Electronic unit
Silent Tools™ Plus
BT A 1PP and BT A 2PP

User manual version 1.0
Introduction

Purchase
Congratulations on your purchase of an Electronic unit Silent Tools™ Plus BT A 1PP or Silent Tools™ Plus BT A 2PP and the use of Silent Tools™ Plus.

This manual contains important safety directions and instructions for product setup 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.

This manual applies to the Electronic units:

<table>
<thead>
<tr>
<th></th>
<th>Model</th>
<th>Art. No</th>
<th>Spare part No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Silent Tools™ Plus</td>
<td>ST+:BT A 1PP</td>
<td>157434</td>
<td>7210 110-01</td>
</tr>
<tr>
<td></td>
<td>ST+:BT A 2PP</td>
<td>160953</td>
<td>7210 110-02</td>
</tr>
</tbody>
</table>

Available documents
Electronic unit Silent Tools™ Plus BT A 1PP or Silent Tools™ Plus BT A 2PP, user manual and other documents can be downloaded from the Sandvik Coromant website:
http://www.sandvik.coromant.com
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
Electronic unit provide digital link between Silent Tools Plus™ turning tool and the client, PC/tablet (Windows 10).

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, unless specifically instructed for certain functions.
- 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.
1.3 Limits of use

Environment
Suitable for use under rough conditions, ref. technical data. Not suitable for use in aggressive or explosive environments.

1.4 Areas of responsibility

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
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

⚠️ Warning
The person responsible for the product must ensure that it is used in accordance with the instructions. This person is also accountable for the training and the deployment of personnel who use the product and for the safety of the equipment in use. The safety of any system incorporating the equipment is the responsibility of the system assembler.

1.5 Hazard of use

⚠️ 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.

⚠️ **Warning**
If you open the product, either of the following actions may cause you to receive an electric shock.

- Touching live components
- Using the product after repair attempts failed

**Precautions:** Do not open the product. Only Sandvik Coromant authorized service workshops are entitled to repair these products.

Batteries not recommended by Sandvik Coromant may be damaged if charged. They may burn and explode.
⚠️ Warning
If the product is improperly disposed of, the following can happen:

• If polymer parts are burnt, poisonous gases are produced which may impair health
• If batteries are damaged or are heated strongly, they can explode and cause poisoning, burning, corrosion or environmental contamination
• By not disposing of the equipment responsibly you may enable unauthorized persons to use it in an unsafe or ill-advised manner, exposing themselves and third parties to the risk of severe injury and rendering the environment liable to contamination

⚠️ The product must not be disposed with household waste.

Dispose of the product appropriately in accordance with the national regulations in force in your country. Always prevent access to the product by unauthorized personnel.

**Precautions:** Product specific treatment and waste management information can be downloaded from the Sandvik Coromant web page: www.sandvik.coromant.com/services.
2 Description of the system

Description
Silent Tools™ Plus BT A 1PP & Silent Tools™ Plus BT A 2PP
The electronic unit is designed to provide a link between one Silent Tools™ Plus Turning tool with Windows PC tablet (Windows 10_1607).

The Silent Tools™ Plus electronic unit provides a link between the Silent Tools™ Plus turning tool and the PC/ tablet (Windows 10) through a connecting wire. It provides communication to/from the sensor in the Silent Tools Plus turning tool. It also provides power to the sensors and transmitter in the turning tool. Finally, it transmits signals from the turning tool to the PC/ tablet.

Silent Tools™ Plus turning tools, with PP connectors, use the same electronic unit, but with one or two PP connectors, depending on the tool mounted to it.
General information

<table>
<thead>
<tr>
<th>Model</th>
<th>Silent Tools Plus PP1</th>
<th>Silent Tools Plus PP2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensor 1, vibration</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Sensor 2, Load</td>
<td>X</td>
<td>✓</td>
</tr>
</tbody>
</table>

One Silent Tools Plus turning tool and PC tablet can be connected at a time.

Component | Description
---|----------------------------------
1 Connector | Connector for cable, vibration
2 Connector | Connector for cable, Load
3 Antenna lid | Lid for Bluetooth antenna
4 Battery | Battery for electronic unit
5 Manual | User manual
3 Operation

3.1 Mounting of the electronic unit

The electronic unit must be mounted on the tool post before use. Mounting should be done by screws. The tool post needs to be modified to allow for the mounting of the electronic unit. The Bluetooth antenna (3) must point towards the operator when positioning the electronic module. This area must not be blocked by metal, in order to ensure proper signal range. The signal penetrates through a closed machine, via the glass and gaps. Bluetooth range depends on the distance between tool and PC (normal range is 10m) and the presence of any obstacles in between them.
Make sure the location of the electronic unit allows for easy battery insertion and removal. The electronic unit should be mounted horizontally (central axis of battery) with screws in the six holes, diameter 5mm.

While installing the electronic module, the cable should be installed and placed carefully, so as to avoid sharp bends in the cable or any weight placed on top of it.
3.2 Connecting the electronic unit

The Electronic unit is to be mounted on the tool post. Connect the cables to the connectors and the Silent Tools Plus turning tool. Insert battery to power up the electronic unit and sensors in the Silent Tools Plus turning tool.

⚠️ Notice
The transmitter will always transmit a signal when the battery is inserted, until the electronics disconnect the battery. This happens when a low voltage threshold is reached. The threshold level is set to be safe for the battery. The electronics power up again when a charged battery is inserted.

⚠️ Notice
If the electronic unit will not be used for a long period remove the battery.
Refer to section “5 Technical Data” for information on voltage and rated power.
After the electronic unit is connected to the battery, a green light indicates electronic unit is powered. The same light changes from green to blue when the BT is connected to PC tablet. The light will flash blue when data is being transferred. The other light indicates if the sensors are connected or not: blue = no sensors connected; yellow = one sensor connected; green = two sensors connected. Ref. section 3.4 Indicators for additional information.

To shut off the electronic unit, remove the battery.

### 3.3 Inserting and removing components

**Inserting cables**

1. Orient cables after (N) mark on connectors.
2. Insert cables to connectors (1) and (2), push* gently until cable sleeves enter connector outer threads, grooves.

* Do not rotate cable while inserting or removing.
Pull out cables
Grip the cable by the connector, when pulling. Pulling on the cable may damage the cable.

Insert cables to the tool so that they are gently bent.

Do not overbend the cables. They may be damaged.

Install the cables so that they are not damaged by the moving/rotating parts of the lath-/turn-mill center.
Inserting battery
1. Orient the battery according to position slot.
2. Insert the battery (4) into cylindrical hole in electrical unit.
3. Push battery until a soft click indicates assembly complete.

Removing battery
1. Grab the main body of the charger (1).
2. Grab cylindrical end of battery (2) and pull out gently.

⚠️ Warning
Only use Silent Tools™ Plus Li-ion batteries as recommended by Sandvik Coromant. Silent Tools™.
3.4 First time use

Notice
Bluetooth connection:
Tool will appear as SilentTools™ Plus ID:xxxx, pairing code 7053

Notice
A new battery must be charged before use.

Step       Description

1  Mount the electronic unit to the tool post.

2  Connect the cables to the connectors on the electronic unit and to the connectors on the Silent Tools Plus turning tool.

3  Insert the charged Silent Tools Plus battery into the electronic unit:
   • Notice that the green power indicator is turned on.
     In addition, the blue sensor indicator is turned on, meaning no sensors are connected yet
   
   • Notice that the sensor indicator now is colored yellow or green, depending on number of sensors connected
4 Connect with PC tablet firmware (BT). Windows standard pairing must be conducted. Click on the pair button.

5 Notice that power indicator now is colored blue, meaning BT is connected. After a while, initial data with temperature, eloage, etc. will start to transfer from the sensors through the electronic unit, and the power indicator will flash blue.

Notice
Check the status indicators again after about one minute.

6 Remove battery after use. This is the power off function. Recharge it when needed. Voltage status is provided in software.
### 3.5 Operating procedure

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Mount the electronic unit to the tool post.</td>
</tr>
<tr>
<td>2</td>
<td>Connect the cables to the connectors on the electronic unit and to the connectors on the Silent Tools Plus turning tool.</td>
</tr>
</tbody>
</table>
| 3    | Insert the charged Silent Tools Plus battery into the electronic unit:  
|      | • Notice that the green power indicator is turned on  
|      | • Notice that the sensor indicator now is yellow or green, depending on the number of sensors connected |
| 4    | Connect with PC tablet firmware (BT). Choose the tool from the available tool list. |
Notice that power indicator now is blue, meaning BT is connected. After a while initial data with temperature, elevation, etc. will start to transfer from the sensors through the electronic unit, and the power indicator will flash blue.

Notice

Check the status indicators again after about one minute.

Remove battery after use. This is the power of function. Recharge it when needed. The battery will be disconnected at a safe voltage level, by the electronic unit.
# 3.6 Indicators

## Explanation of the symbols

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>![LED off icon]</td>
<td>LED off.</td>
</tr>
<tr>
<td>![LED on permanently icon]</td>
<td>LED on permanently.</td>
</tr>
<tr>
<td>![LED flashes icon]</td>
<td>LED flashes.</td>
</tr>
</tbody>
</table>

## Symbol LED

<table>
<thead>
<tr>
<th>Symbol LED</th>
<th>Meaning</th>
</tr>
</thead>
</table>
| ![Off/off icon] | The battery is not connected to the electronic unit.  
The battery is out of power. |
| ![Blue/green icon] | The electronic unit is ready to connect to the sensors.  
The battery is connected to the electronic unit. |
| ![Yellow/green icon] | The electronic unit is connected to a sensor.  
The battery is connected to the electronic unit. |
Green/green  The electronic unit is connected to sensors 1 and 2.
The battery is connected to the electronic unit.

Blue/blue  The electronic unit is ready to connect to the sensors.
The PC tablet is connected to the electronic unit.

Yellow/blue  The electronic unit is connected to sensor 1.
The PC tablet is connected to the electronic unit.

Green/blue  The electronic unit is connected to sensors 1 and 2.
The PC tablet is connected to the electronic unit.

Yellow/blue  The electronic unit is connected to sensor 1.
Transfer of data from the sensor to the PC tablet.
Green/blue  The electronic unit is connected to sensors 1 and 2. Transfer of data from the sensor to the PC tablet.

Red/blue  Battery is low on power. Transfer of data from the sensor to the PC tablet.

Red/green  The unit is in a fault condition.

White/green  The unit is in a firmware update condition.

If any unexpected combinations of indicators are shown:

- Check error messages in firmware if connected with PC tablet.
- Check if battery or cables are properly connected.
- Check for mechanical damages on electronic unit, connections, battery or cables.
- Connect a different battery to check if the fault lies with the battery or the electronic unit.
- Connect different cables to check if the fault lies with the cables.
- If the problem persists, contact Sandvik Coromant.
4 Transport and storage

4.1 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 its equivalent, to protect against shock and vibration.

4.2 Storage

Respect the temperature limits when storing the product, particularly in summer if the product is inside a vehicle. Refer to section “6 Technical Data” for information about temperature limits. Packaging to be used for safe storage.

4.3 Cleaning and drying

Use only a clean, soft, lint-free cloth for cleaning. Clean electrical battery contacts with electrical contact cleaner. Keep plugs clean and dry. Blow away any dirt lodged in the plugs of the connecting cables.
5 Certifications

5.1 Conformity, EU

Sandvik Coromant AB, declares that the products Electronic unit Silent Tools™ Plus BT A 2PP and Silent Tools™ Plus BT A 1PP are in conformity with the following standards:

**Safety:**
- EN61010-1

**Electromagnetical compability (EMC):**
- EN 61000-6-2
- EN 61000-6-4
- ETSI EN 301489-1 V2.1.1
- ETSI EN 301489-17 V3.1.1
- EN 300 328 V2.1.1

**Following the provisions of EU-directives:**
- 2014/53/EU (Radio Equipment Directive (RED))
- 2014/35/EU (low voltage)
- 2014/30/EU (EMC)
- 2011/65/EU (Rohs2)

**USA/Canada**

**Safety:**
- UL 61010-1
- CSA-C22.2#61010-1
5.2 FCC statement, applicable in U.S

This product has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC rules.

These limits are designed to provide reasonable protection against harmful interference in a residential installation.

This equipment generates, uses and can radiate frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to eliminate the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and the receiver.
- Connect the equipment to an outlet on a circuit different from that to which the receiver is connected.
Consult the dealer or an experienced radio/TV technician for help. Changes or modifications not expressly approved by Sandvik Coromant for compliance could void the user’s authority to operate the equipment.

6 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.
### 7 Technical data

<table>
<thead>
<tr>
<th>Category</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Power supply</strong></td>
<td>Battery connection A</td>
</tr>
<tr>
<td><strong>Input voltage</strong></td>
<td>3.7v</td>
</tr>
<tr>
<td><strong>Current consumption</strong></td>
<td>Max 600mA (normal 280mA)</td>
</tr>
<tr>
<td><strong>Operating time</strong></td>
<td>Normal use 9-13h, depending on the type of sensors and radio transmitting condition</td>
</tr>
<tr>
<td><strong>Fuse</strong></td>
<td>Blow fuse 2A, not replaceable</td>
</tr>
<tr>
<td><strong>Input / Output Signal</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Cable type</strong></td>
<td>Shielded signal cable with PP connectors</td>
</tr>
<tr>
<td><strong>Vibration signal (port1)</strong></td>
<td>Signal cable, shielded 10 pin push-pull, maximum 500 mm</td>
</tr>
<tr>
<td><strong>Load signal (port2)</strong></td>
<td>Signal cable, shielded 10 pin push-pull, maximum 500 mm</td>
</tr>
<tr>
<td><strong>Output voltage</strong></td>
<td>3.3v and 5.0v</td>
</tr>
<tr>
<td><strong>Bluetooth</strong></td>
<td>Dual mode. Running on Bluetooth 3.0 mode</td>
</tr>
<tr>
<td><strong>Range</strong></td>
<td>The Bluetooth radio has a range of approximately 10 m. Will vary with surroundings.</td>
</tr>
<tr>
<td><strong>RF output power - Classic Bluetooth</strong></td>
<td>Class 1, Max 10 dBm + antenna gain (1dBi)</td>
</tr>
<tr>
<td><strong>RF output power - Bluetooth low energy</strong></td>
<td>Max 5 dBm + antenna gain (1dBi)</td>
</tr>
<tr>
<td><strong>Receive sensitivity level - Classic Bluetooth</strong></td>
<td>-90dBm - antenna gain (1dBi)</td>
</tr>
<tr>
<td><strong>Receive sensitive level - Bluetooth low energy</strong></td>
<td>-91dBm - antenna gain (1dBi)</td>
</tr>
<tr>
<td><strong>Output frequency</strong></td>
<td>2,402 – 2,480 GHz, ISM band</td>
</tr>
<tr>
<td><strong>Bluetooth stack</strong></td>
<td>U-blox Embedded Bluetooth Stack 2.0</td>
</tr>
<tr>
<td><strong>Bluetooth qualification</strong></td>
<td>4.0</td>
</tr>
<tr>
<td><strong>Compliance</strong></td>
<td>CE</td>
</tr>
<tr>
<td></td>
<td>FCC ID: PVH0946</td>
</tr>
<tr>
<td></td>
<td>IC: 5325A-0946</td>
</tr>
<tr>
<td></td>
<td>Mic 204-210003</td>
</tr>
<tr>
<td></td>
<td>CMIIT ID: 2015DJ1181</td>
</tr>
</tbody>
</table>
| **Operating environment** | IP56 according to IEC 60529  
Indoor use in lathe/CNC machines, closed or open |
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Maximum altitude</strong></td>
<td>2000m</td>
</tr>
</tbody>
</table>
| **Temperature range**    | Storage: -40°C to +85°C  
Operating: -20°C to +55°C |
| **Relative humidity**    | Use 10%-100%, Storage recommended 10-50%          |
| **Indication**           | Refer to section “3.6 Indicators”                 |
| **Weight**               | Approx: 320 g (packaging not included)           |
| **Dimensions**           | W x D x H: 100 x 91 x 34 mm                      |