

# *Thales* Turntable



## TTT-Slim II: most elegant turntable with battery drive

The most elegant Thales turntable with battery-drive-system (TTT-Slim II) is designed to match the Thales Easy tonearm perfectly in all aspects: technically, optically and tonally. It provides incredible accurate and harmonic sound, in a super-compact and sublime design never seen before.

### Concept



True to our philosophy, that a turntable with its tonearm should be one single unit, we have designed a new turntable for the Thales Easy tonearm. It is manufactured in our workshop piece by piece and meets highest requirements. We are convinced about the sublime and compact design can provide mechanical stability which could never be reached by a more extensive concept. Each of the 70 parts has been carefully designed to perform its function in the overall concept perfectly.

In this documentation we will show you some details of the technical design. But please remember the final result is not the outcome of sophisticated details only, but the performance of the whole unit as an ensemble.

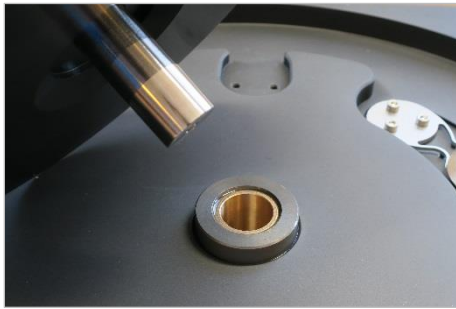
### Drive



The drive of a turntable is basically very easy: it should make the record turning with a speed of  $33 \frac{1}{3}$  resp. 45 rpm. The list of what it should not do is much longer: it should not sound or vibrate at all. It should not be influenced by the mechanical tracking, no matter in which frequency-range. It should not care about temperature, humidity or dust. And finally it should be incredible constant. The human hearing can discern

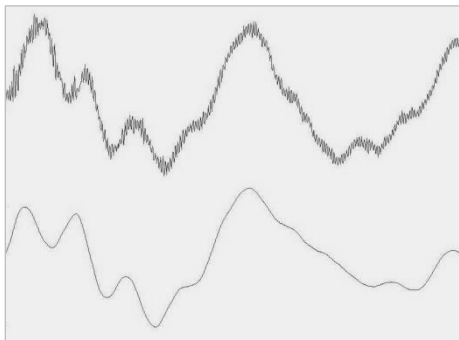
1Hz difference at its most sensitive frequency (1000 Hz). If we would have to define one hour that accurate, we should keep a pitch of less than four seconds! For the TTT-Slim II, we have realized a drive system combining the advantages of the very traditional idle wheel drive (strength and constancy) with the benefit of the belt drive (silence and decoupling). The motor itself – a brushless DC motor – provides a maximum output of 15 Watts and is mounted on a carefully calculated decoupling element. This element keeps away all vibration from the chassis, but avoids any axial movement of the motor. The pulley – which acts as a flywheel to compensate the motor increments – drives the sub-platter via a precision-belt. The whole drive system is completely covered by the platter.

## Bearing



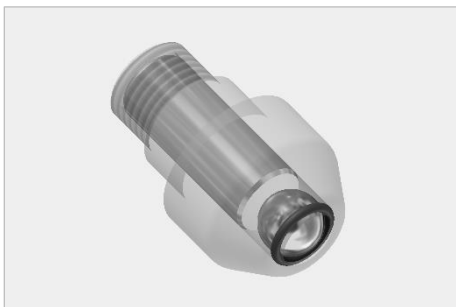
The bearing of the TTT-Slim II is our homage to traditional craftsmanship. The approved construction is known since more than 50 years in the industry, while we have brought the realization and finish to a new level by combining it with traditional knowledge of our watchmaker. The main shaft is made of hardened carbon tool steel. Its surface has been hand polished step by step with basswood and diamond-paste. The shaft runs in a sintered bronze bushing, which has been soaked and heated with specifically made oil. This guarantees maintenance free running for many decades. Vertically, the shaft ends up in a spherical shape, lying on a hardened steel ball. The whole bearing is put inside a body made of chrome-plated bronze.

## Platter



The platter of the TTT-Slim II has two important tasks: it enlarges the rotating inertial mass and provides the underlay for the record. The complete mass of the platter is 3.5 kg, but by concentrating the rotating mass at the outside diameter, the inertial properties are equal to a massive platter of 5 kg. The platter is tuned to one single resonance frequency and efficiently damped by a customized high density inlay. This inlay is at the same time the mat the record is lying on. After choosing the material of the mat by listening tests, we have proved its function by measuring the vibration of the bare platter compared to the damped one. As you can see in the picture above, the – quite high – resonance frequency of the platter (upper curve) is completely damped away with the mat (lower curve). But in all this, the main signal is kept very precise; there is no flattening or blurring, usually known as «overdamping».

## Spikes



The spikes look quite common from outside, but the secret of the decoupling and leveling mechanism is inside. The spikes make the turntable standing on balls, keeping it in position by a small rubber element. This keeps horizontal vibration of the ground away efficiently. The leveling mechanism is a combination of a machined thread with a high precision sliding fit. This makes leveling of the unit easy, secure and precise, while preventing any play or unstable standing. Depending on the base and environment, we do recommend our air-suspension base Levi-Base.

## Electronics



The electronics has been developed especially for our turntable. It is a closed loop controller which keeps the speed of the motor constant. The feedback of the brushless DC-motor is compared with an extreme precise reference voltage, which makes the drive unit significant more accurate than a pll-system with quartz controlled oscillator. The outstanding feature of the TTT-Slim II is the battery based power supply with Li-Ion

accumulators. The peak capacity is higher than 100 W while using not one single vibrating element. Therefore it is possible to integrate the power-supply into the main chassis, keep the signal-path short and skip any connection to the power plant. The battery service life is 20 hours, switching between playing- and charging-mode is to be operated manually.

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### Technical Specifications:

- turntable speed: 33 $\frac{1}{3}$  rpm, 45rpm
- wow and flutter at 33rpm, IEC 386:  $\pm 0,06\%$
- rumble: -60dB (unweighted)
- dimension (WxDxH): 423x305x100mm
- weight: 12kg
- input voltage for charger: 100-240V, 50-60Hz
- battery service life: 20h

### Turntable Specifications:

- chassis and platter made of massive aluminium
- BLDC motor underneath platter
- short-belt drive system with flywheel
- main bearing in ductile-iron body
- main shaft hardened and hand-polished
- high density mat as platter inlay
- decoupling ball element feet
- integrated drive electronics
- anthrazit anodized finish

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### Options:

- clamp with high density inlay
- isolation platform

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