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Industrial Glossary

❶ Analyser

A special class of instruments providing component-based data rather than basic physical data. Examples are gas chromatographs and near infra-red analyzers.

❷ Automation

Automation is usually characterized by two major principles:

1. Mechanization. i.e. machines are self-regulated so as to meet predetermined requirements (a simple example of self-regulation can be found in the operation of a thermostatically-controlled furnace).

2. Continuous process, e.g. production facilities are linked together, integrating several separate elements of productive process into a unified whole.

There are three basic kinds of automated processes:

1. Assembly-line automation - e.g. the automobile industry.

2. Extensive use of computers, as found in many modern offices and businesses.

3. Utilization of complex electronic equipment as controls in the manufacturing and processing of products for example in the refining industry.

❸ Cascade Control

A control technique that involves one controller manipulating a second controller's set point. A common example is a tank level controller manipulating the set point of an inlet flow controller.

The main reason for applying this technique is to assign the different process dynamics to different controllers and each controller can be optimally tuned for its particular process dynamics, rather than have one controller with a comprimised set of tuning constants.

In the tank example the tank level control is typically slow whereas the flow control is often fast. In addition, level control is an integrating process whereas flow control is a regulatory process.

❹ CNC - Computerized Numerical Control

This refers to modern milling machines and other machine tools that can carve complex parts from solid billets. Although CNC parts are not as strong as forged parts, they can be made into more complicated shapes than is possible with forging or conventional casting.

❺ DCS - Distributed Control System

A control system where the processing power is distributed amongst several processors. Current systems can have hundreds of processors. The original concept of DCS was to ensure that loss of a single processor did not have a major impact on the functionality of the control system.

If ten processors are gathering data, then a failure only results in one tenth of the data being lost. Basically it is the "not putting all the eggs in one basket" approach. Note it is the processing power that is distributed, not the physical equipment. However physical distribution of the DCS processors is often used for both security and wiring cost reduction.

❻ DDC - Direct Digital Control

The use of a single processing entity to generate outputs for a control system. Often the generation is based on data from many sources, for example the control system itself, laboratory results, production schedules etc. Note that the entity implementing DDC can have a backup in case of failure.

❼ DMC - Dynamic Matrix Controller

An advanced control technique that uses as a basis a matrix relating input movements to output movements. From this matrix the controller can determine how to manipulate the outputs to move from one plant state to another. DMC is thus applied to multi variable control problems.

❽ Fieldbus

Fieldbus is a method of connecting field instrumentation using a communications network linking the field instruments rather than connecting each field instrument individually to the control system.

Fieldbus uses digital communication protocols allowing information to be communicated between the control system and the field instrument in addition to the process signal. Instrumentation connected to a fieldbus network is always of the smart instrumentation type.

❾ HMI - Human Machine Interface

The Human Machine Interface is the communication between machines and humans. A machine can be anything from a wristwatch to a big factory. The communication can be the human pushing a button or the machine flashing a lamp.

❿ IGBT - Isolated Gate Bipolar Transistor

Basic switching device used in most modern UPS converters. It is a rugged bipolar transistor which is easy to control.

⓫ I/O Device

Refers to any control or monitoring hardware conveying information to or from PLCs, RTUs, micro controllers, loop controllers, DCS elements, weighers, bar code readers, etc.

⓬ IP (Ingress Protection) (IPxx)

Rating for Equipment and Enclosures. A two-digit number (as specified in EN60529) is used to provide an IP Rating to a piece of electronic equipment or to an enclosure for electronic equipment. The two-digit IP Rating covers ingress against solid objects and liquids. See last page for a complete list of each of the ratings. The first digit represents protection against ingress of solid objects. The second digit represents protection against ingress of liquids.

⓭ MODBUS

Communication protocol widely used in SCADA and process control applications.

⓮ MCC - Motor Control Center

The idea behind a motor control center (MCC) is very simple. An MCC is a large enclosure designed to house standard motor control equipment.

The unique characteristic of an MCC is that the motor controls are contained in plug-in units.

⓯ MMI - Man Machine Interface

The Man Machine Interface is the communication between machines and humans. A machine can be anything from a wristwatch to a big factory. The communication can be the human pushing a button or the machine flashing a lamp. This term is typically used in old documentation and has been replaced by HMI.

⓰ NEMA 1 - National Electrical Manufacturers Association, Enclosure Type Descriptions

Type 1 units and sections are intended for indoor use, primarily to provide a degree of protection against contact with the enclosed equipment in locations where unusual service conditions do not exist. The enclosures are designed to meet the rod entry and rust resistance design tests. The enclosure is sheet steel treated to resist corrosion.

⓱ NEMA 12 - National Electrical Manufacturers Association Enclosure Type Descriptions

Type 12 enclosures are intended for indoor use, primarily to provide a degree of protection against dust, falling dirt, and non-corrosive dripping liquids. They are designed to meet drip, dust, and rust resistance tests. They are not intended to provide protection against conditions such as internal condensation.

⓲ PDU - Power Distribution Unit

AC or DC power distribution equipment with breakers and in many cases monitoring of the breakers or the current.PDU's can be equipped with a transformer to adapt to the required load voltage. A PDU can be a stand alone cabinet or integrated in other equipment.

⓳ PLC - Programmable Logic Controller

A PLC is a device invented to replace the necessary sequential relay circuits for machine control. The PLC analyses its inputs and depending upon their state, will turn on/off its outputs. The user enters a program, usually via software, that produces the desired results.

⓴ Process Control

Process Control means checking the process to ensure that all operations during the manufacture of the product are done correctly and consistently to a set standard usually described in the process specification.

㉑ RFI - Radio Frequency Interference

Many electronic devices (e.g. UPS'es, computers, Telco equipment, and peripherals) can interfere with other signals in the radio-frequency range by producing electromagnetic radiation conducted interference. The limits of RFI is generally regulated by government agencies.

㉒ RTU - Remote Telemetry Unit

A control or data collection unit situated remotely to the main control and monitoring system.

㉓ SCADA - Supervisory Control And Data Acquisition

This control system focuses on the supervisory level. It is only a software package interfacing with hardware, in general via Programmable Logic Controllers (PLCs), or other commercial hardware modules.

㉔ SCR - Silicon Controlled Rectifier

A solid state switch often used as the output switching device for a temperature controller instead of a mechanical relay.

㉕ Servo Drive

A Servo Drive is used for controlling and driving a servomotor. A Servo Drive often uses different current and velocity loops for controlling the motor and providing maximum performance. Servo Drives can be multi-axis or single-axis drives, and applicable for both AC and DC servomotors.

㉖ Servomotor

Servomotors are available as AC or DC motors. Early servomotors were generally DC motors because the only way to control large currents was through SCRs for many years. As transistors became capable of controlling larger currents and switching the large currents at higher frequencies, the use of the AC servomotor became more widespread. Early servomotors were specifically designed for servo drives. Today a class of motors is designed for applications that may use a servo drive or a variable-frequency controller. This means that a motor may be used in a servo system in one application, and used in a variable-frequency drive in another application. Closed-loop systems that do not use stepper motors are also referred to as a servo system, and simple AC induction motors connected to a velocity controller can therefore be referred to as servomotors.

㉗ SPC - Supervisory Process Control

The use of a single processing entity to generate setpoints for a control system. Often the generation is based on data from many sources, for example the control system itself, laboratory results, production schedules etc. Note that the entity implementing SPC can have a backup in case of failure

㉘ VFD - Variable Frequency Drive

A Variable Frequency Drive is an electronic controller adjusting the speed of an electric motor by varying frequency and voltage. Variable Frequency Drives provide continuous control and match motor speed to the specific demands of the work being performed.

㉙ VSD - Variable Speed Drive

A Variable Speed Drive is an electronic controller that adjusts the speed of an electric motor by varying frequency and voltage. Variable Speed Drives provide continuous control and match motor speed to the specific demands of the work being performed.

IP Rating	First Digit	Second Digit
Value	Protection from ingress of solids	Protection from ingress of liquids
0	No protection	No protection
1	Protected against solid objects over 50mm e.g. hands, large tools.	Protected against vertically falling drops of water.
2	Protected against solid objects over 12mm e.g. hands, large tools.	Protected against direct sprays of water up to 15° from vertical.
3	Protected against solid objects over 2.5mm e.g.wire, small tools.	Protected against direct sprays of water up to 60° from vertical.
4	Protected against solid objects over 1.0mm e.g. wires.	Protected against water sprayed from any direction. Limited ingress permitted.
5	Limited protection against dust ingress (no harmful deposit)	Protected against low pressure water jets from any direction. Limited ingress permitted.
6	Totally protected against dust ingress.	Protected against high pressure water jets from any direction. Limited ingress permitted.
7		Protected against immersion between 15cm and 1M.
8		Protected against long periods of immersion under pressure.
9		