EMCOTEC®
embedded controller technologies

English

Locating Beeper

Model finder / Tow rope finder

Operating Instructions

Contents

1. What's a Locating Beeper?

The Problem:
Some times you might be in a situation where you must land your RC-model out side of your airfield. Examples are if the engine quits and you do not make it to the runway anymore or the thermal lift vanishes and quick landing is in order. Last resort often is landing in a field or high grass. It is often difficult to find the model afterwards. Often you miss the model by just a few feet. Everyone who searched for his model in a cornfield knows about this problem.

Some pilots believe that servo noise (especially from digital servos) allows for finding the model. Servos only work down to a certain voltage (e.g. 4.0V) and then quit. The Locating Beeper functions down to a voltage of 2.8 volts, i.e. even when the servos quit working a long time ago!

The Solution:
The Locating Beeper (model finder) is the solution for finding the model quickly. When the model is lost it generates an ear piercing warning sound which is easily localized and leads directly to the model. The Locating Beeper is simply connected to and supplied by a (free) receiver channel just like a servo. It does not matter which receiver is utilized (PPM, PCM, IPD or 2.4GHz) – every receiver works in connection with the Locating Beeper!

PRO-Version with integrated battery:
Sometimes a model gets partially damaged when landing out side. Under certain circumstances the receiver battery might be jerked out of the model or its connection cable can be disconnected. It can happen that servos block or a short occurs in servo cables during out side landing.

Due to high current consumption the receiver battery is quickly discharged – possibly before the model is found. Because the receiver set is without energy the Locating Beeper is not supplied with power anymore. In this situation it is no good as model finder.

The PRO-version of the Locating Beeper contains a battery! It supplies the Locating Beeper with energy for 2 hours – totally autarky!

The built in battery is automatically charged as soon as the receiver set is turned on. Charging lasts approx. 10 minutes for an empty battery and automatically stops when the battery is fully charged. There are many advantages by using this new revolutionary battery type: practically no self discharge and virtually unlimited life span (up to 1 million charging cycles!).

Hint:
The **Locating Beeper PRO** contains a new revolutionary battery with a practically unlimited life span! It supplies the electronics with energy for more than 2 hours and automatically recharges as soon as the receiver is turned back on.

Due to its autarky supply the **Locating Beeper PRO** can also serve as tow rope finder (see chapter 4.3.). Even monitoring the voltage of electronically systems (up to 8.4V) is possible. As soon as the supply of the corresponding system fails the **Locating Beeper PRO** sounds alarm with its pervading alarm signal. The energy of the internal battery lasts for 2 hours.

1.1. Summary

- Ingenious system to find models landed out side (wheat- or corn-field, high grass, underneath edge of mountainside, and so on)
- Also usable as tow rope finder if tow rope falls into hard to view terrain (only PRO-version)
- Finding is accomplished by an ear piercing tone with more than 90dB sound pressure
- Two SMD loudspeaker for more safety and higher loudness
- Simple connection to a (free) receiver channel
- Additionally, the Locating Beeper monitors the receiver's supply and activates a low voltage alarm if necessary

- PRO-version with autarky supply due to integrated battery
- Sounding of alarm occurs caused by missing or erroneous servo signal, a defined failsafe signal or interruption of the supply (PRO-version)
- Simple deactivation (switching channel at transmitter) immediately before turning the receiver off inhibits unwanted alarm (PRO-version)

ATTENTION:
The Locating Beeper has two loudspeakers which generate a very high sound pressure (high loudness). Under no circumstances hold the Locating Beeper during operation close to or into the ear! This can lead to permanent damage of the sense of hearing.

2. Mounting

Delivery of the **Locating Beeper** includes a tube clamp. This clamp is simply mounted onto a board inside the models fuselage. The Locating Beeper is pressed into the clamp and is therefore fixed. If necessary an O-ring or some rubber band can be used additionally in order to secure the clamp ends. Of course any other mounting method (e.g. silicone or hot melt adhesive) is possible.

In order to allow for good sound opening select a position inside the model where the sound opening is not covered or disabled.

The connection cable connects to a free, failsafe capable receiver channel in order to utilize all features of the **Locating Beeper**.

3. Functionality

There are several options for activating the alarm:

- A defined servo position, e.g. by a switching channel of the transmitter (servo position < -100%)
- The defined servo position of a servo which is connected in parallel to the Locating Beeper (e.g. choke servo or tow release)
- Failsafe setting of the servo position (e.g. turning the transmitter off)
- Missing or erroneous servo signal (e.g. turning the transmitter off)
- Suddenly missing external supply (PRO-version only)

The receiver does not deliver a servo signal (PPM modulation) if the pilot turns the transmitter off. This is recognized by the Locating Beeper which then will signal alarm.

For 2.4GHz sets or when using PCM modulation, i.e. if servo signals of the receiver assume a failsafe value caused by a missing transmitter signal, then the Locating Beeper recognizes a defined servo signal (failsafe < - 100%), which also leads to an alarm.

As an additional feature, the Locating Beeper monitors the receiver supply. As soon as it drops below 4.8 volts, a continuous alarm is output by buzzer codes (**low voltage code**). This alarm indicates to the pilot an under supplied receiver.

Triggering buzzer codes and their meaning:
There are several acoustically error codes with different meanings which the Locating Beeper can output.

3.1. Low Voltage Code

As soon as the receiver voltage drops below 4.8 volts an alarm sounds after a qualification time of 2 seconds, i.e. a continuously repeating alarm signal. The signal corresponds to the low voltage code of the EMCOTEC DPSI family devices, 3 times short and one time long, repeated every 7 seconds.

Output of the buzzer signal continues until turning the equipment off, this means the indication is not reversible. This error points to an empty battery or to high voltage drops of the receiver which in the worst case can lead to a reset of the receiver. If low voltage is detected, a corresponding signal occurs.

If there is no servo signal detected by the Locating Beeper after the set is turned on for 5 seconds, it is assumed that it should not monitor a servo signal but rather only the receiver supply.

This is a special case! There is only an error indication for low voltage (supply < 4.8 volts) and servo signal evaluation is not carried out.

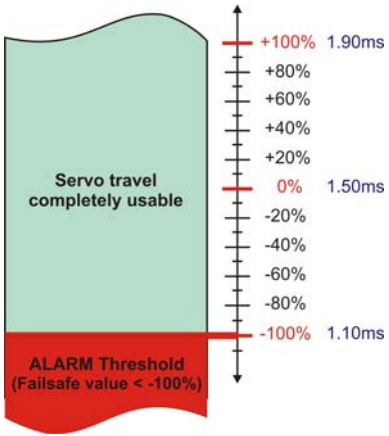
3.2. Model Finder Code (Failsafe)

The **Locating Beeper** outputs a special alarm signal similar to the S.O.S. signal (3 times short, 3 times long and 3 times short) when the servo signal is missing, erroneous or assumes a certain value (failsafe state). The signal repeats every 4 seconds.

Alarm starts with following conditions
Servo pulse length shorter than 0.8ms (corresponds to -175%)
Servo pulse length longer than 2.2ms (corresponds to +175%)
Servo pulse distance is smaller than 10ms (error - malfunction)
Servo pulse distance is longer than 40ms (no servo signal)
Servo pulse exceeds failsafe threshold (< -100%)
Supply voltage interrupted (only PRO-version)

The failsafe threshold is fixed at -100% (1.1ms pulse width). This means: as soon as the servo signal gets < -100% the alarm triggers. The total servo range from -100% up to +100% is usable as normal (e.g. for tow release- or choke servo). An actual S.O.S. error output is interrupted as soon as the servo signal returns to valid values!

Hint:
The Locating Beeper does not evaluate servo signals for the first 5 seconds after turning the receiver on.



4. Specifics of PRO-Version

The **PRO**-version of the Locating Beeper behaves just like the normal version as far as the low voltage alarm is concerned. Model finder alarm (S.O.S. alarm signal) which results from an erroneous servo signal is still output by the **PRO**-version if the receiver supply is interrupted or missing.

The S.O.S alarm signal is repeated every 4 seconds. An exception is the autarky operation, i.e. if the external receiver supply is interrupted. Now the distance of the signals is up to 10 seconds depending on the charge state of the integrated battery.

4.1. Deactivating the Alarm Function

For **Locating Beeper PRO** (with integrated battery) the alarm function must be deactivated by a certain sequence (servo signal) before the receiver can be turned off. Because the receiver's voltage drops and the servo signal starts missing also when purposely turning the receiver off, the Locating Beeper would recognize this as an error and starting outputting the alarm codes. This is not desired in this case!

Hint:
The Locating Beeper PRO must be deactivated before turning the receiver off – otherwise an alarm is triggered!

In order to inhibit undesired alarm output the servo signal must be switched 2 times between 2 values in between a certain period (pass and fail). This can be accomplished by a toggle switch in the transmitter. In a model, the function can also be combined with the tow release (or the choke servo in a motor driven model).

The user must switch the servo channel 2 times between 2 values (value 1 < -100%, value 2 > -100%) before turning the receiver off!

Only then the alarm function will be deactivated which is acknowledged by the buzzer with a confirmation tone (3 beeps).

If the receiver is not turned off within 60 seconds, the alarm function is reactivated again.

Deactivating the alarm function:

- Switch to fail position (servo signal < -100%)
- Count to “twenty-one” theoretically
- Switch to normal position (servo signal > -100%)
- Count to “twenty-two” theoretically
- Switch to fail position (servo signal < -100%)
- Count to “twenty-three” theoretically
- Switch to normal position (servo signal > -100%)
- Count to “twenty-four” theoretically

Now the following switching times are considered valid by the Locating Beeper: 500msec < switching time < 1000msec.

Hint:
With each switching to the fail position (servo signal < -100%) a signal of 3 short beeps is output. This serves as control and function test!

Hint:
An acoustically confirmation is output after a “deactivating sequence” is recognized. The alarm function is then locked for 60 seconds. If the receiver is turned off within these 60 seconds, no alarm is triggered.
After 60 seconds, the lock is automatically released. This action is confirmed with 3 short beeps, too.

Hint:
If after a normal turn on NO servo signal is sent to or measured by the Locating Beeper, it assumes that it should not monitor a servo signal but only monitor the receiver or input voltage. This is a special case => tow rope finder (chapter 4.3)!

Output of buzzer signals of the **PRO**-version occurs until the internal battery is empty, a renewed supply voltage is again provided externally, a valid servo signal is recognized or the alarm is deactivated – depending on the event which triggered the alarm.

4.2. Deactivating the Alarm Signals

The user can stop the output of an alarm signal if the **Locating Beeper PRO** runs autarky (i.e. supplied by its internal battery).
The alarm output beeps for more than 2 hours if not stopped until the internal battery is empty.

There are deactivating possibilities, depending on the event which triggered the alarm.

If the alarm was triggered by servo signal monitoring:

- Deactivation only by a valid servo signal, i.e. turning the receiver back on. Deactivation of the alarm function is described in chapter 4.1.

If the alarm was triggered by voltage monitoring (e.g. function of the tow rope finder):

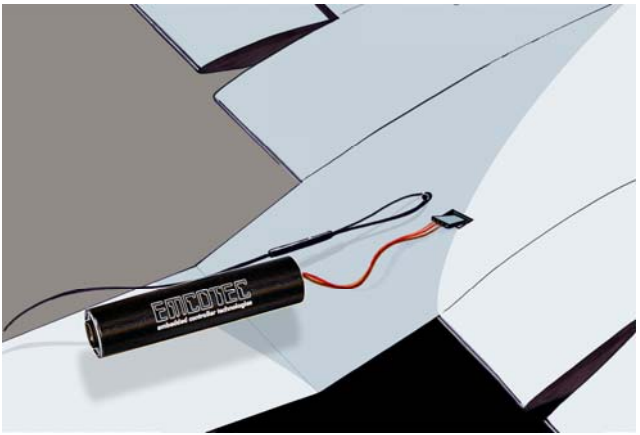
- Connect an external supply voltage or
- Connect minus and servo pulse

If both pins minus (brown) and pulse (orange) of the connection cable are shorted the error output is stopped after 1 second. Use the delivered short circuit jumper (see photo).

4.3. Tow Rope Finder

The **PRO**-version of the Locating Beeper can be used as tow rope finder also. Mount it to the tow rope (close to the tow release of the model). Additionally mount a servo extension cord close to the tow release of the model which connects to a free receiver channel. Remove the plastic housing at the fuselage side of the cable (see photo) so the plug of the Locating Beeper can easily slide out of the socket of the Locating Beeper.

Connect also the connection cable of the Locating Beeper when hooking up the tow rope. After turning the receiver on, the internal battery of the Locating Beeper is automatically recharged.



After the tow rope releases, the plug of the Locating Beeper slides out of its socket; the Locating Beeper sounds the S.O.S. alarm signal. If the rope falls into a field it is easily localized due to the alarm signal of the Locating Beeper. Connecting the shorting jumper stops the alarm (see 4.2.).

A similar application is monitoring of dropped parts (e.g. model sky diver). Here too, the Locating Beeper eases locating.

An additional application is monitoring of supply voltages of electronically systems driven by power supplies which must not fail (e.g. alarm devices). If these systems are supplied approx. 5 volts to 8.4 volts the **Locating Beeper PRO** can be used.

The Locating Beeper is simply connected in parallel to the device. As soon as the monitored supply voltage fails, the Locating Beeper will point to the event by outputting its alarm signals.

4.4. Specifics for Empty Battery

The system needs a few seconds to “get ready” if the integrated battery of the **Locating Beeper PRO** is totally discharged. This is recognized by a strange clicking noise with different beeps of the Locating Beeper after turning it on. This can last up to 20 seconds. Then normal operation starts.

5. Technical Data

Locating Beeper	
Operating Voltage Range	2.5 … 8.4V
Quiescent current (when off)	Approx. 1.5mA
Current Consumption Buzzer Active	Approx. 160mA
Low Voltage Recognition	Starting < 4.8V
Buzzer Loudness	Approx. 90dBA
Buzzer Frequency	Approx. 3.2kHz
S.O.S. Alarm Signal at	Servo Pulse < -100% (< 1.1msec) Servo Pulse missing Servo Pulse erroneous
Temperature Range	-20°C … +70°C / -4°F … 158°F
Reverse Polarity Protection	Yes
Dimensions	43.2mm x 17.8mm / 1.7" x 0.7" (length x diameter)
Weight	11g / 0.353658 oz.
Specialties PRO-Version	
Current Consumption turned off	< 1µA
Current Consumption Charge active	Approx. 170mA for 7 minutes max.
Battery Charging Time	10 minutes with empty battery max.
Battery Capacity	For 2 hours Alarm Signal Output
Battery Life Time	Up to 1Mio. charge cycles
Safeguard	Protection circuitries for charge, over charging, reverse polarity, total discharge protection
Specialties	Special maintenance free battery
Dimensions	78mm x 17.8mm / 3" x 0.7" (length. x diam.)
Weight	23g

6. Safety Instructions

- In general, all connecting lines should be run so that they do not come into contact with moving or hot parts of the model (such as servos, gears or sound absorbers).
- The **Locating Beeper** must be protected from humidity and moisture.
- The **Locating Beeper** must be located at a sufficient distance from neighboring surfaces to enable good heat dissipation of the heat sink.
- Improper handling of the **Locating Beeper** can result in serious damage to property or injury of persons! Particular attention is to be given to the high sound pressure of the built in alarm actuator which can damage the sense of hearing. Never hold the sound opening g directly into ear!
- Carry out a general inspection of all connections in your model before each use! All plugs must be correctly polarized and have clean contacts (i.e. fit tightly). Loose cables present a potential hazard!
- Under no circumstances may power sources being used that do not meet the specified voltages.
- The **Locating Beeper** may not be taken apart or technically altered under any circumstances.
- Never use the **Locating Beeper** for purposes other than for RC model building as a hobby. Above all, their use in passenger-carrying equipment is strictly prohibited.
- Operate the **Locating Beeper** only with the remote control components provided for model making.
- Always ensure that you have fully charged batteries when operating your model. Empty batteries inevitably lead to failure of the RC components, which cause the model to crash.
- Do not expose the **Locating Beeper** to any extremely hot or extremely cold temperatures, moisture or humidity. This would lead to danger of malfunction, damage or decreased efficiency.

7. Warranty

EMCOTEC GmbH shall issue a 24-month warranty on the **Locating Beeper**. The guarantee period shall begin with delivery of the equipment by the retailer and shall be not extended by any guarantee repair or guarantee replacement.

During the period of guarantee, the warranty shall cover the repair or replacement of any proven manufacturing or material defects at no charge. There shall be no specific entitlement to repair work. In case of a guarantee claim, the manufacturer shall reserve the right to exchange the equipment for a product of equal value if repair of the item is not feasible for economic reasons. There shall be no assumption of liability for consequential damages that are brought about by a proven defect during operation of the **Locating Beeper**. There shall be no extended claims for damages.

- All transportation, packaging and travel expenses shall be borne by the purchaser.
- No liability shall be assumed for any damages during transport.
- If repair is needed, the equipment must be sent to the appropriate service center of the respective country or directly to EMCOTEC GmbH.
- The guarantee shall only be valid when the following conditions are met:

  The guarantee document (original invoice) must include the delivery date, the company stamp, the serial number and signature of the retailer.

  No intervention in the equipment may have been undertaken.

  It must have been operated in accordance with our operating instructions.

  Only the power sources and other accessory devices and components that were recommended by us may have been used.
- The guarantee document, the original invoice and other pertinent information regarding the malfunction (a short description of the defect) must be included with the transmittal.
- The equipment must still be the property of the initial purchaser.
- If equipment is sent in that later proves to be functional following an initial inspection, we shall impose a flat processing fee of € 15.
- In all other respects, the general business terms and conditions of EMCOTEC embedded controller technologies GmbH shall apply for any items not listed.

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- DPSI
- DPSI RV

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