SIEMENS energy

Electronic control

Mechanical retrofit of turbine control
PIB 60-2018-IST

Background

An important step towards the modernization of turbine control and monitoring is the changeover to electronic control. This information sheet gives a survey of the indispensable mechanical retrofit of existing control components. This retrofit is independent from the employed electronic controller.

Siemens Energy employs the TURLOOP as electronic controller for turbogenerator sets and the SCAUT for compressor trains. Corresponding information sheets are available upon request.

Existing mechanical-hydraulic or all-mechanical turbine control systems comprise a high number of components subject to a certain wear and tear (see fig. 1). The availability of spare parts for old machines is not always guaranteed. Moreover, an increasing loss of know-how with subcontractors makes a customer-oriented service difficult.

Eventually, an integration of a mechanical-hydraulic or all-mechanical turbine control into a distributed control system is not possible.

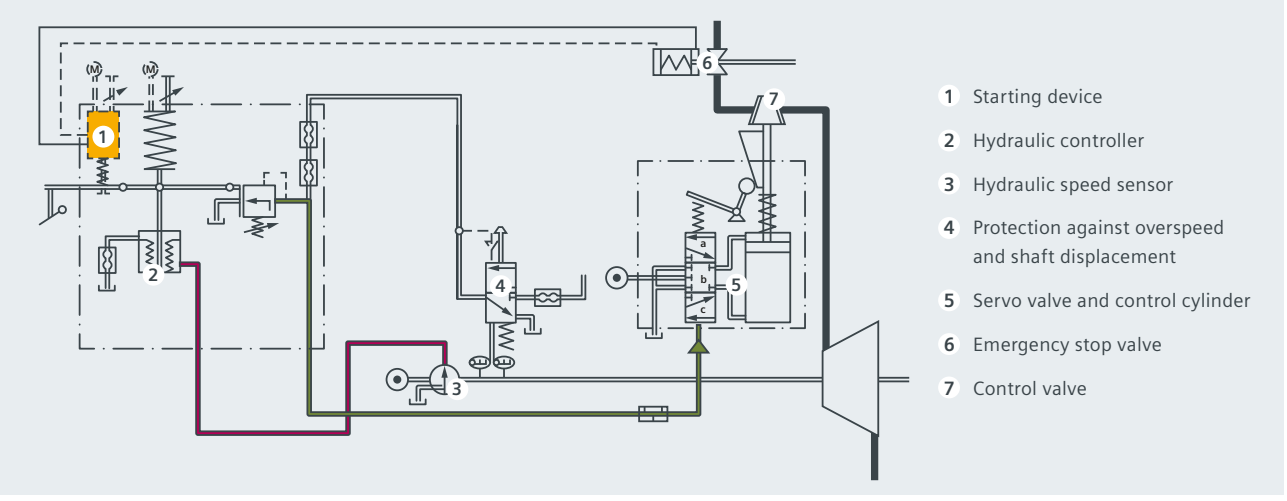


Fig. 1: Simple mechanical-hydraulic control loop before retrofitting

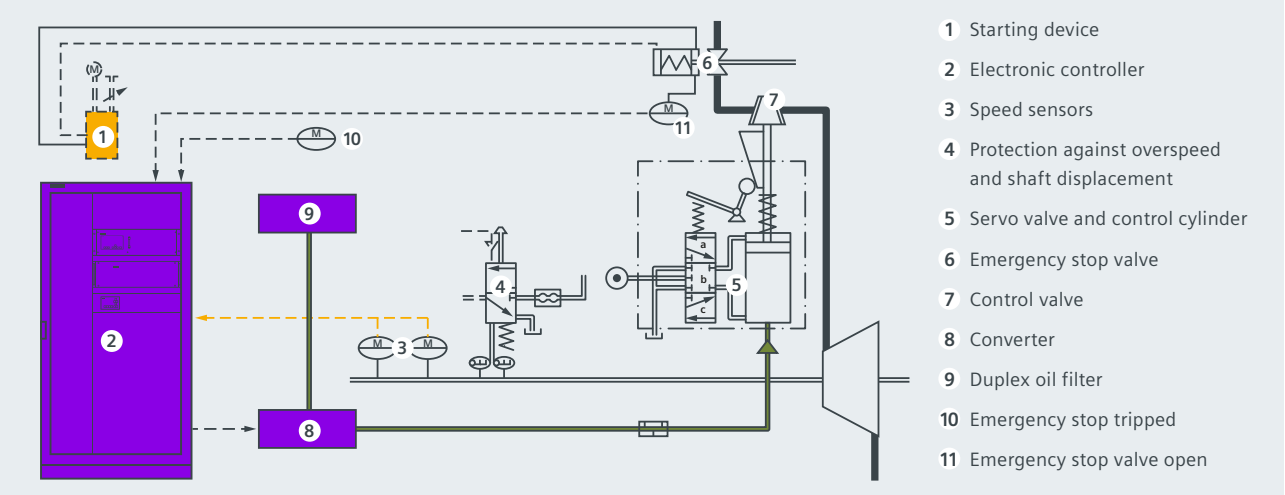


Fig. 2: Simple mechanical-hydraulic control loop after retrofitting

Enhancement potential

A changeover to electronic control does not only include a replacement of existing controllers but also the exchange of different mechanical as well as me-chanical-hydraulic components.

Figure 2 gives a survey of necessary new parts and components. Here, speed measurement by pulse wheel and non-contact speed sensors plays an important role.

Although the installation of a speed measurement device appears to be simple many specifications and fitting conditions have to be considered. Compliance with current API or VGB guidelines or the installation of an additional electronic overspeed protection may be difficult with old machines, as their housings often lack the space for new components. Apart from speed measurement a number of con-verters according to control tasks have to be refit-ted to change an electric into a hydraulic signal for the opening or closing of the control valves. The converter(s) must be protected against contamina-tion by a fine oil filter. According to circumstances the extant starting device may be retained. Existing mechanical protective components against over-speed and shaft displacement may as well be used further.

Siemens Energy offers various solutions for different tasks ranging from a simple, economic retrofit up to an API compliant solution. Of course, all solutions ensure a safe turbine operation.

Benefits

A modern, automated control system does not only advantage new plants but also existing older ones:

- Semi-automated turbine operation
- Gentle operational mode through specified start-up curves. Critical speed ranges and faulty operations are thus excluded
- Temperature-dependent start-circles for cold and warm start (additional instruments re-quired), providing a life-span extension of the turbine
- Saving of spare parts susceptible to wear
- Control performance improvement
- Integration into a distributed control system (DCS)
- Optional integration of additional electronic protective devices

Published by

Siemens Energy Global GmbH & Co. KG
Industrial Applications
Freyeslebenstraße 1
91058 Erlangen, Germany

Siemens Energy Inc.
Industrial Applications
15375 Memorial Drive, Suite 700
Houston TX 77079, USA

For more information, please contact
our Siemens Energy Customer Support Center
Phone: +49 (0)911 6505 6505
Or +49 180 5 24 7000
(charges depending on provider)
E-Mail: support@siemens-energy.com
Web: siemens-energy.com/csc

Siemens Energy is a trademark licensed by Siemens AG.