

# Beckhoff I/Os in action in a research laboratory

The current research project at the CPERI institute examines the feasibility of a single-step catalytic procedure for producing stable liquid bio-fuels via rapid pyrolysis of biomass. This is achieved with the aid of splitting reactions under the influence of an appropriate catalyst.



→ “New Automation Technology” from Beckhoff is not only beneficial in industrial applications, but also in modern research projects. The Greek CPERI (Chemical Process Engineering Research Institute), based in Thessaloniki, is currently involved in the development of an efficient technique for converting biomass into clean and degradable bio-oil. For process control purposes, the pilot plant was upgraded with Beckhoff I/Os and TwinCAT control software.

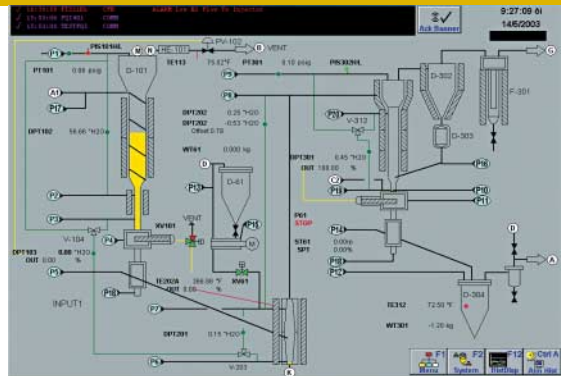


The technique for converting biomass is based on rapid pyrolysis of biomass under the influence of a catalyst (biomass flash catalytic pyrolysis, BFCP). BFCP is a very promising thermochemical procedure for producing liquid products. However, due to the high refinement costs associated with the production of BFCO liquids, large-scale applications are not yet viable.

Research for this complex procedure is carried out in a small pilot plant, which was recently extended and modernized using Beckhoff components. The control panel of the existing plant contained outdated PLC and I/O systems that had to be replaced. Based on the positive experience CPERI had made with Beckhoff equipment in the past, the institute decided to implement a flexible solution involving Bus Terminals and PROFIBUS networking.

“The main feature of the I/O systems from Beckhoff is that they can be adapted to the specific requirements of a wide range of projects,” said Petros Ioannidis, technical director of the research project. “The Beckhoff product portfolio offers a wide range of Bus Terminals, so that the optimum device can be selected for each application, thus avoiding the installation of redundant I/Os.”

The main system tasks are controlling the complete process, measuring temperatures and pressures at several points, and transferring these measurement results to a SCADA display for visualizing the measurement readings in the form of graphs. Although the requirements for this research project are very demanding, the results so far have been outstanding. “Due to limited space, the main control board had to be installed together with several regulating transformers in a single housing without a fan. Naturally, this leads to higher temperatures that can reach more than 55°C in the summer, which is the rated operating temperature of the Bus Terminals. Despite our initial worries that the system might fail under such adverse conditions, so far we had no problems whatsoever,” said Mr. Ioannidis.



The TwinCAT software PLC is coupled with the SCADA system via an OPC server for graphic visualization of the measurement readings.

The technical director is also very satisfied with the performance of the TwinCAT software in this research project: “The software functions enable us to run control and data mining tasks, and at the same time to monitor potential problem areas. The function of the TwinCAT System Manager is particularly helpful in this context, because it shows problem areas directly. This saves the user a lot of time for troubleshooting, and any fault can be rectified more quickly.”

The trial application has already yielded extremely satisfying results, which have led to the publication of several scientific papers. The I/O systems from Beckhoff have played a significant part in these successes. “We are highly satisfied with this system. It is powerful and reliable,” Mr. Ioannidis stressed. “And not least due to the efficient support, both from Industrial Automation Systems – the Beckhoff partner in Greece – and from Beckhoff direct, we have every reason for using a similar system for future projects.”