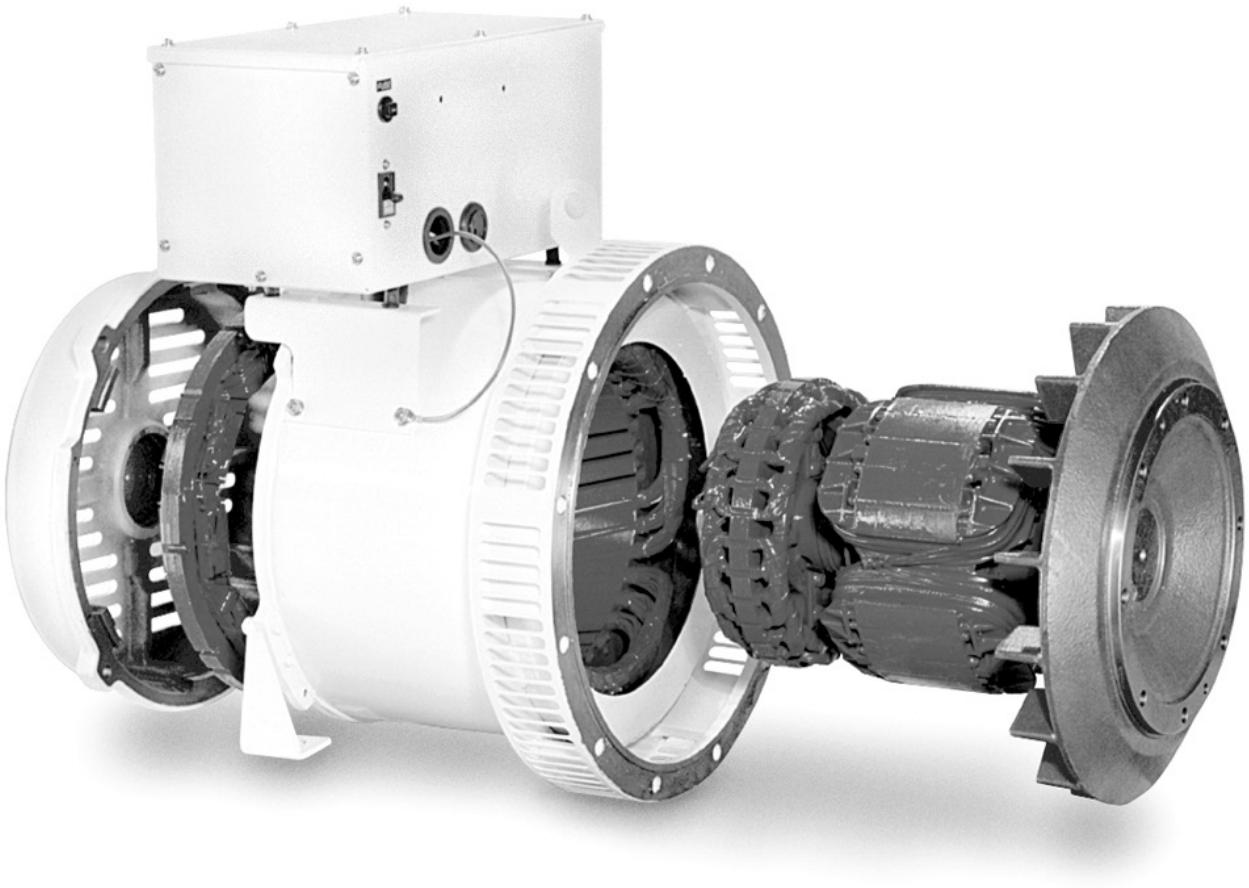
OPERATOR'S & PARTS MANUAL

PX-300K1 SERIES A.C. GENERATORS



NORTHERN LIGHTS

For Generator Models:

PX-308K1, PX309K1, PX-310K1, PX-312K1, PX-316K1, PX-320K1, PX-325K1, and PX-332K1

— CALIFORNIA —
Proposition 65 Warning:

Diesel engine exhaust and some of its constituents are known to the State of California to cause cancer, birth defects, and other reproductive harm.

NORTHERN LIGHTS

Northern Lights
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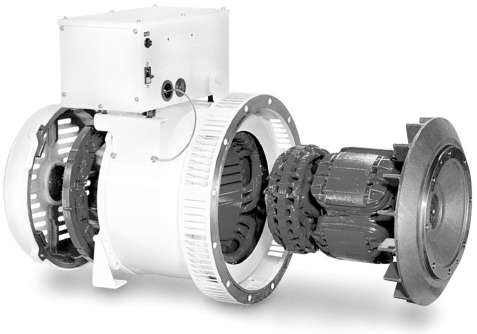
Printed in U.S.A.
PART NO.: OPX300K1 03/15

*Note: 03/2015 revisions: covers. No internal information altered.



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PX-300K1 SERIES A.C. GENERATORS

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Read this manual thoroughly before starting your equipment.
This manual contains information needed to operate your set correctly and safely.

Table of Contents

Introduction

This manual describes procedures for operation, maintenance, inspection and adjustment. It will help the operator realize peak performance through effective, economical and safe operation.

- Read this manual carefully BEFORE operating the generator.
- Study this manual until proper operation becomes personal habit.
- Operation, inspection, and maintenance should be carried out carefully. Safety must be given the first priority.

Safety Rules

- To insure years of trouble-free operation, the specified maintenance is important and should be performed.
- **Electrical equipment should always be kept clean.** Oil, dust, moisture and salt are all harmful to generators.
- **Be careful with electricity**. Do not touch rotating parts.
- **Ambient Environmental Conditions**
  a) **Gas**: Do not use in an environment of corrosive or flammable gas (gasoline, hydrogen sulfide, methane gas, etc.)
  b) **Sandy Dust**: Do not use equipment in places with excessive sand and dust.
  c) **Humidity**: Do not use in very humid environments for long periods of time.
  d) **Salt/Seawater**: Protect your generator from exposure to salt, water, and water vapor.
- **Insulation Resistance and Dielectric**: When measuring insulation resistance and dielectric, be sure to disconnect the AVR and rectifier.
- Be sure that the regulator is shut off by switching the CPR (circuit breaker) on the AVR to the off position when the unit is running at less than rated speed, or when the unit is to be run but no power generation is required.
- Before starting your generator, be sure operating conditions are safe.
- Ventilation: When selecting the installation site, be sure that the area is well ventilated and that ambient temperature does not exceed 40°C. If the temperaure exceeds 40°C, de-rate the generator output as per “data sheet” for operation.
- Be sure to provide generator with cover and protection when operating outside.

PX-300K Series AC generators are based on BS 4999 part 20 and IEC34-5, IP21.

Model and Serial Numbers

GENERATOR END MODEL NUMBERS

Generator Set Model No..... PXK Generator Model

M and NL753K	PX-308K1
M and NL773L	PX-309K1
M and NL843JK	PX-310K1
M and NL843NK	PX-312K1
M844K	PX-316K1
M844LK	PX-320K1
M864	PX-325K
M984	PX-332K1

SERIAL NUMBERS

- When referencing Northern Lights equipment by serial number, it is important to differentiate between the engine, generator end and generator set serial numbers.
- The engine serial number is either on a metal tag or stamped directly into the engine block.
- The generator END serial number is on a metal tag attached to the generator end.
- The generator SET serial number is on a separate metal tag attached to the generator end. It may be a five by one inch tag installed directly below the generator end tag. Or, it may look like the illustrations below. Please use the generator SET number in correspondence or when ordering parts.

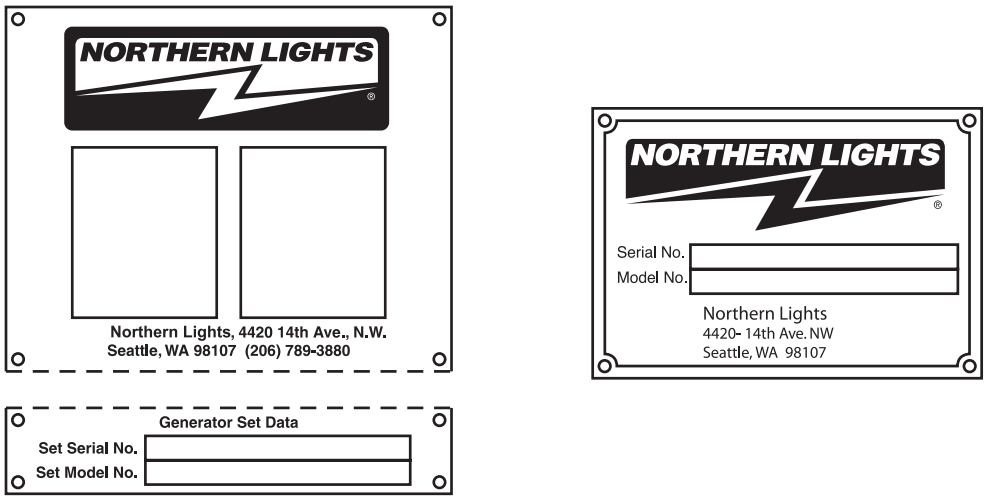


Figure 1: Generator Set Serial Number Plate

Mechanical Construction

STATOR
The stator frame is fabricated from rolled steel. The round construction provides rigidity and strength to resist excessive mechanical shocks. The stator core is made of high quality silicon steel plates coated with insulating film for prevention of eddy currents. The core is positioned along the internal surface of the frame. The exciter field core is made of special steel plates capable of retaining a high degree of residual magnetism.

BEARINGS
The long-life ball bearings are sealed to prevent grease from escaping and to keep dirt out.

ROTOR
The rotor shaft is made of high quality carbon steel, and is designed and manufactured to be mechanically durable. The rotor is a salient revolving field type with the main field core made from special steel plates having superior magnetic characteristics. The field core elements, exciter rotor, rotary rectifier and cooling fan are integral parts of the same shaft.

VENTILATION
Cooling is provided by the cooling fan of the rotor through suction ports and exhausted through outlet ports. Every machine conforms to the cooling code ICO1 of BS.

Initial Inspection and Coupling

INITIAL INSPECTION
If the generator is stored for long periods of time, store in a clean, dry, ventilated area. After extensive storage time, check the resistance of the coil insulation in accordance with this manual (see **MAINTENANCE**, page 9) before operation. Be sure there are no abnormal sounds or any overheating during operation. It is recommended that standby generators utilize a space heater (optional) in order to keep the coil insulation in optimum working condition.

COUPLING BOLT SPECIFICATIONS
The Coupling Bolt Torque for all PX-300K series models is **32 lbs.ft.**

COUPLING WITH PRIME MOVER
PX-300K series single bearing generators make centering and direct coupling easy. Shim the generator legs as needed for proper leveling. Coupling bolt size and torque will vary according to the engine manufacturer. The bolt torque for attaching the coupling plates to the generator rotor are shown in **COUPLING BOLT SPECIFICATIONS**, above.

GROUNDING
The generator frame should be electrically grounded to the base of the generator set. The neutral is not grounded to the frame unless specified.

Performance and Function

EXCITATION SYSTEM

The excitation system of the PX-300K Series generator uses an Automatic Voltage Regulator (AVR) which uses a portion of the output power to supply controlled DC power to the exciter field (EX) as show in Figure 2. When DC power is supplied to the exciter field, output from the exciter armature is rectified by a 3-phase bridge rotary rectifier (Si) and supplied to the main field coils. See Figure 2.

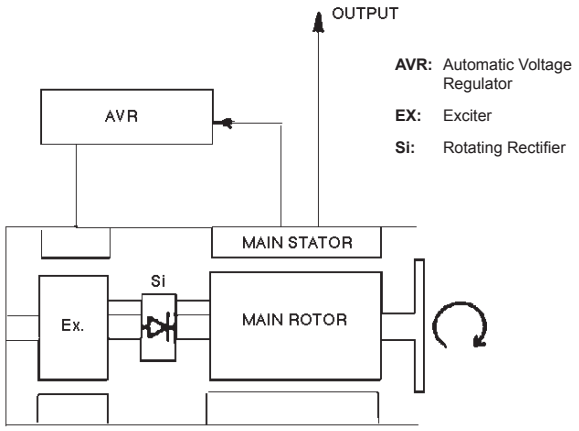


Figure 2: PX-300K Block Diagram

AUTOMATIC VOLTAGE REGULATOR (AVR)

The PX-300K Series generators use a DST-51 AVR. This is a compact voltage regulator for generators with an output up to 50kW. The DST-51 can be used in 120V single phase applications and is installed inside the generator junction box.

The DST-51 obtains sensing input from the main stator coils and compares the rectified value of the sensing voltage with the reference voltage produced inside the AVR. Input power is obtained from the main stator.

Rectified output power to the exciter field is controlled by switching a transistor on and off. This AVR will control terminal voltage even if the input sine wave is distorted.

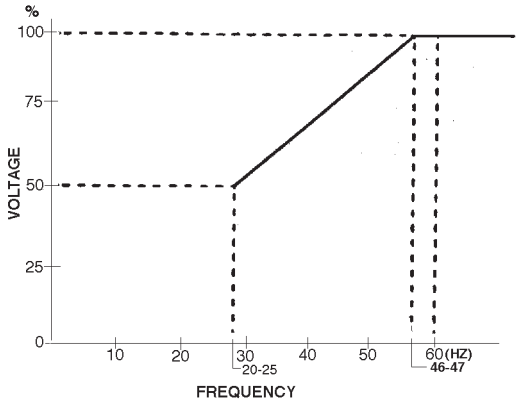


Figure 3: For 50 Hz

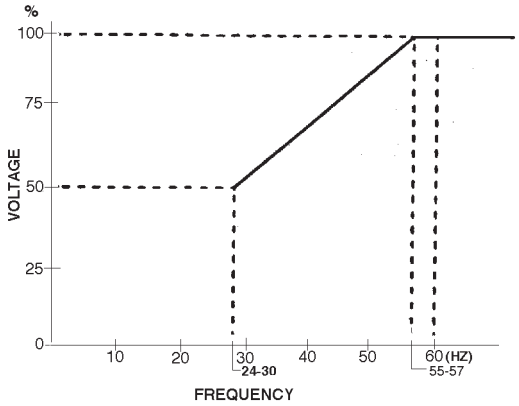


Figure 4: For 60 Hz

UNDER SPEED PROTECTION

A frequency sensing circuit is built into the AVR. When the generator speed drops to 90% of rated speed this circuit protects the AVR by reducing the voltage in proportion to the decrease in engine speed. In addition, when the generator is hit with a rapid overload, this circuit will lower the voltage to protect the engine. See Figures 3 & 4.

ROTARY RECTIFIER AND SURGE SUPPRESSOR

The rotary rectifier assembly, consisting of six diodes, functions as a 3-phase full wave rectifier for the output of the exciter armature and supplies this to the main field. To protect the diodes from large, instantaneous voltage surges, surge absorbers are provided as part of the rotating rectifier assembly.

Characteristics

VOLTAGE REGULATION

Generator terminal voltage regulation is within ±1% of the rated voltage in lagging power factor. 1.0 to 0.8, when the load is varied gradually from no load to full load. This value includes the temperature drift and rotating variation.

RESPONSE

After supplying a load instantaneously, the generator voltage should be restored to the steady condition in accordance with BS4999 Part 40, grade VR2.11 to VR2.23.

VOLTAGE STABILITY

In constant load and engine speed, voltage stability remains 0.25% of the rated voltage.

MOTOR STARTING

The generator is capable of enduring up to 300% of the rated current for 10 seconds at power factor of 0.

SHORT CIRCUIT

PX-300K Series AC generators can provide over 300% of the rated current for a short period of time, with an excitation support system (optional).

PHASE ROTATION

Phase sequence is T1-T2-T3 (U-V-W, A-B-C) with a counterclockwise rotation of generator viewed from the anti-coupling side.

Standard Voltage Tables and Connection Diagrams

Standard voltage selection table and connection diagram for PX-300K Series 1-phase 4-wire and 3-phase 12-wire AC generators. See Page 24.

Winding Connection	*Frequency*	*Voltages*			
3 Phase Series Star (High Wye)	60 Hz	480/277	460/266	440/254	416/240
	50 Hz	415/240	400/231	380/219	
3 Phase Parallel Star (Low Wye)	60 Hz	240/139	230/133	220/127	208/120
	50 Hz	208/120	200/115	190/110	
1 Phase	60 Hz	120/240			
	60 Hz	120			
1 Phase	50 Hz	100/200	110/220	115/230	120/240
	50 Hz	110			

Figure 5: Standard Voltage Table

Operation – Generator Set

STARTING

Before starting generator, check the following:

1. Make sure that the wiring is correct.
2. Be sure that nothing is blocking the air inlet/ outlet.
3. Make sure that the inside of the generator is clean.
4. Be sure the main line circuit breaker is switched OFF.

After checking each of the above, start the genertor in the following procedure:

1. Start engine in accordance with instructions in the Operator's Manual. Be sure there is no abnormal sound or vibration.
2. The voltage will rise due to the increase in generator speed. After making sure that each interphase voltage is balanced, set the voltage and frequency to the rated level. Be sure the CPR switch is "ON". The voltage will not rise with CPR "OFF".
3. After running the generator without load, switch the circuit breaker ON to start the load operation.

VOLTAGE ADJUSTMENT

The generator has been adjusted to obtain optimum voltage at the factory. If the voltage is different, adjust the voltage with the Voltage Adjust provided on the AVR.

RUNNING

Check the following while operating the generator:

1. Abnormal vibration and/or sound
2. Load
3. Environment:

Keep the air inlet/outlet clean and clear for optimum cooling. Insufficient cooling causes overheating of the generator.

Note: *When a 3-phase generator is used at single phase load, each phase current should be balanced and should not exceed 50% of the rated current. In addition, allowable unbalanced load is listed on the Data Sheet.*

STOPPING

After putting the running generator in a no-load condition by removing the generator load, stop the engine in accordance with the Engine Manual.

Operation – Automatic Voltage Regulator

SAFETY RULES

- Do not leave AVR connected when testing generator with high-pot or megger.
- Adjust the engine only when the CPR is in "OFF" position.

OPERATION

1. Make sure the wiring is correct.
2. Make sure the frequency selection switch is set to the rated frequency (60 or 50 Hz).
3. To adjust the voltage turn the Voltage Adjust (VR1) counter-clock wise. Make sure the CPR is "ON".
   a. Start the engine with no load and increase the engine speed slowly to the rated level. The voltage will automatically build up (residual voltage: more than 10V).
   b. Adjust to the rated voltage using the Voltage Adjust (VR1).
   c. Make sure of the proper Volt/Frequency characteristic by reducing the generator speed.
   d. Make sure of voltage stability by switching the load "ON" or "OFF". Use the Stability Adjust (VR2).
   e. If you find no problem with the AVR, start the normal operation.

ADJUSTMENT

Each component of the AVR is adjusted at the factory to obtain optimum voltage. If readjustment is necessary, make sure the voltage, frequency, load, etc. are functioning properly after readjustment.

1. **Initial Excitation:** *For initial excitation use a DC12V or DC24V battery.*
   a. Stop the generator.
   b. Remove the AVR connectors.
   c. Connect the field terminal F(+) with the polarity (+) of battery and the terminal F (-) with the polarity (-) and excite AVR field for 2 or 3 seconds.
2. **Voltage Adjustment:**
   If the voltage output is low, increase the voltage by turning the Voltage Adjust (VR1) slowly clockwise.
3. **Stability:**
   If the voltage output is unstable, increase the voltage by turning the Stability Adjust (VR2) clockwise.
4. **Voltage and Frequency:**
   Voltage and Frequency (Hz) have been preset at the factory.

Maintenance

BEARING INSPECTION

For bearing inspection, make sure that there is no abnormal sound during normal running and no overheating. Greasing is not necessary for generators using the double seal type ball bearings, but these will need to be replaced after every 10,000 hours of operation (see **PARTS REPLACEMENT METHOD**).

INSULATION RESISTANCE MEASUREMENT

If the generator has not been used for a long time, check the insulation resistance of each lead wire at 500V with a megger.

It is usually enough to check only the stator winding. In order to prevent damage to the AVR, disconnect it. If the measured insulation resistance value is above 2 M ohms, there is no problem, but if it is lower than that, check to see if the inside of the generator is wet or dirty. If dust has accumulated, blow it out with dry compressed air. Wipe off oil stains with a cloth. If the generator is damp, dry it and recheck.

ROTATING RECTIFIER ASSEMBLY

The rotating rectifier assembly needs little attention. Clean off dust and oil stains periodically. In the unlikely event that it becomes necessary to replace the diode elements and surge absorber elements. Refer to **PARTS REPLACEMENT METHOD**, Point 2.

PARTS REPLACEMENT METHOD

1. Bearing Replacement:
   a. In order to replace the bearing, first remove the bearing holder housing on the end of the generator. Loosen and remove the four housing bolts. Remove the bearing holder gently since there is a risk that the rotor could fall and damage the exciter rotor or the exciter stator.

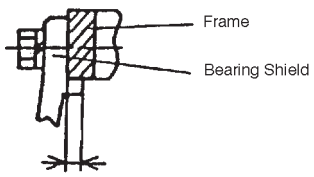


Figure 6. Pilot Length

   b. Using a bearing puller, extract bearing from shaft.
   c. When installing a new bearing, place a steel pipe on the inner race surface, and fit the bearing by tapping it lightly with a hammer.

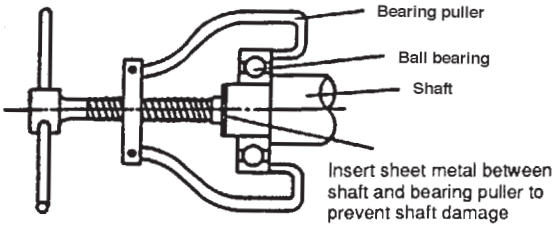


Figure 7. Bearing Puller

Note: Absolutely do not apply pressure to outer race of the bearing during insertion.

Maintenance

2. Replacement of Rotary Rectifier Parts:
   a. Rotary rectifier parts are all located at the rear of Exciter rotor. For parts replacement, remove the bearing shield.
   b. To test the rotating rectifier diodes, disconnect the lead to the diode element and measure the resistance between the anode and cathode on each diode (see Figure 8).

Caution: Do not overheat the diodes. If the resistance value of the diode in the forward direction is low and the reverse direction resistance value shows infinity, it is good. If this is not the case, the diode element is defective and must be replaced. The diode elements can be damaged if overtightened.

   c. "J" type diode elements are fastened to the J(+) side of the rotating rectifier assembly, and "K" type diode elements to the K(-) side.

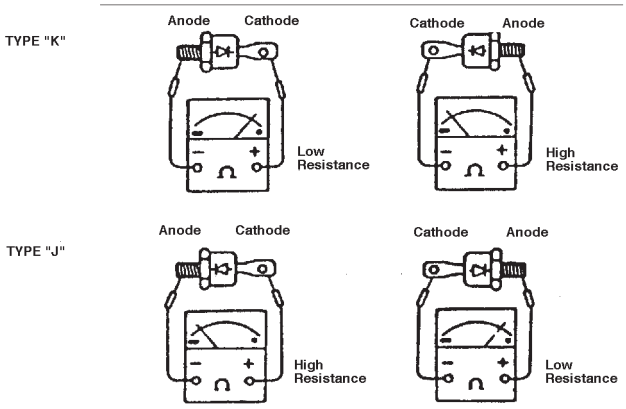


Figure 8. Testing Diode Elements

   d. The Diode Torque Specifications for all 300 series modes is **5 mm = 48 in. lb.**
   e. In order to test whether the rotating rectifier assembly surge absorber elements are good or not, first disconnect all lead wires as described in **PARTS REPLACEMENT METHOD**, Point 2, (above) and measure the resistance across surge absorber elements with a tester.

- Good surge absorber elements have about 10-30 K ohms, but if the resistance reading is near 0 ohms, the surge absorber elements is defective and must be replaced.
- Also, inspect outside of surge absorber and replace if it is cracked.
- In addition, when installing surge absorber elements, apply Loctite to the bolts.

3. Bearing Housing Replacement:
   Inspect the O-Ring. If cracked, replace. Reassemble carefully, aligning housing with bearing. Tighten housing bolts to 2.5 kpm (18 ft/lbs.).

4. Rotating Rectifier Assembly Detailed Structure:

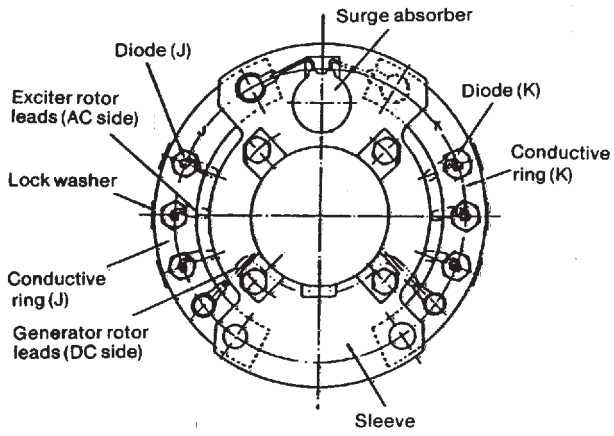


Figure 9. Rotating Rectifier.

Maintenance – Automatic Voltage Regulator

1. Keep the AVR clean at all times. Make sure no dust or moisture accumulates on the AVR.
2. Inspect periodically making sure that wiring connections are not loose.

Generator Specifications: Taiyo Winding Resistances

All ratings in Ohms @ 20° C

	Model Number	4 Wire - 1 Phase U_1–V_1	U_2–V_2	12 Wire - 3 Phase
MAIN	**PX-308K1**	0.3685 ohms	0.3685 ohms	0.599 ohms
STATOR:	**PX-309K1**	0.3685 ohms	0.3685 ohms	
	PX-310K1	0.2480 ohms	0.2480 ohms	0.409 ohms
	PX-312K1	0.1735 ohms	0.1735 ohms	0.293 ohms
	PX-316K1	0.1075 ohms	0.1075 ohms	0.180 ohms
	PX-320K1	0.0776 ohms	0.0780 ohms	0.124 ohms
	PX-325K1	0.0843 ohms	0.0981 ohms	
	PX-332K1	0.055 ohms	0.055 ohms	0.0621 ohms

	Model Number	Ohms, 1 & 3 Phase
MAIN	**PX-308K1**	1.682 ohms
ROTOR:	**PX-309K1**	1.528 ohms
	PX-310K1	2.082 ohms
	PX-312K1	2.236 ohms
	PX-316K1	2.542 ohms
	PX-320K1	2.900 ohms
	PX-325K1	3.65 ohms
	PX-332K1	3.901 ohms

	Model Number	Ohms, 1 Phase	Ohms, 3 Phase
EXCITER	**PX-308K1**	35.74 ohms	47.19 ohms
STATOR:	**& PX-309K1**		
	PX-310K1	35.74 ohms	47.19 ohms
	PX-312K1	35.74 ohms	47.19 ohms
	PX-316K1	37.89 ohms	50.03 ohms
	PX-320K1	37.89 ohms	50.03 ohms
	PX-325K1	37.90 ohms	42.1 ohms
	PX-332K1	42.19 ohms	55.71 ohms

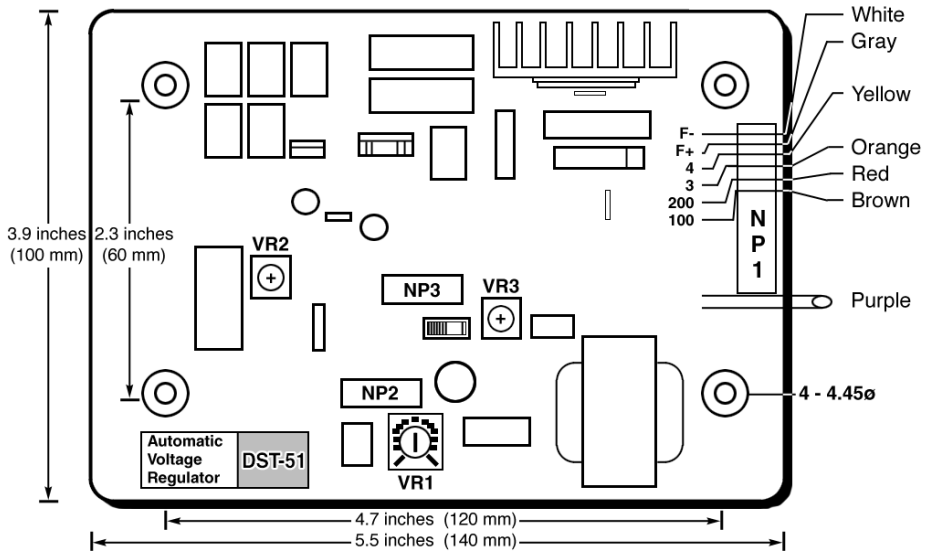
Generator Specifications: Taiyo Winding Resistances

All ratings in Ohms @ 20° C

	Model Number	U - V
EXCITER	**PX-308K1 & PX-309K1**	0.493 ohms
ROTOR:	**PX-310K1**	0.493 ohms
	PX-312K1	0.493 ohms
	PX-316K1	0.527 ohms
	PX-320K1	0.532 ohms
	PX-325K1	0.573 ohms
	PX-332K1	0.311 ohms

	Model Number	4 Wire 1 Phase
FULL LOAD	**PX-308K1 & PX-309K1**	29.0 volts
EXCITATION:	**PX-310K1**	27.3 volts
	PX-312K1	27.9 volts
	PX-316K1	25.4 volts
	PX-320K1	26.4 volts
	PX-325K1	25.4 volts
	PX-332K1	27.56 volts

Automatic Voltage Regulator: DST-51-DFK



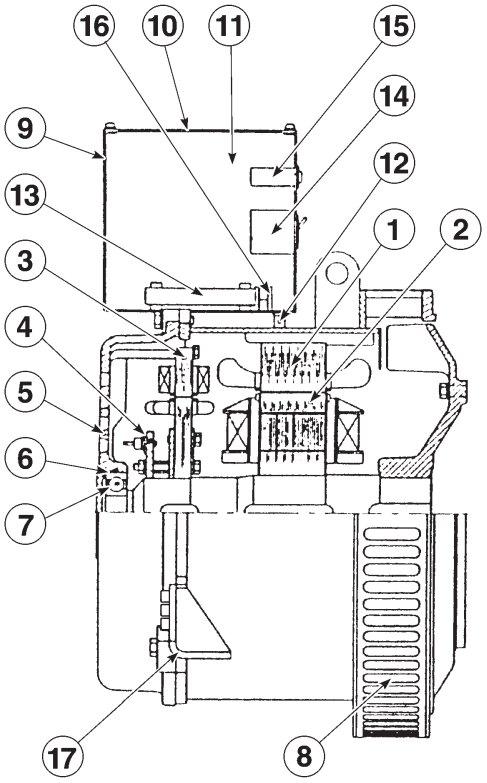
Sensing Output	Frequency	50 Hz	60 Hz
(4) – (100) 100V Class	100 Volt Class	100V	120V
(4) – (200) 200V Class	200 Volt Class	200V	240V
	Phase:	Single Phase	Single Phase
Power Input	Voltage:	100V	139V
(4 – 3)	Frequency:	50 Hz /	60 Hz
	Phase:	Single Phase	Single Phase
Sensing Output	Max. Voltage:	87% of Power Input Voltage (DC Voltage)	
(F+) – (F-)	Max. Current:	Continuous 2.0A DC Short Period Current	
		Endurance 3.5A DC (1 min.)	

Voltage Adjust Range	AC 95V – 126 / 190V – 252V ±5% of Rated Voltage with External Voltage Control Resistor
Voltage Regulation	±1% Root Mean Square Voltage from No Load to Full Load at P.F.: 0.8 to 1.0 including 5% of Engine Speed Regulation
Response Time	Within one (1) cycle
Frequency Characteristic	Volts / Hertz Characteristic
Voltage Build-Up	Self-Building Up at over 10V Power Input Voltage
EMI Remedy	Built-in EMI Filter
Initial Drift	Within ±1.0%
Temperature Drift	Within ±0.025%
Working Temperature	-4°F (-20°C) to 140°F (60°C)
Storage Temperature	-22°F (-30°C) to 176°F (80°C)
Humidity	Within 95%
Max. Allowable Vibration	Within 4 G
Outside Dimension	5.6" x 4.0" x 1.72" (140mm x 100mm x 43 mm)
Weight	1 lb. (0.7 kgs)

Trouble Shooting

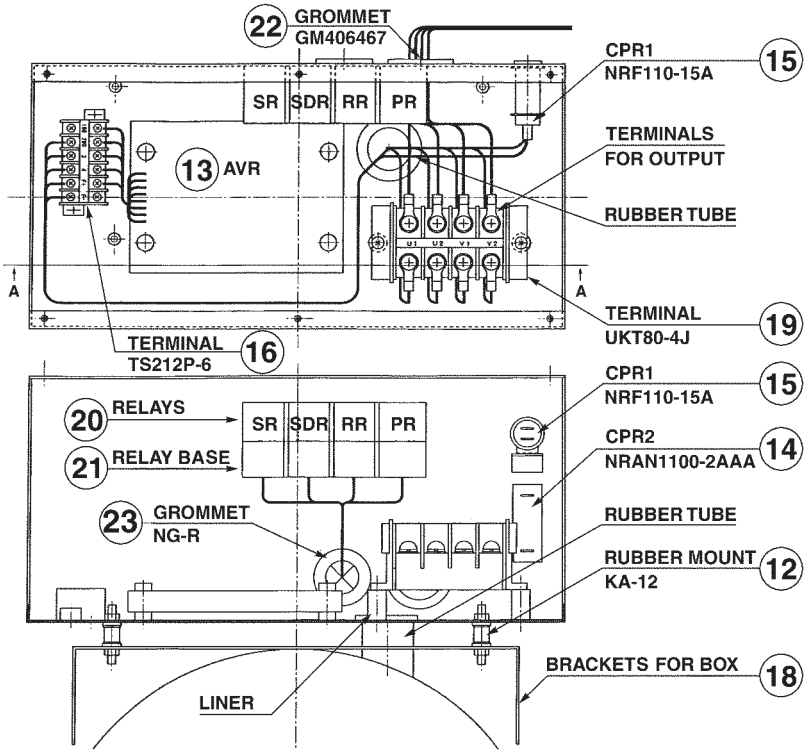
PROBLEM	POSSIBLE CAUSE	RECOMMENDATION(S)
Only a FEW VOLTS of output	Loss of residual magnetism of the exiter field	• Flash field.
	Disconnection or short circuit of windings	• Check the insulation of all windings and check the resistance value.
	Defective AVR	• Check the AVR.
	Defective rotating rectifier assembly	• Replace diode elements.
Voltage is LOW	Incorrect wiring (GEN, AVR)	• Check the winding connection.
	Low speed	• Check the engine.
	Overload	• Reduce the load.
	Defective AVR	• Check the AVR.
Voltage DIPS when on load	Starting of big motor or spot welding machine	• About 15% voltage dip is no problem.
	Defective diode on rotating rectifier [F(+) – F(-) terminal voltage will show a very high value when a diode is defective]	• Change diode.
Voltage is HIGH	Incorrect wiring (GEN, AVR)	• Check the AVR.
	Too high speed	• Check the engine.
	Defective AVR	• Check the AVR.
Voltage FLUCTUATES	Wiring leads are loose	• Tighten leads.
	Irregular speed of engine	• Check the engine.
	Poor AVR adjustment	• Check the AVR.
	External noise	• Check the filter.
Abnormal SOUND or VIBRATION	Foundation uneven	• Check ground level.
	Poor mounting	• Check the mounting section.
	Misaligned coupling	• Check the coupling section.
	Defective bearing	• Replace the bearing.

PX-300K1 Series Parts List



No	Description	PX-308K1/PX309K1	PX-310K1	PX-312K1	PX-316K1	PX-320K1
1	Stator Assembly (1-Phase)	WKC-00011-ST	WKC-00012-ST	WKC-00013-ST	WKC-00014-ST	WKC-00015-ST
	Stator Assembly (3-Phase)	WKC-00016-ST	WKC-00017-ST	WKC-00018-ST	WKC-00019-ST	WKC-00020-ST
2	Rotor Assembly	WKC-00011-RT	WKC-00012-RT	WKC-00013-RT	WKC-00014-RT	WKC-00015-RT
3	Excitor Stator Assembly (1-Phase)	WKC-00031-ST	WKC-00031-ST	WKC-00031-ST	WKC-00032-ST	WKC-00032-ST
	Excitor Stator Assembly (3-Phase)	WKC-00033-ST	WKC-00033-ST	WKC-00033-ST	WKC-00034-ST	WKC-00034-ST
4	Rectifier Assembly	3T201-084-3*	3T201-084-3*	3T201-084-3*	3T201-084-3*	3T201-084-3*
5	Bearing Shield	3T301-253-3	3T301-253-3	3T301-253-3	3T301-253-3	3T301-253-3
6	O-Ring	1BG70	1BG70	1BG70	1BG70	1BG70
7	Ball Bearing	6306ZZ	6306ZZ	6306ZZ	6306ZZ	6306ZZ
8	Ventilation Cover (M Type)	3T301-329	3T301-331	3T301-331	3T301-331	3T301-331
	Ventilation Cover (NL Type)	3T301-330	3T301-332	3T301-332	3T301-332	3T301-332
9	Junction Box (M Type) 1 Phase	3T301-168-2	3T301-168-2	3T301-168-2	3T301-168-2	3T301-168-2
	Junction Box (M Type) 3 Phase	3T302-637-1	3T302-637-1	3T302-637-1	3T302-637-1	3T302-637-1
	Junction Box (NL Type)	3T301-214-4	3T301-214-4	3T301-214-4	3T301-214-4	3T301-214-4
10	Junction Box (Top)	4T301-108	4T301-108	4T301-108	4T301-108	4T301-108
11	Junction Box (Side)	4T301-109	4T301-109	4T301-109	4T301-109	4T301-109
12	Flexible Mount	33-40007	33-40007	33-40007	33-40007	33-40007
13	Automatic Voltage Regulator	22-42037	22-42037	22-42037	22-42037	22-42037
14	Circuit Breaker (Voltage Regulator)	22-42053	22-42053	22-42053	22-42053	22-42053
15	Circuit Breaker (Engine)	22-42043	22-42043	22-42043	22-42043	22-42043
16	Terminal (Control)	22-42242	22-42242	22-42242	22-42242	22-42242
•	Diode Element • *Item Not Shown*	SKN26/12**	SKN26/12**	SKN26/12**	SKN26/12**	SKN26/12**
•	Diode Element • *Item Not Shown*	SKR26/12***	SKR26/12***	SKR26/12***	SKR26/12***	SKR26/12***
17	See next page	*formerly 3T201-084 **formerly SID01-09 (74113) ***formerly ERD51-09 (74114)				

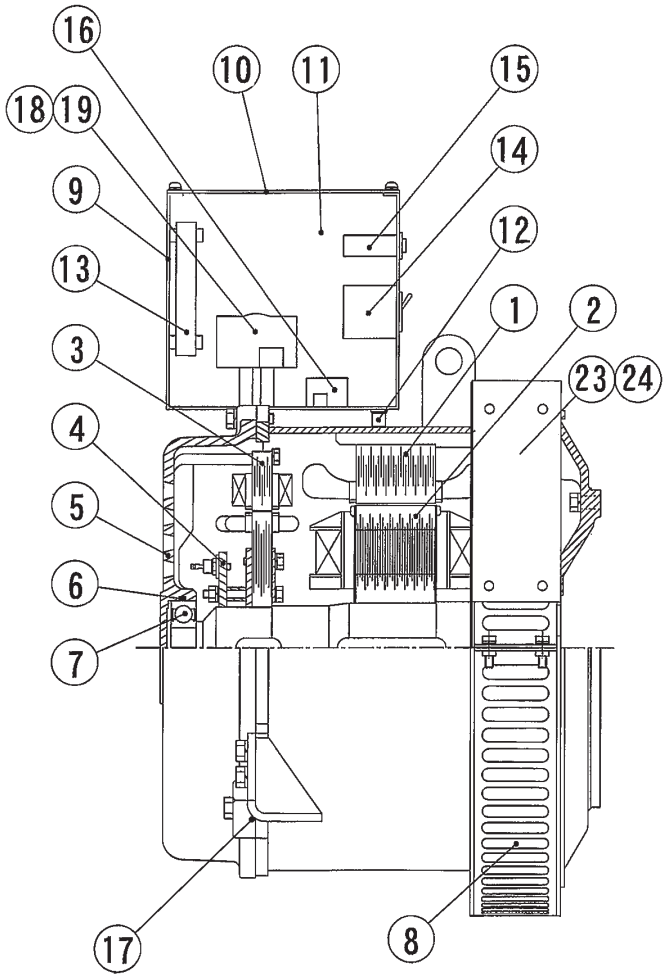
PX-300K1 Series Parts List



No	Description	PX-308K1/PX-309K1	PX-310K1	PX-312K1	PX-316K1	PX-320K1
17	Generator Mounting Bracket	3T301-267-2 R	3T301-268-2 R	3T301-268-2 R	3T301-269-2 R	3T301-269-2 R
		3T301-267-2 L	3T301-268-2 L	3T301-268-2 L	3T301-269-2 L	3T301-269-2 L
18	J-Box Support Bracket, Right	4T301-309	3T301-309	3T301-309	3T301-309	3T301-309
	Left	4T301-310	3T301-310	3T301-310	3T301-310	3T301-310
19	AC Terminal	22-42036	22-42036	22-42036	22-42036	22-42036
20	Relay (12VDC)	22-42047	22-42047	22-42047	22-42047	22-42047
	Relay (24VDC)	22-40085	22-40085	22-40085	22-40085	22-40085
21	Relay Base	22-41032	22-41032	22-41032	22-41032	22-41032
22	Grommet	GM406467	GM406467	GM406467	GM406467	GM406467
23	Grommet	NG-R	NG-R	NG-R	NG-R	NG-R
•	AVR Disconnect Instructions	4T601-011	4T601-011	4T601-011	4T601-011	4T601-011
•	Field Flashing Instructions	GE43037	GE43037	GE43037	GE43037	GE43037

• *Item Not Shown*

PX-320C Parts List

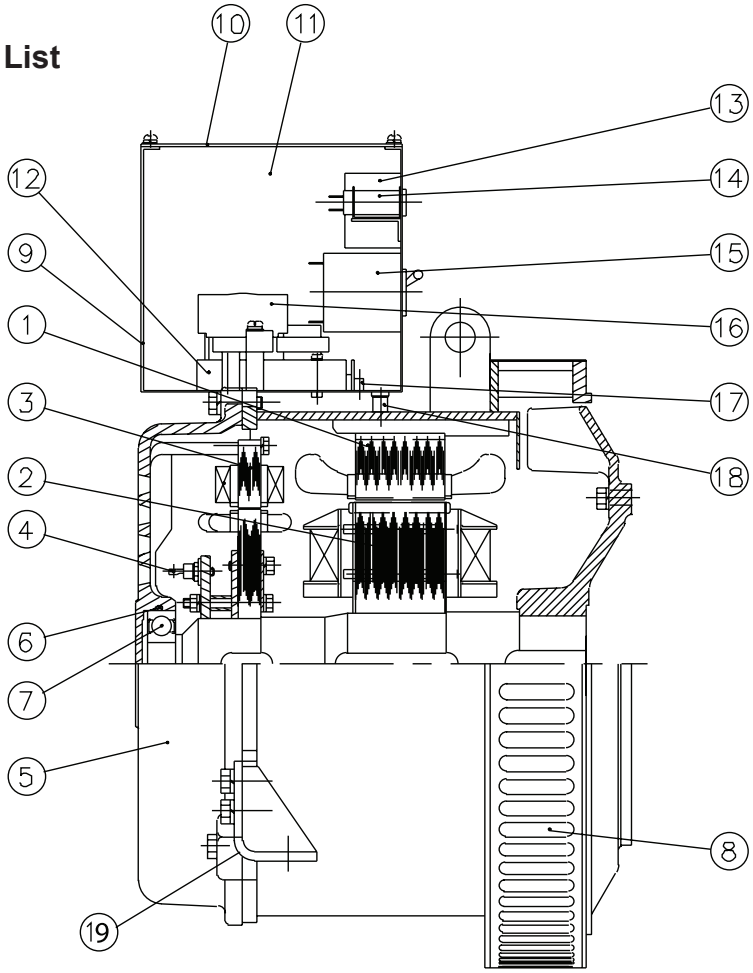


No	Description	PX-320C	
1	Stator Assembly	WKC-00020-1-ST	
2	Rotor Assembly	WKC-00020-1-RT	
3	Excitor Stator Assembly	WKC-00034-ST	
4	Rectifier Assembly	3T201-084	
5	Bearing Shield	3T301-253-3	
6	O-Ring	1BG70	
7	Ball Bearing	6306ZZ	
8	Ventilation Cover	3T302-896	
9	Terminal Box (M Type)	3T302-637-1	
10	Terminal Box (Top)	4T301-108	
11	Terminal Box (Side)	4T301-109	
12	Rubber Damper	33-40007	
13	Automatic Voltage Regulator	22-42037	
14	Circuit Breaker (Generator)	22-42053	
15	Circuit Breaker (Engine)	22-42043	
16	Terminal (Auxiliary)	22-42242	
17	Generator Mounting Bracket	3T301-269-2 R & 3T301-269-2 L	
18	Terminal (Output)	UKT60-3J	
19	Terminal (Output)	TE-K22-4	
23	Drip Proof Cover for Ventilation Cover	4T302-897	
24	Foot of Drip Proof Cover for Ventilation Cover	4T302-898	
*	Diode Element (not shown)	SID 01-09	
*	Diode Element (not shown)	ERD 51-09	

Notes

PX-325K1 Parts List

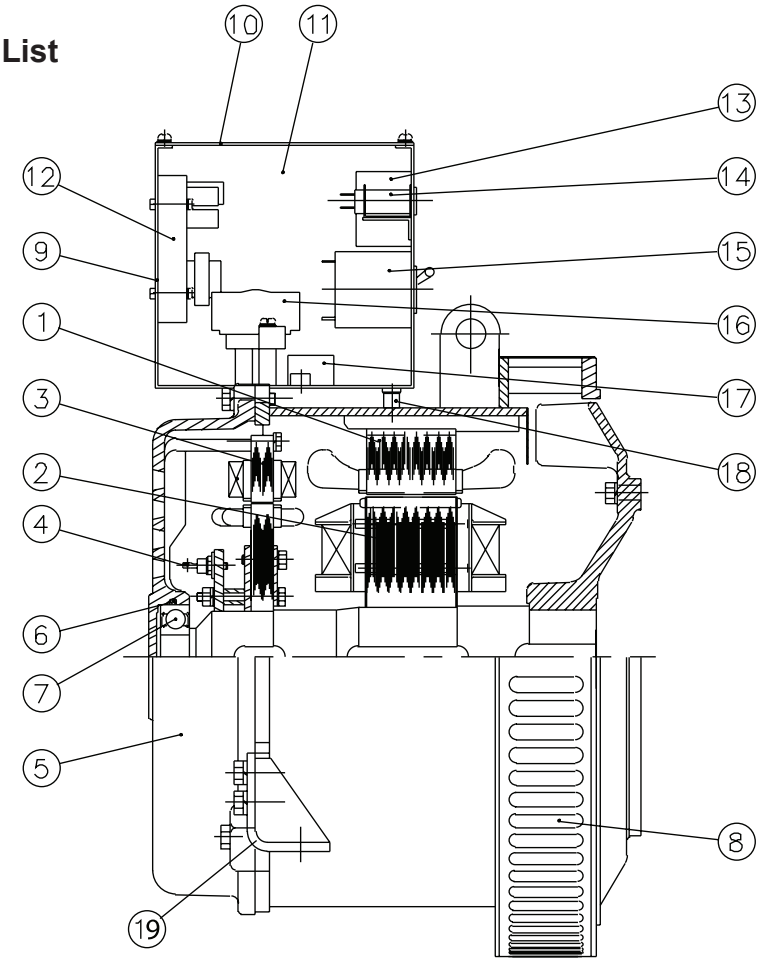
Single Phase



No	Description	PX-325K1 1 Phase	
1	Stator Assembly (1-Phase)	WKC-00077-ST	
2	Rotor Assembly	WKC-00077-RT	
3	Excitor Stator Assembly (1-Phase)	WKC-00032-ST	
4	Rectifier Assembly	3T201-084	
5	Bearing Shield	3T301-253-3	
6	O-Ring	1BG70	
7	Ball Bearing	6306ZZ	
8	Ventilation Cover	3T301-331	
9	Terminal Box	3T301-168-2	
10	Terminal Box (Top)	4T301-108	
11	Terminal Box (Side)	4T301-109	
12	Automatic Voltage Regulator	22-42037	
13	Relay	22-42047	
14	Circuit Breaker (Engine)	22-42043	
15	Circuit Breaker (Generator)	22-42053	
16	Terminal (Output)	UKT80-4J	
17	Terminal (Auxiliary)	TS-212P-6	
18	Rubber Mount	33-40002	
19	Generator Mounting Bracket	3T301-269-2R	
		3T301-269-2L	
20	J-Box Support Bracket, Right (not shown)	4T301-309	
	Left	4T301-310	

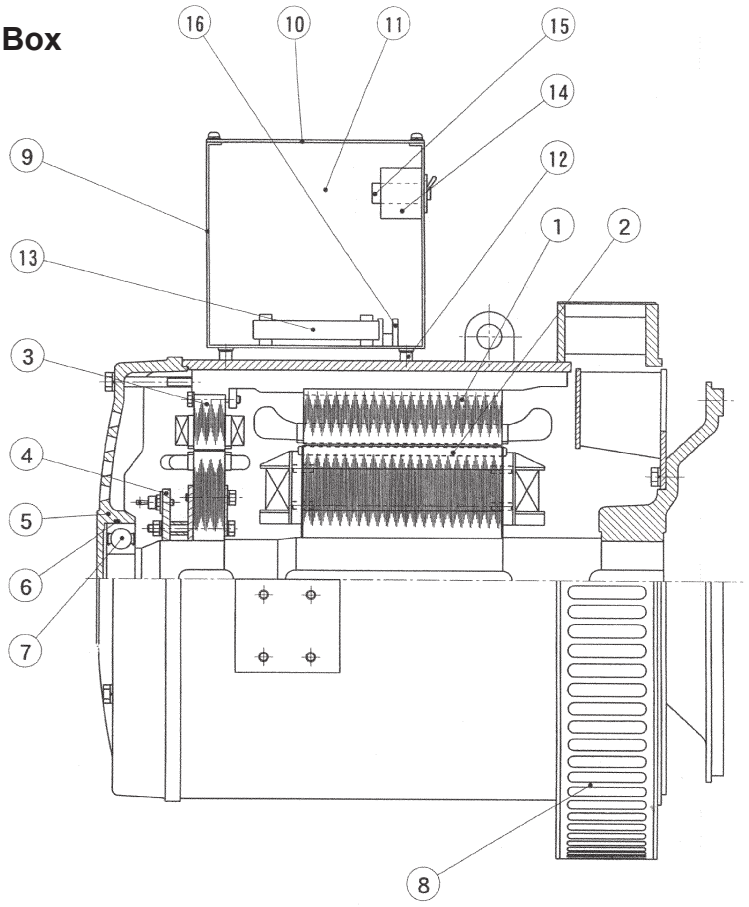
PX-325K1 Parts List

Three Phase



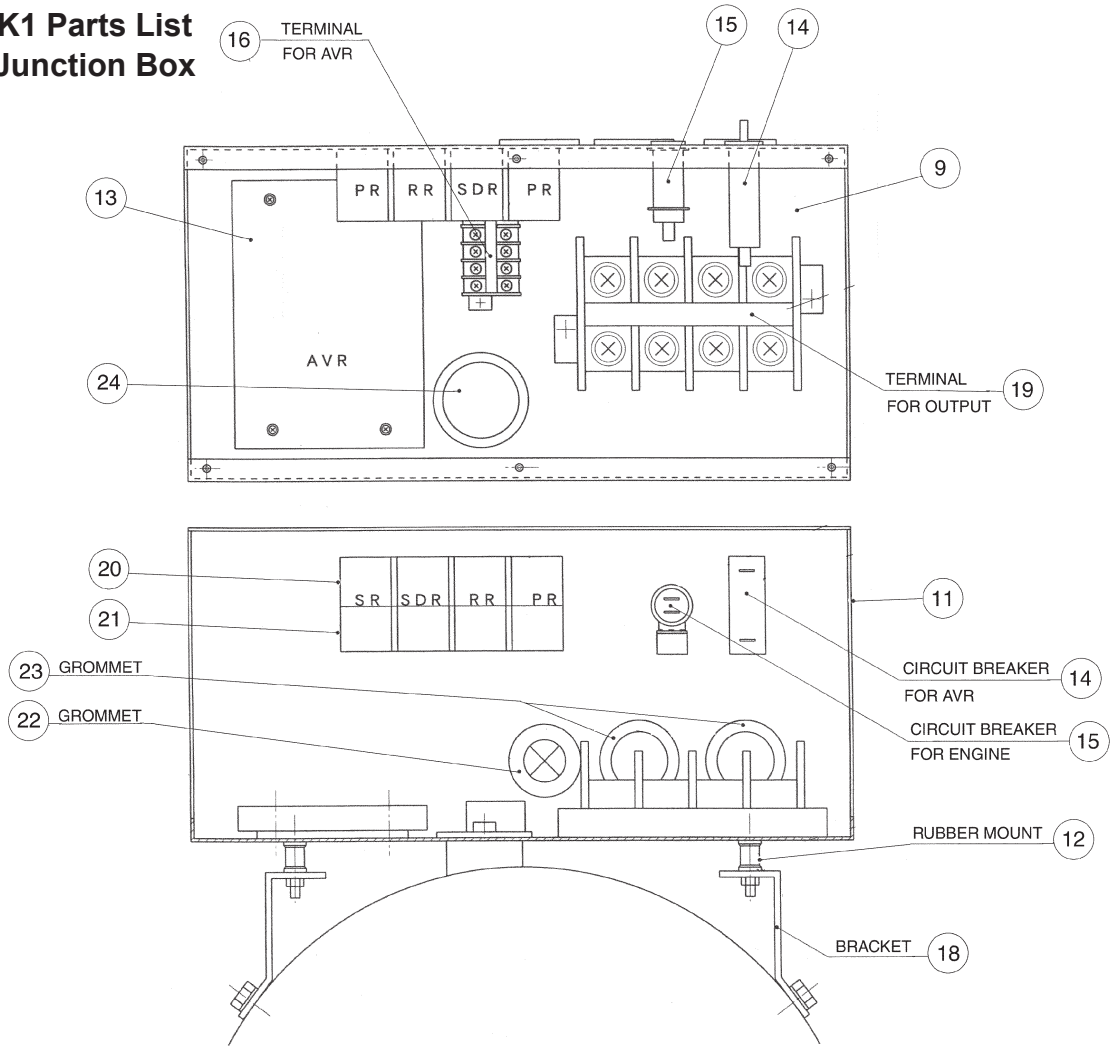
No	Description	PX-325K 3 Phase	
1	Stator Assembly (1-Phase)	WKC-00078-ST	
2	Rotor Assembly	WKC-00078-RT	
3	Excitor Stator Assembly (1-Phase)	WKC-00034-ST	
4	Rectifier Assembly	3T201-084	
5	Bearing Shield	3T301-253-3	
6	O-Ring	1BG70	
7	Ball Bearing	6306ZZ	
8	Ventilation Cover	3T301-331	
9	Terminal Box	3T302-637	
10	Terminal Box (Top)	4T302-144	
11	Terminal Box (Side)	4T302-145	
12	Automatic Voltage Regulator	22-42037	
13	Relay	22-42047	
14	Circuit Breaker (Engine)	22-42043	
15	Circuit Breaker (Generator)	22-42053	
16	Terminal (Output)	TE-K22-4 and UKT60-3J	
17	Terminal (Auxiliary)	TS-212P-6	
18	Rubber Mount	33-40002	
19	Generator Mounting Bracket	3T301-269-2R	
		3T301-269-2L	
20	J-Box Support Bracket, Right (not shown)	4T301-309	
	Left	4T301-310	

PX-332K1 Parts List
With Small Junction Box



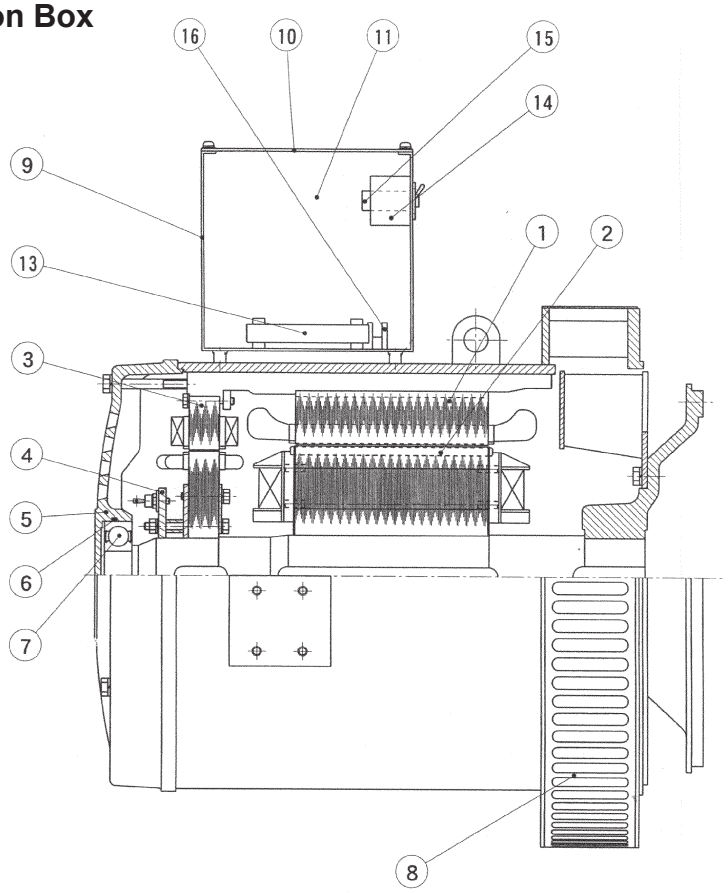
Key	Description	Part Number	
1	Stator Assembly (Single Phase)	WKC-00039-ST	
	Stator Assembly (Three Phase)	WKC-00040-ST	
2	Rotor Assembly	WKC-00039-RT	
3	Exciter Stator Assembly (Single Phase)	WKC-00060-ST	
	Exciter Stator Assembly (Three Phase)	WKC-00061-ST	
4	Rectifier Assembly	3T201-084	
5	Bearing Shield	3T301-349-2	
6	O-Ring	1BG90	
7	Ball Bearing	6308ZZ	
8	Ventilation Cover	3T301-389	
9	Terminal Box	3T301-222-2	
10	Terminal Box (Top)	4T301-108	
11	Terminal Box (Side)	4T301-109	
12	Rubber Damper	33-40002	
13	Automatic Voltage Regulator	22-42037	
14	Circuit Breaker (Generator)	22-42053	
15	Circuit Breaker (Engine)	22-42043	
16	Terminal (Output)	22-45413	
•	Diode Element	SID 51-09	
•	Diode Element	ERD 51-09	
•	Surge Suppressor	ENC471D-2DA	
	• *Item Not Shown*		

PX-332K1 Parts List
Small Junction Box



Key	Description	Part Number	No.	
••	Junction Box Sub-assembly	4T301-496-2	1	(includes keys 9 - 11)
9	Junction Box	3T301-222-2	1	
10	Junction Box, Top	4T301-108	1	
11	Junction Box, Side	4T301-109	2	
13	AVR	22-42037	1	
14	Circuit Breaker (for AVR)	22-42053	1	
15	Circuit Breaker (for Engine)	22-42043	1	
16	Terminal (for AVR)	TS-212-6P	1	
17	Generator Mounting Brackets	23-65413	2	NL984K
		23-68501	2	NL498K
18	J-Box Support Bracket	4T-301-390	2	
19	Terminal (for Output)	22-45413	1	
20	Relays	22-42047	4	12 VDC
		22-40085	4	24 VDC
21	Relay Base	22-41032	4	
22	Grommet	GM406467	1	
23	Grommet	NG-R	2	
24	Grommet	4N911-018	1	
25	Mount, Rubber	33-40002	4	

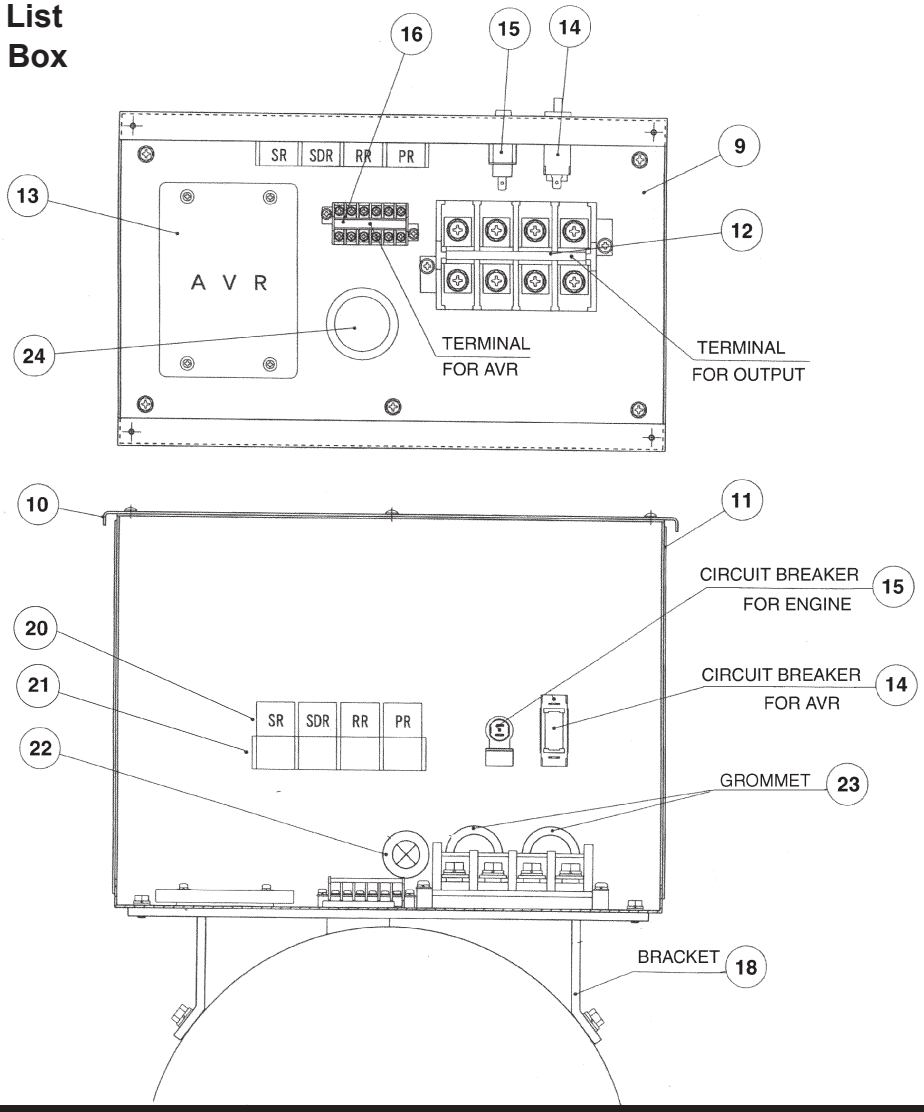
PX-332K1 Parts List
With Large Junction Box



Key	Description	Part Number	
1	Stator Assembly (Single Phase)	WKC-00039-ST	
	Stator Assembly (Three Phase)	WKC-00040-ST	
2	Rotor Assembly	WKC-00039-RT	
3	Exciter Stator Assembly (Single Phase)	WKC-00060-ST	
	Exciter Stator Assembly (Three Phase)	WKC-00061-ST	
4	Rectifier Assembly	3T201-084	
5	Bearing Shield	3T301-349-2	
6	O-Ring	1BG90	
7	Ball Bearing	6308ZZ	
8	Ventilation Cover	3T301-389	
•	Large Junction Box (Includes keys 9-11, & 18)		
9	Junction Box		
10	Junction Box (Top)		See applicable Junction Box Parts Detail
11	Junction Box (Side)		
12	Terminal (Output)	22-45413	
13	Automatic Voltage Regulator	22-42037	
14	Circuit Breaker (Generator)	22-42053	
15	Circuit Breaker (Engine)	22-42043	
16	Terminal (for AVR)	TS-212-6P	
•	Diode Element	SID 01-09	
•	Diode Element	ERD 51-09	
	• *Item Not Shown*		

PX-332K1 Parts List
Large Junction Box

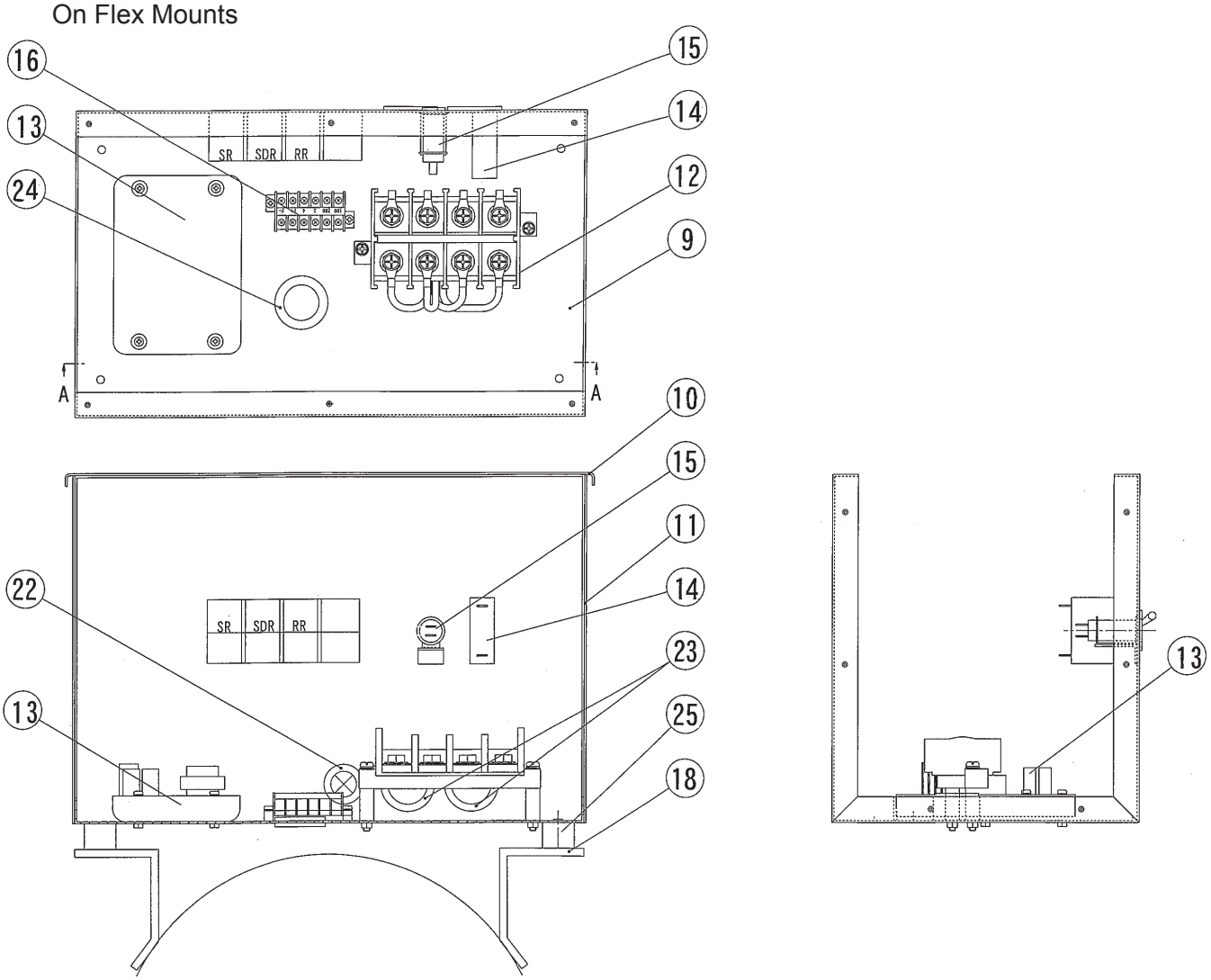
Rigid Mounting



Key	Description	Part Number	No.	
••	Junction Box Assembly	39-65417	1	
9	Junction Box	3T302-142	1	
10	Junction Box, Top	4T302-144	1	
11	Junction Box, Side	4T302-145	2	
12	Terminal (Output)	22-45413	1	
13	AVR (Automatic Voltage Reg.)	22-42037	1	
14	Circuit Breaker (for AVR)	22-42053	1	
15	Circuit Breaker (for Engine)	22-42043	1	
16	Terminal (for AVR)	TS-212-6P	1	
17	Generator Mounting Brackets	23-65413	2	NL984K
		23-68501	2	NL498K
18	J-Box Support Bracket	3T302-143	1	
20	Relays	22-42047	4	12 VDC
		22-40085	4	24 VDC
21	Relay Base	22-41032	4	
22	Grommet	GM406467	1	
23	Grommet	NG-R	2	
24	Grommet	4N911-018	1	

PX-332K1 Parts List
1 Phase Junction Box

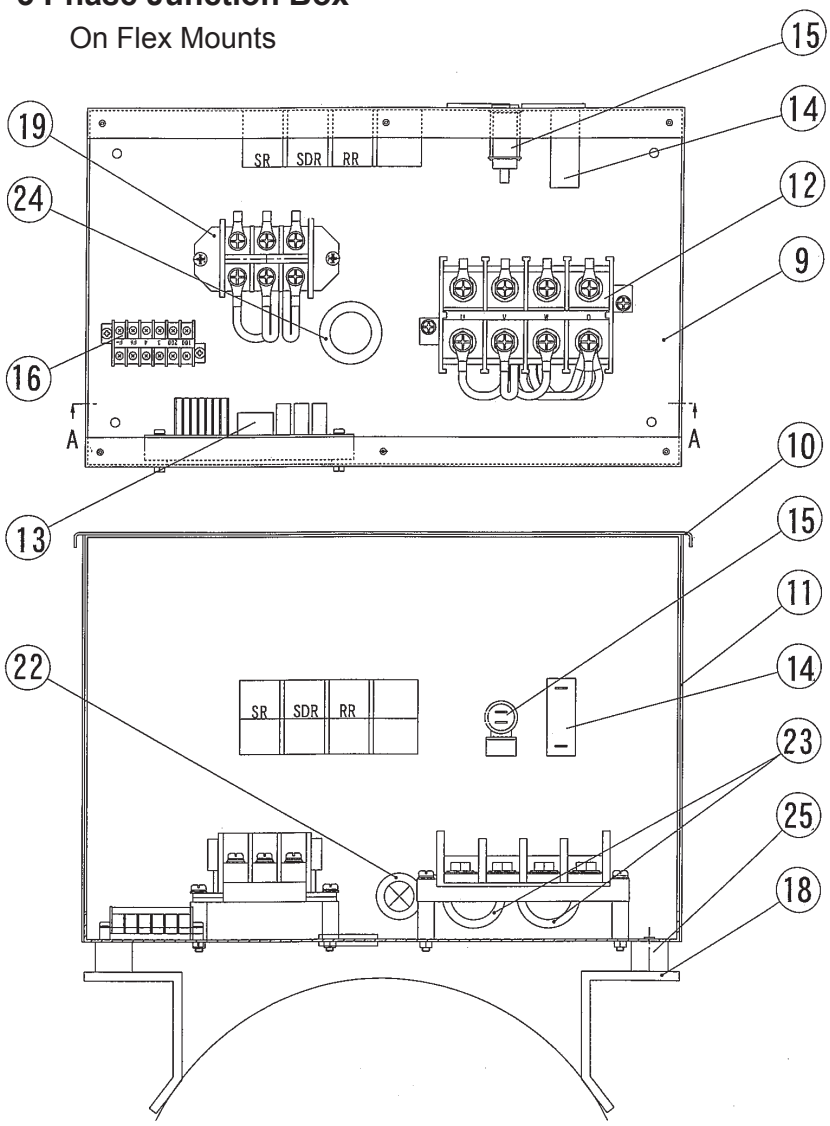
On Flex Mounts

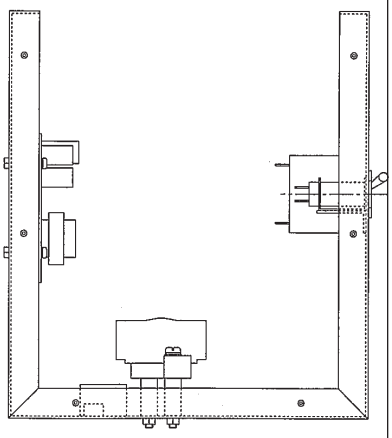


Key	Description	Part Number	No.	
••	Junction Box Assembly	39-65418	1	
9	Junction Box	3T302-858-1	1	
10	Junction Box, Top	4T302-144	1	
11	Junction Box, Side	4T302-859	2	
12	Terminal (Output)	TE-K60-4	1	
13	AVR (Automatic Voltage Reg.)	22-42037	1	
14	Circuit Breaker (for AVR)	22-42053	1	
15	Circuit Breaker (for Engine)	22-42043	1	
16	Terminal (for AVR)	TS-212P-6	1	
18	J-Box Mounting Bracket	3T302-782 L	1	
	J-Box Mounting Bracket	3T302-782 R	1	
19	Terminal (for output)	UKT100-3J	1	
22	Grommet	GM406467	1	
23	Grommet	NG-79-R	2	
24	Grommet	4N911-018	1	
25	Rubber Mount	33-40007	4	

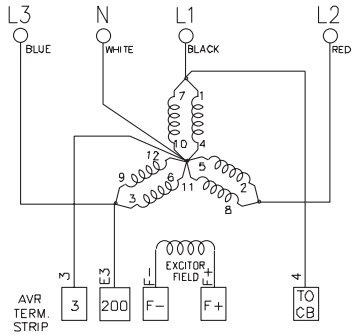
PX-332K1 Parts List
3 Phase Junction Box

On Flex Mounts

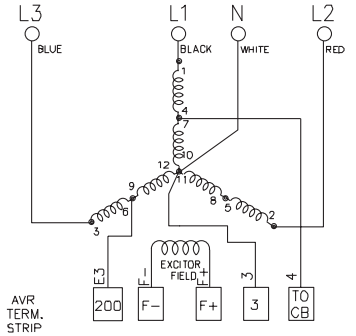




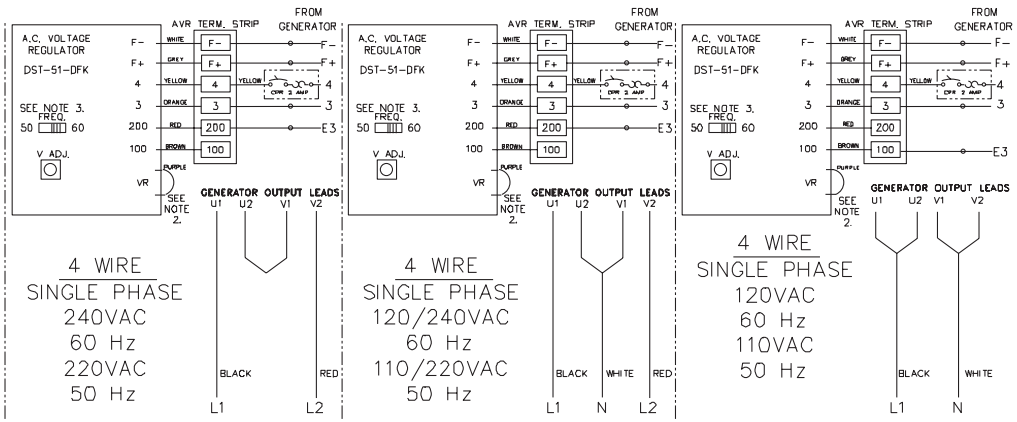
Key	Description	Part Number	No.	
••	Junction Box Assembly	39-65419	1	(Includes keys 9-11, 18, 25)
9	Junction Box	3T302-784-2	1	
10	Junction Box, Top	4T302-144	1	
11	Junction Box, Side	4T302-859	2	
12	Terminal (Output)	TE-K60-4	1	
13	AVR (Automatic Voltage Reg.)	22-42037	1	
14	Circuit Breaker (for AVR)	22-42053	1	
15	Circuit Breaker (for Engine)	22-42043	1	
16	Terminal (for AVR)	TS-212P-6	1	
18	J-Box Mounting Bracket	3T302-782 L	1	
	J-Box Mounting Bracket	3T302-782 R	1	
19	Terminal (for output)	UKT100-3J	1	
22	Grommet	GM406467	1	
23	Grommet	NG-79-R	2	
24	Grommet	4N911-018	1	
25	Rubber Mount	33-40007	4	



12 WIRE
120/208V 3 PHR 60 Hz.
127/220V 3 PHR 50 Hz.
(PARALLEL WYE)



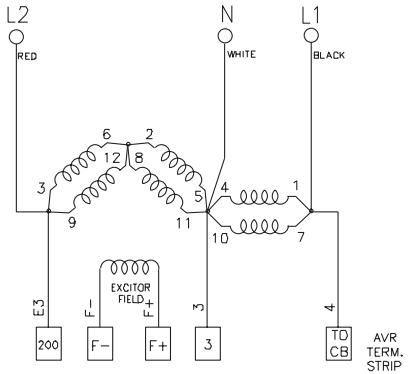
12 WIRE
277/480V 3 PHR 60 Hz.
220/380V 3 PHR 50 Hz.
230/400V 3 PHR 50 Hz.
(SERIES HIGH-WYE)



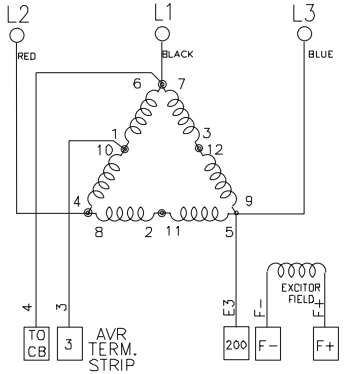
4 WIRE
SINGLE PHASE
240VAC
60 Hz
220VAC
50 Hz

4 WIRE
SINGLE PHASE
120/240VAC
60 Hz
110/220VAC
50 Hz

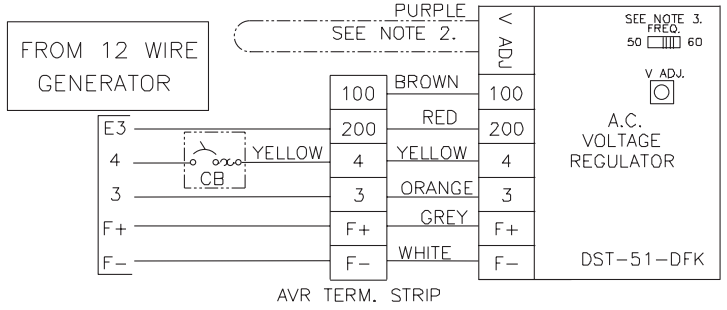
4 WIRE
SINGLE PHASE
120VAC
60 Hz
110VAC
50 Hz



12 WIRE
120/240V 1 PHR 60 Hz.
110/220V 1 PHR 50 Hz.
(ZIG-ZAG)



12 WIRE
240V 3 PHR 60 Hz.
220V 3 PHR 50 Hz.
(SERIES DELTA)



NOTES:
1. ALL INSTALLATION CONDUCTORS TO BE AWG 14, TYPE MTW, 105°C, MULTISTRAND, 600VAC.
2. FOR REMOTE VOLTAGE ADJUST RHEOSTAT CUT JUMPER AND SPLICE INTO PURPLE LEADS.
3. SET FOR CURRENT APPLICATION, (50 OR 60 HZ.)

AC Wiring Schematic - B-5748F
DST-51-DFK, All Voltages

4420 14th Ave. NW., Seattle WA 98107
Tel: (206) 789-3880 • 1-800-762-0165 • www.northern-lights.com