



HIGH FREQUENCY 48V SERIES HIGH FREQUENCY VIBRATION MOTOR OPERATION MANUAL



**HKM 55LFA · 55LFSA
HKM 75LFA · 75LFSA**

EXEN CORPORATION

☆ SAFETY PRECAUTIONS

- ☆ This product is a high-frequency vibration motor for fastening concrete. Do not use this product for any purpose other than tightening concrete.
- ☆ Be sure to read and understand this operation manual carefully before using the product so that it can be operated safely and efficiently. Improper machine use may result in injury or machine failure. Keep this manual for further reference.
Also, read the operation manual of power supply equipment carefully.
- ☆ The following symbols are DANGER, WARNING, and CAUTION instruction for the use of this product so that the product will not cause harm or damage to users or others.



DANGER

【DANGER】 indicates an imminent dangerous situation which may lead to death or serious injury.



WARNING

【WARNING】 refers to a hazard that may cause death or serious injury.



CAUTION

【CAUTION】 refers to a hazard that may cause minor or moderate injury.



(To prevent death)

-  **Never use this product with a commercial power supply.**
Using commercial power supply could burn the motor, break the insulation and thus causing electric shock.
-  **Do not use power supply that is not equipped with earth leakage circuit breaker to this product to prevent electric shock.**
-  **When you install it in high places, provide an anti-drop measure. Falling object may cause injury or damage.**



(To prevent injury or damages)

 Be sure to retighten the hook base fixing bolt, motor fixing nut, and flange nut before work.

 This product vibrates. Be sure to reinforce the installation location to prevent sympathetic vibration.

 Sympathetic vibration may cause falling product by damaging installation parts and loosening or breaking bolts.

 Do not operate the product without the side covers. Otherwise, you may get injury.

 This product becomes high temperature during operation. Never touch the hot surface accidentally after driving. There is a risk of being burned.



 Wear hearing protection at the noisy place during operation.



○ INTRODUCTION

Thank you for purchasing the high frequency vibration motor.

Be sure to read this operation manual before use.

Be sure to read and understand this operation manual carefully before using the product until it can be operated safely and efficiently. Handle and maintain it appropriately for safety operation.

Keep this manual for further reference.

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○ SAFETY



(For personal protection during operation)

- Put on a safety helmet, safety gloves, safety boots, hearing protection, face protector (protective glasses and mask) and safety harness, before installing the vibration motor.



Safety helmet



Safety gloves



Safety boots



Hearing protection



Face protector



Safety harness

- Be sure to gain footholds in a safe environment when installing this product.
- When checking this product, be sure to disconnect the plug from the power supply. If not, electric shock may occur.
- Be sure to wear a safety harness when installing and inspecting this product at a high place.
- When placing concrete, concrete may be splattered around.
Use a face protector (e.g. safety glasses and mask) to protect your eyes and mouth.



(For longer service life)

- To attach this product, the hook base is needed. Please fix by the bolt fixation or the welding when you set up the hook base in the formwork.
- When attach hook base to mold, please fix certainly to become neither resonance nor irregular vibration. There is a possibility that the bolt may loosen or the welding part may be damaged by resonance or irregular vibration.
- Keep the cable away from other machines or objects. Contacting objects causes abrasion or breaking due to vibration. In order to avoid abrasion or breaking, be sure to wrap spiral tube around the cable and secure it in a vibration-free place.
- The number of usable units varies with the capacity of the power supply equipment (inverter.) Refer to "NUMBER OF VIBRATION MOTOR UNITS THAT CAN USE" to avoid overloading.
- Depending on the use condition, the rated current may be exceeded. In this case, adjust the weight angle (to lower the centrifugal force) so that the rated current is not exceeded.
Use of a motor in excess of the rated current may cause burnout of the motor.
- It is recommended to use an over-current protective device in order to automatically protect vibration motor from over-current (larger than the rated current).

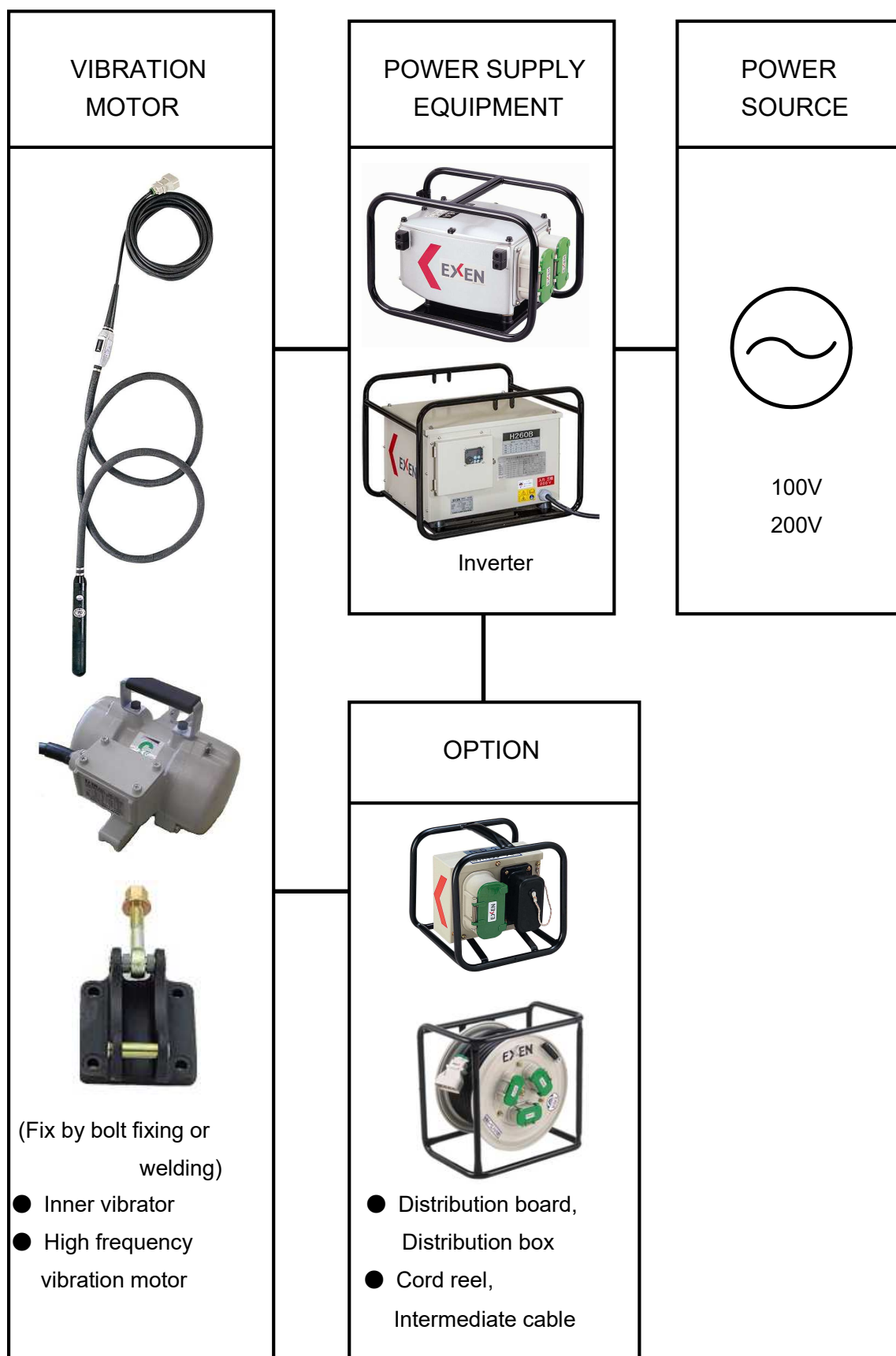
Note : Set the current setting of the overcurrent protection device within the range of 100 to 120% of the rated current value.

- Grab a handle when transporting this product. Never hang or pull a cable. Otherwise, it may lead to cable disconnection and unusable operation.

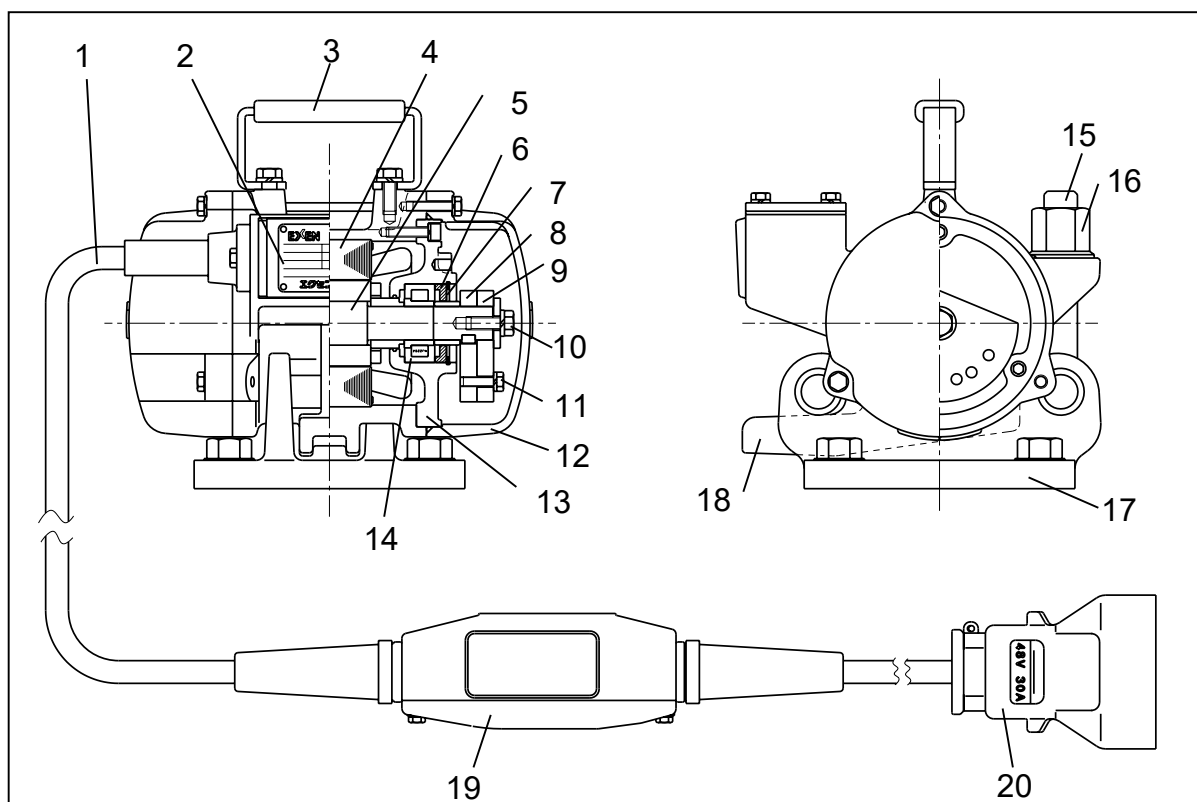
○ NUMBER OF VIBRATION MOTOR UNITS THAT CAN USE

Power supply equipment model		Hook-type high-frequency vibration motor	
		HKM55LFA (SA)	HKM75LFA (SA)
Inverter	HC111B (RC)	—	—
	HC113B	—	—
	HC116B	1	1
	HC230A/B	2	2
	H260B	5	4

○ SYSTEM CONFIGURATION



○ NAMES OF PARTS



1	Cable	11	Adjustment bolt M6
2	Nameplate	12	Side cover
3	Manage	13	Bearing case
4	Stator	14	Bearing
5	Rotor	15	Motor fixation bolt
6	Oil stop washer	16	Flange nut M20 Hook base switch
7	Snap ring	17	Hook base
8	Fix weight	18	Motor hook
9	Adjustment weight	19	Switch
10	Fixed bolt M8	20	Plug

Note : HKM55/75LFA : There is no switch.

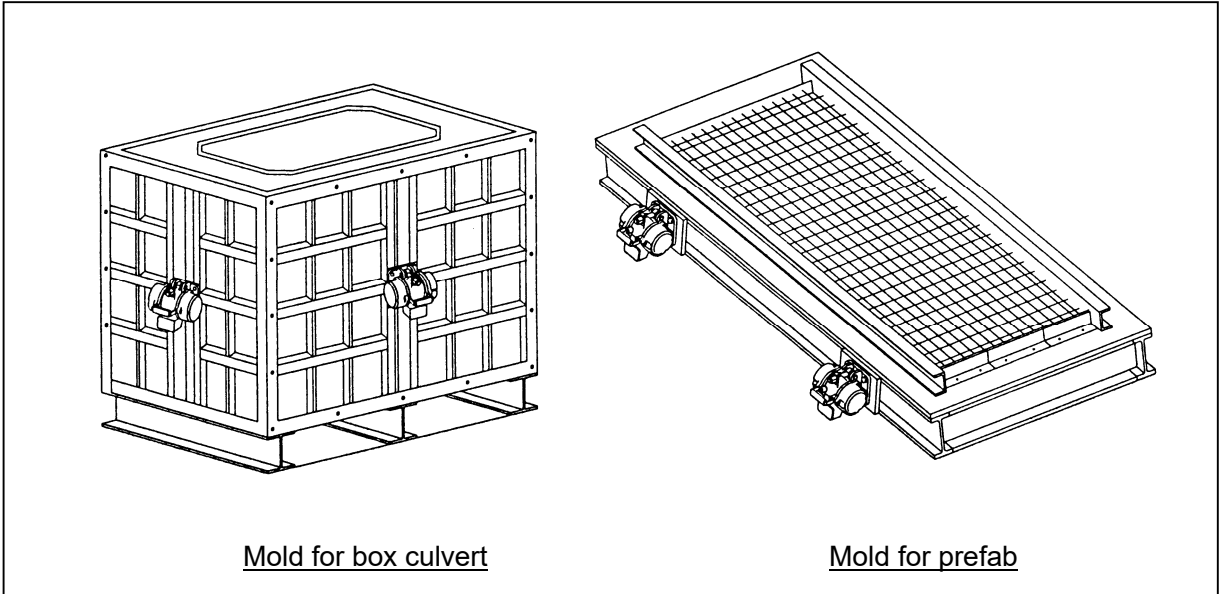
HKM55/75LFSA : There is a switch.

The hook base assembly is optional.

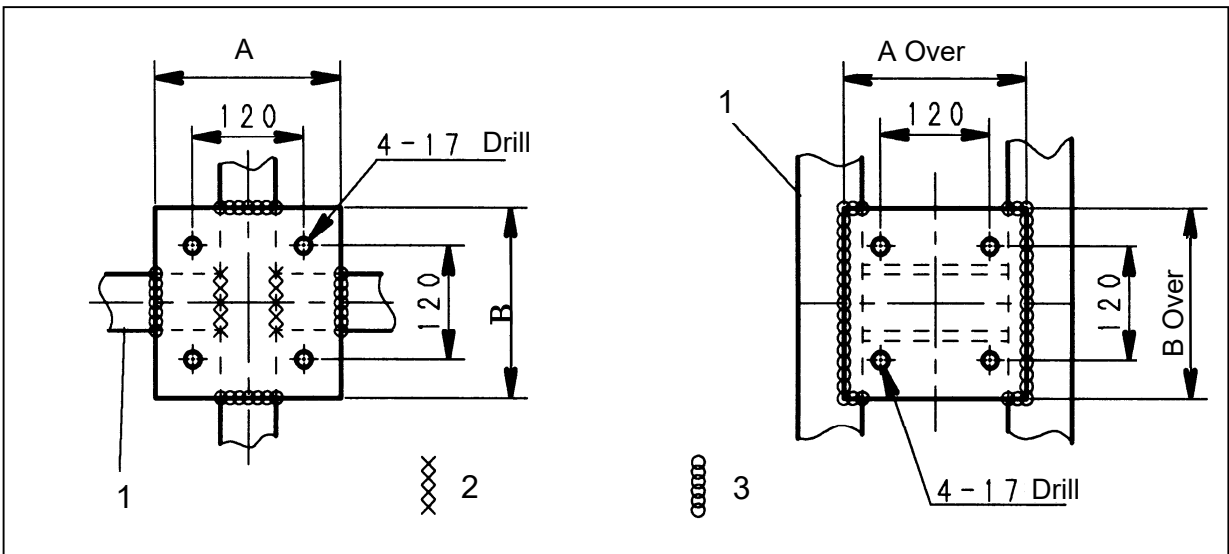
○ INSTALLATION

⚠ When installing this product, be sure to disconnect the plug from the power supply equipment.

■ Basic installation (Attach steel plate to mold)



- Prepare steel plate, ($A \times B \times$ thickness 12 mm) according to the mold rib.
(A, B dimensions shall be 200mm or more.)
- Please prepare rib, in order to prevent resonance and irregular vibration, when B size is long.

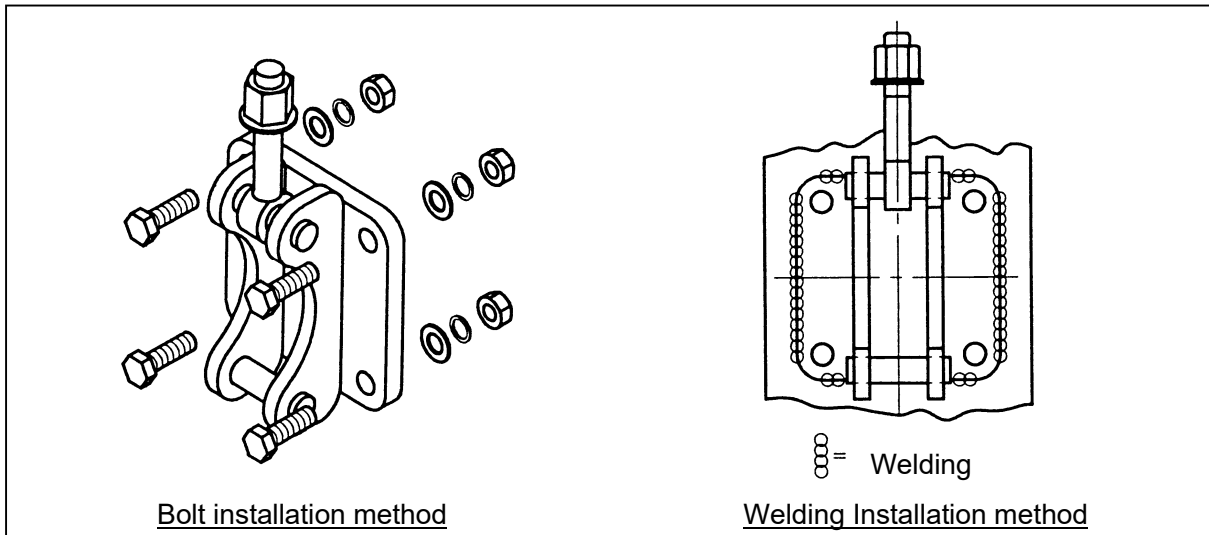


1. Molding flask 2. Grinder 3. Welding

■ In case attach hook base to formwork

(Install the hook base on the steel plate attached to the formwork.)

- There are two methods of hook base installation bolted installation and welded installation.



- ⚠ When bolting the hook base to the formwork, use high-tensile bolts and securely secure with flat washers, spring washers, and nuts. If the installation is insufficient, the bolts may loosen and fall.
- ⚠ If at least one attachment bolt loosens when installing hook base with bolt, there is a possibility of motor falling and causing an unexpected accident. Refer to table —1 for the size and tightening torque of attachment bolt.
- ⚠ When installing by welding, be sure to weld only straight lines, leaving the corners intact.
If the welding is not even or there is little welding penetration, cracks may occur and the product may fall.
- ⚠ When installing the hook base to formwork, please fix certainly to become neither resonance nor irregular vibration. There is a possibility that the bolt may loosen or the welding may be damaged by resonance or irregular vibration.

< Tabel-1 >

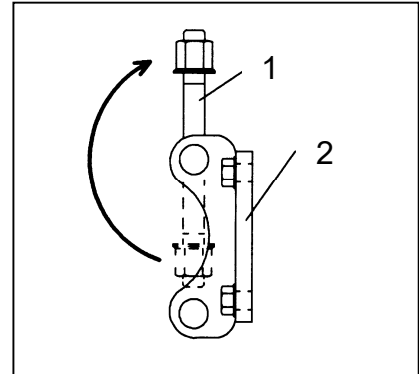
High-tensile strength bolt (Strength type 10.9)

Mounting hole diameter QTY × Diameter (mm)	Attachment bolt (mm)	Tightening torque (N·m)
4 × ϕ 17	16	270

■ In case attach vibration motor to hook base

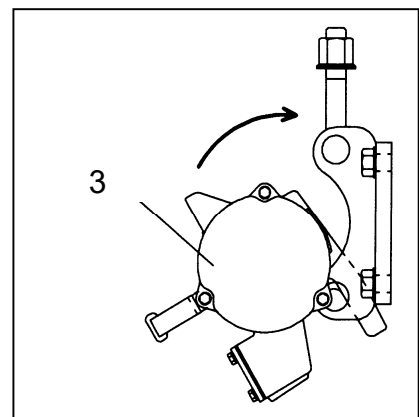
 **Ensure that the hook base is securely attached to the formwork and install the vibration motor according to the following procedure. In addition, we recommend the use of safety hooks or similar devices to improve safety against falling.**

1. Pull up the motor fixing bolt.



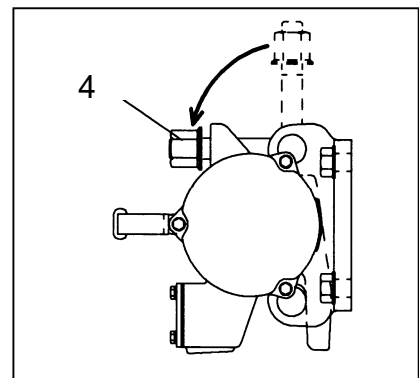
- ▶ 1. Motor fixed bolt
- 2. Hook base

2. Insert the hook of the motor into the hook base, and lift the motor using the hook as a fulcrum.



- ▶ 3. Motor

3. The motor fixation bolt is dropped to the bolt ditch.



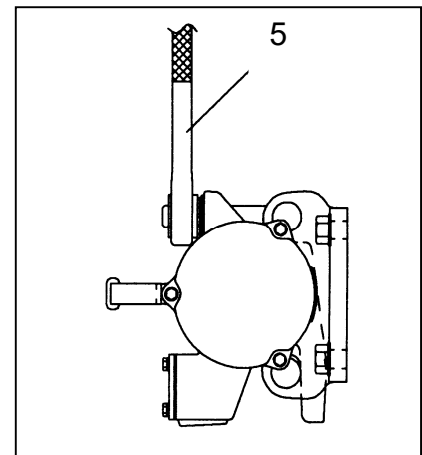
- ▶ 4. Flange nut M20

4. Tighten the flange nut M20 securely with a ratchet.

Tightening torque: 186-284N · m

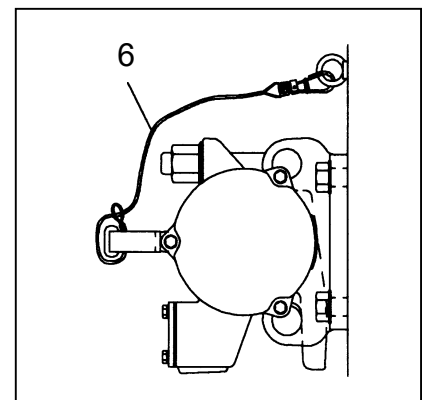
Note: Tighten firmly by hand using a commercially available ratchet wrench.

Tightening torque of approx. 186 N · m.



▶ 5. Ratchet

5. Furthermore, we recommend you to use a safe hook etc.to improve safety.



▶ 6. Safety hook

○ WEIGHT ADJUSTMENT

⚠ Before adjusting the centrifugal force of the weights, be sure to disconnect the plug from the power socket.

The eccentric weights of this product are set to the position of mark "C" at the time of delivery. When adjustment is required, please adjust according to the following procedure.

1. Remove the both side covers.
2. Remove the adjustment bolt M6.
3. Loosen weight fixed bolts M8 of rotor shaft ends till the eccentric weights rotate.
4. Align the adjustment weight with the engraved position to be adjusted and secure it with the M6 bolt.

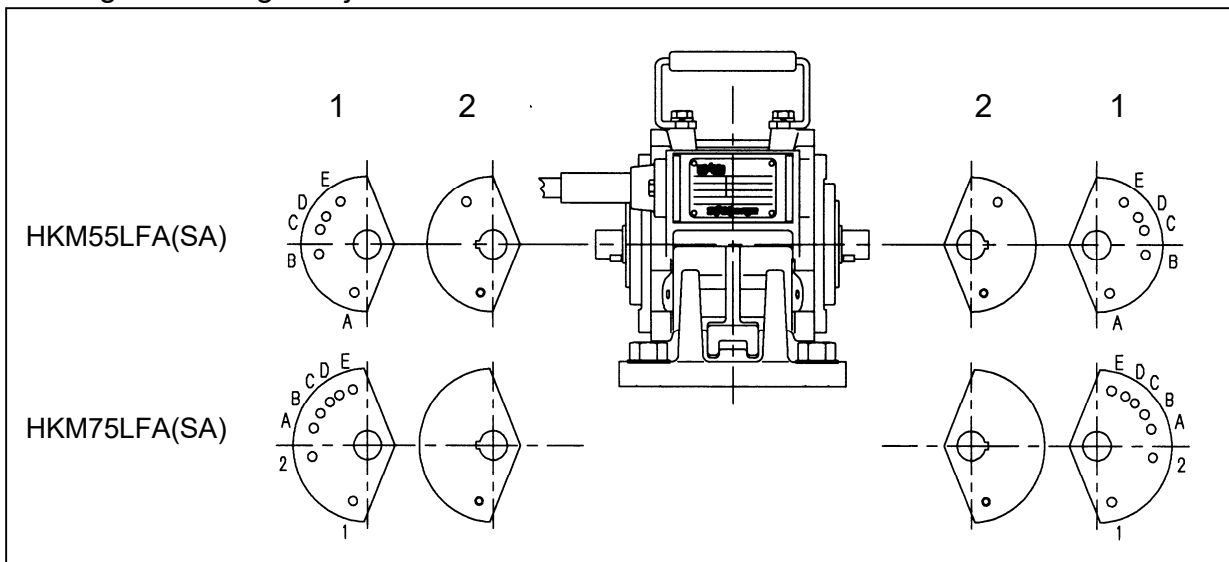
Note : Marking symbol

• 55LFA(SA) = A · B · C · D · E

• 75LFA(SA) = 1 · 2 · A · B · C · D · E

5. After adjustment, visually check that the weight angles at both ends are identical and symmetrical.
6. Fix eccentric weights with the weight fixed bolts M8 of rotor shaft ends.
7. Attach a side cover.

■ Figure of weight adjustment reference



Note : Depending on a power supply frequency, there is a carved mark position of the weight performing the ban on use.

Please refer to 15 pages of "FREQUENCY, VIBRATION, CENTRIFUGAL FORCE AND THEIR RELATION."

○ FREQUENCY, VIBRATION, CENTRIFUGAL FORCE AND THEIR RELATION

■ HKM55LFA (SA) type centrifugal force adjustment table

Unit : kN

Cycle (Hz)		100	110	120	130	140	150	160	170	180	190	200	210	220	230	240
Frequency (Hz)		50	55	60	65	70	75	80	85	90	95	100	105	110	115	120
Mark	A	1.96	2.37	2.82	3.31	3.84	4.41	5.02	5.67	6.36	7.08	7.85	8.65	9.49	10.4	11.3
	B	1.66	2.01	2.40	2.81	3.26	3.74	4.26	4.81	5.39	6.00	6.65	7.34	8.05	8.80	9.58
	C	1.36	1.65	1.96	2.30	2.67	3.07	3.49	3.94	4.41	4.92	5.45	6.01	6.59	7.21	7.85
	D	1.15	1.40	1.66	1.95	2.26	2.59	2.95	3.33	3.74	4.16	4.61	5.08	5.58	6.10	6.64
	E	0.80	0.97	1.15	1.35	1.56	1.80	2.04	2.31	2.58	2.88	3.19	3.52	3.86	4.22	4.60

Unavailable

■ HKM75LFA (SA) type centrifugal force adjustment table

Unit : kN

Cycle (Hz)		100	110	120	130	140	150	160	170	180	190	200	210	220	230	240
Frequency (Hz)		50	55	60	65	70	75	80	85	90	95	100	105	110	115	120
Mark	1	2.89	3.50	4.17	4.89	5.67	6.51	7.40	8.36	9.37	10.4	11.6	12.8	14.0	15.3	16.7
	2	2.45	2.97	3.53	4.15	4.81	5.52	6.28	7.09	7.95	8.86	9.81	10.8	11.9	13.0	14.1
	A	2.01	2.43	2.89	3.40	3.94	4.52	5.14	5.81	6.51	7.25	8.04	8.86	9.73	10.6	11.6
	B	1.70	2.06	2.45	2.87	3.33	3.83	4.35	4.91	5.51	6.14	6.80	7.50	8.23	8.99	9.79
	C	1.38	1.67	1.99	2.33	2.71	3.11	3.53	3.99	4.47	4.98	5.52	6.09	6.68	7.30	7.95
	D	1.11	1.34	1.59	1.87	2.17	2.49	2.83	3.20	3.59	4.00	4.43	4.88	5.36	5.86	6.38
	E	0.75	0.91	1.08	1.27	1.47	1.68	1.92	2.16	2.43	2.70	2.99	3.30	3.62	3.96	4.31

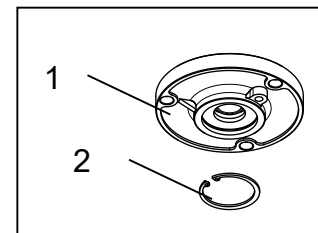
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○ HOW TO REPLACE BEARINGS

 **Before replacing the bearings, be sure to disconnect the plug from the power socket, remove the motor from the installation part, and place it on a workbench for task. Otherwise, you may get an electric shock or injury.**

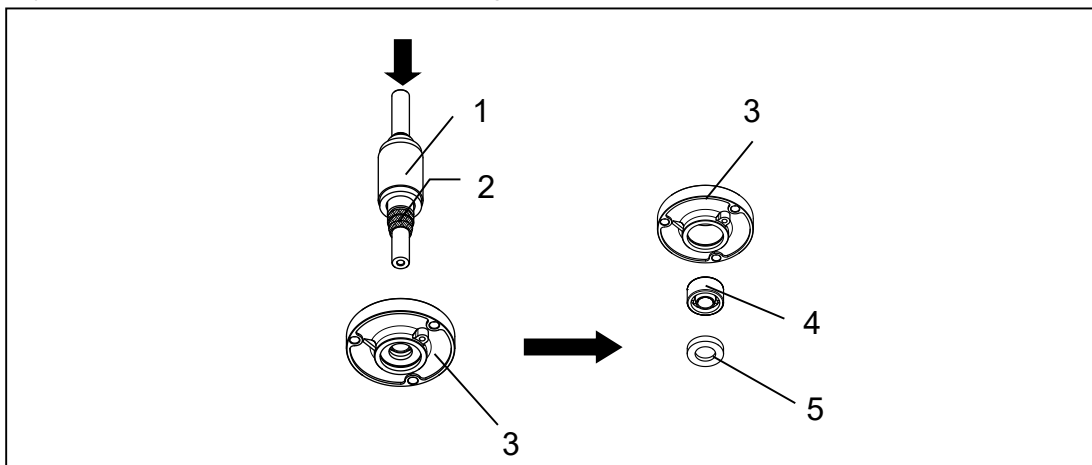
■ Bearing replacement procedure

1. Loosen the side cover bolts on both sides and remove the side covers.
2. Remove weight fixed bolts M8 and washers of rotor ends.
3. Loosen adjustment bolts M6 of both eccentric weights, and remove fixed weights, adjustment weights, and keys.
4. Remove the bolts of the bearing cases.
5. Pound on the rotor shaft with a rubber hammer and remove the bearing cases.
Similarly, remove the bearing case of another side.
6. Remove snap ring.



- ▶ 1. Bearing case
2. Snap ring

Turn oil stop washer side of the bearing case downward, press oil stop washer and bearing by the bearing inner-ring of the rotor from top, and remove them. In the same way, remove oil stop washer and bearing of another side.



- ▶ 1. Rotor 2. Bearing inner-ring 3. Bearing case 4. Bearing 5. Oil stop washer

7. Pull out the inner ring of the bearing attached to the both sides of the rotor shaft.

8. Please fill up the roller part of a new bearing with grease.

Note : Refer to "About grease filling" for the designated grease and the amount.(18 pages)

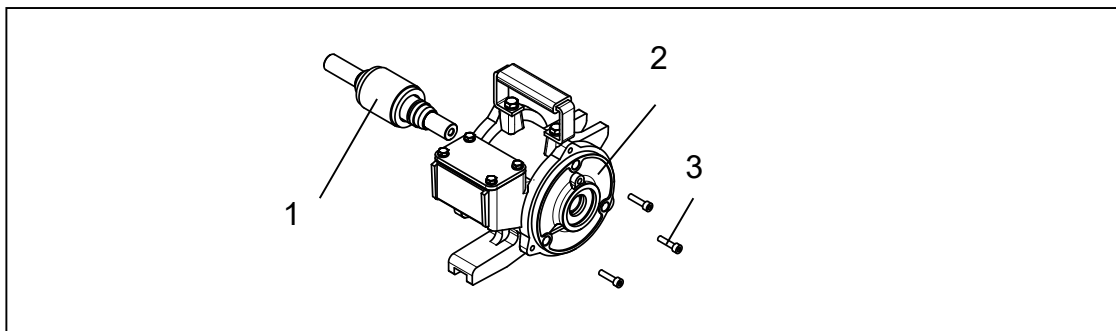
9. Replace old bearing with new one.

Note : Please use a fixture not to attach a wounds to bearing in the case of the exchange.

10. Attach the oil catch washers.

Note : Attach the snap rings and prevent slip.

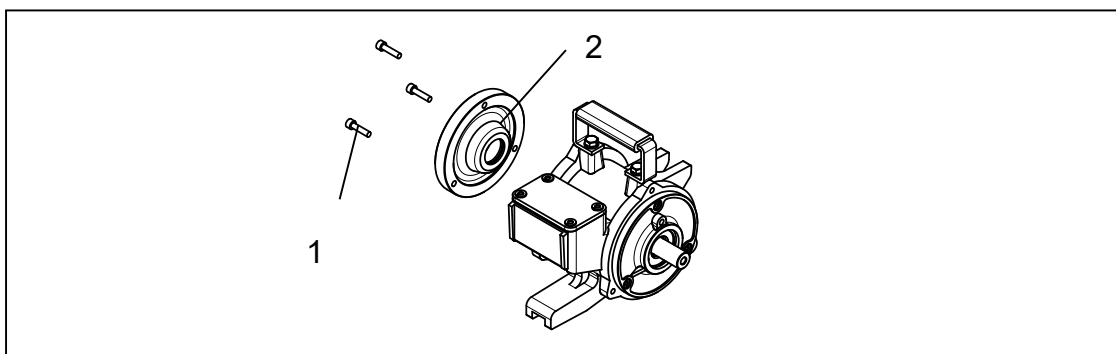
11. Press in bearing case in one side of the body, attach with bolts, and insert rotor.



▶ 1. Rotor 2. Bearing case 3. Bolt

12. Press in another bearing case and attach in the opposite side with bolts.

Note : Please check that the rotor turns simply with a finger.



▶ 1. Bolt 2. Bearing case

13. Insert key in rotor ends and attach fixed weight.

14. Attach adjusting weight, select centrifugal force, and fix adjusting weight and fix weight with bolt M6.

Note : For adjustment of weight, see the "WEIGHT ADJUSTMENT" (Page 14).

Note : Please check that weights are symmetrical.

15. Attach washer and the weight fixed bolt M8 in the both ends of the rotor.
16. Replace the side covers and secure with bolts.
17. Tighten bolts on the side covers.

■ Bearing replacement period

If the motor overheats or abnormal noise (such as metal noise) occurs during operation of this product, it is considered at the end of a bearing product's life. Disassemble the body and replace the old bearing with new one. Although the calculation life of a bearing is 500 hours or more with the maximum centrifugal force, it changes with operating conditions such as weight angle, machine used, and on-site environment.

■ About grease filling

The refueling mechanism of grease has not been installed.

Please fill grease when you replace a bearing.

Model	Bearing part number	Designated grease	Amount of grease at the time of bearing replacement (g)
HKM55LFA(SA)	NJ2204ET2XC3	G1—3 (The ORE-LUBE corp. Japan)	6
HKM75LFA(SA)	NJ2205ET2XC3		9

Note : Filling indication : The space of a bearing outside roller is buried.

○ TRIAL OPERATION

- Be sure to confirm that it is not resonating.

1. Does the current of the motor exceed the rated current during operation?
2. Does it emit any irregular sounds such as bearing sounds or metal sounds?
3. Does the flange nut loosen and is not the motor shaking?

Note : If any of the above apply, it is resonating. Take the following measures.
--

- Resonance measures

1. Adjust the centrifugal force.
To avoid resonance, lower the centrifugal force. (See "Adjusting the Weights.")
2. Reinforce the motor mounting part, if necessary by welding, adding a stiffening rib or increasing plate thickness.
3. Reinforce the resonating part of the machine.

○ CLEANING AFTER USE

- After use, be sure to clean it well.
 - 1. Remove concrete from the unit, cable or switch before it hardens
 - 2. Clean any filth or dirt off the unit, cables and/or switch.

○ INSPECTION

- Be sure to check the following items before and after use. The inspection is in order to reduce the trouble during use as much as possible.
 - 1. Does it emit any irregular sounds such as bearing sounds or metal sounds?
 - 2. Is the operation sound normal?
 - 3. Does the current value exceed the rated current value?
 - 4. Can the switch be turn "ON and/or OFF"?
 - 5. Are bolts and nuts loose?
 - 6. Are there wear, cracks and scratches on cables?
 - 7. Is the insulation resistance value correct?
(DC500V, 10MΩ or more)

○ TROUBLESHOOTING

Phenomenon	Cause	Solution
Motor does not start	Single phase operation	Replacement of stator or cable
	Disconnection	Disconnection of connecting part
Protective device is activated	Wrong setting in protective device	Set to rated current 100 to 120%
	Poor installation	Tighten bolts. Resolve deformation of installation surface
	Overload	Reduce load or adjusting centrifugal force
	Bearing failure	Bearing replacement
	Distortion of installation surface	Correct distortion
	Improper fitting	Replace the bearings or bearing cases
Abnormal heat of main unit	Damage or lack of lubrication	Bearing replacement
	Open phase	Repair or replace the stator or cables
Vibration is weak	Unbalance of left and right weights	Left and right balance adjustment (bilateral symmetry)

○ SPECIFICATIONS

■ Specification

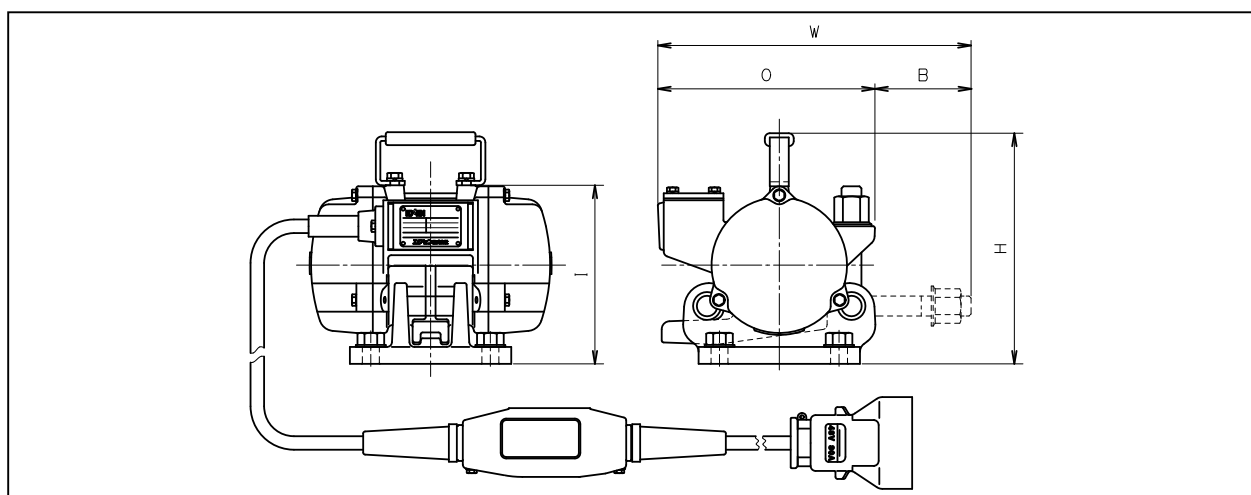
Model	Output (W)	Voltage (V)	Current (A)	Inter mediate switch	Cycle (Hz)	Frequency (Hz)	Centrifugal force (kN)	Mass (kg)
HKM55LFA	550	48	12.5	No	100~240	50~120	8.80	16.5
HKM55LFSA				Yes				17.5
HKM75LFA	750		17.0	No	100~240	50~120	11.6	21.3
HKM75LFSA				Yes				22.3

■ Dimensions (with hook base)

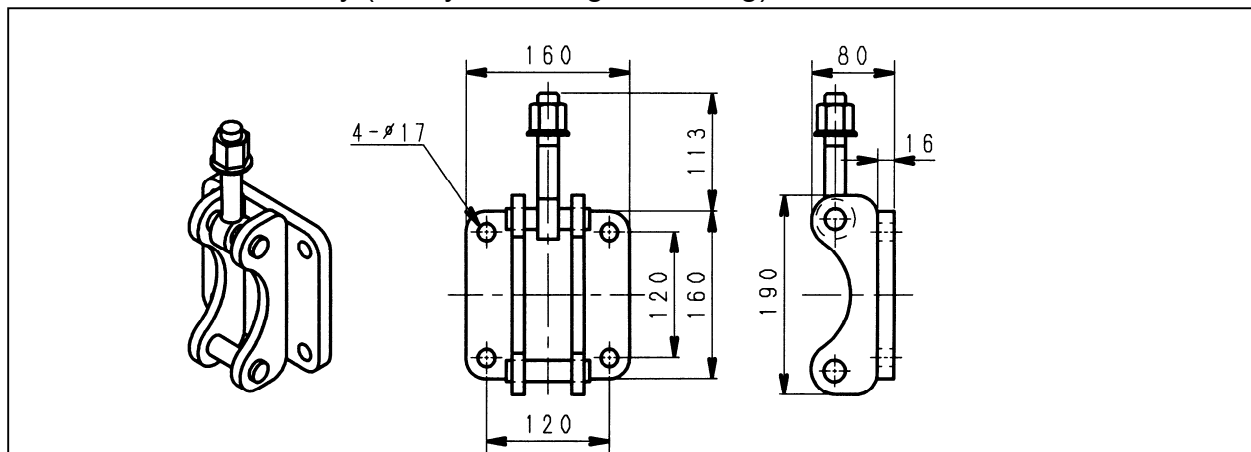
Unit : mm

Model	H	I	O	B	W
HKM55LFA (SA)	235	181	218	96	314
HKM75LFA (SA)	238	194	213	96	309

■ Dimensional drawing(with hook base)



■ Hook base assembly (Fix by bolt fixing or welding)



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