Automation & Control Systems

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Automatic monitoring and control is common place in the home as well as industry. The majority of industrial control systems are based around one or more Programmable Logic Controller (PLC) which follow a software program instructing it how the control task is to be achieved. Applications of how control systems might be used include:

- Building Management — e.g. lighting, heating, lifts, Alarm system etc.
- Machinery Control — e.g. Packaging machines, Hot-air Welding, Generators
- Process Control — e.g. Bottling Lines, Printing Press, Assembly Lines
- Safety Systems — e.g. Protected Area Monitoring, Gas Detection

ITI has been using PLCs from manufacturers including: Siemens, IMO, DirectLogic, Telemecanique and Omron. A little about some of the applications is given below.

Example 1: Mushroom Grading

This application demonstrates the ability of a PLC to take on the challenge of controlling and monitoring a complex machine at the same time as interfacing with an operator through a touch screen (HMI). The mushroom grader increases harvest rates very considerably and has been taken up by several of the UK's biggest growers and retailers.

The operator drives the machine through the growing house, supplying picked mushrooms to the machine via the feed belt. The stalks are trimmed and pass though a grading stage where they fall into one of six punets depending on size. The PLC monitors punet weights and ejects each in turn as it reaches the preset weight. The ejected punets are lined up in the appropriate numbers at the back of the machine before being moved on to a buffer area from where they can go to wrapping.

Modularised Touch Screen and Control System

A number of challenges were faced in the control system design including:
The use of a large number of motors means that the battery voltage varies considerably through the day, yet continued operation of the PLC and HMI is important. Design of a suitable DC / DC converter maintains operation from 26v down to 9v. Motor Control boards were also designed to handle the large switching currents and transients and are PLC controlled. Communications with the weighing system is achieved using RS485 and eliminates errors due to electromagnetic interference.

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Example 2: Energy Recovery from Industrial Waste

Waste MDF prepared as gasifier fuel

With rising energy and waste-disposal costs it is not surprising that efficient methods of dealing with waste are in demand. ITI-Fluidyne has the know-how to adapt gasification technology to suit a range of waste streams and formats. ITI has also used its control system experience to design and implement a suitable automated system for the commercial environment. The first commercial plant is designed to use waste MDF and generates a continuous 70kW electricity into the factory network, thus saving on import of the same amount of power from the grid.

Atlantic Class Gasifier Module

The PLC and touch screen system use Siemens hardware to monitor over 30 inputs (e.g. pressures, temperatures, air ram positions, buttons, etc.) and controls approximately 25 outputs (eg ignition system, fans, pumps, fuel conveyors, fan speed, etc.)

The touch screen provides an overview of plant status and measurements and allows the operator to switch items on or off for maintenance etc..

One of the unique features of the system is the use of a web / email / FTP server module to allow remote monitoring of the plant and automatic emailing of maintenance reminders etc. Plant data is recorded on a regular basis and stored for download by ITI to assist in developing the maintenance schedule and in design of future systems.

If you wish to find out how ITI can help you with any measurement or control issues, please feel free to contact us 028 9337 3379 or projects@innovation-tech.co.uk
Check out ***www.innovation-tech.co.uk*** *to see what other areas ITI operate in.*

IMO DirectLOGIC SIEMENS Telemecanique OMRON

Whatever your engineering problem, ITI have a solution.

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