



Protect your
passengers and
infrastructure
On board with Eaton

EATON

Powering Business Worldwide

Eaton help you build better and safer trains

Compliance

Eaton is offering leading products that guarantee the highest levels of safety and performance according to specific standards such as IEC 61373 (rolling stock equipment - shock and vibration tests) or EN 45545-2 (fire protection on railway vehicles).

Eaton products comply with the usual electrical standards (IEC and UL) for a worldwide usage.

With a unique mix of products, Eaton possesses industry-recognized safety products that are specifically designed for the railway's harsh and hazardous environment.

Competitiveness

Eaton is providing a large range of standard products covering the major electrical components used in rolling stock, and which are designed to reduce the level of maintenance required even when operating in harsh environmental conditions.

You can optimize your total cost of ownership by reducing the maintenance cost with our proven long life-time products.

Our innovation center and engineering teams are designing customized solutions that enhance productivity. Our engineering services help to optimize investment cost.

Expertise and partnerships

With our rail competency center and a network of application engineers, we ensure that new and refurbished trains offer high levels of reliability and help to reduce total cost of ownership.

Legacy of innovation

With 30 years of experience in rail, our innovative portfolio has grown, including solutions from:

Heinemann	Cooper
Bussmann	Walterscheid
Moeller	Vickers
Martek Power	Aeroquip





Protect your passengers and infrastructure

Applications

Protection and switching of electrical equipment such as:

- Motors
- HVAC systems
- Power outlets
- Door control
- Lighting
- Signaling
- Battery box

Your challenges

- Fire safety
- Harsh environmental conditions
- Long life cycle
- Long cables
- Temperature variation
- Switching of loads

Our solutions

Eaton has a unique offer of power protection and switching devices, including:

- Miniature Circuit Breakers (MCB)
- Residual Current Devices (RCD)
- Electronic protection modules (PXS)
- Contactors (DILM, DILH)

Benefits

- Rail certified MCBs, RCDs and contactors from one hand
- Electronic protection modules for safe and reliable protection of 24 VDC circuits
- Special characteristics to avoid nuisance tripping
- Digital RCDs to increase system availability
- RT MCBs & RCDs for safe & reliable electrical connections
- DILM/DILH contactors for safe switching of inductive or weakly inductive loads or their load circuits
- IEC 61373 (Shock & Vibration)
- EN 45545 (Smoke & Fire)

Safe & reliable connections

- Eaton's xEffect portfolio contains also special RT MCB & RCD ranges.
- The xEffect RT ranges are especially designed for the use with ring cable lugs.
- These ensure the highest safety and reliability for electrical connections.
- The PXS24 electronic protection modules are equipped with push-in terminals, another very reliable type of connection.





Protect your passengers and infrastructure

RCDs - Digital



FRCdM, FRBdM

RCBOs



FRBmM

RCBOs - RT



FRBmM-RT

Product description

The xEffect RCDs for fault or additional protection are equipped with digital features to keep system's up-time high. The digital features provide prewarning of creeping fault currents. This helps the operator of the system to solve problems without unwanted downtime. The digital RCDs are available as Type A, B, Bfq and B+. A wide range of accessories completes the digital RCDs.

The xEffect combined MCB/RCD breakers (RCBOs) for short-circuit, overload and residual current protection guarantee highest protection and selectivity in case of a fault. The compact shape of the RCBOs ensures lowest space requirement and global approvals allow a worldwide use. A comprehensive range of auxiliaries, tripping modules, interlocks, busbars and other accessories complete the portfolio.

The xEffect RT RCBOs provide short-circuit, overload and residual current protection. They are especially designed for the use with ring cable lugs. This type of connection ensures highest safety and reliability for electrical connections. The RT RCBOs use the same footprint as the standard xEffect RCBOs which allows the use of the standard RCBO accessories as auxiliaries, tripping modules, interlocks and busbars.

Technical features

In (A)
Un (V)

up to 80 A

240 / 415 VAC

up to 40 A

240 / 415 VAC

up to 40 A

240 / 415 VAC

Rated Tripping Current

30 & 300 mA

10, 30, 100 & 300 mA

30 & 300 mA

Braking capacity

up to 10 kA

up to 10 kA

up to 10 kA

Features

- IEC/EN 61008 (RCCB) IEC/EN 61009 (RCBO)
- EN 45545
- IEC 61373
- Pole: 1N, 2 (RCBO); 3N (RCCB)
- Real-time measurement of the residual current
- Local pre-warning via LEDs
- Remote pre-warning via potential free output (only RCCB)
- Yearly test interval
- Global approvals
- Sensitivity: A, (RCBO); A, B, Bfq, B+ (RCCB)
- Tripping characteristics (only RCBO): B, C, D

- IEC/EN 61009, IEC/EN 60947-2
- EN 45545
- IEC 61373
- Pole: 1N, 2, 3, 3N
- Tripping characteristics: B, C, D
- Contact position indicator (red / green)
- Tripp indicator (white / blue)
- Global approvals
- Wide range of accessories

- IEC/EN 61009
- EN 45545
- IEC 61373
- Pole: 1N, 3
- Tripping characteristics: B, C, D
- Sensitivity : AC, A
- Contact position indicator (red / green)
- Tripp indicator (white / blue)
- Wide range of accessories

Applications

- Protection of electronic equipment and cables against overload & short circuit (only RCBO)
- Protection of people and equipment against residual currents (e.g. circuits with socket outlets...)
- Protection of people and equipment against residual currents in applications with frequency drives (1phase & 3phase)
- Type G RCDs for highest system availability

- Protection of electronic equipment and cables against overload & short circuit
- Protection of people and equipment against residual currents (e.g. circuits with socket outlets...)
- Fits perfectly in applications with less space
- Type G or LiA RCBOs for highest system availability

- Protection of electronic equipment and cables against overload & short circuit
- Protection of people and equipment against residual currents (e.g. circuits with socket outlets...)
- Fits perfectly in applications with less space
- Highest safety and reliability for electrical connections

RCCBs



FRCmM

The xEffect residual current circuit breaker (RCCB) range offers protection against residual currents in systems and installations. xEffect RCCBs can be used for fault and additional protection. Time delayed types and specially developed tripping curves ensure a interference-free operation. The portfolio is completed by a comprehensive range of accessories.

up to 100 A

240/415 VAC

30, 100, 300 & 500 mA

up to 10 kA

- IEC/EN 61008
- EN 45545
- IEC 61373
- Pole: 1N, 3N
- Sensitivity : AC, A, F
- Contact position indicator (red / green)
- Tripp indicator (white / blue)
- Global approvals
- Wide range of accessories

- Protection of people and equipment against residual currents (e.g. circuits with socket outlets...)
- Protection of people and equipment against residual currents in applications with frequency drives (1phase)
- Type G RCCBs for highest system availability

RCCBs - RT



FRCmM-RT

The xEffect RT RCCB provides protection against residual currents. It is especially designed for the use with ring cable lugs. This ensures highest safety and reliability for electrical connections. The RT RCCBs use the same footprint as the standard xEffect RCCBs what guarantees a comprehensive range of accessories.

up to 63 A

240/415 VAC

30 & 300 mA

up to 10 kA

- IEC/EN 61008
- EN 45545
- IEC 61373
- Pole: 1N, 3N
- Sensitivity : AC, A
- Contact position indicator (red / green)
- Tripp indicator (white / blue)
- Global approvals
- Wide range of accessories

- Protection of people and equipment against residual currents (e.g. circuits with socket outlets...)
- Highest safety and reliability for electrical connections

RCD Blocks



FBSmV

The xEffect FBSmV RCD Blocks can be combined with FAZ MCBs and allow the creation of application specific RCBOs. The combination provides short-circuit, overload and residual current protection for systems up to 63 A. The portofolio will be completed by auxiliaries and other accessories.

up to 63 A

240 / 415 VAC

30, 100, 300, 500, 1000 mA

-

- IEC/EN 61009
- EN 45545
- IEC 61373
- Pole: 2, 3, 4
- Sensitivity : AC, A
- Tripp indicator (white / blue)
- Global approvals
- Wide range of accessories

- Protection of electronic equipment and cables against overload & short circuit
- Protection of people and equipment against residual currents (e.g. circuits with socket outlets...)
- Creation of application specific RCBOs up to 63A

Electronic Protection Module



PXS24

The xEffect PXS24 electronic protection module provides short circuit & overload protection for 24 VDC circuits. The tripping behavior addresses the requirements in the 24 VDC circuits and provides reliable protection, especially in combination with long cable lengths. The communication capability of PXS24 allows also a easy integration into the control system. These enables the possibility to protect & control the circuit with one device.

up to 16 A

24 VDC

-

-

- EN 45545
- IEC 61373
- Selective switch-off in case of a fault
- Active current limitation
- Protection & Switching of loads
- Integrated digital In- and Outputs

- Protection of electronic equipment and cables against overload & short circuit
- Protection of long cable lengths

Protect your passengers and infrastructure

MCBs up to 15kA



FAZ

MCBs up to 25kA



FAZT, AZ

MCBs for DC



FAZ-DC

Product description

The xEffect FAZ range provides a broad range of thermal magnetic circuit breakers. They guarantee a reliable protection against overload and short-circuits in installations and systems worldwide. A big range of auxiliaries, tripping modules, interlocks, busbars and other accessories complete the portfolio.

The xEffect FAZT & AZ MCBs are equipped with a high level of rated switching capacity up to 25 kA. These guarantee a reliable protection against overload and short-circuits for applications in which high short-circuits can occur. The range will be completed by a broad range of auxiliaries and other accessories.

The xEffect FAZ-DC range is especially designed for overload and short-circuit protection in DC applications up to 500 VDC. The standard FAZ accessories complete the range.

Technical features

In (A)

up to 63 A

up to 125 A

up to 50 A

Un (V)

up to 254/440 VAC or 60 VDC

up to 254/440 VAC or 60 VDC

up to 500 VDC (250 VDC per pole)

Rated Tripping Current

-

-

-

Braking capacity

up to 15 kA

up to 25 kA

up to 10 kA

Features

- IEC/EN 60898-1, IEC/EN 60947-2
- UL 1077
- EN 45545
- IEC 61373
- Pole: 1, 1N, 2, 3, 3N, 4
- Tripping characteristics: B, C, D, K, S, Z
- Contact position indicator (red / green)
- Global approvals
- Wide range of accessories

- IEC/EN 60947-2
- EN 45545
- IEC 61373
- Pole: 1, 1N, 2, 3, 3N, 4
- Tripping characteristics: B, C, D
- Contact position indicator (red / green)
- Global approvals
- Wide range of accessories

- IEC/EN 60947-2
- EN 45545
- IEC 61373
- Pole: 1, 2
- Tripping characteristics: B, C
- Contact position indicator (red / green)
- Global approvals
- Wide range of accessories




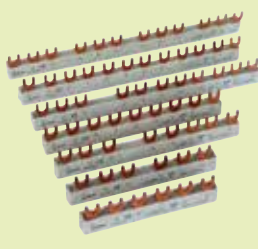
Applications

- Protection of electronic equipment and cables against overload & short circuit

- Protection of electronic equipment and cables against overload & short circuit

- Protection of electronic equipment and cables against overload & short circuit



MCBs - RT	MCBs - RT for DC	Auxiliaries	Busbars
 <p data-bbox="145 611 209 636">FAZ-RT</p>	 <p data-bbox="504 611 592 636">FAZ-RT-DC</p>	 <p data-bbox="858 611 999 636">Screw or Snap-on</p>	 <p data-bbox="1219 611 1347 636">Fork or Pin Flags</p>
<p data-bbox="129 696 464 891">The xEffect FAZ-RT provides short-circuit and overload protection. It is especially designed for the use with ring cable lugs. This type of connection ensures highest safety and reliability for electrical connections. A comprehensive range of accessories completes the portfolio.</p>	<p data-bbox="464 696 815 913">The xEffect FAZ-RT provides short-circuit and overload protection in DC applications up to 500 VDC. It is especially designed for the use with ring cable lugs. This type of connection ensures the highest safety and reliability for electrical connections. A comprehensive range of accessories completes the portfolio.</p>	<p data-bbox="815 696 1166 842">A broad range of auxiliaries as auxiliary contacts, shunt trip releases or undervoltage releases complete the MCB & RCD offering. Most items are available as screw-on or snap-on device.</p>	<p data-bbox="1166 696 1524 864">These busbars allow an easy and fast installation and help to optimize the production process as well as to safe costs. Busbars are available as yardgood or pre-cut types. Special busbars also available for auxiliary contacts.</p>
<p data-bbox="129 981 464 1048">up to 63 A up to 254/440 VAC</p>	<p data-bbox="464 981 815 1048">up to 50 A up to 500 VDC (250 VDC per pole)</p>	<p data-bbox="815 981 1166 1048">- up to 415 VAC or 250 VDC</p>	<p data-bbox="1166 981 1524 1048">up to 100 A up to 1000 V AC/DC</p>
<p data-bbox="129 1137 464 1171">up to 15 kA</p> <ul data-bbox="129 1178 464 1462" style="list-style-type: none"> • IEC/EN 60947-2 • UL 489 • EN 45545 • IEC 61373 • Pole: 1, 2, 3, 4 • Tripping characteristics: B, C, D • Contact position indicator (red / green) • Global approvals • Wide range of accessories 	<p data-bbox="464 1137 815 1171">up to 10 kA</p> <ul data-bbox="464 1178 815 1462" style="list-style-type: none"> • IEC/EN 60947-2 • EN 45545 • IEC 61373 • Pole: 1, 2 • Tripping characteristics: B, C • Contact position indicator (red / green) • Global approvals • Wide range of accessories 	<p data-bbox="815 1137 1166 1171">-</p> <ul data-bbox="815 1178 1166 1429" style="list-style-type: none"> • IEC/EN 60947-2 • EN 45545 • IEC 61373 • NO, NC, CO auxiliary contacts • Shunt trip release • Undervoltage release • Screw-on or Snap-on 	<p data-bbox="1166 1137 1524 1171">-</p> <ul data-bbox="1166 1178 1524 1317" style="list-style-type: none"> • IEC/EN 60947-2 • UL 489, UL 508, UL 1077 • Fork or pin flags • Yard-good or pre-cut
<ul data-bbox="129 1529 464 1664" style="list-style-type: none"> • Protection of electronic equipment and cables against overload & short circuit • Highest safety and reliability for electrical connections 	<ul data-bbox="464 1529 815 1664" style="list-style-type: none"> • Protection of electronic equipment and cables against overload & short circuit • Highest safety and reliability for electrical connections 	<ul data-bbox="815 1529 1166 1709" style="list-style-type: none"> • Auxiliaries for overload, short circuit or residual current protection devices • Communicate the status of the protection device to the controller • Release the protection device from remote 	<ul data-bbox="1166 1529 1524 1585" style="list-style-type: none"> • Build faster and more cost efficient power distribution systems



Switch high loads properly

Contactors



DILM250/22
DILM300A/22



DILM400/22
DILM500/22



DILH600/22
DILH800/22

Product description

Eaton contactors comply with the latest standards and current market trends—particularly when it comes to low pickup and sealing power, thanks to electronically controlled drives. 4 wide-range actuating voltages cover a voltage range from 24 V to 500 V and can be controlled with both an AC and a DC power supply. Another advantage is the high rated control circuit voltage tolerance range of $0.7 \times U_c \text{ min} - 1.15 \times U_c \text{ max}$.

All contactors offer high technical performance through a variety of actuating options – via a classic switching element, directly from the PLC or via a separate low-power sensor. A further advantage of the contactors is their excellent mechanical and electrical durability. The fact that all auxiliary contact modules feature positive-opening contacts to IEC/EN 60947-5-1 and mirror contacts to IEC/EN 60947-4-1 is an additional advantage of the contactors.

Technical features	In (A) @40 °C [AC-1]	430 up to 490 A	612 up to 800 A	850 up to 1050 A
Rated operational current	In (A) [AC-3]	250 up to 300 A	400 up to 500 A	-
Rated operational voltage	Un (V)	1000	1000	1000
Features	<ul style="list-style-type: none"> • IEC/EN 60947-4-1; UL 60947-4-1; CSA - C22.2 no. 60947-4-1-14; CE marking • EN 45545 • IEC 61373 • UL File No. E29096 • UL category control no. NLDX • CSA file no. 1017510 • CSA class no. 3211-04 • Global approvals • Large choice of accessories • Auxiliary contacts: 2 closing contacts and 2 normally closed contacts pre-installed on basic device 			

Applications

From extreme conditions of use up to special applications, such as switching inductive loads (e.g., motors or electrical installations, including heating systems, components of ventilation and air-conditioning systems, and lighting installations.)





Discover how Eaton can help you solve your power management challenges.

Providing your business with a new dimension of expertise, customized innovative solutions and uninterrupted railway operations.

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