

**The VJB Series**

**HIGH FREQUENCY SWITCHING TYPE  
VACUUM CIRCUIT BREAKER**

**FOR ARC FURNACES**

Tohiba's New VJB Vacuum Circuit Breaker Is Designed For Frequent Switching Operations As In Arc Furnaces. Developed Based On Toshiba's VGB2 Series Breakers, This Breaker Has Set A New Standard In Operational Life.

# MEDIUM VOLTAGE VACUUM CIRCUIT BREAKER

## VJB Series

24kV & 36kV

The VJB Series of Vacuum Circuit Breakers is the result of extensive research and development. The VJB series draws on more than 30 years of field proven vacuum interrupter manufacturing and design. Toshiba vacuum circuit breakers are produced under an integrated quality control system ranging from design through production. Vacuum interrupters (the "Heart" of the vacuum circuit breakers) are produced in a modern "Clean Room" and assembled in automated High Vacuum Degassing furnaces to ensure high reliability.

### Standard Features

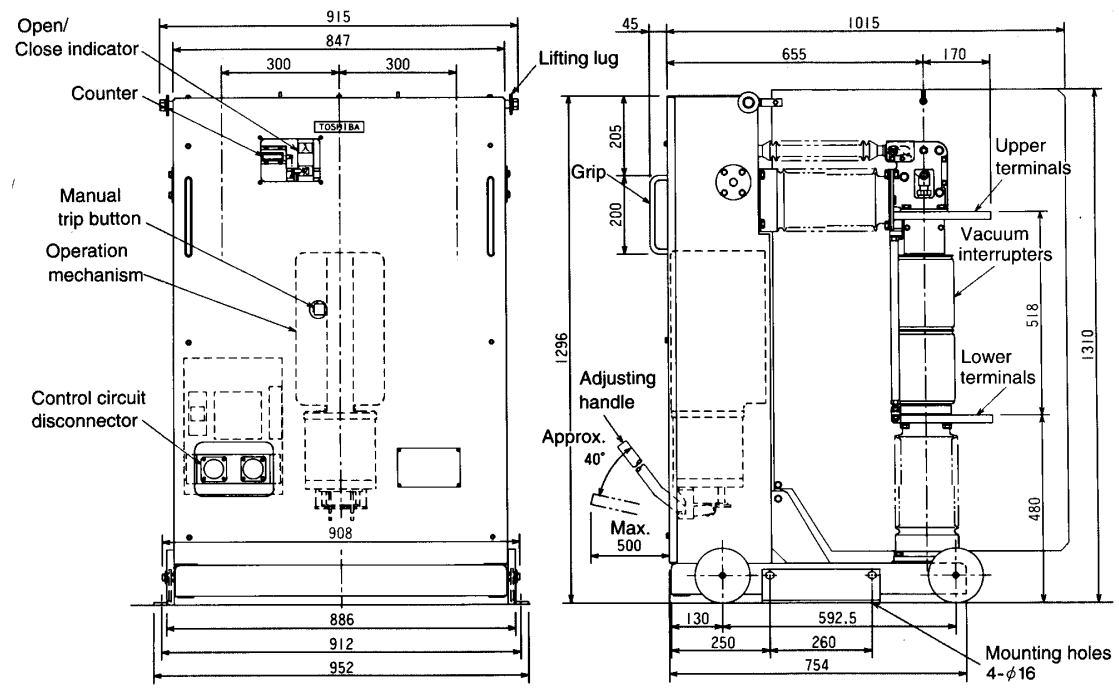
- **Extended Service Life**  
The expected life expectancy of **150,000** times of switching load is extraordinary. This is incomparable service life in vacuum circuit breakers.
- **Facilitated Inspection and Maintenance**  
Simplified structure has eliminated disassembling work of the breaker unit in maintenance and inspection, allowing more facilitated maintenance.
- **Smaller Installation Space Required**  
Because of the switching action in vacuum, vacuum circuit breakers are inherently smaller and lighter than other types of breakers. Further, we have made the new circuit breaker more compact than our previous breaker series (Type VGB2).
- **Safety**  
Because vacuum arc quenching does not require oil, it is free from fire hazard and ensures safety.
- **Less Noise**  
Since the breaker action takes place in high vacuum, the noise at breaking is only from the mechanical operation of the breaker.
- **Easy Replacement of Conventional Type Breakers**  
The VJB is more compact than conventional type breakers. By using the connection adapter, replacing conventional equipment can be done easily.



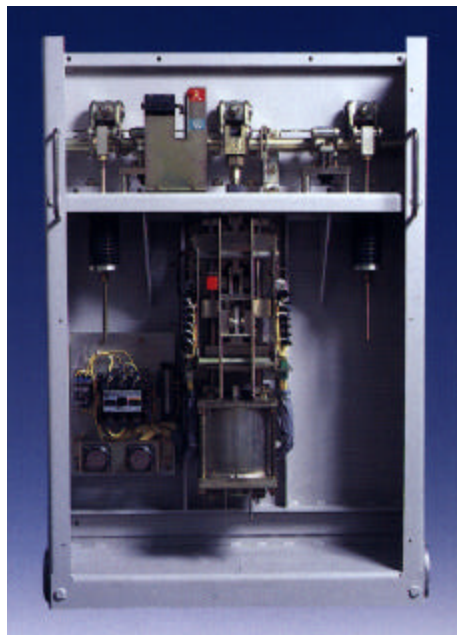
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## VJB Series

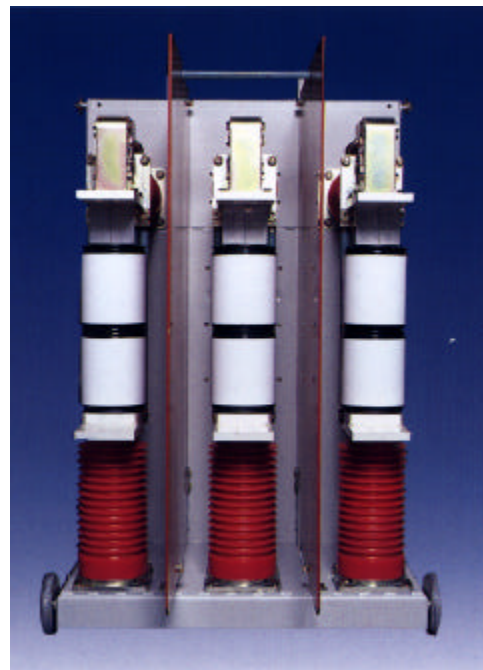
### 24kV & 36kV



External Dimension of Vacuum Circuit Breaker



Front View



Rear View

# MEDIUM VOLTAGE VACUUM CIRCUIT BREAKER

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24kV & 36kV

Rating & Performance Table

| Item                              | / Type      | VJB-20M20F                        | VJB-20P20F | VJB-30M13F         | VJB-30P13F |
|-----------------------------------|-------------|-----------------------------------|------------|--------------------|------------|
| Voltage                           | (kV)        | 24                                |            | 36                 |            |
| Insulation Level                  | (kV)        | AC-50, Impulse-125                |            | AC-70, Impulse-170 |            |
| Current (*1)                      | (A)         | 1200 / 1250                       | 2000       | 1200 / 1250        | 2000       |
| Frequency                         | (Hz)        | 50/60                             |            |                    |            |
| Interrupting Current              | (kA)        | 20                                |            | 12.5               |            |
| Interrupting Capacity             | (MVA)       | 830                               |            | 780                |            |
| Transient Recovery Voltage        | (kV/μs)     | 0.5                               |            | 0.6                |            |
| Closing (Make) Current            | (kA)        | 50                                |            | 31.5               |            |
| Short Time Withstand Current-2s   | (kA)        | 20                                |            |                    |            |
| Opening Time                      | (sec)       | 0.03                              |            |                    |            |
| Interrupting Time                 | (cycle)     | 3                                 |            |                    |            |
| Closing Time                      | (sec)       | 0.25                              |            |                    |            |
| Standard Operating Duty           |             | A (O - 1 min. - CO - 3 min. - CO) |            |                    |            |
| Closing Operation                 | Voltage (V) | DC100                             |            |                    |            |
|                                   | Current (A) | 90                                |            |                    |            |
| Closing Voltage Range             | (V)         | DC 85 ~ 110                       |            |                    |            |
| Opening Control                   | Voltage (V) | DC100                             |            |                    |            |
|                                   | Current (A) | 4.5                               |            |                    |            |
| Opening Voltage Range             |             | DC 60 ~ 125                       |            |                    |            |
| Mechanical Life (*2)              |             | 150,000 Times                     |            |                    |            |
| Electrical Life (*3)              |             | 150,000 Times                     |            |                    |            |
| Contact Wipe                      | (mm)        | 7                                 |            |                    |            |
| Allowable Contact Wear            | (mm)        | 3                                 |            |                    |            |
| Number of Auxiliary Contacts (*4) |             | 7a-6b (7NO-6NC)                   |            |                    |            |
| Installation Method               |             | Floor Mount, Fixed Type           |            |                    |            |
| Weight                            | (kg/lb)     | 520 / 1146                        |            |                    |            |
| Applicable Standards              |             | JEC-2300 / IEC 56                 |            |                    |            |

Notes:

\*1 The rating is fully guaranteed even housed in a dustproof cubicle.

\*2 Replace auxiliary switch, control contacts and auxiliary relay after 75,000 operations.

\*3 Rated interrupting current can be closed and opened 10 times.

\*4 The number of auxiliary switch contacts shown is for externally usable contacts.

### WARRANTY

Toshiba shall repair at no charge any defects of the Vacuum Circuit Breaker which are found in a period of **70,000** times of opening/closing or within **two (2) years** after shipment, whichever is shorter, and which are determined to have been caused in our design or workmanship.

## OPTIONAL EQUIPMENT

### Dustproof Cubicle

For the breaker to be located in the vicinity of the arc furnace, where dust and particles are present, a dustproof cubicle can be provided. The vacuum circuit breaker is mounted on a rail in the cubicle and front access doors allow for easy inspection. Back panels can be removed to allow inspection of the charging unit or replacement of the vacuum interrupters. Allow maintenance space in front of the cubicle to enable replacing a vacuum interrupter by drawing out the breaker from the cubicle.

### Control Panel

The control panel contains parts for the control power supply unit for the vacuum circuit breaker, and a vacuum leak detecting device for finding vacuum fault that might occur in the vacuum interrupter. Parts for the control power supply include a circuit breaker for the distribution panel, a rectifier (when the closing operation power is AC), and a capacitor tripping device (when the tripping operation power supply is AC).

### CR Surge Suppressor

Since an arc furnace needs very frequent open and close operations, installing a CR surge suppressor is recommended for controlling the possible occurrence of switching surge. The standard CR surge suppressor is prepared for connecting the load side of each phase and the ground, but connection scheme differs by the system application. If a DC arc furnace and a flicker compensator are installed in the same system, please contact Toshiba for the proper connection method.

## ACCESSORY PARTS (OPTIONAL)

- Adjusting Handle

Used for manually closing the circuit breaker for adjustment.

- Wip Gauge

For use in measuring the compression of the wipe spring and determining the life of the vacuum interrupter.

## SPARE PARTS (OPTIONAL)

The following can be provided as spare parts as an option.

- Vacuum Interrupter
- Closing Coil
- Tripping Coil
- Auxiliary Switch
- Control Contactor
- Auxiliary Relay

Lamps



## STANDARD SPARE PARTS

The following spare parts are necessary for maintenance and inspection and are supplied with the vacuum circuit breaker as standard spare parts.

- Auxiliary Switch
- Control Contactor
- Auxiliary Relay
- Grease