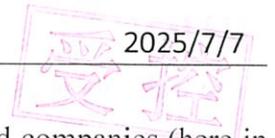


WARRANTY STATEMENT



This warranty document confirms that SUNKEAN CABLE Co., Ltd. and its affiliated companies (here in after referred to as “SKE”) provide product warranty for energy storage cables and harnesses (here in after referred to as “Products”) sold by SKE. Within the scope of use defined in the product manual, SKE guarantees that product performance complies with the technical specifications. The warranty period is five (5) years, starting from the date of delivery.

During the warranty period, if SKE confirms that a quality issue arises due to the design or manufacturing process of the SKE product, SKE will repair or replace the defective product with one of the same specifications. If the product is discontinued, SKE may provide an alternative product of equivalent value or function. The replacement product inherits the full remaining warranty period of the original product, calculated from the original product's date of delivery.

1. Warranty Solutions

1.1 Warranty Claims

a) The customer is responsible for providing evidence of non-conformity with quality standards for SKE products. If the customer believes there is a quality issue, they must contact SKE within **15 working days** and provide the following evidence or information:

- 1、 Customer information, usage environment, method, and operating conditions;
- 2、 Detailed description of the quality issue affecting the product;
- 3、 Photos or test reports of the affected product;
- 4、 Model and quantity of the affected product;
- 5、 Proof of purchase and warranty start date for the affected product.

If the customer fails to notify SKE as described above or provides incomplete, unclear, or inaccurate information, SKE reserves the right to refuse to address the quality issue and bears no responsibility. (If necessary, SKE may dispatch professionals for on-site verification.)

b) Regardless of whether such provisions are included in this warranty document, SKE shall not bear duplicate warranty responsibilities for product quality issues caused by similar root causes with respect to any warranty rights that have already been exercised by SKE and/or enjoyed by the original beneficiary of this warranty document prior to its transfer. That is, the warranty rights of the transferee of this warranty document and any assignee approved by SKE shall exclude any portion of the warranty benefits that have already been enjoyed by the original beneficiary.

1.2 Warranty Measures and Exemptions

a) Warranty Measures

In the event of a product quality issue, SKE reserves the right to choose one of the following remedies at its sole discretion, and shall not be liable for any other consequential or incidental damages resulting therefrom:

- 1、 Repair the defective product.
- 2、 Replace the defective product.

b) Warranty Exemptions

The warranty does not apply, and SKE bears no responsibility, under the following circumstances:

- 1、 Products altered, repaired, or modified without SKE’s authorization or written consent;
- 2、 After the purchased product has been installed and put into use, it is then moved or reinstalled at a location different from the original installation site;
- 3、 Issues caused by errors, misuse, negligence, or accidents during storage, transportation, handling, installation, application, use, or service, not attributable to SKE;
- 4、 Damage due to power surges, lightning, floods, fires, natural disasters, war, tampering, vandalism, accidental damage, or events beyond SKE’s control;
- 5、 Direct contact with corrosive substances or saltwater, or damage from pests or rodents (except for specially designed products);
- 6、 Operating conditions exceeding the maximum voltage or current;
- 7、 Damage caused by failure to follow the product user manual, technical specifications, or relevant laws and regulations.

2. Other Matters

- 2.1 This warranty applies to the original purchaser, their successors, and SKE-approved assignees. SKE is not liable for personal injury, property damage, or any other related losses or damages.
- 2.2 Unless otherwise specified in the sales contract, this warranty automatically expires upon the end of the warranty period.
- 2.3 SKE reserves the right to final interpretation of the above terms and any unresolved matters. Updates to this document will not be separately notified.

Energy Storage Cable and Harness User Manual

1. Main Uses and Scope of Application

The cables comply with UL758/UL1581 and 2 PFG 2693 standards and are designed for energy storage systems, suitable for applications such as electric vehicles and energy storage power stations. The cables meet industry, national, and international standards. The connectors comply with UL4128 standards. Energy storage harnesses play a critical role in signal transmission, energy delivery, temperature monitoring, and enabling high-voltage and high-current transfer. They ensure the stability of power transmission and the safety of the charging process. They are suitable for renewable energy systems, battery storage systems, electric and hybrid vehicles, and backup power systems.

For special environments (e.g., rodent-proof, fire-resistant, waterproof, or direct burial), customized energy storage cables are available to meet specific customer requirements.

2. Operating Conditions

1. Cables

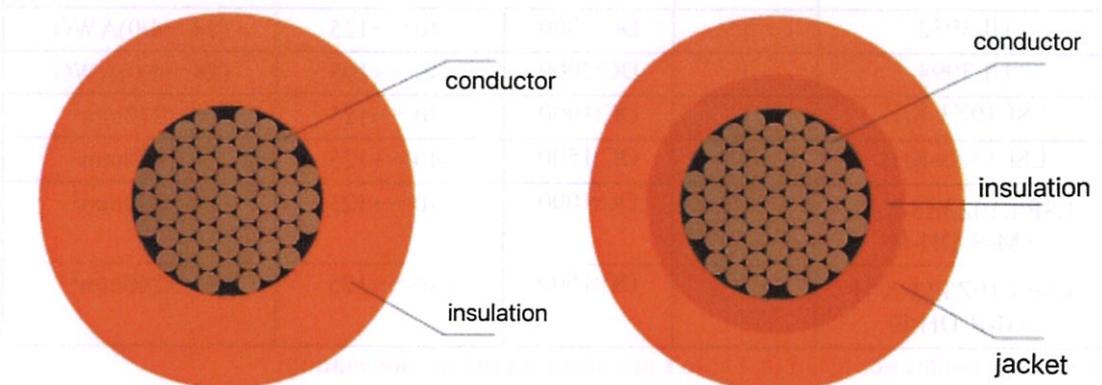
- 1.1 Maximum continuous conductor operating temperature: **125°C**;
- 1.2 Maximum conductor temperature during short-circuit: **250°C for 5 seconds**;
- 1.3 Installation methods: Direct burial, conduit, cable trench, underwater, or overhead (cable tray);
- 1.4 Minimum bending radius during operation: Not less than **6D** (D = cable outer diameter);
- 1.5 Recommended ambient temperature range: **-40°C to 60°C**;
- 1.6 Installation ambient temperature: Not lower than **0°C**.

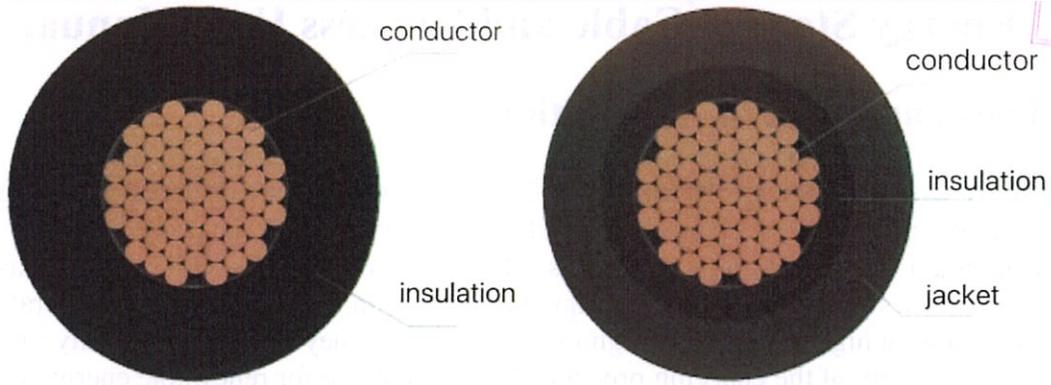
2. Harnesses

- 2.1 Ambient temperature range: **-40°C to 80°C**;
- 2.2 Operating temperature range: **-40°C to 125°C**;
- 2.3 Protection rating: **IP67**;
- 2.4 Flame-retardant rating: **UL94-V0**.

3. Typical Structure Diagram

1. cable





2.Harnesses



4. Cable Selection, Installation, and Environmental Conditions

1. Cable Models, Voltage, and Cross-Sectional Area

Table 1: Common Cable Models, Voltage, and Cross-Sectional Area

Model	Core Count	Rated Voltage (V)	Operating Temperature (°C)	Nominal Cross-Section/Wire Gauge
UL10269	1	DC:1000	-20~+105	(24~4/0)AWG
UL11627	1	DC:2000	-20~+105	(24~4/0)AWG
UL3816	1	DC:3000	-40~+150	(24~4/0)AWG
UL3817	1	DC:3000	-40~+125	(24~4/0)AWG
UL3820	1	DC:1000	-40~+125	(24~4/0)AWG
UL3932	1	DC:2000	-40~+125	(24~4/0)AWG
UL3994	1	DC:2000	-40~+105	(24~4/0)AWG
ESL10Z3-K/H	1	DC:1000	-40~+125	4~240mm ²
ESL15Z3-K/H	1	DC:1500	-40~+125	4~240mm ²
ESP/L10Z3Z3-K/H SM-R DH-R	1	DC:1000	-40~+125	4~240mm ²
ESP/L10Z3Z3-K/H SM-R DH-R	1	DC:1500	-40~+125	4~240mm ²

Note: Energy storage cables not listed in Table 1 are also covered by this manual.

2. Suitable Cable Installation Methods

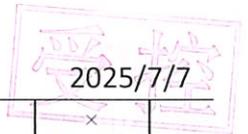
Table 2: Suitable Cable Installation Methods

Model	Installation Method				
	In Air	Conduit	Cable Tray	Indoor	Outdoor
UL10269	√	√	√	√	×
UL11627	√	√	√	√	×
UL3816	√	√	√	√	×
UL3817	√	√	√	√	×
UL3820	√	√	√	√	×
UL3932	√	√	√	√	×
UL3994	√	√	√	√	×
ESL10Z3-K/H	√	√	√	√	×
ESL15Z3-K/H	√	√	√	√	×
ESP/L10Z3Z3-K/H SM-R DH-R	√	√	√	√	√
ESP/L15Z3Z3-K/H SM-R DH-R	√	√	√	√	√

Note: ① “√” indicates compliance; “×” indicates non-compliance. ② All energy storage cables can be directly buried after being installed in conduits.

3. Applicable Environmental Conditions

Model	Flame-Retardant	Oil-Resistant	UV-Resistant	Moisture-Resistant	Rodent-Proof	Water-proof
UL10269	√	√	√	×	×	×
UL11627	√	√	√	×	×	×
UL3816	√	×	√	√	×	×
UL3817	√	×	√	√	×	×
UL3820	√	×	√	√	×	×
UL3932	√	×	√	√	×	×
UL3994	√	×	√	√	×	×
ESL10Z3-K/H	√	×	√	√	×	×
ESL15Z3-K/H	√	×	√	√	×	×
ESP/L10Z3Z3-K/H SM-R DH-R	√	×	√	√	×	×



ESP/L15Z3Z3-K/H SM-R DH-R	√	×	√	√	×	×
---------------------------	---	---	---	---	---	---

Note: ① “√” indicates compliance; “×” indicates non-compliance. ② Rodent-proof and waterproof cables are available as customized products upon customer request.

4. Cable Wiring and Connection

During the installation of DC cables within battery clusters, use a wrench or screwdriver for series connections between battery groups. Tool handles must be wrapped with insulating tape and should not be placed near battery terminals. Connected battery terminals should be promptly fitted with insulating covers. For battery cluster lead-out cables, first secure the DC cable bus end, then route along the cable tray to the corresponding battery cluster, ensuring neat wiring with fixing every 2 meters. Each lead-out cable should be clearly marked to prevent misconnections. Check insulation between positive and negative poles and to ground (e.g., 110V battery bus insulation to ground $\geq 0.1M\Omega$; 220V battery group insulation to ground $\geq 0.2M\Omega$). After passing inspection, connect to the corresponding battery cluster output switch box terminals. Ensure screws or bolts are tightly fastened during connection, with contact resistance $< 25m\Omega$ to prevent overheating due to loose connections. Use flame-retardant cables, and arrange wiring neatly and aesthetically.

5. Transportation and Storage

1. Cables

- 1.1 During transportation and handling, avoid damaging cables or cable reels. Handle with care to prevent damage to reels or cables.
- 1.2 Do not drop cable reels from a height. During transportation, secure reels properly to prevent collisions or tipping.
- 1.3 Before transporting or rolling cable reels, ensure the reel is secure and the cable is tightly wound. Roll in the direction indicated by the arrow on the reel or the cable end.
- 1.4 Store cables in a categorized manner, clearly marking model, voltage, specifications, and length. Provide passageways between reels, ensure a solid foundation, and add padding if needed. Avoid water accumulation at storage sites.
- 1.5 Protect cables from sun exposure, rain, and high temperatures during storage. Keep packaging intact, labels complete, and ends tightly sealed. Address any issues promptly.
- 1.6 Cables can be packaged in reels or coils. Reeled cables should be properly packaged on standard-compliant reels, with sealed ends and protective padding for cable ends extending beyond the reel ($\leq 300mm$). For coiled cables, use high-strength strapping material for multiple layers and secure bundling.

2. Harnesses

- 2.1 During transportation and handling, avoid damaging harness packaging. Handle with care to prevent damage to harnesses or cartons.
- 2.2 Store harnesses in a categorized manner, clearly marking model, specifications, and quantity. Provide passageways between pallets, ensure a solid foundation, and add padding if needed. Avoid water accumulation at storage sites.
- 2.3 Protect harnesses from sun exposure, rain, and high temperatures during storage. Keep packaging intact, labels complete, and ends tightly sealed. Address any issues promptly.

2.4 For harness carton packaging, use high-strength strapping material for multiple layers and secure bundling.

6. Installation and Laying

1. Cables

1.1 When cutting cables in small sections, both sides of the intended cut point should first be tightly bound with iron wire at a distance of 60–80 mm to prevent the cable sheath from loosening. After cutting, the cable ends must be sealed with heat shrink caps.

1.2 Minimum bending radius: Non-armored cables $\geq 6D$; armored cables $\geq 15D$ (D = cable outer diameter).

1.3 Installation temperature: Not below 0°C . Preheat cables if the temperature is below 5°C .

1.4 Apply uniform tension during laying to avoid cable twisting, which may cause conductor or insulation cracks and lead to breakdowns.

1.5 Use dedicated connectors and tools for cable terminations, following international power construction standards.

1.6 If mechanical damage is found during installation, cut out or repair the damaged section before use to ensure safety.

1.7 For direct burial, prevent water ingress or moisture absorption, especially at cable ends.

1.8 Before laying, check:

- ① Clear cable channels with good drainage and adequate tunnel lighting/ventilation.
- ② Cable model, voltage, and specifications meet design requirements.
- ③ The cable's outer sheath must be free from damage and have good insulation. If there is any doubt about the cable's sealing, it should be checked for signs of moisture or water ingress at the cable end. If moisture is detected, the affected section should be dried or cut off to ensure the safety of the cable system.
- ④ A cable reel stand should be used during cable unwinding, and it must be placed securely. The reel stand must match the strength, weight, and width of the cable drum. Vertical unwinding is not allowed.
- ⑤ Before laying cables, the length of each cable should be calculated based on the design and actual routing path. Cable drums should be allocated reasonably to minimize the number of joints.
- ⑥ When laying cables in live (electrically active) areas, reliable safety measures must be taken.

1.9 Before installing the cable system, it is necessary to inspect the cable tray, cable trench, cable bridge, cable duct, conduit, and direct-burial areas to ensure they are clean and unobstructed. Cable trenches and cable passages must be clear and well-drained. After the cable has been laid, no further construction work should be carried out that could affect the cable system.

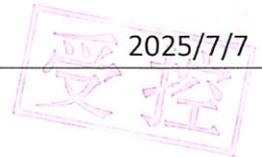
1.10 For conduit laying, ensure pipes are free of perforations, cracks, or significant unevenness, with smooth inner walls and no severe rust on metal pipes. Use sufficiently strong pipes in areas prone to mechanical damage.

1.11 Pipe requirements: No burrs or sharp edges; pipe openings should be flared to avoid cable abrasion.

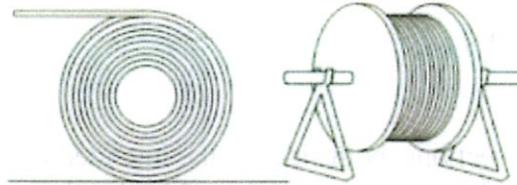
1.12 Draw cables from the top of the reel, avoiding friction against supports or the ground to prevent damage.

1.13 The correct unwinding direction should be horizontal, following the direction of the cable reel's outer end. The unwinding method should use a bearing-equipped reel stand, rather than vertical unwinding, as vertical unwinding can easily cause cable crushing or breakage. See the diagram below for correct and incorrect unwinding methods.

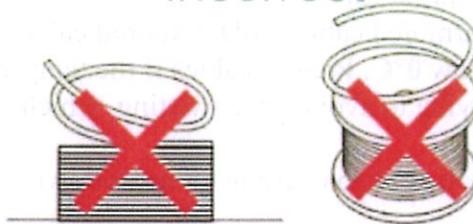
Figure: Cable Unwinding Methods



Correct



Incorrect



2. Harnesses

- 2.1 Determine harness routing and length based on specific design and layout before installation.
- 2.2 Plan harness paths carefully to avoid interference with other components and ensure adequate heat dissipation space.
- 2.3 Ensure male and female connectors match well and are securely connected for stable current transmission.
- 2.4 Avoid bending or stretching harnesses during installation to maintain performance.
- 2.5 Prevent insulation damage during laying and avoid contact between different polarity wires to prevent short circuits. Maintain a safe distance from metal structures to avoid short circuits due to vibration or displacement.