

**YASKAWA**

# Robot Assistants

Collaborative and Easy-to-Use



# Masters of Robo Motion and Cont



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rol



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# SAFE







# HIGH SPEED Collaboration

## FAST >> 2000 $\frac{\text{mm}}{\text{s}}$ Maximum Speed\*

The efficient, high-speed MOTOMAN HC Series provides superior performance with increased axis speeds, surpassing other cobots in its class to deliver maximum productivity.

## AGILE >> Torque Sensors in each Joint

Whether used in coexistence or direct collaboration – the HC Series with progressive sensor technology operates without a fence at peak performance speed. Highly-sensitive sensors immediately detect contact situations and initiate a counter movement that reduces the forces and pressures applied.



## POWERFUL >> Industrial Sigma-7 Servos

Sigma-7 products set a new industry standard in servo capability, with features that continue Yaskawa's 25-year reputation for redefining the possibilities in motion automation.

\*linear motion, depending on payload





# > MOTOMAN HC Series

## MOTOMAN HC10 Series



10 kg  
payload

1,200 mm  
reach

$\pm 0.1$  mm  
repeatability



### HC10

- Our basic model



### HC10DT

- Direct Teaching



### HC10DT IP67

- Direct Teaching
- Food Grade Grease
- Protection Class IP67
- Available as Welding Robot





When you hear the term “industrial robots”, you may associate this with images of welding or painting processes at automobile plants. Now however, robots are used in many more fields and across applications including logistics, pharma and food manufacturing. In recent years, skilled labour shortages at manufacturing sites have become an increasing challenge globally so that automation, utilizing robots has become increasingly significant. In addition, the needs for the utilization of robots are diversifying these days as we assign multiple jobs to one robot, not just make it repeat a simple single task as before.

Nevertheless, there are still challenges for the small and mid-sized company to install robots as the working area for humans has to be separated from industrial robots by a safety fence, which requires sufficient space and additional installation costs. The Yaskawa human collaborative robot (HC10) is a new generation of robotics that is capable, affordable, versatile, simple to use and built with the industrial strength for which Yaskawa products are known. These robots are for customers looking for easy automation, a robot to automate tasks, that can work in close proximity to humans.

## MOTOMAN HC20



20 kg  
payload



1,700 mm  
reach



$\pm 0.15$  mm  
repeatability



### HC10DTF

- Direct Teaching
- Food Grade Grease
- Protection Class IP67
- Chemical proof surface



### HC20

- Direct Teaching
- Food Grade Grease
- Protection Class IP67



# Programming for any Experience Level



## Intuitive Direct Teaching (DT)

This intuitive programming method is the perfect entry into programming. Simply move the robot flange by hand, record the motion points and operate the gripper actuation by pressing the respective DT buttons. Code is automatically generated in the background on your pendant.



## Innovative Smart Pendant

Our latest pendant does not compromise between ease of use and capability. The 10-inch touchscreen is operated like a smartphone with features such as a blend in sidebar, large intuitive buttons or split screen mode. Seamless direct teaching integration makes programming with collaborative robots particularly user-friendly.



## Classic Teach Pendant

With over 40 years of experience in robotic applications, this latest pendant has the proven performance for complex tasks. With full access to our function portfolio, the robust industrial design and the combination of haptic feedback and touchscreen operation, programming possibilities are limitless.

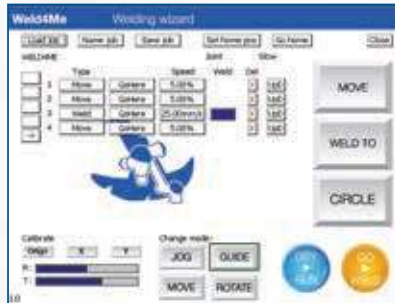








# Fast Learning Curve



## Application-specific Wizards

Application wizards are designed to simplify the steps and decisions you need to make in order to have a working robot program. It is about hand guiding the tip to a sequence of positions, recording and playing back the sequence.



## Smart Frame Technology

Our patented technology determines the user's orientation relative to the robot, supplementing existing three dimensional coordinate system. This intuitive jogging method works by tilting the smart pendant in the desired programming direction.

## Integrated Help Menu

Whenever you face challenges with programming your job, the integrated assistance explains the single functions in detail to you.





# Industrial Robot Controllers



## Classic YRC1000 Controller

The YRC1000, is a fast and flexible controller for MOTOMAN robots that combines a high performance robot controller into a small footprint cabinet. In addition to the typical Yaskawa controller functionality, this new controller generation enables increased robot speeds and higher path accuracy.



## Space-saving YRC1000micro Controller

Powerful and precise, the compact YRC1000micro controller minimizes installation space whilst optimizing performance. Its small footprint and lightweight are ideal for installations with high-density layouts, where stacking of controllers may be required.



## 90+ Industrial Robot Functions

The YRC1000 controller series includes over 90 optional function packages for industrial robots.





# Safe Work Assistant

The MOTOMAN HC series with PLd Cat. 3 certificate utilizes 25 safety functions to keep your operator safe. Particular attention was paid to the sensor technology in each joint for increased sensitivity.

## PL d Cat. 3

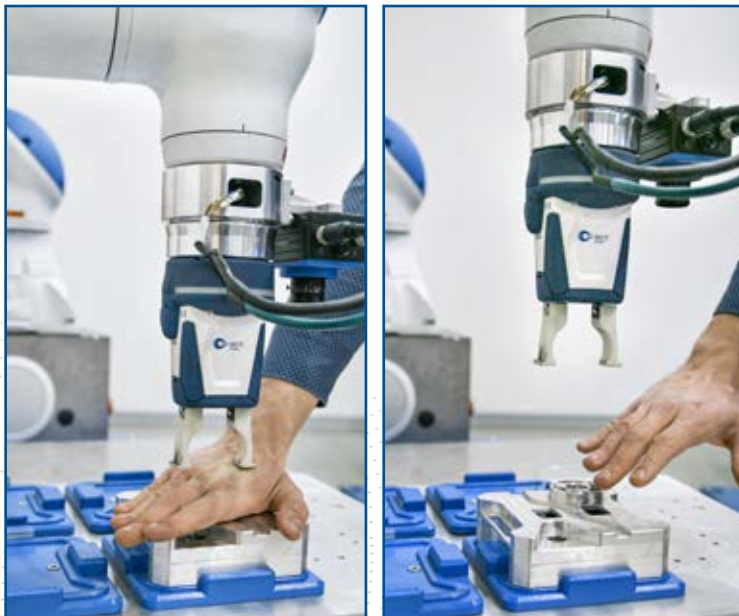
Performance Level d Category 3  
Certificate according to  
EN ISO 13849-1

## 25

Hardware and  
Software  
Safety Functions

### Retract & Clamp Release Function

Our unique safety technology helps detect clamping situations and can react before injury. An immediate robot retract reaction reduces the applied pressure, while the following free drive motion enables the operator to free himself.







## Torque Sensors in each Joint

Each joint is monitored by a single sensor system, that can sense its environment. When a collision occurs, the HC executes a safe stop. The robot's sensitivity is adjustable to adapt to the respective production environment. From sensitive measurement tasks to heavy workpiece handling: the HC robot acts accordingly.

## Rounded Edges without Pinch Areas & internal Media routing

## Pushback Function

The robot can be pushed away smoothly whilst in motion, i.e. if the robot is in the way of the operator during manual process. After push back, the robot moves back to its last position and continues his work.





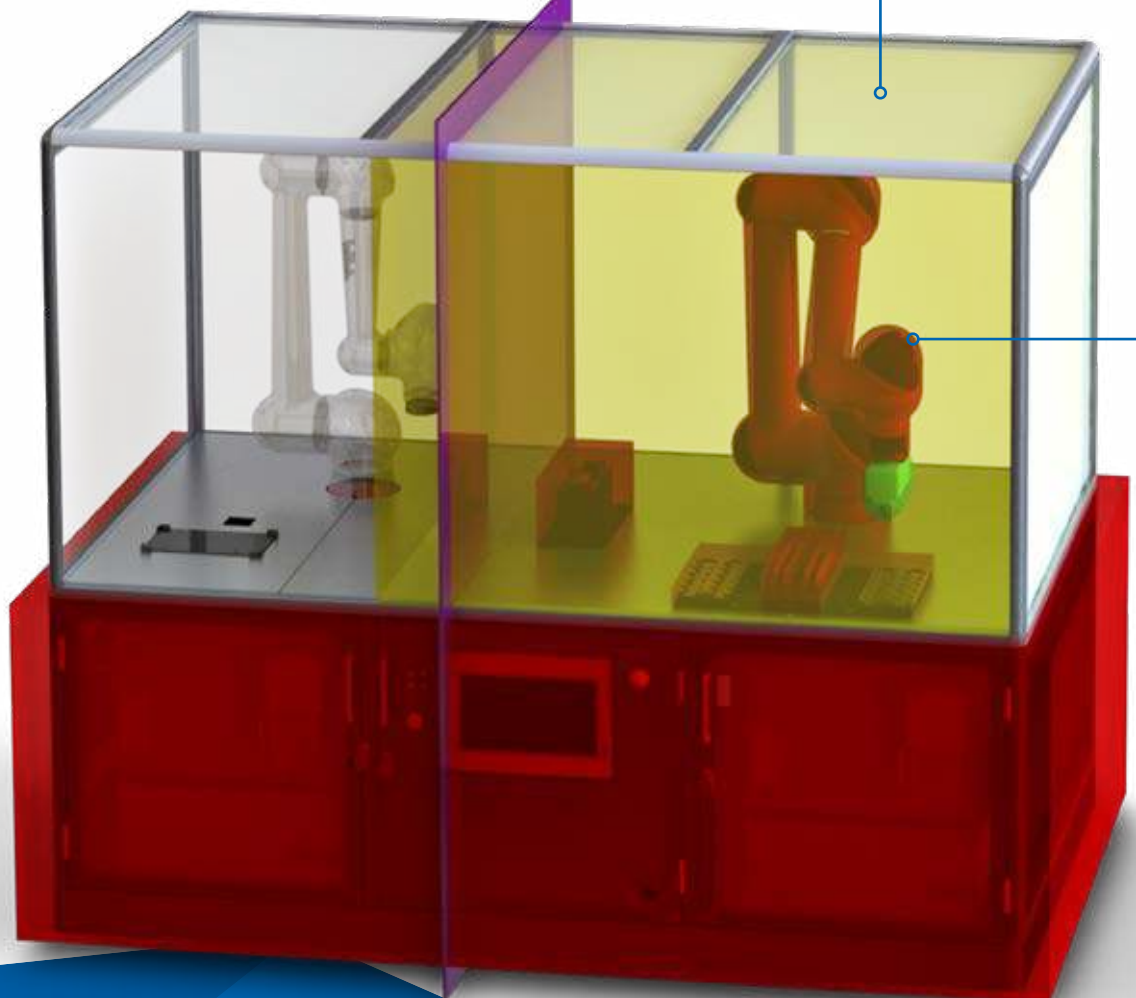
# Safety Controller & Offline Simulation

The powerful Functional Safety Unit monitors the robot's movements and sensors and is the control centre of your safety settings. With the simple interface, speed levels and 3D safety areas are quickly defined.

## 3D Area and Plane Definition

Create safe working areas and individual speed levels:

- Yellow areas to limit the robot's movement area
- Orange areas to reduce the robot operating speed
- Red areas to ensure collision-free operation
- Planes to lock robots to each other

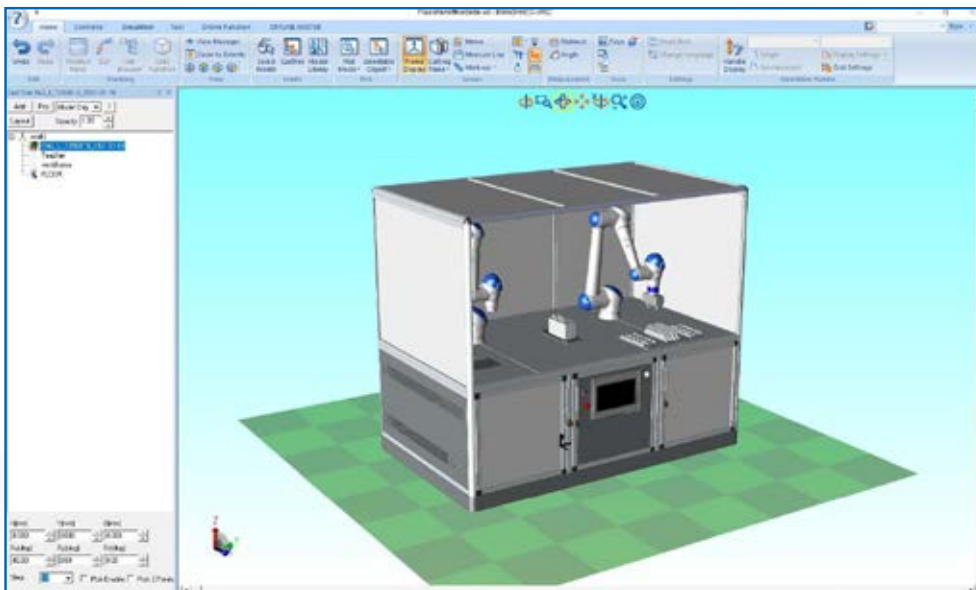


## High-precision Envelope Curves

The robot and tool envelope can be designed very exactly using multiple geometrical elements. This enlarges the available operating space of the robot and increases the safety of the whole application.



Offline programming, 3D simulation and Virtual Robot Control all make it easy to build and simulate a robotic cell without ever installing a robot. Yaskawa provides MotoSim EG-VRC and MotoSize for building and simulating your robot cell. Main features are:



- Offline programming of your whole robot cell
- Minimisation of setup, non-productive and commissioning times
- Full control functionality and simulation of the Yaskawa product family, including robots, gantries, tracks and positioners

# One Robot – three Modes

Our hybrid robots react to the present situation by adjusting their operating speed. In combination with external safety devices, such as pressure sensitive mats or laser scanners, HC robots detect the proximity to the operator and adjust their speed accordingly. This hybrid operation concept provides your application maximal profitability while not compromising occupational safety.

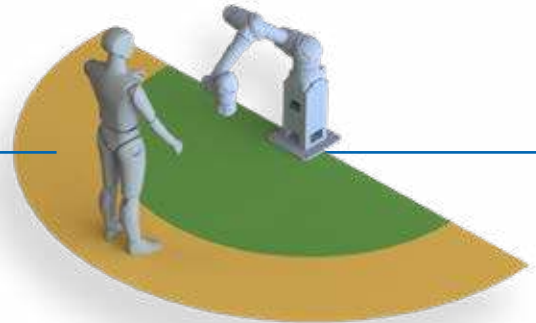
## Collaborative Mode

During direct interaction with the operator, the robot moves in collaborative speed. While classic industrial robots would stop at close proximity, cobots can continue their operation. The torque sensors in each joint guarantee safe operation during the interaction phases.



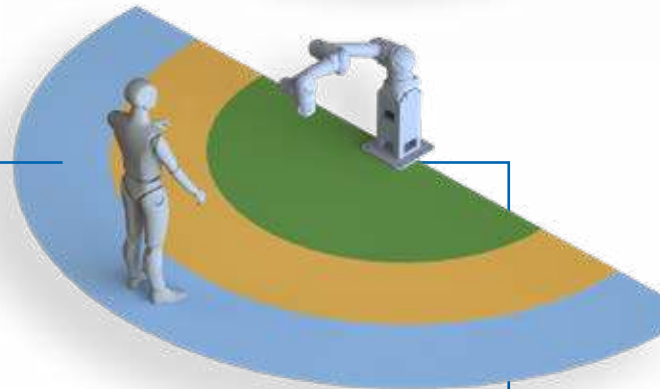
## Speed-Reduced Mode

When entering the robot's operating space, the distance is detected and the robot starts to slow down until the collaborative mode is activated at very high proximity. After leaving this area, the robot switches to industrial mode and works in full-speed.



## Full-Speed Mode

As manufacturer of industrial robots, Yaskawa put all its engineering knowledge in the HC series to provide a cobot on industrial robot level. Besides the robust design, the robot can also operate in industrial speed up to 2 m/s.





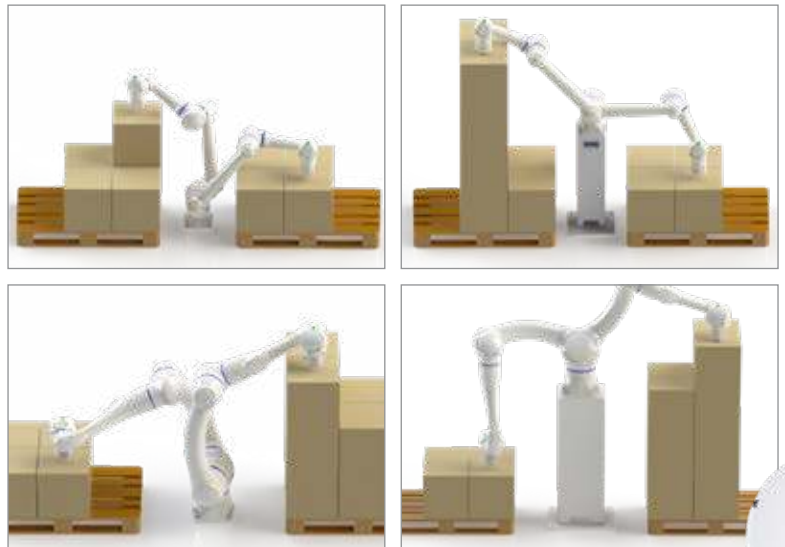
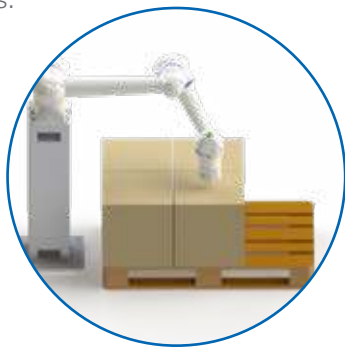
# es – endless Possibilities



# High Reach and Payload

## Operation below Basis

When adding a robot riser stand, the manipulator can grip below its own base, leading to increased stacking heights of the pallets.





### Plug & Play Accessories

Our Smart Series program cooperates with various 3rd party companies, providing our customers a wide range of easy-to-use accessories.



### Large Working Area

The operating range of HC robots is designed to reach the long side of a pallet without the need of a robot pedestal.





# Operates in Rough Environments



## Easy to clean

The high IP67 protection class of our robots makes it easy to clean the robot after operation.



## Dust and Dirt Protection

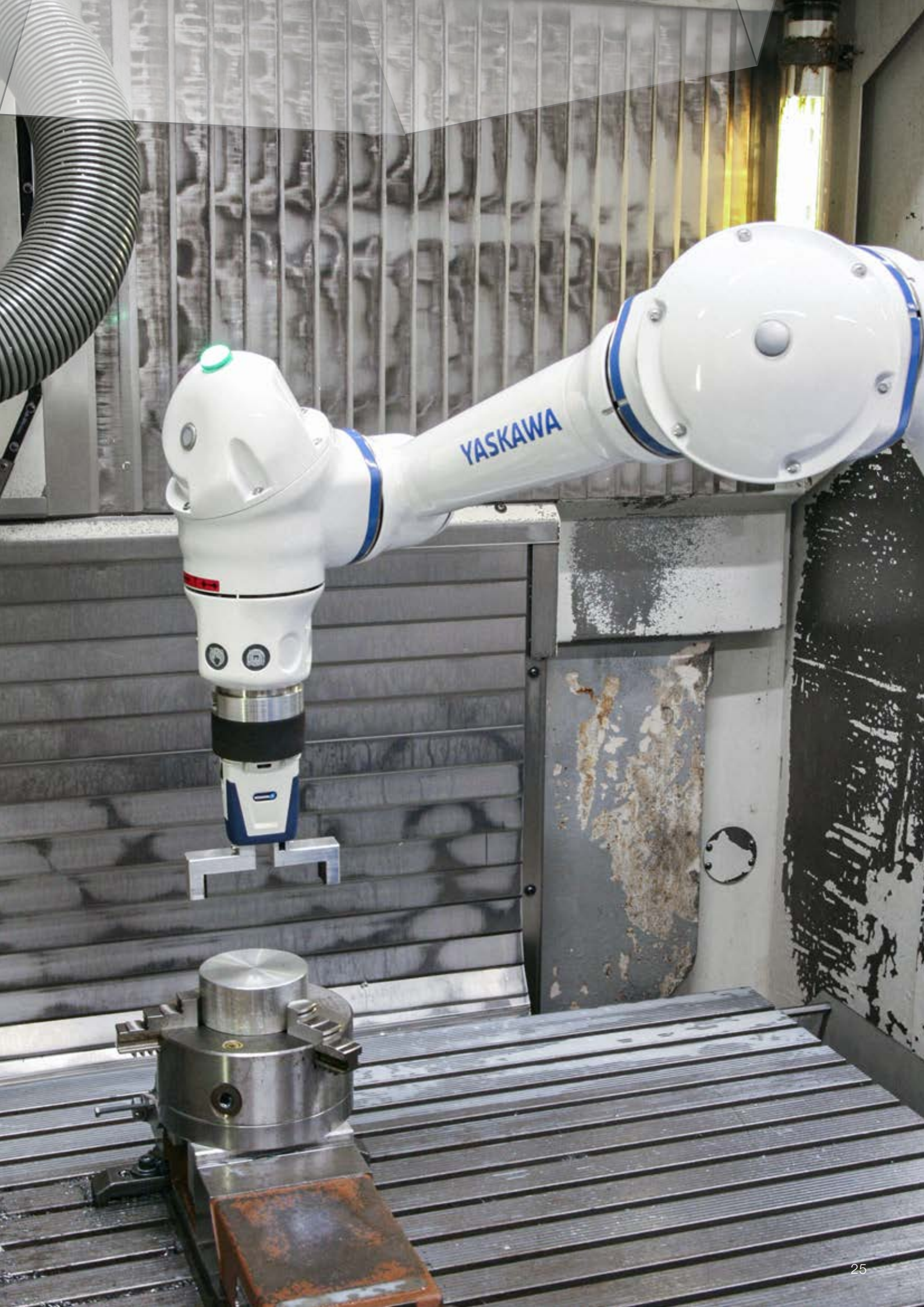
The robust industrial design makes our IP67 robots the perfect choice for industrial jobs, such as machine tending or welding.



## Resistant to Fluids

IP67 gives the robot optimal protection against water spray and ingress of drilling fluids or emulsions; it even withstands submerging in water.









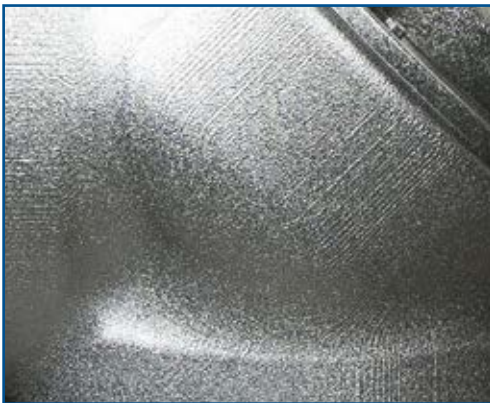


# Ideal for Sensitive Environments



## Food Grade Grease in all Joints

Our HC IP67 and DTF models are upgraded with food grade grease to handle food or pharmaceutical products standards.



## Powder-coated Surface

The special DTF chemical proof coating and VITON seals allow cleaning the robot with acid or alkaline detergents as well as disinfecting the robot with  $H_2O_2$ .



## Cleanroom Specifications

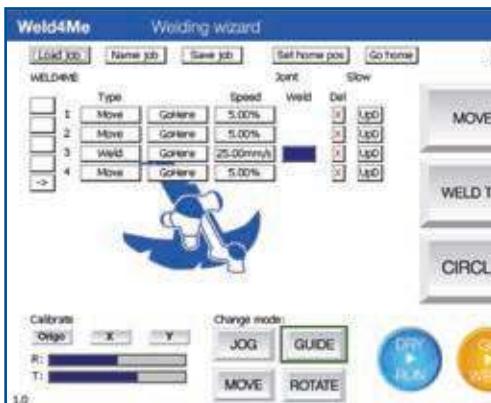
The ISO class 5 of the DTF model complies with cleanroom class A according to the EG-GMP guideline, which makes this robot suitable for particularly high purity requirements.

# Welding Made Easy Weld4Me



## Easy Teaching

Easy to use programming buttons, like “Move”, “Weld to” and “Circle” makes it easy to put together a welding job for the robot. You can always test and run through the motions of your robot job with a “dry run”, and make adjustments if needed, before you start the actual welding process.



## Easy Programming

Although you are using the traditional robot programming pendant, there is no need to learn all its functions, buttons and programming language. The Welding Wizard application window will guide you through all the steps in the creation of a welding job.



## Easy Relocating

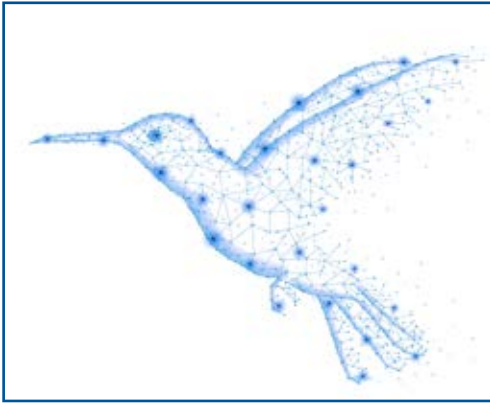
Due to its small footprint and space saving design, this solution can be easily added to an existing production line. The operational stand is movable with a hand-held fork lifter for easy relocation.







# Compact and Lightweight Design



## Optimal Payload-Weight-Ratio

The HC series is designed to save more than 50% of weight compared to industrial robots. Less moved masses are especially important during the direct collaboration with the operator.



## Operation on Linear Axis and Gantries

Low manipulator weight requires less massive gantry steelwork and reduces typical fabrication costs compared to classic automation solutions.



## AGV Operation

Low manipulator weight and collaborative design allows the integration into AGV fleet solutions.



# Smart Series Partner Program

Yaskawa has partnered with the leading gripper and accessory manufacturers to provide our customers an ecosystem of ready-to-use plug&play products.




1. Receive your  
ready-to-install Package



2. Install the Gripper  
on your Robot



3. Configure on  
the Smart Pendant

**SMART**  **SERIES**

**Join our  
Partner  
Network!**







# Yaskawa Total Customer Support (TCS)

Yaskawa supports you throughout the entire product lifecycle with service products and services tailored to your needs. The 360 all around support, the TOTAL CUSTOMER SUPPORT, not only refers to the Yaskawa products and systems but also to your applications and processes. Through our global service network, Yaskawa is always close to you to ensure your success, because customer satisfaction is our top priority!

As soon as you consider acquiring an automation solution or robot for your company, that is where we come in. With many years of expertise in this field, and in-house coverage of all areas, we are able to offer comprehensive service that truly deserves the name "Total Customer Support".

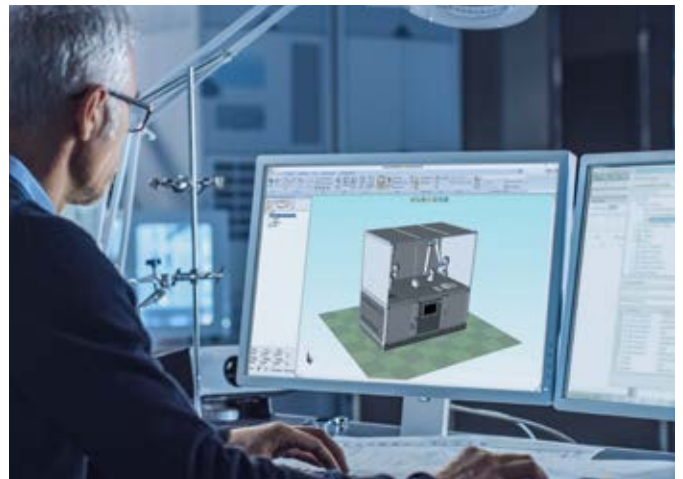
## E-Learning



- HC programming Training with Teach and Smart Pendant
- FSU Webinar

Become familiar with our programming language completely online. Our academy provides e-learning for Teach and Smart Pendant and the configuration of the Functional Safety Unit.

## Cell Design



- 3D Simulation
- Reachability Studies
- Cycle Time Optimization
- Prototyping

Even if you have only a vague notion of your automation solution, Yaskawa will draw up a concept for you and integrate the required components as a turnkey system.

## Safety Consulting



- Initial Analysis
- Feasibility Test
- CE Support
- Crash Course Collaborative Design

Safety made easy – Yaskawa can advise you during the planning phase and support you in the CE process from defined safety zones to flexible safety concepts.

## Personal Advice



- In-Process Engineering Services

Our company's commitment to customer satisfaction starts with your dedicated sales specialist, there to support your project through to its completion.

## In Class Training



- On Site
- In our Academies

The Yaskawa Academy offers a broad range of courses to suit the level of knowledge of the participants – from beginner to expert.

## Aftersales



- Hotline
- Maintenance and Repair
- Overhauls and Refurbishments

Our experienced technicians are only a phone call away to provide you with fast and competent advice on every aspect of your robot system.



# List of technical Specifications of all Models

## HC10



### Specifications HC10 Standard (A00)

Axes	Maximum motion range [°]	Maximum speed [°/s]
S	±180	130
L	±180	130
U	+355/-5	180
R	±180	180
B	±180	250
T	±180	250

## HC10DT



### Specifications HC10DT Standard (A10)

Axes	Maximum motion range [°]	Maximum speed [°/s]
S	±180	130
L	±180	130
U	+355/-5	180
R	±180	180
B	±180	250
T	±180	250

## HC10DT IP67



### Specifications HC10DT IP67 (B10 + B12)

Axes	Maximum motion range [°]	Maximum speed [°/s]
S	±180	130
L	±180	130
U	+265/-95	180
R	±180	180
B	±180	250
T	±180	250

## HC10DTF



### Specifications HC10DTF (F10 + F13)

Axes	Maximum motion range [°]	Maximum speed [°/s]
S	±180	130
L	±180	130
U	+265/-95	180
R	±180	180
B	±180	250
T	±180	250

## HC20



### Specifications HC20DT IP67 (B10 + B12)

Axes	Maximum motion range [°]	Maximum speed [°/s]
S	±180	80
L	±180	80
U	+247/-67	120
R	±210	130
B	±180	180
T	±210	180

Allowable moment [Nm]	Allowable moment of inertia [kg · m <sup>2</sup> ]	Controlled axes	6
		Max. payload [kg]	10
–	–	Repeatability [mm]	±0.1
–	–	Max. working range R [mm]	1200
–	–	Temperature [°C]	0 to +40*   0 to +35**
27.4	0.78	Humidity [%]	20 – 80
27.4	0.78	Weight [kg]	47
9.8	0.1	Power supply, average [kVA]	1

Allowable moment [Nm]	Allowable moment of inertia [kg · m <sup>2</sup> ]	Controlled axes	6
		Max. payload [kg]	10
–	–	Repeatability [mm]	±0.1
–	–	Max. working range R [mm]	1200
–	–	Temperature [°C]	0 to +40
25.3	0.73	Humidity [%]	20 – 80
25.3	0.73	Weight [kg]	48
9.8	0.1	Power supply, average [kVA]	1

Allowable moment [Nm]	Allowable moment of inertia [kg · m <sup>2</sup> ]	Controlled axes	6
		Max. payload [kg]	10
–	–	Repeatability [mm]	±0.1
–	–	Max. working range R [mm]	1200
–	–	Temperature [°C]	0 to +40
27.4	0.78	Humidity [%]	20 – 80
27.4	0.78	Weight [kg]	58
9.8	0.1	Power supply, average [kVA]	1

Allowable moment [Nm]	Allowable moment of inertia [kg · m <sup>2</sup> ]	Controlled axes	6
		Max. payload (on U-axis) [kg]	10
–	–	Repeatability [mm]	±0.05
–	–	Max. working range R [mm]	1200
–	–	Temperature [°C]	0 to +40
27.4	0.78	Humidity [%]	20 – 80
27.4	0.78	Weight [kg]	58
9.8	0.1	Power supply, average [kVA]	1

Allowable moment [Nm]	Allowable moment of inertia [kg · m <sup>2</sup> ]	Controlled axes	6
		Max. payload [kg]	20
–	–	Repeatability [mm]	±0.05
–	–	Max. working range R [mm]	1700
–	–	Temperature [°C]	0 to +40
58.8	4.0	Humidity [%]	20 – 80
58.8	4.0	Weight [kg]	140
29.4	2.0	Power supply, average [kVA]	1.5

# List of all Safety Functions

- |           |   |
|-----------|---|
| <b>1</b>  | Individual Axis Range Limitation                      |
| <b>2</b>  | Individual Axis Speed Monitoring                      |
| <b>3</b>  | Safety Range Limitation                               |
| <b>4</b>  | Safety Speed Limitation                               |
| <b>5</b>  | Tool Angle Monitoring                                 |
| <b>6</b>  | Tool Change Monitoring                                |
| <b>7</b>  | Robot Range Display                                   |
| <b>8</b>  | Power Limit Function                                  |
| <b>9</b>  | Force Limiting Function                               |
| <b>10</b> | Pushback / Avoidance Function                         |
| <b>11</b> | Retract Function                                      |
| <b>12</b> | Clamp Release Function                                |
| <b>13</b> | Self Interference Function                            |
| <b>14</b> | Tool Interference Function                            |
| <b>15</b> | Emergency Stop  |
| <b>16</b> | External Emergency Stop                               |
| <b>17</b> | Safeguard Stop  |
| <b>18</b> | Password Protection Function                          |
| <b>19</b> | Operation Mode Switch                                 |
| <b>20</b> | Robot Operation Digital Output                        |
| <b>21</b> | Hybrid Operation Digital Output                       |
| <b>22</b> | Safety I/O's to Switch Functions                      |
| <b>23</b> | Safety Feedback Signals                               |
| <b>24</b> | Operation Running Output Signal                       |
| <b>25</b> | Safety Circuit for Monitoring External Safety Devices |





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HU	Flexman Robotics Kft Budapest +36 1 259 0981
LT	Profibus UAB Panevezys +370-45-518575
NO	Skala Robotech AS Lierstranda +47-32240600
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All drawing dimensions in mm.  
Technical data may be subject to change without previous notice.  
Please request detailed drawings at [robotics@yaskawa.eu.com](mailto:robotics@yaskawa.eu.com).

Robot Assistants  
A-06-2021, A-No. 195961

# YASKAWA