

# XLHV supercapacitor

## High voltage module



### Description

Eaton supercapacitors are high reliability, high power, ultra-high capacitance energy storage devices utilizing electric double layer capacitor (EDLC) construction combined with proprietary materials and processes. This combination of advanced technologies allows Eaton to offer a wide variety of capacitor solutions tailored to applications for backup power, pulse power and hybrid power systems.

All products feature low ESR for high power density with environmentally friendly materials for a green power solution. Eaton supercapacitors are maintenance-free with design lifetimes up to 20 years\* and operating temperatures down to -40 °C and up to +65 °C.

### Features and benefits

- Standard 19" rack mounting
- Systems up to 1500 V
- Large capacitance for high energy density
- UL recognized
- Estimated life up to 20 years\*

### Applications

- Enhance STATCOM
- Ancillary services
- Fast frequency regulation
- Industrial backup/ridethrough
- Power storage for grid systems
- Solar firming

### Environmental compliance



### Agency information



\*Supercapacitor lifetimes vary based on charge voltage and temperature. See Eaton's application guidelines or contact your local Eaton sales representative for more information on lifetime estimates

## Ratings

Capacitance	62.5 to 94.4 F
Working voltage	102 to 144 V
Surge voltage	112 to 158 V
Capacitance tolerance	-0% to +20% (+20 °C)
Operating temperature range	-40 °C to +65 °C (internal cell temperature)

## Specifications

Part number	Maximum Operating Voltage (V)	Capacitance <sup>1</sup> (F) minimum	Maximum initial ESR <sup>1</sup> (mΩ)	Nominal leakage current <sup>2</sup> (mA)	Stored energy <sup>3</sup> (Wh)	Peak power <sup>4</sup> (kW)	Peak current <sup>5</sup> (A)	Continuous current <sup>6</sup> (A)	Typical thermal resistance <sup>7</sup> Rth (°C/W)	Short circuit current <sup>8,9</sup> (A)
XLHVS1020944C0B00	102	94.4	9.7	9	137	270	2500	64	0.38	10500
XLHVS1440625C0B00	144	62.5	12.5	8	180	420	2500	56	0.38	11500

## Performance

Parameter	Capacitance Change (% of initial value)	ESR (% of initial maximum value)
Lifetime: 1500 hours at maximum rated voltage and operating temperature (XLHVS102)	≤ 20%	≤ 200%
Lifetime: 1000 hours at maximum rated voltage and operating temperature (XLHVS144)	≤ 20%	≤ 200%
Charge/discharge cycling <sup>9</sup> — 1,000,000 at +20 °C	≤ 20%	≤ 200%
Storage, uncharged, up to +35 °C — 3 years	≤ 5%	≤ 10%

1. Capacitance, Equivalent Series Resistance (ESR) and leakage current are measured according to IEC62391-1.

2. Leakage current at +20 °C after 72 hour charge and hold at 96% of rated voltage

3. Stored Energy (Wh) =  $0.5 \times C \times V^2$

4. Peak Power (W) =  $\frac{V^2}{4 \times ESR}$

5. Peak current for 1 second from full rate voltage to half voltage. (A) =  $0.5 \times V \times C$   
 $\frac{1}{1 + ESR \times C}$

6. Continuous current with a 15 °C temperature rise. Continuous current (A) =  $\sqrt{\frac{\Delta T}{ESR \times Rth}}$

7. Thermal resistance (Rth) cell body temperature to ambient in open air in degrees C per Watt (°C/W)

8. Short circuit current is for safety information only. Do not use as operating current

9. Cycling between maximum working voltage and half voltage with 3 seconds rest at +20 °C.

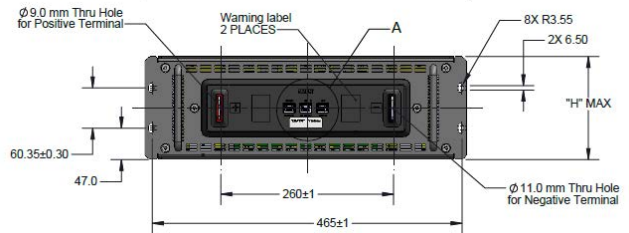
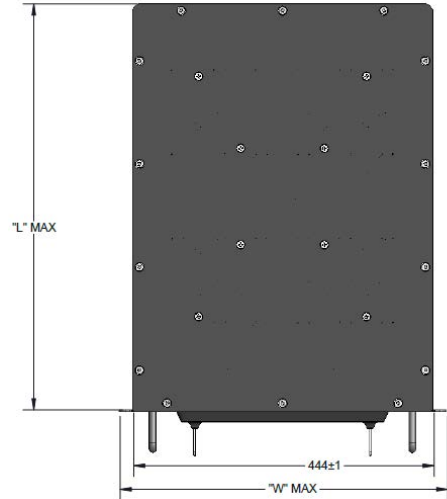
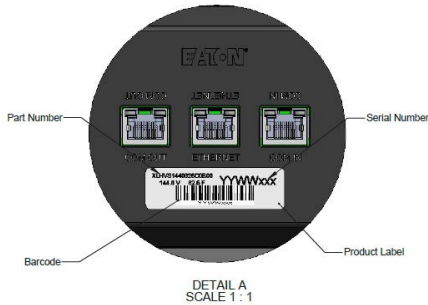
10. Testing and verification of product under end application conditions is recommended

\*\*Short circuit of the module can cause permanent damage. An appropriate fast-acting fuse should be used for protection. A fuse is required to meet UL Conditions of Acceptability

## Safety and certifications

Agency information	UL810a, File: MH46887; CE, EMC: IEC 61000-6-4, EMI: IEC61000-6-2
Operating voltages	Maximum series connection: 1500 V , High potential test (hipot): 4000 V
Seismic Test	IEC 60068-3-3, Zone 4
Environmental	RoHS and REACH compliant, lead free; Ingress protection IP30
Warnings	Do not overvoltage, do not reverse polarity, do not short circuit when charged
Shipping	No restrictions, per UN3499 with all cells <10 watt-hours. Shorting wire must be applied across power terminals.

Dimensions (mm) and mass (kg)



Part number	L maximum (mm)	W maximum (mm)	H maximum (mm)	Typical mass (kg)
XLHVS1020944C0B00	480	485	156	27
XLHVS1440625C0B00	605	485	156	35

Power output connections

Terminal	Recommended bolt size	Recommended torque
Negative	M10	25-30 N·m
Positive	M8	15-20 N·m

Connection type: Bus bar or ring lug with appropriate sizing for application current  
Bolt and nut with lock washer on each side of the terminal  
(Reference user manual for details)

Communication and auxiliary power

Connector: RJ-45  
Recommended cable: Shielded CAT5 or greater  
Minimum module voltage for Cell management system : 44 V

Pin number	COM IN (CANbus+ power in)	ETH (MODbus)	COM OUT (CANbus+ power out)
1	CAN H	Tx +	CAN H
2	CAN L	Tx -	CAN L
3	+5 V (CAN Termination detect)	Rx +	DETECT Termination
4	Power +24 V (12 to 56 Vdc)	No connect	4 W maximum, 3 W typical
5	Power +24 V (12 to 56 Vdc)	No connect	4 W maximum, 3 W typical
6	No connect	Rx -	No connect
7	Common	No connect	Common
8	Common	No connect	Common

See user manual for connection and operation details

### Part numbering system

XLHV	S	102	0944	C0	B	00
Family code	Housing type S-standard	Maximum operating voltage (V)	Minimum initial capacitance (F) CCC.C 0944 = 94.4 F	User interface C0: CANbus/MODbus C1: none	Cell management type B: shunt	Options 00 = none

### Packaging information

- Standard packaging: Bulk, 1 piece per box

### Part Marking

- Manufacturer
- Capacitance (F)
- Module operating voltage (V)
- Family code or part number

### Cleaning/Washing

Avoid cleaning of circuit boards, however if the circuit board must be cleaned use static or ultrasonic immersion in a standard circuit board cleaning fluid for no more than 5 minutes and a maximum temperature of +60 °C. Afterwards thoroughly rinse and dry the circuit boards. In general, treat supercapacitors in the same manner you would an aluminum electrolytic capacitor.

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Printed in USA  
Publication No. ELX1352  
March 2024

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