

dephy

User Manual



For the latest version of this information, please
visit the "How It Works" Page on www.dephy.com



Scan the QR code above to
watch the Sidekick Overview
how-to video

*It's a short guide designed to help you feel
confident and ready to move.*

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Move Forward Together

With your Sidekick, every step feels lighter, every movement more confident, and every adventure more enjoyable. Designed to work seamlessly with your natural motion, the Sidekick helps you keep moving longer, with less effort, so you can focus on what matters most. The Sidekick is a general wellness product and not a medical device.

At Dephy, we believe movement should be a source of freedom, not frustration. For over a decade, we've combined research, innovation, and real-world experience to empower people to live fully, confidently, and on their own terms. Let's move forward together.



1. **Dephy Sidekick** (assembled with adjustable shin levers ("shlever"), shin pads, and calf straps)
2. **Dual Bay Charger** + charger brick and cable
3. **2 Batteries** (1 pair)
4. **Case** that contains the above items
5. **Shoes** compatible with the Sidekick
6. **Fit Adjustment Tool** (used to adjust the height and angle of the "shlever" if needed)

Meet Your Sidekick

Each Sidekick comes configured with your specific shin lever (shlever) and calf strap length. It is designed for comfort and adaptability, allowing you to find the right fit for your body. Be sure to check orientation carefully when attaching, as correct Left/Right alignment is essential for both comfort and performance. "L" and "R" labels are located on the inside of the Sidekick body and on the front of the shlever for easy reference.



This manual is intended to provide instructions for safe and proper use of the Sidekick. Please read each section carefully before use, and reach out to support@dephy.com if you have any questions.

Important Safety Information & Emergency Instructions

In Case of Emergency

- ⚠ If you become injured, uncomfortable, or notice skin irritation, remove the device and stop using it immediately.
- ⚠ If you notice heat, smoke, or an unusual smell from the battery, move the battery outdoors. If you cannot safely handle it, evacuate the area, close doors behind you, and call emergency services immediately. Otherwise, contact Dephy Customer Experience at support@dephy.com.

Safety Information & Warnings

The Dephy Sidekick is designed for safe use, and safe use depends on the user following all guidelines. This section provides an expanded overview of risks, precautions, and correct operating conditions.

⚠ FIRE HAZARDS

- The Sidekick uses lithium polymer batteries, which can pose a fire hazard if handled improperly.
- Do not puncture, crush, or drop batteries. If dropped from over 4 feet, remove the battery from service.
- Do not submerge the battery in liquids or expose it to direct heat sources such as stoves or radiators.
- Use only Dephy-approved chargers. Non-approved charging equipment may create hazardous conditions.
- Do not leave batteries unattended while charging. Remove from charger once full.

⚠ DEVICE USE HAZARDS

- The Sidekick is intended for able-bodied adults and should not be used by people that have poor balance or an increased risk of tripping.
- Do not use or store the Sidekick in hazardous environments, including near flammable liquids, solids, or gases.
- Be cautious when walking on compliant or uneven terrain.

- Exercise caution on stairs:
 - Use the handrails when ascending or descending stairs.
 - Do not transition from running to stairs while using the Sidekick.
 - Walk before engaging in stairs.
 - Do not run up or down stairs.
 - Take 1 step at a time when going up or down stairs.
- Always secure straps and pull tabs firmly before use. Loose straps can cause the device to detach.
- Do not operate while driving or in environments where foot entrapment may create risks.
- Children must not operate the device, or be allowed to play with it.
- Use caution on tight turns, steep declines, and very slow walking.
- Avoid using the device near saltwater or on loose, unstable, or slippery surfaces such as gravel, sand, or ice.
- Avoid long hair, jewelry, or loose clothing getting snagged in the moving parts.


TRAVEL & TRANSPORT

- Do not drive while the Sidekick is attached to your leg or shoe.
- Follow airline safety rules regarding travel with LiPo batteries, i.e. batteries must be carried in hand luggage when flying.

ENVIRONMENTAL HAZARDS


- Do not use the Sidekick in prolonged wet, sandy, or dusty conditions.
- Operating temperature range is 0°C to 30°C (32°F–104°F). Do not use outside these limits.
- Store devices and batteries below 30°C (86°F). For long-term storage, keep batteries at a charge of at least 50%.
- Do not store Sidekick in direct sunlight for extended periods of time.
- Follow local hazardous waste guidelines for end-of-life disposal.

General Support

-  For all product inquiries and issues, please email Dephy Customer Experience at support@dephy.com and specify what the question or problem you are having in the subject line. You can expect to receive a response within 1-3 business days. Please use images when applicable.

Quickstart Guide

This section provides a step-by-step overview for first-time setup and daily use. Each step includes best practices to help you achieve the best fit and function from your Sidekick.

 **Pro tip:** Just like a new workout or breaking in new shoes, it's best to ease into using your Sidekick. Some minor muscle soreness is normal at first, similar to starting a new exercise routine.

Step 1: Attach to Your Shoe

Start with your Dephy shoes laced comfortably. Ensure that the Dephy logo on the Sidekick Quick Connect is level before trying to attach the Sidekick to the shoe.



Hold the Sidekick vertically at the heel of your shoe. Rest the hooked connector against the magnetic bar on the shoe cleat, then rock the device forward until you hear an audible click. This ensures the connection is secure.

 Do not attach a Sidekick that has already been turned on.

Step 2: Adjust the Shlever & Calf Strap

CORRECT SHIN PAD POSITIONING

While in a seated position, the top of the shin pad should rest about two fingers below the bottom of your knee and the circular pad on the inside of the Sidekick should be close to, but not touching your leg.



- ⚠ Do not wear the Sidekick such that the circular pad located on the inner side of the Sidekick is in constant contact with the side of your leg. This part of the Sidekick gets warm and might irritate your leg.
- ⚠ Do not wear with a loose shlever screw. Utilize the provided shlever adjustment tool to adjust the height of the shinpad. Once adjusted, tighten until you hear an audible click. Always verify the shlever screw tightness before use.

ADJUST THE SHIN PAD HEIGHT AND SIDEKICK OFFSET FROM LEG (AS NEEDED):

Your Sidekick will arrive set to your personalized measurements and adjustment to the shin pad height and offset should not be required.

If you need to make any adjustments to the shin pad height or device offset from your leg, loosen the shlever set screw using the fit adjustment tool provided. Then, gently pull up or push down on the shlever to change the height of the shin pad. As you pull up or push down on the shlever, the Sidekick will also move closer to or farther out from the side of your leg. When you have found comfortable positioning, re-tighten the shlever set screw until you hear an audible click. This means the Sidekick is locked at that position. The numbered dial markings at the shlever insertion point indicate your preferred shlever angle.



FASTEN THE CALF STRAP:

Thread the strap through the shin pad slot on the inner side of the leg. Then, adjust it so it rests above the widest part of your calf muscle. Fasten it back on itself so that it is snug. If your pants bunch under the strap, smooth them out before tightening for added comfort. The strap should fasten near the center of the back of your leg. If it does not, you may need to size up/down a strap size.



⚠ Using a strap too short could lead to the device falling off your leg.

Step 3: Insert Batteries & Power On

When using your Sidekick, always start by ensuring the batteries are fully charged and properly inserted. To check the battery charge before inserting it into the Sidekick, press the button on the battery. The four LEDs on the battery indicate the state of charge. Next, insert a battery into each device with the lights facing up and the button outward. Push until you hear a click. Hold the battery power button for three seconds to turn on the Sidekick. LEDs will confirm power-on by blinking.



Step 4: Initialization

Once powered on, remain still until you feel the Sidekick gently hug your shin — a signal that it is aligning with your body. There are 3 LEDs on the Sidekick Boost Level interface that will blink white in succession during this process. The Sidekick will have completed its initialization once the hug is completed. This process takes a few seconds to occur once the Sidekick is powered on.



⚠ Do not run until walk training in step 5 is complete

Step 5: Train Your Sidekick

After powering on and initialization, the Sidekick will enter training mode. Training helps the Sidekick learn your walking style so that your applied boost feels most natural and beneficial. During training, the Sidekick is not boosting your gait – it is learning.

To train your Sidekick, walk 20 strides on level ground at your natural consistent pace. The Sidekick will then begin boosting automatically. Training at your typical speed produces the best results.



During training, all three LEDs on the Boost Level Interface will blink until the Sidekick training is complete. If the Sidekick doesn't feel fully adjusted after training or if boost timing feels off, power both batteries off, turn them back on, wait for initialization, and repeat the training process.

Step 6: Experience the Boost

As you start moving, the boost will gradually increase in power, until it reaches its set boost level. You may now walk, run, go up or down stairs, and the device will support you.

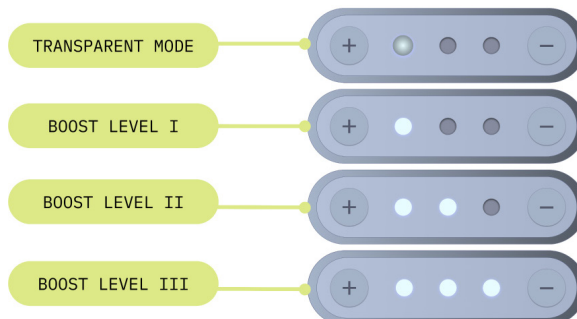
BOOST LEVELS

When walking on any terrain or incline, the Sidekick offers three levels of boost (low, medium and high) that are shown as 1, 2, or 3 LEDs on the Boost Level interface, as well as a transparent mode shown by the first LED slowing blinking. These can be adjusted using the plus or minus buttons on the device. The transparent mode provides no boost while carrying its own weight, for when you don't want the Sidekick to boost you, all while not taking it off.

The first time you use the Sidekick, the boost mode will be at level II - medium level. You can adjust the boost to match your activity and comfort level. Following adjustment, the Sidekick will remember the boost level from the last usage. You must adjust left and right Sidekick separately.

The Sidekick is designed to boost forward motion. If the Sidekick cannot detect a forward movement or detects a different movement than the ones mentioned above, it will automatically and purposefully get out of your way and not provide any boost. Once it recognizes your forward movement, it will gradually start boosting again.

The device will also recognize when you begin running and will switch into running mode. The Sidekick offers a single running boost mode. The Sidekick will also recognize stairs. When going upstairs, the Sidekick will provide a gentle assist. When going downstairs, the Sidekick will provide a cushioning support to dampen each step taken.



- ⚠ The Sidekick slightly increases your leg profile. Use care when navigating doorways and steps to avoid contact.
- ⚠ For some people, the Sidekick may slightly limit ankle range of motion when walking on stairs or slopes. Take care to make sure your toes clear the ground with each step.
- ⚠ Use caution on tight turns, steep declines or inclines. The Sidekick may pause boosting momentarily.
- ⚠ When coming to a stop, avoid sudden movements.
- ⚠ Always use the handrails when ascending or descending stairs.
- ⚠ Do not transition from running to stairs while using the Sidekick. Always walk before engaging in stairs. Do not run up or down stairs.
- ⚠ Take one step at a time when going up or down stairs.
- ⚠ Be cautious when walking on compliant, slippery, or uneven terrain.

Step 7: Power Off

You can power down your Sidekick in two ways: by holding the battery power button for three seconds until the lights turn off, or by removing the batteries entirely. To remove the battery, press on the battery release button located behind the battery well and pull up on the battery with the other hand.



Step 8: Remove Device

Unfasten the calf strap at the inside of your leg and either pull up directly on the pull tab at the heel or rock the device outward and backward to release it. You can continue wearing Dephy shoes without the Sidekick attached.

I. PULL TAB METHOD



II. OUT AND BACK METHOD



Step 9: Charging the Batteries

I. SET UP THE CHARGER

To set up the charger, first plug the AC adapter into a wall outlet; the charger brick will show a green light to confirm it is working. Next, insert the barrel connector of the charger brick into the receptacle on the back of the Dual Bay Charger; a green light to the left of the barrel connector will turn on, confirming the Dual Bay Charger is powered and ready for use.

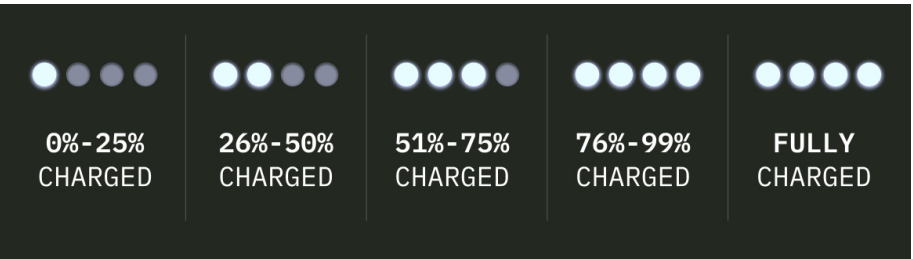


II. CHARGE THE BATTERIES

Before charging, check that the bays are free of dust or debris. Place a battery into the Dual Bay Charger, pin side down, and ensure it is seated securely. The charger can hold and charge one or two batteries simultaneously, and either bay may be used. When connected correctly, the battery LEDs will light up, with the active charging level blinking.

III. BATTERY CHARGE STATUS INDICATORS

As soon as the battery recharges past a given LED's level, that LED will turn solid, and the next LED in sequence will begin to slowly blink.



IV. BATTERY SAVING MODE

The Sidekick features a low-power mode. As the battery approaches depletion, it automatically reduces assistance to extend the remaining battery life until your next charge.

Battery & Device Health Data Monitoring

Each time the battery is placed on the Dual Bay Charger, all battery and usage data collected since the previous charge is automatically transmitted to Dephy through the nearest cell tower. The data package includes information such as battery health, charging cycles, and step counts, along with the location of the cell tower used to send the transmission. No personal identification information or precise user location is captured. This reporting process enables Dephy to monitor system reliability and support ongoing improvements to the Sidekick platform.

With integrated IoT capabilities, the Sidekick Dual Bay Charger can monitor each battery's status and log data to a secure cloud server via an LTE module. This real-time data tracking provides valuable insights into battery health, usage patterns, and charging efficiency—all without requiring any user interaction.

 The charger has no user-serviceable parts. Do not disassemble.

For more information on the Battery or Charger, please refer to the technical specifications in the Appendix of the User Manual.

Cleaning & Care

- **Sidekick Body (metal components):** Wipe with a damp cloth to remove dirt or dust. Don't use harsh cleaners, solvents, or immerse in water. Keep the connectors free of debris.
- **Battery & Charger:** Wipe the battery and charger with a clean, dry cloth only. Do not use liquids, solvents, or cleaning sprays. Make sure the charger and battery are dry before use.
- **Calf Straps and Shin Pads:** Wipe down with a damp cloth after use. Let items air dry completely before wearing again.
- **Shoes:** Spot clean with mild soap and water using a soft cloth or sponge. Line dry fully. Do not machine wash, tumble dry, or expose to high heat. If debris builds up in the cleats, rinse the rear of the shoe with water and allow it to dry completely.
- **Deeper Cleaning:** For a more thorough clean of the shin pad and calf strap, disassemble the soft goods and handwash the calf strap and shin pad in a mild, warm, soapy solution and air dry.

Sidekick Component Removal & Reassembly

For easy removal, use the shlever adjustment tool to loosen the shlever and raise the shlever to its highest position. This will allow for more clearance around the shin pads. When the shlever is at the highest position, re-tighten the shlever screw so that the shlever doesn't move while you are removing the calf strap and shin pad.

Removing the Calf Strap

Unfasten the Velcro strap and, starting from the strap anchor, pull the strap through the slot in the shin pad until it separates from the shin pad. Set aside.

Removing the Shin Pad

Unfasten the Velcro flaps on the front of the shin pad, one side at a time, and slide the shin paddles out of the shin pad pockets.

Reassembling the Shin Pad

Insert the shin paddles into the shin pad pockets, one paddle at a time, and fasten the shin pad flaps over the shin pad pockets. Once the shin pad is fully secured to the shin paddles, reinstall the calf strap.

Reassembling the Calf Strap

Thread the calf strap through the shin pad slot closest to the Sidekick body. Feed the strap from the back of the shin pad toward the front until it stops at the strap's end stopper. Once fully threaded, the Velcro side should face outward, with the neoprene side on the inside, as this will be the side touching your leg. For reference, see the "Sidekick Shin Pad and Calf Strap Care" how-to video.

Removing the Shlever

Remove the calf strap prior to removing the shin pad + shlever. Place the Sidekick on a flat surface with the shlever and shlever screw facing upward.

1. Using the shlever adjustment tool from your kit, turn the shlever screw counterclockwise approximately 10 full turns until it is fully removed from the silver shlever wedge.
2. The silver wedge will drop into the battery well once it is free from the screw. Retrieve the wedge and screw with the washer and set them aside.
3. Rotate the shlever 180° so that the shlever and shin pad face outward from the Sidekick.
4. Pull the shlever away from the Sidekick to detach it.

Reassembling the Shlever

1. Position the shlever and shin pad so they face outward from the Sidekick.
2. Insert the shlever connector into the Sidekick dock, then rotate the shlever 180° to loosely lock it in place.
3. While holding the shlever and Sidekick steady, drop the silver wedge into the back of the dock inside the battery well. The wedge should sit securely in the half-moon space.
4. Insert the shlever screw and washer into the front of the dock.
5. Tighten the screw clockwise with the adjustment tool until you hear a click.

For reference, see the "Removing and Reassembling Your Shlever" how-to video.

Troubleshooting

This section addresses common issues you may encounter with the Sidekick and provides practical solutions.

WHAT SHOULD I DO IF MY SIDEKICK WON'T TURN ON?

- Ensure batteries are fully inserted until you hear a click.
- Check that the battery has sufficient charge. Recharge if no LEDs appear.
- If the issue persists, contact support@dephy.com.

WHY ISN'T MY SIDEKICK BOOSTING?

- Walking too slowly, making sharp turns, or pausing during your walk can temporarily pause boost. The Sidekick requires at least two steps of walking after a non-walking motion to verify you are walking again and are ready to be boosted.
- Verify that the device has completed gait training on level ground. Training is indicated by all three LEDs blinking at once until training is complete. Once training has completed, the Boost UI will display one, two, or three solid LEDs.
- Ensure boost level is set appropriately using the +/- buttons.

WHAT SHOULD I DO IF MY SIDEKICK DOESN'T FEEL QUITE RIGHT AFTER TRAINING?

- Power off both batteries and power them back on.
- Wait for initialization & repeat the training process.

WHY DOES THE BATTERY SHOW BREATHING WHITE LIGHTS?

- It has overheated.
- Power off the device and remove the battery.
- Allow the battery to cool before attempting to recharge.
- If the issue continues, contact support@dephy.com.

MY QUICK CONNECT WON'T CONNECT TO MY SHOE. HOW DO I FIX THIS?

- Ensure the Quick Connect is properly aligned with the magnetic cleat on the shoe, and that you hear an audible click when you rock the Sidekick forward on the shoe cleat.
- Remove any dirt or debris from the cleat before reattaching.
- If the issue continues, contact support@dephy.com.

MY SIDEKICK FEELS JAMMED OR NOISY. HOW DO I FIX THIS?

- Turn the device off, then back on.
- Some noise heard while sitting or not actively walking is normal, but persistent or grinding noises should be reported to support@dephy.com.

WHAT IF I FEEL DISCOMFORT WHILE USING THE SIDEKICK?

- Reposition the shlever, so the top of the shin pad sits 2 inches below the knee and the Sidekick is close to your leg but not touching it.
- Adjust strap tightness — snug but not restrictive.
- Smooth the pants fabric beneath the strap to reduce irritation.

Certifications & Declarations

- The Dephy Sidekick system has been designed to comply with international standards for safety, including **ISO 13482: Robots and robotic devices — Safety requirements for personal care robots**. Compliance has not yet been evaluated, and test results are pending.
- The Sidekick has been tested and complies with IP54 for water and dust incursion. It is not waterproof, but ok to wear in light rain.
- The battery has been tested and complies with IP66 for water and dust incursion. Avoid immersion of the battery in water.
- The battery has been tested and complies with UN38.3 for transport.
- The battery is designed to meet UL/IEC 62133. Compliance testing is underway, and test results are pending.
- The Sidekick system, battery and charger have been tested and comply with FCC Part 15 Subpart B, EN/IEC 61000-6-1, and EN/IEC 61000-6-3.
- The charger has been tested and complies with IEC/EN/UL 62368.

Warranty & Service Policies

WARRANTY POLICY

Your Sidekick body, shlever, calf straps, shin pads, batteries, and charger are covered against defects in materials or workmanship for one year from the date of purchase, provided the product remains in its original, unmodified condition. Shoes are not covered. Please refer to our Warranty Policy included with your Sidekick and on our website for additional information.

For service needs, please refer to our website or contact support@dephy.com.

RETURN POLICY

If you need to return your product, we've got you covered. Returns are accepted within 30 days of shipment. Items should be sent back in their original packaging. Hardware must be unmodified and in new condition, and soft goods must be new and in unused condition. Dephy may refuse returns that don't meet these conditions. Once your return is received and inspected, Dephy will issue a refund to your original payment method. Please refer to our Return Policy included with your Sidekick and on our website for additional information.

REPAIR POLICY

If you need a repair and are still within the warranty period, we've got you covered. For repairs outside of the warranty period, contact support@dephy.com for more information. Please refer to our Repair Policy included with your Sidekick and on our website for additional information.

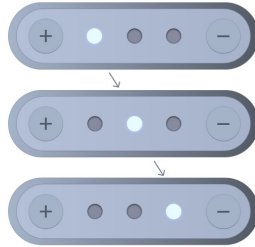
Appendix

LED Indicators

There are two sets of LEDs - one on the battery, and one on the face of the Sidekick (the Boost Indicator) that tells you the Boost Level.

BOOST UI LED INDICATORS

- **Awaiting complete initialization:** After Power On, the three LEDs will blink in succession until the Sidekick training is complete.



AWAITING TRAINING COMPLETION

- **After initialization is complete,** all three LEDs will slow blink together until the Sidekick training is complete.



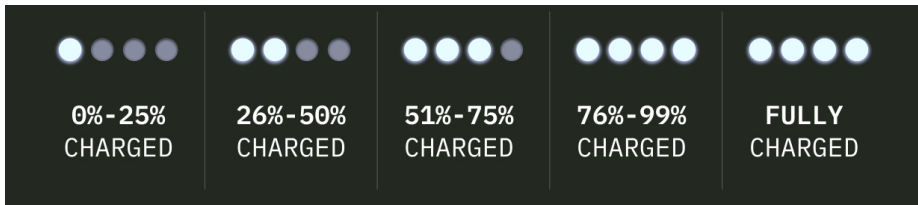
- **After training is completed,** the boost level will default to Boost level II for first time use. If the boost level is changed, it will remember and stay at that new level the next time the Sidekick is used.



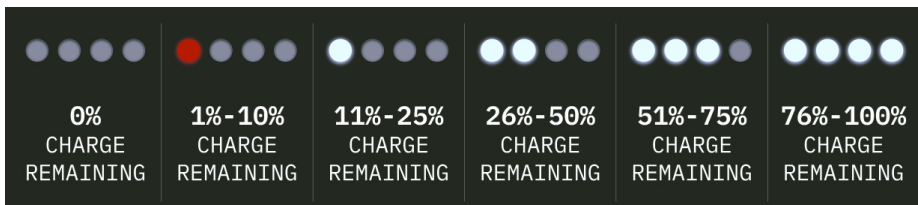
BATTERY LED INDICATORS

The Sidekick features LED indicators both on the battery and the boost display. These provide real-time feedback on charge status, boost level, and error state. Refer to this appendix when checking battery health or boost mode.

Battery Charge Status indicators when charging batteries:

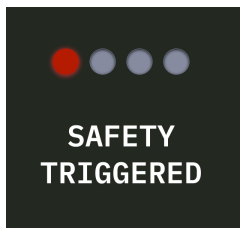


Battery Charge Status indicators when batteries are not being charged:



When the battery is powering the Sidekick, the red LED will slowly blink to inform you of low charge when there is about 5 minutes left before the battery shuts off. Otherwise, all LEDs will display solid.

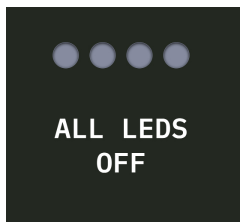
BATTERY SAFETY LED INDICATORS

**1 red solid and 3 white slow blinking**

A problem was detected. The battery pack output and input are disabled and the battery cannot be charged or discharged. Stop use of battery and reach out to support@dephy.com.

**4 white slow blinking**

The battery is overheating. Stop use & remove from device or charger. Wait until the battery reaches low power mode.

**All LEDs OFF**

If the battery is in the Sidekick, it is currently not providing power to the system. The Sidekick remains "off".

If the battery is not in a device, this mode is the most energy efficient state, using the least amount of current while still keeping safeties functional.

Sidekick Technical Specifications

Product: The Dephy Sidekick is a Personal Care Robot that performs actions contributing directly towards improvement in the quality of life of humans, excluding medical applications.

Within this category, the Sidekick is a Physical Assistant Robot. This is a personal care robot that physically assists a user to perform required tasks by providing supplementation or augmentation of personal capabilities.

Following ISO-13482, the Sidekick is specifically a low-powered (2.1) restraint-type physical assistant robot that is fastened to a human during use. This includes non-medical physical assistance exoskeletons which can be overpowered by the user.

- Design Version: January 2026 - First released version
- Use: Walking and running assistance for adults. The Sidekick is not a medical device.
- Lifespan: Tested for durability for more than 6M steps (>6000 miles)
- Features:
 - Battery-powered activation through mechanical assistance
 - Compatible with Dephy footwear
 - Designed to accommodate shoe sizes 4-14M/6-16W, available in half sizes, and calf circumferences up to 23 inches
 - Four power levels (Boost level I, II, III, Transparent)
 - Removable soft goods for cleaning
- Mass:
 - Actuator Mass (per side, maximum configuration, without shoe, without battery): 1.17 kg
 - Shoe Mass, typical, per side (size 10): 0.5 kg
 - Battery Mass, per side 0.25 kg
 - Sidekick net weight: 1.42kg or 3.13lbs (including battery) (each side)
- Dimensions: 1.5inW x 15inH
- Ingress Protection for the system: IP54. It can be used in light rain, but avoid heavy rain or submersion.

- Exterior Materials:
 - Housing and mechanical actuators: Aerospace grade aluminum alloy
 - Plastic covers: ABS
 - Shin pad cover: Spandex
 - Calf strap: Neoprene
 - Medial pad: Synthetic Microfiber
- Operating Conditions:
 - Temperature Range: 0°C to 30°C (32°F to 104°F)
 - Storage Temperature: Up to 30°C (86°F)
 - Not rated for wet, sandy, or dusty environments (IP54 equivalent)
 - Best experience with forward motion over flat ground, <20% incline/decline, up and down stairs, and flat, moderately rough terrain
- Sidekick Lifespan:
 - Dephy footwear will wear out over time, similar to conventional footwear. Monitor the look and feel of the footwear for signs of significant wear, and replace accordingly.
 - Beyond the wear of shoes, shin pad assemblies, and batteries, the Sidekick does not require a regular maintenance schedule.
 - If you see signs of damage to any of these parts, discontinue use and contact support@dephy.com.
- Other useful information:
 - A fully charged battery should last about 5 miles (approx. 1.5 hours) on Boost Level II.
 - The batteries have been tested for reliability over hundreds of charge/discharge cycles.
 - If you are seeing reduced battery performance, contact support@dephy.com to determine if your battery has reached the end of its useful life and it is time to purchase a replacement.

Battery Information

The Dephy battery is a UN38.3 certified Lithium Polymer (LiPo) battery pack that has a maximum stack voltage of 39.01 V, capacity of 900 mAh, and integrated battery management system (BMS). It has built in safeties for overcharge, overdischarge, thermal monitoring, and short-circuit protection. The status indicator consists of four white LEDs and one red LED.

Battery Charging Safeties

- Only charge batteries on a Dephy Dual Bay Charger. Do not use a non-Dephy charger.
- Only charge in environments between 32°F/0°C and 113°F/45°C.

Handling & Storing

- Always insert and remove batteries using the provided latch; never force them.
- Do not store batteries or the Sidekick in environments above 86°F/30°C. Do not store in direct sunlight.
- Long-term Storage: Batteries that will not be used for more than two months should be at least 50% charged.

Disposal

Never throw LiPo batteries in the trash or recycling bin. To dispose of them safely, place the battery in a plastic bag or fireproof container. Find a local recycling center, household hazardous waste collection site, or a participating retailer that accepts lithium batteries. You can also contact call2recycle.org to find locations that accept LiPo batteries.

 The battery has no user-serviceable parts. Do not disassemble.

Sidekick LiPo Battery

KEY FEATURES

- 39 V 900 mAh LiPo battery pack with integrated battery management system (BMS)
- Safety first: built-in safeties to prevent over-charging, over-discharging, and maintain cell balance
- An integrated BMS maintains cell health and enables hundreds of charge / discharge cycles
- An integrated lower power mode to extend battery life



SPECIFICATIONS

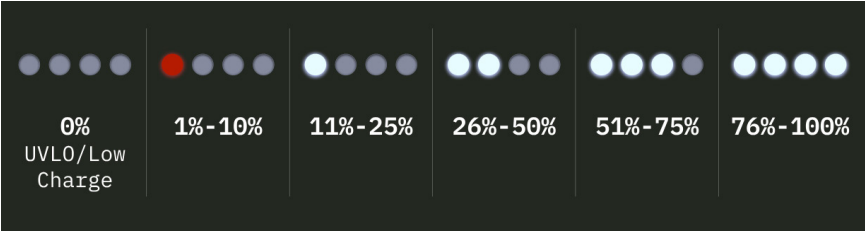
| SPECIFICATION | TYPE | DESCRIPTION |
|-------------------------------------|------|-----------------------------|
| Chemistry | | Lithium Polymer (LiPo) |
| Cell configuration | | 9-series, 1-parallel (9S1P) |
| Nominal voltage | | 34.2 V |
| Maximum stack voltage | | 39.01 V |
| Capacity ¹ | | 900 mAh |
| Design Version | | V02 |
| Battery Management System (BMS) | | Custom Dephy BMS |
| Status Indicator | | 4 white LEDs and 1 red LEDs |
| Recommended Max. Continuous Current | | 5 A |

| | |
|---|---|
| Absolute Max. Current (OCD) | 18 A for 330 ms |
| Short-Circuit Current (SCD) | 35 A for 210 μ s |
| Software Undervoltage | cell: 3.3 V or stack: 29.7 V |
| Hardware Undervoltage | cell: 2.5 V or stack: 22.5 V |
| Hardware Protection Layer | 20 A Slow-Blow fuse + TVS |
| Internal Operating Temperature | Discharge: > 60°C Charge: 0°C – 45°C |
| Ambient Operating Temperature | Discharge: -20°C – 45°C Charge: 0°C – 45°C |
| Storage Temperature (> 1 month) | -20°C – 30°C |
| Connector | Blade Connector (8 pins) |
| Charger | Dephy IoT Charger (IC01) Do NOT use a non-Dephy charger. |
| Mass | 250 g |
| Size | 31.0 mm x 71.7 mm x 102.5 mm |
| ¹ Capacity: measured at 1A constant current discharge, 25C ambient temperature | |

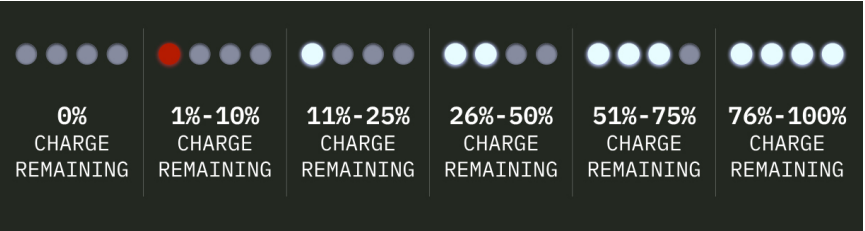
GAS GAUGE

The gas gauge is our battery charge level indicator.

Idle



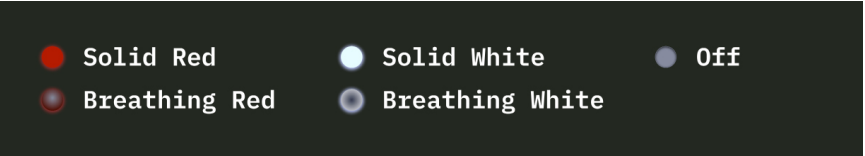
Discharging



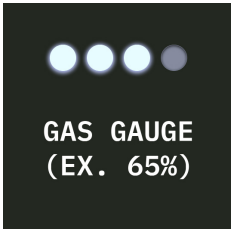
Charging



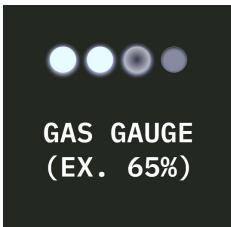
Legend



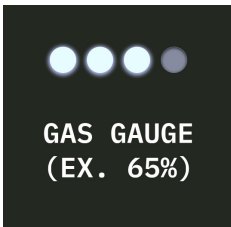
BMS STATES

**Idle**

No charger and no load after pressing the button. Will go to Low-Power mode after five seconds.

**Charging**

The battery is charging and will be ready to be removed from the charger once the LEDs indicate fully charge. Please refer to the Gas Gauge diagram above.

**Discharging**

Connect to the device and press and hold the button.

While holding down the button, after two seconds, the LEDs will turn on to show the current Gas Gauge power level. Release the button here to sustain power to the system after the LEDs are on

To power off the system, press and hold the button for more than two seconds. The lights will return to "Low Power" mode with all LEDs off.

**Safety Triggered**

A problem was detected. Pack output and input are disabled, the battery can't be charged or discharged. If the fault is removed, it will eventually time out and go back to Low Power. The period depends on the fault.



**4 WHITE
BREATHING**

Over Temperature

The battery is overheating. Remove from device, or charger, and set in a LiPo bag until it reaches Low-Power mode.



**ALL LEDS
OFF**

Low Power

If the battery is in the device, it is currently not providing power to the system, keeping the device "off".

If the battery is not in a device, this mode is the most energy-efficient state, using the least amount of current while still keeping all safeties functional.

 **Solid Red**

 **Solid White**

 **Off**

 **Breathing Red**

 **Breathing White**

Safety Information

The BA9x is intended for use by authorized users in a controlled environment.

1. Do not disassemble, puncture, or drop the battery.
2. Inspect any dropped battery for cracks; remove any battery with visible damage from service.
3. Do not submerge the battery in any liquids.
4. Do not short the output of the battery.
5. Do not leave the battery in direct sunlight for extended periods.
6. Do not operate the battery beyond normal room temperature range.
7. Do not charge the battery until the battery temperature has reached room temperature.
8. Inspect BA9x terminals before use to ensure connector integrity.
9. Inspect BA9x terminals before use and remove any debris (using a non-conductive tool).
10. Inspect BA9x housing for damage or bulging before each use.
11. Only use Dephy chargers and accessories.
12. Use the battery only with compatible Dephy products to prevent connector damage.
13. Do not use batteries outside the operating conditions listed in the specifications.
14. Batteries stored for more than two months should be charged to at least 50%.
15. Dephy batteries are designed with several safety features to minimize the risks of creating hazardous conditions. One safety mechanism is the venting of gasses in the event of an internal short within the battery cells. The gas released by a venting Li-ion cell is mainly carbon dioxide (CO₂). Other gases that form through heating may contain vaporized electrolyte consisting of hydrogen fluoride (HF), and phosphoryl fluoride (POF₃), combustion products and organic solvents. In the event of a battery vent occurrence:
 - Disconnect any charger or load.
 - Place the battery in move the battery to an area with good ventilation.
 - Ventilate the room and vacate the area if smoke and gasses are present.
16. A fire involving Dephy products, including LiPo batteries, can be handled like any other combustible fire. For best results use a foam extinguisher, CO₂, ABC dry chemical, powdered graphite, copper powder or soda (sodium carbonate).
17. If a semi-sweet smell is detected emanating from the battery, contact Dephy.
18. Contact Dephy Customer Experience at support@dephy.com for appropriate

For more information, please refer to https://batteryuniversity.com/learn/article/safety_concerns_with_li_ion

Charger Information

Dual Bay Charger: IoT Connected Charger for Dephy 9S Batteries



FEATURES

- Two bays for dual battery charging
- Constant current and constant voltage charging modes, with automatic transition
- Trickle charge for deep-discharged batteries
- Input protections:
 - Reverse polarity protection
 - Overvoltage protection
 - Soft start
- Battery protections:
 - Electrical and mechanical reverse polarity protection
 - Overvoltage and overcurrent protection
 - Hardware and firmware redundant
- Temperature-dependent charging profile
- Automatic telemetry of battery and charger faults
- Battery connection detection
- Certifications:
 - FCC Class B
 - IEC 62368-1 (pending)

DESCRIPTION

The **Dual Bay Charger** is a dual-channel charger for the Dephy BA9x series of 9-cell batteries. It charges autonomously and with high energy efficiency. The charger contains hardware and software features to protect batteries against overvoltage, overcurrent, overtemperature, and other adverse events.

ELECTRICAL SPECIFICATIONS

All specifications are at 25 °C unless otherwise stated.

| ITEM | SYMBOL | DESCRIPTION/CONDITIONS | MIN | TYP | MAX | UNIT |
|-------------------------------|---------------|---|-------|-------|-------|------|
| Charger input voltage | V_{IN} | Voltage at barrel jack | 20.0 | 24.0 | 28.0 | V |
| Battery output voltage | V_{OUT_CV} | Constant voltage mode | 38.23 | 39.02 | 39.80 | V |
| Battery low-voltage threshold | V_{OUT_CV} | Relative to V_{OUT_CV} | | 71.4% | | |
| Battery recharge threshold | V_{RECHG} | Relative to V_{OUT_CV} | | 97.6% | | |
| Output current (per channel) | I_{OUT_CC} | Constant current mode | | 610 | | mA |
| | I_{OUT_PC} | Pre-charge mode | | 60 | | mA |
| Termination current | I_{TERM} | Constant-voltage mode cutoff current | | 50 | | mA |
| Startup time | t_{SU} | Time between barrel jack connection and start of charging | | ? | | ms |

CELLULAR SPECIFICATIONS

All specifications are at 25 °C unless otherwise stated.

| ITEM | SYMBOL | DESCRIPTION/CONDITIONS | MIN | TYP | MAX | UNIT |
|-------------------|--------|------------------------|-----|------|-----|------|
| Transmit Power | | LTE-M/NB-IoT | | | 23 | dBm |
| Receive intensity | | LTE-M | | -105 | | dBm |
| | | NB-IoT | | -113 | | dBm |
| Transmit current | | | | | 550 | mA |

THERMAL SPECIFICATIONS

| ITEM | SYMBOL | DESCRIPTION/CONDITIONS | MIN | TYP | MAX | UNIT |
|-----------------------|---------------------|------------------------|-----|-----|-----|------|
| Operating temperature | T_{MIN} T_{MAX} | | 0 | | 50 | °C |
| Storage temperature | | | 0 | | 65 | °C |

CONNECTORS & PINOUTS

The Dual Bay Charger features three external connectors: one barrel jack for DC supply voltage and two eight-pin spade connectors for charging the batteries.

BARREL JACK

The barrel jack on the back face of the charger is used to supply the system with DC power. It accepts connectors with 2.1 mm inner diameter (ID) and 5.5 mm outer diameter (OD). The allowable input voltage range is 20–28 V DC. The polarity is positive tip with negative shield. A green LED near the jack illuminates when appropriate power is supplied.

Figure X: Polarity symbol for charger DC input barrel jack



Warning: While the Dual Bay Charger has protections against reverse polarity and overvoltage, it should be used only with the provided wall adapter. Using a different adapter can cause permanent damage to the charger.

