

LAMPIRAN

1. Data hasil Uji Indeks Polarisasi Transformator 2 Gardu Induk Kentungan 150kV Tahun 2017

	PT. PLN (PERSERO) TRANSMISI JAWA BAGIAN TENGAH AREA PELAKSANA PEMELIHARAAN SALATIGA Jl. Diponegoro No. 149 Salatiga Telp. (0298) 323167/323168 Fax. (0298) 323169		
	DAFTAR LAMPIRAN "LAPORAN TEKNIK"		
	Merk / Type / No. Serie	/ / /	/ / /
Teg. / Daya / INo.	/	/	
Lokasi GI. / Tanggal	Kentungan	19/11/2017	

LEMBAR HASIL PENGECEKAN TRANSFORMER PENGUJIAN / PENGUKURAN TAHANAN ISOLASI

NO	AKTIFITAS	STANDARD VDE	HASIL SEBELUMNYA			KONDISI AKHIR			KETERANGAN		
			1 MINUTE	10 MINUTE	IP	1 MINUTE	10 MINUTE	IP			
A	B	C	G	H	IP	K	L	M	N		
1	SETELAH TRAFU OFF : TEMP TRAFU										
	1	PRIMARY - GROUND	STANDARD VDE (CATALOUGE 228/4) 1kV = 1 M Ω IP (NORMAL) = 1,25 - > 2,0 IP = 10 Minute / 1 Minute				3280	54700	1,66		
	2	SEKUNDARY - GROUND					30700	36700	1,84		
	3	TERTIER - GROUND					29500	63900	2,16		
	4	PRIMARY - SEKUNDARY					25700	49400	1,92		
	5	PRIMARY - TERTIER					49700	79700	1,59		
	6	SEKUNDARY - TERTIER					18400	56100	1,85		
	7	PRIMARY & SEKUNDARY - TERTIER									
8	PRIMARY & SEKUNDARY - GROUND										
2	TAHANAN PENTANAHAN	< 1 Ω									
3	Catatan :										
Pelaksana pengujian			Tanda tangan			Pengawas pekerjaan			Tanda tangan		
1. Eddy 2. Yon 3.						Marwanto					

Standard (Buku O&M Trafo):

Hasil Uji	Ket	Rekomendasi
< 1	Berbahaya	Investigasi
1-1.1	Jelek	Investigasi
1.1-1.25	Dipertanyakan	Uji Kadar minyak, uji tan delta
1.25-2	Baik	-
>2	Sangat baik	-

2. Data hasil Uji Tangen Delta Transformator 2 Gardu Induk Kentungan 150kV Tahun 2017



THREE-WINDING TRANSFORMERS
CAPACITANCE AND POWER FACTOR TESTS



STATION: GI KENTUNGAN AMBIENT TEMP: 35,1 °C DATE: 19/01/2017
 SITION: TRAFO 2 HUMIDITY: 50,7 % JOB #: _____
 JIPMENT LOCATION: BAY TRAF0 2 ASSETID: APP SALATIGA

MFR: <u>XIAN</u>	CLASS: _____	PHASES: <u>3</u>	BUSHING NAMEPLATE						
R NO: _____	COOLANT: <u>OIL</u>	REASON: <u>Routine</u>	DSG	SERIAL NUM	MFR	TYPE/CLASS	KV	AMPS	YEAR
YEAR: <u>1995</u>	BIL: <u>170</u>	W/ WEIGHT: <u>102000 kg</u>	1U	N101294	HAEFELY	COT	170	800	1994
WINDING MATERIAL: <u>Cu</u>			1V	N101184	HAEFELY	COT	170	800	1994
OIL VOLUME: <u>260000 kg</u>			1W	N101094	HAEFELY	COT	170	800	1994
OIL TEMP: <u>37 °C</u>			1N						
IMPEDANCE: _____ %			2U						
WEATHER: <u>Sunny</u>			2V						
TANK TYPE: <u>SEALED</u>			2W						
			2N						
			3U						
			3V						
			3W						
			3N						

Diagram # 29 (IEC)

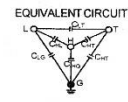
VOLTAGE (KV)	KVA	RATED I	# TAPS	NOMINAL	CHANGER	TAP SETTING
10,00			5	3	Off Load	
10,00			1			
10,00			1			

TEST FREQUENCY: 50 COMMENTS: _____

INSULATION TESTED	Test Mode	Test Lead Connections				TEST kV	Freq Sweep	Capacitance C (pF)	POWER FACTOR %				%VDF	IR	
		H/V	Red	Blue	Gnd				Measured	@ 20°C	Corr Factor	DIRECT			
		mA	Watts												
C _{HG} + C _{HL}	GSTg-B	H	L	T	G	10,00		10.262,25	0,23	0,21	0,905	32,205	0,7617	0,03	
C _{HG}	GSTg-RB	H	L	T	G	10,00		3.559,49	0,32	0,29	0,905	11,156	0,3589	0,03	
C _{HL}	UST-R	H	L	T	G	10,00		6.721,79	0,18	0,19	0,905	21,114	0,3839	0,02	
C _{HL}		Test 1 Minus Test 2						6.702,76			0,905	21,049	0,393		OK
C _{LG} + C _{LT}	GSTg-R	L	H	T	G	10,00		15.993,71	0,27	0,25	0,905	50,191	1,3592	0,03	
C _{LG}	GSTg-RB	L	H	T	G	10,00		1.277,45	0,66	0,60	0,905	4,010	0,2653	0,03	
C _{LT}	UST-B	L	H	T	G	10,00		14.749,85	0,23	0,21	0,905	46,290	1,0686	0,02	
C _{LT}		Test 5 Minus Test 6						14.716,26			0,905	46,181	1,094		OK
C _{TG} + C _{HT}	GSTg-B	T	H			2,00		12.632,65	0,37	0,33	0,905	8,101	0,0596	0,02	
C _{TG}	GSTg-RB	T	H			2,00		12.766,30	0,37	0,33	0,905	8,021	0,0593	0,02	
C _{HT}	UST-R	T	H			2,00		163,54	0,30	0,27	0,905	0,102	0,0006	0,02	
C _{HT}		Test 9 Minus Test 10						164,35				0,080	0,000		OK
C _{HG'}		C _{HG} Minus H Bushings						2.804,45				10,683	0,356		
C _{LG'}		C _{LG} Minus L Bushings													
C _{TG'}		C _{TG} Minus T Bushings													

INSULATION RATING KEY
 G=GOOD
 D=DETERIORATED
 I=INVESTIGATE
 B=BAD

NOTE:
 SHORTEACH WINDING
 ON ITSELF



EQUIPMENT USED: _____ TESTED BY: Ery Dhi dan Yuri Mahardani
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4. Data hasil Uji Indeks Polarisasi Transformator 2 Gardu Induk Kentungan
150kV Tahun 2019

	PT. PLN (PERSERO) TRANSMISI JAWA BAGIAN TENGAH UPT SALATIGA Jalan Diponegoro No. 19 Salatiga Telp. (0298) 323167/323168 Fax. (0298) 323169	No. FORM/TJBT/01.4
	LAMPIRAN " LAPORAN TEKNIK "	
	No. Test / Teg. / Daya / Merk / Tipe	/ / /

**LEMBAR HASIL PENGECEKAN TRANSFORMER
PENGUJIAN / PENGUKURAN TAHAPAN ISOLASI**

NO	AKTIFITAS	STANDARD VDE	HASIL TAHUN LALU			TINGKAPAN	HASIL SAAT INI			KESIMPULAN
			1 MENUTE	10 MENUTE	IP		1 MENUTE	10 MENUTE	IP	
A	B	C	D	E	F	J	K	L	M	N
1	TITIK UKUR TAHAPAN ISOLASI (Mo)									
	TEMP									
	1 Primary - Ground	STANDARD (SKDIR 520) TP (NORMAL) = 1,25 - > 2,0 TP = 10 Minute / 1 Minute 150/20 kV 60 MVA HV > 795 MO LV > 106 MO					4,11	5,75	1,4	
	2 Sekunder / - Ground						2,25	5,20	2,21	
	3 Tertier - Ground						1,68	5,33	3,17	
	4 Primary - Sekundary						2,25	5,87	1,75	
	5 Primary - Tertier						4,54	7,87	1,73	
	6 Sekundary - Tertier						1,75	7,34	1,9	
	7 Core - Yoke									
	8 Yoke - Ground									
	9 Core - Ground	1 Minute								
	10 Tertier - Core	100% /								
	11 Tertier - Yoke									
catatan :										

Pelaksana Pengujian :		Tanda Tangan	
1. AFANDI		1.	
2.		2.	
3.			

5. Data hasil Tangen Delta Transformator 2 Gardu Induk Kentungan 150kV Tahun 2019



THREE-WINDING TRANSFORMERS
CAPACITANCE AND POWER FACTOR TESTS



AMBIENT TEMP. 35,1 °C DATE 22/01/2019
 SUBSTATION GI KENTUNGAN HUMIDITY 50,7 % JOB # _____
 POSITION TRAFO 2 ASSET ID _____ UPT SALATIGA
 EQUIPMENT LOCATION BAY TRAF0 2

MFR	XIAN	CLASS		PHASES	3
SER NO		COOLANT	OIL	REASON	Routine
YEAR	1995	BIL	170	KV	102000
	YNyn0yn0			WEIGHT	102000 kg
				WINDING MATERIAL	Cu
				OIL VOLUME	260000 kg
				OIL TEMP	37 °C
				IMPEDANCE	%
				WEATHER	Sunny
				TANK TYPE	SEALED

DSG	SERIAL NUM	MFR	TYPE/CLASS	KV	AMPS	YEAR
1U	N1012/94	HAEFELY	COT	170	800	1994
1V	N1011/94	HAEFELY	COT	170	800	1994
1W	N1010/94	HAEFELY	COT	170	800	1994
2U						
2V						
2W						
3U						
3V						
3W						

Diagram # 29 (IEC)

	VOLTAGE (KV)	KVA	RATED I	# TAPS	NOMINAL	CHANGER	TAP SETTING
PRIMARY				5	3	Off Load	
SECONDARY				1			
TERTIARY				1			

TEST FREQUENCY: 50

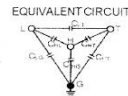
COMMENTS: _____

TRANSFORMER OVERALL TESTS

Test No.	INSULATION TESTED	Test Mode	Test Lead Connections	TEST KV	Freq Sweep	Capacitance C (pF)	POWER FACTOR %			DIRECT		%VDF	IR
							Measured	@ 20°C	Corr Factor	mA	Watts		
1	C _{HG} + C _{HL}	GSTg-B	H L T G	10,00		10.230,71	0,26	0,23	0,905	32,064	0,8245	0,03	
2	C _{HG}	GSTg-RB	H L T G	10,00		3.539,56	0,38	0,35	0,905	11,106	0,4237	0,04	
3	C _{HL}	UST-R	H L T G	10,00		5.697,72	0,18	0,16	0,905	21,018	0,3809	0,03	
4	C _{HL}					6.691,15			0,905	20,978	0,401		OK
5	C _{LG} + C _{LT}	GSTg-R	L H T G	10,00		16.105,19	0,27	0,25	0,905	50,526	1,3752	0,03	
6	C _{LG}	GSTg-RB	L H T G	10,00		1.271,06	0,61	0,58	0,905	3,990	0,2417	0,03	
7	C _{LT}	UST-B	L H T G	10,00		14.847,25	0,24	0,22	0,905	46,581	1,1213	0,03	
8	C _{LT}					14.834,13			0,905	46,537	1,134		OK
9	C _{TG} + C _{HT}	GSTg-B	T H	2,00		12.918,90	0,34	0,31	0,905	8,102	0,0533	0,02	
10	C _{TG}	GSTg-RB	T H	2,00		12.755,96	0,34	0,31	0,905	8,002	0,0548	0,02	
11	C _{HT}	UST-R	T H	2,00		163,02	0,29	0,26	0,905	0,102	0,0006	0,01	
12	C _{HT}					162,94				0,100	0,001		OK
13	C _{HG'}		C _{HG} Minus H Bushings			2.785,46				10,634	0,420		
14	C _{LG'}		C _{LG} Minus L Bushings										
15	C _{TG'}		C _{TG} Minus T Bushings										

INSULATION RATING KEY
 G=GOOD
 D=DETERIORATED
 I=INVESTIGATE
 B=BAD

NOTE:
 SHORT EACH WINDING
 ON ITSELF



TEST EQUIPMENT USED: _____

TESTED BY: Erny DH dan Yuni Mahardani

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6. Data hasil *Break Down Voltage* Transformator 2 Gardu Induk Kentungan 150kV Tahun 2019

	No. FORM/TJBT/01.8 PT. PLN (PERSERO) TRANSMISI JAWA BAGIAN TENGAH UPT SALATIGA Jalan Diponegoro No. 149 Salatiga Telp. (0298) 323167/323168 Fax. (0298) 323169	
	Meas. / Type Teg. / Daya No. Trafic	/ / /

LAMPIRAN " LAPORAN TEKNIK "

LEMBAR HASIL PENGECEKAN TRANSFORMER
 PENGUJIAN / PENGUKURAN TEGANGAN TEMBUS MINYAK ISOLASI

NO	URAIAN KEGIATAN	ACUAN	TAHAP PENGUJIAN	HASIL SEBELUMNYA	TINDAKAN	HASIL AKHIR	KESIMPULAN
A	B	C	D	E	F	G	H
1	TEGANGAN TEMBUS MINYAK (diukur pada suhu °C) - MINYAK BAGIAN TENGAH - MINYAK OLTC	STANDARD IEC 60422 TEGANGAN YG. DIDINKAN > = 30 kV / 2,5 mm > = 40 kV / 2,5 mm > = 50 kV / 2,5 mm Rata - rata > = 30 kV / 2,5 mm > = 40 kV / 2,5 mm > = 50 kV / 2,5 mm Rata - rata	(kV / 2,5 mm) selang waktu 5 menit 1 2 3 4 5 6 1 2 3 4 5 6			75,5 kV 76,3 kV 50,0 kV 62,0 kV 58,5 kV 65,0 kV 66,0 kV 75,0 kV 59,4 kV 60,0 kV 73,3 kV 59,4 kV 73,7 kV 67,7 kV	BAIK

Catatan :

Pelaksana Pengujian :		Supervisi / Peng. Pekerjaan	Tanda Tangan
1	EGP	Supervisi GI	1.
2		Pengawas Pekerjaan	2.
3			