Read the instructions prior to performing any task!



Yu 5 Industrial robot Agile Robots



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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:				
	<ul> <li>"Robot Yu 5 Industrial" operating manual</li> </ul>				
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:				
	<ul> <li>Failure to comply with this manual</li> </ul>				
	<ul> <li>Changes to the software or incorrect entries in the database</li> </ul>				
	<ul> <li>Destruction of any data and files by computer viruses</li> </ul>				
	<ul> <li>Use of third-party programs that are not expressly recommended and approved by Agile Robots SE</li> </ul>				

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Customer service	Our customer service is at you require repairs or expe	your disposal for technical information and if rience malfunctions:			
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.				
Copyright	The contents of this manual may be used within the cor is not permitted without the	al are protected by copyright. The contents ntext of using the robot. Any use beyond this e written permission of Agile Robots SE.			
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	<ul><li>Improperly executed data management</li><li>Failure to back up data at regular intervals</li></ul>				

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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.

# 

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

## Tips and recommendations

Other markings

 $(\mathbf{i})$ 

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

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
Ŕ	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 <sup>®</sup> 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)



- 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 safetyrelevant 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



	<ul> <li>Parametrising the safety configuration taking into account the safety-relevant factors from the risk assessment</li> </ul>
	<ul> <li>Operating the robot in manual mode</li> </ul>
	<ul> <li>Changing tools and devices on the media flange</li> </ul>
	<ul> <li>Opening the robot controller and establishing electrical connec- tions with external components or machines in the owner's overall system, such as additional safety devices</li> </ul>
	<ul> <li>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</li> </ul>
	<ul> <li>Equipping the robot and the components of the overall system with further safety markings, if the risk assessment so requires</li> </ul>
	If necessary:
	Providing additional information for the operator to properly operate a robot application
	<ul> <li>Joint storage of all documents required to operate the robot, including this manual</li> </ul>
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:
	<ul> <li>System integrator</li> </ul>
	<ul> <li>Safety engineer</li> </ul>
	Programmer
	<ul> <li>Maintenance specialist</li> </ul>
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

### $\Delta$ 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.
    - *Constant Constant Co*
  - 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.
     *G* "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 <sup>®</sup> 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  $\bigotimes page 45$ ).



# 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.

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.



Fig. 6 Robot model in simulation mode







Fig. 7 Main screen

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



Ğ	Program No program la un	nched		Speed 100 %	- +	Status REAL STANDBY M 📆	<ô> Control	ŵ
St	atus							
ę	ystem		Log					
F	obot							
s			-2					
F	escue Mode							
¢	ollision Detection 😁							
F	emote Control							
F	obot STAN	DBY Seset						
¢	perating Mode MAN	UAL						
F	educed Mode NOR	MAL						
		Shutdown						

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.



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

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





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



ഹ	Program No program launched			Speed 100%	- +	Status REAL STANDBY M 📆	<ô> Control	ශි
Sta	tus							
Sys	tem		Log					
Rob	ot							
Simu	lation							
Res	cue Mode							
Coll	sion Detection 📆 📿	Off 0n C						
Rem	ote Control							
Rob	ot STANDBY	S Reset						
Ope	rating Mode MANUAL							
Red	uced Mode NORMAL							
		Shutdown						

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



## 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



## 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.



ፈ	Program No program launched			Speed	+	Status REAL STANDBY M 🔐	<ô> Control	\$
Set	tings							л К
1/0		Safety					Change PIN	Edit
Cam	iera	Force And Power Limiting	Motion Ra	inge Limiting	Safe I/Os	Tool Misc		
Tool	s							3
Safe	e ty		deg/s			Max. 150		
Gen	eral	Drive 2	deg/s			Max. 150		
Mon	Itor	Drive 3	deg/s			Max. 180		
Serv	lice	Drive 5	deg/s deg/s	150		Max. 180		
Lice	nses	Drive 6	deg/s			Max. 180		
powered b vorau	y srobotik.com	Safely Limited Drive Speed – R						

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).
- **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. 14 Entering the PIN



പ	Program No program launched			Speed	+	Status REAL STANDBY M 🔐	<ô> Contro	n (3
Set	tings							2,
1/0		Safety					Change PIN	Edit
Cam	era	Force And Power Limiting	Motion Ro	ange Limiting	Safe I/Os	Tool Misc		
Tool	•							
Safe		Drive 1	deg/s			Max. 150		
Gene	eral	Drive 2	deg/s			Max. 150		
Moni	ltor	Drive 4	aeg/s deg/s	150		Max. 180		
Servi		Drive 5	deg/s			Max. 180		
Lice	nses	Drive 6	deg/s			Max. 180		
powered b Voraus	y <b>s</b> robotik.com	Safely Limited Drive Speed – Rec	duced					

Fig. 15 Setting parameters

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



ഹ	Program No program launched		Speed	+ [	Status REAL STANDBY M 🔐	<ô> Control	භි
Set	tings						× ۲
1/0		Safety				Cancel	
Cam Tool	era s	Press the enabling button to o Press "Cancel" to dismiss the	accept the new configu new configuration.	uration.			
Safe		Force And Power Limiting Moti	on Range Limiting Sa	fel/Os To	ool Other		
Gene	əral	Safely Limited Drive Speed – Normal					
Mon	itor	Drive 1 de	eg/s 130				
Serv	lce	Drive 2 de	eg/s 130				
Lice	nses	Drive 4 de	eg/s 150				
		Drive 5 de	eg/s 150				
powered b VORAUS	srobotik.com						

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

2



## Prerequisites

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





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



പ്	Program No program launched	Speed 100%	_	+	Status REAL STANDBY M	**	<ôj> Control	ශි			
Sto	Itus										
sy	stem			Log							
Rot	ot <b>1</b>	Standby									
Sim	ulation										
Res	cue Mode										
Col	ision Detection 🛗										
Rer	note Control										
Rot	ot STANDBY	:	5 Reset								
Op	erating Mode MANUAL										
Red	NORMAL	Sh	utdown								

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.



പ്	Program No program launched		Speed 100 %	- +	Status REAL ST	AND BY M 📆	<ô> Conti	rol	\$ \$
Sett	ings								
1/0		Tools				3	)	New Too	
Cam							ACTIVATE	Ĩ	Ū
Safe	ty	TestTooL2					ACTIVATE	Ø	١
Gene	ral								
Moni	tor								
Servi	ce								
Licer	nses								
powered by voraus	y srobotik.com								

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).



ፈ	Program No program launched				Speed 100 %	_	+	Status REAL STANDBY	M 📆	<ộ v	Control	හි
Set	tings											× ۲
1/0		Edit Param	eter						Canc	el	Save	
Cam	era	Tool Name										
		TestTool_2					)	_				
Safe	) ty	Transformation x Translation		y Translation								
Gene	eral	0										
Mon	ltor	x Rotation 0		y Rotation 0		z Rotation 0						
Serv	ice	Mass						2				
Lice	nses	0										
		Center of Mass										
powered b Voraus	srobotik.com	x 		y A		Z						

Fig. 20 Parametrising a tool

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

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.


Program No program launched				Speed 100 %	-	+	Status REAL STANDBY	M 🔐	<ộ> Control	කි
Settings										د ۲
1/0	Edit Param	eter						Cance	el Sav	/e
Camera	bxy		lxz		lyz					
Tools	0	kg m²	0	kg m²	0	kg m²				
Safety	Spring Probe Powered	Digital Con	figuration							
General		Output	~							
Monitor	M8 Powered	Digital Con	figuration							
Service		Output	~						J	
Licenses	States								(+) New	State
	State list is em	pty								
	Commands								H New Com	mand
powered by <b>voraus</b> robotik.com	Command list	is empty								

Fig. 21 Opening the 'New State' menu

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



Program No program launched		Speed 100 %	- +	Status REAL STAND	DBY M 📆	<ô> Control	හි
Settings	New State						
1/0	Name				Cane	cel Sav	•
Camera	Digital Out 1			~			
Tools Safety							
General	Digital Out 3		High	~			
Monitor	Digital Out 5			× ×			
Licenses	Digital Out 6			~			
	Cancel	Ţ				(+) New	State
voraus robotik.com							

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)



Program No program launched				Speed 100 %	-	+	Status REAL STANDBY	M 📆	ŵ	Control	෯
Settings											<sup>م</sup>
1/0	Edit Paramet	ter						Cance	H	Save	
Camera	lxy		lxz		lyz						
Toolo		kg m²	0	kg m²	0	kg m²					
10015	Spring Probe										
Safety	Powered Di	igital Conf	iguration								
General		Output	~								
Monitor	M8 Powered Di	igital Conf	iguration								
Service		Output	~								
Licenses	States									+ New State	
	State list is empty	Ý						_			
	Commands						(	1)-	• 🕀	New Command	
powered by <b>voraus</b> robotik.com	Command list is e	empty						_			

Fig. 23 Opening the 'New Command' menu

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



Program No program launched		Speed 100 %	- +	Status REAL STA	NDBY M 🎛	ô	Control	ଚ୍ଚ
Settings	New Command							
1/0	Name				Can	sel	Save	
Camera	Digital Out 1			~				
Tools								
General	Digital Out 3			~				
Monitor	Digital Out 4		Low	~			-	
Service							+ New Stat	
Licenses	Digital Out 6			~				
						ŧ	) New Comman	ıd
voraus robotik.com	Cancel	4						

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.



ନ	Program No program launched				Speed 100 %	-	+	Status REAL STANDBY	≤	ô	Control	ŵ
Sett	tings											к И
1/0		Edit Param	eter						Cano	el	Save	
Cam	era	lxy		lxz		lyz						
Tools		0	kg m²	0	kg m²	0	kg m²					
Safe	ty	Spring Probe Powered	Digital Con	figuration								
Gene	oral		Output	~								
Moni	itor	Powered	Digital Con	figuration								
Servi	ice		Output	~								
Licer	1505	States									+ New State	,
		State list is em	ipty									
		Commands								Ð	New Command	1
powered b voraus	srobotik.com	Command list	is empty									
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.

Schapter 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 'lcon' 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).



Program new-program		Speed — + Status 100 % — + REAL STAND	12 M (ŷ Contro 6)
new-program		X Cancel	ی Variables کے Save
Commands	Program		
Motion Vision Logic Tool Misc SafetyPilot Custom			
§ Move To Point	At to Point 🕀 Add		
\$ Move To	Linear 🕀 Add 🗘 Move To		
ti run <b>∩</b>	Add & Move To	5	
	÷		
2			
	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).



ন	Program new-program	Ŷ	Speed 100 %	- +	Status REAL READY M	e cô	Control	ଚ୍ଚ
new	-program 🧷	4			X Close	▶ Run	/> Mod	lify
0			Pri	ogram		3		
		2		Move To			Point to Point	
				Forever			×	
				9 Move To			Point to Point	
$\mathbb{Z}$				<b>9</b>				
							Point to Point	
	$ \land \uparrow \land$			🖇 Move To			Point to Point	
				G Wait			Time	
$\langle$				X Move To			Point to Point	
$\geq$					ĺ			
					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

igtriangle 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.



(1)

#### Moving the robot manually



#### Prerequisites

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

ନ	Program No program launched			Speed 100 %	-	+	Status REAL STANDBY M 📆	<ô> Control	ଚ୍ଚ	
Fig. 31	Open the 'Control' menu									
		<b>01.</b> On the navigation bar, click the 'Control' button Fig. 31 $/(1)$ .								

► The 'Control' menu appears Fig. 32





- 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.





#### 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)

ર	Program No program launched		Speed	+	Status 📕 🧰	<ộ> Control	හි
Prog	grams					+ New Program	Ţ
Gluin	•	Welding					
		Reset emergency stop     Do you want to reset the emerge	ency stop?				
		Cancel	0	ok			



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).



ഹ്	Program No program launched				Speed 100 %	- +	Status REAL STANDBY M 📆	<ô> Control	෯
Stat	tus								
Syst	tem			Log					
Robo	t		• •	-1					
Simul	ation								
Resc	ue Mode								
Collis	ion Detection ∺								
Remo	ote Control								
Robo	t STANDBY		ि Reset						
Oper	ating Mode MANUAL								
Redu	ced Mode NORMAL								
		Sh	utdown						

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.

 $\circledast$  "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.



#### 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.



Program No program launched			Speed — +	Status REAL ERROR M 📆	<ලිං Control ලි
Status				G	
System		Log			
Robot				Show D	etalls X Dismiss
Simulation		Uncaught error M571			
Rescue Mode					
Collision Detection					
Remote Control					
Robot ERROR	S Reset				
Operating Mode MANUAL					
Reduced Mode NORMAL	3				
Enabling Button DISABLED					
Safety READY 064d0127					
	Shutdown				

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.
- O4. 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.
- 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.

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

ନ	Program No program launched		S 10	speed	+	Status REAL STANDBY M		<ộ> Control	ଚ୍ଚ
Sett	tings							2	к <sup>л</sup>
1/0		Safety					Cance	el Apply	
Cam	era	Force And Power Limiting Moti	on Range I	Limiting Safe	I/Os Tool	Misc			
Tools		Enabling Button							
Safe		Enabling Button		Disabled	`				
Gene	əral	Time Delay Reduced							
Moni	itor	Time Delay Reduced		0,2		Max. 10			
Servi	Ice	Safety Engineer							
Licer	ises	Safety Engineer		Virtual Controller					
		Direction of Gravity							
nowaradh		nx					0		
voraus	srobotik.com								



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





**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. 38 Entering the PIN

No program launched		Speed 100 %	+ Status REAL STANDBY	ê) 📅 🗠	› Control ද්රි
Settings					× ۲
ı/o	Safety	٦	↓ Reset Safety	Cancel	Apply
Camera	Force And Power Limiting Motion Ra	nge Limiting Safe I/Os	Tool <u>Misc</u>		
Tools					
Safety	Enabling Button	Disabled	<b>v</b> 1		
General	Time Delay Reduced				
Monitor	Time Delay Reduced s	0,2	Max. 10		
Service	Safety Engineer				
Licenses	Safety Engineer	Virtual Controller			
	Direction of Gravity				
powered by <b>voraus</b> robotik.com	nx			0	

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.





#### 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<sub>x</sub> 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.

ഹ	Program Neves-Programm			Speed 100 %	+	Status REAL STANDBY M 🙆	دۋ¢ Control
Set	tings						
1/0		Licenses					
Cam	era	ACTIVATION Or LICENSES	CONFIGURATION				voraus robotik
Tool	• ty	License Activation		2 Licenses			Activation
Gen	əral	• • • • • • • • • •					
Mon	itor	Enter the Ticket ID to activate your so	ftware.				
Serv	ICe	Ticket ID					
Lice	2	3					NEXT
powered t vorau	srobotik.com						

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.



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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



#### Prerequisites

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

ፈ	Program No program launched				Speed 100 %	-	+	Status REAL STANDBY M	👌 <ộ> Control	ଚ୍ଚ
State	JS									
Syste	m			Log						
Robot	1	Standby								
Simulat	ion									
Rescue	Mode									
Collisio	n Detection ∺									
Remote	Control									
Robot	STANDBY		∱ Reset							
Operat	ing Mode MANUAL									
Reduce	ed Mode NORMAL									
		2	hutdown							

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. A 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.



ഹ	Program No program launched					+	Status REAL STAN	dby M 📆	<ộ> Control	හි
Sett	ings									к Ч
I/O		Service								
Came	era	Update Backup Poses <u>Maintenance</u> Logfile								
Tools		Brake Test								
Safet	ty	To ensure safe operation of the robot, it is mandatory to perform a daily brake test to ensure that the braking force and effect is within specification. When running the brake test, make sure that no person is within reach of the robot, and no external forces are applied to the robot								
Gene	ral	Warning: The robot may move during the brake test. Keep distance!								
Moni	tor	Broke Test Failed : The broke formation could nor be verified. If this problem pendise, please contact service.								
Servi	ce	Torque Sensors								
Licen	ises	External Torque								
		Joint 1 0.00 Nm	Joint 2 Jo 0.00 Nm 0.0	oint 3 <b>00 Nm</b>						
		Joint 4	Joint 5 Jo	oint 6						
powered by voraus	y srobotik.com	0.00 NM	- 0.00 NM - 0.0	<u></u>						

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 ( $\Leftrightarrow$  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.



Program No program launched		Speed — +	Status et al. Standby M 📆	<ộ̂> Control	ନ୍ତ
Settings	2				× ۲
1/0	Service				
Camera	Update Backup Poses Mainten	ance Logfile			
Tools	Brake Test				
Safety	Torque Sensors				
General	External Torque				
Monitor	Joint 1 Joint 2 Joint 3 0.00 Nm 0.00 Nm 0.00 Nm				
Service	Joint 4 Joint 5 Joint 6 0.00 Nm 0.00 Nm 0.00 Nm				
Licenses	Calibration				
	For an optimal calibration result please m active inside the tool settings.	ove the robot into the vertical pose	and unmount the current tool. Ensur	re that no tool is currently	
powered by <b>voraus</b> robotik.com	Torque Calibration				

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).





**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. 55 Entering the PIN



Fig. 56 Calibration successful

- The torque sensors are calibrated (duration: < 1 second).</p>
  - After successful calibration, the text 'Successful' is displayed Fig. 56/(1).



Program No program launched		Speed — +	Status REAL STANDBY M 📆	<ộ> Control	ශි
Settings					× ۲
I/O Camera	Service Update Backup Poses <u>Mainten</u>	ance Logfile			
Tools	Torque Sensors				
Safety	External Torque	Measured torque does	a not correlate with expected torque	e. Multiple reasons are possi	ble.
General	Joint 1 Joint 2 Joint 3 0.00 Nm 0.00 Nm 0.00 Nm	- External force	wing points to decrease the torque	onsec	
Monitor	Joint 4 Joint 5 Joint 6 0.00 Nm 0.00 Nm 0.00 Nm	- Sensor recalibration	required C		
Service		– Irregular shutdown – Defect sensor			
Licenses	Calibration	If none of the previous	ly mentioned errors apply, a recalib	pration should be performed	
<sup>powered by</sup> <b>voraus</b> robotik.com	For an optimal calibration result please m active inside the tool settings. Torque Calibration	ove the robot into the vertical pose	and unmount the current tool. Ensi	ure that no tool is currently	

 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 ( $\bigotimes page 4$ ).

# 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. 57 Calibration failed



ፈ	Program No program launched	Speed 100 %	 + 🖪	CALUS	M 🔐	<ô> Control	ଦ୍ଧ			
Sta	tus									
Sys	tem			Log						
Robo	t									
Simul	ation									
Resc	ue Mode									
Collis	ion Detection ∺									
Remo	ote Control									
Robo	t STANDBY		Reset							
Oper	ating Mode MANUAL		1							
Redu	ced Mode NORMAL	``````````````````````````````````````	Ĭ							
		Sh	utdown							
Redu	iced Mode NORMAL	Sh	utdown							



Fig. 58 Switching the robot off



Fig. 59 Switching the robot off

- 01. In the 'Status' menu, click the 'Shutdown' button Fig. 58/(1).
- In the pop-up window, choose 'OK' to confirm and switch off the 02. 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.



Ro program launched		Speed 100 %	- +	Status REAL ERROR M 🛗	<ộ> Control	ନ୍ତ
Status						
System	Log					
Robot Standby C	<b>3</b> 1/05/2023 16-39-42			Show I	letalls 🗙 Dism	lss
Simulation Simulation R	Uncought error M571					
Rescue Mode Off C						
Collision Detection						
Remote Control Denied Allo	9					
Robot GRACA 5 R	net and a second se					
Operating Mode MANUAL						
Reduced Mode NORMAL						
Enabling Button (DISABLED)						
Safety READY 064d0127						
Shutd	wp.					

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.

#### 0

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).



Program No program launched			Speed — +	Status 1884 STANDON M 😁 😳 Control 💮
Status				
System		Log		2
Robot		() WARNING 31/05/2023 16:30:16		Show Details X Dismiss
Simulation		Brake Test Required		
Rescue Mode				
Collision Detection				
Remote Control				
Robot STANDBY				
Operating Mode MANUAL				
Reduced Mode NORMAL				
Enabling Button DIGABLED				
Safety READY 2a60b374				
	Shutdown			

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).

Program No program launched		Speed	+	Status REAL STANDBY M 📆	دۋې Control	ନ୍ତ
Status						
System	Log					
Robot Star	dby Cn					
Simulation	Real Brake Test Required					
Rescue Mode O	To ensure safe operation of the robot, it is mandatory to perform a daily brake to applied.	est to check the brake func				
Collision Detection	Do you want to navigate to the brake test?					
Remote Control Der	Go to Maintenance	Ŷ				
Robot STANDBY						
Operating Mode MANUAL						
Reduced Mode NORMAL						
Enabling Button OKSABLED						
Safety (READY 2060b374)						
	Shutdown					

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.



rig. 00 Cause of warning message successfully rectified (exam

Contacting customer service

 $\sim$  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 ( $\Leftrightarrow$  page 4).



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