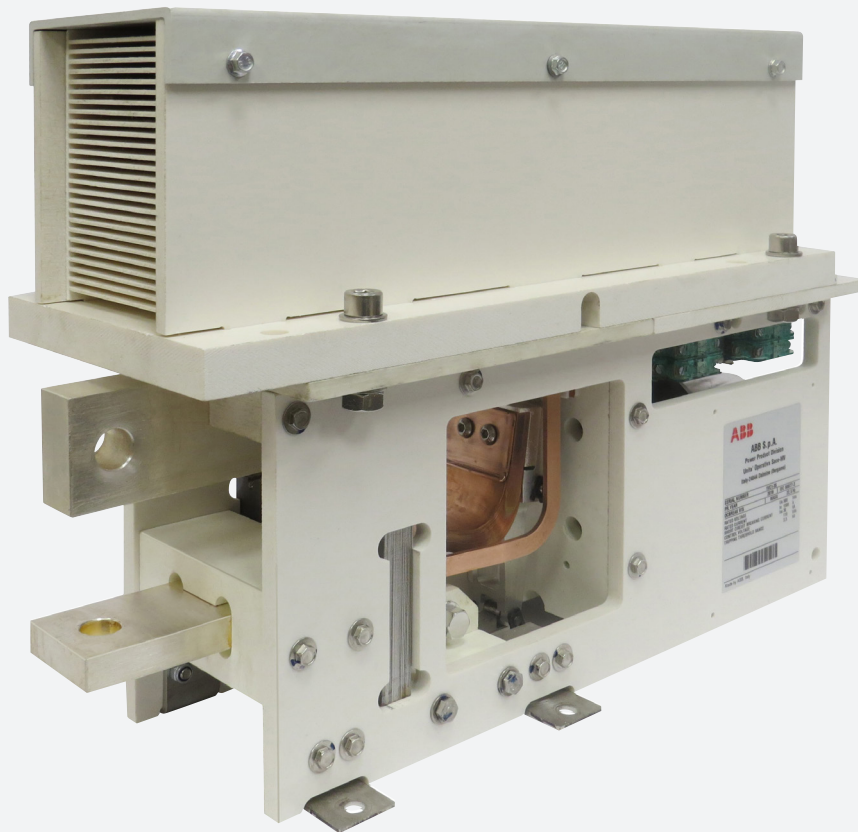


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DISTRIBUTION SOLUTIONS

# DCBreak

## Rolling Stock High Speed Direct Current circuit breaker

### Product catalogue



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**DCBreak is ABB's latest indoor DC high-speed circuit breaker (CB) for urban and inter-city rail lines.**

**DCBreak is characterized by with natural cooling, it is trip-free, single-pole, bi-directional and it operates thanks to electromagnetic blowout, electric control circuits and direct overcurrent instantaneous release. Smaller and easier to service than similar commercial products.**

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# DCBreak: its strengths, your benefits



**Productivity  
maximizes  
your output**



**Improved portability  
facilitates installation**



**Efficiency  
optimizes  
investments**



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## Productivity

Maximize your results



- High mechanical endurance 200.000 CO with operational frequency C3
- Reduced flashover distance
- Limited maximum arc voltage
- Electromagnetic closing and reduced holding power

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## Improved portability

Easy installation



- Smaller footprint
- Simplified systems integration
- Available with high-protection enclosure for underframe or roof installation

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## Efficiency

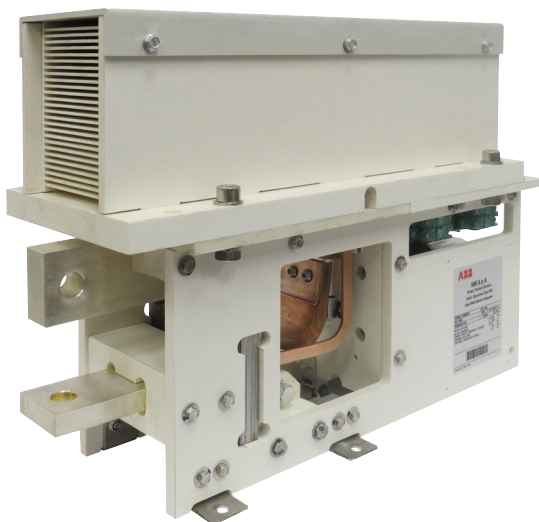
Optimize your investments



- Reduced handling time and cost
- Maximized operation and environmental specifications
- Reduced and simplified maintenance requirements

# 1 Description

DCBreak is ABB's latest DC High Speed Circuit Breaker for urban and inter-city rail lines. DCBreak is characterized by with natural cooling, it is trip free, single pole, bi-directional and it operates thanks to electromagnetic blowout, electric control circuits and direct over-current instantaneous release. Smaller and easier to service than similar commercial products.

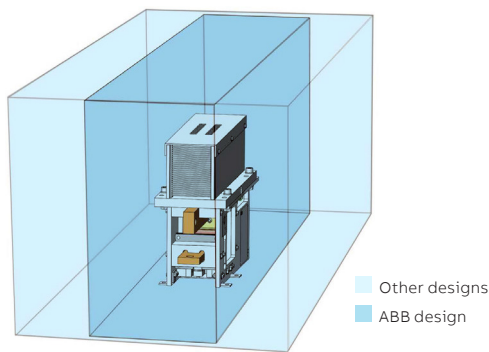


## Customer benefits & savings:

- Conventional thermal current up to 1500A (1400A in protective enclosure)
- Rated operational voltage 900 Vdc or 1800 Vdc
- Short circuit breaking current: up to 30 kA
- High insulation category OV4
- High mechanical endurance 200.000 CO with operational frequency C3
- Insulating materials according to EN 45545-2
- Compliant to IEC 60077-3 and IEC 61373
- Reduced flashover distance
- Limited maximum arc voltage
- Electromagnetic closing and reduced holding power
- Minimal weight
- Improved portability and facilitated installation
- Reduced handling time and cost
- Reduced and simplified maintenance requirements
- Simplified systems integration
- Cadmium free (RoHS standard compliant)
- Maximized operation and environmental specifications
- Available with optional protection enclosure IP65 suitable for roof and underframe installation

### Smaller footprint

When installed on board rolling stock, DCBreak features shorter flashover distances to ground than other HSBCs. It takes upwards of 40% less footprint (\*), resulting in easier integration and optimum adaptation to customers' space constraints.



DCBreak has a reduced footprint compared to the competition, resulting in optimum adaption to customer's space constraints.

### Lighter design

Lighter than similar products, DCBreak simplifies handling and installation by making them faster and easier. This also improves the performance of the overall system.

(\*): 40% less base surface required considering breaker dimensions and recommended clearances toward earthed metallic parts.

### Easy to service

DCBreak is rated for over 200'000 maintenance free operations. The product is engineered to simplify access to wear parts, allowing for simplified maintenance and service procedures.

### Fit for installation in new vehicles as well as retrofits

With its ergonomic design and adaptable mechanical holders, it is a plug-and-play solution that can easily replace older equipment.

### DCBreak is cadmium free and environmental friendly

The contacts of the DCBreak are cadmium free and fully compliant with the RoHS directive on the restriction of the use of certain hazardous substances in electrical equipment.

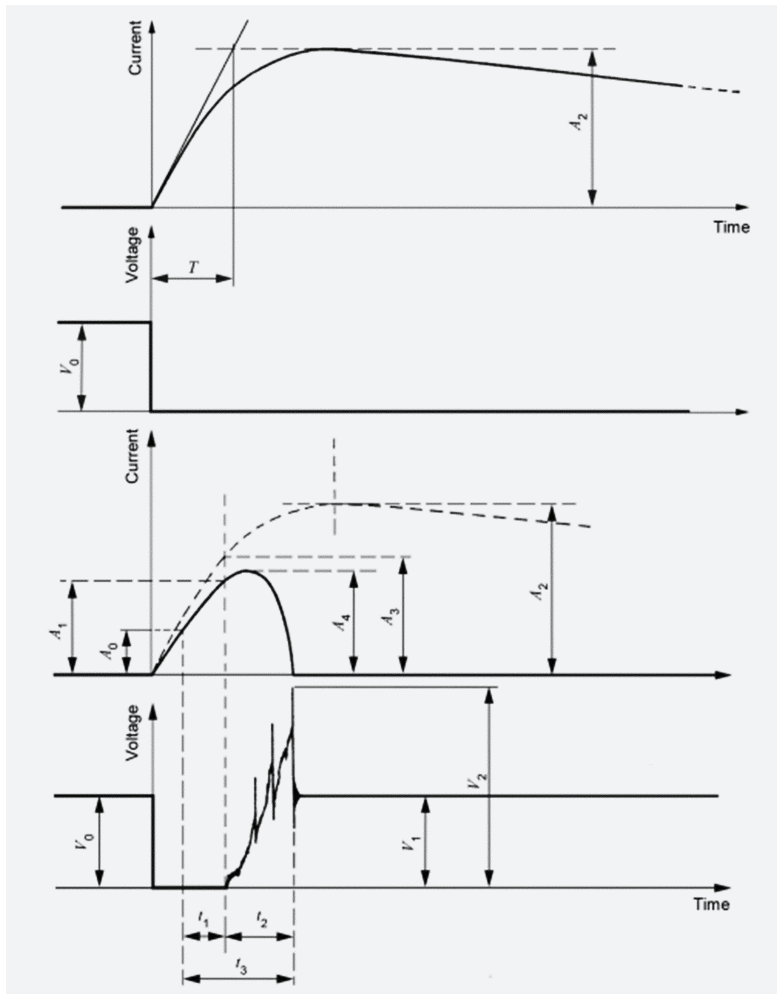
### Conformity to railway standards

This exceptionally robust circuit breaker has been tested to operate under harsh climatic conditions including extreme temperatures as well as shock and vibration situations. It is capable of operating in virtually all conditions relevant to the railway industry.

- IEC 60077-3 (electric equipment for rolling stock)
- IEC 61373 (Shock & vibration)
- EN 45545-2 (fire & smoke)

## 2 Breaking current parameters

Symbols as per IEC 60077-3







$A_0$	Current setting
$A_1$	Breaking current
$A_2$	Prospective peak current
$A_3$	Prospective breaking current
$A_4$	Cut off current
$T$	Time constant
$V_0$	Rated operational voltage
$V_1$	Recovery voltage
$V_2$	Peak arc voltage
$t_1$	Opening time
$t_2$	Arcing time
$t_3$	Break time





## 3 Selection and ordering

DCBreak is available in the following versions:

	Rated voltage	
	900 V	1800 V
<b>Free standing</b>	 DCBreak 915	 DCBreak 1815
<b>In metallic enclosure</b>	 DCBreak 915 B	 DCBreak 1815 B

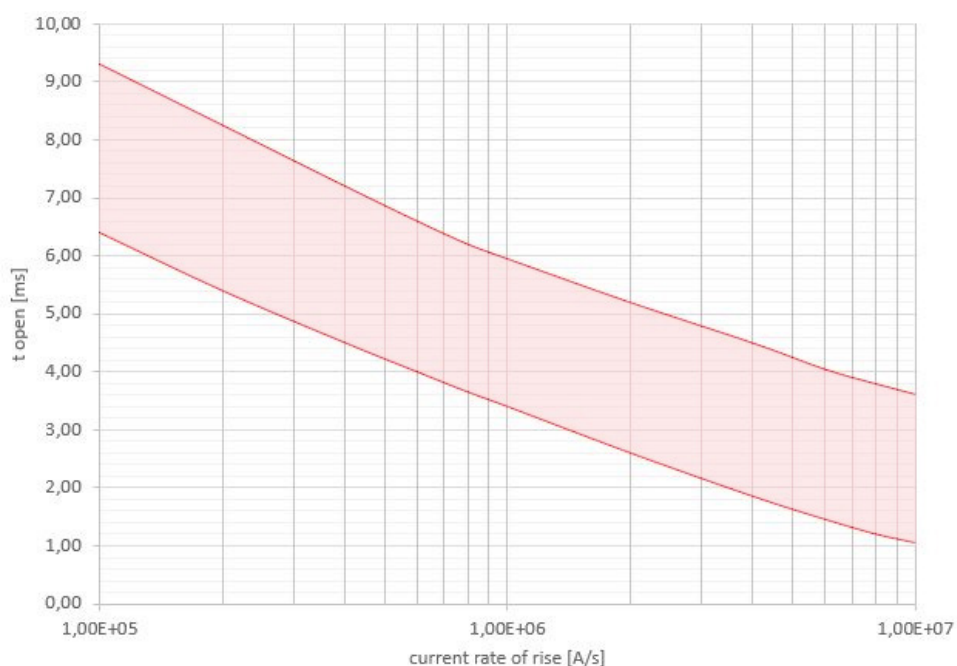


## 4 Ratings and technical characteristics

		DCBreak 915 / 915 B	DCBreak 1815 / 1815 B
Rated service voltage	$U_e$	900 V	1800 V
Highest non-permanent voltage	$U_{max_2}$	1000 V	1950 V
Rated insulations voltage	$U_i$	2300 V	
Rated impulse withstand voltage	$U_{BIL}$	18 kV	
Rated service current	$I_e$	1500 A (1400 A in box)	
Conventional thermal current in free air	$I_{th}$	1500 A (1400 A in box)	
Rated duty short-circuit making and breaking capacity (Nominal operating cycle)		O - 20sec - CO - 60sec CO	
Time constant T1	$I_{ss}$ at $\tau$	30 kA at 0 ms	17 kA at 0 ms
Time constant T2	$I_{ss}$ at $\tau$	30 kA at 15 ms	30 kA at 15 ms
Time constant T3	$I_{ss}$ at $\tau$	30 kA at 50 ms	30 kA at 40 ms
Time constant T4	$I_{ss}$ at $\tau$	30 kA at 150 ms	30 kA at 100 ms
Maximum arc voltage	$\hat{U}_{arc}$	$2.5 \times U_e$	
Direct overcurrent release		0.9 to 3.6 kA	
Rated auxiliary voltage	$U_n$	24 - 36 - 48 - 72 - 96 - 110 Vdc	
Auxiliary voltage limits		70% $U_n$ ÷ 125% $U_n$	
Number of auxiliary contacts		2 NO + 2 NC 4 NO + 4 NC 6 NO + 6 NC 8 NO + 8 NC	
Class of functional operations		C3	
Installation		indoor outdoor (with protective enclosure)	
Degree of protection of protective enclosure (optional)		IP65	
Ambient temperature	$T_{amb}$	$-25\text{ °C} \div +70\text{ °C}$	
Relative humidity		95% at 40 °C	
Altitude	$h$	$\leq 1400\text{ m}$	
Vibrations and shocks (according to IEC/EN61373)		category 1 class B	

For more details about rated characteristics please contact ABB or refer to the product datasheets (see par. 8).

### Opening time (tripping)



## 5 DCBreak overview

### 5.1 Free standing DCBreak

DCBreak circuit breaker is a high speed DC breakers for applications on rail rolling stock. It is available for 900 Vdc and 1800 Vdc voltage ratings with 1500 A rated thermal current. The contacts are opened and closed by means of an electromagnetic actuator which can be energized by a wide range of auxiliary voltages. The circuit breaker is equipped with an instantaneous release for bidirectional overcurrent that allows to adjust to the trip value required by the specific application. DCBreak guarantees long mechanical and electrical life and comprise various subassemblies, which can be easily inspected during preventive maintenance work. The insulating materials comply to the strictest international standards governing mass public transport as regards reaction to fire.

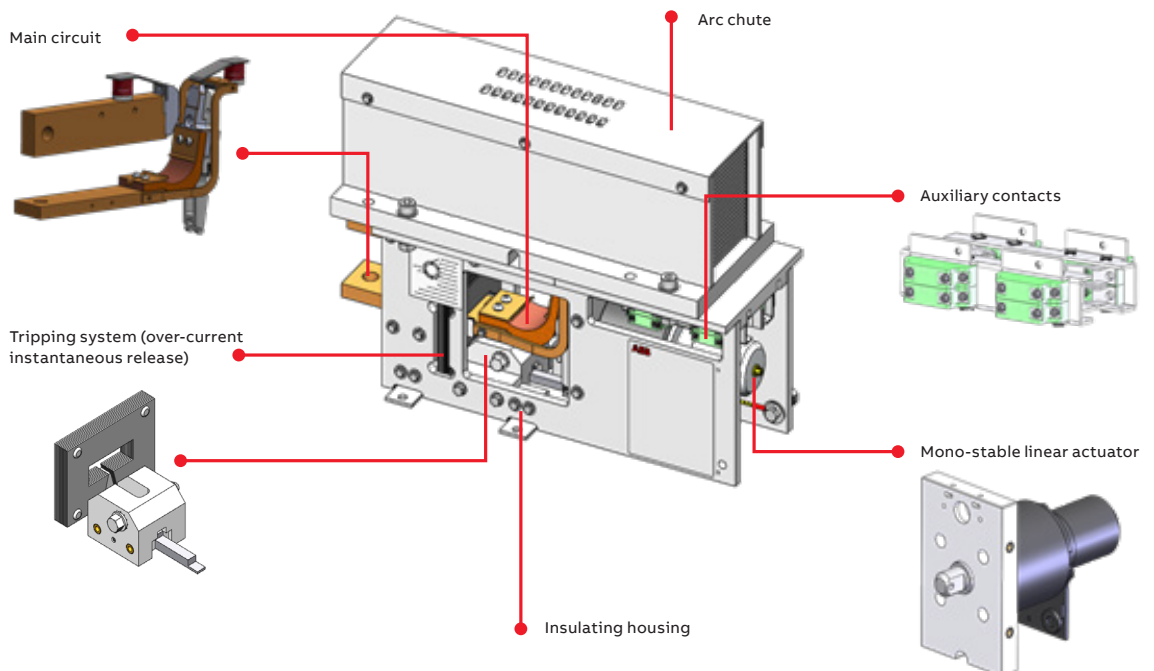
#### 5.1.1 Actuator

DCBreak is actuated by an electro-magnetic mono-stable linear actuator.

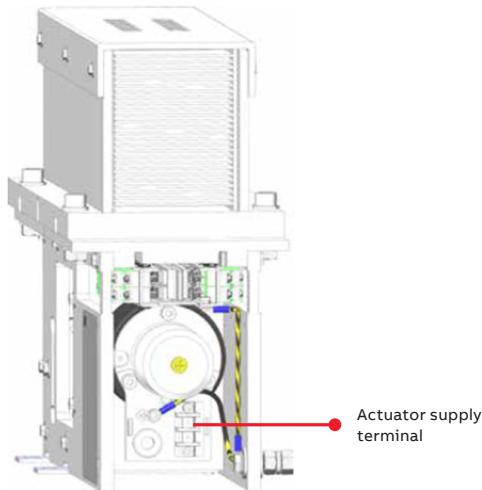
This actuator moves the kinematic chain and lead the main contact to reach the closed position when supplied by the auxiliary voltage.

The connection of the actuator to the external auxiliary voltage supply can be easily done by the customer connecting the supply cable to the terminals of the actuator.

The actuator supply terminals are in an easily accessible position in the back of the breaker just next to the actuator.



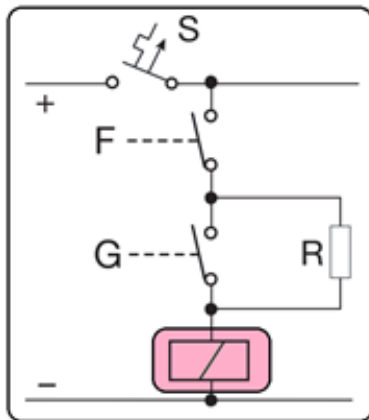
## 5 DCBreak overview



DCBreak actuator is available for the rated auxiliary voltages listed below, which covers most of the rolling stock rails applications worldwide.

The correct functionality of the actuator and of DCBreak is guaranteed within the range of tolerance of auxiliary voltage imposed by the product standard.

DCBreak actuator is mono-stable and it must be supplied by an external circuit which provides the closing and the holding current.



□ : Customer's scope

■ : ABB scope

- S: protective switch of auxiliary circuit
- F, G: control switches
- R: holding resistor

The circuit breaker is kept in the closed position by a holding current of approximately 5% of the current absorbed during the closing operation. The circuit breaker opens automatically when the holding current is cut).

Please refer to the product manual for further details (see reference in par. 8).

### Characteristics

Un	24, 36, 48, 72, 96, 110 Vdc
Operating limits	70% ÷ 125% Un
Closing power	approx. 1400 W (*)
Holding power	approx. 74W (*)

(\*) refer also to product manual

### 5.1.2 Direct over-current instantaneous release

DCBreak can be ordered with the following available setting ranges:

#### Over-current release setting ranges

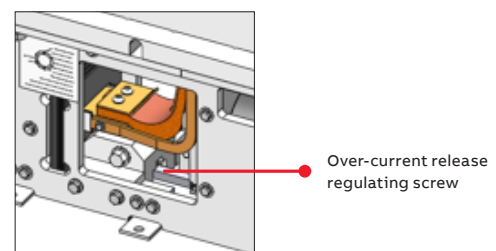
0.9 ÷ 1.1 kA
1.1 ÷ 1.3 kA
1.3 ÷ 1.8 kA
1.8 ÷ 2.5 kA
2.5 ÷ 3.6 kA

The precise over-current setting value within the selected range can be chosen by the customer.

DCBreak can be provided to the Customer already with the exact over-current setting value required set and guaranteed by ABB.

It is anyway possible for the Customer to adjust and change the exact over-current setting value within the selected range.

The regulation is done with a fine tuning on the regulating screw (see below):



### 5.1.3 Auxiliary contacts

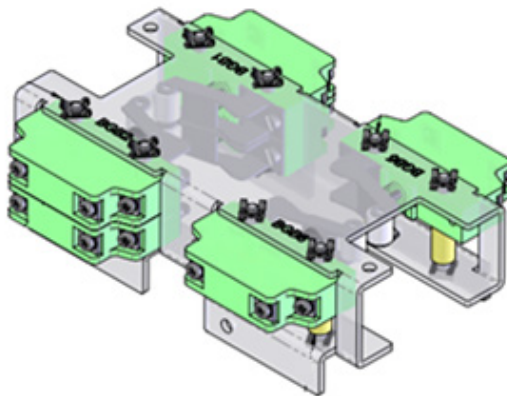
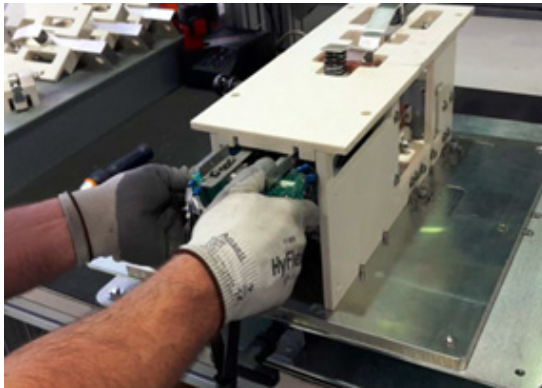
DCBreak can be equipped with from 2 NO + 2 NC up to 8 NO + 8 NC auxiliary contacts (see par. 4). The auxiliary contacts are potential free and are directly actuated by the kinematic chain of the breaker, leading to a full reliability in terms of correct operations.

The design of DCBreak allows an easy access and fast replacement of the auxiliary contacts during the operating lifetime.

#### Characteristics

Standard aux contacts type <sup>(1)</sup>	Crouzet 83244
Contacts material	silver alloy <sup>(2)</sup>
Rated thermal current	10 A
Minimum interrupting current	Up 10 mA (at 4 V)
Mechanical life of aux. contacts	10 <sup>7</sup> CO
Connection type	screws

(1) Schaltbau S826 E 40 aux contacts type available on request  
 (2) Gold alloy available on request



## 5 DCBreak overview

### 5.2 Protective enclosure

DCBreak is also available with a protective enclosure specifically designed to protect the breaker providing a pre-engineered solution suitable for installation on roof and underframe on rail vehicles.

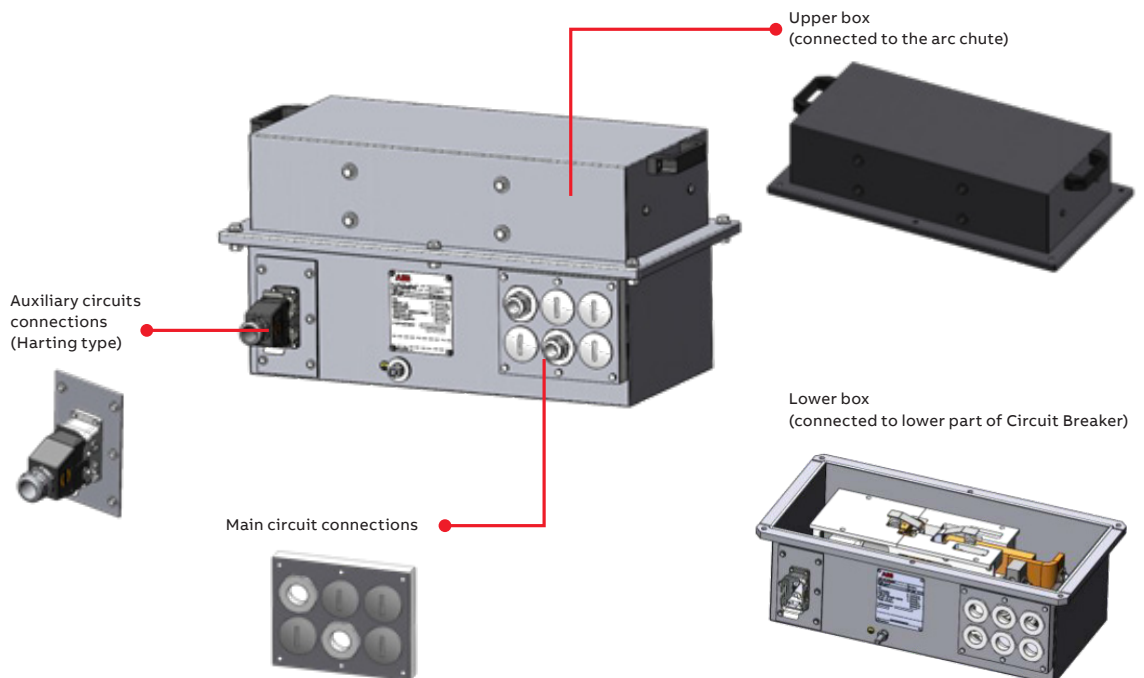
The protective enclosure is made of stainless steel and can provide a fully tested and certified degree of protection up to IP65.

This allows to protect against shocks and impact for under-floor applications and from the penetration of water and polluting dust. DCBreak enclosure can be easily installed with mechanical fixing to the structure of the vehicle (please refer to the product manual for further informations).

DCBreak enclosure solution guarantees easy installation and connection to of the breaker and a very easy and fast access for all the maintenance activities thanks also to the handles installed.

#### Features:

- Stainless steel enclosure (IP65)
- Easy installation and connection
- Easy access for maintenance
- Harting plug connection for auxiliary circuit
- Cable glands connection for main circuit



Each side of the protective enclosure is directly connected to the two parts of the breaker, leading to have faster installing, disinstalling and maintenance activities.



DCBreak protective enclosure is specifically designed to allow an easy installing on roof or underframe installation on rail vehicles. Please see below a typical installation example.



Feel free to contact ABB to evaluate all other possible solutions in terms of installing disposition.

### 5.2.1 Auxiliary plug

DCBreak protective enclosure is equipped with a standard Harting plug.



DCBreak enclosure Harting plug is available with the possible options:

DCBreak enclosure plug connection
Harting plug 24 pins
Harting plug 28 pins
Harting plug 36 pins

Feel free to contact ABB to evaluate other requirements in terms of plug connections of auxiliary circuit.

The cable for the connections of the external circuit to the protective enclosure is not included in DCBreak scope of supply.

# 5 DCBreak overview

## 5.2.2 Cable glands

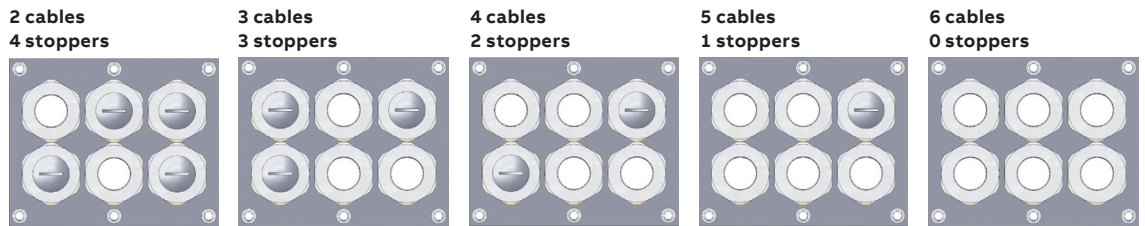
DCBreak protective enclosure is equipped with cable glands for the connections of the cables of the main (HV) circuit.

Customer can select the number of cables required basing of the dimensioning of the main circuit (from 2 to 6).

All the not used cable glands will be provided with stoppers.

Please see below the options available and the cable glands and stopper positions:

Cable gland dimension	Number of cables	Stoppers
M32	6 cables (3 upper + 3 lower)	0 STOPPERS M50
	5 cables (1 upper + 1 lower)	1 STOPPERS M50
	4 cables (1 upper + 2 lower)	2 STOPPERS M50
	3 cables (2 upper + 2 lower)	3 STOPPERS M50
	2 cables (2 upper + 3 lower)	4 STOPPERS M50
M40	6 cables (3 upper + 3 lower)	0 STOPPERS M50
	5 cables (1 upper + 1 lower)	1 STOPPERS M50
	4 cables (1 upper + 2 lower)	2 STOPPERS M50
	3 cables (2 upper + 2 lower)	3 STOPPERS M50
	2 cables (2 upper + 3 lower)	4 STOPPERS M50
M40	6 cables (3 upper + 3 lower)	0 STOPPERS M50
	5 cables (1 upper + 1 lower)	1 STOPPERS M50
	4 cables (1 upper + 2 lower)	2 STOPPERS M50
	3 cables (2 upper + 2 lower)	3 STOPPERS M50
	2 cables (2 upper + 3 lower)	4 STOPPERS M50



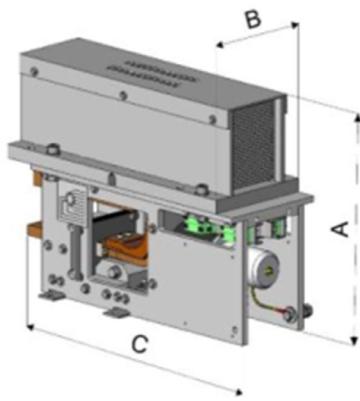


## 6 Dimensions and weights

DCBreak is a DC High Speed Circuit Breaker with a very small footprint, optimized to allow easy installation on rail vehicles.

Its particular design is optimized to allow the suitability for most of the installations and also to ensure replacement for existing vehicles.

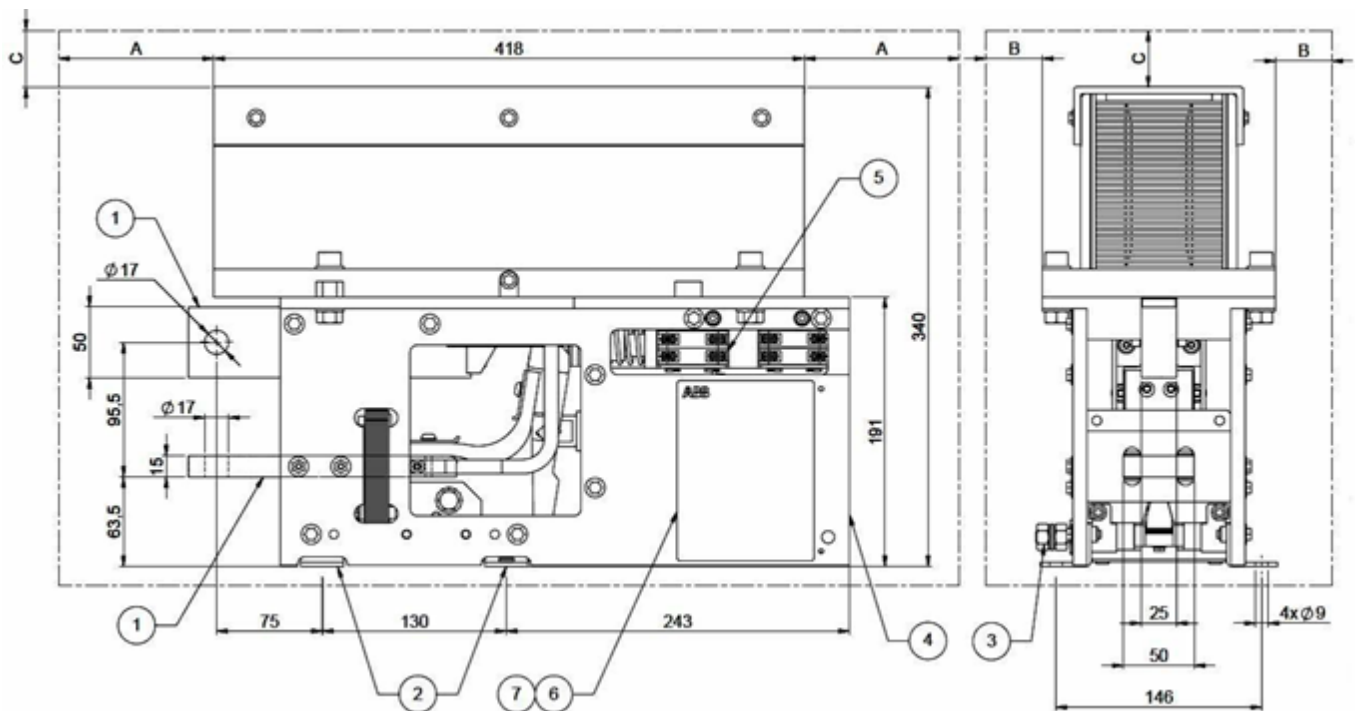
version	weight	height (A)	width (B)	depth (C)
	kg	mm	mm	mm
DCBreak 915	28	340	168	468
DCBreak 915 B	68	370	364	712
DCBreak 1815	38	448	168	468
DCBreak 1815 B	78	470	364	712



## 6 Dimensions and weights

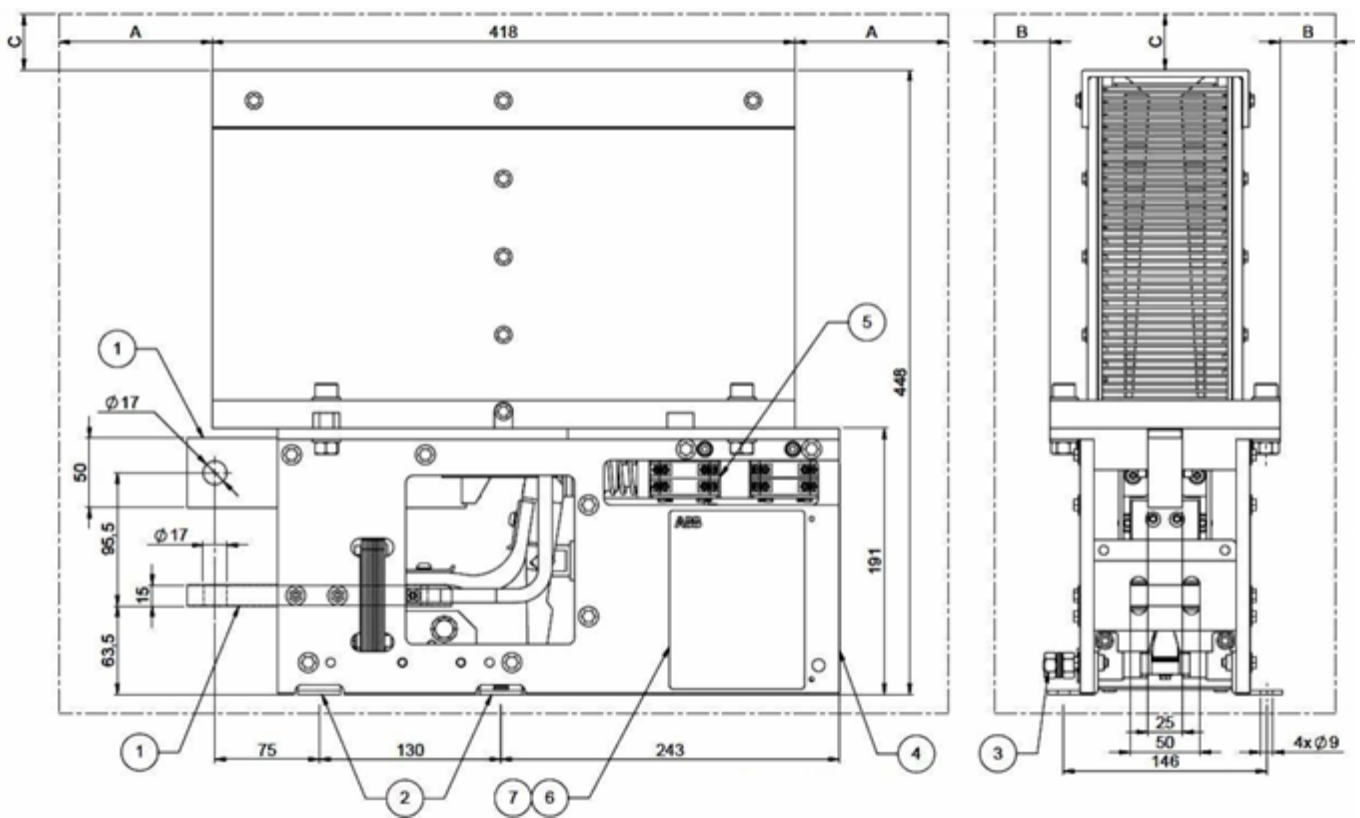
### 6.1 Table of dimensions

#### 6.1.1 DCBreak 915



- 1 Main connections
- 2 Fixing points
- 3 Earthing point
- 4 Actuator supply point
- 5 Auxiliary contacts
- 6 Adhesive rating plate
- 7 Aluminum rating plate (on request)

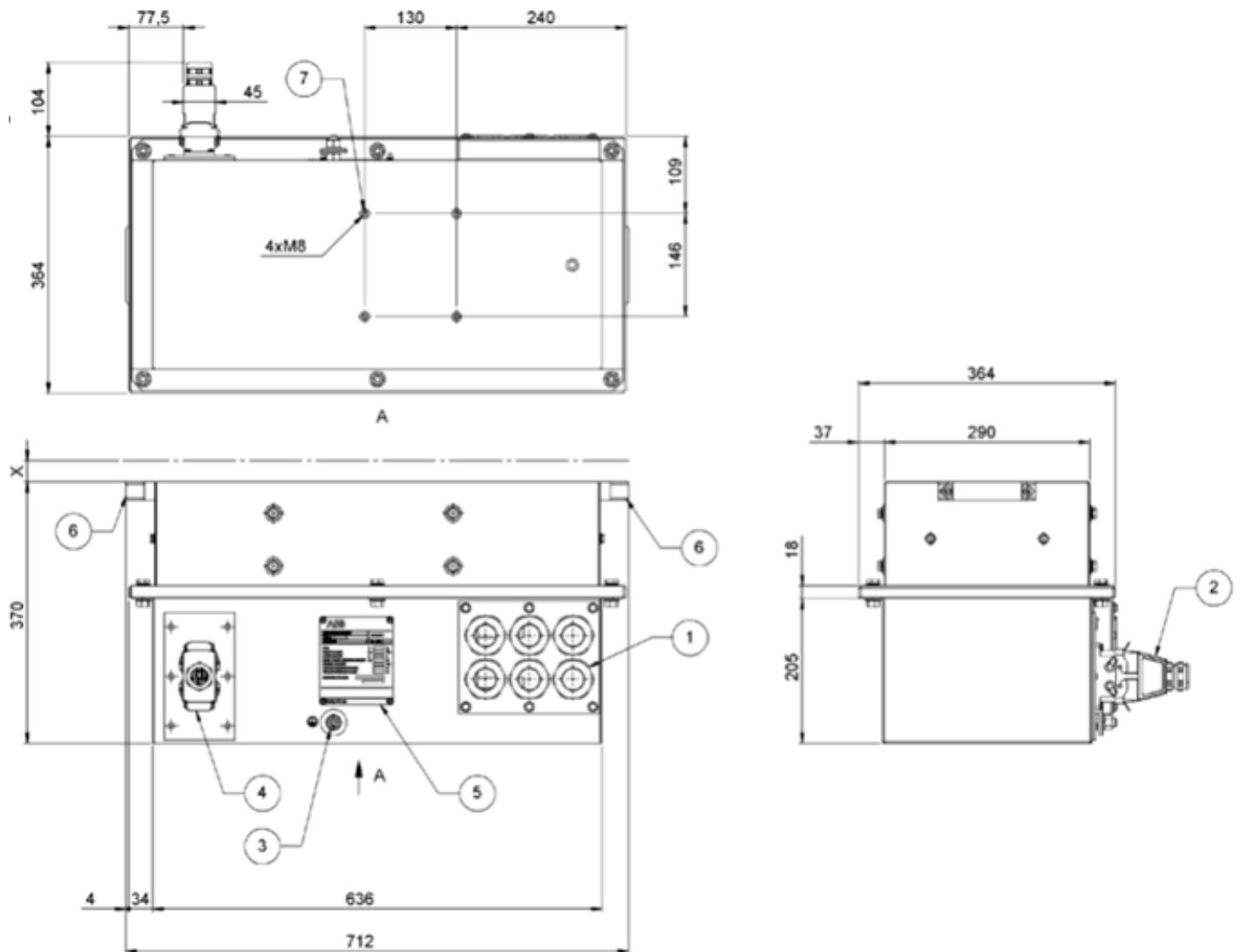
## 6.1.2 DCBreak 1815



- 1 Main connections
- 2 Fixing points
- 3 Earthing point
- 4 Actuator supply point
- 5 Auxiliary contacts
- 6 Adhesive rating plate
- 7 Aluminum rating plate (on request)

## 6 Dimensions and weights

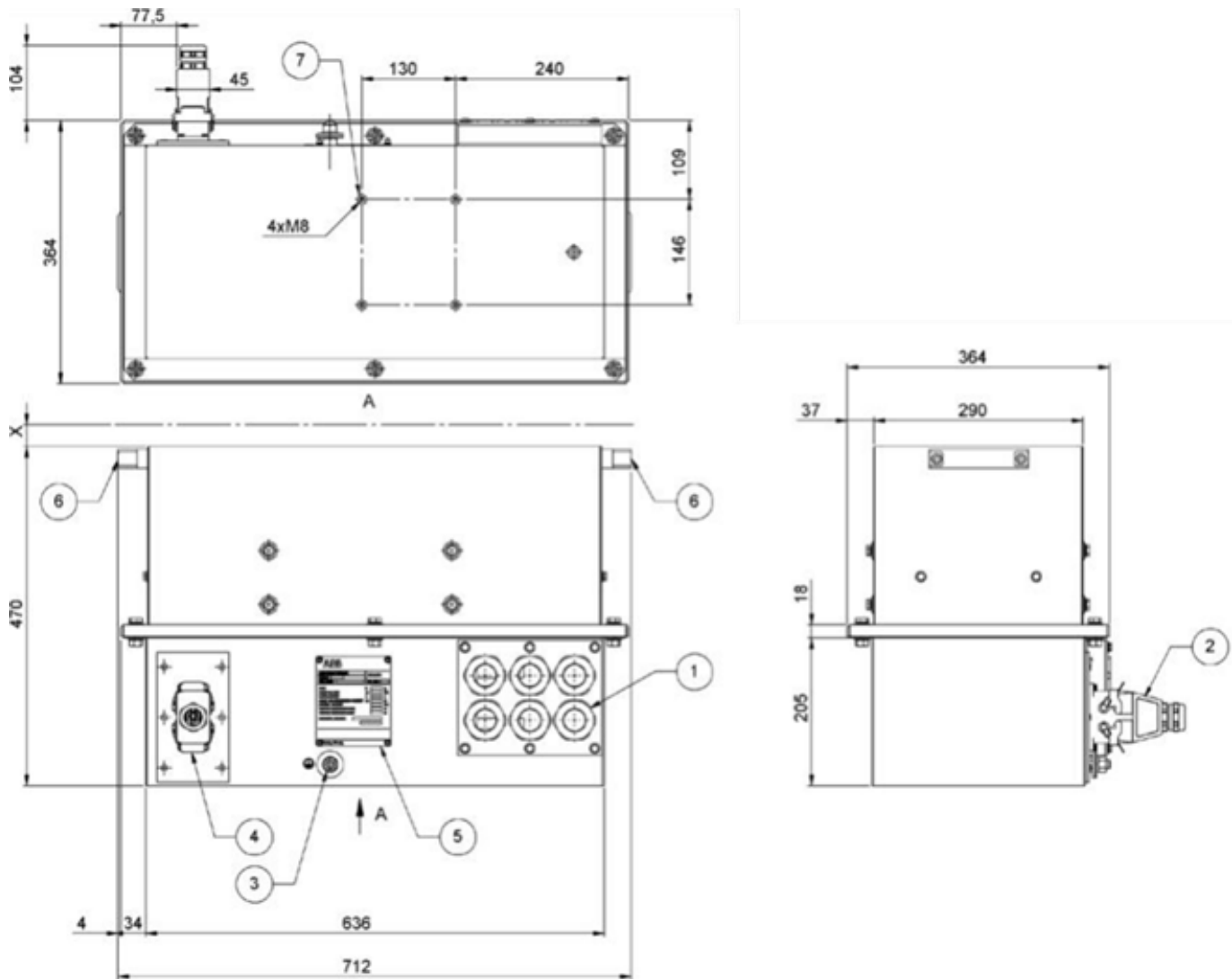
### 6.1.3 DCBreak 915B



1. Main Cable Connections Cable Glands
2. Auxiliary Circuit Connector Plug type Harting (supplied loose)
3. Earthing connection point
4. Auxiliary Circuit Connector feeding socket type Harting
5. Aluminum nameplate
6. Lifting Handles
7. Fixing Points

Minimum clearance for arc chute removal: 30mm

6.1.4 DCBreak 1815B



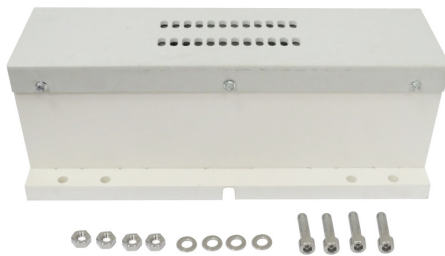
- 1. Main Cable Connections Cable Glands
- 2. Auxiliary Circuit Connector Plug type Harting (supplied loose)
- 3. Earthing connection point
- 4. Auxiliary Circuit Connector feeding socket type Harting
- 5. Aluminum nameplate
- 6. Lifting Handles
- 7. Fixing Points

Minimum clearance for arc chute removal: 30mm

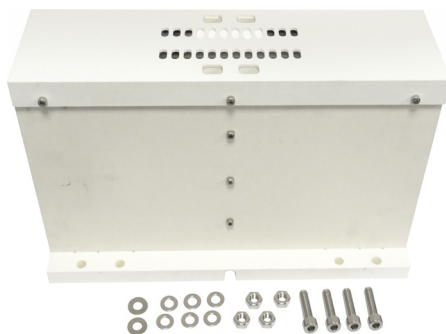
## 7 Spare parts

DCBreak is available with a complete list of spare part immediately available and ready to be installed during the breaker operating lifetime. Most of the spares can be easily installed by the Customer himself without the need on the intervention of ABB technical personnel. For more detailed information regarding spare parts kits, ordering and installation please refer to our spare parts documentation (see par. 8) or feel free to contact ABB Service.

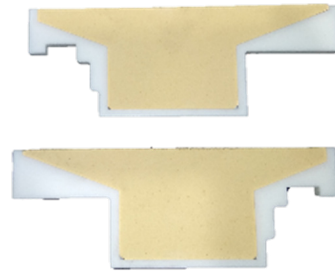
### DCBreak 915 arc chute kit



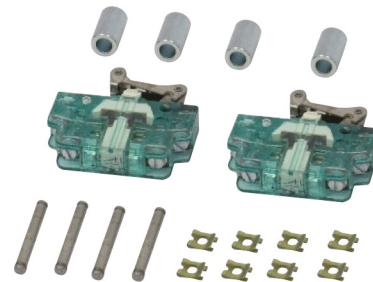
### DCBreak 1815 arc chute kit



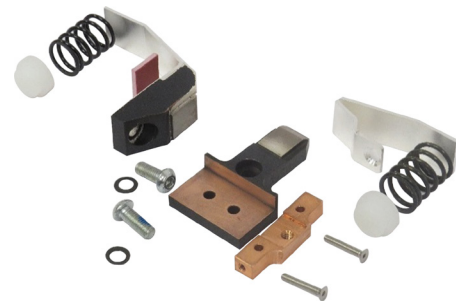
### Ceramic guides kit



### Auxiliary contacts kit



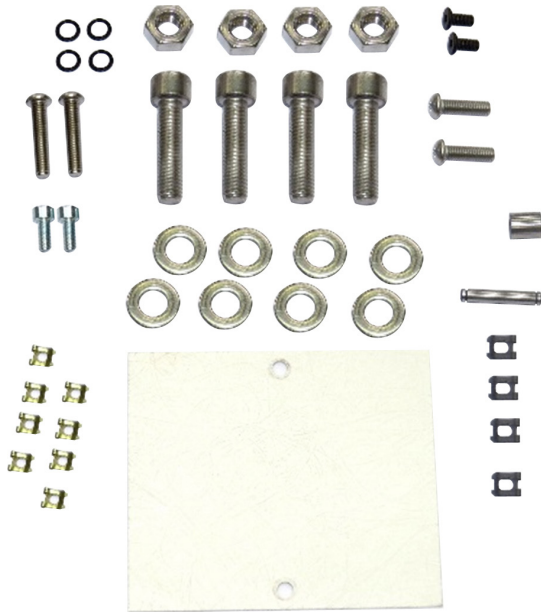
### Main contacts kit



### Flexible connection kit



**Set of bolts, screws and nuts**



**Cable gland kit**



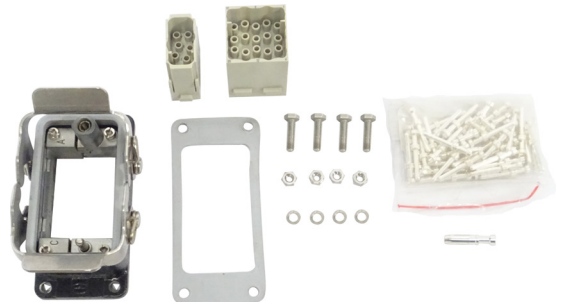
**Closing cap kit**



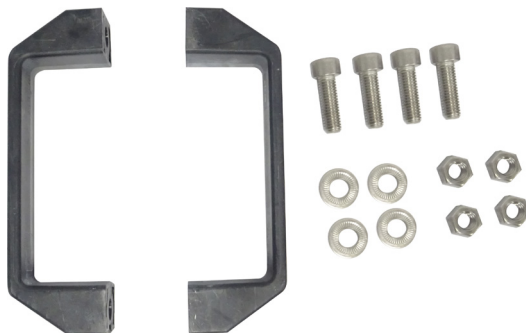
**Socket kit (24pins - 28pins - 36pins)  
for auxiliary circuits**



**Plug kit (24pins - 28pins - 36pins)  
for auxiliary circuits**



**Handle kit**



**Set of insulating parts**



## 8 Additional product documentation

The following documents are available for further information about DCBreak:

<b>Document</b>	<b>Document number</b>
DCBreak manual - instructions for installation, service and maintenance	1VCD601427
DCBreak free standing datasheet (915, 1815)	1VCD500207
DCBreak in-box datasheet (915B, 1815B)	1VCD500207
DCBreak free standing electrical diagram (915, 1815)	1VCD400183
DCBreak in-box electrical diagram (915B, 1815B)	1VCD400285
DCBreak spare part kits	1VCP000922
DCBreak spare part kits and instructions	1VCP000921







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More product information:  
[abb.com/mediumvoltage](http://abb.com/mediumvoltage)  
Your contact center:  
[abb.com/contactcenters](http://abb.com/contactcenters)  
More service information:  
[abb.com/service](http://abb.com/service)  
[abb.com/category](http://abb.com/category)