

BE2000E Digital Voltage Regulator

The BE2000E is an environmentally rugged product designed to control the output of brushless excited synchronous generators equipped with single phase PMG's. The BE2000E is the perfect replacement for Marathon Electric machines equipped with the popular DVR®2000E and DVR®2000EC voltage regulators. Enjoy the benefit of Basler Electric's years of experience and support of excitation control systems when choosing the BE2000E as your DVR® replacement voltage regulator.

FEATURES

- Four control modes: automatic voltage regulation (AVR), manual or field current regulation (FCR), power factor (PF) regulation, and reactive power (var) regulation.
- Programmable stability settings.
- Soft start control with an adjustable time setting in AVR control mode.
- Overexcitation limiting (OEL) in AVR, var, and PF control modes.
- Underfrequency (volts/hertz) compensation or engine unloading feature.
- Crowbar circuitry protects the field.
- Overtemperature protection.
- Three-phase or single-phase generator voltage (RMS) sensing/regulation in AVR mode.
- Single-phase generator current sensing for metering and regulation purposes.
- Field current and field voltage sensing.
- Four contact sensing inputs for system interface.
- One common output relay for alarm indication and trip functions.
- Six protection functions: overexcitation shutdown, generator overvoltage shutdown, BE2000E overtemperature shutdown, loss of generator sensing shutdown, overexcitation limiting and crowbar shutdown.
- Generator paralleling with reactive droop compensation and reactive differential compensation.
- Front-panel human-machine interface (HMI) indicates system and BE2000E status and offers the ability to adjust settings at the front panel.
- Rear RS-232 communication port for personal computer communication using BESTCOMS-BE2000E Windows[®] based software for fast, user-friendly, setup and control.

ADDITIONAL INFORMATION

INSTRUCTION MANUAL

Request Publication 9453600990



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SPECIFICATIONS

OPERATING POWER

Single-Phase Frequency Range Burden Terminals

180 to 240 Vac* 200 to 360 Hz* 350 VA 3, 4

*The operating power input is designed to work with a Marathon Electric PMG with the 7.5 $\mu\text{F},370\text{Vac}$ rated capacitor installed across the terminals.

GENERATOR VOLTAGE SENSING

Туре	1-phase/3-phase, 4 ranges,
	50/60 Hz
Terminals	E1, E2, E3
Burden	<1 VA per phase
Range 1	120 Vac (100 to 140 Vac)
Range 2	240 Vac (200 to 280 Vac)
Range 3	480 Vac (400 to 560 Vac)
Range 4	600 Vac

GENERATOR CURRENT SENSING

Туре	1-phase (BØ), 50/60 Hz
Rating	5 Aac maximum continuous
Burden	<0.1 VA
Terminals	CT1, CT2

CONTACT INPUT CIRCUITS

Type Dry Contact Interrogation Voltage 13 Vdc

Terminals Unit/Parallel Control 52L, 52M Raise Lower

6U, 7 6D, 7 52J, 52K

COMMON ALARM OUTPUT

var/PF Enable

Type

Make

Break

Form A 7 Aac/7 Adc continuous Rated Load 30 Aac/30 Adc, carry for 0.2 seconds 7 Aac/0.1 Adc **Operating Voltage** 240 Vac/250 Vdc maximum Terminals AL1, AL2

FIELD OUTPUT

Continuous Rating: 75 Vdc, 3.0 Adc

10 Second Forcing Rating

200 Vac Power Input: 150 Vdc, 7.5 Adc Field Resistance: 18 Ω minimum Terminals: F+, F-

AVR OPERATING MODE

Adjustment Range	See generator voltage sensing
Voltage Regulation	±0.25% over load range at rated
	PF and constant generator
	frequency
Temperature Drift	±0.5% for a 40°C (104°F) change
Response Time	≤ 1 cycle

Underfrequency (V/Hz)

Characteristic	Slope from 1 to 3 PU is adjust- able in 0.01 increments
Range	40 to 65 Hz
Increment	0.01 Hz

FCR (MANUAL) OPERATING MODE

Adjustment Range	0 to 3 Adc
Increment	0.01 A

VAR OPERATING MODE

100% to -100% Adjustment Range Increment 0.1%

PF OPERATING MODE

Adjustment Range 0.6 lead to 0.6 lag Increment 0.001

PARALLEL COMPENSATION

Modes

Reactive Droop and Reactive	Э
Differential (cross-current)*	

Droop

Adjustment Range	0 to 10%
Increment	0.01%

*Burden can exceed 1 VA if external resistors are added to the CT circuit.

COMMUNICATION PORT

Interface	Full Duplex RS-232
Connection	DB-9 connector on rear panel
Baud	4800
Data Bits	8
Parity	None
Stop Bit	1

FIELD OVERVOLTAGE PROTECTION

Pickup 0 to 250 Vdc Time Delav 15 seconds (fixed)

FIELD OVERCURRENT PROTECTION

Pickup Adjustment Range 0 to 7.5 Adc Increment 0.001 Adc

<u>Time Delay</u>	
Adjustment Range	0 to 10 seconds
Increment	1 second

GENERATOR OVERVOLTAGE PROTECTION

<u>Pickup</u>	
Range	105 to 120% of set point
Increment	1.0%

<u>Time Delay</u> **Fixed Setting** 0.75 seconds

SOFT-START FUNCTION

Time Adjust Range	1 to 120 seconds
Increment	1 second

ANALOG (AUXILIARY) INPUT

-3 Vdc to +3 Vdc
-30% to +30% shift
1 kΩ
A, B

-1.0 to -0.6, +0.6 to +1.0

-40°C to +70°C (-40°F to +158°F)

-40°C to +85°C (-40°F to +185°F)

20 G in 3 perpendicular planes

1 G at 5 to 26 Hz

5 G at 53 to 500 Hz

(27 to 52 Hz)

690 g (1.52 lb)

0.036" double amplitude

Tested per MIL-STD-810E

0.02

2°

0 to 360°

SPECIFICATIONS, continued

Power Factor

Phase Angle

Range

Range

Accuracy

TYPE TESTS

Vibration

Salt Fog

PHYSICAL

Weight

Shock

ENVIRONMENT

Operating Temp

Storage Temp

Accuracy

METERING

Accuracy of all metering values assumes 25C, 50/60 Hz and less than 20% THD.

Generator Voltage

Range Accuracy 10 V to 79 kV 0.5%

<u>Generator Current</u> Range Accuracy

<u>Frequency</u> Range Accuracy 0.1 to 5,000 A (5 A CTs) 0.5%

40 to 65 Hz 0.2 Hz

<u>Field Voltage</u> Range Accuracy

<u>Field Current</u> Range Accuracy

0 to 8.0 Adc 0.5%

5.0%

0 to 200 Vdc

Power (Apparent, Real and Reactive)Range0 to 99 MVA, MW and MvarAccuracy3.0%

CONNECTIONS

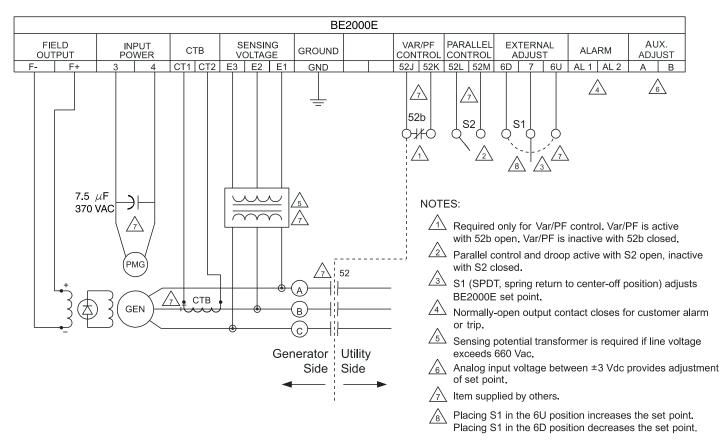
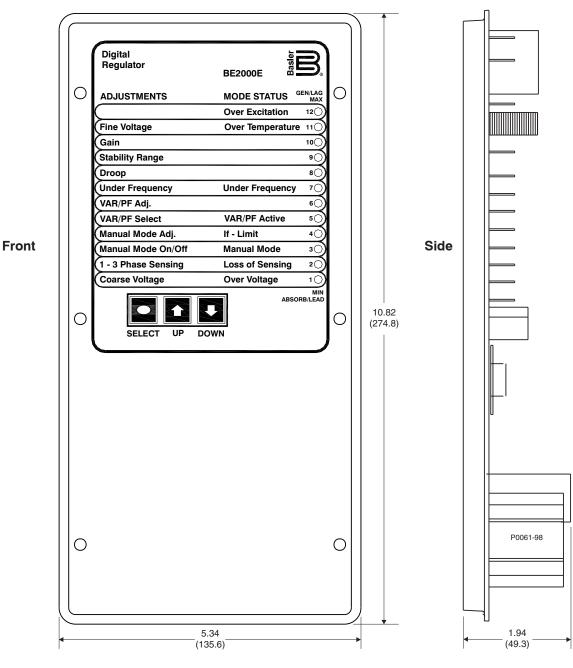


Figure 1 - Typical Connection with ABC Rotation and Three-Phase Sensing

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DIMENSIONS

Figure 2 - Dimensions



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