LAING INNOTECH

Instruction manual LTC Wizard

Description on configuring LTC Controllers

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LTC Wizard

The controllers of the LTC series are supplied with a standard configuration that must be adapted to the respective application and the respective drives. This adaptation is carried out using the LTC Wizard, a Windows app that can be used to make all the necessary settings. After configuration, a configuration file is generated which can then be used to configure other controllers.

If the configuration file is sent with the order, the controllers are delivered preconfigured.

The necessary preparations and the use of the Wizard are described below.

Connecting the controller

- Connect the required number of motors to the motor outputs of the controller
- **Attention:** Observe the connection sequence! The port for motor 1 is located directly next to the control panel connection
- Connect the controller to the mains via the mains cable
- Plug one end of the programming cable (USB to RJ12) into the PC, the other end into the control panel connection of the controller

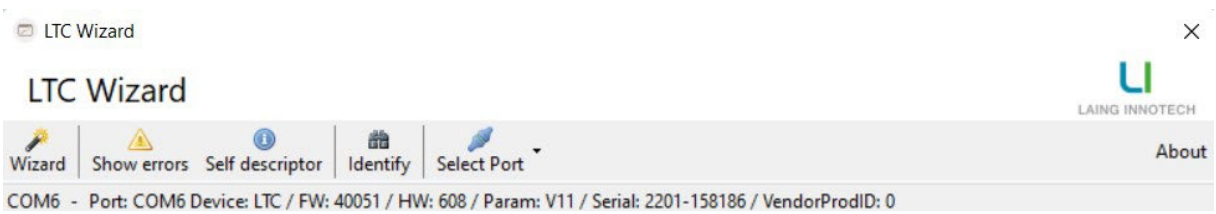
Download

LTC Applications (laing-controller.de) https://laing-controller.de/apps/

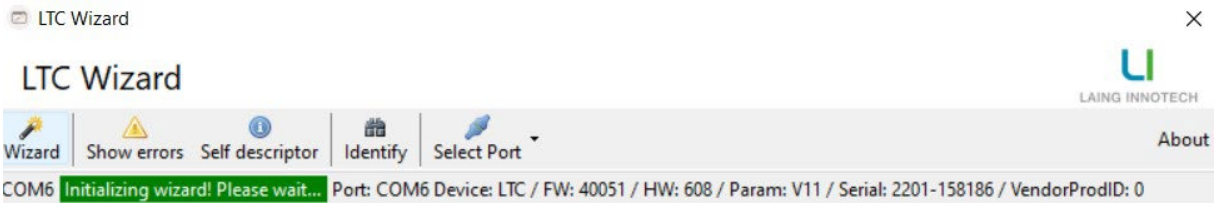
- Download and unzip LTC Apps Portable.
- Attention: all apps must remain together in the same folder!
- The user should have a folding rule ready, this will be needed during the first start-up

Open the application

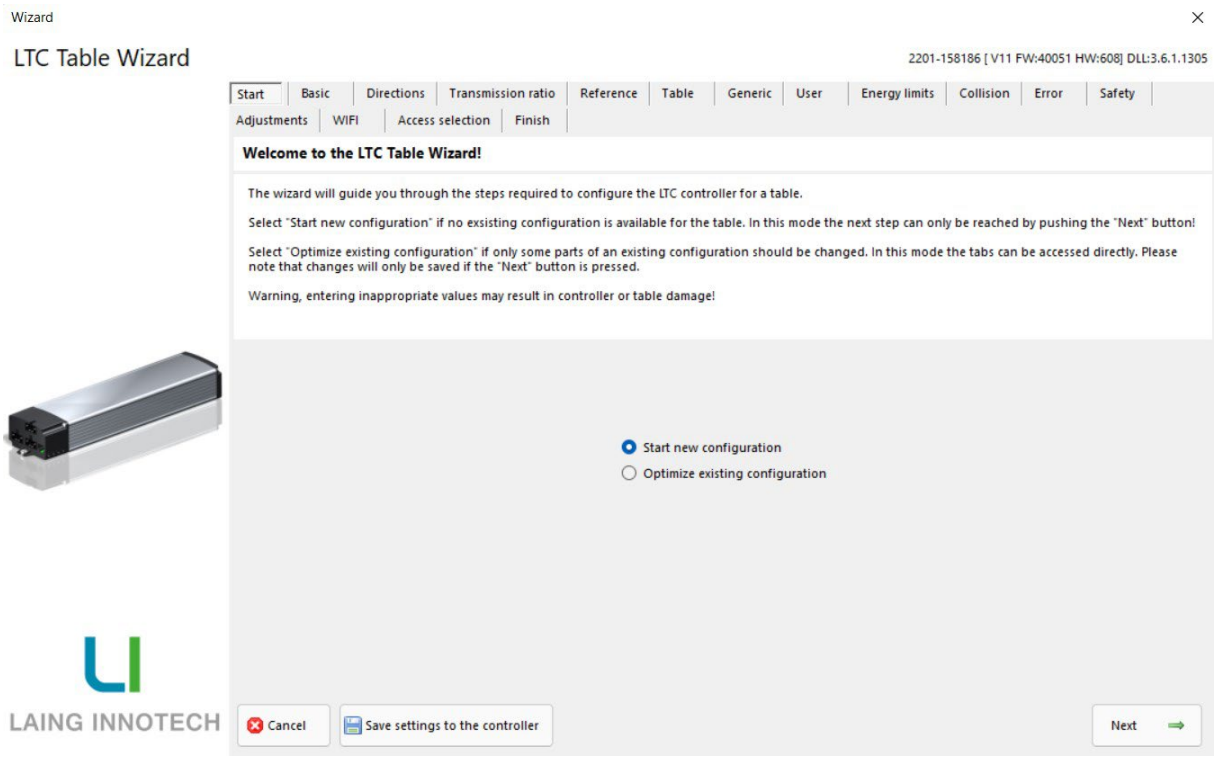
- Select LTC Wizard



- First select the appropriate port with *Select Port*. All ports are displayed, usually the lowest port is the correct one. If this is not the case, the other displayed ports must be tried out
- After selecting the port, *Identify* establishes the connection with the controller and the hardware and software parameters of the controller are then displayed in the status bar. If *Communicaton failed* appears instead of the status bar, another port must be selected
- **Caution:** If none of the displayed ports work (error message for each port: *Communicaton failed*), the LTC Cable Driver may also need to be downloaded and installed via the same link!
- Once the correct port has been found, the program can be opened selecting *Wizard*; this may take a few seconds



Start



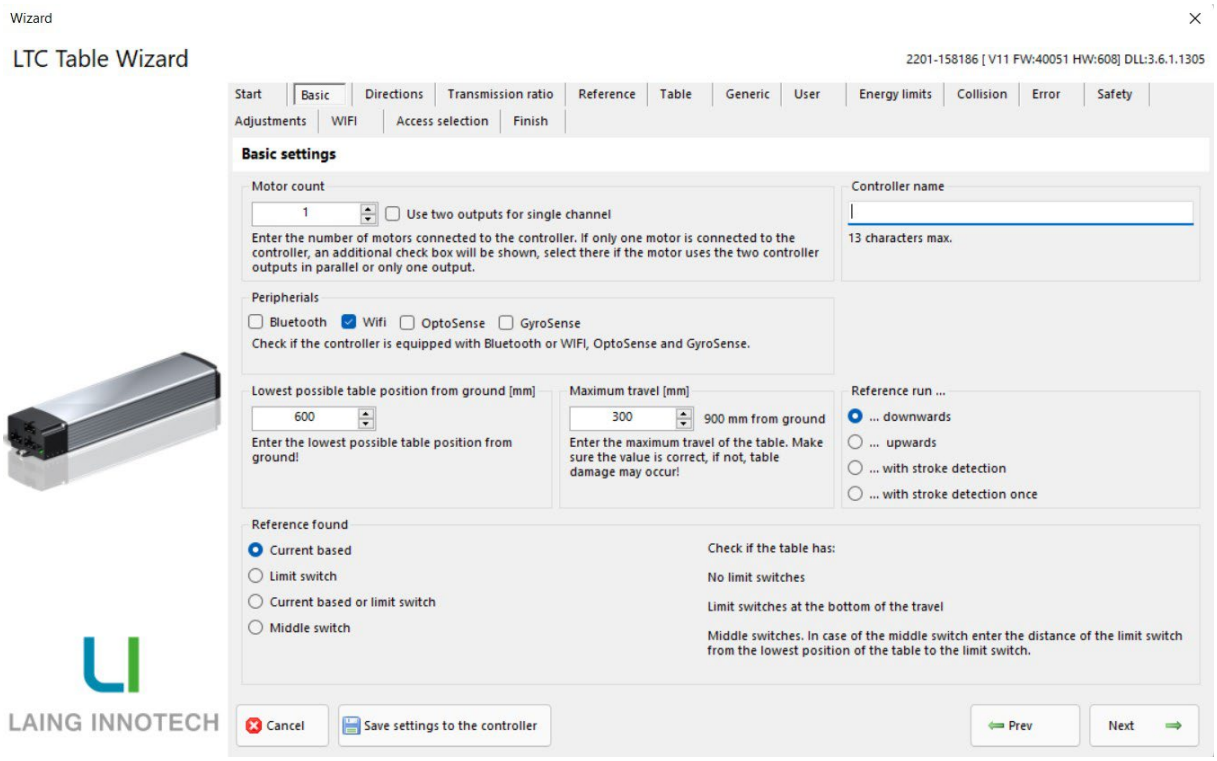
- On the start page, the user can choose between *Start new configuration* and *Optimize existing configuration*
- Start new configuration
    - Reset to factory settings of the controller

- Useful for initial commissioning/configuration
- The individual tabs can only be accessed via *Next* or *Prev* to ensure that the necessary settings are made in each tab

- Optimize existing configuration
  - The complete existing configuration from the controller is adopted and can be further optimized
  - The user can jump between the tabs as required to make individual changes

- Save settings to the controller
  - In each tab, the settings made can be saved permanently in the controller
  - **Attention:** if the save button is not pressed, the changed settings only remain active until the controller is disconnected from the mains! The previous settings are then active again. Settings can be saved at any time and as often as required

Basic Settings

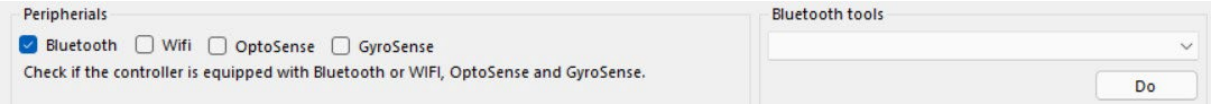


- Motor count
  - The number of connected motors is specified here (1-4)
  - If the number of motors is 1, *use two outputs for single channel* appears for selection; this allows the power from two motor outputs to be used in parallel if the power of one output is not sufficient
    - A special Y-cable is required for this purpose
    - Hall signals only exist at motor output 1

- If automatic motor detection (Generic; *Auto detect number of connected motors*) is used, the number of motors must be set to 1

- Controller name
  - If the controller has an integrated BLE module, a controller name with a maximum of 13 characters can be defined
  - Only relevant when using a smartphone app. The name entered is then displayed in the app

- Peripherals
  - The type plate of the controller indicates whether it has an integrated Bluetooth or Wifi module, OptoSense or GyroSense
  - If this is the case, a check mark can be set for the corresponding option(s)
  - **Attention:** If the controller includes GyroSense collision detection, no checkmark should be set, as the collision detection may otherwise be set too sensitively, making commissioning more difficult - the collision detection settings can be made in the *Collision* tab
  - If the controller has a BLE module, another window appears when the check mark is set.



  - Four actions can be carried out here
    - select *Pairing mode wirless control panels* and confirm with *Do* to set the controller to pairing mode for 10 seconds. Wireless control panels (type LM4RW) can now be paired with the controller. To do this, the up and down buttons on the LM4RW control panel must be pressed simultaneously. Successful pairing is confirmed by an ascending tone sequence. This process can be repeated for up to 15 wireless control panels per controller
    - Select *Unpair all wireless control panel* and confirm with *Do* to delete all connections to wireless control panels
    - Select *Activate private mode for connected phone* and confirm with *Do* to prevent other users from connecting to the userr own table/application when using the smartphone app
    - Select *Clear private mode* and confirm with *Do* to unblock the userr own table/application for other users

- Lowest possible table position from ground (mm)
  - The height of the drive when retracted should be measured here and entered in millimeters. This is usually the distance from the floor to the top edge of the table top
  - This is only relevant for the correct height display

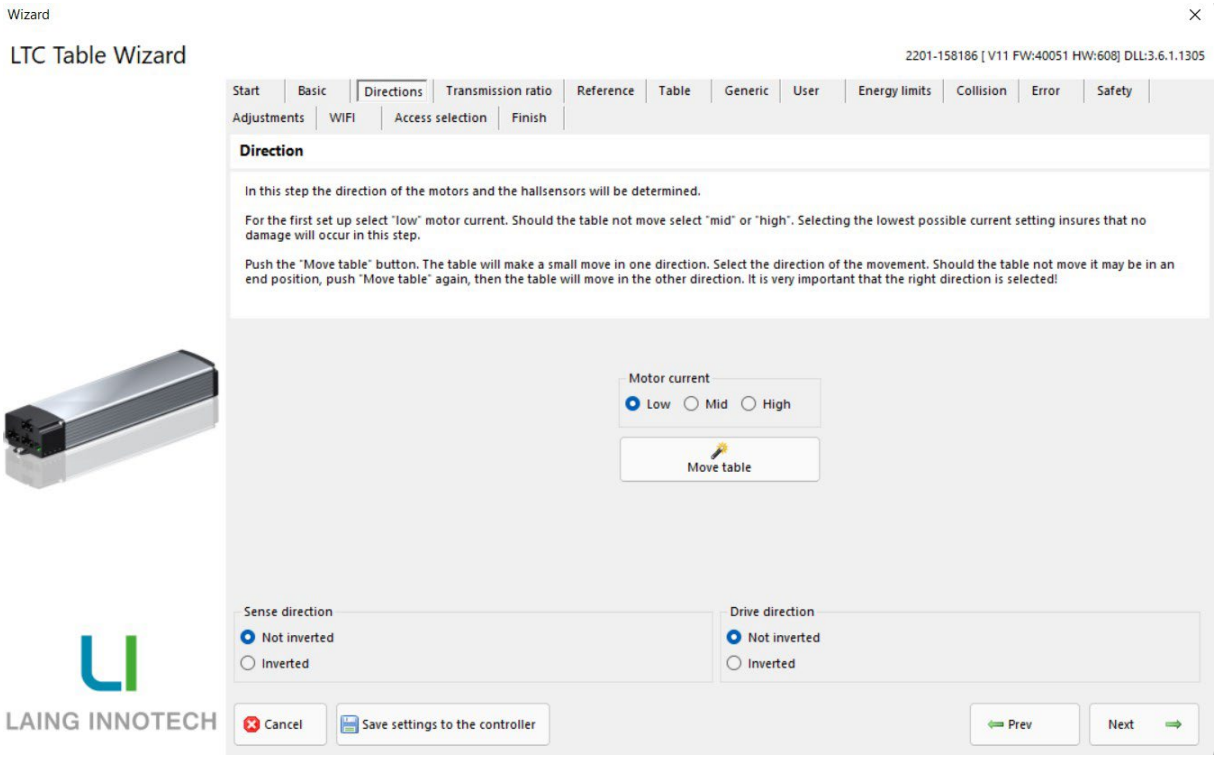
- Maximum travel (mm)
  - Specification of the maximum stroke of the actuator(s) used in millimetres

  - **Attention:** the distance from the lower mechanical stop to the upper mechanical stop should be entered. The desired distances from the mechanical end points are entered in the *Table* tab
  - **Caution:** if this value is entered too high, the drives may be damaged
  - If automatic stroke detection is to take place, enter a value here that is greater than the largest stroke to be detected. Automatic stroke detection is only possible with drives that can perform a reference run both upwards and downwards
  - The maximum drive height is automatically calculated from the lowest drive position and the maximum stroke

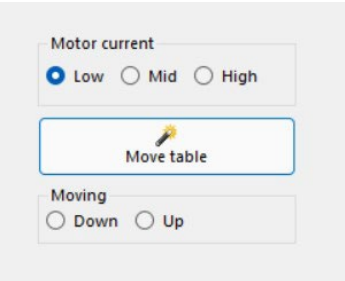
- Reference run
  - Four options can be chosen for the reference run:
    - Downwards: the reference run is performed downwards
    - Upwards: the reference run is performed upwards – **Attention:** This requires that the drive is designed in a way that hitting the upper limit won't lead to damages!
    - With stroke detection: a stroke is determined for each reference run. The stroke is determined to be automatically saved as *Maximum Travel*
    - With stroke detection once: the automatic stroke detection is only carried out during the first reference travel, after which the reference travel is downwards

- Reference found
  - The reference can be determined in four ways
    - Current based: The reference is determined via the current increase when approaching the end position, the drive does not have a limit switch
    - Limit switch: the drive has a limit switch at the top and/or bottom, which is used to determine the reference
    - Current based or limit switch: For applications with limit switches, where the drive may hit a stop before reaching the limit switch, a combination with a current-based reference determination can be selected
    - Middle switch: If the drive has a switch somewhere in the middle of the stroke, i.e. a switch that does not switch the drive current but only indicates a position, *Middle Switch* must be selected. A window then opens in which the distance of the switch from the lower end position must be specified

Directions



- The directions of the motors and Hall sensors are determined in this tab
- *Motor current* is initially set to *Low* by default and should be left as it is in the first step
- Briefly press *Move table* once and at the same time pay attention to the direction in which the drives are moving
- With sluggish drives, it is possible that no movement is visible as long as *Motor current* is set to *Low*. In this case, switch *Motor current* to *Mid*
- Only select *High* for *Motor current* if still no movement is visible
- **Attention:** to prevent damage occurring in this step, the current must be set as low as possible, i.e. the selection should only be changed from *Low* to *Mid* to *High* if no movement is visible at a lower level!

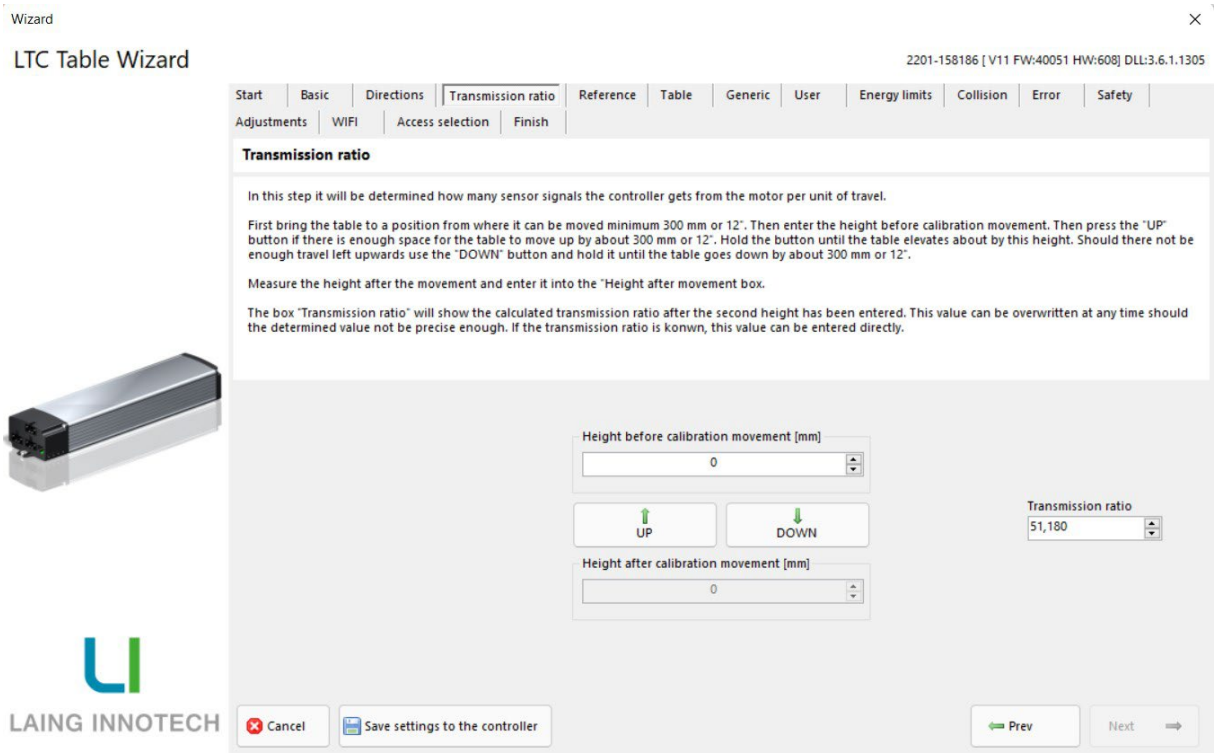


- If the drives have moved downwards, select *Down*
- If the drives have moved upwards, select *Up*
- **Attention:** The drives change direction each time *Move table* is pressed. Therefore, if several movements are carried out, the last direction of movement must always be specified! This

has been defined so that a movement can also be generated for drives that are in the end position

- Based on the direction entered, the wizard automatically makes the settings for *Sense direction* and *Drive direction*. The controller now knows in which direction the drives are moving, and in which order the Hall sensors are coming

Transmission ratio



- In this step, the transmission ratio is determined. The transmission ratio indicates how many Hall sensor pulses the controller receives per millimeter of drive movement. The controller counts both the rising and falling edges of the Hall signals
- If the transmission ratio is already known, it can be entered directly in the *Transmission ratio* field

- Otherwise:
- First, the drive should be brought into a position from which it can be moved up or down by around 200-300 mm
- Height before calibration movement (mm)
    - The current height at which the drives are currently located must be entered here; this must be measured and the measured value entered in millimeters

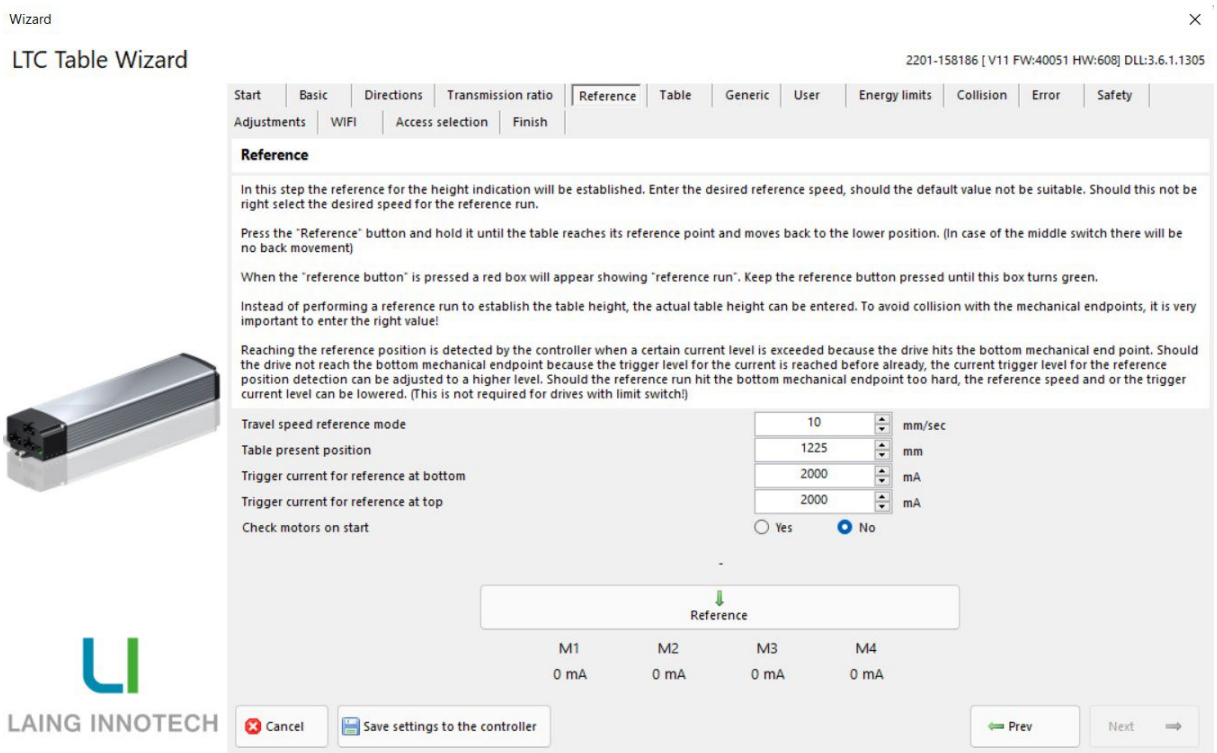
- The user can now use the *UP* or *DOWN* arrow buttons to move in the direction in which a greater distance can be covered

- As the transmission ratio has not yet been determined, the movement may be bumpy and not yet smooth
- The optimum distance is around 300 mm, but of course it is also possible to travel less
- The bigger the distance traveled, the more precise the transmission ratio determined

- Height after calibration movement (mm)
    - After the movement, the height of the drives must be measured again and the corresponding value entered in millimeters
    - By pressing the *Return* key on the PC keyboard, the calculated value of the transmission ratio now appears in the *Transmission ratio* field; this value can be overwritten at any time if the precision is not sufficient

- *Save settings to the controller* saves the settings

Reference



- In order for the controller to know the current height of the drives, a reference run must be carried out in the following step

- Travel speed reference mode
    - According to the factory setting, the reference speed is half the standard speed, but this can be freely selected
    - It is recommended to select a relatively low speed as the reference speed in order to avoid damage to the drives when running up to the end position

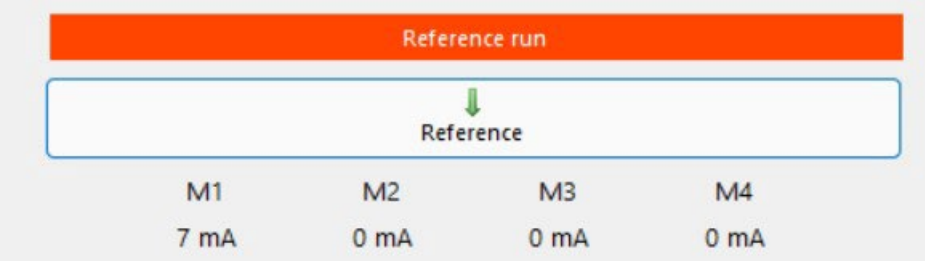
- Table present position
    - If no reference run should be performed, the current position at which the drives are located can be measured and entered in the corresponding field

- Trigger current for reference at bottom
    - If the current entered here is reached during current-based reference fetching, the current position is set as the reference position. It is important that this current is not reached under any circumstances before the end position is reached
    - If the determination of the reference is current-based and the reference run is downwards, the trigger current value may have to be changed
    - During the reference run, the current for the respective motors (1-4) can be observed; the trigger current value should be approximately twice the maximum value that was displayed during the reference run

- Trigger current for reference at top
    - If the determination of the reference is current-based and the reference run is upwards, the trigger current value may have to be changed
    - During the reference run, the current for the respective motors (1-4) can be observed; the trigger current value should be approximately twice the maximum value that was displayed during the reference run

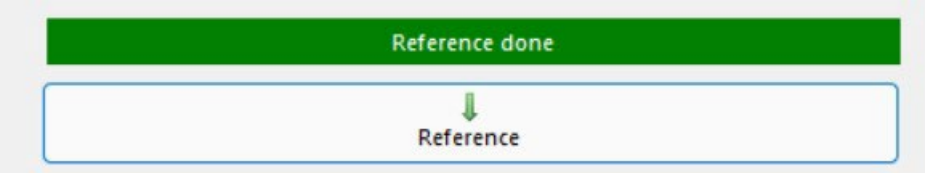
- Check motors on start
    - At each start, the system checks whether the motor is present. The controller tries to rotate once forwards and once backwards and then starts running as soon as every connected motor has been found
    - If the user want to ensure that all motors are connected before starting and there is no bridge from pin 6 to pin 3 in the motor connector, this function can be activated, but this process takes some time before each start

- To perform the reference run, the *Reference* button must be pressed and held down; an orange bar appears while the reference run is active



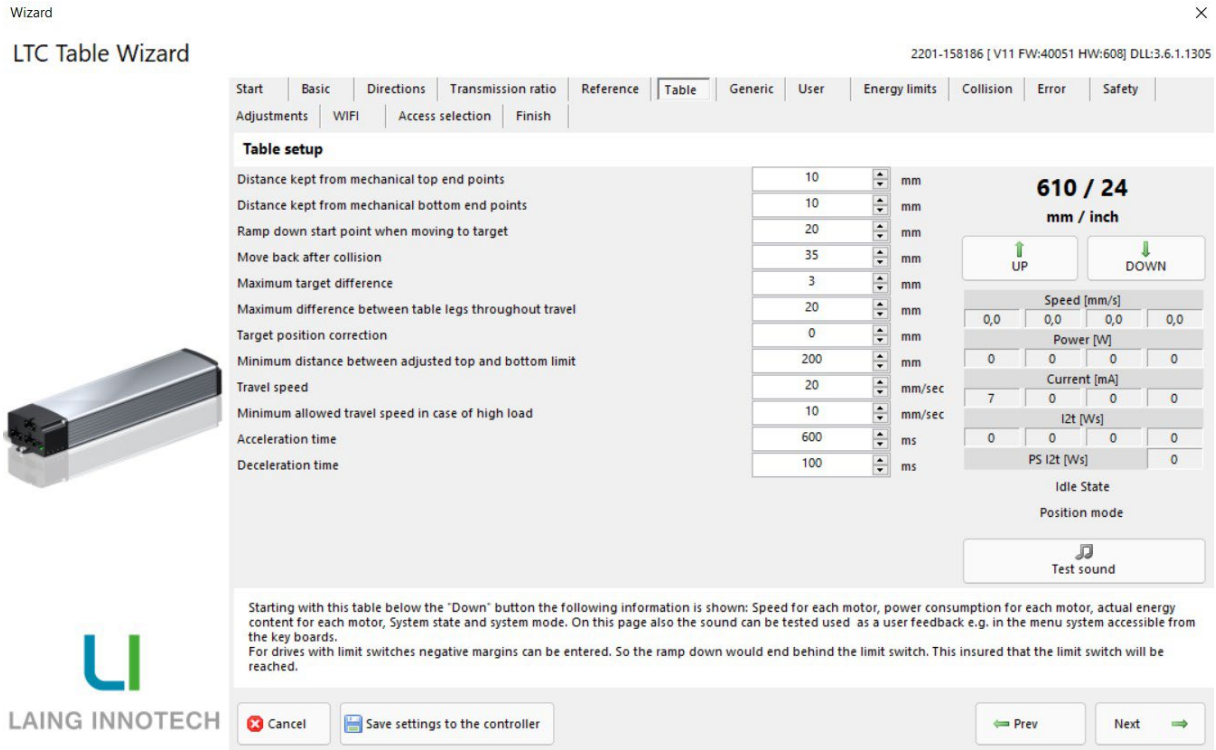
- Depending on the setting, the reference movement is either upwards or downwards. When the end point is reached, the system moves in the opposite direction by the set margin

- The reference run is completed as soon as the bar turns green



- This completes the basic setting, the drives move in the correct direction at the set speed, the display shows the correct height

Table



- From this tab, the user can move up and down at any time, so that the selected settings can be verified immediately
- During movement, the speed, current consumption, amperage and energy value are displayed for each motor
- System status and system mode as well as any error codes are also displayed
- An acoustic signal can be emitted in the motors via *Test sound*

- Distance kept from mechanical top / bottom end points
    - The margin, i.e. a distance to be kept from the upper or lower mechanical end point, can be defined here. The controller does not move beyond this point. For drives with limit switches, this value can also be set to a negative value, in which case the deceleration ramp ends after the limit switch by the set value. This ensures that the limit switch is always reached

- Ramp down start point when moving to target
    - From the value entered here before the target, the controller regulates the speed down linearly when it approaches the upper/lower end point or memory positions. If this value is set to 0 millimeters, a hard stop occurs depending on the selected travel speed

- Move back after collision
    - If a collision is detected, the movement is stopped, and the controller moves by the value set here in the opposite direction to the current direction of travel

- Maximum target difference
    - The controller is not able to position itself as precisely as required. For this reason, a maximum permissible deviation from the specified target is specified here. If the controller is within this range, the information is output that the target has been reached. The minimum value is 2 mm

- Maximum difference between table legs throughout travel
    - If the difference in height between the table legs during travel is more than the value set here, an error message is issued, movement is stopped and the controller switches to reference mode. This value should not be set too low, as a small height difference between the drives can occur, especially when starting up with a high load, but this is compensated for during travel

- Target position correction
    - The target is behind the value to be reached by the *target position correction*. When the controller reaches the target, the current is switched off. This compensates for the *maximum target difference*, as the end of the ramp is behind the target, improving the positioning accuracy
    - The entered value is specified in 0.1 millimeter increments

- Minimum distance between adjusted top and bottom limit
    - To ensure that the end user does not make any settings that result in the upper and lower user heights being so close together that movement is no longer possible, a minimum distance can be defined here that must be maintained between the upper and lower user heights
    - If an attempt is nevertheless made to define the user heights in the area of the minimum distance, acoustic feedback sounds to indicate that the user height is not being saved

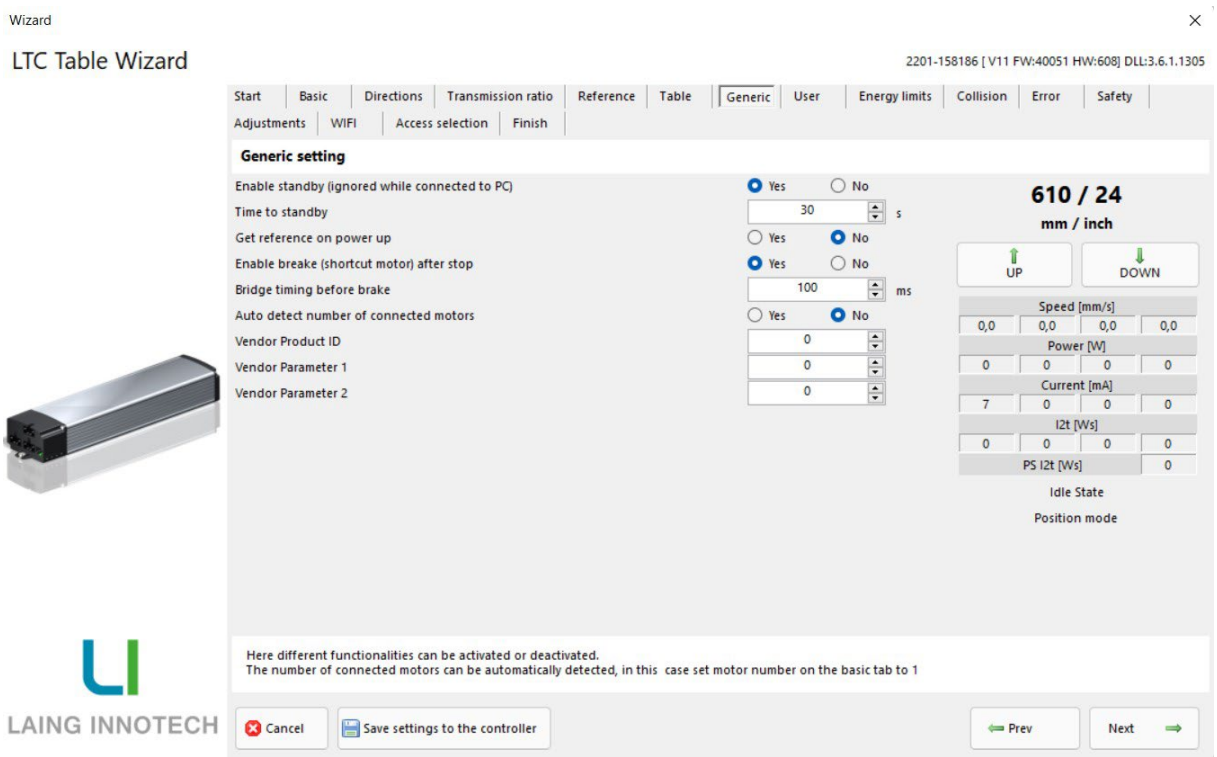
- Travel speed
    - The speed can be defined here. The controller regulates the drives so that they move at a constant speed. To test whether the selected speed is reached, a movement can be executed via *Up* and *Down* and *Speed* can be used to observe whether the set speed is already within the range of the maximum possible PWM value, whereupon the controller starts to regulate the speed down to the maximum possible PWM value.

- Minimum allowed travel speed in case of high load
  - This value is automatically set to half the value of the speed specified for *Travel speed*, but can be adjusted manually
  - In the event of a high load on the table, the controller automatically reduces the speed to ensure a uniform speed. The minimum desired speed to which the speed is reduced in the event of a high load can be defined here
  - If the same speed is entered here as the *Travel speed*, the controller runs at the maximum possible speed in the event of an overload, which is accompanied by a corresponding deterioration in the control behaviour for the speed and synchronization of the drives

- Acceleration time
  - The acceleration time specifies the period of time from pressing a button on the control panel in which the controller reaches the final speed. This involves a linear increase in speed from zero to the set *Travel speed*. With high loads, it can help to extend the acceleration time in order to avoid overcurrent events during acceleration

- Deceleration time
  - The deceleration time specifies the period of time in which the controller reduces the speed to zero after a button on the control panel is released. This involves a linear decrease in speed from the *travel speed* to zero.

Generic settings



- Enable standby
    - In most cases, it makes sense to activate standby. This causes the controller to switch to standby mode after the time specified under *Time to standby* if no movement is requested, which significantly reduces power consumption
    - If the controller is in standby mode, this can be recognized by the fact that the LED on the side of the controller no longer lights up
    - With digital control units, the height display is not active in standby mode
    - If a movement is requested while the controller is in standby mode, it takes a few milliseconds longer for the movement to take place. This is usually not noticeable
    - Standby mode is not activated when the controller is connected to the PC

- Time to standby
    - After the time specified here, the controller switches to standby mode if no movement is requested

- Get reference on power up
    - If this function is activated, the controller automatically switches to reference mode every time it is disconnected from the power supply when it is next plugged in
    - Normal operation is then only possible after a reference run has been performed
    - As a rule, this only makes sense if tests are carried out with different tables, as the position must then be determined each time
    - If the *get reference on power up* function is deactivated, *Reset position* (Finish tab) must be activated before the controller is delivered
    - The controller loses its position and will therefore request a reference run during initial commissioning to determine the current height

- Enable break (shortcut) after stop
    - If the controller stops, whereby a linear ramp is driven down to zero speed, it is possible that the drives still have a residual speed
    - To stop the drives or optimize the holding force, the motors can be short-circuited

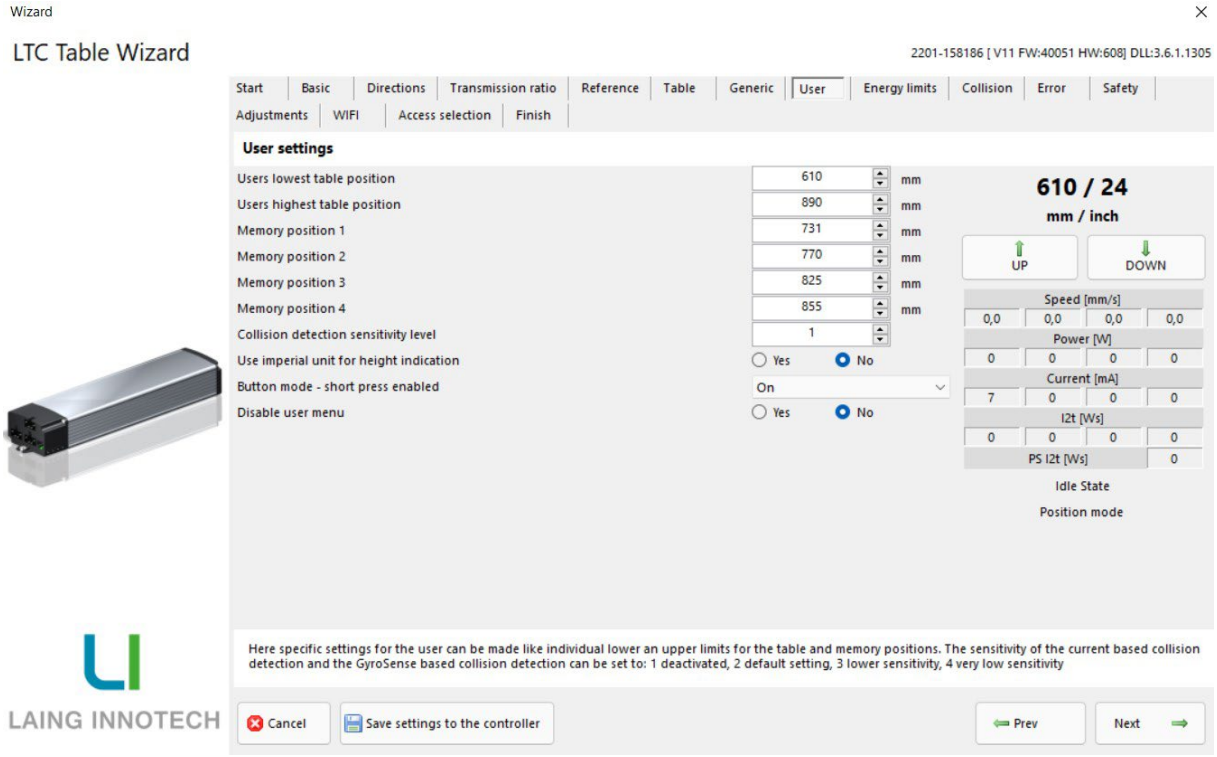
- Bridge timing before break
    - The drives should only be short-circuited after a short pause time to avoid braking too abruptly
    - The pause time is determined by the value specified here
    - If too much overrun occurs at the end of the movement, causing the target to be overshot, this can be improved by shortening the time until the brake is applied
    - If there is a hard stop at the end of the movement, the pause time should be extended, as the short circuit then occurs at a time when the drives are still moving too fast

- Auto detect number of connected motors
    - The controller can automatically detect how many motors are connected
    - If this function is activated, it is not necessary to set the number of connected motors manually, only 1 should be entered under *Motor count* (Basic Tab)

- If more motors than specified are now connected, the controller automatically recognizes this and sets the number of motors accordingly
- If fewer motors are then used again, no movement is executed for safety reasons and the number of motors must be set or reset manually under *Motor count* (Table Tab). The reset can also be carried out via the control panel with height display

- Vendor Product ID/Vendor Parameter 1/ Vendor Parameter 2
  - If required, three numerical values between 0 and 65536 can be entered here, which refer to article numbers, for example
  - The 3 numbers are saved in the controller and can be used freely

User settings



- Users' lowest table position
  - The user can define a lower end point here, beyond which the table cannot be moved
  - This is useful, for example, if there is a drawer container under the table
  - The position can also be defined and changed via the control panel
  - **Attention:** if the margin is changed, this value may also change, as the *Users' lowest position* must always be greater than or equal to the bottom margin. If the margin is reduced, this value must also be checked!
  - **Attention:** these values must not be closer to each other than the distance defined in *Minimum distance between adjusted top and bottom limit* (Table Tab)!

- Users' highest table position
  - Here the user can define an upper end point beyond which the table cannot be moved

  - This is useful, for example, if there is a shelf above the table
  - The position can also be defined and changed via the control panel
  - **Attention:** if the margin is changed, this value may also change, as the *Users' highest position* must always be less than or equal to the top margin. If the margin is reduced, this value must also be checked!
  - **Attention:** these values must not be closer to each other than the distance defined in *Minimum distance between adjusted top and bottom limit* (Table Tab)!

- Memory position 1-4
  - Up to four different memory positions can be defined here, which can be approached by control panels with memory positions
  - The memory positions can also be defined via the control panel if a control panel with memory positions is used

- Collision detection sensitivity level
  - The sensitivity of the collision detection can be defined here
  - After some time, the drives may become sluggish due to dirt or wear and tear and normal movements may be recognized as collisions
  - In this case, the sensitivity of the collision detection can be reduced
  - Four levels (step level) can be selected:
    - 1 - collision detection deactivated
    - 2 - highest sensitivity (factory setting)
    - 3 - medium sensitivity
    - 4 - low sensitivity
  - The percentage gradation of the changed sensitivity can be defined under *Sensitivity level step* (Collision Tab)
  - On delivery, this value should always be set to 2. The value can be set by the user via the control panel

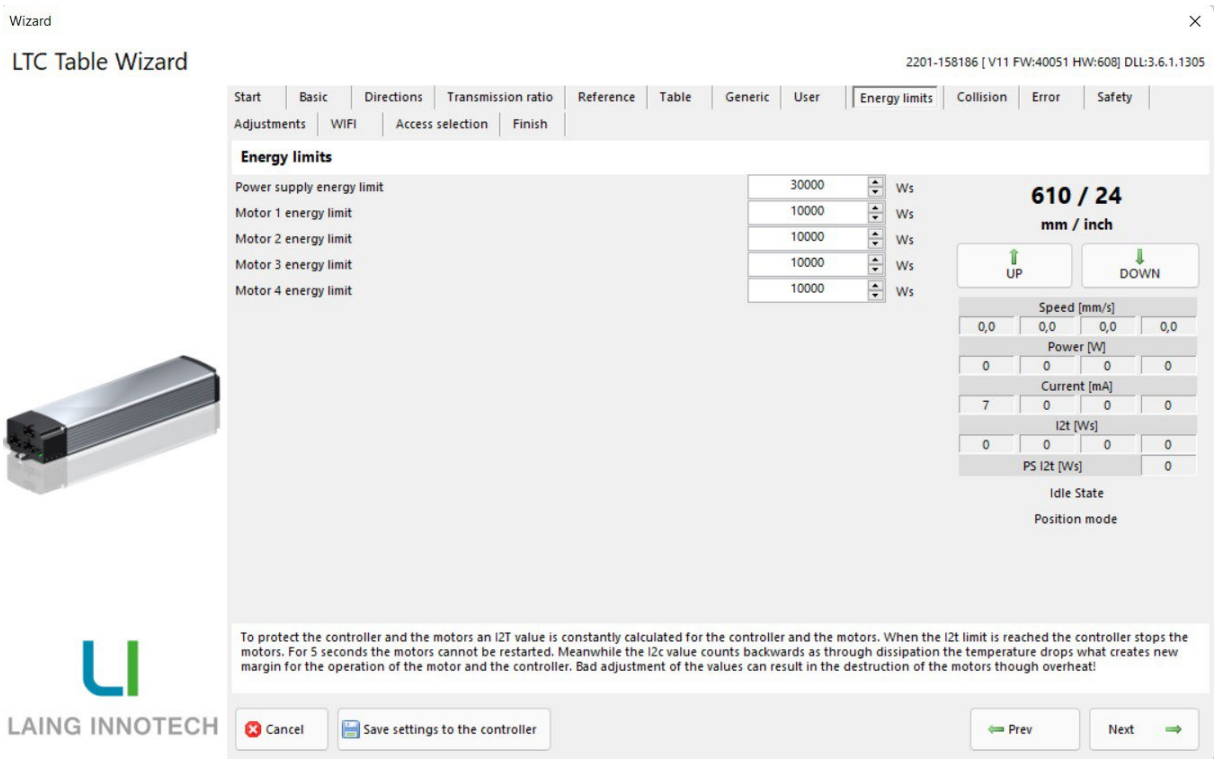
- Use imperial unit for height indication
  - If this function is activated, the height display is shown in inches
  - If this function is deactivated, the height indication is given in millimeters or centimeters

- Button mode - short press enabled
  - If this function is activated, it is only necessary to briefly press the corresponding button on the control panel when moving to a memory position. The movement then continues automatically until the selected position is reached
  - If this function is deactivated, the corresponding memory button must be held down until the position has been reached
  - *Hidden* can also be selected. In this case, the user will not be able to activate *Button Mode* via the control panel

- **Attention:** Activation of button mode is not permitted in the EU for applications such as tables where there is a risk of entrapment. It is only permitted to activate button mode for applications such as skylights or similar

- Disable user menu
  - The user is able to make numerous settings on the controller via the control panel
  - To prevent this, the user menu can be deactivated
  - In this case, it is only possible for the user to save memory positions and initiate a reference run

Energy limits



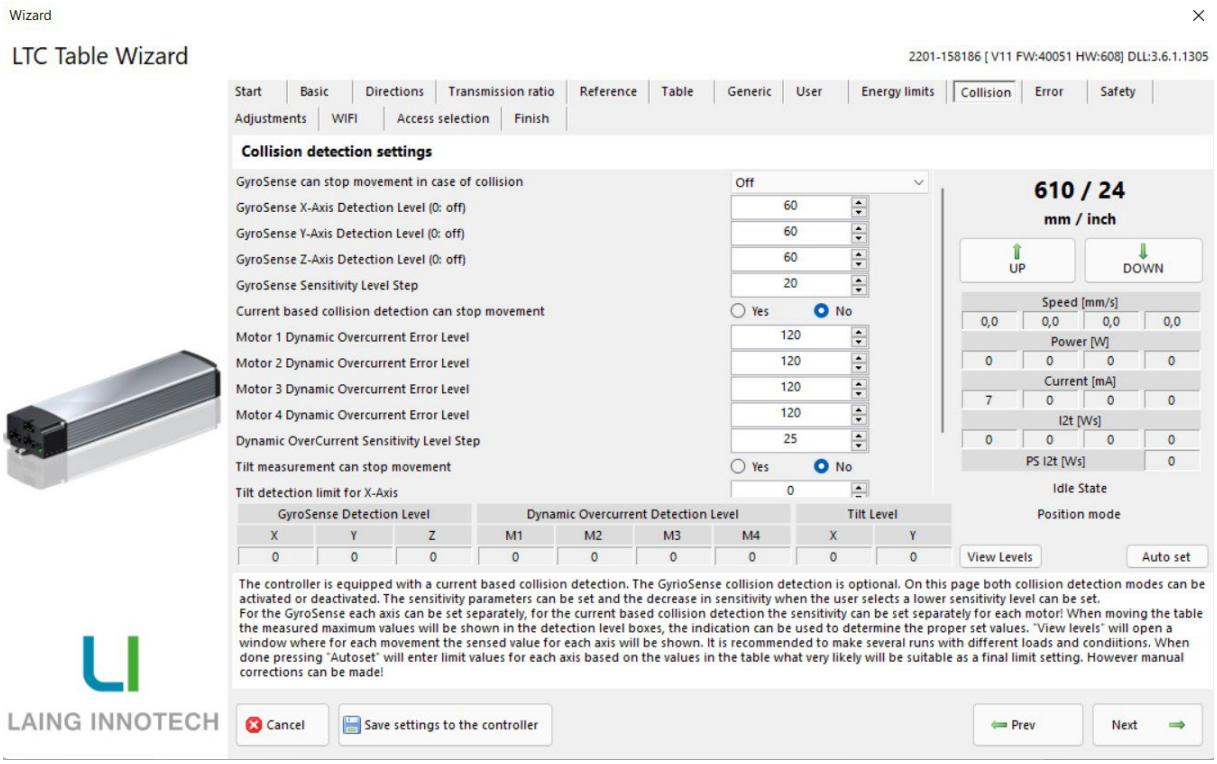
- The controller does not have a time-dependent operating limit, as this does not take the actual conditions into account. Instead, the controller determines the total energy emitted by the controller and the energy emitted to the individual drives
- This energy is now limited to the limit value entered in each case. If the limit value is reached, no more movement is possible for one minute. The release of energy to the environment is taken into account by reducing the energy value for each drive by approx. 800 Ws per minute. After a one-minute break, 800 Ws of energy can be supplied to each drive again
- A load-dependent limitation is thus implemented, which takes effect very late or not at all at low loads, but intervenes as early as possible at high loads

- Power supply energy limit

  - The controller is able to supply a certain maximum amount of energy before it is thermally overloaded. This value is set here. As the thermal load is reduced by heat dissipation, this value is automatically counted down
  - Once 30,000 Ws have been reached, the value returns to zero after around 13 minutes
  - In addition to overcurrent and overtemperature limitation, this serves to protect the controller; the value should not be increased

- Motor 1-4 energy limit
  - Drives do not have their own load detection. Therefore, the supplied energy is determined individually for each drive, so that the motor and the controller of the drive can be protected against overload
  - The correct value must be determined by testing. If, for example, the controller is damaged during prolonged operation or the motor becomes too hot, the value must be reduced

Collision detection settings



- Depending on the version, the controller has up to three collision detection options: gravity, current and gyro sensor
- Current-based collision detection is included as standard
- GyroSense and GraviSense are optionally integrated
- If the controller has a GyroSensor, all three collision detection modes can also be used in parallel

- **Attention:** To set the collision values accurately, the controller must be firmly screwed to the tabletop!

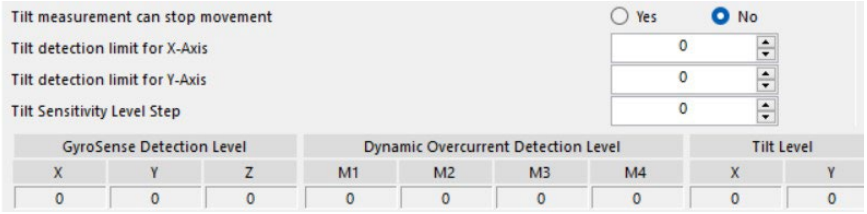
- GyroSense can stop movement in case of collision
  - If collision detection is to take place via the GyroSense, this can be activated here. There are 2 options for activation:
    - *On*, the gyro sensor is activated, but can be deactivated via step level *1*, which can also be set via the control panel
    - *Always on*, the gyro sensor is activated and cannot be deactivated via the control panel
  - An individual limit value can be entered for each of the three axes

- GyroSense Sensitivity Level Step
  - The value specified here describes the increase in the sensitivity limit as a percentage when the step level is increased
  - Three different sensitivity levels can be set in the *User* tab or via the control panel:
    - 2: highest sensitivity (this must be the default setting!)
    - 3: medium sensitivity, here the level step is added to the limit value; i.e. if the limit value is 100 and the level step is 40%, setting 3 results in a limit value of 140
    - 4: low sensitivity, here the level step is added twice to the limit value; i.e. if the limit value is 100 and the level step 40%, the limit value for setting 4 is 180

- Current based collision detection can stop movement
  - If current based collision detection is to be used, this can be activated with *Yes*. Current based collision detection is based on the evaluation of the change in motor currents
  - A limit value can be specified for each connected motor above which a collision event is detected

- Dynamic OverCurrent Sensitivity Level Step
  - The value specified here describes the increase in the sensitivity limit as a percentage for each increase in the step level

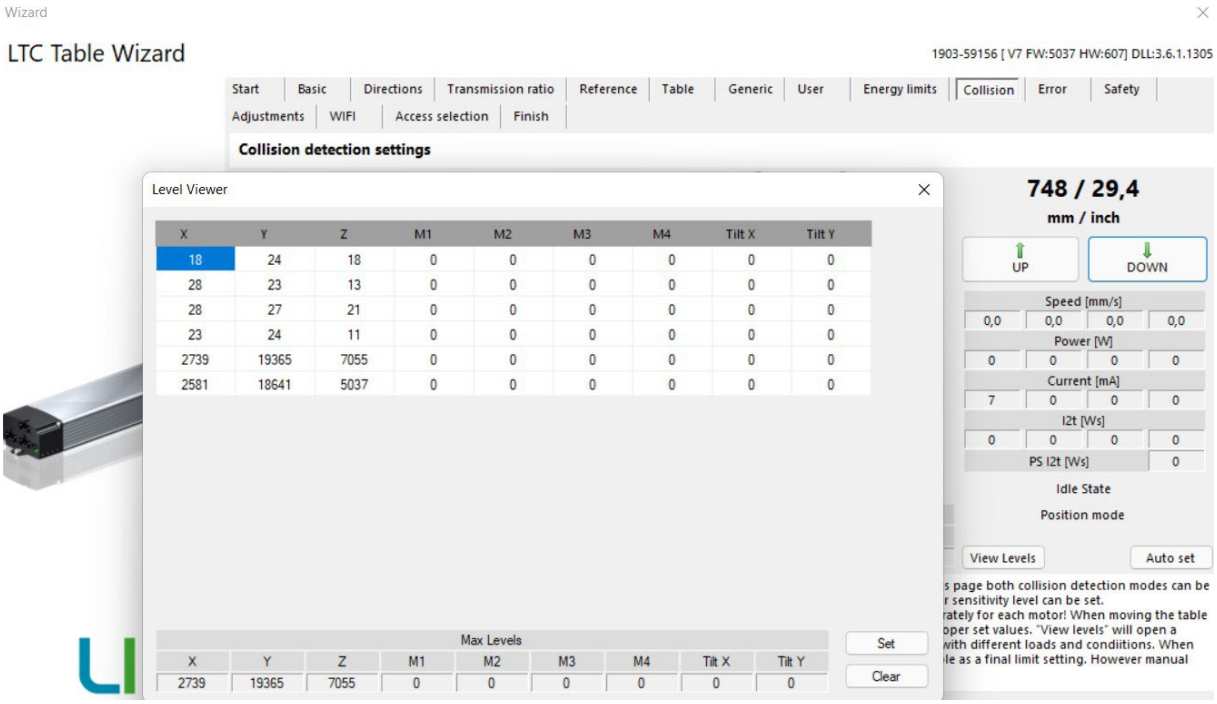
- Tilt measurement can stop movement



  - If collision detection is to take place via the absolute angle change of the tabletop during the movement, this can be activated via *Yes*

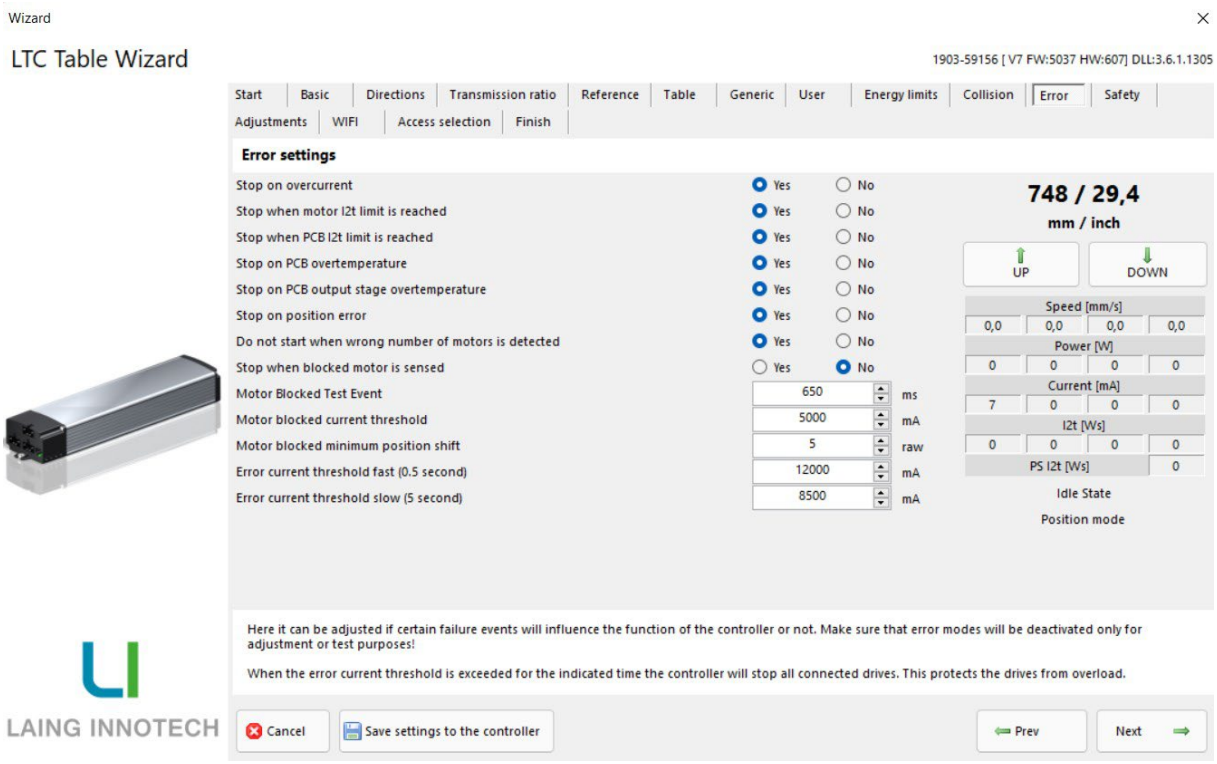
- For the X and Y axes, a value can be specified in tenths of a degree from which a collision is detected. If, for example, 20 is entered, a collision event is triggered as soon as the angle of the tabletop changes by more than 2° compared to the angle at the start of the movement

- Tilt Sensitivity Level Step
  - The value entered here describes the increase in the sensitivity limit as a percentage when the step level is increased



- The optimum limit values can be determined using *View Levels*. This displays the values for all activated collision types in a table, in each case the maximum value that occurred during a movement
  - X, Y and Z refers to the gyro sensor
  - M1, M2, M3 and M4 refer to the current-based collision detection
  - Tilt X and Tilt Y refer to the GraviSensor
  - Movements can be triggered via *Up* and *Down*. It is recommended to perform several movements, even with a differently loaded table
  - *Auto Set* is used to enter limit values for the individual axes, although these are only a rough recommendation and should always be adjusted manually

Error settings



- Certain error modes can be activated or deactivated here. If the error mode is deactivated, the protected malfunction will not lead to an error
- **Attention:** The values should only be deactivated for laboratory tests, if at all! When operating with deactivated error modes, it is accepted that the controller will be damaged or destroyed! Before delivery to the customer, all modes apart from *stop when blocked motor is detected* must be activated!

- Stop on overvcurrent
  - The controller goes into fault mode if one of the overcurrent limits is reached
  - **Attention:** in this case, no movement can be triggered for one minute!

- Stop when motor I2t limit is reached
  - The controller goes into error mode if the energy limit of one or more motors is exceeded
  - **Attention:** in this case, no movement can be triggered for one minute!

- Stop when PCB I2t limit is reached
  - The controller goes into error mode if the energy limit of the controller has been exceeded
  - **Attention:** in this case, no movement can be triggered for one minute!

- Stop on PCB overtemperature

  - The controller goes into error mode when the power supply unit has reached overtemperature. It is necessary to wait until the controller has cooled down

- PCB output stage overtemperature
  - The controller goes into error mode if the motor output stage(s) has/have exceeded the overtemperature limit. It is necessary to wait until the controller has cooled down

- Stop on position error
  - The controller goes into error mode if the value defined under *Maximum difference between table legs throughout travel* (Table Tab) for the maximum permissible height difference of the drives has been exceeded
  - The controller then automatically switches to reference mode; normal operation is only possible again after the reference run has been completed

- Do not start when wrong number of motors is detected
  - The controller goes into error mode if a different number of motors is connected than specified in the configuration
  - To exit error mode, the number of motors must be set manually to the correct number
  - If the function *Auto detect number of connected motors* (Generic Tab) is activated, a movement is also started if more motors than specified are connected, the controller then saves the number of motors found in its configuration

- Stop when blocked motor is sensed
  - The controller can detect whether a motor is blocked by applying a certain current to the motor and counting the number of Hall sensor signals within a certain time. If the number is less than the set number, the controller assumes that the respective motor is blocked
  - If a motor is blocked, the controller goes into error mode and no movement is started
  - The setting must be adapted to the application, as the conditions can be very different
  - Normally, this function does not need to be activated, as the controller goes into error mode anyway when the maximum permissible height difference between the drives has been reached (position error)
  - For applications where a height difference between the drives is not permitted, the function can be activated, but must then be adjusted accordingly

- Motor blocked test event
  - The time is specified here in which a certain number of Hall sensor signals are expected at a certain current in order to detect whether a motor is blocked

- Motor blocked current threshold
  - The current value that is applied to the motor to detect whether a motor is blocked is specified here

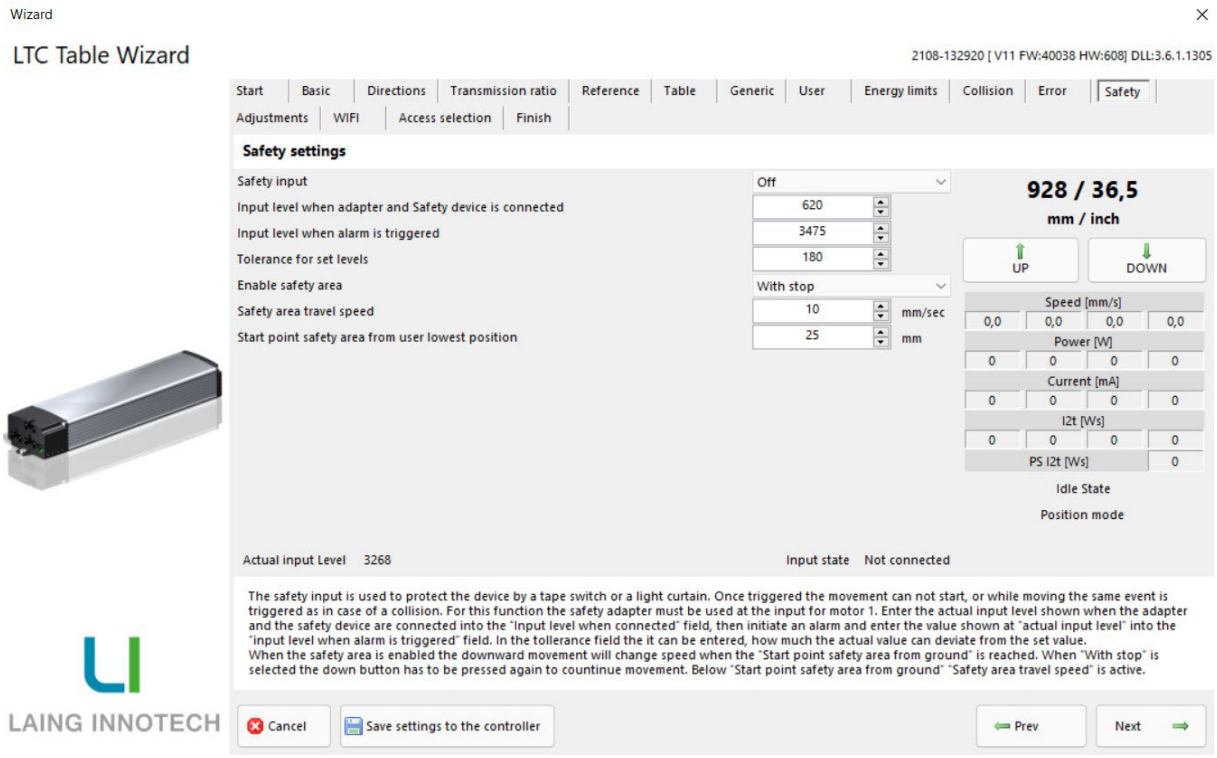
- Motor blocked minimum position shift
    - The minimum number of Hall sensor signals expected when the defined current value is applied to the motor in the defined time to detect whether the motor is blocked is specified here

- The current limits are entered in the two following fields, which are then valid for each individual motor

- Error current threshold fast (0.5 second)
    - The specified value is the current that may be exceeded for a period of less than 0.5 seconds to allow the motor to break free when starting up
    - If the current value is exceeded by more than 0.5 seconds, the controller goes into error mode

- Error current threshold slow (5 seconds)
    - The specified value is the current that may be exceeded for a period of less than 5 seconds during the movement
    - If the current value is exceeded by more than 5 seconds, the controller goes into error mode

Safety settings



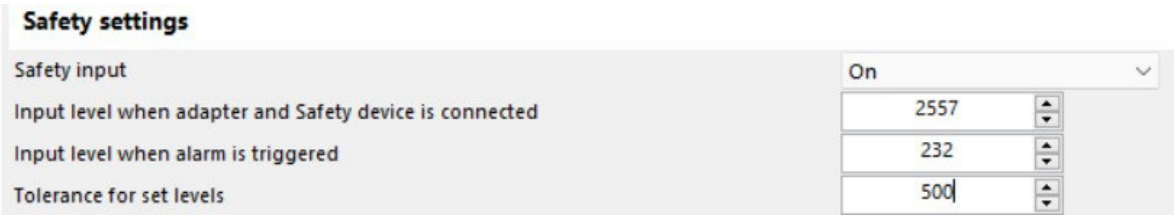
- This tab is used to configure the safety adapter and the safety area

- Safety input
  - If a light barrier or a contact strip is to be used as a safety device, the Laing Safety Adapter must be plugged into motor output *One*. The motor cable and the safety device must then be plugged in. The safety device must have an RJ45 plug
  - *Off*: the safety adapter is deactivated
  - *On*: the safety adapter is activated. If no safety adapter is connected, the controller issues an error message, and it is not possible to move the drives
  - *Auto detect*: the controller automatically recognizes whether the safety adapter is connected or not. If the controller is used without the safety adapter after it has been used for the first time by means of automatic activation, no movement of the drives is possible for safety reasons. This is only possible once the safety adapter has been reconnected, or the function has been reset via the wizard or the control panel

- Input level when adapter and safety device is connected
  - **Attention:** the numerical values given here are examples! Connecting a light barrier results in completely different values than connecting a contact strip; in the first case, the value for operation is significantly lower than the value for triggering the alarm!
  - If the safety adapter with the safety device used is plugged into the controller, the value *Actual input Level* changes at the bottom left. **Attention:** the safety device must not be activated, i.e. it must be in the state in which the operation of the drives is permitted!
  - The value that is displayed after plugging in must be entered under *Input level when adapter and safety device is connected*

- Input level when alarm is triggered
  - If the safety device is then triggered, the value changes again and must be entered in *Input level when alarm is triggered*. This tells the controller at which value the safety device responds

- Tolerance for set levels
  - A tolerance value can be entered here to trigger a reaction if the value fluctuates. The set value is increased and decreased by the tolerance value. If the set value is 1000 and the tolerance value is 100, values between 900 and 1100 are recognized as correct
  - The tolerance value must be selected so that the value for *Input level when adapter and safety device is connected* and *Input level when alarm is triggered* do not overlap due to the tolerance entered

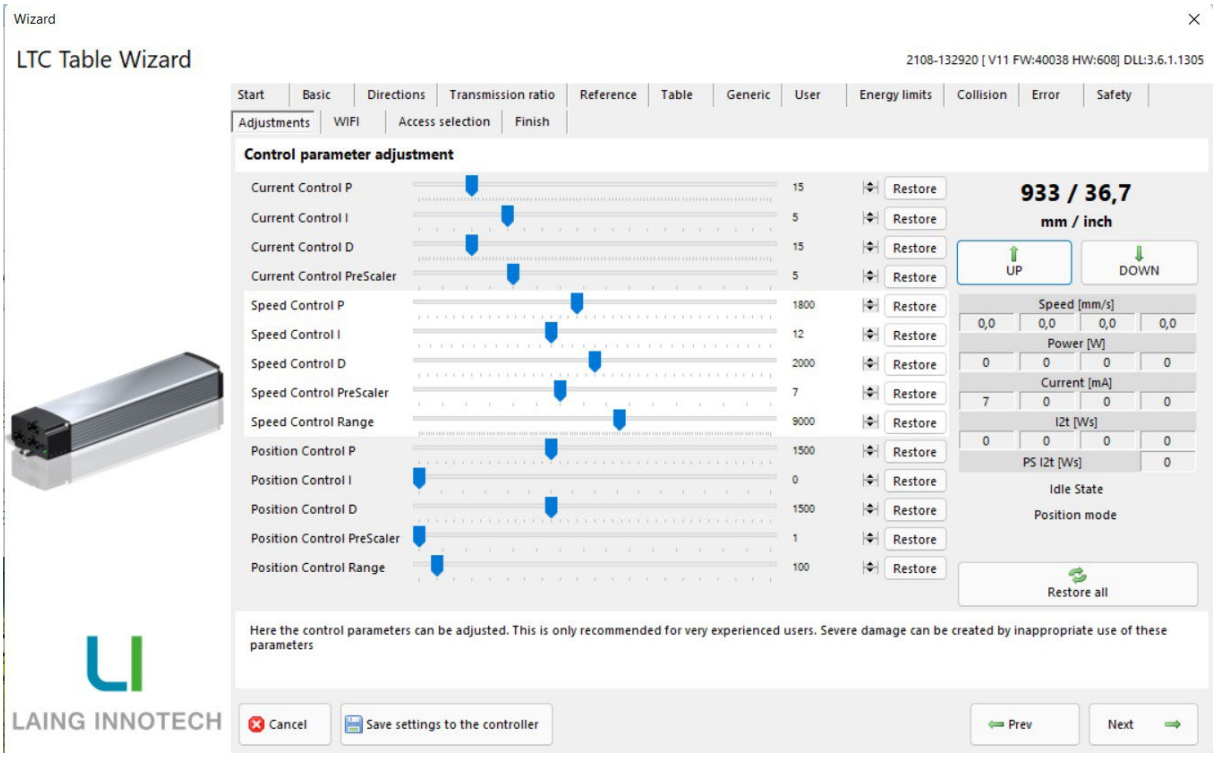


- Enable safety area
  - It is possible to set a different speed for part of the downward movement, e.g. if there is a risk of entrapment at the end of the downward movement
  - *Off*: the safety area is not active
  - *With stop*: with this setting, the movement is stopped from the entered starting point of the safety zone until the control panel is actuated again. After it is pressed again, the drive continues at the speed set under *Safety Area Travel Speed*
  - *Without stop*: With this setting, the movement continues from the entered starting point without stopping at the *Safety Area Travel Speed*

- Safety area travel speed
  - The desired speed to be used from the defined position can be specified here

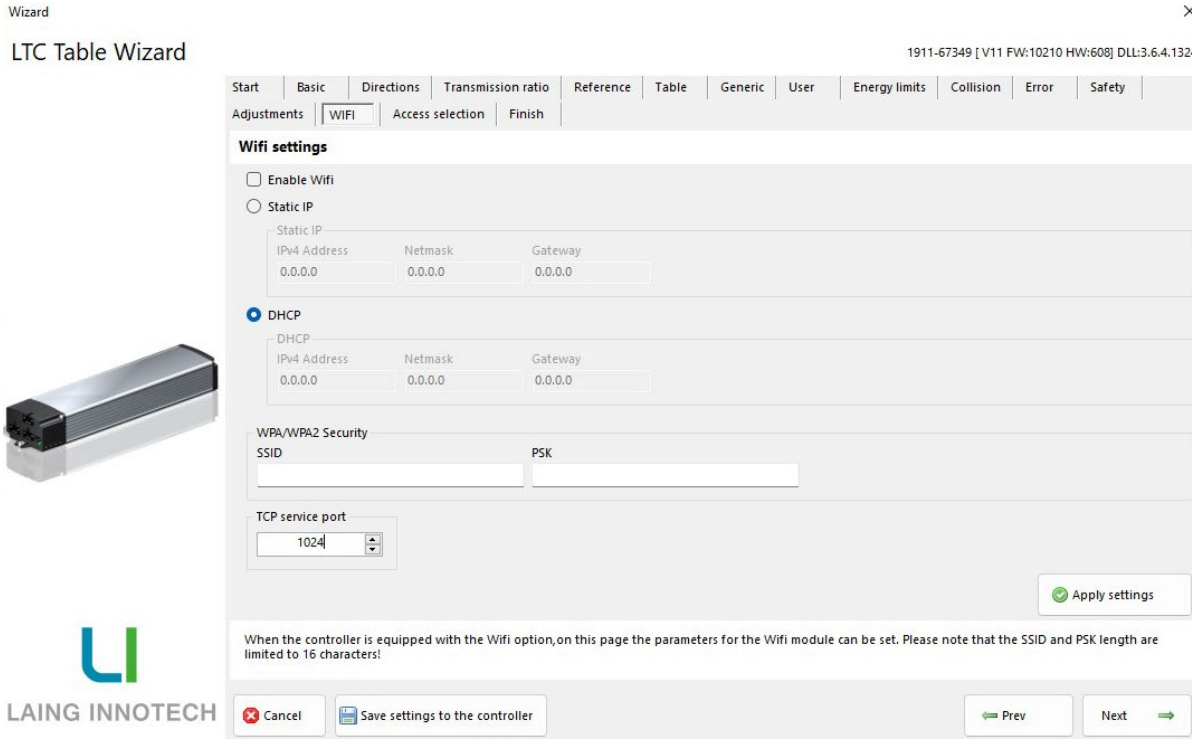
- Start point safety area from user lowest position
  - The height from which the *Safety area travel speed* is to be used for the downward movement can be specified here
  - **Attention:** the height is always based on the lower user height! If this is changed, the starting point of the safety zone also shifts accordingly
  - If the entire downward movement is to take place at a different speed, simply set the starting point to the top position

Adjustments



- *Adjustments* can be used to fine-tune the controller to the drives used. If the drives are not running synchronously enough or irregularly, these settings can be used to achieve optimum running and synchronization of the drives
- The settings can only be made by Laing Service!
- **Caution:** incorrect settings can lead to damage!

Wifi settings



- If the controller has a Wifi module, it can be connected to the Wifi network

- Enable Wifi
  - This function must be activated

- SSID
  - Enter the network name
  - **Attention:** the network name must not have more than 32 characters

- PSK
  - Enter network password
  - **Attention:** the password must not have more than 32 characters

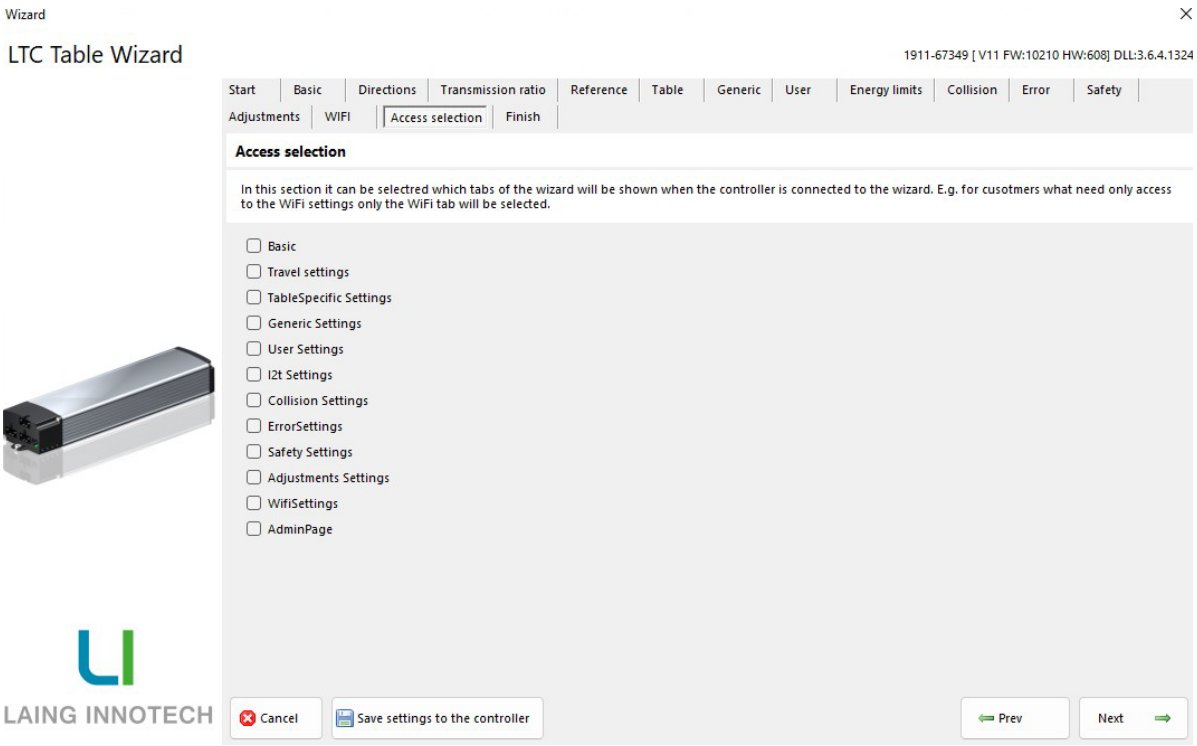
- Enter TCP service port

- If a static IP address is to be assigned:
  - Enter the desired address
  - Enter netmask (subnetmask) address
  - Enter gateway address
  - **Attention:** The assigned address must not be used by any other device, otherwise the controller cannot connect to the Wifi. It must be set in the router that the assigned address may not be assigned to any other device!
  - Once the SSID, PSK and TCP service port have been entered, select *Apply Settings*, then wait a few seconds until the connection is established

- Should DHCP be used:
  - Select DHCP
  - After entering SSID, PSK and TCP service port, click *Apply Settings*, then wait a few seconds until the connection is established
  - The router assigns an address

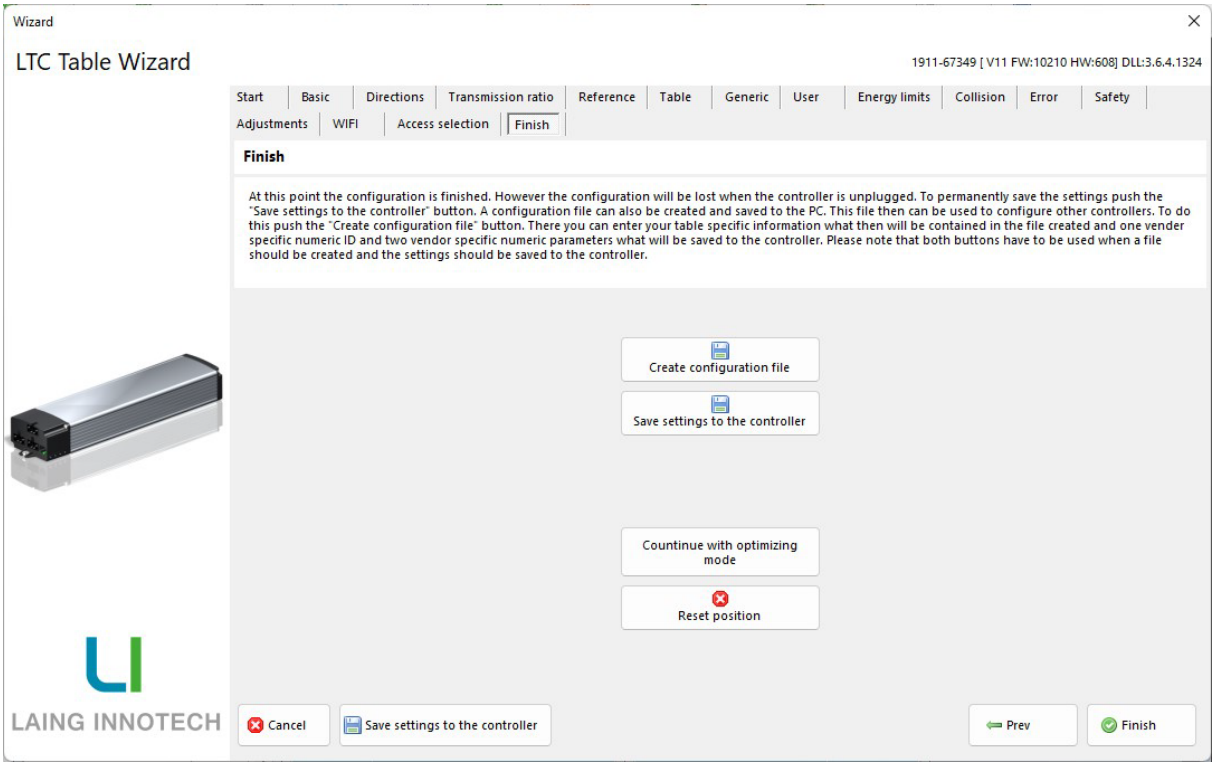
- Click on *Save settings to controller* to save the settings, the controller will then be accessible via Wifi

Access Selection



- In this area, the user can select which tabs of the wizard should be visible as soon as the controller is connected to the wizard. This is particularly useful if the end customer still has to make individual settings themselves, for example to connect the controller to the wifi
- Select the tabs that should be visible the next time the user open it
- *Save settings to the controller*
- Close the wizard, only the selected tabs will be visible the next time the user open it
- **Attention:** This access restriction is saved in the controller in the configuration and can only be undone with assistance from the Laing service!
- If the configuration is read from the controller and loaded into another controller, the same restrictions apply to this controller

Finish



- Once all the necessary settings have been made, a configuration file can now be created which can be loaded into other controllers using the LTC Downloader

- Save settings to the controller
  - to permanently save the settings made in the controller

- Create configuration file
  - This can be used to save the created configuration in the form of a configuration file at the desired location
  - The user can optionally fill in 4 fields that are displayed when the file is reopened so that the file can be assigned to the respective application. These fields are only saved in the file, not in the controller
  - In addition, the 3 numeric fields that could already be filled out in the *Generic* tab are also displayed. These can also be filled in here at a later date. The three numeric fields are saved in the controller, so they can be read out of the controller at any time

- Continue with optimizing mode
  - If the settings are to be further optimized, this can be done via *Continue with optimizing mode*, in *optimizing mode* all tabs can then be selected directly

- Reset position

  - Before delivery to the end customer, it is necessary to reset the position using *Reset position*; the controller will then perform a one-off reference run the next time it is commissioned

- Once all settings have been saved and a configuration file optionally created, the wizard can be closed