

## Weak link system for use with Eurofox Tug

Our Eurofox tug is certificated for a maximum weak link strength of 300kg. We use a weak link with a carefully calibrated breaking strain and one which is not liable to suffer significant reduction in strength with use. This document describes how to use these weak links.

### Design

The weak links consist of a plastic housing (manufactured by Skylaunch), one or two Tost weak links, and two shackles to attach these components to the Tost release rings at one end and to the rope at the other end.



### Shackles

The shackles are rounded so that they do not damage the rope. As supplied by Skylaunch they may be too narrow and need prising open so that they fit without pinching the weak links. Each shackle attaches to the weak links with a 10mm hexagonal nut and bolt.

### Tost rings

These rings are designed to fit the Tost release hooks fitted to Eurofox tugs and to most gliders. They are compatible with the Otfur hooks fitted to some older British Gliders. They cost about £38 each – so try not to lose them! They consist of a pair of linked rings – the smaller ring is designed to fit a Tost or Otfur tow release. Note that some other tugs have releases designed to use the larger ring.

### Main weak link

Tost supply weak links with a variety of different breaking strains. **We use the 300kg weak links numbered “7” and coloured green for easy identification.** Do not use any other colour of weak link for the Eurofox. The weak links are supplied with either two round holes or two oval holes. The main weak link has two round holes and is designed to take the whole load of the launch and to break if the load exceeds 300kg.

### Reserve weak link

Weak links with oval holes are known as reserve weak links and are designed to be used alongside a round-hole link. Apart from the shape of the holes reserve weak links are identical to main weak links. The oval holes mean that when a reserve weak link is used alongside a main weak link it will take no load at all until/unless the main link breaks. The reserve weak link will take the strain if the round-hole weak link breaks prematurely (i.e. at less than the rated 300kg) because of aging or damage. If the load exceeds 300kg then the reserve will break too.

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### Skylaunch plastic housing



This is designed to protect the weak links from wear. It has a U-shaped trough into which the weak links fit. The shackle bolt goes through a hole at the left hand end to attach the shackle to the housing and to the weak links. This end should be used for the Tost rings. The right hand end has a slot instead of a bolt. This is to attach the shackle for the rope and the weak links. The slot allows the shackle and rope to break away from the plastic housing if both weak links break. It is important that the rings are attached to the end of the plastic housing that has a hole. This ensures that after a weak link failure the plastic housing remains with the rings making it easier to find the rings. Meanwhile just the shackle and part of the weak link remains attached to the rope thereby minimizing its weight.

### **Important**

Never use two main weak links together, or two reserve weak links together as this would double the breaking strain from 300kg to 600kg! If we run out of one type of weak link it is permissible to use a single weak link until more links are purchased. Always put the main weak link (the one with round holes) on top where it can be easily inspected. If the main weak link is broken then replace both weak links and discard the reserve because it will very likely have been weakened when the main failed.

### **Usage**

We use a 300kg Tost weak link at both ends of the rope. The weak link at the tug end is to protect the tug when the rope snags on something, e.g. on the fence. If the weak link at the tug end breaks during the aerotow and the weak link at the glider end were to remain intact it is possible for the rope (including

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the shackle at the tug end) to catapult or drop onto the glider with undesirable consequences. Therefore we use a main **and** reserve link at the tug end but just a main link at the glider end. This is important. To distinguish the different ends we mark the tug end of the rope with **yellow** insulating tape and the glider end with white insulating tape.

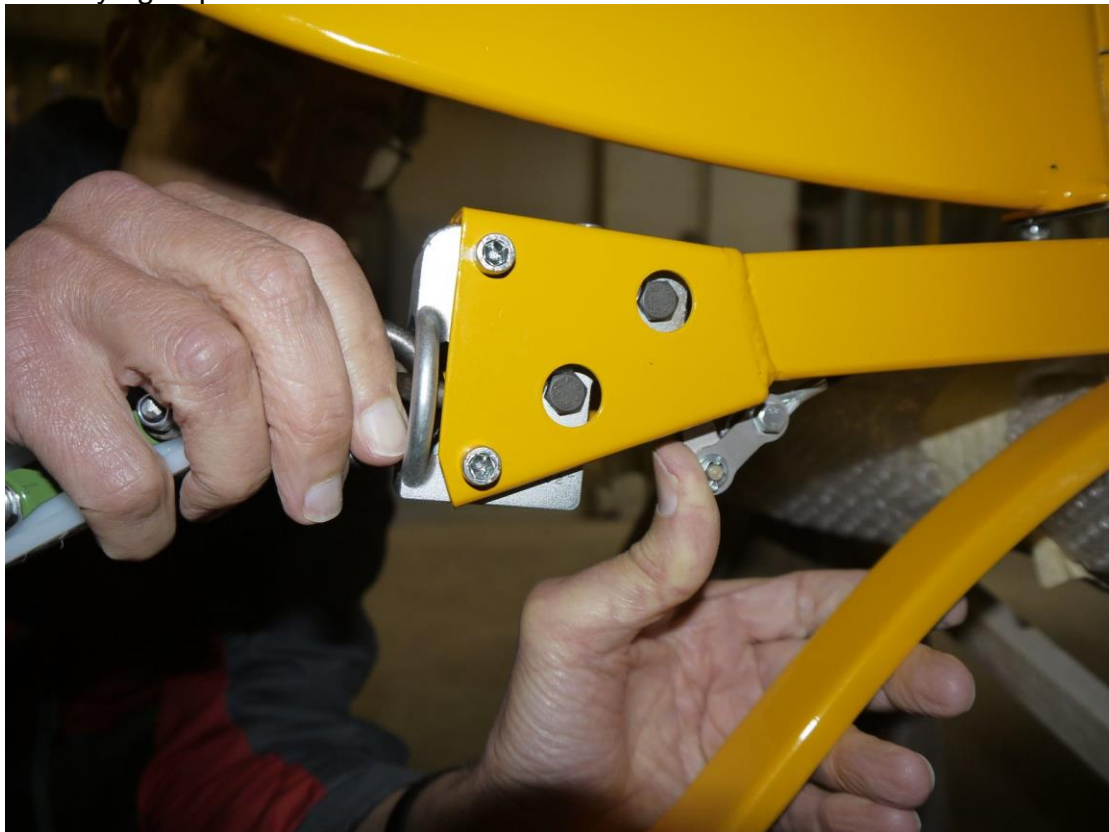
### Inspection

The tug pilot is responsible for inspecting the whole rope before the first launch of the day. Before (re-) attaching the rope to the tug check that you have the correct end marked with the **yellow** insulating tape and with main and reserve weak links. Check that the weak link assembly is ready for service:

- The shackles should be free to move a little within the plastic housing
- The nuts should be tight on the bolts
- The weak links should show no sign of being stretched, bent or damaged
- The rope loop should have no broken strands
- The plastic housing should be intact

### Attaching the rope to the Eurofox

Usually the tug pilot will pull the release to open the hook so you can insert the small ring just as you would on a glider. Alternatively you can open the hook yourself by pushing the release lever – see picture below. This is easier than trying to pull the release wire.



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## Glider end

The glider end is very similar to the tug end except that it is identified with white insulating tape and **uses a single weak link**.

## Replacing a broken or damaged weak link

Provided that no parts have been lost the aerotow rope can be returned to service after the weak links have been replaced by another pair of the same strength – i.e. with one main and one reserve green link for the tug end or with a single weak link at the glider end. The club has a tool kit containing the tools needed to fit a weak link plus spare weak links, shackles, nuts and bolts, plastic housings and Tost rings. To replace a weak link use a 10mm hexagonal spanner and a pair of pliers. You will need to undo both nuts and bolts, remove the two separate parts of the broken weak link and replace them with the new weak links. If the plastic housing is damaged or excessively worn then replace that too. It is good practice to discard the old nuts and use new ones. Observe carefully how the parts are assembled and reassemble them in the same arrangement. – see pictures above. This process is likely to take a while so it is usually preferable to fetch a spare aerotow rope from the workshop and continue launching as soon as possible. The broken links can be replaced later without delaying the launching.

## Routine replacement

Weak links are relatively cheap. They are likely to fail eventually with fatigue. To avoid this they should be replaced whenever there are signs of wear or damage and whenever we replace the rope.

## Tool box

There is a tool box with tools and spares for maintaining ropes and weak links that is generally kept in the workshop along with spare ropes. It contains:

- 2 x Skylaunch plastic housing for weak links
- 4 x spare rounded shackles including nuts and bolts (from Skylaunch)
- 2 x green number 7 300kg weak links with round holes Tost p/n 110107
- 1 x green number 7 300kg reserve weak links with oval holes Tost p/n 110127
- 2 x Tost connecting ring pair p/n 102000
- 10 mm spanner
- Spare M6 nyloc nuts
- Pair of pliers
- Yellow insulating tape
- White insulating tape
- Knife for cutting aerotow rope
- This guide

The numbers quoted are the minimum to make up a complete new aerotow rope. It is important to order more supplies before going below the minimum. If anything is missing or supplies are running low please tell Phil King, preferably by email [Phil@King618.co.uk](mailto:Phil@King618.co.uk).