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9 産業と技術革新の基盤をつくろう

HANDLING FLEXIBLE MATERIALS LIKE CABLES WITH KURASENSE

KURABO



Kurabo Industries Advanced Technology Division

SIer
FA & Robot System Integrator

EV Growth and Wiring Harness Demand

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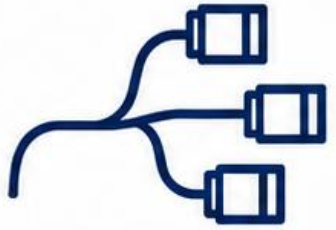


Electric car sales

20 million+

Worldwide, 2025

+20% versus 2024



Automotive wiring harness market

$50.1bn → $63.0bn

2023 estimate — 2030 forecast

3.4% forecast CAGR, 2024–2030

Electrification supports demand for wiring systems.

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Sources: IEA, Global EV Outlook 2026; Grand View Research.
EV sales include battery electric cars and plug-in hybrids. Market forecast covers all automotive wiring harnesses.

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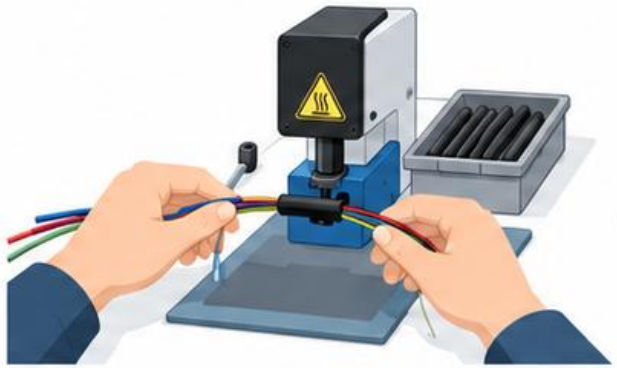
Automation Gap In Wireharness Production

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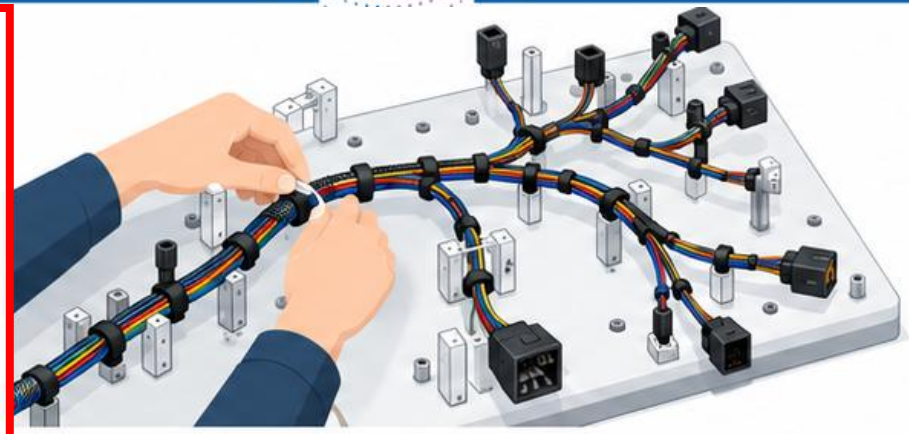
Wire Processing
Cutting /Stripping/Crimping

Highly Automated



Pre- Assembly
Twisting/Splicing/Heat-shrink tubing

Manual and semi-automated



Final Assembly
Wire insertion/Routing/Bundling

Predominantly manual

Final Assembly – Reported Benchmarks

70%

Of total wire harness production time

90%

Of final assembly is performed manually

Source: Nguyen, Kuhn & Franke (2020), Procedia CIRP 97, 379–384, Section 2.1. Historical benchmarks; actual production lines vary.

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KURASENSE – Cable Recognition

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AI powered High-speed 3D vision sensor for cable recognition

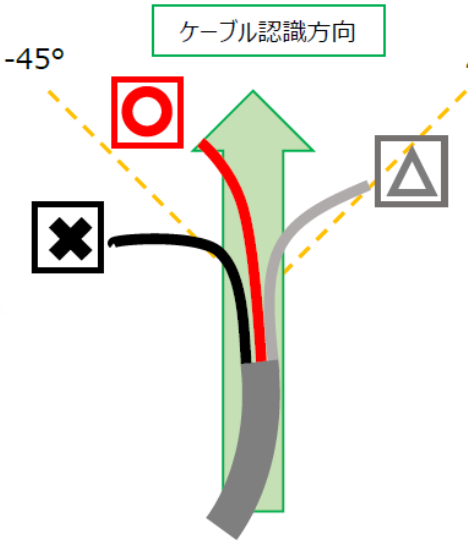
KURASENSE®
クラセンス





2022 10th Robot Awards
Japan Machinery Federation
Chairman's Award Winner





Recognisable objects



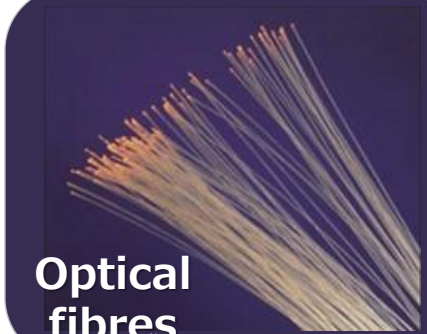
Flat cables



Multi-core cables



Stacked cables



Optical fibres



Connector

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How is it Different From Other Company Products?

		KURASENSE	Other 3D camera	
3D Scanning method		Stereo Camera	Illuminate patterned light several times and capture with a camera	
3D Recognition method	HIGH SPEED	Line Vector Recognition method (“3D object contouring. High speed processing is possible due to small amount of data “)	Point cloud matching method (“ Registered CAD data shapes are Searched from the entire space “)	SLOW
Objects	FLEXIBLE OBJECTS	Especially for cables, flat cables etc.	Objects with a definite shape metal worked , plastic moulded objects etc.	STANDARD OBJECTS

Overall Merits

- ✓ Works seamlessly even when the object is shaking a little.
- ✓ Capable of measuring very thin objects.
- ✓ Ability to selectively choose cable based on colour.
- ✓ High speed due to less data processing
- ✓ Capable of even working with backlights setup

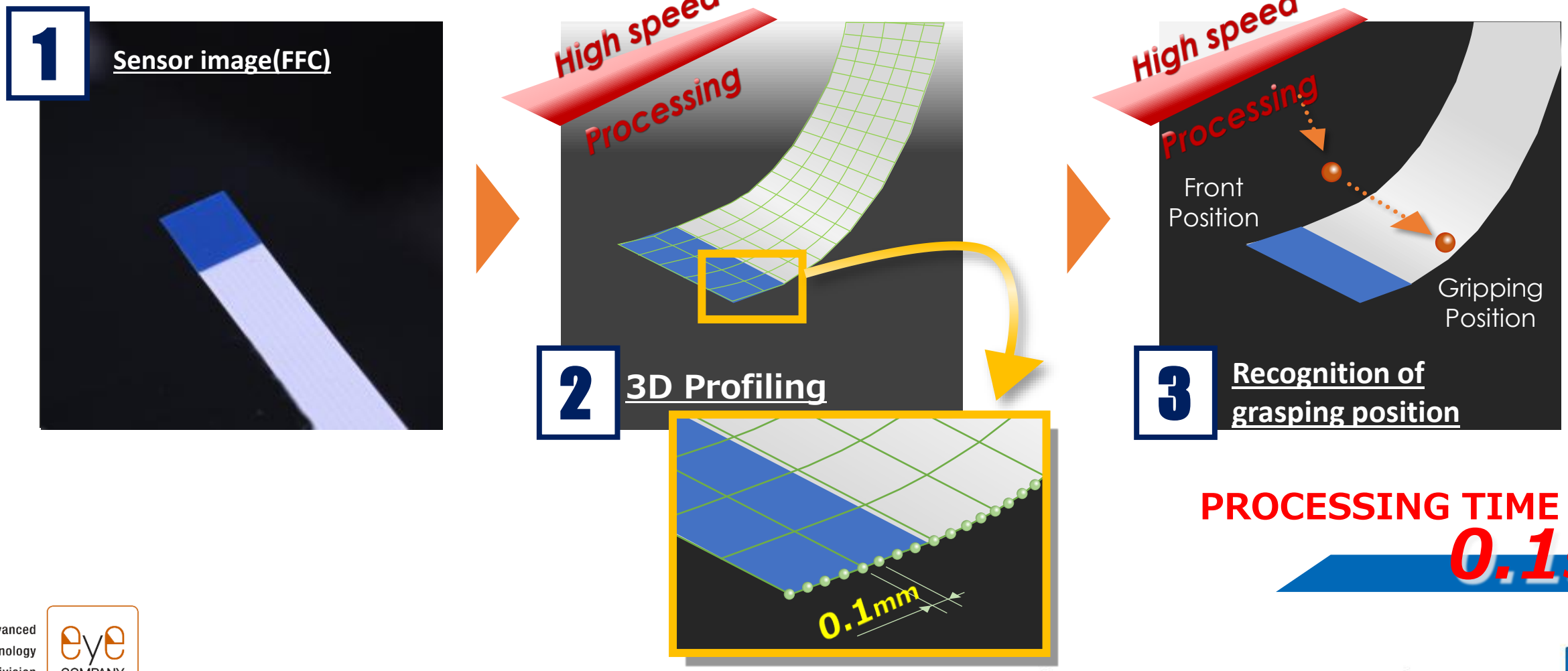
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How Does KURASENSE Cable Recognition Work?

KURASENSE
AI Powered High-Speed 3D Recognition Technology

『Line Sector Recognition』 Method

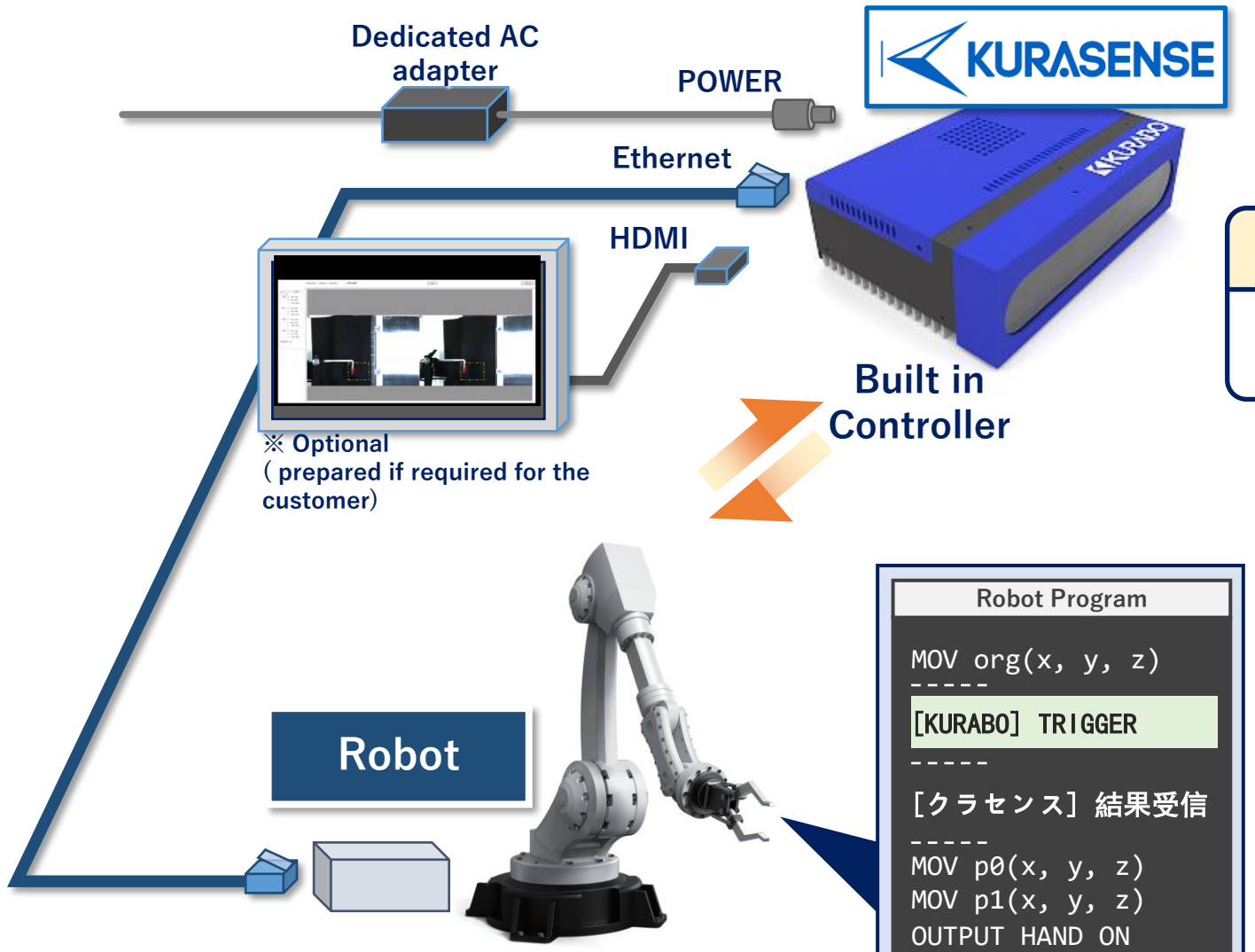


PROCESSING TIME
0.1Sec

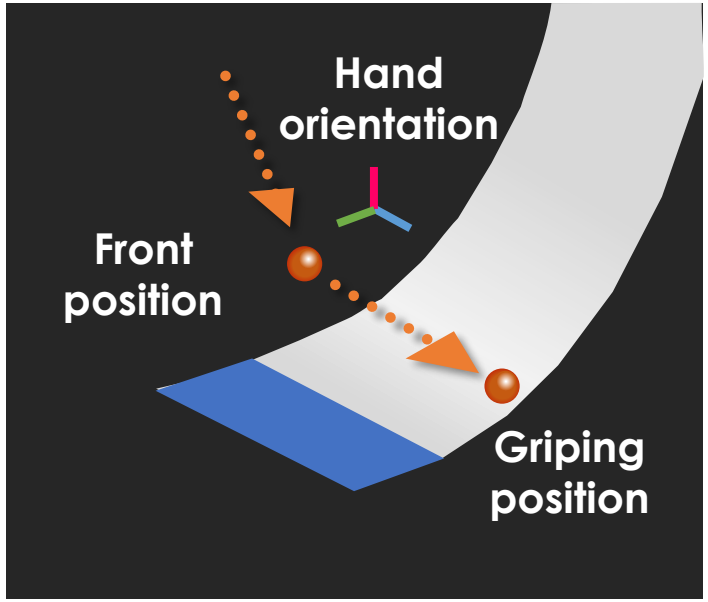
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Kurasense and Robot Connection



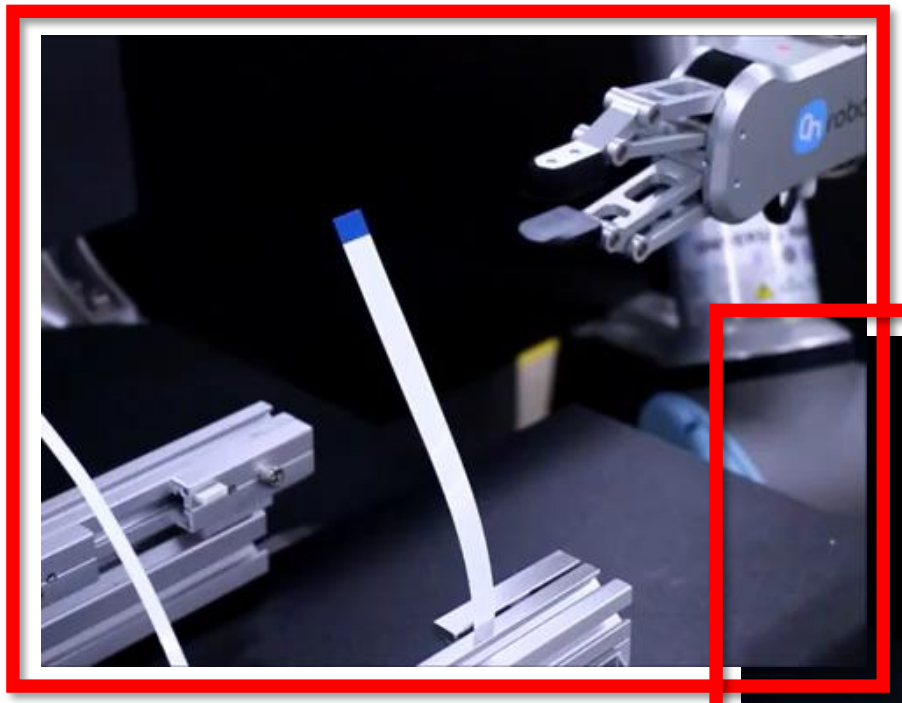
Grip judgement	Front position	Gripping position	Hand orientation
OK/NG	P0(x, y, z)	P1(x, y, z)	(Rx,Ry,Rz)



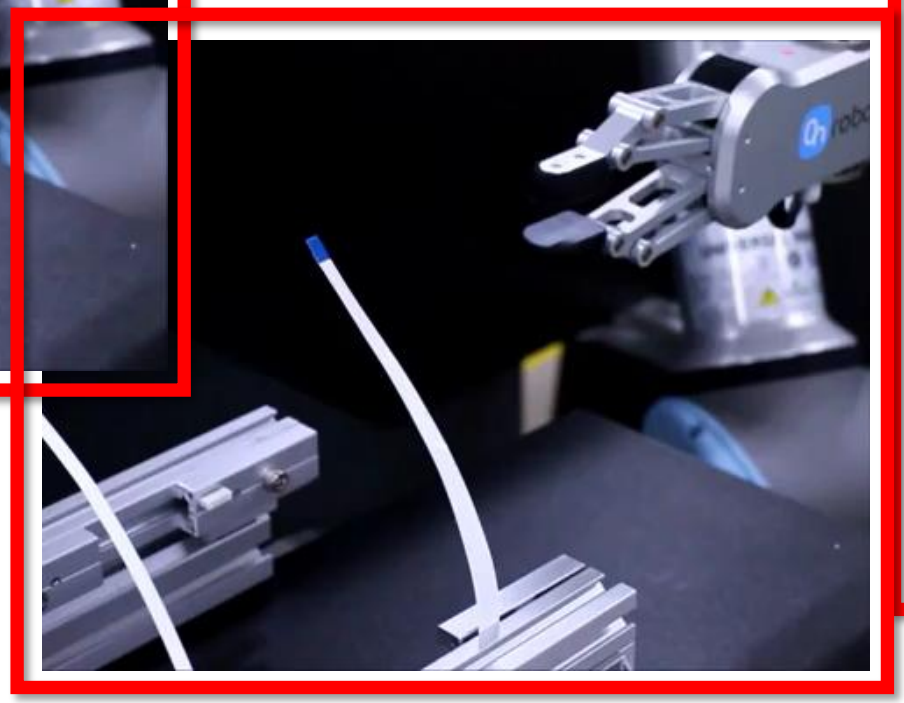
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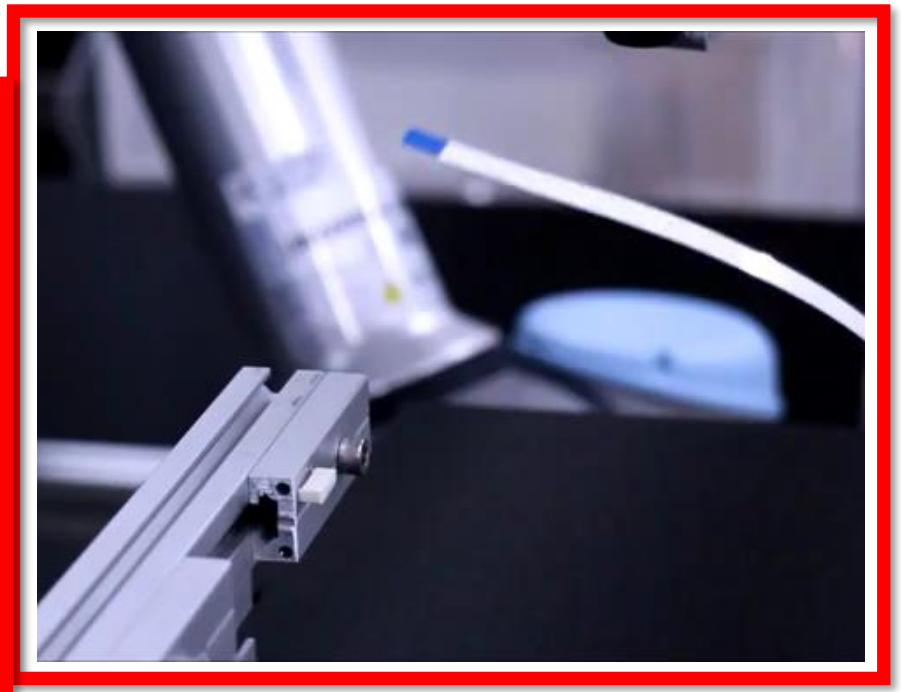
Capabilities of Kurasense



High-speed recognition and gripping



Recognizing twist/bend



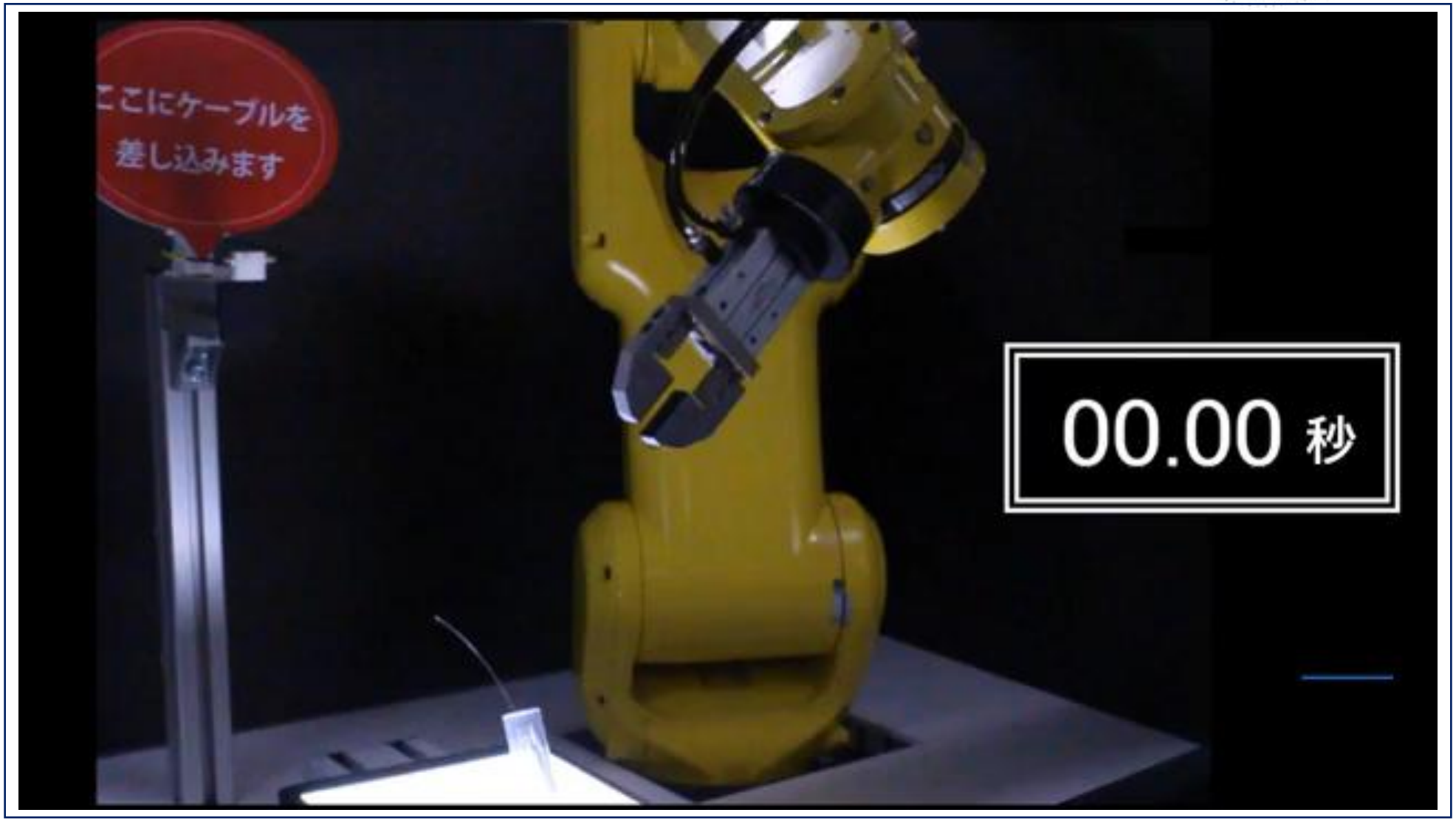
Grip even if it shakes a little

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High Speed Optical Fiber Cable Picking



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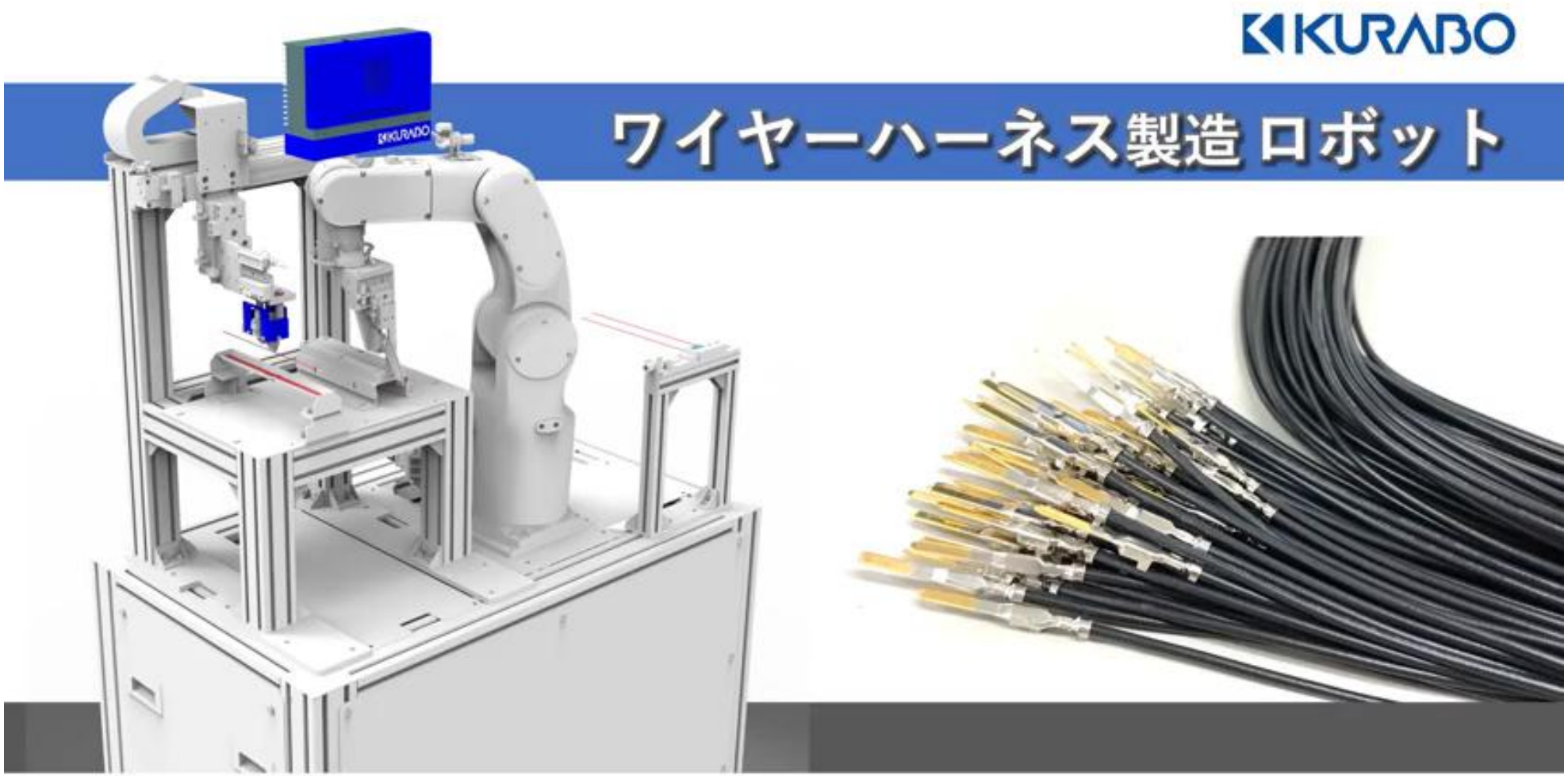
KURASENSE C100F / C100W

DEMO

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EXAMPLE : Cable Harness Production Robot Package



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Connector

Handling

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Example : Square Connector Gripping and Insertion

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角形コネクタ把持挿入　ロボットによる自動組立て



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Kurasense Specification

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Color sensor
Recognises Colour



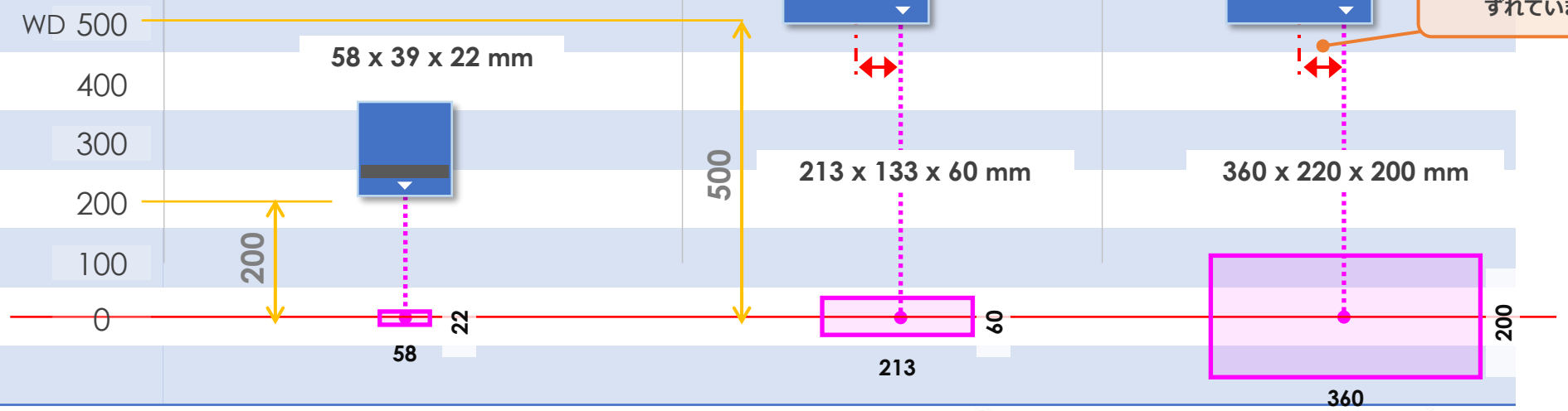


Model	Kurasense - C100FX Compact Ultra-high definition model	Kurasense - C100F High definition model	Kurasense - C100W Wide range model
X-Y Resolution	0.03 mm	0.10 mm	0.20 mm
Z-Accuracy	± 0.1 mm	± 0.5 mm	± 1.0 mm
Recognisable wire Diameter	Φ 0.1 mm	Φ 0.3 mm	Φ 0.6 mm

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WDと計測範囲



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Grippers For Cable Handling

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Kurabotte – R for Orientation Correction

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クラセンス　ケーブル自動化２

圧着端子をコネクタに挿入



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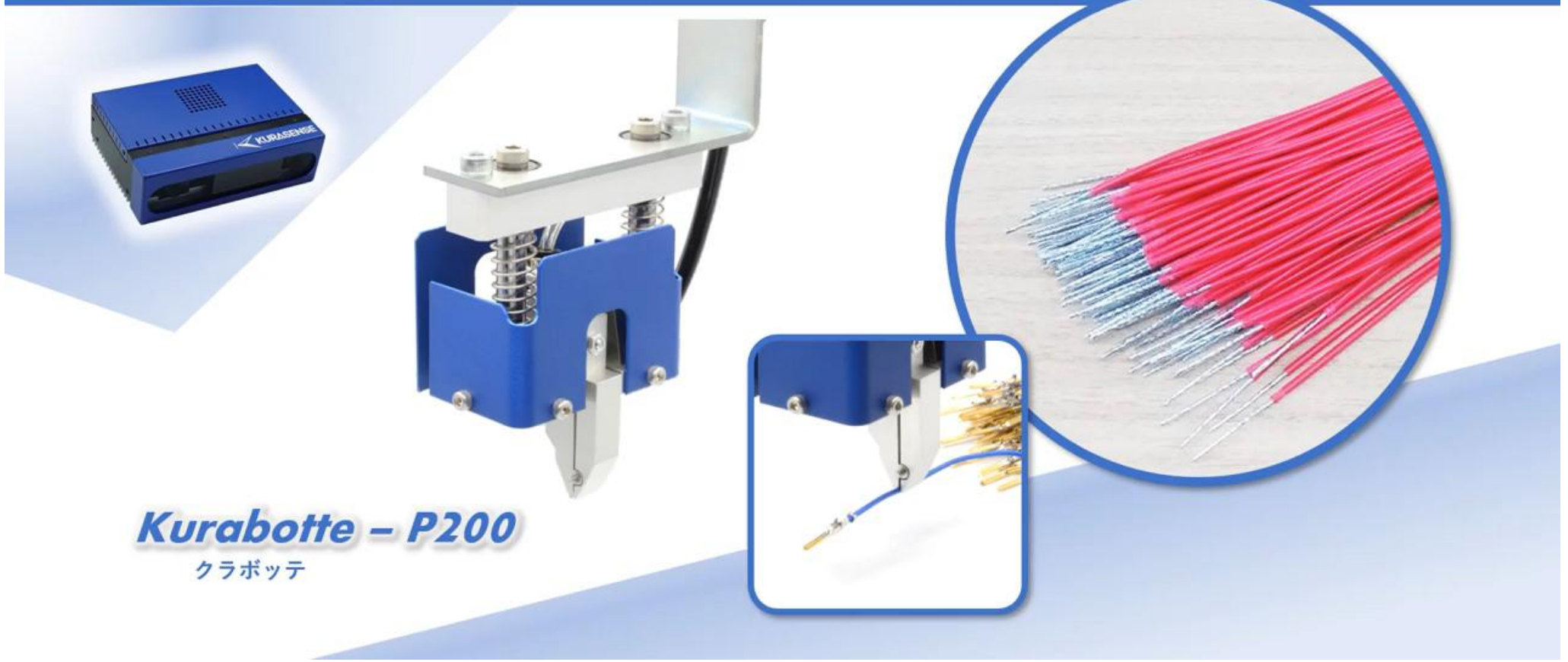
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Kurabotte-P Taking Out 1 Cable Form Bundle of Cable

KURABO

KURABO

Kurabotte-P200　ケーブル束供給ユニット



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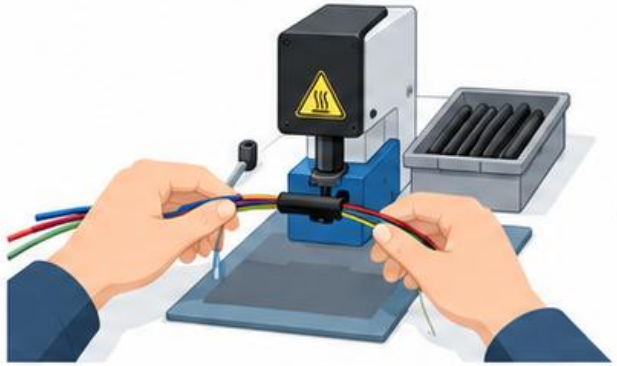
Automation Gap In Wireharness Production

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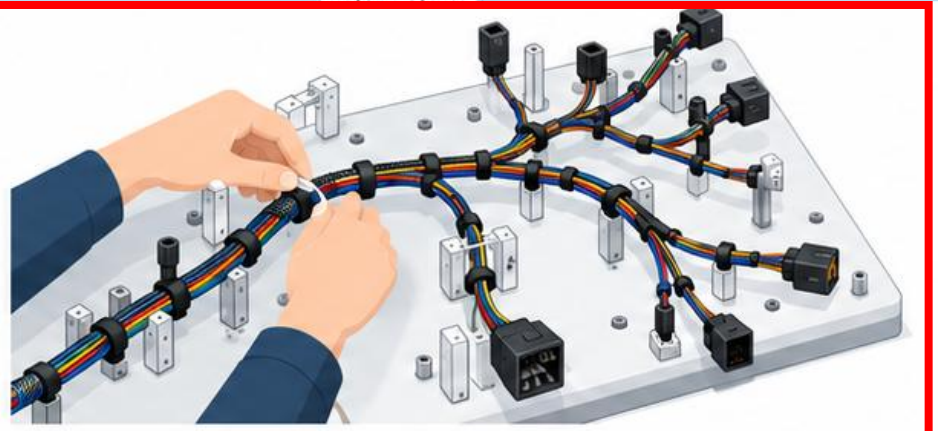
Wire Processing
Cutting /Stripping/Crimping

Highly Automated



Pre- Assembly
Twisting/Splicing/Heat-shrink tubing

Manual and semi-automated



Final Assembly
Wire insertion/Routing/Bundling

Predominantly manual

Final Assembly – Reported Benchmarks

70%

Of total wire harness production time

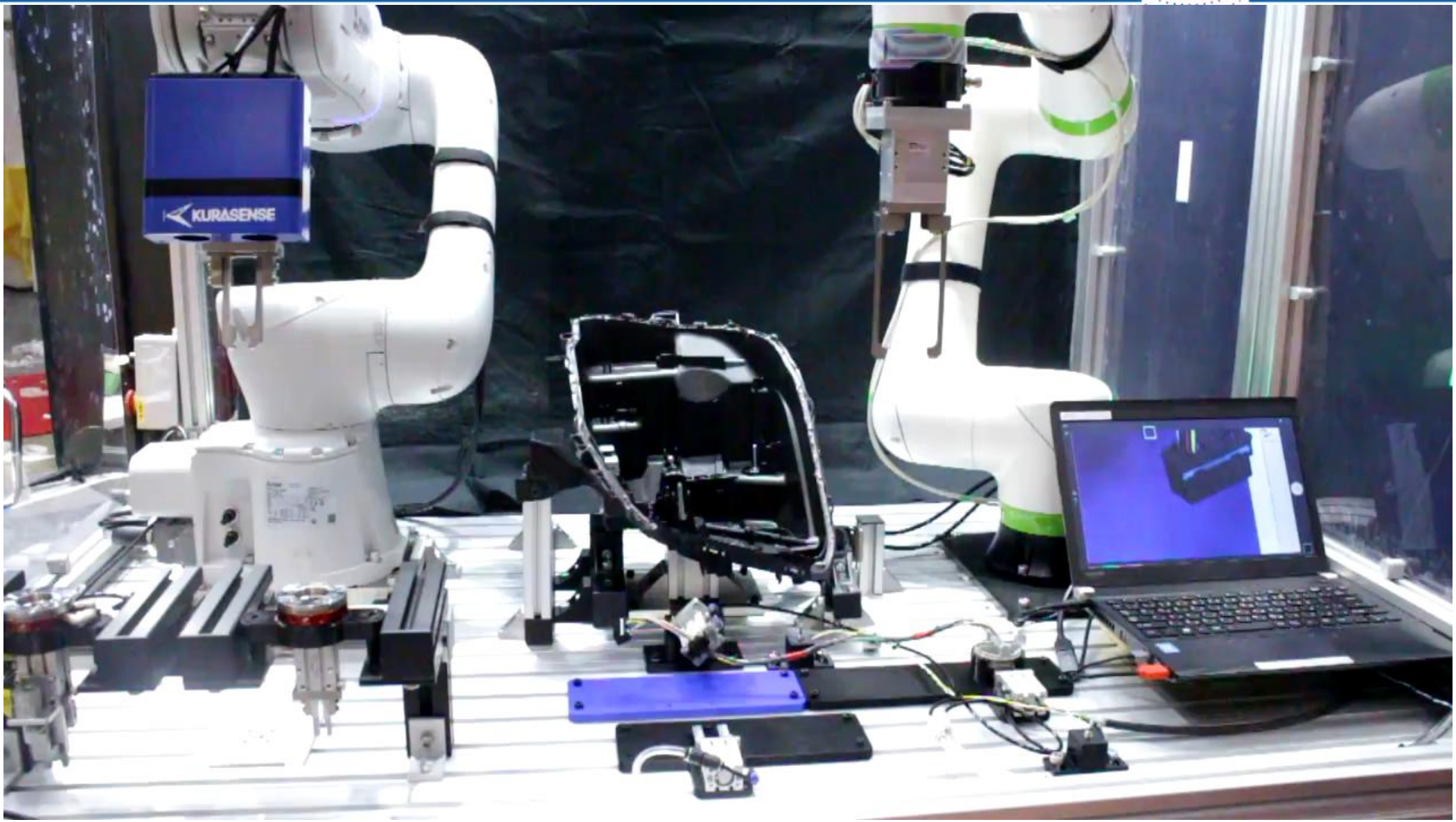
90%

Of final assembly is performed manually

Source: Nguyen, Kuhn & Franke (2020), Procedia CIRP 97, 379–384, Section 2.1. Historical benchmarks; actual production lines vary.

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EXAMPLE : Car Headlight Wire Harness Routing

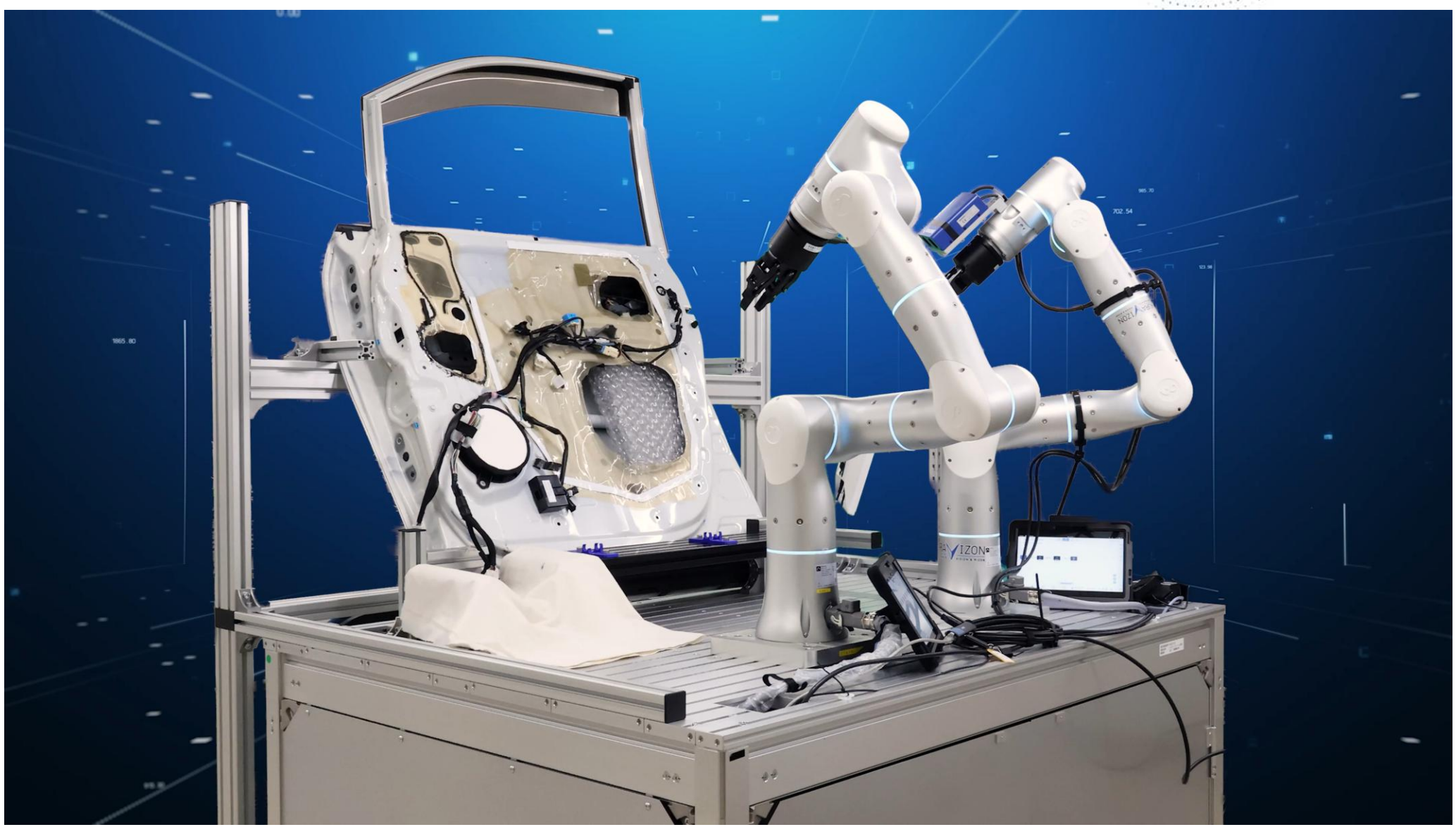


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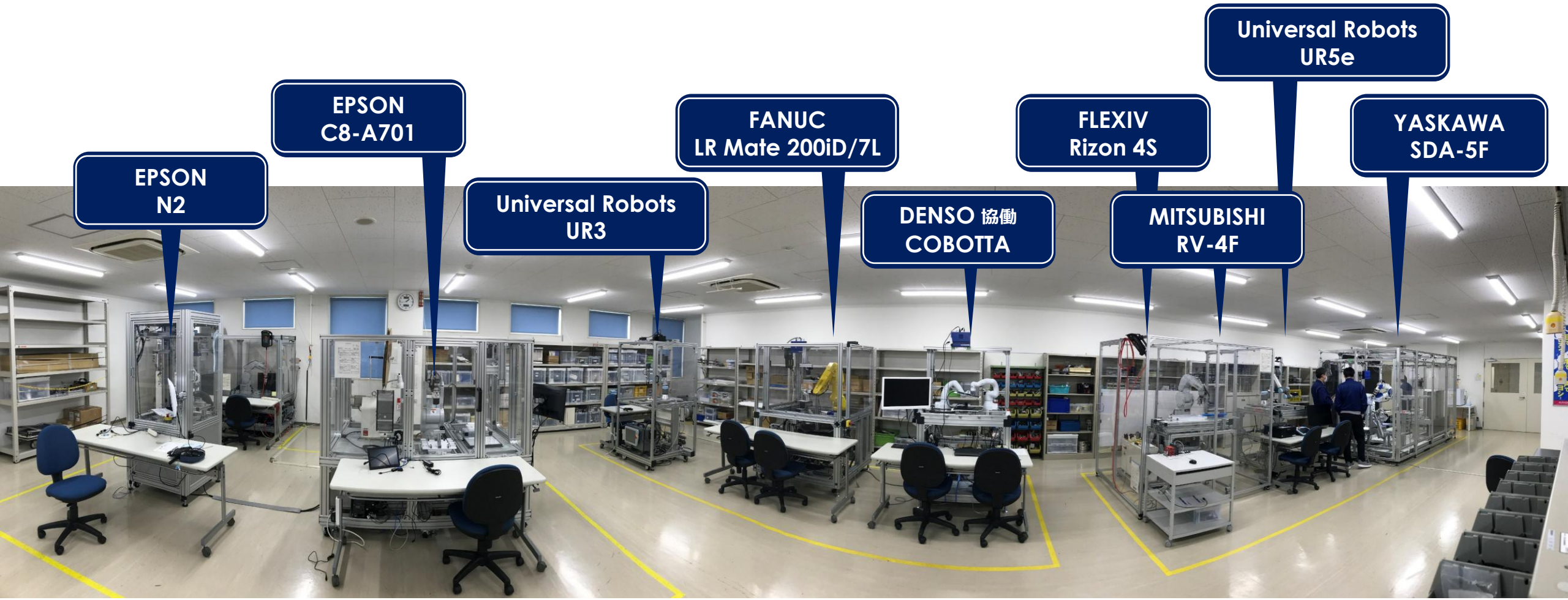
Wire Harness Car Door Assembly



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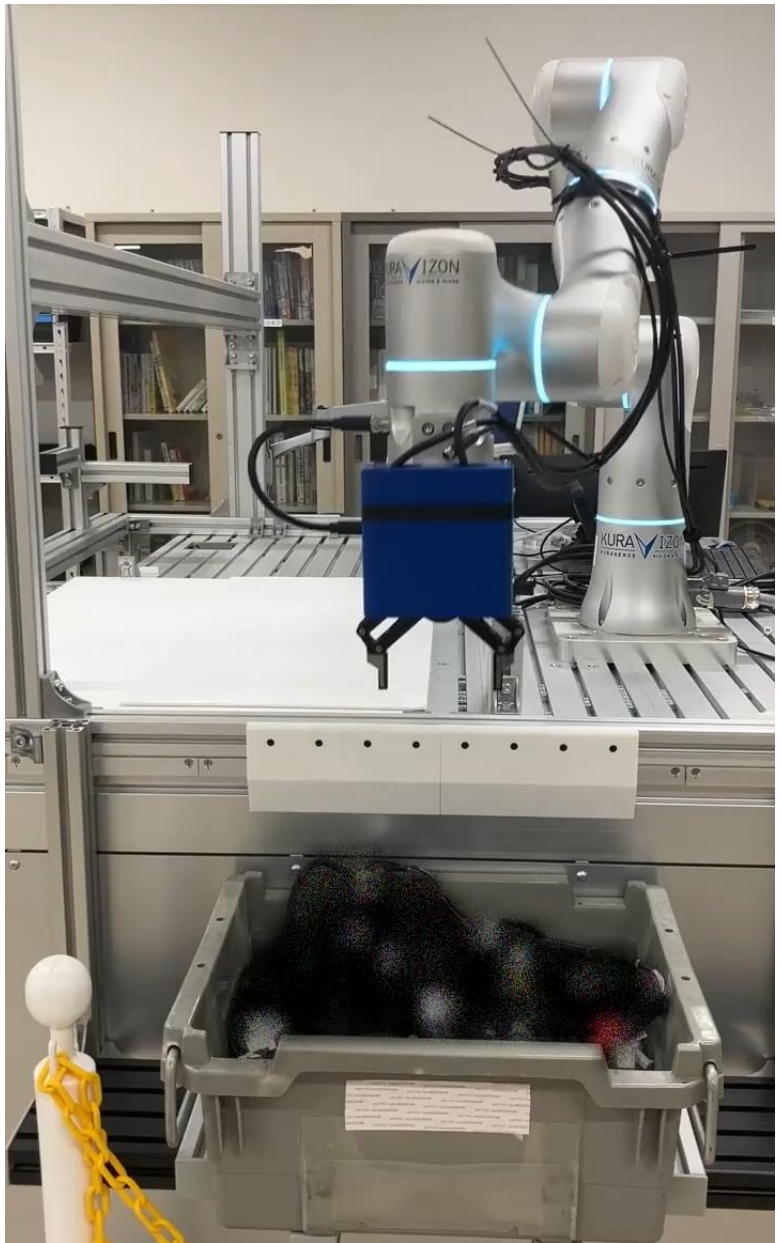
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Research & Development Room



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Wire Harness Bin Picking Using AI



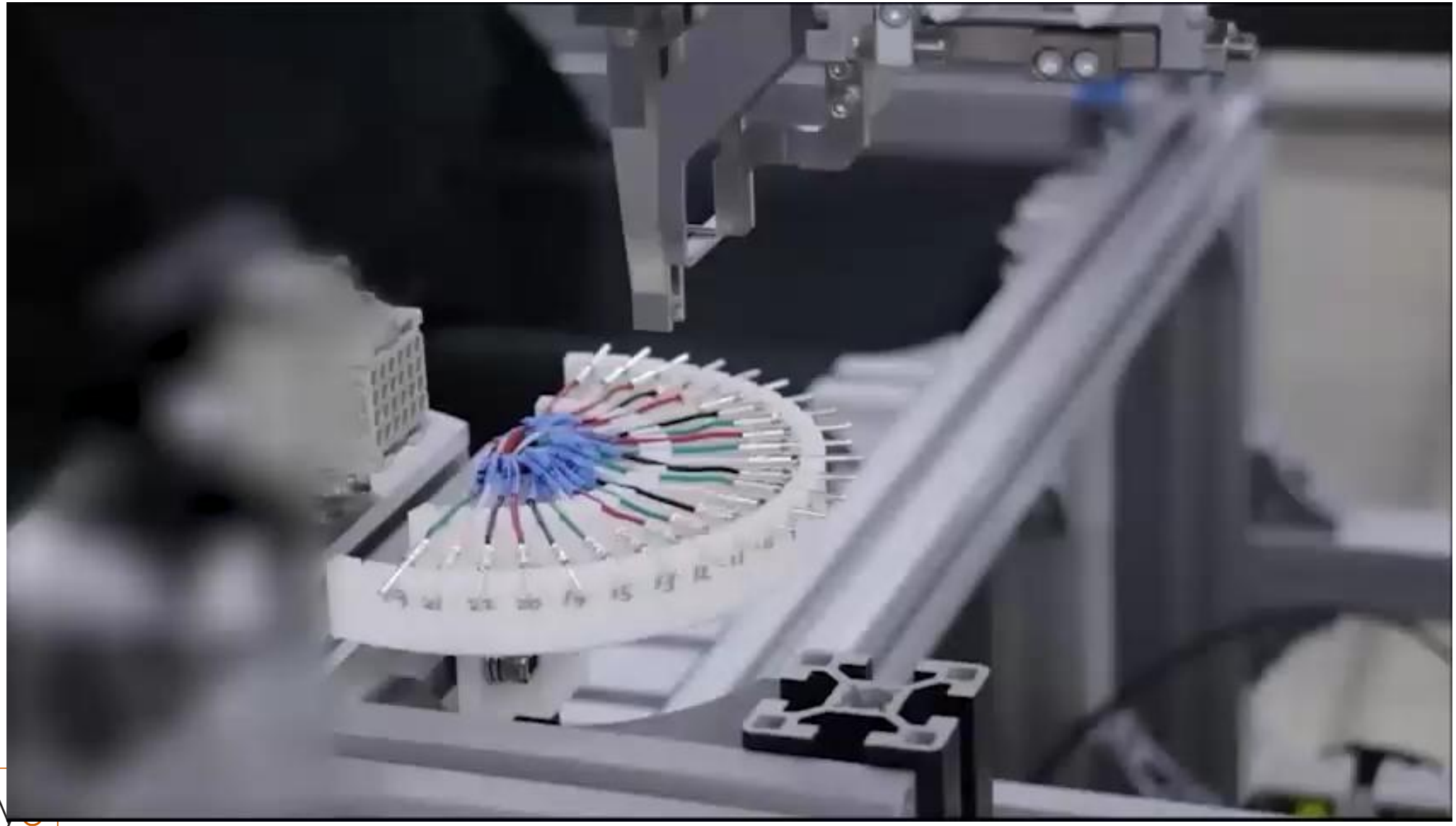


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Bundled cable – Connector insertion



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Thank you.

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