

Basic principles of process control systems and automation – Automation systems

Your Objectives:

At the end of the course, you should be able to justify automation systems.

What is automation?

Historically speaking, **automation** meant those processes of **mechanization** of work and production which were significantly modernized by the **industrial** revolution. Today, however, automation goes well beyond mechanization as it involves, not solely the execution of tasks, but also quality-control and **regulatory** tasks taken on by artificial systems insofar as the entire process now involves the use of **machines**, control systems, etc., in order to optimize production processes in the production of **goods**.

Modern automation systems used in **biotechnology** consist of made-to-measure, **highly** precise hardware and **software** components. They are employed throughout, from single steps to complete processes, including management, regulation and **control**. Because of the good cost-performance ratio and the **flexibility**, platform solutions that can be **adapted** to certain requirements by both manufacturer and **user** have become very popular.

At **Biogen**, the primary automated system used for process control is the Delta V Distributed Control System (DCS)[®]. It would be inane to address the complexities of such a **computer** system within these few pages. But briefly...

Delta V Distributed Control System[®]

Delta V was designed to apply automation to process **industries**. While the components of the system are **based** on industry standards and use PC hardware and standard network configuration, each **Delta V System** is customized to the user's needs. At Biogen's manufacturing locations, the appearance and functionality of Delta V, as well as the version implemented on premises, will largely vary according to the **equipment** and processes in place.

Network Architecture

Delta V is set up using a standard **local area network** (LAN) configuration. In such a network, various devices are connected to a hub or switch. Each device occupies a position, or node, on the network. By connecting the devices to a network configuration, **data** can be transmitted to and from each device.

In the case of Delta V, the network is comprised of workstations (operating terminals), as well as electronic input/output cards (I/O cards) that provide a network interface for various valves, motors, pumps, and machines within the manufacturing environment.

The Delta V network is closed, which means that connectivity to the network is restricted, and so access to the workstations and devices on that network is restricted to authorized personnel.