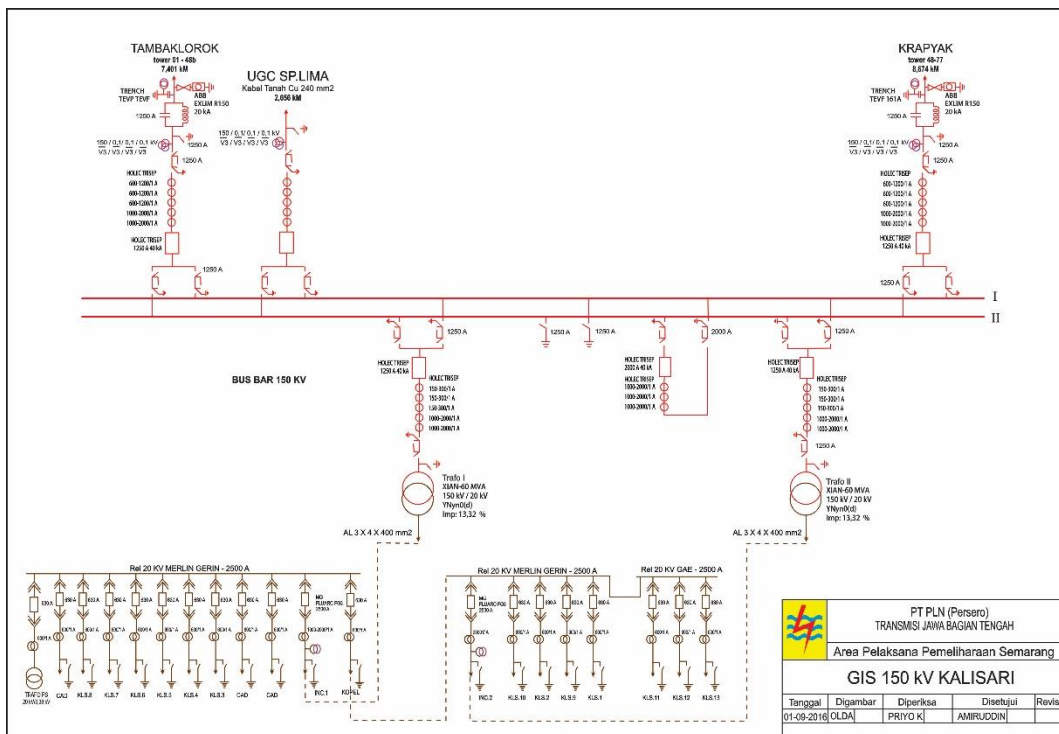


# LAMPIRAN

### 1. Single Line Diagram Gardu Induk Kalisari



2. Name Plate Trafo I 60 MVA Gardu Induk Kalisari

**XIAN TRANSFORMER WORKS**

TRANSFORMER TYPE	SFZ-60000/150	SERIAL NUMBER	135001	MANUFACTURED	1995
NOMINAL RATING MVA	36/60	COOLING SYSTEM	ONAN-ONAF	AMBIENT TEMP MAX	40°
FREQUENCY HERTZ	50	PHASE	3	STANDARD	IEC 76-1976
INSTALLATION	OUT-DOOR	TEMP RISE OIL	53°	WINDING TEMP RISE	59°

TERMINALS	MVA	kV	TAP CHANGER TYPE	CURRENT ONAN/ONAF	BIL	AC
U V W	36/60	150	ON LOAD	138.6/230.9 A	650	275
U V W 0	36/60	20		1039.2/1732 A	125	50
0		15		/ A		38
NT	12.6/21	10		/ A	75	28

TERMINALS	TERMINALS	CONNECTION	VECTOR GROUP	IMPEDANCE VOLTAGE
U V W 0	u v w 0	STAR-STAR	YNyn0(d)	(AT RATED TAP) 10.45%
SHORT CIRCUIT(150kV/20kV)-DURATION		VACUUM TIGHTNESS OF TANK		(AT MAX TAP) 18.85%
31.5kA; 40kA(*)/16kA-3S (#)		6.77x10 <sup>-4</sup> Pa		(AT MIN TAP) 10.00%

POS	VOLTS	AMP. ONAN/ONAF
1	165750	125.4/209.0
2	163500	127.1/211.9
3	161250	128.9/214.8
4	159000	130.7/217.9
5	156750	132.6/221.0
6	154500	134.5/224.2
7	152250	136.5/227.5
8	150000	138.6/230.9
9	147750	140.7/234.5
10	145500	142.9/238.1
11	143250	145.1/241.8
12	141000	147.4/245.7
13	138750	149.8/249.7
14	136500	152.3/253.8
15	134250	154.8/258.0
16	132000	157.5/262.4
17	129750	160.2/267.0
18	127500	163.0/271.7

UNTANKING MASS	8000	kg
TRANSPORT	68000	kg
OIL	26000	kg
TOTAL	102000	kg

PERUSAHAAN UMUM LISTRIK NEGARA

MADE IN P.R.CHINA

NOTE: (\*) FOR UNGARAN AND BANTUL S/S (#) CALCULATION ACC IEC 76-5  
INSULATION OIL: 25° (ALLOW TO MIX WITH SHALL DIALA B)

85B-860-5640

### 3. Data Impedansi Penghantar

#### IMPEDANSI KAWAT PENGHANTAR MENURUT SPLN 64: 1995

Tahanan (R) dan reaktansi ( $X_L$ ) pengantar AAAC tegangan 20 kV

(SPLN 64: 1985)

<i>Luas Penampang <math>mm^2</math></i>	<i>Jari<sup>2</sup>mm</i>	<i>Urat</i>	<i>GMR (mm)</i>	<i>Impedansi urutan positif (Ohm / km)</i>	<i>Impedansi urutan Nol (Ohm / km)</i>
16	2,2563	7	1,6380	2,0161 + j 0,4036	2,1641 + j 1,6911
25	2,8203	7	2,0475	1,2903 + j 0,3895	1,4384 + j 1,6770
35	3,3371	7	2,4227	0,9217 + j 0,3790	1,0697 + j 1,6665
50	3,9886	7	2,8957	0,6452 + j 0,3678	0,7932 + j 1,6553
70	4,7193	7	3,4262	0,4608 + j 0,3572	0,6088 + j 1,6447
95	5,4979	19	4,1674	0,3096 + j 0,3449	0,4876 + j 1,6324
120	6,1791	19	4,6837	0,2688 + j 0,3376	0,4168 + j 1,6324
150	6,9084	19	5,2365	0,2162 + j 0,3305	0,3631 + j 1,6180
185	7,6722	19	5,8155	0,1744 + j 0,3239	0,3224 + j 1,6114
240	8,7386	19	6,6238	0,1344 + j 0,3158	0,2824 + j 1,6034

#### 4. Data KHA (Kuat Hantar Arus) Penghantar

Arus beban terus menerus maksimum, harus lebih kecil dari Kuat Hantar Arus (KHA) dari penghantar.

Besarnya KHA ini terlihat pada Tabel VIII.

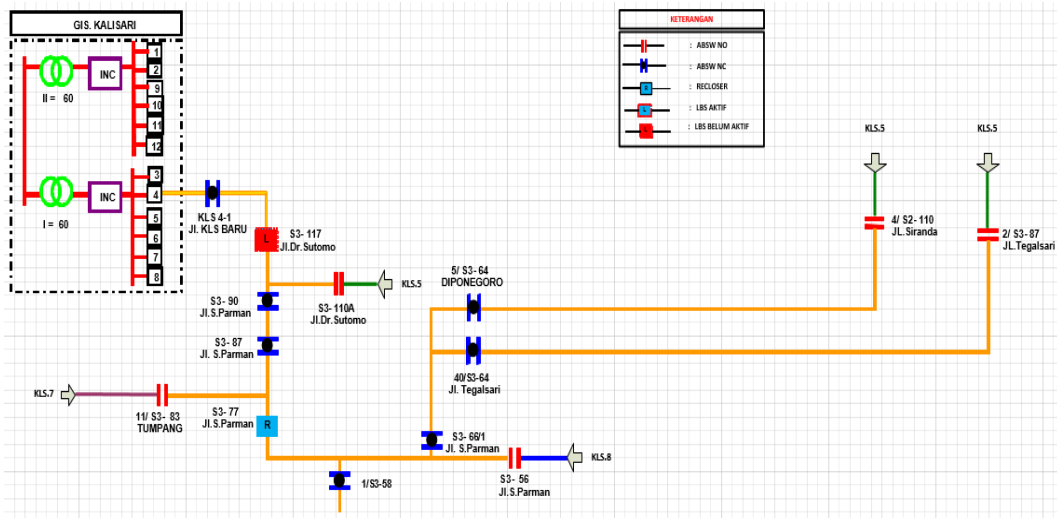
Tabel VIII - Daftar KHA penghantar yang dihitung atas dasar kondisi-kondisi berikut:

- kecepatan angin 0,6 m/ detik
- suhu keliling akibat sinar matahari 35° C
- suhu penghantar maksimum 80° C
- bila tidak ada angin maka KHA dapat dikali dengan 0,7

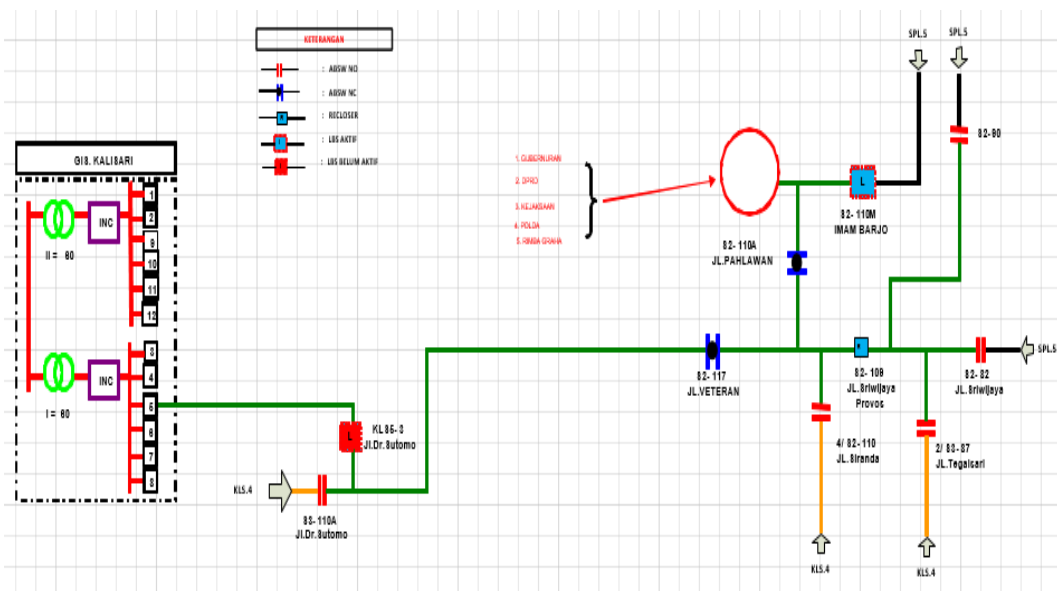
Luas penampang (mm <sup>2</sup> )	KHA terus menerus, untuk penghantar AAC (A)	KHA terus menerus, untuk penghantar AAAC (A)
16	110	105
25	145	135
35	180	170
50	225	210
70	270	255
95	340	320
120	390	365
150	455	425
185	520	490
240	625	585

#### 5. Data Feeder Gardu Induk Kalisari

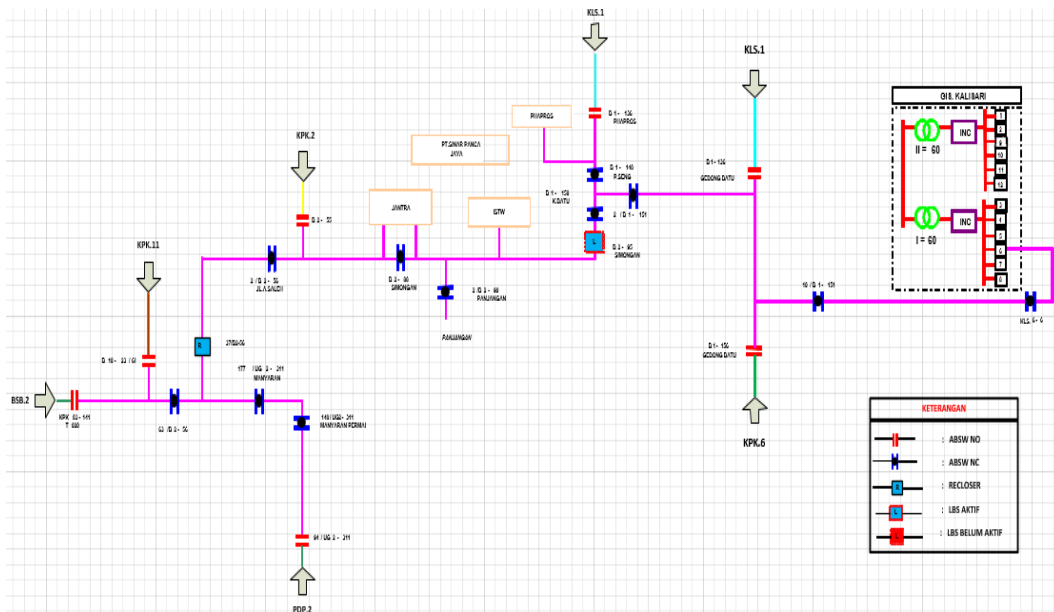
Kalisari 4



Kalisari 5



Kalisari 6



6. Data Beban Feeder Bulan Februari 2018

5. AREA SEMARANG							
Gardu Induk	Data Trafo		Data Beban Feeder	Beban Penyulang		Bulanan	
	Unit	Daya (MVA)		JAM 10:00	JAM 19:00	Tertinggi tercapai	Tertinggi Normal
				T	T		
Kalisari	I	60	KLS03	91	65	91	91
			KLS04	236	275	318	275
			KLS05	235	249	384	249
			KLS06	213	251	417	251
			KLS07	205	211	253	211
			KLS08	0	0	0	0
	II	60	KLS01	46	53	188	53
			KLS02	128	152	328	152
			KLS09	344	318	344	344
			KLS10	142	130	142	142
			KLS11	105	94	105	105
			KLS12	0	0	0	0
			KLS13	0	0	0	0



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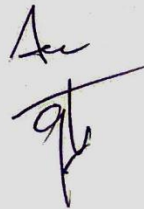
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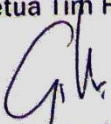
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NIM : 30601401577  
Judul TA : Evaluasi Koordinasi Setting Relay Proteksi OCR, GFR, dan Recloser GIS Kalisari pada Trafo 1 60 MVA ke Feeder Kalisari 4 dengan ETAP 12.6.0

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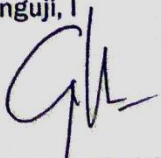
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Semarang, 26 September 2018  
Penguji, I

  
Gunawan, ST, MT  
NIDN.0607117101





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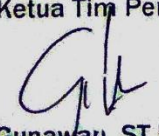
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*by* Tessa Dwi Surya

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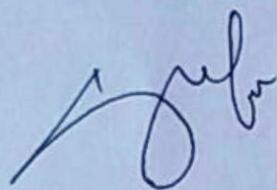
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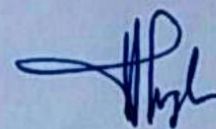
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