



# Grid Solutions High Voltage Disconnect Switches

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# Factories



# Noventa di Piave, Italy



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## Site Overview



### Key data

- Worldwide Disconnect Switch center of competence
- 200 Employees
- Total Area 312,000 ft<sup>2</sup>
- 30,000 poles per year, >585,000 poles shipped total
- installed in 140 Countries
- Disconnect Switch AC and DC, Power Connectors
- Live Tank Circuit Breakers
- Compact and hybrid switchgear
- ISO9001, 14001, 17025 & OHSAS 18001, BBS certified



# Charleroi, PA

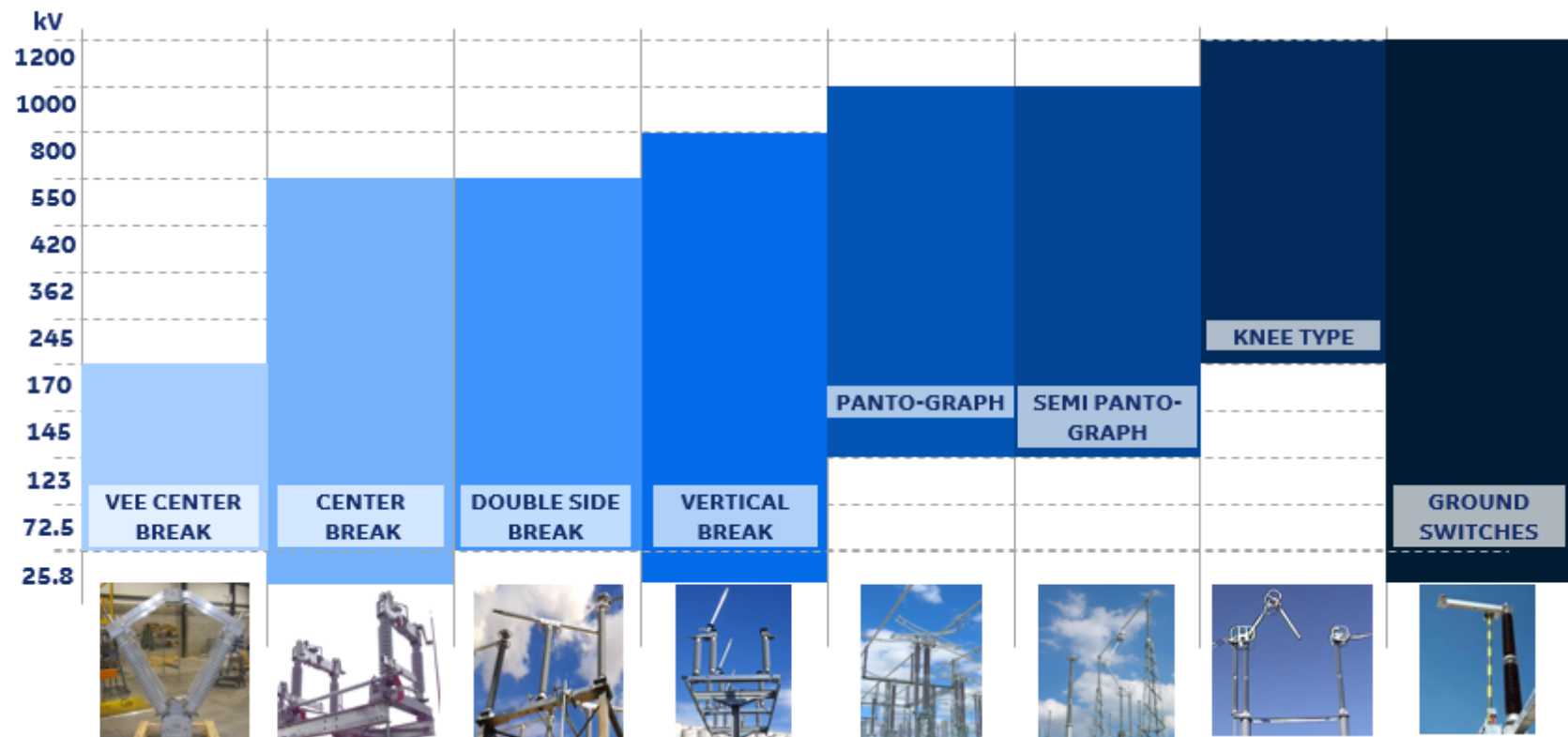


- Manufacturing of 38 - 550kV Dead Tank Circuit Breaker
- Engineering Review and Project Management for Disconnect Switches

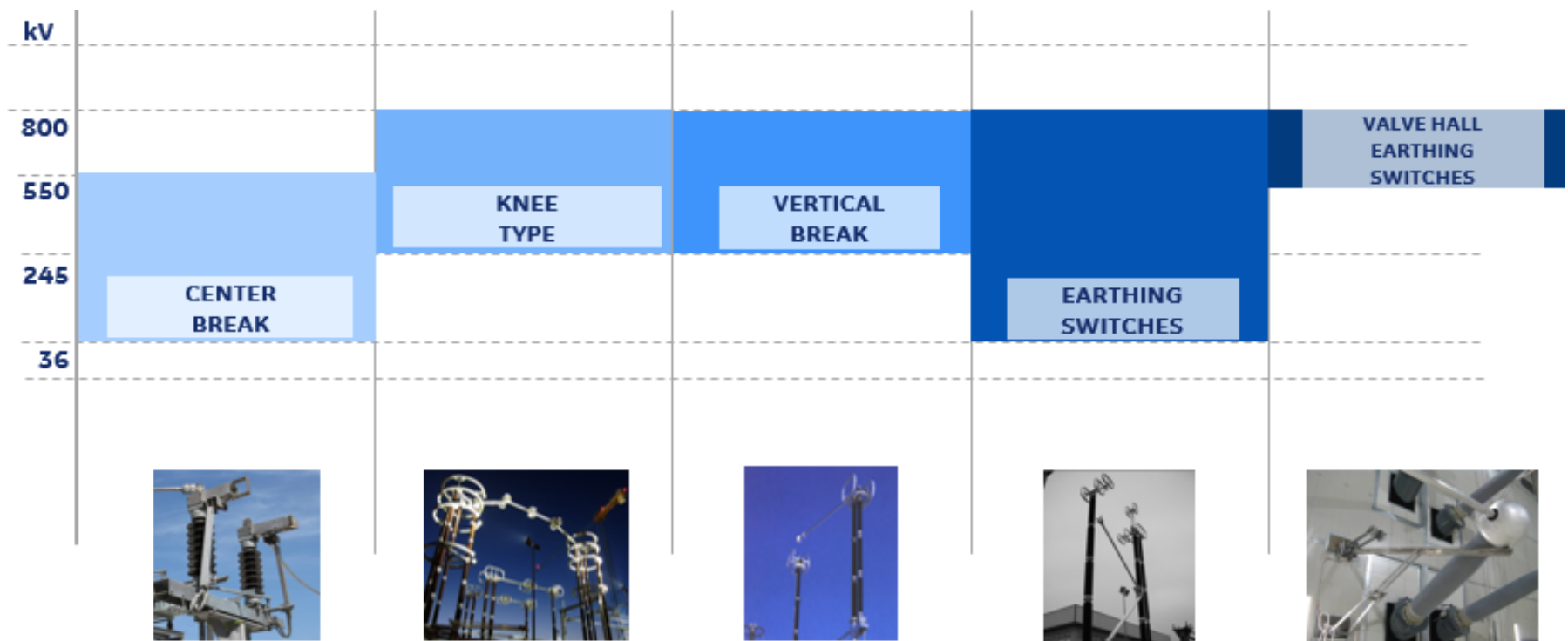


# Portfolio

# Disconnect Switches for AC Applications



# Disconnect Switches for DC Applications



# Vertical Break

## Product range:

- 25kV to 800kV
- Up to 4000A (8000A up to 52kV)
- Up to 80kA , 3sec
- -50C to +50C, 3/4" ice breaking
- High Seismic up to 550kV

## Selling Points:

- Customizable on-site for all mounting configurations variations
- Low operating torque
- Double jaw design avoids current flowing through moving joints
- Optional slanted-jaw insulator design reduces footprint



# Center Break

## Product range:

- 25kV to 550kV
- Up to 5000A
- Up to 63kA
- -50C to +50C, 3/4" ice breaking
- High Seismic at 145kV & 245kV

## Selling Points:

- Low operating torque
- Tested to 6000 mechanical operations
- Hinge transfer from blades to terminals via laminated aluminum straps not susceptible to resistance variation due to misalignment
- No galvanic corrosion due to the coupling of different materials (all aluminium path)
- Self aligning/centerring make-break contacts



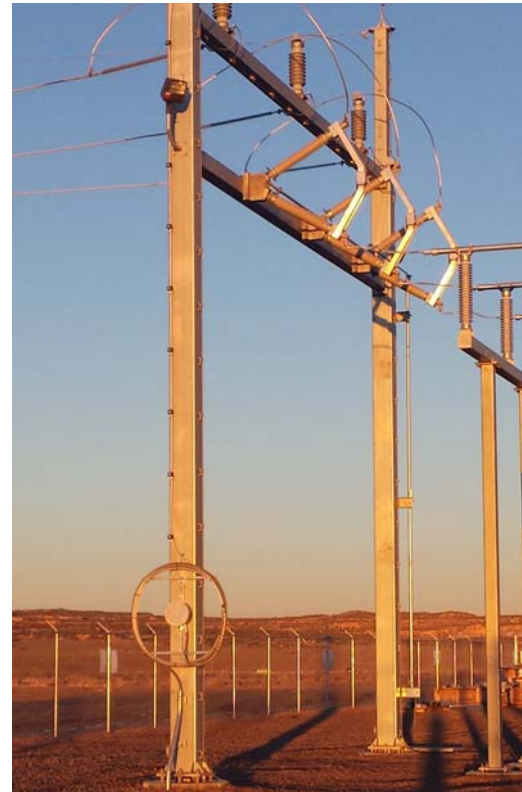
# Vee Center Break

## Product range:

- 72.5kV to 170kV
- Up to 3000A
- Up to 63kA, 3sec
- -50C to +50C, 3/4" ice breaking

## Selling Points:

- Low operating torque
- Live parts tested to 6000 mechanical operations
- Hinge transfer from blades to terminals via laminated aluminum straps not susceptible to resistance variation due to mis-alignment
- No galvanic corrosion due to the coupling of different materials (all aluminium path)
- Large contactaligning/centering make-break contacts



# Double Side Break

## Product range:

- 72.5kV to 550kV
- Up to 5000A
- Up to 75kA, 3sec
- -50C to +50C, 3/4" ice breaking
- Provided in seismic zones worldwide at 0.3g

## Selling Points:

- Low operating torque
- Tested to 10000 mechanical operations
- Gearless double-motion (rollover in jaw)
- Mechanical lock on close for short circuit
- Opens horizontally so excels in high wind applications



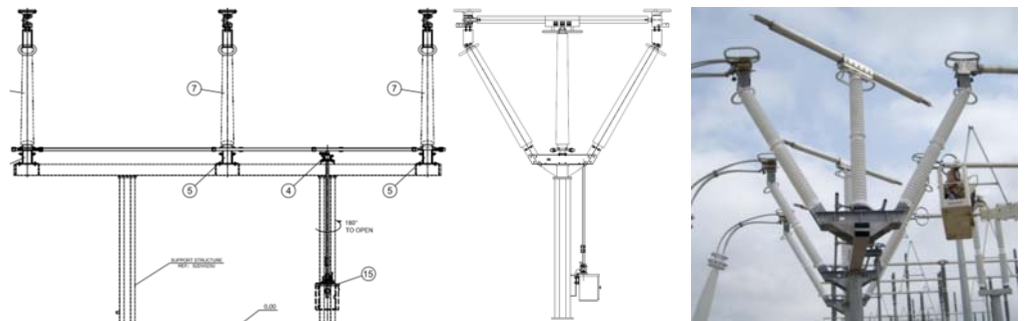
# Vee Double Side Break

## Product range:

- 121kV to 362kV
- Up to 5000A
- Up to 75kA, 3sec
- -50C to +50C, 3/4" ice breaking
- Moderate Seismic analysis at 345kV

## Selling Points:

- Low operating torque
- Tested to 10000 mechanical operations
- Gearless double-motion (rollover in jaw)
- Mechanical lock on close for short circuit
- Can be installed on a 2 leg structure up to 345kV
- Allows adjacent equipment to be closer (similar to vee center break)
- Opens horizontally so excels in high wind applications



# Double Side Break – UH Current Spotlight

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- An innovative live part ([Patent pending](#)) was designed expressly to improve the current carrying capability
- The permissible rated current reaches extremely high values
- The [crossbow contact](#) (main contact) doubles the current carrying cross section
- Aluminium/copper in “parallel layout” improve electrical performances
- A double “D” cross section is used to improve the mechanical and electrical performances of mobile arm



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# Vertical Semi-pantograph

## Product range:

- 121kV to 800kV
- Up to 5000A
- Up to 63kA, 3sec
- -50C to +50C, 3/4" ice breaking
- High Seismic analysis at 550kV

## Selling Points:

- Tested to 10000 mechanical operations
- Huge space and cost savings
- L-contact vastly superior to other designs
- Not affected by busbar oscillation or misalignment
- Can be installed on wire bus (SPV) or solid bus (both)
- Contacts are enclosed in open and close positions -> excellent for sites with heavy ice, sand or pollution exposure



# Knee Type (horizontal semi-pantograph)

## Product range:

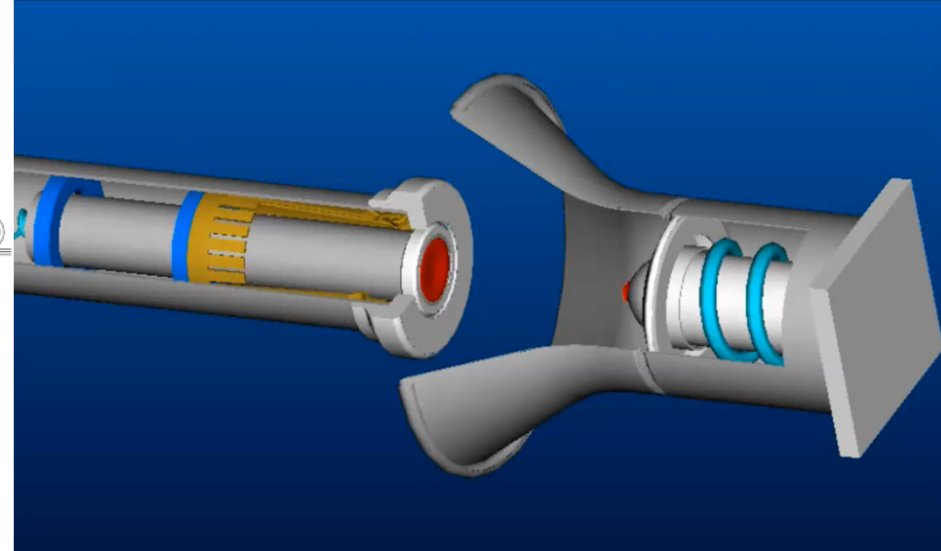
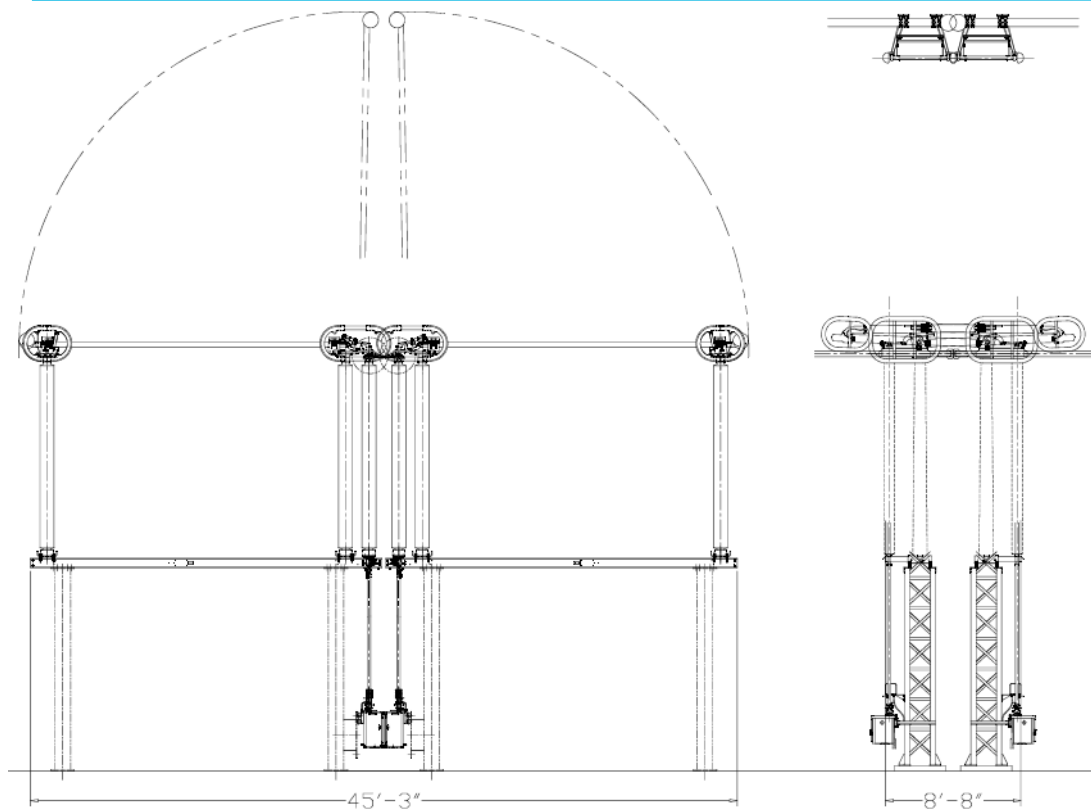
- 230kV to 800kV
- Up to 5000A
- Up to 63kA, 3sec
- -50C to +50C, 3/4" ice breaking
- High Seismic analysis at 550kV

## Selling Points:

- Tested to 10000 mechanical operations
- Reduced overhead clearance versus vertical break
- L-contact vastly superior to other designs
- Not affected by busbar oscillation or misalignment
- Can be installed on wire bus (SPV) or solid bus (both)
- Contacts are enclosed in open and close positions -> excellent for sites with heavy ice, sand or pollution exposure



# Semi-Pantograph – Space Savings & L-Contact



# Operating Mechanisms

## Swing Handle:

- Used on smaller switches, typically 145kV and below

## Worm Gear:

- Per ANSI, max 35lbs force to operate
- Used on larger switches above 145kV
- Uses gear reduction to make it easier to operation (typically 30:1 to 60:1)
- Slower operation than swing handle

## Motor Operator

Optional Drive pipe driven auxiliary contacts (optional)

Door stop (holds door open and out of the way)

Removable side panel for terminal blocks for easy access (on left side of cabinet)

Decoupler with provisions for padlocking and Kirk key interlock

Handcrank for manual operation (insertion automatically disconnects the motor circuit)

Door padlocking provision



# D-Watch: Predictive Maintenance & Real-Time Control

## Key Capabilities:

- Auto-diagnostic system
- Predictive maintenance
- Real-time active control
- Communication capabilities
  - IEC 61850



# D-Watch Touch

## Digital Motor Operator with added 7-inch Touchscreen Display

- All functions of D-Watch configurable by HMI Front Panel Touchscreen Display
- HMI access secured by configurable user level and password
- Full set-up of D-watch drive without PC
- Historical data viewer of all operations
- USB connection for local data transfer and upgrade
- uSD Card for extended storage function 2Gb
- Monitoring up to 3 mechanisms with master / slave configuration



