

クラボウの ケーブル/コネクタ自動化への取り組み

Work for Robot Business Using KURASENSE.

KURABO

クラボウ 環境メカトロニクス事業部

KURABO Advanced Technology Division

Sier
FA & Robot System
Integrator

iRoobo
Network

ND THE AID
(주)디에이드



Computer Color Matching (1980s~)



Visual inspection

+

3D Measurement



- High-speed Image processing
- Camera developed in-house

(2000s~)

- High-speed 3D data processing
- System construction

Visual inspection equipment

#PCB #Bevarage can
#In-vehicle board

Next

The ROBOT !



3D Measurement system

#Road surface #Tunnel
#Railroad

3D vision sensor specialized for cables.

Developed by KURABO.



Kurasense-C100

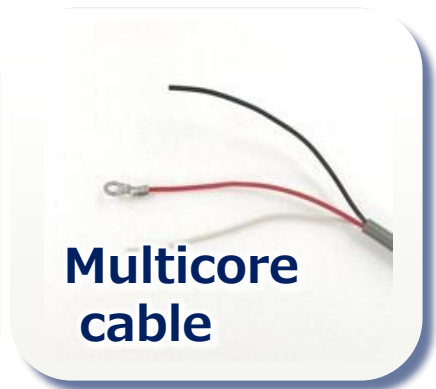
High-speed 3D Scanning and Recognition
for Wire and Cable !



Target



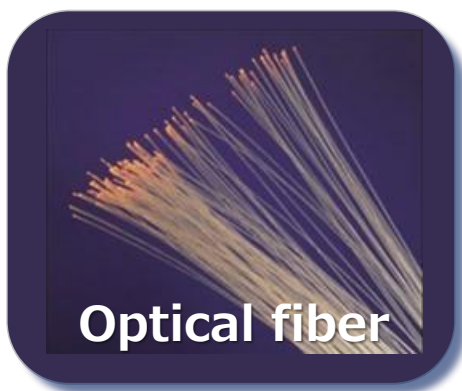
Flat cable



Multicore
cable



Bundle of
cables



Optical fiber



Connector

Not use

3D CAD model
matching



Kurasense-C100

Kurasense-C100 Specification

Exterior



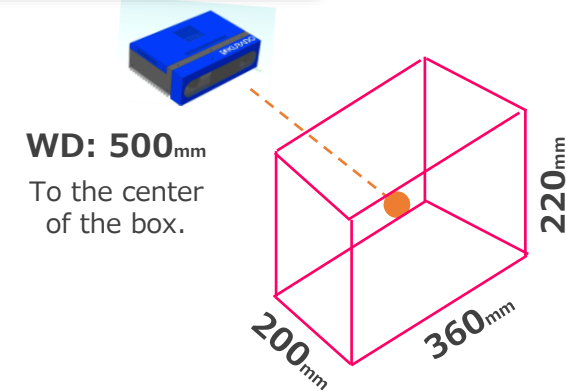
Main specifications

Target	Wire and Cable Flat cable, Multicore cable Bundle of cables, Optical fiber
Power Supply	DC12V 5A(60W) AC Adapter included.
I/O (Back panel)	<ul style="list-style-type: none"> ● HDMI×1 ● Ethernet×1 (GigE) ● DC-IN
Operating Temperature	5~35°C
Housing Size	218 × 72 × 157 mm
Mounting Dimensions	100×100 mm VESA100
Weight (Typical)	about 3.0 kg

Wide range type

Kurasense – C100W

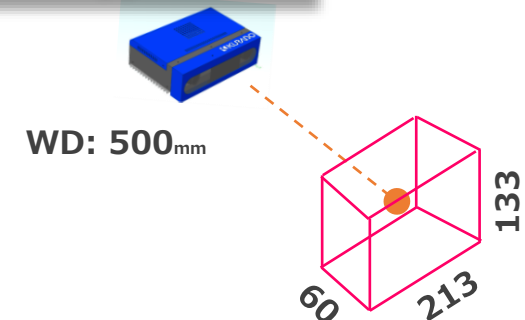
Resolution: about 0.2mm



High definition type

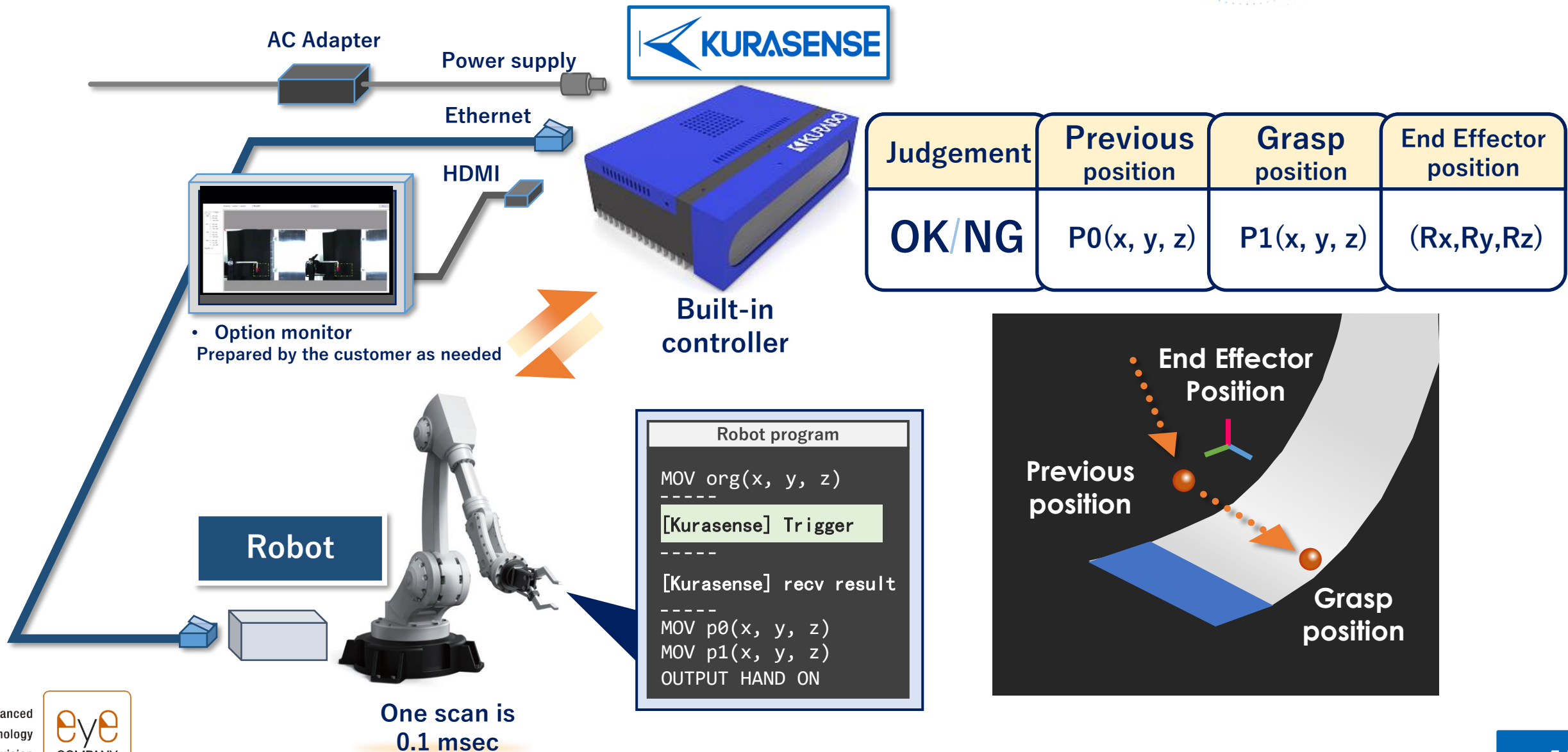
Kurasense – C100F

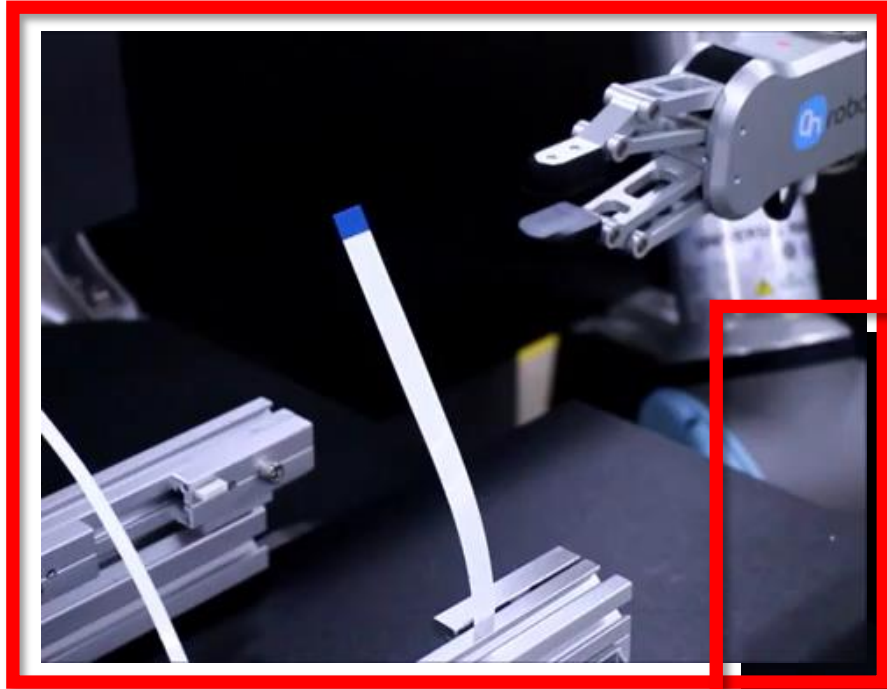
Resolution: about 0.1mm



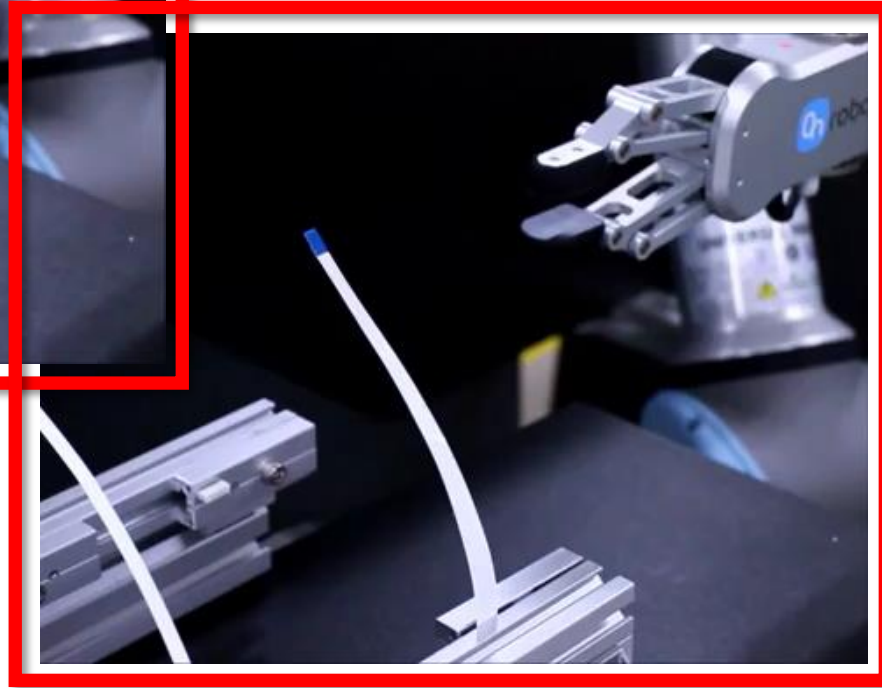
*All product specifications are subject to change without notice.

Hot to connect with the robot.

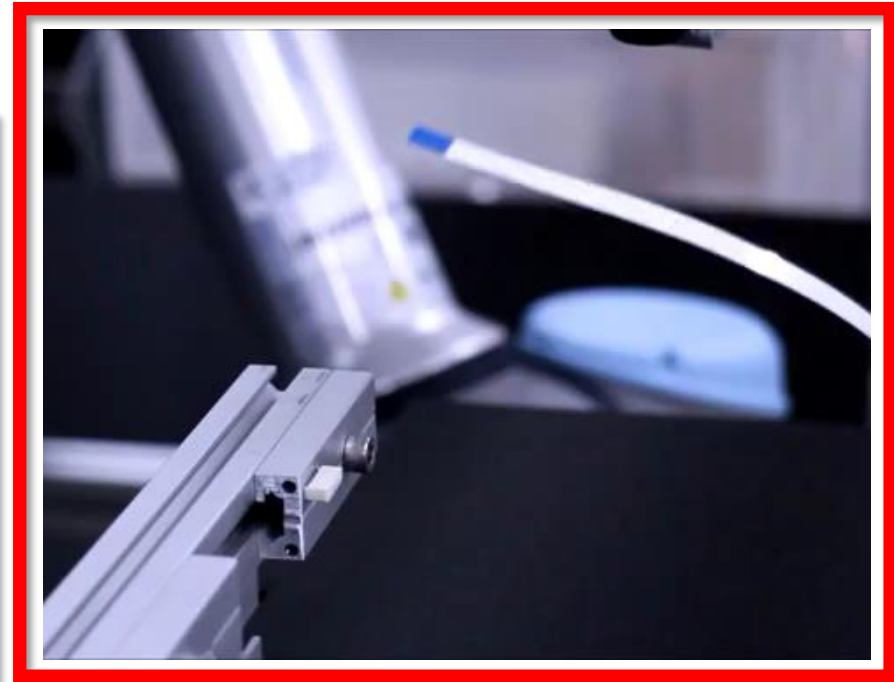




Recognizing “Twist”

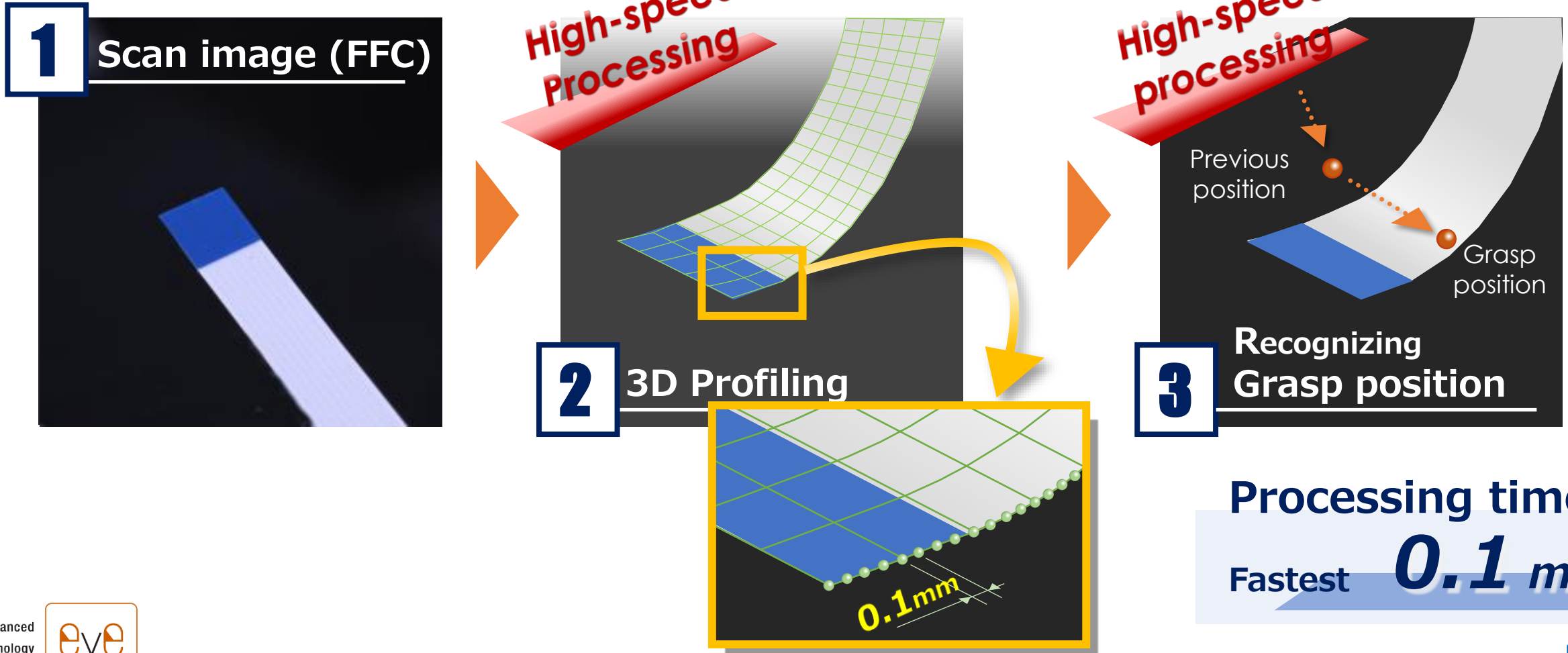


Grasp even if it shakes a little



Cable recognition method.

Kurasense's High-speed 3D Recognition technology



Kurasense Robot System



The Robot manufactures



and others.

The PLC manufactures



Connect anything with TCP/UDP !

"Cable" is still not automated

**Kurasense's
3 targets**

Medical equipment



Electronic device assembly

Display assembly



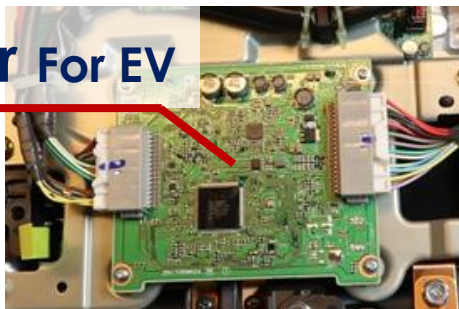
Smart phone

Board to Board connector

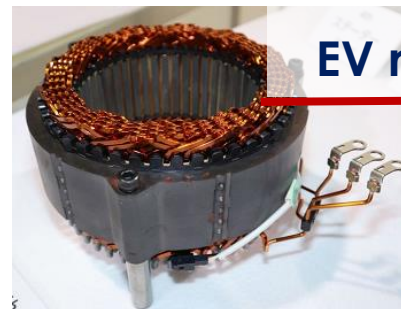


Automotive

Inverter For EV

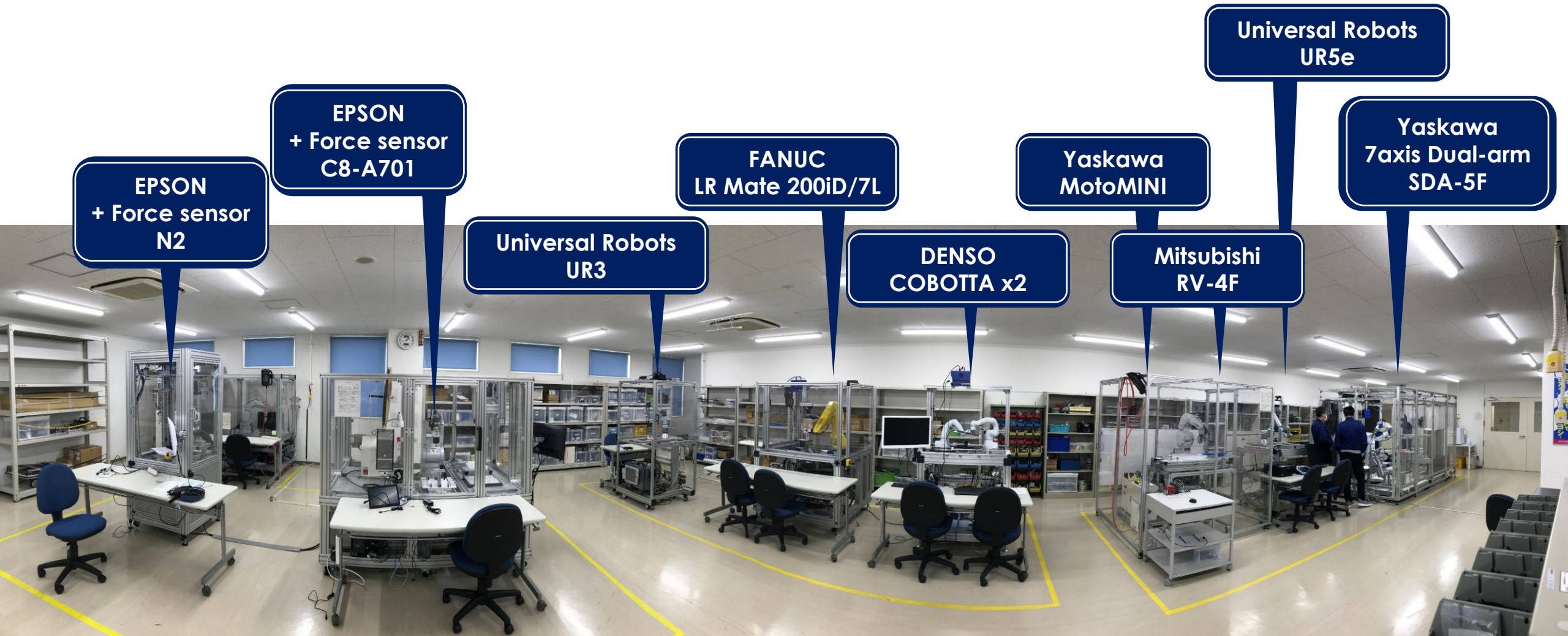


EV motor stator



NOx Sensor

Robot testing room



EPSON
+ Force sensor
N2

EPSON
+ Force sensor
C8-A701

Universal Robots
UR3

FANUC
LR Mate 200iD/7L

DENSO
COBOTTA x2

Yaskawa
MotoMINI

Mitsubishi
RV-4F

Universal Robots
UR5e

Yaskawa
7axis Dual-arm
SDA-5F

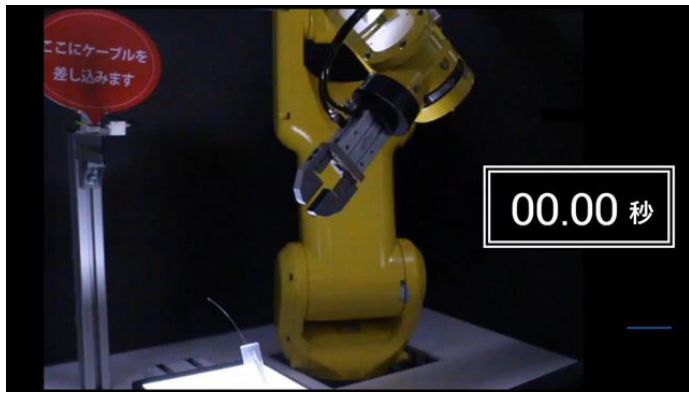
Kurasense robot system

Case study

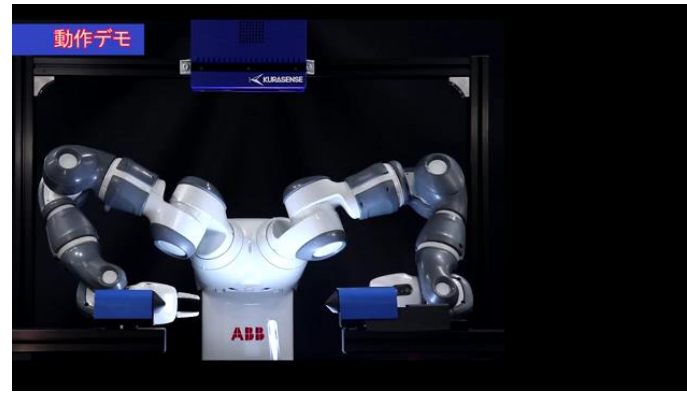


Robot movie

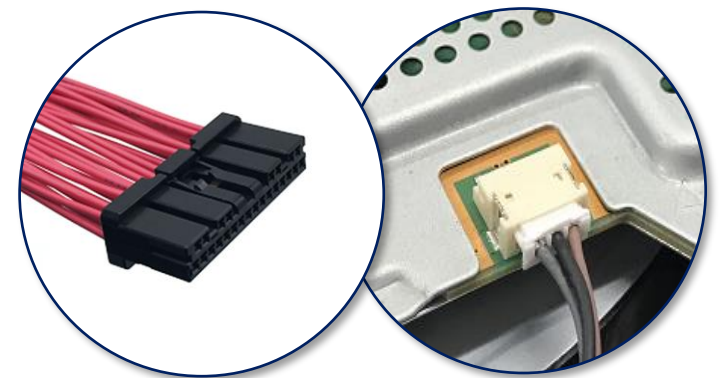
High-speed Robot motion



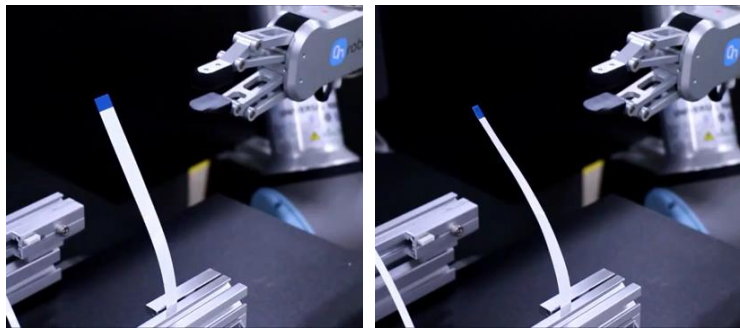
Processing Optical fiber



Connectors



Flat cable



Smart phone



Bundle of cables



High-speed robot motion (2019)



Configuration of robot system

Target

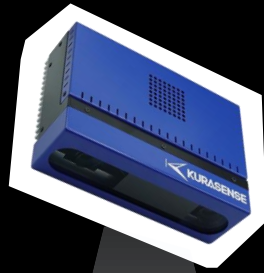
Diameter ϕ 3.0 mm
Use the sensor to check the wire go through the hole.

Optical fiber

Diameter ϕ 0.5 mm
Grasp with a robot

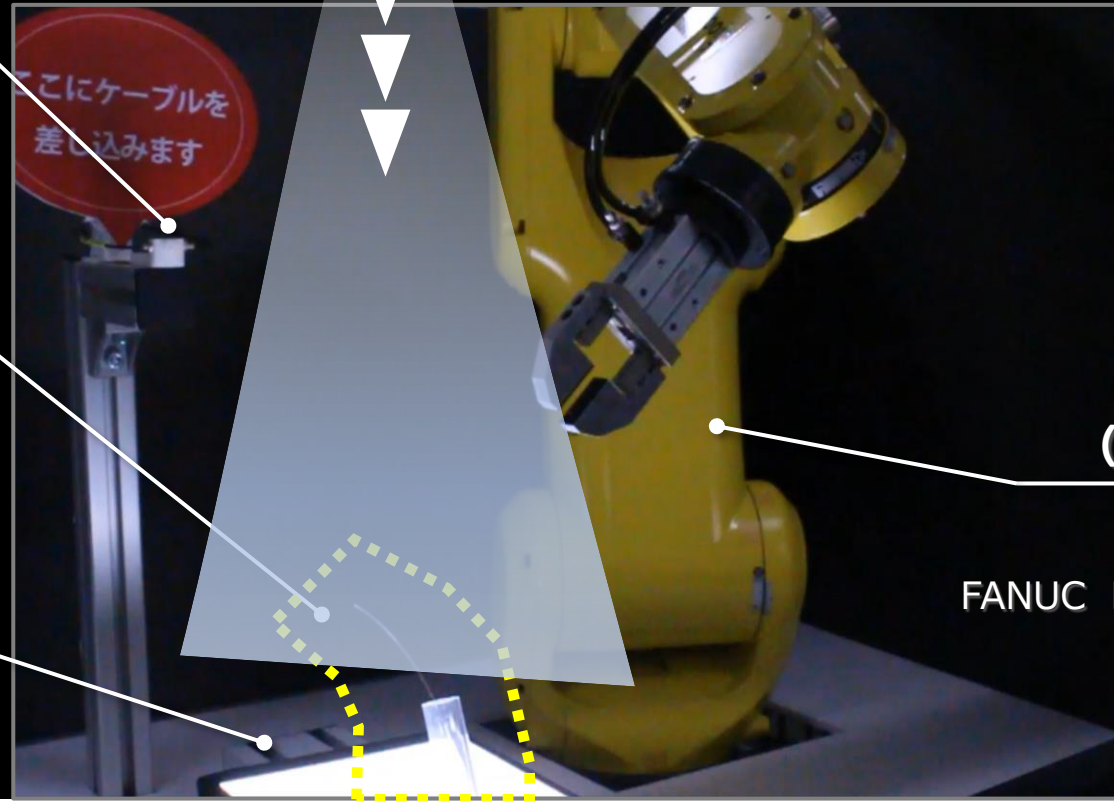
LED lighting (Background)

For cable recognition



Kurasense

KURABO Kurasense – C100F



Robot (for Industrial)

Grasp the cable
FANUC LR Mate 200iD/7L

Please in slow motion

Point of the video

- Cable: $\Phi 0.5$ mm
Target hole: $\Phi 3.0$ mm
- Robot motion
average 2.5 sec
- 2 times 3D recognition
1. Grasp position
+ 2. Curve of the cable top





“Flat cable assembly” Configuration

Kurasense

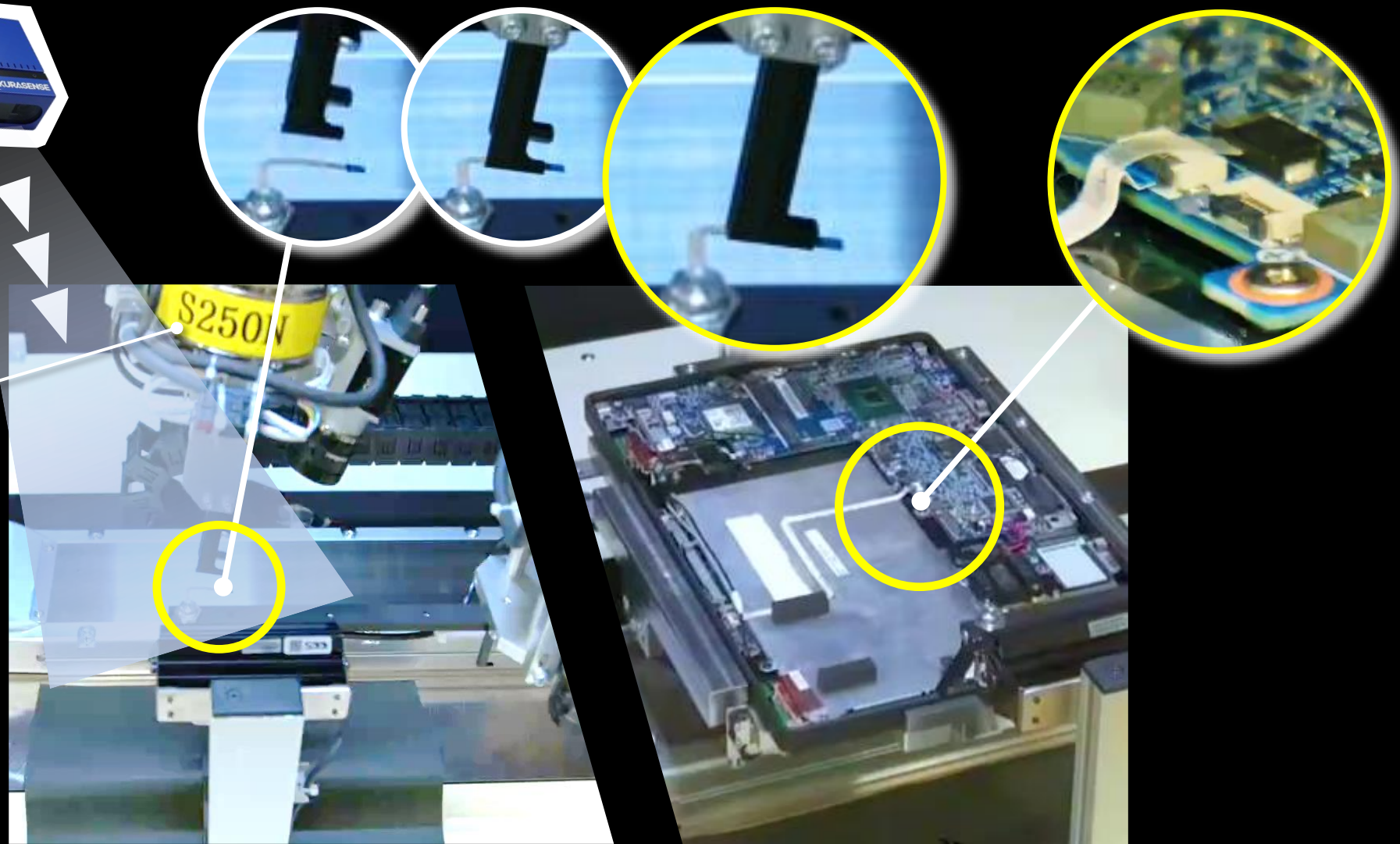
Kurasense – C100F



EPSON robot

Robot : C4 series

Force sensor : S250N



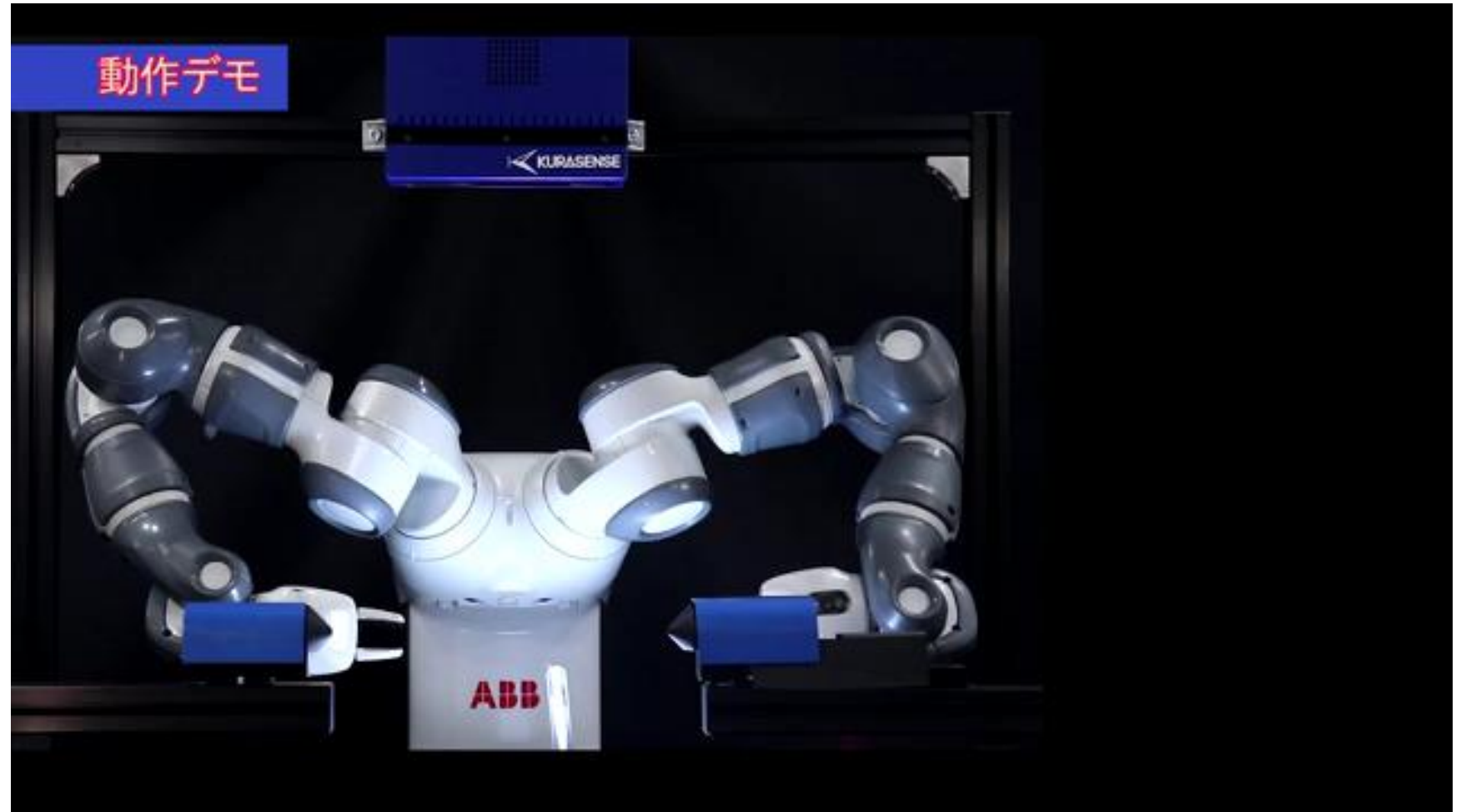
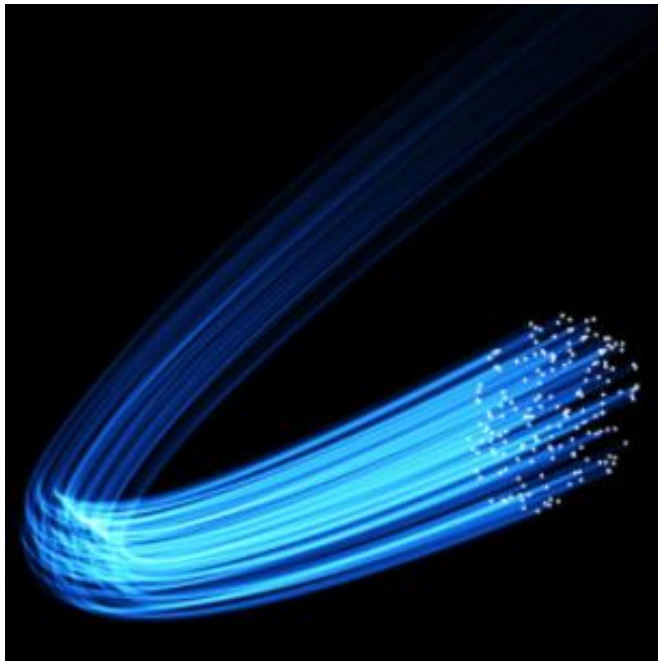


Confidential

スマートフォン向け超小型コネクタ ロボットによる自動組立て



Processing Optical fiber (2020)



Bundle of cables (2020)



**This robot doesn't
use a camera
and 3D sensor.**





角形コネクタ把持挿入 ロボットによる自動組立て



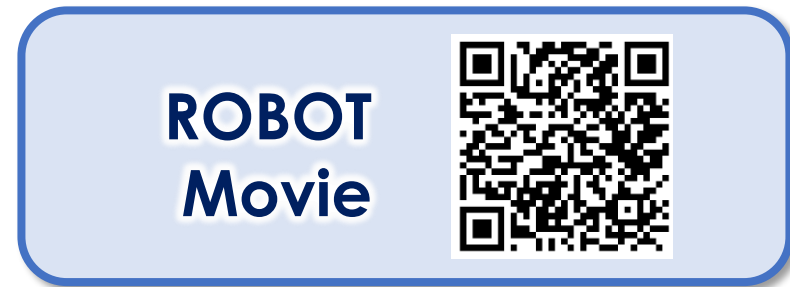
Thank you!

Please look at WEB pages.

● **WEB page**



● **Check the movie
From the WEB page !**



감사합니다.



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