

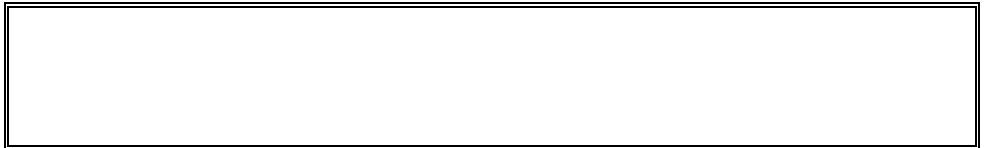


Tost GmbH Flugzeuggerätebau München  
Thalkirchner Straße 62 • 80337 München  
☎ 089-544 599-0 • Fax 089-544 599-70  
<http://www.tost.de> • e-mail: [info@tost.de](mailto:info@tost.de)

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**Operating Manual**  
**Flight and Operating Instructions**  
**for the Tow Cable Retractor Winch**  
**with Guillotine (CRG)**  
for Ultralight aircraft

**Annex to the Aircraft Flight Manual**



This annex consists of 9 pages



## The tow cable retractor winch with guillotine (CRG)

is firmly installed in the motorglider and will allow to retract the tow cable during the flight (descent), after the sailplane pilot has released the cable.

The motorglider can land directly, without additional cable-drop curve. In this way, the towing operations are more safe and economically. The flight time as well as the aircraft noise will be reduced.

The cutting mechanism allows to detach the tow cable also with hazardous flight attitudes: In an emergency, pull the operating lever for the cutting device with a jerk to the stop.

### Description of the system

The tow cable retractor winch with guillotine consists from two components:

1. Traction unit and cutting system (guillotine) are integrated in the towing support, which will be mounted to the tail of the motorglider. The incorporated stop plate unit takes up the cable load (load input) via a sleeve screwed over a knot in the tow cable.
2. The retraction winch will be installed in the fuselage, close to the centre of gravity (see diagram). The cable drum is operated by an electric engine with a friction clutch. The engine is charged via the aircraft's electrical wiring system.

The effective cable length is max. 50 meters. The tow cable will run in a protection tube from the cable drum to the guillotine at the aircraft's tail.

The winch unit can be demounted completely from the SF 25 C in next to no time (see instruction in annex towing to the flight manual).

Feeding the tow cable through the guillotine and the protection tube will be done with an auxiliary cable wind-up-wire, included in the ship set.

Instruction for feeding the tow cable:

- ⇒ Lay out the tow cable in full length behind the tow plane
- ⇒ Pass auxiliary cable wind-up-wire through stop plate unit and protection tube towards the aircraft front. Hang tow cable onto the rear end and pull up to the front to the cable drum. From there, pull the cable about further 4 meters.
- ⇒ Mark the tow cable at the rear end of the stop plate unit by a felt-type pen and pull up the cable until this marking appears at the drum.
- ⇒ Now, slip the half of the cable sleeve with exterior thread onto the cable to the marking (thread showing to the glider). Make an overhand knot into the cable, close to the marking. Tighten the knot with a jerk and pull it into the sleeve's interior. Slip the other sleeve half over frontal cable end (open sleeve halves showing towards each other) and screw firmly to the already fitted sleeve half, see drawing at the end of the Manual.
- ⇒ Pull the tow cable to the rear again, till the sleeve stops at the stop plate (load entry). Place the free tow cable end onto the cable drum at the drum fillet (drum edge). Only fix the cable end with adhesive tape on the drum surface.
- ⇒ **Do not fix the cable end at the motor side of the drum and do not make a knot!**
- ⇒ Wind up some coils of tow cable by hand onto the drum. Make sure that the windings are well distributed. This will ensure accurate rewinding of the cable during retracting operation.
- ⇒ Demount the „end piece“ by **only** removing the special bolt M 6x32. Slip the aluminium part (with transparent protective tube) over the rear end of the tow cable. Make an overhand knot (the same as in the cable sleeve) at the end of the tow cable. Weld/seal cut cable ends immediately to prevent fraying. Pull the knot into the borehole of the aluminium end piece. Fit again the weak link with shackle and connecting ring pair into the aluminium piece and screw with the special bolt M 6 x 32.
- ⇒ The transparent PVC tube (stabilizer) serves as protection of the weak link and as stabilization of the cable during cable retraction. For better visibility, cover the protection tube with **red** adhesive tape.

The special bolt M 6 x 32 of the end piece is placed off centre. The weak link can thus only be fitted in one position, see drawing at the end of the manual.

If it is necessary to replace the tow cable, proceed as described. It is recommended to replace to cable after about 1000 tows or depending on the condition of the cable.

Use only plated PVC or PA ropes with a diameter of 6.3mm maximum.

**→ Attention ←**

Tow cables must not be spliced. A spliced point would prevent the full retraction of the cable.

The breaking strength of the tow cable must range below the trailer load of the tow plane! (see Flight Manual of the aircraft).

Attention must be paid to the use of the correct weak link, specified for the cable end.

About 1 m from the point the cable comes out of the guillotine there are visible 2 black markers of about 5 cm length on the cable (when the tow sleeve is close to the stop plate).

Cable retraction will be started by a toggle switch. A red signal light in the toggle switch indicates the operation of the retraction winch. When the end piece has run up, the toggle switch cut off automatically.

Cable retraction can be visually checked by a mirror, that is mounted lefthand on the canopy cabin's frame.

The release lever serves to actuat the cutting device.

**→ Attention ←**

**In an emergency pull this lever with a jerk up to the stop!**

### Towing Instruction:

The power for the Tow Cable Retractor Winch is charged via the aircraft's electrical wiring system, by operating the circuit breaker. In this manner, the retracting system can be switched out of service during normal flight operations of the tow plane.

The motorglider should be taxied in a suitable distance in front of the sailplane. A member of the towing crew will draw the tow cable by hand to the sailplane, where it is connected properly. After take-off clearance, the pilot of the tow plane will pull tight the cable slowly, until the cable sleeve stops perceptibly at the traction block of the stop plate unit.

### **➔ Attention ←**

Only start the towing operation, after the cable sleeve had been stopped at the traction block.

The aero tow has to be performed in accordance with the flight instructions of the motorglider manufacturer.

After the cable had been released from the glider pilot, switch on the retraction winch by pushing the toggle switch. The red signal light in the toggle switch indicates the cable retracting operation.

A short glance into the mirror will show, whether the red marked end piece has fully run up, that means the cable is completely retracted.

The motorglider should descend according to the instructions of the aircraft manufacturer. Attention must be paid to the flight level and position for a most noise-abating descent. Descent during retracting operation with max. 140 km/h.

The landing can be performed directly. If the cable had not been retracted completely, landing can be done with hanging cable if the runway has a sufficient length. Only in an emergency or in case of obstacles in the flight path the tow cable should be cut for safety reasons.

Malfunctions:

It may happen that the tow cable curls. Then it is only possible to retract the tow cable up to this point and the toggle switch will cut off automatically at the knot. Land as described and remove the curls.

**→ Attention ←**

Do not tow with loops in the cable!

In order to prevent loops or knots in the cable, the glider pilot **may not release under load** or zoom the glider, just before releasing the cable. For a better introduction into this method of towing, the engine power should be reduced first at the end of the tow, and then the sign for releasing should be given.

When taxiing have a look from time to time into the mirror: check if the end piece is correctly inside the rubber funnel or hanging out of it. In this case actuate the toggle switch and pull in the cable completely. Otherwise the cable could damage the tail unit or jam in the tail wheel.

Maintenance Instructions

Proper function of the system can only be warranted if attentive maintenance is performed.

1. Daily Checks prior to the towing operation

- Check proper fastening of the unit and secure all connections
- Check free running ability of the cable drum
- Check proper seat and fastening of the cable sleeve
- Check proper function of the cutting device. Just press the knife slightly with a finger, to check whether it works
- Check terminator for damages, grooves etc., to avoid damage or jamming of the cable during retracting operation
- Unreel full length of the tow cable in starting position and check for defects, especially near to the end piece.
- Check the weak links and the connecting ring pair
- Check proper adjustment of the mirror.
- Pay attention to the fact that the tow cable may freeze in winter operation

2. Checks and maintenance work to be performed with the 100-hour-check-up of the airframe of tow plane

- Remove knife from the cutting device and check for cutting ability and possible defects
- Clean the interior space of the cutting device
- Clean protection tube and pay attention to chafe marks
- When re-installing the knife, the engraved arrow must show backwards - to the cable outlet - (rebord part backwards). Screw down the crown nut - not too tight - and secure with locking pin.
- Check the tension spring at the cutting lever
- Check the cable drum for firm seat and defects. Replace the drum, if necessary
- Check electric connections.

3. Check with the annual inspection of the tow plane

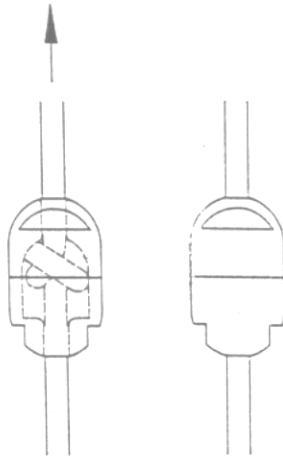
Perform cutting test with fully retracted cable

Spare parts and tow cables should be purchased from the manufacturer.



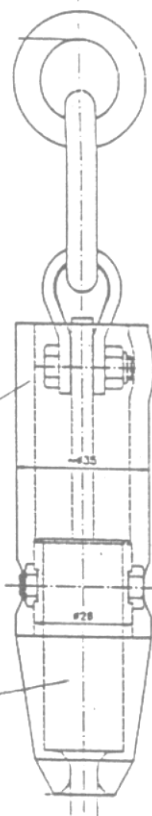


Cable sleeve



overhand knot

Cable end piece



**Attention:**  
Special bolt M 6 x 32  
is constructed off centre.  
The weak link can only  
be fitted in one position.

Knot in the end piece  
is the same as in the  
cable sleeve