HIL and RCP Simulation Systems for Electric Motors
Test bench

| OP1600 | OP1620 |

"Take your wind energy system control design further into real-world implementation, and speed up the testing and tuning of your actual controller with OPAL-RT's RCP and HIL courseware".

Sergio Atayde M.Eng
Field Application Engineer
Control, Power electronics and WECS specialist

ELECTRIC MOTOR LABORATORY CURRICULUM GOALS

The OPAL-RT system, combined with Festo hardware, enables educators to fully teach the V-cycle principles used in the industry. Students and researchers can build a model and then validate the same model against a real system.

This laboratory combines the best of both OPAL-RT and Festo solutions to deliver academic researchers and teachers the ideal Hardware-in-the-Loop (HIL) and Rapid Control Prototyping (RCP) simulation system to conduct experiments and teach in the fields of electrical machinery, power converters and wind energy generation.

TEST BENCH OFFER

OPAL-RT OP8660

HIL Controller Interface

• 16 High Current- max 15A

• 16 High Voltage Probes- max 600V

OPAL-RT OP4510

• 4-core CPU, Xeon E3 3.5 GHz

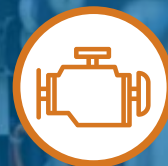• Kintex-7 XILInX FPGA, 325T

• 32 Di, 32Do, 16 Ai, 16Ao

(8331, 8311, 8374, 8857)

(8540)   (8505)

FESTO OP1620

• Four Quadrant Dynamometer 2KW- (8540)

• Induction Motor DFIG- PMSM (8505)

• IGBT Chopper/ Inverter (8857)

• Line Inductors, Resistive Load and Capacitive Load (8331, 8311, 8374)

OUR HIL AND RCP SIMULATION SYSTEM FOR ELECTRIC MACHINES COMES IN TWO FORMATS WITH THREE MODULES EACH

FESTO

OP1600

The **200 W Festo** Electromechanical Training System contains:

- Dynamometer (8960)
- Power supply (8821)
- PMSM (8245)
- DFIG, SYNC M/G, PMDC or SCIM (8231, 8241, 8213,8221)
- 2x 6-pulse IGBT (8837)
- Capacitive Load, Resistive Load or Line Inductors (8331, 8311, 8326-A)

OP1620

The **2-kW Festo** "Renewable Energy" System contains:

- Dynamometer (8540)
- Power supply (8525)
- PMSM (8505)
- Sync M/G, DC or SCIM (8507, 8501, 8503)*
- 2x 6-pulse IGBT (8857)
- Capacitive Load, Resistive Load or Line Inductors (8331, 8311, 8374)

* Optional

OBJECTIVES

- Cover the fundamental concepts of RPC
- Perform hands on exercises using Festo's power electronics and motor drive didactic hardware.

MODULE 1:	MODULE 2:	——— MODULE 3: ———	
OP1600- OP1620 Fundamentals of RCP and operation	**OP1600- OP1620** Entry level application of RCP	**OP1600** Advanced application of RCP	**OP1620** Advanced application of RCP
Laboratory Exercises include:	**Laboratory Exercises include:**	**Laboratory Exercises include:**	**Laboratory Exercises include:**
• Signal conditioning for RCP	• PID based speed control of machines	• Speed control of various machines: DC, IM, PMSM, WRIM.	• Active filtering
• Interface with machines	• Operation of 2-level inverter		• Advanced FOC control of a DFIG
• Interface with power electronics	• Regulation of a DC bus		
• Control of driving dynamometers			