



**SAFETY &  
OPERATING INSTRUCTIONS**

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# SAFETY INSTRUCTIONS

Before connecting this machine to any power source or switching it on, the user must read the operating instructions carefully.

Clay target launchers can be dangerous and must be treated with great care at all times to avoid accidents. You must treat a clay target launcher with the same respect that you would treat a loaded gun.

Never place any bodily part into the path of any mechanical piece whilst the machine is in motion or likely to be so.

## SAFETY FENCING AND GUARDS SHOULD ALWAYS BE ERECTED AROUND THE MACHINE WHEN IN USE

Assume at all times that a clay target launcher is cocked or loaded and treat it accordingly.

**Never** approach the machine from the front or sides. Approach only from behind.

Always disarm the machine before carrying out reloading or adjustment.

Reloading with clays should be carried out from the rear of the machine.

Re-arm/cock the machine only when all personnel are either behind or at a safe distance away.

Ensure that the machine is stable and cannot fall over.

Ensure that the machine is sited in a way that will prevent people from being struck by either the clay in flight, or broken bits of clay being ejected **sideways** from the machine.

**Never** allow members of the public or untrained personnel to approach or touch the machine.

Be aware of the fall zone of both broken and unbroken clays and that changes in wind direction will affect this. This is particularly important with teal and driven birds.

**Never** move a cocked/loaded machine. Remove the main throwing spring before transport.

**Never** place yourself or any bodily part into the path of the casting arm or the clay when the machine is operating.

## **Special Hazardous Conditions**

In the rare event that the release of the casting arm is blocked or jammed by a piece of clay, or, in the event of immovable blockage, release the spring by winding the adjusting nut off, whilst keeping all bodily parts back and away from the spring as it jumps towards the front of the machine upon release.

Think very carefully about the result that your actions will produce before proceeding.

# **INSTALLATION INSTRUCTIONS**

In most instances, these machines will not be used in a permanent situation, but whether the installation is permanent or temporary, the following advice is still applicable.

1. Site the machine in a way, which allows free and un-cramped access all around, paying particular attention to the ease of disarming/arming and reloading.
2. Ensure that there are no obstructions to the path of the arm and that the machine cannot change its position due to vibration or reaction.
3. Ensure that the power supply can be easily disconnected.
4. Ensure that cables are laid in such a way that they cannot become entangled in the mechanism.
5. Ensure that access is only available to the machine by qualified, trained personnel.
6. Although the spring tension can be wound on to the maximum amount possible, it is advisable to leave at least a couple of mm clearance between the end of the spring and the locking nut. This will allow the spring to move freely when the machine is fired.

# PERSONAL USE MACHINES



Firefly



Super Hawk on DTL/ATA Base



Hawk

# FIREFLY SET UP INSTRUCTIONS

Read these instructions before attempting to operate the machine.

1. Remove the contents from the packing box. Inside the box should be the following items
  - a. Firefly machine
  - b. 50-bird magazine
  - c. Mainspring
  - d. Command cable (50m/162' long)
  - e. Owners manual & warranty card
2. Remove the wooden packing board from the base of the machine. It is a good idea to bolt the machine to a small pallet or two-wheel cart for stability before using for the first time. If required, these can be purchased from Promatic, please call for more information.



3. Fit the 50-bird magazine to the top plate of the machine and tighten the three nuts that hold it in place with a 10mm spanner/wrench.



4. Before fitting the main spring check the throwing arm is the correct height for the type of clays to be used. Place a clay on the throwing plate under the large hole in the top plate and push the throwing arm up to the clay by hand. (There may be a cable tie holding the arm in place, if so remove tie first). Check for clearance between the underside of the throwing arm and the horizontal shoulder of the clay, there should be a 2mm ( $1/16$ " ) clearance. Slowly move the throwing arm counter clockwise around the

throwing plate checking the clearance. The throwing arm can be bent upwards or downwards if an adjustment is required.



5. Push the throwing arm counter clockwise until it points to the front of the machine. Fit the mainspring to the machine and tighten the locking nuts at the back of the machine when the desired tension is achieved. With the arm pointing to the front of the machine the spring needs to be tensioned at least enough so that the coils are just slightly separated. Tensioning the spring sets clay distance. The more tension there is the further the clay will be thrown. The spring can be tightened all the way if required for greater distance.



6. The elevation is set but undoing the two black plastic knurled knobs on the side of the base and tipping the machine back. Retighten the two knobs when the required elevation is achieved. On earlier models a 19mm or  $\frac{3}{4}$ " spanner may be required.



7. Fill the machine with clays.



8. Connect the release cable to the machine with the 3 pin connector plugs. Please note the plug will only connect one way. Unwind the cable to the desired shooting position.



9. Before connecting the battery to the machine check the on/off toggle switch to ensure the switch is in the **off** position. Connect the battery with the red connector to the + positive side of the battery and the black connector to the – negative side.
10. Ensure that the machine is sited in a place so that clays can be thrown safely. Standing at the rear of the machine, turn the on/off toggle switch to the **arm/load** position. The machine will arm itself ready to fire a clay. Press the red test fire button to throw a clay to check distance and trajectory.



11. The machine is now ready to be used. Ensure that no one stands in front of or to the side of the machine unless disarmed and with the battery disconnected. The machine will fire every time the release cable button or the test fire button is pressed and will automatically re-arm itself, until disarmed and switched off.
12. To disarm the machine press the red test fire button the rear of the machine and immediately push the on/off toggle switch upwards to the **dis-arm** position before the machine re-arms. Hold the toggle switch upwards until the throwing arm is pointing to the front of the machine. Release the toggle switch and disconnect the battery.

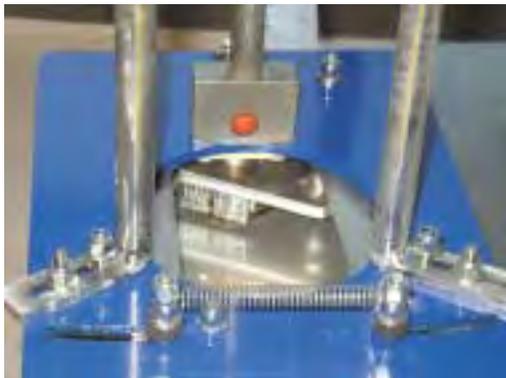


# HAWK & SUPER HAWK SET UP INSTRUCTIONS

Read these instructions before attempting to operate the machine.

Remove the contents from the packing box. Inside the box should be the following items

- a. Hawk or Super Hawk machine
  - b. Two rear hopper rods
  - c. Front hopper rod
  - d. Horseshoe for magazine
  - e. Mainspring
  - f. Command cable (50m/162' long)
  - g. Owners manual & warranty card
1. Remove the wooden packing board from the base of the machine. It is a good idea to bolt the machine to a small pallet or two-wheel cart for stability before using for the first time. If required, these can be purchased from Promatic, please call for more information.
  2. The magazine can now be fitted. Assemble the magazine on the machine by taking the front hopper rod and screwing it in to the brass plunger-mounting block. This is the block that has the red tip protruding from it.
  3. Next fit the two rear hopper rods. The hopper rods have a slotted bracket at each end. The end with the longer slotted bracket fits on to the top plate at the bottom of the magazine. The four M6 nylock nuts will need to be removed from the screws sticking out of the top plate first. See photo below.

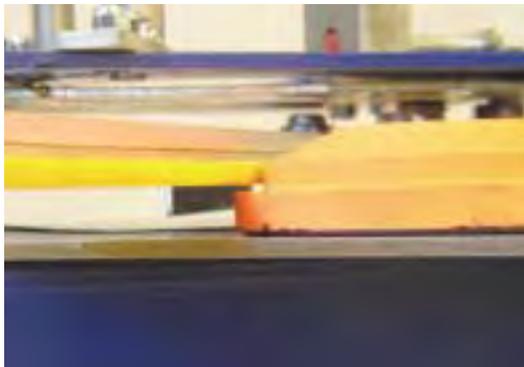


4. Fit the horseshoe to the top of the three hopper rods. The magazine will need to be set for the type of targets to be used. If 90mm targets are to be used, move both slotted rear hopper rods all the way forward. Moving the hopper rods all the way back will set the machine for standard targets. Tighten the upper and lower nylock nuts on the magazine in the correct position required.

5. Check the clay loading operation by placing three or four clays in to the magazine. With the clays pushed towards the two rear hopper rods there should be a visible gap between the second clay up in the stack and the red polyurethane plunger tip. The gap should be 2mm, see photo below ( $\frac{1}{16}$ " ) and can be adjusted if required with two 10mm spanners. One spanner is placed on the half nut that is locked against the back of the brass plunger and the other spanner is used to either wind on the nylock nut (increase the gap) or unwind the nylock nut to (decrease the gap) at the forward end of the plunger assembly.



6. Before fitting the main spring check the throwing arm is the correct height for the type of clays to be used. Place a clay on the throwing plate under the large hole in the top plate and push the throwing arm up to the clay by hand. (There may be a cable tie holding the arm in place, if so remove tie first). Check for clearance between the underside of the throwing arm and the horizontal shoulder of the clay, there should be a 2mm ( $\frac{1}{16}$ " ) clearance. Slowly move the throwing arm counter clockwise around the throwing plate checking the clearance. The throwing arm can be bent upwards or downwards if an adjustment is required.



7. Push the throwing arm counter clockwise until it points to the front of the machine. Fit the mainspring to the machine and tighten the locking nuts at the back of the machine when the desired tension is achieved. See photo below.

With the arm pointing to the front of the machine the spring needs to be tensioned at least enough so that the coils are just slightly separated. Tensioning the spring sets clay distance. The more tension there is the further the clay will be thrown. The spring can be tightened all the way if required for greater distance.



8. Set the elevation of the machine by adjusting the slotted bar on the side of the base plate and mainframe. A 13mm spanner/wrench is required. See photo above.
9. Fill the machine with clays.
10. Connect the release cable to the machine with the 3 pin connector plugs. Please note the plug will only connect one way. Unwind the cable to the desired shooting position.
11. Before connecting the battery to the machine check the on/off toggle switch to ensure the switch is in the **off** position. Connect the battery with the red connector to the + positive side of the battery and the black connector to the – negative side.
12. Ensure that the machine is sited in a place so that clays can be thrown safely. Standing at the rear of the machine, turn the on/off toggle switch to the **arm/load** position. The machine will arm itself ready to fire a clay. Press the red test fire button to throw a clay to check distance and trajectory.
13. The machine is now ready to be used. Ensure that no one stands in front of or to the side of the machine unless disarmed and with the battery disconnected. The machine will fire every time the release cable button or the test fire button is pressed and will automatically re-arm itself, until disarmed and switched off.

14. To disarm the machine press the red test fire button at the rear of the machine and immediately push the on/off toggle switch upwards to the **dis-arm** position before the machine re-arms. Hold the toggle switch upwards until the throwing arm is pointing to the front of the machine. Release the toggle switch and disconnect the battery. Removal of, or tensioning of the spring can be carried out only in the disarmed condition.

## **FAULT FINDING (ELECTRICAL)**

### **Firefly, Hawk & Super Hawk**

1. **Machine does not cock** (i.e. come to the loaded position.) Check:
  - (a) Battery is charged and that connections are tight.
  - (b) Toggle switch is in the down **arm/load** position.
  - (c) Arm is clear of roller switch under casting plate. If not, then press toggle up to **dis-arm** position until the arm is clear, then back down to the **arm/load** position. When in the toggle switch is in the **dis-arm** position, the motor reverses the arm backwards.
2. **Machine still does not cock.**
  - (a) Check all connections are tight. Check for broken wires and damaged connections.
  - (b) If there are no broken connections (battery connected, all switches on) press toggle up to **dis-arm** position. If the motor does not turn then check the fuse in the wiring loom, this is located inside the mainframe of the machine on Hawks/Super Hawks and can be accessed by removing the plate that holds the toggle switch and test fire button on the rear of the machine. See photo below.



3. **Machine runs in 'DISARM' position, but not in 'ON' position.**

If the arm is clear of the roller switch then this switch is faulty. Move wheel on the end of the roller switch from side to side and check to see if it returns to the central position, also check the two wires inside the switch are both connected.

4. **Machine cocks, but will not fire on command cable button.**

- (a) Either the connections, cable or command push button are faulty. Disconnect the duraplug on the command cable and short the 2 outer sockets (**do not** put anything into the center socket – this carries continuous +12v for radio use and is un-fused.) If the trap **does not** fire then it may be necessary to change the wiring loom or repair it.
- (b) If the trap **does** fire then reconnect the command cable, 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 command cable or a bad connection in the duraplug.

5. **Trap fires by itself!**

- (a) Disconnect the command cable and switch the trap back on. If the trap cocks normally – then the command cable is damaged or shorted out. Alternatively, the push button switch is stuck in or faulty.
- (b) If the trap **continues to fire** – then check the arm to crank timing relationship as described later in this manual. If the above relationship is correct then, **after having put the trap into the disarmed/safe position**, move the roller switch **away** from main frame (from behind the machine to the right) along the slotted bracket to its maximum. See photo below. If the machine now cocks normally – then move limit switch back to within 2mm of its original position. If the trap now fires by itself again then move the switch to 4mm of its original position and so on until the trap cocks normally under all conditions.
- (c) If the machine **still fires** by itself then the Roller switch is faulty and must be replaced.

## **FAULT FINDING (MECHANICAL)**

### **Firefly, Hawk & Super Hawk**

1. **Machine will not throw clays.**

It is usually obvious what is wrong with a machine, which does not throw clays at all. It is more likely that the following situation arises;

2. **Machine throws clay but:**

(a) **The clay flicks up in the air.**

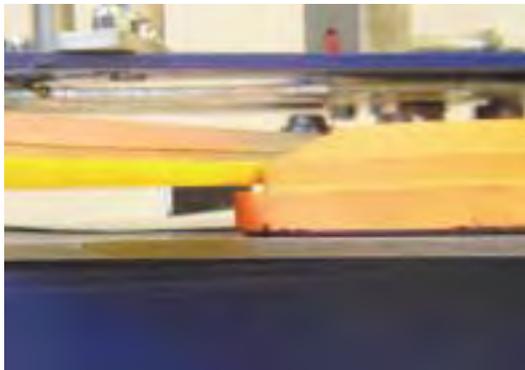
The arm is probably bent down or the casting plate bent up, squeezing the clay between them. The arm or plate should be replaced or straightened.

(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 the arm.

(c) **The clays are inconsistent in direction.**

The clay is being jammed under the arm towards the end. This is usually caused either by the arm being bent down, then the tip bent up or more likely clays varying in thickness.

The solution if the arm is bent is to straighten it. If it is the clay thickness that is the problem then adjust the arm to accommodate the thickest one you can find. See photo below.



3. **The Machine breaks clays!**

A point to consider here is that if you have other traps, which have suddenly started to break clays, it's probably the clays, which are at fault. Particularly soft clays can be accommodated, by fitting a 'soft fall' plate to the machine; but sometimes the clay will be unable to absorb the actual throwing forces consistently. The maximum acceptable level of no birds is 5%, but should in practice be less.

A simple process should be followed which differentiates between the **loading** of the clay prior to throwing and the **throwing** of that same clay.

Check **loading cycle** first:

- (a) Check that the clays in the magazine are intact, not chipped or cracked. If in doubt, remove suspect clays and use ones known to be intact.
- (b) Place two clays at the bottom of the magazine. Check that the tip of the brass plunger (the red rubber tip) is about 1mm away from the top clay. If the gap is any larger, you may experience problems with the machine feeding two or more clays at a time. If there is no gap and the clay cannot fall past the plunger, then this will cause problems as well.

To adjust the plunger, two 10mm combination spanners are required. Put the open-ended side of the spanner onto the  $\frac{1}{2}$  nut, which is locked against the brass plunger. Put the other 10mm spanner on the M6 nylock nut, which sits at the other end of the plunger, behind the aluminium bracket. By turning the nylock whilst holding the  $\frac{1}{2}$  nut, the plunger can be made to move in and out of the plunger hole. This is how the distance is set between the tip of the plunger and the side of the clay.

Set the correct gap as necessary to 1mm and no more. Once this is set, fill the magazine with clays. The machine can now be cycled to check that the clays arrive on the throwing plate intact. If this is the case then the fault lies in the throwing cycle.

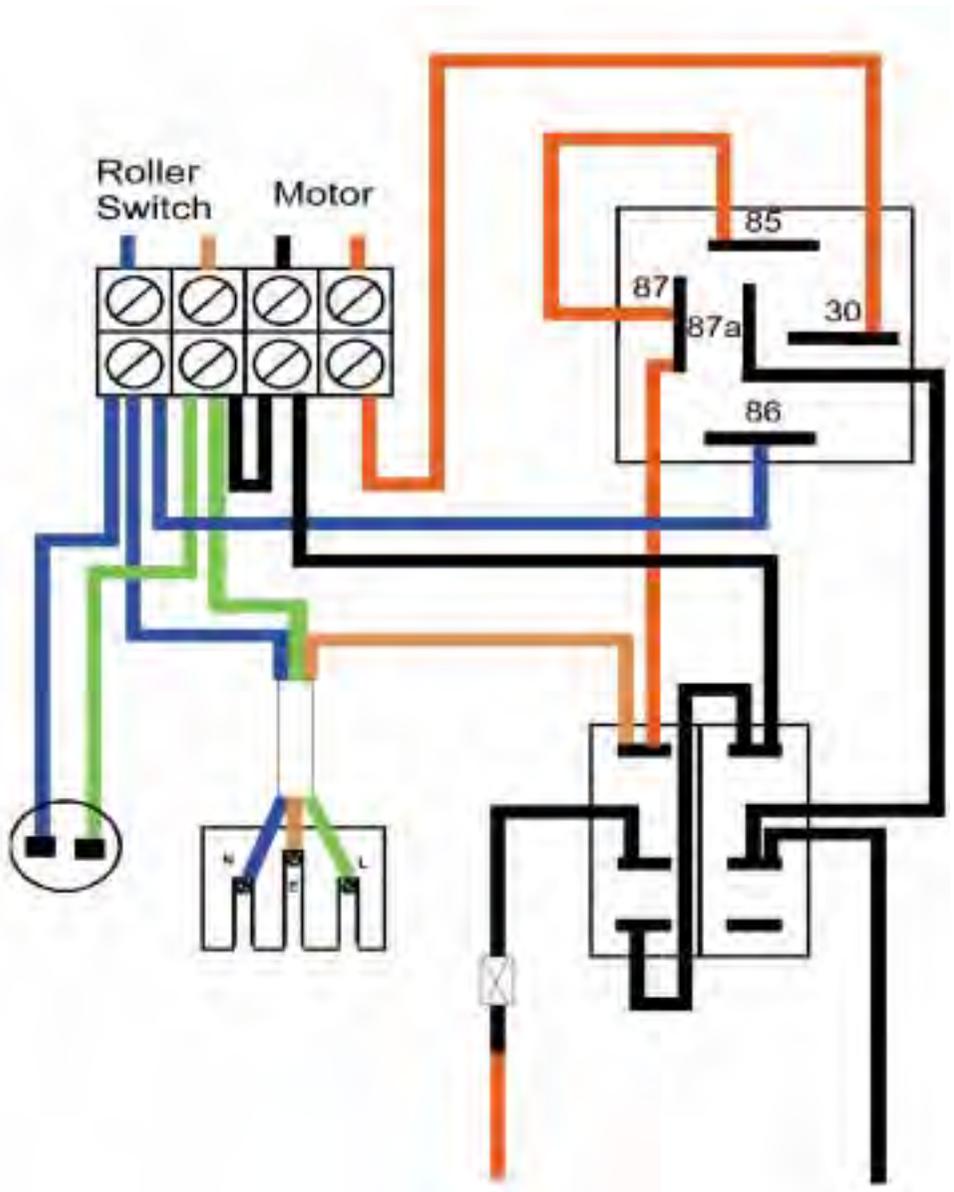
Check **throwing cycle** next:-

- (a) Check arm for straightness, for chunks missing from the rubber/plastic friction strip or any other physical damage to the arm. If the arm cannot be straightened then it should be replaced. A new friction strip can be fitted to an old arm if necessary.
- (b) Check for damage to the casting plate especially the front edge of the plate in case it has been dented, bent or burred. Check for flatness, ensure that no screw heads protrude and that there are no other obstructions to the clays path.
- (c) Check the height of the arm over the plate across its whole surface to ensure that the clay fits under the friction strip with about 1 mm clearance. Any more than 3 mm clearance will cause the arm to break the clay by riding over it.
- (d) Check that the bolt holding the arm to its clamp block is tight.
- (e) Check the **arm-crank timing relationship**. If this relationship is incorrect the trap will definitely break clays when throwing. **The timing can be adjusted to the diagram found in this manual.**

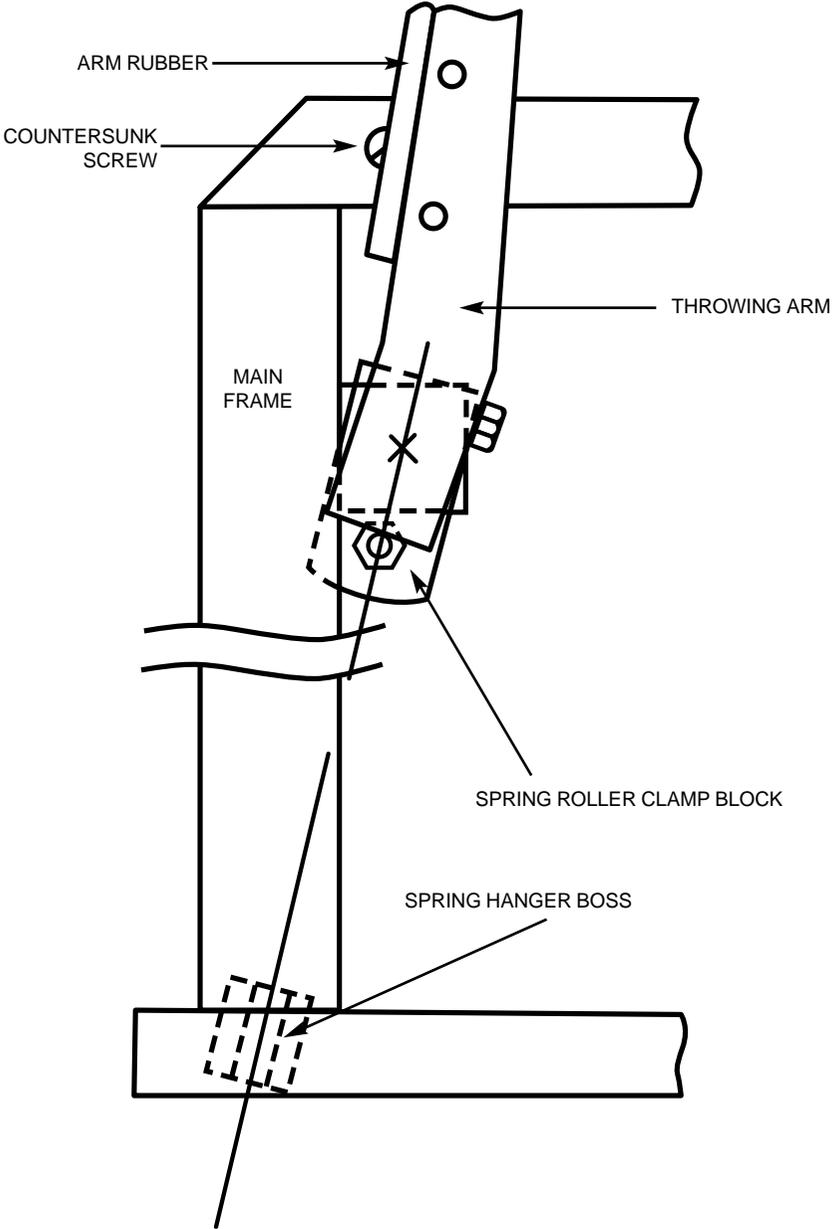
As each of the above elements are checked, something incorrect should be discovered. If the machine still breaks clays, then there is one final check.

Slacken the main spring to its minimum extension, i.e. with the throwing arm in the forward position the coils are just open. Operate the trap a few times in this mode, which puts hardly any stress into the clay because of the slack mainspring. If the clays still break then it is very likely that the actual clays are sub standard and a new batch should be obtained.

## Firefly, Hawk and SuperHawk Electrics



# ARM TIMING DIAGRAM



# CLUB MACHINES



Ranger 8



Ranger 6



Eagle



Harrier

# OPERATING INSTRUCTIONS

## HARRIER, EAGLE & RANGER 6/8 MACHINES

If your machine has been supplied ready for operation, then proceed to the next instruction. If your machine is supplied in a box without its carousel fitted, it will need to be fitted using the centre pin, nut and washers provided on the top plate. Tighten the 19mm nylock nut down on to the blue plastic damping spacer. The nut should be tight enough for the carousel to turn but not spin freely. It is best to keep turning the nylock until the blue damping spacer starts to squash up slightly.



It is advisable to put a fixing bolt or ground peg through the front hole in the base of the machine. Loosening the clamping nut on the elevation slot and possibly the cross pivot and height adjusting bolts to raise the front of the machine will allow you to insert a bolt or peg into the front hole.

Leave this bolt or peg reasonably loose so that the rear of the trap can be moved to adjust the trajectory of the clay.

Lower the machine to about 15-20° of elevation and tighten the nut on the height-adjusting slot lightly. See photo below.



Unwind the power and command cables at the back of the machine and lay them out on the ground. Do not connect the duraplug connection at this stage.

Check that the on/off/nudge toggle switch on the control box at the rear of the machine is in the OFF position. This switch is on a short 1-metre cable with remote box on Ranger Traps.

Place the incoming power connector or battery leads to the right hand side of the machine, slightly to the rear of the control box, and at a distance which will allow some slack in the cables running back to the machine.

Plug in or make the battery connections ensuring a good contact. With battery connections it is essential **NOT** to hammer the connections on or to over tighten them.

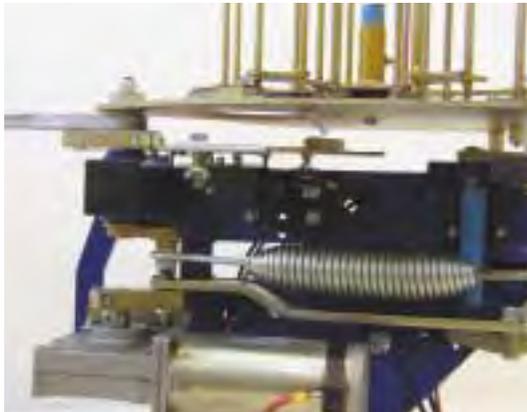
Check visually from the rear of the machine that the motion of the casting arm is not restricted or blocked in any way.

Always operate only from the **REAR** and **NEVER** from the front or sides. From this stage on, do not lean on the machine and touch it with only one hand.

From the back of the machine push the on/off/nudge toggle switch into the “NUDGE” position for about half a second only and release it. The switch is spring-loaded and will return automatically to the “OFF” position.

The casting arm will now be static and visible to the right side of the machine and the machine will still be in a safe condition.

**If your trap was delivered without its mainspring fitted, now is the time to fit it.** The arm can now be moved by hand until it sticks directly out of the front of the trap away from the operator. The mainspring would now normally be at its shortest length and can therefore be fitted to the machine.



## **DO NOT LOAD CLAYS YET.**

Ensure that nothing will restrict the further motion of the arm.

Press the toggle switch down to the “ON” position.

The machine will cycle and stop in the armed position and **MUST BE TREATED WITH EXTREME CAUTION.**

Push the toggle switch to the “OFF” position.

It is now necessary to fire the trap but **NOT** allow it to re-cock so that clays can be loaded. This is done by pushing the toggle to the “NUDGE” position for about half a second and release it so that it returns to the “OFF” position as before.

The trap will immediately fire but not re-arm. The casting arm will be visible and stationary on the left hand side of the machine.

The machine is now in the disarmed or **SAFE** state.

To further remove the risk of accidental re-cocking, it is advisable to unplug the power supply on a mains powered machine or disconnect the battery on a 12volt machine.

(Remember to reconnect after loading clays! This is often forgotten in the rush to re-load during shoots.)

The magazine can now be filled and it is advisable to place only a small quantity of clays in each column initially.

Ensure that the clays about to be thrown are going into a safe area.

Press the toggle switch to “ON”. The machine will load a clay and come to the cocked position and is now ready to fire.

To check for clay flight and direction, fire the trap using the “NUDGE” toggle switch exactly as before so that the machine fires **ONCE** but **does not re-arm** until the switch is returned to the “ON” position.

With the trap in the **DIS-ARMED/SAFE** position, move the rear of the trap to adjust the direction of the clay flight to suit and elevation if required.

Insert further bolts or ground pegs to fix the position and fill the magazine if required.

Should the clay have a tendency to peel off, either left or right of stable flat flight, this can be corrected by tipping the whole machine sideways to compensate and bring the flight level.

This method is used for machines in temporary settings. Certain Ranger 6 models have an optional tilt base fitted, which allows the machine to be leaned over to the side for curling targets or flat targets. A 24mm ( $15/16$ " ) spanner will be required for adjustment.

Increasing or decreasing the distance that the clay is thrown is achieved by winding tension on or off the spring. This can be done with the machine in the disarmed/safe condition for small adjustments. After adjustment of the main spring to set the correct throwing distance, the nuts on the spring stud must be tightened against each other.

The command cable or radio release can now be connected to the command cable duraplug.

The machine can now be switched on for normal use by pressing the toggle down to "ON" to cock the machine.

The machine will fire and re-cock each time that the fire button on either the command cable or radio remote is pressed.

No loading or adjustment to the machine should be carried out unless the machine is disarmed/safe.

After use, the machine must be left in the disarmed/safe condition and the power supply removed. It is **not** necessary to relieve the remaining spring tension.

## **FAULT FINDING (ELECTRICAL)**

### **Harrier, Eagle & Ranger 6/8**

It is Promatic's policy to upgrade or modify any of its products if they are ever proved suspect. Problems, which do occur, usually revolve around the clay pigeons themselves or the variation in their sizes between the different manufacturers. Poor maintenance and cleaning or physical damage caused during transportation of the machine are the other normal causes. Items that should be treated with great care are the throwing arm, casting plate and electrical box.

**WARNING: At no time should you put yourself at risk by placing any bodily part within the area of operation of moving mechanical parts.**

1. **Machine does not cock** (i.e. come to the loaded position.)

Check:

- (a) Battery is charged and that connections are tight.

- (b) Toggle switch is in the down “ON” position.
- (c) Arm is clear of roller limit switch under casting plate. If not, then press toggle up to “NUDGE” until the arm is clear, then back down to the “ON” position.

2. **Machine still does not cock.**

- (a) Check all connections are tight including those inside the electrical box. Check for broken wires and damaged connections.
- (b) If there are no broken connections (battery connected, all switches on) press toggle up to “NUDGE”, listen and watch for the 12v **relay operation** in the control box.
- (c) If the **relay operates** but the motor does **not** turn - short across the 2 large contacts on the relay with a screw driver or piece of wire.

If the motor does not turn - then the motor is suspect.

If the motor does turn - then the relay is faulty. Contacts may be dirty or worn out.

- (d) If the relay does not operate – check the fuse has not blown. Replace fuse if it has blown and try again.
- (e) If the motor does not turn - then short the brown wire to the yellow/green wire on the back of the toggle switch with the switch in the “NUDGE” position.

If the relay operates and the motor turns - then the toggle switch is faulty.

If the relay still does not operate then it is faulty.

3. **Machine runs in “NUDGE” position, but not in “ON” position.**

- (a) If the arm is clear of the roller limit switch then the roller limit switch is faulty.

Check that the roller arm is not seized. If so, strip, clean and re-assemble. Otherwise replace the switch.

4. **Machine cocks, but will not fire on command cable button.**

- (a) Either the connections, cable or command push button are faulty. Disconnect the duraplug on the command cable and short the 2 outer sockets (do not put anything into the centre socket - this carries continuous +12v for radio use.)

If the trap does not fire then there is a broken wire in the cable or a bad connection in the duraplug or control box.

- (b) If the trap does fire then reconnect the command cable, 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 command cable or a bad connection in the duraplug.

## 5. **Trap fires by itself!**

- (a) Disconnect the command cable and switch the trap back on.

If the trap cocks normally - then the command cable is damaged or shorted out. Alternatively, the push button switch is stuck in or faulty.

- (b) If the trap **continues to fire** - then check the arm to crank timing relationship as described on page **XX** in this manual. If the above relationship is correct then, **after having put the trap into the disarmed/safe position**, move the roller limit switch **away** from main frame along the slotted bracket to its maximum. If the machine now cocks normally - then move the limit switch back to within 5mm of its original position. If the trap now fires by itself again then move the switch to 10mm of its original position and so on until the trap cocks normally under all conditions.
- (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.

# **FAULT FINDING (MECHANICAL)**

## **Harrier, Eagle & Ranger 6/8**

### 1. **Carousel does not rotate.**

Check:

- (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 tensioning the locking nut holding the carousel on against the plastic sleeve underneath it.

- (d) Carousel pusher **timing** is correct, i.e. when the gearbox crank and connecting rod are **in line at maximum extension**, (see photo below) the rollers on the bottom of the carousel pusher arm should be 1 mm clear of the carousel plate at maximum travel. 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.

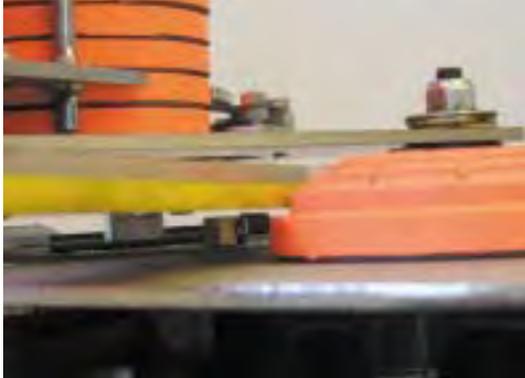


2. **Machine will not throw clays**

It is usually obvious what is wrong with a machine, which does not throw clays at all. It is more likely that the following situation arises:

**Machine throws clay but:**

- (a) **The clay flicks up in the air.**  
The arm is probably bent down or the casting 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 the arm.
- (c) **The clays are inconsistent in direction.**  
The clay is being jammed under the arm towards the end. This is usually caused either by the arm being bent down, then the tip bent up or more likely clays varying in thickness. The solution if the arm is bent is to straighten it. If it is the clay thickness, then lower the casting plate to accommodate the thickest one you can find. Adjust each nut **exactly** the same amount, until 1 to 1.5 mm clearance is achieved between the bottom of the friction strip and the clay. See photo below.



### 3. **The Machine breaks clays!**

A point to consider here is that if you have other traps, which have suddenly started to break clays, then it is probably the clays, which are at fault. Particularly soft clays can be accommodated by fitting a “soft fall” plate to the machine, (all machines manufactured after January 98 are fitted with a soft fall plate) but sometimes the clay will be unable to absorb the actual throwing forces consistently. The maximum acceptable level of no birds is 5%, but should in practice be less.

A simple process should be followed which differentiates between the **loading** of the clay prior to throwing and the **throwing** of that same clay.

Check **loading cycle** first:

- (a) Check that clays in the magazine are 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 magazine by hand, removing each clay as it drops onto the casting 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 magazine and check that the thickest clay you can find slides easily under both inner and outer knife edges, i.e. just free enough not to be squeezed onto the carousel plate. Check of course that the knife-edges are not excessively high, although this would tend to shave the bottom off the next clay, not break it. Adjust both knife-edges accordingly.
- (d) If damaging contact occurs on all columns then the knife-edge is damaged and must be realigned by refitting or possibly filing or grinding to give minimal clearance. The knife-edges are adjustable with a 10 mm spanner. Each knife-edge has three slotted holes for ease of adjustment.

- (e) Check each clay and if all are un-chipped or un-cracked, remove the clay and repeat the process. This time if any of the clays break or crack as they land on the casting plate, then the clay is unsuitable or too soft.
- (d) Check that there are no tight spots in any of the carousel pockets. Occasionally machines can suffer slight damage in shipping to the carousel. This can be easily adjusted with a suitable piece of wood or the handle of a hammer. See photo below. Ensure that a handful of clays move up and down each of the pockets once adjusted. If the clays arrive on the plate intact, then the fault lies in the throwing cycle.



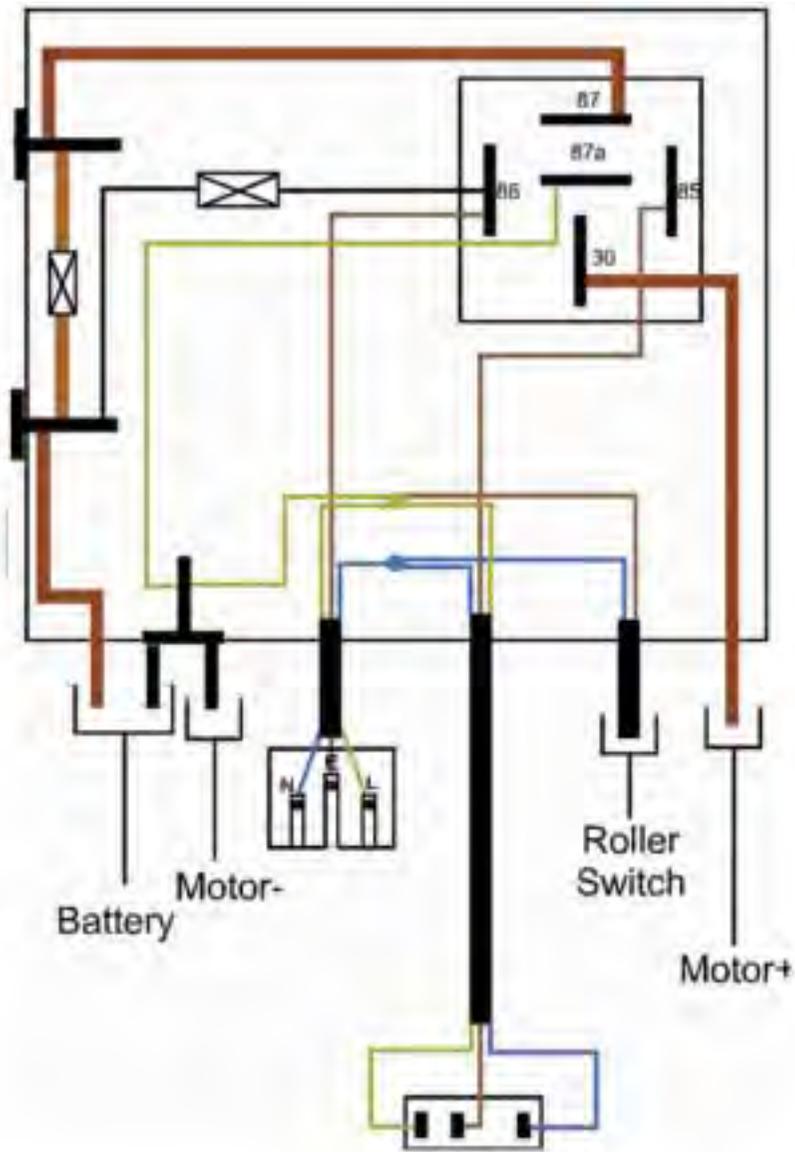
Check **throwing cycle** next:

- (a) Check arm for straightness, for chunks missing from the rubber/plastic friction strip or any other physical damage to the arm. If the arm cannot be straightened then it should be replaced. A new friction strip can be fitted to an old arm if necessary.
- (b) Check for damage to the casting plate especially the front edge of the plate in case it has been dented, bent or burred. Check for flatness, ensure that no screw heads protrude and that there are no other obstructions to the clay's path.
- (c) Check the height of the arm over the plate across its whole surface to ensure that the clay fits under the friction strip with about 1 mm clearance. Any more than 3 mm clearance will cause the arm to break the clay by riding over it.
- (d) Check that the bolt holding the arm to its clamp block is tight.
- (e) Check the **arm-crank timing relationship**. If this relationship is incorrect the trap will definitely break clays when throwing. **The timing can be adjusted to the diagram found in this manual.**

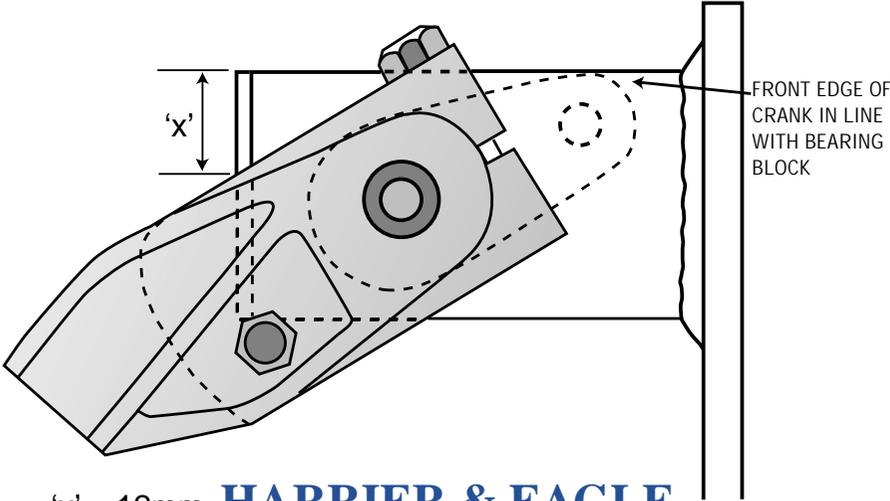
As each of the above elements is checked, something incorrect should be discovered. If the machine still breaks clays, then there is one final check.

Slacken the main spring to its minimum extension, i.e. with the throwing arm in the forward position the coils are just open. Operate the trap a few times in this mode, which puts hardly any stress into the clay because of the slack mainspring. If the clays still break then it is very likely that the actual clays are sub standard and a new batch should be obtained.

## Harrier, Eagle and Ranger 6/8 Electrics



# ARM TIMING DIAGRAM



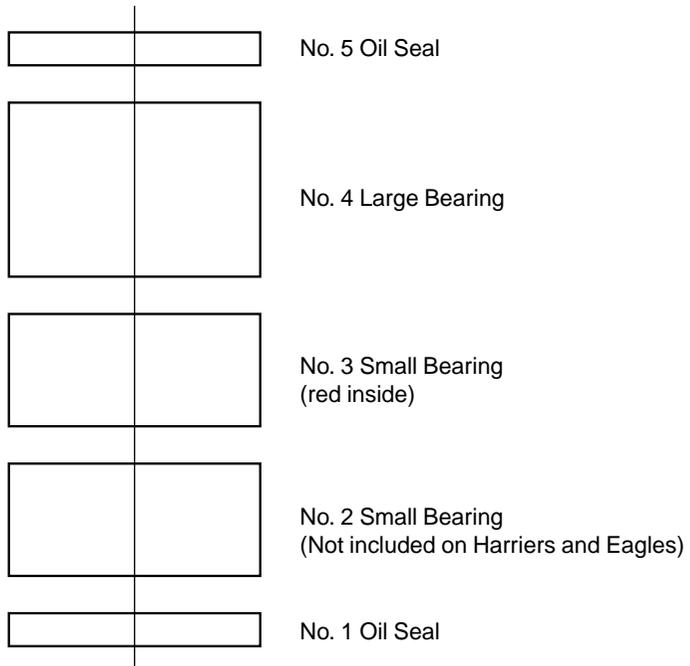
'x' = 12mm **HARRIER & EAGLE**

'x' = 15mm **RANGER**

# INSTRUCTIONS FOR INSTALLING ONE-WAY BEARING IN RANGER/SPORTER/CHONDEL

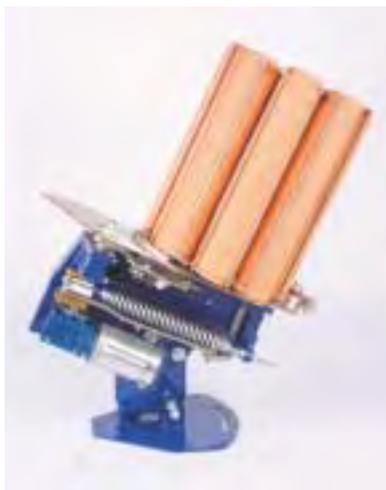
- Release main spring tension and unhook.
- Remove top plate and carousel.
- Remove throwing arm and clamp block.
- Undo 4 bolts holding gearbox and swing clear, to enable main shaft removal.
- Knock out old bearings.

Install new bearings and seals in the order as shown below.  
Install in sequence shown.

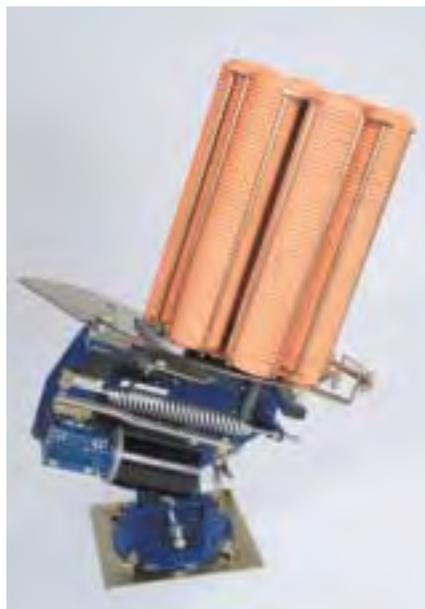


- Note:** — Install the seals and bearings with markings on the upper face.  
— Ensure bearings are well lubricated with 3-in-1 oil on assembly

# COMMERCIAL MACHINES



Super Sporter



Sporter 400TT



Sporter

# OPERATING INSTRUCTIONS

## SPORTER, SPORTER 400TT & SUPER SPORTER

If your machine has been supplied ready for operation, then proceed to the next instruction. If your machine is supplied in a box without its carousel fitted, it will need to be fitted using the centre pin, nut and washers provided on the top plate. Tighten the 19mm nylock nut down on to the blue plastic damping spacer. The nut should be tight enough for the carousel to turn but not spin freely. It is best to keep turning the nylock until the blue damping spacer starts to squash up slightly.



It is advisable to put a fixing bolt or ground peg through the front hole in the base of the machine. Loosening the clamping nut on the elevation slot and possibly the cross pivot and height adjusting bolts to raise the front of the machine will allow you to insert a bolt or peg into the front hole.

Leave this bolt or peg reasonably loose so that the rear of the trap can be moved to adjust the trajectory of the clay.

Lower the machine to about 15-20° of elevation and tighten the nut on the height-adjusting slot lightly. See photo below.



Unwind the power and command cables at the back of the machine and lay them out on the ground. Do not connect the duraplug connection at this stage.

Check that the on/off/nudge toggle switch on the control box at the rear of the machine is in the OFF position. This switch is on a short 1-metre cable with remote box on Sporter Teal and Ranger Traps.

Place the incoming power connector or battery leads to the right hand side of the machine, slightly to the rear of the control box, and at a distance which will allow some slack in the cables running back to the machine.

Plug in or make the battery connections ensuring a good contact. With battery connections it is essential **NOT** to hammer the connections on or to over tighten them.

Check visually from the rear of the machine that the motion of the casting arm is not restricted or blocked in any way.

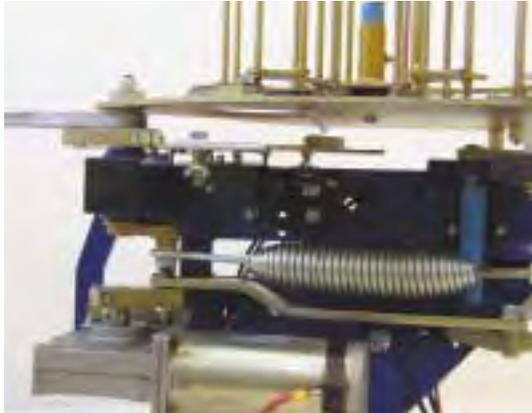
Always operate only from the **REAR** and **NEVER** from the front or sides. From this stage on, do not lean on the machine and touch it with only one hand.

On 12-volt Super Sporter traps switch the trip/isolator on the side of the control box to the "ON" position, so that the red telltale does not show.

From the back of the machine push the on/off/nudge toggle switch into the "NUDGE" position for about half a second only and release it. The switch is spring-loaded and will return automatically to the "OFF" position.

The casting arm will now be static and visible to the right side of the machine and the machine will still be in a safe condition.

**If your trap was delivered without its mainspring fitted, now is the time to fit it.** The arm can now be moved by hand until it sticks directly out of the front of the trap away from the operator. The mainspring would now normally be at its shortest length and can therefore be fitted to the machine. See following photo.



**DO NOT LOAD CLAYS YET.**

Ensure that nothing will restrict the further motion of the arm.

Press the toggle switch down to the “ON” position.

The machine will cycle and stop in the armed position and **MUST BE TREATED WITH EXTREME CAUTION.**

Push the toggle switch to the “OFF” position.

It is now necessary to fire the trap but **NOT** allow it to re-cock so that clays can be loaded. This is done by pushing the toggle to the “NUDGE” position for about half a second and release it so that it returns to the “OFF” position as before.

The trap will immediately fire but not re-arm. The throwing arm will be visible and stationary on the left hand side of the machine.

The machine is now in the disarmed or **SAFE** state.

To further remove the risk of accidental re-cocking, it is advisable to unplug the power supply on a mains powered machine or disconnect the battery on a 12volt machine.

(Remember to reconnect after loading clays! This is often forgotten in the rush to re-load during shoots.)

The magazine can now be filled and it is advisable to place only a small quantity of clays in each column initially.

Ensure that the clays about to be thrown are going into a safe area.

Press the toggle switch to "ON". The machine will load a clay and come to the cocked position and is now ready to fire.

To check for clay flight and direction, fire the trap using the "NUDGE" toggle switch exactly as before so that the machine fires **ONCE** but **does not re-arm** until the switch is returned to the "ON" position.

With the trap in the **DIS-ARMED/SAFE** position, move the rear of the trap to adjust the direction of the clay flight to suit and elevation if required.

Insert further bolts or ground pegs to fix the position and fill the magazine if required.

Should the clay have a tendency to peel off, either left or right of stable flat flight, this can be corrected by tipping the whole machine sideways to compensate and bring the flight level. This method is used for machines in temporary settings.

However the Super Sporter machine has an inbuilt list to the right viewed from behind and an adjusting/jacking bolt on the bottom of the main frame on the right hand side. In permanent settings with the machine on a level base, this bolt can be screwed in to cause the machine to straighten and then move left until flat flight is achieved.

**WARNING:** It is essential to slacken both the nut on the height adjusting slot and pivot cross bolt **BEFORE AND DURING** the process of winding the jacking bolt in. If this is not done, the jacking bolt will exact an enormous leverage and could cause damage to the base casting. Such damage is **NOT** covered under warranty.

All Super Sporter machines have an adjustable rear clay guide rail on the casting plate. By slackening and moving this rail either forward or backwards by **small** increments, and then re-tightening, it is possible to adjust the direction of throw of the clay by up to 30° **without** moving the complete machine. It is not recommended that this facility be used in temporary sporting settings.

Increasing or decreasing the distance that the clay is thrown is achieved by winding tension on or off the spring. This can be done with the machine in the disarmed/safe condition for small adjustments. After adjustment of the main spring to set the correct throwing distance, the nuts on the spring stud must be tightened against each other.

The command cable or radio release can now be connected to the command cable duraplug.

The machine can now be switched on for normal use by pressing the toggle down to "ON" to cock the machine.

The machine will fire and re-cock each time that the fire button on either the command cable or radio remote is pressed. Super Sporter machines have a **"test fire"** button on the electrical box, which also fires the trap.

No loading or adjustment to the machine should be carried out unless the machine is disarmed/safe.

After use, the machine must be left in the disarmed/safe condition and the power supply removed. It is **not** necessary to relieve the remaining spring tension.

## **FAULT FINDING**

It is Promatic's policy to upgrade or modify any of its products if they are ever proved suspect. Problems, which do occur, usually revolve around the clay pigeons themselves or the variation in their sizes between the different manufacturers. Poor maintenance and cleaning or physical damage caused during transportation of the machine are the other normal causes. Items that should be treated with great care are the throwing arm, casting plate and electrical box.

**WARNING: At no time should you put yourself at risk by placing any bodily part within the area of operation of moving mechanical parts.**

## **FAULT FINDING (ELECTRICAL)**

### **Sporter, Sporter 400TT & Super Sporter**

1. **Machine does not cock** (i.e. come to the loaded position.)

Check:

- (a) Battery is charged and that connections are tight.
  - (b) Magnetic trip switch is in the "ON" position.
  - (c) Toggle switch is in the down "ON" position.
  - (d) Arm is clear of roller limit switch under casting plate. If not, then press toggle up to "NUDGE" until the arm is clear, then back down to the "ON" position.
2. **Machine still does not cock.**
    - (a) Check all connections are tight including those inside the electrical box. Check for broken wires and damaged connections.
    - (b) If there are no broken connections (battery connected, all switches on) press toggle up to "NUDGE", listen and watch for the 12v **relay operation** in the control box.

- (c) If the **relay operates** but the motor does **not** turn - short across the 2 large contacts on the relay with a screw driver or piece of wire.

If the motor does not turn - then the motor is suspect. If the motor does turn - then the relay is faulty. Contacts may be dirty or worn out.

- (d) If the relay does not operate - short across contacts on back of trip switch on Super Sporter models. Try toggle switch in "NUDGE" and "ON" positions.

If the motor turns - then the trip switch is faulty.

- (e) If the motor does not turn - then short the brown wire to the yellow/green wire on the back of the toggle switch with the switch in the "NUDGE" position.

If the relay operates and the motor turns - then the toggle switch is faulty.

If the relay still does not operate then it is faulty.

### 3. **Machine runs in "NUDGE" position, but not in "ON" position.**

- (a) If the arm is clear of the roller limit switch then the roller limit switch is faulty.

Check that the roller arm is not seized. If so, strip, clean and re-assemble. Otherwise replace the switch.

### 4. **Machine cocks, but will not fire on command cable button.**

- (a) Either the connections, cable or command push button are faulty. Disconnect the duraplug on the command cable and short the 2 outer sockets (do not put anything into the centre socket - this carries continuous +12v for radio use.)

If the trap does not fire then there is a broken wire in the cable or a bad connection in the duraplug or control box.

- (b) If the trap does fire then reconnect the command cable, 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 command cable or a bad connection in the duraplug.

## 5. **Trap fires by itself!**

- (a) Disconnect the command cable and switch the trap back on.

If the trap cocks normally - then the command cable is damaged or shorted out. Alternatively, the push button switch is stuck in or faulty.

- (b) If the trap **continues to fire** - then check the arm to crank timing relationship as described further on in this manual. If the above relationship is correct then, **after having put the trap into the disarmed/safe position**, move the roller limit switch **away** from main frame along the slotted bracket to its maximum. If the machine now cocks normally - then move the limit switch back to within 5mm of its original position. If the trap now fires by itself again then move the switch to 10mm of its original position and so on until the trap cocks normally under all conditions.
- (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.

# **FAULT FINDING (MECHANICAL)**

## **Sporter, Sporter 400TT & Super Sporter**

### 1. **Carousel does not rotate.**

Check:

- (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 tensioning the locking nut holding the carousel on against the plastic sleeve underneath it.
- (d) Carousel pusher **timing** is correct, i.e. when the gearbox crank and connecting rod are **in line at maximum extension**, (see photo below) the rollers on the bottom of the carousel pusher arm should be 1 mm clear of the carousel plate at maximum travel. 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.



2. **Machine will not throw clays.**

It is usually obvious what is wrong with a machine which does not throw clays at all. It is more likely that the following situation arises:

**Machine throws clays but:**

(a) **The clay flicks up in the air.**

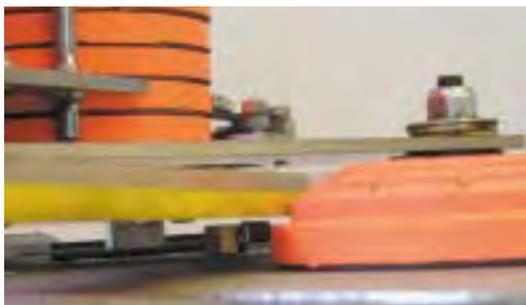
The arm is probably bent down or the casting plate bent up, squeezing the clay between them. The arm or plate should be replaced or straightened.

(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 the arm.

(c) **The clays are inconsistent in direction.**

The clay is being jammed under the arm towards the end. This is usually caused either by the arm being bent down, then the tip bent up or more likely clays varying in thickness. The solution if the arm is bent is to straighten it. If it is the clay thickness, then lower the casting plate to accommodate the thickest one you can find. Adjust each nut **exactly** the same amount, until 1 to 1.5 mm clearance is achieved between the bottom of the friction strip and the clay. See photo below.



### 3. **The Machine breaks clays!**

A point to consider here is that if you have other traps, which have suddenly started to break clays, then it is probably the clays, which are at fault. Particularly soft clays can be accommodated, by fitting a “soft fall” plate to the machine (all machines manufactured after January 98 are fitted with a soft fall plate), but sometimes the clay will be unable to absorb the actual throwing forces consistently. The maximum acceptable level of no birds is 5%, but should in practice be less.

A simple process should be followed which differentiates between the **loading** of the clay prior to **throwing** and the throwing of that same clay.

Check **loading cycle** first:

- (a) Check that clays in the magazine are 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 magazine by hand, removing each clay as it drops onto the casting 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 magazine and check that the thickest clay you can find slides easily under both inner and outer knife edges, i.e. just free enough not to be squeezed onto the carousel plate. Check of course that the knife-edges are not excessively high, although this would tend to shave the bottom off the next clay, not break it. Adjust both knife-edges accordingly.
- (d) If damaging contact occurs on all columns then the knife-edge is damaged and must be realigned by refitting or possibly filing or grinding to give minimal clearance. The knife-edges are adjustable with a 10 mm spanner. Each knife-edge has three slotted holes for ease of adjustment.
- (e) Check each clay and if all are unchipped or uncracked, remove the cloth and repeat the process. This time if any of the clays break or crack as they land on the casting plate, then the clay is unsuitable or too soft.
- (f) Check that there are no tight spots in any of the carousel pockets. Occasionally machines can suffer slight damage in shipping to the carousel. This can be easily adjusted with a suitable piece of wood or the handle of a hammer. See photo below. Ensure that a handful of clays move up and down each of the pockets once adjusted. If the clays arrive on the plate intact, then the fault lies in the throwing cycle.



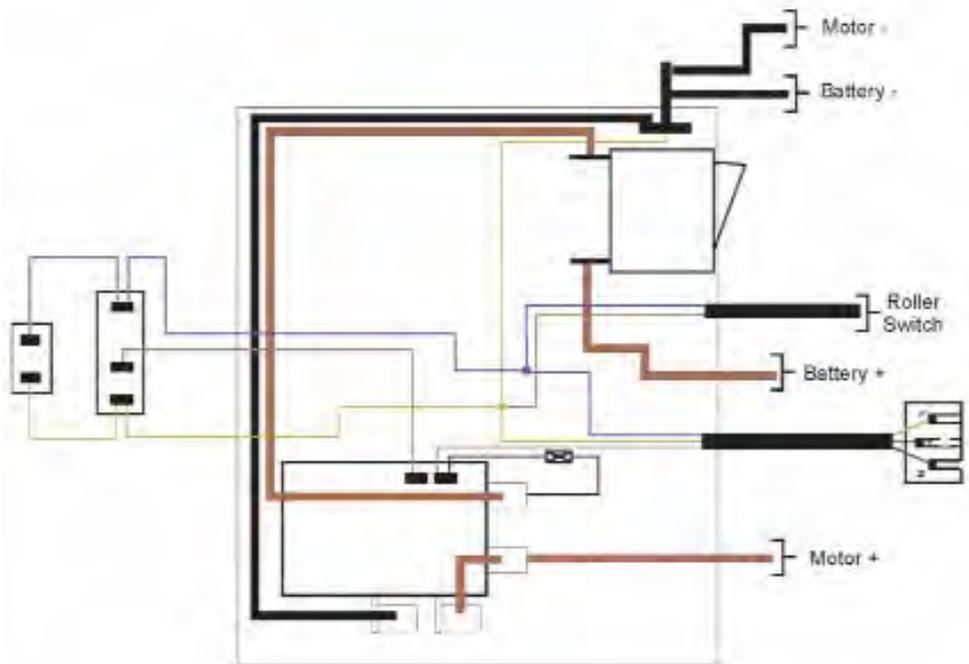
Check **throwing cycle** next:

- (a) Check arm for straightness, for chunks missing from the rubber/plastic friction strip or any other physical damage to the arm. If the arm cannot be straightened then it should be replaced. A new friction strip can be fitted to an old arm if necessary.
- (b) Check for damage to the casting plate especially the front edge of the plate in case it has been dented, bent or burred. Check for flatness; ensure that no screw heads protrude and that there are no other obstructions to the clay's path.
- (c) Check the height of the arm over the plate across its whole surface to ensure that the clay fits under the friction strip with about 1 mm clearance. Any more than 3 mm clearance will cause the arm to break the clay by riding over it.
- (d) Check that the bolt holding the arm to its clamp block is tight.
- (e) Check the **arm-crank timing relationship**. If this relationship is incorrect the trap will definitely break clays when throwing. **The timing can be adjusted to the diagram found in this manual.**

As each of the above elements is checked, something incorrect should be discovered. If the machine still breaks clays, then there is one final check.

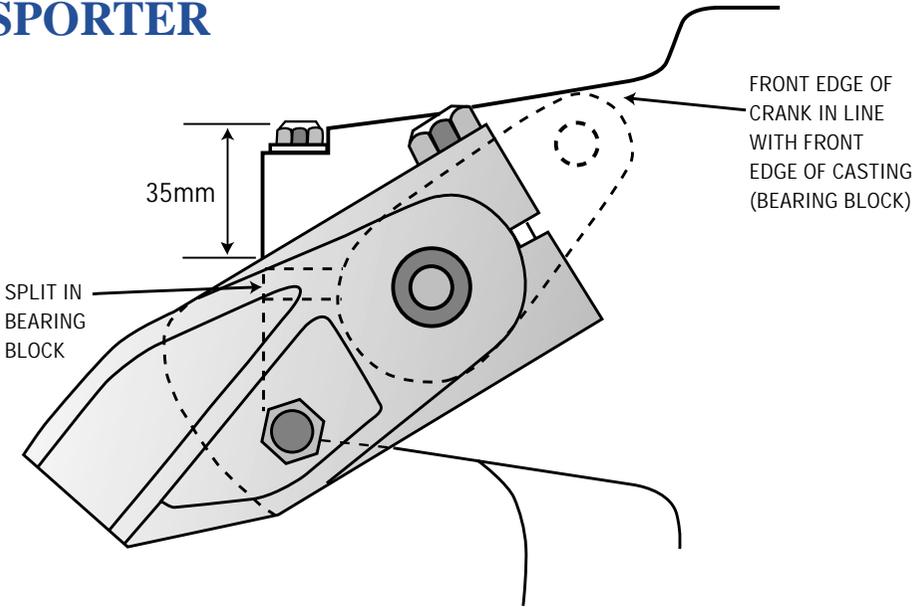
Slacken the main spring to its minimum extension, i.e. with the throwing arm in the forward position the coils are just open. Operate the trap a few times in this mode, which puts hardly any stress into the clay because of the slack mainspring. If the clays still break then it is very likely that the actual clays are sub standard and a new batch should be obtained.

# Sporter, Sporter 400TT and Super Sporter Electrics



# ARM TIMING DIAGRAM

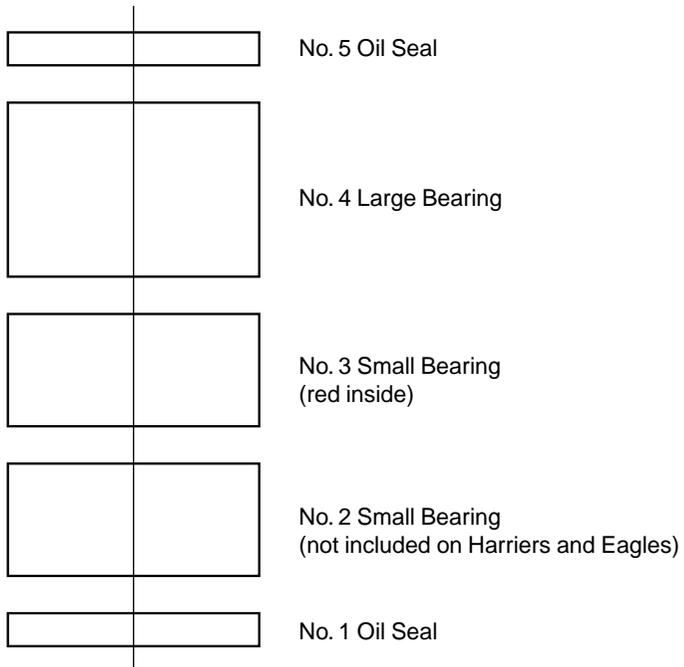
## SPORTER



# INSTRUCTIONS FOR INSTALLING ONE-WAY BEARING IN RANGER/SPORTER/CHONDEL

- Release main spring tension and unhook.
- Remove top plate and carousel.
- Remove throwing arm and clamp block.
- Undo 4 bolts holding gearbox and swing clear, to enable main shaft removal.
- Knock out old bearings.

Install new bearings and seals in the order as shown below.  
Install in sequence shown.



**Note:** — Install the seals and bearings with markings on the upper face.  
— Ensure bearings are well lubricated with 3-in-1 oil on assembly

# RABBIT AND CHONDEL MACHINES



Rabbit



Chondel



Ranger Chondel

# OPERATING INSTRUCTIONS

## Ranger Chondel Machine

Ensure that the machine is set on level ground.

Ensure that the machine is in the **DISARMED/SAFE** position and that the battery is disconnected.

Check the height / clearance of the knife-edges by placing a clay in the carousel and rotating the carousel so that the clay passes through the knife-edge's cleanly.

Put some Standard clay's in the carousel and set angle of elevation to suit. If using Rabbit clays the spring steel deflector must be adjusted in to support the Rabbit targets. This is done by un-winding the three lower horizontal 10mm nylock nuts on the outer guard. The more the 10mm nuts are un-wound the further in the deflector plate moves. See photo below.



**Please note that on all USA spec Ranger Chondel machines, the throwing arm will need to be changed over from the Standard arm to the Rabbit arm if Rabbit clays are to be thrown.**



Left picture above, deflector set for Standard targets. Right picture above, deflector set for Rabbit targets.

It should be pointed out that if the machine is sitting level it will throw a low rabbit target along the ground. Tilting all the way back will allow the machine to throw a vertical teal target.

At this point it should be noted that the machine can be tilted to one side to allow the target to curl. When viewed from behind, the machine can be leaned further to the left for a dome down type target when throwing standards clays.

Unwind the power and command cables at the back of the machine and lay them out on the ground.

Attach the battery connections to the battery ensuring a good contact. Do not connect the command cable to the duraplug at this stage.

Ensure that the clays about to be thrown are aimed into a safe area. Press the toggle switch to on. Push the toggle switch to the disarm position to fire the clay and check for the required trajectory.

If necessary adjust the main spring tension to give the correct throwing distance. Ensure that the nuts on the spring stud are tightened against each other.

The command cable or radio release can now be connected to the duraplug. No loading or adjustment to the machine should be carried out unless the machine is **disarmed / safe. To disarm the machine push the toggle switch to the disarm position allowing the machine to throw the last clay before the toggle springs back to its OFF position.**

After use the machine must be left in the disarmed / safe condition and the power supply removed.

## Switching from Standards to Rabbits (USA models only)

Ensure that the machine is in the **DISARMED/SAFE** position and that the battery is disconnected.

Remove the outer guard by un-doing the 19mm nylock nut and the two 8mm wing nuts.

Remove the standard throwing arm and replace with the Rabbit throwing arm. The arm is attached to its mounting block with one bolt, a 13mm spanner/wrench will be required. **Do not** move the mounting block position on the main shaft or machine timing will be lost and have to be reset.

Refit the outer guard.

The clay deflector will now need to be adjusted. This is done by un-winding the three lower horizontal 10mm nylock nuts on the side of the outer guard. (See previous photo for location of nylock nuts). By loosening these three nuts the spring loaded deflector is pushed closer to the clay. This is necessary as the thinner Rabbit clays would fall out the bottom of the machine if the deflector was left set for Standard clays. Un-wind the three nuts enough so that when a Rabbit clay is loaded the deflector supports it and holds the clay against the throwing plate.

Fill the machine with Rabbit targets and set the elevation etc, before reconnecting the battery.

# FAULT FINDING (ELECTRICAL)

## Ranger Chondel

It is Promatic's policy to upgrade or modify any of its products if they are ever proved suspect. Problems, which do occur, usually revolve around the clay pigeons themselves or the variation in their sizes between the different manufacturers. Poor maintenance and cleaning or physical damage caused during transportation of the machine are the other normal causes. Items that should be treated with great care are the throwing arm, casting plate and electrical box.

**WARNING: At no time should you put yourself at risk by placing any bodily part within the area of operation of moving mechanical parts.**

1. **Machine does not cock** (i.e. come to the loaded position.)

Check:

- (a) Battery is charged and that connections are tight.

- (b) Toggle switch is in the down “ON” position.
- (c) Arm is clear of roller limit switch under casting plate. If not, then press toggle up to “NUDGE” until the arm is clear, then back down to the “ON” position.

2. **Machine still does not cock.**

- (a) Check all connections are tight including those inside the electrical box. Check for broken wires and damaged connections.
- (b) If there are no broken connections (battery connected, all switches on) press toggle up to “NUDGE”, listen and watch for the 12v **relay operation** in the control box.
- (c) If the **relay operates** but the motor does **not** turn - short across the 2 large contacts on the relay with a screw driver or piece of wire. (These are the two terminals with red wires connected to them).

If the motor does not turn - then the motor is suspect.

If the motor does turn - then the relay is faulty. Contacts may be dirty or worn out.

- (d) If the relay does not operate – check the fuse has not blown. Replace fuse if it has blown and try again.
- (e) If the motor does not turn - then short the brown wire to the yellow/green wire on the back of the toggle switch with the switch in the “NUDGE” position.

If the relay operates and the motor turns - then the toggle switch is faulty.

If the relay still does not operate then it is faulty.

3. **Machine runs in “NUDGE” position, but not in “ON” position.**

- (a) If the arm is clear of the roller limit switch then the roller limit switch is faulty.

Check that the roller arm is not seized. If so, strip, clean and Re-assemble. Otherwise replace the switch.

4. **Machine cocks, but will not fire on command cable button.**

- (a) Either the connections, cable or command push button are faulty. Disconnect the duraplug on the command cable and short the 2 outer sockets (do not put anything into the centre socket - this carries continuous +12v for radio use.)

If the trap does not fire then there is a broken wire in the cable or a bad connection in the duraplug or control box.

- (b) If the trap does fire then reconnect the command cable, 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 command cable or a bad connection in the duraplug.

## 5. **Trap fires by itself!**

- (a) Disconnect the command cable and switch the trap back on.

If the trap cocks normally - then the command cable is damaged or shorted out. Alternatively, the push button switch is stuck in or faulty.

- (b) If the trap **continues to fire** - then check the arm to crank timing relationship as described on page **XX** in this manual. If the above relationship is correct then, **after having put the trap into the disarmed/safe position**, move the roller limit switch **away** from main frame along the slotted bracket to its maximum. If the machine now cocks normally - then move the limit switch back to within 5mm of its original position. If the trap now fires by itself again then move the switch to 10mm of its original position and so on until the trap cocks normally under all conditions.
- (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.

# **FAULT FINDING (MECHANICAL)**

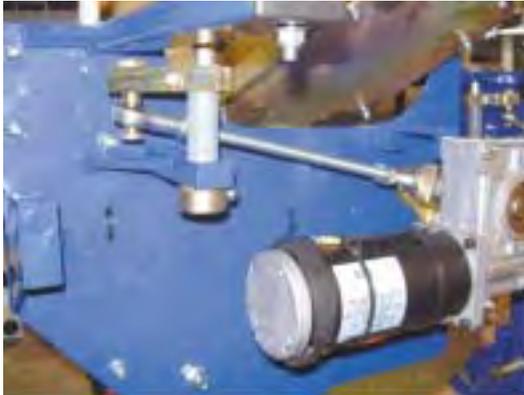
## **Ranger Chondel**

### 1. **Carousel does not rotate.**

Check:

- (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 tensioning the locking nut holding the carousel on against the plastic sleeve underneath it.

- (d) Carousel pusher **timing** is correct, i.e. when the gearbox crank and connecting rod are **in line at maximum extension**, (see photo below) the rollers on the bottom of the carousel pusher arm should be 1 mm clear of the carousel plate at maximum travel. 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.



2. **Machine will not throw clays.**

It is usually obvious what is wrong with a machine, which does not throw clays at all. It is more likely that the following situation arises:

**Machine throws clay but:**

(a) **The clay flicks up in the air.**

The arm is probably bent down or the casting 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 the arm.

(c) **The clays are inconsistent in direction.**

The clay is being jammed under the arm towards the end. This is usually caused either by the arm being bent down, then the tip bent up or more likely clays varying in thickness. The solution if the arm is bent is to straighten it. If it is the clay thickness, then lower the casting plate to accommodate the thickest one you can find. Adjust each nut **exactly** the same amount, until 1 to 1.5 mm clearance is achieved between the bottom of the friction strip and the clay.

3. **The Machine breaks clays!**

A point to consider here is that if you have other traps, which have suddenly started to break

clays, then it is probably the clays, which are at fault. Sometimes the clay will be unable to absorb the actual throwing forces consistently. The maximum acceptable level of no birds is 5%, but should in practice be less.

A simple process should be followed which differentiates between the **loading** of the clay prior to throwing and the **throwing** of that same clay.

Check **loading cycle** first:

- (a) Check that clays in the magazine are 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 magazine by hand, removing each clay as it drops onto the casting 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 magazine and check that the thickest clay you can find slides easily under both inner and outer knife edges, i.e. just free enough not to be squeezed onto the carousel plate. Check of course that the knife-edges are not excessively high, although this would tend to shave the bottom off the next clay, not break it. Adjust both knife-edges accordingly.
- (d) If damaging contact occurs on all columns then the knife-edge is damaged and must be realigned by refitting or possibly filing or grinding to give minimal clearance. The knife-edges are adjustable with a 10 mm spanner. Each knife-edge has three slotted holes for ease of adjustment.
- (e) Check each clay and if all are un-chipped or un-cracked, remove the clay and repeat the process. This time if any of the clays break or crack as they land on the casting plate, then the clay is unsuitable or too soft.
- (f) Check that there are no tight spots in any of the carousel pockets. Occasionally machines can suffer slight damage in shipping to the carousel. This can be easily adjusted with a suitable piece of wood or the handle of a hammer. See photo below. Ensure that a handful of clays move up and down each of the pockets once adjusted. If the clays arrive on the plate intact, then the fault lies in the throwing cycle.



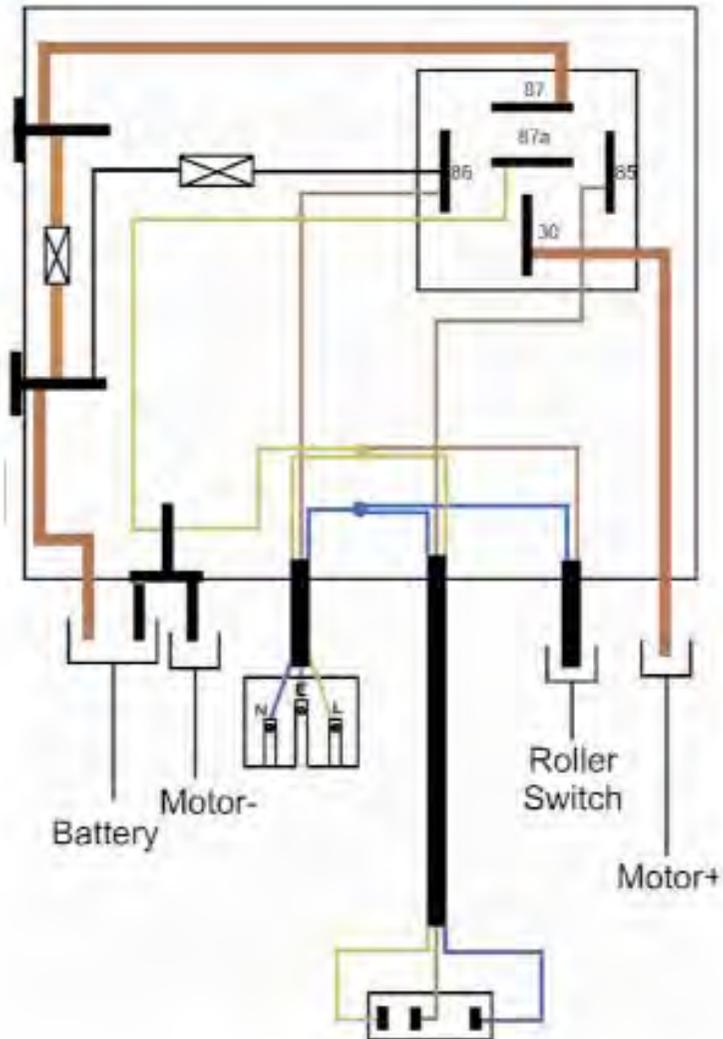
Check **throwing cycle** next:

- (a) Check arm for straightness, for chunks missing from the rubber/plastic friction strip or any other physical damage to the arm. If the arm cannot be straightened then it should be replaced. A new friction strip can be fitted to an old arm if necessary.
- (b) Check for damage to the casting plate especially the front edge of the plate in case it has been dented, bent or burred. Check for flatness, ensure that no screw heads protrude and that there are no other obstructions to the clay's path.
- (c) Check the height of the arm over the plate across its whole surface to ensure that the clay fits under the friction strip with about 1 mm clearance. Any more than 3 mm clearance will cause the arm to break the clay by riding over it.
- (d) Check that the bolt holding the arm to its clamp block is tight.
- (e) Check the **arm-crank timing relationship**. If this relationship is incorrect the trap will definitely break clays when throwing. **The timing can be adjusted to the diagram found in this manual.**

As each of the above elements is checked, something incorrect should be discovered. If the machine still breaks clays, then there is one final check.

Slacken the main spring to its minimum extension, i.e. with the throwing arm in the forward position the coils are just open. Operate the trap a few times in this mode, which puts hardly any stress into the clay because of the slack mainspring. If the clays still break then it is very likely that the actual clays are sub standard and a new batch should be obtained.

## Ranger Chondel Electrics



# OPERATING INSTRUCTIONS

## RABBIT MACHINE

It is advisable to put a fixing bolt or ground peg through the holes in the base of the machine leaving them reasonably loose so that the trap can be moved to adjust the trajectory of the clay.

Unwind the power and command cables at the back of the machine and lay them out on the ground. Do not connect the command cable to the duraplug connection at this stage.

Check that the on/off/nudge toggle switch on the control box on the side of the machine is in the OFF position.

Plug in or make the battery connections ensuring a good contact. With battery connections it is essential not to either hammer the connections on or over tighten them.

Check visually from the rear of the machine that the motion of the throwing arm is not restricted or blocked in any way.

Always operate only from the **REAR** and **NEVER** from the front or sides. From this stage on, do not lean on the machine and touch it with only one hand.

On 12-volt machines switch the trip-isolator on the side of the control box to the 'ON' position, so that the red telltale does not show. From the back of the machine push the on/off/nudge toggle switch into the 'NUDGE' position for about half a second only to release it. The motor should turn a few degrees.

Ensure that nothing will restrict the further motion of the arm.  
Press the toggle switch down to the 'ON' position.

The machine will cycle and stop in the armed position and **MUST BE TREATED WITH EXTREME CAUTION**. See photo below. Push the toggle switch to the 'OFF' position.



It is now necessary to fire the trap but **NOT** allow it to re-cock so that clays can be loaded. This is done by pushing the toggle to the 'NUDGE' position for about half a second and release it so that it returns to the 'OFF' position as before. The trap will immediately fire but not re-arm.

The machine is now in the disarmed or **SAFE** state. See photo below.



To further remove the risk of accidental re-cocking, it is advisable to unplug the power supply on a mains powered machine or disconnect the battery on a 12-volt machine.

(Remember to reconnect after loading clays! This is often forgotten in the rush to re-load during shoots.) The magazine can now be filled and it is advisable to place only a small quantity of clays in each column initially.

Ensure that the clays about to be thrown are going into a safe area. Press the toggle switch to 'ON'. The machine will load a clay and come to the cocked position and is now ready to fire.

To check for clays exit direction, fire the trap using the 'NUDGE' toggle switch exactly as before so that the machine fires **ONCE** but **does not re-arm** until the switch is returned to the 'ON' position.

With the trap in the **DISARMED/SAFE** position, move the rear of the trap to adjust the direction of the clays exit if required. Insert the ground pegs. It is advisable to put a fixing bolt or ground peg through the front hole in the base of the machine.

Leave this bolt or peg reasonably loose so that the rear of the trap can be moved to adjust the trajectory of the clay.

Fix the position and fill the magazine if required.

Should the clay have a tendency to roll off line, either to the left or right, it can be corrected by tipping the whole machine sideways to compensate.

All rabbit machines have an adjustable rear clay stop in the throwing arm. See photo below. By slackening and moving this stop forward or backward in **small** increments, and then re-tightening, it is possible to adjust the angle at which the clay leaves the machine.

Increasing or decreasing the distance that the clay is thrown is achieved by winding tension on or off the spring. This can be done with the machine in the disarmed/safe condition.



After adjustment of the main spring to set the correct throwing distance, the nuts on the spring stud must be tightened against each other.

The command cable or radio release can now be connected to the command cable duraplug. The machine should be switched on for normal use by pressing the toggle down to 'ON' to cock the machine. The machine will fire and re-cock each time that the fire button on either the command cable or radio remote is pressed. Rabbit machines have a 'test fire' button on the electrical box, which also fires the trap.

No loading or adjustment to the machine should be carried out unless the machine is in the **DISARMED/SAFE** position. After use, the machine must be left in the disarmed/safe condition and the power supply removed. It is **not** necessary to relieve the remaining spring tension.

# OPERATING INSTRUCTIONS

## CHONDEL MACHINE

Ensure that the machine is set on level ground and that it is in the **DISARMED/SAFE** position.

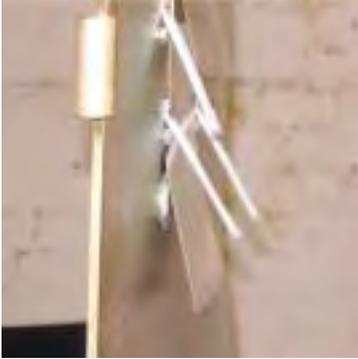
Check the height / clearance of the knife-edges by placing a clay in the carousel and rotating the carousel so that the clay passes through the knife-edges cleanly. Tilt the machine to its maximum position forward, ensuring that the locking screw is locked tightly into appropriate hole. Pass a clay through the knife edges again and if necessary adjust knives to suit. Repeat with machine in maximum position tilted to the rear.

Put some Standard clay's in the carousel and set angle of elevation to suit. If using Rabbit clays the spring steel deflector must be adjusted in to support the Rabbit targets. This is done by un-winding the three horizontal lower 10mm nylock nuts on the outer guard. The more the 10mm nuts are un-wound the further in the deflector plate moves. See photo below.



By loosening these three nuts the spring loaded deflector is pushed closer to the clay. This is necessary as the thinner Rabbit clays would fall out the bottom of the machine if the deflector was left set for Standard clays. Un-wind the three nuts enough so that when a Rabbit clay is loaded the deflector supports it and holds the clay against the throwing plate.

**Please note that all USA spec Chondel machines are supplied with the Rabbit throwing arm fitted. The Standard throwing arm will need to be fitted first before Standard clays can be thrown.**



Left picture above, deflector set for Standard targets. Right picture above, deflector set for Rabbit targets.

It should be pointed out that if the machine is sitting level it will throw a chandelle looper target. Tilting all the way back will allow the machine to throw a vertical teal target. While tilting the machine all the way forward will allow it to throw a rabbit target along the ground.

Unwind the power and command cables at the back of the machine and lay them out on the ground.

Attach the battery connections to the battery ensuring a good contact. Do not connect the command cable to the duraplug at this stage.

Ensure that the clays about to be thrown are aimed into a safe area. Press the toggle switch to on. Press the fire button and check the clays exit elevation and distance.

If necessary adjust the main spring tension to give the correct throwing distance. Ensure that the nuts on the spring stud are tightened against each other.

The command cable or radio release can now be connected to the duraplug. No loading or adjustment to the machine should be carried out unless the machine is disarmed / safe. **To disarm the machine push the toggle switch to the nudge position allowing the machine to throw the last clay before the toggle springs back to its OFF position.**

After use the machine must be left in the disarmed / safe condition and the power supply removed.

## Switching from Rabbits to Standards (USA models only)

Ensure that the machine is in the **DISARMED/SAFE** position and that the battery is disconnected.

Remove the top outer guard by un-doing the four 6mm wing nuts.

Remove the bottom outer guard by un-doing the 19mm nylock nut and the the five 8mm wing nuts.

Remove the Rabbit throwing arm and replace with the Standard throwing arm. The arm is attached to its mounting block with two bolts, a 13mm spanner/wrench will be required. **Do not** move the mounting block position on the main shaft or machine timing will be lost and have to be reset.

Refit the bottom outer guard.

The clay deflector will now need to be adjusted, see photos on previous page. This is done by winding in the three lower horizontal 10mm nylock nuts on the side of the bottom outer guard. By tightening these three nuts the spring loaded deflector is pulled away from the clay. This is necessary as the thicker Standard clays would not be able to fall down in to the loaded position correctly, causing them to lean away from the throwing plate and break when thrown, if the deflector was left set for Rabbit clays. Wind in the three nuts enough so that when a Standard clay is loaded, the deflector supports it and holds the clay against the throwing plate.

Refit the top outer guard.

Fill the machine with Standard targets and set the elevation etc, before reconnecting the battery.

# FAULT FINDING (ELECTRICAL)

## Rabbit & Chondel

**WARNING: At no time should you put yourself at risk by placing any bodily part within the area of operation of moving mechanical parts.**

Fault Finding ( Electrical ) 12 volt DC.

1. **Machine does not cock** (i.e. come to the loaded position)

Check:

- (a) Battery is charged and that connections are tight.

- (b) Magnetic trip switch is in the ON position.
- (c) Toggle switch is in the down ON position.
- (d) Arm is clear of roller limit switch. If not, then press toggle up to NUDGE until the arm is clear, then back down to the ON position.

2. **Machine still does not cock.**

- (a) Check all connections are tight including those inside the electrical box. Check for broken wires and damaged connections.
- (b) If there are no broken connections (battery connected, all switches on) press toggle up to NUDGE, listen and watch for the 12v relay operation in the control box.
- (c) If the relay operates but the motor does not turn – short across the two large contacts on the relay with a screwdriver or piece of wire.

If the motor does not turn- then the motor is suspect.

If the motor does turn- then the relay is faulty. Contacts may be dirty or worn.

- (d) If the relay does not operate- short across contacts on back of trip switch. Try toggle switch in NUDGE and ON positions. If the motor turns then the trip switch is faulty. If the motor does not turn – then short the brown wire to the yellow / green wire on the back of the toggle switch with the switch in the NUDGE position. If the motor does not turn- then the toggle switch is faulty. If the relay still does not operate then it is faulty.

3. **Machine runs in NUDGE position, but not in ON position.**

- (a) If the arm is clear of the roller limit switch then the roller limit switch is faulty. Check that the roller arm is not seized. If so, strip, clean and re-assemble. Otherwise replace the switch.

4. **Machine cocks, but will not fire on command cable button.**

- (a) Either the connections, cable or command push button are faulty.

Disconnect the duraplug on the command cable and short the two outer sockets (do not put anything into the centre socket as this carries continuous 12v for radio use.)

If the trap does not fire then there is a broken wire in the cable or a bad connection in the duraplug or control box.

If the trap does fire then reconnect the command cable, remove the cover on the push button box and short across the two spade connectors.

I f the trap fires, then the push button is faulty.

If the trap does not fire- then there is a broken wire in the command cable or a bad connection in the duraplug.

5. Trap fires by itself.

(a) Disconnect the command cable and switch the trap back on.

If the trap cocks normally- then the command cable is damaged or shorted out.

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

(b) If the trap continues to fire then check the arm to crank timing relationship as described on page 6.

If the above relationship is correct then, after having put the trap into disarmed / safe position, move the roller limit switch down the slotted bracket to its maximum. If the machine now cocks normally, move the limit switch back to within 5mm of its original position.

If the trap now fires by itself again then move the switch to within 10mm of its original position and so on until the trap cocks under all conditions.

(c) If the machine still fires by itself then check to see if the relay contacts have stuck together and if so replace them.

If the relay operates correctly, but the trap still fires by itself, then the roller limit switch is faulty and needs to be replaced.

## **FAULT FINDING (MECHANICAL)**

### **Rabbit**

1. **Carousel does not rotate.**

Check:

(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 tensioning the locking nut holding the carousel on against the plastic sleeve underneath it.

- (d) Carousel pusher timing is correct, i.e., use the NUDGE switch to move the gearbox crank and connecting rod until they are in line at maximum extension. See photo below. In this position the rear pusher shaft should be against the rear of the right hand side of the top plate (viewed from behind the machine). If this is not the case then the clamp on the rear pusher shaft should be undone with a 19mm spanner and the rear pusher shaft adjusted accordingly. It must be tightened before operation of the machine.



## 2. **The machine breaks clays!**

A point to consider here is that if you have other traps, which have suddenly started to break clays, then it is probably the clays, which are at fault.

A simple process should be followed which differentiates between the **loading** of the clay prior to **throwing** of that same clay.

Check **loading cycle** first:

- (a) Check that clays in the magazine are intact, not chipped or cracked. If in doubt, remove suspect clays and refill with ones known to be intact.
- (b) With the machine switch 'OFF', rotate the magazine by hand, removing each clay as it drops into the throwing arm. Check for cracks and chips. If the clays arrive in the throwing arm intact, then move on to the throwing section below.
- (c) If they arrive chipped or cracked then remove the magazine and check that the thickest clay you can find slides easily under both inner and outer knife edges, i.e., just free enough not to be squeezed onto the carousel plate. Check of course that the knife-edges are not excessively high, although this would tend to shave the bottom of the next clay, not break it. Adjust both knife-edges accordingly.

- (d) Replace the magazine and place one clay in each column. Rotate the magazine by hand allowing each clay to fall through the loading port. As each clay passes through the knife-edges, watch for anywhere that either knife-edge bites into the side of the clay. If this occurs on any column then the carousel may be damaged. To check and repair take a handful of clays and pass up and down each of the eight pockets of the carousel. Adjust any pockets of the carousel as on previous carousel adjustment photo.

When this has been achieved on all columns, the carousel should be re-fitted and a single clay placed in each column. The carousel is now rotated holding each clay back against the driving rod and noting its position relative to the inner and outer knife edges, then removing it as it passes through the loading port and into the throwing arm. Bending the pushing rods further **in** will move the clay away from the outer knife edge and closer to the inner and vice versa.

Once all columns are consistently accurate in adjustment it may be necessary to adjust the clearance on one, or the other knife-edge, if there is contact between the knife-edge and the side of the clay. Clearance should be the same on either side of the clay with a correctly adjusted carousel and it is very unusual to have to file or grind one or the other knife-edge. The knife-edge blades can be adjusted with a 10mm spanner

If damaging contact occurs on **all** columns then the knife-edge is damaged and must be realigned by refitting or possible filing or grinding to give minimal clearance.

If all the clays arrive in the throwing arm intact, then the fault lies in the throwing cycle.

Check **throwing cycle** next:

- (a) Check the construction of the throwing arm and for chunks missing from the rubber strip or any other physical damage. If the arm is faulty in any way then it should be replaced. A new rubber strip can be fitted to an old arm if necessary.
- (b) Check for damage to the bars, which the clay slides down and that there are no other obstructions as the clay falls into the arm.
- (c) Check that the bolt holding the arm to its clamp block is tight.
- (d) Check the **arm-crank timing relationship**.

Immediately after the trap fires a clay the throwing arm should come to rest in the horizontal or slightly above horizontal position. This can be adjusted by loosening the cap head bolt, which secures the arm clamp block to the main shaft, adjusting the position of the arm and re-tightening. The trap must then be fired again, with a clay, and the new stopping position checked.

- (e) Check the **arm friction damping**.

As the trap fires a clay the throwing arm should only oscillate up and down 2 or 3 times after the clay leaves before coming to rest. If the oscillation is more than this, then the bevelled washers on the main shaft need to be compressed to slow the arms excess movement. This is done by loosening the cap head bolt which secures the arm clamp block to the main shaft, being careful to maintain the position of the arm on the shaft and tightening the nut on the end of the main shaft to compress the bevel washers. The cap head bolt must be re-tightened and the trap fired again, with a clay, to check the new setting.

## **FAULT FINDING (MECHANICAL)**

### **Chondel**

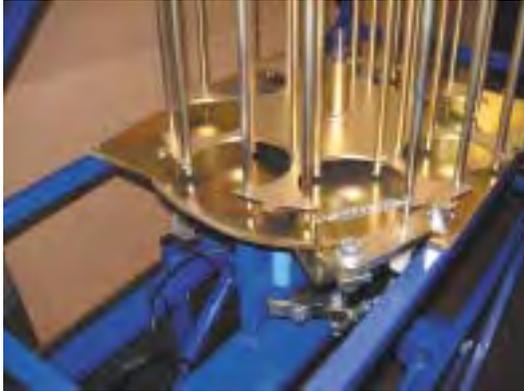
1. **Carousel does not rotate.**

Check:

- (a) The carousel pusher arm is not jammed with broken clays or dirt.
- (b) The carousel 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 tensioning the locking nut holding the carousel against the plastic sleeve underneath it.
- (d) Carousel pusher timing is correct. Looking at the side of the machine with the pusher to the left check that the rectangular block on the gearbox is horizontal and facing the rear of the machine to the right. Referring to photo below, rotate the machine to position the clamp block on the gearbox shaft to point to the rear of the machine as shown.



With the clamp block in this position, the carousel pusher arm should be as far to the right as possible as shown in the photo below. If not adjust the other clamp block on the vertical rear pusher shaft making sure it is tightened before operating the machine. Do not adjust the clamp block on the gearbox.



## 2. **Machine will not throw clays.**

It is usually obvious what is wrong with the machine, which does not throw clays at all. It is more likely that the following situation arises:

Machine throws clays but:-

### (a) **The clay flicks up in the air.**

The arm is probably bent down squeezing the clay against the casting plate. The arm should be straightened or replaced.

### (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 at its tip.

This will also cause clay to break. The arm should be straightened or replaced.

### (c) **The clays are inconsistent in direction.**

The clay is being jammed under the arm towards the end. This is usually caused either by the arm or more likely the clays varying in thickness. The solution is if the arm is bent is to straighten it. To check if it is the clay thickness put a clay against the casting plate and check the clearance with the arm all the way around the throwing cycle. Inserting or removing brass washers behind the arm clamp block on the main shaft can adjust the distance between the arm and casting plate.

Check arm timing relationship (see diagram).

Refit and tension spring. Refit outer guard making sure it is set to the correct gap (see instructions).

3. **The machine breaks clays.**

A point to consider here is that if you have other traps, which have suddenly started to break clays, then it is probably the clays, which are faulty. The maximum acceptable level of no birds is 5%, but should in practice be less.

A simple process should be followed which differentiates between the **loading** of the clay prior to the **throwing** of the same clay.

4. **Check loading cycle first:**

- (a) Check that the clays in the carousel are intact, not chipped or cracked.
- (b) If in doubt, remove suspect clays and refill with ones known to be intact.
- (c) With the machine switched off, rotate the carousel by hand, removing each clay as it drops onto the loading chute. Check for cracks and chips, if the clays arrive onto the chute intact, then move onto the throwing section below.
- (d) If they arrive chipped or cracked then remove the carousel and check that the thickest clay you can find slides easily under both inner and outer knife edges, i.e. just free enough not to be squeezed onto the carousel plate. Check of course that the knife-edges are not excessively high, although this would tend to shave the bottom off the next clay, not break it. Adjust both knife-edges accordingly.
- (e) Replace the carousel and place one clay in each column. Tilt the machine backwards as far as it will go and rotate the carousel by hand allowing each clay to fall through the loading port. As each clay passes through the knife-edges, watch for anywhere that either knife-edge bites into the side of the clay. If this occurs on any column then the carousel may be damaged. To check and repair, remove the carousel and phone the dealer/ manufacturer for instructions.

Tilt the machine to its forward position and repeat above.

If damaging contact occurs on all columns then the knife edge is damaged and must be realigned by refitting or possibly filing / grinding to give minimal clearance.

If the clays arrive on the loading chute intact, then the fault lies in the throwing cycle.

5. **Check throwing cycle next:**

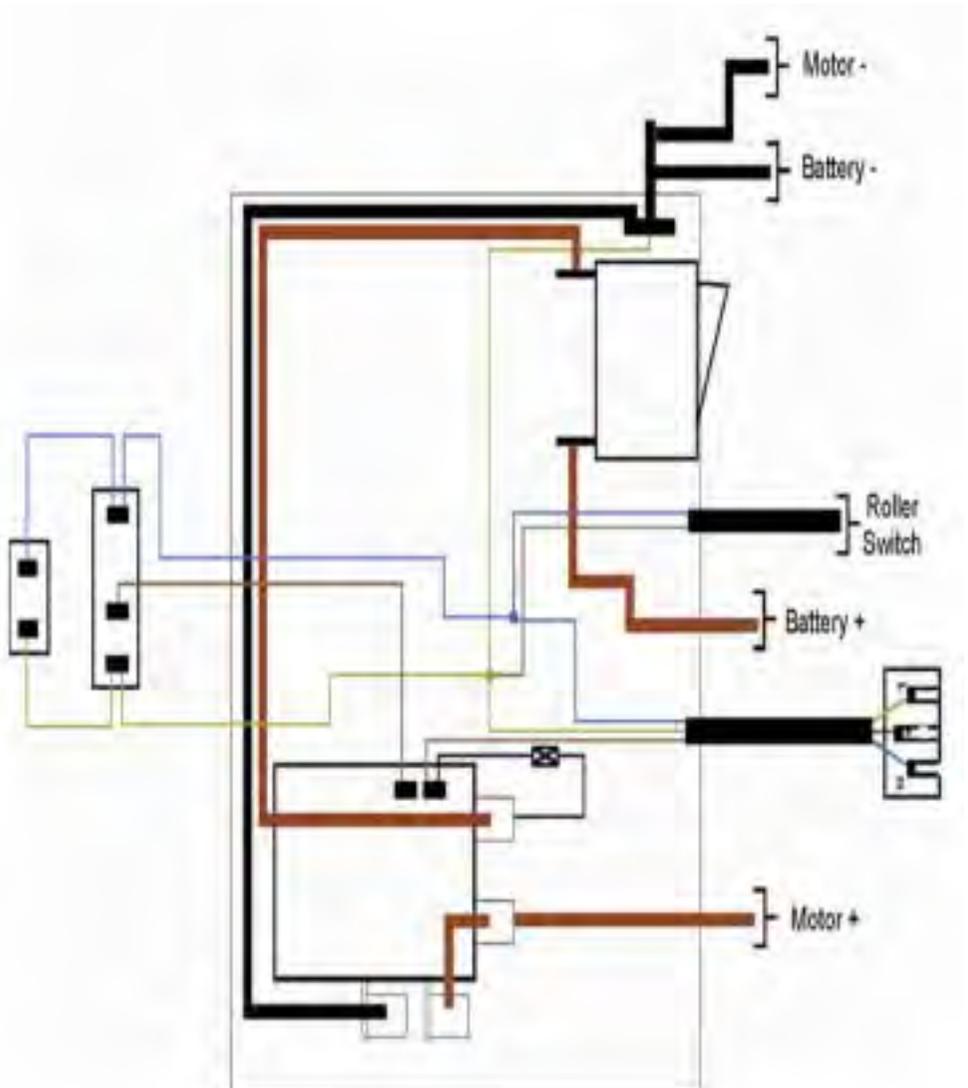
- (a) Check arm for straightness, for chunks missing from the rubber / plastic friction strip or any other physical damage to the arm. If the arm cannot be straightened then it should be replaced. A new friction strip can be fitted to an old arm if necessary.
- (b) Check for damage to the casting plate, for flatness, dents and burrs etc. Ensure that no screw heads protrude above the plate and that there are no other obstructions to the clays path.
- (c) Check the height of the arm over the casting plate across its whole surface to ensure that the clay fits under the friction strip with about 1mm clearance. If the height needs adjusting see paragraph 2c.
- (d) Check that the bolt holding the throwing arm to its clamp block is tight.
- (e) Check the arm – crank timing relationship. If this relationship is incorrect the trap will definitely break clays when throwing.
- (f) Referring to the photo below, rotate the machine to position the main spring and the shaft crank arm with its nylon roller to the position shown.



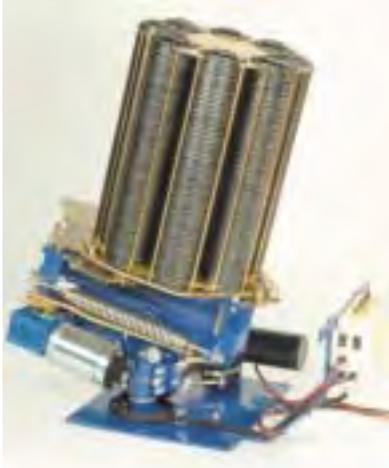
In this position the tip of the throwing arm should be on the timing mark or **in line with the wing nut** used to attach the guard as shown in the photo below. If not then adjust the throwing arm clamp block on the shaft making sure it is tightened before operating the machine.



## Rabbit and Chondel Electrics



# SPORTING DTL/ATA AND ABT/WOBBLE MACHINES



Sporter ABT/Wobble



Pro ABT/Wobble



Harrier DTL/ATA



Ranger Club ABT/Wobble

# OPERATING INSTRUCTIONS

## DTL/ATA & ABT/WOBBLE MACHINES (SPORTING USE ONLY)

### ANGLE ADJUSTMENT

This section concentrates on the setting of the angles of the machine; it covers both the Harrier/Eagle DTL/ATA, Ranger ABT and Sporter ABT versions. Please also read the **CLUB/COMMERCIAL MACHINES** section prior to this.

The DTL and ABT machines have additional control motors to allow the machine to oscillate from side to side and on ABT up and down as well. The amount of angle can be adjusted as follows.

With the trap in the **DIS-ARMED/SAFE** position, undo the crank bolt with a 10mm Allen key, (which is situated on the oscillating disc on the small gearbox, bolted to the base of the machine) and remove from the hole in the disc. See photo below. The disc has several 12mm threaded holes in it spiralling out from the centre of the disc. The further out the hole the greater the angle of oscillation. Put the crank bolt back in to the required hole and tighten.



On ABT versions there is also an extra control motor fitted for up and down movement. See photo above. The same applies for adjustment as on the side-to-side control motor. By placing the crank bolt in a different hole on the disc the angle of elevation can be adjusted. The further out the hole from the centre on the disc, the more up and down movement is achieved.

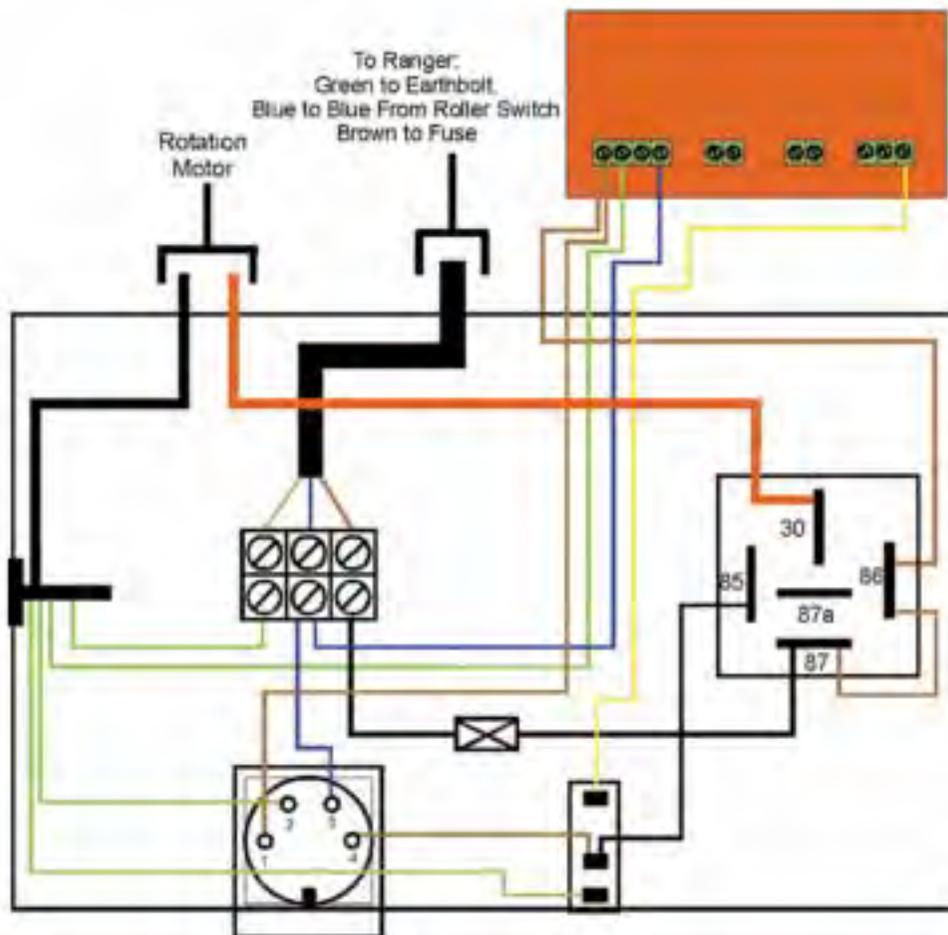
The oscillating control switches on the DTL and ABT machines have three positions. The centre position is the "off" position. The forward momentary position is for inching the machine a few degrees at a time and the rear "on" position holds the motor on so allowing the oscillating motor to oscillate continuously while the machine is in use.

Note that when in the "on" position the oscillating motors will run and then stop momentarily before restarting. This feature is fitted to all machines with oscillating motors as it carries out two functions. The first is to randomly stop and start the oscillating motors so making it impossible for the shooter to "read the target" or guess which direction the next target is going in if the trap is hidden from view. The second function is to stop the oscillating motors after a short period of time if the machine is not being used so saving battery power. This means that the user does not have to walk up to the machine and turn it off when shooting has finished, the timer will do this automatically. When the next target is called for and the trap fired, the timer starts the oscillating motors again.

Even if the oscillating motors have shut down, users must be aware that the machine is still armed and must only be approached from behind to disarm the machine before reloading or adjusting.

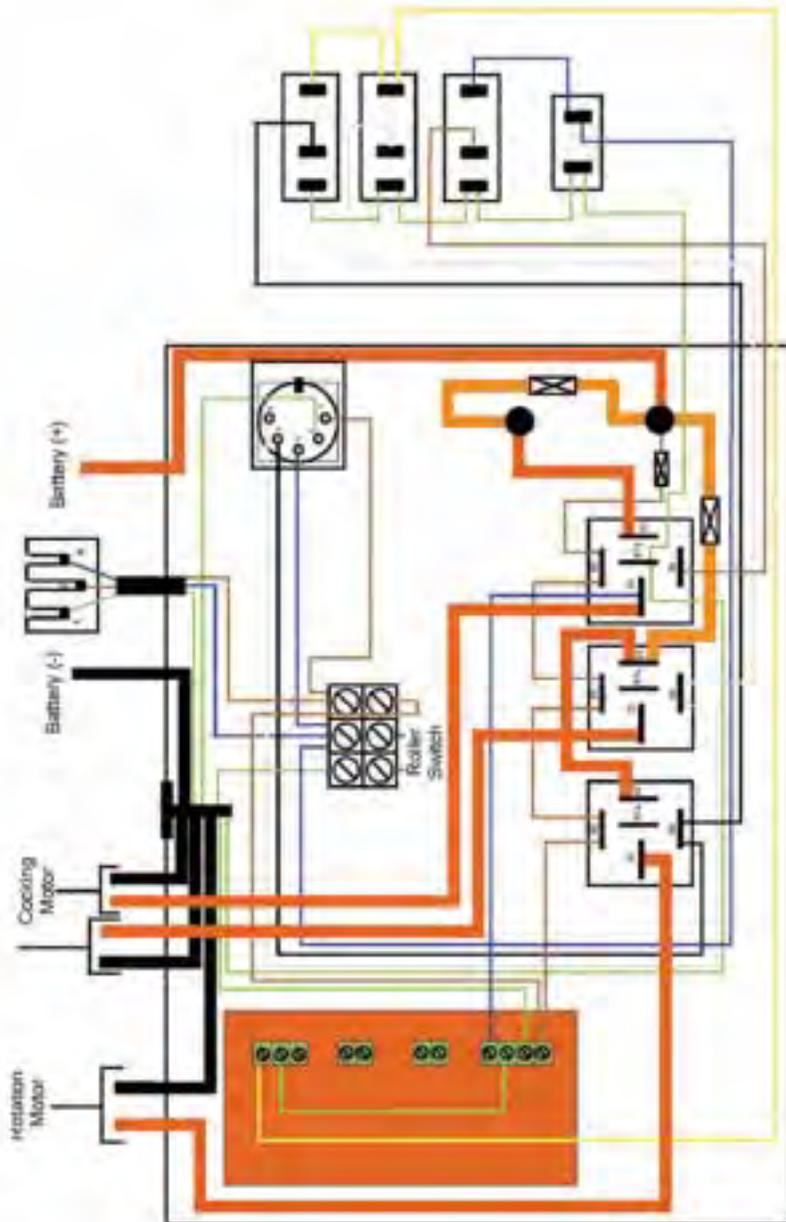
Inch control (either hard wire or radio) automatically bypasses the timer unit if either control motor is switched on from the inch hand control box. This means that the oscillating motors will continue to oscillate until they are switched off at the inch hand control box.

## Harrier/Eagle and Ranger ATA/DTL Electrics

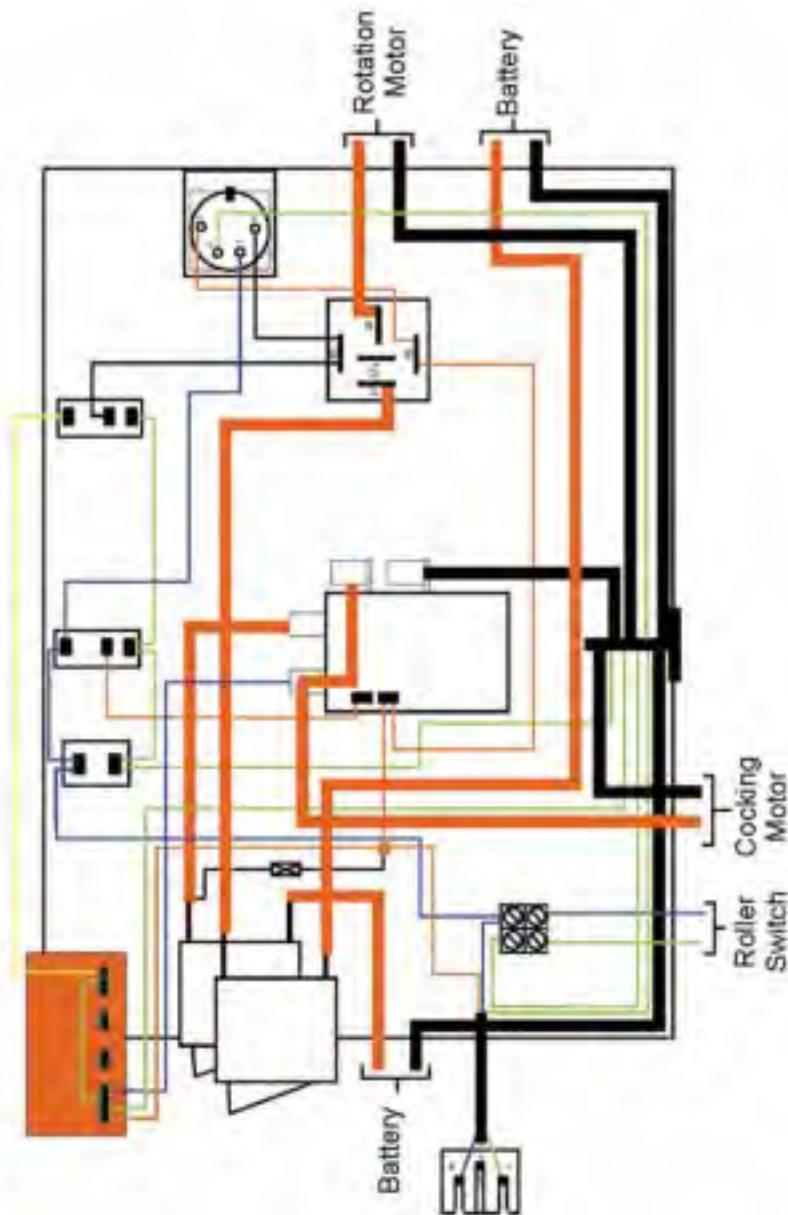


This diagram only covers the oscillating base electrical box. Refer to the relevant machine electrical diagram also.

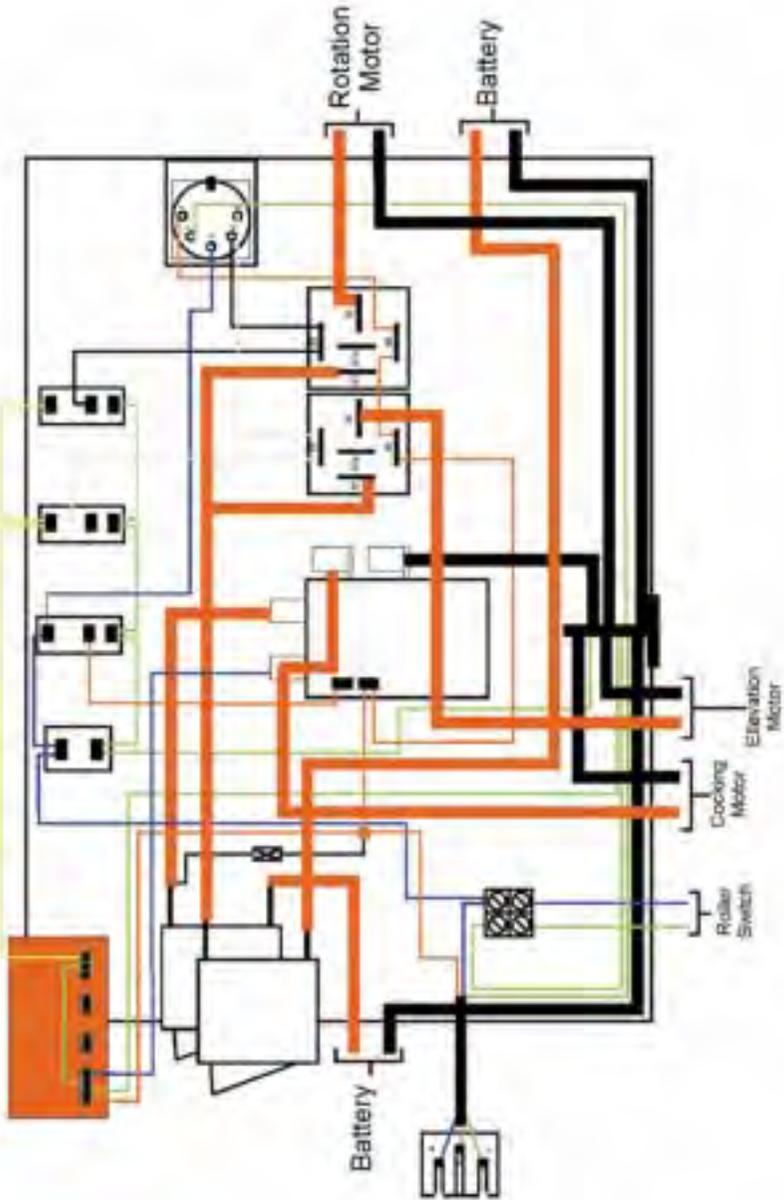
# Ranger ABT/Wobble Electrics



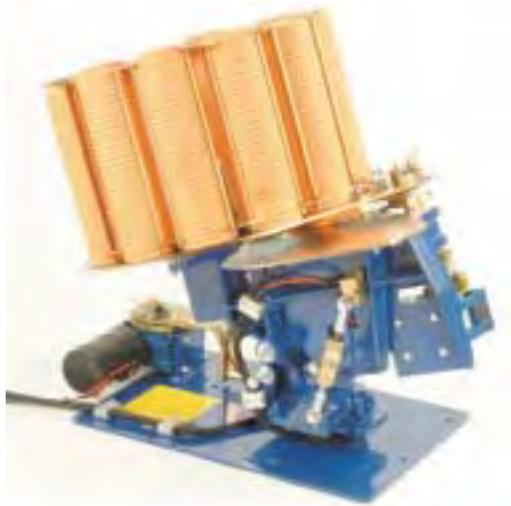
## Sporter ATA/DTL Electrics (No Solenoid)



# Sporter ABT/Wobble Electrics (No Solenoid)



# INT. DTL/ATA AND ABT MACHINES



Int. DTL/ATA



Int. ABT

# OPERATING INSTRUCTIONS

## DTL/ATA AND ABT MACHINES WITH 12 COLUMN CAROUSELS

### ANGLE ADJUSTMENT

International DTL/ATA and ABT machines fitted with solenoid release are adjustable for different types of angles just as on the sporting versions, so before carrying out any adjustment read the previous section. Angles are altered in exactly the same way as on the sporting type machines, but there are additional features included that are not found on the normal sporting versions of these machines. These features are used as described below.

Note that when in the “on” position the oscillating motors will run and then stop momentarily before restarting. This feature is fitted to all machines with oscillating motors as it carries out two functions. The first is to randomly stop and start the oscillating motors so making it impossible for the shooter to “read the target” or guess which direction the next target is going in if the trap is hidden from view. The second function is to stop the oscillating motors after a short period of time if the machine is not being used so saving power. This means that the user does not have to walk up to the machine and turn it off when shooting has finished, the timer will do this automatically. When the next target is called for and the trap fired, the timer starts the oscillating motors again.

Even if the oscillating motors have shut down, users must be aware that the machine is still armed and must only be approached from behind to disarm the machine before reloading or adjusting.

Once an ATA/DTL or ABT machine is installed in the trap house the side-to-side angle needs to be set. For example on a DTL machine, 20 degrees either side of centre is required. It may be that the machine is throwing the targets 25 degrees to the left and only 15 degrees to the right. So the “field” needs to be moved to the right so evening up the angles. It is done as follows.

With the trap in the **DIS-ARMED/SAFE** position remove the knurled locking bolt from the rotation disc on the back of the machine. Reposition the machine and screw the knurled locking bolt back in to the centre hole of the rotation disc. Check that the locking lever (which is on the crank bar on the rotation disc under the knurled locking bolt) is in the centre slot.



### **DO NOT LOAD CLAYS YET.**

Ensure that nothing will restrict the further motion of the arm (including the sides of the trap house).

Press the toggle switch down to the “ON” position.

The machine will cycle and stop in the armed position and **MUST BE TREATED WITH EXTREME CAUTION.**

Push the toggle switch to the “OFF” position.

It is now necessary to fire the trap but **NOT** allow it to re-cock so that clays can be loaded. This is done by pushing the toggle to the “NUDGE” position for about half a second and release it so that it returns to the “OFF” position as before.

The trap will immediately fire but not re-arm. The casting arm will be visible and stationary on the left hand side of the machine.

The machine is now in the disarmed or **SAFE** state.

To further remove the risk of accidental re-cocking, it is advisable to unplug the power supply on a mains powered machine or disconnect the battery/transformer on a 12volt machine.

The magazine can now be filled and it is advisable to place only a small quantity of clays in each column initially.

Ensure that the clays about to be thrown are going into a safe area.

Press the toggle switch to "ON". The machine will load a clay and come to the cocked position and is now ready to fire.

To check for clay flight and direction, fire the trap using the "NUDGE" toggle switch exactly as before so that the machine fires **ONCE** but **does not re-arm** until the switch is returned to the "ON" position.

With the trap in the **DIS-ARMED/SAFE** position, move to the rear of the trap to adjust the direction of the clay flight to suit and elevation if required. The clay flight should be straight down the centre of the "field" with the knurled locking bolt screwed in to the centre of the rotation disc. If it is not then the turnbuckle that is fitted in between the rotation disc and the swivel block at the base of the mainframe needs to be adjusted. The turnbuckle (a hexagonal bar approx 80mm long) has a locking nut on either side of it. Undo the two locking nuts with a 24mm spanner and twist the turnbuckle one way or the other, depending on which way the "field" needs to be moved. From the rear of the machine twisting the turnbuckle clockwise moves the "field" to the right. Counter clockwise moves the "field" to the left. Adjust one or two turns and then fire another clay as described above. Keep adjusting the turnbuckle until the desired direction of flight is achieved. See photo of turnbuckle below.



Once the machine is throwing a clay down the centre line of the "field", make the machine safe by disarming it and tighten the two locking nuts on the turnbuckle. It should not be necessary to adjust the turnbuckle at any time afterwards.

If it is necessary to adjust the "field" at a later date (due to a cross wind), it can be adjusted without moving the turnbuckle.

Place the knurled locking bolt in the centre of the rotation disc and fire a clay. If the clay is off centre one way or the other, the lever underneath the knurled locking nut should be moved across to the next slot. There is a choice of four slots on either side. The further the lever is moved the more the "field" is moved.

With the machine now centred, remove the knurled locking bolt from the centre hole of the disc and place in the desired hole. (Refer to the label on the base plate for angle settings)

On ABT machines the elevation angle is adjusted in much the same way, except that there is no threaded hole in the centre of the elevation disc. A turnbuckle is fitted, which as on the rotation motor does not alter the amount of degrees but allows the whole minimum to maximum throw be moved higher or lower. See photo below of elevation turnbuckle.



For example, an ABT is set to throw at a height of between one and a half metres and three and a half metres at ten metres out (as per the I. S. S. F regulations for Autotrap discipline). If the machine is throwing between one metre and three metres, then adjusting the turnbuckle will move the machine to the correct height. As on the rotation turnbuckle there is a locknut on either side of the turnbuckle, which will need to be retightened when set.

If the machine is throwing between one and a half metres and four metres then the knurled locking bolt needs to be removed from the threaded hole in the elevation disc and placed in another threaded hole. As on the rotation disc, the further out from the centre the threaded holes in the disc are, the greater the angle of oscillation.

**For information on the electrical diagrams please refer to the following chapter.**

# INT. DTL/ATA DOUBLES MACHINES



Double ABT/Wobble

# OPERATING INSTRUCTIONS

## ALL SINGLES/DOUBLES MACHINES WITH 12 COLUMN CAROUSELS

### Angle Adjustment

International DTL/ATA and ABT doubles machines fitted with solenoid release are adjustable for different types of angles just as on the sporting versions, so before carrying out any adjustment read the previous section. Angles are altered in exactly the same way as on the sporting type machines, but there are additional features included that are not found on the normal sporting versions of these machines. These features are used as described below.

Note that when in the “on” position the oscillating motors will run and then stop momentarily before restarting. This feature is fitted to all machines with oscillating motors as it carries out two functions. The first is to randomly stop and start the oscillating motors so making it impossible for the shooter to “read the target” or guess which direction the next target is going in if the trap is hidden from view. The second function is to stop the oscillating motors after a short period of time if the machine is not being used so saving power. This means that the user does not have to walk up to the machine and turn it off when shooting has finished, the timer will do this automatically. When the next target is called for and the trap fired, the timer starts the oscillating motors again.

Even if the oscillating motors have shut down, users must be aware that the machine is still armed and must only be approached from behind to disarm the machine before reloading or adjusting.

Once an ATA/DTL or ABT machine is installed in the trap house the side-to-side angle needs to be set. For example on a DTL machine, 20 degrees either side of centre is required. It may be that the machine is throwing the targets 25 degrees to the left and only 15 degrees to the right. So the “field” needs to be moved to the right so evening up the angles. It is done as follows.

With the trap in the **DIS-ARMED/SAFE** position remove the knurled locking bolt from the rotation disc on the back of the machine. Reposition the machine and screw the knurled locking bolt back in to the centre hole of the rotation disc, see photo below of rotation disc. Check that the locking lever (which is on the crank bar on the rotation disc under the knurled locking bolt) is in the centre slot.



**DO NOT LOAD CLAYS YET.**

Ensure that nothing will restrict the further motion of the arm (including the sides of the trap house).

Press the on/off toggle switch down to the “ON” position.

The machine will cycle and stop in the armed position and **MUST BE TREATED WITH EXTREME CAUTION.**

Push the toggle switch to the “OFF” position.

It is now necessary to fire the trap but NOT allow it to re-cock so that clays can be loaded. This is done by pushing the toggle to the “NUDGE” position for about half a second and release it so that it returns to the “OFF” position as before.

The trap will immediately fire but not re-arm. The casting arm will be visible and stationary on the left hand side of the machine.

The machine is now in the disarmed or **SAFE** state.

To further remove the risk of accidental re-cocking, it is advisable to unplug the power supply on a mains powered machine or disconnect the battery/transformer on a 12volt machine.

The magazine can now be filled and it is advisable to place only a small quantity of clays in each column initially.

Ensure that the clays about to be thrown are going into a safe area.

Press the toggle switch to “ON”. The machine will load a clay and come to the cocked position and is now ready to fire.

To check for clay flight and direction, fire the trap using the “NUDGE” toggle switch exactly as before so that the machine fires **ONCE** but **does not re-arm**.

With the trap in the **DIS-ARMED/SAFE** position, move to the rear of the trap to adjust the direction of the clay flight to suit and also the elevation if required. The clay flight should be straight down the centre of the “field” with the knurled locking bolt screwed in to the centre of the rotation disc. If it is not then the turnbuckle that is fitted in between the rotation disc and the swivel block at the base of the mainframe needs to be adjusted. The turnbuckle (a hexagonal bar approx 80mm long) has a locking nut on either side of it. Undo the two locking nuts with a 24mm spanner and twist the turnbuckle one way or the other, depending on which way the “field” needs to be moved. From the rear of the machine twisting the turnbuckle clockwise moves the “field” to the right. Counter clockwise moves the “field” to the left. Adjust one or two turns and then fire another clay as described above. Keep adjusting the turnbuckle until the desired direction of flight is achieved. See photo below of turnbuckle.



Once the machine is throwing a clay down the centre line of the “field”, make the machine safe by disarming it and tighten the two locking nuts on the turnbuckle. It should not be necessary to adjust the turnbuckle at any time afterwards.

If it is necessary to adjust the “field” at a later date (due to a cross wind), it can be adjusted without moving the turnbuckle.

Place the knurled locking bolt in the centre of the rotation disc and fire a clay. If the clay is off centre one way or the other, the lever underneath the knurled locking nut should be moved across to the next slot. There is a choice of four slots on either side. The further the lever is moved the more the “field” is moved. See photo above

With the machine now centred, remove the knurled locking bolt from the centre hole of the disc and place in the desired hole. (Refer to the label on the base plate for angle settings) See photo above.

On ABT machines the elevation angle is adjusted in much the same way, except that there is no threaded hole in the centre of the elevation disc. A turnbuckle is fitted, which as on the rotation motor does not alter the amount of degrees but allows the whole minimum to maximum throw be moved higher or lower. See photo below of elevation turnbuckle.



For example, an ABT is set to throw at a height of between one and a half metres and three and a half metres at ten metres out (as per the I. S. S. F regulations for Autotrap discipline). If the machine is throwing between one metre and three metres, then adjusting the turnbuckle will move the machine to the correct height. As on the rotation turnbuckle there is a locknut on either side of the turnbuckle, which will need to be retightened when set.

If the machine is throwing between one and a half metres and four metres then the knurled locking bolt needs to be removed from the threaded hole in the elevation disc and placed in another threaded hole. As on the rotation disc, the further out from the centre the threaded holes in the disc are, the greater the angle of oscillation.

## Switching from Singles to Doubles

Before entering the trap house to switch the machines from singles to doubles, ensure that the machine is in the DIS-ARMED/SAFE position. The lever is on the top plate located next to the knife-edges. See photo below.



Once the machine is disarmed, move the lever by un-doing the wing nut that holds it in place.

Always remove the column of clays that are in the location of the adjustable knives, which switch between singles and doubles. This will ensure that no clays are broken when making the change over.

As viewed from behind the machine when the lever is all the way to the left doubles are selected and all the way to the right singles are selected.

Once doubles are selected re-tighten the wing nut and put the clays back in the empty column.

With doubles now selected, the next step is to rotate the machine slightly so that the clays are being thrown in the correct direction. Using the rotation toggle switch on the control box, nudge the machine around so that it facing the approximate correct direction.

Press the on/off toggle switch to "ON". The machine will load two clays and come to the cocked position and is now ready to fire.

To check for clay flight and direction, fire the trap using the "NUDGE" toggle switch exactly as before so that the machine fires **ONCE** but **does not re-arm**.

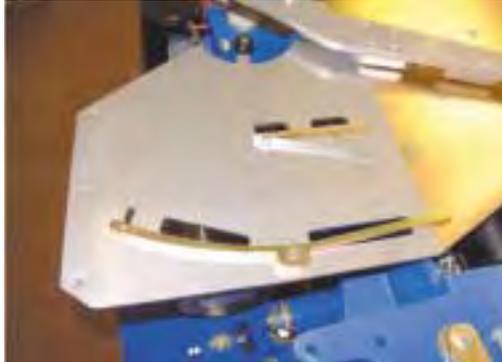
With the trap in the DIS-ARMED/SAFE position, move to the rear of the machine to adjust the direction of the clay flight if necessary and also adjust elevation if required.

It is usually necessary to increase the elevation slightly when changing over to doubles. On the ATA/DTL version, loosen the 24mm extended lock nut and adjust the turnbuckle before re-tightening the 24mm extended locknut. On ABT/Wobble machines use the elevation toggle switch on the control box, by pushing the toggle switch to the momentary nudge position to add a bit of height.

It will also be necessary to increase the spring tension when changing to doubles for which a 19mm spanner/wrench will be required. Increase the tension by about six turns, retighten the spring lock nuts and check the distance clays are thrown. Re-adjust if necessary.

### **Adjusting the Spread of the Targets**

If the spread of the clays is incorrect, the back rail for the rear clay is adjustable.



Loosen the wing-nut on the left hand underside of the throwing plate as viewed from behind and pivot the rail forwards to reduce the spread, or backwards to increase the spread of the clays. The rail only needs to be moved a small amount to make a noticeable difference.

### **Setting the Targets at the Same Height**

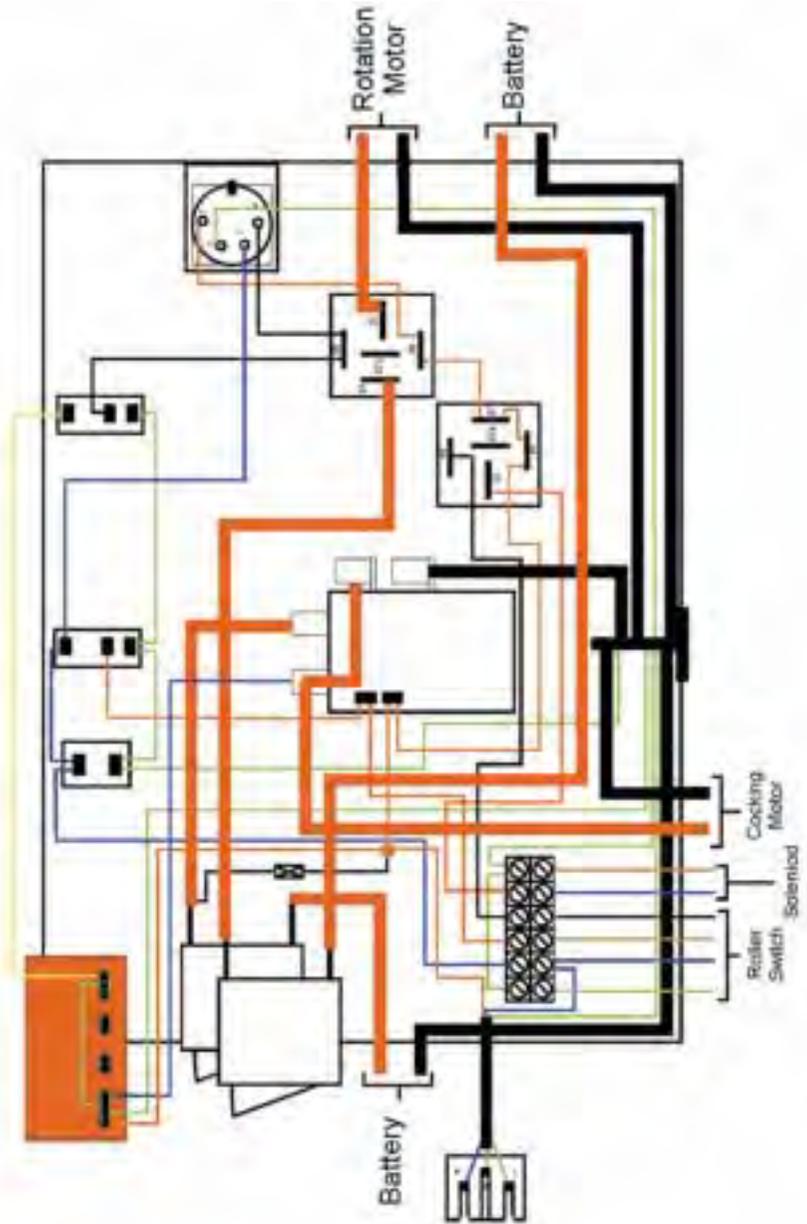
It is also possible to set the machine so that both clays come off the machine at the same height. This is achieved by tilting the trap either to the left or to the right.

With the trap in the  position, move to the rear of the trap and loosen the two locking nuts that support the upright that the mainframe bolts on to. See photo below.

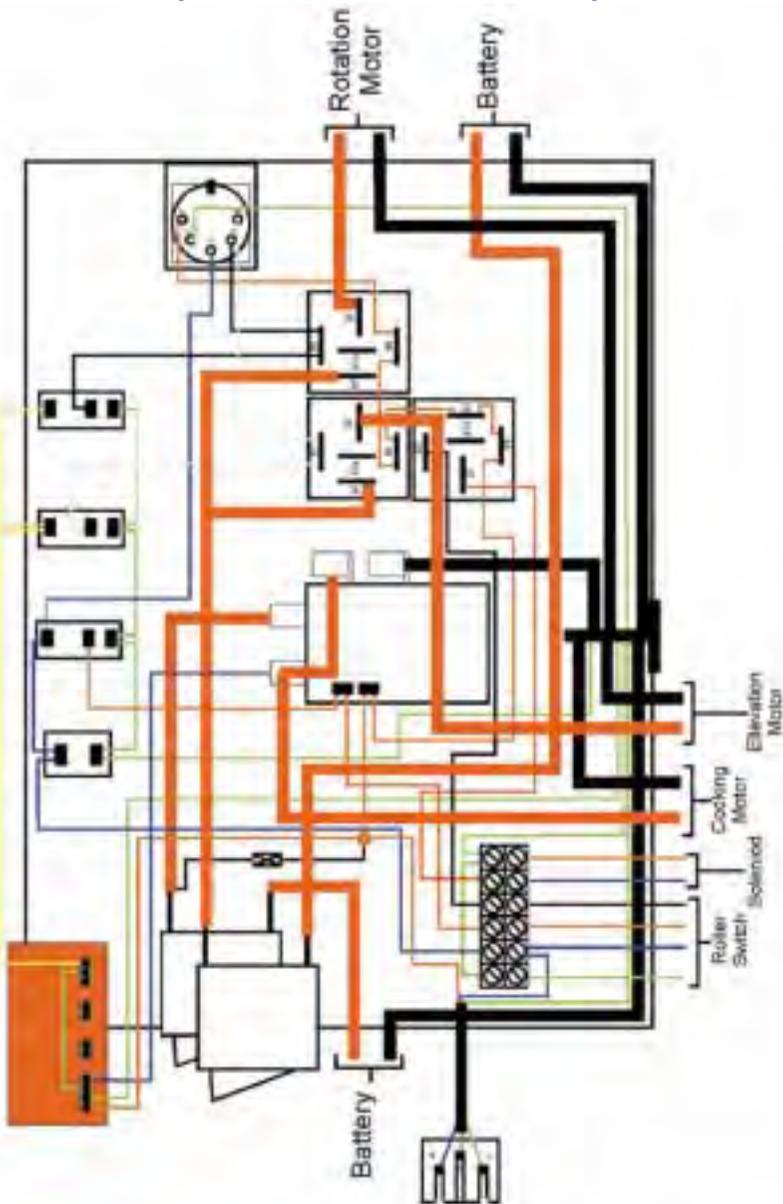


A 24mm spanner/wrench will be required. By loosening the left bolt a turn and tightening the right bolt a turn, the machine will tilt more to the left so bringing up the right hand target and lowering the left hand target. Once the targets are exiting the machine at the same height re-tighten the two 24mm locking nuts.

# INT. ATA/DTL ELECTRICS (SOLENOID RELEASE)



# INT. ABT/WOBBLE ELECTRICS (SOLENOID RELEASE)



# **SOLENOID RELEASE**

This section deals specifically with how to check and adjust the solenoid release mechanism and explains how it works compared to a normal release system on machines not fitted with solenoid release. It does not matter if the machine is a Pro/Int. Skeet machine, DTL/ATA or ABT the principle is exactly the same.

If a machine is breaking targets, or not loading etc, the previous fault finding sections on the relevant machines still apply and must also be read.



## **A BRIEF DESCRIPTION OF SOLENOID RELEASE**

Solenoid release mechanisms are used on machines where an instantaneous release of the target is required. For example on two Skeet machines throwing registered/competition targets, the standard release on normal Rangers and Sporters is not quite fast enough, so solenoid release is fitted.

The solenoid release mechanism consists of a pin fitted to the throwing arm, a trigger assembly which pivots on a bar mounted on a bracket and a solenoid to move the trigger out of the way to allow the pin on the arm to move past it when the trap is fired.

When the machine is turned on and arms itself, the motor drives the arm in a counter clockwise direction up to the solenoid trigger. The arm reaches “top dead centre”(tdc) when the pin on the arm is about 30mm (1 ?”) away from the trigger. See photo below. As the arm reaches “tdc”, the spring is stretched to its maximum. As the arm then passes over “tdc” the spring takes over and pulls the arm around, but the arm comes to rest on the trigger and can go no further. The trigger stops the arm in the cocked position waiting to be fired. The motor is set with the roller switch, to stop just as the arm gets to “tdc”, so that there is no chance of the motor driving the arm on to the trigger to far. So as the arm goes over “tdc” the motor stops and the spring tension pulls the arm on to the trigger the last bit.



If set correctly, when the fire button is pressed, the solenoid moves the trigger out of the way of the pin on the arm in a fraction of a second. The arm is then free to move and because it is already past “tdc” it fires immediately.

On non-solenoid machines the roller switch causes the motor to stop the arm just before “tdc”. When the fire button is pressed the roller switch circuit is bypassed, the motor starts, pushes the arm over “tdc” and then the spring takes over and fires the trap. This is why there is a slight delay on non-solenoid release machines, as the motor has to push the arm up to and just over “tdc” for the arm to then fire. The roller switch can be set so that the arm stops just at the point of firing so the delay is hardly noticeable. It is best to do this when the machine has warmed up.

### **Solenoid Release Adjustment**

Adjustment of the solenoid release is done as follows.

With the trap in the **DIS-ARMED/SAFE** position; standing at the rear of the trap, adjust the roller switch out to the left side of the machine as far as it will go.

Press the toggle switch to “ON”. The machine will load a clay and come to the cocked position and is now ready to fire. Note that the throwing arm has stopped short of the trigger.

Press the toggle switch to “OFF” but do not disarm. The machine should still be armed and treated with **EXTREME CAUTION**.

From behind the machine slowly and carefully push the tip of the arm towards the trigger assembly on the side of the machine. If the arm timing is correctly set, when the arm is about 30mm ( $1\frac{1}{4}$ " ) from the trigger it will go over "tdc" with the spring pulling the arm on to the trigger. If the arm goes over "tdc" more than 30mm away from the trigger or it does not go over "tdc" before touching the trigger, then the arm timing will need to be adjusted.

To adjust the arm timing, the machine must be in the **DIS-ARMED/SAFE** position. Undo the 19mm bolt on the arm clamp block so that the arm can be moved on the shaft. Be careful not to move the arm while undoing the bolt.

If the arm goes over "tdc" to early i.e. 40mm before it gets to the trigger, move the arm counter clockwise about 10mm ( $\frac{1}{2}$ " ) at the tip and retighten the arm clamp block bolt.

Press the toggle switch to "ON". The machine will load a clay and come to the cocked position again it will be short of the trigger.

Press the toggle switch to "OFF" but do not disarm. The machine should still be armed.

As before from behind the machine push the tip of the arm towards the trigger and note where it goes over "tdc". If the arm still goes over "tdc" in the wrong place adjust the arm timing again as before.

With the arm timing set correctly, the roller switch needs to be adjusted back in to the correct position. Before making any adjustment ensure that the machine is in the **DIS-ARMED/SAFE** position. It is best to move the roller switch back in towards the trap about 2-3mm ( $\frac{1}{8}$ " ) at a time. The motor needs to be stopping just as the arm goes over centre, so that when the arm and motor have both stopped there is a gap of about 3mm ( $\frac{1}{8}$ " ) between the base of the main shaft (under the nylon spring roller that the spring hooks to) and the 10mm Allen key bolt (that drives the base of the main shaft). See photo below.



Once set, the motor should stop the arm in the same position every time, it is also important that the spring finger (clay locator) is pushing the clay against the arm.

### **Spring Finger Adjustment**

Unfortunately the only way to check if a spring finger is working correctly is to watch from the REAR of the machine while it loads a clay and arms itself.

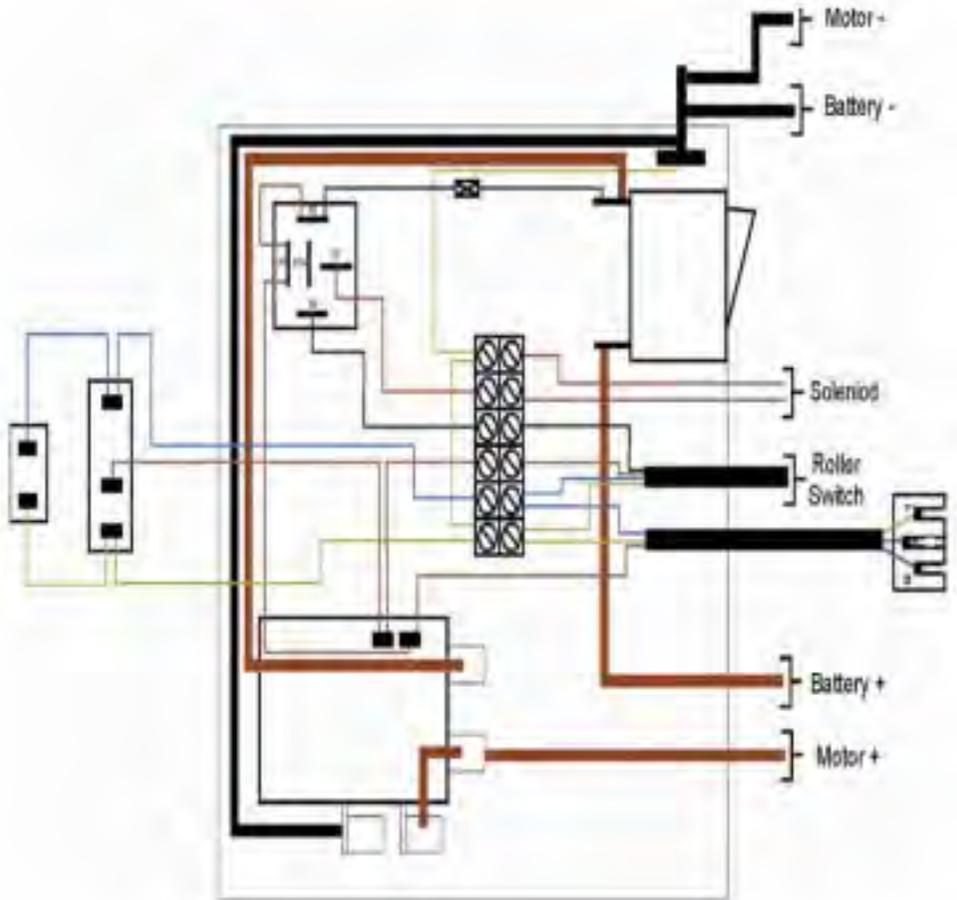
Once loaded and armed the clay should be resting against the arm and the back rail. If there is a gap of more than a few mm, the arm is more likely to break the clay when it is released. The reason for this is because the arm is already past "tdc" when it is armed. As soon as the solenoid releases the arm, it fires in to the clay. The further away the clay is from the arm, the more momentum the arm has when it makes contact with the clay. So the arm smashes in to the clay and therefore breaks it.

If the clay is not up against the arm disarm the machine and check the condition of the spring finger. It is also important that the finger is in the correct position. It needs to be as close to the underside of the hole in the top plate as possible. So looking directly down through the hole in the top plate the spring finger should not be visible. If it is visible then the clay will fall on top of the finger when it drops through the hole. Too far away from the side of the hole and the finger will not push the clay against the arm when the machine is cocked.

To adjust, the machine must be in the **DIS-ARMED/SAFE** position. Undo the spring finger where it attaches to the casting plate with a 10mm spanner. Rotate the finger to the correct position and retighten the fixing nut.

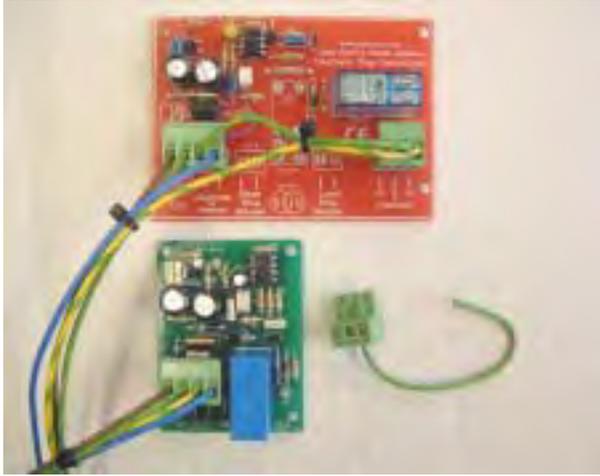
The spring can be removed from the holder using a Phillips screwdriver and replaced if necessary.

# Pro/Int Skeet & UT/OT Electrics (Solenoid Release)



# ADDITIONAL INSTRUCTIONS

## Fitting a New Style Timer Board



When replacing a timer board on DTL/ATA and ABT/Wobble machines; connect wires as shown in photo above.

The “Red” timer board has been discontinued and replaced by the “Green” board.

## Wiring Instructions for Radio 12v Power Supply

(Where there is no live feed for a radio)

### For traps with 12v Relay SW80

Open control box at back of trap and locate Brown wire that comes into the box from the Command cable Duraplug. This will be coiled up inside the box.

Fit female receptacle to Brown wire.

**Locate other Brown wire that comes from the main On/Off switch and is fitted to a terminal on the relay.**

Fit Radio wire to opposite terminal.

## For traps with 12v Relay SW60

Follow above instructions but note that there is only one set of terminals on the relay.

Remove existing female receptacle from the main On/Off switch brown wire. Twist both Brown wires together and fit new larger female receptacle to these. Fit back on to the relay.

### Instructions for Wiring New 5 Pin Relay

(Ranger traps manufactured prior to 2000)

<b>TERMINAL 87</b>	<b>Thick red wire to fuse*</b>
TERMINAL 30	Thick red wire to Motor*
TERMINAL 85	Thin brown wire to fuse
TERMINAL 86	Thin brown wire to remote disarm switch
TERMINAL 87a	Green/Yellow wire to Earth Bolt

(Use of this terminal is optional and will necessitate an adjustment to the roller switch)

\*if replacing 4 pin relay use new yellow terminals

4 PIN RELAYS ARE NO LONGER USED.

### Instructions for Wiring New 12v Relay SW60

(When replacing old type relay SW80 on Sporter Traps)

Connect cables from Motor & On/Off Trip Switch to large terminals at end of Relay as before.

Connect the thin Brown wire from Command Cable & the thin Brown wire from the On/Off Trip Switch together using the blue terminal provided. (Remove existing Red terminals).

Connect this Blue terminal to EITHER small spade terminal on Relay.

Connect thin Brown wire from the Arm/Disarm Toggle Switch to the other small spade terminal on Relay.

### Instructions for Fitting a Midi Carousel

1. With the trap disarmed and the carousel empty of clays, remove the standard carousel from the machine. This is done by unscrewing the 19mm nylock nut in the centre of the carousel.

2. With the carousel removed take a 10mm spanner and unscrew the outer knife-edge assembly from the top plate. Look at the underside of the top plate to establish which two bolts hold the assembly to the top plate.
3. Refit the complete knife-edge assembly over the inner fixing holes on the top plate.
4. Drop the midi carousel on to the top plate shaft but do not fit the 19mm nylock nut and spacer.
5. Put a midi clay into one of the carousel pockets (it does not matter which one) and rotate the carousel so that the clay passes through the knife-edges. The clay must pass through the inner and outer knife-edges without the drive-band of the clay catching on the side of either knife blade. If the clay does catch on either blade, the blade will need to be adjusted. It is possible to move the blades away from the clay as all blades have slotted holes machined in them. Slacken off the bolts that hold the knife blade to the block and then slide the blade in the direction required. Retighten the fixing bolts when the blade is in the correct position.
6. With the clay passing cleanly through the knife-edge blades, stop the clay under the leading edges of the knife blade and check that the blades are at the correct height. Adjust as necessary with a 10mm spanner.
7. Fit the carousel blue spacer and 19mm nylock nut and retighten, so that the carousel does not spin freely when it turns. There needs to be a small amount of friction when the carousel rotates. The carousel does not need to be set in any particular position, it will automatically time itself.
8. The carousel is now ready to be filled with clays.

## **Instructions for wiring a DTL/ATA Base**

(Harrier, Eagle & Ranger Traps)

1. Drill a 13mm diameter hole in the existing control box on the trap.
2. Fit the cable gland supplied.
3. Feed base control cable through the cable gland and tighten the clamping nut.
4. Connect the three core cable as follows.
  - (a) Blue, connect to the existing blue cables using the connector block provided.
  - (b) Brown, connect to the output side of the fuse using the eyelet provided.
  - (c) Green/Yellow, connect to the existing earth bolt using the eyelet provided.

# INSTRUCTIONS FOR SPRING REMOVAL

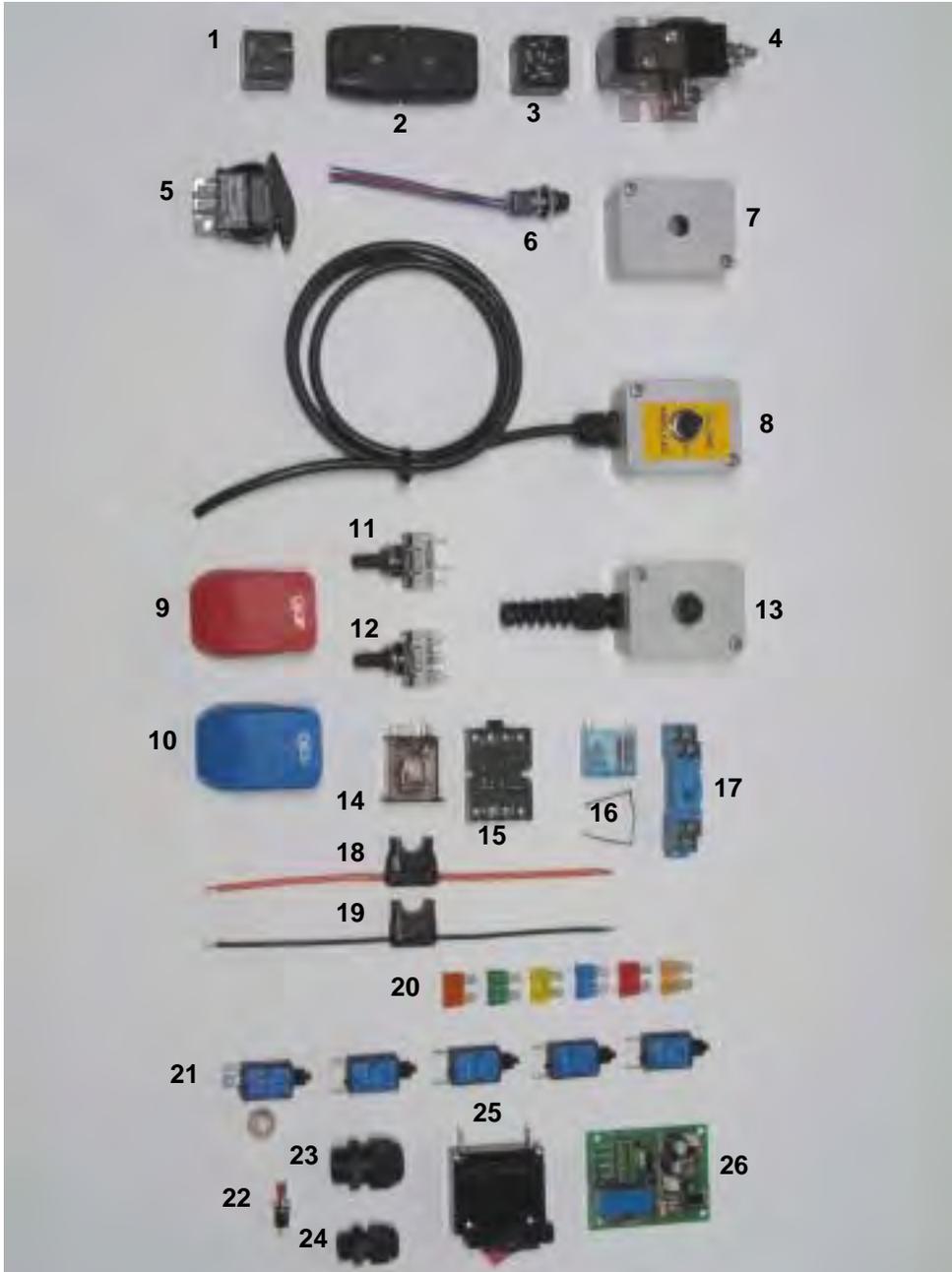
## The instructions below apply to the Harrier, Eagle, Ranger 6/8, Sporter 400TT and all Super Sporter models.

1. Ensure the machine is sited in a way, which allows free and un-cramped access all around, paying particular attention to the ease of disarming/arming and reloading.
2. Ensure that there are no obstructions to the path of the throwing arm and that the machine cannot change its position due to vibration or reaction.
3. Disarm the machine using the arm/disarm toggle switch and make safe before removing any clays from the carousel.
4. From behind the machine, press the arm/disarm toggle switch down to arm the machine. The throwing arm will rotate to the armed position. In this condition the machine must be treated with **extreme** caution.
5. The next step is to disarm the machine, but only hold the toggle switch in the disarm position just long enough for the trap to fire. Release the toggle switch immediately so that the rectangular block (the rectangular block has a long crank bar connected to it with a 10mm cap head bolt) on the gearbox output shaft stops in the 11.00 o'clock position. The 11.00 o'clock position is when viewed from behind the machine looking down on the gearbox itself.
6. If the rectangular block is pointing to 12.00 o'clock flick the arm/disarm toggle switch momentarily just enough to allow the block to point to the 11.00 o'clock position.
7. If the rectangular block is pointing to 10.00 o'clock, rearm the machine and then disarm again.
8. Disconnect the battery from the machine once the block is in the correct position.
9. With the rectangular block now pointing to the 11.00 o'clock position, the throwing arm can be pushed slowly around anti clockwise by hand. It is important to push only on the end of the throwing arm. With the machine disarmed the throwing arm will have stopped at somewhere between 8.00 and 7.00 o'clock. When pushing the arm by hand the spring will take over when the arm gets to about 6.00 o'clock, at this point it is advisable to hold on to the arm so that it gently stops at the 5.00 o'clock position. It is the 10mm cap head bolt on the rectangular block that stops the arm at 5.00 o'clock, which in turn stops the arm from firing. This is why it is important to only carry out step 9 when the rectangular block is pointing to the 11.00 o'clock position.

10. Reconnect the battery to the machine and hold the arm/disarm toggle switch to the disarm position long enough until the throwing arm has moved and is pointing to the 12.00 o'clock position directly in front of the machine.
11. With the throwing arm sticking out in front of the machine, the spring can now be removed by undoing the locking nuts with two 19mm spanners.
12. When refitting the spring, wind tension on until, with the arm fully forward, the coils have at least 0.5mm gap between them. Tighten the two 19mm locking nuts to the mainframe so that the spring can't vibrate loose.

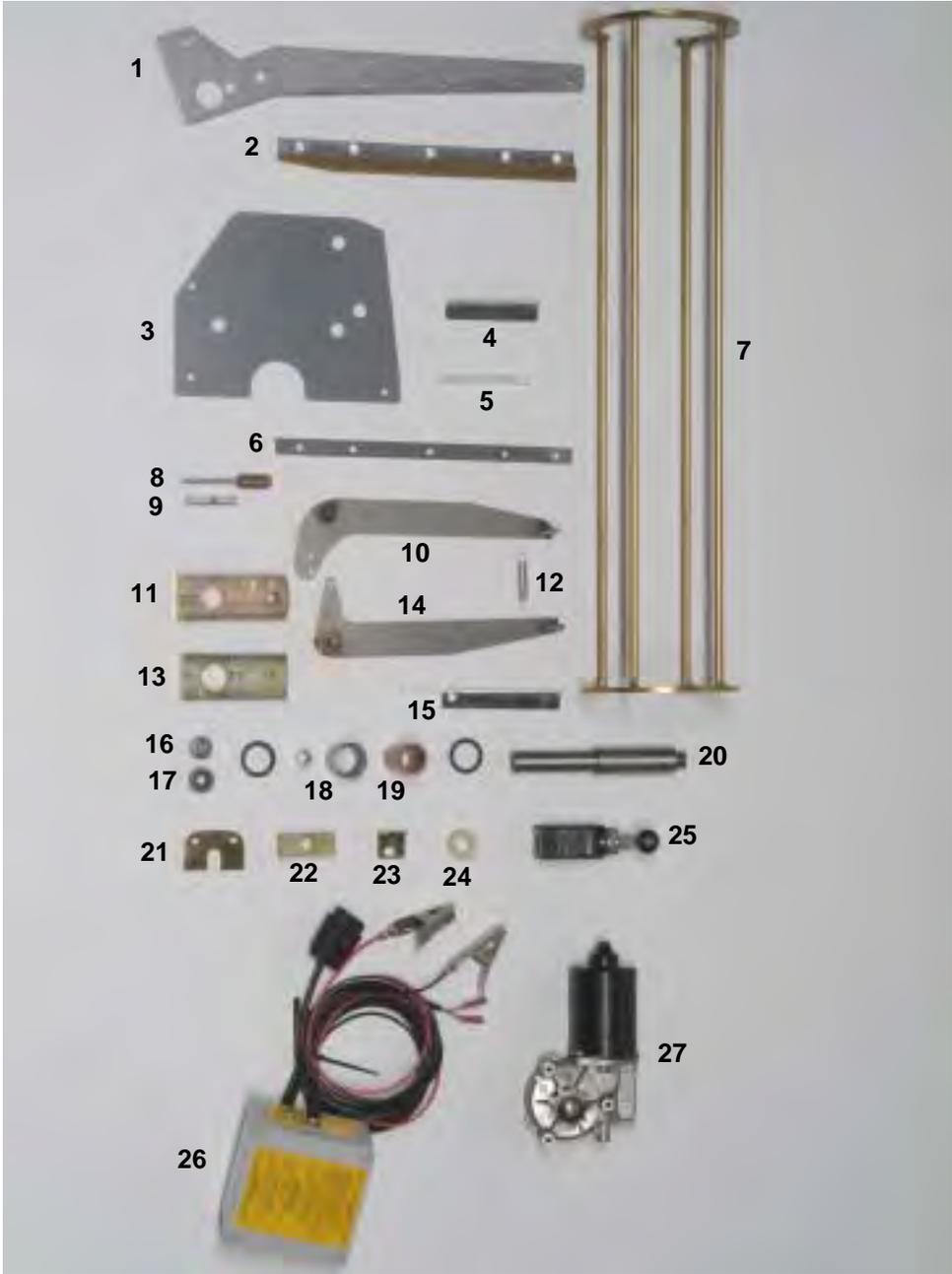
## ELECTRICAL SPARE PARTS

Number	New Part No	Description
1	E09V/5PIN	4 Pin Relay (Replaced With 5 Pin & Terminals )
2	E06V/DURP	Duraplug
3	E09V/5PIN	5 Pin Relay
4	E0PV/SW618	12v Relay (Solenoid )
5	E10V/VB4A	Rocker Switch - Double Pole
6	E11V/7410	Fire Button
7	E01P/CB	Remote Disarm Box
7	E03V/CCBA	Command Button Box
8	E03V/RDFL	Remote Disarm - Complete
9	E06V/45100	Red Battery Terminal
10	E06V/45110	Blue Battery Terminal
11	E11V/7420	Toggle Switch - Spade Terminal
12	E11V/7430	Toggle Switch - Screw Terminals
13	E03V/CCBA	Command Button Box Complete
14	E09V/625668	Large Mains Relay
15	E09V/351926	Large Mains Relay Base
16	E09V/G2R2	Small Relay (Old Mains Trap )
17	E09V/P2RF	Small Mains Relay Base
18	E10V/FH30A	Orange Fuse Holder
19	E10V/FH20A	Black Fuse Holder
20	E10V/F10A	5a Blade Fuse
20	E10V/F05A	10a Blade Fuse
20	E10V/F15A	15a Blade Fuse
20	E10V/F20A	20a Blade Fuse
20	E10V/F30A	30a Blade Fuse
21	E10V/TT03A	Mains Trip 3a
21	E10V/TT04A	Mains Trip 4a
21	E10V/TT05A	Mains Trip 5a
21	E10V/TT06A	Mains Trip 6a
21	E10V/TT10A	Mains Trip 10a
22	E11V/FH59	Fire Button (Colt / Junior )
23	E04N/250PG9	20mm Gland
24	E04N/250PG9	P69 Gland
25	E10V/MB50A	12v Trip Switch (50a )
26	E23V/BLNST	Rotation / Elevation Timer



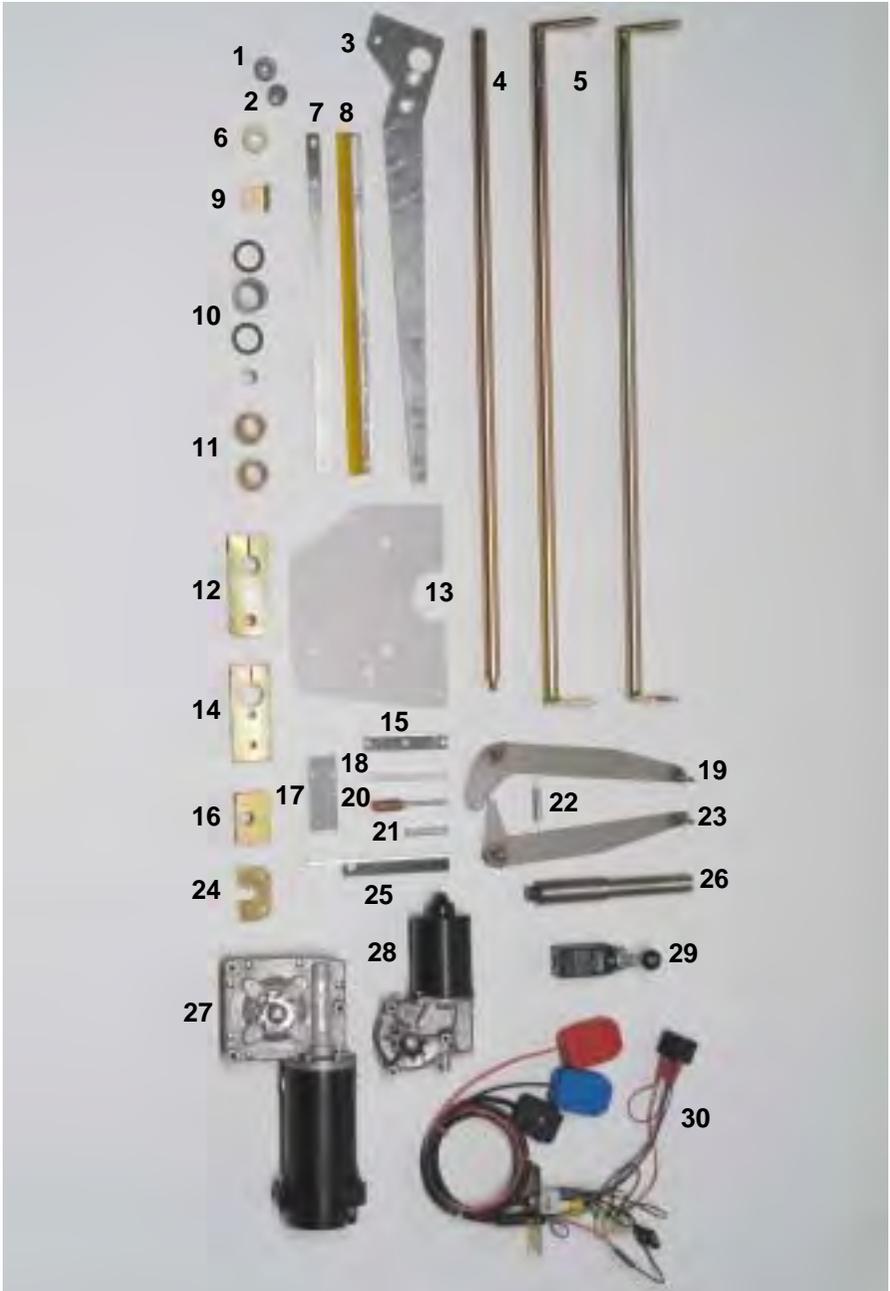
## FIREFLY SPARE PARTS

Number	New Part No	Description
1	FF/2100	Arm
2	RN6/2200	Friction Strip
3	A28S/AWWK	Soft Fall Plate
4	HK/2700	Clay Sweeper
5	RN6/3500	Teal Finger
6	A28A/BRDK	Arm Spacer Strip
7	CAR/B6	50 Bird Magazine (UK)
7	CAR/B7	50 Bird Magazine (US)
8	HK/1200	Brass Plunger
9	S01Z/045E15	Plunger Spring
10	HK/3600	Right Iris
11	HK/4161	Lower Clamp Block
12	S02Z/031D7	Iris Spring
13	HK/2500	Arm Clamp Block
14	HK/3550	Left Iris
15	HK/3450	Backrail
16	HK/3625	Linkage Cam
17	HK/2405	Linkage Bearing
18	B00V/SET2	Bearing Set 2
19	B06V/BF202850	Phos.Bronze Bush
20	FF/2600	Main Shaft
21	HK/3040	Brass Block
22	FF/1205	Plunger Block
23	HK/1215	Plunger Support
24	RN6/2630	Spring Roller
25	HK/7200	Roller Switch
26	E00V/FF	Electric Box
27	HK/8010	Motor & Gearbox ( Stegman )



## HAWK S/HAWK SPARE PARTS

Number	New Part No	Description
1	HK/3625	Linkage Cam
2	HK/2405	Linkage Bearing
3	HK/2100	Arm
4	HK/1350	Front Hopper Rod
5	HK/1340UK	Rear Hopper Rod (UK)
5	HK/1340US	Rear Hopper Rod (US)
6	RN6/2630	Spring Roller
7	A28A/AWWM	Arm Spacer Strip
8	HK/2200	Friction Strip
9	HK/1215	Plunger Support
10	B00V/SET2	Bearing Set 2
11	B06V/BF202630	Phos. Bronze Bush
12	HK/4161	Lower Clamp Block
13	A28S/AWWK	Soft Fall Plate
14	HK/2500	Arm Clamp Block
15	HK/2700	Clay Sweeper
16	HK/1205	Plunger Block
17	A28A/AYVF	Roller Switch Spacer
18	RN6/3500	Teal Finger
19	HK/3600	Right Iris
20	HK/1200	Brass Plunger
21	S01Z/045E15	Plunger Spring
22	S02Z/031D7	Iris Spring
23	HK/3550	Left Iris
24	HK/3040	Brass Block
25	HK/3450	Backrail
26	HK/2600	Main Shaft
27	SHK/8010	Motor & Gearbox ( EMD )
28	HK/8010	Motor & Gearbox ( Stegman )
29	HK/7200	Roller Switch



## HARRIER/EAGLE SPARE PARTS

Number	New Part No	Description
1	HR/2010	Arm Complete (L/Cut)
2	HR/2100	Arm (L/Cut)
3	A28A/BGTU	Arm Spacer
4	RN6/2700	Clay Sweeper
5	RN6/2200	Friction Strip
6	HR/1140	Rear Pusher Shaft
7	HR/3350	Soft Fall Plate
8	HR/2805	Crank Arm
9	RN6/3150	Outer Knife Edge
10	RN6/3300	Inner Knife Edge Block
11	RN6/3200	Outer Knife Edge Block
12	RN6/3250	Inner Knife Edge
13	HR/2600	Main Shaft
14	B00V/SET3	Bearing Set 3
15	S02Z/037D6	Rear Pusher Spring
16	HR/3030	Nylon Top Plate Spacer
17	D04N/RN38	Main Shaft Spacer
18	D04N/RN25	Rear Pusher Roller
19	RN6/2630	Spring Roller
20	RN6/4150	Gearbox Clamp Block
21	RN6/4200	Rear Pusher Clamp Block
22	E11V/83850	Roller Switch
23	D04N/RN38	Top Spacer
24	RN6/2500	Arm Clamp Block
25	RN6/7210	Roller Switch Bracket
26	EOOV/HR	Electrical Box
27	M02V/BR113	Motor & Gearbox EMD (Eagle)
28	M01V/63923	Motor & Gearbox EMD (Harrier)



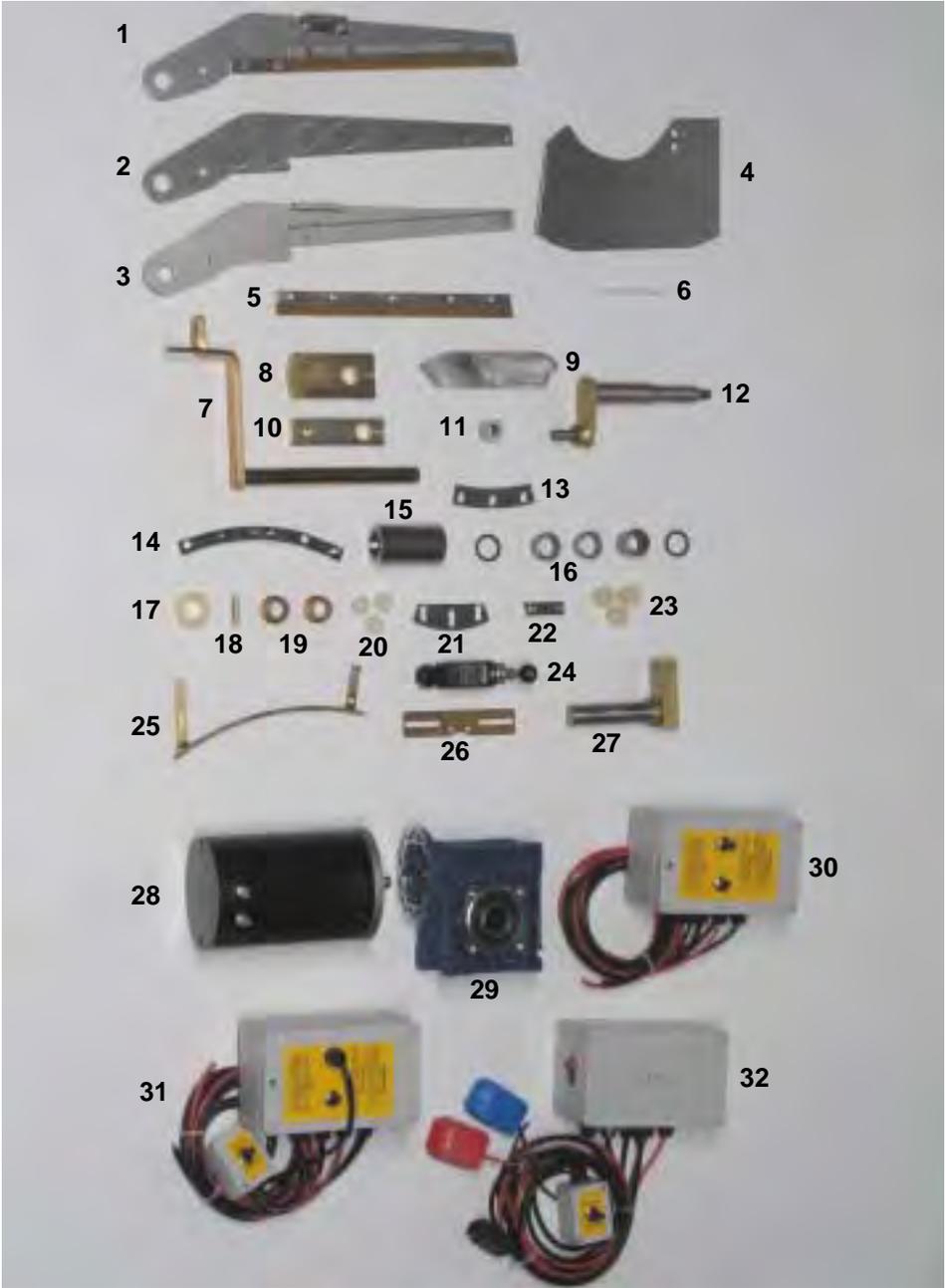
## RANGER 6/8 SPARE PARTS

Number	New Part No	Description
1	RN6/2010	Arm Complete (Cast)
2	RN6/2100	Arm (Cast)
3	HR/2100	Arm (L/Cut)
4	RN6/2200	Friction Strip
5	HR/3350	Soft Fall Plate
6	RN6/3200	Outer Knife Edge Block
7	RN6/3150	Outer Knife Edge Pair
7	RN8/3150	Outer Knife Edges ( Ranger 8 )
8	RN6/3400	Let Down Ramp
8	RN8/3400	Let Down Ramp
9	RN8/1140	Rear Pusher Shaft ( Ranger 8 )
9	RN6/1140	Rear Pusher Shaft
10	RN6/3500	Teal Finger
11	RN6/3300	Inner Knife Edge Block
12	RN6/3250	Inner Knife Edge
12	RN8/3250	Inner Knife Edges ( Ranger 8 )
13	RN6/2600	Main Shaft
14	RN6/2630	Spring Roller
15	RN6/1180	Rear Pusher Top Half
16	D04N/RN25	Rear Pusher Rollers
17	D04N/RN38	Main shaft Shaft Spacer
18	RN6/3030	Rear Top Plate Support
19	S02Z/037D6	Rear Pusher Spring
20	B00V/SET1	Bearing Set 1
21	RN6/2500	Arm Clamp Block
22	RN6/4150	Gearbox Clamp Block
23	RN6/4200	Rear Pusher Clamp Block
23	RN8/4200	Rear Pusher Clamp Block (Ranger 8 )
24	E11V/83850	RollerSwitch
25	RN6/7210	RollerSwitch Bracket
26	M01V/63918	Motor Gearbox (Ranger)
27	E00V/RAN6	Electric Box



## SPORTER 400TT & SUPER SPORTER SPARE PARTS

Number	New Part No	Description
1	HR/2010	Arm Complete (L/Cut)
2	HR/2100	Arm (L/Cut)
3	RN6/2100	Arm (Cast)
4	HR/3350	Soft Fall Plate
5	RN6/2200	Friction Strip
6	RN6/3500	Teal Finger
7	RN8/1140	Rear Pusher Shaft (400TT)
7	SP8/1140	Rear Pusher Shaft (Sporter 8)
7	SSP10/1140	Rear Pusher Shaft (Sporter 10)
8	RN6/2500	Arm Clamp Block
9	RN8/3400	Let Down Ramp
10	RN8/4200	Rear Pusher Clamp Block (400TT)
10	SP8/4200	Rear Pusher Clamp Block (Sporter 8)
10	SPIDA/4200	Rear Pusher Clamp Block (Sporter 10)
11	RN6/2630	Spring Roller
12	RN6/2600	Main Shaft
13	RN8/3150	Outer Knife Edge
14	RN6/3200	Outer Knife Edge Block
15	SP8/4375	Bearing Sleeve (Sporter)
16	B00V/SET1	Bearing Set 1 (400TT)
17	D04N/RN38	Main Shaft Spacer
18	S02Z/037D6	Rear Pusher Spring
19	B06V/BF202620	Phos. Bronze Bushes
20	D04N/RN25	Rear Pusher Rollers
21	RN6/3250	Inner Knife Edge
22	RN6/3300	Inner Knife Edge Block
23	RN6/3030	Rear Top Plate Supports (400TT)
24	E11V/83850	Roller Switch
25	RN6/3440	Backrail
26	RN6/7210	Roller Switch Bracket
27	SP8/4050	Gearbox Shaft
28	M02V/BR113	12v Motor
29	M03V/MV50R50	NMRV50 50:1 Gearbox
30	E00V/SP8	Electric Box (Sporter)
31	E00V/SSP8	Electric Box (Super Sporter)
32	E00V/RN8US	Electric Box (400TT)



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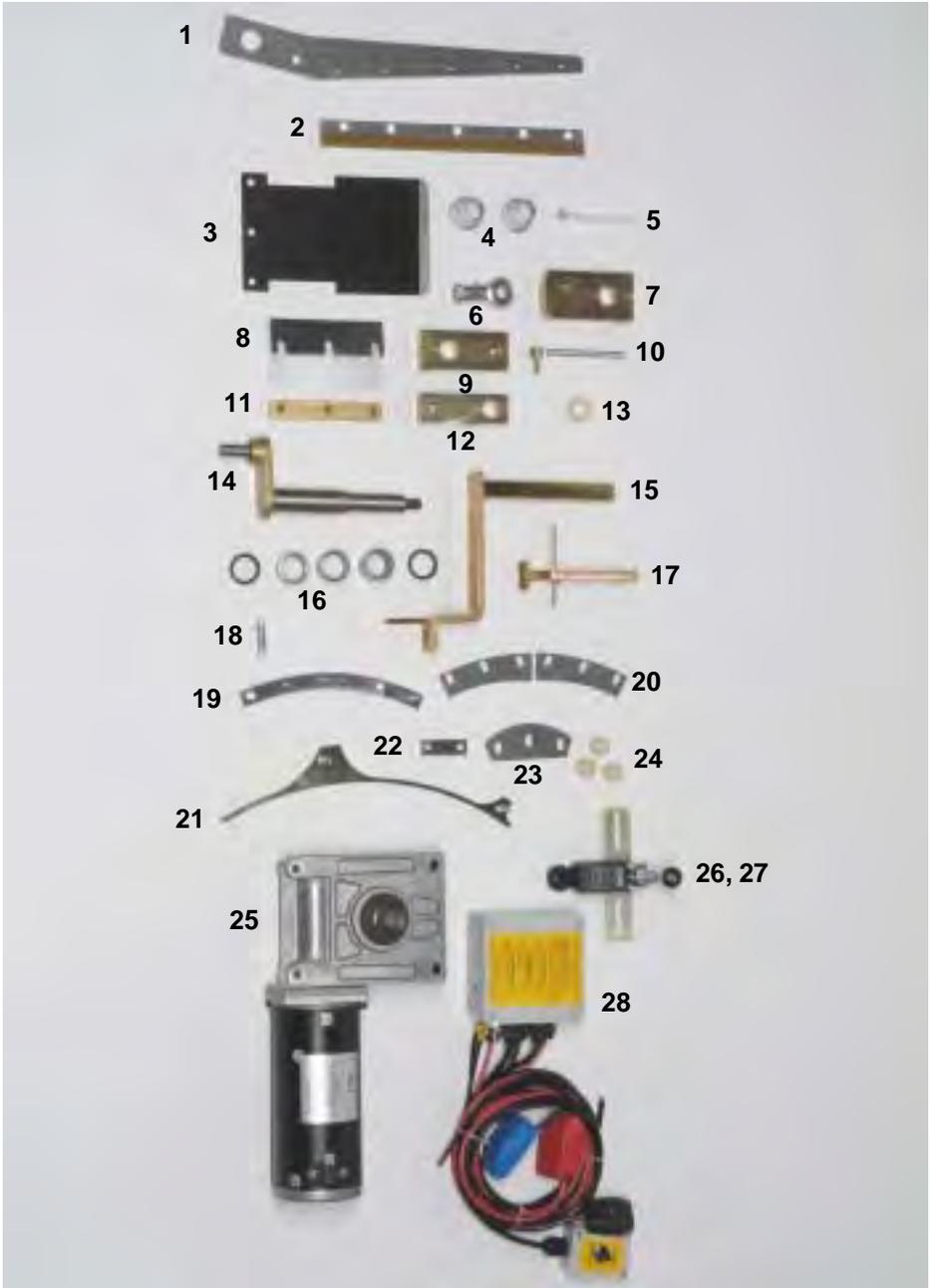
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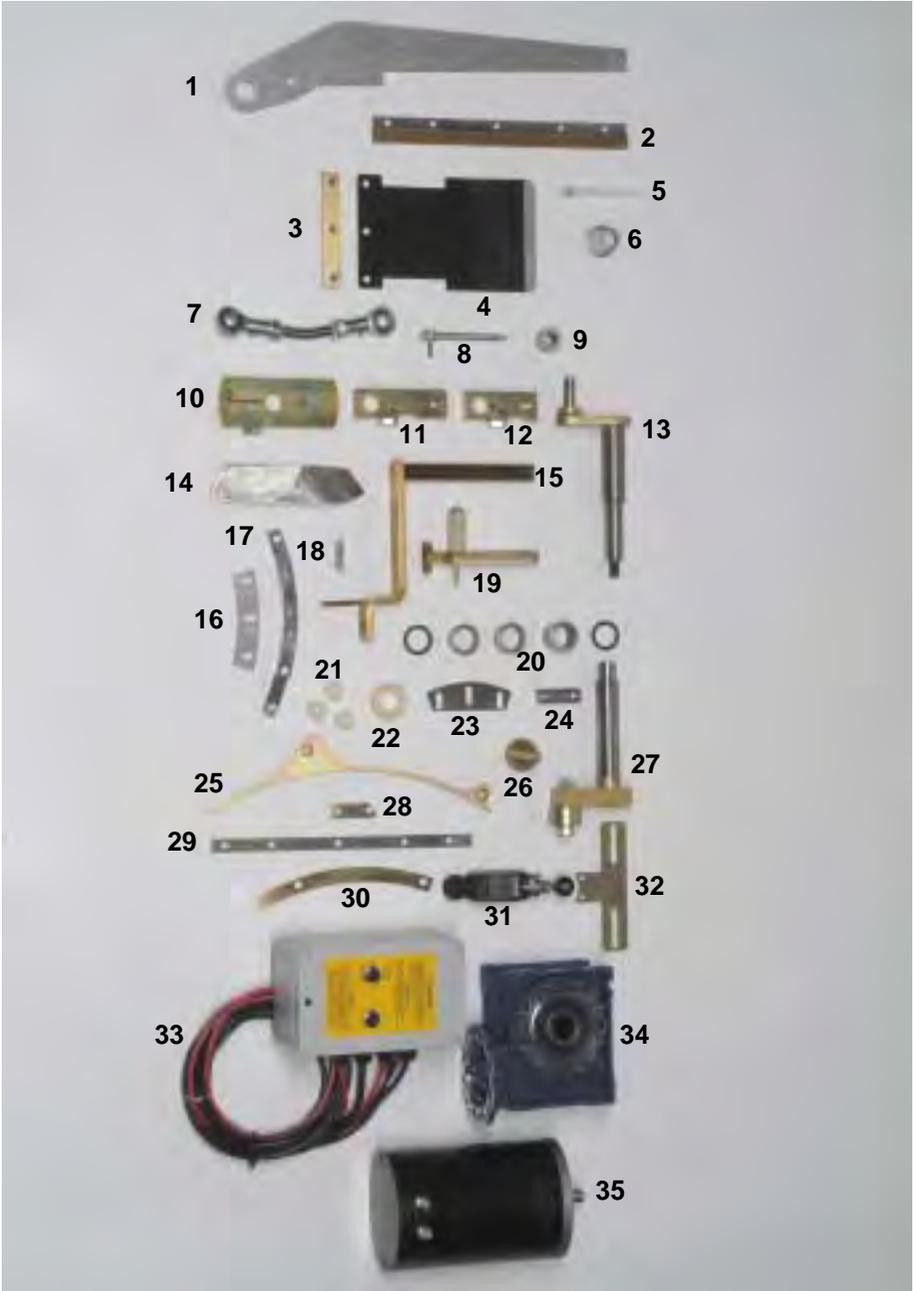
## RANGER CHONDEL SPARE PARTS

Number	New Part No	Description
1	RCH/2100	Arm
2	CH/2100	Friction Strip
3	A28S/AXMR	Chondel Deflector
4	E12V/BENCS	Cone Spring
5	RN6/3500	Teal Finger
6	RCH/2800	Rose Joints Assy.
7	RN6/2500	Arm Clamp Block
8	A28F/BBHG	Rabbit Deflector Plate
9	RN6/4150	Gearbox Clamp Block
10	RN6/3475	Spring Finger Assy
10a	RN6/3485	Spring
11	CH/3650	Chondel Deflector Holder
12	RCH/4200	Rear Pusher Clamp Block
13	RN6/2630	Spring Roller
14	RN6/2600	Main Shaft
15	RCH/1140	Rear Pusher Shaft
16	B00V/SET1	Bearing Set 1
17	RN6/1180	Rear Pusher Top Half
18	S02Z/037D6	Rear Pusher Spring
19	RN6/3200	Outer Knife Edge Block
20	RN6/3150	Outer Knife Edge
21	RCH/3440	Backrail
22	RN6/3300	Inner Knife Edge Block
23	RN6/3250	Inner Knife Edge
24	D04N/RN25	Rear Pusher Rollers
25	M02V/BR113	Motor Gearbox (Ranger)
26	E11V/83850	Roller Switch
27	RN6/7210	Roller Switch Bracket
28	E00V/RAN6	Electric Box



## CHONDEL SPARE PARTS

Number	New Part No	Description
1	CH/2100	Arm
2	CH/2100	Friction Strip
3	CH/3650	Chondel Deflector Holder
4	A28S/AXMR	Chondel Deflector
5	RN6/3500	Teal Finger
6	E12V/BENCS	Cone Spring
7	CH/2800	Rose Joints Assy.
8	RN6/3475	Spring Finger Assy
8a	RN6/3485	Spring Finger Spring
9	RN6/2630	Spring Roller
10	CH/2500	Arm Clamp Block
11	CH/4200	Rear Pusher Clamp Block
12	CH/4150	Gearbox Clamp Block
13	RN6/2600	Main Shaft
14	RN8/3400	Let Down Ramp
15	CH/1140	Rear Pusher Shaft
16	RN8/3150	Outer Knife Edge
17	RN6/3200	Outer Knife Edge Block
18	S02Z/037D6	Rear Pusher Spring
19	RN6/1180	Rear Pusher Top Half
20	B00V/SET1	Bearing Set 1
21	D04N/RN25	Rear Pusher Rollers
22	D04N/RN38	Main Shaft Shaft Spacer
23	RN6/3250	Inner Knife Edge
24	RN6/3300	Inner Knife Edge Block
25	CH/3450	Backrail
26	CH/4500	Location Pin
27	CH/4050	Gearbox Shaft
28	A28F/AXQW	Inner knife Edge Spacer
29	A28A/AYNL	Arm Spacer
30	A28F/AXQX	Outer knife Edge Spacer
31	E11V/83850	Roller Switch
32	CH/7210	Roller Switch Bracket
33	E00V/SP8	Electric Box
34	M03V/MV50R60	NMRV50 60:1 Gearbox
35	M02V/BR113	12v CFR Motor



## OT & PRO/INT SKEET SPARE PARTS

Number	New Part No	Description
1	OT8/2010	Arm Complete OT/Pro Skeet (L/Cut)
2	HR/2100	Arm ( L/Cut )
3	SPIA/2010	Arm Complete Int Skeet (L/Cut)
4	RN6/2100	Arm ( Cast )
5	SPIDA/1180	Rear Pusher Top Half (12 Stack Carousel)
6	RN8/1140	Rear Pusher Shaft (8 Stack Carousel)
6	OT10/1140	Rear Pusher Shaft (10 Stack Carousel)
6	SPIDA/1140	Rear Pusher Shaft (12 Stack Carousel)
7	RN6/3475	Spring Finger Assy
8	OT8/4620	Solenoid Pin Assy
9	SO2Z/037D6	Rear Pusher Spring
10	OT8/4608	Solenoid Trigger (Int Skeet)
11	E11V/83850	Roller Switch
12	SPIDA/4606	Failsafe Bar (OT/Pro Skeet)
12	SPIDA/4606	Failsafe Bar (Int Skeet )
13	SPIDA/4620	Bar Support Bracket Cradle (Int Skeet )
14	SPIDA/4607	Pivot Bar (OT/Pro Skeet )
14	SPIDA/4607	Pivot Bar (Int Skeet)
15	S03Z/14X10X096	Solenoid Compression Spring (OT/Pro Skeet)
15	S03Z/14X10X127	Solenoid Compression Spring (Int Skeet)
16	OT8/4450	Elevation Turnbuckle Assy
16a	SPIDA/4451	Sleeve ( knurled )
16b	BO5V/PHS12	Rod End Bearing
16c	BO5V/PHSL12	Rod End Bearing
17	M02V/BR113	12v Motor
18	M03V/MV50R60	NMRV50 60:1 Gearbox



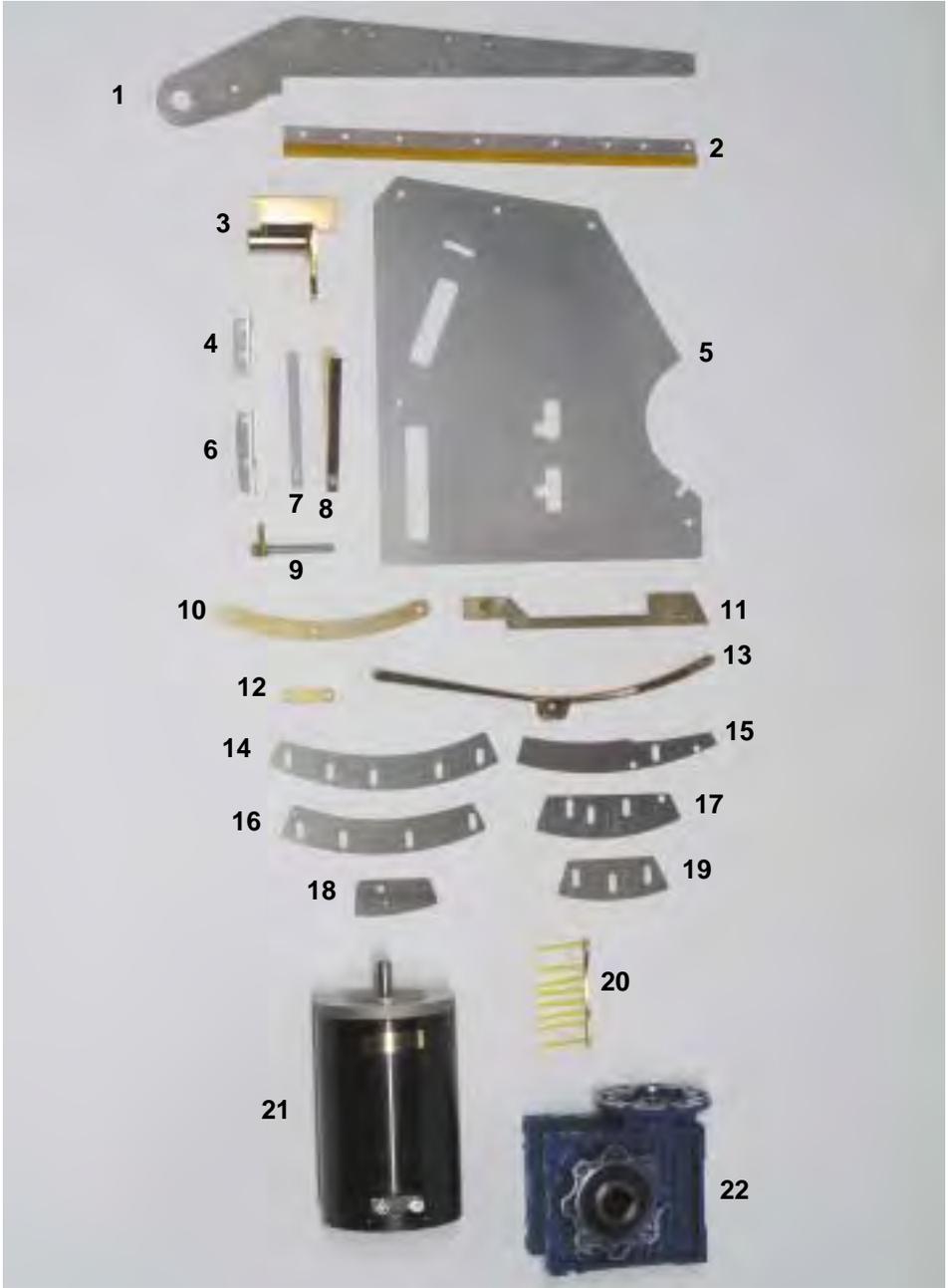
## DTL/ATA & ABT/WOBBLE SPARE PARTS

Number	New Part No	Description
1	SP1A/2010	Arm Complete ( Laser Cut )
2	SP1DA/1180	Rear Pusher Top Half
3	SP1DA/1140	Rear Pusher Shaft
4	OT8/4608	Solenoid Trigger
5	OT8/4618	Solenoid Bracket ( OT )
6	SPIDA/4620	Solenoid Cradle
7	S02Z/031D7	Solenoid Return Spring
8	SPIDA/4604	Solenoid Bracket ( Sporter )
9	S03Z/14 X 10 X096	Solenoid Spring
10	SPIDA/4607	Pivot Bar
11	RN6CA/4100	Rotation Disc ( Club & Pro ATA/DTL )
	RNPW/4100	Rotation Disc ( Pro ABT/Wobble )
	SPIDA/4100	Rotation Disc ( Int Sporter ABT/Wobble )
12	E12V/BEN12	Solenoid
13	SPIDA/4606	Fail Safe Bar
14	RN6CW/4125	Elevation Disc ( Club ABT/Wobble )
	RNPW/4125	Elevation Disc ( Pro ABT/Wobble )
15	M02V/MP080	12 v Oscillating/Elevating Motor
	SPIW/4125	Elevation Disc ( Inter Sporter ABT/Wobble )
16	M03V/MV40R80	Gearbox 80:1 ( Club & Pro ATA/DTL )
	M03V/MV40R60	Gearbox 60:1 ( Club ABT/WOBBLE )
17	M02/MP102	12 v Oscillating/Elevating Motor
18	M03V/MV50R80	Gearbox 80:1 ( Pro ABT/Wobble )
	M03V/MV50R60	Gearbox 60:1 ( Pro ABT/Wobble )
	M03V/MV50R100	Gearbox 100:1 ( Inter Sporter ATA/DTL )



## DOUBLE SPARE PARTS

Number	New Part No	Description
1	SPIDA/2100	Arm
2	SPIDA/2200	Friction Strip
3	SPIDA/2700	Clay Sweeper A (Small)
4	SPIDA/2705	Clay Sweeper B (Large)
5	RN6/3475	Spring Finger Assy
6	RN6/3485	Spring finger Spring
7	SPIDA/3350	Soft Fall Plate
8	SPIDA/3440	Back Rail 1(Front Clay)
9	SPIDA/3250	Inner Knife Edge (Front Clay)
10	A28S/BPWA	Outer Knife Edge (Front Clay)
11	SPIDA/9340	Nylon Finger Assy (Front Clay)
12	A28S/BIWX	Outer Pivot Knife
13	A28S/BIWW	Inner Pivot Knife
14	SPIDA/3445	Back Rail 2 (Rear Clay)
15	A28S/BSAG	Spring Steel Finger (Rear Clay)
16	SPIDA/3251	Inner Knife Edge (Rear Clay)
17	A28S/VPBZ	Outer Knife Edge (Rear Clay)
18	SPIDA/9350	Nylon Finger Assy (Rear Clay)
19	SPIDA/9200	Single/Double Adjuster
20	SPIDA/9202	Linkage
21	SPIDA/1190	Carousel Support





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