



**Vacuum circuit breakers  
VB L - DPI L**

**ALSTOM**

**T&D**  
Power Distribution

# Overview

## VB L | DPI L



Medium voltage vacuum circuit breakers

Up to 24 kV

Lateral arrangement

IEC standards

With conventional spring operating mechanism or magnetic actuator

With or without integrated protection system



### Content

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# General Information

## Product description

### VB L

Medium voltage vacuum circuit breaker with lateral arrangement.

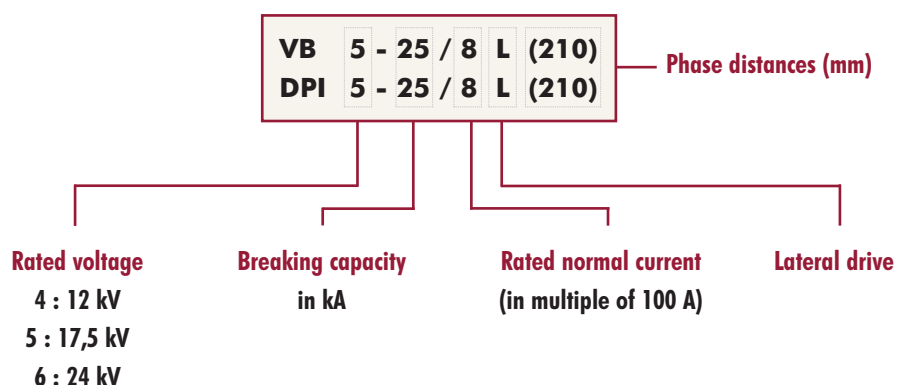
### DPI L

Medium voltage vacuum circuit breaker with lateral arrangement and integrated protection system.

The new generation of medium voltage vacuum circuit breakers type VB L – DPI L is born from the huge experience acquired by ALSTOM in research and development, manufacturing, testing, installation and service expertise of thousands of MV circuit breakers installed all over the world.

Their performances have been improved by the integration of the latest generation of :

- Vacuum interrupters
- Operating mechanisms
- Current Transformers
- Protection relays.



Designation	Rated voltage kV	Rated current A	Breaking capacity kA	Phase distance mm
VB 4-25/8 L	12	800	25	210 - 250
VB 4-25/12 L	12	1250	25	210 - 250
VB 5-25/8 L	17,5	800	25	210 - 250
VB 5-25/12 L	17,5	1250	25	210 - 250
VB 6-16/6 L	24	630	16	250
VB 6-20/8 L	24	800	20	250
VB 6-20/12 L	24	1250	20	250
DPI 4-25/8 L	12	800	25	210 - 250
DPI 5-25/8 L	17,5	800	25	210 - 250
DPI 6-16/6 L	24	630	16	250
DPI 6-20/8 L	24	800	20	250

# General Information

## Applications

The vacuum circuit breakers type VB L and DPI L are particularly designed to meet the switching requirements of the medium voltage distribution networks. Their lateral arrangement allows simple layout of the air insulated medium voltage switchgears equipped with fixed or removable equipment.

The DPI L is a vacuum circuit breaker fitted with a self or dual powered integrated protection and supervision system designed to guarantee the complete and safe protection of medium voltage feeders without requiring an auxiliary power supply.

The DPI L offers all the advantages in terms of performance and reliability of a vacuum circuit breaker combined with the accuracy and the flexibility of a digital protection.

The VB L and DPI L circuit breakers are particularly dedicated to medium voltage switchgears in the following applications :

- **Utilities distribution substations**
- **Industries**
- **Infrastructure equipment's**
- **Large buildings**
- **Railways substations**
- **Mobile substations.**

The DPI L can also advantageously replace old medium voltage circuit breakers fitted with primary relays in existing installations.

## Advantages

### VB L circuit breaker

- Up-to-date switching and protection technologies.
- Maintenance free.
- High electrical and mechanical performances.
- Small dimensions.
- Easy to install and to operate.
- Designed, manufactured and controlled according to ISO 9001 quality standards.
- Type tested in neutral testing stations.

### DPI L circuit breaker

In comparison with circuit breakers fitted with primary relays, the DPI L offers the following further advantages :

- Availability of overcurrent and earth fault protection.
- Choice of several operation curves.
- Higher current rating.
- Wider current and time settings range.
- Higher accuracy.
- Better selectivity.
- Individual setting of the phase fault and earth fault elements.
- Self and dual powered versions.
- Self monitoring and fault diagnostic.
- Measuring circuit monitoring.
- Fault recording.

## Experiences

The very positive customer experiences of thousands of circuit breakers in service at various sites and operational conditions proves that the components of the VB L and DPI L breakers meet the most

stringent requirements of today's electrical distribution applications. These standard components are also the key components of the latest generation of the ALSTOM vacuum circuit breaker family.

## General Information

### Technologies

#### Vacuum interrupters

The VB L and DPI L circuit breakers are equipped with the latest generation of ALSTOM vacuum interrupters. The VG interrupters range is the up-to-date product of systematic enhanced development in switching technologies.

It results in very compact, maintenance free and cost-effective interrupters having performances fully adapted to control and protect medium voltage distribution circuits.

#### Operating mechanisms

The VB L and DPI L circuit breakers may be equipped on demand with either a conventional spring operating mechanism or an innovative magnetic actuator.

Both mechanisms are maintenance free.

The magnetic actuator has a fully enclosed active part for ideal protection against undesirable environmental effects. It presents superb travel, time and force characteristics for optimal control of vacuum interrupters.

#### Digital protection

Issued from the appreciated range of ALSTOM digital protection relays, the MiCOM P124 equips the DPI L circuit breaker.

A self-powered model offers a simple and low-cost solution when no external auxiliary power supply is available. A dual-powered model, when connected to an auxiliary supply, is able to transmit recorded and measured data to a supervisor. Should the auxiliary supply fail, the protection and tripping remain fully operational.

The MiCOM P124 associated to the DPI L circuit breaker offers remarkable protection and supervision features.

### Environment

The materials used in our vacuum circuit breakers may be totally recycled.

Our aim is to be a model to our customers and employees in the environmental protection field. We are committed to run an Integrated Product Policy (IPP), where the entire life cycle of a product is traced, starting from the design, through the production, to the use of the product up to its final disposal. All ecological aspects are constantly being re-evaluated and compared with new options as they are developed. This ensures the continuing production and use of environmentally-friendly products. Our aim is to not merely copy the standards of others, but to achieve the highest standards possible.



## Technical description

### Standards

The VB L and DPI L circuit breakers successfully passed the type tests specified in the IEC and CENELEC standards.

Those tests have been performed either in neutral laboratories or in presence of neutral inspectors.

Test reports in compliance with local specification and standards are also available.

### Technical data

#### Types

Rated voltage	kV
Rated power frequency withstand voltage 1 min.	kV
Rated lightning impulse withstand voltage 1,2/50 $\mu$ s	kV
Rated frequency	Hz
Rated normal current	A
Rated short-time withstand current	kA
Rated duration of the short circuit	s
Rated peak withstand current	kA
Short circuit breaking current at $\leq U_n$	kA
DC component	%
Short circuit making current at $\leq U_n$	kA
Rated operating sequences	
Rated cable charging breaking current at $U_n$	A
Overvoltage factor	
Rated single capacitor bank breaking current at $U_n$ and $f_n = 50$ Hz	A
Overvoltage factor	
Rated off-load transformer breaking current	A
Overvoltage factor	
Rated closing time	ms
Rated opening time	ms
Rated break time	ms
Mechanical life duration (number of CO operations)**	
Minimum life duration of vacuum interrupters	years
Electrical life duration (number of CO operations)**	

\* 1 s. for the integrated protection system / \*\* Guaranteed values as far as a check is performed every 10.000 cycles

## Technical description

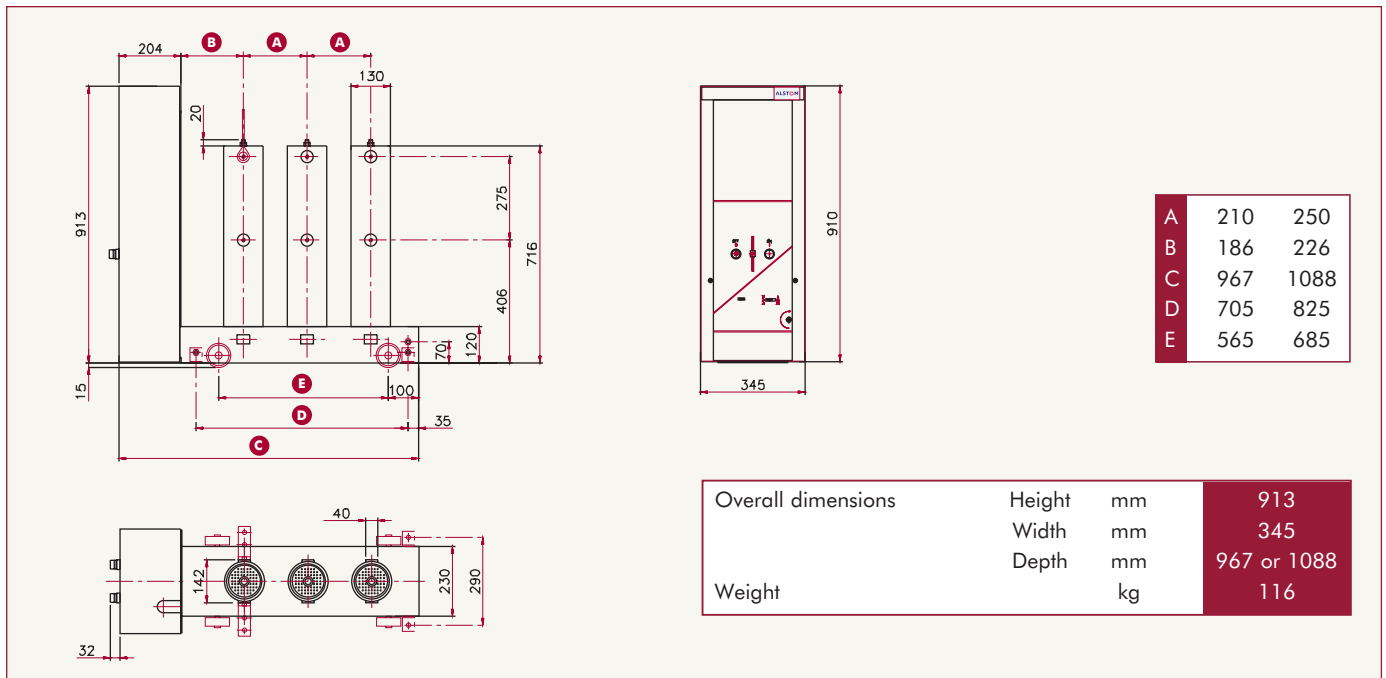
	VB 4-25/8 L	VB 4-25/12 L	VB 5-25/8 L	VB 5-25/12 L	VB 6-16/6 L	VB 6-20/8 L	VB 6-20/12 L
	DPI 4-25/8 L		DPI 5-25/8 L		DPI 6-16/6 L	DPI 6-20/8 L	
	12	12	17,5	17,5	24	24	24
	28	28	38	38	50	50	50
	75	75	95	95	125	125	125
	50/60	50/60	50/60	50/60	50/60	50/60	50/60
	800	1250	800	1250	630	800	1250
	25	25	25	25	16	20	20
	3*	3	3*	3	3*	3*	3
	63	63	63	63	40	50	50
	25	25	25	25	16	20	20
	36	36	36	36	36	36	36
	63	63	63	63	40	50	50
	O - 0.3 s. - CO - 3 min. - CO / O - 0.3 s. - CO - 15 s. - CO / CO - 15 s. - CO						
	25	25	31.5	31.5	31.5	31.5	31.5
	< 4	< 4	< 4	< 4	< 3.8	< 3.8	< 3.8
	400	400	400	400	400	400	400
	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5
	8	12.5	8	12.5	6	8	12.5
	< 4	< 4	< 4	< 4	< 3.8	< 3.8	< 3.8
	50	50	50	50	50	50	50
	55	55	55	55	55	55	55
	70	70	70	70	70	70	70
	30 000	30 000	30 000	30 000	10 000	30 000	30 000
	20	20	20	20	20	20	20

see diagrams on page 23

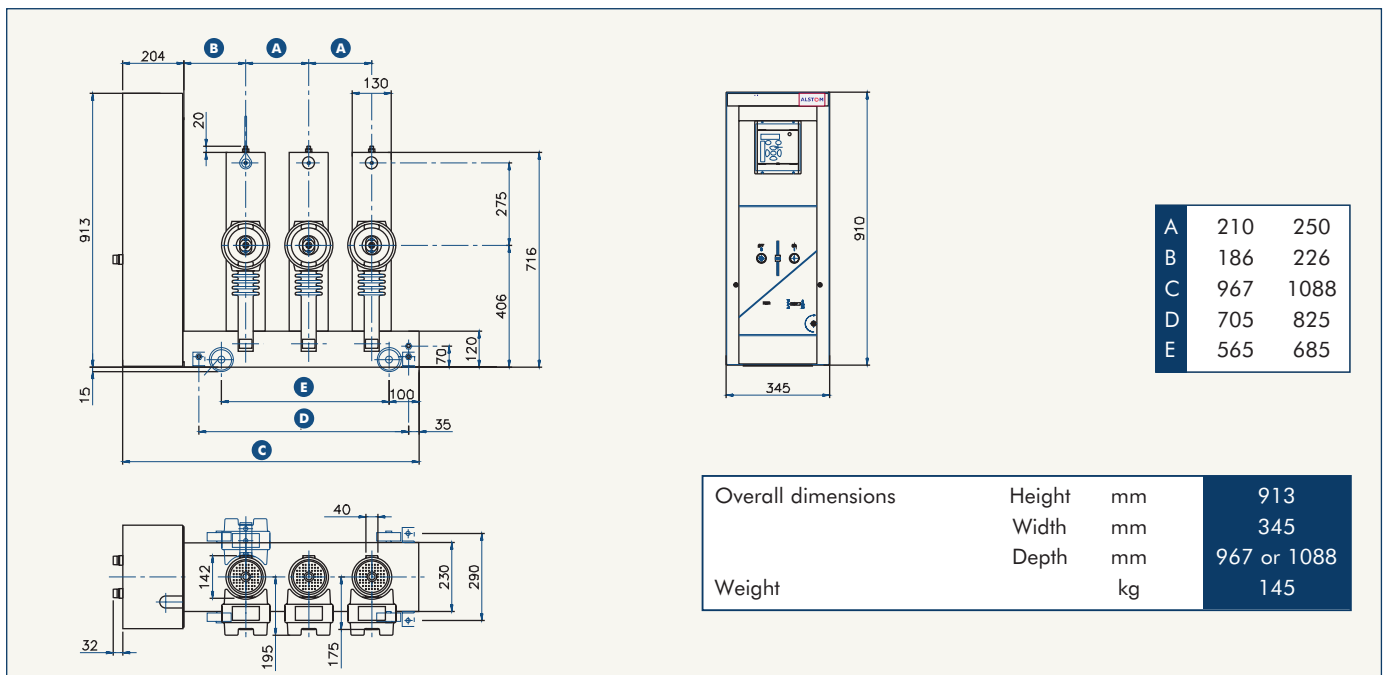
# Technical description

## Dimensions and weight

VB L with spring mechanism type CRR 1-2



DPI L with spring mechanism type CRR 1-2

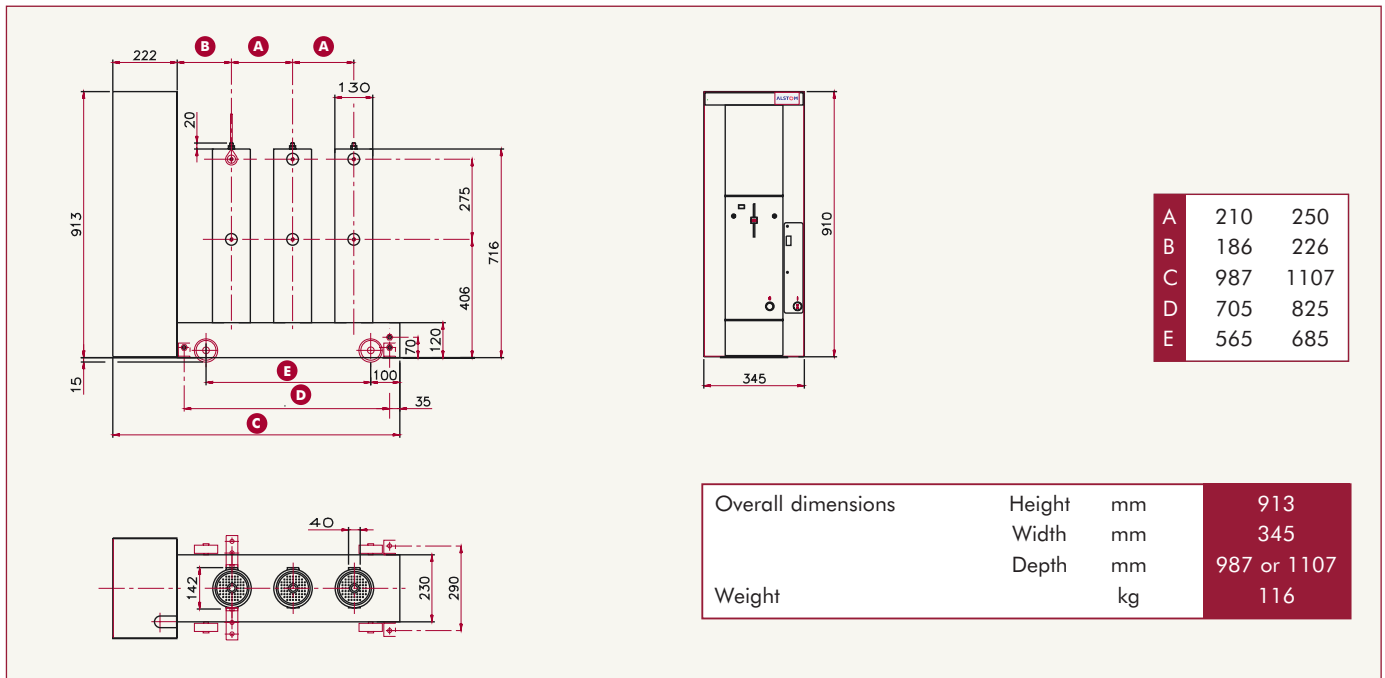


At 24 kV, the VB L and DPI L are only available with a phase distance of 250 mm

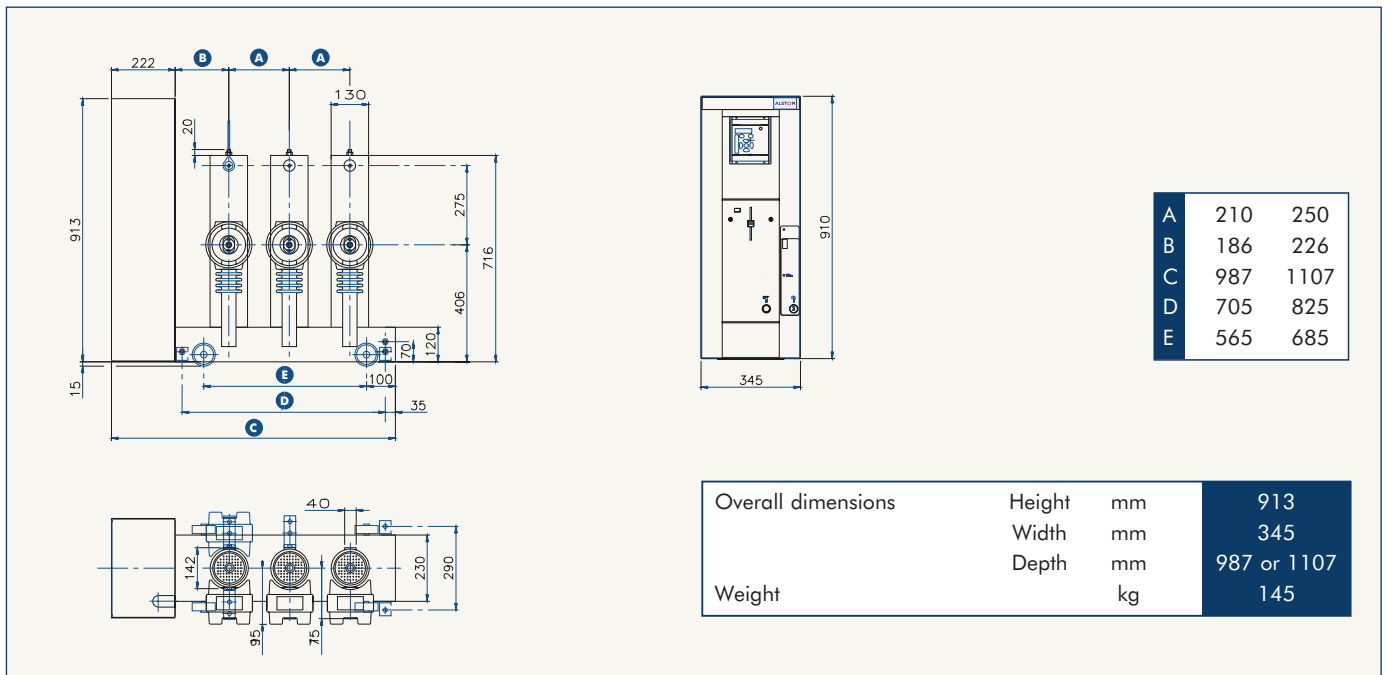


# Technical description

VB L with magnetic actuator type AMD 1-1



DPI L with magnetic actuator type AMD 1-1



At 24 kV, the VB L and DPI L are only available with a phase distance of 250 mm

## Technical description

### Main equipment

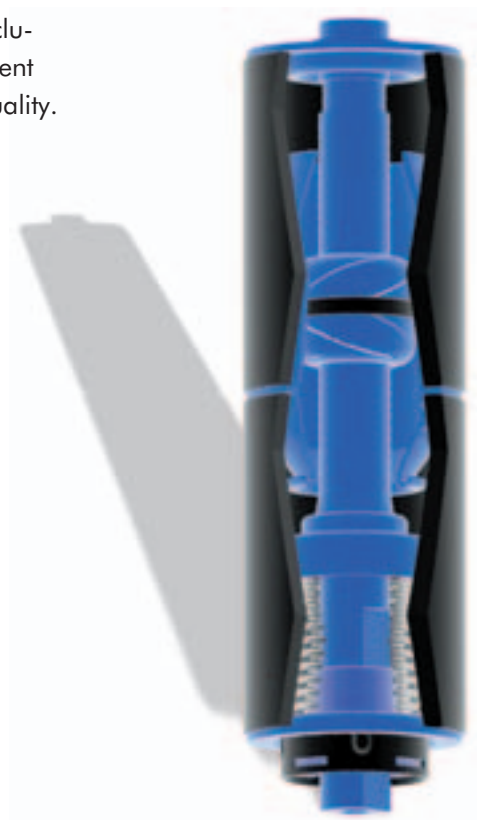
#### Vacuum interrupter

The vacuum interrupter, where the current is interrupted, is composed of a cylindrical vacuum containment chamber with insulating envelope sealed on two metal bottom parts. The vacuum inside the containment chamber is very high, i.e.  $10^{-6}$  to  $10^{-7}$  torr.

The two main butt contacts have an axial arrangement inside this vacuum containment chamber : one contact is fixed and the other is an axial motion contact. When the latter moves, tightness is ensured by means of metal bellows, the ends of which are welded to the rod of this moving contact on the one hand and to the bottom part of containment chamber on the other hand. Material and design of these contacts have been selected with the aim of warranting the best interrupting performances within the widest conditions of use.

A cylindrical shield is provided inside the vacuum containment chamber on which the contact metal molecules vaporized by the arc condense, avoiding thereby their adhesion to the insulating envelope, preventing its insulation ability to decrease.

All the constituent materials of interrupter and contacts are characterised by their extreme pureness and freedom from any gas occlusion ensuring thereby permanent maintenance of the vacuum quality.



VG interrupters range

## Technical description

### Operating mechanisms

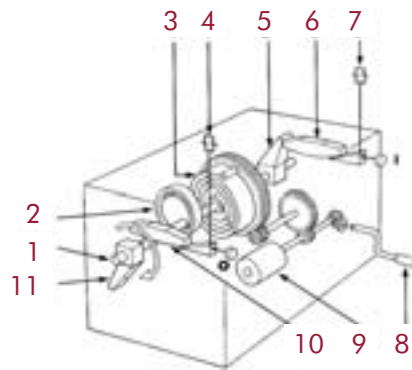
The breakers can be fitted either with conventional spring operating mechanism [CRR 1-2](#) or with magnetic actuator [AMD 1-1](#).

#### [CRR 1-2 Spring operating mechanism](#)

The operating mechanism type CRR 1-2 is a spring mechanism with stored energy for both the closing and the opening operations and suitable for auto-reclosing operation.

The energy for operation is stored in a spiral spring connected on one side to the arming device and on the other side to the main shaft of the mechanism, itself linked to the moving contacts of the vacuum interrupters through a unique rod that actuates simultaneously the 3 poles.

The mechanism is particularly suitable for the low operation strokes and energies requested by vacuum interrupters. Its concept with a unique shaft with one single spiral spring for both closing and opening operations ensures outstanding reliability and safety.



The spiral spring (3) stores the necessary energy for an O-CO fast reclosing cycle. It can be tensioned either electrically by a motor (9) or manually by a hand crank (8). It actuates the main shaft (1) and the cam (2) that changes the rotation movement into a translation movement.

In both opened and closed positions, the shaft leans on respectively the closing pawl (6) or on the opening pawl (10) through a roller lever (5 or 11).

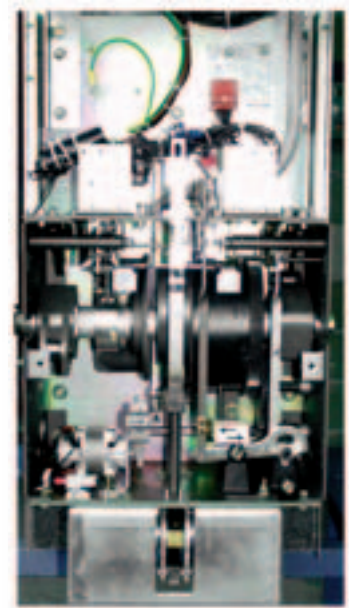
The circuit breaker is closed and opened either by the emission of a voltage impulse on the corresponding releases (7 and 4) or by actuating the closing (I) or opening (O) manual push-button.

The opening of the breaker can also be controlled by a minimum voltage release or when the breaker is associated with a self powered protection relay, by a low energy tripping device.

After a closing operation, the spiral spring can be re-tensioned, so that the necessary energy to perform a complete O-0.3s-CO fast reclosing cycle is available at any time.

An antipumping relay prevents the inadvertent auto-reclosing of the breaker when the electric closing command is maintained by mistake.

The electrical re-tensioning time of the spring by the motor is lower than 15 s, which allows it to perform the cycle O-0.3s-CO-15s-CO.



CRR 1-2

## Technical description

### AMD 1-1 Magnetic Actuator

As simple as a vacuum interrupter

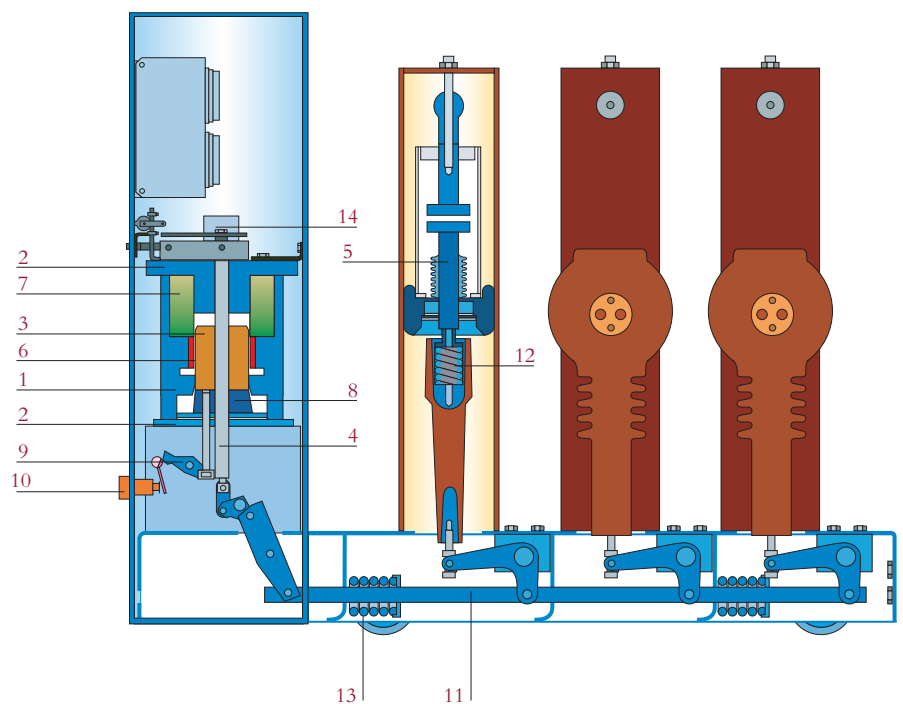
Making an outstanding step forward in the field of maintenance free, highly reliable operating mechanisms for MV circuit breakers, ALSTOM has developed a new concept of magnetic actuator perfectly adapted to the operation of modern vacuum interrupters which are characterised by very low mass movements, short contact stroke and high contact pressure.



As simple as a vacuum interrupter, the heart of the AMD magnetic actuator is composed of a small number of mechanical parts assembled in a closed cylinder which protects them from undesirable environmental effects. Furthermore, the external poles driving linkage is very simple, limiting to a minimum the risks of defect.

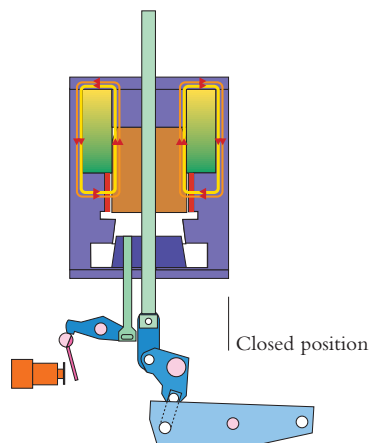
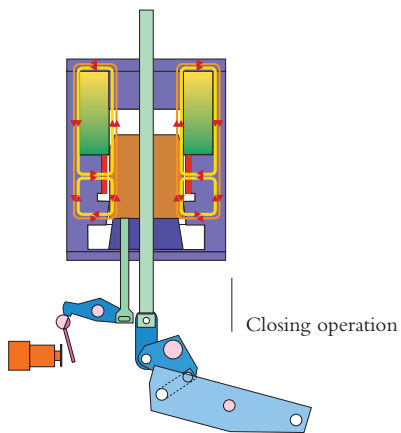
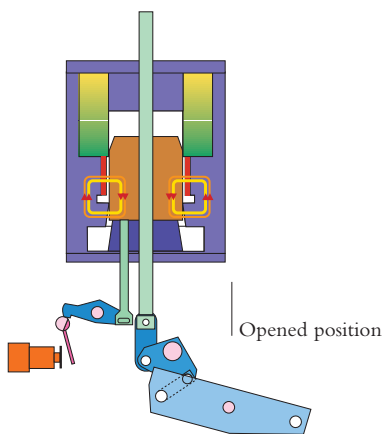
The AMD 1-1 magnetic actuator is able to open with a very low level of energy so that even the more critical functions of a high class circuit breaker operating mechanism are provided.

The magnetic actuator is, without any doubt, the successor for the old spring operating mechanism.



- One main magnetic circuit having a cylindrical shape. **(1)**
- Top and bottom covers to close this cylinder. **(2)**
- One internal moving armature **(3)** mechanically coupled to a central shaft **(4)**, which actuates the moving contact of the vacuum interrupters **(5)** through an external linkage.
- One set of permanent magnets **(6)** which generate the necessary flux to firmly maintain the armature in the lower and upper stable positions.
- One closing coil **(7)** generating a secondary flux in the appropriate direction to pull up the moving armature from the lower position.
- A second internal moving armature, the « magnetic shunt » **(8)**, free on the central shaft, compressing down a spring and linked externally to a conventional latching system **(9)**.
- One or several opening devices **(10)** to release the latch.
- One external linkage **(11)** joining the central shaft of the drive to the moving contacts of the vacuum interrupters and connected to pressure springs **(12)** and to opening springs **(13)**.
- One closing capacitor to store the energy for a complete autoreclosing cycle.
- One electronic controller to monitor the charge of the closing capacitor and to manage the external closing orders.
- One set of conventional well proven auxiliary contacts **(14)**.

## Technical description



### AMD 1-1

Working as a conventional mechanism

#### Charging operation

Before any closing operation, the closing capacitor is charged to store the necessary energy to perform a full closing-opening cycle. This is done automatically when the closing controller is connected to the auxiliary supply generally available in the substation. If an auxiliary power is not available, a « manual » charge is possible with a hand operated generator or a small battery proposed as accessories.

A signal lamp indicates if the auxiliary supply is healthy, another one indicates when the circuit breaker is ready for closing.

#### Opened position

The flux produced by the permanent magnets together with the residual force applied by the opening springs firmly maintains the armature in the lower stable position.

The main contacts of the circuit breaker are opened. The opening springs and the pressure springs are discharged.

There is no electrical consumption.

#### Closing operation

Local manual closing by a simple push-button or an electrical closing order allows the closing controller to discharge the capacitor in the closing coil.

The flux produced by the closing coil modifies the flux flowing in the magnetic circuit and the armature is attracted upwards. The linkage closes the circuit breaker main contacts and compresses the pressure springs.

Simultaneously, it charges the opening springs, storing the energy for the next opening.

At the end of a manual charging, or in case of sudden loss of the auxiliary supply, the execution of a closing command remains possible for 200 seconds after the voltage disappears.

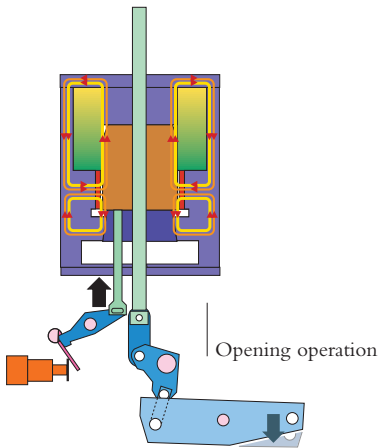
#### Closed position

The flux produced by the permanent magnets firmly maintains the armature in the upper stable position.

The main contacts of the circuit breaker are closed. The opening springs and the pressure springs are charged.

There is no electrical consumption.

## Technical description



### Opening operation

The energy for opening is stored in the opening and pressure springs only, not in the capacitor.

The opening sequence may be started at any time and is totally independent from the state of the capacitor.

The opening is caused by a modification of the flux repartition in the magnetic circuit. The resulting magnetic force applied on the armature becomes lower than the force applied by the pressure and opening springs. The armature is pulled down and the circuit breaker contacts open.

The modification of the flux repartition is made by moving the magnetic shunt upwards. This is simply done by releasing the latch, which maintains the shunt in the lower position.

There are two manners to release this latch : by a simple push-button enabling very easy local manual tripping or by conventional opening releases such as shunt opening release, time delayed under-voltage opening release, series opening release or low energy tripping release.

This last possibility enables the circuit breaker to be opened by a self powered integrated protection system.

### AMD 1-1 Advantages

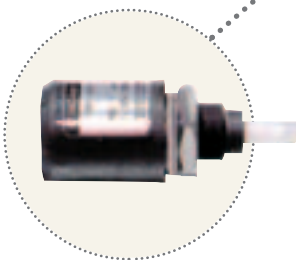
- Maintenance free operating mechanism leading to appreciable maintenance costs savings.
- Simple construction with a limited number of parts eliminating wear and adjustments.
- Fully enclosed active parts for ideal protection against undesirable environmental effects.
- Superb travel, time and force characteristics for optimal control of vacuum interrupters.
- Conventional operations for minimum disturbance of the operator.
- Manual charging facility by hand operated generator or portable battery.
- Very smooth manual closing and opening by simple push-buttons.
- Fully safe closing and opening operations, even in case of complete failure of the auxiliary supply.
- Opening operations completely independent from the closing capacitor. The energy for opening is stored in springs, not in a capacitor.
- Cost savings by the possibility of size reduction of the battery and battery charger which provide the auxiliary power.
- Traditional opening circuits, independent from the electronic controller and suitable for standard healthy trip supervision.
- Suitable for the operation of a vacuum circuit breaker equipped with a self powered integrated protection system.
- Particularly able to perform high speed and repetitive multi-shot reclosing cycles.

## Technical description

### Current transformers

The current needed to feed the measuring systems of the protection relay together with the current needed to trip the circuit breaker in case of fault is generated by three polyurethane resin insulated multi-ratio current transformers especially designed to suit the DPI operation requirements.

According to the desired protection setting range, the transformation ratio may be easily changed on site by simple displacement of terminal block jumps accessible in the circuit breaker mechanism box.



### Integrated digital protection

The DPI L circuit breaker is equipped with a self or dual powered digital over-current relay type MiCOM P124 suitable for phase and earth fault protection. The two models offer a wide range of protection functions without requiring any external auxiliary supply : three independent phase stages, three independent earth stages, eleven groups of IDMT curves and two thermal overload stages. The power necessary for the operation of the relay is taken directly from the current transformers.



P124 relay

When an external supply is available, the dual-powered model offers additional protection and automation features, such as auto-reclosing, monitoring and communication.

In the event of loss of the external power supply, the performances of the P124 dual-powered relay become equivalent to those of the self-powered P124 model and all the main protection functions remain fully operational.

In the DPI L, the energy to trip the circuit breaker is totally independent from an external auxiliary power supply. A capacitor in the relay, charged by the current transformers, is discharged into a low energy tripping release which has been mechanically loaded at the end of the circuit breaker opening stroke.

For detailed information about the MiCOM P 124 protection relay and available features, please refer to the specific documentation and instruction manual.

## Technical description

### MiCOM P124 relay : available functions

Function	ANSI codes	Self-powered relay	Dual-powered relay
Three-phase non directional overcurrent 3 independent thresholds	50/51	X	X
Phase-earth non directional overcurrent 3 independent thresholds	50N/51N	X	X
Thermal overload (true RMS) 2 independent thresholds	49	X	X
Undercurrent	37		X (1)
Negative phase sequence overcurrent	46		X
Broken conductor detection			X
Blocking logic			X (1)
Selective relay scheme logic			X (1)
Cold load pickup			X (1)
Setting groups		1	2
Assignable inputs/outputs			X (1)
Autoreclose option (4 shots)	79		X (1)
Output for striker triggering		X	X
Changeover contact output for trip coil		X	X
Bistable magnetic indicator flag for trip indication		X	X
4 extra magnetic flags option			X
Output relay latching	86		X (1)
Circuit breaker failure	50 BF		X
Circuit breaker supervision			X
Measurements (true RMS)		X	X
Peak and rolling values		X	X
Event recording			X (1)
Fault recording		X	X
Disturbance recording			X (1)
Rear RS485 communication port			X (1)
Front RS232 communication port		X	X

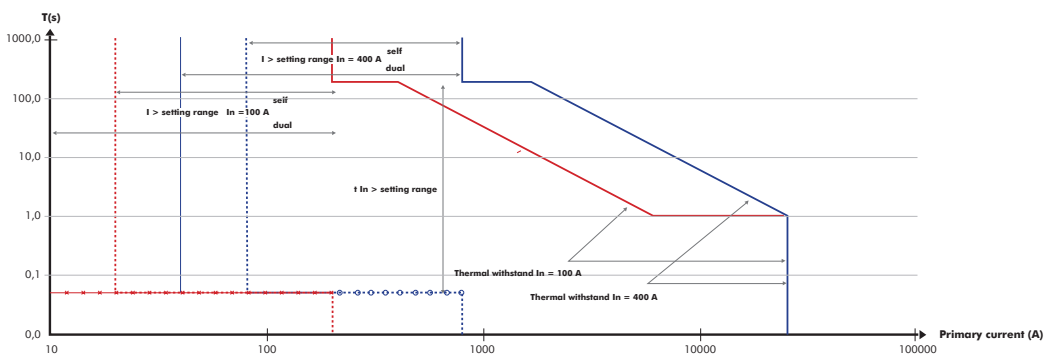
(1) : function not available if auxiliary power supply fails



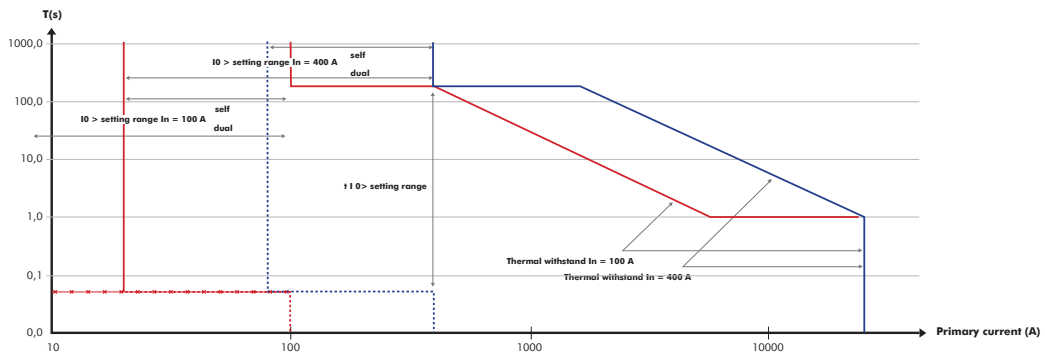
# Technical description

## Setting range of the DPI L

**Absolute min-max phase settings**  $T = f(\text{Primary current})$



**Absolute min-max earth settings**  $T = f(\text{Primary current})$



- $I \max I_n = 100 \text{ A}$
- $I \max I_n = 400 \text{ A}$
- $\times$   $I > \min \text{ dual } I_n = 100 \text{ A}$
- ⋯  $I > \min \text{ self } I_n = 100 \text{ A}$
- $\circ$   $I > \min \text{ dual } I_n = 400 \text{ A}$
- ⋯  $I > \min \text{ self } I_n = 400 \text{ A}$

### Phase fault

### Earth fault

Relay supply mode	Phase fault			Earth fault		
	Dual $I >$	Self $I >$	Dual + Self $I >> \quad I >>>$	Dual $I_0 >$	Self $I_0 >$	Dual + Self $I_0 >> \quad I_0 >>>$
$I_n \text{ (A)}$	0.1 to 2 x $I_n$	0.2 to 2 x $I_n$	0.2 to 40 x $I_n$	0.05 to 1 x $I_n$	0.2 to 1 x $I_n$	0.2 to 8 x $I_n$
100	10 - 200	20 - 200	20 - 4000	5 - 100	20 - 100	20 - 800
300	30 - 600	60 - 600	60 - 12000	15 - 300	60 - 300	60 - 2400
400	40 - 800	80 - 800	80 - 16000	20 - 400	80 - 400	80 - 3200

## Technical description

### Auxiliary equipment

#### Spring operating mechanism CRR 1-2

Type of apparatus		VB L		DPI L	
		Manual	Electrical	Manual	Electrical
Type of operating mechanism		Manual	Electrical	Manual	Electrical
1st shunt tripping release A.C. or D.C.	Y01	■	■	□	□
2nd shunt tripping release A.C. or D.C.	Y02	□	□	□	□
Instantaneous under-voltage release	Y05	□	□	□	□
A.C. time delayed under-voltage release	Y05	□	□	□	□
Low energy tripping release type DFE	Y09	□	□	■	■
A.C. or D.C. shunt closing release	Y11	□	■	□	■
A.C. or D.C. antipumping relay	K1	□	■	□	■
A.C. or D.C. motor equipment	M1	□	■	□	■
Motor limit switch	S4	□	■	□	■
1st auxiliary switch 4 NO + 4 NC	S11	■	■	■	■
2nd auxiliary switch					
4 NO + 4 NC	S21	□	□	□	□
4 NO + 3 NC + 1 WC	S22	□	□	□	□
Interlocking CB opened by Ronis key lock	S8	□	□	□	□
Auxiliary contact 1 NO or 1 NC for ditto	S8	□	□	□	□
Manual closing push button blocking key lock	S10	□	□	□	□
1NO or 1NC aux. contact on manual closing push-button	S1		□		□
1NO or 1NC aux. contact on manual tripping push-button	S2	□	□	□	□
Anti-condensation heater	E1	□	□	□	□
Operating counter	P1	■	■	■	■
Hand crank for spring charging		□	□	□	□

■ Standard basic equipment | □ Optional equipment | Available voltages : 24/48/110/125/220 V D.C. / 110/230 V A.C 50 or 60 Hz

## Technical description

### Magnetic actuator AMD 1-1

Type of apparatus		VB L	DPI L
1st shunt tripping release A.C. or D.C.	Y01	■	□
2nd shunt tripping release A.C. or D.C.	Y02	□	□
Instantaneous under-voltage opening controller A.C or DC	V2	□	□
Time delayed under-voltage opening controller AC	V2	□	□
Low energy tripping release type DFE	Y09	□	■
Closing capacitor	C1	■	■
Closing coil	Y99	■	■
Charging and closing controller including	V1	■	■
Manual + electrical charging			
Manual closing			
Shunt closing release with anti pumping feature			
Indicating led "ready to close"	H1		
Indicating led "auxiliary supply on"	H2		
Auxiliary relay "ready to close"	K4	□	□
1st auxiliary switch 4 NO + 4 NC	S11	■	■
2nd auxiliary switch			
4 NO + 4 NC	S21	□	□
4 NO + 3 NC + 1 WC	S22	□	□
Interlocking CB opened by Ronis key lock	S8	□	□
Auxiliary contact 1 NO or 1 NC for ditto	S8	□	□
Manual closing push-button blocking key lock	S10	□	□
1NO or 1NC aux. contact on manual closing push-button	S1	□	□
1NO or 1NC aux. contact on manual tripping push-button	S2	□	□
Anti-condensation heater	E1	□	□
Operating counter	P1	■	■
Generator for manual charging	G1	□	□
Battery for local charging		□	□

■ Standard basic equipment | □ Optional equipment | Available voltages : 24/48/110/125/220 V D.C. / 110/230 V A.C 50 or 60 Hz

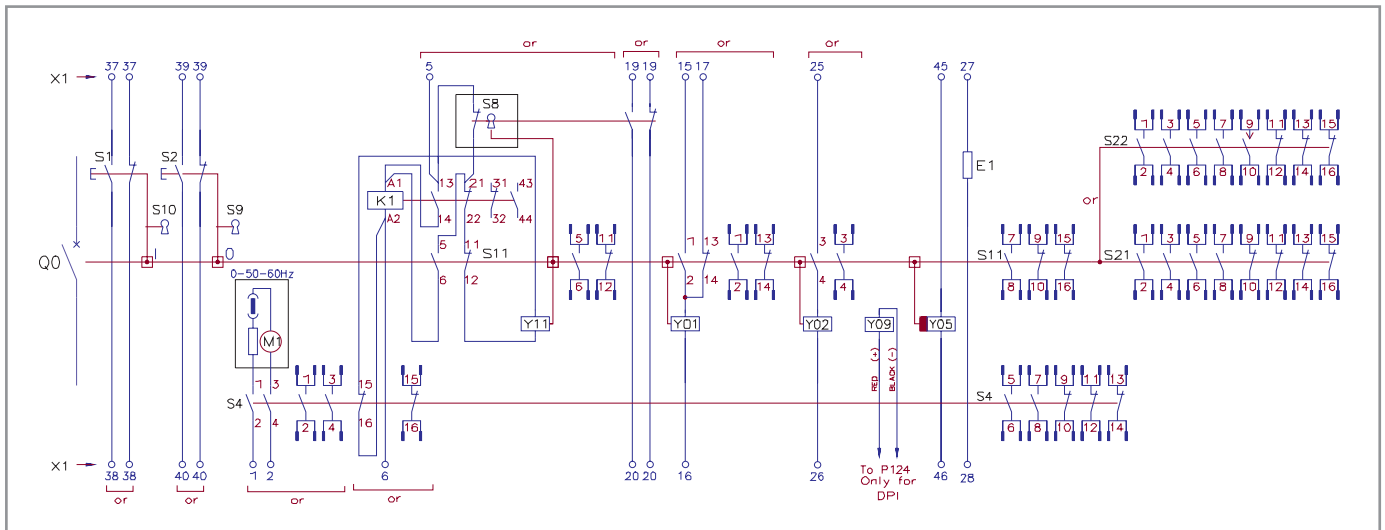
# Technical description

## Schematic diagrams

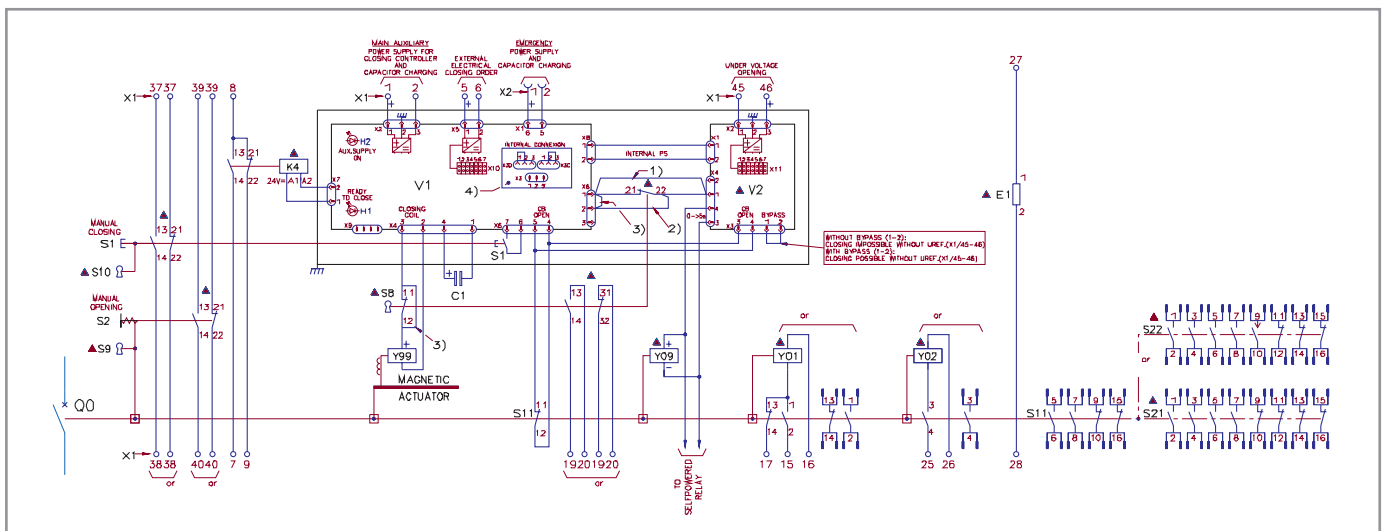
Circuit breaker Q0 shown in opened position, closing spring charged, ready for closing.

Legend for equipment  
See tables sheets 18 and 19

### VB L with spring operating mechanism type CRR 1-2

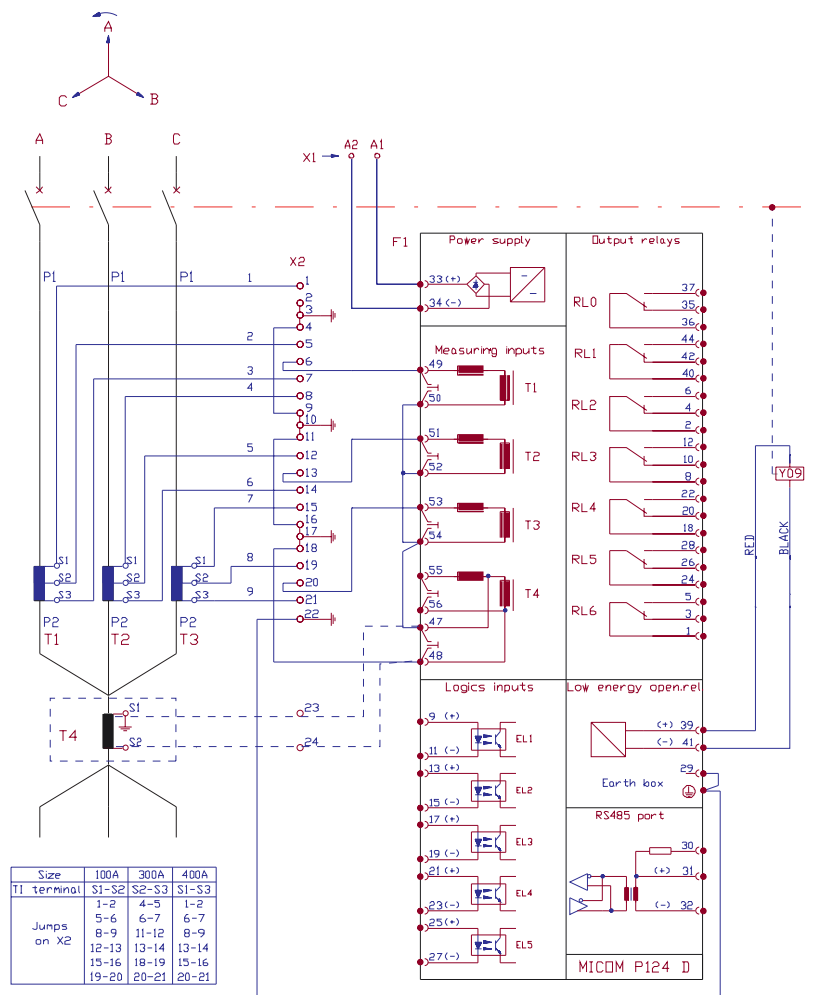


### VB L with magnetic actuator AMD 1-1

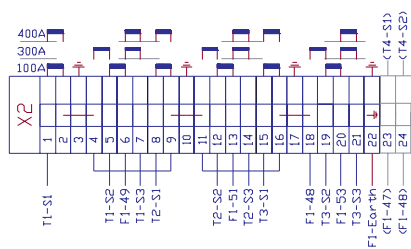


# Technical description

## DPI L integrated protection system



Size	100A	300A	400A
T1 terminal	S1-S2	S2-S3	S1-S3
	1-2	4-5	1-2
	5-6	6-7	6-7
Jumps on X2	8-9	11-12	8-9
	12-13	13-14	13-14
	15-16	18-19	15-16
	19-20	20-21	20-21



PHASES POSITION



LATERAL DRIVE

## Technical description

### Installation

The VB L and DPI L circuit breakers are designed for indoor installation into all types of new or existing medium voltage switchgear having lateral arrangement. They are particularly suitable for replacement of obsolete circuit breakers fitted with or without primary relays. This solution enables remarkable improvement of old installations in terms of performances, maintenance, cost savings and reliability and not only by replacing the main switching equipment but also by substantial upgrading of the entire protection scheme.

### Test report

#### Control and test

The performances of our equipments have been controlled by number of tests performed in various laboratories. All those tests are supported by detailed reports. Furthermore, the published characteristics have been certified by the type tests specified in the standards, performed in neutral laboratory, and consigned in reports and certificates. These tests reports may be consulted on request.

At each stage of the manufacture, all the individual parts are controlled to guarantee the quality of the product. At the end of the assembly line, the routine tests specified by the standards are performed and an individual test report is provided.

#### Quality assurance

The design, development, manufacturing, installation and servicing of our equipment are made in accordance with the last requirements of the Quality standard EN 29001/ ISO 9001. Furthermore, our production plant has established and is fully involved in Quality Focus, a company internal action program for continuous quality improvement in all the aspects of our business. Meanwhile, the confidence shown in our products for more than 80 years by a very large number of customers all over the world is the best sign of the quality of the products we manufacture.



# Operation & maintenance

## Operation

One of the particular advantages of the vacuum circuit-breakers type VB L is the very high number of operations they are able to perform for the interruption of both fault and service currents.

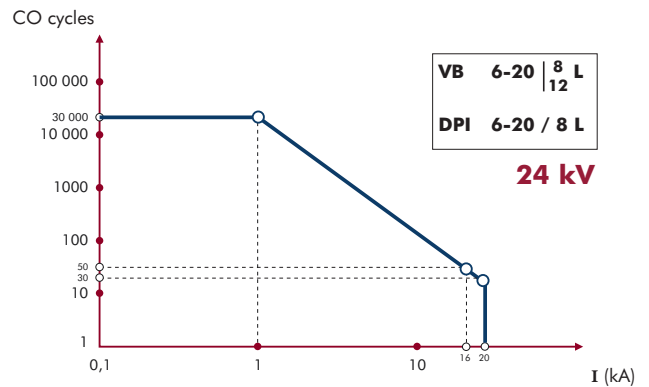
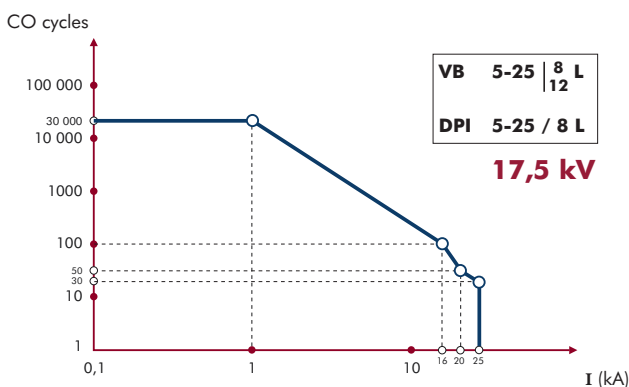
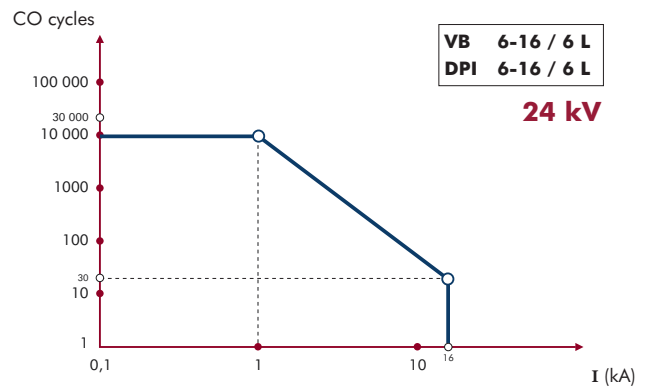
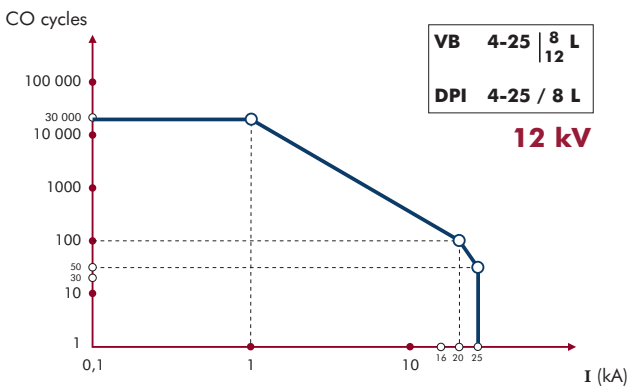
The experience shows that, except for particular cases, this number of operations is much higher than the number of operations the circuit-breakers will actually perform during all their whole operational life.

The diagrams below show the number of authorised CO cycles versus the interrupted currents.

## Maintenance

The vacuum interrupters together with the operating mechanisms of the circuit-breakers VB L and DPI L do not require any maintenance for the specified life duration of the equipment.

However, as the circuit breakers are sometimes required to operate in conditions which may differ one from the other, we recommend that a simple inspection shall be performed every 10 000 operations in order to control the good condition of the apparatus.



Please contact :

