

EMPIRE

# MAGNA CLUTCH

UPGRADE KIT



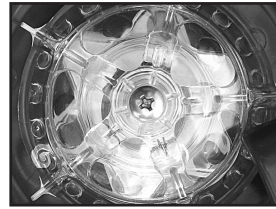
EMPIRE PAINTBALL  
570 MANTUA BLVD.  
SEWELL, NJ 08080



[www.empirepaintball.com](http://www.empirepaintball.com)

# Getting Started

Rotate the cone clockwise until the upper and lower spring tabs hit each other. You should now have both spring tabs pressed together. Lift the drive cone SLIGHTLY and rotate it clockwise up and over the drive cup's tab (taking the upper spring tab) with it. Snap the drive cone down with the drive spring tab on the right side of the drive cup's tab. The drive cone spring is now pre-loaded and will snap back properly when wound up.



(Figure 5)

6) Install the drive cone cover and tighten the cover screw. (Figure 5)

## Installing the Rip Drive shaft

This kit also comes with a rip drive shaft for users without one. (Please refer to [paintballsolutions.com](http://paintballsolutions.com) for detailed instructions).

## Warranty Information

Empire Paintball Products warranties this Magna Drive Upgrade Kit from defects in materials and workmanship under normal use and service for a period of 90 days from original purchase date. The manufacturer agrees to repair or replace any part which has been found to be defective. In the event that this product is defective and needs repair, call Paintball Solutions. If our customer service department requests your Magna Drive Upgrade Kit be sent in for repair, place it inside a box along with your name, return address, daytime telephone number, a brief description of the problem and a copy of your original sales receipt and send to: Paintball Solutions, 570 Mantua Blvd., Sewell, NJ 08080.

## Warranty

### CUT HERE

#### WARRANTY REGISTRATION

#### SEND TO:

Paintball Solutions  
570 Mantua Blvd., Sewell, NJ 08080 • 800-220-3222 • [www.paintballsolutions.com](http://www.paintballsolutions.com)

#### PURCHASE INFORMATION:

Purchased From: \_\_\_\_\_  
City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_  
Serial #: \_\_\_\_\_

#### OWNER INFORMATION:

Your Name: \_\_\_\_\_  
City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_  
Phone: \_\_\_\_\_ Email: \_\_\_\_\_

## Magna Clutch Upgrade Kit Instructions

Tools required for installation:  
#1 size Phillips screwdriver and a medium-size flat head screwdriver.

### This kit contains:

- |                      |                                 |
|----------------------|---------------------------------|
| (1) Drive cone cover | (1) Rip shaft                   |
| (1) Drive cone       | (1) Cover screw                 |
| (1) Spring housing   | (2) E-clips                     |
| (5) Magnet plates    | (12) Magnets                    |
| (1) Magnet holder    | (1) Direct Drive Spring housing |
| (2) Drive springs    |                                 |
| (1) Rip wheel        |                                 |

## Getting started:

- 1) Clear a neat space to work. If possible, spread out a large, light-colored towel or paper towels on a flat surface.
- 2) Remove any paintballs from your hopper. Remove your hopper from your marker.
- 3) Remove the battery pack from the hopper. Consult your hopper's owners manual for help if necessary. Place battery pack aside where it will not come in contact with any liquids or metal objects during installation.
- 4) Open the hopper's lid.
- 5) Using a #1 Phillips screwdriver, loosen and remove the six screws in the right side shell. Place screws in a safe place until you're ready to put back in the end.
- 6) With all screws now completely removed from the holes, begin just slightly separating the two shell halves. As the two halves are separating, all internal components should remain in the left side shell while the right side shell is removed by itself. If necessary, use a very small screwdriver to push the control board back plate and control board toward the left side shell while removing the right side shell. The on/off button of the control board extends through the back plate, so if the control board and back plate are not kept in alignment, the on/off button will snap off and destroy the control board. Remove the right side shell completely.
- 7) Remove the lid and lid pin, leaving the lid spring in its groove in the shell. Be careful not to lose the lid spring as it is small and easily lost.
- 8) Remove the control board and back plate together now from the left side shell. Unplug the control board from the sensor and motor harness. Place off to the side.
- 9) Remove the Drive assembly from the left side shell.
- 10) Remove the upper feed neck cover on drive assembly by removing 2 screws.
- 11) Remove your old Drive Cone and spring housing by removing the center screw.
- 12) Remove the C-clip located on the drive shaft within the top of the drive assembly.
- 13) You are now ready to install your New Magna Drive upgrade kit into your loader.

## Adjusting the Drive Cone Force

### Adjusting the Magna Clutch drive cone force

There are a few ways to adjust the Magna clutch's operation. Changing the amount of magnets, changing their location on the magnet holder, changing the magnet plates and using different feed cone springs.

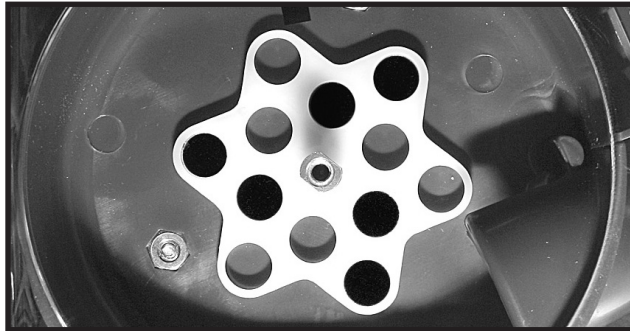
## Magnets

### Magnets

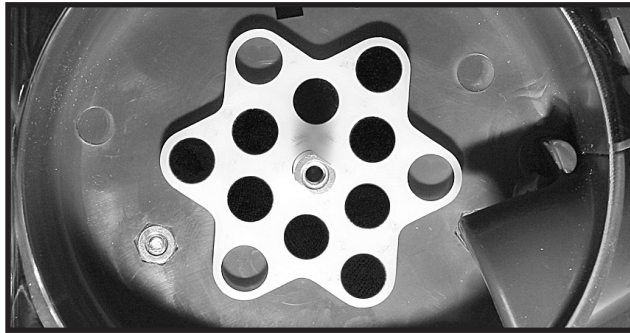
- 1) Remove the Drive cone assembly completely.
- 2) On the Magnet holder there are 12 spots for magnets. Usually a total of 6-9 magnets will be used. It is possible to add, remove and reposition magnets according to what marker and paintballs you are using.

The spots for the magnets toward the center of the magnet holder will supply a constant force to the drive cone. The spots on the outside of the magnet holder will supply an intermittent force to the Drive cone when the clutch slips. Too many total magnets may prevent the clutch from slipping at all, while too few magnets will prevent the feed cone from properly feeding paintballs.

The following diagram is an example of good initial configurations for tournament paintballs:



The following diagram is a good initial configuration for paint-less practice balls (rubber):



- 3) After you have setup your magnet holder read the Drive Cone installation section for the correct assembly procedure.

## Magnet Plates Magnet Plate

There are different metal plates that fit into the bottom of the spring carrier. By changing this metal plate for different configurations you can change the amount of holding force, and the force pulse duration when the clutch slips.

The metal in the center of the magnet plate will supply a constant force to the drive cone. The shaped protrusions on the outside of the magnet plate will supply an intermittent force to the Drive cone when the clutch slips. Too little metal on the inside of the plate may allow the clutch to slip too easily and thus prevent feeding of paintballs.

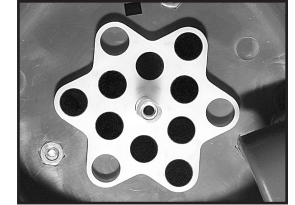
If you are using paint-less practice balls (rubber) you may want the star shaped metal plate with all the shaped protrusions, and more magnets, as the practice balls have significantly more friction than regular paintballs.

After you have setup your magnet plate read the Drive Cone installation section for the correct assembly procedure.

## Feed Cone Springs

### Feed Cone springs

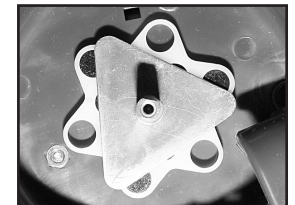
This kit comes with 2 different feed cone springs. One of them is a soft spring and the other is a stiff spring. Changing these springs will change the amount of tension the feed cone puts on the ball stack.



(Figure 1)

### Direct Drive Spring Housing

The Direct Drive Spring Housing is designed to be used with the Magna Drive Cone assembly. It replaces the Magnet holder, Metal plate, and the Magna spring housing. This gives you the option to remove the Magna clutch and run your loader in a standard configuration.

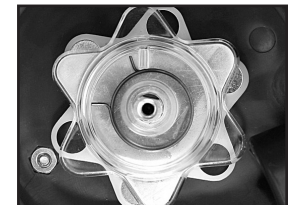


(Figure 2)

### Drive cone installation

It is very important to reinstall the drive cone properly for correct loader operation. **Note:** the drive tab on the drive cone. The tab is used to catch the spring tab.

- 1) Install the magnet holder with selected magnets installed onto the shaft and slide it all the way down. (Figure 1)
- 2) Apply a small amount of Dow 33 to the bottom side of the metal plate. Place the metal plate on top of the magnet holder and try to center it on the shaft. (Figure 2)



(Figure 3)

- 3) Install the spring cup with spring onto the shaft and rotate it until it locks onto the metal plate. (Figure 3)
- 4) Place the drive cone onto the shaft and pre-load the drive cone spring. (Figure 4)



(Figure 4)

- 5) To Preload the drive cone spring:



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