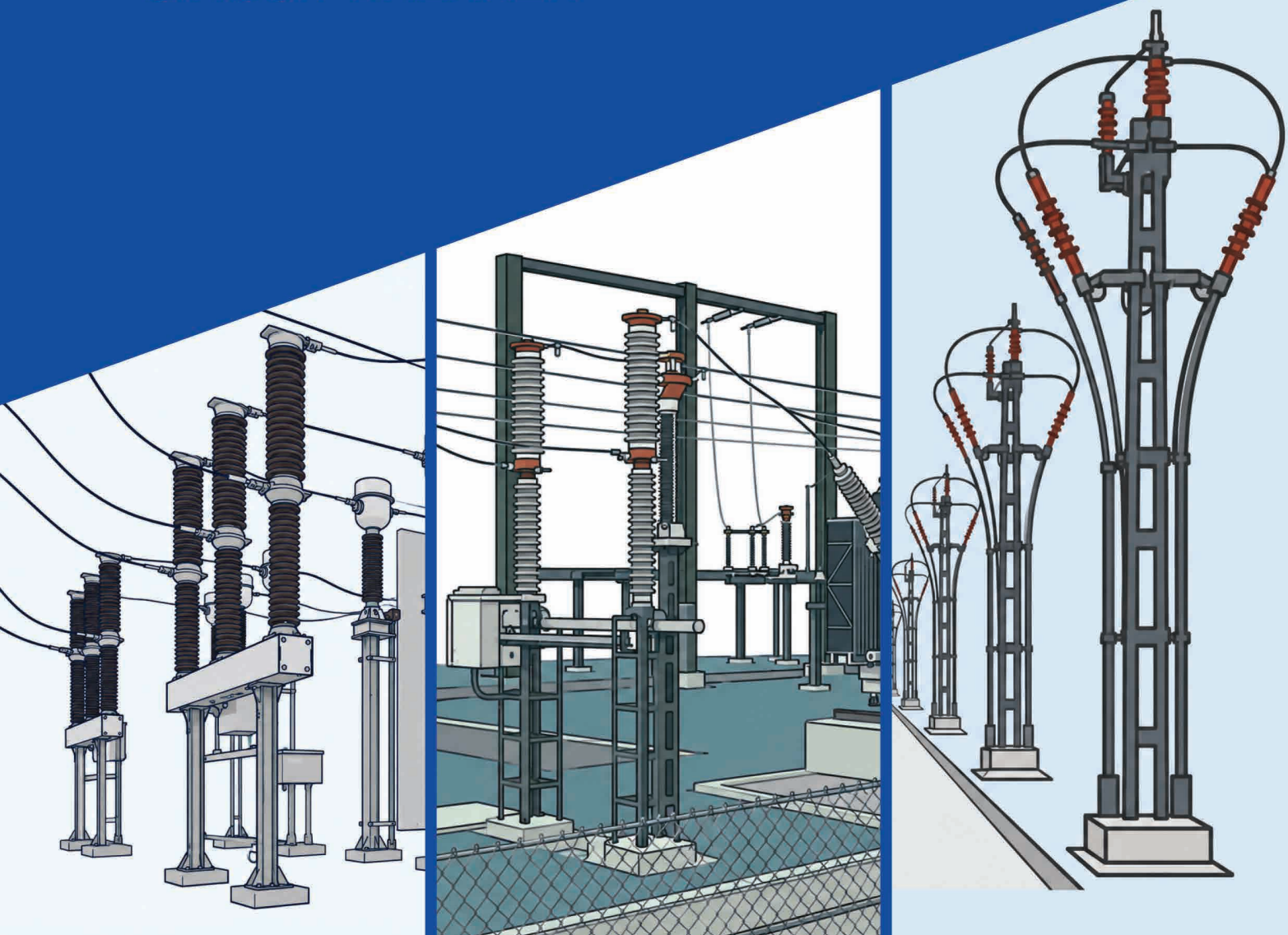


CORPORATE PROFILE

NEXT GENERATION
HIGH VOLTAGE
CIRCUIT BREAKER



ABOUT US

With its more than 30 years expertise in research, development, manufacturing, marketing and sales the company operates in many countries through cooperation with local partners. We are very proud to be a part of the energy industry, a part of the group of professionals all over the world whose mission is to provide electricity to consumers. That mission inspires us to look constantly for new innovative solutions and maintain the high quality and performance of our products. By creating great quality products we honour passionate people that are trying to make a difference today.

Majority of Hughes Power System's products are designed and built in Sweden.

CORPORATE VALUES

OUR VISION

As we move towards our goal of being a world class advanced technological company in electrical utility products, we guarantee our commitment to the well known Swedish standards of reliability, safety and quality.

OUR MISSION

Elegant, innovative solutions at affordable price!

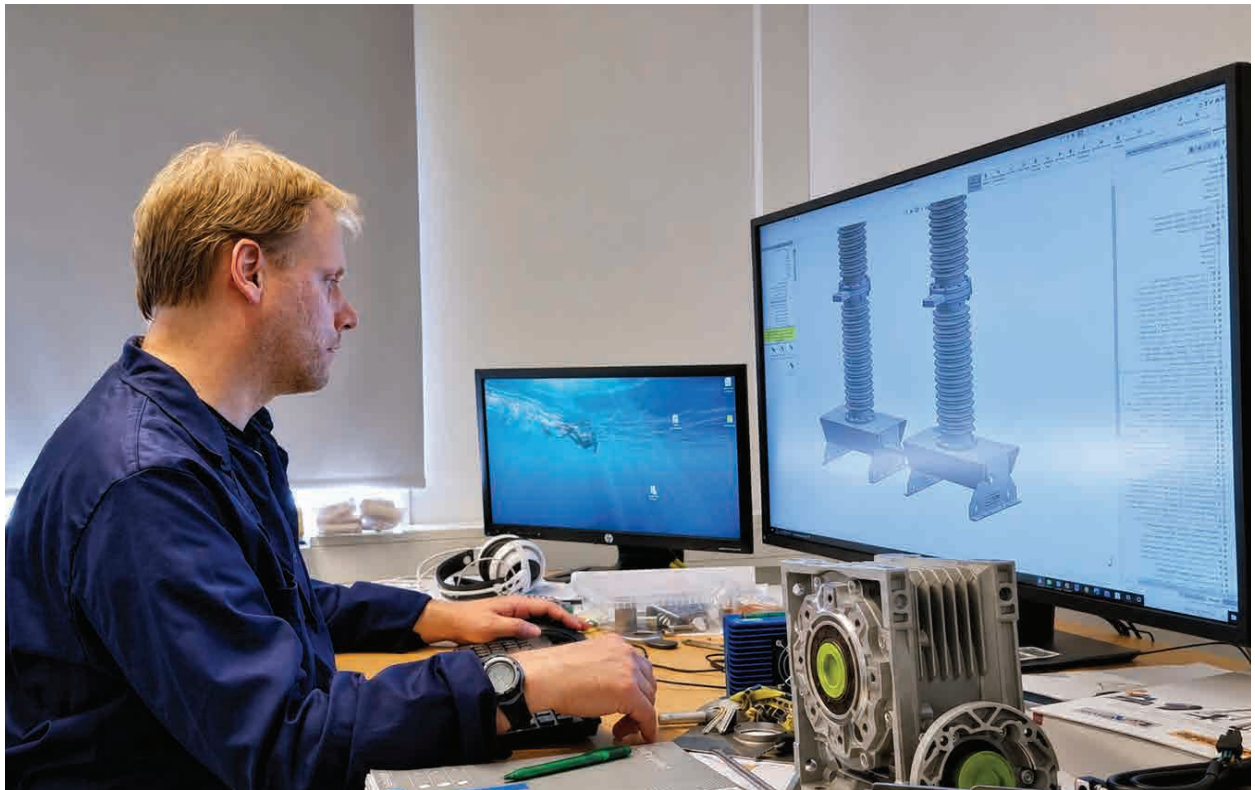
OUR SLOGAN

Innovative Power Engineering at its best!



COMPANY PROFILE

PRODUCTION FACILITIES AND PROCESSES



3D modelling of Hughes products

PRODUCT DEVELOPMENT

Every great idea starts in the R&D team.

Our engineers build mechanical, electrical and electronic designs, that include 3D modeling and FEM methods analysis.

The first level of prototyping is made in 3D printers. When this stage is approved, the second level of prototyping is performed in our production facilities using real materials and components.

The final stage is prototype testing, performed in different climate chambers, electrical high power laboratory, as well as in EMC and PD testing in Faraday cage chambers.



5-axis CNC production



8 axes 170t automatic press brake for processing sheet metal parts

COMPANY PROFILE

PRODUCTION FACILITIES AND PROCESSES



Hughes products assembly

PRODUCTION

Before the production starts, the order is analysed to derive the materials and processes needed to do the job.

Hughes factory automation system manages everything from sourcing the best suitable materials and suppliers, production processes to the final products approval before delivery.

Majority of the products are made from easily recyclable and environmentally friendly materials.

Digitalization, automation and robotization of Hughes production processes for parts manufacturing and assemblies guaranty very high level of uniform quality.



Automatic machine tool setting and measuring system



Laser cutting of stainless steel parts

COMPANY PROFILE

PRODUCTION FACILITIES AND PROCESSES



Inhouse high voltage test laboratory, 400kV power frequency and PD test, 900kV 60kJ impulse test system

TESTING AND QUALITY CERTIFICATION

Hughes testing facilities include:

- high voltage electrical testing laboratory;
- medium voltage electrical test cells;
- different climate chambers with temperature range - 80°C to + 180°C;
- mechanical testing facilities;
- Faraday cage chambers;
- metal x-ray diagnostics;
- high speed camera and thermal photo lab;

Internal factory audit of quality and test routines follows Hughes ISO 9000 standards.



Testing of a switch in electric medium voltage test cell



Testing of solid insulated vacuum circuit breaker in the inhouse high voltage test laboratory,

COMPANY PROFILE

PRODUCTION FACILITIES AND PROCESSES



Customer service centre: online product training and project support

SHIPPING AND CUSTOMER SUPPORT

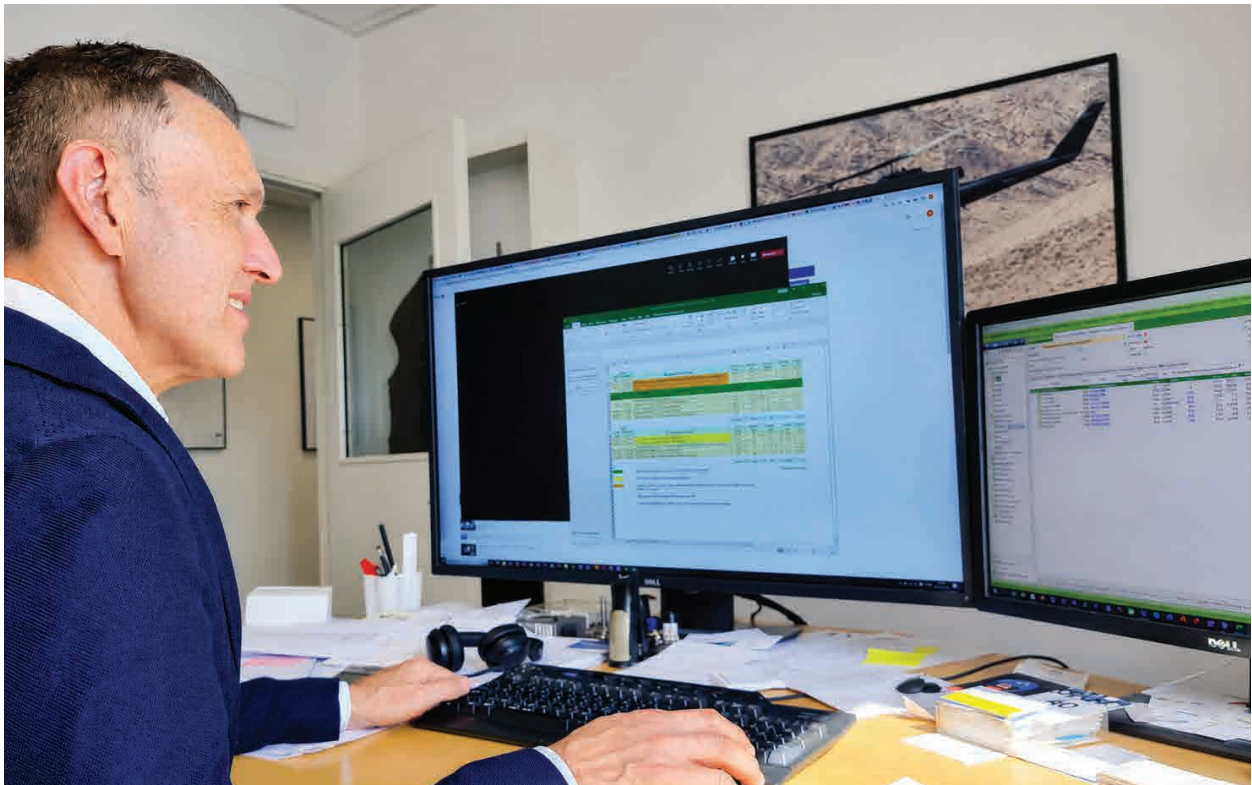
To ensure full customer satisfaction Hughes guarantees full product life cycle support.

This includes the following steps:

- fast delivery;
- commissioning;
- product training;
- technical support;
- marketing and sales support;



Multi loading docks and comprehensive storage system for smoother and faster deliveries



Hughes automation system for orders management

PRODUCTS

HIGH VOLTAGE VACUUM CIRCUIT BREAKER



OVX1402/1102 high voltage vacuum circuit breaker for 145/123kV

DESCRIPTION

The world's first solid insulated **high voltage vacuum circuit breaker** for 72.5/123/145kV, 16.7/50/60 Hz, 2500 - 4000A is a gas-free and a fully environmentally friendly product. This vacuum circuit breaker is built to remain in operation for more than 30 years without major maintenance due to the highest quality materials used in its construction.

The products' applications include railway feeder substations and electrical transmission system. The combination of extremely high mechanical endurance and outstanding electrical parameters with solid insulation and with high performance vacuum interrupters provides highly reliable maintenance free products with low life cycle costs.



Installation of OVX720 high voltage vacuum circuit breaker for 72kV

INDOOR AND OUTDOOR VACUUM CIRCUIT BREAKER



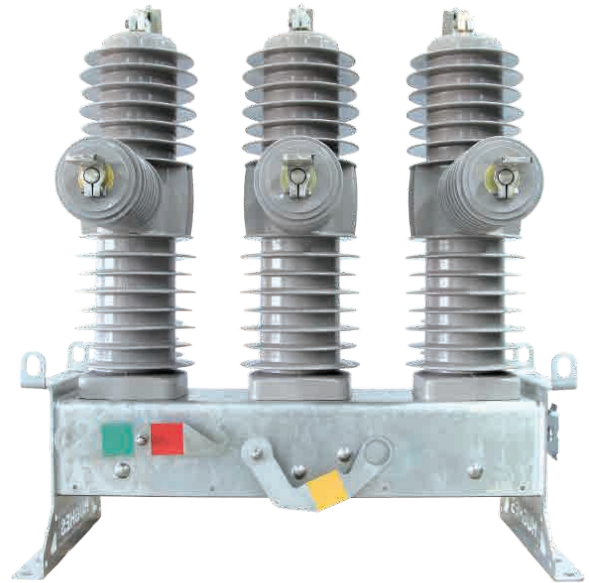
VX4 indoor vacuum circuit breaker switch for 12/24kV

DESCRIPTION

The VX type of **indoor** circuit breaker series is designed for all standard applications in the medium voltage range. The compact VX type vacuum circuit breakers can be easily integrated not only into all types of switchgears, but also retrofitted into existing switchgears.

The compact design, especially the small depth and width, are the key advantages of the product. The VX type of circuit breaker frame is made of premium class nonmagnetic stainless steel to avoid corrosion and related problems.

The drive mechanism is spring operated for reliable and fast operation. Spring mechanisms always give a very high contact force and that minimizes the risk for contact welding in fault situations.



VCB240 outdoor vacuum circuit breaker

DESCRIPTION

The VCB series of **outdoor** vacuum circuit breakers is clearly the most modern, safe and reliable product of its kind on today's market. The drive mechanism operational energy is stored in 4 steel springs. It provides very reliable, fast operation in combination with a very high contact pressure.

- Replaces disconnectors with load break heads;
- Optional integrated disconnector for extra personal safety;
- Unmatchable short circuit capacity;
- Low maintenance;
- Solid insulated - gas free;
- Encapsulated switch point, no risk for bush fire;
- Stainless steel switch frame;
- Easy to install;
- Remote controllable or local operation;

PRODUCTS

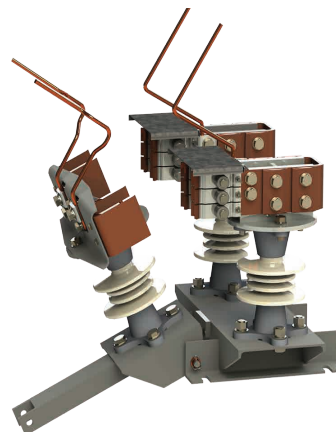
DISCONNECTOR FOR RAILWAYS AND TRAMS



RABS2S-15 disconnecter



RABS1S-15 disconnecter



Tram disconnecter

DESCRIPTION

RABS series of **disconnectors** were especially developed for railway, light rail and tram applications.

The models range for railways includes 1 pole, 1+1 pole and 2 poles versions for DC 750 – 3500 V, 16.7 and 50Hz in a range from 15 to 25kV.

The tram DC version is made with 1 pole.

The mechanical parts are made of the highest-grade stainless steel, qualified hot dip galvanizing and nickel-plated high-grade copper to prevent from corrosion.

Together with our existing motor drives it provides a complete solution for automation and remote control of the railway and tram electrical networks.

DISCONNECTORS FOR TRAINS	
1-pole	1x2-pole, 2-pole
15 or 25kV	15 or 25kV
16.7 or 50Hz	16.7 or 50Hz
1600A line current	1600A line current

DISCONNECTORS FOR TRAM LIGHT RAIL	
1-pole	
750 – 3500VDC	
2500 - 4500A line current	
optional Integrated ground switch	

MOTOR DRIVE FOR RAILWAYS



EOA600 motor drive



EOA600 installation



EOA600 padlocked

DESCRIPTION

The EOA600 railway **motor operating drive**, characterized by its innovative design, is a complete solution from a pole to SCADA system.

The unit is intended for control of disconnectors / earth switches with or without load break heads. The motor drive is easy to install and has built-in all functions for SCADA integration. EOA600 has an built in bi-stable remote blocking unit for extra personal safety for the repair crew. The main mechanism has a built in regenerative break function for high speed operation from unlock-operate-lock.

The motor drive can be directly applied on most 0.5 to 25kV DC/AC single or double (AT or BT system), gang operated 3-phase disconnectors. The unit has a complete interface to SCADA system with multiple dry contacts. Optional built in 4G-LAN-Fiber RTU is available.

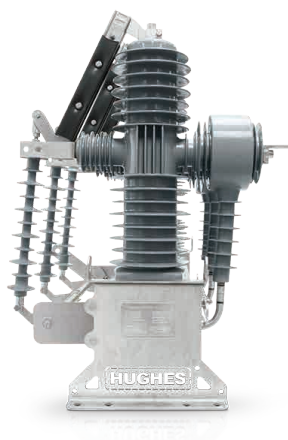
TECHNICAL DATA	
Dimensions, mm	615 x 275 x 185 (HxWxD);
Operating Temperature, °C	-50 ... +60
Enclosure	P54, stainless steel, optional GRP
Heating, °C	optional 35 W PTC element, thermostat on at 5°C off at 15°C
Power supply motor mechanism	24 / 110 / 230 VAC/DC 250 W motor
Power supply remote blocking	24 VDC 10W
Stroke	50 - 240 mm depending on type of lever arm
Operational speed motor mechanism, s	1.5
Operational speed remote blocking, s	1
Control power	400 Nm (100 mm stroke), 1100 Nm stall point

PRODUCTS

RECLOSERS FOR OVERHEAD LINES



ACR241 VCB switch for 24/27kV with core balance and current transformers



ACR240 VCB, 24/27kV with built-in disconnector



R200 protection relay cabinet

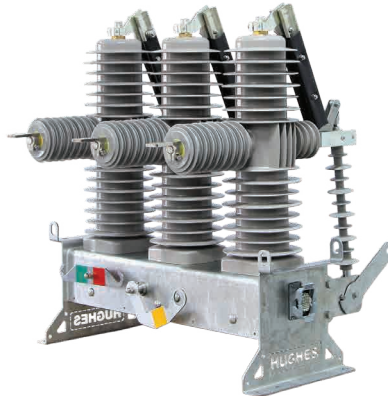
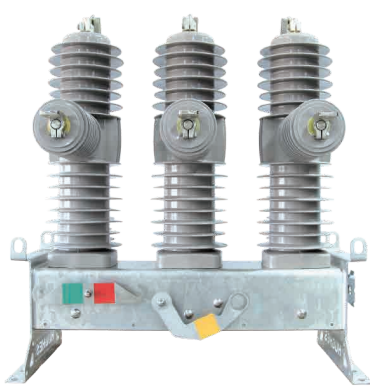
DESCRIPTION

The ACR series of **Automatic Circuit Recloser** for 6/15kV, 24/27kV and 33/40kV is clearly the most reliable and safe product of its kind on today's market. The operational energy is stored in 4 steel springs for fast and precise operation, as in a primary switchgear mechanism.

The ACR is solidly insulated with an optional integrated disconnector for extra personal operation safety. It has low weight, most of the parts are made of non magnetic stainless steel with focus on minimizing electrochemical corrosion. The bushings and isolators core are made of epoxy with silicone rubber surface for extra vandal and UV protection.

TECHNICAL DATA	ACR120/121	ACR240/241	ACR405
Rated maximum voltage, kV	12/15	24/27	38/40
Rated basic impulse level, P>P, kV	85/85	145/145	185
Rated basic impulse level, P>E, kV	75/75	125/125	170
Power frequency withstand, Dry >1min, kV	60/60	60/60	70
Power frequency withstand, Wet >10 sec, kV	45/45	50/50	60
Rated continuous current, A	630/1250	630/1250	1200
Rated fault breaking current, kA	20/20	20/20	16
Rated fault making current, kA	50/50	50/50	42
Rated fault duration time, s	3/3	3/3	3
Line charging current, A	5/10	5/10	5
Cable charging current, A	20/40	20/40	40
Bushing type	Epoxy core with silicone surface		HCEP
Creep distance to ground (disconnector isolator), mm	400	725	
Creep distance to ground, (interrupter isolator), mm	460/1090	960/1090	1310
Rated operation voltage, VAC	85-275		
Operational sequence, no charge	25ms Open - 50ms Close - 25ms Open		

TIME VOLTAGE SECTIONALIZERS



TVS240 time voltage sectionalizer for 22/27kV with built-in disconnector

TVS150 Control cabinet

DESCRIPTION

Autoself (TM) **Time Voltage Sectionalizer** TVS is built of the ACR's high performance outdoor vacuum circuit breaker module and high speed TVX electronic sectionalizer module.

The AutoSelf functionality is built on a auto-reclosing cycle count, lockout function and simple time-voltage logic including multiple timers. It can be operated manually via push buttons and a rotate switch. The unit has an optional built in disconnector and can be easily upgraded to a recloser.

TECHNICAL DATA	TVS120/121	TVS240/241	TVS405
Rated maximum voltage, kV	12/15	24/27	38/40
Rated basic impulse level, P>P, kV	85/85	145/145	185
Rated basic impulse level, P>E, kV	75/75	125/125	170
Power frequency withstand, Dry >1min, Kv	60/60	60/60	70
Power frequency withstand, Wet >10 sec, kV	45/45	50/50	60
Rated continuous current, A	630/1250	630/1250	1200
Rated fault breaking current, kA	20/20	20/20	16
Rated fault making current, kA	50/50	50/50	42
Rated fault duration time, s	3/3	3/3	3
Line charging current, A	5/10	5/10	5
Cable charging current, A	20/40	20/40	40
Bushing type	Epoxy core with silicone surface		HCEP
Creep distance to ground (disconnecter isolator), mm	400	725	
Creep distance to ground,(interrupter isolator), mm	460/1090	960/1090	1310
Rated operation voltage	24-48-110V-230 VDC/VAC		
Operational sequence, no charge	25ms Open - 50ms Close - 25ms Open		



Hughes Power System is a Swedish manufacturer of environmentally friendly equipment for electrification and automation of mass transport and electrical distribution systems. Very high quality standards together with innovative approach result in an advanced range of products, aiming to improve network quality by minimizing the number and duration of faults.

The majority of Hughes Power System's products are designed and built in Sweden.

www.hughespowersystem.com

