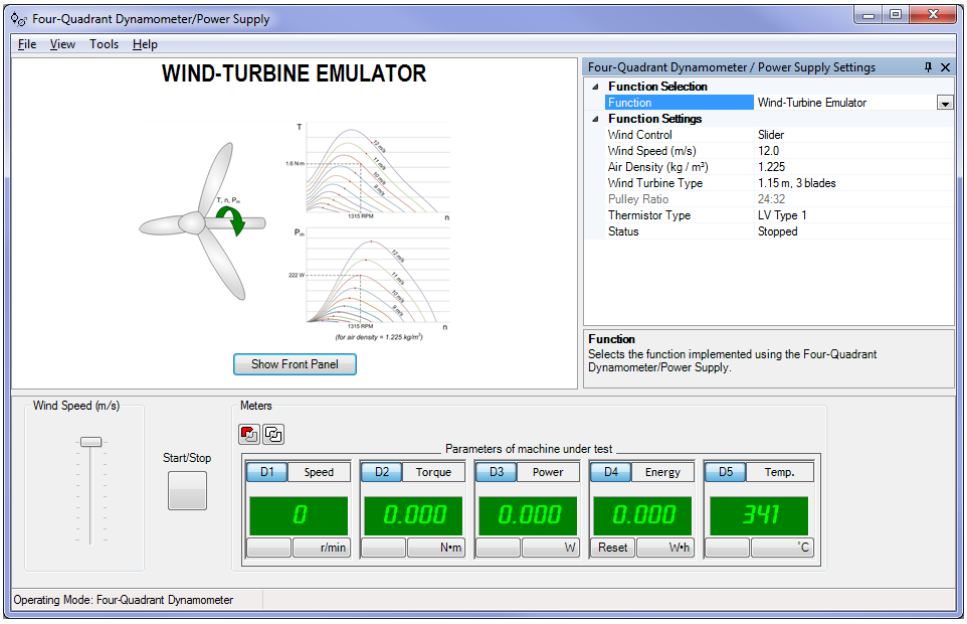
Turbine/Engine Emulator Function Set
579783 (8968-30)

LabVolt Series

Datasheet



Festo Didactic
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Table of Contents

General Description

The Turbine/Engine Emulator Function Set is a package of control functions that can be activated in the Four-Quadrant Dynamometer/Power Supply, enabling the module to emulate the operation of various types of turbines and engines.

The control functions in the set are only available in computer-based mode. This means that the function performed by the Four-Quadrant Dynamometer/Power Supply is selected, set, and monitored using the LVDAC-EMS software. The following control functions are available in the set:

Dynamometer operating mode

- Small Wind-Turbine Emulator: this function makes the permanent-magnet dc motor of the Four-Quadrant Dynamometer/Power Supply faithfully reproduce the effect of wind on the bladed rotor of a small-scale wind turbine. The torque-speed characteristic at the shaft of the machine coupled to the Four-Quadrant Dynamometer/Power Supply is the same as the one that is obtained when wind blows at a certain speed on the rotor of the actual wind turbine. The user has control over the wind speed and air density.

- Hydraulic Turbine Emulator: this function uses the permanent-magnet dc motor of the Four-Quadrant Dynamometer/Power Supply to recreate the behavior of an hydraulic turbine with a synchronous generator. The torque-speed characteristics at the shaft of the machine coupled to the Four-Quadrant Dynamometer/Power Supply is the same as that of a Francis-type hydraulic turbine. The user has control over the vane angle (manually or through the module analog input), the vane variation speed, and the inertia.

- Engine Emulator: this function uses the permanent-magnet dc motor of the Four-Quadrant Dynamometer/Power Supply to recreate the behavior of a diesel engine with a synchronous generator. The torque-speed characteristics at the shaft of the machine coupled to the Four-Quadrant Dynamometer/Power Supply is the same as a diesel generator. The user has control over the fuel rack position (%) (manually or through the module analog input) and the inertia.

Specifications

Parameter	Value
Control Functions	
Control Functions	Wind-Turbine Emulator
	Hydraulic-Turbine Emulator
	Engine Emulator
Wind-Turbine Emulator	
Wind Control	Software slider or 8960 command input
Wind Speed	3-12 m/s (6.7-26.8 mph)
Air Density	1.12-1.44 kg/m³ (0.07-0.09 lb/ft³)
Wind Turbine Type	1.15 m with 3 blades, 1.15 m with 3 blades and gearbox, 0.72 m with 3 blades and passive stall
Inertia J	0.02-0.4 kg·m² (0.475-9.492 lb·ft²) (only available for certain wind turbine types)
Gear Ratio R	0.5-2 (only available for certain wind turbine types)
Hydraulic-Turbine Emulator	
Vane Control	Software slider or 8960 command input
Turbine Type	300 W Francis
Vane Maximal Speed	0-100%/s
Runner Inertia	0.005-1 kg·m² (7.119 lb·ft²)
Engine Emulator	
Fuel Rack Position Control	Software slider or 8960 command input
Engine Type	300 W Diesel
Fuel Rack Position	0-100%
Engine Inertia	0.005-1 kg·m² (7.119 lb·ft²)

Reflecting the commitment of Festo Didactic to high quality standards in product, design, development, production, installation, and service, our manufacturing and distribution facility has received the ISO 9001 certification.

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