



# RAILWAY PROTECTION

Rolling Stock, Signalling and  
Rail Infrastructure



## Foreword

### **CBI-electric: low voltage – Your partner in customer specific solutions for electrical protection and IoT**

Thank you for your interest in our company and the products and solutions we offer. CBI-electric: low voltage is a company that exists to support our customers and industries across the world to manage their low voltage energy needs. We do this by engineering, manufacturing and distributing devices that oversee the protection of electrical infrastructure, devices that measure and communicate energy data, electrical wiring accessories, IoT enabled devices, switchgear and many other products and solutions that enable the safe and effective use of electrical energy.

We are very proud of our over 75 year history as a Global supplier into the world's Telecommunications industries, Data centers, Renewable Energy, Railway signaling and a vast array of other mission critical applications. We are the only manufacturer of scale in the southern hemisphere and in Africa. Being geopolitically independent from the usual points of global manufacture we offer our customers some safety from supply risks associated with global political shifts, health risks, and other major events that can disrupt supply chains.

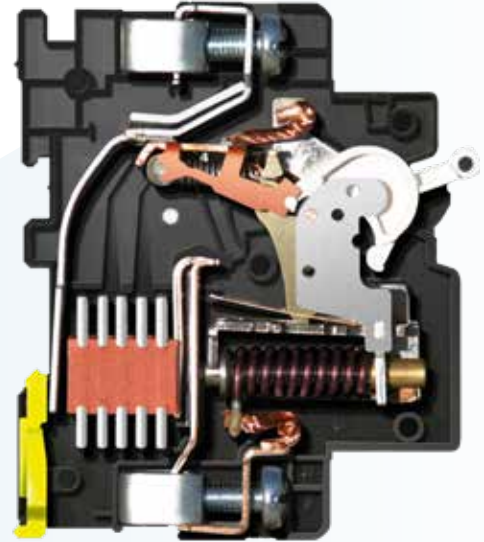
We have an extensive range of products and solutions with multiple global certifications and we welcome all opportunities to engage directly with our customers to understand their needs and partner to solve our customers' unique challenges.

**Charl Osborne**  
**Managing Director**



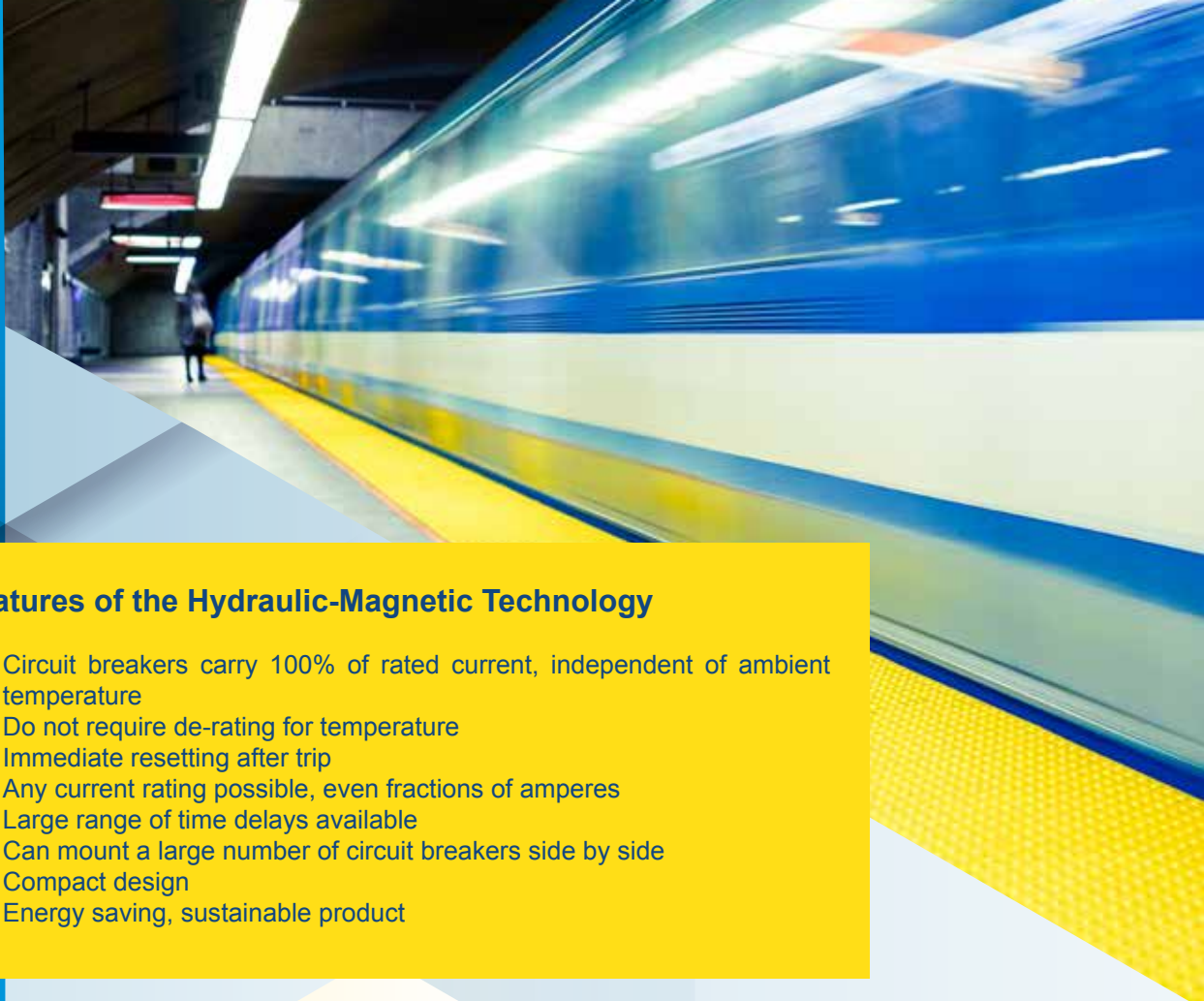
## Company Profile

CBI-electric: low voltage, formerly Circuit Breaker Industries (CBI), is a wholly owned South African subsidiary of Reunert Ltd., which is listed on the Johannesburg Stock Exchange. CBI has more than 70 years of experience in the design and manufacture of a comprehensive range of technically advanced hydraulic-magnetic circuit breakers for electrical protection. Founded in 1949, the company is a world leader in circuit breakers and residual current devices for residential, industrial and equipment protection applications.



While the company is a world leader in the design of hydraulic-magnetic circuit breaker technology, it also uses thermal-magnetic and electronic sensing operating principles in some of its products. The company has excelled as a technology leader through continual and substantial investment in the research and development of its products and in maintaining its modern manufacturing facilities.





### Features of the Hydraulic-Magnetic Technology

- Circuit breakers carry 100% of rated current, independent of ambient temperature
- Do not require de-rating for temperature
- Immediate resetting after trip
- Any current rating possible, even fractions of amperes
- Large range of time delays available
- Can mount a large number of circuit breakers side by side
- Compact design
- Energy saving, sustainable product

## CIRCUIT BREAKERS FOR RAILWAY EQUIPMENT

### Circuit Breakers

While circuit breakers are generally applied for the protection of cables and installations, it is important to choose the correct circuit breaker to protect critical equipment so that essential services are maintained while protecting the equipment. Careful selection of appropriate circuit breakers with specific characteristics will ensure that critical equipment is protected against electrical faults.

CBI's hydraulic-magnetic Circuit Breakers for Railway Equipment comply with various international standards and are built to the highest quality standards. They are specifically designed with the capability to be configured to the requirement of the designer of the end-product or system equipment. CBI's technical and sales staff often work with the design engineers to select the most appropriate product for the requirement. CBI also works with its customers to develop specific customer solutions.

Generally the CBI's hydraulic-magnetic circuit breakers are front mounted, rail mounted, terminal mounted or surface mounted, and available for both AC and DC applications. The products are built to suit the environment of rail protection and to comply with strict environmental specifications.

### Selection and Application of Circuit Breakers for Railway Equipment Protection

The critical operational requirement of railway equipment demands selection of high quality circuit breakers offering a high level of safety, resistance to pollution, shock and vibration, as well as close protection with tripping characteristics suitable for the specific application. Circuit breakers are by definition safety devices and must comply with appropriate specifications and approvals. Many of these are legal and / or regulatory in nature.

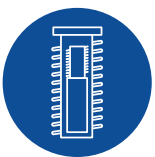
Major considerations in the selection of these circuit breakers are the total cost of ownership of the installed system, life-cycle cost of the equipment, mounting footprint, termination and handle styles and actuator design. When operated with auxiliary switches, trip alarm, shunt and remote trip capabilities, CBI's circuit breakers assist the customer's design engineers in their quest for a high quality design.



**SHORT CIRCUIT PROTECTION**



**OVERLOAD PROTECTION**



**HYDRAULIC-MAGNETIC TECHNOLOGY**

## Standards

Our circuit breakers are designed and comply with the following:

- EN 50155 - Electronic equipment used on rolling stock for railway applications
- EN 45545-2 - Fire performance requirement on railway vehicles
- NF F16-101/-102 - Fire behaviour - Railway rolling stock
- IEC 61373 - Shock & vibration resistance - Railway rolling stock
- ASTM E Standards



Railway Specifications	
Standard	Description
Ambient Operational Temperature	-40°C to +85°C (OT6)
EN 50155	Electronic equipment used on rolling stock for railway applications
IEC 60068-2-1 (test Ad)	Low temperature start-up
IEC 60068-2-2, (test Bd)	Dry heat
IEC 60068-2-11 (test Ka)	Salt mist
IEC 60068-2-30 (test Db)	Cyclic damp heat
EN 50121-3-2	EMC (Electromagnetic compatibility) - railway rolling stock
EN 50125-1	Environmental conditions
IEC 61373	Shock & Vibration resistance - railway rolling stock Shock, category 1 class B body mounted Vibration, category 1 class B body mounted
EN 45545-2, HL3	Fire performance requirement on railway vehicles
NF F16-101/-102 I, F	Fire behaviour - railway rolling stock
MIL-STD 202G, method 107 G, test condition A	Thermal shock
MIL-STD 202G, method 106G	Moisture resistance / humidity

## Common features

- High energy AC and DC circuit breaker
- Ultra compact design
- Hydraulic-magnetic technology
- Can be switched on immediately after tripping
- DIN mount, 45 mm front escutcheon (Grey, 13 mm only)
- DIN mount, 57 mm front escutcheon (Black, 13 mm only)
- Dual (DIN & mini rail) mount, 57 mm front escutcheon (Black, 13 mm only)
- Suitable for electrical isolation
- 100 % rating capability, independent of ambient temperature
- RoHS and REACH compliant

## Applications

- Rolling Stock
- Railway signalling
- Rail infrastructure



## Technical Data

Product Type	Circuit Breaker	Circuit Breaker	Circuit Breaker	Circuit Breaker
Approvals	IEC / EN 60947-2, GB14048.2, CE, UKCA	IEC / EN 60947-2, GB14048.2, CE, UKCA	IEC60947-2, CE, UKCA	AS/NZS 60947-2, IEC60947-2, CE, UKCA
Number of Poles	1, 2, 3, 4	2 - 5 (parallel)	1, 2 - 3 (parallel)	1, 2
Maximum Voltages	240 / 415 Vac, 80 Vdc	80 Vdc	60 Vdc	125 Vdc
Current Ratings	0.1 - 60 A(ac) 0.1 - 100 A(dc)	110 - 400 A	125 A, 250 A, 300 A	0.1 - 60 A
Ics	5 kA (DC), 1.25kA (AC),	5 kA	2.5kA	2.5kA
Icu	3 kA (AC) 5 kA (AC) 10 kA (DC)	10 kA	5 kA	5 kA

Product Type	Circuit Breaker	Circuit Breaker	Circuit Breaker
Approvals	UL489	UL489 A, CSA C22.2 No. 5 -16	UL489 A, CSA C22.2 No. 5 -16
Number of Poles	1, 2, 3	1, 2 - 3 (parallel)	2 - 5 (parallel)
Maximum Voltages	120 Vac, 120 / 240 Vac, 240 Vac, 80 Vdc	60 Vdc	80 Vdc
Current Ratings	0.1 - 80 A(ac) 0.1 - 100 A(dc)	125 A, 250 A, 300 A	110 - 400 A
AIC	AC - 10 kA, DC - 20 kA	14 kA	20 kA

Product Type	Circuit Breaker	Circuit Breaker	Switch	Switch
Approvals	IEC / EN 60934, CE, GB17701, UKCA	UL1077, cURus	UL508	IEC / EN 60947-3, CE
Number of Poles	1 - 4	1 - 6	1, 2	1, 2
Maximum Voltages	240 / 415 Vac, 80 Vdc	277 / 480 Vac, 80 Vdc	120/240 Vac, 80 Vdc	240 Vac
Current Ratings	0.1 A - 100 A (1 p), 0.1 A - 70 A (2 - 3 p)	.1 A - 100 A (1 p), 0.1 A - 70 A (2 - 4 p)	15 A - 100 A	50 A
Interrupting Capacity	-	2 kA/U2/ U3 (AC) 5 kA/ C1 (AC) 5 kAU2/ U3 (DC)	-	-
Rated conditional S/C	3 kA (AC) PC1, 5 kA (DC) PC1	-	-	-
Icm	-	-	-	0.6 kA (for 1 switch)

Verify approvals for specific ratings in accordance with the relevant test certificate

### Aux Switch Specification

Gold DB3	EN61058 0.1 A @ 250 Vac & 0.1 A @ 80 Vdc and UL1054 0.1 A @ 125/250 Vac & 0.1 A @ 30 Vdc & 0.3 A @ 60 Vdc
Silver DB2	EN61058 10 A @ 250 Vac & 0.1 A @ 80 Vdc and UL1054 10 A @ 125/250 Vac
Silver V4D	EN61058-1 10 A @ 250 Vac



(UL489A)



(UL489;  
CSA C22.2 NO.5)



(UL1077;  
CSA C22.2 NO.235-04)



(CSA C22.2 No. 5-16)



(IEC / EN 60947-2;  
IEC / EN 60934)



(GB14048.2;  
GB17701)



(IEC 60947-2; IEC 60934)



(IEC 60947-2)



## DD Remote Actuator Unit (RAU) D7



### Technical Data

Product Type	Circuit Breaker	Circuit Breaker	Circuit Breaker	Circuit Breaker
Approvals	IEC / EN 60947-2, GB14048.2, CE, UKCA	IEC / EN 60947-2, GB14048.2, CE, UKCA	IEC60947-2, CE, UKCA	AS/NZS 60947-2, UKCA
Number of Poles	RAU + 1, RAU + 2, RAU + 3	RAU + 2, RAU + 3	RAU + 1, RAU + 2, RAU + 3	RAU + 1, RAU + 2
Maximum Voltages	240 / 415 Vac, 80 Vdc	80 Vdc	60 Vdc	125Vdc
Current Ratings	0.1 - 60 A(ac) 0.1 - 100 A(dc)	110 - 250 A	125 A, 250 A, 300 A	0.1 - 60 A
Ics	5 kA (DC), 1.25kA (AC)	5 kA	2.5kA	2.5kA
Icu	3 kA (AC) 5 kA (AC) 10 kA (DC)	10 kA	5 kA	5 kA

Product Type	Circuit Breaker	Circuit Breaker	Circuit Breaker
Approvals	UL489	UL489 A, CSA C22.2 No. 5-16	UL489A, CSA C22.2 No. 5-16
Number of Poles	RAU + 1, RAU + 2, RAU + 3	RAU + 1, RAU + 2, RAU + 3	RAU + 2, RAU + 3
Maximum Voltages	120 Vac, 120 / 240 Vac, 240 Vac, 80 Vdc	60 Vdc	80 Vdc
Current Ratings	0.1 - 80 A(ac) 0.1 - 100 A(dc)	125 A, 250 A, 300 A	110 - 250 A
AIC	AC - 10 kA, DC - 20 kA	14 kA	20 kA

Product Type	Circuit Breaker	Circuit Breaker
Approvals	IEC / EN 60934, CE, GB17701	UL1077, cURus
Number of Poles	RAU + 1, RAU + 2, RAU + 3	RAU + 1, RAU + 2, RAU + 3
Maximum Voltages	240 / 415 Vac, 80 Vdc	277 / 480 Vac, 80 Vdc
Current Ratings	0.1 A - 100 A (1 p), 0.1 A - 70 A (2 - 3 p)	0.1 A - 100 A (1 p), 0.1 A - 70 A (2 - 4 p)
Interrupting Capacity	-	2 kA/U2/ U3 (AC) 5 kA/C1 (AC) 5 kAU2/ U3 (DC)
Rated conditional S/C	3 kA (AC) PC1, 5 kA (DC) PC1	-
Icm	-	-

Verify approvals for specific ratings in accordance with the relevant test certificate

### Aux Switch Specification

Gold DB3	EN61058 0.1 A @ 250 Vac & 0.1 A @ 80 Vdc and UL1054 0.1 A @ 125/250 Vac & 0.1 A @ 30 Vdc & 0.3 A @ 60 Vdc
Silver DB2	EN61058 10 A @ 250 Vac & 0.1 A @ 80 Vdc and UL1054 10 A @ 125/250 Vac
Silver V4D	EN61058-1 10 A @ 250 Vac



(UL489A) (CSA C22.2 No. 5-16)



(UL489;  
CSA C22.2 NO.5)



(UL1077;  
CSA C22.2 NO.235-04)



(IEC / EN 60947-2; (GB14048.2;  
IEC / EN 60934)



(IEC 60947-2;  
IEC 60934)



(IEC 60947-2)

# YF-Frame - Miniature Circuit Breakers (AC)



1 Pole  
DIN mount  
57 mm front escutcheon



1 Pole  
DIN mount  
45 mm front escutcheon



2 Pole  
DIN mount  
45 mm front escutcheon



4 Pole  
DIN mount  
45 mm front escutcheon

## Technical Data

Product Type	Circuit Breaker YF				
Approvals	IEC 60947-2, GB 14048.2, CE, UKCA				
Number of Poles	1	2 (1+N)	2	3	4 (3+N)
Operating Voltages	240 Vac		415 Vac		
Minimum Current Rating	0.5 A				
Maximum Current Rating	32 A				
Ultimate S/C Breaking Capacity (Icu)	6 kA				

Product Type	Circuit Breaker YF			
Approvals	UL 489			
Number of Poles	1	2	2	3
Operating Voltages	240 Vac, 80 Vdc	240 Vac	120 / 240 Vac, 80 Vdc	240 Vac, 80 Vdc
Minimum Current Rating	0.5 A	0.5 A	0.5 A	0.5 A
Maximum Current Rating	32 A	25 A	32 A	32 A
Ampere Interrupting Capacity (AIC)	10 kA			

  
(UL 489 CSA C22.2 NO.5)

  
(GB 14048.2)

  
(IEC 60947-2)





# YR-Frame - Circuit Breakers for Railways (DC)



1 Pole  
DIN mount  
57 mm front escutcheon



1 Pole  
DIN mount  
45 mm front escutcheon



2 Pole  
DIN mount  
57 mm front escutcheon



2 Pole  
DIN mount  
45 mm front escutcheon

## Technical Data

Product Type	Circuit Breaker YR			
Approvals	IEC 60947-2, GB 14048.2, CE, UKCA, AS/NZS 60947-2			
Product Category	<b>UNPOLARISED</b>		<b>POLARISED</b>	
Number of Poles	1 Pole	2 Pole	1 pole	2 Pole
Operating Voltages & Interrupting Capacity	80 Vdc @ 10 kA 150 Vdc @ 6 kA	80 Vdc @ 10 kA 150 Vdc @ 6 kA	220 Vdc @ 6 kA 300 Vdc @ 6 kA	220 Vdc @ 6 kA 300 Vdc @ 6 kA
Minimum Current Rating	0.5 A	0.5 A	0.5 A	0.5 A
Maximum Current Rating	32 A (80 Vdc) 50 A (150 Vdc)	32 A (80 Vdc) 50 A (150 Vdc)	50 A	50 A

Product Type	Circuit Breaker YR	
Approvals	UL 489A, CSA C22.2 No. 5-13	
Product Category	<b>POLARISED</b>	
Number of Poles	1 Pole	2 Pole
Operating Voltages & Interrupting Capacity	300 Vdc @ 10 kA	300 Vdc @ 10 kA
Minimum Current Rating	0.5 A	0.5 A
Maximum Current Rating	50 A	50 A

Verify approvals for specific ratings in accordance with the relevant test certificates.



# QF17 - Series Earth Leakages



**QF17A**  
Dual (DIN & CBI Mini rail) mount

**QF17C**  
Dual (DIN & CBI Mini rail) mount

## Technical Data

Product Type	QF17A	QF17C
<b>Approvals</b>	<b>VC 8035</b>	
Number of Poles	2 (1+N)	2 (1+N)
Standard Ampere Ratings	5 to 63 A	40 and 63 A
Sensitivity	30 mA	30 mA
Rated Voltage	230 Vac	230 Vac
Rated S/C Withstand Capacity (I <sub>cw</sub> )	-	5 kA / 50 ms
Ultimate S/C Breaking Capacity (I <sub>cu</sub> )	5 kA	-
<b>Approvals</b>	<b>AS/NZS 60947-2, DIN / EN 60947-2, CE, UKCA</b>	
Number of Poles	2 (1+N)	2 (1+N)
Standard Ampere Ratings	5 to 63 A	40 and 63 A
Sensitivity	30 mA	30 mA
Rated Voltage	240 Vac	240 Vac
Rated S/C Withstand Capacity (I <sub>cw</sub> )	-	6 kA
Ultimate S/C Breaking Capacity (I <sub>cu</sub> )	6 kA	-
<b>Approvals</b>	<b>UL 1053</b>	
Number of Poles	2 (1+N)	2 (1+N)
Standard Ampere Ratings	1 to 63 A	63 A
Sensitivity	22 mA	22 mA
Rated Voltage	240 Vac	240 Vac
<b>Approvals</b>	<b>GB 14048.2</b>	
Number of Poles	2 (1+N)	2 (1+N)
Standard Ampere Ratings	5 to 63 A	40 and 63 A
Sensitivity	30 mA	30 mA
Rated Voltage	240 Vac	240 Vac+
Rated S/C Withstand Capacity (I <sub>cw</sub> )	-	6 kA
Ultimate S/C Breaking Capacity (I <sub>cu</sub> )	6 kA	-

Verify approvals for specific ratings in accordance with the relevant test certificates.

Auxiliary Module	
Auxiliary Switch	DIN and CBI mini rail mounted
Trip Alarm	CBI mini rail mount only
Auxiliary Switch + Trip Alarm	CBI mini rail mount only

VC 8035

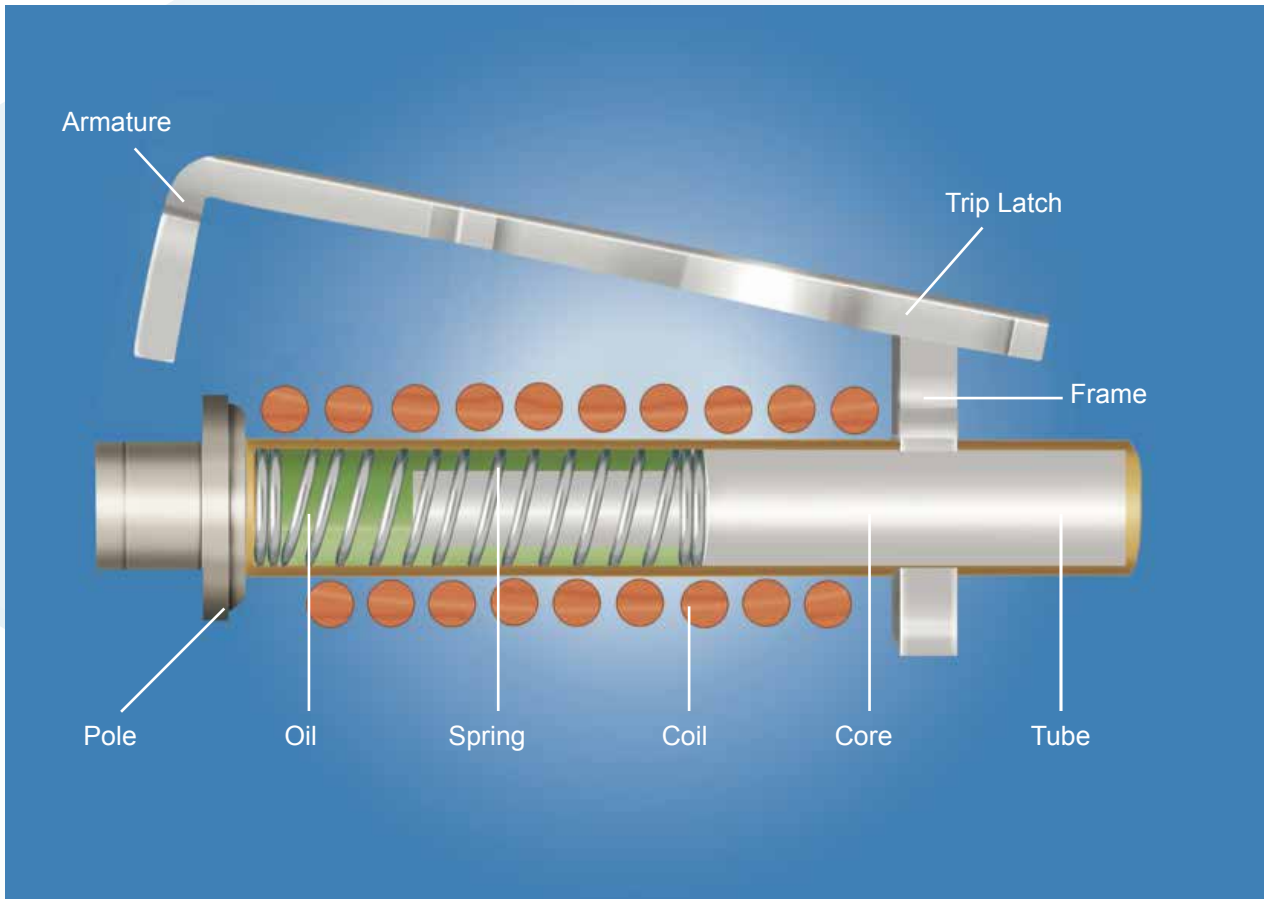


AS/NZS 60947-2



## Hydraulic-Magnetic Technology

Hydraulic-magnetic circuit breakers operate on the magnetic force produced by a load current flowing through a series-connected solenoid coil that is wound around a hermetically sealed tube containing an iron core, a spring and dampening fluid.



## Features of the Construction Common to all CBI Circuit Breakers

- **Trip free operation:** Even if the handle is locked in the ON position, the breaker will trip if an overload occurs
- **Positive ON and positive OFF:** The handle always indicates the status of the breaker contacts
- **Silver alloy contacts:** The contact tips ensure a long, trouble-free life, even in harsh environments, ensuring a low impedance connection throughout the life of the breaker
- **Superior quality polymer materials:** Materials meet or exceed the requirements laid down by international specifications for polymer materials to be used in circuit breaker applications, such as IEC 60947-2 and UL 489
- **Environmental Safety:** Ensures better safety properties for flammability, toxicity and isolation, ensure safety for users and the installation
- **Hermetically sealed sensing / time delay mechanism:** These ensure no aging or deterioration and thereby a longer service life, with precise time-delay and tripping characteristics throughout the life of the breaker
- **Multi-pole Circuit Breakers are fitted with common trips:** All CBI multi-pole circuit breakers are externally coupled with a handle tie-bar and internally with a common trip linkage, ensuring that all poles switch and trip simultaneously



#### **AUSTRALIA**

**CBI-electric: Australia**

27 Wedgewood Rd, Hallam

Victoria 3803 Australia

Tel: +61 3 8752 9300

Fax: +61 3 9796 5407

Email: [sales@cbi-electric.com.au](mailto:sales@cbi-electric.com.au)

Website: [www.cbi-electric.com.au](http://www.cbi-electric.com.au)

#### **SOUTH AFRICA**

**CBI-electric: low voltage**

Tripswitch Drive Elandsfontein

Gauteng South Africa

Tel: +27 11 928 2000

Fax: + 27 11 392 2354

Email: [cbi@cbi-electric.com](mailto:cbi@cbi-electric.com)

[internationalsales@cbi-electric.com](mailto:internationalsales@cbi-electric.com)

Website: [www.cbi-lowvoltage.com](http://www.cbi-lowvoltage.com)

#### **INDIA**

**CBI-electric: Asia**

A1, Pushpagiri Residency, 1st Cross

2nd Main, Jyothi Nagar, B.G Road

Bengaluru 560083, India

Tel: +91-9880553153

Email: [salesasia@cbi-electric.com](mailto:salesasia@cbi-electric.com)

Website: [www.cbibreakers.com](http://www.cbibreakers.com)

Website: [www.cbi-lowvoltage.com](http://www.cbi-lowvoltage.com)

#### **USA**

**CBI-electric: North America**

35 E. Uwchlan Ave Suite 328

Exton PA 19341 USA

Tel: +1 610 524 9949

Fax: +1 610 524 9945

E-mail: [info@cbibreakers.com](mailto:info@cbibreakers.com)

Website: [www.cbibreakers.com](http://www.cbibreakers.com)