Medium Voltage Drive Technology for Water and Waste Water Applications

Energy Savings and Process Optimization
Energy Savings and Process Optimization with Variable Speed Drives

The use of variable speed drives (VSDs) for flow and pressure control of electric motors results in significant energy and cost savings. In addition, VSDs provide soft starting features, which improve system reliability.

Flow and Pressure Control
Water consumption varies greatly during a day. Consequently, pumps often run at partial load. By controlling the flow and pressure of pumps with VSDs the pumps will operate at maximum efficiency under a variety of flow conditions, considering the actual need.

A pump, controlled by a VSD, running at half speed consumes only about one-eighth of the energy compared to one running at full speed.

Soft Starting
VSDs also act as soft starters reducing the stress on network, motors and pumps. During the starting process, the VSD progressively increases the motor speed and smoothly accelerates the load to its rated speed.

Soft starters eliminate high starting currents and voltage dips which can cause process trips. With soft starters, maintenance costs will be reduced and the lifetime of the equipment extended.

Benefits of variable speed drives at various operating points of the pump

### Fields of Application
- **Clean Water Applications**: Pumps for Water Extraction, Transmission, Treatment and Distribution (incl. Electrical Submersible Pumps)
- **Water Sewage Applications**: Pumping Stations and Treatment Plants
- **Desalination Plants**: Raw Water, Process and High Pressure Pumps
- **Industrial Applications**: Pumps for Cooling Water Supply and Condensation
- **Others**: Irrigation and Water Lifting / Storage and District Heating Pumps
ABB – the World’s Leading Supplier of Variable Speed Drives for the Water & Waste Water Industry

To date ABB has installed medium voltage drives with a total rated power in excess of 1'500 MW for applications in the water and waste water industry.

ABB offers the entire range of variable speed drives and soft starters for medium voltage applications in the power range from 315 kW to more than 100 MW.

The medium voltage ACS products are the perfect solution for the water and waste water industry. They incorporate state-of-the-art technologies developed by ABB.

- DTC (Direct Torque Control) for the highest torque and speed performance as well as lowest losses ever achieved in MV drives
- IGCT (Integrated Gate Commutated Thyristor) semiconductor power switching devices for a more efficient, reliable and compact MV drive

ABB’s LCI converter is an optimal solution for high voltage and high power applications.

- Fuseless converter design with thyristor power semiconductors for highest efficiency and highest reliability
- Air- or water-cooled converter design in 6, 12 or 24-pulse configuration for optimal plant integration

ABB has the ability to offer the entire drive system, consisting of transformer, VSD, motor and auxiliaries.
Benefits of ABB Medium Voltage Drives

Energy Savings
VSDs allow the pumps to operate at maximum efficiency under a variety of flow conditions, considering the actual need. This results in significant energy savings, compared to other control methods.

Increased Lifetime of Equipment
VSDs act as soft starters, causing no starting current peaks. This means reduced stress on electrical and mechanical equipment, increasing its lifetime and reducing maintenance costs.

Reduced Operating Costs
Considering the above-mentioned savings in energy and maintenance, operating costs of VSDs are considerably smaller compared to other control methods, such as throttling. Pay-back on investment periods of less than 2 years are not uncommon.

Process Optimization
In Water & Waste Water applications, water flow requirements change according to the varying demands for water at different times of the day. These changing water flow requirements can be met by controlling the flow and pressure of the pumps.

Power requirements for different pump control methods

ABB Medium Voltage Drives
• 315 kW to more than 100 MW
• For flow and pressure control of pump applications
• For soft starting and speed control of electric motors

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