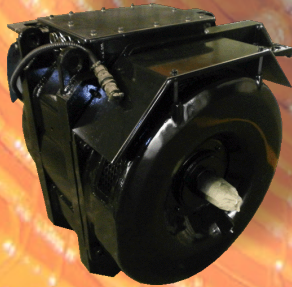


DIVISI MESIN LISTRIK



Pindad Electric

PARTNER IN GROWTH



PT. PINDAD

JL. JEND GATOT SOEBROTO NO 517

BANDUNG 40284 - INDONESIA

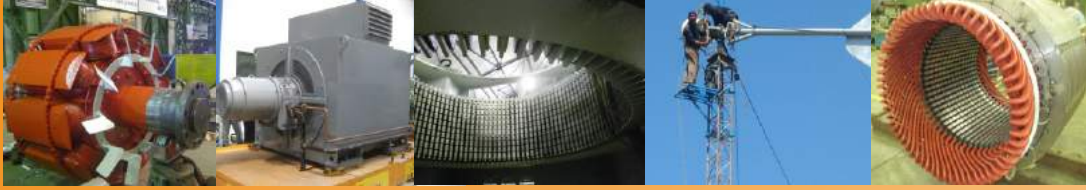
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As a State-Owned Enterprise (BUMN), PT Pindad contributes nationally not only in creating defense products, but also contributes to non-defense products. PT Pindad, particularly the machinery and electrical department produces generators and electric motors in support of the electricity and transportation industries. For example is by producing generators for Diesel Power Plant (PLTD), Steam Power Plant (PLTU), Water Power Plant (PLTA), Mini Hydro (PLTMH), Geothermal Power Plant (PLTP), Wind Power Plant (PLTB), and propulsi generators on Diesel Electric Rail Trains (KRDE). This division also produces induction motors for KRL, Railbus and monorail, as well as a permanent magnet motor that is used to power an electric car.





With complete facilities, well-trained and experienced workforce and experts in the field, the generator product produced by PT Pindad has been installed in the largest Power Generators in areas throughout Indonesia with a total power of more than 400 MW. In addition to generators for power plant, PT Pindad also produces wind generators and propulsion generators used on Electric Diesel Trains. The generator that has been made has a capacity of 0.125 MVA to 11.5 MVA. In addition to generator design, the Electrical Machinery Division also works on generator repair work.



LICENSED by SIEMENS AG – Berlin WG
Year 1984 - 1999

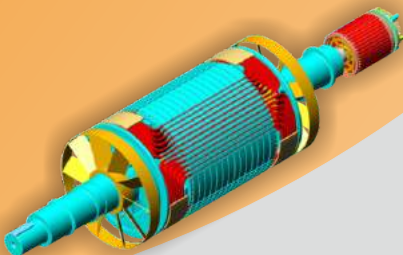
Type : brushless synchronous generator
Voltage : 6.3 kV, 3 phase
Power : 1.0 to 11.5 MVA
Speed : 500 - 1500 rpm
Power factor : 0.8 - 1.0
Overload capacity : 110 % rated current for 1 hour
: 150 % rated current for 2 minutes

Generator 3MW



Type : brushless synchronous generator
Voltage : 6.3 kV, 3 phase
Power : 3000kW
Speed : 1500 rpm
Power factor : 0.8 - 1.0
Overload cap : 110 % rated current for 1 hour
: 150 % rated current for 2 minutes
Insulation : Class F
Frequency : 50 Hz

Rotor Generator 3MW



Stator Generator Tanggari I



Traction motors are made on behalf of the Ministry of Transport of the Republic of Indonesia for KRL projects. This motor uses class H isolation with silicon resin tested to meet the demands of motor operation on the train. The following are several types of traction motor products produced PT Pindad :

- ! Type DMKT 55 / 18.5 with 155kW power
- ! Type DMKT 55/23 with 110kW power
- ! Type DMKT 55 / 29.5 with 200kW power
- ! Type DMKT 53/17 with 180kW power



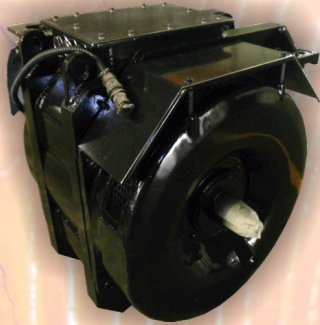
Motor Traksi Tipe DMKT 53/17

Along with the development of technology, the current transportation system continues to grow, one of which is shown by the development of electric car. To support the development of transportation system PT Pindad make permanent magnet motor to power the electric car. *Permanent Magnet Synchronous Motor* has advantages in large output power with dimensions and small motor weight.



Permanent Magnet Motor 25kW

ELECTRIC MOTOR



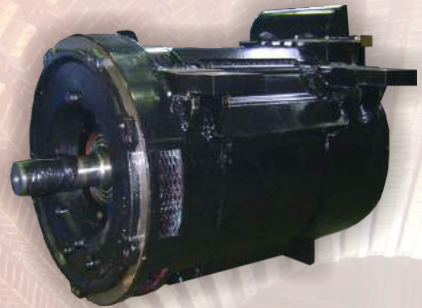
Traction Motor Type DMKT 53/17

DMKT 53/17 Specifications :

Voltage : 1100 VAC
Current : 112 A
Power : 180 kW
Frequency : 70 Hz
Power Factor : 0.89
Rotation Speed : 2043 rpm

DMKT 55/29,5 Specifications :

Voltage : 635 VAC
Current : 217,6 A
Power : 200 kW
Frequency : 36,38Hz
Power Factor : 0.89
Rotation Speed : 1064 rpm



Traction Motor Type DMKT 55/29,5



Permanent Magnet Motor 25kW

**Permanent Magnet Motor Specifications :
Brushless DC Motors**

Power : 25 kW
Voltage : 170 V
Current : 120 A
Torsion : 40 Nm
Max Rotation Speed : 5000 rpm
IP 55
F Isolation Class
Grade 45H NdFeB Magnet
95% Efficiency
Weight 25 kg

No.	Machine Name	Specification
1	CNC DOUBLE COLUMN MACHINING CENTER MPE 2160 (TOSHIBA)	Maximum Lot on Table : 15.000 kg Table Dimension : 6.000 X 1.800 mm
2	CNC PORTAL MILLING MACHINE (WALDRICHSIEGEN)	Distance between table & Face of Milling Spindle : 1.600 mm Max Width of Workpiece : 2.450 mm Max Lot on table : 21.000 kg
3	CNC AUTOMATIC LATHE HEAVY DUTY STANDARD BED LATHE (LIEBER)	Distance between center : 6.000 mm Max swing over bed : 1.100 mm Max swing over cross Slide : 750 mm Max Load : 15.000 kg
4	NC HORIZONTAL BORING & MILLING (WOTAN)	Table Longitudinal Travel : 1.600 mm Table Cross Travel Head : 2.200 mm Stock Vertical Travel : 1.600 mm Max Load on Table : 8.000 kg Table Dimension : 1.520 X 1.700 mm
5	CNC HORIZONTAL JIG BORING (YASDA)	X-Axis : 1.000 mm Y-Axis : 800 mm Z-Axis : 700 mm Max Load on Table : 1.500 Kg Table Dimension : 800 X 800 mm
6	CNC VERTICAL TURNING (VERTIMASTER)	Table Diameter : 2.500 mm max Swing & Turning Dia : 3.200 mm Max Turning Height Above Top of Table : Right Hand Cross Rail Head Vertical Travel (Z-Axis) : 2.800 mm Horizontal Travel to Right of Center Table (X-Axis) : 1.600 mm Max Load on Table : 1.800 mm : 25.000 kg
7	NC VERTICAL TURRET LATHE (FEMCO)	Z-Axis : 1.600 mm Table Diameter : 1.500 mm Max Load on Table : 2.500 kg
8	DRILLING RADIAL (OGAWA)	Working Area of Base : 2.830 X 1.230 mm Spindle Travel : 400 mm
9	CNC LATHE (DAINICHI)	Distance Between Center : 1.500 mm Max Swing over Bed : 820 mm Max Swing over Carriage : 650 mm Max Load : 1.000 kg
10	CNC HORIZONTAL MILLING (WERNER)	X-Axis : 700 mm Y-Axis : 450 mm Z-Axis : 535 mm Max Load on Table : 1.000 kg Table Dimension : 460 X 2.000 mm
11	LATHE MACHINE :	
A	Small Lathe (8 units)	Max Diameter : 100 mm Max Length : 500 mm
B	Medium Lathe (7 units)	Max Diameter : 200 mm Max Length : 1.250 mm
C	Length Lathe	Max Diameter : 250 mm Max Length : 2.000 mm
12	MILLING MACHINE (12 units)	Max Width : 220 mm Max Length : 700 mm Max Height : 350 mm

No.	Machine Name	Specification
12	MILLING MACHINE (12 units)	Max Width : 220 mm Max Length : 700 mm Max Height : 350 mm
13	NOTCHING (SCHULER N20)	Max Diameter : 1.800 mm
14	INDUCTION SOLDERING (RADYNE 125 TC1)	127 Kw, 7 - 11 kHz
15	INDUCTION SOLDERING (MICAFIL)	25 Kw, 10 - 30 kHz
16	HYDRAULIC PRESS	Max Pressure : 250 kg/cm
17	COIL SPREADING (PRJ 48 G)	Max Coil Span : 1.220 mm
18	COIL WINDING (MICAFIL)	
19	COIL PRESS (SCHUMANN 456)	
20	VACUUM PRESSURE IMPREGNATION (MICAFIL)	Vacuum Chamber : 2.300 mm (Dia) X 4900 mm (L) 2 X 2.000 lt storage of class F epoxy resin 1 X 1.000 lt storage of class H silicone resin
21	OVEN (REINHARDT LTV)	1 x 125 Kw, 200 C, 2 X 25 kW
20	Bandazing	Pindad
21	Overhead Crane	MAN GHH : 5 Tons
22	Overhead Crane	MAN GHH : 10 Tons
23	Drop Impregnasi 1	Pindad
24	Drop Impregnasi 2	Pindad
25	Brazing/ Soldering	Elvaminac
26	Insulation Striper	Brush Machine
27	Coil Forming	



Lathe Machine



CNC Vertical Lathe



**CNC Milling Machine
Waldrich Siege**



Notching Machine



200 Tons Press Machine

Notching Machine



Oval Coil Machine



Hot Press Coil Machine



Vacuum Pressure Impregnasi



Making Coil Stator



No.	Machine Name	Specification
1	BALANCING (SCHENCK N590C)	Max Length : 3.000 mm Max Weight : 11 Ton
2	BALANCING (SCHENCK H40B)	Max Length : 1.500 mm Max Weight : 3 Ton
3	TEST BENCH (SIEMENS)	HV Test : 3, 5, 15, 75 kV AC HV Impulse Test : 100 kV peak, 40 kV DC Converter : 4.200 kVA, 0 - 63 kV 0 - 1,0 power factor DC motor : 318 kW, 0 - 1.000 rpm Energy Analyzer, Vibration meter Tan Delta, Oscilloscope Static Test Equipment Endurance Test for VCB
4	Tan Delta	
5	Hot Press Coil (3 units)	Heinrich Schueman
6	HV Impuls Tester	
7	Megger	
8	Vibro Analyzer	
9	Borieng Field	Holec
10	Tegangan Tinggi DC dan Impuls	Siemens
11	Tegangan Tinggi AC	Siemens
12	Tegangan Tinggi AC (Portable)	UM 26
13	Tangen Delta	Tettex Instr.
14	Test Field Generator	Siemens
15	Kontrol Motor DC	Siemens
16	Inverter 200 kW	Schneider
17	Inverter 250 kW	Schneider
18	Endurance VCB	Siemens

High Voltage AC



Insulation Test



9 Tons Balancing Machine



3 Tons Balancing Machine



Impuls Test



Boring Field Test



GENERATOR REFERENCE

NO.	TYPE	CAPACITY	QTY	CUSTOMER	LOCATION
1	Generator Angin	10 kW	5 Unit	LAPAN	Sukabumi
2	Generator Propulsi	295 kVA , 660 Volt	1 unit	PT KAI	Rail Bus Solo
3	Generator Angin	130 KW	1 unit	LAPAN	Sukabumi
4	Generator Angin	50 KW, 380 Volt	1 unit	LAPAN	Sukabumi
5	Generator Propulsi	560 kVA , 660 Volt	2 Unit	PT KAI	Rail Bus Padang, Palembang
6	Generator Sinkron	3 MW	1 unit	BPPT	UBP Kamojang
7	Stator Generator	9 MW	1 unit	PT PLN	PLTA Tanggari 1
8	Stator Generator	9.5 MW	1 unit	PT PLN	PLTA Tanggari 2
9	Generator Sinkron	300kVA, 300rpm 400 Volt	2 unit	PT PLN	PLTM Lokomboro unit 6&7
10	Generator Sinkron	300kVA, 600rpm, 400 Volt	1 unit	PT PLN	PLTM Umbuwangu
11	Generator Sinkron	125kVA, 1000rpm, 400 Volt	1 unit	PT PLN	PLTM Kananggar
12	Generator Sinkron	625 kVA, 500rpm, 400 Volt	1 unit	PT PLN	PLMH Sawidago

MOTOR REFERENCE

NO	TYPE	CAPACITY	QTY	CUSTOMER
1	CKD Motor Traksi HOLEC	155 kW	80 Unit	PT. INKA (PERSERO)
2	CM Motor Traksi HOLEC	155 kW	120 Unit	PT. INKA (PERSERO)
3	Motor Traksi	200 kW	2 Unit	PT. INKA (PERSERO)
4	Motor Traksi	180 kW	48 Unit	KEMENHUB
5	Motor Permanen Magnet	25 kW	1 Unit	Kementrian BUMN
6	Motor Permanen Magnet	75 kW	2 Unit	PT LEN
7	Motor Traksi	75 kW	2 Unit	PT LEN
8	Motor Permanen Magnet	25 kW	2 Unit	PT Tetran
9	Motor Permanen Magnet	30 kW	2 Unit	Mobil Listrik ITB

PINDAD GENERATOR LOCATION LIST

LICENSED BY SIEMENS AG-Berlin WG 1984-1999

TOTAL POWER GENERATED 393,3 MW

205 UNITS

86 LOCATIONS

NO.	TYPE	CAPACITY	QTY/UNIT	CUSTOMER	LOCATION
1	Generator PLTD	0,8 MW	20	PLN	Takengon (Aceh), Tapak Tuan (Aceh), Blang Pidi (Aceh), Kota Cane (Aceh), Tobelo (Maluku), Jailolo (Maluku), Tidore (Maluku), Bacan (Maluku), Kaoratu (Maluku)
2	Generator PLTD	1 MW	6	PLN	Taruntung (Sumatra), Senggang (Sulawesi), Watan Sopeng (Sulawesi), Tobelo (Maluku)
3	Generator PLTD	1,2 MW	77	PLN	Talang Padang (Sumatra), Lubuk Linggau (Sumatra), Sekayu (Sumatra), Muara Bungo (Sumatra), Kuala Tungkal (Sumatra), Tembilahan (Sumatra), Air Molek (Sumatra), Teluk Kuantan (Sumatra), Lubuk Singkaping (Sumatra), Padang Sidempuan (Sumatra), Rantau Prapat (Sumatra), Bagan Siapiapi (Sumatra), Bengkalis (Sumatra), Selat Panjang (Sumatra), Tanjung Uban (Sumatra), Muntor (Aceh), Sigli (Aceh), Takengon (Aceh), Meulaboh (Aceh), Tapak Tuan (Aceh), Kota Cane (Aceh), Gunung Sitoli (Aceh), Sanggan (Kalimantan), Sintang (Kalimantan), Ketapang (Kalimantan), Amuntai (Kalimantan), Randangan (Kalimantan), Kota Baru (Kalimantan), Poso (Sulawesi), Luwuk (Sulawesi), Palapo (Sulawesi), Makale (Sulawesi), Polewali (Sulawesi), Majene (Sulawesi), Pangsidi (Sulawesi), Barru (Sulawesi), Bulukumba (Sulawesi), Jane Ponto (Sulawesi), Manokwari (Papua), Sumbawa Besar (Papua), Bima Raga (NTB), Turen (Jawa)
4	Generator PLTD	1,5 MW	10	PLN	Gunung Sitoli (Nias), Sintang (Kalimantan), Marisa (Sulawesi)
5	Generator PLTD	1,6 MW	2	Burgundi	Burgundi (Afrika)
6	Generator PLTD	1,8 MW	2	IPTN	Bandung (Jawa)
7	Generator PLTD	2,2 MW	2		Burgundi (Afrika)

PINDAD GENERATOR LOCATION LIST

LICENSED BY SIEMENS AG-Berlin WG 1984-1999

TOTAL POWER GENERATED 393,3 MW

205 UNITS

86 LOCATIONS

NO.	TYPE	CAPACITY	QTY/UNIT	CUSTOMER	LOCATION
8	Generator PLTD	2,5 MW	56	PLN	Dumai (Sumatra), Tanjung Balai (Sumatra), Tanjung Pinang (Sumatra), Pangkal Pinang (Sumatra), Pangkalan Bun (Sumatra), Sampit (Kalimantan), Palangkaraya (Kalimantan), Kuala Kapuas (Kalimantan), Singkawang (Kalimantan), Bontang (Kalimantan), Gorontalo (Sulawesi), Kotamongabu (Sulawesi), Watam Pone (Sulawesi), Kendari (Sulawesi), Sorong (PAPua), Jayapura (Papua), Biak (Papua), Kupang (NTT), Dili (Timor Timur)
9	Generator PLTD	2,8 MW	21	PLN	Ketapang (Kalimantan), Sampit (kalimantan), Singkawang (Kalimantan), Tarakan (kalimantan), Kendari (Sulawesi), Bima (NTB), Bandung (Jawa)
10	Generator PLTD	3,0 MW	7	PLN	Sungai Penuh (sumatra), Ketapang (Kalimantan), Senayan (Jawa)
11	Generator PLTD	3,5 MW	5	PLN	Sigli (Aceh), Pidie (Aceh), Meulaboh (Aceh)
12	Generator PLTD	4,5 MW	4	PLN	Batam

Utilizing our facility, we also repair electric motor and generator. We are experienced and have the skills needed to repair electric and rotating devices from simpler works such as *overhaul* and *rewinding* repair to even more complex *re-engineering* for the following products :

- Generators / Alternators
- Electric Motors, Traction Motors
- Turbines and the supporting facilities

MOTOR REPAIR EXPERIENCE LIST

NO	WORK DETAILS	CUSTOMER
1	Repair Motor 500 HP US Electrical	BP. West Java
2	Repair Motor 150 HP US Electrical	BP. West Java
3	Repair Motor 300 HP US Electrical	BP. West Java
4	Repair Motor 500 HP US Electrical	BP. West Java
5	Repair Motor 200 HP US Electrical	BP. West Java
6	Repair Motor 400 HP US Electrical	BP. West Java
7	Repair Motor PM 702 160 kW	Pertamina UP II Dumai
8	Rekondisi Motor 140-PM-17A	Pertamina UP II Dumai
9	Rekondisi Motor 140-PM-17	Pertamina UP II Dumai
10	Rewinding stator motor 140-PM-17B	Pertamina UP II Dumai
11	Rewinding Motor 580-PM-302C	Pertamina UP II Dumai
12	Rekondisi Motor KM-7401B 750 kW	PT. Arun LNG Co.
13	Rewinding Induction Motor 132kW, 50Hz, 6kV	PT. Unggul Pawenang Sentosa
14	Repair 2 Unit Motor 110 kW	PT. Aspex Kumbang
15	Repair 1 Unit 150 kW	PT. Aspex Kumbang
16	Overhaul 6 unit Induction Motor 4.16kV	PT. Arun NGL. Co.
17	Repair AC Motor 110 kW, 6000 V	PT. Aspex Kumbang
18	Repair Journal Bearing motor 4.16kV	PT. Arun NGL. Co.
19	Rewinding motor 132 kW	PT. Aspex Kumbang
20	Overhaul 8 unit Motor Traksi Hyundai	PT. Len Industri
21	Overhaul Motor 1000 HP	PT. Arun NGL
22	Rewinding motor 110 kW	PT. Aspex Kumbang
23	Rewinding motor 132 kW	PT. Aspex Kumbang
24	Rewinding motor 95 kW	PT. Aspex Kumbang
25	Rewinding Motor Toshiba 1,5 MW	PT. Pupuk Kaltim
26	Rewinding Motor Chruser B 500kW	PT PJB UBJOM Indramayu
27	Rewinding EI Motor 500 kW	PT Nusantara Turbine & Propulsi
28	Rewinding 4 Unit Motor 6kV PLTM Sektor Belawan	PT PLN (Persero) Pusharlis
29	Rewinding 2 Unit Motor Chruser 500kW	PT PJB UBJOM Indramayu
30	Repair EL Motor 440 Volt, 55 Hz 750A	PT Nusantara Turbine & Propulsi

GENERATOR REPAIR EXPERIENCE LIST

NO	URAIAN PEKERJAAN	CUSTOMER
31	Rewinding Rotor & Stator Exciter Gen. 2.5MW	PT. Wiyannata
32	Repair GE Generator 3125kVA 4160 Volt	PT. Indoturbine
33	Repair RAPP Ideal Generator 5938kVA 6,6kV	PT. Indoturbine
34	Rewinding Stator Generator 168 MW PLTGU GT 2.3 Priok	PT. Indonesia Power UB Pemeliharaan
35	Repair Generator 3420 kVA & Turbocharger NA 295	PT. PLN Wilayah Kalimantan Barat
36	Repair RAPP Ideal Generator 5938 kVA 6,6kV	PT. Indoturbine
37	Rewinding 3 unit Generator 2.5 MW	PT. Total E&P Indonesia
38	Repair AVK Generator PLTD Rental Pontianak	PLN Wilayah Kalimantan Barat
39	Repair Generator Holec SWD 6 TM 410 RR 4100kVA PLTD Sudirman, Singkawang	PLN Wilayah Kalimantan Barat
40	Repair Generator 2500 KW	BP. West Java
41	Repair Generator 460 KW	BP. West Java
42	Repair 4 Unit Generator PE-9401 750kVA-4160 V	PT. Arun LNG Co.
43	Repair 2 Unit Generator 575 kW	PT. Pro Rekayasa Pandai Teknik
44	Repair Generator 55 MW PLTP Kamojang # 3-UBP Kamojang	PT. Indonesia Power
45	VPI Rotor & Stator GE Gen. 2,5 MW	PT. Total E&P Indonesia
46	Overhaul Generator 950 kVA	PT. General Mekanik Prima
47	Rewinding Stator Unit II PLTA Tanggari II 9MW	PLN Sektor Minahasa
48	Rewinding Stator Unit I PLTA Tanggari II 9,5MW	PLN Sektor Minahasa
49	Overhaul Generator 3000 kW	PLN Sektor Jayapura
50	Repair Generator 7500kVA PLTD Waena	PLN Wilayah Papua & Papua Barat
51	Rewinding Generator 950kW	PT PLN (Persero) Area Tahuna
52	Overhaul Generator	PT Nusantara Turbine & Propulsi
53	Repair Rotor Generator 550kVA PLTD Bitung	PLN Sektor Minahasa
54	Repair 2 Generator Shinko 4,5MVA	PTPN VII
55	Repair Generator Shinko 3,5MVA	PTPN VII





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