RVAC—Gas Insulated Ring Main Unit

Based on the design concept of full insulation and fully sealed, all primary parts within RVAC RMU are fully sealed inside the stainless-steel main enclosure, protect to against condensation and external contaminated environment; the protection degree of the main tank body is up to IP68, equipped with Cooper's waterproofing touchable cable bond, which can provide effective protection against accidental flood in rainy climate.

Construction Feature

Smart grid readiness

Designed to integrate solutions for sensing, monitoring and remote control for feeder automation and load management purposes.

Personal safety

- Logical mechanical and electrical interlocks;
- Complete enclosure earthing, to ensure zero potential for interface
- Compartments protected against penetration of objects;
- Capacitive voltage detection system for verification of safe isolation from supply;
- Feeder earthing by means of make-proof earthing switch.

Environmental-friendly concept

- Low power loss, low maintenance spending, ensuring more reasonable cost investment;
- Only reusable and/or recyclable materials can be used to do the most compact design;
- In normal working conditions, gas leakage rate of lower than 1‰ ensures more than 30 years lifecycle;
- Without gas work on site through installation, operation, extension, and replacement of the product.

User friendly

- Cable connection and user interfaces for operation on the same front side of the panel;
- Ergonomic cable connection height;
- A customized low voltage compartment is optional;

All-weather and high adaptability to environment

- Passed underwater 24-hour powerup immersion test, with IP67 protection degree, thus ensuring reliable protection against summer floods;
- SF6 gas tank is made of stainless steel plates, with anti-rust painting treatment on the surface, to protect against salt spray, humidity, dirt and temperature, and to ensure durable nice appearance;
- EATON pre-fabricated shielding touchable cable terminal is supplied, which can be plugged when system in live, suitable for long -term operation underwater or in other severe conditions.

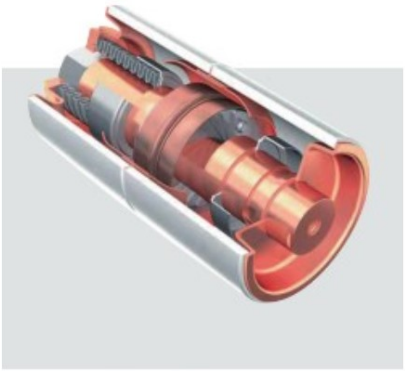
Modular design and flexible configuration

- Both multi-functions in one tank solution and individual panel can be freely combined and extended, to satisfy demands of different customers;
- Non-extensible and both side extensible design suit for your re- quirements.
- Flexible extension of unit modules on site, easy to build medium voltage transformer substations according to different requirements;
- Two options are available for transformer and line protections: load break switch-fuse combination units and circuit breakers with relay protection.

Operation

- Complete design certified in accordance with GB / DL and IEC standards;
- Arc fault tested according GB3906 / IEC 62271-200;
- Quality assurance in accordance with ISO 9001;
- Touching safe and hermetically sealed primary enclosure;
- Gas tank's zero gauge voltage withstand (1min) can reach power frequency withstand voltage.

Construction Feature



Vacuum technology features

- Eaton has an unsurpassed leadership in vacuum technology supported by a strong heritage of innovation from companies such as Westinghouse and Holec
- Pioneers in vacuum technology for over 90 years. First vacuum interrupter supplied at 15kV-12kA in 1967
- Eaton was the first one to develop and patent copper-chromium alloy content for contacts and center shields
- Our vacuum interrupters for contactor applications can perform up to 2.5 million mechanical operations
- More than 5 million units delivered worldwide, operating safely and reliably in all types of net- works, medium voltage applications and environments

SF6 gas insulated system

- All primary high-voltage components are completely enclosed in SF6 gas tank, free from environment impact, thus ensuring fully insulation and maintenance-free;
- SF6 gas tank is made of high-quality stainless steel materials, free from influence of salt spray, humidity, dirt and temperature, ensuring a durable nice outlook;
- Passed underwater 24-hour power-up immersion test, with IP67 protection degree, can reliably prevent from flood immersion in summer;
- Advance gas shielded welding as well as a sealing pressure system of less than 1‰ leakage rate ensure a 30 year service cycle;
- Non-extensible is standard busbar extensible is optional.

Load break switch

The load break switch is a 3-position switch, with Close, Open and earthing position. When in Open position, the moving blade has sufficient insulation distance. An operating handle can be used to make close-open operations on load break switch and earthing switch. There are mechanical interlocks between the load break switch and the earthing switch.

- The load break switch applies metal deionizing arc suppress technology, ensuring good interruption performance for the switch;
- The working speed of switch's moving contact depends on its operation mechanism; and the open-close speed of the switch will not be influenced by operators;
- When moving from closing to opening, the load break switch depends on moving contact speed and arc suppress devices simultaneously, to suppress arc and break current;
- The spring operation mechanism with an operating handle to complete closing and opening operations. Motorization module and opening coil can be added, to achieve remote control.

Protection Relay

Protection relay can be provide as client request , as follows :

- EATON
- GE
- PNC
- LSIS
- Etc.

Features and benefits

The benefit of a sealed for life tank

A “sealed for life” steel enclosure contains all primary parts and driving mechanisms

- Maintenance free
- Internal arc proof
- Protection degree up to IP68 for prevention of summer floods

The benefit of a compact design

- Minimal floor space
- Low building costs
- Easy to install
- It can be extended on site without handling gases.

Computer simulation design

3D simulation design analysis softwares are applied during R&D process to strengthen design capacity, thus improving product reliability greatly.

- Electric field analysis
- Magnetic field analysis
- Gas pressure and motion analysis
- Mechanical strength analysis
- Mechanical movement (speed and force)

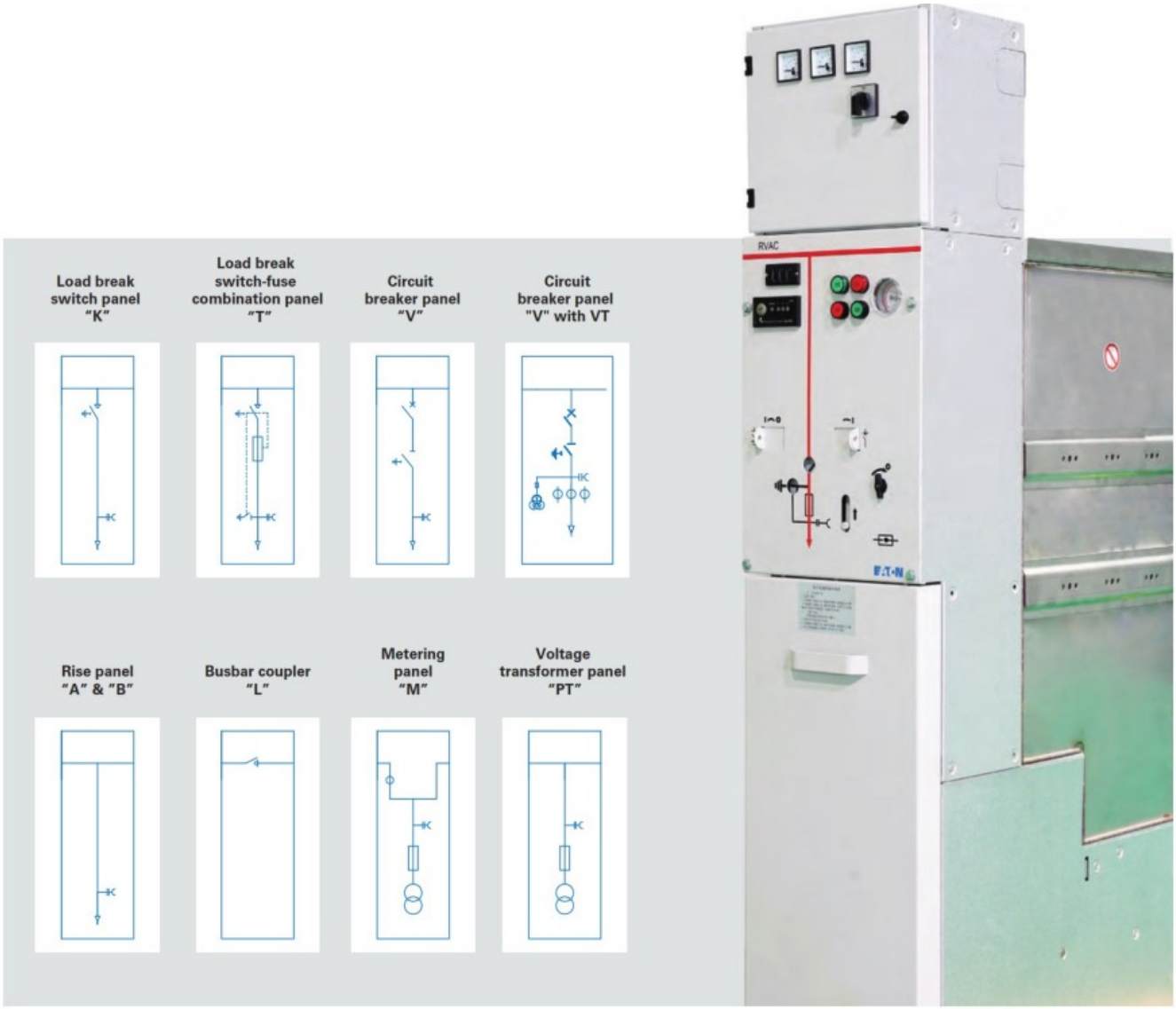
Smart grid readiness

Automation upgrading

- Remote close/open
- Auxiliary contacts for each position local or remote indications
- Measuring CT and current signal

Flexible solutions

- Reliable busbar extended design and interfaces reservered for future project expansion
- Complete types of functional units



RVAC Technical Data

Item		Ratings	
General			
Rated voltage	kV	12	24
Power frequency withstand voltage(1min)			
Phase to phase/Phase to earth	kV	42	50
Between isolating distance		48	60
Lightning impulse withstand voltage （BIL）			
Phase to phase/Phase to earth	kV	75	125
Between isolating distance		85	145
Rated frequency	Hz	50	50
Internal arc classification (IAC)	kA-s	AFLR 20-1	AFLR 20-1
Degree of protection in service		IP3X	IP3X
Degree of protection with doors/covers open		IP2X	IP2X
Busbar system			
Rated normal current	A	630	630
Rated short-time withstand current	kA-s	20-4	20-3
Rated peak withstand current	kA	50	50
Load break switches panel			
Rated normal current	A	630	630
Rated short-circuit making current	kA	50	50
Rated short-time withstand current	kA-s	20-4	20-3
Mechanical endurance class (Lood break switch)		M1 5000	M1 1000
Mechanical endurance class (Earthing switch)		M1 2000	M1 2000
Electrical endurance class (active load breaking capacity 630A)		E3	E3
Circuit-breakers panel			
Rated normal current	A	630	630
Rated breaking current	kA	20	20
Rated short-circuit making current	kA	50	50
Rated capacitive switching current class		C2	C2
Mechanical endurance class (Circuit-breakers)		M2 10000 x	M1 2000
Mechanical endurance class (Earthing switch)		M1 2000	M1 2000
Electrical endurance class		E2	E2
Rated short-time withstand current	kA-s	20-4	20-3
Mechanism type		O - 0.3s - CO - 180s - CO	O - 0.3s - CO - 180s - CO
Switch-fuse combination panel			
Rated normal current	A	125	80
Max. rated current of the optional fuse	A	160	125
Rated breaking current	kA	31.5	31.5
Rated short-circuit making current	kA	80	80
Rated transfer current	A	1750	900

For others, please contact local Eaton sales representative.

RVAC designed to IEC standards

RVAC complies with the following standards	
IEC62271-1: 2007	Common specifications for high-voltage switchgear and controlgear
IEC60265-1: 1998	High-voltage alternating-current switches for rated voltages above 3.6kV and up to and including 40.5kV
IEC71-1: 1993	Insulation co-ordination for high voltage transmission and distribution equipment
IEC62271-102: 2002	High-voltage alternating current distribution and earthing switches
IEC62271-200: 2003	A.C. metal-enclosed switchgear and controlgear for rated voltages above 3.6kV and up to and including 40.5kV
IEC62271-100: 2001	High-voltage alternating-current circuit breakers
IEC62271-105: 2002	High-voltage alternating current switch-fuse combinations

Certificate


RVAC SF6 Switchgear Routine Test Report

Test Report for RVAC-K


RVAC SF6 Switchgear Routine Test Report

Test Report for RVAC-T

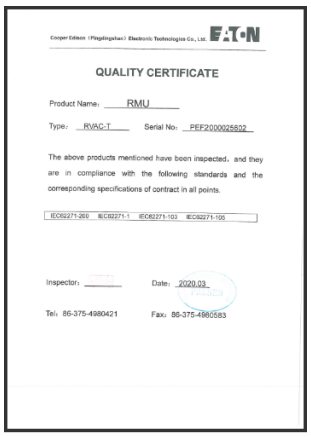

QUALITY CERTIFICATE

Product Name: RMU

Type: RVAC-K Serial No: PEF2000025601

The above products mentioned have been inspected, and they are in compliance with the following standards and the corresponding specifications of contract in all points.

Quality Certificate for RVAC-K


QUALITY CERTIFICATE

Product Name: RMU

Type: RVAC-T Serial No: PEF2000025602

The above products mentioned have been inspected, and they are in compliance with the following standards and the corresponding specifications of contract in all points.

Quality Certificate for RVAC-T

Success Story

NO	Project Name	Customer	Market Application
1	PLTD Sekupang 25 MW	PT. PLN Batam	Power Plant
2	Ulubelu Unit 3&4 Geothermal Power Plant	PT. Rekayasa Industri	Oil & Gas
3	EPC-Upgrading Production Facility & Dismenting Production Facility	PT. Kelsri	Oil & Gas
4	CINTA P	PT. Pertamina Hulu Energi Oses	Oil & Gas
5	Wetar Island Copper	PT. Aggreko Energy Services Indonesia	Utility
6	Tower Alexander	PT. Jaya Teknik	Building
7	Sosial Security Tower	PT. PP (Persero) Tbk	Building
8	Retrofit Primary Distribution RMU RDP PLAJU Tahap 2 Type RVAC-T = 15, RVAC-K = 16, RVAC-VB = 1	PT. Pertamina RU III Plaju	Oil & Gas
9	HOTEL ANANTARA UBUD (PANEL MV)	PT. Jaya Marta Sentosa	High Rise Building