Read the instructions prior to performing any task!

Yu 5 Industrial

Software manual

Yu 5 Industrial robot

Agile Robots

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Translation of the original

About this manual

This manual enables safe and efficient use of the software. This manual is part of the software and must be kept where it is accessible to personnel at all times.

Personnel must have read this manual carefully and have understood it. A basic prerequisite for safe working is compliance with all safety instructions and handling instructions included in this manual.

Screenshots within this manual are for basic understanding and may differ slightly from the real version.

Components of the robot

Components of the robot (e.g. buttons, cables) mentioned in this manual are used to understand the described action sequences, but are not part of this manual.

For more information, refer to the corresponding instructions:

"Robot Yu 5 Industrial" operating manual

Software and hardware version

The content of this manual refers to software version 1.4.x.

This software version is only compatible with hardware version 1.3 of the robot.

Other applicable documents

This manual contains information on how to control the robot and how to operate the robot functions.

In addition to these instructions, the following documents also apply:

- "Robot Yu 5 Industrial" operating manual

Limitation of liability

All information and instructions in this manual were compiled taking into account the valid standards and regulations, the state of the art, and our many years of knowledge and experience.

Agile Robots SE accepts no liability for damage in the following cases, among others:

- Failure to comply with this manual
- Changes to the software or incorrect entries in the database
- Destruction of any data and files by computer viruses
- Use of third-party programs that are not expressly recommended and approved by Agile Robots SE

- Improperly executed data management
- Failure to back up data at regular intervals

The obligations agreed in the contract documents, the general terms and conditions, and the delivery conditions of Agile Robots SE and the legal regulations valid at the time of conclusion of the contract apply.

Copyright

Naming groups of individuals

For reasons of legibility, the masculine form is sometimes used in this manual; this is intended to refer to persons of both genders.

Customer service

Our customer service is at your disposal for technical information and if you require repairs or experience malfunctions:

Address	Agile Robots SE Am Bleichanger 48c 87600 Kaufbeuren GERMANY
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Email	service@agile-robots.com

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1 Notes and markings in this manual

Safety instructions

Safety instructions in this manual are indicated with symbols. Safety instructions are introduced by signal words which explain in words the extent of the hazard.

WARNING

This combination of symbol and signal word indicates a potentially dangerous situation that can result in death or severe injuries if it is not avoided.

NOTICE

This symbol indicates important information which, if ignored, may result in software errors, data loss or property damage.

Tips and recommendations

This symbol emphasizes useful tips and recommendations and indicates important information that makes it easier to use the software.

Other markings

In order to highlight instructions, results, lists, references and other elements, the following markings are used in this manual:

Label	Explanation
→	Step-by-step instructions
▶	Results of actions
↳	References to sections of this manual and to other applicable documents
■	Lists without a fixed order
[Button]	Operating elements (e.g. buttons, switches), display elements (e.g. signal lights)
'Display'	Screen elements (e.g. buttons, assignment of function keys)

2 Your software at a glance

2.1 Brief description

The application is used to interact with a robot and supports personnel in the execution of robot functions, e.g.:

- Creating and managing robot programs
- Configuring robot tools
- Parametrising safety functions
- Manually controlling robot movements

The application is accessed via an Ethernet-enabled terminal (e.g. laptop) on which the Google Chrome ® browser is installed.

2.2 The user interface at a glance

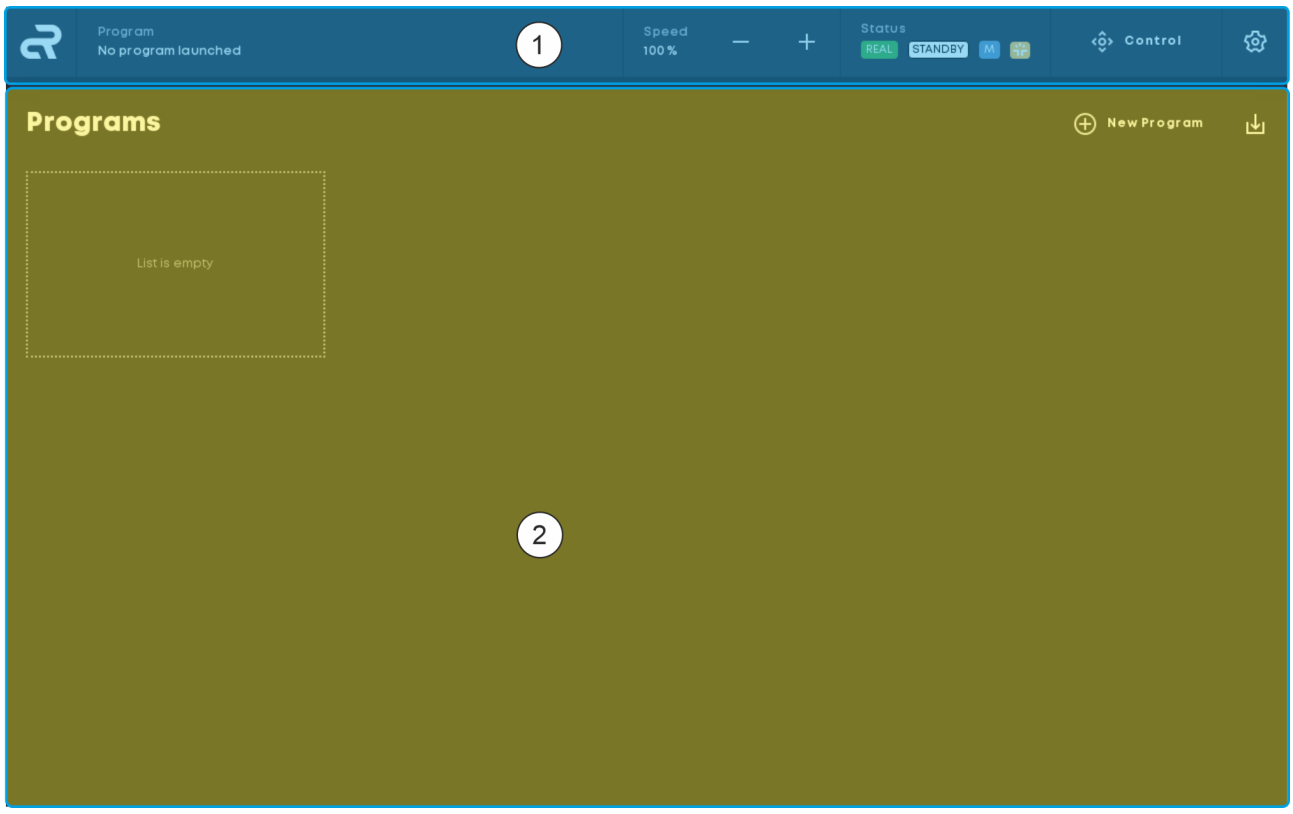


Fig. 1 User interface layout

① Navigation bar
② Work window

The user interface consists of the navigation bar Fig. 1/① and the work window Fig. 1/②.

The work window's display changes dynamically depending on the current menu. All settings for operating the robot are made in the work window. In addition to creating and managing programs, this includes manual movement of the robot and setting the robot parameters.

The navigation bar is displayed on each menu screen and contains the following menus and functions in addition to the robot's current status message:

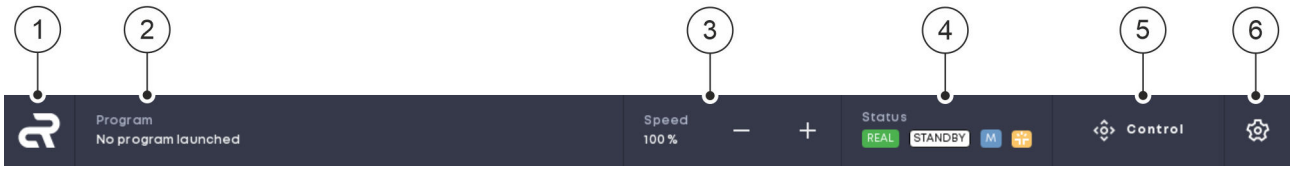


Fig. 2 Structure of navigation bar

No.	Function
Fig. 2/①	**Home button** Return to the main screen.
Fig. 2/②	**Program** Displays the currently active program.
Fig. 2/③	**Speed** Decrease or increase the robot's travel speed (−/+). The maximum allowable value of 100% corresponds to the upper limit set by the system integrator for the travel speed.
Fig. 2/④	**Status** Indicates the robot's current operating status. Clicking the button opens the *'Status'* menu. Information about each fault and warning message is displayed there.
Fig. 2/⑤	**Control** Opens the menu for moving the robot manually. This function is only available to the user level "System integrator".
Fig. 2/⑥	**Settings** Opens the *'Settings'* menu. In this menu, users can set the parameters for the robot, such as the tool dimensions or safety configuration limit values.

2.3 Roles, permissions and operating modes

Access rights are assigned to the individual functions in the user interface. The access rights are defined by Agile Robots SE or the owner's system integrator.

When the robot is delivered, two user levels are provided:

- Operator
- System integrator

The “Operator” user level is active by default. Users with this level can load, start and stop programs.

Only users with the “System integrator” level can make settings for operating and safety parameters or move the robot manually.

The “System integrator” user level is automatically active as soon as the **manual** mode is selected on the mode selector switch. As a result, only system integrators are permitted to set the operating mode and carry the key.

Operating mode

For more information, refer to the corresponding instructions:

“Robot Yu 5 Industrial” operating manual (chapter 2.2.6/6.3.3)

Fig. 3 Buttons

① “System integrator” user level
② “Operator” user level

In **automatic** mode, the buttons reserved for the system integrator are displayed in gray Fig. 3.

2.4 Personnel requirements

Insufficient qualification

WARNING
Risk of injury if personnel are not sufficiently qualified!

If unqualified personnel carry out work on or with the robot, hazards may arise which can lead to serious injuries and considerable property damage.

- All activities must be carried out by qualified personnel only.
- Keep unqualified personnel away from the robot’s working area and hazard area.
- Always keep the login details for the user interface protected against unauthorised access.

Operator

Operators have been instructed or trained by the owner about the tasks assigned to them and the possible dangers associated with improper conduct when handling the robot. In particular, operators have been informed about proper behaviour during collaborative operation and about how the safety devices function.

Operators are able to carry out basic operating activities in automatic mode, and are able to perform cleaning activities in a professional and safe manner. This includes:

- Selecting and loading programs
- Starting programs
- Stopping programs
- Cleaning robots and components

Maintenance specialist

Due to their technical training, knowledge and experience, as well as their knowledge of the relevant standards and regulations, maintenance specialists are able to carry out work on the robot's electrical and mechanical system and to independently recognise and avoid potential hazards – including when operating the robot.

Maintenance specialists are specially trained for the work environment in which they work and are familiar with the relevant standards and regulations in this area.

Programmer

Due to their professional training, knowledge and experience, programmers are able to carry out set-up work, and they have been informed about the specific hazards involved in operating the robot.

Programmers can create new programs for robot applications and have the necessary programming knowledge to ensure that no unexpected movements of the robot are executed at any time.

Safety engineer

Safety engineers are specialists appointed by the owner who, due to their professional training, knowledge and experience, are able to carry out set-up and operating activities on the robot – especially in safety-relevant situations. This includes:

- Parameterisation of the safety configuration in compliance with the system integrator's specifications
- Moving the robot in manual mode
- Moving the robot out of error positions in rescue mode
- Releasing the robot from entrapment situations
- Carrying out the torque sensor calibration
- Carrying out the brake test
- Carrying out position verification

System integrator

The system integrator is responsible for safe operation of the robot. Therefore, the system integrator must carry out a comprehensive risk assessment for each robotic application, taking into consideration all workflows, ambient conditions, and devices used on the media flange, such as tools.

The associated parameters such as the tool geometry or the definition of impermissible movement ranges are set by the system integrator in the safety configuration. For collaborative robot applications, the system integrator must ensure that the permissible limits for speeds and collision forces are not exceeded and that the robot poses no hazards to the operator.

If the robot is integrated into an overall system provided by the owner, the system integrator must take all measures to ensure safe operation of the robot in the production process. This includes, in particular, integrating the robot into the safety concept for the overall system, for example by connecting the robot to safety devices such as safety doors or light barriers.

The system integrator is personally appointed by the owner's business managers. The core tasks of the system integrator include the following work:

- Set-up and initial commissioning of the robot
- Creating risk assessments for the applications in which the robot is to be used

  This also includes taking into consideration the owner's overall system in which the robot is integrated.
- Creating new programs
- Editing existing programs
- Deleting programs

- Parametrising the safety configuration taking into account the safety-relevant factors from the risk assessment
- Operating the robot in manual mode
- Changing tools and devices on the media flange
- Opening the robot controller and establishing electrical connections with external components or machines in the owner's overall system, such as additional safety devices
- Ensuring that unauthorised personnel do not gain access to the robot's safety-related settings and cannot make any changes to the robot's tools and devices
- Equipping the robot and the components of the overall system with further safety markings, if the risk assessment so requires
- If necessary:

  Providing additional information for the operator to properly operate a robot application
- Joint storage of all documents required to operate the robot, including this manual

Changing the operating mode

The following of the owner's personnel groups are authorised to use the key for the key switch and to select the robot's manual mode:

- System integrator
- Safety engineer
- Programmer
- Maintenance specialist

Changing the safety configuration

The robot's safety configuration is password-protected and may only be changed by the responsible system integrator and the responsible security engineer.

3 Operating robot functions

3.1 Operational safety

Improper operation

WARNING
Risk of injury due to improper operation!

Incorrect operation can result in injury and material damage.

- Complete all the operating steps in accordance with the specifications and instructions in this manual.
- Before starting work with the robot, ensure the following:
  - Ensure that the robot is securely mounted.
    "Robot Yu 5 Industrial" operating manual (chapter 5)
    Only switch on the robot when the power cable is connected to the owner's power supply and the robot cable is connected to the robot controller.
  - Ensure that the system integrator or the responsible safety engineer has parameterised the safety configuration in accordance with the requirements of the risk assessment.
  - Ensure that all covers and safety devices are installed and functioning properly.
    "Robot Yu 5 Industrial" operating manual (chapter 3.11)
  - Ensure there are no unauthorised persons in the robot's working area and hazard area.
- Never operate the robot if components are damaged or only loosely attached or have been completely removed.
  Exposed parts can pose a danger for the operator due to electric shock or sharp edges.
- Before commissioning the robot after a collision:
  - Check all components of the robot for damage.
  - Check that safety devices are functioning.
    "Robot Yu 5 Industrial" operating manual (chapter 7.5)

  Do not start up the robot if safety devices are damaged or not functioning.
- Never override or bypass safety devices during operation.
- Ensure that only the following of the owner's personnel perform operating activities on the robot in manual mode:
  - System integrator

  - Safety engineer
  - Programmer
  - Maintenance specialist
- If the system integrator's risk assessment includes the following situation for a specific application:

  Do not enter the robot's working area or touch the robot while it is in operation.
- Ensure that the operator has been informed about the functioning and possible risks of the owner's application.
- If the robot is to be moved in non-collaborative operation using manual guidance:
  - The enabling button on the handheld controller and the manual guidance button on the media flange must be operated by the same person.

    Never allow a person to operate the enabling button while another person is guiding the robot by hand.
  - Ensure that during manual guidance by a person, no other person is in the vicinity of the mobile device that could make entries in the user interface. Data entry in the user interface poses a risk of injury to personnel guiding the robot manually due to unintentional robot movements.

    If possible, lock the mobile device before starting manual guidance.
- Ensure that the total weight of the tool used and the payload to be moved do not exceed the maximum permissible load of 5 kg (movement radius: 1,000 mm):
- When connecting a tool provided by the owner, the cover on the media flange must be removed. This results in the robot losing its IP54 tightness. The system integrator must therefore re-evaluate the robot's IP class after a tool is connected for the first time.
- Never disconnect the robot cable from the robot controller during operation.

  Before putting the robot into operation, ensure that the bracket on the robot cable connector is locked onto the robot controller.
- Never disconnect the power cable from the robot controller or power supply during operation.

  This does not apply if the power supply to the robot needs to be disconnected as quickly as possible in an emergency.

Non-secure IT environment

NOTICE
Risk of robot damage due to non-secure IT environment!

Operating the robot in a non-secure IT environment can cause damage and malfunction.

- Ensure that the robot is never operated in a non-secure network environment where it is endangered by malicious software.
- Ensure that protection measures provided by the owner such as firewalls, antivirus software or encrypted VPN connections are used.

  If possible, during operation disconnect the internet connection for the mobile device that is connected to the robot.
- Ensure that the mobile device connected to the robot is free of viruses and is used exclusively to operate the robot.

  The use of private hardware for robot operation is not permitted.
- Ensure that storage media connected to the robot, such as USB devices, are free of viruses and are only used for data exchange with the robot.

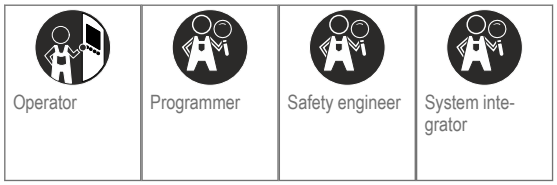
  The use of private storage media for data exchange is not permitted.
- Ensure that exported robot programs are protected against unauthorised access to prevent unauthorised manipulation of the programs.

  The system integrator is obliged to first test each imported program in manual mode before using it in automatic mode.
- Ensure that the system settings and the system status of the mobile device provided by the owner are checked regularly.
- Ensure that the robot is operated exclusively with the latest software version.
- Ensure that no external remote access to the robot is possible from outside the internal company network.

Attacks or intrusion into the network

Agile Robots SE is not liable for damage caused by attacks or intrusion into the network aimed at changing the robot controller's software system or the safety configuration.

3.2 Starting the software



Prerequisites

- The robot is connected to an Ethernet-enabled device (e.g. laptop).
  "Robot Yu 5 Industrial" operating manual (chapter 5.3)
- The Google Chrome ® browser is installed on the end device.
- The robot is switched on.
  "Robot Yu 5 Industrial" operating manual (chapter 6.3.2)

01. Switch the laptop on.

02. On your laptop, open the Google Chrome® browser.

03. Enter the following IP address in the browser's address bar and confirm with the Enter key:

    192.168.1.1

    ▶ ■ The robot controller's user interface opens.
    ■ The robot is ready for operation.

04. **NOTICE! Risk of property damage due to unauthorised data entry in the user interface!**

    Ensure that only the responsible system integrator makes settings in the user interface the first time that the robot is put into operation.

3.3 Managing programs

Overview

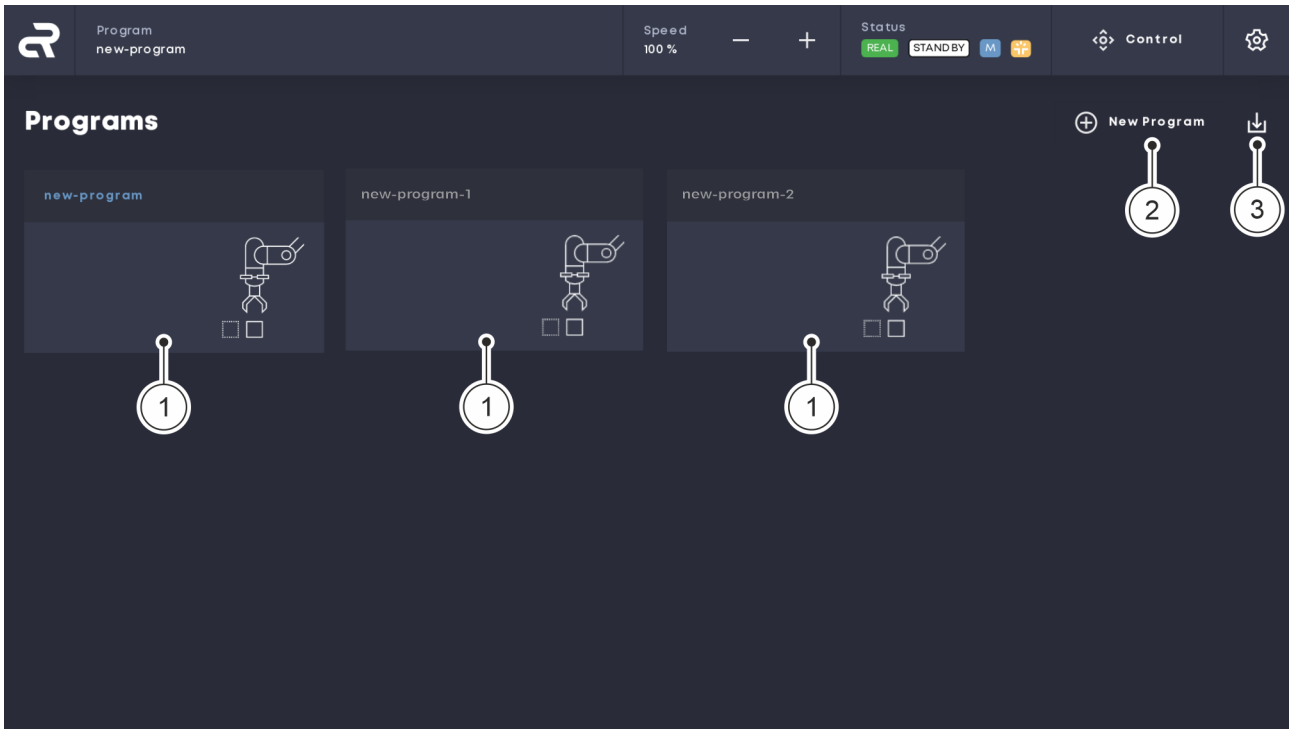


Fig. 4 Main screen

① Existing programs
② Create new program
③ Import program

All collaborative and non-collaborative applications of the robot are defined in the form of programs by the system integrator. Previously created programs Fig. 4/① are displayed on the main screen of the user interface.

Press the *'New Program'* button create new programs Fig. 4/②.

Press the *'Import Program'* button to import programs Fig. 4/③.

Managing programs

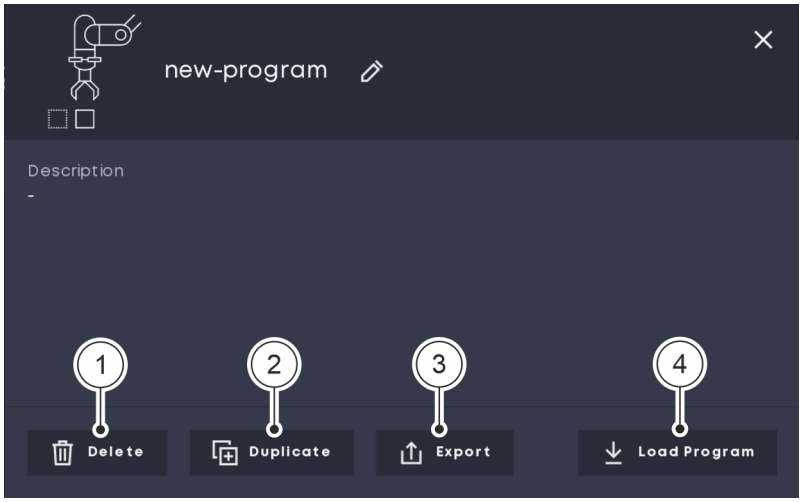


Fig. 5 Managing programs

01. To manage existing programs, click on the relevant program in the main screen.

    ▶ The menu shown in Fig. 5 appears.

02. Click on one of the following buttons:

    - *'Delete'* Fig. 5/①
      Delete the currently selected program.
    - *'Duplicate'* Fig. 5/②
      Copy the currently selected program.
    - *'Export'* Fig. 5/③
      Export the currently selected program.
    - *'Load Program'* Fig. 5/④
      Load the currently selected program (for more information about running programs *page 45*).

3.4 Activating/deactivating simulation mode

WARNING
Risk of injury due to unauthorised data entry in simulation mode!

In simulation mode, the mode selector switch is non-functioning, i.e. the system does not register if a user switches to automatic mode on the mode selector switch and the user level “System integrator” remains active in the user interface.

A perceived switchover to automatic mode when simulation mode is active can lead to the operator making unauthorised entries in the user interface, such as manually moving the robot in a non-collaborative state.

- Ensure that simulation mode is only activated and deactivated by the system integrator.
- Ensure that the system integrator exits simulation mode before automatic mode is switched on and the operator resumes work with the robot.

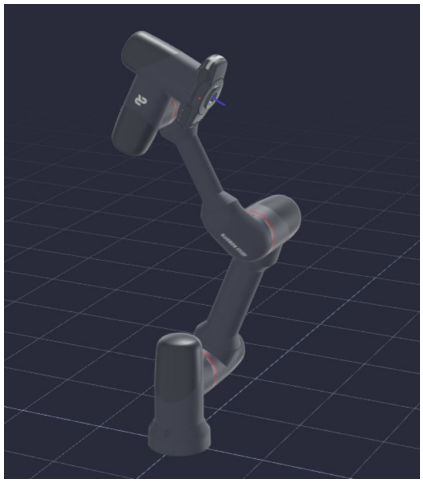


Fig. 6 Robot model in simulation mode

In simulation mode, robot movements can be simulated in the user interface using a virtual robot model Fig. 6.

The real robot does not perform any movements when simulation mode is active.

System integrator

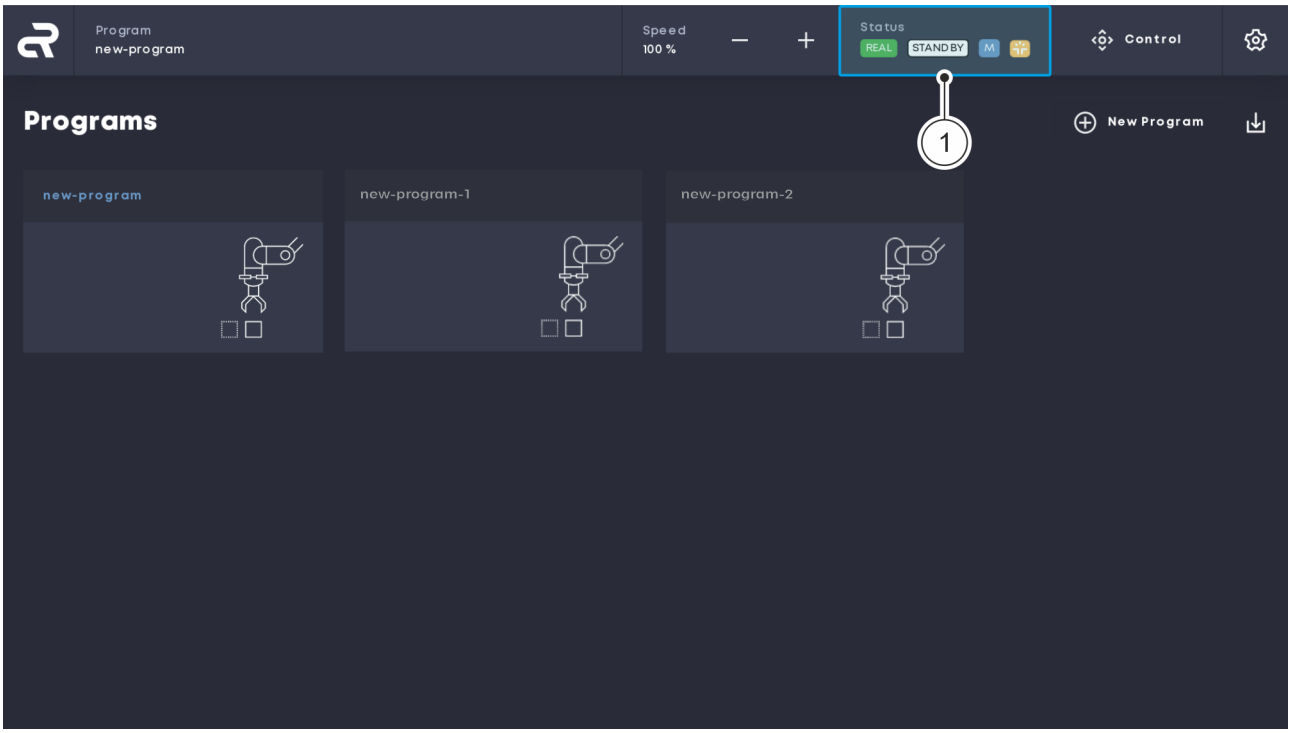


Fig. 7 Main screen

01. On the main screen, click the *'Status'* button Fig. 7/①.

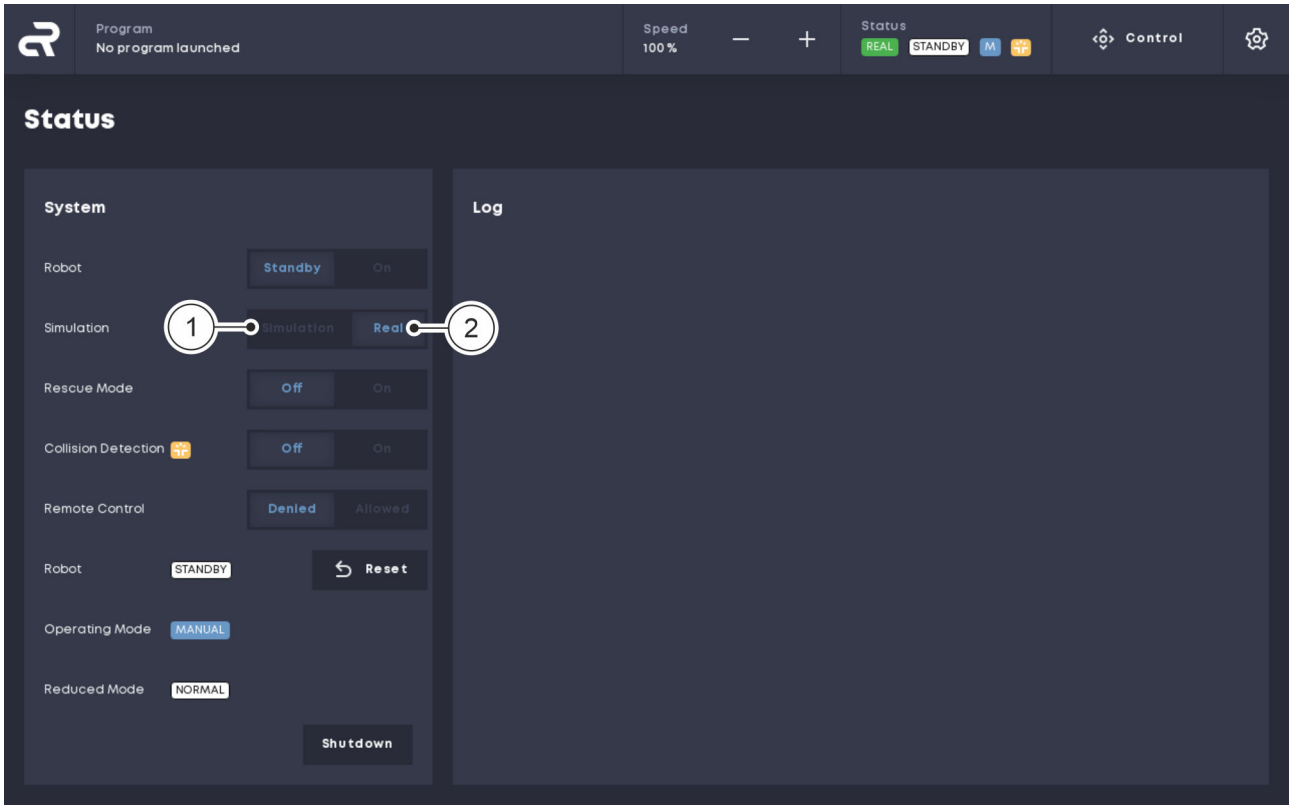


Fig. 8 Activating and deactivating simulation mode

02. In the *'Status'* menu, click the *'Simulation'* button to activate simulation mode Fig. 8/①.

    ▶ All robot movements (e.g. when executing programs or when moving manually) are now displayed exclusively virtually using the robot model in the user interface.

03. In the *'Status'* menu, click the *'Real'* button to deactivate simulation mode Fig. 8/②.

3.5 Activating/deactivating collision detection

Collision detection allows the robot to detect minor impacts or collisions that, while not triggering safety mechanisms, can still interfere with its tasks.

Collision detection is different from the robot's primary safety functions, which work autonomously and remain activated regardless of the setting for collision detection.

When a collision is detected according to the defined parameters of this function, the robot moves within a certain range of its configuration.

Safety functions

Further information on the safety functions can be found in the corresponding instructions:

↳ *"Robot Yu 5 Industrial" operating manual (chapter 3.12.)*

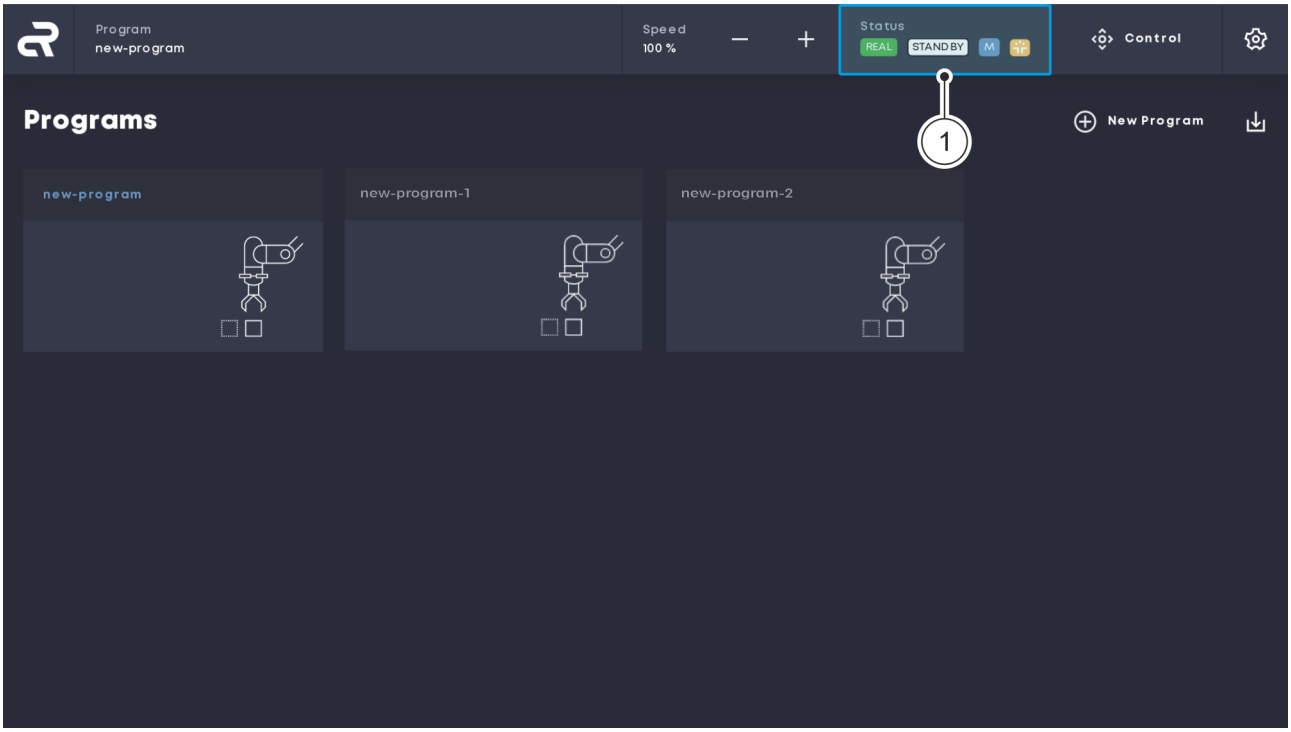


Fig. 9 Main screen

01. On the main screen, click the *'Status'* button Fig. 9/①.

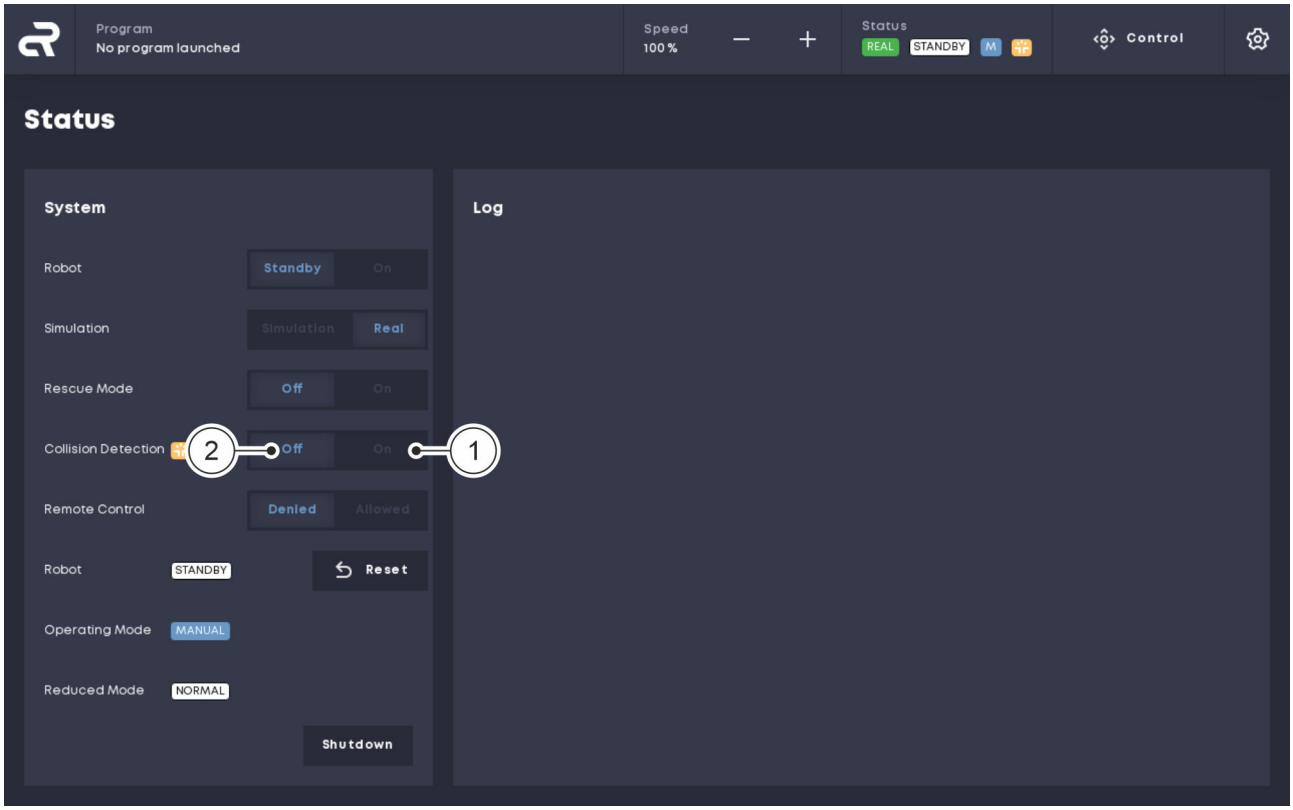


Fig. 10 Activating and deactivating collision detection

02. In the *'Status'* menu, click on the *'On'* button next to *'Collision Detection'* to activate collision detection Fig. 10/①.

03. In the *'Status'* menu, click on the *'Off'* button next to *'Collision Detection'* to deactivate collision detection Fig. 10/②.

3.6 Setting the safety configuration parameters

Dangers if the robot's safety configuration is changed

WARNING
Risk of injury if the robot's safety configuration is changed!

If the robot's safety configuration is not properly parameterised, there is a risk of injury to the operator during collaborative operation.

- The safety configuration can only be changed by the system integrator or by the responsible safety engineer.
- Ensure that the safety PIN is always protected against unauthorised access.
- Ensure that the risk assessment for the respective robot application is taken into account when parametrising the safety configuration.
- Ensure that the requirements of **EN ISO 10218-2** and **ISO/TS 15066** are observed when designing collaborative robot applications.
- Ensure that after each change to the safety configuration (i.e. the safety ID* for the safety configuration also changes) the system integrator or the responsible safety engineer personally checks the safety parameters in a test operation for possible risks and functionality.

** Safety ID*

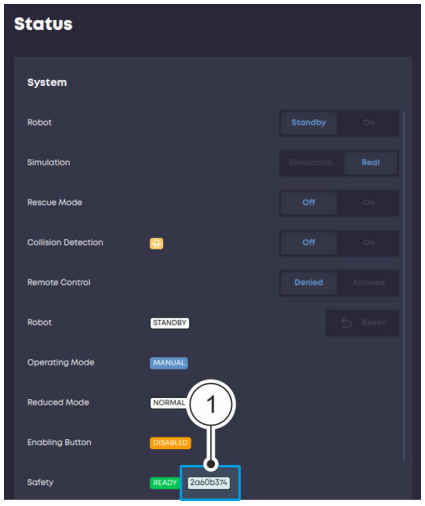


Fig. 11 Safety ID

Safety ID

A safety ID *Fig. 11*/① is assigned to a safety configuration.

When the safety configuration is changed (e.g. change to the maximum joint speed), the safety ID also changes. In this way, the operator can assign a safety configuration and ensure that nothing has changed.

Setting the safety configuration parameters

Safety engineer	System integrator

Prerequisites

- The robot is in manual mode.
  ↳ *"Robot Yu 5 Industrial" operating manual (chapter 2.2.6/6.3.3)*

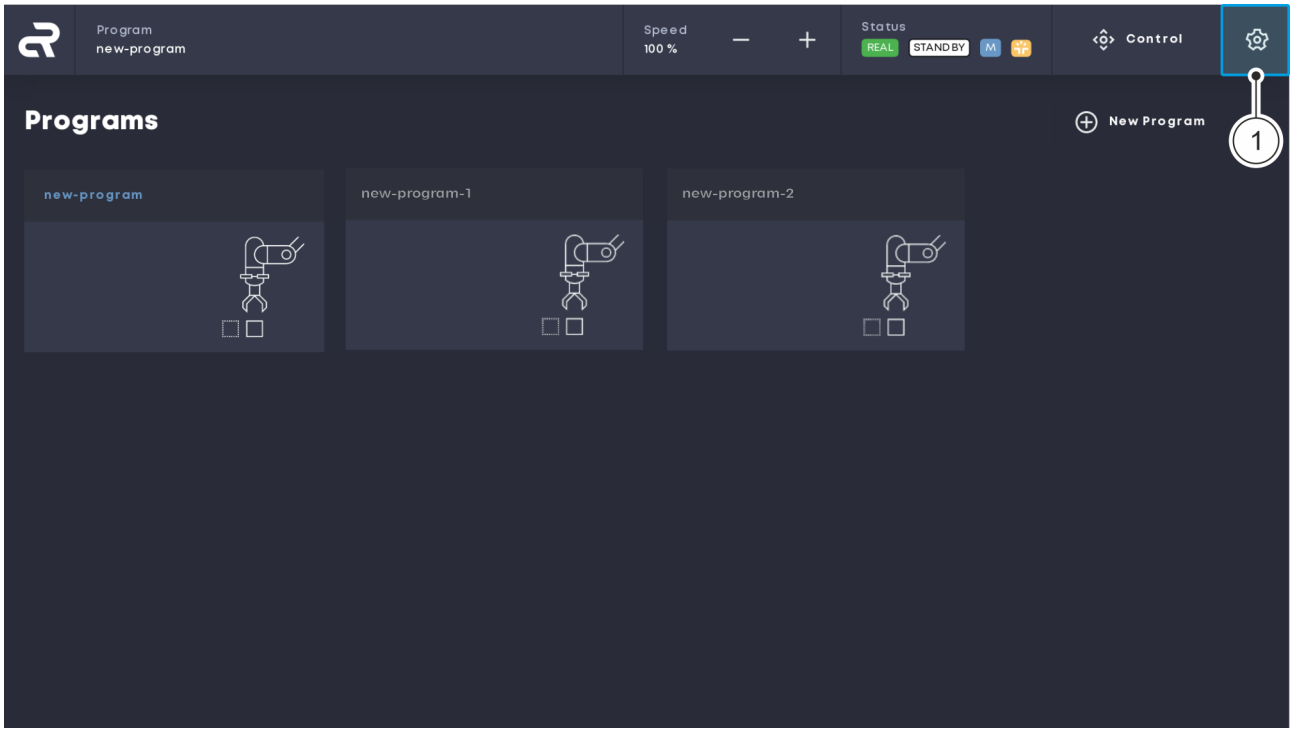


Fig. 12 Opening the *'Settings'* menu

01. In the navigation bar, click on the gear icon Fig. 12/① to open the *'Settings'* menu.

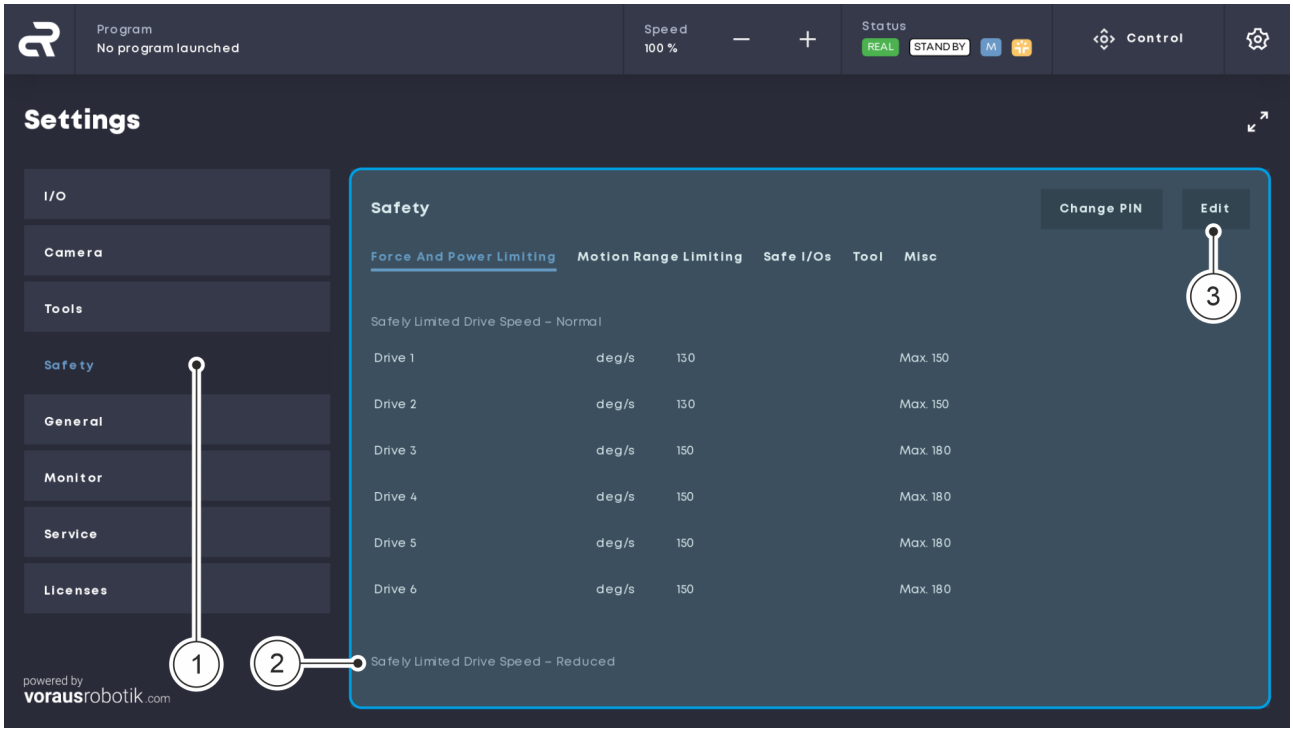


Fig. 13 Editing a safety configuration

02. In the *'Settings'* menu, click the *'Safety'* button Fig. 12/① on the left-hand tab to open the Safety configuration window Fig. 12/②.

03. Click the *'Edit'* button to change the parameters of the safety configuration Fig. 12/③.

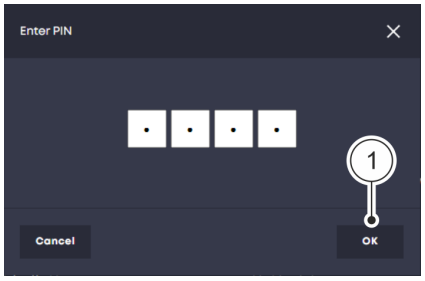


Fig. 14 Entering the PIN

04. Enter the four-digit safety PIN in the pop-up window and confirm with *'OK'* Fig. 14/①.

Safety PIN

When the robot is delivered, the safety PIN is **0000**.

We recommend that the system integrator or the responsible safety engineer change the safety PIN after the robot is switched on for the first time.

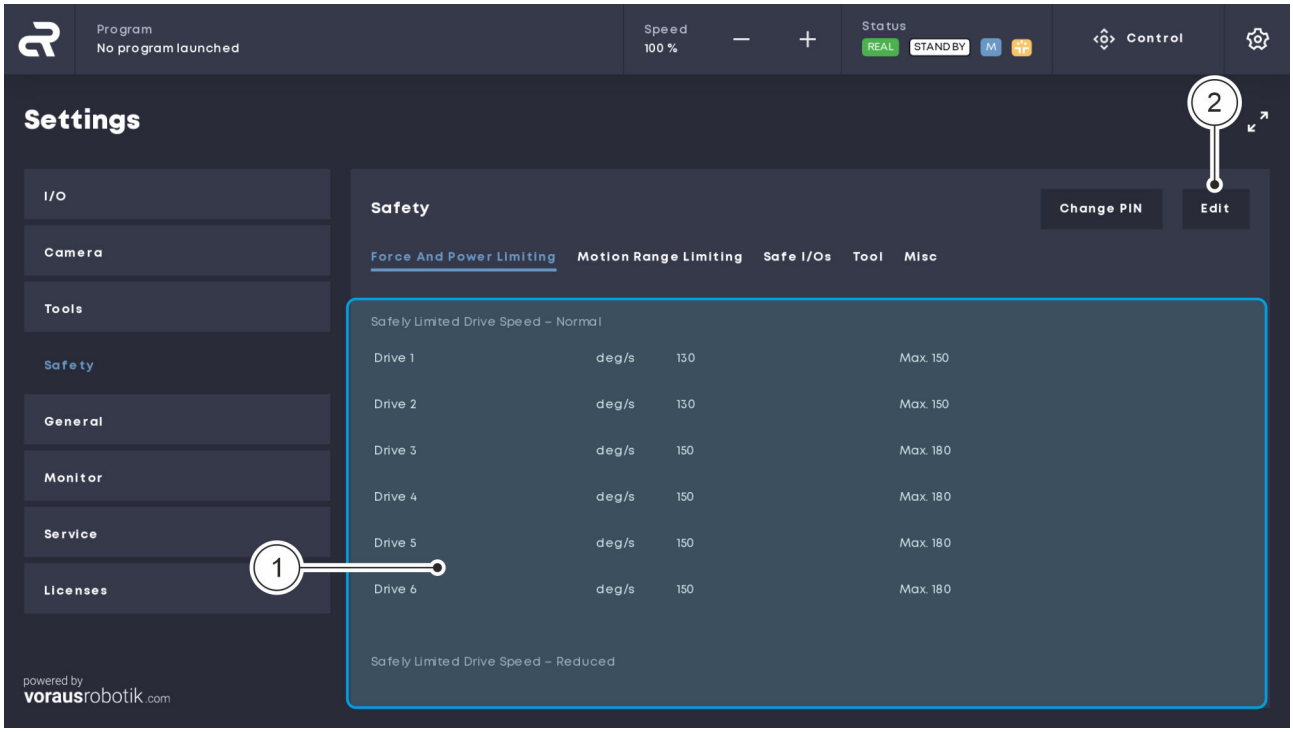


Fig. 15 Setting parameters

05. Enter the required parameter values in the individual fields Fig. 15/①.

    ℹ Collaborative state
    For programs that are to be executed in the collaborative state, the parameters of the safety configuration must comply with the permissible biomechanical limit values for human-machine collisions.

    The limit values are defined in the **ISO/TS 15066** standard.

06. Check changed parameter values and click on the *'Edit'* button Fig. 15/②.

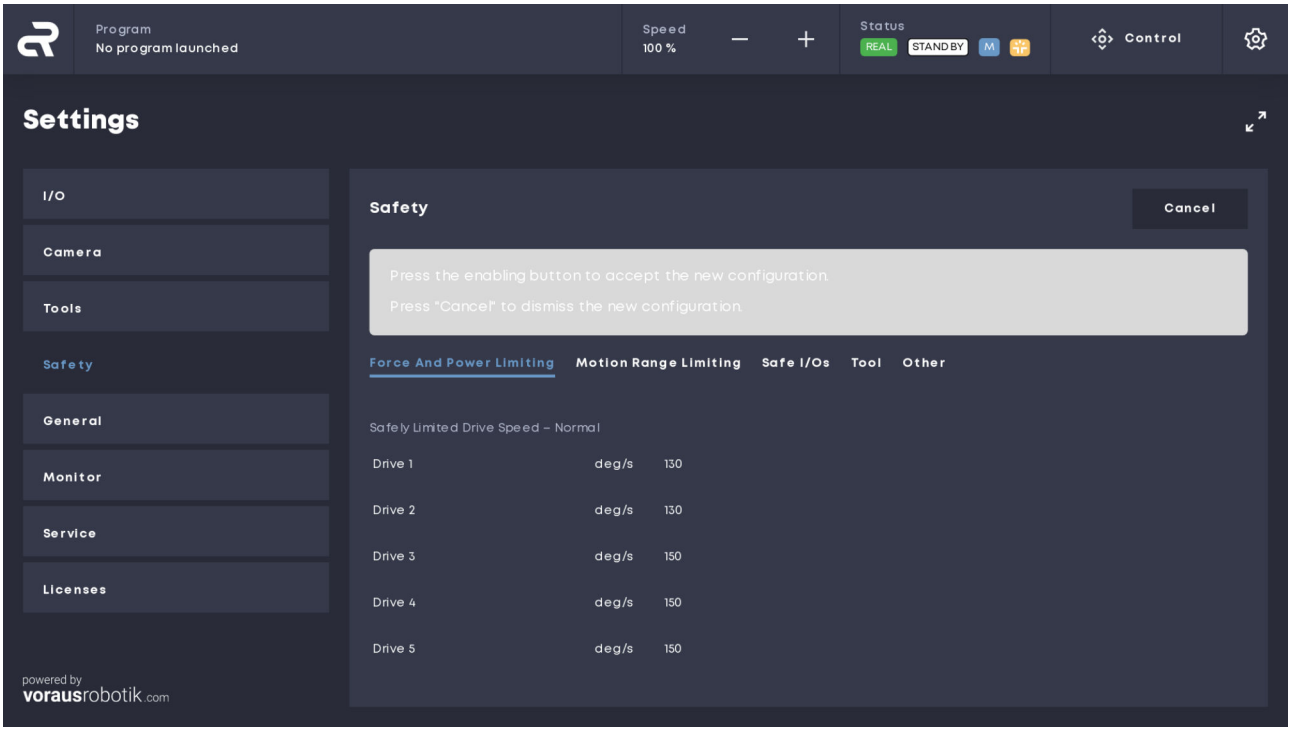


Fig. 16 Confirming a new safety configuration

07. Confirm the new safety configuration by pressing the enabling button in the middle position on the handheld controller Fig. 16.

▶ ■ The new safety configuration is active immediately after confirmation on the enabling button.

■ The new safety configuration applies globally to all programs and manually executed movements of the robot.

3.7 Configuring a tool

System integrator

Prerequisites

- The robot is in manual mode.
  "Robot Yu 5 Industrial" operating manual (chapter 2.2.6/6.3.3)

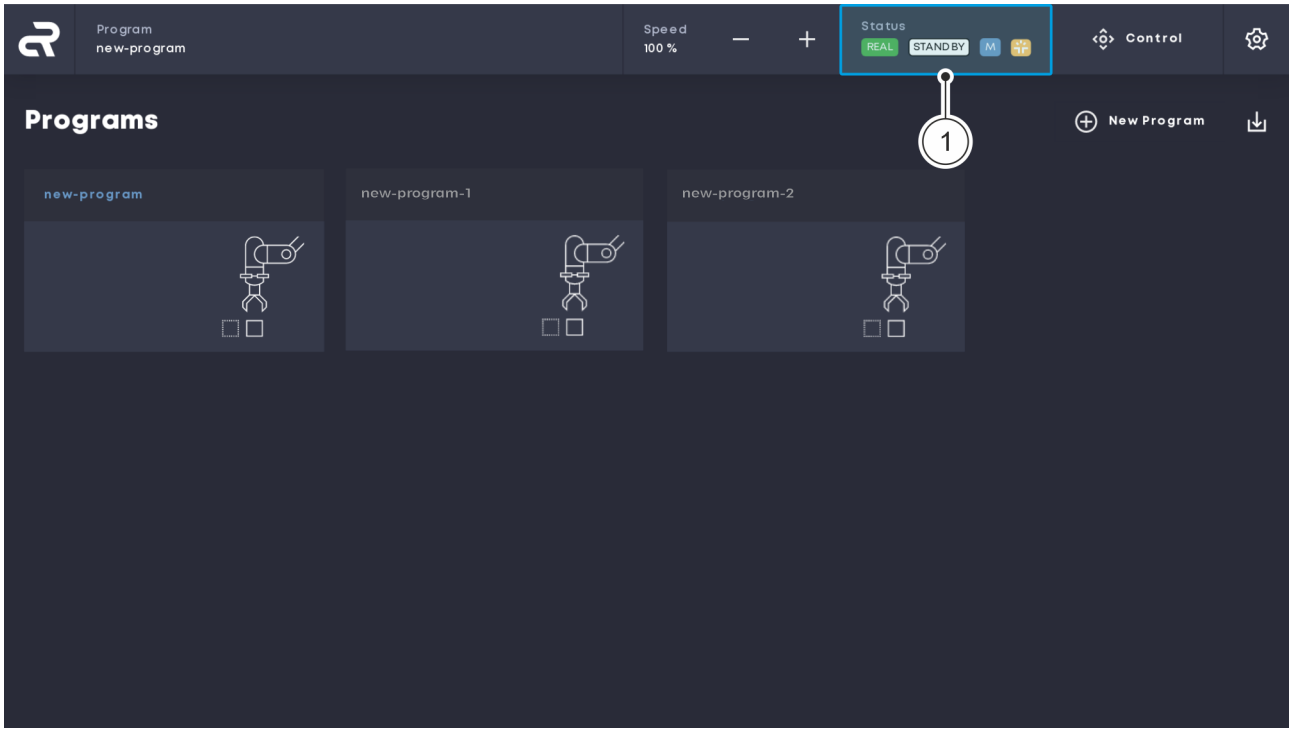


Fig. 17 Main screen

01. On the main screen, click the *'Status'* button Fig. 17/①.

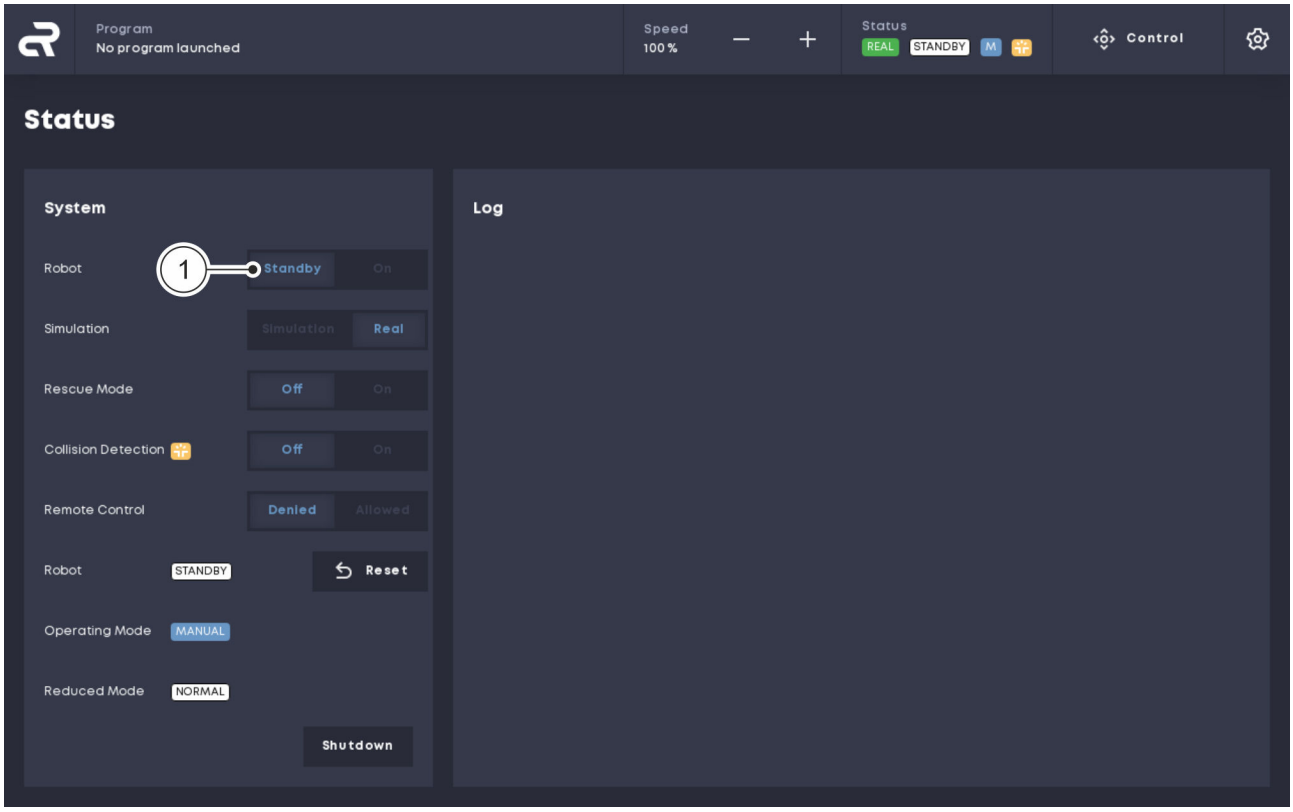


Fig. 18 Setting standby mode

02. In the *'Status'* menu, click the *'Standby'* button Fig. 18/①.

▶ The robot's standby mode is active and the robot controllers are switched off.

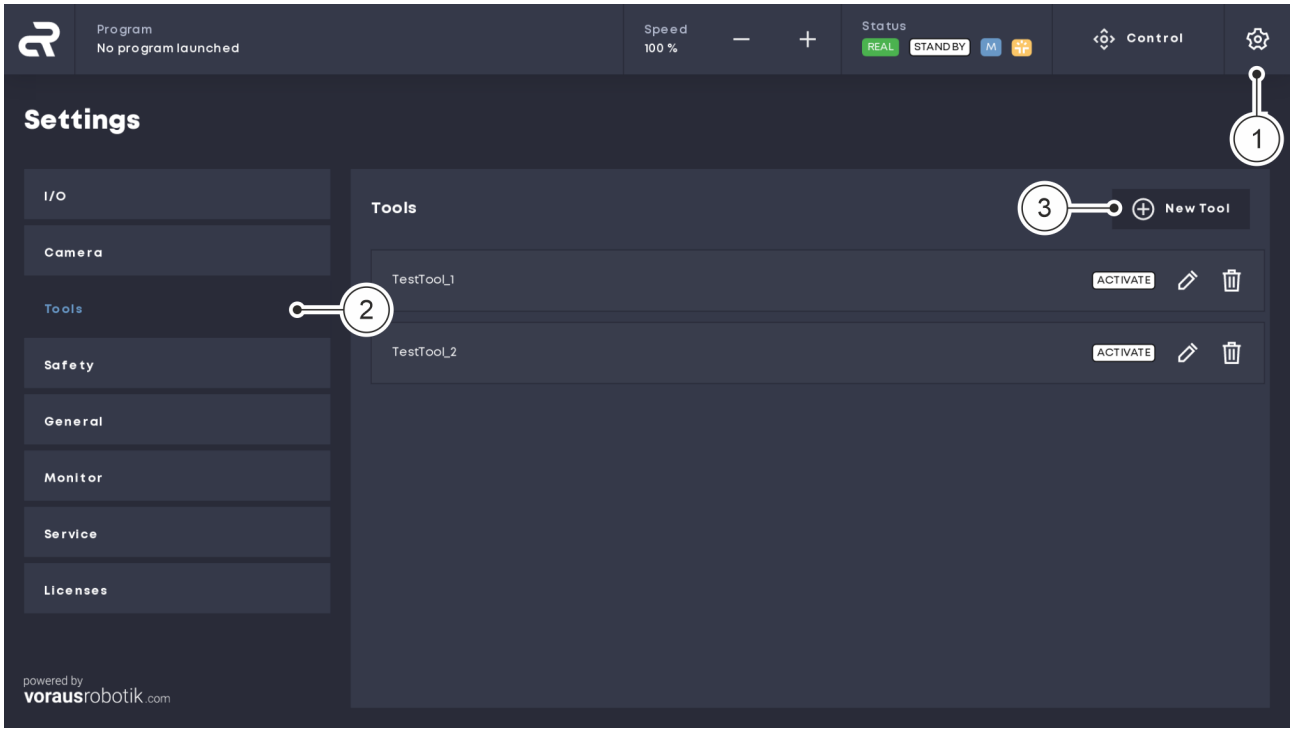


Fig. 19 Opening the *'Settings'* menu

03. In the navigation bar, click on the gear icon Fig. 19/① to open the *'Settings'* menu.

04. In the *'Settings'* menu, click the *'Tools'* button on the left-hand tab to open the tool settings window Fig. 19/②.

05. Click the *'New Tool'* button Fig. 19/③.

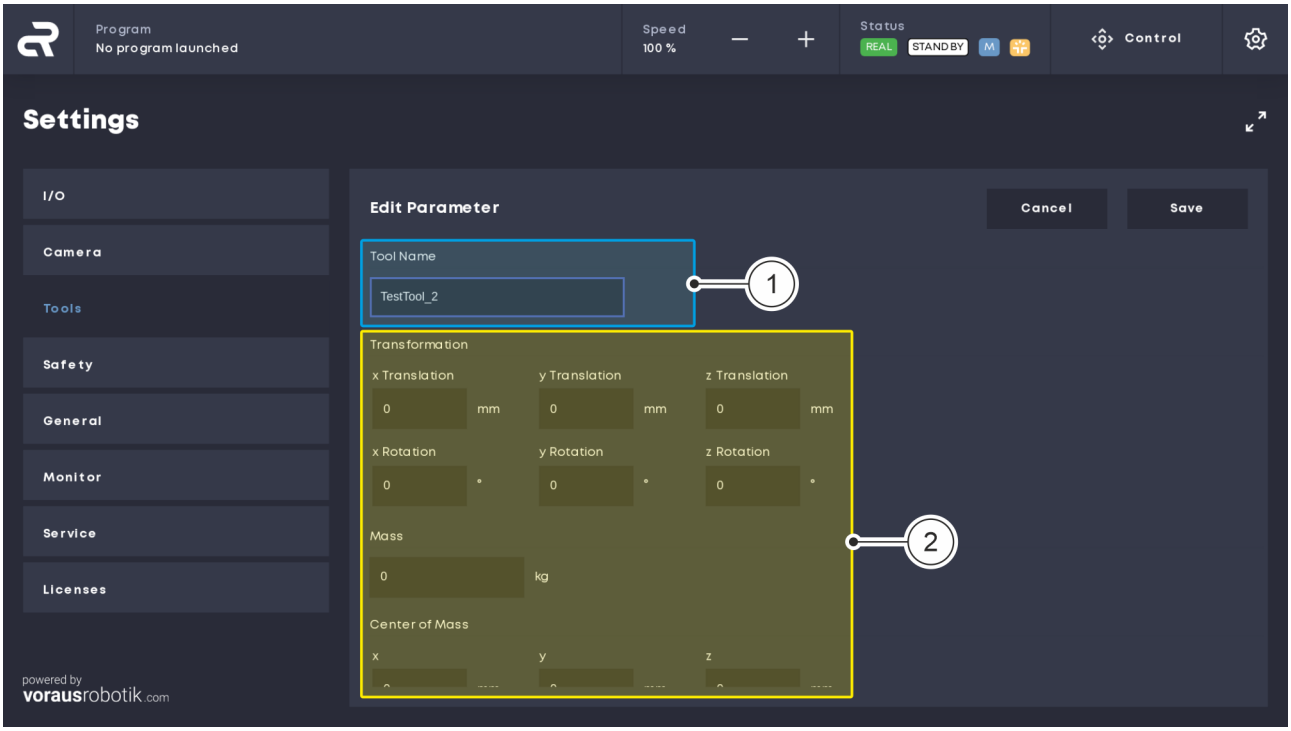


Fig. 20 Parametrising a tool

06. Name the tool Fig. 20/① and enter the tool parameters Fig. 20/②.

ℹ Tool mass as a safety parameter
If the tool is activated and a deviation in the tool mass is detected, a safety stop is executed.

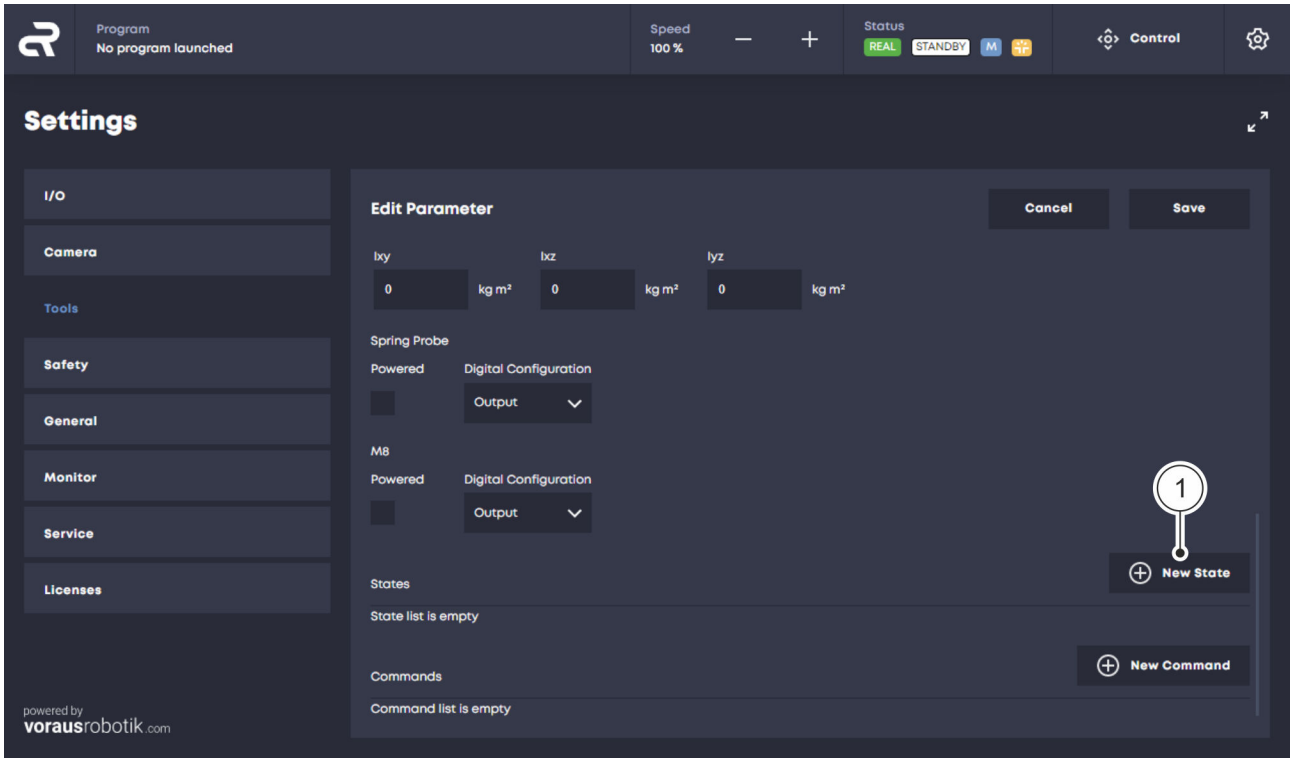


Fig. 21 Opening the *'New State'* menu

07. Click the *'New State'* button to open the *'New State'* menu Fig. 22/①.

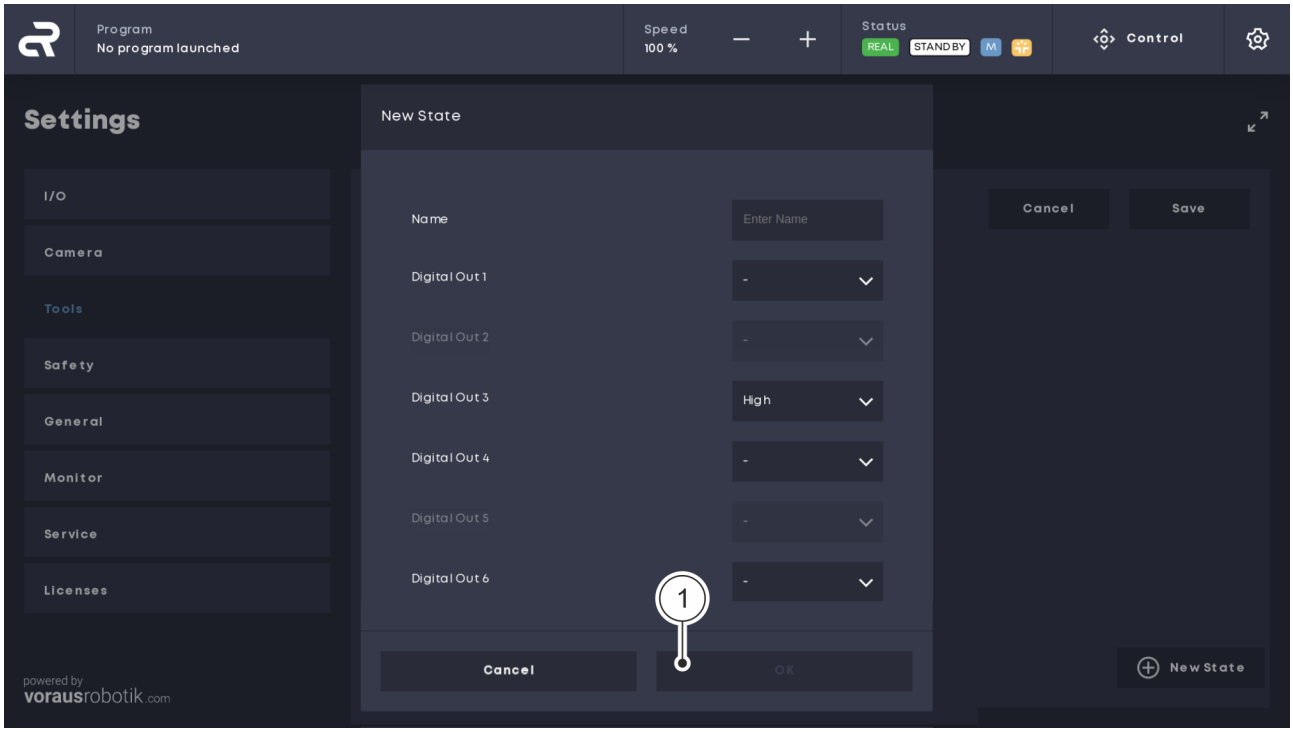


Fig. 22 Defining a status

08. In the *'New State'* menu, define the states of the digital outputs and the digital input according to the owner's specifications, and confirm with *'OK'* Fig. 22/①.

Digital outputs and inputs

For more information, refer to the corresponding instructions:

↳ *"Robot Yu 5 Industrial" operating manual (chapter 2.2.5)*

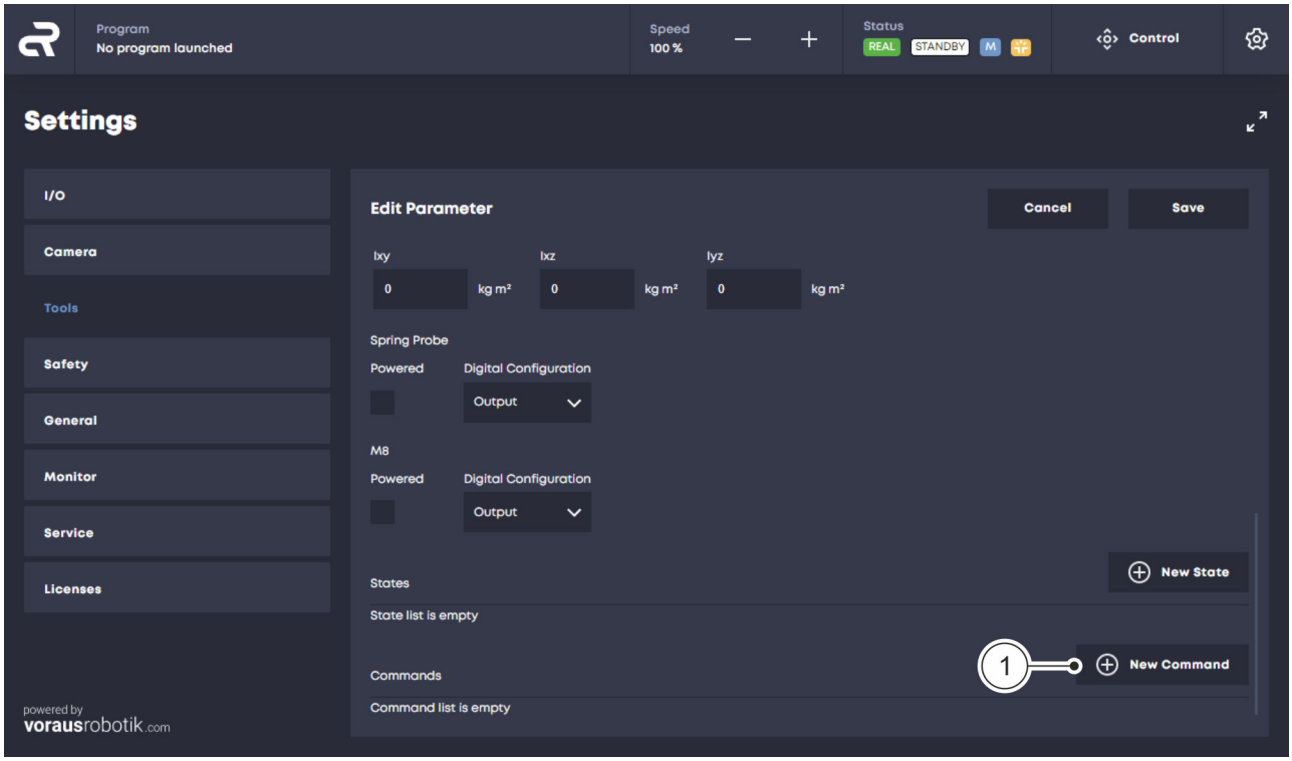


Fig. 23 Opening the *'New Command'* menu

09. Click the *'New Command'* button to open the *'New Command'* menu Fig. 23/①.

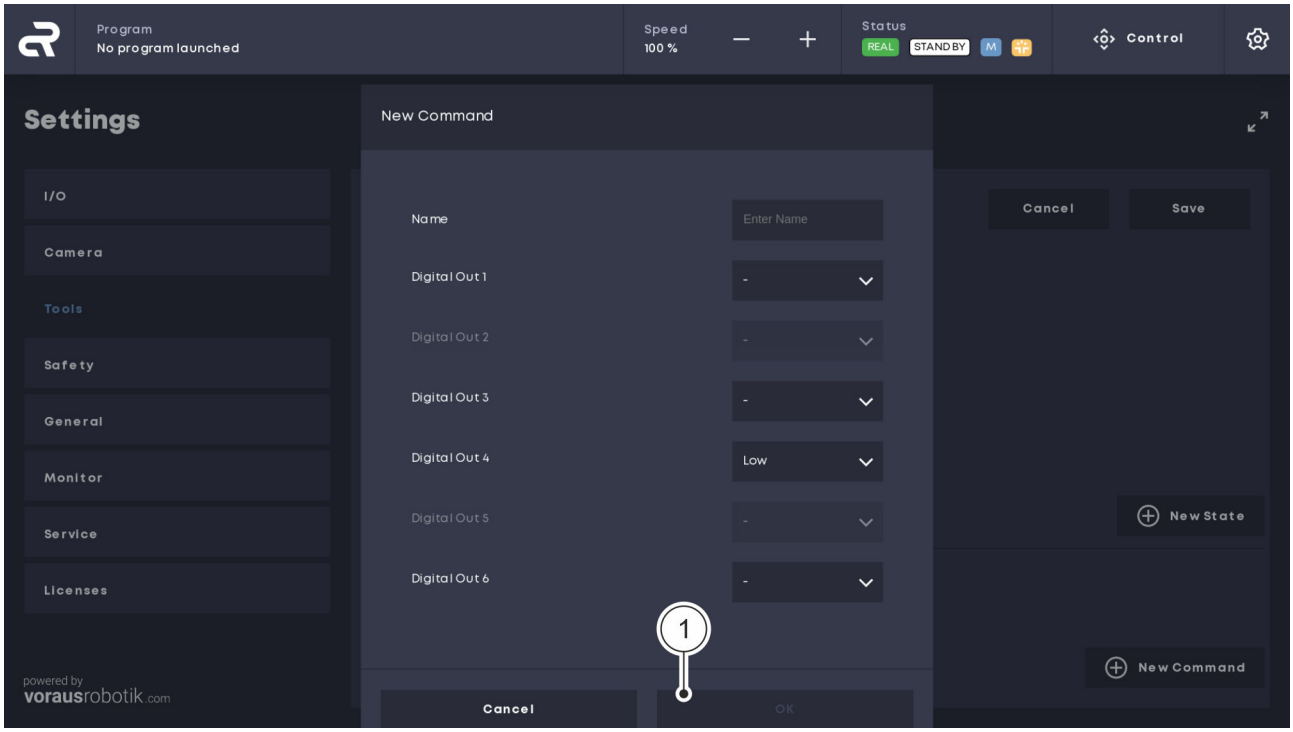


Fig. 24 Defining a command

10. In the *'New Command'* menu, define the states of the digital outputs according to the owner's specifications and confirm with *'OK'* Fig. 24/①.

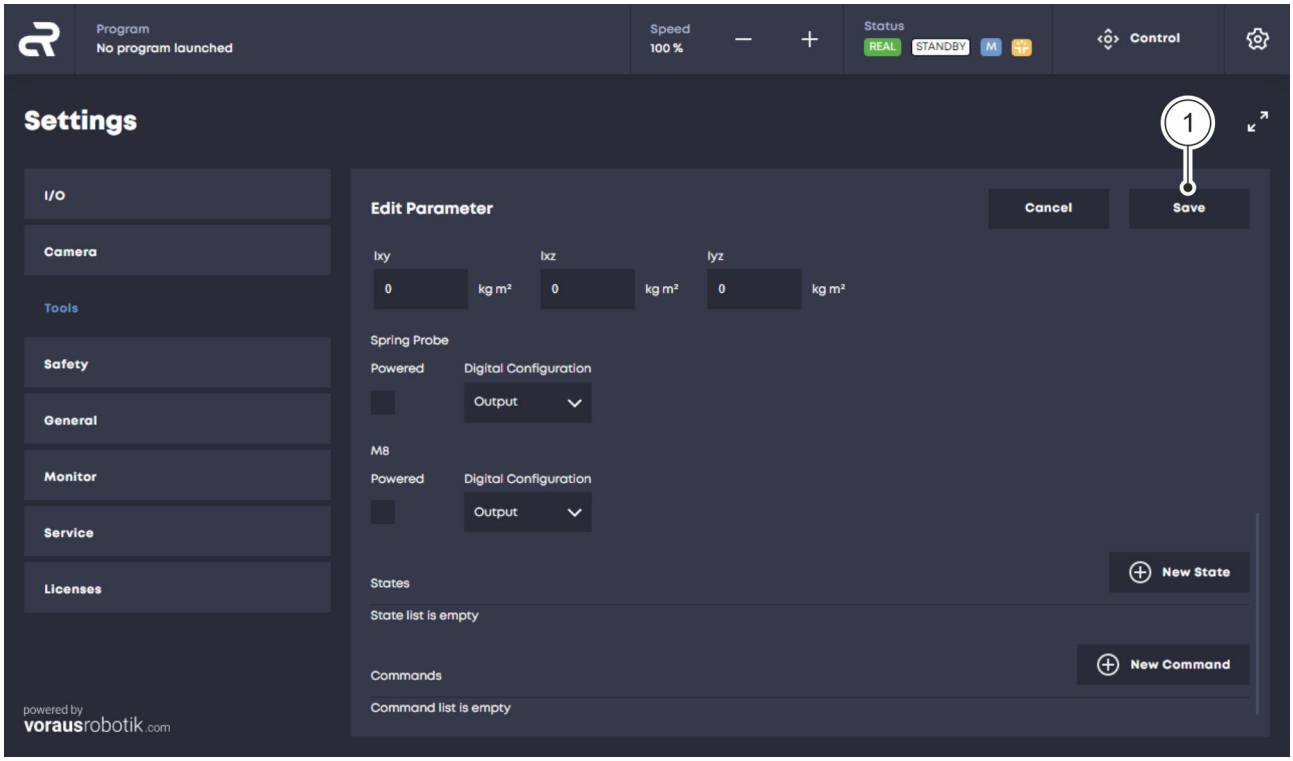


Fig. 25 Saving tool parameters

11. Click the *'Save'* button to save the tool parameters Fig. 25/①.

3.8 Creating a new program

Prerequisites

- The safety configuration for the new program has been correctly parametrised by the system integrator.

  ↳ *Chapter 3.6 'Setting the safety configuration parameters' on page 28*
- The robot is in manual mode.

  ↳ *"Robot Yu 5 Industrial" operating manual (chapter 2.2.6/6.3.3)*

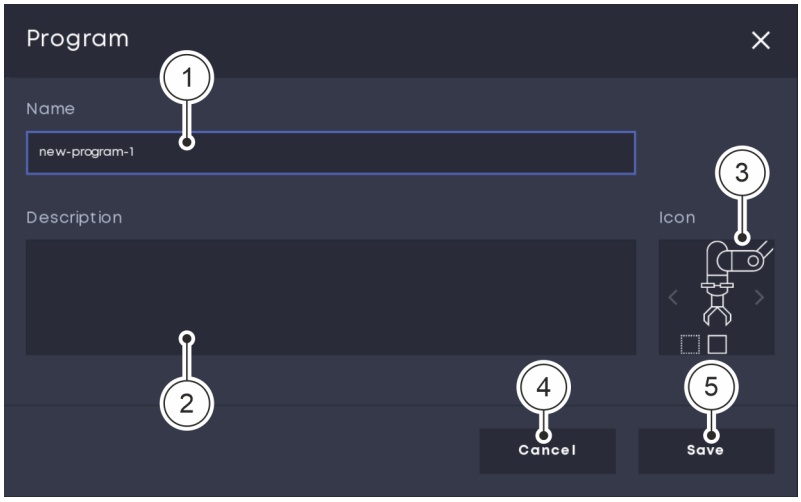


Fig. 26 Creating a new program

01. To create a new program, click the *'New program'* button on the main screen.

    ▶ The menu shown in Fig. 26 appears.

02. In the *'Name'* and *'Description'* fields, enter the desired name and the description of the program function Fig. 26/① + ②.

03. In the *'Icon'* field, select the desired program icon by clicking on the arrows Fig. 26/③.

04. Click the *'Save'* button to create the program Fig. 26/⑤.

    Otherwise, click the *'Cancel'* button to return to the main screen Fig. 26/④.

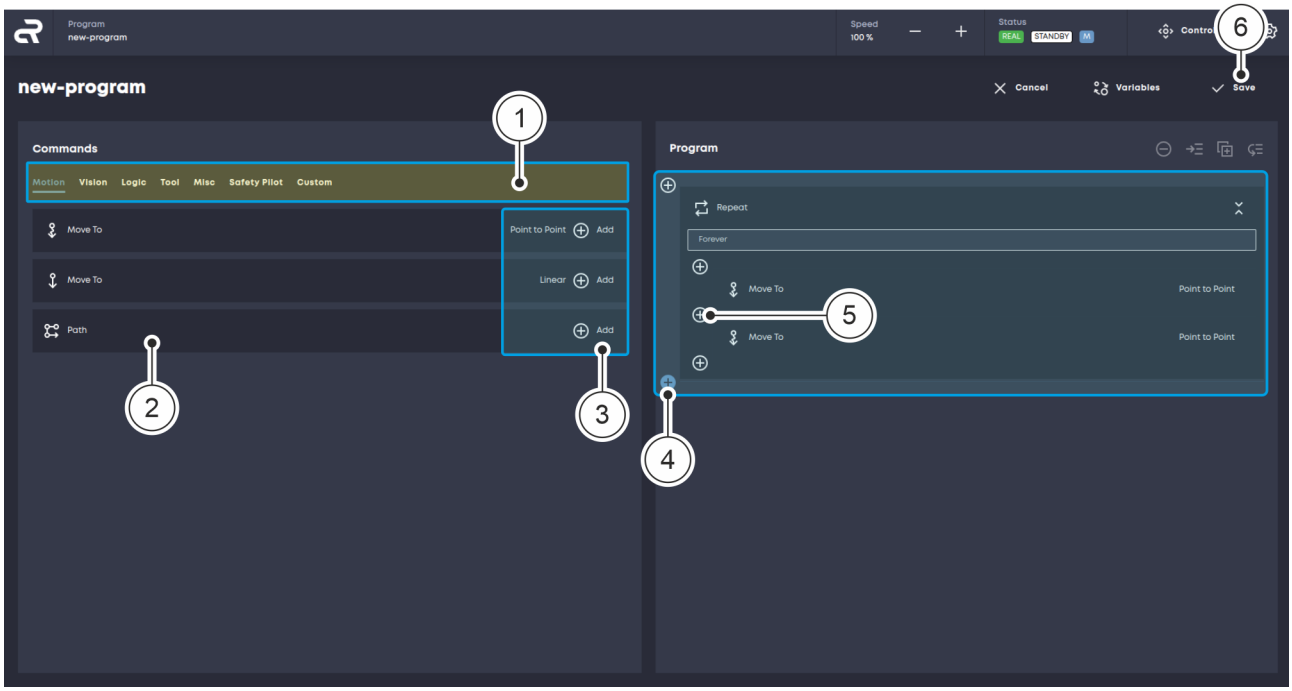


Fig. 27 Assigning commands in the *'Program'* menu

05. In the *'Program'* menu (right half of the screen), define the program sequence by adding individual command blocks Fig. 27.

To do so, proceed as follows:

- On the tab, select the required command category by clicking Fig. 27/①.

  The following command categories are available:

  - *'Motion'*

    Define the robot's movement sequences.
  - *'Vision'*

    Use the camera on the media flange, for example, for object detection.
  - *'Logic'*

    Select logic commands.
  - *'Tool'*

    Select tool commands.
  - *'Misc'*

    Combine commands to form groups.
  - *'Custom'*

    Reuse custom commands.
- Select the desired command block Fig. 27/② and add it to the program sequence by clicking on the plus symbol Fig. 27/③.

  The new command block is added to the program sequence at the location of the selected plus symbol (highlighted in light blue) Fig. 27/④.

Add intermediate steps

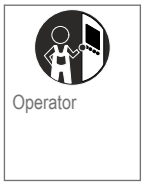
Selecting the plus symbols Fig. 27/⑤ enables you to define and add intermediate steps later.

06. After assigning all the necessary command blocks, click the *'Save'* button to save the program Fig. 27/⑥.

▶ The operator can load and run the newly created program from the main screen.

Chapter 3.9 'Loading and running programs' on page 45

3.9 Loading and running programs



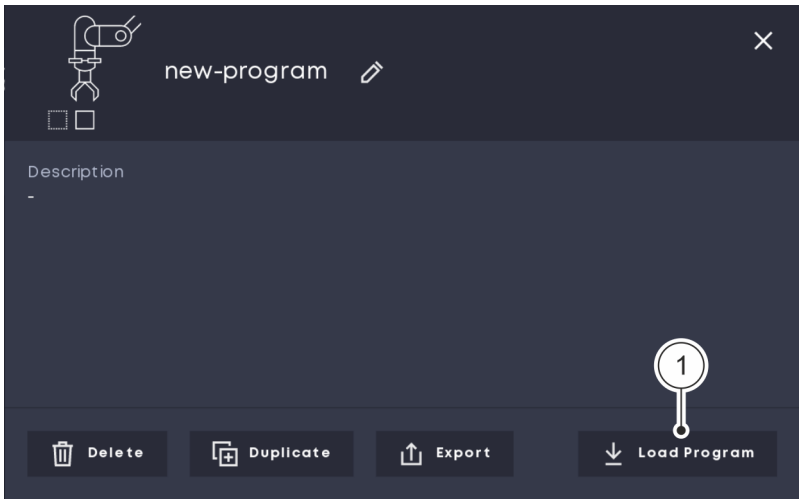


Fig. 28 Loading a program

01. To load a program, click the button of the desired program on the main screen.

    ▶ The menu shown in Fig. 28 appears.

02. Click on the *'Load Program'* button to open the selected program Fig. 28/①.

    ▶ The *'Program'* menu appears Fig. 29.

    In the *'Program'* menu, the program sequence is displayed as a series of individual command blocks Fig. 29/②.

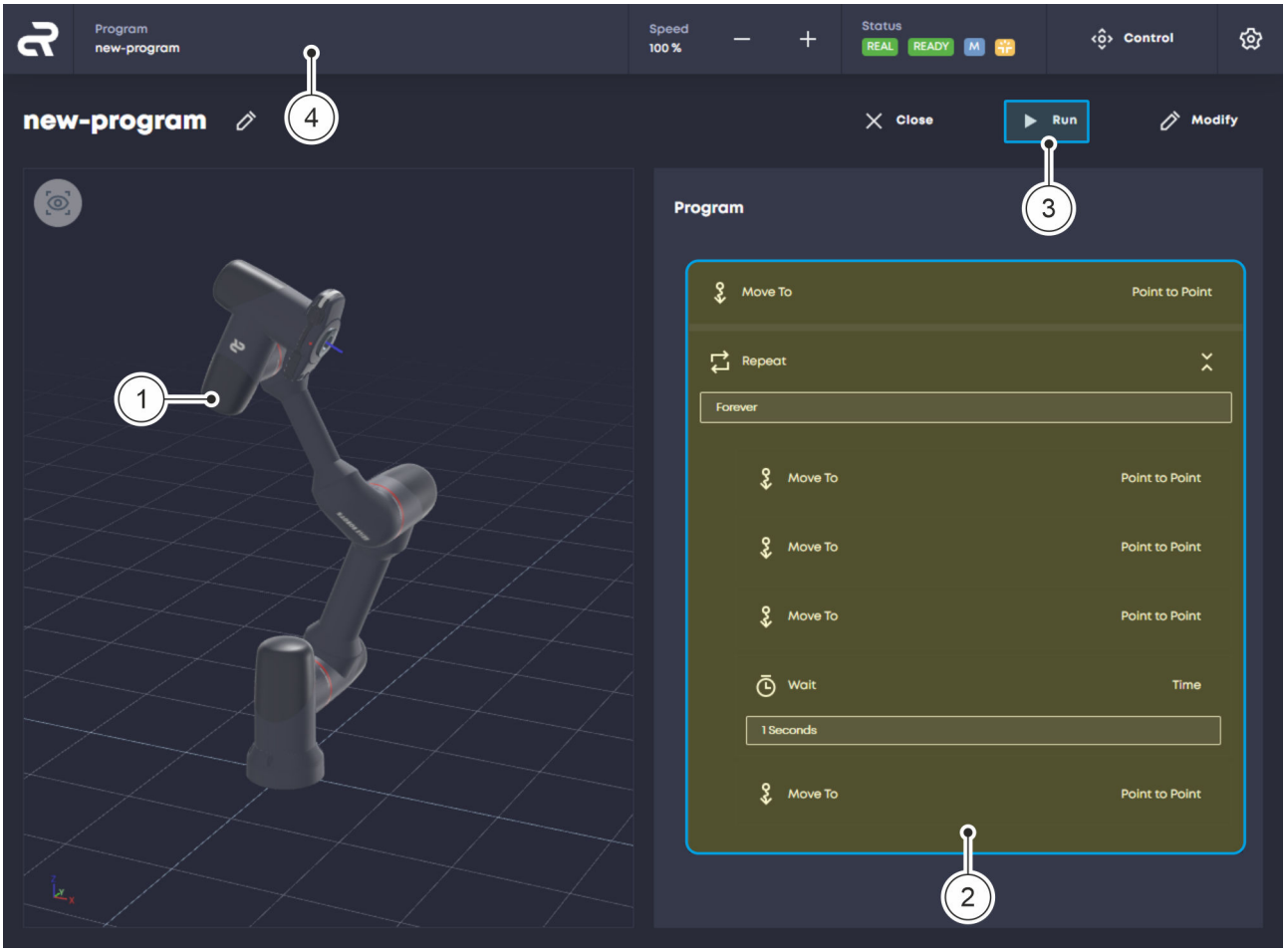


Fig. 29 Starting a program

03. To start the program, click the *'Run'* button Fig. 29/③.

▶ The robot runs the program according to the sequence of command blocks.

ⓘ *'Program'* menu

In the left-hand menu section, the movements are displayed using a virtual robot model Fig. 29/①.

The currently loaded program is displayed in the navigation bar at all times Fig. 29/④.

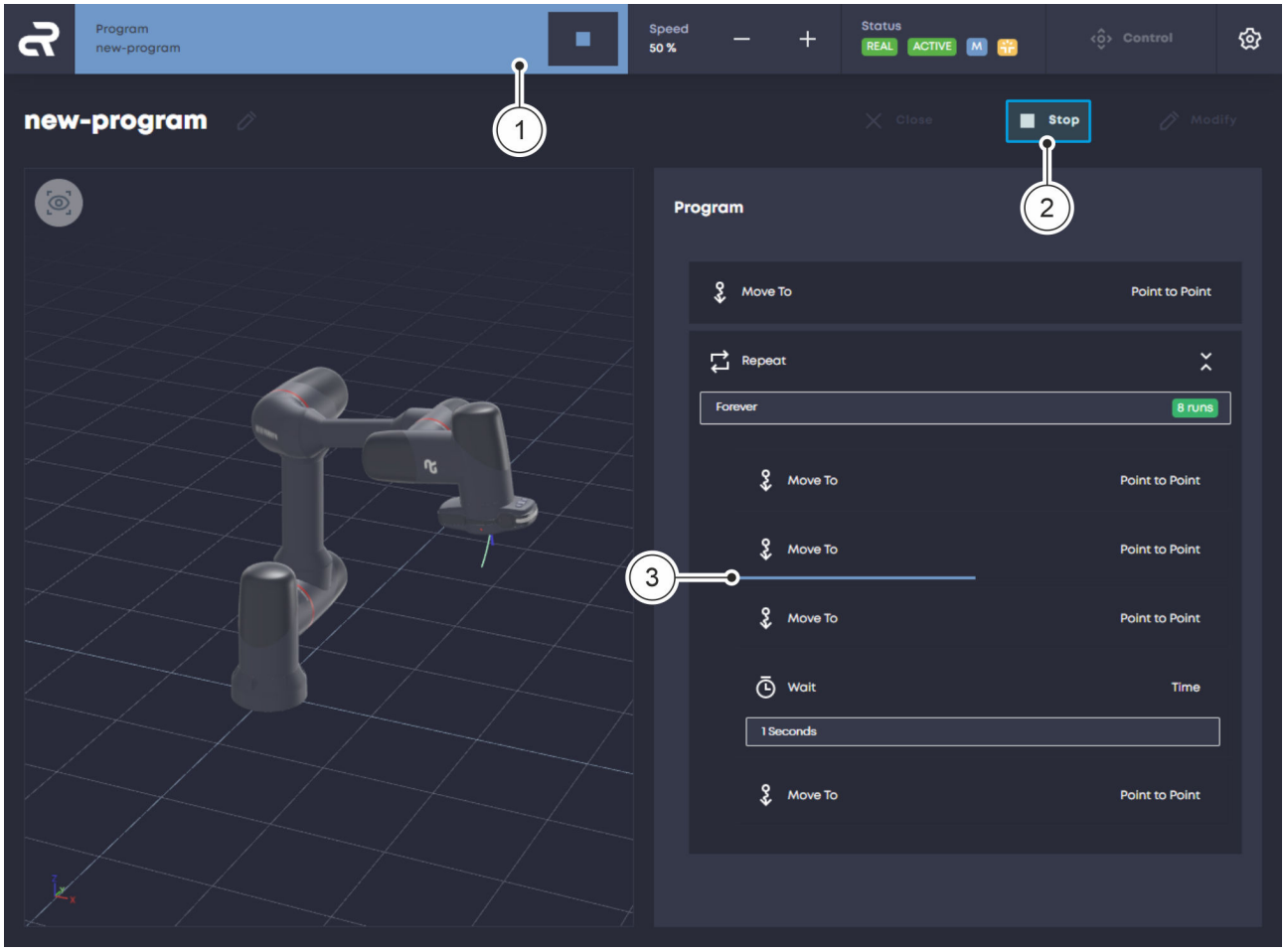


Fig. 30 Stopping a program

04. To stop the program, click the Stop button in the navigation bar Fig. 30/① or the *'Stop'* button in the *'Program'* menu Fig. 30/②.

Program sequence

The command sequence that is currently running is displayed by a light blue timeline *Fig. 30*/③.

3.10 Moving the robot manually

WARNING
Risk of injury due to manual movement of the robot!

During manual movement of the robot, there is a possibility that the robot will be moved in an unsafe environment without a previous risk assessment. Even with active force and power limitation and despite the immediate collision stop in the event of physical contact, injuries can occur due to improper manual operation of the robot.

- Ensure that the only the responsible system integrator moves the robot manually.
- Ensure there are no unauthorised persons in the robot's working area and hazard area.
- Ensure that no pointed or sharp-edged tools or devices are operated on the robot.

Moving the robot manually

System integrator

Prerequisites

- The robot is in manual mode.
  "Robot Yu 5 Industrial" operating manual (chapter 2.2.6/6.3.3)

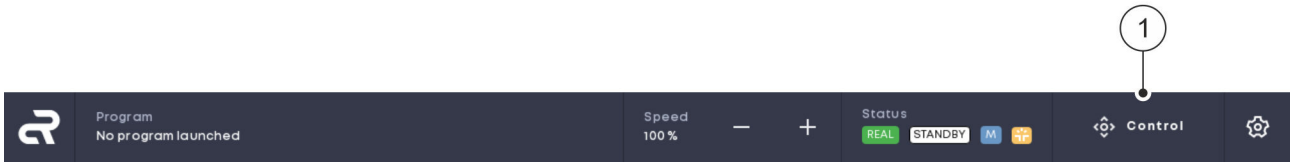


Fig. 31 Open the *'Control'* menu

01. On the navigation bar, click the *'Control'* button Fig. 31/①.
    ▶ The *'Control'* menu appears Fig. 32.

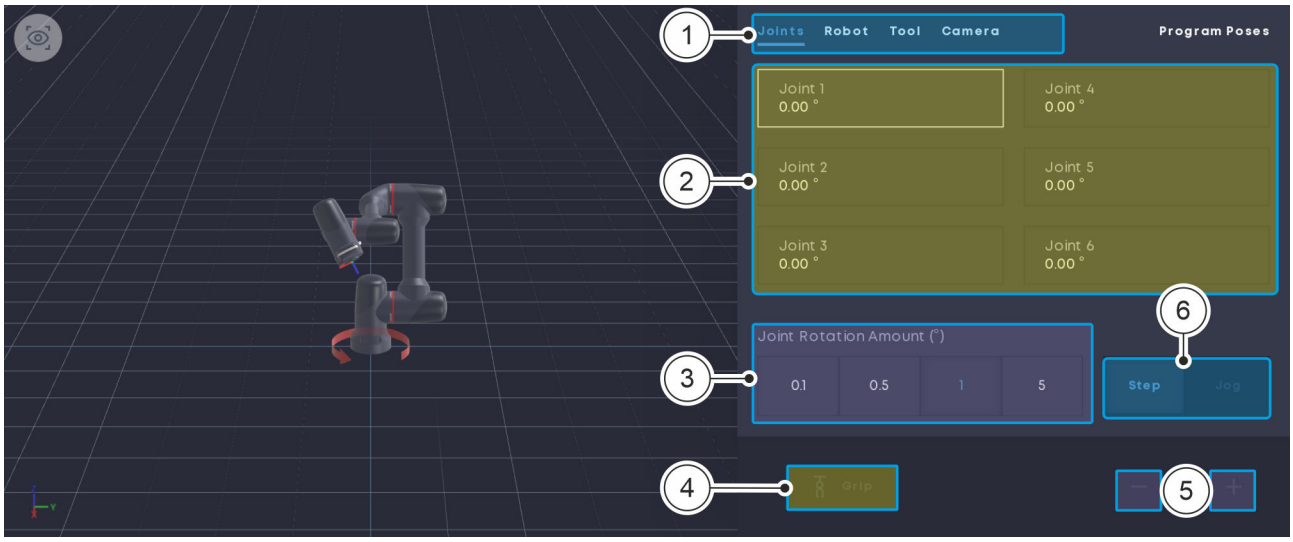


Fig. 32 *'Control'* menu

02. Select the desired coordinate system from the tabs Fig. 32/①.
03. Select the axis for which a movement is to be executed Fig. 32/②.
04. Select the movement method Fig. 32/⑥:
    - *'Step'* (step jogging)
      Robot is moved step by step along the selected axis.
    - *'Jog'* (jogging)
      Robot is moved along the selected axis without interruption.

05. Select angular step size or angular velocity Fig. 32/③.

06. Click the plus or minus button to move the robot forward or backward along the selected axis Fig. 32/⑤.

Moving the robot
Press and hold the plus or minus button to move the robot in an uninterrupted motion while jogging.

To open or close the gripper unit connected to the media flange, click the *'Open'* or *'Close'* (Grip) button Fig. 32/④.

3.11 Reset after a robot stop

The following section describes how to restart the robot after a stop or after a change of operating state.

Operating states of the robot

For more information, refer to the corresponding instructions:

"Robot Yu 5 Industrial" operating manual (chapter 2.2.1)

Reset after an emergency stop

An emergency stop of the robot is triggered by pressing the emergency stop button on the handheld controller.

All robot movements are stopped immediately and the robot's brakes are active.

The robot controllers are switched off.

System integrator

Prerequisites

- The cause of the event that triggered the emergency stop has been rectified (where applicable).
- There is no hazardous situation in the robot's working area.
- The emergency stop button is unlocked.

  "Robot Yu 5 Industrial" operating manual (chapter 6.3.4)

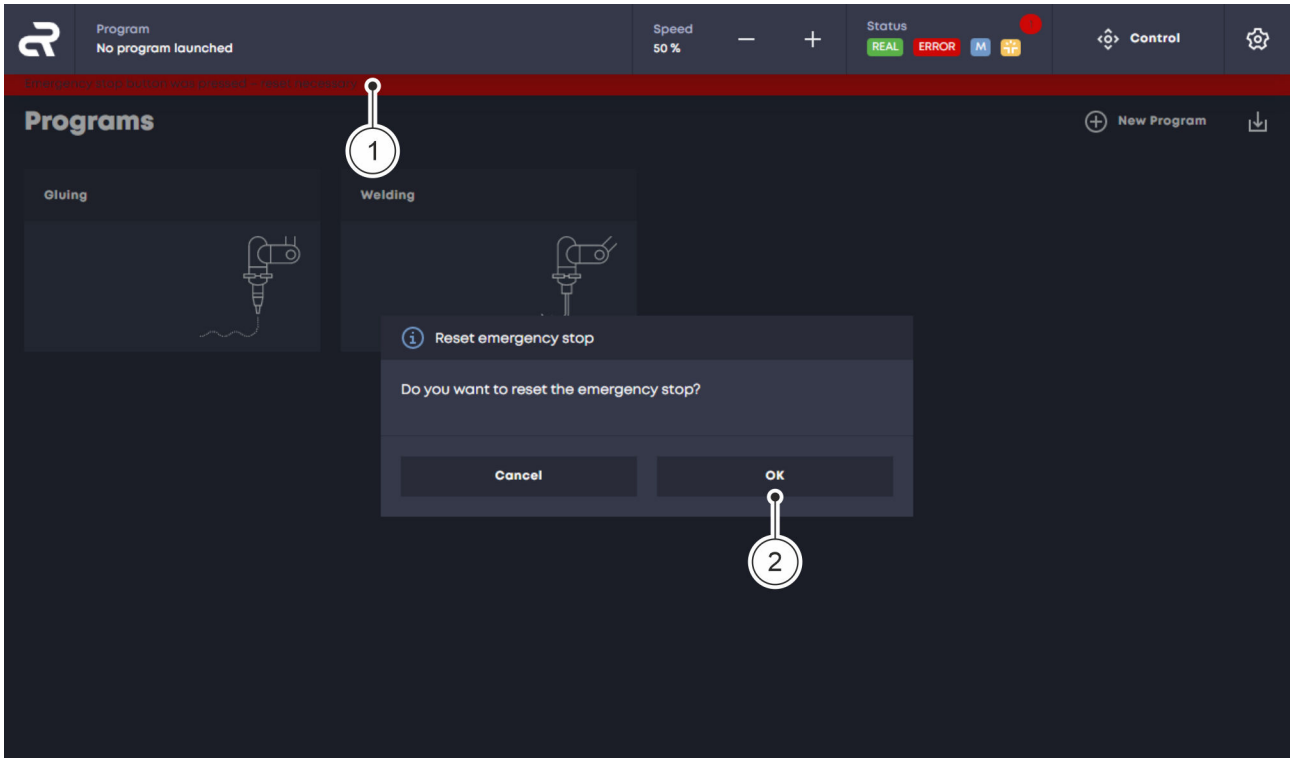


Fig. 33 Acknowledging an emergency-stop status message

01. Reset the robot in the user interface.

    To do this, click on the status message Fig. 33/① and confirm the query with *'OK'* Fig. 33/②.

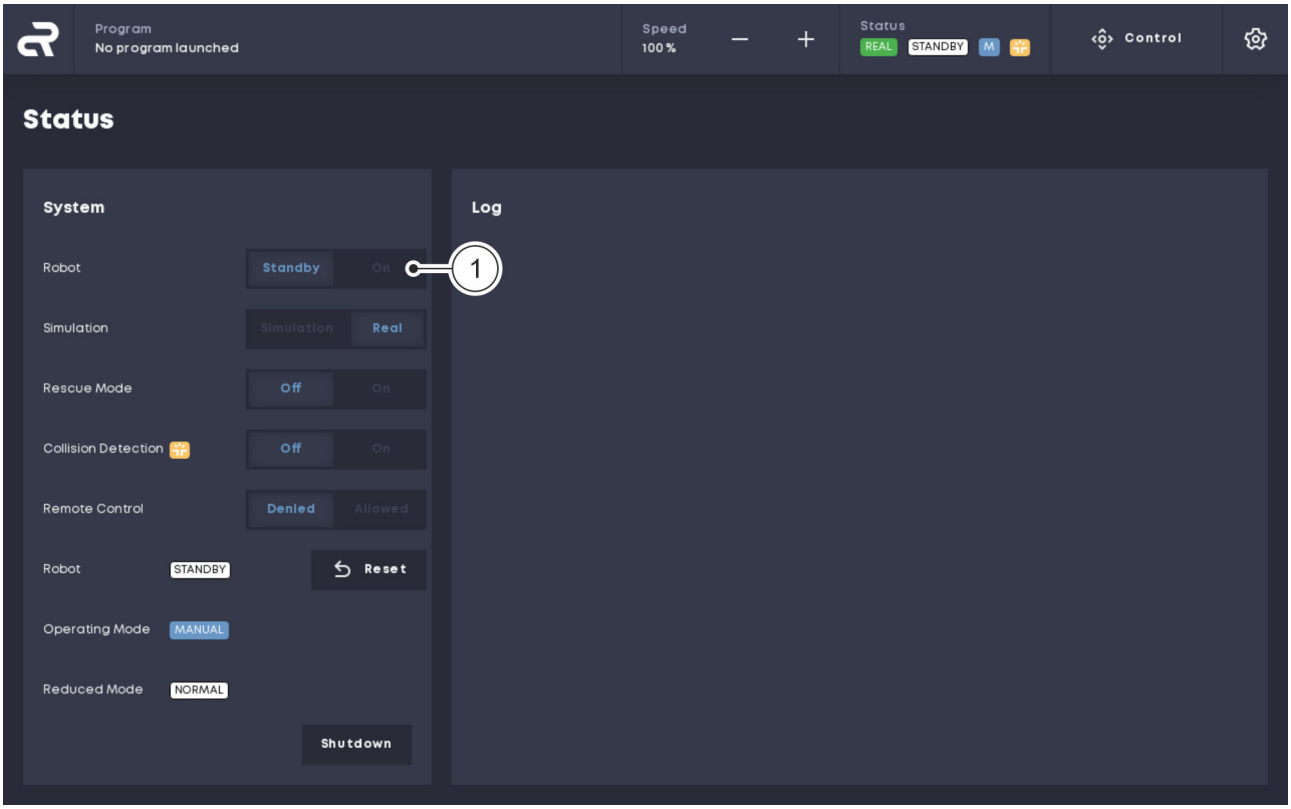


Fig. 34 Switching on the robot controller

02. Switch the robot controller back on in the user interface.

    To do this, click the *'On'* button Fig. 34/① next to *'Robot'* in the *'Status'* menu.

Reset after a safety stop

In the event of a safety stop, all robot movements are immediately stopped and the brakes of the robot are actuated. A safety stop is triggered in the following situations:

- When the emergency stop button on the handheld controller is pressed.
- If there is a fault in the safety controller.
- If the robot is in motion and the operating mode is changed on the mode selector switch.
- If the enabling button on the handheld controller is in the middle position and the operating mode is changed on the mode selector switch (in both automatic mode and in manual mode).

- If any of the robot's safety functions are triggered, e.g. because the maximum permissible speed is exceeded.

  "Robot Yu 5 Industrial" operating manual (chapter 3.12)
- If an external safety device provided by the owner is connected to the safety I/O interfaces in the robot controller and this safety device is triggered.

Programmer	Safety engineer	System integrator

Prerequisites

- The cause of the event that triggered the safety stop has been rectified (where applicable).
- There is no hazardous situation in the robot's working area.
- The robot is in manual mode.

  "Robot Yu 5 Industrial" operating manual (chapter 2.2.6/6.3.3)

01. If the safety stop was triggered by pressing the emergency stop button:

    Unlock the emergency stop button.

    "Robot Yu 5 Industrial" operating manual (chapter 6.3.4)

Fig. 35 Viewing the fault message history

02. **In the event of a safety stop, the program display is highlighted in red in the navigation bar** Fig. 35/①.

    Reset the robot in the user interface.

    Click on the *'Status'* button in the navigation bar to open the *'Status'* menu Fig. 35/②.

    ▶ Fault messages are displayed in the *'Log'* menu Fig. 36/①.

    If a fault is present, the ERROR icon is also displayed in the status display and in the *'Status'* menu Fig. 36.

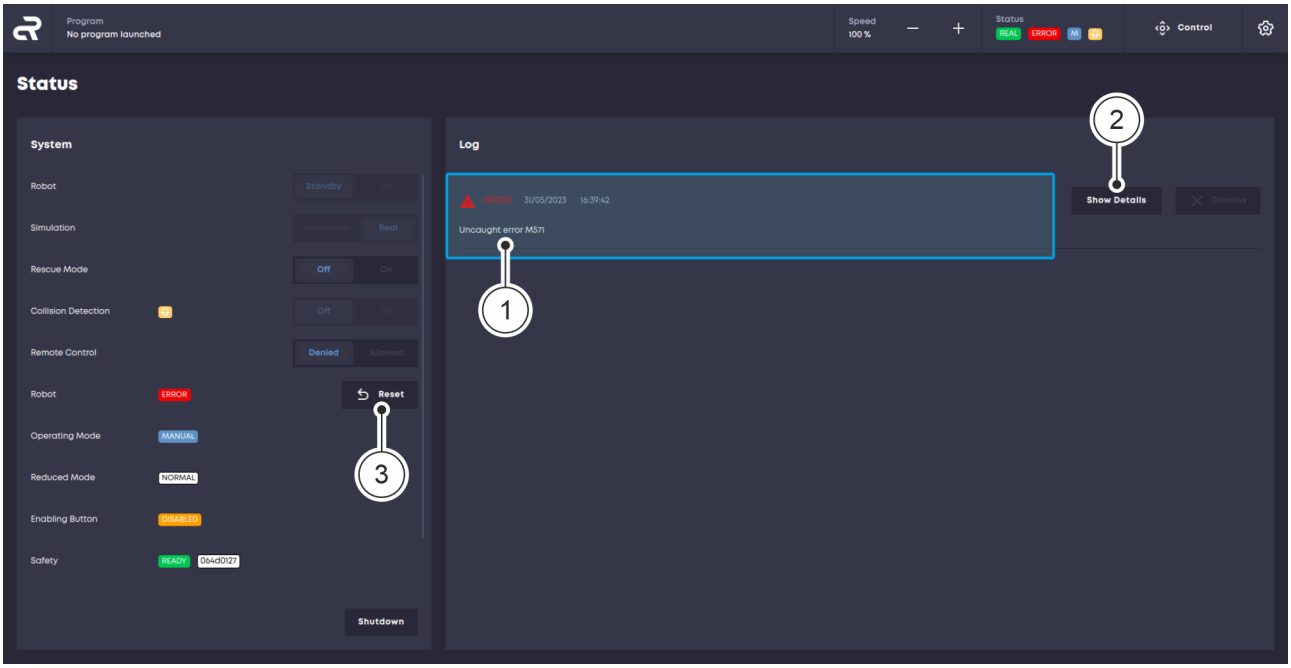


Fig. 36 Acknowledging a fault message

03. In the *'Log'* menu, click on the *'Show Details'* button Fig. 36/② for information on the fault message.

04. Click the *'Reset'* button to acknowledge the fault message Fig. 36/③.

    ▶ The ERROR icon in the status display and in the *'Status'* menu changes to the STANDBY icon.

3.12 Switching off the enabling function

WARNING
Risk of injury due to manual movement of the robot with the enabling function deactivated!

If the enabling function is switched off, the system integrator can move the robot in manual mode without pressing the enabling button. Deactivating a safety device poses a risk of injury due to unsafe movements by the robot.

- Before switching off the enabling function, ensure that the values of the safety configuration are parameterised in the safe range, i.e. the robot is in a collaborative state.
  "Robot Yu 5 Industrial" operating manual (chapter 2.2.6)
- Ensure that only the system integrator switches off the enabling function.

Prerequisites

- The robot is in manual mode.

  "Robot Yu 5 Industrial" operating manual (chapter 2.2.6/6.3.3)
- The robot's safety configuration is parameterised in the safe range, i.e. the robot is in a collaborative state.

  Chapter 3.6 'Setting the safety configuration parameters' on page 28

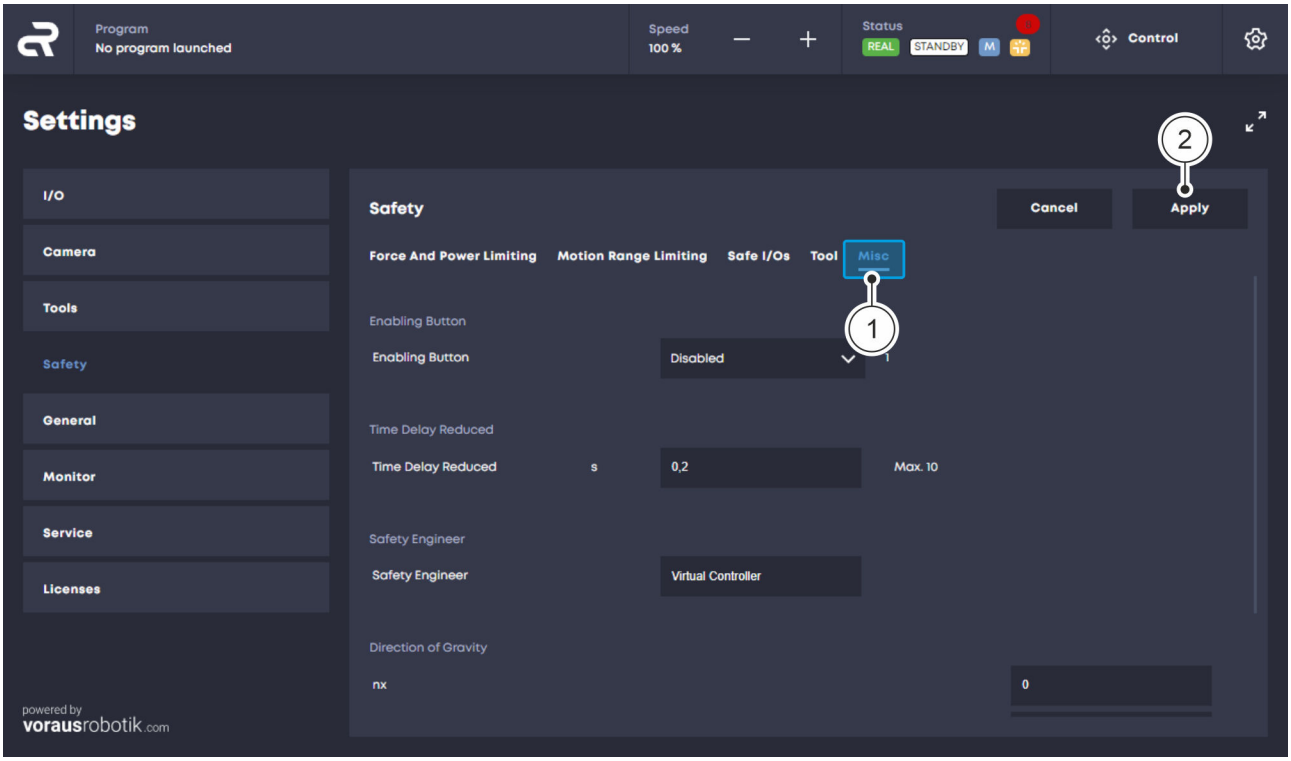


Fig. 37 Editing the enabling function

01. In the *'Safety'* menu, select the *'Misc'* tab Fig. 37/①.
02. Click the *'Apply'* button Fig. 37/②.

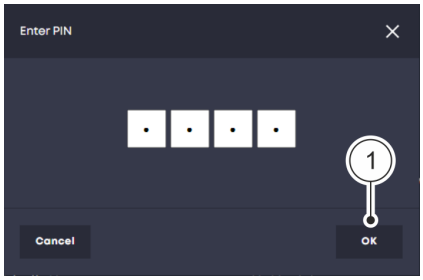


Fig. 38 Entering the PIN

03. Enter the four-digit safety PIN in the pop-up window and confirm with *'OK'* Fig. 38/①.

Safety PIN

When the robot is delivered, the safety PIN is **0000**.

We recommend that the system integrator or the responsible safety engineer change the safety PIN after the robot is switched on for the first time.

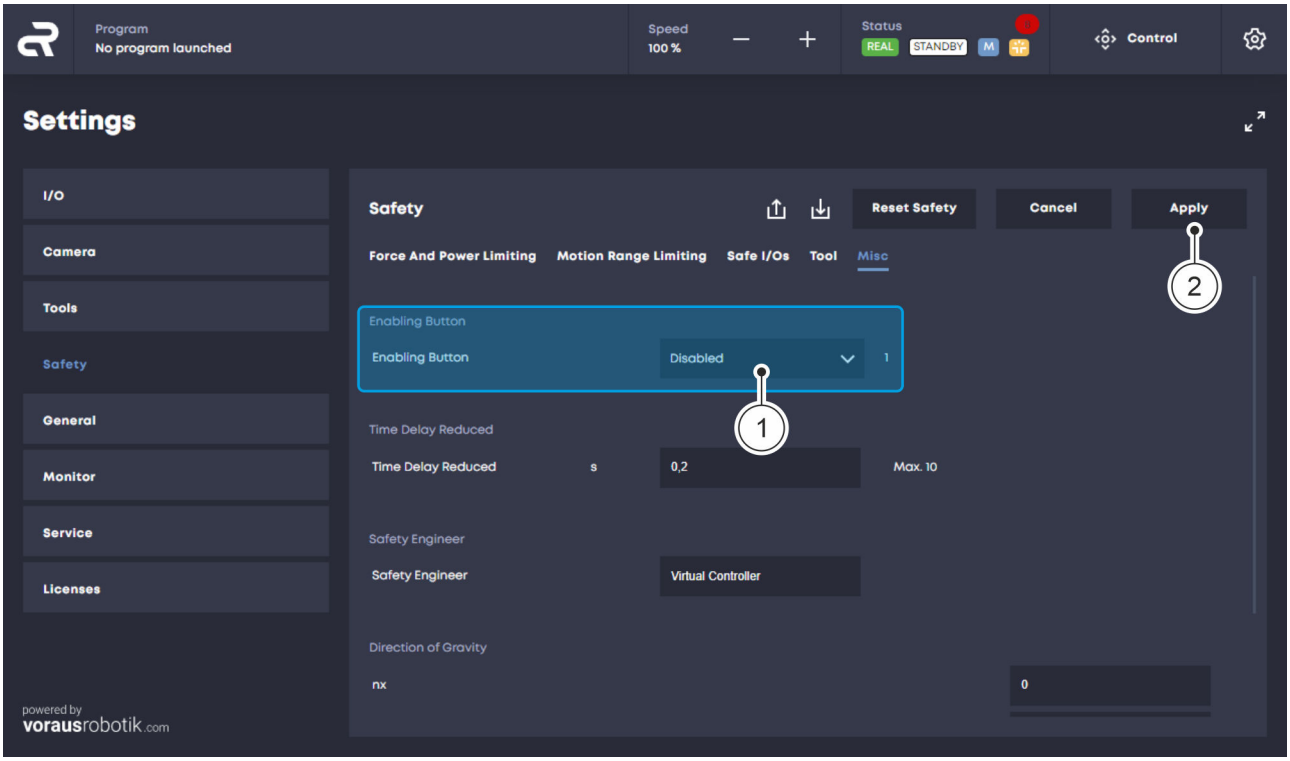


Fig. 39 Switching off the enabling function

04. In the drop-down list, select the menu item *'Disabled'* Fig. 39/①.

05. Click the *'Apply'* button Fig. 39/②.

06. Confirm the new setting by pressing the enabling button in the middle position on the handheld controller.

▶ The enabling button's enabling function is deactivated.

3.13 Moving to the robot's standard positions

3.13.1 Moving to the home position

The home position can be used to move the robot to a defined starting point outside of possible obstacles, for example.

Prerequisites

- The robot is in manual mode.
  "Robot Yu 5 Industrial" operating manual (chapter 2.2.6/6.3.3)

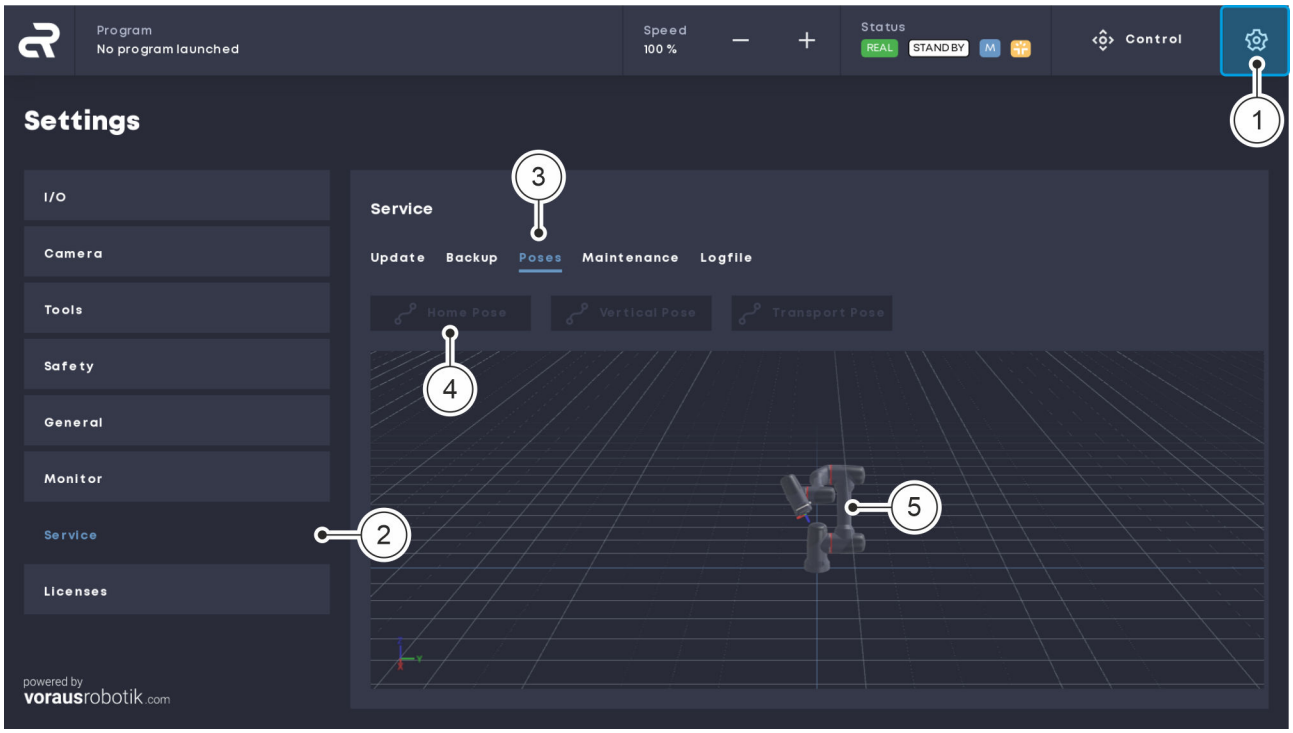


Fig. 40 Moving to the home position

01. In the navigation bar, click on the gear icon Fig. 40/① to open the *'Settings'* menu.

02. In the *'Settings'* menu, click the *'Service'* button on the left-hand tab to open the service settings window Fig. 40/②.

03. In the *'Service'* menu, select the *'Poses'* tab Fig. 40/③.

04. Click and hold the *'Home Pose'* button until the home position is reached Fig. 40/④.

    ▶ The robot is in the home position Fig. 40/⑤.

3.13.2 Moving to a vertical position

To calibrate the torque sensors, the robot should be moved to the vertical position.

Prerequisites

- The robot is in manual mode.
  "Robot Yu 5 Industrial" operating manual (chapter 2.2.6/6.3.3)

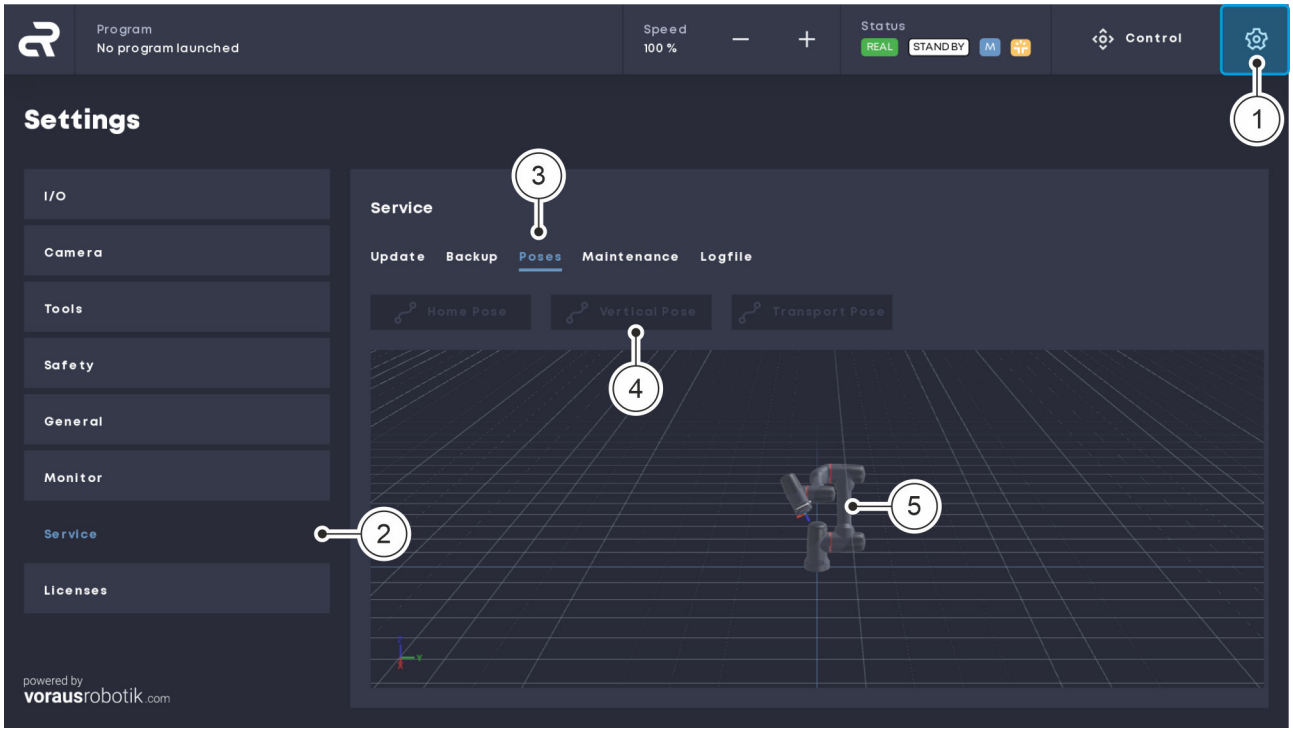


Fig. 41 Moving to a vertical position

01. In the navigation bar, click on the gear icon Fig. 41/① to open the *'Settings'* menu.
02. In the *'Settings'* menu, click the *'Service'* button on the left-hand tab to open the service settings window Fig. 41/②.
03. In the *'Service'* menu, select the *'Poses'* tab Fig. 41/③.
04. Click and hold the *'Vertical Pose'* button until the vertical position is reached Fig. 41/④.
    ▶ The robot is in the vertical position Fig. 41/⑤.

3.13.3 Moving to the transport position

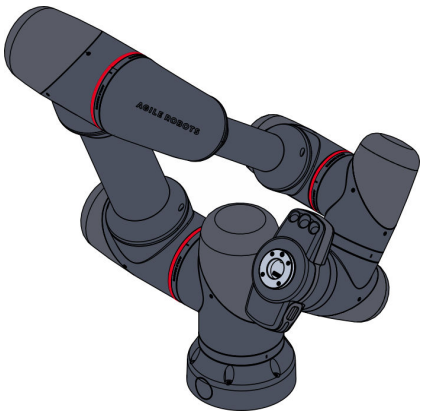


Fig. 42 Robot in transport position

When the robot is shipped, e.g. for repairs, we recommend moving the robot into the designated transport position before packaging it Fig. 42.

Home position

In order to prevent the robot from possibly coming into the vicinity of a collision with itself and thus into an error state when approaching the transport position, we recommend first approaching the home position as an intermediate step.

Prerequisites

- The robot is in manual mode.
  "Robot Yu 5 Industrial" operating manual (chapter 2.2.6/6.3.3)
- There are **no** tools on the robot's media flange.

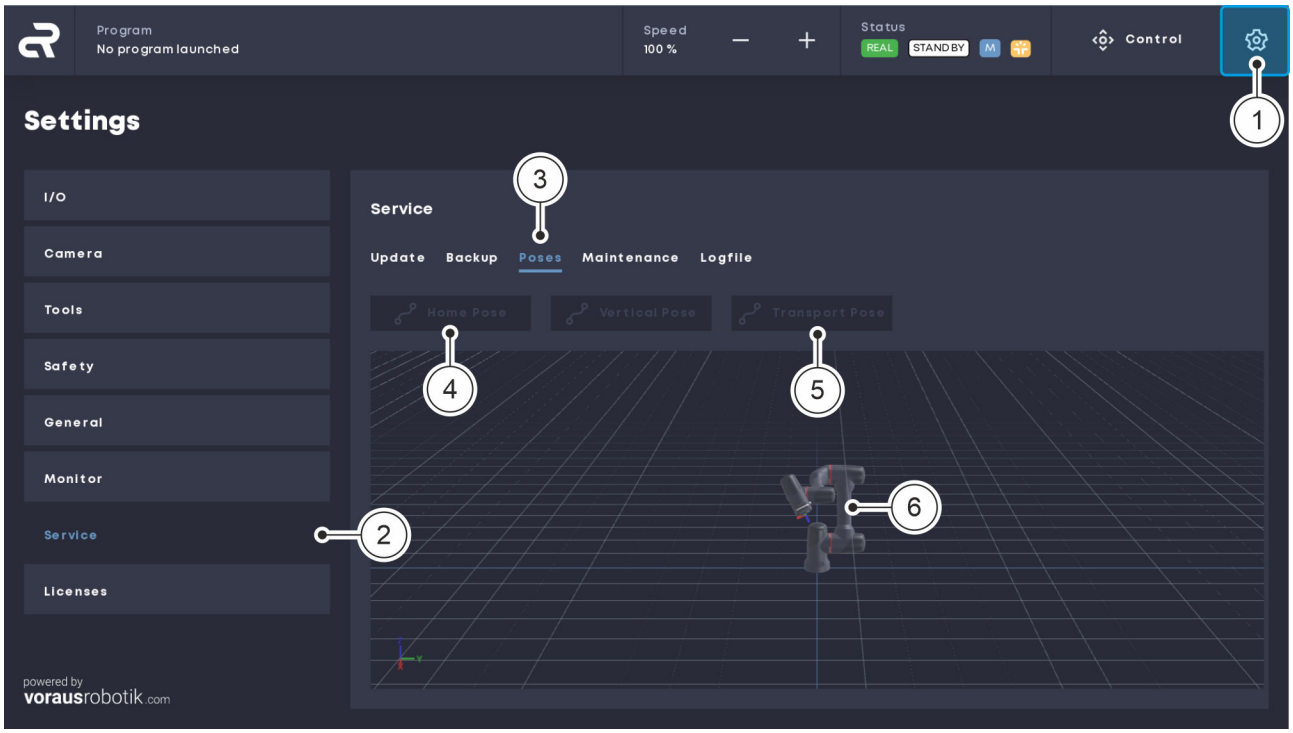


Fig. 43 Moving to the transport position

01. In the navigation bar, click on the gear icon Fig. 43/① to open the *'Settings'* menu.
02. In the *'Settings'* menu, click the *'Service'* button on the left-hand tab to open the service settings window Fig. 43/②.
03. In the *'Service'* menu, select the *'Poses'* tab Fig. 43/③.
04. Click and hold the *'Home Pose'* button until the home position is reached Fig. 43/④.
05. Click and hold the *'Transport Pose'* button until the transport position is reached Fig. 43/⑤.
    ▶ The robot is in the transport position Fig. 43/⑥.

3.14 Verifying the position

If the robot is not switched off properly (e.g. power supply to the robot controller is interrupted unexpectedly), the reference position may be lost. In this case, the current position of the robot must be verified at the next restart.

The position verification pop-up window is automatically displayed in the user interface.

Programmer	Safety engineer	System integrator

Prerequisites

- The robot is in manual mode.
  "Robot Yu 5 Industrial" operating manual (chapter 2.2.6/6.3.3)
- No program is running.

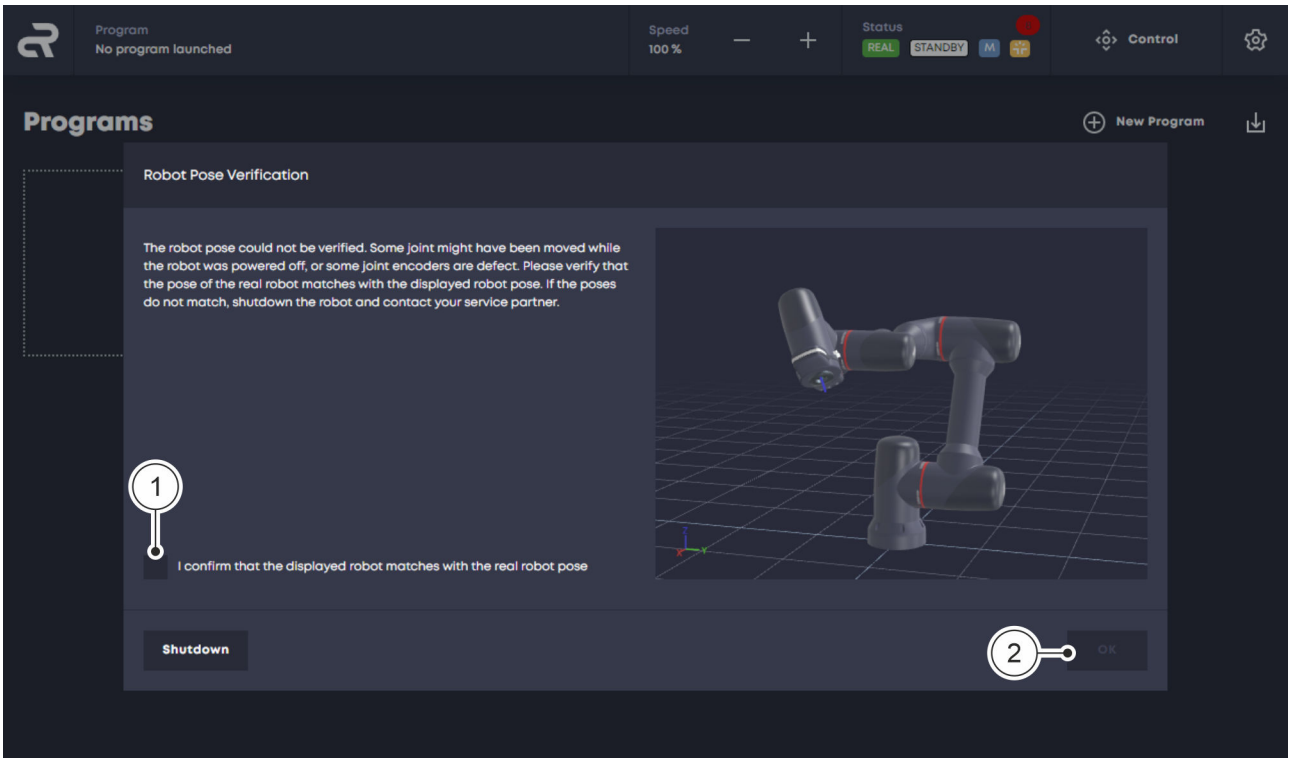


Fig. 44 Verifying the robot position

01. Compare the real position of the robot with the robot position displayed in the user interface.

    If the positions match:

    Select the checkbox Fig. 44/① and confirm with *'OK'* Fig. 44/②.

    ▶ The robot is ready for operation.

02. If the positions differ from each other:

    Switch off the robot and contact Agile Robots SE customer service (*page 4*).

3.15 Activating remote mode

WARNING
Risk of injury due to unexpected robot movements in remote mode!

When remote mode is active, the robot can be operated from an external remote control, e.g. in the form of a PLC. As a result, the single point of control (SPoC) is no longer guaranteed and there is a possibility that robot movements can be performed from another location (e.g. by people or machines).

Before activating remote mode, ensure:

- The system integrator has identified the risks arising from remote access and taken them into account in the risk assessment of the robot application.
- The system integrator has taken appropriate measures to minimise the risks.
- The system integrator has actively enabled remote access.
- There are no people in the robot's hazard area.

Functions in remote mode

In remote mode, the following robot functions are available:

- Starting programs
- Stopping programs
- Resetting the robot
- Specifying digital outputs (DO_x interfaces)

Activating remote mode

Prerequisites

- There are no people in the robot's hazard area.
- The system integrator has enabled remote mode.

- The robot is in manual mode.
  "Robot Yu 5 Industrial" operating manual (chapter 2.2.6/6.3.3)
- No program is running.

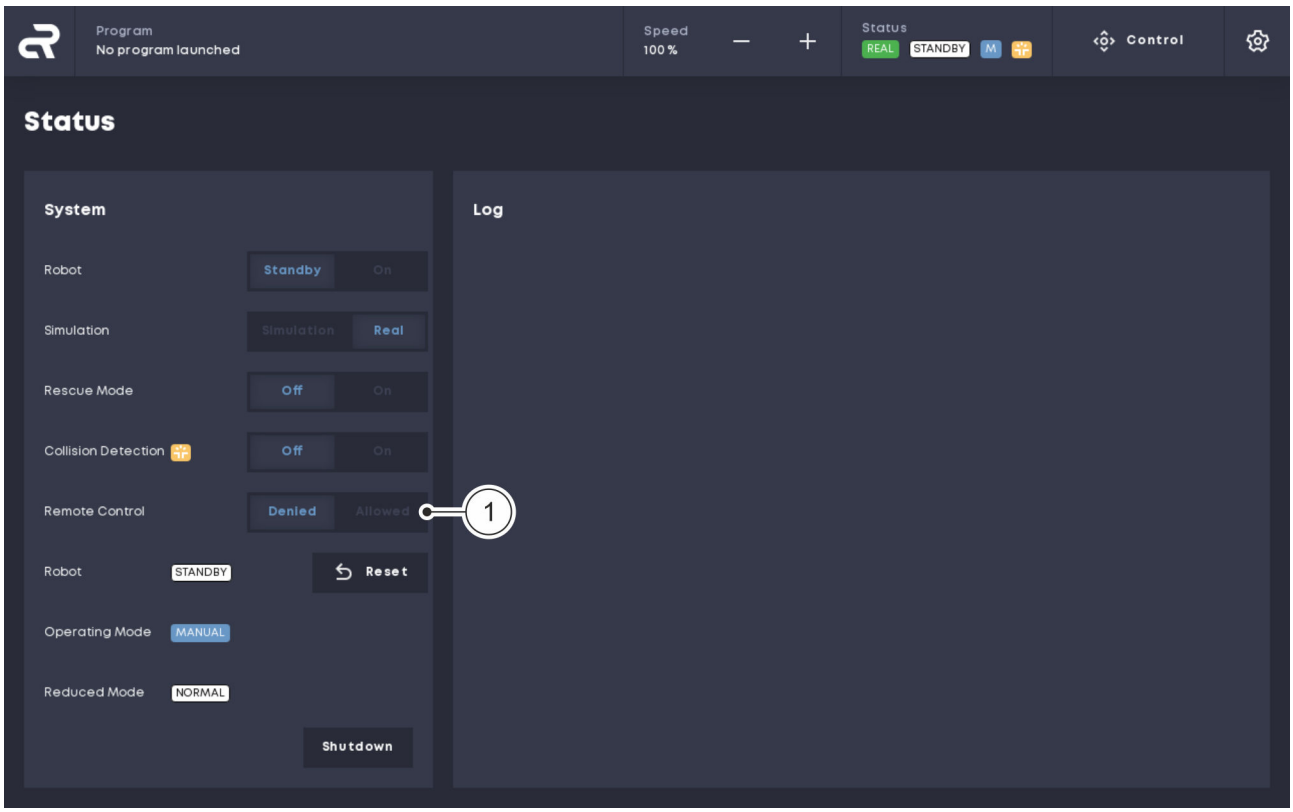


Fig. 45 Remote mode

01. In the *'Status'* menu, click on the *'Allowed'* button next to *'Remote Control'* Fig. 45/①.

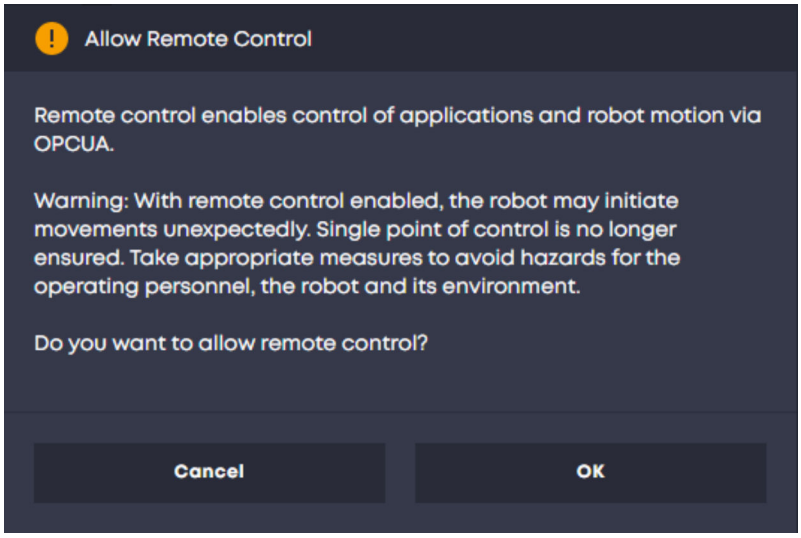


Fig. 46 Activating remote mode

02. Press *'OK'* to confirm and activate remote mode Fig. 46/①.

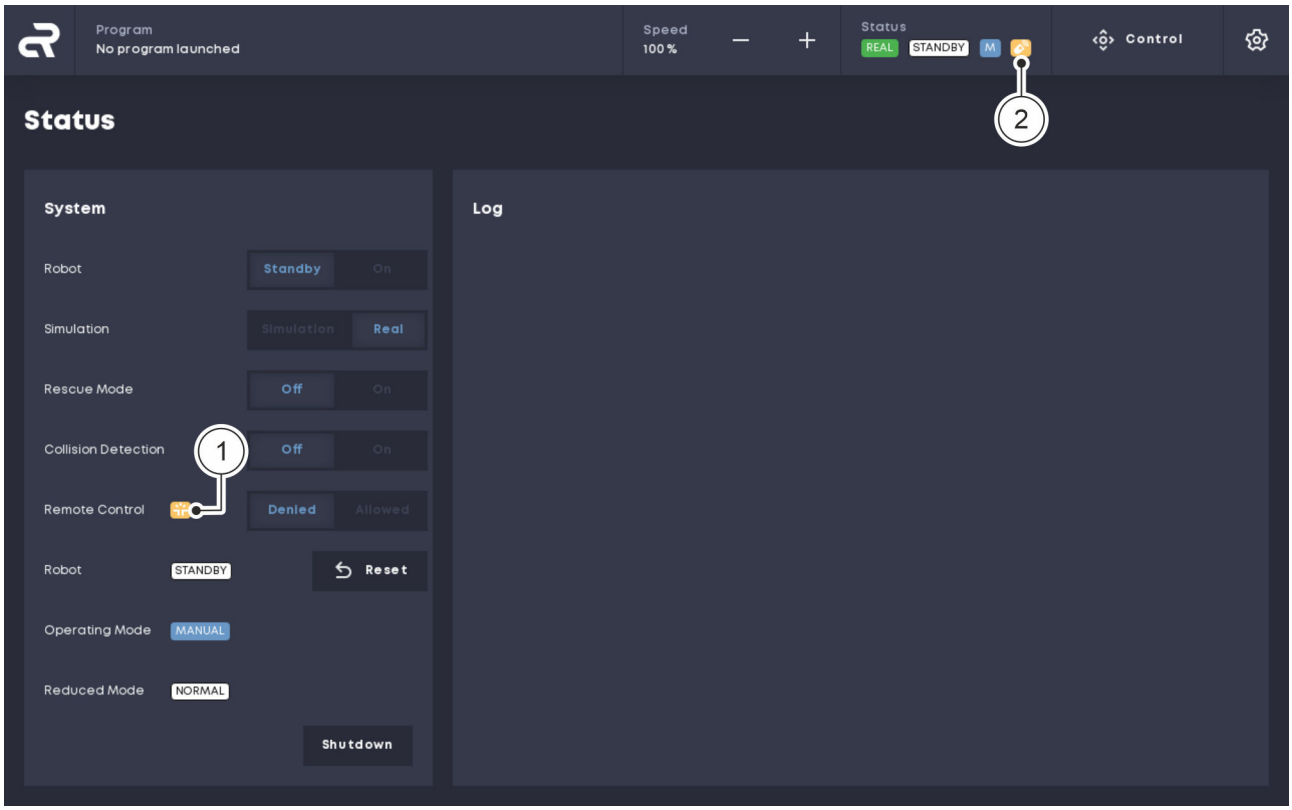


Fig. 47 Overview of symbols

- When remote mode is active, the following icons are displayed in the user interface:
  - Icon in the *'Status'* menu Fig. 47/①
  - Icons in the status display Fig. 47/②

3.16 Activating a software license

Prerequisites

- The ticket ID of the purchased license is available.
- An internet connection is available.

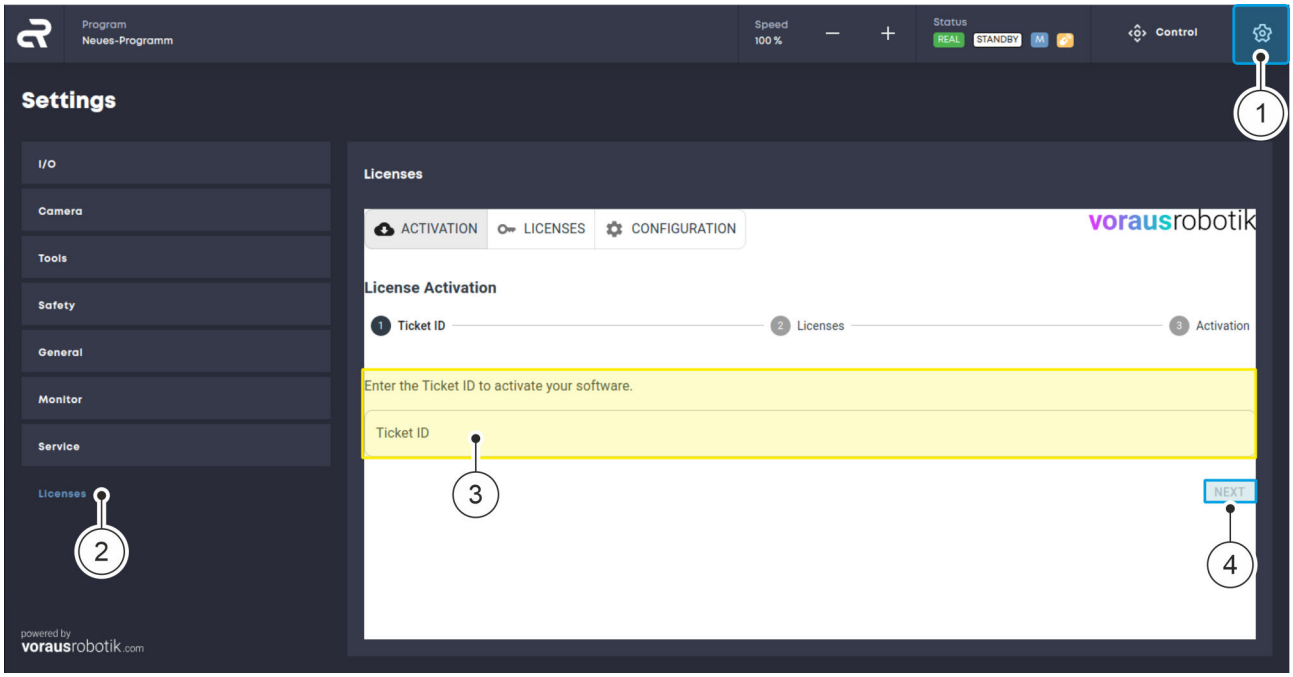


Fig. 48 Activating a software license

01. In the navigation bar, click on the gear icon Fig. 48/① to open the *'Settings'* menu.

02. In the *'Settings'* menu, click the *'Licences'* button on the left-hand tab to open the license settings window Fig. 48/②.

03. In the *'ACTIVATION'* tab, enter the ticket ID of the purchased license Fig. 48/③ and confirm with *'NEXT'* Fig. 48/④.

    ▶ The software license is activated.

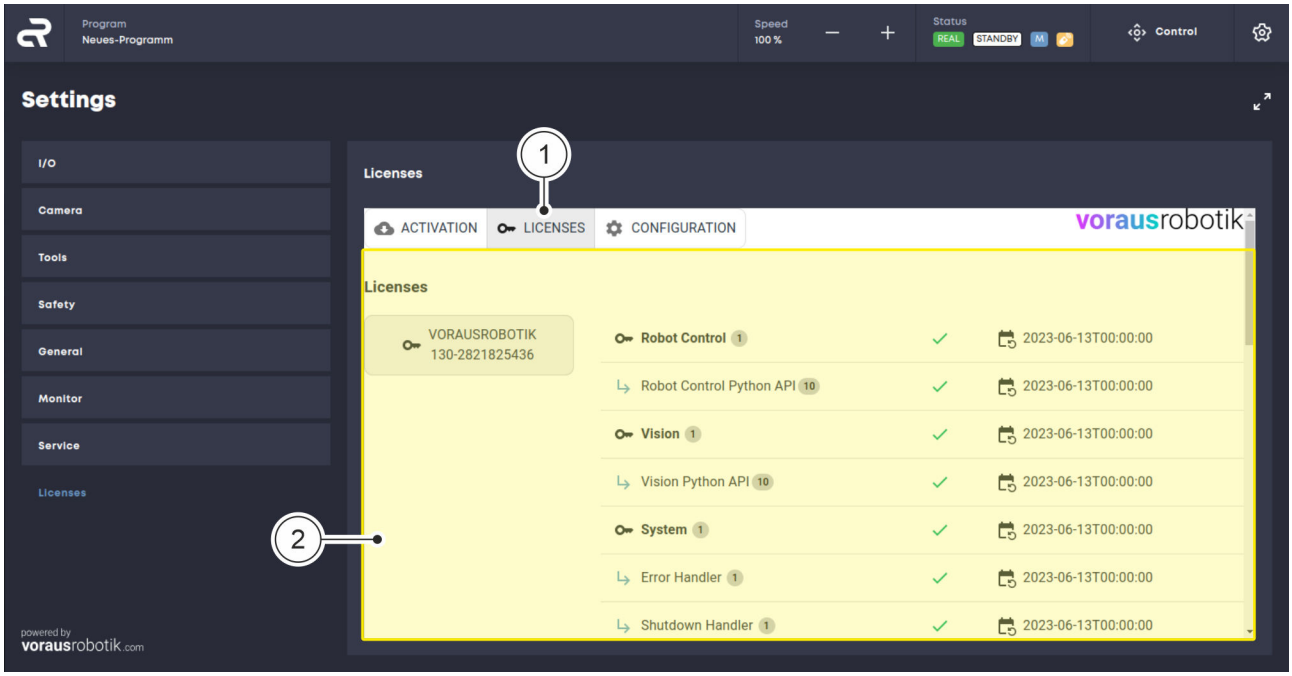


Fig. 49 Opening the license overview

04. Click on the *'Licences'* tab Fig. 49/① to open the overview of all active products, including the expiry date of the licence Fig. 49/②.

3.17 Performing a brake test

Maintenance specialist	Safety engineer

Prerequisites

- There are no people in the robot's hazard area.
- No external forces are acting on the robot.

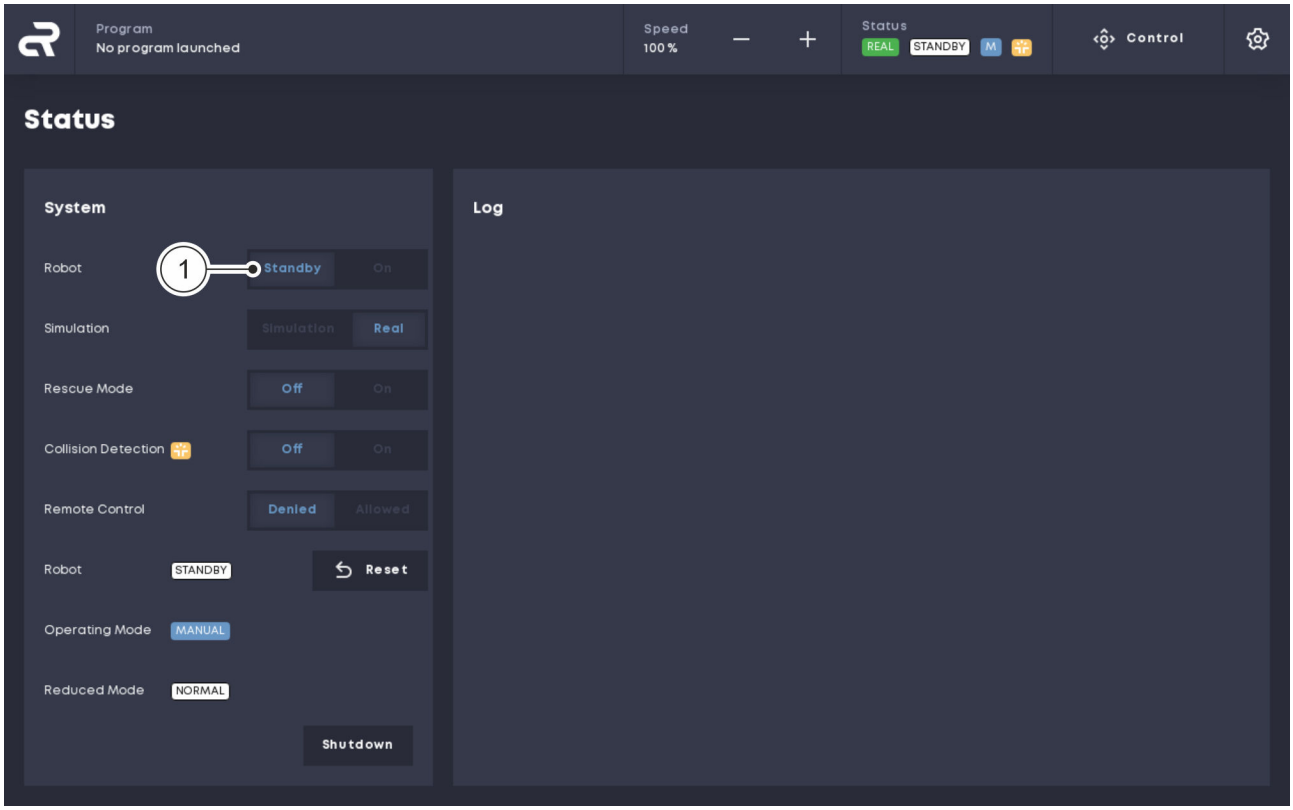


Fig. 50 Standby mode

01. In the *'Status'* menu, click the *'Standby'* button next to *'Robot'* Fig. 50/①.

    ▶ Standby mode is active and the robot controllers are switched off.

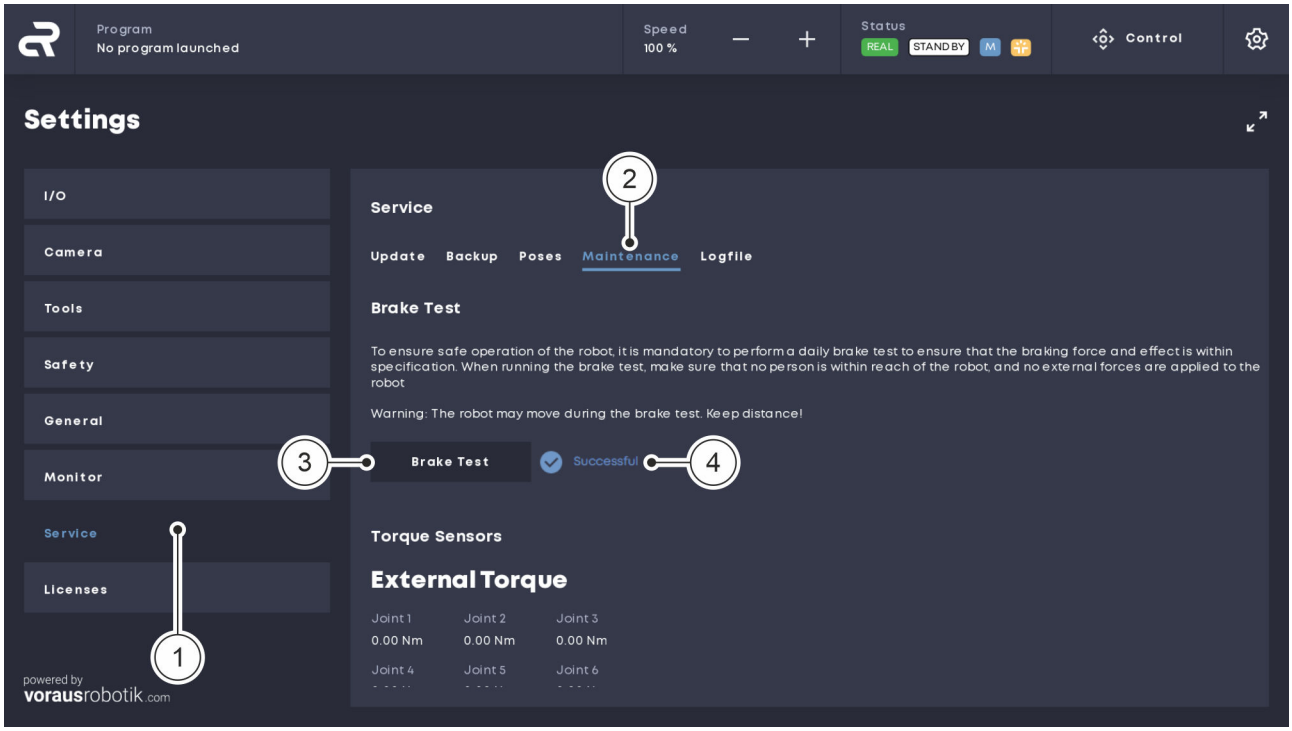


Fig. 51 Performing a brake test

02. In the *'Settings'* menu, click the *'Service'* button on the left-hand tab to open the service settings window Fig. 51/①.

03. In the *'Service'* menu, click on the *'Maintenance'* tab Fig. 51/②.

04. ⚠ **WARNING! Risk of crushing and collision!**
    - **Ensure that the brake test is not carried out when the robot is extended and not at maximum load.**

    Click the *'Brake Test'* button Fig. 51/③.

    ▶
    - The robot is activated and the brake test is carried out.
    - The robot may move during the brake test.
    - After a successful brake test, the text *'Successful'* is displayed Fig. 51/④.
    - The robot is ready for operation.

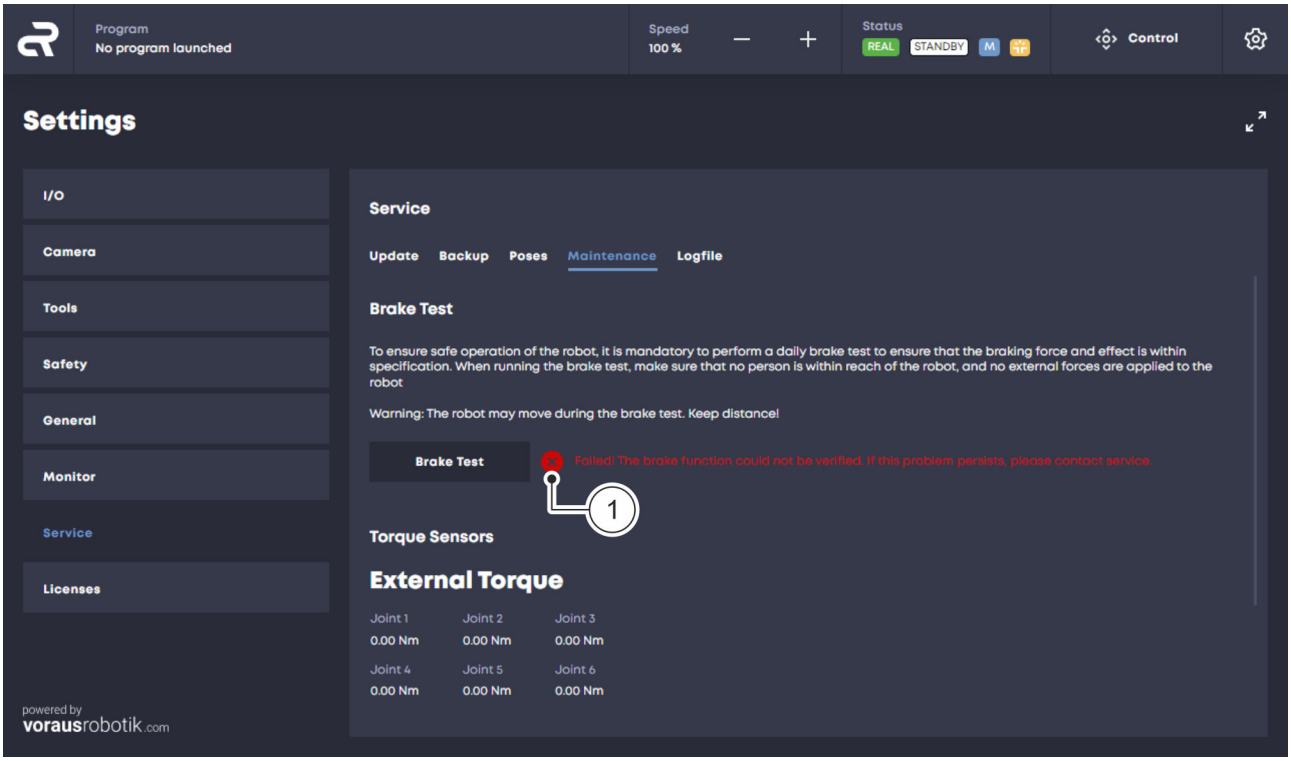


Fig. 52 Brake test failed

05. If the brake test fails and the text *'Failed'* is displayed Fig. 52/①: Repeat the brake test as described above or perform a calibration of the torque sensors (*page 72*).

    If the brake test fails again: Switch off the robot and contact Agile Robots SE customer service (*page 4*).

3.18 Calibrating the torque sensors

Torque sensors

The torque sensors of the robot are calibrated ex-works. However, as the operating time progresses and as a result of excessive loading, the zero point of the torque measurement may shift. In this case, the sensors must be recalibrated.

If a deviation between the measured and expected axis torque is detected after the robot is switched on, the system will initially remain in the safe state. A message on the user interface informs the user that a recalibration of the sensor zero point offset is required. Possible causes of the deviation are:

- The current tool is incorrectly parameterised.
- The tool picked up a heavy object.
  The total weight of the tool used and the payload to be moved must not exceed the maximum permissible load of 5 kg.
- The robot is trapped.
- The parameterised mounting direction (gravitational vector) deviates from the robot's mounting direction.
- A torque sensor is defective.
- The currently measured torque value does not correspond to the last measured value before the robot was switched off.

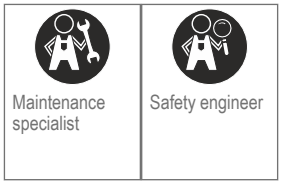
Calibration of torque sensors

In principle, the torque sensors can be calibrated at any time and this process does not require any movement of the robot as long as it is free and not in contact with its surroundings.

Calibration by the user becomes impossible if at least one torque sensor has been loaded beyond its elastic deformation range.

In this case, contact Agile Robots SE customer service (↬ *page 4*).

Calibrating the torque sensors



Prerequisites

- There are no people in the robot's hazard area.
- The robot is in manual mode.
  ↬ *"Robot Yu 5 Industrial" operating manual (chapter 2.2.6/6.3.3)*
- The enabling function of the enabling button on the handheld controller is active.

- No external forces are acting on the robot.
- Mounted loads and imprecise parameters can negatively affect the result of the calibration.

  We therefore recommend setting the robot to the following state before calibration:

  - Disassemble the tool.
  - In the tool settings, select the parameter *'No Tool'*.
  - Set the tool mass (safety parameter) to 0 kg.

    If a deviation in the tool mass is detected, a safety stop is executed.
  - Move the robot to the vertical position.

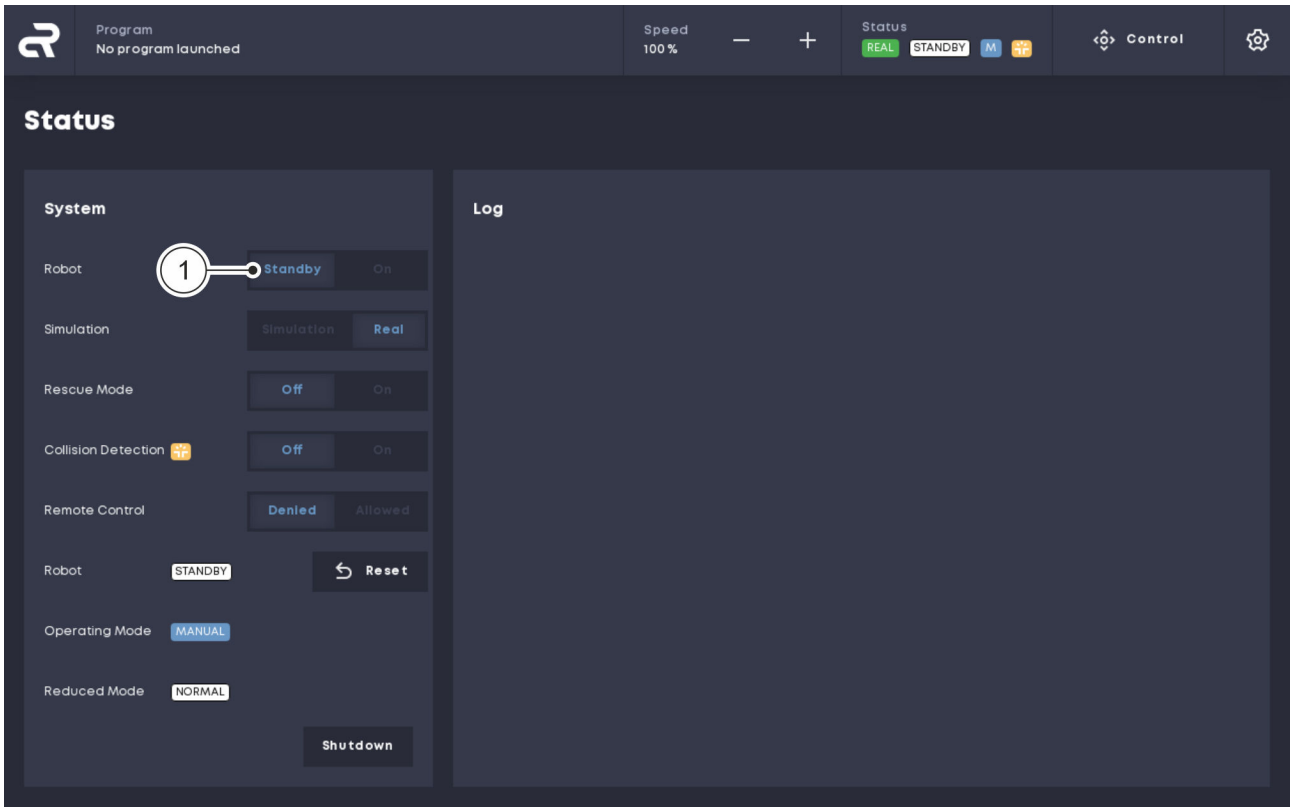


Fig. 53 Setting standby mode

01. In the *'Status'* menu, click the *'Standby'* button Fig. 53/① next to *'Robot'*.

    ▶ Standby mode is active and the robot controllers are switched off.

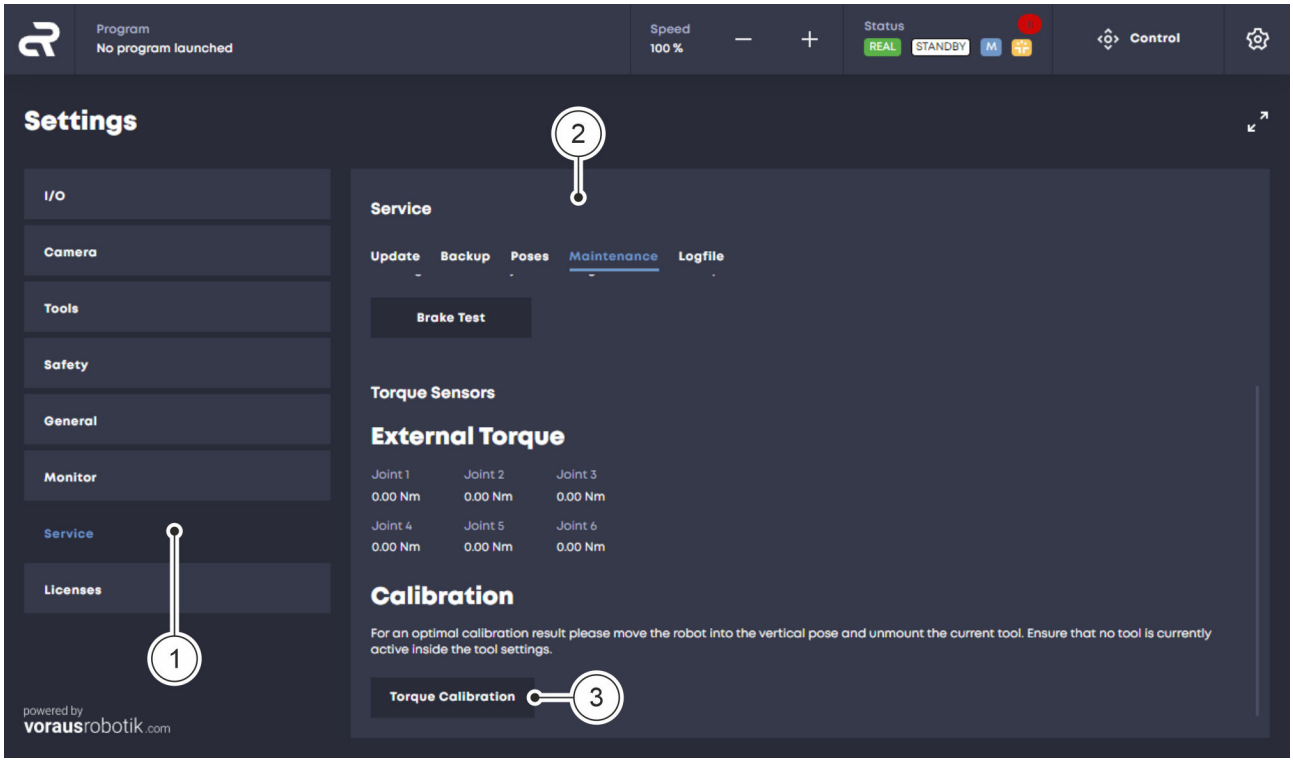


Fig. 54 Calibrating the torque sensors

02. In the *'Settings'* menu, click the *'Service'* button on the left-hand tab to open the service settings window Fig. 54/①.

03. In the *'Service'* menu, click on the *'Maintenance'* tab Fig. 54/②.

04. Scroll down until the torque sensor calibration window appears Fig. 54.

05. Click the *'Torque Calibration'* button Fig. 54/③.

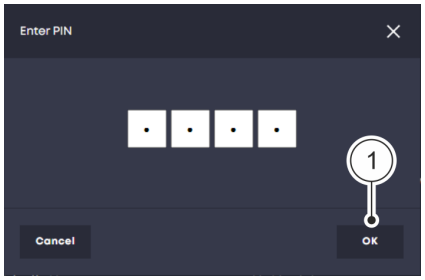


Fig. 55 Entering the PIN

06. Enter the four-digit safety PIN in the pop-up window and confirm with *'OK'* Fig. 55/①.

Safety PIN

When the robot is delivered, the safety PIN is **0000**.

We recommend that the system integrator or the responsible safety engineer change the safety PIN after the robot is switched on for the first time.

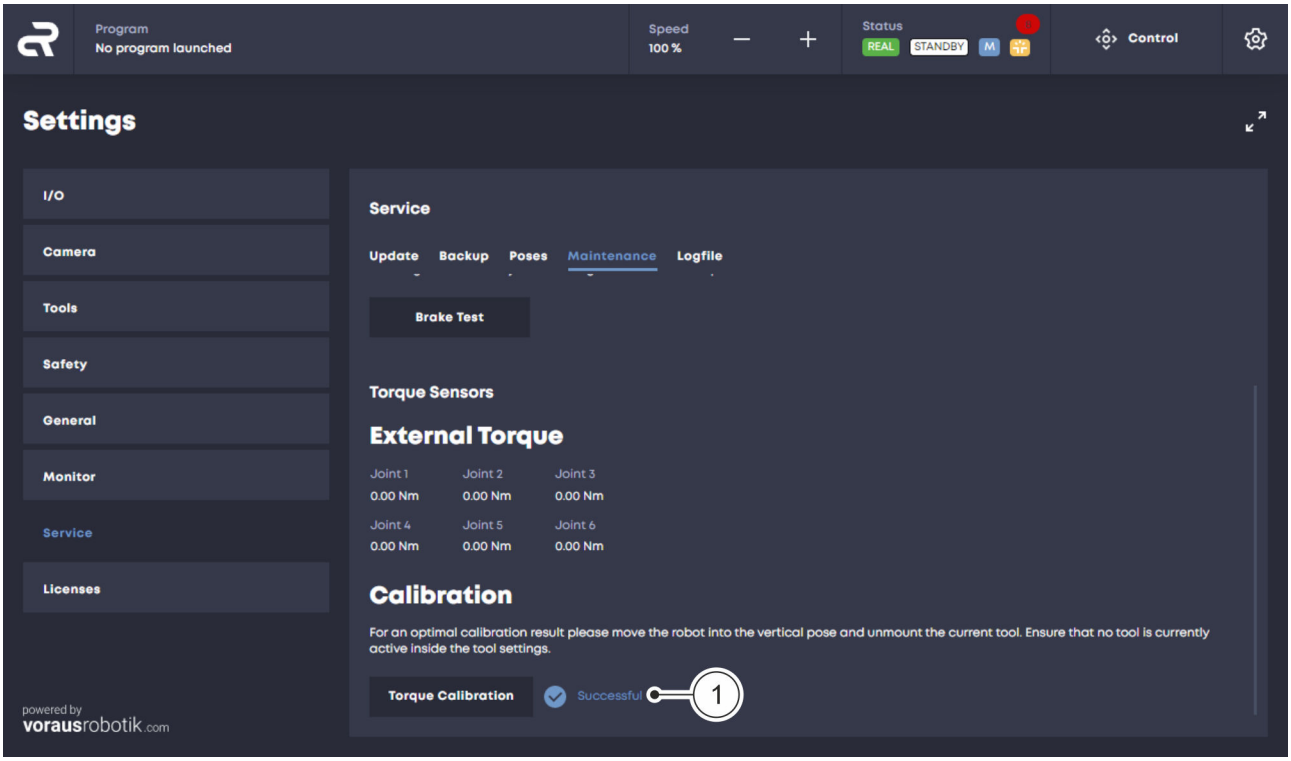


Fig. 56 Calibration successful

▶ ■ The torque sensors are calibrated (duration: < 1 second).

■ After successful calibration, the text *'Successful'* is displayed Fig. 56/①.

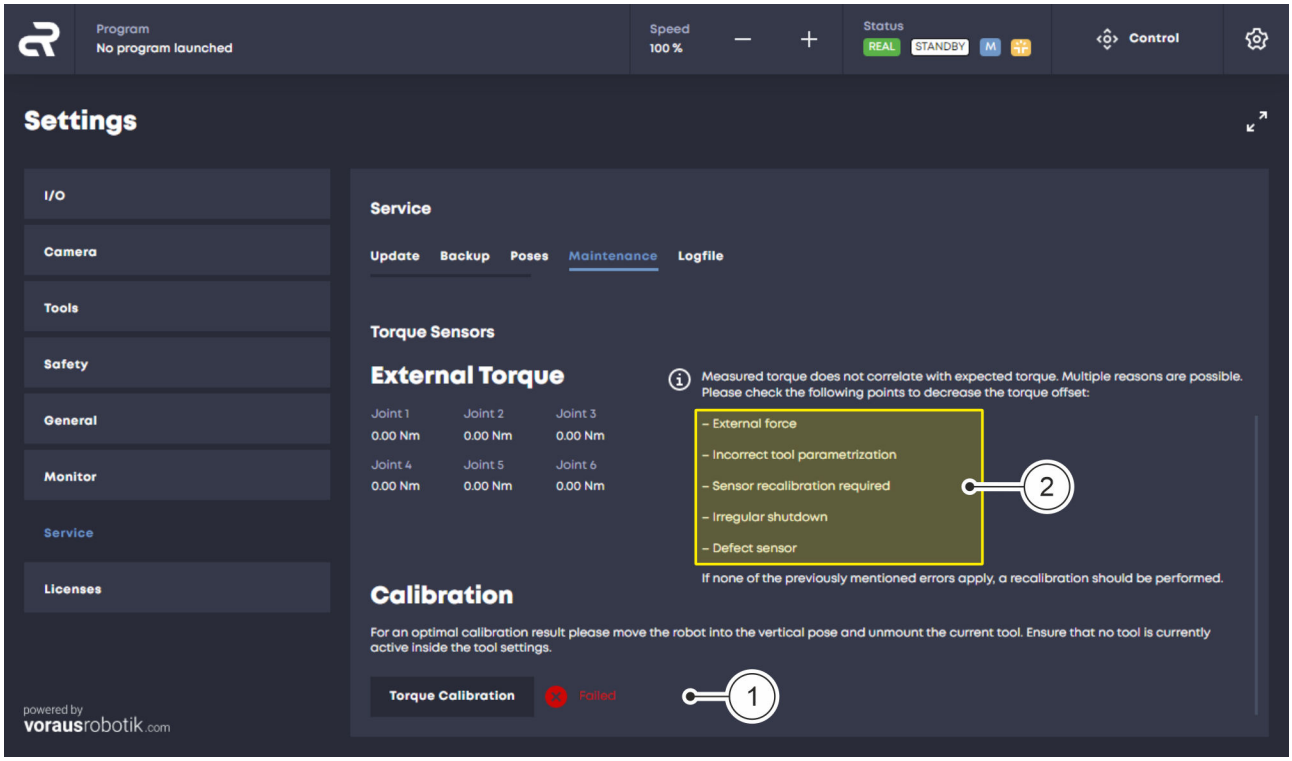


Fig. 57 Calibration failed

07. If calibration fails and the text *'Failed'* is displayed Fig. 57/①: Check the criteria displayed in the user interface and repeat the calibration of the torque sensors as described above Fig. 57/②.

    If calibration fails again: Switch off the robot and contact Agile Robots SE customer service (↯ *page 4*).

3.19 Switching the robot off from the user interface

In addition to the option of switching the robot off directly at the robot, it can also be switched off from the user interface.

The robot can only be switched on at the robot itself.

↯ *"Robot Yu 5 Industrial" operating manual (chapter 6.3.2)*

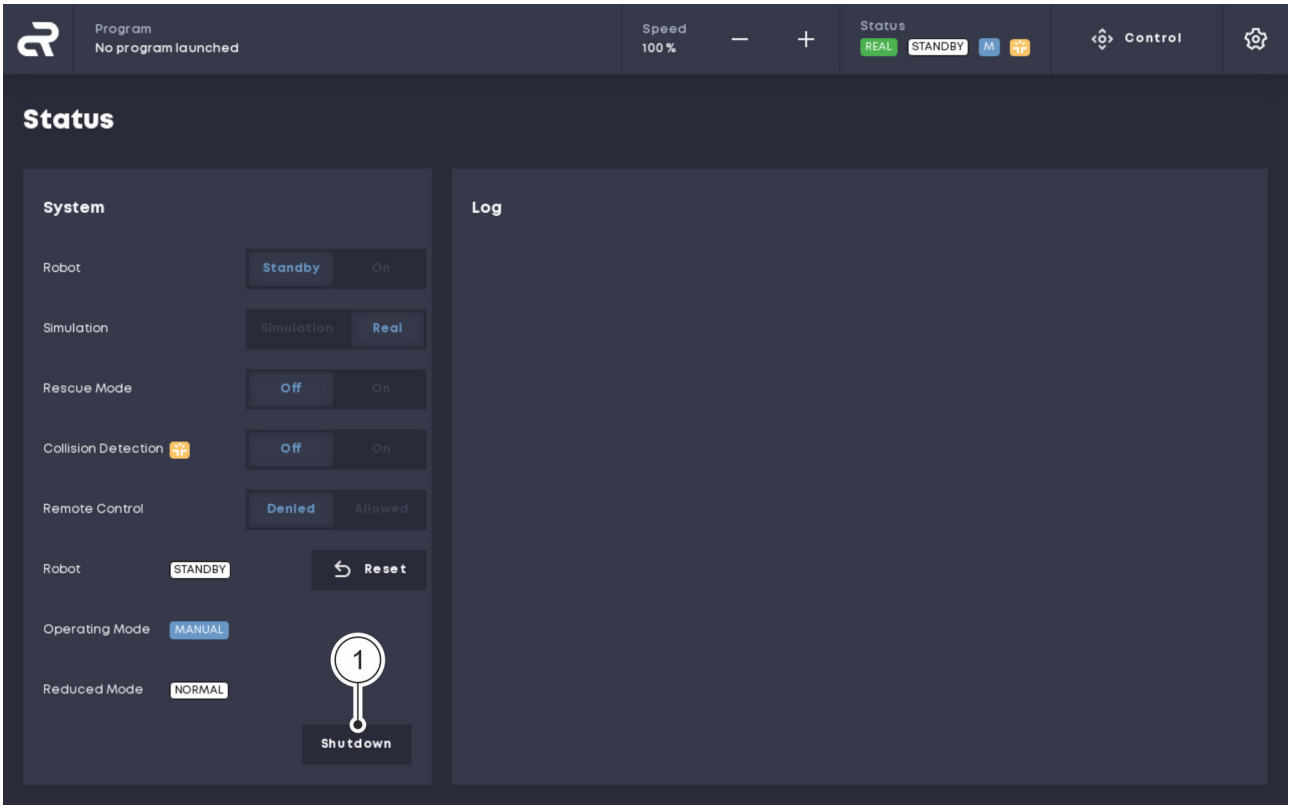


Fig. 58 Switching the robot off

01. In the *'Status'* menu, click the *'Shutdown'* button Fig. 58/①.

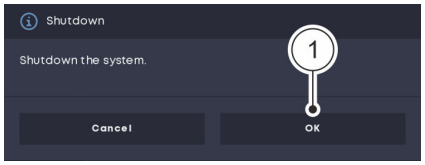


Fig. 59 Switching the robot off

02. In the pop-up window, choose *'OK'* to confirm and switch off the robot Fig. 59/①.

4 Fault and warning messages

Fault messages

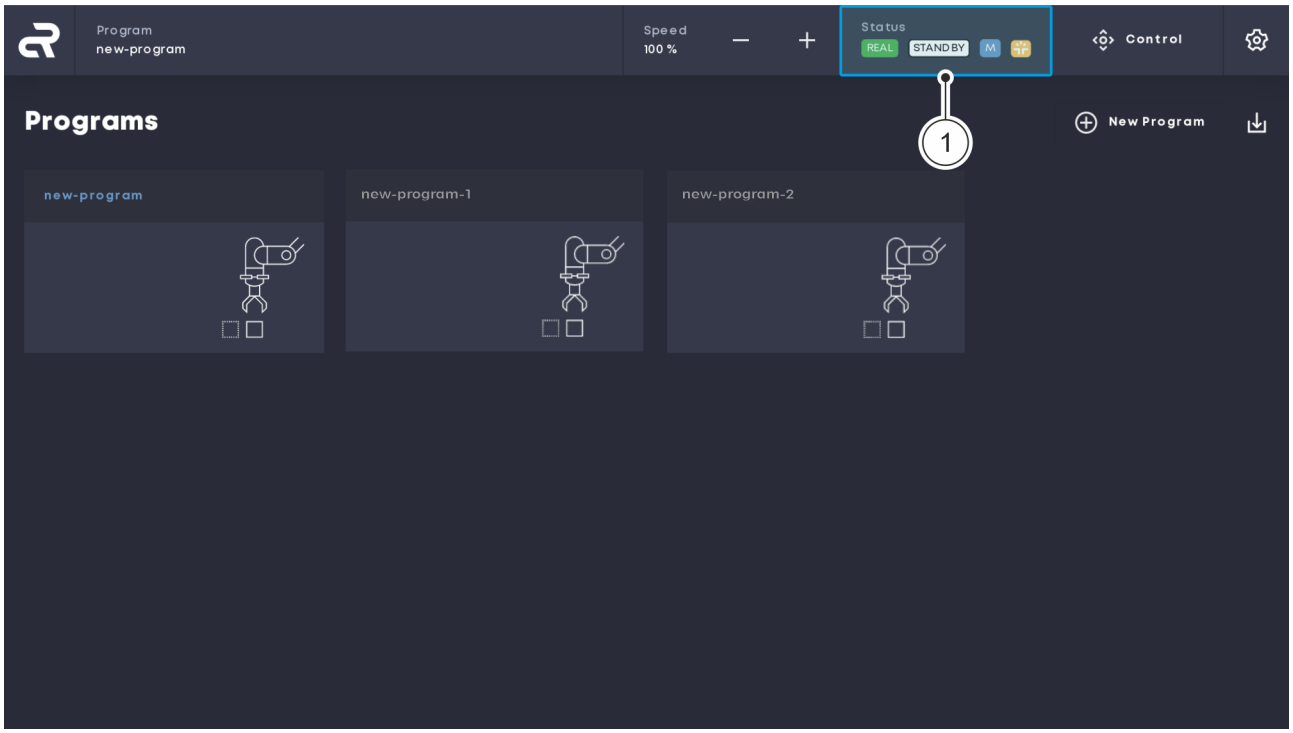


Fig. 60 Main screen

01. On the main screen, click the *'Status'* button to open the *'Status'* menu Fig. 60/①.

    ▶ Fault messages are displayed in the *'Log'* menu Fig. 61/①.

    If a fault is present, the ERROR icon is also displayed in the status display and in the *'Status'* menu Fig. 61.

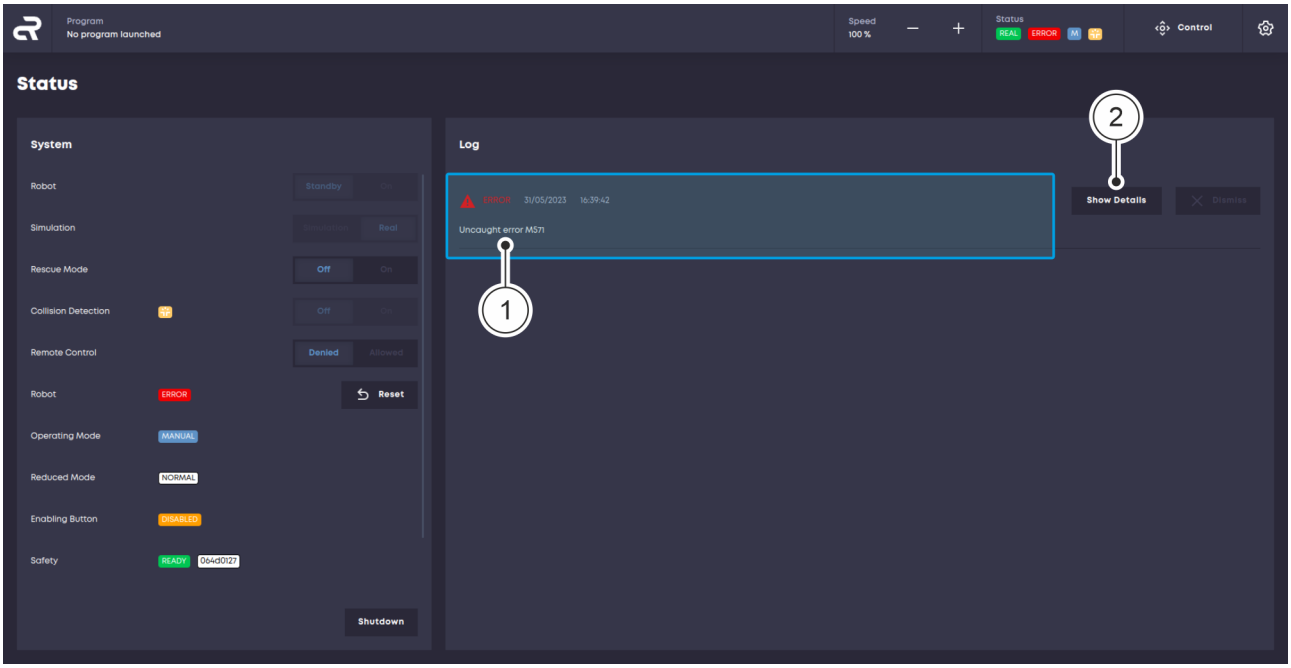


Fig. 61 Viewing the fault message history

02. In the *'Log'* menu, click on the *'Show Details'* button Fig. 61/② for information on the fault message Fig. 62/①.

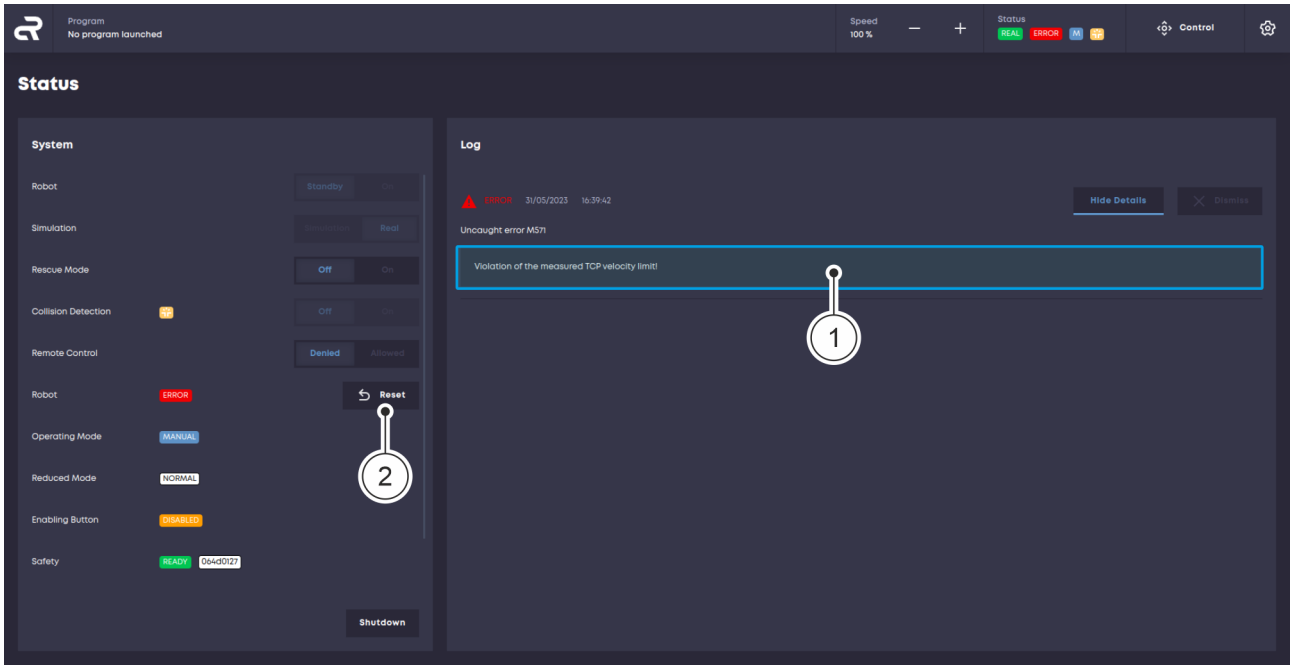


Fig. 62 Acknowledging a fault message

03. Determine and rectify the cause of the fault message.

If troubleshooting requires work in the hazard area, switch off the robot and secure it against being switched on again.

“Robot Yu 5 Industrial” operating manual (chapter 7.4)

04. On the main screen, click the *‘Reset’* button to acknowledge the fault message Fig. 62/②.

▶ The ERROR icon in the status display and in the *‘Status’* menu changes to the STANDBY icon.

Warning messages

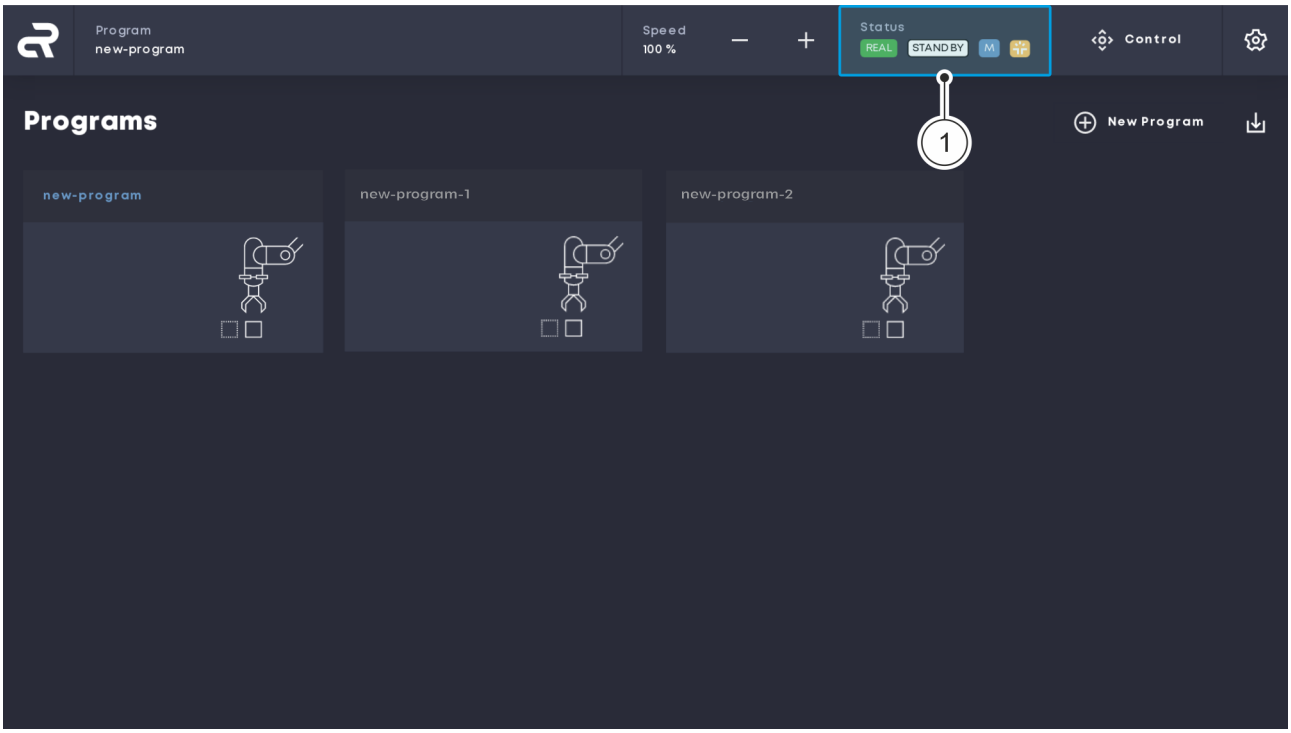


Fig. 63 Main screen

01. On the main screen, click the *'Status'* button to open the *'Status'* menu Fig. 63/①.

    ▶ Warning messages are displayed in the *'Log'* menu Fig. 64/①.

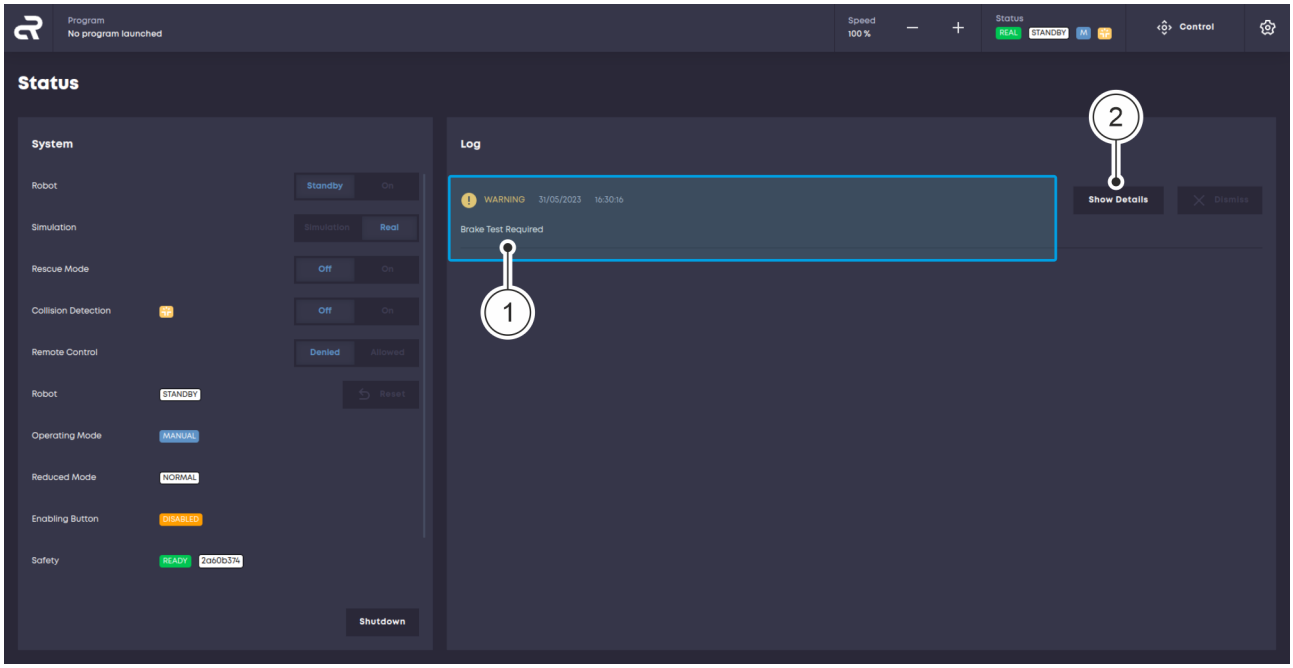


Fig. 64 Viewing the warning message history

02. In the *'Log'* menu, click on the *'Show Details'* button Fig. 64/② for information on the warning message Fig. 65/①.

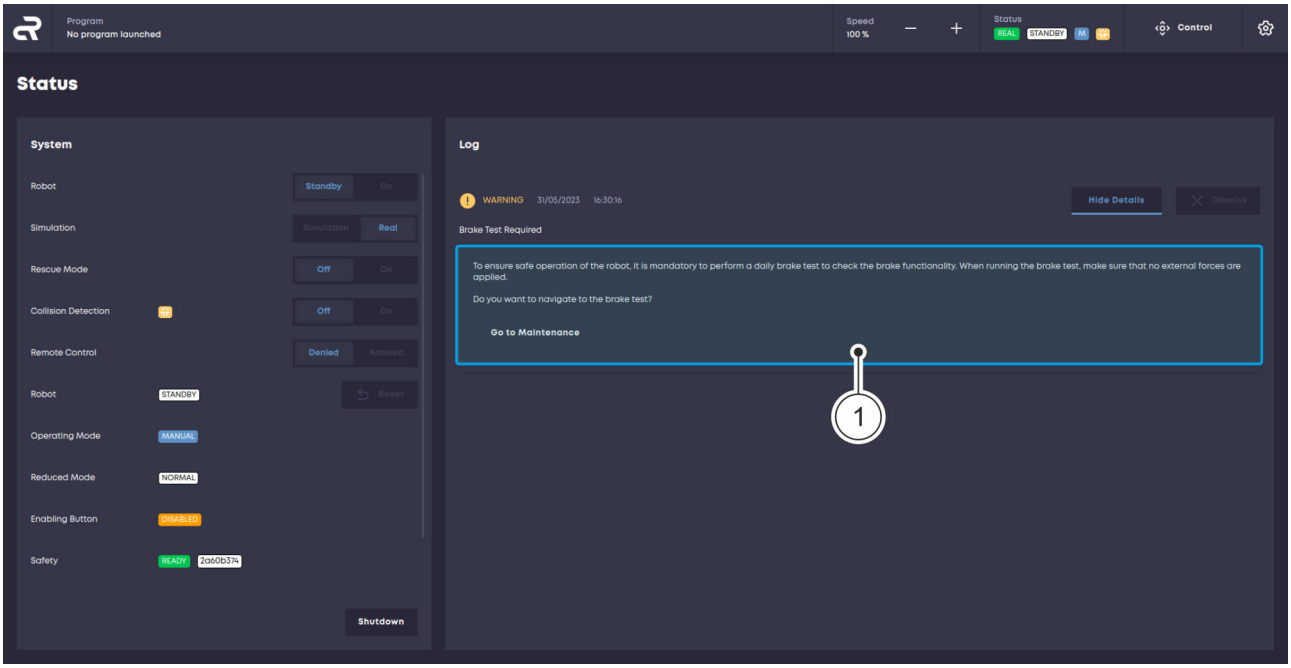


Fig. 65 Editing a warning message

03. Follow the warning instructions displayed in the user interface.

▶ If the cause of the warning message has been successfully rectified, a corresponding text is displayed in the *'Log'* menu Fig. 66/①.

Fig. 66 Cause of warning message successfully rectified (example)

Contacting customer service

Questions about fault messages and warning messages

If you have any questions about fault and warning messages and/or if you have any further questions, please contact Agile Robots SE customer service (*page 4*).

5 Index

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