



FANUC

Contel Webinar
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CONTELTECHNOLOGIES
for Smart Manufacturing

An aerial photograph showing the snow-capped peak of Mount Fuji in the background. In the foreground, there is a large industrial complex with several large buildings, some of which have yellow roofs. The complex is surrounded by greenery and a road. The sky is clear and blue.

FANUC

Profile of FANUC Corp. (Nikkei 6954)

Headquarters: Oshino-mura, Yamanashi pref.

Sales: 4.19 Billion EUR

Net Income : 604 Million EUR

Market Capitalisation: 35.80B US\$
(July, 2020)

Employees: 8,200

*Financial results for the year ended March 2020

OUR MAJOR PRODUCTS

Products specialised in manufacturing industry

OEM PRODUCTS

4.2 million CNC units

FA



CNC

Controls
Laser technology
Drives



Robots

620.000 robots

ROBOT



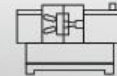
ROBOCUT

Wire cut
EDM machines



ROBODRILL

Vertical
machining
centres



ROBOSHOT

Injection-moulding
machinery



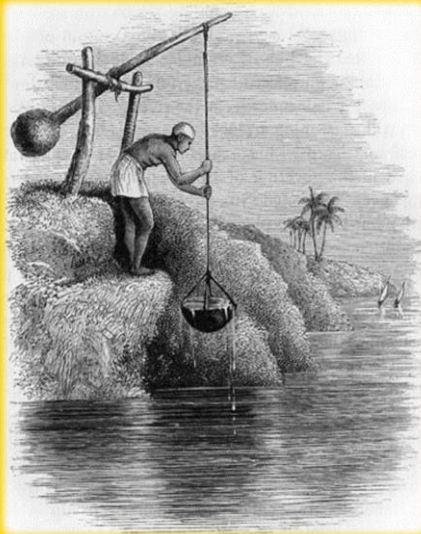
Reliable, Predictable, Easy to Repair

Excellent Factories : Building the Future

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In ancient history different technological achievements are counted as the earliest robotic milestones.

Egyptians used mechanical constructions to lift water from the river in 2.000 BC. (Silverman, 2003, 60)



Factory of the Future

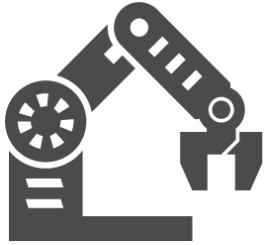
FANUC

- I. Flexible Production Platform →
Intelligent Robotics
- II. Digital Twin →
Software-Defined Manufacturing, AI
- III. Human – Robot collaboration →
CR Series
- II. IIOT → *FIELD solution*



Why use robots in Manufacturing?

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More Flexibility

Single robot can be used to manufacture multiple parts and work multiple processes



Higher Quality

Accurate to microns
Constant quality
Less re-work



More Uptime

Machine up-time increases
Increased production
less waste
less intermediate stocks



Less Cost

Available 24/7
No indirect HR cost like training, hiring, insurance, safety, strikes

FLEXIBLE AUTOMATION - WE FILL THE GAPS.

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Arc welding



Handling



Palletizing, packaging



Measurement



Load/Unload



Loading



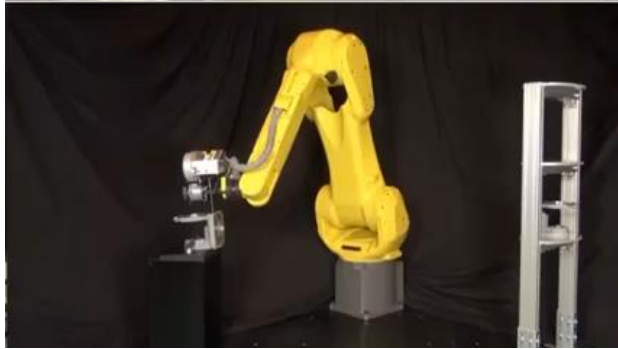
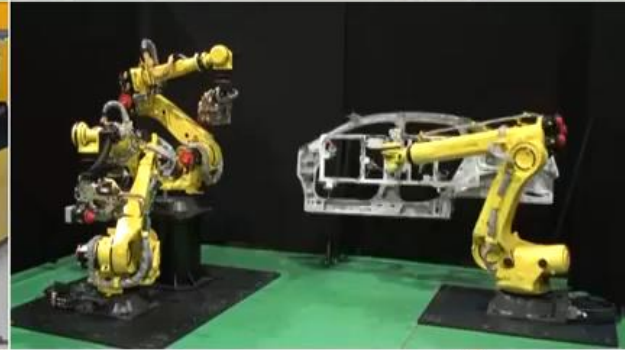
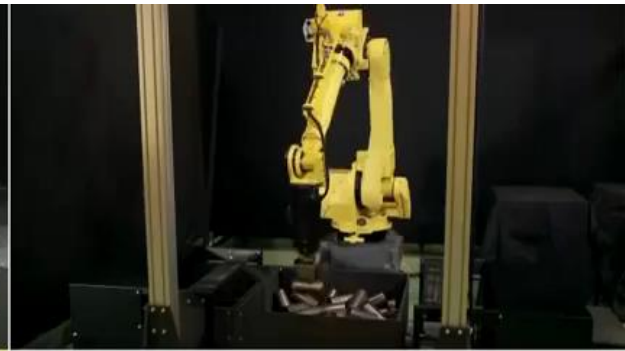
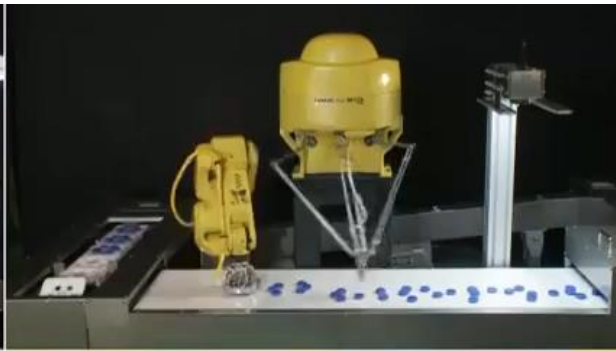
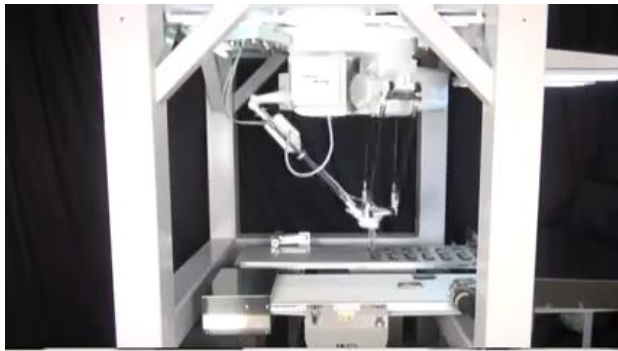
Milling, Deburring, Polishing



Spot welding

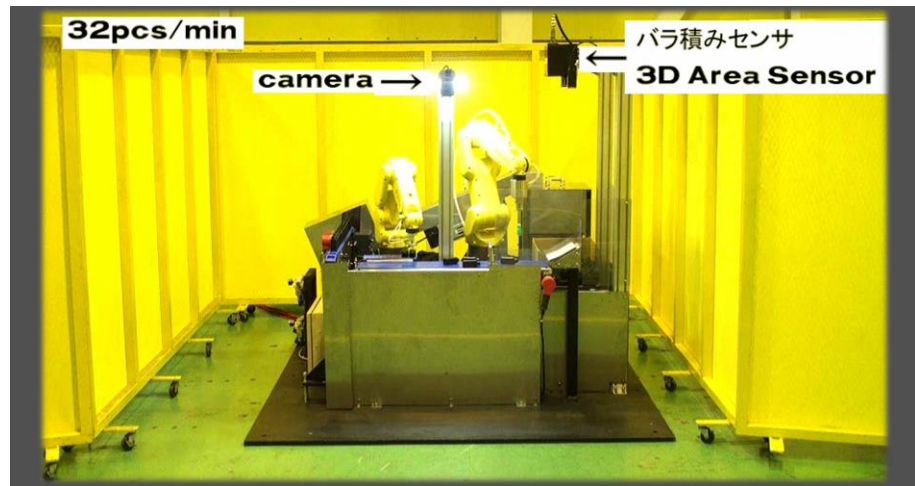


Picking



Intelligent Robotic Developments

- High speed bin picking
- Zero Teach Bin Picking
- Cad to Path



Cad to Path Demonstration

FANUC Robotics

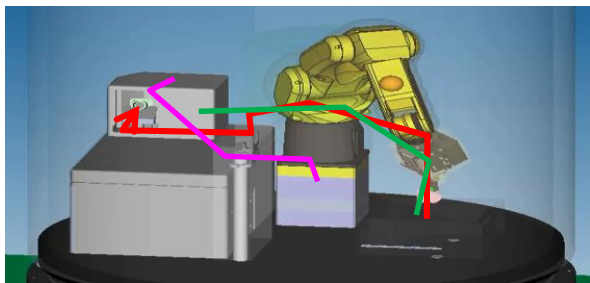


Zero Teach Bin Picking

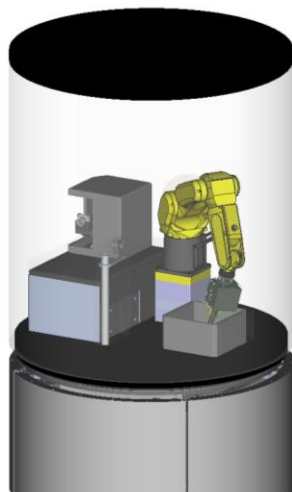
The following two setup needed for bin picking system becomes easier.

- ① Robot Teaching is made easier by “Automatic Path Planning”.
- ② Vision Detection and Pick Position Setup is made easier by “3D CAD Matching”.

Automatic Path Planning

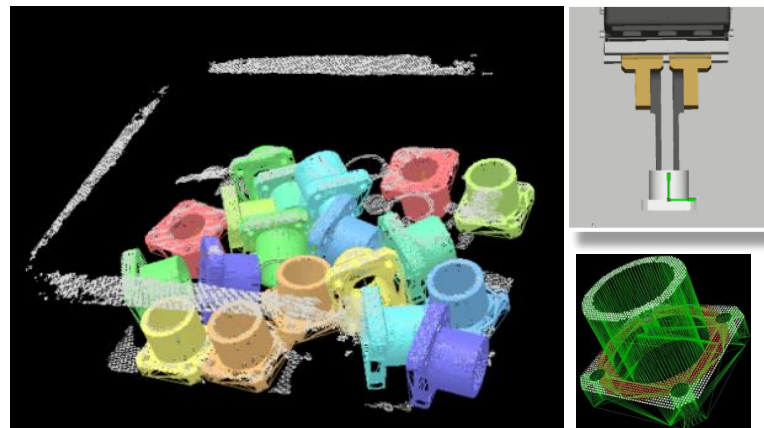


Automatically generate path
from start point and end point



ROBOGUIDE

3D CAD Matching



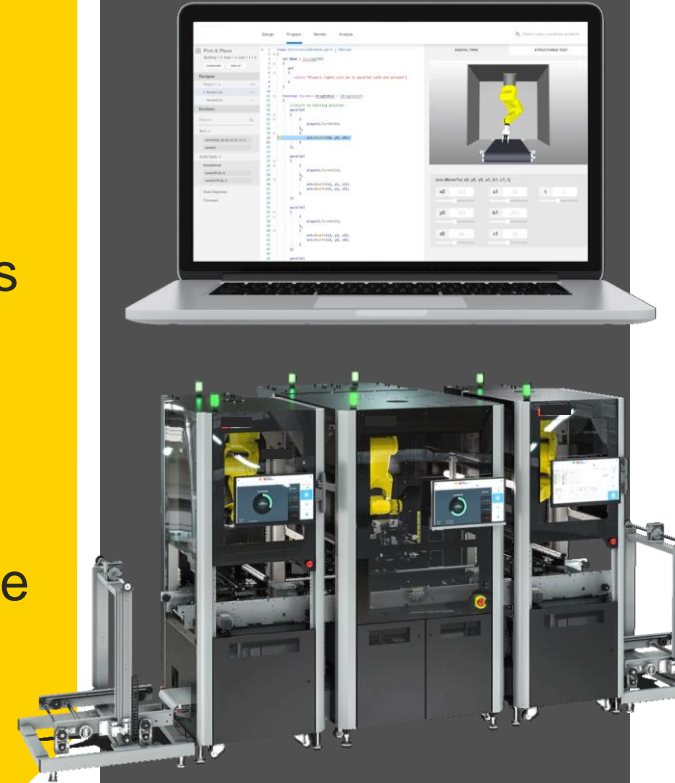
Software Defined Manufacturing

Digital factory

- Introduces a higher level of intelligence to manufacturing through self-learning algorithms (AI)
- Makes it easier to configure, replicate, scale and, ultimately, automate automation
- Digitizes factory operations, making them more transparent and accessible

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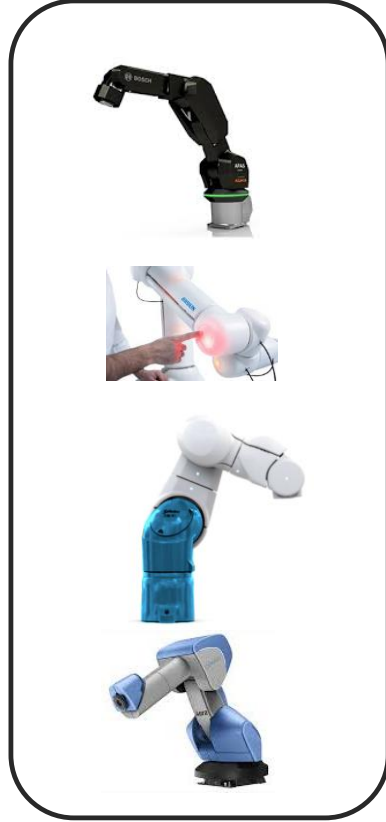
Virtual = Real



Human Robot Collaboration



A flood of brands and manufacturers of collaborative robots....



Why use collaborative robots?

Collaboration robot – human

Possibility to automate processes where the presence of a person can not be excluded

Possibility of replacing the operator

No security fences, cheaper

Security fences may be inflexible for certain types of applications/operations

Reduction of the installation area

Possibility to deal with applications where it was not previously possible with the safety fence

Easy implementation

Simple / Intuitive Programming

Manual Guidance

Flexible move between workplaces (manual or AGV)

Collaborative robotics vs industrial robots > definition of terms

➤ Industrial robot

- ✓ robust
- ✓ strong
- ✓ fast
- ✓ accurate
- ✓ durable demanding work environment
- ✓ primarily for large series
- ✓ manual guidance possible with additional equipment
- ✓ traditional programming - securely secured



➤ Collaborative robot

- ✓ Lightweight
- ✓ Weak
- ✓ **Slow**
- ✓ Less accurate
- ✓ **Lower protection class**
- ✓ Primarily for smaller series
- ✓ Usually integrated manual guidance
- ✓ Simple, intuitive programming
- ✓ Safe



Cobots vs Robots

FANUC CR Robots comply fully to the robot safety norm ISO 10218-1

Safe Robot vs. Safe System

High Payload needed

4 kg to 35 kg payload



CR-4*iA*



CR-7*iA*



CR-7*iA*/L



CR-14*iA*/L



CR-15*iA*



CR-35*iA*

FANUC has the widest range of Collaborative Robots

CR series up to 35Kg

Industrial robot with force sensor

CRX series up to 10Kg

Lightweight robot, easy teach



Industrial collaborative robot

FANUC series CR



- 4 kg
- 550 mm



- 7 kg
- 717 mm



- 7 kg
- 911 mm



- 14 kg
- 911 mm



- 15 kg
- 1441 mm



- 35 kg
- 1813 mm

Collaborative robot

FANUC series CRX

- lightweight
- easy-to-program
- integrated manual guide



CRX-10iA

- 10 kg
- 1249 mm

CRX-10iA/L

- 10 kg
- 1418 mm

NEW COLLABORATIVE ROBOT CRX: THREE KEY FEATURES



Safety

- Safely stops with only a light contact with humans



Contact

stop

Reliability

- Renown FANUC's reliability supported by years of experience

Ease of use

- Simple installation without lifting equipment
- Intuitive operations and simple teaching
- Easy connection to various grippers



Manual Guided

teach

TWO MODELS

Two models with different reach engineered with modular design
Mechanical Weight: 39kg (Same for both models)



Standard arm
CRX-10iA

- Reach: 1,249mm
- Lightweight and compact



Difference: J2 arm length
Payload: 10kg



Long arm
CRX-10iAL

- Reach: 1,418mm
- Capable of “Under-flip” motion



Under Flip

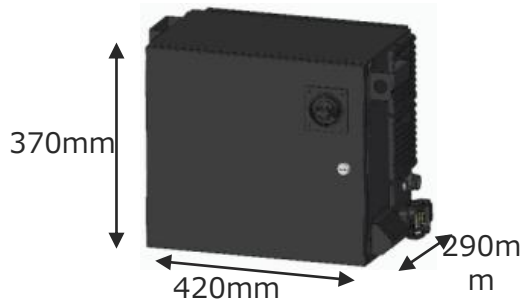


Non-collaborative mode

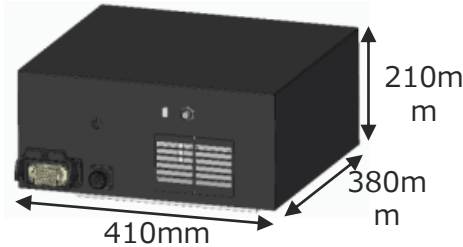
CONTROLLER

New controller transportable by single person (Weight: 19kg)

- Easy to install, lightweight and compact design
- Input power: **AC100V (single phase)**- AC240V
- Cabinet types
 - Vertical : IP54
 - Horizontal : IP20

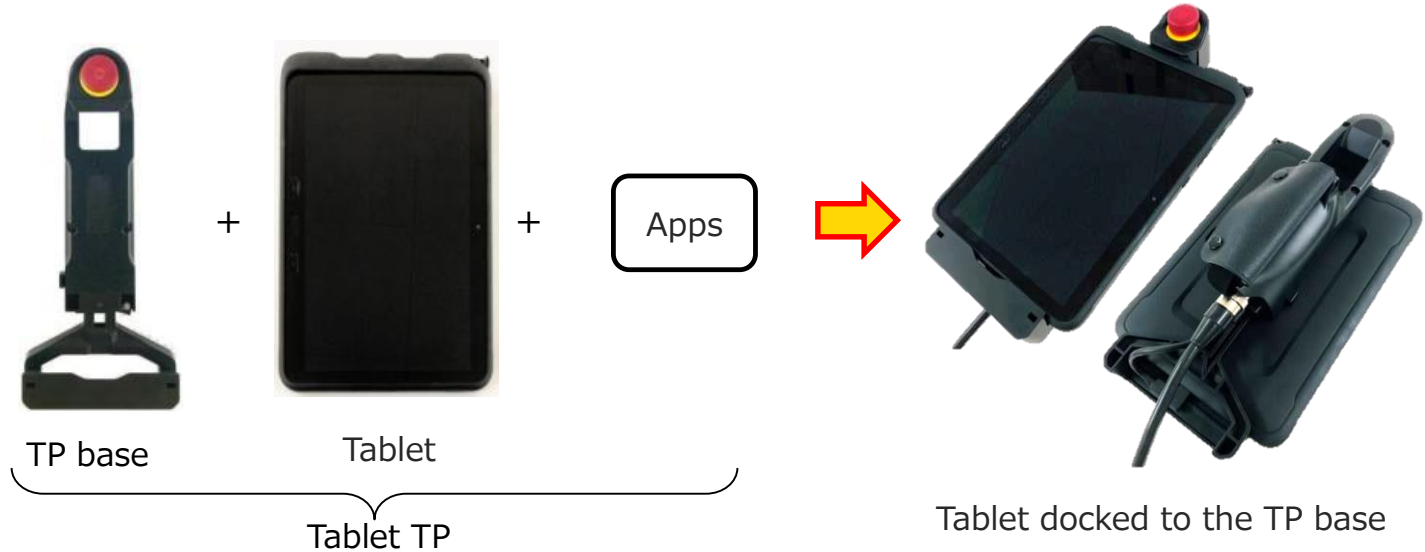


Vertical



Horizontal

TABLET TP



- The Tablet TP is a new teaching device that utilizes a TP base, tablet and apps
- The CRX comes with an industrial tablet TP that offers impact resistance and dust/liquid proof capability as standard
- For robots other than CRX, customers can choose to use the FANUC supplied tablet and TP Base or a customer sourced TP along with the FANUC supplied TP base.

New Intuitive Touch Panel User Interface

Status Bar

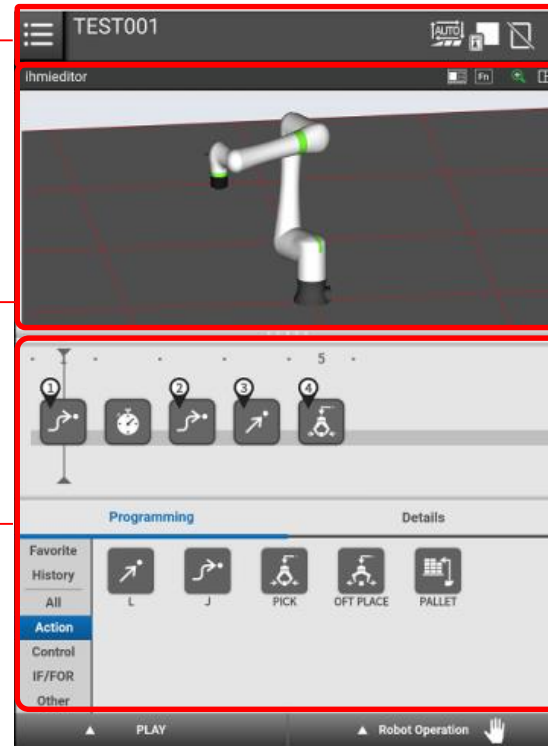
- Dropdown menu
- Status icons

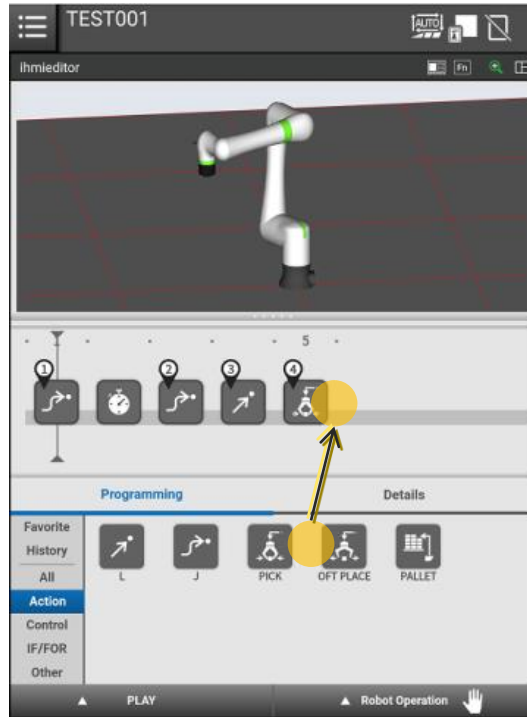
3D View Panel

- Graphical robot status display
- Taught position display

Programming Panel

- Drag & drop icons to the timeline
- Parameters adjustable in Details





- Drag & drop icons to the timeline to teach



- Touch icons in the Timeline to show details
- Modify parameters for commands

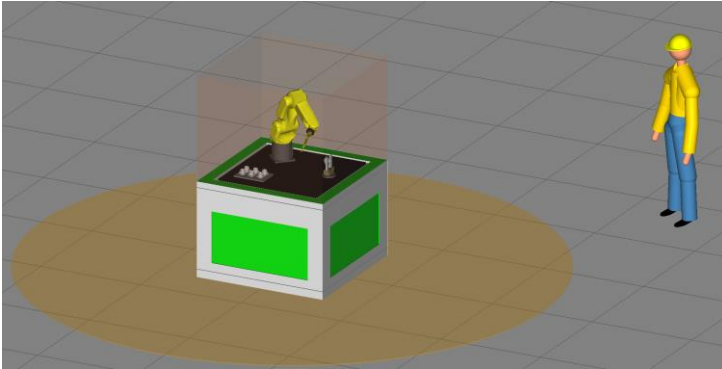


NewUserInterface

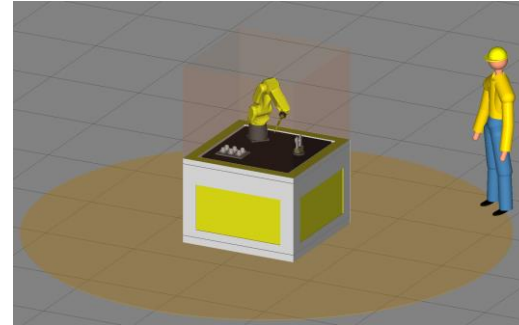
FANUC DCS (Dual Check Safety)

With FANUC DCS solutions, the robot and man can share a common workspace without the need for fencing

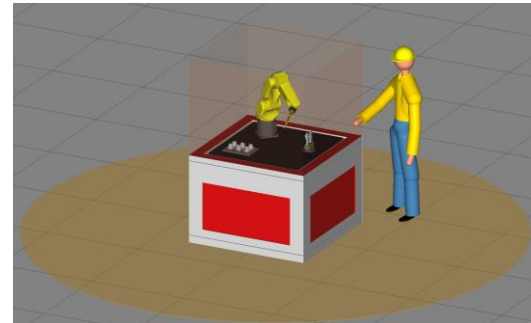
Man out of area – robot at full speed



Man in the area – speed limited



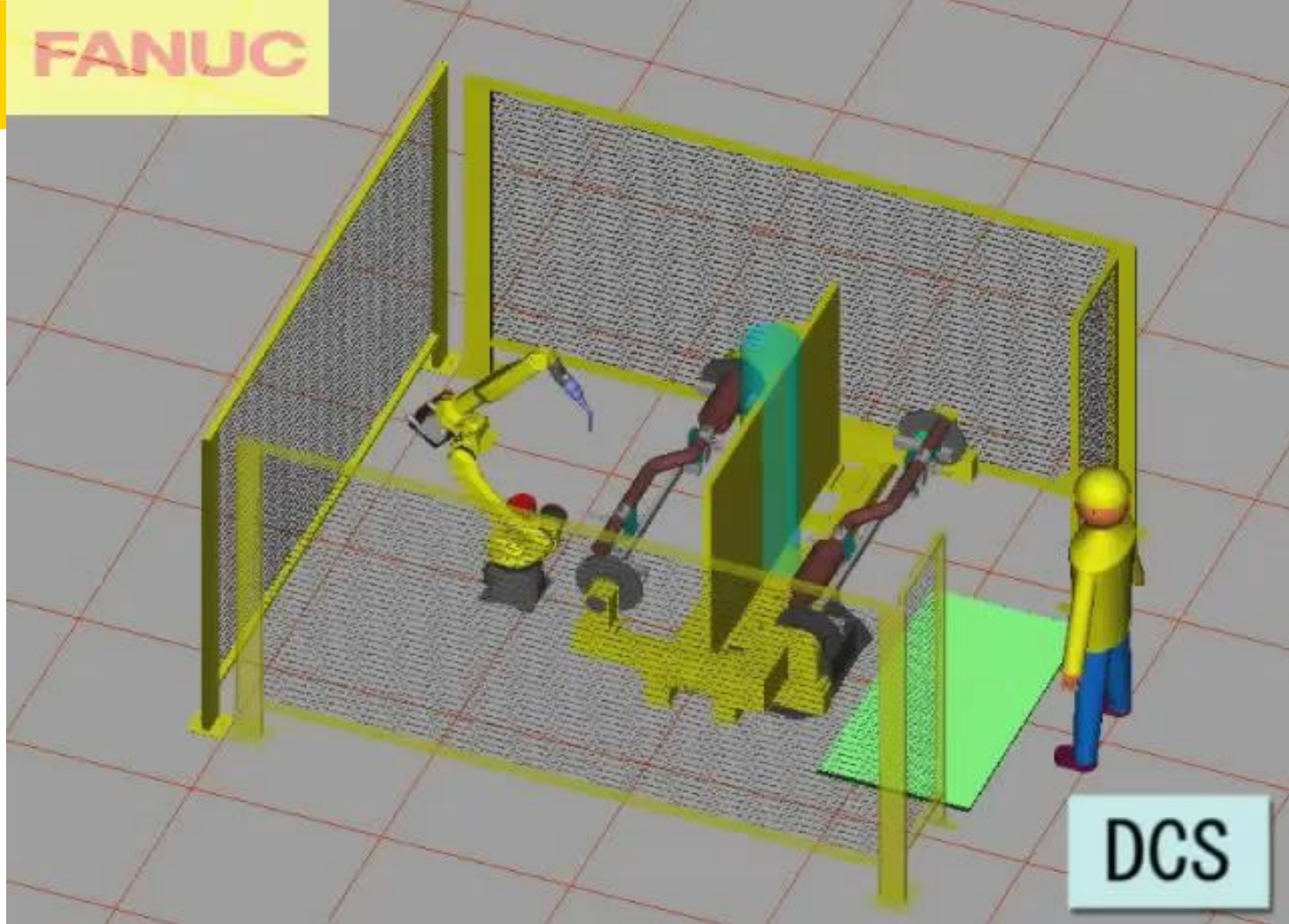
Man in robot space – robot stops



→ The DCS position/speed check function is defined as "Safety rated monitored stop" in chapter "5.10 Collaborative operation requirements" according to ISO 10218.

DCS examples

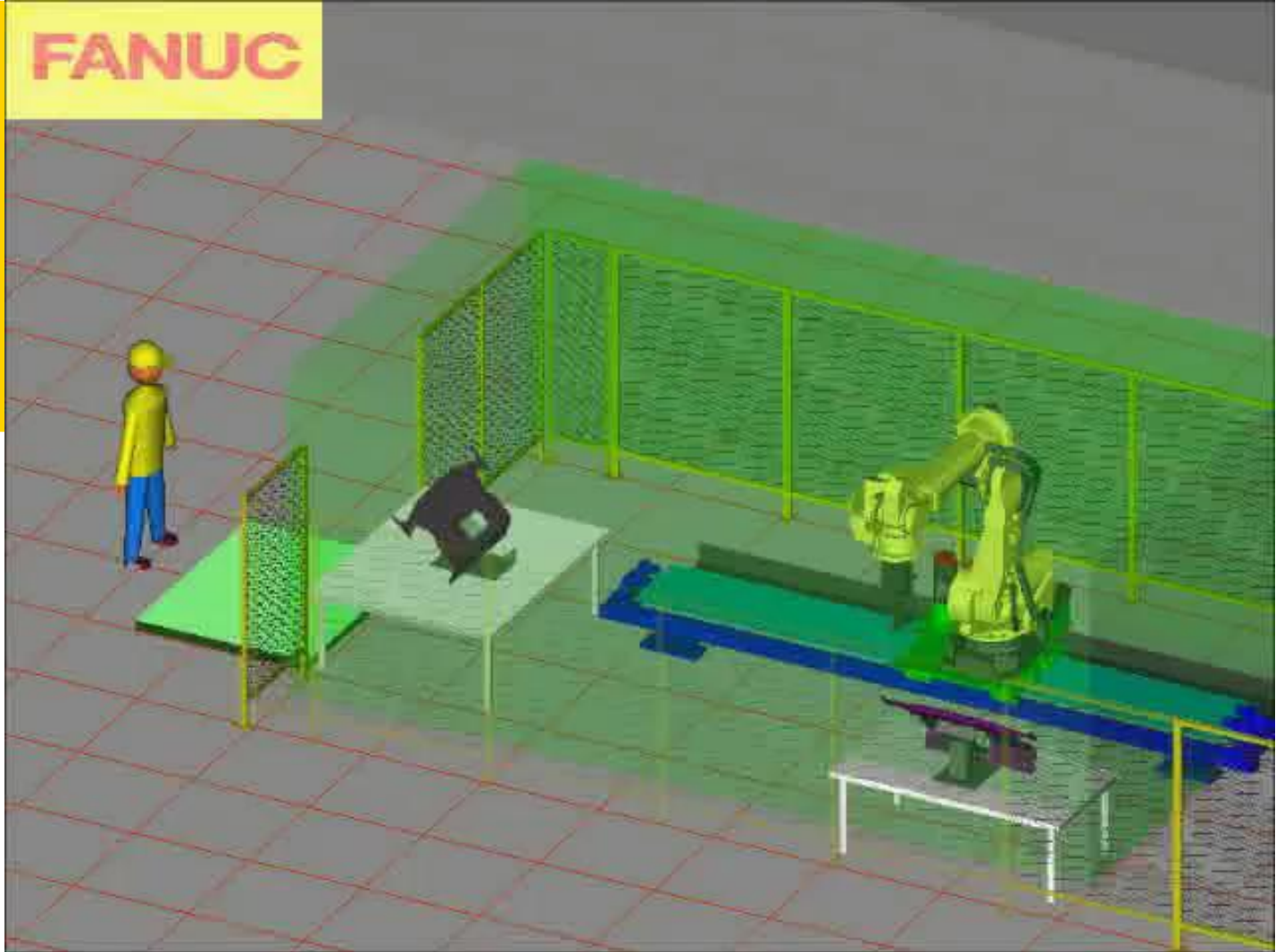
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DCS

DCS examples

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How to choose the right robot???

- Define type of operational cooperation
- Take into account safety / hazards - product - tools - ambient machinery and technology
- Take into account the demands on the performance of the application
- Take into account the availability of technical support and service
- Take into account your budget in terms of m2 and investment



+
DCS



QUESTIONS?



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