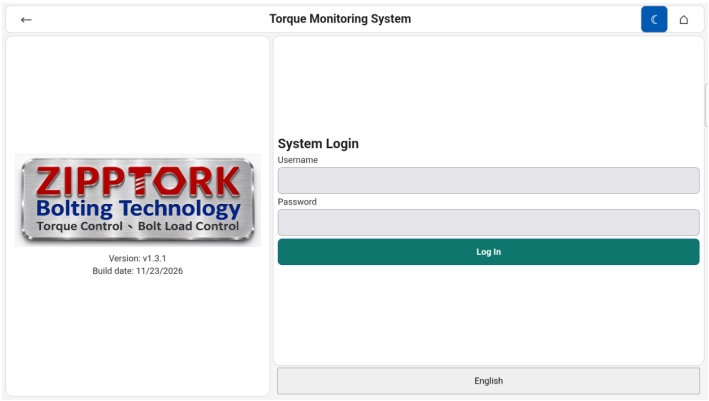
ZIPPTORK

TMS Torque Monitoring System

Software Installation and Operation Manual

English Edition



Applies to: ZIPPTORK TMS 1.3.1 (versionCode 27); package tms.zipptork; SHA b3b48a09

Supported platform: Android 8.0 or later, 64-bit ARM tablet/phone

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Safety Notice

- Follow the safety rules of the tool manufacturer and the factory when applying force. TMS is only a measurement and recording tool; it does not control or cut off the power of external machinery.
- If a sensor shows "Torque overload", "Zero drift", or "Hardware damage", stop using it immediately and send it for calibration or repair.
- Do not leave the work screen, switch parameters, or unplug the receiver while force is being applied.
- Use sensors within their specified range and calibrate them regularly according to the calibration interval.
- Uninstalling TMS or clearing the app data deletes all records. Always export a backup first.
- Modbus TCP has no encryption or authentication and may only be used on a controlled factory local area network.

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Version Identification and What's New in This Release

This manual describes ZIPPTORK installation, first login, sensor pairing, the four measurement modes, batch jobs, record export, and Modbus TCP. Before operating, check the application name, the Android package, and the APK SHA-256; earlier release APKs shared the label 1.0.0 / versionCode 3, so the version label alone cannot identify the program content.

This version is based on the following release APK. Before deployment, check the file delivered by the supplier against the APK SHA-256:

Item	Details
Application name/package	TMS RF/tms.zipptork (the login screen shows "ZIPPTORK TMS")
Version	1.3.1 (versionCode 27); the login screen shows "Version: v1.3.1" and "Build date: 11/23/2026"
Product source (commit)	eec5fee8ed1b40bfe5ff3362440839a9d6ca3d6c
APK	ARM64 (arm64-v8a), not debug, signed, 32,522,643 bytes
APK SHA-256	b3b48a09ae3e23f2912ca8d011e7e4521524409bdf817fcc2cda27ba5289e30d
Android version	Minimum Android 8.0 (API 26); target API 36

The APK size and SHA-256 in the table above were calculated on 2026/11/23 from the signed release file ZIPPTORK-TMS-RF-1.3.1-arm64-release.apk. The previous version of this manual covered 1.1.11 (APK SHA-256 c590b83e…). Compared with 1.1.11, versions 1.1.12 to 1.3.1 add: the app name "TMS RF" on the Android home screen and a release APK file name that includes the brand; a work screen divided into a left and a right area, with larger OK/NOK and reading text; a progress band under the main reading; a "Data Curve" button that opens the curve of an NOK result directly on the work screen; smoother curves in the record details; a blank Target Torque after the sensor is changed, with the allowed range shown while the field is being edited; a confirmation before a paired sensor is deleted; a pop-up list for the "Tolerance Type" of the parameter settings; and clearer messages on the login, user management and record screens. The work screen no longer shows a live curve. Measurement, judgement, export and Modbus TCP behavior are unchanged. The one exception is the TTAS angle torque sensor: an invalid angle

reading as you ease off no longer interrupts the measurement, and if the angle signal is lost and torque is applied again, that cycle is saved as NOK.

Usage Restrictions and Fault Reporting

The current source still has incomplete real-device acceptance. Camera barcode scanning (Section 11.6) has only had limited real-device cross-checking with Code 128 and QR barcodes on the torque wrench parameter page in Traditional Chinese at the normal font size; other languages, pages, barcode formats, and the behavior of returning to the screen after the camera permission is first requested have not been verified. At large font sizes or in narrow windows, the language list, the Modbus address table, and chart text may be clipped, overlap, or have insufficient contrast; you can first switch to landscape full screen and report the issue. Hardware support declarations and host test results do not mean that all devices, RF/PLC setups, long-duration loads, or the 16 KiB Runtime have been verified.

Chapter 1 Product Overview

1.1 System Introduction

The ZIPPTORK TMS Torque Monitoring System (hereinafter TMS) is a measurement application installed on an Android tablet or phone. TMS connects to an RF 2.4G receiver through USB, wirelessly receives torque and angle data from sensors (torque wrench, power tool, or angle torque sensor), displays readings in real time, automatically makes the OK/NOK judgement, saves every measurement record and curve, and, when needed, exports CSV/Excel or provides the data to a PLC through Modbus TCP.

This manual is based on ZIPPTORK TMS version 1.3.1 (versionCode 27, Android package name tms.zipptork, version date 2026/11/23). It covers everything from hardware selection, installation, and first login to every screen, button, and function, with operating steps and examples, for operators, QC staff, and system administrators.

1.2 Main Functions

Function	Description	Reference chapter
Torque Wrench	Makes the OK/NOK judgement from the peak torque; suited to manual torque wrenches.	Chapter 13
Power Tool	Measures the torque of pulse, impact, and clutch-type power tools, and shows the pulse count and working time.	Chapter 14
Torque Measurement	Measures the torque "at the moment of rotating to the specified angle" (angle-point torque) and makes the judgement from it.	Chapter 15
Torque & Angle	Calculates the rotation angle after the torque reaches the seating threshold; you can choose "Angle control" or "Torque control" for the judgement.	Chapter 16

Function	Description	Reference chapter
Batch Jobs	Combines multiple work steps (which may use different modes and sensors) into a flow that switches automatically in sequence.	Chapter 17
Records and Export	Query records by date, mode, and result, view curves, and export CSV or Excel with charts.	Chapter 18
Sensor Pairing	Detects the receiver, sets the wireless channel, and pairs and switches sensors.	Chapter 10
Users and Permissions	Creates accounts, enables/disables them, and grants 8 types of operation permissions individually.	Chapter 9
Communication Settings	Enables the Modbus TCP server so a PLC can read measurement results or issue commands.	Chapter 19
Sensor Fault Monitoring	Real-time alerts and history for low battery, overload, zero drift, hardware faults, and similar conditions.	Chapter 20
Multiple Languages	The interface supports 16 languages (including right-to-left Arabic); the language is selected automatically from the system language at first launch, and numbers and dates are shown in the locale's format.	Chapter 8

1.3 System Architecture

The TMS data flow is as follows (left to right):

Sensor	→	Receiver	→	Android device (TMS)	→	PLC/computer
Torque wrench, power tool, or angle sensor	RF 2.4G wireless	USB RF 2.4G receiver	USB OTG	Measurement, judgement, recording, export	Wi-Fi/Ethernet Modbus TCP	Read results, issue commands (optional)

> **Tip** The receiver's USB connection, the sensor's RF wireless connection, and the sensor's own power are three separate matters. A lit receiver only means the USB port is supplying power; it does not mean correct sensor data is being received. Rely on the status shown on the TMS screen.

1.4 Glossary

Term	Description
Receiver	An RF 2.4G wireless receiver plugged into the USB port of the Android device; it communicates with the sensors.
Sensor	The wireless device that measures torque or angle. The screen identifies it by model (such as TTES, TTAS, TTEB), decimal serial number, and specification.
Specification	The full-scale torque upper limit a sensor can measure, for example 100 N·m. The target torque must be between the minimum (10% of the specification, 5% for the 10 N·m sensor) and the specification, both multiplied by the torque ratio when the multiplier is checked.
Pairing	Associates a sensor with a receiver and saves it, so it can later be selected from the list with "Connect and use".

Term	Description
Wireless channel	The RF 2.4G communication channel; the range is 3–62 and the default is 49. It is unrelated to the Wi-Fi channel and the Modbus station number.
Part Number	The identification code of the workpiece being tightened; it can be scanned with a barcode scanner, scanned with the in-app camera, or entered manually, and is saved in every record.
OK/NOK	Judgement result: OK means pass and NOK means fail.
Rehit	The "Rehit" judgement result of older versions. New measurements in this version no longer produce Rehit, but it may still appear when querying old records.
Tolerance Type	How the torque upper and lower limits are calculated: "±" is symmetric about the target; "≥" means at or above the target (the upper limit is still the target plus the tolerance).
Seating Torque	In angle-related modes, angle counting starts only when the torque first reaches this threshold.
Angle-point torque	In Torque Measurement mode, the torque at the moment of rotating to the target angle (interpolated from the data points before and after).
Multiplier	A torque multiplier. When on, the displayed torque = sensor torque × torque ratio; angle = sensor angle ÷ gear ratio.
Batch Counting / OK count per batch	Counts the passed (OK) pieces; when the "OK count per batch" is reached, "Batch Complete" is displayed and counting restarts.
Batch job (combination)	A workflow made up of multiple work steps; each step can have a different mode, sensor, and pass count.
Modbus TCP	An industrial communication protocol. TMS is the server (slave); the PLC or computer is the client (master).

1.5 How to Read This Manual

- Names of buttons or fields on the screen are shown in quotation marks, for example "Log In" and "Save & Apply".
- Buttons that have only an icon and no text are described by the icon's appearance, for example "← (Back)" and "⌂ (Main Menu)".
- Operation steps are numbered 1, 2, 3; perform them in order.

- The text of this manual follows 1.3.1. Not every image has been recaptured from 1.3.1: images captured from an earlier release can differ slightly from the 1.3.1 screens, for example the position of the "Data Curve" button in Figure 12-5 (in 1.3.1 it is as wide as the action row) and the app icon. The login screen (including the cover), the language menu of the login screen, the login screen with the on-screen keyboard open, the main menu, the four parameter-setting screens (tablet and phone) with their pop-ups and menus (select sensor, tool type, mode, judgement), the "Unpair sensor" confirmation window (Figure 10-6), and the record details (Figures 18-3 and 18-4) were captured on 2026/11/23 from the ZIPPTORK 1.3.1 release APK (versionCode 27) on the phone SM-S9080 (1544×720) and the tablet SM-X230 (1920×1200), with a paired TTEB 10 N·m sensor. The work screens of the four modes (tablet and phone, in the "Pending" state, including dark mode), the target torque range hint (Figure 11-3), the progress band (Figure 12-4), the NOK result (Figure 12-5) and the "Data Curve" window (Figure 12-6) were captured on 2026/11/23 from the 1.3.0 release APK (versionCode 26) with sensor TTEB 20260902 connected; apart from Figure 12-5 they look the same in 1.3.1. The batch work screens (Figure 17-13) were captured on 2026/11/21 from the 1.2.6 release APK (versionCode 22) and look the same in 1.3.1; the tablet screen of Figure 17-14 was captured on 2026/11/18 from the 1.1.12 release APK (versionCode 15), and the phone parameter-setting pop-up (Figure 16-4) on 2026/11/17 from the 1.1.11 release APK. The other screens (system settings, user management, sensor pairing, batch jobs, the record list and export, communication settings, the Modbus register map, sensor fault records and so on) were captured from the 1.1.3 release APK on 2026/11/03. System font scale font_scale 1.0; only the Android status bar and the tablet taskbar were cropped; Figure 16-4 shows the phone with its display size enlarged until the screen width is below 700 CSS pixels. The parameters and lists in the images are existing data on the device, not default values; enter values according to the on-site work instructions.
- Screens known to differ from the current app: the export columns of record details.

Tip Additional notes or operating tips.

Warning Matters related to personnel safety or data loss. Always follow them.

Example Uses actual values to demonstrate an operation or calculation.

Chapter 2 Recommended Hardware Specifications

TMS is an Android application and must be installed and run on an Android tablet or phone (called the "Android device" in this manual). A Windows computer cannot run TMS, but it can be used to transfer and install the APK, open exported CSV/Excel files, and test Modbus TCP connections. The recommended specifications for both are described below.

2.1 Minimum Requirements for the Android Device

The following conditions are required for the program to work; if any one is not met, installation or measurement is not possible:

Item	Minimum requirement	Description
Operating system	Android 8.0 (API 26) or later	Cannot be installed on Android 7.x or earlier.
Processor architecture	64-bit ARM (arm64-v8a)	32-bit ARM and x86/x86_64 devices are not supported by the release APK.
WebView	Android System WebView version 107 or later	If the version is too old, update it from the Play Store first.
USB	USB Host (OTG) support	Used to connect the receiver. Having a USB-C port does not necessarily mean OTG is supported; check the device specifications.

Item	Minimum requirement	Description
Screen orientation and size	Landscape; the window must be at least 320 wide and 360 high (CSS pixels)	In a window narrower than 320 or shorter than 360 (CSS pixels), "Make the window larger." is displayed. Portrait and narrow windows (for example split screen) use a stacked single-column layout instead. In this version, phones and tablets are still locked to landscape and do not switch to portrait when the device is turned; the stacked layout only appears when the app window itself is narrow.
Storage	1 GB or more available	The APK is about 30 MB; the rest is used for measurement records and export files.

2.2 Recommended Specifications for the Android Device

Item	Recommended (tablet, main use)	Recommended (phone, auxiliary use)
Operating system	Android 13 or later	Android 13 or later
Processor	64-bit, 8 cores, 2.0 GHz class or higher	64-bit, 8 cores, 2.0 GHz class or higher
Memory (RAM)	4 GB or more (6 GB or more recommended for long operation)	4 GB or more
Screen	8 inches or larger, resolution 1280×800 or higher	6 inches or larger, used in landscape
Available storage	4 GB or more	2 GB or more
USB	USB-C with OTG support, preferably able to use OTG while charging	USB-C with OTG support

Item	Recommended (tablet, main use)	Recommended (phone, auxiliary use)
Network (optional)	Wi-Fi 5 or later, or a USB Ethernet adapter (when using Modbus TCP)	Wi-Fi 5 or later
Battery	7,000 mAh or more, or connected to power during operation	4,500 mAh or more

> **Tip** Memory, screen size, and storage are operating recommendations, not conditions enforced by the program. Enlarged system fonts, display scaling, the navigation bar, and split screen all reduce the available area; avoid split screen and floating windows during measurement.

2.3 Screen Size and Screen Layout

TMS switches layouts automatically according to the "available screen size"; no manual setting is needed:

Available screen (width × height, CSS pixels)	Layout	Work screen differences
Width < 320 or height < 360	Window-too-small prompt	Shows only "Make the window larger." and the live reading; enlarge the window (for example close split screen).
Width 640–839	Compact landscape layout	Fields are denser. The progress band shows only the bar, without the limit values.
Width 840 or more	Standard landscape layout	The progress band shows only the bar, without the limit values.
Width 1200 or more and height 600 or more	Large-screen expanded layout	The result and the readings are shown larger, and the progress band also shows the lower limit, target and upper limit values (section 12.9).

In this version the work screen does not show a live curve in any layout. To see a curve, tap "Data Curve" after an NOK result (section 12.10) or open the record details (section 18.3).

> **Example** A typical 8–11 inch tablet (such as 1280×800) used in landscape gets the "Large-screen expanded layout"; a 6.5-inch phone used in landscape usually gets the "Compact landscape layout" or the "Standard landscape layout". In every layout the curve is viewed in the record details, or with "Data Curve" after an NOK result.

2.4 Peripherals

Device	Requirements and recommendations
RF 2.4G receiver	A USB receiver approved by the manufacturer; connect only one receiver to an Android device at a time.
OTG adapter/USB hub	Good quality with a secure contact. If you need to charge while using it, choose an adapter that supports PD charging plus OTG, and confirm that the device itself supports it.
Sensor	The manufacturer's RF 2.4G torque/angle sensor; charge it fully before use and confirm it is within its calibration period.
Barcode scanner (optional)	A USB or Bluetooth barcode scanner in "Keyboard mode (HID)"; after scanning, it types the text into the field where the cursor currently is. Barcode length is up to 64 characters.
PLC or computer (optional)	Supports Modbus TCP Client (Master) and is on the same local area network as the Android device.

2.5 Recommended Computer (Windows) Specifications

The computer is used only for installation and data processing, including: installing or updating the APK with ADB, copying the APK to the device, opening exported CSV/Excel files, and testing Modbus TCP connections.

Item	Minimum	Recommended
Operating system	Windows 10 (64-bit)	Windows 11 (64-bit)
Processor	Intel Core i3 / AMD Ryzen 3 class	Intel Core i5 (8th generation or later) / AMD Ryzen 5 class
Memory	4 GB	8 GB or more
Available storage	2 GB	10 GB or more (to keep past export files)
USB	USB 2.0 port plus a USB cable that can carry data	USB 3.0 port plus the original or a certified cable
Installation tool	Android SDK Platform-Tools (ADB)	Latest Platform-Tools
Spreadsheet software	Microsoft Excel 2016 (can open CSV/.xlsx)	Microsoft 365 Excel (full support for native .xlsx line charts)
Network (optional)	Same network segment as the Android device	Wired Ethernet
Modbus test tool (optional)	Any Modbus TCP Client software	Modbus test software that can display hexadecimal and 32-bit integers

2.6 Devices Used in Development Testing

Device	Environment	Description
Samsung tablet SM-X230	Android 16 (API 36), ARM64	Used for development testing and for the screenshots in this manual; screen 1920×1200.
Samsung phone SM-S9080	Android 16 (API 36), ARM64	Used for development testing and for the screenshots in this manual; screen 1544×720.

> **Tip** The table above is for reference; it does not mean other models are incompatible, nor that the devices above have completed acceptance with all sensors, PLCs, and external equipment. Before introducing a new model, first complete the "Pre-shift check" in Chapter 21 with a test part.

Chapter 3 Installation Steps

3.1 Preparation Before Installation

- Confirm that the Android device meets the minimum requirements in section 2.1 (Android 8.0 or later, ARM64, OTG support).
- Obtain the release APK from the supplier (example file name: ZIPPTORK-TMS-RF-1.3.1-arm64-release.apk; the file name starts with the brand) and check the file against the APK SHA-256 (see "Version Identification and What's New in This Release"). Do not substitute a Debug, Benchmark, or test APK for the release version.
- If an older version of TMS is already installed on the Android device: first stop measurement and PLC communication, and export the records you need to keep according to Chapter 18.
- The Android device has at least 50% battery, or is connected to a charger.
- Prepare the receiver, the OTG adapter, and the sensors you will use (charged).

We recommend filling in the table below before installation, as a basis for later repair requests and upgrades:

Item	Content (please fill in)
APK file name	
Version	1.3.1
Build date	
Source/date obtained	
Installed device model/serial number	
Installer	

3.2 Method 1: Install Directly on the Android Device

Suitable for general users; no computer commands are needed.

1. Copy the APK to the Android device: connect it to a computer with a USB cable, select "File transfer" ("Transferring files" on Samsung devices) in the device notification panel, and copy the APK to the "Download" folder; you can also download it through the company cloud drive or email.
2. On the device, open the "My Files" (or "Files") app, go to the "Download" folder, and tap the APK file.
3. If a message such as "For your security, your tablet isn't allowed to install unknown apps from this source." appears (it says "phone" on a phone), tap "Settings", turn on "Allow from this source", and then press the back key.
4. The installation screen shows the application name "TMS RF"; tap "Install". For an update, "Do you want to update this app?" is shown; tap "Update".
5. If Google Play Protect shows a prompt, after confirming that the APK is the release version provided by the supplier, select "Install anyway".
6. After "App installed" appears, tap "Open", or open it later from the "TMS RF" icon on the home screen.
7. After installation is complete, we recommend going back to Settings and turning off the "Allow from this source" option you turned on in step 3.

> **Example** Engineer Wang receives ZIPPTORK-TMS-RF-1.3.1-arm64-release.apk:
> ① Connect the tablet to the computer with a USB cable → pull down the tablet's notification panel → "Use USB for: Transferring files".
> ② On the computer, drag the APK to "Galaxy Tab > Internal storage > Download".
> ③ On the tablet, open "My Files > Downloads", tap the APK → allow the source → install → open; the installation is complete when the TMS "System Login" screen appears.

3.3 Method 2: Install with ADB from a Computer (Administrator)

For administrators who deploy or update many devices. ADB is only an installation tool and does not need to be opened for ordinary measurement work.

3.3.1 Preparing the Computer

1. Download "SDK Platform-Tools for Windows" from the official Android developer website.
2. Extract it to a fixed folder, for example C:\platform-tools.
3. Put the APK file in a location that is easy to type as a path, for example C:\TMS\ZIPPTORK-TMS-RF-1.3.1-arm64-release.apk.

3.3.2 Enabling USB Debugging on the Android Device

1. Open "Settings > About tablet (or About phone) > Software information".
2. Tap "Build number" 7 times in a row until "Developer mode has been turned on" appears.
3. Return to "Settings", go to the newly appeared "Developer options" at the very bottom, and turn on "USB debugging".
4. Connect the device to the computer with a USB cable; when the device shows "Allow USB debugging?", check "Always allow from this computer" and tap "Allow".

3.3.3 Confirming the Connection and Installing

1. On the computer, open "Command Prompt" or PowerShell and switch to the Platform-Tools folder: cd C:\platform-tools
2. List the connected devices: adb devices -l. The output should include a line with the device serial number and the status device; if it shows unauthorized, tap "Allow" on the device.
3. Install or update over the existing app: adb install -r C:\TMS\ZIPPTORK-TMS-RF-1.3.1-arm64-release.apk
4. When Success appears, the installation is complete.
5. When several devices are connected at the same time, you must specify the serial number: adb -s R9XXXXXXXXX install -r C:\TMS\ZIPPTORK-TMS-RF-1.3.1-arm64-release.apk
6. After deployment is complete, turn off "USB debugging" on the device (recommended).

> **Example** C:\platform-tools> adb devices -l
> R9TW1234ABC device product:gta9pwifi model:SM_X230 device:gta9pwifi
> C:\platform-tools> adb install -r C:\TMS\ZIPPTORK-TMS-RF-1.3.1-arm64-release.apk
> Performing Streamed Install
> Success

3.3.4 Common Installation Error Messages

Error message	Cause	Action
INSTALL_FAILED_NO_MATCHING_ABIS	Device is not 64-bit ARM	Replace it with a device that meets the specification.
INSTALL_FAILED_OLDER_SDK	Android version is lower than 8.0	Update the system or replace the device.
INSTALL_FAILED_UPDATE_INCOMPATIBLE	The installed TMS was signed with a different certificate than the new APK	**Do not uninstall directly (this deletes all records). Export the data first, then contact the supplier to confirm the source of the APK.**

Error message	Cause	Action
INSTALL_FAILED_VERSION_DOWNGRADE	Attempting to install an APK older than the current version	Check the APK version; downgrading is not recommended.
INSTALL_FAILED_INSUFFICIENT_STORAGE	Insufficient storage space	Free at least 1 GB of space and try again.
unauthorized / device not found	USB debugging not allowed, or the cable is charge-only	Tap "Allow" on the device; use a cable that can transfer data.

3.4 First Launch and System Permissions

The first time TMS is opened, or the first time the receiver is plugged in, Android may show the following system dialogs; handle them as described:

System dialog	Recommended choice	Purpose
"Allow TMS RF to send you notifications?" (Android 13 or later)	Allow	Shows a system notification when a sensor reports an error (low battery, overload, etc.). If denied, alerts are still shown inside the app, but no system notification appears.
"Allow TMS RF to access the USB device?"	Check "Use by default for this app" (if shown), then tap "OK"	Lets TMS use the receiver. If denied, the screen shows "USB permission denied"; re-plug the receiver or tap "Detect wireless receiver again" on the Sensor Pairing screen.
WebView version too old notice	Update "Android System WebView" in the Play Store	The TMS interface requires WebView version 107 or later.

Camera permission: the first time you tap the camera icon to the right of "Station" or "Part Number", Android asks whether to allow TMS to use the camera. Choose "Allow" to scan barcodes; if you choose "Deny", or the device has no usable camera, you can cancel the scan and enter the value manually, and other functions are not affected. To change this later, go to Android "Settings > Apps > TMS RF > Permissions". Camera scanning needs no network and does not save or upload photos (Section 11.6).

3.5 Updating to a New Version

1. End the current measurement and return to the main menu; if Modbus TCP is in use, first tell the PLC side to pause polling.
2. Export a backup of the records as needed (Chapter 18).
3. Install the new APK using the method in section 3.2 or section 3.3 (install over the existing app). Installing over the existing app keeps users, sensor pairings, parameters and measurement records.
4. After updating, check the app brand, the package name, the version shown on the login screen (v1.3.1 for this version), and the supplier's APK SHA-256; earlier APKs shared the version number 1.0.0. Confirm that accounts, pairings, parameters and records are readable, then use a test part to confirm the workflow.
5. After logging in, go to "System Settings > Sensor Pairing", confirm that the receiver and sensor status are normal, then measure once with a test part.

CSV / Excel files are exports of record data; they are not a restorable backup of accounts, pairings, parameters and the complete database. This version provides no verified procedure for restoring the whole data set; before replacing a device, clearing data or uninstalling, have the administrator confirm the backup and restore plan first.

3.6 Uninstalling

> **Warning** Uninstalling TMS, or using "Clear data / Clear storage" in Android settings, permanently deletes all local users, pairings, parameter settings and measurement records, and this cannot be undone. Always export the records you need to keep first.

To uninstall: "Settings > Apps > TMS RF > Uninstall", or long-press the TMS RF icon on the home screen and choose "Uninstall".

3.7 Installation Completion Checklist

Item to check	How to confirm	Result
The app opens normally	On the home screen, tap the TMS RF icon; the login screen or the "Add User" screen appears	□
Correct version	Below the brand text on the left of the login screen are shown "Version: v1.3.1" and "Build date: 11/23/2026"	□
Landscape display is normal	The screen does not show "Make the window larger."	□
Notification permission	Notifications are allowed (Android 13 or later)	□
The receiver is usable	The Sensor Pairing screen shows "Dongle connected" or "Paired"	□
The sensor can measure	Measure once with a test part and a judgement result appears	□

Chapter 4 Common Screen Operations

4.1 Top Bar Buttons

Every screen (including the login screen and the main menu) has a top bar with the same structure; "Part Number", "Records" and "Diagnostic capture" appear only on the screens noted in the table below:

Position / icon	Name	Function
Top left "←"	Back	Returns to the previous screen. Tapping Back on a work screen ends the current measurement; first confirm that the final result has been saved and that no force is being applied.
Center text	Screen title	Shows the name of the current screen or work mode, for example "Torque Wrench Parameter Settings", "Power Tool".
"Part Number" input box	Part number (work screens only)	Scan or enter the part barcode, up to 64 characters. When a work screen opens, the cursor is placed in this field automatically; the camera icon to the right of the field scans with the in-app camera (Section 12.4).
"Records"	Records (work screens only)	Opens the measurement record list for the current work mode.
"Diagnostic capture"	Diagnostic capture (Sensor Pairing screen only, and only for accounts with diagnostic permission; see section 10.7)	Opens the RF diagnostic capture window; see section 10.7 for details.

Position / icon	Name	Function
"☾" / "☀"	Switch between light and dark mode	☾ means light mode is active (tap it to switch to dark mode); ☀ means dark mode is active. The choice is remembered.
"⌂"	Main menu	Returns directly to the main menu. Using it on a work screen also ends the current measurement.

4.2 How Menu Pop-ups Work

TMS drop-down menus (for example "Mode", "Judgement", "Tool Type", "Select sensor", "On Completion") are all shown as full-screen pop-ups, and they work the same way (the "Tolerance Type" menu has only "±" and "≥", so it has no "Search" field and no "In use" line; the current choice is highlighted):

1. Tap the field (it has a "˅" symbol on the right) to open the menu pop-up.
2. At the top of the pop-up, the current selection is marked "In use".
3. When there are many options, first tap the "Search" field manually, then enter a model, serial number or option text. Opening the pop-up does not focus the search field or open the keyboard automatically; the "In use" option is still kept.
4. Tap the option you need; the pop-up closes automatically and the new value is filled in.
5. To make no change, tap "Cancel" (or press Esc on an external keyboard) to close it; the original value stays unchanged.

> **Tip** A value selected in a menu only updates the draft on the current screen; you must still tap that screen's save button for it to take effect.

4.3 Number and Date Formats

Number fields are displayed and entered in the format of the current interface language; the system always stores plain numeric values internally:

Interface language	Number example	Description
繁體中文, English, 日本語, العربية, etc.	12,345.67	Comma is the thousands separator and period is the decimal point.
Español, Italiano, Deutsch, Türkçe, etc.	12.345,67	Period is the thousands separator and comma is the decimal point.
Français, Русский	12 345,67	Space is the thousands separator and comma is the decimal point.

The number of decimal places for torque adjusts automatically with the value: below 100 shows two decimals (e.g. 48.72), 100–999.9 shows one decimal (e.g. 509.9), and 1,000 and above shows no decimals (e.g. 7,081). Angle always shows one decimal (e.g. 90.0°). Exported CSV and Excel files are different: torque always has two decimals, angle one and time two (Excel cells still store the full precision).

Dates are always shown with the Gregorian year and a two-digit month and day, and the order follows the interface language: Chinese and Japanese use YYYY/MM/DD (e.g. 2026/10/16), English uses MM/DD/YYYY, German, Turkish and Russian use DD.MM.YYYY, Korean uses YYYY.MM.DD, and other languages use DD/MM/YYYY. When a time is included, it is shown in 24-hour format (e.g. 2026/10/16 09:30:00). The Arabic interface still uses the digits 0–9. Examples for each language are in Appendix F.

4.4 Light and Dark Mode

Tap "☾" in the top bar to switch to dark mode, which suits dimly lit stations; tap "☀" to switch back to light mode. Light mode is the default if you have never switched; the choice is remembered automatically and used the next time the app is opened, and the Android status bar and navigation bar icons switch along with it. Dark mode only changes the display colors; it does not affect measurement, judgement, records or exported content.

The accessibility name of the "☾ / ☀" button in the top bar (the name a screen reader reads out) is "Toggle light / dark mode".

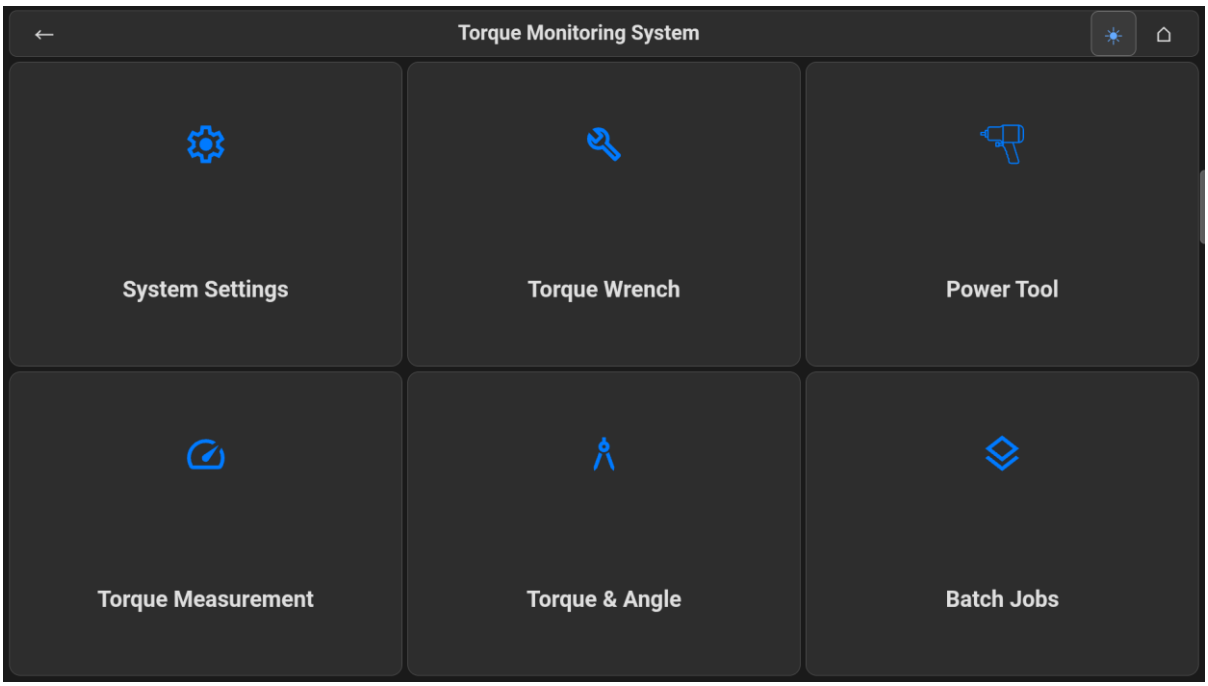


Figure 4-1 Main menu in dark mode (tablet)

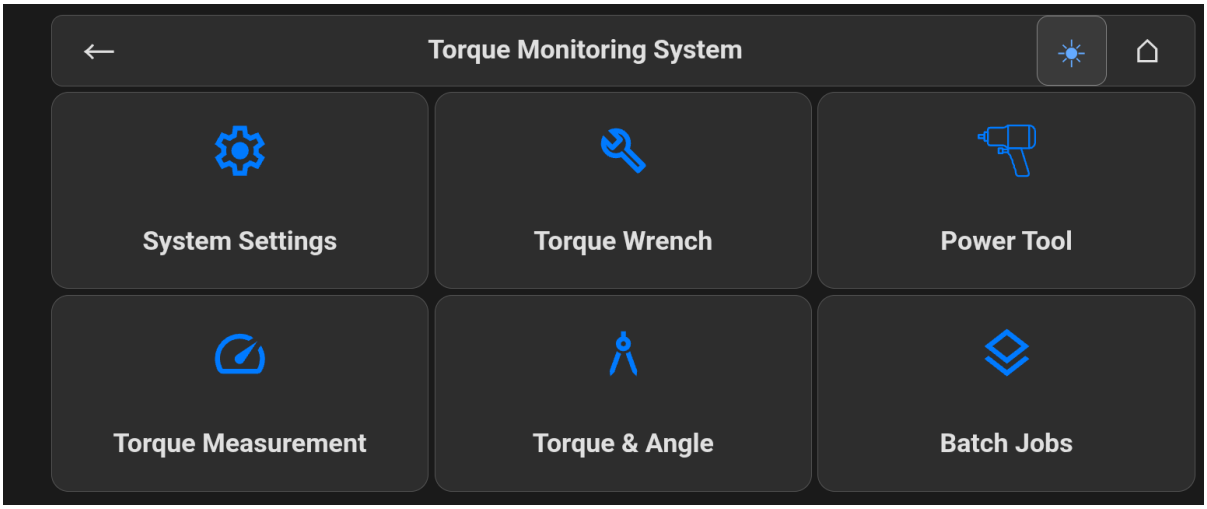


Figure 4-1 Main menu in dark mode (phone)

4.5 Keyboard, Barcode Scanner, and Touch

- Ordinary text or number fields: tap the field to bring up the on-screen keyboard; when the keyboard covers a button, the screen can be scrolled up and down.
- The "Part Number" field on work screens: so that a barcode scanner can type into it directly, the on-screen keyboard does not pop up by default. To type manually, tap the field once to bring up the keyboard; it returns to barcode mode when you leave the field.
- The "Station" and "Part Number" fields have a camera icon on the right that scans one-dimensional or two-dimensional barcodes with the in-app camera; after scanning, a preview is shown first, and the value is filled into the field only after you tap "Apply" (Section 11.6).
- When a pop-up is open, close it before scanning a barcode, so that the barcode is not entered into the search field.
- With an external physical keyboard, use Tab to move focus, Enter to confirm and Esc to close a pop-up. On the login screen, Enter in "Username" moves to "Password" and Enter in "Password" logs in (section 5.2).

Chapter 5 First-Time Setup and System Login

5.1 Default Administrator Account (First Use)

The first time TMS is opened after a fresh installation, if there are no users on the device, the system automatically creates a default administrator account admin (password admin) with all permissions and goes straight to the "System Login" screen; no screen for creating an administrator appears.

1. On the "System Login" screen, long-press the "Log In" button for about 0.6 seconds. The "Username" and "Password" fields are filled in automatically with the default username admin and password admin (this does not log in automatically); tap "Log In" once more. You can also enter admin / admin manually.
2. Go to "System Settings > User Management", tap "Change Password", and change the admin password to one that only administrators know (section 9.4).
3. Create separate accounts for operators and QC staff, and grant them only the permissions they need (section 9.1).

5.2 System Login

Once users have been created, the "System Login" screen is shown first every time TMS is opened.

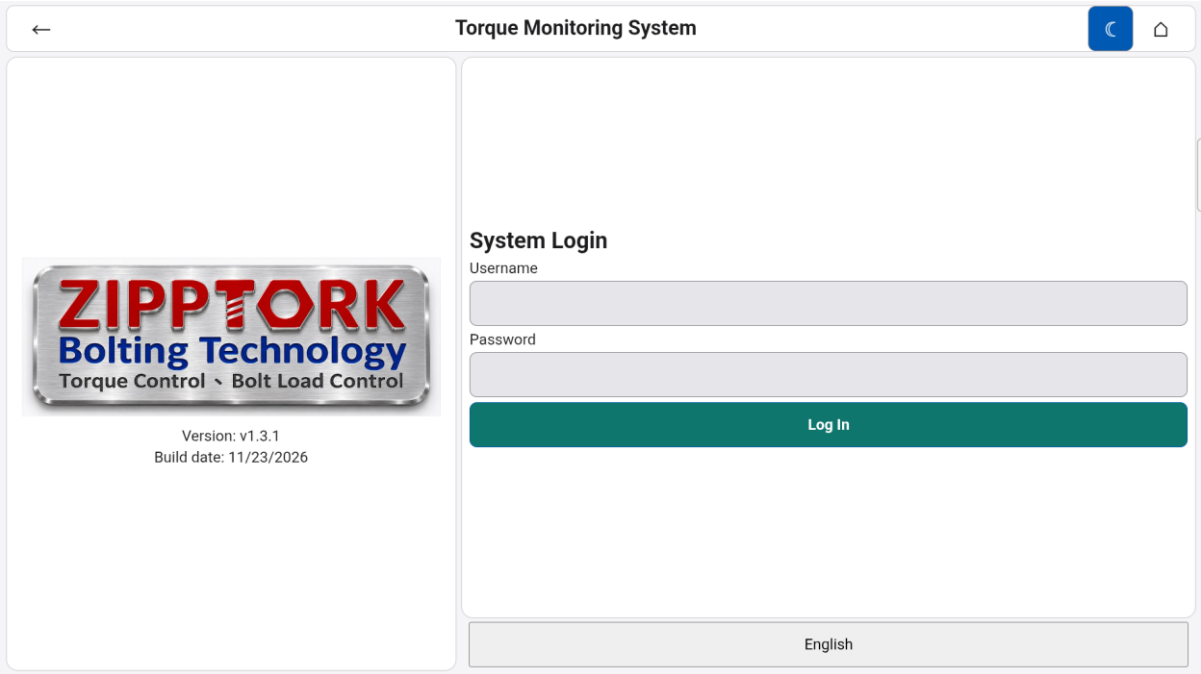


Figure 5-1 System Login screen (tablet)

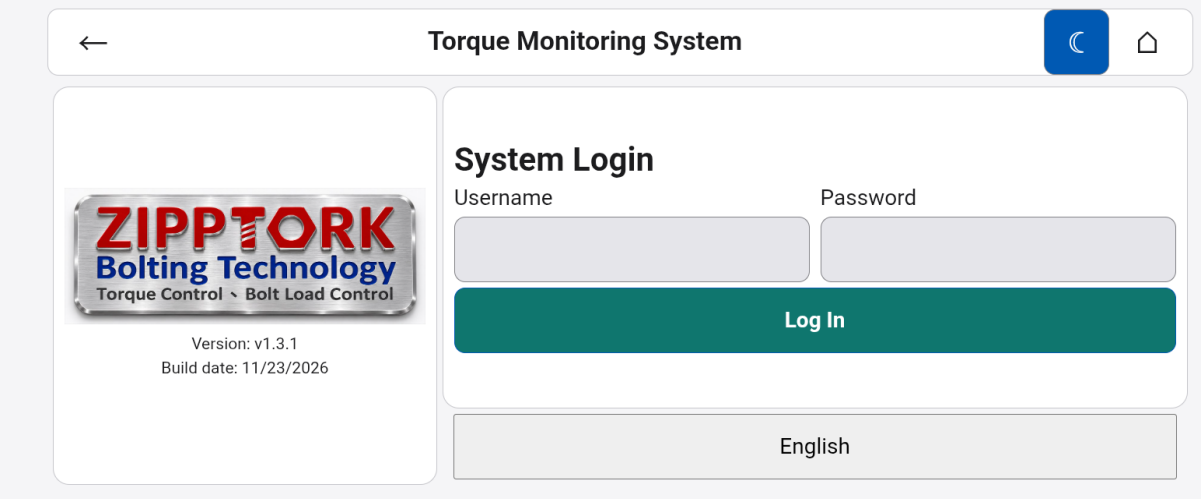


Figure 5-1 System Login screen (phone)

Area / button	Description
Left side: "ZIPPTORK TMS"	Brand text showing "ZIPPTORK" and "TMS", with the version and build date below it; no operation function.
Username	Enter the username of an enabled user account created on this device (up to 64 characters).
Password	Enter the matching password (up to 256 bytes); it is hidden with dots.

Area / button	Description
"Log In"	Verifies the username and password and opens the main menu on success. While verification is in progress, the button cannot be tapped again. Long-press this button for about 0.6 seconds to fill the fields with the default username admin and password admin; this does not log in automatically, so tap it once more. Pressing Enter in "Username" moves to "Password", and pressing Enter in "Password" logs in; while verification is in progress, a second press is ignored.
Language button (for example "繁體中文")	Shows the current interface language. Tap it to switch among 16 languages (section 5.3); the choice is saved immediately. The language button is below the "Log In" button (Figure 5-1).
Version	For example "Version: v1.3.1"; provide this information when reporting a fault or requesting an upgrade.
Build date	APK build date (Taipei time), fixed inside the APK; it is not today's date. The format follows the interface language. This version shows "Build date: 11/23/2026" in the English interface.

1. Confirm that the language at the bottom is the one you need (switch it first if necessary).
2. Tap the "Username" field and enter the username.
3. Tap the "Password" field and enter the password.
4. Tap "Log In". On success, the "Torque Monitoring System" main menu opens.

> **Example** The operator Ms. Chen has the account op_chen: enter op_chen → enter the password → tap "Log In" → the main menu opens, showing six buttons: System Settings, Torque Wrench, Power Tool, Torque Measurement, Torque & Angle and Batch Jobs.

Login Failure

When the username or password is wrong, or the account is disabled, the screen shows only "Incorrect username or password", so this text alone does not prove that the password is wrong. Check the following items first; if it keeps failing, record the version, time and steps taken, and hand them to the administrator.

- Check that the capitalization and spelling of the username are correct.
- Check that the password is correct (watch for Caps Lock and full-width / half-width characters).
- Check whether the administrator has disabled the account (Chapter 9).

> **Tip** Quick fill of the default account: long-press the "Log In" button for about 0.6 seconds to fill the fields with the default username admin and password admin. It does not log in automatically; tap "Log In" once more. This only works for the default account whose password has not been changed; login still fails if the admin password has been changed or the account has been disabled.

If the app cannot read its sign-in status when it starts, the form shows "Unable to load sign-in status" and the "Log In" button changes to "Retry". Tap "Retry" to read the status again; while it is being read, you cannot log in and the long-press quick fill does not work. When the status has been read, the button changes back to "Log In". If the message keeps appearing, close TMS and open it again.

5.3 Changing the Interface Language



Figure 5-2 Language menu on the login screen (tablet)



Figure 5-2 Language menu on the login screen (phone)

1. On the login screen, tap the language button below (for example "繁體中文").
2. In the language pop-up, tap the language you need.
3. The pop-up closes, the screen text switches immediately, and the language is saved as the default for later logins.

Supported languages: 繁體中文, English, 日本語, Italiano, Português, Español, 简体中文, 한국어, Bahasa Indonesia, Deutsch, Français, Tiếng Việt, ภาษาไทย, Türkçe, Русский, 16, العربية in total. The language menu is arranged 4 × 4 with "Cancel" below it (Figure 5-2). After login, the language can also be changed in "Global Settings" (Chapter 8).

> **Tip** On first launch, before a language setting has been saved, TMS selects the interface language automatically according to the Android system language (Traditional or Simplified Chinese is decided by the system's script and region); if the system language is not in the supported list, English is used. After that, the language you chose manually takes precedence; installing an app update over the existing app or changing the system language does not change the chosen language.

After you select English, the login screen text changes to English immediately, and the build date changes to the English format "Build date: 11/23/2026". When العربية is selected, the screen switches to right-to-left layout, and digits still use 0–9.

5.4 Switching Users (Logging Out)

This version has no "Log Out" button. The login state is kept until TMS is closed. To log in as a different person:

1. End the current measurement and return to the main menu.
2. Press the Android "Recent apps" key and swipe TMS upward to close it.
3. If the login screen still does not appear after reopening, go to "Settings > Apps > TMS RF", tap "Force stop", and then reopen the app.
4. On the login screen, log in with the new user's username.

5.5 Small Screens and the On-Screen Keyboard

The left side of the login screen has the brand text "ZIPPTORK TMS" with the version and build date below it, and the right side, from top to bottom, has "Username", "Password", "Log In" and the language button (Figure 5-1). On shorter screens such as phones, the form is compressed. When the on-screen keyboard is open, the "Password" field and the "Log In" button sit in the

same row (Figure 5-3); when the keyboard is dismissed, the original layout returns, the entered text and cursor position are kept, and the full "Log In" button is still visible after a failed login. When an error message appears or a longer language is selected, the language button may be pushed down or temporarily hidden; swipe up, or dismiss the keyboard first.

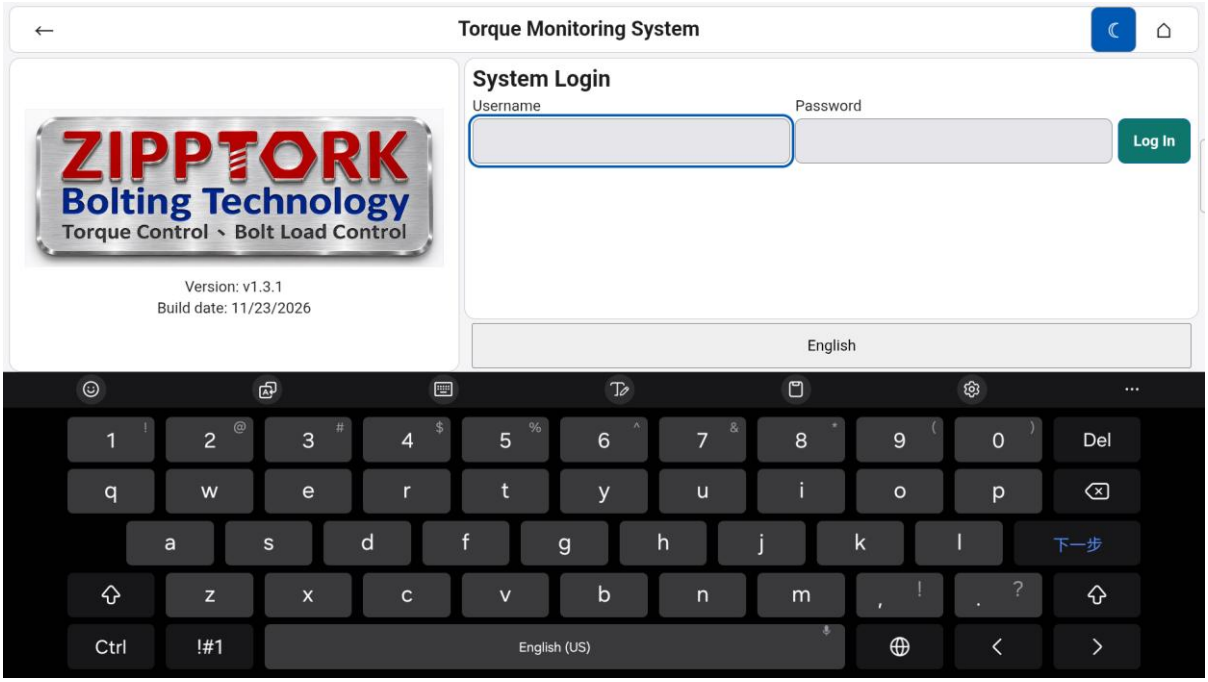


Figure 5-3 Login screen with the on-screen keyboard open (tablet)

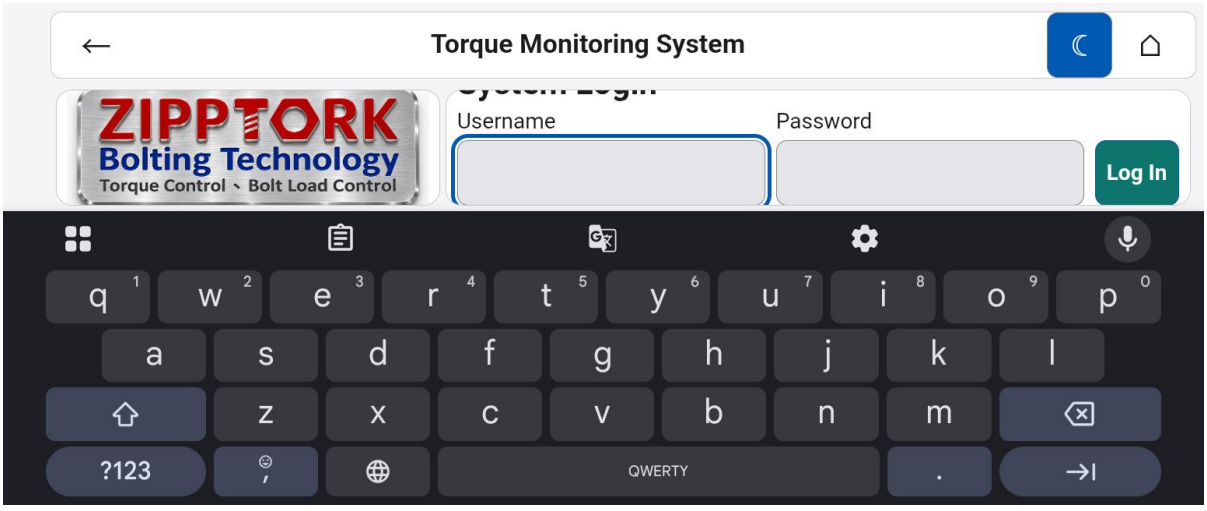


Figure 5-3 Login screen with the on-screen keyboard open (phone)

Chapter 6 Main Menu

After a successful login the main menu opens, titled "Torque Monitoring System". The main menu has 6 large buttons; tap one to enter the corresponding function.

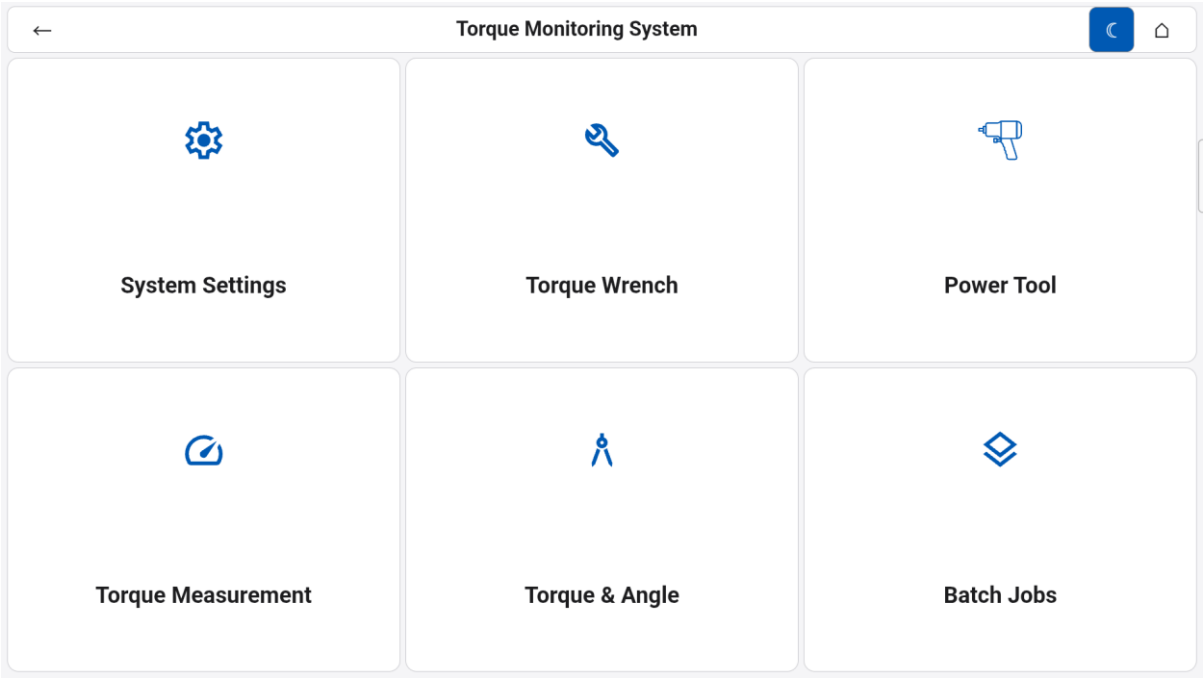


Figure 6-1 Main menu (tablet)

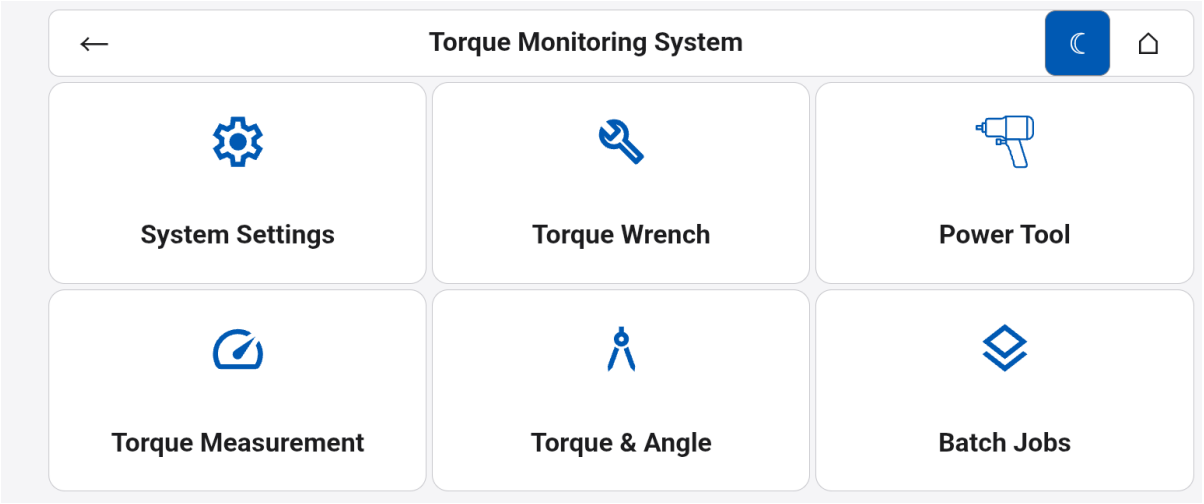


Figure 6-1 Main menu (phone)

Button	Screen it opens	Purpose	Chapter
System Settings (gear icon)	System Settings menu	Global Settings, User Management, Sensor Pairing, Communication Settings, Records and export, Sensor fault records.	Chapter 7
Torque Wrench (wrench icon)	Torque Wrench Parameter Settings	Manual torque wrench work, judged by peak torque.	Chapter 13
Power Tool (electric driver icon)	Power Tool Parameter Settings	Work with pulse / impact / clutch power tools.	Chapter 14
Torque Measurement (gauge icon)	Torque Measurement Parameter Settings	Measures the torque when the rotation reaches the target angle.	Chapter 15
Torque & Angle (compass icon)	Torque & Angle Parameter Settings	Tightening work using torque plus angle.	Chapter 16
Batch Jobs (layers icon)	Batch Jobs (job combination list)	Run or edit multi-step job combinations.	Chapter 17

6.1 Recommended Workflow for First Use

1. When logging in for the first time with the default account admin, first go to "System Settings > User Management" and tap "Change Password" to replace the default password (section 9.4).
2. "System Settings > Global Settings": select the torque unit and interface language, then tap "Save & Apply" (Chapter 8).
3. "System Settings > User Management": create accounts for operators and QC staff and set their permissions (Chapter 9).
4. "System Settings > Sensor Pairing": plug in the receiver and pair the sensors you will use (Chapter 10).
5. Return to the main menu and select a work mode, set the target torque and tolerance, and tap "Save & Apply → Work" to open the work screen (Chapters 11–16).
6. Scan the part number, apply force following the safety procedure, and confirm the OK / NOK result.
7. Go to "System Settings > Records and export" to search and export records (Chapter 18).

Chapter 7 System Settings Menu

Open it by tapping "System Settings" on the main menu. The screen lists 6 settings as text buttons, divided into three rows: general settings, devices and communication, and data management.

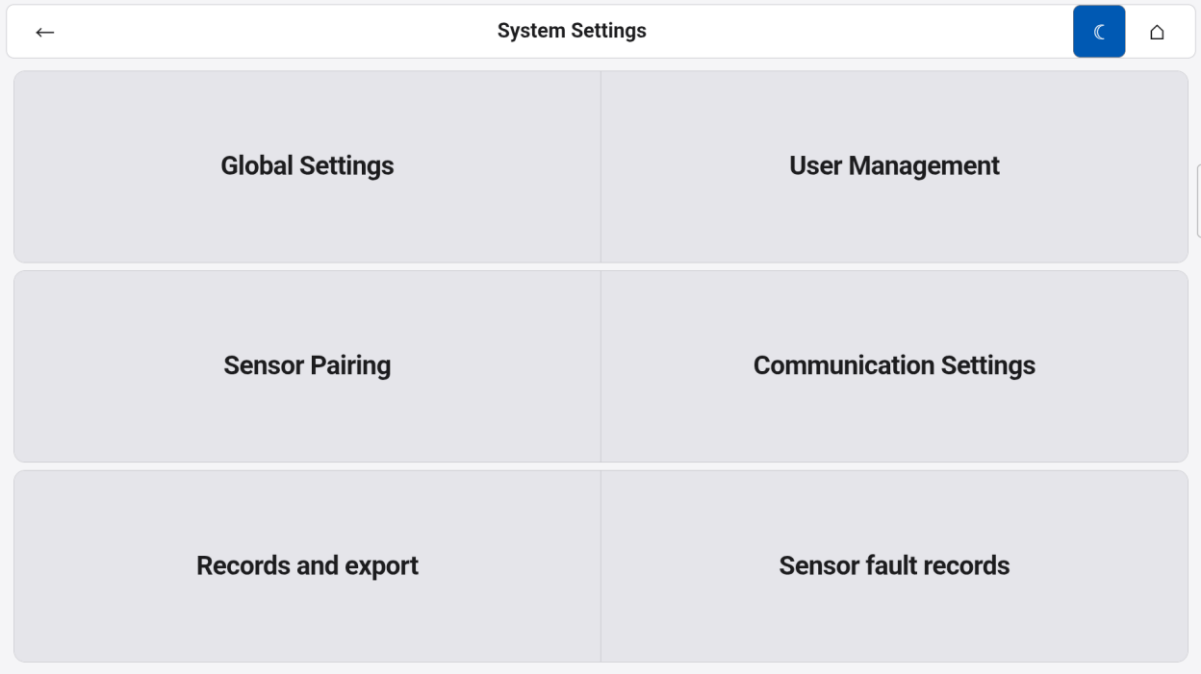


Figure 7-1 System Settings menu (tablet)

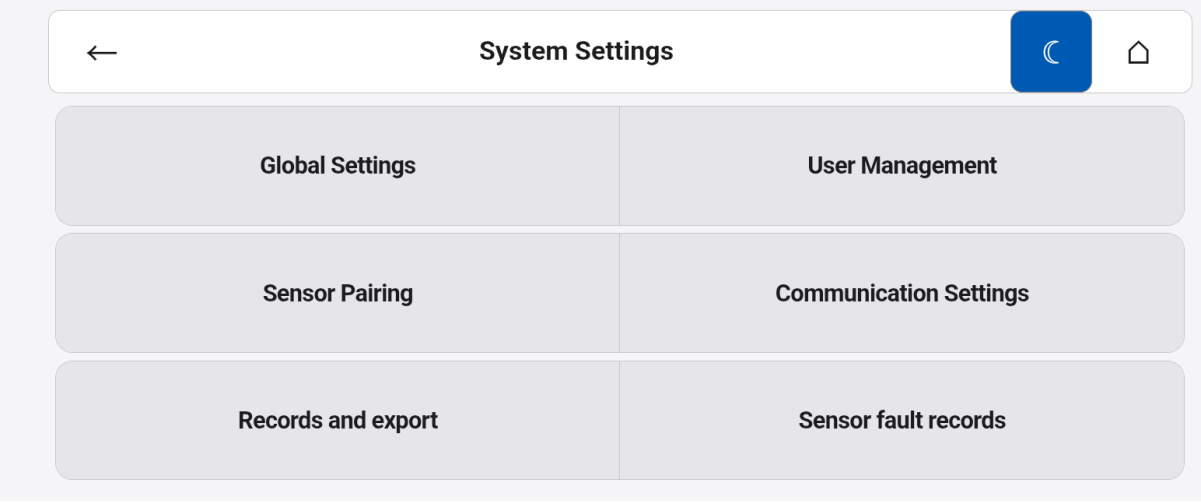


Figure 7-1 System Settings menu (phone)

Button	Function	Required permission	Chapter
Global Settings	Torque unit, force unit and interface language.	System settings	Chapter 8
User Management	Add users, enable or disable accounts, and set permissions.	User management	Chapter 9
Sensor Pairing	Receiver detection, wireless channel, pairing and selecting the sensor to use.	Pair sensors	Chapter 10
Communication Settings	Modbus TCP server start/stop, TCP port, Unit ID and register map.	System settings	Chapter 19
Records and Export	Search measurement records, view detail curves, and export CSV / Excel.	Measurement records (exporting also requires Export CSV)	Chapter 18
Sensor fault records	Search sensor faults that are not yet cleared and those already cleared.	—	Chapter 20

> **Tip** Users without the corresponding permission can still see the button, but after opening it the screen may fail to load or save (it shows "Failed to load or save settings"; User Management shows "You don’ t have permission to manage users."). Contact an administrator to grant the permission.

Chapter 8 Global Settings (Units and Language)

Path: main menu → "System Settings" → "Global Settings". This screen sets the torque unit, force unit and interface language for the whole system; the parameter screens of the individual work modes no longer switch units separately.

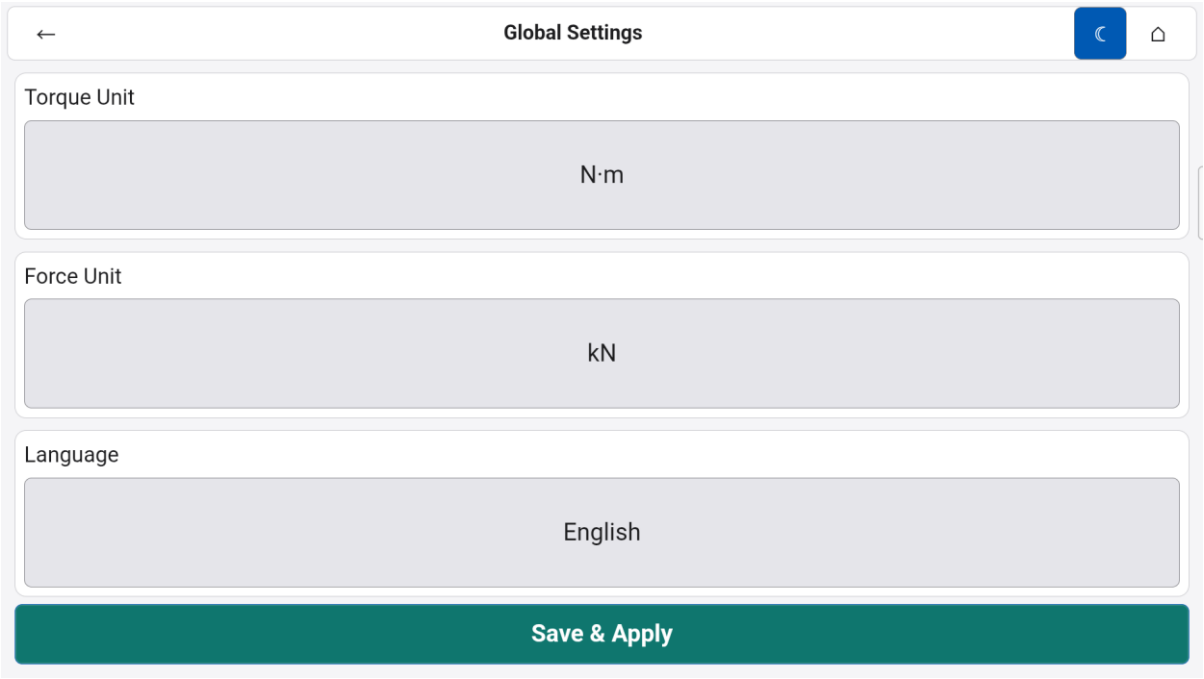


Figure 8-1 Global Settings screen (tablet)

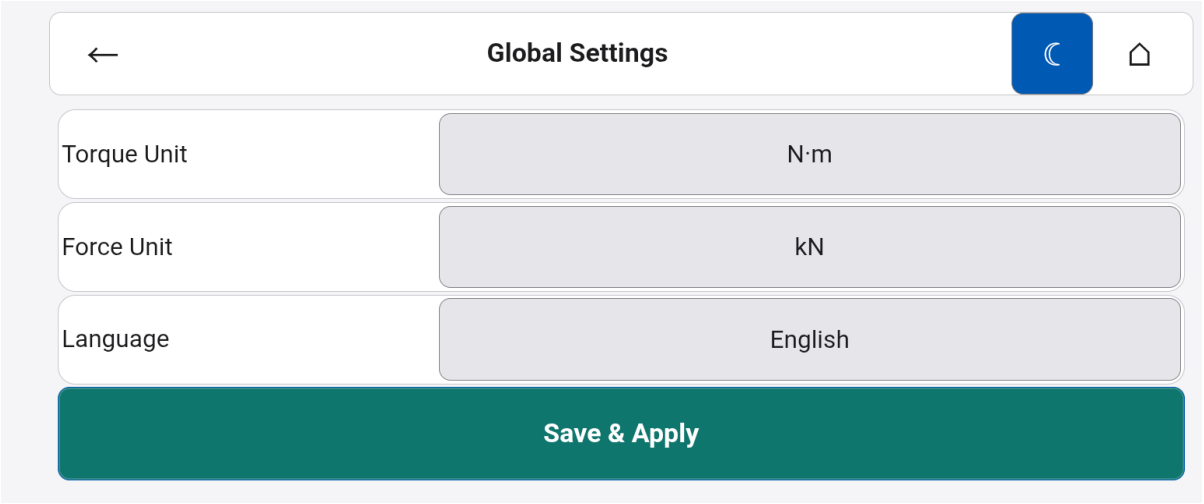


Figure 8-1 Global Settings screen (phone)

Field / button	Options	Scope
Torque Unit	N·m, kgf·cm, kgf·m, ozf·in, lbf·in, lbf·ft (6 units)	Torque display unit for all parameter inputs, work readings, records and the CSV summary.
Force Unit	kN, N, lbf, kgf (4 units)	Display unit for force-related values; it does not change a torque job into a force measurement.
Language	16 interface languages	On-screen text, number and date formats, and the column names of exported files.
"Save & Apply"	—	Saves the three settings above and applies them immediately.

8.1 Changing the Torque Unit



Figure 8-2 Tablet: Torque unit menu (3×2 options)



Figure 8-2 Phone: Torque unit menu (3×2 options)

1. Tap the current value under "Torque Unit" (for example "N·m").
2. In the pop-up, tap the new unit; the pop-up closes automatically. To keep the current unit, tap "Cancel" at the bottom.
3. Tap "Save & Apply" at the bottom of the screen. On success the screen stays as it is and no success message is shown; on failure it shows "Failed to load or save settings".
4. Return to the parameter screen of a work mode and confirm that the target torque has been converted to the new unit.

> **Example** Display values of a target torque of 50 N·m in each unit (converted automatically by the system):
> N·m: 50.00 | kgf·cm: 509.9 | kgf·m: 5.10 | ozf·in: 7,081 | lbf·in: 442.5 | lbf·ft: 36.88

> **Tip** Switching the unit changes only the display. The database always stores the original value in N·m, so no precision is lost when the unit is switched.

8.2 Changing the Force Unit



Figure 8-3 Tablet: Force unit menu

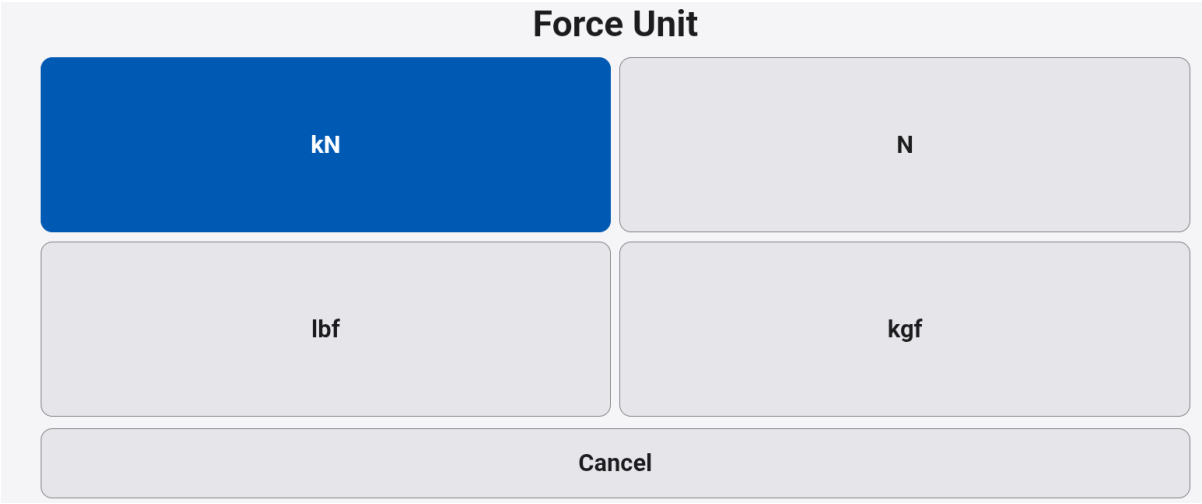


Figure 8-3 Phone: Force unit menu

1. Tap the current value under "Force Unit" (for example "kN").
2. Tap one of kN, N, lbf or kgf; or tap "Cancel".
3. Tap "Save & Apply".

8.3 Changing the Interface Language



Figure 8-4 Tablet: Language menu in Global Settings



Figure 8-4 Phone: Language menu in Global Settings

1. Tap the current value under "Language" (for example "繁體中文").
2. In the pop-up, tap a language; or tap "Cancel" at the bottom.
3. Tap "Save & Apply"; the screen immediately changes to the new language.

Chapter 9 User Management and Permissions

Path: main menu → "System Settings" → "User Management". Requires the "User management" permission. You can create accounts, enable or disable accounts, and grant operating permissions one by one.

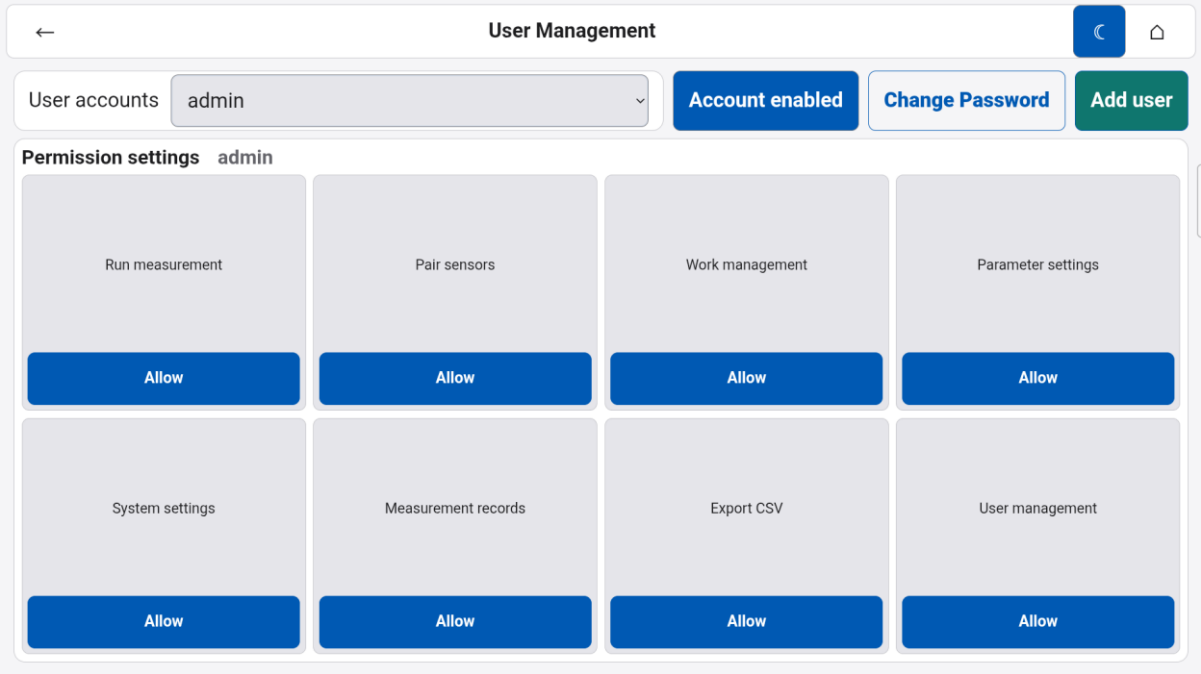


Figure 9-1 Tablet: User Management screen

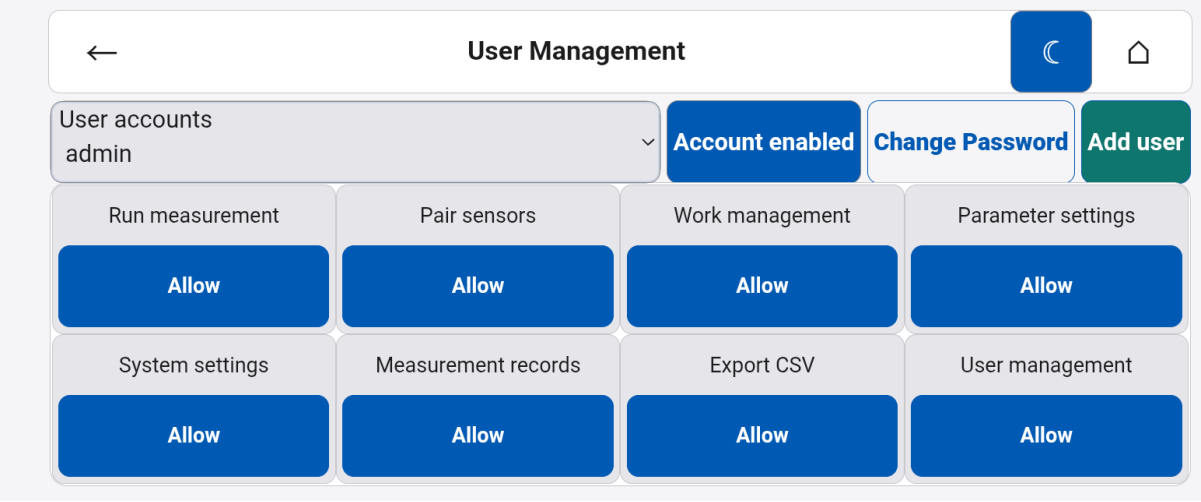


Figure 9-1 Phone: User Management screen

Area / button	Description
User accounts (drop-down)	Select the user to view or modify.
"Account enabled" / "Account disabled"	Shows the status of the selected account; one tap switches between enabled and disabled and saves immediately.
"Change Password"	Located between "Account enabled / Account disabled" and "Add user"; opens the "Change Password" screen. You can only change the password of the currently logged-in user (section 9.4).
"Add user"	Opens the add-user pop-up.
Permission settings (8 tiles)	Each tile shows one permission, and the button below it is "Allow" (blue) or "Do not allow" (gray); one tap switches it and saves immediately.
Message area (above the permission tiles)	Shown only when something needs attention: the list could not be loaded, a change could not be confirmed, or you no longer have access. Tap "Refresh" to read the current settings again; when the session has expired, tap "Log In". The messages are listed in section 9.3.

9.1 Adding a User

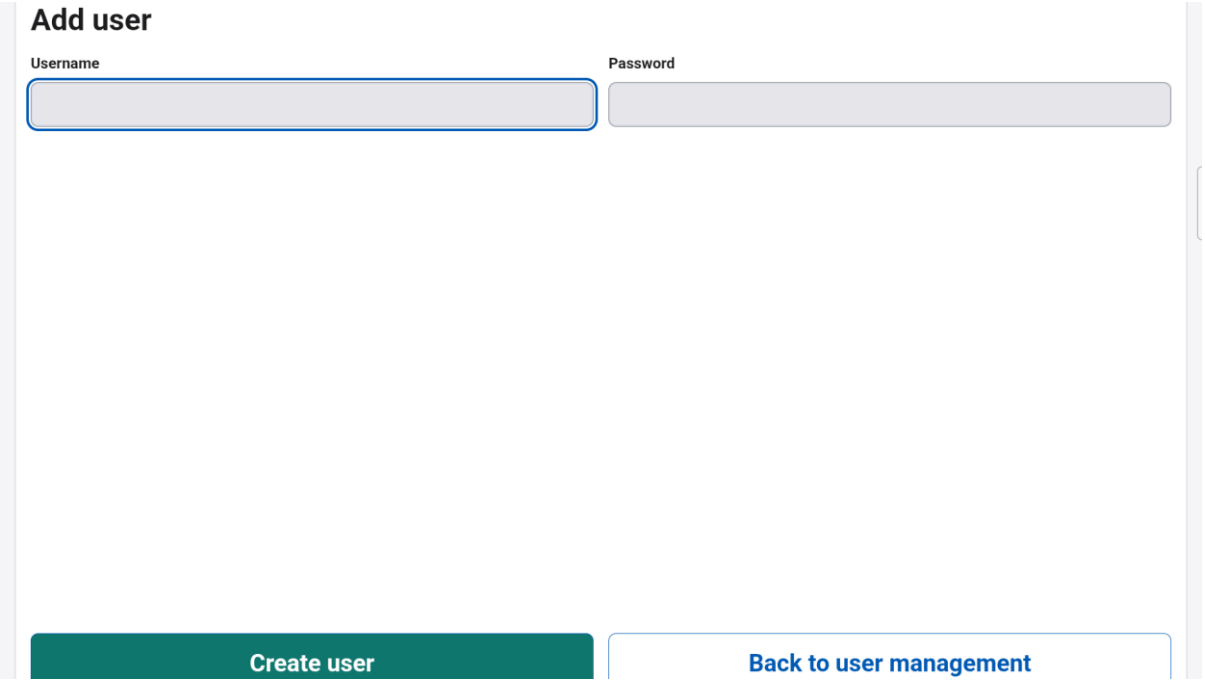


Figure 9-2 Tablet: Add User pop-up

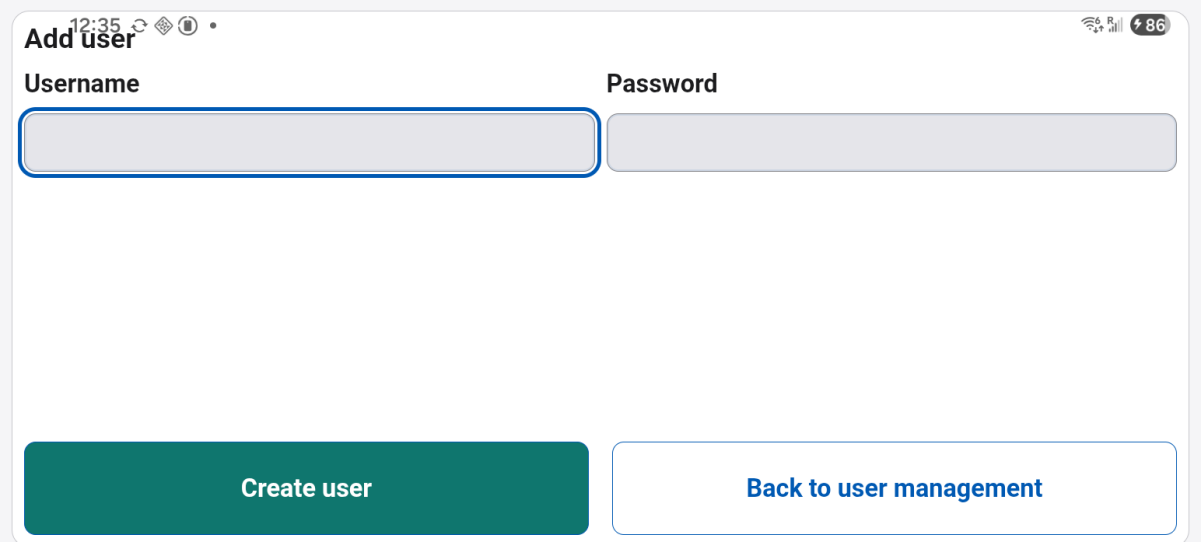


Figure 9-2 Phone: Add User pop-up

1. Tap "Add user" at the upper right.
2. In "Username", enter the account name (up to 64 characters; it cannot duplicate an existing account).
3. In "Password", enter the password (up to 256 bytes).
4. Tap "Create user". On success the pop-up closes and the list updates automatically; to cancel without adding, tap "Back to user management".

"Username" and "Password" must both be filled in; no account is created while either is empty. If the username already exists, "Username already taken" is shown under the field. If the account cannot be created for another reason, "Couldn’ t create the user. Try again." is shown above the buttons. While the account is being created, the fields and buttons cannot be used.

5. In the "User accounts" menu, select the person just created. A new account is enabled by default, but all 8 permissions are "Do not allow".
6. Depending on the person's duties, tap the buttons of the required permission tiles so that they change to "Allow". Each tap saves immediately; there is no separate save button. After you tap a permission button or the account status button, it cannot be tapped again until the change has been saved.

9.2 Permission Descriptions

Permission	What it allows
Run measurement	Enter the work screens of the four work modes and Batch Jobs, take measurements, and open the "Data Curve" of your own NOK result on the work screen (section 12.10).
Pair sensors	On the Sensor Pairing screen, detect the receiver, change the channel, pair, connect and use a sensor, or delete a sensor.
Work management	Add, edit and delete batch jobs.
Parameter settings	Save the parameters of each work mode (target torque, tolerance, and so on).

Permission	What it allows
System settings	Save Global Settings and Communication Settings.
Measurement records	Search the record list and record details.
Export CSV	Export the list summary CSV, the full CSV of a single record and the Excel file of a single record (requires "Measurement records" as well).
User management	Open User Management, add accounts, enable or disable them, and grant permissions.

Example Recommended permission sets by role:

Operator: Run measurement, Measurement records.

Team leader: operator permissions plus Pair sensors, Parameter settings, Work management.

QC staff: Measurement records, Export CSV.

System administrator: all 8 permissions.

9.3 Disabling and Re-enabling an Account

1. In the "User accounts" menu, select the person.
2. Tap the "Account enabled" button; the status changes to "Account disabled". The account can no longer log in, effective immediately, and sessions that are already logged in also become invalid.
3. To restore it, tap "Account disabled" again; the status changes back to "Account enabled".

> **Tip** The system protects the last account that can manage users: this account cannot be disabled and its "User management" permission cannot be removed; when you try, the button status stays unchanged and "At least one admin must remain" is shown after the name of the item, with a "Refresh" button that reads the current settings again.
> This version has no button to delete accounts or for an administrator to reset another person's password; when someone leaves, disable the account instead. Disabling does not delete that person's past measurement records; after an account is disabled, logging in with it shows "Incorrect username or password".

The message area above the permission tiles shows one of the following messages when something needs attention:

On-screen message	Cause and action
You don’ t have permission to manage users.	Your account does not have the "User management" permission, or it was removed while the screen was open. All controls are disabled. Ask an administrator.
Your session has expired. Please log in again.	The account was disabled or the session ended. Tap "Log In" and log in again.
Not logged in	No user is logged in. Tap "Log In" and log in.
Failed to load	The user list could not be read. Tap "Refresh".
The change was submitted. Refresh to confirm the current setting.	The change was sent, but the list could not be read back. Tap "Refresh" and check the setting.
Update incomplete. Refresh to check the current settings.	Shown after the name of the item when a permission or account-status change was not completed. Tap "Refresh", check the current setting, and try again.
At least one admin must remain	Shown after the name of the item when you try to disable, or remove "User management" from, the last account that can manage users. Tap "Refresh".

9.4 Changing the Password

Path: main menu → "System Settings" → "User Management" → "Change Password". The account being changed is always the currently logged-in account, not the person selected in the "User accounts" menu; this version has no function to reset the password of other users.

1. Tap "Change Password" to open the "Change Password" screen.
2. In "Current Password", enter the current password.
3. In "New Password" and "Confirm New Password", enter the same new password (it cannot be blank; up to 256 bytes).
4. Tap "Confirm Change". After "Password changed successfully" is shown, the fields are cleared automatically, and the new password is used at the next login.

On-screen message	Cause and action
Please fill in all fields	A field is blank; fill in all fields, then tap "Confirm Change" again.
New passwords do not match	Enter "New Password" and "Confirm New Password" again.
Current password is incorrect	Check upper/lower case and full-width/half-width characters of the current password.
Not logged in	The login status has expired; reopen TMS and log in.

Chapter 10 Sensor Pairing and Receiver Management

Path: main menu → "System Settings" → "Sensor Pairing". Requires the "Pair sensors" permission. The left side of the screen is the "Pairing console" (receiver and the sensor awaiting pairing) and the right side is the "Paired sensor overview".

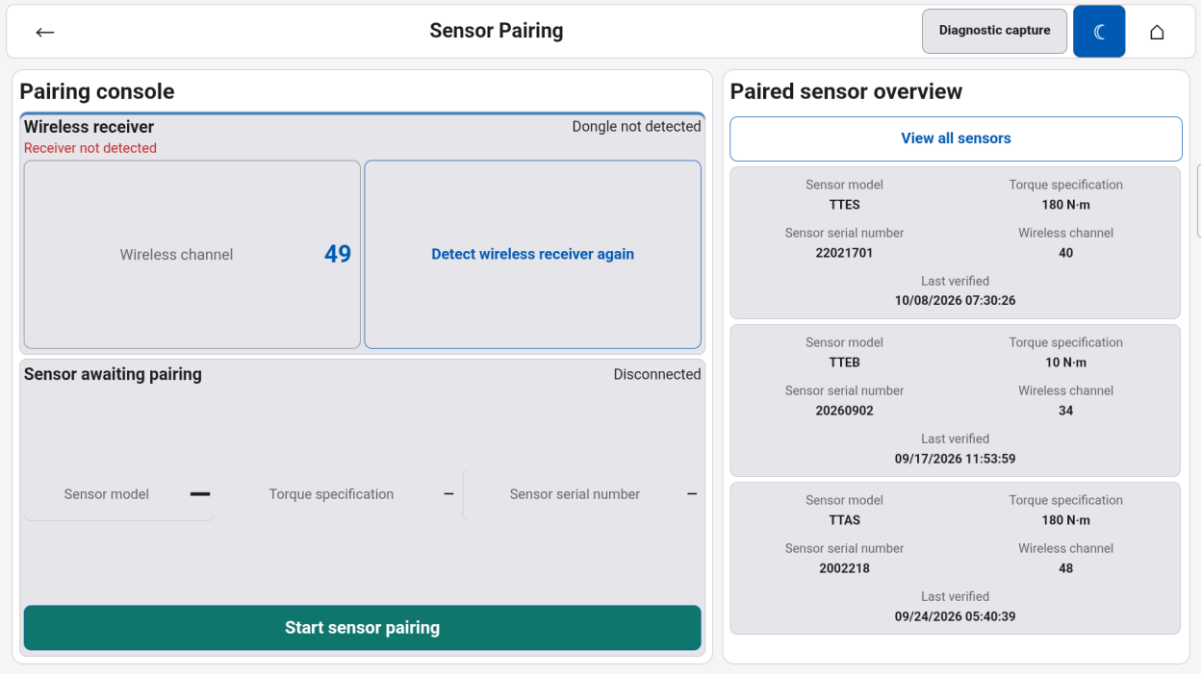


Figure 10-1 Tablet: Sensor Pairing (no receiver detected)

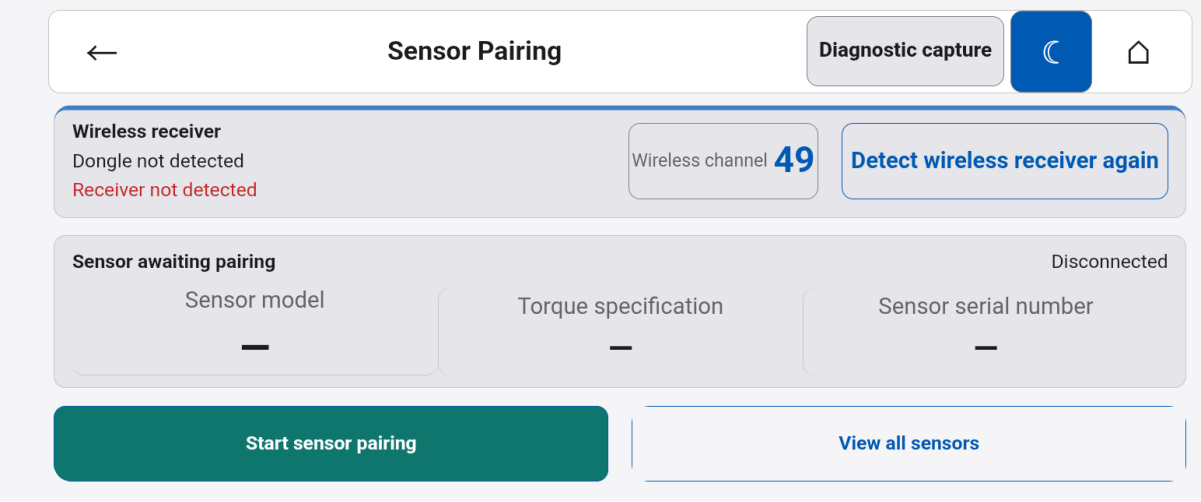


Figure 10-1 Phone: Sensor Pairing (no receiver detected)

10.1 Screen Description

Area / button	Description
Wireless receiver (status text)	Shows the current receiver status; see section 10.2.
Wireless channel (large number)	The RF channel currently in use (default 49); tap it to change it (section 10.3).
"Detect wireless receiver again"	Rescans and opens the USB receiver. It only restores the availability of the receiver and does not delete or change the paired list.
Sensor awaiting pairing / Paired sensors	Shows the model, torque specification and serial number of the sensor that is communicating; shows "—" when there is no data yet. The upper right shows the sensor status (Not Paired, Pairing..., Paired, Disconnected).
"Start sensor pairing"	Can be tapped when the receiver status is "Dongle connected" or "Paired" and the app is not busy; it runs pairing and saves it.
Paired sensor overview	Lists the model, torque specification, serial number, wireless channel and last verified time of all paired sensors. The sensor currently in use is listed at the top and marked "In use".
"View all sensors"	Opens the "All paired sensors" pop-up, used to switch or delete sensors (section 10.5).

10.2 Receiver Status

Displayed text	Meaning	Action
Dongle not detected	No receiver is plugged in, or the USB has no power / poor contact.	Check the OTG adapter and the receiver, reconnect them, then tap "Detect wireless receiver again".
USB permission required	Android is asking whether to allow USB access.	Tap "OK" in the system dialog.

Displayed text	Meaning	Action
Opening Dongle	The USB connection is being opened.	Wait a few seconds.
Linking RF	The receiver is establishing the wireless link.	Make sure the sensor is powered on, and wait.
Dongle connected	The receiver is usable but not yet paired with a sensor.	You can tap "Start sensor pairing".
Pairing	Pairing is in progress.	Keep the sensor powered on and close to the receiver, and wait for completion.
Paired	The receiver is paired with the sensor and can communicate.	You can start work.
Dongle fault	A USB or RF error has occurred.	Check the red error message on the screen (section 10.8); if necessary, unplug and replug the receiver and detect again.

10.3 Changing the Wireless Channel



Figure 10-2 Tablet: Wireless channel selection pop-up (3–62)

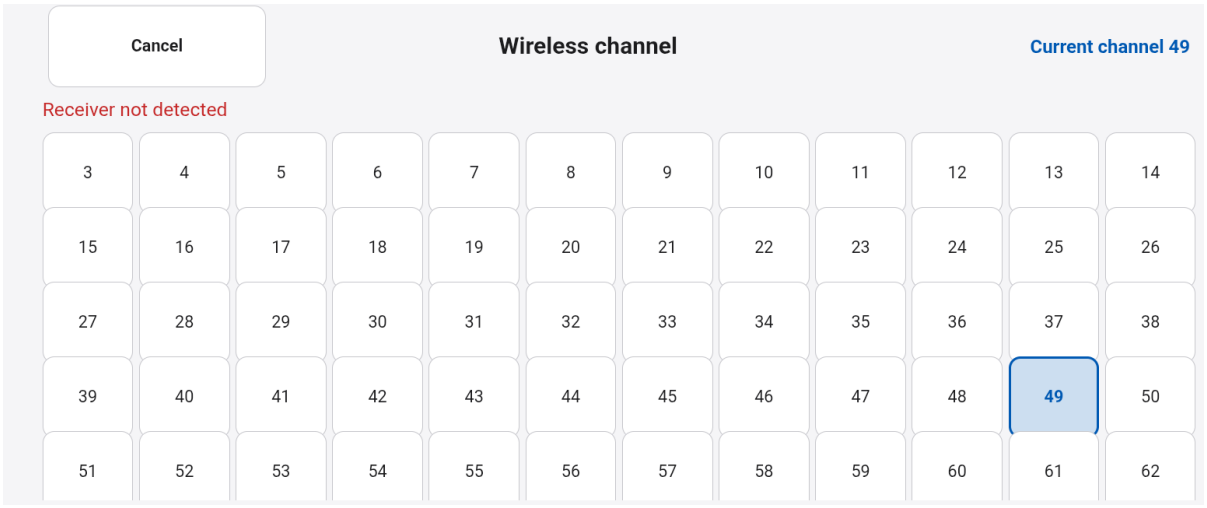


Figure 10-2 Phone: Wireless channel selection pop-up (3–62)

1. Make sure no measurement job is in progress.
2. Tap the "Wireless channel" block (the large number showing the current channel).
3. The top of the pop-up shows "Current channel 49"; tap the new channel number (3–62).
4. After the setting succeeds, the pop-up closes automatically and the change is applied immediately; if a sensor is already paired, the system first disconnects the current RF link and then switches the channel, and the paired list is kept.
5. To make no change, tap "Cancel" at the upper left.

> **Tip** When several TMS systems are in the same plant, use a different channel for each and keep at least 3 channels apart (for example 49, 52, 55) to reduce mutual interference. For how to set the channel on the sensor itself, refer to the sensor manual.

10.4 Pairing a New Sensor

1. End all measurement jobs, plug in the receiver and allow USB access; if necessary, tap "Detect wireless receiver again".
2. Confirm that the receiver status is "Dongle connected" and that the wireless channel is the channel you intend to use.
3. Power on the sensor and put it into pairing mode according to the sensor manual.
4. Confirm that the model, torque specification and serial number shown under "Sensor awaiting pairing" are correct.
5. Tap "Start sensor pairing" and wait until the status changes to "Paired".
6. Confirm that the sensor appears in the "Paired sensor overview" on the right and is marked "In use".

> **Example** Pairing a 100 N·m TTES: plug in the receiver → status "Dongle connected", channel 49 → power on the TTES and put it into pairing mode → Sensor awaiting pairing shows "TTES/100 N·m/16909060" → tap "Start sensor pairing" → status "Paired" → TTES appears at the top of the overview, marked "In use".

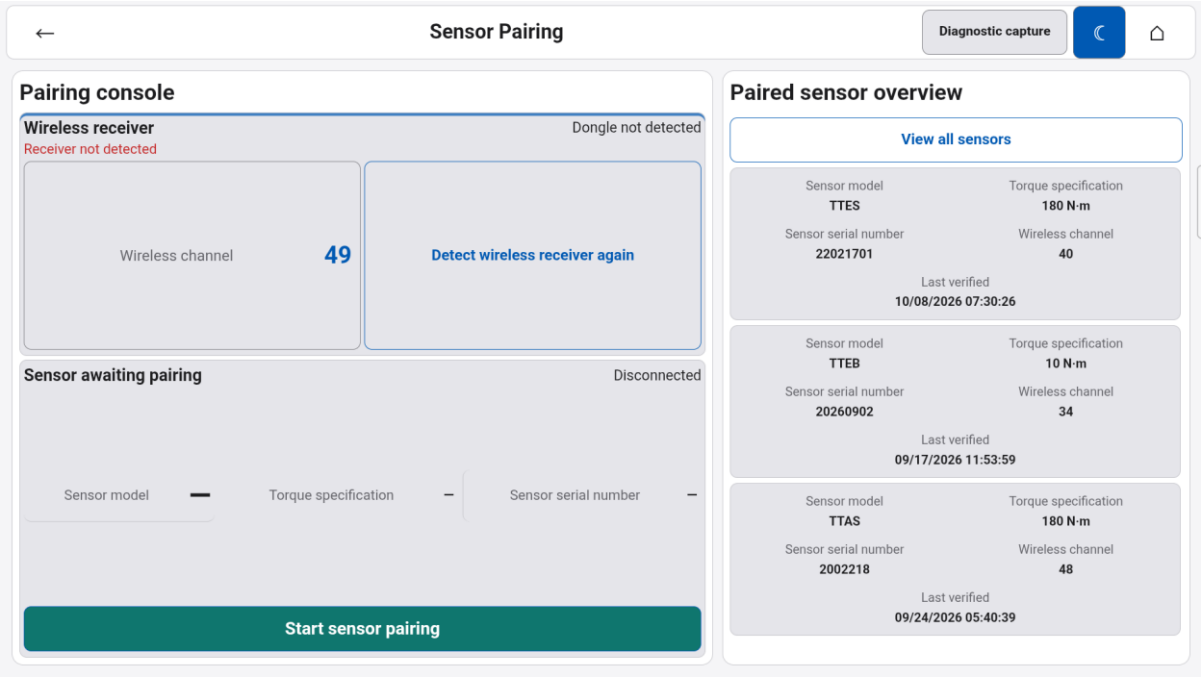


Figure 10-3 Tablet: Paired status and Paired sensor overview

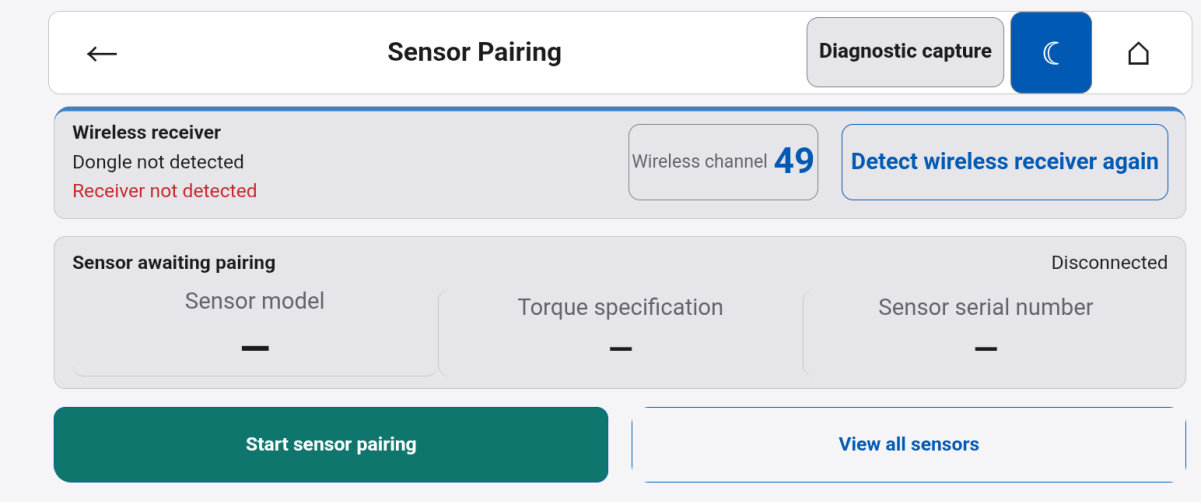


Figure 10-3 Phone: Paired status and Paired sensor overview

10.5 Switching or Deleting a Paired Sensor

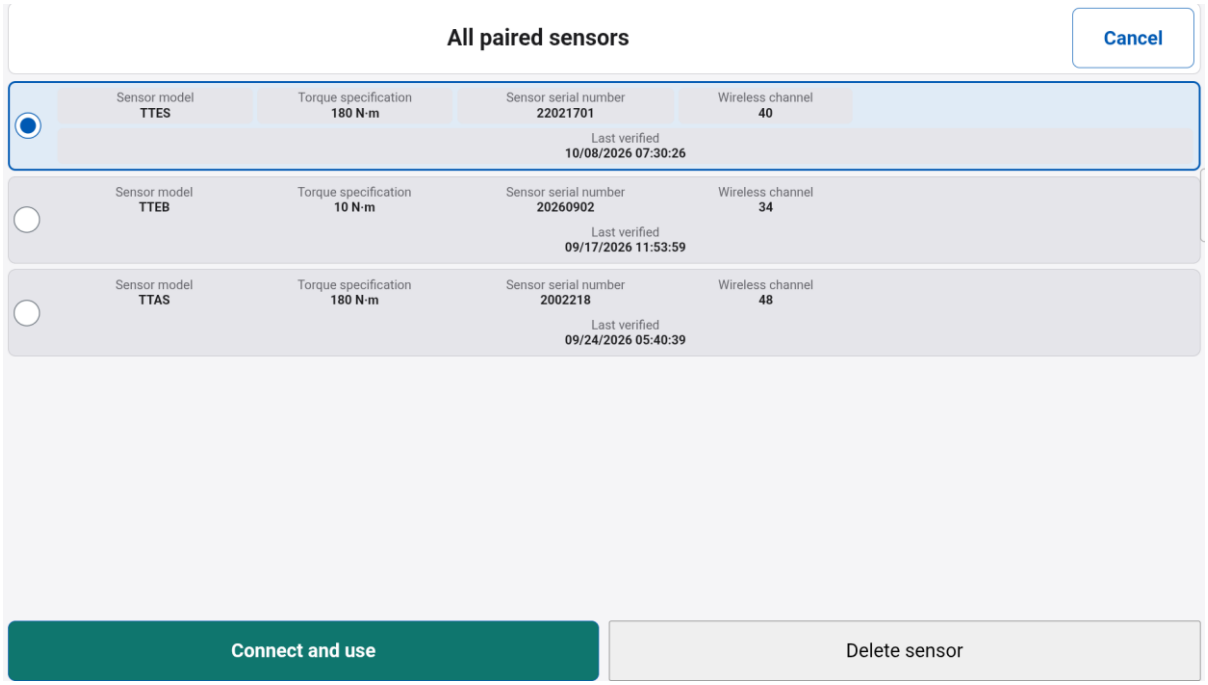


Figure 10-4 Tablet: All paired sensors pop-up

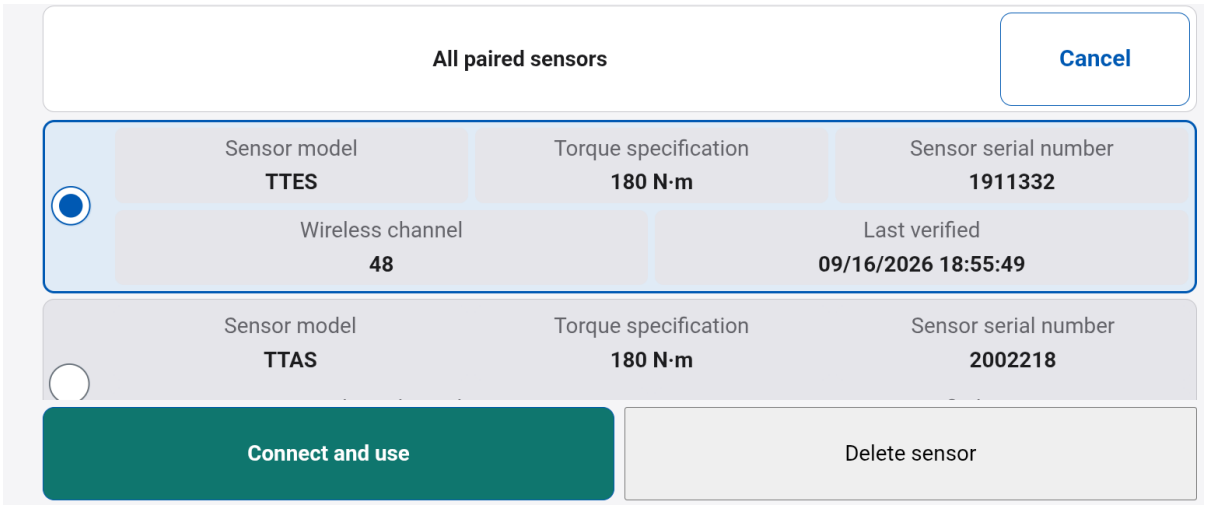


Figure 10-4 Phone: All paired sensors pop-up

1. Tap "View all sensors" at the top right.
2. In the list, tap the round radio button on the left of the sensor you want to use (identified by model and serial number).
3. Tap "Connect and use" at the lower left: that sensor becomes the sensor currently in use, the receiver switches automatically to its wireless channel, and the pop-up closes.
4. To delete, select the sensor and tap "Delete sensor" at the lower right. A confirmation window titled "Unpair sensor" asks, for example, "Unpair sensor TTES 16909060? You’ ll need to pair it again before use." (Figure 10-6). Check the model and serial number, then tap "Unpair sensor" to delete the pairing, or "Cancel" to keep it.
5. To make no change, tap "Cancel" at the upper right.

> **Warning** After you tap "Unpair sensor" in the confirmation window, the pairing data of that sensor is deleted at once and cannot be restored; pair the sensor again before using it. Check the serial number before you confirm. Deleting does not affect measurement records that have already been saved.

If the pairing data of the sensor changed while the confirmation window was open (for example, the sensor was paired again), the pairing is not deleted, the list is reloaded and "The sensor pairing has changed. Review the latest details before removing the pairing." is shown. Check the list and delete again if it is still necessary.

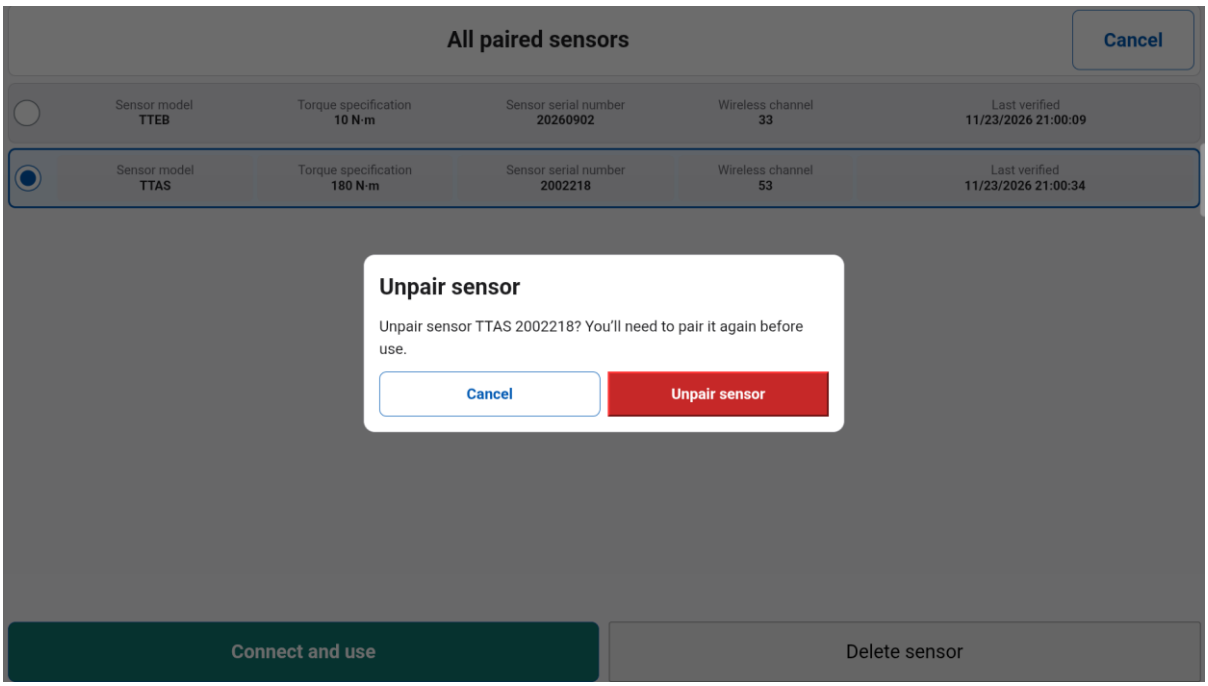


Figure 10-6 Tablet: "Unpair sensor" confirmation window

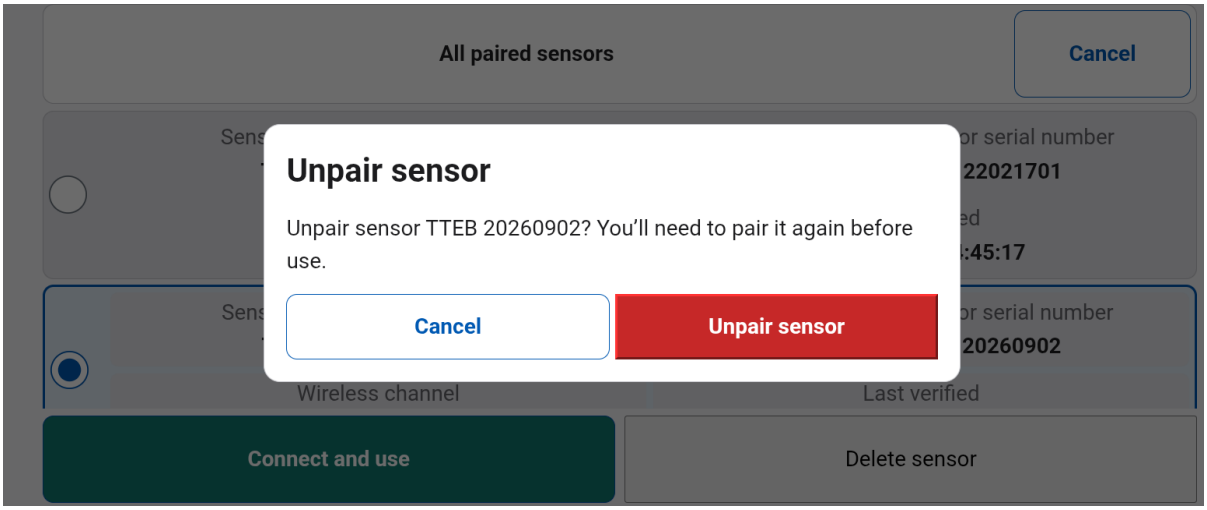


Figure 10-6 Phone: "Unpair sensor" confirmation window

10.6 Sensor Information Fields

Field	Description
Sensor model	For example TTES, TTAS, TTEB.
Torque specification	Full-scale torque, shown in the global torque unit, for example 100 N·m.
Sensor serial number	Decimal serial number, for example 16909060; check it against the label on the sensor body.

Field	Description
Wireless channel	The channel used when this sensor was paired.
Last verified	The time when the identity of this sensor was last confirmed; "Not verified" is shown if it has never been verified.

> **Tip** The sensor battery level is not shown on the pairing screen; check the "Battery" field at the top of the work screen.

10.7 RF Diagnostic Capture (Maintenance Staff)

An account with the diagnostic permission sees a "Diagnostic capture" button in the top bar of the Sensor Pairing screen, used to capture receiver communication data for analyzing problems. This permission is not among the 8 permissions of User Management and cannot be granted on the screen; per program design, only the admin account created automatically at first launch has it. Ordinary users do not see this button and do not need it.

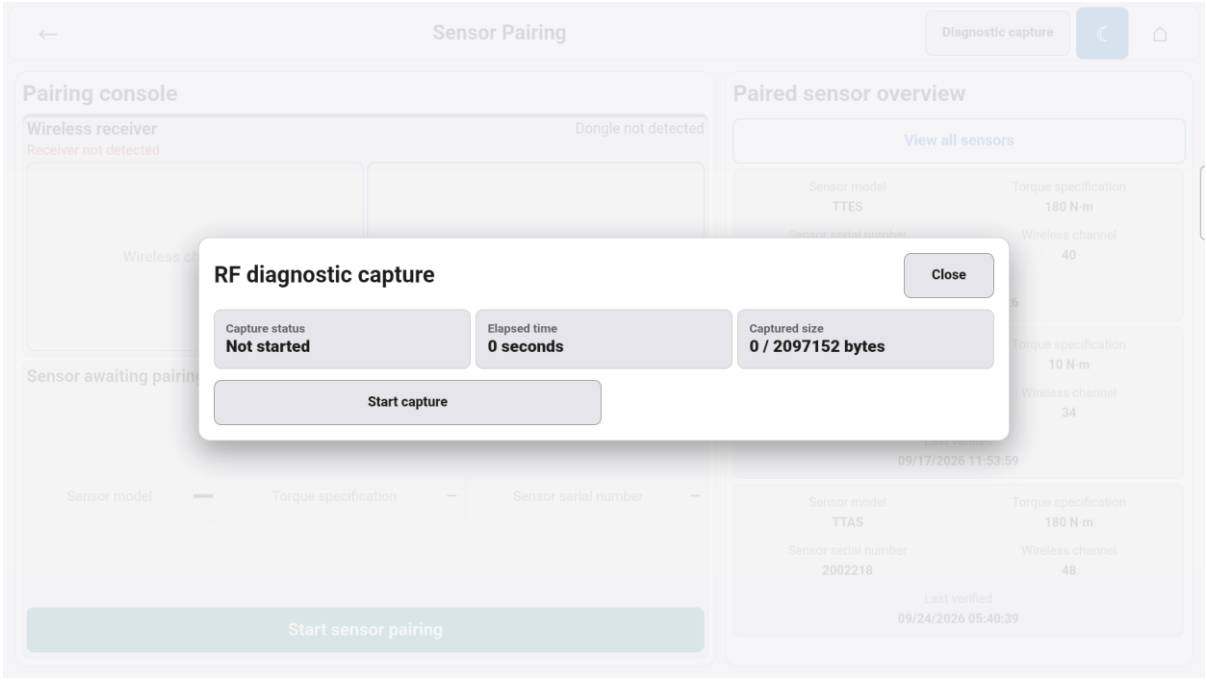


Figure 10-5 Tablet: RF diagnostic capture window

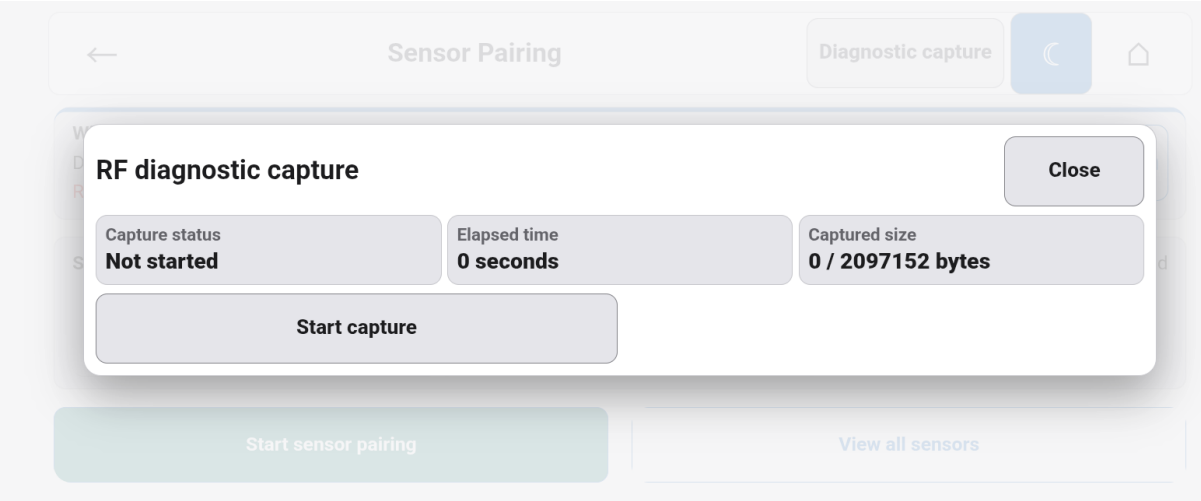


Figure 10-5 Phone: RF diagnostic capture window

Item / button	Description
Capture status	Not started, Preparing, Capturing, Sealing, Ready to export, Capture failed.
Elapsed time / Captured size	The capture limit is about 5 minutes or 2 MiB (2,097,152 bytes), whichever comes first.
"Start capture"	Starts recording communication data; then perform the operation that reproduces the problem.
"Finish and seal"	Stops the capture and seals the data.
"Export diagnostic file"	Exports the sealed data to an Android folder, to be handed to the supplier for analysis.
"Delete capture"	Deletes the captured data. Closing the window does not delete the capture.
"Close"	Closes the window.

10.8 Receiver Error Messages

On-screen message	Cause and action
Receiver not detected / Approved Dongle not detected	Not plugged in or poor contact. Reconnect the receiver, then tap "Detect wireless receiver again".
Allow USB access / USB permission denied	Android USB permission was not granted. Unplug and replug the receiver, and tap "OK" in the system dialog.
USB device is not the approved Dongle	The device plugged in is not the original receiver. Use the original receiver.
Multiple approved Dongles detected	Two or more receivers are plugged in at the same time. Keep only one.
Cannot open Dongle / Dongle reader failed / FTDI driver not found	The receiver failed to open. Unplug and replug the receiver and detect again; if it keeps happening, replace the OTG adapter or the receiver.
This device does not support USB host mode, so the receiver cannot connect.	The device running the app does not support OTG. Replace it with a device that meets the specification.
RF link timed out	The sensor is not powered on, is too far away, or the channel does not match. Check the sensor power and channel, then try again.
Finish the current operation or unpair first	The channel or pairing cannot be changed while a measurement is in progress. Leave the work screen first.
The pending-sensor area shows "Pairing failed"	The receiver is in a fault state, so pairing cannot be completed. Unplug and replug the receiver, then detect it again; if it keeps happening, replace the OTG adapter or the receiver.
The sensor pairing has changed. Review the latest details before removing the pairing.	The pairing data of the sensor changed while the "Unpair sensor" confirmation window was open, so the pairing was not deleted. Check the reloaded list and delete again if it is still necessary (section 10.5).

Chapter 11 Work Parameter Settings (Common Description)

On the main menu, tap any work mode (Torque Wrench, Power Tool, Torque Measurement, Torque & Angle) and you first enter the "Parameter Settings" screen of that mode. The four modes have the same screen structure, divided into columns by blue headings: "Work Info" (in the order "Select sensor", "Station", "Part Number"), "Target Torque", and the mode-specific "Parameter Settings", "Task Parameters" or "Target Angle" column (Torque & Angle has four columns). This chapter explains the common fields; the mode-specific fields are in Chapters 13–16.

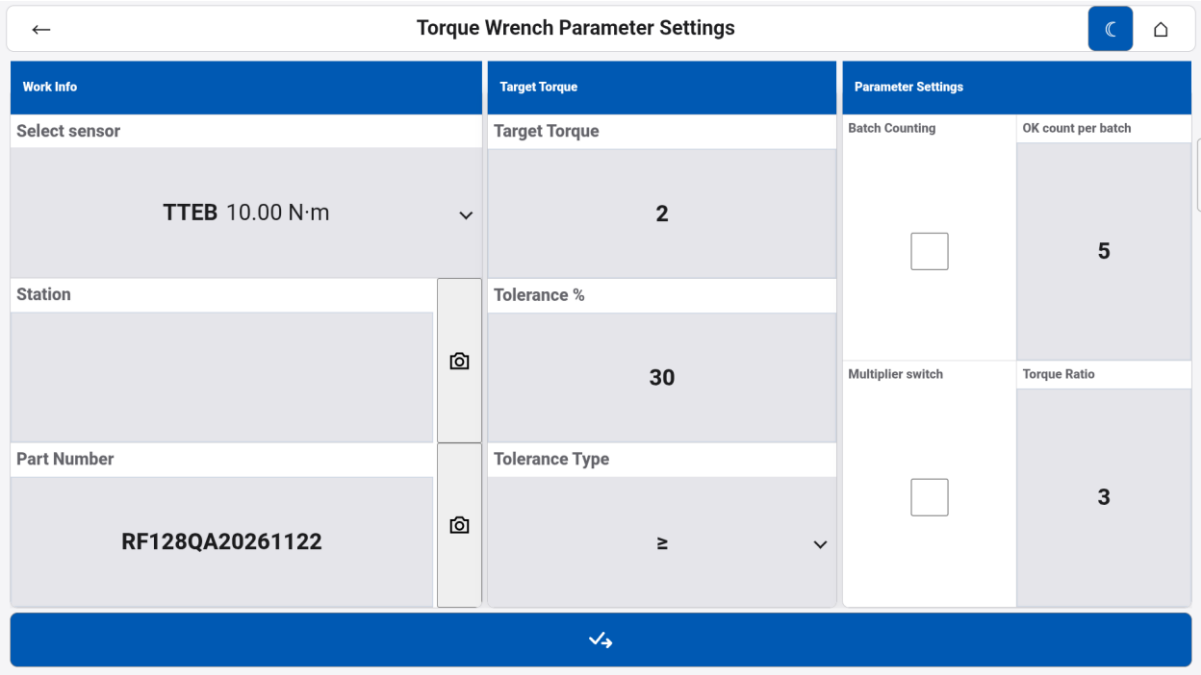


Figure 11-1 Tablet: Parameter settings screen (Torque Wrench as an example)

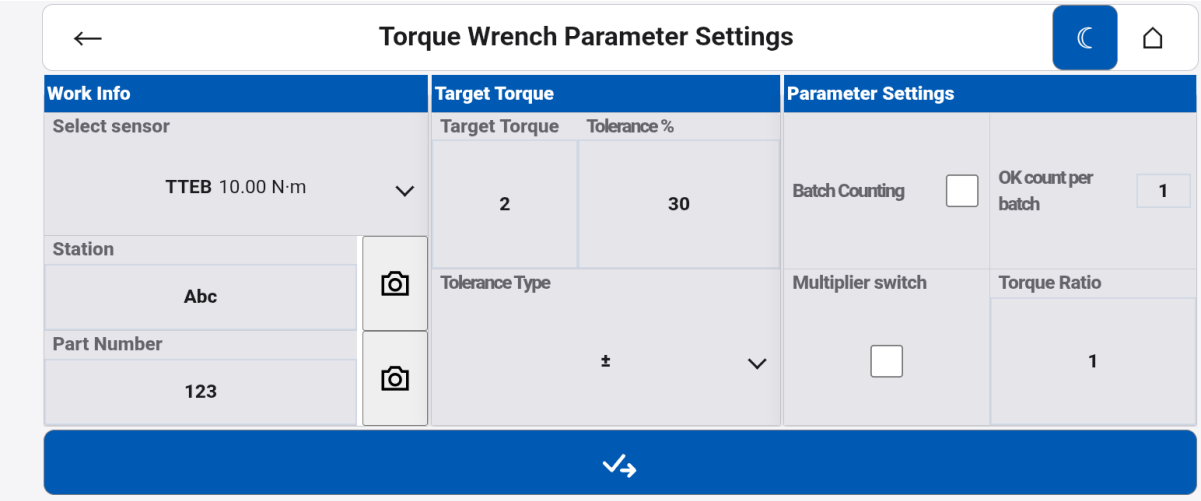


Figure 11-1 Phone: Parameter settings screen (Torque Wrench as an example)

11.1 Common Fields

Column	Field	Description	Default value and limits
Work Info	Select sensor	The paired sensor used by this mode, showing its model and specification. Tap it to open the search pop-up (section 11.2).	Required. If there is no paired sensor, the "Sensor Pairing" button is shown instead.
Work Info	Station	Station or production line code; it is recorded in every record. The camera icon to the right of the field fills it by scanning with the in-app camera (Section 11.6).	Can be blank; up to 64 characters.
Work Info	Part Number	Pre-filled part number (it can also be scanned on the work screen). The camera icon to the right of the field fills it by scanning with the in-app camera (Section 11.6).	Can be blank; up to 128 characters; leading zeros are kept.

Column	Field	Description	Default value and limits
Target Torque	Target Torque	The tightening target value, in the global torque unit.	Must be between the minimum and the maximum of the selected sensor: the minimum is 10% of the specification (5%, 0.5 N·m, for the 10 N·m sensor) and the maximum is 100%; when the multiplier is checked, both are multiplied by the torque ratio. The lower torque limit must not be below the minimum either. Blank in a new setting, and cleared when a different sensor is selected; enter it again. While the field is being edited, the allowed range is shown at the bottom of the screen (section 11.7).
Target Torque	Tolerance %	Allowed torque deviation in percent.	0 or more and less than 100; default 10% for a new entry.
Target Torque	Tolerance Type	"±" or "≥": determines how the lower and upper limits are calculated (section 11.3).	Default is "±".
Parameter Settings	Batch Counting	When checked, OK parts are counted, and "Batch Complete" is shown when the "OK count per batch" is reached.	Not checked by default.

Column	Field	Description	Default value and limits
Parameter Settings	OK count per batch	The number of OK parts required per batch (NOK parts are not counted).	Positive integer from 1 to 999, default 1.
Parameter Settings	Multiplier switch	Check it when a torque multiplier is used (Power Tool does not have this field).	Not checked by default.
Parameter Settings	Torque Ratio	The torque ratio of the multiplier.	Must be greater than 0 when the multiplier is checked; default 1.
Parameter Settings	Gear Ratio	The angle reduction ratio of the multiplier (Torque Measurement and Torque & Angle only).	Must be greater than 0 when the multiplier is checked; default 1.

11.2 Select Sensor

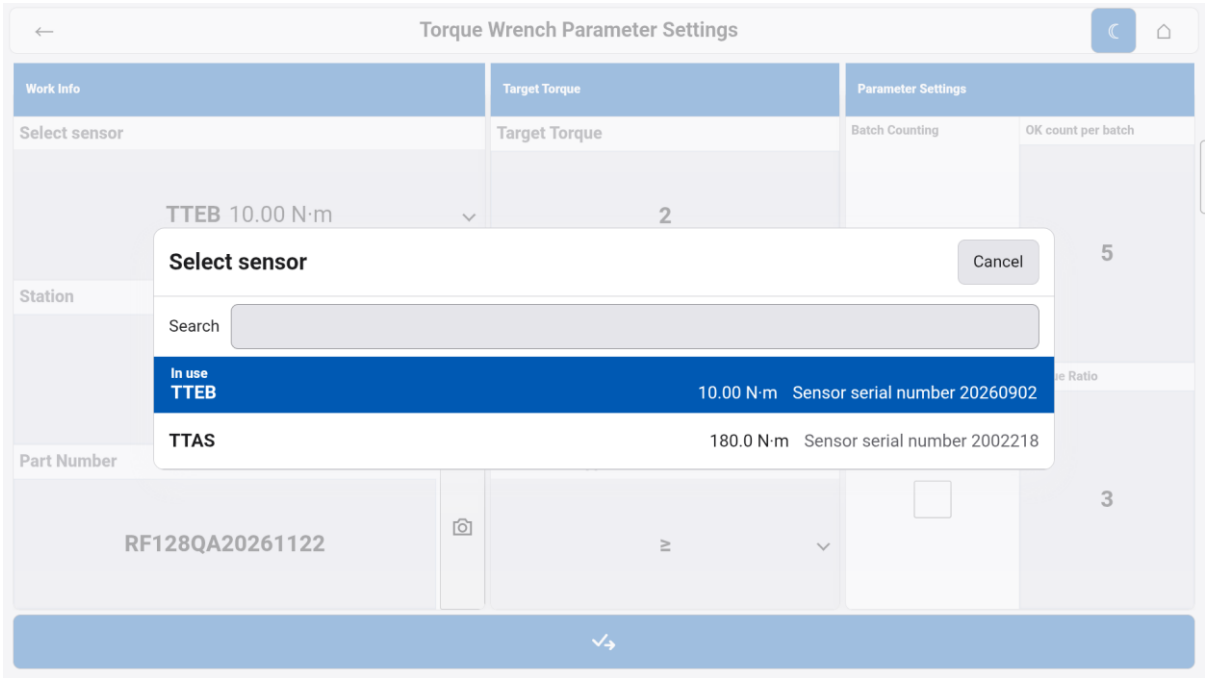


Figure 11-2 Tablet: Select sensor search pop-up

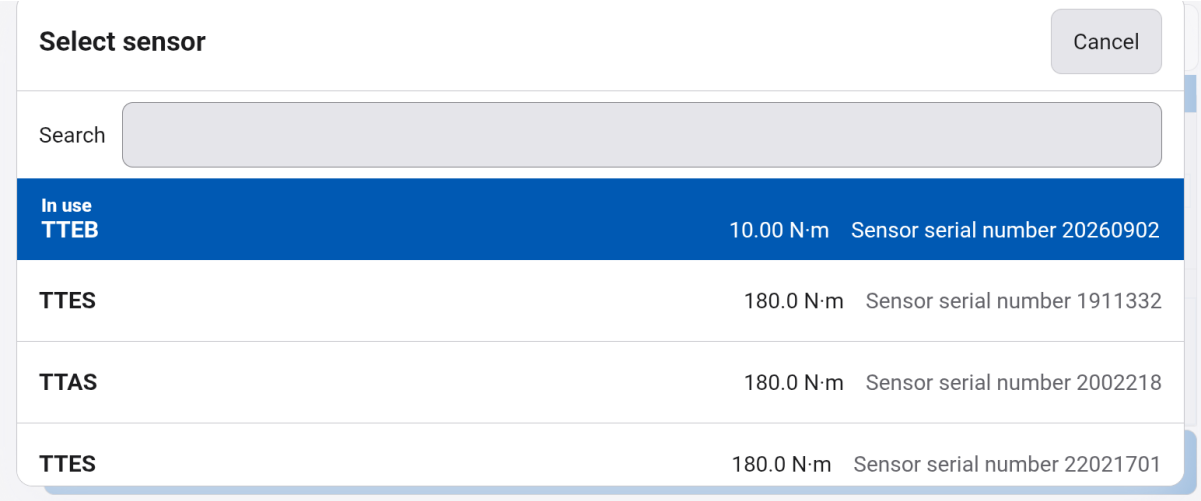


Figure 11-2 Phone: Select sensor search pop-up

1. Tap the "Select sensor" field (shows for example "TTES 100.0 N·m").
2. The sensor "In use" is at the top of the pop-up.
3. When there are many sensors, enter the model or serial number in the "Search" field to narrow the list.
4. Tap the sensor you want to use; the pop-up closes.
5. **Re-enter the target torque and check the seating torque: after you select a different sensor, the Target Torque field is cleared and must be entered again, and the seating torque in angle modes is set to 20% of the new specification. Selecting the same sensor again changes nothing. The Target Torque field is also blank when you open the screen and the sensor now in use is not the one the setting was saved with.**

> **Example** A 100 N·m TTES was in use with a target of 50 N·m; after you choose a 180 N·m TTAS, the Target Torque field becomes blank. Tap the field, check the range shown at the bottom of the screen (section 11.7), and enter 50.00 again.

11.3 Calculation of the Torque Limits

Tolerance Type	Lower specification limit	Upper specification limit
± (tolerance range)	Target × (1 − tolerance %)	Target × (1 + tolerance %)
≥ (greater than or equal to)	Target	Target × (1 + tolerance %)

> **Example** Target 50.00 N·m, tolerance 5%:
> "±" → lower limit 47.50, upper limit 52.50 N·m; a measured 48.72 is OK, a measured 54.20 is NOK.
> "≥" → lower limit 50.00, upper limit 52.50 N·m; a measured 48.72 is NOK, a measured 51.00 is OK.

11.4 Torque Multiplier Conversion

After "Multiplier switch" is checked, the torque used for display and judgement = sensor torque × torque ratio; angle = sensor angle ÷ gear ratio.

> **Example** Torque ratio 4, gear ratio 4: the sensor measures 12.5 N·m and rotates 360° → the output end is displayed as 50.00 N·m, 90.0°.

11.5 Saving and Entering Work

The long button at the bottom of the screen has only a check mark and arrow icon and no text; its accessibility name is "Save & Apply → Work", and this manual uses that name:

1. Confirm that all field values and units are correct.
2. Tap the long button at the bottom.
3. After validation passes, the settings are saved automatically and the work screen opens; measurement starts automatically, and there is no separate start button.
4. When validation fails, the button shows the red text "Failed to load or save settings" (when no receiver is plugged in it shows "Receiver not detected"); correct the out-of-range or blank fields, then tap it again. When there is no paired sensor the button cannot be tapped; after a sensor error it shows a "Sensor Pairing" link instead.

Common reasons it cannot be saved	How to fix
Target torque is below the minimum (10% of the specification, 5% for the 10 N·m sensor, × torque ratio) or above the specification × torque ratio	Adjust the target torque, or select a sensor with a suitable specification.
The lower torque limit would be below 10% of the specification (the screen shows "Target torque must be at least … (below this, the lower limit falls below the sensor's 10% measuring threshold)" and the Target Torque field turns red)	Raise the target torque to at least the value shown (with "±", a smaller Tolerance % also lowers that minimum), or select a sensor with a lower specification.
Target Torque is blank (a new setting, or the sensor was changed)	Tap the Target Torque field, read the allowed range shown at the bottom of the screen, and enter a value within it (section 11.7).
The bottom of the screen shows "No target torque is available. Check the tolerance, multiplier and unit."	With the current tolerance, multiplier and unit, no target value can be saved. Reduce the Tolerance %, check the torque ratio, or select a sensor with a suitable specification.
Tolerance % is blank, negative or ≥ 100	Enter a value between 0 and 99.99.
OK count per batch is 0, a decimal, blank or above 999	Enter a positive integer from 1 to 999.
Multiplier is checked but the torque ratio / gear ratio is 0	Enter a value greater than 0.
Target angle is not within 1° and the maximum, which is the smaller of 360° and 3276.7 ÷ gear ratio	Enter an angle from 1 up to the maximum (at most 360).

Common reasons it cannot be saved	How to fix
There is no paired sensor	First complete pairing on the Sensor Pairing screen (the button becomes "Sensor Pairing").
The user does not have the "Parameter settings" permission	Contact an administrator for authorization.

11.6 Camera Barcode Scanning

The "Station" and "Part Number" fields on the parameter-setting screen of the four modes, and the editable "Part Number" field on the work screen, each have a camera icon on the right (Figure 11-1). It scans one-dimensional or two-dimensional barcodes with the in-app camera, so no external barcode scanner is needed.

1. Tap the camera icon to the right of the field (its accessibility name is "Scan" plus the field name). The first time, Android asks for the camera permission (Section 3.4). If the permission is not granted or the device has no usable camera, the screen shows "Camera permission was not granted. Cancel and enter the value manually." or "Scanning is not available in this environment. Please enter the value manually."; cancel and enter the value manually.
2. Place the barcode within the camera view (rear camera). The screen prompts "Place the barcode within the camera view." and shows "Recognizing..." during recognition. Once a code is read, the camera stops first and the raw scanned string is displayed.
3. After confirming the content is correct, tap "Apply" to fill the field you just tapped; if the content is wrong, tap "Rescan". Tapping "Cancel", pressing Back, or switching pages leaves the field's original value unchanged.
4. Scanning does not save the settings automatically and does not start or stop a measurement: the parameter settings must still be saved with the bottom button as described in Section 11.5, and the work-screen part number continues to use the existing next-part synchronization.

Scanned content is always treated as plain text: leading zeros are kept, and URLs or HTML-like content are never opened or executed. If the content is empty, contains control characters, has an

unrecognized format, or exceeds the field length limit (Station 64, part number in the parameter settings 128, part number on the work screen 64 characters), the screen shows "The content is empty, contains control characters, or exceeds the field length and cannot be applied."; it cannot be applied and is not truncated. If the field value changed during the preview, it is not overwritten, and the screen shows "The original field has changed and was not overwritten; please scan again." This version does not save scan photos or recognition history, and does not upload images.

If the app moves to the background during a scan, the scan is cancelled automatically; during cancellation the screen shows "Closing the camera..." while waiting for the camera to close, and another scan cannot be started in the meantime. If the camera cannot be confirmed as released, the screen shows "Unable to confirm that the camera was released. Please reopen the app." and no scan result is accepted.

> **Tip** The program lists 13 barcode formats: Code 128, Code 39, Code 93, EAN-8, EAN-13, UPC-A, UPC-E, ITF, Codabar, QR Code, Data Matrix, PDF417 and Aztec. This is the range the program supports; it does not mean that the recognition success rate of every format has been verified on real devices. On site, first confirm with a test barcode that it can be read.

11.7 Target Torque Range Hint

The hint shows which target torque values can be saved for the selected sensor, so that you do not have to work out the minimum yourself. It appears on the parameter-setting screen of all four modes, at the left of the bottom row, only while the cursor is in the "Target Torque" field (Figure 11-3); the save button moves to the right to make room. When you leave the field, the hint disappears. The hint is not shown in the step editor of Batch Jobs.

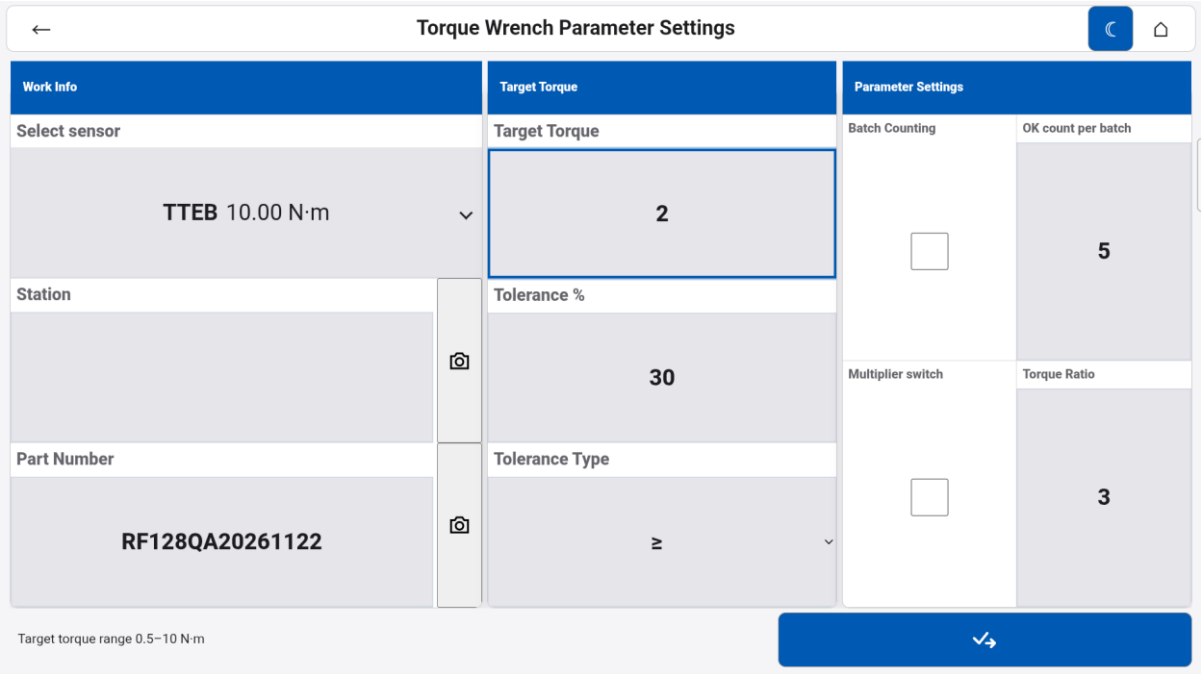


Figure 11-3 Tablet: Target torque range hint while the "Target Torque" field is being edited

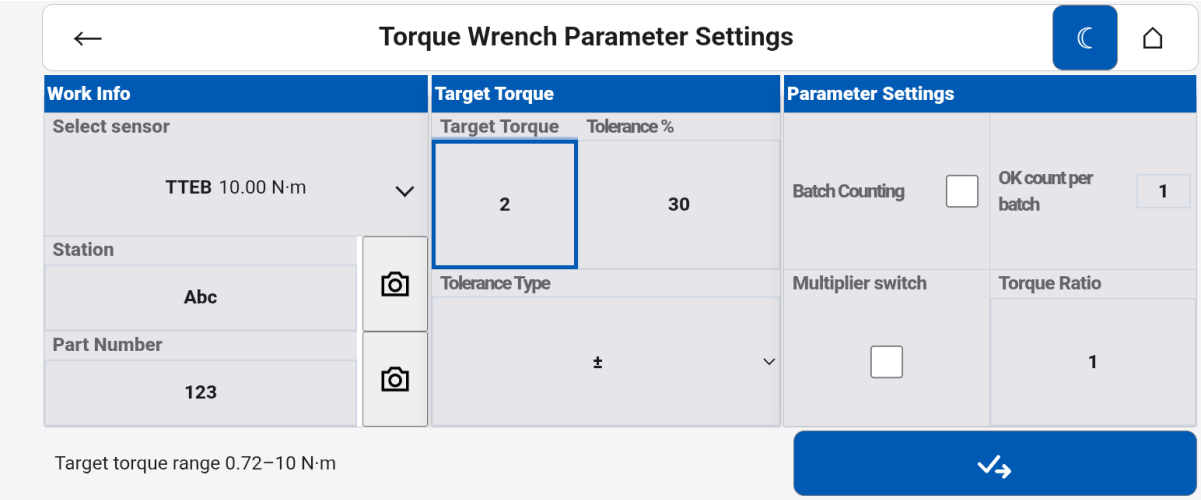


Figure 11-3 Phone: Target torque range hint while the "Target Torque" field is being edited

The hint shows "Target torque range" followed by the lowest value, the highest value and the torque unit:

- The highest value is the sensor specification, multiplied by the torque ratio when the multiplier is checked.
- The lowest value is the minimum of the sensor (10% of the specification, 5% for the 10 N·m sensor, multiplied by the torque ratio when the multiplier is checked). With the Tolerance Type "±" it is raised so that the lower torque limit does not fall below that minimum: lowest value = minimum ÷ (1 − Tolerance %).
- The range follows the tolerance, the multiplier, the torque ratio and the torque unit, and is updated when you change them. The values are rounded inward to the decimal places of the displayed unit (the lowest value is rounded up and the highest value is rounded down).

> **Example** 100 N·m sensor, Tolerance 10%, Tolerance Type "±", multiplier not checked: the minimum is 10 N·m, so the lowest value is 10 ÷ (1 − 0.10) = 11.11…, rounded up to 11.12 N·m; the highest value is 100 N·m.

1. Select the sensor.
2. Enter the "Tolerance %" and choose the "Tolerance Type".
3. Tap the "Target Torque" field and read the range at the bottom of the screen.
4. Enter a value within the range, then save as described in section 11.5.

The same place can show the following:

Shown	Meaning	Action
Target torque range …	The values that can be saved.	Enter a value within the range.
An extra line above the range: "Target Torque", an exact value and the unit	The value shown in the field is rounded and appears to be outside the range, but the exact value in this line can still be saved.	No action is needed.
No target torque is available. Check the tolerance, multiplier and unit.	No value can be saved with the current settings.	Reduce the tolerance, or check the torque ratio and the unit.
Start sensor pairing	The selected sensor is not in the paired list.	Pair a sensor first (Chapter 10).

With an external keyboard, the ↑ and ↓ keys in the "Target Torque" field change the value in steps of 1 and stop at the ends of the range. When the field is blank, the first press enters the lowest value of the range. When no range is available, the keys have no effect.

> **Tip** The hint is an aid only; the value is checked again when you save (section 11.5).

Chapter 12 Work Screens: Common Description

After you tap "Save & Apply → Work" on the parameter screen, the work screen opens. The work screens of the four modes use the same layout components; this chapter first describes the common parts.

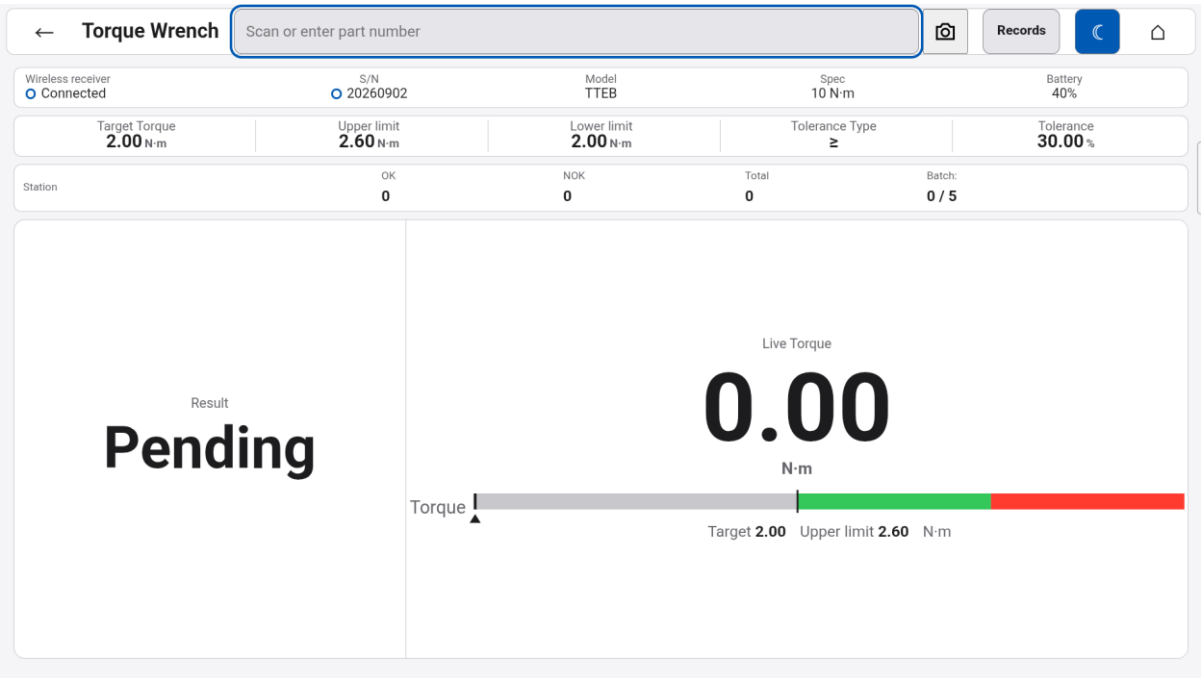


Figure 12-1 Tablet: Work screen (Torque Wrench, large-screen expanded layout)

12.1 Screen Areas

Area	Details	Description
Top bar	←, mode name, part number, Records, ☾, ⌂	See section 4.1.
Device status bar	Receiver, S/N, Model, Spec, Battery	Receiver "Connected" / "Disconnected"; the dot before the serial number shows the sensor link; a battery value of "—" means no battery level has been received yet.

Area	Details	Description
Result card	Result, main reading, progress band	Background color: green for OK, red for NOK, gray for pending. During a measurement the main reading is "Live Torque" ("Max Torque" for Torque Measurement); after the result it is "Max Torque", the peak torque saved for that result. The progress band is described in section 12.9.
Side card	Mode-specific readings to the right of the result card	Power Tool, Torque Measurement and Torque & Angle only (Chapters 14–16); Torque Wrench has none.
Statistics area	Station, OK, NOK, Total, Batch	OK/NOK are the counts for the current batch; "Batch: 1 / 5" means 1 part completed, target 5 parts.
Spec strip	Target Torque, Upper limit, Lower limit, Tolerance Type, Tolerance (angle modes also show Target Angle)	The judgement conditions used for the current job.
Action row (bottom)	"Data Curve"	Shown only after an NOK result (section 12.10).

12.2 Result States

Shown	Meaning
Pending	A complete apply-and-release cycle has not been finished yet.
OK (green)	This result is within the spec range and has been saved automatically.
NOK (red)	This result is outside the spec range and has been saved automatically; it does not count toward the batch OK count. The "Data Curve" button appears so that you can check the curve of this result (section 12.10).

Shown	Meaning
Conditions not met	The conditions for a valid judgement were not reached (for example, Torque Measurement did not reach the target angle). No OK/NOK is produced and nothing is counted in the statistics; repeat the work.
Disconnected	The sensor or receiver link was lost; readings show "--".
Rehit	Appears only in records from earlier versions; new measurements in this version do not produce it.

> **Tip** Per the program design, no beep is played for an OK result and two short beeps are played for NOK; the beeps have not been physically verified.

12.3 Standard Operating Steps

1. On entering the work screen, first check that "Receiver: Connected" is shown, the model and serial number are correct, and the battery is sufficient.
2. Check that the target torque and upper/lower limits in the spec strip match the work instruction.
3. Scan the part barcode with the barcode scanner (or tap the Part Number field and type it), and check that the field content is correct.
4. Tighten following the safety procedure, then release the tool completely when finished. A measurement starts only after the torque reaches 10% of the sensor specification (multiplied by the torque ratio; 5% for the 10 N·m sensor); readings below that are not judged, not recorded and not sent to the PLC.
5. Watch the pointer on the progress band while tightening, and wait for the result card to show OK or NOK. After OK, the part number is cleared automatically, ready for the next part; after NOK, the part number is kept to make rework easier, and you can tap "Data Curve" to check the curve.
6. When everything is finished, with no force applied, tap "←" or "⌂" to leave the work screen.

> **Example** Target 50 N·m ±5%, OK count per batch 5:
> Scan WP-0001 → tighten to 49.0 N·m and release → OK is shown, Batch 1 / 5, and the part field is cleared.
> Scan WP-0002 → tighten to 54.2 N·m and release → NOK is shown, Batch is still 1 / 5, and WP-0002 stays in the part field for rework.

12.4 Part Number and Barcode Scanner

Situation	Handling of the Part Number field
Single mode, result OK	Cleared automatically so the next part can be scanned; the saved record keeps the original number.
Result NOK or Conditions not met	Not cleared, so the same part can be reworked.
Batch Jobs, OK on an intermediate step	Kept; the following steps belong to the same part.
Whole batch job completed	Cleared before the next round starts.
The barcode of the next part was already scanned	Not cleared by the result of the previous part, but still check the field content.

The editable work screen (top row) also has a camera icon to the right of the "Part Number" input box; the operation and the way the result is applied are the same as in Section 11.6. After applying, the existing next-part synchronization used for barcode scanner input continues, and no measurement is started or stopped automatically.

> **Tip** Leading zeros in a barcode are kept (000123 does not become 123). The work-screen field holds up to 64 characters; use barcodes whose length is within this limit.

12.5 Batch Complete

When "Batch Counting" is checked in the parameter settings, once the number of OK parts reaches "OK count per batch", a green full-screen "Batch Complete" is shown for about 1 second. The OK/NOK statistics and progress are then reset to zero; measurement is not interrupted, so you can continue directly with the next batch.

12.6 Low Battery and Sensor Errors

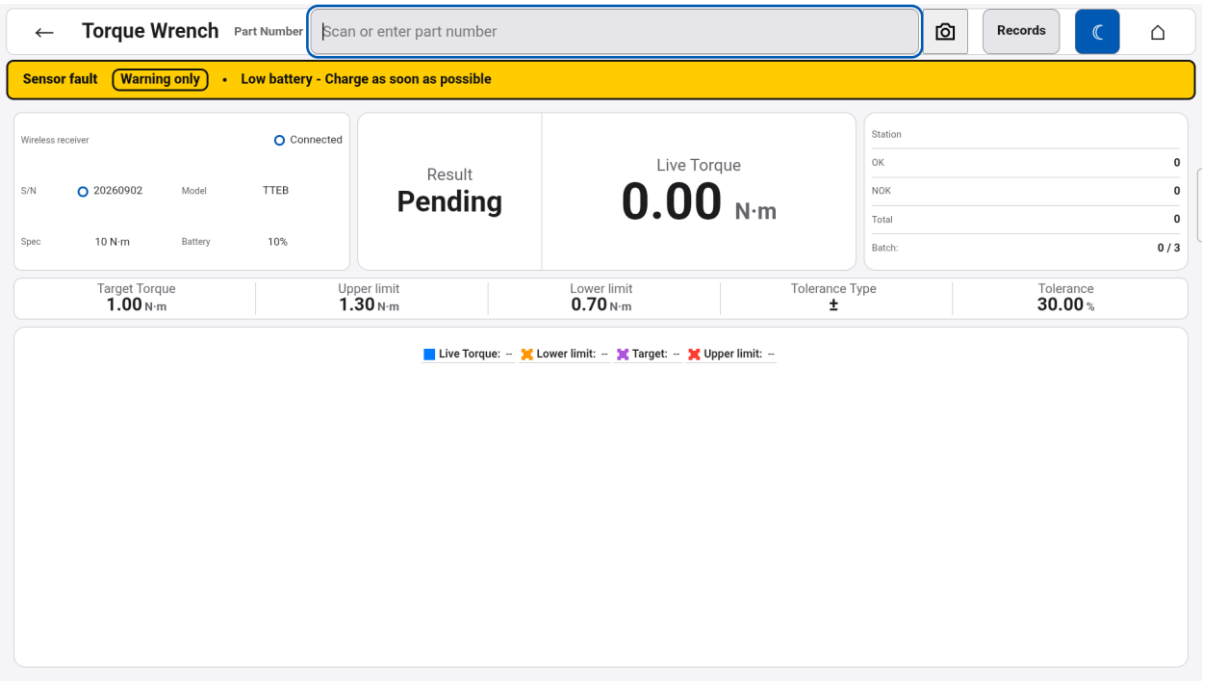


Figure 12-2 Tablet: Low-battery warning (warning only; work is not interrupted)

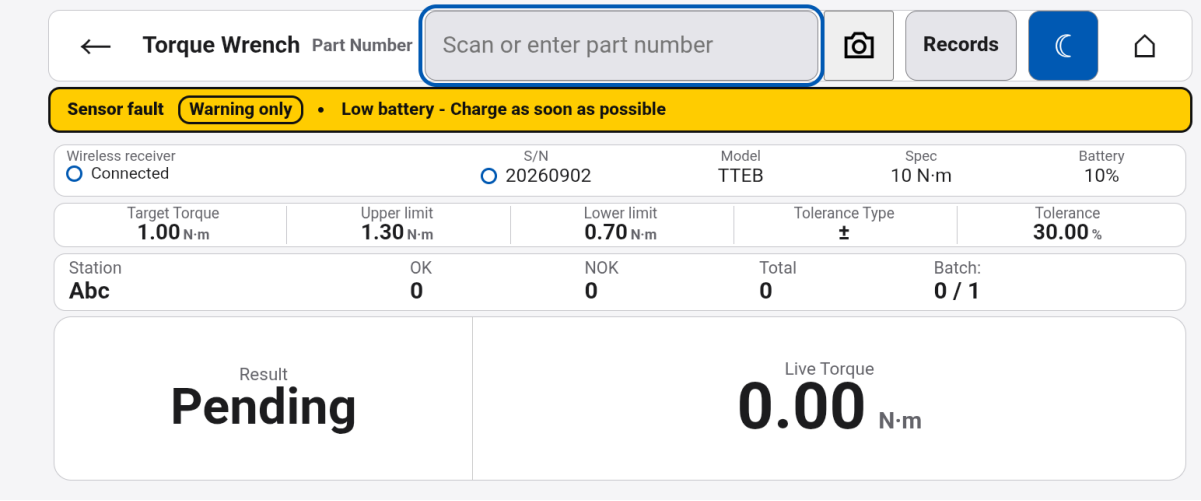


Figure 12-2 Phone: Low-battery warning (warning only; work is not interrupted)

When a sensor reports an error, a "Sensor fault" banner appears at the top of the screen:

- Yellow "Warning only" (low battery, 5,000 cycles reached): work can continue, but deal with it as soon as possible.
- Red "Work stopped" (torque overload, zero drift, hardware damage): work is blocked and a "Sensor fault" dialog appears; tap "Go to sensor pairing" to handle it.

For error codes and how to handle them, see Chapter 20.

12.7 Other Buttons and Messages

Shown	When it appears	Action
"Save result" / "Discard result"	Appears after each measurement when the job is set to manual confirmation. The parameter screens in this version have no switch for it and the default is automatic saving, so it does not appear in normal work.	Tap "Save result" if the result is valid, or "Discard result" if it is not. The next measurement cannot start until one of them is done. The two buttons are in the action row at the bottom of the screen.
"Only the original operator can view the curve."	Shown instead of "Data Curve" for an NOK result that is waiting for manual confirmation, when a different user has logged in since the measurement (section 12.10).	Save or discard the result as usual, or have the user who made the measurement log in to view the curve.
"Confirmed — saving…"	"Save result" was tapped and the system is writing the record.	Wait a moment; the next measurement does not start until saving is complete.
"Save failed. The original measurement is retained."	Writing the record failed; the result is not discarded or re-evaluated automatically.	Stay on the screen and wait for the system to retry; if it keeps appearing, note the on-screen message and contact the supplier.
"Retry reading confirmation"	Reading the result awaiting confirmation failed (for example, communication was briefly interrupted).	Tap this button to read again; no new measurement starts until the read succeeds.

Shown	When it appears	Action
"Error" + "Retry stop"	The command to stop the measurement was not confirmed as completed.	Stop applying force first and tap "Retry stop" until the message disappears, then leave or continue.
Cannot receive measurement data - restart the job	The data stream is abnormal.	Leave the work screen and enter it again.
Could not start the measurement	The receiver or sensor is not ready.	Go to sensor pairing, check the status, and retry.
Session expired - sign in again	The account was disabled or the session expired.	Reopen TMS and log in.
Workpiece number was not saved	Updating the part number failed.	Enter the part number again.
Make the window larger.	The window is narrower than 320 or shorter than 360 (CSS pixels), for example in a very small split-screen or floating window.	Enlarge the window or leave split screen; the measured readings are still shown.

12.8 Work Layout on Smaller Screens

When the width is below 1200 or the height is below 600, the information is arranged more compactly and the progress band shows only the bar, without the limit values. In a portrait or narrow window (for example split screen) the work screen uses a stacked single-column layout without the progress band; when you leave the work screen and come back, the OK/NOK counts, the batch progress and the part number are kept. The curve is always saved and can be viewed in the record details.

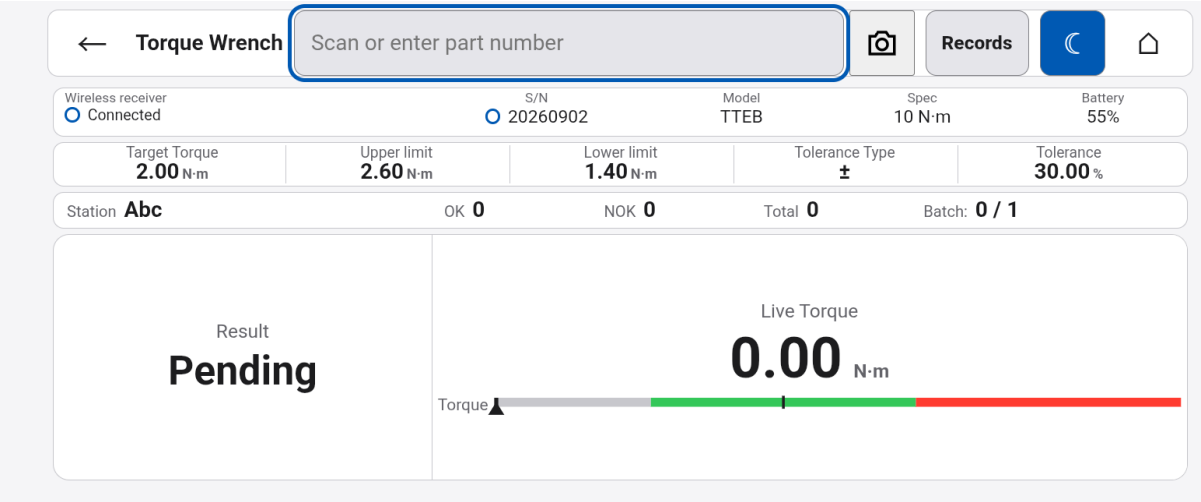


Figure 12-3 Phone: Work screen in the normal landscape layout (915×412)

12.9 Progress Band

The progress band shows at a glance where the current value is in relation to the lower limit, the target and the upper limit, so that the operator can see how close the tightening is to the OK range without reading the numbers. It is in the result card, under the main reading, on the work screens of the four modes (Figure 12-4). Batch work screens do not have it.

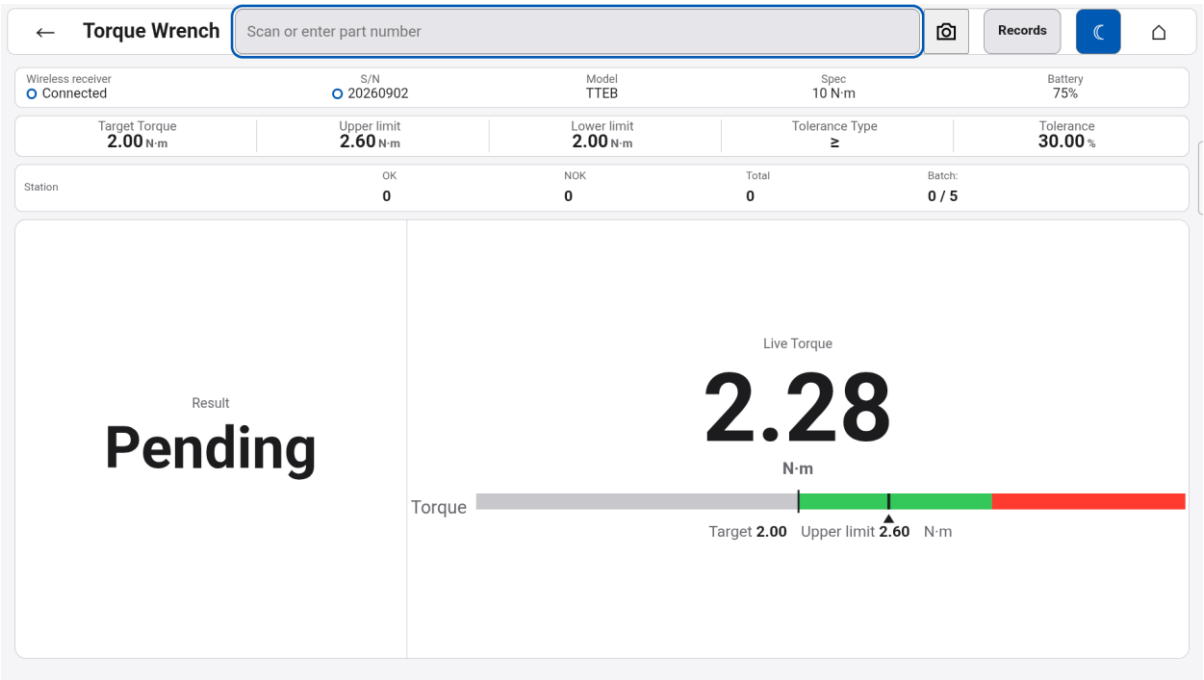


Figure 12-4 Tablet: Progress band on the Torque Wrench work screen

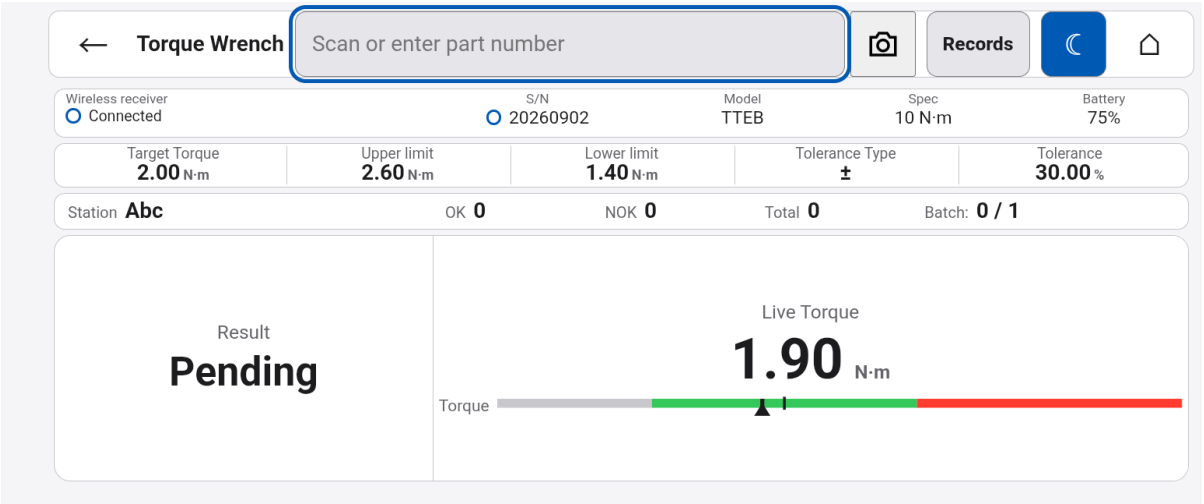


Figure 12-4 Phone: Progress band on the Torque Wrench work screen

Element	Meaning
Title "Torque" or "Angle"	The quantity the band shows.
Gray zone (left)	Below the lower limit.
Green zone (middle)	The OK range.
Red zone (right)	Above the upper limit.
Vertical line	The target value.
▲ pointer	The current value. It moves as the value changes; a value outside the scale keeps the pointer at the end. No pointer is shown when the sensor is disconnected or there is no value yet.
"Lower limit", "Target", "Upper limit" and the unit (tablet only)	The values of the three positions. On phones only the bar is shown; read the values from the spec strip.

The scale always runs from small on the left to large on the right, also in the Arabic interface. The left end of the scale is half of the lower limit.

Each mode shows one band:

Mode	Band	Value of the pointer
Torque Wrench	Torque	Peak torque of the current cycle; after the result, the maximum torque
Power Tool	Torque	Live torque; after the result, the maximum torque
Torque Measurement	Torque	Peak torque of the current cycle; after the result, the maximum torque
Torque & Angle, mode "Live Angle"	Angle	Live angle; after the result, the final angle
Torque & Angle, mode "Live Torque"	Torque	Peak torque of the current cycle; after the result, the maximum torque

The zones follow the judgement conditions: with the Tolerance Type "±" the green zone runs from the lower limit to the upper limit, and with "≥" from the target to the upper limit. On the angle band, with the judgement "≥" the green zone runs from the target angle to the right end, and with "≤" from the left end to the target angle.

1. Before tightening, check that the green zone matches the work instruction (compare with the spec strip).
2. While tightening, watch the pointer move toward the target line.
3. A pointer in the green zone is within the OK range; a pointer in the red zone means the upper limit has been exceeded.

Limits:

- The band is a visual aid. The OK/NOK result is decided by the judgement rules (Appendix A), not by the band. In Torque Measurement the result is judged from the angle-point torque, while the band shows the peak torque.
- The band is not shown in a portrait or narrow window (stacked layout), when the system font size is so large that the card has no room for it, or, on short phone screens, after a result that also shows the final angle or the mode.
- Screen readers do not read out the band.

12.10 NOK Curve Diagnosis ("Data Curve")

After an NOK result, you can open the torque (and angle) curve of that tightening directly on the work screen to see why it failed, without leaving the job and searching the records. On the work screens of Torque Wrench, Power Tool, Torque Measurement and Torque & Angle, a "Data Curve" button with a red frame, as wide as the action row, appears at the bottom of the screen when the result is NOK (Figure 12-5). It does not appear for OK, "Pending" or "Conditions not met", and Batch work screens do not have it.

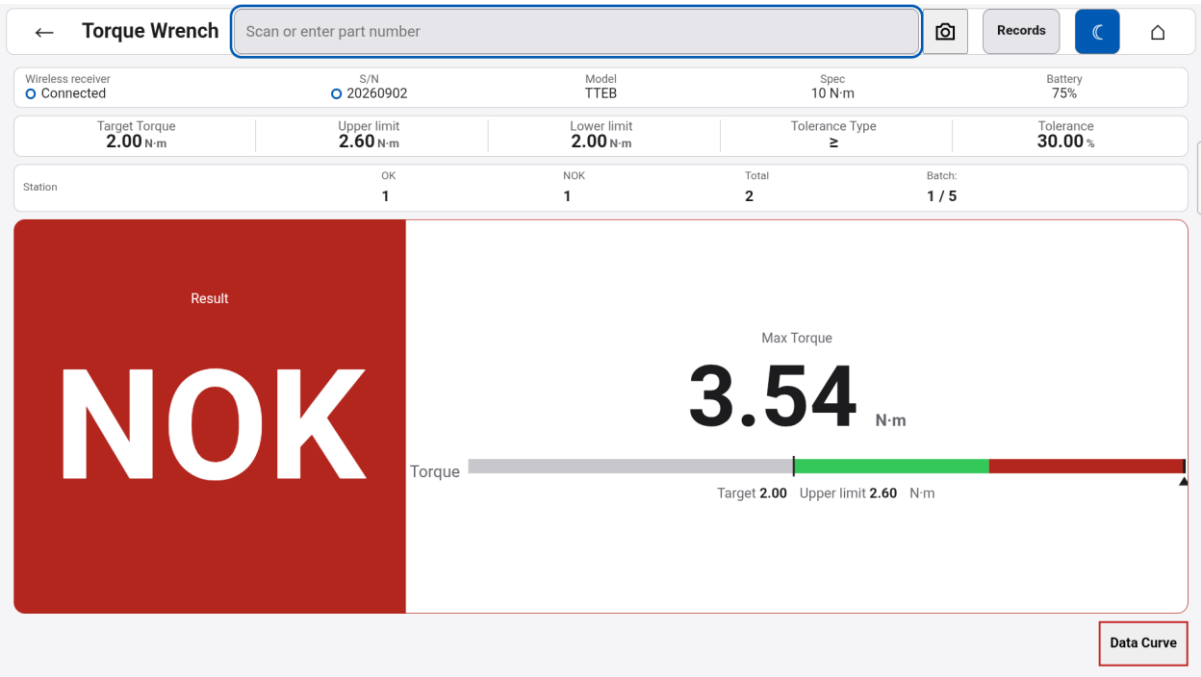


Figure 12-5 Tablet: NOK result with the "Data Curve" button

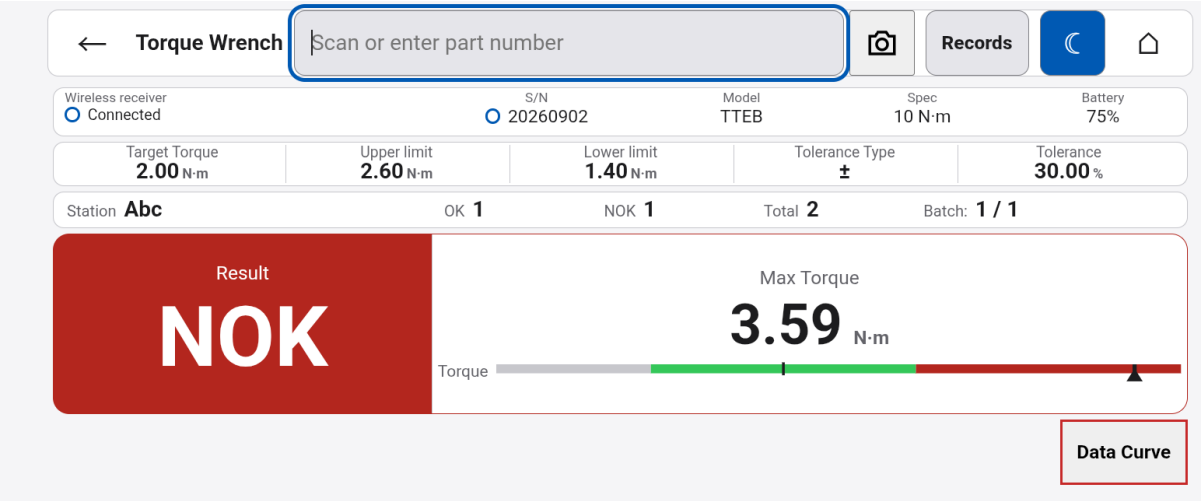


Figure 12-5 Phone: NOK result with the "Data Curve" button

1. Wait for the NOK result and release the tool completely.
2. Tap "Data Curve". A window opens over the work screen (Figure 12-6). Its title is "Torque / Time Curve" (Torque Wrench, Power Tool) or "Torque / Angle Curve" (Torque Measurement, Torque & Angle).
3. Read the summary at the top and the curve below it. Tap the curve to show the cursor and the values at that point (the same as in section 18.4).
4. Tap "Back" at the upper right to close the window and return to the work screen.

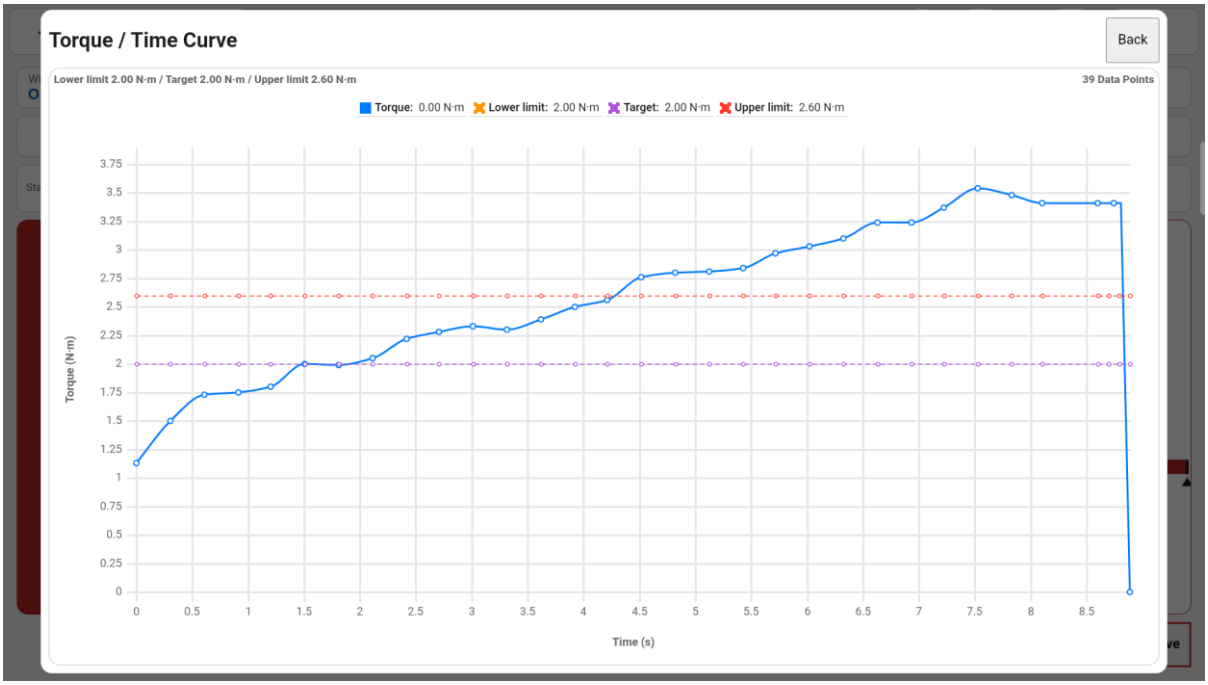


Figure 12-6 Tablet: "Data Curve" window of an NOK result

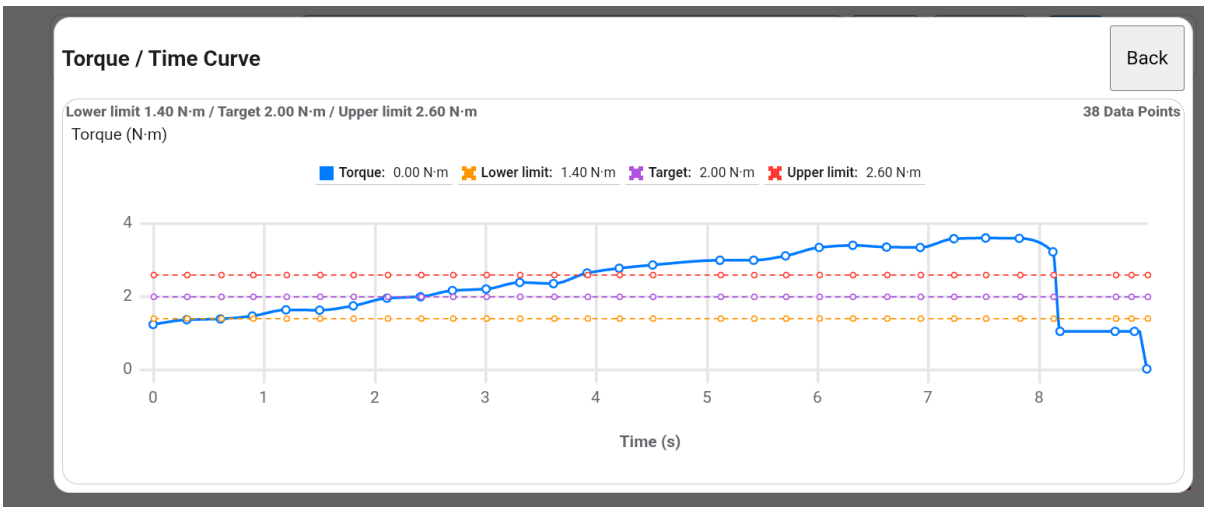


Figure 12-6 Phone: "Data Curve" window of an NOK result

Item	Description
Max Torque	The peak torque of this result.
Angle-point Torque	Torque Measurement only: the torque at the target angle.
Final Angle	Torque Measurement and Torque & Angle only.
Time	The time span of the saved data points, shown as "0–x.xx s".
Last sample torque / Last sample angle	The values of the last saved data point; the angle is shown only in the angle modes.
Curve	The saved data points of this tightening: torque, angle (angle modes), and the lower limit, target and upper limit lines.

Shown instead of the curve	Meaning
Loading data...	The data points are being read.
No data points	No data points were saved for this result. The summary values are still shown.
Load failed: No data points	The curve could not be read. The summary values are still shown; view the curve in the record details (section 18.3).

Limits and permissions:

- The button is shown only while the NOK result is on the screen. When the next tightening starts, the result is replaced and the button disappears; after that, view the curve in the record details (section 18.3).
- Only the user who made the measurement can open the curve, and the account needs the "Run measurement" permission.
- If the screen shows "Error" and "Retry stop", the button is hidden and an open window closes; tap "Retry stop" first (section 12.7).
- The window only displays data. It does not change the result, the record or the counts.

> **Tip** For a job set to manual confirmation, the curve of an NOK result that is still waiting for "Save result" or "Discard result" can be viewed only by the user who made the measurement: if a different user logs in before the result is saved or discarded, the screen shows "Only the original operator can view the curve." instead of the "Data Curve" button. Save or discard the result as usual, or have the user who made the measurement log in again to view the curve. The parameter screens of this version have no switch for manual confirmation (section 12.7), so this message does not appear in normal work.

Chapter 13 Torque Wrench

For manual torque wrenches (such as TTES series sensors). This mode records the peak torque of each apply-and-release cycle; if the peak is within the upper and lower spec limits, the result is OK.

13.1 Parameter Settings

Path: main menu → "Torque Wrench" → "Torque Wrench Parameter Settings". The screen has three columns: "Work Info", "Target Torque" and "Parameter Settings" (see Figure 11-1). For field descriptions see Chapter 11; this mode has no target angle, seating torque or gear ratio.

1. Enter the production line code in "Station", for example LINE-A-01.
2. In "Select sensor", choose the torque wrench sensor, for example TTES 100.0 N·m.
3. Enter 50.00 in "Target Torque" and 5 in "Tolerance %", and choose "±" for "Tolerance Type".
4. To count OK parts, check "Batch Counting" and enter 5 in "OK count per batch".
5. If a torque multiplier is used, check "Multiplier switch" and enter the "Torque Ratio".
6. Tap "Save & Apply → Work" at the bottom to enter the work screen.

13.2 Work Screen

The work screen is shown in Figure 12-1. The main reading, "Live Torque", follows the torque being applied and drops again as you ease off. After the result, its label changes to "Max Torque" and it shows the peak torque saved for that result until the next application of force starts. The torque progress band is under the reading (section 12.9).

Shown	Description
Live Torque / Max Torque	The torque being applied now; after the result, the label changes to "Max Torque" and the peak torque of the cycle is shown.
Result	OK if the peak is between the lower and upper limit, otherwise NOK.
Progress band (Torque)	The pointer shows the peak torque against the lower limit, target and upper limit (section 12.9).
"Data Curve" (after NOK)	Opens the torque/time curve of this result (section 12.10).

13.3 Example

> **Example** Conditions: TTES 100 N·m, target 50 N·m, ±5% (47.50–52.50 N·m), batch of 5 parts.
> ① Scan the part WP-DEMO-002.
> ② Apply force with the wrench; the on-screen reading rises to 49.00 N·m, then release.
> ③ The result shows a green OK, OK = 1, Batch 1 / 5, and the part field is cleared.
> ④ If you apply force up to 54.20 N·m instead, a red NOK is shown (above the upper limit of 52.50) and the part field is kept for rework.

Chapter 14 Power Tool

For pulse, impact, clutch and similar power tools. The judgement is based on the peak torque of the current cycle; the work screen also shows the pulse count, the time to maximum torque and the work time as operating references.

14.1 Parameter Settings

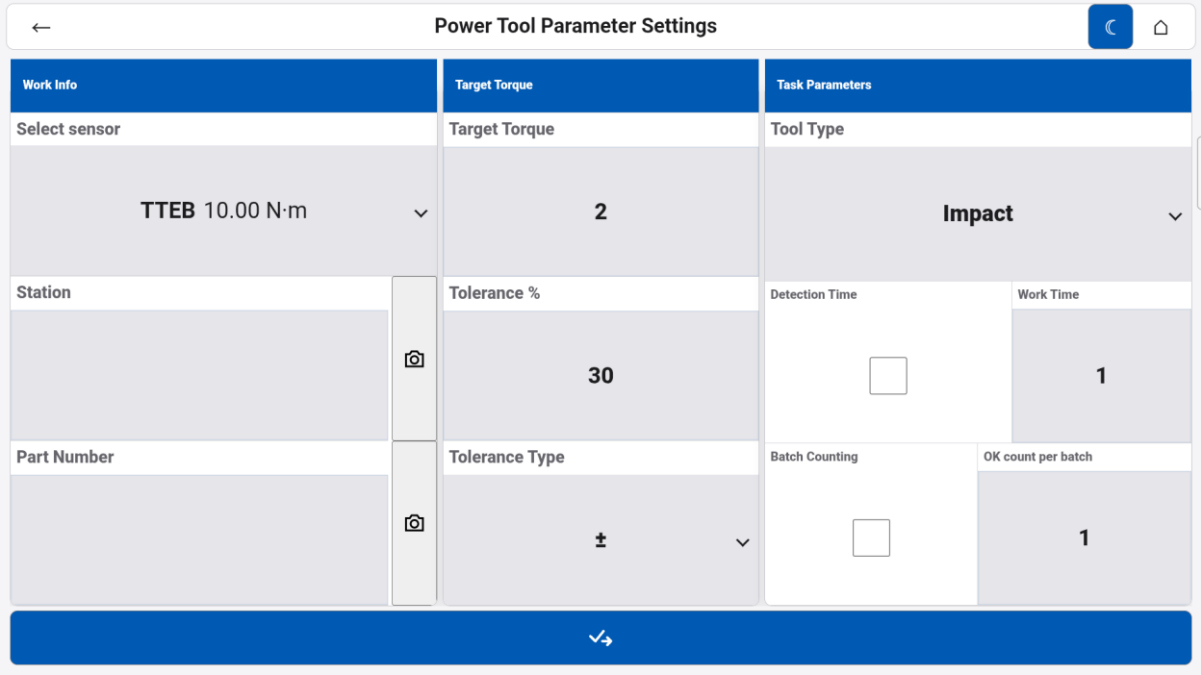


Figure 14-1 Tablet: Power Tool Parameter Settings

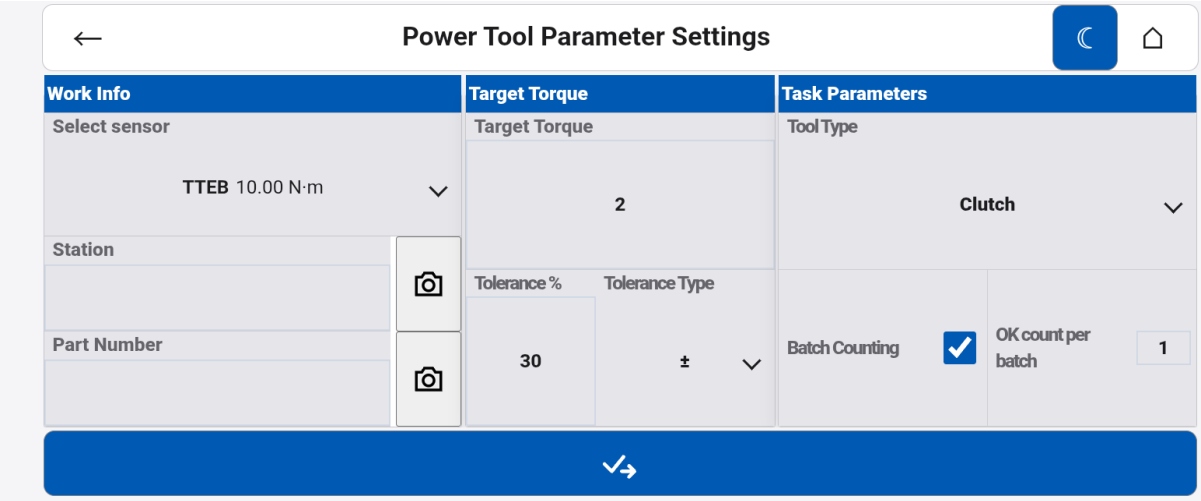


Figure 14-1 Phone: Power Tool Parameter Settings

Field (Task Parameters)	Description	Limits
Tool Type	"Pulse", "Impact" or "Clutch", chosen according to the actual tool.	Default is "Pulse".
Detection Time	Check to enable the work-time reminder (Pulse and Impact only).	Not checked by default.
Work Time	Work time used for the reminder (seconds; up to 3 decimal places).	0 or more; not shown for Clutch.
Batch Counting / OK count per batch	Same as Chapter 11.	—

This mode does not provide settings for the multiplier, pulse detection or pulse count threshold.

14.2 Choosing the Tool Type

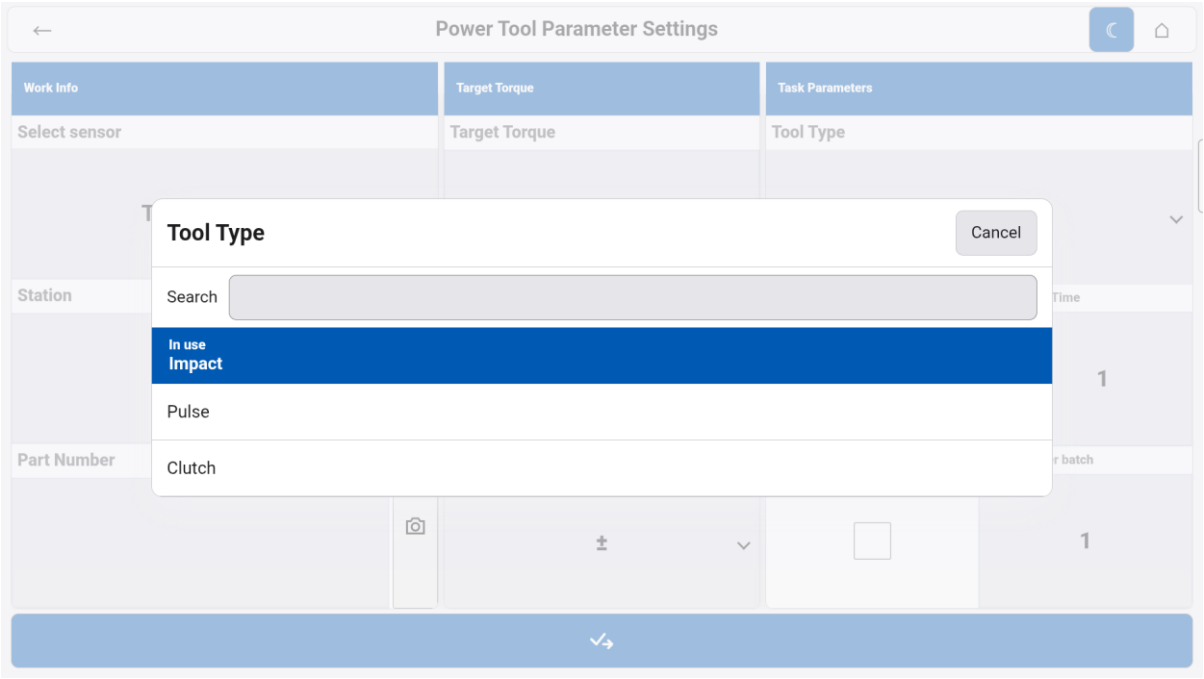


Figure 14-2 Tablet: Tool type menu

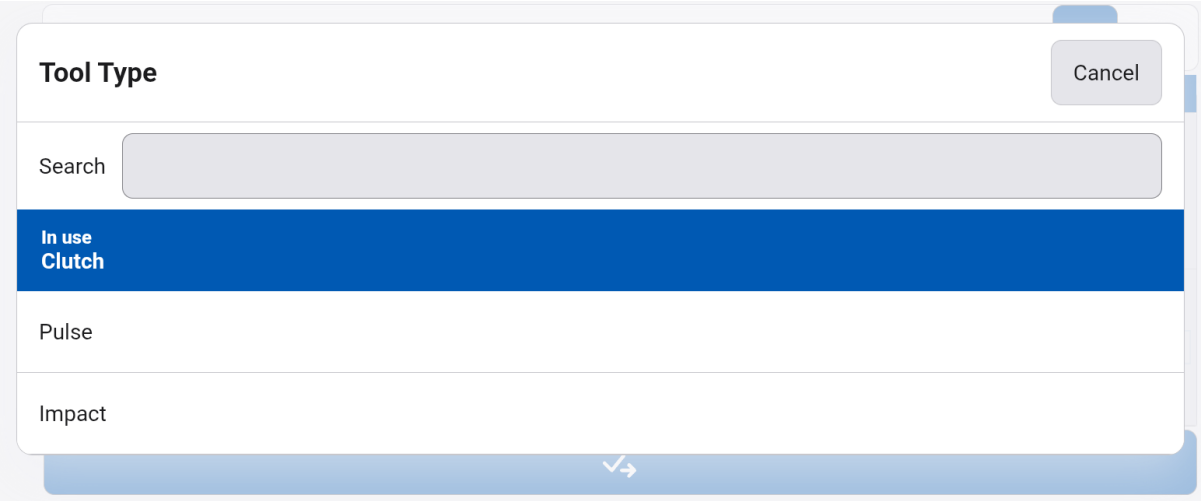


Figure 14-2 Phone: Tool type menu

1. Tap the "Tool Type" field.
2. In the pop-up, tap "Pulse", "Impact" or "Clutch"; tap "Cancel" to leave it unchanged.
3. When "Clutch" is selected, the "Detection Time" and "Work Time" fields are hidden.
4. After checking the remaining parameters, tap the button at the bottom to enter work.

14.3 Work Screen

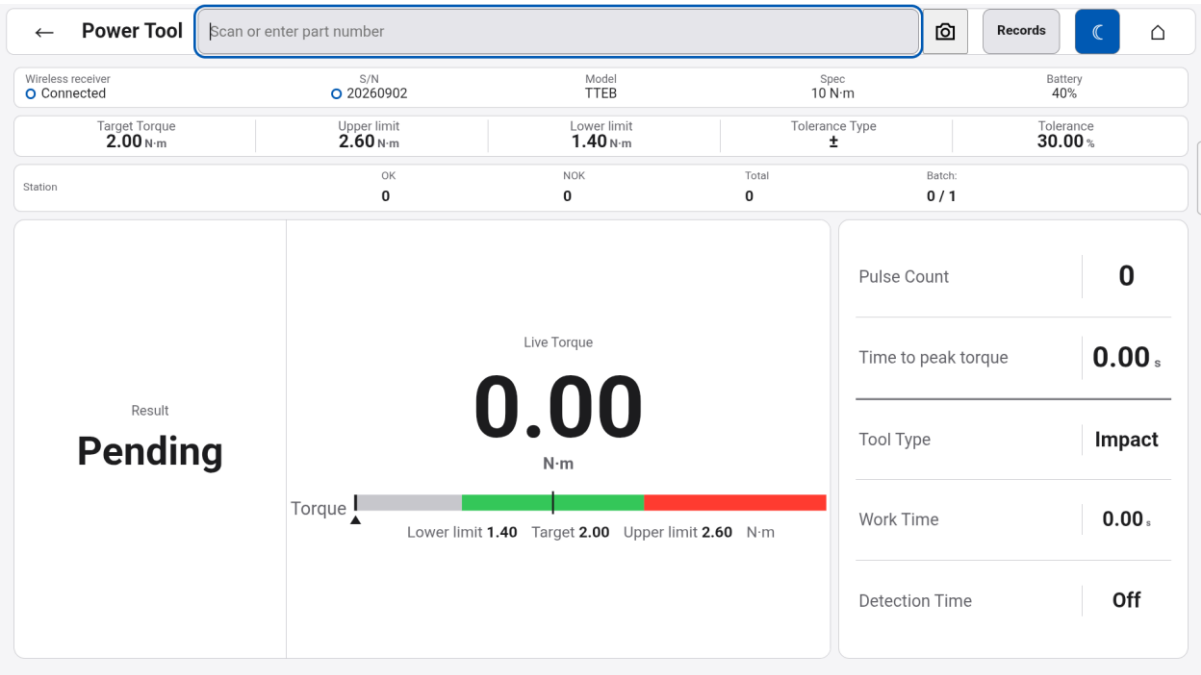


Figure 14-3 Tablet: Power Tool work screen

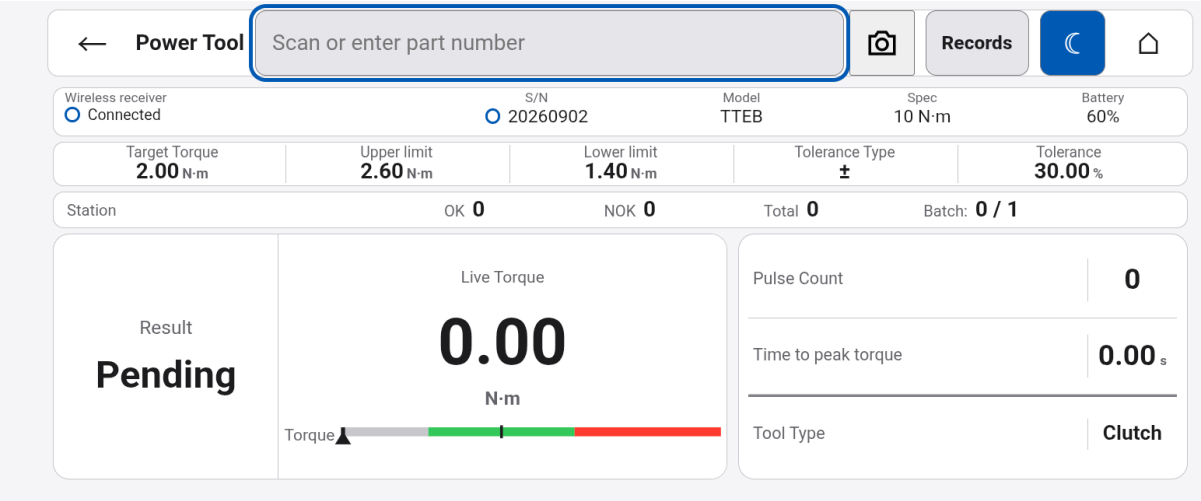


Figure 14-3 Phone: Power Tool work screen

Shown	Description
Live Torque / Max Torque (main reading)	The current torque data; after the result, the label changes to "Max Torque" and the peak of this cycle is shown.
Result	OK if the peak torque of this cycle is within the upper and lower spec limits, otherwise NOK.
Pulse Count	The highest pulse count recorded while the torque was above 0 in this cycle; pulses received after the torque returned to zero are not counted. For reference only; it does not affect the judgement. After the result, the value saved with the record is shown ("--" when no pulse count was recorded).
Time to peak torque	Seconds from the moment torque first appears until the maximum torque is reached. After the result, the value saved with the record is shown.
Tool Type	The currently configured tool type (Pulse / Impact / Clutch).

Shown	Description
Work Time	Seconds from the moment torque first appears until the torque returns to 0 (not shown for Clutch). After the result, the value saved with the record is shown.
Detection Time	Whether the work-time reminder is turned on (On / Off).
Progress band (Torque)	The pointer shows the live torque against the lower limit, target and upper limit; after the result, the maximum torque (section 12.9).
"Data Curve" (after NOK)	Opens the torque/time curve of this result (section 12.10).

Tip Work time and pulse count are operating information only and never turn a result into NOK. The curve data is saved and can be viewed in the record details, or with "Data Curve" after an NOK result (section 12.10).

14.4 Example

Example Conditions: TTEB 10 N·m, impact tool, target 5.00 N·m ±5% (4.75–5.25 N·m).

① In the parameter settings, choose "Tool Type: Impact", check "Detection Time", and enter work.

② Scan the part, start the tool, and release the trigger when tightening is complete.

③ The screen shows Max Torque 4.98 N·m, judgement OK, Pulse Count 25, Time to peak torque 11.98 s, and Work Time 12.73 s.

Chapter 15 Torque Measurement

This mode answers the question "what is the torque when the part has rotated to a specified angle?" and suits work such as residual torque checks. A sensor that outputs angle (such as TTAS) must be used. The judgement is based on the angle-point torque, not on the maximum torque of the whole process.

15.1 Parameter Settings

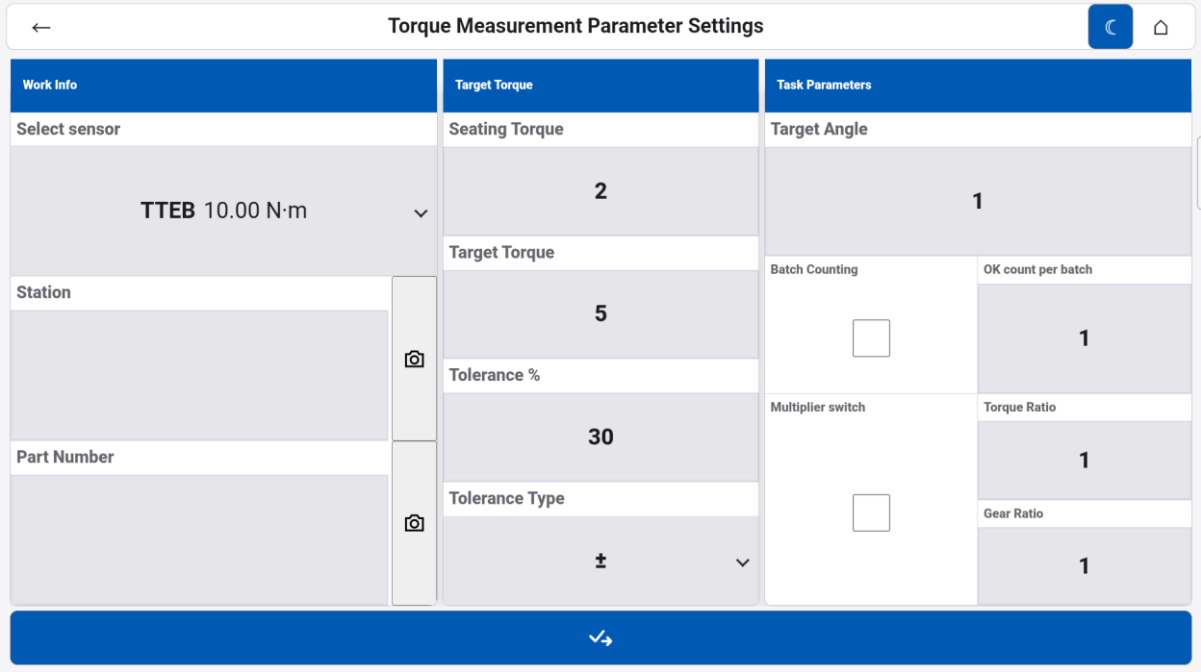


Figure 15-1 Tablet: Torque Measurement Parameter Settings

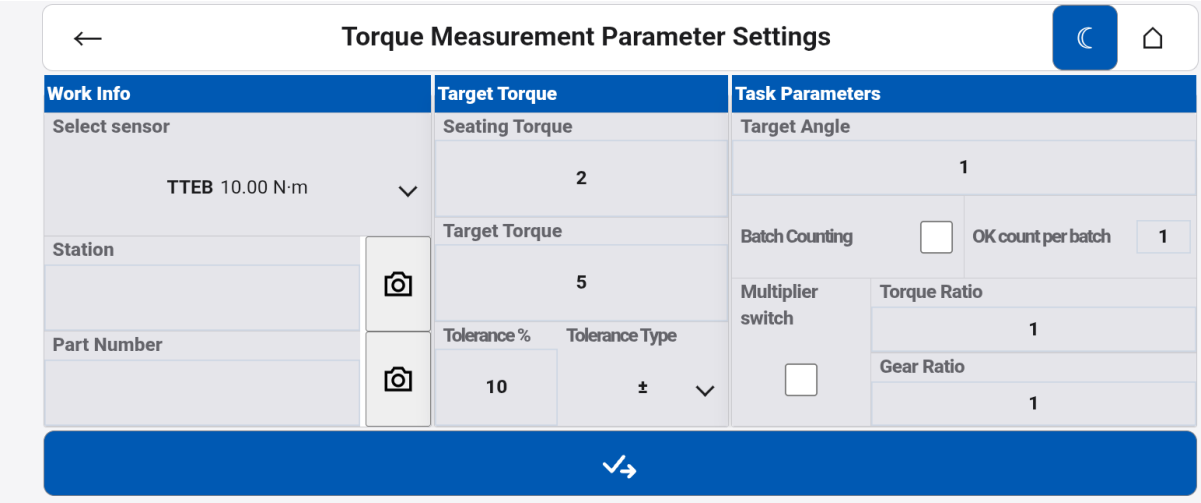


Figure 15-1 Phone: Torque Measurement Parameter Settings

Field	Description	Default and limits
Seating Torque	Angle counting starts when the torque first reaches this value.	0 or more; set to 20% of the specification when the sensor is switched. When set to 0, the raw angle of the sensor is used directly.
Target Torque / Tolerance % / Tolerance Type	The judgement range for the angle-point torque; calculated as in section 11.3.	The target must be between the minimum (10% of the sensor specification, 5% for the 10 N·m sensor) and 100%, multiplied by the torque ratio when the multiplier is checked.
Target Angle	The angle position at which the torque is read (located in the "Task Parameters" column).	1° up to the smaller of 360° and 3276.7 ÷ gear ratio.
Batch Counting / OK count per batch	Same as Chapter 11 (located in the "Task Parameters" column).	—
Multiplier switch / Torque Ratio / Gear Ratio	Set these when a torque multiplier is used.	Must be greater than 0 when checked.

15.2 Work Screen

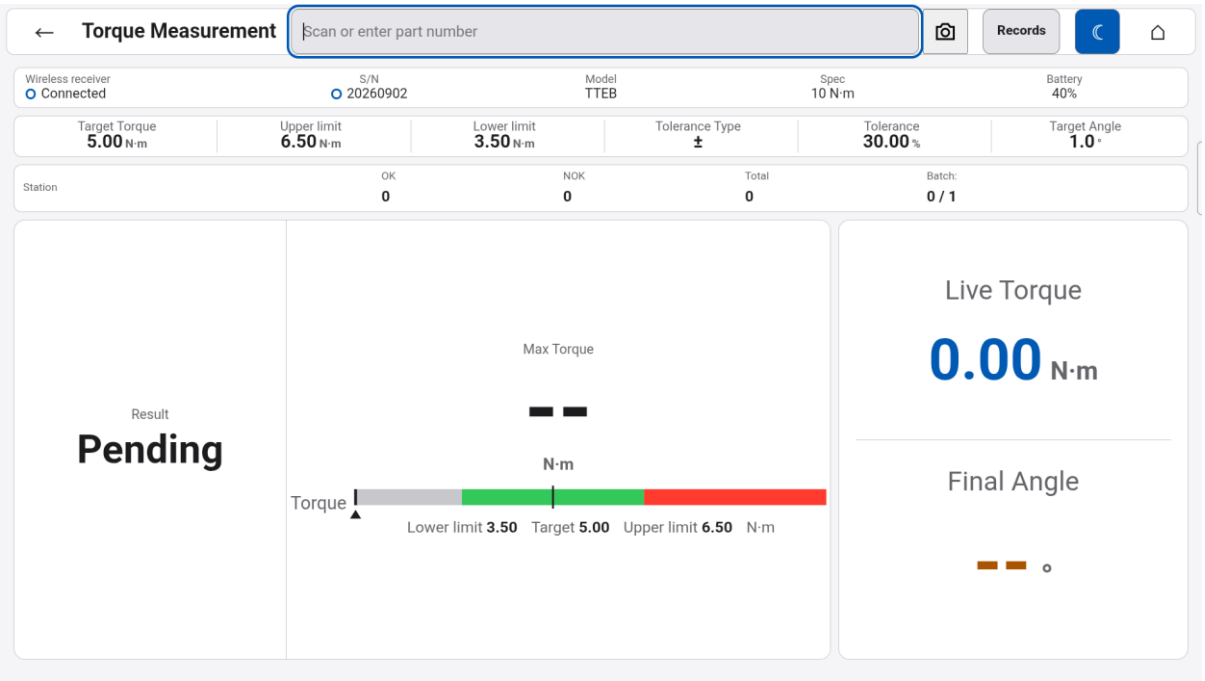


Figure 15-2 Tablet: Torque Measurement work screen

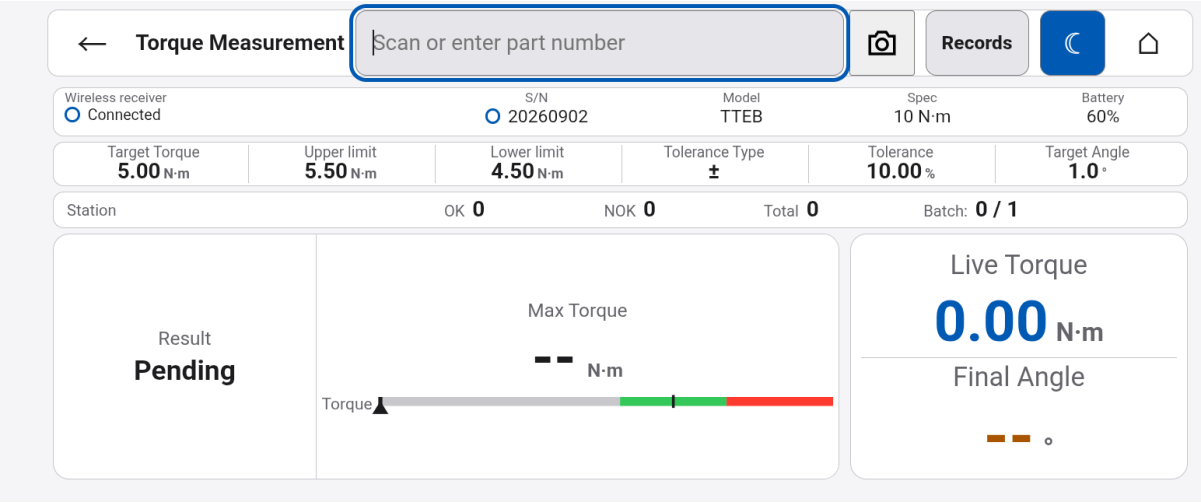


Figure 15-2 Phone: Torque Measurement work screen

Shown	Description
Max Torque (main reading)	The peak torque of the current cycle, for reference only; it is not used for the judgement.
Final Angle (beside the main reading, after the result)	The maximum angle reached in this cycle (counted from the seating torque threshold).
Angle-point Torque (side card)	The torque when rotated to the target angle, used for the OK/NOK judgement. The row appears once the value has been obtained.
"Live Torque" and "Final Angle" (side card, during a measurement)	The peak torque and the maximum angle of the current cycle, for reference.
Progress band (Torque)	The pointer shows the peak torque against the torque limits (section 12.9). The judgement itself uses the angle-point torque.
"Data Curve" (after NOK)	Opens the torque/angle curve of this result (section 12.10).

15.3 Operating Steps

1. Make sure the selected sensor can output angle, and set the seating torque, target torque, tolerance and target angle.
2. Enter the work screen and scan the part number.
3. Apply force so that the torque exceeds the seating torque, keep rotating past the target angle, then release completely.
4. Wait for the result: "Angle-point Torque" appears on the side card and OK/NOK is judged from it; the main reading shows "Max Torque".

15.4 Angle-point Torque Calculation Example

Example Target angle 5°; the two nearest data points are 4° → 20 N·m and 6° → 24 N·m.

Angle-point torque = 20 + (24 – 20) × (5 – 4) ÷ (6 – 4) = 22 N·m.

If a data point falls exactly at 5°, the torque of that point is used directly.

The seating torque was not reached, the rotation did not go beyond the target angle, there is no valid data before and after the target angle, or the angle-point torque is less than or equal to "half of the lower spec limit".

Check the conditions and measure the same part again.

Chapter 16 Torque & Angle

After the torque reaches the "Seating Torque", the rotation angle starts to be counted. You can choose "Live Angle" (angle control) or "Live Torque" (torque control) as the judgement method. A sensor that outputs angle (such as TTAS) must be used.

16.1 Parameter Settings

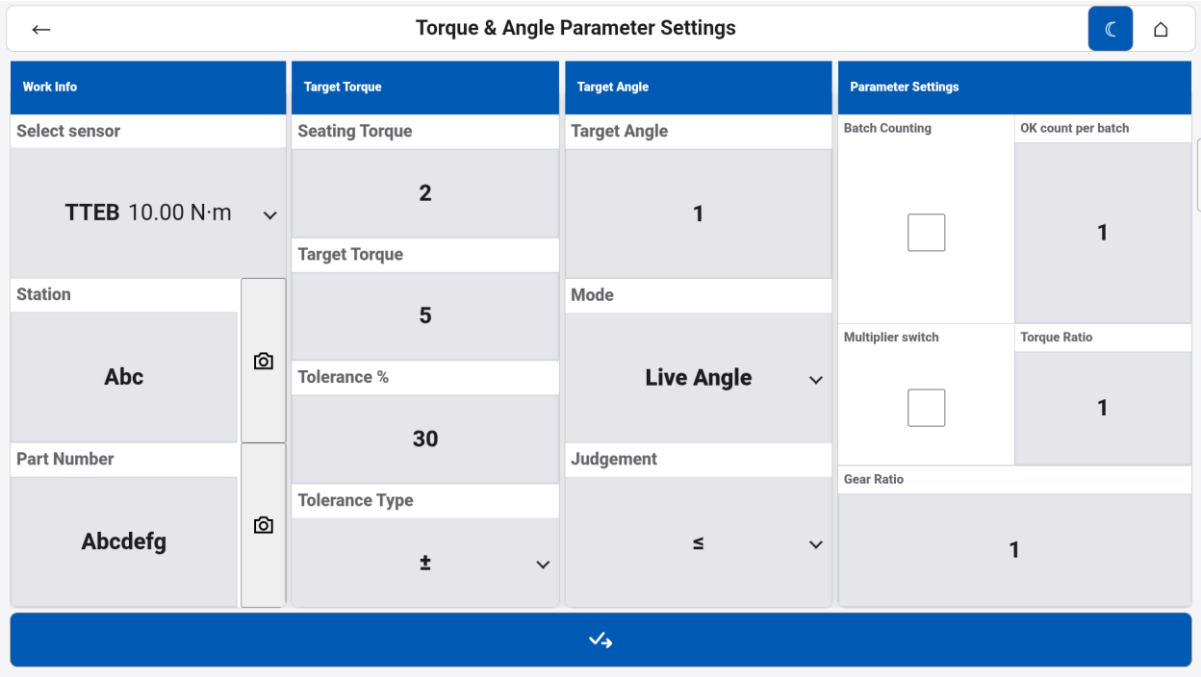


Figure 16-1 Tablet: Torque & Angle Parameter Settings

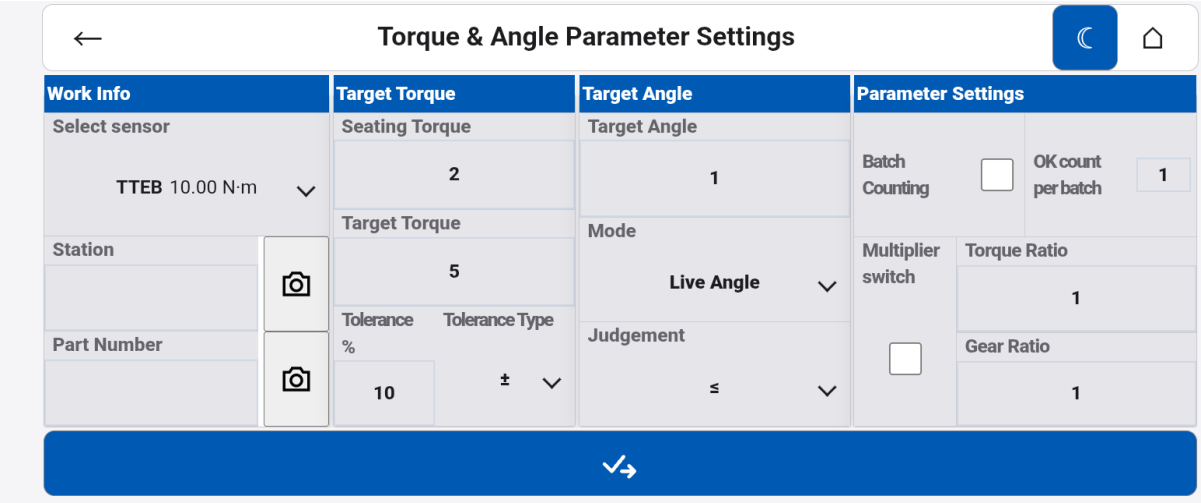


Figure 16-1 Phone: Torque & Angle Parameter Settings

Field	Description	Default and limits
Seating Torque	Angle accumulation starts when the torque first reaches this value.	0 or more; set to 20% of the specification when the sensor is switched.
Target Torque / Tolerance % / Tolerance Type	The torque judgement range (used in torque control), also shown as the work spec.	The target must be between the minimum (10% of the sensor specification, 5% for the 10 N·m sensor) and 100%, multiplied by the torque ratio when the multiplier is checked.
Target Angle	The reference for the angle judgement.	1° up to the smaller of 360° and 3276.7 ÷ gear ratio.
Mode	"Live Angle" (angle control) or "Live Torque" (torque control).	Default is "Live Angle".
Judgement	Live Angle: "≥" or "≤"; Live Torque: "±" or "≥".	Reset when the mode is switched: "≥" for Live Angle, "±" for Live Torque.
Angle Range	Shown only in "Live Torque" mode; the reference range for the angle (degrees).	0 or more.
Batch Counting / OK count per batch, Multiplier switch / Torque Ratio / Gear Ratio	Same as Chapter 11.	—

16.2 Choosing the Mode and Judgement

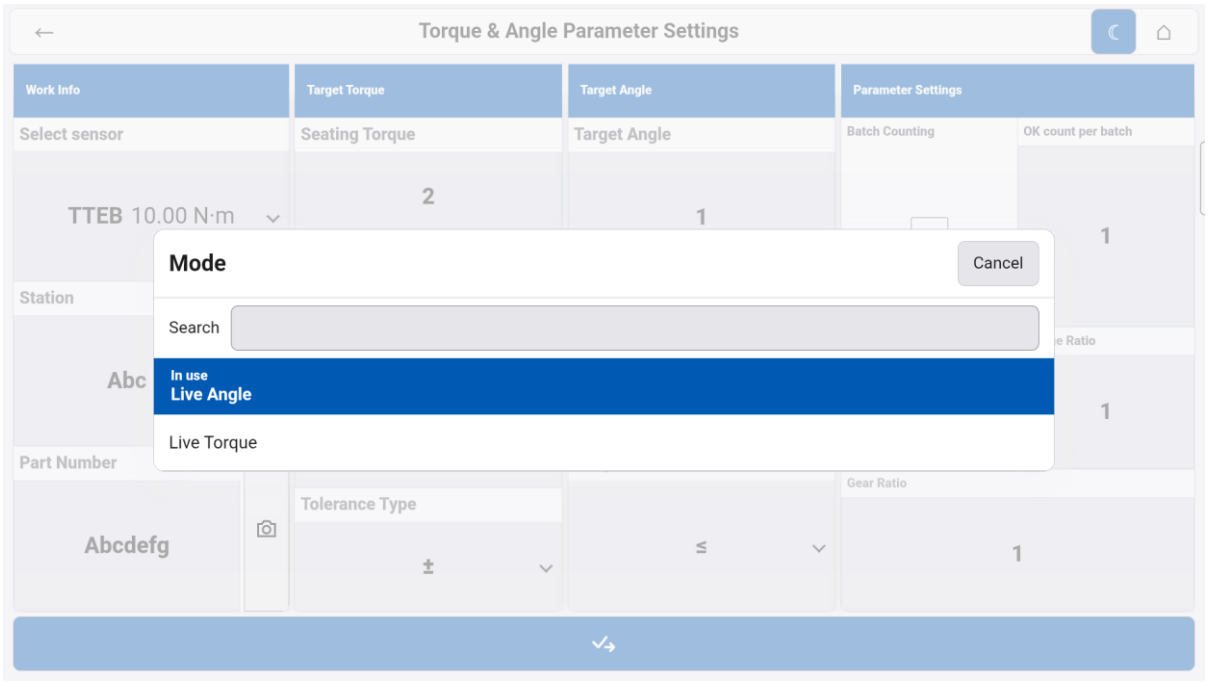


Figure 16-2 Tablet: Mode menu (Live Angle / Live Torque)

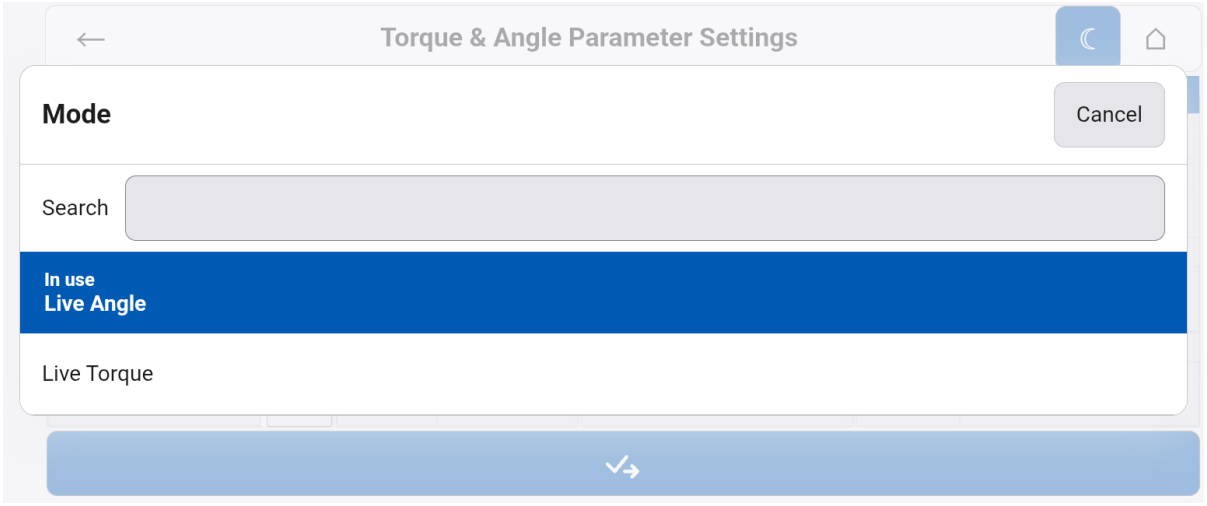


Figure 16-2 Phone: Mode menu (Live Angle / Live Torque)

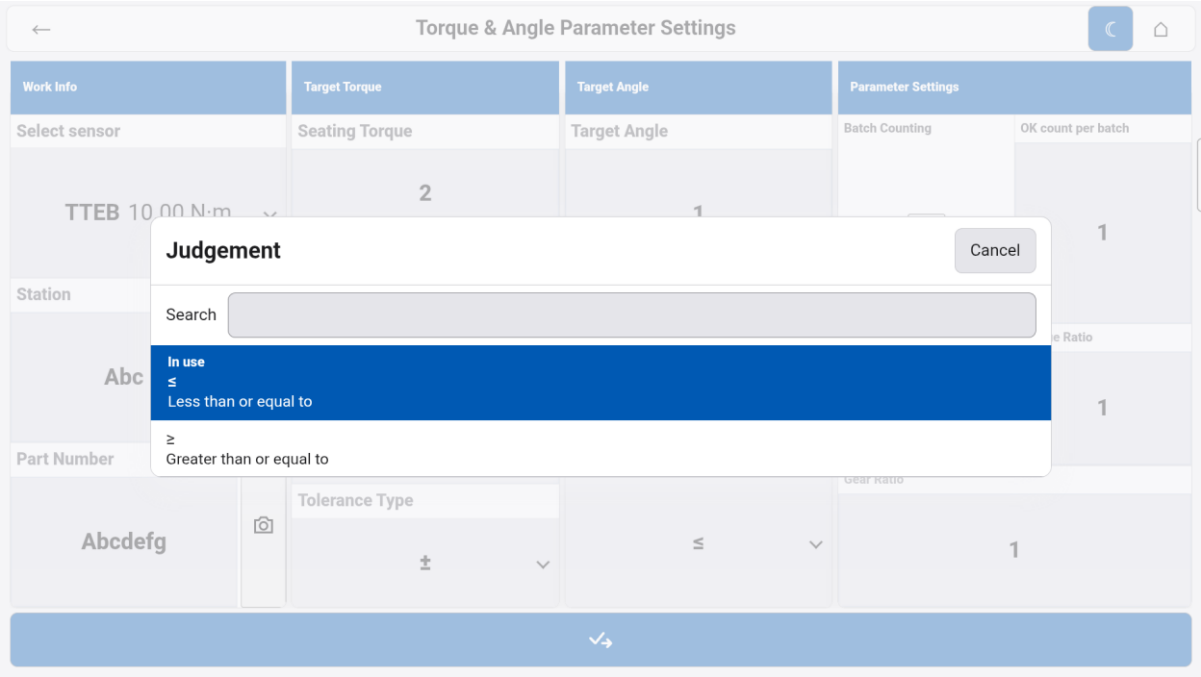


Figure 16-3 Tablet: Judgement menu (angle mode: ≥ greater than or equal to / ≤ less than or equal to)

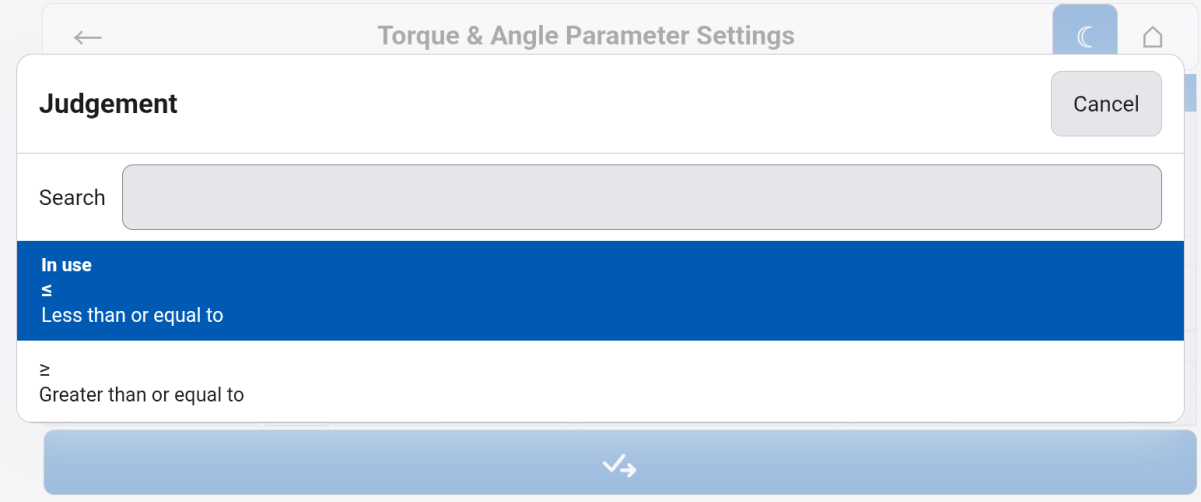


Figure 16-3 Phone: Judgement menu (angle mode: ≥ greater than or equal to / ≤ less than or equal to)

1. Tap the "Mode" field and choose "Live Angle" or "Live Torque".
2. Tap the "Judgement" field and choose the applicable condition. The descriptions in the menu (greater than or equal to, less than or equal to, tolerance range) help identify each option.
3. For "Live Torque", enter the reference range for the angle in "Angle Range".
4. After checking, tap the button at the bottom to enter work.

16.3 Judgement Rules

Mode	Judgement method	Example (target 90°, target torque 50 N·m ±5%)
Live Angle + "≥"	OK if the maximum valid angle of this cycle ≥ the target angle.	Rotated to 92.4° → OK; 85.0° → NOK.
Live Angle + "≤"	OK if the maximum valid angle of this cycle ≤ the target angle.	Rotated to 85.0° → OK; 92.4° → NOK.
Live Torque + "±" or "≥"	OK if the peak torque is within the upper and lower torque limits; the angle is still shown and saved but does not affect the judgement.	Peak 48.72 N·m (±) → OK.

> **Tip** Angle is counted only from the moment the torque first reaches the "Seating Torque"; rotation before that is not counted. For example, with a seating torque of 5 N·m, the angle turned while the torque rises from 0 to 5 N·m is not counted.

16.4 Parameter Settings on Small Screens

When the available screen width is 700 CSS pixels or less, the "Parameter Settings" column of Torque & Angle (batch and multiplier) collapses into a "Parameter Settings" button: tap the button to open the full-screen settings (Figure 16-4), tap "Back" after making changes, then tap the button at the bottom to save everything together. The other three modes do not collapse.

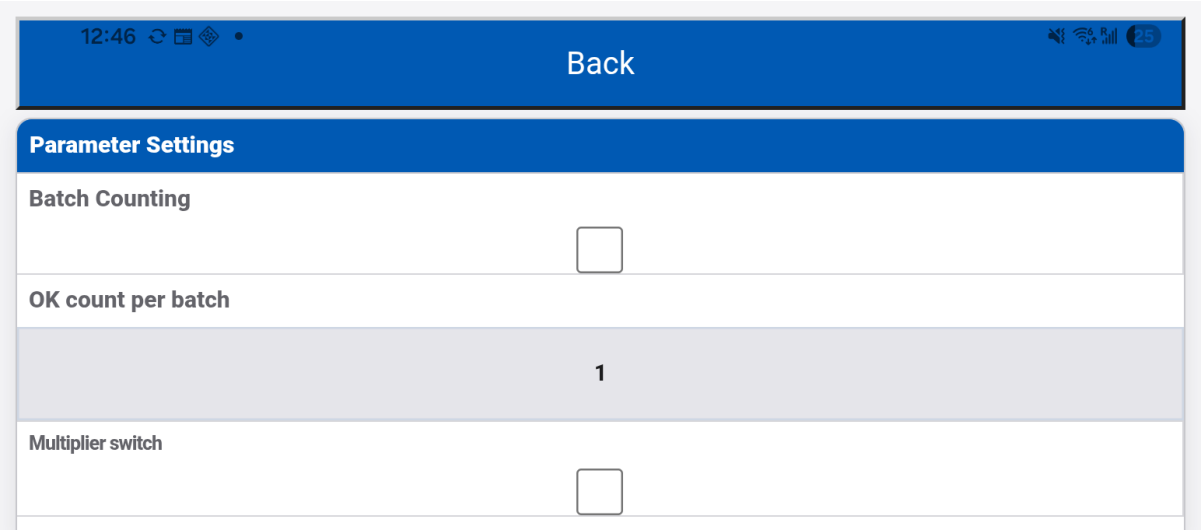


Figure 16-4 Phone: parameter settings pop-up on a narrow screen or with a larger display size

16.5 Work Screen

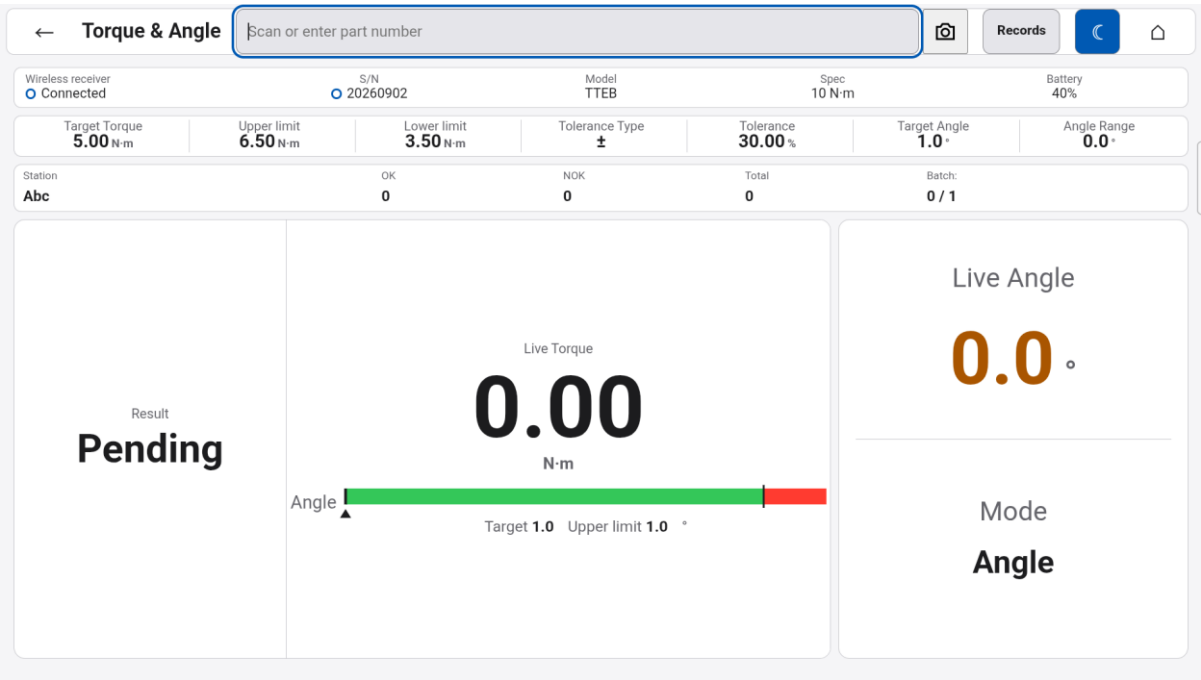


Figure 16-5 Torque & Angle work screen (tablet)

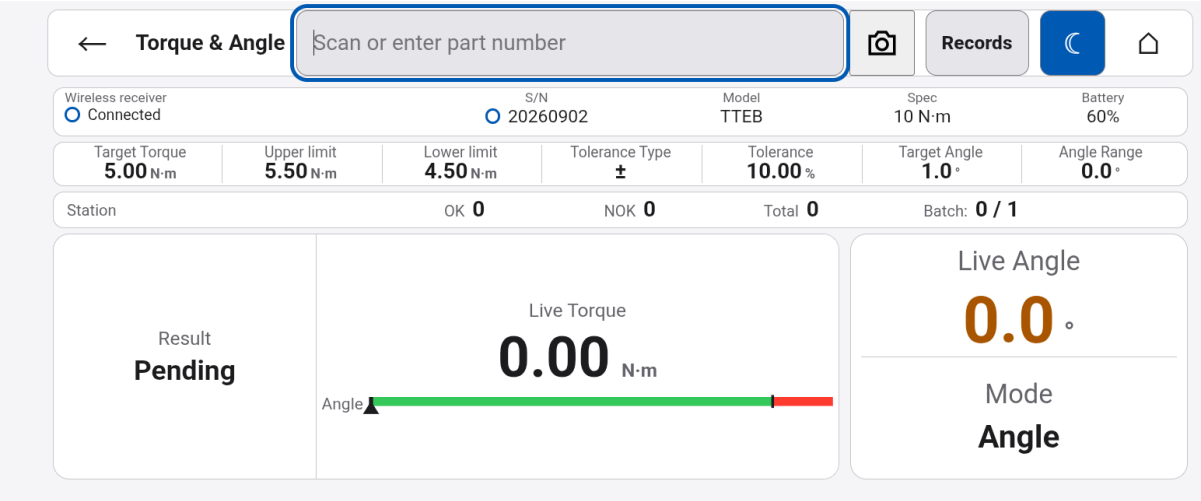


Figure 16-5 Torque & Angle work screen (phone)

Shown	Description
Live Torque / Max Torque (main reading)	The peak torque of the current cycle; the label changes to "Max Torque" after the result.
Live Angle (side card, during a measurement)	The angle accumulated from the seating torque threshold.
Mode	The current judgement method, shown as "Angle" or "Torque". During a measurement it is on the side card; after the result it is shown with the readings in the result card.
Final Angle (in the result card, after the result)	The maximum valid angle of this cycle.
Progress band	"Angle" when the mode is "Live Angle", "Torque" when the mode is "Live Torque" (section 12.9).
"Data Curve" (after NOK)	Opens the torque/angle curve of this result (section 12.10).

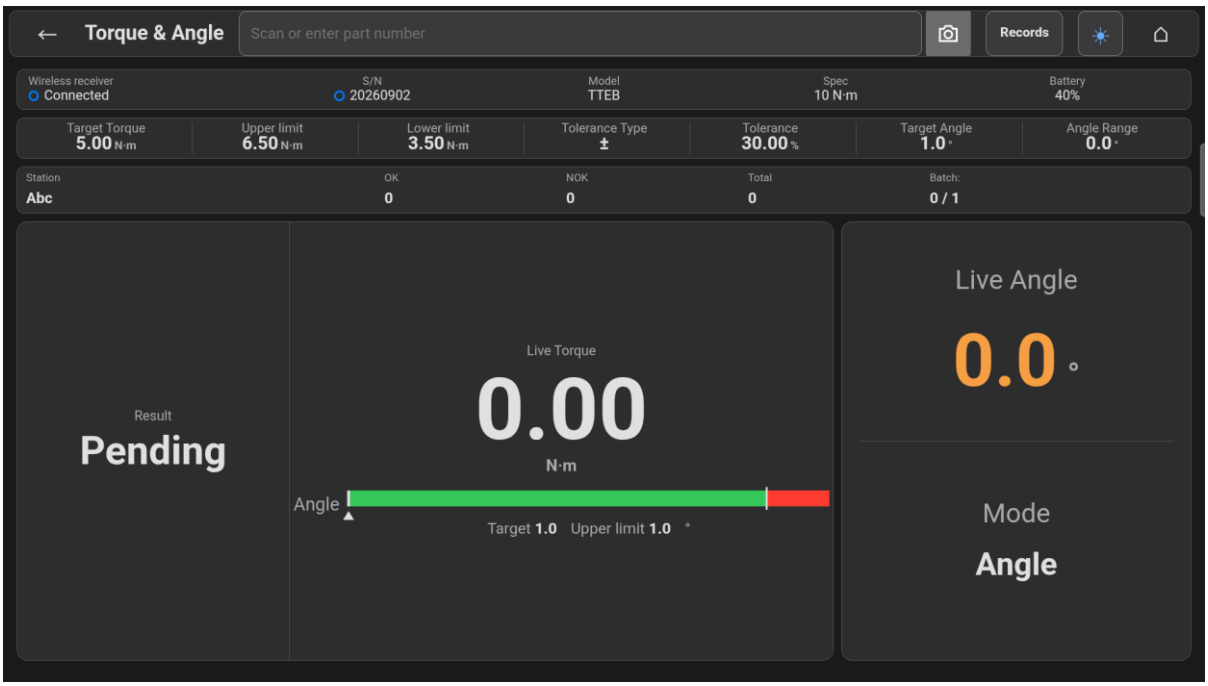


Figure 16-6 Torque & Angle work screen in dark mode (tablet)

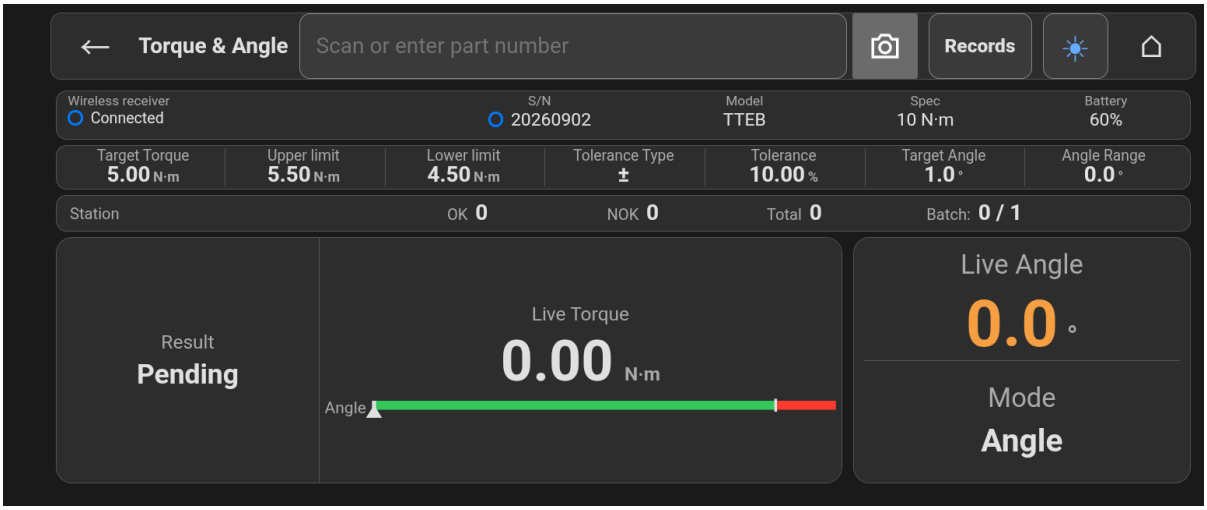


Figure 16-6 Torque & Angle work screen in dark mode (phone)

16.6 Example

Example Conditions: TTAS 180 N·m, seating torque 5 N·m, target angle 90°, mode "Live Angle", judgement "≥".

① Scan the part WP-DEMO-001.

② Apply force until it exceeds 5 N·m and keep rotating; "Live Angle" on the screen starts to accumulate.

③ Rotate to 92.4°, then release completely; the judgement is OK (92.4° ≥ 90°).

Chapter 17 Batch Jobs

Batch Jobs combine several work steps into one process (called a "job"). Each step can use a different work mode, sensor, target value and OK count; when a step reaches its specified number of OK results, the system switches automatically to the next step and makes the receiver follow the wireless channel of that step's sensor.

17.1 Job List

Path: main menu → "Batch Jobs".

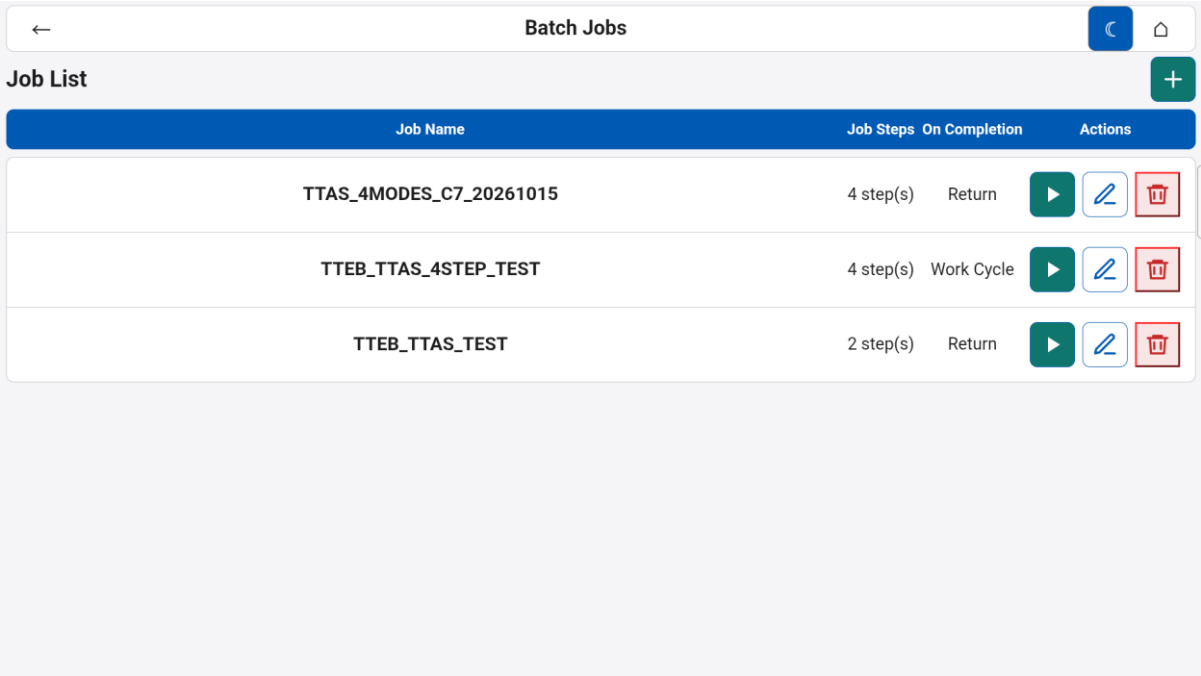


Figure 17-1 Batch Jobs job list (tablet)

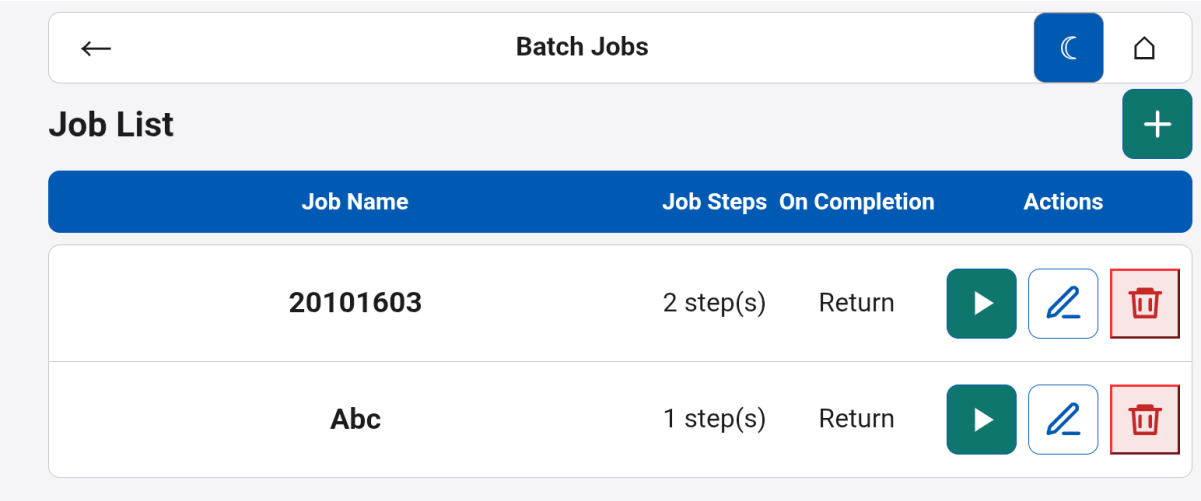


Figure 17-1 Batch Jobs job list (phone)

Area / button	Description
Group buttons	Shown only when the device has a non-default group; after switching, the list shows only the jobs of that group. This version's screens have no operation for creating groups.
"+" at the top right	Add a job (under the current group).
Job Name / Job Steps / On Completion / Actions	Each row shows the job name, the number of steps (for example "2 step(s)") and the completion action (Return or Work Cycle).
"▶" (green)	Start running the job and enter the batch work screen.
"✎" (blue outline)	Edit the job and its step settings.
"🗑" (red outline)	Delete the job (a confirmation dialog is shown first).

Deleting a job

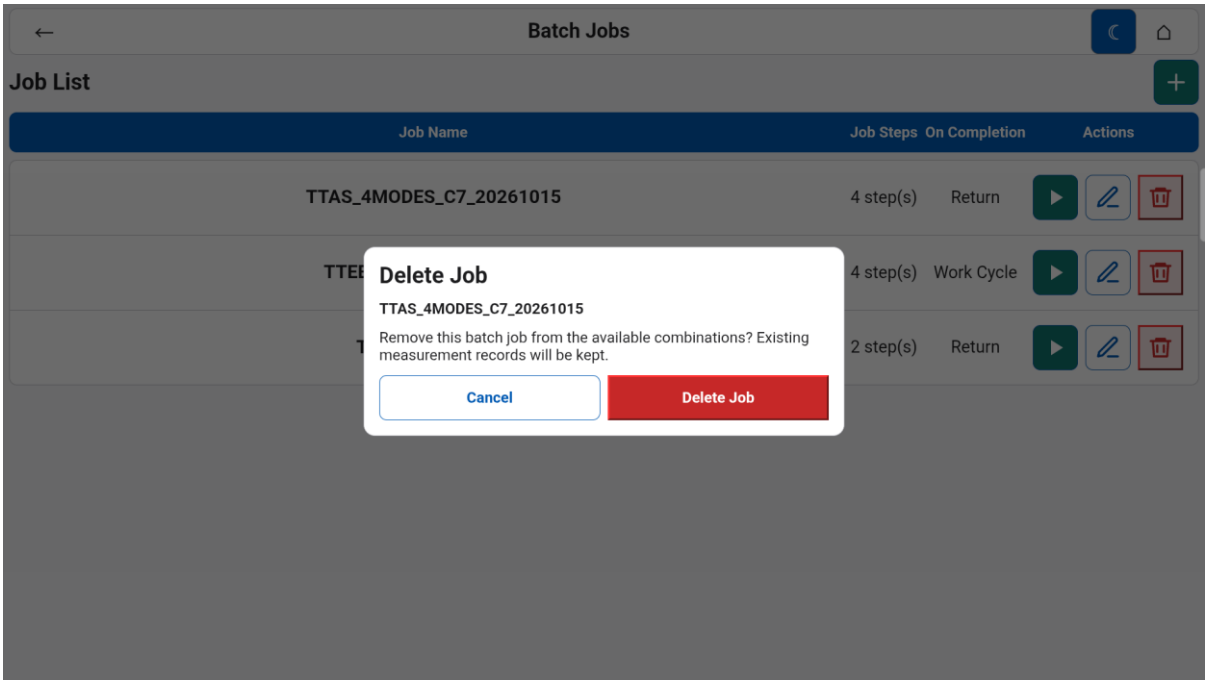


Figure 17-2 Delete job confirmation dialog (tablet)

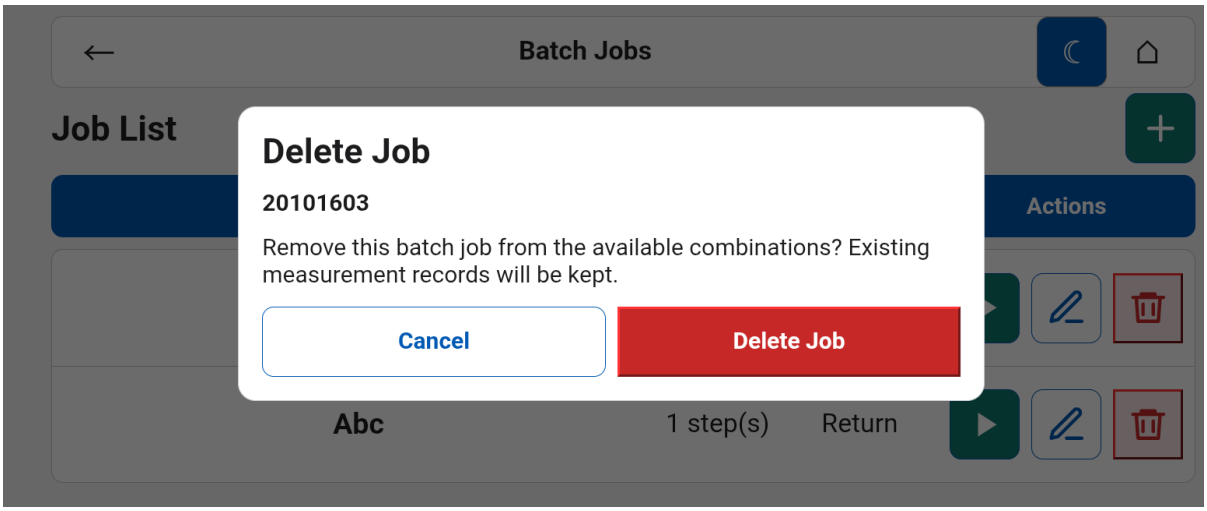


Figure 17-2 Delete job confirmation dialog (phone)

1. Tap the red trash can on that row.
2. The confirmation dialog shows "Remove this batch job from the available combinations? Existing measurement records will be kept."
3. Tap "Delete Job" to confirm, or tap "Cancel" to abort.

> **Tip** Deleting a job only removes it from the list; records previously measured with that job are kept and can be found in Records and export.

17.2 Adding and Editing a Job

Tap "+" to add, or tap "✎" to edit; this opens the "Batch Job Parameter Settings" screen.

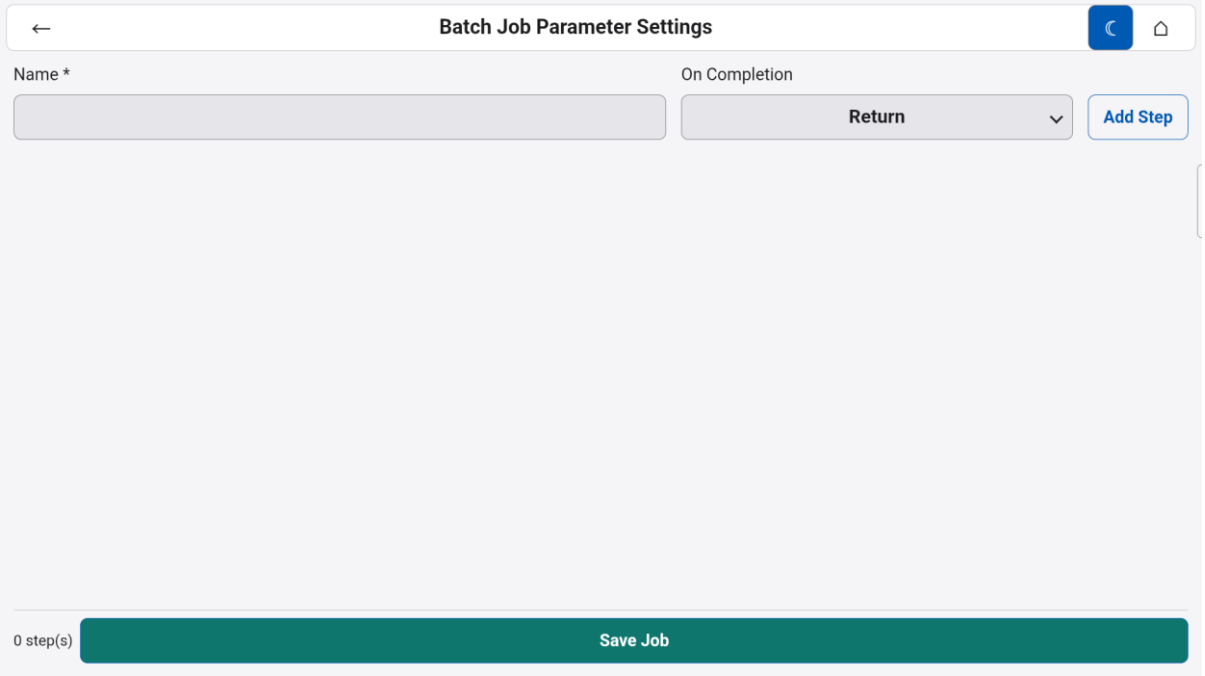


Figure 17-3 New job (no steps added yet) (tablet)

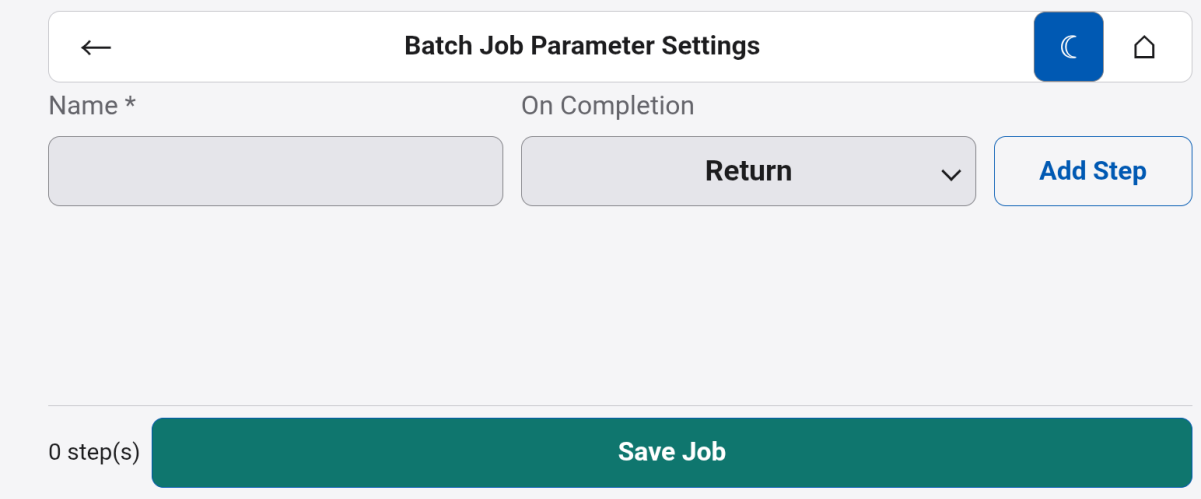


Figure 17-3 New job (no steps added yet) (phone)

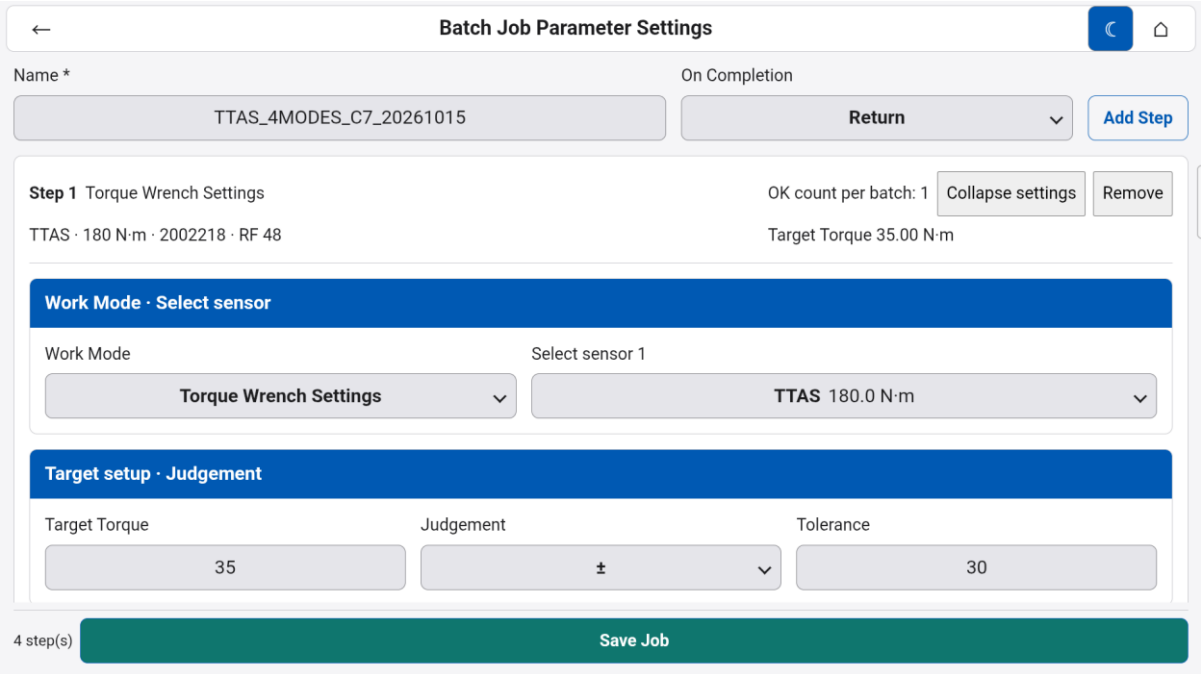


Figure 17-4 Editing a job: step 1 expanded (tablet)

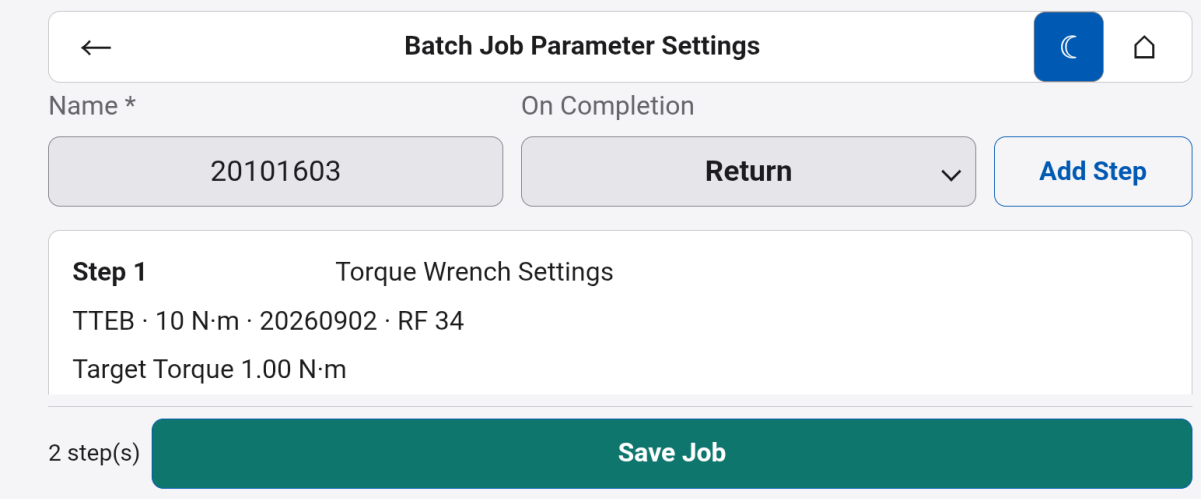


Figure 17-4 Editing a job: step 1 expanded (phone)

Job-level fields

Field / button	Description	Limits
Name *	The job name, for example "Standard Job".	Required, up to 64 characters.
On Completion	"Return" or "Work Cycle"; see section 17.5.	Default is "Return".

Field / button	Description	Limits
"Add Step" (top)	Add a new step at the end, pre-filled with the available parameter settings.	When no sensor has been paired, "Device not connected, please connect the device first" is shown.
"N step(s)" (bottom left)	The current total number of steps.	At least 1 step.
"Save Job"	Validates and saves the whole job; on success you return to the job list.	Cannot be saved while any step is invalid.

Step cards

Each step is shown as a card. When collapsed it shows a summary: the step number and mode, the sensor (model, spec, serial number, RF channel), the OK count per batch, the target torque and the target angle; on the right are the "Expand settings / Collapse settings" and "Remove" buttons. Only one step is expanded at a time.

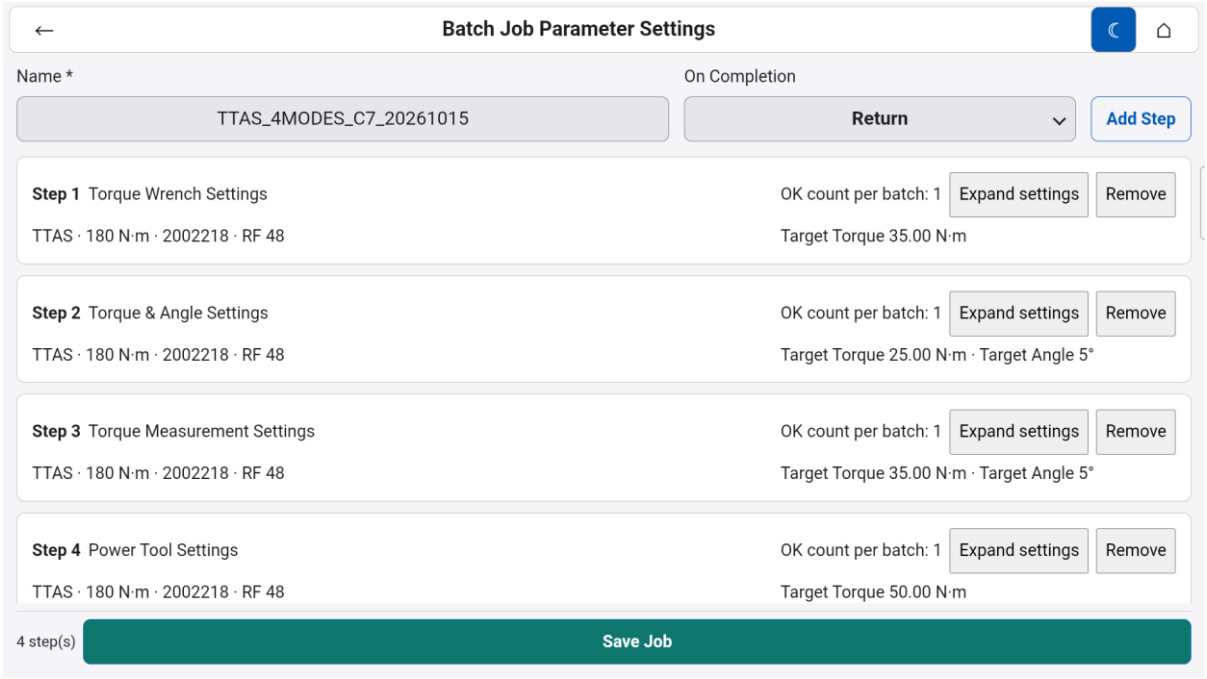


Figure 17-5 Step summary when collapsed (tablet)

Sections within a step	Field
Work Mode / Select sensor	Work Mode (Torque Wrench Settings, Torque & Angle Settings, Power Tool Settings, Torque Measurement Settings) and Select sensor.
Target settings / Judgement	Target Torque, Judgement (±/≥) and Tolerance; angle-related modes also have Target Angle; Torque & Angle also has Mode, Judgement and Angle Range.
Power Tool Settings (Power Tool only)	Tool Type, Detection Time, Work Time.
OK count per batch / Multiplier Parameter Settings	OK count per batch (the number of OK results needed in this step), Multiplier switch, Torque Ratio, Gear Ratio (Power Tool has only the OK count per batch).
Step action buttons	"Move up" and "Move down" change the order; "Add Step" duplicates this step and inserts the copy after it.

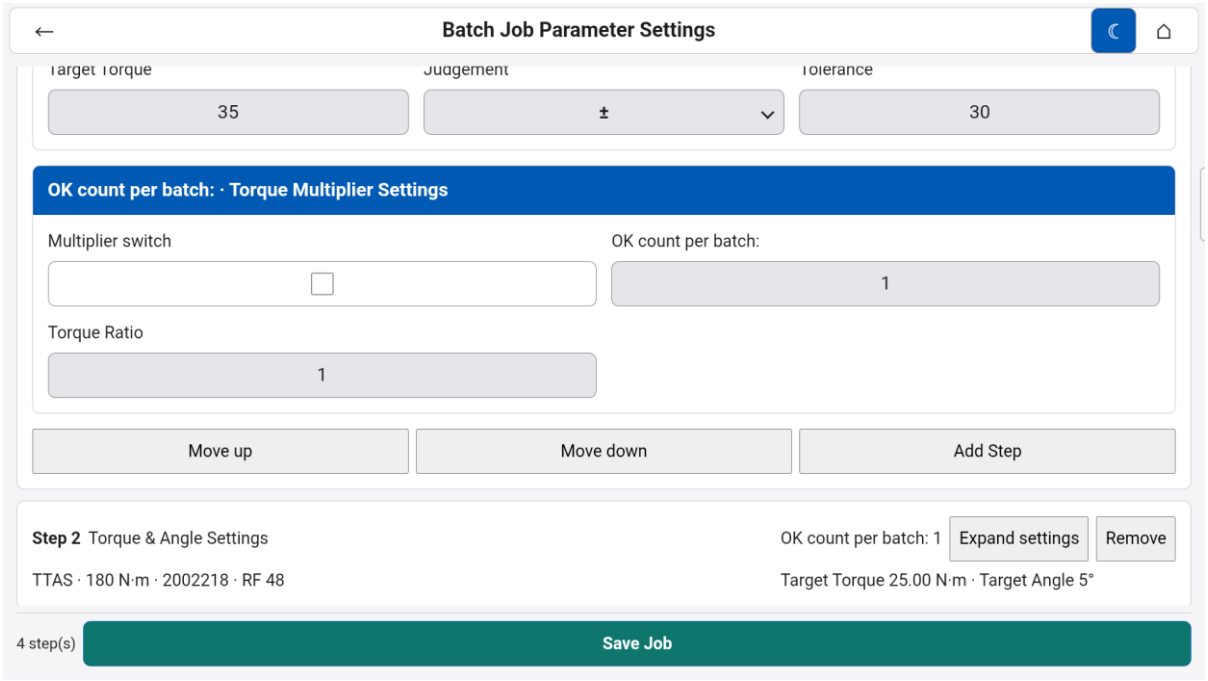


Figure 17-6 Lower part of a step: batch count and Multiplier parameters (tablet)

Menus inside a step

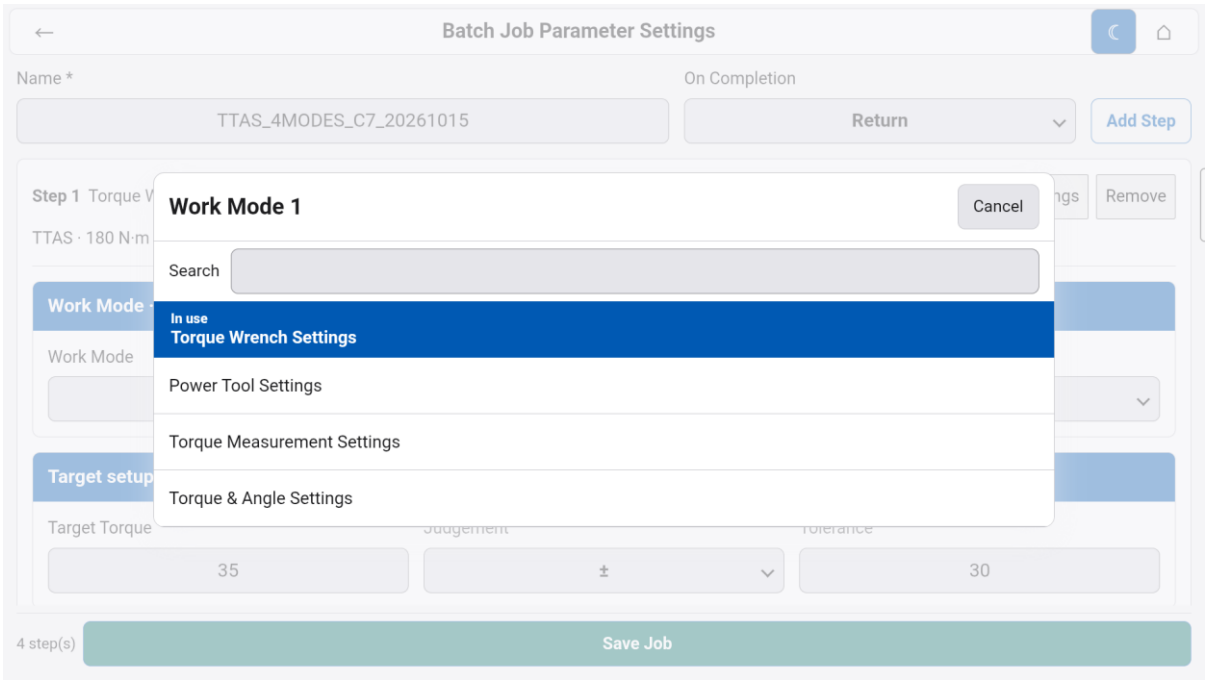


Figure 17-7 Work Mode menu of a step (tablet)

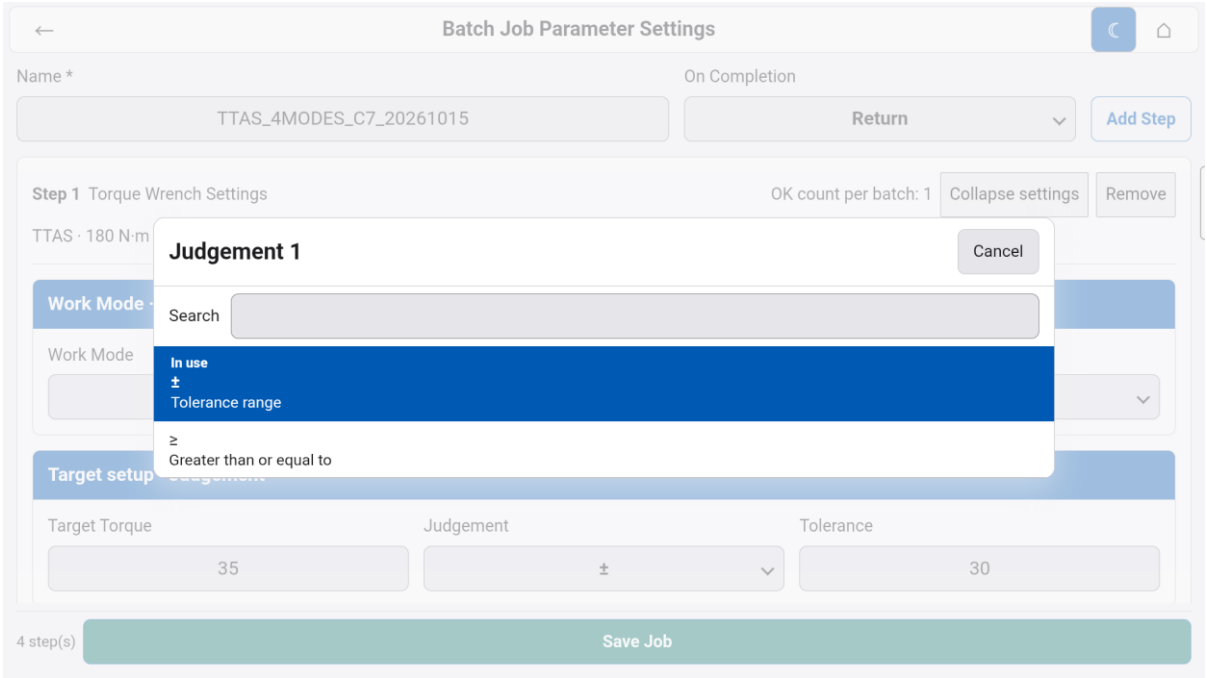


Figure 17-8 Torque judgement menu of a step (tablet)

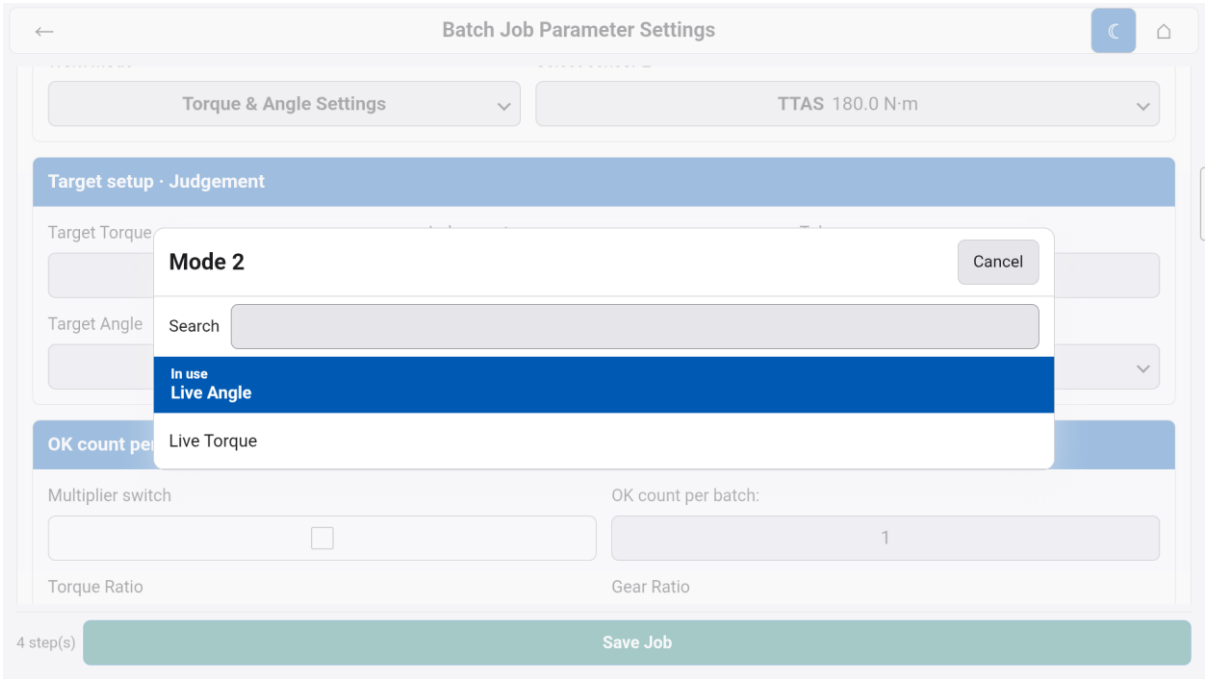


Figure 17-9 Angle control mode menu of a step (tablet)

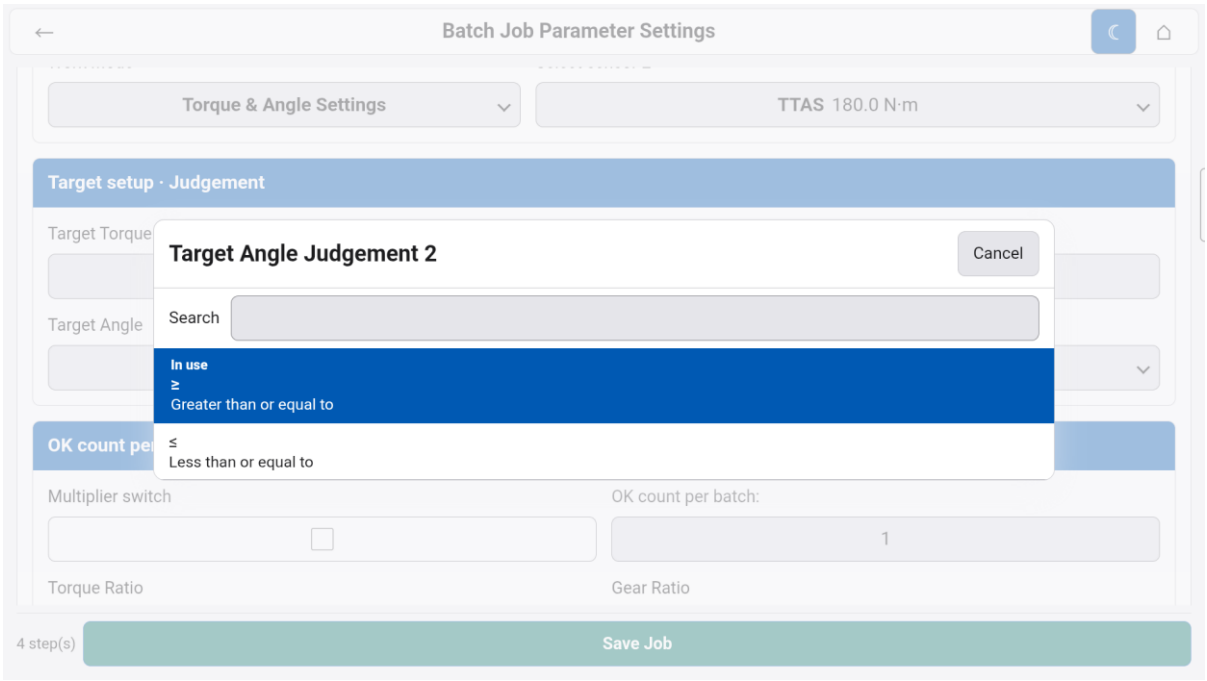


Figure 17-10 Target angle judgement menu of a step (tablet)

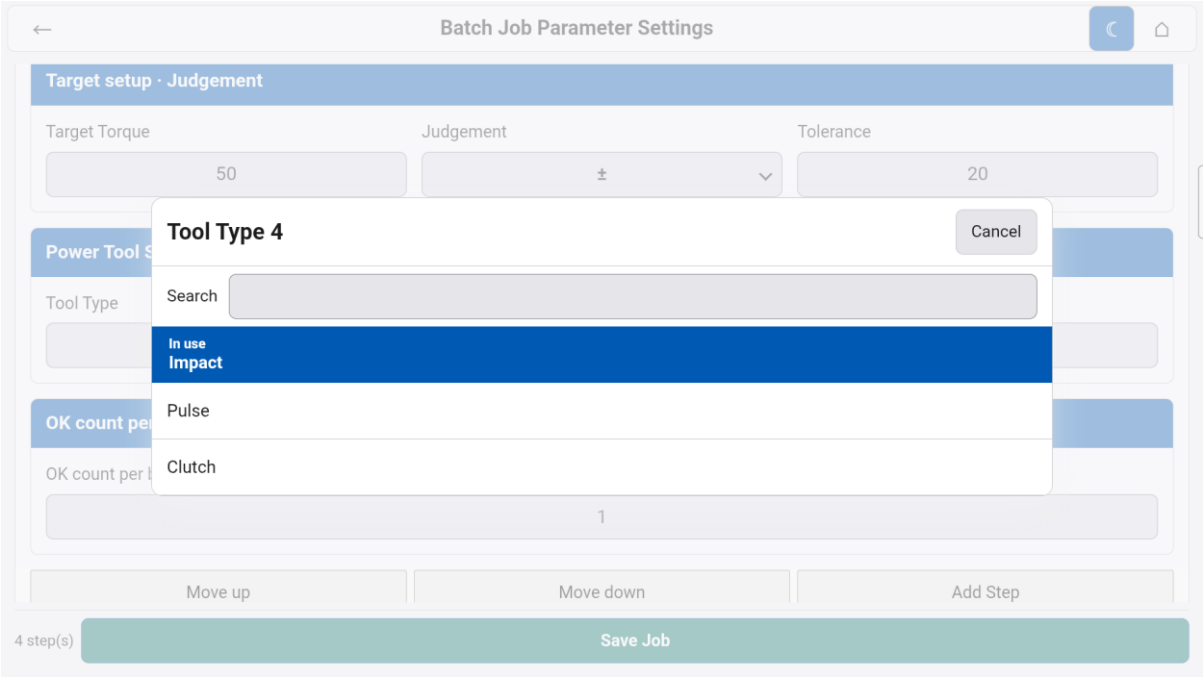


Figure 17-11 Tool Type menu of a Power Tool step (tablet)

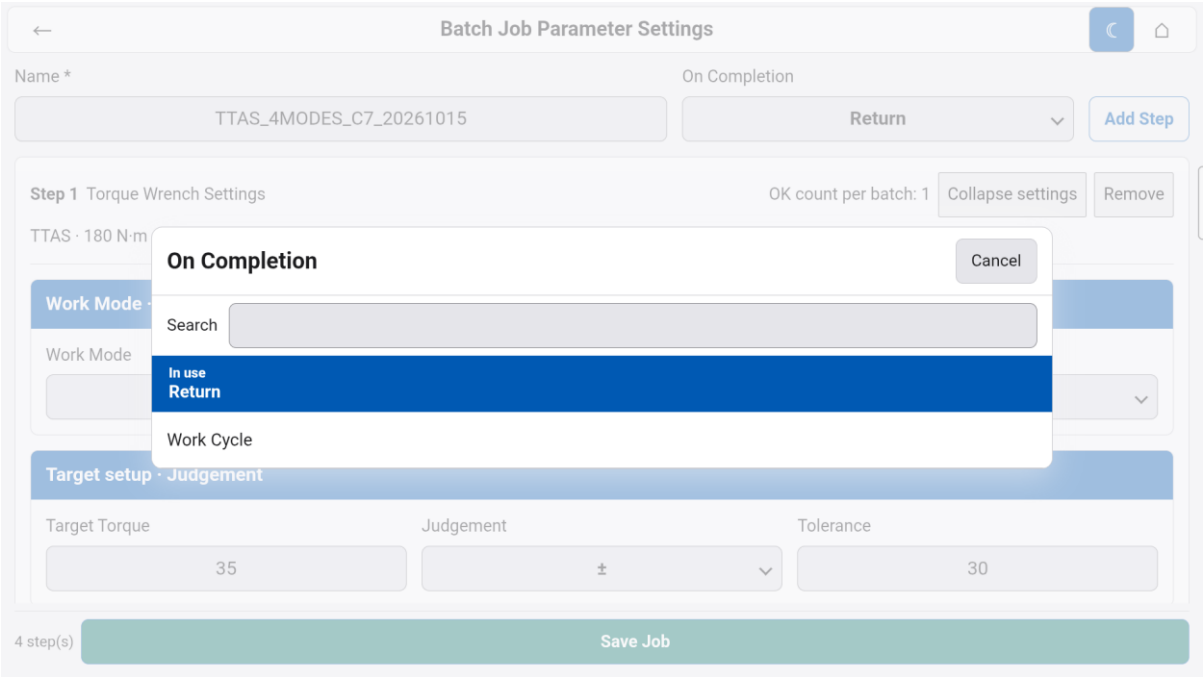


Figure 17-12 On Completion menu of a job (tablet)

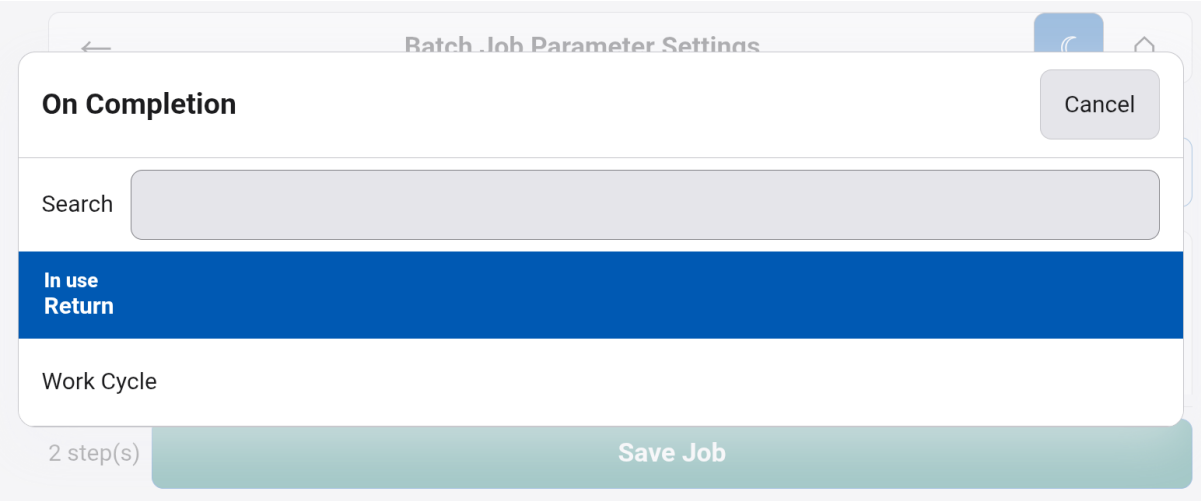


Figure 17-12 On Completion menu of a job (phone)

> **Tip** Switching "Work Mode" loads the settings of that mode, so recheck the sensor, target values and batch count; after you switch the sensor, check the target torque and seating torque again against the new specification (the target torque is set to the lowest value allowed for the new sensor, and the seating torque to 20% of the specification).

Field limits

Field	Valid range
Target Torque	Minimum (10% of the spec of the selected sensor, 5% for the 10 N·m sensor) to 100%; multiplied by the torque ratio when the multiplier is checked
Tolerance	0–99.99%
Target Angle	1° up to the smaller of 360° and 3276.7 ÷ gear ratio
Angle Range	0 or more
OK count per batch	Integer of 1 or more (this editor does not limit it to 99)
Torque Ratio, Gear Ratio	At least 0.001

17.3 Example: Creating a Two-step Job

Example Purpose: on the same part, first tighten 2 bolts with Torque & Angle, then check once with Torque Measurement.

① In the job list tap "+", enter "Angle and Measurement Two-step Job" in "Name", and choose "Return" for "On Completion".

② Tap "Add Step" → expand step 1 → choose "Torque & Angle Settings" in "Work Mode" → choose TTAS 180 N·m in "Select sensor".

③ Set Target Torque 50.00, Judgement "±", Tolerance 5, Target Angle 90, Mode "Live Angle", Judgement "≥", OK count per batch 2.

④ Tap "Add Step" on step 1 to duplicate it as step 2 → expand step 2 → change "Work Mode" to "Torque Measurement Settings" → check the sensor and target values → OK count per batch 1.

⑤ Tap "Save Job", return to the list and confirm that "2 step(s)" is shown.

17.4 Running a Batch Job

In the job list, tap the green "▶" to start; the system prepares the receiver and sensor according to the first step and then enters the batch work screen.

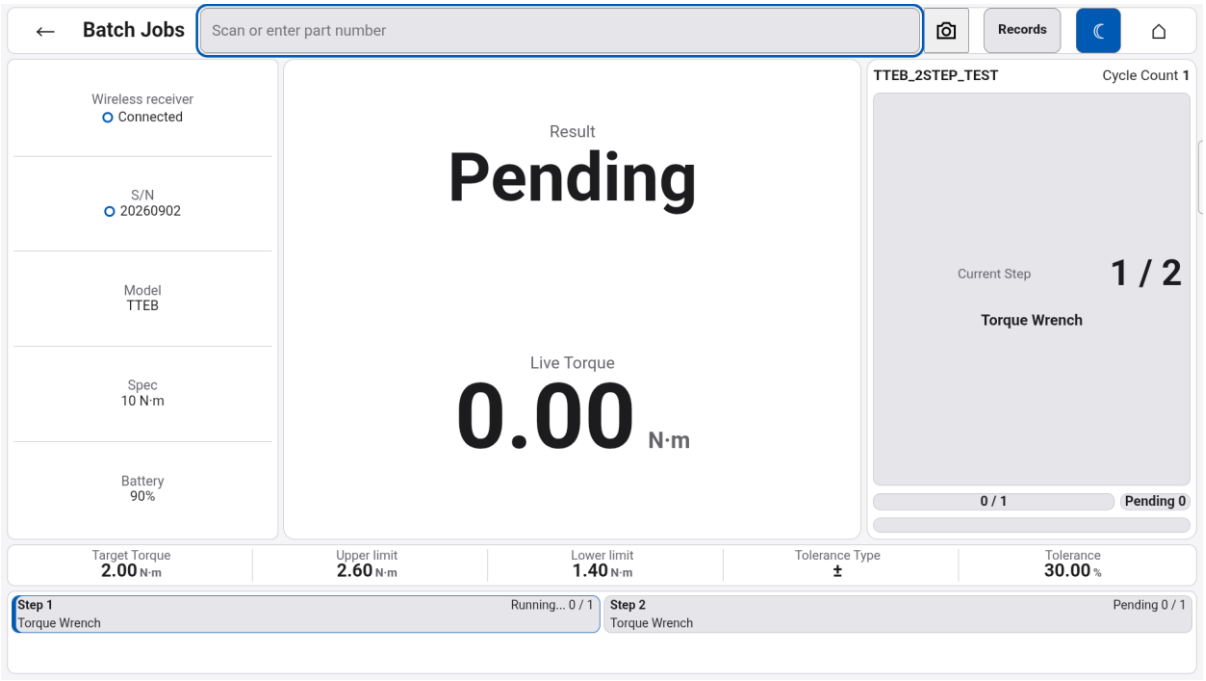


Figure 17-13 Batch work screen (step 1) (tablet)

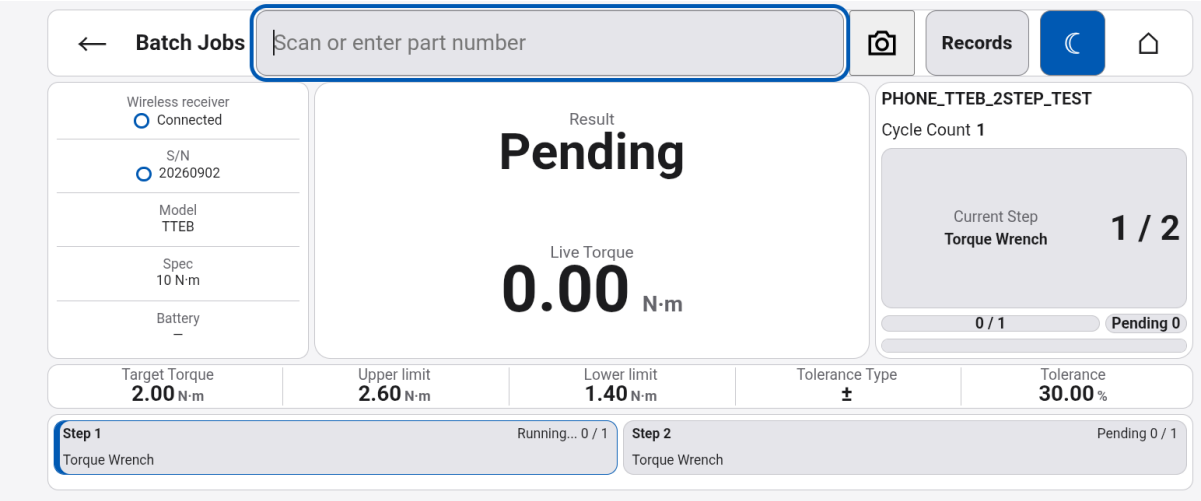


Figure 17-13 Batch work screen (step 1) (phone)

Area	Description
Left	Receiver, S/N, Model, Spec, Battery — check that this is the sensor to be used in the current step.
Center	The result and live torque (angle modes also show Live Angle; Torque Measurement steps show the angle-point torque).
Upper right	The job name and "Cycle Count".
Current Step	For example "1 / 2", with the work mode of the current step.
Progress	"1 / 2" is the saved OK count / the required count of this step; "Pending 0" is the number of OK results waiting to be saved; the blue progress bar is below.
Spec strip	This step's target torque, upper and lower limits, tolerance and angle conditions.
Bottom step bar	The status of each step: Completed, Executing..., Pending, and "completed / required".

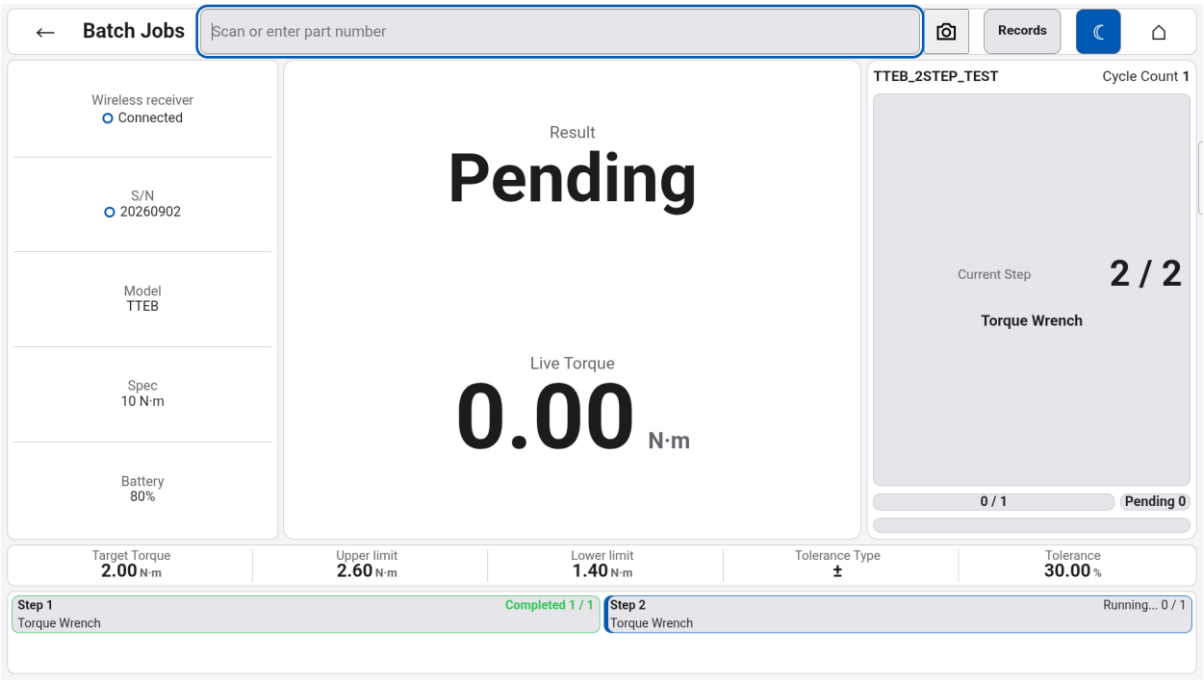


Figure 17-14 Automatic switch to step 2 after step 1 is completed (tablet)

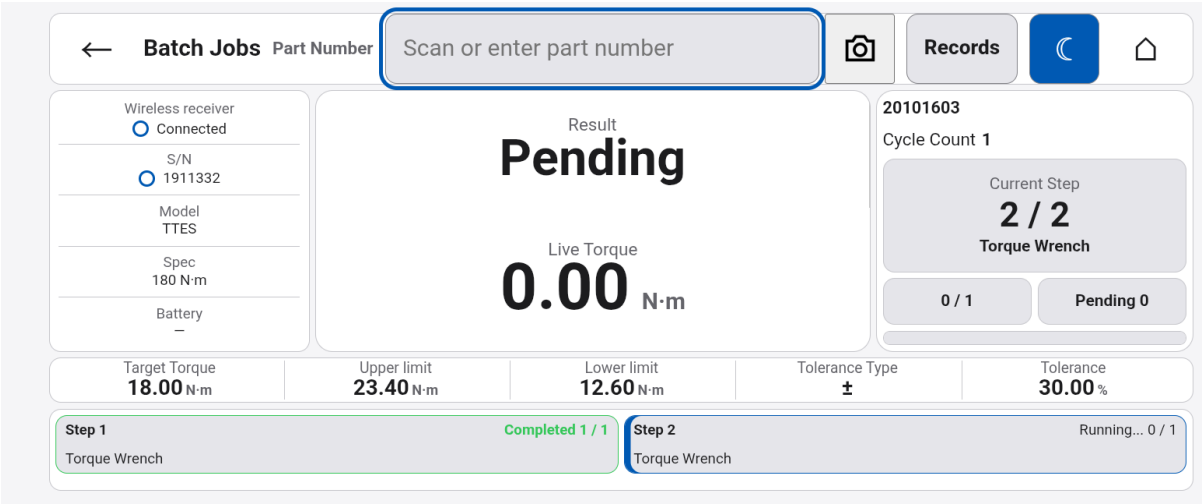


Figure 17-14 Automatic switch to step 2 after step 1 is completed (phone)

1. Scan the part number (all steps of the job belong to the same part).
2. Complete the work according to the conditions of the current step. Only OK increases the progress of this step; NOK is saved but does not advance it.
3. When this step reaches its OK count per batch, the system switches automatically to the next step and the receiver automatically follows the channel of that step's sensor. Make sure the next sensor is powered on.
4. When all steps are completed, a green "Batch Complete" is shown for about 1 second, the part number is cleared, and the next round starts from step 1.
5. To finish, release all force and tap "←" or "⌂" to leave.

17.5 On Completion Actions "Return" and "Work Cycle"

On Completion	Behavior after a full round completes
Back	When the run ends, a new run of the same job starts automatically after about 1 second, and the cycle count restarts from 1.
Work Cycle	The next round starts directly within the same run, and the cycle count increases in sequence (1, 2, 3...).

> **Tip** After a full round completes, both completion actions automatically restart from step 1; neither returns to the job list automatically. To stop the job, leave the work screen manually.

17.6 Interruption and Recovery

- When the receiver is disconnected or the sensor is powered off, the screen shows "Disconnected" and no judgement is produced. After the connection is restored, the system prepares again on the same screen, and completed steps and progress are kept.
- If the screen stays on "Pending" after a step switch, or shows "RF link timed out", stop applying force and confirm that the next sensor is powered on and that its serial number and channel are correct.
- If recovery is not possible, leave the work screen safely, go to "Sensor Pairing", detect the receiver again, tap "Connect and use" on the correct sensor, and then restart the job.

Chapter 18 Records and Export

Path: Main menu → "System Settings" → "Records and export". This lets you query the records of all work modes. When you open it from "Records" in the top bar of a work screen, only the records of that work mode are shown.

18.1 Record List

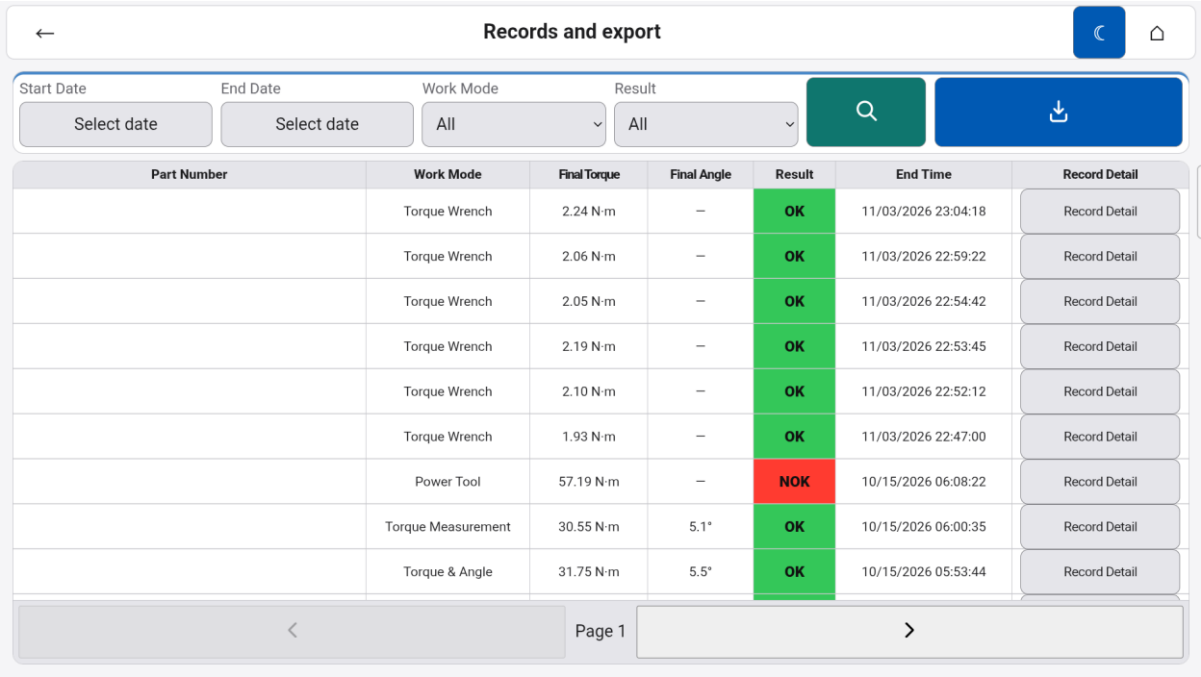


Figure 18-1 Records and Export: record list (tablet)

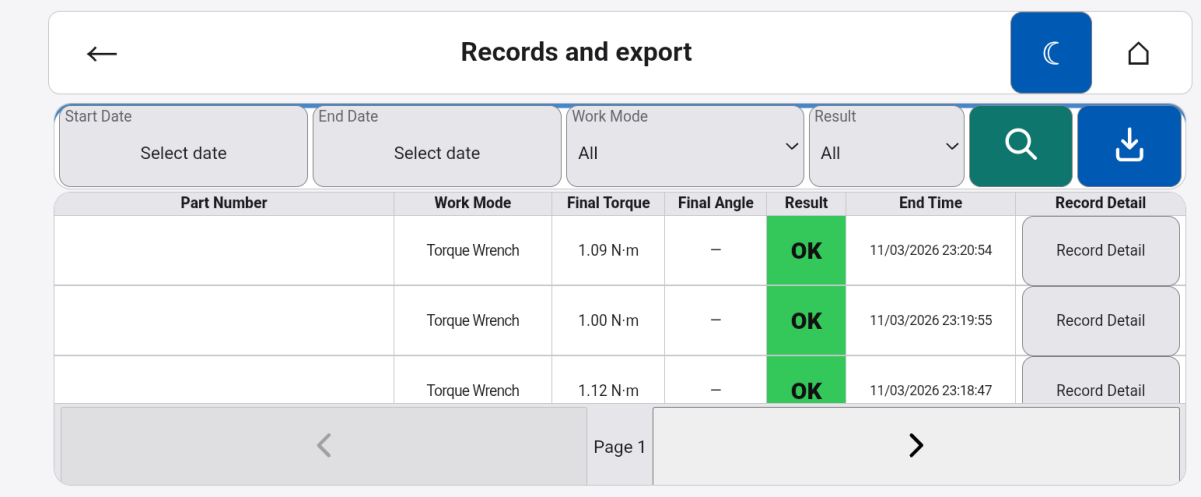


Figure 18-1 Records and Export: record list (phone)

Field / button	Description
Start Date / End Date	Tap "Select date" to open the date pop-up; blank means no limit.
Work Mode	All, Torque Wrench, Power Tool, Torque Measurement, Torque & Angle, Batch Jobs.
Result	All, OK, NOK. Rehit records from older versions are still shown as Rehit in the list, but cannot be filtered separately.
Magnifier (green)	Runs the query with the current conditions. After changing a condition, you must tap it again to update the list.
Download arrow (blue)	"Export current query results as CSV", see section 18.5. It cannot be tapped when the list has no data. It also cannot be tapped after a failed query (section 18.2).
List columns	Part Number, Work Mode, Final Torque ("Angle-point Torque" is shown when Torque Measurement is filtered), Final Angle (hidden when Torque Wrench or Power Tool is filtered), Result, End Time, Record Detail.
"Record Detail"	Opens the detailed data and curve of that record.
"‹", "Page N", "›"	Previous page / next page, up to 50 records per page. The buttons are disabled when there are no other pages.

18.2 Querying Records

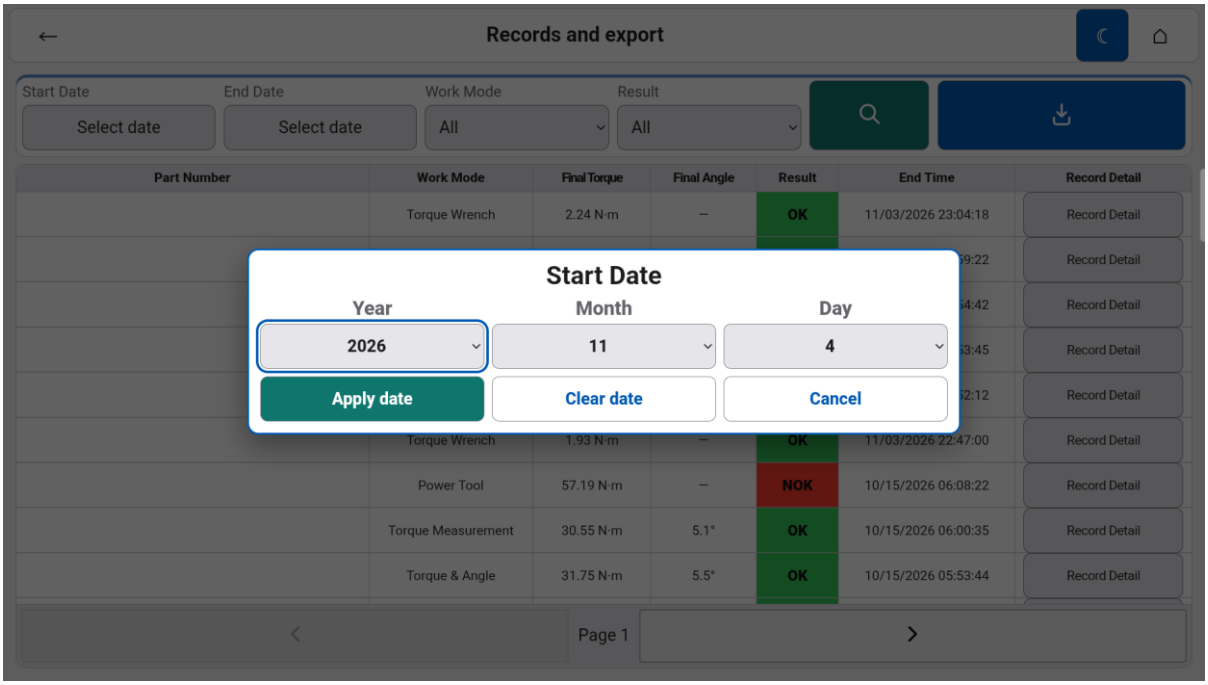


Figure 18-2 Date selection dialog (tablet)

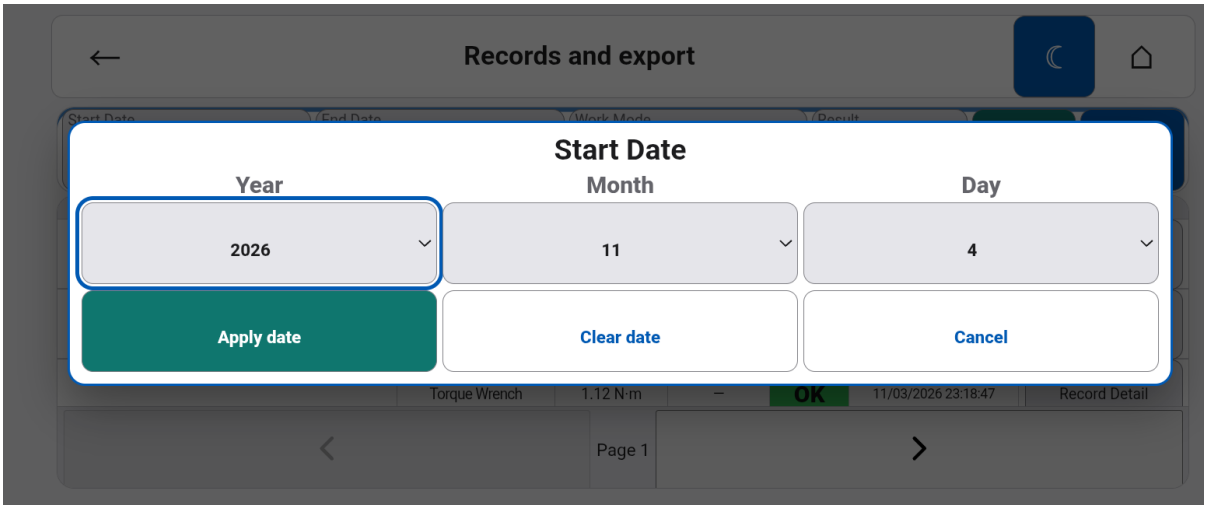


Figure 18-2 Date selection dialog (phone)

1. Tap "Select date" under "Start Date", select the "Year", "Month" and "Day" separately in the pop-up, and tap "Apply date". To remove the date limit, tap "Clear date"; to discard changes, tap "Cancel".
2. Set the "End Date" in the same way.
3. Select the conditions in the "Work Mode" and "Result" drop-down lists.
4. Tap the green magnifier to query, and wait for the list to update.
5. When there are more than 50 records, tap "›" to go to the next page.

If a query or a page change fails while the list already shows records, the list keeps the previous records and shows "Couldn’ t load these records. Showing the last results. Try again." The download arrow cannot be tapped until a query succeeds; after a failed query the page buttons cannot be tapped either. Tap the magnifier to query again.

> **Example** To query the NOK results of Torque Wrench from October 1 to October 12, 2026: Start Date 10/01/2026, End Date 10/12/2026, Work Mode "Torque Wrench", Result "NOK" → tap the magnifier.

> **Tip Dates are filtered by the local date of the device's location, and the end date includes the whole day. After you clear or change a date, you must still tap the magnifier to update the list and the export range; no valid export is available for an empty result.**

18.3 Record Details



Figure 18-3 Record details (tablet)



Figure 18-3 Record details (phone)

Area / button	Description
"Back to record list"	Returns to the list and keeps the original query conditions and page.
"CSV"	Exports the complete point-by-point data of this record as CSV (section 18.6).

Area / button	Description
"Excel"	Exports an Excel file of this record, including the summary, point-by-point data and an editable curve chart (section 18.6).
Result	OK / NOK / Rehit.
Part Number, Work Mode, End Time	Identification data. If there is no part number, the record ID is used instead.
Final Torque (Angle-point Torque for Torque Measurement), Final Angle	The result of this run; Torque Wrench and Power Tool do not show the angle.
Lower limit, Target Torque, Upper limit	The conditions saved at the time of this measurement (they do not change when parameters are modified later); values that do not exist for a one-sided condition (≥) are shown as "--".
Curve	All saved data points of this record ("N Data Points" is shown above). The X axis is "Elapsed time (s)"; the legend includes Torque, Angle (angle modes), Lower limit, Target and Upper limit. The torque and angle lines are drawn as smooth curves through every saved data point; where data points are very close together, only some of the point markers are drawn. The saved data and the exported files are not changed by this.

18.4 Reading Values on the Curve



Figure 18-4 Touching the curve to read the values at a given time point (tablet)



Figure 18-4 Touching the curve to read the values at a given time point (phone)

1. Tap once in the curve area of the record details (or move the mouse) to show a vertical cursor and a value pop-up.
2. The pop-up shows the time, torque and angle (depending on the mode) at that point in time.
3. When the cursor falls between two data points, the value is shown by linear interpolation. It is for reading reference only and does not add data points. The time shown is the saved time of the data, the same as in the exported file.

18.5 Exporting the Query Results as a Summary CSV

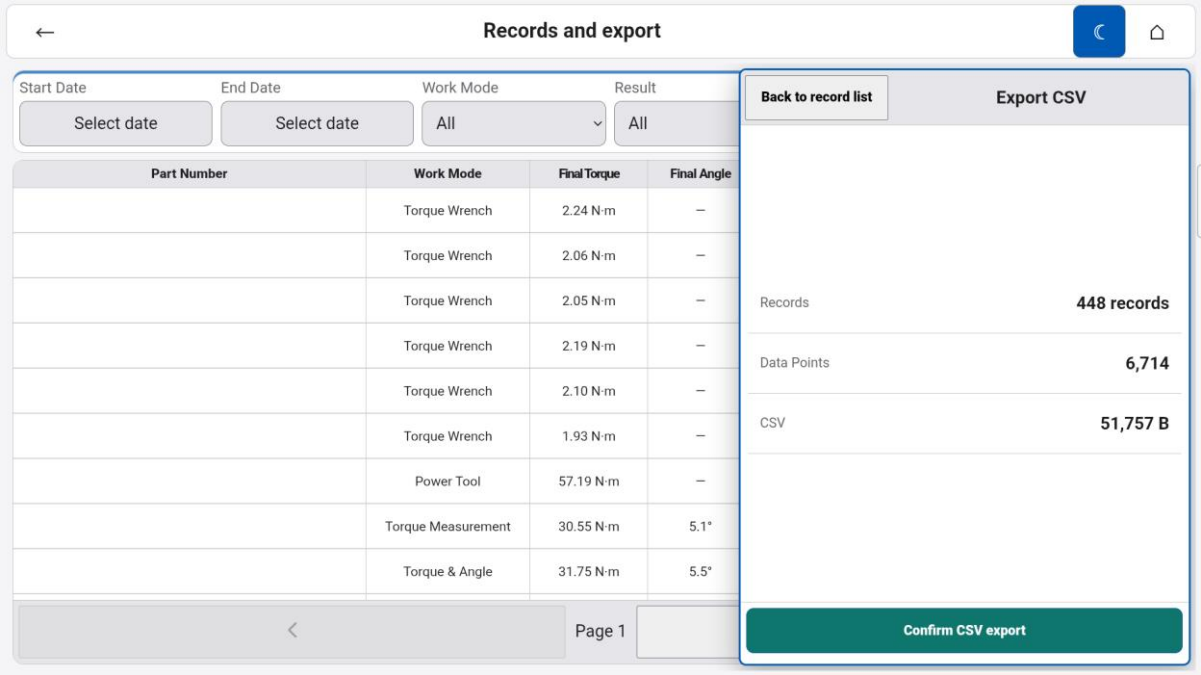


Figure 18-5 Summary CSV export confirmation for the list (tablet)

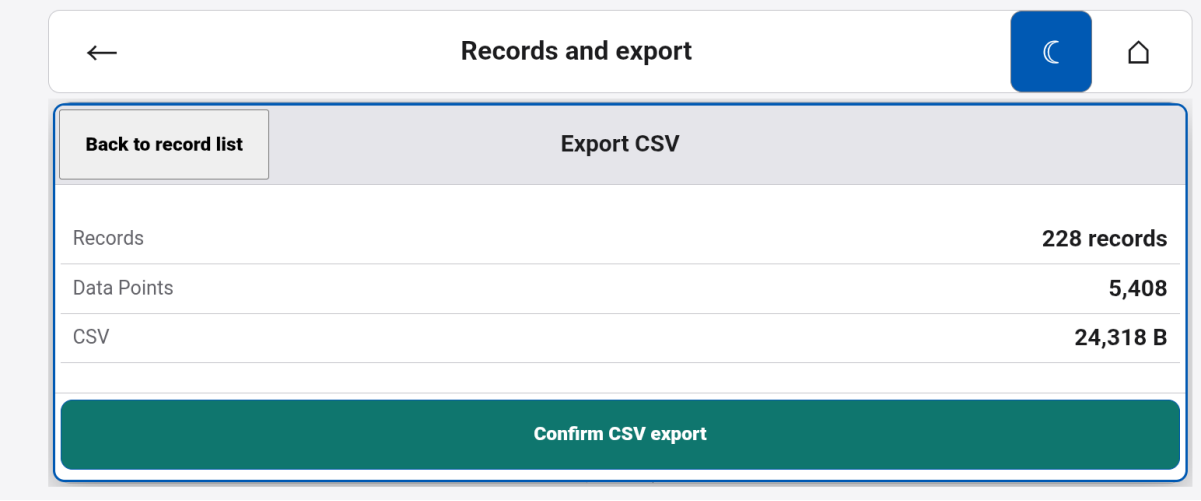


Figure 18-5 Summary CSV export confirmation for the list (phone)

1. First query the data you need in the list (the export covers all results of the last query, not only the 50 records on screen).
2. Tap the blue download arrow "Export current query results as CSV".
3. The confirmation area on the right shows "N records", the number of "Data Points" and the estimated file size.
4. Tap "Confirm CSV export", choose a storage location in the Android folder selection screen (for example "Download"), tap "Use this folder", and then tap "Allow" to grant access.
5. After a successful export, the confirmation area shows the file name. You can check in "My Files" that the file exists.
6. To abandon the export, tap "Back to record list".

> **Tip** The summary CSV has one row per record and does not contain point-by-point curve data. For complete curve data, use the single-record export in section 18.6.

18.6 Exporting a Single Record as Complete CSV or Excel

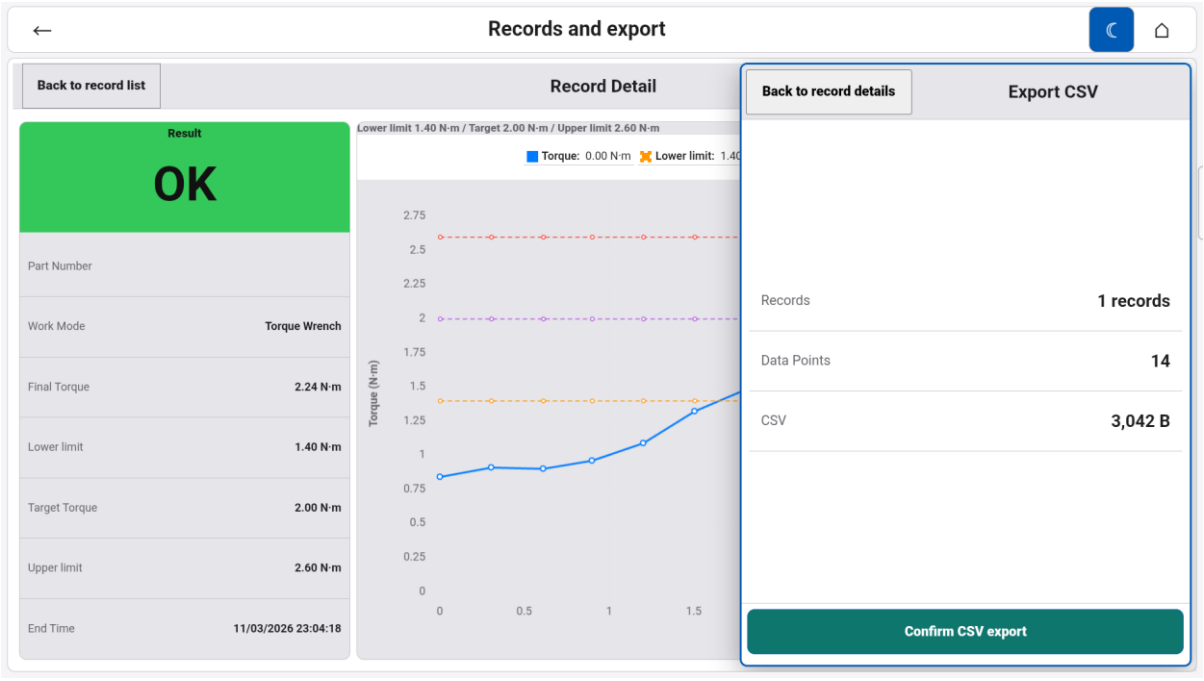


Figure 18-6 Complete CSV export confirmation for a single record (tablet)

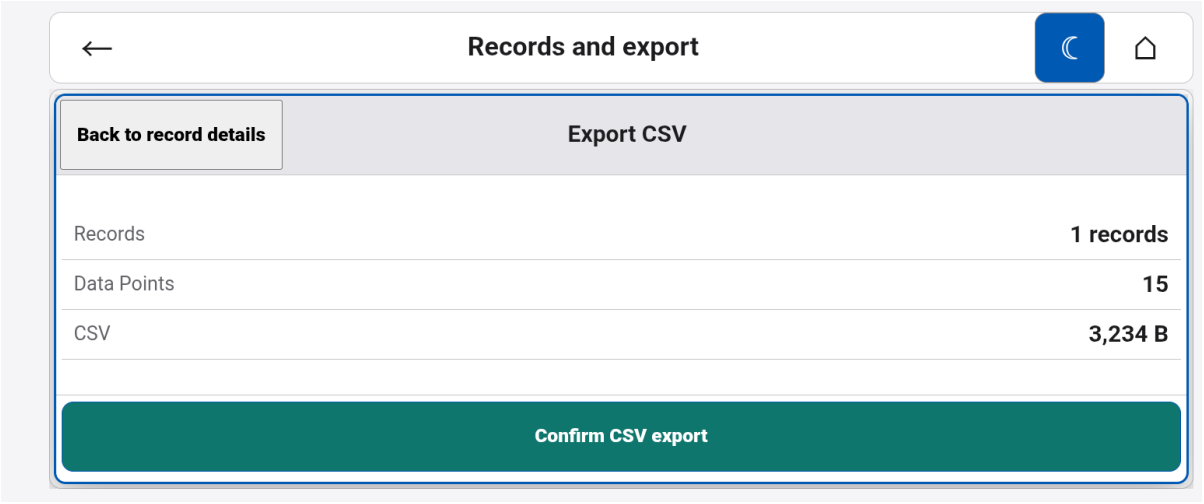


Figure 18-6 Complete CSV export confirmation for a single record (phone)

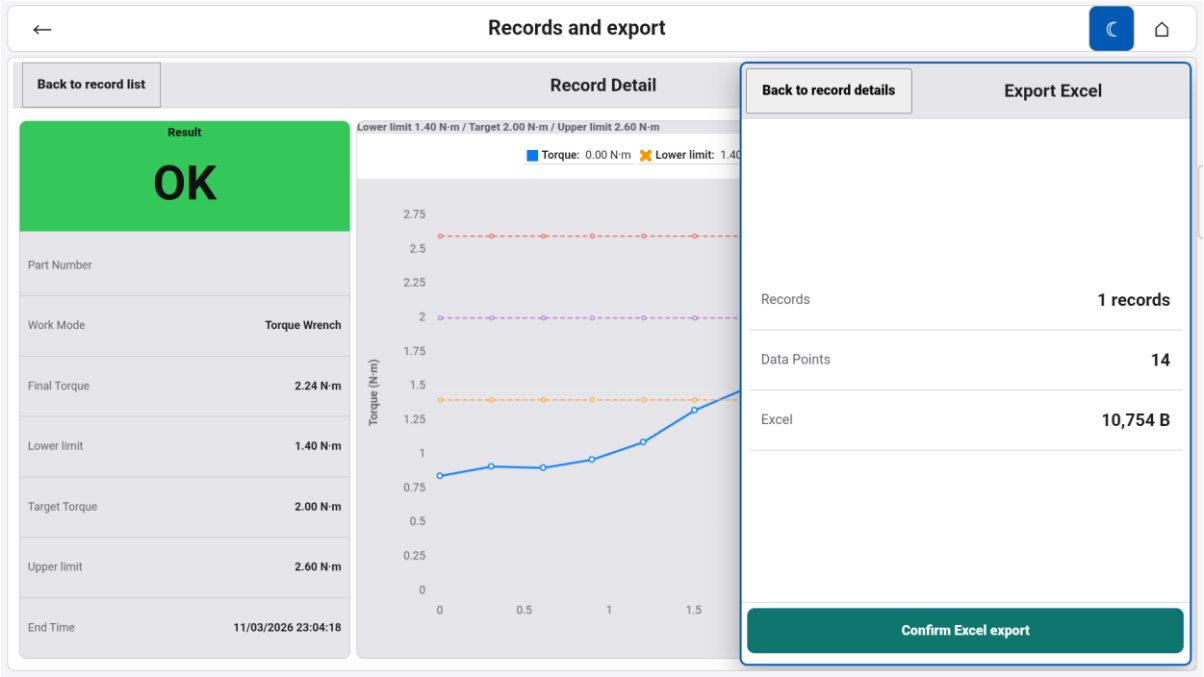


Figure 18-7 Excel export confirmation for a single record (tablet)

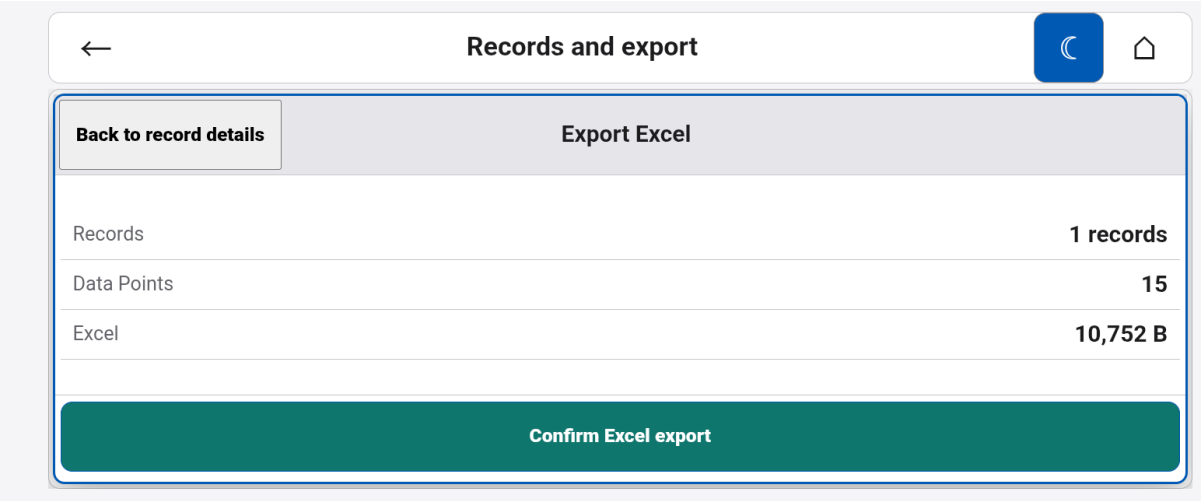


Figure 18-7 Excel export confirmation for a single record (phone)

1. In the list, tap "Record Detail" of that record, and check the part number, mode, result and time.
2. Tap "CSV" (complete point-by-point data) or "Excel" (including the curve) in the top bar.
3. The confirmation area shows "1 record", the number of data points and the estimated size.
4. Tap "Confirm CSV export" or "Confirm Excel export", choose the storage folder and allow access.
5. The export is complete when the file name is shown. To abandon it, tap "Back to record details".

18.7 Export File Formats

Format	Details
Summary CSV	The file name is "mode name-date.csv", with the date in the order of the interface language, separated by hyphens. Examples: 繁體中文 "扭矩扳手-2026-10-16.csv", English "Torque Wrench-10-16-2026.csv"; single-record CSV and Excel use the same rule (the Excel extension is .xlsx). Each record is one row, and the first row contains the column names. The encoding is UTF-8 (with BOM), so Excel can open it directly and display Chinese correctly.
Summary CSV columns	End Time, Work Mode, Result, Username, Station, Part Number, Group ID, Step ID, Tool Type, Model, S/N, Target Torque, Lower Torque Limit, Upper Torque Limit, Max Torque, Angle-point Torque, Target Angle, Lower Angle Limit, Upper Angle Limit, Peak Time (s), Pulse Count, Torque Unit (the Tool Type value is written in the interface language, and Model shows the model name of this brand); "Angle Torque" is added when Torque Measurement records are included, and "Final Angle" is added when angle-mode records are included.
Single-record complete CSV	One row per saved data point. Each row repeats the record summary columns and adds Time (s) (relative time, two decimals), Torque, Sample Torque Unit, Angle (°), Battery (%) and Sample Pulse Count.
Single-record Excel (.xlsx)	Three worksheets: "Record Summary", "Data Points" and "Torque Angle Chart". The chart is a native, editable Excel scatter chart: the X axis is time, the primary Y axis is torque, the secondary Y axis is angle, and target and tolerance lines are included. In the summary sheet, column B is left-aligned (right-aligned in Arabic), and a value that rounds to zero is shown as 0.0, never -0.0.
Values and language	Column names, dates and number formats follow the interface language at the time of export; torque is converted according to the global unit. Switching the language later does not change files already exported.

Format	Details
Delimiter	Traditional Chinese, Simplified Chinese, English, Japanese, Korean, Thai and Arabic use a comma as the delimiter; German, Turkish, French, Russian, Italian, Portuguese, Spanish, Indonesian and Vietnamese use a semicolon. The file is UTF-8 (with BOM) with CRLF line endings. A single quote (') is added in front of text that begins with = + - @ and of numbers with leading zeros, so that spreadsheets do not treat them as formulas or strip the leading zeros.
Data point limit	A single-record export contains all saved data points of that record; an Excel file cannot be exported when it exceeds 1,048,575 points, so use the complete CSV instead.
Columns not included	User exports do not include Format Version, Record ID, Capture ID, Cycle ID, Timezone Offset, Settings Version, Release Torque, Release Angle, or internal columns such as sample sequence number, raw microseconds and raw torque / angle.

Opening a CSV in Excel while keeping the leading zeros of the part number

1. Open Excel, choose "Data > From Text/CSV", and select the exported CSV file.
2. In the preview window, confirm that "File Origin" is "65001: Unicode (UTF-8)" and that the delimiter is correct.
3. Click "Transform Data", set the data type of the "Part Number" column to "Text", and then click "Close & Load".

Cancelling an export and exporting again

If you tap Back or Cancel in the Android save screen, this export does not count as completed: the export preparation is cleared and the confirmation area is closed; tapping "CSV", "Excel" or an export button again prepares the export again. During an export, keep the app in the foreground and wait for it to finish. Export and folder selection have not yet been tried on a real device in this version; if you still cannot export again after cancelling, keep the screen as it is and report it. Do not clear the app data.

18.8 Handling Export Failures

Possible cause	Action
The list has no data	First query at least one record.
The record has no saved data points	A single-record export does not fabricate data; use the summary CSV instead.
You do not have the "Measurement records" or "Export CSV" permission	Ask an administrator to grant them (both are required).
Android folder selection was cancelled, or the folder is not writable	Export again and choose a writable folder (for example Download).
Insufficient storage space	Free up space and try again.
The export area shows "No data to export"	The current query result has no records. Adjust the query and make sure the list has data before exporting.
A record or statistics screen shows "Failed to load"	The data could not be read for the moment. Return to the list and open it again; if it keeps happening, note the time and report it to the supplier.
The list shows "Couldn’ t load these records. Showing the last results. Try again." and the download arrow cannot be tapped	The last query failed, so the list may not match the conditions on the screen. Tap the magnifier to query again, then export.

Chapter 19 Communication Settings (Modbus TCP)

Path: Main menu → "System Settings" → "Communication Settings". TMS provides a Modbus TCP server (slave) on the Android device, and a PLC or computer acts as the client (master) that connects actively to read measurement results or issue commands. This version supports Modbus TCP only, not Modbus RTU / RS-485.

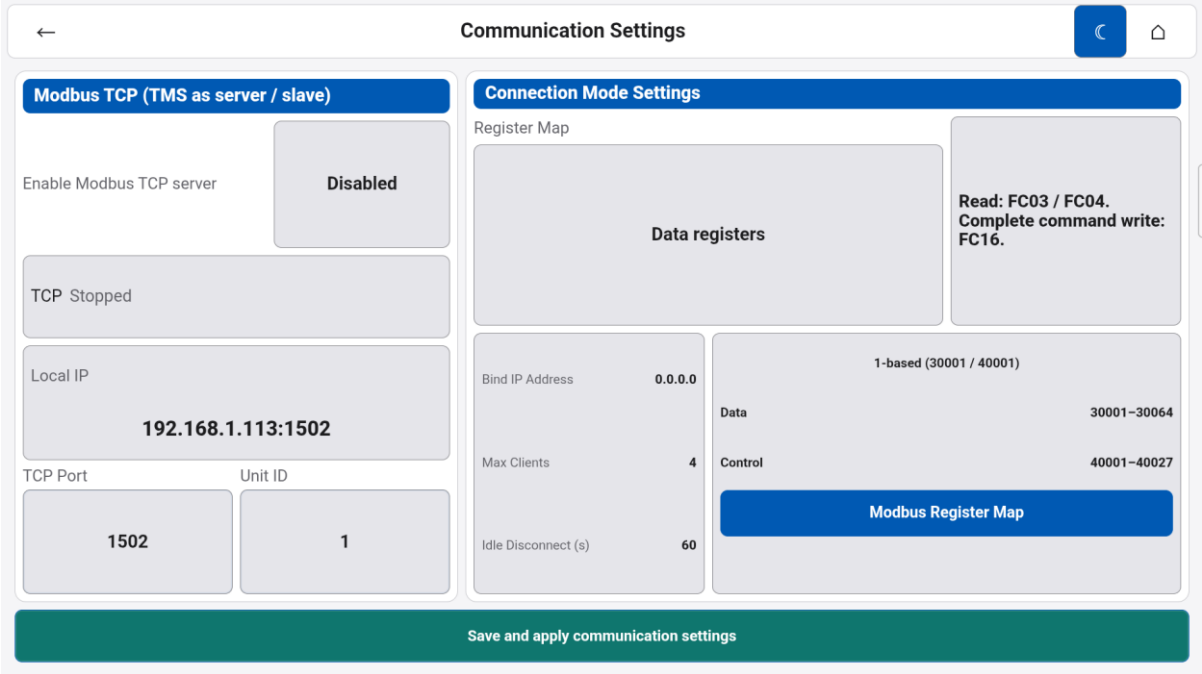


Figure 19-1 Communication Settings (server disabled) (tablet)

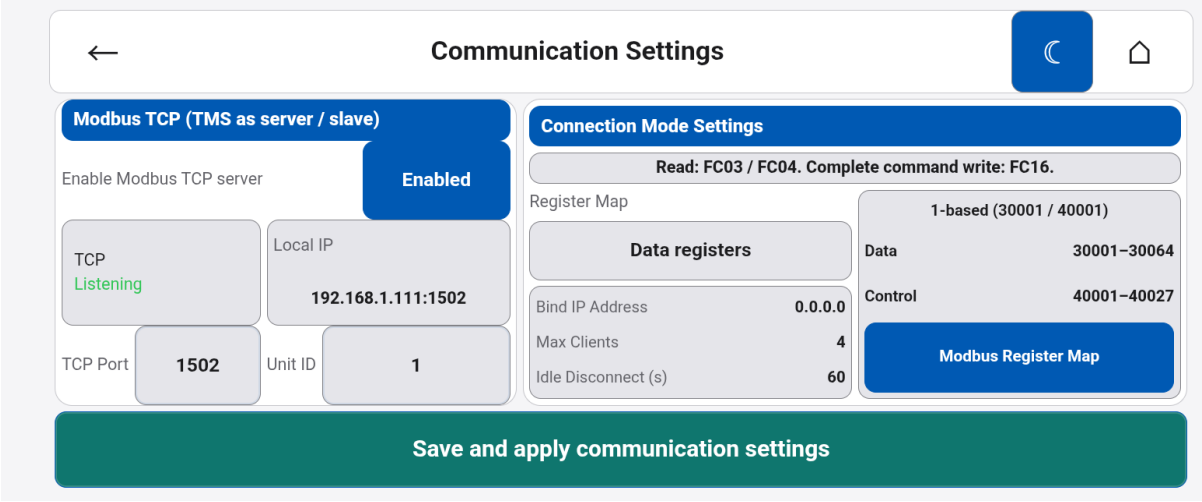


Figure 19-1 Communication Settings (server disabled) (phone)

19.1 Screen Description

Area / field	Description	Default
Enable Modbus TCP server	The button shows "Disabled" or "Enabled"; tap once to toggle (the change takes effect only after you save).	Disabled
TCP (status)	Stopped, Listening (green) or Error. When the port conflicts, it shows "Bind failed: check the port is free, or whether it requires administrator privileges."	Stopped
Local IP	The current IP and port of the Android device, for example "192.168.1.70:1502", for use in PLC settings; when there is no network, it shows "No network interface".	—
TCP Port	The port for PLC connections, 1–65535.	1502
Unit ID	Modbus unit ID, 1–247; the PLC side must use the same value.	1
Register Map	Always shows "Data registers", with the note "Read: FC03 / FC04. Complete command write: FC16." next to it.	—
Bind IP Address	0.0.0.0 means connections from all network interfaces are accepted (read-only).	0.0.0.0
Max Clients	Upper limit of simultaneous connections (read-only).	4
Idle Disconnect (s)	Disconnects automatically after being idle longer than this time (read-only).	60
Address Display Base	The screen shows "1-based (30001 / 40001)"; data 30001–30064 (Input Register), control 40001–40027 (Holding Register).	—

Area / field	Description	Default
"Modbus Register Map"	Opens the complete address table (section 19.3).	—
"Save and apply communication settings"	Saves the settings and restarts the service. While saving it shows "Saving…", on success "Saved and applied", and on failure "Save failed: " followed by the reason.	—

19.2 Enabling the Server and Connecting a PLC

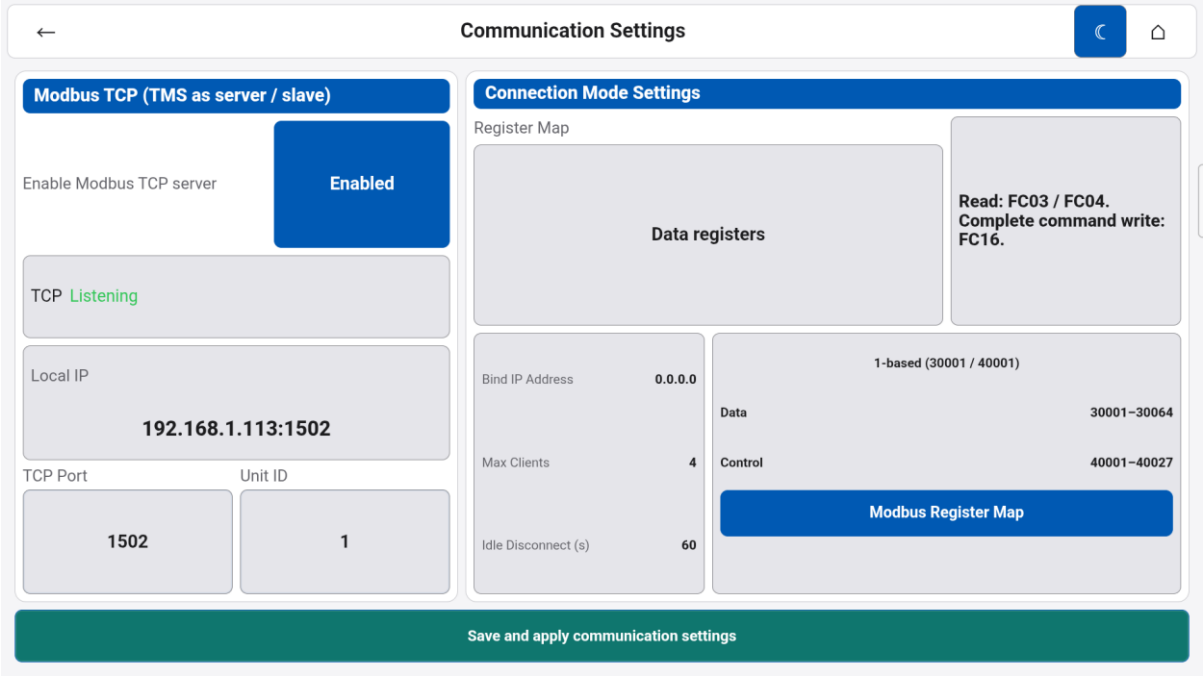
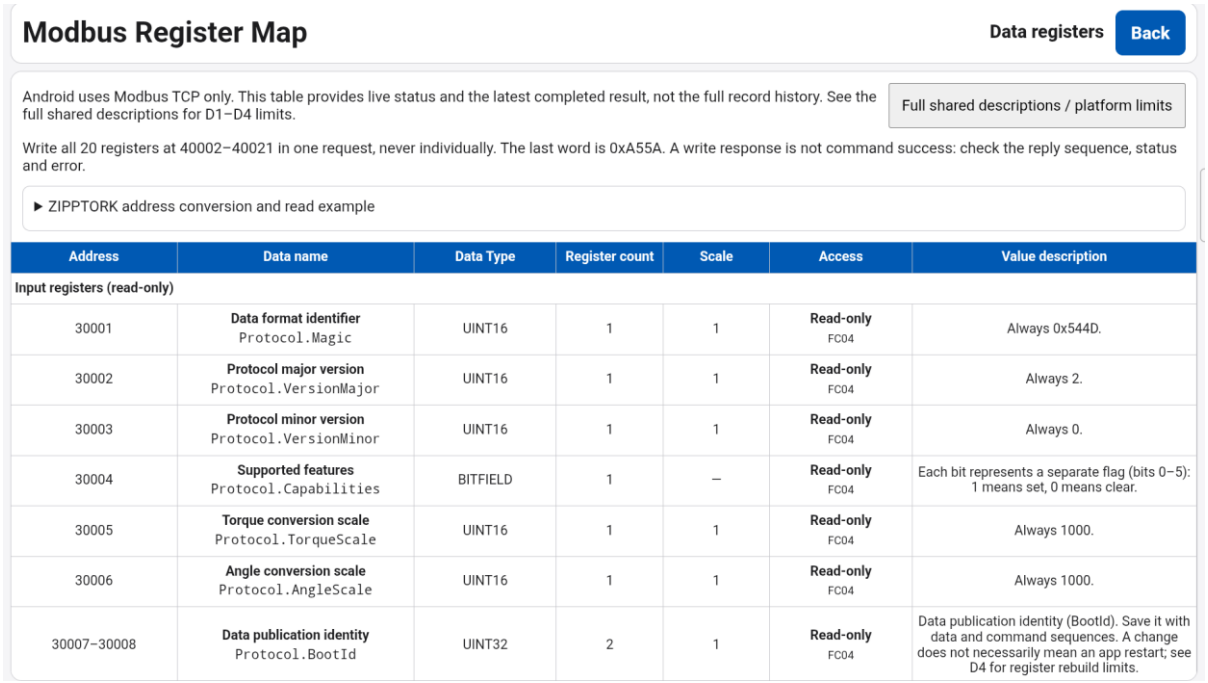


Figure 19-2 Communication Settings (server running) (tablet)

1. Connect the Android device and the PLC to the same local area network (Wi-Fi or USB Ethernet), and make sure the network has no client isolation.
2. Tap the "Disabled" button so that it becomes "Enabled"; if needed, change the "TCP Port" and "Unit ID".
3. Tap "Save and apply communication settings", and confirm that "Saved and applied" appears and the TCP status is "Listening".
4. Note the "Local IP" (for example 192.168.1.70:1502).
5. In the PLC, set up a Modbus TCP Client: IP = 192.168.1.70, Port = 1502, Unit ID = 1.
6. First read 30001–30002 with FC04. You should read 0x544D (decimal 21581) and 2, which shows that the connection and protocol are correct.
7. Then read 30009–30064 to get the measurement data (see section 19.4 for how to decode it).

> **Warning** Modbus TCP has no encryption or account authentication. Use it only in a controlled factory LAN, and do not expose this port to the Internet. When it is not in use, set it back to "Disabled" and save.

19.3 Modbus Register Map



Modbus Register Map Data registers Back

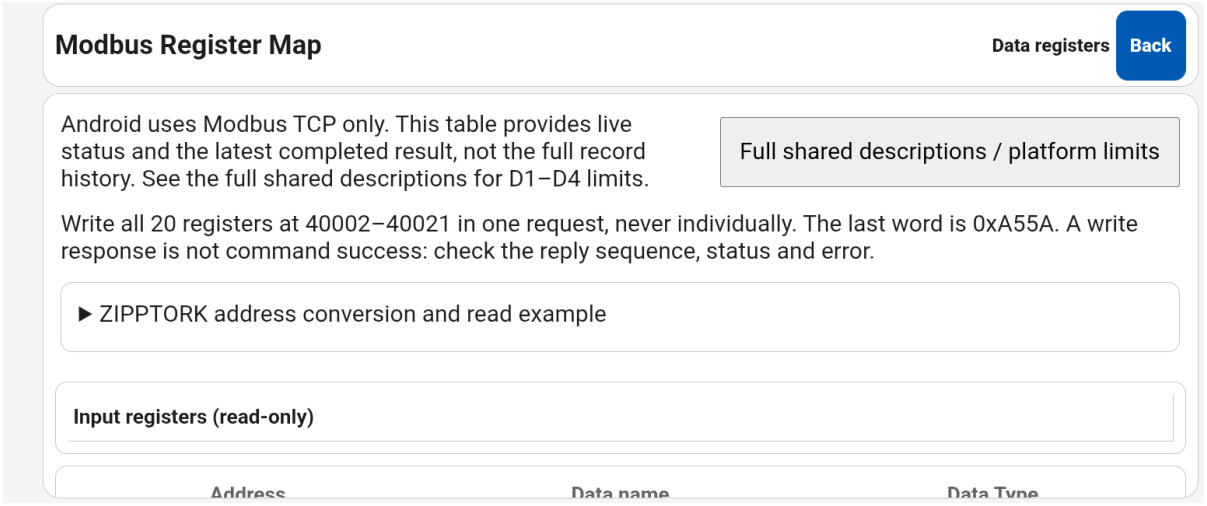
Android uses Modbus TCP only. This table provides live status and the latest completed result, not the full record history. See the full shared descriptions for D1–D4 limits. Full shared descriptions / platform limits

Write all 20 registers at 40002–40021 in one request, never individually. The last word is 0xA55A. A write response is not command success: check the reply sequence, status and error.

▶ ZIPPTORK address conversion and read example

Address	Data name	Data Type	Register count	Scale	Access	Value description
Input registers (read-only)						
30001	Data format identifier Protocol.Magic	UINT16	1	1	Read-only FC04	Always 0x544D.
30002	Protocol major version Protocol.VersionMajor	UINT16	1	1	Read-only FC04	Always 2.
30003	Protocol minor version Protocol.VersionMinor	UINT16	1	1	Read-only FC04	Always 0.
30004	Supported features Protocol.Capabilities	BITFIELD	1	–	Read-only FC04	Each bit represents a separate flag (bits 0–5): 1 means set, 0 means clear.
30005	Torque conversion scale Protocol.TorqueScale	UINT16	1	1	Read-only FC04	Always 1000.
30006	Angle conversion scale Protocol.AngleScale	UINT16	1	1	Read-only FC04	Always 1000.
30007–30008	Data publication identity Protocol.BootId	UINT32	2	1	Read-only FC04	Data publication identity (BootId). Save it with data and command sequences. A change does not necessarily mean an app restart; see D4 for register rebuild limits.

Figure 19-3 Modbus Register Map dialog (old version; now displayed according to shared specification 1.0) (tablet)



Modbus Register Map Data registers Back

Android uses Modbus TCP only. This table provides live status and the latest completed result, not the full record history. See the full shared descriptions for D1–D4 limits. Full shared descriptions / platform limits

Write all 20 registers at 40002–40021 in one request, never individually. The last word is 0xA55A. A write response is not command success: check the reply sequence, status and error.

▶ ZIPPTORK address conversion and read example

Input registers (read-only)

Address Data name Data Type

Figure 19-3 Modbus Register Map dialog (old version; now displayed according to shared specification 1.0) (phone)

Tap "Modbus Register Map" to open it; "Data registers" is shown below the title, and tapping "Back" closes it. This table explains the address format and does not show live values; for the complete address table, see Appendix D. From top to bottom, the screen contains:

- Description: "Android uses Modbus TCP only. This table provides live status and the latest completed result, not the full record history. See the full shared descriptions for D1–D4 limits."
- Write rule: "Write all 20 registers at 40002–40021 in one request, never individually. The last word is 0xA55A. A write response is not command success: check the reply sequence, status and error."
- "Full shared descriptions / platform limits" button: switches some fields to the cross-platform shared descriptions and adds "Platform differences and limits" (D1–D4, see the table below) after the table.
- "ZIPPTORK address conversion and read example" (tap ▶ to expand): taking 30031–30032 as an example, 30031 − 30001 = 30 (0-based address); read 2 registers with FC04, high word first; raw values 0 and 35000 → 35000 ÷ 1000 = 35 N·m (when the data is valid and the unit code is 1). The example does not connect; for the complete steps, see section 19.6.1.
- Register list: divided into two groups, "Input registers (read-only)" and "Holding registers (partly writable)", with the columns address, data name, data type, register count, scale, access and value description. A landscape screen 915 CSS pixels wide or less shows one card per register instead.

The contents of "Platform differences and limits" are as follows. Android supports Modbus TCP only; RTU, Open Protocol and mode 6 (capability index) are Windows only.

Item	Description
D1 Command.RevisionOrBootId	Command 1 uses the settings revision; for commands 2–5, Windows requires the BootId and Android does not check it.
D2 Command.Sequence	It must not be 0; the same sequence with the same content is treated as a resend, and the same sequence with different content is rejected; only Windows rejects an older sequence.
D3 Tool.ErrorFlags	The bit definitions differ on each platform, so do not reuse one decoder for both.
D4 Data.Validity / Controller.Status	The bit names are the same, but the trigger conditions on each platform have not been cross-verified; the BootId may change without the app being restarted.

19.4 How to Decode the Data

- Addresses are 1-based: 30001 corresponds to offset 0 in the communication protocol. Some PLC software requires an offset value; convert it according to the PLC documentation.
- 32-bit data occupies 2 registers, high word first (ABCD).
- INT32 ×1000: combine into a signed 32-bit integer and divide by 1000, for example torque and angle.
- UINT64 UTC ms: the result time is a UTC millisecond timestamp.
- Check the validity bits of 30013 (Data.Validity) first, and then interpret the values; do not treat a reading of 0 as normal data.
- How unknown values are represented: battery 65535 (0xFFFF), Sensor.AgeMs and Result.AgeMs 4294967295 (0xFFFFFFFF), completion time 0. When you read 0 or an unknown value, also check Data.Validity, Sensor.State (30026) and the data time, and do not treat it as a valid measurement.

> **Example** Reading 30035–30036 (Torque.Final) gives 0x0000, 0xBE50:
> Combined: 0x0000BE50 = 48720 → 48720 ÷ 1000 = 48.720 N·m.
> If you read 0xFFFF, 0xFA24: combined 0xFFFFFA24, interpreted as a signed integer it is −1500 → −1.500.

19.5 Writing commands (FC16)

The PLC can write the Holding Registers to issue commands. The rules are as follows:

1. Use FC16 to write the 20 registers 40002–40021 in one request; do not write them in separate requests, and do not use FC06.
2. 40002 Command.Code: 1 = apply parameters, 2 = select batch recipe, 3 = lock tool, 4 = unlock tool, 5 = reset batch.
3. 40003–40004 Command.Sequence: use a new non-zero sequence for each command.
4. 40021 Command.Apply must be written as 0xA55A.

5. Write numeric fields after converting them by their scale: torque, angle and tolerance are all multiplied by 1000, for example a target of 2 N·m is written as 2000, 90.5° as 90500, and a tolerance of 10% as 10000 (not 0.1); 32-bit values are high word first.
6. After writing, read 40022–40027 with FC03, confirm that Reply.Sequence equals the sequence just written, and then check Reply.Status and Reply.Error. The write response only means the registers were written, not that the command was executed successfully; sending a new command while the previous one is still being processed returns busy.

> **Tip** Applying parameters (command 1) requires the current settings revision in 40005–40006 (Command.RevisionOrBootId). The current revision can be read from 40026–40027 (Reply.Revision); the app updates these two words periodically, and the revision changes after parameters are modified on the TMS screen. If the revision does not match, Reply.Error is 2; read the revision again and resend with a new sequence.
> The same sequence with the same content can be resent; the same sequence with different content is rejected. Do not send new commands one after another before the previous command has completed.

When the app receives FC16, it checks the format first; if it does not conform, it returns a Modbus exception code directly, and neither the command area nor the reply area changes:

Write case	App response
Not written as 20 registers in one request starting at 40002	Exception code 02 (illegal data address)
Command code is not 1–5, the sequence is 0, or 40021 is not 0xA55A	Exception code 03 (illegal data value)
Same sequence as the previous one but different content	Exception code 03 (illegal data value)

Write case	App response
Same sequence and same content as the previous one	Treated as a resend: normal response, and it is not executed again
The previous command is still being processed (Reply.Status = 1)	Exception code 06 (slave busy)
Writing a single register with FC06	Exception code 01 (illegal function)

After the format check passes, Reply.Status first becomes 1 (processing), and when finished becomes 2 (success) or 3 (failure; see Reply.Error and Appendix E for the cause). The conditions of each command on Android are as follows; fill 0 in the fields that commands 2–5 do not need. Android does not check 40005–40006 for commands 2–5, but if the same PLC program must also connect to the Windows version, fill in the BootId from 30007–30008 (D1).

Command	Fields to fill	Android execution conditions and result
1 Apply parameters	40005–40006 current settings revision; 40008 mode 1–4; 40009 unit 1–6; 40010 judgement method 0 / 1; 40011–40020 values (×1000)	If a measurement or batch job is in progress, Error 1 is returned; a revision mismatch returns Error 2; mode 5 returns Error 5; other invalid values return Error 3. On success, the work parameters of that mode are updated, and Reply.Revision shows the new settings revision.
2 Select batch recipe	40007 batch recipe number 1–999	If a measurement or batch job is in progress, Error 1 is returned; if the number does not exist, Error 4 is returned.

Command	Fields to fill	Android execution conditions and result
3 Lock tool	Only the command code, sequence number and commit code are required	Disconnects the tool and marks it as locked; 30014 bit 5 becomes 1.
4 Unlock tool	Only the command code, sequence number and commit code are required	Detects the tool again and releases the lock; 30014 bit 5 becomes 0.
5 Reset batch	Only the command code, sequence number and commit code are required	Resets the currently selected batch recipe; if a measurement or batch job is in progress, Error 1 is returned; if no recipe has been selected yet, Error 4 is returned.

> Test commands first in a safe condition with no force applied.

19.6 PLC Read/Write Examples

The following five examples show the read/write sequence of a PLC program. The values are calculated according to the program and the shared specification and are used only to illustrate the format; they are not values measured on a device.

19.6.1 Example 1: Reading Live Torque

This corresponds to "ZIPPTORK address conversion and read example" in the app's Modbus Register Map:

1. Use FC04 to read 30001–30002 and confirm they are 21581 (0x544D) and 2.
2. Read 30013 (Data.Validity) and confirm that bit 0 (live torque valid) is 1; read 30017 (Unit.Live), where 1 means N·m.
3. Use FC04 to read 2 registers starting at 30031. If the PLC software requires a zero-based address, enter 30 (30031 − 30001); if the software accepts 30031 directly, do not subtract again.
4. Combine with the high word first: suppose the values read are 0 and 35000; combined value = 0 × 65536 + 35000 = 35000.
5. Interpret it as a signed 32-bit integer and divide by 1000: 35000 ÷ 1000 = 35.000 N·m.

19.6.2 Example 2: Locking the Tool (Command 3)

Use FC16 to write the following 20 registers at once starting at 40002 (sequence number 1 as an example):

Address	Field	Value written
40002	Command.Code	3
40003–40004	Command.Sequence	0, 1
40005–40020	Remaining command fields	All 0 (on the Windows version, enter BootId in 40005–40006)
40021	Command.Apply	42330 (0xA55A)

1. Use FC03 to read 40022–40025 and wait for Reply.Sequence = 1 and Reply.Status to change from 1 to 2.
2. When Reply.Status is 3, look up the failure reason in Appendix E using Reply.Error.
3. Use FC04 to read 30014; bit 5 (tool locked) should be 1. To unlock, change the command code to 4 and use a new sequence number (for example 2).

19.6.3 Example 3: Applying Torque Wrench Parameters (Command 1)

Goal: Torque Wrench mode, unit N·m, target 2 N·m, plus/minus tolerance 10% (acceptable range 1.8–2.2 N·m).

1. Confirm that TMS is not running a measurement or batch job.
2. Use FC03 to read 40026–40027 (Reply.Revision) to get the current settings revision; the following assumes 0 and 7 are read (revision 7).
3. Use FC16 to write the 20 registers in the table below at once starting at 40002 (sequence number 3 as an example).
4. Read 40022–40027: Reply.Sequence = 3 and Reply.Status = 2 mean success, and Reply.Revision changes to the new settings revision.
5. Reply.Error = 2 means the revision has changed: go back to step 2, read the revision again, and resend with a new sequence number.

Content written in step 3:

Address	Field	Value written
40002	Command.Code	1 (apply parameters)
40003–40004	Command.Sequence	0, 3
40005–40006	Command.RevisionOrBootId	0, 7 (revision read in step 2)
40007	Command.PsetId	0
40008	Command.Mode	1 (Torque Wrench)
40009	Command.Unit	1 (N·m)
40010	Command.Condition	0 (plus/minus tolerance)
40011–40012	Command.TargetTorque	0, 2000 (2 N·m × 1000)

Address	Field	Value written
40013–40016	Command.TargetAngle, Command.StartTorque	All 0 (not used by Torque Wrench)
40017–40018	Command.Tolerance	0, 10000 (10% × 1000)
40019–40020	Command.AngleTolerance	0, 0
40021	Command.Apply	42330 (0xA55A)

> **Example** After success, the Torque Wrench parameters of TMS become target 2 N·m, lower limit 1.8 N·m, upper limit 2.2 N·m; for results completed afterwards, the same target and limits can be read from 30039–30046.

19.6.4 Example 4: Getting Every Completed Measurement Result

To record the result of every tightening on a production line, do not read "live torque" (it changes every instant). Instead, poll the "completed-result sequence number" and read the result once only when the sequence number increases.

1. Use FC04 to read 30001–30002 and confirm they are 21581 and 2; read 30005–30006 and confirm that both the torque and angle scale factors are 1000.
2. Use FC04 to read 30011–30012 (Result.Sequence) and note it down as the previous sequence number. For example, if you read 0 and 12, the sequence number is 12.
3. Read 30011–30012 again every 200–500 ms. A connection idle for more than 60 seconds is disconnected by TMS, so continuous polling also keeps the connection alive; up to 4 clients can be connected at the same time.
4. When the sequence number increases (for example, to 13), there is a new completed result. Immediately read 56 registers (30009–30064) starting at 30009 with a single FC04, so that all fields of the same result come from the same moment. If the PLC software requires 0-based addresses, enter 8 as the start address.
5. First confirm that bit 2 (completed result valid) of 30013 (Data.Validity) is 1, then interpret the values; when it is 0, do not write a record.
6. Decode according to the table below, and store Result.Sequence as the unique ID of this record.
7. If the new sequence number is 2 or more greater than the previous one, several results were completed between two polls and only the latest one can be read. If you need the complete history, use "Records and export" in TMS instead (Chapter 18).

The table below uses a result with sequence number 13 and unit N·m as an example (position in the data block = address − 30009):

Item (address)	Decoding	Example values read → result
Completed-result sequence number (30011–30012)	UINT32, high word first	0, 13 → 13
QC result Result.QC (30021)	1 = OK, 2 = NOK, 3 = Rehit (Appendix E)	1 → OK
Unit Unit.Result (30018)	1 = N·m (see Appendix E for other codes)	1 → N·m
Final torque Torque.Final (30035–30036)	INT32, divide by 1000	0, 35120 → 35.120 N·m
Final angle Angle.Final (30037–30038)	INT32, divide by 1000; valid only when bit 6 of 30013 is 1; used only in modes 3 and 4	0, 0 → 0.000° (not used in this mode)
Acceptable torque range (30043–30046)	Torque.Lower, Torque.Upper, INT32, divide by 1000	24500 and 45500 → 24.500–45.500 N·m
Batch progress (30051–30054)	Batch.CompletedOk, Batch.Size, UINT32	3 and 10 → 3/10
Completion time (30057–30060)	UINT64, milliseconds since 1970-01-01 UTC; 0 = unknown	0x0000, 0x01A1, 0xA1D1, 0x36C2 → 1793716205250 ms = 2026-11-03 14:30:05.250 (UTC)

Tip Result.Sequence (30011–30012) is the "completed-result update sequence number" and is different from Data.Sequence, the live-data sequence number at 30009–30010: Data.Sequence increases every time the live data is updated, so it cannot be used to tell whether there is a new result.

19.6.5 Example 5: Reading Completed Results with Python (pymodbus)

The following is a minimal example that polls completed results with the Python pymodbus package. It only reads and does not write any command; replace the IP, port and unit ID with the values on the "Communication Settings" screen. Addresses are 0-based: the offset of 30009 is 8 and the offset of 30011 is 10. This example was verified with pymodbus 3.16, where the unit ID parameter is named device_id; older versions use slave in the read functions, so adjust it to the installed version.

```
import struct, time
from datetime import datetime, timezone
from pymodbus.client import ModbusTcpClient


client = ModbusTcpClient("192.168.1.70", port=1502)  # IP and port from the TMS screen
client.connect()
last = None
while True:
    # 30011-30012 Result.Sequence (30001 is offset 0, so 30011 is offset 10)
    seq = client.read_input_registers(10, count=2, device_id=1).registers
    now = (seq[0] << 16) | seq[1]
    if last is not None and now != last:
        r = client.read_input_registers(8, count=56, device_id=1).registers  # 30009-30064
        reg = lambda a: r[a - 30009]  # register by 1-based address
        s32 = lambda a: struct.unpack(">i", struct.pack(">HH", reg(a), reg(a + 1)))[0]
        if reg(30013) & (1 << 2):  # Data.Validity bit 2: the completed result is valid
            qc = {1: "OK", 2: "NOK", 3: "Rehit"}.get(reg(30021), "?")
            torque = s32(30035) / 1000  # unit code is in 30018 (1 = N.m)
            ms = (reg(30057) << 48) | (reg(30058) << 32) | (reg(30059) << 16) | reg(30060)
            when = datetime.fromtimestamp(ms / 1000, timezone.utc)
            print(now, qc, torque, when.isoformat())
    last = now
    time.sleep(0.3)
```

Note: The Modbus reads and writes in this chapter were tested on 2026/11/04 on a tablet and a phone running ZIPPTORK 1.1.3, and the results match this chapter: FC04 reads (addresses, multipliers, sequence number, QC result, torque and timestamp), FC16 exception codes 01, 02 and 03, command 3 (lock) and command 4 (unlock), and resending the same sequence number. The pymodbus example in this section was run with pymodbus 3.16 against a simulated-data server and decodes correctly (including negative values); the same pymodbus also read a real completed result on the ZIPPTORK tablet and decoded QC result OK, torque 2.08 N·m and the timestamp (matching the capture time). With no tool connected, commands 3 and 4 return Error 8 (device communication error). Command 1 (apply parameters) returned Error 1 (busy) during the test, so

the success case was not verified on ZIPPTORK. Confirm it in a test environment before adoption, and add timeout, reconnection and error handling as the site requires.

19.7 Connection Troubleshooting

Symptom	Item to check
PLC cannot connect	Check whether "Save and apply communication settings" has been tapped and the status is "Listening"; whether the PLC's IP, Port and Unit ID match the screen; whether both are on the same subnet; and whether Wi-Fi has client isolation enabled.
Shows "Bind failed"	The port is in use by another program or is 1024 or below; use 1502 or another port above 1024.
Local IP shows "No network interface"	The Android device is not connected to a network; connect to Wi-Fi or Ethernet first.
All data read is 0	Confirm that 30001 is 0x544D; check the validity bits in 30013 and whether the sensor is connected.
More than 4 clients	The maximum number of connections is 4; reduce the number of devices connected at the same time.
FC16 returns exception code 02 or 03	Confirm that 20 registers are written at once starting at 40002, the command code is 1–5, the sequence number is not 0, and 40021 = 0xA55A; the same sequence number with different content is rejected, so use a new sequence number.
FC16 returns exception code 06 (busy)	The previous command has not finished; wait until Reply.Status becomes 2 or 3, then send.
Reply.Error = 1 (busy)	While a measurement or batch job is in progress, commands 1, 2 and 5 are not executed; stop the job and send again.
Reply.Error = 2 (settings revision outdated)	Read 40026–40027 again, enter the value in 40005–40006, and resend with a new sequence number.

Symptom	Item to check
Result.Sequence never increases	Confirm that TMS has completed a measurement (the QC result appears on the work screen); confirm that you are polling 30011–30012, not 30009–30010; confirm that the sensor is connected (bit 2 of 30026 is 1).
The polled sequence number skips values	Several results were completed between two polls. Shorten the polling interval (200–500 ms recommended), or use TMS "Records and export" to get the complete history.

Chapter 20 Sensor Fault Records and Alerts

Path: Main menu → "System Settings" → "Sensor fault records". Use it to look up errors that have occurred on sensors and errors that are still active.

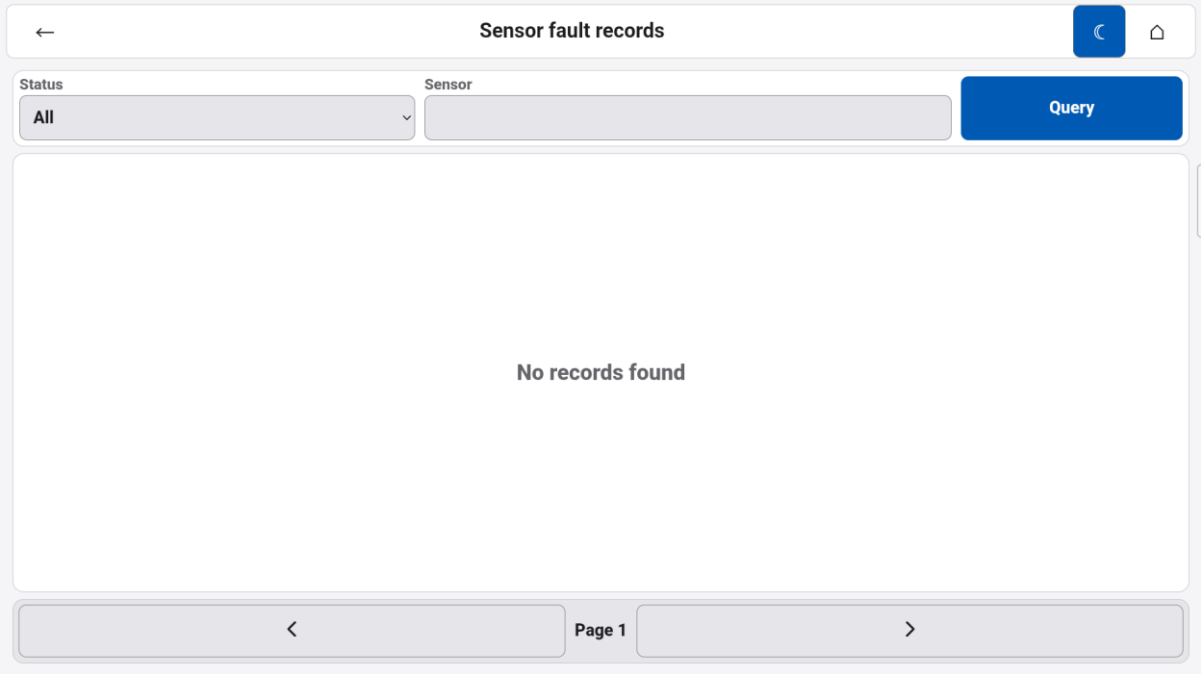


Figure 20-1 Sensor fault records (tablet)

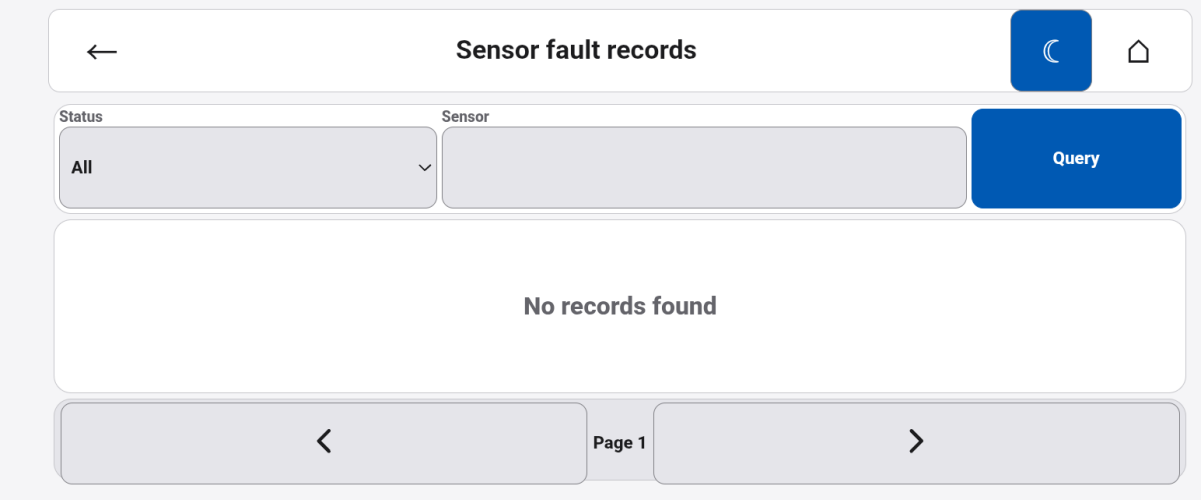


Figure 20-1 Sensor fault records (phone)

20.1 Querying Fault Records

Field / button	Description
Status	All, Active, Resolved.
Sensor	Filters by the sensor's internal ID; normally leave it blank (entering a serial number as shown on the screen does not filter the list).
"Query"	Updates the list according to the conditions.
Fault alert	Error message; the color bar on the left: yellow means a warning, red means a stop-type error.
Status	Active / Resolved.
Sensor serial number, sensor model, wireless channel	The sensor on which the error occurred (not necessarily the sensor currently in use).
Occurred at, Cleared at	When the error is still active, the cleared time shows "--".
Work impact	"Warning only" or "Work stopped".
"‹", "Page N", "›"	Page through the list, 20 records per page.

1. Set "Status" to "Active" and tap "Query" to see the errors that still exist.
2. Handle the error according to "Work impact" and the error message (section 20.2).
3. To trace the history, set "Status" to "All" or "Resolved" and query.

20.2 Error Codes and Handling

Code	On-screen message	Work impact	Action
0x01	Low battery - Charge as soon as possible	Warning only	Charge or replace the battery as soon as possible to avoid automatic shutdown during work.
0x02	Torque overload - Automatic power-off protection	Work stopped	Stop applying force immediately and check whether the sensor specification was exceeded; send the sensor for calibration to confirm.
0x04	Zero drift - Recalibration required	Work stopped	Stop using it and send it for calibration.
0x08 / 0x10 / 0x20	Hardware damage - Return for service	Work stopped	Stop using it and contact the supplier to return it for service.
0x40	5,000 cycles reached - Calibrate before further use	Warning only	Arrange for calibration.

20.3 Errors During Work

- Warning-only errors: a yellow "Sensor fault Warning only" banner appears at the top of the work screen, and you can continue working.
- Stop-type errors: a "Sensor fault" dialog appears and blocks work; tap "Go to sensor pairing" to handle it. Stop applying force first, and do not continue working just by reconnecting.
- If the screen shows "Sensor fault monitoring is not running - faults will not be detected", fault monitoring is not working; restart TMS in a safe state. If it keeps happening, contact the supplier.
- When notifications are allowed, errors are also shown as Android system notifications.

20.4 Low Battery Alert Rules

A warning is shown when the battery level is ≤ 10% for 2 consecutive seconds, or at once when the sensor itself reports low battery (a single 0% packet right after the sensor wakes up does not trigger the warning), but measurement is not interrupted. After the warning appears, the alert disappears only after a battery level of ≥ 20% has been received continuously for 5 seconds and the sensor's low-battery flag has cleared; a level between 11% and 19% does not clear the alert, to prevent the prompt from flickering.

Chapter 21 Daily Workflow and Maintenance

21.1 Checks Before Each Shift

Item	What to check	Result
Software version	The version number and build date on the login screen are correct.	□
Receiver	OTG contact is good, and the pairing screen shows "Paired".	□
Sensor	Model and serial number are correct, the battery level is sufficient, and the sensor is within its calibration validity period.	□
Parameters	Unit, target torque, tolerance, seating torque, target angle and torque multiplier ratio match the work instruction.	□
Trial measurement	Measure a test piece once and confirm that the reading, judgement and record saving are normal.	□
Barcode scanner	Scan a known barcode and confirm that it is entered in the part number field with the leading zeros correct.	□
PLC (optional)	Communication status is "Listening", and the PLC reads the latest result sequence number.	□

21.2 After Each Shift

1. Stop applying force, confirm that the last result has been saved, then leave the work screen.
2. Export the shift's records by date and mode, and confirm that the file can be opened.
3. Record any problems during the shift: time of occurrence, mode, sensor serial number, channel and on-screen message.
4. Turn off the sensor power and charge the sensor.
5. When Modbus TCP is not used, set the communication status to "Disabled" and save.

21.3 Recommended Periodic Maintenance

Interval	Item
Weekly	Export and back up the records to the company server; check the storage space of the Android device (keep at least 1 GB free).
Monthly	Check "Sensor fault records" for active errors; check the OTG adapter and the receiver contacts.
Per calibration interval	Send the sensor for calibration (or when the 5,000-cycle prompt appears).
When the version is updated	Install over the existing app (install -r) as described in section 3.5, and complete the check before each shift after the update.

Chapter 22 Troubleshooting

Symptom	Possible cause	Action
Cannot install the APK	Not ARM64, Android version too old, insufficient space, or different signature.	See section 3.3.4; if the signature is different, do not uninstall first.
After opening, "Make the window larger." keeps showing	The app window is narrower than 320 or shorter than 360 (CSS pixels): split screen, a floating window, or a very large font size or display scaling.	Close split screen or the floating window, and reduce the font size or display size.
Login shows "Incorrect username or password"	Wrong account or password, or the account is disabled.	Check the account and password; ask an administrator to confirm the account status.
The login screen shows "Unable to load sign-in status"	The app could not read its sign-in status.	Tap "Retry"; if it keeps appearing, close and reopen the app (section 5.2).
"Failed to load or save settings" is shown	A field is out of range, there is no permission, or no sensor is selected.	Correct the fields (section 11.5); confirm the permissions.
Target Torque is blank after opening the parameter screen	The sensor in use is not the one the setting was saved with, or the setting is new.	Tap the field, read the allowed range at the bottom of the screen, and enter the value (section 11.7).
"Receiver not detected" is shown	Poor OTG contact, receiver not powered, or USB not allowed.	Plug it in again firmly and tap "Detect wireless receiver again".

Symptom	Possible cause	Action
Receiver light is on but there is no reading	Sensor is off, channel mismatch, or not paired.	Check the sensor power and channel; on the pairing screen, tap "Connect and use" on the correct sensor.
"RF link timed out" appears	The sensor is off or too far away.	Stop applying force, confirm that the sensor is on, and move it closer to the receiver.
Battery shows "—"	Battery data has not been received yet.	This does not mean 0%; wait a moment, and if it keeps showing, check the sensor connection.
Torque Measurement shows "Conditions not met"	Seating torque was not reached, or the target angle was not exceeded.	Check the conditions and measure the same part again.
Batch progress does not increase	The result is NOK or conditions not met.	Only OK increases the progress.
No curve on the work screen	The work screen of this version does not show a live curve.	After an NOK result, tap "Data Curve" (section 12.10); for other results, view the curve in the record details.
"Data Curve" shows "Load failed: No data points"	The curve data of this result could not be read. Only the user who made the measurement, with the "Run measurement" permission, can read it.	View the curve in the record details (section 18.3).
Main reading does not return to zero after release	Torque Wrench and Torque & Angle keep the peak value of this run.	Normal; it updates when the next force application starts.
Export fails	No data, no permission, or the folder cannot be written to.	See section 18.8.

Symptom	Possible cause	Action
PLC cannot read data	Service not enabled, or IP / Port / Unit ID mismatch.	See section 19.6.
Screen freezes or behaves abnormally	Insufficient system resources.	End the measurement, force-stop TMS and reopen it; if it keeps happening, record the version and the operating steps and contact the supplier.

22.1 What to Prepare Before Contacting the Supplier

- TMS version number and build date (below the brand text on the left of the login screen).
- Android device model and Android version.
- Work mode, sensor model and serial number, wireless channel.
- Time of occurrence, operating steps and the complete error text on the screen (a photo or screenshot is fine).
- Do not include any passwords in the report.

Appendix A Judgement Rules Overview

Work Mode	Basis of judgement	Notes
Torque Wrench	Peak torque within the torque limits is OK.	Judged only after full force has been applied and released.
Power Tool	Peak torque within the torque limits is OK.	Pulse count and work time do not affect the judgement.
Torque Measurement	Angle-point torque at the target angle within the torque limits is OK.	Angle-point torque must be greater than half of the lower limit; otherwise the result is "Conditions not met".
Torque & Angle (live angle)	OK if the maximum valid angle satisfies ≥ / ≤ the target angle.	Seating torque must be reached first.
Torque & Angle (live torque)	Peak torque within the torque limits is OK.	The angle is still displayed and saved.
Batch Jobs	Each step is judged by the mode of that step; only OK advances the progress.	When a full round is completed, a batch-completed message is shown and the next round starts automatically.

Appendix B Field Limits Quick Reference

Field	Valid range / limit	Default
Username	1–64 characters	—
Password	1–256 bytes	—
Station	0–64 characters	Blank
Part number (Parameters screen)	0–128 characters	Blank
Part number (work screen)	0–64 characters	Blank
Target Torque	Minimum (10% of the sensor specification, 5% for the 10 N·m sensor) to 100%; multiplied by the torque ratio when the multiplier is checked	Blank (must be entered)
Tolerance %	0 ≤ tolerance < 100	10%
Seating Torque	0 or more	20% of specification
Target Angle	1° up to the smaller of 360° and 3276.7 ÷ gear ratio	1°
OK count per batch (single mode)	Positive integer from 1 to 999	1
OK count per batch (Batch Jobs step)	Integer of 1 or more	1
Torque ratio / gear ratio	> 0 (at least 0.001 for Batch Jobs)	1
Work time (Power Tool)	0 or more, up to 3 decimal places (seconds)	—
Wireless channel	3–62	49
TCP Port	1–65535	1502
Unit ID	1–247	1
Job name	1–64 characters	—

Appendix C Torque Unit Conversion

Unit	1 unit = N·m	1 N·m =	Shown for 50 N·m
N·m	1	1	50.00
kgf·cm	0.0980665	10.1972	509.9
kgf·m	9.80665	0.101972	5.10
ozf·in	0.00706155	141.612	7,081
lbf·in	0.112985	8.85075	442.5
lbf·ft	1.35582	0.737562	36.88

Appendix D Modbus Address Map

Addresses are 1-based; INT32 ×1000 values must be read as signed integers and divided by 1000; multi-register data is high word first. This table uses the same data definition as the "Modbus Register Map" in the app (shared specification 1.0, 2026-10-25); a scale of "—" means a code or bit field, which cannot be converted directly.

Address	Data name	Type	Scale	Function code	Description
30001	Protocol.Magic	UINT16	1	FC04	Fixed at 21581 (0x544D); used to confirm the data format.
30002	Protocol.VersionMajor	UINT16	1	FC04	Protocol major version, fixed at 2.
30003	Protocol.VersionMinor	UINT16	1	FC04	Protocol minor version, fixed at 0.
30004	Protocol.Capabilities	BITFIELD	—	FC04	Supported feature bits 0–5 (Appendix E); fixed at 63 (0x003F) on Android.
30005	Protocol.TorqueScale	UINT16	1	FC04	Torque scale, fixed at 1000.
30006	Protocol.AngleScale	UINT16	1	FC04	Angle scale, fixed at 1000.
30007–30008	Protocol.BootId	UINT32	1	FC04	Data publication identity code; a change does not necessarily mean the app restarted (D4).
30009–30010	Data.Sequence	UINT32	1	FC04	Live data update sequence number, not the measurement count.
30011–30012	Result.Sequence	UINT32	1	FC04	Completed-result update sequence number; an increase means there is a new result.
30013	Data.Validity	BITFIELD	—	FC04	Validity bits 0–7 (Appendix E); check them before reading values.
30014	Controller.Status	BITFIELD	—	FC04	Status bits 0–7 (Appendix E).

Address	Data name	Type	Scale	Function code	Description
30015	Mode.Live	UINT16	—	FC04	Current work mode code (Appendix E).
30016	Mode.Result	UINT16	—	FC04	Work mode code of the completed result.
30017	Unit.Live	UINT16	—	FC04	Live torque unit code (Appendix E).
30018	Unit.Result	UINT16	—	FC04	Torque unit code of the completed result.
30019	Batch.PsetId	UINT16	1	FC04	Current batch recipe number; 0 = not set.
30020	Batch.ActiveStep	UINT16	1	FC04	Current batch step, counted from 1; 0 = not set.
30021	Result.QC	UINT16	—	FC04	Judgement result code 0–3 (Appendix E).
30022	Result.DetailFlags	BITFIELD	—	FC04	Judgement reason bits 0–6 (Appendix E).
30023	Tool.ErrorFlags	BITFIELD	—	FC04	Tool error set; on Android it is generated from the current RF faults and differs from the Windows bits (D3).
30024	Sensor.BatteryPercent	UINT16	1	FC04	Battery level 0–100%; 65535 = unknown.
30025	Sensor.ModelCode	UINT16	—	FC04	Raw sensor model code; 0 = unknown.
30026	Sensor.State	BITFIELD	—	FC04	Sensor state bits 0–2 (Appendix E).
30027–30028	Sensor.Serial	UINT32	1	FC04	Sensor serial number (decimal); 0 = unknown.
30029–30030	Sensor.CapacityNm	INT32	1000	FC04	Sensor specification (N·m), e.g. 10000 = 10 N·m.
30031–30032	Torque.Live	INT32	1000	FC04	Live torque; for the unit see Unit.Live.

Address	Data name	Type	Scale	Function code	Description
30033–30034	Angle.Live	INT32	1000	FC04	Live angle (°), e.g. 90500 = 90.5°.
30035–30036	Torque.Final	INT32	1000	FC04	Final torque of the most recent completed result; for the unit see Unit.Result.
30037–30038	Angle.Final	INT32	1000	FC04	Final angle (°) of the most recent completed result.
30039–30040	Torque.Target	INT32	1000	FC04	Target torque used by the result.
30041–30042	Angle.Target	INT32	1000	FC04	Target angle (°) used by the result.
30043–30044	Torque.Lower	INT32	1000	FC04	Lower acceptable torque limit used by the result.
30045–30046	Torque.Upper	INT32	1000	FC04	Upper acceptable torque limit used by the result.
30047–30048	Angle.Lower	INT32	1000	FC04	Lower acceptable angle limit (°) used by the result.
30049–30050	Angle.Upper	INT32	1000	FC04	Upper acceptable angle limit (°) used by the result.
30051–30052	Batch.CompletedOk	UINT32	1	FC04	Number of accepted results in this batch; only OK is counted.
30053–30054	Batch.Size	UINT32	1	FC04	Total number planned to be completed in this batch.
30055–30056	Pulse.Count	UINT32	1	FC04	Pulse count of this result.
30057–30060	Result.TimestampMs	UINT64	1	FC04	Completion time, in milliseconds since 1970-01-01 UTC; 0 = unknown.
30061–30062	Sensor.AgeMs	UINT32	1	FC04	Age of the sensor data in milliseconds; 4294967295 = unknown.

Address	Data name	Type	Scale	Function code	Description
30063–30064	Result.AgeMs	UINT32	1	FC04	Age of the completed result in milliseconds; 4294967295 = unknown.
40001	Command.Version	UINT16	1	FC03	Command protocol version, fixed at 2.
40002	Command.Code	UINT16	—	FC03 / FC16	Command code 1–5 (Appendix E).
40003–40004	Command.Sequence	UINT32	1	FC03 / FC16	Non-zero command sequence number; use a new value for each new command.
40005–40006	Command.RevisionOrBootId	UINT32	1	FC03 / FC16	Command 1: enter the current settings revision (read 40026–40027); commands 2–5: Android does not check it, Windows requires BootId (D1).
40007	Command.PsetId	UINT16	1	FC03 / FC16	Batch recipe number 1–999 for command 2.
40008	Command.Mode	UINT16	—	FC03 / FC16	Work mode for command 1; Android accepts only 1–4.
40009	Command.Unit	UINT16	—	FC03 / FC16	Torque unit code 1–6 for command 1.
40010	Command.Condition	UINT16	—	FC03 / FC16	Torque judgement method 0 / 1 for command 1 (Appendix E).
40011–40012	Command.TargetTorque	INT32	1000	FC03 / FC16	Target torque ×1000, e.g. write 2000 for 2 N·m.
40013–40014	Command.TargetAngle	INT32	1000	FC03 / FC16	Target angle ×1000; used only in modes 3 and 4, enter 0 in the other modes.
40015–40016	Command.StartTorque	INT32	1000	FC03 / FC16	Seating torque ×1000; used only in modes 3 and 4, enter 0 in the other modes.
40017–40018	Command.Tolerance	INT32	1000	FC03 / FC16	Torque tolerance percentage ×1000, e.g. write 10000 for 10%.

Address	Data name	Type	Scale	Function code	Description
40019–40020	Command.AngleTolerance	INT32	1000	FC03 / FC16	Angle tolerance ×1000; used only in mode 3, enter 0 in the other modes.
40021	Command.Apply	UINT16	1	FC03 / FC16	Fixed at 42330 (0xA55A); written together with the whole command.
40022–40023	Reply.Sequence	UINT32	1	FC03	Command sequence number that the reply corresponds to.
40024	Reply.Status	UINT16	—	FC03	Command status 0–3 (Appendix E).
40025	Reply.Error	UINT16	—	FC03	Failure reason 0–8 (Appendix E).
40026–40027	Reply.Revision	UINT32	1	FC03	Current settings revision; the app updates it periodically; read it before sending command 1.

Appendix E Modbus Code Values

Register	Value	Meaning
Mode.Live / Mode.Result / Command.Mode	0	Not set (Command.Mode must not be 0)
	1	Torque Wrench
	2	Power Tool
	3	Torque & Angle
	4	Torque Measurement
	5	Batch Jobs (cannot be applied with command 1)
	6	Capability indices (Windows only; not used on Android)
Unit.Live / Unit.Result / Command.Unit	0	Not set (Command.Unit must not be 0)
	1	N·m
	2	kgf·cm
	3	kgf·m
	4	ozf·in
	5	lbf·in
	6	lbf·ft
Result.QC	0	No result yet
	1	Pass (OK)
	2	Fail (NOK)
	3	Repeated tightening (Rehit)
Command.Code	1	Apply parameters
	2	Select batch recipe

Register	Value	Meaning
	3	Lock tool
	4	Unlock tool
	5	Reset batch
Command.Condition	0	Plus/minus tolerance: target ± tolerance
	1	Target is the lower limit; target plus tolerance is the upper limit
Reply.Status	0	No reply yet
	1	In progress
	2	Success
	3	Failed (see Reply.Error for the reason)
Reply.Error	0	No error
	1	Busy (measurement or batch job in progress)
	2	Settings revision outdated (40005–40006 differs from the current revision)
	3	Parameter error
	4	Not found (for example, the batch recipe number does not exist, or no recipe has been selected yet)
	5	Not supported (for example, command 1 applying mode 5)
	6	Database error
	7	Tool unavailable
	8	Device communication error

Bit field	Bit	Meaning
Protocol.Capabilities (30004)	bit 0	Select recipe (Pset)
	bit 1	Tool control (lock / unlock)
	bit 2	Batch reset
	bit 3	Apply parameters
	bit 4	Battery level
	bit 5	Tool error
Data.Validity (30013)	bit 0	Live torque valid
	bit 1	Live angle valid
	bit 2	Completed result valid (final torque)
	bit 3	Session (currently fixed at 1 on Android; see D4 for the trigger conditions)
	bit 4	Sensor data is up to date
	bit 5	Value encoding error
	bit 6	Final angle valid
	bit 7	Battery level valid
Controller.Status (30014)	bit 0	Ready (sensor data is up to date)
	bit 1	Working (measurement cycle in progress)
	bit 2	Work completed
	bit 3	Dongle connected
	bit 4	Sensor data is up to date
	bit 5	Tool locked
	bit 6	Low battery (10% or below)
	bit 7	Tool fault (Tool.ErrorFlags is not 0)
Result.DetailFlags (30022)	bit 0	Torque below lower limit

Bit field	Bit	Meaning
	bit 1	Torque above upper limit
	bit 2	Angle below lower limit
	bit 3	Angle above upper limit
	bit 4	Repeated tightening (Rehit)
	bit 5	Sensor / tool fault
	bit 6	Data invalid (value encoding error)
Sensor.State (30026)	bit 0	Sensor selected
	bit 1	Paired
	bit 2	Data is up to date

On Android, Tool.ErrorFlags (30023) is generated from the set of currently active RF faults; its bit definitions and clearing conditions differ from Windows (D3), and this manual does not provide a bit-by-bit decoding; use Controller.Status bit 7 to determine whether there is a tool fault.

Appendix F Supported Interface Languages

Language	Name shown on screen	Number example	Date example
繁體中文	繁體中文	12,345.67	2026/10/16
English	English	12,345.67	10/16/2026
Japanese	日本語	12,345.67	2026/10/16
Italian	Italiano	12.345,67	16/10/2026
Portuguese	Português	12.345,67	16/10/2026
Spanish	Español	12.345,67	16/10/2026
Simplified Chinese	简体中文	12,345.67	2026/10/16
Korean	한국어	12,345.67	2026.10.16
Indonesian	Bahasa Indonesia	12.345,67	16/10/2026
German	Deutsch	12.345,67	16.10.2026
French	Français	12 345,67	16/10/2026
Vietnamese	Tiếng Việt	12.345,67	16/10/2026
Thai	ภาษาไทย	12,345.67	16/10/2026
Turkish	Türkçe	12.345,67	16.10.2026
Russian	Русский	12 345,67	16.10.2026
Arabic	العربية	12,345.67	16/10/2026

The Arabic interface is laid out right to left, but numbers always use the digits 0–9; Modbus address ranges are still displayed left to right. The native-speaker naturalness of each language translation has not been verified.

Appendix G Problem Report Form

If a problem occurs, fill in the table below and send it to the supplier together with photos of the screen:

Item	Details
Report date / time	
Reported by / department	
TMS version number / build date	
Android device model / Android version	
Work Mode	□ Torque Wrench □ Power Tool □ Torque Measurement □ Torque & Angle □ Batch Jobs
Sensor model / serial number / channel	
Part Number	
On-screen error message (full text)	
Operating steps	1. 2. 3.
Frequency	□ Every time □ Occasionally □ Once only
Actions already tried	