

MARUZEN

HYDRAULIC HANDHELD PILE DRIVER

MODEL KH192

OPERATING MANUAL



CAUTION

FOR THE SAFETY PURPOSE, PLEASE READ THIS MANUAL THOROUGHLY BEFORE ATTEMPTING TO USE THIS PILE DRIVER. ANY FALES OPERATING PROCEDURES WILL CAUSE DAMAGES OF THE MACHINE. ALWAYS KEEP THIS MANUAL TO AN EASILY ACCESSABLE PLACE.



MARUZEN KOGYO CO., LTD.

(Revised April 21, 2012)

FOREWORD

This manual is an important part of your equipment. It provides rules and guidelines which will help you use this machine safely and effectively. You **MUST** familiarize yourself with the functions and operations by reading the manual thoroughly before you begin using this machine. For your safety, it is especially important that you read and observe all precautions in this manual and on the machine. The precautions **MUST** be followed strictly at all times when performing operation and maintenance. * Fail to follow the guidelines and safety alerts in the manuals and on the machine, or use this machine in alternative ways from the manuals may result in system failure or serious personal injury.

Keep this manual with the equipment or in an easily accessible place in all times for future reference. Make sure all personnel involved in working on this machine can consult it periodically. In case this manual should be lost or damaged, immediately contact us or your dealer to purchase a new copy.

We recommend you always use Maruzen genuine components and parts. Replacing components and parts from other sources may cause damages to this machine and endanger operators.

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SAFETY INFORMATION

To enable you to use this machine safely, safety precautions and labels are given in this manual and affixed to the machine to give explanations of situations involving potential hazards and of the methods of avoiding such situations.

SAFETY ALERT CLASSIFICATIONS

The following safety alert symbols are used to inform you that there is a potential hazardous situation that may lead to personal injury or damage.

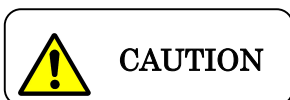
In this manual and on machines labels, the following safety alert symbol are used to express the potential level of hazard.



Indicates an imminently hazardous situation which, if not avoided, could result in death or serious injury.



Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.



Indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury.

**** Safety alert symbols are to emphasize all operation which, if not strictly followed, could result in a life-threatening situation, bodily injury or damage to equipment.**

SAFETY ALERTS

DO NOT OPERATE THE MACHINE UNLESS THE FOLLOWING SAFETY INSTRUCTIONS HAVE BEEN THOROUGHLY READ AND UNDERSTOOD!



WARNING

Before operating the equipment, be sure to wear personal protective equipments such as follows:

1. Helmet
2. Protective goggles
3. Protective boots
4. Safety gloves
5. Hearing Protection



WARNING

Do not operate the equipment if you are or if your

1. taking medication, feeling drowsy, feeling unwell or feeling tired.
2. under the influence of drugs or alcohol.
3. hands, feet, lower back or other parts of your body hurt or being injured.

* Failure to observe this precaution can result serious injury or even death.

**CAUTION**

Do not touch the machine with your bare hands

1. The oil tank may become hot under continuous running.
Do not touch the equipment with your bare hands.

2. Tools may become hot under continuous use, make sure to wear gloves before any contact with the tools.

* Failure to observe this precaution can result getting burned

**CAUTION**

When lending someone the equipment

Make sure the safety instructions have been thoroughly read and fully understood by the person who is going to use the equipment.

**WARNING**

Be special cautions to high pressure gas

1. High pressure gas was held inside the accumulator of the breaker.
2. Do not loosen the nut unless it is necessary for maintenance.

Failure to observe this precaution can result serious injury

INTRODUCTION

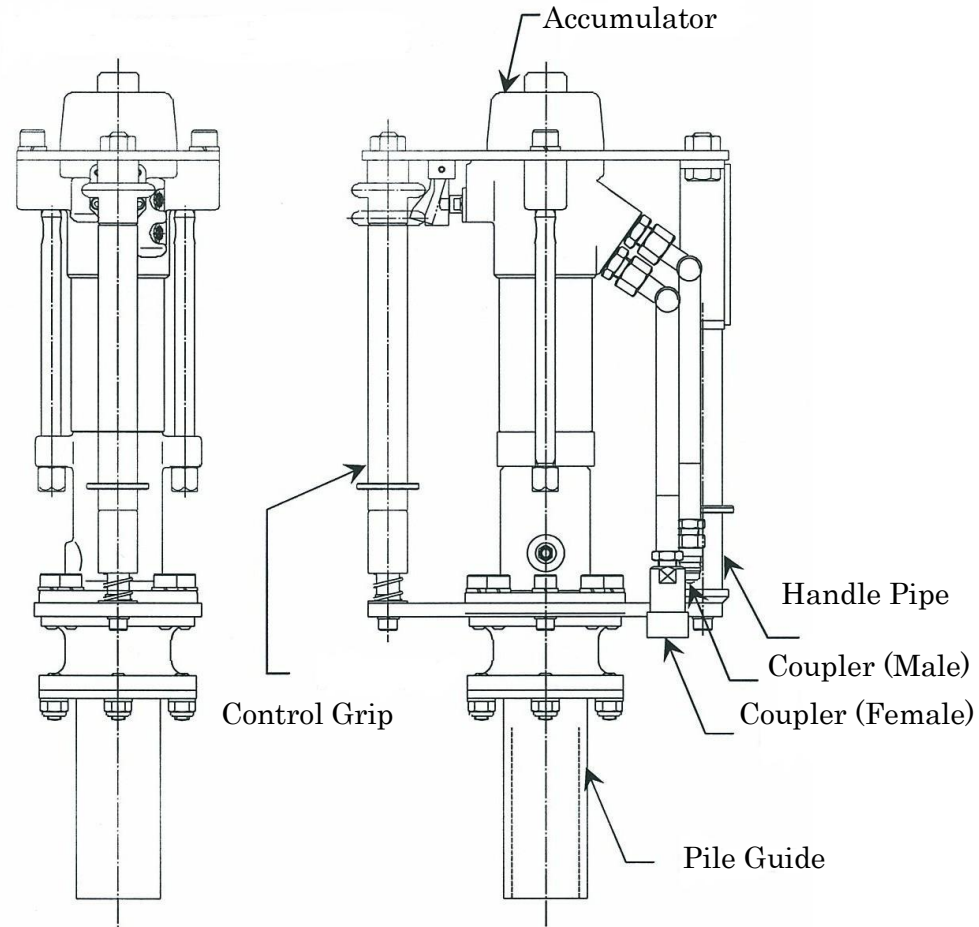
1. This hydraulic pile driver is designed to be used for driving
 - (1) anchors
 - (2) pipes into soil ground.

2. **DO NOT** operate this pile driver on the following situations:
 - (1) Drench part of the body or whole body into water or seawater.
 - (2) Connect with power source which its oil flow and pressure exceeds prescribed.
 - (3) Operating with oil temperature below 10°C or over 100°C.
 - (4) Attach to other construction machinery.
 - (5) Used for purposes other than stated in this manual.

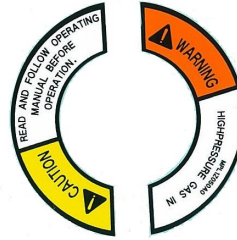
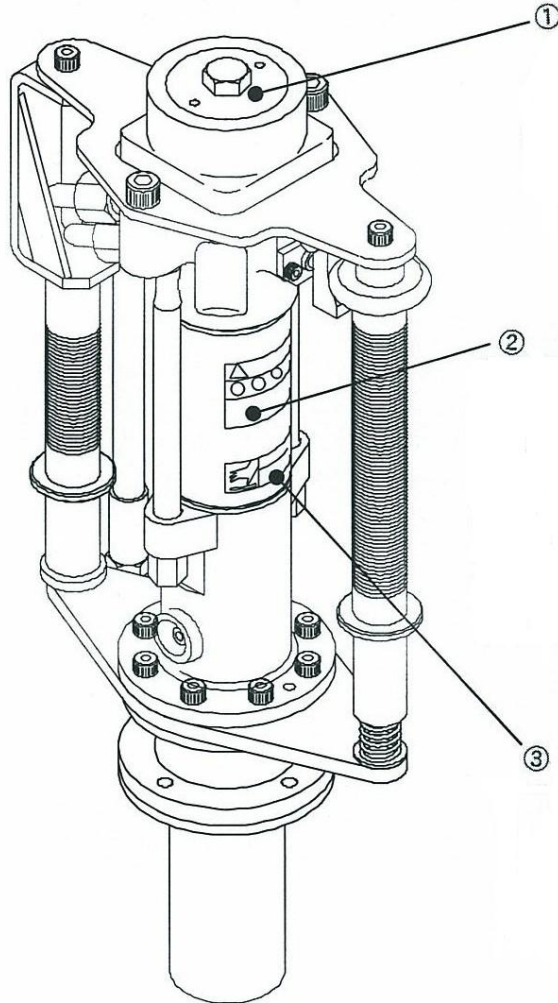
3. Contact us if you intend to use this pile driver for other purposes.

SPECIFICATIONS & DESCRIPTIONS

Overall Weight	20kg
Overall Dimensions	598mm X 273mm X 146mm
Working Pressure	8 ~ 11MPa
Max. Pressure	20.6MPa
Flow Range	20 ~ 25 L/min
Blow per Minute	1920bpm (At 20L/min)
Coupling	3/8" Couplers
Allowable Back Pressure	2.5MPa
Max. Hose Length	3/8" X 20m
Hydraulic Oil	ISO VG32 or equivalent



PRECAUTION LABELS AND POSITIONS

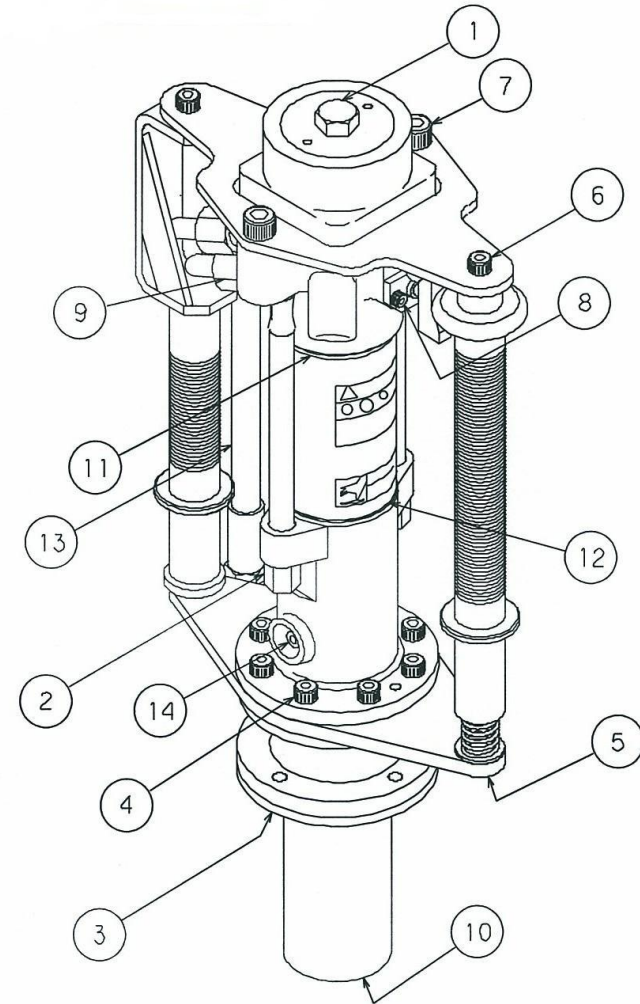


Make sure labels are legible. Replace new one when they are illegible.

INSPECTIONS BEFORE EACH OPERATION

For the purpose of keeping the breaker in good condition, make sure the following inspection items are done each time before using. (Refer the drawing on the right)

Inspection Items	Countermeasures
1. Loose Nuts ①②③	Tighten Loose Nuts
2. Loose Bolts ④⑤⑦⑧	Tighten Loose Bolts
3. Loose Hose Fittings ⑨	Tighten Hose Fittings
4.Oil leakage from Pile Guide ⑩	Contact Maruzen dealers for maintenance
5. Oil Leakage ⑪⑫	Contact Maruzen dealers for maintenance
6. Injuries on Hoses ⑬	If injuries found on wires, replace new ones
8. Insufficient of Lubrication ⑭	Lubricate if necessary



OPERATION

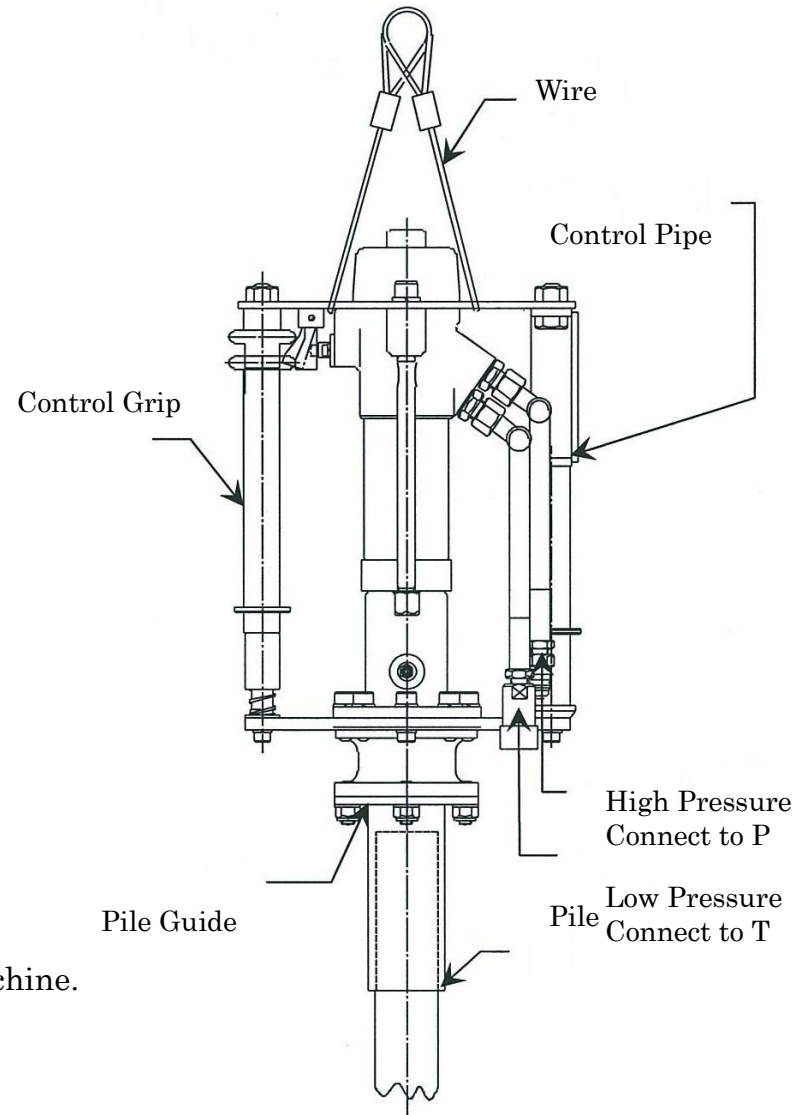
Make sure this pile driver is being connected to a suitable power source before operating.

Preparation

1. Connect the pile driver with hydraulic power source with extension hoses
2. Attaching $\varnothing 4\text{mm}$ (or more) lifting wires on top plate to lift the pile driver. (Refer to the Illustration on the right)
3. Set pile or pole which you intend to drive vertically to the ground. Set the pile guide on the top of the pile or pole which you intend to drive.

Operation

4. Start the power unit or other power source.
5. Slightly releasing lifting wires in order to start operating.
6. Hold on handle grip and control grip with both hands. To start operating, pressure down the pile driver and control grip.
7. Release control grip when intend to stop the machine.



After the operation

8. Stop the power unit or power source.
9. Remove the extension hoses.
10. For preventing dust, dirt entering the extension hoses, attach both sides of the couplers on extension hose to each other.
11. Clean and wipe out dirt and dust on pile driver.

* For more information regarding to operation and precautions, please refer to the next page.

GUIDELINES

Following these guidelines while using this pile driver:

1. Always use a suitable pile guide (right size for the pile you intend to drive) for operating. Using unsuitable size of pile guide will lead to the damage of the machine.
2. Be certain the power source which you intend to connect to the pile driver is within the flow/pressure range of the pile driver.
3. Pay attention to the followings while operating the pile driver.
 - (1) Be cautious for not being tripped by the extension hoses.
 - (2) Be cautious for your footing. Clear the work area of objects which might operators to trip and fall.
 - (3) Make sure the pile driver is placed horizontally while not being used. Fail to place the pile driver horizontally after operating can cause injury by sudden falling of the pile driver.
 - (4) Be cautious not to injure your back while lifting the pile driver.
 - (5) Preventing the sudden falling of pile driver, make sure the pile driver is lifted (with wires) while operating.
 - (6) Do not leave pile driver unattended on applications.
4. After disconnect hydraulic power unit and the pile driver, connect both side of the couplers on extension hoses together.
5. In case of sudden hydraulic hose breakage and hydraulic oil belch out. STOP the power source IMMEDIATELY.
6. When connecting and disconnecting couplers, make sure dirt, dust and other foreign substance does not enter or attach to couplers and hoses.
Always check the oil and refill if necessary before each operation.
7. Make sure the power source is OFF when connecting the pile driver to the power source with hoses.
8. Make sure there is no dirt and dust on couplers before connecting them.
9. If the oil temperature is below 10°C, warm up the breaker before start operating.

10. For long term storage:

- (1) Apply rust-free form on anvil.
- (2) Remove plug and replace it by lubricator (nipple). Squeeze lubricating pump for 10 to 15 times.
- (3) Wipe the pile driver with wet cloth and storage it with a cover in a dry place.



Immediately STOP the power source if the pile driver does not stop operating after releasing the control grip. Ask Maruzen dealer for repair and service before the next operation.

INSPECTION

1. Daily Inspection

- (1) Be certain there is no oil leakage from hoses or main body.
- (2) Be certain there are no injuries, cracks or damages on top plate.
- (3) Be certain nuts on pile guide is firmly tightened.

2. Periodically Inspection

Ask your Maruzen nearest dealers for the following maintenance.

Inspection Items	Operating Hours
Accumulator Nitrogen gas charge	Every 250 hours or 1 Year
Change accumulator diaphragm	Every 500 hours or 2 years
Change O ring in valve body	Every 500 hours or 2 years
Change U cup packing	Every 500 hours or 2 years
Change all O rings	Every 3 years
Grease on front cap	Every 50 hours or 6 months

* The pressure of nitrogen gas charging in accumulator is 4MPa.

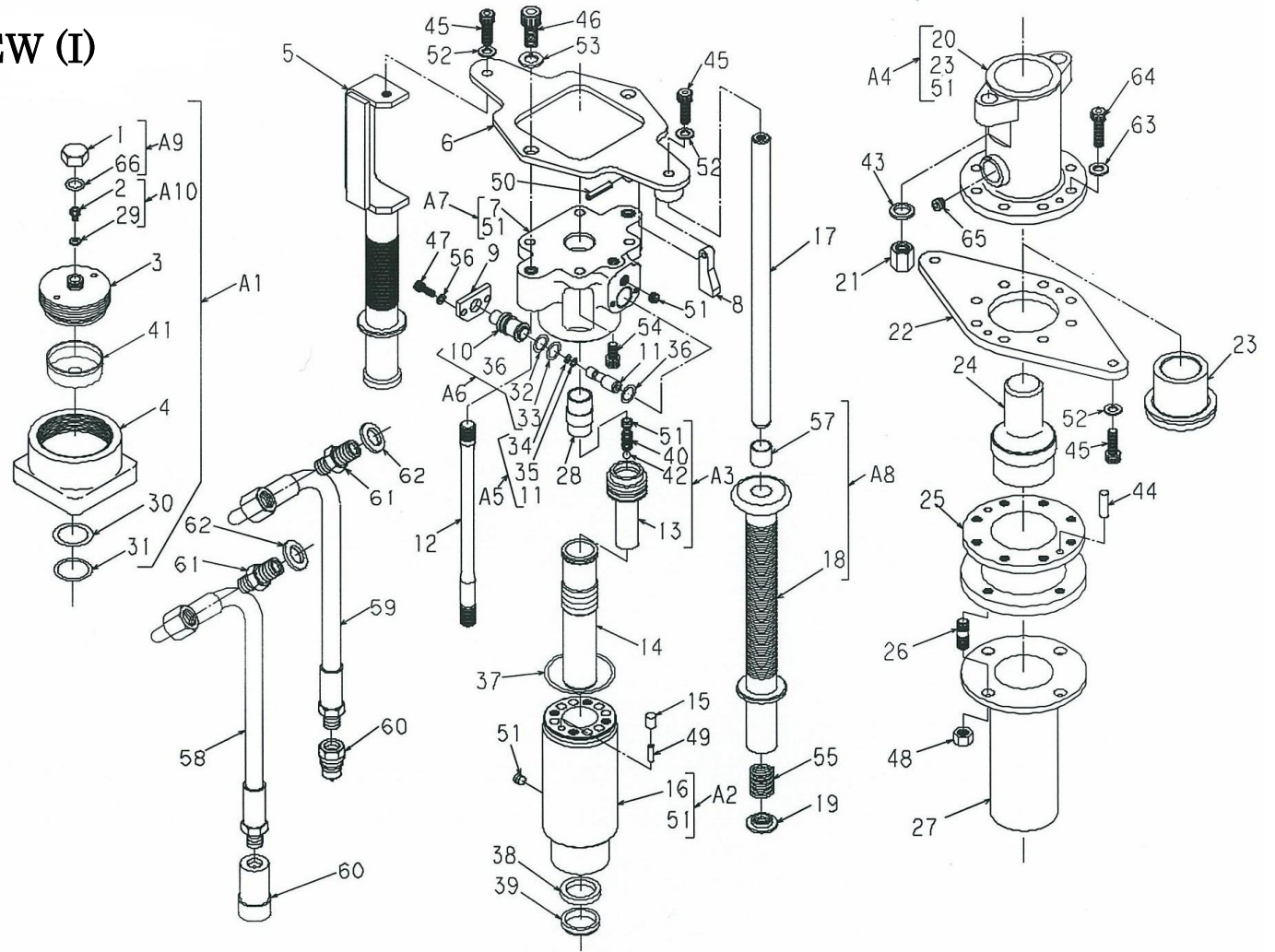
TROUBLE SHOOTING

Symptoms	Causes	Countermeasures
Grip the control lever but it does not start	1. Power unit or power source is OFF	Start the power unit or power source.
	2. The control lever on power unit is in "OFF" position.	Turn the control lever to "ON" position
	3. Hoses are not connected properly.	Connect all the hoses, extension hoses properly.
	4. Couplers are not connected properly.	Connect all the couplers and hose fittings properly.
	5. Pressure of relief valve was set too low.	* Adjust the pressure of relief valve to 11.7~20.6MPa
	6. Damage of control valve	* Replace a new control lever
	7. Malfunction of control valve	* Disassemble the pile driver and remove dirt, foreigner substances between control valve and valve body.
	8. High pressure hose and low pressure hose were attached to the wrong side.	Attach high pressure hose on the top of the main body.
	9. Draw bolt nuts are loosen	* Tighten draw bolt nuts firmly and evenly on both sides
Functioning but weak hammering or low hammering speed	1. Low rate of oil flow from power source	Turn the engine rotation rate up and increase the rate of oil flow (Adjust oil flow to the necessary rate) * Check the displacement of hydraulic pump
	2. Pressure of relief valve was set too low.	* Adjust pressure to the range of 11.7 ~ 20.6MPa)

	3. Malfunction of control valve	* Remove and clean the joint of control lever and valve body
	4. Back pressure is too high	Use shorter and wider hose for hydraulic oil returned side (low pressure hose)
	5. Hydraulic oil is lesser than necessary amount.	Refill hydraulic oil.
	6. Damage of anvil	* Disassemble the pile driver and replace a new anvil.
Normal hammering speed but weak hammering power	1. The gas pressure in accumulator is low	* Nitrogen gas charge * Charge pressure 4MPa
	2. Damage of accumulator diaphragm	* Replace new diaphragm *
Strong hammering and in high speed	1. High rate of oil flow	* Turn the engine rotation rate down to decrease the rate of oil flow (Adjust oil flow to the right range)
An abrupt stop during operation	1. Couplers were disconnected	* Check each connected parts and be certain all the couplers are connected firmly
	2. Damage of control valve	* Replace a control valve
Profuse Oil leakage from front end	1. Damage of U cup packing	* Replace U cup packing *
	2. Damage of U cup packing due to the scratch on piston.	* Replace U cup packing, remove the scratch on piston
High pressure hose shakes intensely	1. Damage of accumulator diaphragm	* Replace diaphragm

For items with * mark , ask Maruzen dealers for service and maintenance.

EXPLODED VIEW (I) MODEL KH150



PARTS LIST MODEL KH150

No.	Code	Descriptions	Q'ty	No.	Code	Descriptions	Q'ty
1	M2LTE115A	Cap	1	25	MB26Y009A	Anvil Holder	1
2	1120 – 413 – D	Cap Bolt	1	26	MB26Z013A	Bolt	4
3	M2LTE109A	Lid (S)	1	27	MB26Z020A	Post Cover	1
4	M2LTD103A	Shell	1	28	MIXTE108A	Control Valve	1
5	MB26Y002A	Handle Pipe	1	29	WS – 06<<<<<<<<<<<<BH	Seal Washer	1
6	MB26Y005A	Top Plate	1	30	OBP – 22	Back Up Ring	1
7	MB26X012A	Valve Body	1	31	OP – 22	O Ring	1
8	MB08Z015A	Cam	1	32	OBP – 14	Back Up Ring	1
9	MB26Z010A	Plate	1	33	OP – 14	O Ring	1
10	M2LTE108A	Valve Guide	1	34	OBP – 5	Back Up Ring	1
11	MIKTE111A	Valve Rod	1	35	OP – 5	O Ring	1
12	MB26Z001A	Draw Bolt	2	36	OP – 12.5 (1B)	O Ring	1
13	M2LTE124A	Inner Tube	1	37	OG – 60	O Ring	1
14	M2LTD125A	Piston (B)	1	38	IUIS – 30 – 40 – 6	U Cup Packing	1
15	MB26Z018A	Collar	1	39	DS – 30385	Dust Seal	1
16	M2LTD104B	Cylinder	1	40	MIHTE107A	Spring (P)	1
17	MB26Z004A	Handle Shaft	1	41	MB02E006A	Diaphragm	1
18	MB26Z003A	Handle Grip	1	42	QB – 5/16	Steel Ball	1
19	MB26Z006A	Spring Stay	1	43	WF – 14 – 2L(JIS B1252)	Spring Washer	2
20	MB26Y016B	Front Cap	1	44	PFB – 6 x 18 (YAKIIRE)	Pin	2
21	1120 – 423	Nut	2	45	BH – 8 x 25	Bolt	4
22	MB26Y007A	Flange	1	46	BH – 12 x 25	Bolt	2
23	MB26Z014A	Chisel Bush	1	47	BH – 5 x 12	Bolt	2
24	MB26Z008A	Anvil	1	48	NFL – 10	Lock Nut	4

No.	Code	Descriptions	Q'ty
49	PR – 6 x 16	Pin	1
50	PR – 5 x 30	Pin	1
51	BPH1 – PT 1/8	Plug	11
52	WS – 8	Washer	8
53	WS – 12	Washer	2
54	BH – 8 x 15	Bolt	4
55	SAWANE – 5549	Spring	1
56	WS – 5	Washer	2
57	DB – MB1615DU	DU Bush	1
58	21091 • 8 – 50 –	Low Pressure Hose	1
59	21091 • 8 – 45 –	High Pressure Hose	1
60	QC – 03	Coupler	1
61	AJ – 1011 – 06	Adaptor	2
62	WS – 18<<<<<<<<<<BH	Seal Washer	2
63	WF – 8 (2 – L)	Washer	8
64	BH – 8 x 30	Bolt	8
65	BPH1 – PT1/8	Plug	1
66	OS – 22.4	O Ring	1

No.	Code	Descriptions	Q'ty	
A1	M2LTZ501A	Accumulator Assy	1	1,2,3,4,28,29,30,31,41
A2	M2LTZ502A	Cylinder Assy	1	16,51
A3	M2LTZ503A	Inner Tube Assy	1	13,40,42,51
A4	MB26Z026B	Front Cap Assy	1	20,23,51
A5	M1XTZ505A	Valve Rod Assy	1	11,34,35
A6	M2LTZ506A	Valve Guide Assy	1	10,32,33,36
A7	MB26Z029A	Valve Body Assy	1	7,51
A8	MB26Z030A	Handle Grip Assy	1	18,57
A9	M2LTZ508A	Cap Nut Assy	1	1,66
A10	MB24Z509A	Cap Bolt Assy	1	2,29