SNS COLLEGE OF TECHNOLOGY

Coimbatore-35
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DEPARTMENT OF MECHATRONICS ENGINEERING

19MCB301 - INTEGRATED AUTOMATION

UNIT 4 – SUPERVISORY CONTROL AND DATA ACQUISITION

TOPIC - HMI and its functions

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Integrated Automation

➢ **INTRODUCTION TO PLC**

➢ **PLC INSTRUCTIONS & I/O DEVICES**

➢ **NETWORKING AND APPLICATIONS OF PLC**

➢ **SUPERVISORY CONTROL AND DATA ACQUISITION**

➢ **DISTRIBUTED CONTROL SYSTEM**

UNIT – 4 SUPERVISORY CONTROL AND DATA ACQUISITION

- HMI and its functions

- Elements and Architecture of SCADA

- Development & Runtime mode functions

- Tools: Tag database - Recipe database - Alarm Logging

- Trends: Real Time & Historical Trends

- Security and User Access Management

- Management Information System & Report Function.

HMI and its functions

HUMAN MACHINE INTERFACE

AKA

Man-Machine Interface (MMI) / Operator Interface Terminal (OIT) / Local Operator Interface (LOI) / Operator Terminal (OT)

Topology is derived from two Greek words topo and logy, where topo means 'place' and logy means 'study'.

HUMAN MACHINE INTERFACE - HMI

- A Human-Machine Interface (HMI) is a user interface or **dashboard** that connects a **person to a machine**, system, or device.

- While the term can technically be applied to any screen that allows a user to interact with a device, HMI is most commonly used in the context of an industrial process.
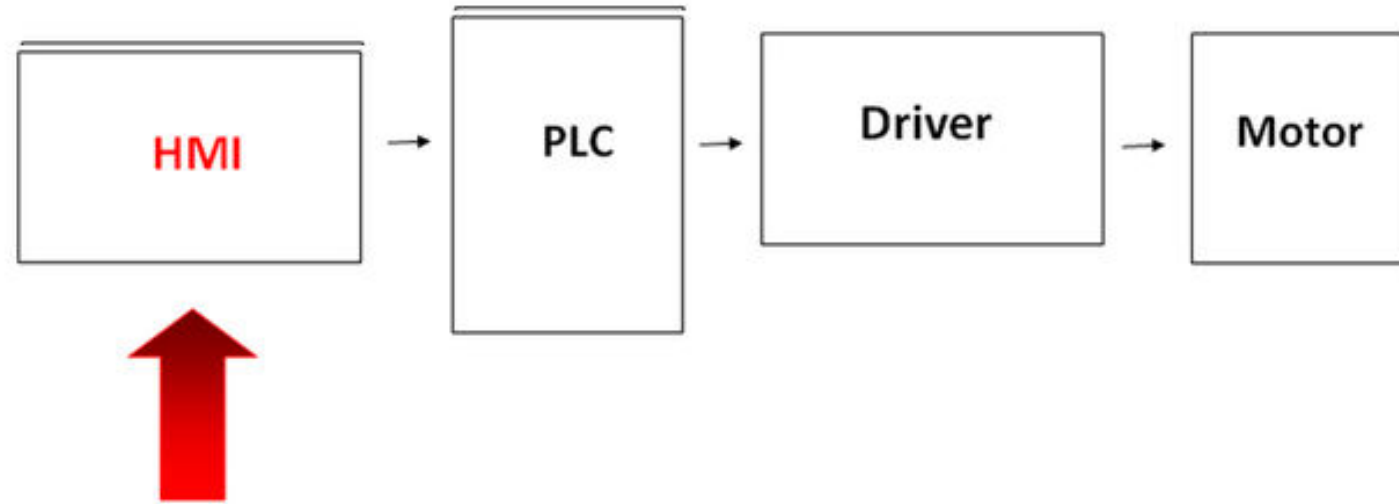
ADVANTAGES OF HMI

- Improved Productivity
- Improved Worker Satisfaction
- Facilitate Internet of Things
- Data Recording
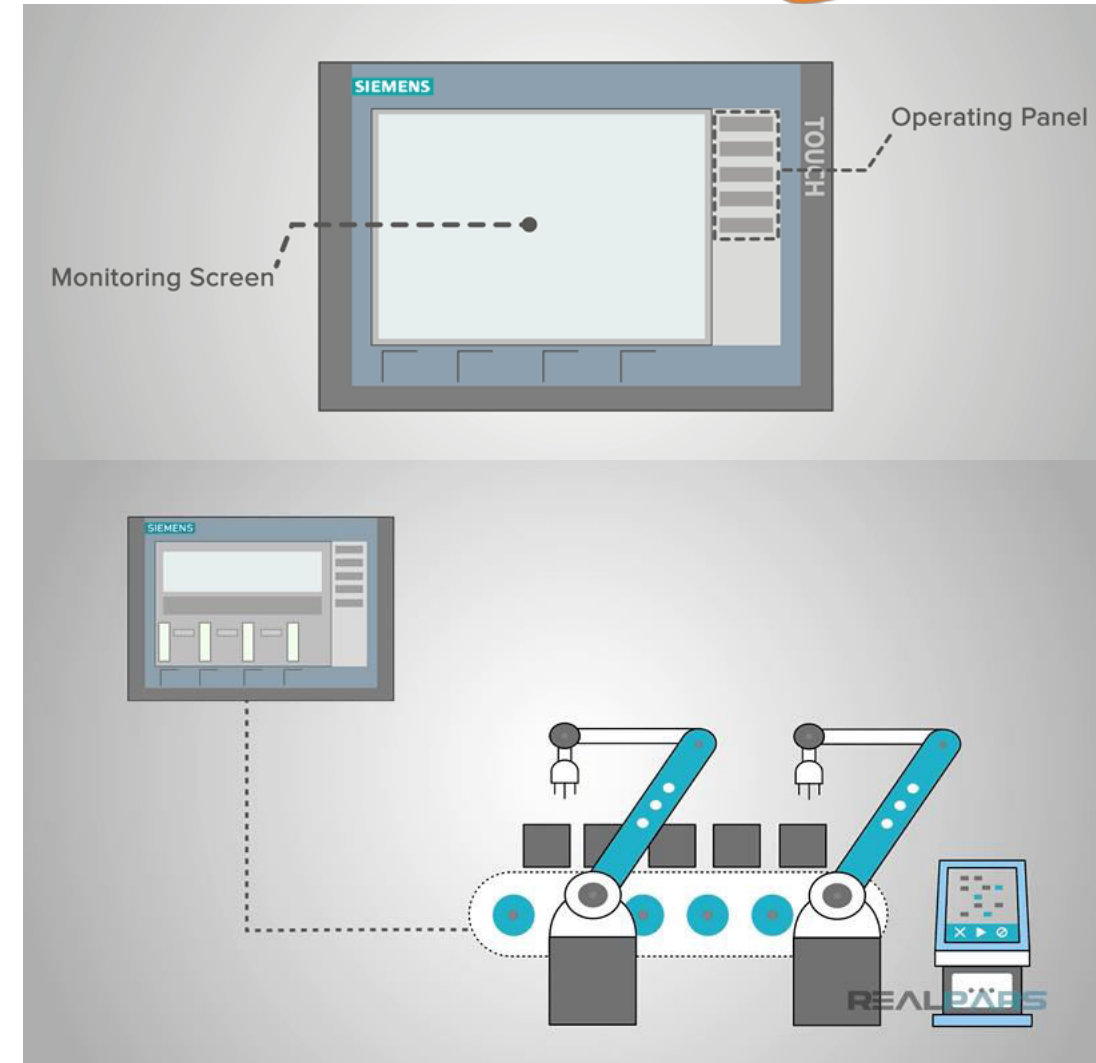
How HMI incorporated in Manufacturing

- An HMI is the centralized control unit for manufacturing lines, equipped with Data Recipes, event logging, video feed, and event triggering, so that one may access the system at any moment for any purpose.

Functions of HMI

- **Data input and display;**

- **Real-time information display of the operating status of the system or equipment;**

- **Setting touch control on HMI can control the operation with HMI as the operation panel.**
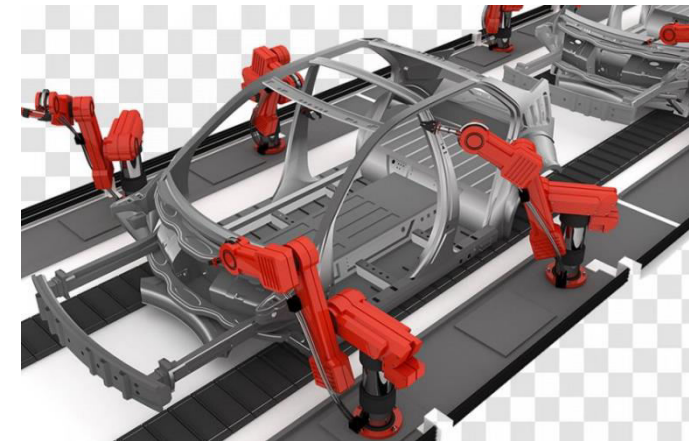
- **Alarm processing and printing.**

Industries using HMI,

- Energy
- Food and beverage
- Manufacturing
- Oil and gas
- Power
- Recycling
- Transportation
- Water Management

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.

Types of HMI Screens

Data handler

- Provides constant feedback from your company's system, the data handler is the perfect HMI.

- The data handler includes functions like data trending, alarm handling, data logging and recipes, and it must be large enough for visual representations, graphs and production summaries.

Pushbutton replacer

This HMI streamlines processes in manufacturing, putting every function of each button in one location.

Overseer

This HMI is beneficial when an application involves MES or SCADA. The overseer requires multiple Ethernet ports and will usually need to run Windows.

Advantages of HMI

1. Alarms/Warnings

- An HMI can allow plant operators to view alarms and locate a malfunction in the equipment, allowing them to react more quickly.

- Alarms can be preventive, so the operator is alerted before the system reaches an emergency level.

- Alarms can also track several different problems and increase productivity by optimizing manufacturing processes.

2. Reliable Messaging

- As an example, when a machine should be refilled because of a low fuel level, the operator will be alerted automatically.

3. Easier Overall Management of Plant

- Easily manage and carry out recipes.

- The high-quality graphics of HMI systems provide realistic views of a plant's operations so that operators can control the facility from

  central locations.

- Resolves security issues.

- Operator doesn't need to approach dangerous areas, and they can control the monitor from another location.

Advantages of HMI

4. Accurate Testing With Simulation

- Testing of equipment and devices is easy, can be achieved in the office without any piece of equipment.

- This function improves overall production and reduces startup time.

5. Cost Reduction

- It reduce operating costs by replacing hundreds of selectors, pushbuttons, indicator lights and more.

- The need for extra cables, panels and consoles is also greatly reduced.

6. Improved Communications

HMI can also improve communications throughout the facility by using various types of equipment. This includes the use of:

    Ethernet

    Data Highway Plus

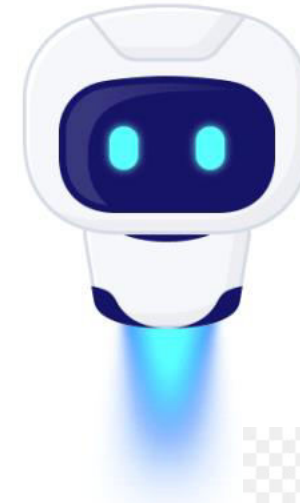   **DDE (Dynamic Data Exchange)**

    Remote I/O

    Serial port

Adding an HMI to a workplace benefits a facility by improving its productivity, operation and safety.

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