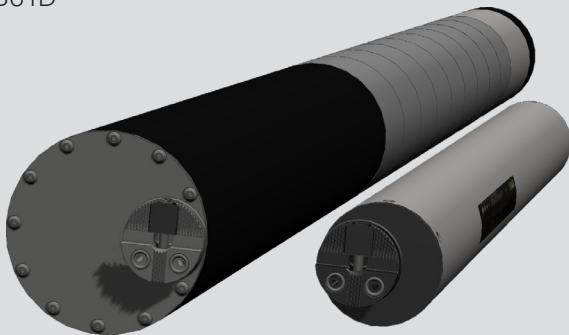


User manual

Silent Tools™ Plus Turning adaptor

TB60D-

TB61D-



Version 1.1

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Introduction

Purchase

Congratulations on your purchase of a Silent Tools™ Plus Turning adaptor.

This manual contains important safety directions and instructions for product set-up and operation.

Keep for further reference

Product identification

Product type and article numbers are printed on the product. Refer to this when contacting Sandvik Coromant.

Validity of this manual

This manual applies to the Silent Tools™ Plus Turning adaptor type: TB60D- and TB61D-, see chapter 2 for naming rules.

Available documents

Silent Tools™ Plus Turning adaptor user manual and other documents can be downloaded from the Sandvik Coromant website:

<http://www.sandvik.coromant.com>

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1 Safety

1.1 General

Description

The following instructions should enable the person responsible for the product and the person who actually uses the equipment to anticipate and avoid operational hazards. The person responsible for the product must ensure that all users understand these instructions and adhere to them.

About warning messages

Warning messages are an essential part of product safety. They appear wherever hazards or hazardous situations can occur. For user safety, all safety instructions and safety messages shall be strictly observed and followed. Therefore, the manual must always be available to all product users.

DANGER, WARNING, CAUTION and NOTICE are standardized signal words for identifying levels of hazards and risks related to personal injury and property damage. For your safety it is important to read and fully understand the table below with the different signal words and their definitions. Supplementary safety information symbols may be placed within a warning message as well as supplementary information.

 **DANGER**

Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

 **WARNING**

Indicates a potentially hazardous situation or an unintended use which, if not avoided, could result in death or serious injury.

 **CAUTION**

Indicates a potentially hazardous situation or an unintended use which, if not avoided, may result in minor or moderate injury.

NOTICE

Important information which must be adhered to in practice as it enables the product to be used in a technically correct and efficient manner.

1.2 Purpose

Permitted use

Silent Tools™ Plus Turning adaptor is intended to be used in a lathe, CNC turning centre or multi-task machines.

Adverse use

- Use of the product without instruction.
- Use outside of the intended limits.
- Disabling safety systems.
- Removal of hazard notices.
- Opening the product using tools, e.g. screwdriver.
- Modification or conversion of the product.
- Use after misappropriation.
- Use of products with obviously recognizable damages or defects.
- Use with accessories from other manufacturers without the prior explicit approval of Sandvik Coromant.

WARNING

Adverse use can lead to injury, malfunction and damage. It is the task of the person responsible for the equipment to inform the user about hazards and how to counteract them. The product is not to be operated until the user has been instructed on how to work with it.

Manufacturer of the product

Sandvik Coromant is responsible for supplying the product, including the user manual and original accessories, in a completely safe condition.

Manufacturers of non-Sandvik Coromant Accessories

The manufacturers of non-Sandvik Coromant accessories are responsible for developing, implementing and communicating safety concepts for their products, and are also responsible for the effectiveness of those safety concepts in combination with the Sandvik Coromant product.

Person in charge of the product

NOTICE

The person in charge of the product has the following duties:

- To understand the safety instructions on the product and the instructions in the user manual.
- To be familiar with local regulations relating to safety and accident prevention.
- To inform Sandvik Coromant immediately if the product becomes unsafe.

1.3 Hazard of use

Environment

Suitable for use under rough conditions, see section "10 Technical

data". Not suitable for use in aggressive or explosive environments.

 **WARNING**

The absence of instruction, or the inadequate imparting of instruction, can lead to incorrect or adverse use, and can give rise to accidents with far-reaching human, material, financial and environmental consequences.

Precautions: All users must follow the safety instructions given by the manufacturer and the directions of the person responsible for the product.

 **CAUTION**

The turning adaptor is intended for use by skilled persons.

 **WARNING**

The turning adaptor may be very heavy and lifting it incorrectly may cause injuries or damage. Ensure use of approved lifting equipment for the job.

 **WARNING**

Use all appropriate safety guards or machine encapsulations to securely collect particles such as chips or cutting elements that may spin off.

Precautions: Always use appropriate personal protective equipment.

 **CAUTION**

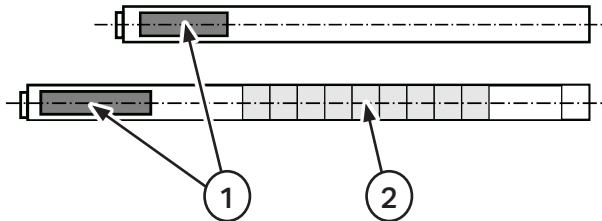
The user must use the turning adaptor as intended.

Precautions: Only Sandvik Coromant authorized service workshops are entitled to repair these products.

Precautions: DO NOT USE or operate damaged tool or product.
Return the product to the appropriate location for repair, replacement or recycling.

1.4 Disposal

The turning adaptors contain a large amount of “strategic metals” such as Wolfram [W] and Cobalt [Co], in addition to other metals. It is recommended to recycle these high-value materials. The damping system (1) contains Wolfram and the carbide bushings (2) contain Wolfram and Cobalt.



WARNING

Carbide bushings are mounted under high compression forces. Cutting the adaptor body to remove carbide bushings will release internal spring forces.

1.5 Unpacking/moving

When unpacking the product, make sure that no accessories are missing and that none of the package contents have been damaged. If you detect any transport damages, please contact your sales representatives.

WARNING



For safety reasons it is recommended to use lifting equipment for lifting damped boring adaptors heavier than 18 kg (40 lb.) ($BD \times L > \varnothing 60 \times 800$ mm ($\varnothing 2.5 \times 31$ inch)). Lifting slings are recommended.

WARNING



Do not use a magnet when lifting carbide reinforced boring adaptors.

CAUTION

The front of the damped boring adaptor may be heavier because of the integrated damped system. Check the centre of gravity before lifting.

NOTICE

Keep the packaging for safe storage of tools.

2 Product description

The turning adaptor is delivered in many design variants, see naming description. The product name is marked on the turning adaptor.

Example: TB61D-CY100C1770W4RB

TB	Product family TB: Turning adaptor
6	Product type 5: 4C damped bars (sensor embedded) 6: 3C damped bars (sensor embedded)
1	Product material group 0: Steel 1: Carbide reinforced
D	Adaptor type D: Damped (): Not damped
-	
CY	Machine side coupling CY: Cylindrical
100	Bar diameter 40, 50, 60 ...: Diameter size in mm A: Inch description, bar diameter given in 1/16 inch

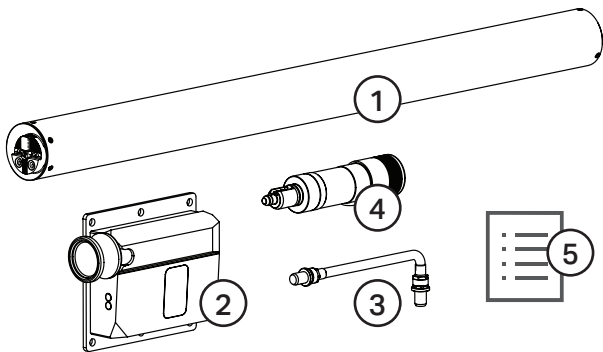
C	Sensor type/signal connection A: Unsensored B: 1 sensor, connector type PP x1 C: 2 sensors, connector type PP x2 D: 1 or 2 sensors, connector type PPO
1770	Functional length 400, 500, 865...: Length in mm (equal to body length for CY)
W	Work side coupling interface W... Wedge lock S... Serration Lock C... Coromant Capto® H... HSK
4	Work side coupling interface size 1: 16 mm 6: 60 mm 2: 25 mm 8: 80 mm 3: 32 mm 0: 100 mm 4: 40 mm
R	Work side coupling position R... Right L... Left N... Neutral 2... 2 couplings
B	Index (): NA B: Europe/North America/Japan R: Repair X: Recondition

3 Description of the system

The Silent Tools™ Plus system is intended for remote monitoring of the machining process.

Component	Description
1 Turning adaptor	<ul style="list-style-type: none">• Holder for a cutting head, intended for metal cutting.• Consists of various models with a range of sizes in diameter, length and cutting head interfaces.• Integrated with sensor(s).• Turning adaptor with signal connection B or C, type PP-connectors is to be used with Electronic unit: ST+:BT A 1PP or ST+BT A 2PP.
2 Electronic unit (ordered separately)	<ul style="list-style-type: none">• Provides a link to the turning adaptor, through the connecting cable, type PP (push-pull).• Provides communication to/from the sensor(s) in the turning adaptor.• Provides power to the sensor(s) and the transmitter.• Transmits the signal to the tablet.

- | | | |
|---|--|--|
| 3 | Connecting cable
(ordered separately) | <ul style="list-style-type: none">• Connecting the electronic unit to the turning adaptor.• Cable with PP type connectors (push-pull).• Length 300 mm or 500 mm. |
| 4 | Battery
(ordered separately) | <ul style="list-style-type: none">• Type-A Li-ion. |
| 5 | User manual | <ul style="list-style-type: none">• Silent Tools™ Plus Turning adaptor |



4 Operation

NOTICE

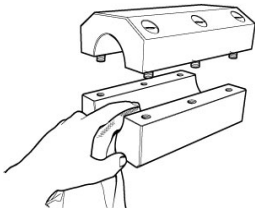
If the equipment is used in a manner not specified, the protection provided by the equipment may be impaired.

4.1 Setting up damped turning adaptor

Two important factors for achieving the right dimensional tolerances and surface finish of the component are clamping stability and correct centre height for the insert.

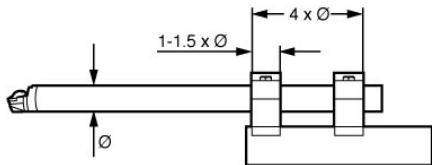
Before use

Make sure that the machine side, coupling surfaces of the tool and tool holder are free from dust or chips. If necessary, clean with a wet/dry cloth.



Clamping

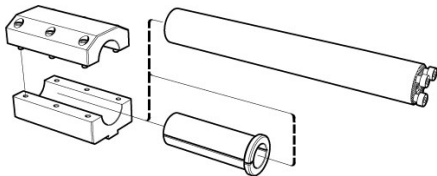
Ensure that the length of the turning adaptor allows for the recommended clamping lengths. Recommended clamping length is $4 \times$ bar diameter (minimum $3 \times$ bar diameter).



Clamp in a split sleeve holder to achieve maximum contact area. Recommended clamping tolerance is ISO H7. Bushing material with minimum hardness of 45 HRC is recommended to avoid permanent deformation.

NOTICE

Never use screws in direct contact with the bar shank as they may damage the bar.



Orient tool

The tool must be rotated to the correct position (around centre axis), for correct placement of the insert. This is done most easily with the Silent Tools™ Plus software. We recommend doing this when the Silent Tools™ Plus software is up and running.

A manual lever can be used on slant bed machines.

Overhang (OHX)

The Silent Tools™ Plus Turning adaptor with Load sensor has a fixed overhang position. The sensor is placed at a specific position inside the tool to ensure it functions as intended. Refer to the catalogue drawing for the adaptor.

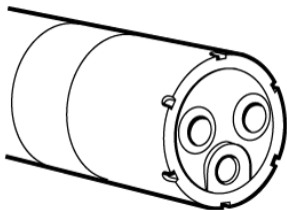
The Silent Tools™ Plus Turning adaptor with only Vibration sensor can be used with overhang between OHN and OHX, as specified in the catalogue drawing for the adaptor.

4.2 Connecting coolant

Coolant flow

Make sure that the coupling surfaces and threads of the fitting are free from dust or particles. If necessary, clean with a cloth.

Thread type: G1/8 (1/8 BSP), Sealing is provided by an O-ring gasket or a sealing washer. Recommended tightening torque is 18 Nm (159 in-lbs).



Maximum pressure

The tool is designed for a maximum coolant pressure. The pressure is labelled on the rear of the turning adaptor at the coolant entrance. The pressure rating is from 70–150 PN (bar) (1015–2175 PSI).

CAUTION

Use fittings and tubing towards the tool according to the maximum coolant pressure used.

4.3 Connecting cables

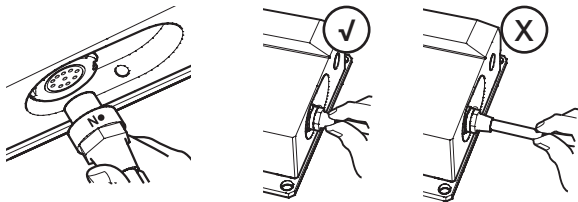
The turning adaptor is connected to the electronic unit through a cable. The turning adaptor is equipped with one or two connectors.

Orient the cable as indicated by the groove in the connector or the N-mark. Push the cable straight into the connector.

Remove the cable by a pull. Grip the connector, not the cable, when pulling.

NOTICE

Make sure not to rotate the cable during the push-pull movement.

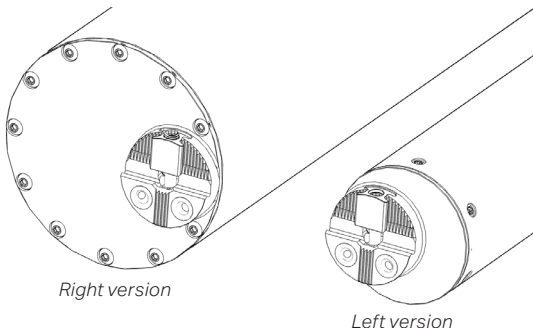


4.4 Workside coupling interface

Wedge Lock interface

It is recommended to use the Wedge Lock interface. This interface provides an easy and precise exchange of the cutting head with only one screw needed for clamping. The screw is a part of the interface so it will not fall off. The Wedge Lock cutting head is capable of high-pressure coolant, up to 150 PN (bar) (2175 PSI).

Right and left versions are available.

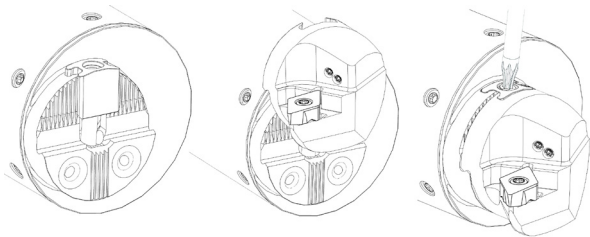


Inserting Wedge Lock cutting head

1. Position the wedge in an upper position.
2. Slide the cutting head in place.
3. Tighten the screw. Use tightening torque 6 Nm (53 in-lbs), bits Torx Plus® 20IP.

NOTICE

Do not overtighten the screw.



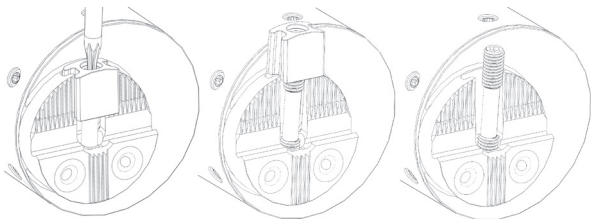
Torx Plus® is a trademark owned by Camcar Corp.
division of Textron Industries.

Changing screw/wedge

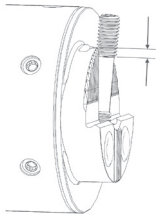
NOTICE

It is important to change the screw when it has any sign of wear in the Torx Plus® or threads.

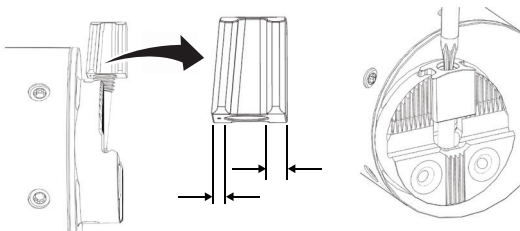
1. Unscrew the wedge and if needed the screw.



2. Install the screw with the shortest thread part at the bottom.
Screw it into the bottom part of the interface until a couple of top thread pitches are under the top part of the interface.

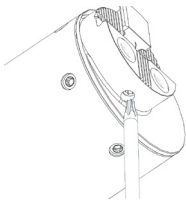


3. Install the wedge. The thinnest section of the wedge is toward adaptor (a dot is indicating). Turn the wedge so it enters the threads and the slot. Screw it into position.



NOTICE

The Torx Plus® screw on the bottom of the Wedge Lock interface is to be used if top Torx Plus® gets damaged and can not loosen the clamping.



Coolant seals

Replace the coolant seals if they leak or are missing.

Engineered solutions

Engineered solutions can upon request provide Silent Tools™ Plus with other cutting head interfaces as: CoroTurn® SL, CoroTurn® SL Quick Change or Coromant Capto® (manual clamping). These interfaces support up to 70 PN (bar) (1015 PSI) coolant pressure.

4.5 Updating the firmware

Firmware in the turning adaptor and electronic unit can be updated with the Silent Tools™ Plus software. The software guides you through the process and downloads/installs the necessary firmware for the turning adaptor connected. The update takes some time.

1. The software compares the currently running firmware with the firmware included in the software. If the running firmware is older, a prompt will appear asking to update.
2. Choose to start the update process or postpone it. Some updates are mandatory based on compatibility with the software version.
3. When the update is complete, a confirmation message will appear.

NOTICE

Ensure that the battery has at least 50% battery capacity before performing a firmware update. Do not remove the battery during the process.

5 Sensors

The Silent Tools™ Plus Turning adaptor can be equipped with one or two sensor units.

Sensor 1, vibration

The vibration sensor is located just behind the cutting head interface. It is positioned as close to the insert as possible, ensuring that the vibrations that affect the surface quality are monitored. The sensor monitors vibration in three axes. The sensor monitors vibration values from very small vibrations up to crash situations.

The algorithms in the Silent Tools™ Plus software provide you with analysis of the sensor information registered during the machining process. The main functions are in cut-, roughness- and vibration monitoring. In the Silent Tools™ Plus software the algorithms are analyzed in more detail.

The temperature probe monitors the internal temperature in the adaptor. Operating the adaptor within the specified temperature range ensures optimal performance of the damping system.

The vibration sensor is calibrated from the factory.

Sensor 2, load

The load sensor monitors the cutting forces and the bending of the tool. It monitors the adaptors bending in two axes (X and Y).

The sensor provides input to the load and deflection functions. It also provides enhanced functions of the in cut and roughness functions. More information about these functions can be found in the Silent Tools Plus software.

CAUTION

The sensor must be calibrated for best performance:

- Load function is factory calibrated, and can be further improved.
- Deflection calibration must be done in the turning machine where the tool is to be used.

Calibration is done by a Sandvik Coromant technician or through a specific test cut procedure. This will also enhance the tolerance of the load function.

6 Care and transport

6.1 Transport

When transporting the product by rail, air or sea, always use the complete original Silent Tools™ Plus packaging, transport container and cardboard box, or equivalent, to protect against shock and vibration.

6.2 Storage

When the adaptor is stored in a wet environment, i.e. in the machine, keep the adaptor connected to the cable to protect the connectors.

CAUTION

Respect the temperature limits when storing the product, particularly in summer if the product is inside a vehicle. Refer to section "10 Technical data" for information about temperature limits.

Keep the packaging for safe storage of the tool.

6.3 Cleaning and drying

Use a clean, soft, lint-free cloth for cleaning. Electrical contact cleaner can be used in small amounts on cable connector(s).

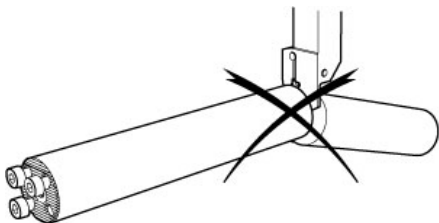
Keep plugs clean and dry. Blow away any dirt lodged in the plugs of the connecting cables.

6.4 Modify turning adaptor

No modification of the turning adaptor is allowed.

CAUTION

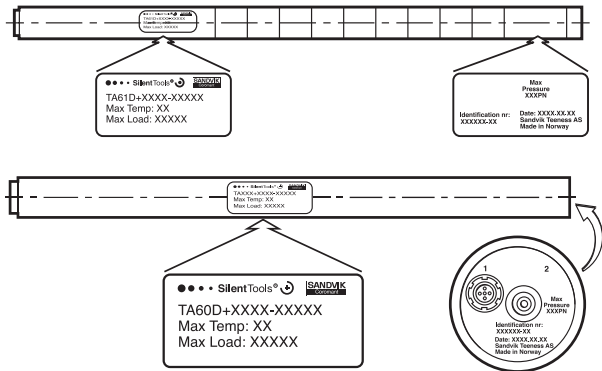
Shortening the adaptors with integrated electronic data collecting system is not allowed.



7 Conformity

Conformity of the system is described in the Silent Tools™ Plus Electronic unit user manual. The turning adaptor sensor system has only function together with the Electronic unit.

8 Labels



9 Warranty

Sandvik Coromant AB warrants its equipment for a limited period of two years, from purchase date, provided that it is installed exactly as defined in associated Sandvik Coromant documentation.

Failure to comply with this will invalidate the Sandvik Coromant warranty. Claims under warranty must be made from authorized service/sales personnel from Sandvik Coromant only.

For more information about Silent Tools™ damped adaptors please visit www.sandvik.coromant.com/silenttoolsplus.

10 Technical data

Sensor 1, vibration	Monitor vibrations from 0–40 or 50 G Monitor vibrations in 3 axes (X-, Y- and Z-axis) Temperature 0–80 °C
Sensor 2, load	Load, up to tools maximum load (see label on tool) Deflection in two directions (X- and Y-axis)
Cable type	PP-connector (push-pull), shielded signal cable
Vibration signal (port 1)	Signal cable, 10 pin push-pull, maximum 500 mm
Load signal (port 2)	Signal cable, 10 pin push-pull, maximum 500 mm
Input voltage	3.3 V and 5.0 V
Power maximum	0.18 W (3.3 V) and 0.25 W (5.0 V)
Operating environment	IP56 according to IEC 60529 Indoor use in lathe/CNC machine, closed or open, dry or wet machining
Maximum altitude	2000 m
Temperature range	Storage: -40 °C to +85 °C Operating: 0 °C to +70 °C
Relative humidity	Use 10–95% Storage recommended 10–50%

Maximum altitude	2000 m
Weight	See adaptor catalogue drawing (packaging not included)
Dimensions	See adaptor catalogue drawing

10.1 Spare parts

Part	Order code	
Wedge	5431 015-01	
Screw	5516 014-09	
O-ring	5641 005-153	6 × 2 mm 90 shore

Get started

To get started using Silent Tools™ Plus, please go to the Sandvik Coromant website and activate the software using the serial number provided with the turning adaptor.

www.sandvik.coromant.com/silenttoolsplus/activate

Serial number:

User manual Silent Tools™ Plus Turning adaptor

English

Part No: 92056

Version 1.1

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March 2020 © Sandvik Coromant

