

# Adaptive Specialty Probe (ASP™)

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Operator's Manual for:  
ASP-45X



▶ **WARNING**

This product is used in inherently dangerous environments and situations. Inappropriate use of this product could result in serious injury or death.

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The ASP™ tools are designed to grapple with the target and may cause the robotic platform to become “entangled” with the device or its associated components with no option for recovery other than a manual approach. Use due consideration in planning.

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Prior to installing or removing the Picatinny Rails on the gripper, or mounting tools onto the Picatinny Rails, make sure that the robot and the OCU are both turned off to avoid injury from inadvertent movement of the gripper or robotic arm.

▶ **WARNING**

The Viper is a robotically powered shear with a spear point fully capable of causing bodily injury whether mounted or not. Use all precautions inherent with the use of a knife. Inappropriate use of the Viper could result in serious injury or death.

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## INTRODUCTION

The Adaptive Specialty Probe (ASP™) is a selection of four highly efficient tools focused on the needs of the downrange operator and first responder, providing a capability in the interrogation and exposure of Improvised Explosive Devices (IED), negotiating hazards, and defeating the dangers associated with those devices. The operator can quickly interchange tools via a Picatinny Rail that is mounted on the outside of an adapted gripper. With the ease of mounting associated with the Picatinny Rail mounting system, additional tools can be designed providing expanded capabilities to meet emerging threats.

## THE SIDEWINDER

The Sidewinder is a probing tool used to search for and recover buried or exposed wires. The operator exposes buried wires through probing or scraping with the Sidewinder and rotates the jaws of the gripper to wind up the wire around the tool for recovery and later exploitation. While mounted on both grippers, the Sidewinder allows virtually unimpeded access to the grippers until wire recovery operations have begun.



**Sidewinder**

## THE COBRA

The Cobra rake is used for interrogating the earth and debris surrounding the target and can be used to remove debris from and perform remote movements of suspect devices. Mounted on only one gripper jaw, the Cobra provides the operator unimpeded access to the gripper.



**Cobra**

## THE ADDER

The Adder hook is used for scraping, removing concealing material, negotiating other obstacles, and can be used to hook and drag suspect objects. Mounted on only one gripper jaw, the Adder hook provides the operator unimpeded access to the gripper.



**Adder**

## VIPER

The Viper is a set of shears capable of piercing soft materials with its exposed tip and tearing them apart by the manipulation and opening / closing of the gripper. Soft materials commonly used to conceal IEDs (i.e. rice bags, clothing, burlap, etc.) can be punctured with the Viper and torn open exposing the device for further exploitation. The Viper is mounted to both jaws of the gripper and impedes direct (but not complete) access to the gripper. It is actuated by the operation of the gripper jaws and is not powered itself.



**Viper**

## CARRYING CASE

The ASP™ kit comes in a hardened case with foam cut outs for the four tools, the Picatinny Rail mounting system, and its associated parts.



**Carrying Case**

## RAIL MOUNTS

The Picatinny Rail is a standard tactical mounting system designed to allow the operator to quickly mount a verity of tools and accessories on the various robotic platforms. Built to MIL-STD-1913, the rails are of a T-shaped cross section interspaced with flat spacing slots through which two cross bolts hold

the tool firmly in place. They provide a quick, sturdy, and movement free mounting system allowing the operator greater options of attack in deploying the various robotic platforms. Note, in the ASP-45X there are four variants, with each being specific to a platform and gripper type.

## PRE COMBAT INSPECTIONS/PRE COMBAT CHECKS

The ASP™ kit requires little maintenance. Before an ASP™ tool is repackaged for storage, or it is returned from field use, the following checks should be made.

### PRE COMBAT INSPECTIONS

Examine the kit for dirt or corrosion that could weaken the tools or prevent their effective employment. Remove any dirt with a stiff dry brush and wipe the tools clean. Examine the tools for any damage suffered, paying particular attention to tools involved in a catastrophic detonation of the target or energetic render safe procedures. Tools exposed to close range explosive shock may become deformed in such a way that they could impede the operation of the gripper or robotic arm. Any tool exposed to such an event should be fully tested through its range of motion in a safe area before employment. If any defects are found, the unit should be disposed of or returned.

#### EXAMINE THE PICATINNY RAIL MOUNTS

Ensure the rail mating surfaces and mounting holes are clean and clear. Verify that the screws holding the Picatinny Rail Mounts attached to the gripper are properly tightened and secure; Loctite the screws if available.

#### EXAMINE THE SIDEWINDER

Examine the rail mating surfaces and the screws to ensure they are clean and undamaged. Examine the prongs of the Sidewinder to ensure they have not become bent or broken. While the Sidewinder will still perform effectively with bent or when missing one or two prongs, bent prongs may hinder operation of the robotic gripper and the operator will be unlikely to discard recovered wire with prongs on only one side.

## EXAMINE THE COBRA

Examine the rail mating surfaces and the screws to ensure they are clean and undamaged. Examine the Cobra tool for hairline cracks and bent or missing teeth. The Cobra can still be used if damaged, but the operator must ensure it does not hinder the use of the robotic gripper.

## EXAMINE THE ADDER

Examine the rail mating surfaces and the screws to ensure they are clean and undamaged. Examine the hook to ensure it has not been damaged in a manner that would hinder the operation of the gripper.

## EXAMINE THE VIPER

### ▶ **WARNING**

The Viper is a robotically powered shear with a spear point fully capable of causing bodily injury whether mounted or not. Use all precautions inherent with the use of a knife. Inappropriate use of this product could result in serious injury or death.

### ▶ **WARNING**

Operator must wear leather or work gloves when handling the Viper tool to avoid cuts from the sharpened knife edges.

Examine the rail mating surfaces and the screws to ensure they are clean and undamaged. Examine the cutting edges of the shears to ensure they are not damaged, are suitably sharp for the task at hand, and not bent. Small burrs and blade damage can be corrected with a suitable sharpening stone. Operate the shears through their full range of operations prior to deployment and remember the installation of the Viper limits the operator's unimpeded access to the grippers.

## PRE COMBAT CHECKS

The operator should check that the Picatinny Rail is securely mounted to the gripper and the screws are tight. Loctite® Threadlocker Blue 242 is recommended to prevent the screws from coming loose while enabling later

removal with ordinary hand tools. Second, ensure the tool can be mounted and the gripper operated effectively through its full range of motion. ASP™ tools should be checked as part of pre-combat checks to ensure they can be quickly and properly mounted and that they will not interfere with effective use of the robotic gripper or arm. They should again be quickly checked after mounting and prior to deployment.

## OPERATION

### ▶ CAUTION

The ASP™ tools are designed to grapple with the target and may cause the robotic platform to become “entangled” to the device or its associated components with no option for recovery other than a manual approach. Use due consideration in planning.

The Adaptive Specialty Probe (ASP™) is designed to be an intuitive enhancement of the operator’s robotic platform and provide additional tactical options once the platform has been deployed down range.

## MOUNTING OF THE GRIPPER MOUNTS AND PICATINNY RAILS

### ▶ WARNING

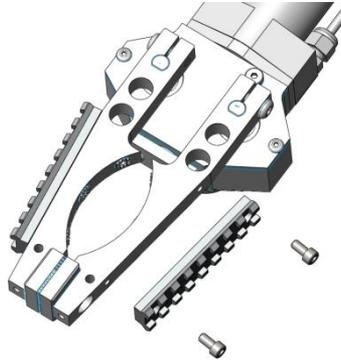
Prior to installing or removing the Picatinny Rails on the gripper, make sure that the robot and the OCU are both turned off to avoid injury from inadvertent movement of the gripper or robotic arm.

The ASP-45X comes with four sets of Picatinny Rails, each specifically designed for the QinetiQ Talon, iRobot PackBot with parallel grippers, iRobot PackBot with standard grippers, or the iRobot SUGV. They are not interchangeable and use existing holes on the platform.

## MOUNTING THE PICATINNY RAIL ON THE TALON

The Picatinny Rail for the Talon is mounted on the outside of each gripper jaw using a 5/32” hex key to secure four 10-24 x 3/8" socket head cap screws, two on each side. The screws supplied with the kit have a thread patch to help prevent the screws from coming loose. Ensure the screws are tight. If a non

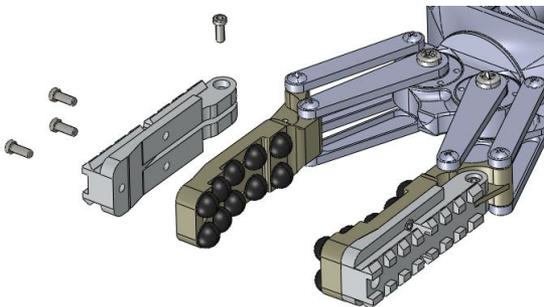
thread patch screw is used, Loctite® Threadlocker Blue 242 is recommended to prevent the screws from coming loose while enabling removal with ordinary hand tools.



**Talon Gripper**

## MOUNTING THE PICATINNY RAIL ON THE PACKBOT PARALLEL GRIPPER

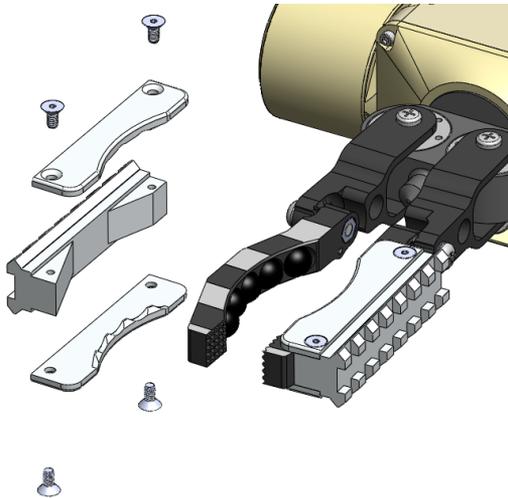
The Picatinny Rail is mounted to the PackBot fitted with a parallel gripper by four 6-32 x 1/4" low profile socket head cap screws using a 1/16" hex key. One mounted vertically at the rear of the gripper (closest to the PackBot body) and three horizontally into the existing holes on the back of the gripper jaw. Ensure the screws are tight and Loctite the screws in place. Loctite® Threadlocker Blue 242 is recommended to prevent the screws from coming loose while enabling removal with ordinary hand tools.



**PackBot Parallel Gripper**

## MOUNTING THE PICATINNY RAIL ON THE PACKBOT STANDARD GRIPPER

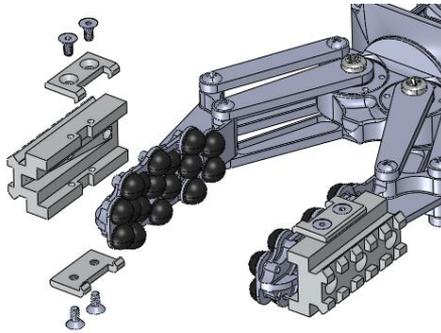
The Picatinny Rail is mounted to the PackBot Standard Gripper using a 5/64" hex key to secure four 6-32 x 5/16" flat head screws and two clamping plates on each jaw. When installing the clamping plates ensure the clamping flange is fully seated on the inside of the curved jaw surface and does not interfere with its operation. Ensure the screws are tight and Loctite the screws in place. Loctite® Threadlocker Blue 242 is recommended to prevent the screws from coming loose while enabling removal with ordinary hand tools.



**PackBot Standard Gripper**

## MOUNTING THE PICATINNY RAIL ON THE SUGV

The Picatinny Rail is mounted to the SUGV Gripper using a 5/64" hex key to secure four 6-32 x 5/16 flat head cap screws and two clamp plates on each jaw. When installing the clamping plates ensure the clamping flange is fully seated on the inside of the curved jaw surface and does not interfere with its operation. Ensure the screws are tight and Loctite the screws in place. Loctite® Threadlocker Blue 242 is recommended to prevent the screws from coming loose while enabling removal with ordinary hand tools.



**SUGV Gripper**

## MOUNTING A TOOL ONTO THE PICATINNY RAILS

### ► **WARNING**

Prior to installing or removing tools onto the Picatinny Rails make sure that the robot and the OCU are both turned off to avoid injury from inadvertent movement of the gripper or robotic arm.



**Installation of Adder Hook onto Picatinny Rail**

By using Picatinny Rails mounted on the outside of an adapted gripper, an operator can quickly interchange tools via a thumb screw. To install a tool onto the Picatinny Rail, first completely remove the thumb screw from the tool mounting block. The tool can now be freely mounted onto the Picatinny rail by sliding the tool block over the rail, with the tool end oriented away from the robot. Once the desired location of the tool is set, by sliding it forward or back along the rail, re-insert the thumb screw to lock the tool into place. The tool may need to be shifted slightly forward or aft to allow complete insertion of

the thumb screw. Screw down the thumb screw to lock it and the tool securely in place. The top of the thumb screw should be flush with the side of the block when it is full tightened.

When mounting two tools onto the gripper, one on each finger, make sure to install the tools onto the Picatinny Rails so that the thumb screw of each tool is aligned with the thumb screw of the other tool, i.e. the screws are both on the top or both on the bottom of the gripper. This will ensure the tools will not interfere with each other when closing the gripper.

To remove the tools from the gripper, unscrew the thumb screw and remove it completely from the tool block. The tool can now be removed by sliding it off of the Picatinny Rail. Be sure to reinsert the thumbscrew into the tool block, and screw it tight, so that the thumbscrew will be ready for the next use of the tool. The Picatinny Rails can be left on the gripper without impeding the action or utility of the gripper.

## OPERATION OF TOOLS

The following are suggested uses of the tools provided in the ASP kit. However, with training and operational experience it is expected that operators will find many uses for each tool beyond what is suggested.

## OPERATION OF THE SIDEWINDER

The Sidewinder is designed to find and recover firing wire. While the grippers are opened to their maximum extent (providing for the widest probing area) the Sidewinder is lowered into the ground and moved forward until a wire is found. Using the on board camera the wire is positioned above the notches on the prong arms and the gripper is rotated causing the wire to wind itself around the prongs. The notched ends will inhibit the wire from sliding off. Once the operator has wound up the desired wire, the arm of the platform should be raised slightly creating enough slack in the wire to eject it from the Sidewinder. After raising the arm slightly, the prongs of the sidewinder are pointed towards the ground and the gripper moved to its fully closed position allowing the wire to slide off. Depending on the recovery conditions of the attempt, the robotic platform or its arm may have to be vigorously shaken to dislodge the wire.

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## OPERATION OF THE COBRA

Operation of the Cobra is highly intuitive and limited only to the imagination of the operator. The widely spaced prongs of the Cobra provide the operator with the capability to efficiently sift through dirt and debris surrounding the target. Sifting and removing rubble such as broken concrete, camouflaging material, or the separation and recovery of components.

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## OPERATION OF THE ADDER

Operation of the Adder hook is again intuitive and limited only by the operator's imagination. The Adder allows the operator to snag a variety of surfaces and materials to perform lifting, dragging, or remote movement of items. When used in conjunction of the grippers' wrist, the hook is able to slide through a variety of attachment points found on IED's.

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## OPERATION OF THE VIPER

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The Viper is a robotically powered shear with a spear point fully capable of causing bodily injury whether mounted or not. Use all precautions inherent with the use of a knife. Inappropriate use of this product could result in serious injury or death.

### ▶ **WARNING**

Operator must wear leather or work gloves when handling the Viper tool to avoid cuts from the sharpened knife edges.

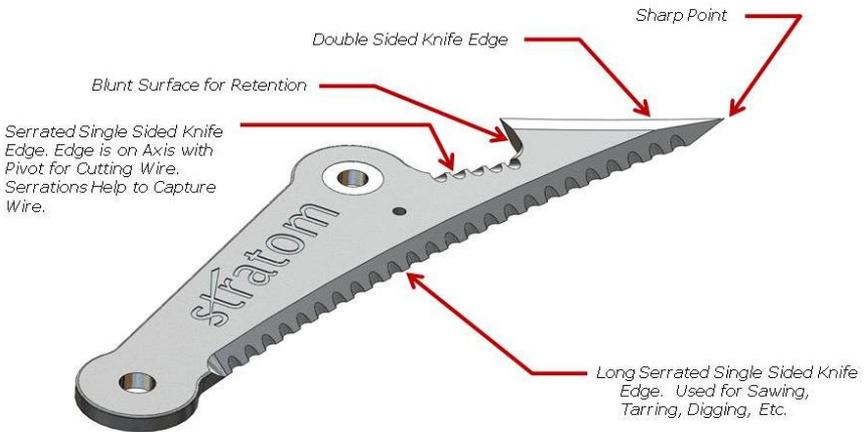
Operation of the Viper is dependent on the operation of the robotic grippers. The Viper is effective in both the opening motion of the shears as well as closing them. To expose a target covered by camouflaging materials (fabric, rice bags, burlap etc.) the shears of the Viper are closed, exposing a single spear point to the target. The Viper is then moved forward to pierce the covering material. Once the Viper has pierced the covering, the gripper jaws are opened to tear the material. Further manipulation and rotation of the robotic platform and gripper will expose the item. In using the shears as a cutting tool, the jaws of the gripper are fully opened; the item to be cut is positioned between the

jaws and the jaws closed. Optimal cutting performance is obtained with the item to be sheared as near to the pivot point of the Viper blades as possible.



### Viper Cutting Area

The shears are capable of cutting through common diameter wire and medium hardness (IE Plastic, light wood, cloth, etc) containers. For ultra-fine firing wire, such as that commonly referred to as missile wire or shellacked insulated wire, the Viper can be used to wrap the wire and then be opened to snap the wire. Both the inside and outside surfaces of the Viper blades can be used for cutting and ripping.





*Cutting Wire, Extending a Puncture, Sawing*



*Puncturing, Drilling, Digging*



*Extending a Puncture, Cutting, Dragging*

## MAINTENANCE

Besides specific procedures mentioned below, the only thing that should be used to clean the surface of the tools is a damp soft cloth, and a small soft bristle brush.

## CLEANING PICATINNY RAILS

Due to the tight tolerances required to mount the tool blocks on the Picatinny Rail mounting system, ensure the rail mating surfaces are clear of debris such as mud or sand. To clean the rails a damp soft cloth or a small soft bristle brush can be used.

## SHARPENING OF THE VIPER BLADES

### ▶ **WARNING**

Operator must wear leather or work gloves when handling the Viper tool to avoid cuts from the sharpened knife edges. Use all precautions inherent with the use of a knife.

A small pocket sharpener is included with the kit to keep the Viper blades sharp and free of burrs during operations. The sharpening tool has a set of two V sharpeners, one of carbide and one ceramic, along with a 2 inch tapered rod, that is diamond coated. To sharpen the straight blades of the Viper it is suggested that the operator begin by “setting” the edge with the carbide V sharpener until the blade passes through smoothly. That should be followed up with a dozen passes of the ceramic V sharpener. To sharpen the serrated edges of the Viper use the diamond coated rod to remove any burrs on the bottom (flat) side of the blade keeping the rod as near flat as possible to the blade.

Finish sharpening the serrated edges using the rod on the inside bevel. Final sharpening should always finish up by sharpening against the edge to remove any wire edge thrown up by sharpening.

Operators may also sharpen Viper blades using conventional sharpening techniques and equipment not supplied with the ASP™. It is recommended that diamond coated stones and water be used in routine sharpening for their ease of use and convenience; however Arkansas, carborundum, India and other abrasive stones are equally suitable.

Stones listed as course or medium, diamond sharpeners of 45-25 microns (typically listed as coarse and medium) and cloth backed emery paper of 220-280 are the most useful in sharpening the Viper. Finer cutting surfaces may be used, but little operational effectiveness is to be gained using finer grits.

Seriously damaged blades can be restored with cloth backed emery paper of 240-grit (typically marketed as auto-body rolls); backing the emery paper with a suitable hard flat surface (e.g. a file or block of hard wood).

The sharpening stroke should be done against the bevel (i.e. with the edge facing towards the operator) taking care to sharpen only the beveled edge and retain the original angle. Once the original edge has been restored to the user's satisfaction the flat side of the blade (opposite the bevel) should have the "wire edge" removed by lightly running the stone across the non-beveled edge at the shallowest angle possible for 3-5 light strokes.



**Sharpening Viper Blades**

**Notes:**

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