AEG GRID-TIED SOLAR INVERTERS

AEG

INSTALLATION MANUAL

INVERTER SERIES:
AS-IR02-XXX

XXX= 700 / 1000 / 1500 / 2000 / 2500 / 3000
SINGLE-PHASE, 1 MPPT

AEG GRID-TIED SOLAR INVERTERS

Thank you for choosing the reliability of AEG grid-tied solar inverters!
This installation manual is intended for dealers and installers involved in the planning, installation and commissioning of photovoltaic systems deploying AEG solar inverters.

AEG grid-tied solar inverters are tested and approved by acknowledged independent certification authorities and can only be installed by qualified professional companies. Please observe the standards and regulations applying to photovoltaic systems in the relevant countries, as well as the rules of the employers' liability insurance associations for accident protection. Failure to comply with these can result in major injuries and damage.

Keep this guide in a safe place for further reference as it contains important information for product care, maintenance and disposal.

CONTENTS

1. PRELIMINARY REMARKS

1.1 Icons

This section describes relevant warning symbols recurring in the installation and operation manual of AEG solar inverters. Icons highlight relevant information for the physical and property safety of the user.

Compliance to the provided instructions is essential to prevent physical injury and product damage.

Below is a list of the icons used in this manual:

Icon	Meaning	Instruction
	Danger	Serious physical injury or even death may occur in case of noncompliance with the requirement (electrical hazard; danger of high voltage and electric shock)
	Warning	Physical injury or product damage may occur in case of noncompliance with the requirement.
	Prohibited	Damage may occur in case of noncompliance with the requirement.
	Note	Useful information for product maintenance and operation is provided

Table 1: Icon meaning

1.2 Product Identification

Each inverter can be identified by means of the following information:

Product Label
It is placed on the inverter side. It provides relevant information about the technical properties of the product, including: the Product Name Code (PNC), DC Input, AC Output, Protection Level, Certifications.

Serial Number (SN)
Each individual inverter is identified by a unique serial number placed on the label.

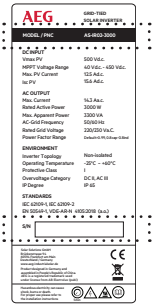


Figure 1: label example. Highlighted: PNC and SN

Icon	Meaning
	Safety warning: electrical hazard
	Wait at least 5 minutes after disconnecting the inverter before touching internal parts
	Product surface may become hot, do not touch

Icon	Meaning
	For proper use read the installation manual
CE	CE marking. The product complies with the CE directives
	EU WEEE mark. Do not dispose of product as household waste.

Table 2: Label icon meaning

Please refer to the specific product datasheet on www.aeg-industrialsolar.de for the latest technical data.

2. SAFETY

2.1 General safety

All AEG PV grid-tied solar inverters are tested according to international safety regulations.
AEG PV inverters should be installed, maintained, connected and operated by qualified technicians in compliance with all local and national applicable standards, codes and regulations issued by the relevant power suppliers, companies and authorities. Installers bear the risk of all injury that might occur during installation including, without limitation, the risk of electric shock. Check and follow all safety precautions specified even for the other components of the system.
Keep children away from the inverter and from the installation site.

2.2 Handling safety

Please observe the following indications when handling AEG solar inverters:

Look for any visible damage to the package or the product itself. Double-check the order information and the product nameplate to ensure the products are of the ordered type. Check that the package contents are not damaged and that all items listed are present (see 3.2 Package content). Should you find any issues, contact the shipping company and / or your supplier as soon as possible before attempting product installation.

Take note of the indications displayed on the product packaging. Specifically:

Icon	Meaning
	Recyclable materials
	This side up
	Max. 8 identical packages can be stacked
	Fragile
	Keep dry
	Only use the original AC / DC connectors provided
	Warning - Risk of electric shock
	Planning recommendations

Table 3: Packaging icon meaning

 Please make sure that the inverter and its components are properly packed and sealed to ensure that the IP65 protection degree is maintained. The inverter should be installed possibly latest one day after unboxing. Should this not be the case, please re-seal all unused terminals and ensure that the inverter is stored in a dry, clean place and not exposed to water or dust.

2.3 Installation and maintenance safety

Installing solar photovoltaic systems requires specialized skills and knowledge and can only be performed by qualified technicians (see 2.1 General safety).

 Handling or changing inverter components without following the instructions in this manual may cause personal injury, cause product damage, damage the built-in protections of the inverter and ultimately void the warranty.

 Only use original parts and components.

To avoid damaging the product and voiding the warranty, please ensure that the output voltage of the PV array to be connected is lower than the maximum rated input voltage of the inverter.

 The solar PV modules in the PV array are required to comply at least with IEC 61730 class A rating.
When exposed to sunlight, the PV array generates dangerous high DC voltages. Installers and operators should carefully follow the instructions in this manual when handling the inverter and avoid hazardous actions that might result in life-threatening situations.

 The PV system is by default not grounded. The inverter must be grounded before operation.

 The electronic components of the inverters may be damaged by static electricity. Please take appropriate protective measures to prevent such damages from occurring and voiding the warranty.

 To avoid electric shock during installation or maintenance, the DC input and AC output ports of the inverters must be disconnected. Wait at least 5 minutes before carrying out with installation or maintenance

Do not insert or pull the AC or DC terminals when the inverter is in operation.

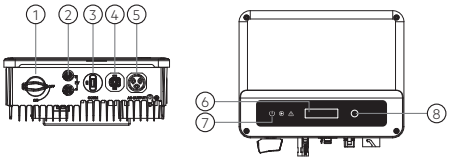
To completely insulate the equipment, turn off the DC switch and AC breaker, and disconnect the DC and AC terminals.

The inverter can exclude the possibility of DC residual currents to 6mA in the system, where an external RCD is required in addition to the built-in RCMU, type A RCD must be used to avoid tripping.

 During operation, the temperature of some inverter components might exceed 60°C. Make sure that you do not touch the inverter while in operation so to avoid burns. Should you need to touch the inverter, allow it to cool down first.

3.PRODUCT OVERVIEW

3.1 Inverter overview



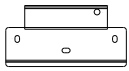
Nr.	Item	Description
1	DC Switch	During normal operation it is „on“. It can shut down the inverter after it is disconnected from the grid by the AC breaker
2	PV Input Terminal	For PV string connection
3	WiFi/LAN Module Port	For WiFi/LAN communication
4	CT /Remote Shutdown/ RS485 Communication Port	For CT and & Remote Shutdown & RS485 Communication
5	AC Output Terminal	For AC cable connection
6	LCD Display	For viewing inverter operation data and for parameter configuration
7	Indicator Lights	Displays the inverter state
8	Button	For accessing the inverter menu and parameter configuration

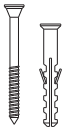
3.2 Package content

Each inverter unit and the package content is thoroughly inspected before shipment. However, it might happen that damages occur during transportation. Before installing the product, please check the package content as described in 2.2 Handling safety.

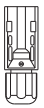
The package content of your AEG inverter will include:

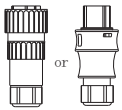

Inverter


1x wall-mount bracket


Expansion bolts


Positive DC connector


Negative DC connector



AC connector

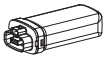

Terminal (used for RS485 function)


Allen wrench (VACONN AC connector only)


PE terminal


Grounding screw


Installation manual


Communication module

4. INSTALLATION

4.1 Choosing the installation location

Select the installation place based on the following considerations:

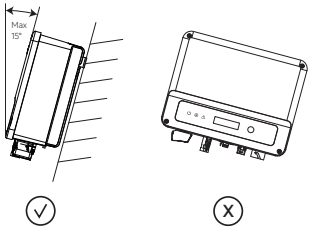
- Consider the weight and dimension of the inverter.
- The ambient temperature should be lower than 45°C to grant optimal inverter performance.
- The installation place should be well ventilated and sheltered from direct sunlight, rain and snow.
- Avoid installing the inverter close to flammable and explosive items, and close to sources of strong electromagnetic charges.

4.2 Installing the inverter

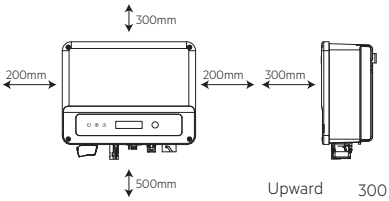
4.2.1 Installation details

Take further into account the following aspects when installing the inverter:

- Choose the appropriate mounting method in terms of weight and dimension of the inverter
- The inverter is best installed at eye level. This facilitates maintenance and allows the best visibility of product label, warnings, and LCD display.
- Install the inverter vertically or with a backward tilt within 15°. The inverter should not be tilted sideways. Do not install the inverter horizontally. The area of the connectors should point downwards.



Allow some clear spaces according to the below indications to grant heat dissipation and to facilitate dismantling:



Upward	300 mm
Downward	500 mm
Front	300 mm
Both sides	200 mm

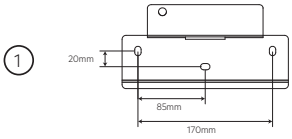
4.2.2 Mounting procedure

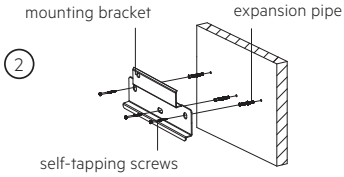
1. Use the wall-mount bracket as guide and drill holes in the wall with Ø 10 mm and 80 mm depth.

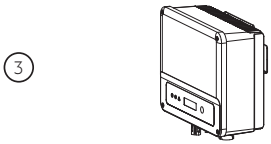
2. Fix the wall-mount bracket on the wall with the expansion bolts provided.

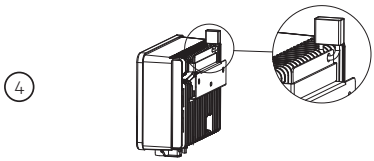
3. Hold the inverter by the side groove.

4. Mount the inverter onto the wall-mount bracket.









4.3 Electrical connection

4.3.1 Grid connection (AC-side connection)

1. When connecting the inverter make sure to adjust the voltage and the frequency in compliance with the local grid regulations and product specifications.

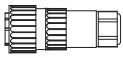
2. Add a breaker or fuse to the AC side. Please note that the maximum operation current should be more than 1.25 times of rated AC output current.

3. The inverter's PE line should be connected to earth. Make sure the impedance of the neutral wire and of the earth wire is less than 10 Ω.

4. Disconnect the breaker or fuse between the inverter and the utility.

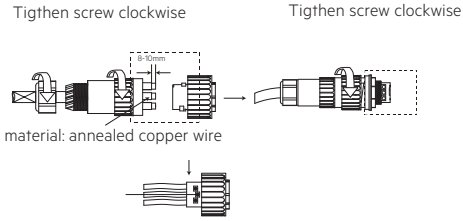
5. When laying the AC line make sure that the protective earthing conductor is not strained.

There are two AC connector brands compatible with the AEG inverters of this product series: VACONN and Exceedconn. Choose one of these to connect the inverter to the grid.


VACONN Series


Exceedconn

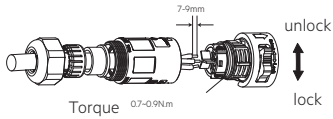
How to install VACONN AC connectors:



Tighten three screws
and ensure no screw head exceeds the surface

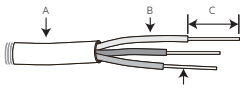
How to install Exceedconn AC connectors:

When unplugging the AC connectors,
press the button and hold it to unlock



Make sure the terminal is rotated to the lock position before the inverter is powered on

AC cable specification



annealed copper wire

Grade	Description	Value
A	Outer diameter.	10-12 mm
B	Conductor material sectional area	2.5-4 mm^2
C	Bare wire length	approx. 10 mm

Neutral wire is blue, live wire is brown (preferred) or black and protective earth wire is yellow-green. Rotate (tightening torque: 0.6N.m) the connector of AC cable into the corresponding terminal.

4.3.2 AC circuit breaker and leakage current protection device

Please install an independent two-pole circuit breaker to protect the inverter and make sure it is safe to disconnect it from the grid. In addition to the built-in RCMU, an external RCD is required to ensure that the inverter system does not carry DC residual currents. To avoid tripping, RCD type A can be used.

Inverter model	Recommended circuit breaker
AS-IR02-700 / AS-IR02-1000 / AS-IR02-1500	16A
AS-IR02-2000 / AS-IR02-2500 / AS-IR02-3000	25A

ⓘ It is not allowed that multiple inverters share a single circuit breaker. The integrated leakage current detection device of the inverter can detect external leakage current in real time. When the detected leakage current exceeds the limit, the inverter will promptly disconnect from the grid. If the leakage current protection device is installed externally, the leakage current value should be set to 300mA or higher.

4.3.3 DC-side connection

1. Before connecting the PV strings, please ensure the connectors have the correct polarity. Incorrect polarity may cause permanent damage to the inverter.

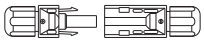
2. The open circuit voltage of the PV strings cannot exceed the maximum input voltage of the inverter.

3. Only the DC connectors supplied in the package are suitable for use with the AEG inverter.

4. The positive (=red) and negative (=black) pole of the PV string should not be connected to the PE wire (ground wire). Failing to comply with this instruction may cause damage to the inverter.

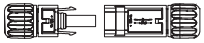
⚠ 5. For the AEG IR02 series, the minimum insulation resistance to the ground of the PV panels must exceed 16.7kΩ (R=500/30mA). If this minimum resistance is not met you might incur in shock hazard.
There are four types of compatible DC connectors (see below picture).

DEVALAN SERIES



MC4 SERIES

AMPHENOL SERIES



QC4.10 SERIES

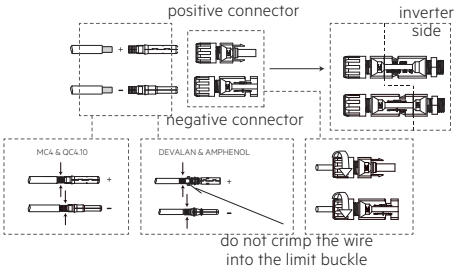
Check the accessory box to know which is the actual DC connector used for your chosen AEG product

DC cable specification:

PV cables should be used for DC connection. (recommended: 4mm PV1-F wire)

Label	Description	Value
A	Outer diameter	4-5 mm
B	Cross-sectional area of conductor material	2.5-4 mm^2
C	Length of bare wire	approx. 7 mm

DC connector installation method:

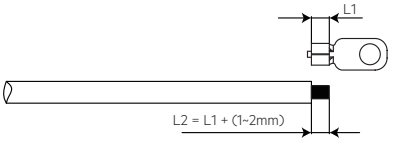


Use tools that are specifically designed for crimping

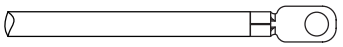
4.3.4 Earth Terminal Connection

The inverter is equipped with earth terminal according to the requirement of EN 50178.
All conductive exposed metal parts of the equipment and other enclosures in the PV power system must be grounded. Follow the steps below to connect the „PE“ cable to ground.

1. Strip the wire insulation sheet of a suitable length with a wire stripper.

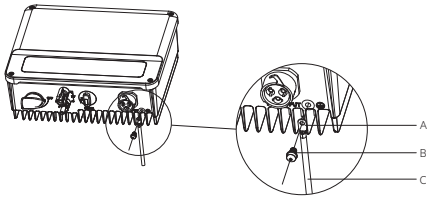


2. Insert the stripped wire into the terminal and compress it tightly by crimping pliers.



3. Fix the PE wire to the inverter.
In order to improve the corrosion resistance of the terminal, it is recommended to apply silica gel on the earth terminal for corrosion protection after the grounding cable assembly is completed.

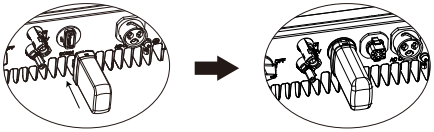
Label.	Description	Value
A	Cold-pressed terminal	
B	Screw	M5*14 (1~1.5Nm)
C	Green & yellow cable	4mm^2 / 10AWG



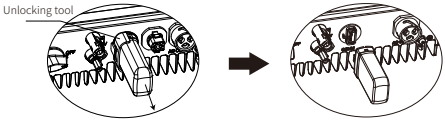
4.4 Communication Connection

4.4.1 WiFi Communication

WiFi communication requires the installation and configuration of the WiFi communication module. The picture below shows the WiFi module installation mode for AS-IR02 series



After installation, check if the indicator on the WiFi module is on. If it is off, unplug the WiFi module and install it again.

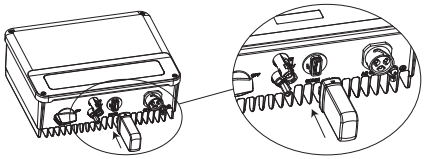


For the configuration of the WiFi communication module, please refer to the the „WiFi Configuration Guide“ provided with the WiFi communication module

⚠ This port is used for connecting the WiFi and / or the LAN communication module only. No further USB connection is allowed. Do not connect PCs or other devices to this port.

4.4.2 LAN Communication

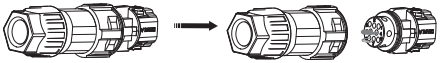
The inverter is by default configured and set for WiFi communication. LAN Communication is optional and only applies if the inverter is configured for it. It requires the LAN Communication module (not included in this box).



4.4.3 RS 485 Communication

The connection steps for RS485 communication are described in the below steps:

Step 1: Disassemble the terminal in the accessory box.

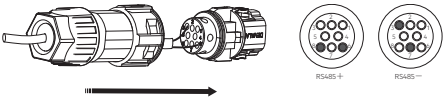


Step 2: Disassemble the resistor or shortcircuit cable.

Step 3: Put the cable through the connector and connect to the terminal.

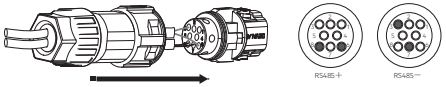
For single inverter connection
Please connect RS485 cables to ‚RS485-‘ port (3 or 7) and ‚RS485+‘ port (6 or 8).

Nr.	Function
3	RS485-
7	
6	RS485+
8	

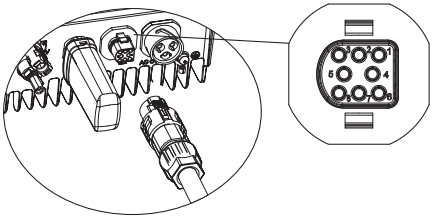


For multiple inverter connection
Please connect RS485 cables to ‚RS485-' port (3 or 7) and ‚RS485+'port (6 or 8).
Note: When several inverters are connected in parallel„ please ensure that terminals at both ends of the 2-pin cable are connected with the same polarity.

Nr.	Function
3	RS485-
7	
6	RS485+
8	

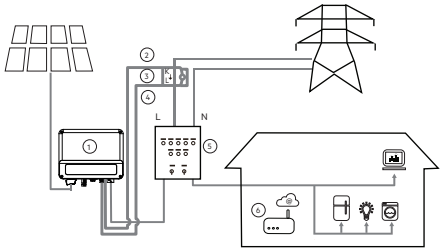


Step 4:
Connect the terminal to the right position onto the inverter.



4.4.4 Export Power Limit (CT device) connection scheme

The methods of connecting the Power Limiting device (CT device) are described in the below scheme:

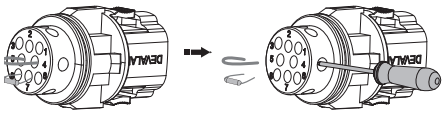


Nr	Description
1	Inverter
2	CT + White wire
3	CT (CT90-5 or CT 90-30 is recommended)
4	CT- Black wire
5	Switch board
6	Router
Note: Correct direction of CT: House (K) ⟶ Grid (L). Incorrect correction will cause incorrect data.	

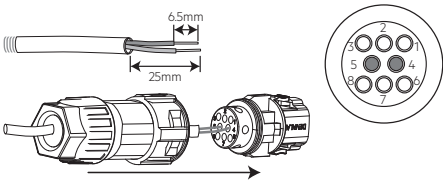
4.4.5 DRED / Remote Shutdown / CT (Power Limit Device) Connection

DRED (Demand Response Enabling Device) is a device required for safety compliance in Australia and New Zealand only. It is not provided by Solar Solutions.
Remote shutdown is required to comply with European safety requirements concerning European installation. The Remote Shutdown Device is not provided by Solar Solutions. Please follow the following steps for the related functions:

Step 1: Dismantle the resistor or shortcircuit cable.

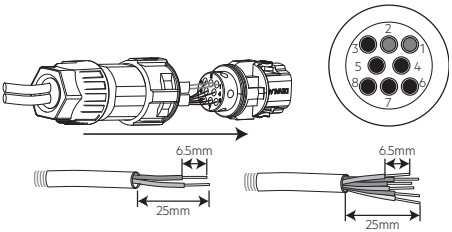


Step 2: Put the cable through the plate
Different cables and connection methods apply based on the function that needs to be activated. Please follow the related connection steps based on the desired function.



CT and DRED

Please connect the cables in the order shown in the below table.



Power Limiting	
Nr.	Function
1	CT+
2	CT-

DRED	
Nr.	Function
3	DRM 1/5
4	DRM 2/6
5	DRM 3/7
6	DRM 4/8
7	REFGEN
8	COM/DRM0

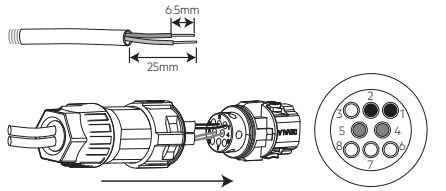
Remote Shutdown

Please connect the cables in the order shown in the below table.

Remote Shutdown	
Nr.	Function
4	Content+
5	Content-

CT and Remote Shutdown

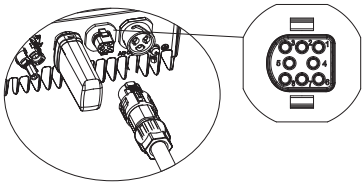
Please connect the cables in the order shown in the below table.



CT	
Nr.	Function
1	CT+
2	CT-

Remote Shutdown	
Nr.	Function
4	Content+
5	Content-

Step 3: Connect the terminal at the right position to the inverter.



Please note:
1. Compatible DRED commands are DRM0, DRM5, DRM6, DRM7, DRM8.
2. Please set up the power limit function in the local setting page once all connection steps are done.
3. CT is directional. Please make sure CT+ is properly connected to the white & black wire and CT- to the black wire. Please make sure the limit buckle is connected to the output live wire (L) of the inverter.
4. If CT is not well connected, the message „CT disconnected“ will show on the inverter display. In the case of reverse connection of the CT, the message „CT reverse“ will show on the inverter display when the inverter is connected to the grid.

4.4.6 Earth Fault Alarm

In compliance with section 13.9 of IEC62109-2, the AEG IR02 inverter series is equipped with an earth fault alarm. When an earth fault occurs, the fault indicator on the LED panel on the front of the inverter will turn on. Inverters in Australia and New Zealand have the additional feature that the inverter buzzer will keep ringing for one minute and ring again after 30 minutes until the fault is solved.

4.4.7 The AEG Monitoring Portal

To monitor your AEG inverter you can rely on the AEG Monitoring Portal. Go to **www.aeg-industrialsolar.de/solar-inverters** (section: **AEG Inverter Monitoring**) and follow the instructions there for the App download. Please note that the App itself is subject to update without notification.

5. SYSTEM OPERATION

5.1 LCD Panel

The LCD panel on the inverter front comprises LED indicators, a button and the LCD display. The LED indicate the working status of the inverter. The button and LCD display are used for inverter configuration and for viewing parameters.

Button

Indicator lights in Yellow/Green/Red refer to (respectively): ⏻ / ⏵ / ⚠

Indicators	Status	Explanation
⏻ Power		ON = WiFi connected/ active
		BLINK 1 = WiFi system resetting
		BLINK 2 = Not connect to the router
		BLINK 3 = WiFi server problem
		BLINK = RS485 connected
		OFF = WiFi not active

5.2 User interface and system configuration

5.2.1 Operation method

The button can be operated in two ways, that is by short pressing it or long pressing it.

At all menu levels, if no action is taken, the LCD backlight will turn off, the LCD screen will go back to the first menu level, and any data modifications will be stored in the internal memory

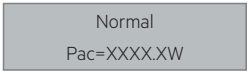
5.2.2 Set the country-specific Safety parameters

If the LCD screen shows the message „Configure Safety“, long press the button to access the second level menu.

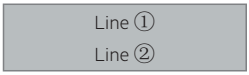
Short press the button to browse the available safety parameters by country. Choose the country according to the location of installation.

5.2.3 LCD

Following is a scheme of the LCD display screen:



The LCD display area consists of two lines (rows)



5.2.4 LCD display area

Line 1: Working status information
Line 2: Shows the real-time power generated by the inverter.
• This area displays the status information. „Waiting“ indicates the inverter is standing by for power generation;
„Checking **S“ (checking time is based on safety, and varies from country to country) indicates that the inverter is self-checking and preparing for power generation.
„Normal“ indicates the inverter is generating power. If the system experiences any anomaly, the screen will display an error message.
Through the operation button, the screen can display various information such as operation parameters and power generation status.

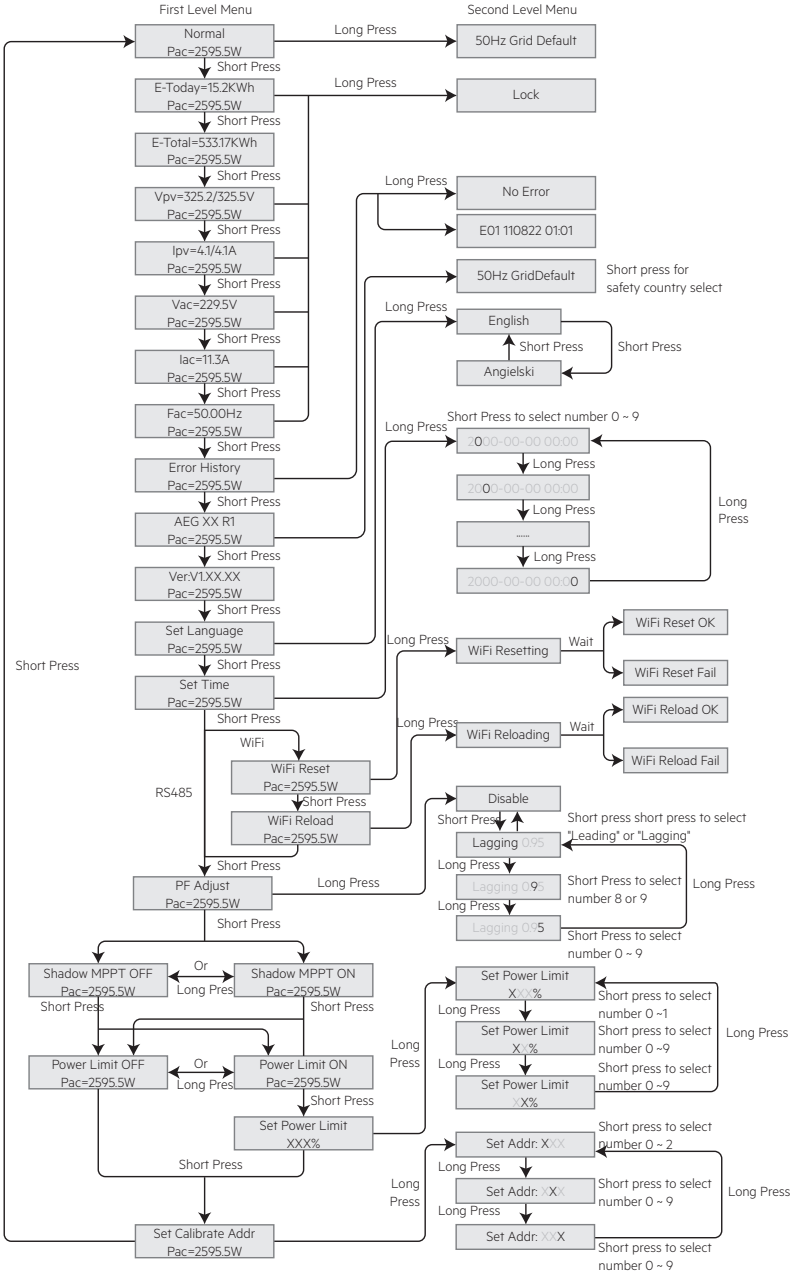
5.2.5 Use of the LCD

The LCD display allows you to acces the configuration of the basic parameters. Language, time and country settings can be configured through the operation button.

The menu showing in the LCD display area has two levels. Short pressing or long pressing the button will allow you to access the different menu levels and items.

Items in the first level menu for which there is no second level are locked. If a level is locked, it will show on the LCD screen if the operation button is pressed for two seconds. Items that are locked can be unlocked by short pressing the button or by switching mode (e.g.: from „Normal“ to „Utility loss“).

5.2.6 The Menu


First Level Menu
Second Level Menu
Normal
Pac=2595.5W
Long Press
50Hz Grid Default
Short Press
E-Today=15.2KWh
Pac=2595.5W
Long Press
Lock
Short Press
E-Total=533.17KWh
Pac=2595.5W
Short Press
Vpv=325.2/325.5V
Pac=2595.5W
Long Press
No Error
E01 110822 01:01
Short Press
Ipv=4.1/4.1A
Pac=2595.5W
50Hz GridDefault
Short press for safety country select
Short Press
Vac=229.5V
Pac=2595.5W
Long Press
English
Short Press
Short Press
Angielski
Short Press
Iac=11.3A
Pac=2595.5W
Short Press
Fac=50.00Hz
Pac=2595.5W
Long Press
Short Press to select number 0 ~ 9
2000-00-00 00:00
Short Press
Error History
Pac=2595.5W
Long Press
2000-00-00 00:00
Long Press
Long Press
Short Press
AEG XX R1
Pac=2595.5W
.....
Long Press
Short Press
Ver:V1.XX.XX
Pac=2595.5W
2000-00-00 0000
Short Press
Set Language
Pac=2595.5W
Long Press
WiFi Resetting
Wait
WiFi Reset OK
WiFi Reset Fail
Short Press
Short Press
Set Time
Pac=2595.5W
Long Press
WiFi Reloading
Wait
WiFi Reload OK
WiFi Reload Fail
Short Press
WiFi
WiFi Reset
Pac=2595.5W
RS485
Short Press
WiFi Reload
Pac=2595.5W
Disable
Short Press
Short press short press to select "Leading" or "Lagging"
Lagging 0.95
Short Press
PF Adjust
Pac=2595.5W
Long Press
Long Press
Lagging 0.99
Short Press to select number 8 or 9
Long Press
Long Press
Lagging 0.85
Short Press to select number 0 ~ 9
Short Press
Shadow MPPT OFF
Pac=2595.5W
Or
Long Press
Shadow MPPT ON
Pac=2595.5W
Short Press
Short Press
Set Power Limit
XXX%
Long Press
Short press to select number 0 ~1
Set Power Limit
X.X%
Short press to select number 0 ~9
Long Press
Long Press
Power Limit OFF
Pac=2595.5W
Or
Long Press
Power Limit ON
Pac=2595.5W
Long Press
Short press to select number 0 ~9
Long Press
Short Press
Set Power Limit
XXX%
Short press to select number 0 ~ 2
Set Addr: XXX
Long Press
Short Press
Long Press
Set Addr: XXX
Short press to select number 0 ~ 9
Long Press
Long Press
Set Addr: XXX
Short press to select number 0 ~ 9
Short Press
Set Calibrate Addr
Pac=2595.5W

For a scheme of the menu, please refer to the picture at the beginning of this paragraph.

When the solar PV panels are producing electricity and feeding it to the inverter, the LCD shows the first-level menu.

Start screen:
• The start screen shows the first item of the first level menu, and the current status of the system. It will show:
„Waiting" in the initialization state;
„Normal" during power generation mode;
and an error message in case of anomaly. (please refer to „5.3 Error message").

To view PV voltage, PV current, grid voltage, current and frequency:
• Short press the button to enter the „E-Today" menu which displays the total power generation *for* the current day.
• Short press the button to enter the „E-Today" menu which displays the total power generation *until* the current day.
• Short press the button to enter the „Vpv" menu which displays the PV voltage in „V".
• Short press the button to enter the „Ipv" menu which displays the PV current in „A".
• Short press the button to enter the „Vac" menu which displays the grid voltage in „V".
• Short press the button again to enter the „Iac" menu which display the grid current in „A".
• Short press the button again to enter the „Frequency" menu which displays the grid frequency in „Hz".

View error code
• Short press the button again to enter the „Error Code history" menu.
Long press the button to enter the second level menu of error detection. The latest three inverter records will be shown by short pressing the button in the second level menu. The records include error codes (EXX) and error times (110316 15:30).

View model name and reconfigure safety parameters for individual countries:
From the error code history in the first level menu, short press the button to see the model name.
If you want to change the safety parameters linked to a specific country, please long press the button, then the LCD will display the second level menu. In the second level menu, short press the button to change the country and choose the country. If there is no further input for 20 seconds, the system will save the country in the settings and the related parameters will be deployed. If there is no exact country code available for the desired country, please choose „50Hz Grid Default" or „60Hz Grid Default" accordingly.

View the software version
In the first level menu, go to the model name item, then short press the button to view the current software version.

5.2.7 Basic Settings

Set the language
Short press the button to enter the „Set Language" menu. Long press the button to enter the second level menu. Short press the button to browse the available languages available.

Set the time
From the first level „Set Language" menu, short press the button to enter the „Set Time" menu. Long press the button to enter the second level menu. The initial

display is „2000-00-00 00:00“.
The first four digits represent the year (e.g. 2000~2099); the fifth and sixth digits represent the month (e.g. 01~12); the seventh and the eighth digit represent the date (e.g. 01~31). The remaining digits represent the time.
Short press the button to increase the number displayed in the current digit position. Long press to move the cursor to the next position.

Set protocol:

This function is for Service personnel use only. Setting a wrong protocol could lead to communication failure. From the first level „Set Time“ menu, short press the button to enter the “Set Protocol Display“ menu. Long press the button to enter the sub menu, which includes two protocols. Choose the protocol by short pressing the button.

MPPT function for the Shadow Optimizer
The default setting for the Shadow optimizer is disabled. You can enable the Shadow Optimizer when shadows are cast on the PV panels. This function helps the system generate more power in case of shadows. Please do not enable the function when there are no shadows cast on the panels, as this could lead to a decrease in the generated power.

Press the button until you access the Shadow Optimizer menu. When the LCD displays „Shadow MPPT OFF“, it means the MPPT function for shadow is switched off. Long press the button to enable the function. If the LCD displays „Shadow MPPT ON“ it means the shadow optimizer is turned on. Long press the button to disable the function.

70% Rated Power Limit
This function is only available for inverters in Germany. It limits the inverter work to under 70% of the rated output. This function should only be used by network operators, otherwise it will cause a loss of power generated from the PV plant.
Press the button until the LCD displays the 70% Rated Power menu. If the LCD displays „70% Rated Enable“, it means the function is disabled. Long pressing the button will enable this function. If the LCD displays „Recover Rated Power“ it means the inverter is working under 70% of the rated output power. Long press the button to allow the inverter to work at 100% of its rated output power.

5.2.8 Power Limiting Function Settings

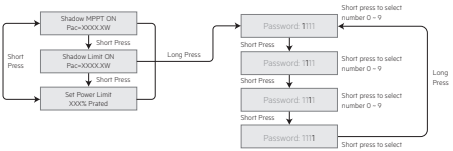
By default the Power Limiting state is OFF and the Power Limiting is set at 2% of the rated power.

You will need to enter the password before changing the Power Limiting state and the Power Limiting setting.

Please note: if the power limiting function is ON, but there are no power limiting devices connected (CT/Meter) or the power limiting devices are out of order, the maximum output power of the inverter will be the default one for operation without power limiting devices.

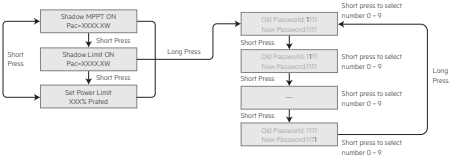
Enter the password
You will have 10 minutes to change the power limiting state after entering the password. Long press the button to enter the Password Input menu. The initial display „1111“ is the default password. Short press the button to increase the number

in current digit position and long press to move to the cursor to the next position. The sequence is shown below.



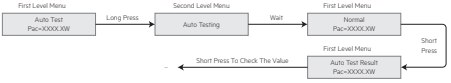
Change the Password

Long press the button to access the Password Change menu. Short press to increase the number in the current digit position. Long press to move the cursor to the next position. You will be prompted to input the old password and set a new password. If the old password was input correctly, the new password will be stored automatically after 20 seconds (no further inputs are necessary).
Note: You can only input the new password only within 10 minutes since logging in.



5.2.9 Auto-Test

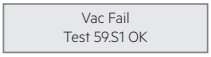
This function is only available for Italy and is disabled by default. To activate it, short press the button until the LCD screen displays „Auto Test“, and long press the button to initiate the function.
When the Auto Test is finished, short press the button until the LCD displays „Auto Test Result“, and long press the button to check the result.



Before starting the test, choose one of the two Auto-Test type: „Remote“ and „Local“. The „Remote“ default setting is 1 and cannot be modified. the „Local“ default setting is 0, which can be set to 0 or 1 by calibrating the software. If „Local“ is set to 1, the testing order will be 59.S1, 59.S2, 27.S1, 81>S1, 81<S1. Otherwise, the testing order will be 59.S1, 59.S2, 27.S1, 81>S2, 81<S2.

After AC connection, the auto-tests will begin when the relays have successfully closed. The output power will be zero and the LCD display will show the information about testing.

If the sub test finishes and the LCD displays „Test ***** Ok“, the inverter relay brakes off and the inverter reconnects to the grid automatically in compliance with CEI 0-21 requirements. Following, the next test will start.



If the sub-test fails, the relay will break off and the inverter will enter the waiting mode. To try the test again, the inverter needs to be completely powered off and restarted.

5.2.10 Display operation during commissioning

When the input voltage reaches the

inverter's minimum voltage for starting up, the LCD starts to work, the yellow light is on and the LCD displays „Waiting". More information will be displayed within a few seconds. If the inverter is connected to the grid, the LCD will display the message „Checking 30S" and start a countdown of 30 seconds. When the countdown reaches „00S" you will hear the relay trigger 4 times. The LCD will then display the message „Normal". The instant power output value will be displayed at the bottom left corner of the LCD.

5.3 Error Messages

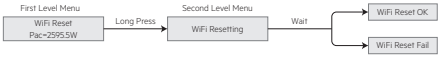
If a fault occurs, an error message will be displayed on the LCD screen.

Error Code	Error Message	Description
03	Fac Fail	Grid frequency out of permissible range
14	Isolation Fail	Ground insulation impedance is too low
15	Vac Failure	Grid voltage out of permissible range
17	PV Over Voltage	Overvoltage at DC input
19	Over Temperature	Over Temperature on the case
23	Utility Loss	Utility is unavailable

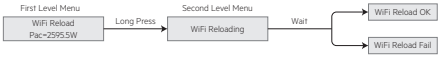
5.4 WiFi Reset and WiFi Reload

The WiFi Reload function is used to change the WiFi configuration to the default value. After activating the function please configure the WiFi again.

Short press the button until the LCD displays „WiFi Reset", then long press the button until the LCD displays „WiFi Resetting". Stop pressing and wait for the screen to display „WiFi Reset OK" or „WiFi Reset Failed".



Short press the button until the LCD displays „WiFi Reload", then long press the button until the LCD displays „Wi-Fi Reloading". Stop pressing and wait for the screen to display „Wi-Fi Reload OK" or „WiFi Reload Failed".



5.5 Precautions for the initial startup

1. Make sure the AC circuit is connected and AC breaker is turned off.

2. Make sure the DC cable between inverter and PV string is connected, and the PV voltage is normal.

3. Turn on the DC switch, and set safety country according to the local regulation.

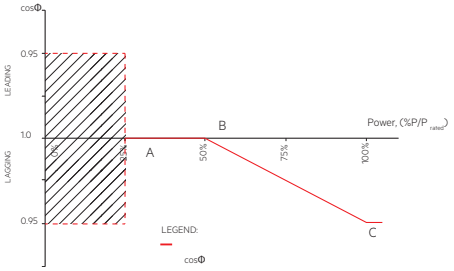
4. Turn on the AC breaker. Check that the inverter functions normally.

5.6 Adjusting special setpoints

It is possible to adjust special setpoints such as trip points, trip times, reconnect times, active and inactive QU curves and PU curves. These are only adjustable through specific software. Should you need to adjust these setpoints, please contact the AEG Technical Support. Following is an overview of these special setpoints:

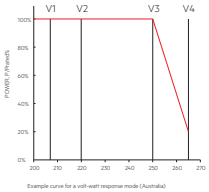
5.6.1 PF Power Curve Mode

The PF Power Curve mode can be modified through the Calibrate Communication method, according to the set range to set the corresponding value.

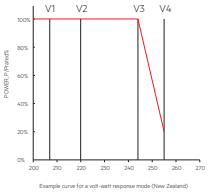


5.6.2 PU Curve Mode

The PU Curve mode can be modified through the Calibrate Communication method, according to the set range to set the corresponding value.



Example curve for a volt-watt response mode (Australia)



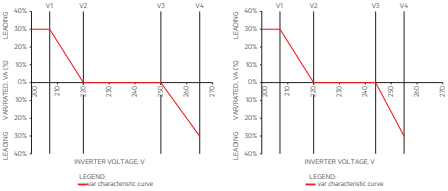
Example curve for a volt-watt response mode (New Zealand)

PF Power Curve Mode			
Function	Default value (Austra-lia)	Default value (New Zealand)	Setting range
PF curve mode enable or disable	0	0	“0”or“1”
B %P/ Prated	50 (50%)	50 (50%)	30%~80%
C Power factor	0.9	0.9	0.8~1

PU Curve Mode			
Function	Default value (Austra-lia)	Default value (New Zealand)	Setting range
PU curve mode enable or disable	1	1	“0”or“1”
V1 voltage ratio	207V	207V	Not applicable
P1 power ratio	100 (100%*Pn)	100 (100%*Pn)	0~120
V2 voltage ratio	220V	220V	216V~ 230V
P2 power ratio	100 (100%*Pn)	100 (100%*Pn)	0~120
V3 voltage ratio	250V	244V	235V~ 255V
P3 power ratio	100 (100%*Pn)	100 (100%*Pn)	0~120
V4 voltage ratio	265V	255V	244V~ 265V
P4 power ratio	20 (20%*Pn)	20 (20%*Pn)	0~120

5.6.3 QU Curve Mode

The QU Curve mode can be modified through the Calibrate Communication method, according to the set range to set the corresponding value.



QU Curve Mode			
Function	Default value (Australia)	Default value (New Zealand)	Setting range
QU curve mode enable or disable	0	0	“0”or“1”
V1 voltage ratio	207V	207V	Not applicable
Q1 reactive power ratio	30 (30%*Pn)	30 (30%*Pn)	0~60
V2 voltage ratio	220V	220V	216V~230V
Q2 reactive power ratio	0 (0%*Pn)	0 (0%*Pn)	0
V3 voltage ratio	250V	244V	235V~255V
Q3 reactive power ratio	0 (0%*Pn)	0 (0%*Pn)	0
V4 voltage ratio	265V	255V	244V~265V
Q4 reactive power ratio	30 (-30%*Pn)	30 (-30%*Pn)	0~60

5.6.4 Power Recovery Rate

The Power recovery rate can be modified through the Calibrate Communication method, according to the set range to set the corresponding value.

Function	Default value (Australia and New Zealand)	Setting range
Power recovery rate setting	16 (16%*Pn)	5~100

6. TROUBLESHOOTING

Should your inverter not function properly, the red (FAULT) LED indicator on the front panel will light up and the LCD screen will display relevant information.

Before contacting your local reseller, please check the instructions in the next pages. Following is a table with the list of error messages that will be displayed on the LCD screen and the associated troubleshooting advice.

ⓘ Please note: when sunlight is insufficient, the PV inverter may continuously start up and shut down automatically due to insufficient power generation from the PV panels. This will not lead to inverter damage.

TROUBLESHOOTING		
Error message		Troubleshooting
SYSTEM FAILURE	Isolation Failure	1. Turn off the inverter. Unplug the DC connector. Make sure the inverter is grounded and check the insulation of the PV string wiring to earth. 2. Turn on the plant again. The impedance must be higher than 100 kΩ. If the impedance is lower than 100 kΩ, please contact your reseller. 3. Take off the AC connector, measure the impedance between neutral and earth. If the impedance is greater than 10Ω, please check the AC wiring.
	Ground I Failure	1. The ground current is too high. 2. Unplug the DC input connectors of the string and check the peripheral AC system. 3. When the problem is solved, reconnect the DC input connectors and check the inverter status. 4. If the problem persists, contact your reseller.
	Vac Failure	1. The inverter will automatically restart within 5 minutes if the grid returns to normal. 2. Make sure that grid voltage complies with specifications. 3. Make sure neutral (N) wire and PE wire are well connected. 4. If the problem persists, contact your reseller.
	Fac Failure	1. Not connected to the grid. 2. Check grid connection cables. 3. Check the inverter connection to the grid.
	Utility Loss	1. Not connected to the grid. 2. Check the inverter connection to the grid. 3. Check the power grid availability.
	PV Over Voltage	1. Check if the PV open circuit voltage is high or too close to the maximum input voltage. 2. If the problem persists even if the PV voltage is lower than the maximum input voltage, contact your reseller.
	Over Temperature	1. The internal temperature is higher than the specified normal value. 2. Reduce ambient temperature. 3. Move the inverter to a cool place. 4. If the problem persists, contact your reseller.

TROUBLESHOOTING		
Error message		Troubleshooting
INVERTER FAILURE	Relay-Check Failure	1. Turn off the inverter's DC switch. 2. Wait until the inverter's LCD lights turn off. 3. Turn on the DC switch and make sure it is connected. 4. If the problem persists, contact your reseller.
	DCI Injection High	
	EEPROM R/W Failure	
	SCI Failure	
	SPI Failure	
	DC BUS High	
	BUS Unbalance	
	GFCI Failure	
	Ifan Fault	
	Efan Fault	
	Afan Fault	
	No display	1. Turn off the DC switch, unplug the DC connector, measure the voltage of the PV array. 2. Plug in the DC connector, and turn on the DC switch. 3. If the PV array voltage is lower than 250V , please check the inverter configuration. 4. If the voltage is higher than 250V, please contact your reseller.
OTHER	Wi-Fi module fail to connect to network	1. If the WiFi communication module fails to connect to the network after choosing the right router and entering the right password, it's possible that there are special characters in the router's password that are not supported by the WiFi communication module. Please change the password. It should only consist of numbers and/or uppercase / lowercase letters. 2. If the problem persists, contact your reseller.

7. TECHNICAL PARAMETERS

	AS-IR02-700	AS-IR02-1000	AS-IR02-1500
PV String Input Data			
Max. DC Input Power (W)	910	1300	1950
Max. DC Input Voltage (V)	500	500	500
MPPT Range (V)	40~450	40~450	50~450
MPPT Voltage Range at Nominal Power (V)	80~450	80~450	125~450
Start-up Voltage (V)	40	40	50
Nominal DC Input Voltage (V)	360	360	360
Max. Input Current per MPPT (A)	12.5	12.5	12.5
Max. Short Current per MPPT (A)	15.6	15.6	15.6
No. of MPPT	1	1	1
No. of Input Strings per MPPT	1	1	1
Max inverter backfeed current to the array (A)	0	0	0
AC Output Data			
Nominal Output Power (W)	700	1000	1500
Nominal Output Apparent Power (VA) [1]	700	1000	1500
Max. AC Active Power (W)	800	1100	1650
Max. AC Apparent Power (VA) [1]	800*	1100*	1650*
Nominal Output Voltage (V)	230	230	230
Nominal AC Grid Frequency (Hz)	50/60	50/60	50/60
Max. Output Current (A)	3.5	4.8	7.2
Max. Output Fault Current (peak and duration) (A/ms)	25/5	25/5	25/5
Inrush current (peak and duration) (A/ms)	50/2	50/2	50/2
Nominal Output Current (A)	3	4.3	6.5
Output Power Factor	~1 (Adjustable from 0.8 leading to 0.8 lagging)		
Max. Total Harmonic Distortion	<3%	<3%	<3%
Efficiency			
Max. Efficiency	97.2%	97.2%	97.3%
European Efficiency	96.0%	96.4%	96.6%
Protection			
DC Insulation Resistance Detection	Integrated		
Residual Current Monitoring Unit	Integrated		
Anti-islanding Protection	Integrated		
AC Overcurrent Protection	Integrated		
AC Short Circuit Protection	Integrated		
AC Overvoltage Protection	Integrated		
DC Switch	Integrated		
DC Surge Arrester	Type III		
AC Surge Arrester	Type III		
General Data			
Operating Temperature Range (°C)	-25~60		
Relative Humidity	0~100%		
Operating Altitude (m)	≤4000		
Cooling	Natural Convection		
User Interface	LCD & LED		
Communication	WIFI (optional: LAN or RS485)		
Communication Protocol	Modbus		
Weight (kg)	5.8		
Size (Width*Height*Depth mm)	295*230*113		
Noise Emission (dB)	25		

Topology	Transformerless
Night Power Consumption (W)	<1
Ingress Protection Rating	IP65
DC Connector	MC4 (2.5~4 mm²)
AC Connector	Plug-and-play connector
Environmental Category	4K4H
Pollution Degree	III
Overvoltage Category	DC II / AC III
Protective Class	Class I
Decisive Voltage Class (DVC)	C
Certifications & Standards	
Grid Regulation & Safety Regulation	Visit www.aeg-industrialsolar.de for more information
[1] *For Belgium Max. Output Apparent Power (VA): AS-IR02-700 is 700; AS-IR02-1000 is 1000; AS-IR02-1500 is 1500.	

	AS-IR02-2000	**AS-IR02-2500**	**AS-IR02-3000**
PV String Input Data			
Max. DC Input Power (W)	2600	3250	3900
Max. DC Input Voltage (V)	500	500	500
MPPT Range (V)	50~450	50~450	50~450
MPPT Voltage Range at Nominal Power (V)	165~450	205~450	245~450
Start-up Voltage (V)	50	50	50
Nominal DC Input Voltage (V)	360	360	360
Max. Input Current per MPPT (A)	12.5	12.5	12.5
Max. Short Current per MPPT (A)	15.6	15.6	15.6
No. of MPPT	1	1	1
No. of Input Strings perMPPT	1	1	1
Max inverter backfeed current to the array (A)	0	0	0
AC Output Data			
Nominal Output Power (W)	2000	2500	3000
Nominal Output Apparent Power (VA) [1]	2000	2500	3000
Max. AC Active Power (W)	2200	2750	3300
Max. AC Apparent Power (VA) [1]	2200*	2750*	3300*
Nominal Output Voltage (V)	230	230	230
Nominal AC Grid Frequency (Hz)	50/60	50/60	50/60
Max. Output Current (A)	9.6	12	14.3
Max. Output Fault Current (peak and duration) (A/ms)	25/5	30/5	30/5
Inrush current (peak and duration) (A/ms)	50/2	50/2	50/2
Nominal Output Current (A)	8.7	10.93	13.0
Output Power Factor	~1 (Adjustable from 0.8 leading to 0.8 lagging)		
Max. Total Harmonic Distortion	<3%	<3%	<3%
Efficiency			
Max. Efficiency	97.5%	97.6%	97.6%
European Efficiency	97.0%	97.2%	97.2%
Protection			
DC Insulation Resistance Detection	Integrated		
Residual Current Monitoring Unit	Integrated		
Anti-islanding Protection	Integrated		
AC Overcurrent Protection	Integrated		
AC Short Circuit Protection	Integrated		

AC Overvoltage Protection	Integrated
DC Switch	Integrated
DC Surge Arrester	Type III
AC Surge Arrester	Type III
General Data	
Operating Temperature Range (°C)	-25~60
Relative Humidity	0~100%
Operating Altitude (m)	≤4000
Cooling	Natural Convection
Display	LCD & LED
Communication	WIFI (optional: LAN or RS485)
Communication Protocol	Modbus
Weight (kg)	5.8
Size (Width*Height*Depth mm)	295*230*113
Noise Emission (dB)	42
Topology	Transformerless
Night Power Consumption (W)	<1
Ingress Protection Rating	IP65
DC Connector	MC4 (2.5~4 mm^2)
AC Connector	Plug-and-play connector
Environmental Category	4K4H
Pollution Degree	III
Overvoltage Category	DC II / AC III
Protective Class	Class I
Decisive Voltage Class (DVC)	C
Certifications & Standards	
Grid Regulation & Safety Regulation	Visit www.aeg-industrialsolar.de for more information
[1] *For Belgium Max. Output Apparent Power (VA): AS-IR02-2000 is 2000; AS-IR02-2500 is 2500; AS-IR02-3000 is 3000.	

Notes

Overvoltage Category Definition

- Category I: applies to equipment connected to a circuit where measures have been taken to reduce transient overvoltage to a low level.
- Category II: applies to equipment not permanently connected to the installation. For example, appliances, portable tools and other plug-connected equipment.
- Category III: applies to fixed downstream equipment, including the main distribution board. For example, switchgear and other equipment in an industrial installation.
- Category IV: applies to equipment permanently connected at the origin of an installation (upstream of the main distribution board). For example, electricity meters, primary overcurrent protection equipment and other equipment connected directly to outdoor open lines.

Moisture Category Definition

Moisture parameters	Level		
	3K3	4K2	4K4H
Temperature Range	0~+40°C	-33~+40°C	-20~+55°C
Humidity Range	5%- 85%	15%-100%	4%-100%

Environment Category Definition

- Outdoor : the ambient air temperature is -20~50°C. Relative humidity range is from 4% to 100%, applied to PD3.
- Indoor unconditioned: the ambient air temperature is -20~50°C. Relative humidity range is from 5% to 95%, applied to PD3.
- Indoor conditioned: the ambient air temperature is 0~40°C. Relative humidity range is from 5% to 85%, applied to PD2.

Pollution Degree Definition

- Pollution degree 1: No pollution or only dry, non-conductive pollution occurs. The pollution has no influence.
- Pollution degree 2: Normally only non-conductive pollution occurs. However, a temporary conductivity occasionally caused by condensation must be expected.
- Pollution degree 3: Conductive pollution occurs. Or dry, non conductive pollution becomes conductive due to condensation, which is expected.
- Pollution degree 4: Persistent conductive pollution occurs. For example, the pollution cause by conductive dust, rain and snow.

8. PRODUCT END-OF-LIFE

Please return any electrical equipment you no longer use to the collection points provided for their disposal. Information concerning where the equipment can be disposed of can be obtained from your local authorities. The equipment shall be disposed of as special waste in accordance to the local regulations.

9. DISCLAIMER OF LIABILITY

The use of this manual and the conditions or methods of installation, operation, use and maintenance of the product are beyond Solar Solutions's control. Solar Solutions expressly disclaims liability for loss, damage, or expense arising out of or in any way connected with such installation, operation, use or maintenance.
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10. CONTACT

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