

Operating Manual

for
Tow Releases

Series:

Tow Release E 85

Date of Issue: March 1989

Pages marked "LBA approved" have been officially approved by the German aviation authority, the Luftfahrt-Bundesamt. They have been approved by:



Skov (Signature)



Luftfahrt-Bundesamt (Authority)

March 13, 1989

Original date of approval

The release may be used only in compliance with the instructions and limitations set out in this manual.

The English translation has been made to the best of our knowledge and belief, but in case of uncertainty the German original is authoritative.

0.1 Document History

All changes to this operating manual must be recorded in the table below and, in the case of the approved sections, endorsed by the Luftfahrt-Bundesamt (German aviation authority).

New or amended sections will be identified by a vertical black line in the margin. The revision number and the date will be printed at the bottom right of the page.

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Operating Instructions

1. General Information

1.1. Introduction

This operating manual is intended to provide glider manufacturers, pilots and flying instructors with the information needed to install and operate the releases safely.

The manual includes the data which must be made available according to German airworthiness regulations for tow releases (Lufttüchtigkeitsforderungen für Schleppkupplungen - LFK). It also contains additional information and recommendations which the manufacturer feels will be helpful.

1.2. Certification basis

The release **E 85 Tow Release** has been approved by the German aviation authority (Luftfahrt-Bundesamt) on the basis of the guidelines for testing tow releases (Lufttüchtigkeitsforderungen für Schleppkupplungen) dated 11th August, 1976, with additions of 30th December, 1988, Ref.: I 413-60.230/2/88. The certificate No. 60.230/1 is dated 8th March, 1989.

1.3. Warnings, cautions and notes

There are three types of note in this manual and their importance for the safe and easy operation of the releases is defined as follows:

WARNING

Ignoring an instruction of this type results in either immediate danger, or considerable risk, to flight safety.

CAUTION

Ignoring an instruction of this type leads to a minor or a more or less long-term reduction of flight safety.

NOTE

This heading draws attention to an item which is important or unusual, although it may not be directly related to safety.

1.4. Description of the release

The TOST Tow Releases, E 85 (German TC No. 60.230/1) can be installed:

- Near the nose of a glider or powered glider.
- Near the tail of the aircraft used to tow gliders, powered gliders, or nonsteerable banners.

Release does not occur automatically. The housing, hook and segment are made of precision cast, high-grade steel. There is a setting screw counter-sunk in the housing. Over-centre locking and release mechanism.

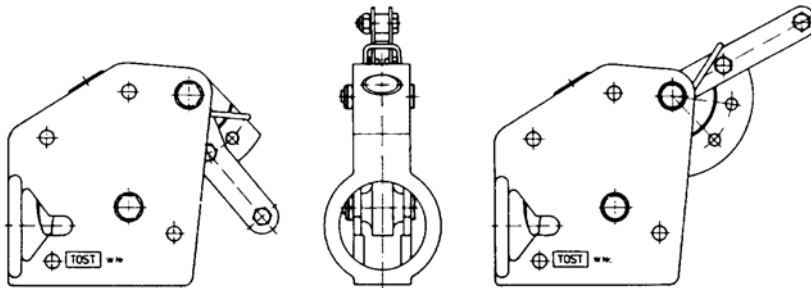
Different versions of the E 85 (see TC No. 60.230/1-6/89)

Depending on the available space in a glider or powered glider, it may be necessary to shorten the segment of the nose tow release by two holes, and to attach a special angled lever instead of the normal lever.

The following engraved letters identify this version: **E 85/1-79**

WARNING

Modified versions of the release may be built into a glider or powered glider only in accordance with the glider manufacturer's specifications.

1.5. Perspective view of the standard and modified versions

E 85/1-79

Front view

E 85

2.6. Towing device specifications

The ring pair LN 65091 (currently valid version only) must be used to connect the hook of the release to the towing cable.

2.7. Period of operation / number of takeoffs (TBO)

Maximum period of operation between two general overhauls
= 2000 takeoffs
(equivalent to 10.000 actuations/releases see also 10.1)

2.8. Types of operation

The tow release may be used in:

- gliders and powered gliders for aircraft tow
- aircraft
 - for towing gliders and powered gliders
 - for towing non-steerable banners

2.9 Using the tow release together with cable retractor winch

When using a cable retractor winch with guillotine, an additional lever must be mounted outside the tow release body.

3. Normal Operation**3.1. Introduction**

This section contains checklists and describes normal operating procedures.

CAUTION

The release is not only a means of load transmission, it is also a safety device. Critical situations occur more frequently in the use of releases than, for instance, of parachutes. Here too, failure or malfunction can be fatal.

For this reason you should make a practice of carefully checking the release and the manual release mechanism before each takeoff (see 3.2). If you find the release has been damaged, or does not function correctly, then it must be taken out of service immediately. On no account should you attempt to repair or adjust the release yourself. It should be sent back to TOST for repair (see Maintenance and Service).

WARNING

If you wish to continue using the aircraft, and you cannot eliminate the tow release problem yourself, i.e. by greasing or cleaning, you should remove the tow release from the aircraft. Gliders and powered gliders can use the centre of gravity release instead, depending on the manufacturer's instructions.

When the release is under load, the actuation arm need be moved only a few millimeters for the tow cable to be released or dropped (unlocking occurs when the dead center point is passed). There is an audible click as the mechanism unlocks.

If the tow cable is under a reduced load, or no load at all (if the glider overruns or overshoots the cable), the tow ring pair, along with the cable, will be released and dropped only when the release mechanism has been fully actuated. To be 100% sure the cable has been released, you should actuate the release completely several times.

For further information refer to the aircraft's operating manuals.

3.2. Pre-takeoff checklist

3.2.1. Functional check

Does the release hook open completely, i.e., until it touches the ring, when the release cable in the cockpit is pulled to its fullest extent? This should be the case even when two releases are attached to a common release cable.

3.2.2. Is the manual release lever, or the segment of the release mechanism, rubbing against the aircraft's fuselage or the pilot's seat?

When you let go the manual release cable, does the release hook return completely to the closed position?

Does the hook open correctly when the cable is under load?

3.2.3. Is the release free of dirt?

3.2.4. Is the glider end of the tow cable fitted with a tow ring marked LN 65091, as specified for the release?

3.3. Normal use of the tow release in aircraft-towed takeoff

The procedure for takeoff is fully described in the aircraft's operating manual. Release is possible at cable angles $\alpha = -90^\circ$ to $+90^\circ$, and $\beta = 0^\circ$ to 90° to either side.

WARNING

The nose tow release does not operate automatically. To make quite sure that the cable has been released, you should activate the release completely several times.

Maintenance and Service

4. General

This section contains notes, instructions and checklists for maintenance and service, and for installing and removing the releases. You will find all the information you need to maintain your release in a safe condition.

If the release of a glider or a powered glider is inoperable or damaged, it must be removed and returned to TOST for overhaul and repair.

WARNING

Do not attempt to alter, repair or adjust the release yourself. Leave this job to the experts! Tampering with the release voids the aircraft's airworthiness.

It is important to make sure that the manual release mechanism in the cockpit is free of friction. This is important for the following reasons:

- to ensure that the force required to actuate the release manually is not too great
- to ensure that the restoring force of the spring attached to the segment is not offset by too much friction in the release mechanism. This can prevent the hook from reaching the locking (over-center) position, which could result in the release opening prematurely (see 9.1).

The aircraft manufacturer has installed the release in such a way that you can check it visually.

It is important to make yourself familiar with and follow the aircraft manufacturer's instructions.

5. Installation

5.1. General

WARNING

When you install a release which has been repaired or overhauled, check that you do in fact have the correct release; either an "Europa G 88", or the modified version approved for your type of aircraft.

CAUTION

If you are not 100% certain, check the aircraft operating manual, or contact the aircraft manufacturer.

5.2. Installation position

Do not change the glider manufacturer's original positioning of the release.

WARNING

Before removing the release, make a sketch, or take a photo, as a record for installing it again.

5.3. Tools needed

You need only some basic tools to install or remove the release in one piece - a No. 5 Allan key, a 10 mm closed-end wrench, or two 10 mm open-end wrenches.

5.4. Installation

To install a release use DIN 931-10.9, or DIN 912-12.9 M6 bolts and DIN 985-M6-6 hexagon nuts.

WARNING

New bolts must have the same shaft length as the original ones. It is especially important that the thread is not subjected to load, and that the shaft does not protrude more than the thickness of a washer beyond the mounting, as the nut cannot then be tightened properly.

Torque: $M_A = 8.75 \text{ Nm}$ (77.5 lb-in)

The release must be installed so that it is not under stress. When a release has been removed, new nuts and bolts should be used when it is reinstalled.

5.5. Checks

- The moving parts must move easily.
- The manual release cable must allow at least 10 mm extra length (dead travel) to ensure that the release mechanism can lock into position correctly.

6. Set screw

The function of the set screw on the upper side of the release is only to adjust the force needed to operate the manual release.

WARNING

The set screw and central and segment bolts are sealed with blue paint or closed with a cap. **The cap may not be removed and the set screw may only be adjusted by the manufacturer.**

The seals may only be removed by the manufacturer.

Any action will end the manufacturer's guarantee!

7. Checklist

7.1. Checks after installation

After installing a release, and as part of the periodic aircraft inspections, these checks must be carried out:

1. You must be able to open the unloaded release completely by applying a force of 7.5 ± 1.5 daN (16.5 ± 3.3 lbs.) - measured on a spring balance - on the manual release lever in the cockpit over the full travel of the release actuation arm.
2. When the release hook is under a load of approx. 150 daN (330 lbs.), you should still be able to operate the manual release lever in the cockpit with the same force, i.e., 7.5 ± 1.5 daN (16.5 ± 3.3 lbs.).
3. If both a nose and a center-of-gravity release are connected to the same release cable, the manual force required to operate them from the cockpit may not exceed 17 daN (37 lbs.), even if one of the releases is under a load of 150 daN (330 lbs.).

7.2. When the manual release force

is transmitted directly to the release mechanism, **the release path of the release cable from the cockpit has a maximum length of 80 mm** (3.1 inches), including the 10 mm dead travel. **Any altered length may never exceed 120 mm** (4.7 inches) - including the 10 mm (0.4 inches) dead travel. One result of this change is that the manual force required to operate the release will be less than specified in 7.1. If your aircraft has this longer release path, you must make absolutely sure that the force which is required for the segment spring to lock the release closed, is not offset by friction on the release cable between the cockpit lever and the release mechanism (see also 7.1.2).

WARNING

When you release the cockpit release lever, the hook must close and the mechanism lock completely, otherwise there is a danger of the hook opening prematurely under load.

7.3. Friction on the release cable

may not reduce the restoring force P_R by more than 1 daN (2.2 lbs.). Thus a restoring force of 1.5^{+1}_0 daN (3.3^{+2}_0 lbs.) must be maintained at the release itself. If not, check and adjust the release cable, or find and remove the source of the friction.

7.4. If the results of these measurements

are in line with the specified values and the checks are carried out satisfactorily, then you can be sure that the release is operating within the limits set out in Section 2.

8. Care and Cleaning

The release is largely protected against corrosion. But certain components like the hook cannot get surface protection due to strength reasons. Therefore regular cleaning and servicing is imperative for maintaining the required security level.

8.1. Regular check

During operation and especially when landing away from paved runways, your release is exposed to dirt and pollution. So it is important to check the release before and at the end of every flight operation (see 3.3) and to clean it if necessary. **This point is indispensable especially if not used daily.**

8.2. If the release is hard to operate,

If the mechanism, in particular the hook, is not moving freely, wash off the dirt, dry the release with compressed air (to prevent corrosion) and lubricate it. To lubricate, we recommend you use an acid-free, spray-on oil, e.g., WD-40. Then actuate the release lever several times until the mechanism moves freely.

9. Malfunction - Causes and Correction**9.1. Premature release**

Premature release under load will occur only if the release mechanism did not lock correctly (pass over-center) in the first place. Generally this is caused by one of the following:

9.1.1. The release cable is too short.

Correct by replacing the release cable with a new one which conforms to the glider manufacturer's specifications.

9.1.2. Poor guidance of the cockpit release tackle - too much friction.

Contact the glider manufacturer - this is a manufacturing fault.

9.1.3. The restoring force is too low because:

- There is friction on the release cable
Correct by cleaning and lubricating the cable in its housing and any pulley bearings.
- The release segment spring is worn out or broken (see 2.7 maximum life-time 10.000 actuations/releases!).
Send the release back to TOST for repairs.

9.1.4. Check installation position.**9.1.5. Check stiffness of fitting and mounting on fuselage.**

10. General Overhaul**10.1. Period between two general overhauls**

The TBO is defined by the life-time of the spring, that means the number of actuations. This life-time is 10.000 actuation. During normal flight operation with 5 actuations per launch that means 2000 take offs. If the release is mainly used for training (with about 8 actuations per launch) the TBO is reduced to 1250 take offs.

In most installations both releases are actuated simultaneously. In this case 1250/2000 takeoffs after the last general overhaul both releases must be returned to the manufacturer:

**TOST GmbH Flugzeuggerätebau
Thalkirchner Str. 62
80337 Munich Germany**

for a general overhaul and service.

Nevertheless, the manufacturer recommends a general overhaul every 4 years because (even if the release is serviced regularly) due to installation position and environmental influences corrosion can occur.

10.2. If the release is installed in another aircraft,

then the number of takeoffs and actuations must be recorded by a qualified inspector in the log of the second aircraft.