



Screw Types & Profile Chart:

Screws are the most common form of joining technology. Force is transferred to the screw by means of positive locking. For this reason each screw requires a counterpart fitting its profile in the form of a screwdriver, L-key or bit. Slotted, Phillips and Pozidriv cross-head, hexagonal and square head screw profiles are common. More recent profiles are TORX® and TORX PLUS®. Then there are additional profiles such as Torq-Set® and Tri-Wing®.



Flat/Slotted Screws:

The slotted profile was one of the very first screw heads and continues to enjoy widespread popularity. A simple slot on the screw head holds the tool blade. Disadvantages are the lack of centering, which means that the bit tends to slip out of the screw, as well as its sharp edges, making it unsuitable for mechanical applications. It does not offer any special properties.

With the slotted profile, the force is applied to the diagonally opposite outer edges of the slot. This shape is not particularly suitable for the transfer of high torques.



Phillips/Cross Screws:

The cross-recessed Phillips profile is characterized by two slots at right-angle to each other. This crossed version offers a number of significant advantages over the classic slotted shape. The force is applied along the four edges and this reduces user fatigue when turning the screw. However, with this profile too, the user has to counteract the cam-out forces by applying an axial force.

Since the force is applied over a narrow area, there is a risk that the high stress placed on both the tool and the screw could cause damage to the profile.

Attention: The Phillips profile is often confused with the Pozidriv profile. Wrong utilization can lead to damages and fast wear of both assembly tool and screw



Phillips/Cross Tamperproof Screws:

Prevents unauthorized tampering with the screws. The Phillips/Cross Tamperproof profile has the same properties as the classic Phillips/Cross; the difference is that the tool has a hole located in the tip and the screw head has a small central pin.

Attention: The Phillips profile is often confused with the Pozidriv profile. Wrong utilization can lead to damages and fast wear of both assembly tool and screw.

**Pozidriv Screws:**

The profile with the two crosses. The Pozidriv profile is a further development of the cross-recessed profile and features two crosses offset at 45-degree angles. However, the additional cross is narrower than the main cross and not as deep. It offers additional stability and better resistance to slipping. Although the Pozidriv profile offers an improvement to the classic Phillips slot profile, it doesn't overcome the problems inherent in the classic Phillips design, such as the cam-out forces.

Attention: The Pozidriv profile is often confused with the Phillips profile. Wrong utilization can lead to damages and fast wear of both assembly tool and screw.

**TORX® Screws:**

TORX® has a star-shaped, elliptically-based geometry with six rounded lobes. The TORX® can be used to transfer a higher torque than the classical screw profiles without damaging bit or screw. Thanks to the low radial forces, the tool life of both screw and driver is prolonged. The low radial forces are a result of the circular geometry of the lobes, the straight, vertical sidewalls and the drive-angle of just 15 degrees. This geometry produces virtually no stress concentration. Unlike the cross-recessed profile, for example, the TORX® driver does not require the application of force. Furthermore, there is no danger of tool slippage, as is sometimes the case with the slotted profile. Much higher torques can also be transferred whilst applying the same amount of force.

Attention: should be paid to the distinction of TORX® and TORX PLUS®: Provisionally it is possible to tighten a TORX PLUS® screw with a TORX® tool, however due to the notable play this leads to fast wear of both assembly tool and screw.

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**TORX PLUS® Screws:**

Similarly to TORX®, the TORX PLUS® has a star-shaped profile with six lobes. However, these are flattened rather than rounded. A real drive-angle of zero degrees thus guarantees maximum engagement between bit and screw. Distributing the driving forces over a large area excludes all damaging radial forces. Through the larger cross sectional area it is possible to transfer even higher torques than with the classic TORX® profile.

Attention: should be paid to the distinction of TORX® and TORX PLUS®: TORX PLUS® tools cannot be used with TORX® screws.

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**TORX® Tamperproof Screws:**

Prevents unauthorized tampering with the screws. The TORX® tamperproof profile has the same properties as the classic TORX®; the difference is that the tool has a hole located in the tip and the screw head has a small central pin.

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**Square-recess/Robertson Screws:**

Meantime this profile is virtually defunct in Europe, but very common in the USA. It is still used by electricians to open electrical switch cabinets or by motor mechanics working with vintage cars. The four surfaces are at right-angles to each other. The opposite sides are parallel. Due to the small drive area, the square-recess profile is not effective for transferring high torques. At the same time, the lever-arm is very small.

**Hex/Allen Screws:**

It is one of the best known and most widely-used profiles. For nuts, there is, as yet, no alternative to the nut driver. It is hexagonal in shape with six faces, all of which are at a 120-degree angle to each other. This is not good news for the transmission of force as the stress concentration is very high. This could result in the deformation of the screw.

**Socket Screws:**

It is one of the best known and most widely-used profiles. For nuts, there is, as yet, no alternative to the nut driver. It is hexagonal in shape with six faces, all of which are at a 120-degree angle to each other. This is not good news for the transmission of force as the stress concentration is very high. This could result in the deformation of the screw.

**Hex/Allen Tamperproof Screws:**

Prevents unauthorized tampering with the screws. Unlike the conventional hex-socket profile, the tamperproof model has a hole in the bit tip; its counterpart in the screw head fits into this hole, thus ensuring that only the matching assembly tool can be inserted into the screw head. Otherwise, the tamperproof model has the same properties as the classic hex-socket.

**Torq-Set® Screws:**

The Torq-Set® profile consists of four edges that are shifted asymmetrically to the centre. Torq-Set® is a security profile with an offset cross; it is designed for use exclusively by professionals. This profile is primarily used in the aerospace industry.

**TriWing® Screws:**

Tri-Wing® is a winged security profile consisting of three edges. Thanks to its unusual, three-wing design, it is intended exclusively for use by professionals. This profile is primarily used in household appliances and in the aerospace industry.

**Spanner/Snake Eyes Screws:**

The Spanner is a security profile with two rectangular pins, otherwise known as “snake eyes”. The spanner bit is little used in trade and industry. The advantage of this profile is the surface of the screw head, which is broken only by the two small rectangular pins and is otherwise solid. At the same time, this profile prevents over-tightening of the screw. Force transmission is associated with high stress concentrations. However, due to the two pins, there is a lower stress on the individual faces. The spanner profile is not suitable for transmitting high torque.

**Roundnut Screws:**

Uncommon screw type. Please call for information.

**Pozidriv Slot Screws:**

Uncommon screw type. Please call for information.

**Philips Slot Screws:**

Uncommon screw type. Please call for information.

For more information on Screw types, please see our *Screw Information Chart*.