How has the operation of machines changed in the last 10 years?

In early 2007, we saw the introduction of the first generation iPhone – the major jumping-on point for multi-touch control in the consumer marketplace. In 2012, Beckhoff presented the first multi-touch panels suitable for industrial applications with its new CP2xxx and CP3xxx models. The resulting transition from basic single-finger interaction to dynamic multi-finger operation and gestures was certainly the greatest change in the last ten years and offers the user the possibility to realize entirely new control concepts.

What challenges do you foresee in machine operation with touch panels and similar devices?

Beckhoff is already offering the necessary hardware with its popular multi-touch panels for industrial applications. The HMI, which so far has been used on a classic touch panel, can also be used without problems on a multi-touch device. Numerous tools are already available for the integration of multi-finger operation and gestures. The integration is partly already supported by the TwinCAT 3 PLC HMI. Beyond that Beckhoff is developing an HMI that will offer full support for all multi-touch features.
Machine operators must frequently work wearing gloves, but many touch panels don’t work that way. What are your solutions for this problem?

When we developed our multi-touch products, we accumulated a wide range of expertise in projected capacitive touch screen technology (PCT). This enables us to configure the properties of our touch controller in such a way that it can be operated with various kinds of gloves.

Many machine operators miss the “touch and feel” feedback when working with touch panels. What are your solutions in response to this complaint?

A survey conducted by the Fraunhofer Institute shows that many operators wish to continue using classic mechanical operating elements. For our standard panels, we offer the option of integrating a full keyboard into the housing. Our customers can also customize their multi-touch panels. Many take advantage of this capability to implement a wide range of operating elements such as special PLC keys, incremental encoders, or key switches. Customers can also integrate membrane keys.

Pressing a key is easy on a touch panel. What safety measures prevent faulty or accidental entries?

The problem of erroneous entries is much older than multi-touch devices, as people can also hit the wrong key on less advanced single-touch devices. To prevent errors, Beckhoff adds a confirmation requirement to the interface. This is also where multi-touch operation comes in handy, because developers can easily add a confirmation button to the function button. The panel accepts the entry only when both buttons are pressed simultaneously. If you position these buttons on opposite sides of the screen, for example, you even force the operator to use both hands.

Certain industries – medical technology comes to mind – have very high requirements regarding cleanliness, which necessitates the use of special materials. What other reasons are there?

Besides the pharmaceutical industry, the food industry also has special requirements regarding the surface and material of Control Panels and Panel PCs. Beckhoff offers devices in stainless-steel housings and with flush-mounted touchscreens for such applications. They can also feature multi-touch operation, and if the customer requires special shatter protection, we can apply a protective foil at the factory.

Touch panels often replace the keyboard-and-mouse combination. Many feature gestures as a new way to control machines. How long will it take for gesture-based operation to become widespread?

Devices that support gesture-based operation are already established on the market, as machine operators are already familiar with this kind of operation from their smartphones and tablets. You may even say that young people expect gesture-based controls when they encounter any kind of touchscreen. All that remains is to integrate this functionality into existing control concepts or design new visual interfaces. Here, too, there are numerous examples that show that the broad introduction is already in full swing.

What are the pros and cons of gesture-based control?

I don’t really see any cons, because gesture-based control is an enhancement of the classic touch interaction. Any worries that the operator might be overtaxed are not justified either, because gesture-based control does not have to be a requirement. Particularly in the first phase of the introduction of these products, many customers ran existing applications on multi-touch panels in the classic 4:3 format without activating multi-finger operation or gestures. Multi-touch is still an optional function. There are also advantages in the increasing usability and operating reliability if intuitive gestures are used in the visualization.

Is the kind of voice control we see in smartphones a topic of interest for industrial applications?

In a study, subjects used the voice control feature of their data glasses in addition to a touchpad in order to display additional information as needed, directly in their field of vision. This kind of voice control makes it possible to further enhance the traditional human-machine interface in industrial applications. For most applications, however, voice control will be difficult to implement because the surrounding environments in industrial applications are often not conducive to this type of technology.

Will touch operation replace electromechanical inputs?

If yes, why?

Touch operation is taking over more and more functions from electromechanical keys. I believe that this process will continue and minimize the number of physical keys in the human-machine interface. How long this will take is difficult to predict. Many machine manufacturers want to have certain keys in the operator’s field of vision at all times, irrespective of the screen content. In any case, a certain amount of safety-related control elements will always be there, such as emergency stop buttons or confirmation buttons on robots.

Further information:

www.beckhoff.com/multitouch