Alpine Rescue Equipment
TYROMONT

Instruction manual
Technical Specifications

Training Transmitter TT2022®

P/N 93930

457 kHz transmitter for training the basic knowledge of
Avalanche transceivers

Read this manual carefully and retain it for future references.

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Document - Versions

00.00	October 21, 2022	first draft, unofficially prerelease
01.00	#####	Rework, official release
02.00	#####	rework
03.00	#####	rework,
04.00		
05.00		

Before commissioning, read the following general warnings:

- The TT2022 may only be used for indoor training
- Read and follow all instructions and information described in this manual
- Use only the specified battery technology
- Do not make any modifications to this unit
- If the unit is damaged, return it to the manufacturer for repair
- Do not open the unit, opening the housing will void the warranty
- A full functional check must be carried out by the manufacturer

Note for Recycling

The electrical appliances must not be disposed of with household waste. It is your responsibility to dispose of your old appliances to a designated electrical appliance recycling centre.

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Author :	Marcel Würgler
Version :	1.00
Created :	August 19, 2022 10:00 AM
Modified :	September 11, 2022 09:00 AM
File Name :	TYR_Operating_Instruction_LVS_Trainings_Tool_v22_10 .docx

1. Introduction

This document describes the 457 kHz transmitter TT2022 as well as the coupling layer template of the company Girsberger.

2. Description

The 457 kHz transmitter TT2022 in combination with the coupling layer template made of technical fabric is the perfect equipment for training the basic knowledge of three-antenna avalanche transceivers, especially the basic knowledge on the subject of range. The range depends on the two factors of reception characteristics and antenna orientation (coupling position) between transmitter and receiver.

The transmitting power of the TT2022 is reduced by a factor of 10, which makes it possible to illustrate at a short distance of 120 cm how the range in the search phases signal search and coarse search depends on the coupling position and how this also affects the directional display in the receiving mode (search).

3. Main Features

- Ideal set for avalanche training on the subject of range and its dependence on the coupling position
- Set consisting of a transmitter and a technical fabric with representations of three possible coupling layer graphics as a template
- Transmitter works on the international standard frequency of 457 kHz and is therefore compatible with all avalanche transceivers
- Transmitting field strength reduced by a factor of 10 compared to standard ETS 300718
- Simple operation, immediately ready for use
- Battery powered
- Very long battery life
- Small dimensions and weight
- Electronics and design Design of the coupling layer templates Graphics developed and manufactured in Switzerland (Girsberger Elektronik AG)
- Housing developed and manufactured in Austria (Tyromont GmbH)

4. Avalanche Transceiver Operating Modes

4.1 Send / Senden

The **Send / Senden** mode is activated after switching on, and the avalanche transceiver is attached to the body during the tour by means of a carrying system.
All avalanche transceiver a pulse in the form of electromagnetic waves (field lines) on the X antenna on the internationally standardised frequency 457 kHz approx. once per second (pulse duration approx. 70 to 140 ms).
Note: Manufacturer-specific position-dependent switching from X to Y antenna possible!
However, these waves (field lines) are not directly visible and are difficult to visualise. On the coupling layer template, the field lines and their course are therefore shown in simplified form as white lines starting from the X antenna of the transmitter.
The closer the individual field lines are to each other (closer to the transmitter), the stronger the signal.

4.2 Search / Empfangen

The operating mode **Search / Empfangen** is activated after an avalanche for locating buried people, or the unit is switched from transmitting to receiving (search). In this mode, the signal is received in the far range (signal search, coarse search) with the X, Y and in the near range (fine search) with all three antennas, processed and visually shown on the display as information for the searcher (distance and direction indication).

5. Avalanche Transceiver Range, Coupling Position

The range of an avalanche transceiver depends on the coupling position (orientation) of a buried avalanche transceiver to a searching avalanche transceiver. The information on the display (distance and direction) of the searching transceiver depends on the intensity and direction of the magnetic field lines at the location of the searching transceiver.
The transmitting and receiving characteristics of a transceiver are elliptical. Put simply, a transmitting transceiver does not have the same transmitting power in all directions and a receiving transceiver does not have the same receiving power from all directions, also due to the different and design-related sizes of the X, Y and Z antenna.

6. Training - Procedure, Instructions

6.1 Choice of Location, Interferences

The location must be as free as possible from disturbances so that during the demonstration / training the receiving operation of the avalanche transceiver to be used is not influenced.

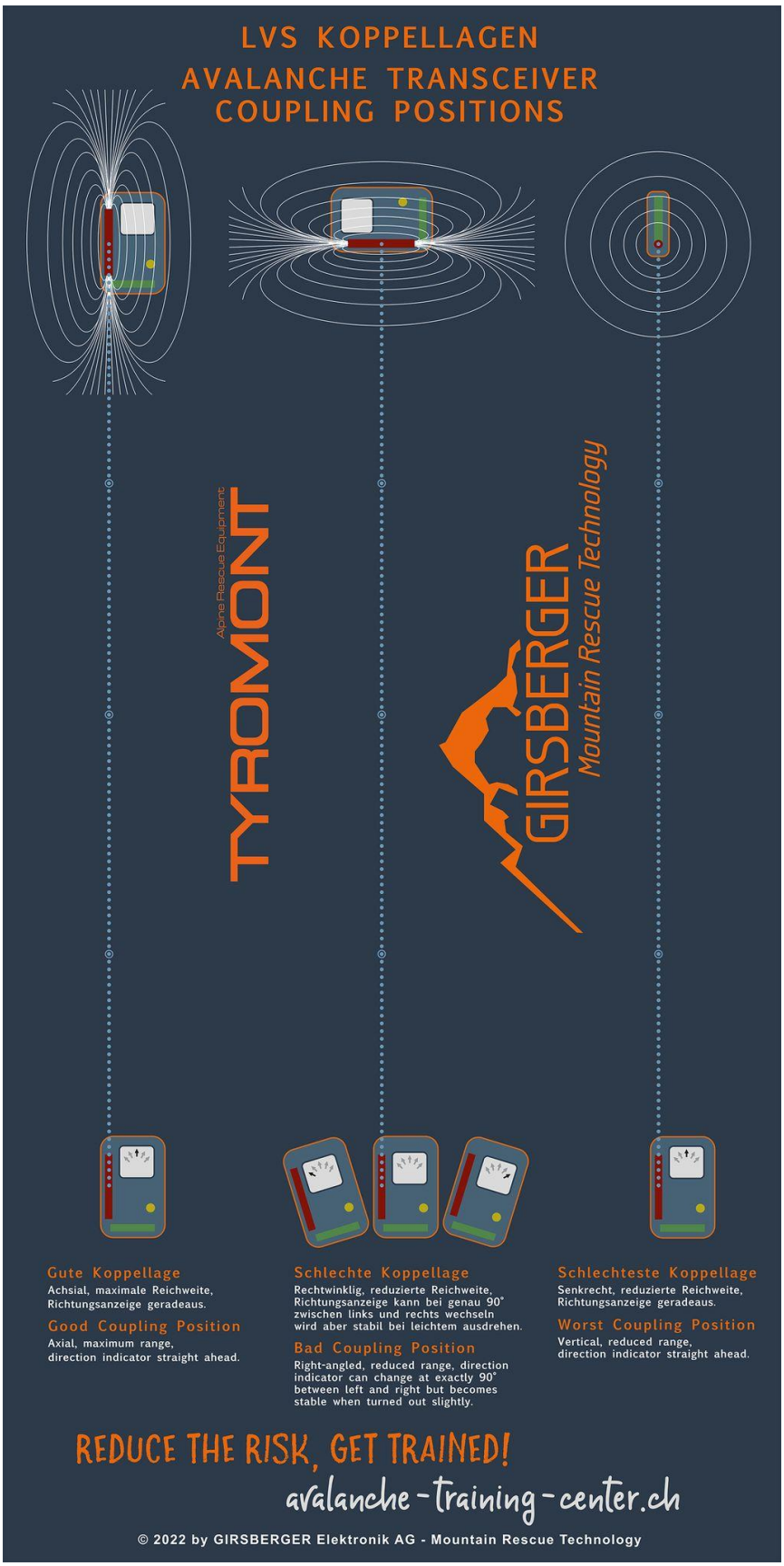
All transceiver within a radius of 100 m must be switched off.

When using the coupling layer template on a table, make sure that there are no metal parts under the tabletop. Preferably use a wooden table.

When using the coupling layer template on the floor, make sure that there are no metal parts or electrical cables underneath.

6.2 Coupling Layer Template

Three possible and decisive coupling positions are shown on the coupling position template (see following figure). It serves as a template and to position the TT2022 transmitter and an avalanche transceiver in reception mode in alignment with each other, precisely and at a distance of distance of 120 cm.
First, the "good coupling position" is instructed, which is also used as a reference measurement.
Due to the reduced transmission power of the TT2022 (factor 10), a distance of 12 m is displayed on the transceiver. Then the two other coupling positions are instructed.


LVS KOPPELLAGEN
AVALANCHE TRANSCEIVER
COUPLING POSITIONS
TYROMONT
Alpine Rescue Equipment
GIRSBERGER
Mountain Rescue Technology
Gute Koppellage
Achsial, maximale Reichweite, Richtungsanzeige geradeaus.
Good Coupling Position
Axial, maximum range, direction indicator straight ahead.
Schlechte Koppellage
Rechtwinklig, reduzierte Reichweite, Richtungsanzeige kann bei genau 90° zwischen links und rechts wechseln wird aber stabil bei leichtem ausdrehen.
Bad Coupling Position
Right-angled, reduced range, direction indicator can change at exactly 90° between left and right but becomes stable when turned out slightly.
Schlechteste Koppellage
Senkrecht, reduzierte Reichweite, Richtungsanzeige geradeaus.
Worst Coupling Position
Vertical, reduced range, direction indicator straight ahead.
REDUCE THE RISK, GET TRAINED!
avalanche-training-center.ch
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6.3 Preparation

1. Lay out the coupling layer template on a table or on the floor
2. switch on TT2022 (insert battery)
3. switch on any transceiver and switch to search mode (only use three-antenna devices)

6.4 Instructions «Good Coupling»

- Place the TT2022 and the avalanche transceiver on the coupling layer template as shown on the left and align them
- The transmitting and receiving antennas are positioned axially or coaxially to each other
- In this "good coupling position" the maximum range is achieved
- The direction indicator must point straight ahead

6.5 Instructions «Bad Coupling»

- Place and align the TT2022 and the avalanche beacon according to the middle illustration on the coupling layer template
- The transmitting antenna is at right angles to the receiving antenna
- In this "bad coupling position" a reduced range is achieved, thus a higher distance of several metres is displayed on the transceiver
- The direction indicator becomes unstable when aligned exactly 90° and will alternate between left and right, but becomes stable on both sides when turned out slightly

6.6 Instructions «Worst Coupling»

- Place the TT2022 and the avalanche transceiver vertically according to the illustration on the right on the coupling layer template and align them
- The transmitting antenna is vertical to the receiving antenna
- In this "worst coupling position" an even shorter range is achieved, thus an even greater distance of several metres is displayed on the transceiver
- The direction indicator must point straight ahead

7. Compatibility

The TT2022 is compatible with all avalanche transceivers that comply with the EN300718 standard and therefore operate on the 457 kHz frequency.

8. Technical Specifications

8.1 TT2022

Transmitting frequency:	457.0 kHz +/- 25 Hz
Transmitting field strength:	0.2 mA/m at 1 m distance (factor 10 lower than in standard EN300718)
Transmit pulse / period duration:	100 / 1000 ms
Power supply:	1 x alkaline battery 1.5 V type IEC LR6 (AA)
Battery life:	720 hours
Operating indicator:	LED green approx. 20...100 %, LED red approx. 20 %
Operating temperature range:	- 20° C to + 40° C
Housing material:	plastic
Dimensions:	77 x 60 x 23 mm
Weight:	100 g (incl. battery)
Protection class:	No protection

8.2 Coupling Layer Template

Material / design:	Textile fabric, waterproof
Dimensions:	1000 x 2000 mm
Weight:	230 g

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9. Warranty

Limited two-year warranty

Girsberger grants a warranty period of 2 years for the TT2022. Calculated from the date of sale according to the sales receipt.

Warranty conditions

The transmitter must be operated in accordance with the instructions in this manual.
In the event of a warranty claim, all parts which are proven to have material or manufacturing defects will be replaced free of charge.
Damage caused by improper handling and normal wear and tear is excluded.
The warranty claim expires for devices that have been opened by the purchaser or unauthorised third parties as well as for devices that have not been used with original spare parts and accessories or those recommended by the manufacturer.

10. Information

The basic idea of the training tool, the electronics development and production as well as the design of the coupling layer template originate from Girsberger Elektronik AG.

Technical data may change at any time and without prior notice.