Operating and Installation Instructions

NGEN STAR H3-Smart

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ENGLISH

Read this installation instruction carefully before installation. Failure to do so may result in personal injury and damage to property or invalidate the warranty and product guarantee. Installation requires specialist knowledge and may therefore only be carried out by appropriately qualified and authorized specialists!

The general handling of the product, its use or the exact installation methods are beyond the control of NGEN. Therefore, NGEN cannot accept any responsibility for damages, losses or cost resulting from improper installation, improper handling of the incorrect use!

1. Hints for this Manual

1.1. Range of Validity

The document describes the installation, commissioning, maintenance and troubleshooting for the following inverter model: NGEN STAR-H3-12.0-Smart

Note: Please keep these instructions in a place where they are always accessible.

1.2. Target Group

This manual is intended for qualified electricians. The tasks described in this manual can only be performed by qualified electricians.

1.3. Used Symbols

The following types of safety instructions and general information appear in this document as described below:

	**Danger!** "Danger" indicates a hazardous situation which, if not avoided, will result in death or serious injury.
	**Warning!** "Warning" indicates a hazardous situation which, if not avoided, could result in death or serious injury.
	**Caution!** "Caution" indicates a hazardous situation which could result in minor or moderate injury if not avoided.
	**Note!** "Note" provides important tips and instructions.

This section explains the symbols shown on the inverter and the type of plate:

	Symbol Explanation CE-Mark. The inverter complies with the requirements of the applicable CE directives.
	ROHS Mark
	Caution, hot surface! The inverter may heat up during operation. Avoid contact with the inverter during operation.

	Danger of high voltage! High voltage inside the inverter is life-threatening!
	Danger! Electric shock hazard!
	Danger to life due to high voltages! There is residual voltage in the inverter that requires 5 minutes to discharge. Wait 5 minutes before opening the top cover or DC cover.
	Read the manual.
	The product must not be disposed of as household waste.
	Protective earth connection

2. Safety

2.1. Personnel Safety

	**Danger!** • This equipment contains high voltage. Unauthorized removal of required protective devices, improper operation, and incorrect installation or commissioning may result in serious safety hazards, electric shock, or equipment damage. • Damage resulting from improper handling is not covered by the warranty. • Do not energize the equipment until the installation is complete and has been verified by qualified personnel. • Operating the equipment before installation is complete is strictly prohibited.
	**Warning!** • Always use specially insulated tools when performing wiring work. • During operation, the enclosure surface becomes hot, posing a risk of burns. Before touching any part of the inverter, verify that the relevant components and surfaces have reached a safe temperature and are free of hazardous voltage.
	**Note!** • All work, including transportation, installation, commissioning and maintenance, must be carried out by qualified and trained personnel.

- Before operating the equipment, always verify that it is in proper condition, including but not limited to its components, safety devices, and meter displays.
- If any abnormality is detected during operation, stop using the inverter and do not attempt temporary or improvised repairs.
- Personnel performing special operations, such as electrical work, work at height, or equipment maintenance, must hold the qualifications required by applicable local regulations and must comply with relevant local standards and safety codes.

- Strictly follow safety operating procedures, be aware of the potential hazards involved in operating the equipment and take appropriate precautions to ensure the safety of yourself and others, to prevent accidents caused by improper operation.
- Operating the equipment while fatigued, intoxicated, or in poor health is strictly prohibited.
- During the installation of the device, use personal protective equipment, including gloves and eye protection.
- Exercise caution when the inverter is disconnected from the public grid, as certain components may retain residual voltage, posing a risk of electric shock.
- Before installation, inspect the equipment to ensure it has not sustained transport- or handling-related damage that could affect insulation or safety clearances. Choose the installation location carefully and observe the specified cooling requirements.
- Before connecting the inverter to the distribution grid, obtain approval from the local grid operator. The connection must be carried out by a qualified technician.
- Do not use the equipment if its safety devices are non-functional or disabled.
- The manufacturer must be notified of any non-standard installation conditions.
- All repairs are only allowed to be carried out with approved replacement parts, which must be installed according to their intended use and by licensed electrical partners or an authorized service technician.
- Liabilities arising from commercial components are delegated to their respective manufacturers.
- Whenever the inverter has been disconnected from public grid, please proceed with extreme caution as some components may retain a sufficient charge and create a shock hazard. Before touching any part of the inverter, make sure that the surfaces and equipment are under safe touch temperatures and voltage potentials before proceeding.

2.2. Note on the installation of protective devices

In every PV system, several elements contribute to the residual current to protective earth (PE). These elements can be divided into two main types.

- **Capacitive-Discharge-Current**
  The discharge current is mainly generated by the parasitic capacitance of the PV modules towards the grounding conductor. The module types, environmental conditions (rain, humidity, etc.), and even the distance of the modules from the roof can affect the discharge current. Other factors that can contribute to parasitic capacitance are the internal capacitance of the inverter with respect to the grounding conductor and external protective elements such as lightning protection.
- **During Operation**
  The DC bus is connected to the alternating current grid via the inverter. Thus, a portion of the alternating voltage amplitude reaches the DC bus. The fluctuating voltage constantly changes the charge state of the parasitic PV capacitor (i.e., capacitance to PE). This process is associated with a displacement current, which is proportional to the capacitance and the applied voltage amplitude.
- **Residual-Current**
  In the event of a fault, e.g. defective insulation, where an energized cable encounters an earthed person, an additional current flow which is referred to as residual current.

All inverters are equipped with a certified internal **residual current monitoring unit (RCMU)**, which protects against a possible electric shock in the event of a malfunction of the PV generator, the cables, or the inverter (DC). The RCMU in

the NGEN inverters can detect faults on the DC side. According to the DIN VDE 0126-1-1 standard, two levels of protection are provided. The low protection level (30mA) is intended to protect against rapid changes in leakage currents, usually in case of direct contact with a person. The high protection level (300mA) is intended to limit currents in grounding conductors for slow changes in leakage currents (Fire Safety).

In some countries, an external RCD circuit breaker is required. The installer must check which type of RDC the local grid operators require according to the local regulations and standards. NGEN recommends the use of a type A RCD circuit breaker with a value between 100mA and 300mA unless local regulations stipulate a lower value. Installations where the local electrical regulations require an RCD circuit breaker with a lower leakage value may cause the external RCD Circuit breaker to trip unintentionally due to the discharge current. The following step is recommended to prevent unwanted tripping of the external RCD:

1. The selection of a suitable RCD circuit breaker is important for the correct operation of the system. An RCD circuit breaker with a protective level of 30mA can be triggered even at a differential current of 15mA (According to IEC 61008). High-quality circuit breakers, such as those from Schrack or EATON, generally trip at a value closer to their rated value.

3. Introduction

3.1. Basic Features

NGEN STAR-H3-Smart series are high-quality inverters capable of converting solar energy into alternating current or storing it in a battery. The inverter can be utilized to optimize self-consumption, store energy in a battery for future use, or feed energy into a local or public grid. The operational mode depends on the PV energy and the preset system settings.

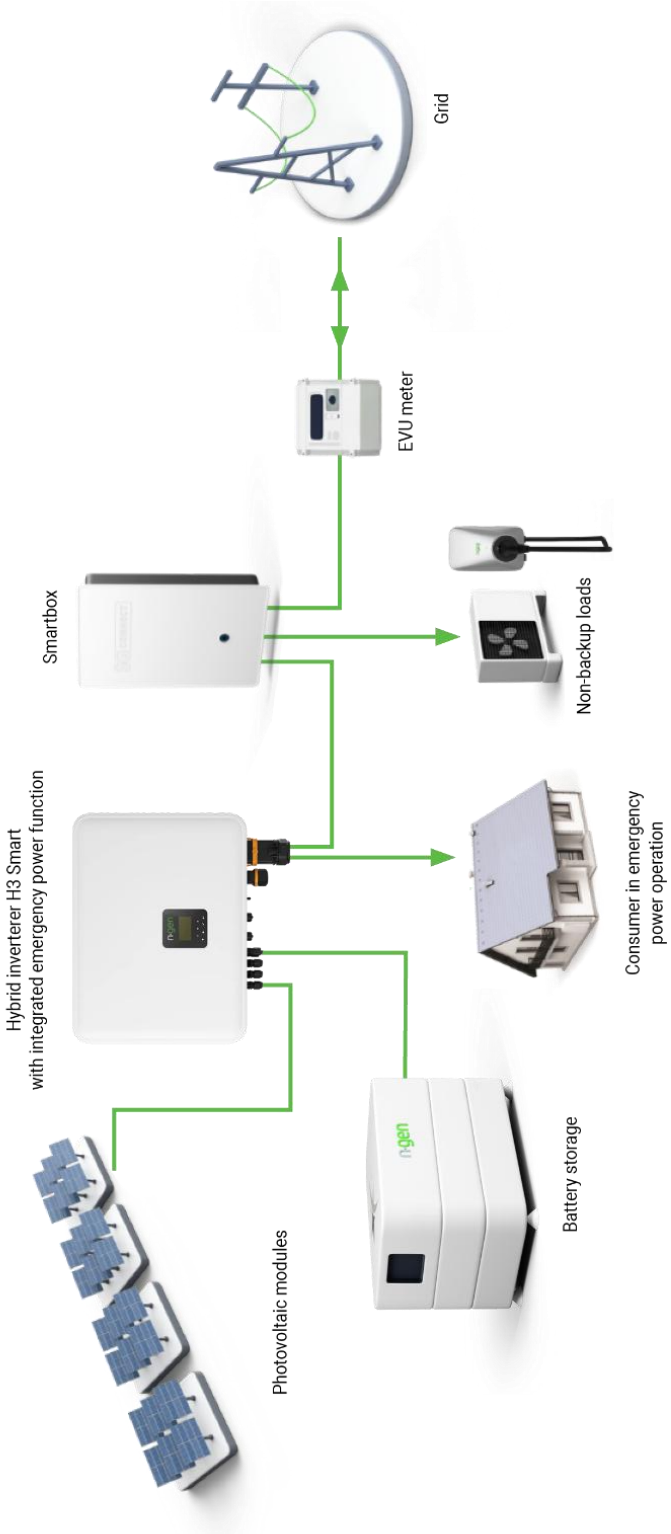
Advantages of the System:

- Advanced DSP control technology
- Uses the latest high-efficiency power components
- Advanced Anti-Islanding Solutions
- IP65 protection class
- Max. efficiency up to 98 %. EU efficiency up to 97,2%. THD<3%
- Safety & Reliability: transformerless design with software and hardware protection.
- Export limitation (NGEN Meter)
- Power factor regulation; user-friendly control panel
- LED status indicators
- LCD display for technical data, operating via four touch buttons
- Remote control via App or monitoring portal

3.2. System connection diagram

The description of the system (schematic representation) is generally shown in the following diagram. The system connection diagrams can be found in the attachment. (Page 54-56)

Schematic diagram:

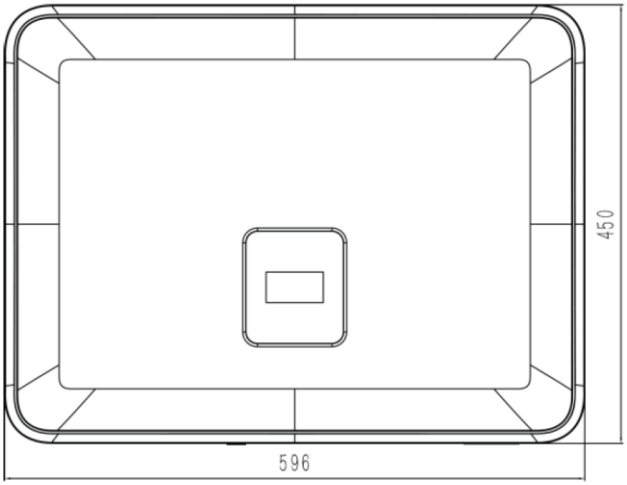


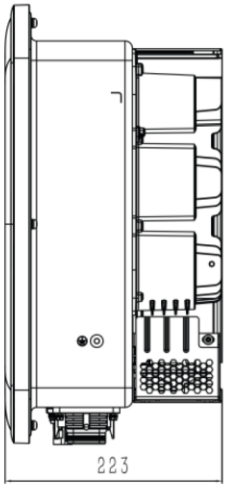
3.3. Working Modes

Work mode	Description
Self-Consumption (with PV power)	Priority: Loads > Battery > Grid The energy generated by the PV system is used to optimize self-consumption.
Self-Consumption (without PV power)	If no PV energy is produced, the battery first discharges for the local consumers and the grid supplies electricity if the battery capacity is insufficient.
Dynamic Prices	Priority: Loads > Grid > Battery In the case of self-consumption activation, energy from the storage system is used to supply local loads. In the case of dynamic pricing, the storage system is charged from the grid and the solar power plant only as much as allowed by the grid and the combined own production of the PV.
Back-up Power (PV + storage)	When the grid is disconnected, the system supplies emergency power from the PV system or the battery to supply the loads in the house (the battery is required in EPS mode).
Assistance to the Grid Operator + Phase Imbalance	The stored energy in the battery can also be used to regulate instability in the grid caused by excess energy produced by the solar power plant or an imbalanced phase load of consumers, ensuring grid frequency maintenance.
Peak Shaving	The system can be set to provide a peak shaving function. A Peak Shaving limit must be set by adjusting »Import limit« to the desired value. We can increase the peak shaving support uptime by setting the »Threshold SOC«. When the battery is above the »Threshold SOC« the system will work in »Self-Consumption« mode. When the battery is below the »Threshold SOC« the peak shaving function will be the priority, and the system will only provide power from the battery when the »Import Limit« is exceeded. When below the »Threshold SOC« the system will charge from the grid when there is available power without exceeding the »Import limit«. This is to ensure prolonged Peak Shaving support for extended periods. If the »Import Limit« is exceeded constantly for an extended period of time, the peak shaving function can only guarantee successful operation while energy remains within the battery. If the battery designated »low level« is reached, the peak shaving function will cease.

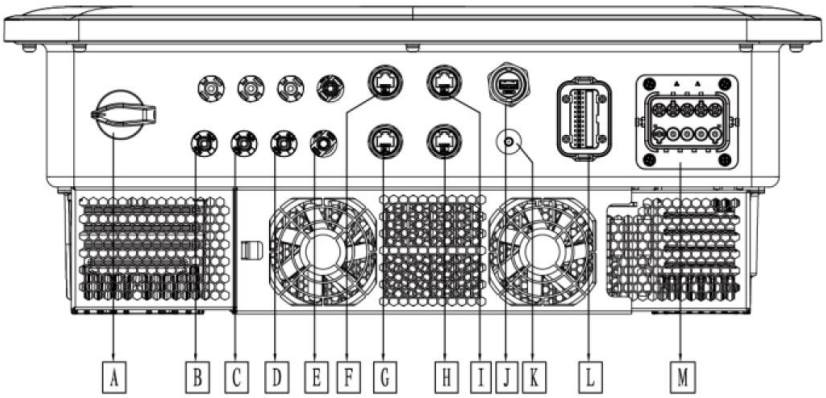
Note: Charging time means that the battery is fully charged within the set time period. The charging time setting can be used in all models listed above. The charging period is mainly used to set the charging time from the power grid to the battery. The PV can also charge the battery when there is sufficient PV outside of charging time.

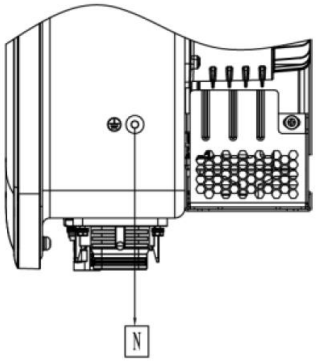
3.4. Dimensions





3.5. Inverter connections





Pos.	Description	Pos.	Description
A	DC-Switch	I	Meter
B	PV1	J	Dongle
C	PV2	K	Antenna
D	PV3	L	COM
E	Battery	M	GRID / EPS
F	BMS	N	Grounding Connection
G	LAN		
H	DRM		

Note: The Connection may only be made by an authorized person!

4. Technical Specifications

4.1. PV-Input

Model	NGEN STAR-H3-12.0-Smart
PV-INPUT	
Max. recommended DC-Power [W]	22500
Max. DC-Voltage [V]	950
Nominal DC-Operating Voltage [V]	620
Max. Input Current (INPUT A / INPUT B / INPUT C) [A]	20 / 20 / 20
Max. Short-Circuit Current (INPUT A / INPUT B / INPUT C) [A]	25 / 25 / 25
MPPT-Operating Voltage Range [V]	120-950
MPPT-Operating Voltage Range (Full load) [V]	210-850
Start-up Input Voltage [V]	140
Number of MPP-Trackers	3
Number of serial Strings per MPP-Tracker	1 + 1 + 1

4.2. Battery-Input

Model	NGEN STAR-H3-12.0-Smart
BATTERY-INPUT	
Battery Type	Lithium-Battery (LFP)
Battery Voltage [V]	100-800
Full AC Load Battery Voltage [V]	250
Max. Charging/Discharging Current [A]	50
Communication Interfaces	CAN

4.3. AC-Output/-Input

Model	NGEN STAR-H3-12.0-Smart
AC-OUTPUT	
AC-Rated Power [VA]	12000
Max. AC-Apparent Power [VA]	13200
Rated Grid Voltage (AC voltage range) [V]	400V/230VAC;380V/220VAC,3L/N/PE
Frequency [Hz]	50 / 60, ±5
Max. AC-Current [A] (Per phase)	20
Power Factor	1 (Adjustable from 0.8 cap. to 0.8 ind.)
Export Control	YES
AC-Inrush Current [A]	15A@0,5ms
Max. Output Fault Current [A]	150A@0,5ms
Max. Output Overcurrent Protection [A]	50
THDI	<3%@ Rated Power

AC-INPUT	
Max.AC-Power [VA]	14400
Rated Grid Voltage (AC voltage range) [V]	400V/230VAC;380V/220VAC,3L/N/PE
Frequency [Hz]	50 / 60, ±5
Max. AC-Current [A] (per phase)	21.8
AC-Inrush Current [A]	15A@0,5ms

4.4. EPS-Output

Model	NGEN STAR-H3-12.0-Smart
Max. AC-Apparent Power [VA]	12000
Peak Apparent AC-Power [VA] (60s)	14400
Rated Output Voltage [V]	400V/230VAC; 380V/220VAC; 3L/N/PE
Rated Grid Frequency [Hz]	50/60
EPS Max. Current [A] (per Phase)	17.4
Power Factor	1 (Adjustable from 0.8 cap. to 0.8 ind.)
Parallel Operation	Yes @max. 10 Pcs
Switch Time	<20ms
THDV	<3%@Linear Load

4.5. Efficiency and Protection

Model	NGEN STAR-H3-12.0-Smart
EFFICIENCY	
MPPT- Efficiency	99.90%
Max. Efficiency	97.90%
Euro-Efficiency	97.20%
PROTECTION	
PV and Battery Reverse Polarity Protection	YES
Anti-Islanding-Protection	YES
Short-Circuit-Protection at the Output	YES
Protection against Leakage Current	YES
Detection of Insulation Resistances	YES
Overvoltage Category	III (AC-Side), II (DC-Side)
Reverse Polarity Protection	YES
Over-Current Protection /Over-Temperature Protection	YES
AC/DC-Over-Voltage Protection (SPD)	Type II (PV) / Type II (AC)
AFCI-Protection	optional
DC-Switch	YES

4.6. General Data

DIMENSIONS AND WEIGHT	
Dimensions (W x H x D) [mm]	600*450*226
Net Weight [kg]	33.5
Cooling	Fan
Inverter Topology	Non-Isolated
Communication Interface	Ethernet, EMS (RS485), Meter, WiLAN (WiFi + LAN + Bluetooth), 4G (Optional), DRM, Ripple Control, USB, BMS(CAN), SG Ready
LCD-Display	Backlight 16*4 Character
ENVIRONMENTAL LIMIT	
Installation	Wall-mounted
Ingress-Protection	IP65 (for outdoor use)
Operating Temperature Range [°C]	-25 to +60 (power derating at +45°C)
Storage/Operation relative humidity	0%-100% (without Condensation)
Altitude [m]	<4000@ Derating exceeding 2000
Protective Class	I
Storage-Temperature [°C]	-40 to +70
Standby-Consumption [W]	20
Idle-Mode	YES
Button	4x Capacitive touch sensor
Buzzer Alarm	1, inside (EPS & Earth fault)
CERTIFICATIONS	
Safety	EN 62109-1 ; EN 62109-2 ; EN 62477-1
EMC	IEC 61000-6-1, IEC 61000-6-2, IEC 61000-6-3, IEC 61000-6-4
Certificates	EN50549-1, EN50549-10, VDE-AR-N 4105, Austria TOR Typ A

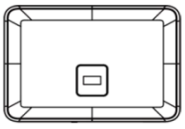
5. Installation

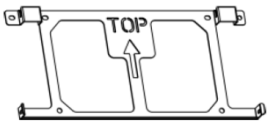
⚠	Danger! • Do not wear loose clothing or jewellery when carrying out installation work. Otherwise, there is a risk of electric shock or mechanical hazard. • Before starting installation work, ensure that the mechanical strength of the installation site is sufficient to safely support the weight of the device. Otherwise, a mechanical hazard may occur.
⚠	Warning! Please strictly observe the following safety instructions when carrying out installation work. Otherwise, serious personal injury or death may occur. • The installation must be carried out properly by qualified personnel and in compliance with all warning instructions. • To facilitate installation and maintenance, it is recommended to provide sufficient space around the device. Adequate cooling airflow, the required clearances, and sufficient space for cables and cable supports must be ensured.

Before installing the device, make sure that the inverter has not been damaged during transport. If there are visible damages, such as cracks, please contact the product seller immediately.

5.1. Scope of delivery

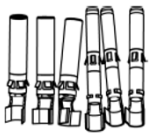
Open the packaging and take out the product. Before installation, check the product and all accessories for visible damage, scratches, dents, rust, or other surface defects. Verify that all accessories are included, that the nameplate information matches the ordered product model, and that all warning labels are intact and clearly legible. The packaging list is shown below:


Inverter



Mounting-Bracket


PV-Connectors


PV-Pin-Contact


AC-Connector


Screw Anchor, Screws

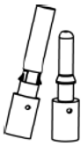

Ground Connection


Communication-Connector



User Manual


Battery Connectors


Battery-Pin-Contacts


Antenna

5.2. Mounting guidelines

Selecting the optimal installation location for the inverter plays a very important role in ensuring safe operation, long service life, and reliable performance.

	Warning! • During operation, the inverter may generate high surface temperatures. Therefore, the inverter must be installed in a location where it cannot be accidentally touched by persons. If this cannot be ensured, suitable protective measures must be implemented. In addition, clearly visible safety warning signs must be placed on the outside of the protected area.
	Note! • The installation location must be selected in accordance with all applicable local laws, regulations, and relevant technical standards.

Therefore, ensure that the installation location fulfils the following conditions:

- Not in direct sunlight
- Not in areas where highly flammable materials are stored
- Not in potentially explosive areas
- Not directly outdoors
- Not near a television antenna or antenna cable
- Not higher than approximately 4.000 meters above sea level. Please note the inverter is derating at 2.000 meters above the sea level.
- Not in an environment with precipitation or high humidity (> 95%)
- Good ventilation conditions must be ensured:
  - The ambient temperature in the range of -25°C to + 60°C
- The Wall on which the inverter will be mounted must meet the following conditions:
  A. Solid brick/concrete or other equivalent surface suitable for mounting
  B. The inverter must be supported or additionally reinforced if the Wall is not strong enough (e.g. wooden wall, wall covered with a thick layer of decoration).
  C. The inclination of the Wall should be within +5°
  D. It is strictly prohibited to install the inverter on flammable surfaces
  E. The inverter should be installed on a wall with good sound insulation to reduce the impact of operational noise.

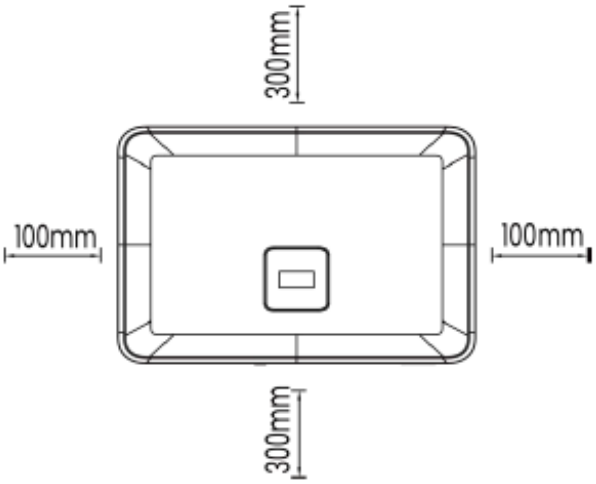
	Warning! Mounting the inverter on a wall that does not meet the specified conditions may cause equipment damage. Any resulting damage will not be covered under the warranty.

– Please avoid direct sunlight, rain and snow during installation and operation:



⚠	Warning! Moisture ingress may cause serious damage to the equipment. To ensure safe and reliable operation, the following precautions must be observed: • Avoid carrying out maintenance, inspection, or repair work during rainy, stormy, lightning, or highly humid weather conditions. • Do not open the cover of the inverter when the relative humidity exceeds 95%.

– Note the minimum distance to adjacent objects on the wall:



Position	Minimum distance
Left	100mm
Right	100mm
Top	300mm
Bottom	300mm

☞	Note! Sufficient clearance must be maintained around the inverter, and an appropriate installation angle must be selected to ensure adequate space for installation, maintenance, and heat dissipation.

5.3. Required tools

The following tools are required to install the inverter:

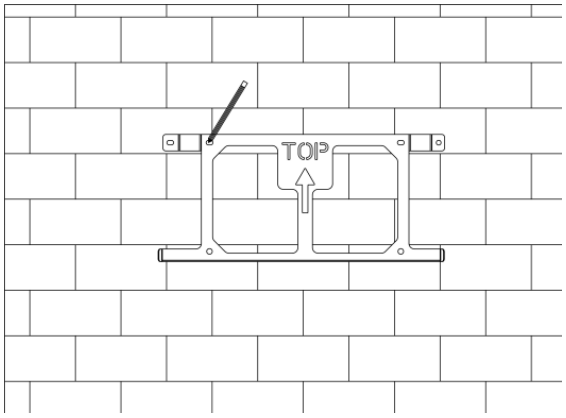


⚠	Danger! Always wear the required personal protective equipment and use all tools only for their intended purpose. Improper handling or unsafe use of the equipment shown may result in personal injury, electric shock, or damage to tools and materials.
☞	Note! All tools must be complete, properly certified, and within their inspection validity period. Before use, verify that each tool is sturdy, undamaged, and free of loose or missing parts.

5.4. Assembly steps

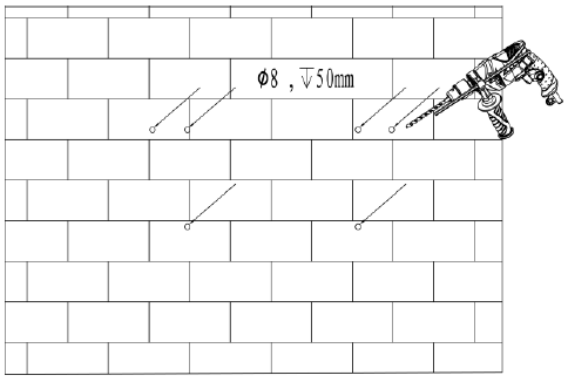
Step 1: Attach the inverter bracket to the wall

- Select the location where you want to install the inverter. Attach the mounting bracket to the wall and mark the position for the 6 holes of the bracket:

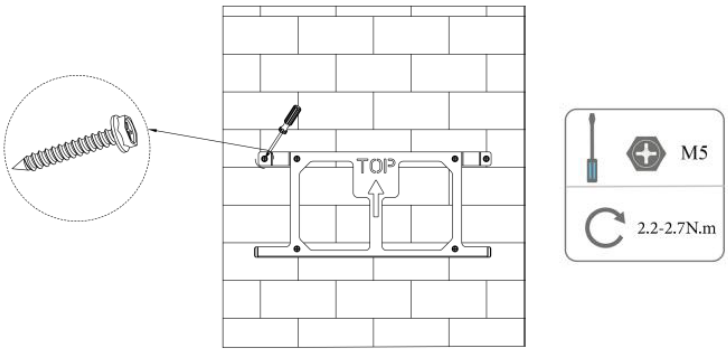


⚠	Danger! Before drilling, make sure that the water and electricity lines in the wall are not damaged at the installation site of the wall bracket to avoid hazards.

- Drill the holes with an electric drill and make sure that the holes are at least 50mm deep and 8mm wide. Then fit the supplied dowels in the pre-drilled holes.

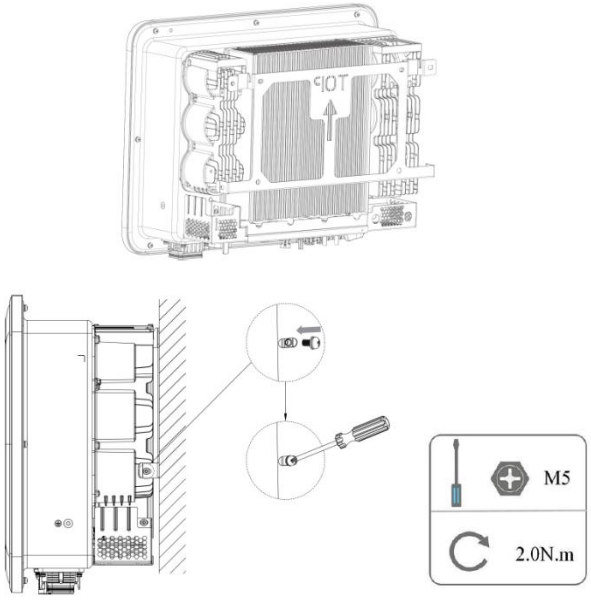


- Fit the mounting plate to the holes already prepared using the fixing screws supplied.



Step 2: Hang the inverter on the wall bracket

- Mount the inverter on the bracket. Secure the inverter with the supplied M5 screws and washers.

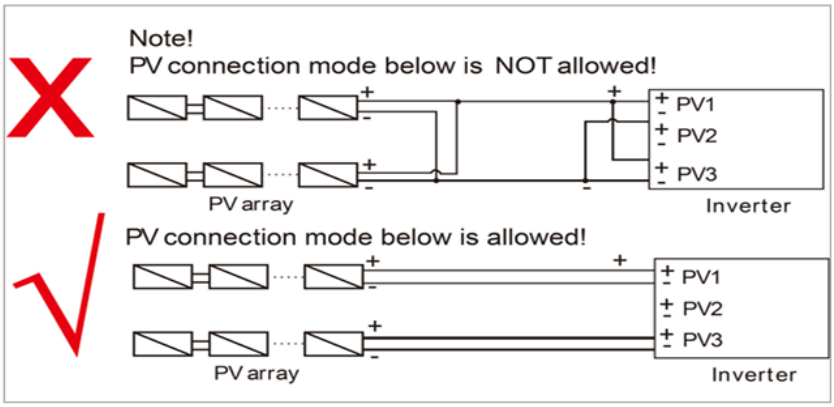


6. Electrical Connection

⚠	Warning! • Prior to electrical connection, inspect the equipment for transport damage and completeness. • Wiring must be installed neatly and clearly labeled in compliance with applicable standards. • Terminals, insulation, and grounding connections must be secure, undamaged, corrosion-free, and should be inspected regularly. • Work may only be performed by trained personnel using proper protective equipment and calibrated, insulated tools. • Post clearly visible warning signs and restrict access to unauthorized personnel to prevent mishandling or accidents.

6.1. Connection of the PV strings

The STAR-H3-Smart series inverter have three MPP-Trackers. Only one serial String is allowed per input! On-site parallel connection of the PV strings is not permitted:



The open-circuit voltage of the connected string of modules must be less than 1000V and the operating voltage must be within the MPP-Tracker voltage range. Also observe all other inverter limitations (see datasheet).

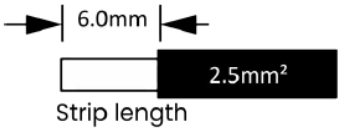
⚠	Warning! The voltage of the PV modules is very high and within a dangerous voltage range. Please follow the electrical safety rules when connecting it.
⚠	Warning! Please do not connect PV positively or negatively to the ground.
⚠	Warning! Before connecting the PV String to the inverter, ensure that the insulation resistance between the positive terminals of the PV string and earth, as well as between the negative terminals and earth, exceeds 1 MΩ.

⚠	Warning! Damage to the product caused by incorrect wiring is not covered by the warranty.
⚠	Danger! The PV string generates lethal high voltage when they are exposed to sunlight. Before any electrical work, operators must wear proper personal protective equipment, set the inverter switch and all connected switches to "OFF," and verify with a measuring instrument that all cables and the inverter are voltage-free and undamaged.
☞	Note! PV-Modules: Please ensure that they are from the same manufacturer, have the same output and specifications, are equally aligned and tilted at the same angle. To save cables and reduce DC power losses, we recommend installing the inverter as close as possible to the PV modules.

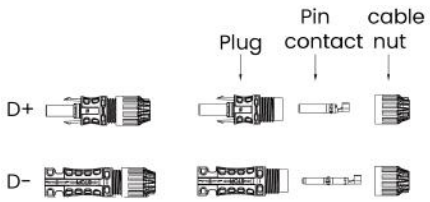
Step 1: Fitting the DC (PV) plug

The DC plugs included in the scope of delivery are designed for a cable cross-section of 2.5 mm² to 6.0 mm².

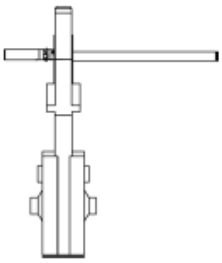
- Cut off 6mm of the insulation from the end of the wire:



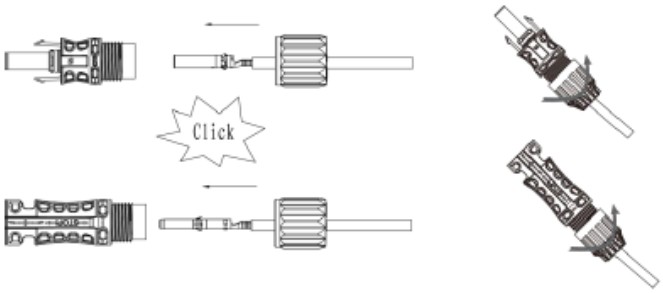
- Separate the DC (PV) connector as shown below:



- Insert the stripped cable into the pin contact and make sure that all conductor wires are included in the contact slot. Then insert the pin contact into the crimping pliers and crimp the contact.



- Insert the pin contact through the cable nut and mount it on the backside of the male or female connector. If you feel or hear a „Click“, the pin contact is correctly installed.



Step 2: Connecting the DC cable (incl. Plug) to the inverter

- Switch of the DC switch
- Connect the mounted plugs to the pre-mounted plug on the inverter. Ensure that the strings are correctly distributed on the MPP trackers.

- To unlock the DC plugs, follow the steps below:

⚠	Danger! Before disconnecting the DC plug, make sure that there is no current at the DC plug. You must measure this with a current clamp meter or deactivate the DC switch, otherwise serious safety accidents may occur.

  - Use a suitable key.
  - When disconnecting the DC+ plug, press the tool from top to bottom.
  - When disconnecting the DC- plug, press the tool from bottom to top.
  - Disconnect the plugs by hand.

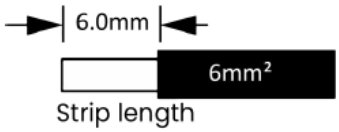
6.2. Connecting the Battery

☞	Note! The battery cables as well as the right communication cable for the connection between the battery and the inverter are prefabricated and included in the battery package. To make your own connection cables between the battery and the inverter, follow the steps below:

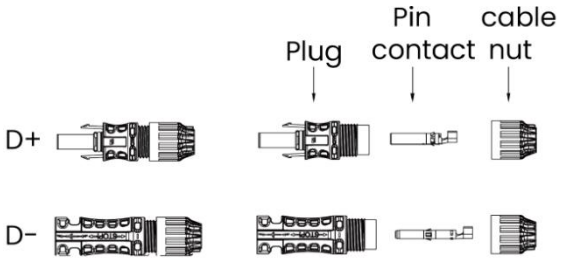
Step 1: Fitting the Battery Plug

The Battery plugs included in the scope of delivery are designed for a cable cross-section of 6 mm².

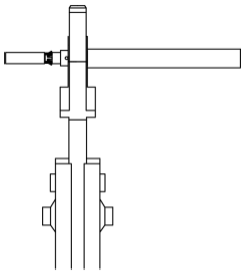
- Cut off 6mm of the insulation from the end of the wire:



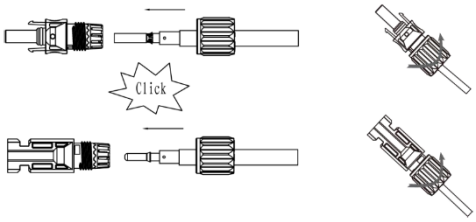
- Separate the DC (PV) connector as shown below:



- Insert the stripped cable into the pin contact and make sure that all conductor wires are included in the contact slot. Then insert the pin contact into the crimping pliers and crimp the contact.



- Insert the pin contact through the cable nut and mount it on the backside of the male or female connector. If you feel or hear a „Click“, the pin contact is correctly installed.



Step 2: Connecting the Battery cable (incl. Plug) and the Communication cable to the inverter

- Switch of the DC switch on the Battery and the Inverter
- Connect the mounted plugs to the pre-mounted plug on the inverter. Ensure that the batteries are connected to the correct connection on the inverter.
- To unlock the DC plugs, follow the steps below:

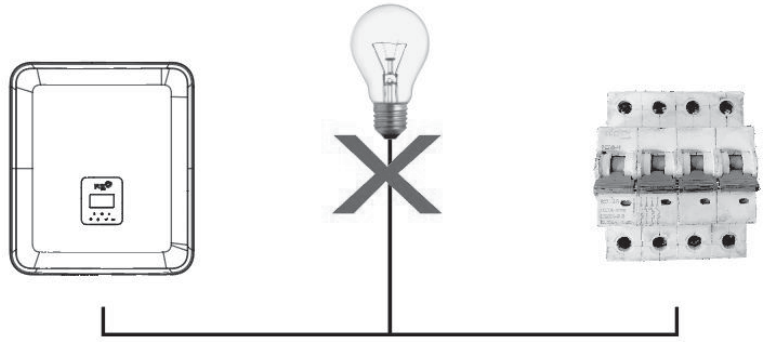
⚠	Danger! Before disconnecting the Battery connector, make sure that there is no current on the Battery connector. You must measure this with a current clamp meter or deactivate the Battery switch, otherwise serious safety accidents may occur.

- Use a suitable key.
- When disconnecting the Battery + plug, press the tool from top to bottom.
- When disconnecting the Battery - plug, press the tool from bottom to top.
- Disconnect the plugs by hand.

6.3. AC-Connection to the Grid and EPS-Connection

The NGEN STAR-H3-Smart series inverters are designed for three-phase grid connections. The voltage range is 400V/230VAC; the frequency is 50/60Hz. Other technical requirements must comply with the requirements of the local public grid.

⚠	Warning! – No consumers should be connected between the circuit breaker of the inverter and the inverter itself.

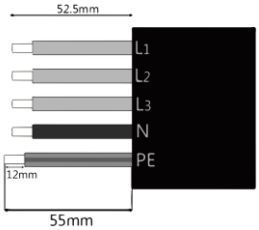


⚠	Warning! A circuit breaker must be installed between the inverter and the grid as a protective device for the maximum output overcurrent protection.

<u>Before you start installing the GRID/EPS Plug, disconnect the circuit breaker from all phases and secure it against reconnection!</u>

Step 1: Stripping the GRID/EPS Cable

- Shorten the L1/L2/L3/N/PE wires to 65-72 mm.
- Use the stripping pliers to cut 12-17 mm of the insulation from all wire ends as shown below:



L1/L2/L3: Brown/Black/Grey wire
N: Blue wire
PE: Yellow & Green wire

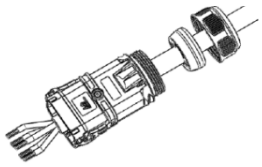
Attention!
The permitted cable cross-section is max. **5 x 6 mm²**.

	Note! Please note the local cable type and colours for the actual installation. The wiring of the power grid must be connected to the N line, otherwise the inverter will report an error and cannot work normally. The SW BUS Volt fault will appear. Before connecting the inverter to the AC-Grid, check the grid voltage and compare it with the permissible voltage range (see technical data).

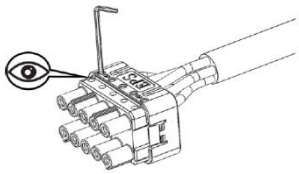
Step 2: Fitting the GRID/EPS Connector

	Note! This connector combines the grid connection (GRID) and the emergency power supply connection (EPS). If an emergency power supply is required, connect both the grid cable and the emergency power supply cable to this connector.

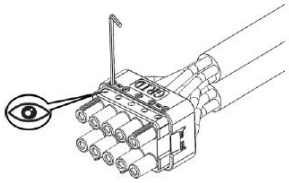
- Thread the stripped GRID and EPS cable through the nut, sealing element, and the middle part of the connector:



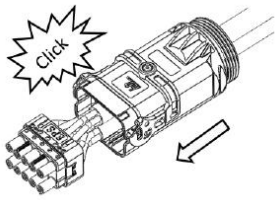
- Insert the stripped wires of the EPS cable into the "EPS" connection on the Connector. Tighten the screws using an S2.5 hexagon wrench with a torque of 2.5 ± 0.1 Nm:



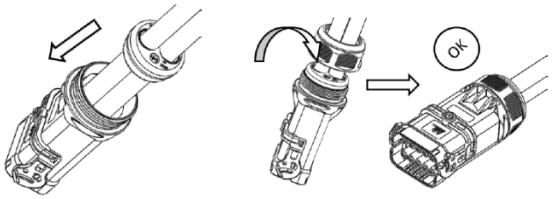
- Insert the stripped wires of the Grid cable into the "GRID" connection on the Connector. Tighten the screws using an S2.5 hexagon wrench with a torque of 2.5 ± 0.1 Nm:



- Insert the connection part into the main part of the connector until you hear the “Click” Sound:

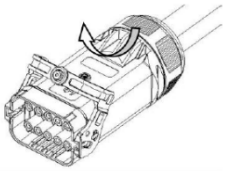


- Complete the Installation of the GRID/EPS Connector by inserting the sealing element to the main part of the connector and tighten the nut:

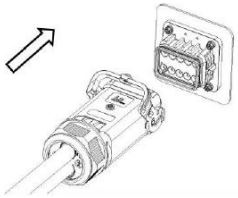


Step 3: Connecting the GRID/EPS Connector to the Inverter

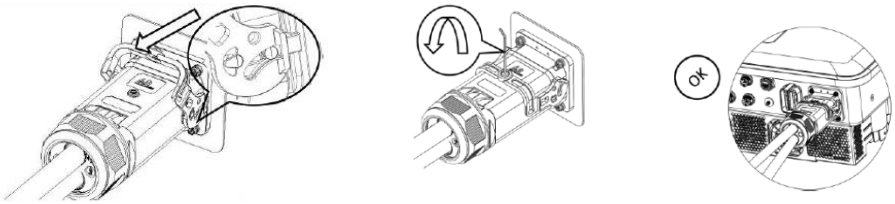
- Open the latch of the connector:



- Connect the GRID/EPS Connector to the inverter:

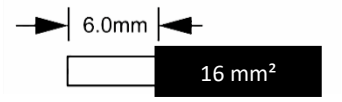


- Secure the Connector by closing the latch and tightening the screws using an S2.5 hexagon wrench with a torque of 2.5 ± 0.1 Nm:

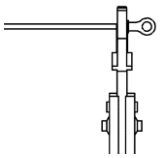


Step 4: Connecting the inverter to an earthing system

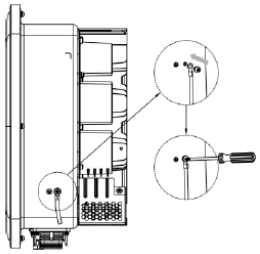
- Use a 16mm² earthing cable for earthing.
- Strip off 6 mm of the insulation from the end of the cable



- Insert the stripped cable into the grounding connector and make sure all wires strands are inside the connector. Crimp the earthing connection using crimping pliers.



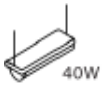
- Tighten the earthing screw with a screwdriver as shown below.



6.4. Connecting the loads to the EPS output

In the event of a grid failure, the inverters emergency power function disconnects the inverter from the grid and supplies all loads connected to the EPS output (EPS = Emergency Power Supply). The emergency power supply function is three-phase and already integrated in the inverter. The unbalanced load between the phases in emergency power mode is max 36.6%. No additional components are required for grid switching.

If you want to connect an inductive load to the EPS, please make sure that the starting power of these consumers is lower than the maximum power of the EPS output (3x 17.4A). The table below shows to the most common consumers and their starting and operating powers. Please refer to the manual of your devices for the actual technical data.

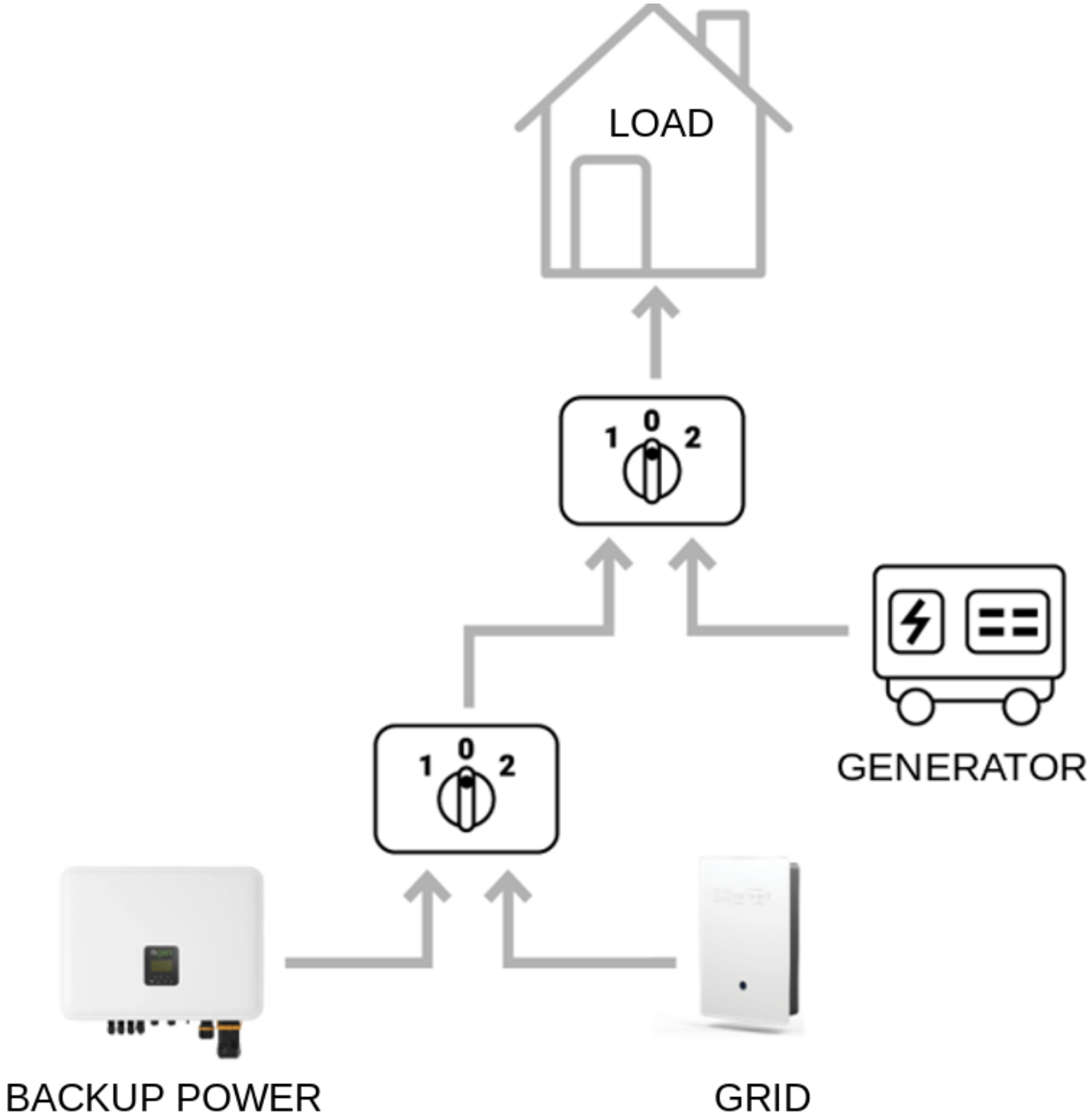
Type	Power		Common equipment	Example		
	Start	Rated Power		Equipment	Start	Rated Power
Resistive Load	X1	X1	 Incandescent lamp  TV	 Incandescent lamp	100VA (W)	100VA (W)
Capacitive Load	X2	X1,5	 Fluorescent lamp	 Fluorescent lamp	80VA (W)	60VA (W)
Inductive Load	X3~5	X2	 Fan  Fridge	 Fridge	450-750VA (W)	300VA (W)

Note: Unipolar loads are not supported

	Note! • Unipolar loads are not supported • Half-Wave loads are not supported • For Motors, the starting current may be far more than 5 times the current, which is also not supported

6.5. Integration of other generating devices in emergency power operation

The connection and use of a generator is prohibited if the generator is part of the same circuit as the inverter. The permitted use is shown in the figure below:



6.6. Connection WIFI/LAN/4G-Dongle

The inverter has an interface for WIFI/LAN/4G, which enables the device to collect information from the inverter. This includes the operating status of the inverter, power, etc., and update this information on a monitoring platform. You can order the WIFI/LAN/4G dongle from your local supplier.

Steps for connection:

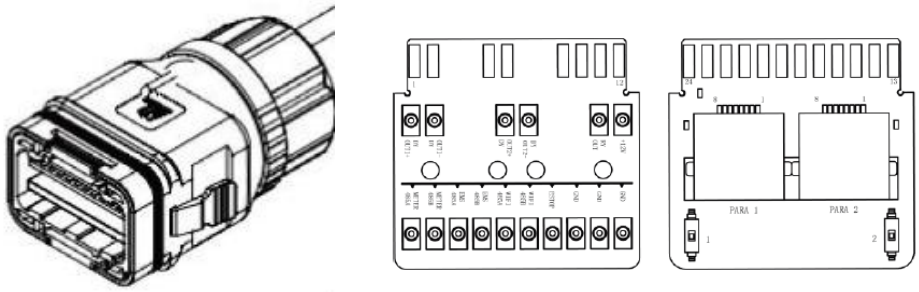
1. For 4G-Devices: Please insert a SIM card (for more details, refer to the 4G installation manual). (**Optional**)
2. Plug the WIFI/LAN/4G device into the USB-Port (Connector J) on the bottom of the inverter.
3. For WIFI-Devices: Connect the WIFI dongle to the local router and complete the WIFI configuration (for more details, refer to the WIFI installation manual). (**Optional**)
4. For LAN-Devices: Connect the LAN dongle to the local internet router using an Ethernet cable.

	Note! If you are using the Smart Box from NGEN, you can connect the LAN dongle directly to the switch inside the Smart Box using an Ethernet cable.
	Note! The Dongle must always remain connected to the Internet. This is essential to enable remote control and to perform remote firmware upgrades of the device.

6.7. Connection of the smart meter

The scope of delivery includes a NGEN (NG380) Meter, which is permissible for a maximum electrical load of 80A per phase. Please exclusively use the provided Smart Meter.

- Note the pin definition of the communication plug:

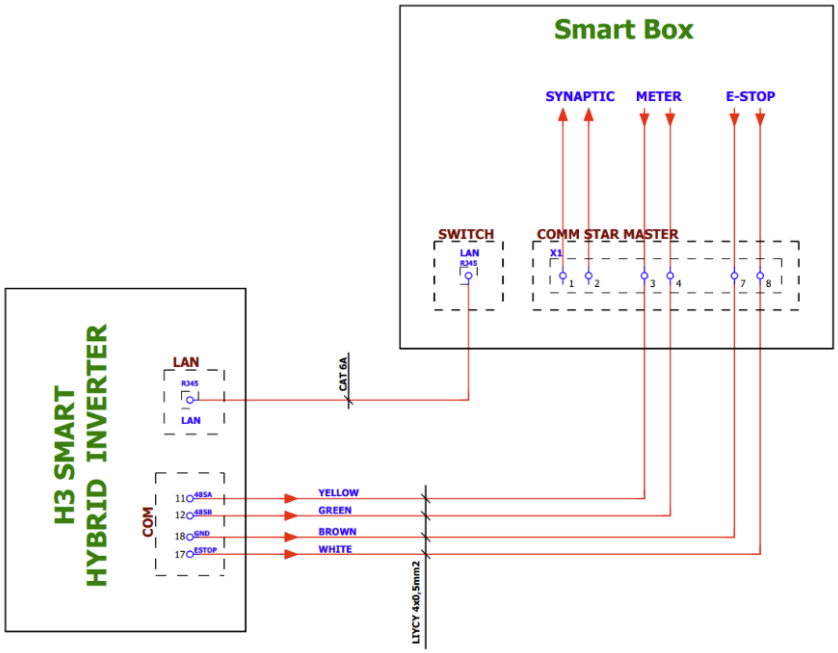


PIN	1	2	3	4	5	6	7	8
Definition	DY OUT1+	DY OUT1-	/	/	DY OUT2+	DY OUT2-	/	/
	9	10	11	12	13	14	15	16
	RY OUT	+12V	Meter 485A	Meter 485B	EMS 485A	EMS 485A	EMS 485B	WIFI 485B
	17	18	19	20				
	ESTOP	GND	GND	GND				

- The connection between the Smart Meter and the inverter is made via an RS485 communication line (CAT5).
- Only pin no. 11 and pin no. 12 are required for the connection between the smart meter and the inverter.

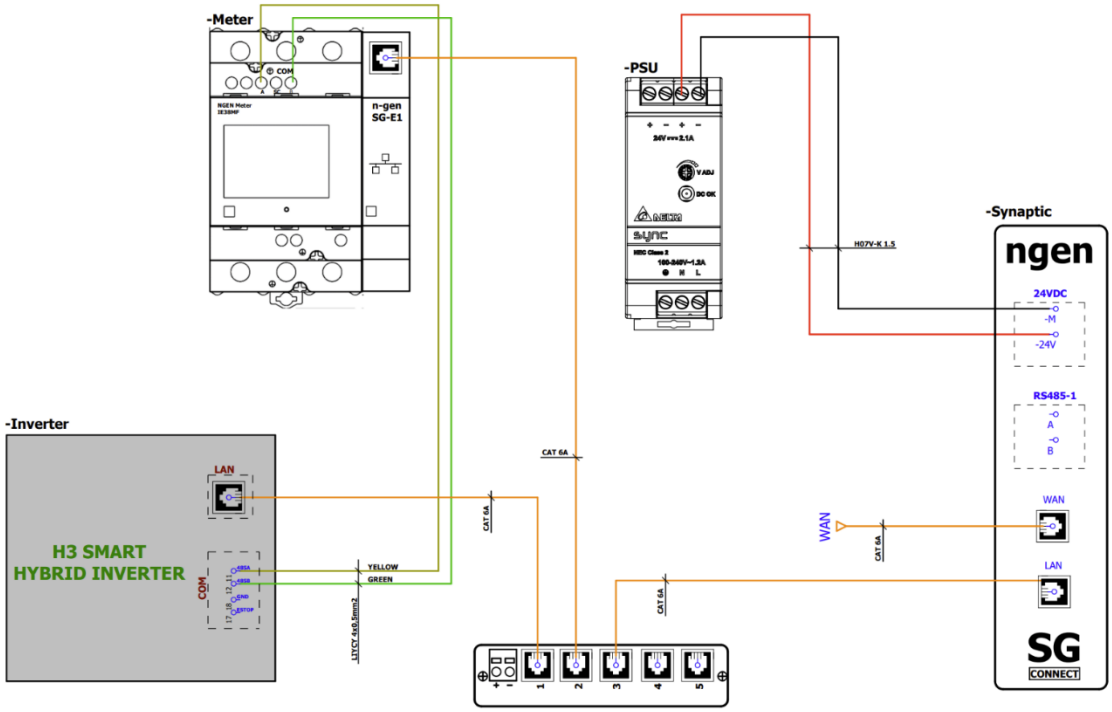
6.7.1. Communication Connection using the Smart BOX

When using the NGEN-Star-Smart Hybrid Inverter in combination with the Smart Box, use a standard CAT7 Ethernet cable for the communication connection between the inverter and the Smart Box, and an RS485 cable for the connection between the inverter and the Smart Meter inside the Smart Box. Refer to the connection diagram below:



6.7.2. Communication Connection without Smart Box only Synaptic and Smart Meter

If you are using the NGEN-Star-Smart System without the Smart Box, but in combination with the communication devices (Synaptic and Smart Meter) please refer to the following connection diagram:



6.8. Combination of NGEN-STAR inverters with an existing generation system

NGEN supports the function of the second electricity meter, which is used to measure the power generation of other power generation system (existing inverters) and to summarize the monitoring data in the NGEN monitoring Platform.

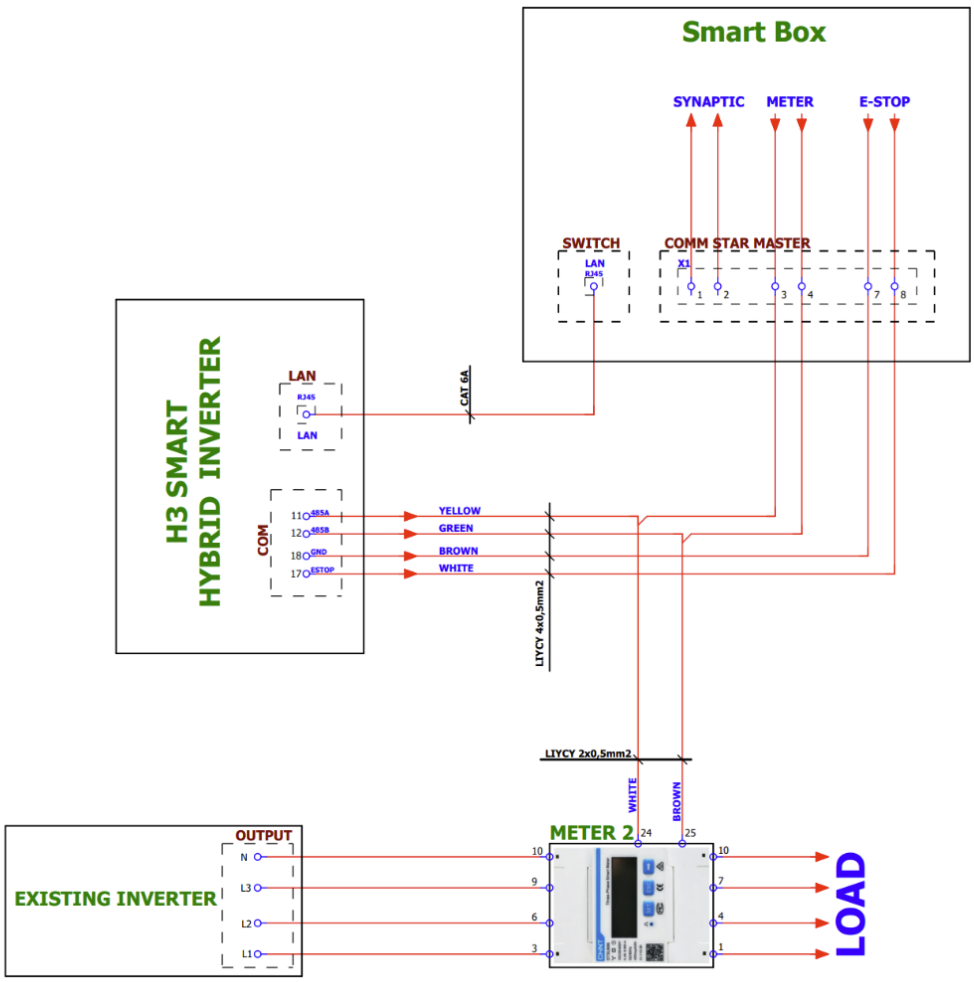
NGEN only provides one Smart Meter in the scope of delivery, which communicates with the inverter and measures the house consumption at the house node.

However, if there is a second inverter due to an existing photovoltaic system, it can be installed a second Smart Meter (CHINT) to measure the output of the existing generation unit and integrate it into the monitoring interface. For the second Smart Meter the following settings are required (address:2, baud rate: 9600).

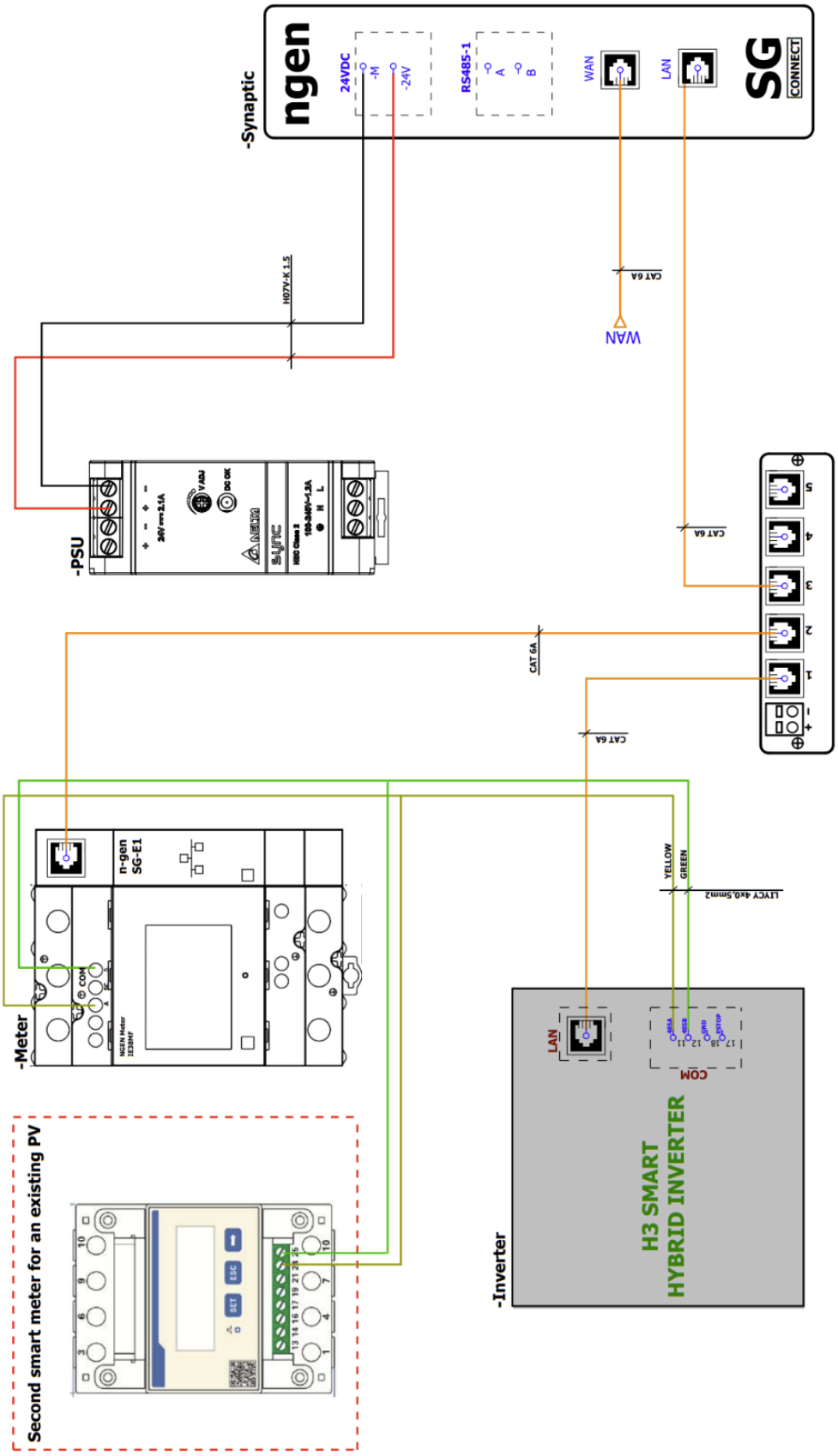
If the setting mentioned above are not executed correctly, errors may occur in the measurement data and be reflected in the monitoring Interface.

Below you will find the wiring diagrams for different use cases to integrate an existing PV generation system!

6.8.1. Wiring Diagram using the Smart Box



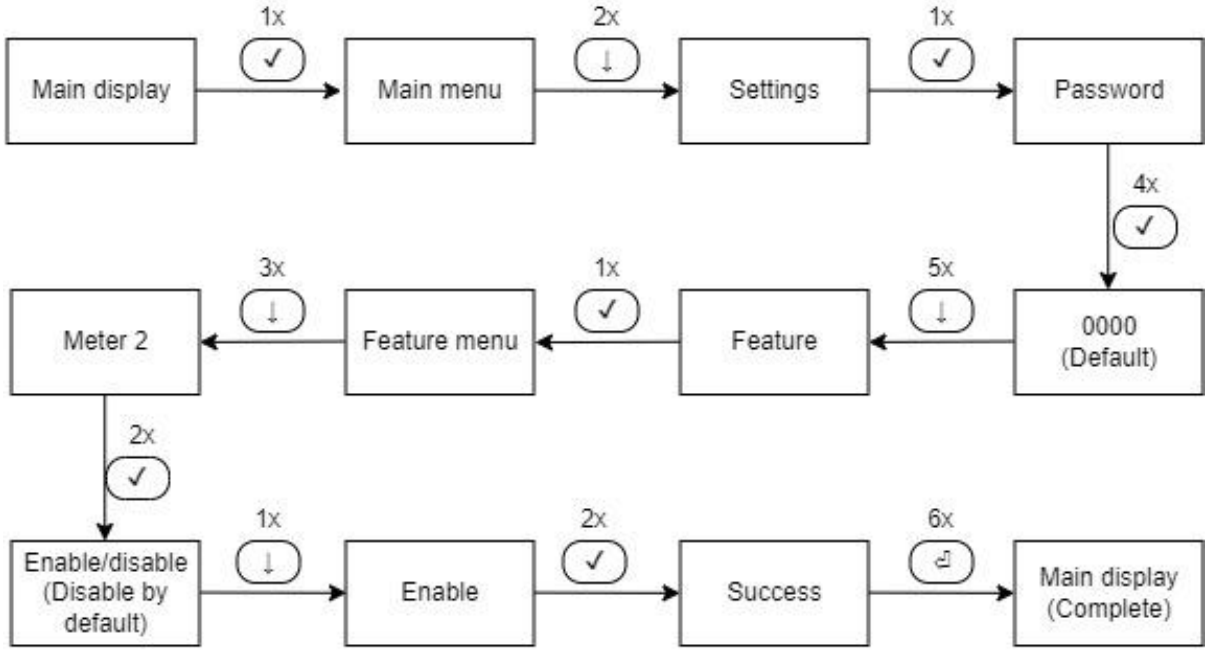
6.8.2. Wiring Diagram without Smart Box only with Synaptic and Smart Meter



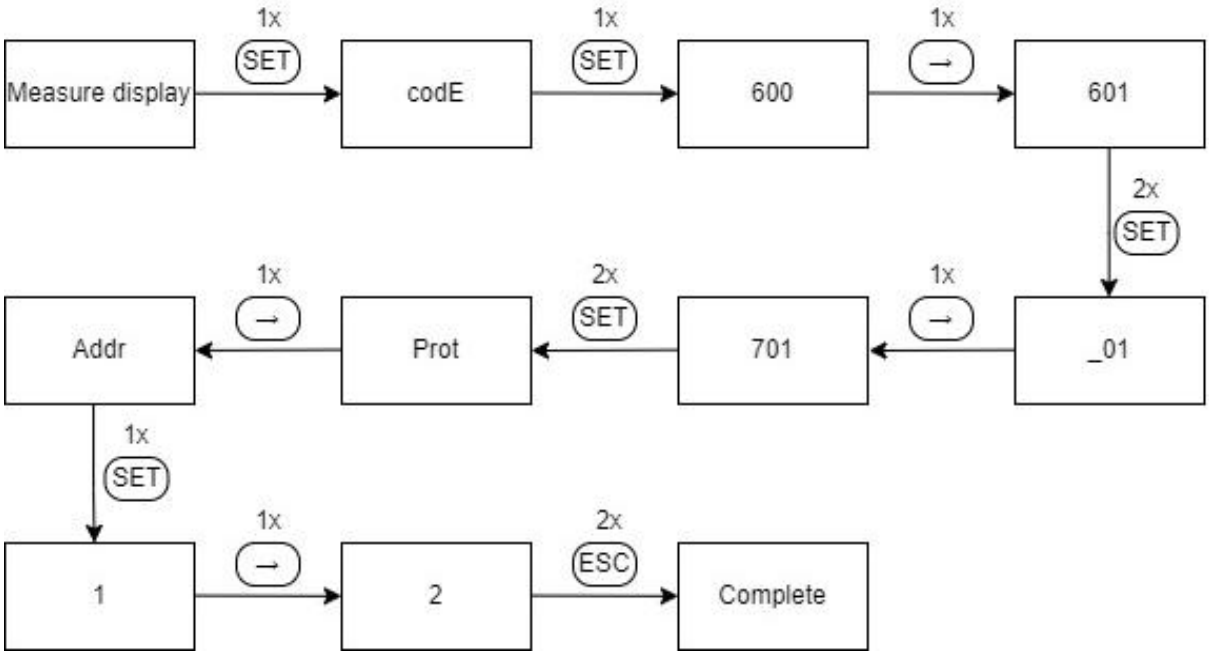
6.9. Set up of the second Smart Meter

To be able to use the functions of the second smart meter, the following settings are required!

Settings on the inverter:



Settings on the second Smart Meter:



6.10. DRM-Interface

The NGEN-STAR-Smart inverter has a DRM function (DRM = Demand Response Mode). This function ensures that the inverter always implements the commands for active power limitation from the grid operator. In some countries, the installation of a DRM interface is currently not required. However, this function may be required by law in other countries. Therefore, please observe the local regulations before installing the inverter.

- Settings path:

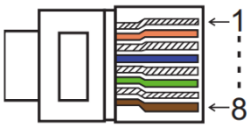


- The DRM supports multiple response modes to demand by transmitting control signals, as shown below:

Mode	Requirement
DRM0	Stop the operation of the inverter.
DRM1	Do not consume power.
DRM2	Do not consume more than 50% of rated power.
DRM3	Do not consume more than 75% of rated power
DRM4	Increase power consumption.
DRM5	Do not produce power.
DRM6	Do not produce more than 50% of rated power.
DRM7	Generation is not more than 75% of the rated power and purchase of reactive power, if possible
DRM8	Increase power generation.

Note: Currently only the DRM0 function is supported, other functions are under development.

- DRM PIN Definition (Connection Point „DRM“on the inverter)



PIN	1	2	3	4	5	6	7	8
Definition	REF GEN/0	DRM1/5	DRM2/6	DRM3/7	DRM4/8	COM LOAD/0	GND	GND

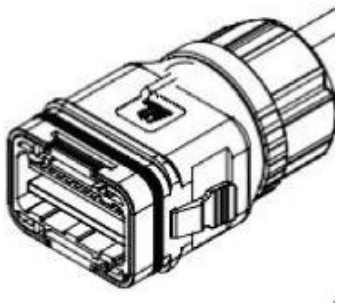
MODEL	PINS need to be short-circuited		FUNCTION
DRM0	1	6	Operate with disconnecting device

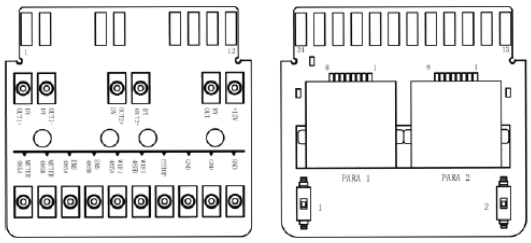
6.11. E-STOP

The E-Stop function puts the inverter into a safe standby state in the event of danger or emergency, to prevent injury to persons or damage to the system during maintenance work, faults, or hazardous situations. Note that the E-Stop does not disconnect the inverter from the grid or the PV.

	Note! • The E-Stop does not disconnect the inverter from the grid or the PV.

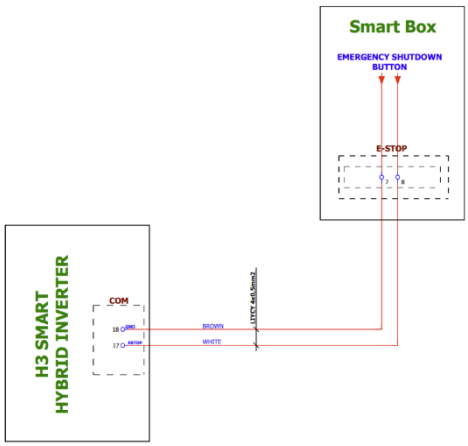
For the Connection of the E-Stop Contact, please use the Communication Plug:





PIN	1	2	3	4	5	6	7	8
Definition	DY OUT1+	DY OUT1-	/	/	DY OUT2+	DY OUT2-	/	/
	9	10	11	12	13	14	15	16
	RY OUT	+12V	Meter 485A	Meter 485B	EMS 485A	EMS 485A	EMS 485B	WIFI 485B
	17	18	19	20				
	ESTOP	GND	GND	GND				

– Only pin no. 17 and pin no. 18 are required for the connection of the E-Stop Function. Short-circuiting these two pins triggers the shutdown of the inverter.



6.12. Inverter Start-up

Please follow the steps below for commissioning the inverter:

1. Ensure that the inverter is securely fastened.
2. Ensure that all DC and AC wiring is connected properly.
3. Ensure that the Smart Meter is properly connected.
4. Ensure that the battery is properly connected.
5. Make sure that the external EPS contactor is properly connected (if necessary)
6. Make sure that the BMS buttons and the battery switches are switched off.
7. Turn on the PV / DC switch, the AC breaker, the EPS breaker and the circuit breaker on the battery.
8. Enter the setting page; the default password is „0000“, select START / STOP and set it to Start. (Long press „Enter“ to quickly enter the START / STOP page).

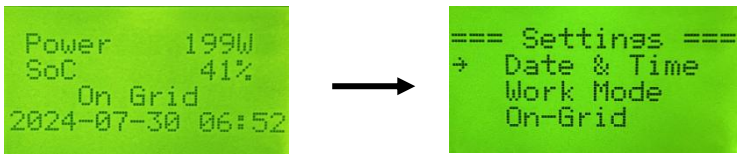
☞	Note! To avoid communication issues, it is essential to ensure that the inverter is fully started up before powering on the battery. For instructions on starting the battery, please refer to the corresponding Battery Installation Manual.

☞ Please note:

– When you start the inverter for the first time, the country code is set to the local settings by default. If you want to change the country code, please follow these menu steps: Settings -> On-Grid -> Safety



- Set the local time in the inverter settings menu. Settings -> Date & Time



6.13. Software Upgrade

The user can update the inverter firmware via a USB-Drive.

Safety check

- Please ensure that the inverter is always switched on.
- The inverter must remain switched on during the entire update process. Please prepare a personal Computer and make sure that size of the USB-Drive is less than 32 GB, and the format is FAT16 or FAT32.

⚠	Attention! Please do NOT connect a USB 3.0 to the USB port of the inverter. The USB port of the inverter only supports USB 2.0.

Steps for updating:

- Step 1: Please contact our service department and obtain the update files, which you should load onto a USB-Disk as follows:

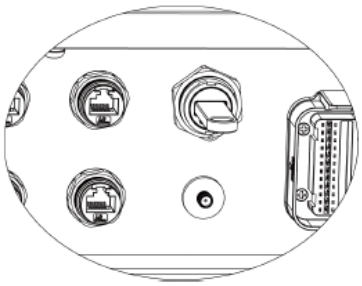
  update/manager/ H3_G2_Smart_Manager_Vx_xx_E.bin

  update/master/H3_G2_Smart_Master_Vx.xx.bin

  update/slave/ H3_G2_Smart_Slave_Vx.xx.bin

☞	Note! • Vx.xx is the version number.
⚠	Warning! • Make sure that the directory of the USB stick matches the above specifications! Do not change the name of the program file, as this may cause the inverter to malfunction.

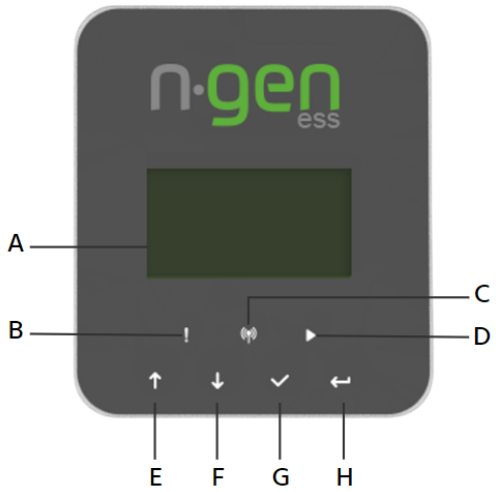
- Step 2: Unscrew the waterproof cover and insert the USB-Drive into the USB port on the bottom of the inverter.



- Step 3: As soon as the USB-Disk is connected to the inverter, the upgrade menu will automatically appear on the display. After that press up and down to select the desired upgrade and press OK to confirm the upgrade.
- Step 4: After the upgrade is complete, pull out the USB-Drive. Screw the waterproof cover on the inverter closed.

7. Operation

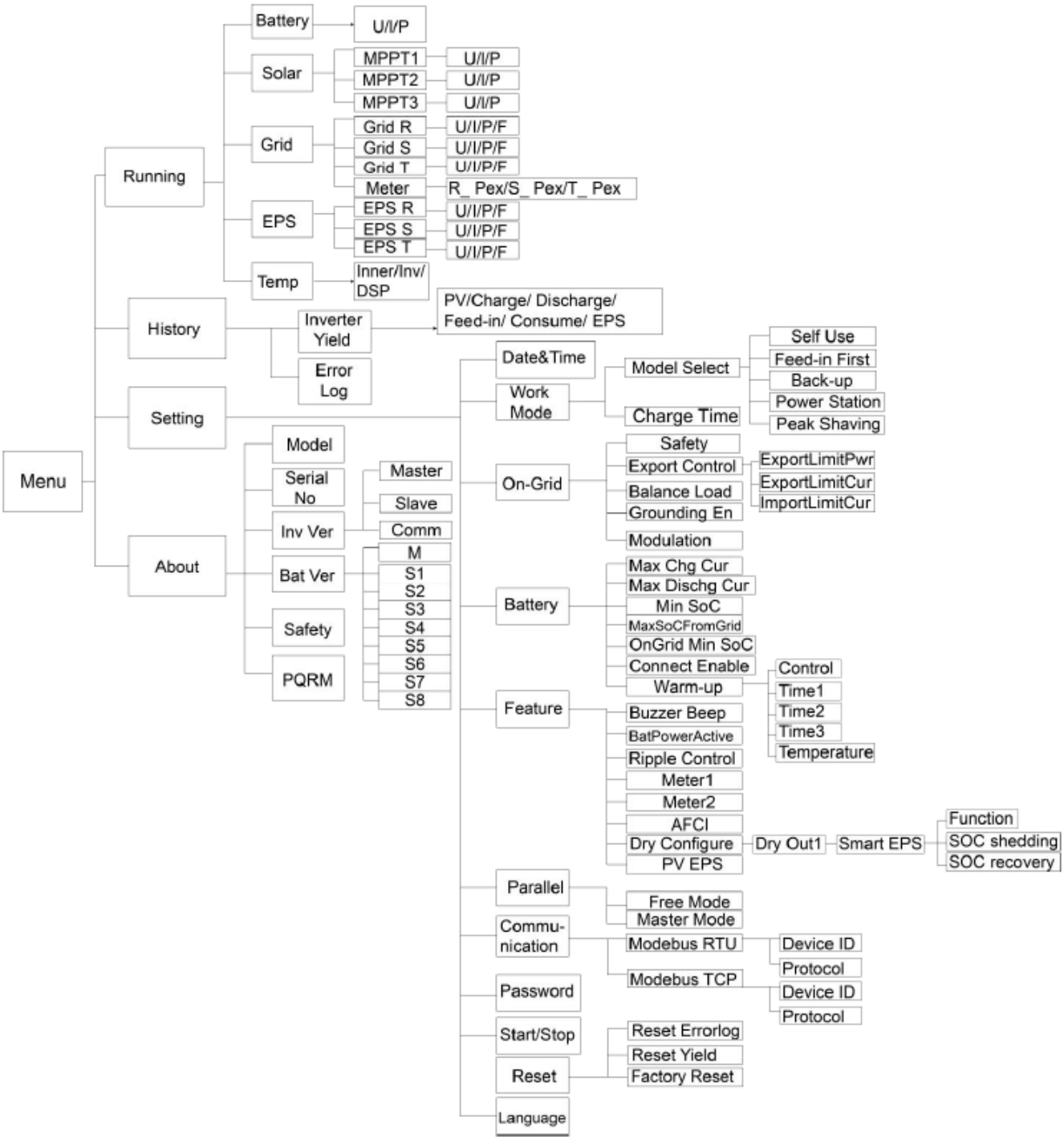
7.1. Control Panel



A	LCD Display	Displays information about the inverter
B	Indicator LED	Red: Displays inverter error
C		Blue: Inverter is properly connected to the battery
D		Green: Inverter is operating normally
E	Function Buttons	UP: Move cursor up or increase value
F		DOWN: Move cursor down or decrease value
G		OK: Confirm selection
H		BACK: Return to previous function

7.1. Function Tree

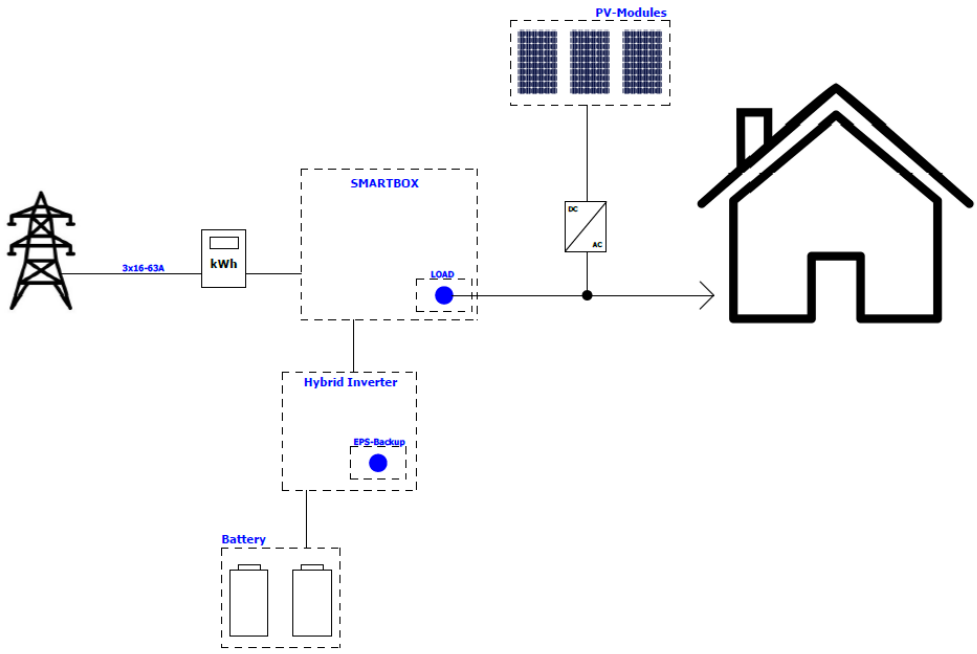
Function tree for single inverter operation:



8. Connecting of an Existing Photovoltaic System to the NGEN Star System

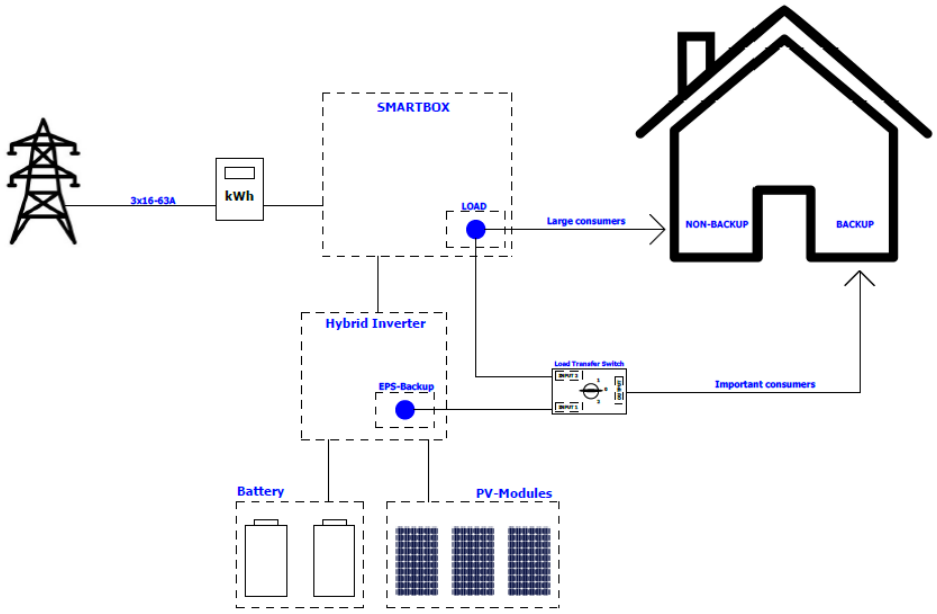
8.1. Connection to „LOAD“ on the Smart Box

If an existing photovoltaic system is available and you wish to continue using it, you can connect it to the “LOAD” wiring on the Smart Box, as shown in the diagram below:



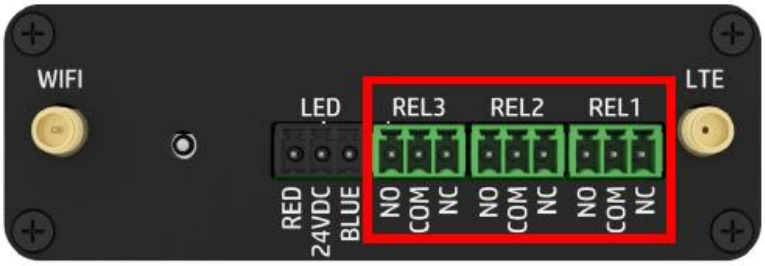
8.2. Connection of the Existing Photovoltaic system to NGEN Hybrid Inverter

If a customer has an existing photovoltaic system and wants to make it compatible with our NGEN-Star inverter, he must remove the existing inverter and connect the strings of the existing photovoltaic system directly to our hybrid inverter, as shown in the diagram below:



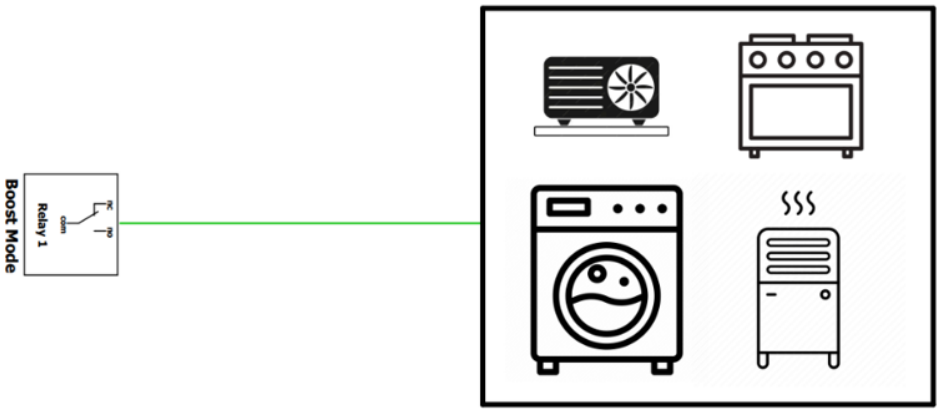
9. Synaptic-Unit part of Smart Box – Function of the relay outputs

The Synaptic unit integrated into the Smart Box features three relay outputs to which various production and consumption units can be connected. The function explanations for each relay you can find below:



9.1. Relay 1 – Boost Mode

The Boost Mode allows you to take advantage of periods of low-cost or free electricity for devices that can store energy in the form of heat or increase consumption at certain intervals. This feature is ideal for heat pumps, electric heaters, and electric vehicles, which you can use when electricity is cheaper or free. With the Boost Mode, you will reduce your costs and increase energy efficiency by using energy when it is most advantageous. Especially when surplus energy from a photovoltaic system is used to optimize self-consumption.

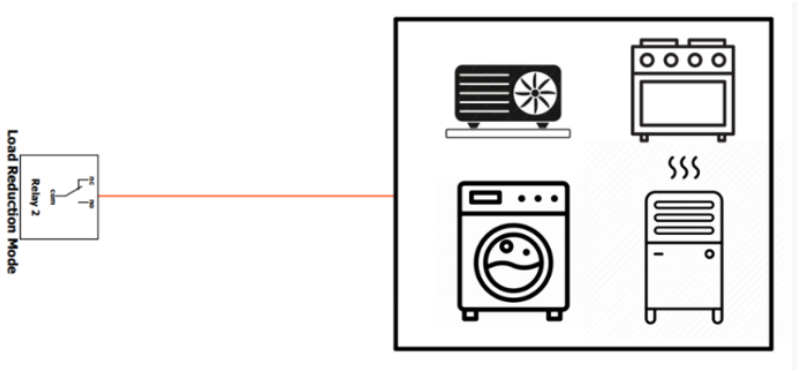


How It Works: Relay 1 is activated during intervals of reduced-price or free electricity.

Configuration: To enable this function, Relay 1 must be connected to your device so that the desired appliance turns on when the relay is activated. This allows automatic control of your device and maximizes the benefits of favourable electricity prices.

9.2. Relay 2 – Load Reduction Mode

The Load Reduction Mode is a feature that rewards you for energy-efficient behaviour. It encourages a reduction in electricity consumption by deactivating devices during times of high network load. This feature is ideal for devices such as heat pumps, electric heaters, and charging stations, which can be deactivated during periods when energy is expensive or when reducing consumption brings a reward.

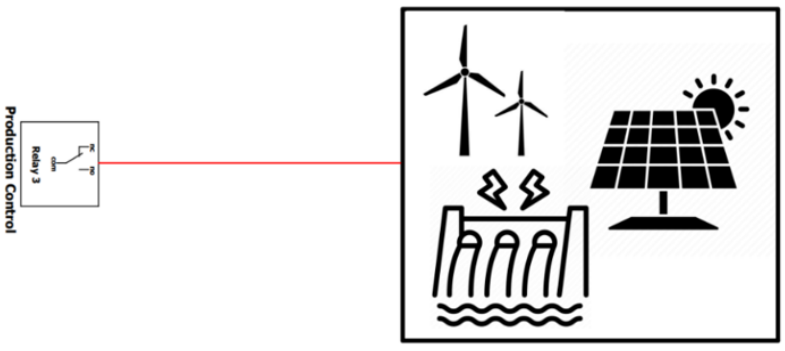


How It Works: Use devices connected to Load Reduction Mode (Relay 2) during these intervals to reduce your consumption. Receive a reward for participating in an energy-efficient program that helps stabilize the grid and reduce high network loads.

Configuration: To enable this function, Relay 2 must be connected to your device. When the relay is activated, your device will adjust to the optimal operating time, allowing you to save and earn rewards.

9.3. Relay 3 – Production Control

Production Control is a feature that helps you balance energy production and provides financial compensation for lost production. It is designed for users with solar power systems or other production units such as hydroelectric, wind or biomass plants that occasionally face disconnections or reduced production. With the Production Control, you can receive compensation for lost energy even when your system is not producing electricity for example during the activation of the negative tertiary reserves by the grid operator.



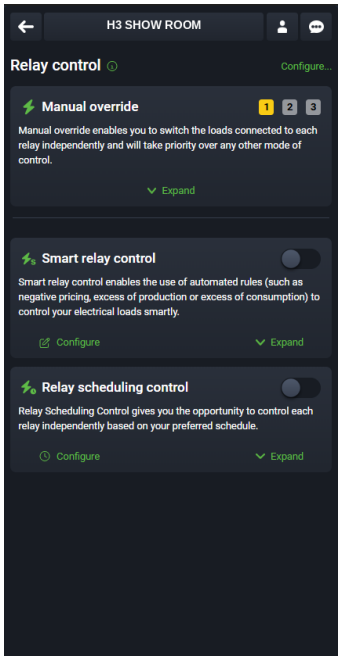
How It Works: In case of disconnections or reduced production, you receive simulated financial compensation for the lost energy.

Configuration: To enable this function, Relay 3 must be connected to your production unit, allowing monitoring and control of lost production. This way, you receive compensation and achieve a more stable return despite occasional interruptions.

10. Configuration of the Relais in the Smart Grid Connect App

After connecting the relay contacts to the intelligent devices, configuring the relays in the Smart Grid Connect app is necessary. Log in to the Smart Grid Connect app and open the desired system. Under the menu item Relay Control, you can perform the relay configuration. For all three relays, the user can define relay name and set manually time frames or automatic control when the relay should be activated.





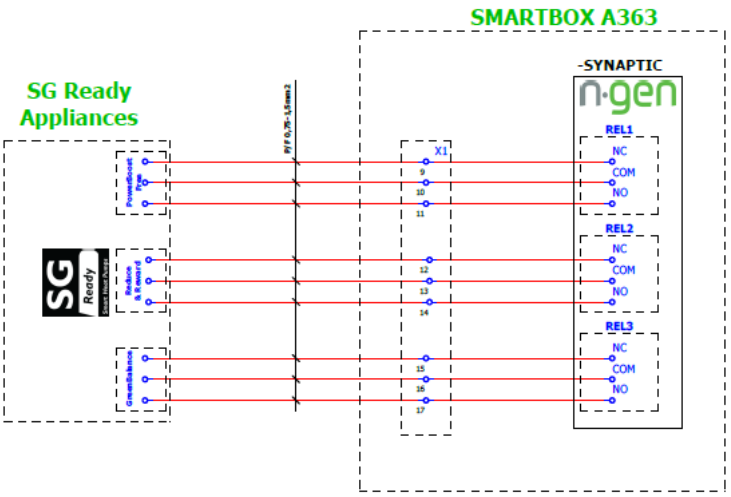
10.1. Synaptic Relay Specifications

The Smart Grid Ready function is controlled by relay 1 and 2 of the Synaptic part of NGEN Smart Box. Please find the technical Specifications of the relays below:

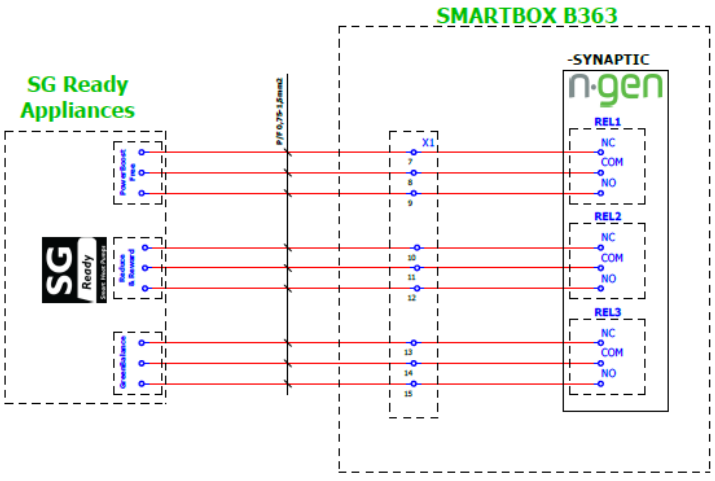
TECHNICAL SPECIFICATIONS	
Contact Arrangement	1: NC 2: COM 3: NO
Contact Resistance	< 50 milliohms initial
Maximum Switching Power	150 W
Maximum Switching Voltage	300VAC, 150VDC
Maximum Switching Current	5A

The switch between operating modes occurs automatically. The measured power at the household connection point is used for control. The use of individual relay functions can be configured via the mobile Smart Grid Connect app.

10.2. Schematic Diagram of Connections for (Smart Box Type A)



10.3. Schematic Diagram of Connections (Smart Box Type B)



11. Maintenance

This chapter contains information and procedures for troubleshooting potential issues with NGEN Star inverters and provides you with tips for resolving them. To identify and resolve most issues that may arise, use the checklist below as a guide.

11.1. Alarm List

Error Code	Solution
Grid Lost Fault	Lost grid connection. • The system switches back on when the power supply returns to normal. If the unit does not return to normal operation, contact the manufacturer.
Grid Volt Fault	Grid voltage is not available. • The system switches back on when the power supply returns to normal. If the unit does not return to normal operation, contact the manufacturer.
Grid Freq Fault	Grid frequency is not available. • The system switches back on when the power supply returns to normal. If the unit does not return to normal operation, contact the manufacturer.
PLL_ Over time	Three-phase system accessing single-phase AC. • The system switches back on when the power supply returns to normal. If the unit does not return to normal operation, contact the manufacturer.
10min Volt Fault	The grid voltage has been out of reach for the last 10 minutes. • The system switches back on when the power supply returns to normal. If the unit does not return to normal operation, contact the manufacturer.
SW Inv Cur Fault	The software has detected a high output current. • Disconnect the PV, grid, and battery, then reconnect. If the unit does not return to normal operation, contact the manufacturer.
DCI Fault	The DC component is out of the output current limit. • Disconnect the PV, grid, and battery, then reconnect. If the unit does not return to normal operation, contact the manufacturer.
HW Inv Cur Fault	The hardware has detected a high output current. • Disconnect the PV, grid, and battery, then reconnect. If the unit does not return to normal operation, contact the manufacturer.

SW Bus Volt Fault	Bus voltage out of the range detected by the software. • Disconnect the PV, grid, and battery, then reconnect. If the unit does not return to normal operation, contact the manufacturer.
Bat Volt Fault	Battery voltage error. • Check if the battery input voltage is within the normal range. If the unit does not return to normal operation, contact the manufacturer.
SW Bat Cur Fault	The software has detected a high battery current. • Disconnect the PV, grid, and battery, then reconnect. If the unit does not return to normal operation, contact the manufacturer.
Iso Fault	Insulation problems • Check if the insulation of the electrical wires is damaged. Wait a while, then check if it works normally again. If the unit does not return to normal operation, contact the manufacturer.
Res Cur Fault	The Voltage is too high. • Check if the insulation of the electrical wires is damaged. Wait a while, then check if it works normally again. If the unit does not return to normal operation, contact the manufacturer.
Pv Volt Fault	PV-Voltage is not available. • Please check the output voltage of the PV panels. If the unit does not return to normal operation, contact the manufacturer.
SW Pv Cur Fault	The software has detected a high input PV current. • Disconnect the PV, grid, and battery, then reconnect. If the unit does not return to normal operation, contact the manufacturer.
Temp Fault	The inverter temperature is too high. • Please check whether the ambient temperature is correct. Wait for a while, then check if it is working normally again. If the unit does not return to normal operation, contact the manufacturer.
Ground Fault	Grounding connection failed. • Check the neutral and PE voltage. • Check AC wiring. Disconnect the PV, grid, and battery, then reconnect. If the unit does not return to normal operation, contact the manufacturer.
Overload Fault	Overload fault. • Check if the maximum power consumption has been exceeded. • Check if the loads have overloaded the device. If the unit does not return to normal operation, contact the manufacturer.
Eps Overload	Overload in backup operation • Check if the maximum power consumption on the EPS connection has been exceeded.

	• Check if the loads have overloaded the device in backup power supply. If the unit does not return to normal operation, contact the manufacturer.
Bat Power Low	Battery power is low. • Wait for the battery to recharge. If the unit does not return to normal operation, contact the manufacturer.
HW Bus Volt Fault	Bus voltage outside the range detected by the hardware. • Disconnect the PV, grid, and battery, then reconnect. If the unit does not return to normal operation, contact the manufacturer.
HW Pv Cur Fault	PV current is out of permissible values. • Disconnect the PV, grid, and battery, then reconnect. If the unit does not return to normal operation, contact the manufacturer.
HW Bat Cur Fault	Battery current is out of permissible values. • Disconnect the PV, grid, and battery, then reconnect. If the unit does not return to normal operation, contact the manufacturer.
SCI Fault	Communication between master and controller is interrupted. • Disconnect the PV, grid, and battery, then reconnect. If the unit does not return to normal operation, contact the manufacturer.
MDSP SPI Fault	Communication between master and controller is interrupted. • Disconnect the PV, grid, and battery, then reconnect. If the unit does not return to normal operation, contact the manufacturer.
MDSP Smpl Fault	Sampling device on master inverter is not working • Disconnect the PV, grid, and battery, then reconnect. If the unit does not return to normal operation, contact the manufacturer.
Res Cur HW Fault	RCD protective switch is not working. • Disconnect the PV, grid, and battery, then reconnect. If the unit does not return to normal operation, contact the manufacturer.
Inv EEPROM Fault	EEPROM on the inverter is not working. • Disconnect the PV, grid, and battery, then reconnect. If the unit does not return to normal operation, contact the manufacturer.
PvCon Dir Fault	Error on PV bus • Check if the positive and negative poles of the PV bus are properly connected. If the unit does not return to normal operation, contact the manufacturer.
Bat Relay Open	Battery relay is open. • Disconnect the PV, grid, and battery, then reconnect. If the unit does not return to normal operation, contact the manufacturer.

Bat Relay Short Circuit	Battery relay is closed • Disconnect the PV, grid, and battery, then reconnect. If the unit does not return to normal operation, contact the manufacturer.
Bat Buck Fault	Mosfet on the battery is defective. • Disconnect the PV, grid, and battery, then reconnect. If the unit does not return to normal operation, contact the manufacturer.
Bat Boost Fault	Mosfet on the battery is defective. • Disconnect the PV, grid, and battery, then reconnect. If the unit does not return to normal operation, contact the manufacturer.
Eps Relay Fault	The relay on the EPS connection is faulty. • Disconnect the PV, grid, and battery, then reconnect. If the unit does not return to normal operation, contact the manufacturer.
BatCon Dir Fault	Battery connection is faulty. • Check if the positive and negative poles of the battery are connected correctly. If the unit does not return to normal operation, contact the manufacturer.
Grid Relay Fault	The grid relay remains open or closed. • Disconnect the PV, grid, and battery, then reconnect. If the unit does not return to normal operation, contact the manufacturer.
RDSP SPI Fault	Communication between master and controller is interrupted. • Disconnect the PV, grid, and battery, then reconnect. If the unit does not return to normal operation, contact the manufacturer.
RDSP Smpl Fault	Sampling device on the subordinate inverter is faulty. • Disconnect the PV, grid, and battery, then reconnect. If the unit does not return to normal operation, contact the manufacturer.
ARM EEPROM Fault	The manager EEPROM is faulty. • Disconnect the PV, grid, and battery, then reconnect. If the unit does not return to normal operation, contact the manufacturer.
Meter Lost Fault	Communication between the inverter and the meter is disrupted. • Check if the communication cable between the meter an the inverter is connected correctly. If the unit does not return to normal operation, contact the manufacturer.
BMS Lost	Communication between the BMS and inverter is disrupted. • Check if the communication cable between the battery an the inverter is connected correctly. If the unit does not return to normal operation, contact the manufacturer.

Bms Ext Fault	Communication between the BMS and inverter is disrupted • Check if the communication cable between the battery and the inverter is connected correctly. If the unit does not return to normal operation, contact the manufacturer.
Bms Int Fault	DIP switch is in the wrong position. Communication between batteries is interrupted. • Move the DIP-Switch to the correct position • Check if the communication cable between the BMS and the inverter is connected correctly.
Bms Volt High	BMS is supplied with too high voltage. • Contact the battery manufacturer.
Bms Volt Low	BMS is supplied with too low voltage. • Contact the battery manufacturer.
Bms ChgCur High	Battery charging current is too high. • Contact the battery manufacturer.
Bms DchgCur High	Battery discharge current is too high. • Contact the battery manufacturer.
Bms Temp High	Battery temperature is too high. • Contact the battery manufacturer.
Bms Temp Low	Battery temperature is too low • Contact the battery manufacturer.
BmsCellImbalance	Cell capacities are different. • Contact the battery manufacturer.
Bms HW Protect	BMS protection has been activated. • Contact the battery manufacturer.
BmsCircuit Fault	Hardware circuit fault in the battery. • Contact the battery manufacturer.

Bms Insul Fault	Battery insulation fault. • Contact the battery manufacturer.
Bms VoltsSen Fault	Battery voltage sensor fault. • Contact the battery manufacturer.
Bms TempSen Fault	Battery temperature sensor fault. • Contact the battery manufacturer.
BmsCurSen Fault	Battery current sensor fault. • Contact the battery manufacturer.
Bms Relay Fault	Battery relay error. • Contact the battery manufacturer.
Bms Type Unmatch	Different battery capacities. • Contact the battery manufacturer.
Bms Ver Unmatch	BMS firmware between the battery modules is different. • Contact the battery manufacturer.
Bms Mfg Unmatch	Different battery cell manufacturers. • Contact the battery manufacturer.
Bms SwHw Unmatch	BMS firmware does not match the installed components. • Contact the battery manufacturer.
Bms M&S Unmatch	The software between the master and slave batterys does not match. • Contact the battery manufacturer.
Bms ChgReq NoAck	No charging demand • Contact the battery manufacturer.

11.2. Troubleshooting and Regular Maintenance

Troubleshooting

- Please check the error message on the inverter control panel. If an error message is displayed, make a note of it before taking any further action.
- Try to find a solution in the above table.
- If the information panel of the inverter does not display an error message, check the following to ensure that the current state of the installation allows the device to operate properly:
    1. Is the inverter located in a clean, dry and adequately ventilated area?
    2. Are the DC disconnect switches open?
    3. Are the cables of the appropriate size?
    4. Are the input and output connectors, and the cabling, in good condition?
    5. Are the configuration settings correct for your installation?
    6. Are the display panel and communication cable properly connected and undamaged?

For further assistance, please contact the NGEN customer service. Please be prepared to describe details of your system installation and provide the model and serial number of the device.

Safety Inspection

A safety inspection must be carried out at least every 12 months by a qualified technician who has the necessary training, knowledge, and practical experience to perform these tests. The data must be recorded in the equipment logbook. If the device is not functioning properly or does not pass any of the tests, it must be repaired. For details of the safety check, refer to Chapter 2 of this manual.

Maintenance Checklists

During the operation of the inverter, the responsible person must regularly inspect and maintain the device regularly. The required actions are as follows:

- Check if dust / dirt has accumulated in the cooling fins on the back of the inverter and clean the inverter if necessary. This work should be carried out at regular intervals.
- Check if the inverter indicators are in normal condition or if the inverter display is working properly. These inspections should be done at least every 6 months.
- Check if the input and output cables are damaged or old. This inspection should be done at least every 6 months.
- Clean the surface of the inverter and check their safety at least every 6 months.

	Note! • Only qualified personnel can perform the above-described work.

12. Shutdown

12.1. Switching off the inverter

Please follow the steps below to switch off the inverter:

1. Open the setting page, select START / STOP, and stop the inverter.
2. Turn off the PV / DC switch, the AC breaker, the EPS breaker, and the circuit breaker on the battery.
3. Wait 5 minutes before opening the top cover to ensure that the capacitors inside the inverter discharge. (if it needs repairing).

12.2. Inverter Dismantling

- Disconnect the inverter from the DC input and AC output. Wait 5 minutes until the inverter is completely de-energized.
- Disconnect the communication and other connected devices. Remove the inverter from the mounting bracket.
- Remove the mounting bracket if necessary.

12.3. Packaging

If possible, please pack the inverters in the original packaging. If the original packaging is no longer available, you can also use equivalent packaging that meets the following requirements.

- Suitable for loads of more than 30kg.
- Includes a carrying handle.
- Can be completely closed.

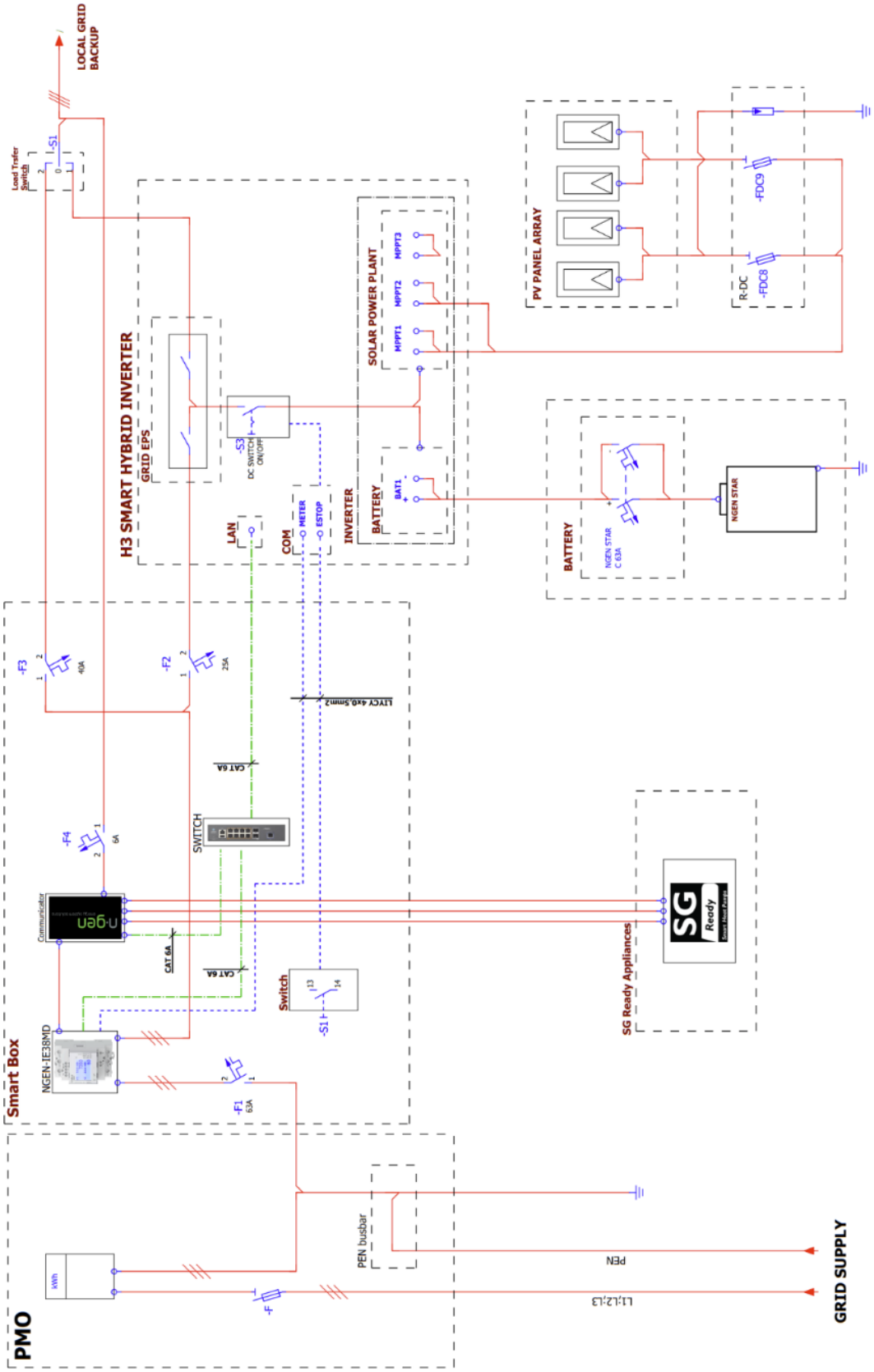
12.4. Storage and Transport

Store the inverters in a dry and well-ventilated place where the ambient temperature is always between -40°C and +70°C and in a relative humidity range of 0% to 100%. Avoid storing the inverter under direct sunlight, next to heat sources, water splashing, rain, or outdoor exposure. The storage place must be free of harmful gases, flammable, explosive materials, and corrosive materials. Ensure that the inverters are not stacked more than four boxes high during storage and transportation. If the inverter or other associated components need to be disposed of, please ensure that this is done in accordance with local regulations for waste disposal. Ensure that each inverter that is to be discarded is delivered to a location suitable for the disposal of this type of waste, in compliance with applicable regulations.

	Note! • Products stored under the above conditions for more than 12 months must undergo • Product damage caused by failure to meet these conditions is not covered under warranty.

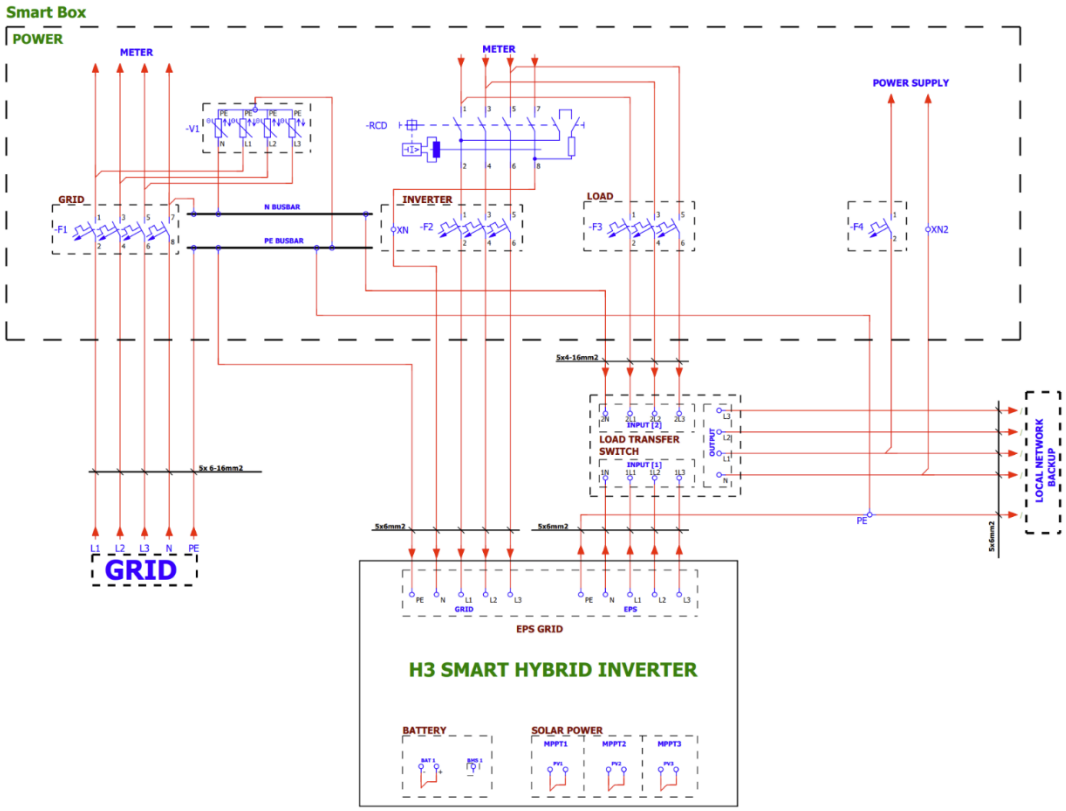
13. Attachment

13.1. Example of integrating the NGEN-Star Hybrid System in a Household

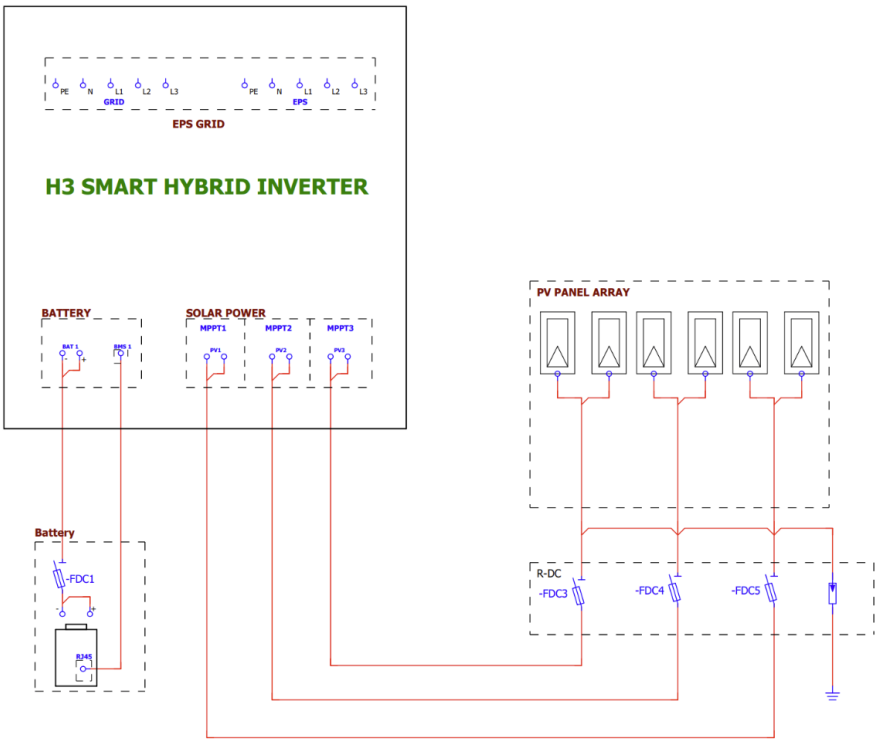


13.2. Connection of the NGEN-Star Smart Hybrid Inverter with the Smart Box

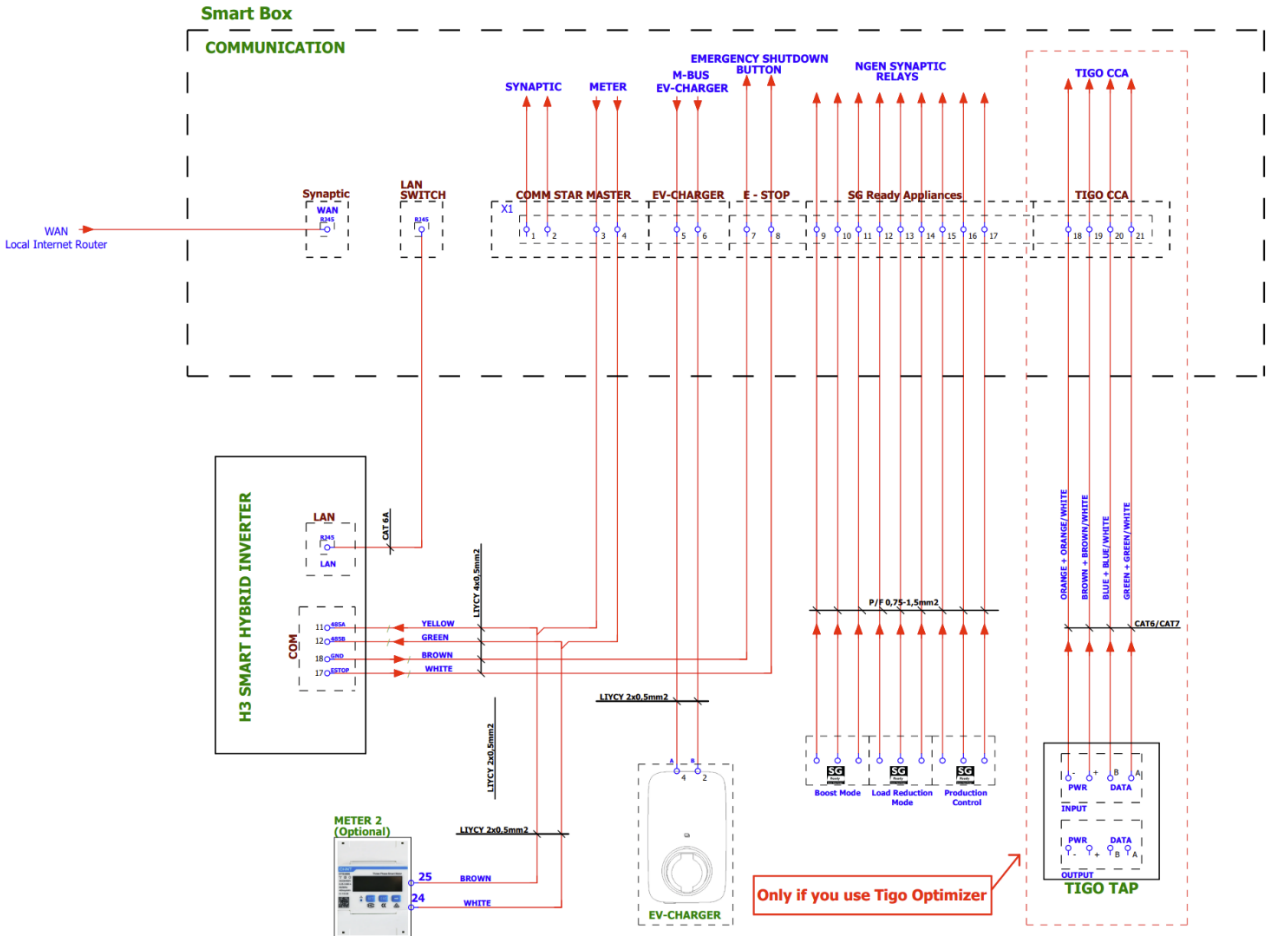
13.2.1. AC-Connection Diagram



13.2.2. DC-Connection Diagram



13.2.1. Communication-Connection Diagram



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