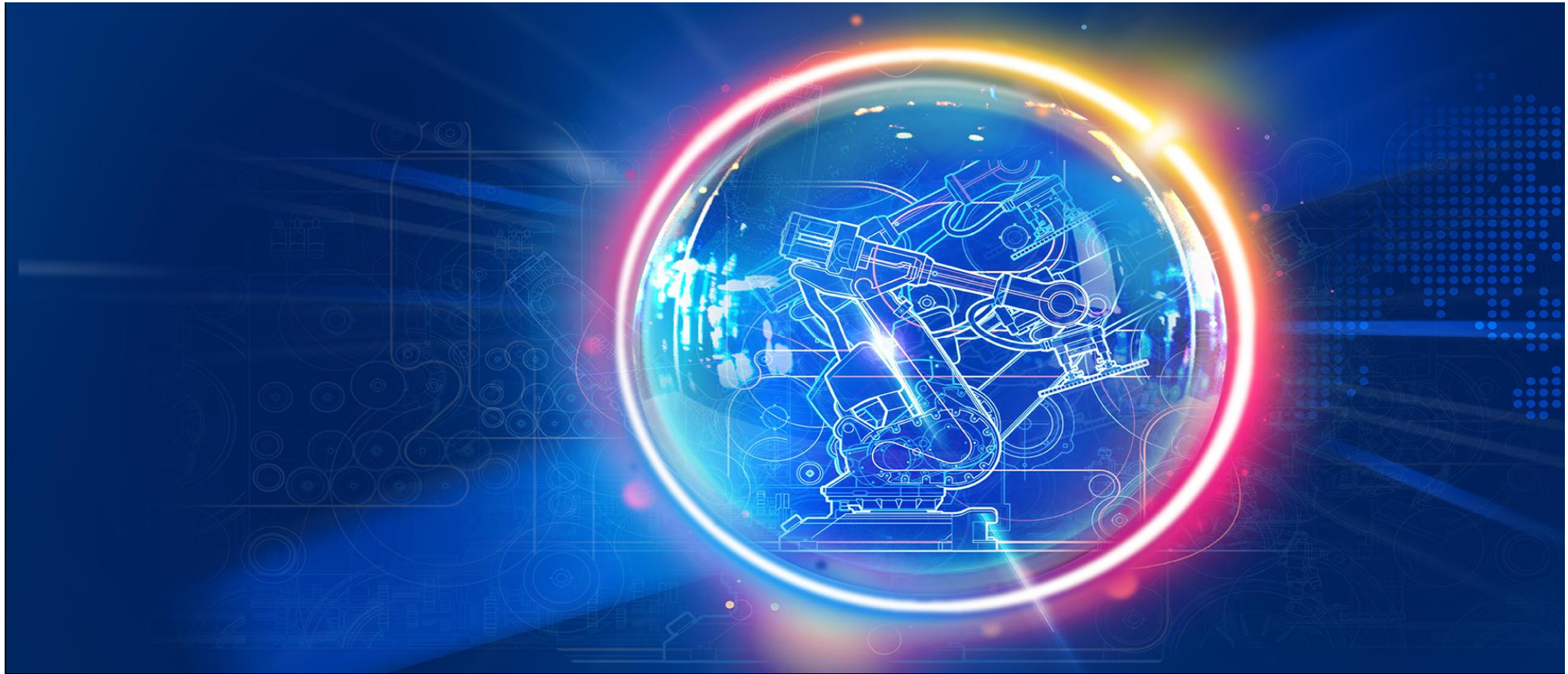


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ABB Robotics EVPC 2013 3C (Electronics) & Small parts assembly









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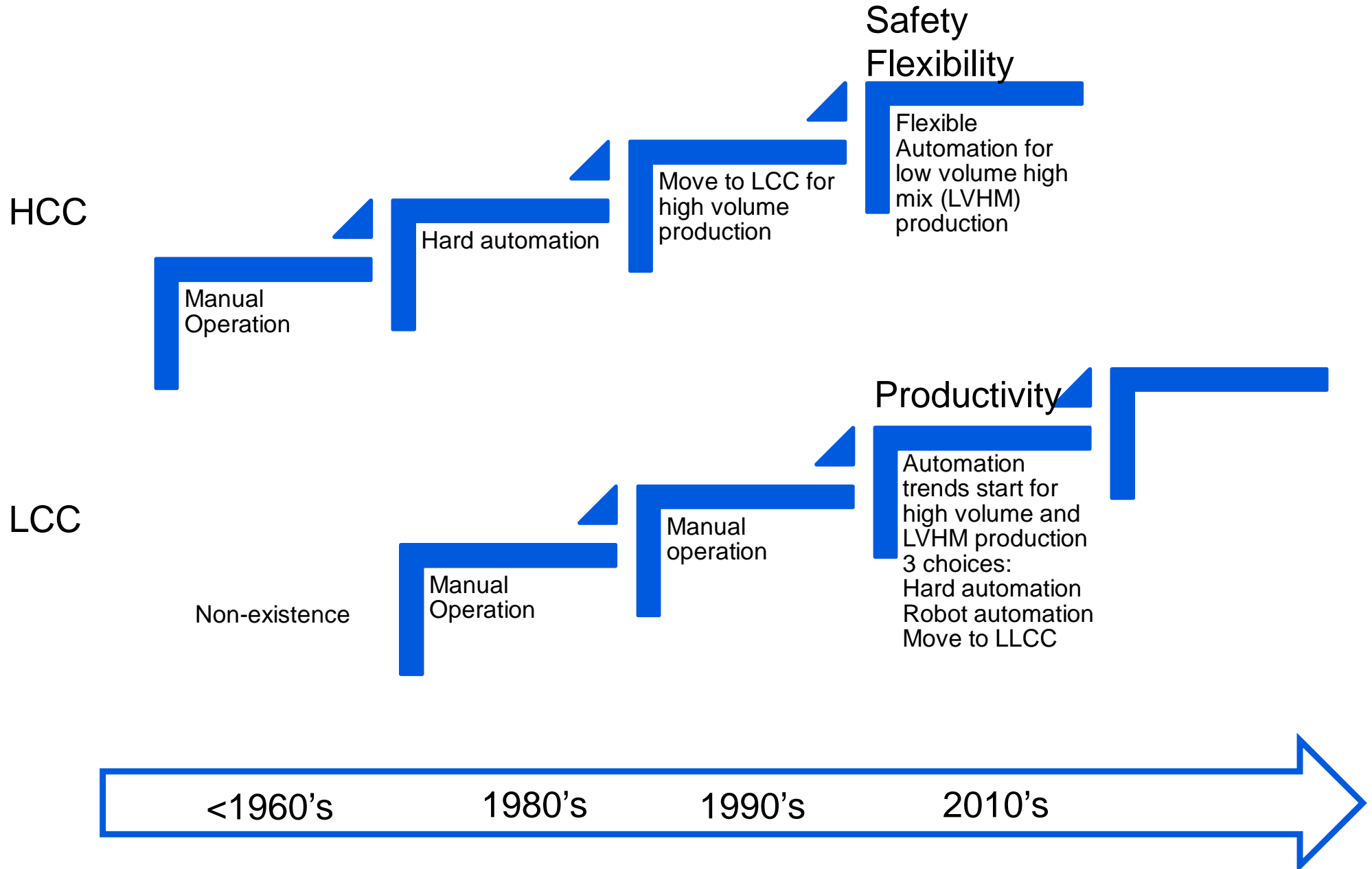
3C (Electronics) & Small parts assembly

Introduction to 3C & trends

What products? What is 3C?

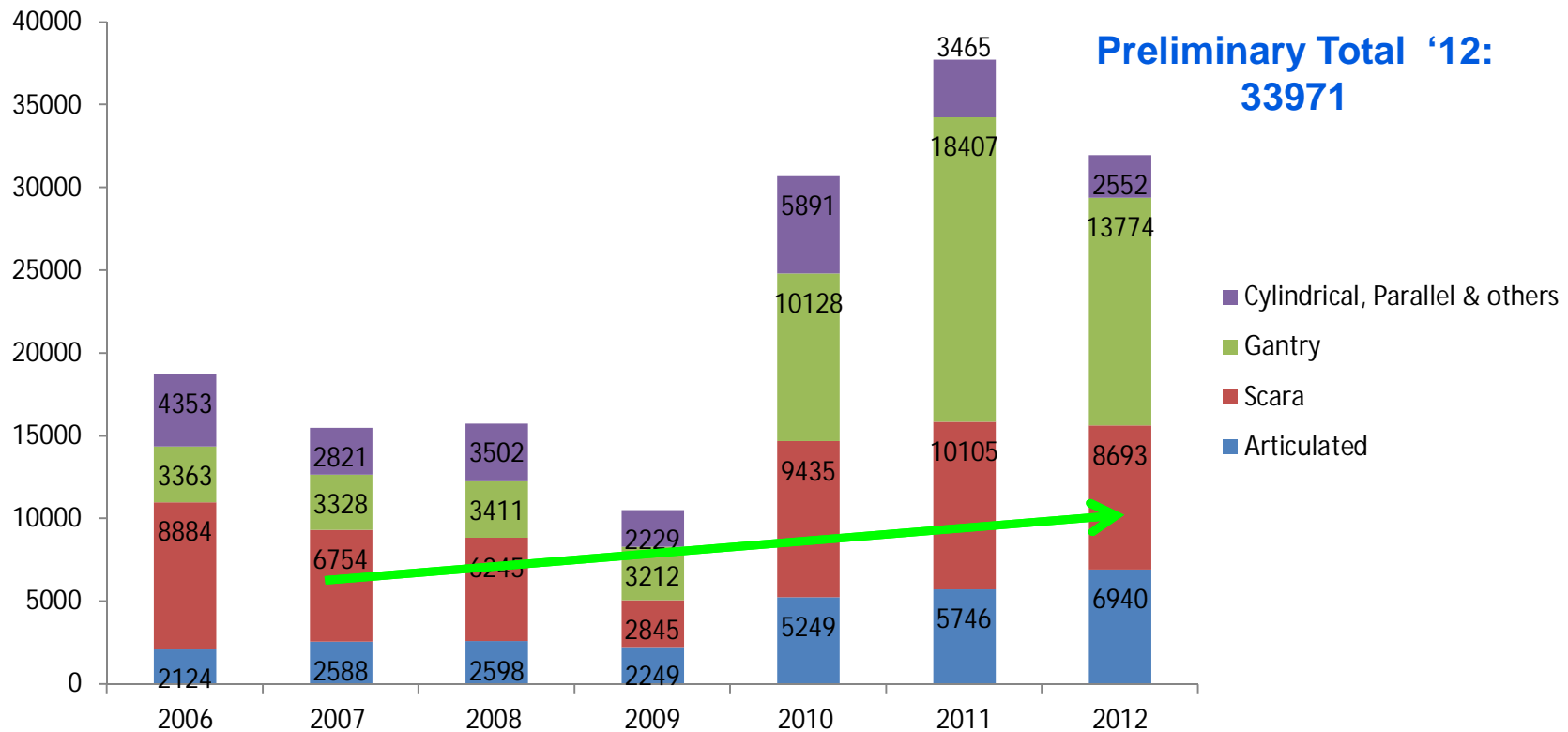
3C Products			Small Consumer Appliance	LV Electrical Equipment	Automotive Electronics
Communication	Computer	Consumer			
<ul style="list-style-type: none"> •Smartphones •Feature phones •Telephones •Walkie-talkies 	<ul style="list-style-type: none"> •Desktop PC •Notebook PC •Tablets •Keyboards •Mouse •Servers •Modems •Memory 	<ul style="list-style-type: none"> •Gaming consoles •DVD players •Camera •Camcorder •Television •GPS devices •MP3 players 	<ul style="list-style-type: none"> •Irons •Shavers •Toothbrushes •Coffee makers •Hand mixers •Hair dryers •Drills 	<ul style="list-style-type: none"> •Sensors •Tachometers •Switches •Circuit breaker 	<ul style="list-style-type: none"> •Car audio •Electrical Motors •Injections •Airbags •Locking systems 
<ul style="list-style-type: none"> •Semiconductors : wafers •FPD –LCD : Displays - screens 					
<ul style="list-style-type: none"> •Components, Assemblies, Plug-and-socket connectors 					

Different Characteristics in HCC and LCC



Robot sales in 3C

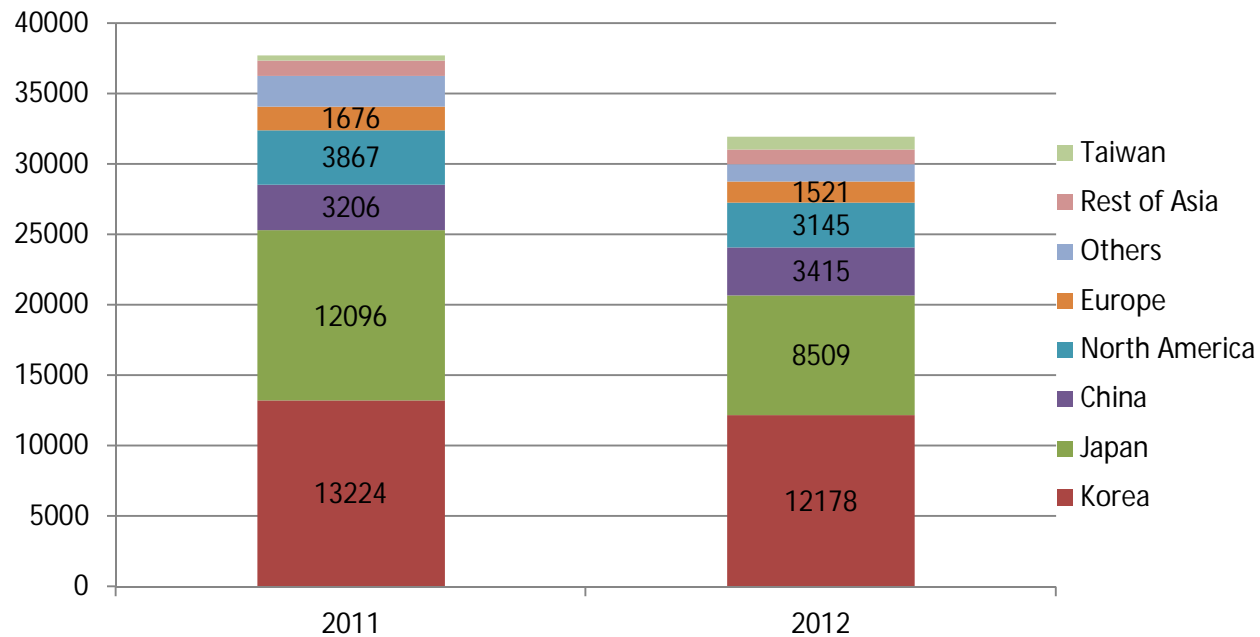
Total 3C market per type



- **Articulated robots => Constant growth and only growing group in 2012**
- **Scara's & gantry's - No CAGR growth after '09-'10 boom**
- **Robots in 3C consistently represent 20 to 25% of the global robot market**

Robot sales in 3C

Total 3C market per region



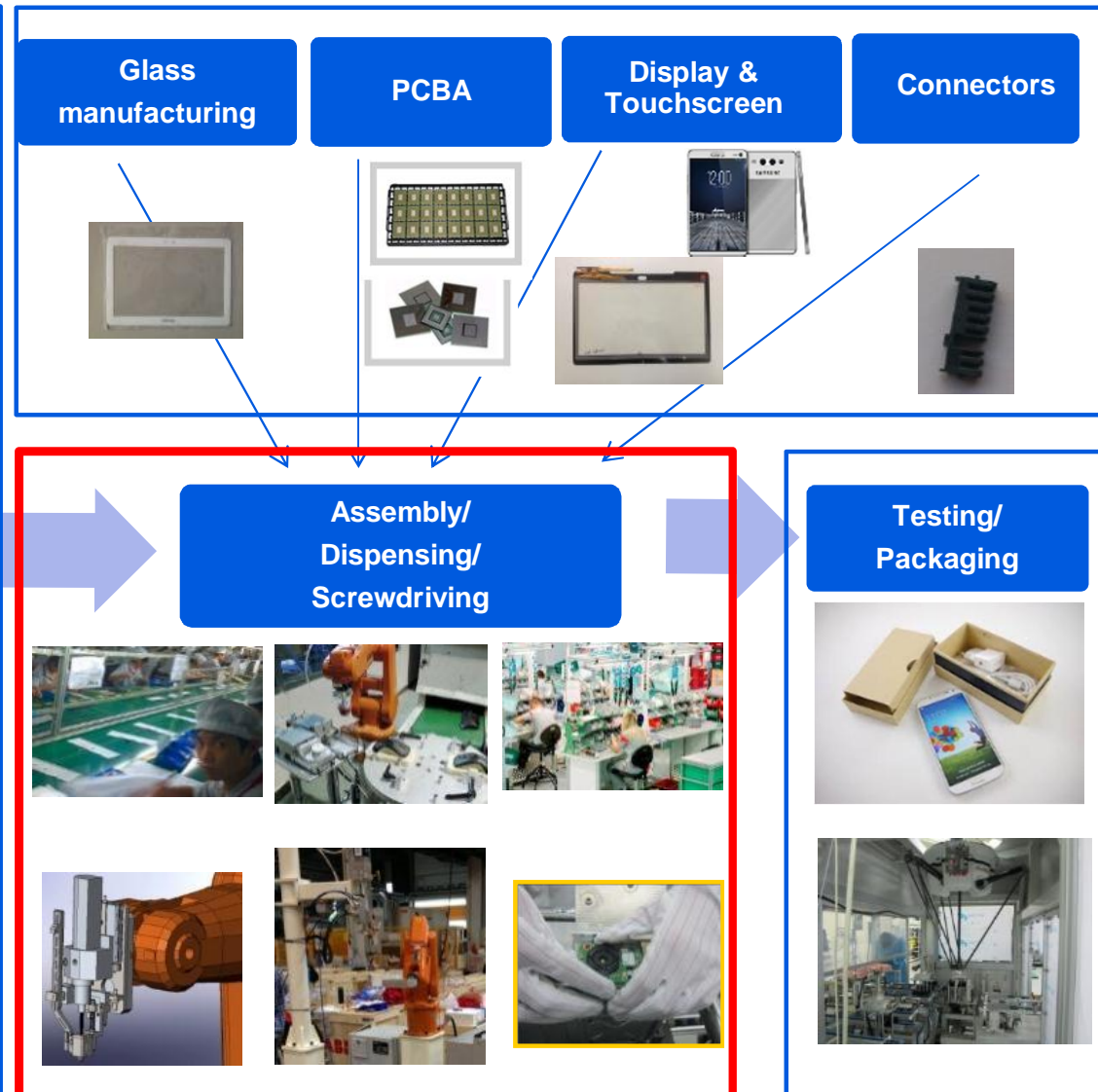
1. **Korea : largest volume with a high concentration of grantry type for LCD & Semicon**
2. **Japan : Second largest but declining**
3. **China: 3rd largest and growing**
4. **70% of Europe deliveries are articulated robots**
5. **50% of Europe deliveries are to Germany. 2nd largest is Hungary with 202 units**

3C manufacturing process

Casing manufacturing



Key components manufacturing

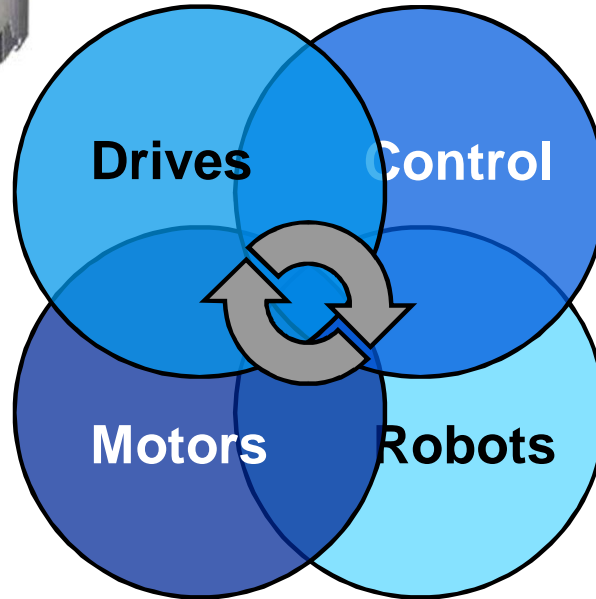


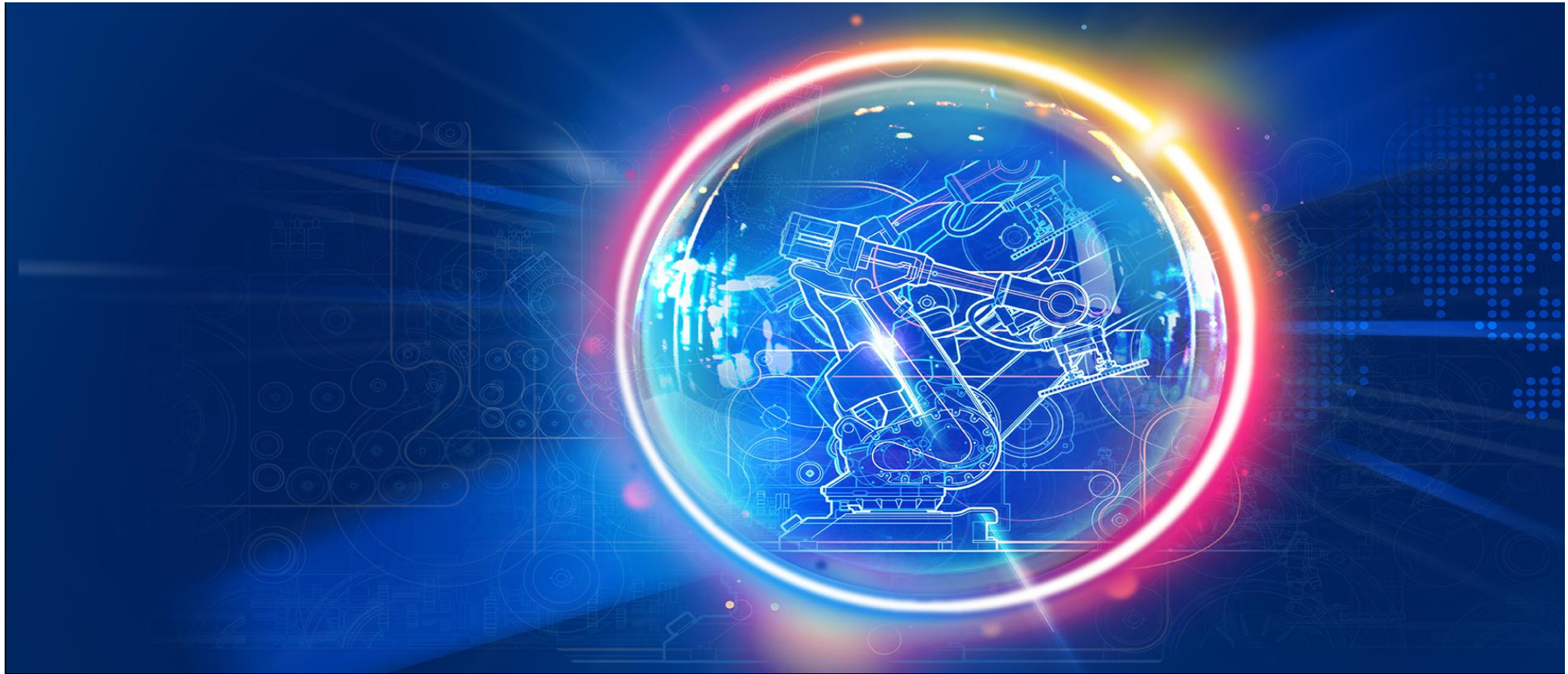
Main customer needs

- Quality, precision and cosmetic finish
- Short cycle time and high volume production
- Short product life cycle production runs
- Rising cost of labor and demanding H&S
- Simple compact & flexible solutions

Discrete Automation and Motion division

Making products work together





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3C (Electronics) & Small parts assembly

Application example & references

Circuit Breaker Assembly

REFERENCE CASE
AVAILABLE SOON!!!



- ABB SACE in Italy (3 plants)
- Electronic and thermo-magnetic low-voltage circuit breakers
- A mix of 40 IRB 120's, 140's, 1600's, 2400's, 4600's, and 360's for soldering, welding, packaging and assembly tasks
- White robots to illustrate a sense of cleanliness, luminosity, and surgical precision
- **Key Benefits**
 - Increased productive 2.5x with no lay-offs
 - More flexibility in product design
 - Quiet compared to traditional automation
 - Quicker introduction of new production lines
 - Compact installations: From 200m² to 50m²
 - Rejection rate reduced from 3% to virtually 0%
 - 30% reduction in energy consumption

Cost savings!!

Assembly of Mouse & Keyboards



- **Customer:** Rapoo in China
- Assembly of mouse, keyboards & headsets with 80 IRB 120
- **Benefits:**
 - Diminish the impact of high labor cost
 - Alleviate to difficulty to recruit
 - Flexibility to manage peaks in demand
 - Robotic automation can handle different type of products in the same line
 - 80 robots can replace 240 workers in 2 shifts

Fully automated ironing machine assembly



- **Customer:** Rowenta in Germany
- **Production capacity**
 - 9000 units per day (3 shifts)
- **Process Description**
 - Multiple processes
 - > 60 IRB 140 in line
 - Integration and engineering done by end-customer
- **Benefits**
 - Increase productivity & flexibility
 - Quality & stability
 - Safe and healthy working environment
 - Lower production cost



Car Audio Speaker Assembly



- **Customer** : OEM in Slovakia
- 9 IRB 120 & 2 IRB 140
- **Applications**
 - Compact palletizing
 - Dispensing & MH
 - Accurate odd component inserting on PCB
- **Benefits**
 - In addition to palletizing the robot is also able to move its own pallets with a very simple tool.
 - Flexibility to handle different sizes of magnet
 - Labor cost savings
 - Process accuracy
 - Higher productivity & flexibility for odd component inserting compared to previous scara system

Assembly of electrical sockets

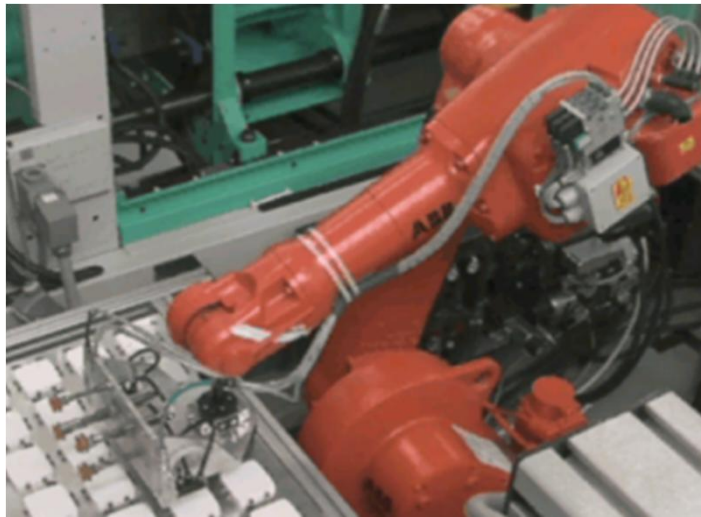
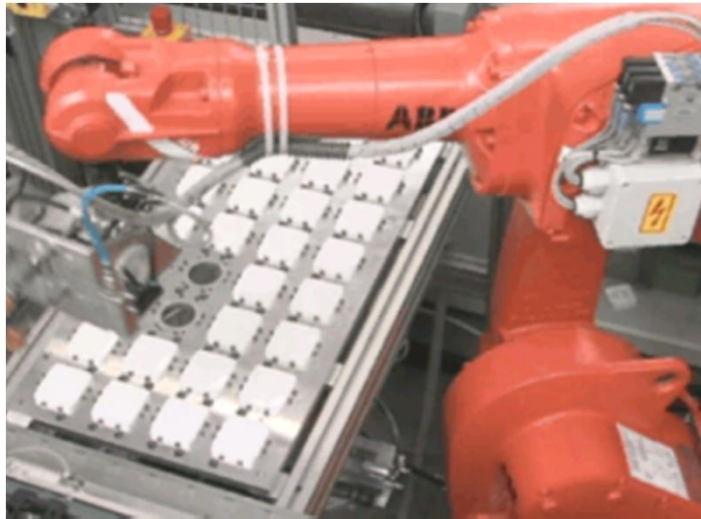
REFERENCE CASE
AVAILABLE !!!



- Products : Wiring accessories (sockets)
- **Assembly with 3 x IRB 140**
 - Round-table assembly from components to packaged product
 - Random feeding of components
 - High-speed inserting & handling of component with vision
 - Flexible line capable of handling different type of products
 - 2 people instead of 20



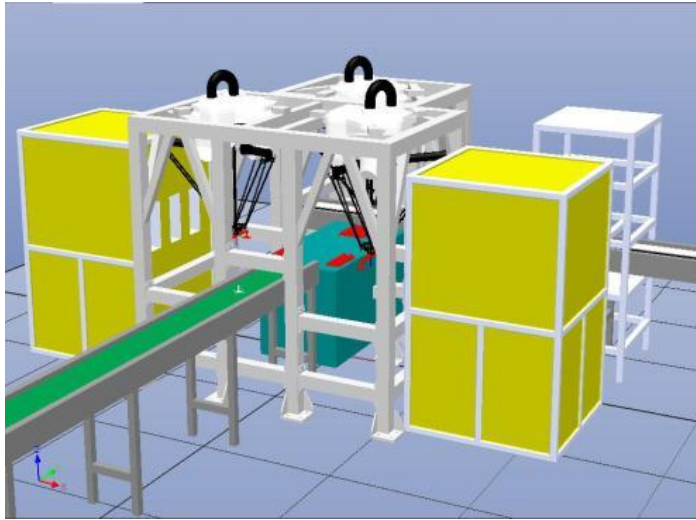
IMM extraction & Assembly



- Product
 - Light switch
- Cycle time
 - 29 seconds for 4 switches
- Process Description
 - Robot extract 4 switches from IMM
 - Place all switches in drying rack
 - Assembles 4 switches during IMM cycle
 - Assembled switches automatically packed
- Customer benefit
 - Fast cycle time
 - Production process never gets interrupted
 - Increase quality, capacity, efficiency & yield
 - Safe and healthy working environment
 - Full automated operation from raw material to packed good



Machine tending for laser marking cell



- **Product**

- Cell phone covers.

- **Cycle Time**

- 2 to 3 s

- **Process Description**

- Sort/arrange covers to tray at shuttle table
- Pick from tray then pick/place at laser marking machine
- Pick/place at inspection machine
- Place to output belt conveyor

- **Customer benefit**

- Turnkey solution
- Increase productivity
- Reduce 12 operators

Cable Tree Routing



- **Customer:** ABB in CZ
- Routing of wires for power modules with IRB 2400
- Up to 14 different cable trees
- Use of positioner to prepare the next assembly while one assembly is ongoing
- Toolchanger with cable router & tie rapper applier
- Benefits:
 - Drastic reduction of error and improvement of quality
 - Reduction of a labour bottleneck which required a specialized skill for a very tedious jobs

Integrated dispensing for small parts



- Accurate dispensing of small & narrow glue paths
- Utilizes IRB 120's proven high speed and path accuracy
- Utilizes **ABB's integrated dispensing**
 - High Performance
reduce production costs
 - Standardized setup and service
no delays of SOP commissioning and little maintenance costs
 - Fewer components/suppliers
reduced system complexity and problems

ABB and 3C on internet

- For more reference & video's on ABB & 3C please visit:

<http://www.abb.com/product/seitp327/b86dd31c63ae5d92c12576c60034e501.aspx?productLanguage=us&country=TW>

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