**Portable Automatic Gas Cutting Machine** 



# EDGE-CUT

# **OPERATION MANUAL**



KOIKE SANSO KOGYO CO., LTD.

### INTRODUCTION

- Thank you very much for purchasing this product. Read this operation manual thoroughly to ensure correct, safe and effective use of the machine. Read the manual first to understand how to operate and maintain the machine.
- Cooperation between colleagues in the workplace is essential for safe, smooth operation. Make sure you read, understand and take all necessary safety precautions.

### SAFETY PRECAUTIONS

- This product is designed to be safe, but it can cause serious accidents if not operated correctly. Those who operate and repair this machine must read this manual thoroughly before operating, inspecting and maintaining the machine. Keep the manual near the machine so that anyone operates the machine can refer to it as necessary.
- Do not use the machine carelessly without following the instructions in the manual.
- Use the machine only after you have completely understood the contents of the manual.
- If an explanation in the manual is difficult to understand, contact our company or sales service office.
- ■Keep the manual to hand at all times and read it as many times as is necessary for a complete understanding.
- If the manual becomes lost or damaged, place an order with our company or sales service office for a new one.
- When transferring the machine to a new owner, be sure to hand over this instruction manual as well.

# **QUALIFICATIONS FOR MACHINE OPERATOR**

Operators and repair staff of this machine must completely understand the contents of the instruction manual and have either of the following qualifications:

- 1. Gas welding foremen's license
- 2. Completion of gas welding training course
- 3. Approval by the Minister of Labor

| Symbol     | Title                                      | Meaning   |
|------------|--|---|
|            | General                                    | General caution, warning, and danger.   |
|            | Be careful not to get your fingers caught. | Possible injury to fingers if caught in the insertion port.   |
| Æ          | Caution: Electric shock!                   | Possible electric shock under special conditions.   |
| •          | Ground this equipment.                     | Operators must ground the equipment using the safety grounding terminal.  |
|            | Pull out the power plug from the outlet.   | Operators must unplug the power plug from the outlet when a failure occurs or when there is a danger of lightning damage. |
|            | Caution against bursting                   | Possible bursting under certain conditions.   |
| $\bigcirc$ | General                                    | General warning.  |
|            | Caution: Hot!                              | Possible injury due to high temperature under certain conditions.   |
|            | Caution: Ignition!                         | Possible ignition under certain conditions.   |

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# **1** Safety information

Many accidents are caused by operation, inspection, and maintenance which disregard the basic safety rules. Carefully read, understand, and master the safety measures and precautions described in this instruction manual and on the machine before operating, inspecting, and maintaining the machine.

The safety messages are classified as indicated on the machine safety labels:





This word is used in a warning message and a warning label is positioned at places that could cause injury or serious accident.

# **ECAUTION**

This word is used in a caution message and a caution label is positioned at places that could cause slight injury or machine damage. This is also used as a caution for frequent dangerous actions.

# **NOTICE SIGNS**



This is a sign to show machine operators and maintenance engineers items that relate directly to damage of machines and surrounding facilities and equipment.

### **1.1 General machine safety precautions**

Read and fully understand the following important safety information:

### **1.1.1 Machine safety**

- 1. The machine casing is mainly made of aluminum alloy to reduce weight. For this reason, be careful not to drop a heavy item on the machine, or not drop the machine when carrying it, since the alloy is not designed to withstand such impact.
- 2. When mounting hoses to the torch and distributor, tighten the nut with the attached wrench. After mounting, be sure to check there is no gas leak with a detection liquid. If a gas leak is found, retighten the nut firmly.
- 3. When fixing a tip to the torch, tighten the nut with the two wrenches attached. In addition, avoid damaging the taper part of the tip since this may cause backfire.
- 4.Never disassemble the machine other than during maintenance and inspection. Otherwise, malfunction will result.
- 5.Never remodel the machine. Remodeling is very dangerous.
- 6. Always turn the power off when not in use.
- 7. Never use the machine outdoors when the weather is wet. This will cause failure of the machine and could cause a fatal accident by electric shock.

### 1.1.2 Safety clothing

1.Be sure to wear protector's gauntlets, goggles, helmet, and safety shoes during operation.

2. Avoid operating the machine with wet clothes or hands in order to prevent electric shock.

### **1.1.3 Operation and handling safety precautions**

- 1. Read this instruction manual before operating the machine.
- 2. Mount and center the machine correctly and confirm correct motion before operation.
- 3. Before connecting the power plug to the outlet, make sure that the power switch is in the OFF position (or the normal/reverse changeover switch is in the stop position).
- 4. Prior to operating the machine, check the safety of the surroundings to avoid accidents.
- 5. Never move the machine while the preheat flame is on.
- 6. Take great care of spatters and dross when operating the machine at a high position. They may injure people below.
- 7. Correctly fix the head shield so that it will not touch the plate
- 8. Screw the horizontal bar with the pan-head screw (SP-5x16) on the horizontal bar holder.
- 9. Always close the PO and GAS valves when not in use.
- 10. Intentionally throwing or dropping the equipment may not only shorten the service life of the equipment, but may also damage the valve and cause gas a leakage.
- 11. Do not place the equipment directly on sandy or muddy ground.
- 12. Be sure to hold the handle when carrying the machine.

### **1.1.4 Electrical system precautions**



- 1. Be sure to check the input power voltage of the machine before operation. The input power voltage should be in the range of  $\pm 10\%$  of the rated voltage. The machine should not be operated out of this range.
- 2. The metal plugs are screw-threaded, therefore, fully tighten them so that they will not come loose during operation.
- 3. The ground pin is attached to the rubber plug of a cabtyre cord. Please use a power receptacle with a ground pin opening.
- 4. Stop operation and turn off the power in the following cases, and ask a qualified electrician to repair the machine.



1)Broken or abraded cables

2)When the machine has been in contact with water, or in case of liquid damage to the machine.

3)Abnormal machine operation despite operating the machine according to the instruction manual4)Machine breakdown

- 5)Poor machine performance that requires repair
- 5. Periodically inspect the electrical system.

### **1.1.5 Maintenance and inspection precautions**

- 1. Ask a qualified electrician to perform repair and inspection service.
- 2. Disconnect the power plug before inspecting and repairing the machine.
- 3. Maintain the machine periodically.



EDGE-CUT

### **1.2 Gas cutting safety precautions**

Strictly observe the safety rules and precautions to ensure the safety of gas cutting operations. Operators and supervisors MUST keep safety in mind.

### **1.2.1 Prevention of explosion**



- 1. Never cut pressurized cylinders or hermetically sealed containers.
- 2. Ensure sufficient ventilation for gas cutting to prevent the air from becoming stale.

### **1.2.2 Pressure regulator safety precautions**

- 1. Before starting operation, check that all pressure regulators are operating correctly.
- 2. Ask a skilled repair engineer to perform maintenance and inspection service.
- 3. Do not use pressure regulators from which gas is leaking, nor malfunctioning pressure regulators.
- 4. Do not use pressure regulators smeared with oil or grease.

### **1.2.3 High Pressure gas cylinder safety precautions**

- 1. Never use broken cylinders or cylinders from which gas are leaking.
- 2. Install cylinders upright and take measures to prevent them from falling.
- 3. Use cylinders only for specified purposes.
- 4. Do not smear container valves with oil or grease.
- 5. Install cylinders in a place free from heat, sparks, slag, and open flame.
- Contact the distributor if the container valves will not open.
   Never use a hammer, wrench, or other tools to forcibly open container valves.

### 1.2.4 Safety precautions for hoses



- 1. Use the oxygen hose for oxygen gas only.
- 2. Replace cracked hoses or other hoses damaged by sparks, heat, unshielded fire, etc.
- 3. Install hoses without twisting.
- 4. To prevent breakage of hoses, take great care during operation and transportation.
- 5. Do not hold the hoses when moving the machine.
- 6. Periodically check the hoses for damage, leakage, fatigue, loose joints, etc, to ensure safety.
- 7.Cut hoses to the minimum possible length. Short hoses reduce hose damage and pressure drop, as well as reduce the flow resistance.

### **1.2.5 Safety precautions for fire**



Take safety precautions to prevent fire prior to gas cutting. Ignoring hot metal, sparks, and slag could cause a fire.

- 1.Keep a fire extinguisher, fire extinguish sand, bucket full of water, etc. ready on the site where gas cutting is performed.
- 2.Keep flammables away from the cutting area to avoid exposure to sparks.
- 3.Always cool down steel plates that have become hot after cutting, as well as hot cut parts or scrap, before bringing them close to flammables.
- 4.Never cut containers to which flammable materials are stuck.



### **1.2.6 Safety precautions for skin burns**



Observe the safety precautions to prevent skin burns. Ignoring heat, spatter, and sparks during operation could cause a fire or burned skin.

- 1. Do not perform cutting near flammables. (Move flammables well away from the sparks.)
- 2. Do not cut containers filled with flammables.
- 3. Do not keep lighters, matches, and other flammables nearby.
- 4. Flames from the torch will burn the skin. Keep your body away from the torch and tip, and check the safety before operating the switches and valves.
- 5. Wear the correct protectors to protect your eyes and body.
- 6. Correctly tighten the tip to prevent backfire.
  - •When fixing a tip to the torch, tighten the nut with the two wrenches attached.
  - If the tip is tightened excessively, it will be heated during cutting and tightened still more, making it difficult to remove the tip.
  - Avoid damaging the taper of the tip since this may cause backfire.
- 7.Check with soapsuds for any leakage of gas from the connection part of the distributor, hose and torch.

Never use oil or grease on the connection of the oxygen pipe to avoid backfire which may lead to explosion.

- 8. Be sure to check the following when igniting:
  - Place the torch on the torch holder before igniting.
  - Always wear the required protectors (gauntlets, helmet, goggles, etc.)
  - Check for any obstacles, dangerous materials and flammables near or in the direction of cutting. Determine the gas pressure.
  - The gas pressure must be within the appropriate range. (For the gas pressure, refer to the Cutting Data.)
- 9. The torch, tip and heat shield are heated to a very high temperature. Always wear gauntlets when handling them. Also the surface after cutting is very hot so do not touch it even while wearing gauntlets.
- 10.Never move the machine while the preheat flame is on.

# 2 Locations of safety labels

Safety labels and other labels for correct operation are affixed to the machine.

· Carefully read the labels and follow the instructions on them when operating the machine.

• Never remove the labels. Keep them clean and legible at all times.



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|------------|------------------------------|----------|
| SERIAL NO. | AC.                          | ۷        |
| KOIKE      | SANSO KOGYO<br>MADE IN JAPAN | CO.,LTD. |

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| NET<br>WEIGHT | K9 |
|---------------|----|
|---------------|----|

# **3** Outline of the machine

### 3.1 Features of the machine

The EDGE-CUT achieves high-quality cutting of the X-shaped grooves only by one unit although it has conventionally been done by two portable cutting machines. By copying the sheet steel edge with a roller, high-quality groove cutting is possible. This machine has originally been developed as a result of intensive research of the field work in users' precincts.

This machine has the following features:

- 1) Clutch operation and speed control can be done only by gripping the handle with one hand.
- 2) Valves with a preset function eliminate complicate operation of the flame adjustment gas valve.
- 3) Thorough measures for thermal insulation (for the bottom surface, side surface and wheel) can block heat so that the speed does not change during cutting.
- 4) Mounting the copy roller ensures high-quality cutting.
- 5) The smoothly operating torch holder quickly responds to a change of root face during cutting. A rack type and a screw type are available.
- 6) A bottom roller and a handle are mounted for improving workability at the start and end of cutting.
- 7) Type 100 specifications are optionally available.

### 3.2 Name and function of each section



| (1)     | Cross feed handle A'ssy   |
|---------|---|
|         | Positional regulation of the torch in horizontal position                       |
| (2)     | Vertical handle A'ssy   |
|         | Positional regulation of the torch in vertical position                         |
| (3)     | Off-center torch  |
|         | Cuts a maximum length of 50 mm of grooves                                       |
|         | NOTE) A type 100 torch is also available.                                       |
| (4)     | Heat shield   |
|         | Mounted on three sections including the bottom surface, side surface and wheel  |
| (5)     | Speed control handle  |
|         | The operation speed is made higher when the handle is turned clockwise, and the |
|         | speed lower when the handle turned counter-clockwise                            |
| (6)     | Wing bolt   |
| (7)     | Clutch lever  |
|         | Griped to make free the machine body  |
| (8)     | Direction switch  |
|         | Switching forward and backward movements and stoppage                           |
| (9)     | Grip  |
| (10)    | Receptacle  |
|         | Cabtyre cord for power supply   |
| (11)    | Handle  |
|         | Supports the machine at the start and end of cutting                            |
| (12)    | Wing bolt   |
|         | Adjusts the copy roller position in the right/left direction                    |
| (13)    | Twin valve A'ssy (JOX)  |
|         | Adjusts the flow of cutting oxygen  |
| (14)    | Twin valve A'ssy (POX)  |
| <i></i> | Adjusts the flow of preheating oxygen   |
| (15)    | I win valve A'ssy (FG)  |
| (10)    | Adjusts the flow of fuel gas  |
| (16)    |   |
|         | Opens/closes cutting oxygen, preheating oxygen and fuel gas                     |

For details, refer to Page 11.

- (17) Foregoing torch
- (18) Following torch

# 3.3 Specifications

| Item   | Specifications  |  |
|--|---|--|
| Model  | EDGE-CUT  |  |
| Overall length   | 402 mm  |  |
| Overall weight   | Off-center type: 11.5 kg, Type 100: 12.5 kg   |  |
| Cutting thickness Up to 50 mm in groove cutting length |   |  |
| Groove angle 0 ~ 45°                                   |   |  |
| Cutting speed  | 100 ~ 1000 mm/min   |  |
| Used tip nozzle  | Off-center type: Type 300 tip nozzle<br>Type 100: Type 100 tip nozzle                             |  |
| Used gas   | Oxygen, acetylene, or LPG gas   |  |
| Tracing method   | Tracing of sheet steel end face   |  |
| Heat shield  | Insulation material inside + Lower thermal insulation plate (bottom surface, side surface, wheel) |  |
| Clutch   | Trigger type  |  |
| Direction switch                                       | Advance-stop-return   |  |
| Gas operation  | Valve with preset function  |  |
| Motor  | DC24V   |  |

# 4 Preparation for operation

### 4.1 Contents of package

The standard package includes the following items. Check the contents before assembling.

| Construction                                   | Off-center type   | Type 100   |
|--|---|--|
| Main unit                                      | 0   | 0  |
| Valve with preset function                     | 0   | 0  |
| Torch  | 300-type  | Type 100   |
| Weight   | ×   | 0  |
| Cross bar A'ssy of the<br>following torch      | 2 0 0 L   | 300L   |
| Cross bar A'ssy of the<br>foregoing torch      | 2 0 0 L   | 3 O O L  |
| Cross bar A'ssy of the guide copy roller A'ssy | 150L  | 2 5 0 L  |
| Hoses  | Foregoing side: 900 (L),<br>3 pcs./set<br>Following side: 600 (L),<br>3 pcs./set    | Foregoing side: 900 (L),<br>3 pcs./set<br>Following side: 600 (L),<br>3 pcs./set |
| Power cord (3P x 5 m)                          | 0   | 0  |
| Tip nozzle                                     | 301 No.0、1、2、3、4<br>302 No.12、13、14、15、16<br>or<br>306 No.15、16、17、18<br>2 pcs each | Type 100: No.0、1、2<br>2 pcs each   |
| Tip nozzle cleaning needle                     | 0   | 0  |
| Philips (+) driver                             | 0   | 0  |
| Spanner (3 pcs.)                               | 0   | 0  |
| Operation manual (this one)                    | 0   | 0  |
| Hexagon wrench (M6)                            | 0   | 0  |

### 4.2 Assembly of the machine

- 1. Take out the main unit from the package.
- 2. Mount the weight on the horizontal bar (only for the type 100 specification)
- 3. Connect the primary hose to the valve with a preset function.
  - Blue hose (for oxygen)
  - Orange hose (for LPG gas) or red hose (for acetylene)



### 4.3.1 Connection of power cord

- 1. Connect the power cord to the main unit.
- Connect the metal consent (plug) of the cabtyre cord to the metal consent (receptacle) of the machine. Before connection, check that there is no foreign matter or dust inside.
- 3. The metal consent is a screw type. Always tighten the screw to prevent the plug from coming off while the machine is traveling.

### 4.3.2 Connection of gas supply hose

- 1. Connect each gas supply hose to the main hose.
- 2. When connecting, tighten the hose securely and check that there is no gas leakage.

### 4.3.3 Connection of tip nozzle

1. Select a tip nozzle according to the thickness of the cutting material, and mount it on the blow pipe.

For selecting the tip nozzle, refer to the Tip Nozzle Capacity Standard Table. (Refer to Page 31.)

- When mounting the tip nozzle on the blow pipe, tighten them securely using two attached spanners.
- Do not tighten the tip nozzle excessively. Doing so may cause the tip nozzle to be heated during cutting resulting the tip nozzle to be further tightened to the blow pipe, making it difficult to dismount.
- Do not damage the tip nozzle mounting tapered section. Doing so may cause a backfire.

### 4.3.4 Use of valve with preset function



- (1) = Close Shuts off gas flow even when an adjusting valve is opened
- (2) = Ignite Supplies preheating oxygen and fuel gasOnce the flame is adjusted, setting the lever to this position and igniting achieve an appropriate preheating flame at all times.
- (3) = Cut Supplies all kinds of gas Cutting oxygen is discharged in addition to the preheating flame in (2) to start cutting.
   NOTE) When cleaning the tip nozzle, close the fuel valve first.
- (4) = Close Stops flowing all kinds of gas when the valve is manually turned in the direction of the arrow

|  | When gas is not supplied, even if it moves a lever to cutting (3), it may return to ignition (2).<br>If it is in a gas supply state, it will be held in the state of cutting (3).<br>It is not unusual. |
|--|---|
|--|---|

# 5 Cutting operation

### 5.1 Safety measures to take before operation

### 5.1.1 Grounding of earth cable



As safety measures for operators, check first that the input current and voltage are appropriate and the power connection is correct.

### Grounding of Earth Cable

• The ground pin is attached to the rubber plug of a cabtyre cord. Please use a power receptacle with a ground pin opening.

### 5.1.2 Selection of tip nozzle

Select an appropriate tip nozzle according to the thickness of sheet steel to cut, referring to the Tip Nozzle Capacity Standard Table. When the sheet steel is excessively rusty or the groove angle is more than 20°, use a tip nozzle listed on the top of the Standard Table.

### 5.1.3 Operation of travel direction selector switch

- Change over the travel direction between advance and return with the travel direction selector switch. The neutral position is to stop the machine.
- When changing over the travel direction, stop the machine first by setting the selector switch back to the stop (neutral) position.
- Always place the selector switch to the stop (neutral) position in other cases than traveling the machine.
- When turning on the power, set the travel direction selector switch to the stop (neutral) position.
- If this switch remains at the advance or return position when turning on the power, the machine starts traveling and constitutes hazardous situation.
- Never insert your hand(s) between the main unit and the sheet steel while the machine is traveling. Doing so may pinch your hand(s).

### 5.2 Ignition and flame adjustment

- Before ignition, adjust the gas pressure, referring to the Tip Nozzle Capacity Standard Table. The pressure listed in the table indicates a value when all valves are opened. After ignition, correct and adjust the pressure as required. (Refer to Page 29.)
- Adjustment of Flame
- 1. Open the fuel gas valve with a preset function by 1/4 to 1/2 turns, and pull the lever to the position (2) (for supplying preheating oxygen and fuel gas). After that ignite with a lighter. (Refer to Page 11.)
- 2. Immediately after ignition, open the preheating oxygen valve little by little to obtain a white spot of the standard flame. (The preferable white spot is 5 ? 6 mm in length and evenly generated.)
- 3. Fully open the cutting oxygen valve and pull the lever to the position (3) (for supplying cutting oxygen). (Refer to Page 11.) If the flame state changes, adjust it again. If the cutting aerial flow is unstable, it may affect the cutting surface quality. If the quality is low, clean the tip nozzle hole with the attached cleaning needle suited to the hole diameter while discharging the cutting oxygen.

### 5.3 Cutting operation

- Place the machine at a cutting position and adjust the copy roller to the sheet steel end face. (Adjust the copy roller height according to the sheet steel thickness.) NOTE) Set the machine main unit in parallel with the sheet plate end face.
- 2. Ignite the tip nozzle of the foregoing torch and the following torch in accordance with the procedure for flame adjustment.
- 3. Set down the normal/reverse switch in the cutting direction, while pressing the clutch to bring the foregoing torch to the cutting start point.
- 4. After preheating the sheet steel sufficiently, pull the lever and discharge cutting oxygen to start cutting. (Set the lever to the position (3).) Manually cut on the foregoing torch side, while using the bottom roller and the handle, until the following torch reaches the cutting start point.
- 5. When the following torch reaches the cutting start point, return the lever to shut off the cutting oxygen. (Set the lever to the position (2).)
- 6. Preheat the sheet steel and pull the lever. As soon as the cutting oxygen is discharged, release the clutch and travel the machine to cut on both the following torch side and the foregoing torch side.
- 7. Adjust to the optimum cutting speed with the speed control dial while checking the cutting status carefully.
- 8. After cutting is finished, return the lever and shut off all gases. (Set the lever to the position (4).)
- 9. Set the normal/reverse switch to the neutral position to stop traveling.
- 10. After cutting is completely finished, close the cutting oxygen valve, preheating oxygen valve and fuel gas valve with a preset function one by one in this order.

For the consequent operation, repeat the steps from item 1.

### 5.3.1 Groove cutting

When cutting in the inclined direction to make a groove, fix the blow pipe at a desired angle referring to the angle scale (5% scale) on the blow pipe support.

Since dimension L shown below is used as plate thickness in calculation, select the tip nozzle based on this dimension.

In order to cover the heating power reduced by the weakened flame, use a tip nozzle with a larger number by one than the specified.

Slightly increase the amount of oxygen used for the flame to improve the cutting efficiently.



# 5.4 Safety measures against backfire and flashback



### , ,

### 5.4.1 Prevention of backfire



Backfire may cause a serious accident or fire. Pay special attention to avoid this. If backfire occurs, always locate the cause, check and service equipment, and restore the normal status before using the machine.

Backfire may be caused under the following conditions:

- 1) Each gas pressure is not adjusted correctly.
- 2) The tip nozzle is heated.
- 3) Slag adheres to the tip nozzle hole.
- 4) The tip nozzle taper section or the blow pipe taper contact section is damaged.

### 5.4.2 Prevention of flashback



Flashback may cause a fire or equipment damage.

If the blow pipe hisses, stop operation immediately and take measures in the following procedure:

- 1) Close the preheating oxygen valve.
- 2) Close the fuel gas valve.
- 3) Close the cutting oxygen valve.

If flashback occurs, always locate the cause, check and service equipment, and restore the normal status before using the machine.

### 6 Maintenance and inspection

Inspect and take care of the machine, referring to the procedure below, in order to use the machine in the best conditions.

### 6.1 Disassembly of the machine

- 1. Dismount the handle (1) from the main unit.
- 2. Dismount the holder (3) of the following torch from the horizontal bar (2), and disconnect the distribution hose from each twin valve (4) with a preset function.
- 3. Loosen the hexagon head bolt (5) and dismount the assembly of the horizontal bar support (6), holder of the foregoing torch (7), and horizontal bar (8) to disconnect the distribution hose.
- 4. Loosen the hexagon head bolt (9) and dismount the guide copy roller assembly (10) from the main unit.
- 5. Loosen the hexagon head bolt (11) to dismount the external thermal insulation plate (12).
- 6. Dismount the lateral feed table assembly (13) and the gear box cover (14) from the main unit.
- 7. Loosen the caster fixing bolts and dismount the caster (15).
- 8. Remove four screws (16) and dismount the bottom thermal insulation plate assembly (17).
- 9. Remove the screws and dismount the lower case (18) from the main unit.
- 10. Remove three screws on the handle of the main unit cover (19) and dismount the connector (6-pin type) to separate the knob (20) from the main unit.
- 11. Remove two screws (21) that fix the controller, and separate the main unit cover (19) from the controller.
- 12. Remove the connecting terminal of the fan mounted on the main unit case.
- 13. Disconnect the lead wire of the motor from the connector.
- 14. Dismount the main unit cover (19) from the gear box (22).

The above procedure completes the disassembly of the main unit. After finishing maintenance and inspection, assemble the machine again in the correct procedure.



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### 6.2 Disassembly for maintenance and inspection of the gear box

- 1. Loosen the set screw (2) of the clutch joint (A) (1) inside the gear box, and dismount the clutch shaft (3) and the clutch joint (A) from the gear box.
- 2. Remove the spring support (4) and dismount the spring (5).
- 3. Remove the screw (6) that fixes the worm.
- 4. Remove the screw (7) that fixes the motor, and take out the motor (8) and the gear head (9).
- 5. Remove the fixing bolts of the drive wheel (10) and the idle wheel (11) to dismount the drive wheel and the idle wheel.
- 6. Remove the bearing support (12).(Lightly tap it with a punch and a hammer to turn in the counterclockwise direction.)
- 7. Take out the drive shaft together with the gear.
- 8. Clean the inside with washing oil, etc.
- 9. Assemble in the reverse procedure  $(10) \sim (3)$ . Check that the clutch lever fits in the clutch groove securely when assembling.



### 6.3 Daily inspection

- 1. Remove dust and iron powder from the horizontal bar rack and the lateral feed handle pinion.
- Apply machine oil to the caster axle.
   Supply grease to the balls if the caster does not operate smoothly.

### 6.4 Semi-yearly or every 1000-hour inspection

- 1. Remove dust from the control board and transformer attached to the case.
- 2. Check if there is sufficient grease in the gear box. If not, supply it.

### 6.5 Yearly or every 2000-hour inspection

1. Disassemble and clean the gear box, and supply a moderate amount of grease. (Use a type of grease designated by Koike.)

2. When assembling, check that the clutch lever fits in the clutch groove securely.

# 7 Troubleshooting

|  | 1. | The machine does not operate. | (The motor does not rotate.) |
|--|----|-------------------------------|------------------------------|
|--|----|-------------------------------|------------------------------|

| Cause |  | Check Point  | Measures   |
|-------|--|--|--|
| 1)    | Power is not supplied.   | Check the power supply and power cord connection.  |  |
| 2)    | The power cord is disconnected.                                      | Check the cord for continuity using a tester. If the tester indicator over-swings, the cord is disconnected. | Repair the disconnection or replace the cord.    |
| 3)    | The connecting section is faulty.                                    | Check the connector for the correct connection.  | Connect again.                                   |
| 4)    | Any switch is faulty.  | Dismount the switch and check continuity between terminals using a tester.                                   | Replace, if it is faulty.                        |
| 5)    | Any volume is disconnected.  | Check if the resistance is 5 K $\Omega$ using a tester.  | Replace, if it is faulty.                        |
| 6)    | The transformer is disconnected.                                     | Check continuity using a tester.   | Replace, if it is faulty.                        |
| 7)    | The lead wire is disconnected.                                       | Check each lead wire for continuity using a tester.  | Replace the faulty lead wire.                    |
| 8)    | Coils in the motor are faulty.                                       | If the above items are all normal, the motor may be faulty.  | Repair or replace with a new one.                |
| 9)    | The controller is<br>stopped due to<br>abnormal<br>temperature rise. | After cooling the main unit (for about 20 min.), turn on the drive switch again to check.                    | If it does not function, replace the controller. |

| 2. | . The machine does not operate. (The motor is rotating.) |   |                                  |  |
|----|--|---|----------------------------------|--|
|    | Cause  | Check Point   | Measures                         |  |
| 1) | The machine malfunctions.                                | Dismount the cover from the gear box, and check the clutch for operation.   | Disassemble to clean and repair. |  |
| 2) | The reduction gears idle.                                | The motor rotates even when the drive<br>wheel is manually pressed while the<br>normal/reverse switch is turned on. | Replace the gear head.           |  |

### 3. The machine operates but not normally.

|    | Cause                        | Check Point   | Measures   |
|----|------------------------------|---|--|
| 1) | The speed is too<br>fast.    | The power voltage is not normal.  | Check the voltage.   |
| 2) | Low speed is not available.  | <ol> <li>(1) The volume is faulty.</li> <li>(2) The wiring is faulty.</li> <li>(3) The motor is faulty.</li> </ol>  | Replace the volume.<br>Repair the wiring.<br>Repair or replace the<br>motor.   |
| 3) | High speed is not available. | The power voltage is lowered.   | Check the voltage using a tester.  |
| 4) | Speed is unstable.           | The gear is damaged.  | Replace the gear or lap it.<br>NOTE) Do not damage the<br>gear when disassembling<br>for repair.   |
| 5) | The speed is not adjustable. | The controller is faulty.   | Replace or repair.   |
| 6) | Knocking occurs.             | <ol> <li>The gear is worn out.</li> <li>The clutches (A) and (B) are<br/>engaged improperly.</li> <li>The clutch key is worn out.</li> <li>The shaft and the drive wheel are<br/>loosened.</li> <li>The rail surface in contact with the<br/>drive wheel has foreign matter or<br/>damage.</li> <li>The hose or cabtyre cord obstructs<br/>the traveling of the machine.</li> <li>The caster is faulty.</li> <li>The drive wheel and the idle wheel<br/>have damage or foreign matter.</li> </ol> | Replace.<br>Replace.<br>Replace or repair.<br>Replace or repair.<br>Call attention or repair.<br>Make consideration during<br>operation.<br>Replace or repair.<br>Replace or repair. |

# 8 Wiring diagram



Assembly drawing of EDGE-CUT Off-center type 9

# 9.1





# 9.2 Type 100





### 10 Parts list 10.1 Drive unit



| Drive unit |                         |      |           |             |
|------------|-------------------------|------|-----------|-------------|
| Item No.   | Part name               | Q'ty | Stock No. | Remarks     |
| 1          | Gear box                | 1    | 61003558  |             |
| 2          | Idle wheel A'ssy        | 1    | 60036804  |             |
| 3          | Collar                  | 1    | 60036806  |             |
| 4          | Gear box cover          | 1    | 61003561  |             |
| 5          | Drive wheel             | 1    | 61003549  |             |
| 6          | Drive shaft A'ssy       | 1    | 61005717  | with key    |
| 7          | Clutch (A)              | 1    | 60036404  |             |
| 8          | Worm gear               | 1    | 60036406  |             |
| 9          | Teflon packing          | 1    | 60036409  |             |
| 10         | Bearing retaining screw | 1    | 60030516  |             |
| 11         | Worm Wheel A'ssy        | 1    | 60030518  |             |
| 12         | Clutch lever            | 1    | 60030528  |             |
| 13         | Clutch lever shaft      | 1    | 60030534  |             |
| 14         | Lever spring            | 1    | 60030530  |             |
| 15         | Spring retainers        | 2    | 60030531  |             |
| 16         | Washer                  | 1    | 60031015  |             |
| 17         | Bearing retainer        | 1    | 60032591  |             |
| 18         | Motor A'ssy             | 1    | 61002409  | DME44S6HPB  |
| 19         | Gear head               | 1    | 60036437  | 6H90        |
| 20         | Bearing                 | 1    | 6A036200  | 6200ZZ      |
| 21         | Bearing                 | 1    | 6A036000  | 6000ZZ      |
| 22         | Bearing                 | 1    | 6A030606  | 606ZZ       |
| 23         | Spring pin              | 1    | 6B022518  | PR-2.5x18   |
| 24         | Hexagon bolt            | 2    | 6C030508  | BC-5x8      |
| 25         | Washer                  | 2    | 6D500050  | WF-5        |
| 26         | Screw                   | 1    | 6C520406  | SP-4x6      |
| 27         | Screw                   | 4    | 6C530440  | SP-4x40(WS) |
| 28         | Wing bolt               | 1    | 6C110612  | BS-6x12     |
| 29         | Screw                   | 4    | 6C530412  | SP-4x12(WS) |
| 139        | Wave washer             | 2    | 60036966  | BWW-6200    |
| 140        | Washer                  | 1    | 60036807  |             |
| 141        | Spring pin              | 1    | 6B022518  | PR-2.5x18   |
| 143        | Heat shield             | 1    | 60033878  |             |
| 144        | Hexagon bolt            | 3    | 6C030612  | BC-6x12     |
| 145        | Washer                  | 6    | 6D500060  | WF-6        |
|            |                         |      |           |             |
|            |                         |      |           |             |



| Main    | hod  | and | electric | com   | nonents |
|---------|------|-----|----------|-------|---------|
| iviairi | bouy | anu | electric | COILI | ponents |

| 30         Lower casing         1         61003559           31         Grip         1         61003569           32         Cover         1         60036813           33         Clutch joint A'say (A)         2         60036827           34         Clutch joint A'say (B)         2         60036828           35         Clutch joint A'say (B)         2         60036820           39         Spring shaft         1         60036822           40         Switch mounting plate         1         60036822           41         Inner heat shield         1         61003355           42         Colar         1         60036842           46         Speed control handle         1         60036842           47         Cuide wheel A'say         1         60036843           48         Wing bolt         1         6C110615         BS-6x15           51         Raceptacle         1         6N100061         NCS-253-R           52         Direction switch         1         60036435         For 10V-220V           54         Controller         1         60036443         For 42V           56         Speed-sating VR         4  | Item No. | Part name                    | Q'ty   | Stock No. | Remarks         |
|--|----------|------------------------------|--------|-----------|-----------------|
| 31         Grip         1         61003560           32         Cover         1         60036813           33         Clutch joint Asy (A)         2         60036823           34         Clutch joint Asy (A)         2         60036823           35         Clutch joint Asy (A)         2         60036823           36         Base plate mounting brackets         2         60036824           37         Lever shaft         1         60036821           40         Syning shaft         1         60036621           41         Inner heat shield         1         61003355           43         Handle         1         60036624           44         Colar         1         60036627           45         Speed control handle         1         60036627           46         Speed control handle         1         60036627           47         Guide wheel Assy         1         60036627           48         Wing bolt         1         60036643           47         Guide wheel Assy         1         60036641           50         Name plate         1         6003643           60         Nastion         1  | 30       | Lower casing                 | 1      | 61003559  |                 |
| 32         Cover         1         60038613           33         Clutch joint Assy (A)         2         60038625           34         Clutch joint Assy (B)         2         60038613           35         Clutch joint Assy (B)         2         60038613           36         Base plate mounting brackets         2         60038621           38         Spring shaft         1         60038622           40         Switch mounting plate         1         60038622           41         Inner heat shield         1         61003355           43         Handle         1         60038622           46         Speed control handle         1         60038642           47         Guide wheal Assy         1         60038643           48         Wing bolt         1         6010061         NCS-254-R           52         Direction switch         1         60038643         For 10V-220V           54         Controller         1         60036441         For 42V           54         Controller         1         60036408         FV-24YN205855K           58         Screw         2         6C630306         SP-3x6           59   | 31       | Grip                         | 1      | 61003560  |                 |
| 33         Clutch joint Asy (A)         2         60036825           34         Clutch joint Asy (A)         2         60036828           35         Clutch joint Asy (B)         2         60036828           36         Base plate mounting brackets         2         60036828           37         Lever shaft         1         60036821           38         Spring shaft         1         60036821           40         Switch mounting plate         1         60036824           41         Inner heat Shield         1         60036870           44         Collar         1         60036870           45         Speed control handle         1         60036870           46         Speed control handle         1         600368432           47         Guida wheel Assy         1         60036843           48         Wing bolt         1         60036843           49         Machine face plate         1         60036843           51         Receptade         1         60036444         For 42V           52         Direction switch         1         60036444         For 42V           54         Controller         1         60036444 </td <td>32</td> <td>Cover</td> <td>1</td> <td>60036813</td> <td></td>  | 32       | Cover                        | 1      | 60036813  |                 |
| 34         Clutch joint Assy (A)         2         60036827           35         Clutch joint Assy (B)         2         60036803           38         Base plate mounting brackets         2         60036821           39         Spring shaft         1         60036822           40         Switch mounting plate         1         60036822           41         Inner heat shield         1         61003355           43         Handle         1         60036824           46         Speed control handle         1         60036842           47         Guide wheel Assy         1         6003642           48         Wing boit         1         6C110615         BS-6x15           50         Name plate         1         6K100061         NCS-253-R           51         Receptacle         1         6K100061         NCS-253-R           52         Direction switch         1         6K0036431         For 42V           54         Controllar         1         6K0036434         RV24YRU2055K           58         Speed-setting VR         1         6K0036434         RV24YRU2055K           59         Screw         4         6C5200305         SP-3x   | 33       | Clutch lever                 | 1      | 60036825  |                 |
| 35         Clutch joint Assy (B)         2         6003898           37         Lever shaft         1         60038919           38         Spring shaft         1         6003892           39         Spring shaft         1         6003892           40         Switch mounting plate         1         60038821           41         Inner heat shield         1         610033531           43         Handle         1         60036822           44         Collar         1         60036824           45         Speed control handle         1         600036842           47         Guide wheel Assy         1         60036870           48         Wing bolt         1         6C110615         BS-6x15           50         Name plate         1         6N10062         NCS-254-R           51         Receptacle         1         60036435         For 100V-220V           52         Direction switch         1         60036435         For 100V-220V           56         S1 Fan Assembly         1         60036430         RV24YBOB56K           58         Screw         2         6C620305         SP-3x6           60 <td< td=""><td>34</td><td>Clutch joint A'ssy (A)</td><td>2</td><td>60036827</td><td></td></td<>   | 34       | Clutch joint A'ssy (A)       | 2      | 60036827  |                 |
| 38         Base plate mounting brackets         2         60038090<br>60038019           37         Lever shaft         1         60038820           38         Spring shaft         1         60038821           40         Switch mounting plate         1         60038821           41         Inner heat shield         1         61003355           43         Handle         1         60038670           44         Collar         6003842           45         Speed control handle         1         6003870           48         Wing bolt         1         6003842           47         Guide wheel Assy         1         60038407           48         Wing bolt         1         60038407           51         Receptacle         11         60038435           53         Transformer         1         60038436           53         Speed-setting VR         1         60038436           54         Controller         1         60038436           55         Speed-setting VR         1         6002440           54         Screw         4         6523035         SP-3x6           58         Screw         2  | 35       | Clutch joint A'ssy (B)       | 2      | 60036828  |                 |
| 37         Lever shaft         1         60036820           38         Spring shaft         1         60036820           39         Spring shaft         1         60036821           40         Switch mounting plate         1         60036822           41         Inner heat shield         1         61003355           44         Collar         1         60036842           47         Guide wheel Assy         1         60036870           48         Wing bolt         1         60036842           47         Guide wheel Assy         1         60036870           48         Machine face plate         1         6110015         BS-6x15           50         Name plate         1         60036400         NCS-253-R           51         Receptacle         1         60036410         NCS-253-R           52         Direction switch         1         60036400         RV24*V2028055K           54         Speed-setting VR         1         60036400         RV24*V2028055K           55         Speed-setting VR         1         60036400         RV24*V2028055K           56         93 Fan Assembly         1         60036400         RV24*V2028055K<   | 36       | Base plate mounting brackets | 2      | 60036908  |                 |
| 38         Spring         1         60038820           40         Switch mounting plate         1         60038821           41         Innor heat shield         1         61003531           43         Handle         1         61003535           44         Collar         60038670         BS-6x15           44         Collar         60038670         BS-6x15           48         Wing bolt         1         60038670           48         Wing bolt         1         60038670           49         Machine face plate         1         60038640           51         Receptacle         1         60038910           52         Direction switch         1         60038435         For 100V-220V           54         Controller         1         60038436         KO-3007           55         Speed-setting VR         1         6102410         With Fan Guard           58         Screw         4         6523035         SP-3x6           60         Guard plate         1         60038911         Kit 202855K           61         Spacers         2         6C630306         SP-3x12           59         Screw <td< td=""><td>37</td><td>Lever shaft</td><td>1</td><td>60036819</td><td></td></td<>   | 37       | Lever shaft                  | 1      | 60036819  |                 |
| 39         Spring         1         60036821           40         Switch mouning plate         1         60036822           41         Inner heat shield         1         60036822           43         Handle         1         60036824           44         Collar         1         60036844           47         Guide wheel Assy         1         60036870           48         Wing bolt         1         6C110615         BS-6x15           49         Machine face plate         1         6N100062         NCS-253-R           50         Name plate         1         6N100062         NCS-253-R           51         Receptacle         11         6003643         For 100V~220V           53         Transformer         1         6003643         RV24VN208B55K           54         Speed-setting VR         1         61002410         With Fan Guard           55         Speed-setting VR         1         61002410         With Fan Guard           56         93 Fan Assembly         1         61002410         With Fan Guard           57         Screw         2         6C530306         SP-3x6           60         Guard plate         1 </td <td>38</td> <td>Spring shaft</td> <td>1</td> <td>60036820</td> <td></td>  | 38       | Spring shaft                 | 1      | 60036820  |                 |
| 40         Switch mounting plate         1         60038622           41         Inner heat shield         1         61003351           43         Collar         1         60038624           44         Collar         1         60038624           45         Speed control handle         1         60038627           48         Wing bolt         1         6003670           48         Machine face plate         1         60038642           50         Name plate         1         60038643           51         Receptacle         1         60038643           52         Direction switch         1         60038643           53         Transformer         1         60038643           54         Controller         1         60038643           55         Speed-setting VR         1         60038644         RV24VN205855K           56         93 Fan Assembly         1         60038643         SP-3x6           58         Screw         4         6250030         SP-3x6           59         Screw         2         6050040         WF-4           50         Suart plate         1         60038690         SP-   | 39       | Spring                       | 1      | 60036821  |                 |
| 41         Infer feat stried         1         61003355           43         Handle         1         60036054           44         Collar         1         60036870           44         Speed control handle         1         60036870           47         Guide wheel A'ssy         1         60036870           49         Machine face plate         1         60110022           50         Name plate         1         60036442           51         Receptacle         1         6N100061         NCS-253-R           52         Direction switch         1         60036414         KO-9097           53         Transformer         1         6003643         For 100V~220V           54         Controller         1         6003643         KO-9097           55         Speed-setting VR         1         61002410         With Fan Guard           59         Screw         2         6C530306         SP-3x6           60         Guard plate         1         60036411         SP-3x12           61         Spacers         2         6C520312         SP-3x12           64         Screw         2         6C520312         SP-4x15   | 40       | Switch mounting plate        | 1      | 60036822  |                 |
| 4-3         Collar         6 0.03352           44         Collar         60038642           46         Speed control handle         1         60038642           47         Guide wheel Assy         1         60038642           48         Wing bolt         1         60038624           48         Machine face plate         1         6           51         Receptacle         1         60038643           52         Direction switch         1         60038643           53         Transformer         1         60038643           54         Controller         1         60038644           6038644         RV24VR028B55K         With Fan Guard           54         Controller         1         60036909           55         Speed-setting VR         1         60036909           59         Screw         4         6520030         SP-3x5           79         Screw         2         60036909         61         Spacers           60         Guard plate         1         60038691         SP-3x12           64         Screw         2         6D510040         WF-4           64         Sup optotecive cap  | 41       | Inner neat shield            | 1      | 61003531  |                 |
| 46         Speed control handle         1         60036442           47         Guide wheel A'ssy         1         60036870           48         Wing bolt         1         6C110615         BS-6x15           49         Machine face plate         1         6N100061         NCS-254-R           50         Name plate         1         60036810         NCS-253-R           52         Direction switch         1         60036443         For 100V~220V           53         Transformer         1         60036440         RV24YN205B55K           56         Speed-setting VR         1         61002410         With Fan Guard           58         Speed-setting VR         1         61002410         With Fan Guard           58         Speed-setting VR         1         61002410         With Fan Guard           59         Screw         2         6C630306         SP-3x6           60         Guard plate         1         60036801         SP-3x12           64         Screw         2         6C520312         SP-3x12           64         Screw         2         6C510040         WF-4           65         Washer         2         6D510040 <t< td=""><td>43</td><td>Collar</td><td>1</td><td>600360524</td><td></td></t<>  | 43       | Collar                       | 1      | 600360524 |                 |
| 5         Coulde wheel A issy         1         60036870           47         Guide wheel A issy         1         6010615         BS-6x15           48         Wing bolt         1         6010615         BS-6x15           49         Machine face plate         1         6010061         NCS-254-R           51         Receptacle         1         60036810         SCS-253-R           52         Direction switch         1         60036435         For 100V~220V           54         Controller         1         60036436         KO-907           55         Speed-setting VR         1         60036440         RV24YN20SB55K           58         35 Fan Assembly         1         60036809         With Fan Guard           58         Screw         2         6C630306         SP-3x6           60         Guard plate         1         60036809         SP-3x6           61         Spacers         2         6C520312         SP-3x12           63         Nut         4         6D010030         NF-3           64         Screw         2         6D510040         WF-4           65         Washer         2         6D510040         WF-4  | 46       | Speed control handle         | 1      | 60036442  |                 |
| 48         Wing bolt         1         6C10015         BS-6x15           49         Machine face plate         1         6         6         1           50         Name plate         1         6         6         1           50         Name plate         1         6         6         1           51         Receptade         1         6         60036910         NCS-253-R           52         Direction switch         1         60036440         RV24/VL20S255K           53         Transformer         1         60036440         RV24/VL20S255K           54         Controller         1         60036440         RV24/VL20S255K           56         93 Fan Assembly         1         61002410         WinF Fan Guard           58         Screw         4         60500030         WS-3           59         Screw         2         6C630306         SP-3x6           60         Guard plate         1         60036919         SP-3x6           61         Spacers         2         6C520312         SP-3x12           63< Nut  | 40       | Guide wheel A'ssy            | 1      | 60036870  |                 |
| 49         Machine face plate         1         1         1         1         1           50         Name plate         1         6N100061         NCS-253-R           51         Receptade         1         60036435         For 100V~220V           53         Transformer         1         60036435         For 100V~220V           54         Controller         1         60036436         KO-0907           55         Speed-setting VR         1         60036440         RV24YN20SB55K           58         Screw         4         6D50030         SP-3/5           58         Screw         4         6D50030         SP-3/5           59         Screw         2         6C630306         SP-3/5           60         Guard plate         1         60036809         61           61         Spacers         2         6C520312         SP-3/3           64         Screw         2         6C520415         SP-4/x15           65         Washer         2         6D500040         WF-4           66         Washer         2         6D500040         WF-4           67         Nut         2         6D510040         WF-4 </td <td>48</td> <td>Wing bolt</td> <td>1</td> <td>6C110615</td> <td>BS-6x15</td>  | 48       | Wing bolt                    | 1      | 6C110615  | BS-6x15         |
| 50         Name plate         1         6N100062         NCS-254-R           52         Direction switch         1         6N100061         NCS-253-R           53         Transformer         1         60036910         NCS-253-R           54         Controller         1         60036435         For 100V220V           54         Controller         1         60036440         RV24VN20SB55K           56         33 Fan Assembly         1         61002410         With Fan Guard           58         Screw         4         6050030         WS-3           59         Screw         2         60C630306         SP-3x6           60         Guard plate         1         60036909         Sr-3x6           61         Spacers         2         60C520312         SP-3x12           63         Nut         4         60510030         NF-3           64         Screw         2         60C520415         SP-4x15           65         Washer         2         60C510340         WF-4           66         Washer         2         60D10040         WF-4           67         Nut         2         60C10310         SM-3x10   | 49       | Machine face plate           | 1      | 00110010  |                 |
| 51         Receptacle         1         6N100062         NCS-254-R           52         Direction switch         1         60036435         NCS-253-R           53         Transformer         1         60036436         KO-920V           54         Controller         1         60036436         KO-907           55         Speed-setting VR         1         60036441         For 42V           56         39 Fan Assembly         1         60036436         KO-907           58         Screw         4         6C520305         SP-3x5           59         Screw         2         6C6630306         SP-3x6           60         Guard plate         1         60036909         61           52         Screw         2         6C520312         SP-3x12           64         Screw         2         6C520415         SP-4x15           65         Washer         2         6D510040         WF-4           66         Washer         2         6D510040         WF-4           66         Washer         2         6D510040         WF-4           67         Nut         2         6D510040         WF-4           68 </td <td>50</td> <td>Name plate</td> <td>1</td> <td></td> <td></td>  | 50       | Name plate                   | 1      |           |                 |
| 52         Direction switch<br>Transformer         (1)         6N100061<br>60036910         NCS-253-R           53         Transformer         1         60036910         For 100V~220V           54         Controller         1         60036436         KO-0907           55         Speed-setting VR         1         60036440         RV24/VL20855K           56         93 Fan Assembly         1         61002410         With Fan Guard           58         Screw         4         6250305         SP-3x5           59         Screw         2         60630306         SP-3x5           60         Guard plate         1         60036909         WS-3           59         Screw         4         6C520312         SP-3x12           61         Spacers         2         60520411         SP-3x12           63         Nut         4         6D500030         WF-4           64         Screw         2         6C520415         SP-4x15           65         Washer         2         6D50040         WF-4           66         Washer         2         6D510040         WF-4           67         Nut         2         6C510310         SM-3x10 <td>51</td> <td>Receptacle</td> <td>1</td> <td>6N100062</td> <td>NCS-254-R</td>   | 51       | Receptacle                   | 1      | 6N100062  | NCS-254-R       |
| 52         Direction switch<br>Transformer         1         60036435<br>60036435         For 100V~220V           54         Controller         1         60036441         For 42V           54         Controller         1         60036441         For 42V           55         Speed-setting VR         1         60036440         RV24VN2OSB55K           56         93 Fan Assembly         1         61002410         With Fan Guard           58         Screw         4         6C520030         SP-3x6           60         Guard plate         1         60036401         SP-3x6           60         Guard plate         1         60036009         SP-3x6           61         Spacers         2         60036001         SP-3x12           63         Nut         4         6D510000         NH-3           64         Screw         2         6C520415         SP-4x15           65         Washer         2         6D5100040         WF-4           66         Washer         2         6D510040         WS-4           67         Nut         2         6C510310         SM-3x10           68         Dust protective cap         1         60032431   |          | •                            | (1)    | 6N100061  | NCS-253-R       |
| 53         Transformer         1         60036431         For 100V~220V           54         Controller         1         60036441         KO-0907           55         Speed-setting VR         1         60036440         RV24/V20SB55K           56         93 Fan Assembly         1         61002410         With Fan Guard           58         Screw         4         6C520305         SP-3x5           60         Guard plate         1         60036941         SP-3x6           61         Spacers         2         6C630306         SP-3x12           62         Screw         4         6C520415         SP-3x12           63         Nut         4         6D510030         NH-3           64         Screw         2         6C520415         SP-4x15           65         Washer         2         6D510040         WS-4           66         Washer         2         6D510040         WS-4           67         Nut         2         6D510040         WS-4           68         Dust protective cap         1         60032480         M-3x10           70         Screw         2         6C510306         SM-3x10  | 52       | Direction switch             | ົ1໌    | 60036910  |                 |
| 54         Controller         (1)         60036436         For 42V           55         Speed-setting VR         1         60036440         RV24YN20SB55K           56         93 Fan Assembly         1         61002410         With Fan Guard           58         Screw         4         6C520305         SP-3x5           Washer         4         6C520305         SP-3x5           60         Guard plate         1         60036911           61         Spacers         2         6C630306         SP-3x5           64         Screw         4         6D510030         NH-3           64         Screw         2         6C520312         SP-3x12           63         Nut         4         6D010030         NF-4           66         Washer         2         6D50040         WF-4           67         Nut         2         6D510040         WF-4           68         Dust protective cap         1         60032480            70         Screw         2         6C510310         SM-3x10           71         Screw         2         6C530515         SP-5x15(WS)           72         Hexagon bolt   | 53       | Transformer                  | 1      | 60036435  | For 100V~220V   |
| 54         Controller         1         60036436         KO-0907           55         Speed-setting VR         1         60036440         RV24YN20SB55K           56         93 Fan Assembly         1         61002410         With Fan Guard           58         Screw         4         6C520305         SP-3x5           Washer         4         6C520306         SP-3x6           59         Screw         2         6C630306         SP-3x6           60         Guard plate         1         60036909         60           61         Spacers         2         6C520312         SP-3x12           63         Nut         4         6C520312         SP-3x12           64         Screw         4         6C520312         SP-4x15           65         Washer         2         6D510040         WF-4           66         Washer         2         6D510040         WF-4           67         Nut         2         6D010040         NH-4           68         Dust protective cap         1         60032431         SM-3x10           71         Screw         2         6C510306         SM-3x10           72   |          |                              | (1)    | 60036441  | For 42V         |
| 55         Speed-setting VR         1         60036440         RV24YN20SB55K           56         93 Fan Assembly         1         61002410         With Fan Guard           58         Screw         4         6C520305         SP-3x5           60         Guard plate         1         60036909         SP-3x6           61         Spacers         2         6C630306         SP-3x6           62         Screw         4         6D010030         NH-3           63         Nut         4         6D010030         NH-3           64         Screw         2         6C520415         SP-4x15           65         Washer         2         6D50040         WF-4           66         Washer         2         6D50040         WS-4           67         Nut         2         6D01040         WS-4           68         Dust protective cap         1         60032431         M-4           69         Dust protective nut         1         60032431         M-4           70         Screw         2         6C510310         SM-3x10           71         Screw         2         6C530412         SP-5x10           74 </td <td>54</td> <td>Controller</td> <td>1</td> <td>60036436</td> <td>KO-0907</td>   | 54       | Controller                   | 1      | 60036436  | KO-0907         |
| 56         93 Fan Assembly<br>Screw         1         61002410         With Fan Guard<br>SP-3x5           58         Screw         4         6C520305         SP-3x5           59         Screw         2         6C630306         SP-3x6           60         Guard plate         1         60036909         SP-3x6           61         Spaces         2         600368011         SP-3x12           62         Screw         4         6D510030         NH-3           63         Nut         4         6D50040         WF-4           65         Washer         2         6C520312         SP-3x12           64         Screw         2         6D50040         WF-4           65         Washer         2         6D510040         WF-4           66         Washer         2         6D510040         WF-4           67         Nut         2         6D510040         WF-4           68         Dust protective cap         1         60032431         Hexagon bolt           70         Screw         2         6C510306         SM-3x6           72         Hexagon bolt         1         6C030402         SP-4x15(WS)   | 55       | Speed-setting VR             | 1      | 60036440  | RV24YN20SB55K   |
| 58         Screw<br>Washer         4         6C520305<br>6D50030         SP-3x5<br>WS-3           59         Screw<br>60         Guard plate         1         60038909         SP-3x6           60         Guard plate         1         60038901         SP-3x6           61         Spacers         2         60520312         SP-3x12           63         Nut         4         60520415         SP-3x12           63         Nut         4         60520415         SP-3x12           64         Screw         2         60500040         WF-4           65         Washer         2         60510040         WS-4           66         Washer         2         60510040         WS-4           67         Nut         2         60510040         WS-4           68         Dust protective cap         1         60032431         60032431           69         Dust protective nut         1         60032431         6011015         BH-10x15           72         Hexagon bolt         1         60030472         P-6           74         Washer         1         60530515         SP-5x15(WS)           77         Screw         2         6C520406<   | 56       | 93 Fan Assembly              | 1      | 61002410  | With Fan Guard  |
| Washer         4         6D500030         WS-3           59         Screw         2         6C630306         SP-3x6           60         Guard plate         1         60036909         60036909           61         Spacers         2         60036901         60036909           62         Screw         4         60520312         SP-3x12           63         Nut         4         60010030         NH-3           64         Screw         2         60520401         WF-4           66         Washer         2         60510040         WF-4           66         Washer         2         60510040         WK-4           67         Nut         2         60510040         WS-4           68         Dust protective cap         1         60032431         MI-4           69         Dust protective nut         1         60032431         MI-4           70         Screw         2         6C510310         SM-3x10           71         Screw         2         6C530515         SP-5x15(WS)           74         Washer         1         60036472         P-6           76         Screw         2   | 58       | Screw                        | 4      | 6C520305  | SP-3x5          |
| Screw         2         6C630306         SP-3x6           60         Guard plate         1         60036909         60           61         Spacers         2         60036911         SP-3x6           62         Screw         4         6C520312         SP-3x12           63         Nut         4         6D10030         NH-3           64         Screw         2         6C520415         SP-4x15           65         Washer         2         6D510040         WF-4           66         Washer         2         6D510040         WF-4           67         Nut         2         6D510040         WF-4           68         Dust protective cap         1         60032430         MF-4           69         Dust protective nut         1         60032430         SM-3x10           70         Screw         2         6C510310         SM-3x10           71         Screw         3         6C51036         SM-3x10           72         Hexagon bolt         1         6D500100         WF-10           75         Oring         1         6C530412         SP-4x12(WS)           78         Screw         2   |          | Washer                       | 4      | 6D500030  | WS-3            |
| 59         Screw         2         6C630306         SP-3x6           60         Guard plate         1         60036909         SP-3x6           61         Spacers         2         60036911         SP-3x12           63         Nut         4         6C520312         SP-3x12           64         Screw         2         6D500040         WF-4           66         Washer         2         6D510040         WF-4           66         Washer         2         6D010030         WH-3           67         Nut         2         6D510040         WF-4           68         Dust protective cap         1         60032431         SM-3x10           70         Screw         3         6C510306         SM-3x10           71         Screw         3         6C510300         SM-3x6           72         Hexagon bolt         1         6D500100         WF-10           75         O-ring         1         6D500100         WF-10           76         Screw         2         6C530515         SP-5x15(WS)           77         Screw         2         6C530412         SP-4x12(WS)           78         Screw<   |          |                              |        |           |                 |
| 60         Guard plate         1         60036909           61         Spacers         2         60036911           62         Screw         4         6C520312         SP-3x12           63         Nut         4         6D010030         NH-3           64         Screw         2         6C520415         SP-4x15           65         Washer         2         6D510040         WF-4           66         Washer         2         6D510040         NH-4           67         Nut         2         6D010040         NH-4           68         Dust protective cap         1         60032480           70         Screw         2         6C510310         SM-3x10           71         Screw         3         6C510306         SM-3x6           72         Hexagon bolt         1         60036472         P-6           74         Washer         1         60036472         P-6           75         O-ring         1         60036472         P-6           76         Screw         2         6C530412         SP-4x12(WS)           78         Screw         2         6C520408         SP-4x8   | 59       | Screw                        | 2      | 6C630306  | SP-3x6          |
| 61         Spacers         2         60036911           62         Screw         4         6C520312         SP-3x12           63         Nut         4         6D010030         NH-3           64         Screw         2         6C520415         SP-4x15           65         Washer         2         6D50040         WF-4           66         Washer         2         6D010040         NH-4           67         Nut         2         6D010040         NH-4           68         Dust protective cap         1         60032431           69         Dust protective nut         1         60032480           70         Screw         2         6C510306         SM-3x10           71         Screw         3         6C510306         SM-3x6           72         Hexagon bolt         1         60036472         P-6           76         Screw         2         6C530515         SP-5x15(WS)           77         Screw         2         6C540405         SS-4x5           81         Screw         2         6C520408         SP-4x12(WS)           78         Screw         2         6C520408         SP-4x8   | 60       | Guard plate                  | 1      | 60036909  |                 |
| 62       Screw       4       6C520312       SP-3x12         63       Nut       4       6D010030       NH-3         64       Screw       2       6C520312       SP-4x15         65       Washer       2       6D500040       WF-4         66       Washer       2       6D510040       WS-4         67       Nut       2       6D010040       NH-4         68       Dust protective cap       1       60032430         70       Screw       2       6C510310       SM-3x10         71       Screw       3       6C510306       SM-3x6         72       Hexagon bolt       1       60032480       SM-3x10         74       Washer       1       60032480       SM-3x10         74       Washer       1       60032480       SM-3x10         74       Washer       1       6050100       WF-10         75       O-ring       1       60036472       P-6         76       Screw       2       6C530412       SP-4x12(WS)         78       Screw       2       6C520406       SM-4x6         79       Screw       1       61003584  | 61       | Spacers                      | 2      | 60036911  |                 |
| 63         Nut         4         6D010030         NH-3           64         Screw         2         6C520415         SP-4x15           65         Washer         2         6D50040         WF-4           66         Washer         2         6D510040         WS-4           67         Nut         2         6D010040         NH-4           68         Dust protective cap         1         60032431           69         Dust protective nut         1         60032480           70         Screw         2         6C510310         SM-3x10           71         Screw         3         6C510306         SM-3x6           72         Hexagon bolt         1         60036472         P-6           74         Washer         1         60036472         P-6           76         Screw         2         6C530415         SP-5x15(WS)           77         Screw         2         6C530412         SP-4x12(WS)           78         Screw         2         6C520408         SP-4x15           81         Screw         2         6C520405         SS-4x5           81         Screw         1         61005384 <td>62</td> <td>Screw</td> <td>4</td> <td>6C520312</td> <td>SP-3x12</td>  | 62       | Screw                        | 4      | 6C520312  | SP-3x12         |
| 64         Screw         2         6C520415         SP-4x15           65         Washer         2         6D500040         WF-4           66         Washer         2         6D510040         WS-4           67         Nut         2         6D01040         NH-4           68         Dust protective cap         1         60032480            69         Dust protective nut         1         60032480            70         Screw         2         6C510310         SM-3x10           71         Screw         3         6C510306         SM-3x6           72         Hexagon bolt         1         6C01010         WF-10           75         O-ring         1         60036472         P-6           76         Screw         2         6C530515         SP-5x15(WS)           77         Screw         9         6C670406         SM-4x6           79         Screw         9         6C520408         SP-4x12(WS)           78         Screw         1         61005384         For 220V DIN           79         Screw         1         61003550         For 42V No plug           146 <t< td=""><td>63</td><td>Nut</td><td>4</td><td>6D010030</td><td>NH-3</td></t<>   | 63       | Nut                          | 4      | 6D010030  | NH-3            |
| 65         Washer         2         6D500040         Wr-4           66         Washer         2         6D510040         WS-4           67         Nut         2         6D010040         NH-4           68         Dust protective cap         1         60032431            69         Dust protective nut         1         60032480         SM-3x10           70         Screw         2         6C510310         SM-3x10           71         Screw         3         6C510306         SM-3x6           72         Hexagon bolt         1         6D500100         WF-10           74         Washer         1         6D500100         WF-10           75         O-ring         1         60030472         P-6           76         Screw         2         6C530515         SP-5x15(WS)           78         Screw         2         6C570406         SM-4x6           79         Screw         2         6C520408         SP-4x12(WS)           74         Heat shield A'ssy         1         61003584         For 220V DIN           78         Screw         2         6C520408         SP-4x8           142   | 64       | Screw                        | 2      | 6C520415  | SP-4x15         |
| b0         Washer         2         605 10440         WS-4           67         Nut         2         6D010040         NH-4           68         Dust protective cap         1         60032431           69         Dust protective nut         1         60032480           70         Screw         2         6C510306         SM-3x10           71         Screw         3         6C510306         SM-3x6           72         Hexagon bolt         1         6D030472         P-6           74         Washer         1         6D036472         P-6           75         O-ring         1         60036472         P-6           76         Screw         2         6C530412         SP-5x15(WS)           77         Screw         2         6C540405         SS-4x5           78         Screw         9         6C670406         SM-4x6           79         Screw         2         6C520408         SP-4x12(WS)           74         Heat shield A'ssy         1         61005384         For 220V DIN           145         Heat shield A'ssy         1         61003550         For 42V No plug           145         Heat shiel   | 65       | vvasner<br>Washer            | 2      | 6D500040  | VVF-4           |
| of         Nut         2         60000000         NH-4           68         Dust protective cap         1         60032430   | 60<br>67 | vvasner<br>Nut               | 2      | 6D510040  | VVS-4           |
| 03         Dust protective cap         1         00032431           69         Dust protective nut         1         60032480           70         Screw         2         6C510310         SM-3x10           71         Screw         3         6C510306         SM-3x6           72         Hexagon bolt         1         6C011015         BH-10x15           74         Washer         1         6D500100         WF-10           75         O-ring         1         60036472         P-6           76         Screw         2         6C530515         SP-5x15(WS)           77         Screw         2         6C530412         SP-4x12(WS)           78         Screw         2         6C520408         SP-4x12(WS)           78         Screw         2         6C520408         SP-4x8           79         Screw         2         6C520408         SP-4x8           142         Cabtyre cord A'ssy         1         61005384         For 220V DIN           145         Heat shield A'ssy         1         61003550         146           144         Insulating material         1         61003551         148           148  | 69       | Nul<br>Duct protective cap   | 2      | 60022421  | ND-4            |
| Obst protective nut         1         00032430           70         Screw         2         6C510310         SM-3x10           71         Screw         3         6C510306         SM-3x6           72         Hexagon bolt         1         6C011015         BH-10x15           74         Washer         1         6D500100         WF-10           75         O-ring         1         60036472         P-6           76         Screw         2         6C530515         SP-5x15(WS)           77         Screw         2         6C530412         SP-4x12(WS)           78         Screw         9         6C670406         SM-4x6           79         Screw         1         61005384         For 220V DIN           70         Strew         2         6C520408         SP-4x8           142         Cabtyre cord A'ssy         1         61005384         For 220V DIN           146         Heat shield A'ssy         1         61003550         146           148         Insulating material         1         61003552         149           148         Insulating material         1         60032134         151           151   | 60       | Dust protective cap          | 1      | 60032431  |                 |
| 71       Screw       3       6C510306       SM-3x6         71       Screw       3       6C510306       SM-3x6         72       Hexagon bolt       1       6C011015       BH-10x15         74       Washer       1       6D500100       WF-10         75       O-ring       1       60036472       P-6         76       Screw       2       6C530515       SP-5x15(WS)         77       Screw       2       6C530412       SP-4x12(WS)         78       Screw       9       6C670406       SM-4x6         79       Screw       1       6C520408       SP-4x12(WS)         78       Screw       2       6C520408       SP-4x8         142       Cabtyre cord A'ssy       1       61005384       For 220V DIN         145       Heat shield A'ssy       1       61003550       146         142       Cabtyre cord A'ssy       1       61003551       146         144       Insulating material       1       61003552       146         148       Insulating material       1       61003552       149         149       Caster       1       60032134       SP-3x12(WS)  | 09<br>70 | Screw                        | 2      | 60032400  | SM-3×10         |
| 71       Otew       3       0001000       SM-0x0         72       Hexagon bolt       1       6C011015       BH-10x15         74       Washer       1       6D500100       WF-10         75       O-ring       1       60036472       P-6         76       Screw       2       6C530515       SP-5x15(WS)         77       Screw       2       6C530412       SP-4x12(WS)         78       Screw       9       6C670406       SM-4x6         79       Screw       1       6C540405       SS-4x5         81       Screw       2       6C520408       SP-4x8         142       Cabtyre cord A'ssy       1       61005384       For 220V DIN         145       Heat shield A'ssy       1       610035350       For 42V No plug         145       Heat shield plate       1       61003551       146         148       Insulating material       1       61003552       149         149       Caster       1       60032134       151         151       Screw       3       6C520630       SP-6x30         151       Screw       4       6D510060       WS-6 <td< td=""><td>70</td><td>Screw</td><td>2</td><td>6C510310</td><td>SM-3x6</td></td<>   | 70       | Screw                        | 2      | 6C510310  | SM-3x6          |
| 74       Washer       1       6051010       WF-10         75       O-ring       1       60036472       P-6         76       Screw       2       6C530515       SP-5x15(WS)         77       Screw       2       6C530412       SP-4x12(WS)         78       Screw       9       6C670406       SM-4x6         79       Screw       1       6C540405       SS-4x5         81       Screw       2       6C520408       SP-4x8         142       Cabtyre cord A'ssy       1       61003584       For 220V DIN         145       Heat shield A'ssy       1       61003550       For 42V No plug         146       Heat shield plate       1       61003551       1         147       Heat shield plate       1       61003551       1         148       Insulating material       1       60032134       1         150       Screw       3       6C530312       SP-3x12(WS)         151       Screw       4       6D510060       WS-6         Washer       4       6D510060       WS-6   | 72       | Hexagon bolt                 | 1      | 6C011015  | BH-10x15        |
| 75         O-ring         1         60036472         P-6           76         Screw         2         6C530515         SP-5x15(WS)           77         Screw         2         6C530412         SP-4x12(WS)           78         Screw         9         6C670406         SM-4x6           79         Screw         1         6C520405         SS-4x5           81         Screw         2         6C520408         SP-4x8           142         Cabtyre cord A'ssy         1         61005384         For 220V DIN           (1)         61005385         For 42V No plug         For 42V No plug           145         Heat shield A'ssy         1         61003550           146         Heat shield plate         1         61003551           148         Insulating material         1         61003552           149         Caster         1         60032134           150         Screw         3         6C530312         SP-3x12(WS)           151         Screw         4         6D510060         WS-6           Washer         4         6D510060         WS-6   | 74       | Washer                       | 1      | 6D500100  | WF-10           |
| 76       Screw       2       6C530515       SP-5x15(WS)         77       Screw       2       6C530412       SP-4x12(WS)         78       Screw       9       6C670406       SM-4x6         79       Screw       1       6C530412       SP-4x12(WS)         81       Screw       1       6C540405       SS-4x5         81       Screw       1       61005384       For 220V DIN         142       Cabtyre cord A'ssy       1       61005385       For 42V No plug         145       Heat shield A'ssy       1       61003550       For 42V No plug         146       Heat shield plate       1       61003551       148         147       Heat shield plate       1       61003552       149         148       Insulating material       1       61003552       149         150       Screw       3       6C530312       SP-3x12(WS)         151       Screw       3       6C520630       SP-6x30         Washer       4       6D510060       WS-6         Washer       4       6D510060       WF-6   | 75       | O-ring                       | 1      | 60036472  | P-6             |
| 77       Screw       2       6C530412       SP-4x12(WS)         78       Screw       9       6C670406       SM-4x6         79       Screw       1       6C540405       SS-4x5         81       Screw       2       6C520408       SP-4x8         142       Cabtyre cord A'ssy       1       61005384       For 220V DIN         145       Heat shield A'ssy       1       61003550       For 42V No plug         146       Heat shield       1       61003551       Image: Second | 76       | Screw                        | 2      | 6C530515  | SP-5x15(WS)     |
| 78         Screw         9         6C670406         SM-4x6           79         Screw         1         6C540405         SS-4x5           81         Screw         2         6C520408         SP-4x8           142         Cabtyre cord A'ssy         1         61005384         For 220V DIN           145         Heat shield A'ssy         1         61003550         For 42V No plug           146         Heat shield         1         61003550         For 42V No plug           147         Heat shield plate         1         61003552         For 42V No plug           148         Insulating material         1         61003552         For 3x12(WS)           150         Screw         3         6C530312         SP-3x12(WS)           151         Screw         4         6D510060         WS-6           Washer         4         6D510060         WS-6   | 77       | Screw                        | 2      | 6C530412  | SP-4x12(WS)     |
| 79         Screw         1         6C540405         SS-4x5           81         Screw         2         6C520408         SP-4x8           142         Cabtyre cord A'ssy         1         61005384         For 220V DIN           145         Heat shield A'ssy         1         61003535         For 42V No plug           146         Heat shield         1         61003550         For 42V No plug           147         Heat shield plate         1         61003551         For 42V No plug           148         Insulating material         1         61003552         For 42V No plug           149         Caster         1         61003552         For 42V No plug           150         Screw         3         6C530312         SP-3x12(WS)           151         Screw         4         6D510060         WS-6           Washer         4         6D500060         WF-6   | 78       | Screw                        | 9      | 6C670406  | SM-4x6          |
| 81       Screw       2       6C520408       SP-4x8         142       Cabtyre cord A'ssy       1       61005384       For 220V DIN         145       Heat shield A'ssy       1       61005385       For 42V No plug         146       Heat shield       1       61003550         146       Heat shield plate       1       61003551         147       Heat shield plate       1       61003552         148       Insulating material       1       61003552         149       Caster       1       60032134         150       Screw       3       6C530312       SP-3x12(WS)         151       Screw       4       6D510060       WS-6         Washer       4       6D510060       WS-6   | 79       | Screw                        | 1      | 6C540405  | SS-4x5          |
| 142       Cabtyre cord A'ssy       1       61005384       For 220V DIN         145       Heat shield A'ssy       1       61005385       For 42V No plug         146       Heat shield       1       61003550       1         146       Heat shield plate       1       61003551       1         147       Heat shield plate       1       61003552       1         148       Insulating material       1       61003552       1         149       Caster       1       60032134       1         150       Screw       3       6C530312       SP-3x12(WS)         151       Screw       4       6D510060       WS-6         Washer       4       6D510060       WS-6  | 81       | Screw                        | 2      | 6C520408  | SP-4x8          |
| 145         Heat shield A'ssy         1         61005385         For 42V No plug           146         Heat shield         1         61003550         1         61003532           147         Heat shield plate         1         61003551         1         61003552           148         Insulating material         1         61003552         1         60032134           150         Screw         3         6C530312         SP-3x12(WS)           151         Screw         4         6D510060         WS-6           Washer         4         6D510060         WS-6   | 142      | Cabtyre cord A'ssy           | 1      | 61005384  | For 220V DIN    |
| 145       Heat shield A'ssy       1       61003550         146       Heat shield       1       61003532         147       Heat shield plate       1       61003551         148       Insulating material       1       61003552         149       Caster       1       60032134         150       Screw       3       6C530312       SP-3x12(WS)         151       Screw       4       6C520630       SP-6x30         Washer       4       6D510060       WS-6         Washer       4       6D500060       WF-6  |          |                              | (1)    | 61005385  | For 42V No plug |
| 14b         Heat shield         1         61003532           147         Heat shield plate         1         61003551           148         Insulating material         1         61003552           149         Caster         1         60032134           150         Screw         3         6C530312         SP-3x12(WS)           151         Screw         4         6D510060         WS-6           Washer         4         6D500060         WF-6   | 145      | Heat shield A'ssy            | 1      | 61003550  |                 |
| 147       Heat shield plate       1       61003551         148       Insulating material       1       61003552         149       Caster       1       60032134         150       Screw       3       6C530312       SP-3x12(WS)         151       Screw       4       6C520630       SP-6x30         Washer       4       6D510060       WS-6         Washer       4       6D500060       WF-6  | 146      |                              | 1      | 61003532  |                 |
| 148       Insulating material       1       61003552         149       Caster       1       60032134         150       Screw       3       6C530312       SP-3x12(WS)         151       Screw       4       6C520630       SP-6x30         Washer       4       6D510060       WS-6         Washer       4       6D500060       WF-6   | 147      | Heat shield plate            | 1      | 61003551  |                 |
| 149         Caster         1         60032134           150         Screw         3         6C530312         SP-3x12(WS)           151         Screw         4         6C520630         SP-6x30           Washer         4         6D510060         WS-6           Washer         4         6D500060         WF-6  | 148      | Insulating material          | 1      | 61003552  |                 |
| 150         Screw         3         6C530312         SP-3x12(WS)           151         Screw         4         6C520630         SP-6x30           Washer         4         6D510060         WS-6           Washer         4         6D500060         WF-6  | 149      | Caster                       | 1      | 60032134  | SD 2×12(M/S)    |
| Washer         4         60320030         3F-0x30           Washer         4         6D510060         WS-6           Washer         4         6D500060         WF-6  | 150      | Screw                        | 3      | 60530312  | SP-6x30         |
| Washer 4 6D510000 WS-0   |          | Washer                       | 4<br>1 | 60520030  | WS-6            |
|  |          | Washer                       | 4      | 6D500060  | WF-6            |



### **10.3 Holder and distributing components**

| Item No.   | Part name                           | Q'ty | Stock No.            | Remarks               |
|------------|-------------------------------------|------|----------------------|-----------------------|
|            |                                     |      |                      |                       |
| 82         | Cross feed table A'ssy              | 1    | 60036848             |                       |
| 83         | Cross bar                           | 1    | 60036849             |                       |
| 84         | Support base                        | 1    | 60030566             |                       |
| 85<br>86   | Holder support                      | 1    | 60030567             |                       |
| 87         | 6 40 handle                         | 1    | 60030223             |                       |
| 88         | ¢ 14 pinion                         | 1    | 60030557             |                       |
| 89         | Cross feed pinion                   | 1    | 60030558             |                       |
| 90         | Handle                              | 1    | 60031628             |                       |
| 91         | Pinion                              | 1    | 60031627             |                       |
| 92         | Hold bar                            | 1    | 61003529             |                       |
| 93         | Calibration collar                  | 1    | 60030568             | SS 478                |
| 94         | Cross feed handle A'ssy             | 1    | 60030556             | 33-4x0                |
| 95         | Hexagon bolt                        | 1    | 6C010835             | BH-8x35               |
| 96         | Spring pin                          | 1    | 6B022516             | PR-2.5x16             |
| 97         | Screw                               | 2    | 6C520516             | SP-5x16               |
| 98         | Hexagon bolt                        | 1    | 6C030615             | BC-6x15               |
| 99         | Copy roller bracket                 | 1    | 61003530             | BU 10-20              |
| 100        | Hexagon bolt                        | 1    | 60021030             | BH-10X30              |
| 101        | Spring pin                          | 1    | 6B022012             | PR-2 0x12             |
| 102        | Screw                               | 4    | 6C510515             | SM-5x15               |
| 104        | Torch                               | 1    | 60010604             | Propane               |
|            |                                     | (1)  | 60010603             | Acetylene             |
| 105        | Auto-stop A'ssy                     | 1    | 61003612             |                       |
| 106        | JOX hose                            | 1    | 60030305             | 600L                  |
| 107        | POX hose                            | 1    | 60030305             | 600L                  |
| 108        | r G nose                            | (1)  | 60030307             | 600L Propane          |
| 109        | IOX hose                            | 1    | 60030324             | 9001                  |
| 110        | POX hose                            | 1    | 60030324             | 900L                  |
| 111        | FG hose                             | 1    | 61001811             | 900L Propane          |
|            |                                     | (1)  | 60030326             | 900L Acetylene        |
| 112        | L bracket                           | 1    | 61003575             |                       |
| 113        | Hexagon bolt                        | 1    | 6C021030             | BH-10x30              |
| 114<br>115 | wasner<br>Scrow                     | 1    | 6D500100<br>6C530515 | WF-10<br>SD 5x15(M/S) |
| 116        | Washer                              | 1    | 6D500080             | WF-8                  |
|            | Washer                              | 1    | 6D510080             | WS-8                  |
| 117        | Hexagon bolt                        | 1    | 6C010620             | BH-6x20               |
| 118        | Twin valve A'ssy (JOX)              | 1    | 60013499             |                       |
| 119        | Twin valve A'ssy (POX)              | 1    | 60013500             |                       |
| 120        | Twin valve A'ssy (FG)               | 1    | 61003573             | SD 5v14               |
| 121        | Cormon torph ournest                | Z    | 61002556             | 3F-5x14               |
| 122        | Holder support                      | 1    | 60032252             |                       |
| 123        | Cross feed holder                   | 1    | 61003524             | *                     |
| 125        | Square thread metal                 | 1    | 60030564             |                       |
| 126        | Square thread                       | 1    | 60032284             |                       |
| 127        | Vertical handle A'ssy               | 1    | 60030563             | T                     |
| 128        | Bent handle                         | 1    | 60030313             |                       |
| 129        | Vertical handle A'ssy               | 1    | 60032253             |                       |
| 130        | Spring pin                          | 1    | 6B022516             | PK-2.5X16             |
| 131        | Wing bolt                           | 1    | 60110615             | BC-0x15<br>BS-6x15    |
| 132        | Following holder A'ssy              | 1    | 61003577             | 00-0010               |
| 134        | Foregoing holder A'ssy              | 1    | 61003546             |                       |
| 135        | Cross bar                           | 1    | 60033111             |                       |
| 136        | Rack                                | 1    | 60033110             |                       |
| 137        | Spring pin                          | 2    | 6B022013             | PR-2x13               |
| 138        | Cross feed bar A'ssy                | 1    | 60031626             |                       |
| 152        | weight bai<br>Guide copy bracket    | 1    | 60031855             |                       |
| 154        | Guide bar                           | 1    | 60036970             |                       |
| 155        | Bearing                             | 1    | 6A036200             | 6200ZZ                |
| 156        | Wing bolt                           | 1    | 6C110612             | BS-6x12               |
| 157        | Guide copy roller A'ssy             | 1    | 61003557             |                       |
| 205        | Nut for Oxygen                      | 1    | 60015056             |                       |
| 206        | Hose connector (OX)                 | 1    | 60015040             | +                     |
| 207        | INULIOF GAS<br>Hose connector (Gas) | 1    | 60015054             |                       |
| 209        | Adaptor (OX)                        | 1    | 60012917             | 00K17                 |
| 210        | Adaptor (FG)                        | 1    | 60012906             | 00K06                 |

### **10.4 Option** 10.4.1 Type 100



| <u>Type 100</u> |                         |      |           |                   |
|-----------------|-------------------------|------|-----------|-------------------|
| Item No.        | Part name               | Q'ty | Stock No. | Remarks           |
| 158             | Cross bar (300L) A'ssy  | 1    | 61003672  | Type 100          |
| 159             | Support base            | 1    | 60030566  |                   |
| 160             | Holder support          | 1    | 61003727  |                   |
| 161             | Square thread           | 1    | 60030565  |                   |
| 162             | $\phi$ 40 handle        | 1    | 60030223  |                   |
| 163             | Handle                  | 1    | 60031628  | · T               |
| 164             | Pinion                  | 1    | 60031627  |                   |
| 165             | Calibration collar      | 1    | 60030906  | with screw        |
| 166             | Hexagon bolt            | 1    | 6C030615  | BC-6x15           |
| 167             | Copy roller bracket     | 1    | 61003530  |                   |
| 168             | Hexagon bolt            | 1    | 6C021030  | BH-10x30          |
| 169             | Washer                  | 1    | 6D500100  | WF-10             |
| 170             | Spring pin              | 1    | 6B022012  | PR-2.0x12         |
| 171             | Torch                   | 1    | 60010303  |                   |
| 172             | JOX hose                | 1    | 60030305  | 600L              |
| 173             | POX hose                | 1    | 60030305  | 600L              |
| 174             | FG hose                 | 1    | 61001810  | 600L Propane      |
| 175             | JOX hose                | 1    | 60030324  | 900L              |
| 176             | POX hose                | 1    | 60030324  | 900L              |
| 177             | FG hose                 | 1    | 61001811  | 900L Propane      |
| 178             | Screw                   | 2    | 6C520514  | SP-5x14           |
| 179             | Screw                   | 1    | 6C520615  | SP-6x15           |
| 180             | Holder support          | 1    | 61003726  |                   |
| 181             | Cross feed holder       | 1    | 61003524  | *                 |
| 182             | Square thread metal     | 1    | 60030564  |                   |
| 183             | Square thread           | 1    | 60032284  |                   |
| 184             | Vertical handle A'ssy   | 1    | 60030563  |                   |
| 185             | Bent handle             | 1    | 60030313  |                   |
| 186             | Vertical handle A'ssy   | 1    | 60032253  |                   |
| 187             | Spring pin              | 1    | 6B022516  | PR-2.5x16         |
| 188             | Hexagon bolt            | 1    | 6C030615  | BC-6x15           |
| 189             | Wing bolt               | 1    | 6C110615  | BS-6x15           |
| 190             | Following holder A'ssy  | 1    | 61003720  | Type 100          |
| 191             | Foregoing holder A'ssy  | 1    | 61003719  | Type 100          |
| 192             | Cross bar (300L)        | 1    | 60038817  | Type 100          |
| 193             | Rack (300L)             | 1    | 60038820  | Type 100          |
| 194             | Spring pin              | 2    | 6B022013  | PR-2x13           |
| 195             | Cross feed bar A'ssy    | 1    | 60038804  | Type 100          |
| 196             | Weight bar (250L)       | 1    | 61003607  | Type 100          |
| 197             | Guide copy bracket      | 1    | 60036969  |                   |
| 198             | Guide bar               | 1    | 60036970  | T                 |
| 199             | Bearing                 | 1    | 6A036200  | 6200ZZ            |
| 200             | Wing bolt               | 1    | 6C110612  | BS-6x12           |
| 201             | Guide copy roller A'ssy | 1    | 61003631  | Type 100          |
| 202             | Tip fixing bolt         | 1    | 60005020  |                   |
| 203             | Weight                  | 1    | 60030578  | with hexagon bolt |
| 204             | Shaft                   | 1    | 61003704  | Type 100          |

# 11 Cutting data 11.1 Tip nozzle (Type 300)

### 301-302 For Acetylene

| PI ATE            | TIP S            | SIZE             | PRESSURE (N | PRESSURE (MPa)/(kg/c m <sup>2</sup> ) |       | Flux (nl/h) |     |                   |
|-------------------|------------------|------------------|-------------|---------------------------------------|-------|-------------|-----|-------------------|
| THICKNESS<br>(mm) | CUTTING<br>(301) | PREHEAT<br>(302) | OX          | FG                                    | JOX   | POX         | FG  | SPEED<br>(mm/min) |
| 3                 | (00)             |                  | 0.18/1.8    |                                       | 1,000 |             |     | 800               |
| 5                 | 0                | 10               | 0.20/2.0    | 0.020/0.20                            | 1,500 | 210         | 190 | 730               |
| 10                | 0                | 12               | 0.25/2.5    |                                       | 1,800 |             |     | 600               |
| 15                | 1                |                  | 0.30/3.0    | 0.025/0.25                            | 2,900 | 230         | 210 | 520               |
| 20                |                  | 13               | 0.35/3.5    |                                       | 4,300 | 310         | 280 | 450               |
| 25                | 2                | 14               | 0.40/4.0    | 0.030/0.30                            | 5 000 | 400         | 365 | 400               |
| 30                |                  | 15               | 0.40/4.0    |                                       | 5,000 | 440         | 400 | 370               |
| 35                | 3                | 15               | 0.45/4.5    |                                       | 6,800 | 470         | 425 | 340               |
| 40                |                  |                  | 0.45/4.5    | 0.025/0.25                            | 8,000 |             |     | 320               |
| 45                | 4                | 16               | 0.50/5.0    | 0.035/0.35                            | 9 600 | 480         | 435 | 300               |
| 50                |                  |                  | 0.50/5.0    |                                       | 8,000 |             |     | 280               |

### 301-306 For Propane

| PI ATE            | TIP S            | SIZE             | PRESSURE (MPa)/(kg/c m <sup>2</sup> ) |            | Flux (nl/h) |        |     | CUTTING           |
|-------------------|------------------|------------------|---------------------------------------|------------|-------------|--------|-----|-------------------|
| THICKNESS<br>(mm) | CUTTING<br>(301) | PREHEAT<br>(306) | OX                                    | FG         | JOX         | POX    | FG  | SPEED<br>(mm/min) |
| 3                 | (00)             |                  | 0.25/2.5                              | 0.020/0.20 | 1,100       | 1 240  | 210 | 800               |
| 5                 | 0                | 15               | 0.30/3.0                              | 0.020/0.20 | 1,800       | 1,240  | 310 | 730               |
| 10                | 0                | 15               |                                       |            | 2,100       | 1 / 20 | 270 | 600               |
| 15                | 1                |                  | 0.35/3.5                              | 0.030/0.30 | 2,700       | 1,400  | 570 | 520               |
| 20                |                  | 16               |                                       |            | 3,800       | 1,880  | 470 | 450               |
| 25                | 2                |                  | 0 40/4 0                              |            | 1 200       |        |     | 400               |
| 30                |                  | 17               | 0.40/4.0                              | 0.020/0.20 | 4,200       | 2,120  | 530 | 370               |
| 35                | 3                |                  | 0.45/4.5                              |            | 5,900       |        |     | 340               |
| 40                |                  |                  | 0.50/5.0                              |            | 7,500       |        |     | 320               |
| 45                | 4                | 18               |                                       | 0.015/0.15 | 0 200       | 2,400  | 600 | 300               |
| 50                |                  |                  | 0.00/0.0                              |            | 0,200       |        |     | 280               |

NOTE

- 1) All pressures are torch inlet pressures.
- 2) Oxygen purity is minimum of 99.7%.
- 3) Depending on the surface condition of the steel plate (scale, paint) either increase the fuel gas pressure or decrease the cutting speed. Also, when precision cutting is required, adjust all data.

# 11.2 Tip nozzle (Type 100)

| PLATE     | тір  | CUTTING  | OXYGEN PRESSURE |            | FUEL GAS          | KERF  |  |  |  |
|-----------|------|----------|-----------------|------------|-------------------|-------|--|--|--|
| THICKNESS |      | SPEED    | (Mpa) /         | (kg/c mੈ)  | PRESSURE          | WIDTH |  |  |  |
| (mm)      | SIZE | (mm/min) | CUTTING         | PREHEAT    | (Mpa) / (kg/c mੈ) | (mm)  |  |  |  |
| 3         | 00   | 680      | 0.15 / 1.5      | 0.15 / 1.5 | 0.02 / 0.2        | 1.0   |  |  |  |
| 6         | 0    | 610      | 0.2 / 2.0       | 0.2 / 2.0  | 0.02 / 0.2        | 1.3   |  |  |  |
| 10        | 0    | 560      | 0.2 / 2.0       | 0.2 / 2.0  | 0.02 / 0.2        | 1.5   |  |  |  |
| 12.5      | 1    | 530      | 0.25 / 2.5      | 0.25 / 2.5 | 0.02 / 0.2        | 1.8   |  |  |  |
| 19        | 2    | 460      | 0.3 / 3.0       | 0.3/3.0    | 0.025 / 0.25      | 2.0   |  |  |  |
| 25        | 2    | 430      | 0.3 / 3.0       | 0.3/3.0    | 0.025 / 0.25      | 2.0   |  |  |  |
| 38        | 3    | 355      | 0.3 / 3.0       | 0.3/3.0    | 0.025 / 0.25      | 2.3   |  |  |  |
| 50        | 4    | 320      | 0.3 / 3.0       | 0.3 / 3.0  | 0.025 / 0.25      | 2.8   |  |  |  |

### 102(STANDARD SPEED) For Acetylene

### 102-D7(HIGH SPEED) For Acetylene

| PLATE<br>THICKNESS | TIP  | CUTTING<br>SPEED | CUTTING OXYGEN PRESSURE<br>SPEED (Mpa) / (kg/c m <sup>2</sup> ) |            | FUEL GAS<br>PRESSURE | KERF<br>WIDTH |
|--------------------|------|------------------|---|------------|----------------------|---------------|
| (mm)               | SIZE | (mm/min)         | CUTTING   | PREHEAT    | (Mpa) / (kg/c mੈ)    | (mm)          |
| 3                  | 00   | 800              | 0.7 / 7.0   | 0.15 / 1.5 | 0.02 / 0.2           | 0.8           |
| 6                  | 0    | 740              | 0.7 / 7.0   | 0.2 / 2.0  | 0.02 / 0.2           | 1.0           |
| 10                 | 0    | 680              | 0.7 / 7.0   | 0.2 / 2.0  | 0.02 / 0.2           | 1.3           |
| 12.5               | 1    | 630              | 0.7 / 7.0   | 0.25 / 2.5 | 0.02 / 0.2           | 1.3           |
| 19                 | 2    | 560              | 0.7 / 7.0   | 0.3/3.0    | 0.025 / 0.25         | 1.5           |
| 25                 | 2    | 510              | 0.7 / 7.0   | 0.3/3.0    | 0.025 / 0.25         | 1.8           |
| 38                 | 3    | 460              | 0.7 / 7.0   | 0.3/3.0    | 0.025 / 0.25         | 2.0           |
| 50                 | 4    | 410              | 0.7 / 7.0   | 0.3 / 3.0  | 0.025 / 0.25         | 2.6           |

NOTE

- 1) All pressures are torch inlet pressures.
- 2) Oxygen purity is minimum of 99.7%.
- 3) Depending on the surface condition of the steel plate (scale, paint) either increase the fuel gas pressure or decrease the cutting speed. Also, when precision cutting is required, adjust all data.

| PLATE     | CUTTING |          | OXYGEN P   | RESSURE    | FUEL GAS          | KERF  |
|-----------|---------|----------|------------|------------|-------------------|-------|
| THICKNESS |         | SPEED    | (Mpa) / (  | (kg/c ㎡)   | PRESSURE          | WIDTH |
| (mm)      | SIZE    | (mm/min) | CUTTING    | PREHEAT    | (Mpa) / (kg/c m²) | (mm)  |
| 3         | 00      | 680      | 0.15 / 1.5 | 0.15 / 1.5 | 0.02 / 0.2        | 1.0   |
| 6         | 0       | 610      | 0.2 / 2.0  | 0.2 / 2.0  | 0.02 / 0.2        | 1.3   |
| 10        | 0       | 560      | 0.2 / 2.0  | 0.2 / 2.0  | 0.02 / 0.2        | 1.5   |
| 12.5      | 1       | 530      | 0.25 / 2.5 | 0.25 / 2.5 | 0.02 / 0.2        | 1.8   |
| 19        | 2       | 460      | 0.3 / 3.0  | 0.3 / 3.0  | 0.02 / 0.2        | 2.0   |
| 25        | 2       | 430      | 0.3 / 3.0  | 0.3 / 3.0  | 0.02 / 0.2        | 2.0   |
| 38        | 3       | 355      | 0.3/3.0    | 0.3/3.0    | 0.02 / 0.2        | 2.3   |
| 50        | 4       | 320      | 0.3/3.0    | 0.3/3.0    | 0.025 / 0.25      | 2.8   |

### **106(STANDARD SPEED) For Propane**

### 106-D7(HIGH SPEED) For Propane

| PLATE     | тір  | CUTTING  | OXYGEN PRESSURE |            | FUEL GAS          | KERF  |
|-----------|------|----------|-----------------|------------|-------------------|-------|
| THICKNESS |      | SPEED    | (Mpa) / (       | kg/c mੈ)   | PRESSURE          | WIDTH |
| (mm)      | JIZL | (mm/min) | CUTTING         | PREHEAT    | (Mpa) / (kg/c m²) | (mm)  |
| 3         | 00   | 800      | 0.7 / 7.0       | 0.15 / 1.5 | 0.02 / 0.2        | 0.8   |
| 6         | 0    | 740      | 0.7 / 7.0       | 0.2 / 2.0  | 0.02 / 0.2        | 1.0   |
| 10        | 0    | 680      | 0.7 / 7.0       | 0.2 / 2.0  | 0.02 / 0.2        | 1.3   |
| 12.5      | 1    | 630      | 0.7 / 7.0       | 0.25 / 2.5 | 0.02 / 0.2        | 1.3   |
| 19        | 2    | 560      | 0.7 / 7.0       | 0.3 / 3.0  | 0.02 / 0.2        | 1.5   |
| 25        | 2    | 510      | 0.7 / 7.0       | 0.3 / 3.0  | 0.02 / 0.2        | 1.8   |
| 38        | 3    | 460      | 0.7 / 7.0       | 0.3 / 3.0  | 0.02 / 0.2        | 2.0   |
| 50        | 4    | 410      | 0.7 / 7.0       | 0.3 / 3.0  | 0.02 / 0.2        | 2.6   |

### NOTE

- 1) All pressures are torch inlet pressures.
- 2) Oxygen purity is minimum of 99.7%, propane is minimum of JIS Grade 3.
- 3) Depending on the surface condition of the steel plate (scale, paint) either increase the fuel gas pressure or decrease the cutting speed. Also, when precision cutting is required, adjust all data.

# EDGE-CUT OPERACTION MANUAL

| Date of issue: | Oct.2005 |
|----------------|----------|
| 2nd            | Dec.2005 |
| 3rd            | Apr.2006 |
| 4th            | Sep.2006 |
| 5th            | Jun.2007 |
| 6th            | Mar.2008 |
| 7th            | Jul.2008 |
| 8th            | Dec.2010 |
| 9th            | Nov.2011 |
| 10th           | Jan.2013 |
| 11th           | May.2016 |
| 12th           | Dec.2016 |
| 13th           | Feb.2018 |
| 14th           | Feb.2023 |
| 15th           | Sep.2023 |

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