

**MEIDEN**

# VACUUM INTERRUPTERS



*Empower for new days*



# VACUUM INTERRUPTERS

High ability development and outstanding vacuum technology of Meidensha Corporation ("MEIDEN") has established high voltage vacuum interrupters. MEIDEN developed a 145kV vacuum interrupter unit for the first time in the world.

Outstanding vacuum-related manufacturing techniques of MEIDEN has completed high performance and high-reliability vacuum interrupters.

## Features

- 1. Simplified arc quenching method**  
The spiral contact assures a high arc driving efficiency.
- 2. Simplified construction and high quality**  
Since complete degassing and hermetical seal are processed in a vacuum furnace, vacuum degree can be maintained for a long time.
- 3. No evacuation tube**  
Since manufacturing of vacuum interrupters using ceramics envelopes is done in a vacuum furnace, no evacuation tube is necessary.
- 4. Slim body**  
Since new contact materials are developed, external dimensions are reduced.

## Major Applications

- Vacuum circuit-breakers
- Vacuum switches
- Vacuum contactors
- Transformer tap changers
- Rail line circuit-breakers
- Autoreclosers
- Special duties, e.g. for multi-operation section switches

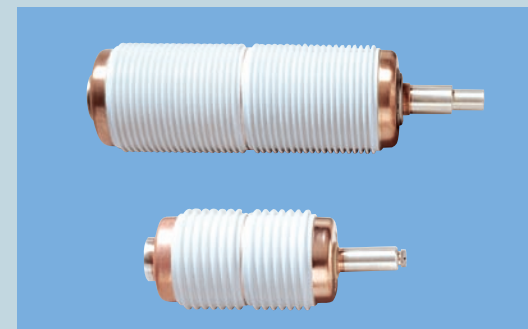


## \*Vacuum Interrupters for Medium Voltage Class

### IEC & ANSI Standard



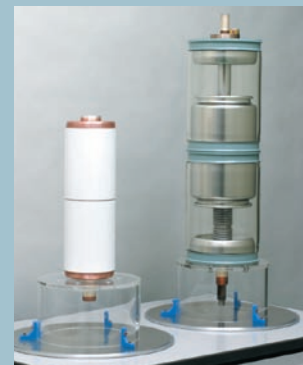
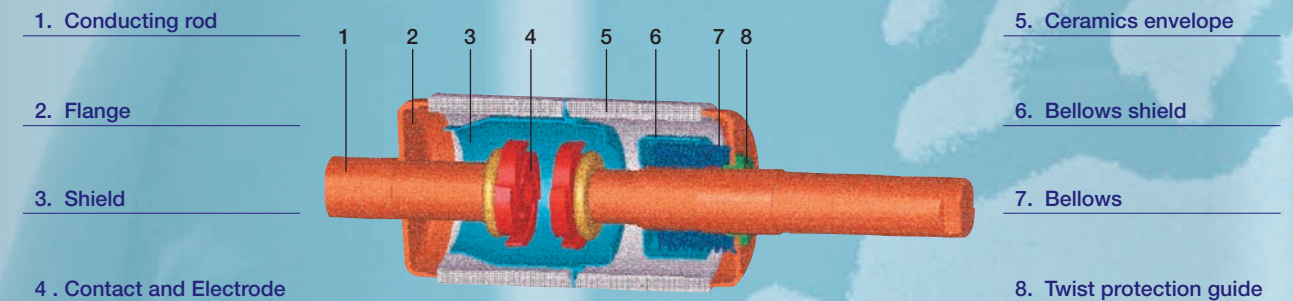
### GB Standard



MEIDEN is manufacturing the medium voltage class VIs which matches to the various specifications in the world.

## \*Vacuum Interrupters-Structure, Feature & Performance

Vacuum Interrupters have simple to its structure. Material of copper is used for VI's flanges. Therefore Vacuum Interrupters have excellent on heat dissipation at load current and short circuitbreaking current.



## \* Vacuum Interrupters for High Voltage Class

MEIDEN developed and commercialized 72.5kV class vacuum interrupter for the first time in the world.

MEIDEN has successfully developed a 145kV/40kA rating and turn into production.

## \* Vacuum Interrupters for Customized Arrangement

MEIDEN corresponds to size arrangement and review the specifications of VIs based on requirement.

Production of prototype VIs as well as test of short circuit breaking test, etc are possible.

If customer would like to have new R&D and changing for now purchases VI, MEIDEN will be possible to test at our own test laboratory for customize arrangement.

## \*Vacuum Interrupters- Manufacturing & Quality & Assurance

All the Vacuum Interrupters assembly works are carried out in a clean room. Each part is chemically cleaned, washed, dried, and then carried to the clean room. Vacuum Interrupter using ceramics envelopes has high heat-resisting characteristics.

Utilizing this advantage, degassing and hermetically sealing processes are simultaneously carried out in a vacuum furnace.

This simplified manufacturing process makes Vacuum Interrupters quality stable. After brazing under vacuum, each Vacuum Interrupter is to be given a constant mechanical load and then inspected its dimensional variations. All data are automatically recorded under high quality control. Data recording and pass-fail judgment are automatically carried out.

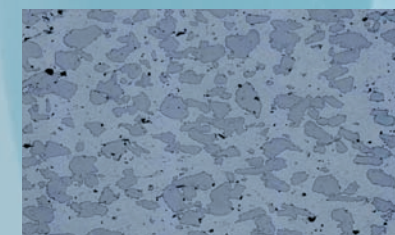
Inspection of materials supplied and process control at all stage and final inspection of vacuum degree of each vacuum interrupter ensure for quality assurance and a long service life.

MEIDEN applies a delivery criterion of ultra-high vacuum less than  $5 \times 10^{-4}$  [Pa], thus a service life of VI is 20 years.



Automatically forming equipment

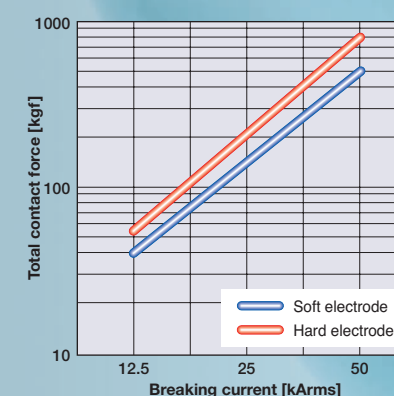
MEIDEN produces two types of electrode (Spiral & Axial Magnetic Field) and its material is pressed powder of Cr-Cu alloy.



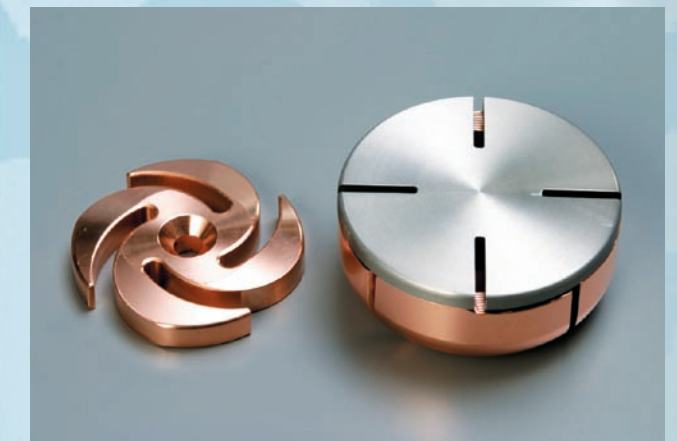
Uniform-dispersion Cr material within Cu

VI contacts are soft and have excellent current-breaking performance, because of their uniform-dispersion materials.

Therefore, it enable to minimize the operating energy for circuit breakers, and it helps much compact size operating mechanism.



Minimized contact pressure



Spiral electrode (Soft material)

AMF electrode (Hard material)

Spiral electrode is normally applied for economic and standard VCB/Switchgear of medium voltage class. MEIDEN manufactures soft electrode by using forming equipment for powder material.

AMF electrode is applied for high voltage class and capacitor bank. The electrode is hard and have excellent high voltage performance.

MEIDEN is manufacturing high voltage VCB upto rated 168kV class, and Switchgear at rated 72.5kV class. These VCB and Switchgear are using hard material on the vacuum interrupter, its electrode is this hard material.

Vacuum Interrupters for Circuit Breaker <50Hz to 60Hz>

Rated Voltage	Rated lightning impulse voltage	Power frequency withstand Voltage	Rated Current		Short circuit breaking current with at least 30-40% DC component and Interrupter (Outdiameter-Style)					
kV	kV	kV	A	12.5kA	16kA	20kA	25kA	31.5kA	40kA	50kA
7.2	60	20	630	M20QC ( φ 52-A)						
			800/1250	M30RC ( φ 94-A)						
			1600/2000	M40SC ( φ 94-A)						
			2500/3150	M50TC ( φ 110-A)						
12/15	75	28	630	M52QC ( φ 65-B)	M41QC ( φ 69-B)	MA61RC** ( φ 94-B)				
			800/1250	M51RC ( φ 82-B)						
			1600/2000	M71SC ( φ 94-B)	M81SC ( φ 110-B)					
			2500/3150	M71TC ( φ 110-B)	M81TC ( φ 132-B)	MA131TC ( φ 150-B)				
17.5/24	95/125	38/50	630	M52QC* ( φ 65-B)		MA102RC** (φ 94-B)				
			800/1250	M72RC* ( φ 75-B)		M102RC ( φ 94-B)				
			1600/2000	M102SC ( φ 94-B)						
			2500	M132TC ( φ 120-B)		M203TC ( φ 120-C)				
36/38	175	80	630	M83QC* ( φ 75-B)	M93QC* ( φ 94-B)					
			800/1250	M123QC* ( φ 94-B)						
			1600/2000	M163SC* ( φ 110-B)						
			2500	M203TCB* ( φ 120-C)	M253TC* ( φ 132-C)					
52	250	90	1250/2000		MA285SC* ( φ 132-B)					
72.5	325	140	1250/2000		MA317SC ( φ 132-B)	MA467SC ( φ 150-B)	MA507SC ( φ 150-B)			

\* : Additional external insulation necessary  
\*\*: Capacitor bank switching

Vacuum Interrupters for Load Break Switch

Rated Voltage	Rated lightning impulse voltage	Power frequency withstand Voltage	Rated Current	Short circuit making current	VI Type (Dia.-Style)
kV	kV	kV	A	kApeak	
12/15.5	95	35	630	40	M01QC (φ 60-A)
24/27	125	60	630	40	M02QC (φ 65-B)
36/38	150	70	630	40	M03QC (φ 65-B)

Vacuum Interrupters for Auto-Recloser & Fault Interrupter Switch

Rated Voltage	Rated lightning impulse voltage	Power frequency withstand Voltage	Rated Current	Short circuit breaking current	VI Type (Dia.-Style)
kV	kV	kV	A	kA	
15.5/27	110/125	50/60	630	12.5	M52QC* (φ 65-B)
15.5/27	110/125	50/60	800	16	M72QC* (φ 75-B)
38	150	70	630	12.5	M83QC* (φ 75-B)
38	150	70	800	16	MA93QC* (φ 82-B)

Vacuum Interrupters for Contactor Switch

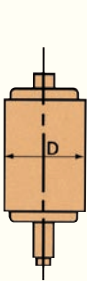
Rated Voltage	Rated lightning impulse voltage	Power frequency withstand Voltage	Rated Current	Short circuit breaking current	VI Type (Dia.-Style)
kV	kV	kV	A	kA	
6.6	45	16	400	4	5G-1 (φ 52-A)
6.6	45	16	400	6	7.5G (φ 52-A)

Vacuum Interrupters for Mobile Railway Interrupter Switch

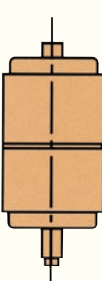
Rated Voltage	Rated lightning impulse voltage	Power frequency withstand Voltage	Rated Current	Short circuit breaking current	Short circuit making current	VI Type (Dia.-Style)
kV	kV	kV	A	kA	kA	
18/36	170	70(16.6Hz) 70(50/60Hz)	750(16.6Hz) 450(50/60Hz)	at 18kV →25(16.6Hz) at 36kV →20(50/60Hz)	at 18kA →62.5(16.6Hz)	163SCM (φ 132-C)

\*Diameter

Interrupter types and diameters are shown in the tables.



Style A



Style B



Style C

