

Dry-type transformers



Reference list

Picture+drawing



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**H.V THREE-PHASE
TRANSFORMERS
DRY TYPE SELF-COOLING
IN AIR, 25 TO 1 000 kVA**

To UTE C52100 ou IEC726 standards

General:

- These transformers are designed for voltage networks from 5 to 20kV,50Hz, with secondary voltage at not load of 400 to 231V, with neutral. They have generally a lighter weight than equivalent transformers, immersed in oil or askarel. They may be installed near the place of use, since these units do not include any liquid causing any constraint. Their very simple maintenance is limited to a periodical de-dusting with dry compressed air.

Thanks to the selection of the insulating materials used for the construction, and the full impregnation of the units, a good stability of the insulating characteristics is guaranteed. The Nomex covering used on the low voltage conductors as well as most of the insulating shims show good self-extinguishing characteristics.

Construction:

- The copper low voltage winding is made of helically wound conductors as far as small units are concerned or of copper strip for higher power units.

- The H.V winding has several multilayer coils made with enamelled wire. The grounding insulation of this winding is most frequently achieved by means of porcelain insulators provided with waves. The H.V windings are separated from each others and from the low voltage windings by means of insulating shields which allow to maintain in the course of time the insulation values.

-In the active part, the spacers used are made from impregnated glass mat or glass laminated. The flexible insulating materials are based on glass or Nomex.

-The winding and magnetic circuit cooling is carried out by natural air circulation in the cooling ducts.

-All the active part is submitted to a full impregnation under vacuum and pressure before being polymerized at approx. 170°C.

-The insulation materials and varnishes used are designed for operating in F heat class i.e. 155°C at the hottest point. The temperature rise of the winding, measured by resistance variation is limited to 100°C. Do not forget that the standard conditions of environment are limited by the following max. values: altitude:1000 meters, and max. temperature: 40°C.

- Winding coupling: the standard coupling is Dyn11 except for units from 25 to 160kVA, with 15 or 20kV voltage for which it is Yzn11.

INSULATION LEVEL 20 kV																		high voltage 5 - 6,6kV					with enclosure IP215			
A	B	C	D	E	F	G	J400V	J231V	K	M	N	P	Q	R	rollers	weight	kVA	A'	B'	C'	weight					
790	590	835	600	450	75	150	740	740	55	80	300	210	305	610	80	245	25	1020	700	1210	310					
790	590	975	600	450	75	150	880	880	55	80	300	210	305	750	80	305	50	1020	700	1350	375					
925	650	1015	680	500	85	170	920	920	65	100	340	255	325	790	125	530	100	1150	740	1410	610					
925	650	1165	680	500	85	170	1095	1095	150	100	340	255	325	940	125	625	160	1150	740	1560	715					
1060	670	1135	760	500	95	190	1065	1065	160	110	380	270	335	910	125	790	200	1290	780	1520	885					
1060	670	1215	760	500	95	190	1145	1145	160	110	380	270	335	990	125	875	250	1290	780	1600	980					
1060	670	1325	760	500	95	190	1255	1275	160	110	380	270	335	1100	125	980	315	1290	780	1710	1090					
1220	700	1315	880	550	110	220	1245	1265	170	120	440	280	345	1080	125	1240	400	1440	820	1750	1370					
1220	700	1445	880	550	110	220	1395	1395	170	120	440	280	345	1210	125	1440	500	1440	820	1900	1580					
1310	750	1485	960	600	120	240	1435	1505	180	130	480	295	355	1250	125	1700	630	1530	840	1940	1850					
1370	750	1525	960	600	120	240	1475	1555	190	140	480	305	365	1290	125	2110	800	1590	860	2040	2280					
1370	750	1695	960	600	120	240	1715	1725	190	140	480	305	365	1455	125	2440	1000	1590	860	2210	2630					
overall dimensions																		with enclosure				overall dimensions				
low voltage																		high voltage					diverse			

INSULATION LEVEL 50 kV																		high voltage 20kV					with enclosure IP215			
A	B	C	D	E	F	G	J400V	J231V	K	M	N	P	Q	R	rollers	weight	kVA	A'	B'	C'	weight					
950	590	1060	600	450	75	150	910	910	55	80	300	210	360	780	80	310	25	1300	900	1380	410					
950	590	1200	600	450	75	150	1050	1050	55	80	300	210	360	920	80	375	50	1300	900	1520	480					
1090	650	1240	680	500	85	170	1090	1090	65	100	340	255	380	960	125	650	100	1440	950	1580	770					
1090	650	1390	680	500	85	170	1265	1265	150	100	340	255	380	1110	125	750	160	1440	950	1730	880					
1230	670	1360	760	500	95	190	1235	1235	160	110	380	270	390	1080	125	945	200	1580	980	1690	1085					
1230	670	1440	760	500	95	190	1315	1315	160	110	380	270	390	1160	125	1030	250	1580	980	1770	1180					
1230	670	1550	760	500	95	190	1425	1445	160	110	380	270	390	1270	125	1140	315	1580	980	1880	1300					
1370	700	1540	880	550	110	220	1415	1435	170	120	440	280	400	1250	125	1435	400	1720	1020	1920	1610					
1370	700	1670	880	550	100	220	1565	1565	170	120	440	280	400	1380	125	1635	500	1720	1020	2070	1830					
1460	750	1710	960	600	120	240	1605	1675	180	130	480	295	410	1420	125	1930	630	1810	1050	2110	2140					
1520	750	1750	960	600	120	240	1645	1725	190	140	480	305	420	1460	125	2380	800	1870	1090	2210	2610					
1520	750	1920	960	600	120	240	1885	1895	190	140	480	305	420	1625	125	2710	1000	1870	1090	2380	2960					
overall dimensions																		with enclosure				overall dimensions				
low voltage																		high voltage					diverse			

Dimensions in mm and weight in kg.

For transformer without enclosure

Insulation level 28kV(network 10kV) --> length less 135 mm, height less 110 mm.

Insulation level 38kV(network 15kV) --> Length less 85 mm, height less 60 mm.

Finish and accessories

The basic type consists of the active part only to be mounted in a cubicle, provided with its connecting parts arranged at the top.

Standard accessories

Earthing terminal

Name plate

Lifting rings

Adjusting taps at $\pm 5\%$ on the H.V winding, by moving strips on the terminal boards placed before the windings.

Rollers orientable in two perpendicular directions.

On request

- Make thermostatic contacts arranged on the low-voltage winding and connected to a terminal board.

-IP215 enclosure: in this case, the H.V cables of dry type pass through the cover by means of glands to be supplied by the customer. Removable plates on the small sides ensure in the same way the low voltage cable inlets.

- Low voltage and medium outgoing lines at the bottom.

-Electrostatic screen between windings.

-Low voltage other than 400V or 231V - dual voltage 231 and 400V.

-Dual primary voltage.

-single-phase or Scott type transformers, frequency other than 50Hz.

TECHNICAL GUARANTEES FOR LOW VOLTAGE 400V										
Rated power kVA	No load losses kW	Load losses (115°) kW	Impedance voltage %				Efficiency for different load			% $\cos\varphi = 0,8$ 1/4
			Insulation voltage				4/4	3/4	2/4	
			20kV	28kV	38kV	50kV				
25	0,36	0,75	4	4	4,5	5,5	94,4	94,8	94,6	91,9
50	0,42	1,45	4	4,2	5	6	95,3	95,9	96,1	94,9
100	0,75	2,20	4	4,2	5	6	96,3	96,7	96,7	95,6
160	0,9	3,30	4	4,2	5	6	96,7	97,1	97,3	96,5
200	0,95	3,70	4,2	4,5	5	6	97,1	97,5	97,7	97
250	1,00	3,80	4,2	4,5	5	6	97,6	97,9	98	97,5
315	1,13	4,50	4,2	4,5	5	6	97,8	98,1	98,2	97,8
400	1,20	5,40	4,2	4,5	5	6	97,9	98,2	98,4	98,1
500	1,50	6,70	4,2	4,5	5	6	97,9	98,2	98,4	98,1
630	1,70	8,00	4,2	4,5	5	6	98	98,3	98,5	98,3
800	2,10	10	4,2	4,5	5	6	98,1	98,4	98,5	98,3
1000	2,40	12	4,2	4,5	5	6	98,2	98,5	98,6	98,4

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