

ITREMOR MANUAL

Create a connection that makes your life easier



Itremor User Manual

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Revision 0.4

1 Introduction

1.1 About this manual

This manual will describe ITremor system and give you the information needed to operate the system safely. Please read this manual carefully before using ITremor. When reading the manual, pay special attention to the statements labelled **WARNING**. They indicate a situation where you or another person may be in danger of serious injury, or a situation in which the ITremor equipment may be damaged.

1.2 About ITremor

The ITremor control system allows you to control a wheelchair by inserting the ITremor Control Unit between the joystick and wheelchair. The Control Unit has a default user configuration or drive map. The configuration can be viewed and updated wireless from an Android device using the ITremor application. Each Control Unit can get a custom drive map tailored to the specific needs of the end user.

1.3 Symbols

Table 1 below explains the meaning of the symbols used on ITremor and its packaging.



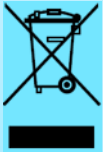
	Refer to documentation
	Device emits non-ionizing radiation
	Do not dispose in household waste

Table 1: Symbols used on ITremor

1.4 Contact and support

Support for the ITremor system is provided by the local dealer. See www.tks-technology.dk for the contact information of the local dealer. Having access to the ITremor system and an internet connection when you call will speed up the support process.

The ITremor is manufactured by:

TKS A/S, Niels Jernes Vej 10, 9200 Aalborg Øst, Denmark

1.5 Warranty

The warranty follow EU standard which gives a total period of 2 years from invoice date.

The warranty is only valid, if ITremor is used according to this User Manual and show no visible sign of unintended use. Use of the ITremor that falls outside the intended use is not covered by the warranty.

2 Setting Up

2.1 System overview

The ITremor consists of the following parts:

- Control Unit (CU).
- Android application (ITremor.apk). Download latest version here:
 - <http://www.tks-technology.dk/support>

WARNING: ONLY USE ITREMOR WITH ANALOG WHEELCHAIR JOYSTICKS.

2.2 Before using the ITremor for the first time

The ITremor should only be used by persons who, when the system is correctly configured, are capable of running a wheelchair in a safe manner.

Before each use of the ITremor system, please observe the following precautions.

1. Is damage to the control unit visible, for example cracks in the box or connectors?
2. Does the ITremor show evidence of faults?

Important: Setup of ITremor should only be performed by authorized service or installation technician.

2.3 Getting started with the wheelchair

The ITremor is compatible with the several control interfaces which support standard sub9 joystick for wheelchairs.

WARNING: DO NOT ATTEMPT TO CONNECT THE ITREMOR WHEELCHAIR CABLE TO OTHER WHEELCHAIRS OR CONNECTIONS. OTHER WHEELCHAIRS MAY NOT BE ABLE TO SAFELY INTERPRET ITREMOR SIGNALS. CONNECTING THE WHEELCHAIR CABLE TO OTHER OUTLETS THAN THE WHEELCHAIR CONTROL INTERFACE MAY DAMAGE YOUR ITREMOR.

When using ITremor with a wheelchair for the first time, please observe the following precautions:

1. Make a configuration and test with the end user.
2. Set the maximum speed of the wheelchair to match the user's capabilities.
3. First practice indoors before starting to use the system outdoors.

2.4 Suitable areas of use for ITremor

ITremor is intended for prolonged daily use. ITremor is intended to be used indoors and outdoors in dry weather. In rainy conditions, the Control Unit should be placed in a waterproof bag or cover.

The ITremor is not intended to be used at more than 90% humidity (non-condensing).

**WARNING: DO NOT USE THE ITREMOR UNCOVERED IN RAINY CONDITIONS.
THIS MAY DAMAGE THE SYSTEM AND IMPAIR ITS ABILITY TO CONTROL A WHEELCHAIR.**

Note: The ITremor control unit is not environmental classified which means that it's not guaranteed protection against the ingress of particles and protected against water.

WARNING: THE ITREMOR MUST BE COMPLETELY SWITCHED OFF DURING AIR TRANSPORT.

2.5 Storage

Maintain

- Temperature between 0°C and 45°C.
- Pressure between 80kPa and 110 kPa.
- Humidity between 15% and 95%.

WARNING: THE ITREMOR SHOULD NOT BE STORED AT HIGHER TEMPERATURES THEN SPECIFIED.

2.6 Faults or damage observed in the ITremor system

If a system fault is observed by the end user, or if the ITremor® system is damaged, a service technician needs to make a system check and evaluate what have to be done.

2.7 Disposing of the ITremor

Deliver the ITremor to an electronic waste disposal site or return it to a dealer for proper disposal.

**WARNING: DISPOSING OF ITREMOR IN HOUSEHOLD WASTE MAY RELEASE
DANGEROUS SUBSTANCES INTO THE ENVIRONMENT.**

3 User guide for the ITremor Application

3.1 Introduction

The ITremor control unit is configurable from an Android smart device. The Android device must support Bluetooth Low Energy (BLE).

The ITremor application can be downloaded from <http://www.tks-technology.dk/support>.

A password is required for making updates in the configuration of a control unit.

**WARNING: DO NOT GIVE THE PASSWORD TO THE END USER.
UPDATE OF THE CONFIGURATION MUST ONLY BE PERFORMED AUTHORIZED SERVICE PERSONNEL.**

3.2 Connecting to the Control Unit

An ITremor Control Unit broadcasts approximately 3 radio “pings” each second using the BLE protocol. The “ping” announces an ITremor Service.

The application listens for broadcasted “pings” and automatically tries to make a connection to the unit announcing the Service.

If several control units are powered on at the same time, the unit with the strongest radio signal is selected. Hint: In that scenario move the smart device close to the specific control unit you want to connect.

Note: The Service only has read permission to the Control Unit’s configuration. Write permission requires login with a password.

3.3 Login

The ITremor application will ask the user to type his/her login credentials.

The password is valid for 10 minutes or until the application is closed. If the application is closed and opened again within 10 minutes, no re-typing of the password is required.

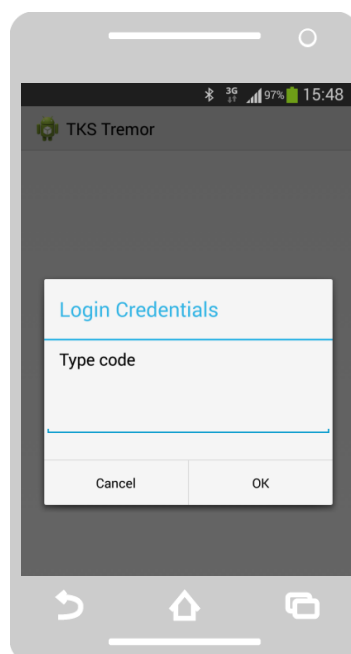


Figure 1: Login

3.4 Main Menu

After a successful login the “Main Menu” screen is presented.

The name of the connected Control Unit is visible in the top bar of the app (Figure 2 as “TKS Tremor 1011”).

Note: Verify the name is correct and has the ID of the unit you want to connect to.

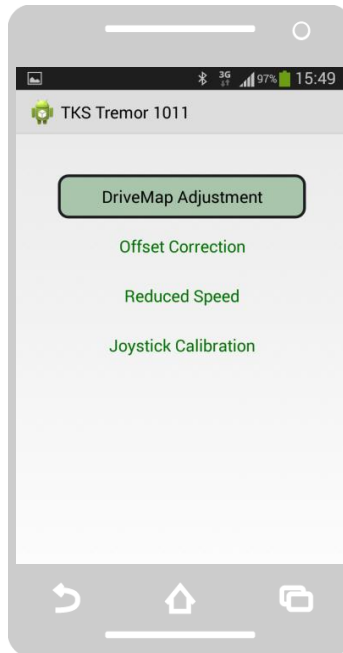


Figure 2: Main menu screen

From the “Main Menu” the following configuration screens are accessible:

- 1) DriveMap Adjustment.
- 2) Offset Correction.
- 3) Reduced Speed.
- 4) Joystick Calibration.

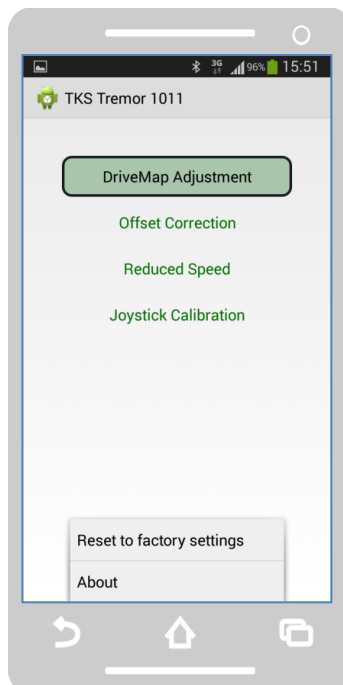


Figure 3: “Options” popup menu

Clicking on the option button for the “Main Menu” screen will show an option popup menu with the following items:

- 1) “Reset to factory setting”
- 2) “About”

Pressing the “Reset to factory setting” item instructs the control unit to reload default factory settings.

Pressing the “About” item system will display a popup with info such as firmware and hardware revisions. This “About” item is also present in the option menu for all other screens.

3.5 DriveMap Adjustment

The “DriveMap Adjustment” screen allows fine-tuning of the DriveMap configuration in the Control Unit.

The configuration can (and should) be tailored for the needs of each individual user.

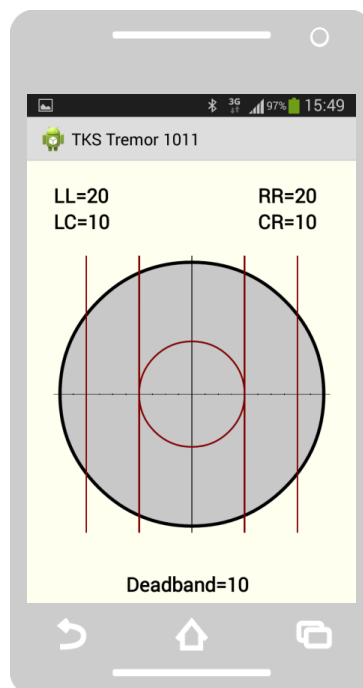


Figure 4: DriveMap Adjustment screen

An activated DriveMap in the control unit modifies the input signals from the Joystick to help a person with tremors to keep the direction.

The joystick area (figure 4) is broken up into smaller regions separated by movable lines:

- **LL - Left Left line**
- **LC – Left Center line**
- **CR – Center Right line**
- **RR – Right Right line**

Assigned functionality:

Turn left.	Area left of LL
Drive forward/backward, turning slightly left.	Area from LL to LC
Drive straight forward/backward.	Area between LC and CR
Drive forward/backward, turning slightly right.	Area from CR to RR
Turn right	Area right of RR

Inside the Deadband circle, the joystick is set to neutral and the wheelchair is stopped.

Clicking on the option button for the “DriveMap Adjustment” screen will show an option menu with the following items:

- 1) “Switch DriveMap On/Off”
- 2) “Draw Joystick Position”
- 3) “About”

DriveMap can be deactivated (or reactivated) by pressing the “Switch DriveMap On/Off” item. This feature is useful during a demonstration of ITremor system.

Note: The DriveMap is by default activated.

The “Draw Joystick Position” item makes it possible to get the joystick position displayed in real-time on the smart device.

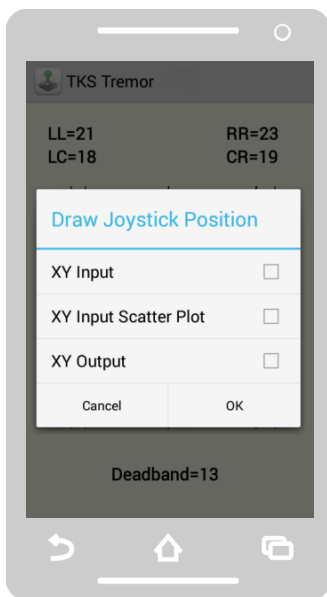


Figure 5a

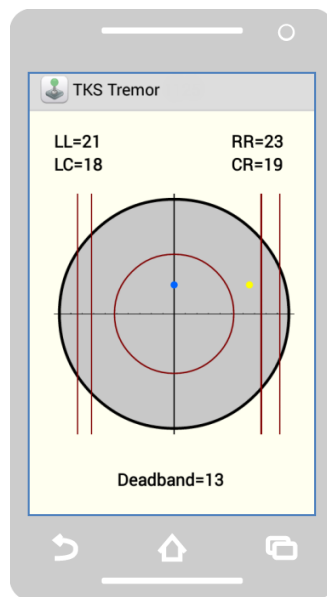


Figure 5b

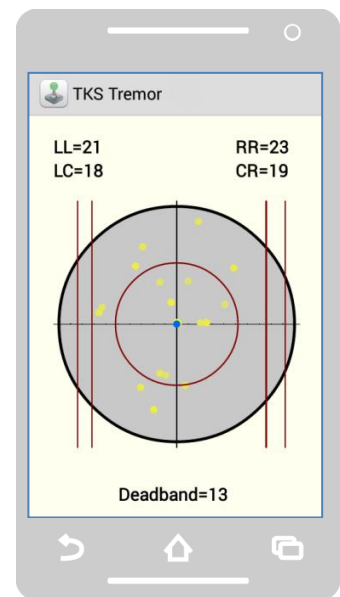


Figure 5c

This gives several possibilities for real-time visualization of what the user is doing with the joystick, and how the ITremor system responds to the user input:

Option checked	Plot
"XY Input"	Input joystick position is drawn with a yellow dot on the screen
"XY output"	Output joystick position is drawn as a blue dot on the screen.
"XY Input scatter plot"	<p>Multiple input joystick positions from the last 6 seconds are plotted. Each dot start as a solid yellow colour becoming progressively faded out with time before finally disappearing after 6 seconds.</p> <p>Note: When option "XY Input" is enabled together with "XY Input scatter plot" the current joystick position is plotted in an orange colour to help differentiate it from the other yellow dots used by the "XY Input scatter plot".</p>

3.6 Offset Correction

A wheelchair should in principle drive in a straight line when joystick x-input is zero. However in practice most wheelchairs will begin to drift slightly to the left or to the right after having moved some distance. The control unit can compensate for this inaccuracy by applying an offset correction.

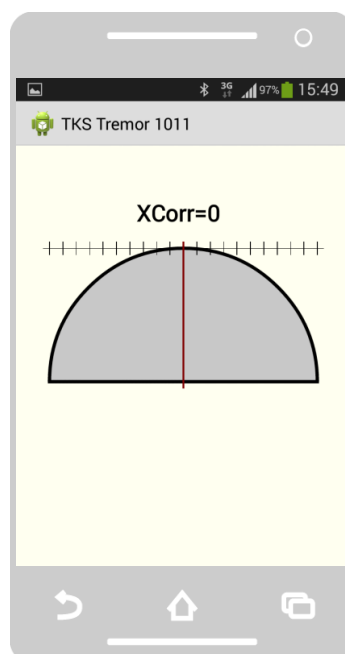


Figure 6: Offset Correction screen

The vertical line “XCorr” in Figure 6 is a visualization of the value used by the control unit. Moving the line left or right updates the value in the control unit.

3.7 Reduced Speed

The “Reduced Speed” feature is de-activated by default. The purpose of the functionality is to stop the wheelchair, if the joystick used for input is pushed or pulled out to an extreme position. This “Reduced Speed” can be set to ON or to OFF by clicking on the “Set Reduced Speed Active” item in the option menu. The option menu has the following items:

- 1) “Set Reduced Speed Active”
- 2) “About”

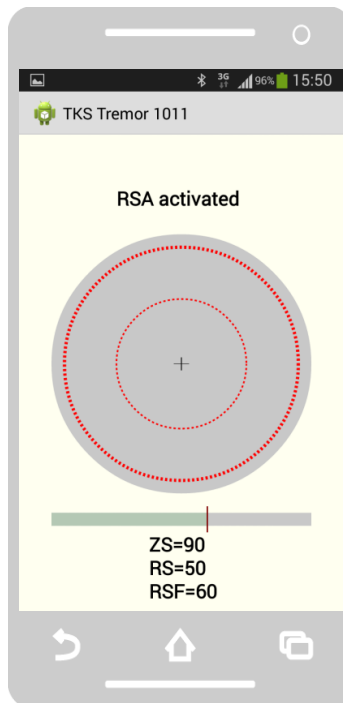


Figure 7: Reduced Speed screen

With “Reduced Speed” active (RSA=ON) the following extra areas with new functionality are added to the DriveMap:

Zero Speed	ZS	<p>The Zero Speed border line is marked as a heavy dotted circle on the screen. ZS = 90 means 90% of joystick full movement.</p> <p>When this border is reached the wheelchair stops. The wheelchair remains stopped until the joystick is released and moved back to neutral position.</p>
Reduced Speed	RS	<p>The Reduced Speed border line is marked as a light dotted circle. RS = 50 means 50% of full joystick movement.</p> <p>When this border is reached or exceeded the wheelchair’s speed will be reduced by an amount determined by Reduced Speed Factor (RSF). As an example, if RSF is equal to 60, speed is reduced to 60% of its normal value.</p> <p>The value of Reduced Speed Factor is set by the green bar.</p>

Note: If “Reduced Speed” is ON, maximum joystick travel as seen by the wheelchair may be too limited (with some combinations of ZS, RS and RSF) to allow navigating in the wheelchair’s own menu system. A certain amount of joystick activation is required for the menu system to work properly.

3.8 Joystick Calibration

The wheelchair system expects a specific input voltage for the joystick to be considered in neutral. When installing the iTremor system, it may be necessary to calibrate the control unit to insure, that its output match the input levels expected by the wheelchair. Turn on the OMNI and navigate to “Joystick Calibration” section (OBP Menu→System→Joystick Calibration). A Screen like Fig.8 appear. This procedure is best done by a service technician with knowledge of both the wheelchair system and iTremor.



Figure 8: Wheelchair joystick calibration screen

The calibration is performed by looking at the values displayed in the wheelchair’s joystick calibration screen while changing the parameters in the “Joystick Calibration” screen of the application.

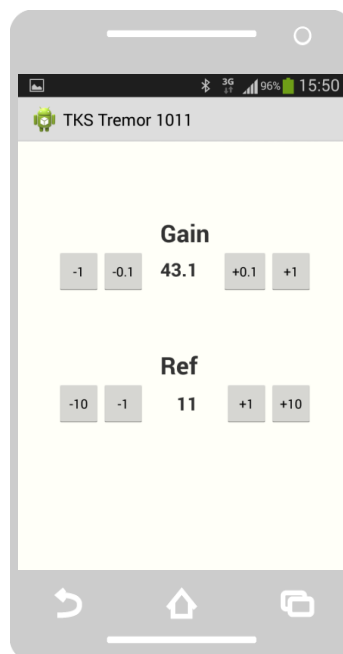
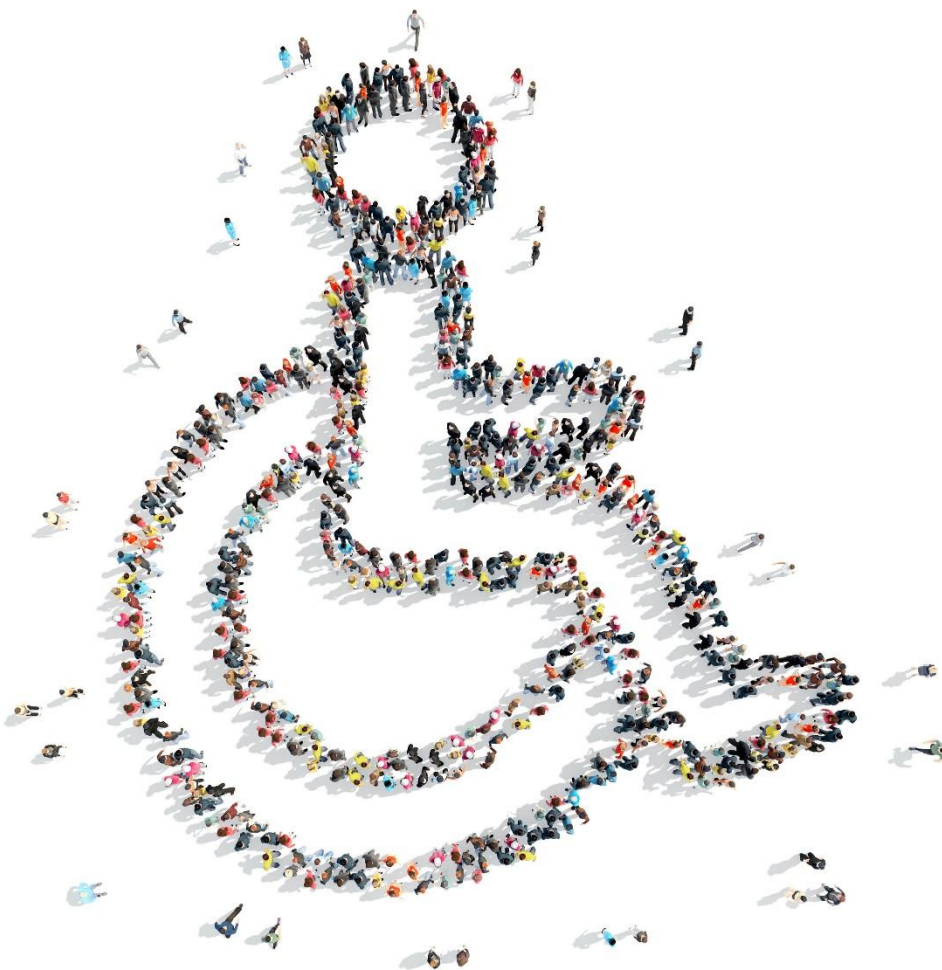


Figure 9: Joystick Calibration screen

With the joystick set in neutral, try to change the Gain and Ref-parameter until the values displayed by the wheelchair calibration screen are close to zero.

Typical values for Gain and Ref are from 43 to 44 – or not too far from this interval.



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Itremor is CE approved