YuMi® – IRB 14000
Overview
Agenda

Overview and vision
Technical data
Integration
Outline
Table mounting
Protection
Controller
Customer benefits
Key applications and segments
Summary
Differentiated value proposition
Overview and vision

No barrier
No cages
No zones

YuMi is the first truly collaborative robot solution.
Overview and vision

To meet the flexible and agile production needs required in the consumer electronics industry, and increasingly in other market sectors, ABB has developed a collaborative, dual-arm, small-parts assembly robot solution that includes flexible hands, parts-feeding systems, camera-based part location and state-of-the-art motion control.

The soft padded dual arms together with a light-weight construction and limited power contributes to the overall safety of human co-workers. Innovative technology allows for process robustness and added safety.

YuMi is a vision of the future. YuMi will change the way we think about assembly automation. YuMi is “you and me,” working together to create endless possibilities.
### Demand from all industries

**Overview and vision**

<table>
<thead>
<tr>
<th><strong>Target Industry</strong></th>
<th><strong>Market Demand</strong></th>
<th><strong>Most common feedback</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>3C / Electronics</td>
<td>Human-robot collaboration</td>
<td>Safety fencing and peripherals are big part of the cell cost</td>
</tr>
<tr>
<td>Automotive electronics</td>
<td>Safe by design</td>
<td>Floor space is often limited</td>
</tr>
<tr>
<td>Consumer products</td>
<td>Small footprint / human sized</td>
<td>Labor shortage is driving the need for automation</td>
</tr>
<tr>
<td>Cosmetics</td>
<td>Suitable for fenceless installation</td>
<td>Flexibility is important to support high variety small batch production</td>
</tr>
<tr>
<td>Toys</td>
<td>ESD compliance and CleanRoom</td>
<td>Robots that are easy to deploy and use</td>
</tr>
<tr>
<td>Other industries with small parts</td>
<td>Easy to deploy into production</td>
<td></td>
</tr>
<tr>
<td>assembly</td>
<td>Easy to move and redeploy</td>
<td></td>
</tr>
</tbody>
</table>
Filling a gap
Overview and vision

**Small IRBs**

Our market in the Small Parts Assembly, has reached great potentials
- Good market reputation
- Good performance in terms of accuracy and robustness
- One major drawback – working close to humans and collaboration

Aim of IRB 14000 is to fill this gap

**IRB 14000**

The goal is to provide a flexible and safe automation solution for tasks where robot need to work close to humans, features include:
- Inherent safety
- Flexible feeding parts management
- Vision-Guided Assembly
- Best in class accuracy
- Speed effective assembly
Leading the competition
Overview and vision

- Ultra compact and lightweight design
- High precision and High collaborative working speed
- Equipped with an enclosed controller
- SmartGrippers with integrated vision, vacuum and servo fingers
- State of the art motion control
- Ultra smooth lead through teaching
- First safe robot by design
- Universal parts feeding system (optional)
ABB's comprehensive robot portfolio

Overview and Vision

Strong robot offering from the IRB 120 to the IRB 8700
## Main features

Technical data

<table>
<thead>
<tr>
<th>Feature</th>
<th>IRB 14000 – 0.5/0.5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Payload</td>
<td>0.5 kg per arm</td>
</tr>
<tr>
<td>Reach</td>
<td>559 mm</td>
</tr>
<tr>
<td>Accuracy</td>
<td>0.02 mm</td>
</tr>
<tr>
<td>Footprint</td>
<td>339 mm * 497 mm</td>
</tr>
<tr>
<td>Mounting interface</td>
<td>Foot interface</td>
</tr>
<tr>
<td>Weight</td>
<td>38 kg</td>
</tr>
<tr>
<td>Mounting position</td>
<td>Table</td>
</tr>
<tr>
<td>Temperature</td>
<td>5 C – 40 C deg</td>
</tr>
<tr>
<td>IP Protection</td>
<td>IP 30</td>
</tr>
<tr>
<td>Clean room/Food grade</td>
<td>ISO lvl 5</td>
</tr>
</tbody>
</table>
Payload

Technical data
## Maximum velocity

Technical data

<table>
<thead>
<tr>
<th>Motion Range</th>
<th>Max. Velocity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Axis 1 Rotation</td>
<td>+168.5° to -168.5°</td>
</tr>
<tr>
<td>Axis 2 Arm</td>
<td>+43.5° to -143.5°</td>
</tr>
<tr>
<td>Axis 7 Rotation</td>
<td>+168.5° to -168.5°</td>
</tr>
<tr>
<td>Axis 3 Arm</td>
<td>+80° to -123.5°</td>
</tr>
<tr>
<td>Axis 4 Wrist</td>
<td>+290° to -290°</td>
</tr>
<tr>
<td>Axis 5 Bend</td>
<td>+138° to -88°</td>
</tr>
<tr>
<td>Axis 6 Turn</td>
<td>+229° to -229°</td>
</tr>
</tbody>
</table>
YuMi: IRB 14000
Table mounting
Protection

**IP Protection**

IP 30 (Standard)
- It is sufficient for assembly

**ESD Protection**

It makes it possible to handle static sensitive parts

**CleanRoom**

YuMi IRB14000 has been certified by Fraunhofer institute (IPA) in Germany to fulfil CleanRoom requirements of ISO 5 level.
YuMi: IRB 14000
Controller

Embedded controller based on IRC5
Portable (38kg)
External connectors
Built-in 8 in /8 out
Customer benefits

1. **Padded arms** - Including internal wiring and air
2. **Integrated controller** - New in ABB portfolio
3. **Lightweight construction** - Makes the robot portable
4. **Ease-of-use** - Lead Through Programing
5. **Enclosed design** - Lower maintenance
6. **Integrated vision and integrated hands** - Built in to product and easy to integrate
7. **Safety certified** - Certified by an independent body
1. Padded arms

Customer benefits

- Adds to safety of operators if there is an unlikely contact during operation
- The robot can be run faster due to added protection
- Faster robot means the ROI will be greater
2. Integrated controller

Customer benefits

- Saves working space
- Better cell layout
- Equipment can be placed closer to, or around, robot without interference
- Robot is more streamlined and easy to relocate
- No floor cables or control cables
3. Lightweight construction

Customer benefits

Makes the robot portable
Increases safety of the robot
Smaller frame to mount the robot
4. Ease-of-use
Customer benefits

Lead-Through Programming makes the programming easy.
Integrated vision can pick parts without fixture.
Can use YuMi App for programming on a wireless tablet.
Standard IRC5 system as other ABB robots for uniform programming environment.
Can use RobotStudio for offline programming and simulation.
5. Enclosed design

Customer benefits

Enclosed design allows all wiring and air to go through the inside of the robot

- Reduced maintenance
- Less risk of cable and air hose damaged
- Can be used in confined spaces
- Easy to keep clean
- No risk of dust collecting on cables
## 6. Integrated vision and integrated hands

### Customer benefits

<table>
<thead>
<tr>
<th>Integrated vision</th>
<th>Integrated hands</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cameras embedded in gripper</td>
<td>No need to design your own hand</td>
</tr>
<tr>
<td>Integrated hands makes it possible to use the hand for vision guided picking</td>
<td>Multi-option hand with five options</td>
</tr>
<tr>
<td>Can be used for simple inspection</td>
<td>Integrated communications and air</td>
</tr>
<tr>
<td></td>
<td>Servo</td>
</tr>
<tr>
<td></td>
<td>Vacuum</td>
</tr>
<tr>
<td></td>
<td>Camera</td>
</tr>
</tbody>
</table>
7. Safety certified

Customer benefits

No need to certify the robot
Can be included in your risk assessment of the cell
Independent body has certified the robot
PL b Cat b
# Key applications and segments

## Applications

### Suitable for
- Small Parts Assembly
- Collaborative Assembly
- Accurate and fast assembly
- Testing and packaging
- Material handling
- Inspection

### Not suitable for
- Harsh environments
- Handling naked food

## Segments

- Electronics assembly
- Automotive Electronics
- Consumer products and general industry
- Medical Equipment
- Toys
- Other small parts manufacturing
Small Parts Assembly

Key applications and segments

IRB 14000 is the perfect alternative/complementary for IRB 120 or IRB 1200 in small parts assembly
Safe collaborative assembly
Precise 0.02 repeatability for small tasks
Vision Guided-Assembly

Key applications and segments

Vision included in hands as package
Vision can also be connected to robot for external devices like flex feeders
This makes it possible to have less jigging and move to a more flexible cell design
Small Parts Assembly using the FlexFeeder™s and ABB gripper

Key applications and segments

Gripper and FlexFeeders make it possible to have a complete solution from part handling to assembly.

Odd sorted parts can be placed in FlexFeeders and presented to the robot in a two dimensional plane.
Small Parts Material Handling
Key applications and segments

After the assembly process is complete the robot can place the finished product in box ready for shipment.

YuMi working side-by-side handing finished parts to be packed.
Summary

Safe and collaborative
No cages needed
Padded arms and light weight design
Designed to be inherently safe

Increased ROI
Fast accurate assembly, lower changeover costs

Ease-of-integration
Wide range of communications interfaces
Integrated hand equipped with vision
Integrated controller
Light weight and portable

Ease-of-use
Lead-Through Programming