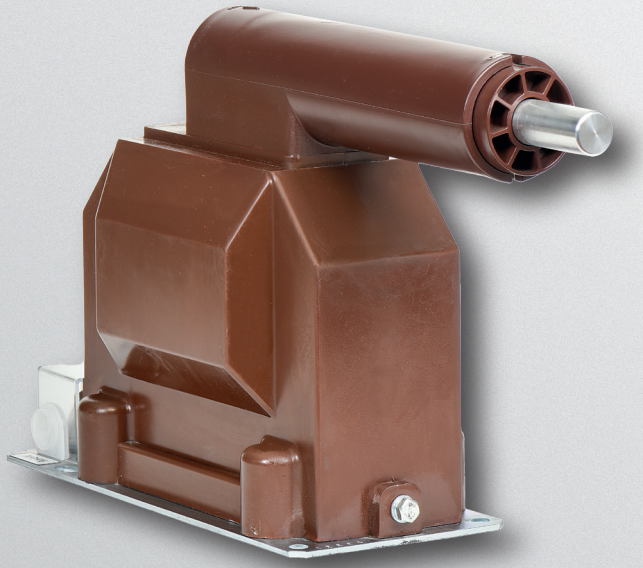
ALCE

TRANSFORMING
SUPPORTING


# INSTRUMENT TRANSFORMERS

- Indoor Types
- Outdoor Types



# INDOOR TYPE INSTRUMENT TRANSFORMERS

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| | Type | Um (kV) | Page |
|---|---|---|---|
|  | 2VK36<br>DOUBLE POLE<br>VOLTAGE TRANSFORMERS | 36 kV | 20 |
|  | VBF12-FE / VBF12-FS<br>SINGLE POLE<br>VOLTAGE TRANSFORMERS WITH FUSE<br>(WITHDRAWABLE) | 17,5 kV | 21 |
|  | VBF24-FE / VBF24-FS<br>SINGLE POLE<br>VOLTAGE TRANSFORMERS WITH FUSE<br>(WITHDRAWABLE) | 24 kV | 22 |
|  | VBF36-FE / VBF36-FS<br>SINGLE POLE<br>VOLTAGE TRANSFORMERS WITH FUSE<br>(WITHDRAWABLE) | 36 kV | 23 |

## OUTDOOR TYPE INSTRUMENT TRANSFORMERS

| | | | |
|---|---|---|---|
|  | AH17<br>CURRENT TRANSFORMERS | 17,5 kV | 25 |
|  | AH24<br>CURRENT TRANSFORMERS | 24 kV | 26 |
|  | A32H<br>CURRENT TRANSFORMERS | 36 kV | 27 |
|  | VH17<br>SINGLE POLE<br>VOLTAGE TRANSFORMERS | 17,5 kV | 28 |
|  | VH24<br>SINGLE POLE<br>VOLTAGE TRANSFORMERS | 24 kV | 29 |
|  | VH36<br>SINGLE POLE<br>VOLTAGE TRANSFORMERS | 36 kV | 30 |
|  | 2VH24<br>DOUBLE POLE<br>VOLTAGE TRANSFORMERS | 24 kV | 31 |
|  | 2VH36<br>DOUBLE POLE<br>VOLTAGE TRANSFORMERS | 36 kV | 32 |

Instrument Transformers: An instrument transformer is a piece of electrical equipment which converts primary electrical values current or voltage-into comparable secondary values which are suitable for the devices to which it is connected. They are defined in two kinds;

Current transformers convert primary rated current to a proper current level (1A...5A) which can be used by metering or protection devices. They can have several secondary windings with magnetically separated cores of the same or different characteristics.

Voltage Transformers, isolate the primary - side rated voltage from the connected instruments and protection circuits and convert the primary voltage into a measurable secondary voltage which is true in magnitude and phase.

**Extended Current Rating;**

It is the value that Current Transformer can withstand at defined current value while remaining in the limits of current error. As described in IEC 61869-2, Standard values of rated primary current 120%, 150% and 200% of primary current.

**Limits of current error and phase displacement for measuring current transformers**

As described IEC 61869-2;

For classes 0.1 – 0.2 – 0.5 and 1, the current error and phase displacement at rated frequency shall not exceed the values given in table when the secondary burden is any value from 25 % to 100 % of the rated burden.

For classes 0,2 S and 0,5 S the current error and phase displacement at the rated frequency shall not exceed the values given in table when the secondary burden is any value from 25 % and 100 % of the rated burden.

| **Limits of current error and phase displacement according to IEC 61869-2** | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Accuracy Class** | **± percentage of current error at percentage of rated current** | | | | | **± phase displacement in minutes at percentage of rated current** | | | | |
| | **1** | **5** | **20** | **100** | **120** | **1** | **5** | **20** | **100** | **120** |
| Measuring Current Transformers | | | | | | | | | | |
| 0,1 | - | 0,4 | 0,2 | 0,1 | 0,1 | - | 15 | 8 | 5 | 5 |
| 0,2S | 0,75 | 0,35 | 0,2 | 0,2 | 0,2 | 30 | 15 | 10 | 10 | 10 |
| 0,2 | - | 0,75 | 0,35 | 0,2 | 0,2 | - | 30 | 15 | 10 | 10 |
| 0,5S | 1,5 | 0,75 | 0,5 | 0,5 | 0,5 | 90 | 45 | 30 | 30 | 30 |
| 0,5 | - | 1,5 | 0,75 | 0,5 | 0,5 | - | 90 | 45 | 30 | 30 |
| 1 | - | 3 | 1,5 | 1 | 1 | - | 180 | 90 | 60 | 60 |
| Protective Current Transformers | | | | | | | | | | |
| 5P | - | - | - | 1 | - | - | - | - | 60 | - |
| 10P | - | - | - | 3 | - | - | - | - | - | - |

# OPERATION CONDITIONS FOR CURRENT TRANSFORMERS

1. When the secondary terminals are connected to the measuring or protection devices, one of the terminals should be earthed for safety as seen in **FIGURE CT-1**

2. The secondary circuit of a current transformer must not be operated open-circuited

3. The secondary winding of a current transformer which will not be used must always be short-circuited and earthed as seen in **FIGURE CT-2**

4. For the transformer with reconnectable and/or tapped secondaries, unused terminals must be left open as seen in **FIGURE CT-3**

5.The current transformers which have capacitive divider tap (Ck) must be connected to the indicator. If the tap will not be used then it must be earthed as seen in **FIGURE CT-4**

6.The primary reconnection can only be used for primary currents up to 2 x 600A and for current transformers. The ratio of the reconnection have to be always 1:2.

For primary reconnection, the primary winding consists of two winding parts (P1-C2 & C1-P2) which can either be connected in series or parallel. **FIGURE CT-5**

**FIGURE CT-1**

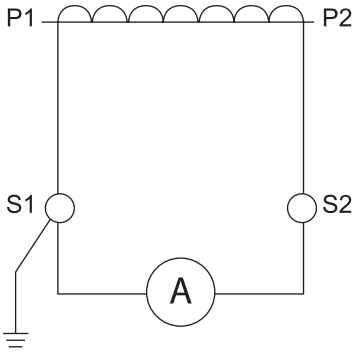



**FIGURE CT-2**

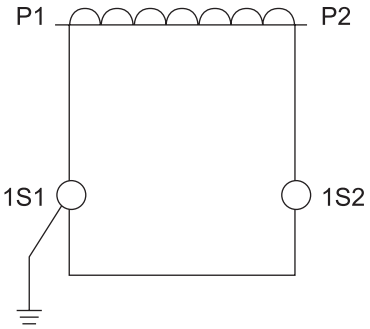



**FIGURE CT-3**

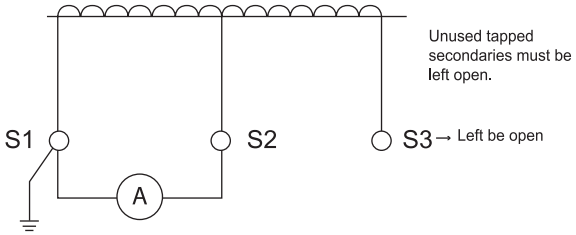



**FIGURE CT-4**

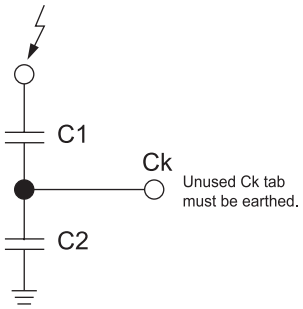
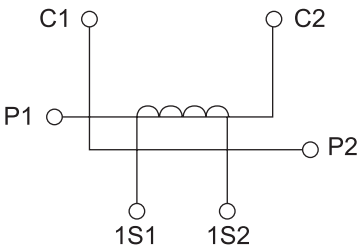



**FIGURE CT-5**




C1-C2 low rated current P1/C1-P2/C2 high rated current
Circuit Diagram Primary Reconnection

# OPERATION CONDITIONS FOR VOLTAGE TRANSFORMERS

1. When the secondary terminals are connected to the measuring or protection devices, one of the terminals should be earthed for safety as seen in **FIGURE VT-1**.

2. The base plate must be earthed.

3. The secondary circuits must not be short-circuited during operation. Otherwise the voltage transformers will be thermally destroyed.

4. If any of the secondary windings of a voltage transformer, used for the purpose of measuring, will not be used then it must be left open with one terminal connected to earth as seen in **FIGURE VT-2**. However, even if the open-delta windings are not to be used for detection of earth faults, they must be connected in an open delta circuit and an appropriate resistor (depending on the voltage and thermal power rating of the secondary) must be connected and open-delta circuit must be earthed only at one point as seen on **FIGURE VT-4**. Please refer to the technical recommendations below.

5. For single phase transformers, the neutral terminal of the primary " N " must be earthed in the earthed (neutral) systems as seen in **FIGURE VT-3**.

**Other important points and notes;**

When using single pole insulated inductive voltage transformers, it is very important to be aware that, if a circuit is being closed or during the decaying period of an earth fault,ferroresonance may occur.

Ferroresonance can lead to the overheating and thermal destruction of the voltage transformer or high levels of voltages may be induced. In general, ferroresonance can be eliminated by the use of an appropriate resistor. The resistor is placed as a burden in open-delta circuit formed by three voltage transformers delta windings. The open-delta circuit must always be earthed only at one point as seen in **FIGURE VT-4**.The open-delta connection can also be used for earth-fault monitoring with appropriate devices.

As the number of cable systems is increasing in the energy distribution systems, the protection of voltage transformers have become very important for the uninterrupted operation of the system without any failure and/or down time. For that reason, ALCE is always recommending the use of open-delta windings in single phase inductive voltage transformers.

The use of open-delta windings may not be sufficient for the protection of voltagetransformers by itself in some cases. An energy systems design engineer shall always use proper surge arresters, avalanche diodes, limiters and/or their combinations for the survivability of the distribution system after a fault or disturbance.

**FIGURE VT-1**

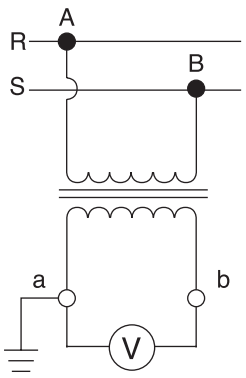



**FIGURE VT-2**

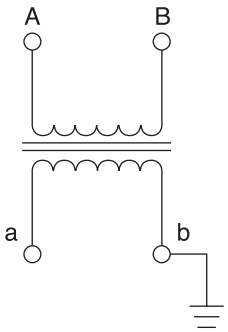



**FIGURE VT-3**

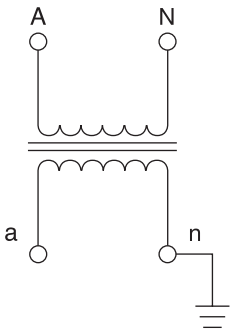
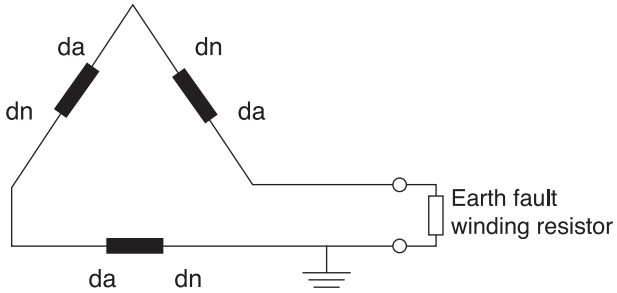


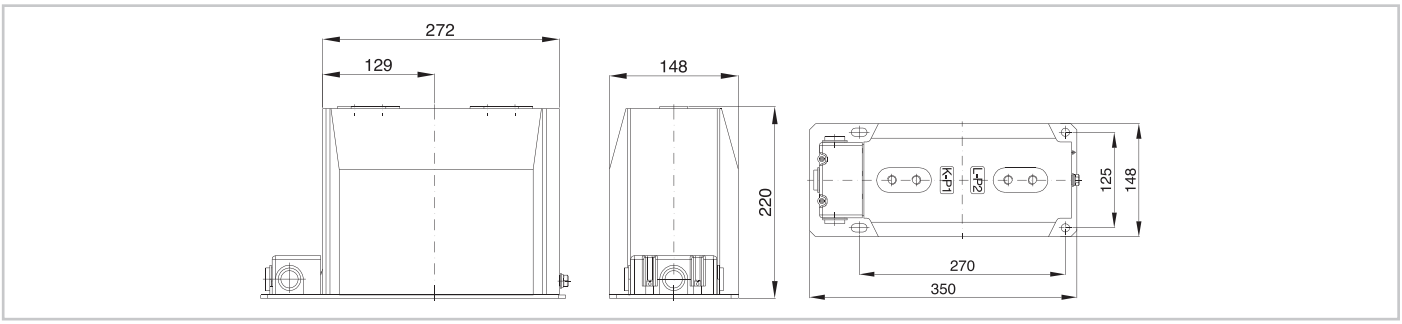

**FIGURE VT-4**



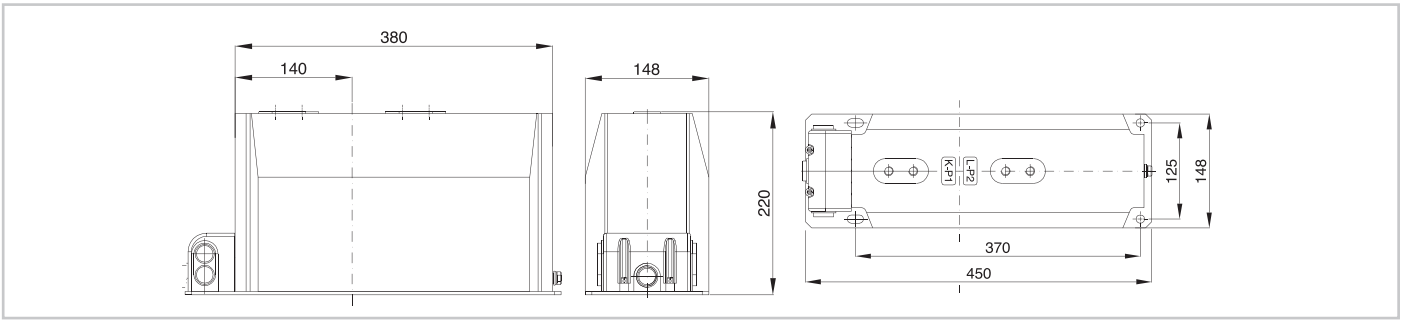
## AB12 / AB12-3

- Block type design
- Standard: IEC 61869-2, VDE, ANSI, GOST
- On request with capacitive layer
- On request with barrier

### AB12




### AB12-3

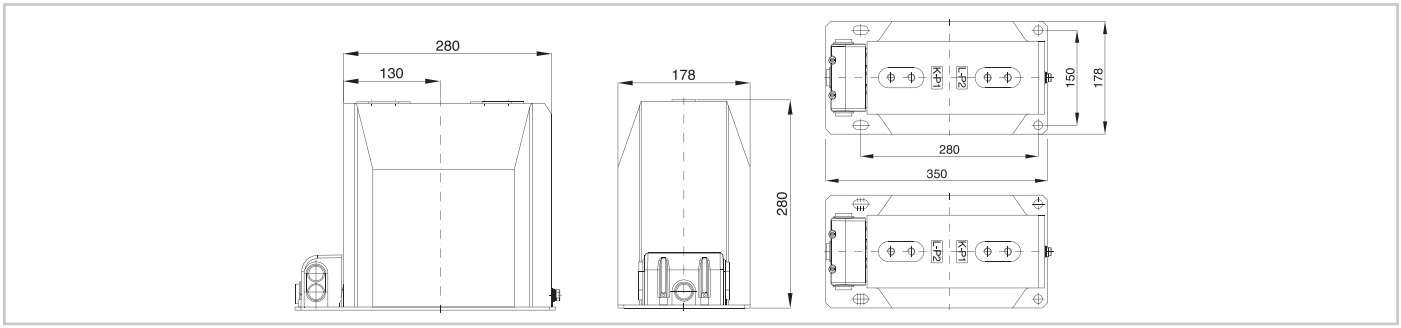



| TECHNICAL DATA | | | |
|---|---|---|---|
| **TYPE** | | **AB12** | **AB12-3** |
| Rated Data | | | |
| Operating Voltage (maximum) | kV | Up to 17,5 | |
| Test Voltages (maximum) | kV | 38/95 | |
| Rated Freguency | Hz | 50 or 60 | |
| Max. Rated Primary Current | A | 2500 | |
| Secondary Rated Current | A | 1 or 5 | |
| Rated Short-Time Thermal Current Ith (1s) | kA | max. 60 (1000 x In) | |
| Rated Dynamic Current Idyn | kA | max. 120 (2,5 x Ith) | |
| Weight (approx.) | kg | 20 - 22 | 30 - 35 |

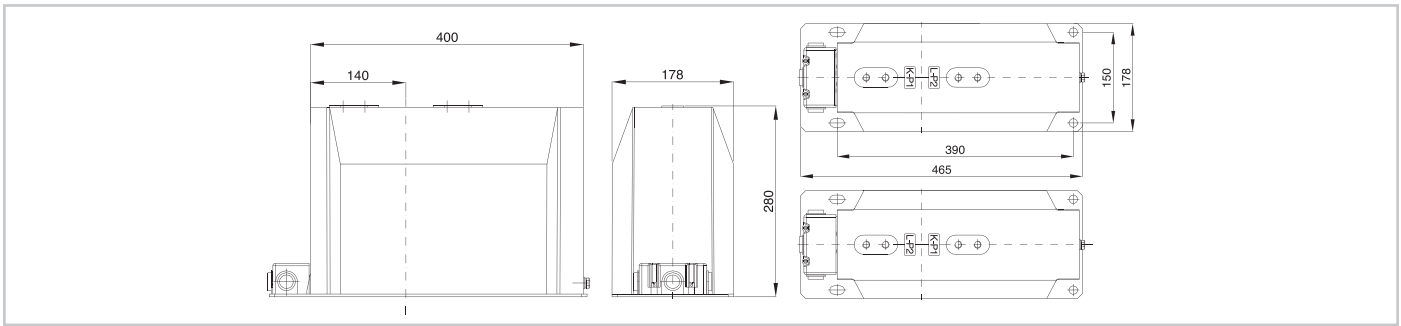
## AB24 / AB24-3

- Block type design
- Standard: IEC 61869-2, VDE, ANSI, GOST
- On request with capacitive layer
- On request with barrier

### AB24




### AB24-3

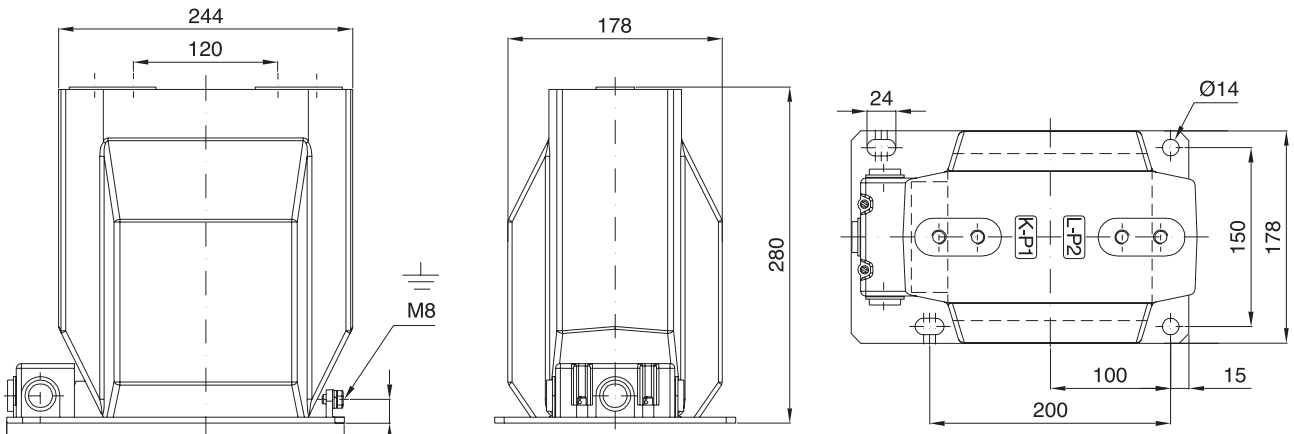



| TECHNICAL DATA | | | |
|---|---|---|---|
| **TYPE** | | **AB24** | **AB24-3** |
| Rated Data | | | |
| Operating Voltage (maximum) | kV | Up to 24 | |
| Test Voltages (maximum) | kV | 50/125 | |
| Rated Freguency | Hz | 50 or 60 | |
| Max. Rated Primary Current | A | 4000 (Icont 1 x In) | |
| Secondary Rated Current | A | 1 or 5 | |
| Rated Short-Time Thermal Current Ith (1s) | kA | max. 60 (1000 x In) | |
| Rated Dynamic Current Idyn | kA | max. 120 (2,5 x Ith) | |
| Weight (approx.) | kg | 33 - 35 | 45 - 50 |

## AK24

- Narrow type design
- Standard: IEC 61869-2, VDE, ANSI, GOST
- On request with capacitive layer

### AK24

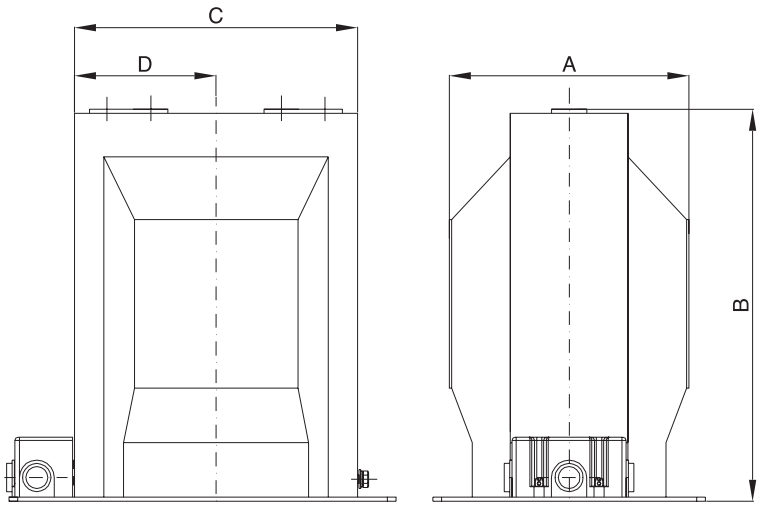



| TECHNICAL DATA | | |
|---|---|---|
| **TYPE** | | **AK24** |
| Rated Data | | |
| Operating Voltage (maximum) | kV | Up to 24 |
| Test Voltages (maximum) | kV | 50/125 |
| Rated Freguency | Hz | 50 or 60 |
| Max. Rated Primary Current | A | 1500 |
| Secondary Rated Current | A | 1 or 5 |
| Rated Short-Time Thermal Current Ith (1s) | kA | max. 60 (1000 x In) |
| Rated Dynamic Current Idyn | kA | max. 120 (2,5 x Ith) |
| Weight (approx.) | kg | 20 |

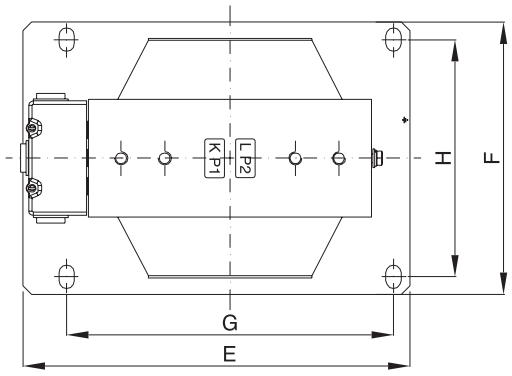
## AB36

- Block type design
- Standard: IEC 61869-2, VDE, ANSI, GOST
- On request with capacitive layer
- On request with barrier

### AB36




| Type | AB36-1 | AB36-3 | AB36-T1 | AB36-T3 |
|---|---|---|---|---|
| A | 220 | 240 | 220 | 240 |
| B | 360 | 360 | 390 | 390 |
| C | 260 | 320 | 260 | 320 |
| D | 130 | 160 | 130 | 160 |
| E | 355 | 380 | 355 | 380 |
| F | 250 | 250 | 250 | 250 |
| G | 300 | 300 | 300 | 300 |
| H | 217,5 | 217,5 | 217,5 | 217,5 |



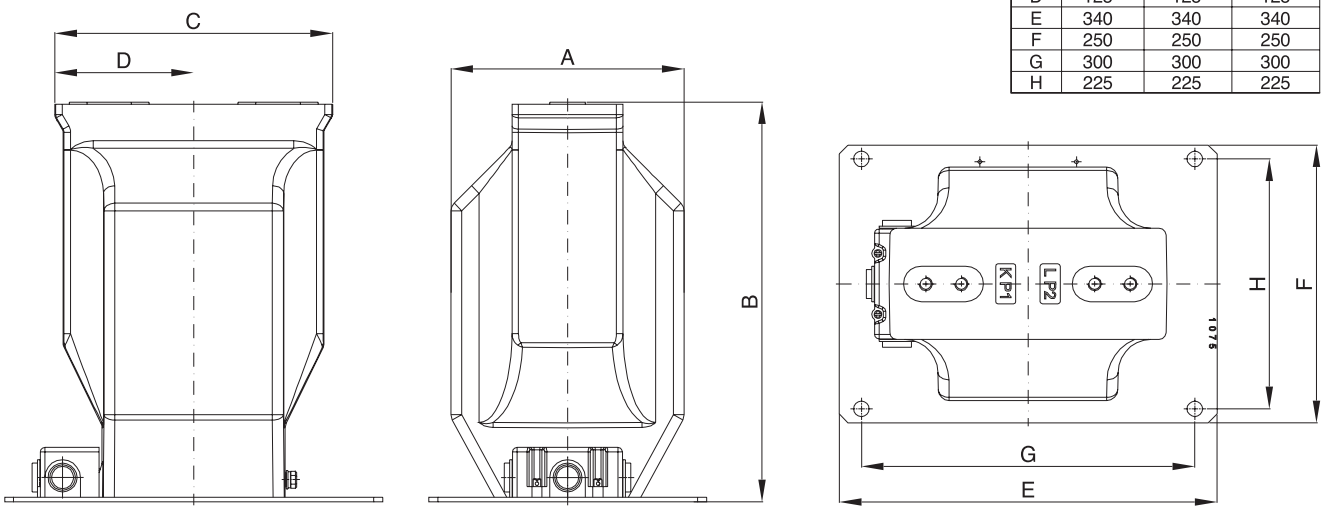

| TECHNICAL DATA | | | |
|---|---|---|---|
| **TYPE** | | **AB36** | **AB36-T** |
| Rated Data | | | |
| Operating Voltage (maximum) | kV | Up to 36 | |
| Test Voltages (maximum) | kV | 70/170 | |
| Rated Freguency | Hz | 50 or 60 | |
| Max. Rated Primary Current | A | 4000 Icont 1* In | |
| Secondary Rated Current | A | 1 or 5 | |
| Rated Short-Time Thermal Current Ith (1s) | kA | max. 60 (1000 x In) | |
| Rated Dynamic Current Idyn | kA | max. 120 (2,5 x Ith) | |
| Weight (approx.) | kg | 40 - 55 | 45 - 60 |

## AK36-10, AK36-20, AK36-30

- Narrow type design
- Standard: IEC 61869-2, VDE, ANSI, GOST
- On request with capacitive layer

### AK36

| Type | AK36-10 | AK36-20 | AK36-30 |
|---|---|---|---|
| A | 210 | 210 | 210 |
| B | 360 | 360 | 360 |
| C | 250 | 250 | 250 |
| D | 125 | 125 | 125 |
| E | 340 | 340 | 340 |
| F | 250 | 250 | 250 |
| G | 300 | 300 | 300 |
| H | 225 | 225 | 225 |

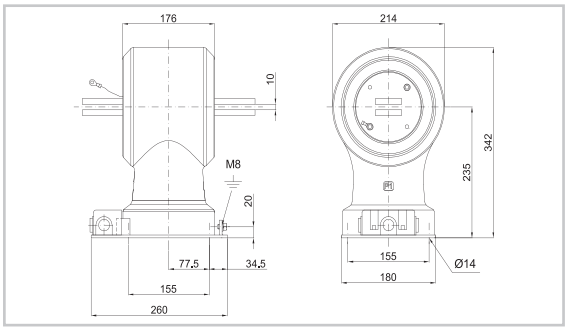



| TECHNICAL DATA | | |
|---|---|---|
| **TYPE** | | **AK36** |
| Rated Data | | |
| Operating Voltage (maximum) | kV | Up to 36 |
| Test Voltages (maximum) | kV | 70/170 |
| Rated Freguency | Hz | 50 or 60 |
| Max. Rated Primary Current | A | 1500 |
| Secondary Rated Current | A | 1 or 5 |
| Rated Short-Time Thermal Current Ith (1s) | kA | max. 60 (1000 x In) |
| Rated Dynamic Current Idyn | kA | max. 120 (2,5 x Ith) |
| Weight (approx.) | kg | 28 - 36 |

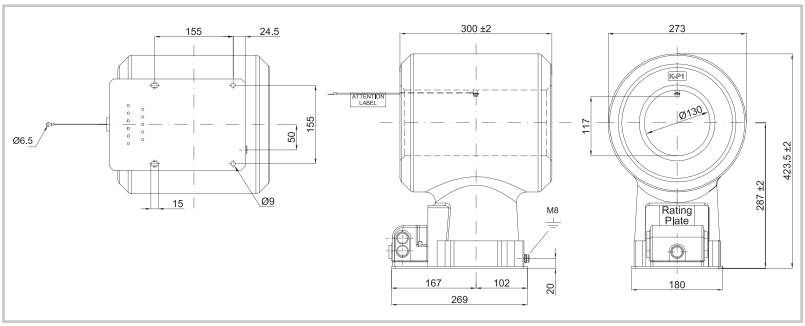
## AD12, AD17, AD24, AD24-L

- Busbar Type Design
- Standard: IEC 61869-2, VDE, ANSI, GOST
- Busbar Upon Request

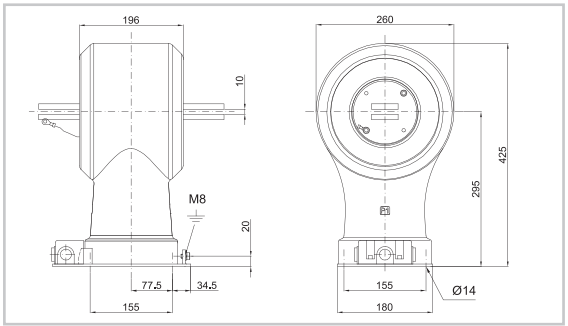
### AD12



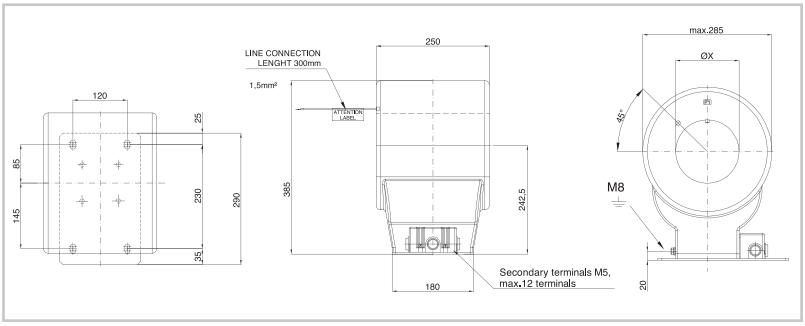

### AD17




### AD24




### AD24-L

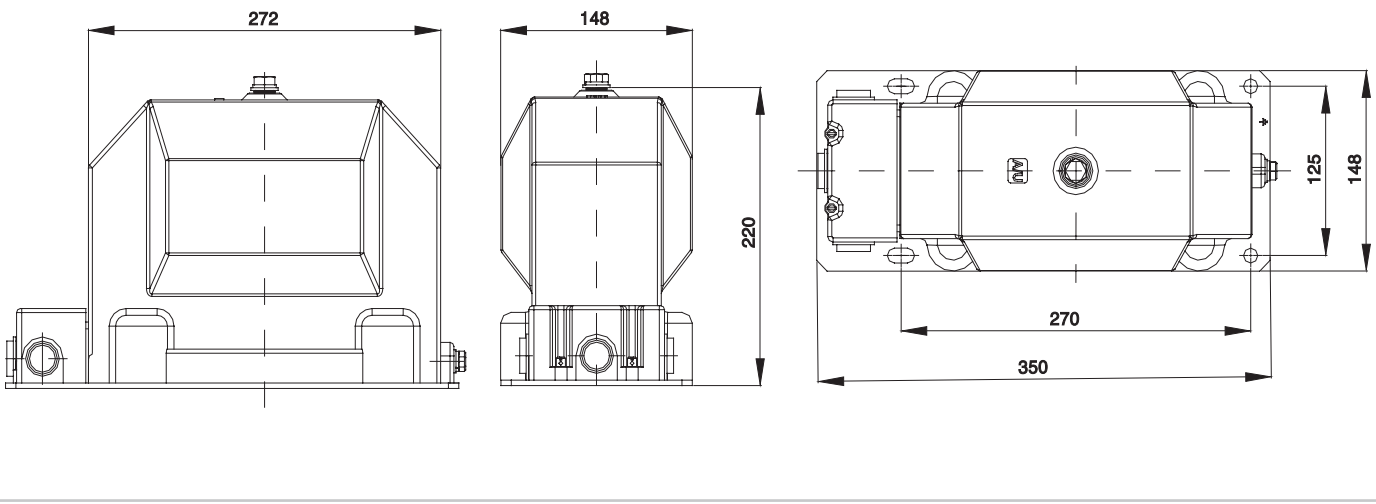



| TECHNICAL DATA | | | |
|---|---|---|---|
| **TYPE** | | **AD12 - AD17** | **AD24 - AD24-L** |
| Rated Data | | | |
| Operating Voltage (maximum) | kV | Up to 17,5 | Up to 24 |
| Test Voltages (maximum) | kV | 38/95 | 50/125 |
| Rated Freguency | Hz | 50 or 60 | |
| Max. Rated Primary Current | A | 800 - 3000 | 800 - 7500 |
| Secondary Rated Current | A | 1 or 5 | |
| Rated Short-Time Thermal Current Ith (1s) | kA | max. 100 | |
| Rated Dynamic Current Idyn | kA | (2,5 x Ith) | |
| Weight (approx.) | kg | 20 - 25 | 55 - 60 |

## VB12

- Single pole insulated
- Block type design
- Standard: IEC 61869-3, VDE, ANSI, GOST

### VB12

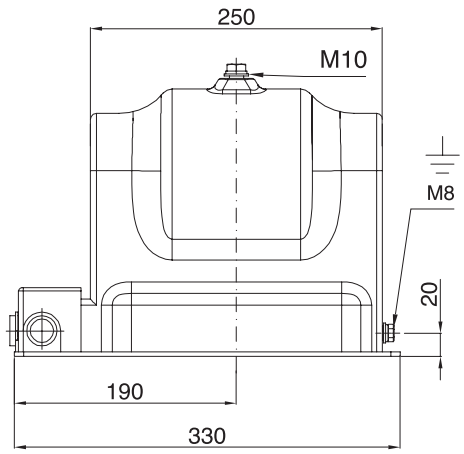


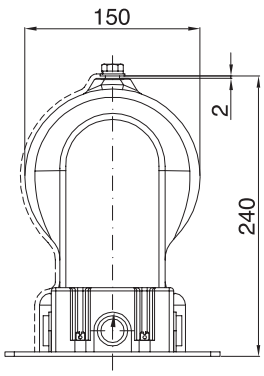

| TECHNICAL DATA | | |
|---|---|---|
| **TYPE** | | **VB12** |
| Rated Data | | |
| Highest Voltage For Equipment, Um(r.m.s.) | kV | Up to 17,5 |
| Test Voltages (maximum) | kV | 38/95 |
| Rated Freguency | Hz | 50 or 60 |
| Rated Primary Voltage, Un (max.) | kV | 15/√3 |
| Secondary Voltage | V | 100/ √3 or 110/ √3 or 120/ √3 |
| Rated Burden in Class 0.2-0.5-1.0 | VA | 5 - 10 - 15 - 20 - 30 - 40... |
| Max. Rated Burden For Protection Purpose in Class 3P/6P | VA | 100 |
| Thermal Limiting Current For Earth Fault Detection Winding | A | 6 |
| Rated Voltage Factor (8h) | | 1,9 Un |
| Weight (approx.) | kg | 25 |

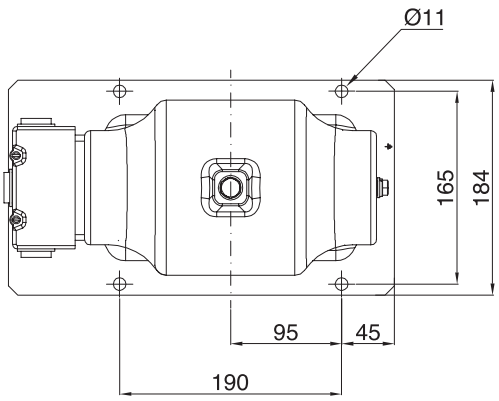
## VK12

- Single pole insulated
- Narrow type design
- Standard: IEC 61869-3, VDE, ANSI, GOST

### VK12



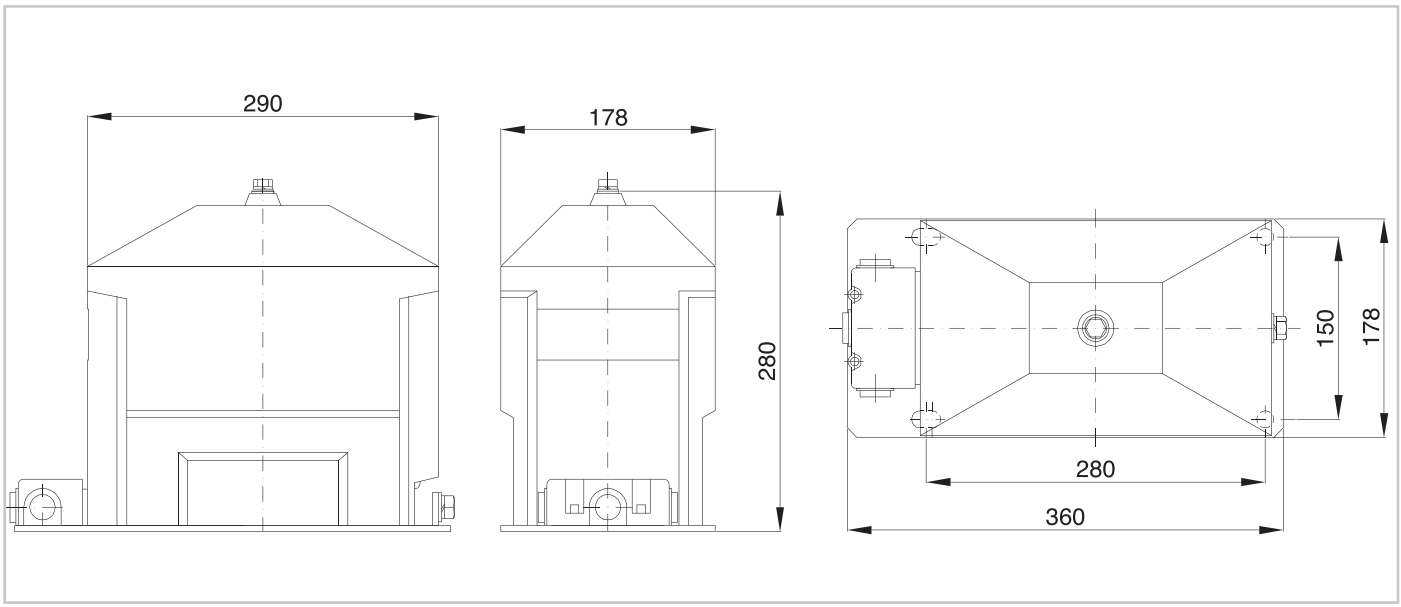




| TECHNICAL DATA | | |
|---|---|---|
| **TYPE** | | **VK12** |
| Rated Data | | |
| Highest Voltage For Equipment, Um(r.m.s.) | kV | Up to 17,5 |
| Test Voltages (maximum) | kV | 38/95 |
| Rated Freguency | Hz | 50 or 60 |
| Rated Primary Voltage, Un (max.) | kV | 15/√3 |
| Secondary Voltage | V | 100/ √3 or 110/ √3 or 120/ √3 |
| Rated Burden in Class 0.2-0.5-1.0 | VA | 5 - 10 - 15 - 20 - 30 - 40... |
| Max. Rated Burden For Protection Purpose in Class 3P/6P | VA | 100 |
| Thermal Limiting Current For Earth Fault Detection Winding | A | 6 |
| Rated Voltage Factor (8h) | | 1,9 Un |
| Weight (approx.) | kg | 23 |

## VB24

- Single pole insulated
- Block type design
- Standard: IEC 61869-3, VDE, ANSI, GOST

### VB24

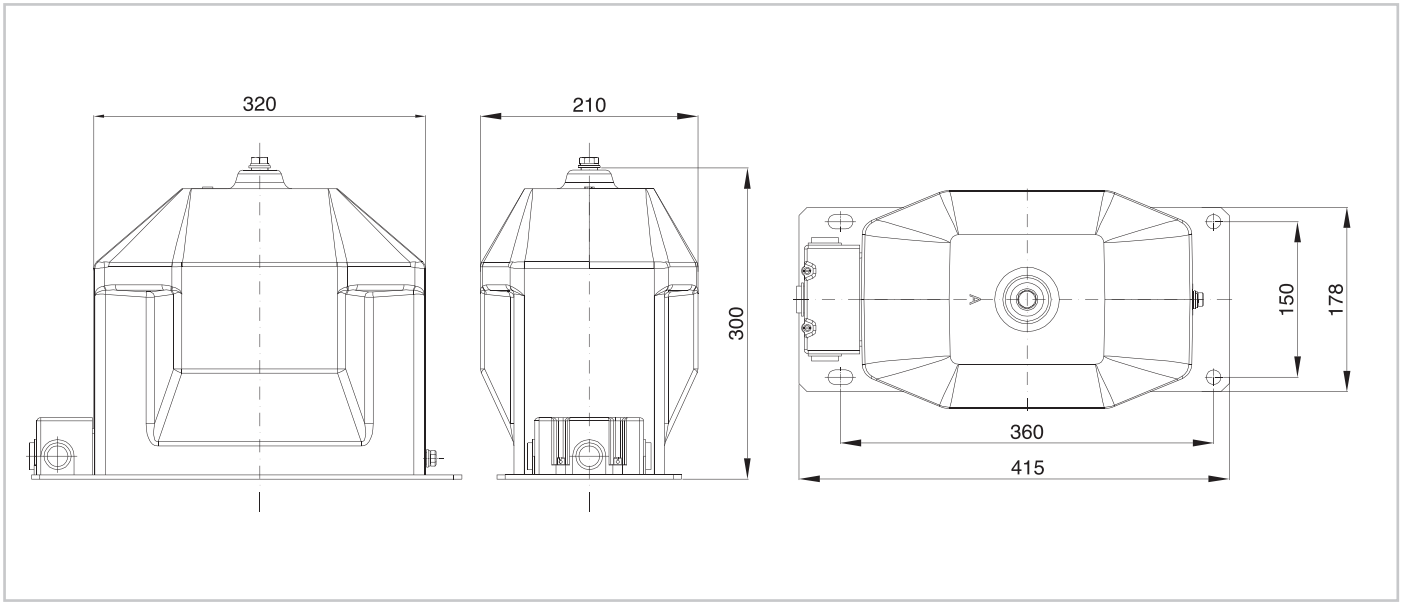



| TECHNICAL DATA | | |
|---|---|---|
| **TYPE** | | **VB24** |
| Rated Data | | |
| Highest Voltage For Equipment, Um(r.m.s.) | kV | Up to 24 |
| Test Voltages (maximum) | kV | 50/125 |
| Rated Freguency | Hz | 50 or 60 |
| Rated Primary Voltage, Un (max.) | kV | 24/ √3 |
| Secondary Voltage | V | 100/ √3 or 110/ √3 or 120/ √3 |
| Rated Burden in Class 0.2-0.5-1.0 | VA | 5 - 10 - 15 - 20 - 30 - 40... |
| Max. Rated Burden For Protection Purpose in Class 3P/6P | VA | 100 |
| Thermal Limiting Current For Earth Fault Detection Winding | A | 6 |
| Rated Voltage Factor (8h) | | 1,9 Un |
| Weight (approx.) | kg | 34 |

## VB36

- Single pole insulated
- Block type design
- Standard: IEC 61869-3, VDE, ANSI, GOST


### VB36

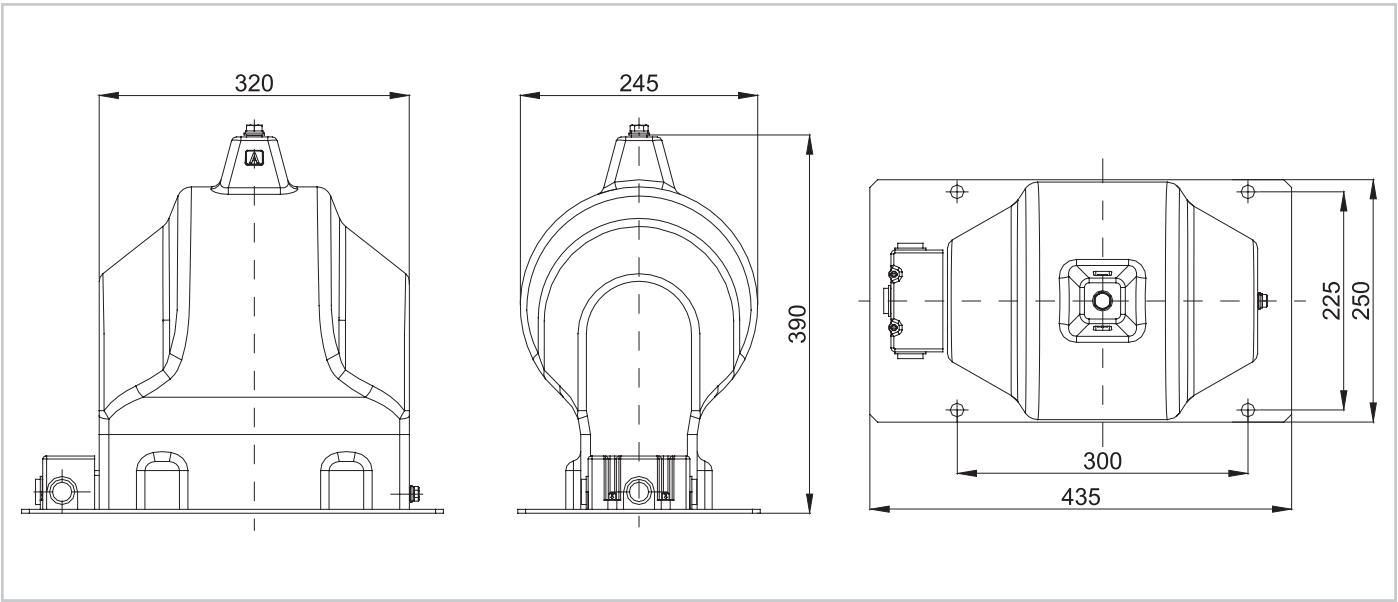



| TECHNICAL DATA | | |
|---|---|---|
| **TYPE** | | **VB36** |
| Rated Data | | |
| Highest Voltage For Equipment, Um(r.m.s.) | kV | Up to 36 |
| Test Voltages (maximum) | kV | 70/170 |
| Rated Freguency | Hz | 50 or 60 |
| Rated Primary Voltage, Un (max.) | kV | 36/ √3 |
| Secondary Voltage | V | 100/ √3 or 110/ √3 or 120/ √3 |
| Rated Burden in Class 0.2-0.5-1.0 | VA | 5 - 10 - 15 - 20 - 30 - 40... |
| Max. Rated Burden For Protection Purpose in Class 3P/6P | VA | 100 |
| Thermal Limiting Current For Earth Fault Detection Winding | A | 6 |
| Rated Voltage Factor (8h) | | 1,9 Un |
| Weight (approx.) | kg | 42 |

## VK36

- Single pole insulated
- Large type
- Standard: IEC 61869-3, VDE, ANSI, GOST


### VK36

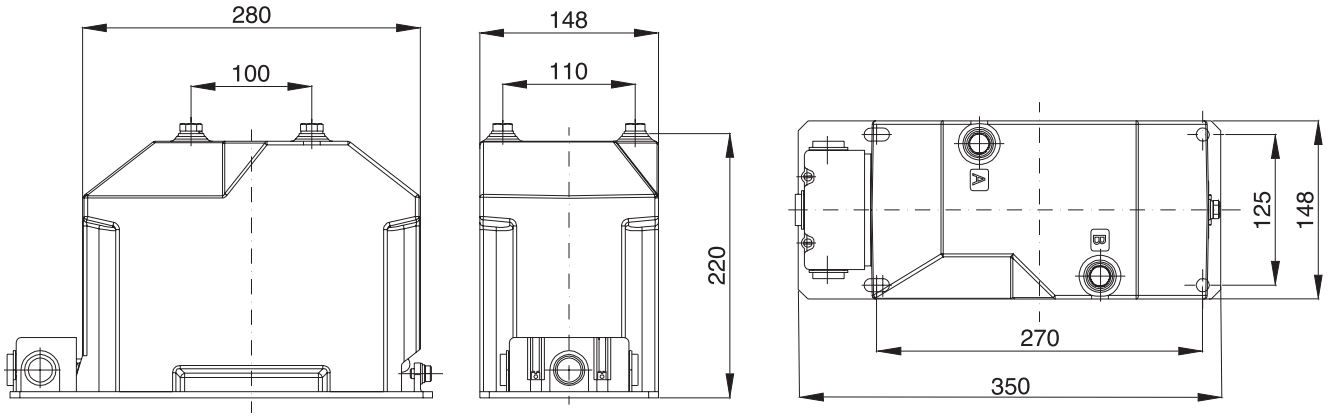



| TECHNICAL DATA | | |
|---|---|---|
| **TYPE** | | **VK36** |
| Rated Data | | |
| Highest Voltage For Equipment, Um(r.m.s.) | kV | Up to 36 |
| Test Voltages (maximum) | kV | 70/170 |
| Rated Freguency | Hz | 50 or 60 |
| Rated Primary Voltage, Un (max.) | kV | 36/ √3 |
| Secondary Voltage | V | 100/ √3 or 110/ √3 or 120/ √3 |
| Rated Burden in Class 0.2-0.5-1.0 | VA | 5 - 10 - 15 - 20 - 30 - 40... |
| Max. Rated Burden For Protection Purpose in Class 3P/6P | VA | 100 |
| Thermal Limiting Current For Earth Fault Detection Winding | A | 6 |
| Rated Voltage Factor (8h) | | 1,9 Un |
| Weight (approx.) | kg | 48 |

## 2VB12

- Double pole insulated
- Block type design
- Standard: IEC 61869-3, VDE, ANSI, GOST


### 2VB12

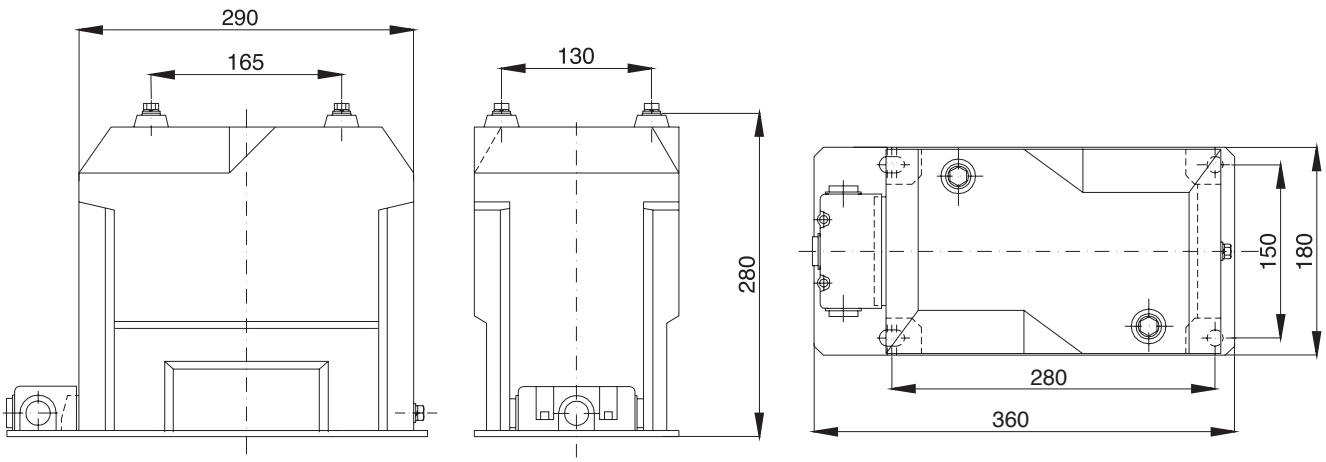



| TECHNICAL DATA | | |
|---|---|---|
| **TYPE** | | **2VB12** |
| Rated Data | | |
| Highest Voltage For Equipment, Um(r.m.s.) | kV | Up to 17,5 |
| Test Voltages (maximum) | kV | 38/95 |
| Rated Freguency | Hz | 50 or 60 |
| Rated Primary Voltage, Un (max.) | kV | 12 |
| Secondary Voltage | V | 100 or 110 or 120 |
| Rated Burden in Class 0.2-0.5-1.0 | VA | 5 - 10 - 15 - 20 - 30 - 40... |
| Max. Rated Burden For Protection Purpose in Class 3P/6P | VA | 100 |
| Rated Voltage Factor (8h) | | 1,2 Un |
| Weight (approx.) | kg | 24 |

## 2VB24

- Double pole insulated
- Block type design
- Standard: IEC 61869-3, VDE, ANSI, GOST

### 2VB24

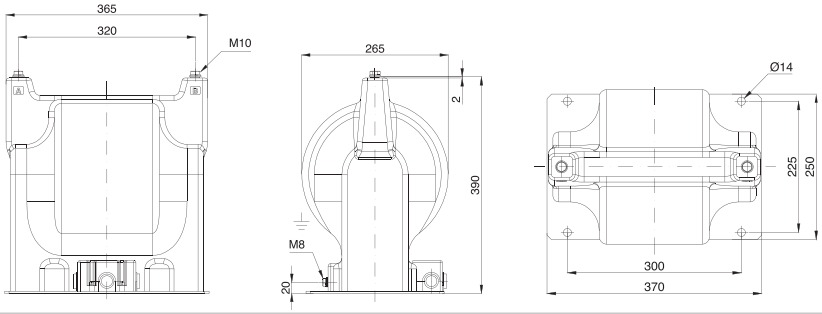



| TECHNICAL DATA | | |
|---|---|---|
| **TYPE** | | **2VB24** |
| Rated Data | | |
| Highest Voltage For Equipment, Um(r.m.s.) | kV | Up to 24 |
| Test Voltages (maximum) | kV | 50/125 |
| Rated Freguency | Hz | 50 or 60 |
| Rated Primary Voltage, Un (max.) | kV | 24 |
| Secondary Voltage | V | 100 or 110 or 120 |
| Rated Burden in Class 0.2-0.5-1.0 | VA | 5 - 10 - 15 - 20 - 30 - 40... |
| Max. Rated Burden For Protection Purpose in Class 3P/6P | VA | 100 |
| Rated Voltage Factor (8h) | | 1,2 Un |
| Weight (approx.) | kg | 36 |

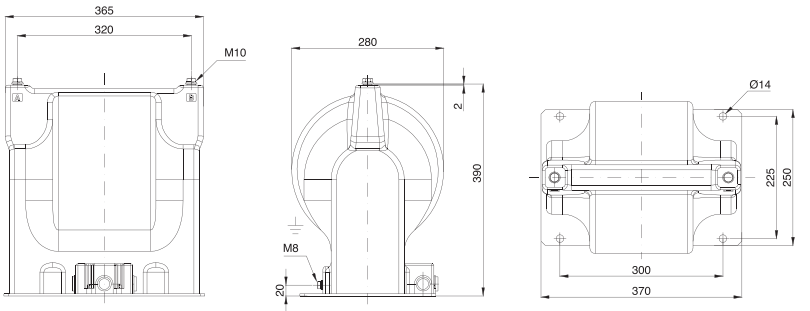
## 2VK36

- Double pole insulated
- Standard: IEC 61869-3, VDE, ANSI, GOST

### 2VK36-1




### 2VK36-2

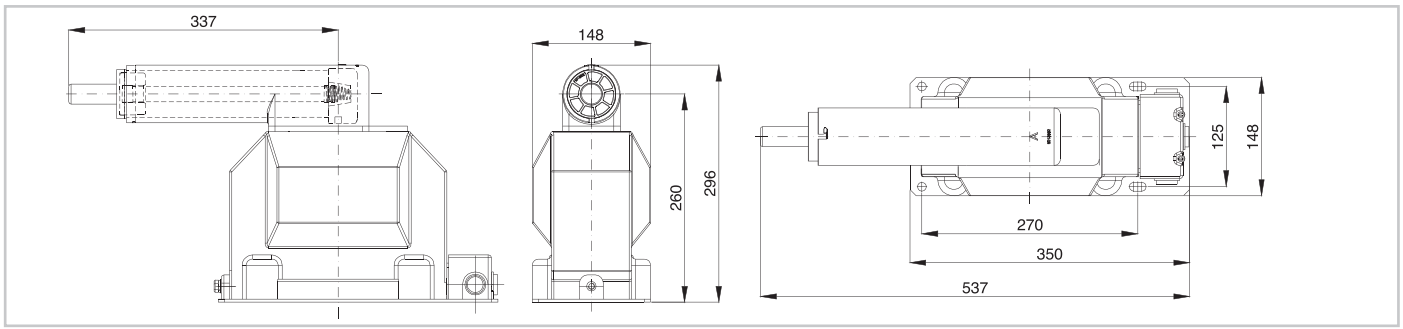



| TECHNICAL DATA | | |
|---|---|---|
| **TYPE** | | **2VK36** |
| Rated Data | | |
| Highest Voltage For Equipment, Um(r.m.s.) | kV | Up to 36 |
| Test Voltages (maximum) | kV | 70/170 |
| Rated Freguency | Hz | 50 or 60 |
| Rated Primary Voltage, Un (max.) | kV | 36 |
| Secondary Voltage | V | 100 or 110 or 120 |
| Rated Burden in Class 0.2-0.5-1.0 | VA | 5 - 10 - 15 - 20 - 30 - 40... |
| Max. Rated Burden For Protection Purpose in Class 3P/6P | VA | 100 |
| Rated Voltage Factor (8h) | | 1,2 Un |
| Weight (approx.) | kg | 55 - 60 |

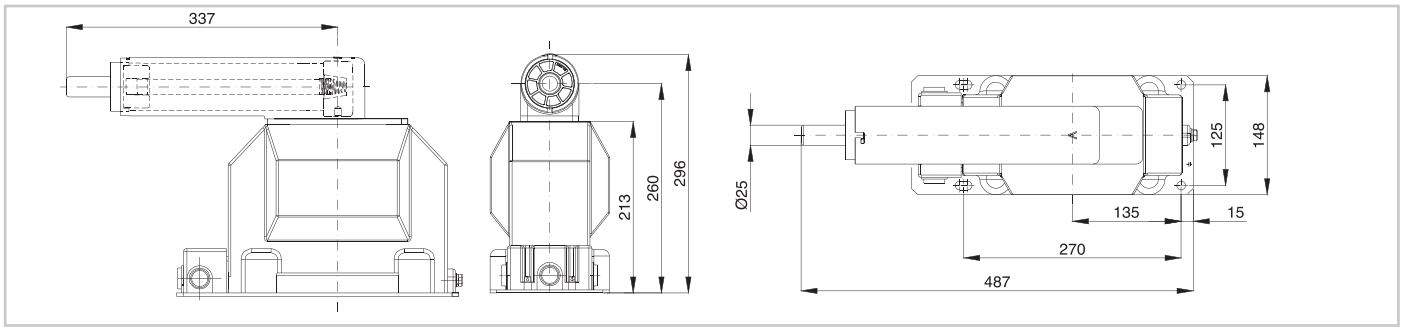
## VBF12-FE / VBF12-FS

- With fuse
- Single pole insulated
- Block type design
- Standard: IEC 61869-3, VDE, ANSI, GOST

### VBF12-FE




### VBF12-FS

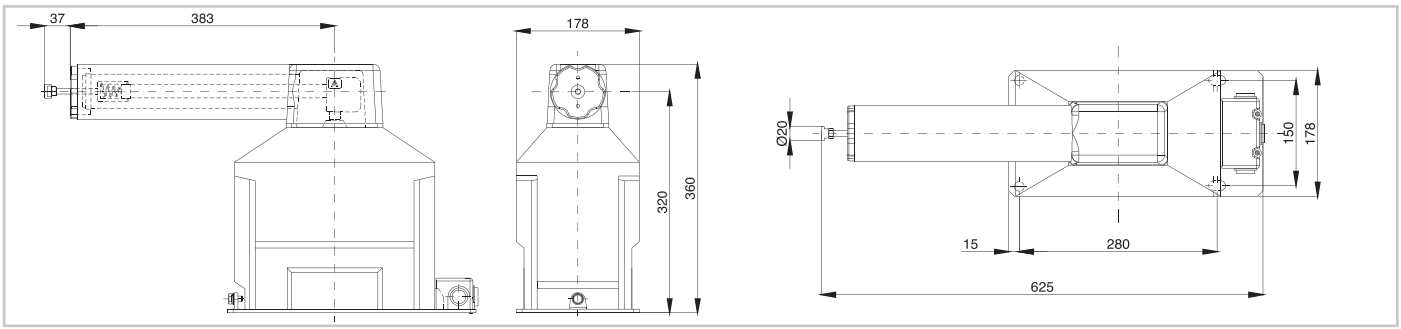



| TECHNICAL DATA | | | |
|---|---|---|---|
| **TYPE** | | **VBF12-FE** | **VBF12-FS** |
| Rated Data | | | |
| Highest Voltage For Equipment, Um(r.m.s.) | kV | Up to 17,5 | |
| Test Voltages (maximum) | kV | 38/95 | |
| Rated Freguency | Hz | 50 or 60 | |
| Rated Primary Voltage, Un (max.) | kV | 15/ √3 | |
| Secondary Voltage | V | 100/ √3 or 110/ √3 or 120/ √3 | |
| Rated Burden in Class 0.2-0.5-1.0 | VA | 5 - 10 - 15 - 20 - 30 - 40... | |
| Max. Rated Burden For Protection Purpose in Class 3P/6P | VA | 100 | |
| Thermal Limiting Current For Earth Fault Detection Winding | A | 6 | |
| Rated Voltage Factor (8h) | | 1,9 Un | |
| Weight (approx.) | kg | 26 | |

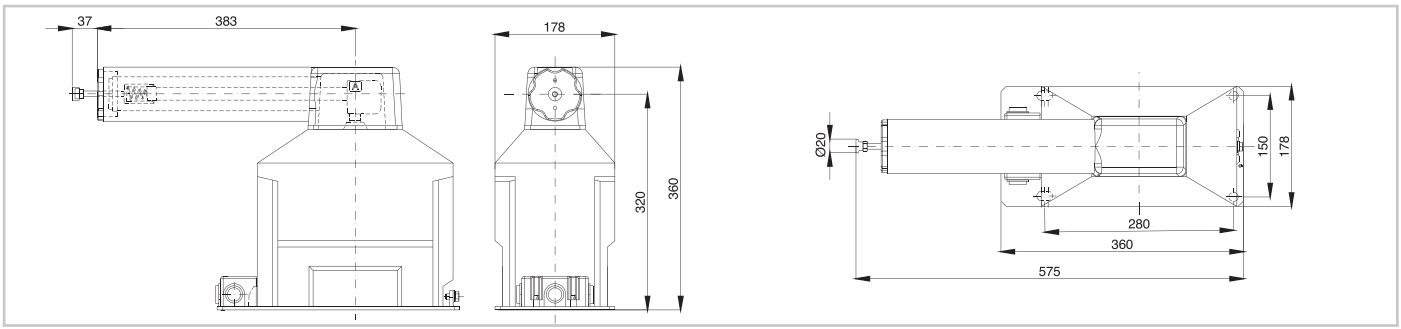
## VBF24-FE / VBF24-FS


- With fuse
- Single pole insulated
- Block type design
- Standard: IEC 61869-3, VDE, ANSI, GOST

### VBF24-FE




### VBF24-FS

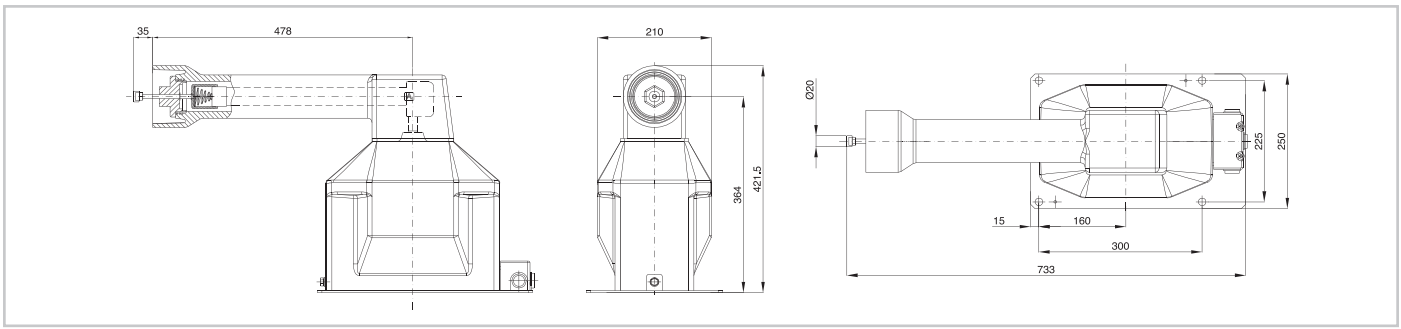



| TECHNICAL DATA | | | |
|---|---|---|---|
| **TYPE** | | **VBF24-FE** | **VBF24-FS** |
| Rated Data | | | |
| Highest Voltage For Equipment, Um(r.m.s.) | kV | Up to 24 | |
| Test Voltages (maximum) | kV | 50/125 | |
| Rated Freguency | Hz | 50 or 60 | |
| Rated Primary Voltage, Un (max.) | kV | 24/ √3 | |
| Secondary Voltage | V | 100/ √3 or 110/ √3 or 120/ √3 | |
| Rated Burden in Class 0.2-0.5-1.0 | VA | 5 - 10 - 15 - 20 - 30 - 40... | |
| Max. Rated Burden For Protection Purpose in Class 3P/6P | VA | 100 | |
| Thermal Limiting Current For Earth Fault Detection Winding | A | 6 | |
| Rated Voltage Factor (8h) | | 1,9 Un | |
| Weight (approx.) | kg | 35 | |

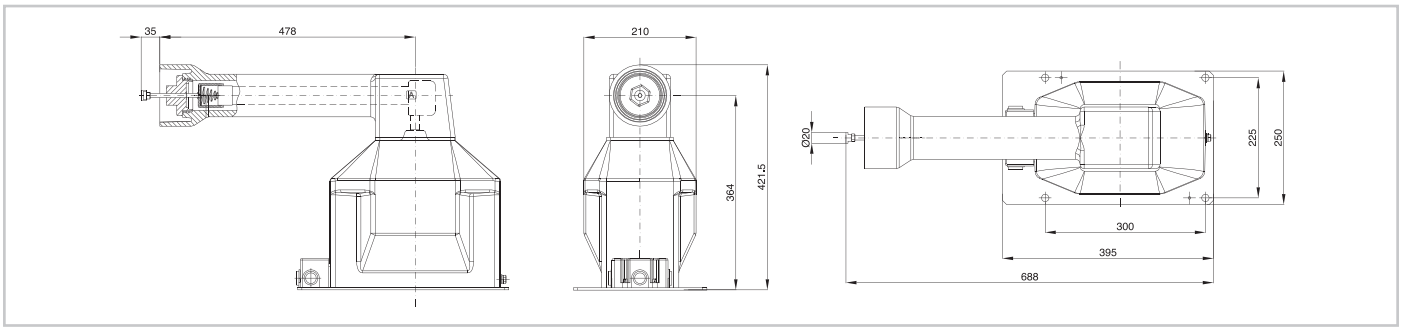
## VBF36-FE / VBF36-FS

- With fuse
- Single pole insulated
- Block type design
- Standard: IEC 61869-3, VDE, ANSI, GOST

### VBF36-FE

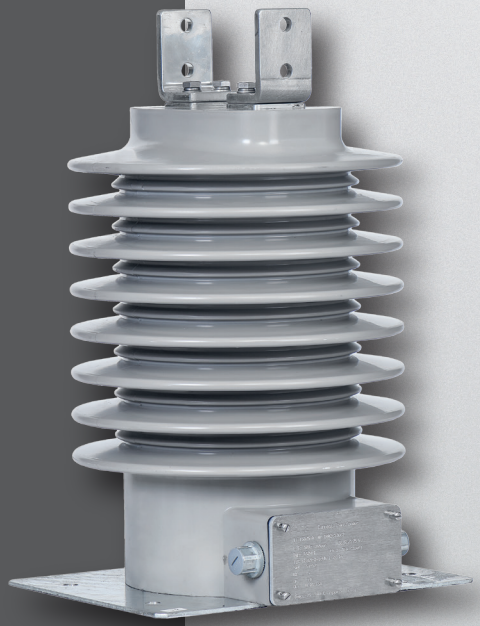


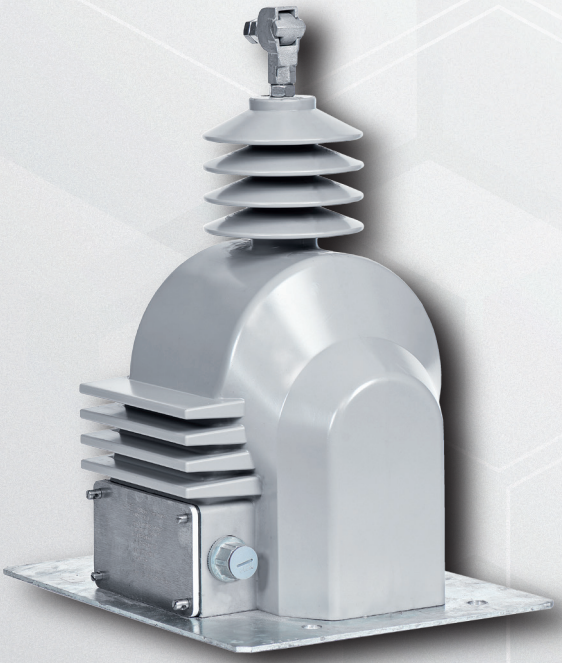

### VBF36-FS

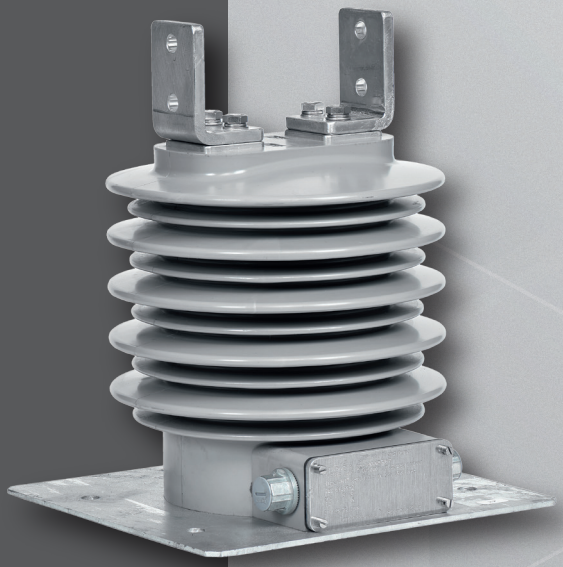



| TECHNICAL DATA | | | |
|---|---|---|---|
| **TYPE** | | **VBF36-FE** | **VBF36-FS** |
| Rated Data | | | |
| Highest Voltage For Equipment, Um(r.m.s.) | kV | Up to 36 | |
| Test Voltages (maximum) | kV | 70/170 | |
| Rated Freguency | Hz | 50 or 60 | |
| Rated Primary Voltage, Un (max.) | kV | 36/ √3 | |
| Secondary Voltage | V | 100/ √3 or 110/ √3 or 120/ √3 | |
| Rated Burden in Class 0.2-0.5-1.0 | VA | 5 - 10 - 15 - 20 - 30 - 40... | |
| Max. Rated Burden For Protection Purpose in Class 3P/6P | VA | 100 | |
| Thermal Limiting Current For Earth Fault Detection Winding | A | 6 | |
| Rated Voltage Factor (8h) | | 1,9 Un | |
| Weight (approx.) | kg | 48 | |

ALCE



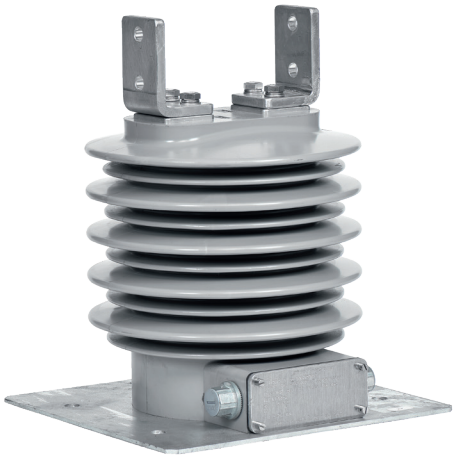




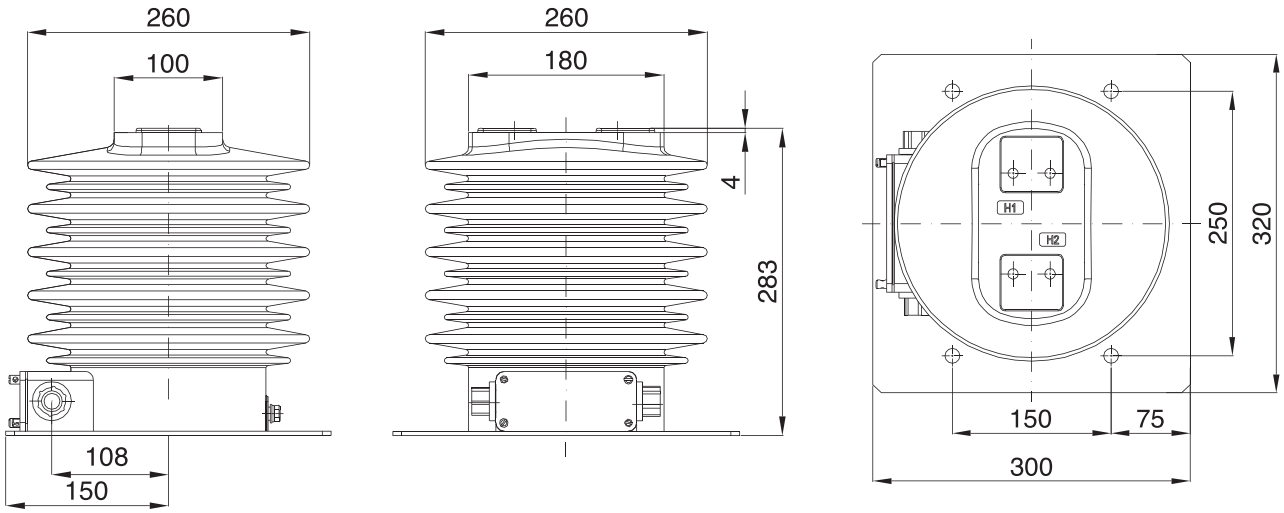
# OUTDOOR TYPE INSTRUMENT TRANSFORMERS

## AH17

- Outdoor application
- Cyloaliphatic epoxy resin insulated
- Ambient air temperature: -40°C to +55°C
- Altitude: Up to 1000 meters above sea level (>1000m on request)
- Exposure to solar radiation: More than 2.800 hours annually peaking at 1000W/m² for horizontal surfaces.
- Max. relative humidity: 100% Max. wind. velocity: 100km/h
- Standard: IEC 61869-2, ANSI, GOST, VDE



### AH17

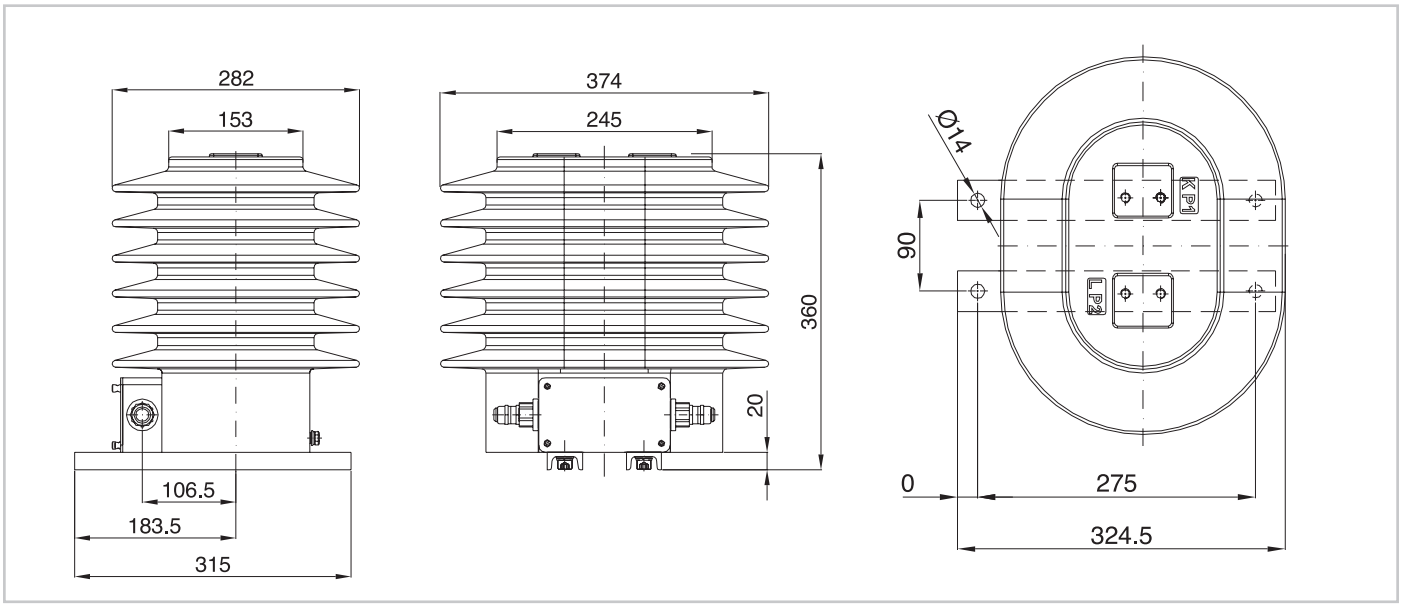



| TECHNICAL DATA | | |
|---|---|---|
| **TYPE** | | **AH17** |
| Rated Data | | |
| Operating Voltage (maximum) | kV | Up to 17,5 |
| Test Voltages (maximum) | kV | 38/95 |
| Rated Freguency | Hz | 50 or 60 |
| Maximum Rated Primary Current | A | 2500 |
| Secondary Rated Current | A | 1 or 5 |
| Rated Short-Time Thermal Current Ith (1s) | kA | max. 60 (1000 x In) |
| Rated Dynamic Current Idyn | A | max.120 (2,5 x Ith) |
| Weight (approx.) | kg | 38 |

## AH24

- Outdoor application
- Cyloaliphatic epoxy resin insulated
- Ambient air temperature: -40°C to +55°C
- Altitude: Up to 1000 meters above sea level (>1000m on request)
- Exposure to solar radiation: More than 2.800 hours annually peaking at 1000W/m² for horizontal surfaces.
- Max. relative humidity: 100% Max. wind. velocity: 100km/h
- Standard: IEC 61869-2, ANSI, GOST, VDE

### AH24

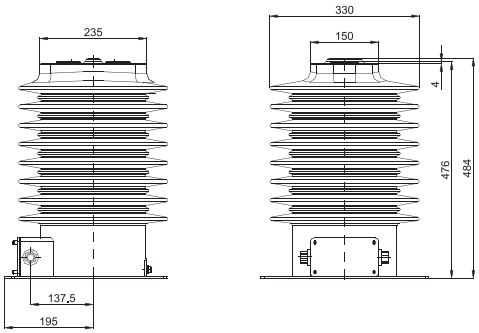



| TECHNICAL DATA | | |
|---|---|---|
| **TYPE** | | **AH24** |
| Rated Data | | |
| Operating Voltage (maximum) | kV | Up to 24 |
| Test Voltages (maximum) | kV | 50/125 |
| Rated Freguency | Hz | 50 or 60 |
| Maximum Rated Primary Current | A | 3000 |
| Secondary Rated Current | A | 1 or 5 |
| Rated Short-Time Thermal Current Ith (1s) | kA | max. 60 (1000 x In) |
| Rated Dynamic Current Idyn | A | max.120 (2,5 x Ith) |
| Weight (approx.) | kg | 48-50 |

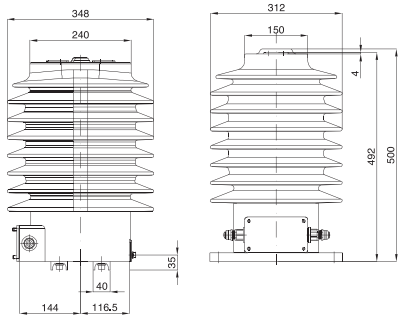
## A32H

- Outdoor application
- Cyloaliphatic epoxy resin insulated
- Ambient air temperature: -40°C to +55°C
- Altitude: Up to 1000 meters above sea level (>1000m on request)
- Exposure to solar radiation: More than 2.800 hours annually peaking at 1000W/m² for horizontal surfaces.
- Max. relative humidity: 100% Max. wind. velocity: 100km/h
- Standard: IEC 61869-2, ANSI, GOST, VDE

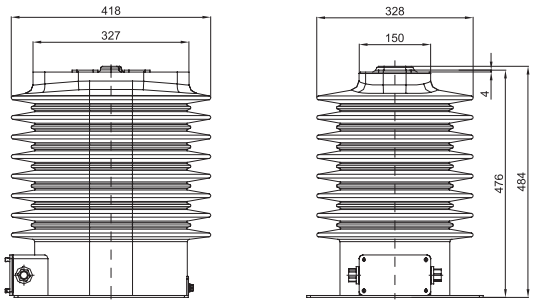
### A32H-1



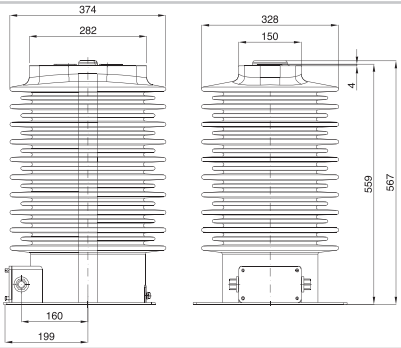

### A32H-2




### A32H-3

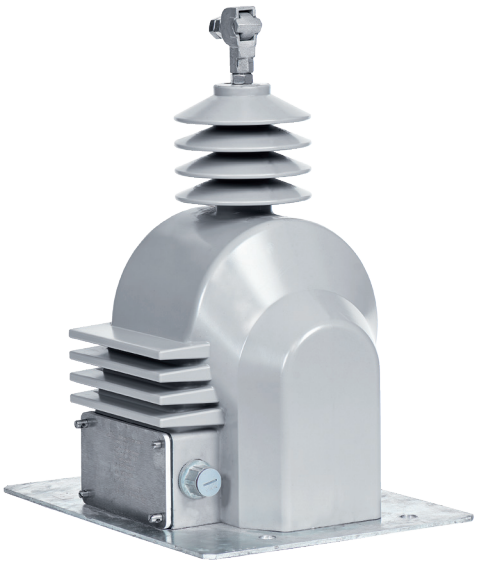



### A32H-4



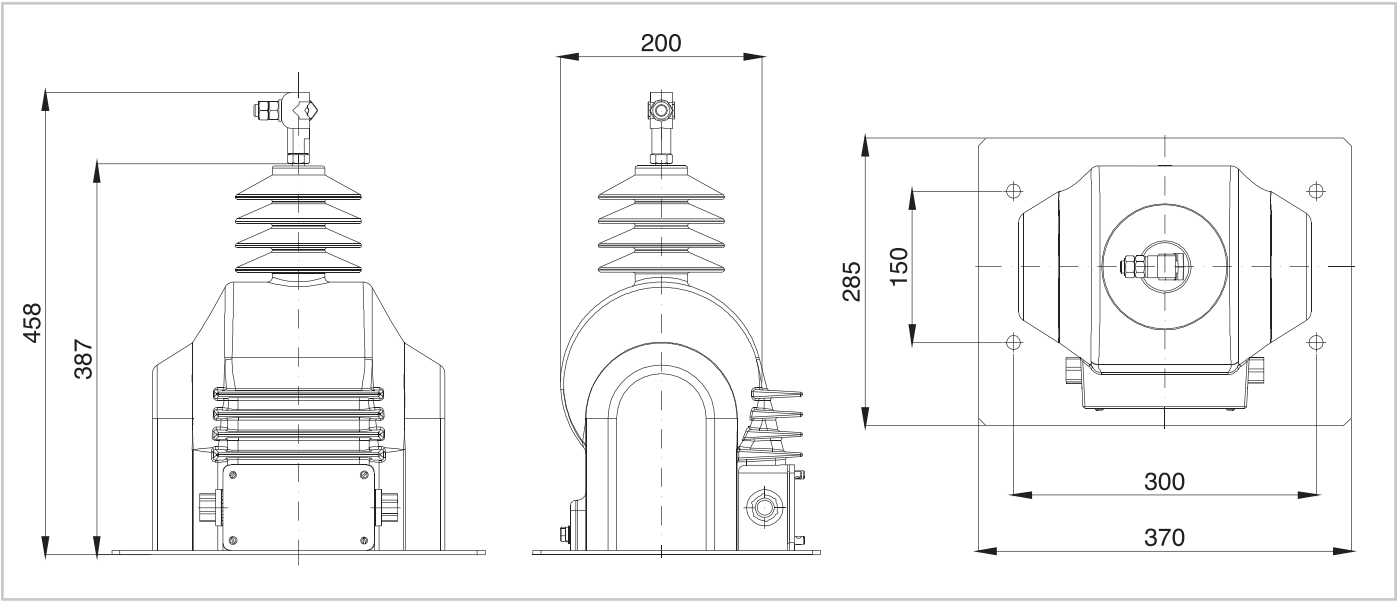

| TECHNICAL DATA | | |
|---|---|---|
| **TYPE** | | **A32H** |
| Rated Data | | |
| Operating Voltage (max.) | kV | Up to 36 |
| Test Voltages (maximum) | kV | 70/170 |
| Rated Freguency | Hz | 50 or 60 |
| Maximum Rated Primary Current | A | 3000 |
| Secondary Rated Current | A | 1 or 5 |
| Rated Short-Time Thermal Current Ith (1s) | kA | max.60 (1000 x In) |
| Rated Dynamic Current Idyn | kA | max.120 (2,5 x Ith) |
| Weight (approx.) | kg | 60 - 65 |

## VH17



- Outdoor application
- Cyloaliphatic epoxy resin insulated
- Ambient air temperature: -40°C to +55°C
- Altitude: Up to 1000 meters above sea level (>1000m on request)
- Exposure to solar radiation: More than 2.800 hours annually peaking at 1000W/m² for horizontal surfaces.
- Max. relative humidity: 100% Max. wind. velocity: 100km/h
- Standard: IEC 61869-3, ANSI, GOST, VDE

### VH17

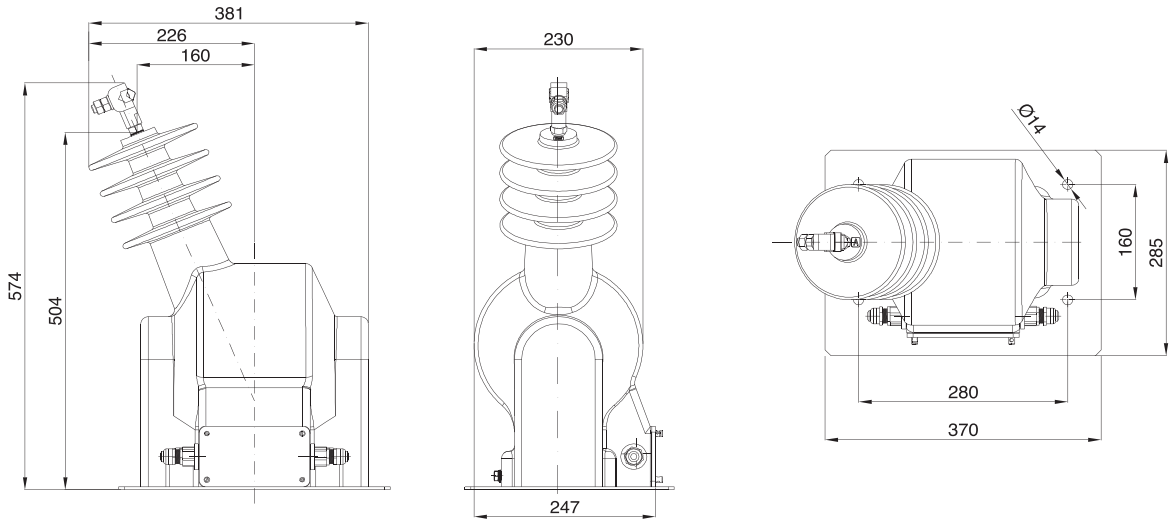



| TECHNICAL DATA | | |
|---|---|---|
| **TYPE** | | **VH17** |
| Rated Data | | |
| Highest Voltage For Equipment, Um(r.m.s.) | kV | Up to 17.5 |
| Test Voltages (maximum) | kV | 38/95 |
| Rated Freguency | Hz | 50 or 60 |
| Rated Primary Voltage, Un (max.) | kV | 15/√3 |
| Secondary Voltage | V | 100/√3 or 110/√3 or 120/√3 |
| Rated Burden in Class 0.2-0.5-1.0 | VA | 5 - 10 - 15 - 20 - 30 - 40... |
| Max. Rated Burden For Protection Purpose in Class 3P/6P | VA | 100 |
| Thermal Limiting Current For Earth Fault Detection Winding | A | 6 |
| Rated Voltage Factor (8h) | | 1,9 Un |
| Weight (approx.) | kg | 38 |

## VH24

- Outdoor application
- Cyloaliphatic epoxy resin insulated
- Ambient air temperature: -40°C to +55°C
- Altitude: Up to 1000 meters above sea level (>1000m on request)
- Exposure to solar radiation: More than 2.800 hours annually peaking at 1000W/m² for horizontal surfaces.
- Max. relative humidity: 100% Max. wind. velocity: 100km/h
- Standard: IEC 61869-3, ANSI, GOST, VDE

### VH24

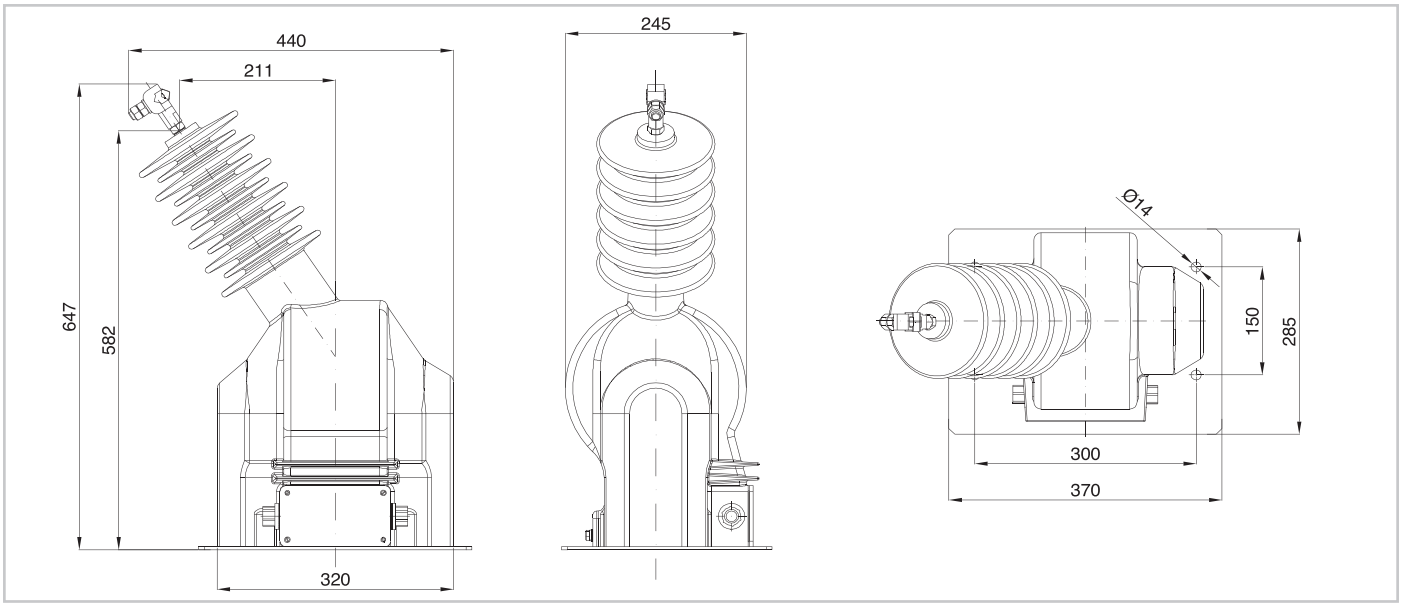



| TECHNICAL DATA | | |
|---|---|---|
| **TYPE** | | **VH24** |
| Rated Data | | |
| Highest Voltage For Equipment, Um(r.m.s.) | kV | Up to 24 |
| Test Voltages (maximum) | kV | 50/125 |
| Rated Freguency | Hz | 50 or 60 |
| Rated Primary Voltage, Un (max.) | kV | 24/√3 |
| Secondary Voltage | V | 100/√3 or 110/√3 or 120/√3 |
| Rated Burden in Class 0.2-0.5-1.0 | VA | 5 - 10 - 15 - 20 - 30 - 40... |
| Max. Rated Burden For Protection Purpose in Class 3P/6P | VA | 100 |
| Thermal Limiting Current For Earth Fault Detection Winding | A | 6 |
| Rated Voltage Factor (8h) | | 1,9 Un |
| Weight (approx.) | kg | 45 |

## VH36

- Outdoor application
- Cyloaliphatic epoxy resin insulated
- Ambient air temperature: -40°C to +55 °C
- Altitude: Up to 1000 meters above sea level (>1000m on request)
- Exposure to solar radiation: More than 2.800 hours annually peaking at 1000W/m² for horizontal surfaces.
- Max. relative humidity: 100% Max. wind. velocity: 100km/h
- Standard: IEC 61869-3, ANSI, GOST, VDE

### VH36

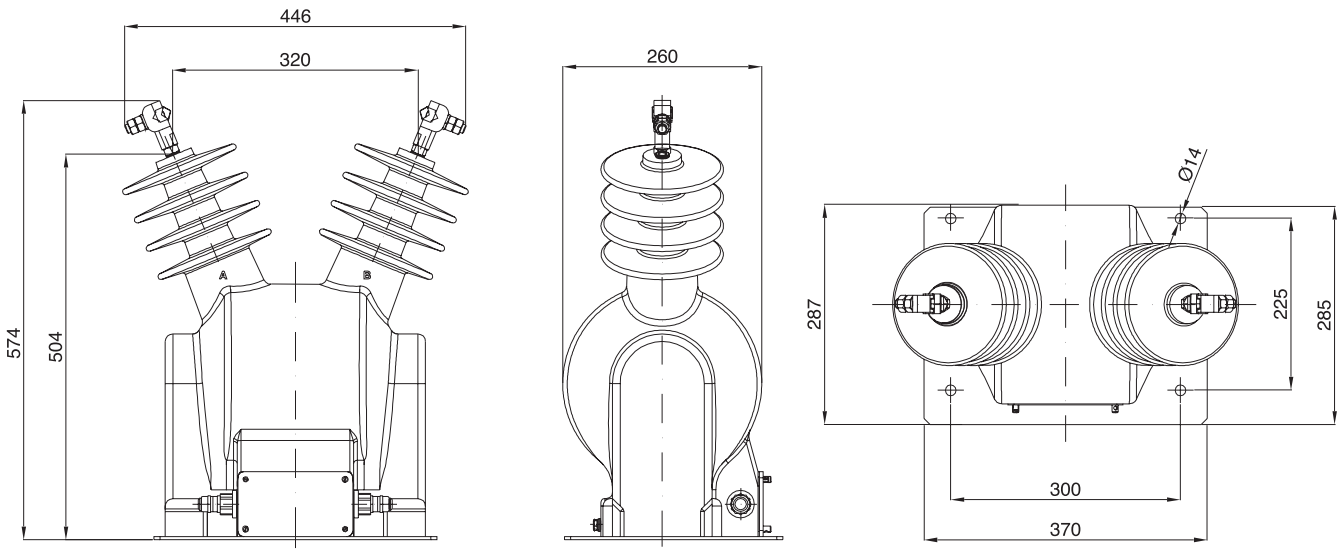



| TECHNICAL DATA | | |
|---|---|---|
| **TYPE** | | **VH36** |
| Rated Data | | |
| Highest Voltage For Equipment, Um(r.m.s.) | kV | Up to 36 |
| Test Voltages (maximum) | kV | 70/170 |
| Rated Freguency | Hz | 50 or 60 |
| Rated Primary Voltage, Un (max.) | kV | 36/√3 |
| Secondary Voltage | V | 100/√3 or 110/√3 or 120/√3 |
| Rated Burden in Class 0.2-0.5-1.0 | VA | 5 - 10 - 15 - 20 - 30 - 40... |
| Max. Rated Burden For Protection Purpose in Class 3P/6P | VA | 100 |
| Thermal Limiting Current For Earth Fault Detection Winding | A | 6 |
| Rated Voltage Factor (8h) | | 1,9 Un |
| Weight (approx.) | kg | 60 |

## 2VH24

- Outdoor application
- Cyloaliphatic epoxy resin insulated
- Ambient air temperature: -40°C to +55°C
- Altitude: Up to 1000 meters above sea level (>1000m on request)
- Exposure to solar radiation: More than 2.800 hours annually peaking at 1000W/m² for horizontal surfaces.
- Max. relative humidity: 100% Max. wind. velocity: 100km/h
- Standard: IEC 61869-3, ANSI, GOST, VDE

### 2VH24

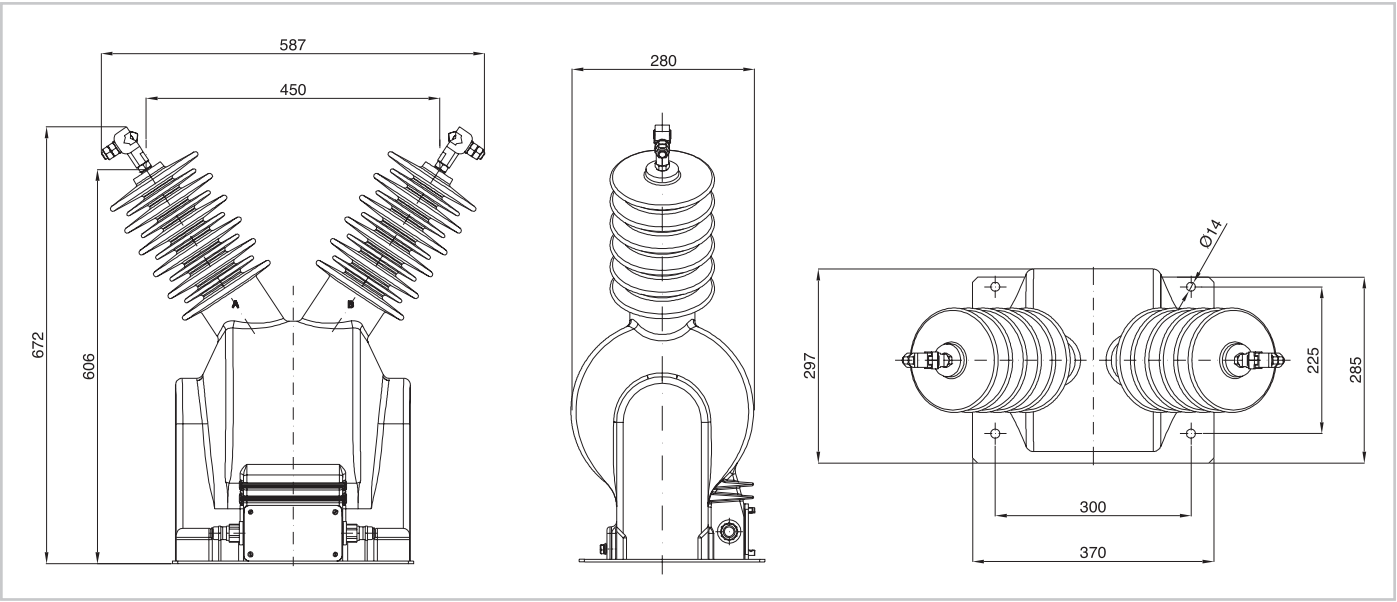



| TECHNICAL DATA | | |
|---|---|---|
| **TYPE** | | **2VH24** |
| Rated Data | | |
| Highest Voltage For Equipment, Um(r.m.s.) | kV | Up to 24 |
| Test Voltages (maximum) | kV | 50/125 |
| Rated Freguency | Hz | 50 or 60 |
| Rated Primary Voltage, Un (max.) | kV | 24 |
| Secondary Voltage | V | 100 or 110 or 120 |
| Rated Burden in Class 0.2-0.5-1.0 | VA | Max. 150 |
| Rated Voltage Factor (8h) | | 1,2 Un |
| Weight (approx.) | kg | 48 |

## 2VH36

- Outdoor application
- Cyloaliphatic epoxy resin insulated
- Ambient air temperature: -40°C to +55°C
- Altitude: Up to 1000 meters above sea level (>1000m on request)
- Exposure to solar radiation: More than 2.800 hours annually peaking at 1000W/m² for horizontal surfaces.
- Max. relative humidity: 100% Max. wind. velocity: 100km/h
- Standard: IEC 61869-3, ANSI, GOST, VDE

### 2VH36




| TECHNICAL DATA | | |
|---|---|---|
| **TYPE** | | **2VH36** |
| Rated Data | | |
| Highest Voltage For Equipment, Um(r.m.s.) | kV | Up to 36 |
| Test Voltages (maximum) | kV | 70/170 |
| Rated Freguency | Hz | 50 or 60 |
| Rated Primary Voltage, Un (max.) | kV | 36 |
| Secondary Voltage | V | 100 or 110 or 120 |
| Rated Burden in Class 0.2-0.5-1.0 | VA | Max. 150 |
| Rated Voltage Factor (8h) | | 1,2 Un |
| Weight (approx.) | kg | 65 |

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