
E.C.A®
VALFSEL SUCCESS STORY:
Wearable IIoT and AI for
Operational Excellence
Achieving zero-defect assembly and
hands-free efficiency at industrial scale.
THREAD IN MOTION

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Operational Profile Dashboard

62,281 m²
Total facility footprint
(Manisa Industrial Zone)

4.2 Million
Units produced annually

4,980 Tons
Raw brass processed per year

40%
Domestic market share and massive global export network

The Paradox of Scale and Precision

Valfsel manages a highly complex, multi-stage engineering operation—from high-temperature casting to micron-level machining and surface coating.

With millions of diverse components in motion, the company requires flawless traceability and “just-in-sequence” production.

Success depends entirely on orchestrating this massive volume with zero-defect precision.

The Anatomy of a Micro-Interruption

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Conventional scanning loop

Pick Up
(Interrupts manual workflow)

Aim & Scan
(High repetitive physical motion)

Visual Verify
(Forces operator to look at a screen, breaking focus)

Put Down
(Re-establishing two-handed grip)

The Hidden Costs

Ergonomic Strain

Constant picking up and putting down of 300g-600g devices causes cumulative muscular fatigue and repetitive strain on wrists/shoulders.

Cognitive Load

Forcing operators to look away from their physical task to verify a screen breaks concentration and slows down the 'just-in-sequence' rhythm.

Safety & Quality Risks

Occupying one hand with a device compromises the operator's balance and grip when handling heavy, sharp, or hot brass components, while delayed visual feedback allows assembly errors to slip through.

The Hardware Revolution: Hands-Free IIoT

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Ultra-Lightweight Design

At just 45 grams, it eliminates muscular fatigue and feels like a natural extension of the body.

Total Hand Liberation

Fabric-based, ergonomic design frees both hands, restoring the worker's natural range of motion for heavy or complex assembly.

Continuous Work Cycle

Eliminates the 'pick up / put down' loop, integrating data capture seamlessly into the physical act of production.

Workers transition from being 'tool carriers' to augmented experts, unlocking unprecedented ergonomic efficiency across the 8-hour shift.

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Operational Diagnostic: Conventional vs. Wearable IIoT

Dimension	Handheld Terminals	VEGA
Device Weight	~300g - 600g	45g Ultra-Lightweight
Operational Form	Occupies one hand completely	100% Hands-Free
Process Flow	Fragmented: pick up, scan, drop	Continuous: scan while holding parts
Error Feedback	Visual: forces user to check screen	Physical: instant sensory alert
Ergonomic Load	High wrist/shoulder stress	Natural motion, near-zero physical stress

The transition to Wearable IIoT completely eliminates optimization gaps, allowing Valfsel to reclaim thousands of lost man-hours annually.

Multi-Layered Digital Poka-Yoke & Connectivity

The Sensory Feedback Loop

Acoustic (Sound)

Auditory alert confirms successful scans or flags sequence errors without visual attention.

Haptic (Vibration)

Physical intervention. The device gently vibrates on the hand the millisecond an incorrect part is scanned, physically haiting a mistake.

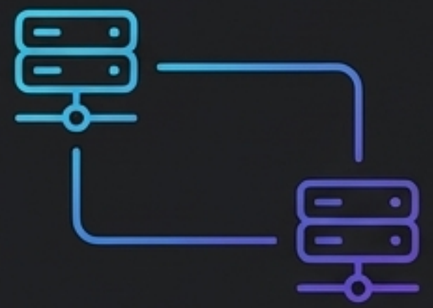
Acoustic (Sound)

Auditory alert confirms successful scans or flags sequence errors without requiring visual attention.

Optic (Light)

LED signals provide immediate peripheral status confirmation.

IT & Connectivity Pillar



Plug-and-Play Integration

Flawless synchronization with Valfsel's existing ERP/WMS via standard RS232/USB without costly middleware.

Resilient Connectivity

Dual-mode LoRa and Bluetooth guarantee uninterrupted data fiow even in heavily metallic, high-interference factory environments.

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Measurable Impact: Speed, Quality, and Safety

Ergonomic Efficiency & Speed

- Eliminated device handling time, unlocking massive man-hour capacity.
- Optimized cycle times by blending barcode scanning seamlessly into the natural movement of assembly.

Quality Assurance (Zero Defects)

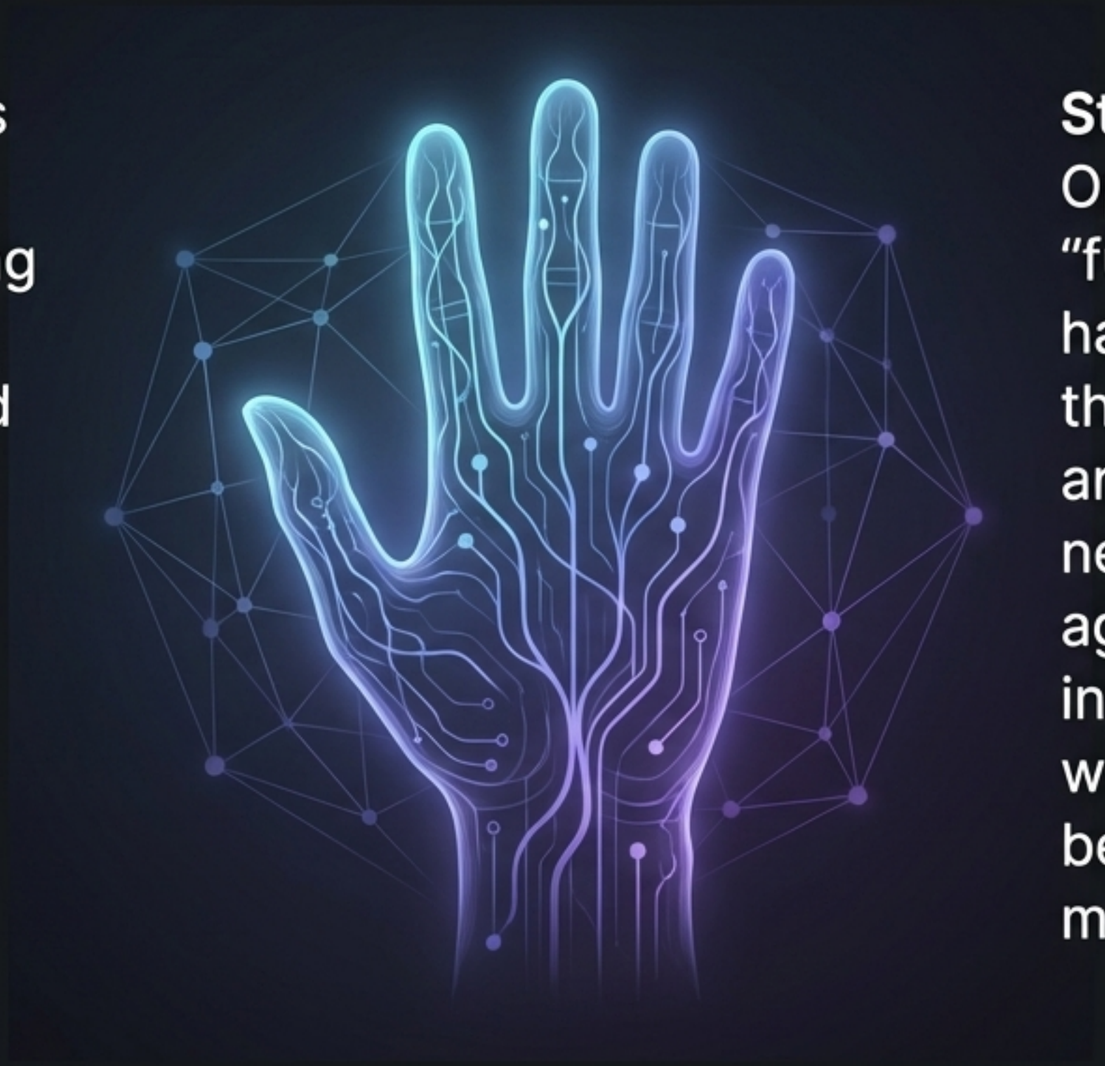
- Achieved 100% error prevention at the source via instant sensory feedback.
- Dramatically reduced scrap loss and rework by ensuring unbroken, fully accurate traceability from raw brass to finished fixture.

Workforce Safety (İSG)

- Mitigated repetitive strain injuries associated with heavy scanners.
- Restored two-handed grip and balance for operators handling heavy, hot, and sharp components, proactively reducing workplace accident risks.

Vision for the Future: Pioneering Industry 5.0

Key Insight: Valfsel has moved beyond simple automation. By adopting technology that inherently respects and augments human biology, they have achieved rapid user adoption and organic trust among the workforce.



Strategic Takeaway: Operations are now “future-proofed.” Valfsel has successfully merged the relentless precision of an automated data network with the physical agility and cognitive intelligence of its human workforce, setting a new benchmark for global manufacturing excellence.

THREAD IN MOTION

GET IN TOUCH WITH US

Website

www.threadinmotion.com

Phone

+44 20 4587 4397

E-mail

info@threadinmotion.com

HQ address

7 Henrietta Street,
WC2E 8PS, London,
United Kingdom