

LAMPIRAN 1
SURAT PENELITIAN





*Building
Future
Leaders*

KEMENTERIAN RISET, TEKNOLOGI, DAN PENDIDIKAN TINGGI
UNIVERSITAS NEGERI JAKARTA
BIRO AKADEMIK KEMAHASISWAAN DAN HUBUNGAN MASYARAKAT

Kampus Universitas Negeri Jakarta
Jl. Rawamangun Muka, Gedung Administrasi Lt. 1, Jakarta 13220
Telp: (021) 4759081, (021) 4893668, email: bakhum.akademik@unj.ac.id



Nomor : 1321/UN39.12/KM/2019

12 Februari 2019

Lamp. : -

Hal : Permohonan Izin Mengadakan Penelitian untuk Penulisan Skripsi

Kepada Yth.
Manager UPT Cawang PT. PLN (Persero)
Jl. Mayjen Sutoyo No. 1 RT.4/RW.7, Cawang, Kramatjati,
Jakarta Timur

Sehubungan dengan keperluan penulisan Skripsi mahasiswa, dengan ini kami mohon kesediaan Bapak/Ibu untuk dapat menerima Mahasiswa Universitas Negeri Jakarta :

Nama : Endiansyah Pradana
Nomor Registrasi : 5115150687
Program Studi : Pendidikan Vokasional Teknik Elektro
Fakultas : Teknik
Jenjang : S1
No. Telp/Hp : 02142801865/081294660811

Untuk dapat mengadakan penelitian guna mendapatkan data yang diperlukan dalam rangka penulisan Skripsi dengan judul "Analisis Aliran Daya Pada Sistem Tenaga Listrik Di Gardu Induk Wilayah UPT Cawang PT PLN (Persero) Dengan Menggunakan Software MATLAB".
Atas perhatian dan kerja samanya disampaikan terima kasih.

Kepala Biro Akademik, Kemahasiswaan
dan Hubungan Masyarakat



Woro Sasmoyo, SH.
NIP. 19630403 198510 2 001

Tembusan :

1. Dekan Fakultas Teknik
2. Koordinator Program Studi Pendidikan Vokasional Teknik Elektro

—



UNIT INDUK TRANSMISI JAWA BAGIAN BARAT
UNIT PELAKSANA TRANSMISI CAWANG

PLN

Jl. Cililitan Besar No. 1 Cawang Cililitan, Jakarta Timur 13640

T : (021) 8092208

F : (021) 8091264

W : www.pln.co.id

Nomor : 0023/SDM.04.09/UPT CWNG/2019 14 Maret 2019
 Lampiran : -
 Sifat : -
 Perihal : Penelitian

Kepada :

UNIVERSITAS NEGERI JAKARTA
 Jl. Rawamangun Muka

JAKARTA 13220

u.p. Yth. Ka. Biro Akademik, Kemahasiswaan HUMAS,

Sehubungan dengan surat Saudara Nomor. 1321/UN39.12/KM/2019 tanggal 12 Februari 2019 perihal Permohonan Izin mengadakan Penelitian untuk penulisan Skripsi, maka kami mengijinkan Mahasiswa Saudara yang tersebut dibawah ini :

Nama : Endiansyah Pradana
 No. Registrasi : 5115150687
 Program Studi : Teknik Elektro

Untuk melaksanakan Penelitian pada tanggal 15 sd 30 April 2019 di PT PLN (Persero) UIT JBB Unit Pelaksana Transmisi Cawang, **ULTG GANDUL** yang beralamat di Jl. Cinere Raya, Gandul, Jakarta selatan 16514.

Adapun ketentuan yang perlu diperhatikan adalah :

1. Tidak disediakan gaji, konsumsi, transportasi dan penginapan.
2. Mematuhi semua peraturan yang berlaku di lingkungan kerja (memakai Seragam Almamater) dan yang bersangkutan dianjurkan melengkapi dengan polis asuransi kecelakaan.
3. Apabila terjadi kerusakan terhadap peralatan yang disebabkan oleh mahasiswa, menjadi tanggung jawab yang bersangkutan.
4. Segala publikasi terhadap data Perusahaan harus atas sepengetahuan dan ijin tertulis dari pihak Manajemen PT.PLN (Persero) UIT JBB UPT Cawang.
5. Kami hanya mengeluarkan Surat Keterangan Pernah Kerja Praktek/Penelitian di PT PLN (Persero) UIT JBB Unit Pelaksana Transmisi Cawang, apabila laporan kegiatan Praktek Kerja (PKL) / Penelitian sudah kami terima.

Demikian kami sampaikan, dan atas perhatiannya diucapkan terima kasih.

MANAGER,

u.b

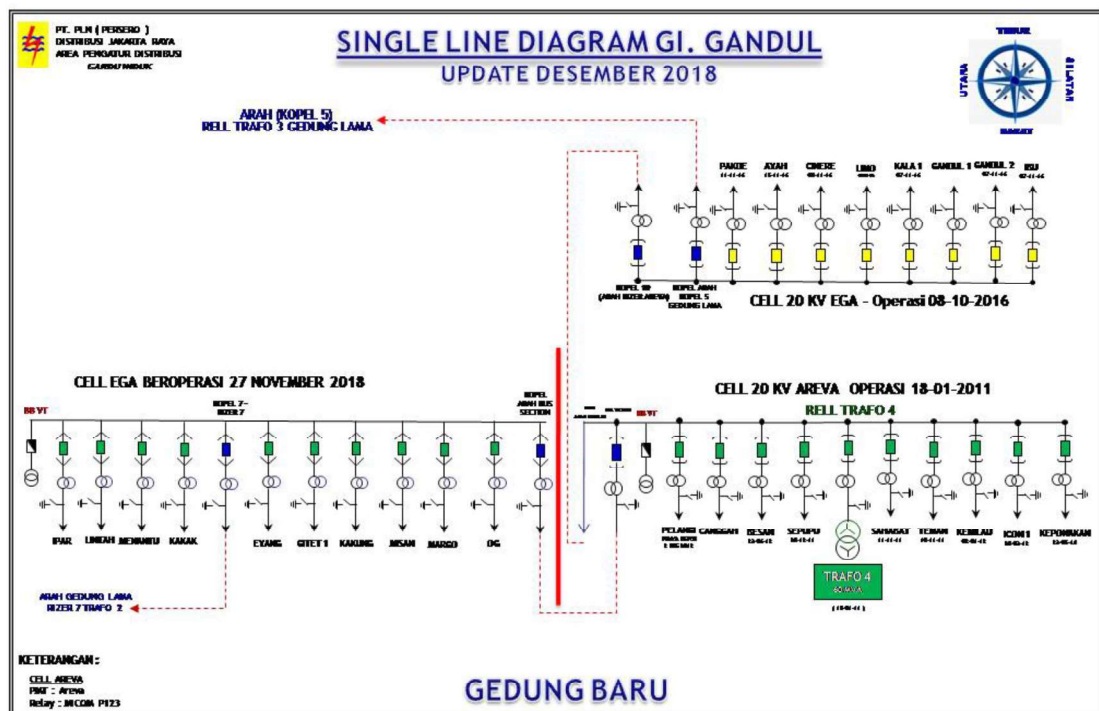
PLH MANAGER BAGIAN KEU DAN ADM



LAMPIRAN 2

SINGLE LINE DIAGRAM (SLD) GARDU INDUK GANDUL 20 KV

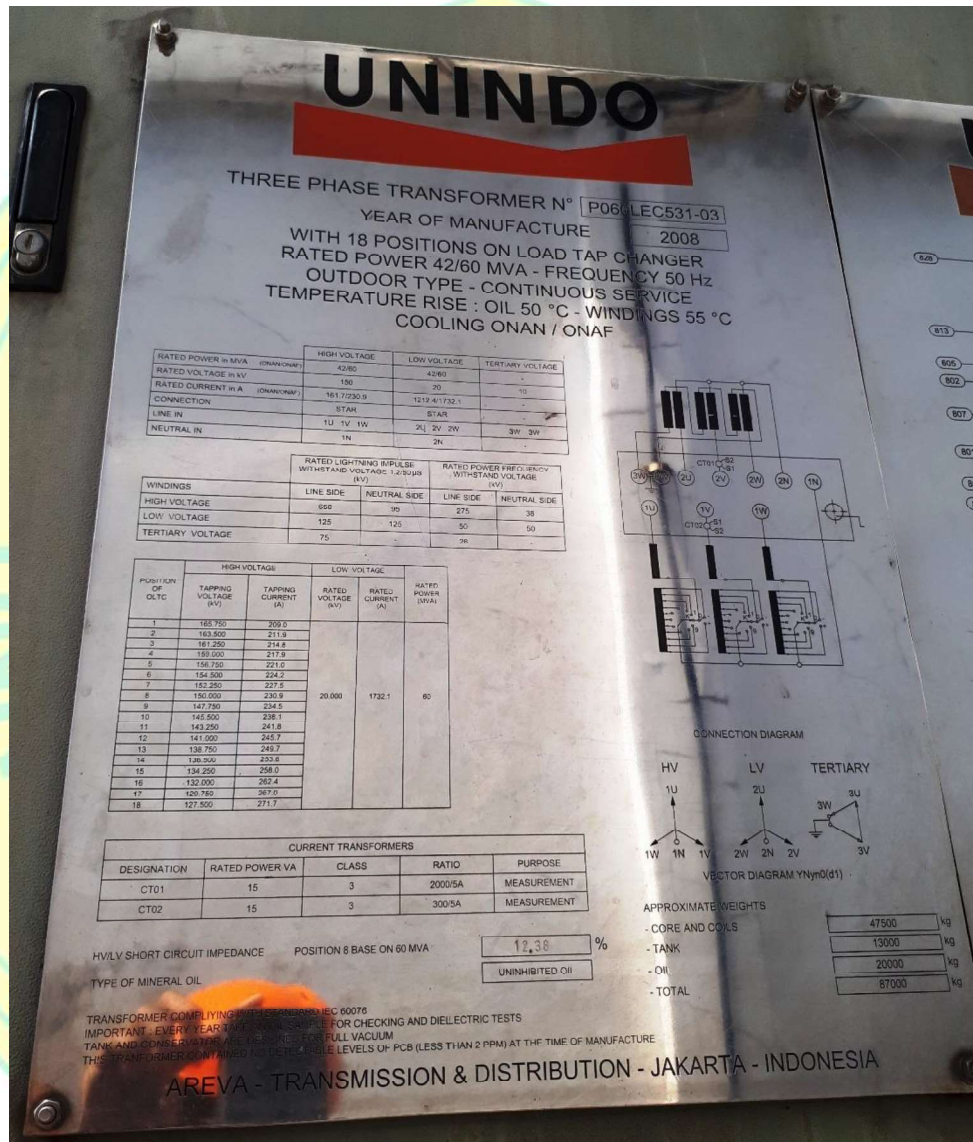
GEDUNG BARU TRANSFORMATOR 4



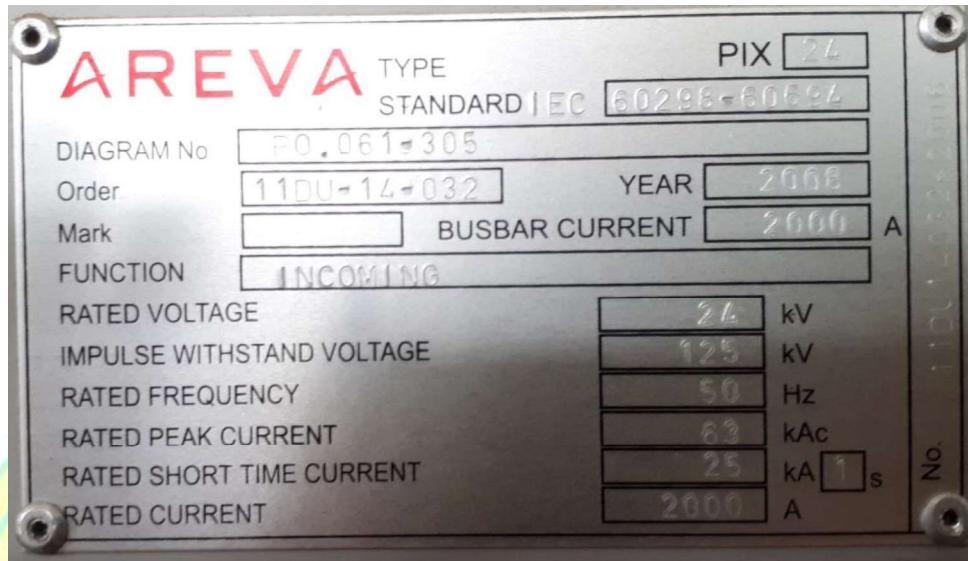
LAMPIRAN 3

DATA DAN SPESIFIKASI PERALATAN GARDU INDUK GANDUL 20

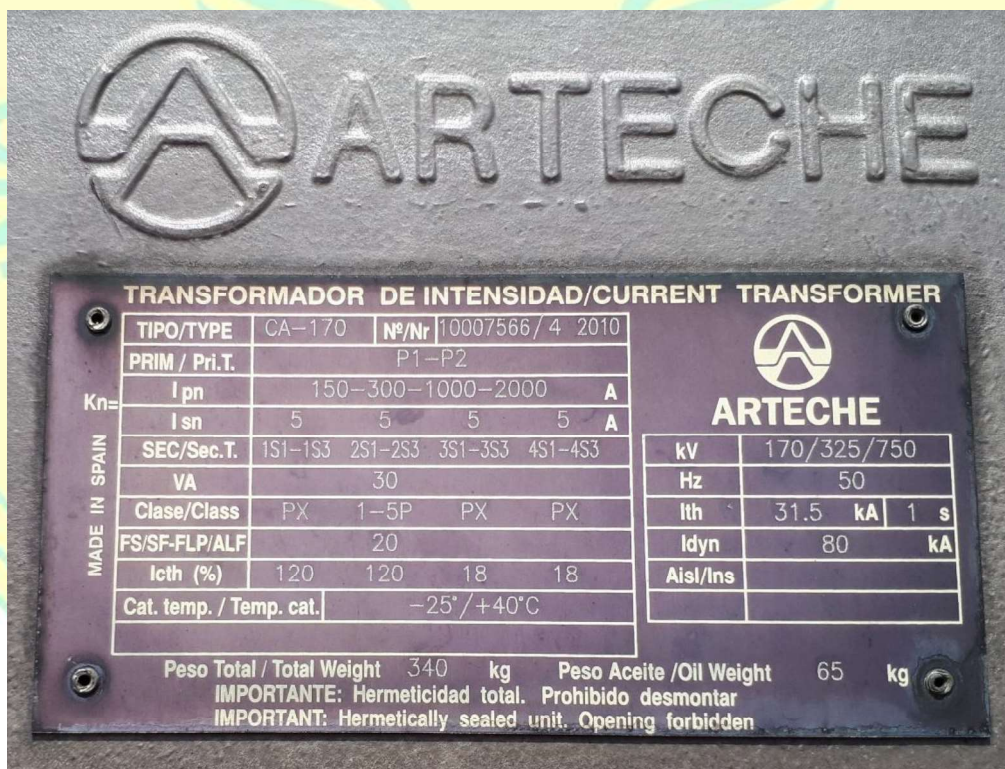
KV



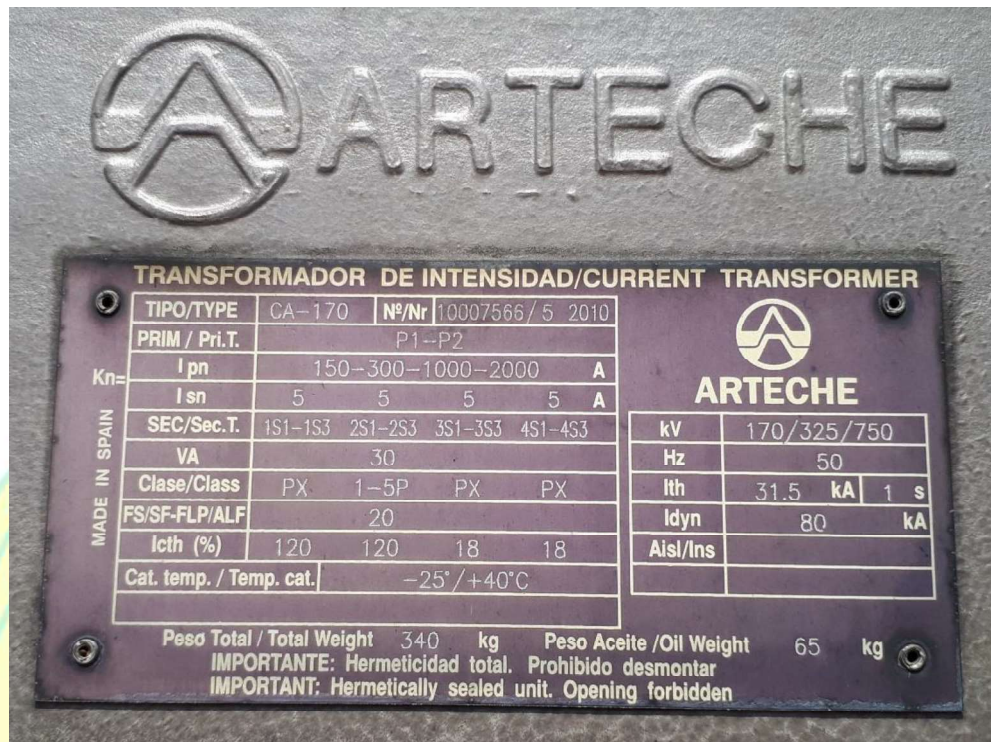
Nameplate Transformator 4 GI Gandul 150/20 kV



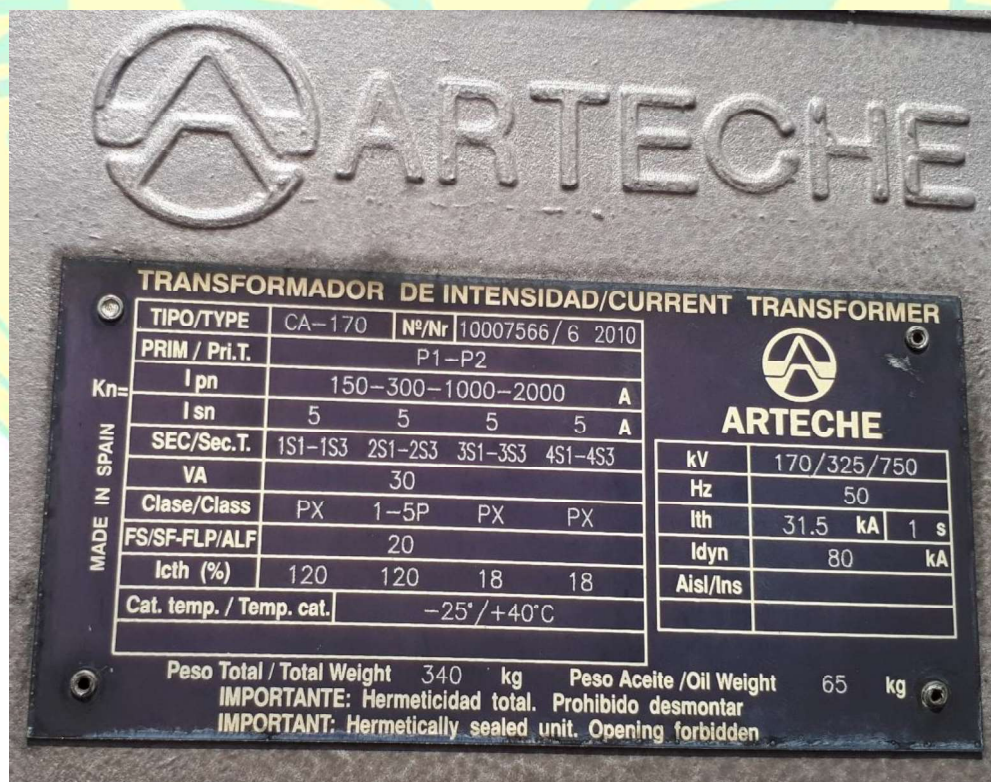
Nameplate INC Transformator 4



CT Transformator 4 R



CT Transformator 4 S



CT Transformator 4 T



NGR Transformator 4

			
Type designation	GL 313 F1	Rated line-charging breaking current	63 A
Serial number	6826-10-2031006 / 1	Rated SF ₆ -gas pressure for interruption p ₀	0.64 MPa
Rated voltage	170 kV	Rated supply voltage of closing and opening devices	110 VDC
Rated lightning imp. withstand voltage	750 kV	Rated supply voltage of auxiliary circuits	110 VDC
Rated switching imp. withstand voltage	- kV	Rated supply voltage of motor	230 VAC
Rated frequency	50 Hz	Mass of SF ₆ -gas	14.1 kg
Rated normal current	3150 A	Mass	1384.1 kg
Rated duration of short-circuit	3 s	Rated operating sequence	O-0.3s-CO-3min-CO
Rated short-circuit breaking current	40 kA	Year of manufacture	2008
First-pole-to-clear factor	1.5	Temperature class	-30 ... +40 °C
Rated out-of-phase breaking current	10 kA		
EN S 2 004 802		Made in Germany	

PMT Transformator 4

PENGUKURAN BEBAN PENYULANG

Pengukuran Beban Penyulang

GI GANDUL BULAN APRIL TRAF0 4

No	GI	Feeder	I. Max (A)	Status CBI	No Urut	Rel	No Trafo	Keterangan	00	01	02	03	04	05	06	07
1	PELANGI	300 ON		45	1	TRAFO 4	45	DEPOK	10	10	10	10	10	10	10	10
2	CANGGAH	300 ON		46	1	TRAFO 4	46	BERBEBAN	120	120	115	115	110	110	110	110
3	BESAN	300 ON		47	1	TRAFO 4	47		100	100	95	95	95	95	95	90
4	SEPUPU	300 ON		48	1	TRAFO 4	48		80	80	75	75	75	75	75	80
5	SAHABAT	300 ON		49	1	TRAFO 4	49		25	25	25	25	25	25	25	25
6	TEMAN	300 ON		50	1	TRAFO 4	50		85	85	80	80	80	80	80	85
7	KEMILAU	300 ON		51	1	TRAFO 4	51	DEPOK	10	10	10	10	10	10	10	10
8	ICON1	300 ON		52	1	TRAFO 4	52		0	0	0	0	0	0	0	0
9	KEPONAKAN	300 ON		53	1	TRAFO 4	53	BERBEBAN	10	10	10	10	10	10	10	10



08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
15	15	15	15	15	15	15	15	15	0	0	0	0	0	10	10
110	130	150	150	160	150	150	150	150	150	160	160	160	160	150	140
90	90	95	95	100	100	100	100	110	110	115	115	115	115	105	100
90	90	110	110	110	120	120	120	110	110	95	95	95	95	80	75
25	25	25	25	25	25	25	25	25	35	35	35	35	35	30	25
90	90	105	105	105	110	110	110	105	100	100	90	90	90	85	85
10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10



TEGANGAN TRAF0 GI 150/20 KV GI GANDUL BULAN APRIL

NO	BULAN	GI	TRAF0	00:00	01:00	02:00	03:00	04:00	05:00	06:00	07:00
1	APRIL	GI GANDUL	TRAF0 1 - 20 KV	20,28	20,37	20,37	20,39	20,30	20,37	20,37	20,12
2	APRIL	GI GANDUL	TRAF0 2 - 20 KV	20,28	20,34	20,30	20,32	20,27	20,34	20,30	20,17
3	APRIL	GI GANDUL	TRAF0 3 - 20 KV	20,06	20,03	20,07	20,13	20,18	20,03	20,07	20,03
4	APRIL	GI GANDUL	TRAF0 4 - 20 KV	20,20	20,22	20,25	20,28	20,24	20,22	20,25	20,05
5	APRIL	GI GANDUL	TRAF0 PS1 - 20 K'	389,00	390,00	391,00	393,00	393,00	390,00	391,00	392,00
1	APRIL	GI GANDUL	TRAF0 1 - 150 KV	150,00	150,00	150,00	151,00	151,00	150,00	150,00	148,00
2	APRIL	GI GANDUL	TRAF0 2 - 150 KV	150,00	150,00	150,00	151,00	151,00	150,00	150,00	148,00
3	APRIL	GI GANDUL	TRAF0 3 - 150 KV	150,00	150,00	150,00	151,00	151,00	150,00	150,00	148,00
4	APRIL	GI GANDUL	TRAF0 4 - 150 KV	150,00	150,00	150,00	151,00	151,00	150,00	150,00	148,00
5	APRIL	GI GANDUL	TRAF0 PS1 - 150 K	20,28	20,37	20,37	20,39	20,30	20,37	20,37	20,12

08:00	09:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00
20,02	20,01	20,02	20,02	20,06	20,06	20,04	20,05	20,03	20,11	20,14	20,18	20,18	20,11	20,18	20,18
20,12	20,02	20,02	20,05	20,08	20,08	20,03	20,06	20,05	20,03	20,02	20,10	20,10	20,06	20,10	20,10
20,00	20,19	20,19	20,17	20,15	20,15	20,25	20,20	20,18	20,17	20,19	20,09	20,09	20,07	20,09	20,09
20,04	20,11	20,11	20,13	20,10	20,10	20,13	20,11	20,09	20,10	20,10	20,28	20,28	20,26	20,28	20,28
392,00	392,00	392,00	392,00	392,00	392,00	392,00	392,00	392,00	392,00	392,00	392,00	392,00	392,00	392,00	392,00
148,00	148,00	148,00	148,00	148,00	148,00	148,00	148,00	148,00	149,00	149,00	149,00	149,00	149,00	149,00	149,00
148,00	148,00	148,00	148,00	148,00	148,00	148,00	148,00	148,00	149,00	149,00	149,00	149,00	149,00	149,00	149,00
148,00	148,00	148,00	148,00	148,00	148,00	148,00	148,00	148,00	149,00	149,00	149,00	149,00	149,00	149,00	149,00
148,00	148,00	148,00	148,00	148,00	148,00	148,00	148,00	148,00	149,00	149,00	149,00	149,00	149,00	149,00	149,00
20,02	20,02	20,02	20,02	20,02	20,02	20,02	20,02	20,02	20,10	20,10	20,10	20,10	20,10	20,10	20,10



PENGUKURAN BEBAN GI GANDUL

PENGUKURAN BEBAN TRAF0 BULAN APRIL 2019

No	Bulan	GI	No Trafo	I. Max (A)	No Urut	00	01	02	03	04	05	06	07	08	09	10
1	APRIL	GI GANDUL TRAF0 1	1732	1732		1130	1095	1050	1030	1020	1025	1040	1050	1060	1115	1155
2	APRIL	GI GANDUL TRAF0 4	1732	1732		1050	1020	980	965	950	940	980	1030	1070	1175	1295
3	APRIL	GI GANDUL TRAF0 3	1732	1732		785	755	730	700	680	700	780	900	970	1055	1175
4	APRIL	GI GANDUL TRAF0 2	1732	1732		700	640	620	610	600	610	620	660	680	725	750



11	12	13	14	15	16	17	18	19	20	21	22	23
1160	1185	1205	1205	1210	1175	1200	1270	1325	1330	1330	1280	1260
1300	1330	1365	1365	1360	1305	1310	1320	1350	1330	1325	1300	1260
1180	1160	1195	1195	1200	1100	1065	1075	1050	1005	995	960	910
755	735	780	780	785	730	740	770	780	795	790	780	720



PANJANG PENYULANG GI GANDUL

GI	PENYULANG	PANJANG HANTARAN	DARI	KE	KETERANGAN
GANDUL	ABAH	9216.63	GI.GANDUL	GH71	SKTM
GI	PENYULANG	PANJANG HANTARAN	DARI	KE	KETERANGAN
GANDUL	ABANG	6385.42	GI.GANDUL	GH45	SKTM
GI	PENYULANG	PANJANG HANTARAN	DARI	KE	KETERANGAN
GANDUL	AYAH	1768.29	GI.GANDUL	TD354P	SKTM
GANDUL	AYAH	698.748	TD354P	TD354	SKTM
GANDUL	AYAH	935.207	TD354	CN125	SKTM
GANDUL	AYAH	484.468	CN125	TD192	SKTM
GANDUL	AYAH	800.883	TD192	TD75N	SKTM
GANDUL	AYAH	416.607	CN64	CN3	SKTM
GANDUL	AYAH	991.363	CN3	TD75S	SKTM
GANDUL	AYAH	308.91	TD75S	TD185	SKTM
GANDUL	AYAH	2426.04	TD185	TD130A	SKTM
GANDUL	AYAH	249.14	TD130A	CP441	SKTM
GANDUL	AYAH	893.516	CP441	CN20	SKTM
GANDUL	AYAH	624.158	CN20	TD149	SKTM
GANDUL	AYAH	4682.98	TD149	GH45	SKTM
GANDUL	AYAH	151.644	TD75N	CN64	SKTM
GI	PENYULANG	PANJANG HANTARAN	DARI	KE	KETERANGAN
GANDUL	BAYU	648.504	GI.GANDUL	TD146	SKTM
GANDUL	BAYU	579.479	TD146	CN57	SKTM
GANDUL	BAYU	1468.95	CN57	CN80	SKTM
GANDUL	BAYU	517.242	CN80	TD220	SKTM
GANDUL	BAYU	2004.09	TD220	TD74N	SKTM
GANDUL	BAYU	620.313	TD74N	CN78	SKTM
GANDUL	BAYU	414.435	CN78	CN90	SKTM
GANDUL	BAYU	1582.13	CN90	TD74P	SKTM
GANDUL	BAYU	902.983	TD74P	TD444	SKTM
GANDUL	BAYU	442.241	TD444	TD74	SKTM
GANDUL	BAYU	647.633	TD74	TD73	SKTM
GANDUL	BAYU	1212.8	TD73	TD300	SKTM
GANDUL	BAYU	3605.28	TD300	TD251	SKTM
GANDUL	BAYU	1068.78	TD251	TD28F	SKTM
GANDUL	BAYU	303.177	TD28F	RG40	SKTM
GANDUL	BAYU	449.365	RG40	RG59P	SKTM
GANDUL	BAYU	438.754	RG59P	RG79	SKTM
GANDUL	BAYU	2541.15	RG79	GH71	SKTM
GI	PENYULANG	PANJANG HANTARAN	DARI	KE	KETERANGAN
GANDUL	BESAN	2835.94	GI.GANDUL	CN97	SKTM
GANDUL	BESAN	256.256	CN97	CN15	SKTM
GANDUL	BESAN	918.304	CN15	CN22	SKTM
GANDUL	BESAN	1894.31	CN22	CN56	SKTM
GANDUL	BESAN	1360.87	CN56	CN4	SKTM
GANDUL	BESAN		CN4	TD93N	SKTM
GANDUL	BESAN	559.329	TD93N	TD92N	SKTM
GANDUL	BESAN	1428.53	TD92N	TD221	SKTM
GANDUL	BESAN	2580.46	TD221	TD329	SKTM
GANDUL	BESAN	1100.88	TD329	TD347	SKTM
GANDUL	BESAN	1232.72	TD347	TD280	SKTM
GANDUL	BESAN	302.559	TD280	GH45	SKTM
GI	PENYULANG	PANJANG HANTARAN	DARI	KE	KETERANGAN
GANDUL	BIBI	3256.1	GI.GANDUL	TD162	SKTM
GANDUL	BIBI	1079.26	TD162	TD216	SKTM
GANDUL	BIBI	653.304	TD216	CN14	SKTM
GANDUL	BIBI	1522.33	CN14	TD162A	SKTM
GANDUL	BIBI	910.79	TD162A	CN106	SKTM
GANDUL	BIBI	1126.7	CN106	TD409	SKTM
GANDUL	BIBI	1028.11	TD409	TD402	SKTM
GANDUL	BIBI	121.454	TD402	CN121	SKTM
GANDUL	BIBI	380.444	CN121	TD162P	SKTM
GANDUL	BIBI	2514.14	TD162P	CN2	SKTM
GANDUL	BIBI	2075	CN2	CN103	SKTM
GANDUL	BIBI	521.967	CN103	CN10	SKTM
GANDUL	BIBI	280.293	CN10	CN54	SKTM
GANDUL	BIBI	651.626	CN54	CN8	SKTM
GANDUL	BIBI	680.855	CN8	TD173	SKTM
GANDUL	BIBI	1041.85	TD173	CP503	SKTM
GANDUL	BIBI	4077.46	CP503	GH403	SKTM

GI	PENYULANG	PANJANG HANTARAN	DARI	KE	KETERANGAN
GANDUL	BUDE	6769.68	GI.GANDUL	GH403	SKTM
GI	PENYULANG	PANJANG HANTARAN	DARI	KE	KETERANGAN
GANDUL	BUNDA	3980.88	GI.GANDUL	CPT7	SKTM
GANDUL	BUNDA	147.961	CPT7	CPT12	SKTM
GANDUL	BUNDA	2526.16	CPT12	CPT9	SKTM
GANDUL	BUNDA	1293.17	CPT9	CNK21	SKTM
GANDUL	BUNDA	261.832	CNK21	CNK22	SKTM
GANDUL	BUNDA	799.219	CNK22	CNK23	SKTM
GANDUL	BUNDA	978.703	CNK23	CNK5	SKTM
GANDUL	BUNDA	453.711	CNK5	CNK14	SKTM
GANDUL	BUNDA	694.575	CNK14	CNK16	SKTM
GANDUL	BUNDA	374.233	CNK16	CNK	SKTM
GANDUL	BUNDA	377.516	CNK	CNK15	SKTM
GANDUL	BUNDA	394.668	CNK15	MVTIC	SKTM
GANDUL	BUNDA	747.107	SKTM CNK15	MVTIC	SKUTM
GANDUL	BUNDA	409.368	MVTIC	SKTM CNK26	SUTM
GANDUL	BUNDA	433.257	SKTM CNK26	CNK26	SKTM
GANDUL	BUNDA	432.796	CNK26	SUTM CNK28	SKTM
GANDUL	BUNDA	315.747	SKTM CNK26	CNK2	SUTM
GANDUL	BUNDA	880.728	AFTAK CNK26	CNK28	SKTM
GANDUL	BUNDA	88.255	CNK28	AFTAKCNK2	SKTM
GANDUL	BUNDA	134.872	SKTM CNK26	CNK2	SUTM
GANDUL	BUNDA	1365.22	CNK2	GH122	SKTM
GANDUL	BUNDA	708.535	CNK	CNK17	SKTM
GANDUL	BUNDA	80.688	CNK15	CNK12	SKTM
GANDUL	BUNDA	348.565	MVTIC	CNK25	SKUTM
GANDUL	BUNDA	572.452	CN29	AFTAK CNK26	SKTM
GANDUL	BUNDA	855.225	CNK7	SKTM CNK8	SKUTM
GANDUL	BUNDA	645.199	SKTM CNK8	CNK8	SKTM
GANDUL	BUNDA	601.432	CNK25	CNK7	SKUTM
GI	PENYULANG	PANJANG HANTARAN	DARI	KE	KETERANGAN
GANDUL	BUNGSU	719.735	GI.GANDUL	TIANG KE 1	SKTM
GANDUL	BUNGSU	2668.4	TIANG KE 1	TM CROSSING MODERN HI	SKUTM
GANDUL	BUNGSU	973.742	SKTM CROSSING MODERN HI	MVTIC1	SKTM
GANDUL	BUNGSU	1816.88	SKTM CROSSING MODERN HI	SUTM	SKUTM
GANDUL	BUNGSU	742.454	MVTIC	CP60S	SUTM
GANDUL	BUNGSU	456.793	CP60S	CP60P	SUTM
GANDUL	BUNGSU	128.672	CP60P	LBS CP60	SUTM
GANDUL	BUNGSU	1271.44	LBS CP60	TD222	SKTM
GANDUL	BUNGSU	636.911	TD222	TD100	SKTM
GANDUL	BUNGSU	388.674	TD100	TD99	SKTM
GANDUL	BUNGSU	539.348	CP444	TD23D	SKTM
GANDUL	BUNGSU	1140.33	TD99	CP444	SKTM
GANDUL	BUNGSU	1379.97	TD23D	GH421	SKTM
GANDUL	BUNGSU	445.757	AFTAK CP60S	CNK15	SUTM
GANDUL	BUNGSU	999.231	CNK15	CN19	SKTM
GANDUL	BUNGSU	1286.37	SUTM CNK15	CN19	SKTM
GANDUL	BUNGSU	291.412	CN19	GH122	SKTM
GANDUL	BUNGSU	106.829	SUTM CP60P	CP175N	SKTM
GI	PENYULANG	PANJANG HANTARAN	DARI	KE	KETERANGAN
GANDUL	CANGGAH	4308.15	GI.GANDUL	TD404	SKTM
GANDUL	CANGGAH	376.424	TD404	CN83	SKTM
GANDUL	CANGGAH	768.548	CN83	TD406	SKTM
GANDUL	CANGGAH	294.111	TD406	TD288N	SKTM
GANDUL	CANGGAH	292.814	TD288N	TD432	SKTM
GANDUL	CANGGAH	297.516	TD432	CN71	SKTM
GANDUL	CANGGAH	742.26	CN71	CN82	SKTM
GANDUL	CANGGAH	297.287	CN82	TD28E	SKTM
GANDUL	CANGGAH	1600.36	TD28E	CN111	SKTM
GANDUL	CANGGAH	1342.35	CN111	TD65	SKTM
GANDUL	CANGGAH	429.552	TD65	TD239	SKTM
GANDUL	CANGGAH	786.204	TD239	TD64	SKTM
GANDUL	CANGGAH	250.339	TD64	TD63	SKTM
GANDUL	CANGGAH	171.355	TD63	TD371	SKTM
GANDUL	CANGGAH	303.985	TD371	TD366	SKTM
GANDUL	CANGGAH	725.401	TD366	TD244	SKTM
GANDUL	CANGGAH	1285.93	TD244	GH71	SKTM
GI	PENYULANG	PANJANG HANTARAN	DARI	KE	KETERANGAN
GANDUL	CICIT	1225.82	PM131S	RG89	SKTM
GANDUL	CICIT	872.654	RG59P	RG118P	SKTM

GANDUL	CICIT	747.202	RG79	RG40	SKTM
GANDUL	CICIT	435.209	PM131A	RG41	SKTM
GANDUL	CICIT	814.158	RG80	RG114	SKTM
GANDUL	CICIT	1181.55	KB252D	PM131S	SKTM
GANDUL	CICIT	6038.09	GI.GANDUL	RG80	SKTM
GANDUL	CICIT	425.023	RG114	PM131A	SKTM
GANDUL	CICIT	465.368	RG41	RG79	SKTM
GANDUL	CICIT	364.94	RG40	RG75	SKTM
GANDUL	CICIT	269.844	RG75	RG59P	SKTM
GANDUL	CICIT	760.601	RG118P	KB252D	SKTM
GI	PENYULANG	PANJANG HANTARAN	DARI	KE	KETERANGAN
GANDUL	GANDUL1	883.321	GI.GANDUL	GH99	SKTM
GI	PENYULANG	PANJANG HANTARAN	DARI	KE	KETERANGAN
GANDUL	GANDUL2	882.659	GI.GANDUL	GH99	SKTM
GI	PENYULANG	PANJANG HANTARAN	DARI	KE	KETERANGAN
GANDUL	GITET1	584.807	GI.GANDUL	SEKTOR TET	SKTM
GI	PENYULANG	PANJANG HANTARAN	DARI	KE	KETERANGAN
GANDUL	GITET2	585.469	GI.GANDUL	SEKTOR TET	SKTM
GI	PENYULANG	PANJANG HANTARAN	DARI	KE	KETERANGAN
GANDUL	IBU	613.9	GI.GANDUL	TD214	SKTM
GANDUL	IBU	511.556	TD214	CN59	SKTM
GANDUL	IBU	631.468	CN59	TD150A	SKTM
GANDUL	IBU	708.691	TD150A	TD180	SKTM
GANDUL	IBU	1034.26	TD180	TD150	SKTM
GANDUL	IBU	516.79	TD150	TD190	SKTM
GANDUL	IBU	1011.79	TD190	CN23	SKTM
GANDUL	IBU	927.648	CN23	CN112	SKTM
GANDUL	IBU	781.059	CN112	CN39	SKTM
GANDUL	IBU	5096.96	CN39	CN130	SKTM
GANDUL	IBU	2729.33	CN130	GH45	SKTM
GI	PENYULANG	PANJANG HANTARAN	DARI	KE	KETERANGAN
GANDUL	ICON1	535.811	GI.GANDUL	TD147 (WISNU)	SKTM
GI	PENYULANG	PANJANG HANTARAN	DARI	KE	KETERANGAN
GANDUL	ICON1	450.225	TD147 (WISNU)	CN65	SKTM
GI	PENYULANG	PANJANG HANTARAN	DARI	KE	KETERANGAN
GANDUL	ICON2	402.517	GI.GANDUL	CN65	SKTM
GI	PENYULANG	PANJANG HANTARAN	DARI	KE	KETERANGAN
GANDUL	INDRA	4774.14	GI.GANDUL	TD39	SKTM
GANDUL	INDRA	926.133	TD39	TD42	SKTM
GANDUL	INDRA	284.909	TD42	TD377	SKTM
GANDUL	INDRA	759.296	TD377	TD12	SKTM
GANDUL	INDRA	29.123	TD12	TD344	SKTM
GANDUL	INDRA	526.92	TD344	TD339	SKTM
GANDUL	INDRA	220.059	TD339	TD44N	SKTM
GANDUL	INDRA	883.578	TD44N	TD44A	SKTM
GANDUL	INDRA	1034.71	TD44A	TD450	SKTM
GANDUL	INDRA	899.704	TD450	TD387	SKTM
GANDUL	INDRA	172.126	TD387	TD264	SKTM
GANDUL	INDRA	125.163	TD264	TD419	SKTM
GANDUL	INDRA	394.603	TD419	TD469	SKTM
GANDUL	INDRA	254.4	TD469	TD11A	SKTM
GANDUL	INDRA	398.295	TD11A	TD11	SKTM
GANDUL	INDRA	248.111	TD11	TD424	SKTM
GANDUL	INDRA	468.448	TD424	TD15	SKTM
GANDUL	INDRA	664.876	TD15	CN86	SKTM
GANDUL	INDRA	599.412	CN86	TD27P	SKTM
GANDUL	INDRA	750.705	TD27P	TD228	SKTM
GANDUL	INDRA	1212.88	TD228	CN67	SKTM
GANDUL	INDRA	301.87	CN67	CN68	SKTM
GANDUL	INDRA	312.518	CN68	GH45	SKTM
GI	PENYULANG	PANJANG HANTARAN	DARI	KE	KETERANGAN
GANDUL	KALA1	1784.75	GI.GANDUL	CN128	SKTM
GANDUL	KALA1	726.736	CN128	CN122	SKTM
GANDUL	KALA1	2335.87	CN122	TD287P	SKTM
GANDUL	KALA1	236.882	TD287P	CN81	SKTM
GANDUL	KALA1	2955.83	TD287P	TD365	SKTM
GANDUL	KALA1	1704.99	TD365	TD175	SKTM
GANDUL	KALA1	1697.4	TD175	CN119	SKTM
GANDUL	KALA1	294.95	CN119	TD237	SKTM
GANDUL	KALA1	473.13	TD237	GH71	SKTM
GI	PENYULANG	PANJANG HANTARAN	DARI	KE	KETERANGAN

GANDUL	KALA2	4161.14	GI.GANDUL	TD53A	SKTM
GANDUL	KALA2	466.442	TD53A	TD53	SKTM
GANDUL	KALA2	1184.58	TD53	TD403	SKTM
GANDUL	KALA2	456.185	TD403	TD61B	SKTM
GANDUL	KALA2	544.463	TD61B	TD61A	SKTM
GANDUL	KALA2	1353.4	TD61A	TD416	SKTM
GANDUL	KALA2	350.524	TD416	TD55	SKTM
GANDUL	KALA2	1161.18	TD55	TD28A	SKTM
GANDUL	KALA2	808.007	TD28A	TD28	SKTM
GANDUL	KALA2	742.489	TD28	CN85	SKTM
GANDUL	KALA2	4013.33	CN85	TD425	SKTM
GANDUL	KALA2	108.479	CN85	CN123	SKTM
GANDUL	KALA2	106.978	CN123	TD425	SKTM
GANDUL	KALA2	459.694	TD425	GH71	SKTM
GANDUL	KALA2	1055.37	TD21	TD28	SKTM
GI	PENYULANG	PANJANG HANTARAN	DARI	KE	KETERANGAN
GANDUL	KAWAN	8730.84	GI.GANDUL	CN96	SKTM
GI	PENYULANG	PANJANG HANTARAN	DARI	KE	KETERANGAN
GANDUL	KEPONAKAN	6156.65	GI.GANDUL	CP431	SKTM
GANDUL	KEPONAKAN	1165.1	CP431	CP173	SKTM
GANDUL	KEPONAKAN	693.475	CP173	CP211	SKTM
GANDUL	KEPONAKAN	380.568	CP211	CP174	SKTM
GANDUL	KEPONAKAN	1123.95	CP174	CP473	SKTM
GANDUL	KEPONAKAN	957.394	CP473	CP404	SKTM
GANDUL	KEPONAKAN	252.969	CP404	CP295	SKTM
GANDUL	KEPONAKAN	640.051	CP295	CP381	SKTM
GANDUL	KEPONAKAN	777.167	CP381	CP119	SKTM
GANDUL	KEPONAKAN	682.97	CP119	CP132	SKTM
GANDUL	KEPONAKAN	434.64	CP132	CP131	SKTM
GANDUL	KEPONAKAN	522.441	CP131	TD91B	SKTM
GANDUL	KEPONAKAN	735.173	TD91B	CP325	SKTM
GANDUL	KEPONAKAN	229.017	CP325	CN35	SKTM
GANDUL	KEPONAKAN	834.996	CN35	CP521	SKTM
GANDUL	KEPONAKAN	671.656	CP521	CP281	SKTM
GANDUL	KEPONAKAN	554.091	CP281	TD91A	SKTM
GANDUL	KEPONAKAN	711.681	TD91A	CN36	SKTM
GANDUL	KEPONAKAN	1367.32	CN36	CP480	SKTM
GANDUL	KEPONAKAN	446.518	CP480	CN50	SKTM
GANDUL	KEPONAKAN	908.169	CN50	CN50T	SKTM
GANDUL	KEPONAKAN	1065.92	CN50T	TD91	SKTM
GANDUL	KEPONAKAN	1387.68	TD91	GH45	SKTM
GI	PENYULANG	PANJANG HANTARAN	DARI	KE	KETERANGAN
GANDUL	KEMILAU	1298.48	GI.GANDUL	CN27	SKTM
GANDUL	KEMILAU	1420.64	CN27	TD191	SKTM
GANDUL	KEMILAU	1540.11	TD191	TD179	SKTM
GANDUL	KEMILAU	661.677	TD179	CN28	SKTM
GANDUL	KEMILAU	872.651	CN28	TD168	SKTM
GANDUL	KEMILAU	2307.08	TD168	CN15P	SKTM
GANDUL	KEMILAU	172.613	CN15P	CN114	SKTM
GANDUL	KEMILAU	1422.68	CN114	CN24	SKTM
GANDUL	KEMILAU	257.563	CN24	CN25	SKTM
GANDUL	KEMILAU	2776.17	CN25	GH45	SKTM
GI	PENYULANG	PANJANG HANTARAN	DARI	KE	KETERANGAN
GANDUL	KERANG	1804.16	GI.GANDUL	CN17	SKTM
GANDUL	KERANG	2691.37	CN17	TD925	SKTM
GANDUL	KERANG	4679.28	TD925	TD414	SKTM
GANDUL	KERANG	688.401	TD414	CN93	SKTM
GANDUL	KERANG	917.676	CN93	TD102	SKTM
GANDUL	KERANG	159.524	TD102	CN46	SKTM
GANDUL	KERANG	560.901	CN46	TD276	SKTM
GANDUL	KERANG	1833.81	TD276	GH188	SKTM
GI	PENYULANG	PANJANG HANTARAN	DARI	KE	KETERANGAN
GANDUL	LINTAH	8057.56	GI.GANDUL	GH188	SKTM
GI	PENYULANG	PANJANG HANTARAN	DARI	KE	KETERANGAN
GANDUL	LIPAN2	3545.81	GI.GANDUL	TD92B	SKTM
GANDUL	LIPAN2	1356.68	TD92B	CN47	SKTM
GANDUL	LIPAN2	1152.69	CN47	TD27A	SKTM
GANDUL	LIPAN2	422.761	TD27A	TD182	SKTM
GANDUL	LIPAN2	1251.04	TD182	TD279	SKTM
GANDUL	LIPAN2	393.761	TD279	TD279P	SKTM
GANDUL	LIPAN2	842.431	TD279P	TD456	SKTM

GANDUL	LIPAN2	798.495	TD279P	TD181	SKTM
GANDUL	LIPAN2	1435.61	TD181	TD224	SKTM
GANDUL	LIPAN2	410.574	TD224	CN60	SKTM
GANDUL	LIPAN2	423.946	CN60	CN61	SKTM
GANDUL	LIPAN2	885.728	CN61	TD22F	SKTM
GANDUL	LIPAN2	346.421	TD22F	GH45	SKTM
GI	PENYULANG	PANJANG HANTARAN	DARI	KE	KETERANGAN
GANDUL	MUDA	2836.03	GI.GANDUL	TD133	SKTM
GANDUL	MUDA	2438.03	TD133	TD443	SKTM
GANDUL	MUDA	151.567	TD443	TD124	SKTM
GANDUL	MUDA	1008.04	TD124	TD353	SKTM
GANDUL	MUDA	493.415	TD353	TD28B	SKTM
GANDUL	MUDA	555.674	TD28B	TD352	SKTM
GANDUL	MUDA	792.612	TD352	TD393	SKTM
GANDUL	MUDA	315.786	TD393	TD28D	SKTM
GANDUL	MUDA	563.03	TD28D	TD463	SKTM
GANDUL	MUDA	584.452	TD463	TD21	SKTM
GANDUL	MUDA	396.028	TD21	TD19	SKTM
GANDUL	MUDA	128.602	TD19	TD145	SKTM
GANDUL	MUDA	117.665	TD145	CN110	SKTM
GANDUL	MUDA	2629.96	CN110	GH45	SKTM
GI	PENYULANG	PANJANG HANTARAN	DARI	KE	KETERANGAN
GANDUL	PAKDE	4863.93	GI.GANDUL	CP255	SKTM
GANDUL	PAKDE	1585.7	CP255	CP474	SKTM
GANDUL	PAKDE	493.202	CP255	CPT13	SKTM
GANDUL	PAKDE	298.657	CPT13	CPT3	SKTM
GANDUL	PAKDE	458.503	CPT3	CP282	SKTM
GANDUL	PAKDE	204.028	CP282	CP131	SKTM
GANDUL	PAKDE	425.01	CP131	CP452	SKTM
GANDUL	PAKDE	453.928	CP452	CP365	SKTM
GANDUL	PAKDE	312.822	CP365	CN34	SKTM
GANDUL	PAKDE	237.713	CN34	CP97	SKTM
GANDUL	PAKDE	738.592	CP97	CP97P	SKTM
GANDUL	PAKDE	118.553	CP97P	CP100	SKTM
GANDUL	PAKDE	753.932	CP100	CNK29	SKTM
GANDUL	PAKDE	1050.82	CNK29	CP46A	SKTM
GANDUL	PAKDE	638.925	CP46A	CP46	SKTM
GANDUL	PAKDE	525.9	CP46	CP271	SKTM
GANDUL	PAKDE	949.648	CP271	CP73	SKTM
GANDUL	PAKDE	1185.27	CP73	CNK1E5	SKTM
GANDUL	PAKDE	241.081	CNK1E5	CP284	SKTM
GANDUL	PAKDE	199.276	CP284	CP384	SKTM
GANDUL	PAKDE	394.428	CP384	CP407	SKTM
GANDUL	PAKDE	256.989	CP407	CNK27	SKTM
GANDUL	PAKDE	483.851	CNK27	CP403	SKTM
GANDUL	PAKDE	543.209	CP403	CNK24	SKTM
GANDUL	PAKDE	977.008	CNK24	TD211P	SKTM
GANDUL	PAKDE	467.178	TD211P	TD211	SKTM
GANDUL	PAKDE	962.448	TD211	CP342	SKTM
GANDUL	PAKDE	1293.46	TD211	CN19	SKTM
GANDUL	PAKDE	287.763	CP342	CP353	SKTM
GANDUL	PAKDE	1715.99	CP353	CP216	SKTM
GANDUL	PAKDE	611.026	CP216	CP151	SKTM
GANDUL	PAKDE	888.396	CP151	CP320	SKTM
GANDUL	PAKDE	2056.26	CP320	CP29E	SKTM
GANDUL	PAKDE	1687.56	CP29E	TD222	SKTM
GANDUL	PAKDE	682.225	TD222	CP26P	SKTM
GANDUL	PAKDE	290.194	CP26P	CP70	SKTM
GANDUL	PAKDE	3060.33	CP70	GH141	SKTM
GI	PENYULANG	PANJANG HANTARAN	DARI	KE	KETERANGAN
GANDUL	PAMAN	4509.62	GI.GANDUL	CN33	SKTM
GANDUL	PAMAN	2614	CN33	CP418	SKTM
GANDUL	PAMAN	1256.24	CP418	CP184	SKTM
GANDUL	PAMAN	650.318	CP184	CP394	SKTM
GANDUL	PAMAN	449.788	CP394	CP346	SKTM
GANDUL	PAMAN	738.345	CP346	TD136	SKTM
GANDUL	PAMAN	128.973	TD136	CP80	SKTM
GANDUL	PAMAN	935.741	CP80	CP277	SKTM
GANDUL	PAMAN	950.182	CP277	CP250	SKTM
GANDUL	PAMAN	498.395	CP250	CP29F	SKTM
GANDUL	PAMAN	1405.89	CP29F	CP29C	SKTM

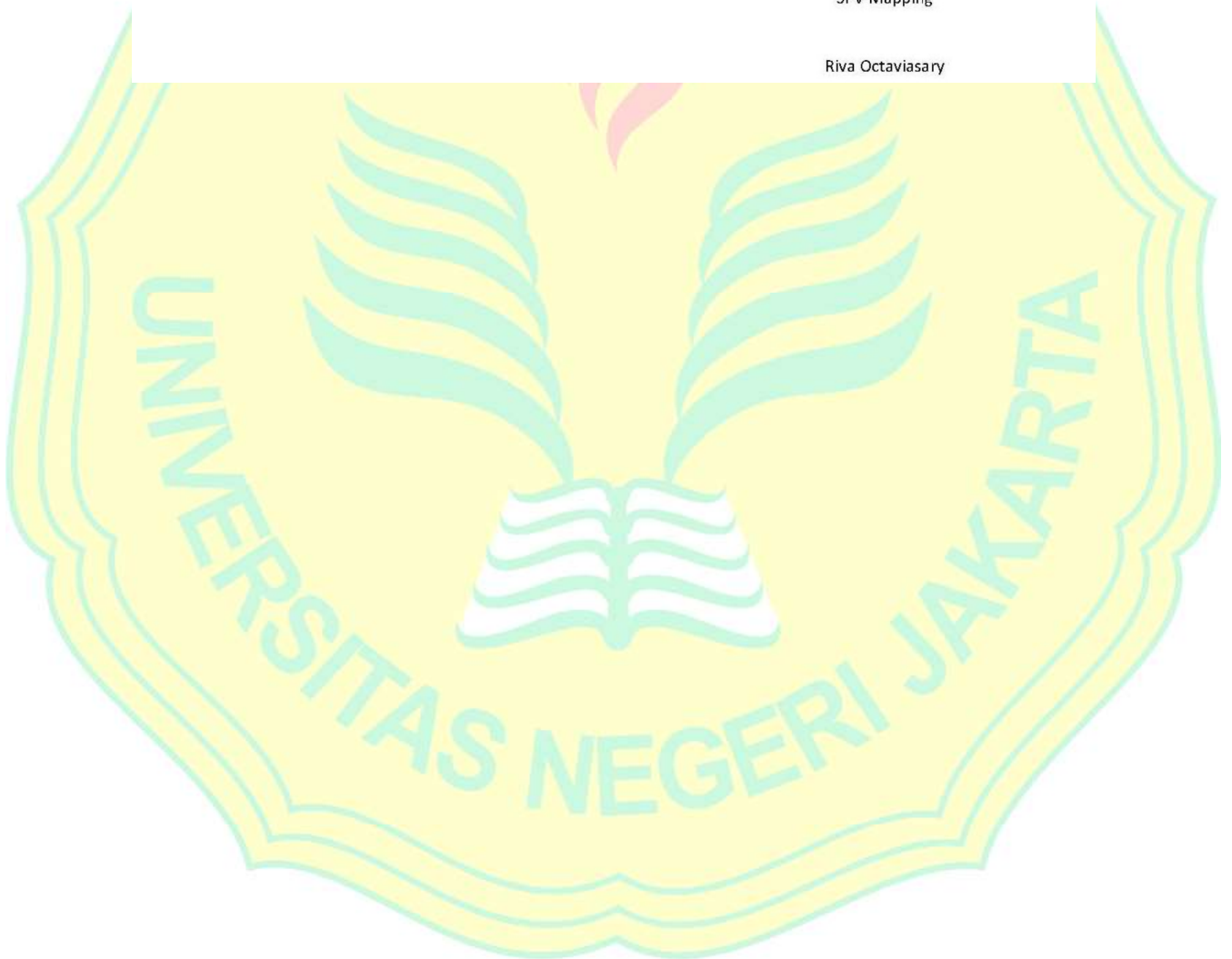
GANDUL	PAMAN	1652.87	CP29C	CP29D	SKTM
GANDUL	PAMAN	820.364	CP29D	CP29A	SKTM
GANDUL	PAMAN	1996.8	CP29A	TD126A	SKTM
GANDUL	PAMAN	843.151	TD126A	CP358	SKTM
GANDUL	PAMAN	220.363	CP358	CP321	SKTM
GANDUL	PAMAN	1045.99	CP321	CP25B	SKTM
GANDUL	PAMAN	950.283	CP25B	GH141	SKTM
GI	PENYULANG	PANJANG HANTARAN	DARI	KE	KETERANGAN
GANDUL	PELANGI	1400.15	GI.GANDUL	TD174	SKTM
GANDUL	PELANGI	2106.63	TD174	CN40	SKTM
GANDUL	PELANGI	1640.14	CN40	CP40A	SKTM
GANDUL	PELANGI	1243.45	CP40A	CP40	SKTM
GANDUL	PELANGI	286.137	CP40	CN9	SKTM
GANDUL	PELANGI	1113.29	CN9	TD91D	SKTM
GANDUL	PELANGI	573.475	TD91D	TD208	SKTM
GANDUL	PELANGI	277.281	TD208	TD229	SKTM
GANDUL	PELANGI	1734.75	TD229	GH403	SKTM
GI	PENYULANG	PANJANG HANTARAN	DARI	KE	KETERANGAN
GANDUL	PENYU	2020.31	GI.GANDUL	CN73	SKTM
GANDUL	PENYU	2690.81	CN73	CN44	SKTM
GANDUL	PENYU	489.229	CN44	TD178	SKTM
GANDUL	PENYU	787.927	TD178	TD186	SKTM
GANDUL	PENYU	792.145	TD186	CP39B	SKTM
GANDUL	PENYU	306.328	CP39B	CP395	SKTM
GANDUL	PENYU	999.184	CP395	TD187	SKTM
GANDUL	PENYU	375.26	TD187	CN42	SKTM
GANDUL	PENYU	287.589	CN42	CP351	SKTM
GANDUL	PENYU	247.879	CP351	CN43	SKTM
GANDUL	PENYU	3455.01	CN43	TD210	SKTM
GANDUL	PENYU	577.135	TD210	TD275	SKTM
GANDUL	PENYU	450.626	TD275	CN94	SKTM
GANDUL	PENYU	1273.04	CN94	TD176	SKTM
GANDUL	PENYU	1239.11	TD176	CN70	SKTM
GANDUL	PENYU	297.732	CN70	TD88N	SKTM
GANDUL	PENYU	1197.99	TD88N	GH188	SKTM
GANDUL	PENYU	1033.08	TD88N	GH45	SKTM
GI	PENYULANG	PANJANG HANTARAN	DARI	KE	KETERANGAN
GANDUL	REMIS	6361.11	GI.GANDUL	GH45	SKTM
GI	PENYULANG	PANJANG HANTARAN	DARI	KE	KETERANGAN
GANDUL	SAHABAT	734.033	GI GANDUL	SKTM GI GANDUL	SKTM
GANDUL	SAHABAT	313.888	SKTM GI GANDUL	SKUTM TD180	SKUTM
GANDUL	SAHABAT	121.567	SKUTM TD180	SKTM TD180	SKTM
GANDUL	SAHABAT	122.638	SKTM TD180	SKUTM CN63	SKTM
GANDUL	SAHABAT	1228.71	SKUTM CN63	CN63	SKUTM
GANDUL	SAHABAT	754.323	CN63	SKTM CROSS SUTT	SKUTM
GANDUL	SAHABAT	148.062	MVTIC CN63	MVTIC	SKTM
GANDUL	SAHABAT	634.953	SKTM CROOSING SUTT	SKTM TD442	SKUTM
GANDUL	SAHABAT	554.697	SKTM TD442	AFTAK TD442	SKTM
GANDUL	SAHABAT	501.837	AFTAK TD442	CN77	SKTM
GANDUL	SAHABAT	427.062	CN77	TD74P	SKTM
GANDUL	SAHABAT	946.194	TD74P	TD74S	SKTM
GANDUL	SAHABAT	204.119	TD74S	CN87	SKTM
GANDUL	SAHABAT	951.206	CN87	TD158	SKTM
GANDUL	SAHABAT	1149.5	SKTM CROOSING SUTT	SKTM TD442	SKUTM
GANDUL	SAHABAT	483.952	MVTIC	TD422	SKTM
GANDUL	SAHABAT	1281.26	TD442	CN76	SKTM
GANDUL	SAHABAT	1283.78	CN76	TD 55 P. KALA2	SKTM
GI	PENYULANG	PANJANG HANTARAN	DARI	KE	KETERANGAN
GANDUL	SAUDARA	4625.17	GI. GANDUL	CNK30	SKTM
GANDUL	SAUDARA	848.057	CNK30	CNK19	SKTM
GANDUL	SAUDARA	211.267	CNK19	SKTM1 CNK6	SUTM
GANDUL	SAUDARA	522.909	SUTM CNK19	CNK6	SKTM
GANDUL	SAUDARA	527.276	CNK6	SUTM CNK4	SKTM
GANDUL	SAUDARA	1026.57	SKTM CNK6	CNK4	SUTM
GANDUL	SAUDARA	564.214	CNK4	SKTM CNK18	SUTM
GANDUL	SAUDARA	326.192	SUTM CNK4	CNK18	SKTM
GANDUL	SAUDARA	325.618	CNK18	SUTM CP509	SKTM
GANDUL	SAUDARA	668.253	SKTM CNK18	SKTM CP509	SUTM
GANDUL	SAUDARA	215.747	SUTM CNK18	CP509	SKTM
GANDUL	SAUDARA	214.994	CP509	SUTM CND	SKTM
GANDUL	SAUDARA	412.025	SUTM CND	SKTM CND	SUTM

GANDUL	SAUDARA	141.95	SKTM CND	CND	SKTM
GANDUL	SAUDARA	419.88	CND	CNK1	SKTM
GANDUL	SAUDARA	998.176	CNK1	GH122	SKTM
GANDUL	SAUDARA	330.507	AFTAK CNK6	MVTIC CNK10	SUTM
GANDUL	SAUDARA	183.016	AFTAK CNK4	CP426	SKTM
GANDUL	SAUDARA	194.537	AFTAK CNK4	CNK3	SUTM
GANDUL	SAUDARA	398.151	SUTM AFTAK CNK6	SUTM CNK10	SKUTM
GANDUL	SAUDARA	132.47	MVTIC	CNK10	SUTM
GANDUL	SAUDARA	334.001	CNK10	CNK9	SUTM
GI	PENYULANG	PANJANG HANTARAN	DARI	KE	KETERANGAN
GANDUL	SEPUPU	1035.73	GI.GANDUL	CN98	SKTM
GANDUL	SEPUPU	1228.07	CN98	TD197	SKTM
GANDUL	SEPUPU	1325.12	TD197	TD87A	SKTM
GANDUL	SEPUPU	2.3	TD87A	CN109	SKTM
GANDUL	SEPUPU	1285.2	TD87A	TD317	SKTM
GANDUL	SEPUPU	405.366	TD317	TD199	SKTM
GANDUL	SEPUPU	192.274	TD199	TD457	SKTM
GANDUL	SEPUPU	606.567	TD199	TD467	SKTM
GANDUL	SEPUPU	710.842	TD467	TD194	SKTM
GANDUL	SEPUPU	388.896	TD194	CN18	SKTM
GANDUL	SEPUPU	452.483	CN18	CN89	SKTM
GANDUL	SEPUPU	570.889	CN89	TD462	SKTM
GANDUL	SEPUPU	568.172	TD462	TD468	SKTM
GANDUL	SEPUPU	1803.22	TD468	GH45	SKTM
GI	PENYULANG	PANJANG HANTARAN	DARI	KE	KETERANGAN
GANDUL	SIPUT	3788.89	GI.GANDUL	CN55	SKTM
GANDUL	SIPUT	153.994	CN55	CN132	SKTM
GANDUL	SIPUT	791.938	CN132	CN88	SKTM
GANDUL	SIPUT	1102.46	CN88	CN75	SKTM
GANDUL	SIPUT	501.898	CN75	CN124	SKTM
GANDUL	SIPUT	621.695	CN124	CN133	SKTM
GANDUL	SIPUT	1084.11	CN133	CN48	SKTM
GANDUL	SIPUT	1677.44	CN48	TD1025	SKTM
GANDUL	SIPUT	240.948	TD1025	CN41	SKTM
GANDUL	SIPUT	992.022	CN41	GH45	SKTM
GANDUL	SIPUT	614.525	CN132 (SIPUT)	TD92B (LIPAN2)	SKTM
GI	PENYULANG	PANJANG HANTARAN	DARI	KE	KETERANGAN
GANDUL	SULUNG	8741.32	GI.GANDUL	GH122	SKTM
GI	PENYULANG	PANJANG HANTARAN	DARI	KE	KETERANGAN
GANDUL	SIWA	9200.12	GI.GANDUL	GH71	SKTM
GI	PENYULANG	PANJANG HANTARAN	DARI	KE	KETERANGAN
GANDUL	TEMAN	3296.13	GI.GANDUL	CP474	SKTM
GANDUL	TEMAN	481.4	CP474	CP29B	SKTM
GANDUL	TEMAN	950.234	CP29B	CN26	SKTM
GANDUL	TEMAN	682.666	CN26	CN30	SKTM
GANDUL	TEMAN	533.023	CN30	CN31	SKTM
GANDUL	TEMAN	265.843	CN31	CN74	SKTM
GANDUL	TEMAN	327.056	CN74	CN45	SKTM
GANDUL	TEMAN	590.354	CN45	CN37	SKTM
GANDUL	TEMAN	1760.46	CN37	CN62	SKTM
GANDUL	TEMAN	408.045	CN62	CN21	SKTM
GANDUL	TEMAN	483.54	CN21	CN51	SKTM
GANDUL	TEMAN	2223.84	CN51	CNK20	SKTM
GANDUL	TEMAN	159.428	CNK20	CPT11	SKTM
GANDUL	TEMAN	3356.2	CPT11	TD131A	SKTM
GANDUL	TEMAN	188.881	CP28B	CP129	SKTM
GANDUL	TEMAN	734.368	CP215	CP255	SKTM
GANDUL	TEMAN	1393.19	CP129	CP215	SKTM
GANDUL	TEMAN	1757.72	CP215	CP290	SKTM
GANDUL	TEMAN	157.259	CP290	CP276	SKTM
GANDUL	TEMAN	544.369	CP276	CP462	SKTM
GANDUL	TEMAN	167.3	CP462	CP492	SKTM
GANDUL	TEMAN	2189.75	CP492	CP517	SKTM
GANDUL	TEMAN	196.934	CP517	CP482	SKTM
GANDUL	TEMAN	2635.63	CP482	GH141	SKTM
GI	PENYULANG	PANJANG HANTARAN	DARI	KE	KETERANGAN
GANDUL	WISNU	535.084	GI.GANDUL	TD147	SKTM
GANDUL	WISNU	237.711	TD147	CN84	SKTM
GANDUL	WISNU	203.346	CN84	TD312	SKTM
GANDUL	WISNU	2401.78	TD312	CN11	SKTM
GANDUL	WISNU	500.126	CN11	CN52	SKTM

GANDUL	WISNU	821.083	CN52	CN120	SKTM
GANDUL	WISNU	367.666	CN120	CN127	SKTM
GANDUL	WISNU	1079	CN127	CN72	SKTM
GANDUL	WISNU	1029.67	CN72	TD28C	SKTM
GANDUL	WISNU	171.747	TD28C	CN53	SKTM
GANDUL	WISNU	463.648	CN53	CN115	SKTM
GANDUL	WISNU	183.329	CN115	CN5	SKTM
GANDUL	WISNU	3536.3	CN5	CN69	SKTM
GANDUL	WISNU	333.706	CN69	CN66	SKTM
GANDUL	WISNU	595.82	CN66	TD258	SKTM
GANDUL	WISNU	1031.83	TD258	TD87B	SKTM
GANDUL	WISNU	292.106	TD87B	CN101	SKTM
GANDUL	WISNU	971.06	CN101	CN12	SKTM
GANDUL	WISNU	195.973	CN12	TD287	SKTM
GANDUL	WISNU	4002.37	TD287	GH45	SKTM
GANDUL	WISNU	1996.58	TD87B	CN128	SKTM

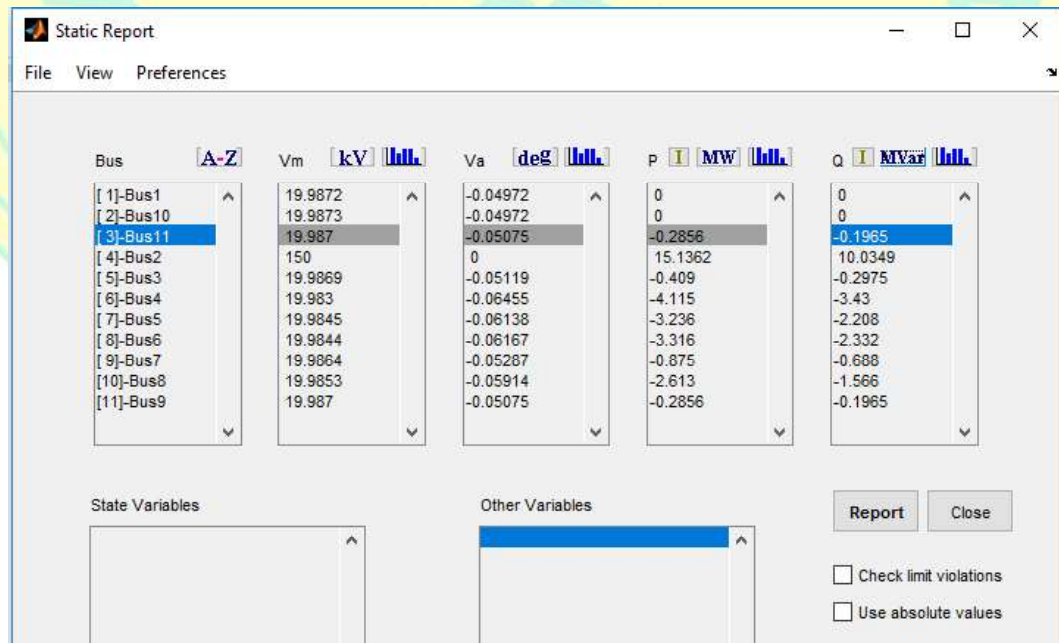
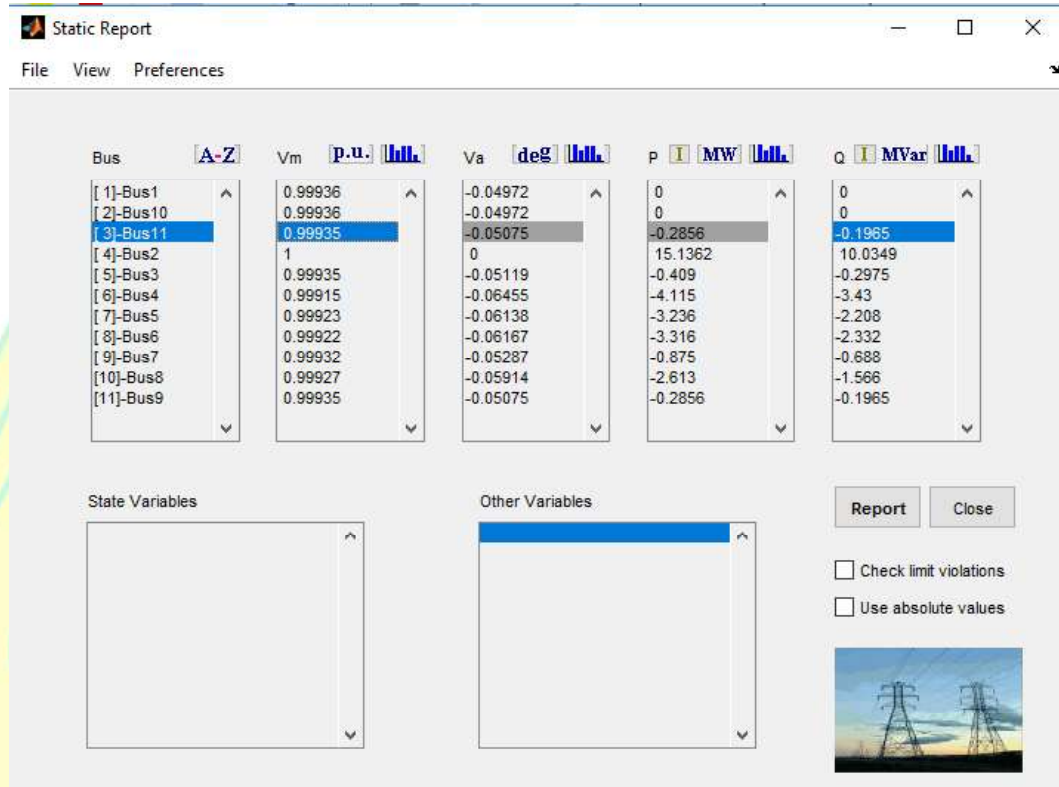
SPV Mapping

Riva Octaviasary



LAMPIRAN 4

HASIL SIMULASI MATLAB PSAT 2.1.7



LAMPIRAN 5**HASIL SIMULASI ETAP 12.6 LOAD FLOW**

Project:
Location:
Contract:
Engineer:
Filename: ENDI

ETAP
12.6.0H

Study Case: LF

Page: 7
Date: 02-14-2020
SN:
Revision: Base
Config.: Normal

LOAD FLOW REPORT

Bus		Voltage			Generation		Load		Load Flow					XFMR	
ID	kV	% Mag	Ang	MW	Mvar	MW	Mvar	ID	MW	Mvar	Amp	%PF	%Tap		
Bus1	20.000	97.824	-1.8	0	0	0	0	Bus12	0.422	0.262	14.6	85.0			
								Bus4	4.250	2.676	148.2	84.6			
								Bus5	3.396	2.133	118.3	84.7			
								Bus6	3.387	2.118	117.9	84.8			
								Bus7	0.844	0.524	29.3	84.9			
								Bus8	2.552	1.608	89.0	84.6			
								Bus9	0.253	0.157	8.8	85.0			
								Bus11	0.253	0.157	8.8	85.0			
								Bus2	-15.356	-9.635	535.0	84.7			
*Bus2	150.000	100.000	0.0	15.372	10.351	0	0	Bus1	15.372	10.351	71.3	82.9			
Bus4	20.000	95.780	-2.3	0	0	4.180	2.590	Bus1	-4.180	-2.590	148.2	85.0			
Bus5	20.000	96.076	-2.2	0	0	3.348	2.075	Bus1	-3.348	-2.075	118.3	85.0			
Bus6	20.000	96.663	-2.1	0	0	3.355	2.079	Bus1	-3.355	-2.079	117.9	85.0			
Bus7	20.000	97.507	-1.9	0	0	0.842	0.522	Bus1	-0.842	-0.522	29.3	85.0			
Bus8	20.000	95.632	-2.3	0	0	2.506	1.553	Bus1	-2.506	-1.553	89.0	85.0			
Bus9	20.000	97.720	-1.9	0	0	0.253	0.157	Bus1	-0.253	-0.157	8.8	85.0			
Bus11	20.000	97.634	-1.9	0	0	0.253	0.157	Bus1	-0.253	-0.157	8.8	85.0			
Bus12	20.000	97.680	-1.9	0	0	0.421	0.261	Bus1	-0.421	-0.261	14.6	85.0			

* Indicates a voltage regulated bus (voltage controlled or swing type machine connected to it)

Indicates a bus with a load mismatch of more than 0.1 MVA

Project:	ETAP	Page:	10
Location:	12.6.0H	Date:	02-14-2020
Contract:		SN:	
Engineer:	Study Case: LF	Revision:	Base
Filename: ENDI		Config.:	Normal

Branch Losses Summary Report

CKT / Branch	From-To Bus Flow		To-From Bus Flow		Losses		% Bus Voltage		Vd % Drop in Vmag
	MW	Mvar	MW	Mvar	kW	kvar	From	To	
Cable1	0.422	0.262	-0.421	-0.261	0.5	0.6	97.8	97.7	0.14
Cable2	4.250	2.676	-4.180	-2.590	70.3	85.5	97.8	95.8	2.04
Cable3	3.396	2.133	-3.348	-2.075	48.0	58.4	97.8	96.1	1.75
Cable4	3.387	2.118	-3.355	-2.079	31.8	38.6	97.8	96.7	1.16
Cable5	0.844	0.524	-0.842	-0.522	2.2	2.6	97.8	97.5	0.32
Cable6	2.552	1.608	-2.506	-1.553	45.3	55.1	97.8	95.6	2.19
Cable7	0.253	0.157	-0.253	-0.157	0.2	0.3	97.8	97.7	0.10
Cable9	0.253	0.157	-0.253	-0.157	0.4	0.5	97.8	97.6	0.19
TRAFO 4	-15.356	-9.635	15.372	10.351	15.9	715.3	97.8	100.0	2.18
					214.5	956.9			



LAMPIRAN 6**HASIL ITERASI MATLAB PSAT 2.1.7**

MATLAB Command Window

Page 1

>> psat

```

      < P S A T >
Copyright (C) 2002-2012 Federico Milano
Version 2.1.7
July 30, 2012

```

```

PSAT comes with ABSOLUTELY NO WARRANTY; type 'gnuwarranty'
for details. This is free software, and you are welcome to
redistribute it under certain conditions; type 'gnulicense'
for details.

```

```

Host:      Matlab 8.3.0.532 (R2014a)
Session:   19-Feb-2020 01:42:57
Usage:     Graphical User Interface
Path:      C:\Users\user\Documents\MATLAB

```

```

Parameter "Settings.mva" set to "60".

```

```

Simulink Model Conversion
Simulink File <Single_Line_20kV_10bus_.mdl>.
Loading Simulink Model

```

```

* * *
Check model version and blocks ...
* * All blocks belong to the PSAT-Simulink Library.
* * *

```

```

Statistics ...
Connections: #11#
Power Flow Components: #20#
* * *

```

```

Definition of component data ...
Data "Bus.con"
Data "Line.con"
Data "PQ.con"
Data "SW.con"
Data "Line.con"
* * *

```

```

Definition of system connections ...
* * *

```

```

Writing Data File
Construction of Data File <Single_Line_20kV_10bus_.mdl.m> completed.
Data file "e:\Simulink MATLAB (SKRIPSI)\Single_Line_20kV_10bus_(mdl)" set

```

```

Newton-Raphson Method for Power Flow Computation
Data file "e:\Simulink MATLAB (SKRIPSI)\Single_Line_20kV_10bus_(mdl)"
Voltage of Line #10 from bus <Bus2> to bus <Bus1> differs more than 10% from the base✓
defined at the connected bus <Bus2>
Writing file "Em_call" ...
PF solver: Newton-Raphson method
Single slack bus model
Iteration = 1      Maximum Convergency Error = 0.0011257
Iteration = 2      Maximum Convergency Error = 1.2621e-06
Power Flow completed in 1.061 s
>>

```

LAMPIRAN 7
HASIL ITERASI ETAP 12.6



Project:	ETAP	Page:	12
Location:	12.6.0H	Date:	02-14-2020
Contract:		SN:	
Engineer:	Study Case: LF	Revision:	Base
Filename: ENDI		Config.:	Normal

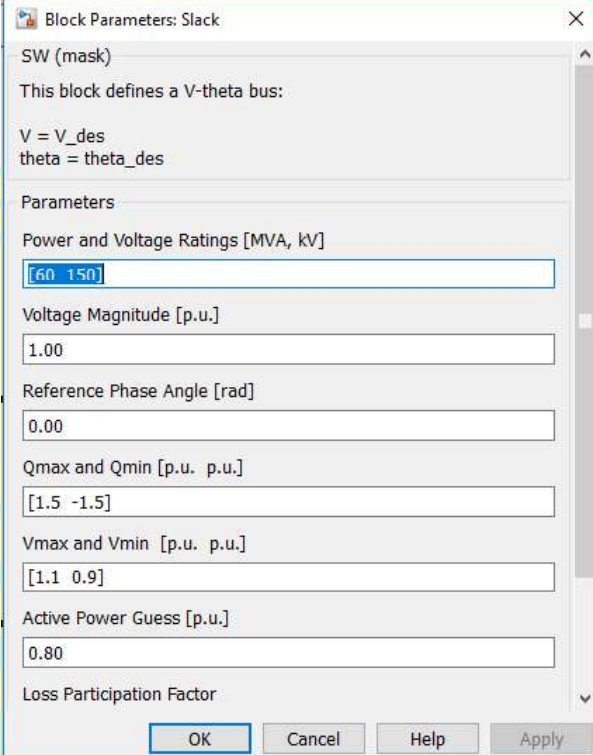
SUMMARY OF TOTAL GENERATION, LOADING & DEMAND

	MW	Mvar	MVA	% PF
Source (Swing Buses):	15.372	10.351	18.532	82.95 Lagging
Source (Non-Swing Buses):	0.000	0.000	0.000	
Total Demand:	15.372	10.351	18.532	82.95 Lagging
Total Motor Load:	12.308	7.628	14.480	85.00 Lagging
Total Static Load:	2.849	1.766	3.352	85.00 Lagging
Total Constant I Load:	0.000	0.000	0.000	
Total Generic Load:	0.000	0.000	0.000	
Apparent Losses:	0.215	0.957		
System Mismatch:	0.000	0.000		

Number of Iterations: 3

LAMPIRAN 8

PARAMETER MATLAB PSAT 2.1.7



Block Parameters: Slack

SW (mask)

This block defines a V-theta bus:

$$V = V_des$$

$$\theta = \theta_des$$

Parameters

Power and Voltage Ratings [MVA, kV]

[60 150]

Voltage Magnitude [p.u.]

1.00

Reference Phase Angle [rad]

0.00

Qmax and Qmin [p.u. p.u.]

[1.5 -1.5]

Vmax and Vmin [p.u. p.u.]

[1.1 0.9]

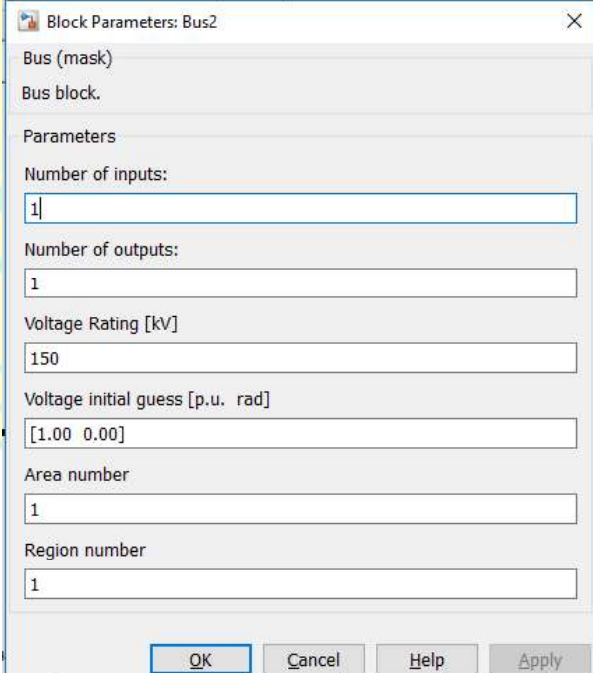
Active Power Guess [p.u.]

0.80

Loss Participation Factor

OK Cancel Help Apply

Parameter Power Grid



Block Parameters: Bus2

Bus (mask)

Bus block.

Parameters

Number of inputs:

1

Number of outputs:

1

Voltage Rating [kV]

150

Voltage initial guess [p.u. rad]

[1.00 0.00]

Area number

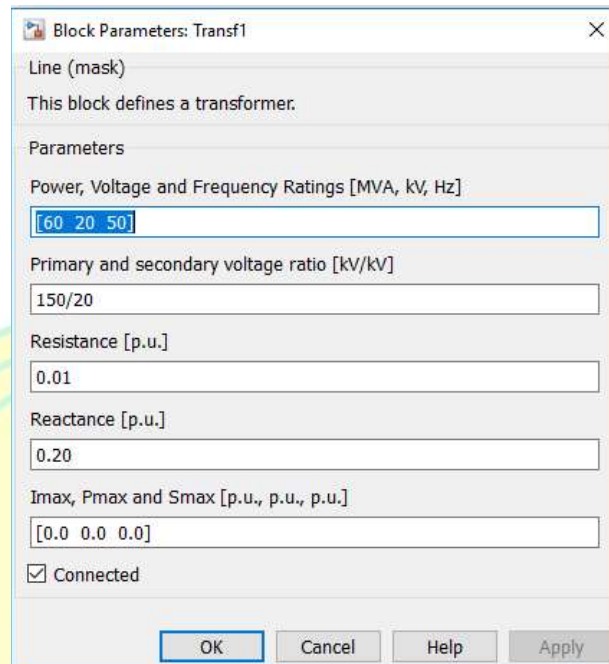
1

Region number

1

OK Cancel Help Apply

Parameter Bus 2 150 kV



Block Parameters: Transf1

Line (mask)
This block defines a transformer.

Parameters

Power, Voltage and Frequency Ratings [MVA, kV, Hz]
[60 20 50]

Primary and secondary voltage ratio [kV/kV]
150/20

Resistance [p.u.]
0.01

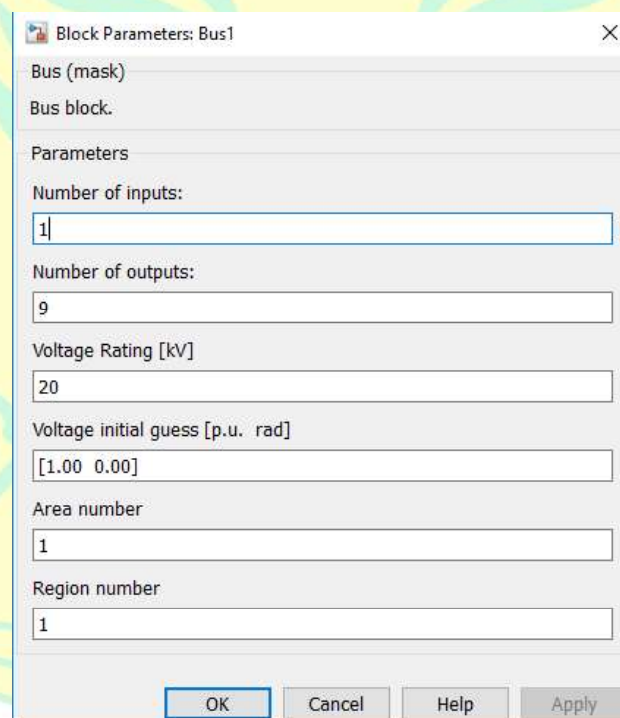
Reactance [p.u.]
0.20

Imax, Pmax and Smax [p.u., p.u., p.u.]
[0.0 0.0 0.0]

☒ Connected

OK Cancel Help Apply

Parameter Transformator 4



Block Parameters: Bus1

Bus (mask)
Bus block.

Parameters

Number of inputs:
1

Number of outputs:
9

Voltage Rating [kV]
20

Voltage initial guess [p.u. rad]
[1.00 0.00]

Area number
1

Region number
1

OK Cancel Help Apply

Parameter Bus 1

Block Parameters: Bus3

Bus (mask)
Bus block.

Parameters

Number of inputs:
1

Number of outputs:
1

Voltage Rating [kV]
20

Voltage initial guess [p.u. rad]
[1.00 0.00]

Area number
1

Region number
1

OK Cancel Help Apply

Parameter Bus 3-11

Block Parameters: Line

Line (mask)
This block defines a pi model for a three phase line.

Parameters

Power, Voltage and Frequency Ratings [MVA, kV, Hz]
[60 20 50]

Length of line [km] (0 for p.u. parameters)
10.375

Resistance [p.u. (Ohms/km)]
0.0790

Reactance [p.u. (H/km)]
0.376

Susceptance [p.u. (F/km)]
0.276

Imax, Pmax and Smax [p.u., p.u., p.u.]
[0.0 0.0 0.0]

☒ Connected

OK Cancel Help Apply

Parameter Line Pelangi

Block Parameters: Line8

Line (mask)
This block defines a pi model for a tree phase line.

Parameters

Power, Voltage and Frequency Ratings [MVA, kV, Hz]
[60 20 50]

Length of line [km] (0 for p.u. parameters)
14.272

Resistance [p.u. (Ohms/km)]
0.0790

Reactance [p.u. (H/km)]
0.376

Susceptance [p.u. (F/km)]
0.276

Imax, Pmax and Smax [p.u., p.u., p.u.]
[0.0 0.0 0.0]

☒ Connected

OK Cancel Help Apply

Parameter Line Canggih

Block Parameters: Line9

Line (mask)
This block defines a pi model for a tree phase line.

Parameters

Power, Voltage and Frequency Ratings [MVA, kV, Hz]
[60 20 50]

Length of line [km] (0 for p.u. parameters)
15.206

Resistance [p.u. (Ohms/km)]
0.0790

Reactance [p.u. (H/km)]
0.376

Susceptance [p.u. (F/km)]
0.276

Imax, Pmax and Smax [p.u., p.u., p.u.]
[0.0 0.0 0.0]

☒ Connected

OK Cancel Help Apply

Parameter Line Besan

Block Parameters: Line1

Line (mask)
This block defines a pi model for a tree phase line.

Parameters

Power, Voltage and Frequency Ratings [MVA, kV, Hz]
[60 20 50]

Length of line [km] (0 for p.u. parameters)
10.375

Resistance [p.u. (Ohms/km)]
0.0790

Reactance [p.u. (H/km)]
0.376

Susceptance [p.u. (F/km)]
0.276

Imax, Pmax and Smax [p.u., p.u., p.u.]
[0.0 0.0 0.0]

☒ Connected

OK Cancel Help Apply

Parameter Line Sepupu

Block Parameters: Line2

Line (mask)
This block defines a pi model for a tree phase line.

Parameters

Power, Voltage and Frequency Ratings [MVA, kV, Hz]
[60 20 50]

Length of line [km] (0 for p.u. parameters)
11.841

Resistance [p.u. (Ohms/km)]
0.0790

Reactance [p.u. (H/km)]
0.376

Susceptance [p.u. (F/km)]
0.276

Imax, Pmax and Smax [p.u., p.u., p.u.]
[0.0 0.0 0.0]

☒ Connected

OK Cancel Help Apply

Parameter Line Sahabat

Block Parameters: Line3

Line (mask)
This block defines a pi model for a tree phase line.

Parameters

Power, Voltage and Frequency Ratings [MVA, kV, Hz]
[60 20 50]

Length of line [km] (0 for p.u. parameters)
25.483

Resistance [p.u. (Ohms/km)]
0.0790

Reactance [p.u. (H/km)]
0.376

Susceptance [p.u. (F/km)]
0.276

Imax, Pmax and Smax [p.u., p.u., p.u.]
[0.0 0.0 0.0]

☒ Connected

OK Cancel Help Apply

Parameter Line Teman

Block Parameters: Line4

Line (mask)
This block defines a pi model for a tree phase line.

Parameters

Power, Voltage and Frequency Ratings [MVA, kV, Hz]
[60 20 50]

Length of line [km] (0 for p.u. parameters)
12.729

Resistance [p.u. (Ohms/km)]
0.0790

Reactance [p.u. (H/km)]
0.376

Susceptance [p.u. (F/km)]
0.276

Imax, Pmax and Smax [p.u., p.u., p.u.]
[0.0 0.0 0.0]

☒ Connected

OK Cancel Help Apply

Parameter Line Kemilau

Block Parameters: Line5

Line (mask)
This block defines a pi model for a three phase line.

Parameters

Power, Voltage and Frequency Ratings [MVA, kV, Hz]
[60 20 50]

Length of line [km] (0 for p.u. parameters)
0.986

Resistance [p.u. (Ohms/km)]
0.0790

Reactance [p.u. (H/km)]
0.376

Susceptance [p.u. (F/km)]
0.276

Imax, Pmax and Smax [p.u., p.u., p.u.]
[0.0 0.0 0.0]

☒ Connected

OK Cancel Help Apply

Parameter Line Icon1

Block Parameters: Line6

Line (mask)
This block defines a pi model for a three phase line.

Parameters

Power, Voltage and Frequency Ratings [MVA, kV, Hz]
[60 20 50]

Length of line [km] (0 for p.u. parameters)
22.699

Resistance [p.u. (Ohms/km)]
0.0790

Reactance [p.u. (H/km)]
0.376

Susceptance [p.u. (F/km)]
0.276

Imax, Pmax and Smax [p.u., p.u., p.u.]
[0.0 0.0 0.0]

☒ Connected

OK Cancel Help Apply

Parameter Line Keponakan

Block Parameters: PQ

PQ (mask)
This block defines a constant power load:
 $P = P_{cost}$
 $Q = Q_{cost}$

Parameters

Power and Voltage Ratings [MVA, kV]
[0.5 20]

Active and Reactive Powers [p.u. p.u.]
[0.818 0.595]

Maximum and Minimum Allowable Voltage [p.u. p.u.]
[1.2 0.8]

☒ Allow conversion to impedance for min or max voltage
☒ Connected

OK Cancel Help Apply

Parameter Beban Pelangi

Block Parameters: PQ1

PQ (mask)
This block defines a constant power load:
 $P = P_{cost}$
 $Q = Q_{cost}$

Parameters

Power and Voltage Ratings [MVA, kV]
[5 20]

Active and Reactive Powers [p.u. p.u.]
[0.823 0.686]

Maximum and Minimum Allowable Voltage [p.u. p.u.]
[1.2 0.8]

☒ Allow conversion to impedance for min or max voltage
☒ Connected

OK Cancel Help Apply

Parameter Beban Canggih

Block Parameters: PQ2

PQ (mask)

This block defines a constant power load:

$P = P_{cost}$
 $Q = Q_{cost}$

Parameters

Power and Voltage Ratings [MVA, kV]

Active and Reactive Powers [p.u. p.u.]

Maximum and Minimum Allowable Voltage [p.u. p.u.]

☒ Allow conversion to impedance for min or max voltage
☒ Connected

OK Cancel Help Apply

Parameter Beban Besan

Block Parameters: PQ3

PQ (mask)

This block defines a constant power load:

$P = P_{cost}$
 $Q = Q_{cost}$

Parameters

Power and Voltage Ratings [MVA, kV]

Active and Reactive Powers [p.u. p.u.]

Maximum and Minimum Allowable Voltage [p.u. p.u.]

☒ Allow conversion to impedance for min or max voltage
☒ Connected

OK Cancel Help Apply

Parameter Beban Sepupu

Block Parameters: PQ4

PQ (mask)

This block defines a constant power load:

$P = P_{cost}$
 $Q = Q_{cost}$

Parameters

Power and Voltage Ratings [MVA, kV]

Active and Reactive Powers [p.u. p.u.]

Maximum and Minimum Allowable Voltage [p.u. p.u.]

☒ Allow conversion to impedance for min or max voltage
☒ Connected

OK Cancel Help Apply

Parameter Beban Sahabat

Block Parameters: PQ5

PQ (mask)

This block defines a constant power load:

$P = P_{cost}$
 $Q = Q_{cost}$

Parameters

Power and Voltage Ratings [MVA, kV]

Active and Reactive Powers [p.u. p.u.]

Maximum and Minimum Allowable Voltage [p.u. p.u.]

☒ Allow conversion to impedance for min or max voltage
☒ Connected

OK Cancel Help Apply

Parameter Beban Teman

Block Parameters: PQ6

PQ (mask)

This block defines a constant power load:

$P = P_{cost}$
 $Q = Q_{cost}$

Parameters

Power and Voltage Ratings [MVA, kV]

Active and Reactive Powers [p.u. p.u.]

Maximum and Minimum Allowable Voltage [p.u. p.u.]

☒ Allow conversion to impedance for min or max voltage

☒ Connected

Parameter Beban Kemilau

Block Parameters: PQ7

PQ (mask)

This block defines a constant power load:

$P = P_{cost}$
 $Q = Q_{cost}$

Parameters

Power and Voltage Ratings [MVA, kV]

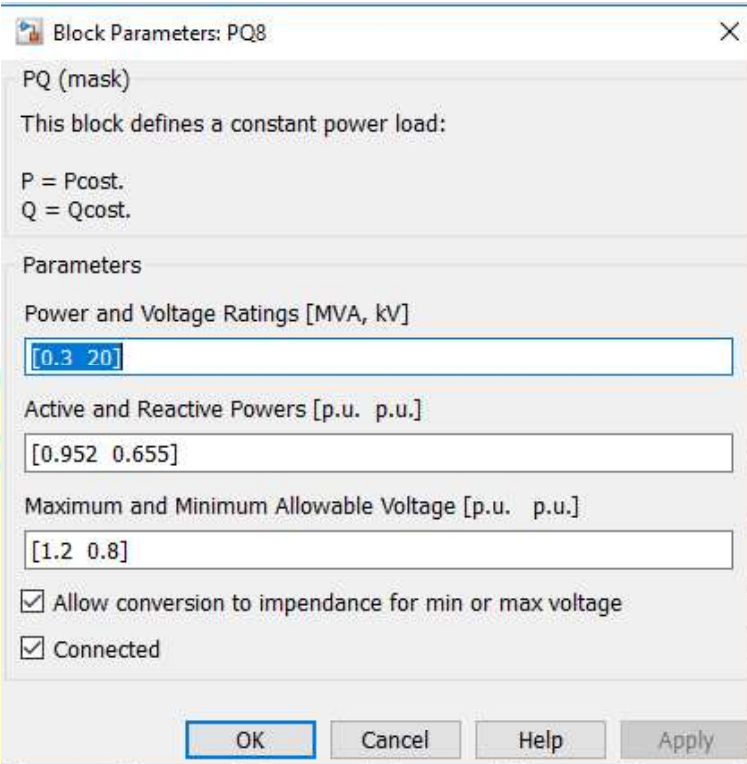
Active and Reactive Powers [p.u. p.u.]

Maximum and Minimum Allowable Voltage [p.u. p.u.]

☒ Allow conversion to impedance for min or max voltage

☒ Connected

Parameter Beban Icon1



Block Parameters: PQ8

PQ (mask)

This block defines a constant power load:

$P = P_{cost}$
 $Q = Q_{cost}$

Parameters

Power and Voltage Ratings [MVA, kV]
[0.3 20]

Active and Reactive Powers [p.u. p.u.]
[0.952 0.655]

Maximum and Minimum Allowable Voltage [p.u. p.u.]
[1.2 0.8]

☒ Allow conversion to impedance for min or max voltage

☒ Connected

OK Cancel Help Apply

Parameter Beban Keponakan

LAMPIRAN 9

PARAMETER ETAP 12.6

Power Grid Editor - U1

Info Rating Short Circuit Harmonic Reliability Energy Price Remarks Comment

150 kV Swing

Rated kV 150 ☒ Balanced ☐ Unbalanced

	Gen. Cat.	%V	Vangle	MW	Mvar	%PF	Qmax	Qmin
1	Design	100	0					
2	Normal	100	0					
3	Shutdown	100	0					
4	Emergency	100	0					
5	Standby	100	0					
6	Startup	100	0					
7	Accident	100	0					
8	Summer Load	100	0					
9	Winter Load	100	0					
10	Gen Cat 10	100	0					

Operating

% V 100 Vangle 0 MW 15,271 Mvar 10,155

U1 OK Cancel

Parameter Power Grid

2-Winding Transformer Editor - TRAF0 4

Reliability Remarks Comment

Info Rating Impedance Tap Grounding Sizing Protection Harmonic

60 MVA IEC Liquid-Fill Other 65 C 150 20 kV

Voltage Rating

Prim. kV 150 FLA 230.9 Bus kVnom 150 Z Base MVA 60

Sec. 20 1732 20

Other 65

Power Rating

MVA

Rated 60 Other 65

Derated 60

% Derating 0

MFR

Alert - Max

MVA 60

☐ Derated MVA ☒ User-Defined

Installation

Altitude 3300 ft

Ambient Temp. 30 °C

Type / Class

Type Sub Type Class Temp. Rise

Liquid-Fill Other Other 65

TRAF0 4 OK Cancel

Parameter Transformator 4

Bus Editor - Bus2

Harmonic	Reliability	Remarks	Comment
Info	Phase V	Load	Motor/Gen
Rating	Arc Flash	Protection	

150 kV 0 Amps Peak 0 kA

Info

ID: Bus2

Nominal kV: 150

Bus Voltage

	% V	kV	Angle
Initial	100	150	0
Operating	100	150	0

Equipment

Tag #:

Name:

Description:

Classification

Zone: 1

Area: 1

Region: 1

Revision Data

Base

Condition

Service: ☒ In ☐ Out

State: As-built

Connection

☒ 3 Phase

☐ 1 Phase 2W

☐ 1 Phase 3W

Load Diversity Factor

Min: 80 % Max: 125 %

OK Cancel

Parameter Bus 2 150 kV

Bus Editor - Bus1

Harmonic	Reliability	Remarks	Comment
Info	Phase V	Load	Motor/Gen
Rating	Arc Flash	Protection	

20 kV 0 Amps Asymmetrical 0 kA

Info

ID: Bus1

Nominal kV: 20

Bus Voltage

	% V	kV	Angle
Initial	100	20	0
Operating	97.864	19.573	-1.8

Equipment

Tag #:

Name:

Description:

Classification

Zone: 1

Area: 1

Region: 1

Revision Data

Base

Condition

Service: ☒ In ☐ Out

State: As-built

Connection

☒ 3 Phase

☐ 1 Phase 2W

☐ 1 Phase 3W

Load Diversity Factor

Min: 80 % Max: 125 %

OK Cancel

Parameter Bus 1 20 kV

Cable Editor - Cable1

Sizing - Phase	Sizing - GND/PE	Reliability	Routing	Remarks	Comment
Info	Physical	Impedance	Configuration	Loading	Capacity
Heesung Non-Mag. 50 Hz Code : 300					
XLPE 100 % 20 kV 3/C CU 300 mm ²					

Info

ID: Cable1

From: Bus1 20 kV

To: Bus12 20 kV

Revision Data

Base

Equipment

Tag #

Name

Description

Condition

Service: ☒ In ☐ Out

State: As-built

No. of Conductors / Phase

1

Length

Length: 10.375 km

Tolerance: 0 %

Library

Library...

Link to Library

Connection

☒ 3 Phase ☐ 1 Phase

OK Cancel

Parameter Cable 1

Cable Editor - Cable2

Sizing - Phase	Sizing - GND/PE	Reliability	Routing	Remarks	Comment
Info	Physical	Impedance	Configuration	Loading	Capacity
Heesung Non-Mag. 50 Hz Code : 300					
XLPE 100 % 20 kV 3/C CU 300 mm ²					

Info

ID: Cable2

From: Bus1 20 kV

To: Bus4 20 kV

Revision Data

Base

Equipment

Tag #

Name

Description

Condition

Service: ☒ In ☐ Out

State: As-built

No. of Conductors / Phase

1

Length

Length: 14.272 km

Tolerance: 0 %

Library

Library...

Link to Library

Connection

☒ 3 Phase ☐ 1 Phase

OK Cancel

Parameter Cable 2

Cable Editor - Cable3

Sizing - Phase	Sizing - GND/PE	Reliability	Routing	Remarks	Comment	
Info	Physical	Impedance	Configuration	Loading	Capacity	Protection

Heesung Non-Mag. 50 Hz Code : 300
 XLPE 100 % 20 kV 3/C CU 300 mm²

Info
 ID Cable3
 From Bus1 20 kV
 To Bus5 20 kV

Revision Data
 Base

Equipment
 Tag #
 Name
 Description

Condition
 Service ☒ In ☐ Out
 State As-built

No. of Conductors / Phase
 1

Length
 Length 15.206 km
 Tolerance 0 %

Library
 Library...
☐ Link to Library

Connection
☒ 3 Phase
☐ 1 Phase

OK Cancel

Parameter Cable 3

Cable Editor - Cable4

Sizing - Phase	Sizing - GND/PE	Reliability	Routing	Remarks	Comment	
Info	Physical	Impedance	Configuration	Loading	Capacity	Protection

Heesung Non-Mag. 50 Hz Code : 300
 XLPE 100 % 20 kV 3/C CU 300 mm²

Info
 ID Cable4
 From Bus1 20 kV
 To Bus6 20 kV

Revision Data
 Base

Equipment
 Tag #
 Name
 Description

Condition
 Service ☒ In ☐ Out
 State As-built

No. of Conductors / Phase
 1

Length
 Length 10.375 km
 Tolerance 0 %

Library
 Library...
☐ Link to Library

Connection
☒ 3 Phase
☐ 1 Phase

OK Cancel

Parameter Cable 4

Cable Editor - Cable5

Sizing - Phase	Sizing - GND/PE	Reliability	Routing	Remarks	Comment	
Info	Physical	Impedance	Configuration	Loading	Capacity	Protection
Heesung	Non-Mag.	50 Hz	Code : 300			
XLPE	100 %	20 kV	3/C CU	300	mm ²	

Info

ID: Cable5

From: Bus1 20 kV

To: Bus7 20 kV

Revision Data

Base

Equipment

Tag #

Name

Description

Condition

Service: ☒ In ☐ Out

State: As-built

No. of Conductors / Phase

1

Length

Length: 11.841 km

Tolerance: 0 %

Library

Library...

Link to Library

Connection

☒ 3 Phase ☐ 1 Phase

OK Cancel

Parameter Cable 5

Cable Editor - Cable6

Sizing - Phase	Sizing - GND/PE	Reliability	Routing	Remarks	Comment	
Info	Physical	Impedance	Configuration	Loading	Capacity	Protection
Heesung	Non-Mag.	50 Hz	Code : 300			
XLPE	100 %	20 kV	3/C CU	300	mm ²	

Info

ID: Cable6

From: Bus1 20 kV

To: Bus8 20 kV

Revision Data

Base

Equipment

Tag #

Name

Description

Condition

Service: ☒ In ☐ Out

State: As-built

No. of Conductors / Phase

1

Length

Length: 25.483 km

Tolerance: 0 %

Library

Library...

Link to Library

Connection

☒ 3 Phase ☐ 1 Phase

OK Cancel

Parameter Cable 6

Cable Editor - Cable7

Sizing - Phase	Sizing - GND/PE	Reliability	Routing	Remarks	Comment	
Info	Physical	Impedance	Configuration	Loading	Capacity	Protection
Heesung	Non-Mag.	50 Hz	Code : 300			
XLPE	100 %	20 kV	3/C CU	300	mm ²	

Info

ID: Cable7

From: Bus1 20 kV

To: Bus9 20 kV

Revision Data

Base

Equipment

Tag #

Name

Description

Condition

Service: ☒ In ☐ Out

State: As-built

No. of Conductors / Phase

1

Length

Length: 12.729 km

Tolerance: 0 %

Library

Library...

☐ Link to Library

Connection

☒ 3 Phase ☐ 1 Phase

OK Cancel

Parameter Cable 7

Cable Editor - Cable8

Sizing - Phase	Sizing - GND/PE	Reliability	Routing	Remarks	Comment	
Info	Physical	Impedance	Configuration	Loading	Capacity	Protection
Heesung	Non-Mag.	50 Hz	Code : 300			
XLPE	100 %	20 kV	3/C CU	300	mm ²	

Info

ID: Cable8

From: Bus1 20 kV

To: Bus10 20 kV

Revision Data

Base

Equipment

Tag #

Name

Description

Condition

Service: ☒ In ☐ Out

State: As-built

No. of Conductors / Phase

1

Length

Length: 0.986 km

Tolerance: 0 %

Library

Library...

☐ Link to Library

Connection

☒ 3 Phase ☐ 1 Phase

OK Cancel

Parameter Cable 8

Lumped Load Editor - Pelangi

Info Nameplate Short-Circuit Dyn Model Reliability Remarks Comment

0,5 MVA 20 kV (80% Motor 20% Static)

Model Type: Conventional Rated kV: 20 Calculator...

Ratings

MVA	MW	Mvar	% PF	Amp
0,5	0,425	0,263	85	14,43

Load Type

Constant kVA: 80 %

Constant Z: 20 %

Motor Load			Static Load		
Loading Category	% Loading	MW	Mvar	MW	Mvar
1 Design	100	0,34	0,211	0,085	0,053
2 Normal	100	0,34	0,211	0,085	0,053
3 Brake	0	0	0	0	0
4 Winter Load	0	0	0	0	0
5 Summer Load	0	0	0	0	0
6 FL Reject	0	0	0	0	0
7 Emergency	0	0	0	0	0
8 Shutdown	0	0	0	0	0

Operating: 0,34 0,211 0,081 0,05 MW +j Mvar

Pelangi OK Cancel

Parameter Load Pelangi

Lumped Load Editor - canggah

Info Nameplate Short-Circuit Dyn Model Reliability Remarks Comment

5 MVA 20 kV (80% Motor 20% Static)

Model Type: Conventional Rated kV: 20 Calculator...

Ratings

MVA	MW	Mvar	% PF	Amp
5	4,25	2,634	85	144,3

Load Type

Constant kVA: 80 %

Constant Z: 20 %

Motor Load			Static Load		
Loading Category	% Loading	MW	Mvar	MW	Mvar
1 Design	100	3,4	2,107	0,85	0,527
2 Normal	100	3,4	2,107	0,85	0,527
3 Brake	0	0	0	0	0
4 Winter Load	0	0	0	0	0
5 Summer Load	0	0	0	0	0
6 FL Reject	0	0	0	0	0
7 Emergency	0	0	0	0	0
8 Shutdown	0	0	0	0	0

Operating: 3,4 2,107 0,814 0,505 MW +j Mvar

canggah OK Cancel

Parameter Load Canggah

Lumped Load Editor - besan

Info Nameplate Short-Circuit Dyn Model Reliability Remarks Comment

4 MVA 20 kV (80% Motor 20% Static)

Model Type: Conventional Rated kV: 20 Calculator...

Ratings

MVA	MW	Mvar	% PF	Amp
4	3.4	2,107	85	115,5

Load Type

Constant kVA: 80 %

Constant Z: 20 %

Motor Load			Static Load		
Loading Category	% Loading	MW	Mvar	MW	Mvar
1 Design	100	2,72	1,686	0,68	0,421
2 Normal	100	2,72	1,686	0,68	0,421
3 Brake	0	0	0	0	0
4 Winter Load	0	0	0	0	0
5 Summer Load	0	0	0	0	0
6 FL Reject	0	0	0	0	0
7 Emergency	0	0	0	0	0
8 Shutdown	0	0	0	0	0

Operating: 2,72 1,686 0,651 0,404 MW + j Mvar

besan OK Cancel

Parameter Load Besan

Lumped Load Editor - sepupu

Info Nameplate Short-Circuit Dyn Model Reliability Remarks Comment

4 MVA 20 kV (80% Motor 20% Static)

Model Type: Conventional Rated kV: 20 Calculator...

Ratings

MVA	MW	Mvar	% PF	Amp
4	3,4	2,107	85	115,5

Load Type

Constant kVA: 80 %

Constant Z: 20 %

Motor Load			Static Load		
Loading Category	% Loading	MW	Mvar	MW	Mvar
1 Design	100	2,72	1,686	0,68	0,421
2 Normal	100	2,72	1,686	0,68	0,421
3 Brake	0	0	0	0	0
4 Winter Load	0	0	0	0	0
5 Summer Load	0	0	0	0	0
6 FL Reject	0	0	0	0	0
7 Emergency	0	0	0	0	0
8 Shutdown	0	0	0	0	0

Operating: 2,72 1,686 0,651 0,404 MW + j Mvar

sepupu OK Cancel

Parameter Load Sepupu

Lumped Load Editor - sahabat

Info Nameplate Short-Circuit Dyn Model Reliability Remarks Comment

1 MVA 20 kV (80% Motor 20% Static)

Model Type: Conventional Rated kV: 20 Calculator...

Ratings

	MVA	MW	Mvar	% PF	Amp
1	1	0,85	0,527	85	28,87

Load Type

Constant kVA: 80 %

Constant Z: 20 %

Motor Load			Static Load		
Loading Category	% Loading	MW	Mvar	MW	Mvar
1 Design	100	0,68	0,421	0,17	0,105
2 Normal	100	0,68	0,421	0,17	0,105
3 Brake	0	0	0	0	0
4 Winter Load	0	0	0	0	0
5 Summer Load	0	0	0	0	0
6 FL Reject	0	0	0	0	0
7 Emergency	0	0	0	0	0
8 Shutdown	0	0	0	0	0

Operating: 0,68 0,421 0,163 0,101 MW + j Mvar

OK Cancel

Parameter Load Sahabat

Lumped Load Editor - teman

Info Nameplate Short-Circuit Dyn Model Reliability Remarks Comment

3 MVA 20 kV (80% Motor 20% Static)

Model Type: Conventional Rated kV: 20 Calculator...

Ratings

	MVA	MW	Mvar	% PF	Amp
3	3	2,55	1,58	85	86,6

Load Type

Constant kVA: 80 %

Constant Z: 20 %

Motor Load			Static Load		
Loading Category	% Loading	MW	Mvar	MW	Mvar
1 Design	100	2,04	1,264	0,51	0,316
2 Normal	100	2,04	1,264	0,51	0,316
3 Brake	0	0	0	0	0
4 Winter Load	0	0	0	0	0
5 Summer Load	0	0	0	0	0
6 FL Reject	0	0	0	0	0
7 Emergency	0	0	0	0	0
8 Shutdown	0	0	0	0	0

Operating: 2,04 1,264 0,488 0,303 MW + j Mvar

OK Cancel

Parameter Load Teman

Lumped Load Editor - kemilau

Info Nameplate Short-Circuit Dyn Model Reliability Remarks Comment

0,3 MVA 20 kV (80% Motor 20% Static)

Model Type: Conventional Rated kV: 20 Calculator...

Ratings

MVA	MW	Mvar	% PF	Amp
0,3	0,255	0,158	85	8,66

Load Type

Constant kVA: 80 %

Constant Z: 20 %

Motor Load			Static Load		
Loading Category	% Loading	MW	Mvar	MW	Mvar
1 Design	100	0,204	0,126	0,051	0,032
2 Normal	100	0,204	0,126	0,051	0,032
3 Brake	0	0	0	0	0
4 Winter Load	0	0	0	0	0
5 Summer Load	0	0	0	0	0
6 FL Reject	0	0	0	0	0
7 Emergency	0	0	0	0	0
8 Shutdown	0	0	0	0	0

Operating: 0,204 0,126 0,049 0,03 MW + j Mvar

File Edit Undo kemilau OK Cancel

Parameter Load Kemilau

Lumped Load Editor - icon1

Info Nameplate Short-Circuit Dyn Model Reliability Remarks Comment

0 MVA 20 kV (80% Motor 20% Static)

Model Type: Conventional Rated kV: 20 Calculator...

Ratings

MVA	MW	Mvar	% PF	Amp
0	0	0	85	0

Load Type

Constant kVA: 80 %

Constant Z: 20 %

Motor Load			Static Load		
Loading Category	% Loading	MW	Mvar	MW	Mvar
1 Design	100	0	0	0	0
2 Normal	100	0	0	0	0
3 Brake	0	0	0	0	0
4 Winter Load	0	0	0	0	0
5 Summer Load	0	0	0	0	0
6 FL Reject	0	0	0	0	0
7 Emergency	0	0	0	0	0
8 Shutdown	0	0	0	0	0

Operating: 0 0 0 0 MW + j Mvar

File Edit Undo icon1 OK Cancel

Parameter Load Icon1

Lumped Load Editor - keponakan

Info Nameplate Short-Circuit Dyn Model Reliability Remarks Comment

0,3 MVA 20 kV (80% Motor 20% Static)

Model Type
Conventional Rated kV
20 Calculator...

Ratings

MVA	MW	Mvar	% PF	Amp
0,3	0,255	0,158	85	8,66

Load Type
Constant kVA
0 80 % 100
Constant Z
100 20 % 0

Motor Load				Static Load	
Loading Category	% Loading	MW	Mvar	MW	Mvar
1 Design	100	0,204	0,126	0,051	0,032
2 Normal	100	0,204	0,126	0,051	0,032
3 Brake	0	0	0	0	0
4 Winter Load	0	0	0	0	0
5 Summer Load	0	0	0	0	0
6 FL Reject	0	0	0	0	0
7 Emergency	0	0	0	0	0
8 Shutdown	0	0	0	0	0

Operating 0,204 0,126 0,049 0,03 MW +j Mvar

keponakan OK Cancel

Parameter Load Keponakan

LAMPIRAN 10
DOKUMENTASI PRIBADI









