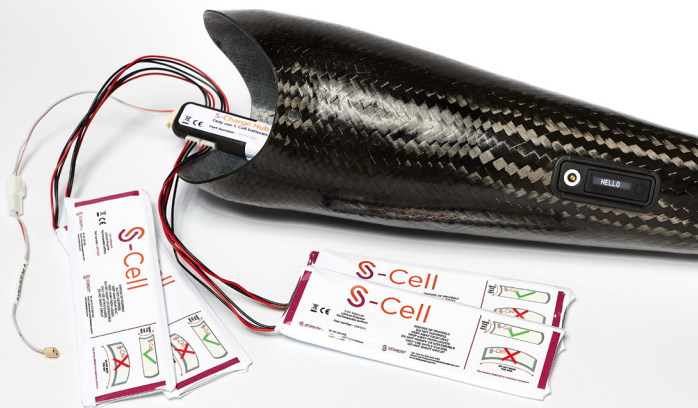
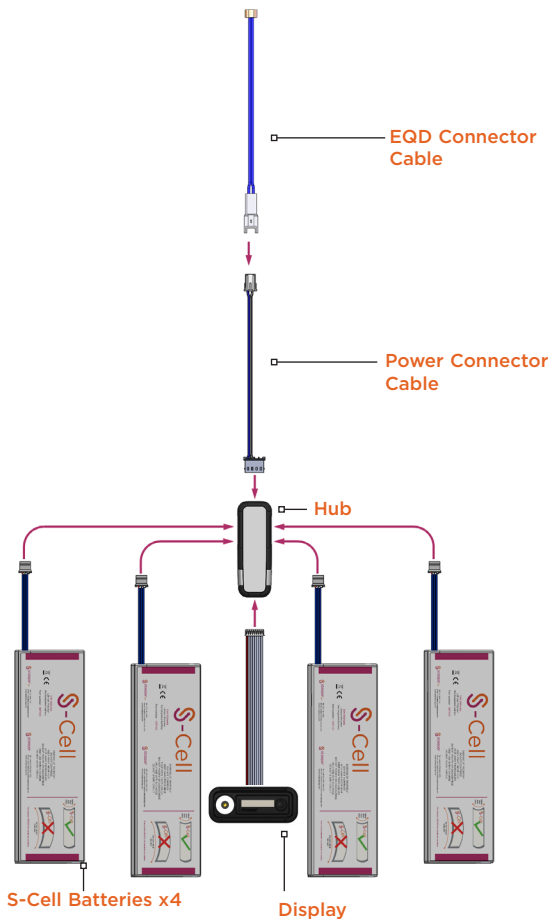


S-Charge System

Battery System with Display
and Magnetic Charger

Technical Manual





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S-Charge System

The S-Charge System is a user friendly battery system with an OLED display and a magnetic charger, that is fitted into a prosthesis to allow the user to easily activate, deactivate and charge their prosthesis. The display informs the user of the remaining power and if there is a charging fault.

In the box

S-Charge Kit (SC2200)	Quantity
S-Cell battery	4
Hub	1
Display	1
Mounting frame	3
Wall charger plus mains adapters (UK, US, EU, AUS)	1
EQD connector cable	1
Power connector cable	1
Battery lamination dummies	2
Hub & display lamination dummies	1 each
Foam gaskets	3
Alignment sticker	2
Technical manual	1
User guide	1
Extension ribbon cable	1
Silicone sealant and dispenser tip	1

For a 4-way to 2-way connection, or a connection to a short wrist rather than EQD, a Short Wrist connector cable is required (separate order: CBBHA72).

Features and benefits

- Slim, low profile S-Cell batteries for easier fit within the forearm
- Fully charges the prosthesis within 4 hours
- Visual display of the power status
- Visual display to inform the user of any charging faults
- Allows the user to activate and deactivate their prosthesis at a touch of a button
- Simple to use with one button that switches to and from standby
- Raised mounting frame to prevent accidental activation
- Magnetic charger allows for easy connection to the power supply
- Quick-release magnet protects against damage
- Automatic Sleep mode activation to save power
- The language can be changed into the following: English, French, German, Spanish, Italian, Portuguese, Dutch, Turkish, Russian, Chinese

System compatibility

The S-Charge System is compatible with all powered upper limb systems with equivalent power rating (8.4V at full battery charge, 7.0V at low battery cut off, 5.0A peak current).

Please contact your local service centre for guidance.

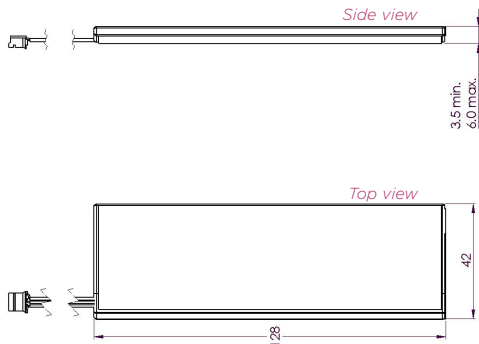
Battery compatibility: the S-Charge System is only compatible with Steeper S-Cell batteries.

Principal dimensions and specifications (All dimensions are in mm)

S-Cell batteries

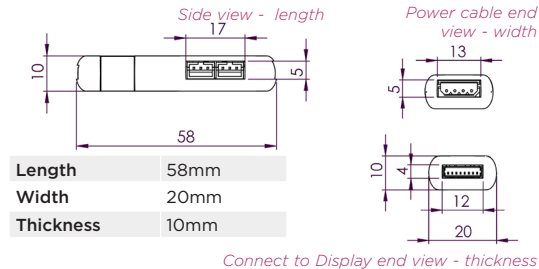
The S-Charge System has been developed to employ the latest advances in battery technology. The system is only compatible with the Steeper 7.4V Lithium Polymer S-Cell batteries provided.

The below dimensions and specifications are based on **one** S-Cell battery. The system can accommodate 2, 3 or 4 S-Cell batteries.

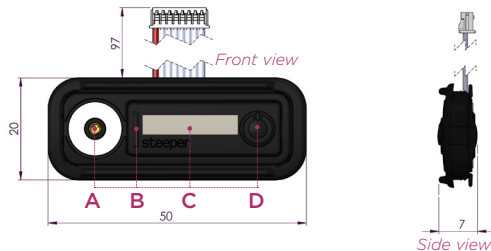


Size (each)	128mm x 42mm x 3.5mm
Mass	36 grams
Capacity	Typical: 550mAh
Voltage	Nominal 7.4V, Min 7.0V, Max 8.4V
Current	Max 2.75A each

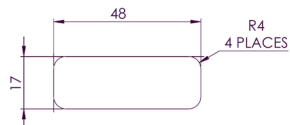
Hub



Display & mounting frame



Hole dimensions for mounting frame

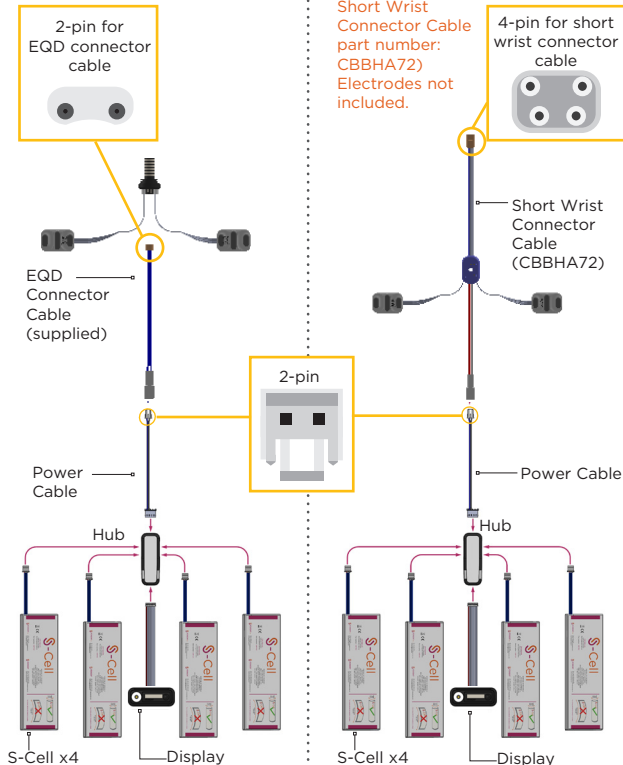


Size	50mm x 20mm x 7mm
A	Magnetic charging point
B	Mode button
C	OLED display
D	Standby button

Connecting the S-Charge System

EQD

(Electrodes not included)



Installation instructions

The mounting frame for the display will accommodate forearm wall thickness of 2.0-2.5mm.

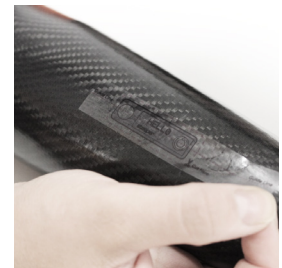
The S-Charge System is designed to be retrofitted to a pre-made forearm. However, if the residual limb is too long to allow all components of the system to fit within the space in the forearm, lamination dummies may be required for a new forearm unit to be created. These are supplied in the box with the S-Charge System.

1. The lamination dummies for the Hub and the Display (shown opposite) can be separated by snapping the adjoining tabs. These, along with the S-Cell battery dummy, can then be laminated into the forearm using the standard process.



2. After lamination, a hole must be cut for the S-Charge Display. Use the fitting guide label supplied in the box.

3. Place the alignment sticker onto the desired location of the prosthesis.



4. Using a suitable tool, cut out the template, keeping within the marked lines, and push out the excess material.



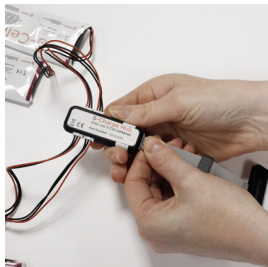
5. File the internal edges of the hole to fit the shape of the mounting frame.

6. Please note to connect all the components these instructions **MUST** be carried out in this order:

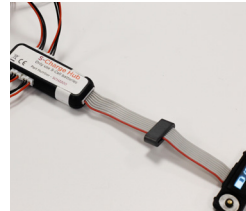
a) Firstly, connect the S-Cells to the Hub. The Hub is able to accommodate 2, 3 or 4 S-Cell batteries in one system.



b) Next, connect the Display with the ribbon cable to the Hub.



c) The system is now connected. Turn on and test by pressing the Standby button on the Display.



d) Connect the power cable connector to the Hub.



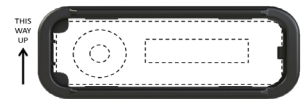
e) Connect the EQD cable to the power cable (if required)



7. Place the foam gasket around the mounting frame, beneath the inner lip. Then use the silicone sealant provided to ensure it is watertight.



8. Fit the mounting frame to the hole, ensuring the correct orientation as shown below.



9. Ensure the plastic clips of the mounting frame are facing into the hole as shown.



10. Feed the full system through the forearm, and pull the Display through so it exits the forearm through the mounting frame hole. If a bend is required to allow the ribbon cable to run along the forearm, carefully fold it at a minimum distance of 5mm from the Display. Use the extension cable, if required, to ensure that the cable is not strained (with extra care required at the joint with the Display).

11. Sit the Display flat on top of the mounting frame and push the corners of the Display until it clicks into place. The front of the Display should sit flush with the mounting frame and the whole unit should feel secure in the forearm. Use the dispenser tip provided to apply silicone sealant to the gap between the Display unit and the mounting frame, ensuring it is water tight.



12. Secure the system inside the forearm using hook and loop fasteners or similar to prevent movement of the components and damage to the cables.

13. Turn on the power at the Display. Test the terminal device and ensure the unit is fully charged with the magnetic charger supplied, prior to providing to the user.



Important notes for fitting

- Use the edges of the four corners to push the S-Charge Display into position, ensuring that too much force isn't exerted directly onto the Display itself.
- Fitting and maintenance should be conducted in a clean, dry environment and care should be taken to not subject the system to Electrostatic Discharge (ESD).
- Please ensure that the fitting process is conducted by a qualified technician.
- Please ensure that all components are plugged in securely and that cables are not over-strained.
- Please ensure that the unit is fully charged prior to providing to the user and provide the accompanying user guide.
- The Hub is able to accommodate 2, 3 or 4 S-Cell batteries in one system. This can provide up to 1100, 1650 or 2200mAh to the terminal device. It is the responsibility of the clinician to determine the number of cells required to adequately power the terminal device and any powered accessories. The user's daily usage should be considered when making this decision.
- We recommend the system is charged each night so that a regular charging pattern is established and the user starts each day with a fully charged battery.



Important notes for fitting

- Fabrication dummies are provided to aid manufacture of the prosthesis.
- During charging, the surface of the Hub will exhibit an increase in temperature. This is normal operation and does not signify a fault. The Hub must be positioned to avoid any direct contact with the residual limb. The prosthesis should not be worn during charging, and has a fail-safe fitted to disable the hand and prevent it from operating when the batteries are being charged.
- If the battery is in storage it should be charged at least once every six months.
- Please see page 7 for the display key when following the initial start-up instructions. (A) Magnetic charging point, (B) Mode button, (C) OLED display, (D) Standby button. **Note:** The buttons must not be pressed with excessive force.
- **Note:** the S-Charge System must only be fitted by a qualified prosthetic technician, and prescribed by a qualified prosthetist.

Initial start-up (when connecting the batteries)

The S-Charge System may require a short amount of charging time before initial start-up. Upon completion of set-up, please ensure the device is placed on charge for 4 hours before providing to the user.

1. Connect the Display and S-Cell batteries to the Hub.
2. The Display will read “ENGLISH”
3. Short presses of the Standby button (D) will change the language. Buttons must not be pressed with excessive force.
4. Once the desired language is displayed; wait for 5 seconds where the Display will automatically set the language and show the current charge of the battery.



Note: to change the language after fitting, first press and hold the Mode button (B) once to display the version number. Then, press and hold the Mode button again to enter the Language Change mode and cycle through stages 3 and 4.



5. The system will automatically enter Sleep Mode after 10 seconds where the display screen will become blank. The hand is still operational whilst the system is in Sleep Mode.

Checking the battery level

1. Once the system is in Sleep Mode, it can be woken up by a short press of the Standby button (D).
2. Once woken up, the Display will show the current charge of the battery.



Activating the prosthesis

1. Waking up the system shows the below screen.



2. The prosthesis can be activated by the user holding down the Standby button (D) for 3 seconds.
3. The Display will read either "HELLO" or ON, dependent on the language selected in the Initial Setup stage.



4. This will be displayed for 5 seconds, after which the Display will show the current charge of the battery.



5. This will be displayed for 10 seconds, after which the system will automatically enter Sleep Mode and the screen will become blank.

Deactivating the prosthesis

1. The prosthesis can be deactivated by holding down the Standby button (D) for 5 seconds.
2. The Display will read either "GOODBYE" or OFF, dependent on the Language selected in the Initial Setup stage.



3. This will be displayed for 5 seconds, after which the system will automatically deactivate the prosthesis and the Display screen will become blank.

Low battery level

1. Once the battery level reaches 10%, the display will flash and show one of the following:

B) If the system is awake.



Or

B) If the system is in Sleep Mode.



The battery icon will flash in both instances.

Note: if the battery level then falls below 10%, the system may turn itself off as a safety precaution. It is important that the system is placed on charge as soon as possible once it reaches 10%.

Charging the prosthesis

1. Connect the magnetic plug to the magnetic charging port (A) of the display.



If pulled, the magnetic charger will auto release. If the prosthesis was activated when the charger was applied, the power will be returned to the terminal device. When not in use, do not leave the wall charger turned on.

2. Once the power supply is turned on, the charging display will be shown.



3. The solid segments of the battery show the current charge. The cycling segments of the battery highlight the proportion of the battery total capacity that has yet to be charged.
4. Once the battery is fully charged, all segments will be solid.



5. Once the magnetic plug is disconnected, the display will show:

- a) If the prosthesis was disabled prior to charging.



- b) The current charge of the battery – if the prosthesis was not disabled prior to charging.



Important Information

- Do not connect or disconnect the batteries from the S-Charge whilst charging.
- The hand will not be operational during charging.
- Do not leave unattended when charging.
- Do not use the wall charger if damaged and contact your supplier.

Charging faults

1. If there is a fault detected during charging, the display will be as follows:



2. If this occurs, disconnect then reconnect the charger.
3. Possible faults indicated by the charging fault image include:
 - Overheating
 - Faulty power supply
 - Faulty battery
 - Faulty circuit
4. If the issue has not been corrected by disconnecting and reconnecting the charger, disconnect for 30 minutes and try again. If the problem persists:
 - The batteries may have worn out, therefore may require a replacement
 - Charger may be faulty - try a different unit
5. If the problem still persists, please refer to the troubleshooting guide. If this does not resolve the issue, please contact your provider for further assistance or to order replacement parts.

Troubleshooting

If you do encounter any problems during set up or following set up of the S-Charge System, please note the following troubleshooting advice. For any further information, please contact your supplier. Suitable advice is also provided to the user in the User Guide.

Note: before following any of these steps, first ensure that the batteries are charged, the wall charger is plugged in and switched on, and that the prosthesis switches are in the 'on' position. See pages 7 and 8 for details on how to connect the S-Charge system.

Display not working

Carry out in the following order until working:

1. Check that the wall charger is not faulty by using a known functioning charger.
2. Check that the batteries are not faulty by using previously charged batteries.
3. Remove the Display from the forearm by inserting a flathead screwdriver under the mounting frame (**note:** the mounting frame will break, replacements are provided within the kit). Check all cables for sign of damage - if damaged, replacement parts are required.
4. If cables show no sign of damage, connect the Display to a functioning Hub. If this works, the Hub is faulty.
5. Connect the Hub to a functioning Display. If this works, the Display will need to be replaced.
6. If the Display still does not work, both the Hub and Display will need to be replaced.

Distorted display

Carry out in the following order until working:

1. Disconnect all parts and ensure that the areas between the connections are clear of debris.

2. Connect the Hub to the Display and ensure that the connection is pushed in securely.
3. Connect one battery and if the screen is still distorted, replace with a second battery to ensure that the first is not faulty.
4. Change the Display with a known working Display. If this works, the Display is faulty.
5. Connect the working Display to a working Hub. If this works, the Hub needs to be replaced.
6. If these steps do not work, the Hub and Display need to be replaced.

A broken battery symbol appears and does not charge

Disconnect the wall charger if connected, then carry out the following:

1. Disassemble the prosthesis as necessary to access the S-Charge Hub (as per the previous guide).
2. Disconnect all parts and ensure that the areas between the connections are clear of debris.
3. Connect each battery one at a time, and check for the broken battery symbol on the Display after the connection of each battery. If the broken battery appears on the last battery, check that this is faulty by removing all the other batteries and check the Display once more.
4. If the broken battery symbol is not visible after connecting all batteries, the system has reset and is functioning correctly.
5. If this does not work, the Hub will need to be replaced.

Prosthesis non-operational despite full charge and power on

Carry out in the following order until working:

1. Disassemble the prosthesis as necessary to access the Hub. Disconnect all the batteries for 10 seconds and reconnect them. Check for the broken battery symbol after each.
2. Replace the Hub with a unit which is known to be functioning correctly. If this rectifies the issue, the Hub needs to be replaced.
3. Replace the Display with a known working device, if this rectifies the issue the display needs replacing. If this does not rectify the issue the Hub and Display need to be replaced.

Prosthesis operational despite the S-Charge power off

Carry out the following:

1. Disassemble prosthesis as necessary to access the S-Charge Hub.
2. Disconnect all batteries, then reconnect the batteries.
3. If the problem persists, replace the existing Hub with a new Hub.

Incorrect language

See page 15 in the technical manual for information on how to resolve this.

Care, cleaning & safety

The S-Charge System has been designed to minimise the requirement for any maintenance. There are no user/customer-serviceable parts in the S-Charge System. Do not adjust, dismantle, attempt to maintain or modify any component within the system. If any aspect of the device is not functioning as you believe it should, please contact your supplier for guidance.

It is important to encourage the user to inspect their system to ensure early detection of any potential problems, noting the following:

- Ensure that the charging point is always clear of debris.
- Moisture must not enter the S-Charge System. If liquid does enter the system, it must not be operated and should be returned to your clinician immediately.
- Do not leave the system for an extended period of time in the sun. Over exposure to heat can lead to damage to the display.
- Do not expose the S-Charge System to a naked flame or any other excessive heat.
- Avoid impacts and do not subject the S-Charge System to excessive loads.
- If the battery gives off an odour, generates extreme heat, becomes discoloured or deformed, or in any way appears abnormal during use, recharging or storage, immediately remove it from the prosthesis.

The display can be wiped clean using a soft cloth only. The use of solvents or abrasives may damage the screen, thus affecting the visibility of the text and compromising the effectiveness of the ingress protection.

S-Charge System: Important Information

The Steeper S-Charge System and its associated components are not waterproof and should not be exposed to moisture. Ingress of moisture may cause corrosion and potentially severe damage.

These products are not designed to be opened and have no user accessible or replaceable internal components.

In the event of failure or suspected malfunction, please contact Steeper or your supplier. The batteries must **only be charged** with the appropriate charger and its power supply unit as detailed on page 4. Do not charge the battery whilst the limb is being worn by the user.

The battery is fitted with a safety circuit to prevent the effects of unintended damage and eliminate potential hazard. Should the battery or charger fail to operate, please note the circumstances for diagnostic purposes.

If the S-Charge System has either been in storage or is being transported for longer than an hour, please leave in an ambient temperature (20° C) for a minimum of 2 hours before use.

To avoid potential damage to the Wall Charger, do not affix magnetic contact to any metallic surface other than the S-Charge System.

Warning: do not modify this equipment.

S-Cell Batteries: Important Information

- Handle batteries with care.
- Do not mix battery voltages.
- Do not immerse the battery in any liquid.
- Do not use or leave the battery near a heat source such as fire or heater.
- When recharging, only use the specified battery charger.
- Do not discard the battery in fire or expose it to a flame.
- For transportation, store the batteries in the bag in which they were provided.
- Do not strike, throw, drop or damage the battery.
- Do not try to pierce, disassemble or modify the battery.
- Store batteries out of reach of children.
- Do not use or leave the batteries at high temperatures (e.g. in direct sunlight or in a vehicle in hot weather). This can cause overheating, burning and performance may degenerate therefore the service life will be reduced.
- If the battery leaks, and the electrolytes get into the eyes, do not rub eyes as this could cause injury to the eyes or loss of sight. Instead, rinse the them with clean running water, and immediately seek medical attention.
- If batteries are in storage, recharge every six months otherwise the battery function could be affected.
- S-Cells will degrade after a number of cycles. To order a replacement, please contact Customer Services - this is not included in the warranty.

Warning: do not bend or twist the S-Cell batteries

Warranty terms

Item	Warranty Period	Warranty Terms
Hub and Display*	12 months	Design and Manufacture *Mounting frames exempt
Cables	12 months	Design and Manufacture
Charger	12 months	Design and Manufacture
S-Cell Batteries	12 months	Design and Manufacture, correct charging

Where a claim is made under warranty, this claim must be supported by appropriate documentation. Photographs of any failed batteries must be provided in lieu of the product itself. Please do not send faulty batteries back to Steeper. You must state if you wish us to supply a replacement.

The warranty will be void on all system components if any components have been subject to abuse, repair or maintenance by an uncertified person, deliberate damage, applied loads beyond those for which the product was designed, or by modification, neglect or actions against those outlined in the important information.

The designed service life of the S-Charge System is two years. Other than the guidance outlined in 'Care and cleaning', no other maintenance is required for this system.

Returns

If items are to be returned for any reason, please contact your local distributor quoting the part number and serial number (where applicable). **You will be issued with a returns number and returns form that will need to be completed in full to ensure that your request is dealt with promptly.**

Disposal

The S-Charge System is an electrical device and should not be mixed with general household waste. For proper treatment, recovery and recycling, please take this product(s) to designated collection points.

Alternatively, in some countries, you may be able to return your products to your local retailer upon the purchase of an equivalent new product.

Disposing of this product correctly will help save valuable resources and prevent any potential negative effects on human health and the environment, which could otherwise arise from inappropriate waste handling.

Please contact your local authority for further details of your nearest designated collection point.

Penalties may be applicable for incorrect disposal of this waste, in accordance with your national legislation.



Test certification

The S-Charge System and its associated components listed within this document have been tested and certified to the following standards and requirements:

- Medical Safety Testing:
 - IEC 60601-1: 2005/A1:2012.
 - IEC 60601-1-11: 2015; Includes meeting requirements: ISO 14971:2012.
 - IEC 60601-2: 2014.
- IP22 to BS EN 60529: 1992+ A2: 2013, when the S-Charge display is sealed using the silicone sealant as outlined in the fitting instructions.

Environmental operational conditions

Storage, transport and operation	-20°C (-4°F) to +50°C (+122°F)
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Operational	-5°C (-23°F) to +40°C (+104°F)
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Pressure range	700-1060 hPa
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Maximum 80% relative humidity, above non-condensing

Do not expose to EM emissions above 8kV contact, 15kV air

Quality assurance

Steeper is registered with both the **Medicines and Healthcare Regulatory Authority** in the UK and the **Food and Drugs Administration** of the United States Government for the manufacture and supply of prosthetics and orthotics products.

MHRA Registration N° : 0000006617

FDA Registration N° : 9612243

Model N°: RSL-RP616

Continued compliance with the standard is monitored by a programme of internal and external audits.

All individual products are marked indicating that they comply with the requirements of the Medical Devices Directive 93/42/EEC (MDD).

The **CE** mark may be applied on packaging, accompanying literature or an enclosure, rather than the product itself.

The design and manufacture of Steeper equipment and components are subject to a policy of continuous reappraisal. The company therefore reserves the right to introduce changes and withdraw products without notice.

For the most recent issue of this technical manual, please visit www.steepergroup.com.



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