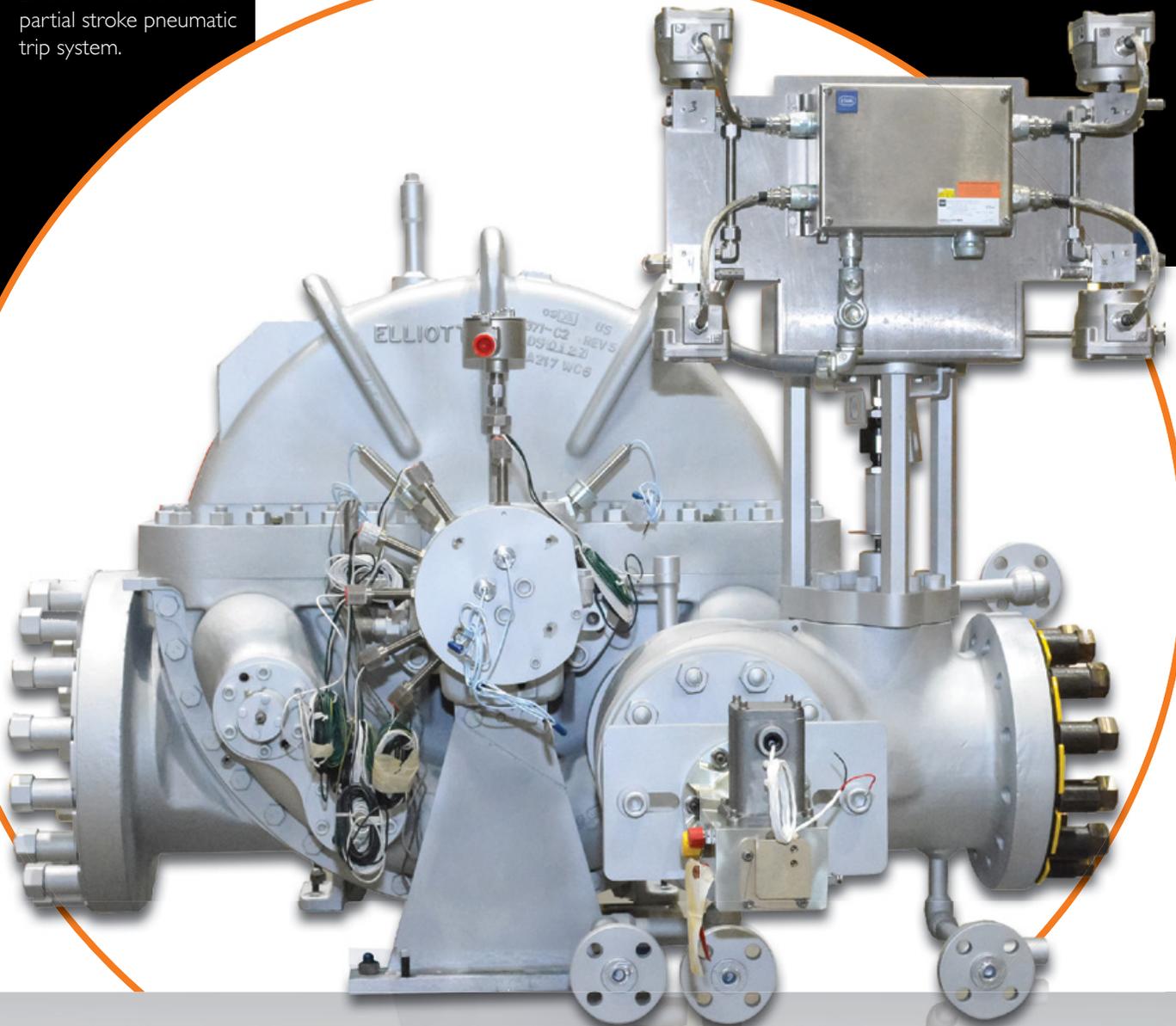


Elliott YR turbine with
partial stroke pneumatic
trip system.



CHANGING THE WAY
TURBINE TRIP SYSTEMS ARE TESTED

CHANGING THE WAY TURBINE TRIP SYSTEMS ARE TESTED

ELLIOTT INTRODUCES PNEUMATIC TRIP SYSTEM WITH PARTIAL STROKE ACTUATION

BY BRENT HAIGHT

Overspeed trip systems provide a vital safety function for steam turbines. Proper maintenance and testing are necessary to ensure safe and reliable equipment operation. However, many mechanical trip systems are not tested as frequently as recommended, if at all. The testing process can be inconvenient and requires the turbine to be tripped, taking it offline.

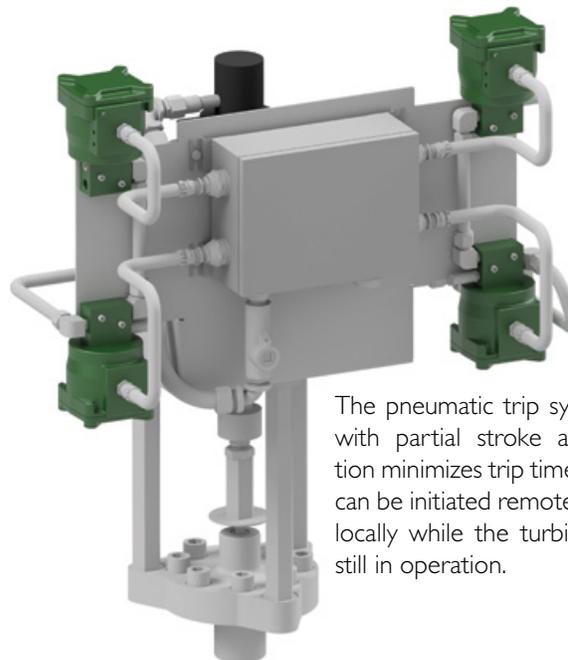
Elliott has introduced a pneumatic trip system with partial stroke capability that is changing the way turbine trip systems are tested. Available for new equipment or retrofit, this new partial stroke trip system provides a way to exercise the trip valve regularly, without interfering with the turbine's operation or its ability to trip. Within seconds, the system completes a partial stroke of the trip valve, enabling operators to determine if the system is working properly or requires attention.

"It only takes 3 to 5 seconds to exercise the trip system," said Bill Pacelli, Industrial Products Engineering Manager at Elliott Group. A wholly owned subsidiary of Ebara Corp., Elliott designs, manufactures, and services steam turbines, steam turbine generators, centrifugal compressors, power recover expanders, and axial compressors. "An operator can go out once per shift and exercise the trip system. They don't have to shut down the turbine. In 99% of the cases, the driven machinery will not even notice the change in speed."

According to Pacelli, before the introduction of Elliott's partial stroke pneumatic trip system, online testing required an oil-operated trip and throttle valve – a more expensive and complicated system.

"We set out to come up with a better solution, using the pneumatic trip as a base and adding the partial stroking, which is the holy grail of trip system testing, because you can exercise the trip valve whenever you want without needing to shut down the turbine. Elliott recommends shutting the turbine down once per week to exercise the trip valve. We recognize this isn't practical to do on a regular schedule. Our partial stroke pneumatic trip system provides a quick and easy alternative."

Regular testing of a trip system is essential to verify that the trip valve is in proper working order. Infrequent testing can result in the accumulation of scale, boiler carryover, or rust, which can hinder the valve's ability to close when needed. A trip valve malfunction may prevent the safe shutdown of the steam turbine in the event of a trip condition.



The pneumatic trip system with partial stroke actuation minimizes trip time and can be initiated remotely or locally while the turbine is still in operation.

The pneumatic trip system with partial stroke actuation allows turbine operators to test the trip system while the turbine is in operation. Turbine operators can initiate the partial stroke locally or remotely via a distributed control system (DCS). The system is supplied with standard hardware that is suitable for either application, providing flexibility to adapt the partial stroke system to any equipment configuration.

"This is a bolt-on product," said Pacelli. "It's a nice little package. The pneumatic trip system is engineered to minimize trip time and has been extensively tested to ensure that we can make that quarter-second in all cases."

The system can use nitrogen or any inert gas, "but typically we want air in the range of 80 to 100 pounds of air pressure," said Pacelli. "We have options available for ambient conditions ranging from -50 to 100+ °F (-46 to 38+°C)."

Elliott's partial stroke pneumatic trip system features a pneumatic cylinder with fail-safe spring closure and is compliant with myriad global environmental and regulatory requirements, making it suitable for applications worldwide. 