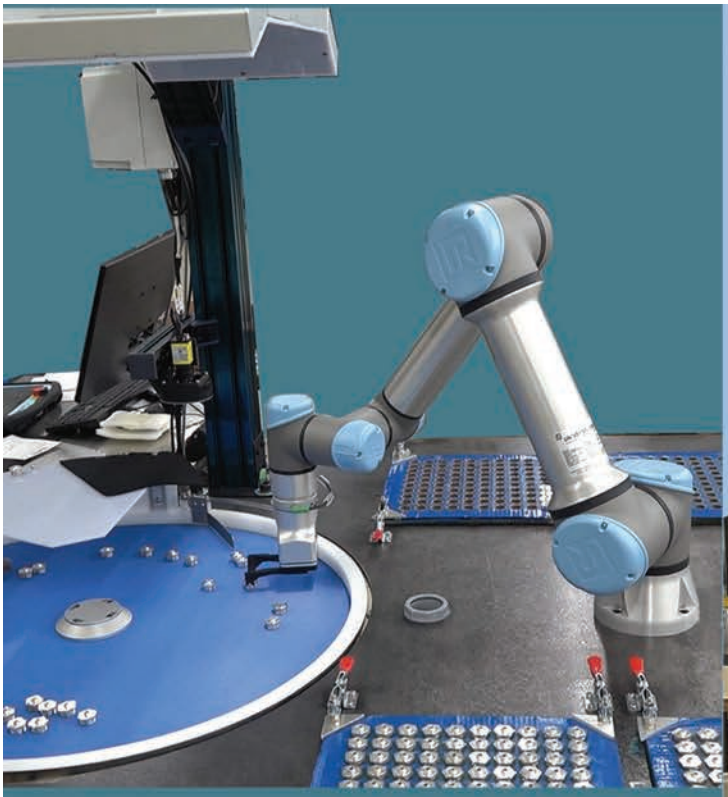
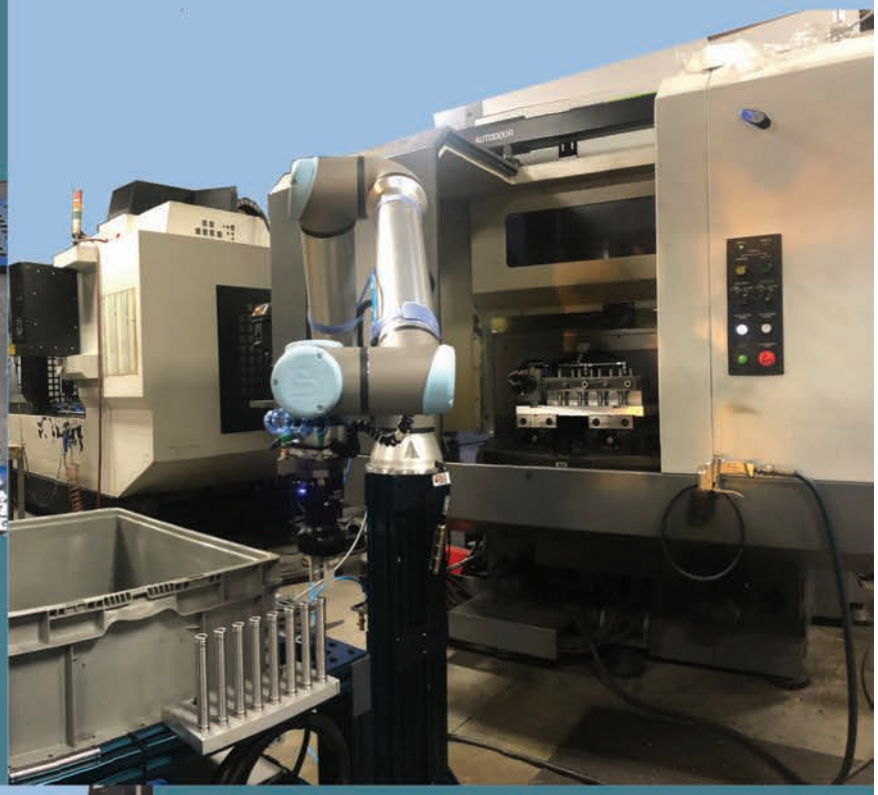
UNIVERSAL ROBOTS
Preferred Distributor

M-D SALES INC ROBOTICS DIVISION

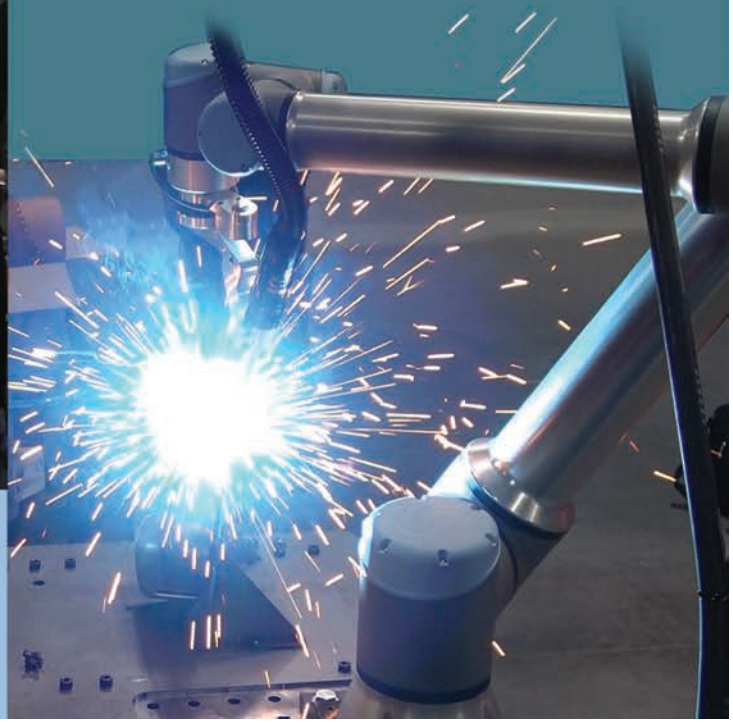


MACHINE TENDING



PICK & PLACE

WELDING



M-D SALES INC ROBOTICS DIVISION

e-Series.
Built to do more.

From Universal Robots

Collaborative robots can work almost anywhere and automate almost anything.

They free people up to do what they're good at: creating, collaborating, and doing something amazing.

Collaborative robots, or cobots, expand capacity for businesses of all sizes. They can change the way employees work; integrate seamlessly with existing processes, layouts, and equipment; and improve quality across many applications. Collaborative automation makes the workplace safer and lets workers pursue more valuable tasks.

Many manufacturers overlook cobot automation because they think it brings the same challenges as old school traditional automation: huge cash outlays, disrupted factory floors, and complicated coding requiring specially trained personnel. The all-or-nothing approach of previous generations leads many plant managers and business owners to believe robot automation isn't accessible for their facilities.

Fortunately, this couldn't be further from the truth. In 2008, Universal Robots introduced the world's first commercially viable cobot arms, which differ from traditional industrial robots thanks to their small footprint, light weight, and ease of use. Automation is fast, flexible, and affordable thanks to collaborative robots.

In today's fast-changing manufacturing environment, cobots can help shops fill production orders faster, upskill their workers, and become more competitive. From packaging and palletizing, to machine tending, to assembling and welding, cobots can take on labor intensive tasks that leave staff free to deploy their expertise elsewhere.

Our e-Series range of collaborative robots is bringing automation's benefits to more businesses and industries than ever. This brochure will address the key e-Series technologies making manufacturers more productive, and how cobots overcome the top challenges facing manufacturing businesses of all sizes.

>50k

Massive installed base

Universal Robots' 50,000+ cobot solutions have been deployed around the world in both tier 1 automotive suppliers and small machine shops, and thousands of facilities in between.

1/2

Simple to redeploy

Cobots can be reconfigured and programmed for a new task in as little as half a day.

90

Easy programming

After an online 90-minute course on **UR Academy**, anyone can become a certified cobot programmer. There are even in-person classes for hands-on learning.

17

Collaborative-ready

The e-Series 17 standard adjustable safety functions effectively and easily mitigate risk in a work cell, following a risk assessment.

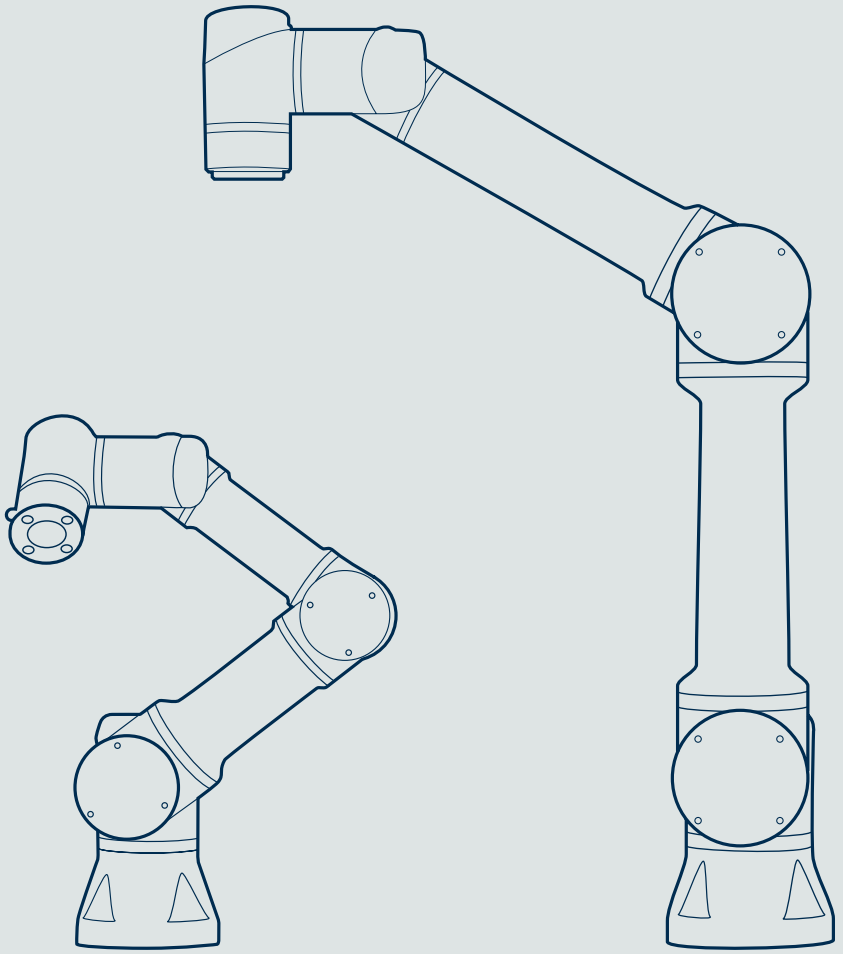
1

Quick payback

UR cobots routinely deliver payback within a year.

A collaborative solution for every need.

Meet the e-Series family.



The e-Series family has four members – the UR3e, UR5e, UR10e, and UR16e. Each cobot offers a different reach and payload, and they share the same ease of use and dependability that makes them a valuable addition to any production facility.

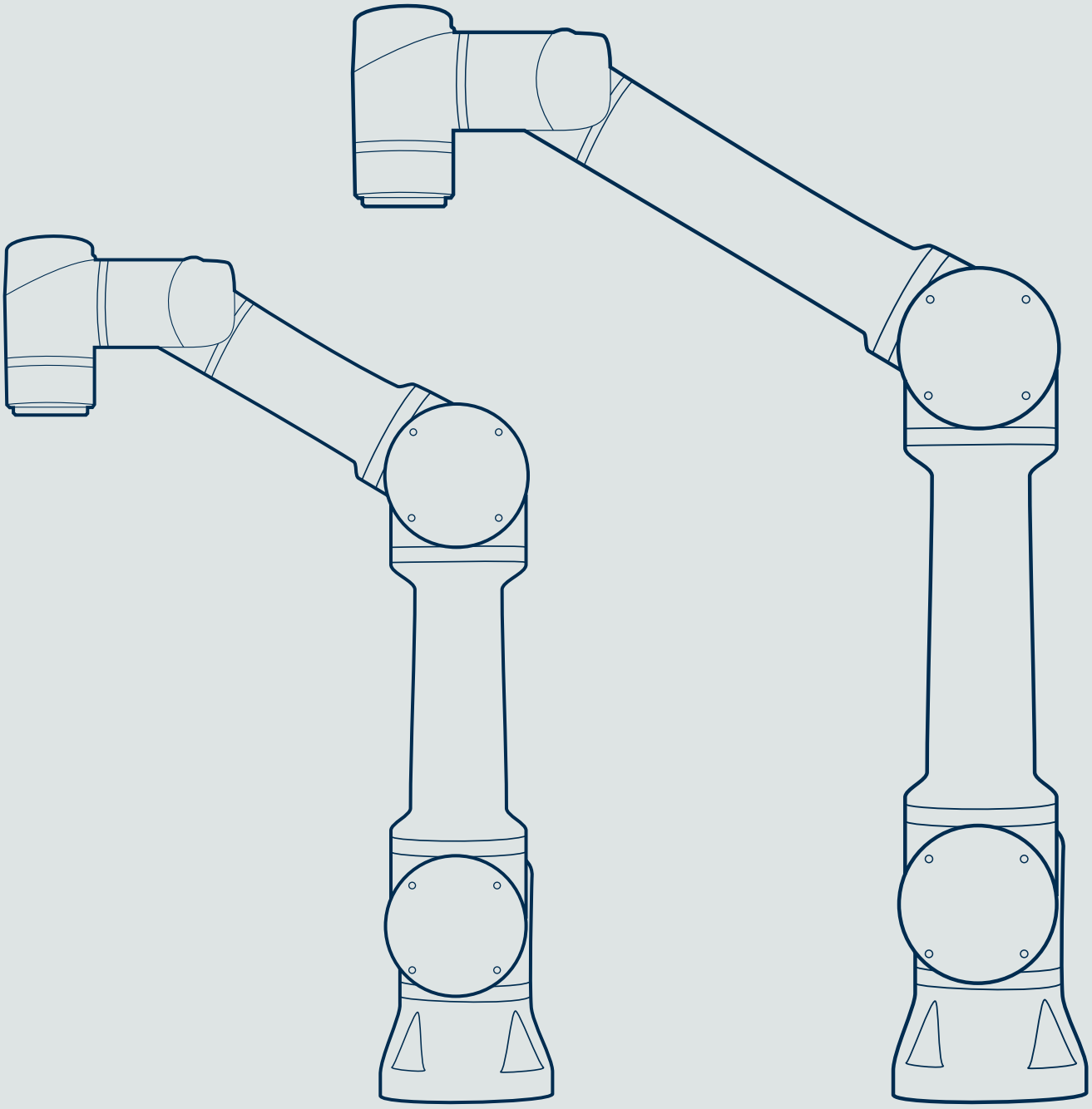
Subject to risk assessment, e-Series cobots can typically work alongside skilled operators on the production line, thanks to built-in configurable safety functions. Our cobots are certified by TÜV NORD for ISO 10218-1 and safety functions are rated as Cat.3 PL d according to ISO 13849-1. Safety is one of the pioneering features of collaborative robotics, and our users can meet demanding safety standards while exploring the unlimited applications of our cobots. Greater productivity, improved product quality, and peace of mind are ways we're making automation acces sible to everyone.

UR3e

Small but powerful, the UR3e has a payload of 3 kg and reach radius of 500 mm. With 360-degree rotation on all wrist joints and infinite rotation on the end joint, this table-top cobot handles high precision tasks and light assembly tasks with ease.

UR5e

The medium-sized member of the Universal Robots family is ideal for automating low weight processing tasks with its 5 kg payload and 850 mm reach radius. Easy to program and fast to set up, the UR5e strikes the perfect balance between size and power.



UR16e

With its 16 kg payload, the UR16e helps reduce the costs, ergonomic risks, and downtime associated with heavy part handling. A small footprint and 900 mm reach make the UR16e ideal for applications such as heavy-duty materials handling and CNC machine tending applications, including multi-gripper end of arm tooling.

UR10e

Capable of automating tasks up to 12.5 kg with the same reliability and performance characterized by the e-Series, the UR10e has a reach radius of 1300 mm. This enables it to carry out tasks like packaging and palletizing in facilities

UNIVERSAL ROBOT

Robot arm specifications.

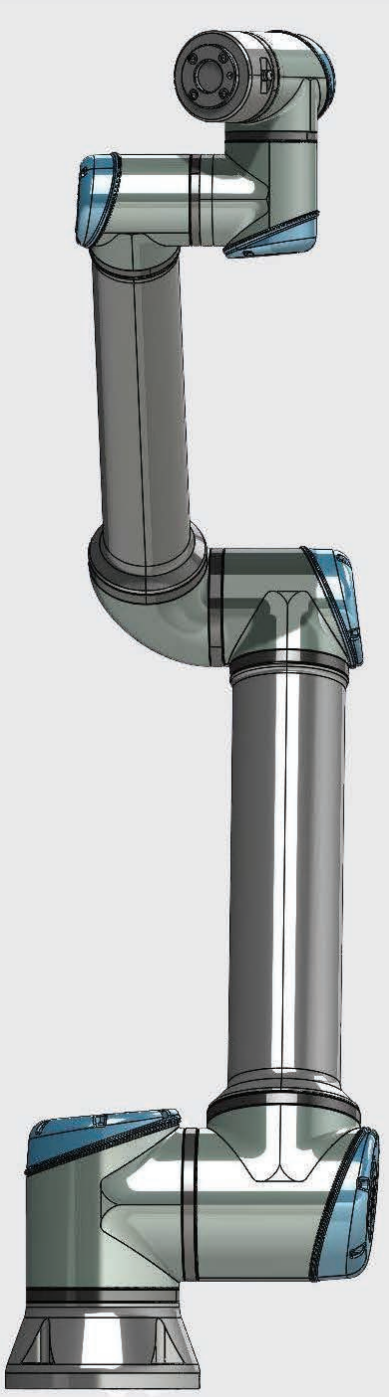
	UR3e		UR5e	
Specification				
Payload	3 kg (6.6 lbs)		5 kg (11 lbs)	
Reach	500 mm (19.7 in)		850 mm (33.5 in)	
Degrees of freedom	6 rotating joints		6 rotating joints	
Programming	< 12 inch touchscreen with PolyScope graphical user interface >			
Performance				
Power, Consumption, Maximum Average	300 W		570 W	
Power, Consumption, Typical with moderate settings (approximate)	100 W		200 W	
Safety	< 17 configurable safety functions >			
Certifications	< EN ISO 13849-1, PLd Category 3, and EN ISO 10218-1 >			
Force Sensing, Tool Flange	Force, x-y-z	Torque, x-y-z	Force, x-y-z	Torque, x-y-z
– Range	30.0 N	10.0 Nm	50.0 N	10.0 Nm
– Precision	2.0 N	0.1 Nm	3.5 N	0.2 Nm
– Accuracy	3.5 N	0.1 Nm	4.0 N	0.3 Nm
Movement				
Pose Repeatability per ISO 9283	± 0.03 mm		± 0.03 mm	
Axis movement	Working range	Maximum speed	Working range	Maximum speed
– Base	± 360°	± 180°/s	± 360°	± 180°/s
– Shoulder	± 360°	± 180°/s	± 360°	± 180°/s
– Elbow	± 360°	± 180°/s	± 360°	± 180°/s
– Wrist 1	± 360°	± 360°/s	± 360°	± 180°/s
– Wrist 2	± 360°	± 360°/s	± 360°	± 180°/s
– Wrist 3	Infinite	± 360°/s	± 360°	± 180°/s
Typical TCP speed	1 m/s (39.4 in/s)		1 m/s (39.4 in/s)	
Features				
IP classification	IP54		IP54	
ISO 14644-1 Class Cleanroom	5		5	
Noise	Less than 60 dB(A)		Less than 65 dB(A)	
Robot mounting	Any Orientation		Any Orientation	
I/O ports				
– Digital in	2		2	
– Digital out	2		2	
– Analog in	2		2	
Tool I/O Power Supply Voltage	12/24 V		12/24 V	
Tool I/O Power Supply	600 mA		1.5 A (Dual pin) 1 A (Single pin)	
Physical				
Footprint	Ø 128 mm		Ø 149 mm	
Materials	Aluminium, Plastic, Steel		Aluminium, Plastic, Steel	
Tool (end-effector) connector type	M8 | M8 8-pin		M8 | M8 8-pin	
Cable length robot arm	6 m (236 in)		6 m (236 in)	
Weight including cable	11.2 kg (24.7 lbs)		20.6 kg (45.4 lbs)	
Operating Temperature Range	0-50°C		0-50°C	
Humidity	90%RH (non-condensing)		90%RH (non-condensing)	

Tested and trusted collaborative robot technology.

UR10e	UR16e
12.5 kg (27.5 lbs)	16 kg (35.3 lbs)
1300 mm (51.2 in)	900 mm (35.4 in)
6 rotating joints	6 rotating joints
< 12 inch touchscreen with PolyScope graphical user interface >	
615 W	585 W
350 W	350 W
< 17 configurable safety functions >	
< EN ISO 13849-1, PLd Category 3, and EN ISO 10218-1 >	

Force, x-y-z	Torque, x-y-z	Force, x-y-z	Torque, x-y-z
100.0 N	10.0 Nm	160.0 N	10.0 Nm
5.0 N	0.2 Nm	5.0 N	0.2 Nm
5.5 N	0.5 Nm	5.5 N	0.5 Nm

± 0.05 mm		± 0.05 mm	
Working range	Maximum speed	Working range	Maximum speed
± 360°	± 120°/s	± 360°	± 120°/s
± 360°	± 120°/s	± 360°	± 120°/s
± 360°	± 180°/s	± 360°	± 180°/s
± 360°	± 180°/s	± 360°	± 180°/s
± 360°	± 180°/s	± 360°	± 180°/s
± 360°	± 180°/s	± 360°	± 180°/s
1 m/s (39.4 in/s)		1 m/s (39.4 in/s)	
IP54		IP54	
5		5	
Less than 65 dB(A)		Less than 65 dB(A)	
Any Orientation		Any Orientation	
2		2	
2		2	
2		2	
12/24 V		12/24 V	
2 A (Dual pin) 1 A (Single pin)		2 A (Dual pin) 1 A (Single pin)	
Ø 190 mm		Ø 190mm	
Aluminium, Plastic, Steel		Aluminium, Plastic, Steel	
M8 | M8 8-pin		M8 | M8 8-pin	
6 m (236 in)		6 m (236 in)	
33.5 kg (73.9 lbs)		33.1 kg (73 lbs)	
0-50°C		0-50°C	
90%RH (non-condensing)		90%RH (non-condensing)	



3D Layouts Available

The power to automate is in your hands.

e-Series 3PE Teach Pendant

All e-Series cobots include the standard e-Series Teach Pendant, offering an intuitive user interface for easy programming with UR's powerful PolyScope software.
A 3-position enabling teach pendant is also available as a variant for all payloads of e-Series robots, and as a UR+ component. The 3PE device is mechanically and function-ally integrated with the e-Series Teach Pendant – just Plug & Produce with any e-Series control box. Additionally, it is fully integrated into the PolyScope user interface to enable all robot motion, including Freedrive, in manual mode.

Key Benefits

- Full mechanical 3PE device integration
- Full software integration - the 3PE Teach Pendant is natively supported in PolyScope
- Connects to the control box with the same connector as the standard e-Series teach pendant
- Can be mounted to any existing e-Series teach pendant brackets
- Includes two 3PE devices, allowing comfortable use with left or right hand
- Included in TÜV NORD certifications ISO 10218-1:2011 and ISO 13849-1:2015

Hardware Specifications

Width	300 mm (11.81 in)
Height	231 mm (9.09 in)
Thickness	50 mm (1.97 in)
Weight, including 1 meter of cable	1.8 kg (3.961 lbs)
IP Classification	IP54

Your solution
with UR built in.

e-Series OEM Control Box

Our standard control box complements the mobility and small footprint of our cobot arms. To meet the growing demand for cobots in sophisticated, purpose-built automation systems, we have developed a ready-to-integrate control box, designed to be embedded in another control panel. The minimal form factor of our OEM Control Box is powering complex automation sys - tems, turnkey solutions, and OEM products, across many industries and applications.

The compact OEM control box is available with all sizes of e-Series robot arms, in AC or DC versions.

Key Benefits

- Cost effective
- Compact and lightweight
- No teach pendant or metal cabinet enclosure
- Reduces unneeded components and waste
- Power connector with strain relief included makes wiring easy
- Convenient mounting features
- AC model, like our standard robots, can be powered by a standard single-phase wall outlet
- DC model is ideal for battery-operated systems such as mobile robots

Hardware Specifications

OEM Control Box Size (W×H×D)	451 mm × 168 mm × 150 mm (17.8 in × 6.6 in × 5.9 in)
Weight	AC model: 4.7 kg (10.4 lbs) DC model: 4.3 kg (9.5 lbs)
Input Voltage	AC model: 100–240 VAC, 47–440Hz DC model: 24–48 VDC (typical)
Standby Power	AC model: <1.5 W DC model: <7 W

System specifications.

A control box, teach pendant, and standard cable are included with every standard robot arm.

Control box

Features

IP classification	IP44
ISO 14644-1 Class Cleanroom	6
Operating Temperature Range	0-50°C
Humidity	90%RH (non-condensing)
I/O ports Digital in Digital out Analog in Analog out Quadrature Digital Inputs	 16 16 2 2 4
I/O power supply	24V 2A
Communication	500 Hz Control frequency Modbus TCP PROFINET Ethernet/IP USB 2.0, USB 3.0
Power source	100-240VAC, 47-440Hz

Physical

Control box size (WxHxD)	460 mm x 449 mm x 254 mm (18.2 in x 17.6 in x 10 in)
Weight	12 kg (26.5 lbs)
Materials	Powder Coated Steel

Teach pendant

Features

IP classification	IP54
Humidity	90%RH (non-condensing)
Display resolution	1280 x 800 pixels

Physical

Materials	Plastic, PP
Weight including 1m of TP cable	1.6 kg (3.5 lbs)
Cable length	4.5 m (177.17 in)

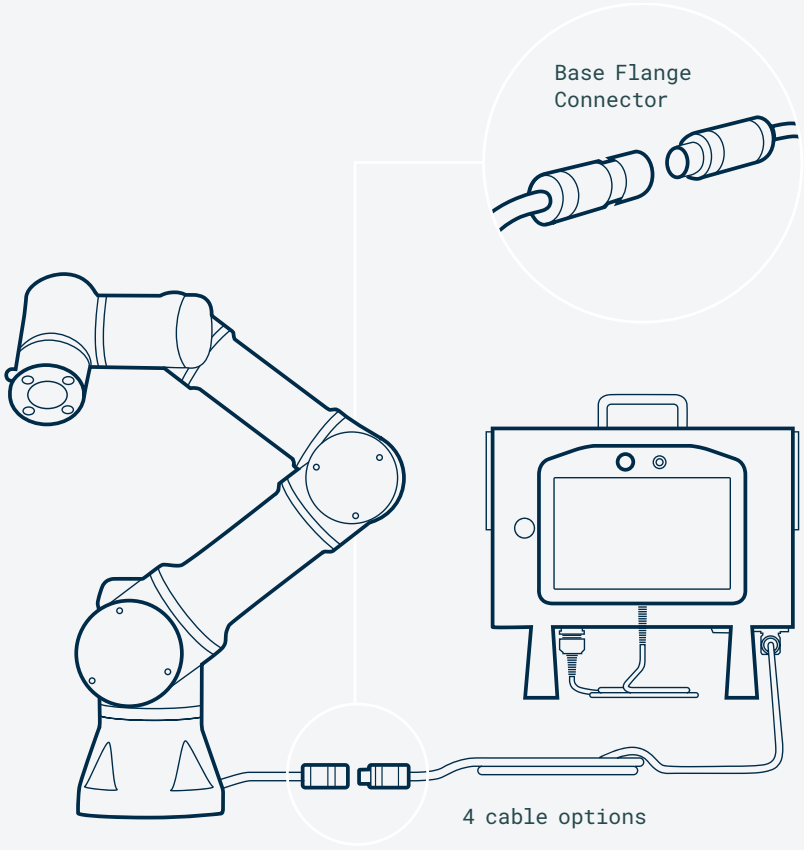
PolyScope – our intuitive programming interface.

PolyScope offers users a high-level interface for very straightforward applications that any frontline operator can master. It also features a deep and complex programming environment for developers to pursue complex and experimental cobot applications.

Cable suite
for e-Series.

Every e-Series purchase includes a 6 m standard cable and a base flange connector that enables through-side and through-hole mounting for your robot.

The cable suite offers variants available for separate purchase that simplify the deployment of many common applications, like extending your range with a 12 m version of the standard cable. Also available is the High-Flex cable, designed to withstand more extensive and repeated bending. Making the right selection from the cable suite helps manufacturers tend multiple machines, weld larger workpieces, and in crease pallet height with ease.



Specification	Standard*	Standard Extended**
Material	PVC	PVC
Color	Black	Black
Length	6 m (19.7 ft)	12 m (39.4 ft)
Diameter (d)	12.1 mm (0.48 in)	12.1 mm (0.48 in)

Specification	High-Flex**	High-Flex Extended**
Material	PUR	PUR
Color	Blue	Blue
Length	6 m (19.7 ft)	12 m (39.4 ft)
Diameter (d)	13.4 mm (0.53 in)	13.4 mm (0.53 in)
Bend Radius	4 x d (static) 8 x d (dynamic)	4 x d (static) 8 x d (dynamic)
Bend Cycle	5 million	5 million

* Included with robot purchase
** Separately sold accessory

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ActiNav™
Next-generation machine loading.

ActiNav

This ActiNav Demo is located at our Service/Training Center.

What makes ActiNav next-generation?

Precision

Precise scanning – even on complex parts.

Thanks to ultra-high resolution sensor technology, ActiNav processes up to 3.2 million 3D points in every scan. This means it can work with complex parts, and a variety of bin sizes.

The advanced sensor technology used in ActiNav has a high tolerance to a variety of lighting conditions and can detect parts whether they have black, shiny or reflective surfaces. ActiNav combines advanced scanning with high-accuracy CAD-based matching algorithms which means you benefit from accurate part scanning and picking around the clock.

Consistency

Parts are placed the same way, every time.

ActiNav optimizes motion trajectories to avoid collisions, joint limits and singularities. It's built to be relied upon.

With 20 years of path planning technology built in, ActiNav explores multiple paths to multiple parts in every cycle. Advanced multi-threading means it's actually processing future potential paths while executing a current path and driving the robot motion. Scanning at each cycle ensures parts don't shift and that each pick is accurate, so it will keep operating, even overnight, and without interventions.

Intuition

Intuitive technology, powered by AMM.

The Autonomous Motion Module (AMM) lies at the heart of ActiNav, delivering vision processing, collision-free motion planning and real-time control.

ActiNav automatically exploits part and end effector symmetry to expand the range of path options for moving the part, instinctively adapting to perform at its best. There's no need to program every step or rely on pre-programmed waypoints. Simply teach the system what you'd like it to do, and it will work out the best way to do it.

Agility

An agile program, for optimized tasking.

Plans change. But ActiNav lets you adapt quickly. Alter your workcell, bin size or place target in minutes, without changing other sections of the program.

It can be installed next to your existing machines, without changing your factory layout. And, once it's in, ActiNav can be shown how to run many kinds of parts in the same machine. Adding a new part type only takes a matter of hours, not weeks.

Plan, pick and place parts with unrivaled accuracy.

ActiNav™ combines intelligent vision and sensor software with the autonomous motion control of Universal Robots' world-leading cobots. Delivering game-changing machine loading that's precise, consistent, intuitive and more agile than ever before.

Plan, pick and place parts with total accuracy. Without collisions or the need to stop, machine uptime and productivity is optimized.

Plan

Pick

Place

Solve part handling challenges with ActiNav.

Automating machine loading used to mean integrating conveyors, bowl feeders, custom trays, shaker tables and much more. But, since most parts are already in bins, the most flexible and scalable route to integration is moving parts directly from bin to machine.

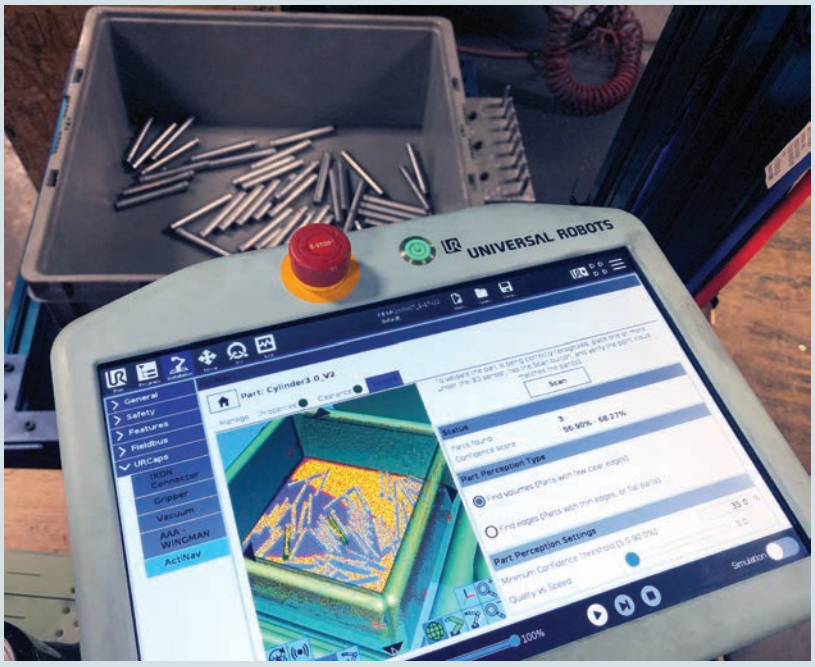
Typically, bin picking with accurate part placement is unreliable and complicated. But with its advanced vision and motion control, ActiNav cuts out this complexity and risk, unlocking new levels of productivity.

Easy to implement.
Easy to use.
Quick to perform.

Boost worker flexibility with automation and get set up in 2 hours or less.

ActiNav's entire application sits within the UR teach pendant, where operators are guided through a simple, six-step setup process. A smooth user experience, with no robotics or vision expertise required. Two hours or less is all it takes to program ActiNav and start transforming your business.

Rather than leaning on pre-programmed waypoints, ActiNav uses functions like 'Free Spin Pick' to automatically select the optimal path plan for the picked part. It can be placed almost anywhere and be programmed by almost anyone. And, it can learn a complete program in no more than 12 lines of programming. Significantly less than the hundreds needed by its competitors.



Pick your parts with a magnet, vacuum, or two-finger gripper.

An investment with staying power.

You can achieve a typical payback time of less than 18 months on two shift operations with ActiNav.

In the entire deployment, the only part-specific elements are the end effector and CAD file. Because of this limited part-specific investment, an ActiNav application kit has tremendous versatility to be cost-effectively re-deployed to new parts or machines.

Discover lower maintenance requirements, reduced labor costs and higher rates of productivity. All with next-level accuracy.

How does it work?

Position a UR e-Series robot in your existing operator workspace, attach the end effector of your choice and mount the included 3D sensor above your bin of parts.

Using the teach pendant, train your environment by touching objects the robot can reach. Then, using the scan-to-teach feature, train the desired pick points and part-relative placements.

The Autonomous Motion Module enables the robot to actively navigate into the bin, move through the environment collision-free, and place parts into the machine with very little programming. No two paths are the same, but part placement is consistent and precise.

Advanced part picking.

Reduce labor costs and enhance manufacturing turnover.

ActiNav is designed to run unattended for extended periods of time and uninterrupted production runs. And when parts are running low, you'll be alerted. So, production levels go up, along with your own productivity.

ActiNav works out the best way to pick and place. Thanks to its 'Free Spin Pick' function, a single trained pick means ActiNav will consider a full 360° of tool rotation. This means fewer lines of programming and leads to better bin pick percentage and cycle time performance.

ActiNav technical details.

	UR5e	UR10e
Performance		
– Power consumption	Approx. 200 W using a typical program	Approx. 350 W using a typical program
– Collaboration operation	17 advanced adjustable safety functions incl. elbow monitoring. Remote Control according to ISO 10218	17 advanced adjustable safety functions incl. elbow monitoring. Remote Control according to ISO 10218
– Certifications	EN ISO 13849-1, Cat.3, PL d, and EN ISO 10218-1	EN ISO 13849-1, Cat.3, PL d, and EN ISO 10218-1
– F/T Sensor - Force, x-y-z		
Range	50 N	100 N
Resolution	2.5 N	2.0 N
Accuracy	4.0 N	5.5 N
– F/T Sensor - Torque, x-y-z		
Range	10 Nm	10 Nm
Resolution	0.04 Nm	0.02 Nm
Accuracy	0.30 Nm	0.60 Nm
– Ambient temperature range	0-50°C	0-50°C
– Humidity	90%RH (non-condensing)	90%RH (non-condensing)
Specification		
– Payload	5 kg / 11 lbs	12.5 kg / 27.5 lbs
– Reach	850 mm / 33.5 in	1300 mm / 51.2 in
– Degrees of freedom	6 rotating joints DOF	6 rotating joints DOF
– Programming	Polyscope graphical user interface on 12 inch touchscreen with mounting	Polyscope graphical user interface on 12 inch touchscreen with mounting
Physical		
– Footprint	Ø 149 mm	Ø 190 mm
– Materials	Aluminium, Plastic, Steel	Aluminium, Plastic, Steel
– Tool (end-effector) connector type	M8 | M8 8-pin	M8 | M8 8-pin
– Cable length robot arm	6 m / 236 in	6 m / 236 in
– Weight including cable	20.6 kg / 45.4 lbs	33.5 kg / 73.9 lbs
Bin Picking Solution		
– Max reach	850mm	1300mm
– Power requirements	100-240V AC, 47-440Hz	100-240V AC, 47-440Hz
– Autonomous Motion Module	232 X 90 X 232	232 X 90 X 232
– 3D Sensors	UR5e	UR10e
– Minimum part size	15 x 15 x 2 mm	20 x 20 x 5 mm
– Minimum thickness	2 mm	5 mm
– Maximum bin size (WxLxD)	630 x 490 x 450 mm	1100 x 970 x 850 mm
– Nominal scanning distance (focus)	650 mm	1239 mm
– Scanning range depth of field)	458 – 1118 mm	870 – 2150 mm
– Scanning area (typical)	590 x 421 mm	1082 x 802 mm
– 3D sensor size	77 x 68 x 416 mm	77 x 68 x 616 mm
– 3D sensor weight	950 g	1100 g
– Light source	Visible red light (laser)	Visible red light (laser)
– Wavelength	638 nm	638 nm
– Laser class	3R (IEC/EN 60825-1, 2014)	3R (IEC/EN 60825-1, 2014)
– Sensor IP rating	IP-40	IP-40

UNIVERSAL ROBOTS

Service Offerings

Warranty Options

	UR CARE	UR INSIGHT	UR PERFORMANCE
Warranty	-	-	✓ *
myUR Customer Portal	✓	✓	✓
UR Academy (e-learning, webinars, tutorials)		✓	✓
Knowledge Hub	✓	✓	✓
NEW! Customer Success Management	✓	✓	✓
NEW! myUR Monitoring		✓	✓
Annual Cobot Performance Check			✓
Coming soon myUR Remote Control			✓

*Max contract length of 36 months
*Requires Annual Cobot Performance Check
*Recertification required if Cobot is out of warranty

Service designed to EMPOWER

Service Offerings

Our next generation service includes 3 levels providing operators exactly what they require.

UR CARE
Provides **support** and **ressources** you can expect from a trusted partner

SUPPORT

- UR Academy
- myUR Ticket Management
- Knowledge Hub
- Customer Success Management

UR INSIGHT
Achive **clarity** through collecting and understanding data

VISIBILITY

- Monitoring
- Notifications
- Dashboards

UR PERFORMANCE
Leverage **expertise** to verify your cobot is used as expected and optimize productivity and longevity

ENHANCE

- Annual Cobot Perfomance Check
- Extend warranty

Learn, Improve, Adapt

UR CARE

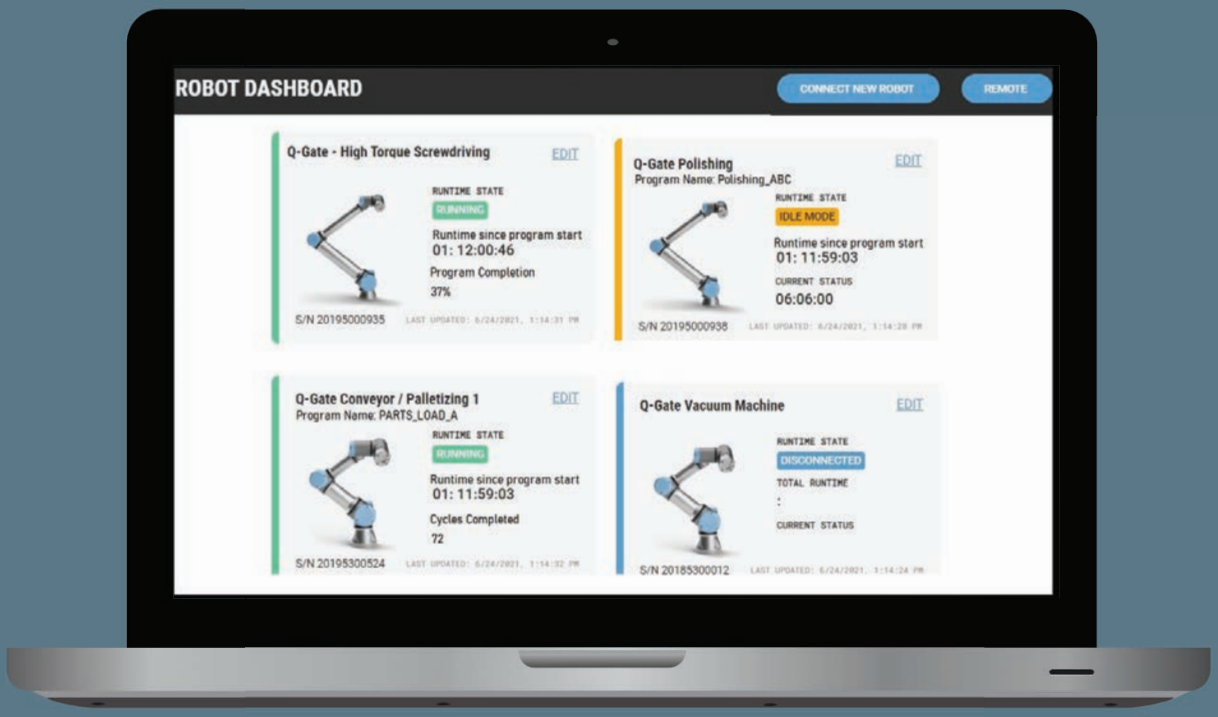
- **UR Academy**
  Award winning training to secure a good start of your journey with Universal Robots
- **Support**
  Aways available when you need us
- **Knowledge Hub**
  ... is the place to go for information

See, Understand, Manage

UR INSIGHT

Includes everything in UR CARE, plus following:

- **Remote Monitoring**
  Track cycle time and cycle count in real time
- **Dashboard**
  Monitor multiple robot workcells on one dashboard
- **Notifications and Alerts**
  Receive notification for robot stops, alarms and customized application specific events
- **Log Report**
  Diagnose production inefficiencies with log reports



Strive, Optimize, Transform

UR PERFORMANCE

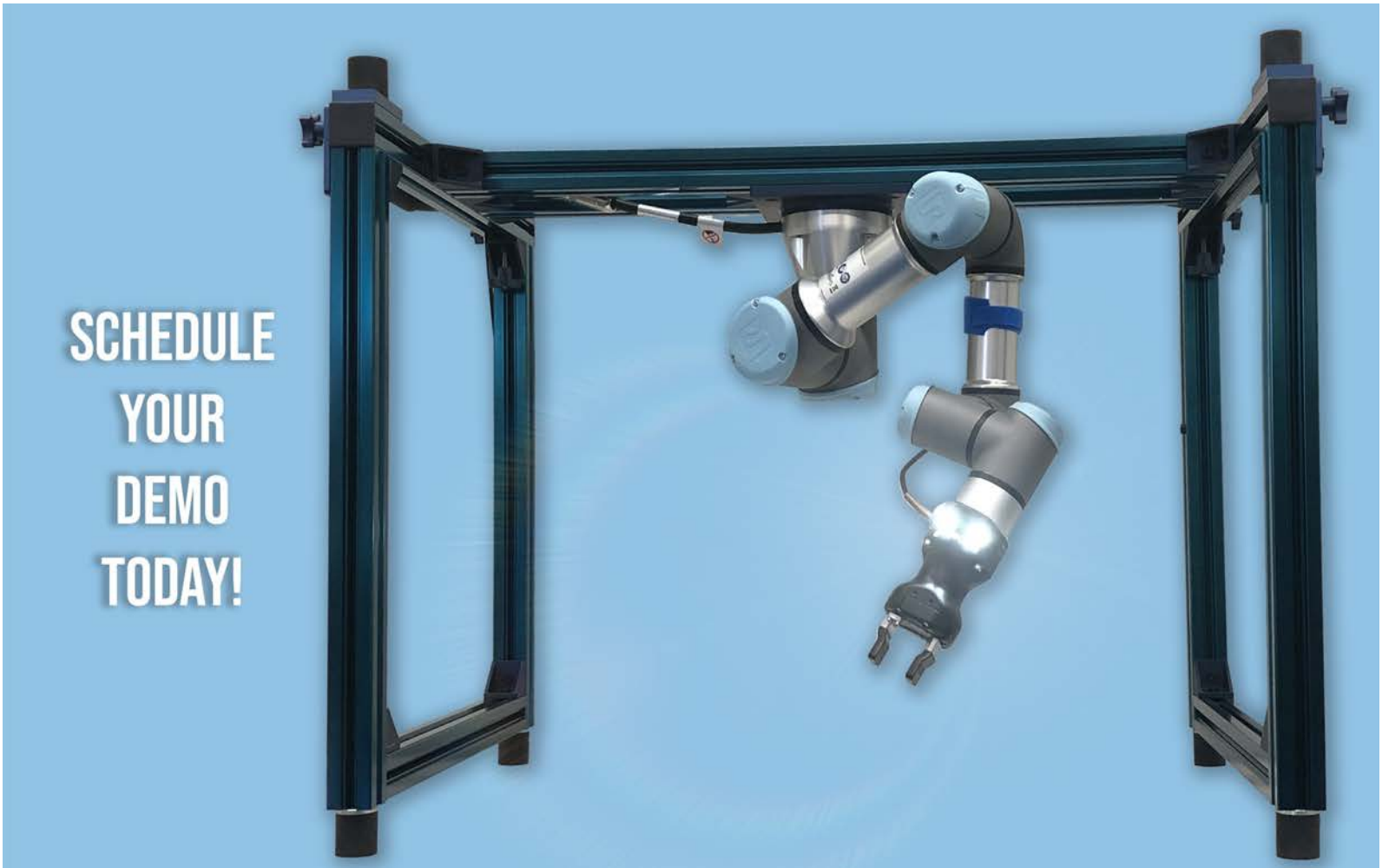
Includes everything in UR INSIGHT, plus the following:

- **Annual Cobot Performance Check**

  Ensures you treat your Cobot well and optimize your product's lifetime

- **Covered Under Warranty**

  Be confident knowing Universal Robots cover you in case your Cobot breaks



MSD Sales Training / Service Center

ROBOT ACCESSORY PRODUCT LINES

UNIVERSAL ROBOTS
Preferred Distributor

MSD SALES INC ROBOTICS DIVISION

Service Center

3100 C Ave Ext
Marion, Iowa 52302
By Appointment Only
Parts@msdsalesinc.com

Serving all of Iowa & Nebraska

Training / Demos Available

Corporate Contacts

Office: (319) 899-4646
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