

# Eaton's EVR microprocessor-controlled tap changer (10–500 kVA, three-phase)



Eaton's electronic voltage regulator (EVR) reduces equipment downtime through constant voltage regulation. It is the ideal solution for equipment or facilities experiencing brownouts and voltage regulation problems. The EVR's unique design offers a high in-rush current, rapid response and operating advantages over other manufacturers.

## Overview

The appropriate transformer tap is automatically activated through a silicon-controlled rectifier (SCR), maintaining a tightly regulated output voltage. Tap changes are initiated within one electrical cycle—switching at zero current crossing to ensure a minimum amount of noise during tap transitions.

Seven taps per phase are used for optimal voltage regulation. Also, the EVR is a low output impedance, shielded isolation transformer. As a result of the low impedance, load changes do not affect other equipment connecting the system.

The EVR's unique design ensures high efficiency at 97% and 100% in-rush capability. It is equipped with a thermal-magnetic breaker that allows for proper system coordination to prevent nuisance trips.

The EVR provides the triple function of isolation, noise attenuation and voltage regulation. The power transformer supplies the first two functions. The third function, voltage regulation, is supplied by the SCRs connected to taps on the power transformer. This sequential tap-changing design eliminates voltage "overshoot" from typical electronic voltage regulators, providing a seamless transition between the required power transformer taps.

## EVR features

- $\pm 3\%$  voltage output for a +10/–23% voltage input
- Power factor—the EVR is not affected by load power factor
- Total harmonic distortion (THD)—the EVR adds less than 1% added to the output waveform under any dynamic linear loading conditions presented to the line regulator
- High efficiency—97%
- Wide input frequency range—the EVR operates within a broad input frequency range of 57–63 Hz
- Integral manual rotary maintenance bypass switch standard on 50–500 kVA units and optional on smaller units
- Seven taps per phase used to provide optimal voltage regulation
- Fail-safe bypass circuit, triple-shielded isolation transformer and overtemperature protection
- One-year parts warranty with no startup required
- Front-only access required (50–150 kVA units only) allows unit to be installed in tight spaces



Typical 10–45 kVA Unit



Powering Business Worldwide

EVR Specifications	
Technology	Electronic tap changer
Input voltages	208–600V, three-phase (three-wire)
Input voltage range	+10% to –23% of nominal rated input
Output voltage	±3% of nominal
Response time	1/2 cycle
Frequency	60 Hz, ±3%
Efficiency	97% typical
Line regulation	Output is ±3% of nominal for input variations of +10% to –23% of nominal
Load regulation	Output is maintained within 3% of nominal from no load to full load
Correction time	Output will be corrected to within ±3% of nominal in 1.5 cycles or less
Harmonic distortion	Less than 1.0% added to the output waveform under any dynamic linear loading conditions presented to the line regulator
Noise attenuation	
Common mode	146 dB
Normal mode	3 dB down at 1000 Hz, 40 dB/decade to below 50 dB with resistive load
Turn-on characteristics	When energized, voltage overshoot will be less than 5% of nominal for 1 cycle or less
Overload rating	1000% for 1 cycle and 200% for 10 seconds
Ambient rating	–10° to 40°C
Monitoring	Three green LEDs (phase power on indication), one red LED (alert indication)
Surge protection (optional)	CVX 50 kA SPD device 50 kVA and below, CVX 100 kA SPD device 75 kVA and above
Input breaker	MCCB rated 125% of full rated current
Bypass switch	Normal and bypass selector
Metering (optional)	Standard metering (IQ 130)—voltage and current with minimum and maximum Premium metering (IQ 150)—voltage, current, frequency, power, energy, PF, with minimum and maximum, communications capabilities
Warranty	1-year parts

For custom design, call the support number below.

### Application support

If you are having trouble understanding a problem related to power quality, reliability or energy management, call an application engineer at 800-809-2772 (option 4, sub-option 2).

### EVR ordering guidelines

**EVR XXX XXXX XXXX X X XX X**

kVA Ratings and Dimensions					
kVA	Weight (lbs)	BTUs/hr	Bypass	Metering	Cabinet Size Dimensions H x W x D in Inches (mm)
010	440	1,025	Optional	No	30.20 x 22.20 x 29.00 (767.1 x 563.9 x 736.6)
010	520	1,205	Optional	Yes	44.20 x 22.20 x 29.00 (1122.7 x 563.9 x 736.6)
015	465	1,540	Optional	No	30.20 x 22.20 x 29.00 (767.1 x 563.9 x 736.6)
015	700	1,540	Optional	Yes	44.20 x 22.20 x 29.00 (1122.7 x 563.9 x 736.6)
025	700	2,560	Optional	Yes	44.20 x 22.20 x 29.00 (1122.7 x 563.9 x 736.6)
030	720	3,090	Optional	Yes	44.20 x 22.20 x 29.00 (1122.7 x 563.9 x 736.6)
045	950	4,600	Optional	Yes	44.30 x 45.90 x 29.00 (1125.2 x 1165.9 x 736.6)
050	1,176	7,332	Yes	Yes	66.00 x 29.00 x 35.50 (1676.4 x 736.6 x 901.7)
075	1,575	9,514	Yes	Yes	76.00 x 34.40 x 35.50 (1930.4 x 873.8 x 901.7)
100	2,014	11,833	Yes	Yes	76.00 x 34.40 x 35.50 (1930.4 x 873.8 x 901.7)
125	2,137	14,748	Yes	Yes	76.00 x 34.40 x 35.50 (1930.4 x 873.8 x 901.7)
150	2,240	17,698	Yes	Yes	76.00 x 34.40 x 35.50 (1930.4 x 873.8 x 901.7)
225	3,300	23,000	Yes	Yes	77.40 x 56.00 x 41.50 (1966.0 x 1422.4 x 1054.1)
300	4,000	30,750	Yes	Yes	77.40 x 56.00 x 41.50 (1966.0 x 1422.4 x 1054.1)
500	5,500	51,250	Yes	Yes	77.00 x 72.40 x 48.40 (1955.8 x 1839.0 x 1229.4)

**Nominal Input Voltage**

Delta Input: L, L, L, G

208D = 208  
240D = 240  
400D = 400  
480D = 480  
600D = 600

**Nominal Output Voltage**

Wye Output: L, L, L, N, G

208Y = 120/208  
400Y = 230/400  
480Y = 277/480  
600Y = 347/600

**Surge Protection**

X = No  
S = Yes

**Frequency**

A = 60 Hz  
B = 50 Hz

**Options**

B = Bypass switch

M1 = Standard metering (IQ 130)

M2 = Premium metering (IQ 150)

Bypass is standard on 50 kVA and larger units and an option on 45 kVA and smaller units. The 'B' is not included in the part number for units 50 kVA and larger.

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