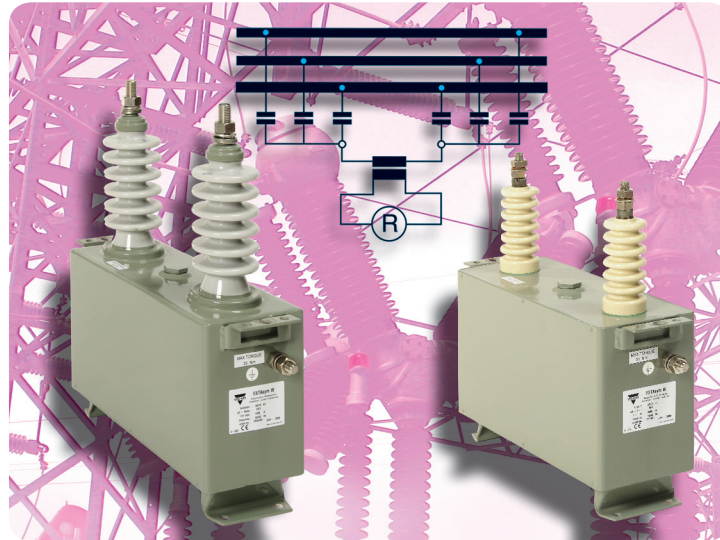


ESTAsym W Unbalance Monitoring



APPLICATION

When a short circuit occurs in the winding element of a capacitor unit, gas can form, causing the capacitor case to swell and eventually burst if left uncontrolled.

A protection relay can be used to detect such faults well in advance. The relay compares the star points of two parallel star connected capacitor arrangements. As soon as there is a voltage shift in one of the star points, an unbalanced current will flow between the two star points. The protection relay can be configured to indicate the fault and disconnect the faulty capacitors when this tripping current goes over a predetermined value.

Capacitor banks arranged in a bridge circuit can also be controlled by the ESTAsym W, which in such cases is connected in the midpoint of the bridge (Fig. 2).

The combination of an ESTAsym W and ESTAsym Relay can recognize winding element failure early on and disconnect the capacitor bank before any significant damage occurs.

RESOURCES

- For technical questions contact esta@vishay.com



Setting of Tripping Value

The choice of the appropriate tripping value for the unbalanced current depends on how the capacitors are connected internally and upon the external arrangement of the capacitor bank. Factory recommendations for alarm and/or tripping values as well as time delays are included in the contractual documentation supplied with each capacitor bank at time of delivery.

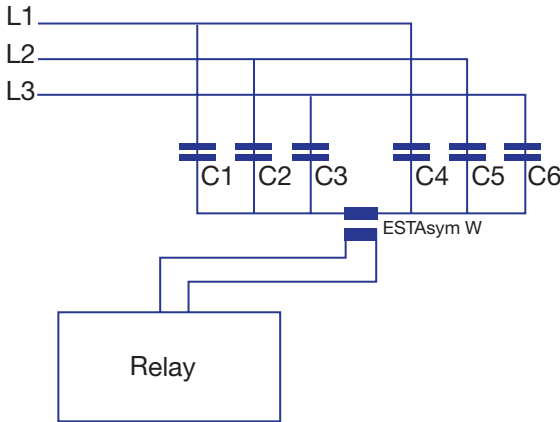


Fig. 1 Double star connection

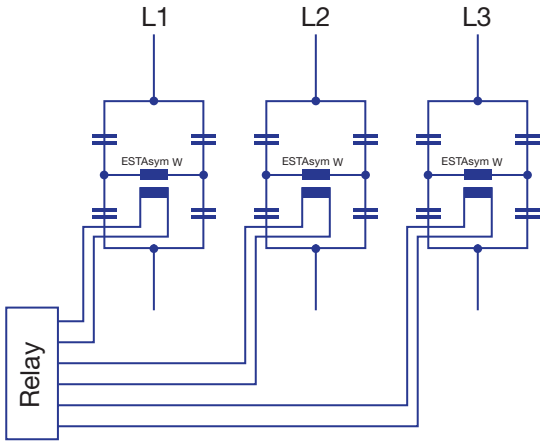


Fig. 2 Bridge connection

Factory Tests

Because the ESTAsym W is intended exclusively to protect capacitor banks, we use the testing voltages specified by the IEC 60871 standard for capacitors in performing our insulation test for the ESTAsym W. This means that on the basis of insulation class 12 kV or 17.5 kV the primary sides are tested to the secondary side/housing with 28 kV AC/10 s or 38 kV AC/10 s respectively. The test of the secondary side to the housing is made with a voltage of 2.5 kV AC for 10 s.

Testing the ESTAsym W for Proper Functioning

For reliable operation, we recommend a regular examination of the complete capacitor protection set-up. The operation of the alarm and trip levels for the protection circuits are best confirmed through primary current injection of the ESTAsym W. Following an alarm or trip operation, the capacitor bank should only be re-energized after it has been thoroughly inspected.

Rated Primary Current:

5 A – 10 A – 25 A – 50 A

Rated Secondary Current:

1 A

Accuracy Class:

Class 1

VA-Rating:

1.5 VA

Maximum Overload:

200 A / 1 s

Frequency:

50 Hz / 60Hz

Temperature:

- 30 °C / 65 °C

Insulation Level:

12 kV (28 kV / 75 kV)
17.5 kV (38 kV / 95 kV)

Installation:

Available for indoor (Fig. 3) and outdoor (Fig. 4) mounting

Protection Level:

Protection level IP00, specially designed to fit capacitor bank assemblies with IP55 terminal cover

Fig. 3 Indoor type with bushing D-199

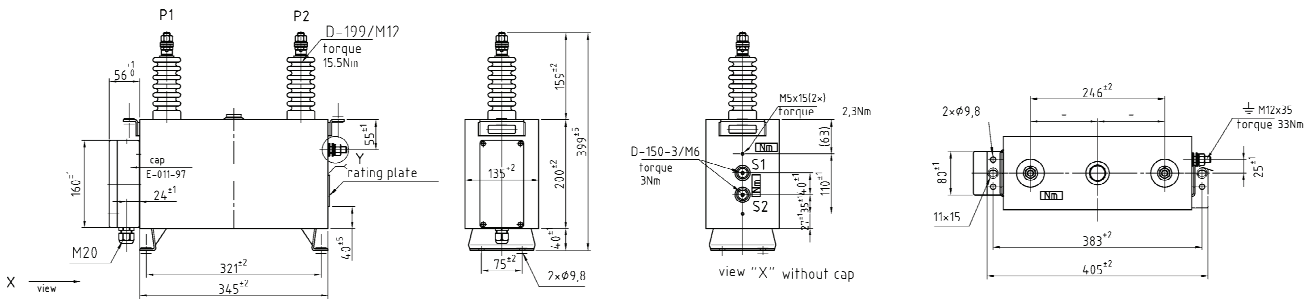
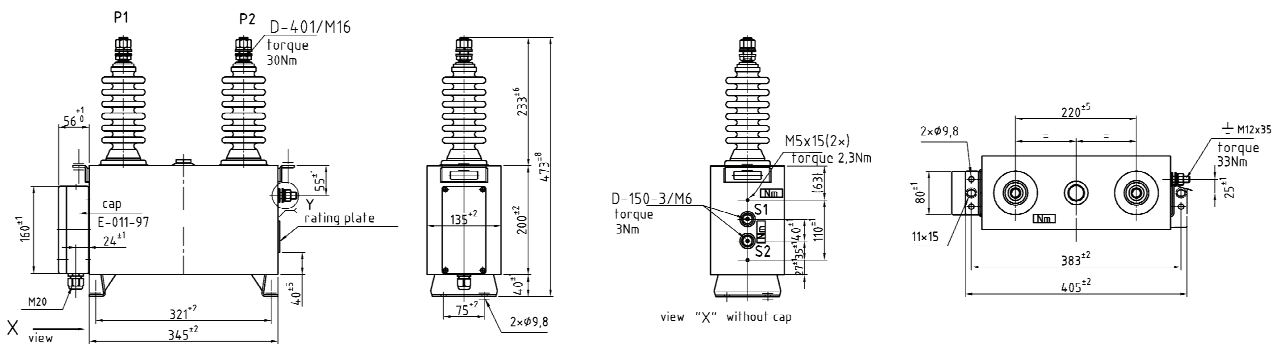


Fig. 4 Outdoor type with bushing D-401





SEMICONDUCTORS

MOSFETs Segment

MOSFETs

- Low-Voltage TrenchFET® Power MOSFETs
- Medium-Voltage Power MOSFETs
- High-Voltage Planar MOSFETs
- High-Voltage Superjunction MOSFETs
- Automotive-Grade MOSFETs

ICs

- VRPower® DrMOS Integrated Power Stages
- Power Management and Power Control ICs
- Smart Load Switches
- Analog Switches and Multiplexers

Diodes Segment

Rectifiers

- Schottky Rectifiers
- Ultra-Fast Recovery Rectifiers
- Standard and Fast Recovery Rectifiers
- High-Power Rectifiers/Diodes
- Bridge Rectifiers

Small-Signal Diodes

- Schottky and Switching Diodes
- Zener Diodes
- RF PIN Diodes

Protection Diodes

- TVS Diodes or TRANSZORB® (unidirectional, bidirectional)
- ESD Protection Diodes (including arrays)

Thyristors/SCRs

- Phase-Control Thyristors
- Fast Thyristors

IGBTs

- Field Stop Trench
- Punch-Through Trench

Power Modules

- Input Modules (diodes and thyristors)
- Output and Switching Modules (contain MOSFETs, IGBTs, and diodes)
- Custom Modules

Optoelectronic Components Segment

Infrared Emitters and Detectors

Optical Sensors

- Proximity
- Ambient light
- Light Index (RGBW, UV, IR)
- Humidity
- Quadrant Sensors
- Transmissive
- Reflective

Infrared Remote Control Receivers

Optocouplers

- Phototransistor, Photodarlington
- Linear
- Phototriac
- High-Speed
- IGBT and MOSFET Driver

Solid-State Relays

LEDs and 7-Segment Displays

Infrared Data Transceiver Modules

Custom Products

PASSIVE COMPONENTS

Resistors and Inductors Segment

Film Resistors

- Metal Film Resistors
- Thin Film Resistors
- Thick Film Resistors
- Power Thick Film Resistors
- Metal Oxide Film Resistors
- Carbon Film Resistors

Wirewound Resistors

- Vitreous, Cemented, and Housed Resistors
- Braking and Neutral Grounding Resistors
- Custom Load Banks

Power Metal Strip® Resistors

Battery Management Shunts

Crowbar and Steel Blade Resistors

Thermo Fuses

Chip Fuses

Pyrotechnic Initiators / Igniters

Variable Resistors

- Cermet Variable Resistors
- Wirewound Variable Resistors
- Conductive Plastic Variable Resistors
- Contactless Potentiometers
- Hall Effect Position Sensors
- Precision Magnetic Encoders

Networks/Arrays

Non-Linear Resistors

- NTC Thermistors
- PTC Thermistors
- Thin Film RTDs
- Varistors

Magnetics

- Inductors
- Wireless Charging Coils
- Planar Devices
- Transformers
- Custom Magnetics

Connectors

Capacitors Segment

Tantalum Capacitors

- Molded Chip Tantalum Capacitors
- Molded Chip Polymer Tantalum Capacitors
- Coated Chip Tantalum Capacitors
- Solid Through-Hole Tantalum Capacitors
- Wet Tantalum Capacitors

Ceramic Capacitors

- Multilayer Chip Capacitors
- Disc Capacitors
- Multilayer Chip RF Capacitors
- Chip Antennas
- Thin Film Capacitors

Film Capacitors

Power Capacitors

Heavy-Current Capacitors

Aluminum Electrolytic Capacitors

ENYCAP™ Energy Storage Capacitors