

# HEEL CLICKER

## CLUTCH SYSTEMS

Congratulations! You have purchased the finest clutch kit available. This patent-pending "dual quadrant" technology is revolutionary to the industry! This technology is ONLY AVAILABLE from Super Torquer Systems!

### STS1TRA 45-10

#### How to Install and Use the Heel Clicker™ Clutch Weight System and Most Frequently Asked Questions (Ski-Doo TRA Clutch design)



#### **WARNING! READ BEFORE INSTALLATION!**

Personal injury and damage to property can result from the improper installation and use of any product, including the Heel Clicker Clutch Kit. Installation of this kit should not be attempted unless you are a trained service technician or have a thorough and complete knowledge of CVT systems and their repair and tuning. Novice tuners should not attempt installation. It is recommended that a qualified dealership or repair facility install this kit.

**DEFINED WARNING:** This is a high performance product for use in sanctioned racing events only and is not for installation or operation by "consumers" as defined by the Magnuson-Moss Warranty Act. DO NOT install any performance parts unless you have the technical ability to properly set up the entire machine to compensate for the installation of these parts.

The expertise and necessary work needed to install products varies from one product to another. Instructions (where provided) are given to assist in installation only and are not a substitute for mechanical expertise. References to performance gains, reliability, ease of installation and tuning are based on our experiences. This is NOT a guarantee of similar performance in every installation. While we sell tested and proven products, individual results may vary.

## **Before you begin to install your Heel Clicker™ clutch kit, please note the following:**

- DO ACCEPT only genuine HEEL CLICKER™ parts. This kit is assembled with made-to-specification parts. Accept no substitutes.
- DO ALWAYS use the same combination of fasteners on each weight arm and shoulder. NO EXCEPTIONS.
- DO make sure the bolt/washers don't overhang on the ramp area of the weight arm where they could come into contact with the roller.
- DO ensure the bolt/washers are fully seated in place.
- DO make sure the weight arms are balanced (weigh the same) before installation. Ideally, use a gram scale to check this. In a pinch, remember a magnet will not stick to aluminum.
- DO make certain you have any excess side play shimmed out of the pivot area of your weight arm.
- DO make sure your pivot bolt and nut are new or in like-new condition and securely fastened.
- DO make sure your drive belt is in good condition. Also, verify that your center-to-center and offset adjustments are correct.
- DO use LOCTITE™ (not included in kit) or similar product on each fastener after you determine the proper combination for your setup.
- DO NOT grind or alter any portion of the weight arm or shoulder.
- DO NOT adjust the shoulder mass while the weight is mounted on the stationary pin in the clutch.
- DO NOT operate your machine without checking the full range of motion of each weight to make sure you clear the spider assembly and related areas.
- DO NOT exceed 9,000 RPM's.
- DO NOT allow an unqualified person to make any adjustments to your clutch kit.
- DO NOT install a Heel Clicker™ clutch kit in any clutch assembly that has excess wear, damage, or is in otherwise questionable condition.
- DO NOT use any clicker position to mount the roller carrier except position number 6.

## **Provided in this kit are the following items:**

- |   |                |
|---|----------------|
| - Three (3) bushed Heel Clicker™ clutch weights               |                |
| - Three (3) Billet cut aluminum roller carriers with roll pin |                |
| - Three (3) 1/4x28x1.0 S.S. button headed bolts               | 6.4 grams each |
| - Six (6) 1/4x28x 5/8 S.S. button headed bolts                | 4.8 grams each |
| - Six (6) 1/4x28 self locking nuts                            | 2.2 grams each |
| - Six (6) 5.0mm x 0.8mm aluminum T-nuts                       | 0.8 grams each |
| - Three (3) 5.0mm x 0.8mm steel T-nuts                        | 3.0 grams each |
| - Six (6) 5.0x8x14.0mm S.S.Button headed bolts                | 2.5 grams each |
| - Nine (9) 6.0mm steel washers                                | 0.8 grams each |
| - Three (3) 1/4x28x3/8 S.S. button headed bolts               | 3.3 grams each |
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3A) Use the following application chart to tune the arm to the proper weight and spring. Use Figure 3A to identify the tip, center, base, and shoulder of the weight. An example of a calibrated weight for a MXZ 800 is also shown in Figure 3A.

### Ski-Doo Models

| Model      | HC Weight | Shoulder | Base | Center | Tip | Spring               |
|------------|-----------|----------|------|--------|-----|----------------------|
| MXZ440     | 45-10     | 4.3      | 0.0  | 8.6    | 0.0 | Blue                 |
| MXZ500     | 45-10     | 4.3      | 0.0  | 8.6    | 0.0 | Blue                 |
| MXZ600     | 45-10     | 4.3      | 0.0  | 7.0    | 6.0 | Green                |
| MXZ670     | 45-10     | 4.3      | 7.0  | 5.5    | 0.0 | Green                |
| MXZ700     | 45-10     | 4.3      | 0.0  | 5.5    | 7.0 | Purple               |
| MXZ800     | 45-10     | 4.3      | 0.0  | 13.4   | 5.0 | Purple (48-42 helix) |
| Mach1 700  | 45-10     | 4.3      | 0.0  | 5.0    | 7.0 | Stock                |
| MachZ800   | 45-10     | 4.3      | 0.0  | 6.2    | 7.0 | Stock                |
| Summit 700 | 45-10     | 4.3      | 7.0  | 5.5    | 0.0 | Blue                 |
| Summit 800 | 45-10     | 4.3      | 7.0  | 5.5    | 3.3 | Blue(40 helix)       |

### Installing the fixed roller carrier assembly.

- 4A) Remove the ramps and clicker bolts from the cover assembly. Place the ramps and washer for the clicker bolt in your toolbox. They are not used in this assembly.
- 4B) Remove the rollers, plastic centering washers, and pins from the TRA arms.
- 4C) Place the TRA rollers, plastic washers, and pins into each of the three roller carrier adapters. Use the three cotter pins supplied with the kit to secure the pins in the roller adapters. Push the cotter pins in from the topside and bend ends over. See Figure 4C at right.
- 4D) Place the roller adapter into the upper cover and finger-tighten the roll pin keeper bolts.
- 4E) Place the six-position-clicker-bolt through the roller adapter base hole and line the bolt up in position number "6". Note before pushing this bolt in place clean up the sharp edge with a file or sandpaper at the front edge of the large diameter. This bolt is a machined bolt and if not cleaned up it can make the assembly more difficult. Lightly tap the bolt through the hole with a small hammer. Place the nut on the end of the bolt when fully seated. See figure 4E.

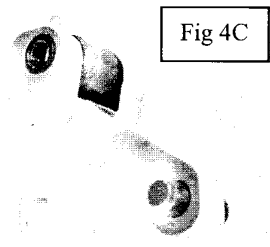
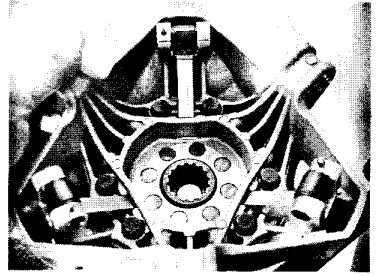


Fig 4C

Fig 4E



4F) Torque all nuts and bolts holding the roller carriers in place to 15ft-lbs of torque. Shown to the right is a completed governor cup assembly.



5) Install all three clutch weights using the customs shoulder bolts provided in this kit. Place one nylon washer on each side of the weight. Check again for clearance of the weight to the movable sheave. Torque all bolts to the manufacturer's specifications.

6) Install one of the three clutch springs supplied with this kit. **The Green spring is a 130-200 spring and is intended for use with large torque engine applications with low engagement . The Purple spring is a 160-230 spring and meant for high torque heavy shoulder weight. The Blue spring will give you the highest engagement RPM. It is a 185-380 spring and used for Snocross and mountain applications.** OEM and other manufacturer's springs can be used with these weights.

7) Install one of the new spring Install the spring cap and torque all bolts to the manufacturer's specifications.

8) Install clutch on engine and torque clutch bolt to the manufacturer's specifications.

The final adjustment involves tuning the shoulder for maximum performance. As explained earlier, the shoulder of the weight already weighs 10 grams. This means the Heel Clicker™ weight will already weigh 10 grams more than the traditional Polaris-style flyweight. Extra weight is provided in this kit in the form of a 2.2 gram set screw and the 3/8 long button headed bolt and lock washer weighing 4.3 grams.

**Caution: use only these fasteners supplied for the shoulder!. The new MXZ series machines have a very short center to center distance between the clutches. If longer bolts are used in this location they may come in contact with the secondary clutch.**

**When using these fasteners always use the lock washer with the bolts and blue Loctite with the set screw.** The addition of these fasteners will increase the load on the belt and make the clutches upshift faster. This additional weight will also drop the engine engagement RPM's. Listed below is the engine engagement RPM you can expect with these weight combinations

| <i>Set up</i>   | <i>Green spring</i> | <i>Purple spring</i> | <i>Blue Spring</i> |
|-----------------|---------------------|----------------------|--------------------|
| No weight added | 5500                | 5800                 | 7000               |
| 4.3 grams added | 4500                | 4800                 | 6000               |
| 5.8 grams added | 3500                | 3800                 | 5000               |

- Three (3) 1/4x28x1/2 long set screws 2.2 grams each
- Six ¼ lock washers 1.0 grams each
- Three (3) cotter pins
- Three (8)mm shoulder bolts and nylon locking nuts
- Six (6) nylon centering washers
- Three primary clutch springs (Green 130-200) (Purple 160-230) (Blue 185-360)
- One Heel Clicker™ Super Torquer Systems sticker
- Two paper centering template

## NOW YOU ARE READY TO INSTALL YOUR NEW HEEL CLICKER™ CLUTCH KIT.

- 1) Remove the drive clutch from the machine. Disassemble the cover and remove the drive spring. Leave the old clutch arms in the clutch for now.
  
- 2) A clearance for the clutch weight is needed in all TRA clutches. This is a simple process that will be done by simply drilling and filing the material away using basic tools (a hand drill with 1/8" and 9/16" drill bits, center punch, hammer, and metal file). Templates are included for easy location placement. This one-time process will take approximately 1 hr. Clutch balance and durability will not be affected (all test sleds have had this done to them and have shown no change in balance or durability even with thousands of miles of use). **Repeat steps 2A through 2F in all three clutch weight locations.**
  
- 2A) Center the template at each weight location on the movable sheave as shown. Line up the template inside the movable sheave behind each weight pocket location. The template is the same width as the weight pocket. The template is long on both sides so you can use the template as a guide between the weight pocket. Tape the template to the sheave. Two templates are provided and each side of the template should be used. The top edge of the sheave and the template need to be even. This will insure proper placements for the holes. See Fig. 2A

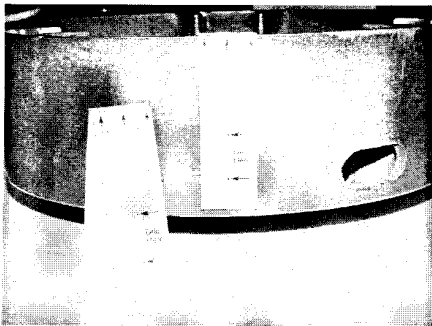
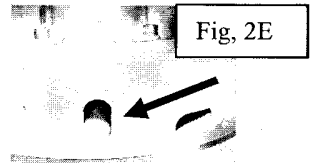
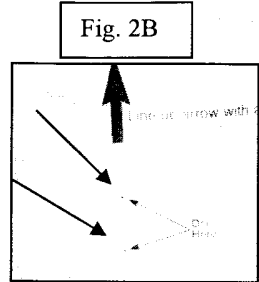


Fig. 2A

2B) Using a center punch and hammer, mark all 6 locations saying "Drill Here". Then remove template. See Fig. 2B.

2C) Drill a 1/8" diameter hole through all six centering marks. These six holes will act as pilots for the next drilling operation.

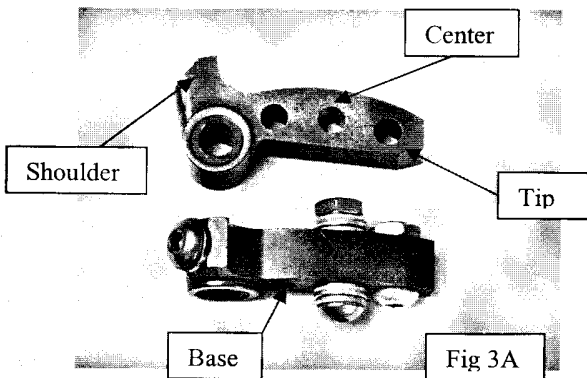
2D) **Carefully and slowly**, drill all six 1/8" pilot holes with a 9/16" drill bit. When drilling, proceed slowly and alternate holes instead of drilling one through hole at a time. Caution, aluminum is very soft and cuts very quickly. Drill slowly applying very little pressure. Hint: clamp the sheave into a workmate clamping style bench. This makes the drilling operation much easier. Prop up and clamp the old clutch weights in place. The arms will act as a stop for the drill bit. When all six locations have been drilled, remove old clutch arm and stationary pin.



2E) File off the material between the two holes and form an oval shaped pocket clearance as seen in Figure 2E.

2G) Compare the three pockets to ensure that equal material has been removed from each (so as not to affect clutch balance).

3) **You are now ready to tune the Heel Clicker™ weights** for your particular application. The Heel Clicker™ weights are adjustable in both the traditional arm and the new shoulder. At this time, it is important to understand the nomenclature of the Heel Clicker™ weights. The first number identifies how many grams are in the arm of the weight, and the second number is the weight of the shoulder (in grams) without any tuning hardware attached. So the STS1TRA 45-10 has an arm weight of 45 grams and a shoulder weight of 10 grams.



# Most Frequently Asked Questions

**I seem to have lost top speed?** Check the notch you drilled in your clutch. Make sure you have clearance between the shoulder of the weight and the movable sheave when the clutch weight is fully shifted out. Sometimes the drill will wander off location and the pocket will not be deep enough (see Figure #2G). This clearance is critical for top speed.

**Can I put in more shoulder weight?** Yes, Putting in 6.0 grams or more is common with many customers. But, if you run more than 4.1 grams in the shoulder, the button headed bolt will interfere with the governor cup. **The shoulder will catch the governor cup and the clutch will not engage!** Removing 6mm or ¼ of an inch from the edge of the governor cup will allow the shoulder of the weight to clear without catching. Remove equal material from the governor cup at each weight location. This will not change the balance or effect the clutch durability.

**How can I get less engagement RPM?** Any OEM clutch spring will work with our weights. Large twin cylinder motors like very soft springs. A series of 70lb.preload springs are available from Ski-Doo.

**What helix or secondary spring should I run with the Heel Clicker weights?** We have found 48/42 helixes work excellent for all twin high performance applications. Very stiff secondary springs with light preloads (12-15lbs) of twist.

**I am shifting out at to high or to low of an RPM, How do I adjust rpms?** The recommended settings given in the set up section is an average setting. Many of our customers have other modifications done to their machines that will require an adjustment to the weights added to the flyweight arm. A good rule of thumb adjustment is to add or subtract 1 gram of weight for every 200 rpm of over- or under-rev to the tip location.

**Can I use the other five clicker positions to adjust shift RPMs?** No. The roller carrier has to remain in the number six clicker position. This will set the rest of the dimensions that are critical for proper operation.

**Does drilling the clearance for the Heel Clicker™ weight to rotate change the balance or durability of the clutch?** No. We have tested this system in many TRA and other clutches with no balance changes or durability issues. Just ensure that an equal amount of material is removed from all three clearance areas. This will ensure self-balancing. Some of the top level Ski-Doo racing teams are running this product as part of our test fleet. Some of these engines are well over 250HP and running at 9500 rpm. This system is proving to be very durable and reliable.