



**DUKE ESI/RM(x)  
Installation and Operation  
Manual**

**Duke Part No. 10192  
Rev. B**

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## INTRODUCTION

The Duke Model ESI/RMX shock tube initiator is designed to provide EOD robots with a reliable shock tube initiation system for breaching systems and disrupter cannons. It is built to mount directly to the arm of a Remotec Andros Mark 5A, 6A, F6A, and Wolverine robot with minimal interface requirements. This unit utilizes the weapons output terminals, which outputs +24VDC and is controlled at the main or local control panel of the robot.

## THEORY OF OPERATION

The ESI/RMX unit is composed of three major modules; 1-Power Auto Polarity and Sequence Control, 2- High Voltage Power Supply, and 3- High Voltage and Low Voltage Relays

## TO FIRE

Install switch tip(s) firmly into red/black terminals. Move firing lever to “armed” position.

Test the unit by selecting a weapons platform channel and activating the weapons output (fire control button) **continuously** for 3 seconds at the main or local control panel for each circuit. If ESI tip is functioning, a loud ‘pop’ emanating from the initiator tip will be heard approximately 2 seconds after circuit is activated.

## INSTALLATION

### ESI/RM(2, 4, 6)

For Mark 5A, 6A, F6A and Wolverine:

- Using the 5/32" allen wrench and mounting brackets supplied, fasten the module on the robot's right side as viewed from rear of the 5A, 6A, and Wolverine, or the left side of the F60 of the lower arm. Note that the bracket attached to the box has mounting holes used to either raise or lower the unit by ¼ inch. This is done to allow the box to clear the battery cover on the 5A, 6A, and F6A, or the arm motor on the Wolverine.
- Connect the power connectors to the weapons terminals on the robot, paying careful attention to polarity.
- Install the shock tube initiator tips on all channels.
- Test fire each channel.
- Secure the cables with tie wraps (not supplied), leaving additional slack at arm joints.
- Move the arm through the entire range of motion to verify that the initiator does not interfere with the arm's motion and that the power cable to the initiator is not stretched, kinked, or pinched.

### ESI/RM1

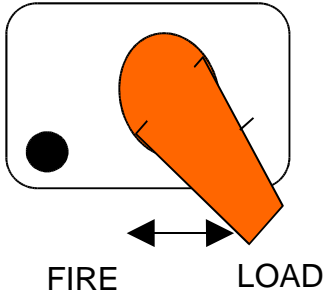
For Mark 5A, 6A, F6A and Wolverine:

- Thread large tie wraps into the bottom of the cradle and over the top of the initiator.
- Attach unit to lower arm section.
- Tighten the strap to secure the cradle and initiator. Note that the rubber pads are supplied to prevent the cradle from slipping on the arm.
- Connect the power connectors to the weapons terminal. Note that the power connector is *polarity insensitive* on the ESI/RM1.
- Install firing tip and test operation of the initiator.
- Secure cable with tie wraps (not supplied), leaving additional slack at arm joints.
- Move the arm through the entire range of motion to verify that the initiator does not interfere with the arm's motion and that the power cable to the initiator is not stretched, kinked, or pinched.

If you have any questions on any of the steps above, please don't hesitate to call us.  
**TOLL-FREE 866-587-DUKE (3853)**

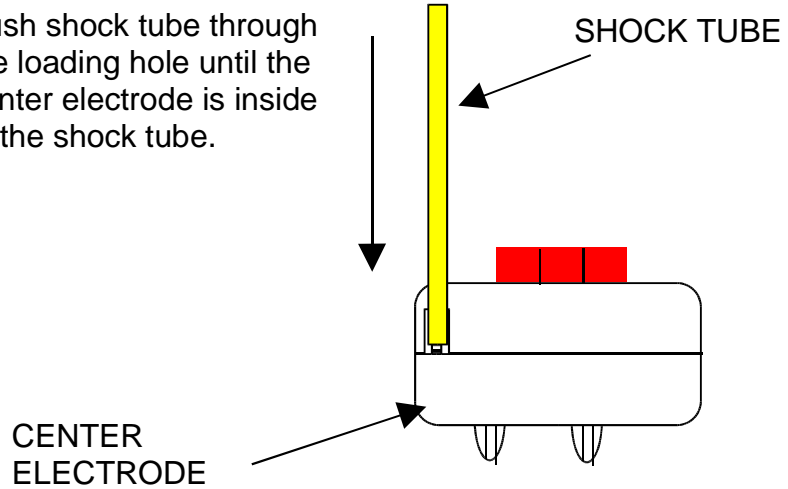
**STEP ONE**

Place piercing electrode control level in the load position (away from center electrode hole).



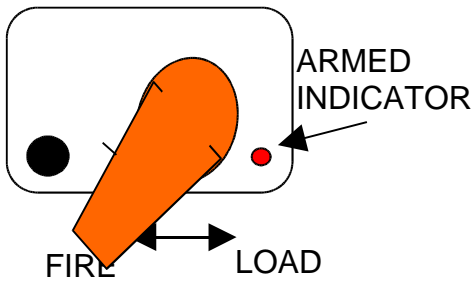
**STEP TWO**

Push shock tube through the loading hole until the center electrode is inside of the shock tube.



**STEP 3**

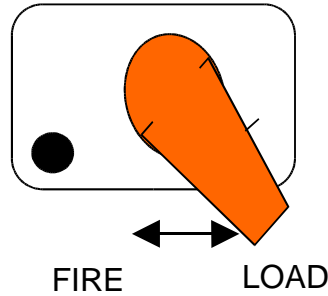
Move the piercing control arm level to the FIRE position.



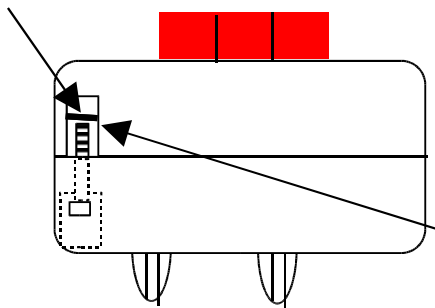
**STEP 4**

**\*\*\* IMPORTANT \*\*\***

Always move piercing control lever to the LOAD position *before* removing shock tube.



PIERCING ELECTRODE



**CALIBRATION:** Every 1,500 shots, screw the center electrode in until it touches the piercing electrode. Then back off ½ turn to establish the proper gap.

CENTER ELECTRODE SCREW HEAD

## OPERATING INSTRUCTIONS

### GENERAL

Power is applied from the robot's weapons terminals. The 24VDC source switching action will occur only when the fire command is actuated at the robot control panel AND held on for at least three seconds. It will not fire again until power switch is released.

### SEQUENCE CONTROL

When the power is applied the unit automatically begins a two second charging cycle. After approximately two seconds the power is removed from the high voltage power supply and the initiator tip is connected to the high voltage capacitors, initiating the shock tube. The unit then goes into a standby mode and cannot be recycled until power is removed. If the user wishes to abort during the two-second cycle, simply release the fire switch and power will be removed from the weapon terminals used to power the ESI/RM(X) unit. The high voltage capacitors will discharge internally and the unit will return to an idle state.

### OPERATION VERIFICATION

Prior to loading shock tube, verify that unit is functioning by powering up each circuit with the ESI tip in place and armed. A loud 'pop' will be heard, indicating the tip is sparking. For additional verification, a short segment of shock tube (4 inch) may be inserted into tip and fired (please observe safety precautions when performing this test).

**TECH TIP!**: Improperly shipped or stored shock tube can have 'dead' spots that will not easily ignite with an electronic initiator. Dangle the ESI tip on the end of a length of shock tube (approx. 3 feet) and thump the tube to get additional RDX around the ignition point for more reliable results.

**TECH TIP!**: Remember to store and maintain your shock tube reel **on its side** with a moisture barrier cap on the end.

## TROUBLESHOOTING AND MAINTENANCE

### TESTING

Test the tip prior to insertion of the shock tube for spark. An audible 'pop' should be heard indicating the tip works. If spark is weak or not present, swap tip with one from a known working channel. If subsequent spark is strong, recalibrate the weak tip.

If the tip works on one channel but not the other, verify that +24VDC is present for at least two seconds during firing cycle. If voltage is present, remove ESI tips and listen

for audible relay clicks two seconds apart internally. This will verify that the electronics are receiving power. If relays are operating but no output is present, return the unit to the factory.

The ESI/RMX is equipped with two 5-gram size, molecular sieve desiccant packs, mounted with hook and loop fasteners inside of the unit. These parts should be replaced every 5 years as a general maintenance item.

## SPECIFICATIONS

### ELECTRICAL

**Input Voltage:** 16 ~ 30 volts D.C.

**Firing Voltage:** 2500 Volts D.C.  $\pm$  2%

**Charge Time:** 2 seconds  $\pm$  200 ms

**Firing Sequence:** Charge time 2 seconds followed 5 milliseconds later by discharge cycle.

**Peak Current @24 VDC:** 0.250 amps

**Tip Life:** 5,000-10,000 shots typical

### MECHANICAL

**Housing:** Weather Resistant, Cast Aluminum Housing (Dimensions : 8.7" L x 4.7" W x 3.25" H )

**Weight:** 3.5 Lb.

**Mounting:** The ESI/RM 1,2,4, or 6 is designed for Remotec ® robots and uses two custom clamp assemblies to mount the unit securely to the robot arm. Universal mount for other robots available

**Available Colors:** Unpainted Aluminum or Black .

Operating Temperature: -20° ~ 160° F

Storage Temperature: -40° ~ 185° F

**Relative Humidity:** 0~95 % NON-CONDENSING

## **DUKE PRO REPLACEMENT PARTS LIST**

Initiator Module – PN 337800A

Mounting Brackets – PN 337805A

5/32 Allen wrench – PN 10007

Shock tube initiator tip – Switch Tip – PN 1096

Desiccant Pak (includes 2 sealed 1/6 size molecular sieve units and self adhesive loop fastener) – PN 10005

Custom Mounting Kit for ESI/RM1 – PN 5556