STANDARD OPERATING PROCEDURES FOR THE USE OF THE SYNTOUCH TOCCARE® HAPTICS MEASUREMENT SYSTEM

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CONFIDENTIAL INFORMATION

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ABOUT THIS DOCUMENT

The purpose of these standard operating procedures ("SOPs") is to ensure the safety of the operators of the Toccare Haptics Measurement System ("Toccare"), the Toccare's integrity, and the fidelity of its measurements. This is not a detailed user manual for the operation of the Toccare. Procedures and questions not covered in this document may be obtained by requesting technical support from SynTouch.

These SOPs are pursuant to the *Policies for the Use, Support and License of the Toccare Haptics Measurement System* ("Policies") and are to be strictly followed to be eligible for any warranties. Specifically:

- Only Certified Toccare Operators may operate the Toccare. Certified Toccare Operators must be certified by SynTouch, which may require training by SynTouch.
- Certified Toccare Operators must comply with both these SOPs and the Policies. Non-compliance may result in personal injury, damage to the Toccare or the BioTac sensors, low-fidelity data, or termination of SynTouch's support and licensing obligations.

Related documents

These documents are located at syntouchinc.com/toccare-policies-and-sops

- *Policies for the Use, Support and License of the Toccare Haptics Measurement System*
- *Standard Operating Procedures for the Installation, Training & Acceptance of the SynTouch Toccare Haptics Measurement System*
- *Limited Warranty for the Toccare Haptics Measurement System*

Alerts and tips

This document contains four types of alerts that highlight especially important facts and procedures:

COMPLIANCE. Mandatory for compliance with the Policies.

SAFETY. Mandatory for prevention of injury to the operator.

DATA FIDELITY. Important for Toccare's accurate capture and reproduction of measured haptics.

RECOMMENDED BEST PRACTICE. Recommended for optimal use and performance of the Toccare.

TECHNICAL SUPPORT

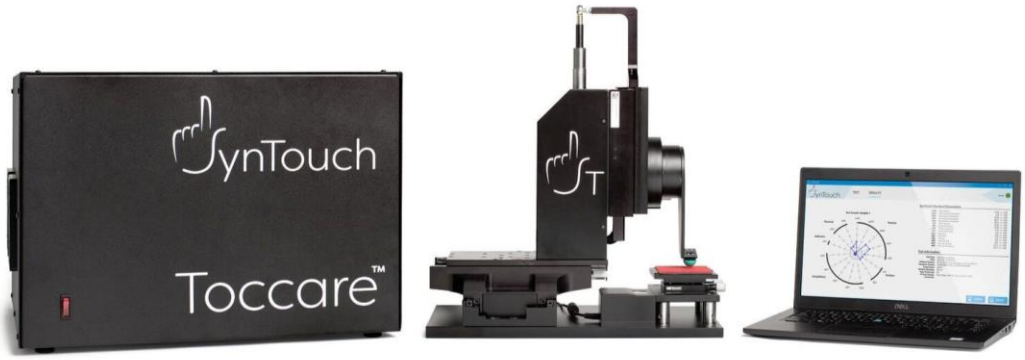
SynTouch's obligations to provide technical support are set forth in the Policies. SynTouch only responds to requests for technical support submitted by Certified Personnel on the SynTouch Help Desk at syntouch-inc.com/support.

- Technical support by SynTouch covers issues related to the Toccare's standard operation, the Toccare SOPs, the Policies, and the supply of BioTac sensors.
- Unless agreed upon in writing by SynTouch, technical support does not cover:
  - Personnel training.
  - Customization of the Toccare, including fixtures or non-standard test movements.
  - Design, review or interpretation of studies and tests.
  - Support of third-party software or equipment not supplied by SynTouch, such as statistical analysis software.
  - The service or maintenance of the Toccare performed at either SynTouch's or customer's premises.
  - Out-of-pocket expenses such as travel, supplies and shipping incurred by SynTouch to provide technical support.

THE TOCCARE SYSTEM

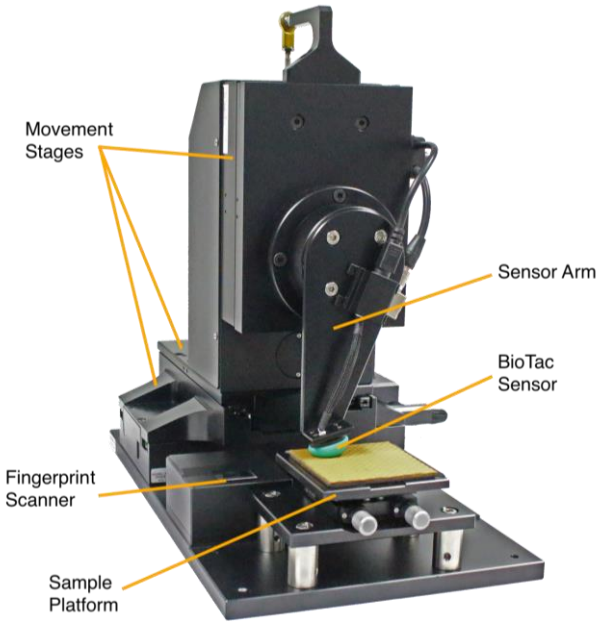
SYSTEM COMPONENTS

The Toccare consists of three main components plus ancillary documents, minor components, cables, toolkit, reference sample materials, and accessories.



Controller. The black box that contains the Toccare's electronics and power supply.

Test Station. Consists of the sample platform, sensor arm, BioTac® Sensor, movement stages, and fingerprint scanner.



Computer Console. A computer for the exclusive use by Certified Toccare Operators to operate the Toccare using the Toccare software ("STS").

Environment Sensor. Located near the sample platform to record temperature, relative humidity and barometric pressure.

SAFETY

The emergency stop push button (E-Stop) is a fail-safe control switch that provides both safety for the Certified Toccare Operator and the Toccare. It immediately stops the Toccare when the Certified Toccare Operator deems there is a risk of injury or stopping instantly is required.

COMPLIANCE

The following actions are not allowed under any circumstances:

- Lift, carry, move, disconnect or reconnect any part of the Toccare, which must remain exactly as it was installed by SynTouch, except for (a) the replacement of BioTac sensors on the Test Station and (b) minor movements of the Computer Console, E-stop or environment sensor needed to accommodate non-standard testing fixtures or samples as long as these components are not disconnected from the Toccare even momentarily.
- Substitute, modify, adjust, or unplug components and accessories installed by SynTouch including, but not limited to, data cables, electrical cables, zip ties, power strips, connectors, knobs, and switches.
- Connect any peripheral or external device(s) to the Toccare except for passive removable storage media connected to an open USB port on the Computer Console for the sole purpose of exporting data.
- Attempt to troubleshoot the Toccare except as indicated in the Troubleshooting section of this document. Actions not listed there are expressly forbidden without exception. If a warning or condition is not listed there or if a condition persists, you must immediately request technical support from SynTouch. Do not attempt to resolve the issue without SynTouch's involvement.
- Perform actions that could be interpreted as an intent to tune, adjust or modify the Toccare's performance.
- Disassemble or open any component or sub-component including, but not limited to, the Controller, Test Station, BioTac sensors, and Computer Console.
- Modify any setting or the configuration of the Computer Console.
- Connect the Computer Console to any internal or external network, or the internet.
- Install, modify, or delete, any software on the Computer Console.
- Subject the Toccare to non-approved environmental conditions (see next section).
- Dampen or apply water to the Toccare, including placing the Toccare in a humid environment.

ENVIRONMENTAL CONDITIONS

COMPLIANCE

Operating the Toccare outside these environmental conditions may damage the equipment or cause low data fidelity:

Temperature	10–30°C (50–95°F)
Relative humidity	10–90% – non-condensing

BEST PRACTICE

Temperature	22°C (~72°F) +/- 1°C
Relative humidity	50% +/- 3%

DATA FIDELITY

External sources of vibration (electrical and mechanical) will affect data fidelity.

The Test Station may be installed on a granite block intended to dampen extraneous vibrations. This does not guarantee that the Toccare will be isolated from all vibrations from external sources located on the same or a contiguous surface. Sources may include but are not limited to:

- other instruments
- lab equipment
- cell phones
- laptops
- fans
- HVAC system

THE BIOTAC SENSORS

The skin of the BioTac is made of a silicone elastomer with viseolastic properties and has a fingerprint profile similar to human fingers.

Data fidelity is affected by the BioTac's:

- Degree of skin wear. The fingerprint ridges may wear down during testing.
- Contaminants. Substances or particles lodged between ridges may distort how the BioTac interacts with a surface.
- Chemical interactions. The BioTac skin's silicone elastomer may interact on a chemical level with the tested material. The silicone elastomer material safety sheet provides further details.

DATA FIDELITY

Replace the BioTac as often as necessary to resolve one or more of the above factors that may affect its fidelity. Refer to the section *Estimating BioTac wear*.

COMPLIANCE

Do not connect the BioTac to any device other than the Toccare.

Do not use the BioTac in any configuration other than secured to the Toccare.

Do not disassemble the BioTac.

Do not replace the BioTac's skin.

Do not connect the cable on the Test Station to any device other than the BioTac.

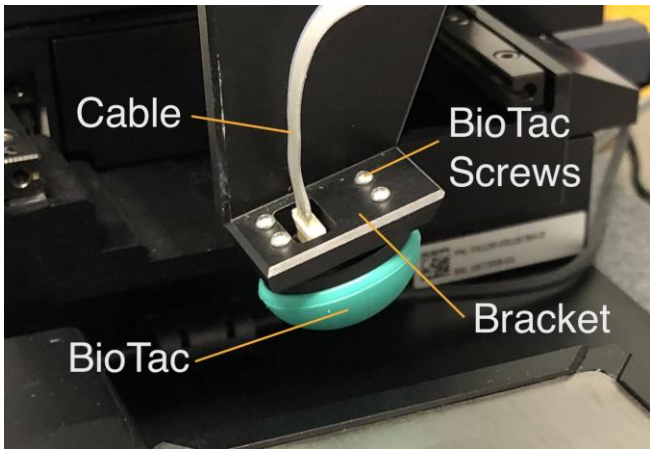
RECOMMENDED PRACTICE

Start every study with a previously unused BioTac.

Depending on the number of tests required to complete the study, multiple BioTacs may be needed to maximize data fidelity.

REPLACING THE BIOTAC ON THE TEST STATION

Replacing the BioTac takes 1-2 minutes with the 1.3 mm hex tool included in the Toccare toolkit.



Uninstalling

1. Disconnect the cable from the BioTac. If the Toccare is powered on, the Test Station will immediately become passive.
2. Loosen all four BioTac screws to release the BioTac from the Test Station.
3. Return the BioTac to the box labeled with its corresponding serial number.

> RECOMMENDED PRACTICE
>
> To avoid losing the BioTac screws, loosen but do not remove them from the Test Station.

> COMPLIANCE
>
> Yanking, tugging or similarly handling the BioTac cable will damage the cable and the BioTac.

Installing

1. Orient the BioTac under the bracket on the sensor arm such that the slot in the bracket lines up with the white cable port on the BioTac.
2. Gently secure the BioTac to the bracket with the four BioTac screws (any order).
3. Tighten all BioTac screws until snug.
4. Connect the cable to the BioTac.

COMPLIANCE

Attempting to connect the cable at any angle not in line and in plane with the BioTac will damage the BioTac and the cable.

Overtightening the BioTac screws will damage the BioTac and/or the bracket. Hand snug is the recommended torque spec.

BIOTAC CARE

COMPLIANCE

Not following these care guidelines may permanently damage the BioTac. SynTouch's obligations do not include replacing at no cost BioTacs damaged due to lack of observance of these guidelines.

Storage

DATA FIDELITY

Keep BioTacs in the storage box labeled with the BioTac's corresponding serial number.

Do not use BioTacs more than three weeks after receiving them from SynTouch.

Do not expose BioTacs to temperatures, humidity levels, or barometric pressures outside the ranges specified in this SOP.

Do not expose BioTacs to repeated fluctuations in temperature, humidity, or barometric pressure.

Store BioTacs in the same temperature, humidity, and barometric pressure as the Toccare.

Cleaning

BioTac skin is sensitive to contaminants such as, but not limited to, human finger oils, cleaning materials, fingerprint scanner contaminants, and residues from samples. Removing unintended coatings and particles is recommended for data fidelity.

The protocol for cleaning the BioTac during a study depends on the study's sample materials. Cleaning the BioTac according to a specific cleaning protocol is important to ensure the Toccare system produces consistent results. This said, replacing the BioTac may not be recommended for specific studies that require accumulation of coatings or particulates.

The interaction between the BioTac and any material (including cleaning agents) should be assessed as a chemical reaction and as a physical interaction that could result in nonrecoverable deformation. If in doubt about the removal of specific contaminants or the use of certain cleaning agents, request technical support from SynTouch.

The glass of the fingerprint scanner should also be cleaned. Avoid any action or cleaning agent that may scratch or damage the surface.

RETURNING BIOTAC SENSORS TO SYNTOUCH

A BioTac sensor should be returned to SynTouch when it is no longer suitable for testing. The SynTouch Help Desk explains how to return BioTac sensors to SynTouch.

DATA FIDELITY

A BioTac is no longer suitable for use three weeks after it was shipped by SynTouch, there are signs of wear, or it has performed in any way that gives doubt about data fidelity.

BEST PRACTICE

Do not stockpile sensors, but rather request and use them in a just-in-time fashion.

You are not limited to the number of sensors you can request from SynTouch, nor the frequency of ordering. Also, don't assume that it is a mandated exact exchange. That is, if you have X sensors that need returning and require Y new sensors, return X and order Y. X and Y do not have to be the same number; X can be larger than Y and vice versa. Moreover, if you have sensors that are within their use-by date of less than three weeks from having received them, you don't have to return them to order new ones.

Schedule your tests for a relatively short horizon (no more than 2-3 weeks), so you may request the precise number of sensors. Again, you may request sensors one-for-one with those you are returning, request more sensors, or request fewer sensors.

After you complete the tests, return the used sensors and only keep unused sensors if you will use them within 2-3 weeks of having received them.

OPERATING THE TOCCARE

SAFETY

At any time, if there is a perceived safety concern, press the E-Stop.

After pressing the E-Stop, the Toccare must be reset before it is ready for testing. To reset: power the Toccare off, twist the E-Stop clockwise, power the Toccare on.

POWER CYCLING THE SYSTEM

Power on

1. Inspect for potential safety hazards.
2. Remove all Test Station lock devices. Refer to Appendix A.
3. Visually inspect for anything (e.g. objects or cables) that may impede the Test Station's range of motion.
4. Install the BioTac.
5. Verify that the BioTac is resting on the fingerprint scanner.
6. Turn on the Controller using the red power switch on its front panel (illuminated status).

   The Test Station will immediately begin its initial motion sequence.

   If the initialization is successful, the Test Station will finish its motion sequence and actively hold position; for example, the BioTac will not move when gently nudged.

   If the initialization is not successful, the Test Station will become passive and, for example, the BioTac will move easily when touched. Refer to the *Troubleshooting* section.
7. Turn on and log in to the Computer Console.
8. Launch STS, the Toccare software.

   The Computer Console will connect to the Controller and make ready the Toccare for testing.

Power off

You may leave the Toccare powered on between tests. Power the Toccare off prior to extended breaks, such as overnight.

1. Close STS. **Wait for STS to close all connections.**
2. Power off the Computer Console.
3. Power off the Controller using the red power switch on its front panel (non-illuminated status).
4. Uninstall the BioTac and store it in the plastic box with the corresponding serial number.
5. Install Test Station stage locks. Refer to Appendix A.

CONDUCTING TESTS

Testing a sample consists of five steps: sample preparation, test setup, calibration, data collection, and data export.

> COMPLIANCE
>
> Do not use the Computer Console for any purpose other than operating STS for calibration or collecting data.

> DATA FIDELITY
>
> During data collection and calibration:
>
> - Do not work or use a computer on the same surface as the Toccare.
> - Do not bump into or move any Toccare component.
> - Do not place or operate vibrating, oscillating, electrical, mechanical or dynamic devices near the Toccare or on the same table as the Toccare.
> - Do not connect any form of passive removeable storage media to the Computer Console.
> - Do not close STS.

Sample preparation

The standard sample preparation procedures explained here are for materials that can be tested positioned flat on the Test Station's sample platform.

> COMPLIANCE
>
> Materials that require non-standard testing fixtures or configurations will require non-standard sample preparation procedures. Request technical support from SynTouch with questions about the use of non-standard fixtures.

- Mount the sample free of wrinkles or other surface deformations on a 3"x3" magnet irrespective of the dimensions of the sample material.
  - The sample's surface must be flat, without sample-scale slope or curvature.
  - The sample must be prepared such that once the mounted sample material is positioned on the sample platform the magnet can be in direct contact with the sample platform and any excess material does not impede the movement of the Test Station's sensor arm.
  - Mount the sample material on the magnet such that a finger sliding along a line parallel to the sample platform's edge will experience the material in the test's intended way. For example, when mounting wood, if the test is expected to be experienced with the wood's grain, the sample's grain must be exactly parallel to the edge of the magnet.
  - Samples smaller than 3"x3" are considered non-standard and may require technical support from SynTouch before testing.

- If necessary, clean the sample.

> DATA FIDELITY
>
> Store the prepared samples and BioTacs to be used in the tests in the same temperature, relative humidity and atmospheric pressure as the Toccare for 48 hours prior to testing unless the atmospheric differences are part of the study's design.

Test setup

- Place the mounted sample on the sample platform. The sample platform is magnetic and is designed with alignment ridges on two adjacent edges. To ensure the sample is stable during testing, mount the magnet in direct contact with the sample platform, and have the corner of the magnet well seated against both alignment ridges.
- Ensure that the fingerprint scanner is not covered with or obstructed by any material or contaminants.
- Launch and enter data in STS:
    - Required to save the results: Select the project folder where to save the test results.
    - Required: Select the test type, which refers to the movement pattern the Toccare will perform during the test.
    - Required to save the results: Sample name.
    - Optional: Pauses between movements. By default, Toccare will not pause between each movement. In some experiments it is necessary to pause between every movement (e.g., to reapply lotion to the BioTac). If the toggle is clicked "on", the Toccare will remain paused after each movement until the Certified Toccare Operator confirms it should continue.
    - Optional: Comments. For example, the orientation of the sample, or the name of the Certified Toccare Operator.
    - Required: Click *Start Test*. STS will run a pre-test validation.

> SAFETY
>
> At any time, if there is there is a perceived safety concern, press the E-Stop.
>
> After pressing the E-Stop, the Toccare must be reset before it will be ready for testing. To reset: power the Toccare off, twist the E-Stop clockwise, power the Toccare on.

> DATA FIDELITY
>
> Only use BioTacs cared for under the guidelines presented in the *BioTac Care* section above.

Calibration

BioTac calibration

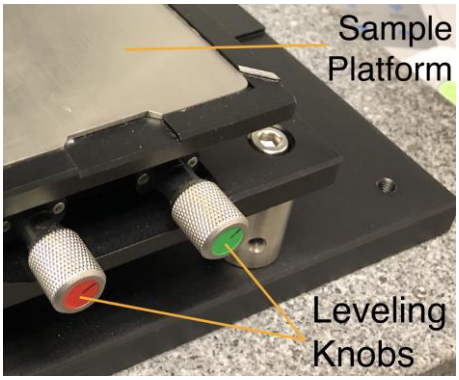
STS will guide the Certified Toccare Operator through the BioTac calibration, including when to place the provided SynTouch Reference Surface (referred to by STS as "Calibration sample") on the sample platform (referred to by STS as "sample mount"), and when to remove it.

> COMPLIANCE
>
> Only use the provided SynTouch Reference Surface during the BioTac calibration.

> DATA FIDELITY
>
> Material (e.g. particulates, coatings, sample residue) must be removed from the BioTac immediately prior to calibration.

Sample levelness

An out-of-level sample platform may affect the accuracy of the measurements. STS provides guidance on adjusting the levelness of the sample platform by rotating the colored leveling knobs. Certified Toccare Operators may dismiss the guidance at their discretion.



Estimating BioTac wear

If a BioTac has not been used within the past 24 hours (including never having been used), STS may register a baseline fingerprint image of the BioTac skin at the end of the calibration.

At the beginning of the subsequent test, STS will offer the Certified Toccare Operator the opportunity to register a user-selected reference sample. See below for context.

The Certified Toccare Operator must actively monitor the status of the BioTac's skin in addition to performing calibrations as requested by STS. STS does not mandate the replacement of a BioTac, so the BioTac must be replaced at the discretion of the Certified Toccare Operator.

RECOMMENDED PRACTICE

Replace the BioTac after a maximum of 30 tests.

Replace the BioTac when data from testing of a known reference material yields different values.

STS includes tools that are experimental and therefore may not be reliable:

- **Test count.** STS notifies when the test count exceeds 50 tests.
- **Side-by-side visual comparison** of current fingerprint image to the baseline fingerprint, and the estimated percent change in wear between the current and baseline skin conditions.
- **Comparison of microtexture roughness** values for a reference material (a material previously selected by the Certified Toccare Operator that is not the Calibration sample) as measured to a baseline value recorded when the BioTac was first used.

Data collection

During the test, the BioTac moves in a pre-programmed sequence of pushing and sliding movements.

- If the option to "pause between movements" is selected, the Toccare will remain paused after each movement until the Certified Toccare Operator instructs STS to continue.
- To abort a test, the Certified Toccare Operator must click "Stop Test" on STS. *Data will not be saved.*

DATA FIDELITY

Do not touch the BioTac unless the software indicates that it is safe to do so (e.g., when the Toccare has been set to "pause between movements").

Data review and export

When a test is complete, STS displays the *Results* tab showing (a) the summary of measurements, (b) a spider plot, (c) test metadata including warnings that were displayed during testing, and (d) the following options:

- Save. If a sample name was not specified prior to testing, the Certified Toccare Operator may add one and save the test results.
- Open. If the Certified Toccare Operator specified a sample name, clicking "Open" will open the computer directory where the data are saved.

COMPLIANCE

Do not click "Print" because connecting a printer to the Computer Console is not supported.

Only a Certified Toccare Operator may export data from the project folder on the Computer Console to passive removable storage media connected to an open USB port or SD card slot of the Computer Console.

COMPLIANCE

DO not use any powered external removable storage media.

Do not leave passive removable storage media connected to the Computer Console when not actively exporting data.

TROUBLESHOOTING

This section presents a list of common errors and steps to resolution.

> COMPLIANCE
>
> Do not attempt to troubleshoot the Toccare except as indicated below. Actions not listed below are expressly forbidden without exception.
>
> If a warning or condition is not listed below or if a condition persists, immediately request technical support from SynTouch. Do not attempt to resolve the issue without SynTouch's involvement.

> RECOMMENDED PRACTICE
>
> When in doubt, request support from SynTouch.

If the Toccare detects an error or an emergent condition, the Computer Console may display one or more message(s) and take the necessary actions to safeguard both the integrity of the Toccare and the safety of the operator.

The message may contain a description of the primary condition or error, and a notification that the Toccare has been disabled.

Resolve the errors in the order they are listed.

If the "Stage Fault Error" is the only remaining message, the "Enable Motors" button will become available. Position the BioTac on the fingerprint scanner and click to enable the motors and return the Toccare to an operable state.

If the message obscures the display, it is possible to temporarily hide it by clicking "hide". Reopen the message by clicking on the image of the red status LED in the top-right corner of the STS window.

Error or warning	**What to do**
After powering on the Controller, the stages do not move and reach an active steady, motionless state.	Manually move the BioTac to the fingerprint scanner. Restart the Controller.
Error message: *The application failed to connect to the Data Logger.*	Request technical support from SynTouch.
Error message: *The application failed to connect to the Ensemble Controllers.*	Request technical support from SynTouch.
Error message: *The application failed to connect to the fingerprint scanner.*	Request technical support from SynTouch.

Error or warning	What to do
Error message: *USB-RS232 Communication Error: There were errors in USB or RS232 communication.*	Request technical support from SynTouch.
Error message: *AUX Communication Error: Z-axis AUX communication failure detected.*	Request technical support from SynTouch.
Error message: *E-Stop Engaged: All operations are disabled*.	Power off the Toccare, twist the E-Stop clockwise to disengage, and power on the Toccare.
Error message: *BioTac Communication Error: The BioTac data is invalid.*	Check the BioTac's cable connection. Replace the BioTac and return it to SynTouch noting the error.
Error message: *Force Plate Error: The force plate data is invalid.*	Request technical support from SynTouch.
Error message: *Over Force Error: The BioTac contact force was over the safe limit.*	Check for and remove obstructing objects or samples. Restart the Toccare.
Error message: *Stage Fault Error: The stages are disabled, not homed, or in error.*	Resolve any additional errors shown on the console, then click "Enable Motors" to initialize.
Could not enable the motors.	Restart the Toccare.
Error message: *BioTac serial number is incompatible.*	Replace the BioTac.
Error message: *BioTac firmware is incompatible.*	Replace the BioTac.
Error message: *Data Logger firmware is incompatible.*	Request technical support from SynTouch.
Error message: *Ensemble firmware is incompatible.*	Request technical support from SynTouch.
Error message: *One or more analyzers are not supported.*	Request technical support from SynTouch.
Warning: *The pre-test validation has failed. Failure to communicate with the ensemble controllers.*	Request technical support from SynTouch.
Warning: *Calibration does not exist or is out of date.*	Follow on-screen instructions to perform Calibration before testing.

Error or warning	What to do
Warning: *Calibration check failed.*	Follow any instructions on the screen to perform before testing. Replace the BioTac.
Warning: *Calibration failed.*	Replace the BioTac.
Warning: *BioTac failed to warm-up.*	Wait 15 minutes and restart test. Replace the BioTac.
Warning: *BioTac DC temperature is out of range.*	Wait 15 minutes and restart test. Replace the BioTac.
Warning: *BioTac AC temperature is out of range.*	Wait 15 minutes, and restart test. Replace the BioTac.
Warning: *BioTac DC pressure is out of range.*	Wait 15 minutes, and restart test. Replace the BioTac.
Warning: *BioTac AC pressure is out of range.*	Wait 15 minutes, and restart test. Replace the BioTac.
Warning: *BioTac AC temperature noise is out of range.*	Wait 15 minutes, and restart test. Replace the BioTac.
Warning: *BioTac AC pressure noise is out of range*	Ensure that the Test Station is isolated from unwanted vibrations and restart test. Replace the BioTac.
Warning: *Ambient sensor is not connected*	Check the USB cable. It is possible but *not advisable* to dismiss this message and proceed without the ambient sensor.
Warning; *BioTac may be contaminated*	Clean the BioTac skin and fingerprint scanner, and restart test.
Warning: *BioTac may be worn*	Perform reference/control sample test to confirm wear. If skin wear is confirmed, replace the BioTac.
Warning: *BioTac fingerprint is worn*	Replace the BioTac.
Warning: *Sample Platform is not level.*	Even if this error is corrected before test, in some instances it will appear as a note in subsequent test results.
Warning: *Temperature*	Check if environmental conditions are outside operating limits.

Error or warning	What to do
Warning: *Humidity*	Check if environmental conditions are outside operating limits.
Warning: *Ambient Noise*	Check if environmental conditions are outside operating limits.
Warning: *Stages Tuning*	Request technical support from SynTouch.

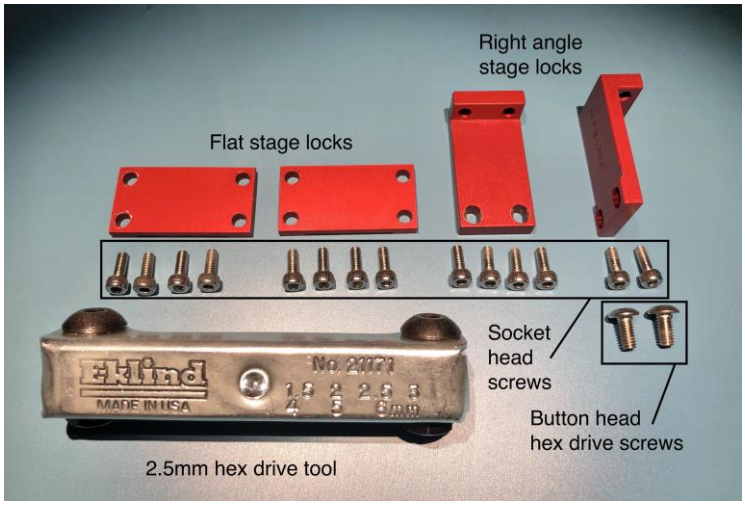
APPENDIX A – INSTALLING AND REMOVING STAGE LOCKS

Prerequisites

> COMPLIANCE
>
> Prior to installing stage locks, Toccare must be powered off and the BioTac must be uninstalled.

All required materials are in the toolkit included with the Toccare:

- 2 x button head hex drive screws
- 14 x socket head screws
- 2 x right-angle stage locks
- 2 x flat stage locks
- 1 x 2.5 mm hex drive tool



Installing stage locks

Primary stage lock

- Move the primary stage to mid-travel position and adjust the secondary stage to expose two screw holes (Figs 1 and 2).
- Being careful not to touch the silver rails, place a right-angle stage lock in contact with both the primary and secondary stages. Position the long vertical face flush against the primary stage and the short face flush against the underside of the Secondary stage (Fig 3).
- Align the holes on the short face of the stage lock with the holes of the primary stage (Fig 2).
- Using the hex tool, install both button head screws, hand tight (Fig 2).
- If necessary, adjust the position the primary stage such that the holes on the long face of the stage align with the holes of the primary stage.

- Using the hex tool, install two socket head screws, hand tight.

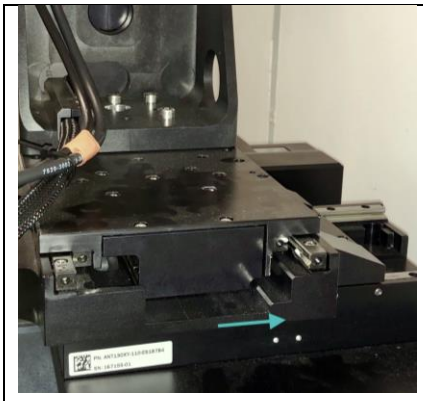
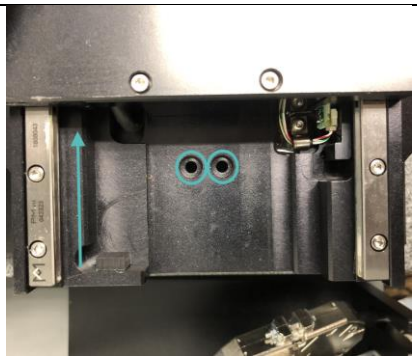
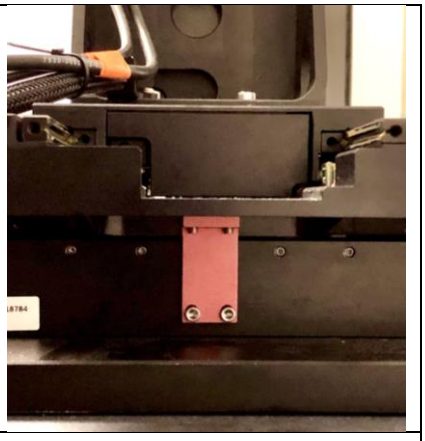
		

Fig 1. Move primary stage into mid-travel position.	Fig 2. Adjust secondary stage to expose two screw holes for short side of primary stage lock	Fig 3. Installed primary stage lock

Secondary stage lock

- Move the secondary stage to its mid-travel position (Figs 4 and 5).
- Orient the right-angle stage lock such that the long face is both vertical and positioned flush against the secondary stage on the side of the Test Station without cables. The short face will be horizontal and in contact with the base of the secondary stage (Fig 6).
- Align the holes of the stage lock with the holes in the secondary stage (Fig 5).
- Using the hex tool install four socket head screws, hand tight (Fig 6).

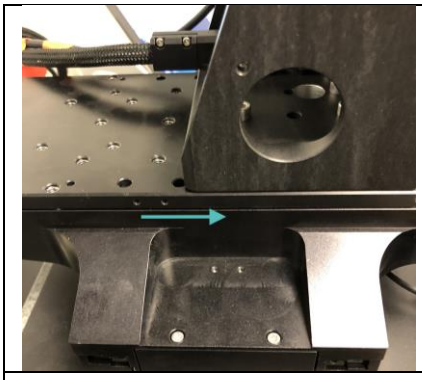
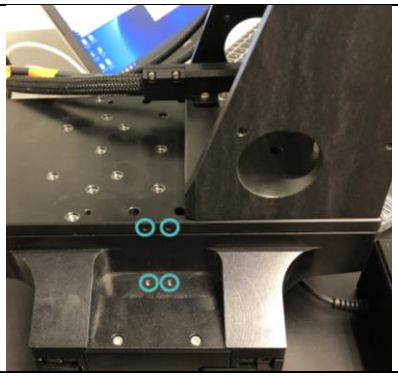
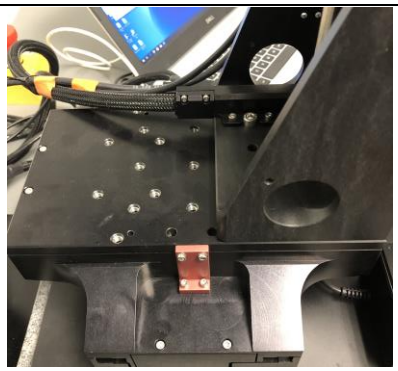
		

Fig 4. Move secondary stage into mid-travel position.	Fig 5. Align screw holes.	Fig 6. Installed secondary stage lock

Tertiary stage locks (Qty: 2, one on each side of the tertiary stage)

- Move the tertiary stage to the mid-travel position (Fig 7). When it is in the mid-travel position, the two sections of the tertiary stage will be aligned, and the holes will be aligned (Figs 8 and 10).
- For each side of the tertiary stage:
    - Orient the stage lock such that the completely flat face presents outward, and align the holes of the stage lock with the corresponding holes of the tertiary stage (Fig 9).

- Hand thread four socket head screws to secure the stage lock to the tertiary stage (Fig 9).
- Only after all four screws are in place, use the hex tool to tighten the screws (Fig 9).
- Repeat the steps on the opposite side of the tertiary stage to install the second stage lock (Figs 10 and 11).

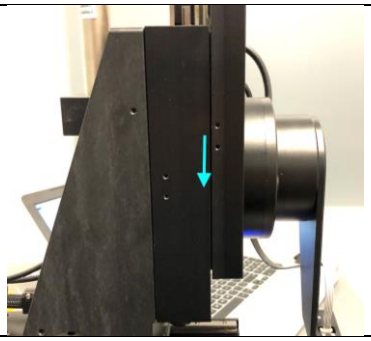


Fig 7: Move tertiary stage into mid-travel position.

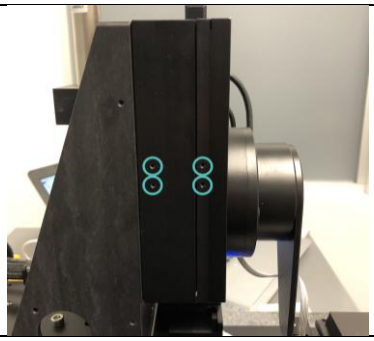


Fig 8: Align screw holes.

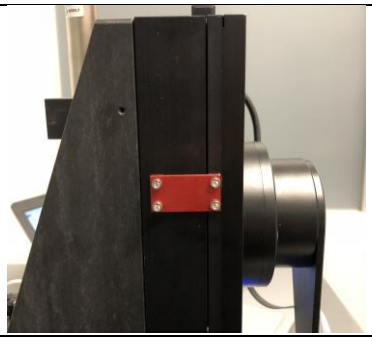


Fig 9: Installed tertiary stage lock (1 of 2)

Fig 10: Align screw holes.

Fig 11: Installed tertiary stage lock (2 of 2)

Removing stage Locks

- Complete all the above steps in the EXACT reverse order.