

Section S.1

Safe Work

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S.1 Safe Work



Introduction

There is no such thing as a perfectly safe machine when improper handling or ignoring precautions stands in the way. Any incorrect usage could possibly result in a serious bodily injury, in the worst case it could cause death, and/or substantial property damage.

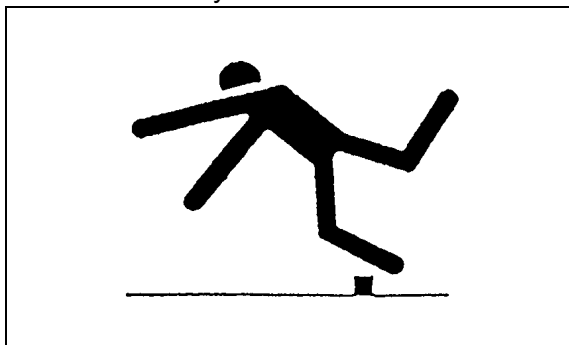
TOYOTA has made every effort to assure as safe work as possible, which cannot be completed however, without your understanding and cooperation.

It is impossible for the manufacturer to take into account individual operating conditions of the machinery at the user site and prepare an instruction manual covering all information relating to the machine operation. We, therefore, ask you to establish your own individual safety standards for each safe job of installation, operation, adjustment, and maintenance.

S.1.1 Rules for Installation Work

[1] Before Installation

- (1) Check the safety rules and the workmanship standards for the plant.
- (2) Make sure that all personnel involved know the nature of the job and the installation procedure, and agree as to the best way to get them done.
- (3) For jobs requiring a group effort, choose a supervisor whose instructions should be followed thoroughly by all.
- (4) For jobs requiring a group effort, agree beforehand on words or gestures for giving and confirming signals.
- (5) Wear safety shoes.
- (6) Check the work places and their surroundings. If any unsafe point is found, take the necessary action to make it safe.

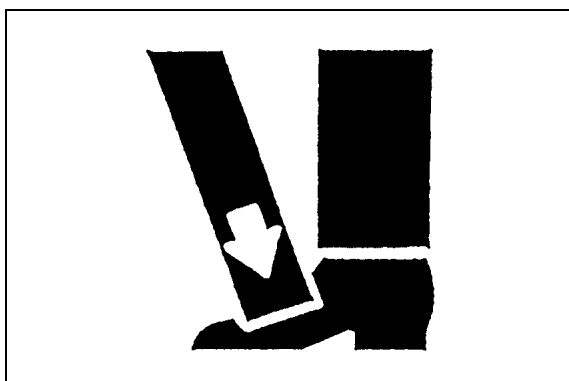
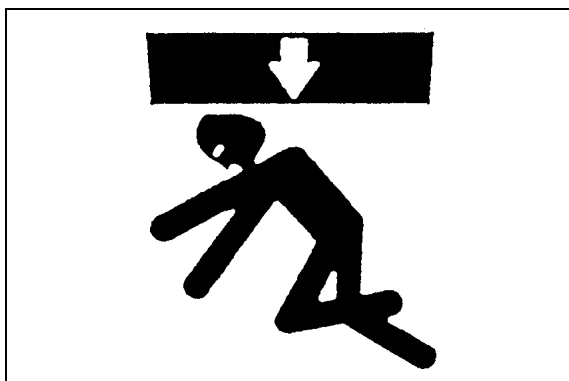
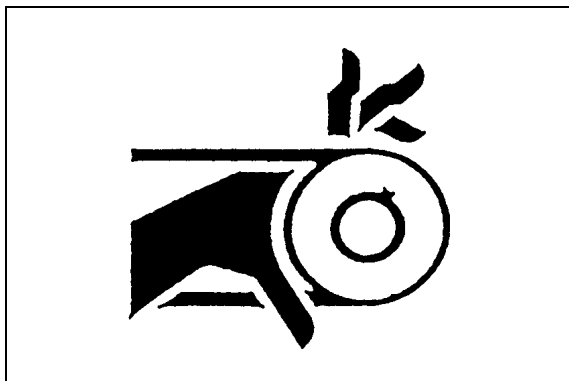
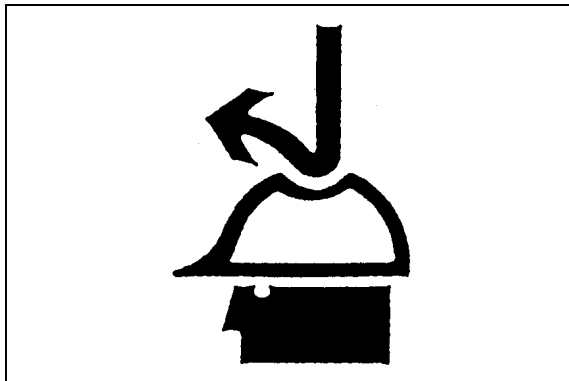


For example

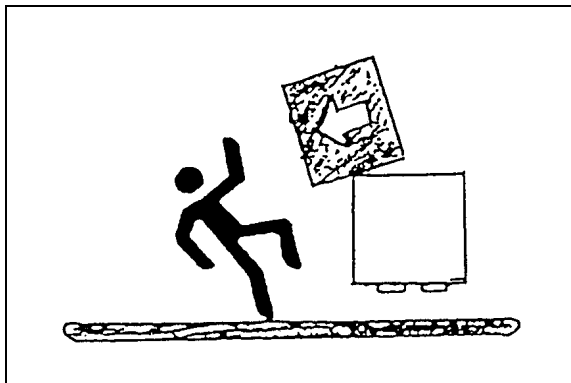
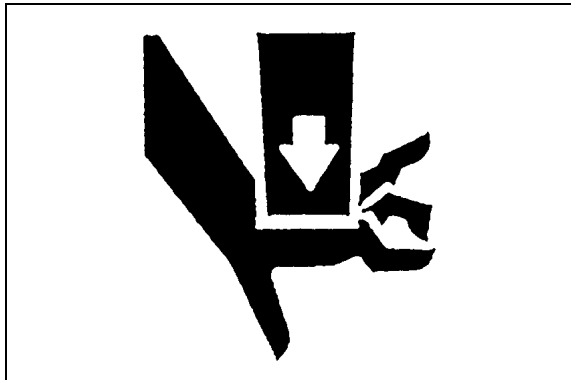
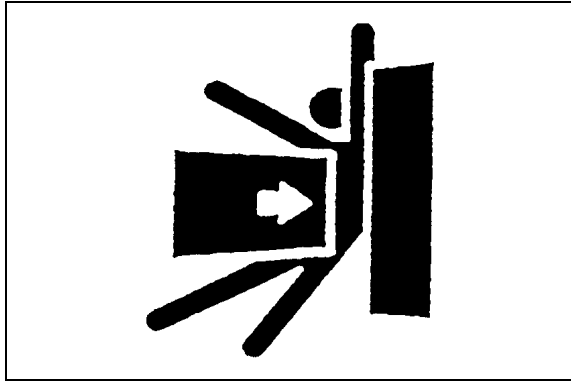
- i) When foundation bolts, power cable conduits and water inlet piping are spread out before installation, mark them clearly with brightly colored cloth or a flag so that workers can avoid tripping or hitting the machine and carriers against them during installation.
- ii) If there is any unstable footing due to any pits (for drainage, piping, wiring, or other purposes) which are dangerously uncovered, put on a temporary cover to prevent falling accidents.
- iii) Use specified tools matched to the job to be done.
- iv) Always keep the floor dry. If the floor becomes wet with leaked water and slippery, repair piping to prevent water leakage.

[2] During Installation

[2.1] General points for installation work



- (1) Always wear a helmet whenever installation is being carried out at the same time as other jobs, such as construction and piping.
- (2) Always wear gloves whenever there is the possibility of injuring hands or fingers.
- (3) Never use gloves if there is the possibility of their becoming caught in a rotating section of the machine.
- (4) Never get oil or grease on the floor, since these can cause slipping accidents.
- (5) Always provide a stable platform or scaffold for those jobs in places too high to reach from the floor.
- (6) Never climb onto a heavy hoisted object nor get under it.
- (7) Keep your tools, parts, devices and instruments neatly arranged, and observe the following rules:
 - i) Put them where they are not likely to fall down.
 - ii) Whenever standing or leaning them against something else, do what is necessary to prevent them from falling over.
 - iii) Whenever piling round bars or pipes, do what is necessary to prevent them from falling down.
- (8) Observe the following rules when conducting a group effort:
 - i) Choose a supervisor whose instructions should be followed thoroughly by all.
 - ii) Agree beforehand on words or gestures for giving and confirming signals.
 - iii) Be especially careful when handling heavy objects. If the weight exceeds 20 kg, two or more workers should handle them.



[2.2] Transport

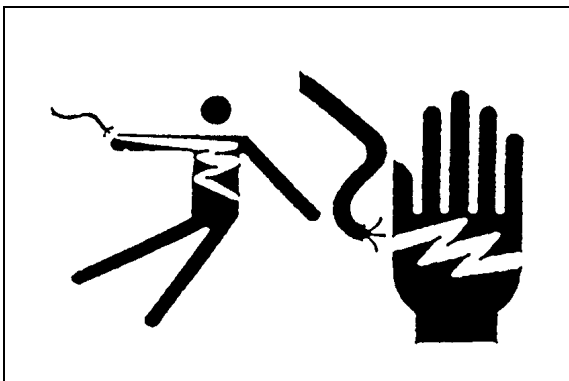
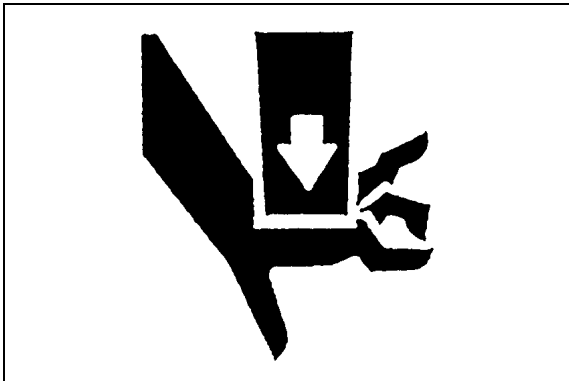
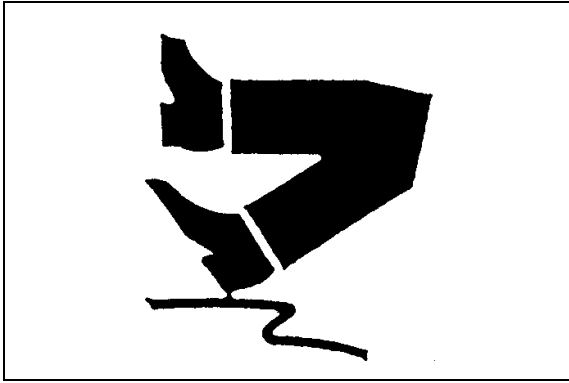
- (1) Before bringing in machinery, always prepare well-maintained carriers.

Carriers	Q'ty	Specifications
Forklift (or wrecker)	1	3.5t (Reed space: 150-190 cm)
Hand lift	2	3.0t or more
Small jack	2	1.5t or more
Wooden block	4	Approx. 90 × 150 × 60 mm


- (2) Never lift the machine or load any higher than 200 mm above the floor during transport.
- (3) Never stand in small spaces between the machine/load and the wall during transportation.
- (4) Always assign a guide and transport according to his or her instructions.

The guide should pay sufficient attention to any protruding parts on the transport route.

- (5) Whenever inserting wooden blocks under the machine/load, never let fingers get between the machine/load and floor.
- (6) Always push hand carts when carrying loads. Never pull them.
- (7) Fix the load with a rope or other means if necessary, to prevent the load from falling down during transport.
- (8) When putting a lift beneath the machine, make sure that its hook catches the place between the back and front cross rails and balances it right and left securely.



[2.3] Unpacking and cleaning

 **WARNING:** Never apply gasoline or other volatile cleaning agents for cleaning.

- (1) Parts are coated with rust-preventive oil. Take necessary action so they will not slip when carrying them.
- (2) When washing parts, use waterproof paper to prevent the floor from becoming stained.
- (3) As the cleaning fluid, use New-sol Deluxe (Nippon Oil Corporation) or its equivalent. Do not use trichlene-based fluid. such fluid will cause peeling or discoloring of the coating or cracking (on plastic parts).
- (4) To clean the plastic parts, use the neutral detergent.
- (5) Do not place anything in the parts storage area, passages, or footing area.

[2.4] Levelling work

- (1) When using a small jack, apply it to two points underneath the front and back cross rails and make sure that it catches them securely.
- (2) When conducting a group effort, agree beforehand on words or gestures for giving and confirming signals.
- (3) Whenever inserting fiber packings under the bottom of the machine's feet or removing them during the levelling work, never let fingers get between the packings and the floor.

[2.5] Wiring work

- (1) Never allow non-qualified workers to carry out connection or disconnection of the primary power lines.
- (2) Before starting wiring work, be sure to check that the main circuit breaker is open and the warning notice (tag) is put up for all to see.
- (3) Before starting wiring work, use a spark-testing screwdriver to check that the lines are not alive.

S.1.2 Before Trial Running

[1] Area Around the Machine

- (1) Clear away bolts, nuts, tools and other unnecessary things around, on and under the machine.
- (2) Check that all sections of the machine are securely tightened and that the safety covers are on.

[2] Electrical Components

- (1) See that the grounding wires in the control boxes are connected correctly.
- (2) Check the routing, connection, and insulation of the wiring.
- (3) Check the rotating direction for: the main motor, water extraction blower motor, PAW motor, and electrical let-off motor. Also check the rotating direction of forward/reverse inching.
- (4) Check the functions of each of the stop motions and limit switches.

S.1.3 Rules for Safe Operation

[1] General Rules

[1.1] Absolute precautions

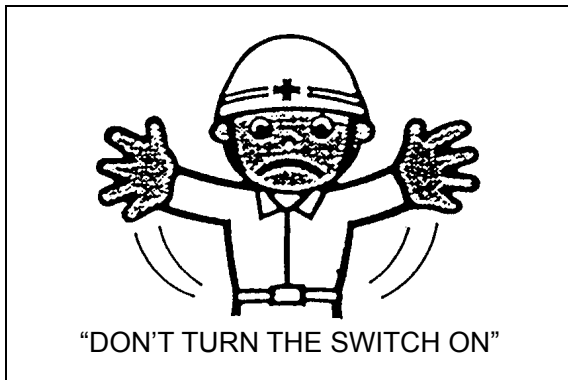
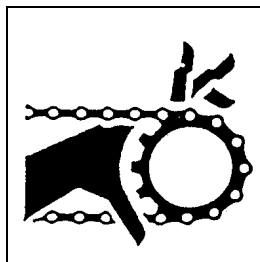
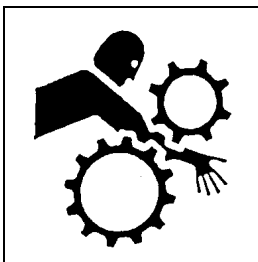
- (1) Never allow non-qualified workers to carry out connection or disconnection of the primary power lines.
- (2) Never try live-wire operation when changing the wiring on the machine.
- (3) Never start the machine without signaling your intention to your co-workers or without confirming their answers to your signals.
- (4) Never touch rotating or operating parts until the machine comes to a complete stop.
Also when removing a cover, ensure that all the machine components are completely stopped.
- (5) Never operate the machine in clothes which could become entangled in the rotating parts.
- (6) Never remove any of the warning notice, caution plates or instruction plates from the machine, no matter what.

[1.2] Handling abnormal situations

- (1) Always turn the power off before making any adjustments or repairs to correct abnormalities occurring during operation.
- (2) If you turn off the power, be sure to put up the warning notice on the power switch.
- (3) The temporary warning notice (tag) should be removed only by the person who put it up, once it has become unnecessary.

[1.3] Other precautions

- (1) The supervisor should make sure that each worker sufficiently observes all safety rules.
- (2) Observe the safety codes and regulations enforced in individual countries.



[2] Precautions for Weaving

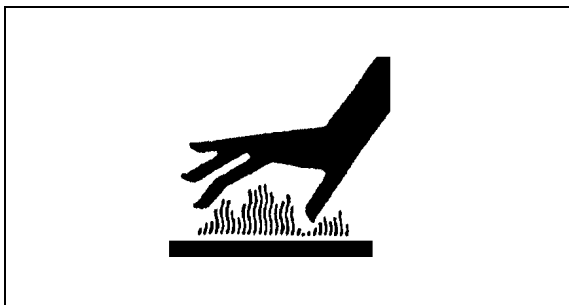
[2.1] Starting

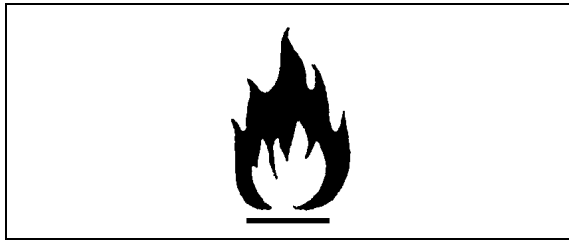
- (1) When two or more workers are to handle operation, they must always communicate through words or gestures before starting up the machine.
- (2) Before pressing any switches on the machine, be sure to identify them to prevent mistakes.
- (3) The standard procedure is two-handed operation: holding down the INTER-LOCK switch with your left hand and pressing any of the drive switches (START, FORWARD or REVERSE) with your right hand.

[2.2] During weaving

- (1) No one other than the person in charge must take recovery action if any of the electrical parts in the control box operates so as to cause the machine in operation to either stop or become non-workable.
- (2) While the machine is in operation:
 - i) Never touch the running portion.
 - ii) Never open or remove any of the safety covers.
 - iii) Never try to remove yarn or fly.
- (3) Do not operate the machine wearing these types of clothes, shoes, or hairstyles:
 - i) Loose fitting jacket
 - ii) Long sleeves with buttons
 - iii) Work cloths with buttons sticking out in front
 - iv) Sandal-type shoes
 - v) Necktie hanging in front
 - vi) Long hair worn loose or hanging in front
- (4) Never put scissors or tools in a non-flap breast pocket.
- (5) Never restart the machine without permission if it is stopped by:
 - i) A person in charge of maintenance
 - ii) A patrol inspector
 - iii) A person in charge of lubrication
 - iv) Other responsible people
- (6) Never touch the main motor. Its surface will be HOT depending upon the working conditions.

If any motor error occurs, the temperature will go up. Touching an overheated motor could cause a serious hand burn. (Reference: If the temperature inside the motor exceeds the specified level, the internal thermal sensor works to stop the weaving machine.)





(7) Be sure to clean the weaving machine to prevent fire as follows:

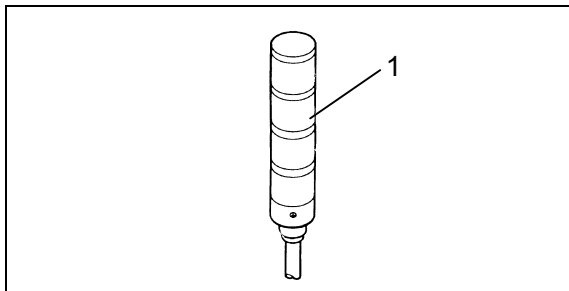
- Periodically wipe off fly or fleece accumulating around the main motor.

Even though the thermal sensor works if the motor temperature exceeds the specified level, this is no excuse to neglect any cleaning.

- Periodically blow air to the magnet switch and its surroundings in the main control box to remove fly or fleece accumulating around them.

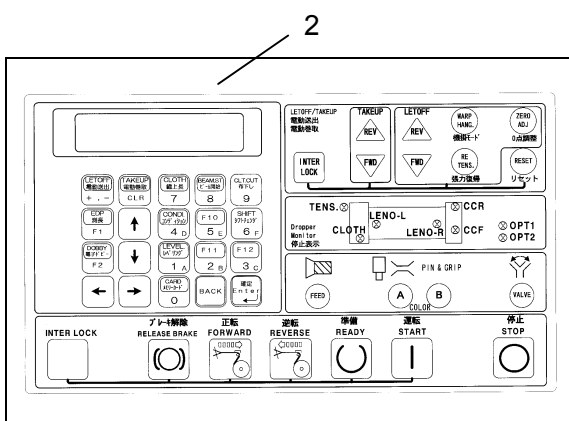
When activated normally, the magnet switch will spark which could result in fire if fly or fleece accumulates around the magnet switch.

- If the rotating sections of the machine become entangled with any fly, fleece or yarn dust, immediately remove those foreign materials. Otherwise, they will build up coming into contact with other parts, which could result in abnormal heat or fire.



(8) If the machine stops, check

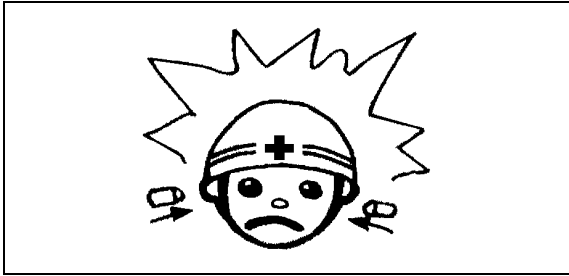
- the signal indicator 1,
- the dropper monitor above the left operation panel, and LCD panel 2.



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- (9) Put on a gauze mask in the weaving room when the machine is in operation. There will be a lot of invisible fly, fleece or yarn particles floating around.



- (10) Put on a pair of ear plugs to protect your ears from noise when working around operating machines for a long time.

S.1.4 Rules for Maintenance

[1] Before Maintenance Work

[1.1] Checking the work procedure

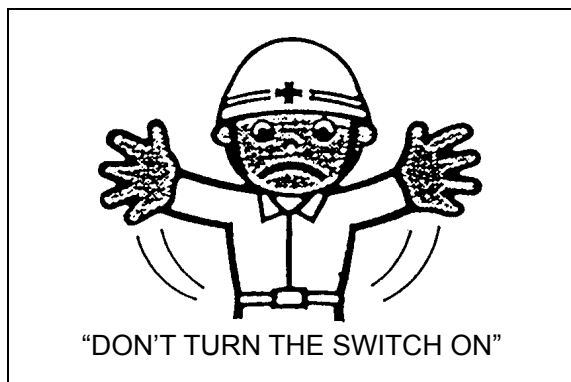
Check the work procedure with co-workers in advance. Be sure to inform the operators that the machine is to be stopped, and always put up the maintenance notice (specified by the plant) on the power switches.

[1.2] Checking the jigs and tools

Select and inspect the jigs and tools for the job purpose. Use spanners and wrenches suitable for the sizes and locations of bolts and nuts.

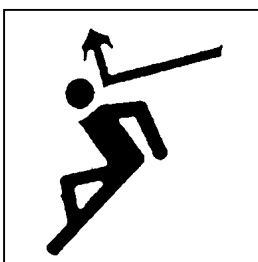
[1.3] Keeping things neat and tidy

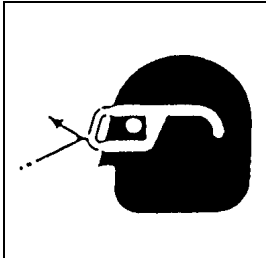
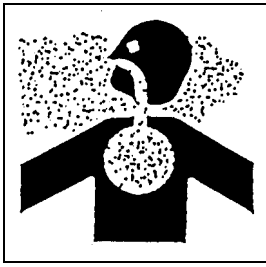
Determine the storage location for disassembled parts, making sure that passages are clear for operators.



[2] Precautions for Maintenance Personnel

- (1) If you stop the machine for maintenance, be sure to put up the warning notice saying "DON'T TURN THE SWITCH ON".
- (2) Never put tools or any items on top of the machine whether it is in operation or on halt. Otherwise, they may fall into the machine, causing parts damage or even bodily injury.
- (3) Never use compressed air for cleaning your skin. It may cause infection if your skin has any open wounds.






- (4) When using lubricant, paint, adhesive, sealant, or detergent, put on the protectors, safety gloves, and safety goggles to protect your skin and eyes from those materials.

Such materials may cause bodily damage. If your skin or eyes become contaminated, wash the affected part at once and get appropriate medical care. When using any detergent, always ventilate the workshop sufficiently.

Follow the instructions provided by the material manufacturer or supplier.

- (5) For any work which could damage the eyes, always wear safety goggles.


[3] Adjustment Work

 **CAUTION:** For safety, always turn power off before beginning adjustment of the loom. Further, indicate the "Maintenance (Adjustment)" signboard regulated by the plant at the power switch.

[3.1] Use the following procedure to turn power off:


- (1) Stop the loom using the ordinary stop button.
- (2) Set the frame to the closed or leveling state in inching.
- (3) Check that the frame does not move even if the brake release button is pressed.
(For an electronic dobby loom, it is recommended to record the current address before turning power off, as considerable time will be required for pattern matching at restarting the machine if the loom is turned with the power off.)
- (4) Turn power off.
- (5) Check that the machine has come into a complete stop before beginning adjustment work.

[3.2] When work with power on is required:

 **CAUTION:** Observe the following cautions when conducting adjustments using the machine brake or electrical signals:

- (1) Use the slow operation (inching) when operating the machine.
- (2) When conducting a group effort, agree on words or gestures beforehand for giving and confirming signals. Further, indicate the "Maintenance (Adjustment)" signboard regulated by the plant at the power switch.

Take measures to avoid sudden power off or automatic or manual operation of the machine by a third person, which may cause an injury accident.

 **WARNING:** For a dobby machine, it is possible that the load to the machine is unbalanced according to the fabric texture. If a sudden power failure occurs by lightning or other reasons, the power may be turned off to cause the loom to run idle. In such a case, restart operation after unloading the loom according to the procedure instructed in [3.1] (2).

[4] Lubrication

- (1) Make sure that the machine has stopped before greasing of the bearings or gears.
- (2) Always wipe up oil spilled on the floor after supplying oil to the oil bath.
- (3) Waste oil drained from the oil bath should be disposed of in containers specified by the plant.

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S.1.5 Rules for Operating or Checking Electrical Devices



WARNING

Turn OFF the power breaker before removing any of the covers to which the electric shock warning mark is attached. The devices under these covers include electric controllers or power transformers that have a voltage of 200 V AC or over.


- (1) All operating and checking jobs must be carried out by persons with appropriate special qualifications (e.g., duly trained persons or electrical experts).
- (2) Be sure to turn OFF the main breaker and the inverter inching breaker before opening the control box.

 CAUTION: Never touch the terminals indicated with the mark seal in the machine control panel. The machine having the inverter inching function is not provided with the inverter inching breaker (as a standard device), and therefore the inverter current is always supplied to these terminals.
Turn OFF the inverter breaker on the plant power distribution panel before performing maintenance of the devices in the inverter power circuit.

- (3) After turning OFF the breaker, be sure to put up the warning tag "NEVER switch on" on the breaker.
- (4) Prior to starting checking or servicing the electrical components or parts, use a voltmeter to make sure that there is no current flow.

Even after the breaker is turned OFF, current may still flow through main terminals in the control box, so take special care. (To cut off the current completely, turn OFF the circuit breaker.)

- (5) Take extra care when powering up the machine during work in order to check the control system.

 CAUTION: When removing the power-failure brake unit, wait until its LED goes out. The capacitor in the brake unit is charged.

- (6) Use the measuring devices and tools, all kept in proper condition.
- (7) When wiring the units, be sure to first connect the protective wire (green or yellow/green spiral). When disconnecting the wires, remove the protective wire last of all.
- (8) During electrical installation work, the observer responsible for security of the workers must absolutely, without fail, attend at the field. The observer should be limited to someone with know-how concerning electrical troubles.