EPMG-1270 & EPMG-2470

Generator Excitation Booster System
User Manual

For use with brushless self-excited, excitation systems with continuous excitation current below 8A and intermittent excitation 15A up to 10 seconds.

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SECTION 1 : INTRODUCTION

The EPMG-1270 / 2470 converts DC battery power into an auxiliary excitation power source. In series with brushless self-excited (shunt), excitation systems increasing generator excitation power. As shown in the drawing below, the voltage regulator excitation output in series with the EPMG-1270 / 2470 output provides the generator excitation power.

EPMG-1270 / 2470 increases generator transient load handling capacity and improves recovery time from voltage dips when a load is added, without affecting the ability of the voltage regulator to maintain voltage stability with the same effect as PMG systems. When used gensets with no load excitation voltage of 15 – 50 Vdc the benefits are particularly significant.

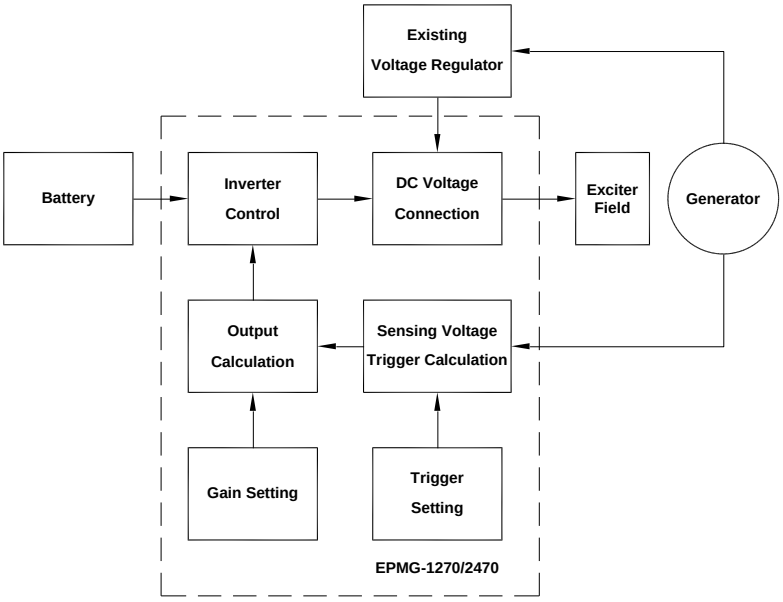


Figure 1 EPMG-1270 / 2470 Flow Chart

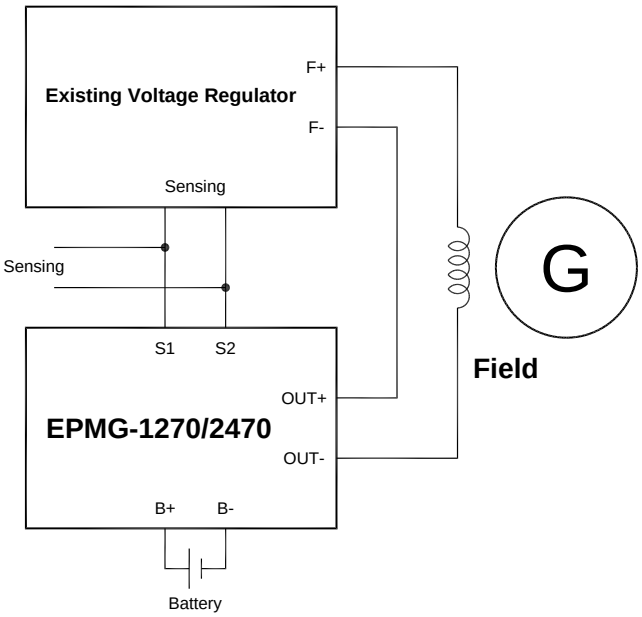


Figure 2 EPMG-1270 / 2470 + Self-excited (shunt) excitation system

ATTENTION

Incorrect connection of EPMG® output polarity will cause excitation failure.

SECTION 2 : SPECIFICATION

Sensing Input (S1, S2)

Voltage	80 – 600 Vac (Single phase)
Frequency	50/60 Hz

Power Output (OUT-, OUT+)

Voltage	90 Vdc
Power	Max. 400 VA

Battery Power Input (B-, B+)

Voltage	EPMG-1270	8 – 18 Vdc / 50A
	EPMG-2470	16 – 36 Vdc / 25A
Protections	Battery Reverse Polarity	
	Battery Current Limit	
Fuse spec.	EPMG-1270 (60A) / EPMG-2470 (30A)	

Applicable AVR

Max. Excitation Current 8A

Typical System Response

10 ms

Static Power Dissipation

Less than 0.5 watts

Efficiency

greater than 85% @ Full load

Environment

Operating Temperature	-40 to +60 ˚C
Storage Temperature	-40 to +85 ˚C
Relative Humidity	Max. 95%
Vibration	5.5 Gs @ 60 Hz

Dimensions

175.0 (L) x 115.0 (W) x 104.0 (H) mm

6.89 (L) x 4.53 (W) x 4.09 (H) inch

Weight

2.90 kg +/- 2%

6.39 lb +/- 2%

SECTION 3 : OUTLINE / DIMENSIONS

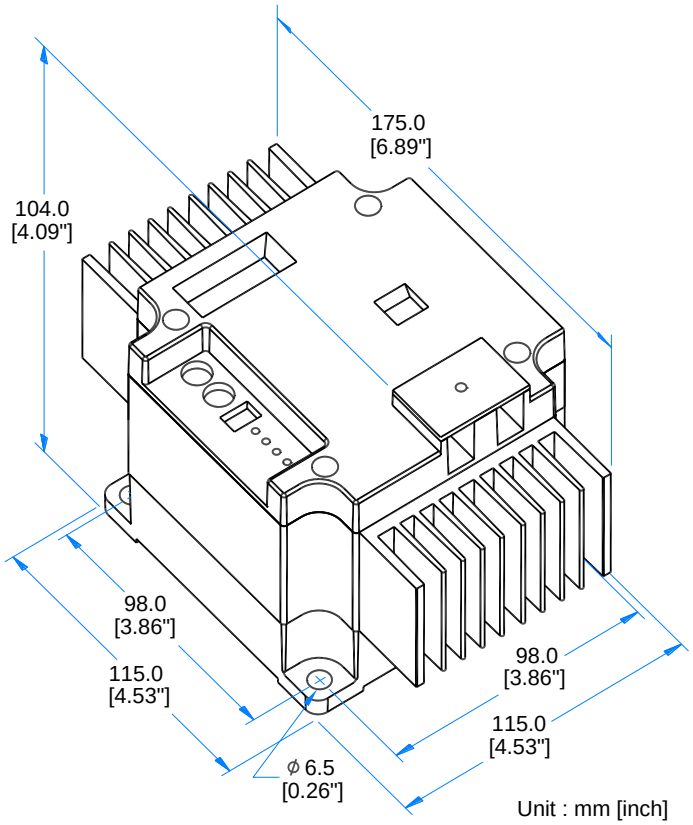


Figure 3 Dimension Drawing

Accessories :

1. Connection wires (White x 2, Brown x 2)
2. Screw bolt M6L20 x 4

SECTION 4 : FUNCTIONAL DESCRIPTION

S1 & S2 Sensing Input

OUT- & OUT+ In series with voltage regulator excitation output

Trigger Activation Setting
Settings 0 – 9 (3 – 16.5 %, See Table 1).
Voltage drop 3 – 16.5 %, adjustable

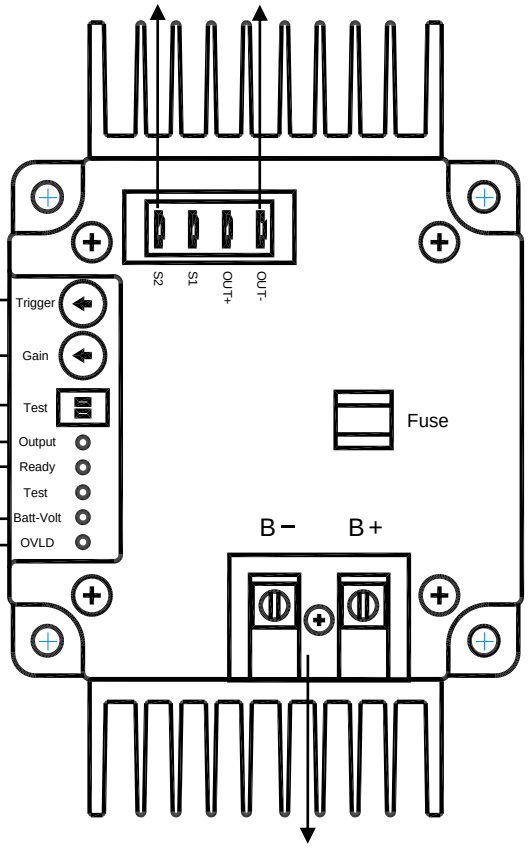
Output Gain
Settings 0 – 9 (40 – 400, See Table 1).
Output (V) = Gain x (Droop voltage / Rated voltage)
At this time generator field voltage = voltage regulator excitation + EPMG® output voltage.

Output Test

1. Disconnect OUT- and OUT+ wiring before testing.
2. Set DIP-SW1 to ON position. 90 Vdc output will appear across OUT- and OUT+ for 5 seconds.
3. TEST LED stays illuminated indicates unit has passed. Flashing of the LED indicates a malfunction.
4. When test is complete place DIP-SW1 in OFF position and reconnect wiring to OUT- and OUT+.

Note 1 : Do not contact OUT- or OUT+ terminals during test *!!*

Note 2 : Test can only be carried out with S1, S2 frequency below 40 Hz.



B- & B+ Battery Power Input

Recommended Wiring
EPMG-1270 ≧ AWG 8 (8.3mm^2)
EPMG-2470 ≧ AWG10 (5.3mm^2)

Output LED (Green)
Output indicator

Ready LED (Green)
Flashing : Standby
Steady : Sensing input is stable, unit is ready to output

Batt-Volt LED (Red) Battery Voltage Malfunction Indicator
Rated Voltage Range EPMG-1270 : 8 – 18 Vdc
EPMG-2470 : 16 – 36 Vdc
When battery voltage is abnormal, the unit will not operate.

OVLD LED (Red) Overload Indicator LED
When battery current exceeds 50A (25A) during operation the current limiting function will automatically activate, limiting the battery current to 50A (25A). The OVLD indicator will illuminate at this time.

Setting / Item	0	1	2	3	4	5	6	7	8	9
Trigger	3.0%	4.5%	6.0%	7.5%	9.0%	10.5%	12.0%	13.5%	15.0%	16.5%
Gain	40	80	120	160	200	240	280	320	360	400

Table 1

SECTION 5 : EPMG® ACTIVATION TIMING AND OUTPUT SETTING

If the voltage drops to the level of the Trigger setting when a load is added to a generator the EPMG® will activate output. The magnitude of the output is determined by the Gain setting (40 – 400 see Table 1) and magnitude of the voltage drop. As the sensing voltage recovers the output will slowly turn off. Ex. Gain = 160, voltage drop 10%, EPMG® output = 160 x 10% = 16V. See Figure 4 below for EPMG® Activation timing.

Trigger Setting (Activation Timing) :

The lower the Trigger setting the more frequently the EPMG® will activate and consume more battery power.

Gain Setting Procedures :

It is recommended to adjust GAIN from a lower setting to higher settings to find the optimal excitation response curve. If the Gain is set too low the effect of the additional excitation power will not be obvious. If the Gain is set too high it could lead to large fluctuations in generator voltage. For optimal setting please see Section 6.

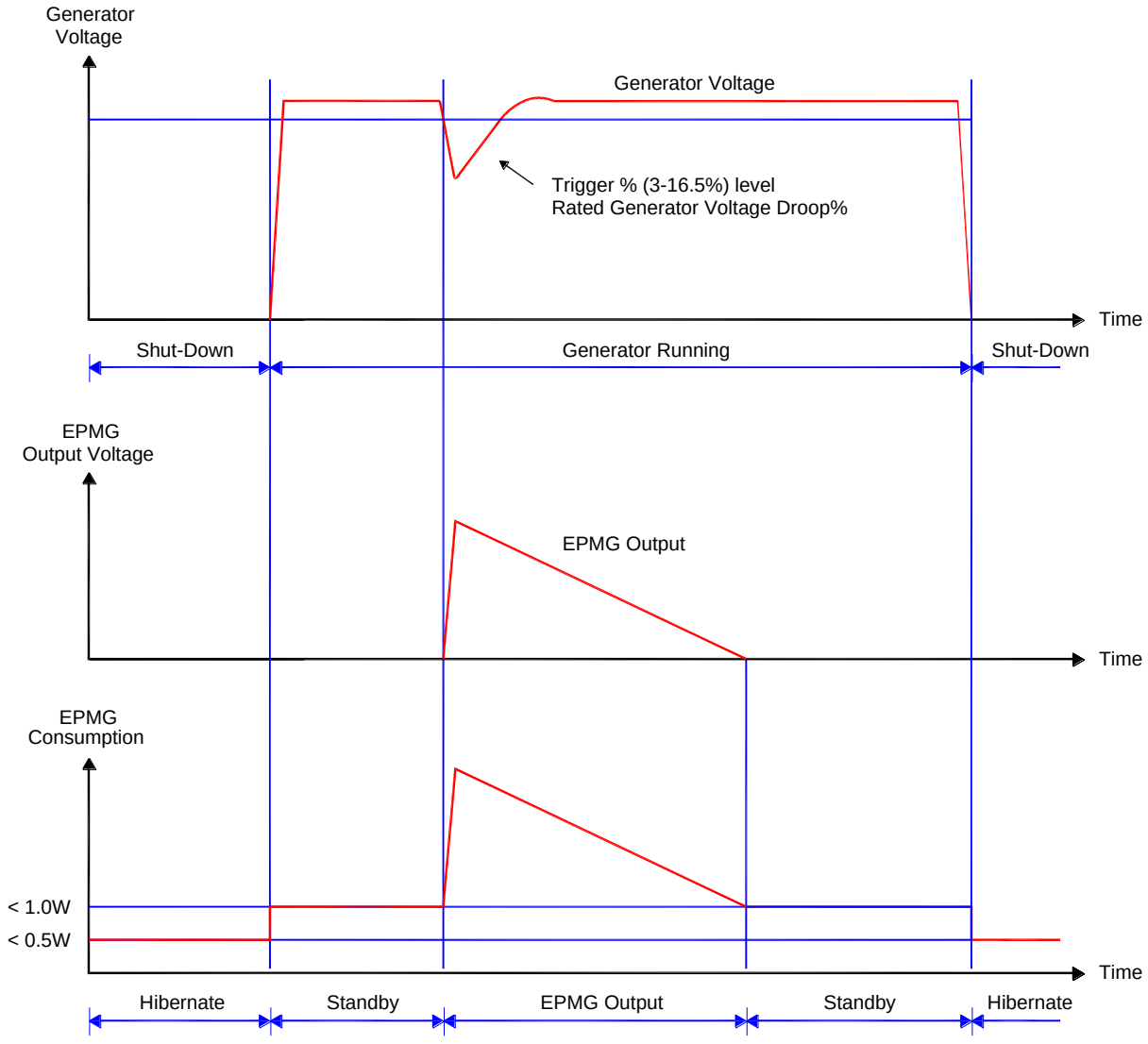


Figure 4 Activation Timing For Auxiliary Excitation Power

When the EPMG® is installed on some generators the frequency (engine speed) may temporarily drop below the generator Under Frequency protection point when a heavy load is added. This will cause an extremely large voltage drop because of the reduction of excitation caused by the Under Frequency protection function. As generator voltage drops output power will follow it downward until engine horsepower and generator output power are balanced. As engine speed (generator frequency) gradually recovers, generator voltage will also follow it in returning to normal.

SECTION 6 : OPTIMAL RESPONSE SETTING

Install the EPMG-1270 / 2470 in series with the voltage regulator and with generator operating with load adjust the Gain from low to high to find the optimal excitation response curve, as shown in the curve in Figure 5 (Voltage Regulator + EPMG®).

That figure includes three different curves: Gain setting Too Low, Ideal and Too High.

Blue : Voltage Regulator
Black : Voltage Regulator + EPMG®

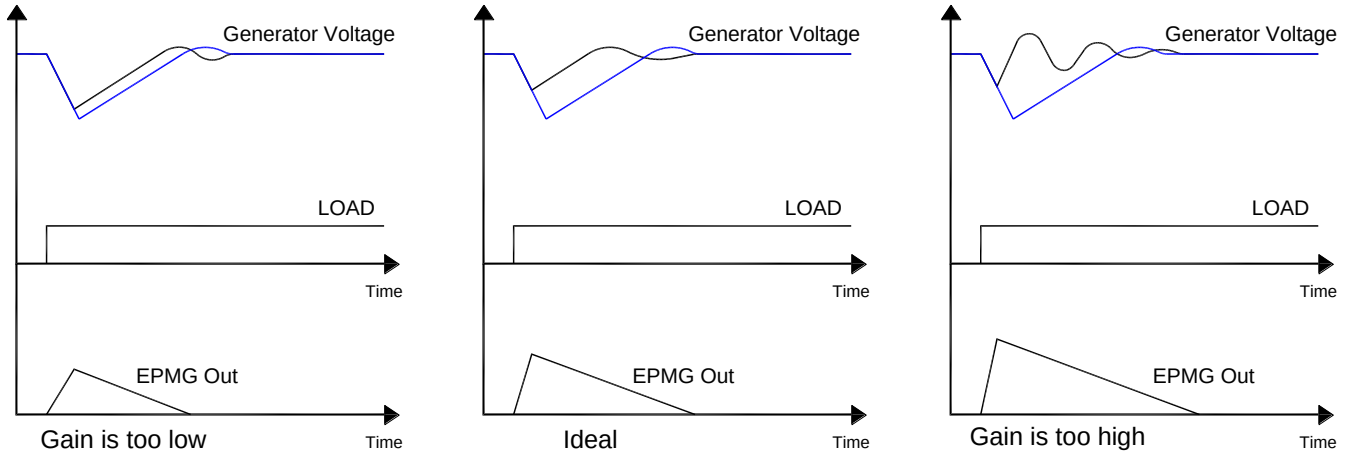


Figure 5 AVR + EPMG® Response Curves For Different Gain Settings

ATTENTION

All AC voltages are average.

※ Use only the replacement fuses specified in this user manual.

※ Appearance and specifications of products are subject to change for improvement without prior notice.