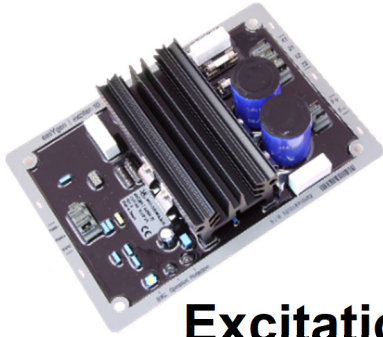


easYgen | exciter-10



Excitation module for synchronous generators

Salient Features

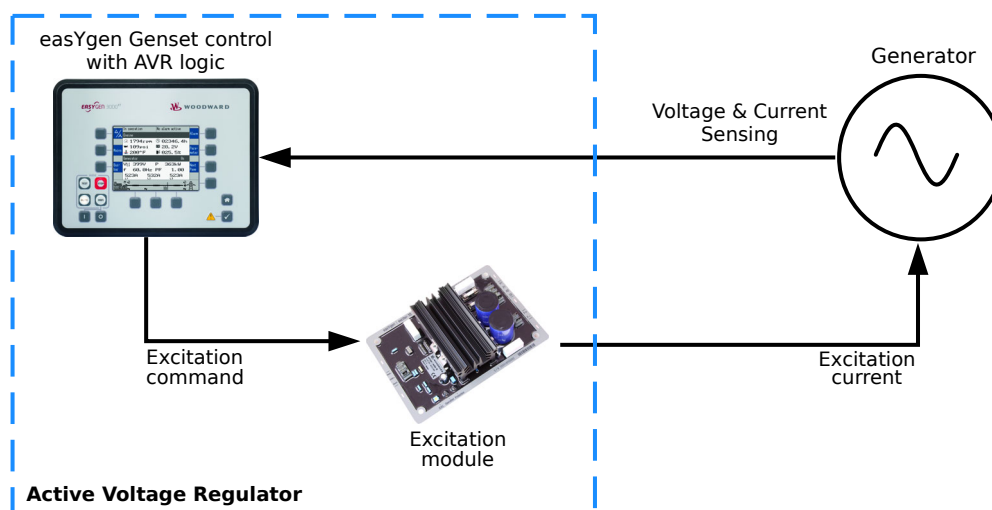
- ✓ Eliminate redundant voltage and current sensing
 - No PT/CT connection to the AVR
- ✓ Simplify voltage control topology
 - No cascaded PID loops
- ✓ Compatible with all types of synchronous generators
 - Shunt, Auxiliary Winding, PMG Excitation
- ✓ Standard simulation files available to speed-up design/certification process

DESCRIPTION

Woodward's easYgen | exciter-10 (EX-10) module is a power electronics component designed to provide excitation current to the generator that is controlled by the Active Voltage Regulator (AVR) feature in the easYgen-3400/3500XT genset controls.

The active voltage regulation concept intends to substitute a traditional voltage regulation configuration by simplifying the overall topology. The easYgen internal controller regulates generator output voltage by sending a pulse width modulation (PWM) signal to the excitation module. The excitation module controls generator excitation and therefore generator output voltage. This topology eliminates the redundant voltage and current sensing from a traditional voltage regulator and also makes a feedforward control architecture at AVR level simplifying the cascaded PID control topology. For power input, EX-10 interfaces with any of the following excitation systems: Self/Shunt Excitation, Auxiliary winding/AREP Excitation and Permanent Magnet (PMG) Excitation systems to make it a standard yet versatile solution.

APPLICATION



- Simple plug and play excitation module
- Easy and convenient to install, operate, and diagnose
- No extra configuration tool required
- On-board protection schemes: Current limitation, Short circuit, Over-temperature
- Status LEDs for local annunciation
- Seamless integration with easYgen-3400/3500XT genset controls
- Active voltage Regulation (AVR)
- Soft start control
- Under frequency (Volt / Hz) regulation
- Voltage droop compensation
- Compact design
- Line drop compensation
- Fault Ride Through (FRT) support
- CE marked
- UL pending

FEATURES

- Current limitation – limit can be adjusted via a potentiometer (IEXC.)
- Over-temperature protection – as the heat sink temperature crosses a threshold EX-10 output shuts-off
- Short-circuit protection – when transient current output exceeds a threshold, the EX-10 decreases the excitation output to below 0.2A until shutdown

In conjunction with easYgen-3400/3500XT genset controls, the active voltage regulator system offers:

- Automatic Voltage Regulation (AVR)
- Soft start functionality
- Under frequency regulation (Volt/Hz) defined by five configurable points and activated by LogicsManager
- Line drop compensation via AnalogManager
- Power factor and kvar control
- Voltage droop compensation
- Fault Ride Through (FRT) support
- Setpoint configuration and AVR status overview on the easYgen screen and on Woodward ToolKit Service Tool

SPECIFICATIONS

Electrical

Power consumption max. 450 VA
At max. Continuous Rating.

Max. Continuous Field Current Output 6 A

Max. Forcing Field Current Output 10 A
(for 10 s)

Max. AC Voltage Input 260 Vrms
(X1:X2, Z1:Z2)

PWM Input Signal 500 Hz, 5~20 V DC

PWM duty cycle 0~100%

Approvals

UL Pending

CE In conformity with the applicable requirements of the following Standards

EN 61000-6-2, 2005: Generic Standards - Immunity for Industrial Environments

EN 61000-6-4, 2007: Generic Standards - Emissions for Industrial Environments

EN 61010-1, 2010: Safety requirements for electrical equipment for measurement, control, and laboratory use - Part 1: General Requirements

Housing

Connection plug terminals 2.5 mm²

Weight approx. 770 g

Environmental

Ambient temp. -40 to 80 °C / -40 to 176 °F
(operation, when mounted in landscape orientation)

Ambient temp. -55 to 85 °C / -67 to 185 °F
(storage)

Ambient humidity 93 %, non-condensing

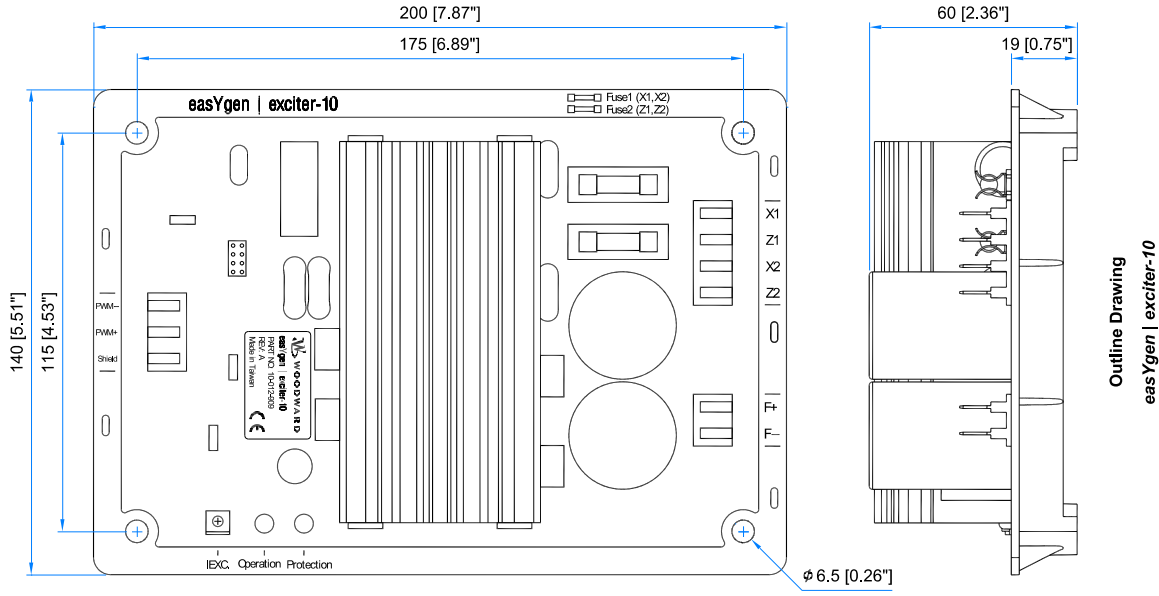
Vibration

5.05 G, 1 mm amplitude, 69 Hz in 3 orthogonal planes

Generator Excitation Types

Self / Shunt Excitation, Internal / Auxiliary Winding Excitation, Permanent Magnet (PMG), Single or Three Phase

DIMENSIONS

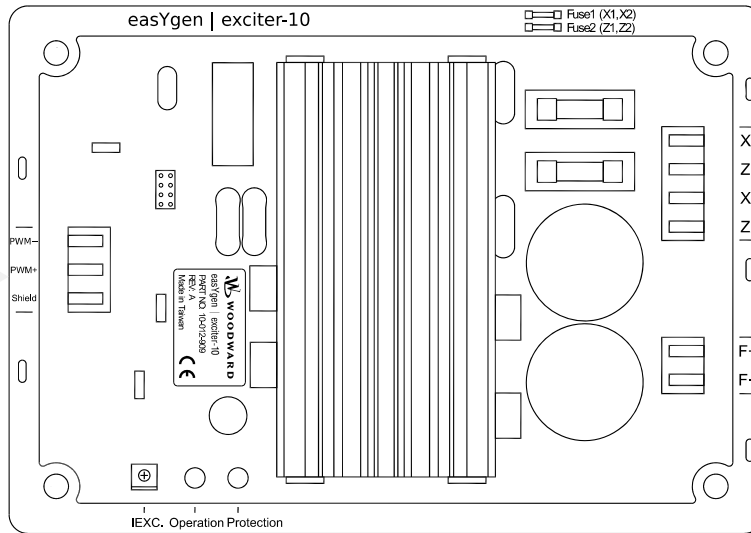


Unit : mm [inch]

CONNECTION DIAGRAM

3-Terminal Connector (Excitation command)		
Terminal Label	Function	According easYgen-3400/3500XT Connection
PWM-	PWM neg. input	Terminal 20
PWM+	PWM pos. input	Terminal 19
Shield	Shield	To the common Protective Earth (PE)

4-Terminal Connector Function (Excitation power supply input)			
Terminal Label	PMG Excitation	Self excitation	Aux. winding excitation
X1	Phase A	Single phase A	Winding 1 A
Z1	n.c.	n.c.	Winding 2 A
X2	Phase B	Single phase B	Winding 1 B
Z2	Phase C	n.c.	Winding 2 B



	LED1: Operation	LED2: Protection
Normal Operation	Green	Off
Current limitation	Off	Blinking red 2/s
Short-circuit	Off	Blinking red 5/s
Over-temperature	Off	Illuminated red

2-Terminal Connector (Excitation current output)	
Terminal Label	Function
F+	Excitation field positive
F-	Excitation field negative

TOOLKIT CONFIGURATION & VISUALIZATION SOFTWARE

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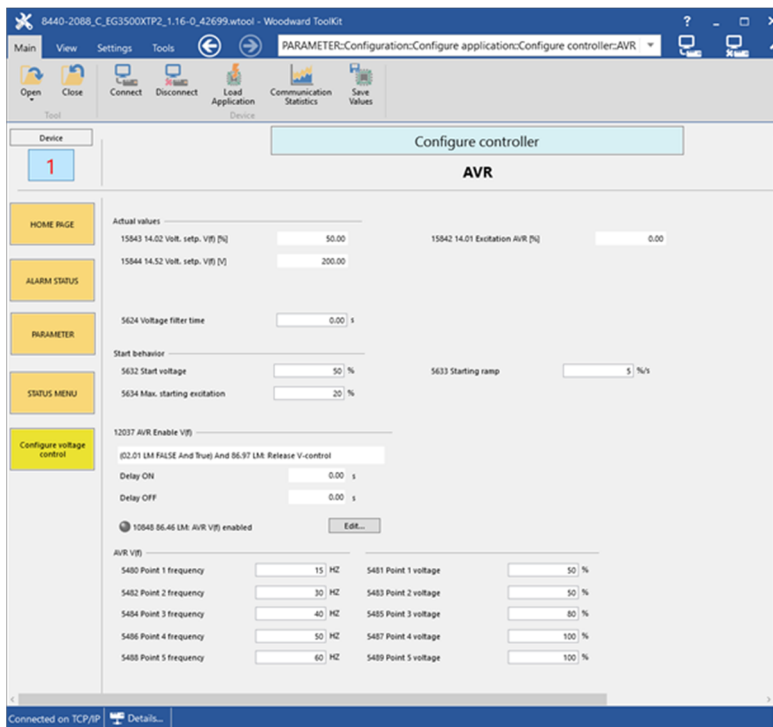
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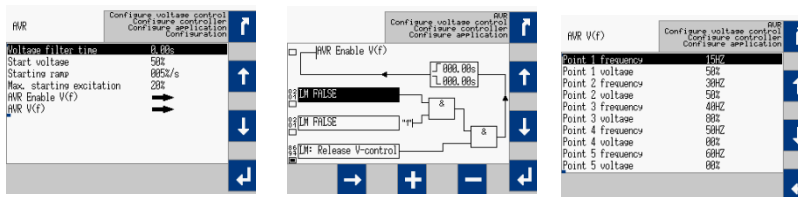
For more information contact:

Woodward's ToolKit, available to download from woodward.com is the service tool to program and troubleshoot the AVR feature and the full control in general.



AVR DISPLAY SCREENS

The AVR related parameters can be accessed directly through the easYgen screens.



ORDERING INFORMATION

WOODWARD PRODUCT	ORDERING NUMBER #
easYgen exciter-10	10-012-909

RELATED PRODUCT INFORMATION

WOODWARD PRODUCT	PRODUCT SPECIFICATION	TECHNICAL MANUAL
easYgen-3400/3500XT-P1	37583	37580
easYgen-3400/3500XT-P2	37583	37581
easYgen exciter-10	B37909	B37910