



Control Valve Upgrades

Control valve upgrades for BBC IT-Series steam turbines

GE offers upgraded valves that help improve reliability and efficiency.

Reliability Improvement

Live steam control valves are key components for the operation of steam turbines; they must operate safely and reliably.

GE regularly reviews the layout of its power equipment in the light of extensive field experience. Improvements are developed into upgrade products that fulfill the requirements of a changing and ever more challenging business area. The core control valve elements of the former BBC IT-series turbines have been modified in order to improve reliability and performance.

Background

The BBC IT-series steam turbines were developed in the 1970's and over 100 units were delivered to customers around the world.

Fleet experience and inspections since then have revealed potential problems with the control valves (Fig 1); for example, failures in the connection of the valve spindle to the head, wear of nitrided spindles and piston rings, and steam leakage through the graphite packing system.

Based upon this experience, an upgrade package has been developed for all IT-series steam turbines.

Solution

The new modular valves (sizes DN050 to DN140) (Fig. 2) are developed for improved reliability.

For the larger valves (DN063 and above), the upgraded solution includes a pilot valve. The valve head is guided by shrunk-on bushes with welded stellite or sprayed chrome carbide coatings for increased lifetime.

Further improvements include a relief opening for steam leakage and a head guide with an integral strainer/muffler. The strainer reduces throttling loss and permits a more uniform flow with consequently reduced noise levels and less likelihood of vibration excitation of the valve.

A valve solution including a strainer has also been developed for valve sizes DN050 and DN056, which are however too small for conversion to a piloted valve. The new valve spindle and head are made as a single piece.

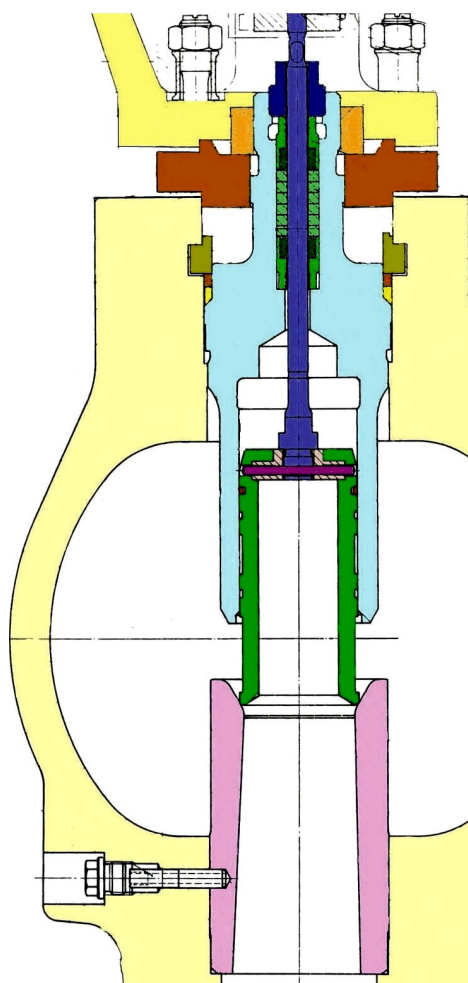


Fig. 1: IT-Series original control valve

Since only the internal parts are modified, upgrade packages for valves of all sizes may be installed without change to the valve chest or actuator. Typically, this can be done within the timeframe of a routine valve inspection. The interfacing surfaces can be cleaned and adapted on site. In some cases, a modification of the cam contour may be necessary, particularly for condensing turbines.

Benefits

- **Outage time reduction**

The new coatings help reduce wear during operation and thus repair work during outages, which reduces maintenance cost.

- **Availability improvement**

The improved wear resistant cladding reduces friction forces and therefore the probability of sticking spindles. The upgrade effectively provides a new valve of a more robust architecture, which is less prone to vibration, leading to life-time extension and reduced down-time.

- **Life-time extension**

Applicability

The control valve upgrade package may be applied to all BBC IT-Series steam turbines.

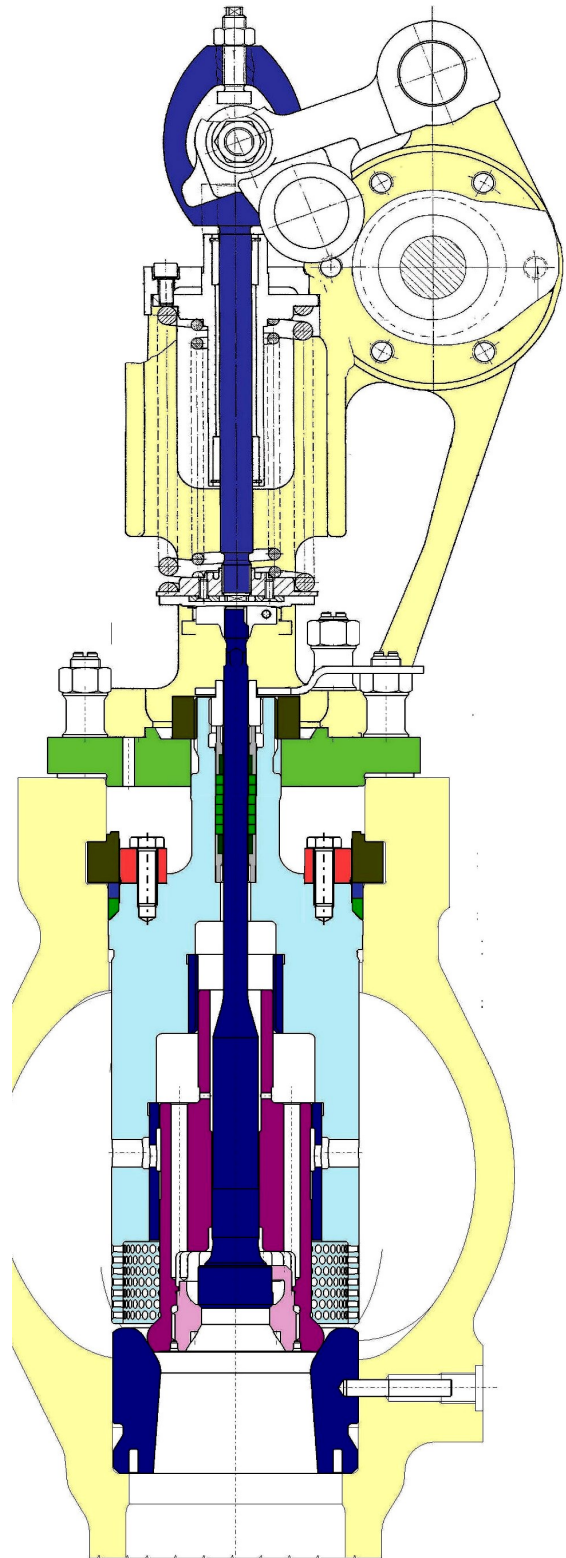


Fig. 2: IT-Series upgraded control valve