

Technical Demonstration Report

Customer:	Tourmaline	Location (LSD)	04-17-052-15W5
Product:	KVA38-19-D2 KVA38-13-D2	Evaluation Date(s)	May 17, 2024 – August 17, 2024
Kinetics Contact:	Ryan Gibson info@kineticsautomation.com		
Customer Contact:	James Phillips		

Introduction:

Wellsite 04-17-052-15W5 is a remote operating natural gas wellsite near Edson Alberta. The testing was conducted as part of Tourmaline’s involvement in the NGIF Emissions Testing Center (ETC) Program and was funded in part by Prairies Economic Development Canada. Kinetics KVA38 actuators were installed onto a three-phase separator package to operate two dump valves and one backpressure control valve. The KVA38 is a spring-loaded electric valve actuator designed for the energy sector.

Project Objective:

Replace prototype valve actuators, installed in 2022, with commercial samples and assess whether the commercial units can meet operational requirements. The dump valve actuators must maintain valve interface, and avoid unintended fluids flowing through the valve. The backpressure control valve actuator must maintain the desired backpressure in the system as commanded by the provided position signal.



Figure 1 - Prototype and Commercial Actuators Compared

Summary:

Kinetics electric valve actuators were deployed onto a natural gas well near Edson, Alberta. After the actuators indicated a setup issue with the power system, the issue was corrected and the actuators were run through a 3-month evaluation period. The actuators automated the separator package effectively and continue to do so, with no unintentional shutdowns or incidents caused by Kinetics equipment. Over 10,000 actuations and 160 days of operation has been recorded so far on the Kinetics equipment, and approximately 6,500m³ of natural gas produced.

Background:

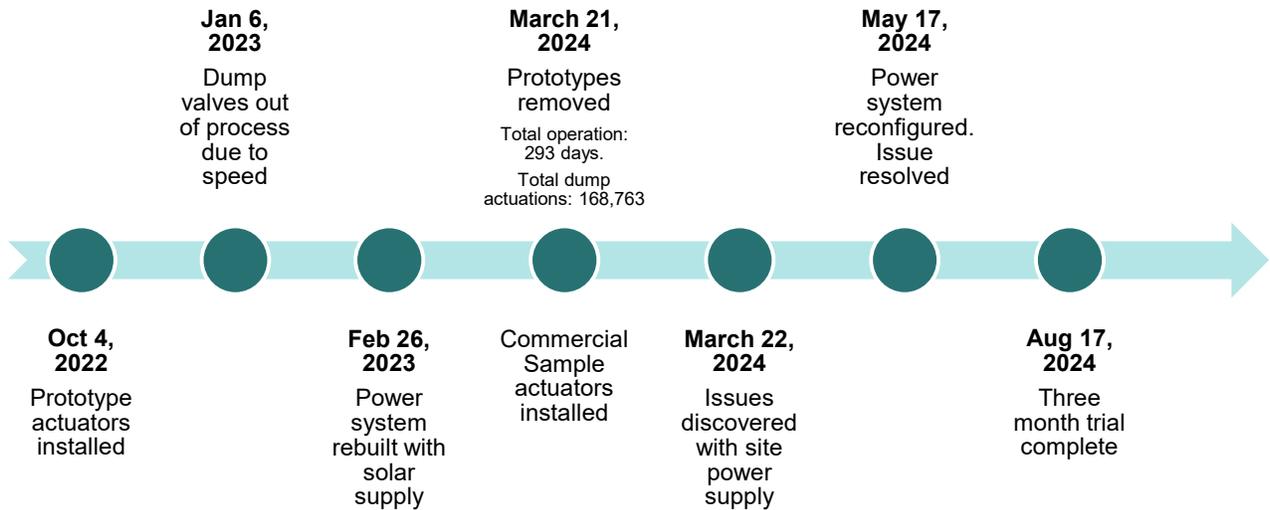


Figure 2 - Timeline summary of Kinitics equipment demonstrations on Wellsite 04-17-052-15W5

Prototype Demonstration



Figure 3 - Prototype actuators

Kinitics deployed prototype actuators onto the wellsite with the intention of validating the core technology and discovering operational requirements. Two actuators were installed to operate the water and condensate dump valves, while a third would operate the backpressure control valve. It was quickly discovered that the smaller actuators did not actuate quickly enough for dump valve operation. The backpressure control valve actuator remained in operation for the duration of the test period.

In February 2023, an initiative was undertaken to refit the wellsite with solar power rather than the ICE generator previously in use. While it wasn't immediately apparent, electrical setup issues were present which degraded device performance including eliminating device feedback and slowing actuation speed.

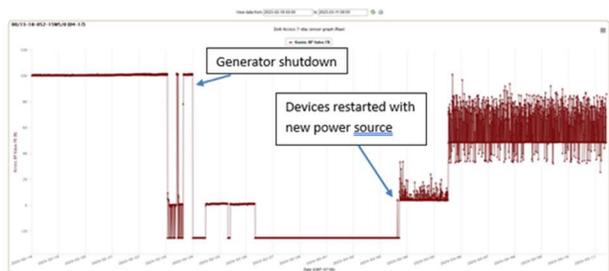


Figure 4 - Feedback signal showing electrical issues.

Commercial Design

After the completion of the prototype trial period, the KVA38 underwent a planned design upgrade and refinement to address feedback from site operators and prepare for commercial release. A datasheet excerpt is included in Appendix A. Key product improvements included:

1. Increased closing speed by 5x
2. Reduced power consumption by 20%
3. Addition of an indicator light for local feedback
4. Simplified mounting system for faster installation
5. Designed for mass production



Figure 5 - KVA38 commercial version installed

May 2024 Power System Refit

Commercial-ready upgraded actuators were deployed to the wellsite in March 2024. The enhanced sensors and communication tools inside the actuators immediately identified an issue with the power system setup. Significant voltage drop on the 24 VDC power system was measured far in excess of typical resistive losses in cabling, charge controllers etc. which persisted once the ICE generator was placed back into service. While the backpressure control actuator was able to operate on low voltage and remained in process, the dump actuators were forced offline until the power system setup issue could be rectified. Corrective actions included:

1. Simplifying the cable run
2. Replacing old cabling
3. Reinstalling all terminal connections between the battery bank and actuators

On May 17, 2024 the dump actuators were reactivated and reported normal function. SCADA reports show consistent actuation for the evaluation period of 3 months.

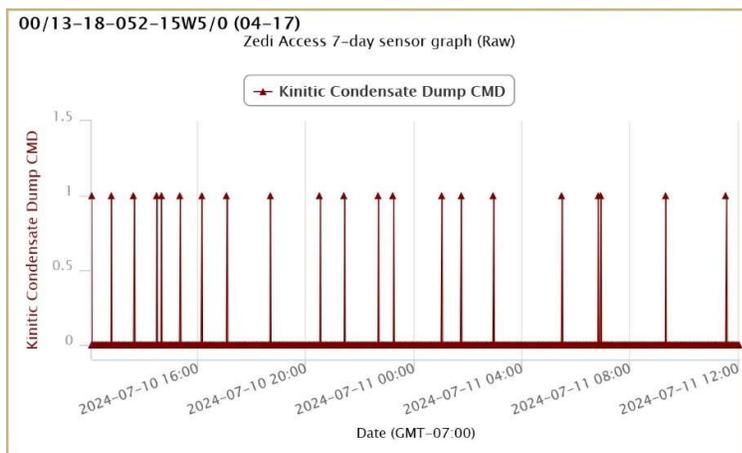


Figure 6 - Sample capture of Kinitics dump valve operation

Test Plan

Test Start Date

March 21, 2024 (BPCV)

May 17, 2024 (dump valves)

Test End Date

August 17, 2024

Experiment Length

3 Months

Installed equipment:

Actuators:	Serial Number	Valve:	Purpose:	Monitored Parameters:
KVA38-19-D2	K016733	NPS2 D body	Backpressure control valve	Command signal, feedback signal, status, faults, runtime
KVA38-13-D2	K016735	D2	Water dump valve	Command signal, feedback signal
KVA38-13-D2	K016732	D2	Condensate dump valve	Command signal, feedback signal

Power Supply:

Equipment:	Size:	Description:
Solar Panels	900W	3x 300W solar panels, vertically oriented
Solar controller/Battery Charger	960W	Phoenix Contact Quint-PS/1AC/24DC/40
Battery Bank	480Ah	8x 12VDC, 120Ah. 4 banks of 2
Generator	-	Primegen M5

Sample Data Captures of Actuator Behaviour During Evaluation Period

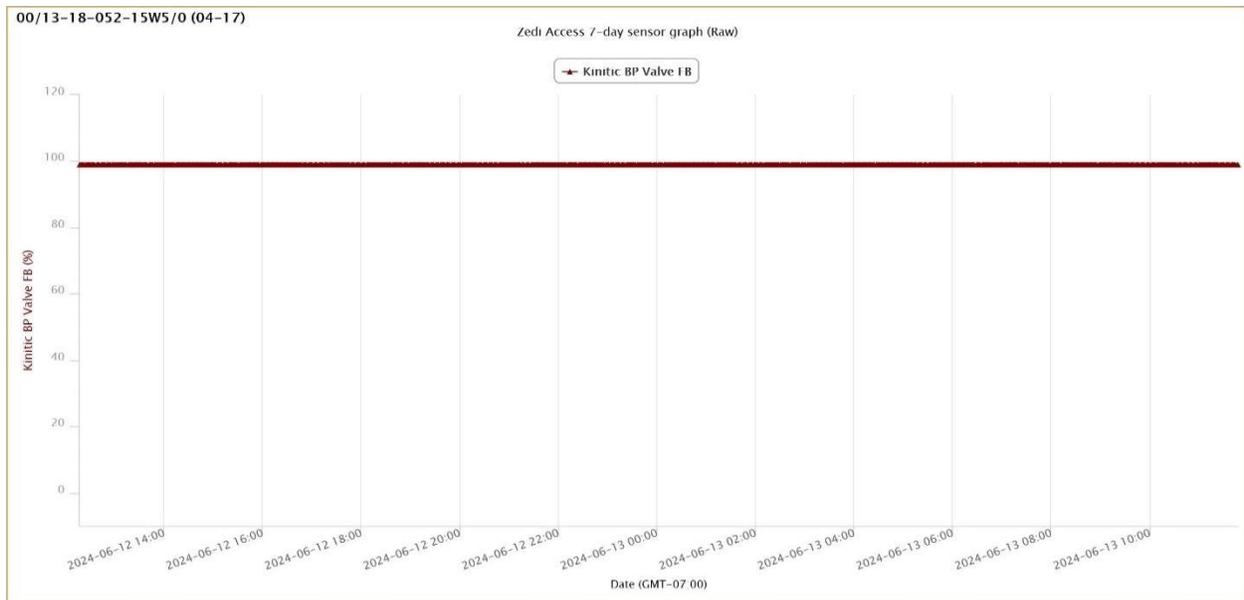


Figure 7 - Backpressure control valve maintaining 100% position as per command signal

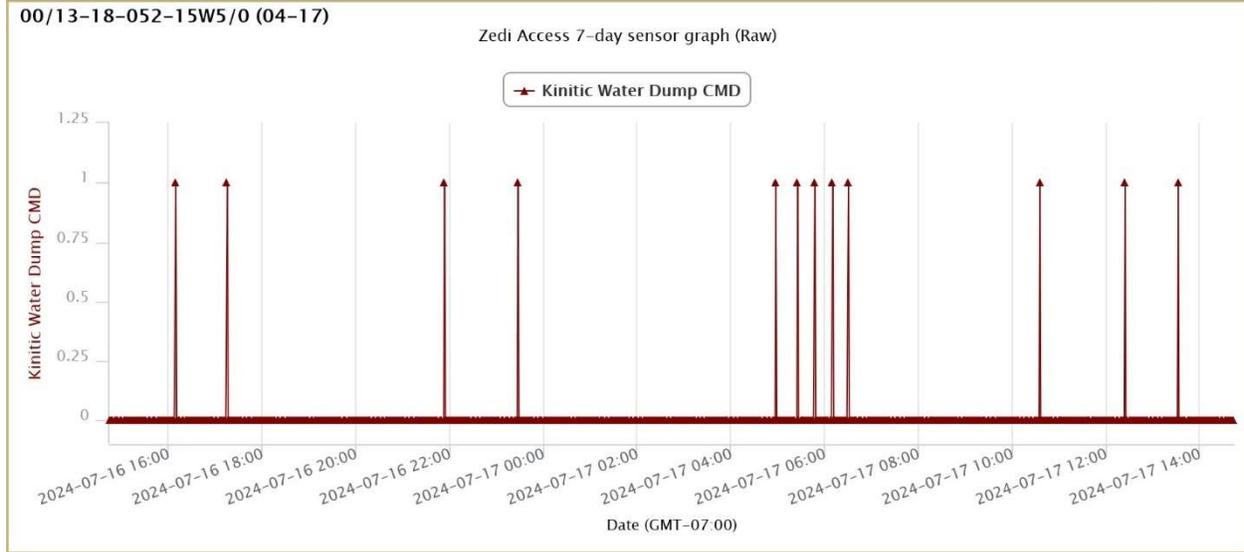


Figure 8 - Water dump valve command signal

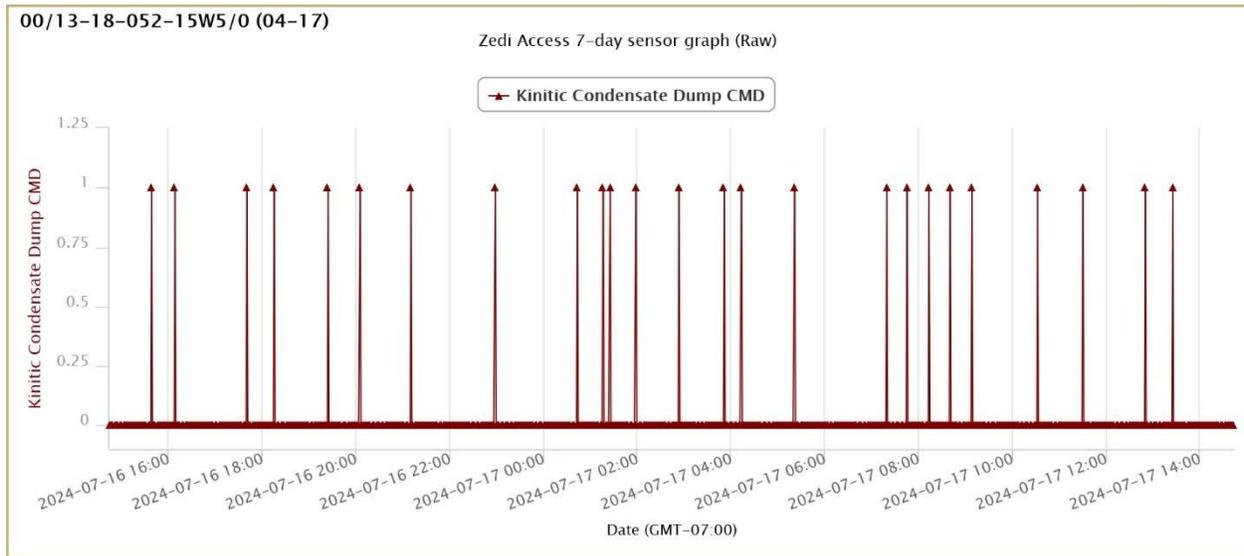


Figure 9 - Condensate dump valve command signal

Operational Summary

All values are taken up to date of report compilation (September 20, 2024)

Dump Valve Summary

Water dump cycles	4,406
Condensate dump cycles	5,787
Total dump cycles	10,193
Total water volume processed	161.08m ³
Total condensate volume processed	58.18m ³

Backpressure Control Valve Summary

Backpressure control valve operational time	161 days
Total gas produced	Approx 6500m ³

Operations Summary

Reported incidents:	0
Reported unintentional shutdowns:	0

Conclusion

After installation the sample valve actuators detected and reported an issue with the power supply. Once the site power supply issues were rectified, the Kinitics valve actuators operated effectively over a 3 month evaluation period and have continued to automate the separator package beyond the completion date. Over 10,000 dump cycles have been performed, and over 160 days of backpressure operation has been recorded. The dump valve actuators lift and close at an adequate rate for the demands of the separator. The backpressure control actuator is highly responsive and accurate to the control system commands.

Appendix A: KVA38 Datasheet



**KINITICS VALVE
ACTUATOR
KVA38**

The KVA38 Valve Actuator

Powering Reliability with Kinitics Automation

The KVA38 is a versatile general-purpose globe valve actuator designed to meet the needs of the energy and process control industries. The KVA38 is ideal for use in throttling and snap-acting control applications and serves as the perfect replacement for pneumatic actuators.

- Low maintenance design
- Spring-biased electric actuator
- Certified to operate in hazardous locations



Product ratings:
USA: Class I, Zone 1, AEx ia IIC, T4, Gb
CA: Class I, Zone 1, EEx ia IIC, T4, Gb



PRODUCT DATA SHEET

Appendix B: Prototype vs Commercial Product

Commercial Product



Learnings from field trials have been applied to the commercial product

Product Enhancements

- Increased stroke and speed ratings to service **more applications**
- Replaced billet components with metal castings to **reduce CoGS**
- Improved installation process
- Focus on **power optimization**
- Designed for mass production

