

# Eaton's Electronics Components

April 2<sup>nd</sup>, 2020

# The transformation of healthcare

Electronic components are **powering** the modernization of **healthcare delivery**



# Top applications

## Patients



- Personal testers for blood sugar, blood pressure and urine
- IoT devices

## Providers



- Test and measurement equipment
- Monitoring devices
- Mobile equipment (Ventilators, X-ray, dialysis, ultrasound)

## Imaging and labs



- Guided hospital vehicles & beds
- Diagnostics imaging (X-ray, CT, MR)
- Test and measurement

## Medical equipment



- Test and measurement
- USB peripherals
- Panel control circuit and component protection
- LCD panels
- Sensors and signal conditioning

## IT and facilities

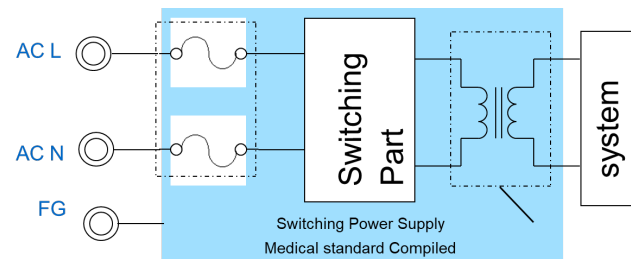


- Power conversion on power supplies
- Backup power
- Power boost of weak spots

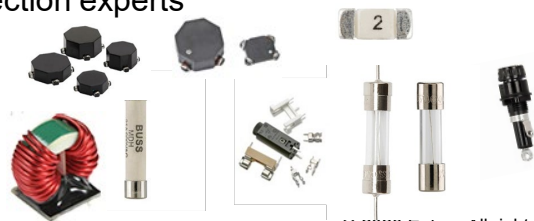
# Medical Power Supply

## Application:

- Protect Power Supply from short circuit damage
- DC-DC and EMI filters
- Challenges
  - Highly regulated
    - IEC 60601-1 or IEC 61010-1
    - UL60601-1
    - CSA 22.2 No 601.1
  - Low leakage current
  - Reinforced or double insulation
  - Stringent isolation specifications
  - Strict levels for Electro-Magnetic Compatibility (EMC)
- Why Eaton
  - Overcurrent protection experts
  - Reliability



Fuses are mounted on both L & N line



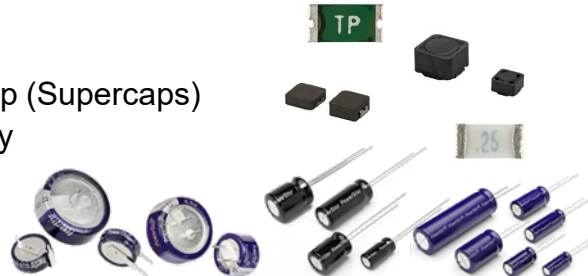
## Eaton's electronic components:

- Cartridge and axial leaded fuses (5mm and ¼")
- Panel mount/PCB fuseholders (HTB, H15 & HB)
- Surface mount Brick fuses (6125 & 1025)
- CMS Family & Toroid power inductors (LCPI )
- Econo-Pac Families

# Meters, Instruments, Diagnostics

## Application:

- Real time clock backup
- Battery swap ride through
- Audible alarm power
- Battery life extension
- Point-of-load (POL) converters
- Circuit Protection (OC&OV)
- Challenges
  - Reliability
  - Peak power
  - High efficacy
- Why Eaton
  - Low total cost of ownership (Supercaps)
  - High peak power capability
  - Reliability and life time

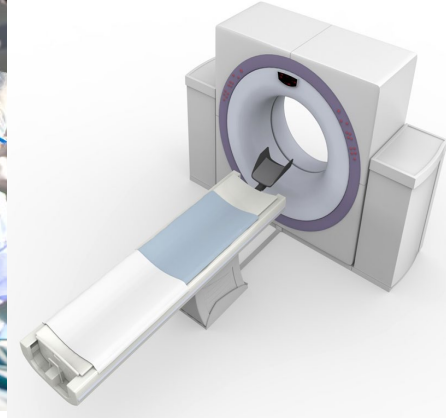


## Eaton's electronic components:

- KR family & KW family
- B/HB Families
- PB/PHB Families
- PPTC Resettable fuses
- MPI Families & DR Families
- CC06H, 0603FA & 3216FF Chip Fuses
- ESD Suppressors

# Mobile equipment (Ventilators, X-ray, CT and MRI)

- Application:
  - Peak power shaving
  - Emergency backup
  - DC-DC, EMI filters & Point of Load
  - Over Current protection
- Challenges
  - High power loads: CT-scan, MRI
  - High cost of increasing facility power
  - Frequent power backup checks



- Why Eaton
  - High peak power capability
  - Low total cost of ownership
  - Maintenance free (Supercaps)
  - Reliability and life time

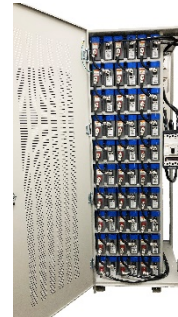
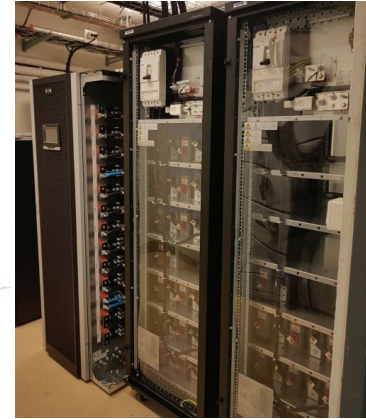


## Eaton's electronic components:

- XV3560-2R7407-R (up to 200)
- XT3560-3R0377-R (up to 180)
- XLM-62R1137-R (10x 3)
- Cartridge fuses (5mm and 1/4")
- Panel mount/PCB fuseholders (HTB, H15 & HB)
- HCM Families, DR/DRA Families & CMS Family

# Facilities (UPS, hospital grid boost)

- Application:
  - UPS – with genset
  - Grid stabilization/boost
- Challenges
  - Reliability – critical power
  - Old hospitals electrical infrastructure doesn't support high peak power equipment
- Why Eaton
  - Expertise and proven on the field
  - Highest power and energy density supercapacitor solutions
  - Total solution provider for complete backup systems



## Eaton's electronic components:

- XLM-62R1137-R (10x 1-10)
- XLCM cabinets

# Eaton's Essential Components for Critical Equipment



Inductors



Transformers



Supercapacitors



Fuses



PTC Resettable Fuses



Fuse Holders



ESD Suppressors



**Ventilators**

**Hospital Beds**

**Blood Analyzers**



**Ultrasound**

**Patient  
Monitors**

**Mobile X-Ray**



Powering Business Worldwide

# Ferrule / cartridge fuses and accessories



## Ferrule Fuses and accessories

Wide range of certified fuses to safely protect valuable medical stationary or larger mobile/cart type medical equipment and personnel from damaging overcurrent conditions

### Product Description

1/4" and 5 mm diameter cylindrical fuses designed to both UL and IEC standards

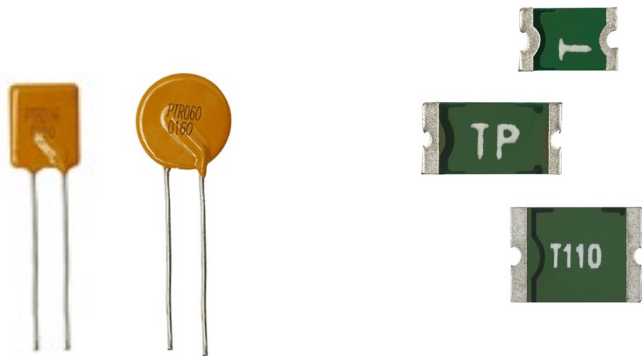
### Features & Benefits

- Performance from very fast-acting to dual element time-delay
- Voltage ratings up to 600Vac and 400Vdc
- Proven products with multiple specifications written around Bussmann brand (ABC, MDA, GMA, etc)
- Vast capabilities in both UL and IEC design characteristics
- Multiple packaging configurations to service OEM and MRO

### Applications

- Power conversion Medical power supplies, rectifiers, converters
- Cable and wire harnesses for Medical applications
- Control circuit and component protection in medical equipment panels
- Control equipment and transformer protection
- Medical test and measurement equipment

# PTC Resettable fuses



To protect any Medical devices with communication and/or charging ports.

## Product Description

Radial and Surface mount polymeric positive temperature coefficient (PPTC) resettable overcurrent protection devices

## Features & Benefits

- Fast time-to-trip
- Low resistance
- Halogen free
- lead free, RoHS compliant
- Up to 60V rating

## Applications

- Protect USB peripherals for Medical equipment
- Control circuit and component protection in equipment panels
- Control equipment and transformer protection

# ESD suppressors



Ultra-low Capacitance  
(PolySurg™)



Multilayer Varistors



TVS Diodes

## Product Description

Multiple ESD Suppressor technologies in 0201, 0402 and 0603 sizes

## Features & Benefits

- Provides Electro Static Discharge (ESD) protection with fast response protection with fast response time ( $<1$  ns) allowing equipment to pass IEC 61000-4-2 Level 4 test
- Multiple packaging configurations
- Unique ultra-low capacitance ESD protection within Polysurg
- Low leakage current ( $<0.1$  nA typ.) reduces power consumption

## Applications

- Protect data IC's from ESD damage for Medical equipment
- Control circuit and component protection in equipment panels
- Control equipment and transformer protection
- Test and measurement equipment

# Radial fuses



## Product Description

Space saving round & square body radial leaded fuses are designed to UL248 and IEC 60127-3 for overcurrent protection of electronic circuits.

## Features & Benefits

- Performance from fast-acting to time-delay
- Proven products with multiple specifications written around Bussmann brand up to 450Vdc
- Most of the plastic cap and base conform to the flammability requirements of UL 94V0 and to MIL-STD-202F, Method 201A for high frequency vibration

## Applications

- Primary and secondary circuit protection for Medical Equipment
- Control circuit and component protection in equipment panels
- Test and measurement Medical equipment

# Coin Cell Supercaps



## Product Description

Supercapacitor energy storage for real time clock (RTC) backup

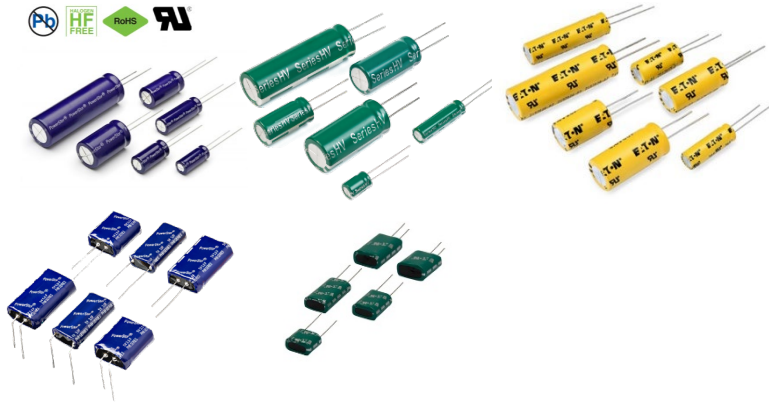
## Features & Benefits

- 0.1-1.5F capacity per cell
- 5.5V rated voltage
- -40°C-+85°C operating temperature available (KW series)
- Very low self discharge
- Up to 20yrs lifetime
- RoHs, Reach, no heavy metals or un-safe chemicals used like in batteries

## Medical Applications

- **Medical monitoring, testers, analysers** control circuit brownout protection nearly all electronic equipment uses (0.5-5uA with days of autonomy time). Typically 0.5-1.5F cells used to replace button cell batteries to reduce equipment downtime and improve reliability using maintenance free supercapacitor solution.

# Cylindrical Cell & Pack Supercaps (B,HB,HV,TV,PB,PHB,PHV)



## Product Description

Supercapacitor energy storage for short term backup and pulse applications for automotive, industrial and medical.

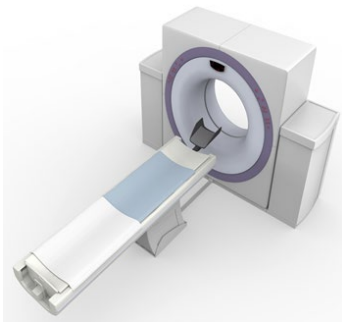
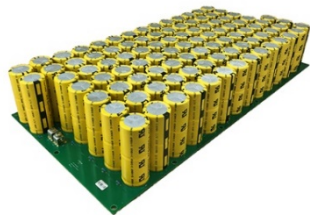
## Features & Benefits

- 0.5-110F capacity per cell
- 2.5, 2.7, 3.0, 5.0 or 5.4V rated voltage
- -40°C -+85°C operating temperature
- UL recognized
- B, HB, PB, PHB offer maximum safety and compliance
- TV offers the highest performance, highest energy and power

## Medical Applications

- Battery boost for **smart personal testers** (blood sugar, urine etc.) typically 0.5-1F/3.6V
- **Medical monitoring**, control circuit brownout protection nearly all electronic equipment uses (0.1-1A for seconds) typically 2.5-5F/5V
- **Mobile respiratory ventilator** boost with continuous cycling for battery range extension 1-2F/12-24V

# Module Supercaps



## Product Description

Supercapacitor energy storage for short term backup and pulse applications for automotive, industrial and medical.

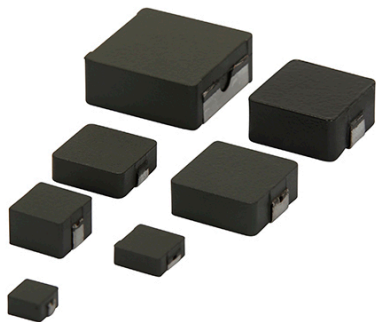
## Features & Benefits

- 4-189F capacity per module
- 16-62V rated voltage
- -40°C-+85°C operating temperature
- UL recognized
- Highest power and energy density on the market
- Up to 1450V per string

## Medical Applications

- Peak power support for medical imaging (mobile X-ray, CT, MR). Typically 25KW for mobile and 250kW for stationary equipment
- Battery power boost for automated guided hospital vehicles and beds

# High Current HC/HCM Family



## Product Description

HCM product line uses pressed powder construction providing a robust high current low EMI inductor ideal for medical applications.

## Features & Benefits

- Temperature : -55C to 155C
- Inductance up to 100uH/100A+
- High Current / Low DCR
- 11 Footprints (4x4 to 22x22)
- Soft Roll-off
- Low EMI

## Applications

- DC/DC (Buck, boost, forward, and resonant converters)
- Memory and Core power for high-end FPGAs/processors for sophisticated algorithm and critical mission, like diagnostics imaging & anesthesia delivery systems.
- Portable and handheld medical devices
- LCD panels for medical equipment
- Noise filtering and filter chokes
- Point-of-load (POL) converters

# High Current MPI Family



## Product Description

MPI miniature power inductors high current, low profile inductors in very small form factors which make them well suited for mobile applications and devices

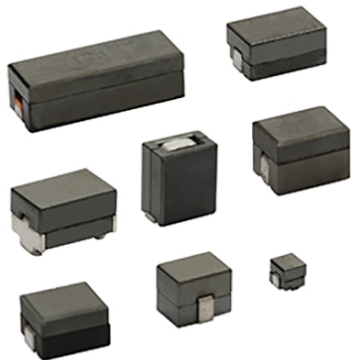
## Features & Benefits

- High current carrying capacity
- Magnetically shielded, Low EMI
- Rugged flexible construction
- Small footprint (2.2x1.6, 2.7x2.2, 4.8x4.4)
- High operating frequency 3MHz+

## Applications

- DC/DC (Buck, boost, forward, and resonant converters)
- Portable and handheld medical devices
- LCD panels for medical equipment
- Sensors and signal conditioning for medical equipment
- IoT for medical devices
- Noise filtering and filter chokes
- Point-of-load (POL) converters

# High Current FP Family



## Product Description

LAT-PAC (FP) family power inductors are available in a wide array of footprints and profiles for high performance requirements.

## Features & Benefits

- Ferrite core material
- High efficiency and low loss
- Ultra low DCR with tight tolerance for sensing circuits
- Current range up to 100A+
- Different form factor, more than 30 size to optimize the power and space needs

## Applications

- Multi-phase DC/DC
- Memory and Core power for high-end FPGAs/processors for sophisticated algorithm and critical mission, like diagnostics imaging & anesthesia delivery systems.
- Noise filtering and filter chokes

# Chip Inductor



## Product Description

MCL multilayer and WCL wirewound chip inductors for RF and EMI application

## Features & Benefits

- Wide product range 0402/0603/0805 size, 1nH to 22uH
- Low profile
- High Current
- Low DCR

## Applications

- Turn circuit for RF circuit
- Noise filtering and filter chokes
- Wireless LAN/Bluetooth for medical equipment
- IoT for medical devices

# Eaton's Parts for Medical Equipment

## Supercapacitors



## Inductors & Transformers

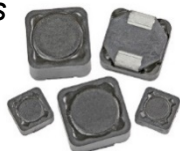


*Econo-Pac Series*

*HC Series*



*FP Series*



*DR/DRA Series*



*CMS Series*



*Versa-Pac Series*

## Circuit Protection



*Cartridge fuses & holders*



*PCB Fuses*



*PPTCs*



*PolySurg*

## Terminal Blocks



*A2 Series*



*A3 Series*

We make what matters work

# Tools & resources



## Parametric search

Drill down into the Eaton Electronics product database to find the right part for your application.



## Cross reference

Find a cross to a competitor's product or to an alternate Eaton Electronics part number.



## Terminal block selector

Find the right terminal block for any application.



## IC matching

Find the Eaton Electronics parts called out on IC manufacturers' demo and evaluation boards.



## Supercapacitor calculator

Determine your calculated requirements and design capability.



## Automotive electronics solutions

Find electronics components for automotive solutions.

[www.eaton.com/electronics](http://www.eaton.com/electronics)

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