

DC Electric Vibrators

Operating Instructions

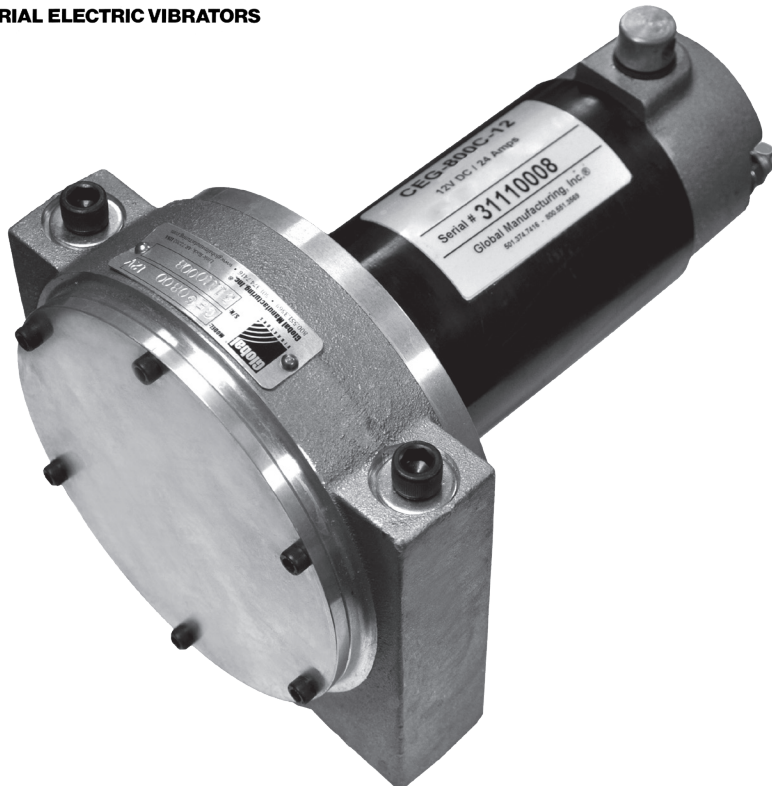
Global[®] External bin & hopper
12 & 24 Volt DC Electric Vibrators



Models:

CEG-400-12
CEG-800-12
CEG-1200-12

CEG-400-24
CEG-800-24
CEG-1200-24



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I. Introduction

You have purchased a CEG 12 Volt or 24 Volt electric vibrator. The vibrator's DC electric motor turns shaft-mounted eccentric weights to produce rotary vibration. This vibrator produces up to 1,193 pounds of force at 5,400 rpm. Actual performance will depend on the rigidity of the mount and the weight of the material being moved.

PRECAUTIONS

1. Read this entire manual and follow all installation and operating instructions.
2. This vibrator is rated for **continuous** use when ambient temperatures are below 110°F (43°C). When the ambient temperature exceeds 110°F (43°C), do **not** run the vibrator continuously for more than 30 minutes. Allow the vibrator to cool for at least one minute for each minute of operation up to 30 minutes.
3. Always use a proper ground cable.
4. Always use a safety cable to attach the vibrator to an independent stronghold. The ground cable can be used as the safety cable if it is sufficiently strong to hold the weight of the vibrator (approximately 16 lb or 7.3 kg).
5. Do not operate the vibrator on an empty structure. This can damage the structure or the vibrator.
6. If a truck battery is used to power the vibrator, the vehicle engine should remain running while the vibrator is in use. Keep all ancillary equipment such as air conditioners turned off while operating the vibrator.
7. Do not operate the vibrator with the cover removed or if any fasteners are missing.
8. Disconnect or lock out the electrical supply before performing maintenance on the vibrator.
9. Persons near the vibrator should wear ear protection if the decibel levels exceed 90 dB.

II. Operation

Electrical Requirements

Operating Requirements:

The CEG 12V DC models require a 12 volt/25 amp DC power source and the CEG 24V DC models require a 24 volt/12.5 amp DC power source. Maximum ambient temperature is 130°F (54°C).

Continuous Use Applications:

The CEG vibrators are rated for *continuous* use when ambient temperatures are 110°F (43°C) or less. If temperatures exceed 110°F (43°C), the vibrator should **not** be run continuously for more than 30 minutes. Allow the vibrator to cool for at least one minute for each minute of continuous operation up to 30 minutes. Accessory kits for intermittent and continuous use are available from Global Manufacturing.

Material Flow Applications:

Once properly installed, the vibrator is operated by turning on the on/off switch provided in the accessory kit. Cycle the vibrator on and off to maintain material flow. The vibrator can run continuously (at temperatures below 110°F or 43°C), but this is usually not necessary. Once the material is set in motion, gravity will keep it moving. Be sure to stop the vibrator whenever all material has been removed from the hopper or truck bed. Allowing the vibrator to run with an empty hopper or truck bed can damage the structure or vibrator.

Truck Dump Body Applications:

Continuous operation can run down the vehicle battery. Keep the vehicle engine running during vibrator use. Time for the vehicle alternator to recharge the battery between vibrator ON cycles might be required. Increasing the vehicle engine speed (rpm) might be necessary during vibrator operation if the vibrator draws more current than the vehicle's alternator can produce when the engine is idling. Do not operate the vehicle's air conditioner or other ancillary equipment while the vibrator is running.

Concrete Consolidation Applications:

CEG DC vibrators are rated at 5,400 rpm. This rate of vibration (same as rpm of vibrator) is only about half of what is ideal for concrete consolidation - 10,000-14,000 vibrations per minute is recommended. Therefore, another Global vibrator should be selected for concrete consolidation applications.

Controlling Vibrator Speed:

A rheostat can be used to control the speed of DC electric vibrators. Operating the vibrator at lower voltages will slow the speed of the vibrator, reduce the force of the vibrator, and enhance the bearing life (a 10% decrease in speed increases the bearing life by 50%). If using a rheostat to control the vibrator speed, reduce the speed using the rheostat until material flow stops. Gradually increase the voltage until the speed of the vibrator is adequate to maintain the material flow.

Maintenance:

The CEG DC vibrators require very little maintenance. These vibrators are equipped with shielded bearings that are permanently lubricated at the factory. No lubrication is required. Periodically check for loosening of the mount.

III. Performance Variations Caused by Special Applications

Examples:

- **High amps**
- **Reduced speed reducing force output**

When using Global Manufacturing DC Vibrators on certain applications, performance can vary unexpectedly. The speed or force output might be less than expected from our standard performance data. First, it should be understood that the published data is based on an ideal rigid mount. With electric vibrators of all types, the performance can vary quite a bit depending on the rigidity of the mount. The more flexible the mount, the higher the amp draw will be, and the slower the vibrator will run (vibrator force output will decrease as the speed decreases). With AC vibrators using squirrel cage induction motors, this lack of mount rigidity can be disastrous. If the vibrator does not get up to speed, the windings will overheat and fail in a very short amount of time. DC motors are usually more forgiving, but the same principles apply, and the speed can vary with the load and input voltage.

We expect this series of DC vibrators (CEG-400/800/1200) to run at 5,400 rpm and pull 25 amps for the 12V DC motor and 13 amps for the 24V DC motor when operated on a good rigid mount. With a less rigid mount or if the vibrators are mounted on portable equipment that is suspended or flexible (i.e. arm of a back hoe), the DC motor can run slower and pull higher amps. Since the heat production of the motor is directly related to the amp draw, it is important to keep the amp draw below the amp rating for the motor (25 amps for 12V DC motor and 13 amps for the 24V DC motor).

As implied above, having a rigid mount will help keep the amp draw to a minimum. We recommend you follow as closely as possible the mounting instructions provided in this operations manual. If the amp draw exceeds the rating for the motor despite a good mount, it will be necessary to adjust the weights to a lower force setting or purchase smaller weights for the vibrator. Running the vibrator while the motor is pulling amps in excess of the motor rating will cause the motor to overheat resulting in premature motor failure. Running a vibrator while it is pulling high amps can also result in the vibrator shaking itself apart.

Another way to keep the amp draw down is to make sure the voltage provided to the motor stays as close to 12V DC (or 24V DC for the 24V motor) as possible. On truck applications, we recommend keeping the truck engine running while operating the vibrator. This will keep the battery fully charged while operating the vibrator. It is also important to use the proper cable for your application to minimize the voltage drop between your power source and the vibrator. A good voltage drop calculator can be found at:

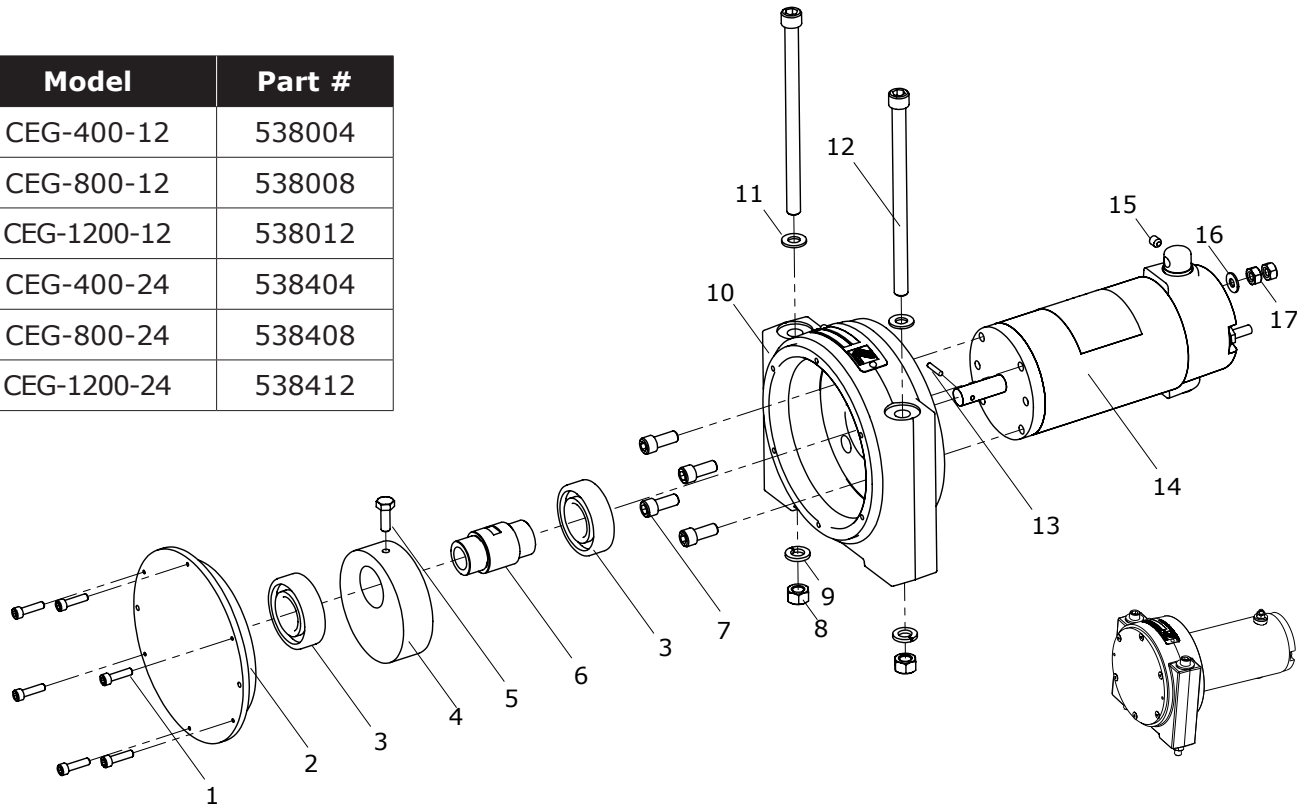
<http://www.nooutage.com/vdrop.htm>

- Select the appropriate voltage: 12V or 24V
- Select the cable size you are attempting to use.
- For the load enter the amp draw you measure for your application.
- Select copper conductor for conductor type.
- Select "DC" for system type.
- Select conductor temperature.
- Select "no conduit" for conduit type.
- Select "single set of conductors".
- Put in the length of your cable in feet.
- Then press "Calculate Voltage Drop." If the voltage drop is greater than 5%, we recommend using a heavier cable or a shorter cable if possible.

We hope these guidelines give you a better understanding of your Global DC vibrator. If you have additional questions, please contact Global Customer Service at 800-551-3569.

IV. Parts List and Drawings - CEG Models -12 and 24 Volt

Model	Part #
CEG-400-12	538004
CEG-800-12	538008
CEG-1200-12	538012
CEG-400-24	538404
CEG-800-24	538408
CEG-1200-24	538412



CEG 12 Volt & 24 Volt DC Vibrator Parts List

NO.	PART #	PART DESCRIPTION	12V - QTY	24V - QTY
1	336707	10 - 24 X ¾" SCS Screw	6	6
2	110220	Cover	1	1
3	382245	Bearing	2	2
4	193000	Weight for 400 force pounds	1	1
4	193002	Weight for 800 force pounds	1	1
4	193044	Weight for 1200 force pounds	1	1
5	330007	Hex Head Bolt ¼" - 20 x ¾"	1	1
6	200301	Shaft	1	1
7	337007	5/16" - 18 x ¾" HSHC Screw	4	4
8	333706	¾" - 16 Nut	2	2
9	338106	¾" Lock Washer	2	2
10	142029	Housing	1	1
11	338205	5/16" Washer	2	2
12	337196	¾" - 16 x 6" HSC Screw	2	2
13	344614	⅛" x ⅝" Dowel Pin	1	1
14	460122	12 Volt DC Motor	1	N/A
14	460124	24 Volt DC Motor	N/A	1
15	336103	¼" - 20 x 5/16" SS Screw	1	1
16	338203	3/16" Flat Washer	1	1
17	3344041	¼" - 20 Hex Nut	2	2

V. Wiring Instructions

Only a qualified electrician should connect an electric vibrator to a power source. Using incorrect voltage, inadequate wire size, or operating a vibrator pulling high amps will damage the vibrator and void the manufacturer's warranty.

Wiring to Power Source and Switching:

CEG DC vibrators can be wired for intermittent duty or continuous duty. To assist in the installation Global Manufacturing offers DC Electric Accessory Kits include: a push button switch (intermittent use) or pull on switch (continuous use), solenoid (12V or 24V), 25 feet of AWG #6 cable with terminal and hardware to connect to the vibrator, and terminal to connect the cable to the solenoid. See the drawing on page 5 which illustrates necessary connections.

1. Be sure all the equipment is all rated for the same voltage

12 volt Battery
12 volt Vibrator
12 volt Solenoid

or

24 volt Battery
24 volt Vibrator
24 volt Solenoid

2. Be sure the negative battery terminal is properly grounded to the truck chassis.

3. Connect the positive battery terminal to the large input terminal on the solenoid using AWG #6 cable or heavier.

4. Ground the small input terminal on the solenoid to the truck chassis or the negative battery terminal using AWG #16 wire or heavier.

5. Connect the large output terminal of the solenoid to the power terminal on the vibrator using AWG #6 cable or heavier. The DC Electric Vibrator Accessory kits include the solenoid and 25 feet of cable with the necessary terminal and connectors to do this.

6. Connect the appropriate switch to the small output terminal on the solenoid using AWG #16 wire or heavier. Use a push button switch for intermittent use and a pull on switch for continuous use. The appropriate switch is included in the DC Electric Vibrator Accessory kits.

7. Connect the other side of the switch to the positive battery terminal using AWG #16 wire or heavier.

8. Connect the ground terminal found on the end cover of the vibrator motor to the mount channel or truck bed using AWG #6 cable or heavier.

Caution

ALL wires and cables connecting to the vibrator should have some slack.

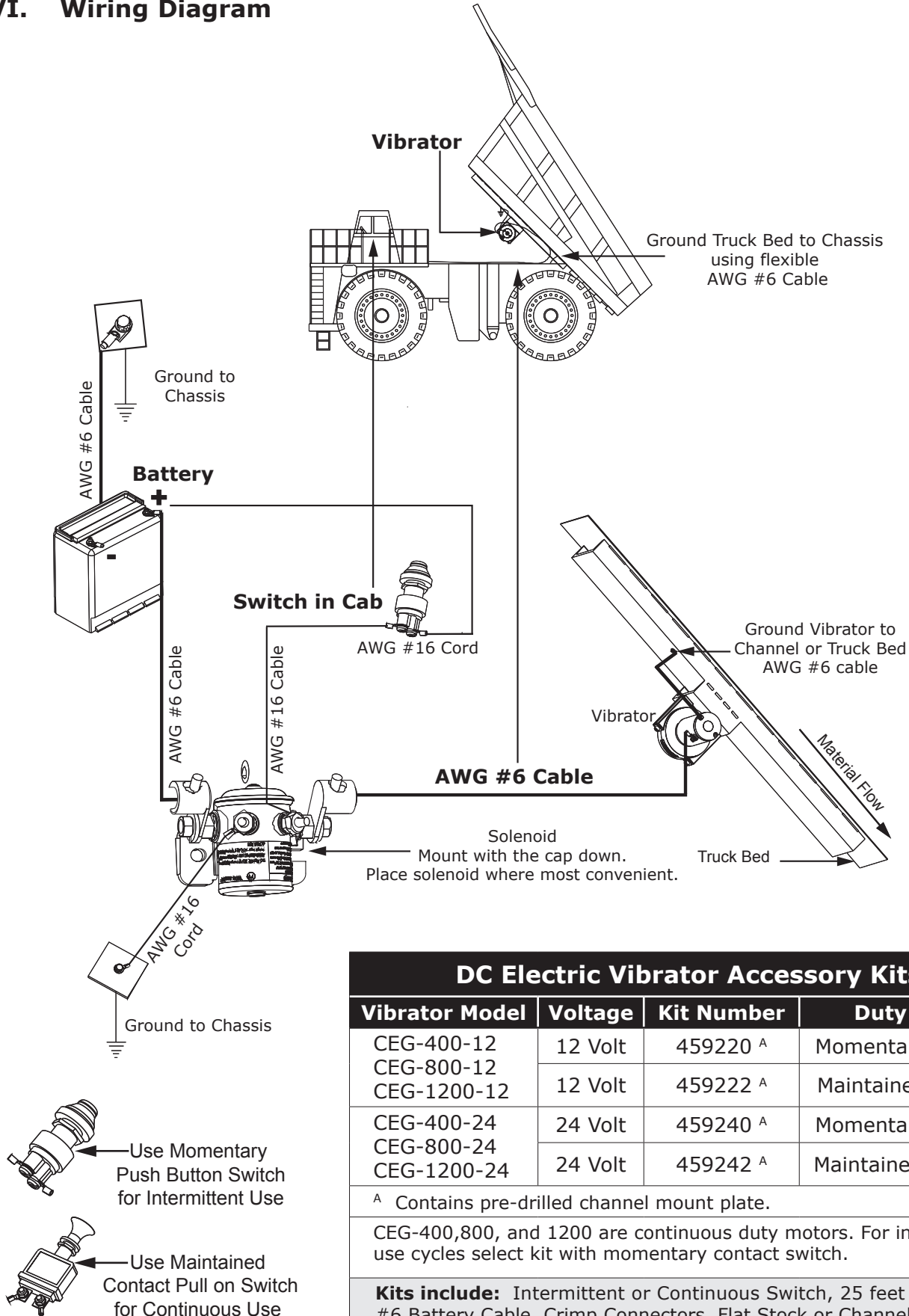
The vibrator must be properly grounded. A heavy duty ground cable or strap should be used to complete the electrical circuit between the truck bed and the truck frame to insure proper grounding and operation.

For non-truck applications, mount the solenoid & switch where most convenient.

Take amperage and voltage readings upon completion of the installation of the vibrator. A high amperage reading means something is wrong. The vibrator might be damaged or is not mounted properly. Do NOT operate a vibrator that pulls high amps. Contact Global Customer Service at 800-551-3569 if you are unable to closely follow all installation instructions or if the amp readings are high.

High amp readings should never be ignored.

VI. Wiring Diagram



DC Electric Vibrator Accessory Kits

Vibrator Model	Voltage	Kit Number	Duty Cycle
CEG-400-12	12 Volt	459220 ^A	Momentary Contact
CEG-800-12	12 Volt	459222 ^A	Maintained Contact
CEG-1200-12	12 Volt	459222 ^A	Maintained Contact
CEG-400-24	24 Volt	459240 ^A	Momentary Contact
CEG-800-24	24 Volt	459242 ^A	Maintained Contact
CEG-1200-24	24 Volt	459242 ^A	Maintained Contact

^A Contains pre-drilled channel mount plate.

CEG-400,800, and 1200 are continuous duty motors. For intermittent use cycles select kit with momentary contact switch.

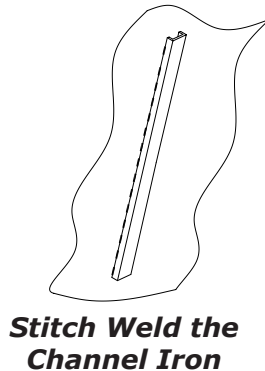
Kits include: Intermittent or Continuous Switch, 25 feet of #4 or #6 Battery Cable, Crimp Connectors, Flat Stock or Channel Mount Plate, and Mount Bolt Assemblies.

VII. Mounting - Follow Guidelines for Optimum Performance

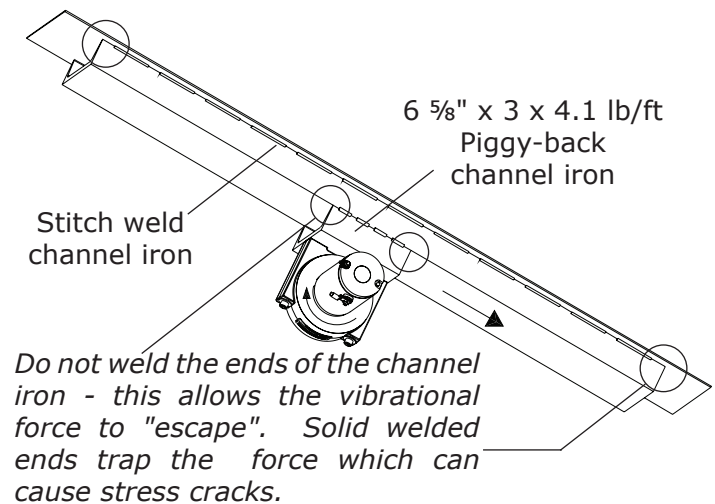
⚠ Caution!

Do not mount the vibrator directly to the structure wall. Use a channel iron stiffener for proper mount rigidity and as the transducer of the vibrational energy.

The key to successful vibration is a proper mount because rotary vibration resonates the material inside the structure, when the vibrator is mounted correctly. The vibrator should appear motionless. There should not be a large amount of motion or noise.



Attach the vibrator to the channel iron. Stitch weld nuts to the back of the channel iron or the channel iron may be drilled and tapped to accept the mounting bolts. An alternate method is to cut a second channel iron slightly longer than the footprint of the vibrator. Stitch weld the second channel iron to the first. Do not weld the ends. Mount the vibrator to the second channel iron.



Channel Irons - Size & Mounting

Important!

The channel iron should be at least two-thirds of the height of the sloped portion of the hopper but no greater than 10 feet (3 m).

The channel iron should be at least two-thirds the height of the sloped portion of the hopper, but not less than 6 feet (1.83 m) in length. The channel iron width should not be less than the base width of the vibrator. See chart below for recommended channel sizes. **Do not** install more than one vibrator on the same channel iron or use a channel iron shorter than the recommended length. A short channel may flex the bin wall.

Channel Iron Size:

For all CEG DC models use the following channel iron size:

C3 X 4.1 lb/ft (C75 x 6 kgs/m)

Stitch weld the channel iron vertically to the sloped portion of the bin wall. Weld 3 inches (7.5 cm), skip 1 inch (2.5 cm), weld 3 inches (7.5 cm), etc... Leave 1 inch (2.5 cm) un-welded on the ends and corners. This allows the vibration to dissipate out the ends of channel without causing stress cracks to the hopper or bin. By doing so, should the weld fail, the entire mount will not fall off. Do not mount the channel iron horizontally.

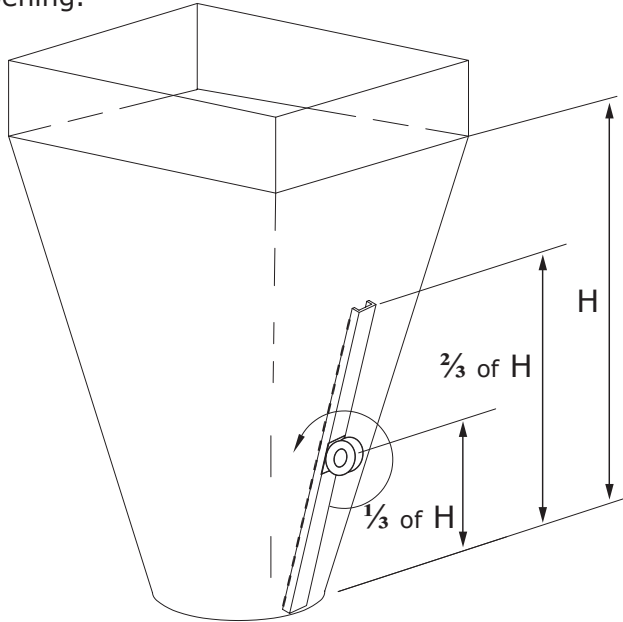
Secure the vibrator to the channel iron with SAE coarse thread grade 8 plated bolts with lock washers or an adhesive such as Loctite[®] 262. Tighten bolts in a sequential process. At least two passes are required in most situations. Give all bolts the same torque value. Grade 8 bolts can handle more torque than standard bolts. If Loctite[®] is not used, retorque the bolt after the vibrator has operated for a few minutes and check tightness often. If Loctite[®] is used do not retorque the bolts as this will break the Loctite[®] bond.

Attach a safety cable to a stronghold (not the channel iron mount), which is higher than the mounted vibrator and capable of holding the vibrator's weight.

Mounting Locations

Single Vibrator

Install a channel iron stiffener on the outside of the sloping wall $\frac{1}{3}$ the distance above the discharge opening.

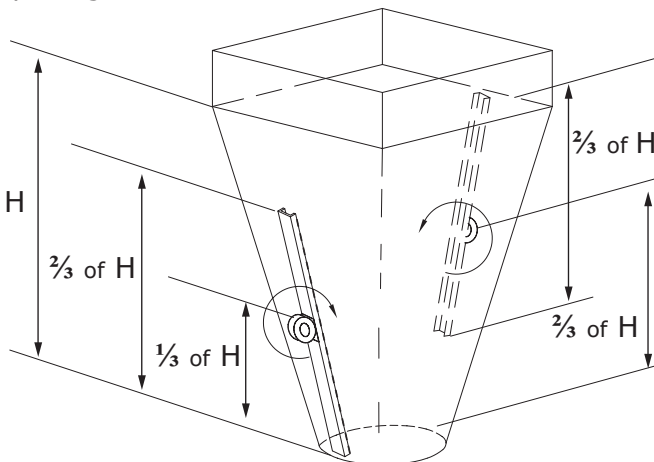


Multiple Vibrators

Use more than one vibrator when the diameter or width of any wall is greater than 12 feet (3.66 m). Always mount the vibrators on different planes.

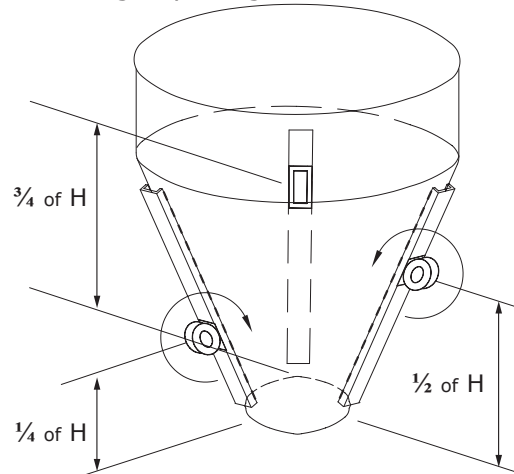
Two Vibrators on Round or Square Hoppers

Install channel iron stiffeners 180° apart. Install one vibrator on the outside of the sloping wall $\frac{1}{3}$ the distance above the discharge opening. Install the second vibrator on the outside of the opposite sloping wall $\frac{2}{3}$ the distance above the discharge opening.



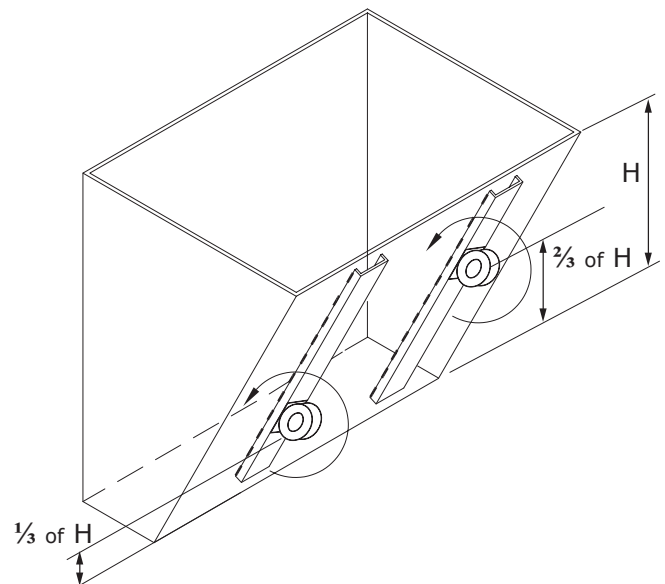
Three Vibrators

Install channel iron stiffeners mounted 120° apart. Install the first vibrator on the outside of the sloping wall $\frac{1}{4}$ the distance above the discharge opening. Install the second vibrator on a separate channel iron at $\frac{1}{2}$ the distance above the discharge opening. Install the third vibrator on the remaining channel iron at $\frac{3}{4}$ the distance above the discharge opening.



Two Vibrators on Rectangular Hoppers

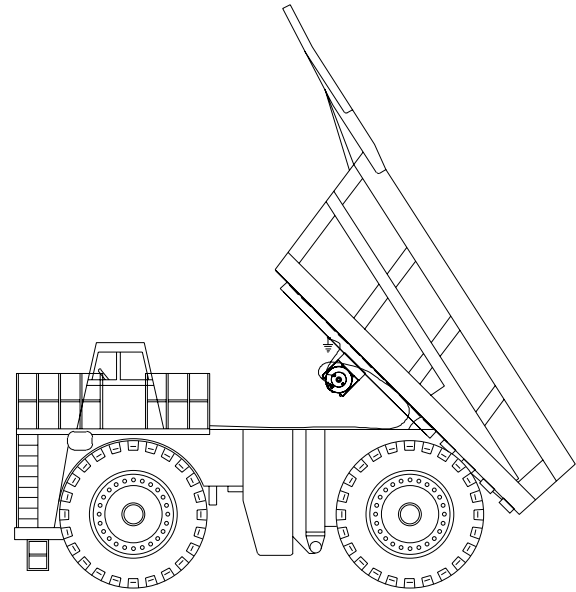
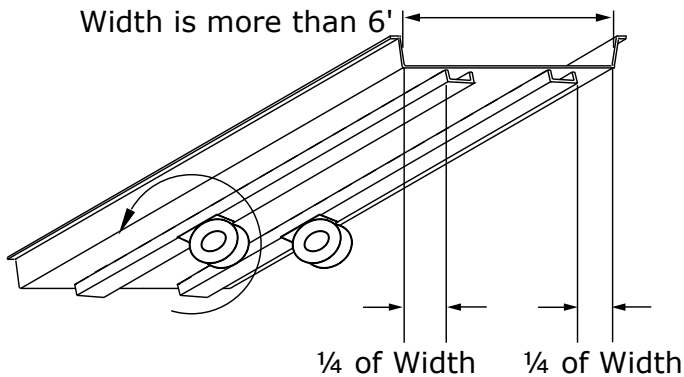
Install channel iron stiffeners on opposite sides of the long walls. Install one vibrator on the outside of the sloping wall $\frac{1}{3}$ the distance from the discharge opening. Install the second vibrator on the outside of the opposite sloping wall $\frac{2}{3}$ the distance above the discharge opening. When only one wall slopes, mount both stiffeners on it. Equally space the stiffeners on the wall. Place one vibrator $\frac{1}{3}$ above the discharge opening on one channel iron and the other vibrator $\frac{2}{3}$ above the bin's discharge opening on the second channel.



Installation on Chutes and Flow Pipes Mounting on Truck Bed

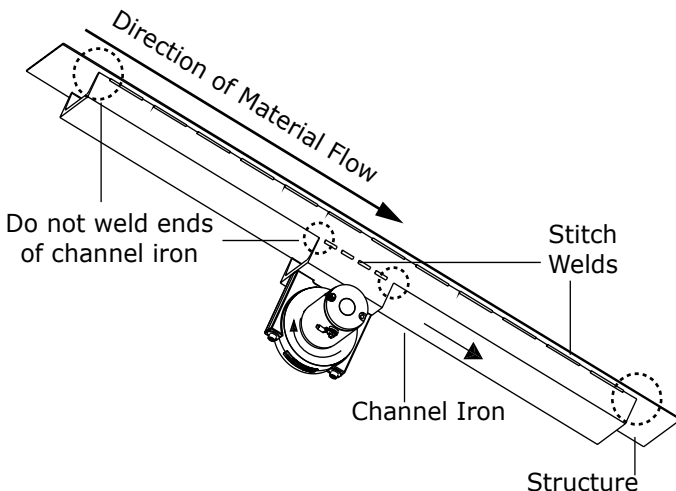
Mount channel iron stiffeners vertically or in the direction of material flow. Center the channel if the chute is less than 6 feet (1.83 m) in width. If the chute is greater than 6 feet in width, use two vibrators on separate channel irons. To maximize each vibrator's radius of influence; center each channel iron in each half of the chute. Each channel iron should be located $\frac{1}{4}$ of the chute width from the edge and $\frac{1}{2}$ of the chute width apart. (e.g. – for a chute 8' wide, the channel iron locations would be 2' from each edge and 4' apart.) When wall thickness is less than $\frac{1}{8}$ ", additional reinforcement may be required.

Mount each vibrator on an independent channel iron. Locate the channel iron as close as possible to the material flow problem area. The most common problem areas are in the corners of the dump body.

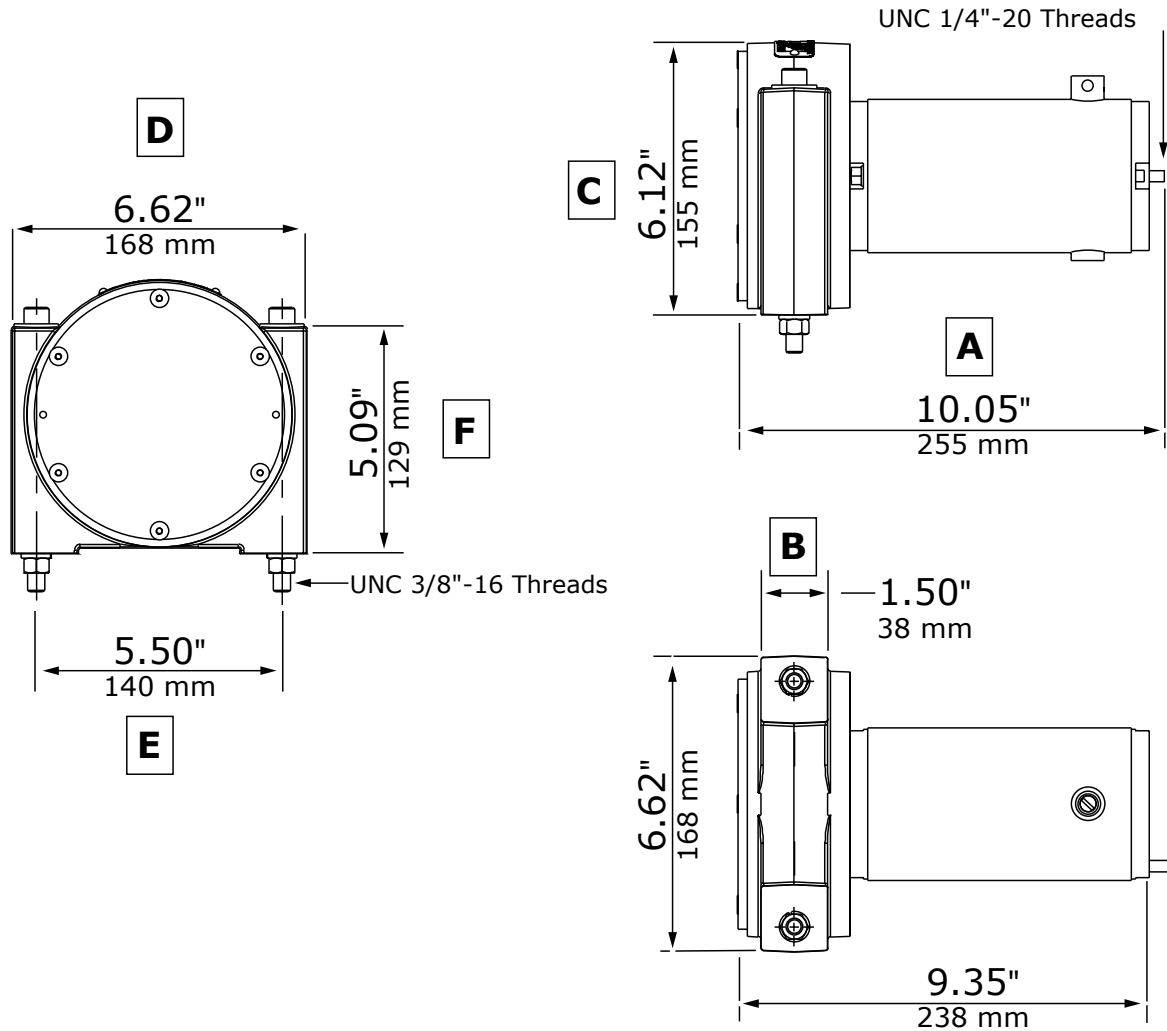


Orientation of Vibrator

The vibrator should be mounted with the shaft horizontal and the DC motor on the right when looking at the application from outside the structure with the direction of material flow from top to bottom. This will provide the proper direction of rotation to assist material flow.



VIII. Dimensions for CEG Vibrators - 12 and 24 Volt Models



12 Volt and 24 Volt DC Vibrator Dimensions

VIBRATOR MODEL	WEIGHT	A	B	C	D	E	F	G
		Total Length	Foot Width	Total Height	Total Width	Bolt Hole Separation Width	Foot Thickness	Bolt Hole Size
		in	in	in	in	in	in	in
		mm	mm	mm	mm	mm	mm	mm
CEG All Models	15.1	10.05	1.50	6.12	6.62	5.50	5.09	7/16
	6.8	255	38	155	168	140	129	11

IX. Performance Data

12 and 24 Volt DC Vibrators Performance Data					
VIBRATOR MODEL	Unbalance	Speed	Force	Voltage	Amp Draw
	lb/in	rpm	lb	volts	amps
	kg/mm		kN		
CEG-400-12	0.55	5400	455	12V DC	25
	63		2.03		
CEG-800-12	1.02	5400	845	12V DC	25
	118		3.76		
CEG-1200-12	1.44	5400	1193	12V DC	25
	166		5.03		
CEG-400-24	0.55	5400	455	24V DC	13
	63		2.03		
CEG-800-24	1.02	5400	845	24V DC	13
	118		3.76		
CEG-1200-24	1.44	5400	1193	24V DC	13
	166		5.03		
Force output is determined by the speed the motor rotates. Motor speed can be affected by the type and quality of the mount and the load on the motor. Follow manufacturer's guidelines for optimum performance.					

X. Troubleshooting

PROBLEM	PROBABLE CAUSE	SOLUTION
Vibrator will not operate	Poor electrical connections	Check to make sure all electrical connections, including ground connections, are secure and free of corrosion. Check switch to ensure it is making contact.
	Field/Armature is locked up	Disconnect and check to make sure shaft turns freely.
Vibrator starts but fails to continue to operate	Battery is low.	Recharge battery. Keep engine running while operating vibrator. Turn off other accessories using battery.
	Brushes are worn	Replace brushes in motor.
	Short circuit in motor windings	Replace motor.
Vibrator makes too much noise	Inadequate mount.	Be sure all mounting bolts are tight and that mount is rigid and secure. Be sure all mounting instructions are followed.
	Bearing failure (squealing noise)	Replace bearings.
	Loose cover or motor	Be sure all bolts securing the cover and the motor to the vibrator housing are secure.
Vibrator overheats	Inadequate mount	Be sure all mounting bolts are tight and that mount is rigid and secure. Be sure all mounting instructions are followed.
	Ambient temperature is too hot for vibrator	Protect vibrator from ambient temperatures above 130°F (54°C).
	Vibrator has been operated continuously for too long	The CEG vibrators are rated for <i>continuous</i> use when ambient temperatures are 110°F (43°C) or less. If temperatures exceed 110°F (43°C), the vibrator should not be run continuously for more than 30 minutes. Allow the vibrator to cool for at least one minute for each minute of continuous operation up to 30 minutes. Accessory kits for intermittent and continuous use are available from Global Manufacturing.
High Amp draw and/or Low Force output	Inadequate mount or portable equipment	See page 4. Reduce weight setting or purchase a smaller weight.
	Power cable of insufficient size	See page 4.