

HC-DRIVE EMV obsolescence solution



Customized solutions for obsolete EMV controllers of Meggitt, Moog and Kollmorgen/MTS/Parker

Many gas turbine operators around the world find themselves in a position that critical Electric Metering Valve (EMV) controllers are unserviceable; either due to the absence of electronic replacement parts or decisions made by the manufacturer to no longer support these products.

At Holland-Controls we have teamed up with the original developer of the famous Kollmorgen controller. Together we developed **HC-DRIVE** - a superior solution ticking all the boxes for hardware and software compatibility, and for support.

Besides just offering a piece of hardware, Holland-Controls offers a comprehensive retrofit of your site-specific setup covering engineering, documentation, parts supply, installation, commissioning and system handover. Resulting in a robust solution which is operable and serviceable for the coming years ahead.



Features

HC-DRIVE is the universal valve motor driver for gas turbine control systems. It is fully configurable using our HC-CONFIG software tool.

This tool makes diagnostics a simple task and allows you to fine-tune HC-DRIVE's behavior.

Compatibility

HC-DRIVE is the only product covering all the protocols for the following (obsolete) EMV drivers. These drivers are used with FT and HC series gas turbine control systems covering the Avon (SGT-A20), RB211 (SGT-A35) and Trent (SGT-A65) using Whittaker fuel metering valves (1.5" and 2" models) and the HP6 valve.

HC-DRIVE can also be used to replace (obsolete) EMV drivers for the GE Speedtronic control systems for LM and Frame gas turbines. HC-DRIVE is cross-compatible, i.e. in one installation you can mix HC-DRIVE with other EMV drivers.

Driver	4-20 mA Analog	4 Byte Serial	10 Byte Serial	DeviceNet Serial
Kollmorgen (MTS, Parker) FLX Drive	✓	✓		
Moog DS2000XP	✓			✓
Meggitt (Siemens) SAVC	✓			✓
Meggitt (GE) C173455	✓		✓	
Meggitt (GE) C450305	✓	✓	✓	
HC-DRIVE	✓	✓	✓	✓
Control system	FT55, FT110 HC-CORE3	FT100, FT110 HC-CORE1,2	Speedtronic	FT125 HC-CORE3
Control cable length*	<300m	<100m	<100m	<250m

*Referring to the cable length between the control system and HC-DRIVE. With technical measures it may be possible to stretch longer distances. Holland-Controls can develop & test this for you.

Valve cable length

Not all EMV controllers can be used at an arbitrary distance to the valve. HC-DRIVE has been tested with motor & resolver cable lengths up to 100 m without issues. In-house we can test longer lengths for you.

Hazardous area

HC-DRIVE may be installed in a control panel in the safe area, or in an Ex-e junction box near the turbine as long as the area is rated zone 2 or no zone. The following certifications apply:

- ATEX certified for direct use in zone 2 hazardous areas
- UL/CAN/CSA compliant for use in Class I, division 2 hazardous areas

For applications in zone 1 we can supply HC-DRIVE in an Ex-d junction box. The assembly (HC-DRIVE + JB + cable glands) will then be certified as one package. For DLE applications we can have up to 4 controllers (3x fuel valves, 1x HP6 valve) in one junction box, or any other combination as the situation requires.

The operating temperature range of HC-DRIVE is between -20 to +70 °C. Due to the self-heating of the drive this suffices even if the temperature should occasionally fall below -20 °C.

Plug and play

HC-DRIVE has a smaller footprint than the FLX-Drive, DS2000XP and SAVC it is replacing. This ensures it always fits in the existing cabinet – be it in the control room or in the field.

It is also offered in various pre-assembled versions, so that the hardware is a true plug & play replacement!

> See attachment showing an HC-DRIVE replacing a Moog DS2000 XP controller.

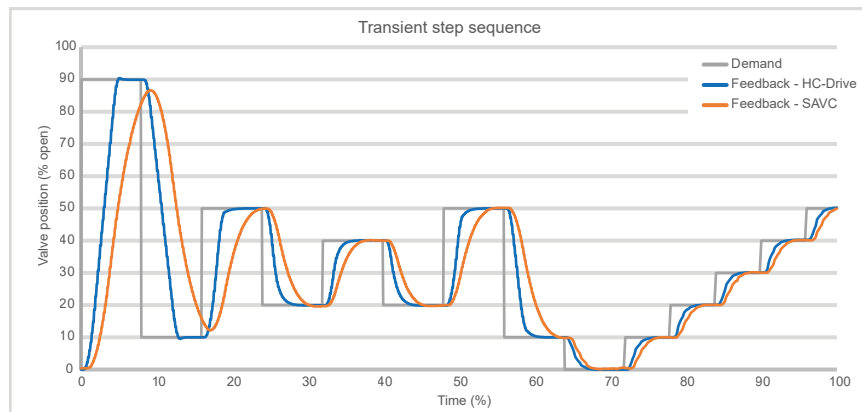
HC-DRIVE is configured by Holland-Controls for your application. This ensures that it understands the protocol of the controller it is replacing. Unlike other solutions, there is no modification required in the current turbine control system application software. The HC-DRIVE is truly plug & play!

Performance advantage – HC-DRIVE vs SAVC

The following three figures visually depict the difference in performance between HC-DRIVE and the SAVC. They have been selected to provide a concise summary of difference in performance, across a range of typical operating conditions.

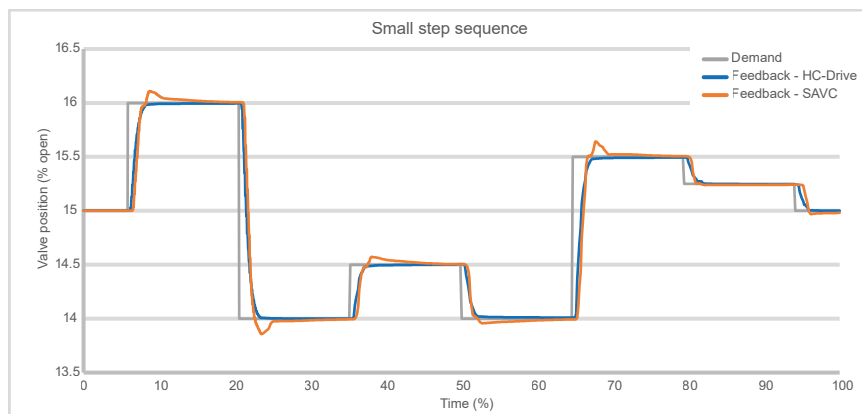
These tests were conducted in the Holland-Controls testing laboratory.

The test setup consisted of a C327835 1.5" gas fuel metering valve (this valve is commonly used on Rolls-Royce RB211 DLE and Rolls-Royce Avon engines, among others), additionally HC-DRIVE or the SAVC (whichever is under test) and a Rockwell ControlLogix CPU with a DeviceNet card to simulate the FT125 ECS (Engine Control System).



Transient step test sequence

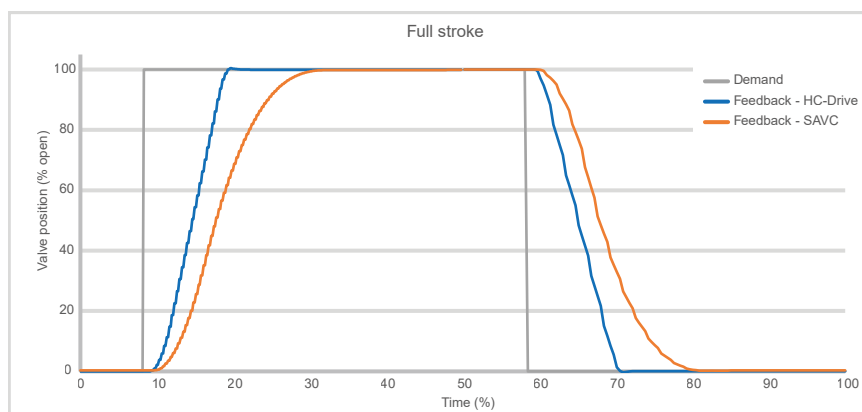
Step sizes of 40% and lower are typical of load shed/accept scenarios. It is clear in all cases that HC-DRIVE is able to move the valve to the demanded position between 20% and 100% faster than the SAVC.



Small step test sequence

Small steps (<2%) are typical for normal operation of the gas turbine - it is approximately "steady state" performance whereby small loads are accepted and shed.

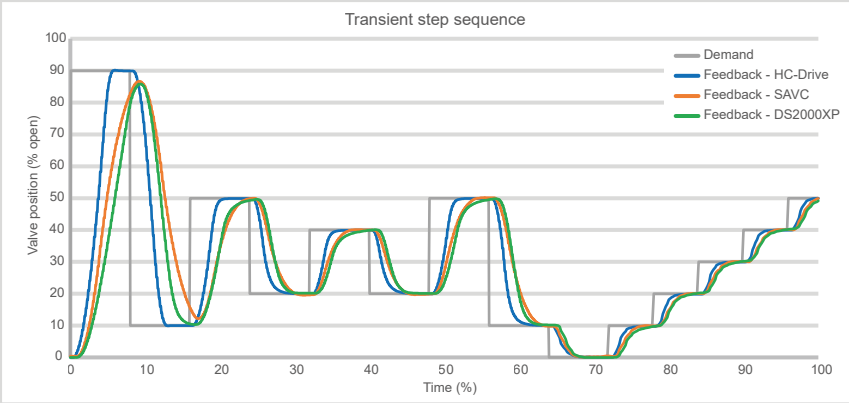
While the SAVC has a good response, the small overshoots when changing direction are detrimental to the performance of the system and place unnecessary wear on the valve actuator's ball screw. HC-DRIVE on the other hand arrives almost immediately at the demanded position with no overshoot.



0-100-0 step test sequence

HC-DRIVE is able to drive the fuel metering valve significantly faster than the SAVC. While this is not a condition that the valves will ever be exposed to during normal operation of the turbine (these steps would immediately cause a flameout), it is impressive to see that HC-DRIVE is able to do a full stroke step in almost half the amount of time compared to the SAVC.

Performance advantage - HC-DRIVE vs SAVC and DS2000XP



The results of a site test with a C521405 1.5" gas fuel metering valve on a RB211-24G DLE are presented. The DS2000XP feedback was recorded prior to it being retrofitted with HC-DRIVE. The superior performance of HC-DRIVE is clear.

Note that the SAVC feedback curve in this figure is from the C327835 valve test in the HC lab – so while not a direct comparison due to using a different valve in a different environment, it is clear that the SAVC performs quite similarly to the obsolete DS2000XP.

Conclusion

The table below serves to summarize the key differences between HC-DRIVE and the SAVC as alternative retrofit solutions for the obsolete Moog DS2000XP or Kollmorgen (MTS, Parker) FLX Drive.

Compatible valves			Valve drivers
C236385	C421895	C520245	C173455
C236765	C422165	C521375	C173735
C327835	C422635	C521385	C173815
C327895	C422845	and other	C174465
C329635	C422855	BLDC motors	
C329925	C424055		

HC-DRIVE	SAVC
No control system software changes required	Significant control system software changes required
No wiring changes required to retrofit DS2000XP	Significant wiring changes to retrofit DS2000XP
Faster valve response - can result in improved transient (load shed/load accept) response	Similar valve response to the obsolete metering valve driver that it is replacing
Designed to support piece-wise replacement, meaning they can be installed as the existing metering valve drivers fail*	OEM strongly recommends replacing all obsolete metering valve drivers associated with the unit at once
Supports RS-485 control therefore is also a plug and play replacement for the Kollmorgen (MTS, Parker) FLX Drives	Doesn't support RS-485, so cannot replace Kollmorgen (MTS, Parker) FLX Drives used in FT100/FT110 systems without major re-engineering
Optimized control leads to reduced wear on the actuator ball screw resulting in extended valve life	Frequent direction changes during steady state operation wears out the actuator ball screw
*Excluding drivers mounted in Ex-d junction boxes, due to voiding the assembly certification	



HC-DRIVE
Holland-Controls



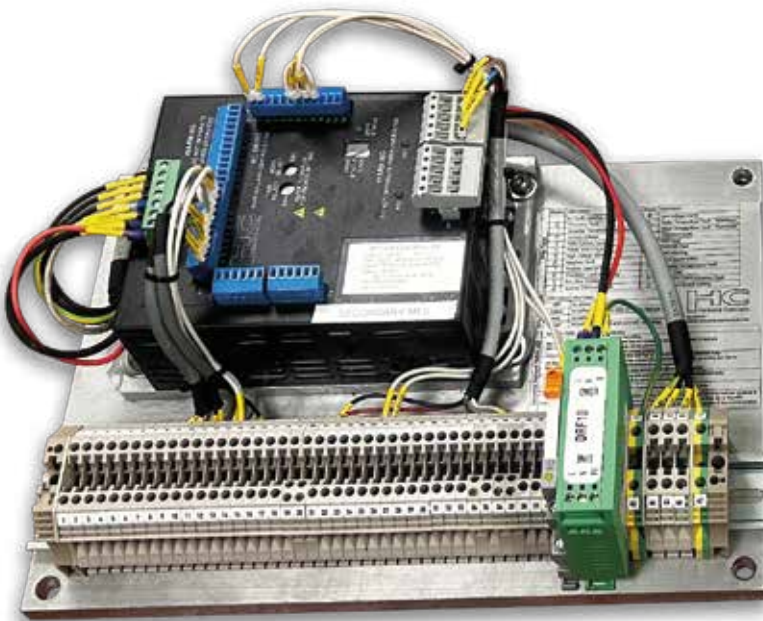
SAVC
Meggitt for
Siemens Energy



DS2000XP
Moog



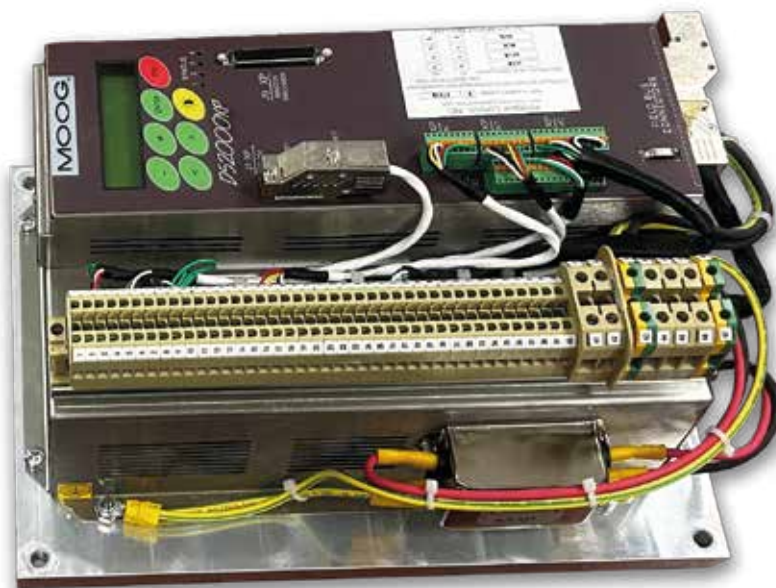
Attachment – HC-DRIVE replacing a Moog DS2000 XP controller



HC-DRIVE

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DS2000 XP

One of the obsolete drivers the HC-DRIVE can replace is the DS2000XP by Moog.