

## TIMING ADJUSTMENT INSTRUCTIONS

*Note: You MUST contact Thunder Equipment prior to attempting this repair. Unauthorized modifications to the launchers are not covered under warranty. Failure to contact Thunder Equipment voids manufacturer's warranty.*

**CAUTION: ALWAYS REMOVE THE GAS AND MAKE SURE POWER SWITCH IS IN "OFF" POSITION BEFORE PERFORMING ANY SERVICE ON THE MACHINE.**

Your Thunder Equipment launcher has a self aligning feature. The bumper tubes should never get out of alignment. On very limited occasions it may become necessary to adjust the internal timing on your machine. This sometimes occurs after the break in period of a new machine. If there are any questions about this process or you need additional support please contact Thunder Equipment.

### STEP 1: TAKE THE COVER OFF YOUR LAUNCHER

Remove all of the Phillips Head screws except for the ones holding the battery box. Remove the nut holding the power switch to the case. Carefully pull the case from the gas valve side in order to clear the valve as you lift up and remove the cover. Pull out the rubber grommet protecting the receiver wire and slide over the plug.

### STEP 2: LOCATE THE TIMING CAM

The timing cam is the one closest to the bumper tubes and contacts the metal timing arm.

### STEP 3: ROTATE MACHINE USING REMOTE ELECTRONICS

Turn on power button and use remote electronics to rotate timing cam. There is a 1/8" allen screw drilled through the body of the cam. Rotate until the set screw is accessible

### STEP 4: ADJUST TIMING CAM

Turn off power switch. Loosen the set screw inside the cam with a 1/8" allen wrench. With the bumpers tubes facing to the left, rotate the timing cam toward you as far as it will go and while pressure is being applied retighten the set screw. This adjustment allows the machine to rotate slightly more before the timing switch engages.

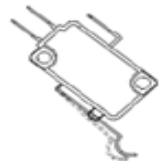
### STEP 5: CHECK TIMING ADJUSTMENT

Turn on power switch and rotate machine using remote electronics with the cover off and no gas installed. Check to see that the timing switch stops on every cam tooth and the yellow firing button at least begins to come back out away from the igniter when the machine is in each neutral position on the firing cam. If adjustment is successful when the machine is in each neutral position on the firing cam the yellow ignition button will begin to retract.

**IF ABOVE ADJUSTMENT IS NOT SUCCESSFUL PROCEED TO NEXT STEPS LEAVING TIMING CAM IN NEW POSITION.**

### STEP 6: LOCATE THE TIMING SWITCH

The timing switch looks like the picture on the right. It will have a small plastic body with a metal arm protruding from the side. The switch functions by the arm contacting the timing cam. When the teeth of the cam depress the metal arm the machine stops. When the switch receives a signal from the transmitter the machine begins to rotate. It continues rotating until the cam depresses the metal arm.



### STEP 7: ADJUSTING THE TIMING

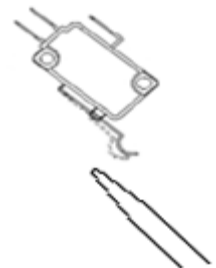
*Note: Always make sure the power switch is in the OFF position before starting your adjustment.*

The plastic body of the switch is permanently mounted to the internal plate. Adjusting the timing requires bending the metal arm in the proper direction at the proper place on the arm. This is an acceptable industrial method for adjusting this switch and yields a VERY reliable and durable adjustment once completed. When completed the only goal is to ensure that the teeth of the timing cam stop the switch on every tooth and the igniter button near the firing cam turns off after firing to allow the gas flow to stop.

Determine which way the microswitch arm needs to bend. If the machine is rotating too far during the cock position causing the machine to fire quickly before it has a chance to charge the arm needs to be bent TOWARD the timing cam. If the machine is not rotating far enough to allow gas to shut off after firing the metal arm needs to be bent AWAY from the timing cam.

### BENDING THE ARM AWAY FROM THE TIMING CAM:

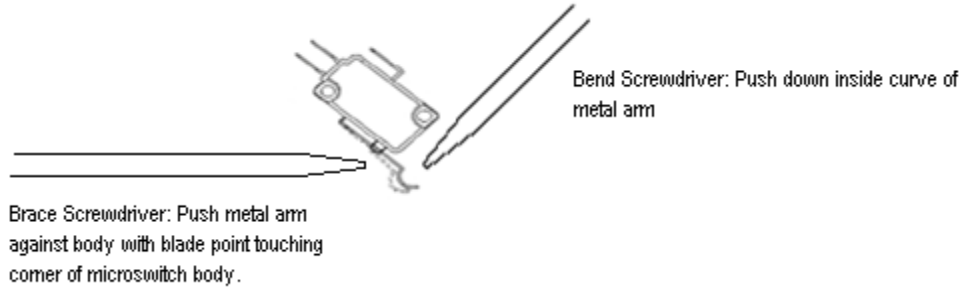
This is the easiest of the adjustments. It is required if machine is not fully shutting off in neutral position, i.e not rotating far enough before microswitch stops rotation. Allow the microswitch arm to stop on one of the timing teeth on the cam. Place a flat blade screwdriver between the tooth and the metal arm and VERY EASILY flex the arm up and away from the cam tooth. Under normal conditions the amount of bend placed in the arm will be about 1/2 the thickness of the metal arm. **THIS IS A VERY SMALL adjustment.**



**Check to see if timing has changed:** Once you have put a little flex on the metal arm remove the screwdriver, turn on the power and cycle the machine with your electronics. If the machine is performing properly you're done. If not, repeat the process being very patient. If you bend too far the machine will not stop on the cam teeth and you will have to bend the arm toward the timing cam.

### **BENDING THE ARM TOWARD THE TIMING CAM:**

This is necessary if machine is rotating too far causing early ignition or if machine constantly rotates when power switch is engaged. It is caused by metal arm not striking cam and allowing shut off. To perform this procedure you need 2 – flat blade screwdrivers, one to support the metal arm from breaking and to put the bend in the proper place and one to actually bend the arm. To perform this operation the metal arm of the microswitch cannot be touching a cam tooth. You need to cycle your machine with your electronics and turn off the power button when the metal arm is “dangling” between two teeth. Follow the diagram below to put a VERY SLIGHT bend in metal arm approximately at the point where the metal arm touches the corner of the microswitch body. Repeat the process above for checking to see if timing has changed.



### **STEP 8: CHECK TIMING ADJUSTMENT**

Repeat step #5 to check timing adjustment. If further adjustment is required return to Step #7.