MARUZEN

HYDRAULIC PILE DRIVER

MODEL KH800

OPERATING MANUAL

CAUTION

FOR THE SAFETY PURPOSE, PLEASE READ THIS MANUAL THROUGHLY 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.

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.

MARUZEN KOGYO CO., LTD.
155-8 NAGABUSE, MISHIMA-SHI,
SHIZUOKA-KEN, 411-0824, JAPAN

CONTENTS

Safety Information.....4 ～ 7
Safety Alert Classifications.....4
Safety Alerts .....5 ～ 7
Specifications & Descriptions.....8
Precaution Labels and Positions.....9
Inspection before Each Operation.....10 ～ 11
Operation.....12
Guidelines .....13 ～ 14
Maintenance.....14
Daily Inspection.....14
Periodically Inspection 14
Troubleshooting.....15 ～ 16
Exploded View 17
Parts List .....18 ～ 19

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 ware 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 body of the machine may become hot under continuous running. Do not touch the machine with your bare hands and make sure to ware gloves before any contact with the machine.

* Failure to observe this precaution can result getting burned

WARNING

Be special cautions to high pressure gas

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

Failure to observe this precaution can result serious injury

WARNING

Never operate the machine when bystanders are in the work area

1. Do not operate the machine if any people except the operator are in the working area.
2. Always operate the machine hanging by wire.

Failure to observe this precaution can result personal serious injury.

CAUTION

Avoid blank hammering..

1. Do not operate the machine by blank hammering.
Failure to observe this precaution can result serious damage of machine and abnormal rising up of oil temperature.

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.

INTRODUCTION

1. This hydraulic pile driver is designed to be used for driving piles, pipes and anchors into soil ground.
2. (1) To drive ϕ 150mm pipe or pile with standard driving tool.
   (2) To drive Guard Rail (ϕ 114.3, 139.8) and H Steel (100mm Sq.)
3. **DO NOT** operate this pile driver on the following situations:

(1) Drench part of the pile driver or whole pile driver into water, mud or seawater.
(2) Continuous operation for over 3 minutes in condition that the pile never enters into ground any more.
(3) Operating for other applications except the specified purpose.
(4) Connect with power source which its oil flow and pressure exceed prescribed.
(5) The atmosphere temperature below -10℃ and over 40℃.
(6) Operating with oil temperature below 10℃ or over 100℃.
(7) Operating with the extension hoses exceeded 3/8”x10m.

SPECIFICATIONS & DESCRIPTIONS

Overall Weight	114kg (not including driving tool & hook)
Overall Dimensions	L767xW359xT310mmm
Working Pressure	9.8～14.7Mpa
Max.Intake Pressure	27.5MPa
Flow Range / BPM	20～25L/min→500-600bpm
	25～35L/min→600-900bpm

** It needs the change of orifice plug to convert

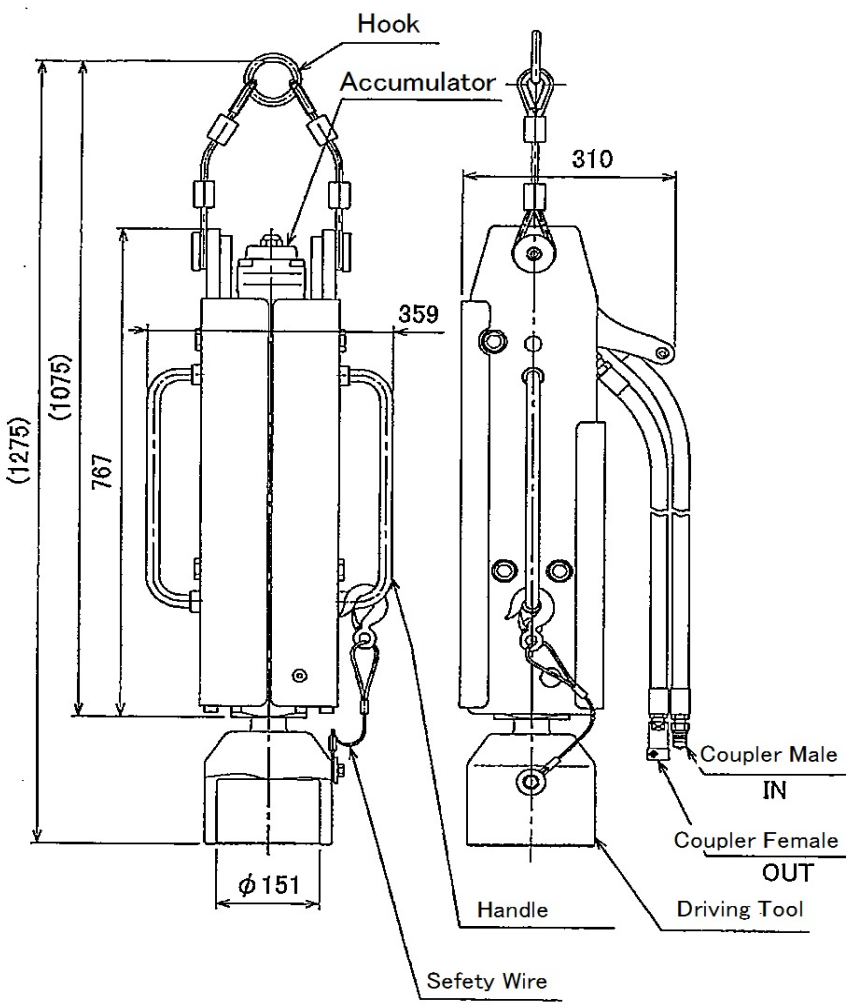
Max Driving Dia.	150mm
Standard Driving Tool:	ϕ150mm for round pile

Driving Option Tool:

For Guard Rail Pile(114.3mm,139.8mm)

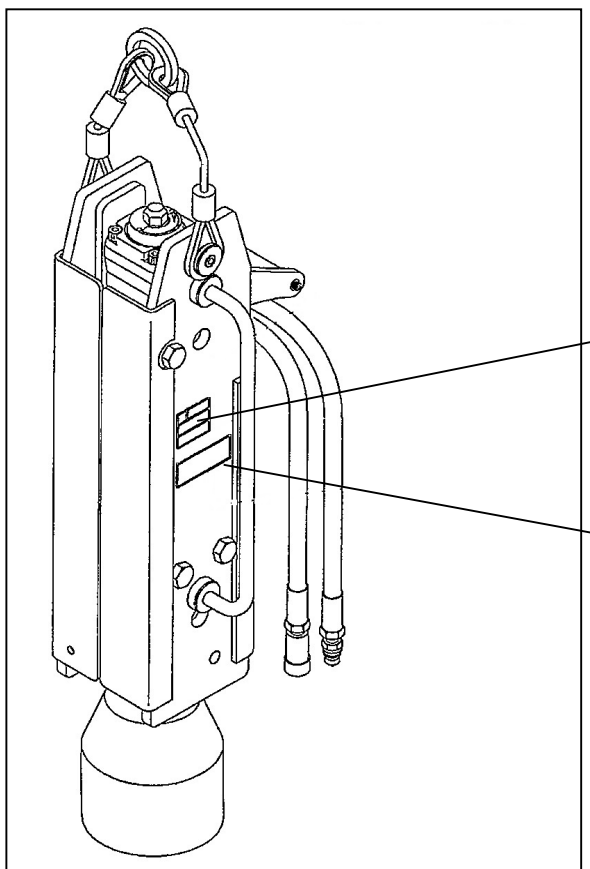
For H Steel 100mm square

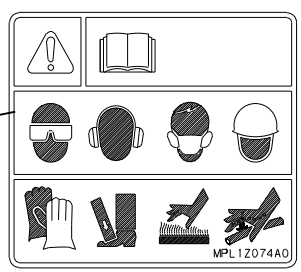
Max Allowable Back Pressure:	2.5MPa
Max. Hose Length	20-25L: 3/8" X 10m
	25-35L: 1/2"x10m
	(with power unit)
Recommended Oil	VG32/ 46



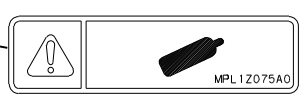
PRECAUTION LABELS AND POSITIONS

To operate the machine safely, keep the safety caution labels always visible.
When the labels are damaged or dirty, replace to new ones.





Safety Alert Label

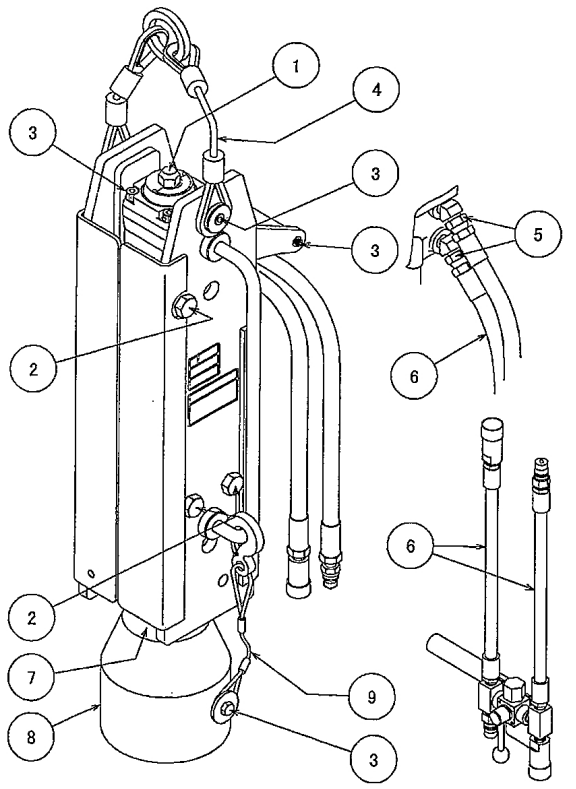


High Pressure Gas Caution Label

INSPECTIONS BEFORE EACH OPERATION

For the purpose of keeping the pile driver 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 of nuts ①	Tighten the loosen nuts
2. Loose of bolts ②③	Tighten the loosen bolts
3. Loose of hose fittings ⑤	Tighten hose fittings
4. Damage of wire ④⑨	Replace to new one
5. Oil leakage ⑦	Ask your service dealer for repair and service
6. Damage or crack of driving Tool ⑧	Replace
7. Damage of hose ⑥	Replace



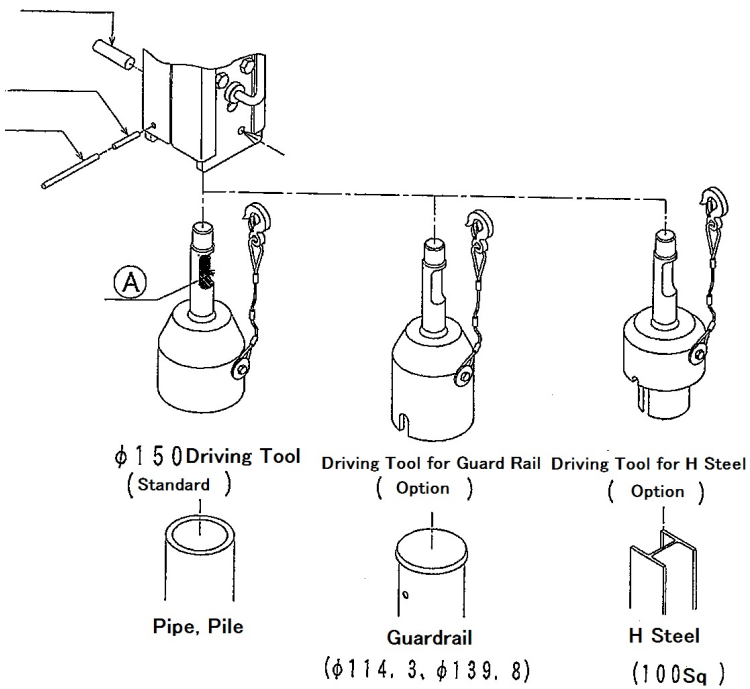
Optional Tools

For driving pile or pipe other than standard ϕ 150mm round pile, 2 optional tools are arranged.

1. Driving Tool for Guard Rail Pipe (ϕ 114.3mm or ϕ 139.8mm)
2. Driving Tool for H Steel (100mm square)

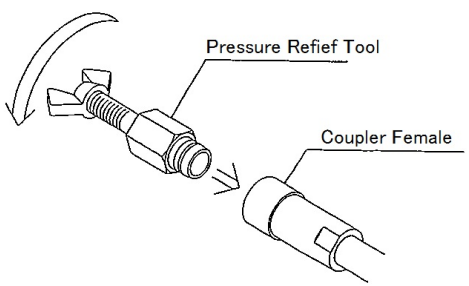
Remarks

Always apply 5g grease on the shank Ⓐ of tool when you use the tools.



When coupler can not be connected

It may suppose the high pressure remains inside of hoses.
Use the pressure release jig to release the pressure.

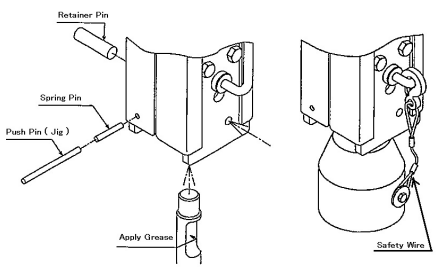


OPERATION

Always check and confirm the using power source is complied with the specifications of this pile driver.

Preparation

1. Check and confirm if the Driving Tool is fit for the pile you intend to drive. Change the tool if necessary.
   STD: ID 150mm Option: For Guard Rail Post/ H Steel. Always apply 5g grease on tool shank and grease up 4-5 times by grease gun through the hole of front end and set the tool with retainer pin and spring pin when you use it.
2. Connect the pile driver to hydraulic power source and remote control valve with extension hoses which is always to be machine side.
   At this time, remote valve must be in OFF position.
3. Use wire to lift the pile driver (See Fig.)
4. Place pile vertically on the point which you intended to drive in. Set the pile driver on the top of pile. Be cautious not to let the pile driver falls.

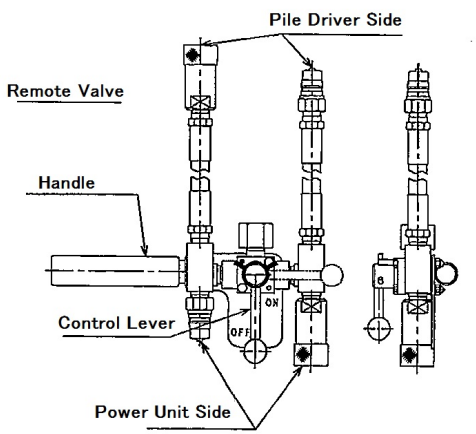


Operation

5. Start the power source.
6. Loose the lifting wire slowly.
7. Turn the lever of remote valve to ON position, and the pile driver start working.
   Make sure that pile stays vertically without inclination
8. While pile has been driven into the desired depth, Stop the pile driver by turning the lever of remote valve to OFF position

After Operation

9. After operation stop the power source.
10. Stop the power source and detach the connection hoses and control valve.
11. Clean each component and part of pile driver.



GUIDELINES

Following these guidelines while using this pile driver:

1. Always use the suitable driver tool according to the diameter of post you intend to drive. Otherwise, the machine may be damaged.
2. When intend to use other power source (other than Maruzen hydraulic power units), make sure the pressure and oil flow of the power source are in the range prescribed.
3. Pay attention to the followings while operating the pile driver.
   (1) Be cautious not to be injured by the falling down of pile.
   (2) Be cautious for not being tripped by the extension hoses.
   (3) Be cautious for your footing. Clear the work area of objects which might operators to trip and fall
   (4) Be cautions not to be injured seriously by fallen down the machine. Always check if the wire is not damaged.
   (5) Make sure the pile driver is placed horizontally before or after operation. Fail to place the pile driver horizontally after operating can cause injury by sudden falling of the pile driver.
   (6) Be cautious not to injure your back while lifting the pile driver. When using the machine, always lift up it with wire by crane.
4. When detach from power source, attach two hoses to each other.
5. When remote valve cannot be on OFF position, Stop the power source IMMEDIATELY. Ask Maruzen dealer for repair and service before the next operation.
6. In case of sudden hydraulic hose breakage and hydraulic oil belch out. STOP the power source.
7. When detach couplers, a small amount of oil may slip out. Make sure that surrounding area does not get dirty by oil. When operating, check the oil volume and refill the oil if it is short.
8. Make sure the power source is OFF when connecting and disconnecting the pile driver to the power source with hoses.
9. When connecting and disconnecting couplers, make sure dirt, dust and other foreign substance does not enter or attach to couplers and hoses.
10. If the oil temperature is below 10℃, warm up the machine till +15° C before starting operating.
11. Don't use pile driver putting the body head into the ground.
12. For long storage of the machine, treat the followings to the machine.
    (1) Apply anti-rust oil to anvil through post cover.

(2) Remove the plug and put the grease nipple. Refill the grease by pumping by grease gun 4-5 times.

13. Clean whole machine by oil-wet cloth. Keep the machine in dry area with cover.
14. Replace new hoses when they are worn or when oil exudes from them.

Maintenance

1. Daily inspection

(1) Check if there are no oil leakage or spoil on the body and hoses of pile driver.
(2) Check if there are no cracks or damages on hook.
(3) Check if there are no loosen nuts on post cover.
(4) Check if the remote valve moves smoothly.

2. Periodical inspection

Ask your dealer for the periodical inspections.

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

* To grease, replace grease nipple with plug and use grease gun for 4 to 5 times.
* The charging gas pressure for accumulator is 3.9MPa.

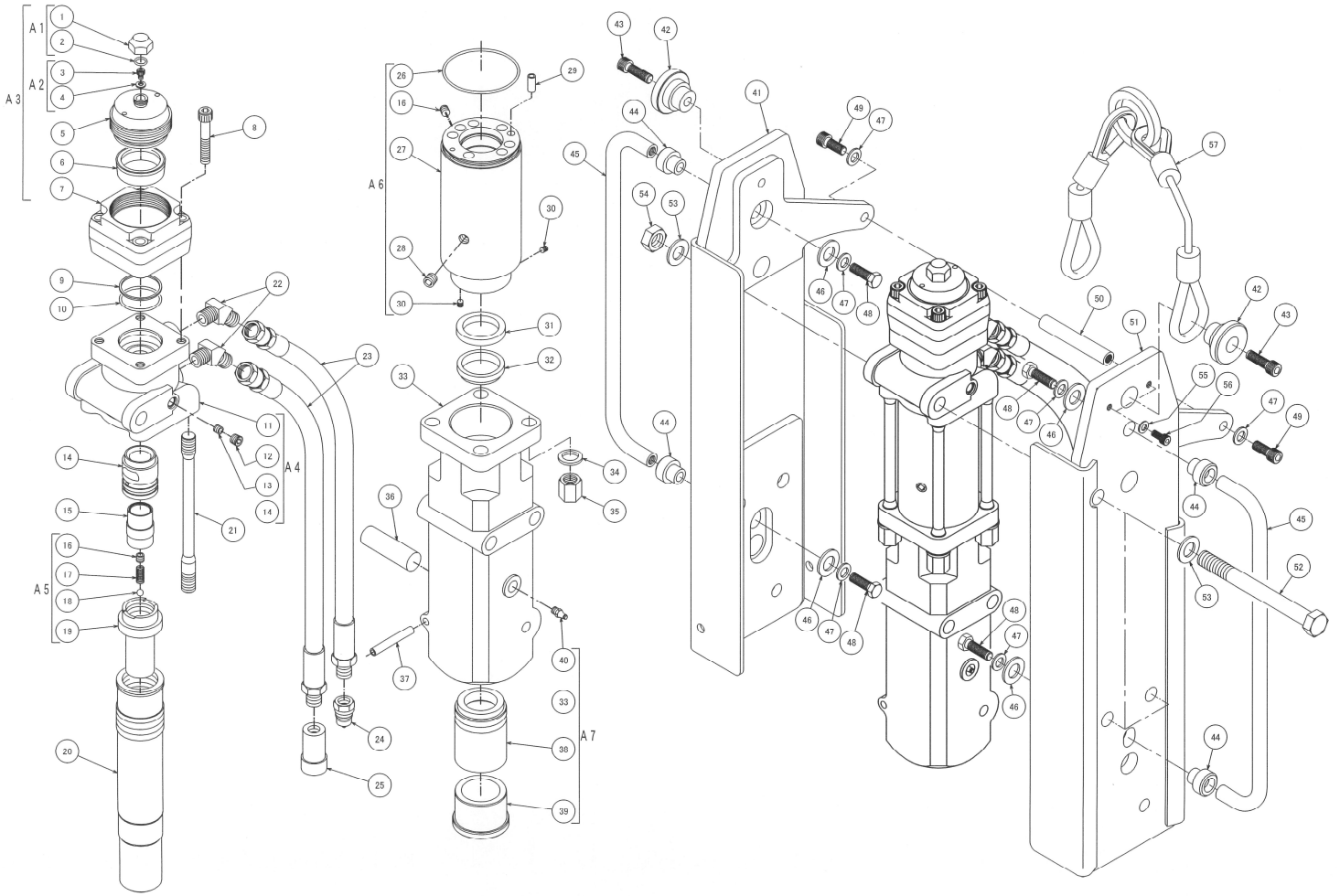
TROUBLE SHOOTING

Symptoms	Causes	Countermeasures
Put the remote control valve "ON" but does not start	1. Power source is off (Switch lever is not in ON position) 2. Hoses and remote valve are not connected 3. Couplers are not connected properly 4. Relief valve pressure is set too low 5. Damage of control valve 6. Control valve is not functioning 7. Outlet side and oil return side was connected inversely 8. Looseness of stud bolts	1. Start the power source (Turn the switch lever to On position) 2. Connect hoses 3. Check out if all the couplers have been connected properly 4. Adjust pressure to 11.7～20.6MPa * 5. Replace it. * 6. Disassemble pile driver, clean and remove dirt and dust between control valve and valve body * 7. High pressure hoses is connected to the upper side of the pile driver. 8. Re-tighten them. *
Functioning but weak hammering or low hammering speed	1. Low rate of oil flow from power source 2. Pressure in relief valve in power source is set too low 3. Control valve does not function properly 4. Back pressure is too high 5. Oil of power source is not enough volume. 6. Anvil is damaged	1. Turn the engine rotation rate up and increase the rate of oil flow (Adjust oil flow to the necessary rate) 2. Adjust pressure to the range of 140～210kgf/㎠ (13.7～20.6MPa) * 3. Remove and clean the joint of control lever and valve body * 4. Inspect return side hose 5. Refill the oil. 6. Disassemble the pile driver and

	7. Coupler is damaged	repair. * 7. Replace it.
Normal speed but weak hammering	1. Low gas pressure in accumulator 2. Damage of accumulator diaphragm 3. Abnormal rising up of oil temperature.	1. Nitrogen gas charge * Charge pressure 3.9MPa (40kgf/㎠) 2. Replace new diaphragm * 3. Check power source Clean radiator and fan.
Strong hammering and in high speed	1. High rate of oil flow	1. 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 are not connected 2. Damage of control valve 3. Remote valve changes to Off position	1. Check each connected parts 2. Replace a control valve * 3. Put the valve to On position.
Oil leakage from control lever	1. Damage, wear or harden of O ring	1. Replace O ring *
Profuse Oil leakage from post cover	1. Damage of U cup packing 2. Damage of U cup packing due to the scratch of piston rod.	1. Replace U cup packing * 2. Replace U cup packing, remove the scratch on piston rod *
High pressure hose shakes intensely	1. Damage of accumulator diaphragm	1. Replace diaphragm *
Remote valve cannot be Off position.	1. Improper movement of spool of remote valve	1. Disassemble, clean and repair *

For items with *, ask Maruzen dealers for service and maintenance.
Anvil may have some oil on it. It is not abnormal.

EXPLODED VIEW
MODEL KH800



PARTS LIST (I) MODEL KH800 * only can be supplied as assembly parts

No.	Code	Descriptions	Q'ty	No.	Code	Descriptions	Q'ty
*1	MIKTE108A	Cap Nut	1	26	OG-95	O-Ring	1
2	OS-22.4	O-Ring	1	*27	MB13Z004A	Cylinder	1
3	1120-413-D	Cap Nut	1	28	BPH1-PT3/8	Taper Plug	3
4	WS-06<<<<<<<<BH	Seal Washer	1	29	PR-10*25	Spring Pin	1
5	MB13Z009A	Lid	1	30	MB850-040	Expander	2
6	1110-421	Diaphragm	1	31	IUIS-50-60-6	U-Cap Packing	1
7	1110-31-01	Shell	1	32	DS-5058565	Dust Seal	1
8	BH-12*70	Bolt, Hex Socket	4	*33	MB13X002A	Front End	1
9	OBG-50	Back Up Ring	1	34	WF-18-2L(JIS B 1252)	Washer	4
10	OG-50	O-Ring	1	35	MIKTE115A	Nut	4
*11	MB13X001A	Valve Body	1	36	MB13Z013A	Retainer Pin	1
12	BPH1-PT1/8	Taper Plug	2	37	PR-8*50	Spring Pin	1
13	MB06E007A, MB13Z018A	Orifice Plug (Φ3.6, Φ4.0)	1	*38	MB13Z011A	Bush (A)	1
*14	MB13Z006A	Valve Bush	1	*39	MB13Z012A	Bush (C)	1
15	MB13Z008A	Control Valve	1	40	A-PT1/8H	Grease Nipple	1
16	BPH1-PT1/8	Taper Plug	3	41	M8FTX047A	Bracket A	1
17	M1HTE107A		1	42	M8FTZ044A	Boss A	2
18	QB-5/16	Steel Ball	1	43	BH-12*40	Bolt, Hex Socket	2
*19	MB13Z007A	Inner Tube	1	44	M8FTZ045A	Boss B	4
20	MB13Y005A	Piston	1	45	M8FTZ043A	Handle	2
21	MB13Z010A	Stud Bolt	4	46	M8FTZ017A	Spring Washer	4
22	AJ-1036-08	Adapter	2	47	WF-12H (JIS B2760)	Washer	6
23	21122・6-110SX	Hose	2	48	B-12X40(10.9T)	Bolt	4
24	QC-03M	Coupler (Male)	3	49	BH-12*30	Bolt, Hex Socket	2
25	QC-03F	Coupler (Female)	1	50	M8FTZ014A	Guide	1

No.	Code	Description	Q'ty	No.	Code	Descriptions	Q'ty
51	M8FTX046A	Bracket B	1	64	B-5*40	Bolt	2
52	B-20*200(10.9t)	Bolt	3	65	WS-6	Spring Washer	2
53	Wf-20(1-L)	Spring Washer	6	66	HV-03-No2	Selector Valve Assy	2
54	N1-20	Nut	3	67	M8FTZ005A	Rod	1
55	WP-8	Spring Washer	4	68	M8FTY031A	Driving Tool	1
56	BH-8*18	Bolt	4		M8FTZ033A	Spring Washer A	1
57	M8FTZ028A	Wire	1		M8FTZ035A	Hook Wire	1
58	21091・1-50--	Hose	2		M8FTZ034A	Spring Washer B	1
59	C-30B	Line Grip	1		B-12*25	Bolt	1
60	N-2072-06	Adaptor	1		T6007	Push Rod Jig for Retainer Pin	1
61	M8FTZ028A	Base	1				
62	HB-5	Cap Nut	2				
63	N-2093-06	Adaptor	2				

Assembly Parts

No	Code	Descriptions	Q'ty	Content
A1	MB24Z508A	Cap Nut Ass'y	1	1,2
A2	MB24Z509A	Cap Bolt Ass'y	1	3,4
A3	MB13Z501A	Accumulator Assy	1	1,2,3,4,5,6
A4	MB13Z505A	Valve Body Assy	1	11,12(2),13,14
A5	MB13Z503A	Inner Tube Assy	1	16,17,18,19
A6	MB13Z502A	Cylinder Assy	1	16(2),26,27,28(3),30(2)
A7	MB13Z504A	Front End Assy	1	33,38,39,40
A8	MB13Z039A	Seal Kit Assy	1	2,4,9,10,26,31,32