

# Refurbishing 62 Critical Petrochemical Process Actuators in 26-Day Turnaround

## Challenge

A large petrochemical production plant in the Middle East asked Flowserve to upgrade, configure and calibrate 62 electric actuators used on butterfly valves in critical systems during a planned 26-day plant shutdown. The upgrade involved replacing the entire electronic control system. Although the actuator/valve packages had operated reliably for 15 to 20 years, the condition of the internal components could not be determined until they were removed from service.



## Solution

Flowserve successfully completed the planned control system upgrades — and last-minute mechanical repairs — during the plant's scheduled shutdown. We started planning 18 months in advance and arranged for a team of specialists from one of our regional Quick Response Centers (QRCs) to work on-site at the customer's facility as well as at a third-party workshop nearby. We also conducted two tests of repair procedures prior to shutdown to confirm the work would be performed on time and meet all customer requirements.

### Updating actuators in continuous service for 20 years

Our customer operates one of the largest petrochemical plants in the Middle East, producing ethylene glycol (GE) and polyethylene (PE) in partnership with other companies. Plant operators scheduled a 26-day shutdown starting in January 2023 for maintenance, repairs and upgrades.

The scope of the project for Flowserve included upgrading 62 Limitorque® L120 multi-turn electric actuators which have been in continuous service in the plant for at least 15 years. They were being used on third-party butterfly valves to control flow to compressors and dry-gas units in a furnace process. The valves range in size from 8 to 72 in.

After completing the upgrades, Flowserve would need to install, configure and calibrate the actuators for service.

### Modernizing reliable actuator capabilities

Our customer sought additional diagnostic capabilities for the existing L120 actuators and to directly connect them to the petrochemical plant's distributed control system (DCS). To accomplish these aims, the plan was for the standard UEC-3 control system to be replaced with a UEX control system. Some units would also require special configuration with spare limit switches.

The UEC-3 modules provide only open, close and stop control. But UEX modules provide come-on actuation as well as gear-switch limits. This functionality enables better control of the sequencing of valves in furnace processes.

They also enable connectivity through five network protocols for reliable process control. Additional features include an LCD display for actuator setup, status indication in 11 languages, and position feedback via a battery-free, absolute encoder.

The LCD screen provides actuator status and diagnostics, displaying continuous position indication and fault conditions.



## Turnaround planning 18 months in advance

Teams from Flowserve and our customer began planning 18 months in advance, with site visits and a comprehensive site survey.

Essential to production, the valve/actuator packages have operated so reliably that the plant operator decided to keep them instead of purchasing and commissioning new equipment. That meant the shutdown would begin without knowing the condition of the components inside the actuators.

To prove the performance of the upgraded units and evaluate the feasibility of completing the upgrades in the necessary time frame, Flowserve removed one valve/actuator package from service 12 months before the scheduled shutdown. The test revealed that more components than anticipated would need to be replaced within the 6 to 7 hours allotted for each unit.

A second test was conducted six months later. At that time, Flowserve arranged to have all spare parts that could be needed on-site. Flowserve QRC technicians demonstrated that all necessary work could be completed within the shutdown timeline and the upgraded unit would perform as needed.

## An expanded scope

Days before the scheduled shutdown, our customer expanded the project scope to include work on the actuator mechanicals. This involved overhauling the gearboxes and replacing the de-clutch assemblies. But the additional work had to be completed in the same time frame as the initial scope.

Using proven project management skills and tools, Flowserve accomplished the initial and expanded scopes of work in the necessary time frame.

About 35% of the 62 actuator packages were rebuilt on-site. Most of them were transported to the nearby workshop for mechanical repairs, electronics upgrades and testing by the workshop employees under the Flowserve team's supervision.

## Refurbished, tested, back in operation

Our customer completed its plant turnaround with Flowserve as its expert partner. We upgraded, overhauled, calibrated, function-tested and then commissioned 62 actuators successfully within the scheduled shutdown timeline. Part of the scope included testing actuator operation and valve timing.

## The right partner for successful turnarounds

Successful turnarounds begin long before the execution stage with smart planning. Companies around the world rely on Flowserve's proven fluid motion and control expertise, superior technologies and experienced field support to solve complex turnaround and scheduled outage challenges.

Leverage our global engineering and aftermarket support resources to ensure that your turnarounds are completed safely, within budget and on schedule.



*Limitorque L120 actuator*