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CASE STUDY NOTES

DC Test Rig Backplate and Motor

Drives and Automation have long been involved with manufacturers producing a range of test rigs for different applications.

In this project, a Sicme Orange1 RA Series DC motor and our back plate housing a Mentor MP DC Drive were to be integrated into a test stand to enable calibration of larger single cylinder fuel injection pumps, as typically found in marine and rail applications.

Whilst no test rig is typical, our long experience working with DC Drives and motors make us the ideal partner for test rigs of this type, enabling us to tailor the system to the customers requirements.

Mentor MP drives bring several practical advantages to a test-rig setup, particularly where precision and repeatability matter. Their digital DC control architecture allows fine adjustment of speed and torque, helping engineers reproduce consistent load conditions. This level of control makes it easier to gather reliable performance data without the drift or instability that can occur with less responsive systems.

Integration is straightforward, which is valuable in environments where rigs often combine multiple sensors, controllers, and data-logging equipment.

The drives support common communication protocols and can be configured quickly through software or onboard interfaces. That flexibility means less time spent on wiring and calibration, and more time focused on actual testing.

In operation, Mentor MP drives handle dynamic changes smoothly. Fast response to command inputs allows accurate simulation of start-stop cycles, variable loads, or transient events. This helps engineers observe how components behave under realistic conditions, improving the quality of the test results.

Built-in protection features guard against overcurrent, overheating, and electrical faults, reducing the risk of damage to both drive and test equipment. For rigs that run continuously/under demanding conditions, these safeguards help maintain uptime and protect investment in hardware.

The drives are well supported with documentation and diagnostic tools, making maintenance and troubleshooting straightforward. Engineers can monitor performance parameters, and identify issues quickly, keeping the rig adaptable for future testing needs without extensive redesign.

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Stable DC Torque Characteristics
The Sicme Orange1 RA Series is known for delivering smooth, predictable torque across the full speed range. This makes the motors well suited to test-rig environments where controlled loading, steady-state operation, and repeatable performance are essential for gathering reliable data.

Heavy-Duty Mechanical Design
RA-Series motors are built around robust frames, solid bearings, and durable construction. This allows them to tolerate frequent cycling, rapid load transitions, and long operating periods — all common demands in development and endurance test rigs. Their mechanical resilience helps maintain uptime and reduces the likelihood of test interruptions.

Reliable Thermal Performance
The cooling arrangements used across the RA Series support extended operation at varying speeds and loads. In a test-rig setting, where motors may run outside typical duty cycles, this stable thermal behaviour helps maintain consistent performance and reduces the need for cooldown intervals.

Strong Compatibility With Modern DC Drives
The electrical characteristics of the RA Series — including armature design, inductance, and field configuration — pair effectively with contemporary DC drives. This enables precise control of speed and torque, making it easier to run scripted test profiles, simulate transient events, or hold the motor at fixed operating points during measurement.

Straightforward Maintenance and Support RA-Series motors are designed with accessible brush gear, clear nameplate data, and well-documented maintenance procedures. This makes them practical for engineering teams who need to inspect, service, or adapt the rig over time. Easy serviceability helps keep the test environment flexible and reduces downtime.

The Sicme Orange1 RA Series and Mentor MP drives work well together in a test-rig environment because they offer stable torque control, predictable behaviour, and the robustness needed for repeated cycling. This combination allows engineers to run controlled load profiles and gather consistent data without the drift or variability that can complicate development work.

The RA Series provides the mechanical strength and thermal stability needed for long-duration or high-demand testing, while the Mentor MP delivers precise regulation and fast response. Together, they support everything from steady-state evaluation to transient-event simulation, giving a rig the flexibility to handle a wide range of testing scenarios.

Drives and Automation are an ideal partner for projects like this because they understand how to integrate motors, drives, and control systems into a coherent, reliable test platform. Their experience ensures the rig performs as intended, remains easy to maintain, and can evolve as testing requirements change.

Drives and Automation (DnA), based in Chesterfield, provide a comprehensive system design, control system manufacture and project management service for new and retrofit control systems. Working alongside machine builders or end users, we provide systems encompassing AC and DC drives, PLC systems and turnkey project solutions.

Technical Details

- **Modern Control Techniques Mentor MP Drive**
- **Sicme Orange1 Square Frame DC Motor**

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