Components and structure

A PLC – be it single-unit or modular – is comprised of a few significant hardware components.
- The **power supply**, built-in or external, helps to supply the right electric currents to the internal circuits while maintaining the PLC isolated and secure.
- The **CPU**, which organises the PLC activity by interpreting and executing the user programme, computing arithmetic calculations and functional verifications. The main circuits connected to the CPU are the **operation mode selector**, which determines the PLC operation mode (programming or executing); the **self-diagnostic circuit**, which repeatedly sees that all necessary security requirements are met to run the user programme; the **watch-dog circuit**, which interrupts the PLC activity whenever the self-diagnosis reveals any unusual activities.
- **Memories** – a volatile memory (**RAM**) useful to write and read the data of the user programme being executed; a non-volatile memory (**ROM**), used to file the system programme essential for the PLC to operate. In addition to these two, there are specific EPROM memories, which can be written and re-used only through ultraviolet ray stimulation of one of the integrated cells.
- The **I/O modules** are the input and output devices used by the PLC to interact with the circuit to be controlled. They communicate via analogue or ON-OFF-like signals, i.e. analogue signals are numerically variable values transmitted and then converted into digital signals within the PLC (ADC and DAC devices); on the contrary, ON-OFF-like signals can work out two different values, just like with ON/OFF contacts. There are also remote I/O modules, i.e. which are connected to the PLC although being located elsewhere.
- **Programming devices** consist of all the appliances used to write, compile and send out user programmes designed for the PLC memory. There are different programming modes: ON-LINE, if the programme is connected directly to the PLC, or OFF-LINE, if the programmes is saved onto an EPROM memory only to be transferred to the PLC afterwards.