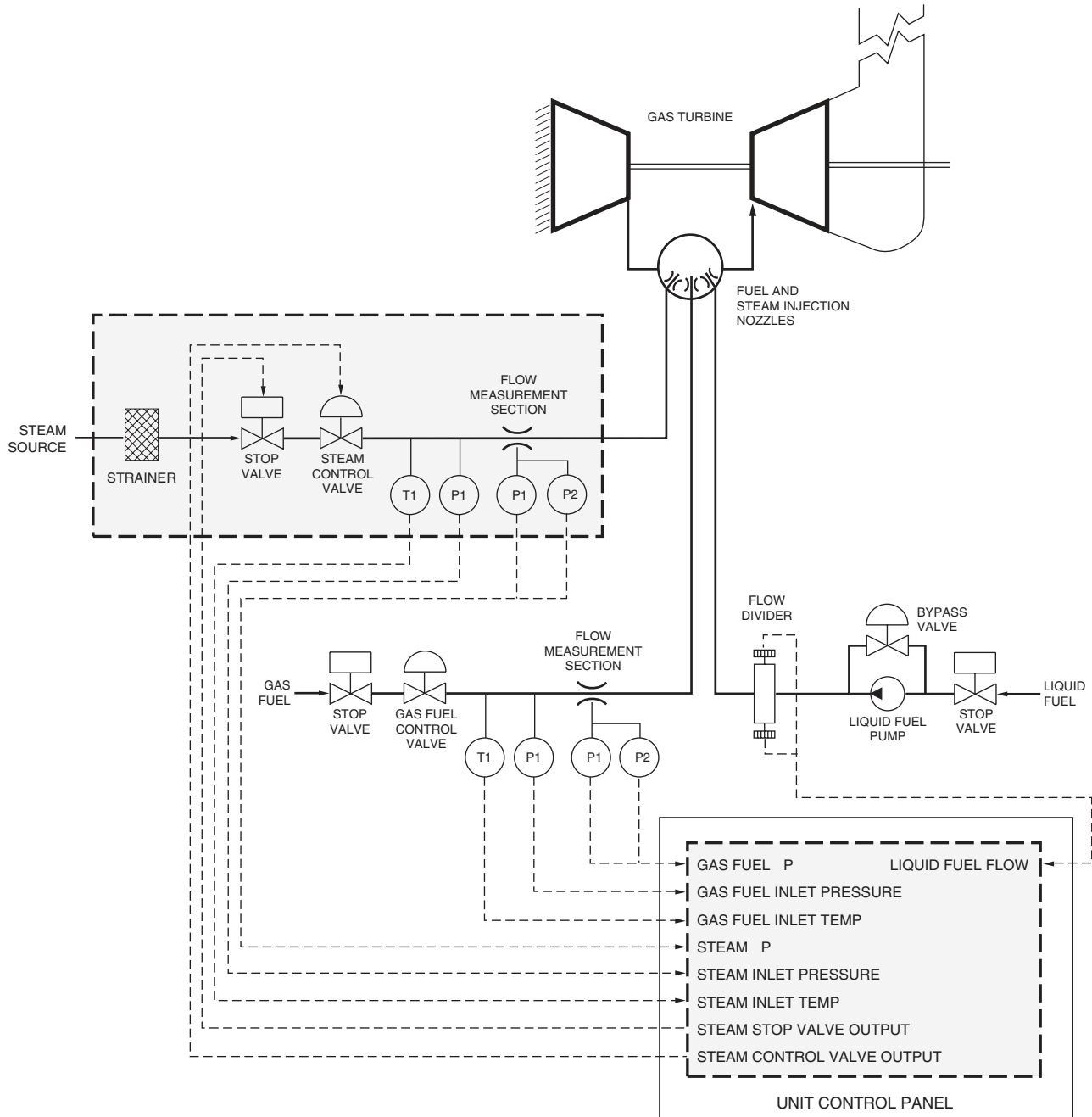


GAS TURBINE STEAM INJECTION SYSTEM FOR NO_x REDUCTION



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Simplified schematic showing principal parts of the Petrotech steam injection system for NO_x reduction.



APPLICATION

Injection of steam into the combustion primary zone of a heavy-duty gas turbine reduces peak combustion temperature which reduces nitrous oxide emissions. NO_x emissions can be reduced to EPA acceptable levels on most gas turbines using a steam injection system.

ADVANTAGES

Functional control improvements:

- Faster, more accurate steam injection control extends hot gas path parts life. NO_x reduction of up to 70% is possible on most units. The cost per kW is very low.

Maintenance:

- "Off-the-shelf" commonly used valves and other components reduce spare parts and maintenance costs.
- Items available off the shelf have original manufacturer's part numbers, rather than Petrotech part numbers.

No hydraulics possibility:

- If Petrotech's electro-mechanical servo actuated (EMSA) gas fuel valve is used, all hydraulic and pneumatic requirements are eliminated. However, the system will function with most hydraulic fuel control valves.

Simple Installation:

- The steam injection system hardware assembly is typically delivered as a packaged, tested skid for mounting on or adjacent to the turbine skid base. The steam flow measurement section is installed in the steam piping, on or off base. The control logic installs either in an existing PLC-based unit control panel such as Petrotech's Series 9500 control panel, or can be a separate control unit.

STEAM INJECTION SYSTEM FOR NO_x REDUCTION SCOPE OF SUPPLY

The Steam Injection for NO_x Reduction System includes the following:

- High-recovery venturi type flow measurement section.
- Hydraulic or electric (specify) actuated steam control valve.
- Hydraulic actuated steam stop valve.
- Two (2) dP flow transmitters, Rosemount.
- One (1) temperature transmitter, Rosemount.
- One (1) pressure transmitter, Rosemount.
- Miscellaneous hand valves, strainers, filters, and gages.
- As required fuel flow measurement components for gas and/or liquid fuel system.
- Steam Injection for NO_x Reduction Application Control Package software for specified microprocessor hardware. This software integrates seamlessly into Petrotech Series 9500 gas turbine unit control panels, and is usually adaptable to other PLC-based control systems.
- PLC, if required.
- Project-specific engineering, installation assistance, start-up and commissioning, documentation, and training.

Certain items typically furnished by the customer, but can be furnished by Petrotech:

- Gas and liquid manifolds, fuel nozzles, pigtails, check valves, miscellaneous installation piping and labor.

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