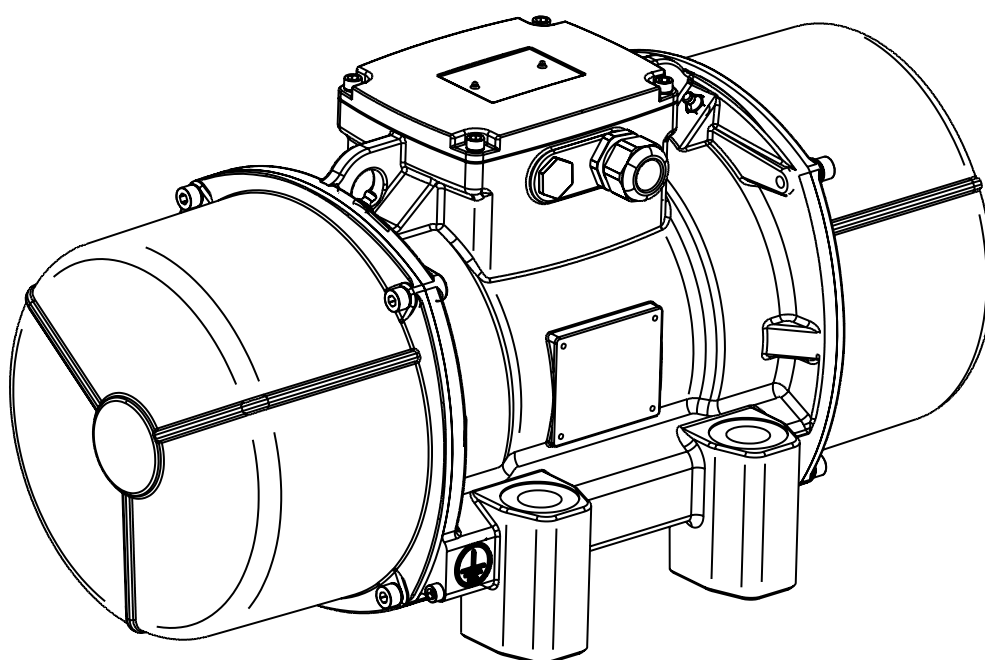




LOW FREQUENCY VIBRATION MOTOR EVSİ 3 SERIES OPERATION MANUAL



**EVSİ 3—100／200／300／500／700／800A
3—1100A／1600／2310／3200／4000**

EXEN CORPORATION

☆ SAFETY PRECAUTIONS

- ☆ This product is a vibration motor to be installed in a vibratory conveyor, shaking separator, or vibratory hopper. Do not use the vibration motor for any other purpose.
- ☆ 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.
- ☆ 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.

 WARNING

(To prevent death)

-  Do not use power supply that is not equipped with earth leakage circuit breaker to this product to prevent electric shock.
-  Be sure to connect the ground wire. Otherwise, you may get an electric shock.
-  Please do not use this product in explosive or corrosive environments, in the presence of flammable gases, locations subjected to splashing water, or near combustibles. Otherwise, it may cause a fire or injury.
-  Please turn off the power during blackout. Otherwise, at the time of power recovery, a motor may start suddenly and may cause injury and machine damage.
-  When you install it in high places, provide an anti-drop measure. Falling object may cause injury or damage.
-  In case of falling object, be sure to replace a wire for preventing drop even if there is no abnormality in appearance.

 CAUTION

(To prevent injury or damages)

-  Be sure to operate this product within the voltage specified in the nameplate. Applying a higher voltage may cause burnout of the motor. Burnout may lead to breaking of the insulator thus, electric shock.
-  This product vibrates.
When installing this product, select a position that does not resonate and install it securely.
-  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.
-  Be careful to adjust the centrifugal force of the motor installed at tilted place enough so that the weight does not fall.
-  Do not touch the motor for a while after driving or stopping operation. The high temperature of the motor surface causes burn.

○ INTRODUCTION

Thank you for purchasing the low 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 the product 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 and safety harness, before installing the vibration motor.



Safety helmet



Safety gloves



Safety boots



Safety harness

- Be sure to gain footholds in a safe environment when installing this product.
- Do not connect the cable wrongly. The green wire (E) is the ground wire. A wrong connection may cause an electric shock.
- When checking this product, be sure to disconnect the cable 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.
- This product reaches high temperature during operation. Be careful not to touch your hands or body carelessly.
- Do not operate the product without the side covers. It may cause a serious accident due to touching rotary parts.
- When adjusting eccentric weights, please turn off the power in advance. Otherwise, it may cause injury.
- When transporting this product, check its mass and use a hoisting attachment with a load rating of more than or equal to the mass. Otherwise, you may get injury by falling vibration motor.



CAUTION

(For longer service life)

- Be sure to install it firmly on the installation location to avoid sympathetic or irregular vibration when installing this product. Sympathetic or irregular vibration may cause loosening bolts or damaging the installation part.
- This product incorporates waterproof structure (IEC Standards IP66 equivalent.) However, do not pour water on it intentionally and do not operate it in water.

IP code	Type	Definition
IP66	Dust-tight	No ingress of dust
	Protected against water jets	Water projected from a nozzle against the enclosure from any direction shall have no harmful effect

- When transferring or loading this product onto the carrier of a car, be sure to use a hoist by using a wire and a shackle to hook the hanging hook at the top of the motor. Do not hang or pull this product with the cable. It may damage the cable.
- It is recommended to use an over-current protective device (with open-phase protection circuit) in order to automatically protect motor from over-current (larger than the rated current.)

Note : Set the current setting of the over-current protective device to the rated current value.

Note : When this product is used for a vibratory conveyor or shaking separator, the rated current is rarely exceeded. However, when it is used for a vibratory hopper, over-current may occur.

- Depending on the use condition, the rated current may be exceeded. In this case, adjust the eccentric weight angle (to lower the centrifugal force) so that the rated current is not exceeded.
- The operating ambient temperature for this product is 0 to 40°C. Using it out of this temperature range may cause an operation failure or breaking of an insulator.
- When abnormalities occur, please stop operation immediately. Otherwise, it may cause a fire, an electric shock, or injury.

○ INSTALLATION



When installing this product, be sure to disconnect the cable from the power. Otherwise, vibration motor starts suddenly and there is a possibility of causing an unexpected injury. When installing it at a high place, provide an anti-drop measure.

- Before installing this product, make sure the four installation positions machined flat where the motor feet contact. Otherwise, this product or other attached equipment may be damaged due to sympathetic or irregular vibration.
- Please do not put combustibles near the circumference of a motor. Otherwise, it causes a fire or burn.
- When installing this product, be sure to secure it with high-tensile strength bolts, flat washers, spring washers, and double nuts.
- Only one loose bolt may cause an unexpected accident due to falling of the motor or breaking of the motor.
- If this product is installed on a channel steel, be sure to use tapered washers. Otherwise, bolts may bend and break.
- The cable also vibrates during operation. Do not bend the cable at its outlet at a steep angle. If the cable is bent, the bend radius must be at least 75 mm or more.
- 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.
- For the size of attaching bolts and the tightening torque, see the "Tightening torque table" below.

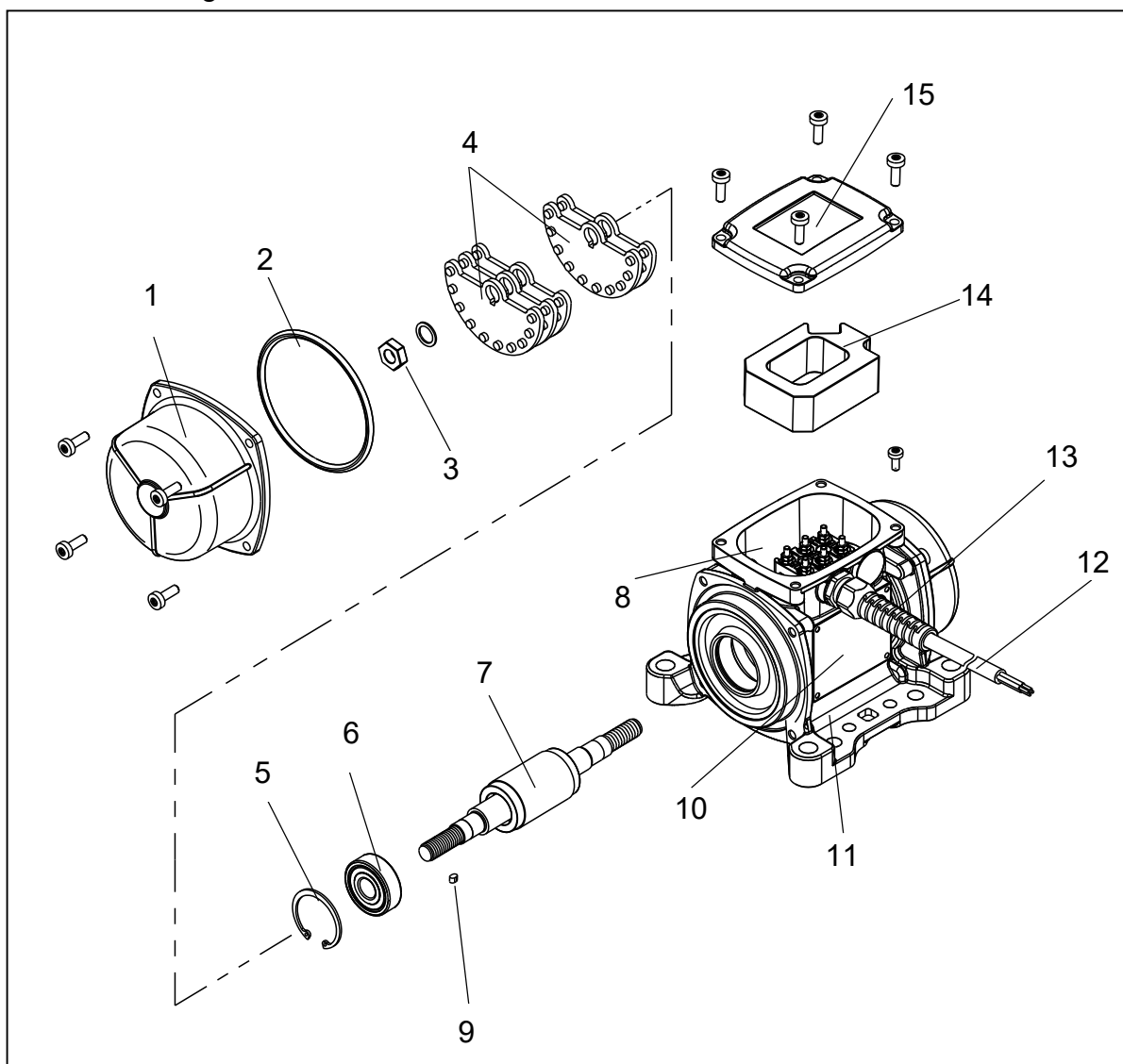
■ Tightening torque table

High-tensile strength bolt (Strength type 10.9)

Bolt size	M8	M10	M12	M16	M20	M22
Tightening torque (N·m)	31	62	109	270	520	710

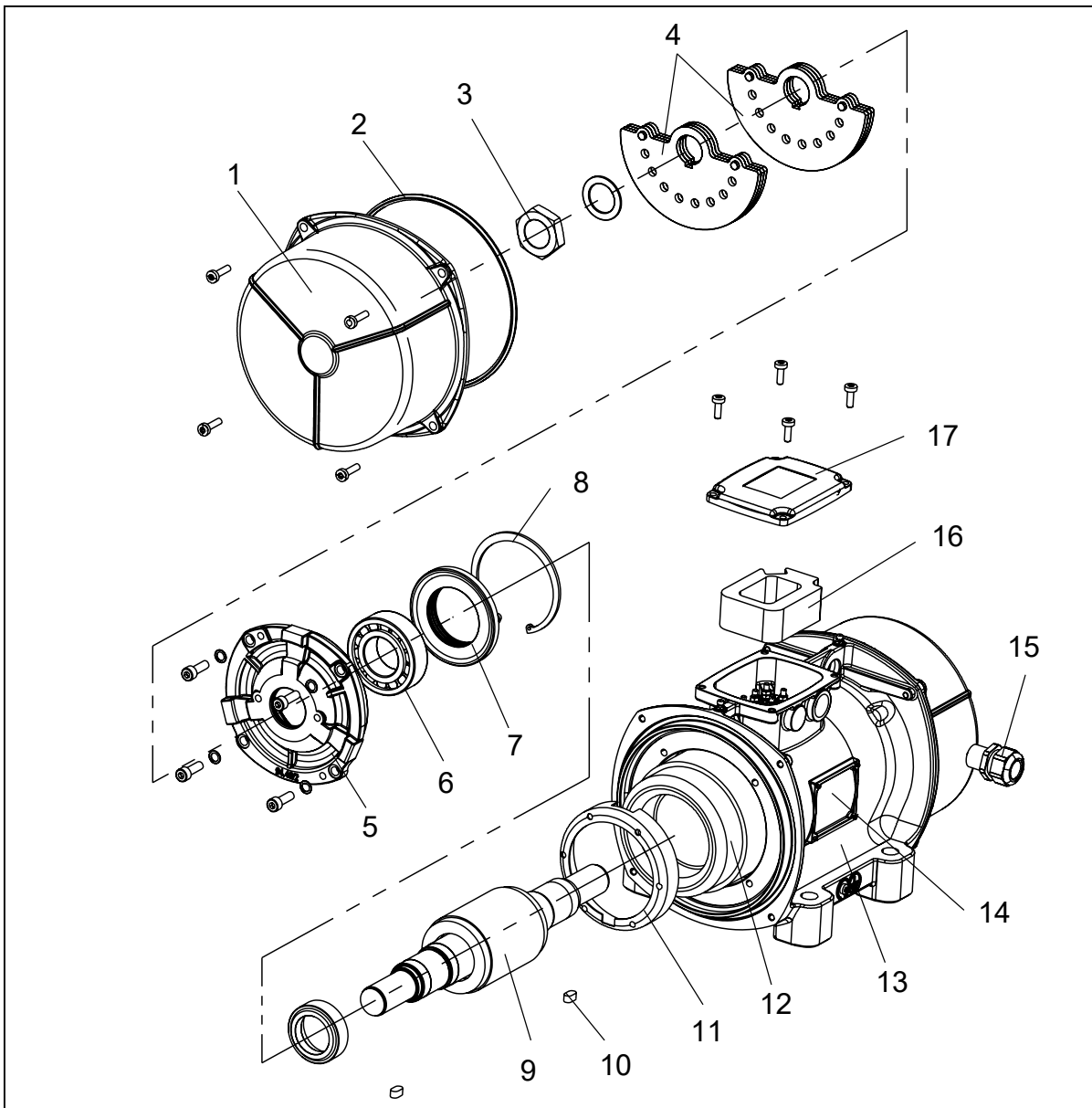
○ NAMES OF PARTS

■ Ball bearing



1	Side cover	9	Key
2	O-ring	10	Name plate
3	Fixing nut	11	Motor case
4	Plate-type eccentric weights	12	Cable
5	Snap ring	13	Cable gland nut
6	Bearing	14	Rubber seal
7	Rotor	15	Terminal cover
8	Terminal block	—	—

■ Roller bearing



1	Side cover	10	Key
2	O-ring	11	Coil cover
3	Fixing nut	12	Stator
4	Plate-type eccentric weights	13	Motor case
5	Bearing case	14	Name plate
6	Roller bearing	15	Cable gland nut
7	Bearing retainer washer	16	Rubber seal
8	Snap ring	17	Terminal cover
9	Rotor	—	—

○ CONNECTION METHOD OF CABLE

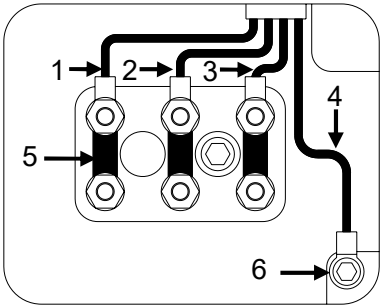
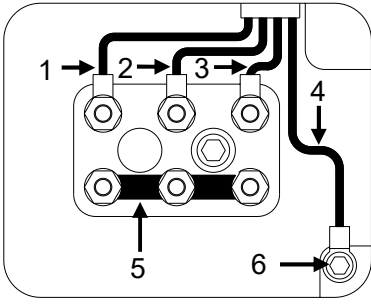


When you wire the cable, please be sure to remove the cable from a power socket before the task. Otherwise, there is a possibility of an electric shock.

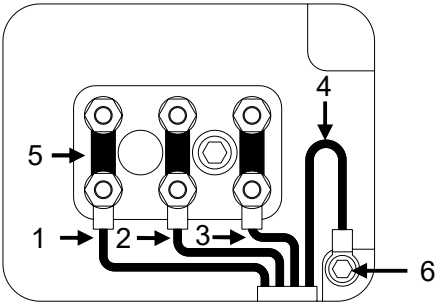
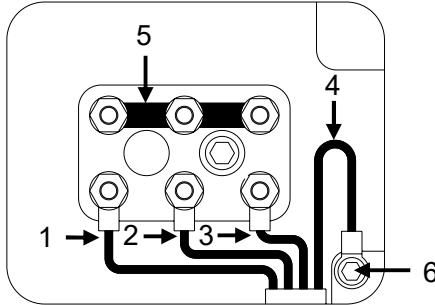
- The power supply which can be used for this product depends on wire connection in the terminal box. Please connect a wire to the cable after confirming the power supply conditions to be used.
- For models with the rated output exceeding 750 W, cables are not included as a standard equipment, so please connect the appropriate one with reference to the following cable size.
 - Recommended cable size: 2mm²
 - Applicable cable outer diameter: ϕ 11 to ϕ 16
- Please connect the cable with the supplied nuts and washers. Bolt size of the terminal block varies with the model. When connecting the cable to the terminal block by yourself, please attach round terminal suitable for bolt size before connection.

Nut size	M4	M5	M6	M8	M10
Tightening torque (N·m)	1.2	2.0	2.9	6.4	13

■ Connection method depending on power supply condition

Connection	Voltage 3 ϕ	Frequency	Connection method
			EVSI 3-100/200/300
Delta connection	200 V	50 Hz	
	200 V	60 Hz	
	220 V	60 Hz	
Star connection	380 V	50 Hz	
	400 V	50 Hz	
	400 V	60 Hz	
	415 V	50 Hz	
	440 V	60 Hz	

▶ 1.Black 2.White 3.Red 4.Green 5.Copper plate 6.Ground terminal

Connection	Voltage 3 ϕ	Frequency	Connection method
			EVSI3-500/700/800A/1100A/1600 /2310/3200/4000
Delta connection	200 V	50 Hz	
	200 V	60 Hz	
	220 V	60 Hz	
Star connection	380 V	50 Hz	
	400 V	50 Hz	
	400 V	60 Hz	
	415 V	50 Hz	
	440 V	60 Hz	

▶ 1.Red 2.White 3.Black 4.Green 5.Copper plate 6.Ground terminal

○ ADJUSTING CENTRIFUGAL FORCE OF ECCENTRIC WEIGHT

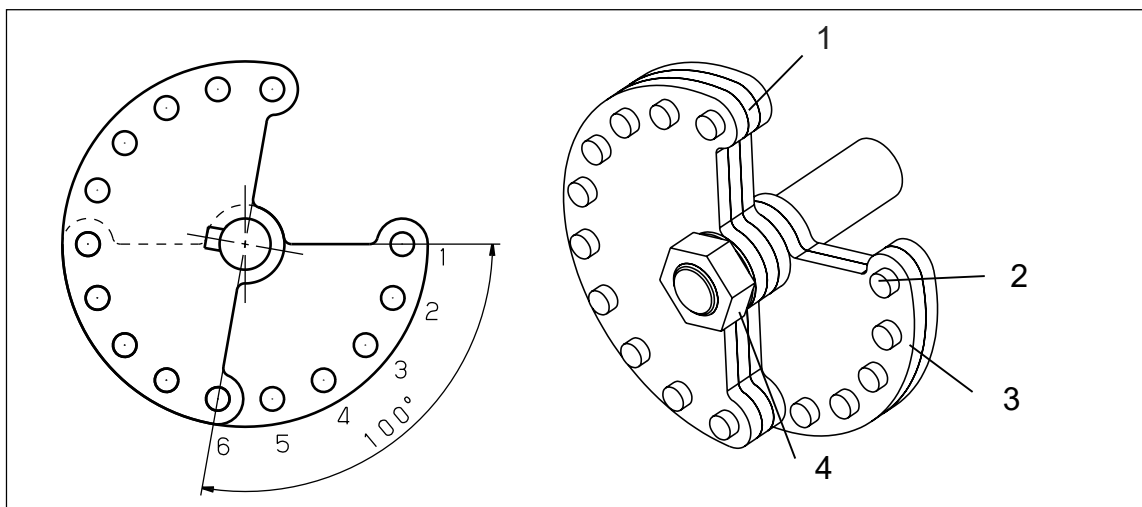


Before adjusting the centrifugal force of the weights, be sure to disconnect the cable from the power socket. Otherwise, you may get an electric shock due to unexpected movement.

- When the frequency is 60 Hz, there is a prohibited area for using eccentric weight adjustment. Please check "Correspondence of centrifugal efficiency between weight angle and frequency".
- If sympathetic vibration occurs in the main unit or the rated current is exceeded, adjust the centrifugal force by the weight angle.
- Loosen the fixing nut and slide the adjustment weight (outer) to adjust the centrifugal force.
- Make sure to check that the weight angles (direction of the eccentric weight) on both sides of the main body are symmetrical.
- Align the concavity of the adjustment weight with the convex portion of the fixed weight and fix with the fixing nut.

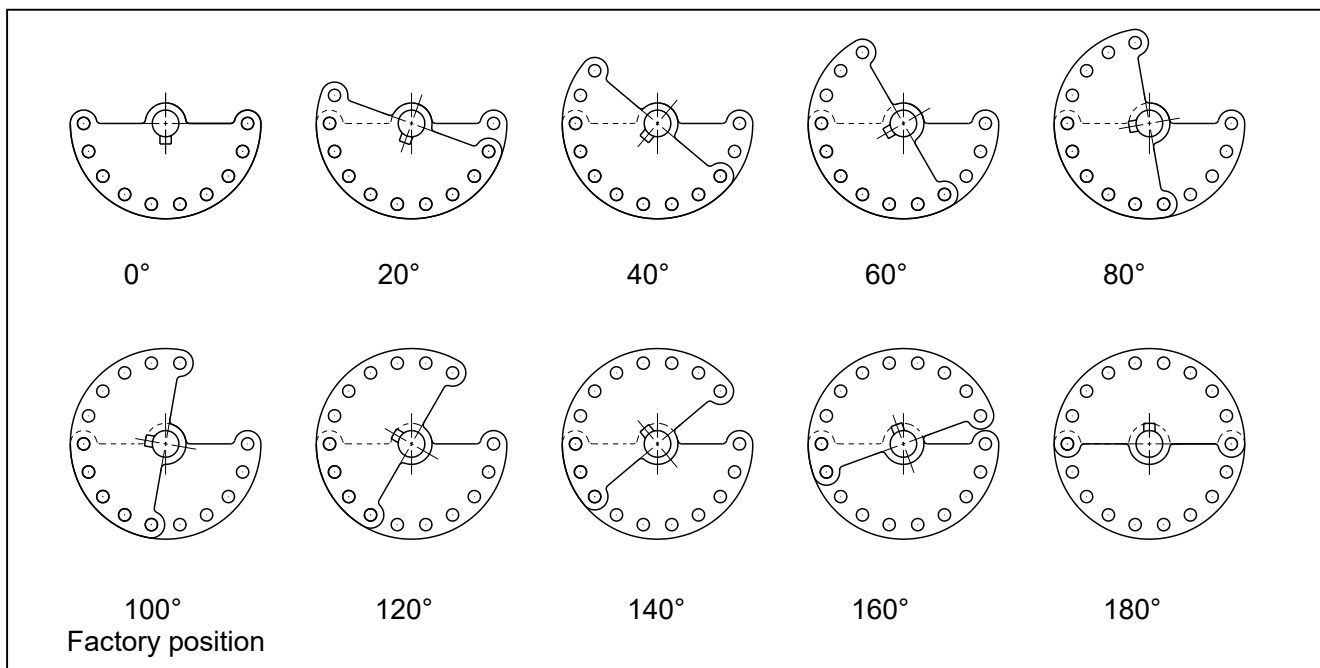
Fixing nut size	M13	M15	M20	M25	M30	M45
Tightening torque (N·m)	30	50	100	170	340	500

1. The number of adjustment weights and fixed weights varies depending on the model.
2. If the adjustment weight is more than one, adjust all of them at the same angle.
3. When shipping the product, adjust it to the position shown below (100 °.)



1. Adjustment weight 2. Fixed weight protrusion 3. Fixed weight 4. Fixing nut

■ Adjustment weight setting angle



■ Correspondence of centrifugal efficiency between weight angle and frequency

EVS I	Weight QTY Adjustment/ Fixed	Frequency (Hz)	Weight angle / Maximum centrifugal contrast efficiency (%)									
			0°	20°	40°	60°	80°	100°	120°	140°	160°	180°
3-100	1/2	50	100	99.0	95.0	88.0	80.0	69.0	58.0	47.0	37.0	33.0
		60	100	99.0	95.0	88.0	80.0	69.0	58.0	47.0	37.0	33.0
3-200 3-500	3/2	50	100	99.0	94.0	87.0	78.0	66.0	53.0	39.0	26.0	20.0
		60	Unavailable					100	80.5	59.0	39.5	30.5
3-300	2/2	50	100	99.0	94.0	87.0	77.0	64.0	50.0	35.0	18.0	0
3-700	3/3		Unavailable					100	78.0	54.5	28.0	0
3-800A	2/2	60	Unavailable					100	78.0	54.5	28.0	0
3-1100A	3/3		Unavailable					100	78.0	54.5	28.0	0
3-1600	3/3	60	Unavailable					100	78.0	54.5	28.0	0
3-3200	3/3		Unavailable					100	78.0	54.5	28.0	0
3-2310	4/5	50	100	98.0	94.0	87.0	78.0	66.0	52.0	36.0	21.0	11.0
		60	Unavailable					100	79.0	54.5	32.0	16.5
3-4000	3/4	50	100	99.0	94.0	87.0	78.0	66.0	52.0	37.0	23.0	14.0
		60	Unavailable					100	79.0	56.0	35.0	21.0

[Position at the factory shipment]

○ HOW TO REPLACE BEARINGS



Before replacing the bearings, be sure to disconnect the cable 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.

- Replacement and maintenance procedures for bearings vary depending on bearing type and motor model. Also, bearing replacement, a "Bearing replacement manual" is available.

■ Bearing replacement cycle

If abnormal heat, abnormal sound such as metallic clank, or increase of the current value occurs during operation, there can be something wrong with bearings. Dismount the cases from the main unit to replace the bearings.

Bearing replacement cycle (reference): 5000 hours

Note : The replacement cycle depends on the usage conditions such as weight angle and environment around the machine.

■ Time for replenishing grease

Periodic replenishment of grease is required for roller bearings.

Estimated grease replenishment time: 1000 hours

■ Recommended grease

Model	EVSI 3-4000	Other than EVSI 3-4000
Grease NOK KLUBER	STABURAGS NBU8EP	ISOFLEX NBU15
Features	Load bearing capacity, abrasion resistance, water resistance	Load bearing capacity, abrasion resistance, high speed
Temperature range	−35~150℃	−40~130℃
Consistency	No.2	No.2

■ Roller bearing and grease lubrication amount (rough standard)

Model	Brand new	Replenishment
NJ2208E C4	40g	20g
NJ2308E C4	30g	16g
NJ2311E C4	52g	26g

○ INSPECTION

- This product is operated under harsh conditions for the motor. Be sure to perform the following inspection in order to minimize troubles during operation.

⚠ After starting operation, you need to check tightening bolts and nuts and retighten them once a week. If any loose is not found then, subsequent retightening may be needed monthly.

Inspection cycle	Inspection point/item	Inspection procedure and evaluation criteria
Daily	Current for load	Rated current is not exceeded
	Bearing sound/ Operation sound	There is no metallic clank nor abnormal noncontiguous sound
Monthly	Installed condition	Looseness of bolts and nuts (Tighten them with specified torque)
	Cable damage	Visual inspection of abrasion and breaking
Annual	Insulated resistance	Measure with a megger. DC500V/10MΩ at minimum

○ TROUBLESHOOTING

Phenomenon	Cause	Solution
Motor does not start	Single phase operation	Check the connection inside the terminal
	Disconnection of connecting part	Replace the stator or cable
	Difference in wiring	Check the connection inside the terminal
Protective device is activated	Wrong setting in protective device	Set to the rated current
	Long start-up period	Improve installation environment (0 to 40°C)
	Difference in wiring	Check the connection inside the terminal
	Poor installation	Tighten bolts. Resolve deformation of installation surface
	Overload	Reduce load or adjusting centrifugal force
	Bearing failure	Replace the bearing
	Distortion of installation surface	Correct distortion
	Improper fitting	Replace the bearings or bearing cases
Abnormal heat of main unit	Damage or lack of lubrication	Replace the bearing
	Too high ambient temperature	Improve installation environment (0 to 40°C)
Vibration is weak	Unbalance of left and right weights	Balance the angles (bilateral symmetry)
	Difference in wiring	Check the connection inside the terminal

○ SPECIFICATION

■ Specification

Model	Output (W)	Voltage / Frequency								Maximum centrifugal force (kN)		Mass (kg)
		200V	200V	220V	380V	400V	415V	400V	440V			
		50Hz	60Hz		50Hz			60Hz				
		Rated current (A) Vibration frequency (Hz)								50Hz	60Hz	
EVSI 3-100	130	0.70 48.2	0.67 57.2	0.61 57.9	0.37 48.8	0.35 49.0	0.34 49.0	0.33 58.1	0.30 58.5	1.19	1.71	6.4
EVSI 3-200	130	0.70 47.2	0.67 56.8	0.61 57.4	0.37 47.7	0.35 47.9	0.34 48.2	0.33 57.8	0.30 58.2	2.07	1.97	6.7
EVSI 3-300	180	1.20 48.5	1.14 58.1	1.03 58.7	0.63 48.8	0.60 49.0	0.58 49.0	0.57 58.7	0.52 59.0	2.98	2.75	10.4
EVSI 3-500	330	1.60 47.5	1.51 55.4	1.37 56.6	0.84 47.9	0.80 48.0	0.77 48.0	0.76 57.4	0.69 58.1	5.73	5.45	14.8
EVSI 3-700	330	1.60 47.0	1.54 55.6	1.37 56.3	0.84 47.0	0.81 47.4	0.83 47.8	0.76 57.0	0.69 57.8	7.19	6.63	15.0
EVSI 3-800A	500	2.20 47.0	2.38 55.2	2.07 56.3	1.17 47.4	1.16 47.9	1.20 48.2	1.05 57.1	1.01 58.1	7.70	7.10	20.5
EVSI 3-1100A	790	3.50 48.3	3.44 58.0	3.12 58.4	1.84 48.5	1.75 48.9	1.69 48.9	1.73 58.3	1.57 58.7	10.8	9.95	24.5
EVSI 3-1600	1100	4.60 48.7	4.35 58.6	3.95 58.6	2.42 48.9	2.30 49.1	2.44 49.1	2.18 58.8	1.98 59.1	15.2	14.0	33.5
EVSI 3-2310	1650	7.00 47.9	6.98 57.6	6.34 58.2	3.68 48.5	3.50 48.6	3.37 48.8	3.50 58.0	3.19 58.7	22.7	21.6	50.1
EVSI 3-3200	3360	13.0 50.0	12.3 60.0	11.2 60.0	6.84 50.0	6.50 50.0	6.27 50.0	6.17 60.0	5.61 60.0	33.9	31.2	94.5
EVSI 3-4000	3360	13.0 50.0	12.3 60.0	11.2 60.0	6.84 50.0	6.50 50.0	6.27 50.0	6.17 60.0	5.61 60.0	38.2	36.3	96.5

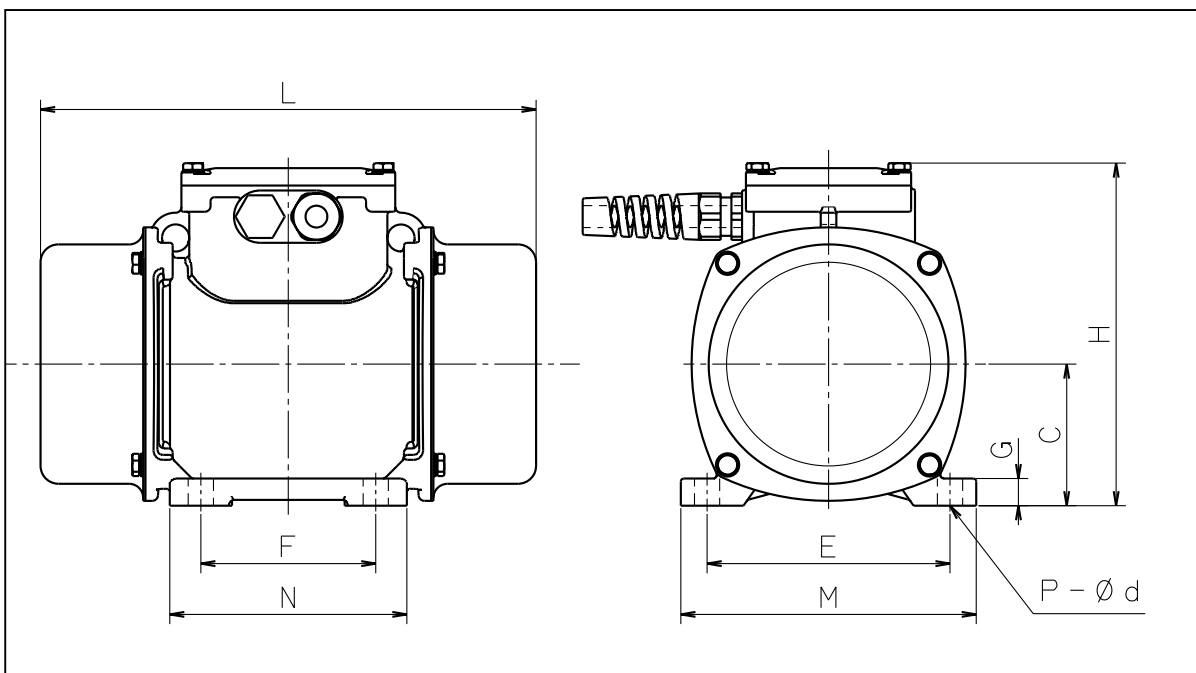
Note : The product more than 750 W output does not include cable mass.

■ Dimension table

units : mm

Model	E	F	G	C	H	L	N	M	P	ϕd
EVSI 3-100	120	40	12	61	149	211	166	166	4	9
	130	80	12							11
	140	140	25							13
EVSI 3-200	120	40	12	61	149	235	166	166	4	9
	130	80	12							11
	140	140	25							13
EVSI 3-300	150	90	12	73	171	255	186	186	4	13
	160	90	25							(Long hole)
	160	160								
EVSI 3-500	140	105	30	82.5	203	288	146	167	4	13
EVSI 3-700	140	105	30	82.5	203	288	146	167	4	13
EVSI 3-800A	170	120	45	93.5	211	308	174	205	4	17
EVSI 3-1100A	170	120	42	104.5	224	435	162	205	4	17
EVSI 3-1600	190	140	45	116	244	430	190	230	4	17
EVSI 3-2310	190	140	49	104	230	465	180	230	4	17
EVSI 3-3200	255	155	91	130	289	560	210	310	4	25
EVSI 3-4000	255	155	91	130	289	560	210	310	4	25

■ Dimension drawing



EXEN CORPORATION

1 - 17 - 13 Hamamatsucho, Minato - ku, Tokyo 105 - 0013, Japan

TEL 8 1 - 3 - 3 4 3 4 - 8 4 5 2 FAX 8 1 - 3 - 3 4 3 4 - 8 3 6 8

<https://www.exen.co.jp/English/>