



POWER HAWK[®]
RESCUE SYSTEMS

P-16 RESCUE SYSTEM



Safety & Instruction Manual



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GENERAL SAFETY INFORMATION

The Power Hawk® P-16 Rescue System is designed to provide safe operation. All users should read and be thoroughly familiar with the operating instructions and safety precautions contained in this manual. Operator safety depends on users being properly trained by the Authority having jurisdiction and using the tool for the purpose intended. The following safety precautions must be observed at all times. **FAILURE TO DO SO COULD RESULT IN SERIOUS PERSONAL INJURY AND/OR DAMAGE TO PROPERTY AND/OR EQUIPMENT.**

- The Power Hawk® P-16 Rescue System shall only be operated by persons authorized by the Authority having jurisdiction.
- Suitable protective equipment shall be worn as directed by the Authority having jurisdiction. At a minimum, this should include gloves, helmet, eye protection, and body protection – such as turnout gear.
- Prior to use, inspect all Power Hawk® P-16 Rescue System components for any signs of damage or fraying. Do not use damaged equipment.
- Stay alert. Do not operate tool when tired.
- The Power Hawk P-16 Rescue System has been third-party water tested in accordance with Standard IEC 529 (the Standard for Degrees of Protection Provided by Enclosures) and passed the highest water jet spray test requirements of Clause IPX6. If the tool, however, becomes completely submerged under water, contact the Factory or an Authorized Power Hawk® Service Center regarding the service necessary to remove any ingested water and to ensure proper re-lubrication of parts. Failure to do so could result in internal corrosion of parts that could lead to the tool not working properly.
- Use only Factory authorized service parts.
- This tool should only be used with accessories approved by Power Hawk Technologies, Inc. Use of unauthorized accessories can result in unpredictable and unreliable tool operation and is prohibited.

See also the POWER HAWK Training DVD
included with your purchase
for detailed information on
Techniques using the P-16 Rescue System

CONTACT INFORMATION

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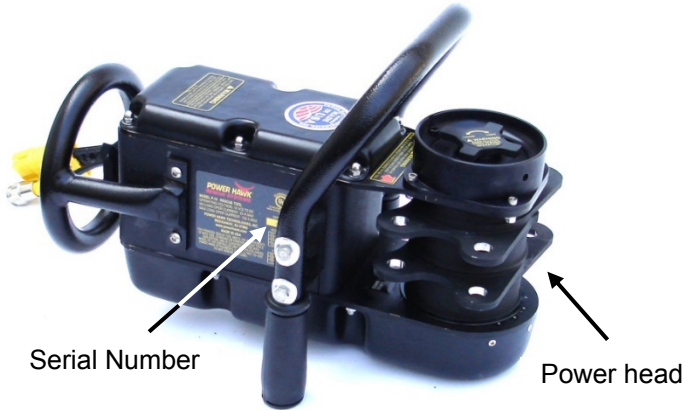


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SYSTEM DESCRIPTION

THE P-16 RESCUE TOOL

The Power Hawk® P-16 Rescue Tool utilizes aerospace gear technology, namely the Curtiss Wright Power Hinge™, to deliver high output forces to tool attachments such as spreaders and cutters. Tool attachments are quickly interchangeable using high-strength steel, ball detent pins. A variable 70° articulation of the power head and attachments allows greater versatility of access as compared to conventional hydraulic rescue tools. The P-16 Rescue Tool is powered solely by 12 volts DC. There are NO HYDRAULICS. The rear handle has a circular design to maintain identical trigger switch operation regardless of the tool's rotational position.



! WARNING

The P-16 Rescue Tool must be connected to the Power Hawk® PC-100 Controller Unit. Never attach the P-16 Rescue Tool directly to any other power source. Connection to an unauthorized power source will result in uncontrolled operation

THE PC-100 CONTROLLER UNIT

The “brain” of the Power Hawk® P-16 Rescue System is the PC-100 Controller Unit. The PC-100 receives input from the P-16 Rescue Tool trigger switch and allows 12 volts DC power to be delivered to the Rescue Tool for operation. Special electronics within the PC-100 sense electrical current and automatically cut power to the tool when maximum force is reached. When this happens, the user should reverse direction to relieve the load, then reposition the tool.

NOTE: The PC-100 Controller Unit and the P-16 Rescue Tool are serialized as a matched set, and should be used as such.



! CAUTION

The PC-100 is serviceable only by the Factory or an Authorized Power Hawk Service Center. Do not break the manufacturer seals. Do not loosen or remove the black pressure-relief knob. Internal access or disturbance of PC-100 components may result in uncontrolled operation of the P-16 Rescue Tool and create risk of serious personal injury and/or damage to property and/or equipment.

PREPARATION FOR OPERATION

STEP 1: INSPECTION

Remove P-16 Rescue System components and carefully inspect contents for any damage. If damage is found, contact your local Power Hawk® Dealer or the Factory for instructions.



- A. P-16 Rescue Tool
- B. PC-100 Controller Unit
- C. AP-1600 Attach. Pin Set
- D. CA-4M Power Cable
- E. PWR-12MP Power Pack, 12V
- F. BC-U1 Battery Charger
- G. LiPK-16C Li-GHT Attack Pack (Option)
- H. S-1601 Spreader Arms
- I. CS-1602 Power Blade
- J. C-1601 Curved Cutter
- K. C-1603 Hatchet Cutter
- L. C-1604 Shredder Cutter
- M. JC4-16 Jumper Cables
- N. EC4-16 Extension Cable, 16 Ft.
- O. VH4-4 Vehicle Harness Kit

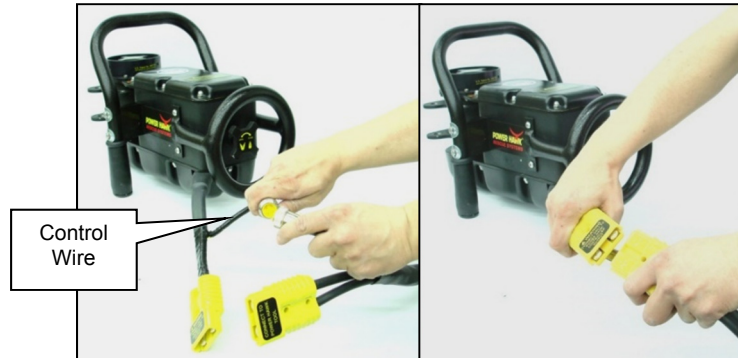


- G1. PWR-Li16C Lithium-Ion Power Pack
- G2. BC-Li16 Charger, Lithium-Ion
- G3. SLPK-L680 Sling Pack

STEP 2: P-16 RESCUE TOOL AND PC-100 CONTROLLER UNIT CONNECTIONS

Prior to making electrical connections, make sure all connectors are clean and free from dirt and debris. On the P-16 Rescue Tool cable and the CA-4M Power Cable Assembly, the “ribbed” side of the power cable must match with the negative terminal side of the yellow connector plugs.

Attach the CA-4M Power Cable connector with the decal “Connect to Power Hawk Tool” to the P-16 Rescue Tool cable connector. The small control wire connectors must be aligned, then screwed together by hand. The large connectors snap into place when properly attached.



Connect the other end of the CA-4M Power Cable Assembly to the PC-100 Controller Unit. The control wire connector must be aligned with the case-mounted receptacle, then tightened by hand. The power wire connector snaps into the case-mounted connector labeled “Power Output”.



HINT: Always connect the threaded control wire first before connecting the larger yellow connectors. This will make aligning the control wire tabs and screwing the connector together easier by not fighting the heavier wire.

The Power Hawk® P-16 Rescue System can be stored with the PC-100 Controller fully connected – this is recommended for faster on-scene response. The only further connection required on-scene is for the 12VDC power supplied to the controller as described in Step 3. See Storage Recommendations in the Maintenance section for more information.

NOTE

The Power Hawk® P-16 Rescue System power cable connectors are color-coded. YELLOW plugs are only used to deliver controlled 12 volts DC from the PC-100 Controller Unit to the P-16 Rescue Tool. RED plugs are used to supply 12 volts DC power to the PC-100 from a source such as a Power Hawk® power pack, direct vehicle hook-up, 12 VDC battery, 12 VDC generator, etc. The yellow and red connectors are configured differently and cannot be connected together. Do not attempt to attach different colored connectors.

STEP 3: POWER SOURCE SELECTION AND CONNECTIONS

The Power Hawk® P-16 Rescue Tool is powered using 12 volts DC which must be channeled through the Power Hawk® PC-100 Controller Unit. Power sources may include:

- **Power Hawk Power Packs**



PWR-12MP
Lead Acid AGM



PWR-Li16C
Lithium-Ion

- **Direct 12 VDC vehicle system hook-up**



VH4-4
Vehicle
Harness
with



EC4-16
Extension
Cable

- **Jumper Cable to 12 VDC batteries**



JC4-16
Jumper
Cables

- **12 VDC Generator**

- **12 VDC Converted Power Supply**

It is recommended that back-up 12 volts DC power always be available on-scene when using the Power Hawk® P-16 Rescue System, especially when operating with consumable power sources such as the Power Hawk power packs.

NOTE

The 12 volts DC power source must be capable of delivering sufficient current to properly operate the P-16 Rescue Tool without causing damage to the power source itself. (See Specifications section of this manual for P-16 current requirements.)

PWR-12MP Power Pack, 12V Lead Acid AGM



The PWR-12MP Power Pack is a vented portable battery pack that utilizes a 33 amp-hour valve-regulated lead-acid battery (VRLA). The PWR-12MP Power Pack comes equipped with two red “Power Output” plugs which can provide power to two devices simultaneously, including the PC-100 Controller Unit for P-16 Rescue Tool operation or other accessories such as the portable winch, Sawzall, circular saw, impact wrench, ventilator fan, air bag compressor, and more. A charge indicator and test button are provided so that the user can visually check the charge state of the internal battery. The PWR-12MP Power Pack includes a battery charger port for connection to the required battery charger (i.e. Model BC-U1) provided by POWER HAWK Technologies, Inc. (See Battery Charger Operation section of this manual.)

WARNING

Do not make direct contact between battery positive and negative terminals as this can cause an explosion or fire. Keep the protective caps snapped in place over the 2 red connector terminals and charger port when not in use.



The Power Hawk® PWR-12MP Power Pack is vented to allow any hydrogen gas exhausted by the internal battery to safely diffuse out of the carrying case without dangerous build-ups. These vents and drain holes are shown below (holes on the front cover, strap slots in the back, holes on the top, and a drain hole on the bottom).



Front View



Back View



Top View



Bottom View

CAUTION

Prior to charging, inspect case to ensure all vent and drain holes are clear and fully open. Do not plug holes. Inspect vents and drain holes after each use.

Prior to selecting the PWR-12MP Power Pack, note the charge condition of the battery by depressing the test button located on the side of the unit. A fully charged battery is indicated by the position of the dial in the green above the “recharge line”. As the charge on the battery is depleted, the indicator dial will move toward the yellow and red bars, indicating reduced battery capacity.



IMPORTANT: The battery gauge will show the proper voltage level ONLY when the battery is in its “settled” state. It will not indicate accurate state-of-charge under the following conditions:

1. **During recharging**, the battery gauge will show above the recharge line, even if the battery is not yet fully charged. After disconnecting the charger from the battery pack, it may take up to 20 minutes for the battery to “settle” and for the gauge to indicate the actual charge level. If the battery is being recharged, you **MUST** use the charger indicator lights to determine if the battery has reached its fully charged condition (see Battery Charger Operation section).

2. **During operation of the P-16 Rescue Tool**, the battery gauge on the PWR-12MP will indicate RED (or empty) even though there may be plenty of capacity remaining in the battery. This is because the indicator is sensing voltage and as amperage is being drawn by the P-16 Rescue Tool, the voltage of the battery drops naturally when under load. After operating the tool, it may take several minutes for the battery to “settle” and for the gauge to indicate the actual charge level.

CAUTION: A partially discharged battery will shorten the operational time of the P-16 Rescue Tool. Keep the PWR-12MP Power Pack fully charged when not in use. **Recharge at least once a month to avoid reduced battery capacity due to self-discharging.** Charge the PWR-12MP Power Pack using only the Power Hawk® Battery Charger Model BC-U1 (or previous Model 2C0810-2).

ATTACHING THE PC-100 CONTROLLER UNIT TO THE PWR-12MP POWER PACK

To facilitate one-person portability when using the PWR-12MP Power Pack, assemble the straps provided in the rear of the pack to harness the PC-100 Controller Unit to the PWR-12MP Power Pack as shown below.



Hint: With the power pack lying on its cover, set the “button” feet on the back of the PC-100 into the four machined recesses on the back of the PWR-12MP. Then connect and tighten the straps.

Keep straps on inside of PC-100 hinges



Pigtail

PC-100 Controller Unit

Supply power to the PC-100 Controller Unit by connecting the short “pigtail” cable from the PWR-12MP Power Pack to the red connector labeled “12 Volt Power Input.” The red plugs will snap into place when properly connected.



BC-U1 BATTERY CHARGER OPERATION

Battery packs supplied by Power Hawk Technologies, Inc. require special chargers designed to properly charge and prevent overcharging conditions. Only chargers provided by Power Hawk Technologies, Inc. shall be used to recharge Power Hawk® battery packs.



The Model BC-U1 Battery Charger (pictured left) is designed for use with valve-regulated lead-acid batteries. It is also designed to resist vibration and is suitable for installation onboard a vehicle. The battery charger supplies energy at rates that are best suited to recharge the battery and maintain its life. Once the battery reaches full charge, the BC-U1 charger automatically switches to “Float” mode, keeping the battery in the fully charged condition without overcharging. To ensure a fully charged battery for on-scene use, it is recommended that the PWR-12MP Power Pack stay connected to the BC-U1 Charger until the Power Hawk is taken out to be used.

To connect the charger to the power pack, align the tab and slot of the output connector to the mate found on the front face of the power pack. Press together.

The BC-U1 Charger has three lights (LED’s) that indicate the status of the recharge cycle.

- Red = Power On
- Yellow (Steady) = Charging
- Yellow (Flashing) = Fault
- Green = Ready (Fully Charged)



IMPORTANT:

- When recharging, ALWAYS use the indicator lights on the charger to determine the status of the battery, not the indicator on the power pack.
- Charge the PWR-12MP Power Pack at ambient temperatures ranging from 32° to 104°F.
- Do not operate the P-16 Rescue Tool using the PWR-12MP Power Pack while connected to the battery charger. The high amperage current draws of the P-16 Rescue Tool may cause the charger to blow a fuse.
- Turn charger power “ON” by plugging the power input cord into a suitable 105 to 240 VAC outlet.

NOTE: Earlier BC-U1 Models require a power switch on the back of unit to be turned “ON”.



Earlier Model
Power Switch

PWR-12MP BATTERY AND BATTERY CHARGING SAFETY INFORMATION

All batteries contain corrosive acids and produce explosive gases during recharging. Failure to follow the safety precautions below may result in acid burns and/or gas explosion, causing blindness, serious personal injury, and/or damage to property and/or equipment.

- Charge batteries in well-ventilated areas away from sparks, flames, and smoking.
- Only use chargers provided by Power Hawk Technologies, Inc. and follow charging instructions carefully.
- Prior to charging, ensure power pack vent holes are clear and fully open. Inspect vents after each use.
- Do not charge power packs upside down.
- Only charge batteries at ambient temperatures specified by the battery manufacturer.
- Do not make direct contact between battery positive and negative terminals as this may cause an explosion or fire.
- Batteries should not be stored discharged.
- Keep batteries and chargers away from children.
- Lead-acid batteries must be disposed of properly. They must be collected, recycled, or disposed of in an environmentally sound manner. It is unlawful to incinerate batteries, or discard them in municipal solid waste or landfill.

PWR-12MP BATTERY MAINTENANCE INFORMATION

1. **When recharging, use the indicator lights on the CHARGER to determine full charge, NOT the indicator on the battery pack.** Power Hawk chargers indicate a fully charged battery when the charger light switches from “Fast Charge” to “Float” or from “Charging” to “Ready”. Removing the charger prior to it reaching “Float” or “Ready” mode will leave the battery in a less than fully charged condition. A fully discharged battery could take up to 15 hours to become fully recharged, a partially discharged battery will take less time. Because the charger output voltages are higher than 100% of the battery pack indicator, the battery will take several minutes to “settle” back down (approx. 20 minutes) after being disconnected from the charger before the battery pack indicator will read its true state-of-charge. All Power Hawk chargers are designed to prevent overcharging and may remain connected to the battery pack, even after reaching the fully charged condition.
2. **Charge prior to first use.** New battery packs may have been stored or in transit for extended periods of time and/or at temperatures that reduced the battery’s state-of-charge due to self-discharging. Charge new battery packs overnight, regardless of their indicator readings.
3. **Recharge immediately after EACH use.** There is no “memory” problem to worry about. Recharge regardless of the battery’s state-of-charge. Storing a discharged battery can result in it becoming sulfated, which will reduce its capacity. (See “Sulfated Battery” below)
4. **Recharge at least ONCE A MONTH when not in use.** The internal battery will self-discharge if stored without the Power Hawk charger connected. The self-discharge rate is approximately 3.5% per month @ 77°F and will double for each 15°F increase in battery storage temperature. A lower storage temperature will result in longer shelf life. (See “Battery and Battery Charging Safety Information” below for storage temperatures)
5. **Disconnect ALL accessories** from the battery pack when not in use or when the battery pack’s indicator reaches 0% state-of-charge. Examples are lights, fans, saws, winches, cameras, etc. that are powered using the Power Hawk battery pack. Excessive deep discharging of the battery may cause it to sulfate, resulting in lost capacity. (See “Sulfated Battery” below). Note: Immediately after the battery delivers high amps, such as from using the P-16 Rescue Tool or other accessories, it will take several minutes for it to “settle” back up before the battery indicator will read its true state-of-charge. As a rule, always disconnect the battery pack from the PC-100 Controller Unit and any accessories when not in use and cap all live battery terminals.

6. **Sulfated Battery.** If a battery is undercharged or excessively discharged, sulfating of the battery can occur, whereby a thick layer of lead sulfate remains on the internal positive and negative plates, which will reduce its capacity. A symptom of a significantly sulfated battery is shortened operational time and low performance even after proper recharging (Note: this is also the symptom of a naturally worn out battery). In this condition, the Power Hawk charger may indicate the battery is fully charged (“float” or “ready” mode) even though it is actually discharged. Sulfating is most commonly caused from storing a battery for excessive periods of time without being recharged or from discharging a battery below 0% indicator reading. Excessive discharging can happen by leaving a light or other accessory plugged in and turned on. (Note: the P-16 Rescue Tool will stop operating before the battery becomes excessively discharged.) A sulfated battery will need to be replaced.
7. **“On-Board” Charging.** The Power Hawk chargers are designed to withstand vibration and are recommended for use onboard emergency vehicles. The Power Hawk chargers may be installed into a vehicle compartment and plugged into the shoreline circuit. All Power Hawk chargers are designed to prevent overcharging and may remain connected to the battery pack.
8. **Always have back-up 12 volts DC power available.** It is recommended that you have spare battery packs (i.e. Model PWR-12MP), however, other back-up 12 Volts DC sources may be used. An automobile battery (using jumper cables Model JC4-16), direct vehicle hook-up (using Models VH4-4 Vehicle Harness Kit and EC4-16 extension cable), 12 Volts DC generator, and 12 Volts DC converted power supply, etc. are viable power source options.
9. **CHANGING THE INTERNAL BATTERY IN THE PWR-12MP POWER PACK:** Recommended replacement is every two years.

IMPORTANT: When replacing the internal battery in *POWER HAWK* power packs, ALWAYS use the EXACT battery that is approved by POWER HAWK TECHNOLOGIES, Inc. **CAUTION:** A battery supplier may recommend the same type and size battery for your Power Hawk power pack, however, performance varies greatly between manufacturers and therefore other batteries should not be used. Contact the Factory if you plan to purchase a replacement battery locally to get the most up-to-date part number and local sources.

- Push in lock button and lift latch on both sides of the cover
- Slide battery out slightly to expose terminals
- Remove bolts and nuts on terminals to disconnect the red and black cables from the battery
- Remove battery and replace with new one. Important: Slide in new battery carefully so that it is secured by the foam inserts and other internal components are free and clear.
- Re-connect cables to battery terminals and slide battery into place on the foam inserts.
 - Ensure proper polarity is maintained.**
 - RED cable = POSITIVE (+)**
 - BLACK cable = NEGATIVE (-)**
- Close cover and latches

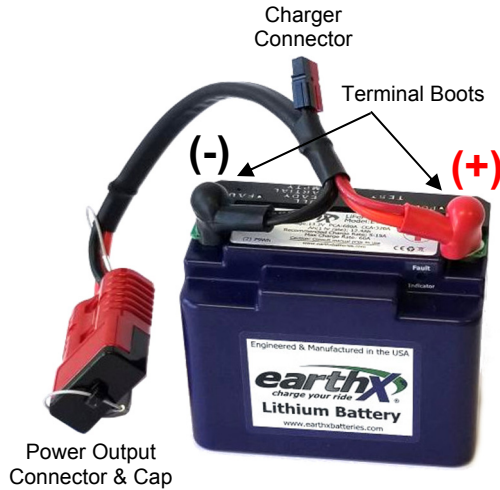


LiPK-16C Li-GHT ATTACK Pack (Lithium-Ion Power Pack)

Model LiPK-16C Li-GHT ATTACK Pack™ is comprised of three items which are; (a) PWR-Li16C Lithium-Ion Battery Pack (b) BC-Li16 Lithium-Ion Battery Charger, and (c) SLPK-L680 Sling Pack. The Li-GHT ATTACK Pack provides long-lasting P-16 Rescue Tool power in a super lightweight and portable pack.



PWR-Li16C Battery Pack



! WARNING

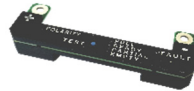
Do not make direct contact between battery positive and negative terminals, as this can cause battery damage and/or fire. Keep the protective terminal boots in place at all times. Keep the black plastic cap in place over the red power output connector when not in use.

**Ensure proper polarity is maintained.
RED cable = POSITIVE (+)
BLACK cable = NEGATIVE (-)**

The PWR-Li16C Battery Pack is comprised of the following parts:



EarthX Battery Pack
P/N ETX680C



Charge Indicator
P/N 2C1220-1



Wire Assembly
P/N 2C1210-1

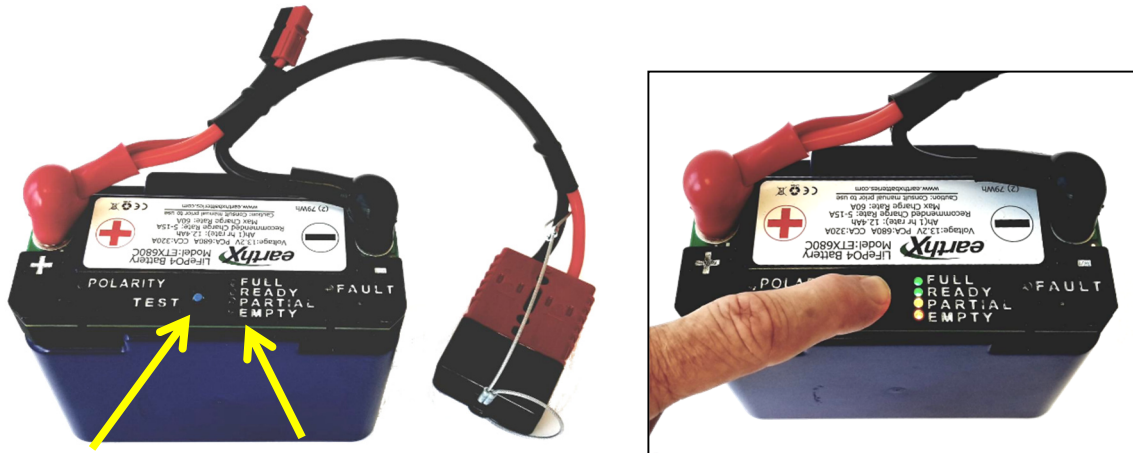


Ensure terminal bolts are tight and the power output cable is secure. Tighten to 5 Ft-Lbs max.

During battery replacement, the fault wire on the EarthX ETX680C battery must be connected to the spade connector found on the bottom of the Charge Indicator P/N 2C1220-1 as shown right. When installing, make sure the wire is positioned so that it is not pinched between the indicator housing and the battery.



Prior to using the PWR-Li16C Battery Pack, note the State of Charge of the battery by pressing on the test button located on the top of the unit. This will illuminate up to four LED indicator lights



Test Button LED Indicators

- 2nd Green = 100% charged and ready for full workload
- 1st Green = Ready for full workload. Less than 100% charge
- Yellow = Partial charge and limited workload. Recharge.
- Red = Empty. Recharge.

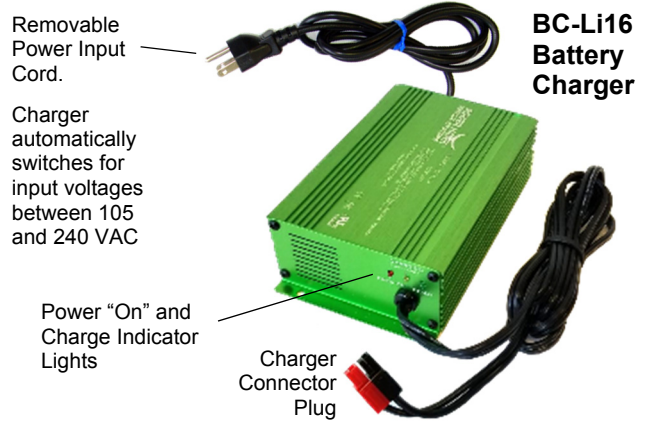
A partially discharged battery will shorten the operational time of the P-16 Rescue Tool. Keep the PWR-Li16C Battery Pack fully charged when not in use. To avoid reduced battery capacity due to self-discharging:

- Charge upon receipt
- Recharge after each use
- When not in use, recharge at least:
 - **Recommended: ONCE EVERY 6 MONTHS**
 - **Required: ONCE EVERY 12 MONTHS**

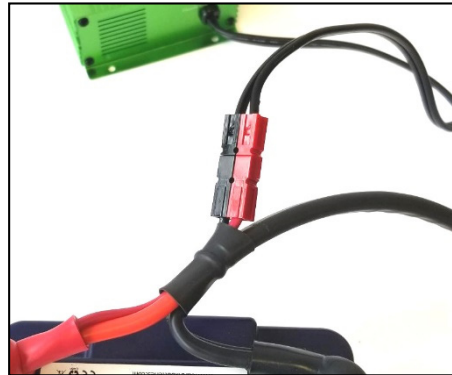
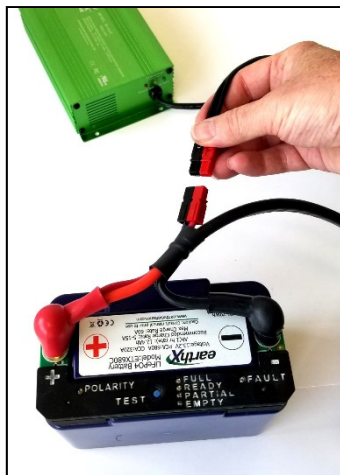
IMPORTANT: The PWR-Li16C Lithium-Ion Battery Pack delivers consistent voltage to the P-16 Rescue Tool as it is being discharged and unlike lead-acid battery options, the tool will not provide early notice to the operator that the battery is near empty by slowing down. When the P-16 stops running due to a depleted Lithium-Ion battery (Indicator is RED), stop all heavy work and operate the tool using the reserve battery energy to remove it from the working material. **NOTE: If the P-16 does not respond, WAIT APPROXIMATELY 3 MINUTES and then try again.** For continued operation, replace with a charged battery pack or switch to back-up power.

BC-Li16 BATTERY CHARGER OPERATION

Lithium-Ion battery packs, such as Model PWR-Li16C supplied by Power Hawk Technologies, Inc., require special chargers designed to properly charge the battery and prevent damage or overcharging conditions. Only chargers provided by Power Hawk Technologies, Inc. shall be used to recharge Power Hawk® battery packs. The Model BC-Li16 Battery Charger (right) is designed for use with the PWR-Li16C battery pack.



Turn charger power “ON” by plugging the power input cord into a suitable 105 to 240 VAC outlet. Connect the charger to the power pack by aligning the Charger Connector with the mating connector found on the wire assembly of the power pack. “Snap” the connectors together as shown below.



The BC-Li16 Charger has three (3) LED lights that change color to indicate the status of the recharge cycle.



- Red = Power On
- Yellow (Steady) = Charging
- Yellow (Flashing) = Fault
- Green = Ready (Fully Charged)

RECHARGE TIME: For a fully discharged PWR-Li16C battery pack, the recharge time is approximately 3 hours. A partially discharged battery will take less time.

IMPORTANT:

- When recharging, ALWAYS use the indicator lights on the charger to determine the status of the battery, not the indicator on the power pack.
- The charger is designed so that it will not overcharge or damage the battery if left plugged in. It is recommended, however, that the charger be unplugged from the battery once fully charged and stowed.
- Charge at ambient temperatures ranging from 32 to 113°F (0 to 45°C).
- Do not operate the P-16 Rescue Tool using the PWR-Li16C Battery Pack while connected to the charger. The high amperage current draws of the P-16 Rescue Tool may cause the charger to blow a fuse.
- When stowed, disconnect the battery pack RED plug from the Controller Unit and install the plastic protective cap over the live contacts.
- Always have back-up power available for operating the P-16 Rescue Tool. It is recommended that you have spare Power Hawk battery packs, however, other back-up power sources may be used such as; 12 volts DC automobile battery (using jumper cables Model JC4-16), 12 volts DC direct vehicle hook-up (using Models VH4-4 Vehicle Harness Kit and EC4-16 extension cable), 12 Volts DC generator, and 12 Volts DC converted power supply, etc.

SLING PACK SETUP:

The SLPK-L680 Sling Pack provides comfortable and super lightweight portability of the self-contained power unit for the P-16 Rescue Tool. The pack features a rear compartment for the PC-100 Controller Unit and a padded front compartment for the PWR-Li16C Battery Pack. The cover flap is secured using two adjustable straps with large snap buckles. An additional wide strap is provided on top of the cover to hold the CA-4M Power Cable. For added stability, a waist belt can be found in the Velcro pouch located on the back panel of the pack.



Use the top strap to secure the CA-4M Power Cable



PC-100 Controller Unit [Red Connector on Left side]

PWR-Li16C Battery Pack

Connect Red Plugs to provide power to the P-16 Rescue Tool [Stow disconnected with cap in place]



Waist belt is located in the rear pouch.

PWR-Li16C BATTERY AND BATTERY CHARGING SAFETY INFORMATION:

- RECHARGE PWR-Li16C Battery Pack using ONLY the special charger Model BC-Li16 provided by POWER HAWK Technologies, Inc.
- RECHARGE battery pack ONLY at temperatures between 32 to 113°F (0 to 45°C)
- DO NOT expose battery pack to temperatures above 140°F (60°C)
- DO NOT use battery pack below -22°F (-30°C), if cold-soaked for 2 hours or more
- DO NOT store battery pack in a discharged state
- DO NOT attempt to open or service the battery pack
- DO NOT use battery pack for jump starting another battery
- DO NOT crush or puncture battery pack
- DO NOT submerge battery pack in water
- DO NOT expose battery pack to fire or excessive heat
- Keep battery pack and charger away from children
- TRANSPORTATION of Lithium-Ion batteries must be in accordance with U.S. DOT Hazardous Material Regulations and International Dangerous Goods Regulations.
- DISPOSE of battery pack in accordance with Local, State, & Federal Laws and Regulations. They must be collected, recycled, or disposed of in an environmentally sound manner. It is unlawful to incinerate batteries, or discard them in municipal solid waste or landfill.



PWR-Li16C BATTERY MAINTENANCE INFORMATION

MAINTENANCE AFTER USE & EVERY SIX (6) MONTHS:

- RECHARGE BATTERY PACK.
- Inspect battery, charge indicator, cables, plugs, and fasteners for fraying, wear, and damage.
- Check switches for proper functioning.
- Make sure battery terminal bolts are tight and cables are secure. If loose, re-tighten to 5 Ft-Lbs. max.

ANNUAL INSPECTION:

- Test all cables for electrical integrity.
- Inspect battery, charge indicator, cables, plugs, and fasteners for fraying, wear, and damage.
- Make sure battery terminal bolts are tight and cables are secure. If loose, re-tighten to 5 Ft-Lbs. max.
- Perform battery integrity test.
- Replace battery as required.

If service is required, contact your Power Hawk® dealer or the Factory for assistance.

AUXILLIARY & BACK-UP 12V POWER

WARNING

Do not make direct contact between battery positive and negative battery terminals as this can cause an explosion or fire. Keep the protective caps snapped in place over the 2 red connector terminals and charger port when not in use.

Ensure proper polarity is maintained.

RED cable = POSITIVE (+)

BLACK cable = NEGATIVE (-)

NOTE: The PC-100 Controller Unit is designed so that if polarity is accidentally reversed, the P-16 Rescue Tool will not operate, remaining unharmed. If the P-16 Rescue Tool does not operate, check cable connections for proper polarity.

JC4-16 Jumper Cables

Power may be supplied by a charged automobile battery at the scene by using the JC4-16 Jumper Cables. Connect the Jumper Cable clips to the appropriate battery terminals. For operation, connect the red plug of the Jumper Cable to the PC-100 Controller Unit via the red plug labeled “12 Volt Power Input.”

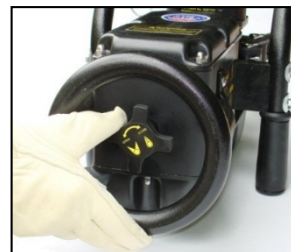


VH4-4 Vehicle Harness with EC4-16 Extension Cable

Using the VH4-4 Vehicle Harness Kit and EC4-16 Extension Cable, power may be supplied from a vehicle at the scene without opening its hood. Install the Vehicle Harness Kit by mounting the red plug to a desired location on the vehicle (i.e. front grill) and routing and connecting the wires to the proper battery terminals. Make sure the protective terminal cap is secured to the red plug and kept snapped in place when not in use. For operation, connect the plugs of the harness and the EC4-16 Extension Cable. Then connect the Extension Cable to the PC-100 Controller Unit via the red plug labeled “12 Volt Power Input.”



Test the connections by momentarily turning the P-16 Rescue Tool trigger switch. The tool should energize and move the powerhead output lugs. If the tool does not operate, see the Troubleshooting section of this manual.



STEP 4: TOOL ATTACHMENT SELECTION AND INSTALLATION

The P-16 Rescue Tool is designed to change from spreading to cutting in seconds using interchangeable tool attachments. These attachments are safely secured to the P-16 powerhead lugs through the use of special-grade steel pins. Use only Power Hawk Technologies, Inc. authorized attachments with the Power Hawk® P-16 Rescue System.



S-1601
Spreaders



CS-1602
Power Blade



C-1601
Curved Cutter



C-1603
Hatchet Cutter



C-1604
Shredder Cutter

Installing P-16 Tool Attachments...

General

- Tool attachments have “left” and “right” designations. The sides are different sizes, and cannot be installed incorrectly.
- The attachment pins are also left and right side specific. The left pins are longer and have a larger diameter than the right pins. For clarity during use, the right pin set has a red ribbon attached to it.

Remember Red = Right.

- Loosen the clutch and rotate the powerhead as necessary for better accessibility to the pins. **Be sure to re-tighten the clutch prior to operation.**



Left Spreader Arm



Right Spreader Arm



Left
Pins



Right
Pins

WARNING

The attachment pins supplied with the P-16 Rescue Tool are made from special-grade steel. Use only pins supplied by Power Hawk Technologies, Inc. Use of unauthorized pins can result in product malfunction causing serious personal injury and/or damage to property and/or equipment.

- Attachment pins must be completely inserted. Check by lightly pulling up on the pins to ensure the ball detents are below the bottom lugs on the powerhead.

! WARNING

Pins not properly locked in place can cause uneven loading and tool failure, which may cause serious personal injury and/or damage to property and/or equipment.



Installing Spreader Arms

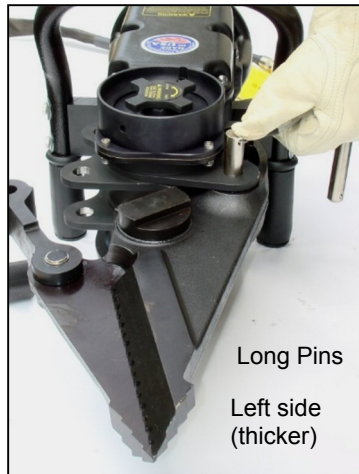
- Note decals indicating “Left” (thicker) and “Right” (thinner) sides of the spreader arm set. Align the holes in the arms to those on the powerhead. Insert the correct attachment pins. If the holes do not line up, you may need to operate the trigger switch of the P-16 Rescue Tool in the direction that will allow hole alignment.



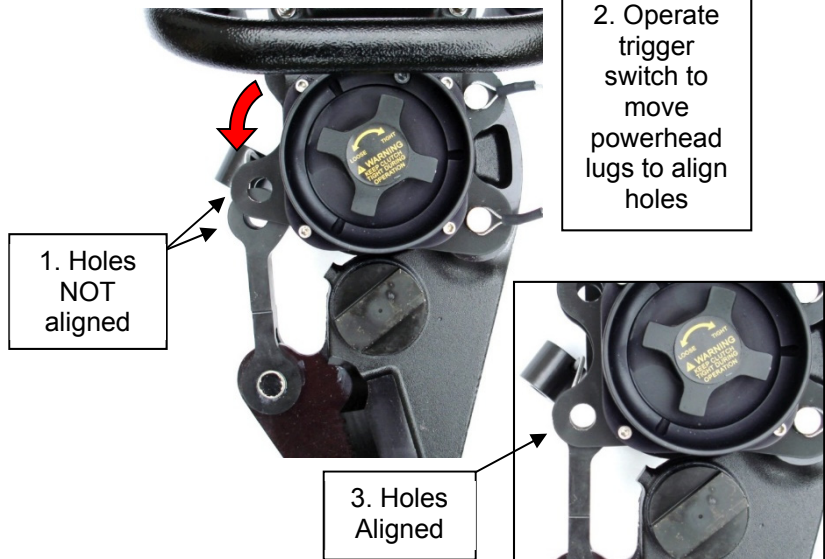
HINT: Use your thumb over the top of the pin to facilitate insertion.

Installing Cutters

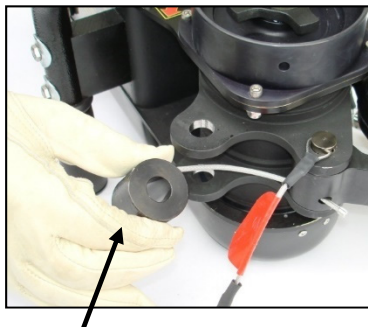
- Install the left (thicker) side of the cutter first, aligning the holes and using the long pins.



- Align the hole in the cutter link with the front right hole in the powerhead lug and insert pin. If the holes do not line up, operate the trigger switch of the P-16 Rescue Tool in the direction that will move the hole in the powerhead lug toward the hole in the cutter link.



- Install the tethered cylinder stop in the right rear of the powerhead lug using the remaining pin.



Cylinder Stop



CAUTION: Failure to install the Cylinder Stop could result in the cutter link hitting the Powerhead, causing serious damage to the P-16 Rescue Tool.

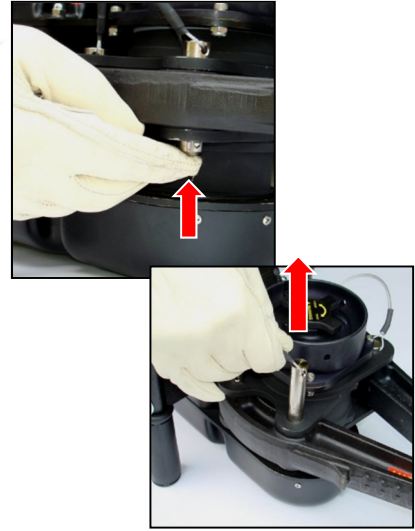
Removing P-16 Tool Attachments...

General and Removing Spreader Arms

- Relieve tool load prior to removing tool attachment. Spreader arms should be at least slightly open. Failure to relieve load will prevent removal of attachment pins.
- Use the coated steel cable between the pins as an aid when pulling up pins. Pins should remove easily. If not, verify tool load is relieved. **DO NOT FORCE. If load is relieved properly, attachment pins will come out easily**
- Loosen the clutch and rotate the powerhead as necessary for better accessibility to the pins. **Be sure to re-tighten the clutch prior to operation.**



Slightly opened



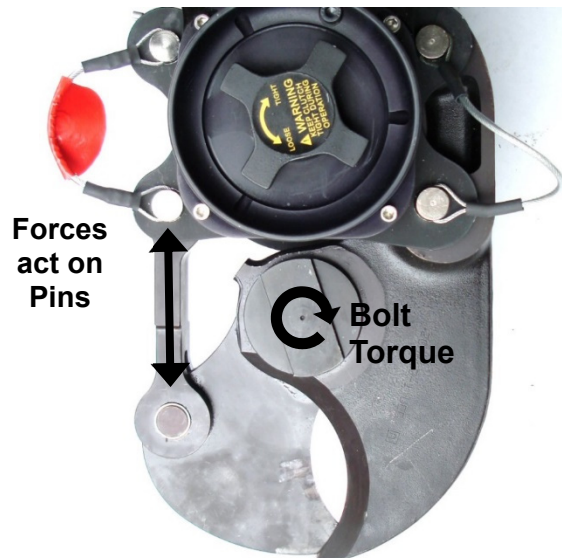
HINT: After removing Pins, drape them over each handle bracket to prevent losing them.

Removing Cutters

All Power Hawk cutter blades are held together with a special-steel bolt and nut that is tightened to approximately 150 ft.-lbs. of torque. As the cutter is operated to open or close, there exists a natural load on the pins as the blades “push through” the friction induced by the high torque of the bolt.

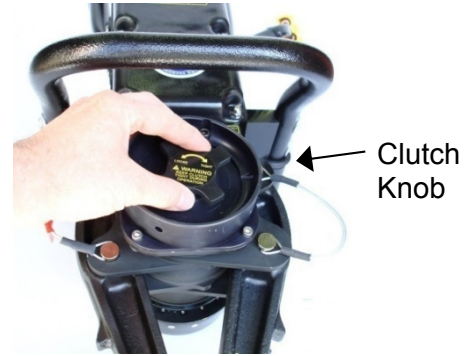
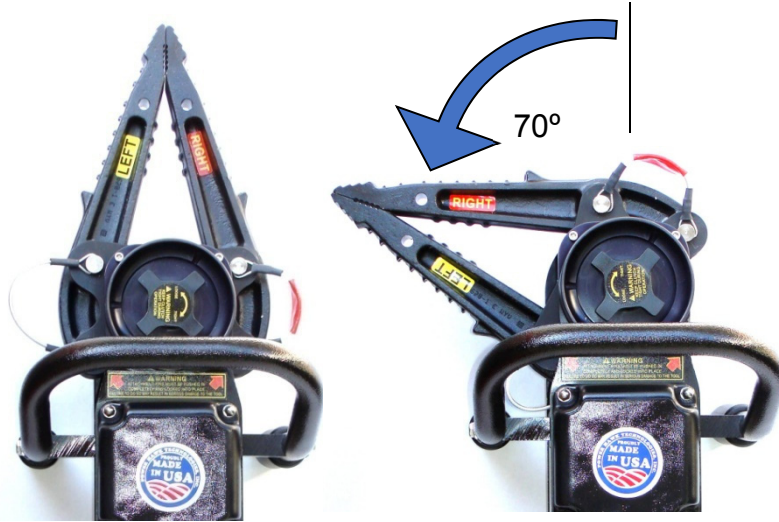
To relieve this load...

1. Operate the tool in one direction by depressing the trigger switch.
2. Jog the switch (split-second “on” then “off”) in the opposite direction. This will relieve the load on the pins.
3. Push up on bottom of pins and then pull up using the coated steel cable. **DO NOT FORCE.** If load is relieved properly, attachment pins will come out easily



STEP 5: POWERHEAD 70° VARIABLE POSITIONING

The P-16 Rescue Tool is designed with a pivoting powerhead to provide greater access and versatility of the attachment. The powerhead is capable of rotating 70° to the left relative to the tool body when upright. During operation, the powerhead is held in place by a clutch located directly above the powerhead.

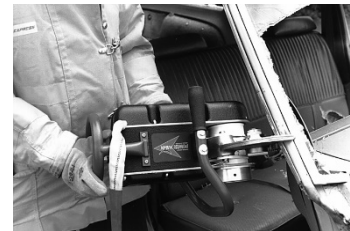


To prevent debris from entering the clutch housing and causing damage, do not remove the clutch knob.

To pivot the head...

1. Make sure there is no load on the spreader or cutter attachment (i.e. slight gap between spreader tips).
2. Loosen the clutch knob
3. Swing the Powerhead and attachments to the desired position.
4. Retighten the clutch knob.

To swing an attachment to the right, simply use the tool up-side down. To prevent debris from entering the clutch housing and causing damage, do not



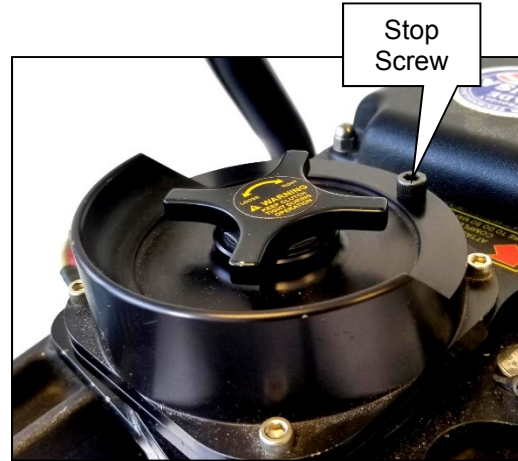
WARNING

The clutch knob must be tightened prior to engaging and loading the P-16 Rescue Tool. Failure to do so may result in sudden movement of the tool and attachments, which may cause personal injury and/or damage to property and/or equipment.

The clutch is intended to secure the position of the attachments. It has been designed, however, so that if the body of the tool (handles, covers, etc.) should become jammed against other objects and loaded during operation, the clutch will slip within the 70° rotation limits to prevent tool damage, even with the clutch knob tight. There will be times when, in order to prevent the P-16 tool body from jamming against other objects, the tool should be used UPSIDE DOWN and the attachments repositioned. Lower handle grips are provided on the tool for this purpose.

NOTE

The 70°-rotation limits of the P-16 powerhead is maintained through the use of a stop screw. To protect the tool from serious damage, the stop screw is designed to shear should the tool body become jammed against other objects and loaded during operation with no more rotational freedom of the powerhead. If this happens, the tool, though still operational, has lost its safety stop positioning and must be repaired by replacing the stop screw (See Maintenance section). This condition will be apparent since the P-16 attachments will be capable of swinging beyond 70° and making contact with the carrying handle when the clutch is loose.



! WARNING

Do not load the P-16 Rescue Tool such that the body becomes jammed against other objects and is loaded. Shearing of the stop screw causes loss of the 70° safety stops. Operating the tool in this condition may result in serious personal injury and/or damage to property and/or equipment.

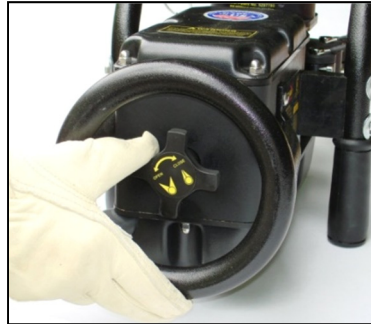
OPERATION

THE POWER HAWK® P-16 RESCUE SYSTEM SHALL BE OPERATED ONLY BY THOSE TRAINED AND AUTHORIZED BY THE AUTHORITY HAVING JURISDICTION.

Before operating the Power Hawk® P-16 Rescue Tool, make sure that the clutch knob directly above the P-16 powerhead is tight and the quick-change attachment pins are firmly seated in place. Do not attempt to adjust the position of the clutch while the arms or cutters are under load (including attachments being fully opened or closed). Remove tension on the attachments before loosening the clutch. This will allow positioning in the complete 70° range of motion.

The Power Hawk® P-16 Rescue Tool is operated by turning the trigger switch at the back of the unit.

- Turning the switch to the left (counter-clockwise) will open the attachments.
- Turning the switch to the right (clockwise) will close the attachments.



The P-16 Rescue Tool is designed to shut off automatically when it reaches maximum force. When this occurs, reverse direction to relieve load and reposition the tool. After the tool has shut off automatically, DO NOT continue to move the attachments in the same direction without first reversing direction to relieve the load, then reposition the tool.

WARNING

Continued loading of the P-16 Rescue Tool in the same direction after it has automatically shut off, without first relieving the load, can result in over-stressing and breakage of rescue tool components which may cause serious personal injury and/or damage to property and/or equipment.

WARNING

Never use the tool while holding the cutting or spreading attachments. To avoid risk of serious personal injury, do not under any circumstances place hands or other body parts on or near Power Hawk® attachments when in operation.

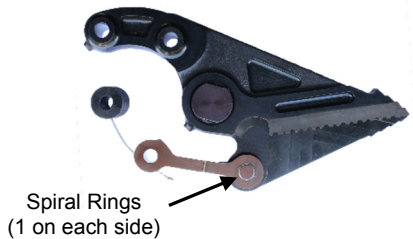
Do not carry or hold the tool by the trigger switch. Hold the handles and operate the trigger switch with a finger. The round handle is designed to allow easy grasp of the tool and operation of the trigger switch when held in any position.

**Remember:
One hand on each handle at all times!**

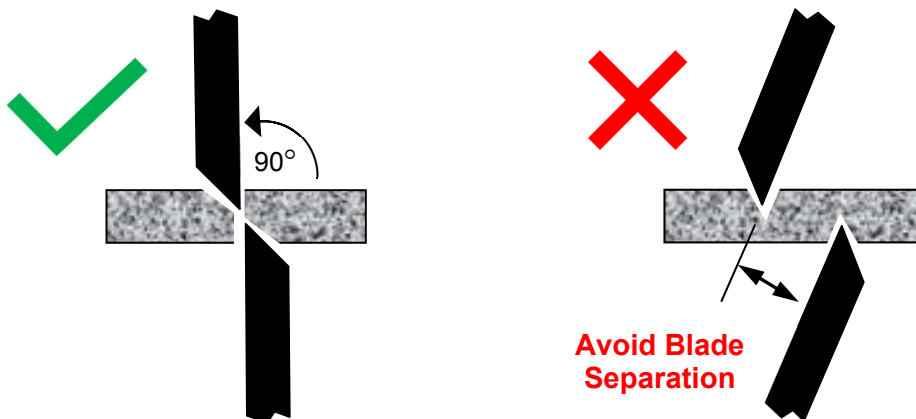


OPERATING SAFETY INFORMATION

- Never use the tool while holding the cutting or spreading attachments. Hold the tool only by the black handles when operating. To avoid risk of serious personal injury and/or damage to property and/or equipment, do not under any circumstances place hands or other body parts on or near Power Hawk® attachments when in operation.
- Operate the tool only with the clutch knob tightened. The clutch is intended to secure the position of the attachments. Failure to do so may result in personal injury due to sudden movement of the tool and/or attachments.
- When spreading with Power Hawk® spreader attachments, make sure objects being spread are stabilized and operator(s) and patient(s) are shielded from any loose debris.
- When stabilizing, use proper cribbing methods.
- Power Hawk® cutter attachments are designed to cut a variety of materials such as door and windshield posts, pipe, sheet metal, steel plate, rebar, etc. Do not attempt to cut hardened metal, such as steering columns, nader pins, seat belt bolts, lock hasps, etc., as this action may result in blade damage.
- When cutting with the Power Hawk® cutting attachments, make sure the object being cut is anchored on both sides and the tool is held firmly.
- Make sure the cutter bolt is tight. The cutter nut should be torqued to 150 foot-pounds.
- Make sure the cutter-link spiral rings are secure.



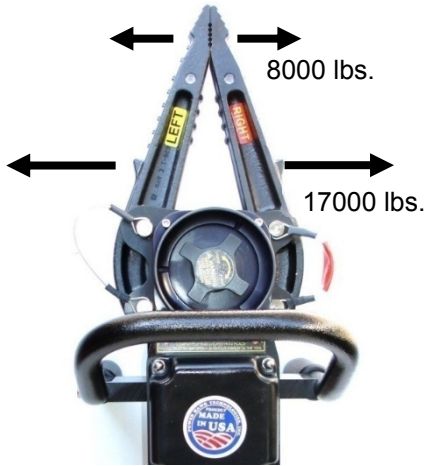
- Position the cutter blades so that the material being cut is perpendicular and do not allow the blades to twist so that they separate while cutting. Failure to do so may result in component breakage, causing serious personal injury and/or damage to property and/or equipment.



Helpful Hints:

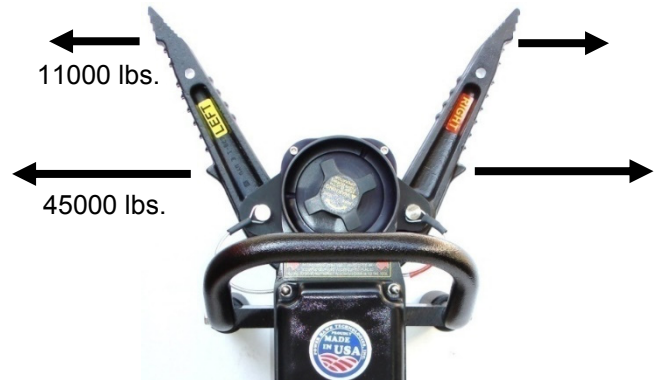
When spreading, forces are greater near the base of the arms than near the tip. Additionally, tool forces increase as the spreader moves from the closed position to the fully opened position due to mechanical advantage. You can use this knowledge to your advantage when performing an operation.

1. Deeper = Greater Force



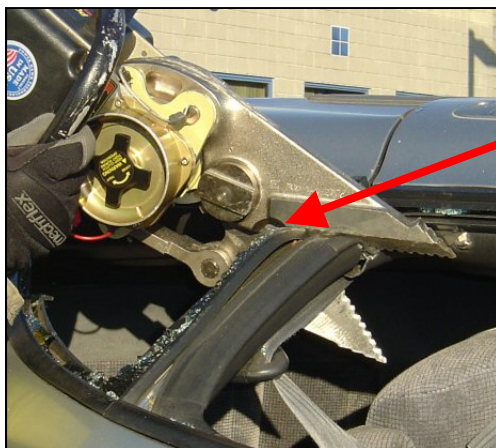
Moving the spreader arms deeper into the working material increases the spreading force of the tool.

2. Wider = Greater Force



Purchase points that are wider apart deliver higher spreading forces.

When cutting, the greatest cutting forces are available at the base of the cutter (point closest to the cutter bolt). When possible, begin cut as close to the base of the cutter as conditions will allow.



Engage working material at cutter notch for greater cutting forces

MAINTENANCE

MAINTENANCE AFTER USE:

- Recharge battery pack.
- Clean tool and all accessories. (Note: It is normal for small amounts of grease to leak from the powerhead. This requires no maintenance beyond periodic cleaning.)
- Check all parts for damage, wear, and/or fraying.
- Check that all hardware is securely fastened (i.e. handle bolts, etc.).
- Check cutting and spreading attachments for damage.
- Check P-16 to ensure 70° articulation and stop screw are functional.
- Check P-16 clutch for proper holding of the powerhead and attachments.
- Lubricate attachment pins and cutting blades with light machine oil or WD-40.
- Check that cutter nuts are tight. If blades can be moved by hand, or if blades display abnormal separation during cutting, the nut is loose. If loose, torque to 150 foot-pounds.
- Check proper installation of cutter-link spiral rings.

If service is required, contact your Power Hawk® dealer or the Factory for assistance.

MONTHLY MAINTENANCE AND INSPECTION:

- Check charge on battery.
- Inspect Power Hawk® P-16 Rescue System components for damage.
- Inspect cables and plugs for fraying, wear, cleanliness, or damage.
- Check switches for proper functioning.
- Lubricate attachment pins and cutting blades with light machine oil or WD-40.

If service is required, contact your Power Hawk® dealer or the Factory for assistance.

ANNUAL INSPECTION (PERFORMED BY FACTORY OR AUTHORIZED SERVICE CENTER):

- Test all cables for electrical integrity.
- Inspect all plugs and connections; replace as necessary.
- Perform load and amperage draw tests.
- Inspect blades and arms for damage and cracking.
- Replace safety labels as required.
- Inspect and replace fasteners as required.
- Clean and lubricate unit as required.
- Replace battery as required.
- Check torque on cutter nut. Torque to 150 foot-pounds.
- Inspect cutter-link spiral rings; replace as necessary.
- Check P-16 to ensure 70° powerhead articulation and safety stops are functional. Replace parts as necessary.
- Check covers and handles; replace as necessary.

To ensure **MAXIMUM PERFORMANCE** of your **POWER HAWK® P-16 Rescue System**, contact your Local Dealer or the Factory for information on *POWER HAWK* Maintenance Plans

STORAGE:

- Stow P-16 Rescue System with 12VDC power supply disconnected and all battery terminals covered. It is recommended that cables between the P-16 Rescue Tool and the PC-100 Controller Unit be left fully connected.
- Stow P-16 Rescue Tool with attachments relieved of any load (i.e. spreader tips slightly separated).
- Protect unit from moisture by stowing in a dry area.
- Stow securely to prevent damage from movement.

STOP SCREW REPLACEMENT:

Loosen the Clutch Knob so the powerhead swings freely. Rotate the powerhead to the position shown below left (approximately 30°).

Using a 3/16" hex key, remove the Stop Screw from the Clutch Housing as shown below right.



Screw the replacement Stop Screw (part number 2C0433-1) into the Clutch Housing.

Confirm that the powerhead rotation is limited to 70° to the left, by swinging the powerhead in each direction until it hits the stops.

REPLACEMENT PARTS

Replacement parts for the *POWER HAWK*® P-16 Rescue System can be obtained from your authorized *POWER HAWK*® Dealer or by contacting the Factory.

TROUBLESHOOTING

PROBLEM	POSSIBLE CAUSE	SOLUTION
Tool will not operate	Poor / loose / dirty electrical connections	Disconnect, clean, and reconnect cables.
	Battery discharged	Charge battery or connect an alternate 12 V DC power source.
	Polarity from 12 V DC power source is reversed	Reverse polarity at 12 V DC power source.
	Insufficient 12 V DC current is being supplied	Check amperage being delivered. Connect 12 V DC power source capable of supplying sufficient current.
Tool has low power	Poor / loose / dirty electrical connections	Disconnect, clean, and reconnect cables.
	Battery discharged	Charge battery or connect an alternate 12 V DC power source.
	Insufficient 12 V DC current is being supplied	Check amperage being delivered. Connect 12 V DC power source capable of supplying sufficient current.
P-16 Attachments swing uncontrolled when loaded	Clutch knob is loose	Tighten clutch knob.
P-16 Attachments will not swing when clutch knob is loosened	Attachment is under load	Tighten clutch, operate tool to remove load, loosen clutch, and then reposition Attachment.

If above does not correct problem, contact your authorized *POWER HAWK*® Dealer or the Factory.

SPECIFICATIONS

P-16 Rescue Tool

Powerhead Output Torque	72,000 in-lbs (8135 N-m)
Input / Output Ratio	5958:1
Powerhead Articulation Angle	70°
Motor Type	12 Volts DC – Permanent Magnet
Motor Inrush Current	220 Amps
Motor Current @ No Load	23 Amps
Motor Current @ Max. Load	155 Amps
Pigtail Cable Length	12" (305 mm)

With No Attachments

Weight	32 lbs (14.5 kg)
Envelope (LxWxH)	17" x 10" x 12" (432 mm x 254 mm x 305 mm)

With S-1601 Spreaders Attached

Weight	41 lbs (18.6 kg)
Envelope (LxWxH)	25" x 10" x 12" (635 mm x 254 mm x 305 mm)
Travel Distance	14" (356 mm)
Opening Time	16 Sec
Closing Time	19 Sec
Highest Spreading Force	
At tips (NFPA 1936, HSF)	9270 lbs (41.2 kN)
At back of arm	45,240 lbs (201.2 kN)
Lowest Spreading Force	
At tips (NFPA 1936, LSF)	6990 lbs (31.1 kN)
At back of arm	17,530 lbs (78.0 kN)

With C-1601 Curved Cutter Attached

Weight	44 lbs (20 kg)
Envelope (LxWxH)	24" x 10" x 12" (610 mm x 254 mm x 305 mm)
Cut Level Rating (NFPA 1936)	A3, B4, C3, D3, E4
Opening Distance	5" (127 mm)
Opening Time	18 Sec
Closing Time	21 Sec

With CS-1602LW Straight Cutter Attached

Weight	47 lbs (21.3 kg)
Envelope (LxWxH)	27" x 10" x 12" (686 mm x 254 mm x 305 mm)
Cut Level Rating (NFPA 1936)	A3, B6, C3, D5, E6
Opening Distance	10" (254 mm)
Opening Time	17 Sec
Closing Time	20 Sec

PC-100 Controller Unit

Power Input	12 Volts DC
Case	Sealed
Weight	5 lbs (2.3 kg)
Envelope (LxWxH)	11" x 4.5" x 7.5" (279 mm x 114 mm x 190 mm)

CA-4M Power Cable Assembly

Cable Length	13 ft (4 m)
Weight	6.8 lbs (3.1 kg)

SPECIFICATIONS (Continued)

PWR-12MP Power Pack

Battery Type	12 V, Valve-Regulated, Sealed, Lead-Acid
Battery Capacity	33 Ampere Hour
Case	Vented
Charge Indicator	Dial Indicator
Charger Port	Special
Charger Required	Power Hawk® BC-U1 (NFPA Compliant)
Charging Ambient Temperature	-4 to 122°F (-20 to 50°C)
Power Output Connectors	2 Red Connectors for Power Hawk® Accessories
Weight	29.6 lbs (13.4 kg)
Envelope (LxWxH)	11.8" x 8" x 10" (300mm x 203mm x 254mm)

BC-U1 Battery Charger (UL 1012, NFPA-1936)

Input	
Line Voltage, Frequency	90-230 V AC (±10%), 50-60 Hz (±10%)
Maximum Input Current	0.70 A RMS (1.40 A Peak)
Input Fuse Type	5 x 20 mm, Glass Cartridge Type, Time Lag, (Slo-Blo®)
Input Fuse Value	2.5A, 250 V
Power Cord	SVT, VW-1, 18 AWG, 3 Conductor Detachable Power Supply Cord, 6 feet long with NEMA 5-15P Grounding Plug and IEC-320 Grounding Connector, rated 10 A
Output	
Charge Current	4 A Max. (± 5%)
Charge Voltage	14.8 ± .20 V DC
Output Fuse Type	Blade Type, Fast Acting, (MINI® Fuse) (SAE J2077)
Output Fuse Value	5 A, 32 V
Power Cord	SPT-2, VW-1, 18 AWG, 2 Conductor Fixed Power Cord, 6 feet long with special output connector
Weight	2.4 lbs (1.1 kg)
Envelope (LxWxH)	6.75" x 4.15" x 2.00" (172mm x 105mm x 51mm)
Operating Temperature	32° to 104° F (0° to 40° C)

PWR-Li16C Lithium-Ion Power Pack

Battery Manufacturer and Model	EarthX ETX680C
Battery Type	13.2 V Lithium-Ion (LiFePO ⁴)
Battery Capacity	12.4 Ampere Hour
Battery Enclosure	Sealed, IP66
Charge Indicator	Attached 4 LED with test button, with polarity and fault indication
Charger Required	Power Hawk Model BC-Li16
Charging Ambient Temperatures	32 to 113°F (0 to 45°C)
Discharging Ambient Temperatures	-22 to 140°F (-30 to 60°C)
Storage Temperatures	Short-term: -4 to 113°F (-20 to 45°C) Long-term: -4 to 77°F (-20 to 25°C)
Weight	4.5 lbs (2.0 kg) Including charge indicator and connector cables
Battery Envelope (L x W x H)	5.9" x 3.4" x 4.5" (150mm x 86mm x 115mm) NOT including power connector cable

SPECIFICATIONS (Continued)

BC-Li16 Battery Charger (UL 1012)

Input	
Line Voltage, Frequency	105-240 V AC, 50-60 Hz
Maximum Input Current	3.5 A (at 240 V AC rated load input)
AC Input Power Cord	SVT 18AWG*3C detachable power supply cord with IEC-320 Grounding Connector (rated 10 A), 6 feet (1.83 m)
Output	
Max Output Power	63 Watts
Fast Charge Voltage	14.4V +/- 0.2VDC
Constant Current	4 ADC Nominal Max 4.3A
Switching Current	Approx. 0.2 A
DC Output Power Cord	SPT-2 #16 105°C 300V with Anderson mini output connector, 6 feet (1.83 m)
Weight	2.1 lbs (0.95 kg)
Envelope (L x W x H)	6.1" x 4.16" x 1.98" (155 mm x 106 mm x 50.3 mm)

WARRANTY INFORMATION

See separate Statement of Warranty provided at time of sale.

Power Hawk Technologies, Inc.,
300 Forge Way, Suite 2
Rockaway, New Jersey 07866 USA
Telephone: 973-627-4646 or 1-800-PWR-HAWK (1-800-797-4295)
Fax: 973-627-4622

www.powerhawk.com

Power Hawk® is a registered trademark of Power Hawk Technologies, Inc.
U.S. Patent No. 5,297,780 and additional patents pending.

MAINTENANCE SERVICE RECORD

DATE	SERVICE PERFORMED / COMMENTS	SERVICE PERSON

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