

# VOLTAGE TRANSFORMERS FOR GIS APPLICATIONS



**VOLTAGE  
TRANSFORMERS  
FOR GIS APPLICATIONS**

# INFORMATION ABOUT THE SAFE OPERATION OF VOLTAGE TRANSFORMERS

## OPERATION CONDITIONS FOR POTENTIAL 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

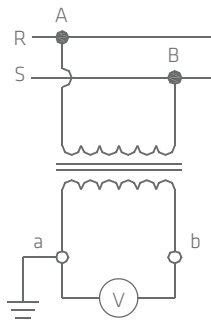
### Other important points and notes

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.

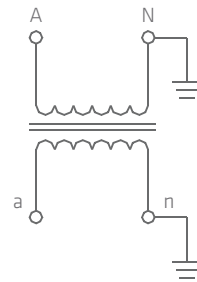
Ferroresonance can lead to the overheating and thermal destruction of the voltage transformer or high levels of voltages may be induced. In general, ferroresonance can be eliminated by the use of an appropriate resistor. The resistor is placed as a burden in open-delta circuit formed by three voltage 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 voltage transformers 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.

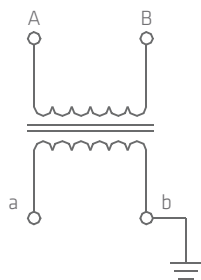
## ASSEMBLY



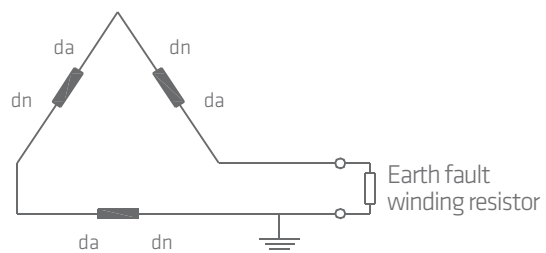
**FIGURE VT-1**



**FIGURE VT-3**



**FIGURE VT-2**



**FIGURE VT-4**

### Test Voltages

Highest voltage for equipment $U_m$ (r.m.s.)	Rated power-frequency withstand voltage (r.m.s.)	Rated lightning impulse withstand voltage (peak)
[kV]	[kV]	[kV]
12	28	75
17,5	38	95
24	50	125
36	70	170

# VOLTAGE TRANSFORMERS FOR GIS APPLICATIONS



**12-24-36kV**  
**Touch Proof Type**  
**Single pole insulated**  
**For switchgears insulated with SF6 gas**

## TECHNICAL DATA

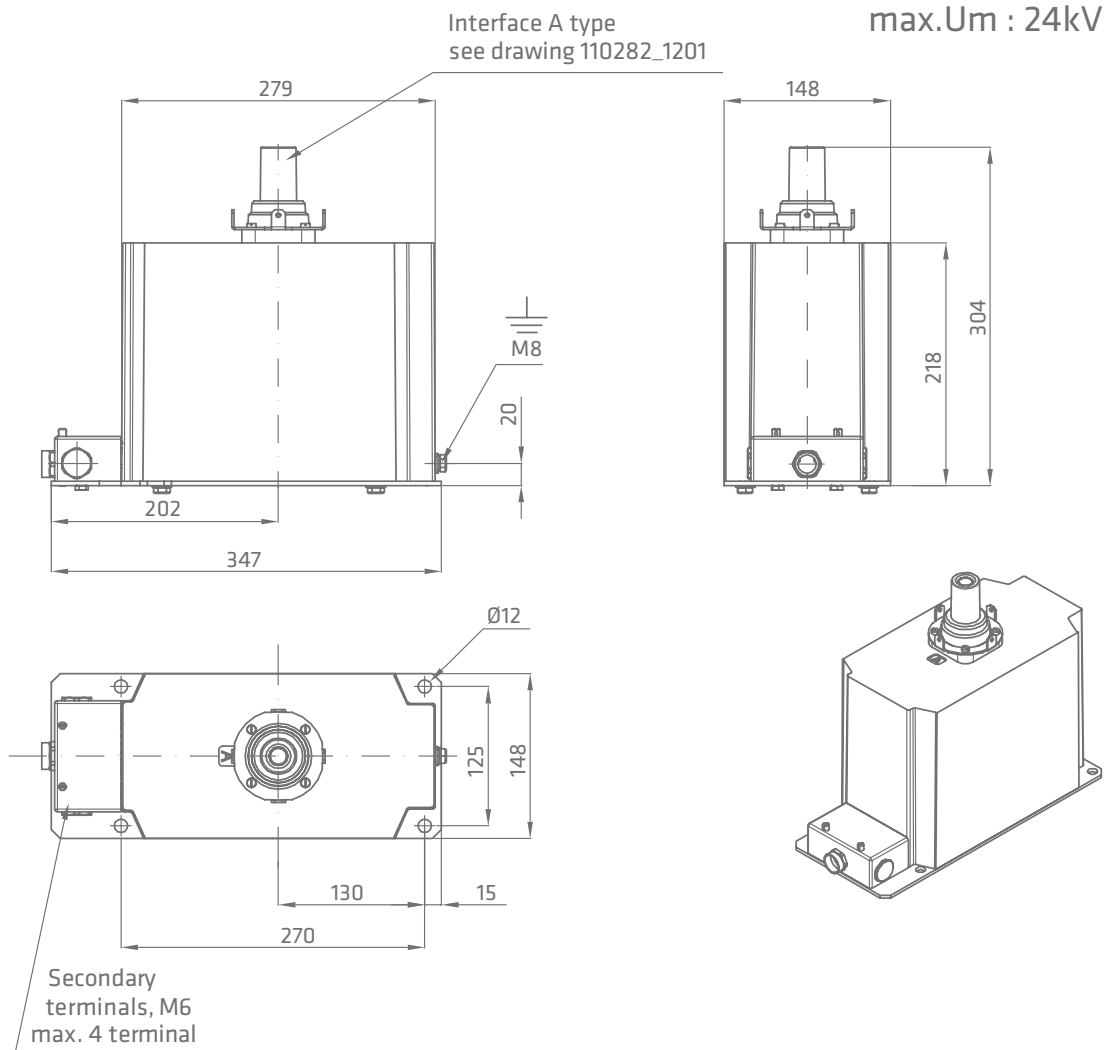
Type		VEI-24	VEG-36
Rated data			
Highest voltage for equipment, Um [r.m.s.]	[kV]	12 - 24	24-36
Test voltages	[kV]	28/75 - 50/125	50/125 - 70/170
Rated frequency	[Hz]	50 or 60	
Rated primary voltage, Un[max.]	[kV]	12/√3 24/√3	24/√3 36/√3
Secondary voltage	[V]	100 / √3 or 110 / √3 or 120 / √3	
Rated burden in class 0.2-0.5-1.0	[VA]	5-10-15-20-30-40-50-60...	
Maximum 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]	24	36

Other specifications available on request



### DIMENSIONS

### VEI-24A



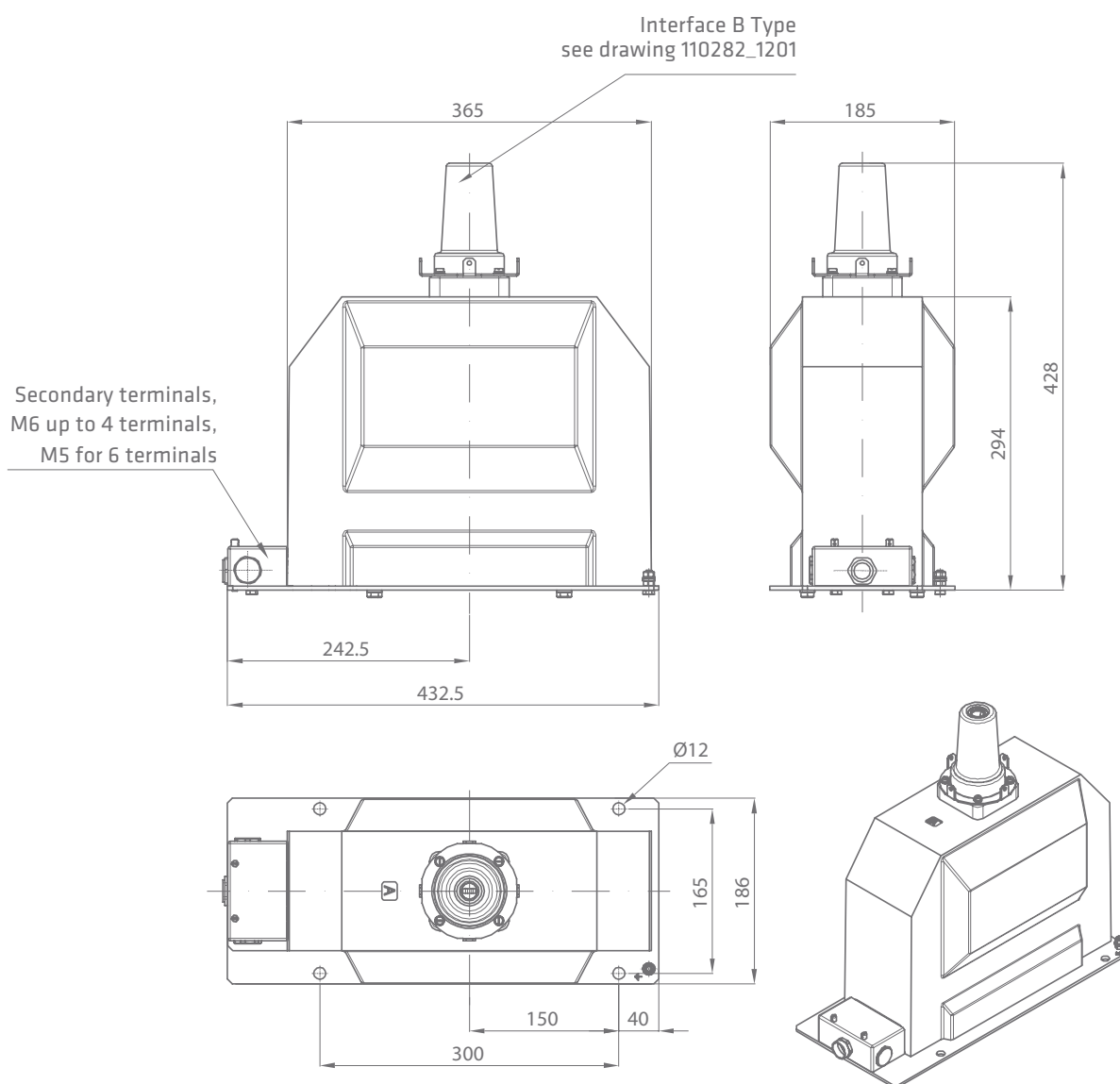
SCREW	TORQUE Nm
M5	2-2.5
M6	2.5-3.5
M8	16-20

NOTE: N terminal of primary winding connected to base plate

# VOLTAGE TRANSFORMERS FOR GIS APPLICATIONS

## VEG-36B

max. Um: 36kV



SCREW	TORQUE Nm
M5	2-2.5
M6	2.5-3.5
M8	16-20

NOTE: N terminal of primary winding connected to base plate

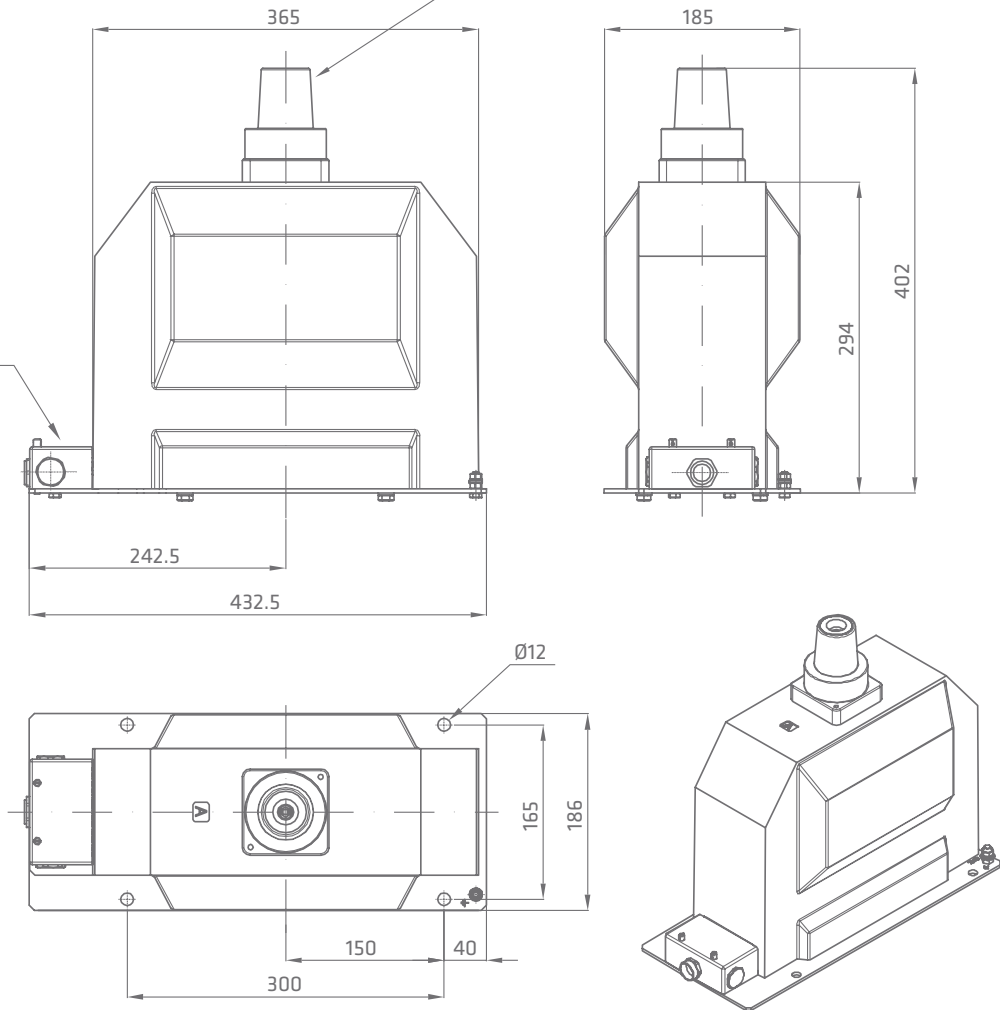
## DIMENSIONS

### VEG-36N

max. Um: 36kV

Interface N Type  
see drawing 110282\_1201

Secondary terminals,  
M6 up to 4 terminals,  
M5 for 6 terminals



SCREW	TORQUE Nm
M5	2-2.5
M6	2.5-3.5
M8	16-20

NOTE: N terminal of primary winding connected to base plate



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