Daurala Sugar Works, Meerut, India

Woodward India Retrofitted old 505 with Flex500 PM on Easyflex platform with LS5 for the Steam Turbine and Gen Set control.

Background

Daurala Sugar Works was established in the pre independence era in the **year 1932 at Daurala**, a small unknown village near Meerut on New Delhi - Haridwar National highway no. 58. Today, after more than eight decades it continues to command respect as one of the more efficient and modern sugar factories of the country, being a familiar name not only in India but overseas as well.

Over this period, diversification of activities was pioneered under the umbrella brand of **"Daurala Sugar Works", Daurala**. This included manufacture of pharmaceutical grade sugar, sugarcane research farm, setting up of distillery, manufacture of IMFL, Bio-Methanation, manufacture of aromatic chemical, co-generation of power etc.

Challenge

Woodward has faced lot of challenges in recent times pushing our product into industries like sugar and paper mill and failed to convert retrofit order from old 505 to 505D/ 505XT. This is due to the tough competition faced from our Competitors like Heinzman who are providing low-cost solutions to the customer which includes not only the governing part but as well as synchronization and load sharing capabilities though one single controller. Notably the competition has 2 MPU signals, PT and CT on board. Technically, the end user wants to have Woodward but loses orders to the competitor over commercial terms and the requirement of different controllers for different functions.

Solution

To overcome the above problem statement and to evolve as per the market and customer demand, Woodward India with the support from WW Germany started working on the Easyflex controller which has MPU hardware as well as PT CT on board.

Woodward India used the Steam turbine core for the start-up, speed control and valve demand control and DSLC core for the load management and synchronization of the Generator Breaker. Also, logics have been made to derive the Import/Export setpoint and read data with LS5 over can bus.

Woodward India supplied,installed, and commissioned the following products:

- Flex 500 PM (Easyflex) for Governing, Load Sharing, Load Management, Power Factor control and Synchronization of the Generator Breaker.
- LS5 for the synchronization of the Tie breaker and measuring the grid load.
- Human Machine Interface (HMI)

STG of the 16.75 MW has been retrofitted with Flex 500 PM replacing old 505 governor to serve the above-mentioned function.

Engineering Challenges

- Different Coder for the Steam turbine core and DSLC core.
- MPU hardware is not tested for high-speed turbine system.
- MPU had their value in GAP in integer format.
- Detailed alarm history and trends were not available.

Solutions

- Steam turbine core migrated to PGX controller.
- PGX coder is modified to accommodate some of the commonly used GAP blocks in the Flex500 coder.
- MPU measurement has streamlined by taking moving averages and practically checking with the Overspeed in the Beta Testing.
- AC measured frequency is converted in the speed and used in a HSS block along with real MPU for controller. This frequency is used only when gen breaker is on.
- Interactive, more informative, and user-friendly HMI screens were developed.
- Alarm and Event history logs were generated through SQL server.

Results

- Governing and Load sharing in one Control.
- Eliminate the use of Active Power Transducer.
- Decreased downtime by providing easy access to information and data acquisition for enhance troubleshooting.
- Trip and alarms can be analyzed better through SQL alarm and event server and Trends data logging.
- Cost Efficient.

WOODWARD

Woodward Flex 500 PM (EasyFlex)

The Flex500 PM control system represents a new generation of turbines and gen-set control with inbuilt synchronization and load share facility. This controller is based on a standard industrial hardware platform that offers robust, low-cost control for a wide variety of turbine, engine cum synchronizing and load sharing application The platform's real-time operating system and dedicated inputs and outputs provide deterministic performance for key prime mover-control functionality.

LS 5

The LS-5x1 devices manage synchronization, loading and un-loading on each bus segment and send the required voltage, frequency, and phase angle references via CAN bus to the easYgen-3400XT/3500XT genset controllers. When serving an incoming main breaker, it automatically detects mains failure, performs mains decoupling and sends the start signal to EasyGen.

HMI

Flex 500 PM is a bulkhead mount and does not have an integrated display. For Operation purposes, a touch-enabled IPC was provided with Allen Bradley FT View software. This has enhanced the function of the control by providing more information and ease of operation though 15.6 led scree. Also, trends can be configured as fast as 1 msec and can be stored for more than 6 months. This will result in better troubleshooting and ease of operation.

Location

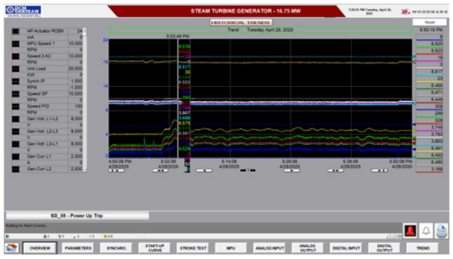
Woodward Flex 500 PM/ EasyFlex

Woodward supplied the system and along with the support of DSW Plant maintenance team and commissioned the system successfully.

Results

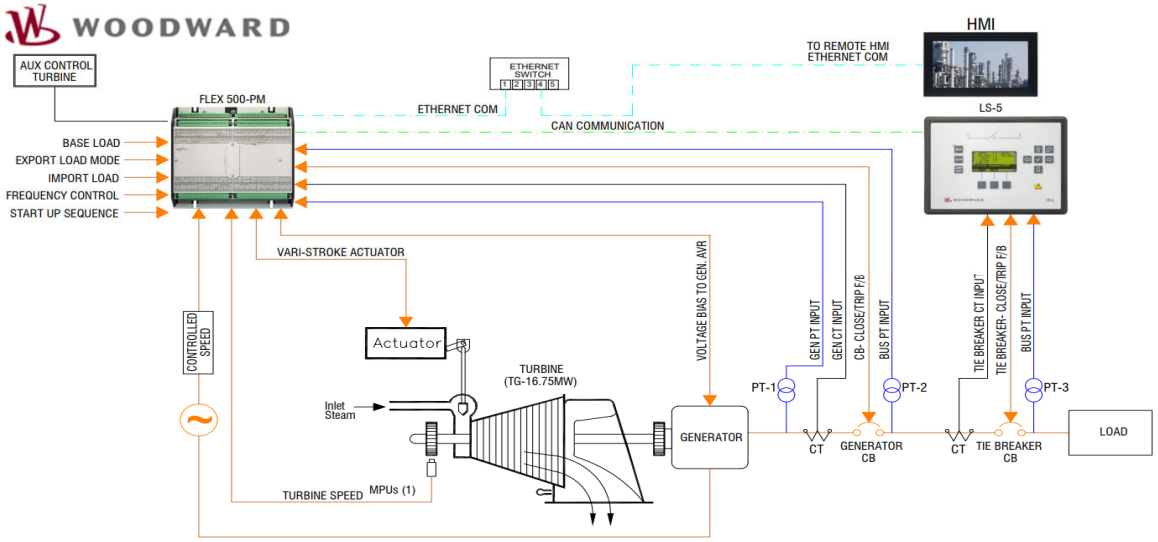
- Flex500 PM has reduced the number of controllers required to do different functions and capable of working as a complete package for Governing and Load Sharing Control.
- Eliminate the use of Active Transducer and hence eliminating the point of failure.
- Introduced the features on the proven hardware from the EasyGen family.
- Ease of Operation due to a more informative workstation SCADA, historical trends, and Alarm History.

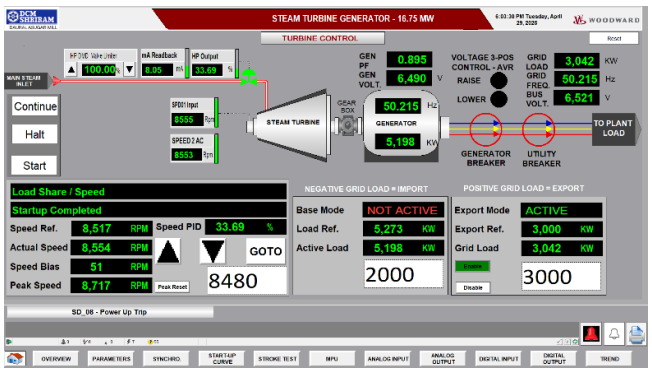
Historical Trend (HMI)

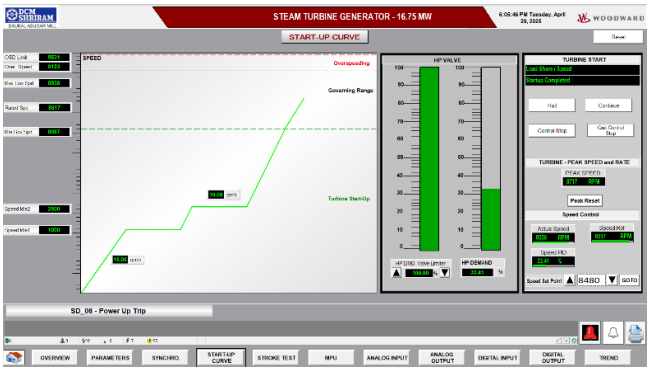


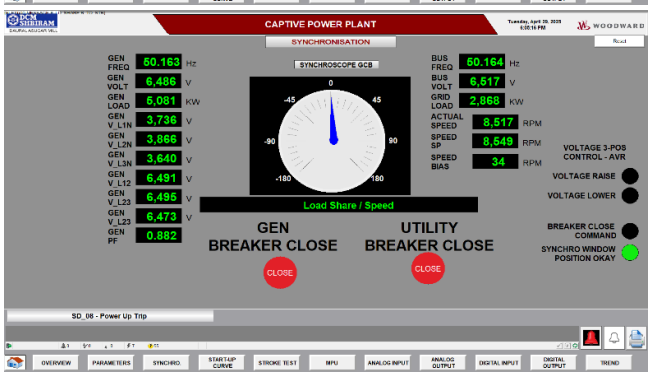
Daurala Sugar Works was pleased with the commissioning and the controller's performance and saw that Woodward has been successful in meeting their and sugar industries' expectations to provide solutions at less cost as well. They are confident that this will work in the sugar industry and will maintain the Woodward control relevance in the sugar and paper industry.

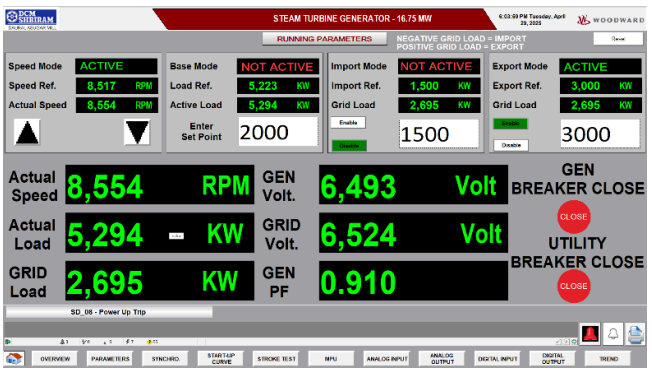
Alarm Summary











About Woodward

Woodward's integrated systems and components provide superior control for steam and gas turbines, diesel and reciprocating engines, and compressors, along with integral safety systems. These products measure, regulate, and optimize the volume and mix of fuel and air to improve power output, efficiency, and emissions. Our innovative control technologies enable engines, turbines, and compressors to consistently achieve efficiency, emissions, performance, and reliability demands—and have been proven in the field on thousands of applications.