

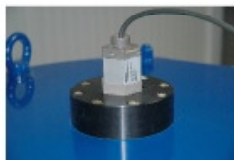
Performance



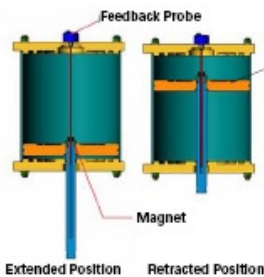
MATTERS™

CCI improves BWR Class 4 plant performance by actuator modernization for Main Feedwater Regulation Valve

CCI's advanced QuickTrak® digital actuator is active in multiple applications in the nuclear industry, most recently at Entergy's Pilgrim Nuclear Station in Plymouth, Massachusetts, U.S.A. CCI was contacted to solve a problem related to oscillations to feedwater level (and flow), most noticeable during reduced power operation, which would require manual control of the feedwater regulator valves to restore stability. The direct cause was determined to be the inability of the conventional control schematic to control valve position to acceptable levels.



Position feedback probe



Remote mounting capability

Direct drive pneumatic positioning module

Requires no mechanical linkage for position feedback



Push-button or hand-held communications

Remote mounting capability

Automatic system calibration and tuning

Advanced control module

Product: CCI QuickTrak® Digital Controller Actuator

Application: Feed Water Level Control/Regulating Valves Upgrade – Boiling Water Reactor (BWR)

Characteristics: The QuickTrak® pneumatic actuator has high flow main control element that accommodates full air flow for rapid and precise valve positioning without using quick exhausts or volume boosters.

See reverse side for results

Customer Problems: Feed water level (and flow) oscillations during reduced power operation required Operator intervention, which often required manual control of one (or both) feed regulator valves to restore stability.

CCI QuickTrak® Solutions and Benefits: The installation of the QuickTrak® system eliminated delays and improved the overall accuracy, in addition to a dramatic reduction in down time associated with tuning and calibration. The remote mounted design now allows for a high degree of system protection with no associated performance loss.

Performance Comparison:

	Original design	New Design (QuickTrak®)
Accuracy Overall	8.37%	0.625%
Dead Time	>23 sec	0.08 sec
Phase Shift (in degrees)	> 40° lagging	Insignificant

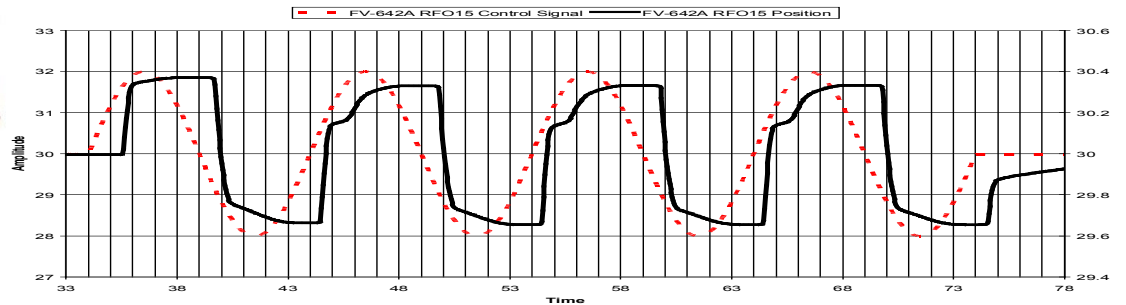
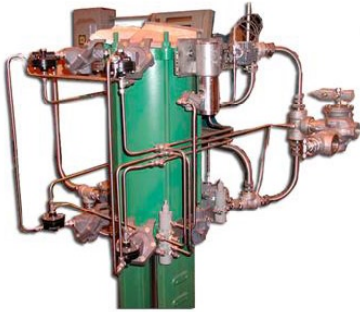


Figure 1: Frequency response test – before upgrade

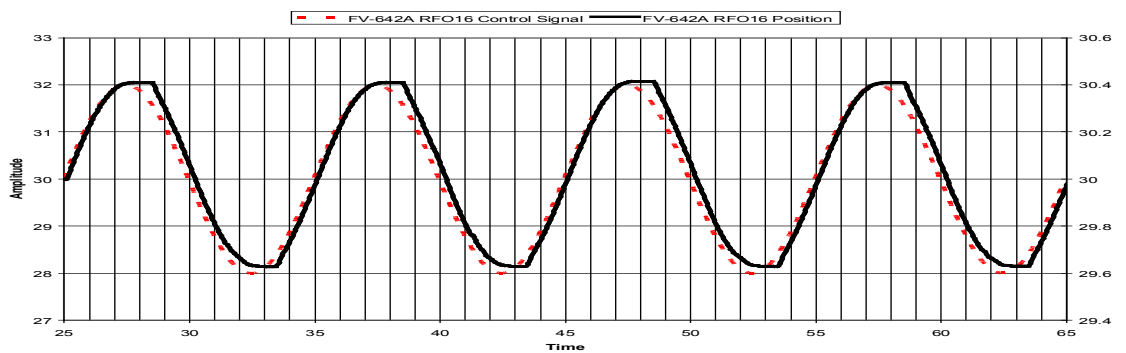


Figure 2: Frequency response test – after QuickTrak® upgrade

CCI QuickTrak® Cost Comparison:

	Original Hardware	New Hardware (QuickTrak®)	Savings
Outage Calibration	120 hours	32 hours (both Valve)	88 hours
Outage Instrument PMs	32 – 40 hours	2 hours	30-38 hours
Mechanical Actuator PM's	80 -120 hours / 4 years	Potential Increase to 6 years	2 years
Mechanical Valve PM's	80 hours / 6 years	No change	No change
On line Troubleshooting, Maintenance Temporary monitoring, or tuning (per cycle)	120 -160 hours maintenance 80-160 hours engineering	Not Required	200-320 hours
Total Savings			More than 500 hours

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