

# EPOCH-II® High-Current Output Unit



- **1000 VA of high current**
- **Rugged, portable test set**
- **Up to 187 Amperes maximum output**

## DESCRIPTION

The EPOCH-II® is a high-current output unit designed to be controlled by the PULSAR® in combination with the High-Current Interface Module to produce a rugged, portable high-current, high-volt/ampere test set.

The EPOCH-II also is designed to be controlled by the EPOCH-10® Relay Test Set.

PULSAR/EPOCH-II or EPOCH-10/EPOCH-II combination uses microprocessor-based, digitally synthesized sine wave generators and solid-state regulated power amplifiers to provide sinusoidal voltage and current outputs with precise control of the phase-angle relationships.

These combinations will produce accurate test results even with a fluctuating power source or when testing nonlinear or highly saturable relays.

An optional IEEE-488 GPIB interface transforms the EPOCH-10/EPOCH-II combination into a programmable automatic test system when used with an external controller or computer. Amplitude and/or phase angle can be set to desired values, step changed, ramped, or pulsed to new values.

## APPLICATIONS

PULSAR/EPOCH-II or EPOCH-10/EPOCH-II combination is designed to test both complex protective relays which require phase-shifting capability and simpler relays, including all overcurrent relays.

Device No.	Relay Types	Specify
50	Instantaneous Overcurrent up to 187 A at 1000 VA	One EPOCH-II and PULSAR with High-Current Interface Module or one EPOCH-10
51	Overcurrent up to 187 A at 1000 VA	
67	Directional Overcurrent up to 187 A at 1000 VA	
67N	Ground Directional Overcurrent up to 187 A at 1000 VA	
87	All of the above plus . . . Differential	One EPOCH-II and PULSAR with Interface Module or two EPOCH-10s
21	Distance (open-delta)	
21	Distance (wye)	One EPOCH-II and PULSAR with Interface Modules or three EPOCH-10s

The table above lists the different types of relays by device numbers, and the different combinations of a PULSAR or EPOCH-10s and an EPOCH-II required to test them.

## FEATURES AND BENEFITS

- Output current source has a 5-minute duty cycle rating of 1000 volt-amperes.
- Four output ranges at 0.01 ampere and two output ranges at 0.1 ampere are provided.
- Tough steel, sealed enclosure provides a high shock and vibration resistance.
- Completely compatible with PULSAR via the High-Current Interface Module and the EPOCH-10 units.

**SPECIFICATIONS**

**Input**

**Input Voltage (specify one)**

115 V  $\pm$ 10%, 50/60 Hz, 30 A (at full rated output)  
**OR**

230 V  $\pm$ 10%, 50/60 Hz, 20 A

**Output**

**Output Current**

To provide a variety of test circuit impedances, six output taps with two ranges are provided.

**High Range**

- 2.00 to 10.00 A at 100 V max
- 3.00 to 15.00 A at 66.6 V max
- 8.00 to 40.00 A at 25 V max
- 10.00 to 50.00 A at 20 V max
- 20.00 to 100.0 A at 10 V max
- 34.00 to 170.0 A at 5.9 V max

**Output Power:** 1000 VA

**Low Range**

- 2.00 to 10.00 A at 50 V max
- 3.00 to 15.00 A at 33.3 V max
- 8.00 to 40.00 A at 12.5 V max
- 10.00 to 50.00 A at 10 V max
- 20.00 to 100.0 A at 5 V max
- 34.00 to 170.0 A at 2.95 V max

**Output Power:** 500 VA

**Accuracy**

**Typical:**  $\pm$ 0.5% of setting

**Maximum:**  $\pm$ 1.0% of setting

Alarm will indicate when amplitude, phase angle, or waveform is in error.

**Resolution**

**Four ranges:** 0.01 A

**Two ranges:** 0.1 A

**Duty Cycle**

Five minutes at full rated VA output. Fifteen minutes recovery time.

**Overrange Capability**

The EPOCH-II has an overrange capability of +10% for each tap with a maximum output current of 187 A on the 170 A tap.

**Distortion**

Less than 1% typical, 3% max.

Output of EPOCH-10/EPOCH-II Combination

**Frequency**

- Synchronized to input power source
- 60 Hz crystal-controlled
- 50 Hz crystal-controlled

**Accuracy**

- Synchronized, tracks input frequency
- $\pm$ 0.006 Hz for 60-Hz crystal control ( $\pm$ 0.01%)
- $\pm$ 0.005 Hz for 50-Hz crystal control ( $\pm$ 0.01%)

Output of PULSAR and Interface Module Connected to EPOCH-II  
The High-Current Interface Module provides a variable frequency signal to the Epoch-II High-Current Output Unit.

Output frequency is continuously displayed for each channel with large, high-intensity LEDs with the following ranges:

5.000 to 99.999 Hz

100.01 to 999.99 Hz

**Frequency Accuracy:**  $\pm$ 10 ppm at 23° C,  $\pm$ 2° C)

**Current Phase Angle Control**

Angle is adjusted on the EPOCH-10 control unit by 4-digit, pushbutton control with large LED display of setting.

**Range:** 0.0 to 359.9°

**Resolution:** 0.1°

**Accuracy:** less than  $\pm$ 0.3° typical,  $\pm$ 1.0° max

**Control Section**

The control section for the EPOCH-II high-current section is PULSAR (with the High-Current Interface Module), an EPOCH-I or EPOCH-10. Thus, the excellent operating and control features of PULSAR and the EPOCH-10 are used to control the EPOCH-II.

**Note:** When the EPOCH-II is in use, the current output of the EPOCH-10 control unit is inoperative. All EPOCH-10s can control an EPOCH-II high-current section. When the high-current section of the EPOCH-II is not needed, the EPOCH-10 can be used independently or slaved together with other EPOCH units.

**Protection**

The input line circuit is breaker-protected. The dc power supply is overcurrent-protected. In addition, overvoltage protection is provided on the input line circuit.

The power amplifiers are forced-air cooled and are protected by thermal-overload sensors.

Audio and visual alarms on the PULSAR and EPOCH-10 control units indicate whenever the current or potential outputs are overloaded.

**Temperature**

**Operating**

32 to 122° F (0 to 50° C)

Reduced duty cycle above 113° F (45° C)

**Storage**

-13 to +158° F (-25° to +70° C)

**Dimensions**

7.6 H x 19.75 W x 21.6 D in.

(193 H x 502 W x 549 D mm)

**Weight**

115 lb (52.3 kg)



EPOCH-II with EPOCH-10 control unit

**ORDERING INFORMATION**

<b>Item (Qty)</b>	<b>Cat. No.</b>
PULSAR - Refer to pages 17-18	
EPOCH-II	EPOCHII-STD
EPOCH-II without enclosures, fits standard, 19-in. [483-mm] rack	EPOCHII-RK
<b>Included Accessories</b>	
Carrying case	11437
Fuses, 1.0 A, 250 V (5)	4139
Ground lead (1)	11258
High-current leads	
Black (1)	10708
Red (1)	11245
Power cord	11266
Interconnect cables	
Control (1)	10574
Signal (1)	11307
Instruction manual (1)	10709

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**EPOCH\_II\_DS\_en\_V10**  
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