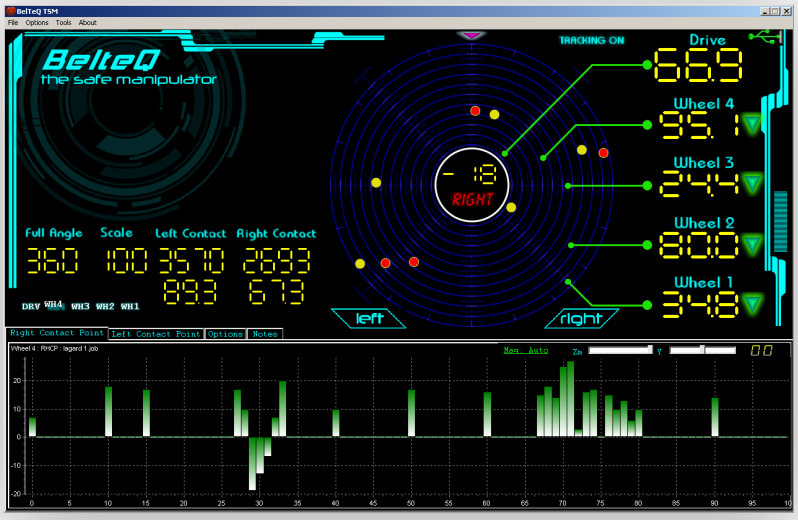
Software User Guide

BELTEQ

The Safe Manipulator



Hi-Tech Tools for Professionals

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SECTION 1.01 PARTS LIST

- High Resolution Rotary Encoder
- Oldham Flexible Couplings
- TSM USB Interface
- Allan Key 1 x 1.5mm
- Mini Cantilever Arm
- Magnetic Base
- Super Glue

ARTICLE II. TSM INSTALLATION

SECTION 2.01 PC & OS SPECIFICATIONS

The minimum requirements to run the TSM Software :

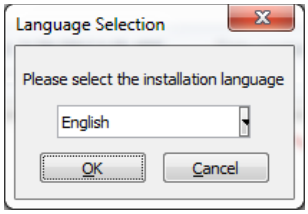
Pentium 4, 1 GHZ CPU, 1 GB RAM, 20 GB Hard Disc
MS Windows XP
1x USB 2.0 Socket

TSM Software
Download the latest program version
www.BelTeq.de

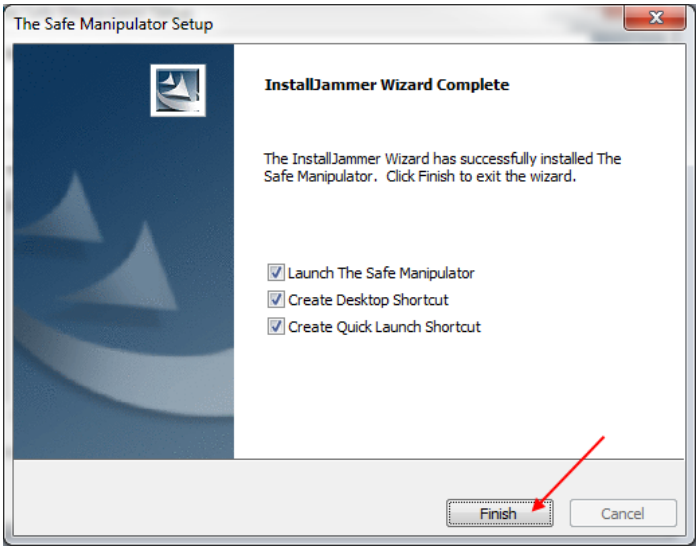
Please check our website regularly for updates to the TSM software. We will update the program with feature requests and fix any bugs that may have been discovered.

If you would like to report any problems or you would like to request new functionality / features, please email us at requests@BelTeq.de

Double Click the BelTeq-TSM-2012.exe installation file and follow the installation sequence.



..... and finally ..



SECTION 2.03 AUTOMATIC DRIVER INSTALLATION..

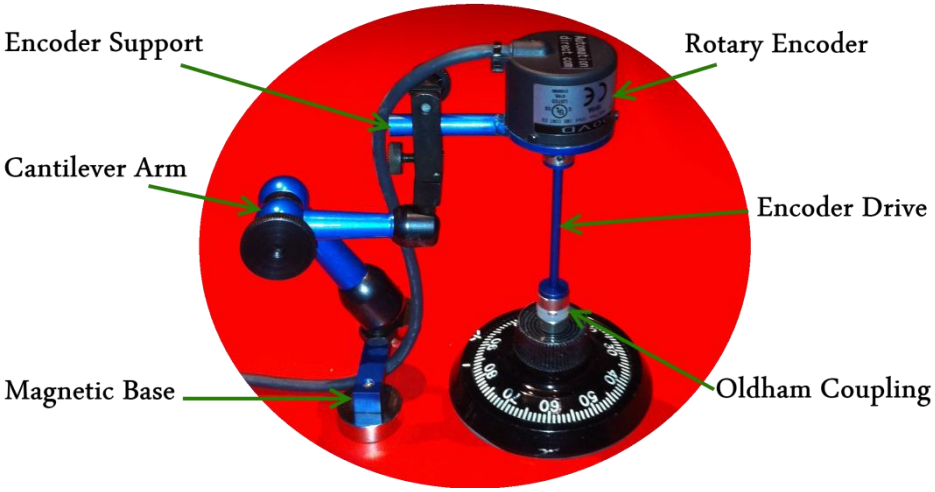
The Safe Manipulator driver is installed automatically, however, in cases where the driver has not installed correctly then please follow the steps…

1. Connect the Rotary Encoder to the TSM USB Interface
2. Connect the TSM Interface to a spare USB socket
3. Open the Windows Hardware Control Panel
4. Locate and select the USB device with a yellow symbol. The device is marked as 'USB – Serial Cable'
5. With your mouse, right click on the device and select 'Update Driver Software'
6. Select 'Browse my computer for driver software'
7. Now navigate to the folder where you expanded the downloaded driver.zip file
8. Select Next
9. Check the 'Include Subfolders' option and click next
10. Next, agree to install the driver
11. You should now be notified that the driver installed correctly
12. In the device manager, the device should now be listed correctly without errors

Note:If the PC is connected to the internet, Windows can also download and install the driver automatically

ARTICLE III. TSM ASSEMBLY

SECTION 3.01 STEP BY STEP..



1. Attach/glue an Oldham flexible coupling to the center of combination dial
2. Attach the Magnetic Base to the Cantilever Arm and position on the safe
3. Attach the Oldham coupling between the Encoder Drive & Combination Dial
4. Move the rotary encoder and Encoder drive on the cantilever arm so that the Oldham flexible coupling engages with the one on center of the combination dial
5. Rotate the combination dial to check the encoder alignment and adjust as necessary
6. Connect the TSM USB interface to the end of the rotary encoder cable
7. Plug the TSM USB interface into a spare USB port of the pc
8. Click 'Start/Programs/BelTeq/TSM/Launch TSM'

Note: If the TSM software does not display the 'Wheels' or react to rotation of the encoder drive, then unplug the USB adapter wait for 5 seconds then re-insert the USB connector. (Do not exit the program)

ARTICLE IV. TSM MOUNTING POSITION

The positioning of 'The Safe Manipulator' requires careful planning. However, through practice the user will become quickly able to position the Magnetic Base, Cantilever Arm & Encoder.

Generally though, a position of 9'oclock through to 3'oclock (clockwise) for right handed users is good.

SECTION 4.01 EXAMPLE MOUNTING

e.g.

The Safe Manipulator is so accurate, that, when coupled with its operating principles and an Experienced Safe Engineer it can in many cases plot even the smallest deviations in wheel circumference e*ven those caused by the combination change mechanism. See Section...*

1. High resolution position sensing
2. Small, lightweight and quick to assemble
3. Alternative Dial types are supported
4. Various Dial scales are supported
5. Software Model accurately tracks the pick up points of the wheels (3 & 4 wheels are supported)
6. Visual realtime plotting of the relative position of the wheels, and found combinations
7. All the work can be saved and recalled

I. Lightweight Kit of parts
II. Quick Assembly
III. Designed for Display resolution of 1280x800

ARTICLE V. TSM LIST OF FUNCTIONS

SECTION 5.01 FUNCTIONS

I. TSM Zeroing

Rotate the dial and position the marker on 'Zero'

This is a necessary calibration step, the software then uses this point as a relative marker.

II. TSM Dial (Angle)

a. On most Dials the used portion of the Dial exists throughout the complete 360 degree circumference. However, on some, the Dial 'numeric scale' exists over only a portion of the circumference. For this type, please rotate the dial to the last marker and click 'Set Angle'.

b. If this is a standard Dial where the numeric scale exists throughout the complete circumference, then please do not move the Dial, leave it at '0' and click 'Set Angle'

III. TSM Scale

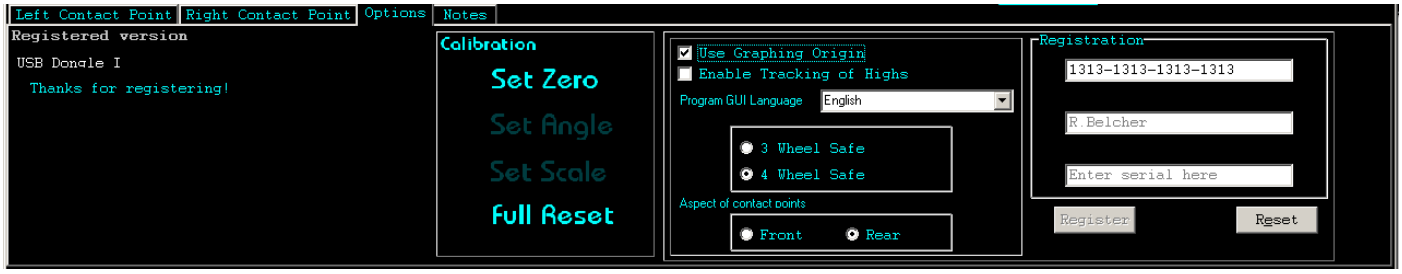
a. On most safes this would be 0 to 99, there are variation of course. If the scale is 0 to 80 then rotate the Dial to 80 and click on 'Set Scale'.

b. If the Scale is 0 to 99 then leave it at '0' and do not move the Dial, just click 'Set Scale'.

c. This is a necessary calibration step, the software then uses this point to set the Dial Scale.

IV. TSM Contact Points

Both 'Left' and 'Right' contact point should be set before the user can attempt to manipulate the combination lock using measurements taken at the contact point regions.



V. TSM 3 & 4 Wheel Support

The TSM software can be used on 3 or 4 wheel Safes. Select the appropriate type. The software will then alter the on screen display to reflect the Wheel count.

VI. TSM Tracking of Highs

During the manipulation process when measurements are taken, the user can through this function, see the current highest point. This is represented by a small graphic symbol placed on the highest reading encountered.

VII. TSM Aspect of contact points

The view aspect of the contact points can be interpreted as seen from behind the lock mechanism or from in front. Depending on the users preference, this can be set with this option. This will alter the 'Left' & 'Right' Contact point relative viewpoint.

ARTICLE VI. TSM CONTACT GRAPHING

SECTION 6.01 THE CONTACT POINT GRAPHS

There are 10 graphs in total. Two per Wheel for Left & Right readings. Each reading taken can be accurately measured from +40 to -40. This equates to +/- 1 division on a standard 0 to 99 combination dial. The section of the program window is dedicated to taking readings and viewing the plotted results of your measurements.

SECTION 6.02 THE GRAPH CONTROLS

Keyboard Key	Function
Escape	Take Drive reading
F1	Take reading for Wheel 1
F2	Take reading for Wheel 2
F3	Take reading for Wheel 3
F4	Take reading for Wheel 4
Delete	Clear Drive Wheel readings
r	Reset all readings
z	Set Zero
f	Set Angle

ARTICLE VII. TSM WHEEL TRACKING

SECTION 7.01 WHEEL TRACKING

I. TSM Enable wheel tracking (TRACKING ON)

Enabling this option allows the display to show the relative position of the lock wheels including the Drive wheel. Enable this option to help visualize the lock internals during wheel parking etc.

II. TSM Combination Tracking

Used in conjunction with Wheel tracking, once a combination is found, the user then clicks the digital position display of the associated wheel. This then allows visual tracking of the 'Found' combination. A green triangle symbol lights to indicate the selection.

SECTION 7.02 SAVING YOUR WORK

To save your work, select 'Save' from the file drop down menu at the top left of the program window. In the Save Dialog that opens, give your file a name and select where you wish to save the file. When the TSM program is re-started, select 'Open' from the File dropdown menu and navigate to your saved file to load it. It will be necessary to re-calibrate the TSM program.

ARTICLE VIII. CALIBRATION SEQUENCE

I. ZERO set turn the dial at least 5 times and set the dial to zero then 'click' 'Set Zero'

II. Set Angle set the Angle, rotate the dial to the last marker on the dial circumference if the dial has a section without numeric markers then click 'Set Angle' otherwise do not move the dial, just click Set Angle.

III. Set Scale. Rotate the dial to the values of the Dial scale, e.g. if the scale is 0 to 80 then rotate the dial to read 80 then click Set Scale, otherwise leave the dial on '0' and click 'Set Scale'.

IV. 'RIGHT' set right hand contact point

V. 'LEFT' set left hand contact point

VI. Note: When taking readings, the computer automatically determines left hand and right hand contact point readings.

ARTICLE IX. TAKING CONTACT POINT READINGS

When you want to take a reading of Contact Points (when rotating the complete pack) press 'Escape'. This enters the contact point measurement into the Drive Wheel Graph. The TSM Software will determine whether it is a left or right contact reading.

To record the other wheels, press F1 for Wheel 1, press F2 for Wheel 2 etc.
Note:- It is advisable to run the Graph in the Auto mode.

ARTICLE X. USING THE GRAPHS

As previously mentioned, this product uses '0' as a reference point, along with Left & Right contact point references the TSM software plots the shape of the combination wheels. The resultant graphs depict not only the physical shape of the wheels but also physical movement that changes the literal point of contact and the effective wheel radius at that point.

Knowing this the user can interpret the graphed results in a new light. Ignoring the actual physical shape of the wheel, there are Two additional factors that affect the shape of the wheel.

The two factors derive from {1} Lateral motion of the wheel around the drive spindle causing a sinusoidal motion when rotated and {2} The combination change mechanism changing the shape of the wheel when altered, and thereby creating a sinusoidal result.
The results of the effects are seen when manipulation measurements are taken and plotted.

In locks where the change mechanism is centered with the Gate, then the graph will show a single 'hump'. (Caused by {1} & {2} With the change mechanism centered with the Gate.
Whereas, in locks where the change mechanism is offset from the Gate angle, a 'double hump' will be seen. Caused by {1} & {2}. With the change mechanism offset from the Gate.

These become fixed points of reference that depend on the direction of rotation and can be used effectively to determine the location of the Gate for a wheel. Furthermore, understanding this motion and result, the user can take advantage and apply this knowledge when parking the wheels during measurement.

The factors that affect the graph shape, phase and amplitude are:

1. Age, wear & Tear of the lock
2. Lock Type
3. Relative skill of the Safe Engineer
4. Direction of rotation prior to taking measurements

ARTICLE XI. BELTEQ TSM COPYRIGHT

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