

PORTABLE HMIS - SMART ABOUT SAFETY

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ABSTRACT

Assembly lines with equipment, robots and people in constant motion are fraught with potential dangers. And this is just one example of ever-present factory floor hazards. With these precarious surroundings, manufacturers continually face the challenge of protecting both employees and assets without sacrificing efficiency.

Addressing the need for increased safety and efficiency, the electronic revolution presents new portable technologies. These technologies offer safer working conditions without cutting into productivity and efficiency. The new portable technologies include cabled and wireless tools to help manufacturers minimize mishaps and enhance protection against injury to employees and damage to machinery.

INTRODUCTION

Traditional operator interface terminals are panel-mounted and constrained by their mounted locations. Whether a problem occurs on one machine or an entire line, a single worker may need to walk hundreds of feet between machinery and a fixed panel device, monitoring the effect of any adjustments – a time-consuming job. Even when two workers are monitoring the equipment and communicating critical information from separate locations, the operation is prone to logistical problems and communication breakdowns – misunderstandings resulting in potentially unsafe conditions. In gated areas, this can be a dangerous practice when one employee is controlling the body (adjusting a limit switch or moving the device) and another employee is controlling the brain (the operator interface). Even a slight misunderstanding can result in an unsafe condition.

HMI AND THE PLANT FLOOR

Today's portable human machine interface (HMI) devices are breaking the boundaries of traditional fixed panel operator interfaces, allowing personnel to carry information and control directly to most locations in and around the machinery. The use of portable HMI carries significant plant efficiency and productivity benefits, especially in terms of worker safety. Following are two possible scenarios.

SCENARIO ONE: THE ROBOT CELL

Let's say an automobile manufacturer uses traditional HMI devices to monitor a typical cell application where welding robots are used. With robots working on automatic pilot, this gated area is dangerous to human workers and closed off to personnel. Diagnostic tests indicate that this cell is not reaching its full production quota; a decision is made to investigate a particular robot. The robots are only partially shut down before Worker A enters the gated area and goes directly to the trouble spot.

Meanwhile, Worker B monitors the operator interface device, some distance away on the factory floor. Worker B yells suggestions for adjustments to Worker A across the already noisy factory floor. Worker A makes the adjustments but has difficulty hearing all of the commands and cannot tell if the adjustments are working. Suddenly, Worker A is struck from behind by one of the robots. Time passes before Worker B realizes an accident has occurred and takes action to disable the cell.

PORTABLE HMI PROVIDES INFORMATION INSIDE THE CELL, SAFEGUARDS WORKERS

With access to the operator interface information and direct contact with the machinery in question, one worker can accomplish the same task that used to take two people. With the operator interface information in hand, and access to the e-stop and the enable switch on the portable HMI, one worker can walk into the semi-shutdown gated area. With the enable switch on, the machinery will remain in its semi-shutdown state, "reading" that the status of the worker is okay. However, if the worker is injured, the enable switch could immediately disable the moving equipment in the cell.

Portable HMI reduces the number of employees needed for equipment monitoring, dramatically reduces downtime, and helps ensure operator safety. If the unforeseen occurs, injury to the worker can be minimized.

SCENARIO TWO: THE ASSEMBLY LINE

The same automobile manufacturer operates a separate assembly plant where cars move along a line from one area to the next. Large areas of the plant floor are covered with pieces of equipment, making it difficult for maintenance personnel to access the entire line. When performing advanced troubleshooting, a worker might carry a laptop around the entire assembly line, returning frequently to a panel-mounted device. Portable devices, such as cabled machine terminals or wireless tablets, offer solutions that result in increased efficiency and productivity.

PORTABLE HMI IMPROVES TROUBLESHOOTING EFFICIENCY, MINIMIZES LINE DOWNTIME

A maintenance worker monitoring equipment with a portable HMI in a potentially hazardous environment could use a cabled device in its enabled state. If the device was dropped, the system would default to a safe state, instead of continuing to let the machinery operate and potentially putting the worker in more danger.

Another portability advantage is the ability to react to a co-worker's impending danger. Upon seeing a co-worker in trouble, utilizing the device's emergency stop (e-stop) shuts down machinery without having to search for the machine's stop button.

By using portable HMI devices, workers have added control of their situation and their safety. Additionally, increased productivity and efficiency means that maintenance and troubleshooting are streamlined.

CONCLUSION

Ultimately, portable HMI devices are a cost-efficient complement to existing panel-mounted operator interfaces. Panel-mounted operator interfaces along with portable HMI devices can enhance and optimize maintenance and troubleshooting, in addition to regular start and stop functions. Financial benefits come from the following:

- System downtime is reduced by the resulting faster machine set-up and changeover times.
- Time-efficient troubleshooting and maintenance reduce costs and keep machinery running better over the long term.
- Human and mechanical resources realize enhanced safety.

Employees are a company's greatest resource. From a business perspective, it makes sense to reduce costs associated with worker related downtime. But from a human standpoint, the cost of keeping employees safe is priceless. The new portable and wireless tools give employers the best of both worlds – cost efficiency AND peace of mind.

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