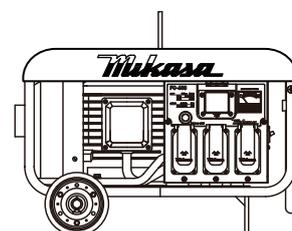


Mikasa

HIGH FREQUENCY CONVERTER

FC-450



OPERATION MANUAL

en



<http://www.mikasas.com>

102-02101



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1. INTRODUCTION

- This operation manual describes the proper operation, basic inspection and maintenance procedures of the high frequency converter. Please read this operation manual before use in order to maximize the excellent performance of this machine and make your work more efficient and effective.
- After reading the manual, please keep it in a handy location for easy reference.
- For inquiries about repair parts, parts lists, service manuals, and repairs, please contact the store where you purchased the product, our sales office, or the Mikasa Parts Service Center. For parts lists, please visit our homepage (<https://www.mikasas.com>) where you can access Mikasa WEB parts lists.

The illustrations in this manual might slightly differ in part from the machine you actually purchased due to design changes.

2. MACHINE OVERVIEW

Application

Mikasa FC-450 is the high frequency converter for using Mikasa 48V (200 / 240Hz) high frequency internal vibrators and external vibrators. It converts three-phase 380V (50Hz) / 400V (50Hz / 60Hz) power supply to three-phase 48V (200 / 240Hz) by the motor generator.

Warning About Incorrect Applications And Techniques

Mikasa FC-450 is the high frequency converter for Mikasa high frequency vibrators. Do not use other vibrators. The input power supply for this converter is three-phase 380V (50Hz) / 400V (50Hz / 60Hz). Do not connect to other power sources. The converter and the vibrator will be damaged, and also there is a danger of electric shock.

Structure

Mikasa FC-450 is the high frequency converter of the motor generator type. It is equipped with the three phase induction motor, the magnetic rotor with high power generation efficiency and the control box which are mounted on the frame. The control box is equipped with a breaker in the primary power circuit and a circuit protector in the secondary power circuit to protect the generator and motor from overcurrents. And it is equipped with the 2E thermal relay to protect the three phase induction motor from the power supply failure such as unbalanced input power supply.

3. WARNING SIGNS

The triangle shaped  marks used in this manual and on the decals stuck on the main body indicate common hazards. Be sure to read and observe the cautions described.

 Warning labels indicating hazards to humans and to equipment.	
 DANGER	Denotes an extreme hazard. It calls attention to a procedure, practice, condition or the like, which, if not correctly performed or adhered to, is likely to result in serious injury or death.
 WARNING	Denotes a hazard. It calls attention to a procedure, practice, condition or the like, which, if not correctly performed or adhered to, could result in serious injury or death.
 CAUTION	Denotes a hazard. It calls attention to a procedure, practice, condition or the like, which, if not correctly performed or adhered to, could result in injury to people and may damage or destroy the product.
CAUTION (without at )	Failure to follow the instructions may result in damage to property.

4. CAUTIONS FOR SAFETY

4.1 General Cautions

WARNING

- Do not work with this machine, when
 - you are tired or sick and not feeling well.
 - you have taken medicine or drug.
 - you have had a drink.



CAUTION

- Please read the operation manual well and work safely by using the machine properly.
- For handling of the engine, please refer to the separate engine operation manual.
- Please have a good understanding of the structure of this machine.
- Make sure to do work start inspection, regular self inspection and specified self inspection.
- To make your work safe, please use protective equipment (use specified helmet, protective shoes, etc.) and wear appropriate work clothes.
- Always use noise protection equipment such as ear muffs or ear plugs.
- Always check the machine to make sure it is in normal condition before operating the machine.
- The nameplates attached to the machine (nameplates showing operation method, warning, etc.) are very important for your safety. Clean the machine so that the nameplates can be read easily. If it is difficult to read the nameplate, please replace the old one with a new one.
- It is dangerous for young children to come near the machine. Please pay careful attention to the method of storing and the storage location for this machine. Especially the engine start key has to be taken out every time you finish your work, and keep it in a designated location.
- To do maintenance work, stop the machine and unplug.
- Mikasa does not accept any liability for accidents or problems caused as a result of not using genuine Mikasa parts or if the machine has been modified.



4.2 Precautions About Cabtyre Cord And Socket & Plug.

DANGER

- Check of the cabtyre cord.
Confirm that insulator / conductor part does not crop out by a rift or the wear of mantle (sheath). Because abrasion is comparatively intense, change the cabtyre cord for a new article early.
- Check the damage and transformation of the cord, and the socket & plug by fever.
The exposure of conductor part is in danger of an electric shock and the fire by the short circuit.
The transformation of code is in danger of disconnection and the short circuit.
- Do enough thickness (size) retention of the cabtyre cord for a flowing electric current.
The voltage falls in proportion to the length of the code.



4.3 Precautions For Location Where Machine Is Used.

DANGER

- Do not put the machine in locations which are exposed to rain, direct sunlight, or puddles. When the machine gets wet, be in danger of the short circuit. Provide a suitable breaker at the power source of input side for safety.
- Do not use electronic devices such as a computer near the converter. The noise from the converter might interfere or damage such devices.
- Do not operate the machine near open fires. When flammable fuel volatilizes, be in danger of the explosion.
- Select the location of converter for keeping dry and clean in operation and storage to avoid any dust and fine sand.



4.4 Precautions Before Work.

DANGER

- When using the engine generator for input power, the exhaust gas from the engine contains toxic gases such as carbon monoxide and is very hazardous. Do not run the engine indoor or inside a tunnel where ventilation is poor.
- This converter is connected to the input power on the nameplate.



CAUTION

- Check each part to see if it is tightened properly. Vibration causes loosening of bolts, which results in unexpected serious malfunctions of the machine. Tighten the bolts securely.
- Make sure that the switch is OFF before connecting to the input power. It become the cause of the accident that you do not think to start suddenly.
- Check plug and socket. When joint falls out, repair it immediately. When you just use it, heat generation is critical.
- Check a patch (extension) code. The cabtyre cord use a thing without a damage. The joint be careful to short circuits.



4.5 Precautions During Work.

⚠ DANGER

- Do not handle the cord roughly.
 - Do not pull the cord when you pull the plug out of the socket.
 - Do not hang the machine with the cord.
 - Do not bring a cord close to some places of heat / oil / sharp corner.
 - Do not wire place where a vehicle passes the cord.
- As for the above, a worker is in danger of an electric shock, and the cord is in danger of disconnection and the short circuit.
- Stop work when abnormality is found.

When you hear an abnormal sound causes something wrong with the machine, you switch it off immediately, and stop use. And you contact the purchase or the place where one go to for rent, and ask it for check and repair.
 - Keep the usable numbers of high frequency vibrators. Refer to the table of “Usable numbers of High Frequency Vibrators”. Do not use vibrators more than usable numbers.
 - Do not use in overload. When the output of a converter exceeded rated value, FC-450 type stops the output. It protects the machine and implement (vibrator and External Vibrating Motor etc.).
 - Be careful of electric shock.
 - Do not operate a machine by the hand which got wet.
 - Do not use it in rain and snow.
 - Do not put dangerous materials (oils and fats, celluloid, gunpowder, etc.) and inflammables (paper, small piece of wood, etc.) in circumference of a machine. Remove ignitable materials.



⚠ WARNING

- Do not use the vibrator which cannot operate ON/OFF with a switch.
- When you do not use it, turn off a switch by all means.
- When stops work and stays away from the converter, stop it by all means.
- Use ropes of fall prevention in high place work, and get security.



4.6 Precautions After Work

⚠ CAUTION

- Follow the following stop procedures.
 - ① Turn off the vibrator switch.
 - ② Turn off the converter switch.
 - ③ Unplug the vibrator plug.
 - ④ Unplug the power plug.
- Do not put heavy objects on a plug and a cord of a converter. It causes disconnection and trouble.

4.7 Lifting Precautions

⚠ DANGER

- Before lifting, check the machine parts (especially the hook and frame) for any damage and loosened or missing bolts.
- Stop the machine and unplug the power plug and vibrator plug before lifting.
- Use a sufficiently strong wire rope.
- For lifting, use only the lifting hook, and do not lift at any other part.
- When the machine is lifted, never let people or animals come underneath.
- For safety reasons, do not lift to a height that is higher than necessary.



4.8 Transportation And Storage Precautions

WARNING

- Stop the machine and unplug the power plug and vibrator plug before transporting.
- Tie down the machine securely to prevent the machine from moving or falling during transportation.



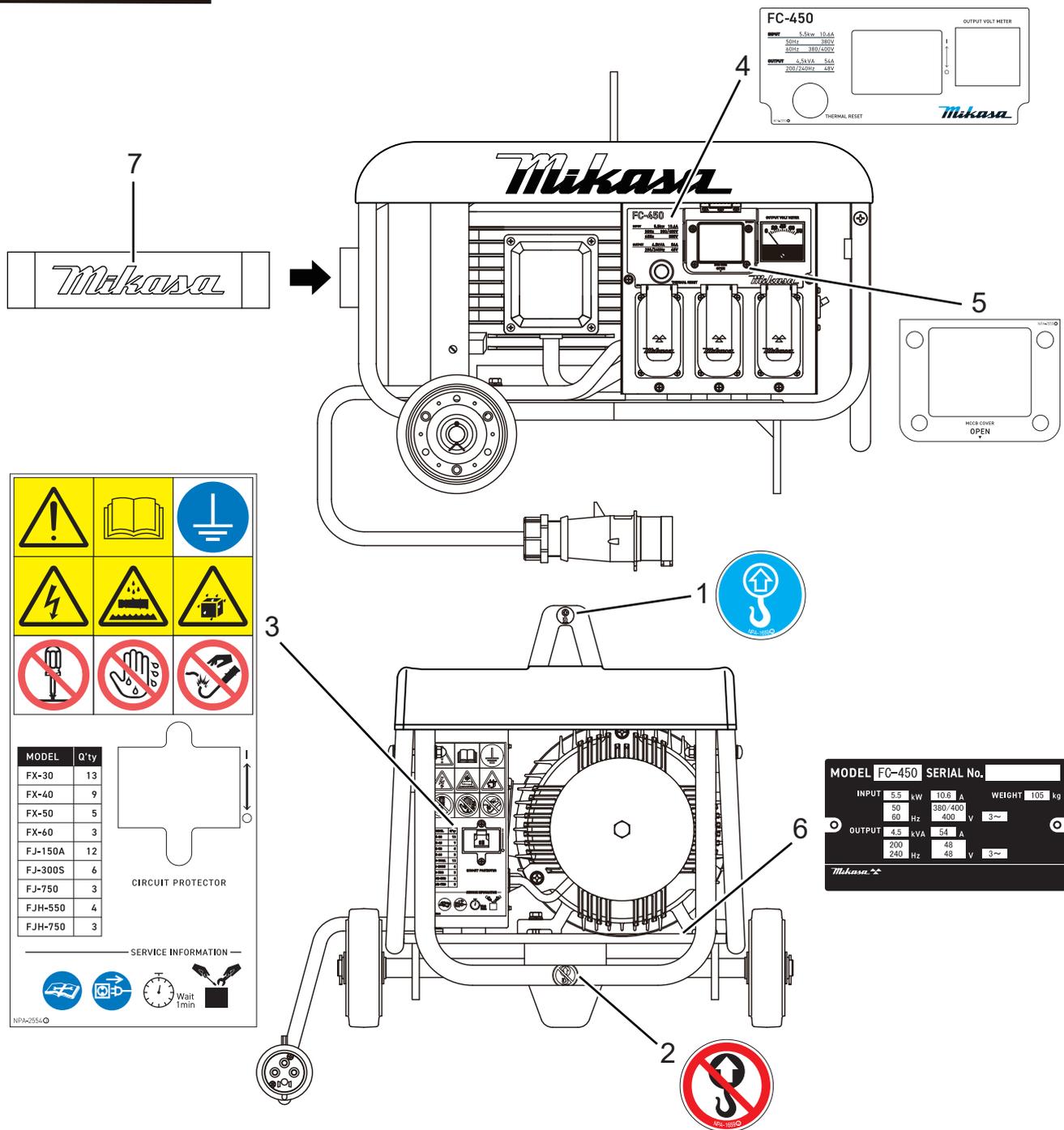
4.9 Maintenance Precautions

CAUTION

- Read the operation manual and service manual before check (maintenance) of converter, understand enough maintenance method, and do check (maintenance) with care safely.
- Appropriate maintenance is always required for safety operation and to maintain performance of the machine. Pay full attention in the condition of the machine, and maintain good condition. Especially improper maintenance of lifting-related part becomes cause of serious accident.
- Do work after lower temperature of machine. In addition, be careful not to burn itself enough.
- Do the check alignment in situation that stopped converter by all means. There is badly injured danger when you are rolled up in a reel. After maintenance fulfillment, check the installation of safety protection parts of the machine. Especially, check bolts and nuts thoroughly. When you do maintenance with dismantlement, refer to maintenance manual regularly, and work safely.
- Use non-inflammable cleaner (brake cleaner, etc.) when cleaning. Blow enough after cleaning, and do not leave cleaner.
- The location where indoor and ventilation are no good, has danger of gas poisoning. Do enough ventilation.



4.10 Decal Position



PARTS LIST of NAME PLATES

REF No.	PART No.	PART NAME	Q' TY	REMARK
1	9202-16590	DECAL, LIFTING LABEL SET	1	NPA-1659
2		Lifting Position	1	
		No Lifting Position	1	
3	9202-25540	DECAL, CAUTION / FC-450	1	NPA-2554
4	9202-25530	DECAL, FRONT PANEL	1	NPA-2553
5	9202-25550	DECAL, MCCB COVER	1	NPA-2555
6	9202-25610	PLATE, SERIAL NO. / FC-450	1	NPA-2561
7	9201-09560	DECAL, MIKASA(250 WHITE)	1	NP-956

4.11 Descriptions Of Symbols Used On Warning Decals



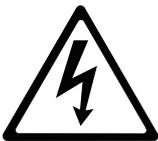
Unplugging of the power plug with wet hand is prohibited

Do not unplug the power plug with wet hand.



Never touch a broken cord

Do not touch the broken part when a cord is broken. Carefully unplug the power cord to avoid electric shock. Have the cord repaired professionally.



Watch out for electric leak and electric shock

Be careful not to get electric shock. Please use ground-fault interrupter at the power source.



Connect ground wire

To protect workers from electric shock, always ground securely.



No lift point

Lifting by the handle is prohibited.



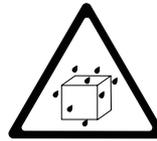
Disassembly prohibited

While current is flowing or if you are not sure whether the power is cut, do not disassemble nor alter the converter. Electric shock, fire or burn might occur.



Caution against water immersion of power plug

Do not let the power plug immersed in water and avoid it from getting wet. Electric shock or malfunction might occur.



Use in the rain not allowed

Do not use the converter in the rain.



Carefully read the operation manual

Before using, please read necessary operation manual. Also, always keep the manual at hand.



Never touch with wet hand

Do not touch the converter with wet hand. Electric shock or burn accident might occur.



Lift point

For lifting, use only one point hoisting hook, and do not lift at any other part.



Other danger

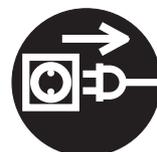
Handle the converter by paying attention to the potential danger that is associated with its use.

For service (repair)



Read service manual carefully

When you do repair work on this converter, always read the service manual. Also, repair work has to be done by a service person who has mastered a skill for repair.



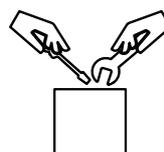
Unplugging of the power plug

When doing repair work of the converter, always unplug the power plug from the outlet.



Disassembly start time

When disassembling, wait for one minute after the converter is unplugged.



Disassembly of the converter

Use appropriate tool for disassembly and do disassembly in an area suitable for such work.

5. SPECIFICATIONS

5.1 Specifications

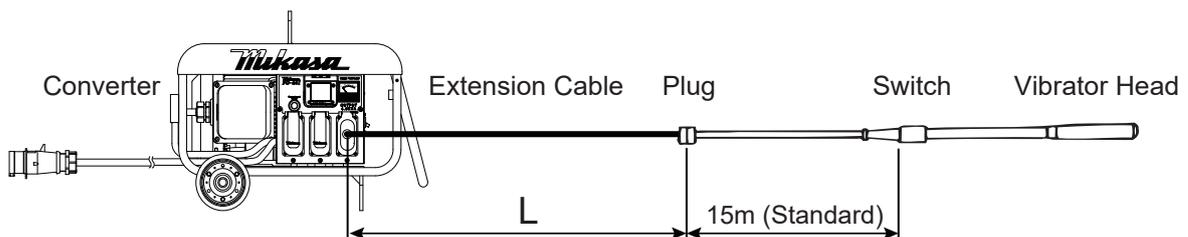
Model		FC-450		
Overall length		665 mm		
Overall width		570 mm		
Overall height		535 mm		
Total weight		105 kg		
INPUT	Phase	3 phase		
	Frequency	50 Hz		60 Hz
	Motor speed	3000 rpm		3600 rpm
	Voltage	380 V	400 V	
	Current	10.6 A	10.1 A	10.1A
	Power	5.5 KVA		
OUTPUT	Phase	3 phase		
	Frequency	200 Hz		240 Hz
	Voltage	48 V		
	Current	54 A		
	Power	4.5 KVA		
Number of outlets		3 pcs		
Power cable length		5 m		

5.2 Usable numbers of High Frequency Vibrators

Model	FX / FXS / FXB				FJ			FJH	
	30E(RE)	40G(RE)	50G(RE)	60E(RE)	150A	300S	750	550	750
FC-450	13	9	5	3	12	6	3	4	3

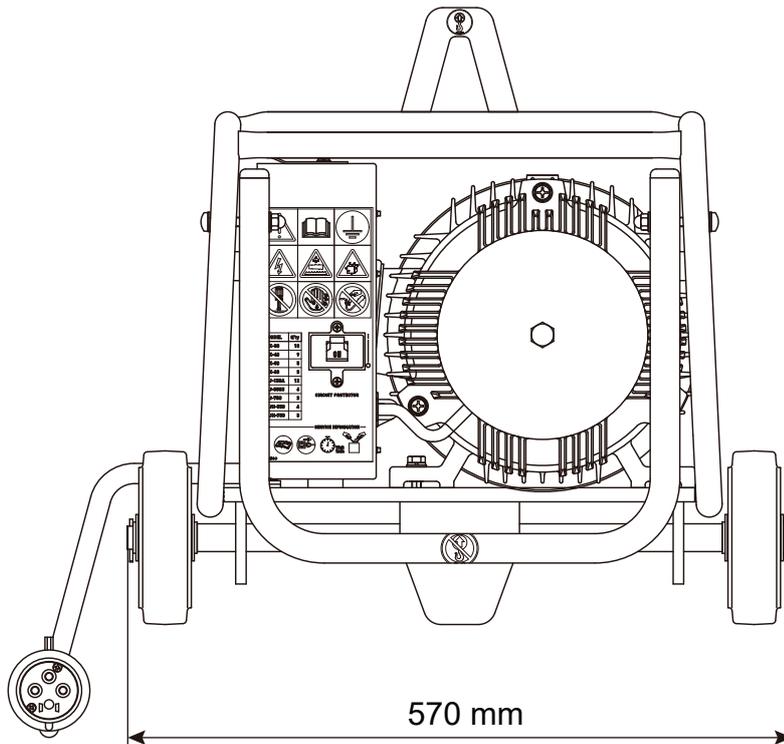
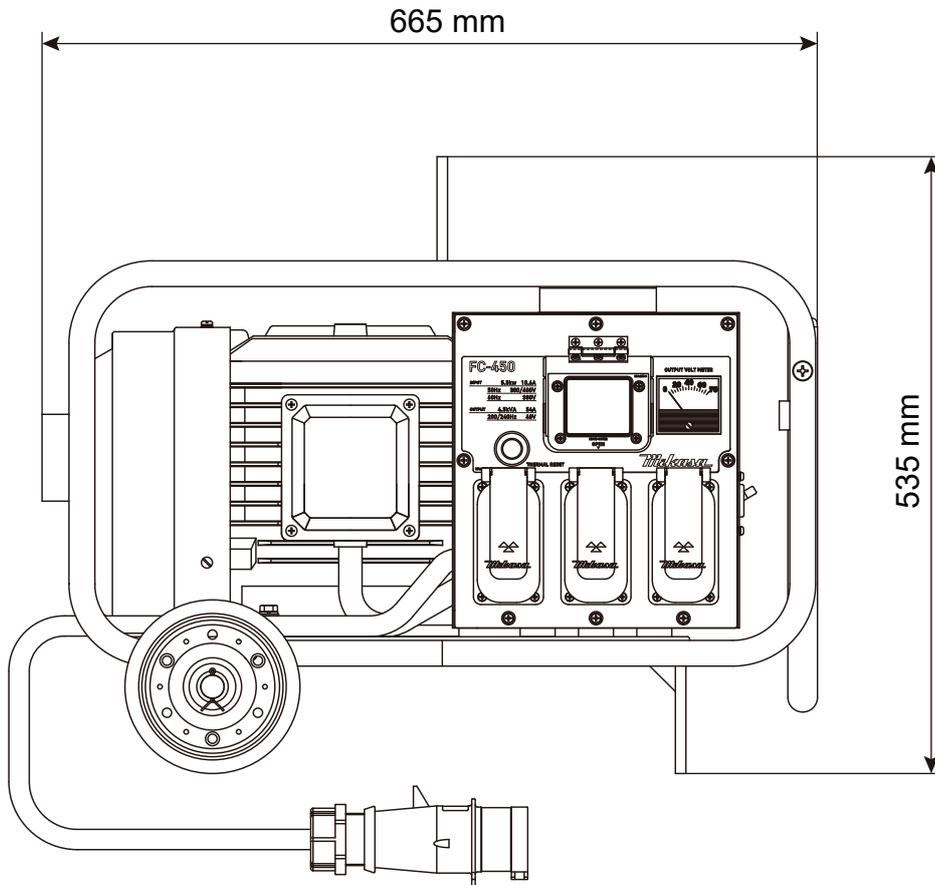
5.3 Extension Cable Length and Cable Size (between converter and vibrator)

Size of cable (cross-section area)	L (m)			
	FX-30E (RE)	FX-40E (RE)	FX-50E (RE)	FX-60E (RE)
2.0 mm ²	50	30	20	—
3.5 mm ²	80	50	30	—
5.5 mm ²	130	80	50	20
8 mm ²	200	120	80	35
14 mm ²	350	220	140	70

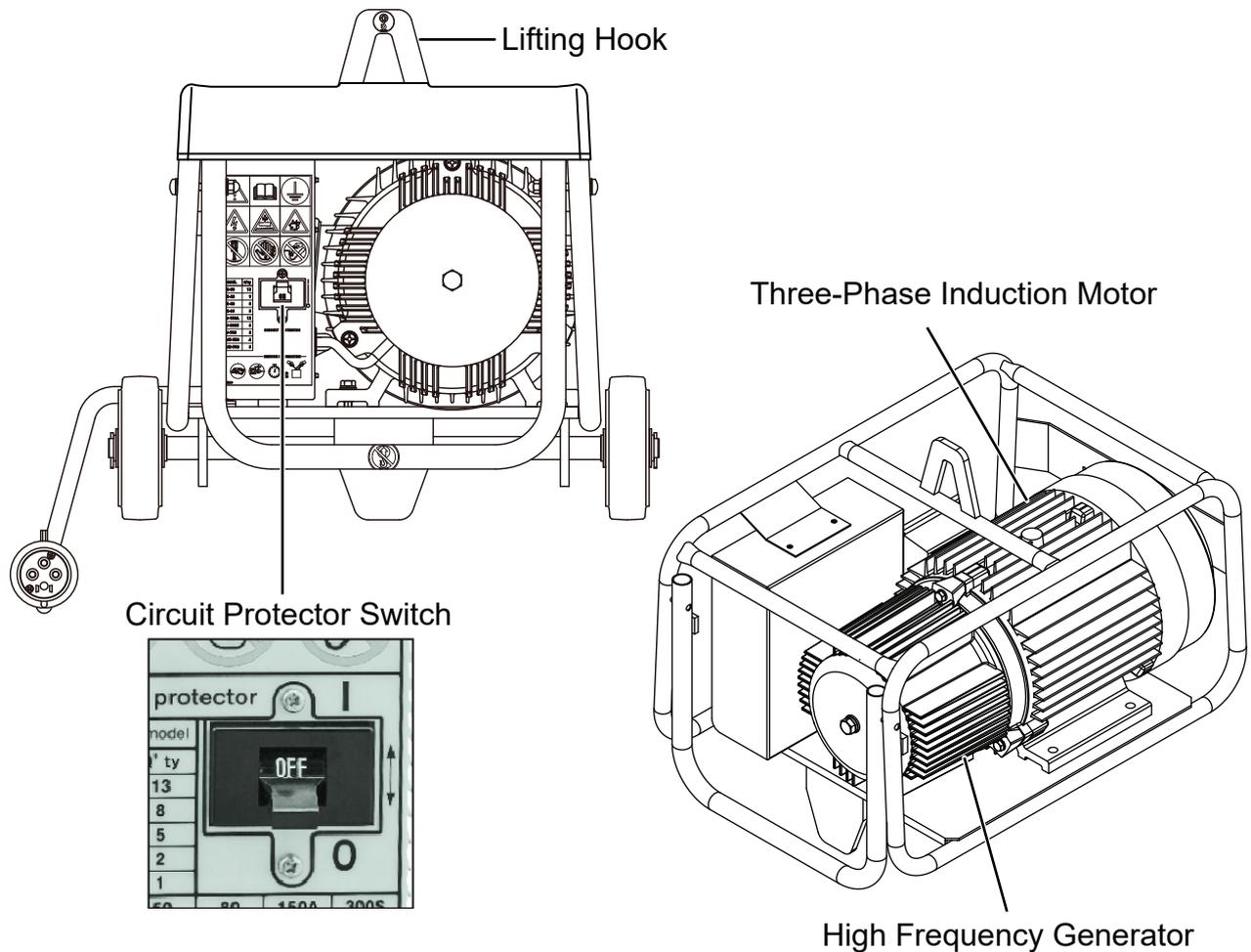
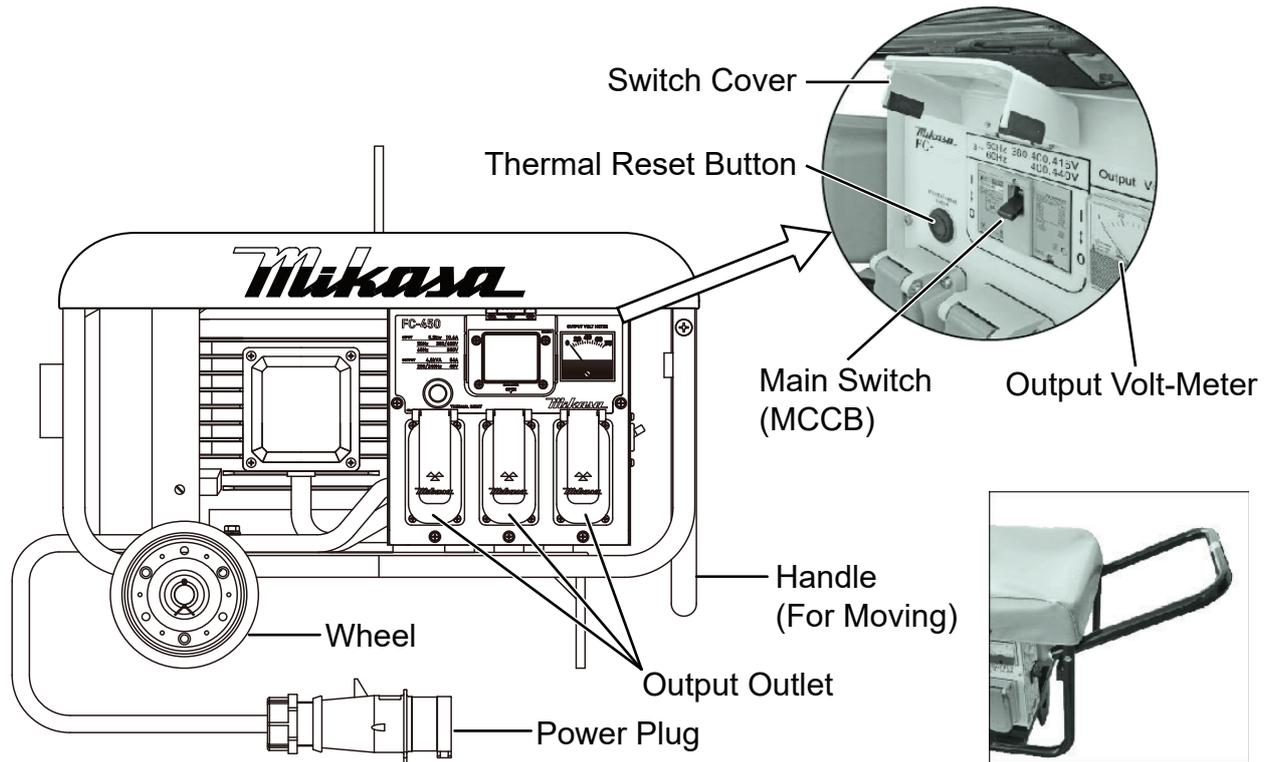


6. APPEARANCE

6.1 Overall Dimensions



6.2 Control Unit Positions And Names



7. OPERATION

- 7.1 Make sure that the power is appropriate for the specification of the converter. Also check to see if the voltage is in the normal range by using measurement device such as voltage tester and electrical circuit security device that can check the power rating.
- 7.2 Plug the power cord to the outlet.
- 7.3 Open the switch cover. Turn on the switch of main switch (MCCB). Read the output voltmeter of the converter to make sure it is 53V - 57V. (Fig.1, Fig.2)

⚠ CAUTION

If phase failure (current not flowing in one of the three phases) occurs at starting, the electromagnetic switch operates to disable the converter. If that happens, shut the power and solve the problem. Then, press the thermal reset button. For details, please refer to P.12 "Electromagnetic switch".

- 7.4 Make sure the switch of the machines (vibrator, self oscillating motor) is turned off.
- 7.5 Turn on the switch of circuit protector (secondary side). (Fig.3)
- 7.6 Securely insert the male plug of the machine all the way into the output outlet of the converter. (Fig.4)

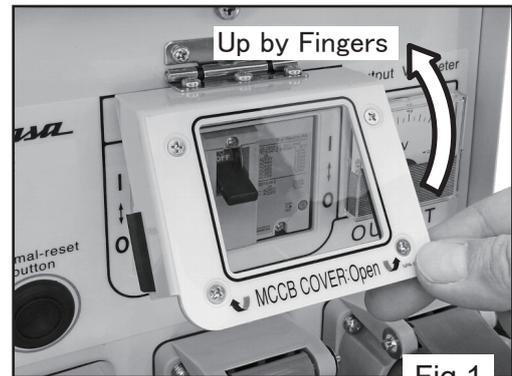


Fig.1

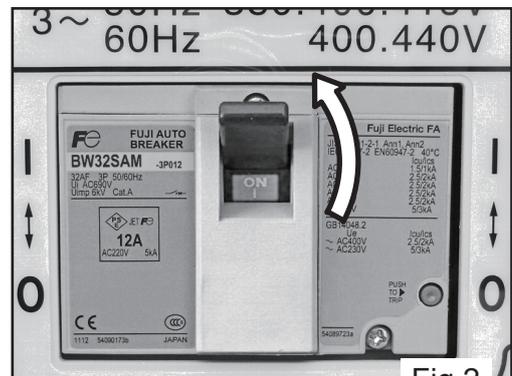


Fig.2

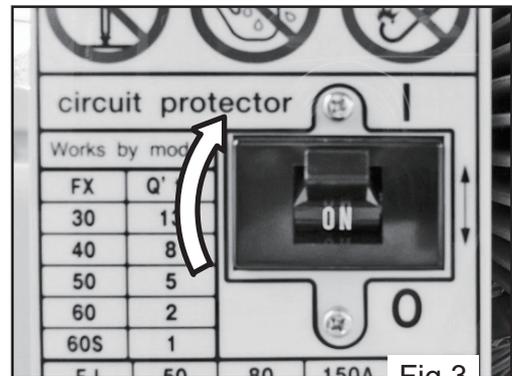


Fig.3

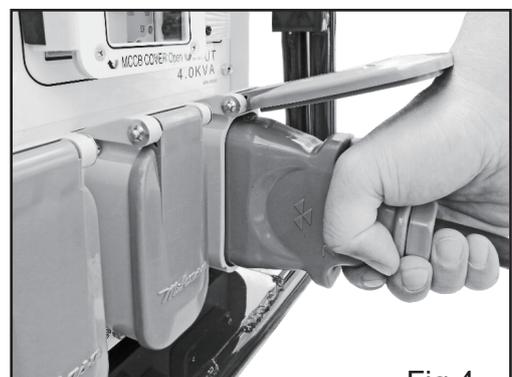


Fig.4

- 7.7 Check to make sure that the claw of the output outlet cover is securely catching the male plug and the plug does not come off even when the cord is pulled lightly. (Fig.5)
- 7.8 Start concrete casting by turning the switch of the machines (vibrator, self oscillating motor) one by one.

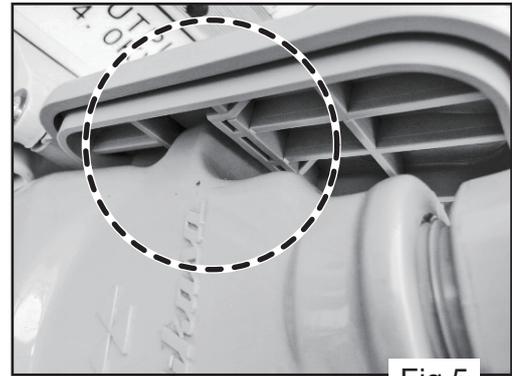


Fig.5

CAUTION

If there is an abnormality in the machine, the circuit breaker (secondary side) switch will turn off automatically. If that happens, first stop the converter for safety reason, then check the machines (vibrator, self oscillating motor) one by one. After the problem is solved, turn the switch on again.

ELECTROMAGNETIC SWITCH

7.9 This converter contains an “electromagnetic switch”. The electromagnetic switch shuts the power automatically if the following condition exists.

- **Before operation**
 - a) Phase failure (current not flowing in one of the three phases before starting)
- **During operation**
 - a) Abnormal heat generation (thermal abnormality) of the motor during operation
 - b) Phase failure during operation (current not flowing in one of the three phases during operation)

- **Recovery method**

For abnormal heat generation (thermal abnormality), wait until the converter cools down, then press the thermal reset button on the front of the control box. (Fig.6)

For phase failure, check the power plug outlet. If the problem is solved, the electromagnetic switch will return to normal to let the current flow. In case if the electromagnetic switch still does not let the current flow, there might be trouble with the converter. Shut the power safely by paying attention to the risk of electric shock and electric leakage, and have the converter checked and repaired.

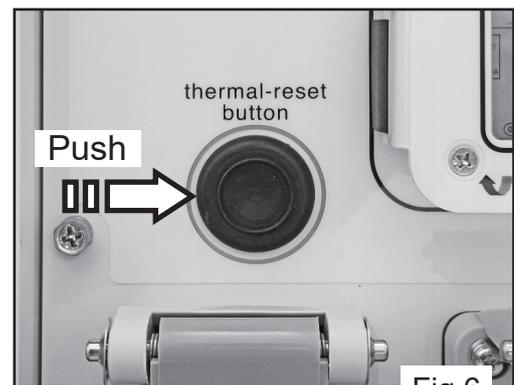


Fig.6

CAUTION

For recovery process of the electromagnetic switch, always turn off the main switch (MCCB) and the circuit protector (secondary side) first.

8. STOP OPERATION

- 8.1 After concrete casting work is finished, turn off the switch of the machines one by one. Then, unplug the machines from the output outlet.
- 8.2 Turn off the switch of circuit protector (secondary side). (Fig.7)

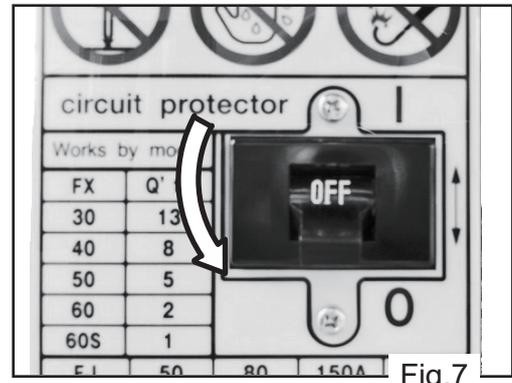


Fig.7

- 8.3 Open the switch cover, and turn off the switch of the main switch (MCCB). (Fig.8. Fig.9)

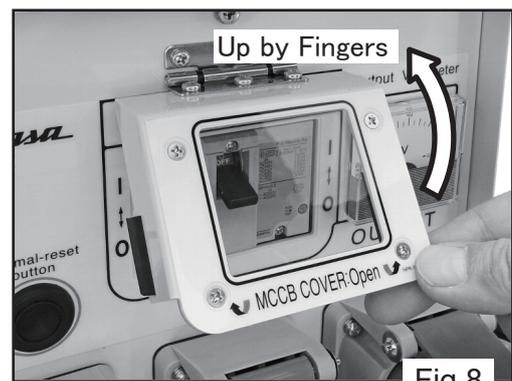


Fig.8

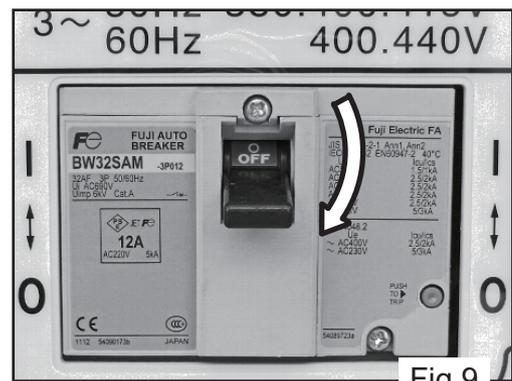


Fig.9

9. MAINTENANCE AND STORAGE

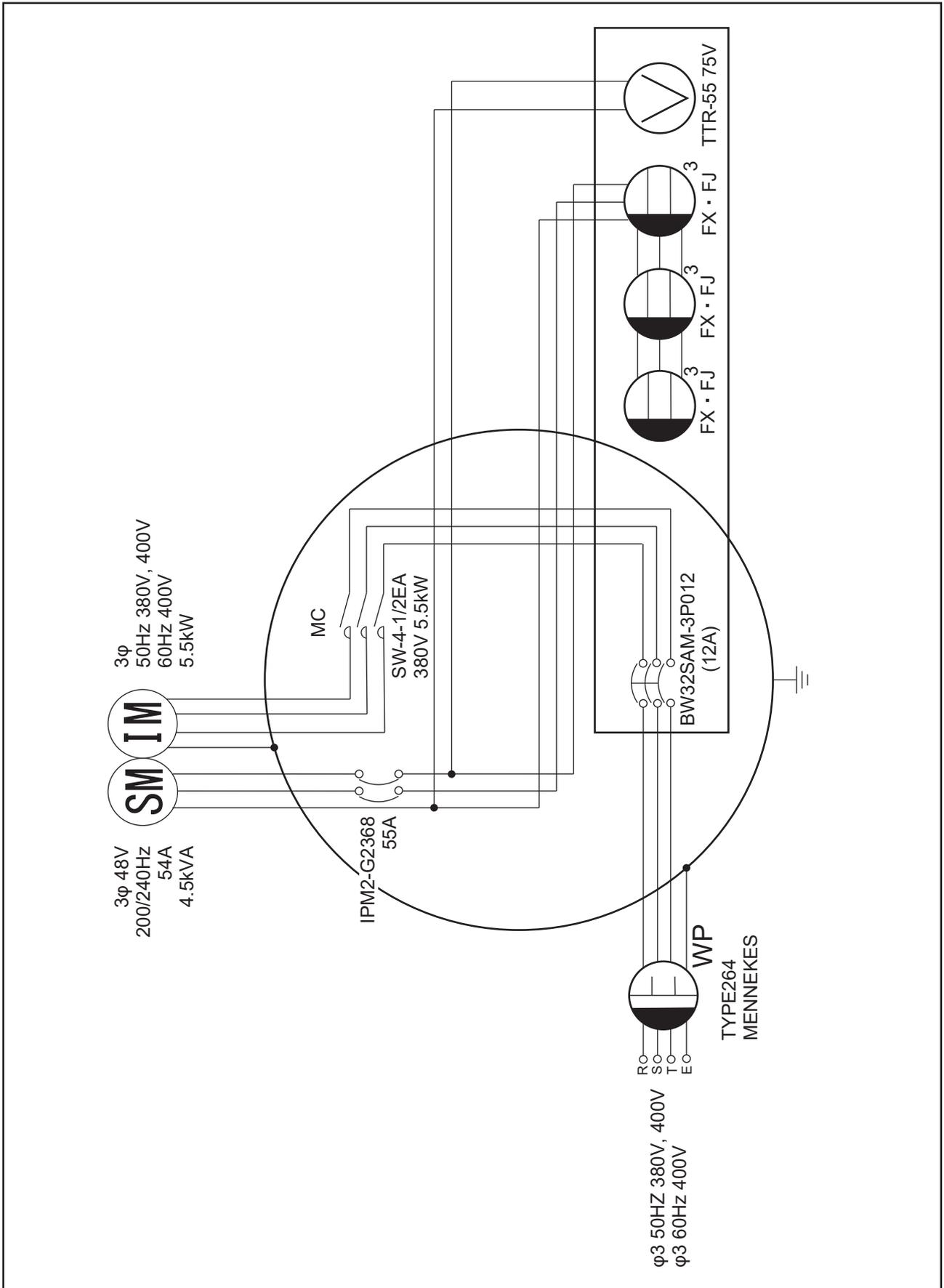
- 9.1 Check the power plug and outlet to see if they are dirty or have rust, deformation or breakage.
- 9.2 Check the power cord to see if it is worn, cracked or crushed.
- 9.3 Check the switches to see if there is looseness or breakage.
- 9.4 Wipe off the mortar, etc. attached on the converter after the work is finished.
- 9.5 Do not wash the converter in water.
- 9.6 Check each part for loosened screws and bolts.
- 9.7 Store indoor protected from rain or water.
- 9.8 To prevent accumulation of dust, use the cover that comes with the converter.
If lost or damaged, replace it with a new one.

10. TROUBLE SHOOTING

<p>1</p>	<p>Connect the input plug to the primary power source. But it does not cause solenoid contactor to turn ON.</p>	<p>CAUSES</p> <p>a. Power source defective. (Open phase or input voltage too low). - Check the power source.</p> <p>b. Solenoid contactor (relay) defective. (Contact melted or deficient connection.) - Replace or connect properly. * Apply proper primary voltage (see the name plate of the connector) to voltage coil of the relay. Excessively low voltage develops a chattering, causing the contact to melt.</p> <p>c. Breaker switch is OFF. (Due to overheating, impact or vibration, the breaker switch may go OFF.) - Return it to ON. (If thermal switch is actuating... overheated ..., allow it to cool down before turning it ON.)</p>
<p>2</p>	<p>Turning ON the starter switch, but it does not cause the converter to start..</p>	<p>CAUSES</p> <p>a. Starter switch (γ-Δ switch) defective or connection deficient. - Replace or connect properly.</p> <p>b. Stator coil on motor end defective, due to burning, broken wire or deficient connection. - Replace or rewind.</p> <p>c. Wirings deficient Broken or defective lead wire connection, or improper wiring. - Replace lead wire, correct defective connection for normal wiring.</p>
<p>3</p>	<p>Troubles after starting. 3.1 Secondary voltage improper after starting.</p>	<p>CAUSES</p> <p>a. Input power source improper, voltage too low (generator capacity insufficient or cable too long), or voltages not balanced. - Correct the input power source.</p> <p>b. Stator or rotor on motor end defective due to burning or broken wire. - Replace or rewind</p> <p>c. Connection between motor and generator ends improper. Motor end and generator end should electrically turn in opposite direction, but they do not. - Reverse two phases on motor end.</p> <p>d. Contact between carbon brush and slip ring deficient due to excessively worn carbon brush, no contact or defect on sliding surfaces of carbon brush and slip ring. - Replace carbon brush, regrind slip ring, etc.</p>

<p>3</p>	<p>3.2 Although normal secondary voltage is powered, at no load operation, it drops when load is applied.</p>	<p>CAUSES</p> <ul style="list-style-type: none"> a. Load (attachment) defective, due to overloading, open phase, short circuit or deficient contact. <ul style="list-style-type: none"> - Correct the load. b. Input capacity insufficient. Capacity insufficient when generator is used. <ul style="list-style-type: none"> - Use the one with normal capacity. c. Rotor or stator coil defective, due to burning or deficient contact. <ul style="list-style-type: none"> - Replace or rewind.
<p>3</p>	<p>3.3 Thermal switch actuates due to overheating.</p>	<p>CAUSES</p> <ul style="list-style-type: none"> a. Converter cooling ventilation inlet or outlet blocks up. <ul style="list-style-type: none"> - Remove obstacle. b. Load excessive, open phase or short circuit. <ul style="list-style-type: none"> - Correct the load. c. Voltages of three phases not balanced. <ul style="list-style-type: none"> - Correct to be normal. d. Rotor or stator is short circuit or burnt. <ul style="list-style-type: none"> - Rewind or replace.
<p>3</p>	<p>3.4 High noise of rotation.</p>	<p>CAUSES</p> <ul style="list-style-type: none"> a. Bearing defective <ul style="list-style-type: none"> - Replace bearing. b. Rotor or stator defective. <ul style="list-style-type: none"> - Rewind or replace.

11. WIRING DIAGRAM



Mikasa

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