

Get a Grip on Industrial Mobile Devices.

Modern consumer-grade tablets can provide a flexible and capable automation HMI experience, but only when used with the right specialized component to safely integrate them into the industrial environment.

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Mobile smartphone and tablet devices aren't just for consumer use any more, and they are steadily making their way into all types of industrial automation applications. There are many reasons for this, such as familiar high-resolution visualization, modern touch interfaces, and a wide and cost-effective variety of hardware. However, it is necessary to incorporate these sometimes-slippery devices into challenging factory environments, while maintaining the proper levels of safety.

This article will describe a solution to address this and other issues, and it will show how tablets can be applied in various industrial applications.

HMI on the Go

Typical operators in industrial plants and facilities used to do much of their work standing in front of a fixed control panel, often using a dedicated human-machine interface (HMI) display, or maybe with a specialized teaching pendant. This was the case for those working with and around machinery, conveyor systems, robotics, automated guided vehicles (AGVs), and all types of production operations.

Today, there are many HMI apps and web browser-based ways for operators to interact with automated equipment. One tablet can replace multiple control panels worth of buttons and indicators, giving the user advanced visibility and access to operations. Wireless Ethernet and Bluetooth provide complete mobile connectivity with equipment and business networks.

Beyond HMI functionality, mobile devices can display drawings and manuals, show reports and trends, and support videoconferencing and other forms of messaging so operators can stay in touch with the team. In addition, a growing number of industrial internet of things (IIoT) smart devices are providing a significant volume of information, all of which can be conveniently viewed on a mobile device.

When operators are freed from an anchored HMI location, they can move about the equipment and have relevant operational information right at their fingertips—but only if those same fingertips do not accidentally drop the tablet. And many types of operational equipment demand hardwired safety related devices like emergency stop (e-stop) buttons or enable switches. Until now, it has been very difficult to outfit modern mobile HMIs with these industrial-grade usability and safety features.



Industrial-Grade Safety Update

Recognizing the need, a new type of mobile device holder has been developed, making it easy to use tablets effectively and safely in industrial settings (Figure 1). The front of the holder consists of diagonally sliding adjustable grippers to accommodate tablets ranging from 8- to 11-inches in diagonal size. The back of the device has a sturdy and ergonomic hand grip and strap, making it suitable for both right- and left-handed users. There are also options for a neck strap, and a wall-hanging bracket for storing the holder when it is not in use.



Figure 1, The IDEC HT3P Safety Commander is a unique new way to incorporate capable but relatively fragile tablets safely into an industrial automation environment.

Once a tablet is installed into the holder, it can be key-locked into place to keep it secure, or users can insert and remove their own tablets at will. Using a patented mechanism, the display can be rotated between vertical/portrait and horizontal/landscape orientation as needed, depending on the application in use. The holder itself carries an IP54 rating for protection against water splashes and dirt, and it has been tested to 1.2 meters for drop resistance.

Making Connections

To provide power and safety wiring connections when needed, the holder includes a 5-meter cable (Figure 2). This cable is not required for normal mobile operation and can be disconnected, but it is needed to provide wired functions. Users can move about with the tablet+holder, much as they would with a traditional industrial wired pendant controller. This cable enables the power and safety functions.



Figure 2: By including hardwired safety buttons, a charging port, and multiple holding and mounting options, the IDEC HT3P Safety Commander overcomes physical integration challenges of using a tablet for machinery and robotics applications.

One issue with using mobile tablets on the factory floor is the need to recharge them periodically. By incorporating a USB Type-C port, the holder enables the tablet to be maintained on-charge the entire time it is mounted in the holder. A tablet can remain semi-permanently installed in the holder for use, or personnel such as maintenance technicians can install their own tablets when and where they are needed for their work.

Two hardwired features incorporate safety into the device. There is one wired e-stop button with an LED indicator. This type of hardwired emergency stop, integrated into the equipment safety circuit, is required when any personnel are working near or around equipment with moving parts. With this safety function right at hand, the user can activate it as quickly as possible when needed.

The holder also includes a three-position enable switch. This type of switch is also commonly known as a 'dead man's switch', and it is widely used when operators must work closely around moving equipment, especially robotics. For the equipment to operate, the operator enables the switch as a hold-to-run control, and if they let go for any reason, the equipment stops.

Unique Tablet Capabilities

In many cases, using a modern tablet for industrial automation can help designers avoid installing multiple control panels, fixed HMIs, and even PCs on the plant floor. Tablets clearly offer more capabilities than other interface methods and are an excellent way to make IIoT data accessible, but designers have struggled with custom and awkward ways for incorporating tablets with industrial automation, and they may have been forced to compromise on safety considerations.

Consider an operator working in the vicinity of a robot or AGV (Figure 3). They can use a tablet with the holder to obtain a far better visualization and interface experience than is possible with traditional HMIs. In addition, they will be protected by the wired e-stop and hold-to-run enable switch functions, so the design can be compliant with ISO/IEC safety standards and requirements.



Figure 3: Robotics and AGV applications can be designed using a modern tablet-based HMI experience, yet still meet all hardwired e-stop and enable switch requirements, using the Safety Commander.

Long distance conveyor systems or wide-ranging production lines are another target application (Figure 4). Usually these require infrequent operator input, but designers were compelled to install multiple operation panels along the line to provide HMI functionality.

A better solution in many cases is to install holders at multiple locations along the line, stored on wall-hanging brackets. Operators and maintenance personnel can quickly install and use their own tablet as needed at any location, allowing them to work efficiently without running back and forth to a fixed HMI. This saves space, reduces control panel costs, and improves operator efficiency.



Figure 4: The ability to use tablets anywhere along a conveyance or production line gives users the best HMI options, and helps designers avoid installing excessive fixed operator interface panels.

Modern tablets are an excellent form of HMI, enabling operators and maintenance personnel to interact with automated equipment in a more flexible manner than is possible with fixed panels. However, incorporating these consumer-grade devices into industrial-grade systems has been difficult and impractical.

By using a newly available type of holding device, designers can easily provide one or more locations where they can incorporate inexpensive tablets for their users, while also providing a robust carrying method and hardwired safety functionality. Manufacturing and processing operations can now provide the best visualization, control, and IIoT experience for their users, enabling them to move safely about the equipment, and interact with it for best efficiency.

About IDEC Corporation

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A leading manufacturer of innovative industrial automation and control products since 1945, IDEC delivers world-class products backed by personalized service and highly-rated technical support. IDEC provides solution-driven products to design engineers to help them create lean, cost-effective and safe solutions for their automation applications. Products provided include PLCs, HMIs, machine safety, relays, power supplies, sensors, switches, LED lighting and more.

