WHITEPAPER

Turning tablets into **safety-grade industrial HMIs**

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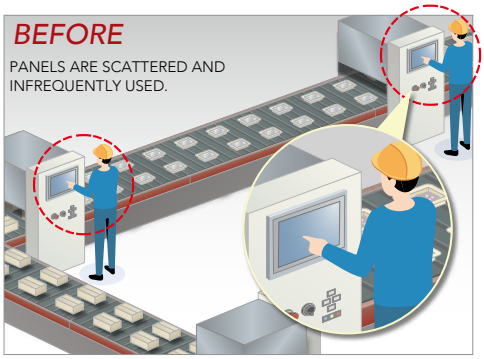
The electronic mobile devices known as tablets — ubiquitous in everyday life — are increasingly used in industrial settings as well. For the latter, tablets can serve as extremely versatile high-performance human-machine interfaces (HMIs) to impart access to and control over machines and workcells. But what about industrial applications involving safety functions? Here, a wirelessly connected tablet would never satisfy industrial regulatory requirements written to protect machine operators from harm.

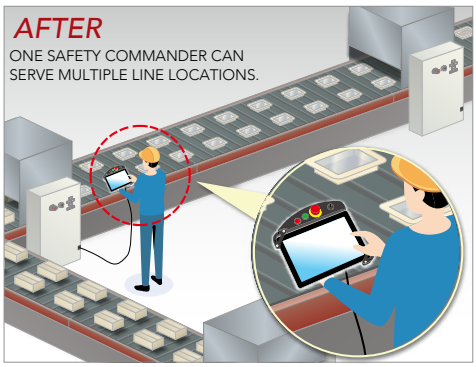
IDEC's Safety Commander elevates the functions of tablets of various sizes to support the requirements of manufacturing settings. These Safety Commander frames feature a ruggedized body that locks onto the tablet and wraps its edges. In addition, Safety Commander frames render tablets capable of digitalization and safe automation tasks in factories, warehouses, and distribution facilities.

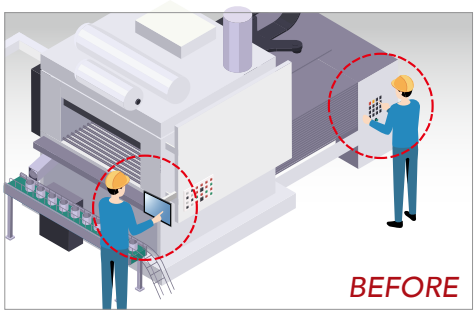
Safety Commander tablet holders accept the insertion of tablets to elevate the latter into dedicated operating terminals — complete with safety elements needed to satisfy ISO/IEC safety standards. A tablet complemented by a Safety Commander tablet holder can serve as:

- An operating terminal to control an automotive production machine, transfer line, or other large equipment
- A robot teaching pendant
- A touchpanel replacement on semiconductor manufacturing equipment or packaging machinery
- A portable HMI to manage multiple machines.

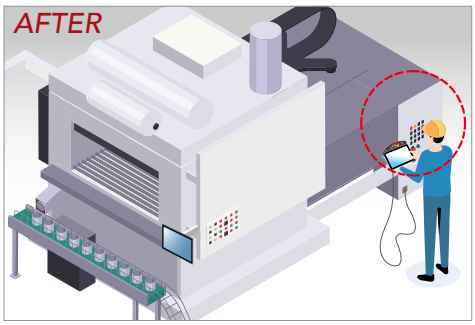
As industrial operations have come to embrace the use of remote monitoring, IoT, and mobile designs such as automated guided vehicles (AGVs) and autonomous mobile robotics (AMRs), interest in flexible and portable machine access has







TOUCHPANELS ARE FIXED IN PLACE, SO WORKERS CALL OUT TO EACH OTHER DURING MAINTENANCE.



ONE WORKER CAN TROUBLESHOOT A MACHINE — LEVERAGING WEB BROWSER AND REMOTE-DESKTOP FUNCTIONS.

Safety Commander tablet frames are revolutionizing the use of tablets and machine operator panels at manufacturing sites.

also increased. These portable human-machine interface (HMI) options are often an improvement upon traditional terminals or machine-mounted touchpanels.

In many instances, design engineers specify consumer-grade tablet computers as information terminals to let facility personnel enter work records and check historical data — and even operate machines and equipment sans touchpanels.

Features and accessories abound.

Now, Safety Commander frames from IDEC complete such tablets. Accepting insertion of various tablet brands and sizes, the frames make them more rugged, ergonomic, and capable of supporting demanding industrial applications. Safety Commander HT3Ps frames accept tablets with screens of 8 to 11 in. while HT4Ps accept tablets with screens of 10 to 13 in.— and both feature a latching dock element on the frame's main body.

Safety Commander support of safety functions

Over the last decade, automation has transformed manufacturing, warehousing, and other industrial operations big and small. Today's equipment is expected to serve a variety of functions for flexible operations and easy changeovers. Where traditional operator panels and HMIs aren't accommodating of such production modalities, Safety Commander augmented tablets can fit the bill.

Consider the decidedly industrial requirement for quantified safety levels. International Organization for Standardization (ISO) and International Electrotechnical Commission (IEC) safety standards require undefeatable safety devices on hazardous equipment's operator panels as well as hazardous robots' teach pendants. To

The HT4P Safety Commander frame from IDEC features an emergency-stop pushbutton on its face as well as an enabling switch integrated into the handle (grip) on its rear. The enabling switch is an off-on-off input — so whether the operator loses grip or squeezes more tightly when startled by a dangerous machine condition, the switch serves to halt operation.

satisfy these requirements, traditional designs feature emergency-stop pushbuttons and safety enabling switches on the panel or pendant. Any OEM attempts to render a consumer-grade tablet capable of assuming safety functions would likely involve extensive hardware development not unlike those to build a dedicated terminal from scratch.

IDEC Safety Commander tablet frames solve these issues in a few ways.

They secure safety elements to tablets in one simple step. Every HT4P Safety Commander frame features an emergency-stop pushbutton on its face as well as an enabling switch integrated into the handle (grip) on its rear. Operators can hold the frame at the grip and operate the tablet with the other hand. During an emergency, the frame's enable switch (or emergency-stop pushbutton switch if needed) quickly stops the connected machine just like any other industrial-grade safety component.

They provide wired LAN connection. The HT4P has a built-in USB/LAN converter to allow stable wired communications between the OEM or plant controller and the tablet — even in noisy environments. The HT4P also features USB-PD battery charging with which most plant personnel are familiar.

They impart an ergonomic design. The tablet frame is easy to grip for left or righthand operation; portrait or landscape tablet

Engineers can custom-order Safety Commander tablet frames to sport illuminated pushbuttons of various colors; selector switches with two and three position counts; switches on a single or separate commons; and key selector switches.

orientation is also possible. What's more, the frame is drop-resistant to 1.2 m … and it satisfies IP54 for safe operation even when exposed to water or dirt.

The solution helps satisfy mobile-robotics safety requirements. The most recent development in industrial automation has been the proliferation of mobile robotics — including AGVs and AMRs. ISO 3691-4 requires that AGVs and AMRs have safety implemented for times when they're manually commanded. Here, Safety Commander-augmented tablets can assume safety e-stop functions that are easier to access than those on the ADV or AMR vehicle itself.

Traditional machine designs include safety-related switches and emergency stops on a stationary panel. Hydraulic profile bender image: Ryzhov Sergey • Dreamstime

In fact, the solution can also satisfy collaborative-robot safety needs. More specifically, Safety Commander-augmented tablets can also satisfy the ISO 10218 requirement that collaborative-robot installations have an e-stop and enable switch.

HMI solution compatible with digital transformation (DX) initiatives

Beyond assuming safety functions, Safety Commander tablet frames can also support smart-factory modalities.

Eliminating the need to develop dedicated terminals trims cost. Especially for OEMs and industrial robotics suppliers, standardizing on Safety Commander-augmented tablets eliminates the need to engineer and produce dedicated HMIs and pendants for each supplied design. Instead, IDEC control software drives the tablet and hardware — complete with industrial-grade housing, connectivity, and buttons. The solution continues to pay dividends where end users rely on suppliers for maintenance and ongoing support. Any production changes necessitating changes to the terminal can be made via simple software upgrades.

The IDEC HT4P Safety Commander mounting spacer is adjustable to allow access to tablet buttons.

Forgoing stationary touchscreen HMIs boosts worker efficiency. Safety Commander-augmented tablets can replace machine-

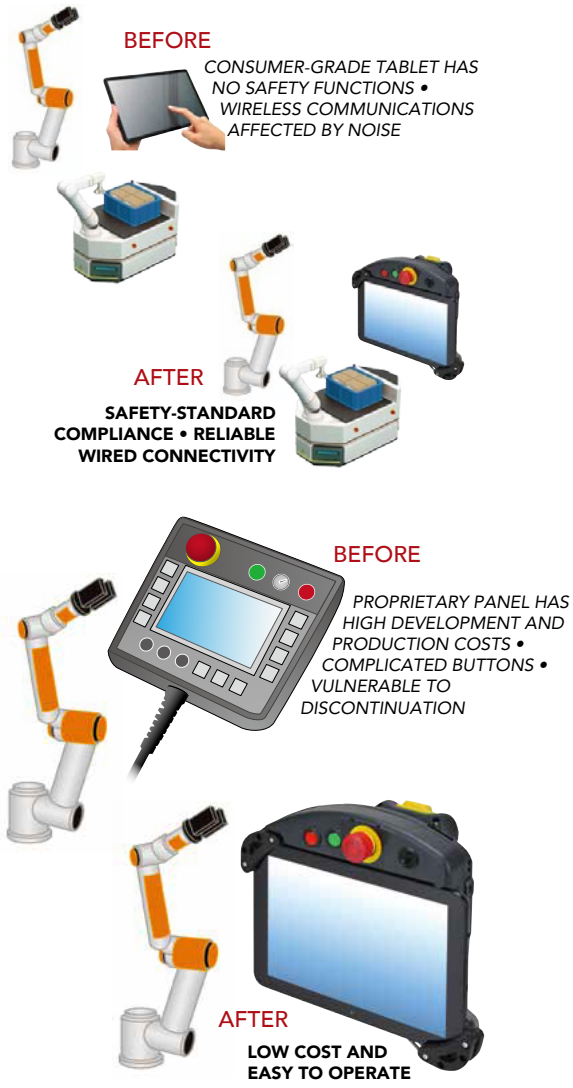
mounted control touchpanels to lower upfront cost and simplify operations. In most cases, the tablets paired with Safety Commander frames can also be far larger and more sophisticated than proprietary screens integrated into industrial equipment — even at half the cost. Tablets are also ubiquitous so easier to procure than proprietary industrial touchpanels … especially given the way COVID-related supply-chain issues have lingered longest for specialty components.

Tablets can also reduce the overall number of touchpanels in an automated facility. That's most beneficial where touchpanels are rarely used. With this solution, one Safety Commander-complemented tablet serves as the operating unit for multiple control panels to maximize overall workcell efficiency.

Solitary maintenance personnel can execute fixes without waiting for assistance. Traditional maintenance approaches may put one maintenance worker at a main operator panel and another at the malfunctioning production-line section to communicate conditions and troubleshoot actions through a walkie-talkie.

In contrast, Safety Commander-complemented tablets let short-staffed maintenance workers singlehandedly execute machine fixes from one interface. That's because the Safety Commander allows such staff to bring a connected tablet to the production-line section being serviced. Then via a web-browser or remote-desktop function, the tablet displays what's on the operator panel screen elsewhere on the machine.

Safety Commander frames make existing tablet assets better. Many companies already deploy tablets for tasks once tracked on paper — including equipment inspection, inventory control, and work input and outputs. Now, Safety Commander frames can let tablets also display machine condition and availability; manuals and drawings; and collected inspection records. Combined with the ability to email, send SNS notifications, and (via the mounted



tablet's camera) allow video conferencing, these capabilities transform dedicated devices for simple uses into a multi-functional automation components. Such multifunctionality boosts efficiency and hastens ROI.

Tablets combined with Safety Commander frames work as reconfigurable IoT operator panels. Touchpanels are quickly replacing electromechanical keypads and switches in consumer settings as well as industrial settings. Now, operator panels in the form of fixed on-machine elements are yielding to mobile touchpanels with more versatility. Case in point: Safety Commander frames give tablets IoT-type functionalities for field-data visualization and analysis. Access to such information supports advanced control functions for maximal productivity. More specifically, Safety Commander-complemented tablets:

The Safety Commander mounting bracket is also adjustable.

- Communicate production data (for information technology or IT functions) and
- Allow the control of industrial equipment (for operational technology or OT functions).

The integration of these functions represents a DX solution for better control, safety, and throughput from a given industrial operation.

In summary, the ubiquitous electronics known as tablets can serve as safety-grade terminals in industrial settings when complemented by Safety Commander tablet holders. Tablets thusly outfitted can impart access to and control over machines and workcells as well as wired connectivity to ISO/IEC-rated safety systems to protect machine operators from harm.

IDEC Corp. is a global supplier that has provided innovative and reliable industrial automation and control products since 1945. Covering a broad range of market needs, these feature-rich and value-driven products include PLCs, human machine interfaces (HMIs), safety products, switches, relays, and other industrial automation components.

By delivering world-class products backed by personalized service and highly rated technical support, IDEC enables design engineers to create lean, cost-effective, and safe solutions to optimize automation applications. With the recent acquisition of APEM, one of the world's leading manufacturers of operator interface panels and related components, IDEC continues to enhance design engineers' ability to create high-quality solutions. For more information, visit www.IDEC.com/usa.

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