

## ArtiMinds Robot Programming Suite

Fast | Intuitive | Easy | Flexible | Robust









# AUTOMATING OUR WORLD

## Your **benefits** with ArtiMinds

- 1 Fast and easy commissioning
- 2 Versatility due to completely new approaches
- 3 Easy monitoring of production
- 4 Nonnecessity of expert knowledge
- 5 Reduction of project-specific hardware
- 6 Quick amortization

### ArtiMinds pays off within the very first project

Using our software ArtiMinds Robot Programming Suite (RPS) offers significant savings compared to classical automation solutions. Maintenance, handling of process variances and the transfer of already existing solutions to new applications have never been easier. Automate your processes robustly with ArtiMinds. For the first time you can automate even complex processes profitably – thanks to ArtiMinds RPS. We are pleased to support you with our expertise. Contact us for a noncommittal assessment of your automation projects.

### Project example: Insertion of sealing plugs

Sealing plugs are plastic or rubber parts that are commonly used in a wide range of industries. The flexibility of the material, small batch sizes as well as the diversity of variants place high demands on the automation solution.

	ArtiMinds RPS	Classic Solution
<b>Programming time</b>	4 hours for experienced users	Approx. 250 hours for senior experts
<b>Coding effort</b>	Automatically generated	3 600 lines UR Script Code
<b>Reusable and adjustable</b>	✓	×
<b>Easy cycle-time optimization</b>	✓	×
<b>Easy online quality control</b>	✓	×
<b>Programming costs</b>	< 1000 EUR	ca. 25 000 EUR

# Meet the ArtiMinds Software Family

ArtiMinds Robot Programming Suite (RPS) represents a new era of automation. The software is flexible and universally applicable, provides robust solutions and can be adapted to various applications. The different software packages can be combined as required and equip your robot with the necessary intelligence to optimally solve your application. The benefits of human work are combined with the advantages of classic automation.

## CHOOSE YOUR SOFTWARE PACKAGE(S) TO UNLEASH THE FULL POTENTIAL OF YOUR ROBOT:

### +Vision:

Set up your vision system quickly and easily to move your robot based on vision detection results. ArtiMinds RPS automatically generates the robot source code to communicate with the vision system. Choose your vision system from a variety of manufacturers.

- + Extensive support of vision systems, as for instance Cognex, Halcon, Keyence, SensoPart
- + Easy setup of the camera mounting and calibration
- + Templates and wizards for visual detection
- + Automatic validation of detection results
- + Visual adaptation of teach points
- + Controlled robot motion based on detection results
- + Capture, plotting and export of live data of the robot execution
- + Automatic generation of robot source code and execution without a need for additional PCs





## RPS:

ArtiMinds RPS combines online and offline programming in a unique and intuitive way to easily create complex robot programs – without writing a single line of source code.

- + Intuitive programming using drag & drop and wizards
- + Extensive template library for easy solutions of complex applications
- + Import of CAD files for reachability and collision checks
- + Import of curves from CAD models
- + Automatic computation of collision-free robot motions
- + Simulation of robot movements and 3D editing
- + Easy transfer to different robot platforms, gripper and sensor systems
- + Simple connection to PLC control systems, sensors and actuators
- + Automatic generation of robot source code
- + Capture, plotting and export of live data of the robot execution
- + Execution on standard robot controllers without a need for additional PCs

## ARTIMINDS +Monitoring

### +Monitoring:

Easily define sub-processes within your robot program to monitor and upload their states using standard interfaces. Key performance indicators as well as process-specific values can be logged and uploaded. Connect your robot directly to MES-, ERP- or SCM-software to reorder parts before the production stops. Turn your Universal Robots teach pendant into a standalone process monitor.

- + Templates and wizards to monitor sub-processes
- + Recording of key performance indicators, e.g. PPM, OEE
- + Recording of process-specific values, e.g. filling level of a tool
- + Easy connection to ERP-, MES- and SCM-systems
- + Standalone process monitor for Universal Robots teach pendant

## ARTIMINDS +Force

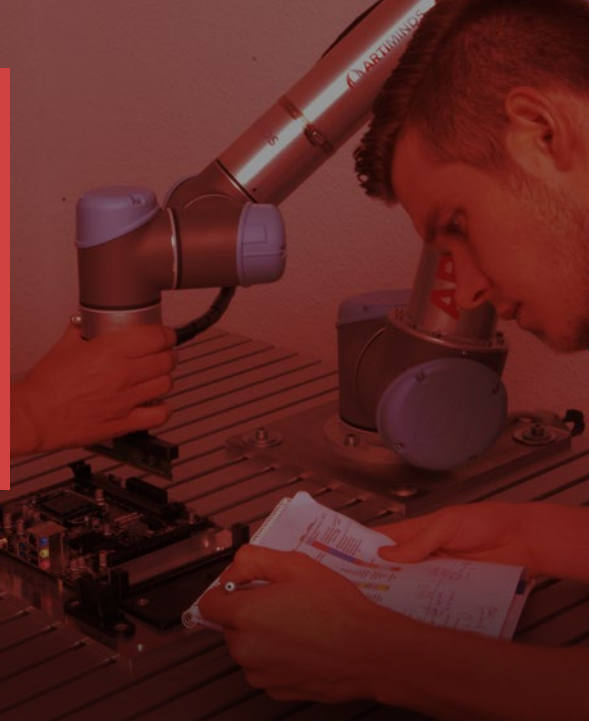
### +Force:

Easily and robustly solve automation tasks that require the robot to react to force measurements due to variances. Equip your robot with a force-torque sensor and add tactile sensitivity to significantly extend its scope of applications.

- + Extensive support of a large number of force-torque sensors and robot vendor technology packages
- + Sensor selection and configuration in a few steps
- + Templates and wizards to solve your application optimally with tactile sensitivity
- + Tools to guide the robot with the aid of a force-torque-sensor
- + Capture, plotting and export of live data of the robot execution
- + Automatic generation of robot source code and execution without a need for additional PCs

# ArtiMinds is an Allrounder

ArtiMinds RPS allows the automation of complex applications in various industries and domains. Independent of the volume, tasks ranging from heavy-duty – such as grinding and handling – to highly delicate – like in electronics assembly or quality control – become economically feasible with ArtiMinds.



## Surface Treatment:

With its unique functions, ArtiMinds RPS is the optimal choice for the various kinds of surface treatment applications. The required robot motions can be created precisely due to the simple import via CAD files.

**Application examples:** Polishing, grinding, dispensing, deburring, painting

## Assembly:

ArtiMinds RPS enables you to automate complex assembly tasks in various industries, which have formerly been perceived as not economically solvable. Flexible as well as rigid parts can be handled robustly by integrating tactile sensitivity.

**Application examples:** joining parts without jamming, even in the case of tolerances in the  $\mu\text{m}$  region, insertion of plastic clips, seals, plugs or rivets, assembly of gear boxes and engines, automated screw fastening and bonding with constant pressure

## Electronics Assembly:

The biggest challenge to automate the production of electronic components is the precise handling of flexible, often delicate parts, combined with a high degree of variant diversity and small lot sizes. Most of these processes can now be automated robustly using ArtiMinds RPS due to the easy integration of visual and tactile sensors.

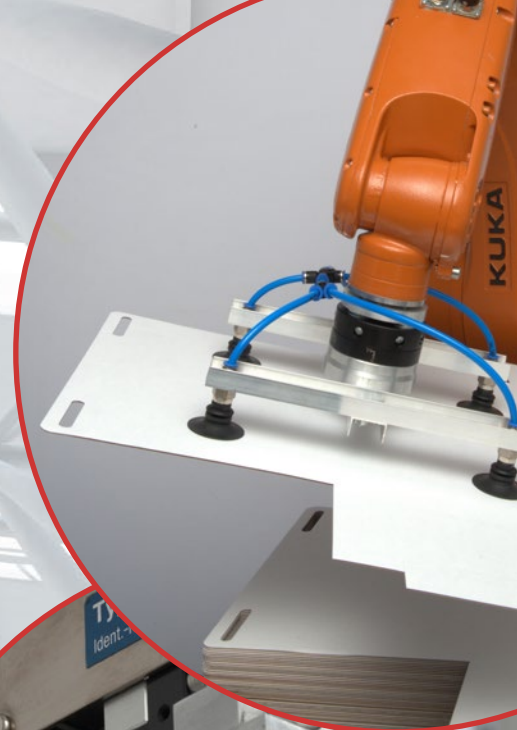
**Application examples:** assembly of plugs and wires, automated screw fastening, placing of THT components, mounting of PCBs and casings



## Handling & Packaging:

Optimize your handling and packaging with ArtiMinds RPS. Our special programming templates enable your robot to handle flexible materials, such as cardboard, conduct vision based alignments or pick up parts from stacks, blisters or any kind of work piece carriers.

**Application examples:** Machine loading, force-controlled stacking, tight palletizing and unfolding of packaging material



## Laboratory:

Laboratory applications are characterized by a high degree of variant diversity and small lot sizes. You can deploy your robot system with ArtiMinds RPS in a flexible way and easily adapt it to new tasks. As a result of the automated execution of the process steps, a consistently high quality is achieved, so that your laboratory staff is optimally supported.

**Application examples:** handling of laboratory glasses, tubes and sample vessels, opening and closing screw caps, pipetting and deparaffining, testing



## Quality Control & Inspection:

The highly flexible and efficient robot programming with ArtiMinds RPS perfectly fits tactile, visual and electrical quality control. Easily implement tactile tests using out-of-the-box measurements of the resulting forces and torques. Vision systems can be integrated easily and comfortably. Process monitoring enables live data logging and the straightforward connection to ERP-, MES- and SCM-systems.

**Application examples:** testing of buttons, switches, hinges and knobs, inserting and unplugging cables for electronic quality control



## WHAT DO YOU WANT TO AUTOMATE?

Are you looking for a robust, flexible and affordable automation solution? ArtiMinds RPS has unique features that make solutions possible, which have been impossible so far. Talk to our experts about your specific needs, we will be pleased to support you!

# Everybody can Program Robots

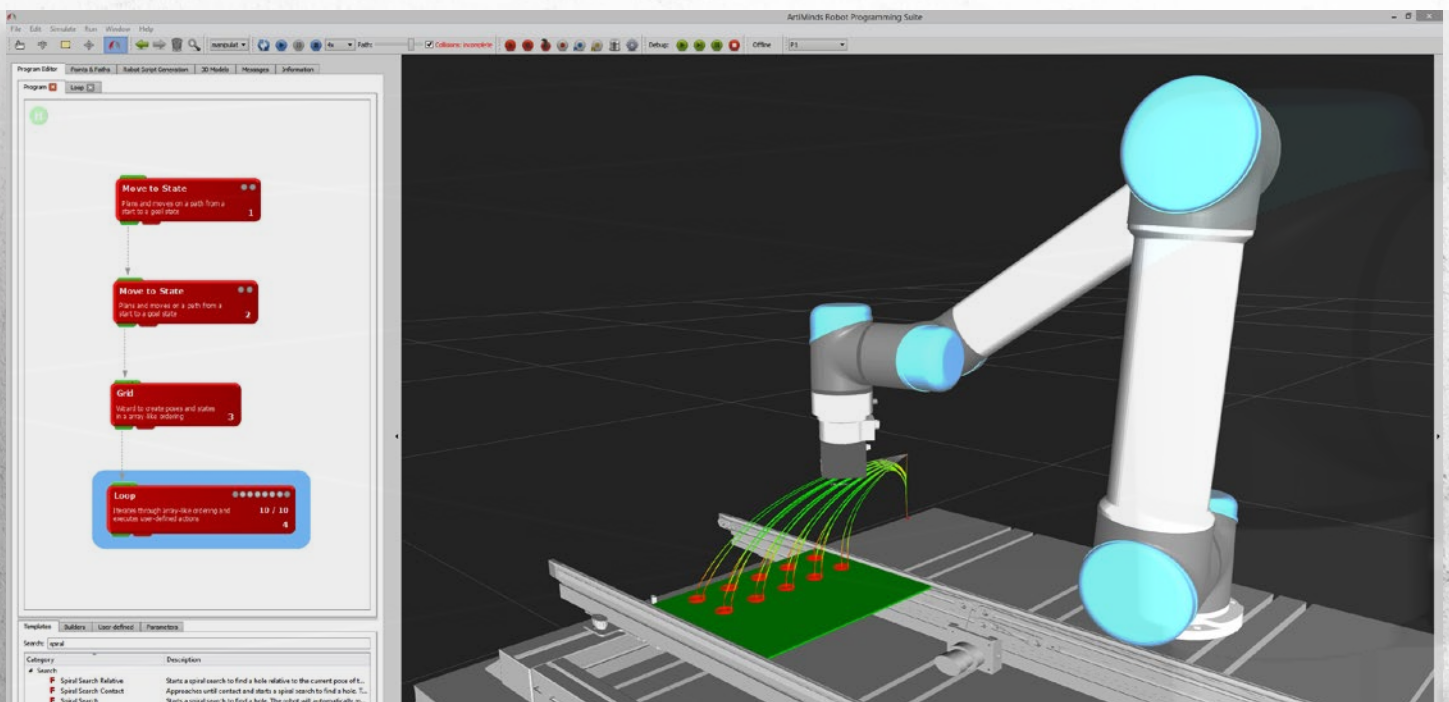
With ArtiMinds RPS, everybody, whether robotics expert or novice, can program robots quickly and easily in 3 steps. Instead of writing several hundred lines of source code, complex robot programs will be composed of templates and set up with the help of wizards. The software can easily be customized according to the level of proficiency of the user.

## STEP 1

### Create program structure via drag & drop

Choose from more than 60 integrated templates and build your program structure simply via drag & drop. The extensive template library ranges from standard robot motions to force-sensitive alignment and camera-based search motions.

Combine different templates to easily solve applications in various domains. Each template is illustrated by a demo video to simplify the selection and familiarize with existing projects. For expert users, powerful tools are provided and custom source code can be integrated easily. Full-text search, online help, tutorials and videos support novice users.





## STEP II

### Teach-in and parameterize

After creating the program structure, the process-oriented parameters of each template will be adapted to your application. Each template provides different wizards to guide you step-by-step through the setup process.

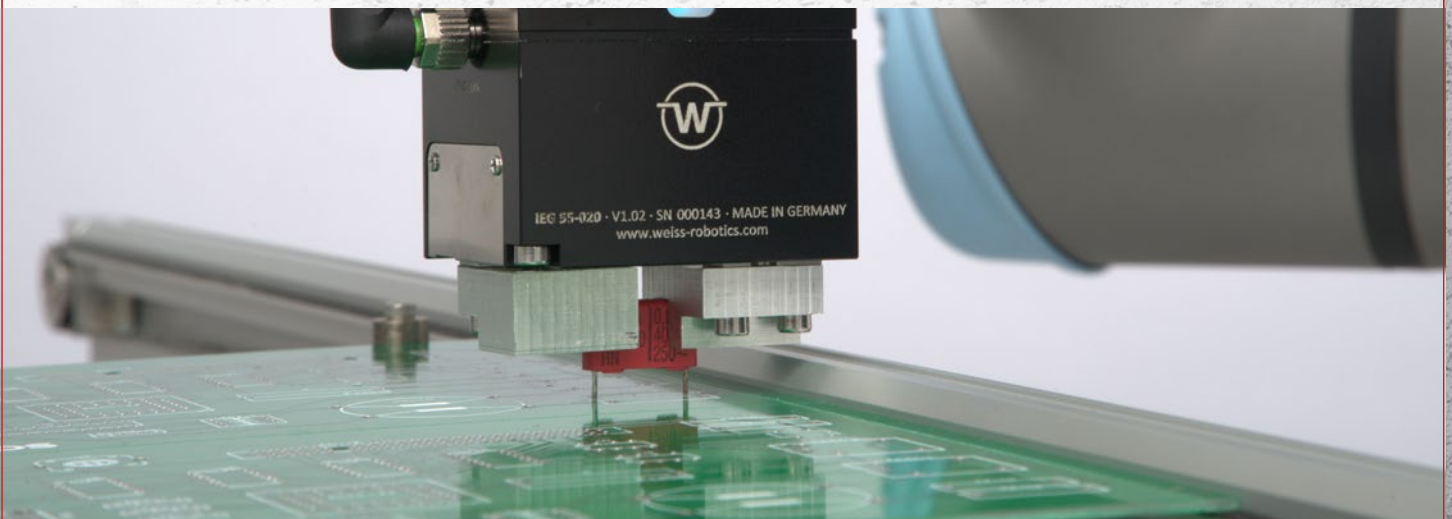
ArtiMinds RPS automatically computes the process-oriented parameters from a few key points, which are either taught in online with the real robot or offline with the simulated robot. The software is not a black box – any time, experts can change all parameters as detailed as for instance force-control parameters. Powerful tools assist you in programming, e.g. guiding the robot, loading of CAD models or defining 3D points.



## STEP III

### Simulate and execute

Finally, one click on “Play” is sufficient to finalize the creation of the robot program. The software automatically calculates all motions and simulates the execution in the 3D visualization, in order to for instance check for collisions. Subsequently, ArtiMinds RPS generates the source code in the native robot language and transfers it to the robot controller. Without additional PC, the source code will be executed directly on the standard robot controller and can be combined with existing source code fragments.



**ArtiMinds RPS is not required after the final program has been generated.  
The program runs independently on your robot controller.**



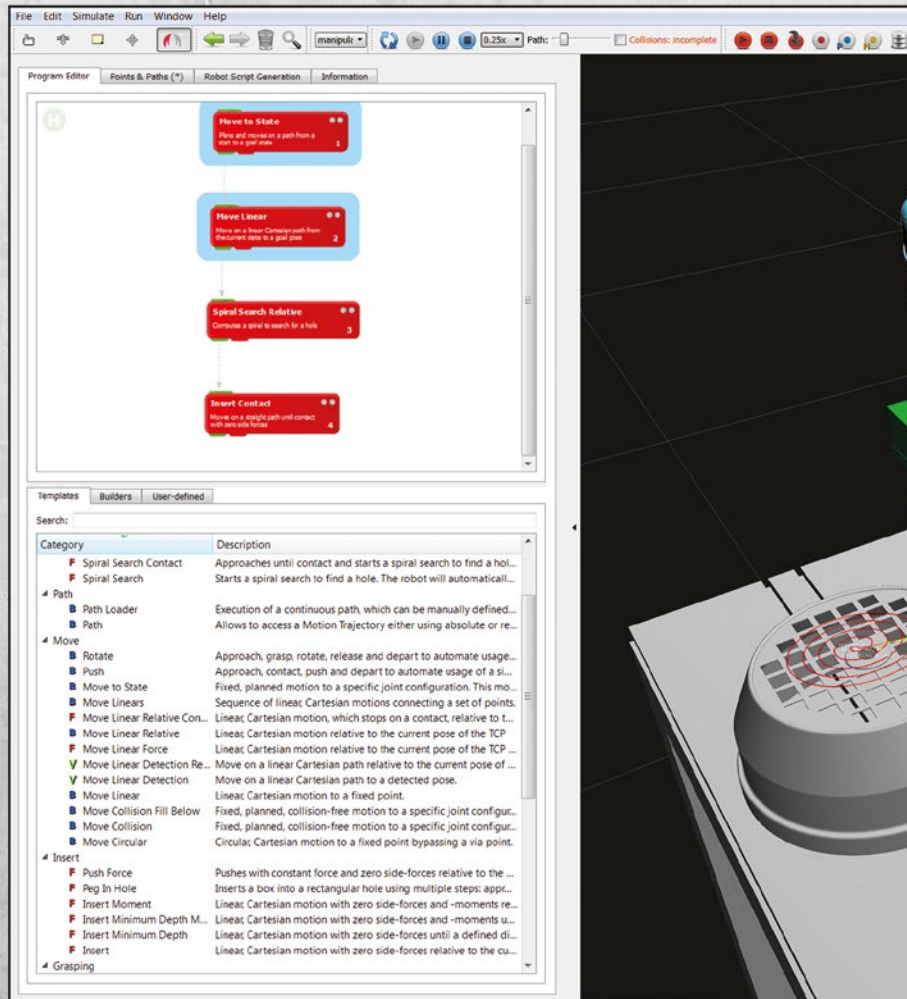
# Boost your Efficiency with the Award-winning Features of ArtiMinds RPS

ArtiMinds offers unique, innovative features making robot programming not only highly simple but also fast and economic. Break new ground with us and equip your robot with humanlike skills to use it as a universal tool.



## Intuitive On- and Offline Programming:

Complex industrial robot tasks can be programmed online and offline via simple drag & drop of predefined templates. Expert knowledge to write robot specific code is not required. Due to the intuitive programming approach, the setup complexity can be reduced for novice users while experts can refine automatically computed parameters in detail.



## Reusable Skills:

ArtiMinds RPS allows to create individual, domain specific task libraries. Easily reuse and adapt already programmed and well-tested processes. This allows the highly efficient automation of processes with a high number of variants.



## Force:

ArtiMinds RPS supports the integration of 6D force-torque sensors, thus process and part variances can be handled as robustly and flexibly as by a human. The robot moves according to data measured by the force-torque sensor with the appropriate templates (F).



## Vision:

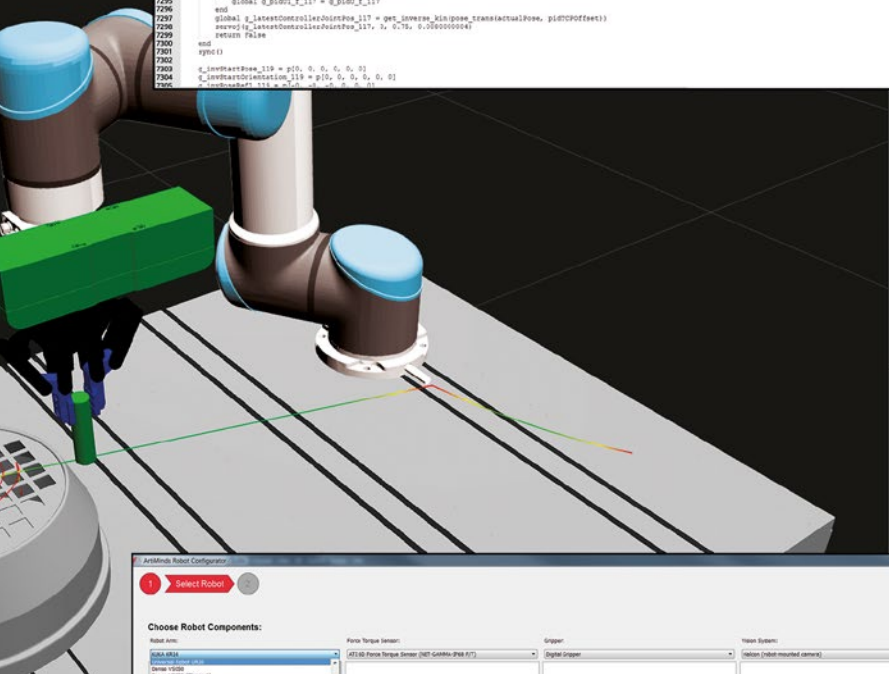
ArtiMinds RPS is able to process information generated by 2D or 3D vision systems. Combine standard hardware with powerful vision templates (V) to detect positions or variances. The software automatically generates the source code that enables the robot to react to detection results correctly in any case.



```

7256 actualOrient[1] = 0
7257 actualOrient[2] = 0
7258 getStartPoseToCompensatePose_116()
7259 if (norm((g_fkrange[1], g_fkrange[2]), g_fkrange[3]) > 0.01)
7260   warning("The measured forces surpass the threshold defined in the Soft Safety settings. Stopping.")
7261   return True
7262 end
7263 global forceToCompensate = pose_trans_pose_transform(forceToCompensate, g_startOrientation_117), actualOrient
7264 e0_f = norm(forceToCompensate, g_startPose_116)
7265 e0_fy = e0_f[1]
7266 e0_fz = e0_f[2]
7267 global g_startF_x_117 = p((1/g_startF_x_117[0]) * (0.000748499 * e0_fax) + (-0.0002787 * g_startF_x_117[1]) + (0.00010935 * g_startF_x_117[2]) + (-0.000178499))
7268 global g_startF_y_117 = p((1/g_startF_y_117[0]) * (0.000748499 * e0_fay) + (-0.0002787 * g_startF_y_117[1]) + (0.00010935 * g_startF_y_117[2]) + (-0.000178499))
7269 global g_startF_z_117 = p((1/g_startF_z_117[0]) * (0.000748499 * e0_faz) + (-0.0002787 * g_startF_z_117[1]) + (0.00010935 * g_startF_z_117[2]) + (-0.000178499))
7270 global g_startF_x_117 = g_startF_x_117
7271 global g_startF_y_117 = g_startF_y_117
7272 global g_startF_z_117 = g_startF_z_117
7273 forceToCompensate[0] = 0
7274 forceToCompensate[1] = 0
7275 forceToCompensate[2] = 0
7276 global g_startCompensate = pose_trans_pose_transform(forceToCompensate, g_startPose_116), actualPose
7277 g_startCompensate[0] = 0
7278 g_startCompensate[1] = 0
7279 g_startCompensate[2] = 0
7280 global g_startCompensate = pose_trans_pose_transform(forceToCompensate, g_startPose_116), actualPose
7281 global g_startCompensate = pose_trans_pose_transform(forceToCompensate, g_startPose_116), actualPose
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7288 global g_startCompensate = pose_trans_pose_transform(forceToCompensate, g_startPose_116), actualPose
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7298 global g_startCompensate = pose_trans_pose_transform(forceToCompensate, g_startPose_116), actualPose
7299 global g_startCompensate = pose_trans_pose_transform(forceToCompensate, g_startPose_116), actualPose
7300 global g_startCompensate = pose_trans_pose_transform(forceToCompensate, g_startPose_116), actualPose
7301 global g_startCompensate = pose_trans_pose_transform(forceToCompensate, g_startPose_116), actualPose
7302 global g_startCompensate = pose_trans_pose_transform(forceToCompensate, g_startPose_116), actualPose
7303 global g_startCompensate = pose_trans_pose_transform(forceToCompensate, g_startPose_116), actualPose
7304 global g_startCompensate = pose_trans_pose_transform(forceToCompensate, g_startPose_116), actualPose
7305 global g_startCompensate = pose_trans_pose_transform(forceToCompensate, g_startPose_116), actualPose

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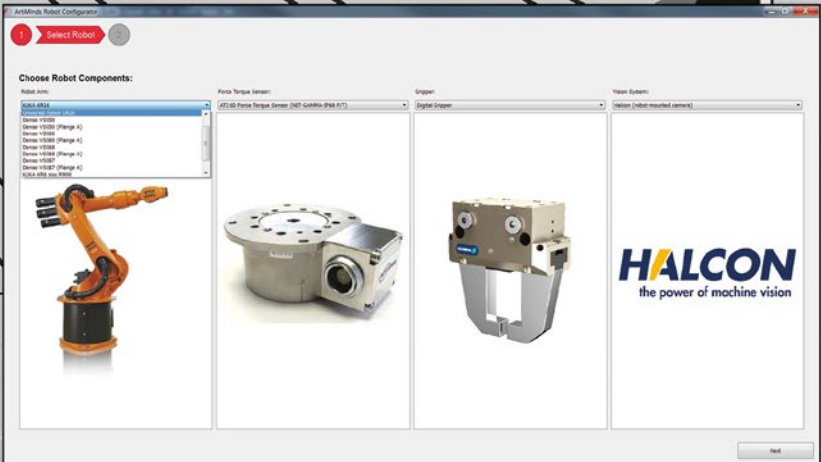
**Industrially Robust:**

ArtiMinds RPS automatically generates a secure and verified source code in the manufacturer-specific robot language. This code runs independently on the robot controller without a connection to ArtiMinds RPS. Thus, the software does not increase the complexity but reduces the likelihood of errors.



**Simulation & CAD:**

Quickly and easily import and visualize curves from CAD models or complete CAD files in ArtiMinds RPS. Unlock advanced features like path planning, reachability checks, collision checks and runtime optimization.



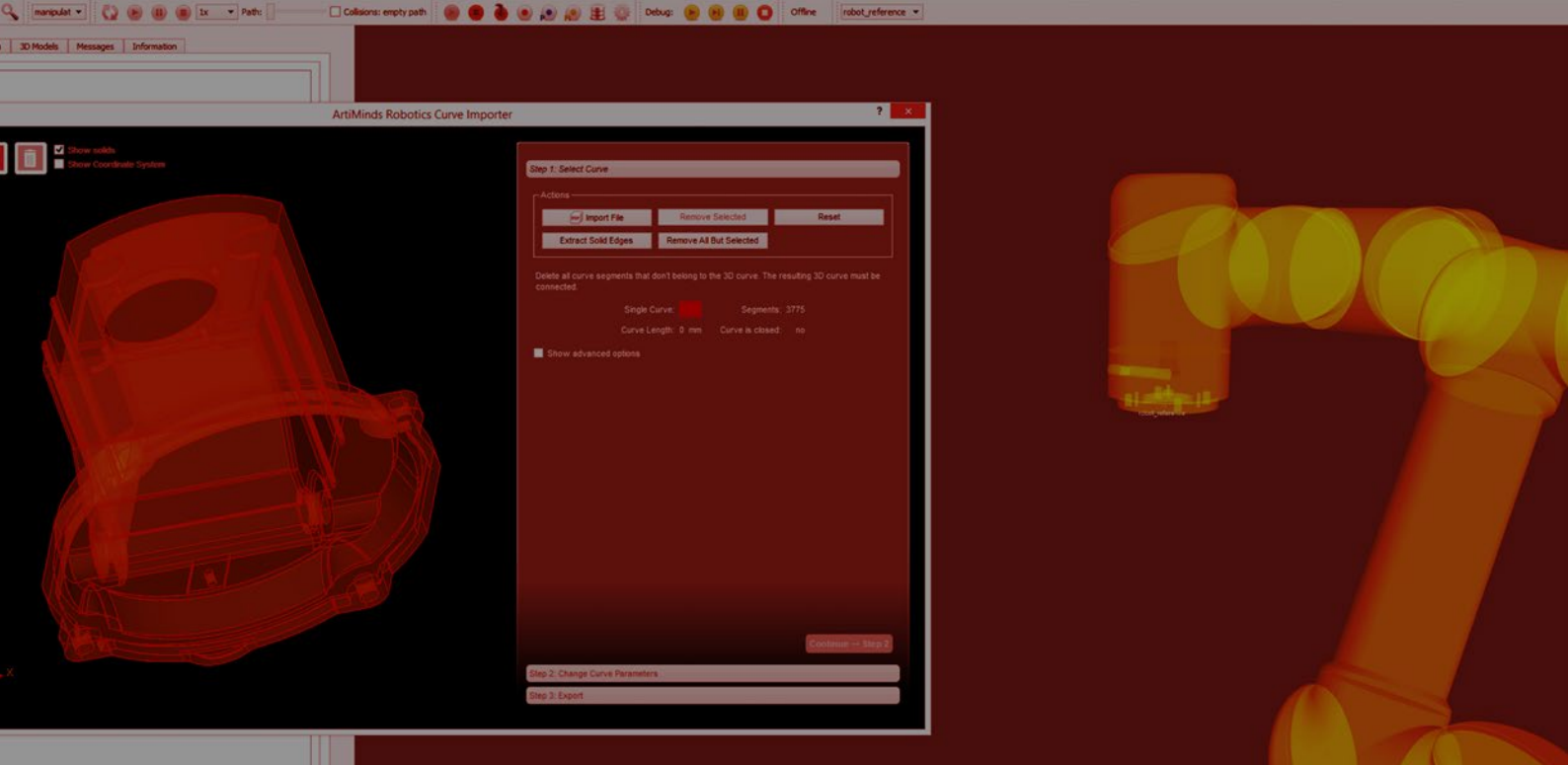
**Extensive Hardware Support:**

Easily set up robots, sensors, cameras and end effector tools using the integrated robot configurator. All kinds of applications can be solved with these standard components, significantly reducing the demand for expensive, project-specific hardware developments.



**100x Faster Programming:**

Robot programming, commissioning and later adaptations are realized much faster. An independent benchmark showed that with ArtiMinds typical force-controlled robot tasks can be programmed in a few minutes instead of days.

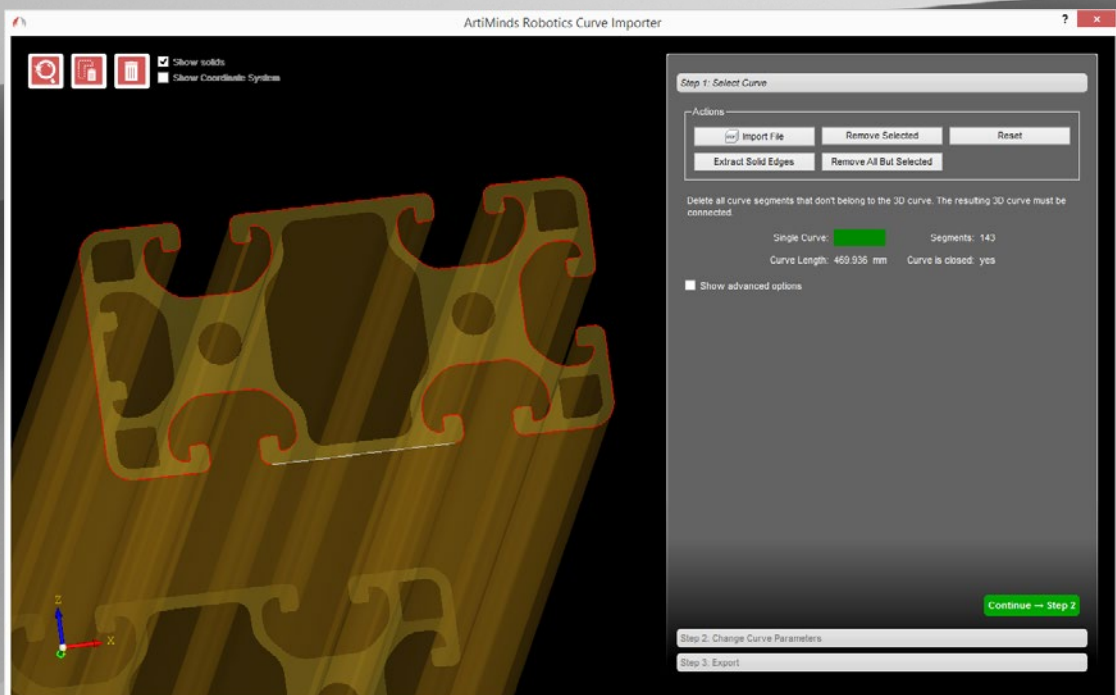


## Get to know CAD2Path

With ArtiMinds RPS you can create complex robot motions based on CAD files in a few steps. Solve applications like deburring, polishing, grinding, gluing or painting with mathematical precision. Robot motions can be imported directly from a CAD file, created based on the edges of the CAD model or via the projection onto a freeform surface. Either move the tool along the part or keep the tool stationary and move the part with the robot. ArtiMinds RPS automatically computes the correct robot motion to achieve the desired result at the point of processing.

### Create a robot motion in a few steps

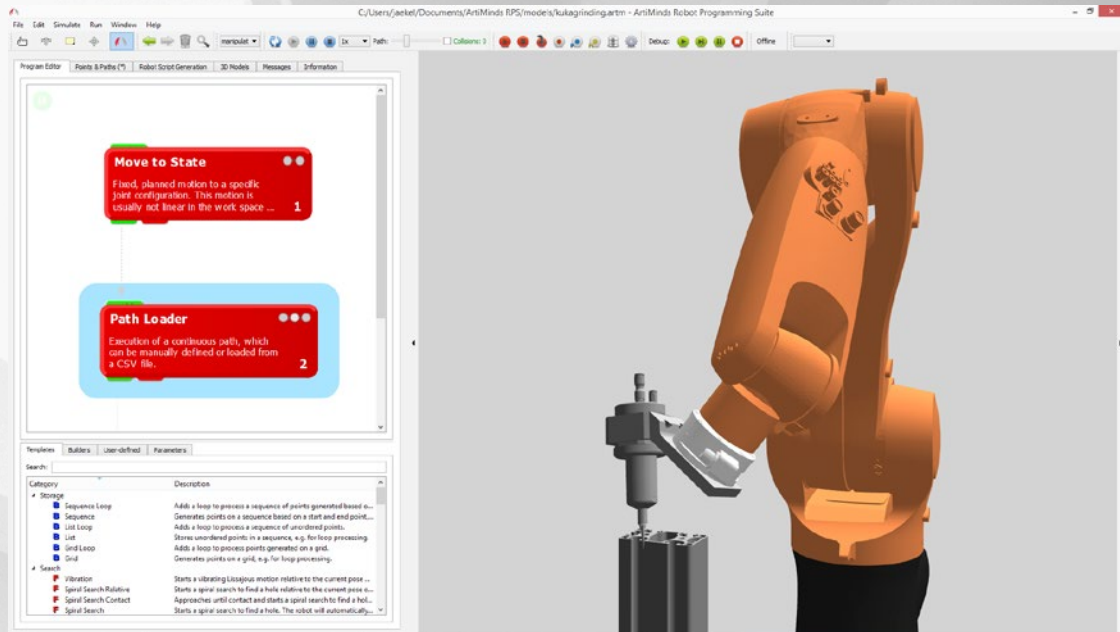
Within CAD2Path, you can easily import and edit CAD files. Create possible machining edges based on the geometry with a single click and compose a tool path. The tool orientation can be chosen flexibly from different orientation options, e.g. following the motion direction or orthogonal to the surface. If you have a stationary tool, the robot motion will be automatically adapted to ensure that the velocity of the transported part at the processing point is constant.





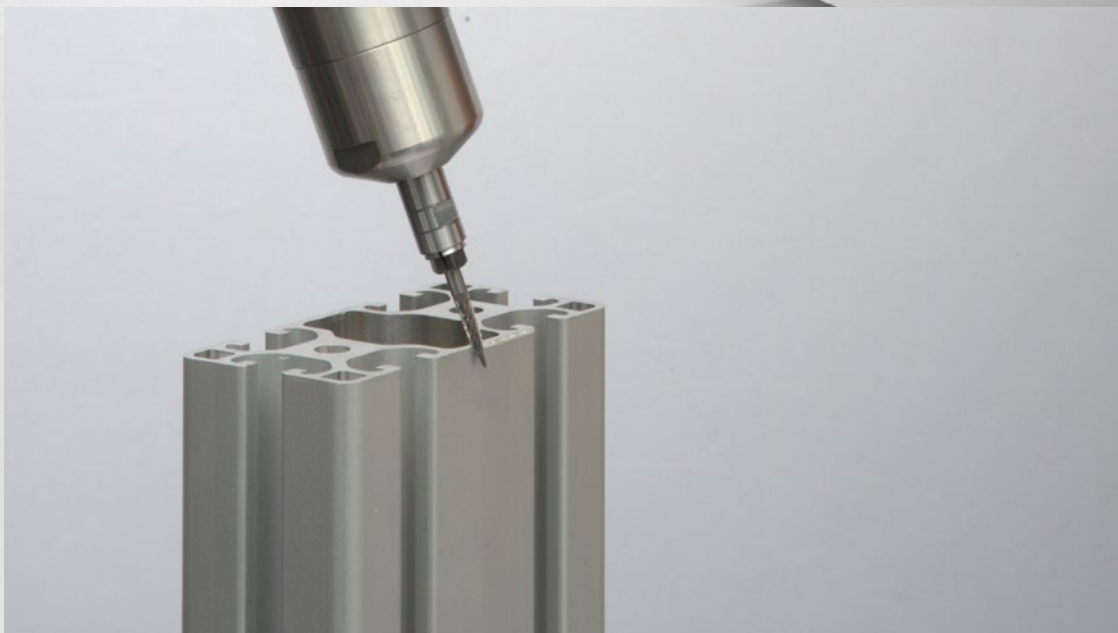
## Calibrate the robot motion with the real part

The generated robot motion can be moved freely within the work space using a 3D reference point. ArtiMinds RPS offers comprehensive tools to calibrate the simulated robot motion with the real world. Measure a point on the robot's path or use multiple reference points to compute the 3D reference point correctly. The automatic generation of the robot source code and its automatic transfer to the robot system allow extremely short testing cycles.



## Execute the robot motion on the robot controller

The robot motion is automatically created using linear, circular or spline motions. ArtiMinds RPS provides extensive configuration options and automatically considers requirements of the robot controller, e.g. minimal blending radii or the linearity of circular segments. Leverage the automatic generation of source code and concentrate on your expertise to set the process variables correctly.



# Supported Robots:

ArtiMinds RPS supports most common collaborative and classic industrial robots as well as a variety of force-torque sensors and gripper families.

## UNIVERSAL ROBOTS



UR3 / UR3e



UR5 / UR5e



UR10 / UR10e

## KUKA



KR 6 R900



KR 10 R1100



KR 16



+ all robots with KRC4 controller

## YASKAWA



GP7



GP8



GP25



+ more



## FANUC



LR MATE 200iD



M-10iA



R-2000iB



+ more

## DENSO



VP-6242



VS-050/060



VS-6556



+ all robots with  
RC8 controller

## STÄUBLI



TX2-40



TX2-60



TX2-90



+ more

## ABB



IRB 1200



IRB 1600



IRB 2600



+ more

# Your Robot?

For requests concerning further support of robots, please contact us.

# Supported Hardware:

ArtiMinds RPS supports a variety of force-torque sensors, grippers and vision systems.

## FORCE-TORQUE SENSORS



ATI



ROBOTIQ



WACOH-TECH



WEISS



ON ROBOT



+ more

## GRIPPERS



ROBOTIQ



ON ROBOT



SCHUNK



WEISS



ZIMMER



+ more



## VISION SYSTEMS



KEYENCE



COGNEX



SENSOPART



SICK



HALCON



+ more

## INTERFACES

I/O

DIGITAL I/O

EtherCAT

EtherCAT

IO-Link

IO-Link

PROFINET

PROFINET

Remote Procedure Call

RPC



+ more

## YOUR HARDWARE ?

We constantly extend the list of supported hardware components. Please do not hesitate to contact us if your hardware is not supported, yet.



## SERVICES



### Free support

We are pleased to introduce Artiminds RPS to our new customers during free online introductions. Moreover, we offer advice on how to optimally realize your automation solution with our software. We are available for our customers at any time via e-mail ([support@artiminds.com](mailto:support@artiminds.com)). We are looking forward to your suggestions and feature requests.

### Premium service

Get a personal training with extensive training materials from our distributors or directly from us. We, of course, support you with our technical know-how. Our experts advise you on the fast implementation of new concepts of highly demanding applications. If you want to benefit from our technology without getting involved with the programming, we are happy to offer you turnkey solutions in cooperations.

### Global presence with a broad network of distributors

We are continuously expanding our worldwide network of distributors to provide you excellent support and local training. Therefore, ArtiMinds RPS is the first choice for robot programming – also at your international locations! Contact our regional partner!





## OUR CORPORATE HISTORY: THE ARTIMINDS TIMELINE

The founders recognize the commercial opportunities in the area of intuitive programming for complex industrial tasks and found their company ArtiMinds Robotics GmbH in July. While the product development starts at zero, the company already wins several awards and scholarships for the concept.

In spring 2015, selected beta testers have the chance to test ArtiMinds RPS for the first time for real robot applications. After consistently positive feedback, the software is ready for sale. Gradually, sales start in several countries.

ArtiMinds goes USA! With the successful participation in the German Accelerator program, the company opens a branch in New York City. A few months later, ArtiMinds Inc. already has a network of distributors in several states. With version 1.5, ArtiMinds RPS reaches another milestone, whereby both the functionality and the hardware support increase. The successful collaboration with Universal Robots enters the next stage with ArtiMinds Essentials: directly installed on the robot controller, the software allows a direct and precise, force-sensitive guiding of the robot. The new office at TechnologiePark Karlsruhe offers enough space for more than 30 employees, so that the steady growth can continue

**2012**

During their work as research assistants on various national and international research projects at the Karlsruhe Institute of Technology (KIT), Institute for Anthropomatics and Robotics, the three founders of ArtiMinds gather extensive experience in the field of robot task modeling during the years 2002 to 2012. Thereby, they develop a comprehensive understanding of challenges and limitations of modern task modeling. Numerous new ideas are explored and many research prototypes are developed and tested on real robot applications.

**2014**

A first version of the Robot Programming Suite (RPS) celebrates world premiere at Automatica 2014. Although the company is only 11 months old and still operates at least partly in stealth mode, ArtiMinds is rated second place in the category of the most promising robotics start-ups by the jury of the ESA BIC Start-Up Award.

**2015**

**2016**

The year 2016 is dominated by growth and improvement. By winning two national awards (Focus Digital Star Award and BILANZ Magazine's StartMeUp Award), the company remains in focus at trade fairs and exhibitions. While the team grows both in size and in experience, ArtiMinds publishes version 1.3 of the Robot Programming Suite. New and enhanced features enable the use of RPS in various industries. Use cases and applications in numerous companies make a great contribution to ArtiMinds's business goal: Automating Our World!

**2017**

**2018**

After continuous growth by their own capacity ArtiMinds now has paying customers in over a dozen industries in 20 countries worldwide. ArtiMinds RPS is deployed in companies of all sizes, whether medium-sized businesses or global companies. The now 60-headed team moves to two additional expansion areas in the Technologiepark Karlsruhe. Within the scope of trade shows, inter alia, the Automatica in Munich and MOTEK in Stuttgart, ArtiMinds presents its latest product ArtiMinds Learning & Analytics for Robots (LAR). In autumn ArtiMinds opens their ArtiMinds Academy in Karlsruhe for an even further improved training experience.





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web: [www.artiminds.com](http://www.artiminds.com)