Service Instructions

Syntron® Vibrator
Model: RV-10209
INSTRUCTION MANUAL
Syntron® Rotary Vibrator
Model: RV-10209

■ Installation ■ Operation ■ Maintenance

IMPORTANT

The instructions and data herein are VITAL to the proper installation and operation of this equipment. In order to avoid delays due to faulty installation or operation, PLEASE SEE THAT THESE INSTRUCTIONS ARE READ BY THE PERSONS WHO WILL INSTALL, OPERATE AND MAINTAIN THIS EQUIPMENT!!
GENERAL DESCRIPTION

The RV-10209 Electromechanical Rotary Vibrators are ruggedly constructed, using roller bearings for long service life.

The 10209 Vibrator is an extra heavy duty vibrator that incorporates an electric motor center drive with eccentric weights on each end of the drive shaft. The bearings are sealed and a system is provided to permit periodic addition of recommended lubricant.

Rotary Vibrators can be mounted in a horizontal position to vibrate vertically the equipment on which they are installed, or at an angle, in pairs, to generate a twisting action for a rotary motion.

The motor is a dual wound for 208/230 volt and 460 volt 3 phase 60 cycle operation. A single wound motor is used for 550 volt, 3 phase, 60 cycle operation. For wiring details see page 5.

Each Rotary Vibrator is furnished with a thermal overload starting switch to provide protection for the motor. The vibrator MUST be operated through this switch or required protection is eliminated.

All SMH Rotary Vibrators are wired and tested at the factory for satisfactory operation, at your specified voltage, and recommended overload heaters are installed in the thermal overload switch. IF YOU OPERATE THE VIBRATOR ON A DIFFERENT VOLTAGE, BE SURE TO REPLACE OVERLOAD HEATERS AS RECOMMENDED ON PAGE 6.

INSTALLATION

Be sure surface to which the rotary vibrator is to be mounted is flat and rugged. To mount vibrator use six 1-1/2” Grade 4140 cap screws, Tightened to 1500 ft. lbs. torque.

If the rotary vibrator is to be bolted to a sub-plate, the sub-plate should be secured to the assembly by six 1-1/2” Gr. 4140 bolts tightened to 1500 Ft-Lbs torque.

Be sure wiring connections are correct for your line voltage and that the thermal overload switch is installed in the line.

The rotary vibrator is fitted with a four (4) conductor cable, one wire of which is grounded to the vibrator. Make certain that the ground lead is attached to an efficient ground, such as a water pipe or earth anchor.

OPERATION

To start the vibrator, place the starting switch in the “ON” position. The vibrator will start rotating and in few seconds reach its rated RPM. If the equipment assembly will not allow the motor to attain its rated RPM, the vibrator will draw excessive current, which if it continues will trip the overload starting switch. The motion of the vibrated equipment will determine motor RPM—The stiffer the assembly the higher the motor RPM, up to its design maximum. If it is not possible to keep the motor operating (it is drawing excessive current) and the vibrated load cannot be increased or equipment cannot be stiffened, REDUCE THE FORCE OF THE ROTARY VIBRATOR BY ADJUSTING THE ECCENTRIC WEIGHTS ON THE MOTOR SHAFT. See section titled “Thrust Adjustment”, Page 6 as to how this done.

MAINTENANCE
The RV-10209 Rotary Vibrator requires very little maintenance except lubrication of bearings. Check periodically for loose or broken bolts and/or loose cable connections.

To lubricate the bearings, apply the grease gun to fittings 14 and pump 1/2 ounce of grease into each fitting. Use Pure Oil Co. POCO HI-TEMP #2 Grease.

(a) Add grease while vibrator is running.
(b) If vibrator is mounted in a HORIZONTAL POSITION, lubricate every 90 to 100 HOURS OF OPERATION.
(c) If vibrator is mounted in an INCLINED POSITION, lubricate every 40 to 48 HOURS OF OPERATION.

THIS LUBRICATION SCHEDULE IS VERY IMPORTANT.

TROUBLE CHECK LIST

1. Check current into the vibrator.
2. Check all connections to thermal overload switch and terminal block for tightness.
3. Check operation of overload heaters.
4. Check three (3) power leads from stator for continuity.
5. Check bearings by removing one end bell and turn shaft by revolving weights. If shaft is tight, unit should be disassembled and the cause determined. If shaft is free, replace end bell before starting unit.

TO DISASSEMBLE VIBRATOR

Removal of bearing assembly, EITHER END, reference, Fig. 1, 2, and 3:

Step 1. Place vibrator on its base and remove bell (28).

Step 2. Remove weights (24) and (20) by removing lock tab (26) and weight retainer (25) and loosen screw (21). Care should be used as weights are quite heavy and difficult to handle.

Step 3. Remove grease retainer (19).

Step 4. Remove cap screws holding bearing adapter (15). Use three of these screws and insert them into the tapped holes provided. Use as jack screws, placing spacers behind them as the adapter advances from the housing (11). This gives you the bearing adapter assembly, which can be placed in a press for bearing (18) removal. (SMH recommends new bearing and seal replacements for reassembly.)

TO REMOVE SHAFT AND ROTOR ASSEMBLY, follow the above 4 steps--one end only.

Step 5. Remove second end bell (28) and weights (24) and (20) as described in Step 2.

(a) Replace second end bell (28), turn housing up on end bell and screw a 1/2"-13 eye-bolt into end shaft (13) and attach a hoist and carefully lift shaft and rotor assembly from housing (11). Remove second end bell and bearing adapter assembly for inspection.

TO REMOVE STATOR

Step 6. Remove the two (2) set screws (10) in side of housing (11) and disconnect leads from the terminal block (4).
(a) Place housing (11) on the end WITH THE STATOR LEADS IN THE UP POSITION. The stator (12) must be pressed out in the direction opposite to the lead wires so that the leads can be fed down through the cast hole in housing. This is necessary to prevent damage to the leads.

(b) To press stator (12) from housing (11) use a steel ring against the lamination (never against the wiring) and use a firm mechanical pressure.

TO REASSEMBLE VIBRATOR

Reference, Fig. 1, 2 and 3:

**Step 1A**  Press stator (12) into housing (11) using a firm mechanical pressure. (SMH recommends a steel ring 9-1/4” I.D. x 9-3/4” O.D. x 3-3/8” in height). To be used against the laminations of the stator (never against the wiring).

(a) If the old stator checks satisfactorily and is reused, be sure to align set screw holes with the tapped holes in housing and pull lead wires up through housing hole as the stator (12) is pressed into the housing (11). Be sure the leads are well protected where they pass through hole in housing to prevent damage to the wires. Install two (2) set screws (10).

(b) Wire leads into terminal block (4) in accordance with wiring information on page 6.

**Step 1B**  If a new stator (12) is being installed, use the recommended steel ring. Align the stator leads with the hole provided in the housing, square the stator apply a firm mechanical pressure. Press the stator (12) into the housing (11), pulling the insulated leads through the cast hole in the housing as stator is being pressed. Be sure leads are well protected. For proper location of the stator in the housing, it should be 3-3/8” from the lamination of the stator (12) to the face of the housing (11). Check to be sure the dimension on opposite side is the same. STATOR MUST BE CENTERED IN HOUSING.

(a) When stator is in proper position, drill two 9/32” diameter holes 3/16” deep in the stator through each of the tapped holes in the housing. Install two (2) set screws (10) into holes just drilled.

(b) Wire leads into terminal block (4) in accordance with wiring information on Page 6.

**Step 2.** Place housing (11) on its base and carefully place rotor and shaft assembly (13) into the housing.

**Step 3.** Install seal (29) and garter spring (30) into one bearing adapter, install adapter on shaft. Be very careful not to damage the rubber seal (29) as it passes over the shaft surface. Bolt bearing adapter (15) to housing (11).

**Step 4.** Place a shim 1-1/2” thick--THIS IS IMPORTANT—in end bell (28) in a position that the shaft will rest on it when housing is turned on end. Place the end bell into position and bolt it to the housing (11). Turn housing (11) up on end bell (28). Install second bearing adapter (15) with seal (29) and garter spring (30) in place over shaft; (See Fig. 1, Page 7). Be careful not to damage seal as it passes down over shaft surface.
**Step 5.** Before pressing bearing (18) into adapter, prepack grease into bottom of adapter cavity.

(a) When pressing bearing (18) into place, apply the same amount of pressure to the outer and inner races of the bearing.

(b) When the bearing is in place against adapter shoulder, pump grease into the adapter through grease fitting (14) and rotate shaft until grease is visible around the rollers of the bearing.

**Step 6.** Place seal and garter springs (31) and (32) into grease retainer (19).

(a) Prepack grease retainer cavity with grease before installing on bearing adapter.

(b) Assemble grease retainer (19) to bearing adapter (15).

**Step 7.** Place housing (11) on its base and remove end bell (28). Now place shim and end bell on opposite end of housing. Place shim so shaft will rest on it. Turn housing on end bell and press bearing (19) into adapter following step 5.

**Step 8.** Follow step 6 and assemble grease retainer (19) in place. Place housing (11) on its base and remove end bell (28).

NOTE: All cap screws must be drawn up tight and secure.

**Step 9.** TURN SHAFT BY HAND. IF THERE IS BINDING, SOMETHING IS WRONG AND MUST BE CORRECTED BEFORE PUTTING UNIT INTO SERVICE.

**Step 10.** If thrust of vibrator is not to be changed, install weights (24) and (20) as they were removed to both shafts ends. If thrust of vibrator is to be changed follow information provided on Page 6. Be sure to tighten screw (21) on weights and that key (23), weight retainer (25) and lock tab (26) are in place in both ends.

**Step 11.** Install end bells (28).

![Wiring Diagram](image)

The rotary vibrator motor is dual wound for 208/230 volt and 460 volt 3 phase 60 cycle operation. A single wound motor is used for 550 volt, 3 phase, 60 cycle operation.

When wiring is completely and secured for proper operating voltage according to wiring diagram, place insulation (3) into housing (11) for wire protection. Install gasket (2) and cover (1) according to Figure 2.

NOTE: To change the direction of rotation of the weights, reverse any two wires of the incoming line.

CAUTION: In the event the motor is changed in the field from one voltage to another, THE OVERLOAD HEATERS IN THE THERMAL OVERLOAD SWITCH MUST ALSO BE CHANGED. The heaters to be used are as follows:
NOTE: ALL SMH Rotary Vibrators are furnished with a thermal overload starting switch to provide protection for the motor, and the vibrators MUST be operated thru this switch.

THRUST ADJUSTMENT

The thrust of these vibrators is adjustable by rotating the adjustable (24) relative to the fixed weights (20). One of each on each end.

In order to make this adjustment, remove both end bells (28) and……

1. Remove screw (27) and loosen screw (21) in the adjustable weight (24).

2. Rotate the adjustable weight (24) relative to the fixed weight (20) to the position that gives the desired resultant force. See table (below) of resultant forces.

3. When adjusting the thrust, THE WEIGHTS ON BOTH ENDS MUST BE SET AT THE SAME POSITION AND IN THE SAME DIRECTION. See positions 1, 2, and 3.

NOTE: When weights are adjusted, tighten screws (27) and (21) in weight (24). REPLACE END BELLS.

RESULTANT FORCE AT VARIOUS SETTINGS
Pos. 1 Pos. 2 Pos. 3
20,000 16,400 13,000

RESULTANT EFFORT AT VARIOUS SETTINGS
Pos. 1 Pos. 2 Pos. 3
Effort Effort Effort
Lbs.-inches Lbs.-inches Lbs.-inches
925 760 600

METHOD OF CALCULATING AMPLITUDE OF STRUCTURE

\[
E = \text{Eccentric weight effort in pounds-inches.}
\]
\[
W = \text{Weight of structure (mounted on isolators) to be vibrated in pounds. (Includes weight of rotary vibrator – 1150 lbs.)}
\]
\[
A = \text{Amplitude of structure in inches.}
\]
\[
S = \text{Total stroke in inches} = 2A
\]
\[
E = W \times A A = \frac{E}{W}
\]
Example:

W = 2000 lbs. (weight of isolated structure).

E = 760 lbs. – Inches (Position 2)

A = \frac{W}{E} = \frac{2000}{760} \approx 2.63 \text{ inches}

S = 2A \times 0.38 = 2 \times 2.63 \times 0.38 \approx 1.85 \text{ inches}.
# PARTS LIST

## MODELS RV-10209-A AND RV-10209-B ROTARY VIBRATORS

<table>
<thead>
<tr>
<th>ITEM NO.</th>
<th>PART NO.</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>A-78926</td>
<td>Terminal Box Cover</td>
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<tr>
<td>2.</td>
<td>A-79298</td>
<td>Gasket</td>
</tr>
<tr>
<td>3.</td>
<td>A-81335-B</td>
<td>Insulation</td>
</tr>
<tr>
<td>4.</td>
<td>174X4</td>
<td>Terminal Block</td>
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<tr>
<td>5.</td>
<td>A-87402</td>
<td>Gasket</td>
</tr>
<tr>
<td>6.</td>
<td>A-22310-G</td>
<td>Eye Bolt</td>
</tr>
<tr>
<td>7.</td>
<td>A-79370</td>
<td>Cable Assembly</td>
</tr>
<tr>
<td>8.</td>
<td>102X29</td>
<td>Cable Grip</td>
</tr>
<tr>
<td>9.</td>
<td>367X1</td>
<td>Strain Relief</td>
</tr>
<tr>
<td>10.</td>
<td>H0410400</td>
<td>Set screw 1/2&quot;-13 x 3/4&quot;</td>
</tr>
<tr>
<td>11.</td>
<td>D-78922-A</td>
<td>Housing</td>
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<tr>
<td></td>
<td></td>
<td>Motor Stator – 550V., 60 CY.</td>
</tr>
<tr>
<td></td>
<td>B-136784-A1</td>
<td>Motor Stator – 230/460V., 60 CY. For RV-10209B only.</td>
</tr>
<tr>
<td></td>
<td>B-136784-B1</td>
<td>Motor Stator – 550V., 60 CY.</td>
</tr>
<tr>
<td>13.</td>
<td>B-78928</td>
<td>Shaft and Rotor Assembly – For RV-10209A only.</td>
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<tr>
<td></td>
<td>B-136784-A2</td>
<td>Shaft and Rotor Assembly – For RV-10209B only.</td>
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<tr>
<td>14.</td>
<td>151X7</td>
<td>Grease Fitting</td>
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<td>15.</td>
<td>B-78923-A</td>
<td>Bearing Adapter</td>
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<tr>
<td>16.</td>
<td>31X160</td>
<td>Bearing</td>
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<tr>
<td>17.</td>
<td>B-78924-A</td>
<td>Grease Retainer</td>
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<tr>
<td>18.</td>
<td>B-108850</td>
<td>Weight (Fixed)</td>
</tr>
<tr>
<td>19.</td>
<td>28X713</td>
<td>Cap Screw 5/8&quot;-18 x 6&quot; Hi Carbon H.T.</td>
</tr>
<tr>
<td>20.</td>
<td>H0105005</td>
<td>Hex Nut 5/8&quot;-18 (Stover Grade B)</td>
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<tr>
<td>21.</td>
<td>A-108873</td>
<td>Key</td>
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<tr>
<td>22.</td>
<td>B-108849</td>
<td>Weight (Adjustable)</td>
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<td>23.</td>
<td>A-86629</td>
<td>Weight Retainer</td>
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<tr>
<td>24.</td>
<td>A-80668</td>
<td>Lock Tab</td>
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<tr>
<td>25.</td>
<td>H0318901</td>
<td>Cap Screw 5/8&quot;-18 x 2-1/4&quot;</td>
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<tr>
<td>26.</td>
<td>B-80121</td>
<td>End Bell (Solid)</td>
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<tr>
<td>27.</td>
<td>A-97132-A1</td>
<td>Grease Seal</td>
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<tr>
<td>28.</td>
<td>A-96131-A2</td>
<td>Garter Spring</td>
</tr>
<tr>
<td>29.</td>
<td>A-97132-B1</td>
<td>Grease Seal</td>
</tr>
<tr>
<td>30.</td>
<td>A-96131-A3</td>
<td>Garter Spring</td>
</tr>
<tr>
<td>31.</td>
<td>H0315001</td>
<td>Cap Screw 1/2&quot;-13 x 1&quot;</td>
</tr>
</tbody>
</table>

WHEN ORDERING REPAIR PARTS, GIVE COMPLETE NAME PLATE DATA.
Important

Syntron Material Handling reserves the right to alter at any time, without notice and without liability or other obligations on its part, materials, equipment specifications, and models. Syntron Material Handling also reserves the right to discontinue the manufacture of models, parts, and components thereof.

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