TÜV PRODUCT SERVICE Quality system certified to EN ISO 9001

INSTRUCTION MANUAL

for

URAS VIBRATOR

KEE-16-2BW	to	KEE-40-2W	(2 pole models)
KEE-17-4BW	to	KEE-110-4W	(4 pole models)
KEE-24-6CW	to	KEE-185-6W	(6 pole models)
KEE-32-8W	to	KEE-170-8BW	(8 pole models)

Please furnish this manual to the END-Users

If the model name does not have “W” at the end then it is for indoor use only.

W is a marker signifying the model is for use outdoors in all weather conditions. Models without the W marker are exclusively for use indoors.

Manufacturer

MURAKAMI SEIKI MFG. CO., LTD.

Sole Agent

URAS TECHNO CO., LTD.

TO OUR CUSTOMER

We thank you for your selection of our Uras Vibrator.
This is a rotary type electric vibrator which produces vibrations by means of centrifugal force of the rotating unbalance weights mounted at both ends of the rotor shaft. The Vibrator is basically different from an ordinary electric motor.

As special care has been taken by the manufacturer in the manufacturing process, the Vibrator should be capable of satisfactory, efficient operation when it is properly used. This manual has been prepared in order to give you sufficient awareness of the vibrators installation, handling, adjustment and maintenance, because without such awareness the vibrator will not be able to perform at its full potential and also its service life will be shortened. During storage,make the following inspection and maintenance every 5 months.

- The Vibrator should be hand-rotated a number of times to prevent the bearings from rusting. If power is available, running it for about 5 minutes with no load is preferable.
- Check coil insulation resistance. 3 MΩ or above is satisfactory. Please read this manual thoroughly before you use the Vibrator.

Thank you

Manufacturer:
MURAKAMI SEIKI MFG. CO., LTD.
—Kitakyushu, Japan

Sole Agent:
URAS TECHNO CO., LTD.
—Kitakyushu, Japan

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Installation and Operating Environment
Ambient(including installation base)temperature : -15℃ to +40℃
Altitude : 1,000 m max.
Relative humidity : 85% max with no condensation

Removal notice
Take care not to catch or pull on the cable or cable gland when removing the Uras Vibrator from it's packaging, as it may be damaged.

1. Receiving

This unit has been put through severe testing at the factory before being shipped.

- Its nameplate rating meets your requirements.
- It has sustained without damage in the transit.
- Fastening bolts and screws are not loosened
- Connect the unit to power, with reference to section 4-3, "Wiring", in this manual and make a test run to see if it properly starts, runs and stops.

If any part of the unit is damaged or lost, or any defective conditions are found, notify us giving full details and nameplate data.

2. Storage

When Uras Vibrator is not installed immediately, it shall be stored in a clean, dry, indoor place. If the Uras Vibrator must be stored outdoors, it should be loosely covered with a tarpaulin, plastic cover or similar type of protective cloth to protect it from any precipitation, liquid, dirt, etc.

When the motor-driven vibrator must be stored for a long period of time (up to 2 years at most), ensure that the storage area is at ambient temperature (not less than +5℃) with a relative humidity of not more than 60%.

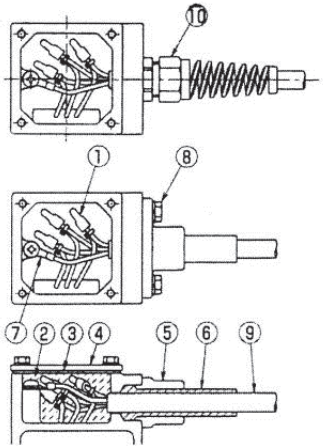
3. Construction

The grease-lubricated Uras series of vibrators are classified into four types on the basis of vibrating force. Table 1 lists the drawings to be referred to for each type of Uras vibrator.

Construction of Terminal box

Construction of terminal box is as follow.

The terminal box is filled with the Uras compound to protect the lead, and prevent from contact with the metal parts.



1	Crimp contact
2	Uras Compound
3	Rubber gasket
4	T-cover
5	Bell mouth
6	Protective tube
7	Grounding wiring
8	Bell mouth retaining bolt
9	Lead wire
10	Resin cable gland

Table 1

Type	Max. vibrating force N (kgf)	Motor power [kW]	Full-load current 50/60Hz [A]	Protection	Drawing
KEE- 16-2BW	16000 (1600)	1.2	4.6/4.7	IP55	Fig. 1
- 23-2BW	23000 (2300)	1.7	6.8/6.5	IP55	Fig. 1
- 30-2W	30000 (3000)	2.2	8.2/8.2	IP55	Fig. 1
- 40-2W	40000 (4000)	3.0	11/11.3	IP55	Fig. 1
KEE- 17-4BW	17000 (1700)	0.85	3.8/3.6	IP66	Fig. 2
- 24-4BW	24000 (2400)	1.1	4.9/4.5	IP66	Fig. 2
- 34-4W	34000 (3400)	1.5	6.1/6.0	IP66	Fig. 2
- 52-4BW	52000 (5200)	2.2	8.6/8.5	IP55	Fig. 3
- 75-4BW	75000 (7500)	3.7	14.3/14.3	IP55	Fig. 3
- 84-4CW	84000 (8400)	5.5	21/21	IP55	Fig. 3
-110-4W	110000 (11000)	7.5	29/28	IP55	Fig. 4
KEE- 24-6CW	24000 (2400)	1.6	8.0/7.2	IP66	Fig.2
- 34-6W	34000 (3400)	2.2	9.9/9.3	IP66	Fig.2
- 45-6BW	45000 (4500)	3.0	13.3/12.6	IP66	Fig. 3
- 60-6BW	60000 (6000)	3.7	16.2/15.4	IP66	Fig. 3
- 80-6CW	80000 (8000)	5.5	22/21	IP55	Fig. 3
-110-6BW	110000 (11000)	7.5	31/29	IP55	Fig. 4
-140-6W	140000 (14000)	9.0	39/37	IP55	Fig. 4
-165-6W	165000 (16500)	11.0	46/44	IP55	Fig. 4
-185-6W	185000 (18500)	13.0	51/50	IP55	Fig. 4
KEE- 32-8W - 35-8RW	32000 (3200) 35000 (3500)	2.2	11.9/10.7	IP66	Fig. 2
- 54-8BW -60-8BRW	54000 (5400) 60000 (6000)	3.7	18/16	IP66	Fig. 3
- 85-8W -100-8RW	85000 (8500) 100000 (10000)	6.0	36/32	IP55	Fig. 4
-110-8BW -125-8BRW	110000 (11000) 125000 (12500)	7.5	43/35	IP55	Fig. 4
-135-8BW -150-8BRW	135000 (13500) 150000 (15000)	9.0	43/39	IP55	Fig. 4
-170-8BW -185-8BRW	170000 (17000) 185000 (18500)	11.0	63/51	IP55	Fig. 4

Note: The entries in the full-load current column mentioned above are approximate and applied to the supply voltage 200V AC. When the power supply voltage is 400V AC, the full-load current is about half the values given in the table.

The eight-pole models, indicated by the letter R at the end of a code, are available only for a 60 Hz power supply.

※ IP-55, IP-66 specified by IEC, indicates the type of construction adopted for Uras vibrators, which protects the operator from the vibrator and prevents foreign matter or water from getting inside the vibrator.

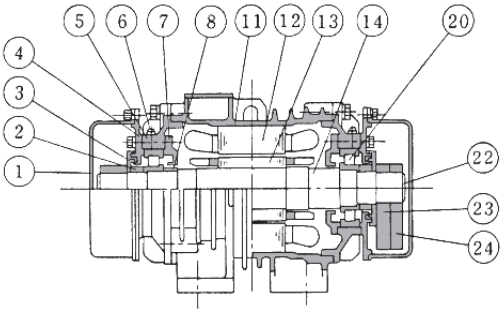


Fig. 1

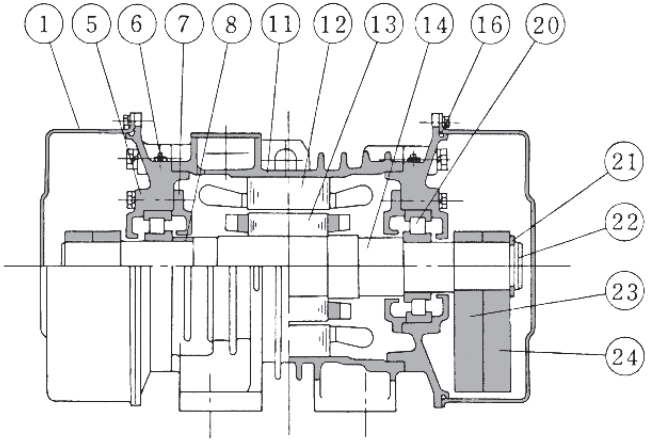


Fig. 2

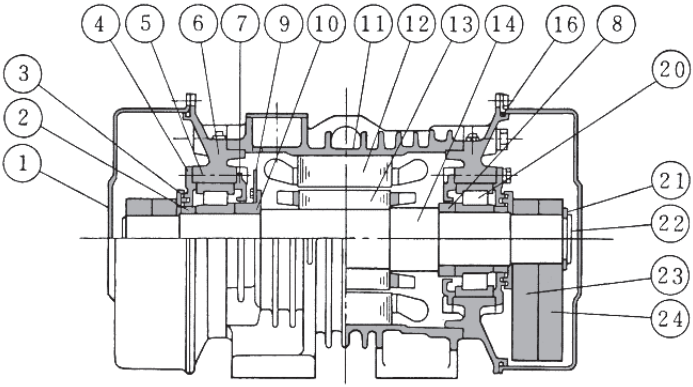


Fig. 3

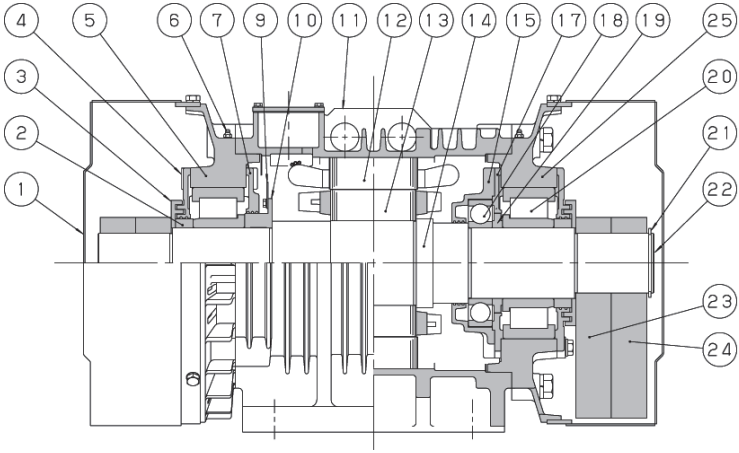


Fig. 4

Parts list

No.	Part name	No.	Part name
1	Weight cover	14	Shaft
2	Dust collar	15	Housing
3	Dust cover	16	Seal ring
4	Bearing cover	17	Thrust collar
5	Bracket	18	Ball bearing
6	Grease nipple	19	Distance collar
7	Bearing cover	20	Roller bearing
8	Collar	21	Snap ring
9	Grease stopper	22	Scale plate
10	Sleeve	23	Fixed weight
11	Frame	24	Adjustable weight
12	Stator core	25	Bracket
13	Rotor core		

3-1 Construction (Fig. 1,2 and 3)

The brackets ⑤ are tightly fitted into the frame ⑪. The outer and inner races of high-load (E or R type) roller bearings ⑳ are tightly fitted to the holes of brackets ⑤ and shaft ⑭,respectively. The roller bearings allow the Uras Vibrators to be easily disassembled and reassembled.

The roller bearings are lubricated with grease supplied through grease nipples ⑥.

The Uras vibrators shown in Fig. 1 are equipped with labyrinth packing to prevent foreign matter from getting inside the vibrators, allowing them to be cooled by ventilating air.

Fig. 2 and 3 shows the construction of the enclosed Uras vibrators which are equipped with seal ring ⑯ between brackets ⑤ and weight covers ① to prevent foreign matter from getting inside.

3-2 Construction (Fig. 4)

Brackets ⑤ are tightly fitted into the frame ⑪. Three bearing are used; two high-load (E type) roller bearings ⑳ and one ball bearing ⑱ are used to support radial force and thrust force, respectively. Even though the outer and inner races of the roller bearings ⑳ are tightly fitted into the holes of brackets ⑤ and shaft ⑭ respectively, the roller bearings allow the Uras Vibrators to be easily disassembled and reassembled. The inner race of the ball bearing ⑱ is tightly fitted to the shaft ⑭, while the outer race is loosely fitted inside the housing ⑮, keeping the outer race free from radial force.

This type has ventilating holes in the brackets ⑤ and weight covers ① to ventilate the vibrators. They are provided with labyrinth packing to prevent foreign matter from getting inside.

4. Installation and operation

When driving a 400V-class Uras Vibrator with an inverter, please install the following:

-suppression filter or reactor on the inverter OR,

-increased insulation class on the Uras Vibrator.

Damage and fire can be caused by the breakdown of the insulation.

4-1 Installation and retightening of screws.

The roughness of the surface of the equipment on which the vibrator is mounted should be below 25 S. Securely install the vibrator using flat and spring lock washers to prevent screws from loosening, because even one loose screw can cause an accident.

All securing screws should be retightened after the vibrator has been installed, because the initial tightening force will be reduced when the mounting base surface is broken in.

Retighten the securing screws once a week after the vibrator has gone into operation. Even if no loose screws are found when retightening, periodically check for looseness. When a vibrator is reinstalled, treat it as if it has been installed for the first time. Table 2 gives the tightening torque for securing screws.

Table 2

Type	Number of mounting holes × hole diameter (mm)	Mounting bolt	Tightening torque N・m (kgf・m)
KEE- 16-2BW - 23-2BW - 17-4BW - 24-4BW	4 × 26	M24	370 (37)
KEE- 30-2W - 34-4W - 24-6CW	4 × 33	M30	740 (74)
KEE- 40-2W - 52-4BW - 34-6W - 45-6BW - 32-8W	4 × 39	M36	1300 (130)
KEE-75-4BW - 84-4CW - 60-6BW - 80-6CW - 54-8BW	6 × 39	M36	1300 (130)
KEE-110-4W -110-6BW - 85-8W	6 × 45	M42	2100 (210)
KEE-140-6W -165-6W -185-6W -110-8BW -135-8BW -170-8BW	8 × 45	M42	2100 (210)

4-2 Mounting position.

When installing the vibrator at an angle or vertically, position it so that the side with the snap ring faces down.

The KEE-17-4BW and -24-4BW Uras vibrators can be installed at any position.

When installing a vibrator which has ventilating holes in weight covers ① outdoors, open a 10 mm diameter drainage hole at the bottom of the weight covers.

4-3 Wiring

Install the cable carefully so as not to bend it at the cable connection opening to a radius smaller than that indicated in Table 3 to prevent it from being damaged by any vibration which may be transferred from the vibrator.

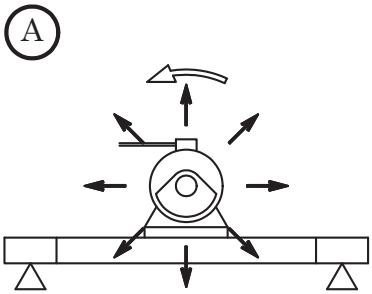
Clamp the cable on a stand insulated against vibration, leaving an extra cable length of 500 to 1,000 mm to let it vibrate freely with the rubber insulator, taking care not to let the cable come into contact with any devices.

Table 3

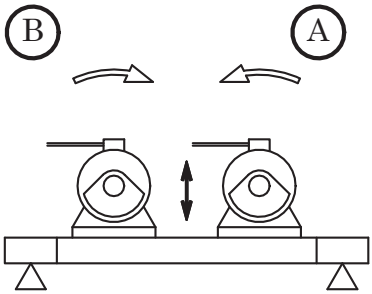
Type	Conductor sectional area and cable dia.	Min. bending radius [mm]
KEE- 16-2BW - 23-2BW - 17-4BW - 24-4BW	1.25mm² φ 11.5	100
KEE- 30-2W - 40-2W - 34-4W - 52-4BW - 24-6CW - 34-6W - 45-6BW - 32-8W	2.0mm² φ 14.4	145
KEE-75-4BW - 84-4CW - 60-6BW - 80-6CW - 54-8BW	5.5mm² φ 19.3	195
KEE-110-4W -110-6BW - 85-8W	8mm² φ 21.2	215
KEE-140-6W -165-6W -185-6W	14mm² φ 26.9 (200V～240V)	270
-110-8BW -135-8BW -170-8BW	8mm² φ 21.2 (380V～690V)	215

STANDARD

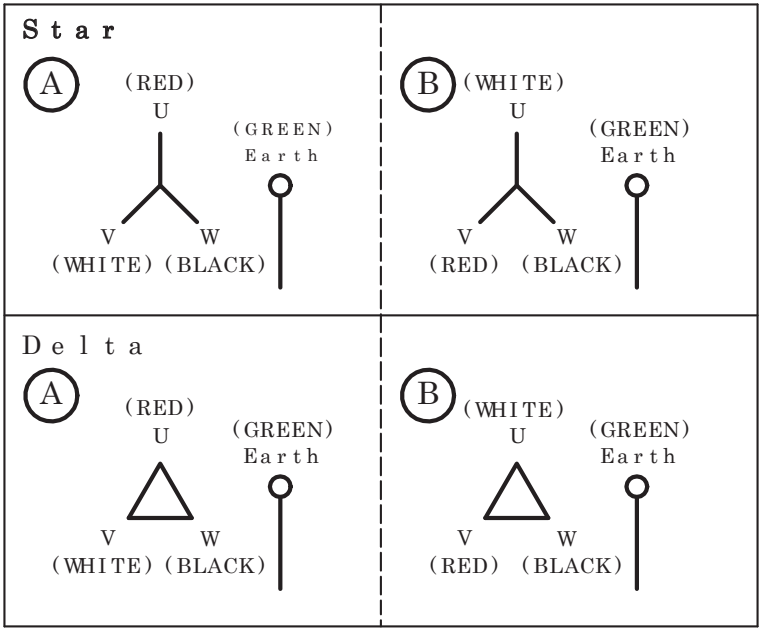
Connecting wires



Vibrating force directed in all directions through 360°, in rotational mode

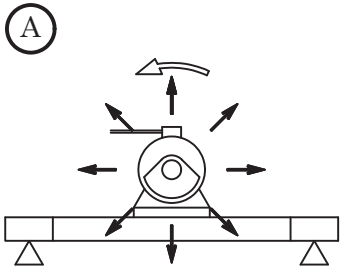


Vibrating force directed in all directions through 360°, in rotational mode

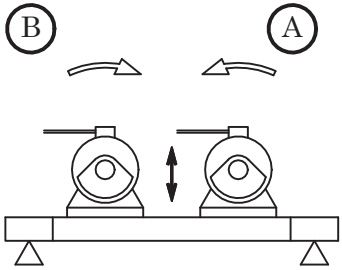


CSA

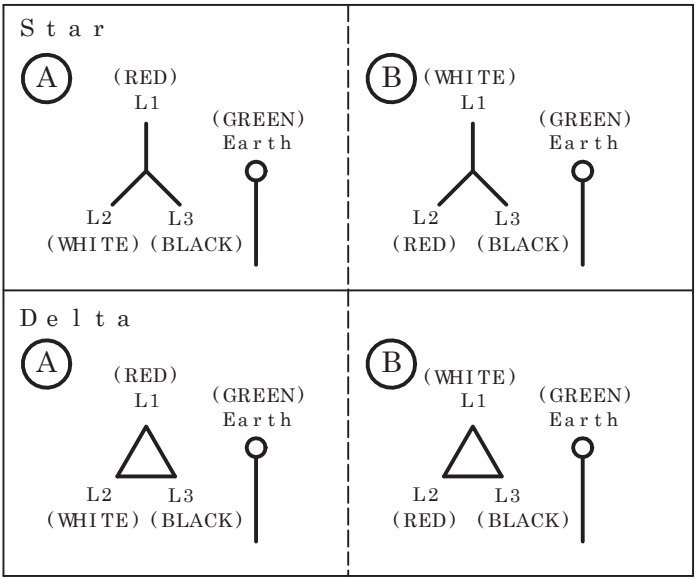
Connecting wires



Vibrating force directed in all directions through 360°, in rotational mode



Vibrating force directed in all directions through 360°, in rotational mode



4-4 Grounding

Ground the green wire, marked E, of the four-core cabtyre, which is connected to the vibrator body at the terminal box.

4-5 Precautions

When the vibrator is used for feeders or screens, the current supplied to the vibrator usually does not exceed the rated value because the effect of the spring constant and damper coefficient are negligible. However, the current may exceed the rated values depending on the application. In the latter event, adjust the position of the adjustable weights ㉔ to reduce the vibrating force and current below the rated value.

Install an electromagnet switch with a thermal relay to open the power supply circuit when excessive current is supplied to the vibrator.

Set the thermal relay tripping amperes to 100 % of the vibrator rated current.

4-6 Vibrating force adjustment

The vibrating force is adjusted to 40 % of the maximum vibrating force with a 50 Hz power supply at the factory.

It can be adjusted to any desired value by changing the position of the adjustable weights ㉔ at both ends of the shaft ⑭. Adjust the vibrating force in the following manner as required.

Loosen the adjustable-weight securing screw, then set the indication dot on the adjustable weight ㉔ to the desired graduation indicated on the scale plate ㉒.

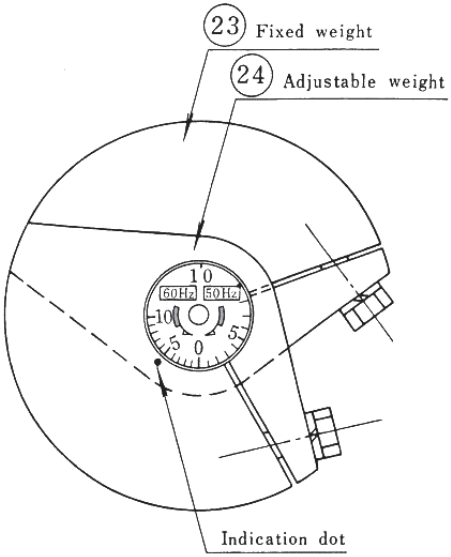


Fig. 5

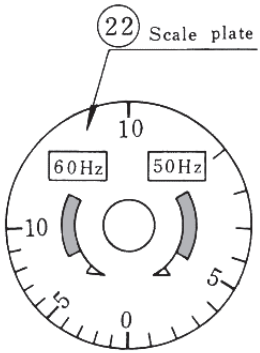


Fig. 6

As shown in Fig. 6, the scale plate ㉒ has 10 graduations, according to which the vibrating force can be adjusted for both 50 and 60 Hz power supplies.

Select the graduation according to the power supply frequency.

The larger the figure selected, the greater the vibrating force. Thus when the dot is positioned at figure 10, the maximum vibrating force is obtained.

After setting the dot to the desired graduation, tighten the adjustable-weight securing screw, taking care not to loosen the fixed weight securing screw.

Fig. 5 shows the dot set to 5 on the 60 Hz side, i.e., the vibrating force is adjusted to 50 % of the 60 Hz maximum vibrating force.

The scale plate ㉒ for eight-pole vibrators with a 60 Hz power supply has only graduations for a 60 Hz power supply, similar to the 50 Hz graduations shown in Fig. 6.

Table 4 shows the tightening torque for securing securing screws of the fixed ㉓ and adjustable weights ㉔.

Table 4

Type	Securing bolt	Tightening torque N・m
KEE-16-2B・KEE-23-2B	M10	40
KEE-30-2・KEE-40-2・KEE-17-4B・KEE-24-4B KEE34-4・KEE-52-4B・KEE-75-4B	M12	70
KEE-84-4C・KEE-110-4・KEE-24-6C・KEE-34-6 KEE45-6B・KEE-60-6B・KEE-80-6C・KEE-110-6B KEE-32-8・KEE-35-8R・KEE-54-8B・KEE-60-8BR・ KEE-85-8・KEE-100-8R	M16	170
KEE-140-6・KEE-165-6・KEE-185-6 KEE-110-8B・KEE-125-8R・KEE-135-8B	M20	340
KEE-170-8B・KEE-185-8BR	M24	600

Bolt material : Type 8.8

5. Supplementary explanation to insert adjustable weight

After overhaul, please install adjustable weights (herein after called "Weights") based on the following procedure. Also, please adjust the vibrating force in the same way. (Ref. photo1 to 4)

5-1 Weights and scale plates

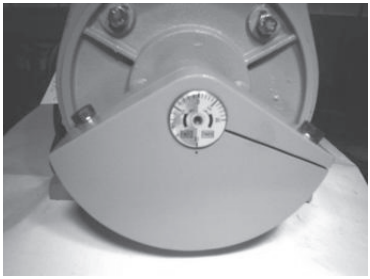
1) There are four weights in one unit : two fixed and two adjustable weights
2) Scale plates are on both ends of the shaft

5-2 Procedure to install weights

The vibrating force is adjusted to 40 % of the maximum vibrating force with a 50 Hz power supply.

5-2-1 「Photo-1」 attach weights

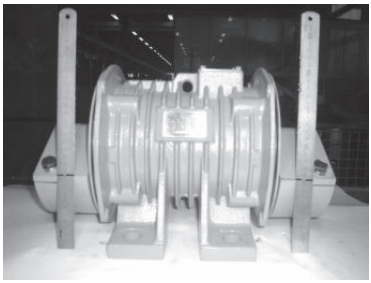
1) Attach a fixed weight and an adjustable weight on each side of the shaft.
2) Adjust the indicator of the adjustable weight to 10 on the 50 Hz side of scale plates on each side of the shaft and fix them by tightening the clamping bolt.
3) Align the fixed weights on each side with the adjustable weights, then fix them with the clamping bolts.
4) For tightening torque, please refer to table 4.



「Photo-1」
Installing the fixed and adjustable weights

5-2-2 「Photo-2」 Check the difference between the left and right weights

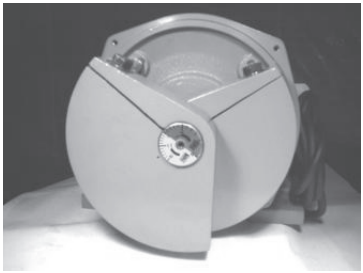
1) Check the height of the corners of the left and right weights on a horizontal board.
2) If there is a large difference, please repeat 2-1, 2, and readjust the weights.



「Photo-2」
Check the difference between weights

5-2-3 「Photo-3」 Set the vibrating force

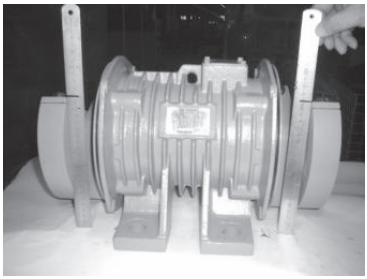
1) Loosen the bolts for the adjustable weights.
2) Set the adjustable weights to the same vibrating force. Photo 3 shows the vibrating force set for 60Hz at 80%.



「Photo-3」
ex. 60Hz 80% setting

5-2-4 「Photo-4」 Check the difference after securing vibrating force

1) After setting the vibrating force, please check if there is a difference between left and right.
2) When there is a difference, readjust the adjustable weight on one side to match the height of the adjustable weight on the other side.



「Photo-4」
Check the difference of the adjustable weights

6. Bearing lubrication and maintenance

The expected fatigue life of the bearing for 4, 6, and 8 pole vibrators is 10,000 hours, and 5,000 hours for 2 poles.

Shell Alvania Grease RA-J is applied to the bearing at the factory. Use Shell Alvania Grease RA-J or lithium soap grease No.2 as a substitute (See Table 5).

Apply the specified amount of grease to the bearings at the specified intervals through the grease nipples, using a grease gun, referring to Table 5.

One and a half to two grams of grease is supplied to the grease nipples by one squirt of a grease gun. Small amounts of grease should be applied at short intervals, because a large amount of grease applied at one time may increase resistance to movement, affecting not only the smooth operation and starting of the vibrator, but also causing excessive heat due to grease agitation, which accelerates grease deterioration.

Table 5 shows only the maximum amount of grease which can be applied at any one time and the corresponding intervals.

It is recommended that the customer reduce the amount of grease applied at one time and shorten the intervals accordingly.

For example, shortening the intervals to a half or a third the intervals shown in Table 5 reduces the amount of grease needed at one time to half or a third.

The service life of the grease and its resistance to movement after it has been applied extensively depends on the temperature of the grease. When the ambient temperature is low in winter, decrease the amount of grease as described below without changing the intervals shown in Table 5.

Ambient temperature : 0 to 10 ℃
Half the amount shown in Table 5

Ambient temperature : -10 to 0 ℃
One quarter the amount shown in Table 5

It is usually not necessary to clean the bearings except when an excessive amount of grease or the wrong grease has been applied to the bearings.

After the bearings have been cleaned or replaced, apply grease as directed in Table 5 and fill the bearing cover ④ and the grease groove in the housing ⑮.

Table 5

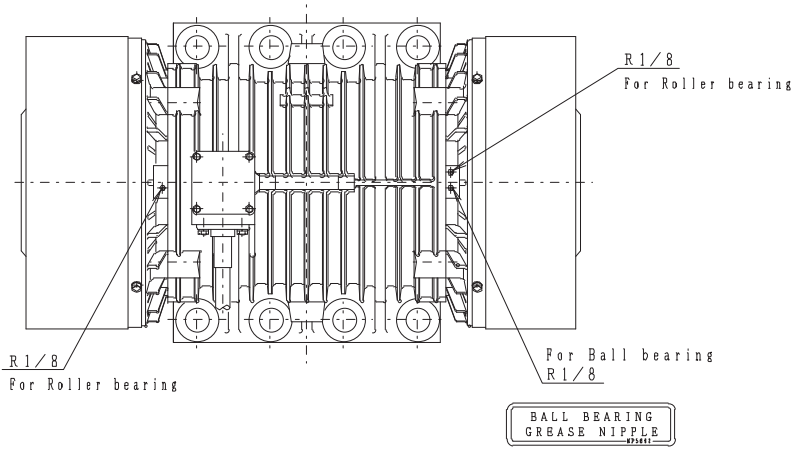
Type	Bearings (Q'ty×type)	Horizontal Installation		Slanted installation or Run over 10 hours continuously		Ambient temperature 0℃ ~ -20℃			Amount of grease applied at the factory (g)
		Amount of grease to be added per bearing (g)	Grease supply intervals (h)	Amount of grease to be added per bearing (g)	Grease supply intervals (h)	Amount of grease to be added per bearing (g)	Grease supply intervals (h)		
						0～－20℃	Horizontal	Slant or vertical	
KEE－16－2BW	2×NJ309EC3	12	750	6	375	4	750	375	25
－23－2BW	2×NJ310EC3	15	650	8	325	5	650	325	30
－30－2W	2×NJ312EC3	20	500	10	250	6	500	250	40
－40－2W	2×NJ313EC3	24	450	12	225	8	450	225	50
KEE－17－4BW	2×NJ309EC3	12	1300	6	650	4	1300	650	25
－24－4BW	2×NJ310EC3	15	1200	8	600	5	1200	600	30
－34－4W	2×NJ312EC3	20	1000	10	500	7	1000	500	40
－52－4BW	2×NJ2314EC3	35	950	18	475	12	950	475	65
－75－4BW	2×NJ2316EC3	50	800	25	400	16	800	400	90
－84－4CW	2×NJ2318EC3	50	600	25	300	16	600	300	110
－110－4W	2×NJ2320EC3	65	500	33	250	22	500	250	140
	1×6220	25		13		8			60
KEE－24－6CW	2×NJ310EC3	15	2000	8	1000	5	2000	1000	30
－34－6W	2×NJ312EC3	20	1800	10	900	6	1800	900	40
－45－6BW	2×NJ314EC3	26	1500	13	750	8	1500	750	55
－60－6BW	2×NJ316EC3	35	1350	18	675	12	1350	675	65
－80－6CW	2×NJ2318EC3	50	1200	25	600	16	1200	600	110
－110－6BW	2×NJ2320EC3	65	1050	33	525	22	1050	525	140
	1×6220	25		13		8			60
－140－6W	2×NJ2322EC3	80	950	40	475	27	950	475	175
	1×6222	30		15		10			80
－165－6W	2×NJ2324EC3	90	850	45	425	30	850	425	200
	1×6224	35		18		12			90
－185－6W	2×NJ2326EC3	105	700	53	350	35	700	350	250
	1×6226	40		20		13			100

Table 5 Continue

Type	Bearings (Q'ty×type)	Horizontal Installation		Slanted installation or Run over 10 hours continuously		Ambient temperature 0℃ ~ -20℃			Amount of grease applied at the factory (g)
		Amount of grease to be added per bearing (g)	Grease supply intervals (h)	Amount of grease to be added per bearing (g)	Grease supply intervals (h)	Amount of grease to be added per bearing (g)	Grease supply intervals (h)		
KEE−32−8W −35−8RW	2×NJ313EC3	24	2300	12	1150	8	2300	1150	50
−54−8BW −60−8BRW	2×NJ316EC3	35	2000	18	1000	12	2000	1000	65
− 85 −8W −100−8BRW	2×NJ2320EC3	65	1600	33	800	22	1600	800	140
	1×6220	25		13		8			60
−110−8BW −125−8BRW	2×NJ2322EC3	80	1400	40	700	27	1400	700	175
	1×6222	30		15		10			80
−135−8BW −150−8BRW	2×NJ2324EC3	90	1300	45	650	30	1300	650	200
	1×6224	35		18		12			90
−170−8BW −185−8BRW	2×NJ2326EC3	105	1200	53	600	35	1200	600	250
	1×6226	40		20		13			100

・Lubrication for the types of Construction Fig.4

KEE-110-4W、KEE-110-6W～KEE-185-6W、KEE-85-8W～KEE-185-8BRW



The above figure shows the positions of the grease nipples.

There is a nameplate indicating the grease nipple for ball bearing.

Table 6

Manufactures	Grease name
Shell Oil	Alvania Grease RA-J / Gadus S2 V100
Mobil Oil	Unirex N2

Note : The grease shown above should be used in the temperature range of
−10 ℃ to +100 ℃

7. Disassembly

7-1. Vibrator shown in Fig. 1

Fig.7 shows the disassembly of the vibrator of shown in Fig. 1. Follow the steps below when disassembling

(1) Loosen the screws securing the left and right weight cover ①, then remove the weight covers.

(2) Loosen the screws securing the fixed weights ㉓ and adjustable weight ㉔, then remove the two fixed and two adjustable weights.

(3) Loosen the counter - sunk screws securing dust cover ③, then remove the dust covers.

(4) Loosen the screws securing the bearing covers ④, then remove the bearing covers.

(5) Loosen the screws securing the bracket ⑤ to the frame ⑪, then remove it together with the outer race, the rollers of the roller bearings ⑳ by inserting two screws into the two tapped holes in the bracket ⑤.

(6) Remove the outer race and rollers of the roller bearings ⑳ from the bracket ⑤ using a metal disk with a slightly larger diameter than the inner dia. of the outer race, holding the outside of the bearing hole in the bracket.

(7) Hook the claws of a pulley puller to the inner race of the roller bearing ⑳, remove the inner race, then remove dust collar ② and bearing covers ⑦ from the shaft ⑭. Pour warm oil over the inner race so that it will expand, facilitating its removal.

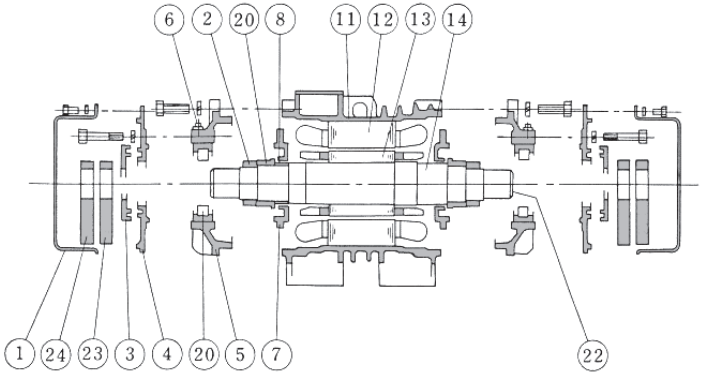


Fig. 7

7-2. Vibrator shown in Fig. 2

Fig.8 shows the disassembly of the vibrator shown in Fig. 2. Follow the steps below when disassembling.

(1) Loosen the screws securing the left and right weight covers ① and remove.

(2) Remove the snap ring ㉑ if provided.

Loosen the screws securing the two fixed ㉓ and two adjustable weights ㉔ and remove.

(3) Remove the screws securing the bearing covers ⑦.

(4) Loosen the screws securing the brackets ⑤ to the frame ⑪, then remove the brackets ⑤ together with the outer races and the rollers of the roller bearings ⑳ by inserting two screws into the two tapped holes in the brackets ⑤.

(5) Remove the outer races and rollers from the brackets ⑤ by inserting screws into the tapped holes in the brackets.

(6) Hook the claws of a pulley puller to the inner race of the roller bearings ⑳, remove the inner race, then remove the bearing covers ⑦ from the shaft ⑭. Pour warm oil over the inner race so that it will expand, facilitating its removal.

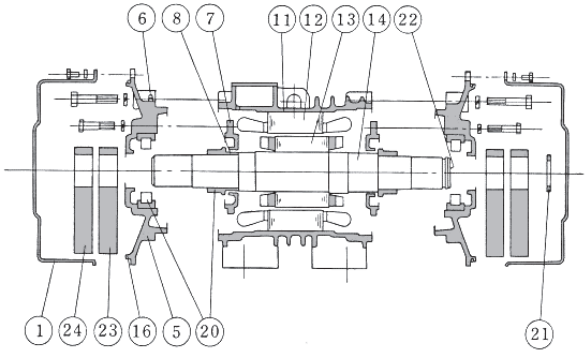


Fig. 8

7-3. Vibrator shown in Fig. 3

Fig. 9 shows a disassembly of the vibrator shown in Fig. 3.

Follow the steps below when disassembling.

(1) Loosen the screws securing the weight cover ①, then remove it.

(2) Loosen the screws securing the fixed ㉓ and adjustable weights ㉔, then remove both.

(3) Loosen the counter-sunk screws securing the dust cover ③, then remove it.

(4) Loosen the screws securing the bracket ⑤ to the frame ⑪, then remove it together with the outer race, the rollers of the roller bearings ⑳, and the bearing covers (④ and ⑦), by inserting two screws into the two tapped holes in the bracket ⑤.

(5) Loosen the screws securing the bearing covers (④ and ⑦), then remove the bearing covers from the bracket ⑤.

(6) Loosen the screws securing the grease stopper ⑨, then remove the grease stopper from the sleeve ⑩.

(7) Remove the outer race and rollers of the roller bearing ⑳ from the bracket ⑤ using a metal disk with a slightly larger diameter than the inner dia. of the outer race, holding the outside of the bearing hole in the bracket.

(8) Since the inner race is closely fitted to the shaft, warm the inner race to expand it using a burner, or by pouring warm oil over it when removing it from the shaft using a pulley puller.

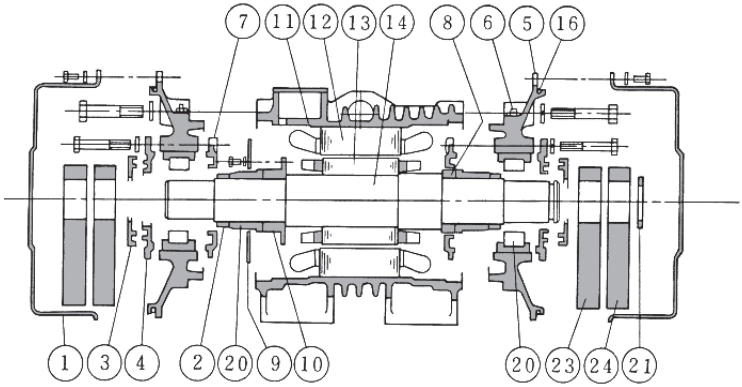


Fig. 9

7-4. Vibrator shown in Fig. 4

Fig. 10 shows a disassembly of the vibrator shown in Fig. 4.

Follow the steps below when disassembling.

Disassemble the vibrator starting from the side opposite the thrust portion, where only one grease nipple is provided.

(1) Loosen the screws securing the weight cover ①, then remove it.

(2) Loosen the screws securing the fixed ㉓ and adjustable weights ㉔, then remove both.

(3) Loosen the counter-sunk screws securing the dust cover ③, then remove it.

(4) Loosen the screws securing the bracket ⑤ to the frame ⑪, then remove it together with the outer race, the rollers of the roller bearings ⑳, and the bearing covers (④ and ⑦), by inserting two screws into the two tapped holes in the bracket ⑤.

(5) Loosen the screws securing the bearing covers (④ and ⑦), then remove the bearing covers from the bracket ⑤.

(6) Loosen the screws securing the grease stopper ⑨, then remove the grease stopper from the sleeve ⑩.

(7) Remove the outer race and rollers of the roller bearings ⑳ from the bracket ⑤ using a metal disk with a slightly larger diameter than the inner dia. of the outer race, holding the outside of the bearing hole in the bracket.

Disassemble the ball-bearing side where two grease nipples are provided in the following order.

(1) Loosen the screws securing the weight cover ①, then remove it.

(2) Remove the snap ring ㉑, then follow steps (2) and (3) for disassembling the opposite side of the ball bearing.

Loosen the screws securing the bracket ⑤ to the frame ⑪, then remove the bracket with the shaft ⑭ and other parts from the frame shown in the upper drawing of Fig. 10 using the tapped holes in the bracket.

(3) Loosen the screws securing the bearing cover ④ and thrust collar ⑰, then remove the bracket, bearing cover, thrust collar, and the outer race and rollers of the roller bearings ⑳ from the shaft ⑭, the dust collar ②, inner race of the roller bearings ⑳, distance collar ⑲, ball bearing ⑱, housing ⑮, rotor core ⑬ and sleeve ⑩ remaining on the shaft. The bearing cover and thrust collar are also removed from the bracket by the above operation.

(4) Remove the outer race and rollers of the roller bearing ⑳ from the bracket ⑨ in the same manner as step ⑦ for disassembling the opposite side of the ball bearing.

(5) Since the inner race is closely fitted to the shaft, warm the inner race to expand it using a burner, or by pouring warm oil over it, when removing it from the shaft using a pulley puller.

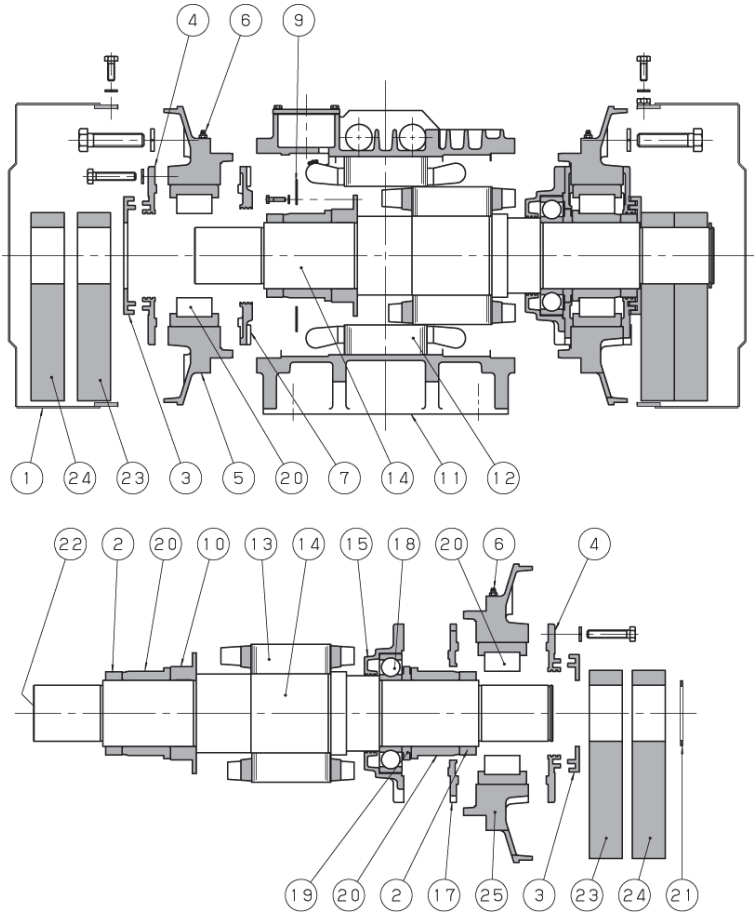

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Fig. 10

8. Reassembly

Reassemble the vibrator, reversing the steps for disassembly, observing the following precautions.

(1) Gradually press the outer race of the roller bearing ⑳ into the bracket ⑤ using a metal disk with a slightly smaller diameter than the outer dia. of the outer race, holding the outside of the bearing hole in the bracket.

(2) Attach bearing cover ⑦ to the shaft ⑭ before shrink fitting the inner race of the roller bearing ⑳ into the shaft when reassembling the vibrator types shown Fig. 1 or Fig. 2. Attach the housing ⑮ to shaft ⑭ before shrink fitting the ball bearing ⑱ to the shaft when reassembling the vibrator types as shown in Fig. 4.

(3) Uniformly warm the ball bearing ⑱, sleeve ⑩, distance collar ⑲, inner race of the roller bearing ⑳ and the dust collar ②, which should be shrink fitted into shaft ⑭, to 100 ℃ to 120 ℃ in an oil bath, then quickly attach them to the shaft ⑭ and leave them there until the temperature drops.

(4) Attach the bearing cover ⑦ to the bracket ⑤, taking care to align the grease grooves when reassembling the vibrator types shown in Fig. 1, 2 and 3.

When reassembling a vibrator of the type shown in Fig. 4, attach the bearing covers (④ and ⑦) to the bracket ⑤ on the opposite side of the ball bearing, and attach the bearing covers ④ thrust collar ⑰ and housing ⑮ to the bracket ⑤ on the ball bearing side, taking care to align the grease grooves.

(5) When pressing the bracket ⑤ into the frame ⑪, screw the studs into the tapped holes in the frame to align the bolt holes in the bracket and the tapped holes in the frame.

Insert the bracket into the frame using a press or by diagonally tightening the bracket securing screws one fourth of a turn each time, taking care not to damage the bearing.

9. Overhaul and Bearing Replacement Precautions

9-1 Bearing gap and roller bearing retainer

(1) While a ball bearing with a standard gap may be used for the vibrators of the type shown in Fig.4 to support the thrust force, the roller bearings must be of high-load (E) type, with a gap C3.

(2) Use a polyamide plastic or copper alloy retainer for the roller bearings to ensure they can withstand vibrating force at high speed. Never use a pressed retainers for the roller bearings.

(3) Since special roller bearings are used, contact our sales representatives when replacements are required.

9-2 Bearing Replacement precautions

(1) Extreme care must be taken not to damage the bearings as small flaws can adversely affect performance.

(2) Bearings are delivered coated in rust-preventing grease. While those with new rust-preventing grease may be used without removing the grease, hardened rust-preventing grease should be removed with thinner before use.

Never use a rusty bearing.

(3) Gradually insert the outer races of the roller bearings into the bracket ⑤ by pressing the outer races with a metal disk, or by tightening the screws. Never tap the bearings.

(4) When shrink fitting the inner races of the roller bearings ⑳ onto shaft ⑭, uniformly warm the inner races up to 120 ℃ in an oil bath, then quickly attach the inner races to the shaft and leave them until the temperature drops.

Shrink fit the collars ⑧ onto the shaft ⑭ in the same way the inner races are fitted.

9-3 Applying grease

(1) When the breaking-in process begins, if the grease does not spread enough, the rollers may come into direct contact with the inner and outer races of the roller bearings ⑳, damaging the roller bearings due to insufficient lubrication. Extreme care is required since it is difficult for the roller bearings to spread grease to the outer race and retainer.

Apply grease to the rollers, then rotate the rollers to spread the grease to the outer and inner races and the retainer.

(2) Put grease in the grooves of the bearing covers ⑦ shown in Fig. 1, 2 and 3, the grooves in the brackets ⑤ shown in Fig. 2 and the groove in the housing ⑮ shown in Fig. 4.

(3) Apply grease to the labyrinth packing of the bearing covers ④ shown in Fig. 1, 3 and 4. The grease functions as a dust seal.

9-4 Breaking-in

After reassembling the vibrator, rotate the shaft 60 to 70 turns by hand with the weights balanced to spread the grease to the inner and outer races, retainer and rollers.

Adjust the vibrating force to 20 % to 30 % of the maximum value, then break in the vibrator for one to three hours.

When breaking in the vibrator, suspend it by a spring, or put it on a used tire or a surface plate supported by an elastic material.

At the beginning of the breaking-in process, a current greater than the rated value may be supplied to the vibrator due to the resistance of the grease to spreading. The current will drop to about half the rated value in a short time.

Adjust the vibrating force to the desired value, then install the vibrator.

Running the vibrator with the vibrational force set to less than 20% may cause sliding contact within the bearings, leading to abnormal sound or premature failure of the bearings.

10. Periodical Inspection and Troubleshooting

10-1 Periodical inspection

Interval	Points to check	Procedures and criteria
Daily	Load current	The load current measured with an ammeter should be less than the rated value.
	Bearing noise	Check the bearing noise using a rod. Bearings should not generate intermittent or metallic noise.
Monthly	Loose screws	Check screws for looseness. Screws should be tightened to the specified torque.
	Cable	Visually inspect the cables, ensuring there is no damage.
Annually	Insulation resistance of stator coil	Insulation resistance across terminals of stator coil, measured with a megger, should be 5 MΩ (min.).

10-2 Troubleshooting

Problem	Causes	Inspection procedures	Remedial action
Vibrator won't start	① Two cables of the vibrator or two phases of the coil are broken	Measure the voltage drop across the two phases.	Replace the broken cables or rewind the coil.
The vibrator moans and does not accelerate	② Single phasing	Same as above and check cable for looseness.	Same as above or securely connect the cables.
	③ Ambient temperature is too low or there is an excessive amount of grease	Remove the weight covers ①, then rotate the shaft ⑭ 30 to 50 turns by hand.	Adjust the vibrating force to from 20 % to 30 % of the maximum value, then break in the vibrator.
Thermal relay is tripped	④ Ambient temperature is too low or there is an excessive amount of grease	Same as above.	Same as above.
	⑤ Vibrator takes too long to start. (This may be caused by ④ above)	Measure the time required for vibrator to start.	If the vibrator takes five seconds or more to activate with the thermal relay adjusted to 100 % of the rated current, replace the thermal relay with a slow-activation relay.
	⑥ Short circuit between phases of the coil	Compare the resistance between phases of the coil.	If there is a large difference in resistance between the phases of coils, replace the coils.
	⑦ Loose screws	Check screws for looseness.	Tighten screws.
	⑧ Abnormal vibration	Ensure that the vibrator rotates in the correct direction and that the vibrator body is free of defects.	Correct vibrator rotation direction or repair.
	⑨ Load is too large	Measure load current.	Decrease vibrating force.
	⑩ Damaged bearing	Rotate the shaft by hand and check that the bearings are not damaged.	Replace the bearing.
Abnormal bearing noise	⑪ Damaged raceway surface	Check bearing noise using a rod or bearing checker.	Replace the bearing.
Temperature of the vibrator body is too high	⑫ Ambient temperature is too high	Measure ambient temperature.	Decrease ambient temperature to a maximum of 40° .
	⑬ A lot of foreign matter has adhered to the vibrator	Check the condition of the foreign matter attached to the vibrator.	Carry out dust prevention measures.

11. Guarantee

Besides the provisions specified in the supply contract, the manufacturer guarantees the products for a period of 12(twelve) months from the date of delivery.

For the repaired products which have passed for 1 to 3 years after delivery, the manufacture guarantees for 3(three) months.

This guarantee solely covers free repair or replacement of those parts which, after having been carefully examined by the manufacturer's technical department, are recognized as being defective.

This guarantee excludes the following items.

The damage deriving from:

・negligence, carelessness, incorrect and improper use of the Uras Vibrator, incorrect handling by the operator and incorrect installation,

・natural disasters and

・repair, adjustment and modification performed by anyone except for the manufacturer or a designated service office.

Costs related to damages caused by the Uras Vibrator, including repair, part replacement, and construction work, are also excluded from this guarantee.

WARNING-for mounting motor on an angle or vertically

1. Models with Snap Rings

Note "**BOTTOM SIDE**" as per label on motor.

If motor is not positioned correctly, the adjustable weights may fall and cause injury or damage.

2. Models without Snap Rings

BEWARE when adjusting bottom weights as they may fall when loosened and cause injury or damage.

memo

The specifications listed in the user manual may change without notice due to product design revision.

Manufacturer

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