ISO 9001:2000
ISO 14001:2004
PN-N-18001:2004

FABRYKA TRANSFORMATORÓW w Żychlinie

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POWER TRANSFORMERS

EN 60076-1

2,5 – 80 MVA
6 – 132 kV

Catalogue Sheet No. **71**

Application

The transformer reduces voltage in power networks.

Operating conditions

The standard type of the transformer can operate in a moderate climate.
They can be installed in altitude of up to 1000 m outdoors or in sufficiently ventilated premises, in an atmosphere free of dust and chemically active or explosive gasses.
Ambient temperature ranges from -25°C to +40°C (248°K to 313°K), average yearly temperature must not exceed +20°C (293°K).
The transformers are adapted to continuous work and loading conditions are compliant with the PN-71/E-81000 standard and IEC Publ. no. 354.

Tolerances

According to valid standards related to transformers' parameters, following tolerances are envisaged:

- losses of no-load state +15%
- losses of loading state +15%
- total losses +10%
- no-load state current +30%
- short-circuit voltage ±10%

Construction

Three-column cores of transformers are made of cold-rolled transformer sheet, covered with inorganic insulation. Mitred sheets of the core are spliced to ensure the reduction of no-load losses and a noise level.
The transformers' windings are manufactured with electrolytic copper in paper insulation.
A tap-changer for underload control on the HV side is built into the transformer and is provided with a 3x400/230 V, 50 Hz voltage motor, 230V, 50 Hz control voltage. The drive can be remotely or locally electrically controlled and also can be driven manually with a crank. The drive is equipped with a tap-changer location indicator.
A tank without extra accessories withstands the difference between internal and external pressure of ±500 hPa. The tank's structure allows for the lifting of the transformer with a hydraulic lift, overhead cranes or hoists. A two-chamber conservator (a separate chamber for a tap-changer under load). There are also radiators installed on the transformer's tank that – if necessary – can be dismounted.
The radiators have plugs for an oil outlet and deaeration and are installed into the tank with locks that enable to cut off oil in the tank from the radiators. The radiators are galvanised. The transformer is coated with weather-resistant paint.

Transformer's accessories.

Test valves for oil tests from the upper and lower part of the tank, valves for draining and filling with oil on the tank and the conservator for the filtering of oil, plugs in the tank's bottom for draining sediments and residues of oil, earth clamps on the tank, supports and eyes for the lifting and handling of the transformer, wheels in the body with sills for moving in two directions with the spacing of 1505 mm.

Bushings.

3 HV phase seal wires and one HV neutral point seal wire as well as 3 LV seal wires will be installed on the transformer's enclosure.
Nominal voltage of bushings:

- HV line terminals: 123 kV (condenser insulators)
- neutral point terminal: 52 kV (condenser insulators)

- LV line terminals: 24 kV (oil insulators)

Inspection-measuring equipment.

- Buchholz relays with contacts for signalling and shutting down the transformer
- pressure relay for the underload change-over switch
- two magnetic indicators for the level of oil in the conservator (for transformer and switch) with signalling contacts working in the reduced level of oil below a permissible level
- two air dehumidifiers
- contact plate-thermometers for measuring oil temperature with the maximal temperature indicator and contacts for signalling and shutting down the transformer
- resistance thermometer with an indicator for installation in a switching station
- safety valve with release contacts
- control circuits for safety equipment are installed in the terminal box located in the transformer

International standards and requirements

PN-EN 60076-1 - Transformers. General requirements.
EN 60076-1 – Power transformers (IEC Publ. nr 76.1)

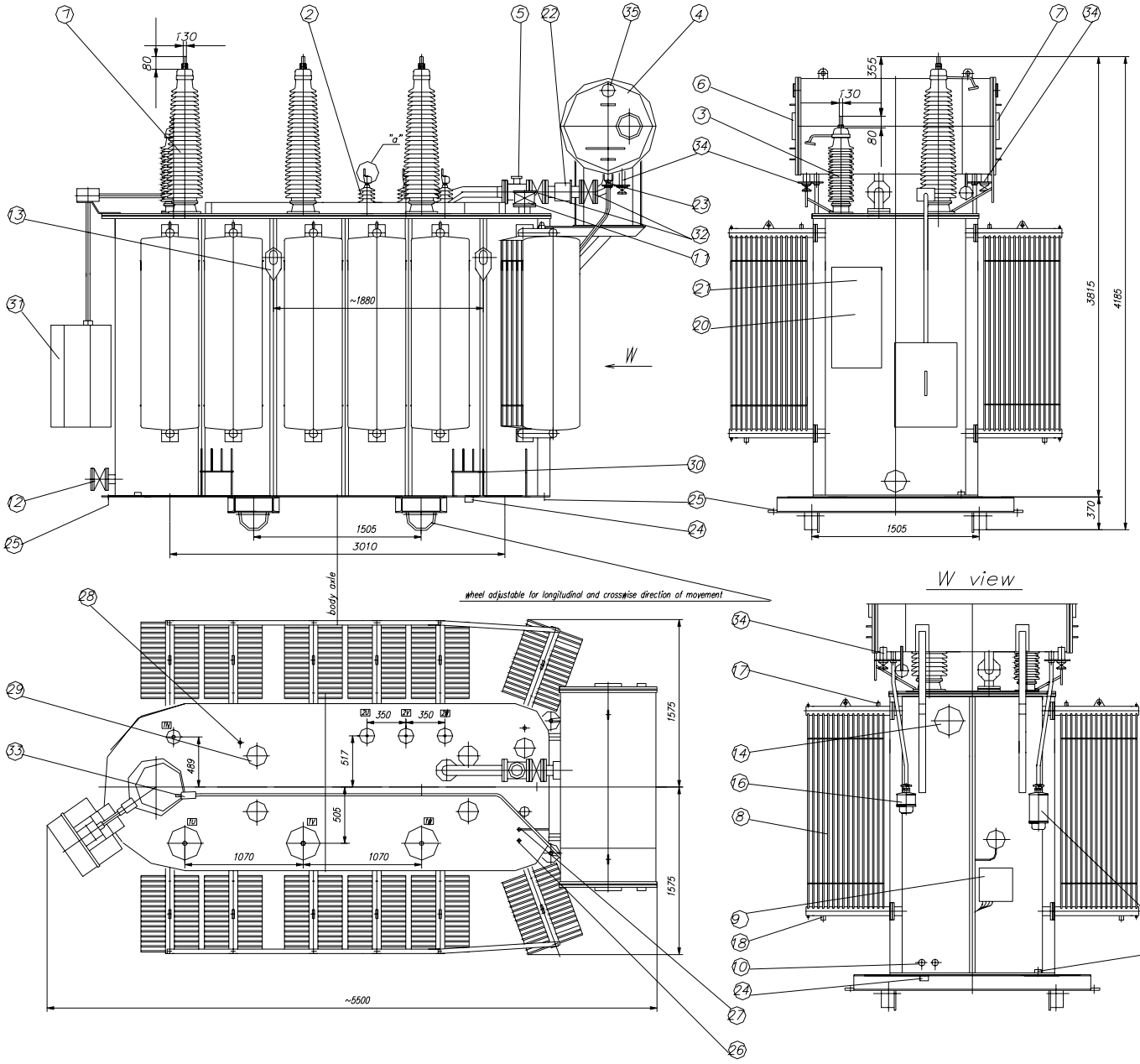
The manufacturer reserves the right to make alternations in the catalogue's data related to the product modernisation. Other constructional types can be agreed upon with the Company.
Fabryka Transformatorów renders guarantee and post-guarantee services and carries out refurbishments and examinations of its products.

Transformers with under load control

No.	Type	Power	HV Voltage	LV Voltage	Freq.	Regulation Range	Vector Group	Imped. Voltage	No-load loss	Load loss	Total Mass	Oil Mass	Length	Width	Height	Wheel track
		kVA	V	V	Hz	%	-	%	kW	kW	kg	kg	mm	mm	mm	mm
1.	TORc 4000/15	4000	16500	6300	50	±10/±8st.	YNd11	6	4	25	12000	3300	4150	2560	2730	1505
2.	TORc 6300/16.5	6300	16500	6300	50	±12/±8st.	YNyn0	7	5,5	40	14800	3800	4150	2740	2890	1505
3.	TORc 6300/115	6300	115000	16500	50	±10/±8st	YNd11	7,5	7,5	37	18200	4500	4995	2810	3350	1505
4.	TORc 10000/115	10000	115000	16500	50	±10/±8st.	YNd11	10,5	7	65	24600	6900	5550	2900	3715	1505
5.	TORc 16000/115	16000	115000	16500	50	±10/±8st.	YNd11	12	9	79,5	30000	7500	5390	3090	3650	1505
6.	TORc 20000/115	20000	115000	10500	50	±10/±8st.	YNd11	11	13,9	119	32500	7500	5320	3090	4050	1505/3010
7.	TORc 25000/115	25000	115000	16500	50	±16/±12st	YNd11	18	14	130	42500	9500	6185	3630	3765	1505/3010
8.	TORc 25000/115F	25000	115000	15750	50	±15/±12st	YNd11	11	7,2	155	39000	9000	5770	2900	4180	1505/3010
9.	TORc 25000/115	25000	115000	15000	50	±10/±8st.	YNd11	11	15	125	35000	8000	5375	2570	3875	1505/3010
10.	TORc 31500/115	31500	115000	33000	50	±16/±12st	YNd11	10,5	22	150	42200	9200	5925	2930	4315	1505/3010
11.	TORc 31500/115F	31500	115000	15750	50	±15/±12st	YNd11	18	9	180	43000	9500	5860	3020	4290	1505/3010
12.	TORc 40000/115	40000	115000	22000	50	±15/±12st	YNd11	12	14,5	158	50500	9300	6010	3060	4500	1505/3010
13.	TOTRc 40000/115	40000/25000/40000	115000	6300/15750	50	±15/±12st	YNd11d11	18/11/6	13,1	171	61000	12500	6100	3150	4750	1505/3010
14.	TORc 50000/115	50000/50000/16670	115000	15750(10500)	50	±15/±10st	YNyn0(d5)	18	17,5	245	67000	19000	6550	3440	4850	1505/3010
15.	TORc 60000/115F	60000	115000	15750	50	±10/±8st.	YNd11	18	23	235	61000	12500	6120	3500	4700	1505/3010

Transformers with dead control

No.	Type	Power	HV Voltage	LV Voltage	Freq.	Regulation Range	Vector Group	Imped. Voltage	No-load loss	Load loss	Total Mass	Oil Mass	Length	Width	Height	Wheel track
		kVA	V	V	Hz	%	-	%	kW	kW	kg	kg	mm	mm	mm	mm
16.	TOc 4000/35	4000	35000	6300	50	±2x2,5	YNd11	6,5	4,3	28	11600	2250	3135	2400	3040	1505
17.	TOc 6300/20	6300	21000	6300	50	±2x2,5	YNyn0	7	6,5	42	14000	2750	3240	2180	3485	1505
18.	TOc 8200/15	8200	15750	15750	50	±2x2,5	Dd0	6	7,5	43	14500	2900	3435	2890	2815	1505
19.	TOc 10000/15	10000	15750	10500	50	±2x2,5	YNd11	7	11	63	16000	3700	3860	2460	3610	1505
20.	TOc 10000/30	10000	31500	6300	50	±2x2,5	YNd11	7	11,5	59	16500	3200	3715	2880	3270	1505
21.	TOc 16000/20	16000	21000	10500	50	±2x2,5%	YNyn0	8	17	100	32400	6700	4720	3010	4065	1505
22.	TOc 25000/30	25000	31500	6300	50	±2x2,5%	YNd11	8	18	120	37000	7500	4450	2940	4430	1505
23.	TOc 30000/110	30000	11000	10500	50	±10/±8st.	YNd11	11	21	145	42500	8900	5435	3670	4325	1505/3010
24.	TOc 40000/115	40000	115000	10500	50	±10/±4st.	YNd11	12,5	20	140	68000	16000	6570	3920	5100	1524/2000
25.	TOc 63000/30	63000	33000	10500	50	±2x2,5	YNd11	13	28	280	71000	13600	5980	4170	4800	1505/3010



⑦ HV seal wire PTK 123/550/630
② LV seal wire PTK 20/630
③ N seal wire PTK 72.5/325/630
④ Conservator
⑤ BF–80/10 Bucholz relay
⑥ MWP 220 transformer oil level indicator
⑦ MWP 220 change–over switch oil level indicator
⑧ B2/520–FG–1800x16x80–Zn radiators
⑨ Spacial 3000 installation box
⑩ Plugs for taking oil samples from tank
⑪ ø80 ball valve for oil filler and filtering
⑫ ø80 ball valve for oil drain and filtering
⑬ Pins for lifting the transformer
⑭ ZUB 55 safety release valve
⑮ Transformer air dehumidifier 4 l
⑯ Switch air dehumidifier 2 l
⑰ Radiator dehumidifying screw
⑱ Oil for draining oil from radiator
⑲ Earth clamps
⑳ Identification and diagram plate
㉑ Access for control of tap–changers
㉒ ZOK–80 cut–off valve
㉓ Valve for draining oil from conservator
㉔ Valve for draining residues of oil from transformer
㉕ Eye for transformer handling
㉖ Resistance thermometer sensor
㉗ Plate–contact thermometer sensor
㉘ Mercurial thermometer pocket
㉙ Access for lifting removable part
㉚ Support for lifting transformer
㉛ Tap–changer
㉜ ø80 ball valve
㉝ URF25/10 safety contact for tap–changer
㉞ ø40 ball valve for filling and draining oil from conservator
㉟ Oil filler for conservator

Transformer total weight 36,7 t
Removable part weight 19,8 t
Oil weight 8,8 t

TORb 16000/115

115000 ±10% / 21000 V