

# Double-Break Disconnectors Types SDB 123 ÷ 420 kV and SDBwt 72,5 ÷ 170 kV

for Outdoor Installation

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**HAPAM**

## Application

Disconnectors are used for metallic isolation of systems by creating in open position a visible isolating distance. They are appropriate for switching small currents or currents when no significant change in voltage occurs across the terminals. Double-break disconnectors can be operated in many types of high voltage switchgear that are in use.

For earthing and short-circuiting disconnected plant sections, each disconnector pole can be equipped with one or two earthing switches. They are available for rated voltages from 123 to 420 kV and for rated currents up to 4000 A.

## Regulations

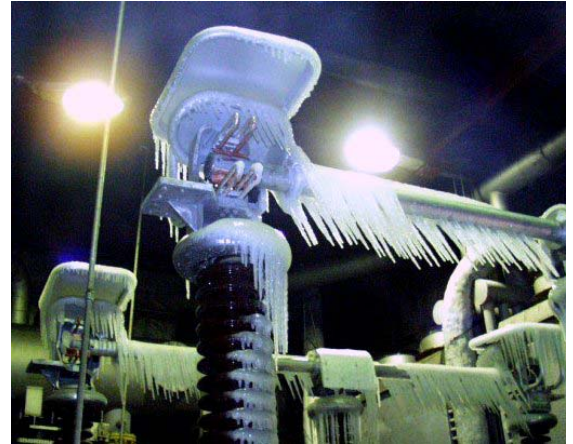
The disconnectors are designed according to the publication IEC 62271-102; IEC 60694 and most other national regulations.

ANSI specifications can be met on request.

## Tests

The type tests on the disconnectors were performed successfully in our own and also in independent test laboratories in accordance with the latest regulations. During manufacture all components are continuously subjected to quality tests in order to ensure consistent high quality of the products.

After completion of the disconnector poles a comprehensive electrical and mechanical routine test is carried out on the poles and associated operating mechanisms, so that their perfect functioning is guaranteed.



**Double-break Disconnector SDB  
20mm ice breaking test**

## Features

- **WELDED ALUMINIUM STRUCTURE**  
The current path halves are welded aluminium structures with a minimum number of terminal points that are subject to corrosion; thanks to that no appreciable change of the contact resistance over many years
- **NO EXTERNAL CONTACT SPRINGS**  
Contact fingers without external springs.
- **STRONG PEDESTALS**  
They guarantee that the deflection remains unchanged at high static mechanical terminal loads.
- **EASY AND SIMPLE ERECTION**  
Thank the design of current path it is easy to adjust contact systems after cabling. (self adjusting)
- **DEAD CENTRE INTERLOCKING**  
For all operating mechanisms. It ensures no change of the switching position in case of extreme external influences such as storm, vibration and earthquake.
- **LITTLE MAINTENANCE**  
Owing to the selection of the material used and the encapsulation of the pedestals with a permanent lubrication, the units are practically maintenance-free.

## Design

The load-carrying constructional element of the disconnecter is a sectional-steel base frame. The middle one of the three insulators is fixed on a common base frame and mounted on the rotary pedestal protected against atmospheric influences and running on maintenance-free assembled ball bearings. The middle insulator bears aluminium current path.

### SDB disconnecter:

The main contacts of current path are made of silver-plated copper profiles and the contact head is equipped with silver plated fingers. When the disconnecter is closing, the middle insulator rotates  $70^\circ$  until the main contacts touch each other. During final phase of closing the current path makes a rotation round the longitudinal axis. This movement gives the best connection of main contacts and make possible to break an ice coating.

### SDBwt disconnecter:

In case of disconnecter designed as SDBwt, the current path is equipped with silver-plated copper fingers. The heads are mounted on the top of outer insulators. They consist the contact bar made from copper. When disconnecter is closing the current path does not rotate round its axis and fix contact goes between the fingers.

The main contacts of the disconnecter in closed and opened position are locked via a dead centre system. The HV terminals can be made according to DIN or NEMA standard.

The current path consists of a welded aluminium structure with a minimum of terminal points and therefore no appreciable change of the contact resistance over many years occurs.

The optionally available earthing unit consists of a hinged-type-earthing switch fixed at the base frame. When in the open position, the tubular arm is located along the base frame.

In closed position the earthing switch contact attached to the head of current path comes to rest between the contact fingers of the earthing switch, which can be mounted on both sides of the disconnecter.

The universal design permits the earthing switch to be attached at site and it can be retrofitted without any difficulty.

All components are protected against atmospheric influences. The steel parts liable to rusting being hot galvanised.

## Mode of Operation

Disconnecter and earthing switch are operated separately.

The design of the operating mechanism of the disconnecter and earthing switch is such that a dead centre position is passed through shortly before the end positions are reached. Due to that incidental opening or closing of the units due to external influences (e.g. short-circuits, storm, earthquake) is impossible.

The energy is transmitted from the operating mechanism of the disconnecter to a rotary pedestal.



**Double-break Disconnecter SDB  
rotating mechanism of current path**



**Double-break Disconnecter SDB  
Head of rotating current path,  
earthing contact**



**Double-break Disconnecter SDBwt  
Head of non-rotating current path,  
earthing contact,  
optionally with ice protection shields**

## Operating Mechanisms

All disconnectors can be supplied with manual operating mechanism or motor-operated mechanism, as requested by the client. Each three-pole disconnector or earthing switch group requires only one operating mechanism with the exception of 420 kV disconnector, which is single-pole operated.

The operating mechanisms are fastened laterally to the base frame.

With units installed on a higher level it is possible to mount the operating mechanism within reach from the ground level by using the additional pivot bearing and the operating shaft.

## Interlocks

At the client's request disconnector and earthing switch can be mechanically interlocked with each other so that during manual operation it is only possible to operate the earthing switch with the disconnector in the open position and the disconnector with the earthing switch in the open position. For disconnectors with motor-operated mechanism and earthing switches with manual operating mechanism, mechanical interlock can be provided for the earthing switch, whereas the motor operating mechanism of the disconnector is interlocked electrically.

Electrical interlocking of both operating mechanisms can be provided if motor-operated mechanisms are used both for disconnector and earthing switch.

As the additional interlocking facility operating mechanisms can be equipped with the blocking magnet, which prevents any operation of the manual operating mechanism or emergency manual operation of motor operated mechanism if there is no actuating signal from the control room. This enables the centralised supervision over all manual operations of disconnectors and earthing switches in the whole substations.

## Little Maintenance

Owing to the selection of the material used and the encapsulation of the pedestals and rotary heads in connection with a permanent lubrication the units are practically maintenance-free.

Inspections and maintenance are mainly limited to components exposed to atmospheric influences and cover for example cleaning the insulators. Under normal climatic conditions the inspection intervals are 5 years.



**Motor-Operated Mechanism  
MT 50/100**



**Manual-Operated Mechanism  
HA 31-80**



# Characteristics

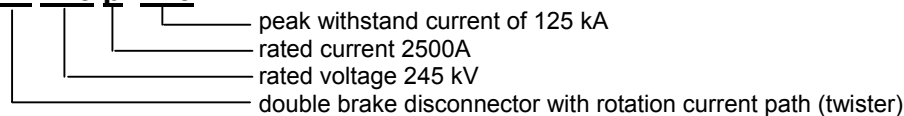
Disconnecter		-	SDB 123	SDB 145	SDB 170	SDB 245	SDB 300	SDB 362	SDB 420
		SDBwt 72,5	SDBwt 123	SDBwt 145	SDBwt 170	-	-	-	-
Rated voltage	kV	72,5	123	145	170	245	300	362	420
Rated normal current									
type n	A	1500	1500	1500	1500	1500	1500	1500	1500
type p	A	2500	2500	2500	2500	2500	2500	2500	2500
type pc	A	-	3150**	3150**	3150**	3150	3150	3150	3150
type q	A	-	4000**	4000**	4000**	4000	4000	4000	4000
Rated peak withstand current of disconnector and earthing switch	kA	100/125	100 /125	100 /125	100 /125	100 /125	100 /125	100 /125	125 /160
Rated short-time withstand current (rms.)	kA	40 / 50	40 / 50	40 / 50	40 / 50	40 / 50	40 / 50	40 / 50	50 / 63
Rated power-frequency withstand voltage 50 Hz, 1min									
To earth	kV	140	230	275	325	460	380	450	520
Across open switching device	kV	160	265	315	375	530	435	520	610
Rated lightning impulse withstand voltage 1,2 / 50µs									
To earth	kV	325	550	650	750	1050	1050	1175	1425
Across open switching device	kV	375	630	750	860	1200	1050(+170)*	1175(+205)*	1425(+240)*
Rated switching impulse withstand voltage 250/2500 µs									
To earth:	kV	-	-	-	-	-	850	950	1050
Across open switching device, class. A:	kV	-	-	-	-	-	850	950	1050
Across open switching device, class. B:	kV	-	-	-	-	-	700(+245)	800(+295)	900(+345)
Discharge inception voltage	kV	>46	>80	>95	>110	>160	>190	>230	>270
Radio interference voltage	µV	-	<2500	<2500	<2500	<2500	<25000	<25000	<2500
3- phase breaking capacity inductive / capacitive	A	2	2	2	2	1,5	1	1	1
Insulator design:									
minimum failing load	kN	4,0-6,0	4,0-6,0-8,0	4,0-6,0-8,0	4,0-6,0-8,0	4,0-6,0-8,0	6,0-8,0	6,0-8,0	8,0-10,0
overall height	mm	770	1220	1500	1700	2300	2650	2900	3350
minimum creepage distance	mm	1450	2460	2900	3400	4900	6000	7240	8400
Admissible mechanical terminal load:									
static and dynamic	kN	3,5-5,5	3,5-5,5-7,5	3,5-5,5-7,5	3,5-5,5-7,5	3,5-5,5-7,5	5,5-7,5	5,5-7,5	5,5-7,5
static portion	kN	1,5-2,5	1,5-2,5-2,5	1,5-2,5-2,5	1,5-2,5-2,5	1,5-2,5-2,5	2,0-2,0	2,0-2,0	2,0-2,0

\* Values in brackets are peak values of power frequency voltage applied to the opposite terminal

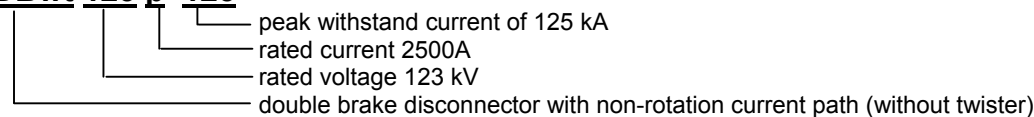
\*\* not apply for SDBwt ....

Type designation is complemented by the data for rated current (p- 2500A; pc-3150A) and peak withstand current.

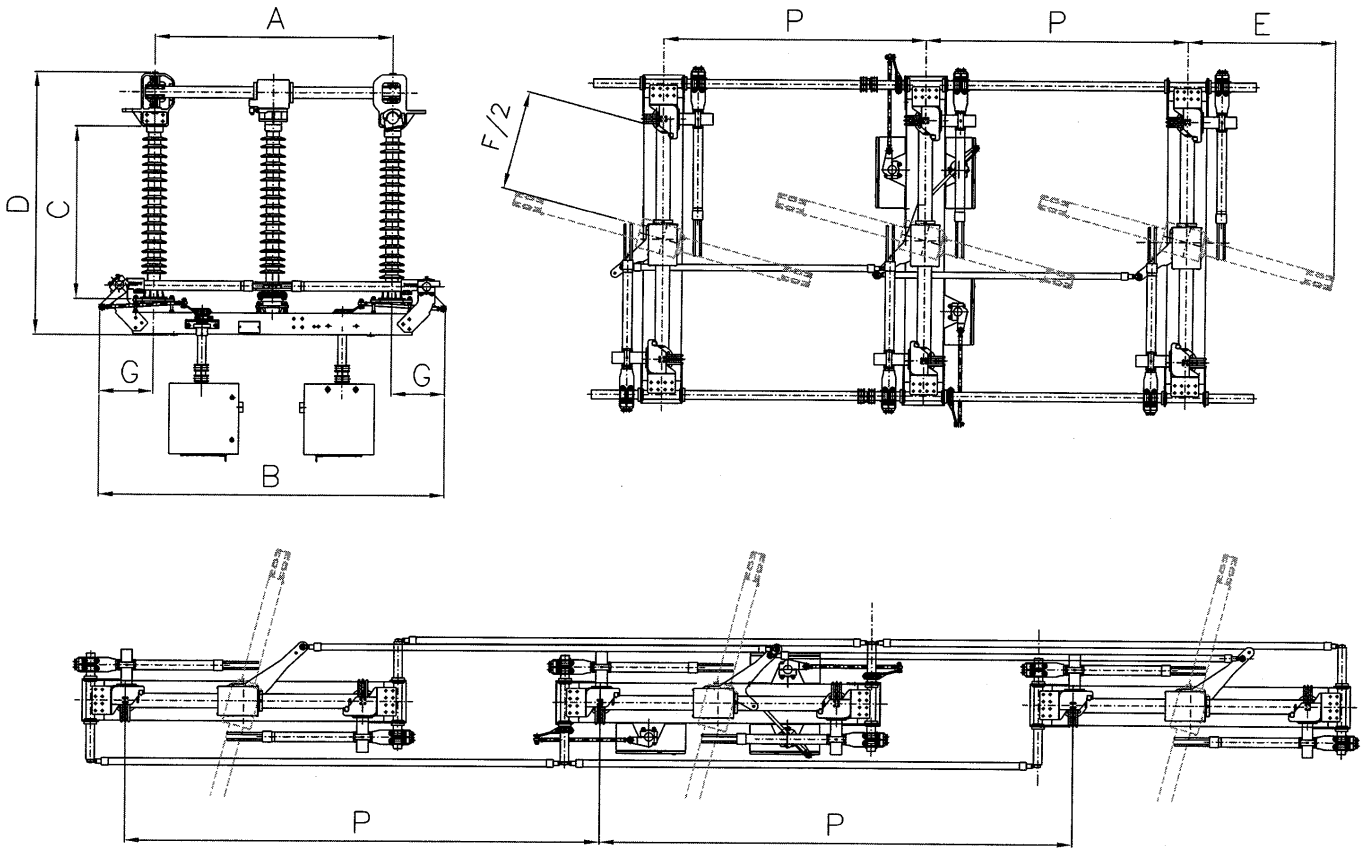
Example 1: **SDB 245 p 125**



Example 2: **SDBwt 123 p 125**



# Main dimensions



Disconnecter:		-	SDB	SDB	SDB	SDB	SDB	SDB	SDB
		SDBwt	SDBwt	SDBwt	SDBwt	SDBwt	SDBwt	SDBwt	SDBwt
<b>Main dimensions</b>	<b>kV</b>	<b>72,5</b>	<b>123</b>	<b>145</b>	<b>170</b>	<b>245</b>	<b>300</b>	<b>362</b>	<b>420</b>
A Support insulator distance	mm	1550	1700	2000	2300	3000	3600	4000	4800
B Base frame length	mm	1850	2650	2900	3200	3900	3300	4900	5700
C Disconnecter height	mm	1280	1900	2180	2380	2980	3330	3600	4050
D Height of support insulator	mm	770	1220	1500	1700	2300	2650	2900	3350
E Arm range ( open)	mm	705	800	950	1100	1470	1695	1900	2300
F Isolating distance	mm	875	1200	1500	1800	2500	3100	3500	4300
G Length of earthing switch attachment	mm	450	450	450	450	450	450	1000	1000
P Minimum distance between poles									
- parallel arrangement	mm	1250	1750	1950	2150	2850	3400	3750	4150
- series arrangement	mm	-	3000	3500	4000	5300	6000	6600	8100

*This catalogue describes our standard product and does not show variations in design which may be available. If additional details are required, contact your local HAPAM representative. HAPAM reserves the right to make changes or improvements to the product shown in this bulletin without notice or obligation*

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