(3) After completing installation of the generator and prime mover, all auxiliary machines such as the radiator for cooling water, etc. should be equipped and the shaft center should be adjusted. Then, after confirming the horizon of the common bed, the mortar should be placed on the foundation bolt hole and the foundation bolt should be firmly fitted to a specified position.

(4) The generator and prime mover should be assembled to prevent water, dust, chip, etc. from coming in the inside.

1.4 Distribution board

(a) The installation of closed type distribution board should be as mentioned below.

(1) The distribution board should be installed on a position where the channel steel for the base is cornered and, after adjustment is made to make the surface of channel steel horizontal, should be firmly fixed to the floor by the foundation bolt.

(2) Other boards should be fitted to the wall, etc. by bolts.

(3) The plate mentioned matters to be especially noted for handling and operation of equipment should be provided in a place of the box to be easily seen.

1.5 Air compressor

The air compressor should be horizontally fixed to the concrete fundation by bolts. Further, the thickness of concrete fundation should be over 150mm.

1.6 Starting air tank

(a) The starting air tank should in principle be installed in a box built on the foundation or concrete floor and should be installed in such a way as the main _____ valve takes a position about 1,200mm above the floor or the operation bed.

(b) Between the air tanks a pillar made of wood, etc. should be inserted to combine the air tank with each other by steel band.

(c) Around the part of air tank which is buried, dried sand should be put in and tamped enough to allow no space.

Then the place should be coated with asphalt thickly enough to prevent the dried sand from damping and on the asphalt the concrete should be placed. In this instance, the air tank should be correctly fixed so that the center line of the tank may be vertical and the buried part should be fully coated for rust prevention.

1.7 Fuel tank, etc.

(a) For the stand of fuel tank, steel material having strength similar to or more than the same of angle steel should be used. The stand should be, if necessary, reinforced with braces, etc. to withstand the load of tank and should be assembled in a shape of tower, on which the tank should be fixed by bolts.

(1) The self-standing type stand of a tower of less than 600 l in capacity should be made of steel material of more than 50 x 50 x 6mm.

(2) The stand of a self-standing tower of 1000 l capacity should be made of steel material of more than 75 x 75 x 9 mm.

(3) The stand should be firmly fitted to the wall surface or the floor surface by use of bolts.

(b) The inflation tank should be in accordance with (a).

Further, the stand should be in accordance with (a) (1).

2. Piping

2.1 Piping in general

(a) The piping of systems for fuel oil, starting air, etc. to connect the main body of prime move and the auxiliary machines should be acceptable at the withstand test at each system after completing connection and should be performed to prevent oil leakage, air leakage, etc.

(b) The piping should be strong enough to withstand vibration, temperature rise, etc. which occurs with the operation of generator and prime mover.

(c) The piping should be profided with washers in the places where it passes through the ceiling, floor, wall, etc. in case the piping is not with frost-proof covering nor heat-insulation covering.

(d) The piping inside of the pit should be as mentioned below.

(1) The pipe fittings should be fixed on the pit side wall or floor in such a way as it does not interfere with the drainage, etc. and should be arranged and fitted according to proper order of systems for fuel oil, starting air, etc.

(2) The pipes should be laid out not to corss with each other.

(3) In case each equipment is raised from the inside of pit, it should be raised vertically by providing flanges at its proper places.

(e) The pipe should be cut at the right angle to its axial center to prevent deformation of the section and its cut place should be finished smooth.
The pipe should be inspected before it is jointed and should be jointed after it is confirmed that no foreign matter exists and all chips, dust, etc. are removed. In case the execution of piping is suspended temporarily, the inside of pipe should be cured to prevent foreign matters.

(f) The packing made of oil-resistant rubber or fibre may used for the flange of cooper pipe used for the fuel oil and lubricating oil in combination with the adhesive.

(g) The connection of pipe should be as mentioned below.

(1) The connection of copper pipe should be performed by use of inserted joint, Flaver joint or flange joint. In case of inserted joint, after the outside of pipe and the inside of joint are fully cleaned, the pipe should be correctly inserted into the joint and in the joint part the brass wax or silver wax heated at a proper temperature should be cast in. In case it is necessary to remove, the Flayer joint or flange joint should be used.

(2) The joint of steel pipe should be done by use of screws or by welding. The joint by screws should be in accordance with JIS B 0203 "Tapered screws for pipe". Further, for the joint a stiff paste paint, hemp, etc. must not be used.

(h) The caulking of piping should not repaired.

(i) The supporting interval for the side run of piping should be according to Table 2.2.1. Further, the bending part and branch part should be supported when necessary.

Table 2.2.1 Maximum supporting Interval of Pipe

(Unit: m)

Nominal dia. (A)		Less than 20	20 to 40	50	50 to 90	More than 100
Interval	Steel pipe	1.8	2.0	3.0	3.0	4.0
	Copper pipe	1.0	1.5	2.0	2.5	-

(j) The piping provided with expansion joints should be provided with metal fixtures at effective places as a starting point of the expansion and compression.

(k) For the rising and pulling parts of the piping of the generator, fuel tank, etc. flexible pipes should be used. The flexible pipes should be used in places where consideration has been given to the vibration direction and amplitude at the connection point between each pipe and the prime mover, fuel tank, etc.

2.3 Cooling water system piping

(a) In the main piping the flange joint should be inserted in proper places to make removal easy.

(b) The purge valve should be provided at a place where air in the piping is accumulated.

(c) The suction pipe of the inflation tank should be provided with a float valve with a strainer at the edge and should be connected to the entrace of engine cooling water pump through the piping pit.

(d) At the bottom of the water jacket and the cooling water pipe in principle the drain cock should be provided.

(e) The cooling water pipe should be tested for hydraulic pressure after the piping is completed and should be withstand the pressure for the minimum time of 60 minutes at a pressure value of 5kg/cm^2.

(f) The flexible joint for the cooling water tank should be made of metal.

.3 Fuel oil system piping

(a) In case the oil is fed from the fuel oil drum to the indoor fuel tank directly, the synthetic resin made hose should be provided between the fuel-oil mounting pump or hand pump and the drum and its tip on the drum side should be provided with a copper pipe, longer than 1200mm.
Further, the tip should be slantly cut or cut in concave.

(b) The joint of pipe should be made by welding.
Further, in case the screw joint is performed for the buried piping, the at the joint part the box for inspection opening made of concrete should be provided.

(c) For the screw joint and flange joint the oil-resistant paint and the oil-resistant packing should be used.

(d) The rising pipe or lowering pipe from the piping pit or concrete floor to the equipment such as the prime mover and indoor fuel tank, etc. should be arranged along the equipment concerned or in parallel with the side.

(e) The connection to the prime mover and indoor fuel tank should be made by use of metal bellows-shape flexible joints. The length of flexible joint should be according to Table 2.2.2.

Table 2.2.2 Length of flexible joint

Dia. of pipe (A)	Length (mm)
Less than 25	More than 300
25 to 50	" " 500
More than 50	" " 800

(f) The steel pipe buried in the earth should be painted and covered. The method of painting and covering should be according to one coat and one roll (double roll) in JIS G 3491 "Method of painting and covering of asphalt of steel pipe for waterworks" or JIS G 3492 "Method of painting and covering of coaltar enamel steel pipe for waterworks". The depth of buring should be more than 300mm in general sites, more than 750mm in the vehicle roads and more than 1000 mm in the heavy behicle roads.

(g) The fuel oil pipe should be tested for the air pressure after the piping is completed and should withstand the pressure for the minimum time of 30 minutes at a pressure value of 1.5 times of the maximum working pressure.

2.4 Starting air system piping

(a) The pressure steel pipe or high pressure steel pipe should be connected perfectly to allow any air leakage.

(b) The steel pipe small in the outer diameter may be replaced with a flexible pipe and be given flexibility by making it ring-shaped, etc.

(c) The starting air piping should be tested for the air pressure after the piping is completed and should withstand the pressure for the minimum time of 30 minutes at a pressure value of 1.2 times of the maximum working pressure.

2.5 Exhaust pipe system piping

(a) The pipe should be a carbon steel pipe for piping or a pipe welded on the spot which is more than 3.2mm thick.

(b) The piping of the exhaust pipe should be connected to the engine aggregate exhaust port or the supercharger exhaust turbine outlet flange by use of an exhaust flexible pipe and should be ceiling piping unless specified otherwise.

(c) The connection of pipe should be made by use of cast-steel or steel-plate made inserted type flange 90° bend, 45° bend, etc.

(d) The supporting fittings of the exhaust pipe and muffler should be vibration-proof s fittings or vibration-proof supporting fittings strong enough to withstand the weight of the exhaust pipe or muffler to prevent propagation of vibration.

(e) The piping should be performed with consideration to the termal expansion during operation time.

(f) The exhaust pipe should be as mentioned below:

(1) The pipe should be insulated for heat by use of rockwool 25mm thick and be 3-ply roll-finished.

(2) The insulating material should be fixed by steel wire and on it a hexagonal rope should be wound.

(3) In case the outer diameter of insulation is less than 250mm, it should be finished by binding with zinc-plated iron plate of more than 0.3mm etc. and in other cases, by binding with zinc-plated iron of more than 0.4mm.

(4) The expansion joint part should be covered with blanket of rockwool insulation material at its circumference and should be stetched by steel wire. The same is applied to the flange part.

(g) The muffler should be treated for heat insulation by a method similar to or better than the method mentioned in the preceding item.

(h) The piping which passes through the building materials or is close to them should be performed very carefully to prevent causing fire.

3. Wiring

3.1 General matters

(a) The wiring should be more than 0.5 m away from the high temperature part to prevent being influenced by the

heat which generates from the prime mover. However, in case it is difficult to put an equipment such as the water-temperature relay, etc. more than 0.5 m away, a heat-resistant wire or a wire having heat-resistance similar to or better than it should be used or protection by the electric wire pipe, etc. or the heat-resistance treatment should be given.

(b) The charging part should be provided with protection, covering, etc. to prevent it from being touched easily.

3.2 Cable wiring

(a) In case the cable is wired in the pit, the cleat made of china, etc. should be provided in the pit and should be arranged in order according to the destination of wiring.

(b) The cable for control should be seperated as far as possible from other cables. If it is inevitable that the cable for control comes in contact with other cable, the insulation, etc. should be used to prevent direct contact.

(c) In case the electric wire or cable is wired upon mounting on a frame it should be wired in good order by use of fittings. Further, the wiring should be made in places hard to cause damage on the covering of electric wire or sheathing of cable.

3.3 Connection of electric wire

(a) In case of connecting electric wires, it should be avoided to increase the electric resistance. Further the strength of electric wire should not be decreased more than 20%.

(b) The terminal of electric wire should be treated to prevent damage on the core and further treated as mentioned below.

(1) The cover of the vinyl electric wire should be removed by the wire stopper method or the pencil sharpening method.

(2) The cover of cable should be removed in the order of cable sheath, cloth tape, inbetween jute, etc. and in a way to prevent damage on the core.

(c) It should be avoided to connect the electric wire or cable in the midway.

3 Connection of electric wire with the equipment terminal

(a) The electric wire should be connected with the equipment terminal without exerting tension to the connecting point.

(b) The electric wire should be treated at the edge in accordance with 2.3.2.

(c) The connection should be made by tightly fastening to prevent risk of slackening. In case there is possibility of slackening due to vibration, etc., a double nut or spring washer should be used.

(d) In case the equipment terminal is not of bush-button type, clamp type nor of structure similar to them, the strand should be properly treated to prevent it from being broken in disorder. However, this is not applied to connecting terminals of push-button type.

(e) To the terminal, the structure of which allows the connection by one electric wire, more than 2 electric wire should be connected.

(f) On the terminal of wind-fastening structure, the electric wire should be tightly wound in 3/4 to 1 round of the circumference.

4. Bus duct wiring

4.1 Accessories of duct

The accessories should be suitable to the duct and the facilities site.

4.2 Laying of duct

(a) The supporting interval of duct should be less than 3 m and it should be firmly fitted to the building materials. Further, in case the duct is fitted to concrete, beforehand the insert bolt, etc. for fitting should be buried. If it is compelling, a drill anchor bolt, etc. having enough strength should be used.

(b) The edge part of duct and the inserting opening of the plug-in duct which is not used should be closed to prevent the dust and water from coming inside of the duct. However, in case of the ventilation type, this is not necessarily applied.

4.3 Connection of duct

(a) In connection between the ducts, between the duct and distribution board and between the conductors, the butt should be complete and the connection should be made perfect mechanically by use of bolts, etc. Further, the connection should be made electrically completely by use of mild copper wire thicker than shown in Table 2.4.1, copper belt or plain stitch zinc-plated copper wire. The connection should be non-soldering connection.

Table 2.4.1 Thickness of Bond Wire

Rated current of overcurrent circuit breaker	Thickness of bond wire
Below 600A	$38mm^2$
" 800A	50 "
" 1000A	60 "
" 1200A	80 "
" 2000A	100 "

(b) In case the duct goes through the wall, the connection should not be made at such a place.

(c) The earthing should be according to 5. Earthing.

5 Earthing

5.1 Kind of earthing work and resistance value of earth

The kind of earthing work and the earth resistance value at the earthing work should be as mentioned below.

(1) Kind No. 3 earthing work -------- less than 100Ω

(2) Special Kind No. 3 earthing work---less than 10 Ω

5.2 Electric works to be treated for No. 3 earthing work.

The following works are to be treated for Kind No. 3 earthing work.

(1) Iron base and outer box made of metal of machinery and implement of less than 300V in working voltage.

(2) The iron core of the transformer for meters of less than 300V in working voltage. However, this is not necessarily applied to the transformers without box covered with insulation made of rubber, synthetic resin, etc.

(3) The electric circuit of more than 300V in working voltage.

(4) The wiring of metal pipe of low voltage, less than 300V in working voltage, bus duct wiring, the metal part of the cable protective device used for the cable wiring of less than 300V in working voltage.

(5) The outer box made of metal of the distribution board, etc.

3 Special Kind No. 3 earthing work

(a) The iron bed and outer box made of metal of machinery and implement for low voltage over 300V.

(b) The iron core of transformer for meters of low voltage over 300V. However this is not necessarily applied to the transfer for meters without box, covered with the insulation such as rubber, synthetic resin, etc.

(c) The pipe of electric circuit for low voltage over 300V by the metal pipe wiring.

(d) The metal pipe to accommodate the cable of electric wire by cable wiring of low voltage 300 V, the connection pipe made of metal and the metal part of the protective device of the cable.

(e) The metal pipe wiring, the pipe of low voltage indoor wiring over 300V and duct.

5.4 Earth line

(a) For the earth line the green-colored vinyl electric wire should be used.

(b) The thickness of earth line should be according to Table 2.5.1.

Table 2.5.1 Thickness of Earth Line

Earthing of iron bed and piping, etc. of low voltage motor		Earthing of others (rating of fuse, circuit breaker for wiring)	Thickness of earth line
200V class motor	300V class motor		
Below 3.5 kw	below 7.5 kw	below 50A	Over 2.0 mm
" 7.5 kw	" 15 "	" 100A	" 5.5 "
" 15 "	" 30 "	" 225A	" 14 "
" 37 "	" 75 "	" 400A	" 22 "
		" 600A	" 38 "
		" 800A	" 50 "
		" 1000A	" 60 "
		" 1200A	" 80 "

(Remarks) When the rating output exceeds * mark, the thickness of earth line should be determined according to the rated current of fuse or circuit breaker for wiring.

6. Painting

In wiring of the oil feed pipe, air pipe, etc. the color-classification painting should be performed.

7. Heat insulation board

The heat insulation board should be used also for absorbing sound and should be provided on the concrete part (ceiling and wall) of the generator room.
Further, the thickness of heat insulation board should be more than 50mm.

8. Inspection and test of Work

8.1 Inspection

(a) The inspection should be performed for the base , installation, installation conditions, method, etc. of the equipment.

(b) The inspection should be performed for the conditions of connection of piping (including support).

(c) The inspection should be performed for the isolation of wiring and protection of charging part.

(d) The inspection should be performed for the current capacity of the protective device, the current capacity of circuit breaker, etc.

(e) The inspection should be performed for isolation between the cable and oil feed pipe, etc.

(f) The inspection should be made for the paint finished conditions, etc. of the machinery and piping.

[redacted].2 Test

The test as mentioned below should be performed in presence of the officer in charge upon coming the generator with the prime mover and the results of test should be submitted to the officer.

(1) The starting test should be according to 1.11.2 (b)(1).

(2) The test of protective equipment relay and sequence test should be according to 1.11.2(b)(2) and (c)(3) and (4).

(3) The speed characteristics test, load test, fuel consumption rate test and temperature test should be according to 1.11.2 (b)(3) (4), (5) and (6).

(4) The voltage variation rate test should in principle be performed in a way same as the actual load test or in a way near to it and should practically be not different from the specifications of 1.2.3 (f).

(5) In the vibration test, at the time of rated operation at the places shown in Table 1.3.2 vibration in the up and down direction, axial direction and the horizontal direction at a right angle to the axis should be measured.

(6) The insulation resistance test should be performed according to 1.11.2 (a) (3).

(7) The withstand voltage test should be performed according to 1.11.2 (a) (2).

(8) The earth resistance test should be according to Chapter 2, Paragraph 5.

(9) The pressure test should be performed for all kinds of piping for fuel, starting air, etc.

6-3 Maintenance

1. Maintenance, etc.

1.1 Period

(a) The period should be for 2 years after concluding contract.

(b) The frequency of maintenance should be 2 times.

1.2 Personnel

The personnel should comprise about 4 technicians at one time.

4-4 Work division

1. Work division

1.1 The division of work concerning the generator between Indonesia and Japan is determined as below.

1.2 Domestic work on the side of Indonesia

(a) All of building, generator foundation, forming and reinforcing of the necessary opening of the suction and exhaust system, fitting of hook supporters, fitting of insect prevention metal net, pit making, etc.

(b) Supply of fuel oil, lubricating oil, etc. and water, drainage, etc. and facilities for them.

(c) Various facilities such as the electric lamps, plug socket, toilet, etc. inside of building.

.3 Work on the side of Japan

(a) All works for in-plant transportation, installation or machinery, fitting of foundation bolt and buring of concrete.

(b) All works for excavation of the outdoor underground buried fuel oil tank, rolling, frame, concrete placing, tank installation, burnt sand, rolling, contrete placing and burying again.

(c) All works for execution of piping, etc. of air, water, oil and electricity required between machinery and for machinery.

(d) All works for electricity for the power source between the boards and machines, signals, controls, etc.

(e) Responsibility for adjustment before hand regarding the works to be shared on the side of Indonesia.

4-6 Special Specifications for Independent Power Plant Facilities Work

Special Specifications of Independent
Power Plant Facilities Work

1. RS Guhung Wenang

2. Matters to apply

The matters which are not in this specifications and the drawings should be according to the common specifications of independent power plant facilities work.

3. Independent power plant facilities specifications

	Type	Horizontal Synchronous AC Generator
AC Generator	Rated output	500 KVA
	Rated voltage	127/220V and 220/380V
	Number of phase and frequency	3-phase & 4-line system 50Hz
	R. P. M.	Below 1000 rpm
	Power-factor	Over 80%
	Class of insulation	Above Kind B
	Rated Time	Continuous rating
	Starting Time	Within 40 seconds
	Excitation System	Brush-less system
	Type	Single-acting 4 cycle diesel engine
	Rated output	Over 584 PS
	Starting System	Pneumatic System
	R. P. M.	Over 1000 r.p.m.

Prime Mover	Rated Time	Over 72 hours
	Cooling system	Radiator system 220/380V 11KW
	Air Compressor	3-phase 220/380V 3.7 KW
	Air Tank	150 l x 2 with pressure switch
	Inflation Tank	100 l -
Fuel	Kind	A heavy oil
	Fuel Tank	1000 l
	Fuel Pump	3-phase 220/380V 0.4 KW
Type of board		Closed type
Control system		Hand Push Button system
Elevation		150 m
Heat Insulation Plate		Ceiling and wall of generator room
Ventilating Fan		3-phase 220/380V 0.75 KW with automatic shutter hood

Special Specifications of Independent
Power Plant Facilities Work

1. RS Tondano

2. Matters to apply

The matters which are not in this specifications and the drawings should be according to the common specifications of independent power plant facilities work.

3. Independent power plant facilities specifications

	Type	Horizontal Synchronous AC Generator
AC Generator	Rated output	250 KVA
	Rated voltage	127/220V and 220/380V
	Number of phase and frequency	3-phase & 4-line system 50Hz
	R.P.M.	Below 1000 rpm
	Power-factor	Over 80%
	Class of insulation	Above Kind B
	Rated Time	Continuous rating
	Starting Time	Within 40 seconds
	Excitation System	Brush-less system
	Type	Single-acting 4 cycle diesel engine
	Rated output	Over 300 PS
	Starting Time	Within 40 seconds
	Starting System	Pneumatic System
	R. P. M.	Below 1000 r.p.m.

Prime Mover	Rated Time	Above 72 hours
	Cooling system	Radiator system 220/380V 7.5 KW
	Air compressor	3-phase 220/380V 3.7 KW
	Air Tank	150 l x 2 with pressure switch
	Inflation Tank	100 l -
Fuel	Kind	A heavy oil
	Fuel Tank	600 l
	Fuel Pump	3-phase 220/380V 0.4 KW
Type of board		Closed type
Control system		Hand Push Button System
Elevation		150 m
Heat Insulation Plate		Ceiling and wall of generator room
Ventilating Fan		3-phase 220/380V 0.75 KW with automatic shutter hood

Special Specifications of Independent Power Plant Facilities Work

1. RS Kotamobagu

2. Matters to apply

The matters which are not in this specifications and the drawings should be according to the common specifications of independent power plant facilities work.

3. Independent power plant facilities specifications

AC Generator	Type	Horizontal Synchronous AC Generator
	Rated output	250 KVA
	Rated voltage	220/380V
	Number of phase and frequency	3-phase & 4-line system 50Hz
	R.P.M.	Below 1000 rpm
	Power-factor	Over 80%
	Class of insulation	Above kind B
	Rated Time	Continuous rating
	Starting Time	Within 40 seconds
	Excitation System	Brushless system
	Type	Single-acting 4 cycle diesel engine
	Rated output	Above 300PS
	Starting Time	Within 40 seconds
	R.P.M.	Below 1000 r.p.m.

Prime Mover	Rated Time	More than 72 hours
	Cooling system	Radiator system 220/380V 7.5 KW
	Air compressor	3-phase 220/380V 3.7 KW
	Air Tank	150 l with pressure switch
	Inflation Tank	100 l
Fuel	Kind	A heavy oil
	Fuel Tank	600 l
	Fuel pump	3-phase 220/380V 0.4 KW
Type of board		Closed type
Control system		Hand Push Button System
Elevation		150 m
Heat Insulation Plate		Ceiling and wall of generator room
Ventilating Fan		3-phase 220/380V 0.75 KW with automatic shutter hood

Special Specifications of Independent

Power Plant Facilities Work

RS Gorontalo

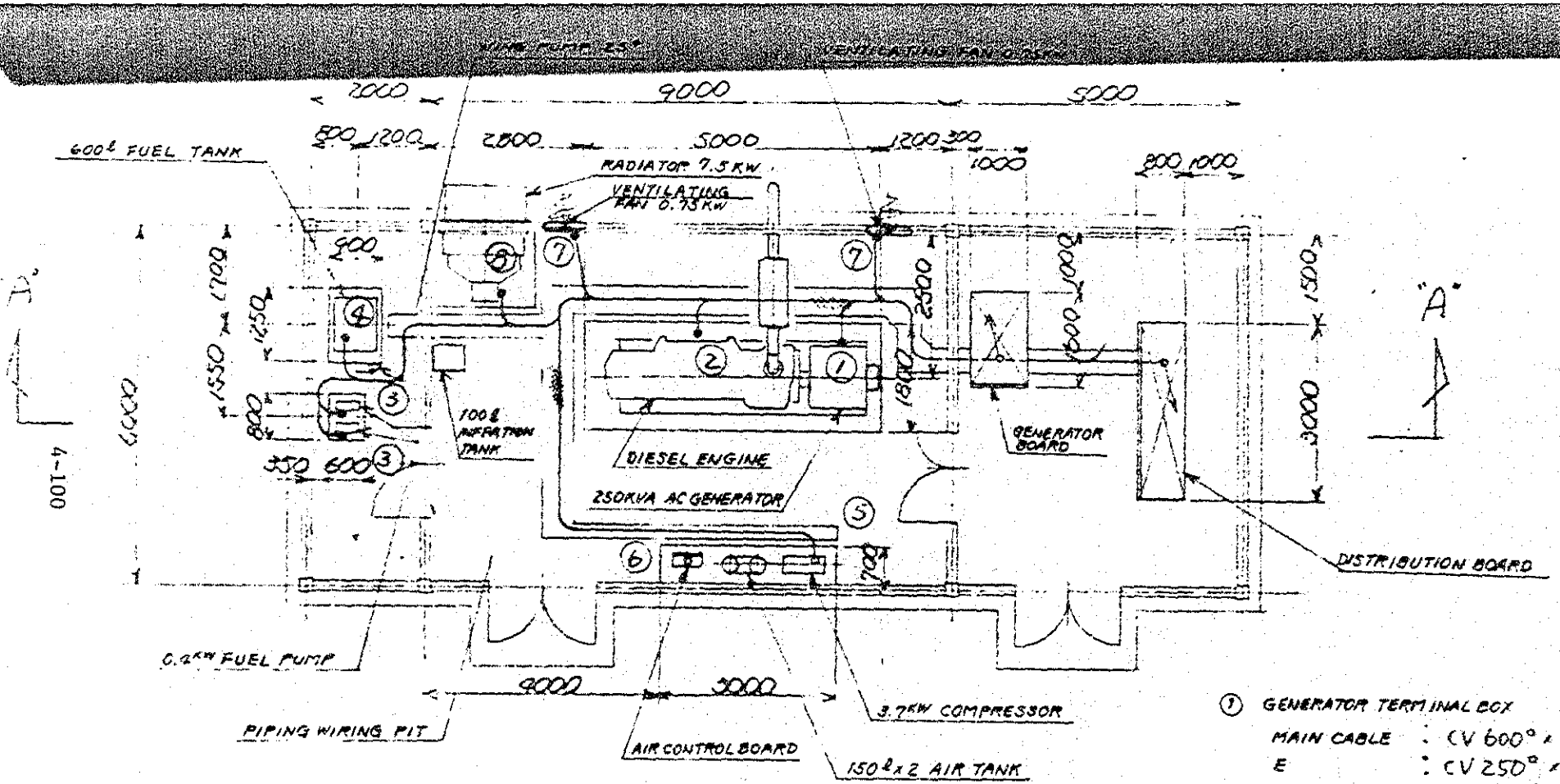
Matters to apply

The matters which are not in this specifications and the drawings should be according to the common specifications of independent power plant facilities work.

Independent power plant facilities specifications

AC Generator	Type	Horizontal Synchronous AC Generator
	Rated output	250 KVA
	Rated voltage	127/220V and 220/380V
	Number of phase and frequency	3-phase & 4-line system 50Hz
	R.P.M.	Below 1000 rpm
	Power-factor	Over 80%
	Class of insulation	Above kind B
	Rated Time	Continuous rating
	Starting Time	Within 40 seconds
	Excitation System	Brush-less system
	Type	Single-acting 4 cycle diesel engine
	Rated output	Above 300 PS
	Starting Time	Within 40 seconds
	Starting System	Pneumatic system
	R. P. M.	Below 1000 r.p.m.

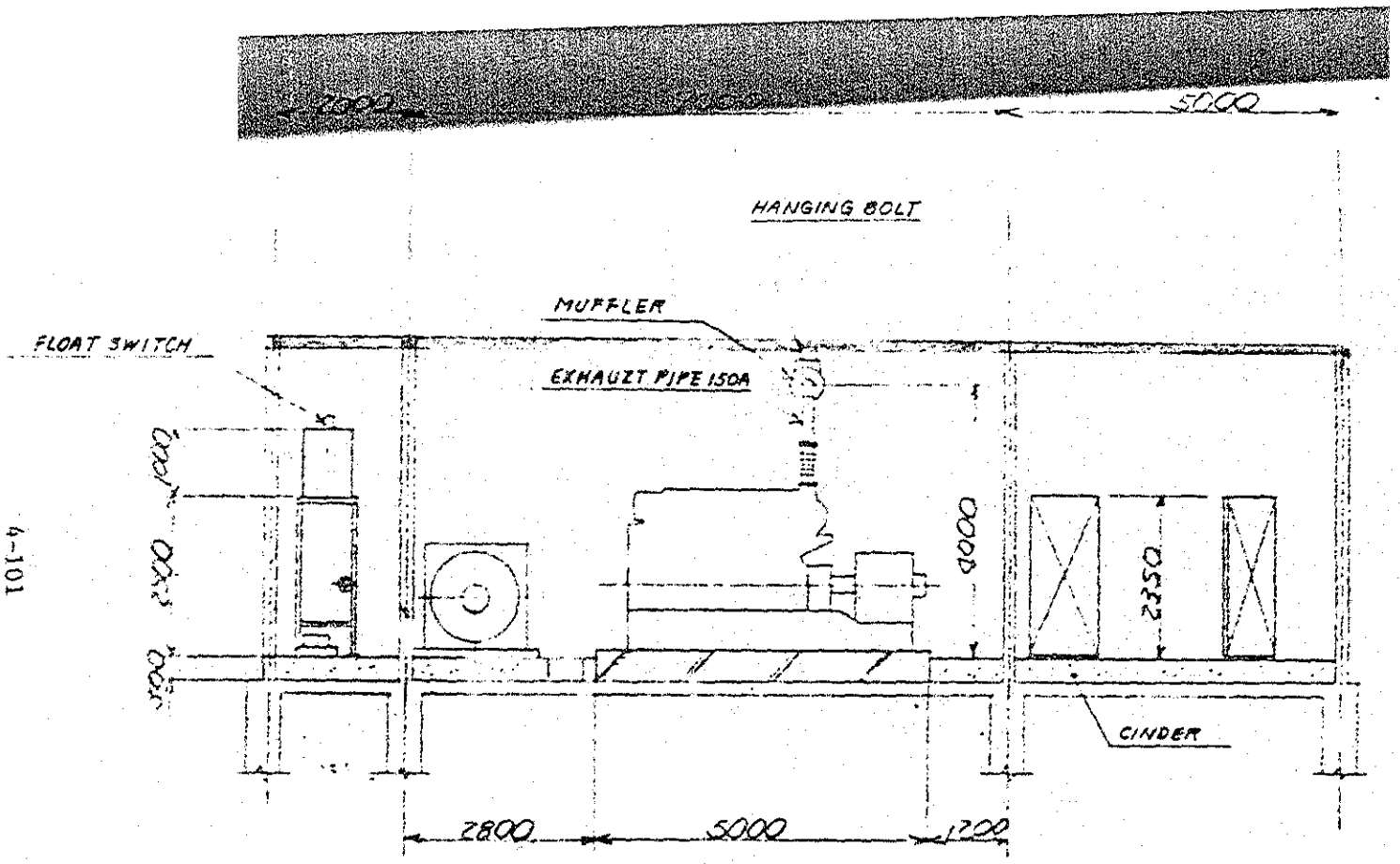
Prime mover	Rated Time	More than 72 hours
	Cooling system	Radiator system 220/380V 7.5 KW
	Air compressor	3-phase 220/380V 3.7 KW
	Air Tank	150 l with pressure switch
	Inflation Tank	100 l -
Fuel	Kind	A heavy oil
	Fuel Tank	600 l
	Fuel pump	3-phase 220/380V 0.4 KW
Type of board		Closed type
Control system		Hand Push Button System
Elevation		150 m
Heat Insulation Plate		Celling and wall of generator room
Ventilating Fan		3-phase 220/380V 0.75 KW with automatic shutter hood



LAYOUT OF 250KVA GENERATOR ROOM SCALE: 1/100

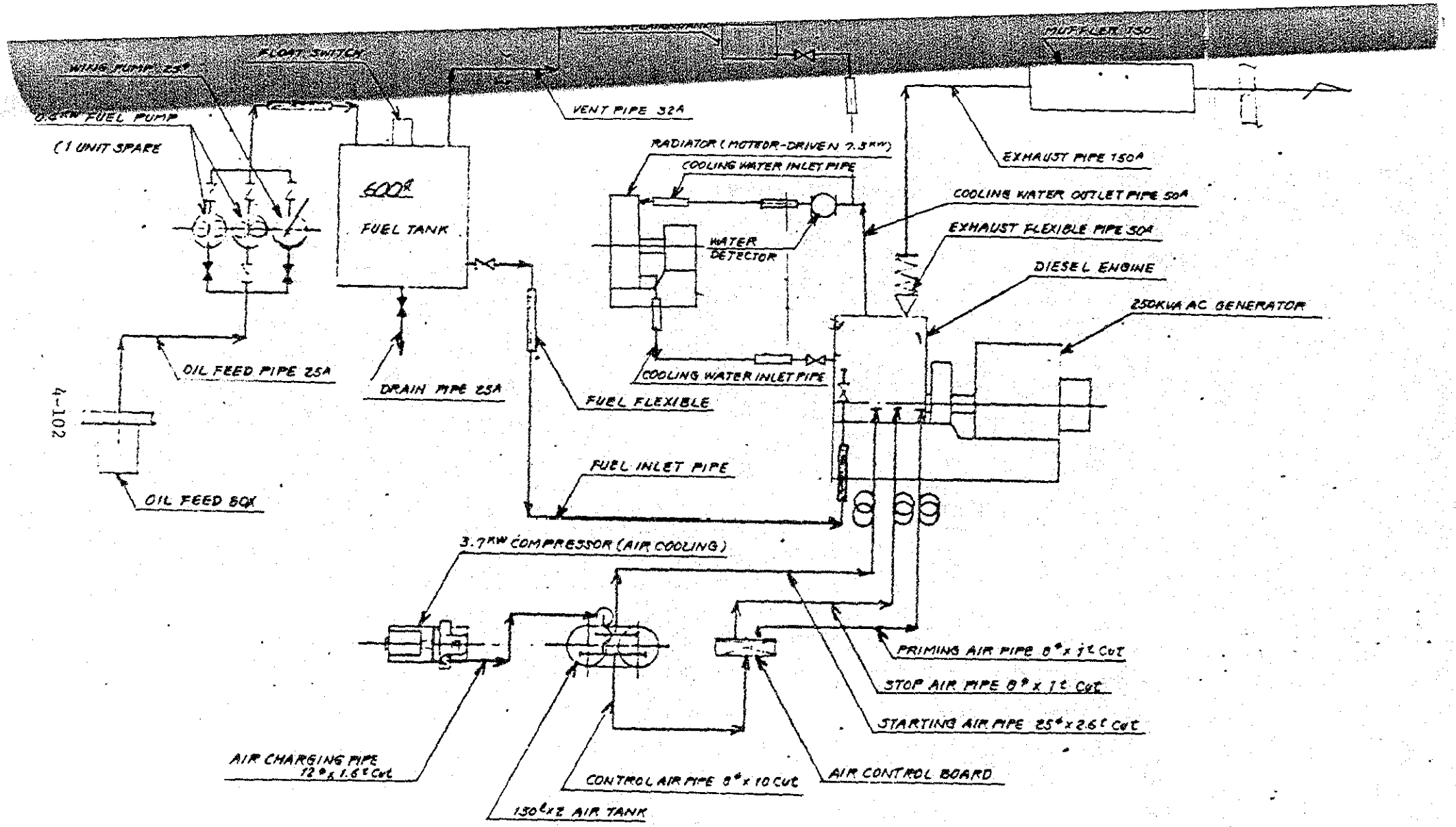
① GENERATOR TERMINAL BOX
- MAIN CABLE : CV 600° x 3C
- E : CV 250° x 3C
- EARTH : IV 38° x 1C
- EXCITATION : CV 22° x 2C

② ENGINE TERMINAL BOX : CVV 2° x 8C
③ FUEL PUMP : CV 3.5° x 4C x 2
④ FLOAT SWITCH : CVV 2° x 6C
⑤ COMPRESSORE : CV 5.5° x 4C
⑥ AIR CONTROL BOARD : CVV 2° x 8C
⑦ VENTILATING FAN : CV 3.5° x 4C x 2
⑧ RADIATOR : CV 5.5° x 4C

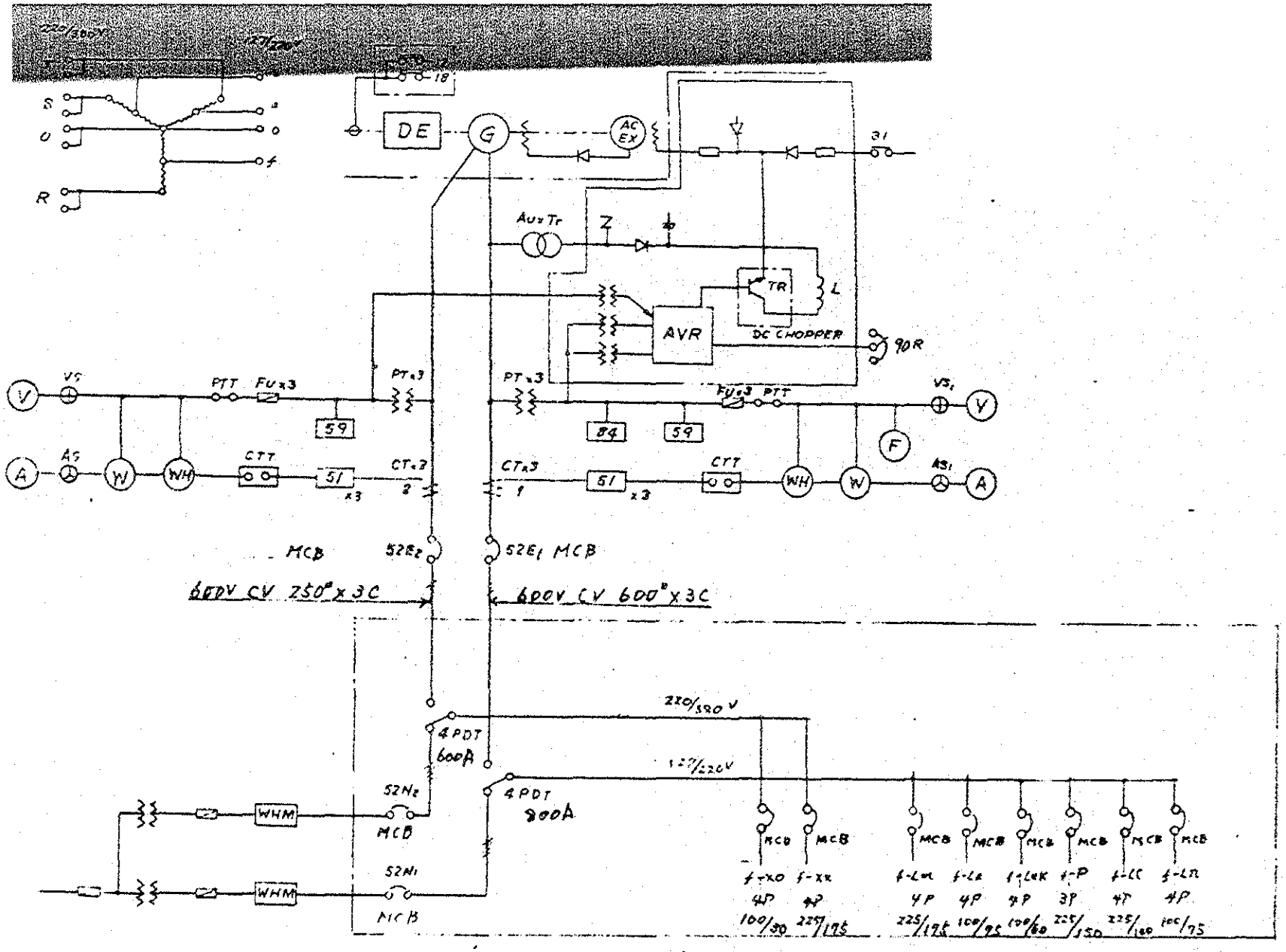


"A" ~ "A" SECTION

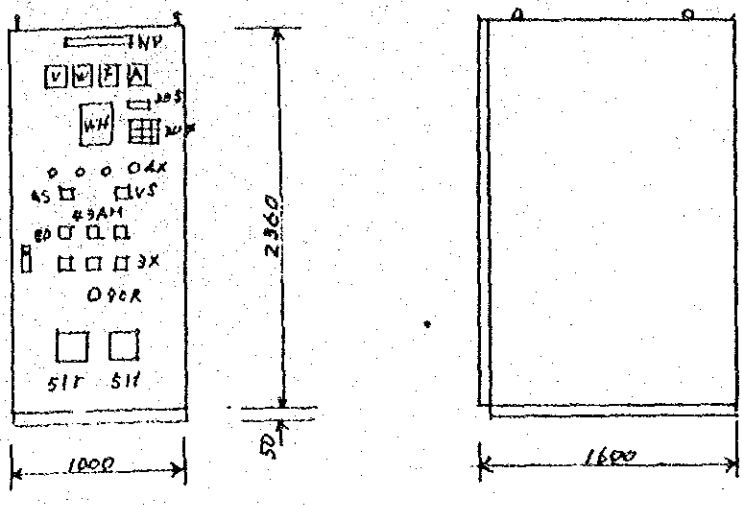
SECTIONAL VIEW OF 250KVA GENERATOR SCALE 1/100



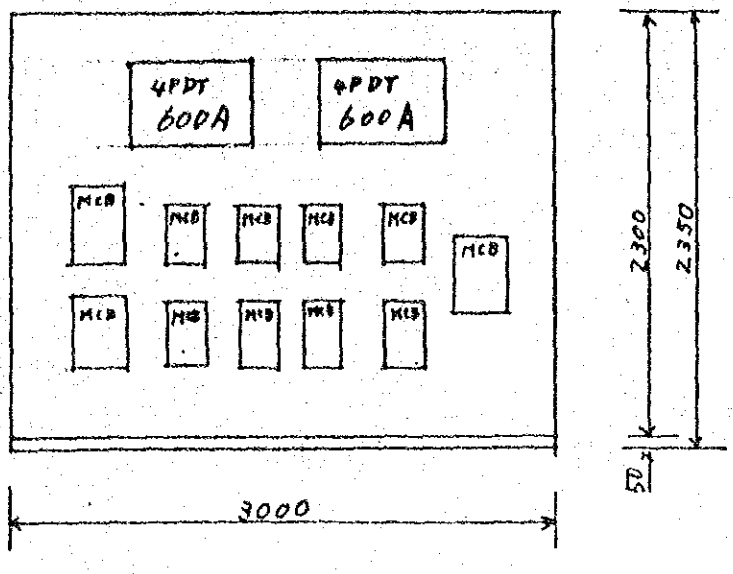
FROW SHEET OF 250KVA GENERATOR PIPING

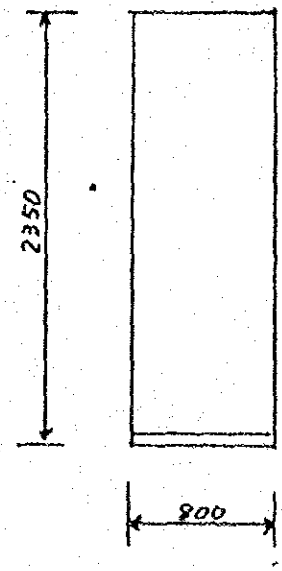


FROW SHEET OF 250KVA WIRING



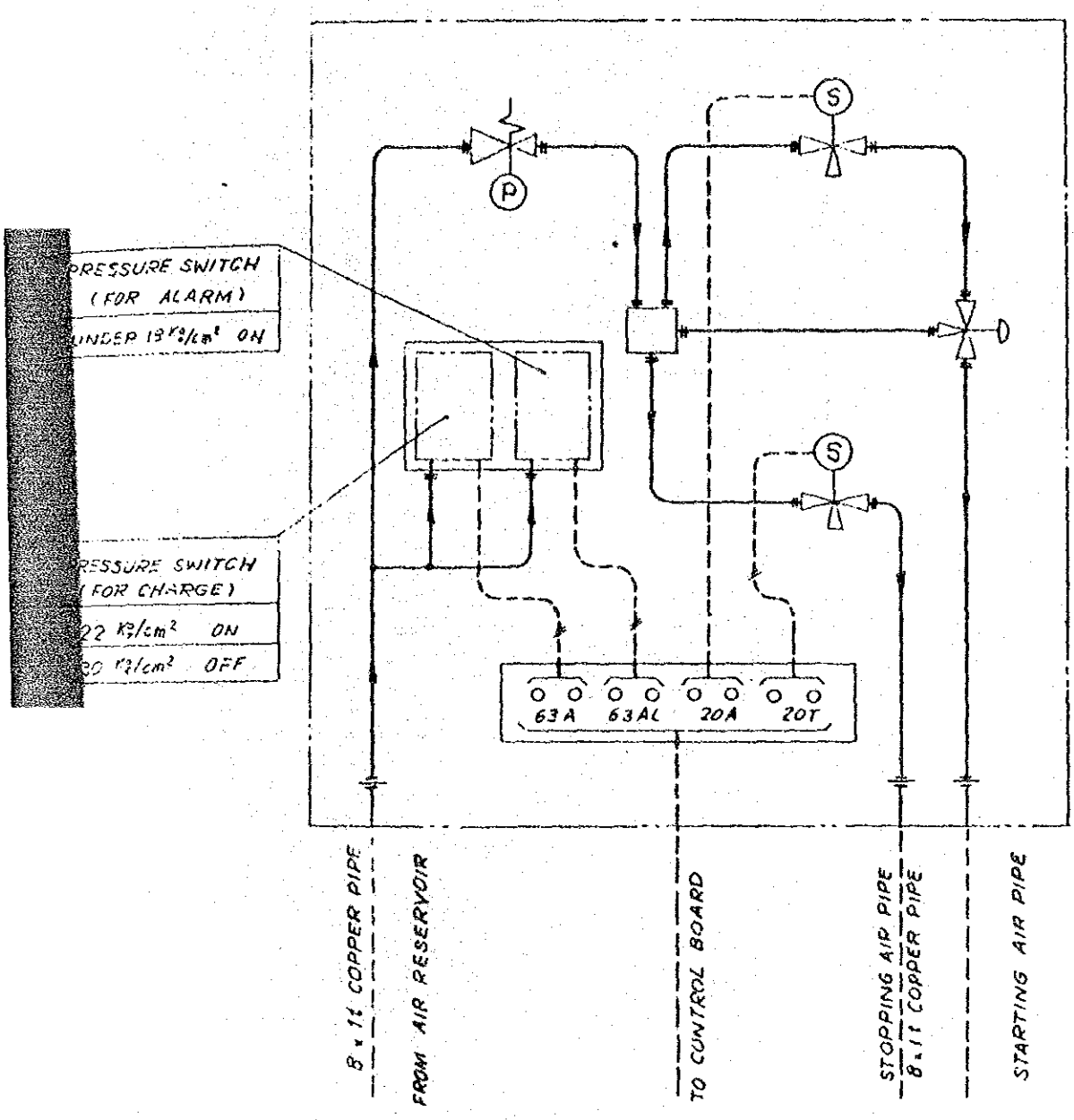
Symbol	Description
A	AC ammeter
W	Indiating Watt Meter
F	Frequency Meter
V	AC Voltmeter
WH	Electric Energy Meter
43 AM	Control Switch (Automatic-Manual)
8D	" (Control Power Source)
90R	Voltage
5/r 51t	Overcurrent Relay
3x	Push Button Switch (Lamp Test)
3x	" (Trouble Return)
3x	" (Alarm Stop)





DISTRIBUTION BOARD

MODEL : ML · RL · UL · GL ZL · AL



AIR CONTROL BOARD

Special Specifications of Independent
Power Plant Facilities Works

1. R. S. Gorontalo

2. Matters to Apply

Matters which are not mentioned in this specifications and in the drawings should be according to the common specifications of Independent Power Plant Facilities Works.

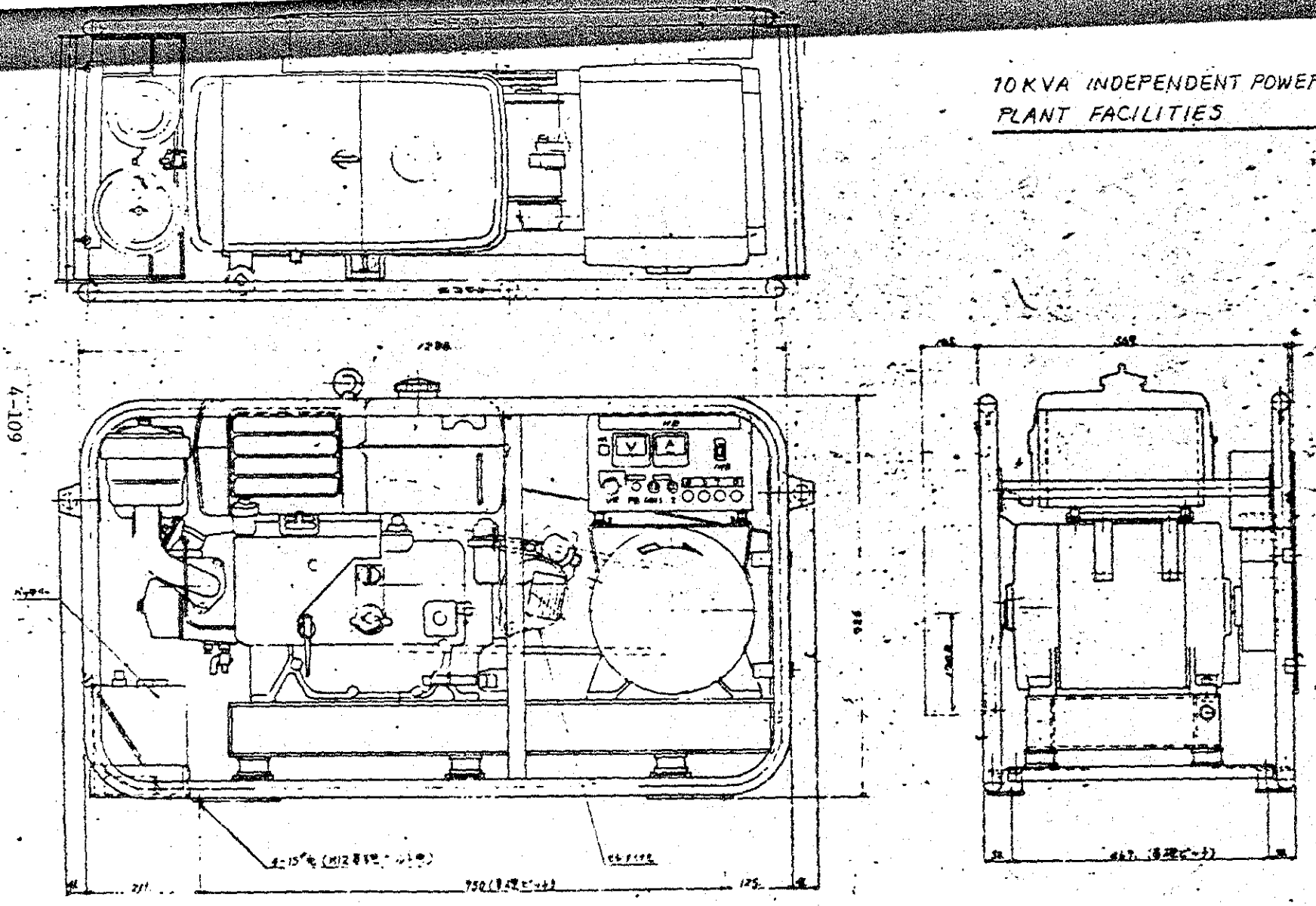
3. Specifications of Independent Power Plant Facilities

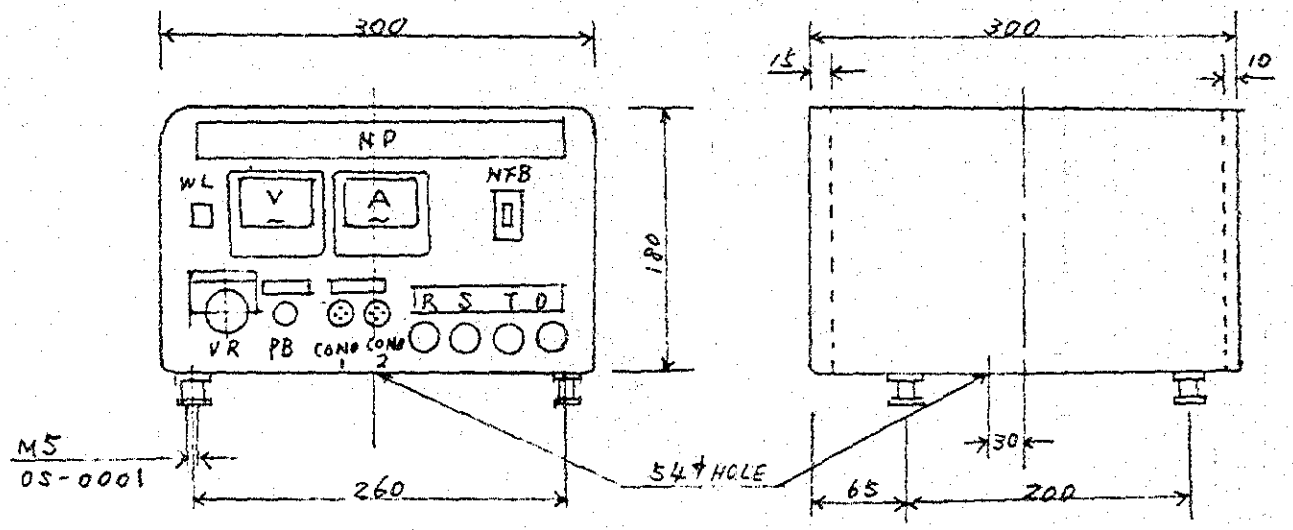
AC Generator	Type	Revolving Field Brushless System
	Rated Output	10KVA
	Rated Voltage	127/220V
	Number of phase and frequency	3-phase 4-line system 50 Hz
	R. P. M.	3000 r.p.m.
	Power-factor	Above 80%
	Class of insulation	Above Kind E
	Rated Time	10 hours
	Starting Time	Within 40 seconds
	Excitation System	Brushless Self-exciting system
	Type	Horizontal Water-cooling 4-cycle Diesel Engine
	Rated Output	Above 15PS
	Starting Time	Within 40 seconds
	Starting System	Electric System

Prime mover	Dynamo Capacity	DC, 12V 1.25KW
	Battery Capacity	DC, 12V 70AH
	R. P. M.	2200 r.p.m.
	Rated Time	10 hours
	Cooling system	Condenser system
Fuel	Kind	A heavy Oil
	Fuel Tank	14 l.
Type of Board		Closed type
Control system		Hand Push Button System
Elevation		150 m

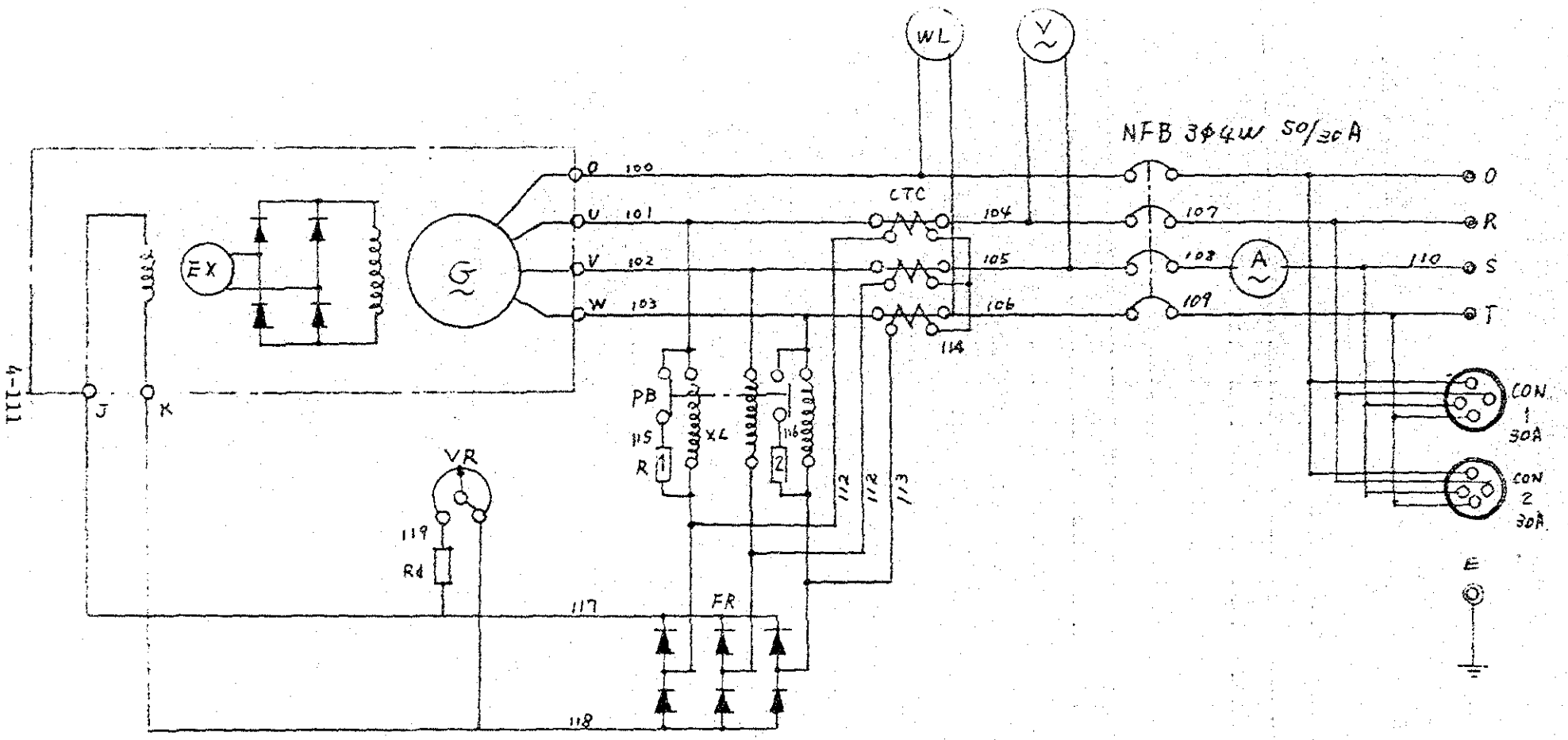
(Remarks) The matters which are not mentioned in this specifications should be according to the manufacturer's standard

10KVA INDEPENDENT POWER PLANT FACILITIES





10KVA GENERATOR BOARD



10KVA GENERATOR BOARD

Special Specifications of Independent Power Plant Facilities Works

1. RS Lim Kendage

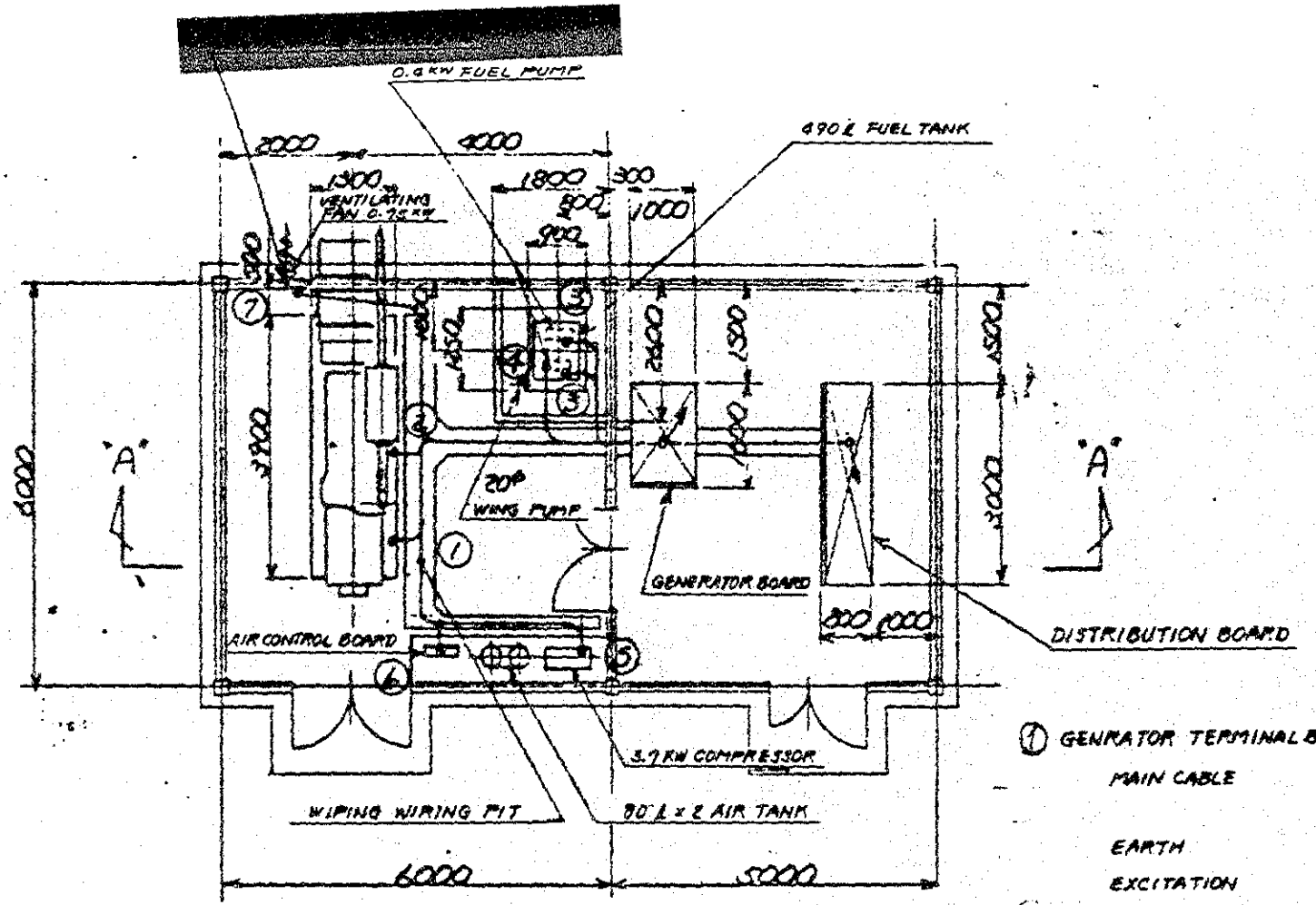
2. Matters to Apply

Matters which are not mentioned in this specifications and drawings should be according to the common specifications of Independent Power Plant Facilities Works.

3. Specifications of Independent Power Plant Facilities

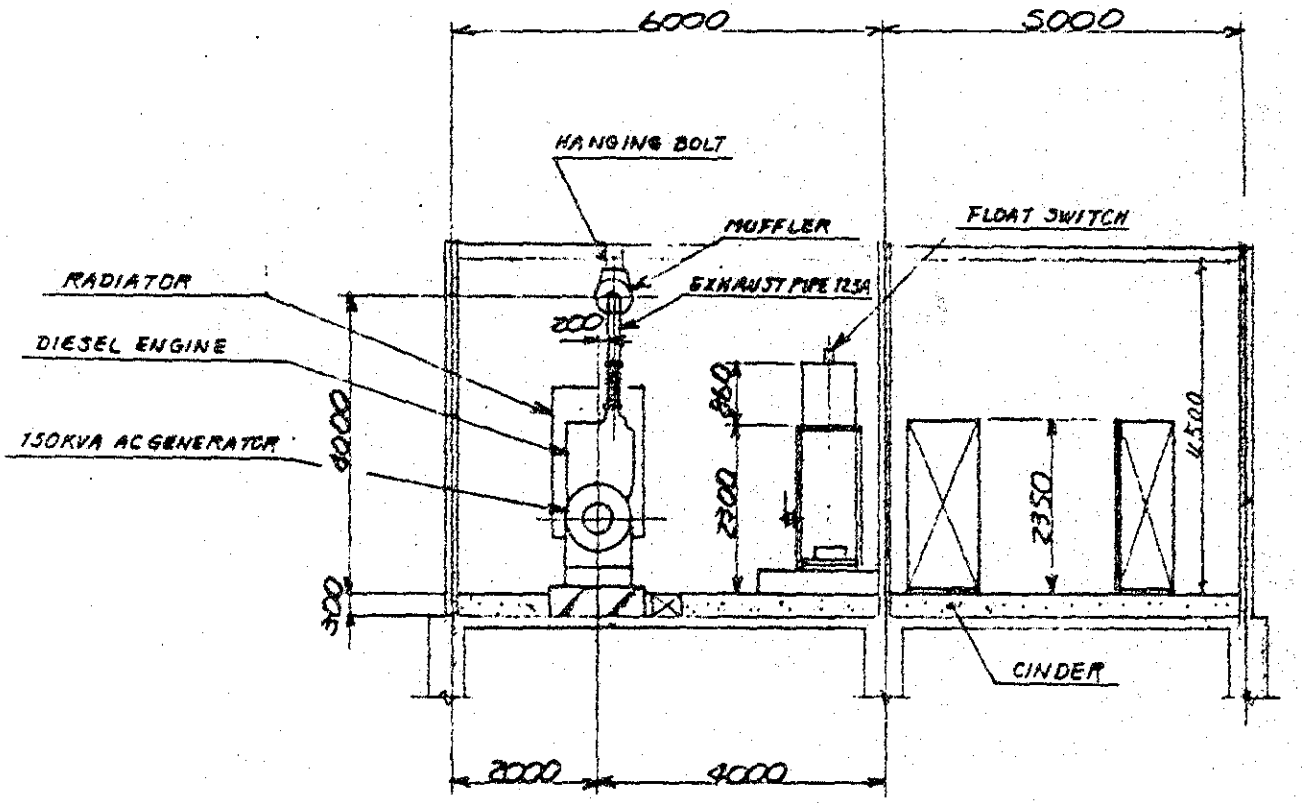
AC Generator	Tupe	Horizontal Synchronous AC Generator
	Rated Output	150 KVA
	Rated Voltage	127/220V and 220/380V
	Number of phase and frequency	3-phase 4-line system 50 Hz
	R. P. M.	Below 1500 r.p.m.
	Power-factor	Above 80%
	Class of insulation	Above Kind B
	Rated Time	Continuous Rating
	Starting Time	Within 40 seconds
	Excitation System	Brushless System
	Type	Single-acting 4-cycle Diesel Engine
	Rated Output	Above 180 PS
	Starting Time	Within 40 seconds
	Starting System	Pneumatic System

Prime Mover	R. P. M.	Below 1500 r.p.m.
	Rated Time	More than 72 hours
	Cooling System	Radiator System (Engine driven fan)
	Air Compressor	3-phase 220/380V 3.7KW
Fuel	Kind	A Heavy Oil
	Fuel Tank	490 l.
	Fuel Pump	3-phase 220/380V 0.4 KW
Type of Board		Closed type
Control system		Hand Push-button System
Elevation		150 M
Heat-Insulation Plate		Ceiling and wall of Generator
Ventilating Fan		3-phase 220/380V 0.75KW with automatic shutter hood



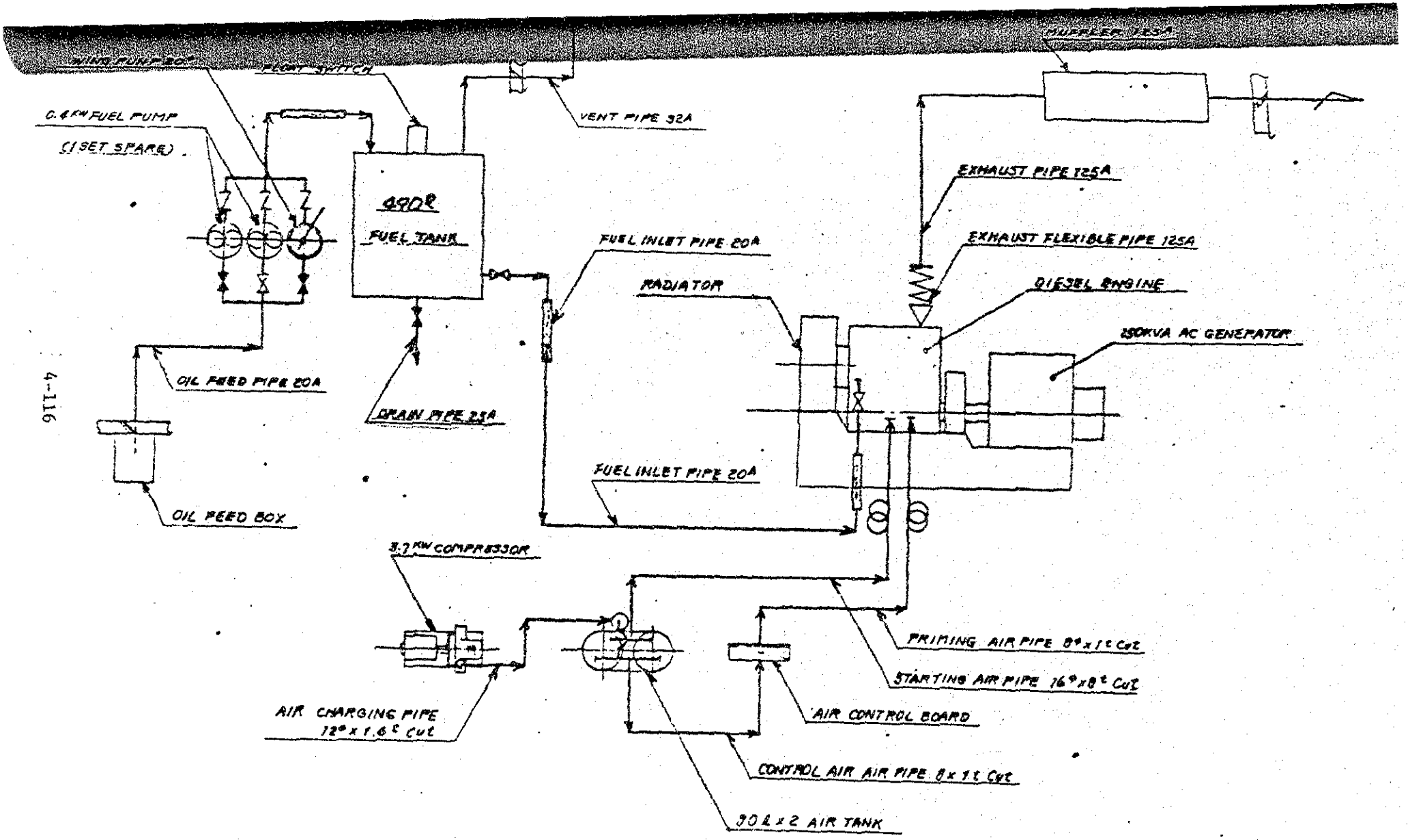
LAYOUT OF 150KVA GENERATOR ROOM

①	GENERATOR TERMINAL BOX	
	MAIN CABLE	: CV 250°×3C
	EARTH	: IV 38°×1
	EXCITATION	: CV 2.2°×2C
②	ENGINE TERMINAL BOX	: CVV 2°×8C
③	FUEL PUMP	: CV 3.5°×4C×2
④	FLOAT SWITCH	: CVV 2°×6C
⑤	COMPRESSOR	: CV 5.5°×4C
⑥	AIR CONTROL BOARD	: CVV 2°×8C
⑦	VENTILATING FAN	: IV 3.5°×4C

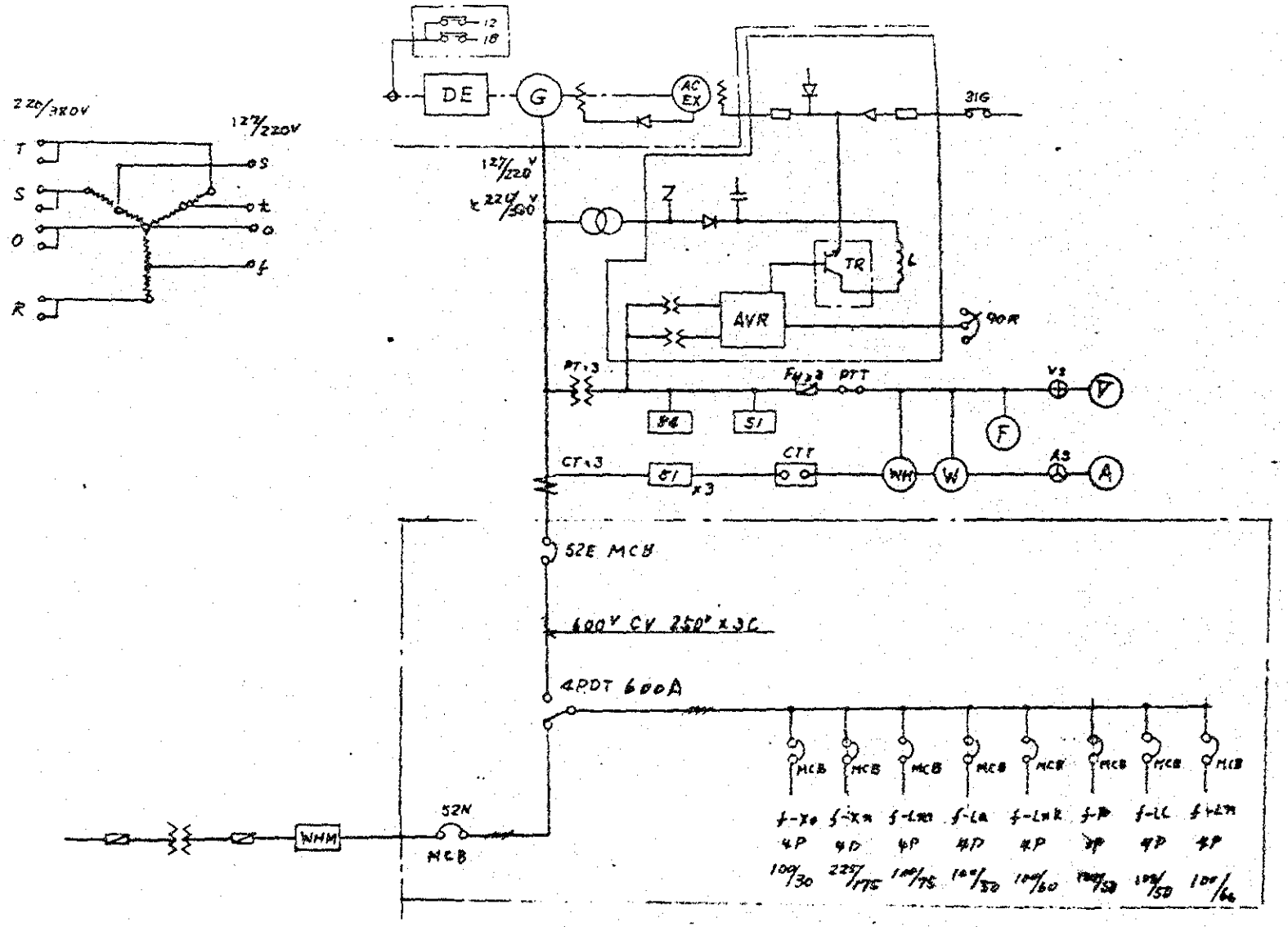


"A" ~ "A" SECTION

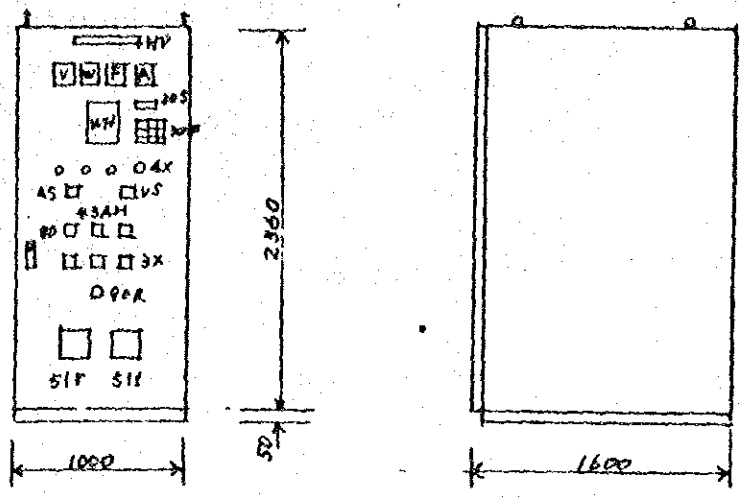
SECTIONAL VIEW OF 150KVA GENERATOR SCALE: 1/100



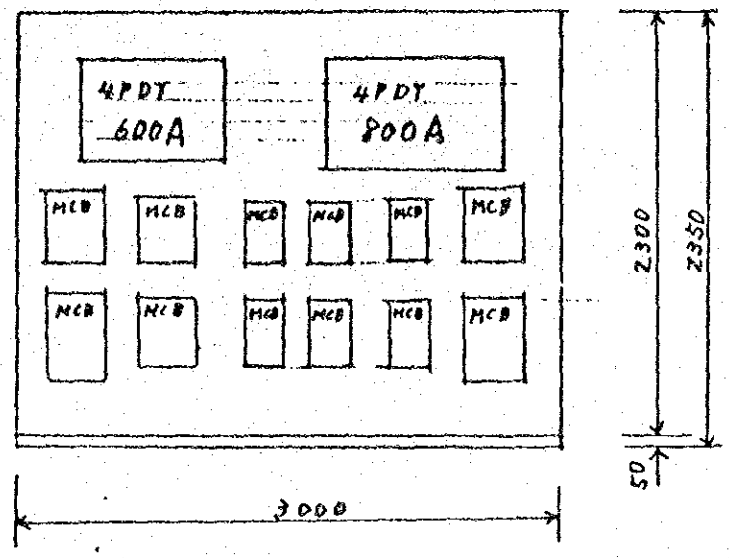
FLOW SHEET OF 150KVA GENERATOR PIPIPING

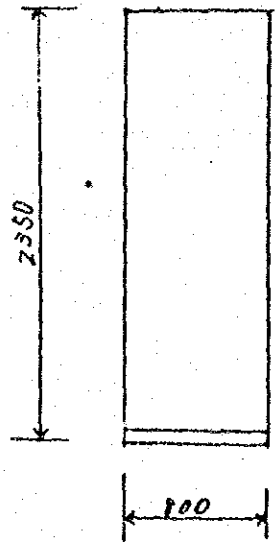


FLOW SHEET OF 150KVA WIRING



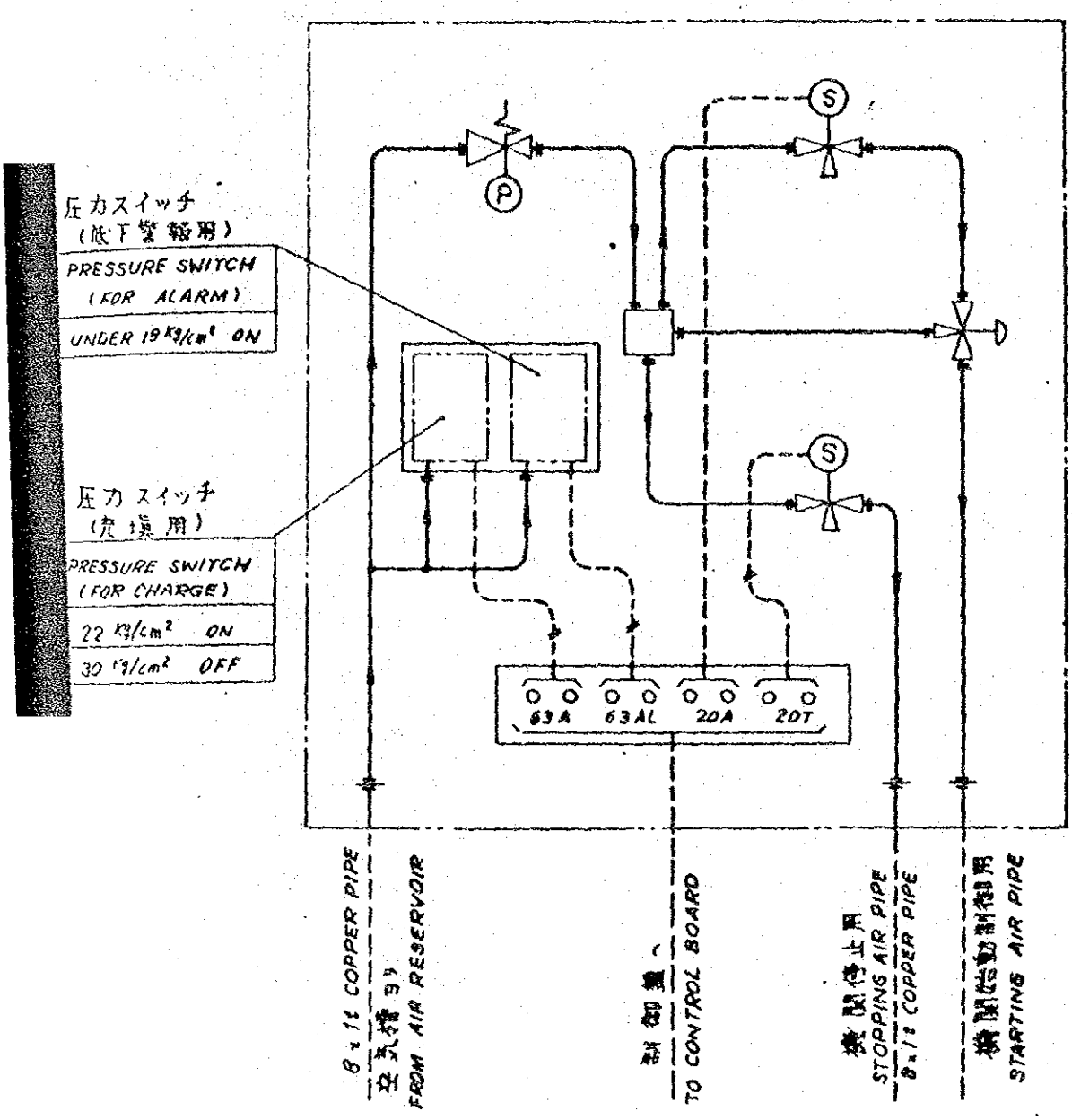
Symbol	Description
A	AC ammeter
W	Indicating Watt Meter
F	Frequency Meter
V	AC Voltmeter
WH	Electric Energy Meter
43 AM	Control Switch (Automatic-Manual)
8D	" (Control Power Source)
90R	Voltage
5/r 51t	Overcurrent Relay
3x	Push Button Switch (Lamp Test)
3x	" (Trouble Return)
3x	" (Alarm Stop)





DISTRIBUTION BOARD

MODEL : ML · RL · UL · GL · ZL · AL



AIR CONTROL BOARD

Special Specifications of Independent

Power Plant Facilities Works

1. RS Ujung Pandang

2. Matters to Apply

The matters which are not mentioned in this specifications and drawings should be according to the common specifications of Independent Power Plant Facilities Works.

3. Specifications of Independent Power Plant Facilities

AC Generator	Type	Horizontal Synchronous AC Generator
	Rated Output	500 KVA
	Rated Voltage	127/220V 220/380V
	Number of phase and frequency	3-phase 4-line system 50 HZ
	R. P. M.	Below 1000 r.p.m.
	Power-factor	Above 80%
	Class of Insulation	Above Kind B
	Rated Time	Continuous Rating
	Starting Time	Within 40 seconds
	Excitation System	Brushless System
	Type	Single-acting 4-cycle Diesel Engine
	Rated Output	Above 584 PS
	Starting Time	Within 40 seconds
	Starting System	Penumatic System

Prime Mover	R.P.M.	Below 1000 r.p.m.
	Rated Time	More than 72 hours
	Cooling system	Radiator system 220/380V 11 KW
	Air Compressor	3-phase 220/380V 3.7KW
	Air Tank	150 l, with pressure switch
	Inflation Tank	100 l.
Fuel	Kind	A Heavy Oil
	Fuel Tank	1000 l.
	Fuel Pump	3-phase 220/380V 0.4 KW
Type of Board		Closed type
Control System		Hand Push-button System
Elevation		150 m
Ventilating Fan		3-phase 220/380 V 0.75KW with automatic shutter hood

Special Specifications of Independent
Power Plant Facilities Works

1. RS Watampone

2. Matters to Apply

Matters which are not mentioned in this specifications and drawings should be according to the common specifications of Independent Power Plant Facilities Works.

3. Specifications of Independent Power Plant Facilities

AC Generator	Type	Horizontal Synchronous AC Generator
	Rated Output	150 KVA
	Rated Voltage	127/220V and 220/380V
	Number of phase and frequency	3-phase 4-line system 50 Hz
	R. P. M.	Below 1500 r.p.m.
	Power-factor	Above 80%
	Class of insulation	Above Kind B
	Rated Time	Continuous Rating
	Starting Time	Within 40 seconds
	Excitation System	Brussless System
	Type	Single-acting 4-cycle Diesel Engine
	Rated Output	Above 180 PS
	Starting Time	Within 40 seconds
	Starting System	Pneumatic System

Prime Mover	R. P. M.	Below 1500 r.p.m.
	Rated Time	More than 72 hours
	Cooling System	Radiator System (Engine-driven Fan)
	Air Compressor	3-phase 220/380V 3.7 KW
	Air Tank	80 l. with pressure switch
Fuel	Kind	A Heavy Oil
	Fuel Tank	490 l.
	Fuel Storage Tank	5000 l.
	Fuel Pump	
Type of Board		Closed type
Control System		Hand Push-button system
Elevation		150 m
Heat Insulation Plate		Ceiling and Wall of Generator
Ventilating Fan		3-phase 220/380V 0.75 KW with Automatic shutter hood

Special Specifications of Independent
Power Plant Facilites Work

1. RS Soppeng

2. Matters to Apply

Matters which are not mentioned in this specifications and drawing should be according to the common specifications of Independent Power Plant Facilities Works.

3. Specifications of Independent Power Plant Facilities

AC Generator	Type	Horizontal Synchronous AC Generator
	Rated Output	More than 150KVA
	Rated Voltage	127/220 and 220/380V
	Number of phase and frequency	3-phase 4-line system 5 Hz
	R. P. M.	Below 1500 r.p.m.
	Power-factor	Above 80%
	Class of insulation	Above Kind B
	Rated Time	Continuous Rating
	Starting Time	Within 40 seconds
	Excitation	Brushless System
	Type	Single-acting 4-cycle Diesel Engine
	Rated Output	Above 180 PS
	Starting Time	Within 40 seconds
	Starting System	Pneumatic System

Prime Mover	R.P.M.	Below 1500 r.p.m.
	Rated Time	More than 72 hours
	Cooling System	Radiator system (Engine-driven fan)
	Air Compressor	3-phase 220/380V 3.7 KW
	Air Tank	80 l. with pressure switch
	Kind	A Heavy Oil
	Fuel Tank	490 l.
	Fuel Reservoir	5000 l.
	Fuel Pump	3-phase 220/380 V 0.4 KW
Type of Board		Close type
Control System		Hand Push-button system
Elevation		500 m
Heat-Insulation Plate		Ceiling and Wall of Genertor Room
Ventilating Fan		3-phase 220/380V 0.75KW with automatic shutter hood

Special Specifications of Independent

Power Plant Facilities Works

1. RS Pare Pare

2. Matters to Apply

Matters which are not mentioned in this specifications and drawing should be according to the common specifications of Independent Power Plant Facilities Works.

AC Generator	Type	Horizontal Synchronous AC Generator
	Rated Output	250 KVA
	Rated Voltage	127/220V and 220/380V
	Number of phase and frequency	3-phase 4-line system 50 Hz
	R. P. M.	Below 1000 r.p.m.
	Power-factor	Above 80%
	Class of Insulation	Above Kind B
	Rated Time	Continuous Rating
	Starting Time	Within 40 seconds
	Excitation System	Brushless System
	Type	Single-acting 4-cycle Diesel Engine
	Rated Output	Above 300 PS
	Starting Time	Within 40 seconds
	Starting System	Pneumatic System

Prime Mover	R. P. M.	Below 1000 r.p.m.
	Rated Time	More than 72 hours
	Cooling System	Radiator System 220/380 V 7.5 KW
	Air Compressor	3-phase 220/380V 7.5KW
	Air Tank	150 l. with pressure switch
	Inflation Tank	100 l.
Fuel	Kind	A Heavy Oil
	Fuel Tank	600 l.
	Fuel Pump	3-phase 220/380V 0.4KW
Type of Board		Closed type
Control System		Hand Push Button System
Elevation		150 m
Heat Insulation Plate		Ceiling and wall of generator room
Ventilating Fan		3-phase 220/380V 0.75KW with automatic shutter hood

Special Specifications of Independent
Power Plant Facilities Works

1. RS Elim Rantepao

2. Matters to Apply

Matters which are not mentioned in this specifications and drawing should be according to the common specifications of Independent Power Plant Facilities Works.

3. Specifications of Independent Power Plant Facilities

AC Generator	Type	Horizontal Synchronous AC Generator
	Rated Output	150KVA
	Rated Voltage	127/220V and 220/380V
	Number of phase & frequency	3-phase 4-line system 50 HZ
	R. P. M.	Below 1500 r.p.m.
	Power-factor	Above 80%
	Class of Insulation	Above Kind B
	Rated Time	Continuous Rating
	Starting Time	Within 40 seconds
	Excitation System	Brushless System
	Type	Single-acting 4-cycle Diesel Engine
	Rated Output	Above 180 PS
	Starting Time	Within 40 seconds
	Starting System	Pneumatic System

Primer Mover	R. P. M.	Below 1500 r.p.m.
	Rated Time	More than 72 hours
	Cooling System	Radiator system (Engine-driven fan)
	Air Compressor	3-phase 220/380V 3.7 KW
	Air Tank	80 l. with pressure switch
Fuel	Kind	A Heavy Oil
	Fuel Tank	490 l.
	Fuel Reservoir	5000 l.
	Fuel Pump	3-phase 220/380 V 0.4 KW
Type of Board		Closed type
Control System		Hand Push-button system
Elevation		500 m
Heat-Insulation Plate		Ceiling and Wall of Generator Room
Ventilating Fan		3-phase 220/380V 0.75KW with automatic shutter hood

Special Specifications of Independent Power

Plant Facilities Works

1. RS, Palopo

2. Matters to Apply

Matters which are not mentioned in this specifications and drawing should be according to the common specifications of Independent Power Plant Facilities Works.

3. Specifications of Independent Power Plant Facilities.

AC Generator	Type	Horizontal synchronous AC Generator
	Rated Output	150 KVA
	Rated Voltage	127/220V and 220/380V
	Number of phase and frequency	3-phase 4-line system 50 Hz
	R. P. M.	Below 1500 r.p.m.
	Power-factor	Above 80%
	Class of Insulation	Above Kind B
	Rated Time	Continuous Rating
	Startation Time	Within 40 seconds
	Excitation system	Brushless system
	Type	Single-acting 4-cycle Diesel Engine
	Rated Output	Above 180 PS
	Starting Time	Within 40 seconds
	Starting System	Pneumatic System

Prime Mover	R. P. M.	Below 1500 r.p.m.
	Rated Time	More than 72 hours
	Cooling System	Radiator System (engine-driven fan)
	Air Compressor	3-phase 220/380 V 3.7 KW
	Air Tank	80 l. with pressure switch
Fuel	Kind	A Heavy Oil
	Fuel Tank	490 l.
	Fuel Oil Reservoir	5,000 l.
	Fuel Pump	3-phase 220/380V 0.4 KW
Type of Board		Closed type
Control System		Hand Push-Button System
Elevation		150 m
Heat Insulation Plate		Ceiling and Wall of Generator Room
Ventilating Fan		3-phase 220/380V with automatic shutter hood

Special Specifications of Independent Power Plant Facilities Works

1. RS Bantaeng

2. Matters to Apply

   Matters which are not mentioned in this specifications and drawing should be according to the common specifications of Independent Power Plant Facilities Works

3. Specifications of Independent Power Plant Facilities

AC Generator	Type	Horizontal synchronous AC Generator
	Rated Output	150 KVA
	Rated Voltage	127/220V and 220/380V
	Number of phase and frequency	3-phase 4-line system 50Hz
	R. P.M.	Below 1500 r.p.m.
	Power-factor	Above 80%
	Class of insulation	Above Kind B
	Rated Time	Continuous Rating
	Starting Time	Within 40 seconds
	Excitation System	Brushless System
	Type	Single-acting 4-cycle Diesel Engine
	Rated Output	Above 180 PS
	Starting Time	Within 40 seconds
	Starting System	Pneumatic System

Prime Mover	R. P. M.	Below 1500 r.p.m.
	Rated Time	More than 72 hours
	Cooling system	Radiator System (Engine-driven fan)
	Air Compressor	3-phase 220/380V 3.7KW
	Air Tank	80 l. with pressure switch
Fuel	Kind	A Heavy Oil
	Fuel Tank	490 l.
	Fuel Pil Reservoir	5000 l.
	Fuel Pump	3-phase 220/380V 0.4KW
Type of Board		Closed type
Control System		Hand Push-Button System
Elevation		150 m
Heat Insulation Plate		Ceiling and Wall of Generator Room
Ventilating Fan		3-phase 220/380v with automatic shutter hood

Special Specifications of Independent
Power Plant Facilities Works

1. RS Medan

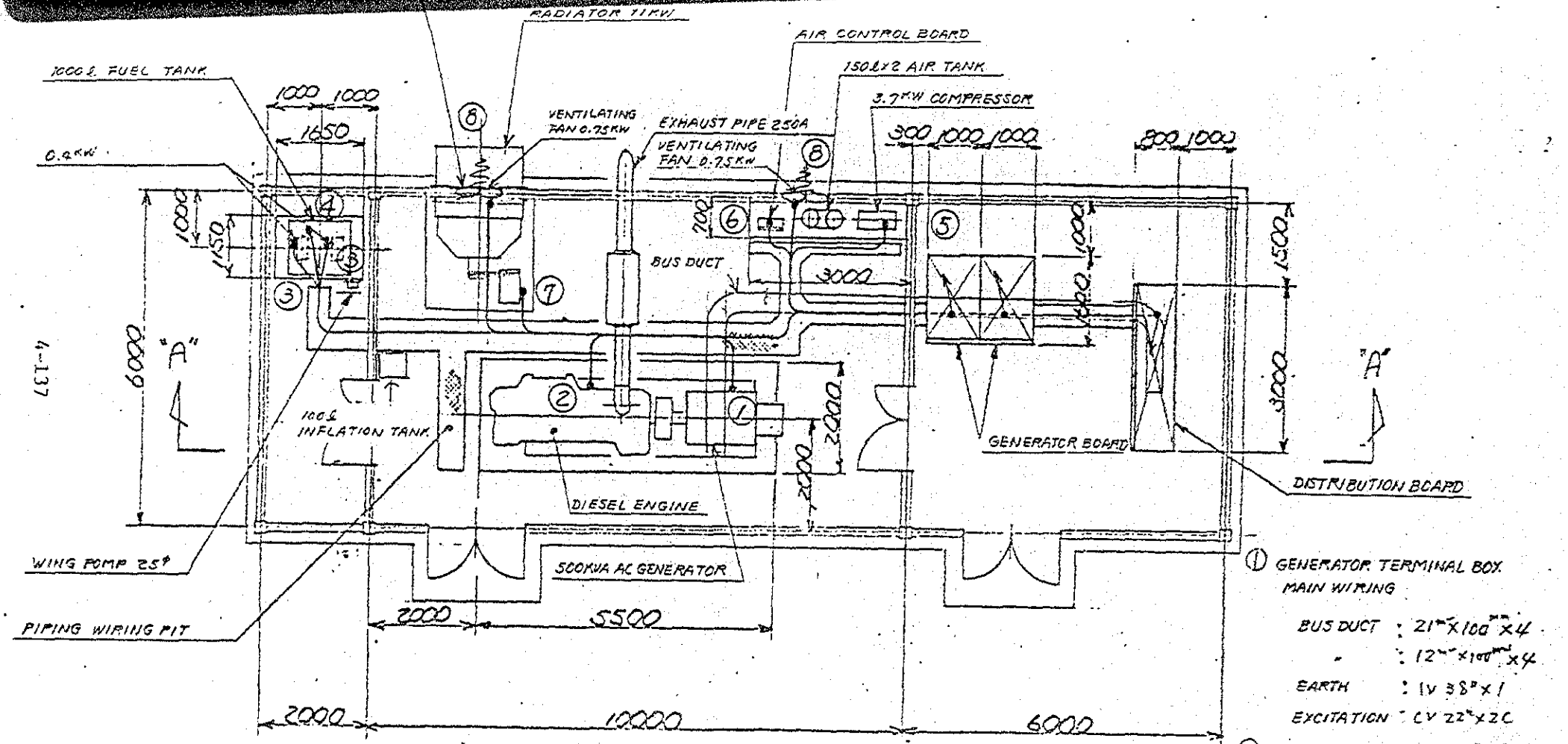
2. Matters to Apply

Matters which are not mentioned in this specifications and drawing should be according to the common specifications of Independent Power Plant Facilities Works.

3. Specifications of Independent Power Plant Facilities

AC Generator	Type	Horizontal Synchronous AC Generator
	Rated Output	500 KVA
	Rated Voltage	127/220 V and 220/380V
	Number of phase and frequency	3-phase 4-line system 50Hz
	R. P. M.	Below 1000 r.p.m.
	Power-factor	Above 80%
	Class of Insulation	Above Kind B
	Rated Time	Continuous Rating
	Starting Time	Within 40 seconds
	Excitation System	Brushless System
	Type	Single-acting 4-cycle Diesel Engine
	Rated Output	About 584 PS
	Starting Time	Within 40 seconds
	Starting System	Pneumatic System

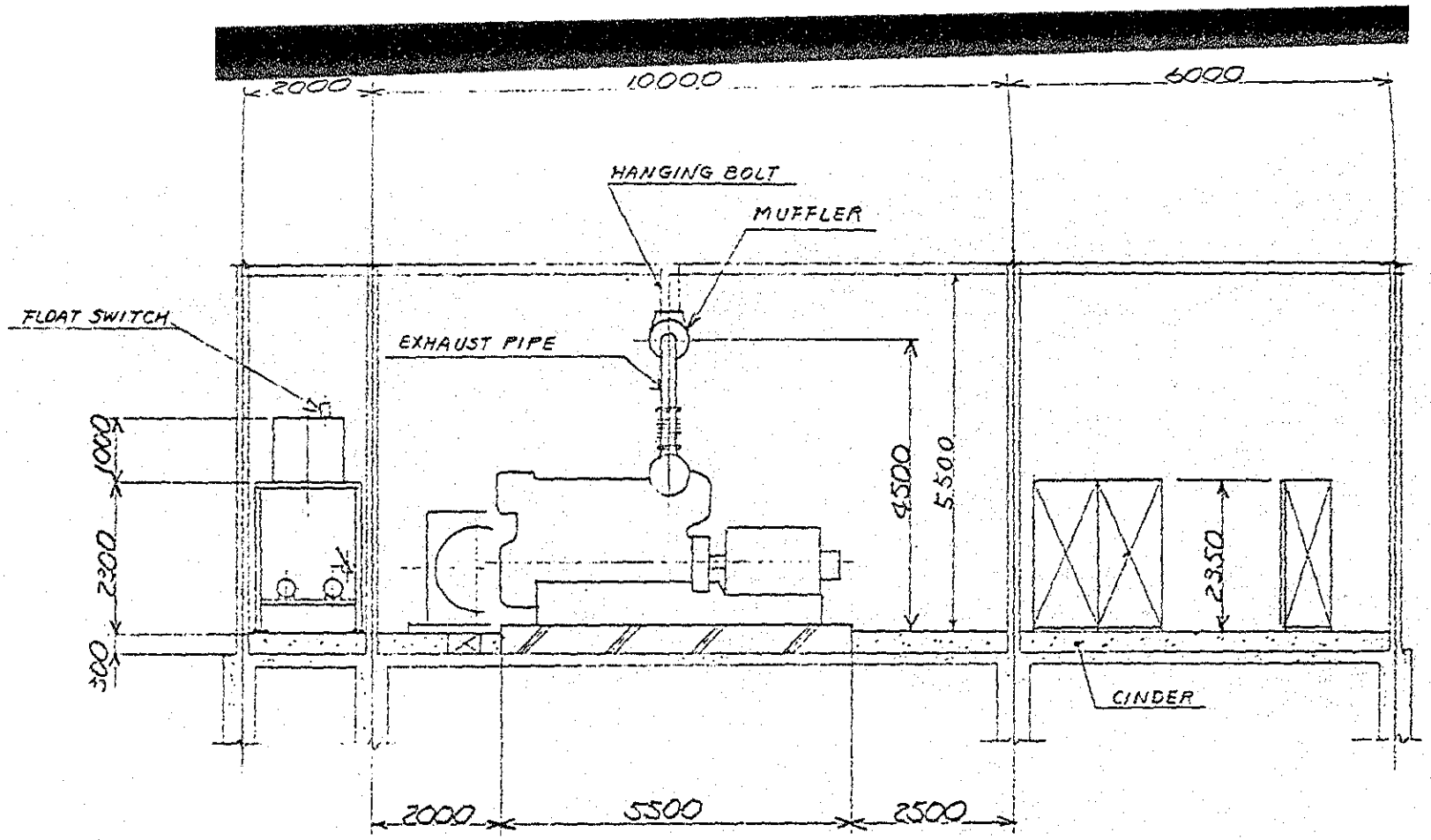
Prime mover	R. P. M.	Below 1000 r.p.m.
	Rated Time	More than 72 hours
	Cooling system	Radiator System 220/380V 11KW
	Air Compressor	3-phase 220/380V 3.7KW
	Air Tank	150 l. with pressure switch
	Inflation Tank	100 l.
Fuel	Kind	A Heavy Oil
	Fuel Tank	1000 l.
	Fuel Pump	3-phase 220/380V 0.4 KW
Type of Board		Closed type
Control System		Hand Push Button System
Elevation		150 m
Heat Insulation Plate		Ceiling and Wall of Generator Room
Ventilating Fan		3-phase 220/380V 0.75 with automatic shutter hood



LAYOUT OF 500KVA GENERATOR ROOM SCALE 1/100

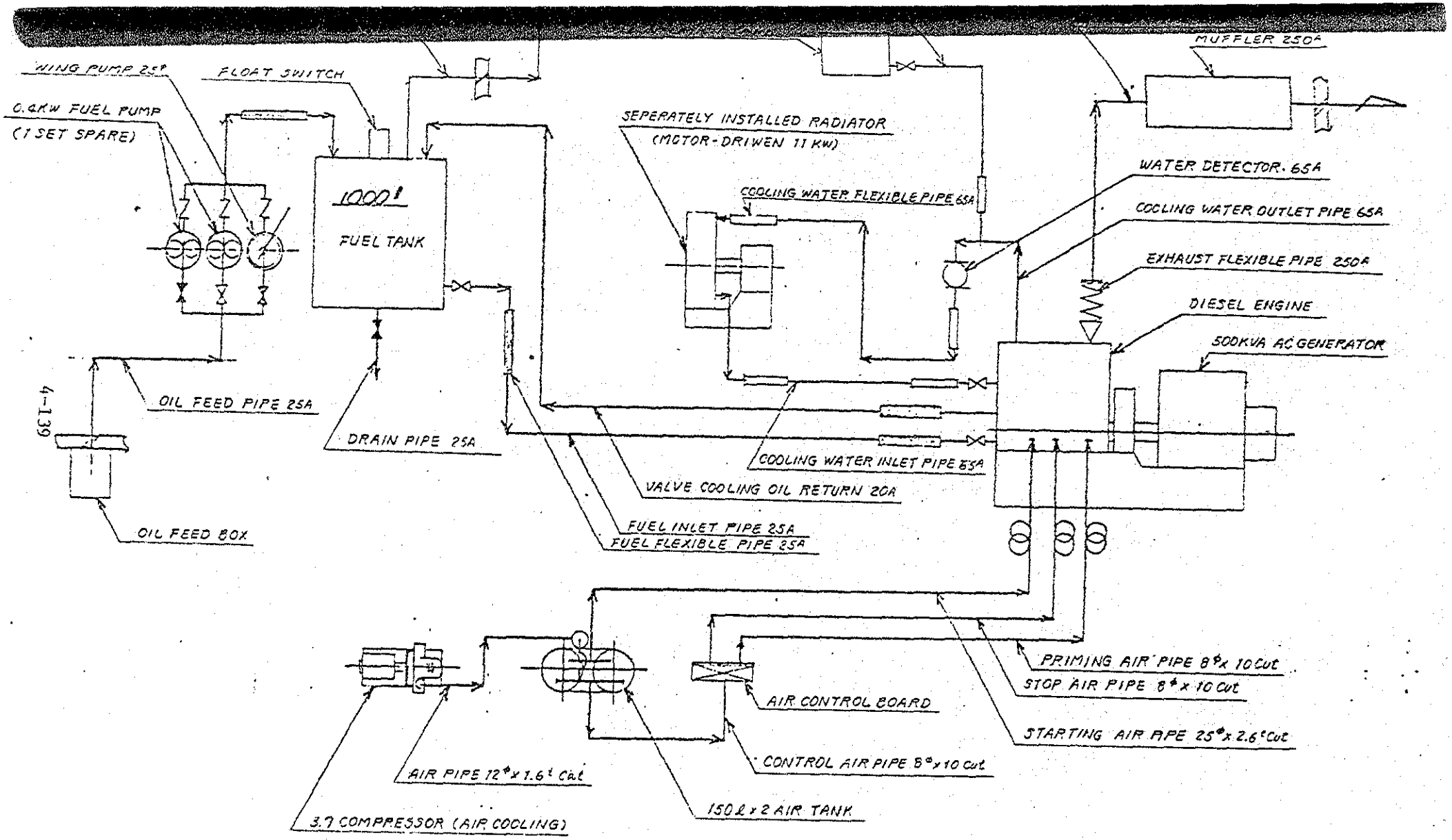
① GENERATOR TERMINAL BOX MAIN WIRING

BUS DUCT	: 21"×100"×4
"	: 12"×100"×4
EARTH	: 1v 38ϕ×1
EXCITATION	: CV 22ϕ×2C
② ENGINE TERMINAL BOX	: CVV 2ϕ×8C
③ FUEL PUMP	: CV 3.5ϕ×4C×2
④ FLOAT SWITCH	: CVV 2ϕ×6C
⑤ COMPRESSOR	: CV 5.5ϕ×4C
⑥ AIR CONTROL BOARD	: CVV 2ϕ×8C
⑦ RADIATOR	: CV 5.5ϕ×4C
⑧ VENTILATING FAN	: CV 3.5ϕ×4C×2

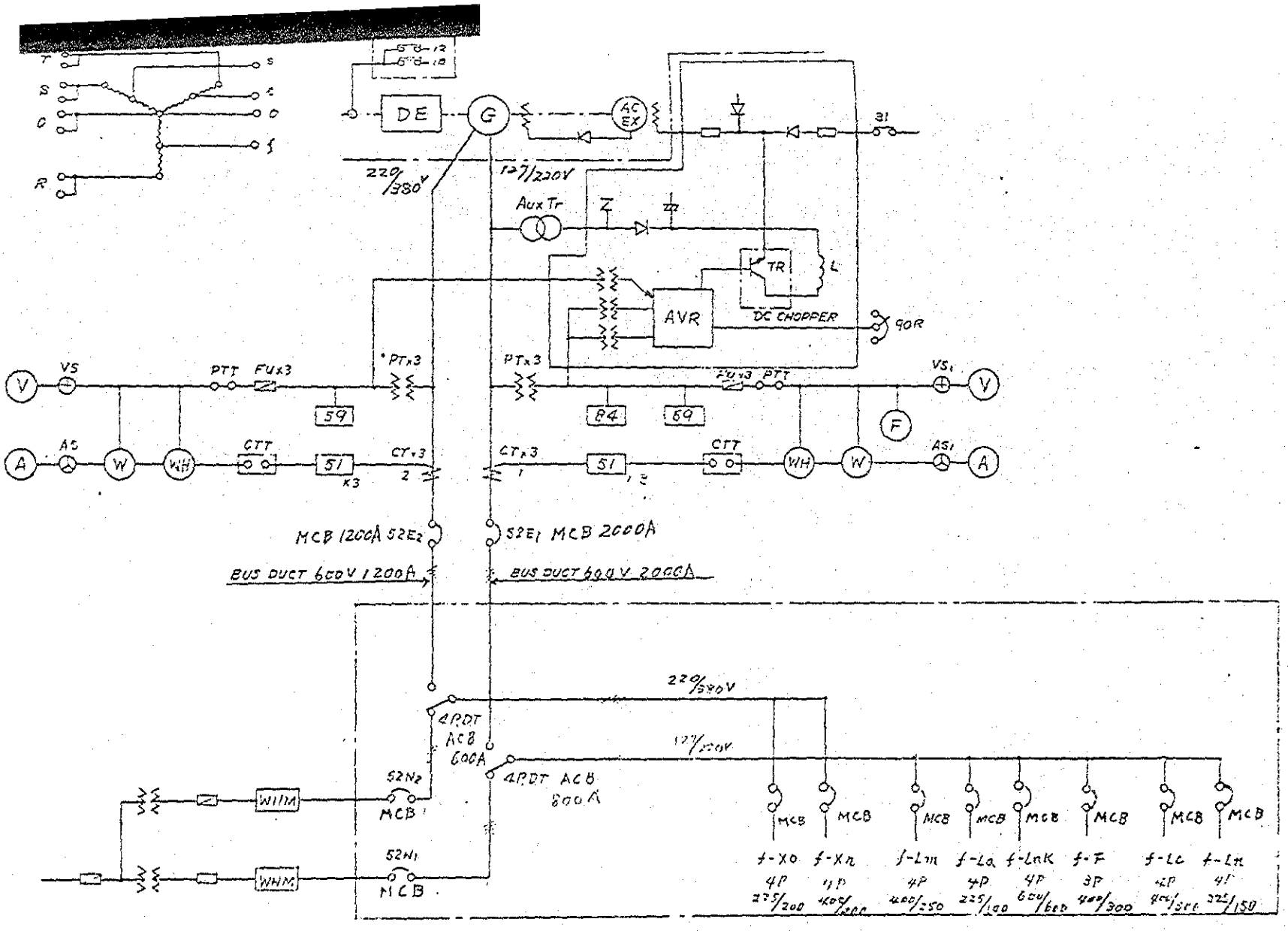


"A" ~ "A" SECTION

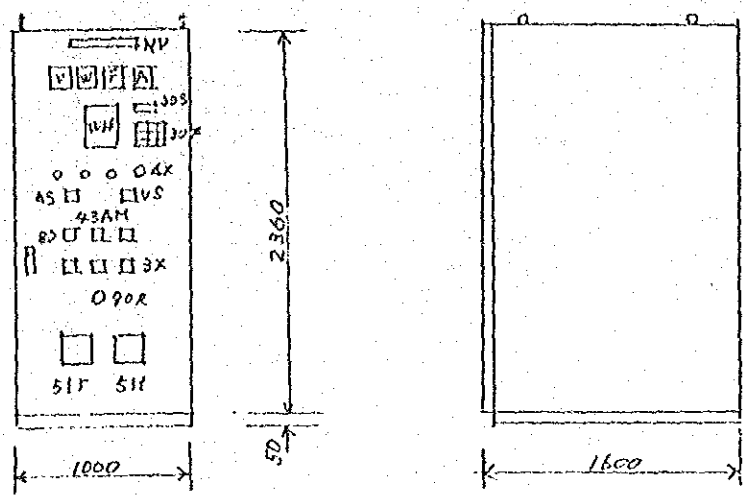
SECTIONAL VIEW OF 500KVA GENERATOR SCALE : 1/100



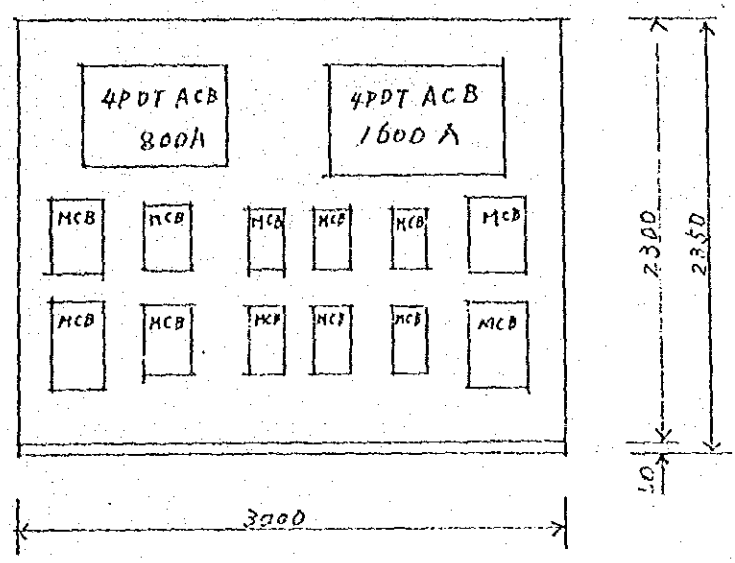
FLOW SHEET OF 500KVA GE ERATOR PIPING

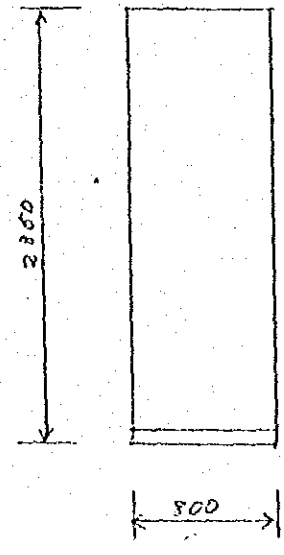


FLOW SHEET OF 500KVA 'RING



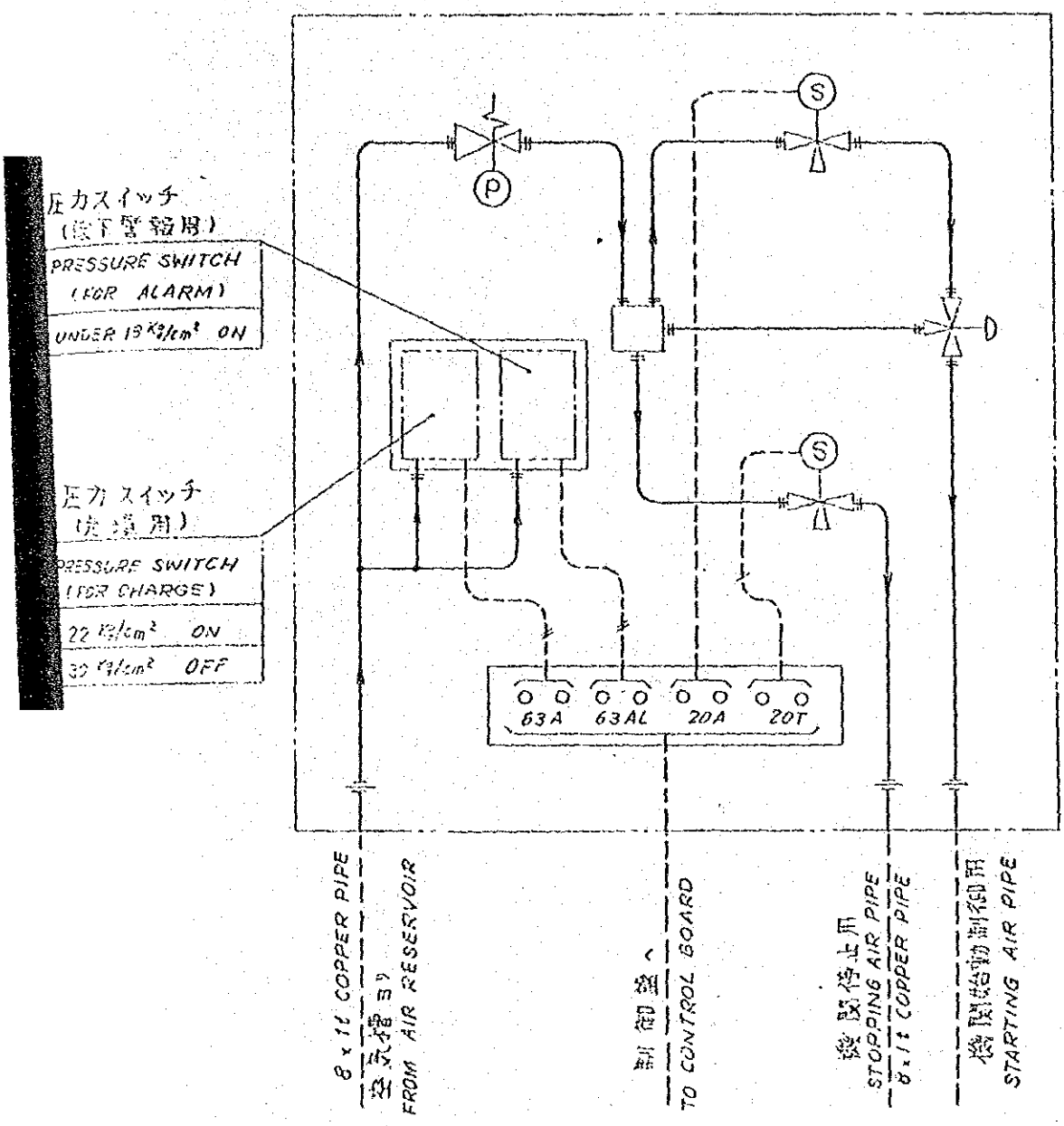
Symbol	Description
A	AC ammeter
W	Indicating Watt Meter
F	Frequency Meter
V	AC Voltmeter
WH	Electric Energy Meter
43 AM	Control Switch (Automatic-Manual)
8D	" (Control Power Source)
90R	Voltage
5/r 51t	Overcurrent Relay
3x	Push Button Switch (Lamp Test)
3x	" (Trouble Return)
3x	" (Alarm Stop)





DISTRIBUTION BOARD

MODEL : ML · RL · UL · GL · ZL · AL



AIR CONTROL BOARD

Special Specifications of Independent Power Plant Facilities Works

1. RS Tartung

2. Matters to Apply

Matters which are not mentioned in this specifications and drawing should be according to the common specifications of Independent Power Plant Facilities Works.

3. Specifications of Independent Power Plant Facilities Works.

AC Generator	Type	Horizontal Synchronous AC Generator
	Rated Output	250 KVA
	Rated Voltage	127/220V and 220/380V
	Number of phase and frequency	3-phase 4-line system 50 Hz
	R. P. M.	Below 1000 r.p.m.
	Power-factor	Above 80%
	Class of Insulation	Above Kind B
	Rated Time	Continuous Rating
	Starting Time	Within 40 seconds
	Excitation System	Brushless System
	Type	Single-acting 4-cycle Diesel Engine
	Rated Output	Above 300 PS
	Starting Time	Within 40 seconds
	Starting System	Pneumatic System

Prime Mover	R. P. M.	Below 1000 r.p.m.
	Rated Time	More than 72 hours
	Cooling System	Radiator System
	Air Compressor	3-phase 220/380V 3.7KW
	Air Tank	150 l. with pressure switch
	Inflation Tank	100 l.
Fuel	Kind	A Heavy Oil
	Fuelt Tank	600 l.
	Fuel Pump	3-phase 220/380V 0.4KW
Type of Board		Closed Type
Control System		Hand Push Button System
Elevation		1200 m
Heat Insulation Plate		Ceiling and Wall of Generator Room
Ventilating Fan		3-phase 220/380V 0.75KW with automatic shutter hood

Special Specifications of Independent
Power Plant Facilities Works

1. RS Porsea

2. Matters to Apply

Matters which are not mentioned in this specifications and drawing should be according to the common specifications of Independent Power Plant Facilities Works.

3. Specifications of Independent Power Plant Facilities Works

AC Generator	Type	Horizontal synchronous AC Generator
	Rated Output	150KVA
	Rated Voltage	127/220V and 220/380V
	Number of phase and frequency	3-phase 4-line system 50 Hz
	Power-factor	Above 80%
	Class of Insulation	Above Kind B
	R. P. M.	Below 1500 r.p.m.
	Rated Time	Continuous Rating
	Starting Time	Within 40 seconds
	Excitation System	Brushless System
	Type	Single-acting 4-cycle Diesel Engine
	Rated Output	Above 180 PS
	Starting Time	Within 40 seconds
	Starting System	Pneumatic System

Prime Mover	R. P. M.	Below 1500 r.p.m.
	Rated Time	More than 72 hours
	Cooling System	Radiator System (Engine-driven fan)
	Air Compressor	3-phase 220/380V 0.4KW
	Air Tank	80.1 with pressure switch
Fuel	Kind	A Heavy Oil
	Fuel Tank	490 l.
	Fuel Oil Reservoir	5000 l.
	Fuel Pump	3-phase 220/380V 0.4KW
Type of Board		Close type
Control System		Hand Push Button System
Elevation		900 m
Heat Insulation Plate		Ceiling and Wall of Generator Room
Ventilating Fan		3-phase 220/380V with automatic shutter hood

Special Specifications of Independent
Power Plant Facilities Works

1. RS Pematang Siantar

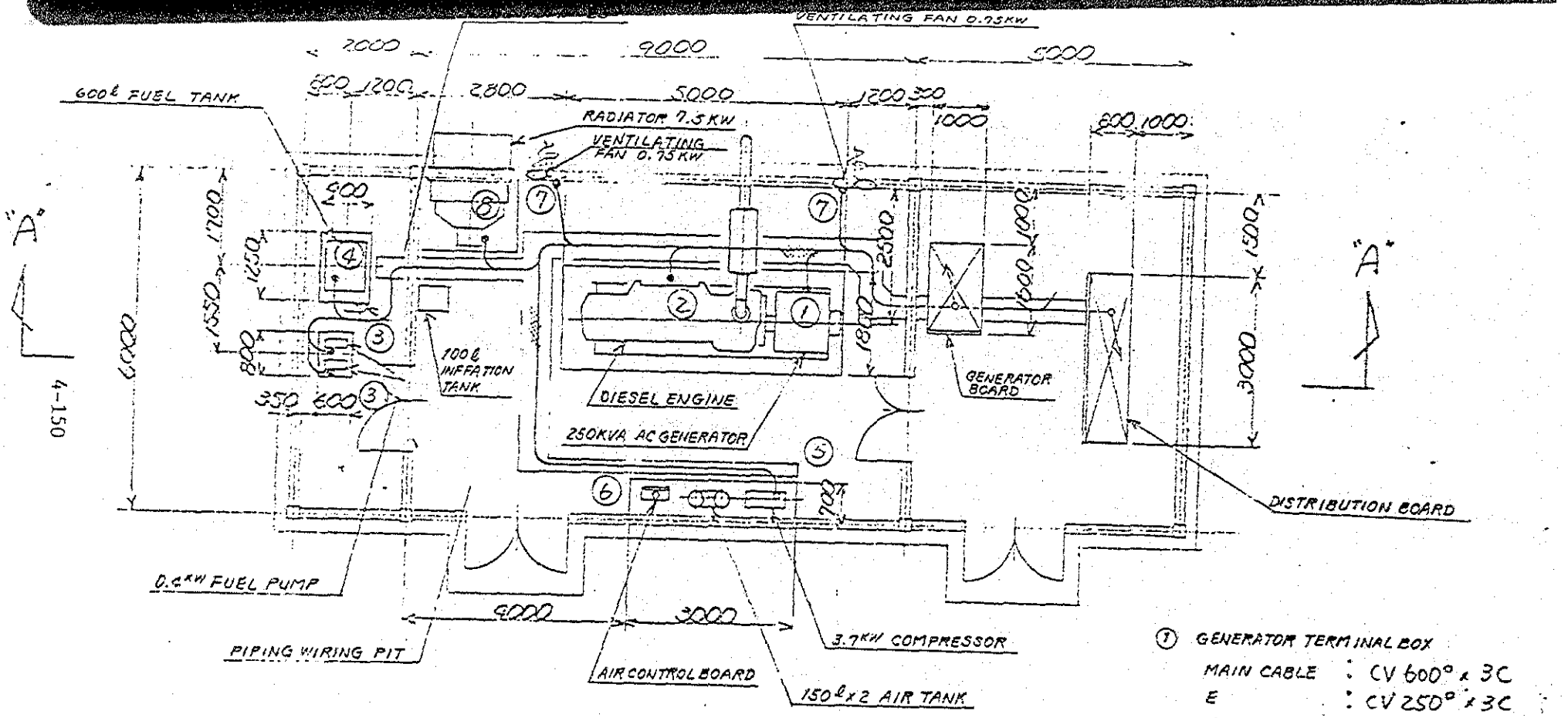
2. Matters to Apply

Matters which are not mentioned in this specifications and drawing should be according to the common specifications of Independent Power Plant Facilities Works.

3. Specifications of Independent Power Plant Facilities.

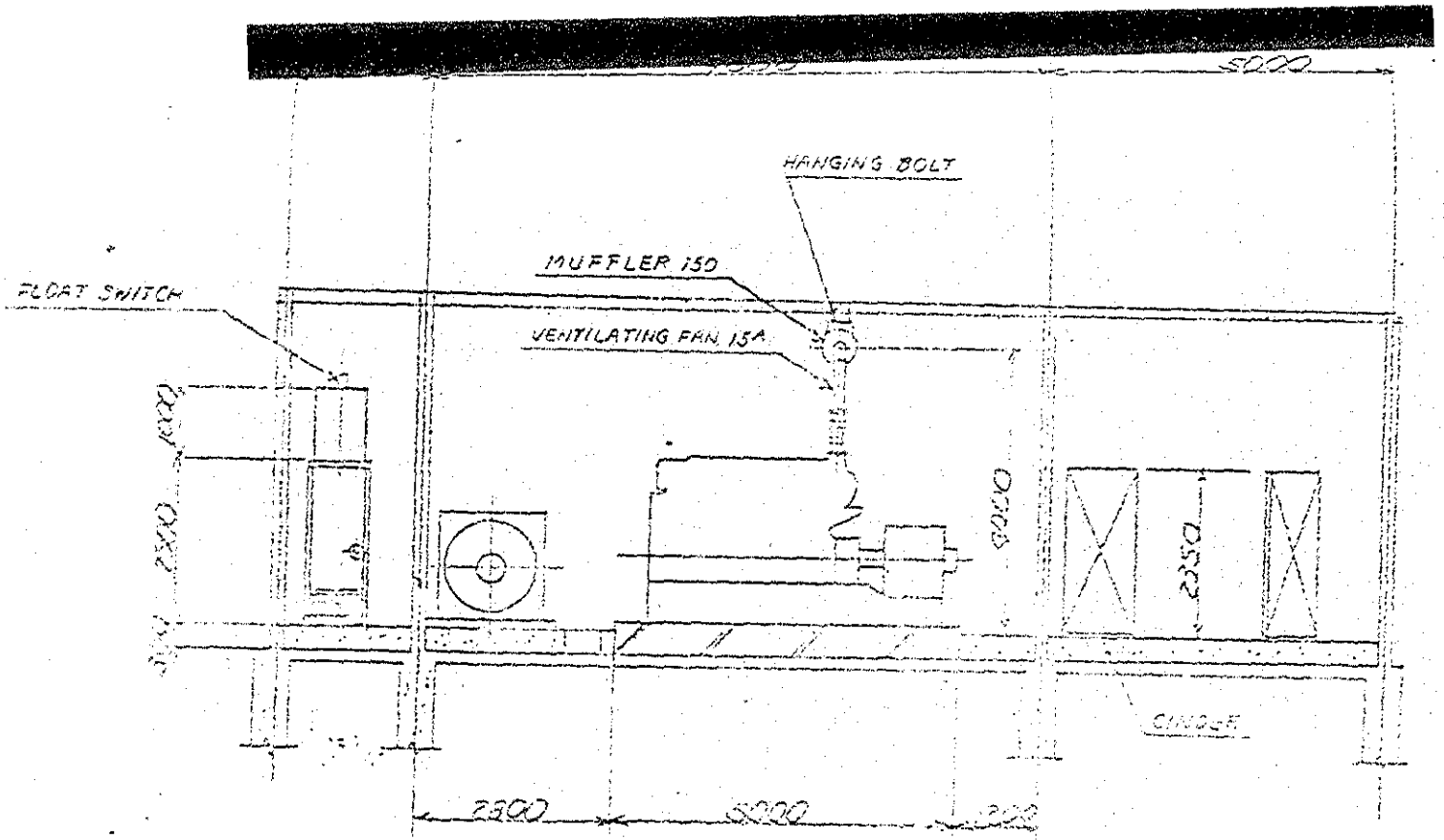
AC Generator	Type	Horizontal synchronous AC Generator
	Rated Output	250 KVA
	Rated Voltage	127/220V and 220/380V
	Number of phase and frequency	3-phase 4-line system 50 Hz
	R. P. M.	Below 1000 r.p.m.
	Power-Factor	Above 80%
	Class of Insulation	Above Kind B
	Rated Time	Continuous Rating
	Starting Time	Within 40 seconds
	Excitation System	Brushless System
	Type	Single-acting 4-cycle Diesel Engine
	Rated Output	Above 300 PS
	Starting Time	Within 40 seconds
	Starting System	Pneumatic System

Prime Mover	R. P. M.	Below 1000 r.p.m.
	Rated Time	More than 72 hours
	Cooling System	Radiator system 220/380 V. 7.5KW
	Air Compressor	3-phase 220/380V 3.7KW
	Air Tank	150 l.
	Inflation Tank	100 l.
Fuel	Kind	A Heavy Oil
	Fuel Tank	600 l.
	Fuel Pump	3-phase 220/380V 0.4 KW
Type of Board		Closed type
Control System		Hand Push Button System
Elevation		400 m
Heat Insulation Plate		Ceiling and Wall of Generator Room
Ventilating Fan		3-phase 220/380V. 0.75KW with automatic shutter Hood



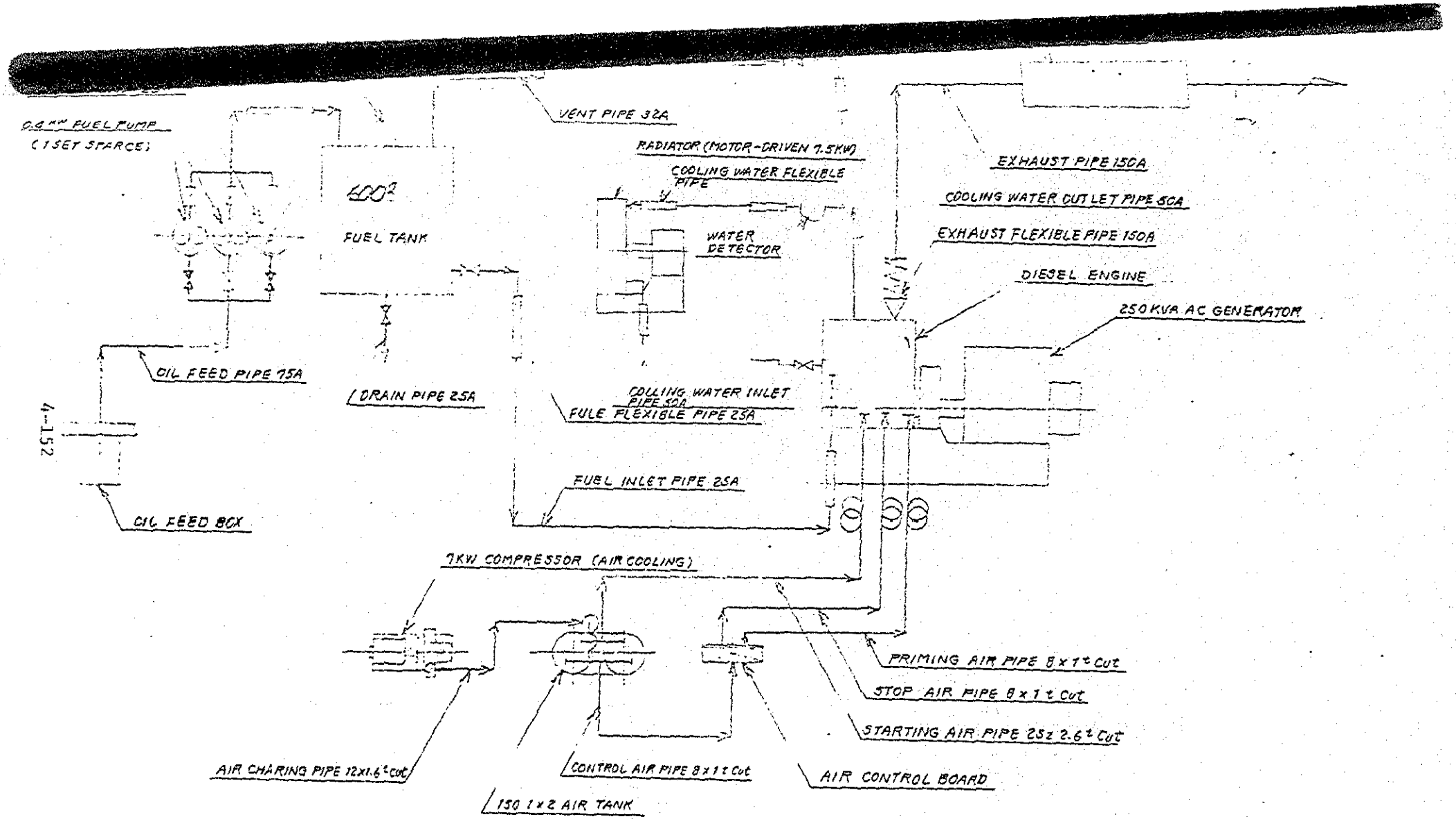
LAYOUT OF 250KVA GENERATOR ROOM SCALE: 1/100

①	GENERATOR TERMINAL BOX	
	MAIN CABLE	: CV 600° x 3C
	E	: CV 250° x 3C
	EARTH	: IV 38° x 1C
	EXCITATION	: CV 22° x 2C
②	ENGINE TERMINAL BOX	: CVV 2° x 8C
③	FUEL PUMP	: CV 3.5° x 4C x 2
④	FLOAT SWITCH	: CVV 2° x 6C
⑤	COMPRESSORE	: CV 5.5° x 4C
⑥	AIR CONTROL BOARD	: CVV 2° x 8C
⑦	VENTILATING FAN	: CV 3.5° x 4C x 2
⑧	RADIATOR	: CV 5.5° x 4C

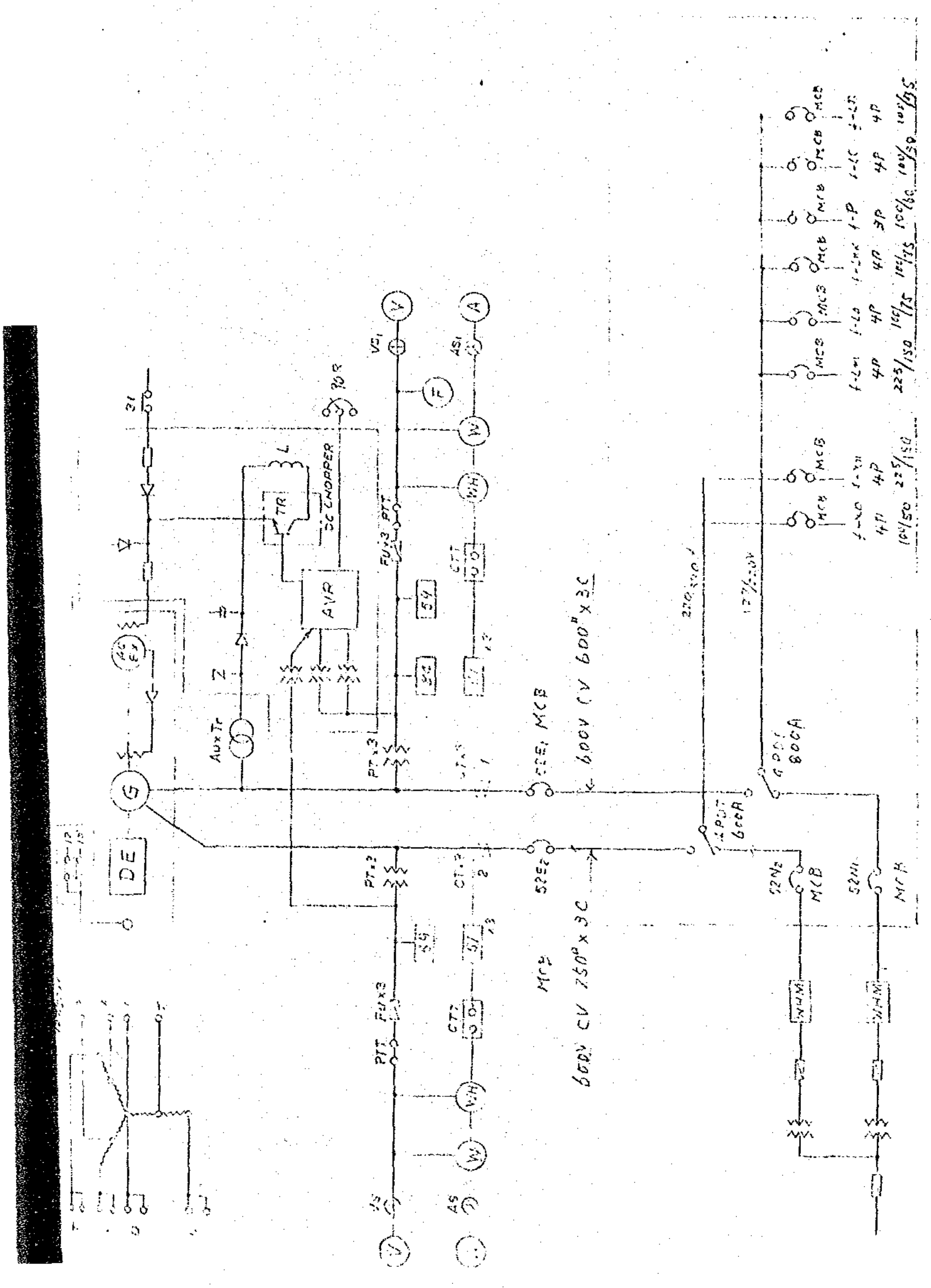


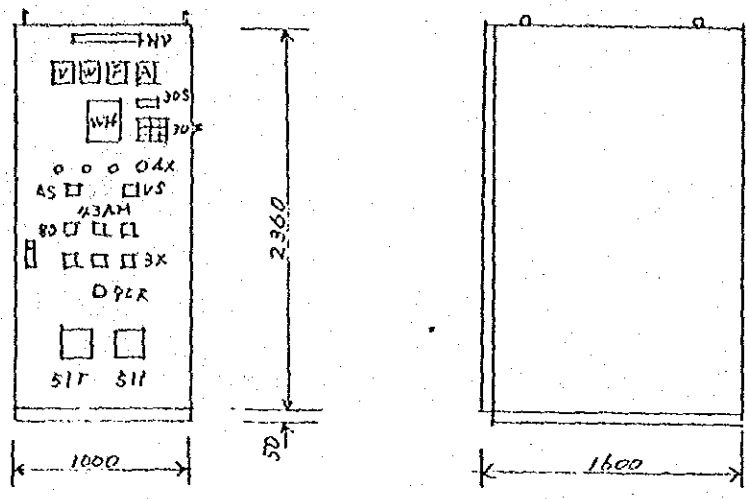
"A" ~ "A" SECTION

SECTIONAL VIEW OF 250KVA GENERATOR SCALE 1:100

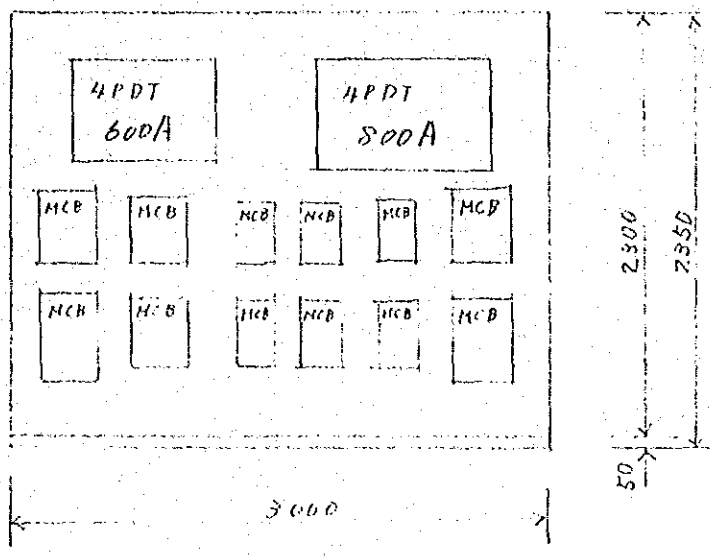


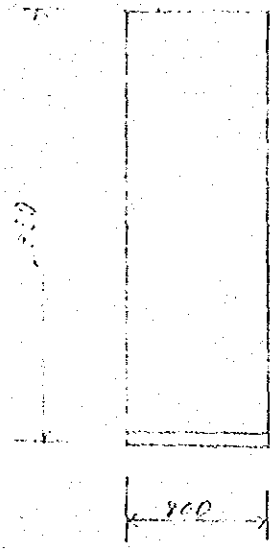
FLOW SHEET OF 250 KVA GENERATOR PIPING


DE
AVR
DC CHOPPER
AuxTr
MCB
FROM SHEET
WIRING



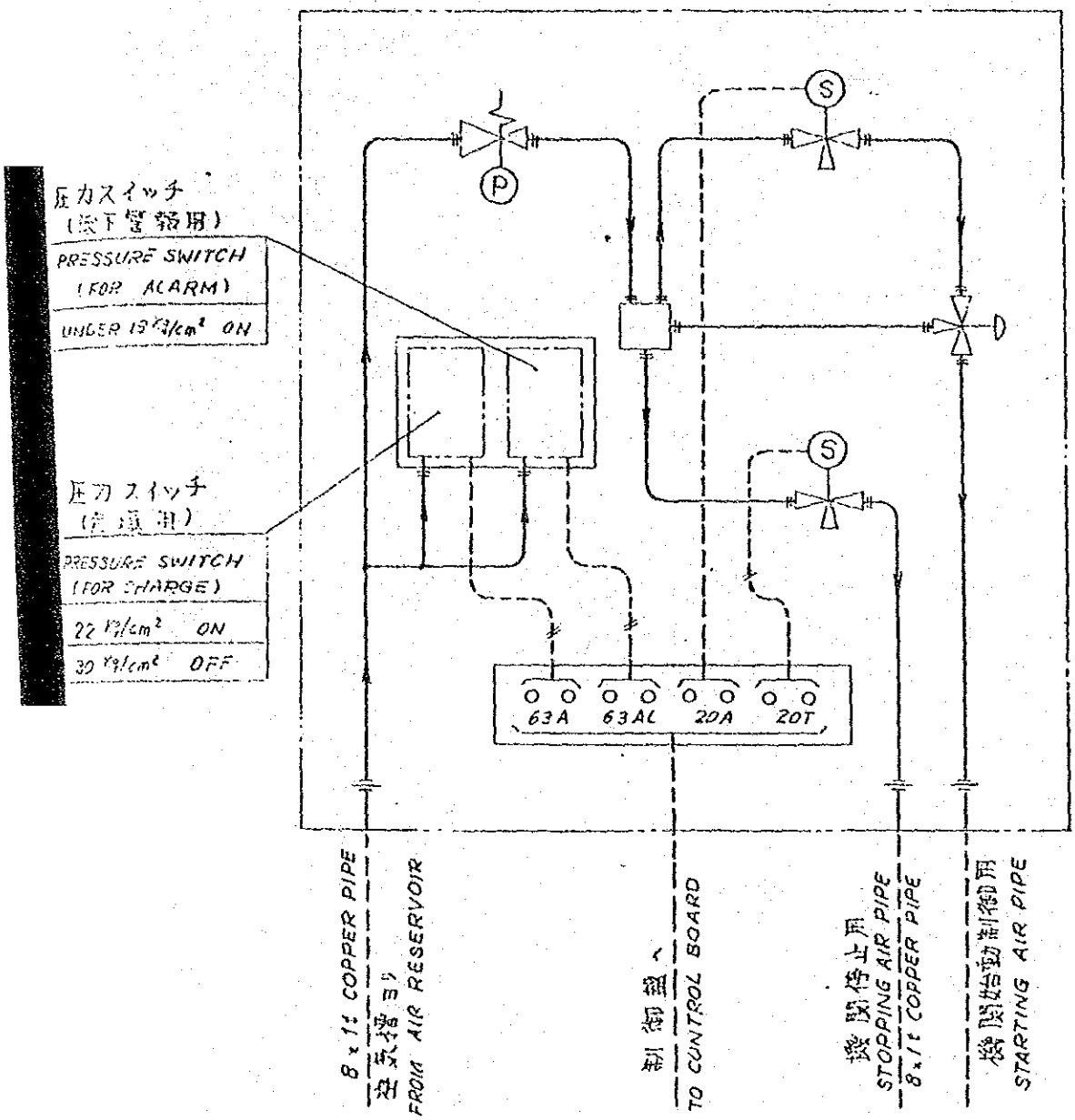
Symbol	Description
A	AC ammeter
W	Indicating Watt Meter
F	Frequency Meter
V	AC Voltmeter
WH	Electric Energy Meter
43 AM	Control Switch (Automatic-Manual)
8D	" (Control Power Source)
90R	Voltage
5/r 51t	Overcurrent Relay
3x	Push Button Switch (Lamp Test)
3x	" (Trouble Return)
3x	" (Alarm Stop)





DISTRIBUTION BOARD

MODEL : ML · RL · UL · GL · ZL · AL



AIR CONTROL BOARD

Special Specifications of Independent
Power Plant Facilities Works

1. RS Tebing Tinggi

2. Matters to Apply

Matters which are not mentioned in this specifications and drawing should be according to the common specifications of Independent Power Plant Facilities Works.

3. Specifications of Independent Power Plant Facilities Works

AC Generator	Type	Horizontal synchronous AC Generator
	Rated Output	150 KVA
	Rated Voltage	127/220V and 220/380V
	Number of phase and frequency	3-phase 4-line system 50 Hz
	R. P. M.	Below 1500 r.p.m.
	Power-factor	Above 80%
	Class of Insulation	Above Kind B
	Rated Time	Continuous Rating
	Starting Time	Within 40 seconds
	Excitation System	Brushless System
	Type	Single-acting 4-cycles Diesel Engine
	Rated Output	Above 180 PS
	Starting Time	Within 40 seconds
	Starting System	Pneumatic System

Prime Mover	R. P. M.	Below 1500 r.p.m.
	Rated Time	More than 72 hours
	Cooling System	Radiator System (Engine Driven fan)
	Air Compressor	3-phase 220/380V 3.7KW
	Air Tank	80 l. with pressure switch
Fuel	Kind	A Heavy Oil
	Fuel Tank	490 l.
	Fuel Pump	3-phase 220/380V. 3.7 KW
Type of Board		Closed type
Control System		Hand Push Button System
Elevation		200 m
Heat Insulation Plate		Ceiling and Wall of Generator Room
Ventilating Fan		3-phase 220/380V with automatic shutter hood

Special Specifications of Independent
Power Plant Facilities Works

1. RS Tanjung Balai

2. Matters to Apply

Matters which are not mentioned in this specifications and drawing should be according to the common specifications of Independent Power Plant Facilities Work.

3. Specifications of Independent Power Plant Facilities.

AC Generator	Type	Horizontal Synchronous AC Generator
	Rated Output	150 KVA
	Rated Voltage	127/220V and 220/ 380V
	Number of phase and frequency	3-phase 4-line system 50 Hz
	R. P. M.	Below 1500 r.p.m.
	Power-factor	Above 80%
	Class of Insulation	Above Kind B
	Rated Time	Continuous Rating
	Starting Time	Within 40 seconds
	Excitation System	Brushless System
	Type	Single-acting 4-cycle Diesel Engine
	Rated Output	Above 180 PS
	Starting Time	Within 40 seconds
	Starting System	Pneumatic System

Prime Mover	R. P.M.	Below 1500 r.p.m.
	Rated Time	More than 72 hours
	Cooling system	Radiator System (Engine driven fan)
	Air Compressor	3-phase 220/380V 3.7KW
	Air Tank	80 l. with pressure switch
Fuel	Kind	A Heavy Oil
	Fuel Tank	490 l.
	Fuel Pump	3-phase 220/380V 0.4KW
Type of Board		Closed type
Control System		Hand Push Button System
Elevation		150 m
Heat Insulation Plate		Ceiling and Wall of Generator Room
Ventilating Fan		3-phase 220/380V 0.75KW with automatic shutter hood

Special Specifications of Independent
Power Plant Facilities Works

1. RS Kisaran

2. Matters to Apply

Matters which are not mentioned in this specifications and drawing should be according to the common specifications of Independent Power Facilities Works.

3. Specifications of Independent Power Facilities Works

AC Generator	Type	Horizontal Synchronous AC Generator
	Rated Output	250 KVA
	Rated Voltage	127/220V and 220/380V
	Number of phase and frequency	3-phase 4-line system 50 Hz
	R. P. M.	Below 1000 r.p.m.
	Power-factor	Above 80%
	Class of Insulation	Above Kind B
	Rated Time	Continuous Rating
	Starting Time	Within 40 seconds
	Excitation system	Brushless System
	Type	Single-acting 4-cycle Diesel Engine
	Rated Output	Above 300 PS
	Starting Time	Within 40 seconds
	Starting System	Pneumatic System