

PURE SINEWAVE INVERTER



SAMLEX EUROPE[®] B.V.

Pure Sinewave Inverter Heavy Duty

Model No.


AJ 275-12
AJ 350-24
AJ 400-48
AJ 500-12
AJ 600-24
AJ 700-48
AJ 1000-12
AJ 1300-24
AJ 2100-12
AJ 2400-24

**User Manual / Benutzerhandbuch
Manuel Utilisateur / Manual Para Utilizador**

Please read this manual before operating your inverter

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ENGLISH DESCRIPTION

INTRODUCTION

The sine wave inverters of the AJ serie have been designed to meet industrial and domestic needs. They meet the highest requirements in terms of comfort, safety and reliability.

Any device designed for the public electrical grid of 230 V 50 Hz can be connected to them (up to the nominal power of the inverter).

The AJ series is the perfect source of voltage in any place where the public grid is not available.

This document is an essential part of the inverter and must always be carried with it and be available for anyone working on the installation.

Should you have any doubt or question, do not hesitate to contact your specialist salesperson who will give you the best advice.

WARNING

A deficient assembly could result in damage to the device, cause function failures or potential damage to the users.

The working device generates a high voltage which might be lethal in case of contact. So, any manipulation of the inverter must be carried out with utmost care and meet the local rules.

THE OWNER MUST NOT MANIPULATE ANY PIECE INSIDE THE INVERTER.

Opening the inverter or using it incorrectly will result in the immediate loss of the warranty.

The inverter AJ is to be used only with a lead battery. As for the use of batteries, follow the manufacturer's instructions.

No current or voltage generating device (public grid, generator, ...) may be connected to the output of the inverter because this could result into its destruction.

INSTALLATION

The AJ sine wave inverter is an electronic device, for which some caution must be taken when installing it:

Place where the inverter is to be installed:

Out of reach of unauthorized persons, especially children.

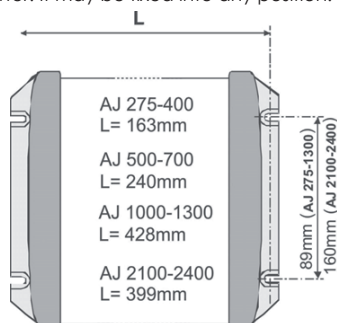
In a dry place (max. 95% humidity), and in any case with no condensation.

Not directly on top of the batteries.

No easily inflammable material should be placed directly underneath or close to the AJ. Ventilation must be free, and a space of 10 cm. on each side is needed for good evacuation of the internal heat.

Mounting the inverter

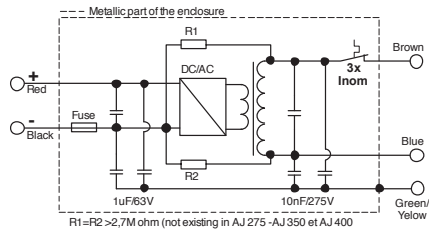
The inverter shall be mounted on a non flammable surface by screws (diameter max. 4 mm for AJ 275-AJ 1300 or max. 8 mm for AJ 2100 and 2400) using the four holes provided. The fixing screws are not supplied with the inverter. It may be fixed into any position.



CONNECTION

The connection of the inverter should be done with utmost care for a good operation of the system. The technical data and connection's description are either under one side of the inverter or onto the cable connection side. First connect the consumer devices and install a plug so as to prevent any further contact once the 230 V voltage is present. Installation is to be made only by authorized persons.

EQUIVALENT DIAGRAM



CONNECTING THE CONSUMER DEVICES

The AJ is supplied with a 230 V cable to be connected to the consumer devices. This connection must be done observing the colours:

- Yellow-green: earth
- Brown: phase
- Blue: neutral

Once the consumer devices are connected, make sure that they are turned off before connecting the battery.

Note

An Inverter constitutes a voltage source independent from the grid and could be considered in the same way as a generator set. The voltage in between the phase and the neutral is 230V. An appropriate divisor establishes a 115V voltage in between neutral and earth, and between the phase and earth. According to the local prescriptions or particular requirement, (example: use of a ground fault detector) a true neutral may be established by connecting the neutral and the earth wire together (yellow - green and blue).

CONNECTING THE BATTERY

Once the consumer devices are connected, make sure that the installations instructions of the 230V has been followed with utmost care before connecting the battery.

The battery cables are supplied with the inverter and already connected in it. Connect the battery observing carefully the polarity.

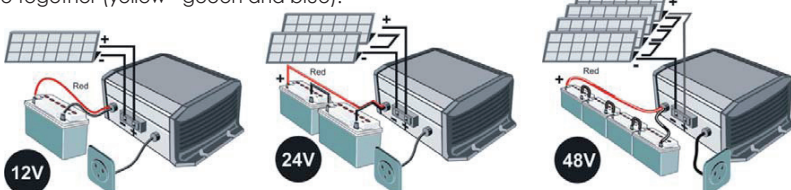
The AJ inverter, except AJ 2100-12, is protected against reverse polarity by a fuse, but should the polarity be reversed, the inverter must be sent to the manufacturer for control.

Connect the battery using the following colours:

- BLACK cable: negative pole (-)
- RED cable: positive pole (+)

For AJ 275-12 (-S) to 700-48 (-S), a bicolor cable is used. Go for the dominant colour.

When connecting the battery, there is a spark (Danger of explosion!), because of the charging of the internal filtering capacitors. A fire security fuse must be installed on the battery.



Check that the cables are well adjusted and well tightened.

As long as it is possible, do not extend the cables supplied with the batteries. Extending them may increase the losses and lead to a malfunction of the inverter.

Once the inverter is connected to the batteries, a 230 V voltage is present at the output of the inverter.

Use

CONTROL AND INDICATORS



Control switch on/off

There is a switch on the inverter to activate or deactivate it. Use this function to save the energy of the batteries when you are not using the inverter.

Note:

The solar charge controller remains in operation even when the inverter is off.



"Functionning" indicator (green LED 1)

A green light on the inverter indicates its functioning mode:

Illuminated : A 230 V voltage is present at the output, the inverter is on.

Blinking :

— — — — — No load (stand-by).

— — — — — The 230 V voltage has been cut due to an alarm; the inverter will automatically resume function when the failure has disappeared (see the failure table p. 9).

Off : The 230 V voltage is NOT present at the output, the inverter is off.



**B.L.O. indicator (green LED 2)
Led only on AJ 275-12 to 700-48**

This indicator is illuminated only if the enhanced Battery Lifetime Optimizer function (description p. 9) is activated.

Activation/Deactivation described in p. 8.

ACOUSTIC INDICATOR

The AJ inverter has an acoustic indicator for the following cases:

Intermittent beep :

There is a failure in the inverter and the output voltage will be interrupted.

Overheat :

The acoustic indicator beeps 3 °C before cutting the voltage. Reduce the consumption in order to lower the inverter temperature and to avoid the output voltage is cut off.

Low battery voltage :

The indicator beeps for a minute before the interruption. Reduce the consumption in order to get the battery voltage rise and to avoid that the output voltage is cut off.

Continuous beep for two seconds:

You have pushed the ON/OFF switch to restart the inverter. The output voltage will be immediately present after the acoustic signal. The acoustic warning can be deactivated as per the procedure described p. 8.

ALARM BY VOLTAGE FLICKERING

When the acoustic indicator is deactivated or when the inverter is out of hearing, it can be useful to be warned of an imminent inverter stop due to an "overheat" or a "battery undervoltage". If this function is activated (see p. 8 for Activation/Deactivation of functions), the output voltage will flicker slightly (max. 20%), leading to a variation of the lights intensity and therefore indicating the imminent stop of energy supply.

The user can then choose to reduce his consumption in order to secure the supply to priority loads (for instance lighting).

MODEL WITH STAND-BY SYSTEM

The inverters from the AJ 500-12 are equipped with a stand-by system (also available in the models AJ 275-12/350-24/400-48 with the option -S).

The stand-by is an energy saving system which turns off the inverter intermittently when no consumer is detected. In this mode the functioning indicator (green LED 1) blinks, showing the intermittent presence of the voltage.

The detection threshold is set by default at 2 W. On models from AJ 500-12 onwards it is possible to deactivate this function or to modify the threshold by adjusting the yellow Turning Knob marked Stand-by.

Adjusting the switching-on level is as follows: Switch off all consuming devices; turn the

Turning Knob to the right (clockwise) until the LED is blinking, switch ON the smallest consuming device (i.e. mobile phone charger); turn the Turning Knob slowly to the left until LED is lit continuously. Check that the inverter goes back in stand-by mode when you remove the load. If not, this means that the load is too small to be detected.

If the stand-by is not required, turn the Knob fully to the right.

The minimal load detected can be adjusted between 1 and 20 W. In most cases this adjustment is not necessary. This adjustment is made with a small screw driver in the hole marked stand-by. In the full counter clockwise position, the sensibility is minimal (20 W). Do not push on the screw driver.

NOTE: In this mode the output voltage is intermittently present at the output!

ACTIVATION / DEACTIVATION OF FUNCTIONS:

The following functions of the AJ range can be freely enabled or disabled by the user:

1. Acoustic warning of imminent stop of the inverter according to p. 6.
2. Battery lifetime optimizer function as described p. 9.
3. Imminent stop alarm by voltage flickering as described p. 6.

The state « activated » or « deactivated » of the functions is indicated by the buzzer with a continuous push on the on/off key after a duration given for each function as per the table below:

- Single « beep » short = function activated
- Double « beep » short = function deactivated

	Function	Duration (onto on/off) of impulse	Default setting
1.	Acoustic alarm	5 seconds	Activated
2.	Battery Lifetime Optimization (B.L.O.)	10 seconds	Deactivated
3.	Alarm by voltage flickering	15 seconds	Deactivated

The state is reversed if the on/off key is released within 2 seconds following the buzzer sound.

To consult the state of functions without having any effect on them or changing their programming it is possible to maintain the on/off key pushed on. Beyond 20 seconds the buzzer will sound continuously to indicate the end of the sequence and will stop by the release of the key.

SAFETY

The inverter is electronically protected. It is protected against reverse polarity by an internal fuse, except for AJ 2100-12 inverter, which must be protected by an external fuse. The next table displays the various possible default cases and their consequences.

Caution: the inverter is not protected against the connection of an AC source (generator or grid) at its output. Such connection will cause a major failure and should be avoided.

Battery protection by LVD - Low voltage disconnection battery protection:

The battery is protected from deep discharge by stopping the inverter if the battery reaches a voltage lower than $0.87 \cdot U_{nom}$ (10.5, 21 or 42 V) during more than 1 minute. An acoustic signal or a voltage flickering (if authorized) is activated during 1 minute before the inverters stops. The inverter must then be restarted manually. It will restart automatically if the battery voltage is back to a value higher than $1.04 \cdot U_{nom}$ (12.5, 25 or 50 V). The inverter will stop immediately (with no delay) if the battery voltage is lower than $0.75 \cdot U_{nom}$ (9, 18 or 36 V).

The table below will show you the different causes of inverter stopping.

CAUSE	CONSEQUENCE	SOLUTION
Low battery voltage Voltage < $0.87 \cdot U_{nom}$	Inverter temporary stopped, the green indicator blinks.	Automatic restart when the battery voltage rises at $1.04 \cdot U_{nom}$. The inverter should be manually restarted
Deep discharged battery $0.75 \cdot U_{nom}$	Inverter stopped	Inverter should be manually restarted when the battery has reached $=0.87 \cdot U_{nom}$
Overheating	Inverter temporary stopped, the green indicator blinks.	Automatic restart when the temperature reaches the normal range.
Battery overvoltage $1.33 \cdot U_{nom}$	Inverter stopped.	Wait until the battery voltage reaches the correct level. Push the ON/OFF button to reactivate the inverter. $1.25 \cdot U_{nom}$
Short circuit at the output	Inverter stopped.	Eliminate the short circuit. Push the ON/OFF button to reactivate the inverter.
Overload	Inverter stopped.	Use the inverter only in the range of its nominal power. Regular use in overload power diminishes the lifetime of the inverter. Push the ON/OFF button to reactivate the inverter.
Battery reverse polarity	Internal fuse broken down.	Back to manufacturer for testing.

BATTERY LIFETIME OPTIMIZER – BLO



Cycling a battery in permanent charging mode from 0 to 30% is often a cause of early aging of batteries, particularly in solar home systems.

In order to enhance the battery lifetime, the AJ inverters are equipped with a unique function that will readjust the low voltage disconnection (LVD) threshold according to the behavior of the user consumption. This allows a full recharge of the battery.

This function can be activated at anytime as per the procedure described p. 8.

An indicator (green LED 2) only available on from AJ 275-12 to 700-48 is lit or blinks when this function is activated. The number of blinkings indicates the LVD currently applied.

If this indicator is lit continuously, this means that the use of the battery is correct and that it was well charged. The LVD is then set at $0.87 \cdot U_{nom}$ (10.5, 21 or 42V) as per the model. This also means that you have the widest availability of the energy stored and that your battery is likely to last longer.

If the indicator is blinking one or several times, this means that the use of the battery is restricted and that the disconnection voltage was set according to the table below (+/- 2%).

12V	24V	48V	LED	Comments
10.5	21	42	0 x (ON)	This is also the LVD level when BLO is deactivated
11V	22V	44	1 x off	-
11.4	22.8	45.6	2 x off	Level at BLO activation
11.6	23.2	46.4	3 x off	-
11.8	23.6	47.2	4 x off	-
12	24	48	5 x off	-
12.2	24.4	48.8	6 x off	-

This strategy will of course restrict the use of the battery and drive the user to reduce his consumption or to increase the production (by an additional charger connected to a backup generator for instance).

When the battery voltage is higher than $1.08 \times U_{nom}$ (13 V, 16 V, 52 V) during 2 hours, the LVD is progressively stepped down by a decrement of 33 mV/cell (0.4 V @ 12 V). This process insures that the average charge of the battery is sufficient (over 50 %) to assure its optimized lifetime.

This function is particularly useful in solar home systems where the battery is sized in 3-5 times the daily average production. For instance a 200 W solar system producing 800 Wh/day connected to a 200-300 Ah / 12 V battery.

If the battery is sized so as to be fully discharged and charged every day, it may be possible that the restriction of use implied by the permanent increase of LVD is not wished. We recommend then to deactivate the Battery Lifetime Optimizer.

Maintenance

The inverters of the AJ series do not need any special maintenance. The casing may be cleaned with a damp cloth (not wet).

In the case of malfunction or mechanical deformation, the inverter should be sent back to the manufacturer for control carefully packed in its original packing.

Before deciding to send back the inverter, check the following points:

- The battery is loaded and is in accordance to the nominal input voltage of the inverter.
- The consumer devices do not have any defect or overload for the inverter (to make sure, disconnect them).

Should you contact your salesperson, note the following points before calling:

(You will find this information on the label underneath the inverter or at the cable side)

- Exact model
- Serial number
- Power of the inverter
- Nominal input voltage of the inverter

In case the inverter should not be sent back in its original packaging, it should be packed in a stiff carton box and be well protected on all sides by means of an anti-shock and isolating layer of min. 5 cm thickness. A weak protection may cause damages to the inverter during transport and are not covered by the warranty.

WARRANTY LIMIT

The warranty period is 2 years.

It does not cover damages arising from a use not conforming to the user manual, not described in it or resulting from any other inappropriate use like:

- Battery reverse polarity
- Inadequate input voltage (overvoltage)
- Back-feeding at the inverter output by public grid, generator or any other source.
- Mechanical shock or deformation especially by transport due to an inadequate package.
- Contact with liquid or oxidation by condensation.

Use in inappropriate environment (dust, corrosive vapour, humidity, high temperature ...).

LIMITS OF MANUFACTURER LIABILITY

SAMLEX EUROPE cannot control the installation, use and maintenance of the inverter. Thus, we are not responsible for damages, costs or losses resulting from an installation which is not in accordance with the regulations or from inappropriate use or maintenance.

The customer is always responsible for the use of the inverters SAMLEX EUROPE.

This device has not been designed and is not warranted for use in life support equipment or any other critical device with potential risks of important harm to people or to the environment. We do not accept any responsibility for any violation of patent rights or other third person rights resulting from the use of the inverter.

SAMLEX EUROPE keeps the right to modify its products without previous notice.

JT8 REMOTE CONTROL FOR AJ 1000-12 TO 2400-24

Functions on remote control are the same as control and indicator on the inverter (see chapter Use p. 6).

Remote control must be connected to the inverter with the original SAMLEX 10 m cable or any RJ11/6p 1:1 cable up to 50 m.



MODELS WITH BUILT-IN SOLAR CHARGER (OPTION – S)

The solar charge controller built in option in the inverter AJ is meant for charging a battery exclusively from a solar generator.

Any other source of current needs an external and suitable charge controller.

The maximum (open) voltage of the solar generator is 23 V for 12 V systems, 46 V for 24 V systems and 90 V for 48 V systems.

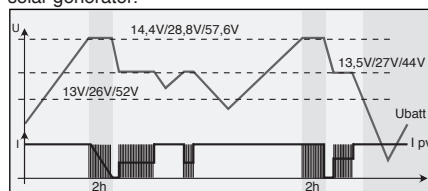
Connect firstly the inverter to the battery before connecting the solar generator. The adjustment mode is a I/Uuo ("floating") shunt and it guarantees optimal charge conditions along the battery lifetime.

The yellow indicator displays the functioning mode:

Illuminated : The solar charge is at its maximum.

Not illuminated : the solar generator is not connected or the battery is fully charged, or the solar generator does not get solar irradiation.

Blinking : The battery is more than 95% charged and the charger is in "floating" mode to complete the charge. The blinking frequency varies as per the capacity of the battery and the power of the solar generator.



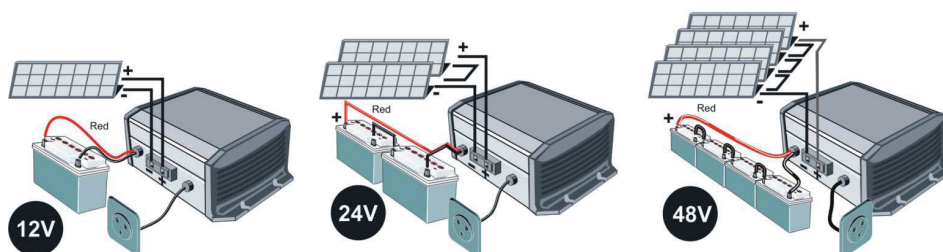
On AJ 2100-S/2400-S inverters, a preinstalled cable (2 x 6mm²) replaces the terminals. Wiring should be done through a connecting box.

Connection:

Positive (+) pole to the brown or red cable.

Negative (-) pole to the blue or black cable

Examples



TECHNICAL DATA

MODEL	AJ 275	AJ 350	AJ 400	AJ 500	AJ 600	AJ 700
Battery voltage (V)	12	24	48	12	24	48
Input voltage (V)	10.5-16	21-32	42-64	10.5-16	21-32	42-64
Continuous / 30' power (VA)	200/275	300/350	300/400	400/500	500/600	500/700
Stand-by / ON @ no load (W)	0.3*/2.4	0.5*/3	1*/5	0.4/4.5	0.6/7.5	1.5/12
Maximum efficiency (%)	93	94	94	93	94	94
Dimensions (mm)	142 x 84 x 163			142 x 84 x 252		
Weight (kg)	2.4	2.6		4.5		
Remote control plug (RCM-01)	Option			Option		
Load detect. (Stand-by) 1-20 W	With option S			Yes		
Solar charge controller (option-S)	10A			15A		

MODEL	AJ 1000	AJ 1300	AJ 2100	AJ 2400
Battery voltage (V)	12	24	12	24
Input voltage (V)	10.5 - 16	21 - 32	10.5 - 16	21 - 32
Continuous / 30' power (VA)	800/1000	1000/1300	2000/2100	2000/2400
Stand-by / ON @ no load (W)	0.7 / 10	1.2 / 13	0.7 / 15	1.2 / 16
Maximum efficiency (%)	93	94	92	94
Dimensions (mm)	142 x 84 x 428		273 x 399 x 117	
Weight (kg)	8.5		19	18
Remote control (JT8)	Option		Option	
Load detect. (Stand-by) 1-20 W	Yes		Yes	
Solar charge controller (option-S)	25A		30A	

Output voltage	Sinus 230V 0/-10% (115V 0/-10%)
Frequency	50 Hz +/- 0.05 % (60 Hz +/-0.05%)
Ventilation	From 45° C
Overheating protection	Yes
Overload protection	Yes
Short circuit protection	Yes (Fuse)
IP protection index	IP 30 (AJ 2100-2400 = IP 20)
Cos φ	0,1-1
E norm (ECE-R 10)	All models in 12 and 24V are certified

* Stand-by supplied along with the option –S (solar charge controller)

DECLARATION OF CONFORMITY



IMPORTER : Samlex Europe B.V.
ADDRESS : ARIS VAN BROEKWEG 15
1507 BA ZAANDAM
The Netherlands

Declares that the following products:

PRODUCT TYPE : Pure Sinewave inverter
BRAND : Samlex

AJ 275-12, AJ 350-24, AJ400-48
AJ 500-12, AJ 600-24, AJ 700-48
AJ 1000-12, AJ 1300-24
AJ 2100-12 AJ 2400-24

Product options and accessories: Solar Charge controller (S)
Remote control JT 8
Remote control plug RCM-01

Standards to which conformity is declared:

- EMC Dir. 2004/108
- EN61000-6-1
- EN61000-6-3
- EN61000-3-2
- EN55022
- EN55014
- EN50091-2
- LVD 2006/95EC

Signed : Marcel van Veen

Date: 01 September 2010



Authority : Managing Director



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