

PROTRACK™ DYTTER

AUDIBLE ALTIMETER & FREEFALL COMPUTER



MANUAL

PROTRACK™ DYTTER

AUDIBLE ALTIMETER & FREEFALL COMPUTER

Manufactured by:



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Brusgaard**

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Larsen & Brusgaard operates a policy of continuous development. Therefore, we reserve the right to make changes and improvements to any of the products described in this guide without prior notice.



!!! WARNING !!!

Do not put the PRO-TRACK directly next to the ear when testing the alarm sounds on the ground.

The PRO-TRACK alarm volume is very loud, especially when the alarm volume is set to "HI Volume". It may cause pain or even damage to the ear.

Due to outside wind noise in freefall the alarm sounds will not be as loud as when testing the PRO-TRACK on the ground.

If the PRO-TRACK is not mounted correctly you may not hear the alarm sounds in freefall. Make sure the PRO-TRACK is mounted correctly before you jump.

Use the PRO-TRACK at your own risk.

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Introduction

The Pro-Track comprises *three* instruments:

1. An *audible altimeter* with three selectable warning altitudes
2. An *electronic logbook*, storing and displaying detailed information about the last 200 jumps and displaying the accumulated number of jumps and freefall time up to 9,999 jumps
3. A *datalogger*, storing freefall profiles for the last 10 jumps

The Pro-Track may be used as an *audible altimeter* only or together with the *electronic logbook* and *datalogger*. In the latter case Larsen and Brusgaard recommends that the Pro-Track is mounted on the lower part of the leg. See page 45.

The Pro-Track is designed to use the latest developments in microcomputer technology and freefall parameters.

All information is continuously stored in a non-volatile memory.

Logbook data and jump profiles can be transferred to a PC by means of the **Data-Track** unit and **Jump-Track** PC software (optional accessory).

Among other features are:

- **User selectable feet/meters and mph/kmh**
- **Display of speeds in True airspeed (TAS) or Skydiver's airspeed (SAS)**
- **Automatic or battery saving mode**
- **Adjustable output volume**
- **Display of date and time**
- **Display of climb information:** Present altitude,
Estimated altitude in 5 minutes
Climb rate
- **Display of dive types (AFF, Tandem, Surf, etc)**

The thin and ergonomic curved design ensures a perfect and comfortable fit to your ear when put within a "frap" hat or hard helmet.

A **snap-on Holder** is included for mounting the Pro-Track on the outside of any type of helmet or on a pair of goggles.

The Pro-Track is compatible with the **Light-Track** visual warning system, goggle mounting kit and leg strap mount.

The Pro-Track has many useful features and we know you will enjoy jumping the unit.

LARSEN & BRUSGAARD

Road Map Description

It is recommended that you first familiarize yourself with the **PRO-TRACK ROAD MAP** which is a very helpful tool when using the Pro-Track for the first time.

The **ROAD MAP** consists of two selectors: **MODE SELECTOR** and **SET SELECTOR**.

MODE SELECTOR

In the **MODE SELECTOR** you can,

- view jumps
- preset three warning altitudes in three Warning Memory Banks
- go to the **SET SELECTOR**
- view the accumulated number of jumps and freefall time
- download jump information to a PC (requires the Jump-Track PC software accessory)
- set the clock.


SET SELECTOR

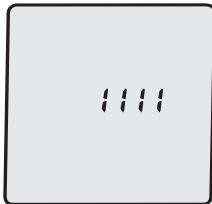
In the **SET SELECTOR** you can,


- **preprogram dive type**
- **select feet/mph or meters/kmh**
- **select True airspeed (TAS) or the compensated reading, Skydiver's airspeed (SAS)**
- **select Automatic or Economize (battery saving mode)**
- **turn the Logbook on or off**
- **set the alarm output volume to HI or LO, and test the sound patterns**
- **perform Manual Zeroing**
- **delete the last jump**
- **delete all information in the logbook**
- **exit the SET SELECTOR**


Performing ACCESS

To gain access to the Pro-Track, press  in the following sequence:

1. Press  (short beep sound) and release quickly.



2. When the unit displays "1111", immediately press  again (short beep sound) and keep it pressed.

3. When the unit displays "2222", release  (two short beep sounds). ▶



Now the Pro-Track displays information in the **Main Window** about the last jump.



Note: The unit will leave ACCESS if no button is pressed within 60 sec


MODE SELECTOR


Main Window

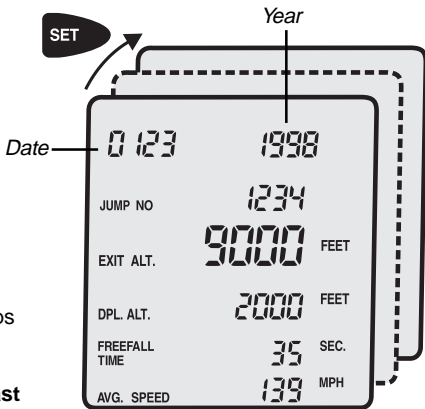
Provided the Logbook has been turned to ON and the freefalls have lasted more than seven seconds, the Pro-Track will display information about the jumps in the Main Window.

The information on the display includes:

- Date
- Year
- Jump no.
- Exit altitude
- Deployment altitude
- Freefall time
- Speeds

To leaf through the previous jumps
press .

Press  to return to the last jump.



Main Window

Speed Information

The Pro-Track can display four different terminal speed informations in mph and kmh:

1. Max speed, 2. Average speed, 3. Average speed during the first half of the freefall and 4. Average speed during the second half of the freefall.

All speeds are calculated from **15 sec after exit to 7 sec before deployment.**

If the freefall lasted between 20 and 30 sec.

The display shows:

- **Max speed**



If the freefall lasted between 30 and 40 sec.

The display shows:

- **MAX speed**

- **AVG. speed**



If the freefall lasted more than 40 sec.

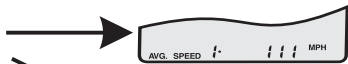
The display shows:

- **MAX speed**

- **AVG. speed**

- **The average speed during the first half of the freefall (1)**

- **The average speed during the second half of the freefall (2)**



NOTE: If the freefall lasted less than 20 sec. the display shows no speed information

A small dot next to MAX / AVG indicates when the speed readings are set to Skydiver's airspeed (SAS).

Supplementary Jump Information

The PRO-TRACK can also display freefall speeds in **ft/sec and m/sec.**

To change the speed reading **from mph to ft/sec. (km/h to m/sec.)** press and hold **MODE**.

After a few seconds the display changes and displays **date/year/jump no./Dive Type and speeds in ft/sec. (m/sec.).**

Release **MODE** to return to Main Window.



Setting the Warning Altitudes

NOTE: If no button is pressed within 15 sec., the Pro-Track will leave ACCESS

NOTE: When **SET** is pressed and held, the numbers count up. To change direction of counting, release **SET** then press and hold again.

Press **SET** to change first warning altitude.

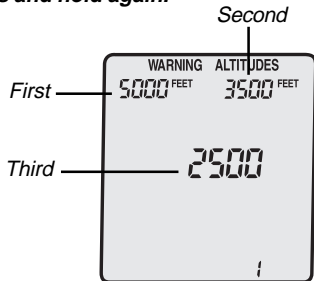
Press **MODE**, then **SET** to change the second warning altitude.

Press **MODE**, then **SET** to change the third warning altitude.

NOTE: The second and third warning altitudes cannot be set to an altitude higher than the first and second warning altitudes respectively.

Two warning altitudes: To choose only two warning altitudes, select same altitude for the first and second warnings. The Pro-Track will then sound only the second and third warning alarms.

One warning altitude: To choose only one warning altitude, select same altitudes for all three warnings. The Pro-Track will then sound only the third warning alarm.



Warning Memory Banks

The Pro-Track makes it possible to store warning altitudes in three custom "Warning Memory Banks". This is a useful option when jumping various types of jumps, e.g., AFF, Tandem, Camera, etc.

In the lower right-hand corner of the warning altitudes window a number indicates in which Warning Memory Bank the warning altitudes are stored.


The warning altitudes in the Memory Banks are factory preset as follows:

1st: 4,500 ft, 2nd: 3,000 ft, 3rd: 1,500 ft

To change between Memory Banks and edit factory settings:

Press and hold  . Keep  pressed and then press and release  to change between Warning Memory Banks.

The small number in the corner indicates the selected Warning Memory Bank.

Release  and the warning altitudes can be changed in the selected Warning Memory Bank as you would set them in the normal altitude warning adjustment mode.

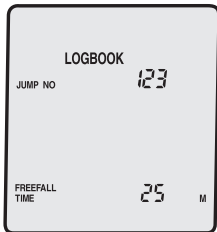


Warning Memory Bank


Note: The PRO-TRACK will sound at the selected altitudes that were displayed last on the LCD.

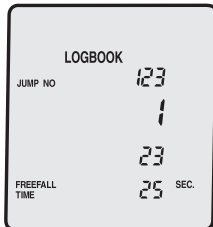
Setting the Logbook Totals

It is recommended that you update the Pro-Track logbook (your accumulated number of jumps and freefall time) before making the first jump with the unit.



◀ 1. Go to **Logbook Totals**.

2. Press and release  **three** times, and wait. After a few seconds the display changes and **Jump No.** starts flashing. ▶



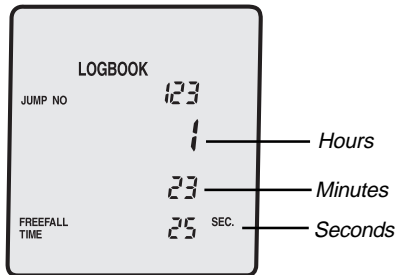
NOTE: *If no button is pressed within 15 sec., the Pro-Track will leave the Logbook Totals mode.*

The **SET** button now operates as follows:

When **SET is pressed and held, the numbers count up.**

To change direction of counting, release **SET and press and hold again.**

1. Press **SET** to count to accumulated number of Jumps
2. Press **MODE**, then **SET** to count to accumulated hours of freefall
3. Press **MODE**, then **SET** to count to accumulated minutes of freefall
4. Press **MODE**, then **SET** to count to accumulated seconds of freefall




NOTE: Logbook Totals are kept in memory when replacing batteries.

PC Mode



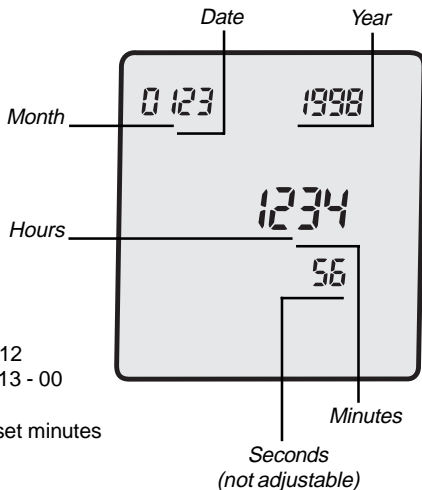
In this mode logbook data and jump profiles can be transferred to a PC by means of the **Data-Track** unit and **Jump-Track** PC software accessory.

Transfer of data is done by means of an infrared diode located on the rear of the Pro-Track.

Note: When  is pressed while in **PC mode** the Pro-Track starts to transfer data. **The buttons are disabled** during the sixty seconds it takes to transfer data (the display counts to 16,300).

Setting Date, Time and Year

1. Press and hold **SET** to preset month
2. Press **MODE**, then **SET** to preset date
3. Press **MODE**, then **SET** to preset year (1998-2050)
4. Press **MODE**, then **SET** to preset hours (24-hours' clock)
US 1 am – 12 noon = Europe 1 – 12
US 1 pm – 12 midnight = Europe 13 - 00
5. Press **MODE**, then **SET** to preset minutes
6. Press **MODE** to store data




NOTE: Clock setting is not kept in memory when replacing batteries.

SET SELECTOR

In the **SET SELECTOR** the following options can be selected:

- DIVE TYPE
- FEET/MPH / METERS/KMH
- (TAS) TRUE AIRSPEED / (SAS) SKYDIVER'S AIRSPEED
- (ECO) ECONOMIZE / (AUT) AUTOMATIC
- LOGBOOK ON/OFF
- (SND) SOUND: HI/LO
- (0000) MANUAL ZEROING
- DELETE LAST JUMP
- DELETE LOGBOOK
- OUT

TO ENTER THE SET SELECTOR

Go to **SET** window and press 



NOTE: *If no button is pressed within 15 sec. after choosing the SET window, the Pro-Track will leave ACCESS.*

SET SELECTOR Modes

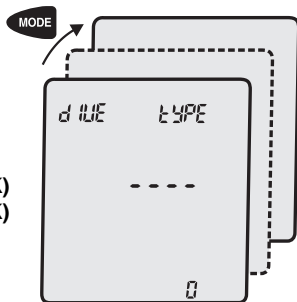
General: Once a mode has been chosen in the SET SELECTOR, it is not also necessary to press a button to store the choice.

DIVE TYPE

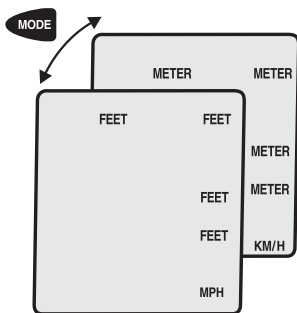
This mode is used to store Dive Types to be displayed in the Supplementary Jump Information Window.

Press **MODE** to select:

- 0 = --- (blank)
- 1 = 1 (User selectable in JUMP-TRACK)
- 2 = 2 (User selectable in JUMP-TRACK)
- 3 = AFF (Accelerated Free Fall)
- 4 = TAN (Tandem)
- 5 = BBF (Basic Body Flight)
- 6 = PHO (Photo)
- 7 = 4 (4-way)
- 8 = 8 (8-way)
- 9 = FrEE (Freestyle)
- 10 = SurF (Skysurf)
- 11 = HEAD (Head Down)



FEET/MPH / METER/KMH

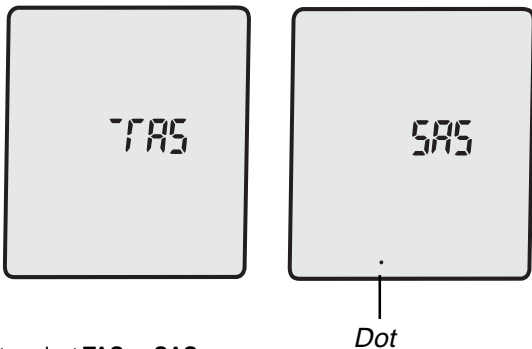


Press **MODE** to select *FEET/MPH* or *METER/KMH*

Note: Jump data is continually stored in both feet and meters, and mph and km/h. At any time stored information may be displayed in either unit of measurement by selecting the respective mode.

See Supplementary Jump Information chapter for changing mph to ft/sec.
and kmh to m/sec.

TAS (True airspeed) / SAS (Skydiver's airspeed)



Press  to select **TAS** or **SAS**.

A small **dot** is displayed in the **SAS** window. The **dot** is also displayed in the **Main Window** and Supplementary Jump Information Window when **SAS** is selected.

See separate chapter in the annex for explanation of **TAS** and **SAS**.

Note: Jump data is continually stored in both **TAS** and **SAS**.
Stored information may be displayed in either unit of measurement by selecting the respective mode.

AUT (Automatic) / ECO (Economize)

Description

Contrary to other audible altimeters from Larsen & Brusgaard that do not need to be turned on or off, the Pro-Track may be operated in two modes, **Automatic** and **Economize**. This feature enables the user to decide when it is most convenient to have the unit switched on or off.

If jumping frequently it is recommended to use the Pro-Track in **Automatic** mode. In this mode the battery life time is either about 1.5 years or 300 jumps.

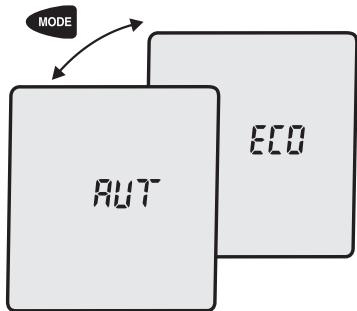
Economize is a battery saving mode and is used when jumping is mostly done in the week-ends. The battery life time is then about 5 years.

Function

Press  to select **AUT** or **ECO**.

Automatic

In **Automatic** mode the unit is active all the time and continually records the ambient air pressure and temperature and adjusts the electronic circuitry to the local elevation.



Economize

When set to **ECO (Economize)** the Pro-Track operates in a semi-automatic mode. It continually records the ambient air pressure and temperature and adjusts the electronic circuitry to the local elevation, but switches off 14 hours after the last jump or 14 hours after the last pressing of **MODE** whichever comes first.

The Pro-Track cannot switch off when in Jump Mode.

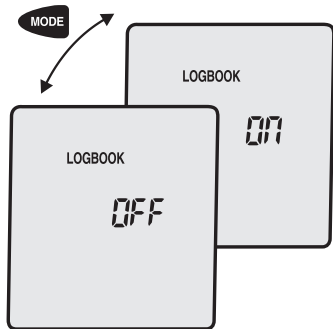
Press **MODE** or **SET** to restart the Pro-Track after it has switched off in ECO. After a few seconds the unit performs a test (display and sounds) and calibrates itself to the local elevation.

LOGBOOK ON/OFF

Press  to select **LOGBOOK ON** or **OFF**.

When the **LOGBOOK is ON** the Pro-Track automatically records and displays information about each jump for up to 200 jumps and stores the accumulated number of jumps and freefall time up to a total of 9,999 jumps.

When the **LOGBOOK is OFF** the Pro-Track stops recording.

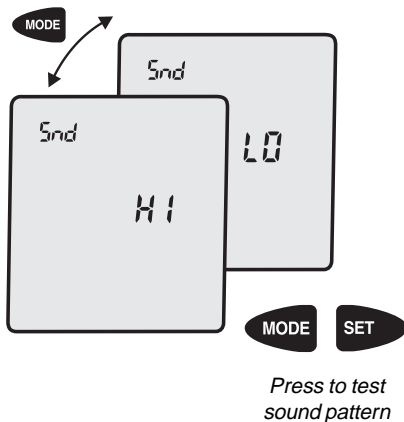


NOTE: In order not to risk recording jumps that are not required, select **LOGBOOK OFF** when shipping the device, when travelling on international flights or when lending out the unit.

Snd (Sound) HI/LO and TEST


Press **MODE** to select **output volume**.

Press **MODE** and **SET** simultaneously and the Pro-Track sounds the preset warning alarms at the selected output volume.



“0000” (Manual Zeroing)

When arriving at the Drop Zone the Pro-Track may be in **Jump Mode** (*ALTITUDE* flashes once every 7 sec.).

In this case it is necessary to **manually zero** the unit before jumping, as follows: **Go to “0000”, and press** 

The display changes and flashes “0000” five times while beeping at the same time.

When the manual zeroing is completed the display again flashes “0000” five times while beeping at the same time. The unit has now adjusted to the new ground level.

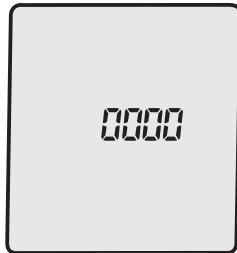
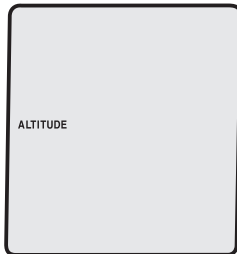
If the Drop Zone elevation differs from that of the airport:

Perform **Manual Zeroing** in the airplane at Drop Zone elevation, or compensate by adjusting the warning altitudes accordingly.

Perform **Manual Zeroing** before entering the airplane if the pressurized cabin will be activated.

NOTE:

Manual Zeroing cannot be performed when in Jump Mode above 2,000 feet.

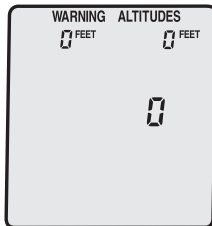



“JUMP NO dEL” (delete last jump)



In order to delete the last jump, a certain sequence must be followed:

Preset each of the three warning altitudes in the selected Warning Memory Bank to “0”



Go to “**JUMP NO dEL**”, press . All information about the last jump is erased. At the same time the accumulated number of jumps and freefall time are updated.

LOGBOOK dEL (delete logbook)



In order to delete the logbook, a certain sequence must be followed:

Preset each of the three warning altitudes in the selected Warning Memory Bank to "100"



Go to LOGBOOK "dEL", and press  .
All logbook information is erased.

Caution: The accumulated number of jumps and freefall time are also erased.

32 **Once  has been pressed there is no way to restore the information.**

OUT (to Main Window)



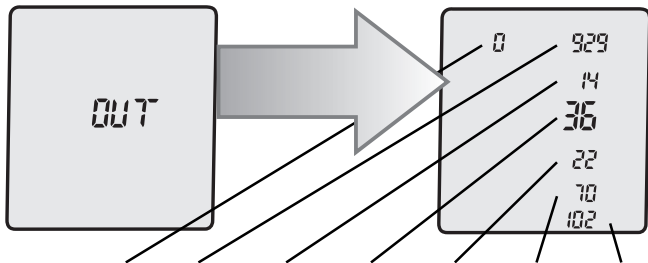
Serial Number

Each Pro-Track is programmed with a **unique serial number**.

To read the number:

Go to the **SET** window and enter the **SET SELECTOR**.

Press **SET** repeatedly. When the **OUT** window appears for **the fourth time** the Pro-Track displays the serial number.



SERIAL NUMBER:								
PURCHASED AT:								
DATE:								

It is recommended you write down the serial number for later reference in case you
34 need to contact LARSEN & BRUSGAARD or your dealer.

Function and Sound Sequence

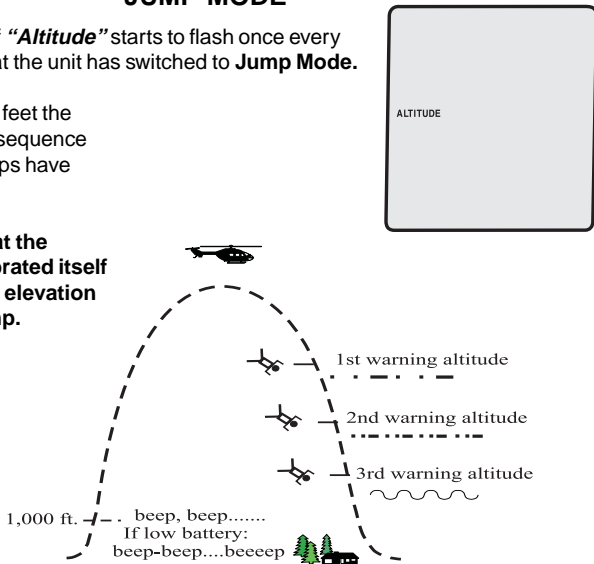
NOTE: Above 2,000 feet warning altitudes cannot be changed.

JUMP MODE

Shortly after take-off "**Altitude**" starts to flash once every 7 sec., indicating that the unit has switched to **Jump Mode**.

At **1,000 feet +/-100 feet** the Pro-Track sounds a sequence of beeps. These beeps have two functions:

1. They indicate that the Pro-Track has calibrated itself to the local ground elevation and is ready to jump.



2. The sequence indicates the altitude at which the highest warning is set.

Ex.: If set to **5,000 ft.** the sound sequence will sound: **beep-beep-beep-beep-beep.**


If set to **5,500 ft.** the sound sequence will sound:
beep-beep-beep-beep-beep-(pause)-beep.

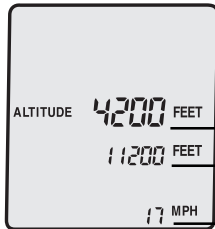
Note: The Pro-Track warning altitudes can be set with 100 ft. intervals, but it is only for each 500 ft. that the “-(pause)-beep” sounds.

Information Above 2,000 Feet

NOTE: Above 2,000 feet  **and**  **change function and can only be used for displaying jump information.**




◀ Above 2,000 feet press  to display the preset warning altitudes.



Present alt.

Estimated alt.
in 5 min.

Climb rate

36 Above 2,000 feet press  to display altitude and climbing information. ▶

Before Jumping

The Pro-Track has been factory preset as follows:

MODE SELECTOR

- Warning Memory Banks: 4,500 ft. – 3,000 ft. – 1,500 ft.
- Logbook Totals: 0 jumps
- Date: 01.23.1999
- Time: 12.34

SET SELECTOR

- Dive type: None
- Display reading: FEET / MPH
- TAS (*True airspeed*)
- ECO (*Economize*)
- Logbook OFF
- Sound: HI

Before making the first jump with the Pro-Track it is recommended to:

- select the warning altitudes (if different from factory presetting)
- update the logbook to your acc. number of jumps and freefall time
- choose AUT (automatic) or ECO (economize) *)
- turn the logbook on to start recording of freefall data
- set the date and time (to put the correct information into the logbook)

*) Please see chapter AUT (Automatic) / ECO (Economize)

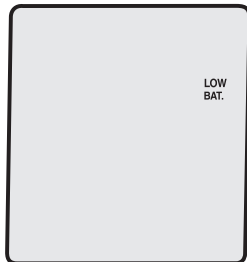
Low Battery

A “**Low battery**” condition is indicated as follows:

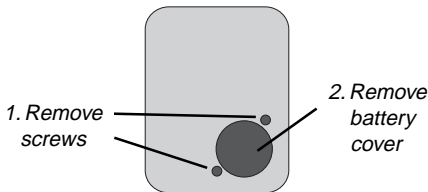
After performing **ACCESS**, the “**Low bat**” lights and the unit sounds an alarm.

A continuous alarm tone sounds for 5 sec when climbing through 1,000 feet.

The “**Low bat**” flashes once every 7 sec. when the Pro-Track is in **Jump Mode**.



Replace batteries when “Low bat” shows.



Be careful that tiny goldplated springs do not fall out

- Note polarity
- Use only CR 2330 or equivalent

Note:

After removal wait 120 sec. before installing new batteries.

Upon installing the new batteries press **MODE or **SET** and wait for self test to finish (display and sounds).**

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TAS and SAS

Definition

True airspeed (TAS) and **Skydiver's airspeed (SAS)** are two methods to calculate airspeeds.

TAS is a term used in aviation: It is the speed of an object relative to the surrounding air, regardless of the altitude.

SAS is a new concept developed by LARSEN & BRUSGAARD:

SAS is the speed of a skydiver calculated from measurements of air pressure and temperature and converted to a fixed air pressure (875.3 mb) and a fixed temperature (+7.08°C) which corresponds to 4,000 feet ASL.

TAS

Explanation

A skydiver's True airspeed (TAS) relative to the ground changes as a function of the altitude (air pressure) and temperature which makes it difficult to compare the fall rates.

Example: A skydiver (in a fixed freefall position) who has a terminal fallrate of 62 meters/sec at 10,000 feet. will have a terminal fallrate of 50 meters/sec at 3,000 feet.

From this it will be seen that the difference in altitude (air pressure), makes it difficult to compare the true fall-rates.

SAS

The SAS formula calculates, using the TAS information as though the complete skydive had been performed at a fixed air pressure and a fixed temperature which corresponds to 4,000 feet ASL.

4,000 feet is the chosen reference by LARSEN & BRUSGAARD since this is the average altitude at which the working time of a skydive is normally ended.

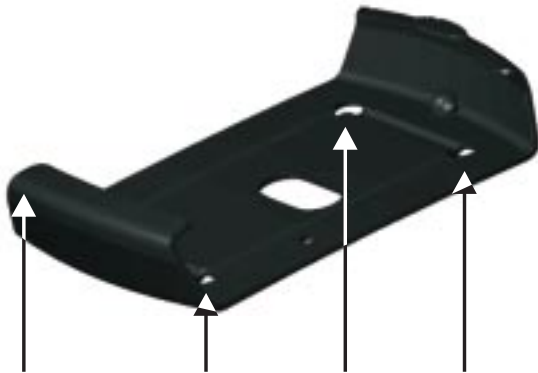
Conclusion

Using **SAS**, skydivers in any body position can express their vertical speed by a number (**SAS**). This number remains virtually constant regardless of altitude with little or no variance due to temperature differences and can be compared with the airspeeds of other skydivers.

This means that regardless of the elevation of the DZ you are jumping at, **SKYDIVER'S AIRSPEED (SAS)** will be the same for the same body position.

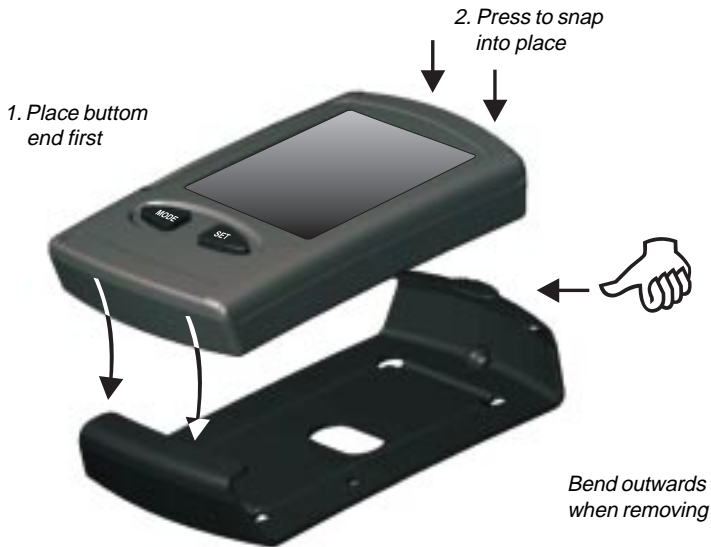
Mounting the Holder on a helmet

Loop 2.5 mm cable ties or threads through the four mounting holes and fasten on helmet.



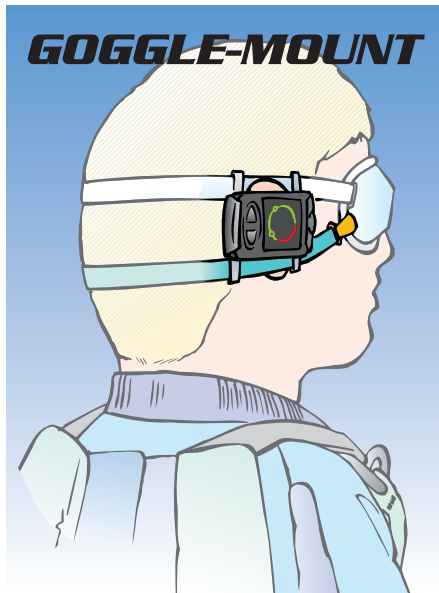
Mounting holes

Fixing the Pro-Track in the Holder



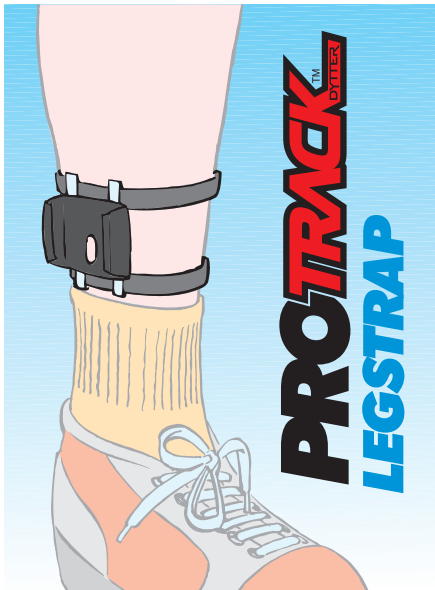
Mounting Assistance

When using the Pro-Track as an **audible altimeter** it must be mounted inside or outside the helmet or on the **Goggle Mount** (accessory) and next to the ear. Make sure that there is no material between the loudspeaker hole and the ear.



When using the Pro-Track **only as a freefall computer and electronic logbook** it may be put anywhere on the body. However, the closer the unit is put to the torso the more inaccurate the freefall data will be, due to air turbulence from the body, head movements, etc.

In order to record more accurate fall-rates (terminal speeds and jump profiles), Larsen & Brusgaard recommends using the **Leg-Strap Mount** (accessory) to put the Pro-Track on the lower part of the leg where the air flow is cleanest.



SPECIFICATIONS

MECHANICAL

Dimensions: 58 x 43 x 11 mm (2-1/4 x 1-3/4 x 1/2 inches)

Weight: 36 gr (1.6 oz)

LCD area: 9 cm² (1.4 inch²)

WARNING ALARMS

Altitude selection interval: 100 ft (25 m)

Calibration range: 0 – 9,900 ft (0 – 3,025 m)

Accuracy: +/- 100 ft (+/- 33 m)

Alarm sounds

1st warning: One 3.8 second pulsating alarm if vertical airspeed exceeds 20 m/sec at the preset altitude. Sound sequence: Pulsating, low repetition.

2nd warning: One 5.0 second pulsating alarm if vertical airspeed exceeds 20 m/sec at the preset altitude. Sound sequence: Pulsating, high repetition.

3rd warning: Siren alarm as long as vertical airspeed exceeds 27 m/sec. at or below the preset altitude. Sound sequence: High pitch continuous siren.

Alarm output volume

LO: +110 dB +/- 2dB measured at 1 inch (2.5 cm)

HI: +117 dB +/- 2dB measured at 1 inch (2.5 cm)

LOGBOOK

Maximum display indication

Jump information: 200 jumps

Accumulated number of jumps: 9,999

Exit altitude: 19,999 feet (6,060 m)

Accumulated freefall time: 999 hours

Tolerances

Exit altitude: +/- 100 ft (+/- 30 m)

Deployment altitude: +/- 100 ft. (+/- 30 m)

Freefall time: +/- 1 sec

Speed (TAS and SAS) when mounted on the wrist or leg:

+/- 3 mph or +/- 10 ft/sec

+/- 5 kmh or +/- 1 m/sec

DATALOGGER

Continued storage of freefall profiles: Last 10 jumps

Maximum logging altitude: 19,999 feet (6,060 m)

Maximum logging time: 120 sec. per jump

Sampling rate: 4/sec.

OTHER

Climb information

Present altitude: +/- 100 ft

Estimated altitude in 5 min: +/- 0,5 min

Climb rate (steady climb): +/- 2 mph (+/- 4 kmh)

Operating altitude: 0 to 40,000 ft (0 to 12,120 m)

Clock: +/- 4 min/month

Operating Temperature Range: -20°C to +50°C (-40°F to 122°F)

Battery type: 2 x CR 2330 or equivalent

Battery Life Time (at normal use)

Automatic mode: 1.5 years or 300 jumps

Economic mode: 5 years or 500 jumps

L&B part no.: 197475

NATO Stock no. 6605-22-124-5934

Meets or exceeds EEC/89/336

Warranty

The following conditions apply to the PRO-TRACK warranty:

Damage or defects in the unit within 12 months after delivery that are proven to be caused by faulty manufacture will be repaired at no cost to the end user.

Repairs performed under this warranty will not extend the warranty period.

To make a claim under this warranty, send the unit to an authorized dealer or directly to Larsen & Brusgaard together with the dated purchase invoice or receipt.

The warranty becomes void if damage is caused by external circumstances or if the unit has been serviced or repaired by third parties not authorized by ourselves or our national agents.

All further claims, especially for defects caused by or occurring after a skydiving accident are excluded. The manufacturer has no obligation to honour any extension of warranty granted by his national agent.

Waiver of liability

The buyer and user of the PRO-TRACK indemnifies the manufacturer and vendor from any liability for damage incurred before, when and after skydiving with the instrument.



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