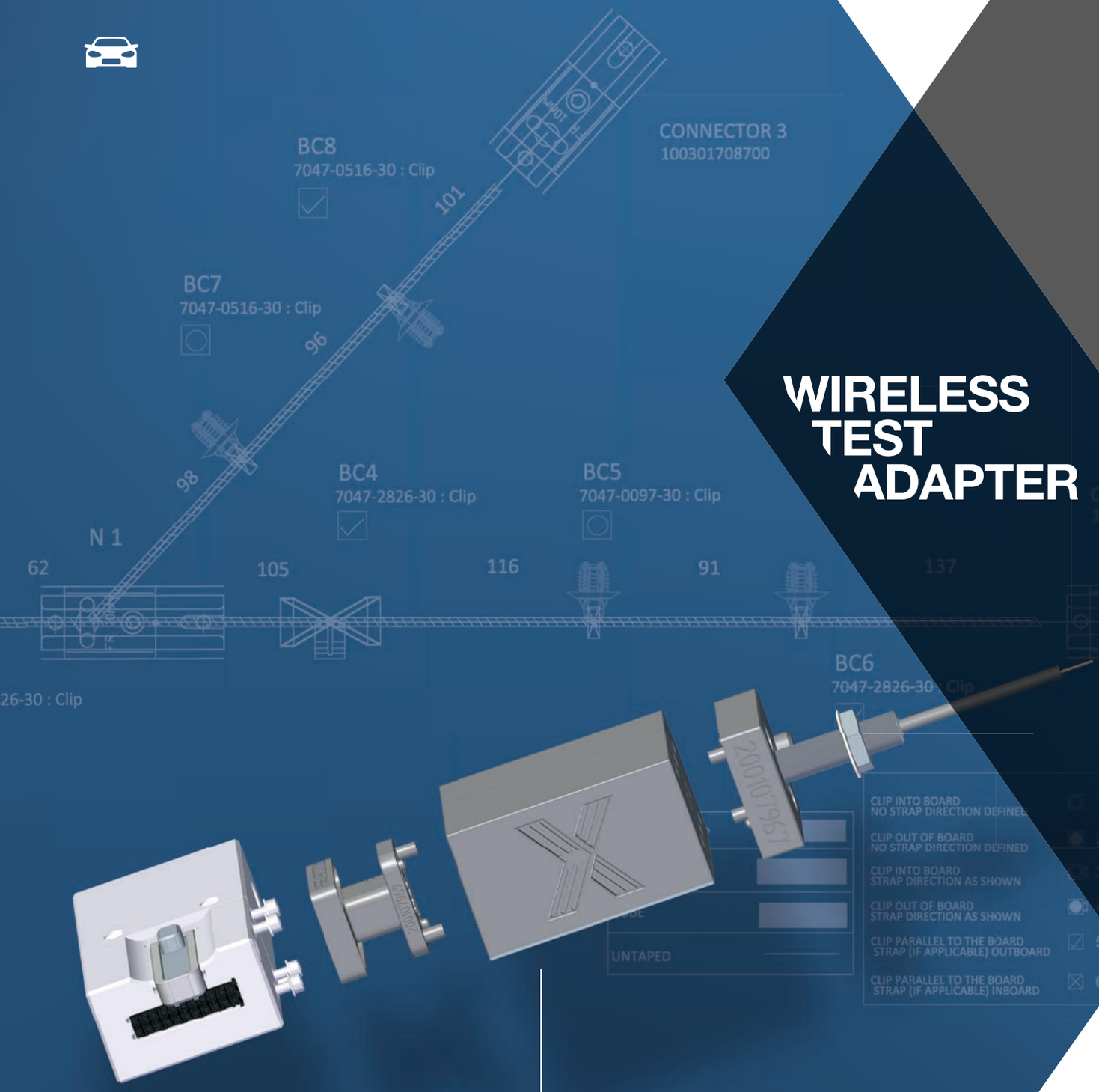
WIRELESS TEST ADAPTER



DRIVING QUALITY
IN WIRE HARNESS PRODUCTION

EN

komax

INTRODUCTION

PROBLEM SOLVING & DATA CREATION

Revolutionize wire harness production with **Komax, cutting edge inline testing solutions**, delivering unmatched precision, cost reduction, efficiency and reliability. The smart assembly hall automation and intelligence combined into seamless manufacturing.

By introducing inline testing technologies to production stages with the most human influence, our **wireless test adapter** performs continuity and short-circuit tests to verify strict quality standards. Test results are **sent to a central unit for real-time monitoring**. Our wireless test adapter is the key to real-time quality assurance, ensuring every wire is properly connected, tested, and validated before it moves forward. Harness assembly is a highly complex process with the potential for costly errors due to manual labor.

Komax inline testing ensures flawless quality at every level, enabling manufacturers to gain optimal workflows.
Let‘s achieve „first-time-right“ production and minimize rework and scrap.

What Makes Komax Inline Testing Different?

- **Instant Error Detection:** Identifies issues before they cause delays.
- **Real-time Monitoring:** Provides immediate feedback on continuity and short-circuit tests.
- **Seamless Process Integration:** Ensures optimal quality throughout the wireless test adapter, maximizing productivity by eliminating unnecessary manual checks and automating quality control.

The result: lower costs, faster production, and supreme quality.

Komax Next-Gen Testing Technology

Komax Next-Gen Testing Technology is powered by **HMI workflow guidance** for intuitive operation, supported by a robust **IoT software architecture** and web server application for seamless integration and monitoring. Through a powerful IoT-driven ecosystem, data is collected, analyzed in real-time, and used for optimization. Every wire harness is tracked, allowing defects to be identified at the source.

The impact: higher productivity, lower error rates, and stronger process control. With real-time monitoring, users stay in control and production runs smoothly.

Shaping the Future of Smart Manufacturing

At Komax, we believe in shaping the future of smart manufacturing, where automation, AI, and data-driven insights redefine production efficiency. Our **digital factory concept** brings cost-saving automation, unmatched process reliability, and future scalability with real-time analytics, automated testing, and intelligent workflows. We set new standards in wire harness production. Komax and its partners are paving the way for next-generation smart factories where innovation and efficiency go hand in hand.

Let‘s build the future together.

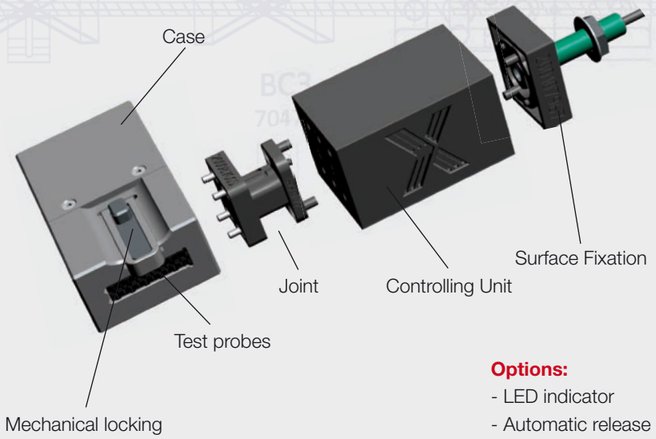
WIRELESS ADAPTER

Boost Quality with Modular Wireless Testing

The Komax Wireless Test Adapter combines real-time error detection with modular flexibility – ensuring reliable inline testing across various production environments. Its standardized modules can be tailored to your connector specifications and are interchangeable between platforms, delivering smarter, faster, and more adaptable wire harness manufacturing.

MODULAR DESIGN

COMPONENTS INTERCHANGEABLE BETWEEN PLATFORMS



Options:
- LED indicator
- Automatic release

With its wireless architecture, the adapter eliminates complex wiring setups and enables seamless integration across production environments. The system ensures accurate inline testing at critical assembly points, empowering manufacturers to detect and correct issues immediately – before they impact downstream processes.

Wireless Adapter Variants

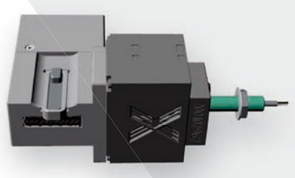
Choose the adapter configuration that fits your production needs – whether compact, robust, or automation-ready:

WA-Gen. 1

Compact standard adapter designed for minimal footprint and efficient use of operating space.

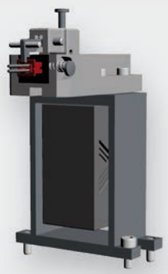
WA-Gen. 2

Robust solution engineered for customerspecific applications and adaptable to both wood and metal fixture setups in wire harness assembly.



WA-Gen. 3

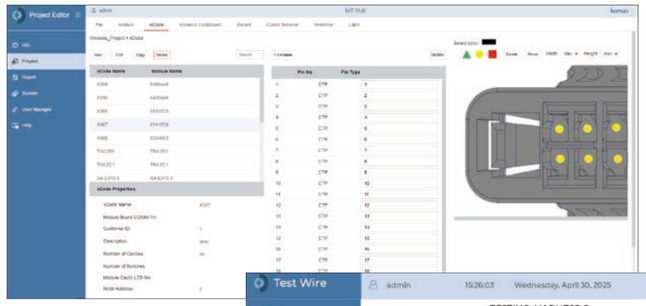
Automation-ready adapter optimized for robotic systems. Supports semi- or fully automated workflows with features like auto-fixation, secondary lock access, and optional pneumatic-free connector release.



SOFTWARE

The Komax Wireless Adapter is powered by a robust software and hardware eco-system designed to ensure first-time-right results through intuitive operation, real-time communication, and full digital integration. Combined with an intuitive Linux-based interface and IoT-enabled data traceability, the solution drives process reliability and predictive optimization – ultimately eliminating rework, minimizing downtime, and ensuring first-time-right production at scale.

SMART SOFTWARE MEETS MODULAR HARDWARE ENGINEERED FOR PRECISION AND FLEXIBILITY



Webserver - Project Editor

HMI - Test Wire

The integrated webserver hosts a built-in **Project Editor**, enabling centralized configuration, project management, and seamless parameter updates. Users can define test plans, manage connector libraries, and deploy settings across multiple systems – all from a standard web browser.

The **Human-Machine Interface (HMI)** offers a guided workflow for operators, providing step-by-step visual cues and feedback during harness assembly.
The **Test Wire** function ensures precise connection checks by prompting users through validation steps, minimizing errors during manual interaction.

With built-in **OPC UA** and **RESTful API** support, the system can be fully integrated into MES and ERP systems. These interfaces enable real-time communication for data acquisition, remote control, and seamless factory-level integration – supporting Industry 4.0 and smart factory initiatives.

OPC UA { REST:API }

Highlights

HMI-guided workflow for intuitive, error-free operation **IoT-driven architecture** with live analytics, diagnostics, and remote access.

HARDWARE

The Komax Wireless Adapter hardware is based on a proprietary, multi-board architecture designed for maximum configurability. Each WA-Gen unit can be tailored by stacking modular boards, enabling a custom fit to connector specifications and test requirements. This expandable design allows precise control over each configuration while maintaining uniform compatibility across platforms – simplifying deployment, upgrades, and maintenance.

MODULAR HARDWARE

ENGINEERED FOR SCALABILITY

Wireless Technology

The adapter operates on a **dedicated wireless sensor network (WSN)** architecture using the **868 MHz ISM band**, optimized for industrial environments. To minimize interference and latency, the system supports **multichannel communication**, using smart channel and timeslot management.
Typical sub-band use includes:
868.0–868.6 MHz (standard WSN band)
868.7–869.2 MHz
869.4–869.65 MHz

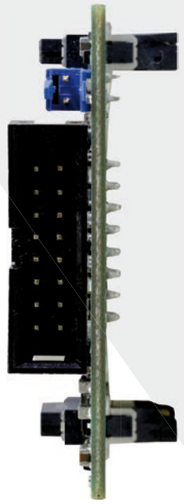
The wireless protocol complies with **EU regional regulations**, and compatibility with other regions is available based on chip configuration.

Each wireless network supports **up to 128 WA-Gen/nodes** (expandable upon request), enabling high-density testing across large-scale production.

Test Point Card – TPC16

The TPC16 module is the standard test point interface for all WA-Gen configurations, regardless of communication mode. Each card provides 16 individual test points, and up to 8 cards can be stacked per WA-Gen, allowing for a total of 128 test points per adapter (expandable if required). All configurations follow a masterslave topology, with each WA-Gen requiring a minimum of 1 wireless (or CAN-bus) control board and 1 TPC16 master.

This structure ensures reliability, ease of scaling, and streamlined testing accuracy.



CAN bus (Optional)

The CAN-bus version of the WA-Gen provides a robust wired alternative for environments where **EMI resistance** or wireless restrictions are critical. Designed for reliability and structured communication, the system supports a **multi-link topology**, where multiple CAN-bus lines can be deployed in parallel – each managing up to 32 WA-Gen nodes.

Key features:

Standard ISO 11898-2 high-speed CAN 1000 kbps communication rate

Each CAN line enables structured, scalable deployment with stable performance across complex setups.

PRODUCT SPECIFICATION

Category	Specification	Details / Notes
Product Type	Wireless Test Adapter	Next-Gen inline testing solution for wire harness manufacturing
Adapter Types	Active Adapter / Passive Adapter	Active Adapter – directly connected to power source Passive Adapter – no power source required
Operating Voltage	9-24VDC	Standard industrial voltage
Adapter Configuration	Min: 16 test points Max: 128 test points	Based on count of TPC16 modules (other configurations available on demand)
Wireless Network	Operating Frequency Band: 868 MHz ISM Architecture Max Nodes: 1024 Max Network ID: 255 Max distance between computer unit and nodes: 10 meters	High-performance ultra-low power RF transceiver for sub-1GHz applications. **Support for Channel ID configuration up to 4 channels. Supports multiple networks operating concurrently, each with a unique network ID.**
Standards & Compliance	ETSI EN 300 220, EN 303 131; FCC Part 15/90; Japan ARIB T67/T108; China SRRC	**The wireless communication module in the Wireless Adapter is designed to comply with international regulatory standards that ensure safe, legal, and interference-free operation in industrial and commercial environments.**
HMI (Human-Machine Interface)	7inch HDMI LCD (H) 1024x600Pixel USB Capacitive Touch	7inch touch display with universal DIN Rail Mount and protective case.
Computing Core	CPU: BCM2712 quad-core Cortex-A76 @ 2.4 GHz Video Core VII @ 800 MHz RAM: LPDDR4X, 2/4/8/16 GB @ 4267 MT/s Storage: microSD (SDR104) ≥ 64 GB Ethernet: Gigabit, PoE+ support USB: 2×USB 3.0, 2×USB 2.0 Wi-Fi: 802.11ac dual-band Bluetooth: 5.0/LE PCIe: 1×PCIe 2.0 x1 I/O: 40-pin GPIO, 2×4-lane MIPI CSI/DSI, micro-HDMI (dual 4Kp60) Power: 5 V/5 A USB-C Extras: RTC, power button, fan connector	Platform for Wireless Adapter control, GPU: HMI, communications
Operating System	Linux-based system (Debian-based OS)	Standard kernel, fast boot
Machine-to-Machine Comms	OPC-UA, REST API	Standard protocols
Interfaces	**CAN**: proprietary (requires an external CAN interface); **USB; Ethernet; Wi-Fi/Bluetooth**	Controller Area Network (CAN) bus operating at 1000 kbps (1 Mbps) – Related Standards ISO 11898-2 (Specifies the high-speed physical layer - used in automotive and industrial applications). Node count: up to 32 nodes
Software Features	Webserver (setup mode), low-code programming, quality reports, serial label printing, guided test UI	Enables easy configuration and traceability
Remote Applications	VNC server/client, TeamViewer, browser-based access	For remote monitoring and support

Komax - leading the field now and in the future

As a pioneer and market leader in automated wire processing, Komax provides its customers with innovative solutions. Komax manufactures series and customer-specific machinery, catering to every degree of automation and customization. Its range of quality tools, test systems, and intelligent software and networking solutions complete the portfolio, and ensure safe, flexible, and efficient production.

Komax is a globally active Swiss company with highly qualified employees and development and production facilities on several continents. It provides local support to customers worldwide through its unique sales and service network and offers services that help them get the most out of their investments.

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