



DEFENDER 400 OWNERS MANUAL

CAUTION: ANY MEC CLAY TARGET MACHINE MUST BE IN THE DISARMED STATE WITH THE BATTERY DISCONNECTED PRIOR TO MAKING ANY ADJUSTMENTS, LOADING THE CLAY TARGETS OR TRANSPORTATION OF MACHINE.

Step 1 – Securely set the machine on level ground, either on the optional T Cart with hardware supplied or a pallet. If using a pallet, please make sure that it is fastened with clamps to keep machine from tipping. **IF NOT FASTENED SECURELY, SERIOUS INJURY OR DAMAGE TO MACHINE CAN OCCOUR!!!**

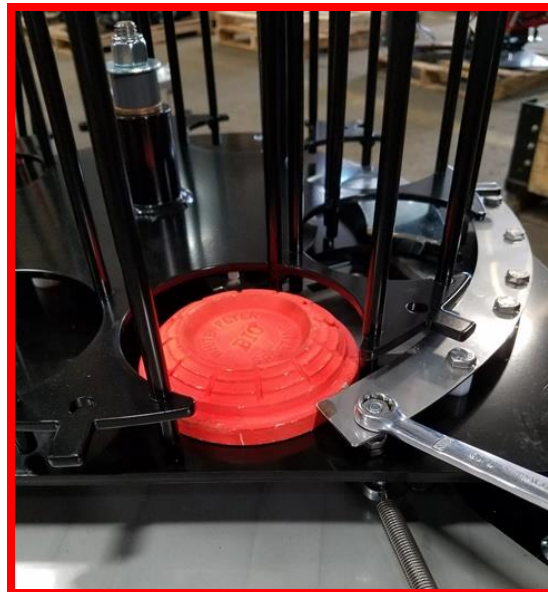
DO NOT CONNECT THE BATTERY. Ensure that the machine is in the **DISARMED/SAFE** position.

Step 2 – In most cases, your machine has been supplied to you ready to fire. If so, please proceed to **Step 3**. If your machine is supplied in a box without its carousel (shown below) fitted, you will need to attach it to the machine. Simply slide the carousel weldment onto the top plate shaft. If no grease is present, please add a little bit to the shaft. You may have to spin/rotate the carousel for it to slide on. Next, place the gray plastic collar over the shaft and onto the flange bearing in the carousel. Now place the $\frac{3}{4}$ " washer and nut onto the threads and tighten. Do not over tighten. You want a little bit of resistance there, but not too much. You shouldn't be able to spin the carousel with one finger.





Step 3 – Your machine comes with the knives adjusted to White Flyer Clays. However, clay sizes can vary by manufacturer. Check the height / clearance of the knife-edges by placing a clay in the carousel. Rotate the carousel so that the clay starts to pass underneath the inner and outer knife separator blades. The clay must pass freely under the knife separator blades without binding but with the minimum of clearance. Adjust if necessary, with 7/16" open ended wrench. The height on both the inner and outer knife edge will need to be adjusted. Photos below show adjustment with carousel fitted, but you can remove the carousel to make adjustment easier if preferred.



Step 4 – Now, you can lay out the battery terminals and control box at the back of the machine. **DO NOT CONNECT BATTERY AT THIS POINT.**

Step 5 – Check that the ON/OFF/DISARM toggle switch on the grey control box in the OFF position. Connect the terminals from the wire harness to the battery. A fully charged good quality deep cycle marine battery is recommended. It is imperative that the **Red Wire** goes to positive (+) and **Black Wire** goes to negative (-) on the battery. Never hammer the terminals onto the post of the battery and do not over tighten the terminals.

Step 6 – Visually check, from the rear of the machine, that the motion of the Throwing Arm is not restricted or blocked in any way.



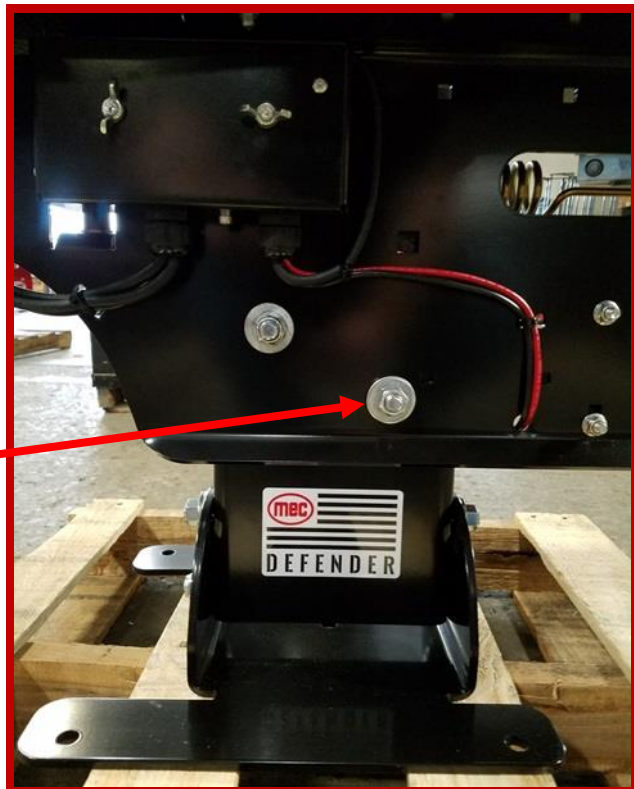
CAUTION: ALWAYS OPERATE THE MACHINE FROM BEHIND, NEVER FROM THE FRONT OR THE SIDES OF THE MACHINE. KEEP HANDS AND BODY PARTS AWAY FROM THE MACHINE WHEN ARMING, RELEASING AND DISARMING.

Step 7 – Standing at arm's length behind the machine and making sure that all body parts are clear of the machine, push the ON/OFF/DISARM toggle switch into the DISARM position and then release it as soon as the throwing arm fires. The toggle switch is spring loaded and will return to the off position as soon as the switch is released stopping the machine from re-arming itself. If done correctly the arm will be pointing away from the left side of the machine when viewed from behind (right handed machines only). On left handed machines the arm will point away from the right side of the machine. The machine will now be in a safe condition.

Disconnect the terminals from the battery to ensure that the machine is not accidentally armed while adjusting and loading the machine.

Step 8 – Adjust the machines elevation by loosening the bottom ½” nut on the side of the machine, with a ¾” wrench. Tip machine back to the desired angle and then retighten the nut.

LOOSEN / TIGHTEN
THIS NUT TO
ADJUST TILT!!





Step 9 – Adjust the machines tilt by loosening the two top ½” nuts on the base of the machine. There is one at the front and one at the rear of the machines. Tilt the machine to the desired angle and then retighten both nuts. This adjustment can be done with a ¾” wrench.



LOOSEN/TIGHTEN THIS
NUT BOTH SIDES

KEEP THIS NUT SNUG AT
ALL TIMES!!!

Step 10 - Carefully load carousel with clays, removing any clays that show signs of damage. Load clays as evenly as possible and do not over load.

Step 11 – Your machine is now loaded and ready to fire. Make sure that the machine is pointed in a safe direction.

Step 12 – Standing at arm’s length behind the machine, press the ARM/OFF/DISARM toggle switch to ARM. The machine will load a clay and come to the armed position and is now ready to fire and must be treated with **extreme caution**.

Step 13 – To check for clay flight and direction, fire the trap using the ON/OFF/DISARM toggle switch exactly as before, and press and release the DISARM toggle. This will fire one clay and will not rearm itself. Note – holding the disarm toggle will continually fire clay targets. Please use caution!



Step 14 – You can adjust the distance that the clay is thrown by extending the spring. This is achieved by winding tension on or off the main spring using a $\frac{3}{4}$ " wrench or the optional $\frac{3}{4}$ " extended socked which can be attached to an impact drive. This should be done with the machine in the disarmed/safe condition for small adjustments. After adjusting the main spring for the correct throwing distance, the nuts on the spring stud must be tightened securely against each other.



Step 15 – The pull cord or optional radio release can now be connected to the machine. Pull cord will connect through the yellow- ended cord.

Step 16 – The machine can now ready for use by pressing the ARM/OFF/DISARM toggle switch, down to the “ARM” position.



Step 17 – With the machine pointed in a safe direction, press the fire button on the pull cord or radio release. This will cause the machine to fire a clay and then reset to the firing position. Pressing the fire button again will do the same as above. Pressing and holding the fire button will continuously fire clays without delay.

Your machine is now operating smoothly and ready for use. **IT IS CRITICAL THAT YOU NEVER LOAD OR MAKE ADJUSTMENT TO THE MACHINE UNLESS IT IS DISARMED AND THE BATTERY DISCONNECTED.**

While in storage, the machine must be left in the disarmed state and the battery disconnected. Any spring tension does not need to be released.



FAULT FINDING MECHANICAL

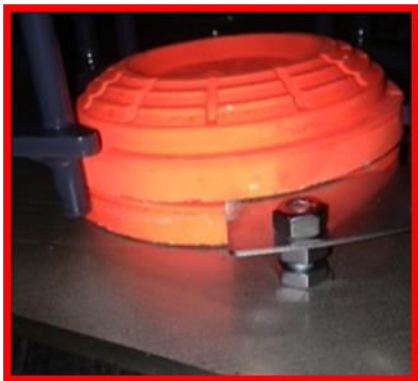
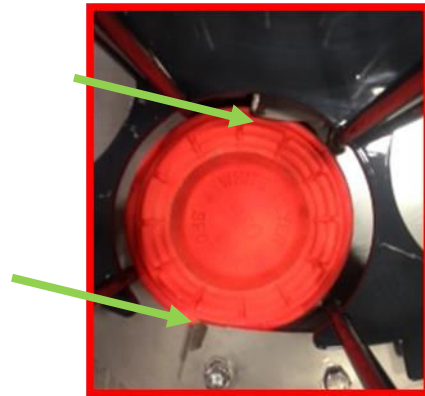
CAUTION: ANY MEC MACHINE MUST BE IN THE DISARMED STATE WITH THE BATTERY DISCONNECTED PRIOR TO MAKING ANY ADJUSTMENTS, LOADING WITH CLAYS OR TRANSPORTING

1. The Machine breaks clays - Check loading cycle first:

- (a) Check that clay in the carousel is intact, not chipped or cracked. If in doubt, remove suspect clays and refill with ones known to be intact.
- (b) With the machine switched "OFF", rotate the carousel by hand, removing each clay as it drops onto the throwing plate. Check for cracks and chips. If the clays arrive on the plate intact, then move on to the throwing section below.
- (c) If they arrive chipped or cracked then remove the carousel and check that the clay slides under both inner and outer knife edges. There should also be some space between the inside and outside knife edge, about 1/8". Check that the knife-edges are not excessively high. 2 clays should have split without chipping or damaging the top or bottom clay. Using a 7/16" wrench adjust both knife-edges accordingly.

<https://www.youtube.com/watch?v=cBz4NKNj9I4> knife settings

1/8" SPACE
BETWEEN CLAY
AND KNIFE BLADE



- (f) When loading the clays be sure there are no tight spots in the carousel. Occasionally machines can suffer slight damage to the carousel.



Check throwing cycle next:

- (a) Check that the bolt holding the arm to its clamp block is tight.
- (b) Check arm for chunks missing from the black arm rubber or any other physical damage to the arm. If damage has occurred the black arm rubber should be replaced.
- (c) Check for damage to the throwing plate, in case it has been dented, bent or burred. Ensure that no screw heads protrude and that there are no other obstructions to the clay's path.
- (d) Check the height of the arm over the plate across its whole surface to ensure that the clay fits under the black rubber throwing arm strip with about 1/16" clearance. Any more than this clearance can cause the arm to break the clay by riding over it. Adjust by raising or lowering the throwing plate with 4- 1/2" nuts on the plates adjustment bolts.

2. Machine throws clays but:

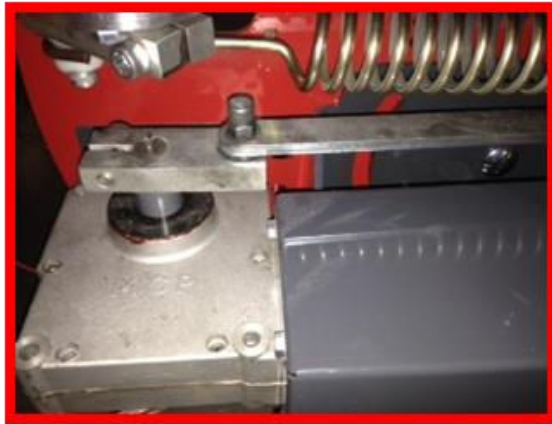
- (a) The clay barely flies off throwing plate:
 - Check the height of the arm over the plate across its whole surface to ensure that the clay fits under the black rubber throwing arm strip with about 1/16" clearance. Any more than this clearance can cause the arm to break the clay by riding over it. Adjust by raising or lowering the throwing plate with 4- 1/2" nuts on the plates adjustment bolts.
 - <https://www.youtube.com/watch?v=qPnQpIMGT7E> E-series arm settings
 - <https://www.youtube.com/watch?v=IDGtb62IXj4> XP series arm adjustments
 - The arm might be bent down or the throwing plate bent up, squeezing the clay between them, the arm or plate should be replaced or straightened.
- (b) The clay goes no distance (even though the main spring is wound up tight).
 - The arm is probably bent upwards causing clay to go under it at its tip. This will also cause clays to break, the solution, is to straighten or replace the arm.
- (c) The clays are inconsistent in direction.
 - This could be caused by buildup of debris on the throwing plate; dirt, leaves, pieces of broken clay.
 - This is could also be caused by the front rail not moving freely. Light oil or a mechanical adjust if not free.
- (d) If the machine is a "Midi" or "Mini", the arm timing could have slipped.



3. Carousel does not rotate.

Check the following:

- (a) The Carousel pusher arm is not jammed with broken clays or dirt.
- (b) The pusher return spring is broken or missing.
- (c) With the pusher arm withdrawn, the carousel should be free to rotate with a small amount of friction. This is adjusted by tightening or loosening of the lock nut on top of the carousel's shaft.
- (d) Carousel pusher timing is in-correct, i.e. when the gearbox crank and connecting rod are in line at maximum extension, the Rear Pusher nylon for the carousel should be deep into the cut out on the Top Plate (100 e, 200e, 300e, 306xp). If your machine is a 400e or 408xp then the rear pusher will be on the radius of the top plate. If this is not the case, then the clamp on the rear pusher shaft should be adjusted accordingly. It must be tightened before operation of the machine.



<https://www.youtube.com/watch?v=N3Wdk88efTQ> XP pusher shaft



FAULT FINDING ELECTRICAL

CAUTION: ANY MEC MACHINE MUST BE IN THE DISARMED STATE WITH THE BATTERY DISCONNECTED PRIOR TO MAKING ANY ADJUSTMENTS, LOADING WITH CLAYS OR TRANSPORTING

1. Machine does not Arm

Check:

- (a) Battery is charged and that connections are tight.
- (b) Toggle switch is in the down ON position or on the Handheld that the “ARM” indicator light is on.
- (c) There are 3 components in place to protect your electrical box.
 1. Re-settable breaker. Found on the side of the electrical box. (older models have non-resettable breakers)



2. 60amp or 70amp relay. Found inside the electrical box. (automotive type)



3. Inline fuse. Found inside electrical box. (7.5amp automotive type 2 prong fuse)
<https://www.youtube.com/watch?v=JZZmYQtybAE> replacing fuse





(b) Check the above items.

(c) **If your machine has a Gray Arm / Dis-arm box.** Make sure the wires inside are in good shape, free of corrosion and not pinched on the bottom of the box. Green to White would by-pass the switch and arm the machine. This would indicate a faulty switch.

3. Machine runs in DISARM position, but not in the ARM position.

(a) Check for faulty relay.

4. Machine ARMS but will not fire on the Pull Cord button.

(a) Either the connections, cable or command push button are faulty. Disconnect the 110V Plug from the Pull Cord, using a lead wire, with 1" stripped of each end, insert into the Positive and Negative sides of the outlet plug. Once contact is made, the machine should fire.

If the trap does not fire, then there is a broken wire in the cable or a bad connection in the three-pin plug or control box.

(b) If the trap does fire then reconnect the Pull Cord, remove the cover on the push button box and short across the two spade connectors.

If the trap fires - then the push button is faulty.

If the trap does not fire - then there is a broken wire in the Pull Cord or a bad connection in the three-pin plug.

5. Trap fires by itself.

(a) Disconnect the Pull Cord and switch the trap back on.

If the trap cocks normally - then the Pull Cord is damaged or shorted out.

Alternatively, the push button switch is stuck in or faulty.

(b) If the trap continues to fire – Check to make sure the Throwing arm is contacting the roller limit switch arm. The arm should pass over the limit switch with only a small amount of space.

(c) If the machine still fires by itself - check if the relay contacts have stuck together, and if so replace. If the relay operates correctly, but the trap still fires by itself, then the roller limit switch is faulty and should be replaced.

(d) If the machine still fires by itself – Throwing arm timing could have slipped. Call the Technical Support Line for help.



CUSTOMER SERVICE

We're here and ready to help you! Don't forget to take advantage of our trouble shooting guide, website videos, and online owner's manuals, which are available 24/7. You may contact factory customer service at:

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Mayville Engineering Company (MEC)

Website: www.mecinc.com

Thanks for choosing MEC! Every machine is hand set and tested prior to leaving our shop to ensure quality. We take pride in our products, so you can have a better experience in the field. Your patronage is very much appreciated!

For any questions regarding setup or use of any MEC Clay Target Machines, please give us a call or you can visit us on our website for video footage showing how setup and adjustments are made.

To receive our monthly newsletter, go to our website, select the "Shooting Sports Lifestyle" tab and click "Join Us".