

Five reasons you need an HMI:

- **Safety**
The HMI provides full access to system-wide data without having to physically be near the sensors or switches in the working substation.
- **System Perspective**
HMI's improve your ability to view alarms and status information from a system perspective, not just one device at a time.
- **Response**
The HMI not only gives you breaker control from a remote and safe distance, but it provides you near-real-time feedback on system-wide response to your control action.
- **Clarity**
HMI's gather data from a variety of instruments, hardware platforms, and protocols to present one consistent view of the entire system.
- **Value**
HMI's add value by enhancing your interface with powerful protection, monitoring, and control instrumentation.

Why HMI's Make Sense

Let's start by defining HMI. Simply, it is a human-machine-interface. Its purpose is to act as a portal for information exchange. At this portal, machine data is gathered, formatted, prioritized, and presented to humans. In turn, humans observe, analyze, interpret, and act on available data. When designed by those who have a fundamental understanding of how the entire system works, and more particularly, how each discrete component and sensor works together to create a system, the HMI converts raw, discrete data into useful and actionable information.

The instrument panel of your car is a great example of an HMI designed by those who understand each system and component. The experienced operator is able to quickly scan the panel for current performance information like speed and distance traveled, as well as status information such as engine temperature, oil pressure or fuel-level. These important data are measured by sophisticated instrumentation (created by many different vendors) located in or near the point of operation. To vehicle operators, having an HMI to report vehicle status and performance is logical and natural. Today, it makes no sense to have the operator wander around through the engine compartment after a trip to see how fast he was going, or maximum engine temperature during the trip. More ridiculous is the idea of having the operator climbing through the engine compartment to collect this information while the vehicle is in operation. Fortunately, visionary automotive engineers decided to collect critical performance and status information and make it available to the operator in formats that are universally understandable. One does not need to be an automotive engineer to collect available data and make informed decisions regarding operational adjustments or even when it is time to seek professional service.

A great HMI optimizes both human and machine factors, creating a balance that takes advantage of the technologies of each sensor, and optimizes human performance during the interface event. Key human factors include safety, ease of use, and clarity for understanding. Machine factors involve device communications, data concentration, and data presentation within the context of time.

Here are five reasons why you need an HMI in your substation:

1 – Safety

Keeping people safe is both a priority and a responsibility. Without taking the “car” analogy too far, it is obvious that using an HMI during vehicle operation is much safer than crawling around the car and engine to gather important status information as you travel. Likewise, it doesn’t make sense to send people into hazardous substation environments to gather status and performance data during operation. The HMI provides full access to system-wide data without having to physically be near the sensors or switches in the working substation. HMI’s help keep your system operators safe.

2 – System Perspective

Prior to failure, systems often provide hints that there is something wrong. Suppose that temperature sensors on a critical motor or transformer indicate excessive heating. A routine walk through the power plant or substation might catch that alarm. The HMI not only catches and records the alarm, but provides alarm history for the whole system and can even initiate an email message, an audible voice message or a pager call when an alarm asserts. HMI’s improve your ability to view alarms and status information from a system perspective, not just one device at a time.

3 – Response

Trip the breaker! Sometimes rapid and informed human intervention is required when systems deviate from intended performance. Taking a circuit out of service involves a switching action. It takes time to go to the breaker switch in question. Once there, you may need to use personal protective equipment (PPE) to protect against arc flash and explosion. The HMI not only gives you breaker control from a remote and safe distance, but it provides you near-real-time feedback on system-wide response to your control action. Through the HMI, you can have immediate access to all switching devices in case subsequent action is required in another part of the system. HMI’s improve your total response during intervention or control events.

4 – Clarity

Rarely do you find a substation with instrumentation from a single manufacturer. No two vendors approach device communication in the same way. Even when you have one vendor’s instruments, substantial variances regarding data availability and communication exists. HMI’s eliminate that confusion. They gather data from a variety of instruments, hardware platforms, and protocols to present one consistent view of the entire system. HMI’s overcome communication barriers.

5 – Value

HMI’s bring enormous value at very low cost to substations equipped with modern microprocessorbased instrumentation. Imagine adding an instrument panel to a powerful automobile. The value of an HMI interface greatly enhances every aspect of the operating experience by improving safety, providing a system perspective, improving response times for control actions, and eliminating the confusion of multi-vendor communications. HMI’s add value by enhancing your interface with powerful protection, monitoring, and control instrumentation.