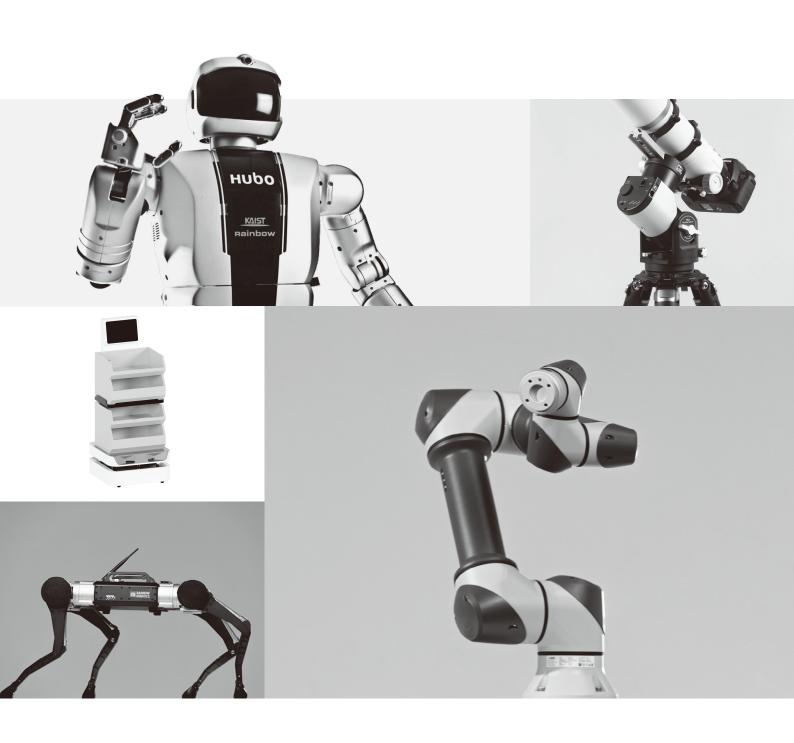


**RAINBOW ROBOTICS Company Introduction**English

# WE TCUCH THE CCRE

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# **Introduction of Rainbow Robotics**

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# **Company Introduction**

Rainbow Robotics, founded by researchers from KAIST Humanoid Robot Research Center (HUBO Lab), is a leader in robotic platforms. Our mission is to commercialize advanced robots through continuous research and development. We deliver cutting-edge technology at competitive prices.

#### 'We touch the core'

Rainbow Robotics strives relentlessly to become a leader in the robot industry through preeminent technologies.

Founder	Junho Oh Ph D. The Chair Professor of Korea Advanced Institute of Science and Technology
CEO	Jungho Lee Ph D. Korea Advanced Institute of Science and Technology
Established date	02.10.2011
Publicly listed date	02.03.2021
Address	10-19, Expo-ro 339beon-gil, Yuseong-gu, Daejeon, Republic of Korea
Website	www.rainbow-robotics.com



# **Key Milestones**

To enrich lives through technology and robotics, Rainbow Robotics is leading the change.

Dec 2024	Samsung Electronics Expands the stake, Incorporates Rainbow Robotics Inc as Subsidiary	Jan 2023	Samsung Electronics Invests in Rainbow Robotics
Sep 2024	Signed contract with KASI for mid-/hign-orbit	Sep 2022	Launched quadruped robot RBQ-10
	optical surveillance system	Mar 2021	RB-N Series "NSF/ANSI 169" Certification
Aug 2024	Delivered quadruped prototype robot for counter-terrorism to the South Korean Army Developed South Korea's first	Feb 2021	Rainbow Robotics Inc. listed on KOSDAQ* (277810)
	Dual-Arm Mobile Manipulator, RB-Y1	Aug 2020	Delivered the LIG Nex1 internal gimbal driving assembly, and 1 other product
Jun 2024	Launched autonomous mobile robot RBM Series		37
Mar 2024	Contract with KAI for Automated Drilling System Deployment	Jul 2020	Signed a service contract to design a satellite monitoring telescope system for the KASI
Apr 2023	Established a branch company in	Apr 2020	"ISO 9001:2015" Certification
	Schaumburg, Illinois, U.S.A	Jul 2019	Launched RB Series (collaborative robot)







Feb 2018	Operated of humanoid robot experience
	service during 2018 Pyeongchang Winter
	Olympic Games

Feb 2016 Supplied 'Space Observation Mount Syste to LIG Nex1	Feb 2016	rvation Mount System'
-----------------------------------------------------------------	----------	-----------------------

Dec 2015	Exported four units of DRC-HUBO+ to the
	Naval Research Laboratory, USA

Sep 2015	Operated MOUNT, the electronic and optica
	space object monitoring system of the KASI

Jun 2015	"DRC-Hubo" wins 2015 DARPA Robotics
	Challenge

Jan 2014	"Venture Company" Certification

Sep 2013	Exported two HUBO II units to Google Inc.,
	USA

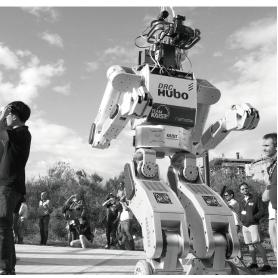
Dec 2011	Exported six HUBO (humanoid robot) units
	to the MIT with support from the US National
	Science Foundation

Jul 2011	Mount technical service agreement signed with the Korea Astronomy and Space Science
	Institute (KASI)

May 2011 | Established an affiliated research institute

Feb 2011 | Established Rainbow Robotics Inc. (Original company name: Rainbow Co., Ltd.)

\*KOSDAQ : Trading board of Korea Exchange (KRX) in South Korea established in 1996.













# Certification

#### 1. RB Series

- Ensured robot stability by obtaining CE, NRTL, and KCs Safety Certifications through TÜV SÜD, a well-known overseas certification body (ISO 13849-1, PL d, Cat.3, & ISO 10218-1, ISO/TS 15066)
- $\hbox{-} Systematization and procedure for quality assurance of corporate operations through Quality}\\$ Management System Certification (ISO 9001)









Types of certifications	Subject	Application standard-certifying body	Proof of conformity
	Motor, drive-	UL 61800-5-1:2012/R:2021-02 CSA C22.2 No. 274:2017	
NRTL/CSA	Industrial Robot	CSA Z434:2014 UL 1740:2018/R:2020-11 NFPA 79:2021	
	Motor, drive-	EN 61800-5-1:2007/A1:2017	
	Industrial Robot	EN 61000-3-2:2014 EN 61000-3-3:2013 EN 61000-3-3:2013/A1:2019 EN 61000-6-2:2005 EN 61000-6-4:2007/A1:2011 EN IEC 61000-3-2:2019	
CE AOC	EMCD	EN 61000-3-2:2014 EN 61000-3-3:2013 EN 61000-3-3:2013/A2:2021 EN 61000-6-2:2005 EN 61000-6-4:2007/A1:2011 EN IEC 61000-3-2:2019/A1:2021	
	Industrial Robot MD	EN 60204-1:2018 EN ISO 10218-1:2011 EN ISO 12100:2010 Machinery Directive 2006/42/EC	TÜV SÜD
Functional Safety	Robot Safety Unit	IEC 61508-1:2010 (SIL 2) IEC 61508-2:2010 (SIL 2) IEC 61508-3:2010 (SIL 2) EN 62061:2005/A2:2015 (SILCL 2) EN ISO 13849-1:2015 (Cat. 3, PL d) EN ISO 10218-1:2011 ISO TS 15066:2016 IEC 61800-5-2:2016	
KCs	Industrial robots	-	Korea Occupational Safety and Health Agency

#### 2. RB-N Series

- The RB-N Series robot is certified by the National Sanitation Foundation (NSF) for safe and hygienic use in the F&B market, and is designed for use as a single product without installing a jacket or supplementary devices on it.



Types of certifications	Subject	Application standard-certifying body	Proof of conformity
NSF	Collaborative Robot Arm	NSF/ANSI 169: Special purpose food equipment and devices	NSF International



RB Series RB-N Series

# **Patents**

- An intellectual property management company that differentiates itself in peforming intellectual property management activities
- 17 domestic patents and 12 pending patents, 36 foreign patents, 12 pending trademarks, 11 domestic trademark registrations, and 7 foreign trademark registrations

#### Major patents in S. Korea and other countries

Name	Registration no.
REAL-TIME CONTROL SYSTEM, REAL-TIME CONTROL DEVICE AND SYSTEM CONTROL METHOD	US 11,135,719 B2
REAL-TIME DEVICE CONTROL SYSTEM HAVING HIERARCHICAL ARCHITECTURE AND REALTIME ROBOT CONTROL SYSTEM USING SAME	US 10,857,672 B2
GPOS-CONNECTED REAL-TIME ROBOT CONTROL SYSTEM AND REAL- TIME DEVICE CONTROL SYSTEM USING SAME	US 10,864,635 B2
STATOR COIL WINDING MACHINE	US 11,368,075 B2
SERIES ELASTIC ACTUATOR, METHOD FOR CONTROLLING SERIES ELASTIC ACTUATOR AND SYSTEM THEREOF	US 11,431,222 B2
DEVICE FOR BRAKING DRIVE SHAFT	EP 3756837 B1
リアルタイム制御 システム、リアルタイム制御装置及びシステムの制御方法	JP 6836585
GPOS連動型リアルタイムロボット制御システム及びこれを用いたリアルタ イムデバイス制御システム	JP 6771027
階層的なアーキテクチャを有するリアルタイムデバイス制御システム及び これを用いたリアルタイムロボット制御システム	JP 6938473
实时控制系统、实时控制装置及统控制方法	CN 108025436 B
具有分层架构的实时设备控制系统及利用其的实时机器人控制系统	CN 108136578 B
스테이터 코일 권선 장치	KR 10-2235169, 10-2256187, 10- 2280446, 10-2280447, 10-2280448
구동축 브레이킹 장치	KR 10-2235169
계층적 아키텍쳐를 갖는 실시간 디바이스 제어 시스템 및 이를 이용한 실시간 로봇 제어 시스템	KR 10-2235168
스텝 기반 실시간 디바이스 시스템 제어 방법, 디바이스 시스템 제어 장치 및 스텝 기반 디바이스 제어 시스템	KR 10-2235167
실시간 로봇 시스템, 로봇 시스템 제어 장치 및 로봇 시스템 제어방법	KR 10-2235166

# **Awards**

- The following cases represent public recognition of Rainbow Robotics' R&D outcomes.

Year	Awards	Awarding Organizations
2023	USD-Two Million Export Tower	Ministry of Industry, Trade and Energy
2022	USD-One Million Export Tower 2022 Korea Engineering Prize (Director Oh Jun-ho) 17th Korea Robot Award (CEO Lee Jeong-ho) 29th Korea Impact Award (World's first NSF-certified collaborative robots, RB-N Series)	Ministry of Industry, Trade and Energy Korean Academy of Science and Technology Ministry of Industry, Trade and Energy Ministry of Science and ICT
2018	Selected as Top 100 Future Technology Stars to lead S. Korea (CEO Lee Jeong-ho)	Korean Academy of Science and Technology
2016	Ho-Am Prize (Director Oh Jun-ho) Changjo Medal of Order of Science and Technology Merit (Director Oh Jun-ho)	The Ho-Am Foundation Ministry of Science, ICT and Future Planning
2015	DARPA Robotics Challenge Finals 1st	DARPA



# Chapter

Business Domain and Main Products	
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# **Core Technology**

0



#### **Real-time operating system**

Controlling all of the robot's movements to achieve the objective

2



# Imaging sensors to detect the external environment visually

Sensors in autonomous vehicles

3



# Inertial sensors to measure the inclination of the ground and robot

Measuring and detecting motion

4



#### Redundant robot arms to perform various tasks

Able to be operated even in an undefined environment with more than 6 degrees of freedom

6



# Adaptive robot hands capable of gripping various objects

Gripping any object shape

6



# Transformable robot legs capable of biped walking / wheel driving transformation

A ground vehicle capable of achieving multiple purposes

7



# Drive controller and speed reducer to drive each joint

Internalization of motor and decelerator technology, which are the main driving components

8



#### Real-time operating system

Controlling all of the robot's movements to achieve the goal



# **Business Domain**

As a company specializing in robot platforms with preeminent technology, Rainbow Robotics devotes steadfast efforts to commercialize robots by securing innovative technology with continuous R&D and selling cost-effective excellent robots.



# **Collaborative robots**



### **Mobile robots**



# **Dual-Arm Mobile Manipulator**



# **Legged robots**



**Precision pointing mount** 

#### **Collaborative Robots**

# **RB Series**

Rainbow Robotics' RB series cobots feature 6-axis robotic arms, developed using our exclusive technology. With multiple options available (RB3-730, RB5-850, RB16-900, RB3-1200, RB10-900, RB20-1900), these cobots cater to diverse needs in various work environments. Our RB cobots undergo thorough testing and inspection by TÜV SÜD, a globally renowned certification body. They are certified with NRTL, CSA, CE and KCs, meeting the following standards.

- ISO 13849-1, Cat.3, PL d
- · ISO 10218-1
- ISO/TS 15066











#### **RB Series lineup**

- RB3-730ES
- · RB5-850
- · RB16-900
- RB3-1200
- RB10-1300
- RB20-1900ES

#### **Range of Applications**

- Packaging
- Welding
- Assembly
- · Quality inspection
- · Adhesion spreading
- · Picking and placing
- · Laser marking
- · UT welding
- · Injection molding
- · Photography and video shooting
- · CNC machine tending
- 3D scanning

#### **Key features**

- · Securing a high performance and price competitiveness by internalization of core components
- Collaborative robots with built-in humanoid robot technology
- User-friendly software

#### Options with built-in pneumatics (A1, A2, A3)

Model Name	Pneumatics lines	Signal lines
RB5-850A1	4EA(4Ø tube)	Ν
RB5-850A2	5EA(4Ø tube)	12Pin(AWG28)
RB3-1200A1	4EA(4Ø tube)	Ν
RB3-1200A2	5EA(4Ø tube)	12Pin(AWG28)
RB10-1300A1	1EA(8Ø tube)	Ν
RB10-1300A2	1EA(8Ø tube)	12Pin(AWG28)
RB10-1300A3	4EA(4Ø tube)	N

- \* Some specifications may be changed to improve performance.
- \* When applying the option, it is necessary to check the operating scope and environment.

#### The world's first NSF-certified collaborative robots,

# **RB-N Series**

The RB-N Series robot is certified by the National Sanitation Foundation (NSF)



#### **RB-N Series lineup**

- RB5-850N
- RB3-1200N
- · RB10-1300N

#### **Range of Applications**

- Unmanned cafe platform (Coffee, aid, milk tea and cocktails)
- · Soft cone ice cream robot
- Waffle-making robot
- · Chicken cooking robot
- · Kitchen utensil washing robots, etc.

#### **Key Features**

- NSF Food Sanitation Safety Certification
- Safety certification for food processing equipment and related parts for particular purposes (NSF/ANSI169)
- Qualification by NSF for production facilities
- Cooking robots that are harmless to the human body
- Using special paint that does not emit harmful substances
- Ensuring a safety level to cook the food twice, even if it comes into contact with the robot
- Passed a crash test (proof that foreign matter such as paint materials occurring in the event of a collision is non-hazardous to human health)
- · Use of durable fasteners
- Using special SUS fasteners that do not cause rust
- Using coupling rings with proven high temperature, high strength, high rigidity, low moisture absorption rate, fatigue resistance, creep resistance, and hygiene
- Increased user convenience
- 6-axis robot arms with IP66 waterproof and dustproof rating
- A single robot product that can reduce the hassle of switching jackets and be cost-effective

### **Compact Autonomous Logistics Robot**

# **RBM-S100 Series**

Rainbow Robotics' small sized logistics robot features in-house developed core components and software, enhancing overall product quality. Despite its compact size, it offers the highest payload capacity in its class, maximizing operational efficiency across diverse environments. In addition, a 3D LiDAR option is available, reflecting the latest industry trends.



#### **Range of Applications**

- Warehouse Management
- Fulfillment Facilities
- Transportation Hubs
- Hospitality Industry
- Medical Institutions

#### **Key Features**

- Hardware
  - Adjustable tray height for on-site customization
  - Durable, premium exterior made of metal materials
- Safety
  - Equipped with sensors for obstacle detection and collision avoidance (2×2D LiDAR, 2×3D cameras)
  - Capable of detecting obstacles as low as 5 cm above the ground
- Localization
  - Core components and software are fully designed and developed in-house
- Additional
  - Smallest footprint and highest payload capacity in its class (Based on internal research of logistics robots)

#### **Product Specifications**

	RBM-S100a	RBM-S100b	RBM-SRV
Size (mm/WxDxH)	510x510x1250	680x710x1250	510x510x1250
Weight	Approx. 50kg	Approx. 70kg	Approx. 50kg
Payload Capacity	120kg	100kg	30kg
Sensors	2D LiDAR x 2, 3D Camera x 2	2D LiDAR x 2, 3D Camera x 2	2D LiDAR x 1, 3D Camera x 2
Driving Speed	up to 1.2m/s	up to 1.2m/s	-
Tray Load Capacity (mm)	345x450x200(150)	365x565x300	380x510
Display	10.1in (1280x800)	10.1in (1280x800)	10.1in (1280x800)
Number of Trays	1 (expandable)	2 (expandable)	2+1 (expandable)
Network	WIFI	WIFI	WIFI
Continuous Operating Time	10 hrs optional 3D LiDAR supported	10 hrs optional 3D LiDAR supported	12 hrs

<sup>\*</sup> Some specifications may change for performance improvements.

### **Autonomous Mobile Robot for Manufacturing**

# **RBM-D400**

The Autonomous Mobile Robot (AMR) developed by Rainbow Robotics is suitable for various fields such as logistics automation, manufacturing, disinfection, security, and customer service.



#### **Range of Applications**

- Fullfillment
- · Last Mile delivery
- Manufacturing Automation
- · Cleaning and Disinfection Autonomous Security
- · Customer Service

#### **Key Features**

- Hardware
  - Durable and luxurious design with a metal exterior
  - Compact design relative to load capacity, suitable for various work environments
- Safety
  - Equipped with sensors for obstacle detection and collision prevention (2\*2D LiDAR, 1\*3D camera)
- Brake installed for emergency stop
- Edges are chamfered and rounded for worker safety
- Software
  - Robot control available anywhere on-site with a smartphone via web-based UI
  - Optimal path navigation using various SLAM and obstacle avoidance algorithms
- Scalability
  - Offers options for mounted devices (lifts, conveyors, etc.) compatible with AMRs
- Localization
  - Core components and software designed and manufactured with in-house technology

RBM-D4           Size (mm)         600x80           Self-Weight         110kg           Payload         400kg	00 0x240 (WxDxH)
Self-Weight 110kg	0x240 (WxDxH)
Payload 400kg	
Positioning Accuracy ±10mm	ı, 1° (3D Camera, 2D LiDAR)
Maximum Speed Up to 1.	2 m/s
Floor Obstacle Height Max. 5 r	mm
Battery 50 V 25	Ah
LED 8 RGB L	EDs
EMO 2 corne	rs
Charger Chargin	g station, manual charging
2D Lidar 2EA	
3D Camera 1EA (fro	ont-mounted)

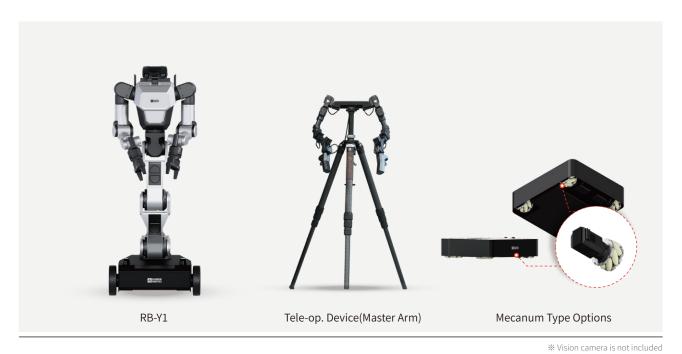
<sup>\*</sup> Some specifications may change for performance improvements.

#### **Dual-Arm Mobile Manipulator**

# RB-Y1

Rainbow Robotics' RB-Y1 is a next-generation humanoid mobile robot featuring two 7-DOF arms and a single 6-DOF leg, mounted on a wheeled platform. This configuration allows it to overcome the workspace and mobility limitations of conventional single-arm cobots and stationary industrial robots, making it more stable and versatile than bipedal robots in real-world industrial environments.

Developed based on Rainbow Robotics' core technologies from humanoid robot research, RB-Y1 provides an open and adaptable platform optimized for AI integration, supporting various sensors and development tools.



#### **Key Features**

- Collecting the robot's physical data through the teleoperational master arm
- High stability, precision, and durability, ensured by applying cobot technology
- Options: wrist F/T sensor, electirc gripper, LiDAR
- Offer Ros,Python, C++, Library and Robot Model (URDF,MCUR)

#### **Product Specifications**

	. Todaot opeomodione			
	RB-Y1			
Size (mm)	600x690x1400 (WxDxH)			
<b>Battery Capacity</b>	50V, 25Ah (1,270Wh)			
Mobile Operation Velocity	1.5m/s			
Power Supply Voltage and Frequency	48VDC			
Arm Repeatability	< ±0.05mm			
Exterior Materials	Aluminum			
Arm Payload Capacity	3kg (per arm)			
Arm Range of Motion	640(to wrist) + hand [mm]			
Weight	Total: 131kg Upper body: 38kg (Arms 11kg x 2, Torso 16kg) Lower body: 42kg Mobile base: 51kg			
Degrees of Freedom	Total: 26 DOF Arms: 7 DOF x 2 Legs: 6 DOF Wheel: 1 DOF x 2 Neck: 2 DOF Grippers(fingers): 1 DOF x 2 (optional accessory)			

Input Voltage
 12VDC

 Interface
 RS-485

 Weight
 3.8kg

 Degrees of
 Total: 14 DOF Arms: 7 DOF x 2

Tele-op.Device (Master Arm)

350x100x600 (WxDxH)

(Same configuration as the robot body)

Size (mm)

Freedom

Mecanum Type Options

Size (mm) 600x695x204 (WxDxH)

Weight 90kg

Payload 300kg

Driving Speed 1.5m/s

Max. Negotiable Step Height

Options 2D Lidar, 3D Lidar

<sup>\*</sup> Some specifications may change for performance improvements.

#### **Quadruped robot**

# **RBQ Series**

The RBQ series is a quadruped robot that can perform various tasks in an atypical complex environment. It is a platform that can walk rough and field areas and which can be equipped with various sensors such as lidar and cameras. It can also be used for crime prevention patrols, detection of dangerous objects, transport of goods, safety inspection, etc



#### **Range of Applications**

- · Air defense
- Industrial applications
- Disaster response
- Firefighting and rescue
- · Defense applications
- Military reconnaissance
- Logistics and cargo handling

#### **Core Technologies**

- Environmental Awareness
  - Equipped with depth camera and 3D LiDAR
  - In-house developed PTZ camera module
- · Autonomous Driving/Charging
  - Autonomous driving function through scheduling
- Walking Algorithm
  - Robust walking algorithm based on dynamics, customizable for various environments
- Interface
  - Provides various interfaces for external equipment compatibility and research platform use
- Actuators
  - company itself developed motors, reducers, and controllers
  - Dustproof and waterproof with fanless hardware design

#### **Key Features**

- moving on uneven terrain, such as steps and stairs
- 24/7 unmanned operation with autonomous driving and automatic charging
- · Real-time transmission of video and sensor data
- Currently developing a quadruped robot for counter-terrorism operations
- Used as a research platform by institutions such as ETRI, KHNP, and KETI

#### **Product Specifications**

Troduct opecifications	
	RBQ-10
Size (mm)	430x980x620 (WxDxH)
Weight	40kg
Payload	15kg
Operating hours	2 hrs of continuous walking (Max.4 hrs)
IP grade	IP54
Speed	4 km/h (Up to 8 km/h in driving mode)
Step walking ability	Max. 20cm
Max.Climbimg ability	45% slope, 20% side slope, steps and stairs up to 20cm
Battery	Replaceable battery, separate charging possible, supports auto-charging
Sensor	IMU sensor,2D+ stereo camera, 3D Lidar and various sensor built-in
Communication Method od	WiFi / LTE remote control and autonomous navigation supported
Additional Inspection Tool	4K visible image and thermal camera

<sup>\*</sup> Some specifications may change for performance improvements.

### Astronomical observation equipment with precision robot control technology

# **Astronomical observation mount**

An astronomical observation mount is an ultra-precision pointing device for observing outer space objects, i.e. planets, stars, and satellites, from the ground. Rainbow Robotics has developed an astronomical mount based on humanoid robot technology, and unlike conventional mounts, it does not use weights, offering excellent portability. We also develop and supply large mounts for research and special purposes. The mount type, load capacity, speed, acceleration, precision, and driving method are determined based on the intended use. We have a history of developing mounts with load capacities ranging from 200kg to 500kg, which have been supplied to observatories, research institutions, and defense industry companies.



# A lineup of mounts for astronomical observation

- RST-135
- RST-135E
- RST-300

#### **Range of Applications**

- Mobile observation
- Remote observatory
- · Educational observatory
- · For defense industry
- · satellite tracking, etc.

#### **Key Features**

- No need to add weights
- · Ultra-light and compact
- · Wave gear reducer (harmonic drive)
- · CNC machining
- Wi-Fi
- · GPS receiver
- · Built-in home sensor

#### **Product Specifications**

	RST-135	RST-135E	RST-300
Body weight	3.3 kg (7.3 lb)	3.4 kg (7.5 lb)	8.5 kg (18.7 lb)
Size (mm/WxDxH)	144x131x195	144x131x205	183x175x279
Mount weight (with no weight)	13.5kg (30 lb)		30kg (66 lb)
Mount weight (with weight)	18kg	50kg (110 lb)	
Maximum speed	1,800x (7.5 deg/sec)		1,200x (5deg/sec)
Output stage encoder	Χ	Built into the rightscension axis Product by UK-based Renishaw	Χ
Cycle error	-	±2.5 arcsec	-
Input power	DC 12V ~ 16V		
Recommended telescope	I In to 0 inch or 6 inch rotlantar		Up to 14-inch or 7-inch refractor

<sup>\*</sup> The large mount is available as a custom-made product. Please contact us separately for inquiries.

<sup>\*</sup> Some specifications may change for performance improvements.



Chapter

Fields of application

22

# Fields of application

#### **Collaborative Robots**



#### CNC machine tending

- CNC operation
- Input and discharge of processed products, etc.



#### Welding



#### Packaging

- Automated packaging process
- Product / box packaging,



#### Injection molding

- Automated injection process
- Collection of injection products, etc.



#### Assembly

- Plastic, wood, metal, furniture assembly, etc.



#### Picking and placing

- Manufacturing automation process
- Loading / unloading, etc.



#### Quality inspection

- 3D scanning
- Machine vision inspection
- Defect inspection, etc.



#### Logistics

- Logistics automation
- Transport and loading
- Palletizing



#### Adhesive / application

- Application of adhesives, finishes, adhesives, chemicals, etc.
- Quarantine system



#### F&E

- Unmanned cafe platform
- Soft ice cream
- Kitchen cooking
- Cleaning kitchen utensils



#### Education

- R&D

- Training at educational institutions, etc.



#### Photographing

- 3D facial scanning
- Video and photo shooting

#### **RBM Seires**



#### Café

- Serving coffee and beverages
- Guidance to a table, etc.



#### Restaurant

- Guidance to a table, etc.
- Food Serving
- Clearing table function



#### Internet cafe

- Guidance to a desk
- Food serving and clearing table functions



#### Mart

- Promotional function
- Transport of goods



#### Hospital

- Guidance to a patient room - Convenience functions such as various kinds of
- such as various kinds of guidance



#### Hotel

- Serving function
- Various guidance functions



**Fulfillment** 



Load / Pallet Handling



Manufacturing automation



Autonomous security



Customer service

### **Dual-Arm Mobile Manipulator**



Assembly



Pick and Place



Al Research

#### **Quadruped robot**



#### Military sector

 Surveillance, reconnaissance, dangerous object detection, etc.



Fire-fighting safety



#### Safety inspections

 Safety inspection of piping, narrow passages, etc.



#### Security patrols

- Constant patrol, risk detection, and alarms



#### Convenience functions

- Convenience functions such as serving and guidance



#### Logistics functions

 In-plant parts transfer, last-mile logistics within an apartment complex, etc.

### **Precision Pointing Mount**



#### For military purposes

- Satellite observation and tracking
- Close-range defense system
   High-resolution image acquisition
- Radar for collecting information



# For astronomical observation

- Unmanned stargazing
- Astronomical photography

### **Biped robot**



# For research and education

R&D, educational institutions, etc.



# For exhibitions and entertainment

- Science museum exhibition / demonstration, etc.



#### For disaster rescue

 Surveillance, reconnaissance, dangerous object detection, etc.



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