ANG POWER SYSTEMS
ANGCONVERTERS.COM

ANG-BOOST™ evolution
MARINE ISOLATION BOOST TRANSFORMER & VOLTAGE STABILIZER

OPERATING MANUAL

INDEX

1 • IMPORTANT SAFETY INSTRUCTION

READ CAREFULLY THE HANDBOOK BEFORE USING THE EQUIPMENT. FOLLOW ALL THE SAFETY INSTRUCTIONS IN THIS MANUAL. IMPROPER USE COULD FULLY DAMAGE THE EQUIPMENT.

USE AND INSTALLATION OF THIS EQUIPMENT ARE RESERVED TO QUALIFIED OPERATORS (MARINE CERTIFIED TECHNICIANS).

DANGEROUS VOLTAGES ARE PRESENT IN THE EQUIPMENT. TO AVOID SERIOUS INJURY OR DEATH FROM HIGH VOLTAGE ELECTRICAL SHOCK, DISCONNECT AC SHORE POWER BEFORE OPENING PANEL. USE ONLY ISOLATED AND PROFESSIONAL TOOLS.

2 • WARNINGS

THE EQUIPMENT CANNOT BE USED IN ZONES THAT ARE POTENTIALLY FLAMMABLE OR EXPLOSIVE.

THE EQUIPMENT SHOULD BE USED ONLY WHEN THE BOAT ENGINE IS OFF. DISCONNECT AC SHORE POWER BEFORE OPENING THE EQUIPMENT.

BEFORE INSTALLATION MAKE SURE THAT ADEQUATE SYSTEM OF SMOKE OR GAS DETECTOR ARE PROVIDED.

THE EQUIPMENT CANNOT BE USED IN PARALLEL WITH CO-GENERATION SYSTEM.

3 • PRECAUTIONS

• Install ANG-BOOST™ away from any heat. Proper ventilation around the unit is very important:
allow at least 20 cm / 8 inch on the front and rear side of the unit to ensure sufficient air circulation and cooling.

• During normal operation the equipment may reach high temperatures, install the ANG-BOOST TM in an area where people will not get in contact with it.

• An appropriate periodic cleaning and maintenance program is recommended to keep the equipment in perfect condition.

• If the equipment is installed in a particularly dusty environment, increase the cleaning and maintenance program, making sure that the ventilation system is working properly.

• ANG-BOOST™ is intended for installation inside a boat, engine room or elsewhere in the interior of the boat.

• Be careful that the location will not subject the equipment to rain, snow, excessive moisture, or excessive heat.

• These equipments are intended for hard-wired, permanent, on- board applications.

• Do not operate the Iso-Boost if it has received a sharp blow, been dropped, immersed in water or otherwise damaged.

• Do not disassemble.

• Only Certified and Qualified Marine Technicians are allowed to operate the ANG-BOOST™.

• DEGREE OF PROTECTION:	**IP 21**
• OPERATION TEMPERATURE:	**0°C -/+ 50°C**
• HUMIDITY NOT CONDENSED:	**85%**

4 • INTRODUCTION

It combines an Isolation Transformer with a Boost Voltage Increase Circuit in order to provide the automatic rise of line voltage and the complete safety to your boat.

Our Marine Isolation Boost Transformers (IsoBoost) provide the correct voltage to the onboard equipment as well as preventing turning off in the event of a sudden voltage drop or damage in case of excessive increase (within a given range).

Our Marine Iso-Boost Transformers ensure the protection of all the marine electrical equipment.

The output voltage is boosted if the supplied voltage is too low.

ANG ISO-BOOST™ has the static system with Seamless technology, the soft start, auto-restart and by-pass systems as standard features, while for the Charles Iso-Boost these were all optional.

Moreover, **ANG ISO-BOOST™** transformer is lighter than the Charles Iso-Boost and is available in seven (7) models, all equipped with Toroidal Transformer, the new generation and the best quality transformer on the market.

In addition, **ANG ISO-BOOST™** has three steps (two steps up 15% and 7.5%) while Charles Iso-Boost only had two steps (one step up 15%); the **ANG ISO-BOOST™** steps are adjustable, a feature not available for Charles isolation transformer.

COMPETITORS COMPARISON CHART

FEATURES	ANG ISO.BOOST™	CHARLES ISO-BOOST	COMPETITORS
Frequency Range	50Hz and 60Hz	60Hz	60Hz
Boosting Steps	Three (3) Steps	Two (2) Steps	Two (2) Steps
Transformer	Toroidal	Traditional	Traditional
Transformer Efficiency	100% at any step	100% only at 240V	100% only at 240V
Soft Start	YES (Integrated)	Optional	Optional
Auto restart	YES (Integrated)	Optional	No after High voltage
By-Pass	YES (Integrated)	Optional	No
Electronic Switching	Seamless System (no blackout during the switching)	Mechanical Contactors	Mechanical Contactors (15 sec blackout during switching)
High Voltage Protection	Protection engage at 258V	- -	Protection engage at 270V
Weight	Lighter	Heavier	Lighter
Models Available	7	2	2

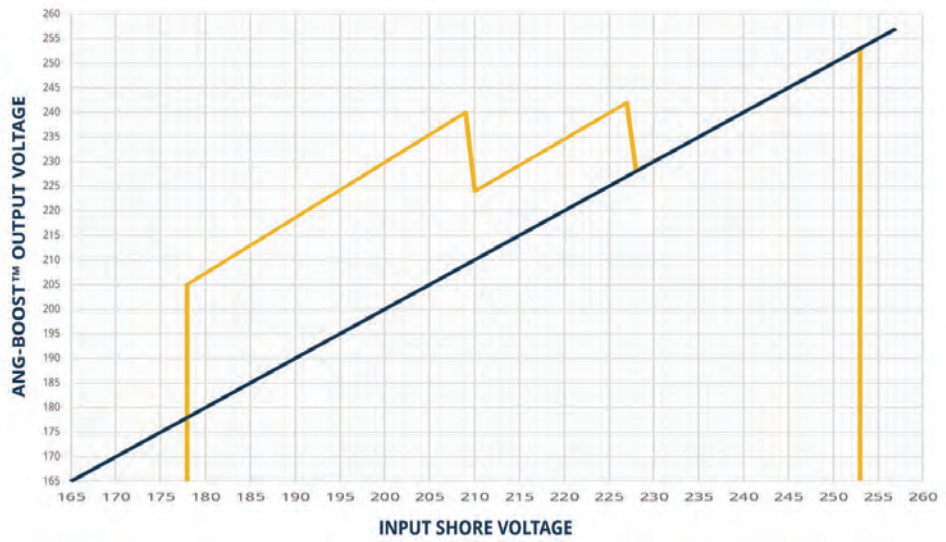
5 • FUNCTIONING

ANG ISO-BOOST™ covers a wide voltage range gradually increasing the output voltage.

ANG ISO-BOOST™ is designed to power the boat from a nominal voltage of 120/240 V with three operating thresholds:

Shore Voltage from 178 to 209 V (+/- 3V): output voltage from 210 to 240 V (+/- 3V)
Shore Voltage from 210 to 227 V (+/- 3V): output voltage from 224 to 242 V (+/- 3V)
Shore Voltage from 228 to 253 V (+/- 3V): output voltage from 228 to 253 V (+/- 3V)
If the input voltage is less than 178V or higher than 253V, the output is deactivated.

ANG ISO-BOOST™ guarantees the maximum output current even in boost mode.



This chart shows the output voltage curve secured by ANG-BOOST™ compared to the Shore Voltage.

6 • DISPLAY/LED INDICATOR PANEL

ANG ISO-BOOST™ provides the LED/Display Control Panel that indicates the operating status of the equipment.

The LED lights indicate the operating status of the **ANG ISO-BOOST™**

OVER TEMPERATURE: RED LED LIGHT - Thermal protection automatically shuts down the system until the temperature returns to a safe operating level.

LOW VOLTAGE: SOLID RED LED LIGHT Shore input Voltage below 178VAC, the system shuts down to protect the boat's electrical system.

HIGH VOLTAGE: FLASHING RED LED LIGHT - Shore Input Voltage over 253VAC, the system shuts down to protect the boat's electrical system.

BY-PASS: RED LED LIGHT - Manual By-Pass ON, NON-Boost Mode, Boat Voltage equals Shore Voltage, Isolation Transformer ON.

POWER: GREEN LED LIGHT – Non-Boost mode, Boat Voltage equals Shore Voltage.

BOOST 7.5%: YELLOW LED LIGHT – Boost Mode ON.

BOOST 15%: YELLOW LED LIGHT – Boost Mode ON.

The display panel shows a rotation of a series of information every 5 seconds:

1st screen	V LINE (Input Voltage)	&	POWER = KW
2nd screen	CURRENT (Input AMP)	&	FREQUENCY (Input/output frequency)
3rd screen	OUTPUT (output Voltage Rms)		

7 • MAIN FEATURES

ANG ISO-BOOST™ is FULLY AUTOMATIC.

ANG ISO-BOOST™ is CE and ISO 9001 certified, it is manufactured with UL CERTIFIED components and complies with ABYC E-11 Standards.

SEAMLESS SYSTEM: **ANG ISO-BOOST™** is provided with SEAMLESS transfer system in order to avoid power interruption during the switching. The system automatically chooses the optimal point of switching without loss of power.

OVERLOAD ENDURANCE: **ANG ISO-BOOST™** is designed to withstand 30% overload for at least one hour.

ELECTRICAL PROTECTION: **ANG ISO-BOOST™** is provided with a protective shield. The shore grounding conductor is connected to a shield between primary (shore) and secondary (boat) transformer windings. This shield assures isolation on the boat for electrical protection.

BY-PASS SYSTEM: **ANG ISO-BOOST™** is provided with manual By-Pass system that allow to manually disconnect the Boost mode in case of breakdown and supply power from the shore. The by-pass system guarantees the isolation protection on the boat.

SOFT START SYSTEM: **ANG ISO-BOOST™** is provided with Soft Start System that assures the minimal current in-rush during the power up of the system.

FULL OUTPUT POWER GUARANTEED: **ANG ISO-BOOST™** ensures full output power even in boost mode. The output voltage is always stable.

AUTOMATIC THERMAL PROTECTION: **ANG ISO-BOOST™** is provided with a thermal protection that automatically shuts down the system until the temperature returns to a normal level. The unit will automatically restart when the temperature returns to a safe operating level.

AUTO-RESTART: **ANG ISO-BOOST™** automatically restart after high voltage, low voltage, blackout, and overload. **ANG ISO-BOOST™** is equipped with very low peak transformers.

The **ANG ISO-BOOST™** is provided with cooling fan system.

STATIC SYSTEM: the static switch doesn't need any maintenance, the only required maintenance is the filter cleaning.

ANG ISO-BOOST™ increases the output voltage in three steps up: 15% (1st step) and 7.5% (2nd step), and +6Vac (3rd step, non boost mode).

1st Step: from 178V to 209V + 15%
2nd Step: from 210V to 227V + 7.5%
3rd Step: from 228V to 255V + 6Vac, non-Boost Mode (Shore Supply)

We can customize the 3 steps based on the clients needs, by contacting our dedicated support.

ANG ISO-BOOST™ EUROPEAN VERSION
9 Kva and 18 Kva these ANG Iso-Boost has the same features of the US version, but suitable for European boats.

Aluminum Construction, Antirust.

ANG ISO-BOOST 2x25kW installed on a Sanlorenzo Yachts SX88

8 • TECHNICAL SPECIFICATIONS

ANG Boost	12.5 kVa	15 kVa	18 kVa	20 kVa	25 kVa	30 kVa
Input Current (A)	52	62.5	74.8	83.2	104	125
Input Voltage (Vac)	from 178V to 255V	from 178V to 255V	from 178V to 255V	from 178V to 255V	from 178V to 255V	from 178V to 255V
Boost Voltage Correction	+15%,+7.5% + 6V	+15%,+7.5% + 6V	+15%,+7.5% +6V	+ 15%,+7.5%, +6V	+15%, +7.5%, +6V	+15%, +7.5%, +6V
Operating Frequency (Hz)	50-60	50-60	50-60	50-60	50-60	50-60
Output Voltage nominal (Vac)	120 | 240	120 | 240	120 | 240	120 | 240	120 | 240	120 | 240
Output Current Boost Mode (A) 15%	44	53	64	71	89	106
Output Current No Boost (A)	50.5	60.6	73	82	100	121
Input Connection (Terminal Block)	L1A+L2A+SH (GND)	L1A+L2A+SH (GND)	L1A+L2A+SH (GND)	L1A+L2A+SH (GND)	L1A+L2A+SH (GND)	L1A+L2A+SH (GND)
Output Connection (Terminal Block)	L1B+L2B+N+GND	L1B+L2B+N+GND	L1B+L2B+N+GND	L1B+L2B+N+GND	L1B+L2B+N+GND	L1B+L2B+N+GND
kVA Continuous	12.1	14.5	17.5	19.3	24	29
Automatic Thermal Protection	110 °C	110 °C	110 °C	110 °C	110 °C	110 °C
Operation Temperature (°C)	0-50°C	0-50°C	0-50°C	0-50°C	0-50°C	0-50°C
Noise Level (Dba)	40	40	40	40	45	45
Degree of Protection	IP 21	IP 21	IP 21	IP 21	IP 21	IP 21
Seamless Technology	YES	YES	YES	YES	YES	YES
Soft Start	YES	YES	YES	YES	YES	YES
Manual by-pass	YES	YES	YES	YES	YES	YES
Alarms: Over Temperature Over Voltage/Low Voltage	YES	YES	YES	YES	YES	YES
Display Data and Alarm 6 x 16	YES	YES	YES	YES	YES	YES
Aluminium enclosure/Antirust	YES	YES	YES	YES	YES	YES
Cooling	Forced	Forced	Forced	Forced	Forced	Forced
Approximate Weight (lbs/kg)	160 lbs | 72 kg	187 lbs | 85 kg	209 lbs | 95 kg	242.5 lbs | 110 kg	322 lbs | 146 kg	353 lbs | 160 kg
Length (inches/cm)	18 in | 46 cm	18 in | 46 cm	18 in | 46 cm	18 in | 46 cm	18 in | 46 cm	18 in | 46 cm
Width (inches/cm)	14 in | 36 cm	16.5 in | 42 cm	16.5 in | 42 cm	16.5 in | 42 cm	16.5 in | 42 cm	16.5 in | 42 cm
Height (inches/cm)	14 in | 36 cm	17.5 in | 45 cm	17.5 in | 45 cm	17.5 in | 45 cm	23.6 in | 60 cm	23.6 in | 60 cm
Auto Restart	YES	YES	YES	YES	YES	YES
Isolation Transformer	YES	YES	YES	YES	YES	YES
Isolation Transformer Class	H	H	H	H	H	H
Low Peak Transformer	YES	YES	YES	YES	YES	YES

9 • INSTALLATION

Before proceeding with the installation you should check that no damages occurred to the ANG-BOOST™ during the shipping or the delivery. In case of damages, plese immediately notify the shipper and than contact ANG support.

Before installing the ANG-BOOST™ check the presence of other transformers on board and remove or by-pass them.

Before installing the ANG-BOOST™ you should read the manual carefully and ensure that the equipment is installed in a secured and safe place away from rain exposure, excessive moisture or excessive heat, in order to preserve the personal safety of users and the correct functioning.

To avoid serious injury or death from high voltage electrical shock, disconnect AC shore power before opening panel.

The ANG-BOOST™ is intended for hard-wiring in a permanent location.

The terminal block inside the equipment is accessible once the right cover side is removed.

The cable passage from the shore to the load is provided by two cable glands.

Follow the ABYC standards for "installation of an isolation transformer".

For a correct and safe installation you need to install a breaker before (input) the ANG-BOOST™ and a breaker right after (output).

The breaker must be of adequate size and a CURVE C:

- **AB 3.6 Kva: 30 amp CURVE C**
- **AB 12.5 Kva: 50 amp CURVE C**
- **AB 15 Kva: 63 amp CURVE C**
- **AB 18/20/25/30 Kva: 100 amp CURVE C**

The ANG-BOOST is provided with input and output cable glands, conveniently located in the back of the unit.

⚠ No other operation is allowed except for the input and output wires connections to the terminal block.

⚠ Before inserting the by-pass, contact the ANG support.

⚠ Before inserting the by-pass, turn off the ANG-BOOST™ (turn off the input breakers).

⚠ Open only the terminal block access cover on the right side of the unit to proceed with the connections.

⚠ No other cover side, including the roof, must be open.

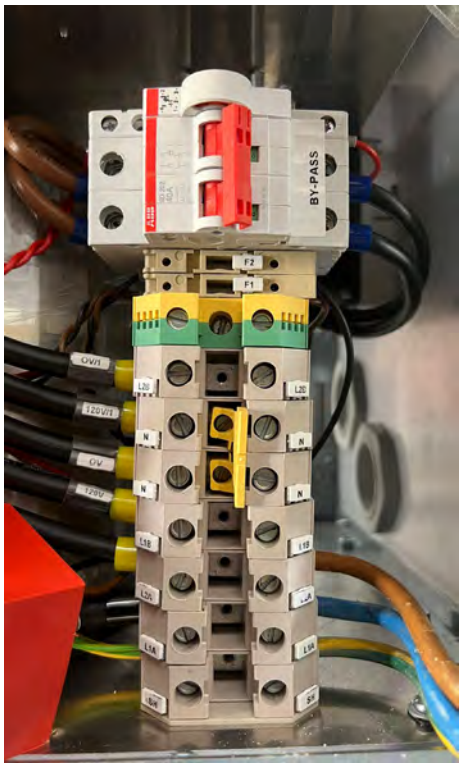
⚠ The unauthorized opening of the ANG-BOOST™ will void the warranty.

⚠ **NEVER DISCONNECT OR CHANGE THE ORIGINAL WIRING ON THE LEFT SIDE OF THE TERMINAL BLOCK, IT WILL VOID THE WARRANTY.**

10 • WIRING METHODS

STANDARD CONNECTION (USA)

L2-B	———	OUTPUT TO THE LOAD
N	———	
L1-B	———	
GND	———	
L2-A	———	INPUT LINE 240V
L1-A	———	
SH	———	



- L1-B: Output to load phase — 120V
- N: Output to load Neutral — 240V
- L2-B: Output to load phase — 120V
- GND: Boat Grounding

- L1-A: Line Input phase 120V — 240V
- L2-A: Line Input phase 120V — 240V
- SH: Shore Grounding

11 • PROTECTIONS

There are two fuses above the terminal block (5 x 20 1,6 A – T) marked with F1, F2 to protect the ventilation system and the power supply.

⚠ POWER SHOULD BE APPLIED AFTER ALL CONNECTIONS AND TERMINATIONS HAVE BEEN MADE AND THE TERMINAL ACCESS COVER IS SECURE.

⚠ NEVER DISCONNECT OR CHANGE THE ORIGINAL WIRING ON THE LEFT SIDE OF THE TERMINAL BLOCK, IT WILL VOID THE WARRANTY.

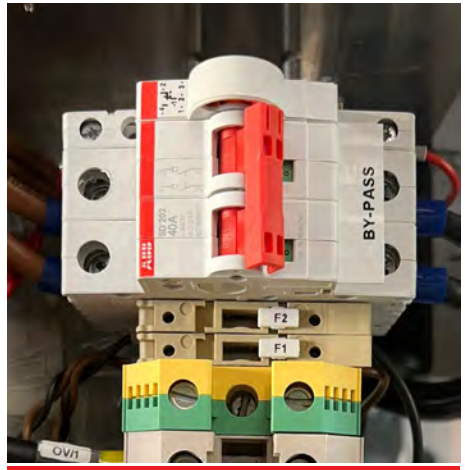
12 • BY-PASS

The ANG-BOOST™ is equipped with a by-pass which allows the power to be supplied directly from the dock pedestal, in the event of electronic system failure.

In the event of an electronic failure:
- turn off the power
- insert the by-pass

The unit will continue to work as an isolation transformer without the boosting.

⚠ WARNING: Do not insert the by-pass switch with line voltage present, risk of hard failure!



WARNING
DO NOT INSERT BY-PASS WITH LINE VOLTAGE PRESENT RISK OF HARD FAILURE

ADVERTENCIA
NO INSERTAR BY-PASS CON VOLTAJE DE ENTRADA PRESENTE RIESGO DE DAÑO ELECTRICO

13 • QUALITY ASSURANCE

The entire production cycle of our equipment is subject to surveillance regarding quality assurance. The quality assurance system complies with ISO9001-2008 standard.

14 • TROUBLESHOOTING

• If there is a problem with the ANG-BOOST™, first check that all connections in the terminal block are correct and tightened, check the input voltage, breakers, temperature and test.

• Only qualified operators are allowed to check the equipment. Make certain no AC power is present when checking.

• Check wire connections in the terminal for tightness.

• Check the wiring Methods on the manual.

• Check the breaker at the shoreside power pedestal and the boat's shore power input breaker.

• Check the input shore voltage is between the range.

• Check the ambient temperature of the engine room and of the equipment is in the range.

• If the system still does not work, turn off the power, open the right side panel and insert the by-Pass and following the instructions on this operating manual (Page 9)

• If the problem persist contact ANG SUPPORT.

15 • WARRANTY

This product and all its components have been tested and accurately checked before exiting production and is warranted for a period of 12 months (1 year) after the purchase date. (Purchase date is the one that appears on the invoice).

Warranty covers substitution or repair free of charge of all the components that are acknowledged by the producer as inefficient or faulty. The product must be delivered to the manufacturer and all data concerning the defect product must be included.

Transportation to the manufacturer is at the owner expenses and at its own risk.

The warranty repair will be performed as soon as possible and eventually shipped to the customer at its own expenses and risks.

Warranty doesn't cover accidentally broken parts, natural events, improper use or installation of the product. Travel expenses, shipping, installation and removal costs are not covered by warranty. Warranty is not granted when the product has been opened, tempered or repaired by personnel that is not authorized by the manufacturer.

ONLY MARINE CERTIFIED TECHNICIANS ARE ALLOWED TO OPERATE THE EQUIPMENT.

Substitution of the product or prolongation of the warranty period is not granted by the manufacturer, as well as the manufacturer will not be considered responsible of direct and indirect damages to people, animals or things due to the use or lack of use of the product.

Please download the full terms and conditions of sales, warrany from our website angconverters.com

NOTES:

• A.N.G. USA Inc. is responsible only for the performance of the equipment.

Any other factor within the yacht that might cause the equipment not to perform efficiently isn't to be considered our responsibility.

A.N.G. USA Inc. guarantees all systems designed by us.

All main replacements are always available in our head quarter in Fort Lauderdale and in Italy.

16 • SUPPORT

Our technical staff is always available for a free consultation and a free inspection of your boat, to recommend the ideal marine equipment, and suggest the easiest, safest, and less expensive installation.

SUPPORT, ASSISTANCE & CONSULTING

ANG Marine Products are manufactured to be durable and they allow the replacement of any part in the simplest way.

All spare parts are always available at our headquarters in the US and Europe and can be shipped express worldwide.

Our Staff of engineers and technicians is available for technical support.

The required maintenance is minimal.

OUR SERVICES

1 • CONSULTING
2 • PROJECTING
3 • MAINTENANCE & SUPPORT
4 • TECHNICAL SUPPORT

SUPPORT CONTACTS

USA **+1 (954) 368-3214**
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17 • DECLARATION OF CONFORMITY

Declaration of Conformity:
All A.N.G. USA Inc. products are in conformity with UNI CEI EN ISO/IEC 17050-1:2005 and UNI CEI EN ISO/IEC 17050-2:2005 standards.
We, A.N.G. USA Inc. 3200 S. Andrews Ave, suite 207 Fort Lauderdale, FL 33316, hereby declare that the product below conforms to the relevant requirements of the appropriate EU directive.

All components are UL CERTIFIED.

Applicable UE Directives:
2006/95/CE (EU Directive on Electrical equipment designed for use within certain voltage limits).
2004/108/CE (EU Directive on Electromagnetic Compatibility).

Harmonized Standards:
CEI EN 55022:2006 Information technology equipment. Radio disturbance characteristics. Limits and methods of measurement.
CEI EN 61000-4-2/A2:2001 Electromagnetic compatibility (EMC). Part 4: Testing and measurement techniques. Section 2: Electrostatic discharge immunity test.
CEI EN 62040-1-1:2003 Uninterruptible power systems (UPS). Part 1-1: General and safety requirements.
CEI EN 62040-1-2:2003 Uninterruptible power systems (UPS). Part 1-2: General and safety requirements.

PRODUCT CATALOG DISCLAIMER

The information provided has been gathered and assembled with every effort made to validate accuracy and consistency of the content. However, A.N.G. USA INC does not make any warranty or guarantee as to this information.

If you have any questions about the specifications of any products, please verify with A.N.G. USA INC technicians and or specialists before ordering.

Due to our continuous research and innovation, products design and all specifications are subject to change without notice.

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