
STELLANTIS
Achieving Zero-Defect Production with AI and Wearable Technology
Stellantis Success Story
THREAD IN MOTION

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Executive Context: The Pursuit of Zero-Defect Manufacturing

The Baseline Standard

Modern automotive manufacturing demands foolproof part-to-vehicle matching. Every component must be precisely synchronized with the vehicle's chassis number (VIN) via Programmable Logic Controllers (PLCs).

The Critical Component

Anti-lock Braking System (ABS) modules.

The Mandate

A single mismatched component poses immediate safety risks, requiring absolute certainty during assembly.

The Traceability Blind Spot: Hidden Costs of Operational Inefficiency

The Core Deficit: Critical ABS modules lacked scannable barcodes or RFID tags.

Failure Matrix	
✕ **Failure of Handheld Scanners**	✕ **Failure of Fixed Cameras**
Operators possessed **no scannable ID** to verify the part against the vehicle build sequence.	Traditional vision systems could **not** verify parts **tucked** into **hard-to-see chassis locations** due to tight angles and poor factory lighting.

Enterprise Risk Impact

The Threat

High probability of wrong-part installation leading to misbuilt vehicles.

The Cost

Industry automotive recalls average **over $10,000,000 per event**, coupled with severe reputational damage.

From Manual Guesswork to Intelligent Automation

TIM INSPECT (AI Vision OCR)

- Deep learning Optical Character Recognition (OCR).
- Extracts embossed alphanumeric codes directly from curved, shiny ABS surfaces.
- Bypasses poor lighting to generate a real-time digital identity for unlabelled parts.

VEGA-X (Wearable Tech)

- Mini-size hand computer with a dynamic, built-in camera.
- Enables up-close, hands-free image capture in challenging, hard-to-reach locations.
- Eliminates the ergonomic strain of tethered pistol-grip scanners.

The Real-Time “Poka-Yoke” Verification Loop

1. Capture

Operator naturally reaches for the ABS module; VEGA-X captures the image hands-free at the optimal angle.

2. Analyze

Edge-processed AI (TIM INSPECT) instantly reads the embossed code, unfazed by factory conditions.

3. Verify

The system automatically cross-checks the extracted ID against the vehicle’s required PLC data.

4. Feedback

Instant multi-modal alerts (haptic vibration, acoustic tone, visual LED) stop the operator before a wrong part is installed.

Measurable Impact: Securing 100% Traceability

100%

Part Traceability achieved on previously undocumented ABS components.

Zero

Assembly Errors. Total elimination of misbuilds (Full Poka-Yoke achieved).

< 1 Sec

Real-time verification speed, delivering instant operator guidance.

1,100+ Hours

Annual productivity gained. Eliminating handheld scanners saves ~4 seconds per cycle, streamlining high-volume throughput.

Strategic Impact: A Scalable Leap Towards Industry 5.0

Complete Recall Immunity

Transitioned from reactive quality control to proactive error prevention at the source.

Frontline Empowerment

Seamless integration of AI reduces cognitive load and physical strain, turning workers into augmented, highly confident operators.

Enterprise Scalability

Established a plug-**and-play** template capable of extending AI vision checks to any unlabelled component across global production lines.

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