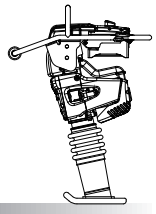
Mikasa

TAMPING RAMMER

MTX-i60



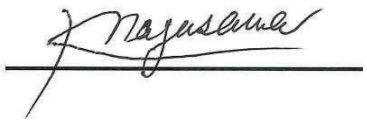
OPERATION MANUAL

en

http://www.mikasas.com

302-08001

EC Declaration of Conformity

1 Manufacturer's name and address		**Mikasa Sangyo Co., Ltd.** 1-4-3, Kanda-Sarugakucho, Chiyoda-ku, Tokyo, 101-0064, Japan
2 Description of the equipment		
2.1 Product		Compaction machines (Tamping Rammers)
2.2 Type		MTX-i60
2.3 Version(s)		—
2.4 Measured sound power level	dB(A)	99
2.5 Guaranteed sound power level	dB(A)	107
2.6 Motor type : Net power		3 Phase Induction Motor : 2.3 kW
3 Conformity assessment procedure		Annex VIII of 2000/14/EC as last amended by 2005/88/EC
4 Notified Body's name and address		TÜV Rheinland LGA Products GmbH Tillystraße 2, 90431, Nürnberg, Germany Notified Body number: NB 0197
5 Comply with relevant provisions and requirements of the following directives and standards		2000/14/EC , 2006/42/EC , 2014/30/EU EN 500-1:2006 +A1:2009 , EN 500-4:2011
6 Signature		 Apr. 2024 Kenichi Nagasawa : Director, General Manager R&D Division
7 Technical documentation keeper		Engineer , R&D Division , Mikasa Sangyo Co., Ltd. 15-1,Shimoosaki,Shiraoka-city,Saitama,349-0203,Japan
Reference data		MTX-i60
Hand-arm vibration level ※	Ahv m/s^2	6.5

※ Directive 2002/44/EC compliant. Test course (crushed gravel) is in comply with EN 500-4

Table of contents

1. INTRODUCTION

- This operation manual describes the proper methods for using the tamping rammer, as well as simple checks and maintenance. Be sure to read this operation manual before using the rammer, in order to get full use of the excellent performance of this machine, to improve your operation and to perform work effectively.
- After reading this manual, store it in a handy location for easy reference.
- For details about the RECHARGEABLE BATTERY (BOB) and BATTERY CHARGER (BOC) for this machine, see the separate operater's manuals for them.
- For inquiries about repair parts, parts lists, service manuals and repair of the machine, please contact the shop where you purchased it, or the Mikasa Website.
  In addition, parts lists are available on the MIKASA website at: http://www.mikasas.com/english/

The illustrations in this manual might slightly differ in part from the machine you actually purchased due to design changes.

2. MACHINE OVERVIEW

Application

This rammer is small size and lightweight, but it is a powerful compacting tool capable of applying a tremendous force in consecutive impacts to a soil surface.
It will compact nearly all types of soil, except soft soil that contains too much moisture.
Use the rammer to the construction works of roads, embankments and foundation works, and backfill works of gas lines, water lines and other pipe lines.

Warning about Incorrect Applications and Techniques

Do not use the rammer for the pile driving work, and compacting work on the rock and hard ground that is over compacted more than compaction ability of the rammer.
Furthermore, in case of using the rammer on sloping ground such as the side of embankments, it may cause an accident and machine trouble like an abnormal wear due to unstable operation.

Structure

Circular motion is converted to create impact force.
The upper section of the rammer functions as a weight and consists of the power unit section, gear reducer section, reciprocating section and handle section. The handle section is equipped with the battery and control unit section, and assembled to the upper section with shock absorbers.
The lower section of the rammer that compacts the ground, consists of the spring cylinder section to create sliding motion, the sloping section to tilt the machine forward, foot section to compact the ground, and bellows and protect sleeve to cover the sliding section.

Power Transmission

This machine is equipped with the three phase induction motor and the lithium ion battery as power unit. Transmission of the power takes place by increasing the motor speed to engage the centrifugal clutch. The motor speed is reduced to the speed required for tamping by the reduction ratio of the pinion gear and crank gear. Circular motion is converted to create reciprocating motion through the crank gear and connecting rod. This reciprocating motion creates jumping motion of the foot up and down through the strong coil spring of spring cylinder. The rammer creates strong impact force to the ground by its own weight and the jumping motion of foot.

3. WARNING SIGNS

The triangle shaped ⚠ marks used in this manual and on the decals stuck on the main body indicate common hazards. Be sure to read and observe the cautions described.

⚠ Warning labels indicating hazards to humans and to equipment.	
⚠ **DANGER**	Denotes an extreme hazard. It calls attention to a procedure, practice, condition or the like, which, if not correctly performed or adhered to, is likely to result in serious injury or death.
⚠ **WARNING**	Denotes a hazard. It calls attention to a procedure, practice, condition or the like, which, if not correctly performed or adhered to, could result in serious injury or death.
⚠ **CAUTION**	Denotes a hazard. It calls attention to a procedure, practice, condition or the like, which, if not correctly performed or adhered to, could result in injury to people and may damage or destroy the product.
CAUTION (without at ⚠)	Failure to follow the instructions may result in damage to property.

4. CAUTIONS FOR SAFETY

4.1 General Cautions

⚠ DANGER

- Do not use the machine in the rain and machine wet with water.
- Do not use the machine near flames.
- Do not touch the machine with wet hands. It is dengerous about electric shock and electric leakage.

⚠ WARNING

- Do not work with this machine, when
  - you are tired or sick and not feeling well.
  - you have taken medicine or drug.
  - you have had a drink.


⚠ CAUTION

- Please read the operation manual well and work safely by using the machine properly.
- For handling of the rechageable battery and battery charger, please read to the attached operation manuals for them.
- Please understand of the structure of this machine well.
- Make sure to do the inspection and check the machine conditions before starting operation.
- Please use protective equipment such as helmet, protective shoes, protective gloves, etc., and wear appropriate work clothes for making your work safe.
- Always wear noise protection equipment such as ear muffs or ear plugs and protective eyeglasses.
- The decals shown operation method, warning and etc. stuck on the machine are very important for your safety. Clean the machine so that the decals can be read easily. If it is difficult to read the decals, please replace with new ones.
- It is dangerous if children touch the machine. Please be careful about storage location and storage method for the machine.
- Stop the motor and remove the rechargeable battey before maintenance work.
- We are not responsible for any accidents occurred due to the fixing without using genuine parts (foot and etc.) and equipment modifications.





4.2 Cautions for Installing and Removing the Rechageable Battery

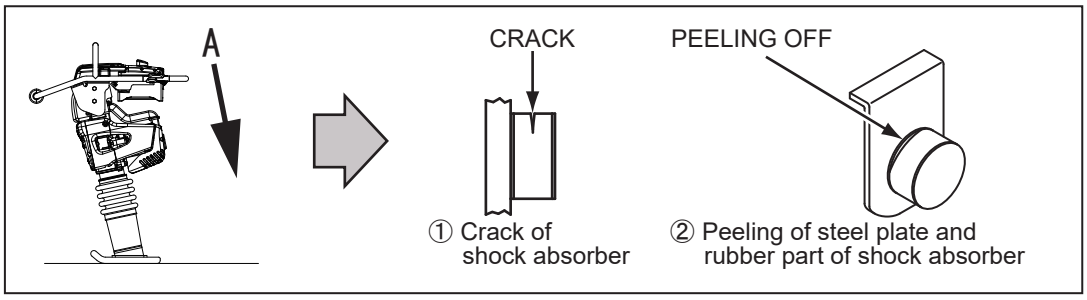
⚠ DANGER

- Be sure that the rechageable battery switches off.
- Be sure to work in a clear and flat location without any combustibles nearby.
- After installing the rechageable battery, make sure it is securely installed.

4.3 Precautions before Starting Work

⚠ CAUTION

- Always preform a pre-operation inspection before each operation and correct any problems.
- Always check the equipment for loosened bolts or nuts before starting.
- Before attaching the rechageable battery, make sure that:
  - ○ Exterior covers are not damaged.
  - ○ Switches are not damaged.
  - ○ Start lever and safety lever are not damaged.
  - ○ Battery lock lever is not damaged.
  - ○ Battery connections are not damaged.
  - ○ Motor wire harness is not damaged.
  - ○ There are no debris or excessive dirt on the motor or the rechageable battery.
- During the test run,
  - ○ Check that all switches work (start and stop) properly.
  - ○ Check that all indicators light when the motor is turned on.
- Push down the rear end of the handle as shown in the left figure (A) and check that there is no damage on the shock absorbers. If it found the damaged shock absorbers, replace them with new ones by left and right set.



4.4 Precautions during Work

⚠ CAUTION

- If you use the machine for a long time, be careful to watch for signs of vibration syndrome. Since this machine vibrates, work for a long time may have a negative effect on your body. Take sufficient brakes while working.
- Before starting to operate the machine, check the safety for people around and obstacles nearby.
- When starting the motor, the rammer may jump suddenly. Hold the handle firmly with one hand and then press the starter lever with other hand.
- Always be careful around ground condition at job site. Operate the machine in stable position and balance.

- Keep your foot away from the plate of the rammer during work. The plate of the rammer may crush your foot.
- Do not touch the motor during work or soon after work, because it is very hot.
- If you find trouble or damage of the machine during work, stop work immediately.
- Before leaving or moving the machine, be sure to stop the motor.

4.5 Precautions for Tips Over

⚠ DANGER

- Take the utmost care not to tip over the rammer during work, stored or stopped. Tie down the rammer with cable (wire or rope) when stopped or stored so that it cannot tip over.
- If the rammer tips over when children are nearby, they may have a serious accident.
- If the plate of the rammer is worn, the rammer will be especially unstable. If the plate of the rammer is severe worn, replace it with new one.
- If the rammer tips over during work, it will move to forward due to kicking motion of the plate while tipping over. And if the ground is solid, the rammer will move quickly so it is very dangerous. After ensuring that the operator and people around are safe, press the start button for deactivating or move the start lever to OFF position and make sure the rammer stops.
- Take careful note of safe especially when working on the public road, because a serious accident can occur easily.

4.6 Precautions while Lifting

⚠ DANGER

- Before lifting the machine, make sure that there is no damage to parts on the machine (especially the shock absorber and the hook), loosening or missing of the bolt, and the machine must be in a safe condition.
- Stop the motor and then remove the rechargeable battery before lifting the machine.
- Use adequate lifting cable (wire or rope) of sufficient strength for support to the machine.
- Do not lift it higher than necessary for safety.
- Do not use a damaged lifting cable.
- Use one point lifting hook for lifting the machine and lift straight upwards.
- Do not use any other points (such as the handle) for lifting.
- Never lift or suspend the machine rapidly with hydraulic excavator.
- Never allow any person or animal to stand underneath the machine while lifting.
- Be careful not to an accident when using any lifting equipment. Before using the lifting equipment, make sure that there is no trouble or damage.
- When lifting the rammer with the handle, be careful not to pinch your fingers between the handle and main body.

4.7 Precautions for Transportation and Storage

⚠ DANGER

- Stop the motor and then remove the rechargeable battery before transporting or storing the machine.
- After the motor and main body has cooled down enough, transport or store the machine.
- Maintain upright position of the machine on a level ground during transporting or storing.
- Tie down the machine with cable (wire or rope) so that it cannot move or tip over.
- Avoid storage areas with high temperature and high humidity, or environments with severe temperature changes. Keep away from direct sunlight and rain.
- When transporting the rammer, use MC-1B of Mikasa Carry or similar product.

4.8 Precautions for Maintenance

⚠ WARNING

- Ensure safety for maintenance. It needs appropriate maintenance for keeping the machine performance. Keep the machine in good condition with attention to the machine's condition always.
- Do not touch the hot parts until they have cooled down enough to prevent burn.

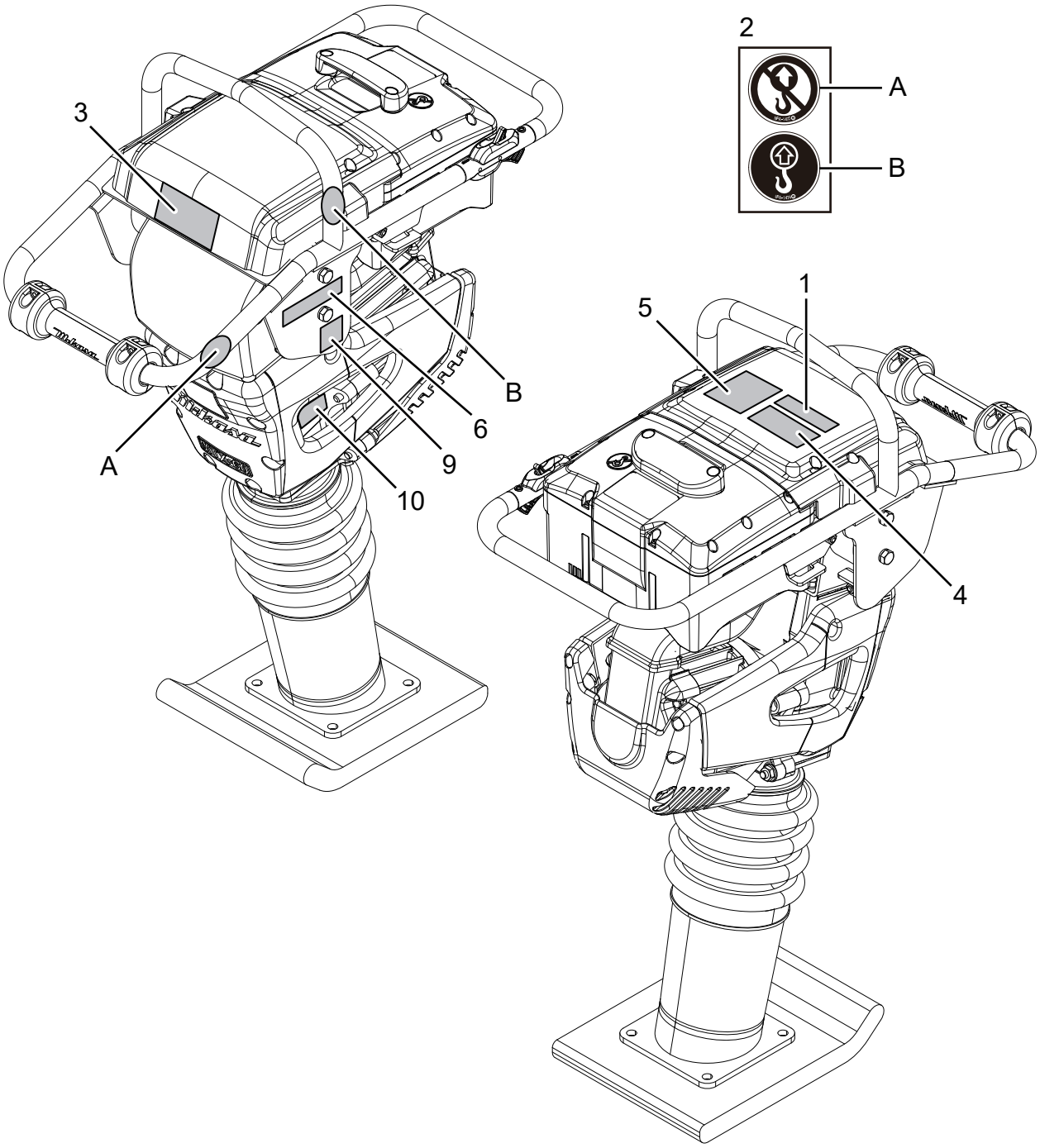
⚠ CAUTION

- Be sure to stop the motor before maintenance of the machine.
- Do not touch the lubrication oil until they have cooled down enough to prevent burn.
- When maintenance of the machine with disassembling, be sure to refer the service manual and always work safely.
- After maintenance of the machine, check that the parts are assembled properly and machine conditions are safe.

4.9 Precautions for Rechargeable Battery and Battery Charger

Regarding precautions for the RECHARGEABLE BATTERY (BOB) and BATTERY CHARGER (BOC), follow the separete operation manuals for them.

4.10 Decals Position



4.11 Decals List

No.	Part No.	Part Name	Q'TY	Label No.
1	9202-10870	DECAL,COUTION/CONBI PL4	1	NPA-1087
2	9209-00180	DECAL SET,LIFT/NO LIFT	1	
3	9202-25970	DECAL,SMART-i_96X54	1	
4	9202-24540	DECAL,COUTION/COMBI/e55	1	NPA-2454
5	9202-25920	DECAL,OPERATION/MTXi60	1	NPA-2592
6	9202-24760	DECAL,CAUTION WASH&DRY/EX	1	NPA-2476
9	9202-10310	DECAL,EC NOISE REQ.LWA107	1	
10	9202-25910	PLATE,SERIAL NO./MTXi60/EX	1	

4.12 Descriptions of the Warning Decals

Read the manual carefully.
Read and fullly understand the operation manual before operating the machine.

Fire hazard.
Be careful of any flames while operating, storing and refueling.

Tip over hazard.
Take the utmost care not to tip over the machine during operation, storage or stop.

Crush hazard.
Keep your foot away from the machine during operation. The plate of machine may crush your foot.

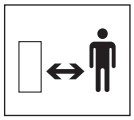
Burn hazard.
Never touch the hot parts. Allow these parts to cool before servicing the machine.

Lifting position.
Use one point lifting hook for lifting the machine.

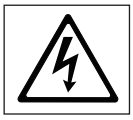
Noise hazard.
Always wear ear protection while operating the machine.

No lifting position.
Do not use any other points (such as the handle) except one point lifting hook for lifting the machine.

Eye hazard.
Always wear eye protection while operating the machine.



Keep safe distance.
Be careful not to approach danger source during operation.



Electric shock hazard.
Be careful about electric shock.
Stop the power unit before maintenance.

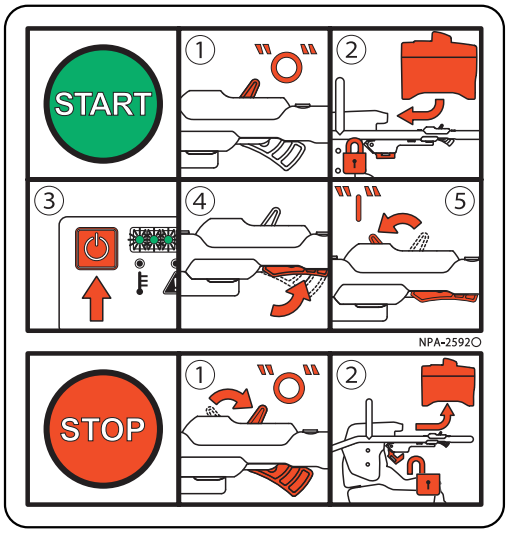
Do not use the machine in the rain and wet machine.

Do not use the machine with wet hands.

Do not use high pressure washer.

Keep dry.

Start and Stop the MTX with Battery ONE.



START

① Set the start lever to the OFF "O" position.
② Install the rechargeable battery until locked.
③ Press the start button: Activation/Deactivation.
④ Pull the safety lever.
⑤ Slowly push the start lever to the ON " I " position.

STOP

① Pull the start lever to the OFF "O" position.
② Push the battery lock lever down and then remove the rechargeable battery.

5. SPECIFICATIONS

5.1 Rammer

Model			**MTX-i60**
Operating Weight		kg (lbs.)	74 (163)
Dimensions	Length	mm (inch)	748 (29.4)
	Width		352 (13.9)
	Height		1040 (40.9)
Plate Size	Length	mm (inch)	340 (13.4)
	Width		265 (10.4)
Jumping Stroke		mm (inch)	40 - 70 (1.57 - 2.76)
Impact Force		kN (kgf, lbf.)	13.6 (1390, 3064)
Impact Number per min.		Hz (v.p.m)	11.7 (702)
Lubrication Oil			API Service Categories SE or higher SAE 10W-30
Lubrication Oil Capacity		liter (qt.)	0.65 (0.69)
Operating Time		min	30 (Battery Type: BOB10)
Charging Time		min	95 (Charger Type: BOC13)

5.2 Motor

Type		Three-phase induction motor
Rated Output	kW (PS)	2.3 (3.1)
Rated Current	A	45
Rated Voltage	V	51
PTO Shaft Type		Taper
Rated Speed	rpm	4350

5.3 Rechargeable Battery

Manufacturer			**BATTERY ONE**
Model			**BOB10**
Battery Type			Rechargeable Lithium Ion Battery
Type of Current (Output)			DC
Rated Voltage		V	51
Dimensions	Length	mm (inch)	220 (8.7)
	Width		290 (11.4)
	Height		196.5 (7.7)
Weight		kg (lbs.)	9.7 (21.4)
Energy Content		Wh	1008
Operating temperature range		°C (°F)	-10 ~ +50 (14 ~ 122)
Charging temperature range		°C (°F)	0 ~ +45 (32 ~ 113)
Storage temperature range		°C (°F)	-20 ~ +50 (-4 ~ 122)

※ Specifications are subject to change without notice.

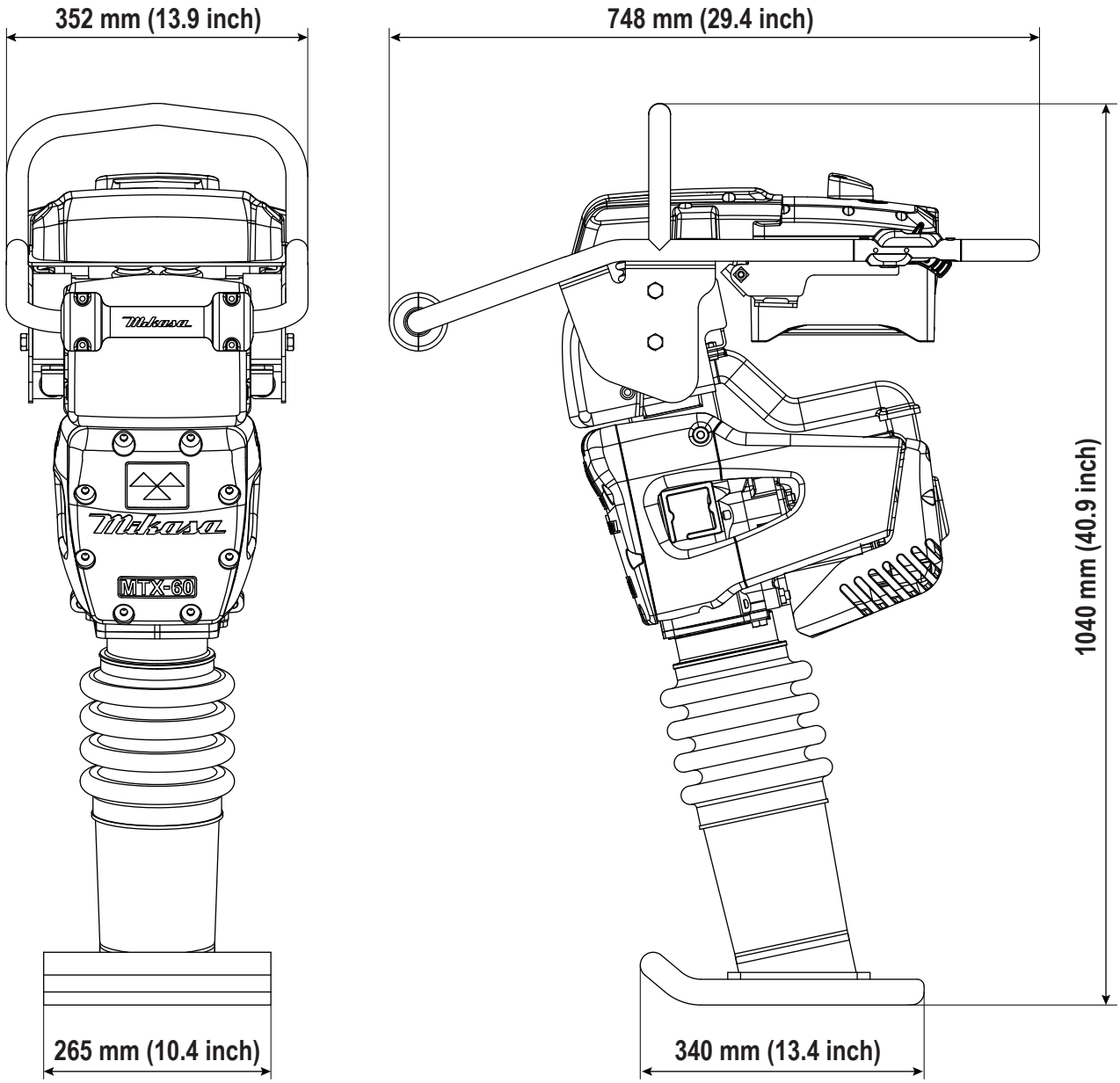
5.4 Battery Charger

Manufacturer		**BATTERY ONE**
Model		**BOC13**
Type of Current (Input)		AC
Rated Voltage	V	100 ~ 240
Rated Current	A	2.9 ~ 7.3
Rated Frequency	Hz	50 ~ 60
Rated Output	kW	0.65
Type of Current (Output)		DC
Output Current	A	13.5
Nominal Output Voltage	V	48.0
Output Voltage Range	V	2.7 ~ 60
Phases		1
Dimensions Length	mm (inch)	296 (11.7)
Width		396 (15.6)
Height		217 (8.5)
Weight	kg (lbs.)	5.3 (11.7)
Supply Cable	mm (inch)	2000 (78.7)
Protection Class		I / Protective earthing
Protection Type		IP65 *
Operating temperature range	°C (°F)	0 ~ +45 (32 ~ 113)
Storage temperature range	°C (°F)	-20 ~ +60 (-4 ~ 140)
*Different protection for: * Rechargeable battery connector plug: IP20		

※ Specifications are subject to change without notice.

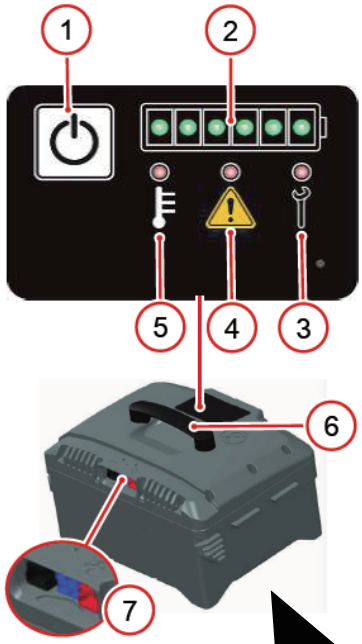
6. APPEARANCE

6.1 Dimensions



※ Specifications are subject to change without notice.

6.2 Components



1 Start Button: Activation / Deactivation

2 Control Light Charge Condition

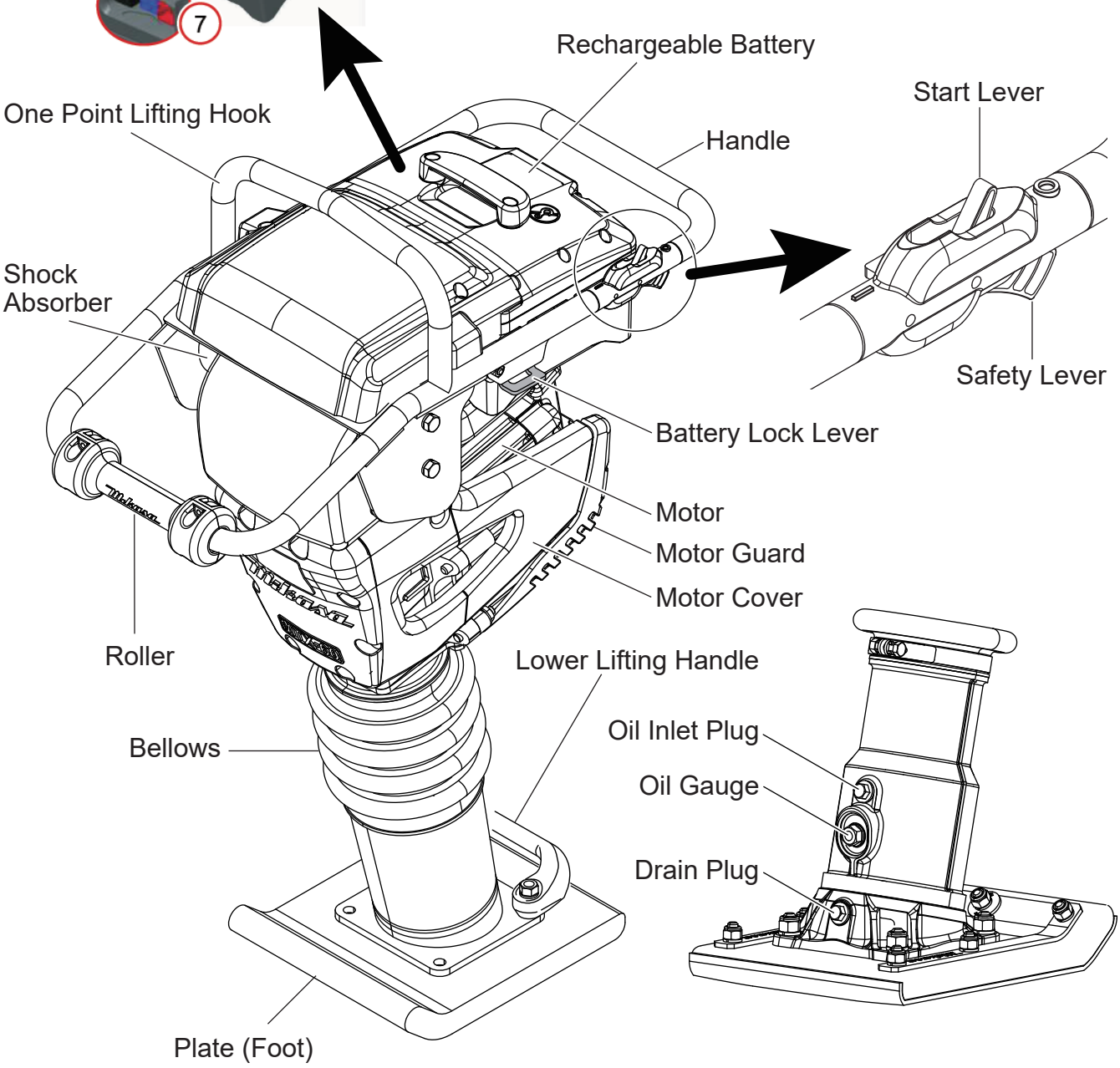
3 Control Light Diagnosis

4 Control Light Rechargeable Battery Error

5 Control Light Over Temperature / Under Temperature

6 Handle

7 Connections (Contact Strip)



7. INSPECTION BEFORE OPERATION

⚠ WARNING

- Check the machine while the motor is stopped. You may be caught in a rotating part and be seriously injured.
- Check the machine after it ties down on level ground to avoid tip over.
- Check the machine after it has cooled down to avoid burns.

⚠ CAUTION

- It is extremely important that this section be read carefully before attempting to operate the rammer.
- Do not use your rammer until this section is thoroughly understood.
- Follow the separate operation manuals for the rechargeable battery and battery charger when you operate them.

Inspection parts	Inspection items
Visual inspection	Deformation, Breakage, Crack, Dirt
Plate (Foot)	Wear, Deformation, Breakage, Crack
Handle	Deformation, Breakage, Crack
Shock absorber	Deformation, Breakage, Crack
Main body oil	Leaks,oil level,dirt
Bolts, nuts	Loosing or missing
Power connection	Deformation, Breakage, Crack, Dirt, Wear

7.1 Inspection

1. Clean each parts of the machine. Thoroughly remove dirt and oil from the machine.

2. Make sure that all bolts and nuts are not loosened. If they are loosened, retighten them to prevent an accident and trouble.

3. Make sure that the handle and shock absorbers are not damaged. If they are damaged, replace new ones.

4. Replace any missing or damaged safety and operation decals.

5. Check the main body oil from the oil gauge on the protection sleeve on level ground. (Fig.1)
   The oil level shoud be kept at the half way point of the oil gauge.

- **Main body oil: API Service Categories SE or higher SAE 10W-30**
- **Oil capacity: 650cc**
- **Tightening torque of oil inlet plug: 39.2 N·m (400kgf·cm)**
- **Tightening torque of drain plug: 49 N·m (500kgf·cm)**

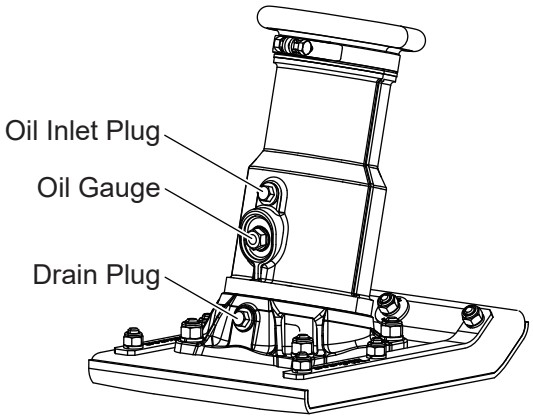


Fig.1

6. Retighten the all nuts for assembling foot. (Fig.2)

- **Tightening torque:**
  M10 nut: 29.4 N·m (300kgf·cm)
  M12 nut: 78.4 N·m (800kgf·cm)

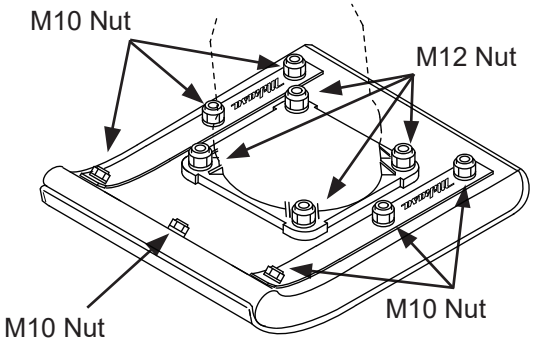


Fig.2

7.2 Rechargeable Battery and Battery Charger

Follow the separate operation manuals for the rechargeable battery and the battery charger when operating the following contents.

- Charging and Charge Level
- Cleaning
- Storage
- Disposal

7.3 Install and Remove the Rechargeable Battery

⚠ CAUTION

- Make sure to use a genuine rechargeable battey.
- Connections and contact area of the rechargeable battery must be clean and dry.
- Note the direction of installation when installing the rechargeable battery. The connections must point in the direction of the protective cover.

- Installing the rechargeable battery (Fig.3)

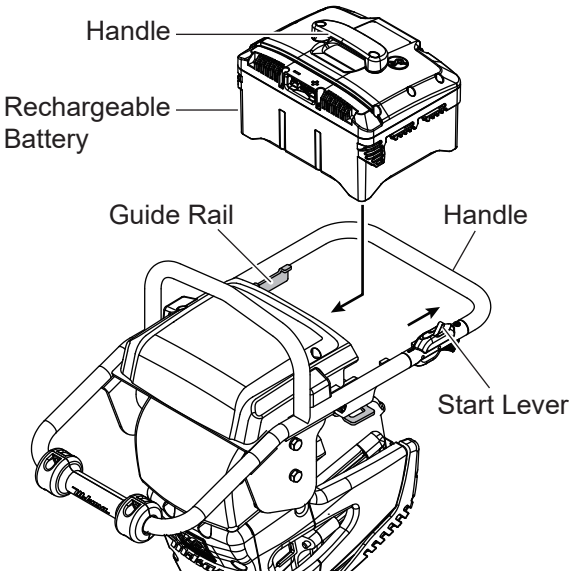


Fig.3

1. Set the start lever to the OFF position.
2. Hold the machine with one hand on the handle.
3. Using the other hand, lift the rechargeable battery by its handle.
4. Carefully insert the rechargeable battery into the guide rail provided on the handle.
5. Insert the rechargeable battery to the front by its handle until you hear the lock make a clearly audible click.

- Removing the rechargeable battery (Fig.4)

⚠ CAUTION

- Allow the machine to come to a complete stop.

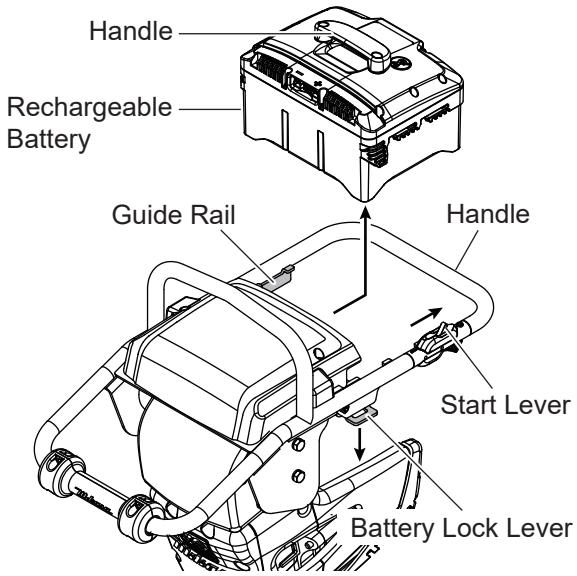


Fig.4

1. Check that the start lever is in OFF position.
2. Hold the machine with one hand on the handle.
3. Push the battery lock lever down.
4. With the other hand, carefully pull the rechargeable battery by its handle to the rear until it stops.
5. Pull out the rechargeable battery by its handle and put it down safely.

8. OPERATION

8.1 Start

1. Set the start lever to the OFF position.
2. Hold the machine by the handle.
3. Press start button: Activation / Deactivation.
4. Check the current state of charge via the control light charge condition.
5. Pull the safety lever with one hand.
6. Slowly push the start lever forward and the rammer starts up by jumping.

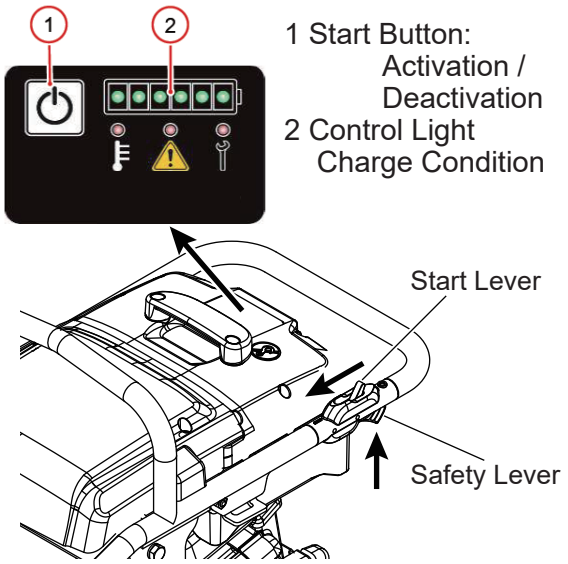


Fig.5

⚠ CAUTION

- Rammer should only be operated while standing behind the machine, and holding the handle firmly with both hands.
- DO NOT use this machine on ground that is harder than the machine can handle, or for driving pilings or tamping rock beds.
- Furthermore, use of the machine on sloping ground, such as the side of an embankment, may make the machine unstable and can cause an accident. It can also result in premature machine wear due to uneven loads on the machine.
- Use the machine with confidence for tamping earth and sand, soil, gravel, and asphalt.
- DO NOT use the machine for other types of jobs.

8.2 Stop

⚠ WARNING

- Do not touch the hot parts until they have cooled down enough to prevent burn.

1. Slowly pull the start lever back until it stops, and then the safety lever clicks into place with the start lever and holds it in the OFF position.
2. Allow the machine to come to a complete stop.

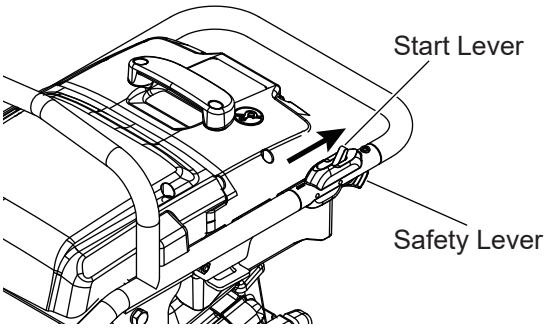


Fig.6

9. TRANSPORTATION

1. Stop the motor unit before transporting the machine.
2. Do not move the machine until the motor and main body have cooled down enough.
3. Remove the rechargeable battery.
4. Maintain upright position of the rammer on a level ground during transporting.
5. Tie down the rammer with cable (wire or rope) so that it cannot move or tip over during transporting.

10. CLEANING

- Do not use a hose or pressure washer to spray water to the electrical components.
- Water entering the electrical components may cause a malfunction.
- Only use dry and clean cloths.

11. STORAGE

1. Store the machine the same procedure as 9. TRANSPORTATION.
2. Avoid storage areas with high temperature and high humidity, or environments with severe temperature changes. Keep away from direct sunlight and rain.
3. Put a cover on the machine to avoid depositing dirt.

12. INSPECTION AND MAINTENANCE

Proper maintenance is essential for safe, economical, reliable, and environmentally friendly operation.

⚠ WARNING

- Check the machine while the motor is stopped. You may be caught in a rotating part and be seriously injured.
- Check the machine after it ties down on level ground to avoid tips over.
- Check the machine after it has cooled down to avoid burns.

Regarding the inspection and maintenance of the Rechargeable Battery and Battery Charger, always follow each operation manuals.

12.1 Inspection and Maintenance Schedule

Inspection interval	Inspection parts	Inspection items	Remarks
Daily (before starting operation)	Visual inspection	Deformation, Breakage, Crack, Dirt	
	Plate (Foot)	Wear, Deformation, Breakage, Crack	
	Handle	Deformation, Breakage, Crack	
	Shock absorber	Deformation, Breakage, Crack	
	Battery lock lever	Operation	
	Main body oil	Leak, oil level, dirt	Engine oil
	Bolts, nuts	Loose or missing parts	
	Power connection	Deformation, Breakage, Crack, Dirt, Wear	
Every 200 hours	Main body oil	Change (first 50 hours)	Engine oil

⚠ CAUTION

- The above table shows the inspecyion interval for standard condition.
- The inspection interval may vary depending on the condition in which the machine is used.
- For check of bolt and nut loosening and retightening, refer to the following standard tightening torque table.

Standard tightening torque table (unit: kgf・cm, 1 kgf・cm = 9.80665 N・cm)

		Bolt size							
		6 mm	8 mm	10 mm	12 mm	14 mm	16 mm	18 mm	20 mm
Material	4T (SS400)	70	150	300	500	750	1,100	1,400	2,000
	6-8T (S45C)	100	250	500	800	1,300	2,000	2,700	3,800
	11T (SCM435)	150	400	800	1,200	2,000	2,900	4,200	5,600
	In case counterpart is of aluminum.	100	300～350	650～700					

- Bolt threads used with this machine are all right-hand screw.
- Material and quality of material is marked on each bolts.

12.2 Main Body Oil Change

- Change the main body oil, first in 50 hours of operation and every 200 hours afterwards.

1. Remove the oil drain plug on foot housing and drain the main body oil.
2. Refill the main body oil from the oil inlet plug on the protection sleeve on level ground.
3. The oil level shoud be kept at the harf way point of the oil guage. (Refer to P12, Fig.1.)

- **Main body oil: API Service Categories SE or higher SAE 10W-30**
- **Oil capacity: 650cc**
- **Tightening torque of oil inlet plug: 39.2 N・m (400kgf・cm)**
- **Tightening torque of drain plug: 49 N・m (500kgf・cm)**

13. TROUBLESHOOTING

13.1 Rechargeable Battery and Battery Charger

Regarding the troubleshooting of the Rechargeable Battery and Battery Charger, please refer to each operation manuals for them.

13.2 Rammer

- Motor dose not start.
  - Rechargeable battery is not installed correctly.
  - Battery power is low.
  - Rechargeable battery has malfactioned.
  - Wire breakage or short circuit.

- Motor starts normally, but tamping stroke is not stable or it does not tamping.
  - Excessive main body oil.
  - Clutch slips.
  - Spring failure.
  - Bearing failure.

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