

Easy to Use, Completely Safe

Wireless handheld operating panel revolutionizes welding system operation: Robot welding systems from igm Robotersysteme AG often form the backbone of production facilities at leading manufacturers of trucks, mobile machinery, and rail vehicles, as well as pressure vessels, and ships. The previously used K6 handheld operating panel had one major drawback: the cable. Based on its HGW wireless series, SIGMATEK developed a custom variant. Its significantly improved ergonomics, enabled by unrestricted freedom of movement around often very large production systems while maintaining full functional safety, led to a revolution in welding system operation. By Peter Kemptner

Shortcut

Task: Improve ergonomics by developing a wireless mobile panel for operating welding robots.

Solution: A custom-designed wireless version of the existing handheld operating panel with full functional safety.

Benefits: Significant ergonomic advantages during system operation thanks to comfortable handling while maintaining full safety.

Whether truck frames, bogies for rail vehicles, excavator buckets, or bridges: Most metal fabrication products – even large ones – are fabricated as welded assemblies. In the past, the welding work required for these structures was physically and mentally demanding hard labor. To manufacture large welded constructions within a reasonable timeframe, cost-effectively, and with consistently high quality, manufacturers rely on robot-assisted automation.



Although offline programming is possible for IGM robotic systems, teach-in using a handheld operator device remains a commonly used method.



igm Robotersysteme AG is a leading global manufacturer of large and complex, sensor-guided welding and cutting robot systems.

Robotic Solutions for Large Welded Structures

For such tasks, igm Robotersysteme AG in Wiener Neudorf develops and manufactures robots specifically designed for arc welding, as well as automated systems based on these robots for arc welding and cutting. At the heart of the company's product portfolio is the modular RTE 400 robotic system. Based on this system, igm implements subsystems for automated welding as well as complete systems consisting of multiple robot cells and entire production lines.

igm exports approximately 150 to 200 of these systems per year to customers around the world.

There, they often form the backbone of production facilities at leading manufacturers of trucks, mobile machinery, and rail vehicles, as well as at boiler and transformer manufacturers. At the heart of the modular RTE 400 robot system are in-house developed, exceptionally slim robots with high rigidity. "Customers around the world appreciate that we have full control over development and production and can therefore offer high quality in addition to our expertise in our customers' industries," says DI Martin Wihsbeck, Head of Marketing at igm Robotersysteme AG. "One of our strategic advantages is the fact that we are now the only manufacturer of such robots and systems that is wholly owned by domestic investors." »



”SIGMATEK is a proven expert in safe wireless handheld operator devices and was willing to provide a cost-efficient custom development, even for our comparatively low production volumes. This enabled us to offer an innovation that reinforces our technology leadership and strengthens our market position.

Thomas Hammermüller, Software Developer and Project Manager, igm Robotersysteme AG



SIGMATEK developed the **K6 Wireless handheld operator device** as a Wi-Fi-enabled version of IGM's proven wired solution.

Programming via Teach-in or Offline

Even the first igm robots, developed in the late 1970s, were equipped with an in-house-developed mobile panel serving as the human-machine interface. igm has remained committed to this principle to the present day. While commercially available motors and motion-control systems provide motion in the Lower Austrian company's systems and PC-based systems developed in-house perform many other tasks, the handheld operating panel continues to serve as the only interface between the machine operator and the robot or system control.

This portable mobile panel not only enables programming but also allows direct process monitoring, combined with immediate intervention capabilities, including emergency stop functionality directly at the point of operation. This is particularly important during setup and teach-in mode, where process sequences and robot movements within the system are created and optimized. In these situations, operators must be able to react instantly to changing conditions, such as potential collisions, and take corrective

action without delay.

A few years ago, the sixth generation of the mobile panel was ready for mass production. Since then, it has been a standard part of every igm system. The device is equipped with an 84-key membrane keyboard. An 8.4-inch touchscreen allows for convenient display and entry of process data, sequences, and parameters. In addition, a joystick ensures ease of use during teaching, a USB port allows for easy import of program backups, and two confirmation buttons as well as an emergency stop button ensure safety.

No More Tripping Hazards from Cables

"The device met all the requirements for comfortable, safe operation – whether during programming and teaching or during program execution," says Thomas Hammermüller, software developer and project manager at igm Robotersysteme AG. "It had only one weakness: the cable." Since igm's systems are sometimes very large, the mobile panel was supplied with cables up to 50 m long. Combining conductors for power supply and data transmission with shielding and a rugged outer



” Without the weight and drag of a trailing cable, the custom-designed wireless version of the IGM mobile operating panel developed by SIGMATEK offers significantly improved ergonomics and requires far less effort to operate than the wired version.

Stefan Mingler, Sales Manager for Eastern Austria, SIGMATEK GmbH & Co KG

jacket designed for harsh industrial environments, these cables were relatively heavy and far from inexpensive. In addition, they were exposed to the risk of damage, for example from forklifts or pallet trucks.

While this may be good news for spare-parts sellers, from an operational standpoint, every cable break is a disaster, because if the connection to the emergency stop button on the control panel is interrupted, the safety circuit or control system must bring the system to a safe stop. In addition, long cables lying on the floor pose a dangerous tripping hazard for staff.

Wireless with Safety

igm had therefore been pursuing the idea of developing a wireless version of its mobile panel for many years. "We observed the attempts made by other companies," reports Hammermüller. "However, these consistently failed due to safety issues that had not yet been resolved." Initially, Hammermüller, together with a hardware partner, had considered developing a solution in-house. During a visit at Smart Automation Austria, the igm technicians learned at the SIGMATEK stand that combining wireless communication and safety can indeed work. The Salzburg-based automation specialists had launched the HGW 1031, a wireless mobile panel, in 2016. This device can be seamlessly integrated into an overarching safety concept via secure data transmission over Wi-Fi.

A New Development Built on a Solid Foundation

The wireless mobile panel impressed the igm engineers, but its screen-only operation did not directly meet their needs. "Our own wired handheld operating panel is the result of decades of application experience in large robot-assisted welding systems," explains Hammermüller. "With its membrane keyboard, a joystick, and two confirmation buttons for both right- and left-handed operation – but above all, with its sophisticated, ergonomic design – it is precisely tailored to these applications."

SIGMATEK offered igm a custom-designed new product based on the wireless safety panel. The housing of the igm mobile panel remained unchanged. The electronics are an enhanced »



The solution consists of the wireless mobile panel, a BWH 001 base station, the charger, and a safety related CPU.

version of the SIGMATEK device. The dimensions, mounting elements, and connectors of the electronics were adapted to the existing housing and the operational requirements of the robotic welding systems.

Universal Handheld Operating Panel

The mobile panel operates via wireless connection (2.4 GHz and 5 GHz Wi-Fi). The built-in rechargeable battery is charged using a safe SIGMATEK charger via a plug-in cable connection. This allows the programmer to continue working normally even while the device is charging. SIGMATEK developed a new safety circuit compatible with igm systems and integrated the necessary interfaces for the additional control elements.

Energy management was a challenge in its own right, as the device was not supposed to be significantly heavier despite the battery. "This issue is put into perspective, however, because the cable normally used isn't exactly light either," emphasizes Stefan Mingler, Sales Manager for Eastern Austria at SIGMATEK. "Since there's no weight or drag from the cable, the cordless version is actually much easier to handle." By integrating numerous energy-saving features, SIGMATEK was able to significantly extend the operating time between charging cycles to over two hours under full load.

Completely wireless, seamlessly integrated

Unlike the wired mobile panel, the wireless handheld panel must be logged in to the assigned machine before use and logged out again after use. This is the only way to establish a connection to the integrated emergency stop button and terminate the connection without compromising safety due to a connection failure. Since igm systems can be very large, it is sometimes necessary to equip them with multiple Wi-Fi transmitters to prevent dead zones. To do this, the roaming functionality available in SIGMATEK's wireless mobile panels is used. This also enables the control and monitoring of multiple systems using just a single operating panel.

Integrated Part of the Complete Automation System

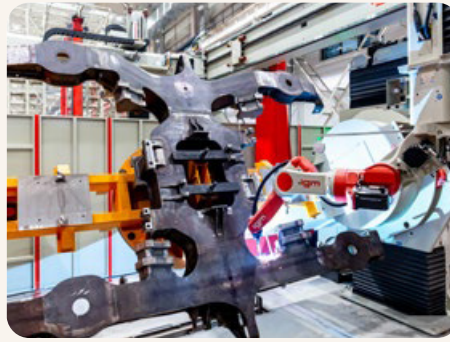
The handheld operating panel is integrated into the overall system via a wireless connection through one or more base stations. A charging station developed specifically for igm enables battery charging while maintaining the safe operation of the programming device. The safety signals exchanged via the Black Channel are forwarded to a CPU SCP 111. To integrate the hardware control elements (keyboard, joystick, etc.) of the handheld panel, the software »

developers at igm ported the existing drivers and functions – developed in-house – from Linux to SIGMATEK's proprietary operating system, Salamander. They programmed the visualization using an object-oriented approach in SIGMATEK's LASAL development environment, specifically in the LASAL SCREEN HMI tool.

Technology Leadership Confirmed

"SIGMATEK had mastered the challenge of safe wireless handheld operating panels and was willing to deliver a cost-effective custom solution even for our comparatively small order volumes," says Thomas Hammermüller. "This enabled us to introduce an innovation in a very short time that confirms our technology leadership and further strengthens our excellent market position." DI Wihsbeck adds: "The K6 Wireless mobile panel, developed in close and solution-oriented collaboration with SIGMATEK, offers our customers real added value. Although it naturally comes at an additional cost, more than half of our customers already choose this version."

» www.sigmatek-automation.com



Use Case

Founded in 1967 and headquartered in Wiener Neudorf (Lower Austria), igm Robotersysteme AG – with subsidiaries and sales partners in more than 20 countries – is a leading global manufacturer of complex, sensor-guided welding and cutting robot systems. To date, igm has successfully installed more than 4,500 of these systems worldwide across all sectors of the mechanical engineering industry. With approximately 400 employees, the company generates annual revenue of about 80 million euros.

igm Robotersysteme AG

Industriezentrum Süd/Straße 2a, Objekt M8,
A-2355 Wiener Neudorf
Tel. +43 2236-6706-0, www.igm-group.com