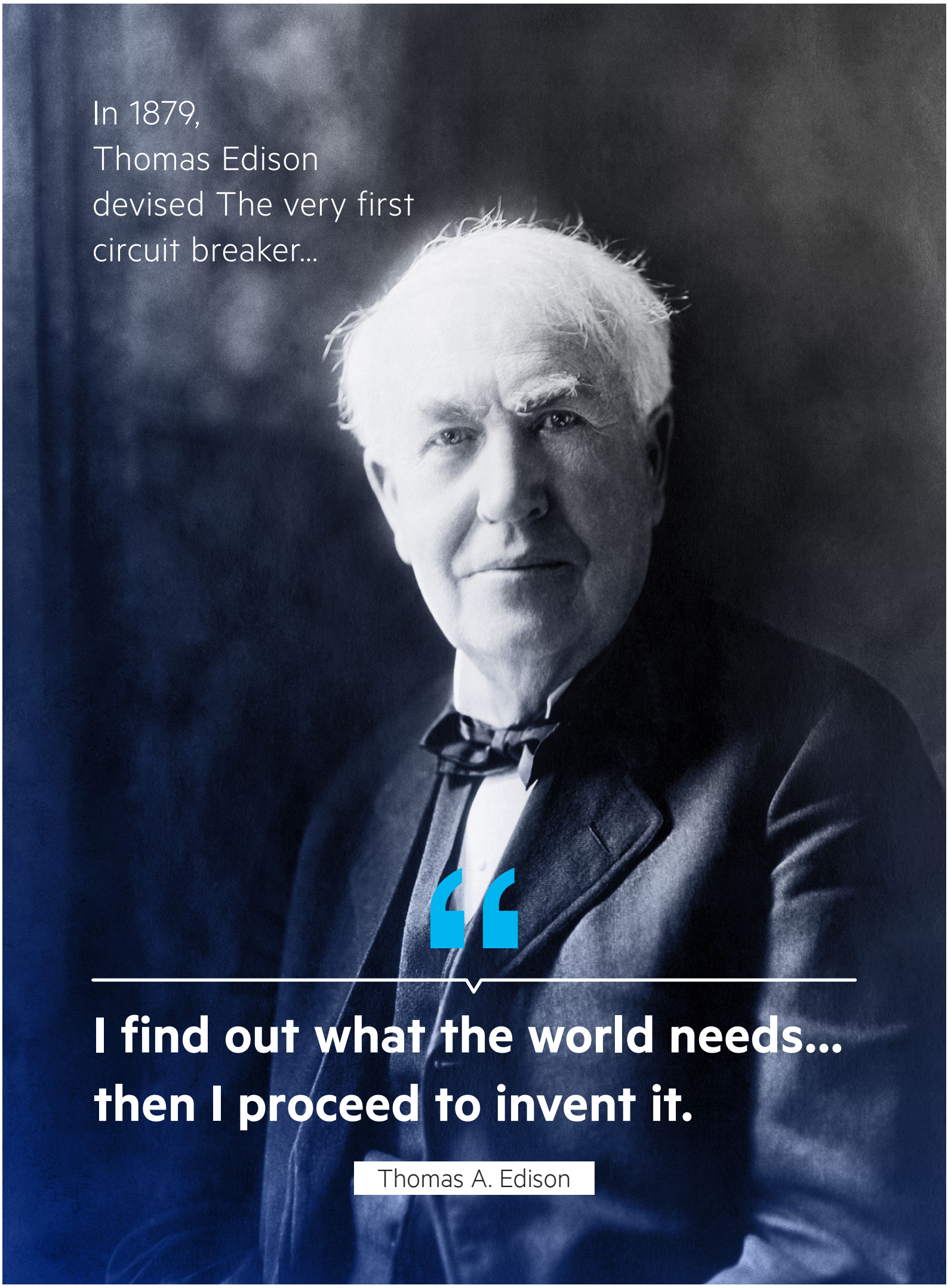
GEIS

# SecoVac

## VB2 Plus G-15 Generator Circuit Breaker

GEIS Electrical Protection

Safer Smarter Greener


In 1879,
Thomas Edison
devised The very first
circuit breaker...
“
I find out what the world needs...
then I proceed to invent it.
Thomas A. Edison

## About GEIS

GEIS was formed as a spin-off from the original GE Industrial Solutions China operation in December 2019. The company operates under the AEG brand in China and the GEIS brand globally.

Reinventing a 130-year legacy with an entrepreneurial spirit, GEIS delivers products built on GE's original technologies, incorporating innovations for the latest electrification applications, and a steadfast commitment to the highest standards of quality.

## The Evolution of Business and Brand


Note: GEIS brand is also used in China

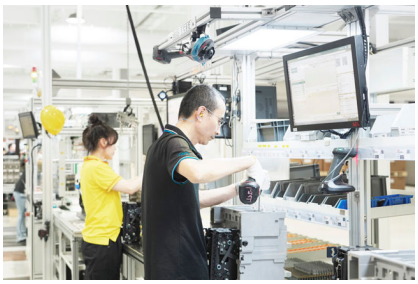
## Quality is Built-in

The Vertical Integrated Manufacturing Center

- Established in 2000, the 1st North Asia facility of GE Industrial Solutions
- Localize US and European products to serve the local market
- Evolving into a Global platform of Cast Coil Dry Type Transformer, Air Circuit Breaker, IEC and NEMA medium voltage VCB and switchgear for GE Industrial Solutions
- A GE Global Star Facility





### GEIS deliver complete range of products for the evolving electrification needs:

***SecoVac*** VCB

***M-PACT Plus*** ACB

***Elfa*** Series MCB/RCBO

***EV*** Charger

***SecoGear*** MV Switchgear

***RMU*** Gas Insulated Switchgear


***WaveCast*** Transformer

***MLS*** LV Switchgear

# VB2 Plus G-15 Generator Circuit Breaker

## Catalogue

# Product Description

## Product Overview

The SecoVac VB2 Plus G circuit breaker designed for three-phases AC up to 15kV rated voltage, and can be used for switching and protecting generators in industrial, mining and power plants applications. The product conforms to IEC/IEEE 62271-37-013. The breaker can be installed in the switchgear in fixed or withdrawable arrangements. It is the optimum choice for the control and protection of MV generators.


## Service Conditions/ Storage

### Normal Service Conditions

- Unless otherwise specified, SecoVac VB2 Plus G circuit breakers, including the operating devices and the auxiliary equipment which form an integral part of them, are intended to be used in accordance within their rated operating parameters and normal service conditions listed as follows.
- The ambient air temperature does not exceed 40°C and its average value, measured over a period of 24h, does not exceed 35°C. The minimum operating ambient air temperature is -15°C. (storage and transportation is allowed at -30°C).
- The altitude does not exceed 1000m
- The ambient air is not significantly polluted by dust, smoke, corrosive and/or flammable gases, vapours or salt.
- The conditions of humidity are as follows:
  - The average value of relative humidity, measured over a period of 24h, does not exceed 95%.
  - The average value of water vapour pressure, measured over a period of 24h, does not exceed 2.2kPa.
  - The average value of the relative humidity, measured over a period of one month, does not exceed 90%.
  - The average value of water vapour pressure, measured over a period of one month, does not exceed 1.8kPa.
- Seismic intensity is not more than UBC Zone 4.

## Service Conditions/ Storage

### Special service conditions

If the actual service conditions differ from the normal service conditions, the circuit breaker and associating devices and auxiliary equipment shall be designed and made to comply with any special service conditions. This must be discussed with GEIS in advance.

Normally, the following special service conditions will be encountered:

- At sites with altitude above 1000m, the effects of the reduction in dielectric strength of the air must be taken into account. GEIS can supply circuit breakers which can be applied in areas less than 3000m above sea level. At this time, the insulation level in the switchgear should be taken into account and must be discussed with GEIS in advance.
- The ambient temperature is above 40°C. The rated current of circuit breaker shall be derated or fans shall be installed for heat dissipation. Please confirm with GEIS in advance.

Attention

- When circuit breakers are operated in areas with high humidity and/or major rapid temperature fluctuations, there is a risk of condensation, thus
  - –Put the circuit breaker into operation as soon as possible after the package is dismantled
  - –Turn on the anti condensation heater into service as soon as possible after the switchgear is installed

### Storage

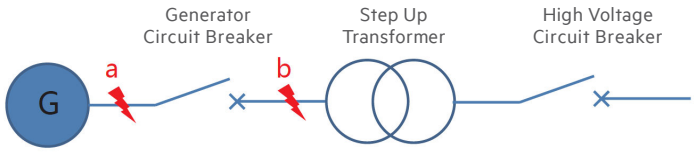
- The product should be subject to normal transportation conditions and shall be protected fully from rain and water spray.
- Do not store product other than as indicated on packaging. Damage is possible if stored on side/back or top.
- If immediate installation is not possible, please maintain original packaging or otherwise similarly protect the product. After inspection and stored, the circuit breaker should be switched off and the spring mechanism should be discharged.
- The product shall be stored in dry and ventilated indoor place free of dust severe contamination, chemical corrosion and vibrations. The climate condition conforms to related specifications in IEC/IEEE 62271-37-013 and adequate air circulation shall be maintained. The store room temperature shall not be lower than -30°C. Check periodically to avoid condensation inside breaker.

# Technical Data

## Electrical Parameter

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Rated short-circuit breaking current** | kA | 31.5 | | 40 | | 50 | |
| **Rated Voltage** | kV | 15 | | 15 | | 15 | |
| **Rated Current** | A | 2500/3000*/3150/4000** | | 2500/3000/3150/4000**/5000** | | 2500/3150/4000** | |
| **Rated Frequency** | Hz | 50/60 | | 50/60 | | 50/60 | |
| **Rated power Freq withstand voltage (1 min)** | kV | 38 | | 38 | | 38 | |
| **Rated lightening impulse withstand voltage** | kVp | 95 | | 95 | | 95 | |
| **Operation sequence** | | CO – 30min - CO | | CO – 30min - CO | | CO – 30min - CO | |
| **Generator Circuit Class** | | G2 | | G2 | | G2 | |
| **Location of fault (refer below schematic diagram)** | | 'a' ' System supplied fault | 'b' 'Generator supplied fault | 'a' ' System supplied fault | 'b' 'Generator supplied fault | 'a' ' System supplied fault | 'b' 'Generator supplied fault |
| Rated short-circuit breaking current | kA | 31.5 | 15.8 | 40 | 25 | 50 | 25 |
| Rated short-circuit making current: Ipeak | kAp | 86.5 | 34.1 | 110 | 54 | 137 | 54 |
| Interrupting Time | ms | 50 | | 50 | | 50 | |
| Minimum Opening Time | ms | 24.3 | | 24.3 | | 24.3 | |
| Degree of Asymmetry | % | 75 | 130 | 75 | 130 | 75 | 130 |
| Asymmetry interrupting capability | kAp | 46 | 34.1 | 58.4 | 36.5 | 73 | 36.5 |
| Close and Latch Capability | kAp | 86.3 | | 110 | | 110 | |
| Rated short time withstand current | kA | 31.5 | N/A | 40 | N/A | 50 | N/A |
| Rated duration time for short-circuit | s | 3 | N/A | 3 | N/A | 3 | N/A |
| Rate of Rise of Recovery Voltage (RRRV) | kV/μs | 3.5 | N/A | 3.5 | N/A | 3.5 | N/A |
| Peak Recovery Voltage | kV | 27 | N/A | 27 | N/A | 27 | N/A |
| **Out-of-Phase Current Switching** | | | | | | | |
| Duty Voltage | kV | 21.2 | N/A | 21.2 | N/A | 21.2 | N/A |
| Breaking Current | kA | 15.8 | N/A | 20 | N/A | 20 | N/A |
| Max. Making Current (V~0) | kAp | 31.5 | N/A | 40 | N/A | 40 | N/A |
| Rate of Rise of Recovery Voltage (RRRV) | kV/μs | 3.3 | N/A | 3.3 | N/A | 3.3 | N/A |
| Peak Recovery Voltage | kV | 39 | N/A | 39 | N/A | 39 | N/A |
| **Mechanical life operations** | Number | 10000 | | 10000 | | 10000 | |
| **Center distance between phase** | mm | 275 | | 275 | | 275 | |

* 3000 is for IEEE market; **4000A/5000A are VCB with force cooling, detail please connect with GEIS person.



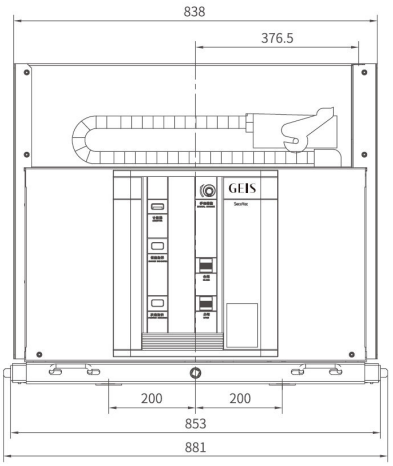

## Control Circuit Data

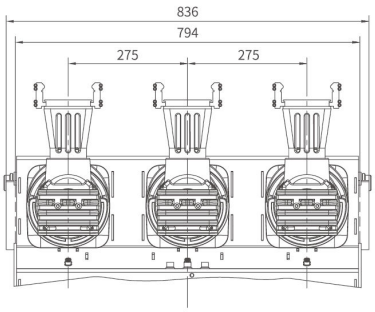
| Rated Voltage(V) | Resistance Value (Ω) | Rated Current (A) | Inrush Current (A) | Maximum Power (W) |
|---|---|---|---|---|
| DC48 | 3.1 | 15.5 | 92.9 | 743.2 |
| DC125/AC120 | 45 | 2.8 | 16.7 | 347.2 |
| DC250/AC240 | 216 | 1.2 | 6.9 | 289.4 |

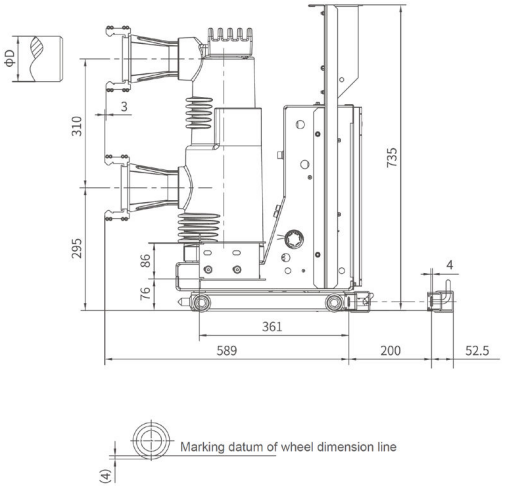
| Rated Voltage(V) | Normal Operation Voltage Range (V) | Charging Time at Rated Voltage (s) | Input Power (W) |
|---|---|---|---|
| DC48 | 36-56 | <15s | 150 |
| DC125 | 90-140 | <15s | 150 |
| DC250 | 180-280 | <15s | 150 |
| AC120 | 104-127 | <15s | 150 |
| AC240 | 208-254 | <15s | 150 |

# Overall Dimensions

## Withdrawable type

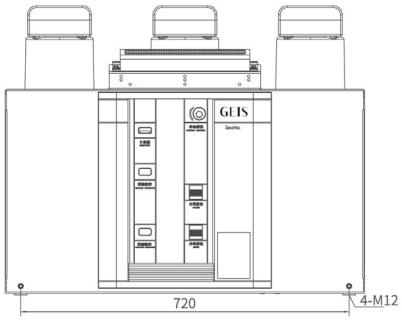


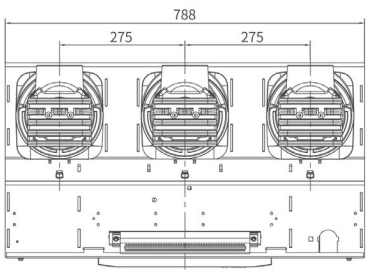



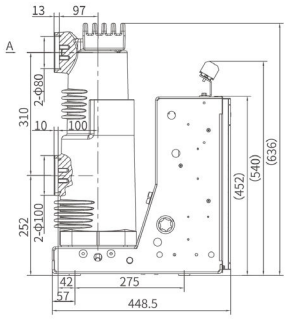



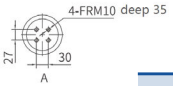

| Specifications | D |
|---|---|
| 2500A/31.5~50kA | Ø109 |
| 3150A/31.5~50kA | Ø109 |
| 4000A/40~50kA | Ø109 |
| 5000A/50kA | Ø109 |

## Fixed type



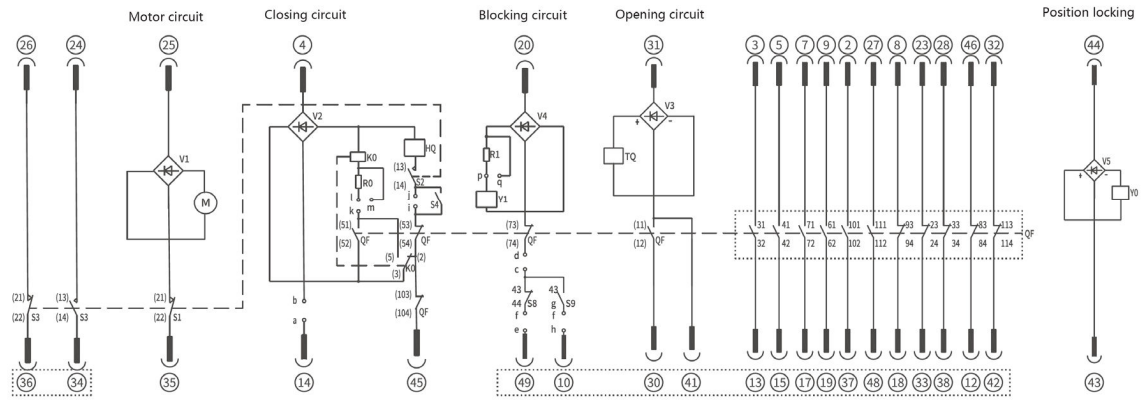



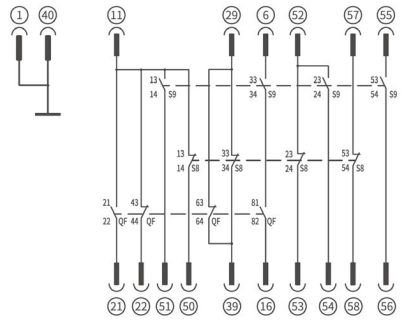




| Specifications |
|---|
| 2500A/31.5~50kA |
| 3150A/31.5~50kA |
| 4000A/40~50kA |
| 5000A/50kA |

# Internal Wiring Diagram

## Withdrawable type



Opetation power selection:

| Operating power supply \ Jumper | p-q | m-l |
|---|---|---|
| AC/DC 220V | / | / |
| AC/DC 110V | √ | √ |

Remark: “/”means disconnection; “ √” means connection

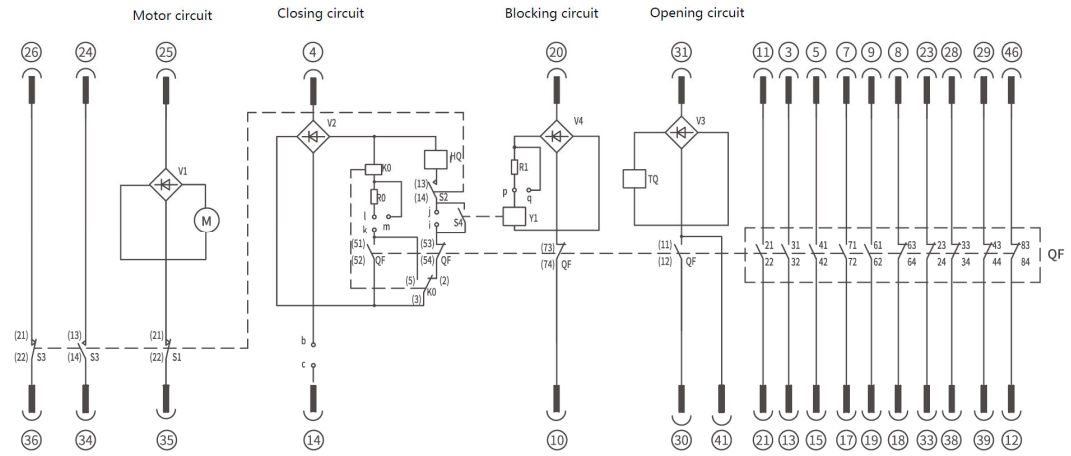
Optional connection settings:

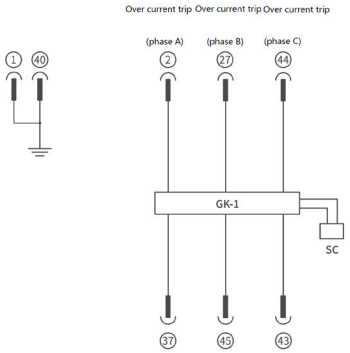
| Jumper status / Configure / Jumper | | a-b | c-d | e-f | g-h | a-f | a-g | b-c | i-j | l-k |
|---|---|---|---|---|---|---|---|---|---|---|
| With protection | With locking | √ | √ | √ | √ | / | / | / | / | √ |
| | Without locking | / | / | / | / | √ | √ | √ | √ | √ |
| Without protection | With locking | √ | √ | √ | √ | / | / | / | / | / |
| | Without locking | / | / | / | / | √ | √ | √ | √ | / |

| | | |
|---|---|---|
| S9: Limit switch (service position) | HQ: Closing coil | V1~V5: Rectifier |
| S8: Limit switch (test position) | TQ: Opening coil | K0: Anti-pumping relay (optional) |
| S4: Electromagnet for locking's anxiliary switch | R0~R1: Resistance | Y1: Electromagnet for interlocking (optional) |
| S1-S3: Energy staring travel switch | M: Spring charge motor | Y0: Electromagnet for interlock truck (opional) |
| QF: Auxiliary switch | | |

# Internal Wiring Diagram

## Fixed




Opetation power selection:

| Opetation power selection: Jumper / Operating power supply | p-q | m-l |
|---|---|---|
| AC/DC 220V | / | / |
| AC/DC 110V | √ | √ |

Remark: "/"means disconnection; " √" means connection

Optional connection settings:

| Jumper / Jumper status / Configure | | b-c | i-j | l-k |
|---|---|---|---|---|
| With protection | With locking | √ | / | √ |
| | Without locking | √ | √ | √ |
| Without protection | With locking | √ | / | / |
| | Without locking | √ | √ | / |

| | | |
|---|---|---|
| S4: Electromagnet for locking's anxiliary switch | R0~R1: Resistance | K0: Anti-pumping relay (optional) |
| S1~S3: Energy staring travel switch | M: Spring charge motor | Y1: Electromagnet for interlocking (optional) |
| QF: Auxiliary switch | GK-1: Controller | SC: Over current trip coil (optional) |
| HQ: Closing coil | V1~V4: Rectifier | |
| TQ: Opening coil | | |

# Structure

## Product Overview

The VB2 Plus G circuit breaker uses a vacuum interrupter for the making and breaking of an electric power circuit. The movable primary cluster contacts on the breaker are connected to fixed primary contacts in the switchgear and a secondary disconnectable plug connects with the secondary socket of the switchgear. The operating mechanism is equipped with a compact spring charging mechanism. The mechanism adopts a modular design method and some parts have multiple functions.


Figure 1 Primary circuit

1. Upper arm 2. Embedded poles
3. Lower arm 4. Cluster

## Service Conditions/ Storage

The primary circuit is made up of cluster upper arms, lower arms and embedded poles (figure 1). The vacuum interrupters and main contact parts are embedded in epoxy resin using APG process, which ensure the vacuum interrupters are protected from the ambient influence and mechanical damage.

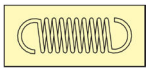
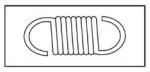

Figure 2 Front panel of the circuit breaker

1. Opening button
2. Status indicator for charging
3. Closing button
4. Counter
5. Indicator for open or close

## Operating mechanism

The spring operating mechanism consists of a single module. The operating mechanism is equipped with manual charging device which uses the charging handle and an electric charging device which charges the spring via a motor. The mechanism has a reclose function.

On the front panel of the circuit breaker, there are Open/Close, Charged/Discharged indicators and the manual operating handle. The operator can operate the breaker locally through manual push buttons or remotely via the closing and opening coils, the status of the circuit breaker can be observed on the front panel (figure 2).

| Energy charged status indicator | | Closing-opening status indicator | | Manual closing & opening buttons | |
|---|---|---|---|---|---|
|  | The spring is charged |  | The circuit breaker is closed |  | Manual closing button |
|  | The spring is discharged |  | The circuit breaker is opened |  | Manual opening button |

# Ordering Check List

## SecoVac 40.5kV (VCB on truck) Ordering check list

**Project** _____ **Product** _____

**Order Quantity** _____

**Rated voltage:** ■ 15kV **Operating Mechanism:** ■ Spring **Structure:** ☐ Withdrawable ☐ Fixed

| | |
|---|---|
| **Pole type** | ■ **Embedded Pole** |
| **Phase Distance** | ■ 275mm |
| **Rated current** | ☐ 2500A ☐ 3150A ☐ 4000A ☐ 5000A ☐ others |
| **Breaking Current** | ☐ 31.5kA ☐ 40kA ☐ 50kA |
| **Earthing Mode** | ☐ Earthing with copper bar at the bottom of truck ☐ Earthing with connecter on the sides of truck |
| **Open&Close Coil** | ☐ DC110V ☐ DC220V ☐ AC110V ☐ AC220V |
| **Charging Motor** | ☐ DC110V ☐ DC220V ☐ AC110V ☐ AC220V |
| **Secondary Wiring** | ☐ Withdrawable Method (64 Pin) ☐ Fixed Method<br>☐ Withdrawable Method (58 Pin) ☐ Other Method |
| **Other **** | Close Interlock ☐ DC110V ☐ DC220V ☐ AC110V ☐ AC220V |
| | Truck Interlock ☐ DC110V ☐ DC220V ☐ AC110V ☐ AC220V |
| | Anti Pump ☐ YES |
| **Over Current Release *** | ☐ Without over current release ☐ 1 over current release ☐ 2 over current release ☐ 3 over current release |
| **Standard Accessory *** | ☐ Energy-stroing handle (2 pcs for each 5 breakers) ☐ Rocking handle of chassis (2 pcs for each 5 breakers) |

**Special Request:** _____

**Signature of buyer** _____ **Date** ____ / ____ / ____

*It will have additional cost if not a standard product (except anti-pump relay).

# GEIS

GEIS Electric
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This catalog may be subjected to revision without prior notice.
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