

# STS100 Steam Turbine Simulator

## for 505, 505E, and 5009 Controls

### Applications

The STS100 Steam Turbine Simulator provides closed loop simulation with Woodward's 505, 505E, and 5009 steam turbine control systems. Actual field data (pressures, flows, power and response rates) are used to provide realistic simulation of the actual plant conditions. The controller's actions can be monitored, tested, and verified before installation on the actual turbine. Operators, technicians, and engineers now have a perfect off-line tool to train, test, and troubleshoot. Both before and after system commissioning, plant personnel will understand the control, the configuration, and possible field scenarios.



- Simulate typical steam turbine applications
- Train plant personnel
- Test 505, 505E, or 5009 controls
- Field configurable
- User friendly operator interface
- Steam map X-Y plot capability
- Configurable trending package

### Description

Woodward 723-type hardware platform, associated peripherals, and an integral software interface package. The Woodward 723 platform is packaged within a portable industrial case and wired to user interface terminal blocks. The included software interface package, once installed on your computer and connected to the simulator, functions as a simulator configuration tool and an operator interface.

The STS100 can simulate the following types of turbines:

- Single Inlet Valve Turbines
- Dual Inlet Valve Turbines
- Single Extraction Turbines
- Single Admission (Induction) Turbines
- Single Extraction/Admission Turbines

The STS100 can simulate the following turbine applications:

- Mechanical Drive (pump, fan, compressor)
- Generator Drive (island and utility paralleled)

The STS100 can simulate the following turbine related parameters:

- Inlet Header Pressure Transducer
- Inlet Header Flow Transducer
- Extr/Adm Header Pressure Transducer
- Extr/Adm Header Flow Transducer
- Exhaust Header Pressure Transducer
- Exhaust Header Flow Transducer
- Generator Power
- Generator Breaker Action
- Plant Tie Breaker Action
- Pump/Compressor load
- Plant Load
- DCS Demand Signal
- V1 Servo Position
- V2 Servo Position

The STS100 can simulate the following types of actuators:

- Single Coil, 4–20 mA
- Dual Coil, 4–20 mA
- Single Coil, 20–160 mA
- Dual Coil, 20–160 mA

### SIMULATOR INPUTS

- V1 (HP) Actuator Coil #1
- V1 (HP) Actuator Coil #2
- V2 (LP) Actuator Coil #1
- V2 (LP) Actuator Coil #2
- Trip Command
- Reset TTV Command
- Generator Breaker Open/Close Commands (Gen Config.)
- Tie Breaker Position (Gen Config.)
- V1 CPC-Skid Transfer Command
- V2 CPC-Skid Transfer Command
- 4–20 mA Meter Readouts (4)
- Indication LEDs (8)

### SIMULATOR OUTPUTS

- MPU #1—Turbine Speed
- Transducer #1—(Configurable)
- Transducer #2—(Configurable)
- Transducer #3—(Configurable)
- Trip & Throttle Valve Status
- Generator Breaker Status (Gen Config.)
- Eight isolated toggle switches

### HARDWARE

The simulator is housed in an industrialized carrying case, with toggle switches, LEDs, and meters mounted on its top panel, and the associated turbine/plant input and outputs located in the case's lower panel. The simulator is interfaced to through-removable terminal blocks. These terminal blocks allow you to create your own control-to-simulator wiring interface, as required.

### OPERATOR INTERFACE

The included software interface package, once installed on your computer and connected to the simulator, functions as a simulator configuration tool and as an operator interface. This tool allows you to configure the STS100 to simulate your plant's turbine and turbine related parameters. After the STS100 is configured, this interface tool allows you to operate the simulated plant. You can open and close turbine Trip & Throttle valves, enable and disable turbine header letdown stations, and change plant flow demands and responses.

### Hardware Specifications

#### Dimensions:

- Case (LxWXH): 74 x 51 x 25 cm (29 x 20 x 10")

#### Environment:

- Operating Temperature: 0 to 55 °C (32 to 131 °F)

#### Inputs:

- Power: 90–132 Vac (100 W max)
- Discrete Inputs: 6 Dedicated Contact Inputs
- Valve/Actuator Coil Inputs: 4 Actuator Inputs (4–20 mA or 20–160 mA)

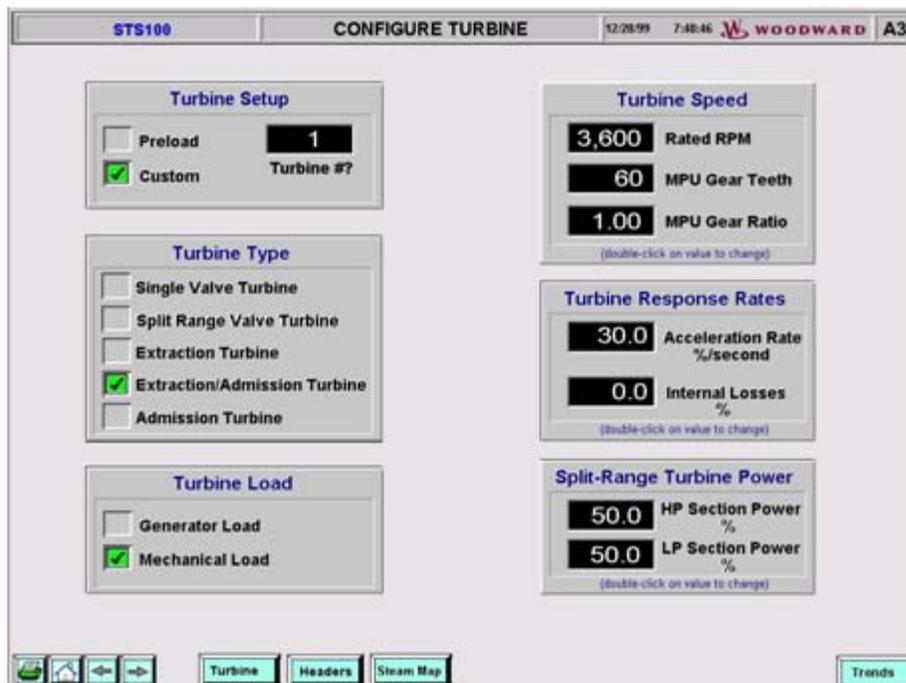
#### Outputs:

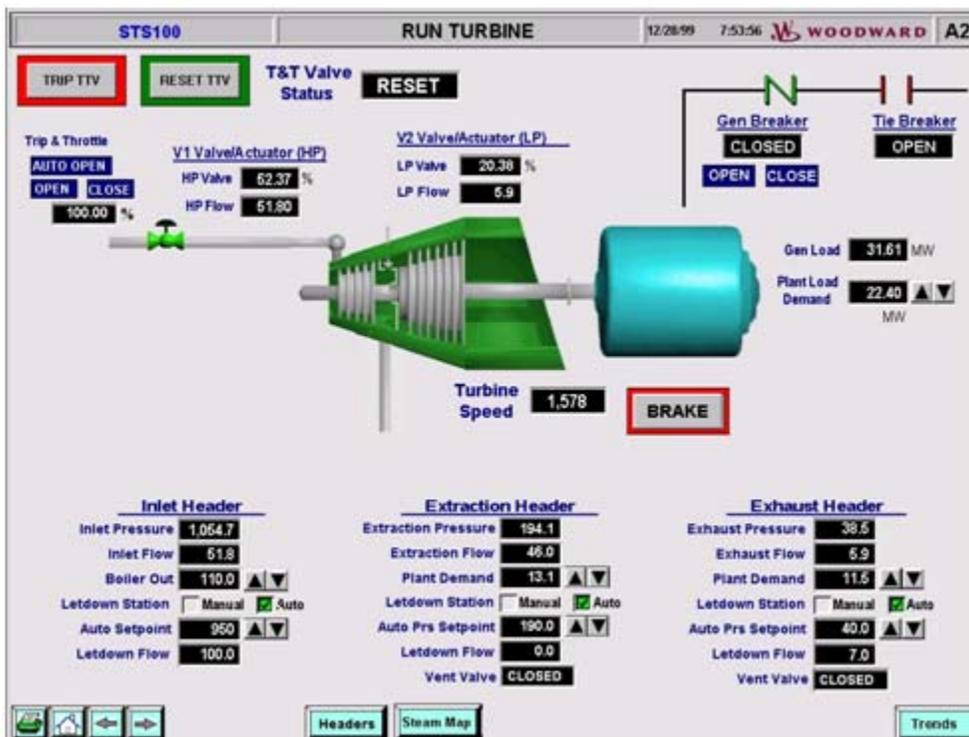
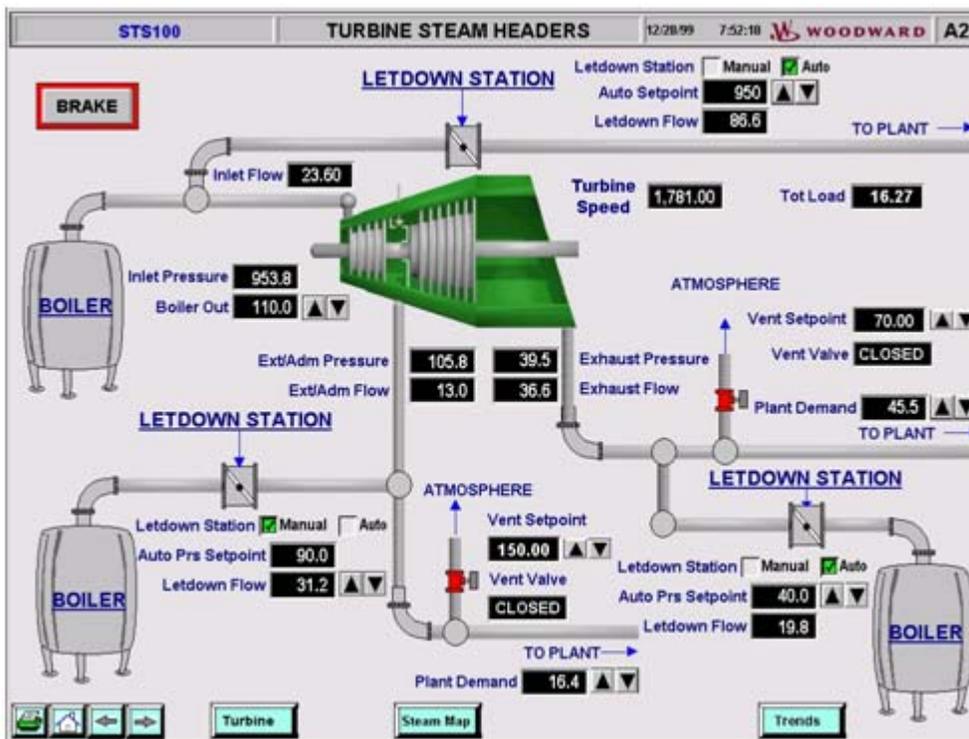
- Speed: 1 MPU (1–2.5 Vrms)
- Transducer Outputs: 3 Programmable Current Outputs (4–20 mA)
- Discrete Outputs: 2 Dedicated Relay Outputs

#### Communications:

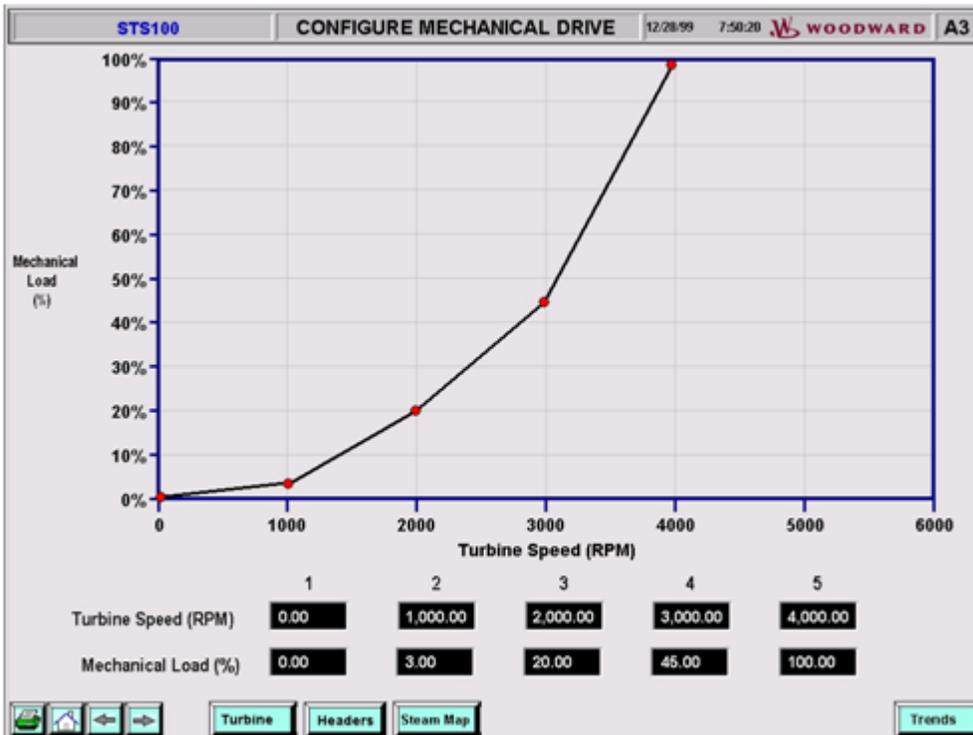
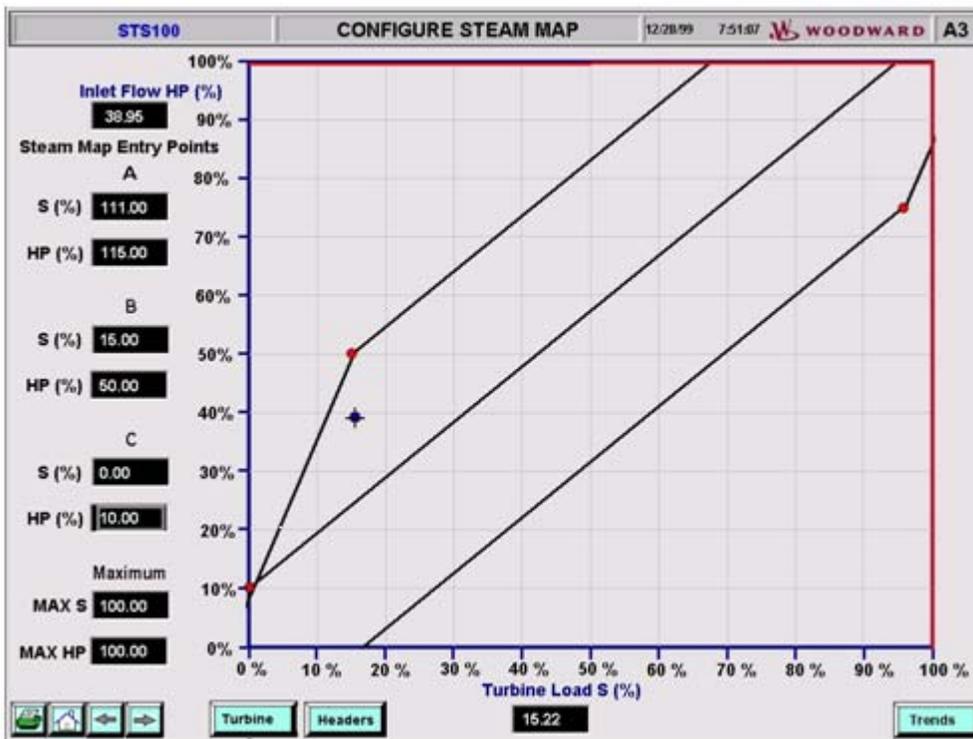
- Serial: 2 Dedicated Com Ports (RS-232 based)

### TYPICAL SIMULATOR INTERFACE SCREENS:





- Technical Manuals
- 26044 (STS100 Software)
  - 26210 (STS100 Steam Turbine Simulator)
  - 26217 (STS100 Package w/ Operator Panel)



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