EMERGENCY STOP VIA WLAN

How SIGMATEK bridged the gap and with the new »HGW« handheld operating device series, is bringing a mobile as well as wireless HMI solution with integrated Safety functions to the market

With the »HGW« series, the Salzburg automation technology provider SIGMATEK launches the next generation of mobile handheld operating devices. The HMI panels, which communicate via WLAN, are equipped with a 10.4" color touch screen and with 1,300 g, they weigh just slightly more than the current cable-connected version; despite the integrated battery pack. The wireless devices give the operator new freedom – they can move within the surroundings of the machines and systems without having to worry about the cable length. In addition to the transfer of function-oriented data, it will be later possible in a second variant to even send Safety data via WLAN. For this purpose, the HMI is equipped with emergency stop and confirmation buttons, as well as a key switch. Safety-relevant data is exchanged over the standard WLAN network using the »Black Channel« principle.

Wireless is in – not only in the consumer world. In every production hall, cables prove to be notorious trip hazards and can be a cost factor that should not be underestimated. Since if damaged – when driven over for example – can lead to a machine stop or long maintenance times. Operating machines and systems using a mobile HMI device is nothing new. Whereby in the industry, the definition of »mobile« can almost be confusing – after all, though most so-called mobile operating devices may be portable by hand, the action radius is decidedly limited by

Unbound Machine Operation with Safety

„The »missing link« in the industrial context is without a doubt, a compact and Safety-oriented solution for the reliable, wireless operation of machines and systems", Franz Aschl, Innovations Manager from SIGMATEK is sure. „Market-ready solutions for Safety via WLAN have been around for several years. Until now however, the serial application on industrial machines has failed because of two factors – namely on the size of the available systems and most of all, their high costs.

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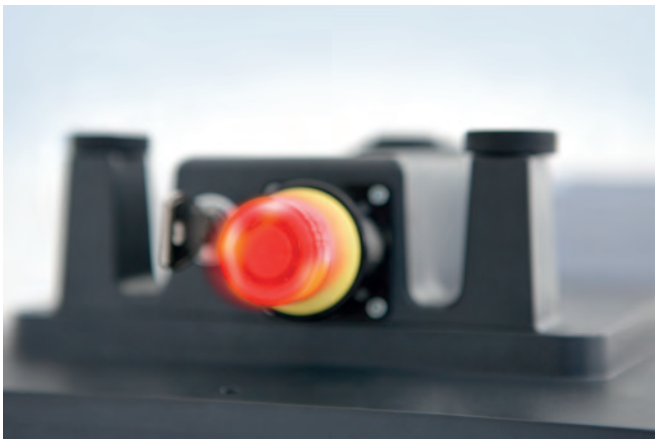
We have recognized this unsatisfactory situation for many manufacturers. With the new »HGW« series, we are introducing wireless WLAN handheld operating devices to the market which will be available without and – in a second variant – with the much-desired emergency stop function via radio signal." In addition to the transmission of function-oriented data, the next generation of »HGW 1031« devices will also transmit Safety data via WLAN. The handheld operating device is therefore equipped with an emergency stop and confirmation buttons, as well as a key switch. Safety-relevant data is transferred using to the Black Channel principle over the standard wireless network. No manufacturer or device-specific protocols are therefore required. Safety data are automatically sent to the »Safety« controller of the I/O and control series »S-DIAS« from SIGMATEK and appear like a permanently wired emergency stop as a digital input. »

the predefined cable length. With wireless HMIs, machine operators can specify the location in the system they want to view themselves. During use, having to drag the cable along is also inconvenient. The local manufacturer SIGMATEK sees comfortable and literally, unbound as well as fatigue-free operation as essential. One thing is clear however: The power source must be contained in the wireless application. Finding the optimal balance between battery life and weight is therefore crucial. In full operation, the new SIGMATEK operating panel »HGW 1031« can run at least two hours without recharging. And despite the powerful battery, the convenient HMI weighs only 1,300 g – a flyweight. Further deciding criteria with the use of wirelessly communicating devices are the availability and data throughput of the wireless network. Since today practically all consumer products operate over 2.4 GHz WLAN, the »HGW 1031« supports the 2.4 GHz as well as 5 GHz frequency band. Depending on the environment and distance requirement, users can determine the ideal solution themselves.

Fits well in the hand: The new wireless »HGW 1031« handheld operating panel from SIGMATEK with 10.4" touch screen.

Emergency Stop Function via WLAN

Based on the Black Channel principle, the transmission of Safety-oriented signals via WLAN is problem-free. However, for unrestricted use in the wireless network, there are aspects that should be considered. Such as interruption-free transmission for example. „Above all, the bit error probability of the transfer medium which plays an equally important role in wired devices, is normally higher during wireless transmission", explains Franz Aschl further. „The bit error probability during wireless transmission is around 10^{-3} – in comparison, this is improved by two exponents with a twisted-pair cable and reaches a value of only 10^{-5}." For this reason, this fact is of particular importance during radio transmission. Whereby the Safety-oriented protocol, the maximum number of participants and the transmission cycle are deciding factors. Another new task is logging the panel into the assigned machine before operation. „This is especially important when transferring Safety data, because this connection is not forced through a cable via hardware, but via the Safety application programming" emphasizes Franz Aschl. „Logging off before leaving the machine environment and shutting down is equally important. If the connection to the integrated emergency stop button is lost, the Safety control – as with a cable break – must assume that a Safety-related problem has occurred and stops the machine." SIGMATEK created the required mechanisms during development of the device software, in order to ensure that in setup mode, the view to the machine is free or that a specific WLAN panel always connects with the designated robot. This equally applies to the integration of system components that are not always available or active.



The WLAN handheld operating panel has an active lighting emergency stop button. When it lights red, the HMI clearly indicates that the emergency stop function is available and the Safety system is connected correctly.

The Safety solution from SIGMATEK is modularly constructed and easily adaptable to the respective on-site infrastructure and network configuration. The monitoring time for secure data transfer (latency time) can be set from 0 to 5,000 ms.

What the Safety Norms Say About Emergency Stop via WLAN

The increased mobile and wireless use of machines also brings new aspects in the current Safety norms. To date, it has been presumed that an accessible emergency stop button will always perform its intended function: bring the machine to a safe standstill. What happens now however, when on a non-functioning mobile device with no power, such as an operating panel or driverless transport system, the emergency stop button is pressed? Are the additional system components in the defined area then brought to a safe standstill? The new points in the EN ISO 13850:2016 cover exactly these applications. To avoid confusion between an active and inactive emergency stop triggering element, such as the emergency stop button, a change in the element's color via lighting the active emergency stop element must be made. SIGMATEK's new WLAN handheld operating device with Safety elements therefore has and actively lighting

Pictures: Sigmatek, Dreamstime;

emergency stop button (certified according to EN ISO 13850), which reduces the risk of an operating error. If the operating panel is not connected to a machine, system component or robot, this is clearly visible through the »grey«, unlit button. When the mobile HMI is correctly connected or logged in, the emergency stop button lights in red (LED) and thereby clearly indicates that the emergency stop button is functional and the Safety system connected correctly.

HMI with a Future

Mobile, as well as relocatable machines and system components are a particular challenge for automation technology. This begins with the limited space conditions, since the automation solution is often installed – without a control cabinet – directly into the mobile unit. Compact and streamlined control solutions with low power consumption and reduced loss are in demand – and will only be more so in the future. „Transmitting all information and process data via wireless connection – even Safety-oriented data – will become normality“, says Franz Aschl looking to the future. „Functions in the compact Safety CPUs that were to date unimaginable, will play an important role in mobile and intelligent machine connections; such as VNC, web server, OPC-UA, data recording, file transfer, E-Mail, PDF creation or intelligent axis control for example. And of course, the requirements from the machine guidelines must always be met.“ The wireless HMIs from SIGMATEK raise the application dynamics for machine operation today to a new level. Operators can use the existing WLAN infrastructure in the factory and run multiple machines, system components, robots and driverless transport systems with a single mobile panel. "This leads to obvious cost savings", emphasizes Franz Aschl. WLAN and cable-connected operating devices of the HMI series from SIGMATEK can also be combined as desired. Users can profit from the flexible adaptability of their HMI solution to the needs of the respective application. "Existing applications can also be reused in the mobile HMI variants“, adds Franz Aschl. "With the use of our new, portable, approximately DIN A4 size »HGW« operating panels, machine manufacturers expand the scope of functions and application possibilities of their machines and systems, and are a decisive step ahead of the global competition." (r.PA./TR)

INFOLINK: www.sigmatek-automation.com

Safety Solution for »Industry 4.0«

Highly flexible manufacturing and handling concepts with intelligent production resources, which can automatically adapt their configuration to changed requirements, place new demands on functional Safety in »Industry 4.0«. The path leads from the mostly hardware solutions of today to flexible bus-integrated, programmable Safety systems. In addition to higher flexibility, the remarkably simpler wiring on the machine also has valuable benefits, since the safe signals are transmitted over greater distances via the existing system bus. Through the OPC-UA communications protocol, the extensive and uncomplicated exchange of information between cooperative safe units is also brought into direct proximity.

Integrated or Stand-alone

With the compact and modular control and I/O system »S-DIAS« from SIGMATEK, Safety requirements can be implemented flexibly and economically. Safety is thereby an integral part, the »S-DIAS Safety« components can also be used as a stand-alone solution. The transfer of data between multiple Safe controllers using Black Channel via TCP/IP enables the implementation of cascaded stand-alone architectures. CPU, Safety controller and Safety I/O modules measure only 12.5 mm in width, 104 mm in height and 72 mm in depth. High-performance, fully programmable Safety solutions can be thereby implemented within a width of 37.5 mm. The solution meets the newest Safety norms (SIL3 in accordance with IEC 62061 and PL-e/Cat.4 according to EN ISO 13849-1/-2). The user-friendly software »LASAL SAFETY Designer« enables fast project development in a clearly designed graphical editor. Theunderlying library provides PLC-open-based Safety function blocks, such

as »Emergency Stop«, »Two Hand Control« or »Guard Locking« for example. The toolkit-like construction ensures consistent, error-free programming and quickly guides the user to clean documented results.

Modular in Every Sense

The »S-DIAS Safety« system provides the option to log system components in and out. This is the basis for a flexible reconfiguration of machines during operation, as well as ensuring safe handling with partial systems that – for example via WLAN – are wirelessly connected. A big advantage of this Safety solution is its fully modular construction and simple adaptability to the on-site infrastructure and network configuration. With »S-DIAS«, the monitoring time for the safe data transfer can be freely set from 0 to 5,000 ms. The user can therewith define the optimal setting with respect to actual latency time for any application.

ExhibitionTIP

At the »SPS IPC Drives« trade fair in Nuremberg, SIGMATEK will present among other things, a mini Safety system within a control cabinet width of only 25 mm. In addition, dual-core CPUs as well as function modules for temperature, resistance and absolute pressure measurement expand the »S-DIAS« system.

»SPS IPC Drives«: Hall 7, Stand 270