



E-PAPER

STANDARDIZED ROBOT PROGRAMMING

independent of manufacturers | flexible | integrated

One software - all manufacturers:

how to program industrial robots, force/torque sensors, grippers and vision systems consistently and standardized with ArtiMinds

Overview of robots, supplementary peripheral devices and manufacturers compatible with ArtiMinds RPS & LAR



INDUSTRIAL ROBOTS

ArtiMinds offers integrated software solutions for planning, programming and operating robot cells. Getting started is easy since no additional control unit is required. ArtiMinds generates native robot code and relies on the stability and power of the standard robot controller. Solve challenging tasks including force control, vision sensing and PLC communication without writing a single line of robot code. With ArtiMinds RPS you can create complex robot programs in a few simple steps to automate your production processes in a short time.

The number of robot manufacturers, providers of force/torque sensors, grippers and vision systems is steadily increasing. The manufacturer-independent programming approach of ArtiMinds enables you to select the best available standard hardware for your processes. This saves costs and time, with the highest performance.

ARTIMINDS SUPPORTS, AMONG OTHERS, THE FOLLOWING MANUFACTURERS OF ROBOT SYSTEMS:

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ROBOTS FROM ABB

ARTIMINDS SUPPORTS ALL 6-AXIS ROBOTS WITH IRC5 CONTROLLER FROM ABB

ABB currently offers 19 six-axis robots in numerous variants. These offer payloads from 3 to 800 kg and reaches from 0.48 to 4.20 m. Depending on the robot model, different protection types and classes are available. This comprehensive portfolio enables customers to find the perfect robot for their application. The robots are driven by the IRC5 robot controller. The IRC5 offers outstanding motion control and enables the rapid integration of additional hardware. Its motion control technologies optimize robot performance in terms of accuracy, speed, cycle time, programmability and synchronization with external devices. In addition, the robot controller offers a HMI with touchscreen and joystick and powerful communication interfaces. The software of the IRC5 is available with different options and specific application software based on the basic software.

With the safety-certified SafeMove software, users can turn any 6-axis robot into a collaborative robot, because SafeMove safely monitors the robot movement, guided tools, standstills and the robot speed.

IRB 1200: A COMPACT, FLEXIBLE & FAST SMALL ROBOT

With the IRB 1200, ABB is addressing the industry's needs for flexibility, ease of operation, short cycle times and compactness, while offering a wide working range.

The IRB 1200 is available in two versions. The robot is versatile in use and, thanks to standardized components, cost-effective. Both versions are available with Foundry Plus 2 or Clean Room protection, as well as with SafeMove and Food Grade Lubrication. The version with 700 mm reach can handle up to 7 kg, the version with 900 mm reach has a payload of 5 kg.

ARTIMINDS TECHNOLOGY CHECK:

ArtiMinds uses the software options 616-1 PC Interface, 623-1 Multitasking, 661-2 RobotWare Force Control Base.



© ABB

ABOUT ABB

ABB is a leading global technology company that energizes the transformation of society and industry to achieve a more productive, sustainable future. By connecting software to its electrification, robotics, automation and motion portfolio, ABB pushes the boundaries of technology to drive performance to new levels. With a history of excellence stretching back more than 130 years, ABB's success is driven by about 110,000 talented employees in over 100 countries.

PRODUCT PORTFOLIO

ABB Robotics & Discrete Automation is a pioneer in robotics, machine automation and digital services, providing innovative solutions for a diverse range of industries, from automotive to electronics up to logistics. The industrial robot portfolio includes 6-axis, delta, palletizing, SCARA, painting and collaborative robots. This means that ABB has the most comprehensive range of robots on the market. Standardized software solutions and extensive application equipment are available for the various applications of the robots. ABB also has many years of experience in the planning and implementation of turnkey solutions. Services such as maintenance, repairs and plant optimization round off the portfolio.



© ABB



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ROBOTS FROM DENSO ROBOTICS

ARTIMINDS SUPPORTS ALL 6-AXIS ROBOTS WITH RC8A CONTROLLER FROM DENSO

NEW VS-SERIES

The robots of the VS-050/060/068/087 series provides high speed and high power in a compact, slim body. The robot models can be applied in assembly, inspection, matching, material handling, material tending, packaging, palletizing and customised applications. The VS Series is available in 4 different sizes, with an arm reach from 505 to 905 mm and payload from 4 kg to 7 kg.

BENEFITS OF DENSO ROBOTS

- Compact, slim design / extensive array of robot arms and optional features
- Smallest robot controller in 3 kW class (RC8A: 300 mm x 440 mm x 94 mm)
- Communication flange VS Series – direct connection of servo gripper and GigE periphery
- Comprehensive software packages: Integrated image processing, SDK middleware for connection and IDE for various peripherals, mobile tools for maintenance and operation
- Low maintenance: lifetime grease lubrication
- Long service life and maximum reliability
- Standard-24-Months-Guarantee

ARTIMINDS TECHNOLOGY CHECK:

ArtiMinds uses the communication protocol b-CAP as well as the technology package Force Sensor Compliance Control.



© DENSO Robotics

ABOUT DENSO ROBOTICS

DENSO Robotics is part of DENSO Corporation- according to Fortune Global 500 one of the 500 largest companies in the world and one of the two largest automotive suppliers. As a recognized world market leader in the small assembly industrial robotics segment, DENSO Robotics is a pioneer in terms of reliability, flexibility and functionality. With approximately 120,000 DENSO robots worldwide- of which more than 20,000 are used in our own production- DENSO has extensive knowledge and experience in the field of automation.

PRODUCT PORTFOLIO

The company's product portfolio ranges from 4-axis robots (SCARAs) to 5- and 6-axis robots, all of which stand out for their outstanding speed, precision and quality. The robots can move a weight of up to 20 kg and thus offer a high degree of functionality. Each model was developed to the highest quality standards. The robots are not only compact, light weighted and require minimal maintenance, they also come with a two-year warranty. For more cost-effectiveness and user-friendliness, there is a unified controller type RC8A for all robot models from DENSO. The robot arms can be used in almost any environment and have the required protection classes. In addition, DENSO Robotics deals with solutions related to logistics and IoT tasks.



© Denso Robotics

SCARA ROBOTS

- Arm reach from 400 mm to 1,000 mm
- Payload from 3 kg to 20 kg
- Repeatability: up to +-0,01mm
- Mounting possibilities: floor- and ceiling-mounted

6-AXIS ROBOTS

- Arm reach from 430 mm to 2,500 mm
- Payload from 2,5 kg to 40 kg
- Repeatability: up to +-0,02mm
- Mounting possibilities: floor-, wall- and ceiling-mounted



ROBOTS FROM FANUC

ARTIMINDS SUPPORTS ALL 6-AXIS ROBOTS WITH R-30iB (PLUS) CONTROLLER FROM FANUC

LR MATE ROBOT AND R-30iB PLUS CONTROLLER: HIGH LOAD CAPACITY COMBINED WITH SMALL DESIGN

- perfect solutions for high-performance handling, loading and unloading and assembly applications
- reaches up to 911 mm, load capacity of up to 14 kg
- high moment and moment of inertia on the wrist unit
- integrated service interface in the robot arm prevents pinching and interfering with gripper supply devices
- IP67 protection saves costs for additional safety equipment
- ideal for compact robot cells, production lines and installation directly in or on the machine

In order to increase the functionality and reliability of the robot, FANUC has developed the R-30iB Plus controller. It is characterized by increased user friendliness, minimal energy consumption and maximum productivity and ensures better robot performance in terms of cycle times, speed and safety.



© FANUC

ARTIMINDS TECHNOLOGY CHECK:

ArtiMinds uses the technology packages R796 Ascii Program Loader, R648 User Socket Messaging, J876 Force Control Basic and J835 Force Control Contouring. V8.20 or higher of the robot controller is required.

HUMAN-ROBOT COLLABORATION WITH THE FANUC CR SERIES

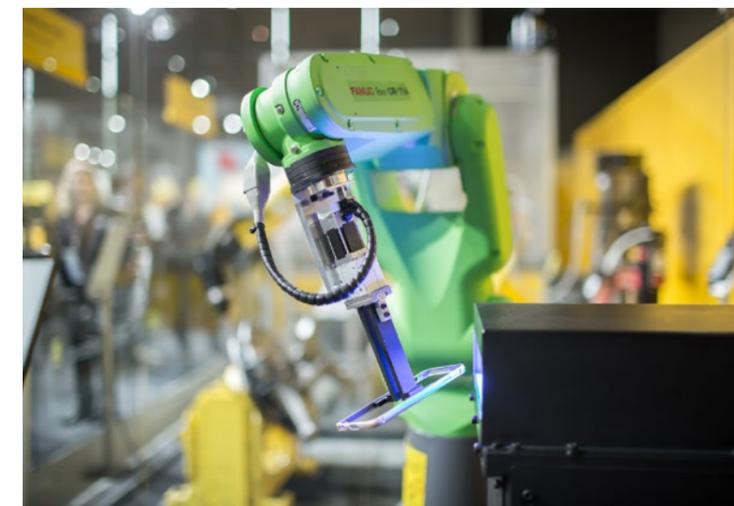
Safety-certified, FANUC cobots work hand in hand with humans to add value to your processes. They stop at a touch and restart at the push of a button. Covering the needs of medium- and small-sized businesses as well as automation beginners and large corporations, the range of the CR series contains exactly the right solution for your business. Quick to install, easy to use and offering unrivalled reliability, they represent a lasting solution that boosts your productivity and provides you with new growth opportunities.

Offering payloads of 4 kg, 7 kg, 14 kg, 15 kg and 35 kg and unrivalled reach, the CR series is ideally suited to handling processes that expose human workers to the risk of repetitive strain and other work-related injuries. Since FANUC cobots control force with much more precision than humans, they also offer you huge benefits in terms of quality and repeatability.

ABOUT FANUC

FANUC is one of the world's leading manufacturer of factory automation. With more than 264 subsidiaries worldwide and more than 7,000 employees, FANUC offers a dense network in sales, technical support, research & development, logistics and customer service.

In addition to powerful CNC products and machines, FANUC offers a wide product portfolio of industrial robots for a wide variety of industries and applications. With these core product groups, FANUC is the only company in its industry that develops and manufactures all main components itself.



© FANUC

PRODUCT PORTFOLIO

100% FANUC

FANUC offers the widest range of robots in the world to cover the needs of diverse applications and industries. They are a key standard component – totally flexible with application-specific options, straightforward integration, and the colour of choice for demanding automation solutions. Global leader with almost 40 years of experience in the development of robot technology, more than 600,000 robots installed worldwide, and satisfied customers in every corner of the globe.



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ROBOTS FROM KUKA

ARTIMINDS SUPPORTS ALL 6-AXIS ROBOTS WITH KR C4 CONTROLLER FROM KUKA

KR C4 CONTROLLER

The KR C4 software architecture integrates Robot Control, PLC Control, Motion Control (e.g. KUKA.CNC) and Safety Control. All controllers share a database and infrastructure. This makes automation simpler and more powerful.

BENEFITS:

- Robot, PLC, Motion and Safety Control seamlessly and interactively integrated
- Uses a shared database and infrastructure
- Maximum performance, scalability and flexibility
- Effortless control of entire systems
- Understands KRL and the PLC and CNC languages (G-code)

KR AGILUS: KUKA SMALL ROBOTS FOR 3 KG TO 10 KG PAYLOADS

With the KR AGILUS series, KUKA presents a comprehensive family of small robots. The performance of the KR AGILUS robots is unrivaled in their payload categories; furthermore, the robots feature six axes, high speed, short cycle times and an integrated energy supply system. They can perform even unusual tasks in any installation position.

The KUKA small robots are available in different variants – suitable for standard ambient conditions or special requirements, such as cleanrooms. All KR AGILUS models are operated with the service-proven KR C4 compact or KR C4 smallsize-2 – the universal control technology for all KUKA robot models.

ARTIMINDS TECHNOLOGY CHECK:

ArtiMinds uses the technology packages KUKA.EthernetKRL, KUKA.DirectoryLoader, KUKA.RobotSensorInterface and KUKA.ForceTorqueControl.



© KUKA Group

ABOUT KUKA

KUKA is a global automation corporation with sales of around 3.2 billion euro and roughly 14,000 employees. As one of the world's leading suppliers of intelligent automation solutions, KUKA offers customers everything they need from a single source: from robots and cells to fully automated systems and their networking in markets such as automotive, electronics, general industry, consumer goods, e-commerce/retail and healthcare. The company is headquartered in Augsburg.

PRODUCT PORTFOLIO

KUKA is one of the world's leading automation specialists and aims to support its customers in the integrated optimization of their value creation by providing comprehensive automation and digitalization know-how.

The company offers its customers everything they need from a single source: from the core component – the robot – to production cells, turnkey systems and networked production with the aid of cloud-based IT tools.

KUKA offers industrial robots in a wide range of versions with various payload capacities and reaches. The spectrum of products also includes the appropriate robot peripheral equipment – from linear units to end effectors.



© KUKA Group



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ROBOTS FROM MECADEMIC

ARTIMINDS SUPPORTS MECADEMIC'S MECA500

MECA500

Mecademic's Meca500 industrial robot arm is an unbelievably compact plug & work automation component offering a tiny footprint and built-in controller. Unlike other industrial robots, the Meca500 is a slave component rather than a complex stand-alone system making it very easy to integrate in any automation application. The robot arm also automatically compensates for gravity without software adjustments, making it easy to mount in any orientation for additional flexibility. A repeatability of 5 µm makes the Meca500 the world's most precise industrial robot, ideal for small-part precision manipulation. Users benefit from simplicity and lower costs, as the Meca500 doesn't require any training courses, software installations, or additional option purchases. Assembly, pick-and-place, machine tending, inspection, and testing are just a few common applications.

The robot is integratable via any computer or PLC using an Ethernet cable and any programming language of the user's choice. Users may communicate with the robot via EtherCAT, or by sending commands via TCP/IP. Mecademic robots come with an intuitive web interface accessible with any web browser.



© Mecademic

ARTIMINDS TECHNOLOGY CHECK:

ArtiMinds communicates via TCP/IP interface.

ABOUT MECADEMIC

Mecademic offers the world's smallest, most compact, and most precise industrial robot arms. The Montreal-based firm was founded by robotics engineer Jonathan Colombe and robotics Pr. Ilian Bonev. Their goal was to facilitate the use and accessibility of industrial robotic automation in a wide range of industries. Mecademic robots are unique in that they are plug & work automation components with a tiny footprint, low overall cost, and easy integration.

PRODUCT PORTFOLIO

The Meca500. is the smallest and most precise 6-axis robot arm on the market used as a plug-and-work automation component:

- Extra-small: 4,5 kg and 330mm reach
- Ultra-compact: The controller is embedded in the base
- Precise: 0.005 mm repeatability
- Easy to integrate: Simple communication protocols
- Energy efficient: 24V and 30W

Mecademic is about to release a SCARA robot in 2020.



© Mecademic

COBOTS FROM UNIVERSAL ROBOTS

ARTIMINDS SUPPORTS ALL COBOTS FROM UNIVERSAL ROBOTS

UR3e

The UR3e is a compact table-top robot (payload: 3 kg; working radius: 500 mm) for light assembly tasks and automated workbench scenarios.

UR5e

The UR5e (payload: 5kg; working radius: 850 mm) is an all-round talent and ideal for many applications- from machine assembly and packaging tasks to polishing or painting work.

UR10e

The UR10e (payload: 10kg; working radius: 1300 mm) can move heavier workpieces and is just as flexible as the UR5e.

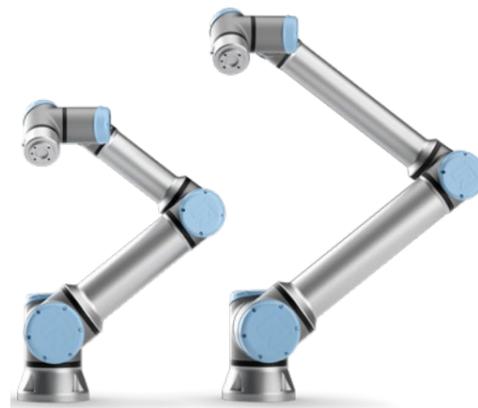
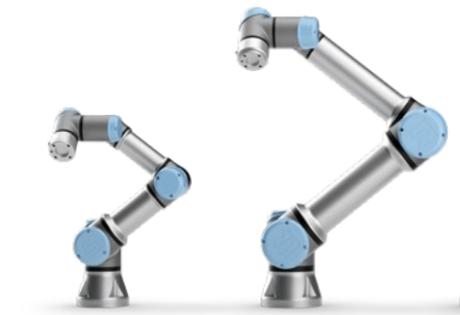
UR16e

The UR16e (payload: 16 kg; working radius: 900 mm) automates the handling of heavy duty tasks without the need of a protective fence like pick-and-place or machine tending.

ARTIMINDS TECHNOLOGY CHECK:

ArtiMinds supports the generation of URScript or Polyscope programs as well as the built-in F/T sensor.

With the free ArtiMinds Essentials URcap plugin, the robot arm can be easily and quickly guided- also based on force/torque sensors. You can download the plugin on www.artiminds.com/downloads



© Universal Robots

5 REASONS TO USE COBOTS FROM UNIVERSAL ROBOTS

- **Simple operation:** The UR cobots can be operated intuitively via a user-friendly touchscreen tablet and without robot experience.
- **Fast set-up:** The UR cobots are ready for use within a few hours.
- **Flexible deployment:** A cobot can be flexibly re-programmed for other processes- even when it comes to small batches and if there is little time available.
- **Safe and TÜV-certified:** The security system of the UR cobots has been approved and certified by TÜV Nord.
- **Inexpensive investment:** Universal Robots offers all the advantages of modern robot automation- but without the usual high costs for industrial robots, and therefore making automation affordable even for small and medium-sized companies.

ABOUT UNIVERSAL ROBOTS

Universal Robots is the world leader in collaborative robotics. Founded in 2005, the Danish company revolutionized the robot market with its light and flexible robot arms, the “cobots”.

The advantage: under certain conditions, the cobots can work directly with humans. Intuitive to use and applicable for a wide variety of applications, the arms are used in almost all industries. Today, thousands of cobots from Universal Robots are in use around the world.

PRODUCT PORTFOLIO

The e-series cobots from Universal Robots (UR) perform repetitive, ergonomically inconvenient tasks that people find monotonous and tiring. The e-Series can optimize any type of production regardless of its industry, size and type of product.

With the help of the Universal Robots+ ecosystem, the company also offers access to peripheral devices and application kits that are certified for smooth commissioning with the UR cobots.



© Universal Robots



FORCE/TORQUE SENSORS & GRIPPERS

Force/torque sensors are proven tools in many robot applications, e.g. to compensate manufacturing tolerances or wear and thereby increasing the robustness. For this purpose, robot manufacturers offer extensive technology packages for their controllers, but their use requires special expertise and extensive programming knowledge.

With ArtiMinds RPS +Force you can implement robot applications with force/torque sensors in a very short time, even without special knowledge. Since the robot code is generated automatically and, during online mode, there is a direct connection to the robot controller, you can test solution approaches such as probing, searching for holes or torque balancing live on the robot without high programming effort – and thus save a lot of time during process development.

ArtiMinds RPS +Force supports a wide range of force/torque sensors and offers over 25 tailored building blocks and wizards, as well as the extension of the robot's live data with sensor measurement data.

ARTIMINDS SUPPORTS, AMONG OTHERS, THE FOLLOWING F/T SENSORS & GRIPPER MANUFACTURERS:

- | | |
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|  ATI Industrial Automation | Page 18 |
|  OnRobot | Page 20 |
|  Robotiq | Page 22 |
|  Schunk | Page 24 |
|  Weiss Robotics | Page 26 |
|  Zimmer | Page 28 |

F/T SENSORS FROM ATI INDUSTRIAL AUTOMATION

ARTIMINDS SUPPORTS ATI'S AXIA 80, GAMMA, DELTA & OMEGA F/T SENSORS

AXIA80

The Axia80 (Force Max: 900N; Torque Max: 20Nm) is ATI's new high-performance, low-cost sensor that offers extremely high resolution, accuracy, and stiffness for a variety of robotic applications from electronics assembly to force-controlled polishing of complex contours..

GAMMA

ATI's Gamma Force/Torque Sensor (Force Max: 400N; Torque Max: 10Nm) maintains an exceptionally high strength-to-weight ratio and, with its ultra-sensitive silicon strain gages, provides the best sensitivity available for high-quality data collection and process analytics. IP60, IP65, and IP68 (10m) versions available.

DELTA

The Delta Force/Torque Sensor (Force Max: 1980N; Torque Max: 60Nm), precision-machined from high-strength stainless steel, is designed for heavier-payload applications including force-controlled palletizing, mechanical assembly, grinding, polishing, product testing, and more. IP60, IP65, and IP68 (10m) versions available.

OMEGA

ATI's variety of Omega-series Force/Torque Sensors optimize accuracy and precision for heavy-payload applications. Omega F/T sensors are used in more physically demanding operations including heavy mechanical assembly, part placement/removal in precision fixtures, grinding, polishing, and more.



© ATI Industrial Automation

ARTIMINDS TECHNOLOGY CHECK:

- UR, KUKA: Communication via NET F/T Box.
- ABB: Communication via ABB Force Box.
- Axia80 Sensor:
 - KUKA: Ethernet RDT (UDP) or EtherCAT
 - UR: Ethernet TCP/IP

ABOUT ATI INDUSTRIAL AUTOMATION

ATI Industrial Automation is the world-leading, engineering-based developer of robotic accessories and robot arm tooling including Automatic and Manual Tool Changers, Multi-Axis Force/Torque Sensing Systems, Utility Couplers, Material Removal Tools, Collision Sensors, and Compliance Devices. ATI's end-effectors are found in thousands of successful applications around the world. Since 1989, their team of mechanical, electrical, and software engineers has developed cost-effective, state-of-the-art robotic solutions to improve productivity.



© ATI Industrial Automation

PRODUCT PORTFOLIO

ATI's Force/Torque (F/T) Sensor Systems measure all components of force and torque simultaneously. Just like a human's sense of touch, these F/T Sensor Systems are sensitive enough to detect very subtle changes in force and torque. They feature the highest levels of resolution and accuracy available, ensuring users have the utmost confidence in their data. Integrating an ATI Force/Torque sensor into a robotic or automated process produces a comprehensive load profile that allows the user to measure, monitor, and control forces acting on a process. Through a variety of electronic interface options and high overload protection, ATI's F/T Sensor Systems can be deployed in research, medical and industrial applications with ease.



GRIPPERS & F/T SENSORS FROM ONROBOT

ARTIMINDS SUPPORTS ONROBOT'S RG2 AND RG6 GRIPPERS & HEX F/T SENSOR

PRODUCT DESCRIPTION: RG2 & RG6 GRIPPER

- Flexible grippers can be used for a wide range of part sizes and shapes
- Built-in Quick Changer system and up to 150mm stroke
- Automatic tool center point calculation
- Plug-and-produce design reduces deployment time from a day to an hour
- Easy deployment with out-of-the box grippers reduces programming time by 70%
- Customized fingertips for the handling of different parts
- TÜV certified and come standard with safety shields

PRODUCT DESCRIPTION: HEX FORCE/TORQUE SENSOR

- 6-axis force torque sensors provide accurate force and torque measurements along all 6 axes
- Enable robots to carry out tasks that require the sensitivity of the human hand
- Includes path recording and force control
- Easy deployment, lower number of engineering hours
- Due to sensing capabilities, it produces high quality faster



© OnRobot

ARTIMINDS TECHNOLOGY CHECK:

F/T Sensor:

- UR: Communication via TCP/IP with the OnRobot Compute-Box

Grippers:

- UR: RPCXML and RTDE register for communication with the OnRobot URcap as well as direct communication via digital I/Os

ABOUT ONROBOT

OnRobot is based in Odense, Denmark, and develops hardware and software technologies for solutions used with collaborative robots, so called cobots. OnRobot develops grippers, sensors and other cobot equipment that enables the use of the technology in various applications such as packaging, quality control, machine maintenance, assembly and welding. In addition to its headquarters in Denmark, OnRobot has sales offices in Germany, the USA, Spain and Hungary and employs more than 175 people.



© OnRobot

PRODUCT PORTFOLIO

All Robot Brands. One OnRobot System.

OnRobot products open up new possibilities for automation tasks that were previously not possible. With the cutting edge gripping and sensing systems for industrial automation you can easily create collaborative applications that will enable your employees for assembly, surface treatment, pick & place, machine loading or testing side by side with collaborative robots. You can choose any product regardless of a robot brand. The quick changer system is compatible with all robot brands and allows you to change tools within seconds and offers a fast deployment time.

GRIPPERS & F/T SENSORS FROM ROBOTIQ

ARTIMINDS SUPPORTS ROBOTIQ'S HAND-E, 2F-85, 2F-140 AND EPICK GRIPPERS AS WELL AS THE FT 300 F/T SENSOR

HAND-E ADAPTIVE GRIPPER

Hand-E's high accuracy and 50 mm parallel stroke make it perfect for precision assembly tasks, while its sealed design ensures reliability in the toughest manufacturing conditions—including CNC machining. Hand-E's design adheres to ISO/TS 15066 standard best practices, with maximum force, rounded edges, self-locking functionalities, and other features making it the gripper for collaborative robots.

2F-85 AND 2F-140 ADAPTIVE GRIPPER

The 2F-85 and 2F-140 Adaptive Grippers are the world's best-selling grippers for collaborative robots. Use them to accomplish a complete lineup of applications with a fast time-to-production—no robotics expertise required. They're key to a highly flexible and reliable robotic cell.

EPICK VACUUM GRIPPER

Vacuum Grippers can handle a wide range of applications and are ideal for picking up uneven and even workpieces made of different materials, such as cardboard, glass, sheet metal (dry) and plastic. Because of the customizable bracket and unique air nodes, Robotiq Vacuum Grippers provide manufacturers full control over their Gripper to make sure it's a perfect fit for their applications.

FT 300 FORCE TORQUE SENSOR

The Robotiq FT 300 Force Torque Sensor unlocks force-sensitive applications on collaborative robots. It's easy to control and program and doesn't require maintenance. Benefits: Plug + Play installation and configuration | includes Force Copilot.



© Robotiq

ARTIMINDS TECHNOLOGY CHECK:

F/T Sensor:

- UR: Communication via TCP/IP with the Robotiq URCap

Grippers:

- UR: Communication via TCP/IP with the Robotiq URCap
- UR: Modbus communication directly with the gripper

ABOUT ROBOTIQ

Robotiq manufactures flexible robot grippers, sensors and vision systems to make automation easy, fast, and accessible for global manufacturers and SMEs without needing extensive technical knowledge, leading to a quick ROI. With both Plug + Play and software solutions, Robotiq aims to lower the barriers to entry for industrial automation and allow companies to automate in areas considered too complex or costly.

Robotiq is the humans behind the robots: a team of passionate people in an employee-shareholder cooperative working with an international network of partners.

PRODUCT PORTFOLIO

Flexible robot grippers, force torque sensors, vision systems and monitoring software. They are easy to install for a Plug + Play solution; can grip parts of many different sizes; bring the senses of touch and vision to robots; introduce human-robot collaborations; and accelerate robot projects and optimize robot performance through their software applications.



© Robotiq

GRIPPERS & F/T SENSORS FROM SCHUNK

ARTIMINDS SUPPORTS SCHUNK'S PARALLEL GRIPPERS AND FTE-AXIA80, FTN- & FTD-GAMMA, FTS-DELTA & FTS-OMEGA85 F/T SENSORS

ELECTRIC EGP GRIPPER FOR SMALL COMPONENTS:

The electric 2-finger parallel gripper with smoothly running base jaws guidance on roller bearings is perfect for gripping and moving of small to medium-sized workpieces with flexible force and high speed in clean environments, such as assembly, testing, laboratory and pharmaceutical industry.

BENEFITS:

- Highest compact performance
- Control via digital I/O
- Two to four stage adjustable gripping force
- Backlash-free, pre-loaded cross roller guide

6-AXIS-FORCE/TORQUE SENSOR FT-AXIA:

The rigid 6-axis force/torque sensor for precision measuring in all six degrees of freedom is universally applicable in robot applications such as haptics, medicine, grinding, testing, inserting, and research and development.

BENEFITS:

- Many sizes
- Integrated temperature compensation
- Easy integration into processes
- Robust design

ARTIMINDS TECHNOLOGY CHECK:

Grippers:

- Direct communication with the gripper via digital I/Os

F/T Sensors:

- see technical information provided by ATI



© SCHUNK

ABOUT SCHUNK

SCHUNK is a competence leader in gripping systems and clamping technology. More than 3,500 employees in 9 plants and 34 directly owned subsidiaries and distribution partners in more than 50 countries throughout the world ensure an intensive market presence. With 11,000 standard components SCHUNK offers the world's largest assortment of gripping systems and clamping technology from one source, and with 2,550 SCHUNK grippers, the largest product range of standard grippers on the market. The complete program of gripping system comprises more than 4,000 components.

PRODUCT PORTFOLIO

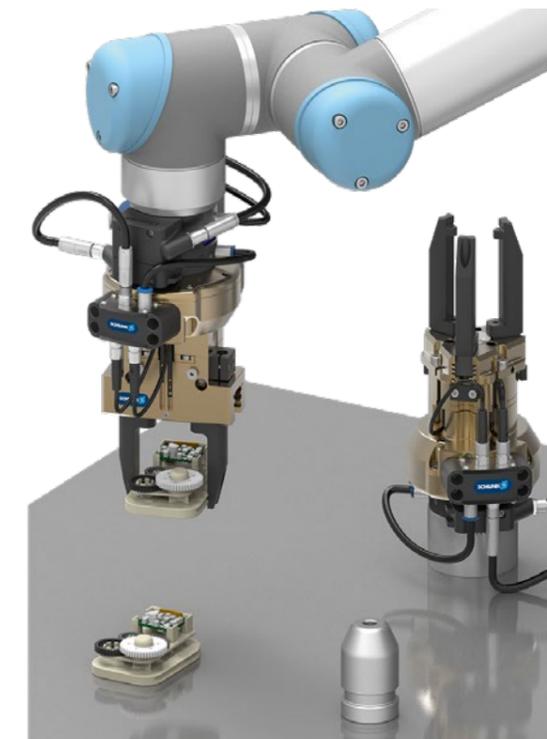
Gripping Systems

The first industrial-suited grippers from SCHUNK were a milestone in assembly and handling automation. Since then the company has launched countless newly and further developments. Consistently oriented to the requirements of users, applications, and markets.

SCHUNK does not just meet today's expectations with regard to maximum precision, productivity and investment protection, but already fulfills the requirements of tomorrow for gripping system solutions in service robotics, and human-robot collaboration. 4,000 standard components and more than 12,000 implemented gripping system solutions speak for themselves.

Clamping Technology

Using the best clamping technology available for your tools and workpieces is the key for ensuring the safety, efficiency, and high-precision processes in machining. SCHUNK develops, manufactures, and optimizes powerful, economical products and solutions for the machine and machine room that are tailored to the individual needs of each customer and application. The standard of its work raises the bar for such products and sets new benchmarks in the ongoing development of clamping technology - and has been doing so for more than 50 years.



© SCHUNK

GRIPPERS FROM WEISS ROBOTICS

ARTIMINDS SUPPORTS WEISS ROBOTICS' SERVO-ELECTRIC AND COLLABORATIVE GRIPPERS OF THE IEG, WSG AND CRG SERIES

SERVO-ELECTRIC GRIPPERS: IEG SERIES & WSG SERIES

The integrated control, a regulated gripping force and the flexible positioning of the servo-electric grippers from Weiss Robotics enables safe and reliable handling even in difficult situations.

Technical details IEG Series:

Servo-electric gripper module, ESD version, with sensorless force control, integrated part detection and monitoring, pre-positionable fingers. Gripping force 200 N, stroke 30 mm, IO-Link interface.

Technical details WSG Series:

Servo-electric gripper module with Ethernet interface, gripping force 50 N, stroke 68 mm, integrated part detection and monitoring, pre-positionable fingers. Integrated sensor port for active force measurement fingers. Control via TCP/IP with text-based GCL protocol, web interface for configuration and diagnosis. Optional interface: PROFINET RT.

COLLABORATIVE GRIPPERS: CRG SERIES

The HRC-compatible gripping modules have been specially developed for the interaction of humans and robots. They already meet the DGUV recommendations for collaborative robot systems as well as the requirements of ISO/TS 15066 standard and thus considerably simplify the risk assessment of the entire plant.

Technical details CRG Series:

Servo-electric gripper module for collaborative applications, gripping force 30 N, stroke 50 mm, sensorless force control, integrated part detection and monitoring, gripping force retention, LED ring for status visualization, IO-Link interface.



© Weiss Robotics

ARTIMINDS TECHNOLOGY CHECK:

- UR: Gripper series WSG- communication via Modbus
- UR: Gripper series IEG & CRG- communication with Weiss URcap via RPCXML

ABOUT WEISS ROBOTICS

Founded in 2008 as a startup, today we are the leading specialist for mechatronic gripping systems. As an owner-managed family company, we develop innovative gripping solutions for demanding automation tasks at our headquarters in Ludwigsburg, Germany, setting new standards both qualitatively and technologically in the context of Industry 4.0 and Smart Factory.

PRODUCT PORTFOLIO

Whether it is about the machine conversion at the touch of a button or the quality assurance in pick & place applications integrated into the production process: Plant engineers and production companies rely on our innovative gripping solutions every day. By choosing a Weiss Robotics gripper, you choose high quality and reliability, excellent service and technological expertise. With our GRIPKIT we offer a turnkey gripping solution for robotic handling technology.

The intelligent grippers from Weiss Robotics show their particular strength in interaction with the cobots from Universal Robots. You will find the right solution for every application, whether you need high forces for your automation tasks or whether collaborative operations are planned.



©Weiss Robotics

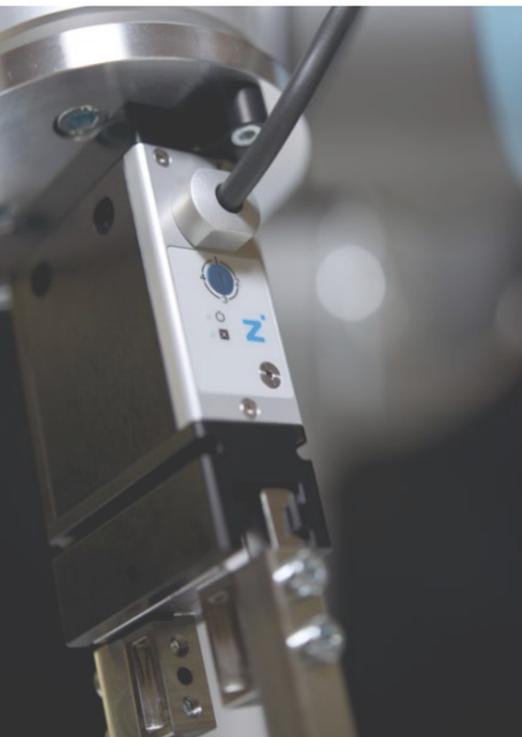


GRIPPER FROM ZIMMER GROUP

ARTIMINDS SUPPORTS DIFFERENT GRIPPER SERIES FROM ZIMMER GROUP

SERIES GEP2000 “THE ELECTRIC COMPACT ONE”:

- **Largest stroke in small installation space**
Do you require a large stroke, due to the fact that you are operating either a form fit gripper or a large range of parts but the installation space and the load capacity of your application is limited? Then this gripper is perfect for you!



- **Adjustable gripping force**
Using pressures that are too high can damage your workpieces! You can optimally adjust the gripping force to your workpiece by means of the integrated potentiometer or over the control system via IO-Link.
- **The simplest activation**
It is your choice whether you want to control the gripper by means of I/O ports—like a valve—or if you prefer the version with IO-Link. Both have this in common: they are easy to integrate into your control system.

SERIES GEH6000IL “HIGHEST PERFORMANCE”:

- **5 million maintenance-free cycles**
- **Integrated sensing via IO-Link**
- **Servo drive with integrated control**
Brushless drive technology, position, speed and force control guarantee the highest amount of functionality.
- **IO-Link on board**
In addition to the unshielded single-cable solution, the future-proof, hot-pluggable activation provides you with a wide variety of travel profiles for easy implementation into your control system.
- **Gentle yet powerful**
Power version-03 for handling heavy workpieces with mechanical self-locking and version-31 for gently gripping of delicate parts.

ARTIMINDS TECHNOLOGY CHECK:

- UR: Communication with Zimmer URcap via TCP/IP, the gripper is connected via an IO-Link master gateway
- Fanuc: Communication via PROFINET or Ethernet/IP, the gripper is connected via an IO-Link master gateway

ABOUT ZIMMER GROUP

Zimmer Group was founded in 1980 in Rheinau, Germany, by the brothers Martin and Günther Zimmer. The company now employs more than 1,200 people globally. As the industry specialist in assembly, handling and automation, the Zimmer Group Know-How Factory has been consistently oriented towards the requirements of our customers. In particular, our mechatronic products in combination with an I4.0 integration give rise to even greater flexibility and functionality. Thanks to a wide variety of new products – strengthened by our customer’s confidence in us and our products – Zimmer Group has been able to distinctly rise above the competition in recent years, both in Germany and around the world

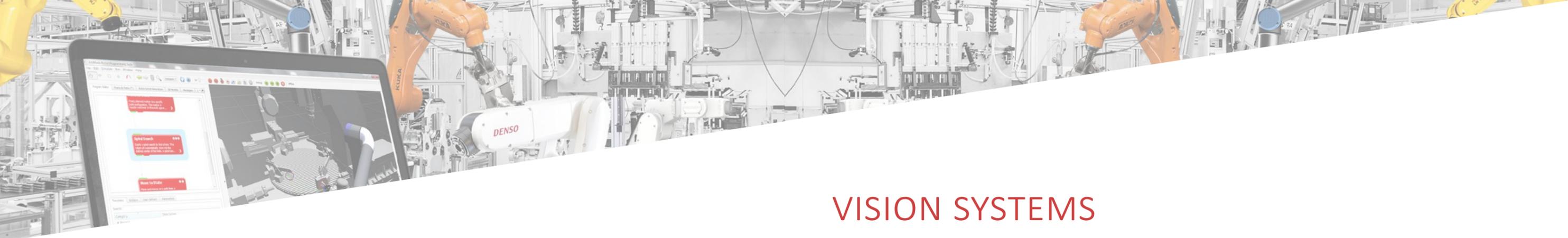


© Zimmer Group

PRODUCT PORTFOLIO

Over the past several decades, the company has consolidated its capabilities into six major technology areas: Handling Technology, Damping Technology, Linear Technology, Process Technology, Machine Tooling Technology and System Technology. Within these areas, Zimmer Group creates cutting-edge products, which are marketed globally under the established brand names of Zimmer Group.

© Zimmer Group



VISION SYSTEMS

Vision systems are an integral part of countless automation solutions. They enable the compensation of large process tolerances e.g. when picking up from conveyor belts, when determining variants or during quality assurance. Today, smart image processing software enables users to solve demanding recognition tasks without special knowledge.

With ArtiMinds RPS +Vision, you can add vision systems and sensors to your robot applications without having to write a single line of robot code. Functions such as executing several image processing tasks, error handling and checking, converting and temporarily storing results are available to you without any programming effort. There is also the option of using the image processing results in your robot program and linking them to other tasks. You can e.g. move a workpiece carrier by the camera or center the robot on a component with the camera.

ArtiMinds RPS +Vision supports a wide range of vision systems and offers numerous building blocks and wizards tailored to them. The live data of the image processing results are automatically recorded, which means that they can easily be logged and used to optimize your application.

ARTIMINDS SUPPORTS, AMONG OTHERS, THE FOLLOWING MANUFACTURERS OF VISION SYSTEMS:

- | | |
|---|---------|
|  Cognex | Page 32 |
|  ifm | Page 34 |
|  KEYENCE | Page 36 |
|  SensoPart | Page 38 |
|  Sick | Page 40 |



VISION SYSTEMS FROM COGNEX

ARTIMINDS SUPPORTS COGNEX IN-SIGHT SMART CAMERAS

IN-SIGHT SERIES

Cognex In-Sight 2D machine vision systems are unmatched in their ability to inspect, identify and guide parts. These self-contained, industrial-grade vision systems combine a library of advanced vision tools with high-speed image acquisition and processing. A wide range of models, including line scan and color systems, meet most price and performance requirements.

- In-Sight 7000 series: smart camera with integrated, modular lighting and optics, offering a resolution up to 5 MP for monochrome or color applications
- In-Sight 8000 series: compact smart camera with Power-over-Ethernet (PoE) for high-speed lines where machine space is a premium
- In-Sight 9000 series: High-resolution 12 MP smart camera for applications requiring high precision or a larger field of view

Cognex 2D In-Sight vision systems solve inspection and robotic applications of leading manufacturers in the automotive, pharma, consumer products and electronics industry around the globe.

ARTIMINDS TECHNOLOGY CHECK:

Direct communication with the smart cam via TCP / IP connection



© Cognex Germany

ABOUT COGNEX

Cognex Corporation is the world's leading provider of vision systems, software, sensors, and industrial barcode readers used in manufacturing automation. Typical applications for machine vision include detecting defects, monitoring production lines, guiding assembly robots, and tracking, sorting and identifying parts. Cognex serves an international customer base from offices located throughout the Americas, Europe and Asia, and through a global network of integration and distribution partners. The company is headquartered close to Boston, USA.

PRODUCT PORTFOLIO

Cognex offers a comprehensive range of 2D- and 3D-Vision Systems and sensors as well as deep learning-based image analysis for inspection, OCR, robot guidance and other factory automation applications. In addition, Cognex products include image-based fix-mount, handheld and smartphone-based barcode readers which have been designed for industrial applications in the manufacturing and logistics industry. Cognex reinvests roughly 14% of the annual revenue in research and development. As a result, Cognex products are equipped with industry-leading algorithms. Smart product features and a high degree of usability make them preferred products in their respective segments.



© Cognex Germany

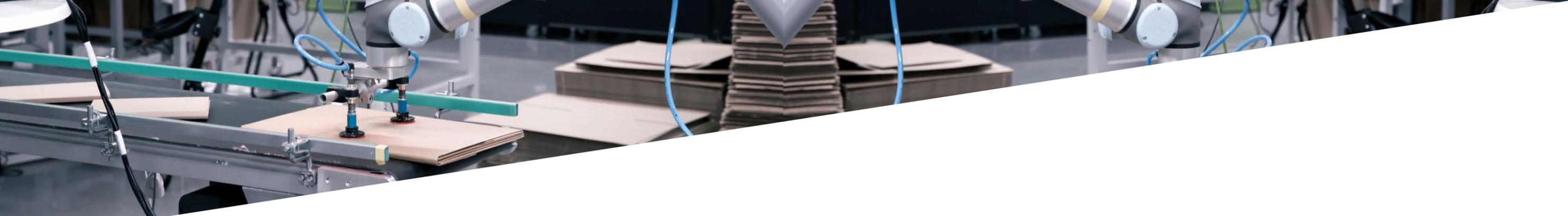


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3D SENSORS FROM IFM

ARTIMINDS SUPPORTS IFM'S O3D SENSORS

O3D SENSORS

The O3D is a photoelectric 3D sensor which measures the distance between the sensor and the nearest surface point by point using the time-of-flight principle. The unit illuminates the scene with an internal infrared light source and calculates the distance by means of the light reflected from the surface.

The sensor can be used for completeness checks, volume determination or sorting tasks. For example, it can check whether a case or pallet contains the correct number of items. This inspection is independent of the items' colour and texture. Using the parameter setting software, the sensor is easily adjusted to different packaging sizes.

Applications can also be found in the parcel services field, in warehouses and in logistics and distribution centres. For automated storage space planning, the sensor provides the size, orientation and position of the packages. This ensures optimum use of the available storage space.

3D SENSORS - YOUR BENEFITS:

- Visual assessment of distance, level or volume
- Time-of-flight measurement principle
- Illumination, measurement and evaluation in one unit
- 23,232 distance values per measurement for the detailed assessment of the application
- Two switching outputs, one of them programmable as analog output

ROBOT GRIPPER NAVIGATION:

- Position indication of moved objects
- Various shapes can be detected
- Several object positions can be read simultaneously
- For industrial robots and lightweight collaborative robots
- Suitable for hydraulic, pneumatic and electrical grippers



© ifm electronic

ARTIMINDS TECHNOLOGY CHECK:

Direct communication with the smart cam via TCP / IP connection

ABOUT IFM

After many years of intensive cooperation with our customers we have established ourselves in the market as service-oriented sensor specialists and today we are represented by more than 7,300 employees in over 95 countries worldwide. Even though we have grown into a big company we have still maintained the virtues of the founding years: The flexibility and individuality of a small enterprise and the quality and professionalism of a group.

And our customers are still today in the center of our work - close to you.



© ifm electronic

PRODUCT PORTFOLIO

ifm's exceptionally large product range does not only consider all relevant standard solutions, but also the specific requirements of individual industries. Apart from position and process sensors, this product range also includes sensors for motion control and safety technology. In addition to this, ifm offers products for industrial image processing and communication as well as identification systems for mobile machines.

VISION SYSTEMS FROM KEYENCE

ARTIMINDS SUPPORTS KEYENCE'S CV-X SERIES

POWER MEETS SIMPLICITY: CV-X SERIES

Consistent standardization has made it possible to meet all speed and capacity requirements with 8 different controller variants without sacrificing flexibility and cost efficiency.

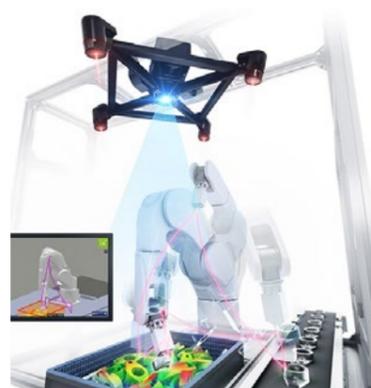
From a total of 22 different area camera models, the most suitable variant for the measuring task can be selected with regard to the speed of the production line and the available space. These include matrix cameras with resolutions of up to 21 megapixels, cameras for the use of shape-from-shading, multispectral and stripe projection recording methods, as well as 3D robot vision models for bin picking.

BENEFITS:

- Multi-Spectrum Image Capture: accurately captures the slightest contrast differences
- Area Cameras: resolution up to 21 megapixels
- Pattern Projection Lighting: simultaneous 2D and 3D inspection enables stable detection
- Vision-Guided Robots: features a new search algorithm (PatternTrax™)
- LumiTrax™: Fusion of intelligent camera, light and inspection algorithm

2D AND 3D VISION-GUIDED ROBOTICS

The CV-X Series communicates directly with a variety of robots, synchronizes the coordinate systems of the vision system and robot, and provides stable vision-guided robotic operation. The auto-calibration function provides highly accurate and effortless calibration.



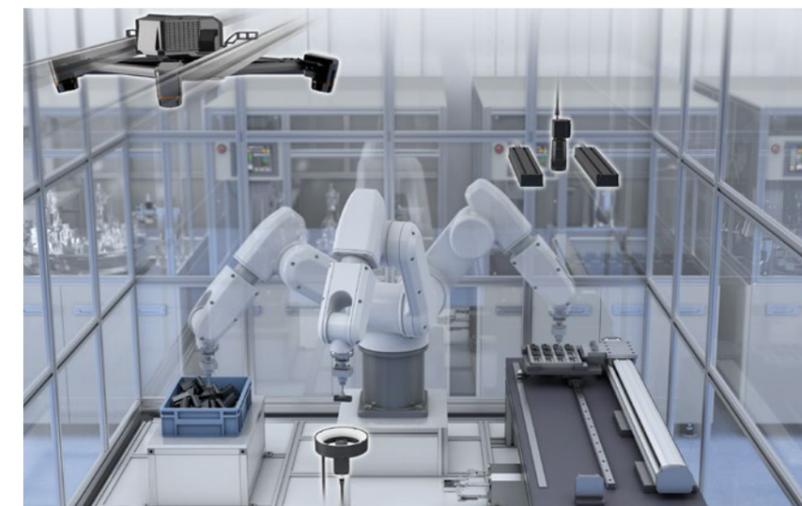
© KEYENCE

ARTIMINDS TECHNOLOGY CHECK:

Direct communication with the smart cam via TCP / IP connection

ABOUT KEYENCE

KEYENCE has steadily grown since 1974 to become an innovative leader in the development and manufacturing of industrial automation and inspection equipment worldwide. The company's expanded network of 220 offices in 46 countries supports and serves over 250,000 customers worldwide. KEYENCE has been continuously ranked in prominent company rankings such as "The World's Most Innovative Companies" (Forbes), and we are among the top 5 companies in Japan based on market capitalization as of March 2020.



© KEYENCE

PRODUCT PORTFOLIO

The products of KEYENCE consist of code readers, laser markers, machine vision systems, measuring systems, microscopes, sensors, and static eliminators. The products are designed to add value to our customers' manufacturing and research processes. Customers benefit from a direct cooperation with technical sales, who supports them in solving application problems and is able to quickly and competently answer technical questions about devices.



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VISION SENSORS FROM SENSOPART

ARTIMINDS SUPPORTS SENSOPART'S VISOR® VISION SENSOR SERIES

VISOR® ROBOTIC: THE EYES OF THE ROBOT

The VISOR® Robotic was specially developed for robot applications. As an “eye”, it provides the robot with all visual information on part positions. This data is already converted into robot coordinates; Previously required programming work on the robot controller is no longer required. Special functions, such as gripper space check and gripper point offset, guarantee additional safety for the automation of handling tasks.

The applications of the VISOR® Robotic are diverse: In the material feed, it is used for the flexible removal of parts from belts, from load carriers or from vibration conveyors. In assembly applications such as applying glue or automated screwing, the VISOR® Robotic provides the robot with precise position information for the part. Especially in the field of collaborative robotics, the VISOR® is used for calibration of mobile robots.

Specially developed apps and function modules allow seamless communication between the vision sensor and the robot systems and considerably facilitate the setup of a robot application. Besides that, the user can easily integrate the VISOR® via the programming platform ArtiMinds RPS.

VISOR®: A STRONG PRODUCT FAMILY

- **Versatile deployment:** several application-specific preconfigured sensor variants
- **Image resolution of your choice:** 0.5 to 5 megapixels, optionally monochrome or color chip, various fields of view (wide, normal, narrow)
- **Easy setup:** motorized focus and target laser (laser class 1) for easy alignment and easy-to-use configuration software
- **Flexible integration:** support of flexibly adjustable digital IO channels, Ethernet socket connections, fieldbus interfaces such as EtherNet / IP and PROFINET as well as numerous archiving options



© SensoPart

ARTIMINDS TECHNOLOGY CHECK:

- UR: direct communication with the smart cam via TCP / IP connection
- KUKA: using the functions of the “VISOR® Robotic KUKA App
- Fanuc: direct communication with the smart cam via TCP / IP connection

ABOUT SENSOPART

SensoPart is one of the leading manufacturers of innovative sensors for factory automation. The family-owned company based in Gottenheim near Freiburg was founded in 1994 and is today represented by four subsidiaries and a network of over 40 international distribution partners worldwide. SensoPart products are used in numerous applications and industries, from automotive and mechanical engineering to the electronics and solar industries to the food and pharmaceutical industries



© SensoPart

PRODUCT PORTFOLIO

The SensoPart product range includes optoelectronic, inductive and ultrasonic sensors as well as image processing vision sensors for industrial applications- for example for the detection of objects or colors, for distance measurement, for code reading or in robotics. All products are “made in Germany” and meet the highest standards of quality and reliability.

SensoPart is a technological leader, particularly with the vision sensors of its VISOR® series. The VISOR® vision sensors are based on a powerful smart camera in a compact sealed sensor housing with integrated signal processing, LED lighting (white, red, infrared), data interfaces and digital I/Os and integrated lens or C-mount. The easy-to-use configuration software enables numerous automation tasks to be solved in just a few steps.

VISION SENSORS FROM SICK

ARTIMINDS SUPPORTS SICK'S INSPECTOR PIM60

INSPECTOR PIM60

The Inspector is an intelligent vision solution in an easy-to-use sensor package. No matter if the task is to verify completeness and quality, find a part's position or measure its dimensions, the Inspector is up to the challenge. The sensors' rugged design and IP 67 metal housing makes them ideal for tough environments and intelligent processing technology makes the Inspector perfect for high-speed applications. The flexible housing is designed to easily optimize the optical needs of your application. This ensures excellent inspection even with tough targets, such as highly reflective metal parts and multicolored labels. The Inspector family provides broad support for control, monitoring and data collection through a variety of interfaces. This vision sensor provides everything to meet your integration needs and facilitate daily work.



© Sick

INSPECTOR- YOUR BENEFITS:

- The **multi-functional vision toolbox** offers smart camera-level performance but with sensor ease-of-use
- **Unique, interchangeable housing** design provides the easiest way to improve image quality
- The **simple configuration** in SOPAS, including emulator for offline configuration and testing, will reduce downtimes in production to a minimum
- The **easy-to-use operator interfaces** are optimized to make it easier for the operator to oversee daily work more efficiently
- Ethernet communication and web API gives **excellent connectivity** and freedom to customize user's HMI

ARTIMINDS TECHNOLOGY CHECK:

Direct communication with the smart cam via TCP / IP connection

AN INTELLIGENT SOLUTION FOR MANY INDUSTRIES:

Consumer Goods

- Quality inspection with measurement and position control of commercial goods
- Integrated quality control in packaging machines

Electronics & Solar

- Calibrated alignment when assembling electronic components
- Component testing and dimensional control when assembling electronic components

Automotive

- Robot-guided commissioning on conveyor belts with inspection and dimensioning in automobile production

Cross industry

- Line-based management of AGV or AGC
- Pick and place robot applications in material handling, packaging and assembly

ABOUT SICK

SICK is one of the leading manufacturers of intelligent sensors and sensor solutions for industrial applications. With more than 9,700 employees and over 50 subsidiaries and equity investments as well as numerous agencies worldwide, SICK is always close to its customer. A unique range of products and services creates the perfect basis for controlling processes securely and efficiently, protecting individuals from accidents and preventing damage to the environment.

PRODUCT PORTFOLIO

There is never only one answer to intelligent questions. The best technology depends on the task at hand.

SICK offers a broad portfolio of vision products ranging from easy-to-use configurable sensors and programmable flexible cameras to high-speed streaming cameras to meet the toughest of requirements. Even in the face of the most challenging requirements, SICK supports you to realize your vision. Our broad 2D and pioneering 3D vision portfolio based on decades of innovation leadership helps customers worldwide. Positioning, inspection, measuring and reading – all at the same time, if needed.



© Sick



About ArtiMinds

ArtiMinds Robotics develops software solutions to standardize and continuously optimize the workflow for the integration and deployment of industrial robots. Our goal is to simplify the programming and operation of industrial robots and to enable cost-efficient integration and maintenance as well as flexible automation.

As a pioneer for sensor-based robot applications, we are familiar with the challenges of our customers and encourage them in implementing their applications independently and building up expertise within the company.

With a team of over 40 employees and around 20 international distribution partners, ArtiMinds Robotics serves customers from a wide range of industries worldwide.

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