



Transzwill Zrt.

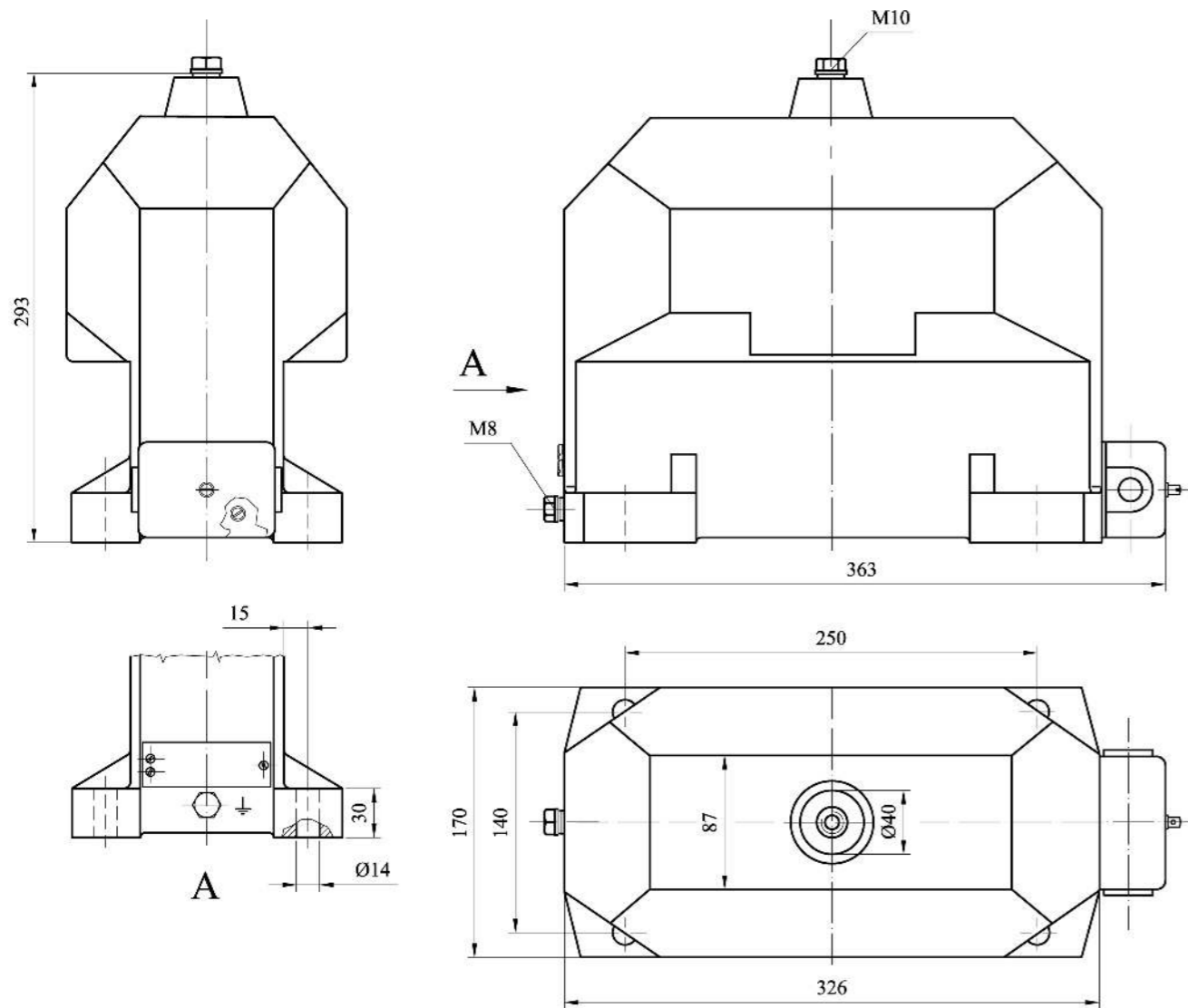


Figure 3. Voltage transformer type FME-24



FME-12, 24 FM-24

Synthetic resin insulated, indoor voltage transformers
for 12 kV and 24 kV highest voltage for equipment.
Types FM-24, FME-12, FME-24

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TYPE MARKING

The letters and numerals applied in type markings have the following meanings:

F	Voltage transformer
M	Synthetic resin insulated
E	Single pole insulated
12, 24	Highest voltage for equipment

GENERAL DESCRIPTION

The types FM and FME are of single-phase synthetic resin insulated indoor voltage transformers, manufactured for supplying the voltage coils of measuring instruments, relays and other devices in equipments with highest voltage of 12, 24 kV. The type FME is of single-pole insulated, applicable between phase and earth (earthed), while the type FM is of double-pole insulated, applicable between phase and phase design.

The voltage transformer is composed of primary (high voltage) and secondary (low voltage) windings, wound concentrically on a "C" type core made of cold rolled electrical steel, embedded entirely in synthetic resin insulation. The material of the windings and the terminals is copper. The secondary windings can be for measuring or protective purposes (in the case of type FME also for producing residual voltage) and the combination of the two respectively. The voltage transformers are available with 1 or 2 secondary windings, in the following accuracy classes: windings for measuring 0.2, 1 or 3, for protection 3P, 6P and for residual voltage 6P.

The voltage transformer comply with the specifications of MSZ EN 60044-2 and EN 60044-2 standards. It is also possible to produce according to other standards differing from the afore-mentioned.

STATE VERIFICATION

The secondary windings of the voltage transformers in class 0.5 (in case of type FME also in class 0.2) are manufactured in finish suitable for verification. The verification will be made only on special request, in this case it will be accomplished and documented by an official seal or an affixed verification stamp, by the National Office for Measures.

PACKING, DELIVERY

The voltage transformer is delivered in a finish suitable for use under normal climatic conditions, packed in corrugated paper box. Upon agreement, the delivery will be made in finish and packing, suitable for the required climatic zone.

STORAGE

In case of a long-term storage, it is practical, to keep the voltage transformer indoor, in a covered, well ventilated room (storage temperature: +5°C +40°C).

INSTALLATION, PUTTING INTO OPERATION OPERATION

Before installation the voltage transformer has to be checked in order to discover on the surface, or on the terminals any possible damages occurred during the transportation or the storage. In case of any damages further investigation is necessary. Generally the voltage transformer can be mounted in upright position by means of 4 pcs M12 bolts. The fastening to the supporting structure can be accomplished by the help of legs shaped on the bottom of the device. When fixing, it is advisable to put under the legs a rubber or a rubbercork plate, in order to equalize the accidental unevennesses. The bus bar can be connected to the high voltage terminal by M10 bolt.

The neutral primary terminal of the type FME is located beside the secondary terminals and the connection to this (system earthing), which should be accomplished according to the current local prescriptions, is possible by an M5 screw. The size of the screw used for the protective earthing is M8. The protective earthing of the voltage transformer is obligatory. The connection to the secondary terminals is achieved by M5 screw. The rating plate can be found on the opposite side to the secondary terminals.

The screws and washers applied on the voltage transformer are protected by hot-dip galvanizing or cadmium plating. The primary and secondary terminal markings on the voltage transformers (on the type FM: A, B, a, b on the type FME: A, N, a, n, da, dn) and the earthing symbol (\perp) are painted with high quality, durable indoor paint beside the terminals.

The secondary terminals are covered by a sealable plastic cap. Before connection, any contamination, occurred during the transportation and storage has to be removed, the terminals cleaned and smeared with contact vaseline. Application an overvoltage protection for the voltage transformers suggested. Operation is possible keeping the prescriptions of the relevant security-, labour- and property-protection directives. Any faults and breakdowns emerging in the customer's sphere of interest due to breaching, disobeying the afore-mentioned, exempt the manufacturer from the warranty and guarantee liabilities.

MAINTENANCE

The maintenance consists of works to be done according to the general rules for indoor instruments and discontinuing of the accidental irregularities. These are:

- periodical inspection of the contamination and cleaning, depending on the degree of impurity,
- inspection of the surfaces,
- tightening of the bolts of the primary and secondary connections,
- tightening of the fastening bolts.

DATA TO BE SUBMITTED WITH THE ORDER

- type (e.g. FME-24),
- rated insulation level (e.g. 24/50/125 kV),
- rated primary and secondary voltages (e.g. 20000/ $\sqrt{3}$ /100/ $\sqrt{3}$ /100/3 V),
- number, accuracy class, output of the secondary windings. (e.g. class 0.5, 30 VA),
- voltage factor (pl.: 1,9Un/8h),
- quantity,
- requested term of delivery.



OTHER OR SPECIAL REQUIREMENTS

- climatic zone of use other than normal,
- language of the rating plate,
- packing,
- number of pieces and sort of the documentation to be attached.

WARRANTY PERIOD, GUARANTEE

The warranty period is 12 months and otherwise it can also be established upon the mutual agreement of the parties respectively.

TECHNICAL DATA

Types	Unearthed FM-24	Earthed FME-12	Earthed FME-24
Highest voltage for equipment [kV]	12 , 24	12/√3	24/√3
Rated secondary voltage [V]	100, 110	110/√3, 110/√3	100/√3, 110/√3
Power frequency withstand voltage [kV] (r.m.s)	28, 50	28	50
Rated lightning impulse withstand voltage [kV] (peak)	75, 125	75	125
Rated frequency [Hz]	50		
Voltage factor	1,2 x U _n	1,9 x U _n (8 hours)	
Limit capacity [VA]	400		
Accuracy class, Output	According to table		
Residual voltage winding	-	Output: 30 VA; Accuracy class: 6P	
Class of insulation	B		
Climatic zone of use	Upon agreement		
Mass [kg]	30	22	30
Dimensions [mm]	Figure 1.	Figure 2.	Figure 3.

ACCURACY CLASSES RELATED TO THE RATED OUTPUTS

One secondary winding

Output [VA]	5	10	15	30	50	75	100	150	200
Accuracy class	0,2	0,2	0,2	0,2	0,5	0,5	1	1	3

Two secondary windings

1. winding	2. winding		Output [VA]								
	5	10	15	30	40	50	75	100			
Output [VA]	5	0,2	0,2	0,2	0,5	0,5	0,5	1	1	1	1
	10	0,2	0,2	0,2	0,5	0,5	0,5	1	1	1	1
	15	0,2	0,2	0,2	0,5	0,5	0,5	1	1	1	1
	30	0,5	0,5	0,5	0,5	0,5	0,5	1	1	1	1
	40	0,5	0,5	0,5	0,5	0,5	1	1	1	1	1
	50	0,5	0,5	0,5	0,5	1	1	1	1	1	1
	75	1	1	1	1	1	1	1	3	3	3
	100	1	1	1	1	1	1	3	3	3	3



accuracy of the first secondary winding
accuracy of the second secondary winding

MAXIMAL SECONDARY LOADING CURRENTS (I_{tmax})

Single pole insulated voltage transformer

		U ₂ [V]	100/√3	100	110/√3	110
I _{tmax} [A]	One winding	1. wind	7	4	6,3	3,6
		Two windings	1. wind	3,5	2	3,2
		2. wind	3,5	2	3,2	1,8
	Signaling winding	U ₂ [V]	100/3		110/3	
		3. wind	0,9		0,8	

MAXIMAL SECONDARY LOADING CURRENTS (I_{tmax})

Double pole insulated voltage transformer

		U ₂ [V]	100	110
I _{tmax} [A]	One winding	1. wind	4	3,6
	Two windings	1. wind	2	1,8
		2. wind	2	1,8

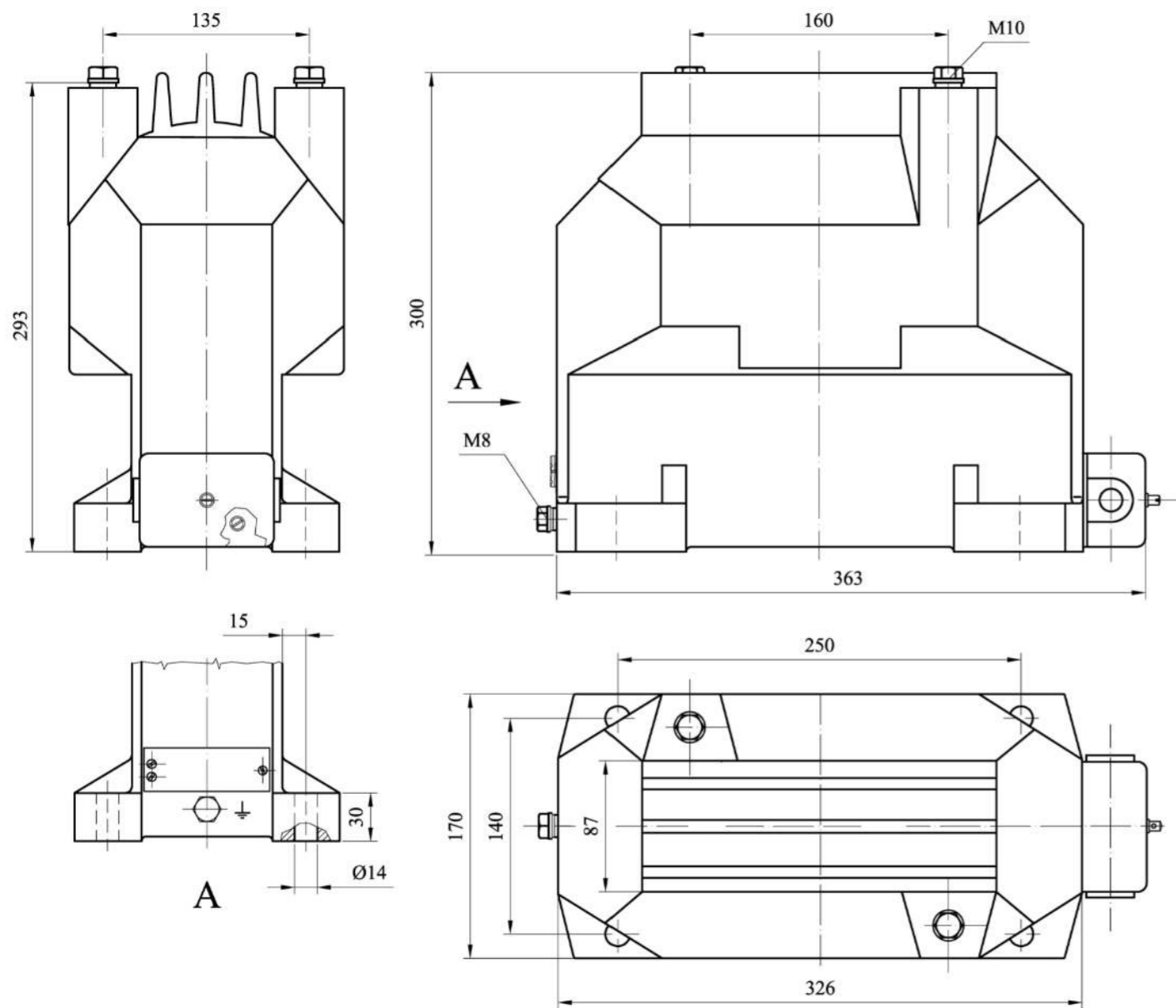


Figure 1. Voltage transformer type FM-24

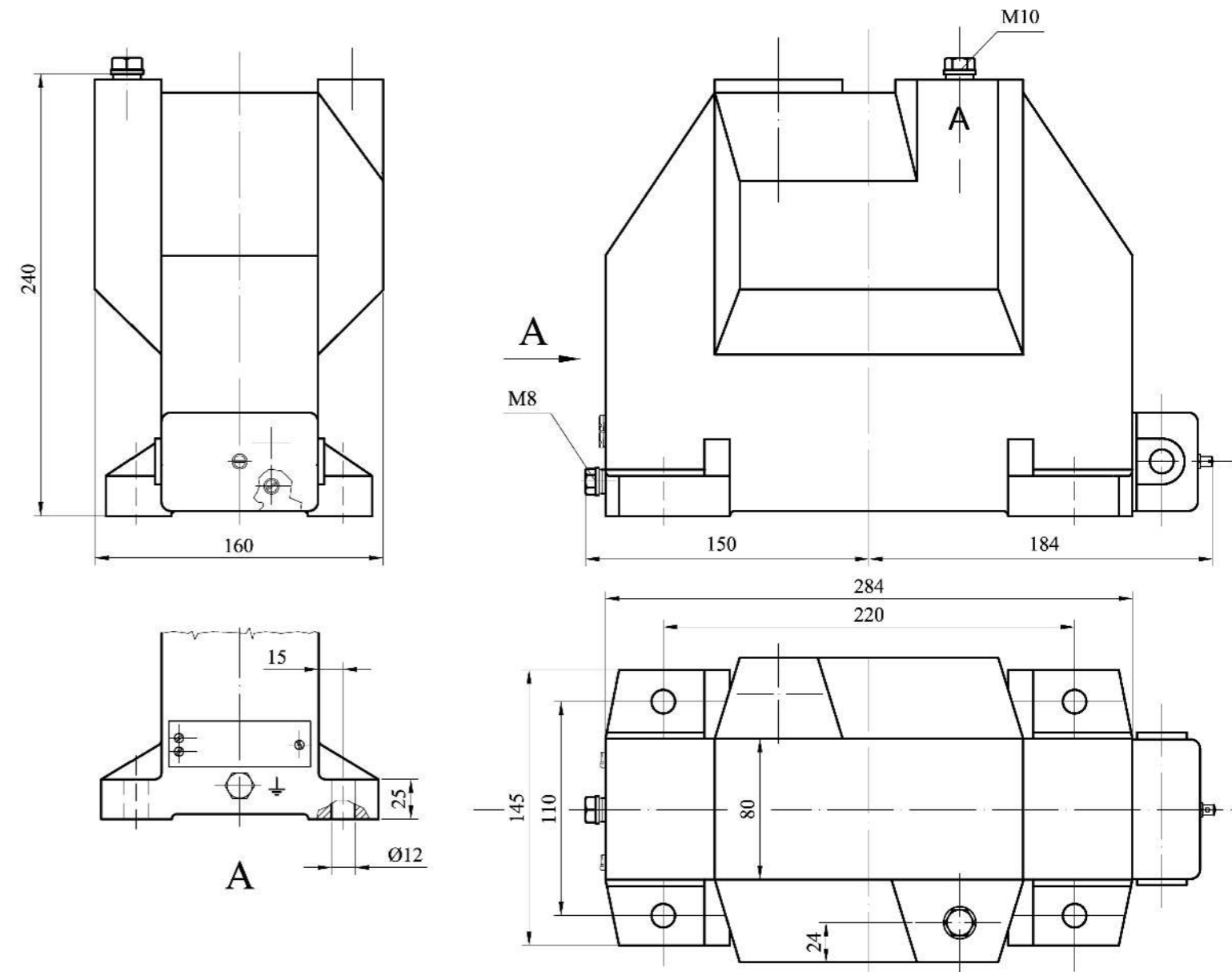


Figure 2. Voltage transformer type FME-12