ROKAE

xMate | New-Generation Flexible Collaborative Robot

A Partner You can Rely on in Production

Better Life with Robots

ROKAE Robotics

400-010-8700
www.rokae.com
sales@rokae.com

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Product Vision

New-Generation Flexible Collaborative Robot

The global labor shortage has created increasing demands for robots in industrial production. As robots are adopted in more and more applications, they are required to be safer, more flexible, and easier to use. The introduction of collaborative robots paves the way for human-robot collaboration, but their application faces huge challenges in many scenarios, such as high-precision assembly in industrial production, compliant human-robot interaction in wellness physiotherapy, and high-precision operations in medical surgery, to name just a few. To satisfy these new scenarios, new robot technologies are needed.

ROKAE's new-generation flexible collaborative robots come with intelligent force sensing and vision. This allows the original open-loop teaching-execution process to be replaced with an intelligent closed-loop process that features dynamic interaction with the environment, making possible safe and accurate interaction between the environment and people. The disruptive innovation enables the robots to unlock more scenarios and become a partner you can rely on in production.

xMate

A Powerful Yet Flexible All-Rounder

PRODUCT CHARACTERISTICS

Superior Performance

Compliant Flexibility

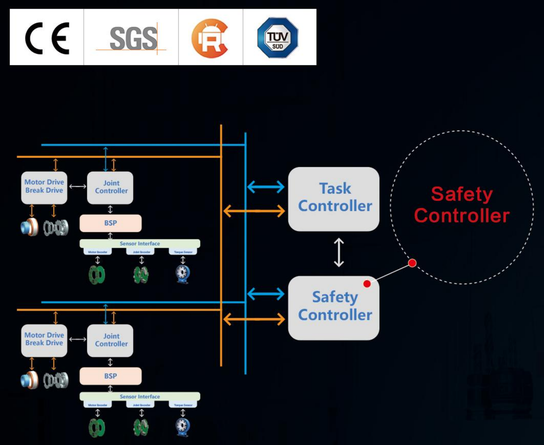
Ease of Use

Extreme Safety

Excellent Reliability

Extreme Safety

- Sensitivity improved by 10 times thanks to the collision detection by torque sensors
- More than 21 TÜV functional safety features, meets functional safety standards: ISO 13849-1, ISO 10218-1/PL d, Cat. 3; ISO 15066
- Dual-channel redundant monitoring of sensor information and an independently certified safety controller
- The position holding accuracy is better than ±0.1mm when power on and off, powered by suction contracting brake and dynamic feed-forward compensation

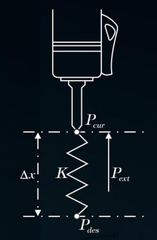


Safety Architecture

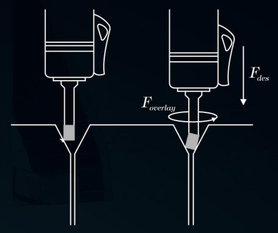
one-touch stop

Compliant Flexibility

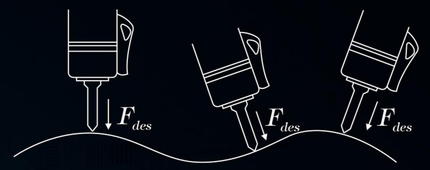
- Powerful yet flexible robot control based on patented unified force-position hybrid control framework
- Force control task efficiency improved by over 3 times through highly dynamic force control
- Fine grinding and precision assembly with no extension required thanks to built-in joint sensors and complete force control process kit



Impedance Control



Controlled Force Assembling

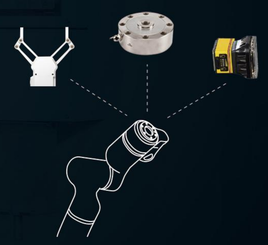


Constant Force Grinding

Ease of Use

- Direct teaching control with 1N based on point position and continuous trajectory
- Graphical programming interface with flowcharts enables users to get started within 1 hour
- Friendly development and open ecosystem support 100+ ecosystem extension tools of 5 categories

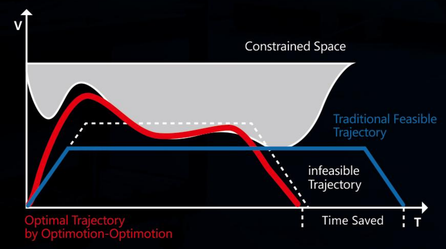
Graphical Programming



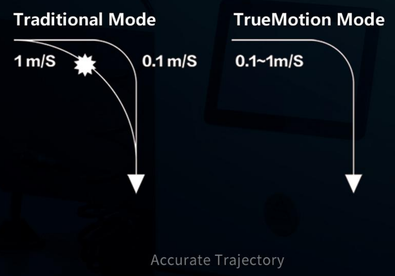
Open Ecosystem

Superior Performance

- Cutting-edge motion control technologies for industrial robots: OptiMotion, TrueMotion, and SyncMotion
- First-class robot path accuracy supported by dynamic feedforward compensation and dynamic modeling based on over 2000 parameters
- Payload capacity increased by 20% thanks to the customized motor drive control system



Optimal Takt Time



Accurate Trajectory

Excellent Reliability

- Motion planning based on dynamics constraints delivers high performance, overload protection, and an extended service life
- 100+ design verification experiments, 20+ factory tests, and MTBF > 80,000 h
- IP67 protection level satisfies the demands of harsh industrial applications

Better Protection

PRODUCT SERIES

CR Series | SR Series

Payload
3kg - 45kg

Reach
705mm - 2246mm

CR Flexible Collaborative Robots

xMate CR series flexible collaborative robots are built on the force-position hybrid control framework and xCore, a new self-developed high-performance control system for industrial robots. Designed for industrial applications, the robots deliver improved motion performance, force control, safety, ease of use, and reliability.

Robot body with IP67 protection rating can adapt to more stringent application scenarios.The independent control cabinet provides richer IO resources and more flexible extensibility. Its built-in independent safety controller, TÜV certified, functional safety meets ISO 13849-1:2015 standard, up to PL d/Cat. 3 level.

The newly upgraded xMate CR series of flexible cobots further broadens the application scenarios with the characteristics of safer, more flexible and easier to use.The payload capacity has increased to 45kg, with an operating range of up to 2246mm. This significantly expands the application scenarios for collaborative robots, allowing them to cover a wide range of industry-specific applications. It comprehensively assists enterprises in enhancing production efficiency and rapidly achieving flexible manufacturing.

| Model **CR20-17/2.0C-5**
Payload **17kg**
Reach **2047mm**

| Model **CR20-25/1.8C-5**
Payload **25kg**
Reach **1798mm**

| Model **CR20-20/1.8C**
Payload **20kg**
Reach **1798mm**

| Model **CR18-18/1.0C**
Payload **18kg**
Reach **1062mm**

| Model **CR7-7/0.98C**
Payload **7kg**
Reach **988mm**

| Model **CR12-12/1.4C**
Payload **12kg**
Reach **1434mm**

| Model **CR35-45/1.9C**
Payload **45kg**
Reach **1947mm**

| Model **CR35-35/2.2C**
Payload **35kg**
Reach **2246mm**

SR

Flexible Collaborative Robots

xMate SR,ROKAE's next-generation flexible cobot series that is lightweight, flexible, and great in cost performance, is a good helper for people's work and life.Independent controller cabinet caters to more confined base installation environments.

- The cobot features industrial-grade high-performance core components that ensure stable and reliable around-the-clock operations.
- Each joint is equipped with a torque sensor that enables high-precision one-touch stop collision detection. Together with multiple protections such as independent safety control and more than 21 TÜV functional safety features, human-machine safety collaboration is brought into full play.
- Only 1N for dragging and direct teaching programming enables easy adjustment of point positions with one hand. With graphical programming, extensive secondary development interfaces, robot operations are much easier for all users.

Model **SR5-5/0.9C**
Payload **5kg**
Reach **919mm**

Model **SR3-3/0.7C**
Payload **3kg**
Reach **705mm**

Specifications	CR7-7/0.98C	CR12-12/1.4C	CR18-18/1.0C	CR20-20/1.8C	CR20-25/1.8C-5	CR20-17/2.0C-5	CR35-35/2.2C	CR35-45/1.9C
Payload	7 kg	12 kg	18 kg	20 kg	25 kg	17 kg	35 kg	45 kg
Reach	988 mm	1,434 mm	1062 mm	1,798 mm	1,798 mm	2,047 mm	2,246 mm	1,947 mm
Weight	About 25 kg	About 41 kg	About 38 kg	About 71 kg	About 69 kg	About 71 kg	About 165 kg	About 161 kg
Degrees of freedom	6	6	6	6	5	5	6	6
MTBF	> 80,000 h	> 80,000 h	> 80,000 h	> 80,000 h	> 80,000 h	> 80,000 h	——	——
Power supply	48VDC	48VDC	48VDC	48VDC	48VDC	48VDC	——	——
Programming	Direct teaching control and graphical interface	Direct teaching control and graphical interface	Direct teaching control and graphical interface	Direct teaching control and graphical interface	Direct teaching control and graphical interface	Direct teaching control and graphical interface	Graphical interface	Graphical interface

Performance

Typical Power	300 w		500 w		600 w		1,000 w		900 w		600 w		——	——
Safety	Over 21 adjustable safety features including collision detection, virtual walls, and collaboration mode(Optional for models 35kg and above)													
Certification*	EN ISO 13849-1, EN ISO 10218-1/ PL d, Cat. 3; ISO 15066, and EU CE marking requirements,KCs marking requirements,EAC marking requirements													
Force sensing (tool flange)	Force,x-y-z	Torque,x-y-z	Force,x-y-z	Torque,x-y-z	Force,x-y-z	Torque,x-y-z	Force,x-y-z	Torque,x-y-z	Force,x-y-z	Torque,x-y-z	Force,x-y-z	Torque,x-y-z	——	——
Torque sensor resolution	0.1N	0.02Nm	0.1N	0.02Nm	0.1N	0.02Nm	0.1N	0.02Nm	0.1N	0.02Nm	0.1N	0.02Nm	——	——
Adjustable range of Cartesian stiffness	0~6000N/m,0~1000Nm/rad		0~18000N/m,0~2500Nm/rad		0~18000N/m,0~2500Nm/rad		0~18000N/m,0~2500Nm/rad		0~18000N/m,0~2500Nm/rad		0~18000N/m,0~2500Nm/rad		——	——

Motion

Repeatability	±0.02 mm		±0.03 mm		±0.03 mm		±0.05 mm		±0.05 mm		±0.05 mm		±0.05 mm		±0.05 mm	
Motion joint	Working range	Maximum speed	Working range	Maximum speed	Working range	Maximum speed	Working range	Maximum speed	Working range	Maximum speed	Working range	Maximum speed	Working range	Maximum speed	Working range	Maximum speed
Axis 1	±360°	180°/s	±360°	120°/s	±360°	20°/s	±360°	120°/s	±360°	120°/s	±360°	120°/s	±360°	163°/s	±360°	163°/s
Axis 2	±360°	180°/s	±360°	120°/s	±360°	120°/s	±360°	120°/s	±360°	120°/s	±360°	120°/s	±360°	163°/s	±170°	163°/s
Axis 3	±360°	234°/s	±360°	180°/s	±165°	180°/s	±170°	120°/s	±170°	120°/s	±165°	120°/s	±168°	135°/s	±168°	135°/s
Axis 4	±360°	240°/s	±360°	234°/s	±360°	180°/s	±360°	180°/s	±360°	234°/s	±360°	234°/s	±360°	155°/s	±360°	155°/s
Axis 5	±360°	240°/s	±360°	240°/s	±360°	180°/s	±360°	234°/s	±360°	234°/s	±360°	234°/s	±360°	199°/s	±360°	199°/s
Axis 6	±360°	240°/s	±360°	240°/s	±360°	180°/s	±360°	234°/s	——	——	——	——	±360°	228°/s	±360°	228°/s
Maximum speed at tool end	≤3.2m/s		≤3.0m/s		≤3.0m/s		≤3.5m/s		≤3.5m/s		≤4.0m/s		≤6.0m/s		≤6.0m/s	

Considering the upgrade of the product, the actual parameters of the product shall be subject to the corresponding hardware installation manual

Physical properties

IP rating	IP67	IP67
ISO cleanroom class*	5	5
Noise	≤ 70 dB(A)	≤ 85 dB(A)
Operating ambient temperature	0°C~50°C	0°C~40°C
Humidity	≤ 93% RH (non-condensing)	≤ 93% RH (non-condensing)
Robot installation	At any angle	At any angle
Tool I/O ports	2 Digital outputs, 2 Digital inputs, 2 Analog inputs	2 Digital outputs, 2 Digital inputs, 2 Analog inputs
Tool communication interface	RS485(Alternative with two analog input pins, can not be used simultaneously)	RS485(Alternative with two analog input pins, can not be used simultaneously)
Tool I/O power supply	12V/24V 1A (rated)	12V/24V 1A (rated)

Note: If you have any questions about the status of product certification, please contact the manufacturer. Please refer to the corresponding product manual for more details

CR Series
Specifications

CR7-7/0.98C CR12-12/1.4C CR18-18/1.0C CR20-20/1.8C CR20-25/1.8C-5 CR20-17/2.0C-5 CR35-35/2.2C CR35-45/1.9C

Specifications

	SR3-3/0.7C		SR5-5/0.9C	
Payload	3 kg		5 kg	
Reach	705 mm		919 mm	
Weight	About 13.8 kg		About 16.5 kg	
Degrees of freedom	6		6	
MTBF	> 80,000 h		> 80,000 h	
Power supply	48VDC		48VDC	
Programming	Direct teaching control and graphical interface		Direct teaching control and graphical interface	

Performance

Typical Power	160 w		225 w	
Safety	Over 21 adjustable safety features including collision detection, virtual walls, and collaboration mode.			
Certification	EN ISO 13849-1, EN ISO 10218-1/ PL d, Cat. 3; ISO 15066, and EU CE marking requirements, KCs marking requirements,EAC marking requirements			
Force sensing (tool flange)	Force, x-y-z	Torque, x-y-z	Force, x-y-z	Torque, x-y-z
Torque sensor resolution	0.1 N	0.02 Nm	0.1 N	0.02 Nm
Adjustable range of Cartesian stiffness	0~3,000 N/m, 0~300 Nm/rad		0~3,000 N/m, 0~300 Nm/rad	

Motion

Repeatability	±0.03 mm		±0.03 mm	
Motion joint	Working range	Maximum speed	Working range	Maximum speed
Axis 1	±360°	180°/s	±360°	180°/s
Axis 2	-155°~+140°	180°/s	-160°~+150°	180°/s
Axis 3	-175°~+135°	180°/s	-170°~+140°	180°/s
Axis 4	±360°	180°/s	±360°	180°/s
Axis 5	±360°	180°/s	±360°	180°/s
Axis 6	±360°	180°/s	±360°	180°/s
Maximum speed at tool end	≤ 1.5 m/s		≤ 2.0 m/s	

Considering the upgrade of the product, the actual parameters of the product shall be subject to the corresponding hardware installation manual

Physical properties

IP rating	IP54
ISO cleanroom class	5
Noise	≤ 70 dB(A)
Operating ambient temperature	0°C~50°C
Humidity	≤ 93% RH (non-condensing)
Robot installation	At any angle
Tool I/O ports	2 Digital outputs, 2 Digital inputs, 2 Analog inputs
Tool communication interface	One 100-megabit Ethernet port with RJ45 interface on the connection base
Tool I/O power supply	(1) 12V/24V 1A (2) 5V 1.5A

SR Series
Specifications

Extreme Safety, Comprehensive Guarantee
High-precision torque sensors in all joints enable ultra-sensitive force sensing,thus effectively avoiding accidental collisions and injuries and ensuring safe operation.

Lightweight & Flexible, Fashionable & Friendly
The innovative design brings superb lightweight flexibility as well as user-friendly human-machine interaction, shattering stereotypes about robots.

Excellent Reliability, Solid Partner
Industry-leading 80,000 hours of MTBF makes it an economical and solid partner

Higher ROI
Flexible and easy to deploy, enabling rapid task switching, which shortens the payback period.

SR3-3/0.7C

SR5-5/0.9C

Controller Teach Pendant Specifications

Controller

- Compact and lightweight design enables flexible deployment in confined spaces
- The maximum IP54 protection level of the cabinet can adapt more application
- Richer IO and communicaiton resoureces
- More flexible extensibility
- Build-in independent safety controller, PL d/Cat. 3 in accordance with ISO 13849-1:2015

Specifications

Name	xMate Control Cab (Abbreviated as MCC)	xMate Control Cab Mix (Abbreviated as MCCM)	LightCab
Applicable models	CR Series models below 35kg, SR Series	CR Series models 35kg and above	SR Series
IP rating	IP54	IP54	IP20
Operating ambient temperature	0℃~50℃	0℃~50℃	0℃~50℃
Humidity	≤93% RH (Non-condensing)	≤93% RH (Non-condensing)	≤93% RH (Non-condensing)
Input power	Single-phase 90V ~ 264VAC, 47-63Hz Single-phase 180V ~ 264VAC, 47-63Hz (CR20 Series)	110V~260V AC，50~60Hz	48VDC
Dimensions	450 mm x 250 mm x 350 mm	480 mm × 325 mm × 360 mm	228.5 mm ×180 mm ×88 mm
Weight*	About 15 kg	About 15 kg	About 2.4 kg
User IO	16 inputs and 16 outputs (standard)	16 inputs and 16 outputs (standard)	4 Digital outputs, 4 Digital inputs
Communication	5 safety inputs, 4 safety outputs(all dual-redundant channels)	5 safety inputs, 4 safety outputs(all dual-redundant channels)	2 safety inputs, 1 safety outputs
Power output	RS232*1; Gigabit Ethernet RJ45*1;USB3.0*2; HDMI*1; EtherCAT*1	RS232*1; Gigabit Ethernet RJ45*1;USB3.0*2; HDMI*1; EtherCAT*1	2 channels Ethernet,Ethercet
Optional extension	General Digital I/O module; Analog I/O module; Incremental encoder signal acquisition module, etc.	General Digital I/O module; Analog I/O module; Incremental encoder signal acquisition module, etc.	General Digital I/O module; Analog I/O module; Incremental encoder signal acquisition module, etc.

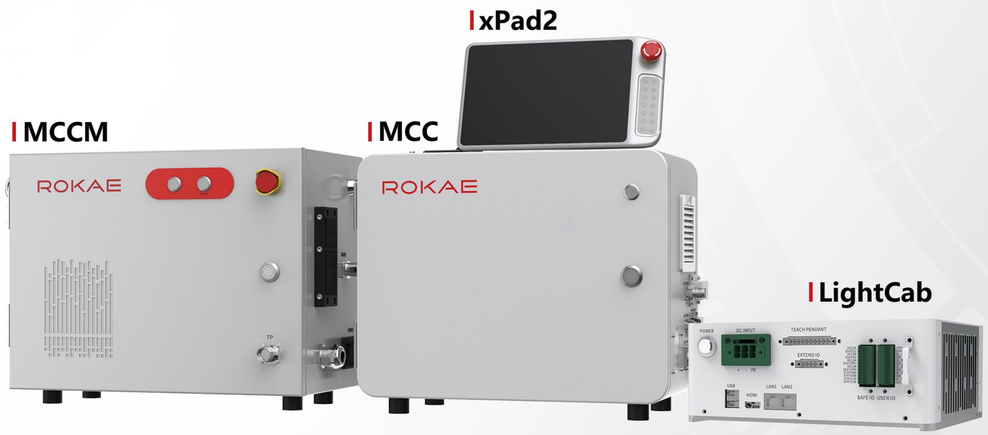
* Note: There will be some differences in the weight of the control cabinet in different configurations.

Teach Pendant

- Modern ergonomic design for comfortable grip
- Large multi-touch high-definition LCD supporting zoom, swipe, and tap
- Hot-swapping, wired communication, and sharing between robots
- As light as 840g for easy teach programming
- Intuitive UI layout allowing quick start within 10 minutes

Specifications

Name	xPad2
Dimensions	290 mm×170 mm×80 mm
Weight	About 840g (excluding cables)
Cable length	5 m/7 m/15 m/22 m
Display	10.1-in LCD with a resolution of 1920×1200
IP rating	IP54



Specifications

	CR7-7/0.98	CR12-12/1.4	CR12-20/1.4	CR18-18/1.0	CR20-20/1.8	SR3-3/0.7	SR5-5/0.9
Payload	7 kg	12 kg	20kg	18 kg	20 kg	3 kg	5 kg
Reach	988 mm	1,434 mm	1,434 mm	1,062 mm	1,798 mm	705 mm	919 mm
Weight (including built-in controller)	About 27 kg	About 43 kg	About 41 kg	About 40 kg	About 75 kg	About 15 kg	About 17.5 kg
Degrees of freedom	6	6	6	6	6	6	6
MTBF	> 80000 h	> 80000 h	> 80,000 h	> 80000 h	> 80000 h	> 80000 h	> 80000 h
Power supply	Single-phase 90-264VAC, frequency 47-63Hz / 48VDC	Single-phase 90-264VAC, frequency 47-63Hz / 48VDC	Single-phase 90-264VAC, frequency 47-63Hz / 48VDC	Single-phase 90-264VAC, frequency 47-63Hz / 48VDC	Single-phase 180V ~ 264VAC, frequency 47-63Hz / 48VDC	90-264VAC, 47-63Hz/48VDC	90-264VAC, 47-63Hz/48VDC
Programming	Direct teaching control and graphical interface	Direct teaching control and graphical interface	Direct teaching control and graphical interface	Direct teaching control and graphical interface	Direct teaching control and graphical interface	Direct teaching control and graphical interface	Direct teaching control and graphical interface

Performance

Typical Power	300 w		500 w		500 w		600 w		1,000 w		160 w		225 w	
Safety	Over 21 adjustable safety features including collision detection, virtual walls, and collaboration mode.													
Certification	EN ISO 13849-1, EN ISO 10218-1/ PL d, Cat. 3; ISO 15066, and EU CE marking requirements,KCs marking requirements,EAC marking requirements													
Force sensing (tool flange)	Force, x-y-z	Torque, x-y-z	Force, x-y-z	Torque, x-y-z	Force, x-y-z	Torque, x-y-z	Force, x-y-z	Torque, x-y-z	Force, x-y-z	Torque, x-y-z	Force, x-y-z	Torque, x-y-z	Force, x-y-z	Torque, x-y-z
Torque sensor resolution	0.1N	0.02Nm	0.1N	0.02 Nm	0.1N	0.02 Nm	0.1N	0.02 Nm	0.1N	0.02 Nm	0.1N	0.02Nm	0.1N	0.02Nm
Adjustable range of Cartesian stiffness	0~6000N/m, 0~1000Nm/rad		0~18000N/m, 0~2500Nm/rad		0~18000N/m, 0~2500Nm/rad		0~18000N/m, 0~2500Nm/rad		0~18000N/m, 0~2500Nm/rad		0~3000N/m, 0~300Nm/rad		0~3000N/m, 0~300Nm/rad	

Motion

Repeatability	±0.02 mm		±0.03 mm		±0.05 mm		±0.03 mm		±0.05 mm		±0.03 mm		±0.03 mm	
Motion joint	Working range	Maximum speed	Working range	Maximum speed	Working range	Maximum speed	Working range	Maximum speed	Working range	Maximum speed	Working range	Maximum speed	Working range	Maximum speed
Axis 1	±360°	180°/s	±360°	120°/s	±360°	90°/s	±360°	120°/s	±360°	120°/s	±360°	180°/s	±360°	180°/s
Axis 2	±360°	180°/s	±170°	120°/s	±360°	90°/s	±170°	120°/s	±360°	120°/s	-135°~+130°	180°/s	-135°~+135°	180°/s
Axis 3	±360°	234°/s	±360°	180°/s	±360°	112°/s	±165°	180°/s	±170°	120°/s	-175°~+135°	180°/s	-170°~+140°	180°/s
Axis 4	±360°	240°/s	±360°	234°/s	±360°	146°/s	±360°	180°/s	±360°	180°/s	±360°	180°/s	±360°	180°/s
Axis 5	±360°	240°/s	±360°	240°/s	±360°	200°/s	±360°	180°/s	±360°	234°/s	±360°	180°/s	±360°	180°/s
Axis 6	±360°	240°/s	±360°	240°/s	±360°	200°/s	±360°	180°/s	±360°	234°/s	±360°	180°/s	±360°	180°/s
Maximum speed at tool end	≤3.2m/s		≤3.0m/s		≤3.0m/s		≤3.0m/s		≤3.5m/s		≤1.5m/s		≤2.0m/s	

Considering the upgrade of the product, the actual parameters of the product shall be subject to the corresponding hardware installation manual

Physical properties

IP rating	IP54	IP54
ISO cleanroom class	5	5
Noise	≤70 dB(A)	≤70 dB(A)
Operating ambient temperature	0℃~50℃	0℃~50℃
Humidity	≤ 93% RH (non-condensing)	≤ 93% RH (non-condensing)
Robot installation	At any angle	At any angle
Tool I/O ports	2 Digital outputs, 2 Digital inputs, 2 Analog inputs	2 Digital outputs, 2 Digital inputs, 2 Analog inputs
Tool communication interface	RS485(Alternative with two analog input pins, can not be used simultaneously)	One 100-megabit Ethernet port with RJ45 interface on the connection base
Tool I/O power supply	12V/24V 1A	(1) 12V/24V 1A (2) 5V 1.5A

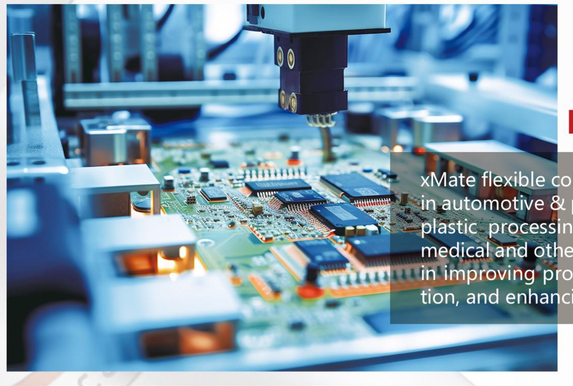
Robot-Integrated Controller Product Series Specifications

Robot-Integrated Controller

Controller	Built-in controller	
Applicable models*	Robot-Integrated Controller CR Series	Robot-Integrated Controller SR Series
Operator interface	Notebook/PAD/Drag Interactive Module	
Safety protection device	1 handheld enable / 1 handheld emergency stop	
Communication protocols	TCP/IP 1000Mbit, Modbus TCP, Profinet, Ethernet/IP, DeviceNet, CC-Link, CC-Link IE Field Basic	
External control interface	Highly dynamic external control; low-level force/position control; robot model library and API	
Input power	48VDC	
Base I/O ports	4 Digital outputs, 4 Digital inputs, 2 safety input, 1 safety output	
Base communication interface	1 channel Ethernet	2 channels Ethernet
Base output power supply	24V, 1.5A	24V, 1.5A

xMate Flexible Collaborative Robots

How do they change your industry?

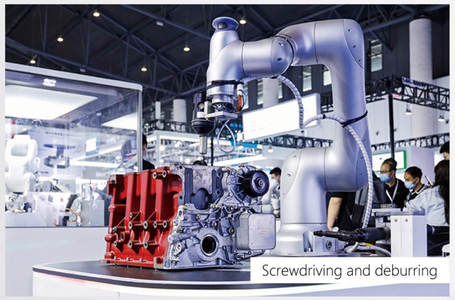


Industry Applications

xMate flexible collaborative robots have found wide applications in automotive & parts, electronics and semiconductor, metal and plastic processing, research and education, business services, medical and other industries. They have played an important role in improving productivity and quality, enabling flexible production, and enhancing personnel safety.

xMate Flexible Collaborative Robots

Typical Applications

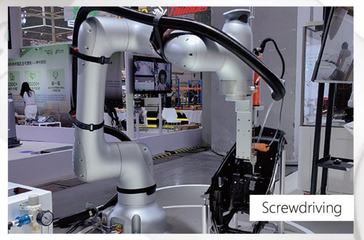

Screwdriving and deburring

Palletizing


Loading/Unloading, and Inspection


Welding


Healthcare & wellness


Screwdriving


Compliant assembly

Gluing

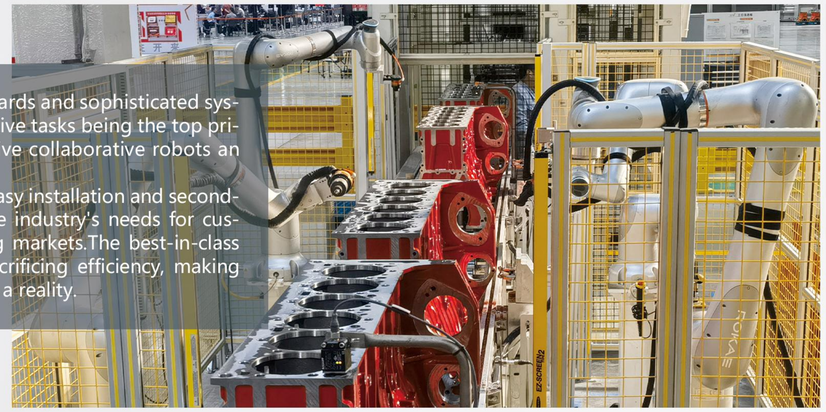
Typical application

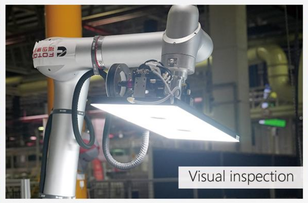
xMate flexible collaborative robots can undertake a variety of tasks, including **compliant assembly, screw locking, inspection and measurement, handling, material removal, gluing, welding, and equipment care**, driving improved productivity and flexible automation for companies of all sizes.

Automotive & Parts

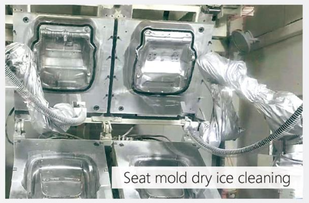
While the automotive and parts industry enjoys a high level of automation, its supply chain still has lots of room for growth.
For example, the general assembly process is complex with flexible working procedures. Safer and more flexible collaborative robots can take the place of traditional industrial robots to cope with these complex processes and working conditions. They can add value at different stages of automotive manufacturing and boost overall productivity.

The automotive industry has rigorous standards and sophisticated systems, with quality and consistency in repetitive tasks being the top priority for customers. This makes cost-effective collaborative robots an ideal choice.
xMate flexible collaborative robots feature easy installation and secondary deployment, and satisfy the automotive industry's needs for customization and rapid response to changing markets.The best-in-class safety ensures operation safety without sacrificing efficiency, making human-robot coexistence and collaboration a reality.

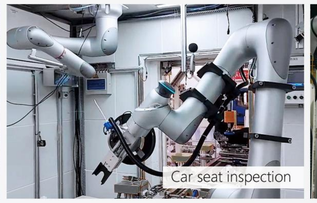



Visual inspection


Cylinder head inspection and labeling


Seat mold dry ice cleaning


Car roof panel gluing


Car seat inspection


Engine valve assembly

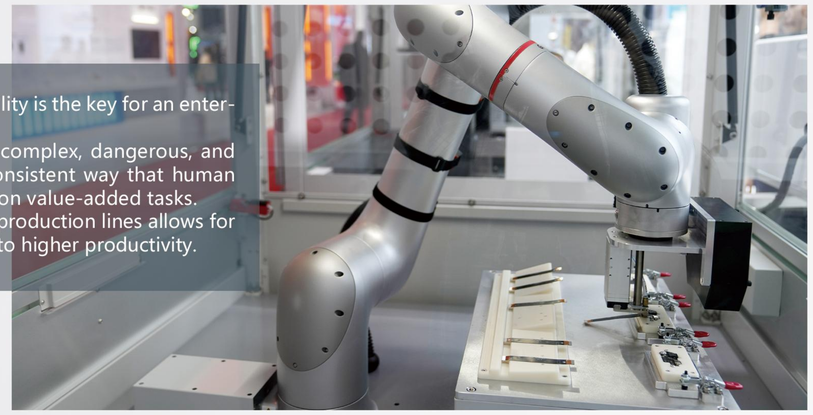
Advantages	Values for Customers
Ease of Use	A control-cabinet-less design is available, small footprint, and plug-and-play mechanical and electrical connectors mean easy and quick installation, which usually takes less than 10 minutes.
Extreme Safety	Ultrasensitive collision detection by torque sensors means no safety fence or grating is required.
Easy Programming	1N easy dragging and graphical programming interface allow users without programming experience to get started within an hour.
Compliant Force Control	Integrated joint force sensors eliminate the need for additional sensors, while the complete force control process kit greatly reduces the application extension cost.
Excellent Reliability	IP67 protection, 100+ design verification experiments, 20+ factory test items, and MTBF > 50,000 h.
Leading Performance	Cutting-edge motion control technologies enable the robot to perform repetitive tasks accurately and reliably. Product quality and consistency are enhanced as well.

Applications	Description
Bolt tightening at any angle	Equipped with a tightening gun, the robot tightens bolts at any angle and provides real-time visibility into the force/torque value.
Compliant Assembly	Space compliance allows the robot to assemble complex parts and prevent workpiece loss.
Deburring	Normal tracking and constant force control improve the quality and consistency of surface and edge deburring.
Loading and Unloading	Stable and flexible operation in tight spaces with no safety barriers required, making the robot ideal for tasks like loading and unloading spark plugs.
Gluing	Precise control over the gluing position and volume, e.g., on vehicle door frames and
Handling	End effectors ensure stable and flexible handling of workpieces in limited spaces, such as when loading and unloading vehicle dashboards.

Electronics and Semiconductor

The electronics (Computer, Communication, and Consumer Electronics) industry has gradually shifted from large-scale, mass production of standard products to customization and flexible manufacturing. The change in production mode has posed new requirements and challenges to automated production. As electronics products are diverse and the installation of traditional automation equipment is complex, it is difficult for the production line to adapt to new products, resulting in high secondary deployment costs. This makes rapid changeover nearly impossible.

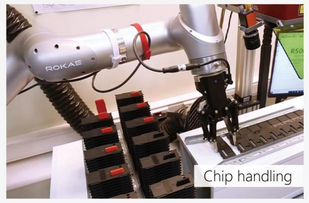
In the fast-growing electronics industry, agility is the key for an enterprise to survive and succeed.
Flexible collaborative robots can perform complex, dangerous, and highly repetitive tasks in a reliable and consistent way that human workers cannot, and enable them to focus on value-added tasks.
Besides, the use of collaborative robots on production lines allows for easy and fast changeover, which translates to higher productivity.



TVs outbound communication testing

Mobile manipulator for loading and unloading

Case loading and unloading



Chip handling

PCB soldering loading/unloading

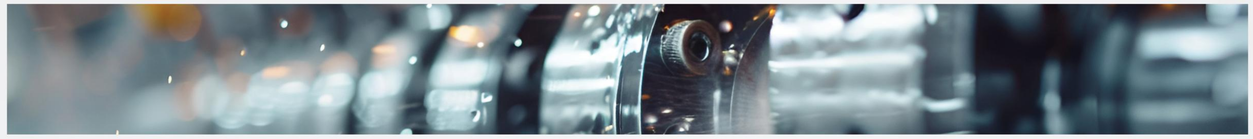
Earphone shell constant-force wiping

Advantages	Values for Customers
Ease of Use	A control-cabinet-less design is available,reduces the weight by 50% and enables fast cable change and redeployment, without affecting the production line.
Extreme Safety	More than 21 TÜV functional safety features, ensure the highest safety when the robot is working next to workers.
Easy Programming	Practical direct teaching control, graphical programming interface with flowcharts, and one-touch project import and export allow for fast change-over.
Leading Performance	Cutting-edge motion control technologies enable the robot to perform repetitive tasks accurately and continuously. Product quality and consistency are enhanced as well.
Excellent Reliability	IP67 protection, compact structure, maintenance-free design, and MTBF > 50,000 h.
Compliant Force Control	Integrated joint sensors eliminate the need for additional sensors, while the complete force control process kit greatly reduces the application extension cost.

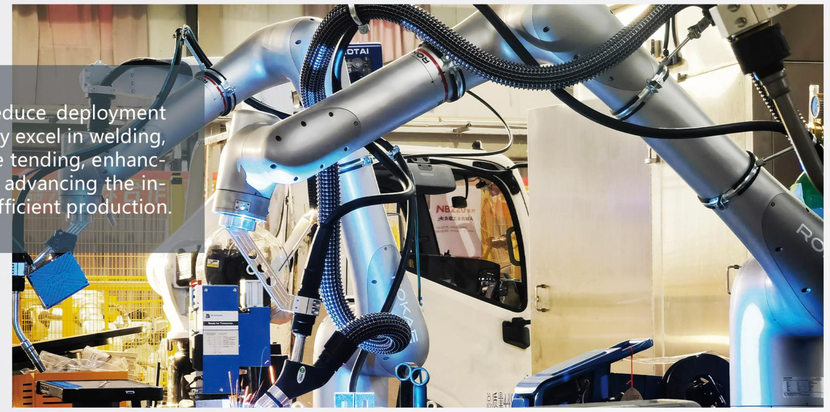
Applications	Description
Gluing and Dispensing	Precise control over the dispensing volume delivers improved appearance and reduced consumption, e.g. for PCB dispensing.
Mobile Manipulator	The robot can be used with a mobile trolley to meet the safety requirements in open spaces. Cabinet-free design and low power consumption make the trolley last longer in a single run.
Testing	Space compliance allows the robot to deal with inconsistent incoming parts and eliminate the internal force, such as in the connector plugging test.
Inspection	Visual inspection system works with highly dynamic force control to quickly identify defective and faulty parts, enabling non-destructive inspection such as screen inspection.
Screw Locking	The automatic screw locking machine allows the robot to complete both 2D and 3D locking tasks and repeat the same action with the same precision and speed.
Compliant Assembly	The robot accurately performs complex, compliant assembly tasks in tight spaces and prevents workpiece loss.

Metal Fabrication

In the metal fabrication industry, tasks like machine tending loading and unloading, grinding, welding, and inspection are repetitive and demand high operator focus. Manual operations increase safety risks, reduce product consistency, and lower yields. Coupled with labor shortages, these challenges hinder growth, driving the need for automation.



ROKAE Flexible Collaborative Robots reduce deployment costs and shorten changeover times. They excel in welding, material handling, grinding, and machine tending, enhancing efficiency, ensuring consistency, and advancing the industry toward smarter, safer, and more efficient production.



Welding

Sandblasting loading/unloading

Handling/Loading and unloading

Machine tending loading/unloading

Metal grinding

Machine tending loading/unloading

Advantages	Values for Customers
Flexible Deployment	Quick changeovers and reconfiguration for adaptable production.
Easy Programming	1N direct teaching control and graphical programming for simple operation by non-specialists.
Enhanced Safety	SIL3-rated safety controller, dual-redundancy monitoring, and 21 safety functions.
Compliant Force Control	Integrated joint force sensors eliminate the need for additional sensors, while the complete force control process kit greatly reduces the application extension cost.
High Reliability	IP67 protection and over 100 design tests for robust performance in tough conditions.
Leading Performance	Cutting-edge motion control technologies enable the robot to perform repetitive tasks accurately and reliably. Product quality and consistency are enhanced as well.

Applications	Description
Welding	1N direct teaching control, graphical programming, and vibration-free operation, perfect for small-batch, multi-variety welding tasks.
Machine Tending	IP67 protection, excels in complex environments for efficient, high-quality results.
Grinding/Deburring	High-precision force sensing, no extra sensors needed, ensures efficient material removal.
Inspection	Visual inspection system works with highly dynamic force control to quickly identify defective and faulty parts, enabling non-destructive inspection such as screen inspection.

Commercial Services

Consumer demand is evolving towards personalization and diversification, with trends like unmanned supermarkets, vending machines, moxibustion wellness, massage therapy, smart medical aesthetics, and surgical robots gaining traction. Unmanned and intelligent solutions are shaping the future of the commercial therapy industry. Lightweight, intelligent flexible collaborative robots are replacing humans in complex tasks, driving widespread commercial adoption.

The ROKAE xMate flexible collaborative robot, featuring advanced safety and human-arm-like compliant control, delivers user-friendly operation for diverse, personalized services, unlocking new possibilities in commercial services.

Advantages	Values for Customers
Compliant Force Control	Integrated joint force sensors offer highly dynamic and sensitive force control, ensuring safe and intelligent interaction with the environment.
Ease of Use	A control-cabinet-less design is available and plug-and-play mechanical and electrical connectors mean quick installation within 10 minutes.
Easy Programming	Direct teaching control with 1N, together with a graphical programming interface with flowcharts, makes operation much easier for all users.
Extreme Safety	Suction contracting brake is combined with dynamic feedforward compensation to deliver a position holding accuracy of ±0.1 mm and ensure safe surgeries.
Open Ecosystem	Rich IO and communication interfaces, supports most industrial accessories, integrable into medical products as robotic components.
High Reliability	100+ design verification experiments, 20+ factory tests, and MTBF > 50,000 h.

Applications	Description
Moxibustion	The compliance control function of the robot works with artificial intelligence to make moxibustion safe, precise, and even.
Massage	3D vision and automatic trajectory generation enable the robot to generate personalized massage programs with multi-level adjustable force.
Rehabilitation	When used with rehabilitation equipment, the robot can assist patients in rehabilitation exercises with its highly dynamic force control.
Coffee Making	High positioning repeatability means that the robot can accurately reproduce Archimedes curve, spiral pouring, and other hand brewing coffee actions. It ensures consistent quality in a cost-effective manner.
Surgery	Free from spatial interference during equipment and personnel operation thanks to flexible arrangement of manipulator position based on precise assisted positioning.
Sterilization	Unattended sterilization in office buildings, lobbies, and other public places with quick deployment on a mobile trolley.