ABB Seccionadores de Potencia HV
Características Tecnicas y Aplicaciones Especiales.
## Disconnecting switches portfolio

<table>
<thead>
<tr>
<th>Type</th>
<th>Vertical operation</th>
<th>Horizontal operation</th>
<th>Independent earthing</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Type</strong></td>
<td>Pantograph GW54</td>
<td>Horizontal Knee GW57</td>
<td>Earthing Switch JW11</td>
</tr>
<tr>
<td><strong>Volt.</strong></td>
<td>123-550kV</td>
<td>245-550kV</td>
<td>72.5-550kV</td>
</tr>
<tr>
<td><strong>S.S.C</strong></td>
<td>40-63kA/3(4)s</td>
<td>50-63kA/3s</td>
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<tr>
<td><strong>Current</strong></td>
<td>3150-5000A</td>
<td>4000A</td>
<td>2000-4000A</td>
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</tbody>
</table>
Disconnecting switches features
Why ABB? High performance

Disconnecting switches features
- High breaking and thermal capability: upto 63kA/3s, 5000A
- Temperature rising test: 1.1 * rated current
- Mechanical endurance: M2, 10,000 times.
- Dielectric level higher than IEC std.
- Bus transfer current capability higher than IEC std.
  - DSSP// upto 1600A, 300V, 100 times
  - GW54/GW57 upto 1600A, 400V, 100 times

Earthing switches features
- Induced current switching capability higher than IEC std.
  - Electromagnetic coupling
    - Rated induced current 400A (IEC Class B 160A)
    - Rated induced voltage 35kV (IEC Class B 20kV)
  - Electrostatic coupling
    - Rated induced current 50A (IEC Class B 25A)
    - Rated induced voltage 50kV (IEC Class B 25kV)

Varies environment application
- Environment temperature from -50°C to +50°C
- Seismic capability: IEC/IEEE 0.5g
- Operation under severe ice condition: 20mm
Disconnecting switches features
Horizontal central break

Structure
- Main blade (Two rotating arms)
- Two rotating insulators
- Earthing switch – both left and right side available
- Base
- Drive mechanism – manual or motor operated

Technical data

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Main contacts
- Electrolytic copper plated with 20μm silver layer
  - higher conductivity than normal copper
  - preventing oxidation
- “Surface” contact - large contact area
  - higher conductivity than “point” or “line” design
- Insulated & stainless springs
  - ensure contact pressure in long service life

Main arms
- U-shape square tube made of AL/MG/SI alloy
  - high strength and light weight
  - large conductive pathway and good cooling effect
  - anti-corrosion
Disconnecting switches features
Horizontal central break

Connection
- Flexible braids with good mechanical and electrical performance
  - M2, 10000 times
  - E2, 5000 times, upto 3150/4000A

Reliable driving - ball bearing design
- Double ball bearing rotary design
- Fully sealed. Anti-dust and corrosion
Disconnecting switches video
Horizontal central break
Disconnecting switches features
Horizontal central break

Arrangement
- 3P: 0/45/135 degree, air switch, line, L, gantry; 2P; 1P
Disconnecting switches features
Horizontal double break

Structure
- Main blade (One rotating arm)
- One rotating insulator. Two supporting insulators
- Earthing switch – both left and right side available
- Base
- Drive mechanism – manual or motor operated

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Disconnecting switches features
Horizontal double break

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Disconnecting switches features
Horizontal double break

**ABB patents – “Rolling contact” smart design**
- Applied for high current ≥3150A
- Avoid complicated traditional design “turn-twist”
- No undue wear
  - Fixed & moving contact don’t contact during process
- Reduce operating force
  - Rolling friction on ball-bearing instead of contact
- M2

1. Terminal
2. Ball-bearing
3. Guide plate
4. Moving contact
5. Fixed contact

- Start close operation
- Ball-bearing separated with Guide
- Moving & fixed contact close, D=37

- Ball-bearing contact, D=37
- No friction on moving & fixed contact
- D=40
Disconnecting switches features
Horizontal double break

Interlock hooks
- Equipped with interlock hooks on both ends
  - short circuit protection

Reliable driving - ball bearing design
- Double ball bearing rotary design
- Fully sealed. Anti-dust and corrosion
Disconnecting switches video
Horizontal double break
Disconnecting switches features
Horizontal double break

Arrangement
- 3P: 0/45/135 degree, gantry; 1P
- 3/2 break design: 2xDouble Break DS (save 40-70 m² area)
Disconnecting switches features

Horizontal knee GW57

Structure
- Main blade (Two hinged arms)
- One rotating insulator. Two supporting insulators.
- Earthing switch – both left and right side available
- Base
- Drive mechanism – manual or motor operated

Technical data

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Disconnecting switches features
Horizontal knee GW57

Main contacts
- Electrolytic copper plated with 20μm silver layer
- “Multiple-surface” contact – large contact area
- “Reverse-loop” design – high short circuit currents
- Insulated stainless springs keep pressure in service life

Main arms
- Two hinged arms.
- U-shape open structure conductor
- AL/MG/SI alloy with high strength, light weight, anti-corrosion

Bus transfer current capability
- 1600A, 300V, 100 times
- Extra graphite materials used for moving/fixed arcing contact
Disconnecting switches features
Horizontal knee GW57

Connection
- Flexible braids with good mechanical and electrical performance
  - M2, 10000 times
  - E2, 5000 times, upto 4000A

Reliable driving – Spring, rack & pinion design
- Precise folded motion control
- Balance spring inside lower arm.
Disconnecting switches video
Horizontal knee GW57-252
Disconnecting switches video
Horizontal knee GW57-550
Disconnecting switches features
Horizontal knee GW57

Arrangement
- 3P, 1P
- 3/2 break design: 2GW57 (save 40-70 m² area)
Disconnecting switches features
Vertical pantograph GW54

Structure
- Main blade (Two arms)
- One rotating insulator. One supporting insulator.
- Earthing switch
- Drive mechanism – manual or motor operated

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Disconnecting switches features
Vertical pantograph GW54

Main contacts
- “Bow-shaped” moving contact fingers
  - self-elastic force to ensure reliable connection between arms and contact fingers.
- Electrolytic copper plated with 20μm silver layer
- “Multiple-points” contact
  - reliable and large electrical contact area

Main arms
- Stable double solid square tubes
- AL/MG/SI alloy with high strength, light weight, anti-corrosion
Disconnecting switches features
Vertical pantograph GW54

Connection
- Flexible braids with good mechanical and electrical performance
  - M2, 10000 times
  - E2, 5000 times, upto 5000A

Reliable driving – Spring design
- Stainless steel balance springs & rod-end ball bearing
  - compensate operation torque to reduce energy
  - guarantee time curve requirement of open/close
- Mechanical interlock system integrated in the base
  - simple and reliable
Disconnecting switches video
Vertical pantograph GW54
Disconnecting switches features
Vertical pantograph GW54

Arrangement

- 3P: 0, 45, 135 degree; 1P
- Vertical instead of horizontal to busbar: GW54 (save 50-180 m² area)
Disconnecting switches features
Vertical semi-pantograph DSSP

**Structure**
- Main blade (Two folded arms)
- One rotating insulator. One supporting insulator.
- Earthing switch
- Base
- Drive mechanism – manual or motor operated

**Technical data**

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Disconnecting switches features
Vertical semi-pantograph DSSP

Main contacts
- Electrolytic copper plated with 20μm silver layer
- Catching motion. Guiding and preventing dropout structure
- “Multiple-points” contact – reliable and large electrical contact
- Insulated stainless springs keep pressure in service life

Main arms
- Two folded single arms.
- U-shape open structure conductor
- AL/MG/Sl alloy with high strength, light weight, anti-corrosion

Bus transfer current capability
- 1600A, 300V, 100 times
- Graphite materials used for moving/fixed arcing contact
Disconnecting switches features
Vertical semi-pantograph DSSP

**Connection**
- Flexible braids with good mechanical and electrical performance
  - M2, 10000 times
  - E2, 5000 times, upto 4000A

**Reliable driving – Spring, rack & pinion design**
- Precise folded motion control
- Balance spring inside lower arm.
Disconnecting switches video
Vertical semi-pantograph DSSP
Disconnecting switches features
Vertical semi-pantograph DSSP

Arrangement
- 3P: 0, 45, 135 degree; 1P
- Vertical instead of horizontal DS to busbar: DSSP (save 50㎡ area)
Disconnecting switches features
Horizontal central break DDH 40.5kV

Main blades
- Main contacts: Electrolytic copper plated with 20μm silver layer
- “Surface” contact - large contact area
- U-shape open structure conductor
- AL alloy arms with high strength, light weight, anti-corrosion

Connection & Reliable driving
- Flexible braids with good mechanical and electrical performance
- Ball bearing rotary design
- Fully sealed. Anti-dust and corrosion

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Disconnecting switches features
Horizontal central break DDH 40.5kV

Arrangement
- 1P, 2P, 3P. Varies installation
Disconnecting switches features
Vertical break DDV 40.5kV

Main blades
- Main contacts: Electrolytic copper plated with 20μm silver layer
- “Surface” contact - large contact area
- Insulated stainless springs keep pressure in service life
- AL alloy arms with high strength, light weight, anti-corrosion

Connection & Reliable driving
- Stainless steel bearing with good mechanical and electrical performance

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Disconnecting switches features
Vertical break DDV 40.5kV

Arrangement

- 1P, 2P, 3P. Varies installation
Earthing switches features

Earthing switch JW11

Structure
- Earthing switch
- One supporting insulator.
- Base
- Drive mechanism – manual or motor operated

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Earthing switches features
Earthing switch JW11

Main contact
- Moving contact – Copper chromium zirconium alloy
- Fixed contact – T2 hard copper

Main blade
- Solid spare tube.
- AL/MG/SI alloy with high strength, light weight, anti-corrosion
Earthing switches features
Earthing switch JW11

Driving base
- Flexible and reliable
- Mechanical performance
  - M1: 3000 times
  - M2: 10000 times (optional)

Induced current switching capability upto:
  Electromagnetic coupling
  -- Rated induced current 400A (IEC Class B 160A)
  -- Rated induced voltage 35kV (IEC Class B 20kV)
  Electrostatic coupling
  -- Rated induced current 50A (IEC Class B 25A)
  -- Rated induced voltage 50kV (IEC Class B 25kV)
Earthing switches video
Earthing switch JW11
Earthing switches features
Earthing switch JW11

Arrangement

- 3P; 1P
Disconnecting switches feature
Motor or manual mechanism

- Motor or manual drive
- Mechanical interlock between DS and ES
- Local and remote control
- Double door design for easy wiring and maintenance
- Upto 32 auxiliary contacts
- Reliable motor gears
- M2, 10000 times
- IP55
- Cabinet material: aluminum alloy or stainless steel
Disconnecting switches application
2GW design for 3/2 breaker configuration

2GW57/56 design

2GW57 or 2 + DSSP or GW54
- 550kV Space saving
  -- 1 unit GW54/DSSP can save 180 m² area
  -- 1 unit 2GW57/56 can save 70 m² area
- 252kV Space saving
  -- 1 unit GW54/DSSP can save 50 m² area
  -- 1 unit 2GW57/56 can save 40 m² area
Disconnecting switches

Routine test

Routine test standard
- GB, IEC and IEEE latest standard

Routine test content
- Design and visual checks
- Dielectric test on the main circuit (insulators dimension check)
- Auxiliary and control circuits tests
- Measurement of the resistance of the main circuit
- Measurement of grip pressure for contact system

.......... Special test upon request

*10% of order is entirely assembled and tested incl. the base, main blade, drive mechanism. All the coupling rods, insulators and structures are using standard tools.

Routine test lab
- All test equipment will be calibrated, verified and certificated by CNAS, Ilac-MRA qualified lab/institute by periodical inspection.
Central break application – 245kV SEC Ethiopia project

Customer needs
- Economic cost
- High altitude (2000m-3500m)
- Tropic area

ABB response
- Supply -245
- Good performance in high altitude and tropic area.

Export to Columbia, Congo, Ethiopia, Georgia, Indonesia, Iraq, Kazakhstan, Kyrgyzstan, Laos, Malaysia, Mongolia, Myanmar, Nicaragua, Nigeria, Pakistan, Philippines, Turkey, Turkmenistan, Vietnam, Zambia 636 units upto -252!
Railway application – disconnecting switches

**Customer needs**
- 2-pole or 1-pole operation
- High pollution

**ABB response**
- Vertical break or Horizontal central break
- 2*27.5kV or 1*27.5kV products
- Creepage distance 1400 or 1600mm.

*Export to Turkey, Malaysia, Kyrgyzstan 171 units. And domestic varies applications!*
Double break application

Export to Cambodia, Columbia, Congo, Kazakhstan, Mauritius, Myanmar, South Africa, Thailand 95 units upto -252!
double break application – 252kV Diaodong S/S, CN

**Customer needs**
- Economical land utilization
- High pollution requirement near sea

**ABB response**
- Supply GW54-252+-252
- Spacing saving
- High pollution level

*Export to Cambodia, Columbia, Congo, Kazakhstan, Mauritius, Myanmar, South Africa, Thailand 95 units upto -252!*
GW57 horizontal knee application

Customer needs
- Economical land utilization

ABB response
- Supply GW57-550
- Spacing saving

Export to Brazil, Columbia, Ecuador, Ethiopia, Indonesia, Iraq, Pakistan, Vietnam 101 units upto GW57-550!
2GW57 horizontal knee application – Inner Mongolia 550kV Qixiaying S/S, CN

Customer needs
- Economical land utilization
- Cost saving
- Low temperature (min -50°C)
- Ice breaking capability

ABB response
- Supply GW54-550+2GW57-550+GW57-550+JW11-550
- Spacing saving
- Good performance in low temperature.
- Operation in severe ice condition. Type test under 20 mm.

Export to Brazil, Columbia, Ecuador, Ethiopia, Indonesia, Iraq, Pakistan, Vietnam 101 units upto GW57-550!
GW54 pantograph application – 252kV Mudanjiang Lianhua HPP, CN

Customer needs
- Limited space
- Low temperature (min -50°C)
- Ice breaking capability

ABB response
- Supply GW54-252+-252
- Spacing saving
- Good performance in low temperature.
- Operation in severe ice condition. Type test under 20 mm.

Export to Brazil, Cote D’Ivoire, Columbia, Congo, Ethiopia, Indonesia, Iraq, Mongolia, Peru, South Africa, Vietnam 232 units upto GW54-550!
DSSP semi-pantograph application – CSG 252kV Maiwang S/S, CN

**Customer needs**
- Economical land utilization
- High temperature (max +50°C) and humidity (100%)
- High pollution requirement near sea

**ABB response**
- Supply DSSP245+-252 and DSSP145+-145
- Spacing saving
- Good performance in tropic area.
- High pollution level.

Export to Congo. And domestic varies applications!
JW11 Earthing switch application – Inner Mongolia 550kV Qixiaying S/S, CN

Customer needs

- Economical land utilization
- Cost saving
- Low temperature (min -50°C)
- Ice breaking capability

ABB response

- Supply GW54-550+2GW57-550+GW57-550+JW11-550
- Spacing saving
- Good performance in low temperature.
- Operation in severe ice condition. Type test under 20 mm.

Export to Brazil, Ethiopia, Iraq, Malaysia, Mongolia, Morocco, Philippine, South Africa, Zambia 53 units upto JW11-550!