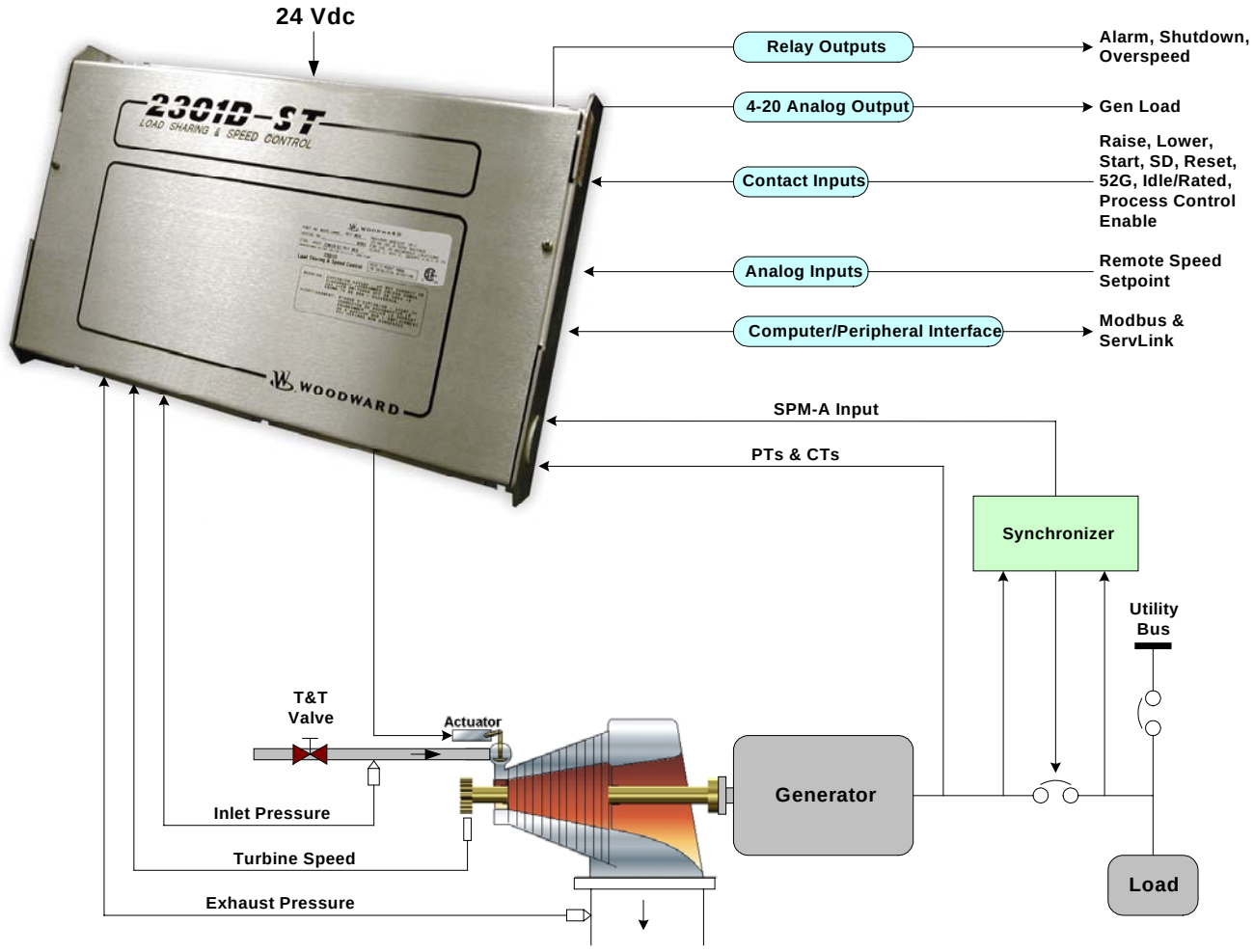
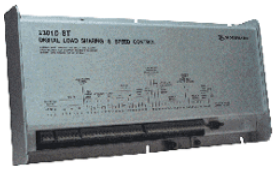
Simple Generator Drive Steam Turbine Applications

Many small to medium sized steam turbine driven generator sets provide process steam pressure control while profitably generating electrical power. The Woodward 2301D-ST is a microprocessor based control with integral application software designed for single-valve steam turbine applications. To facilitate unit retrofits, the 2301D-ST's I/O terminals are located in the same general location as Woodward's 2301A line of controls. This control is designed to perform the core control functions of a small steam turbine package. The application software is field configurable, allowing it to be configured and modified to meet site-specific requirements. With more I/O than a 2301A LSSC, the 2301D-ST control also has serial communications, allowing it to easily interface with the package PLC or plant DCS. The 2301D-ST is configured and serviced (dynamic adjustments made) via a laptop computer connected to the control's RS-232 communications port. These configuration and dynamic settings are set, changed, tuned, and saved via a laptop computer and Woodward's user-friendly Watch Window software program. This Windows® based PC program allows users to set and adjust all application-based parameters, plus upload and download configurations to and from the control.

Benefits

- Field configurable for single-valve steam turbine generator set applications
- Easy to retrofit existing Woodward 2301A or 2301A LSSC controls
- Expanded speed control functions like: multiple starting modes, starting valve ramps, critical speed avoidance, droop-isoch control, KW-actuator droop
- Shutdown and alarm logic
- On-board diagnostics
- Process control and remote speed/load setpoint
- Generator power sensing, load sharing (with soft loading/unloading transfer), and synchronizing inputs
- ServLink (DDE)/Modbus® Communications via RS-232 with the capability to switch between protocols
- Hazardous location version available (shown below)
- Marine listed version available
- Interfaces with many types of actuators



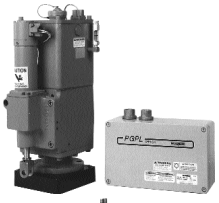


The **2301D-ST** is a microprocessor-based control with integral application software designed for single-valve steam turbines driving either mechanical or generator loads. Like Woodward's 2301A line of controls, this control is housed in a sheet-metal chassis and consists of a single printed circuit board. To facilitate unit retrofits, the 2301D-ST's I/O terminals are located in the same general location as Woodward's 2301A line of controls. This control is designed to perform the core control functions of a small steam turbine package with integral process control. The application software is field configurable, allowing it to be configured and modified to meet site-specific requirements.

(product spec 03297)

The **TG-13E and TG-17E actuators** are drop-in replacements for TG mechanical governors, and are self-contained electro-hydraulic actuators for use on steam turbines where isochronous control, load sharing, or other functions are required. They can be used with all available Woodward electronic governor controls and accessories.

(product spec 04044)



The **PGPL Actuator/Driver** is a drop-in replacement for PG-PL mechanical governors, and is an electro-hydraulic actuator with a proportional driver interface which can be used with electronic controls providing a 0 to 200 mA position signal. The actuator is designed for use with Woodward controls.

(product spec 37520)

The electrically controlled **Hydraulic Amplifier** is a pilot operated, linear servo actuator with up to 3 inches (76 mm) of stroke and up to 4500 lb (20 kN) of force. The amplifier is capable of operating the control mechanisms for steam turbines or large engines which require relatively large forces and work capacity.

(product spec 89007)

The DSLC™ control is a microprocessor-based synchronizer and load control designed for use on three-phase ac generators equipped with Woodward or other compatible speed controls and compatible automatic voltage regulators. The DSLC control is a synchronizer, a load sensor, a load control, a dead bus closing system, and optionally a VAR/PF and process control, all integrated into one powerful, yet convenient package.

(product spec 02006)

The MSLC control is a microprocessor-based load control designed for three-phase electric power generation sites equipped with Woodward DSLC Digital Synchronizer and Load Control units which operate in parallel with the utility. The MSLC is a synchronizer, a utility load sensor, an import/export load level control, a power factor control, and a master process control.

(product spec 02021)

Designed for medium- and large-sized generators, the **EGCP-3** is a complete turbine/generator power management package designed to work with automatic voltage regulators and speed controls, and contains advanced IEEE protection algorithms, revenue-grade metering, individual control of utility and inter-tie breakers, added input/output capabilities and backward compatibility with Woodward DSLC/MSLC synchronizers. A network of up to 16 EGCP-3 controls can handle your most sophisticated base-load, peak shaving or backup power generation applications. Based on Woodward's powerful GAP™ application programming tools, the EGCP-3 can be easily customized.

(EGCP-3 LS Multi-unit Load Share product spec 03300)
(EGCP-3 MC Multi-unit Mains Controller product spec 03301)

WOODWARD

www.woodward.com

PO Box 1519, Fort Collins CO, USA 80522-1519
Ph: +1 (970) 482-5811

1000 East Drake Road, Fort Collins CO 80525
Fax: +1 (970) 498-3058