

## Compressor Train Retrofit

*“Cooperation between Woodward’s Channel Partners has been key to the success of this project. I am very pleased with everyone’s commitment and professionalism”*

*Sonia Fernández*

*Technical Director, Indalbi Sur*



Fertiberia Chemical Plant



### LOCATION

Puertollano, Spain

### POWER

Turbine AEG KANIS 5150 kW

### OBJECTIVE

To ensure uptime and optimize efficiency

### SOLUTION

Woodward Flex500, LINKnet™ HT Nodes, CPC-DX, Toolkit HMI, TTS software, Siemens PLC

### IMPLEMENTATION

Main contractor (supply, engineering, commissioning and support): **Indalbi Sur S.L.**



Application Software: **Turner ECS B.V.**



Start-up support: **JPM-TCCS B.V.**



PLC: **HEXA Ingenieros S.A.**



### RESULT

Improved control accuracy, flexibility and operation efficiency

## First Woodward Integrated Turbine and Compressor Control System in Spain

### Customer Goals

The turbine had a fully mechanical speed control system. The startup curve was executed manually and the turbine operated at constant speed. It was not possible to control the air flow to process (main parameter to control) by changing the turbine speed. The air flow to process was manually regulated by operating two valves acting in split range. The anti-surge and performance control was done by three ABB Protronic devices, one for each anti-surge protection loop and a third one to control the IGV position by regulating the discharge pressure. These devices were obsolete. In addition, there was a SIEMENS S5 PLC for all sequencing logic which was also obsolete. The customer wanted to change the control philosophy to use the discharge flow as control parameter, instead of the discharge pressure, thus removing the pressure drop caused by the split range valves. A second objective was to be able to control the air flow to process by changing the turbine speed at a fixed IGV position.

### Solution

The turbine and compressor control have been integrated in a Flex500 platform, using Total Train Solution application software. The main control parameter is the air flow to process, which eliminates the need of controlling this parameter by manually operating the split range valves. These valves can now be set fully open, thus the loss of load and consequent loss of efficiency introduced by the partial opening of the valves is eliminated. The control also offers the possibility of setting the IGV's at a fixed position and regulate the air flow by changing the turbine speed. The PLC has been upgraded to a SIEMENS S7. All the obsolescence issues have been eliminated.

### Result

The startup of the compressor train can be done in a fully automatic manner, keeping the flexibility of starting up manually if the customer wishes to do so. The control offers the possibility as well of using the discharge pressure as control parameter, maintaining the original control philosophy as a backup. The air flow control is more accurate, flexible and efficient. The steam consumption has been reduced and the obsolescence problems have been eliminated.



## Woodward Control Systems for Gas and Steam Turbines and Compressors

### ***Control hardware/software for easy development, commissioning, startup, and operation***

Woodward programmable and configurable control systems for gas and steam turbines are purpose built with simplex, dual redundant and TMR options. All Woodward controls are designed to operate gas turbines, steam turbines, or integrated turbine/compressor systems. While standard I/O is built into the units, each control has options for communication with distributed I/O modules to provide extended application flexibility. Extensive experience with a diverse range of customers and applications has resulted in the integration of

### ***Independent controls company offers greater flexibility***

As an independent company, Woodward and its partners are able to provide full service, support and upgrades. Woodward takes great pride in customer support and continues to sustain fielded products for as long as parts are available. When upgrades are required, Woodward's OEM and

most digital communication protocols. Woodward's GAP (Graphical Application Programming) software is specifically designed for mission-critical turbine and compressor control. GAP allows control engineers to develop applications in an easy-to-use, error-checking environment. Updates can be made in GAP, or imported as programming blocks from other commonly used software environments such as Matlab, C++, etc.

Channel Partners provide service on all controls. Through standardization and attention to software evolution, Woodward's partners can adapt 1990's software into today's advanced control platforms with minimal change.

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