

# **OPERATION MANUAL**

# SILENT PILER



**GIKEN**

## FORWARD

We thank you for your purchasing our Silent Piler. Since the Silent Piler consists of a number of special parts, we request that you read this manual thoroughly so as to ensure that you use the piler efficiently and safely for a long time.

On adjustment and handling of detailed parts not described in this manual, we request that they should be left to our service personnel since the function of this machine is delicately influenced depending on how these parts are adjusted or handled.

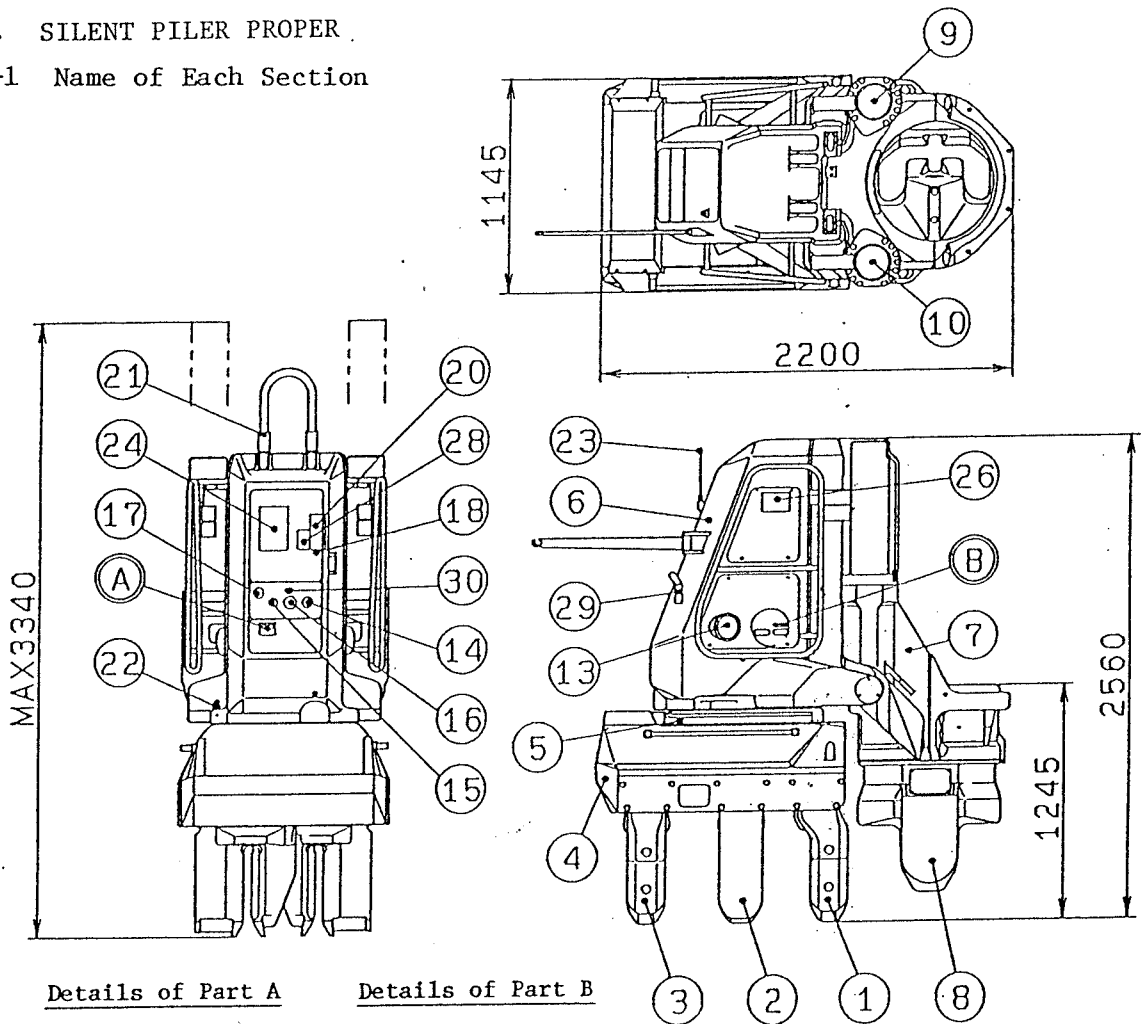
\* Please note that the contents are subject to change for improvement, etc.

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1. SILENT PILER PROPER.

1-1 Name of Each Section



Details of Part A

Details of Part B

- |  |  |   |
|--|--|---|
| 1. Clamp No. 1   | 15. 20M super-high pressure hydraulic hose connection port | 23. Radio controller receiver antenna   |
| 2. Clamp No. 2   | 16. 20M Return hydraulic hose connection port              | 24. Radio controller receiver (in Mast) |
| 3. Clamp No. 3   | 17. Secondary power supply cable connection port           | 25. Speed select switch under chuck     |
| 4. Saddle  | 18. Sub-controller cable connection port (in Mast)         | 26. Main unit lighting lamp             |
| 5. Slide frame   | 19. Spot light switch                                      | 27. Automatic drive monitor             |
| 6. Leader mast   | 20. Interface (in Mast)                                    | 28. Card drive                          |
| 7. Chuck proper  | 21. Main body suspending wire                              | 29. Radio controller transmitter hook   |
| 8. Chuck   | 22. Swing lock pin   | 30. Water hose connection port          |
| 9. Main cylinder (left)                                  |  |   |
| 10. Main cylinder (right)                                |  |   |
| 11. Clamp safety lamp                                    |  |   |
| 12. Chuck safety lamp                                    |  |   |
| 13. Load meter   |  |   |
| 14. 20M High/low pressure hydraulic hose connection port |  |   |

1-2 Specifications

- . Max. press-fit force ..... 150 (60) Ton
- . Max. drawing force ..... 160 (75) Ton
- . Press-fitting speed ..... 1.2 - 12.0 m/min
- . Drawing speed ..... 1.0 - 9.6 m/min
- . Press fit and draw stroke ..... 800 mm
- . Applicable steel sheet-pile type ... VL - VIL
- . Operation system ..... Radio control
- . Moving method ..... Self-moving
- . Weight ..... 7,800 kg

\* The value in parentheses for the items of maximum press-fit force and drawing force indicates the force in the state of driving two sheet-piles.

1-3 Operation Procedure (From the position of standing for transporting)

Preparation	<ol style="list-style-type: none"> <li>1. Connect the 20 m hydraulic hose and supply cable with the piler proper.</li> <li>2. Start the hydraulic unit.</li> <li>3. The radio control unit starts.</li> <li>4. Start to charge the radio control unit battery.</li> <li>5. Match the clamp opening to the wave form of steel sheet-pile using the clamps (left and right).</li> <li>6. Check that the clamps are open and then set the piler to the steel sheet-pile.</li> <li>7. The clamps close.</li> <li>8. Check for lighting of the clamp safety lamp.</li> </ol>	<p>Connect with ⑭, ⑮, ⑯ and ⑰.</p> <p>Refer to the hydraulic unit explanation.</p> <p>Refer to the radio control unit explanation.</p> <p>Refer to the charger explanation.</p> <p>Refer to the radio control unit explanation.</p> <p>Refer to the radio control unit explanation.</p> <p>Refer to the radio control unit explanation.</p> <p>Lamp ⑪ lights up.</p>
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<p>Press-fitting</p>	<ol style="list-style-type: none"> <li>1. Check opening of the chuck and load a steel sheet-pile into the chuck.</li> <li>2. The chuck moves up.</li> <li>3. The chuck closes.</li> <li>4. Check for lighting of the chuck safety lamp.</li> <li>5. The chuck moves down and press-fitting starts.</li> <li>6. The chuck opens. (Repeats steps 2 to 6)</li> </ol>	<p>Refer to the radio control unit explanation.</p> <p>Refer to the radio control unit explanation.</p> <p>Lamp (12) lights up.</p> <p>Refer to the radio control unit explanation.</p> <p>The light of lamp (12) goes off.</p>
<p>Drawing</p>	<ol style="list-style-type: none"> <li>1. The chuck closes and grasps the the steel sheet-pile for drawing</li> <li>2. Check for lighting of the chuck safety lamp.</li> <li>3. The chuck moves up and drawing begins.</li> <li>4. The chuck opens.</li> <li>5. The chuck moves down. (Repeats steps 1 to 5)</li> </ol>	<p>Refer to the radio control unit explanation.</p> <p>Lamp (12) lights up.</p> <p>Refer to the radio control unit explanation.</p> <p>The light of lamp (12) goes off.</p> <p>Refer to the radio control unit explanation.</p>

End of work	<ol style="list-style-type: none"> <li>1. The lamp closes</li> <li>2. Check for lighting of the clamp safety lamp.</li> <li>3. Set hydraulic unit start switch 64 to STOP.</li> <li>4. Set hydraulic unit start switch ⑥4 to Run. Set the piler switch of each action to ON and OFF a few times.</li> <li>5. Set hydraulic unit start switch ⑥4 to STOP.</li> <li>6. Turn off the radio control unit transmitter power switch.</li> <li>7. Turn off operation power switch ⑤9 .</li> <li>8. Turn off main power switch ⑥0 .</li> </ol>	<p>Refer to the radio control unit explanation.</p> <p>Lamp ①1 lights up.</p> <p>Refer to the hydraulic unit explanation.</p> <p>Refer to the hydraulic unit explanation. Extraction of residual pressure</p> <p>Refer to the hydraulic unit explanation.</p> <p>Refer to the radio control unit explanation.</p> <p>Refer to the hydraulic unit explanation.</p> <p>Refer to the hydraulic unit explanation.</p>
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(Items 1, 7 and 8 of Preparation)

These are preparation works necessary at the time of transporting the piler to the construction site.

(Items 4 and 5 of End of work)

These are done to extract the residual pressure in the hydraulic circuit. However, these steps are unnecessary when the 20m hydraulic hose is not disconnected from the piler proper after ending the work. Each action of the piler refers to ①4 actions including chuck moving up/down and chuck opening/closing.

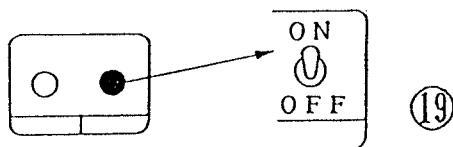
#### 1-4 Safety Device

##### . Overload protector

When the maximum load for press-fitting or loading of one pile driving in the state of 2-pile driving (the side frame is protruding out of the saddle), excessively large force applies to the major parts, resulting in damage to the piler. Therefore, in the 2-pile drive state, the chuck moving up/down action stops when a certain load is applied. In such a case, let the pile move (self-moving) and set it to the 1-pile drive state or open the chuck at the point. The chuck can be moved up/down.

#### 1-5 Work at Night

The spot lamp illuminates two sides of the driver, loading port, chuck sheet-pile section, or clamp when working at night, thereby ensuring the safety of work.



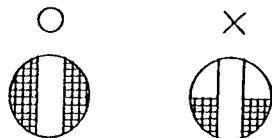
#### 1-6 Caution for Handling

(If you do not observe the following, bodily injury, breakage of equipment, or insufficient performance of the machine may occur.)

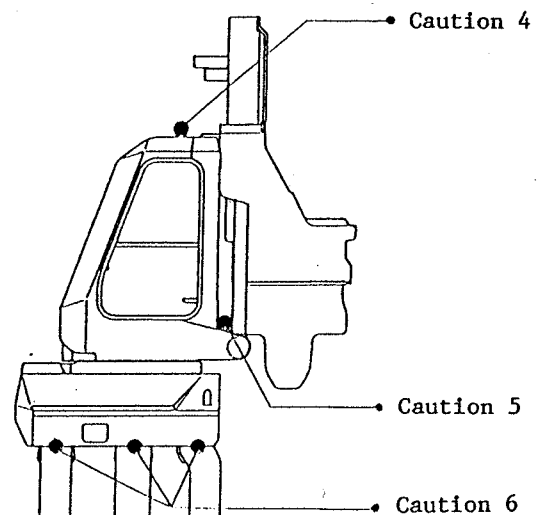
1. Never attempt remodeling the piler. Especially, welding to the piler proper is strictly forbidden.
2. Never change the hydraulic and electric circuit equipment and the adjustment. It is very dangerous.
3. When you clean the piler with steam, etc., do not clean the leader mast inside and secondary power supply cable connection port (17).



4. Never step on the leader mast upper part at the time of press-fitting and drawing. It is dangerous.
5. Never insert your foot or hand into the space between the main cylinder and leader mast lower part. It is dangerous.
6. Never insert your hand into the space between the saddle cover and clamp. It is dangerous.
7. Check for lighting of safety lamp (11) or (12) at the time of opening the clamp or closing the chuck, and be sure to set the switch to the OFF position.
8. Check suspending wire (21) before starting the work and if it has a defect (kink, broken element), replace it with new one immediately.
9. Beware that the limit on the capacity of this piler may change when you use an attachment.
10. Be sure to stop the piler when you must step on it.
11. Grasp the steel sheet-pile with the whole surface of the movable tooth of chuck. If only half or one third of the movable tooth is used to grasp, the service life of the cylinder and tooth is extremely shortened.

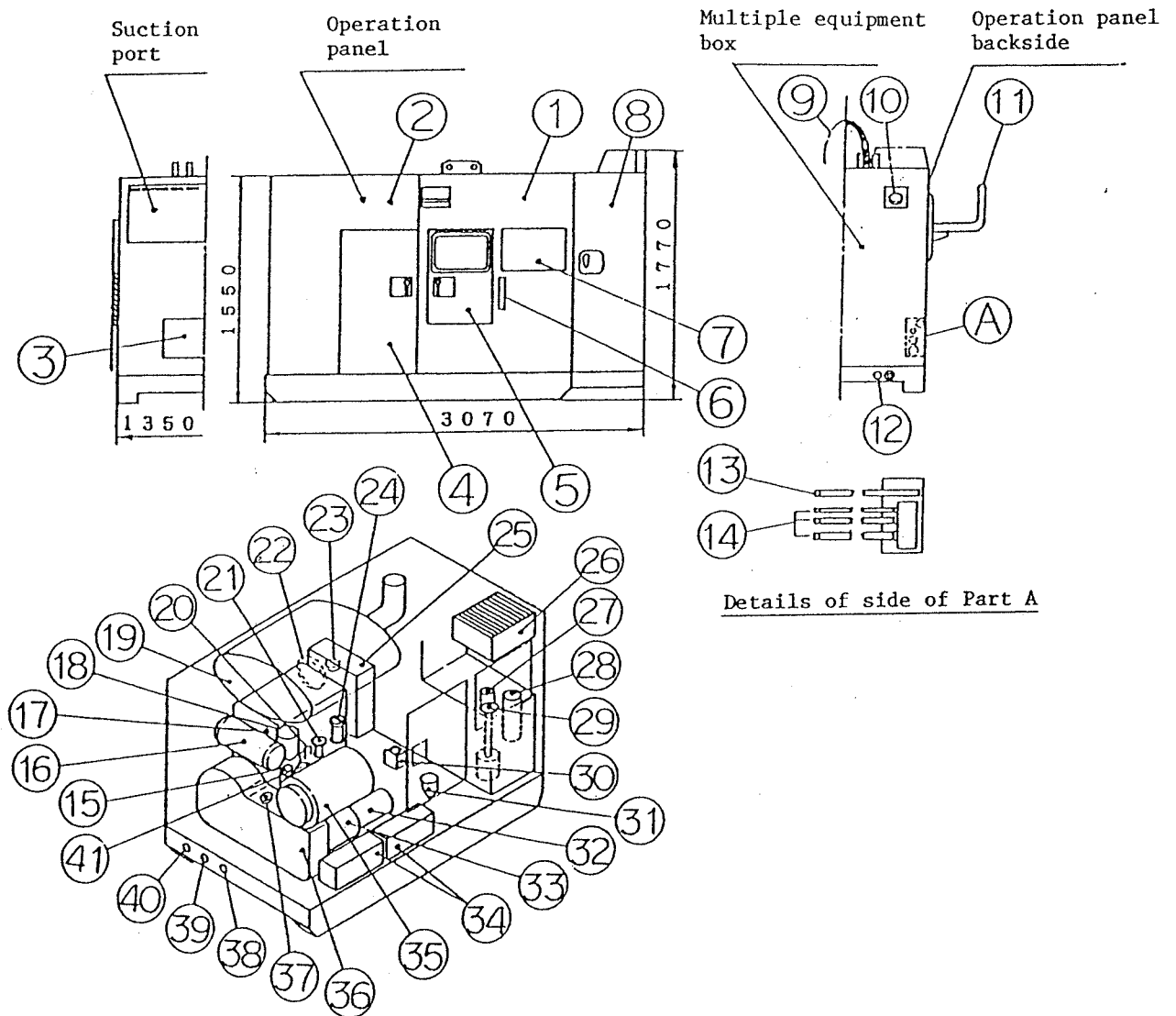


(Grasping with whole surface of tooth)      (Grasping with half surface of tooth)



## 2. HYDRAULIC UNIT

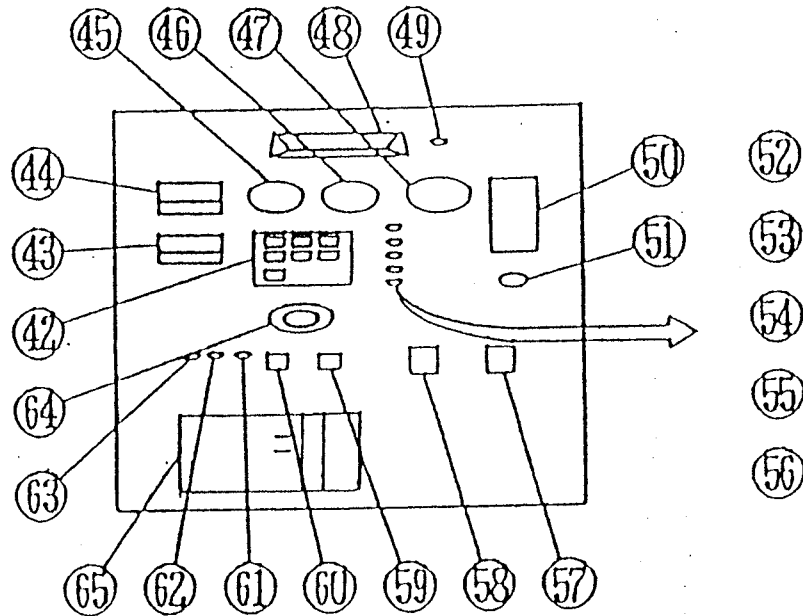
### 2-1 Name of Each Part



Details of side of Part A

- |                                |   |                                       |
|--------------------------------|---|---------------------------------------|
| 1. Bonnet                      | 15. Suction dust indicator              | 30. Sub-tank (Cooling water)          |
| 2. Bonnet cover                | 16. Air cleaner                         | 31. Oil-water separator               |
| 3. Gear box maintenance cover  | 17. Engine                              | 32. Low-pressure hydraulic pump       |
| 4. Left door at front          | 18. Fuel filter                         | 33. High-pressure hydraulic pump      |
| 5. Right door at front         | 19. Muffler                             | 34. Battery                           |
| 6. Hydraulic oil gauge         | 20. Engine oil level gauge              | 35. Generator                         |
| 7. Oil cooler duct door        | 21. Priming pump                        | 36. Bear box                          |
| 8. Multiple equipment box      | 22. Alternator driving V-belt           | 37. Gear oil supply port, level gauge |
| 9. Suspending wire             | 23. Muffler drain (Muffler bottom face) | 38. Gear oil drain                    |
| 10. Fuel supply port (Gas oil) | 24. Engine oil adding port              | 39. Engine oil drain                  |
| 11. 20M hose hanger            | 25. Radiator                            | 40. Cooling water drain               |
| 12. Fuel drain                 | 26. Oil cooler                          | 41. Engine oil filter                 |
| 13. Secondary power cable      | 27. Hydraulic oil supply port           |                                       |
| 14. 20M hydraulic hose         | 28. Return filter                       |                                       |
|                                | 29. Suction filter                      |                                       |

Operation panel
















- |                                    |                                 |  |
|------------------------------------|---------------------------------|--|
| 42. OK monitor                     | 50. Fuel gauge                  | 58. Single phase 100V power switch                   |
| 43. Generation ammeter             | 51. Fuel pump activation switch | 59. Operation power switch                           |
| 44. Generation voltmeter           | 52. Charge lamp                 | 60. Main power switch                                |
| 45. Cooling water thermometer      | 53. Air heater lamp             | 61. Oil pressure control lamp (Low pressure, yellow) |
| 46. Lubrication oil pressure gauge | 54. Generation indication lamp  | 62. Oil pressure control lamp (High pressure, green) |
| 47. Engine tachometer              | 55. Idling indication lamp      | 63. Oil pressure control lamp (super high, red)      |
| 48. Panel illumination             | 56. Warm-up indication lamp     | 64. Sarter switch                                    |
| 49. Panel illumination switch      | 57. 3-phase 220V power switch   | 65. Radio controller battery charger                 |

## 2-2 Specifications

- . Diesel engine (with turbo) 100PS
- . Fuel tank capacity 200 liters
- . Hydraulic tank rated capacity 400 liters (Center position of oil gauge)
- . Operating power supply Single phase 200V 2kW  
3-phase 220V 20kVA
- . Battery NS150 (2 cells)
- . Weight 4600kg (with 20M hydraulic hose and box, rated quantity of hydraulic oil and fuel filling up the tank)
- . Noise As specified by the Ministry of Construction and Ultra-low noise type construction machine

## 2-3 Operation Procedure

Preparation	<ol style="list-style-type: none"> <li>1. Check the quantity of hydraulic oil (6) .</li> <li>2. Check the quantity of engine oil (20) .</li> <li>3. Check the quantity of gear box oil (36) .</li> <li>4. Check the quantity of cooling water (30) .</li> </ol>	  	
Operation	<ol style="list-style-type: none"> <li>1. Set starter switch (64) to the operation position.</li> <li>2. Check the indication of OK monitor (42) .</li> <li>3. Check for lighting of charging lamp (52) .</li> <li>4. Check the quantity of fuel (gas oil) (50) .</li> </ol>	 	The red lamp lights up.

Operation	5. Set starter switch 64 to the start position and release the finger.		
	6. Idling state		
	7. Check suction dust indicator (15).		OK if the red mark is not shown.
	8. Idles up automatically (1800rpm).		
	9. Check the indication of OK monitor (42).		
	10. Turn on operation power switch (59).		The red lamp lights up.
11. Turn on main power switch (60).		The red lamp lights up.	
Stop	1. Set starter switch (64) to OFF.		
	2. Turn off operation power switch (59).		The red lamp goes off.
	3. Turn off main power switch (60).		The red lamp goes off.

Note 1) Even if the starter switch is set to the operation position immediately after stopping the engine by setting starter switch (64) to the stop position, the engine does not start for ten seconds because of activation of the stop solenoid.

(Operation Item 5)

If the starting motor is used continuously for ten seconds or longer at the time of starting the engine, the starting motor may have trouble.

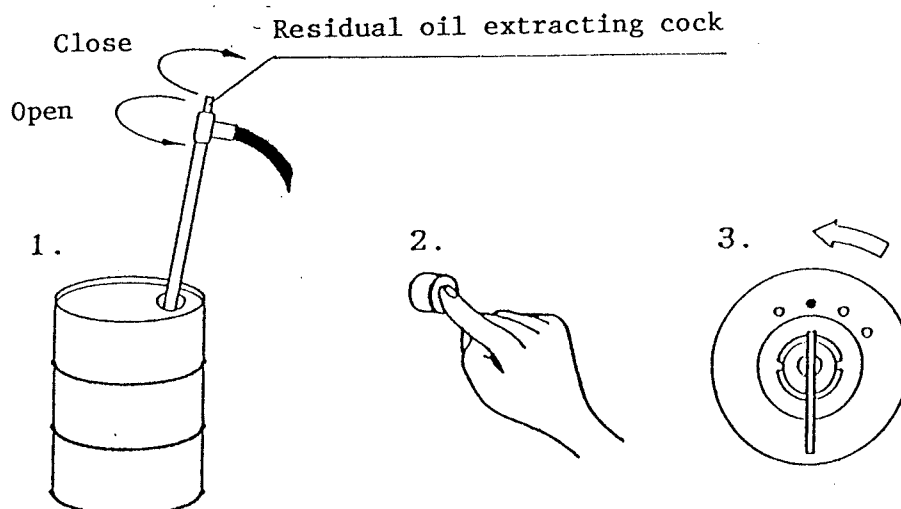
## 2-4 Fuel Adding

When the level of fuel oil nears the bottom, add fuel as soon as possible.  
(Diesel gas oil, JIS-K2204-2)

### Operation procedure

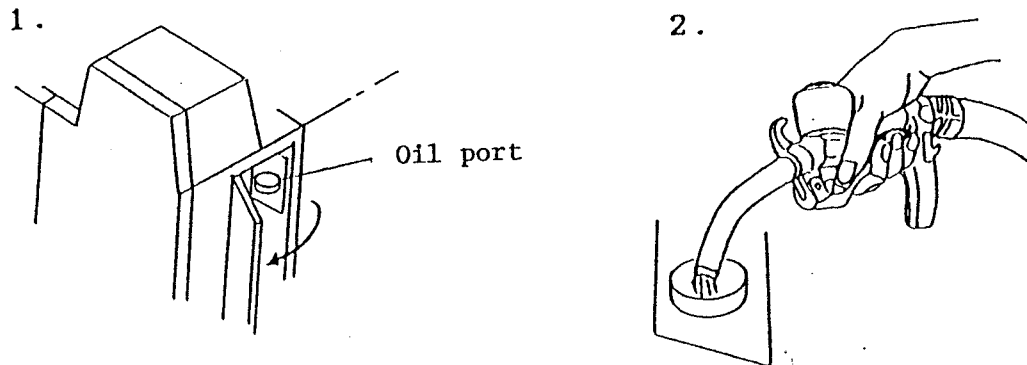
#### (1) Adding the fuel with fuel pump

1. Set the oil adding pipe (contained in the multiple equipment box) to a fuel metal drum. Check that the residual oil extracting cock is closed.
2. Set starter switch (64) on the operation panel to the operation position (in the state of engine stopping) and turn on the fuel pump activation switch.
3. When the fuel tank is filled or when the oil metal drum no longer has oil, the fuel pump automatically stops. Also, you can stop the pump by setting the starter switch to OFF.
4. After completing to add the oil, open the residual oil extraction cock to discharge the oil from the oil adding pipe and place it back in the multiple equipment box.



(2) Manual adding of fuel

1. Open the door of multiple equipment box at the backside of unit operation panel.
2. Remove the oil port cap and add the fuel. Check the amount of added oil with the fuel gauge on the unit operation panel.



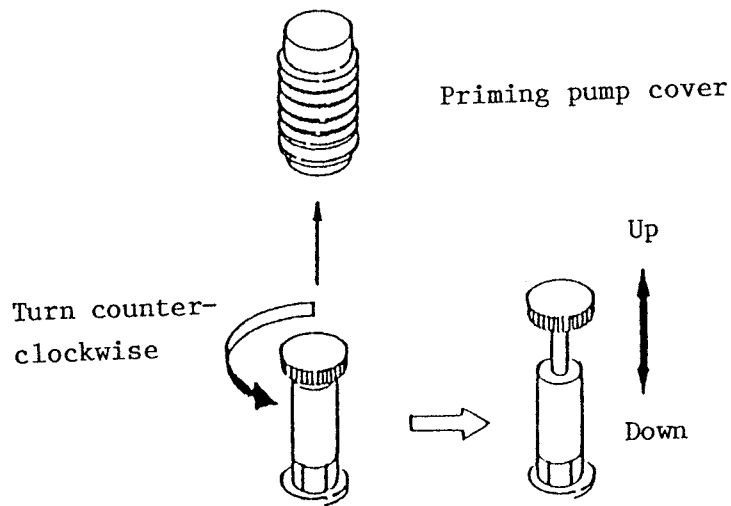
2-5 Bleeding of Air from Fuel Line

The fuel line means the line from the fuel tank to the fuel nozzle. If air enters the line, the fuel is not injected.

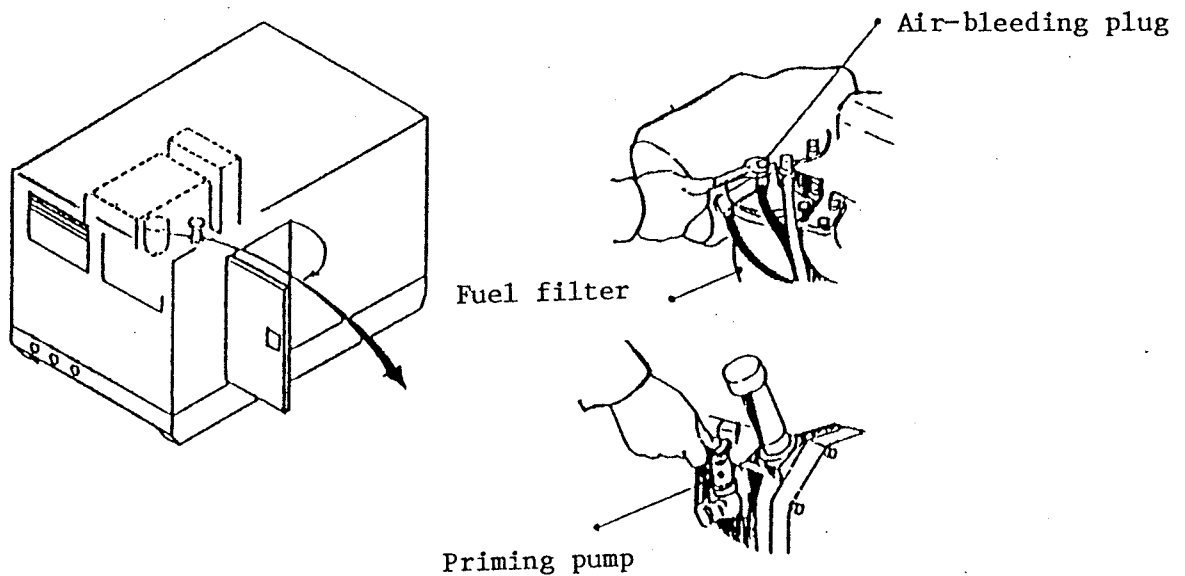
Air bleeding is necessary in the following cases.

- . When the fuel tank is emptied.
- . When the fuel filter is replaced.
- . When the oil-water separator filter is replaced.

1. Remove the cover of priming pump (24) attached to the fuel injection pump and turn the knob counter-clockwise. You can move up/down the pump.



2. Then, loosen the air-bleeding plug attached to the top center of fuel filter (18), prime until the fuel contains no bubbles and tighten the air-bleeding plug while injecting the fuel.



3. Lock the priming pump (turn the knob clockwise) and put back the pump cover. The air-bleeding completes.



## 2-6 Safety Devices

### (1) Engine start interlock

- . Decrease of cooling water quantity
- . Decrease of engine oil quantity
- . Decrease of gear box oil quantity
- . Decrease of hydraulic oil quantity

Indicated on OK  
monitor (42) .

The engine does not start in the above cases. Check the pertinent place.

### (2) Engine forced stop

- . Increase of cooling water temperature
- . Decrease of engine oil pressure
- . Decrease of gear box oil pressure
- . Decrease of hydraulic oil quantity

Indicated on OK  
monitor (42) .

The engine automatically stops in the above cases. Check the pertinent place.

### (3) No-fuse breaker

1. Operation power switch ..... (59)
2. Main power switch ..... (60)

When the current flows abnormally in the electric circuit of (59) or (60), the pertinent switch is automatically set to OFF. If this occurs repeatedly, contact us.

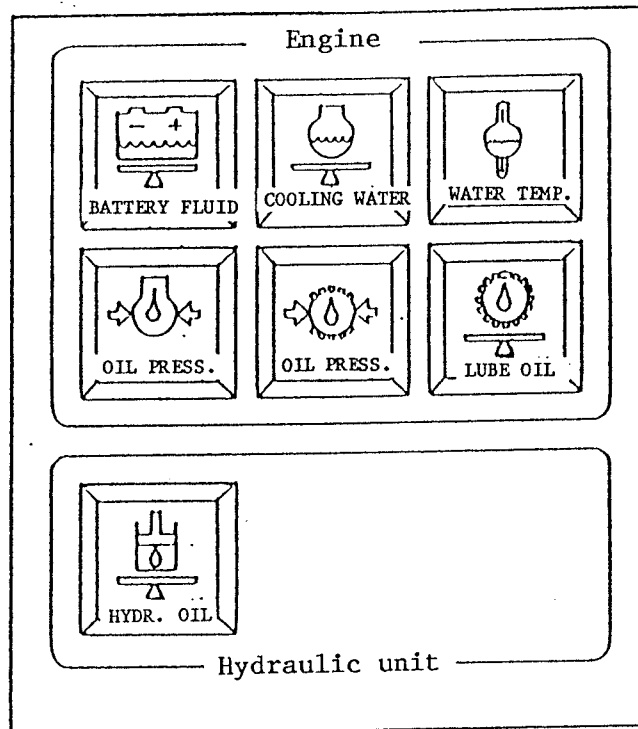
## 2-7 Caution for Handling

(If you do not observe the following, bodily injury, breakage of equipment, or insufficient performance of the machine occurs.)

1. Do not change the hydraulic and electric circuit equipment and the adjustment. It is very dangerous.
2. Install the unit on a flat surface.
3. If the ground is soft or water accumulates, install a stabilized flat floor and install the unit on the floor.

4. When connecting secondary power cable ⑬ , be sure to check that the connecting part is free of mud, oil and moisture beforehand, pay close attention to avoid twisting or damaging the cable and turn off starter switch 64 without fail prior to starting the connection.
5. Check suspension wire ⑨ beforehand. If it has a defect (kink or broken element), replace it with new one immediately.
6. The engine does not start if the hydraulic oil quantity is small. Check the oil quantity before starting.
7. Do not install the unit in an arrangement which blocks the suction duct.
8. Do not place a cover or any other material that blocks the suction duct.
9. Do not connect the generator with indoor wiring.
10. Be sure to lock all doors when transporting the unit.

2-8 OK Monitor Indications



Classi- fica- tion	Monitor indication	Indication contents	OK monitor indication and safety mechanism				
			Starting interlock (Note 1)	Engine stop (Note 2)	Place to check	Check contents	Mainte- nance No.
Engine	Battery fluid	Decrease of battery fluid quantity			③4	Battery fluid quantity	16
	Cooling water	Decrease of cooling water quantity	o		③0	Cooling water quantity	①6
	Water temperature	Increase of cooling water temperature		o	③0 ②2	Cooling water quantity V-belt	①6 15
	Oil pressure	Decrease of engine oil pressure		o	②0	Engine oil quantity Oil leak	①4
	Oil pressure (Gear)	Decrease of gear box oil pressure		o	③5	Gear box oil quantity	①5
	Lube oil	Decrease of engine oil quantity	o		②0	Engine oil quantity	①4
		Decrease of gear box oil quantity	o		③5	Gear box oil quantity	①5
Hydrau- lic	Hydraulic oil	Decrease of hydraulic oil quantity	o	o	⑥	Hydraulic oil quantity	

- (Note 1) Mechanism that does not allow the engine to start even when the starter switch is turned on.  
 (Note 2) Mechanism that forcibly stops the engine. (The engine stops in about 5 seconds after trouble occurs.)  
 (Note 3) Refer to the Table of General Check Items for Maintenance No. ①4, ①5, and ①6 and refer to the Maintenance and Check Points for Maintenance No. 15 and 16.

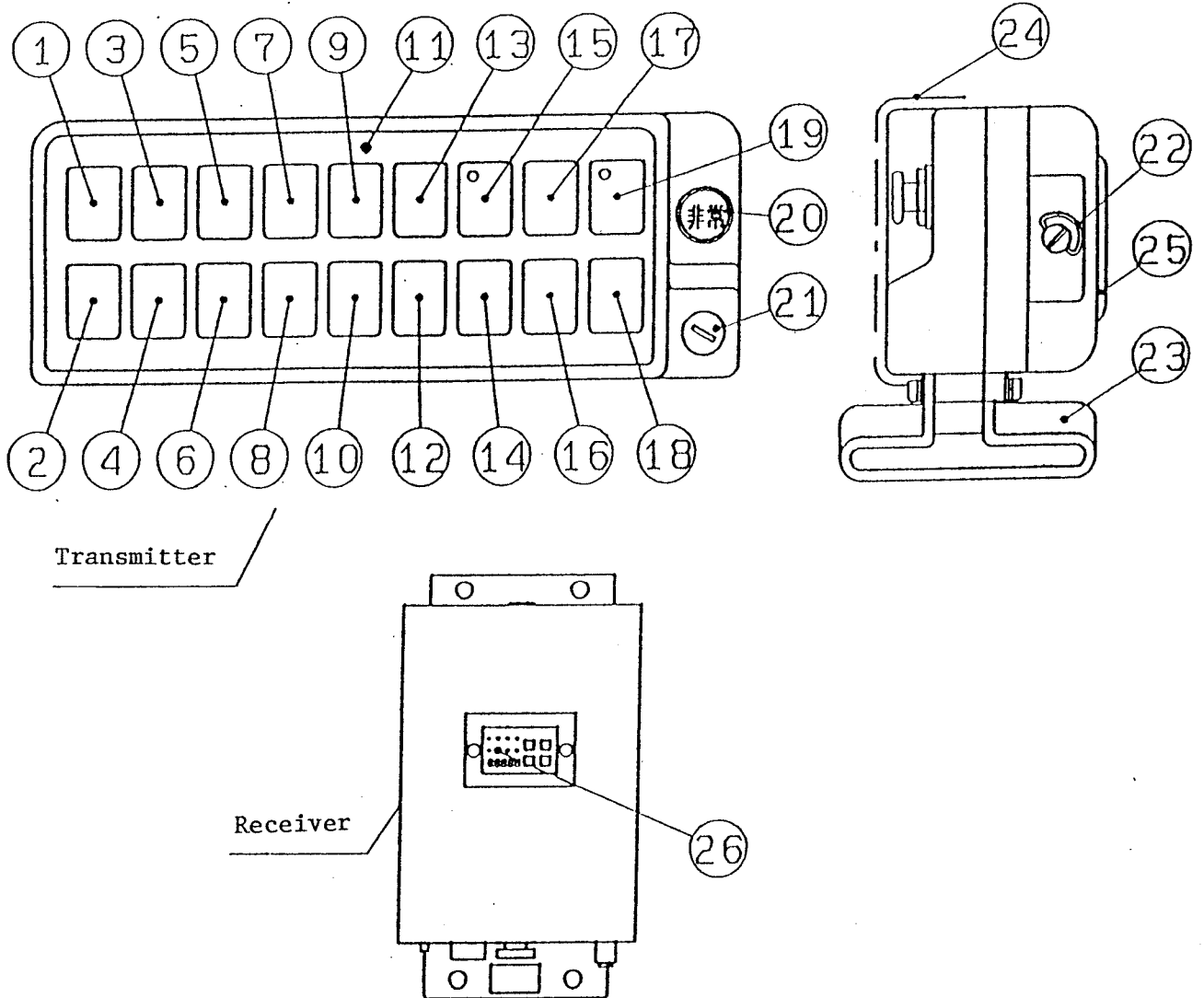
2-9 Operation Panel Indications

○ Lamp lighting ● Lamp not lighting

No.	Nameplate	Indication contents	Lamp (Color)	Starter switch position					
				Pre-heating	Stop	Operation (while engine is stopping)	Start	Operation (while engine is idling)	Operation (while engine is at-rate running)
52	Charge	Charging the battery	Red	○	●	○		●	●
53	Air heater	Pre-heating the air heater	Red	○ (● 15 seconds later)	●	●		●	●
54	Generating	The generator is operating.	Red	●	●	●		●	○
55	Idling	The engine is idling.	Green	●	●	●		○	●
56	Warming up	The engine is being warmed up.	Green	●	●	●		○ (● about 2 min. later)	●
61	Oil pressure control (low pressure)	Discharging low-pressure oil	Yellow	●	●	●		●	○ (while low-pressure pump is operating)
62	Oil pressure control (high-pressure)	Discharging high-pressure pump is operating)	Green	●	●	●		●	○ (while high-pressure pump is operating)
63	Oil pressure control (super-high)	Discharging super-high pressure oil	Red	●	●	●		●	○ (while super-high pressure pump is operating)

### 3. RADIO CONTROL UNIT (TRANSMITTER AND RECEIVER)

#### 3-1 Name Each Part



Transmitter

Receiver

- |  |   |                             |
|--|---|-----------------------------|
| 1. Chuck move-up switch                | 11. Power pilot lamp                    | 21. Frequency select switch |
| 2. Chuck close switch                  | 12. Auto-operation mode select switch   | 22. Power switch            |
| 3. Mast advance switch                 | 13. Auto-operation switch               | 23. Belt attaching metal    |
| 4. Mast return switch                  | 14. Clamp open auxiliary switch         | 24. Dust cover              |
| 5. Mast counter-clockwise swing switch | 15. Wetting ON/OFF switch               | 25. Battery                 |
| 6. Mast clockwise swing switch         | 16. Chuck clockwise turn switch         | 26. Error lamp              |
| 7. Clamp leftward move switch          | 17. Chuck counter-clockwise turn switch |                             |
| 8. Clamp rightward move switch         | 18. Chuck open switch                   |                             |
| 9. Clamp open switch                   | 19. Chuck move-down switch              |                             |
| 10. Clamp close switch                 | 20. Emergency stop switch               |                             |

### 3-2 Specifications of Transmitter and Receiver

#### 3-2-1 Transmitter specifications

- . Structure Rain-proof type
- . Power supply Ni-Cd cell (Package type)
- . Continuous usable time About 8 hours or longer (when fully charged)
- . Reaching distance Whole press-fitting and drawing work range
- . Weight 1.3 kg

#### 3-2-2 Receiver specifications

- . Structure Dust-proof type
- . Power supply DC24V, exclusive power supply
- . Installed position Built in the leader mast of piler

### 3-3 Operation Procedure

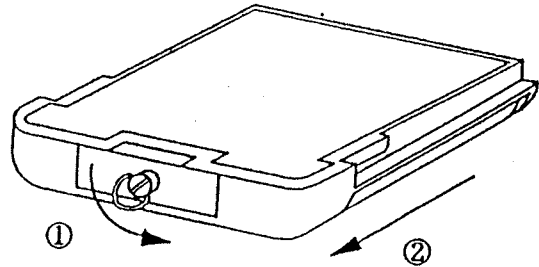
Preparation	1. Replace battery (25) of transmitter. 2. Turn on power switch (22) of transmitter.	Refer to 3.3.1. Lighting of lamp (11) (If lamp (11) is blinking, replace with new battery, referring to 3.3.1.)
Operation	1. Refer to the description of 3.8.	
Stop	1. Turn off power switch (22) of transmitter.	

(Note 1) Frequency select switch (21) is set to the AUTO (A mode) for both transmitter and receiver at the time of shipment.

(Note 2) Turn off power switch (22) while the piler is not working. This extends the battery service life.

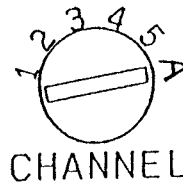
### 3-3-1 Battery replacement (removal)

1. Set the power switch to OPEN.
2. Move the battery sideways.



### 3-3-2 Search of transmitter channel

Ordinarily, five waves can be used for this unit. When frequency select switch (24) is set to the A mode, the optimum frequency is selected automatically.



### 3-3-3 Influence of spark and noise

The operation of this unit is not affected by welding spark, spark of electric car aerial wire and by noise of various types including automobile engine noise.

### 3-3-4 Disturbing electric wave

This transmitter does not disturb other telecommunication waves since it is approved as a specific small power radio station based on the electric wave law.

### 3-3-5 Lighting of receiver ERR (error) lamp

The ERR lamp lights up and the piler stops in the following cases.

- Interference of others

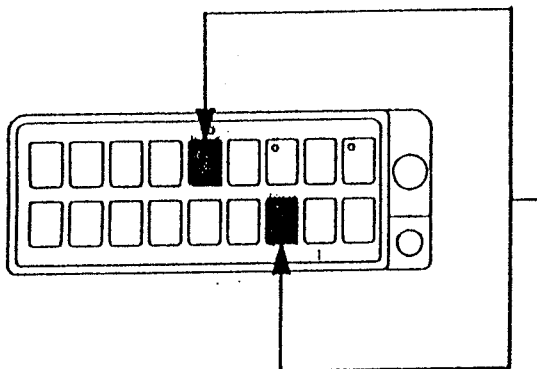
→ Change the frequency of transmitter and receiver.

- . Inability of receiving because of shield existence  
→ Change the transmission position.
- . Inability of receiving because of too weak transmitter output  
→ Replace with new battery.

### 3-4 Safety Devices

#### 3-4-1 Clamp opening (Transmitter)

Two switches must be pressed to open the clamp for prevention of an operation error.



The clamp opens only when the clamp open switch and clamp open auxiliary switch are pressed.

#### 3-4-2 Auto-stopping circuit on interference (Receiver)

When an interference occurs, the piler stops for safety. Turn off the transmitter switch once and turn it on.

The frequency of transmitter and receiver automatically changes to the position where the piler can operate.

### 3-5 Caution for Handling

(If you do not observe the following, bodily injury, breakage of equipment, or insufficient performance of the machine occurs.)

1. Store the transmitter in a place free of rain water and direct sunshine.
2. When setting the battery to the transmitter, be sure to check that no mud, oil, or moisture is sticking to the terminal beforehand.



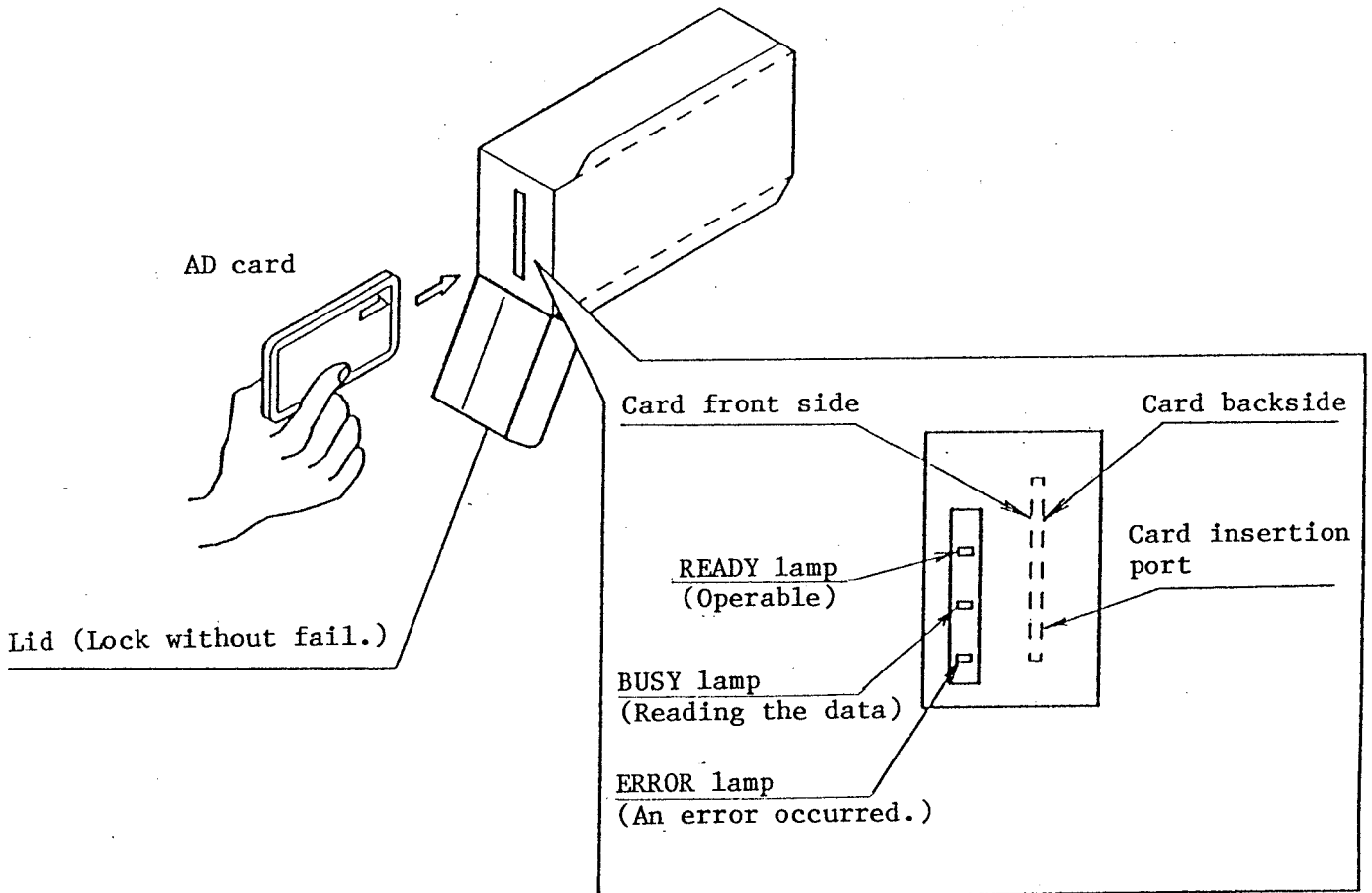
### 3-6 Automatic Drive (AD) System

#### 3-6-1 Outline of AD system

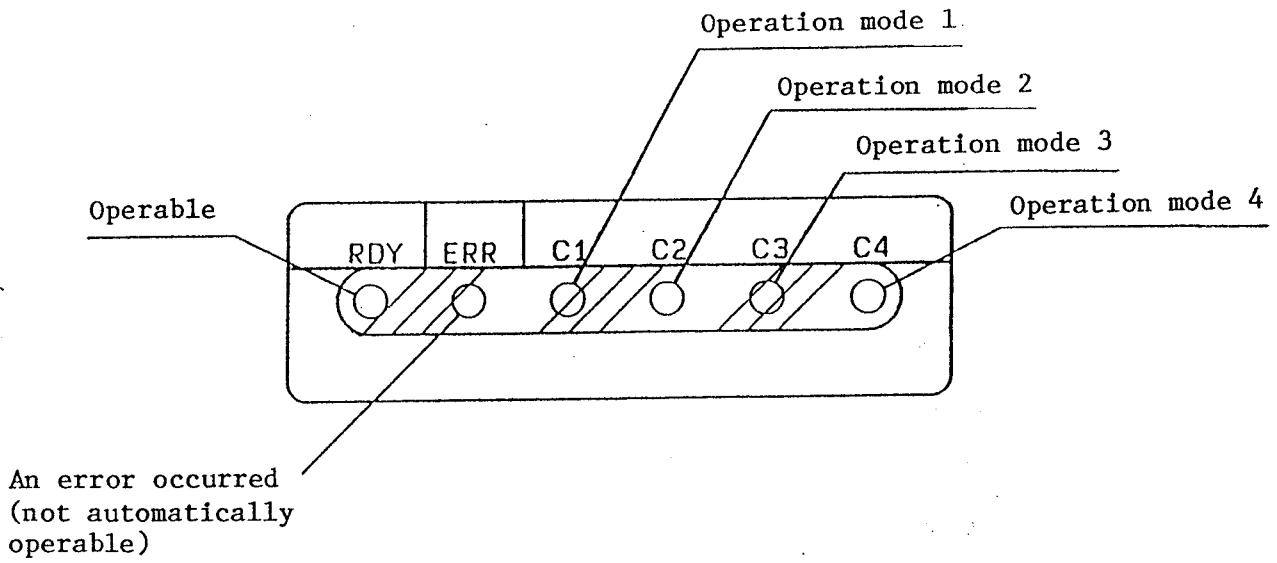
- . This piler is capable of automatically operating sheet pile press fitting and drawing under computer control. It extremely increases the construction efficiency.
- . The available number of operation modes is 4 for automatic press fitting and 3 for automatic drawing and the radio control transmitter allows automatic mode selection and work execution in the selected mode.

#### 3-6-2 AD system equipment

- (1) Card drive unit (built in the mast)



(2) AD monitor (attached to a side of mast)



### 3-6-3 Transmitter operation procedure

Preparation	<ol style="list-style-type: none"> <li>Turn on the transmitter power switch.</li> <li>For about 10 seconds after the engine starts, the AD monitor blinks. * No blinking if the transmitter power switch is not turned on within about 10 seconds.</li> <li>Check for lighting of the RDY lamp of AD monitor. <table border="1" data-bbox="470 600 1372 974"> <tr> <td data-bbox="470 616 598 705">Failure</td> <td data-bbox="598 616 790 705">The blinking does not stop.</td> <td colspan="3" data-bbox="790 616 1372 705">Turn off the operation power of hydraulic unit or stop the engine and then turn it on again or restart the engine.</td> </tr> <tr> <td data-bbox="470 705 598 974" rowspan="3"></td> <td data-bbox="598 705 790 974" rowspan="3">The ERR lamp lights up.</td> <td data-bbox="790 705 949 795">C1 also lights up.</td> <td data-bbox="949 705 1157 795">Card insertion failure</td> <td data-bbox="1157 705 1372 795">Insert correctly.</td> </tr> <tr> <td data-bbox="790 795 949 884">C2 also lights up.</td> <td data-bbox="949 795 1157 884">Card failure</td> <td data-bbox="1157 795 1372 974" rowspan="2">Contact our service personnel.</td> </tr> <tr> <td data-bbox="790 884 949 974">C3 also lights up.</td> <td data-bbox="949 884 1157 974">Card reader error</td> </tr> </table> </li> <li>Close the clamp and chuck.</li> <li>Check for lighting of the safety lamps of clamp and chuck. (AD system starting condition)</li> </ol>	Failure	The blinking does not stop.	Turn off the operation power of hydraulic unit or stop the engine and then turn it on again or restart the engine.				The ERR lamp lights up.	C1 also lights up.	Card insertion failure	Insert correctly.	C2 also lights up.	Card failure	Contact our service personnel.	C3 also lights up.	Card reader error
Failure	The blinking does not stop.	Turn off the operation power of hydraulic unit or stop the engine and then turn it on again or restart the engine.														
	The ERR lamp lights up.	C1 also lights up.	Card insertion failure	Insert correctly.												
		C2 also lights up.	Card failure	Contact our service personnel.												
		C3 also lights up.	Card reader error													
Mode selection	<ol style="list-style-type: none"> <li>Each time the MODE switch is pressed, the AD monitor indication changes: C1 C2 C3 C4 C1 ... * C1 is indicated immediately after the start.</li> </ol>															
Auto press-fit operation	<ol style="list-style-type: none"> <li>Concurrently press the AUTO and PRESS-FIT switches. * During the automatic operation, interrupt operations like chuck leftward/rightward movement and mast CCW/CW swing and advance/return are possible.</li> </ol>															
Auto drawing operation	<ol style="list-style-type: none"> <li>Concurrently press the AUTO and DRAW switches. * During the automatic operation, interrupt operations like chuck leftward/rightward movement and mast CCW/CS swing and advance/return are possible.</li> </ol>															
Pause	<ol style="list-style-type: none"> <li>Press the AUTO operation switch.</li> <li>During the pause, one of the AD monitors, C1 through C4, blinks. * During the pause, operations like chuck leftward/rightward movement and mast CCW/CW swing and advance are possible.</li> </ol>															
Pause resetting	<ol style="list-style-type: none"> <li>Press the AUTO switch.</li> </ol>															
Auto	<ol style="list-style-type: none"> <li>Press any one of the chuck UP or DOWN and emergency switches.</li> </ol>															

(Note 1) While the ERR lamp of AD monitor is lighting (AD card inserted), the automatic operation is not possible but the piler can be manually operated. If the operation is abnormal but the RDY lamp is lit, pull out the AD card, turn off the hydraulic unit operation power and then turn it on (ERR lights up). The piler can be manually operated.

(Note 2) If sheet piles cannot be driven smoothly during the automatic operation, we recommend operating the piler in the manual mode.

### 3-7 Caution for Card Handling

(If you do not observe the following, the using equipment is broken or its performance is insufficient.)

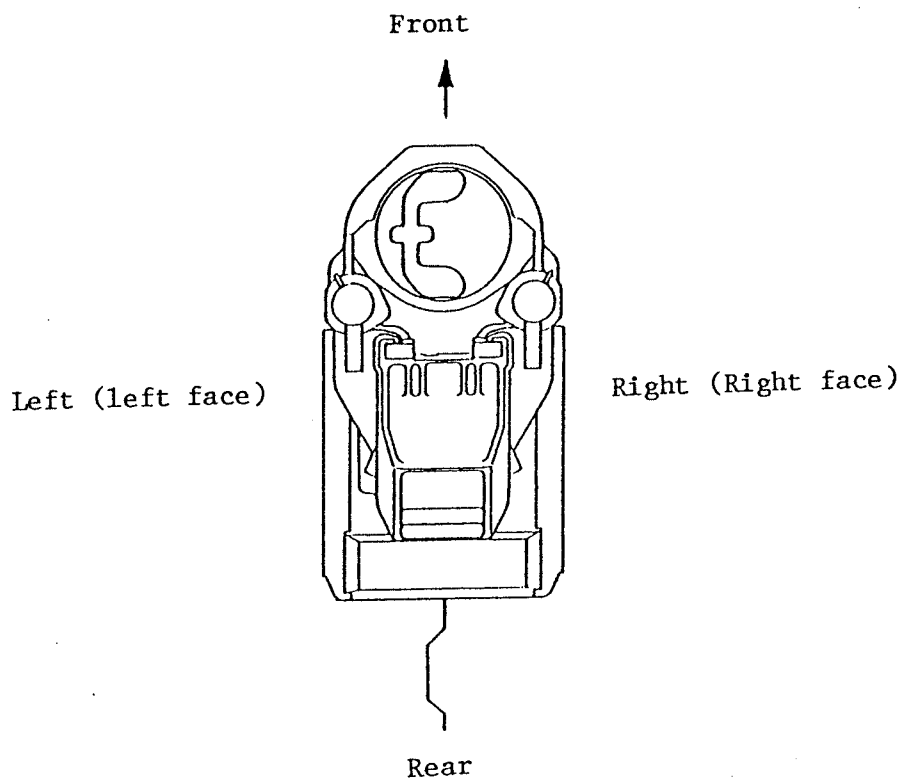
1. Do not bend the card.
2. Do not apply a strong impact to the card.
3. Avoid exposing the card to direct sunshine or high temperature.
4. The service life of AD card is about 5 years, although it depends on how the card is handled.
5. Before inserting the AD card into the card drive, check that no mud, oil, or moisture is sticking to the card.

### 3-8 Operation of Radio Control Unit

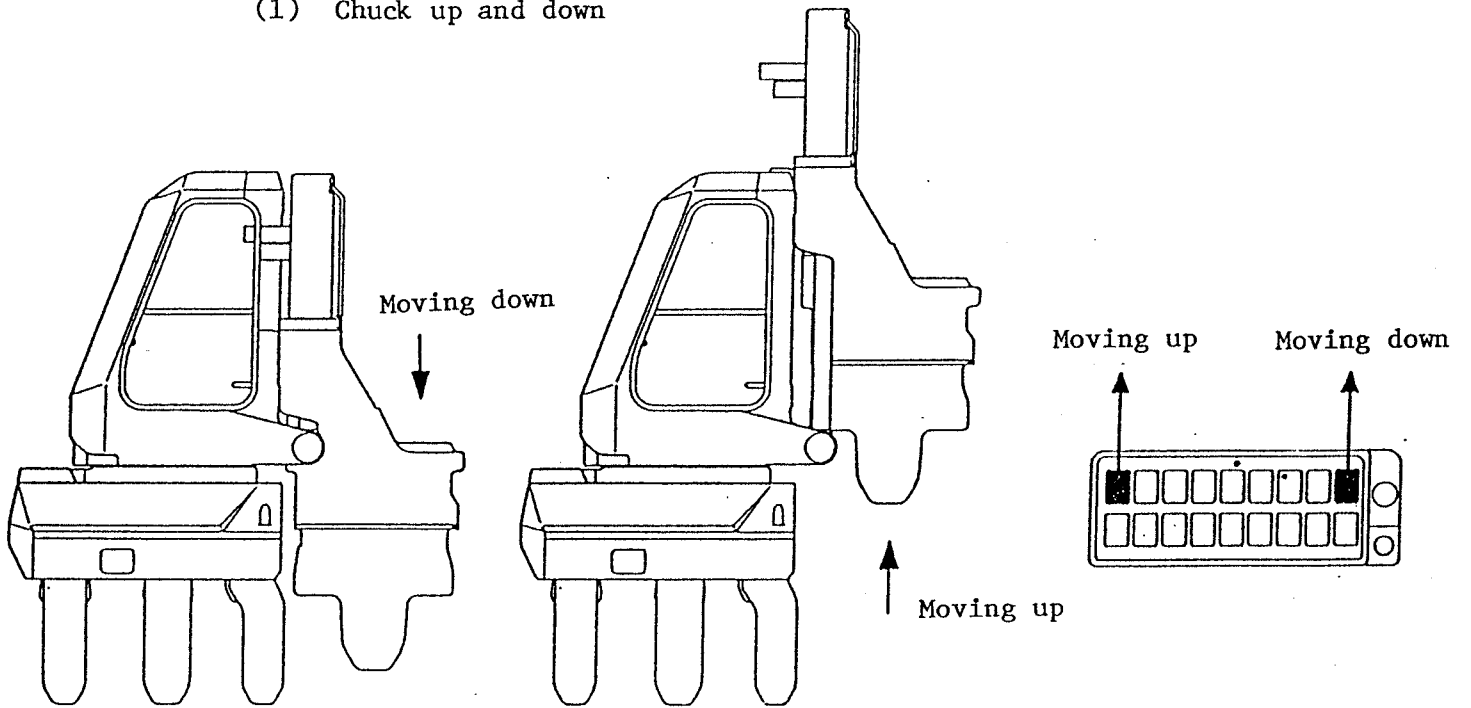
#### \* Definition of direction

The directions are defined based on viewing the piler from above and the front is the direction of movement at the time of press-fitting, as shown below.

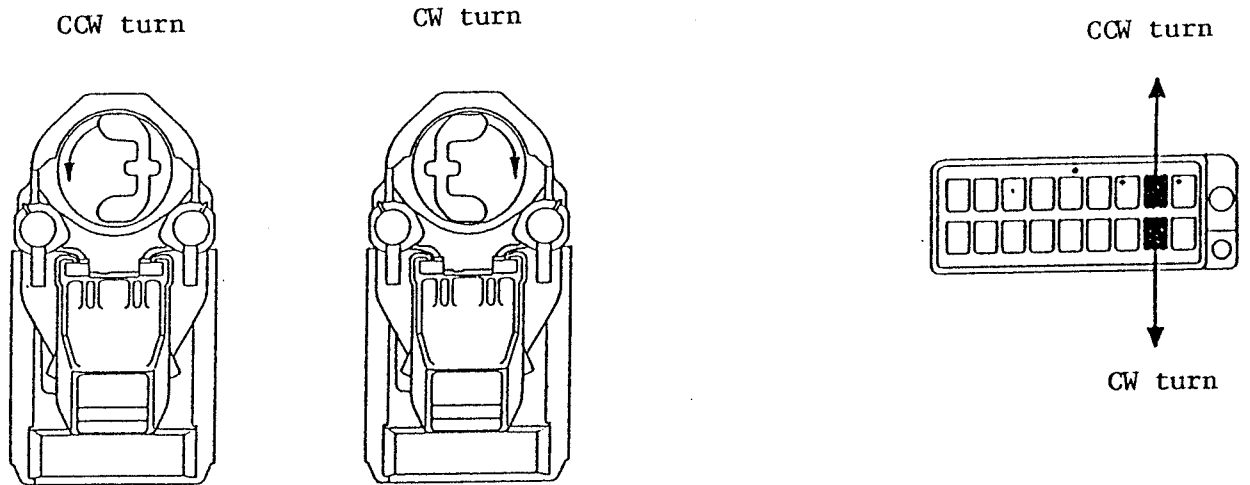
(The same applies to left and right of attached parts.)



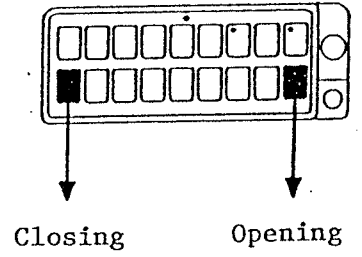
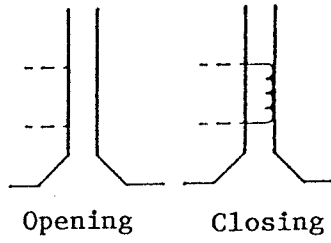
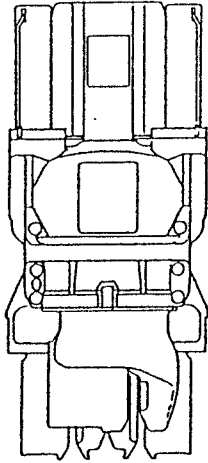
(1) Chuck up and down



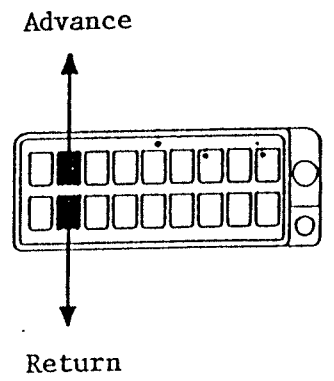
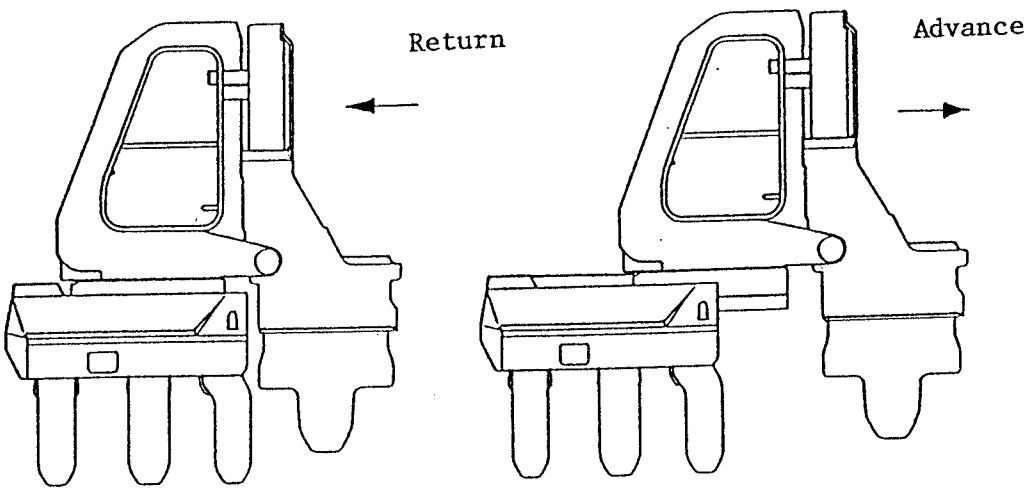
(2) Chuck turning



(3) Chuck opening and closing

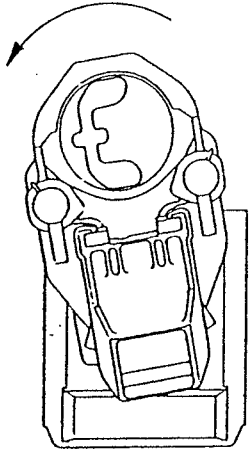


(4) Mast advance and return

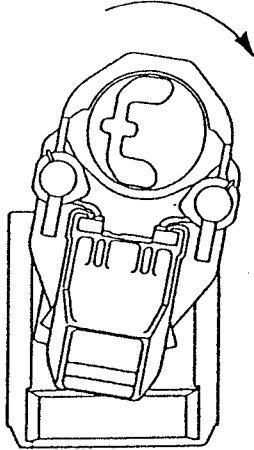


(5) Mast swing

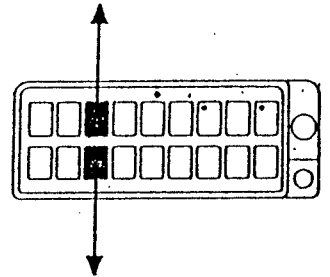
CCW swing



CW swing

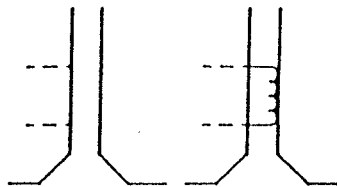
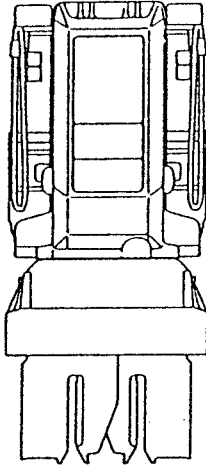


CCW swing



CW swing

(6) Clamp opening and closing

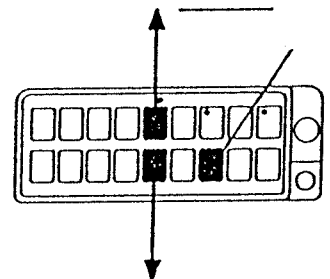


Opening

Closing

To open, press these two switches concurrently.

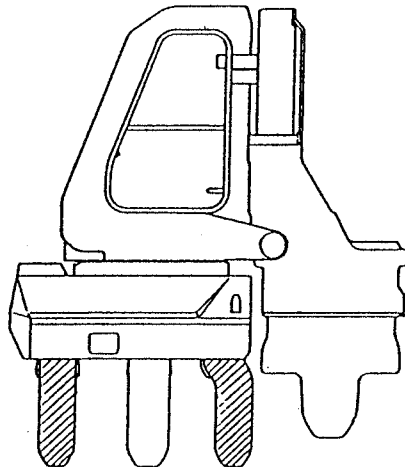
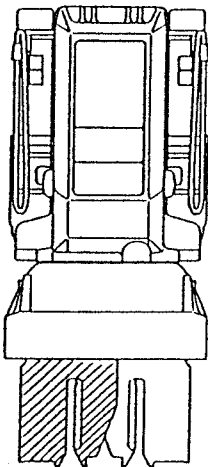
Opening



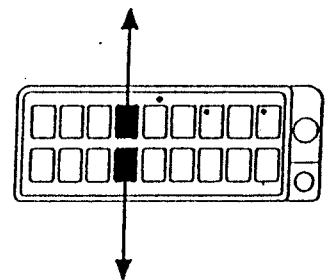
Closing

(7) Clamp leftward/rightward move

Direction of movement of the clamp marked by



Leftward

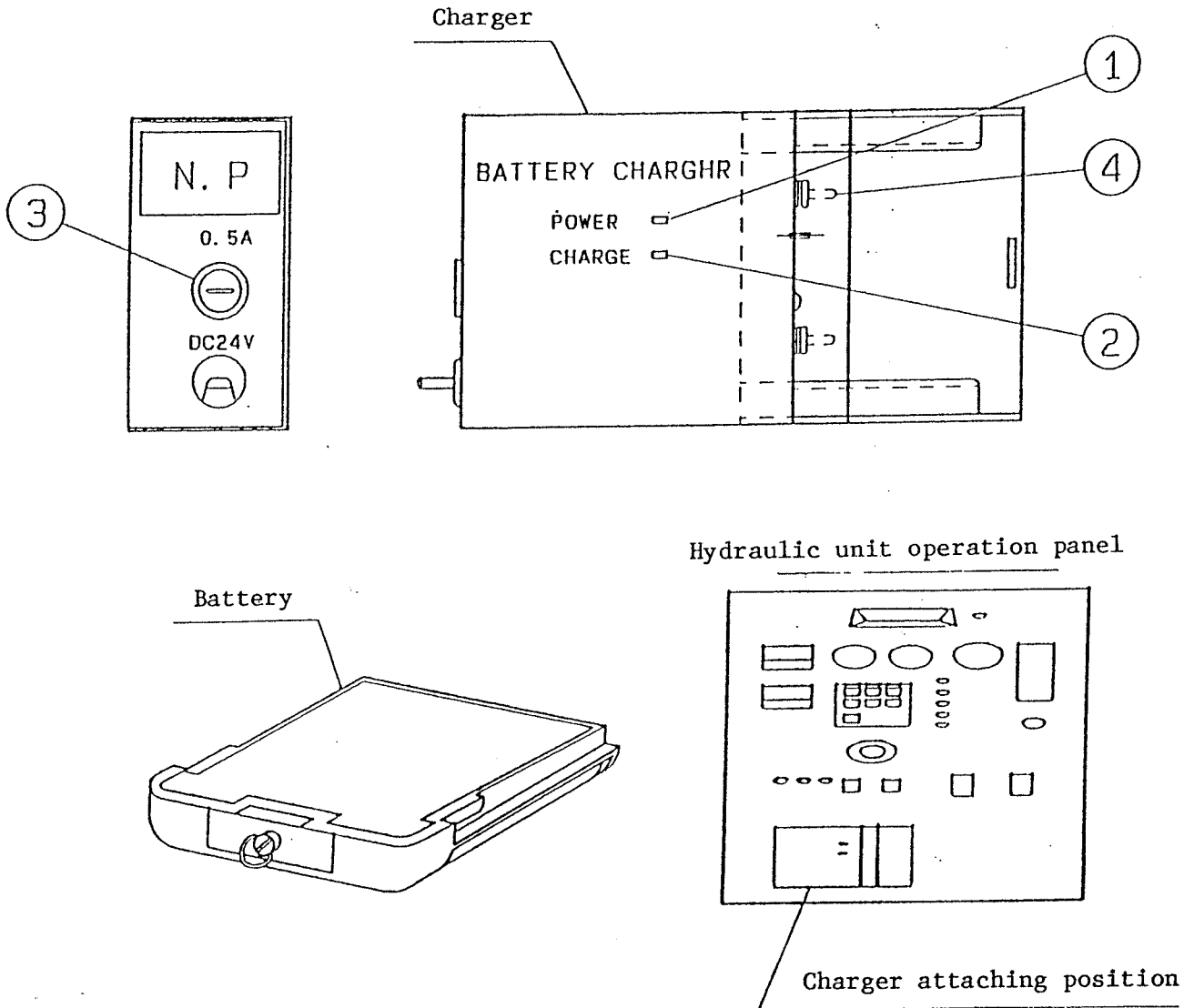


Rightward

← Rightward →  
Leftward

#### 4. RADIO CONTROL UNIT (CHARGER)

##### 4-1 Name of Each Part



1. Power lamp (Green)
2. Charging lamp (Red)
3. Fuse (0.5A)
4. Charging terminal



#### 4-2 Battery Specifications

- . Charging time 5 hours (Rapid charging)
- . Structure Ni-Cd cell (Package type)
- . Continuous usable time About 8 hours (when fully charged)
- . Charging count (Service life) About 300 times

#### 4-3 Operation Procedure

Charging	1. Set the battery to the charger.	Lamp ② lights up (red).
	2. The charging completes in 4 to 5 hours.	Lamp ② blinks.

#### 4-4 End of Battery Service Life

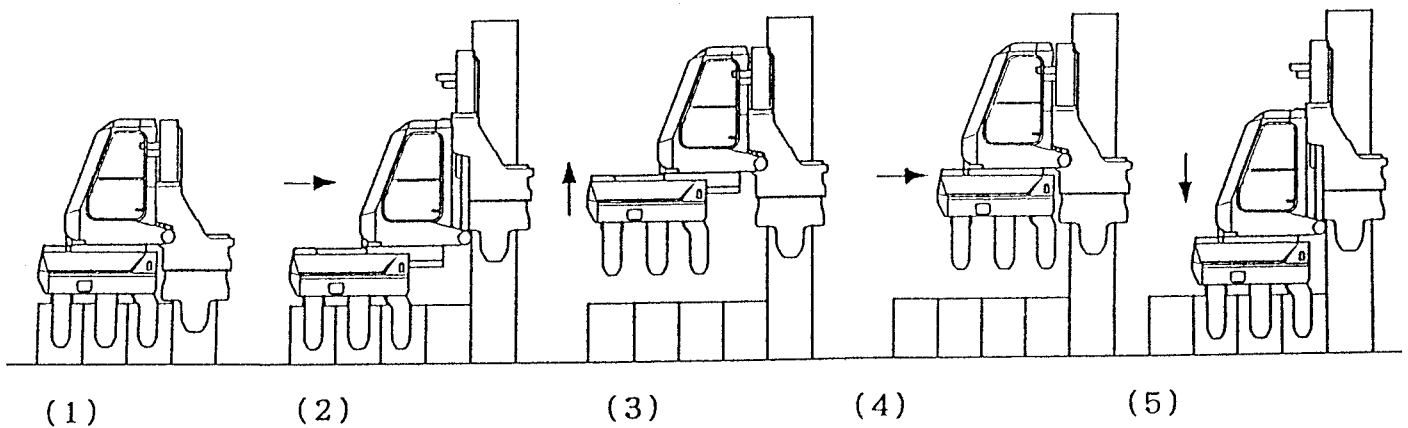
1. If charging lamp ③ blinks immediately after starting and if the power pilot lamp blinks when the battery is set to the transmitter and the use starts.
2. If charging lamp ③ does not blink even after charging for 7 hours or longer.

#### 4-5 Caution for Handling

(If you do not observe the following, bodily injury, breakage of equipment, or insufficient performance of the machine occurs.)

1. When setting the battery to the charger, be sure to check that no mud, oil, or moisture is sticking to charging terminal ④ beforehand.
2. Use the exclusive charger for battery charging without fail.
3. When you store the battery, avoid a place of high temperature and humidity.
4. Do not dispose of the battery at random. Utilize the non-flammable material recovery system of the pertinent municipal authority or ask us for the disposal.

## 5. SELF-MOVING PROCEDURE



5-1 Self-Moving Procedure

No. in above figure

Operation procedure	1. Press-fit the first steel sheet pile in the predetermined position.	(1)	
	2. Start to press-fit the second pile by moving the slide forward.	(2)	
	3. Press-fit up to the state of self-movable.		
	4. Open the chuck and move it up to the self-movable height.		
	5. Close the chuck.		
	6. Check for lighting of the chuck safety lamp.		Lights up.
	7. Open the clamp.		Light goes off and buzzer sounds.
	8. The piler proper moves up by lowering the chuck.	(3)	
	9. Temporarily stop before the clamp is released from the steel sheet pile (about 50mm from the top of steel sheet pile).		
	10. Correct the piler proper position, it is inclining, by using the chuck and mast swing.		
	11. The piler proper moves up by lowering the chuck.		
	12. The saddles moves forward when the mast is moved backward.	(4)	
	13. Move the clamp leftward/rightward to match the wave form of steel sheet pile.		
	14. Check opening of the clamp and move down the piler proper by moving up the chuck.	(5)	
	15. Set the clamp to the steel sheet pile and close the clamp.		
	16. Check for lighting of the clamp safety lamp.		Lights up and buzzer sound stops.

### 5-1-1 Safety devices

. Buzzer (Alarm sound)

The alarm buzzer informs the workers around that the piler is self-moving.

. Chuck close retaining circuit (Hydraulic)

Even if the hose of chuck closing circuit is broken during piler self-moving, the pressure retaining device functions not to open the chuck or not to allow abrupt drop of the grasping pressure.

. Chuck close retaining circuit (Electric)

While the piler is self-moving (chuck is closed and clamp is open), if chuck opening operation is conducted by error, this circuit does not allow the chuck to open.

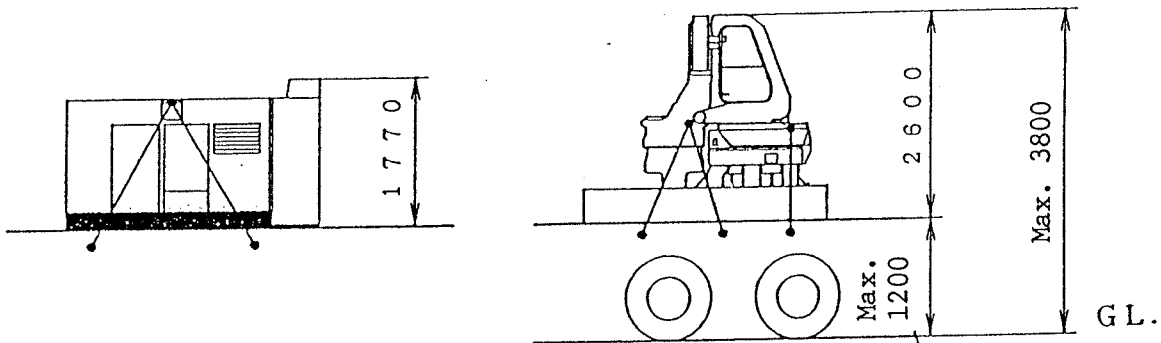
### 5-2 Caution for Self-Moving

Checks before starting the self-moving	<ol style="list-style-type: none"><li>1. The steel sheet pile is firmly rooted and enough supporting strength is given to it.</li><li>2. The steel sheet pile does not fall sideways.</li><li>3. The steel sheet pile is strong enough.</li><li>4. The chuck safety lamp is lighting.</li><li>5. There is nobody nor obstacle around the piler.</li></ol>
Cases in which a crane must be used as a help	<ol style="list-style-type: none"><li>1. When the steel sheet pile is not rooted sufficiently.</li><li>2. When the pile is connected.</li><li>3. When the steel sheet pile falls sideways.</li><li>4. When the ground is soft.</li><li>5. When the top is very high.</li><li>6. When the steel sheet pile itself is not strong.</li></ol>

1. Do not look away under any circumstance during self-moving.
2. Never work in a space between the piler and structure while the piler is self-moving.
3. Check all above items and if the piler tilts immediately after starting to self-move, use a crane and suspend and move the pile.

## 6. TRANSPORTATION

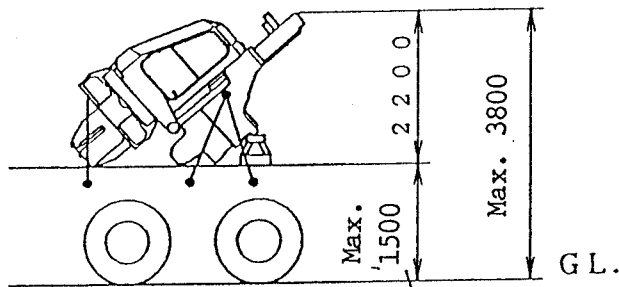
### 6-1 Transportation in Standing State



Caution: Lower the chuck to the bottom.

Height of truck cargo floor when piler is loaded in standing state

### 6-2 Transportation in Lying State

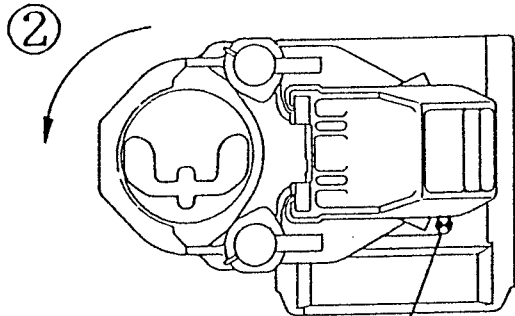


Height of truck cargo floor when piler is loaded in lying state

### 6-3 Setting of Lying Piler

- ① Move up the chuck to the top of leader mast.
- ② Swing the mast counter-clockwise in the direction square to the saddle, match the mast lower part with the pin hole of slide frame and completely insert the swing lock pin into the hole.
- ③ Move the slide frame to a balanced position in the neighborhood of the saddle center.
- ④ Turn the chuck drum.

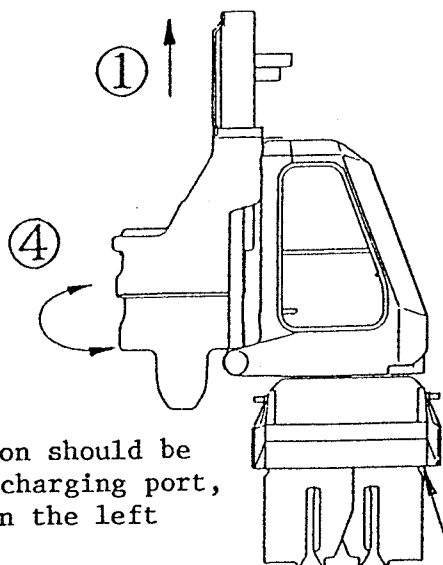
Direction of  
piler moving



After swing of (2), insert  
the pin into the pin hole.

Note) A setting stand that is necessary  
at the time of handling the lying  
piler is optionally available.

The position should be  
the chuck charging port,  
as shown in the left  
figure.



Backside

Never insert your hand  
into the space between  
the saddle cover and  
clamp.

Note) A setting stand that is necessary at the time of handling the  
lying piler is optionally available.

#### 6-4 Caution on Transportation

1. Select a plate of flat and sturdy ground when loading/unloading the piler onto/from a truck.
2. Be sure to pull the side brake and place wheel stoppers for the truck.
3. Fix the piler and hydraulic unit firmly using wires so that they are not collapsed by vibration during transportation.
4. When the piler is laid sideways, the saddle moves because of the weight of piler. Everyone related to the work should be made aware of the danger of inserting their hand in the space between the clamp and saddle cover.
5. When the piler is transported in the lying state, set the swing pin.

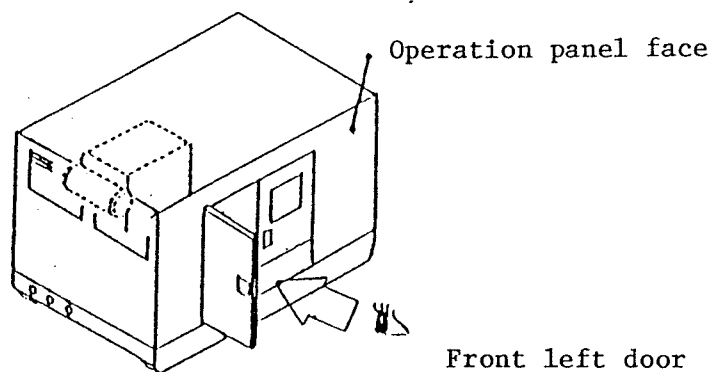
7. MAINTENANCE

7-1 Table of General Check Items

Classi- fication		No.	Check item	Daily	Weekly	Before or when brought in	Page to refer to
Piler	Proper	1	Greasing	o		o	
		2	External oil leak (Hydrau- hose and others)		o	o	
		3	Internal oil leak (Hy- draulic hose and others)		o	o	
	Safety lamp	4	Lighting of chuck safety lamp (green) when chuck is closed.			o	
		5	Lighting of clamp safety lamp (orange) when clamp is closed.			o	
	Radio control unit	6	Break of switch and dust cover	o		o	
		7	Damage or breakage of transmitter case	o		o	
		8	Battery charging state	o		o	
		9	Connection and damage of receiver antenna		o	o	
Hydraulic unit	Hydrau- lic unit	10	Quantity of hydraulic oil, stain	o		o	
		11	Leak of oil, cooling water, and fuel around the engine and pump		o	o	37
	Fuel line	12	Check and adding of fuel	o		o	
		13	Drain discharge of fuel tank		o	o	
	Lube oil line	14	Check and addition of engine oil	o		o	37
15		Check and addition of gear box oil	o		o	38	

Classification		No.	Check item	Daily	Weekly	Before or when brought in	Page to refer to
Hydraulic unit	Cooling water line	16	Check and addition of cooling water	o		o	39
	Electric line	17	Check for lighting of charging lamp	o		o	40
	Air cleaner	18	Check of dust indicator	o		o	40
	Hydraulic hose and cable	19	Damage of high/low pressure, super-high pressure, and return hydraulic hoses		o	o	
		20	Oil leak and damage of hydraulic hose coupler connection		o	o	41
		21	Loosening of secondary power cable connector	o		o	41

- (11) Leak of oil, cooling water, and fuel around the engine and pump  
 Check whether or not the oil leaks on the floor in the unit or from the engine, gear box pump, or piping.



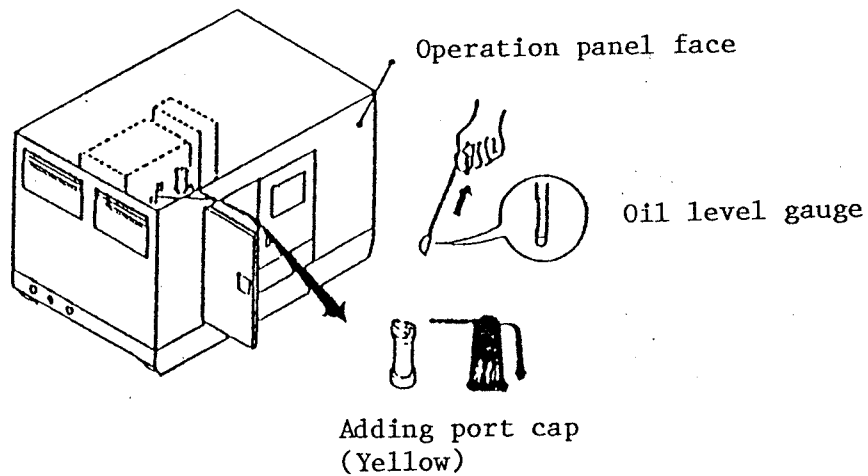


(14) Check and adding of engine oil

Prior to starting the operation, pull out oil level gauge ⑳, wipe off the sticking oil with new waste cloth or the like and check the oil level. If the level is as specified (between the upper and lower limits), the quantity is normal. If it is short, add the engine oil up to the specified level through engine oil supply port ㉔.

(Note 1) Also check that the oil is not whitened or deteriorated.

Engine oil	API classification class CD SAE10W30
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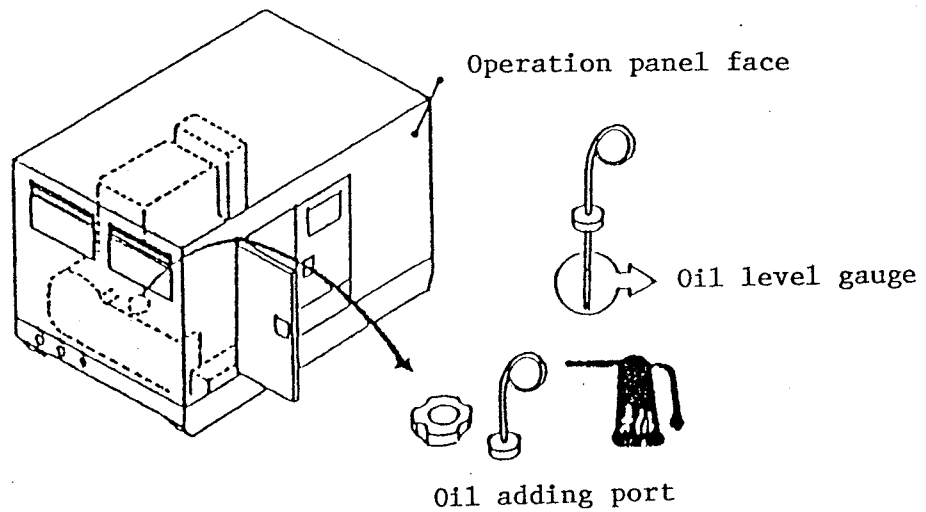


(15) Check and addition of gear box oil

Pull out oil level gauge ㉟ attached to the gear box, wipe off the sticking oil with new waste cloth or the like and check the oil level. If the level is as specified (between F and L of the scale), the quantity is normal. If it is short, add the oil up to the specified level through gear oil supply port ㉟.

(Note 1) Also check that the oil is not whitened nor deteriorated.

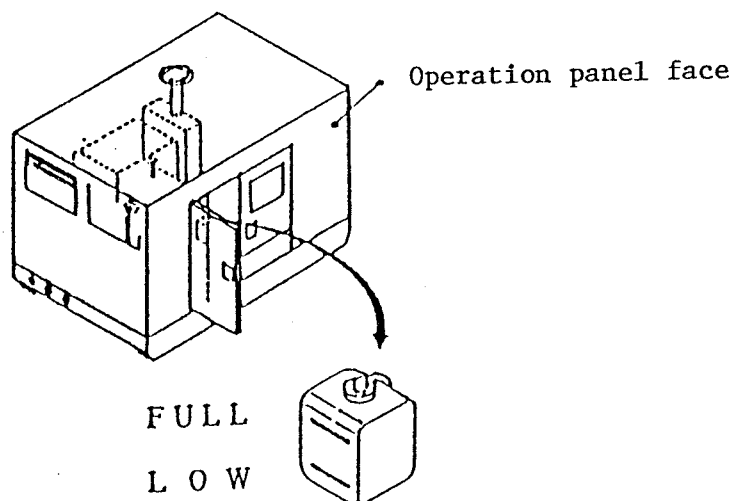
Gear box oil	API Classification Class CD SAE10W30
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(16) Check and addition of cooling water

Check the quantity of cooling water with the FULL (Upper limit) and LOW (Lower limit) scale of sub-tank ③⑩. When the quantity of water in the sub-tank is at the LOW level or below it, add the water up to the FULL level. After adding, completely tighten the lid.

(Note 1) Check the quantity of cooling water when the engine is cool.



(17) Check of charging lamp not lighting

This lamp does not light when the engine is operating, instead it, lights up when the engine stops, indicating the charging state of the alternator. If the charging lamp lights up during the engine operation because of insufficient charging, the alternator itself or V-belt is not functioning properly. Check and adjust.

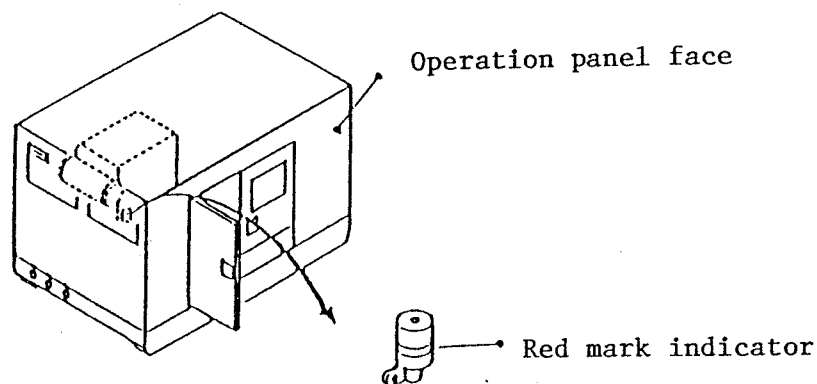
(Refer to (15) Check and adjustment of alternator driving V-belt on Page 54.)

(18) Check of dust indicator

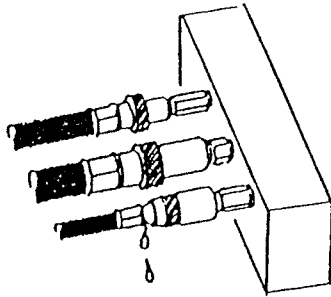
During the operation, check whether or not a red mark is shown on the dust indicator located at the lower part of the air cleaner. If a red mark is shown, it means the element is clogged. Immediately clean the element or replace it with a new one.

(Note 1) When the element is clogged, the following troubles occur.

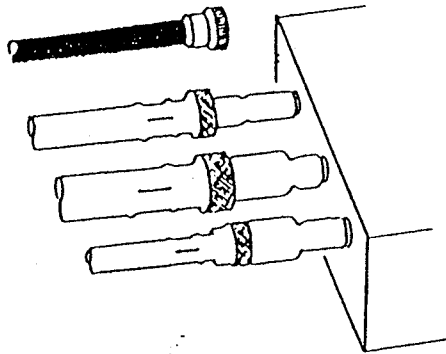
- . Shortage of engine output
- . Increase of fuel consumption
- . The color of exhaust becomes black.



- (20) Oil leak and damage of hydraulic hose coupler connection  
Check that no oil leaks from the hose coupler connection or the part (especially, the joined part) is damaged.  
If oil leaks, the piler does not operate normally.



- (21) Loosening of secondary power cable connector  
Check that the cables are connected firmly to the piler and hydraulic unit.



7-2 Table of Maintenance and Check Points

Classification		No.	Check item	Check period (Note 1)												Page to refer to
				Every 8h	Every 50h	Every 100h	Every 200h	Every 250h	Every 500h	Every 1000h	Every 2000h	Every 2500h	When brought in			
Piller proper	Proper	1	Grease adding	o												44
		2	Wear, damage, and deformation of suspension wire	o												
Hydro- ulic	Hydro- ulic unit	3	Cleaning or replacement of suction filter and return filter						o							45
		4	Adding or replacement of hydraulic oil						o	Initial	o					46
Fuel line	Fuel line	5	Cleaning of fuel adding port filter			o										46
		6	Drain discharge of oil-water separator			o										47
		7	Cleaning or replacement of oil-water separator filter						o							48
		8	Drain discharge of fuel filter			o										48
		9	Fuel filter replacement						o							49

Classification		No.	Check item	Check period (Note 1)													Page to refer to	
				Every 8h	Every 50h	Every 100h	Every 200h	Every 250h	Every 500h	Every 1000h	Every 2000h	Every 2500h	When brought in					
Hydro- ulic	Lube oil	10	Engine oil replacement		o Initial												49	
		11	Engine oil filter replacement		o Initial													50
		12	Cleaning of gear box oil filter															
		13	Gear box oil replacement															52
		14	Cooling water replacement															52
		15	Check and adjustment of alternator driving V-belt		o Initial													
		16	Battery check															55
		17	Cleaning or replacement of air cleaner element															
Others		18	Muffler drain discharge															56

(Note 1) Use the engine unit clock hour (in the engine tachometer) as a guide for the check period.  
The check period varies by how the machine is used in the construction site.

(Note 2) The period of adding or replacing the oil and water varies by how the machine is used. Check the oil and water diligently.

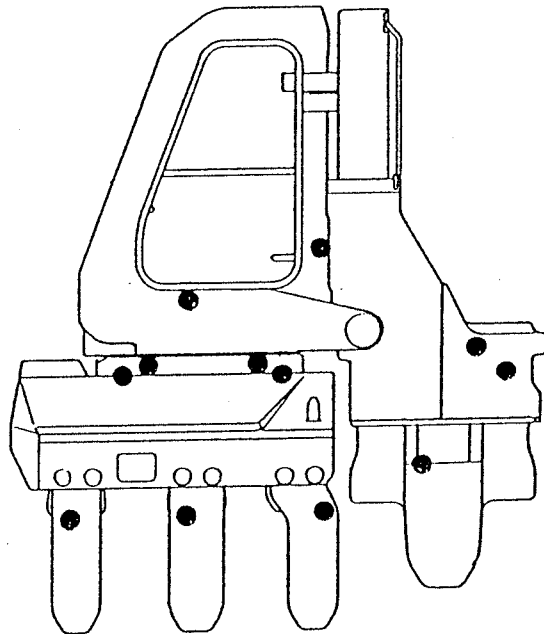
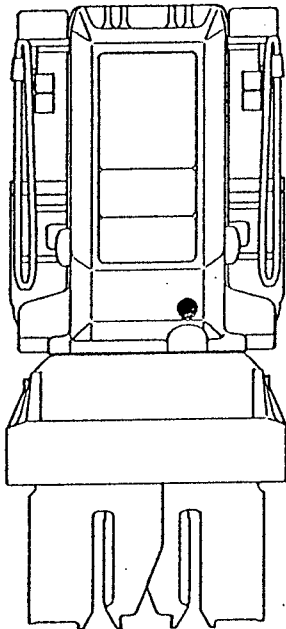
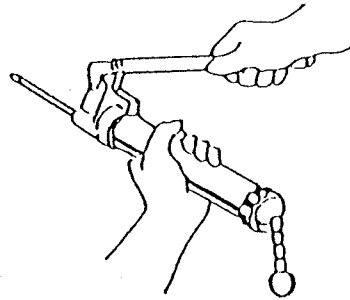
Points on Checks and Maintenance

(1) Greasing

Clean the soil and dust deposited on the grease nipple and each sliding face, and add the grease.

DYNAMIC GREASE MP-2M

● Greasing places

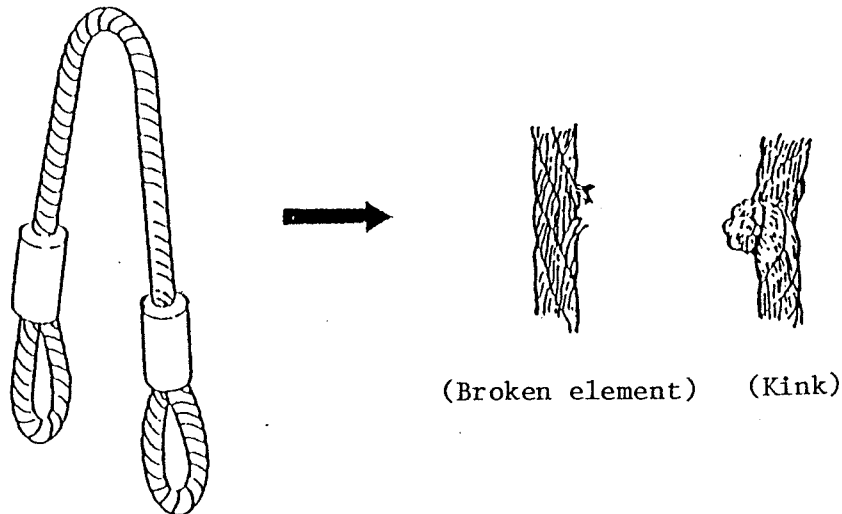


The port marked with o is on the clamp of saddle inside.

(2) Wear, damage, and deformation of suspension wire

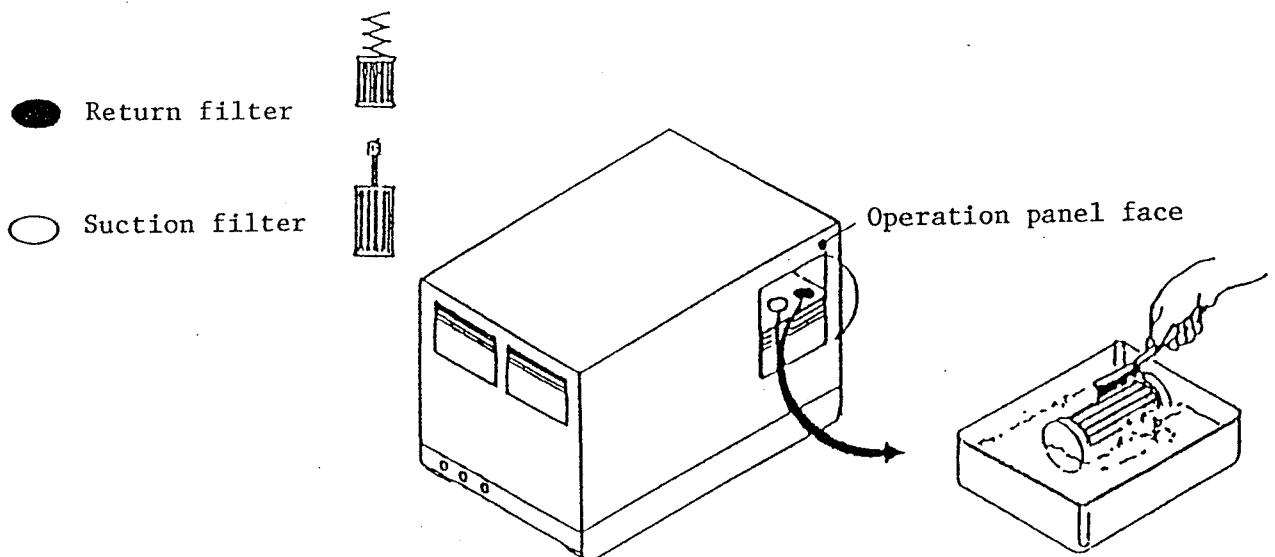
Check that the suspension wire has no defect like kink or broken element.

If you use the suspension wire having a defect, bodily injury or machine breakage occurs caused by dropping of the machine.



(3) Cleaning or replacement of suction filter and return filter

1. Remove the suction filter and return filter and clean them using a cleaning oil (kerosine oil, gas oil) and hand brush.
2. Blow air from inside of filter using an air gun or the like and blow out the cleaning oil.

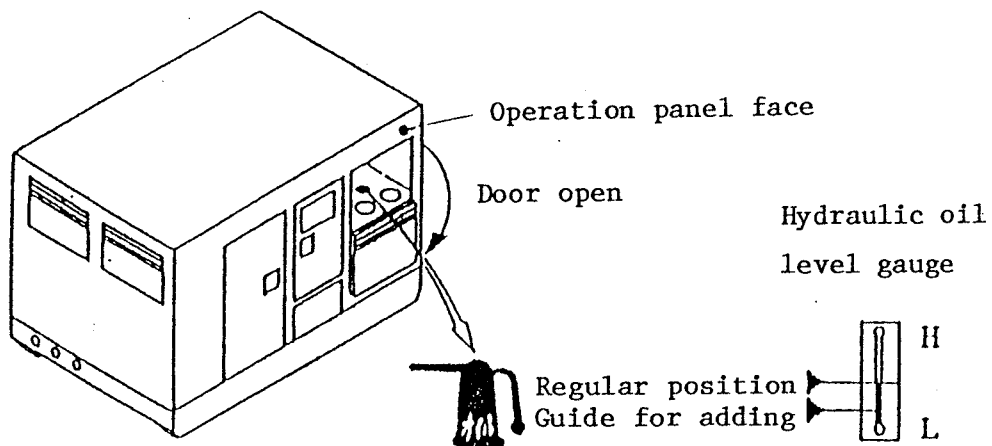




(4) Adding or replacement of hydraulic oil

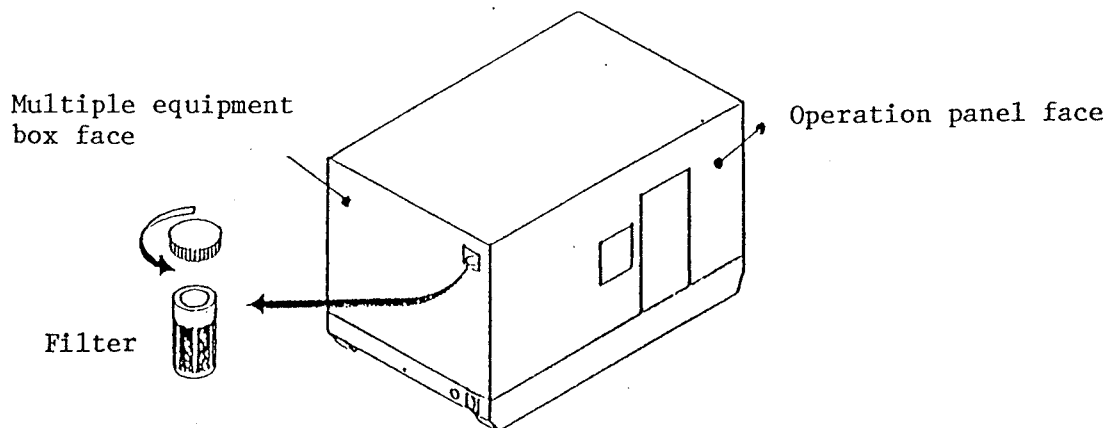
1. Add the hydraulic oil to maintain the hydraulic oil level at no lower than 1/4 below the hydraulic oil level gauge.
2. When adding the hydraulic oil, add up to the center of hydraulic oil level gauge. The hydraulic oil supplied to the machine is Idemitsu DAPHNEY SUPER HYDRO LW46. An oil of the following brands may be used in the case of replacing the whole quantity.

Idemitsu	DAPHNEY SUPER HYDRO LW46	Rated capacity of hydraulic oil tank: 400 liters
COSMO	HYDFLUID W46	
Showa-Shell	TELLUS R46	
Mobile	DTE25	
Mitsubishi	DIAMOND POWER FLUID W46	



(5) Cleaning of fuel oil supply port

1. Remove the oil supply port cap, take out the filter and clean it with a cleaning oil (gas oil).
2. Blow air using an air gun or the like and blow out the dust.

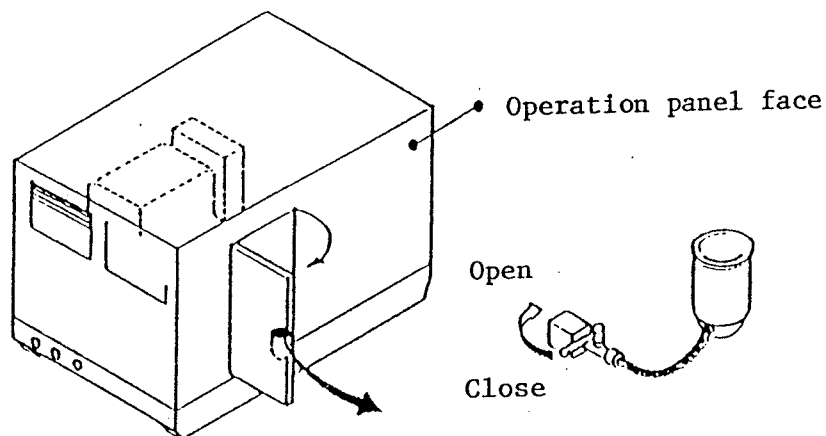


(6) Drain discharge of oil-water separator

Stop the fuel flow by closing the fuel inlet cock before the oil-water separator.

1. Open the fuel drain cock and discharge the dust and water accumulating at the filter bottom.
2. After completely discharging the drain, firmly close the fuel drain cock.

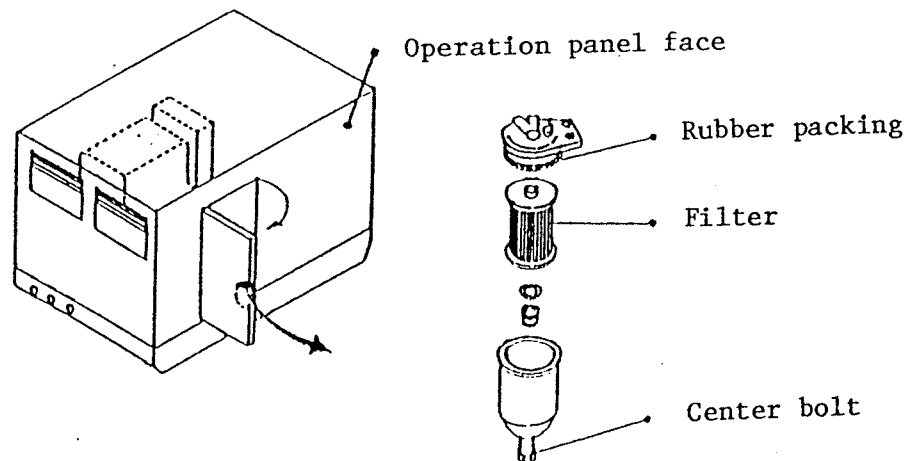
(Note 1) The oil-water separator separates dust and water before the fuel enters the fuel filter. Discharge the drain at an earlier timing than the check period.



(7) Cleaning or replacement of oil-water separator filter

Stop the fuel flow by closing the fuel inlet cock before the oil-water separator.

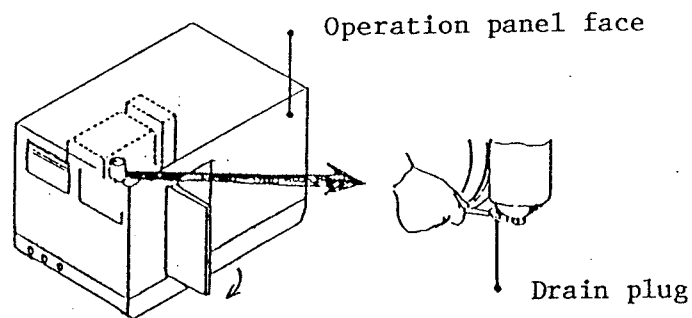
1. Remove the center bolt of filter and remove the filter.
2. Clean the filter in a cleaning oil (gas oil). If you cannot remove the contamination, replace with a new filter.
3. At the time of replacing the filter, clean the filter case inside. Do not forget the spring and washer and firmly tighten the center bolt



(8) Drain discharge of fuel filter

1. Remove the drain discharge plug at the lower part of filter and receive dust and water in the filter in a tray.
2. After completing the drain discharge, firmly tighten the plug.

(Note 1) When water is mixed in the fuel, the fuel pump and injection valve are damaged or their service life is shortened.

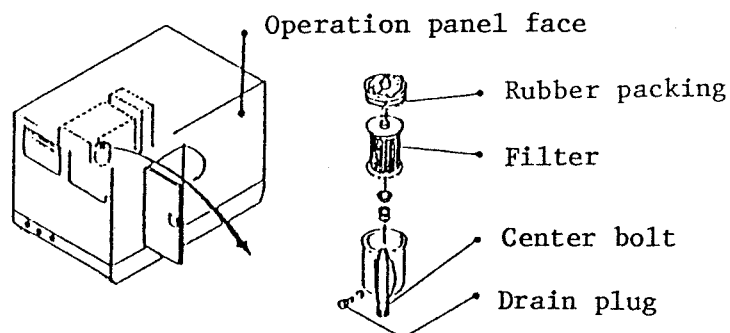


(9) Fuel filter replacement

Stop the fuel flow by closing the fuel inlet cock before the oil-water separator.

1. Remove the center bolt of filter case, and replace it with a new filter.
2. At the time of replacing the filter, clean inside of the filter case. Do not forget the spring and washer and firmly tighten the center bolt.

(Note 1) When the filter is used for a long time, the filter is clogged, reducing the fuel flow rate and this affects the engine.



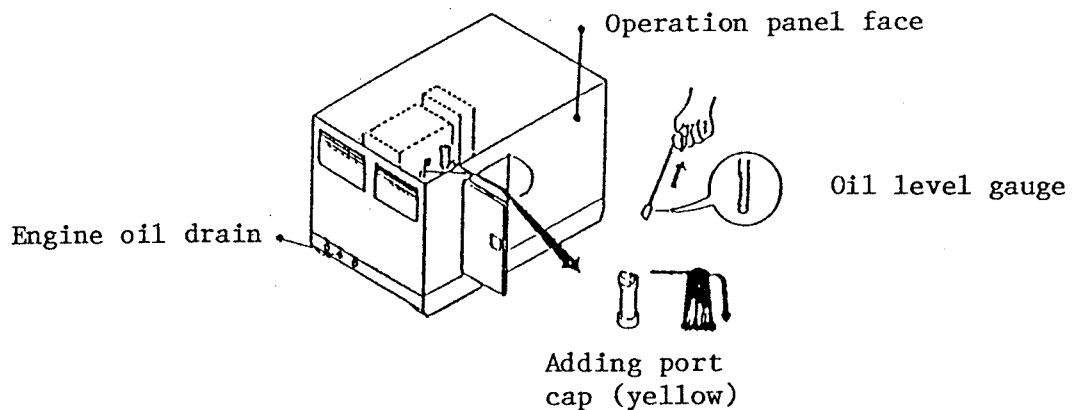
(10) Engine oil replacement

1. Stop the engine and while it is still warm, remove drain plug <sup>(39)</sup> at the bottom of the suction side to discharge the oil hold it in a tray.

2. Pull out oil level gauge ⑳, wipe off the sticking oil using new waste cloth, put it back and add the oil up to the specified level (between the upper limit and lower limit on the gauge scale).
3. Operate the engine for warming up and check the oil quantity again.

(Note 1) Use of old lube oil expedites wear of each part, causing trouble.

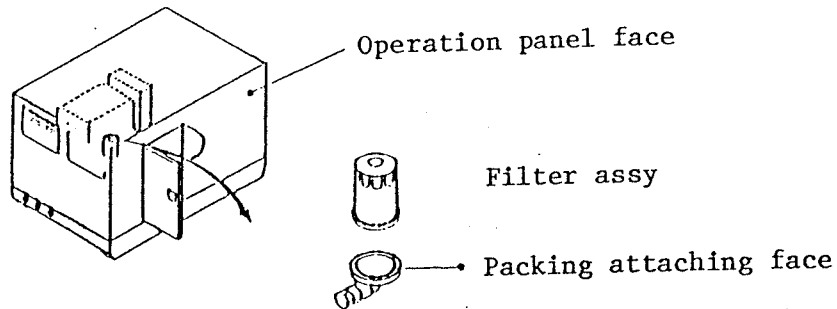
Engine oil	API Classification Class CD or higher SAE10W30	Capacity: 15 lit.
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(11) Engine oil filter replacement (Replace in the form of a set.)

1. Remove the oil filter proper, replace with new one, wipe off the packing attaching face and reassemble while paying close attention not to catch dust and foreign matter.
2. Check that no oil leaks during the operation.

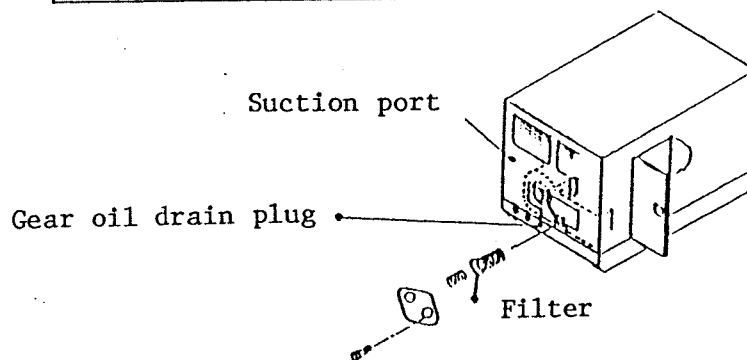
(Note 1) When the filter becomes old, it is clogged with dust, lowering the oil pressure and causing metal seizure, or the dust flows onto the metal, resulting in early wear of the metal.



(12) Cleaning of gear box oil filter

1. Stop the engine, remove the oil adding port cap (yellow) and gear oil drain plug (38), discharge the gear oil in the gear box and hold it on a tary.
2. Remove the filter and clean it with a cleaning oil (gas oil).
3. Put back the oil filter and gear oil drain plug, wipe off the oil sticking to the oil level gauge using new waste cloth, insert the gauge through the oil supply port and pour the oil up to the specified level (between F and L of the scale).
4. Operate the engine to warm it up, and check the oil quantity again.

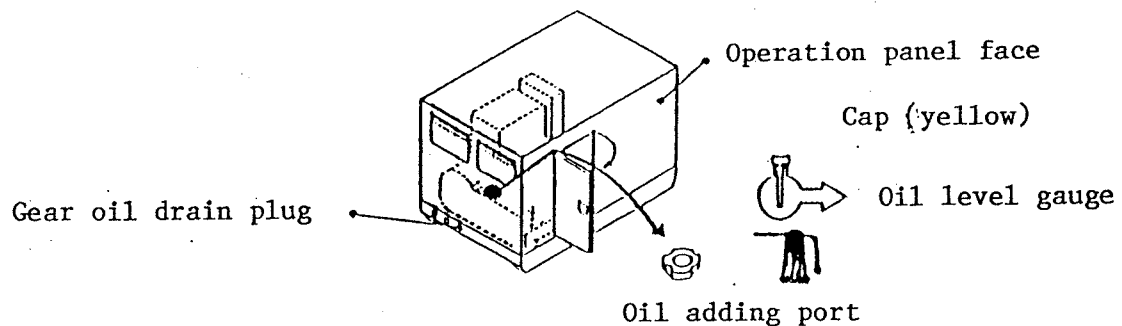
Gear box oil	API Classification Class CD or higher SAE10W30	Capacity: 5 lit.
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(13) Gear box oil replacement

1. Stop the engine, remove the oil supply port cap (yellow) while the engine is still warm, remove gear oil drain plug (38), discharge the gear oil in the gear box and hold it on a tray.
2. After discharging, clean with a cleaning oil (gas oil).
3. Put the plug back, wipe off the oil sticking to oil drain plug (37) using new waste cloth and pour the oil up to the specified level (between F and L of the scale).
4. Operate the engine to warm up and check the oil quantity again.

Gear box oil	API Classification Class CD or higher SAE10W30	Capacity: 5 lit.
--------------	--	---------------------



(14) Cooling water replacement

(Note 1) Do not loosen the radiator cap until the water temperature drops to 60°C or lower, regardless of the engine being operated or stopped. If the radiator cap is removed, steam or hot water blows out and this is very dangerous.

1. Check that the engine is cooled before starting the cooling water replacement.
  - ① Open the inspection lid on the bonnet and remove pressure cap (A) of radiator.
  - ② Open drain cock (B) at the lower part of radiator (turn the cock counter-clockwise).

- ③ Open drain cock (C) of the engine block.
- ④ Remove cooling water drain plug (40) on the suction port face and discharge the cooling water.
- ⑤ Upon completing ① through ④, close each drain plug.
- ⑥ Pour the cooling water into the radiator and sub-tank on top of the unit.

Operate the engine to warm up and check the quantity of cooling water.

Cooling water	Capacity 18 ℓ
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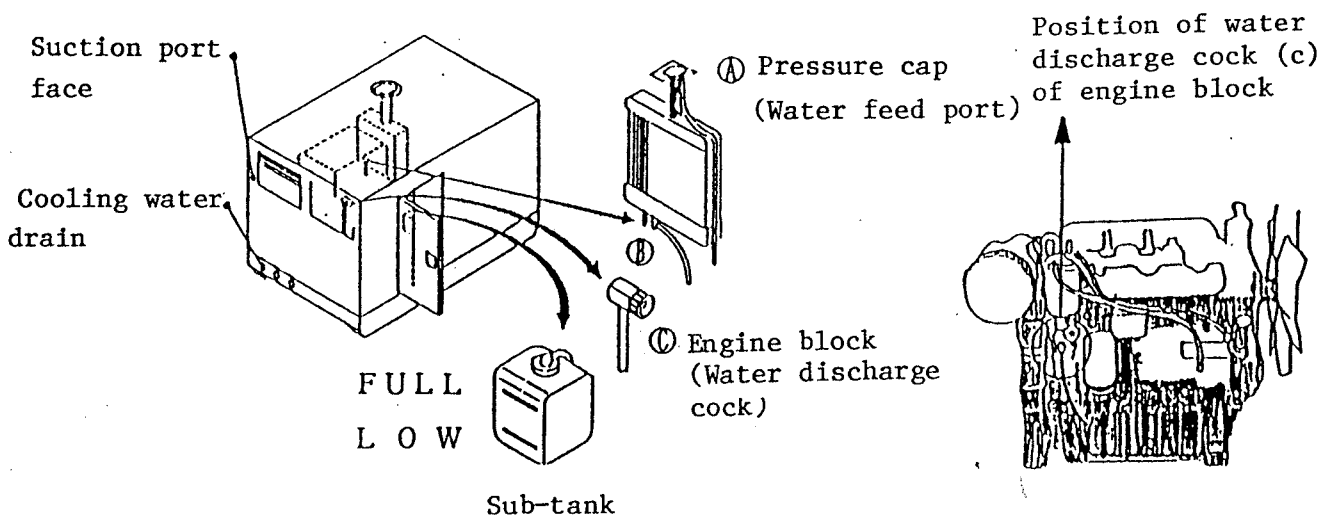
(Note 2) When the cooling water contaminates, the cooling performance degrades, causing seizure and etc.

## 2. Use of anti-freeze

In a district where the cooling water may freeze in winter, use anti-freeze.

Determine the necessary quantity of anti-freeze to avoid breakage of the engine caused by freezing, based on the data shown below, pour it in the radiator and then pour in the cooling water.

Atmospheric temp. (°C)	-5	-10	-15	-20	-25
Ratio to cooling water quantity (%)	12	22	29	35	40
Anti-freeze to pour in radiator (ℓ)	2.1	3.9	5.2	6.3	7.2

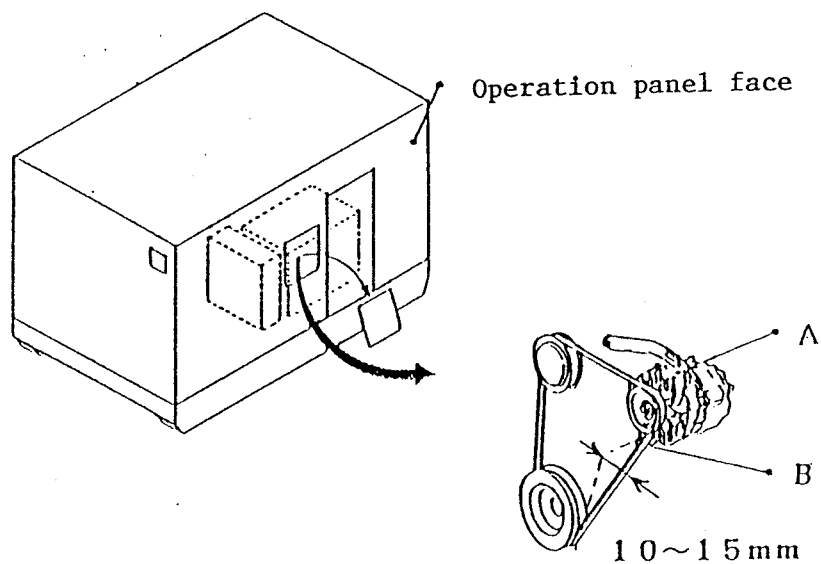




(15) Check and adjustment of alternator driving V-belt

(Note 1) If the V-belt is not properly adjusted, the V-belt may be broken or the battery is not charged sufficiently, making the piler unoperable.

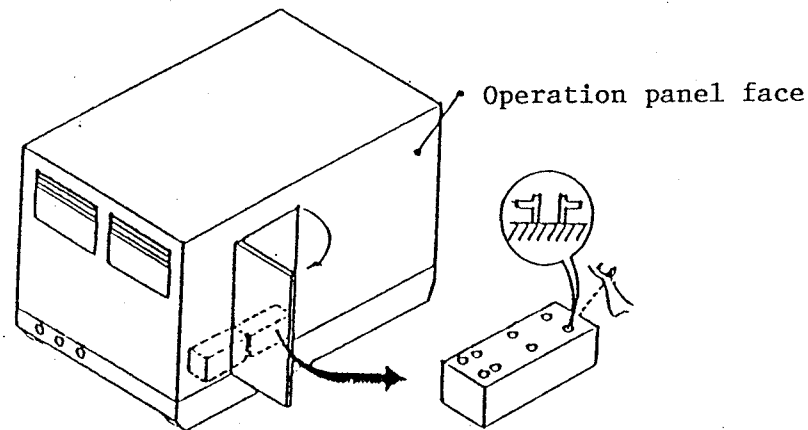
1. Remove the engine maintenance cover at the backside of operation panel.
2. Press the center of V-belt with a finger. If the deflection is 10 to 15 mm, the tension is OK. If it is outside of the range, loosen adjustment bolt (A) of alternator bracket (B)-side attaching bolt and adjustment bar, and adjust the tension by changing the alternator attaching angle.
3. After the adjustment, firmly tighten bolts (A) and (B).



(16) Battery check

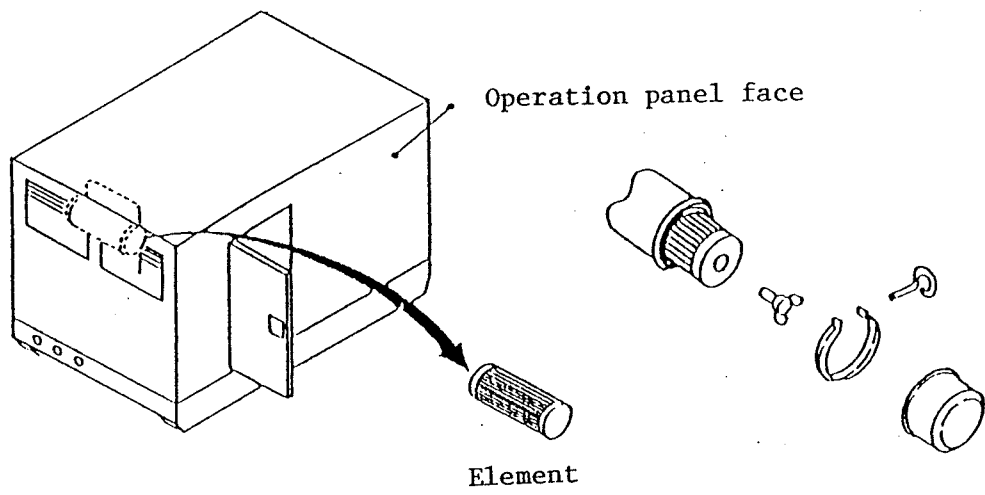
1. The normal level of battery fluid is about 10 mm above the electrode. If it is short, add distilled water.
2. Measure the specific gravity of battery fluid and check the charging state. (In the completely charged state, the specific gravity is 1.26 at 20°C.)

Battery standard	NS150, 2 cells
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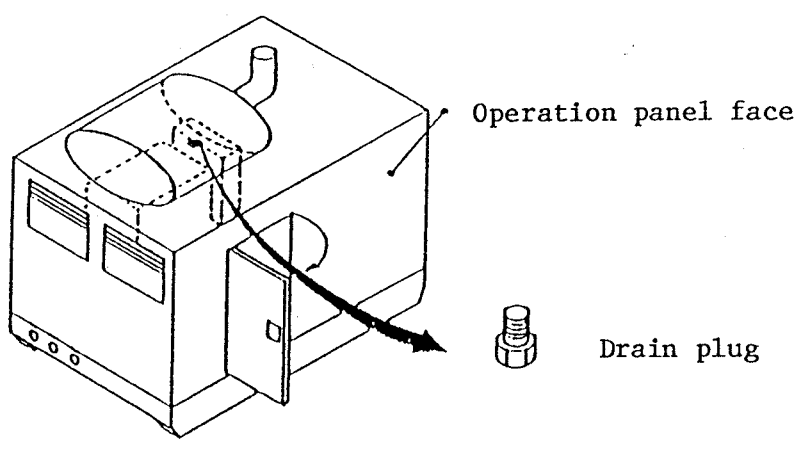
(17) Cleaning or replacement of air cleaner element

1. Remove the element from the air cleaner.
2. Blow air (up to  $7 \text{ kg/cm}^2$ ) to the element inside and remove the dust.
3. Dip the element in a water solution containing a cleaning agent (ND-1500, made by Japan Donaldson) for about 30 minutes, rinse it in fresh water and dry.



(18) Muffler drain discharge

1. Remove the drain plug at the bottom of muffler and receive the drain on a tray.
2. After discharging the drain, tightly set the drain plug.



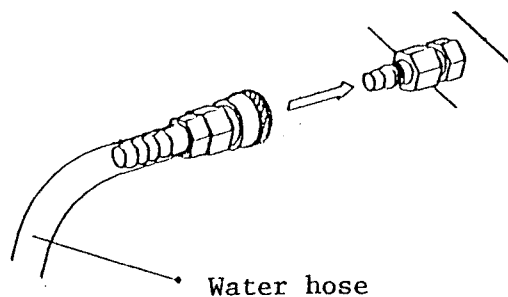
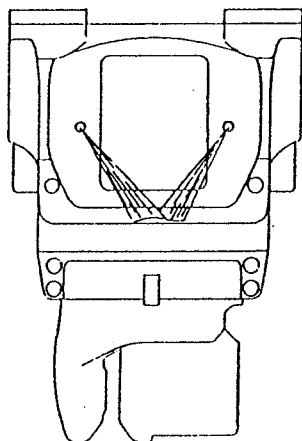
## 8. SHEET-PILE WETTING UNIT

### 8-1 Use Method

Wet the sheet pile to be press-fit with city-supply water for the purpose of preventing soil from sticking to the sheet pile belly (sticking soil inclines the sheet pile), thereby reducing the press-fit resistance.

### 8-2 Setting

1. Prepare a city-supply water hose.
2. Connect the water hose with the hose connection port (coupler insertion port) at the backside of the mast and start feeding water.
3. Press the wetting ON/OFF switch (switch LED lights up) of radio control transmitter. Water spraying starts.  
When the wetting ON/OFF switch is pressed again (the light on switch LED goes off), the water spraying stops.
4. The figure below shows the water spraying position.  
Adjust the quantity of water at the cock side.

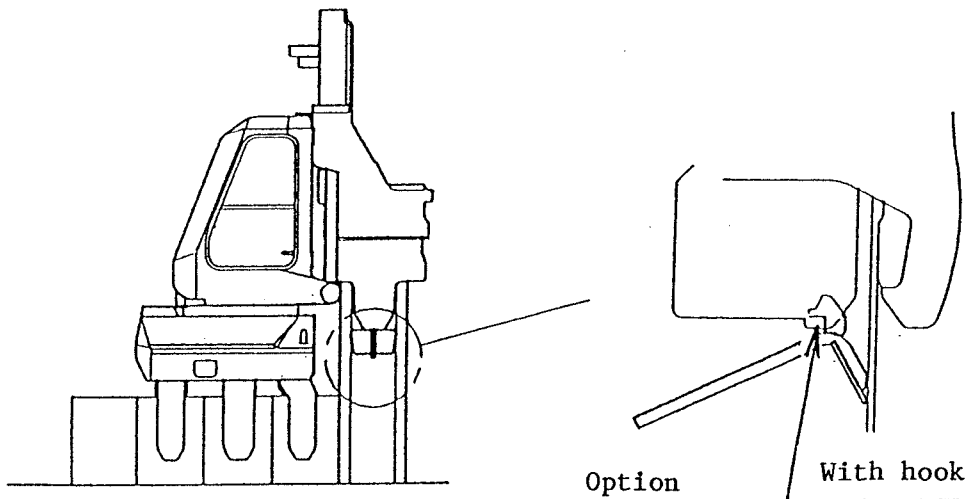


## 9. SOIL SCRAPER (Optional)

### 9-1 Use Method

Use the soil scraper to rake out the soil and mud sticking to the sheet pile belly at the time of drawing the pile, thereby making the drawing work smooth.

### 9-2 Setting



### Caution for handling

1. If the sheet pile has a protrusion made by welding or etc, it may damage the soil scraper.

## 10. SELF-MOVEMENT AUXILIARY BAR

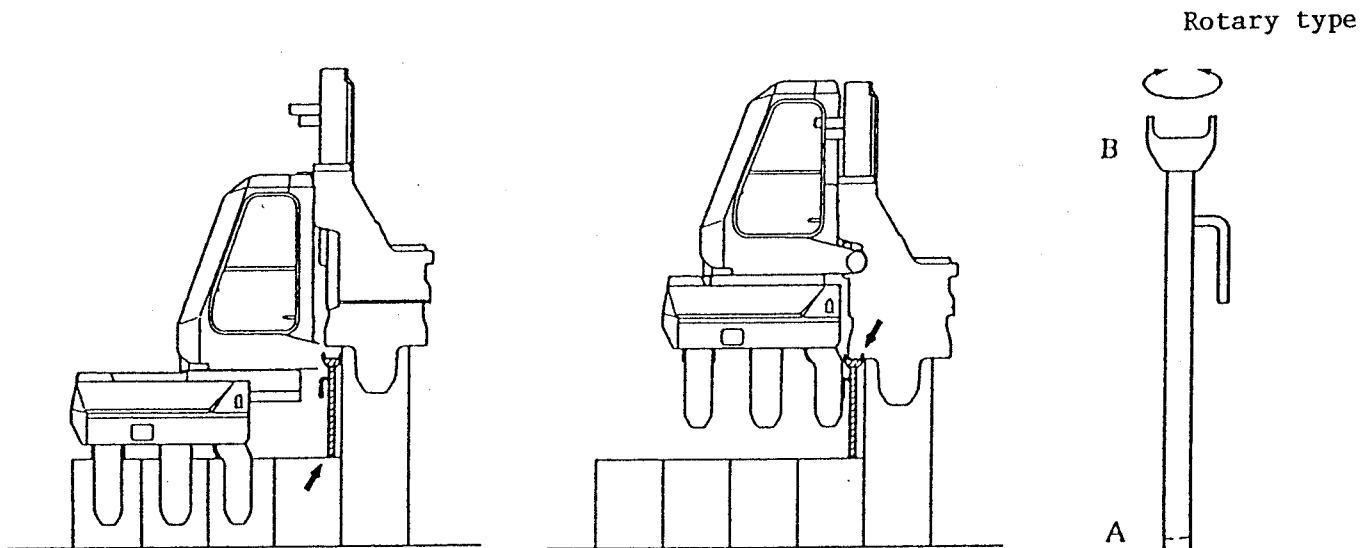
### 10-1 Use Method

At the time of self-movement on a soft ground or after the drawing operation, sometimes the sheet pile, forming a counter force to the self-movement, may not be able to support the weight. In such a case, use this auxiliary bar to obtain the counter force from the sheet pile, prior location.

### 10-2 Setting

1. First, set the sheet pile to Part A of auxiliary bar.
2. Lower the chuck in the state of open clamp and set Part B of auxiliary bar to the chuck.

This completes the preparation.

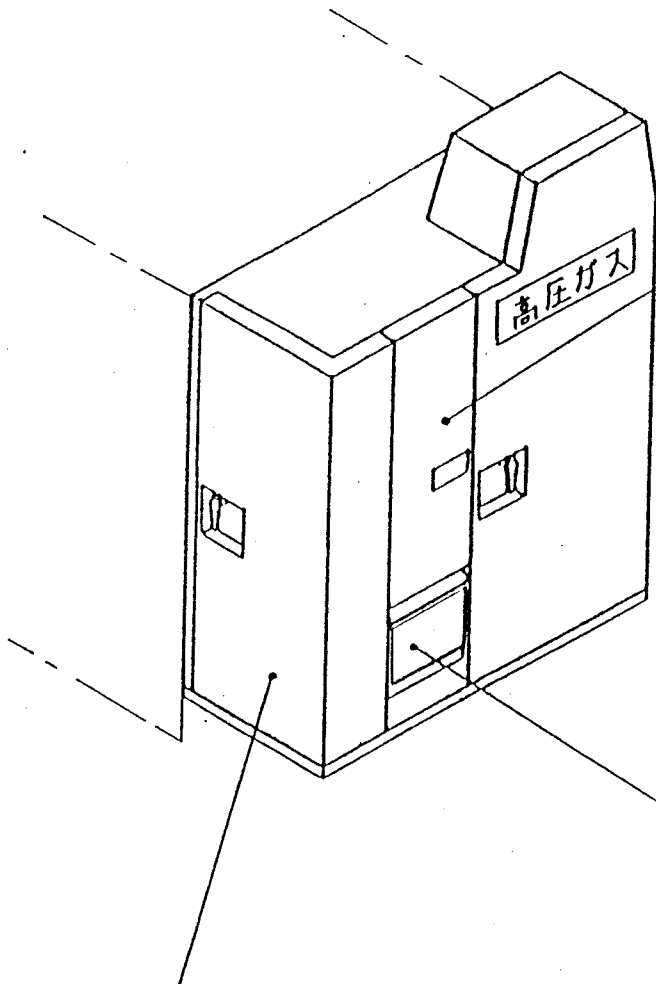


### Caution for Handling

1. When setting the auxiliary bar, hold the auxiliary bar handle in the state of open clamp, and set the lower part of chuck by micro actions.
2. If the piler inclines during self-movement using the auxiliary bar, use the crane to move it.
3. Do not use the auxiliary bar if it is bent or the hook part (A and B) is damaged.

# 11. MULTIPLE EQUIPMENT BOX

## 11-1 Equipment in Box



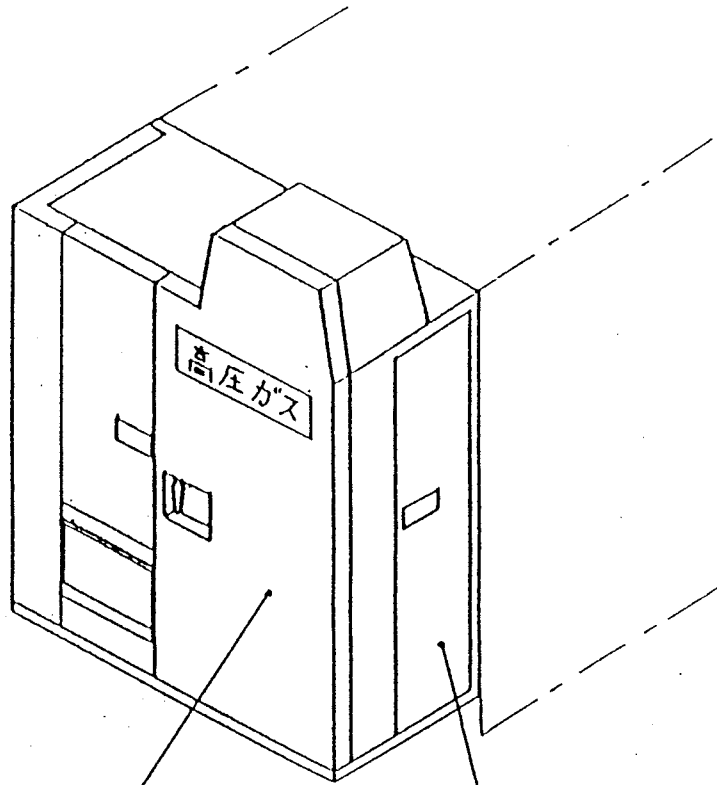
### Welding machine and others

1. DC welding machine
2. Holding face
3. Remnant removing hammer
4. Leather gloves
5. Welding rod
6. Single phase power supply 100V, 2KW
7. 3-phase power supply 220V, 20KVA
- (8. Telephone set)

(Note 1) The single phase power supply can be used at the same time of piler press-fitting and drawing throughout the operation range.

(Note 2) The 3-phase power supply can be used at the same time of piler operation within the limit of piler press-fitting pressure up to 60 ton and max. 9KVA (about 5.5KW on the motor) in the whole range of drawing (load example: Submersible pump).

Field tools	Mechanical tools	Welding reel
<ol style="list-style-type: none"> <li>1. Flat edge shovel</li> <li>2. Pointed edge shovel</li> <li>3. Large hammer</li> <li>4. One-hand hammer</li> <li>5.</li> <li>6. Shackle (1 ton)</li> <li>7. Shackle (2 ton)</li> <li>8. Measure</li> <li>9. Level</li> <li>10. Safety belt</li> <li>11. Chalk</li> <li>12. Self-movement auxiliary bar</li> </ol>	<ol style="list-style-type: none"> <li>1. A set of two-ends spanners</li> <li>2. A set of hexagon wrenches</li> <li>3. A set of screw-drivers</li> <li>4. Monkey wrench</li> <li>5. Pliers</li> <li>6. Long-nose pliers</li> <li>7. Knife</li> <li>8. Pipe tools</li> </ol>	<ol style="list-style-type: none"> <li>1. Holder</li> <li>2. Grounding clip</li> </ol>
		<h3>Lubricator and etc.</h3> <ol style="list-style-type: none"> <li>1. Grease gun</li> <li>2. Cartridge grease</li> <li>3. Waste cloth</li> </ol>



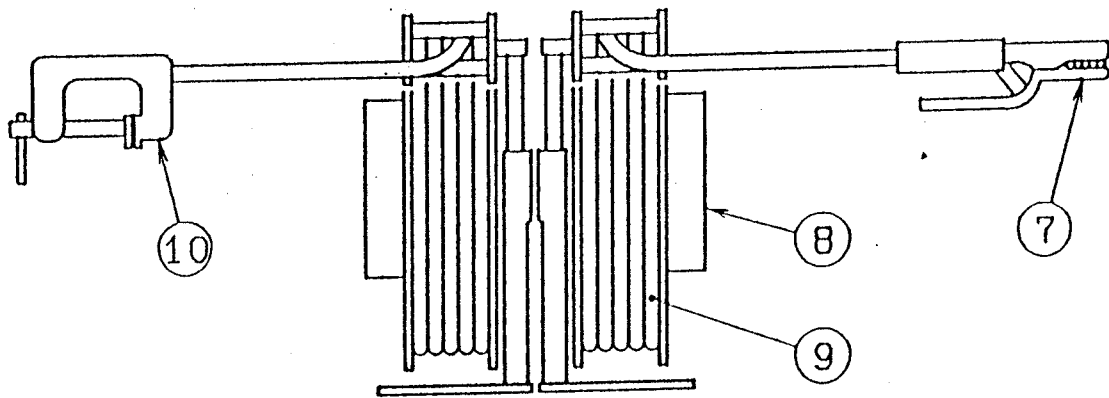
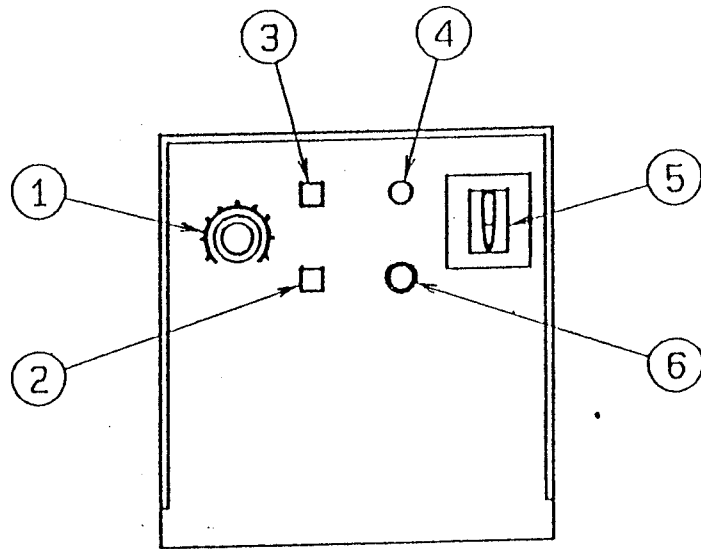
Cutting tools	
1.	A set of cutter
2.	A set of oxygen adjuster
3.	A set of acetylene adjuster
4.	Spare torch
5.	Torch cleaning needle
6.	Ignition lighter
7.	Spare lighter flint
8.	Cylinder open/close handle

Fuel supply equipment and others	
1.	Fuel supply pump
2.	Spare hydrolic hose



11-2 DC Welding Machine

11-2-1 Name of Each Part



- |                                   |                          |
|-----------------------------------|--------------------------|
| 1. Welding current knob           | 6. Fuse (3A)             |
| 2. Overheat lamp                  | 7. Welding holder        |
| 3. Input error lamp               | 8. Electric welding reel |
| 4. Power lamp                     | 9. Welding cable         |
| 5. Power switch (No-fuse breaker) | 10. Grounding clip       |

### 11-2-2 Specifications

- . Rated input 9.0KVA (6.8KW)
- . Rated output current 200A
- . Rated load voltage 28V
- . Output current range 10 - 200A
- . Max. Y-Non-load voltage 77V
- . Rated use rate 40%

(Note 1) Since this power supply is for DC arc welding machine, no shock preventive device is needed.

(Note 2) The use rate of this machine is 40%. Therefore, when the welder is used at rated current 200A, it can be used continuously for 4 minutes and then it must be rested for 6 minutes. If it is used with a current lower than the rating, the use rate increases. The allowable use rate in this case can be calculated as follows:

$$\text{Allowable use rate} = \left( \frac{\text{Rated current}}{\text{Using current}} \right)^2 \times \text{Rated use rate}$$

### 11-2-3 Operation procedure

Preparation	1. Firmly connect grounding (10) with the base material. 2. Set power switch (5) (No-fuse breaker) to ON. 3. Adjust the welding current by using welding current control knob (1).	Lamp (4) lights up. Cooling fan starts.
Welding	4. Let the welding rod contact the base material for welding. 5. Pull up the welding rod.	
Stop	6. No-load voltage generation. The output stops about 5 seconds later. 7. Set power switch (5) to OFF.	The light of lamp (4) goes out. Cooling fan stops.

(Note 1) When the welding rod of 4 mm is used, this welder can be used at the same time of piler operation within the limit of 60 tons or less of press-fitting and throughout the drawing operation range (provided that no submersible pump or etc. is used).

#### 11-2-4 Monitor lamp

##### (1) Input failure lamp

If the input power supply is outside of the regular range because of power supply trouble, input failure lamp (3) lights up. When this lamp lights up, welding is not possible.

##### (2) Overheat lamp

When the temperature of internal parts rises excessively because of a use rate that exceeds the allowable rate, this lamp lights up. When this lamp lights up, welding is impossible.

When the cooling fan is kept operated for some time, the temperature of internal parts decreases below the prescribed value and the lamp lighting automatically goes off. The welder can be used again when the lighting goes off.

#### 11-2-5 Caution for Handling

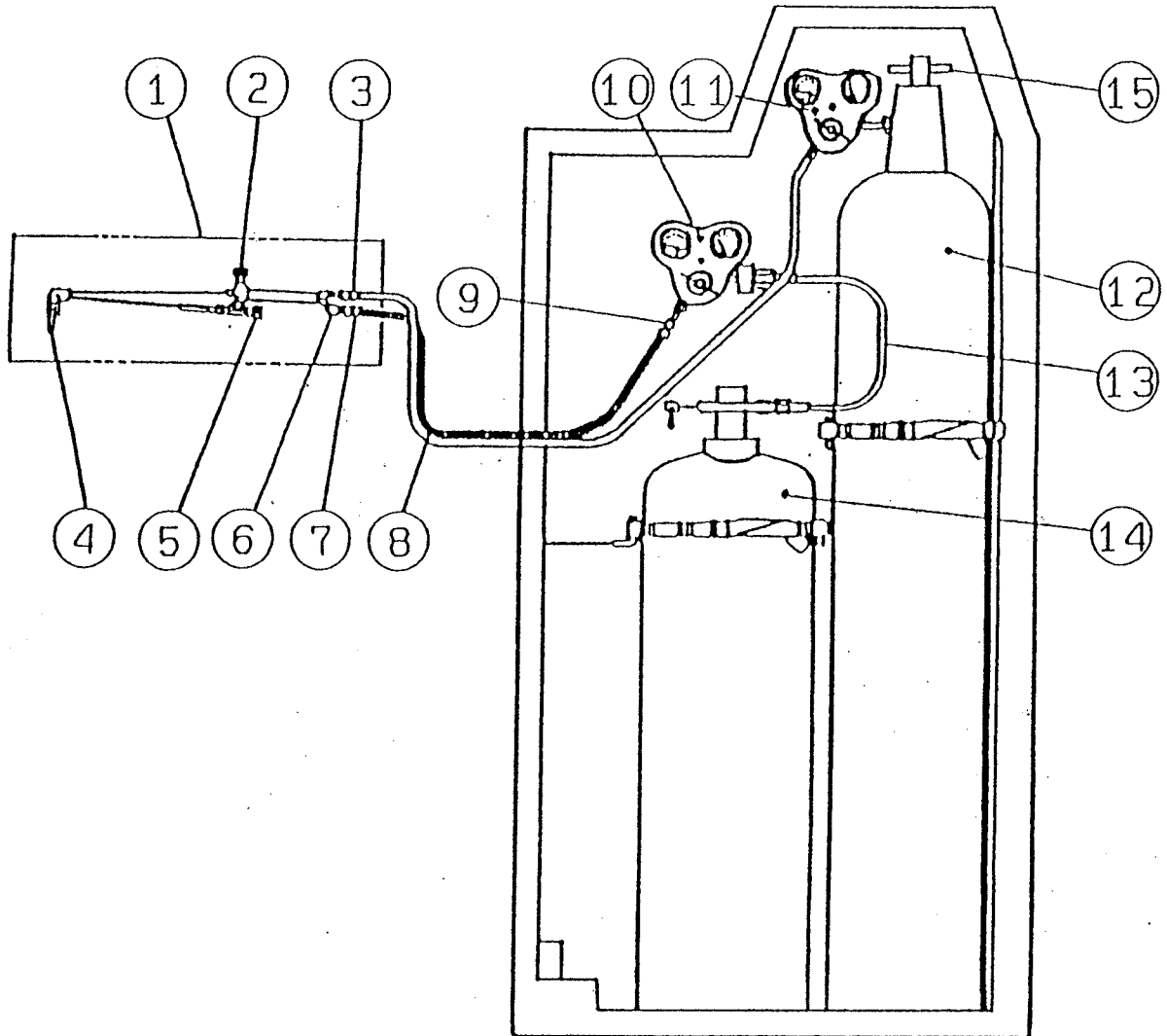
(If you do not observe the following, bodily injury, breakage of equipment, or insufficient performance of the machine occurs.)

1. The operators of this welding machine must be given special education of arc welding and etc., as prescribed in the Industrial Safety and Health Law, before they operate this machine.
2. Do not set grounding clip (10) to the piler proper or a steel sheet pile that is located afar. Be sure to fix the clip firmly.
3. Make a habit of wearing protective working clothing and leather gloves, when welding, so as to protect your body from sparks and heat.
4. Keep any flammable materials in the work range far enough away.

5. Since the light of the welding arc is very intense, wear goggles having sufficient light blocking effect (No. 10).
6. Check that welding holder (7) and welding cable (9) are not damaged nor twisted beforehand.
7. Do not cast welding holder (7) or never put it in a place that may be stepped on during work.
8. In the case of continuous welding, pull out the entire welding cable (9) from electric welding reel (8).

11-3 Cutting Device

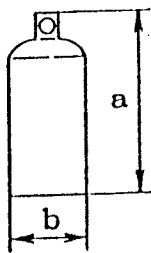
11-3-1 Name of each parts



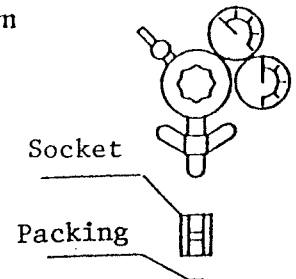
- |   |   |                                |
|---|---|--------------------------------|
| 1. Cutter                                   | 6. Acetylen valve                             | 11. Oxygen adjuster            |
| 2. Cutting oxygen valve                     | 7. Acetylen valve (backfire protective valve) | 12. Oxygen cylinder            |
| 3. Oxygen valve (backfire protective valve) | 8. Gas hose                                   | 13. Acetylene hose             |
| 4. Torch                                    | 9. Coupler socket                             | 14. Acetylene cylinder         |
| 5. Preheating oxygen valve                  | 10. Acetylene adjuster                        | 15. Cylinder open/close handle |

## 11-3-2 Specifications

### . Usable cylinder sizes



Oxygen	a	1 4 4 5 ~ 1 6 3 5 mm
	b	MAX 2 6 7 mm
Acetylene	a	MAX 1 0 8 0 mm
	b	MAX 3 1 8 mm



(Note 1) The oxygen adjuster can be commonly used in the Kanto and Kansai districts. However, when it is used in the Kanto district, attached the socket and packing provided to it before connecting it to the oxygen cylinder.

(Note 2) The backfire protective valve (for oxygen and acetylene) completely blocks the backfire factors since, even if a fire starts, the flame is scattered and the heat is absorbed by the fire-extinguishing filter and, at the same time, the backfire valve is activated by the backfire pressure, shutting out the back flow. However, if the supply pressure decreases because of excessive backfire or etc, thoroughly check the valve and determine whether or not it can be used.

(Note 3) The user is to arrange the oxygen cylinder and acetylene cylinders since they are not provided with the machine.

### 11-3-3 Caution for Handling

1. The person who work on cutting must obtain a Gas Welding Senior Worker license or complete the gas welding skill training course, prescribed in the Industrial Safety and Health Law, beforehand.

2. Carefully handle cylinders (12) and (14) . Do not drop them or give impact to them.
3. Gently open or close adjusters (10) and (11) .
4. Use soap water to check gas leakage. Do not use fire.
5. Check torch (4) , gas hose (8) and adjusters (10) and (11) prior to starting the work.
6. When torch (4) or adjusters (10) and (11) freeze, use hot water to dissolve the freezing. Do not use fire directly.
7. Wear goggles and gloves while working.
8. Keep cylinders (12) and (14) away from fire.
9. When gas hose (8) hardens or has a crack and must be replaced with new hose, firmly attach the hose to backfire protective valves (3) and (7) (oxygen and acetylene) and coupler socket (9) , which are used at present, firmly using metal pieces like hose band.
10. Acetylene hose (13) is used to connect acetylene adjuster (10) to cylinder (14) . Do not bend or twist the hose when you attach or remove it.
11. When setting oxygen cylinder (12) and acetylene cylinder (14) to the box, firmly tighten the cylinder belts.