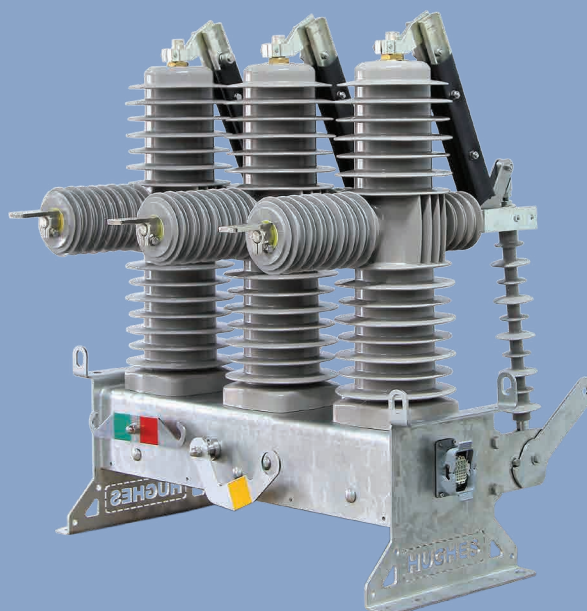


Innovative Power Engineering at its best!

HUGHES
POWER SYSTEM

SECTIONALIZERS

WITH AUTOMATIC SECTIONALIZING LOGIC



TVS AUTOSELF™ SECTIONALIZERS SERIES FOR DIFFERENT APPLICATIONS:

- Disconnectors / air break switches;
- Load break switches;
- Vacuum load break switches;

ABOUT US

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.

Our product portfolio includes:

- Reclosers
- Vacuum interrupter switches
- Disconnectors
- Motor drives
- Voltage transformers
- D/C power supplies

With its more than 30 years expertise in research, development, manufacturing, marketing and sales the company operates in many countries though cooperation with local partners. 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.

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



GENERAL DESCRIPTION



TVS FOR DISCONNECTORS INCLUDES:

- The **EOA501TVS** (1) motor drive with sectionalizing (compulsory);
- Disconnector (2) (optional);
- Interconnecting cable (optional);
- Built in components (3) (optional);
- External accessories (4) (optional);



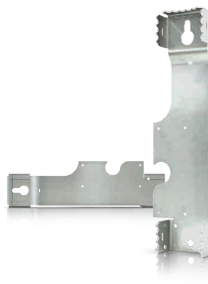
1



2



3



4

WHAT IS SECTIONALIZER

TVS time - voltage sectionalizer (Autoself TM) is a control system, including a control cabinet and a disconnector or a load break switch. It can be connected to the most existing switch elements in the network. The Autoself has the same purpose as a recloser but utilizes a much simpler sectionalizing algorithm. The product's reliability has been proven for more than 30 years of operation in electrical distribution networks.

TVS TYPES:

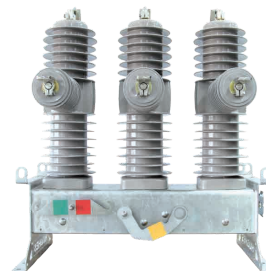
- for disconnectors / air break switches;
- for load break switches;

TVS FOR LOAD BREAK SWITCHES INCLUDES:

- The **TVS150** (1) control cabinet with sectionalizing (compulsory);
- LBS (2) vacuum load break switch (optional);
- Interconnecting cable (3) (optional);
- Built in components (optional);
- External accessories (4) (optional);



1



2



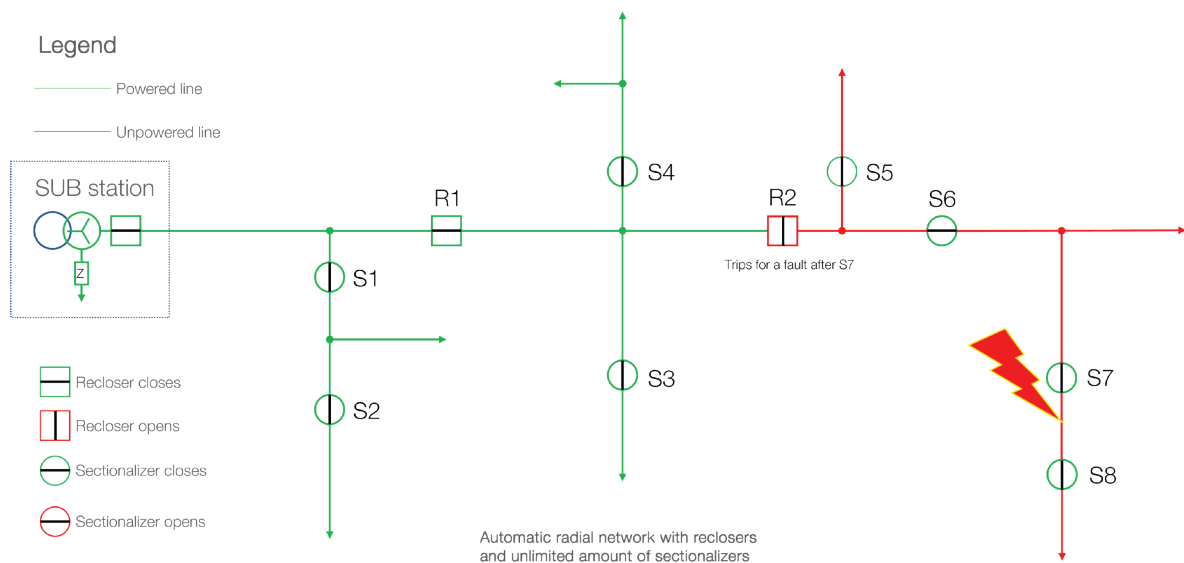
3



4

OPERATION PRINCIPLE

- The AutoSelf functionality is built on time count of voltage cycles from the feeding substation/units, lockout function and simple time-voltage logic including multiple timers.
- The TVS uses a **Time Voltage Sectionalizing algorithm**. When a fault is registered by the distribution substation, its circuit breaker trips. At the same moment, the TVS150 or EOA501TVS devices sense that the line voltage disappears. The first timer starts. After a pre-programmed time, all TVS150 open when the line is de-energized. The network is now divided into several sections. Some time later, the distribution substation's circuit breaker reconnects the outgoing line. The first TVS150 senses that line voltage has returned. The second timer starts. After a pre-programmed time, the TVS150 closes the load break switch. If the line voltage disappears in a pre-programmed time window after the TVS150 has closed its load break switch, it recognizes that it has closed against the fault. The circuit breaker in the distribution substation trips. The circuit breaker of the distribution substation recloses. At the same moment, the TVS150s sense that the line voltage has returned, but they do not close. The auto sectionalizing sequence is now complete;



TVS SERIES FOR LOAD BREAK SWITCHES MODEL RANGE

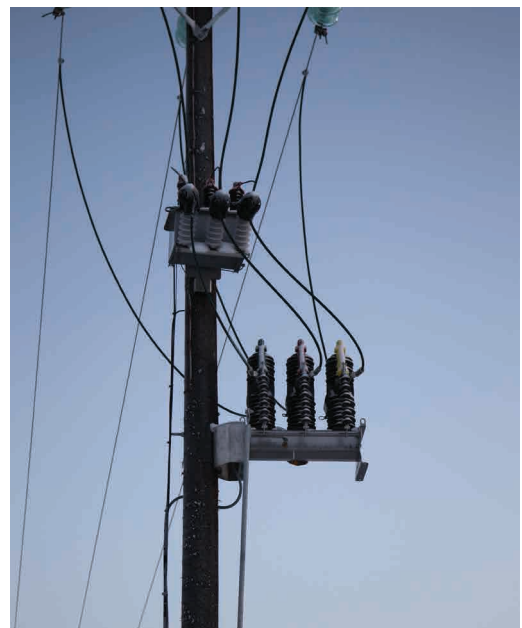
- TVS120** has the LBS120 vacuum load break switch equipped with 12kV bushings and a built-in disconnecter;
- TVS121** has the LBS121 vacuum load break switch equipped with extra insulated 27kV bushings and an optional set of voltage sensors on feed side;
- TVS240** has the LBS240 vacuum load break switch equipped with 24kV bushings and a built-in disconnecter;
- TVS241** has the LBS241 vacuum load break switch equipped with extra insulated 27kV bushings and an optional set of voltage sensors on feed side;
- TVS405** has the LBS405 vacuum load break switch equipped with ABB VG10 2000A/20kA 40.5kV vacuum interrupter and voltage sensors on the load side;

GENERAL DESCRIPTION

TVS TIME - VOLTAGE SECTIONALIZER ADVANTAGES

Hughes **TVS** series of sectionalizers has the following advantages:

- **Low maintenance.** Hughes sectionalizers are built to remain in operation for more than 30 years without major maintenance due to the highest quality materials used in its construction;
- **Low initial investment cost.** AutoSelf operates without protection relay, fault pass indicator and radio, as open/close operation and monitoring are performed automatically without the need of remote control and communications;
- **Long operational life time.** Up to 20,000 interruptions (one of the longest operating life on today's market) of the well proven LBS load break switch;
- AutoSelf can make and **break short circuit currents** if needed, both electronically and mechanically;
- **Optimized operation.** In order to save service life of the AutoSelf and ensure the immediate restoration of the power supply, the AutoSelf operates from the second reclosing cycle. Almost 82% of transient faults are cleared during the first reclosing cycle, that is why the AutoSelf operates only from the second one;
- **Unlimited number** AutoSelf's can be installed with an downstream recloser in the trunk line or branches of the overhead line to sectionalize the network in small sections;
- **Simple setup.** AutoSelf only uses a LBS vacuum load break switch and a TVS150 control unit that contains the time - voltage sectionalizing logic without complex protection;
- **Fast restoration.** When the fault is cleared, the AutoSelf unit down streams automatically closes with the incoming line voltage (if the reclaim time is not exceeded). There is no need to manually or remotely close the AutoSelf;
- **Easy upgrade.** Hughes AutoSelf can be easily upgraded to a recloser;



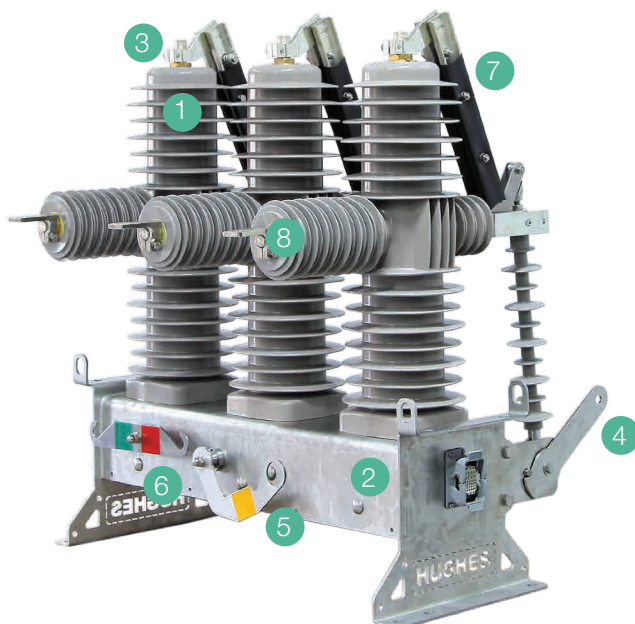
LBS VACUUM LOAD BBREAK SWITCH COMPONENTS AND ADVANTAGES

Hughes **LBS** series of vacuum load break switches is a modular building system, enabling to build easy tailored switches for different qualified solutions. It has the following components and advantages:

- **Bushings and insulators** (1) with solid epoxy insulation. Silicon coating provides UV protection, is environmentally friendly, does not contain harmful SF6 gas or oil;
- **Frame** (2) made of 5 and 4mm highest quality stainless steel to minimize electrochemical corrosion. The use of stainless steel in accordance with DIN50049 / 3.1B, thanks to its non-magnetic properties, completely eliminates the occurrence of any kind of corrosion, including electrochemical corrosion over the entire life of the product;
- **Electrical circuit** (3) made of high grade copper;
- **Attachment points** (4) for down pole mounted disconnector operation handle;
- **Spring stored energy operating mechanism** (5). It provides turning On and Off the switch module even in the complete absence of power supply (voltage transformer malfunction, full battery discharge).
- **Manual maneuvering** (6) of LBS. Manual charging of the spring mechanism as well as switch operation On and Off are possible with the help of manoeuvring arms located on a switch body. The spring capacity is enough for the full reclosing cycle (Off - On - Off) without recharging;
- **Disconnecter switch** (7) gives visible open points of all three phases for extra safety. The disconnector (for LBS120 and 240 only) is synchronized with the vacuum interrupter and cannot be open or closed when the vacuum interrupter is closed;

OPTIONAL COMPONENTS:

- **1 set of voltage sensors** (8) can be installed on feed side (for LBS121 and 241) or on load side (for LBS405);

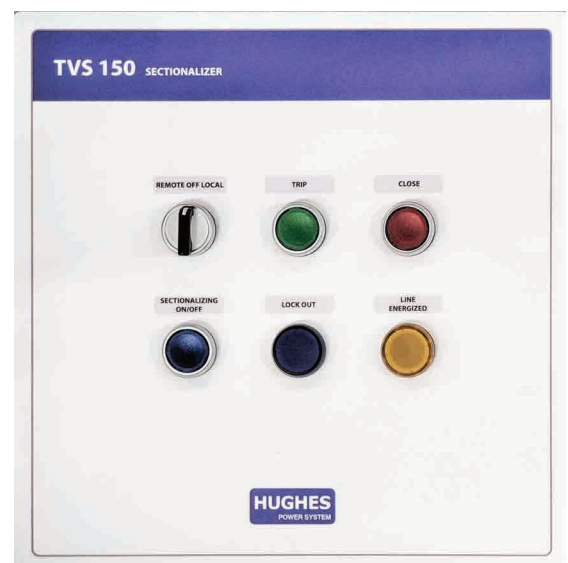


GENERAL DESCRIPTION

TVS150 CONTROL CABINET / EOA501TVS MOTOR DRIVE ADVANTAGES

Hughes TVS series uses **TVS150** control cabinet for control of load break switches and **EOA501TVS** motor drive for control of disconnectors. The only difference between them is that EOA501TVS motor drive has the built in motor mechanism to drive a disconnector. Both models have the following advantages:

- **Complete solution** from a pole to SCADA system;
- **Easy installation** and compatible with most disconnectors (applicable only for EOA501TVS);
- **Compact design**;
- **Advanced motor mechanism** (applicable only for EOA501TVS) that provides high operation torque with low start current when the disconnector's contacts shall open or close. Its unique design is one of the main features. The Neodymium magnetized DC motor starts rotating with high speed before the operation shaft is moving. It uses extra kinetic energy from the rotating mass as a booster in just that moment when a disconnector needs the most operation energy. The motor operation stops precise at its end position due to a regenerative function. It is a secure self locking mechanism;
- **External cabinet** (1) of highest quality stainless steel. The use of stainless steel in accordance with DIN50049 / 3.1B, thanks to its non-magnetic properties, completely eliminates the occurrence of any kind of corrosion, including electrochemical corrosion over the entire life of the cabinet;
- **Special double roof** (2) prevents the accumulation of the water / snow on the cabinet and protects from over-heating of the internal cabinet in hot climates;



Front panel

- **Automatic sectionalizing logic.** The EOA501TVS/TVS150 uses a Time Voltage Sectionalizing algorithm. When a fault is registered by the distribution station, its breaker trips. At the same moment, the EOA501TVS/TVS150 devices sense that the line voltage disappears. The first timer starts. After a preprogrammed time, all EOA501TVS/TVS150 open when the line is de-energized. The network is now divided into several sections. Some time later, the distribution station's circuit breaker reconnects the outgoing line. The first EOA501TVS/TVS150 senses that line voltage has returned. The second timer starts. After a pre-programmed time, the EOA501TVS/TVS150 closes the disconnecter. If the line voltage disappears in a pre-programmed time window after the EOA501/TVS150 has closed its disconnecter, it recognizes that it has closed against the fault. The switch of the distribution station releases. The switch of the distribution station resets. At the same moment, the EOA501TVS/TVS150 sense that the line voltage has returned, but they do not close. The section allocation sequence is now complete;
- **Padlock facility** (3) handle protects from unauthorized access;
- **Protection lips** (4) from rain water;
- **Connector** (5) for antenna remote control;
- Rugged pole **mounting brackets** (6) for different pole types;
- **Door alarm switch** (7) activates when the door is opened and sends the signal to the SCADA system. This feature notifies about access to the cabinet;
- **Inventive climate system** (8) for long term reliability. The lower louvers have a combination of a polymeric fine filter and a PTC thermoelement, which creates a moving air stream to the upper louvers. This air stream always evens out the day and night effect. The bottom of the cabinet has 5 drainage holes with micro filter preventing water gathering in case of any condensation;
- **Inventive protection system** (9) from water ingress via the outgoing drive shaft;



TVS150 / EOA501TVS



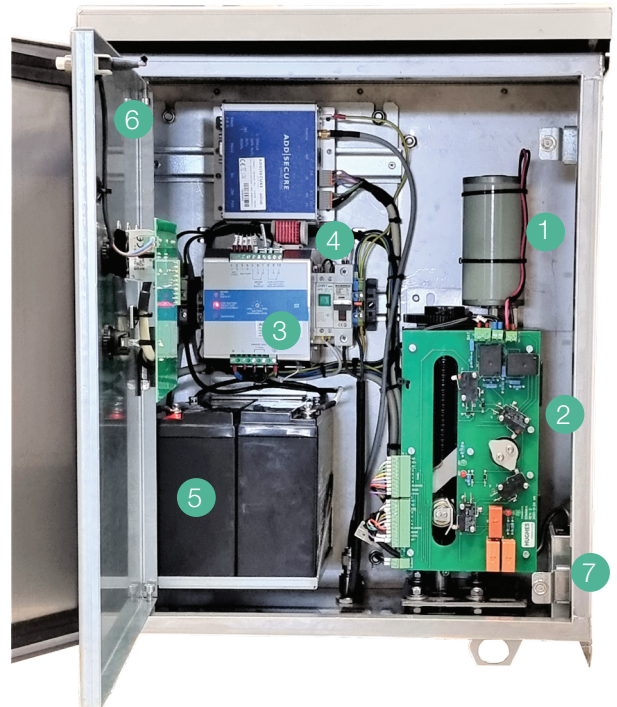
Bottom view

GENERAL DESCRIPTION

TVS150 / EOA501TVS COMPONENTS

Hughes TVS150 control cabinet / EOA501TVS motor drive with auto sectionalizing has the following components:

- Wide body cabinet;
- EOA501 motor mechanism (1)
(applicable for EOA501TVS only);
- Motor control board (2)
(applicable for EOA501TVS only);
- Local control panel;
- Temperature compensated battery charger (UPS)
(3);
- MCB's for input power and battery (4);
- Start button for UPS;
- Batteries AGM type 2 x 12V 20 AH (5);
- Internal ventilation system with special filter (6);
- Heating system (7);



GIO200

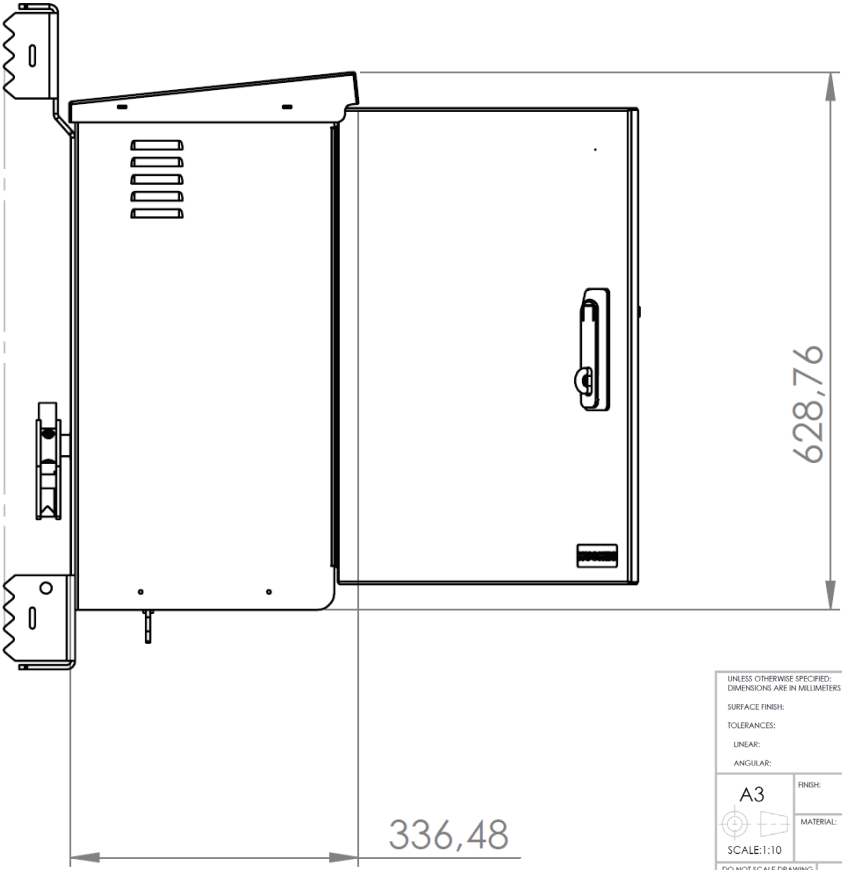
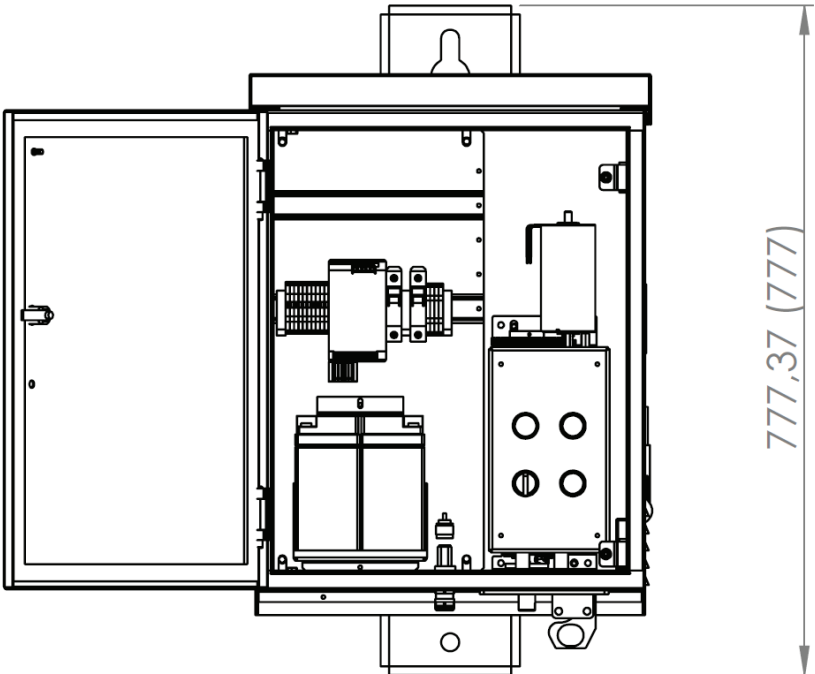


LI-Ion battery battery

OPTIONAL COMPONENTS

- Lightning protection for the antenna connector;
- Li-Ion batteries for high temperature climate zones, 2 x 12.8 V 20 AH;
- Input power (110 or 230V) surge arresters;
- Communication unit option A: GIO-100 GSM/4G/ LAN Router with IEC60870-5-104 signalling protocol and IPsec encryption and IP filtering;
- Communication unit option B: GIO-200 GSM/4G/ LAN Router with IEC60870-5-104 signalling protocol and IPsec and Open VPN encryption and IP filtering;

DRAWINGS



UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN MILLIMETERS SURFACE FINISH: TOLERANCES: LINEAR: ANGULAR:		DATE: 2019-10-16	HUGHES
		Revision	
A3		Title: EOA 501R - No Inner Door	Part No: EOA_501R_2000
SCALE: 1:10		DWG NO: D_EOA_501R_NoDoor	
DO NOT SCALE DRAWING		WEIGHT:	SHEET 1 OF 1

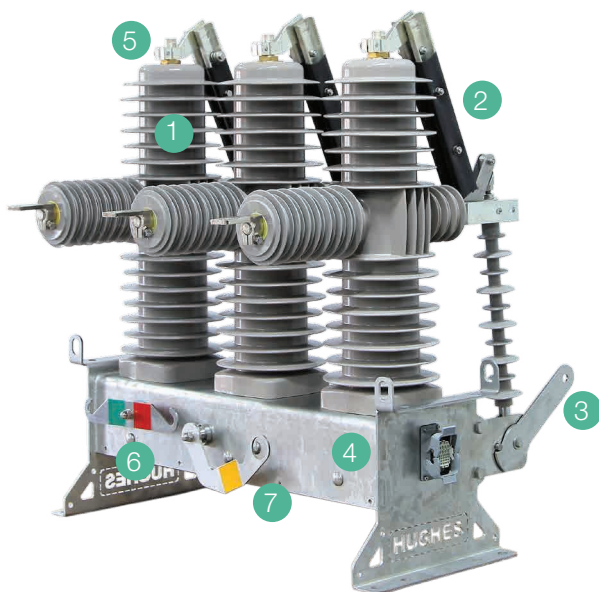
TVS120 / 121 FOR 6/15KV

TVS120 SET COMPONENTS

TVS120 model for 6/12kV has a built in disconnecter which gives visible open points for extra personal safety of the maintenance staff.

Hughes **TVS120** time-voltage sectionalizer set includes:

- **LBS120** (1) vacuum load break switch (optional);
- **TVS150** (2) control cabinet (compulsory);
- Interconnecting cable (3) (optional);
- Built in components (optional);
- External accessories (4) (optional);



LBS120 COMPONENTS

Hughes **LBS120** load break switch for 6/12kV has the following components:

- **12kV bushings** (1) of epoxy with silicone surface;
- Integrated and synchronized **disconnecter** (2) with visible open points on all 3-phases;
- **Attachment points** (3) for down pole mounted disconnecter operation handle;
- **Frame** (4) made of 5 and 4mm stainless steel to eliminate corrosion;
- **Electrical circuit** (5) made of high grade copper;
- **Manual maneuvering** (6) of vacuum interrupter;
- **Spring stored energy operating mechanism** (7);

Optional components:

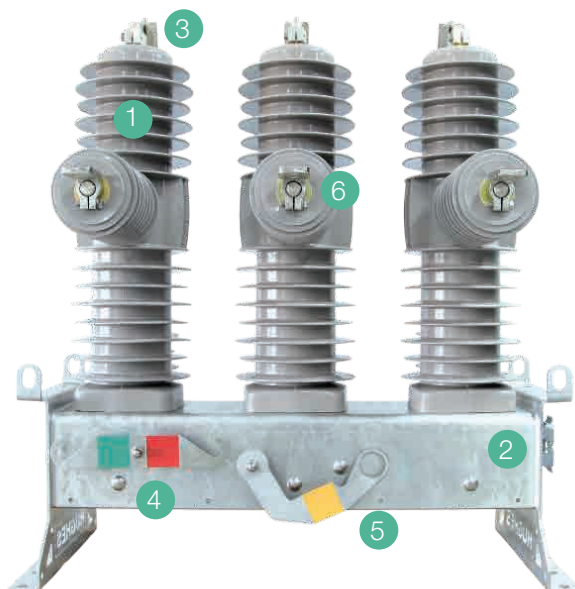
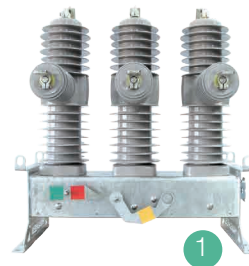
- **1 set of voltage sensors** (6) on load side;

TVS121 SET COMPONENTS

TVS121 model for 6/15kV has an extra insulation level which makes it very effective in the areas with multiple lightning strikes.

Hughes **TVS121** time-voltage sectionalizer set includes:

- **LBS121** (1) vacuum load break switch (optional);
- **TVS150** (2) control cabinet (compulsory);
- Interconnecting cable (3) (optional);
- Built in components (optional);
- External accessories (4) (optional);



LBS121 COMPONENTS

Hughes **LBS121** load break switch for 6/15kV has the following components:

- **27kV bushings** (1) of epoxy with silicone surface;
- **Attachment points** for down pole mounted disconnecter operation handle;
- **Frame** (2) made of 5 and 4mm stainless steel to eliminate corrosion;
- **Electrical circuit** (3) made of high grade copper;
- **Manual maneuvering** (4) of vacuum interrupter;
- **Spring stored energy operating mechanism** (5);

Optional components:

- **1 set of voltage sensors** (6) on feed side;

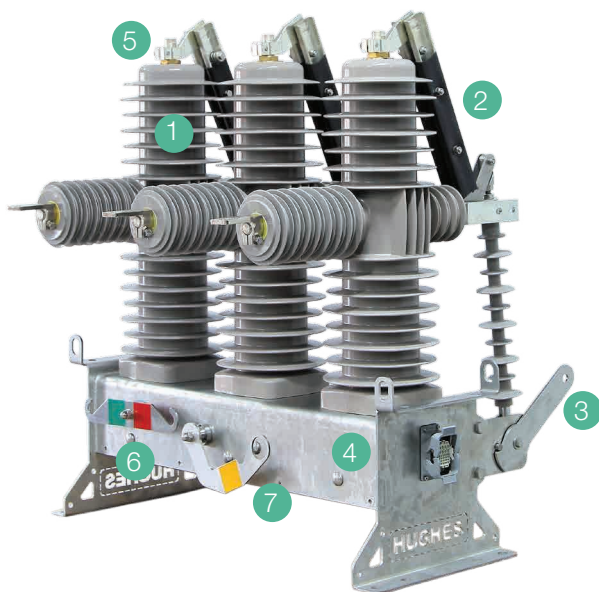
TVS240 / 241 FOR 22/27KV

TVS240 SET COMPONENTS

TVS240 model for 22/27kV has a built in disconnecter which gives visible open points for extra personal safety of the maintenance staff.

Hughes **TVS240** time-voltage sectionalizer set includes:

- **LBS240** (1) vacuum load break switch (optional);
- **TVS150** (2) control cabinet (compulsory);
- Interconnecting cable (3) (optional);
- Built in components (optional);
- External accessories (4) (optional);



LBS240 COMPONENTS

Hughes **LBS240** load break switch for 22/27kV has the following components:

- **24kV bushings** (1) of epoxy with silicone surface;
- Integrated and synchronized **disconnecter** (2) with visible open points on all 3-phases;
- **Attachment points** (3) for down pole mounted disconnecter operation handle;
- **Frame** (4) made of 5 and 4mm stainless steel to eliminate corrosion;
- **Electrical circuit** (5) made of high grade copper;
- **Manual maneuvering** (6) of vacuum interrupter;
- **Spring stored energy operating mechanism** (7);

Optional components:

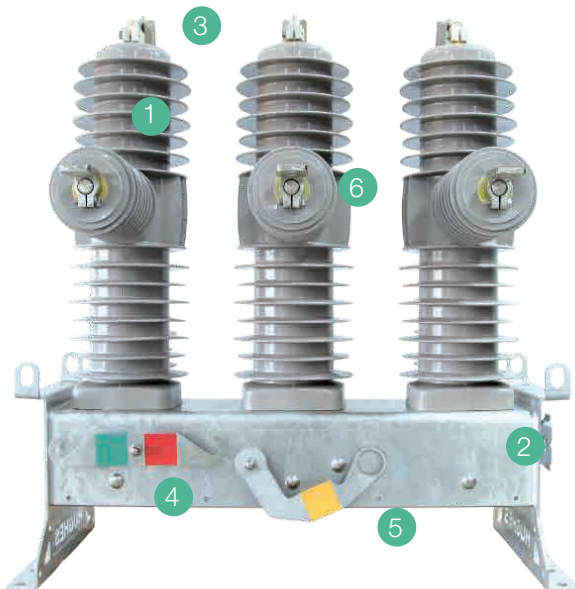
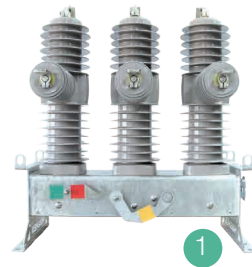
- **1 set of voltage sensors** (6) on load side;

TVS241 SET COMPONENTS

TVS241 model for 22/27kV has an extra insulation level which makes it very effective in the areas with multiple lightning strikes.

Hughes **TVS241** time-voltage sectionalizer set includes:

- **LBS241** (1) vacuum load break switch (optional);
- **TVS150** (2) control cabinet (compulsory);
- Interconnecting cable (3) (optional);
- Built in components (optional);
- External accessories (4) (optional);



LBS241 COMPONENTS

Hughes **LBS241** load break switch for 22/27kV has the following components:

- **27kV bushings** (1) of epoxy with silicone surface;
- **Attachment points** for down pole mounted disconnect operation handle;
- **Frame** (2) made of 5 and 4mm stainless steel to eliminate corrosion;
- **Electrical circuit** (3) made of high grade copper;
- **Manual maneuvering** (4) of vacuum interrupter;
- **Spring stored energy operating mechanism** (5);

Optional components:

- **1 set of voltage sensors** (6) can be installed on feed side;

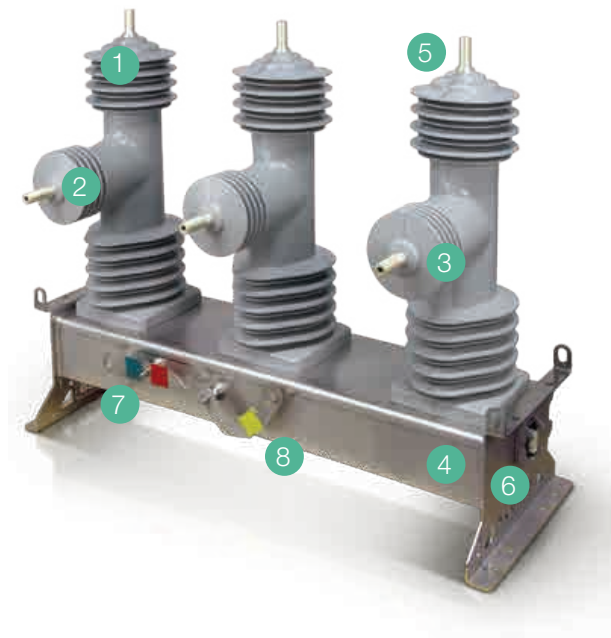
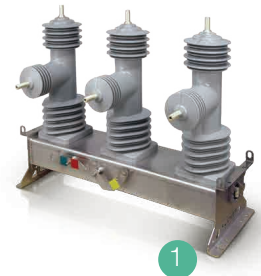
TVS405 FOR 33/40kV

TVS405 SET COMPONENTS

TVS405 model for 33/40kV has a long creep distance to ground and heavy duty vacuum interrupter, which makes it very effective in the areas with multiple high current faults.

Hughes **TVS405** time-voltage sectionalizer set includes:

- **LBS405** (1) vacuum load break switch (optional);
- **TVS150** (2) control cabinet (compulsory);
- Interconnecting cable (3) (optional);
- Built in components (optional);
- External accessories (4) (optional);



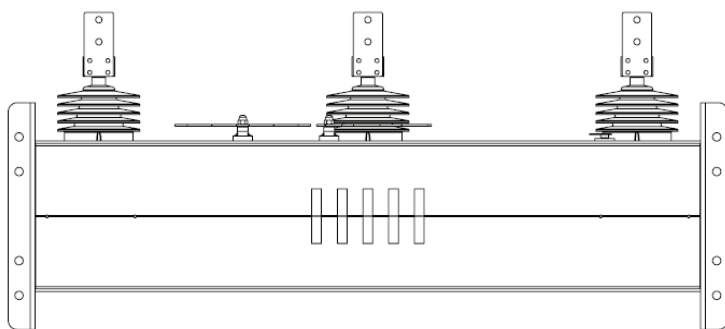
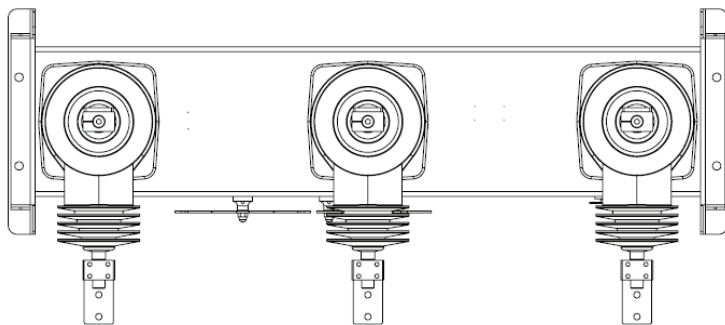
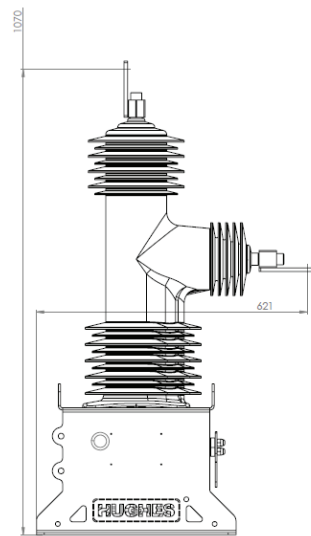
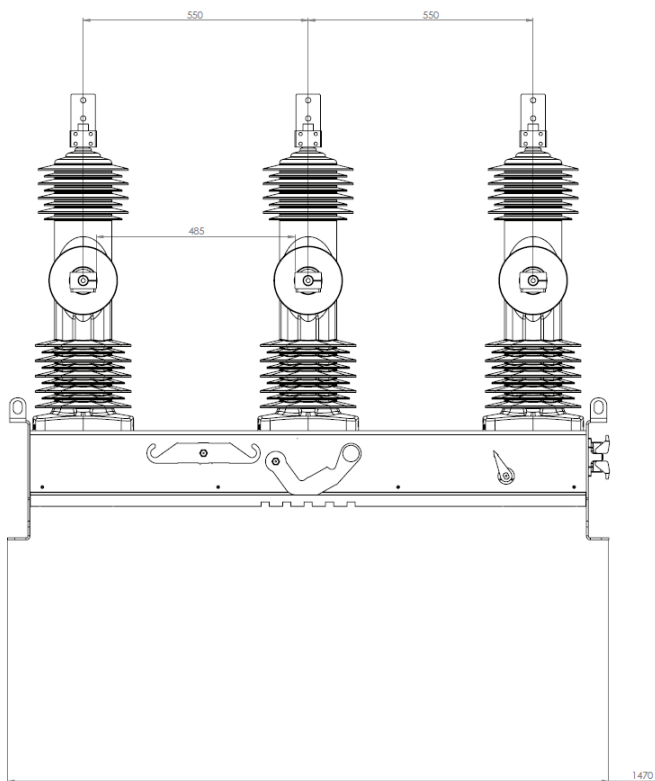
LBS405 COMPONENTS

Hughes **LBS405** load break switch for 33/40kV has the following components:

- **ABB VG10 2000A/20kA 40.5kV** vacuum interrupter (1);
- Integrated 3x **phase current transformers** (2);
- Integrated **voltage sensors** (3);
- **Frame** (4) made of 5 and 4mm stainless steel to eliminate corrosion;
- **Electrical circuit** (5) made of high grade copper;
- **IP67** Control cable contact (6);
- **Manual maneuvering** (7) of vacuum interrupter;
- **Spring stored energy operating mechanism** (8);

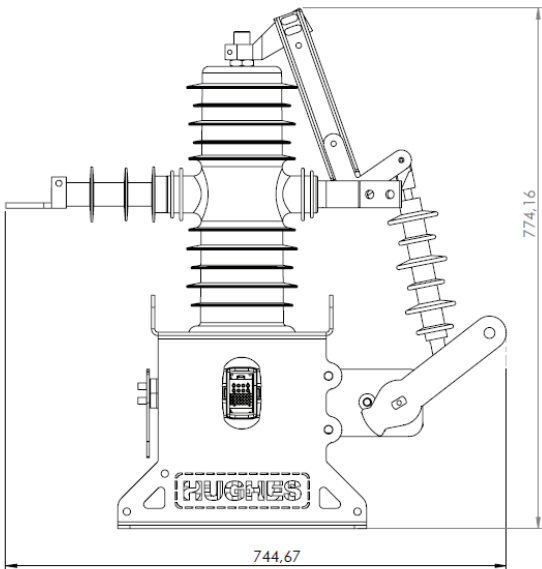
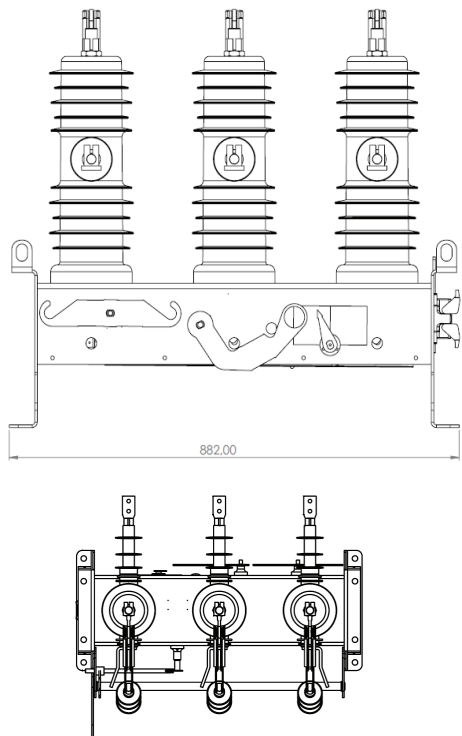
DRAWINGS

TVS405

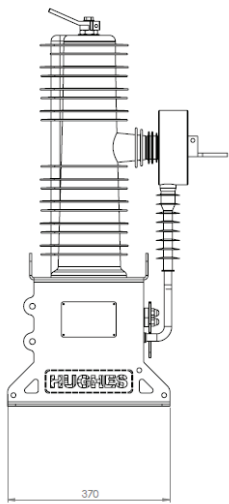
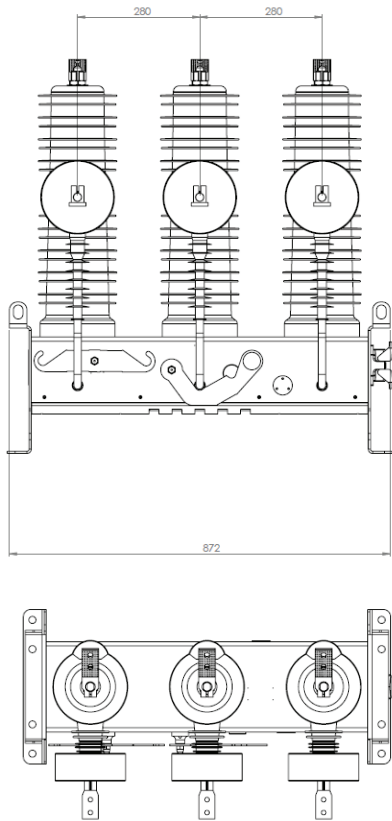


DRAWINGS

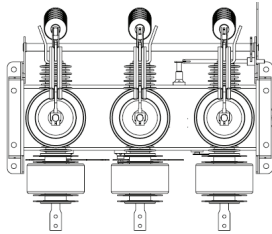
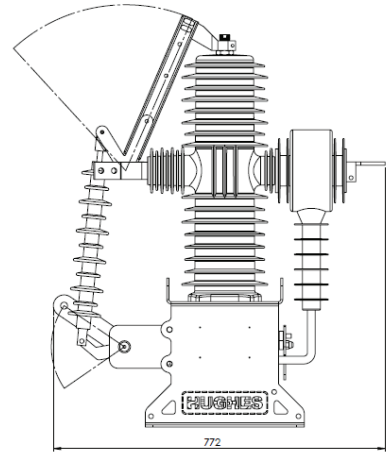
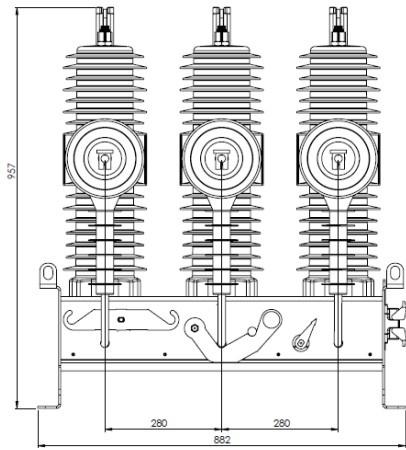
LBS120



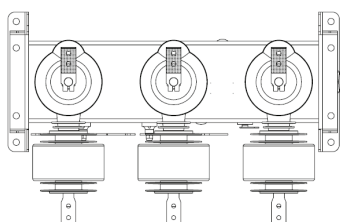
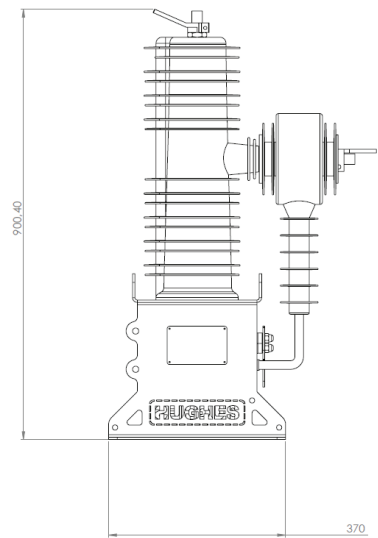
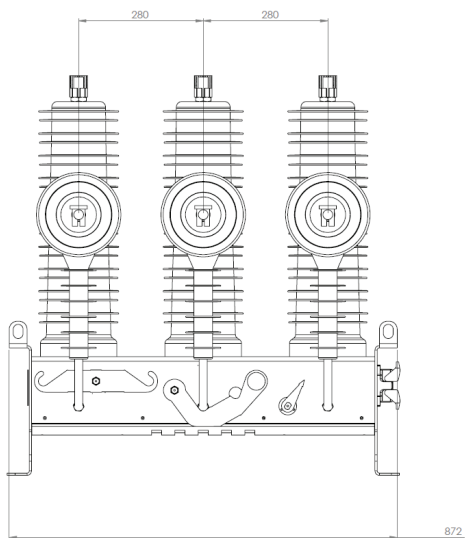
LBS121



LBS240

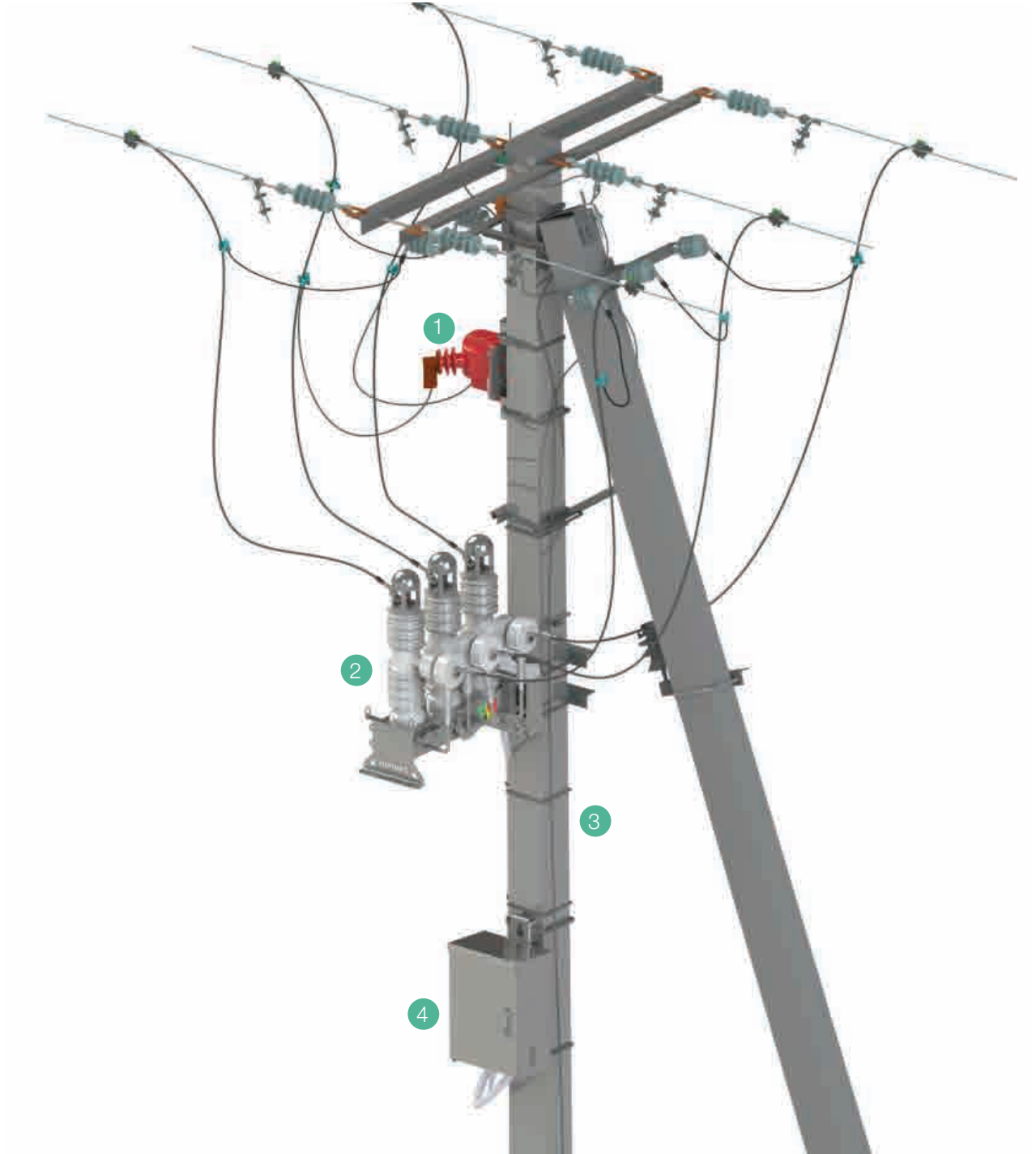


LBS241



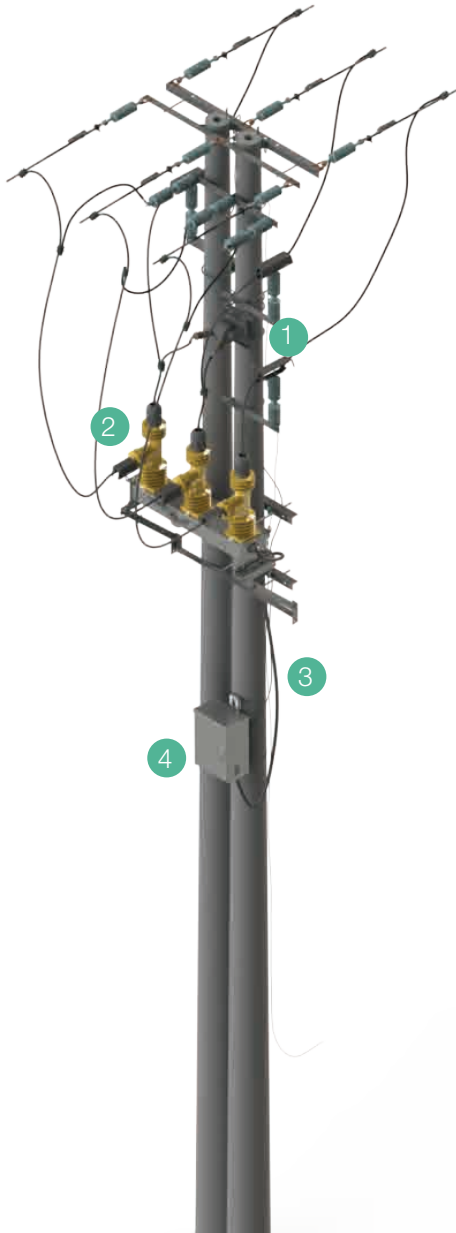
INSTALLATIONS

TVS120/121, TVS240/241

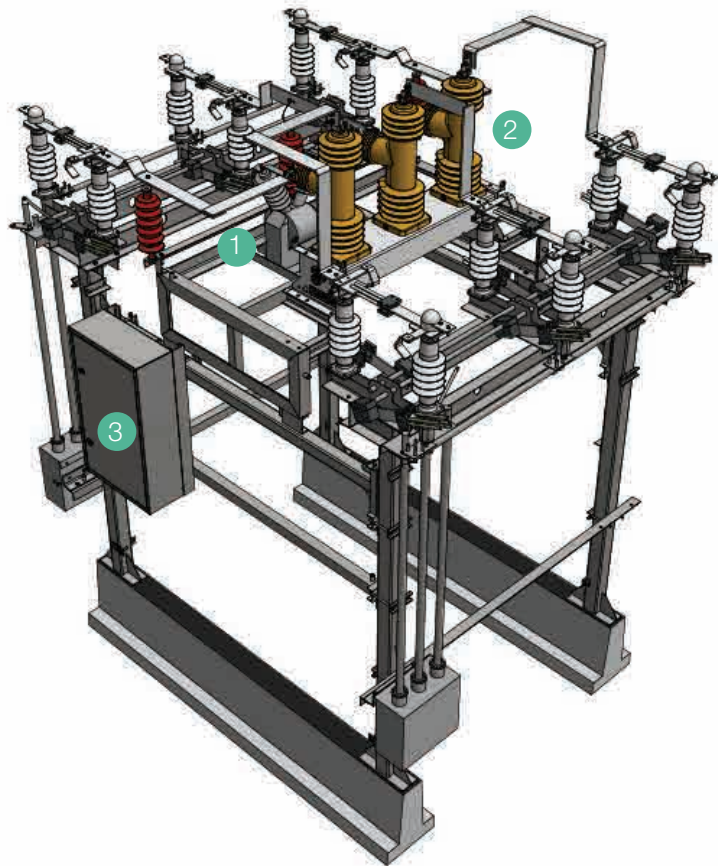


- Voltage transformer (1)
- Vacuum load break switch (2)
- Interconnecting cable (3)
- Control cabinet (4)

TVS405



- Voltage transformer (1)
- Vacuum load break switch (2)
- Interconnecting cable (3)
- Control cabinet (4)



Installation of the TVS450 set inside of a sectionalizing scheme.

- Voltage transformer (1)
- Vacuum load break switch (2)
- Control cabinet (3)

ADDITIONAL ACCESSORIES

NEW! FOR TVS150 CONTROL CABINET GROUNDING SYSTEM CABLE THEFT ALARM

Grounding system cable theft alarm is an optional accessory that notifies SCADA system if the grounding system is missing or damaged.

It is installed inside a control cabinet and is suitable for all Hughes pole mounted products, such as:

- motor drives;
- overhead line and kiosk reclosers' protection relay cabinets;
- control cabinets for sectionalizers;
- control cabinets for vacuum circuit breakers or load break switches.



Installation in the motor drive cabinet

INDICATORS AND BUTTONS

When a ground wire of a control cabinet is cut, the red LED button is activated, and an immediate notification is sent to a SCADA system.

- The accessory has 3 indicators and one test button:
- POWER - on with a constant blue LED indicator;
- OK - with green LED displaying that ground system is normal;
- ALARM - with red LED displaying that the ground wire is cut;
- Test button - for testing the operation of the device;



PURPOSES

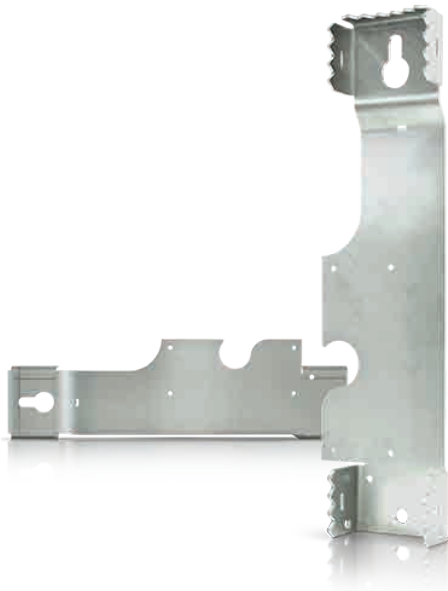
The alarm is in high demand in regions with a big number of copper cable thefts.

The theft alarm purposes are:

- to receive immediate notification that the grounding system is missing;
- to help to prevent big electrical hazardous risks for the operator or public;
- to avoid receiving false measuring information from the remote device;
- to make it possible to repair the grounding system in the shortest time;

ADDITIONAL ACCESSORIES

FOR TVS150 CONTROL CABINET, EOA501TVS MOTOR DRIVE



TVS150, EOA501TVS mounting bracket



Phase to phase connected, epoxy insulated voltage transformer 11/0.11kV



Drop out fuses, silicone insulated, 15kV 3A



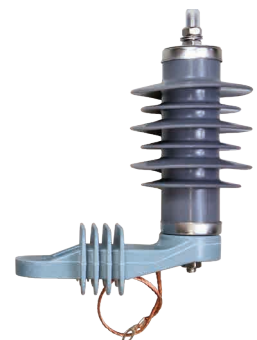
Phase to phase connected, epoxy insulated voltage transformer 24/0.11kV



Drop out fuses, silicone insulated, 38kV 3A



Phase to phase connected, epoxy insulated voltage transformer 33/0.11kV



Surge arresters silicone insulated, 22kV



LBS mounting bracket



Phase to ground connected, epoxy insulated voltage transformer 19/0.11kV



Surge arresters silicone insulated, 33kV



Modem – Router G100



Modem – Router G200



Antenna for GSM/4G



Pole mounted bracket for antenna



Surge arresters for antenna
N-N connectors



Antenna cable (3) 8M RG-213 N-N
professional connectors;



Standard lead acid AGM type battery 12 V 20 AH;



Modem – Router G200 Li-Ion batteries for hot climate
with LiFePO₄ chemical system 12.8V 20 AH

TECHNICAL DATA

CHARACTERISTICS	TVS150 control cabinet	EOA501TVS motor drive
Dimensions (mm)	Wide body version 630 x 465 x 336 (HxWxD), multiple formats, custom fit	Wide body version 630 x 465 x 336 (HxWxD), multiple formats, custom fit
Weight (kg)	46 (including batteries)	46 (including batteries)
Operating temperature (°C)	-50 ... +60 Optional -10...+80	-50 ... +60 Optional -10...+80
Enclosure	IP55-65, non-magnetic stainless steel, optional painted in RAL or ANSI colour	IP55-65, non-magnetic stainless steel, optional painted in RAL or ANSI colour
Climate system	35 W PTC element	35 W PTC element
Thermostat (°C)	on at 5°C off at 15°C	on at 5°C off at 15°C
Linear speed	NA	160mm in max 2.5 seconds
Linear force	NA	2.5 – 4kN
Stroke	NA	160, 180, 200, 220 and 240mm
Motor	NA	24Vdc 150 or 250W
Motor type	NA	Neodymium magnetized DC
Operation voltage	90– 250VAC 240 W, temperature compensation;	90– 250VAC 240 W, temperature compensation;
Batteries	2 x 12 V 22 Ah AGM Lead cell	2 x 12 V 22 Ah AGM Lead cell
Battery optional	2 x 12.8 V, 22 AH Li-Ion	2 x 12.8 V, 22 AH Li-Ion
Control interface	Parallel - Modbus	Parallel - Modbus
Signalling protocols, optional	IEC60870-5-104, DNP3, Modbus	IEC60870-5-104, DNP3, Modbus
Communication interface, optional	RS-232/485, 10/100Mbit TP(Ethernet), GSM/4G	RS-232/485, 10/100Mbit TP(Ethernet), GSM/4G
Tests	• EN 60068-2-1 • EN 60068-2-2 • EN 60068-2-30 • EN 60068-2-52 • EN 60068-2-78 • EN 62271-102 6.103 • EN 62271-102 6.104 • EN 62271-102 6.105 • EN 60265	• EN 60068-2-1 • EN 60068-2-2 • EN 60068-2-30 • EN 60068-2-52 • EN 60068-2-78 • EN 62271-102 6.103 • EN 62271-102 6.104 • EN 62271-102 6.105 • EN 60265

CHARACTERISTICS	LBS120 / 121 for 6/15kV	LBS240 / 241 for 22/27kV	LBS405 for 33/40kV
Dimensions LxWxH (mm)	882x745x775 / 872x370x902	882x772x957 / 872x370x900	1470x621x1070
Mass (weight) without air break switch - kg (lbs)	75 (165) / 75 (165)	101 (222) / 101 (222)	155 (342)
Mass (weight) with disconnecter - kg (lbs)	98 (216) / NA	125 (275) / NA	NA
Operating temperature (°C)	-45 - +70 / -45 - +70	-45 - +70 / -45 - +70	-45 - +70
Humidity	100% at 25C / 100% at 25C	100% at 25C / 100% at 25C	100% at 25C / 100% at 25C
Enclosure	IP55-65, non-magnetic stainless steel, optional painted in RAL or ANSI colour	IP55-65, non-magnetic stainless steel, optional painted in RAL or ANSI colour	IP55-65, non-magnetic stainless steel, optional painted in RAL or ANSI colour
Bushing type	Epoxy core with silicone surface	Epoxy core with silicone surface	Hydrophobic Cycloaliphatic Epoxy (HCEP)
Phase to phase distance	280mm / 280mm	280mm / 280mm	550mm
Creep distance to ground (airbreak switch isolator)	400mm	725mm	
Creep distance to ground (interruptor isolator)	460mm / 1090mm	960mm / 1090mm	1310mm
Max installation altitude at rated BIL	3000m / 3000m	3000m / 3000m	3000m
Rated operation voltage	24-48-110VDC	24-48-110VDC	24-48-110 VDC
Rated maximum voltage	12kV / 15kV	24kV / 27kV	38kV / 40kV
Rated basic impulse level, P>P	85kV / 85kV	145kV / 145kV	185kV
Rated basic impulse level, P>E	75kV / 75kV	125kV / 125kV	170kV
Power frequency withstand, Dry	60kV / 60kV	60kV / 60kV	70kV
Power frequency withstand, Wet	45kV / 45kV	50kV / 50kV	60kV
Rated continuous current	630A / 1250A	630A / 1250A	1200A
Rated fault peak current	50kA / 50kA	50kA / 50kA	42kA
Rated fault breaking current	20kA / 20 kA	20kA / 20 kA	16kA
Cable charging current	20A / 40A	20A / 40A	40A
Line charging current	5A / 10A	5A / 10A	5A
Rated fault duration time	3s / 3s	3s / 3s	3s
Contact resistance, VCB	< 35μΩ / <35 μΩ	< 35μΩ / <35 μΩ	< 40μΩ
Contact resistance, ABI	< 60μΩ	< 60μΩ	
Network frequency	50/60Hz / 50/60Hz	50/60Hz / 50/60Hz	50/60Hz / 50/60Hz
Design min mechanical/electrical	20.000 / 20.000	20.000 / 20.000	20.000 / 20.000
Rated power	40W / 40W	40W / 40W	40W
Design specification	IEC 62271-100	IEC 62271-100	IEC 62271-100
Marking specification	IEEE std C37.60	IEEE std C37.60	IEEE std C37.60
Operation sequence, no charge	25ms trip - 50ms close - 25ms trip	25ms trip - 50ms close - 25ms trip	25ms trip - 50ms close - 25ms trip



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

