

WORKMASTER[®]

WE FIND A WAY — OR MAKE ONE!

CAR-ROCKER[®]

RAILCAR VIBRATORS

**CRR
Roller
Series**



OWNER / OPERATOR MANUAL

WORKMASTER disclaims any liability for injuries, death or damages arising directly or indirectly, from the use, operation, or application of this product not in accordance with the procedures, specifications and recommendations contained in this owner's manual. The user of this product is responsible to install, maintain and operate the product and parts or components manufactured or supplied by **WORKMASTER** in such a manner as to comply with all federal, state, and local rules, ordinances, regulations, and laws, including the Williams-Steiger Occupational Safety Act, and the American National Standards Institute Safety Code.

SYMBOLS

The following symbols are found throughout this Owner/Operator's Manual to alert the reader to the relative danger that may result from non-observance.



This indicates a situation in which a hazard is imminent and will result in a high probability of serious injury or death.



This indicates a potentially hazardous situation, which could result in minor to moderate injury.



CAUTION

This indicates a potentially hazardous situation or unsafe practice which could result in product or property damaged.



IMPORTANT

This symbol indicates a general statement to assist the user in the operation or maintenance of the equipment.

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I. INTRODUCTION

Fast, safe, and economical unloading of hopper cars continues to be a problem at most unloading sites. One of the biggest contributors to this problem is the often time-consuming and difficult job of emptying the railcar. Load compaction, weather conditions, age, abuse, or corrosive or gritty bulk materials can combine to make this task increasingly difficult.

Regardless of cause, the costs associated with the problem are significant. Delays in emptying the hopper cars means slow car turnaround, increased demurrage costs, and interrupted production schedules.

To meet our commitment of **"WE FIND A WAY – OR MAKE ONE®"**, **WORKMASTER** has developed a line of Railcar Vibrators and accessories which provide a safe, efficient, and economical solution to the problem of unloading easy, medium, and hard-to-empty hopper cars.

This Operation Manual details the specifications, operation, maintenance, and safe use of the **CRR Series of Railcar Vibrators**. Experience has shown that the **CRR Series Vibrators** will help unload the most difficult railcars. However, the same experience demonstrates that total satisfaction-in-use depends on attention to detail in operating and maintaining the unit.



IMPORTANT

All workers involved in the operation and maintenance of this equipment should be thoroughly familiar with the contents of this Operator's Guide.

II. SAFETY

To prevent injury to yourself or others, and/or damage to equipment, you should adhere to the following basic safety instructions.

1. Carefully read the entire Owner/Operator's Manual prior to installing or operating equipment.
2. Always follow proper precautions and use proper tools and safety equipment.
3. Be sure to receive proper training.
4. Always use the equipment and all its components in applications for which they are approved.
5. Be sure to assemble all components correctly.
6. Never use worn, defective or damaged components.
7. Always Practice good housekeeping and maintain good lighting around all equipment.
8. Perform Lock-out/Tag-out procedure on all energy sources to the equipment, mounting structure, loading and discharge systems in accordance with ANSI Standards before installation or maintenance.

III. REQUIRED MATERIALS

The following items are not supplied with your **WORKMASTER** Railcar Vibrator but are necessary for its proper installation and operation.

- ☑ CLEAN, DRY, REGULATED and LUBRICATED compressed air supply at required PSI and CFM Volume
- ☑ High-quality air hose: 3/4" - 1" ID, preferably fitted with a Universal (Chicago type) coupling.

IV. AIR SUPPLY REQUIREMENTS

CRR Railcar Vibrators can be operated continuously at 85 to 90 PSI. Vibrator speed should be controlled with a Pressure Regulator w/ Gauge, and Ball Valve. Dry, filtered, and lubricated air is essential to proper operation and long Vibrator life. The ideal installation will incorporate a 3/4" or 1" Filter-Regulator-Lubricator (FRL) assembly as close to the Vibrator as is practical (no more than 25'). Regulator should have a working pressure gauge to measure PSI flow to Vibrator.

The air supply hose must be the same size as the inlet diameter of the Vibrator (3/4"). If the hose length is over 25', the next larger hose (1") should be used. 3/4" Hose and Pipe Fittings must be used throughout the Air Supply to not restrict the System's air flow to the Vibrator. The Vibrator should always be started at a high speed (instantaneous burst of full pressure [85 – 90PSI]), and then throttled back with the Ball Valve to the frequency that assures optimum railcar emptying performance. Care should be taken that an uncoupled air hose isn't dropped in the dirt and then immediately re-coupled allowing dirt to enter the hose and then the Vibrator.



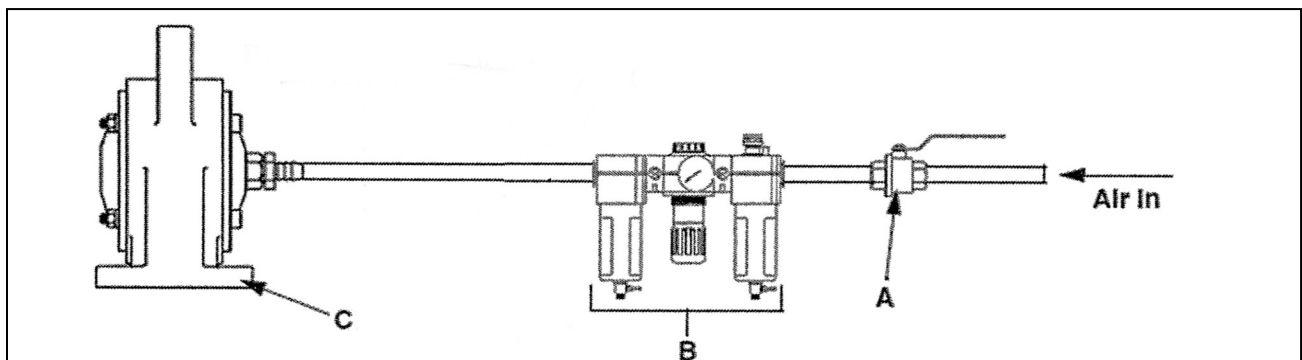
IMPORTANT

Lubricated air must be used to ensure proper operation of the vibrator. Set lubricator to deliver 2–4 drops of oil per minute. Use **WORKMASTER Vibra-Lube** vibrator oil or an equivalent.

Run a lubricated airline (supplied by the Customer) to the intake on the vibrator as shown below. See APPENDIX D AIR SUPPLY PIPING for recommended pipe sizes.

- a. Connect airline to ball valve (A), and Filter/Regulator/Lubricator (FRL) Assembly (B) Set lubricator to deliver 2–4 drops per minute.
- b. Connect air to vibrator (C).

Connecting Airline



V. OPERATION

1. Verify that the Vibrator is properly seated in the Cradle Lug Bracket and that the Nut on the Bracket's Tie Bolt is tightened.



IMPORTANT

The Vibrator must be tightened securely, started, and then re-tightened while running. Running the Vibrator assists in seating the Tie Bolt and Nut securely, it is impossible to tighten too securely. Any unusual sound (eg, pounding), coming from the Vibrator usually means that the Tie Bolt Nut has loosened. It is bad practice to leave the Vibrator unattended during operation.

2. Use both the **CAR-ROCKER** Vibrator's Top Handle and the Bracket's Side Handle to easily lift and place the CRR Assembly into the Railcar's female wedge bracket.
3. Vibrator is shipped without lubrication. Add oil to your Lubricator/Oiler or hold the air hose feeding each Vibrator above the Vibrator and pour 1-1/4 oz of Vibrator Oil (eg, **WORKMASTER's** VIBRA-LUBE) into the hose inlet.
4. Before connecting the air supply hose to the Vibrator, make sure there is no dirt or water in the hose. Blow-out the hose line for 30-45 seconds prior to connecting to the Vibrator.
5. IF the Site doesn't use an Automatic Lubricator, lubricate the Vibrator every day before use. For continuous use applications lubricate every 4-5 hours of operation. If the site does use an Automatic Lubricator, make sure it is filled with Vibrator Oil.
6. Connect the air supply hose to the Vibrator. Make sure all hose and pipe connections are secure, and re-check periodically during each operating shift.
7. Use a Couplings Safety Pin and a WHIPCHECK hose-to-hose connector to secure connections.



Always use a WHIPCHECK Safety Cable to connect air hoses across couplings to prevent a pressurized hose from uncontrolled flailing if the coupling connection separates.

8. When the Railcar's slide gate is opened, you are ready to vibrate.



IMPORTANT

Never vibrate the Railcar with the slide gate closed, to not further compact the material in the hopper car.

Start the Vibrator by quickly and fully turning ON the air to the Vibrator (instantaneous burst of 85-90 PSI).



IMPORTANT

Slowly energizing the airline does not produce enough force to get the Vibrator's heavy-duty inner and outer rollers into motion.



IMPORTANT

A Vibrator is transmitting maximum force when there is little, if any, visible movement of the Vibrator. Operators must abandon the false notion that to do a good job, the Vibrator itself should show great movement while in operation.

9. When finished vibrating the Railcar, shut the air OFF, disconnect the main airline from the Vibrator's Hose Whip and carefully lift the **CAR-ROCKER** out of the Pocket.
10. After prolonged use it may be difficult to remove the Vibrator from the Pocket's Female Wedge Bracket. If this occurs, turn the airline pressure down to 5-10 PSI and allow the Vibrator to "sputter" (will lessen friction) as you remove it from the Pocket.

VI. MAINTENANCE

Proper maintenance of the Vibrator begins with the complete disassembly, cleaning, and inspection – but depends on the ability of the Service Technician to determine whether a part or assembly is worn to the point it should be replaced. The following information is intended to help the Service Technician in making this decision.

DISASSEMBLY

1. Remove the Hose Whip from the Vibrator.
2. Remove the Adapter from the Inlet Port.
3. Remove the Hex Nuts, Washers and Socket-Head Through Bolts that hold the Endplates in place.
4. Press the Endplates off the Housing with the aid of an arbor press or a hydraulic press. This is accomplished by positioning the Housing on its Mounting Lugs and pressing on the Shaft, preferably on the side with the Inlet Port.
5. Do not allow the Rotor Shaft or Vane to fall to the ground when Endplates are pressed off.



IMPORTANT

Note the position of the Vane as it is removed. The Vane must be returned to the exact position it was in when removed.

INSPECTION AND REPAIR

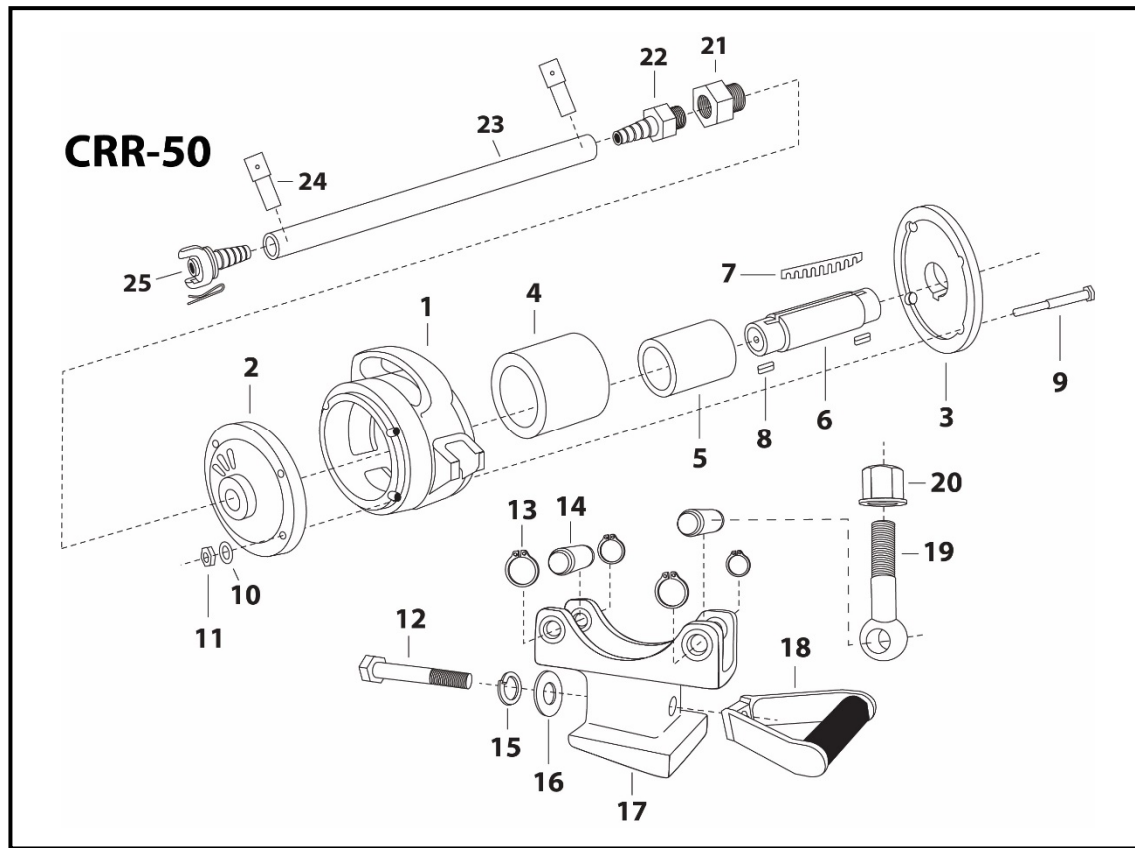
1. Clean all parts and remove all burrs. Internal parts can be cleaned with a good grade of commercial solvent.
2. Examine the CRR's Rollers and inspect inside diameter of Housing. Wear-groove marks in the Housing are usually caused by foreign matter in the airline. Minor groove scoring and rust can be removed with a 150-grit abrasive cloth.

3. Examine the ends of the Roller for roughness. If necessary, smooth them with 150-grit abrasive cloth on a flat surface. Inspect and clean the series of holes inside the Rotor's Vane Slot to make sure they are free of dirt and debris. Inspect the Vane Slot for wear or burrs. A new Vane should move in and out of the Slot freely. If necessary, use a honing stone to break away any sharp edges found on the corners of the Slot.
4. The Endplates will show wear marks on the inner face. Light score marks can often be lapped out with abrasive cloth. If marks are deep (over .030"), or if the Endplates are severely grooved, they must be replaced. Cracked Endplates must be replaced.
5. The Vane is the most frequently worn-out part of the Vibrator since it is subjected to a high level of force-movement and friction. If the Vane is worn down to a width of .398" (80% of its original width of .498") or has an excessive concave area on the flat side, it must be replaced. A Vane found to be within wear limits may be cleaned in solvent or degreaser and lapped on the slotted side. Place a sheet of 400-grit, waterproof sandpaper or fine Emery Cloth on a flat surface and lightly lap the slotted side of the Vane. This will clean the Vane but will not remove so much material it will affect the performances of the Vibrator. Be sure to lap only the slotted side of the Vane so as not to disturb the varnished side. The upper edge of the Vane must be flush with the upper lip of the Rotor Shaft slot. It should not be necessary to remove material from the length of the Vane. Finally, be sure the refurbished Vane will move freely in the Rotor slot.
6. It is best practice to replace the four (4) through-bolts, lock washers and elastic lock nuts when servicing the Vibrator, due to the stress created during vibration.
7. After parts have been inspected and, where needed, replaced, they should be wiped down with a lightweight spindle oil or the VIBRA-LUBE Vibrator Oil used in the lubricator. The addition of oil leaves a rust preventive film on the parts.

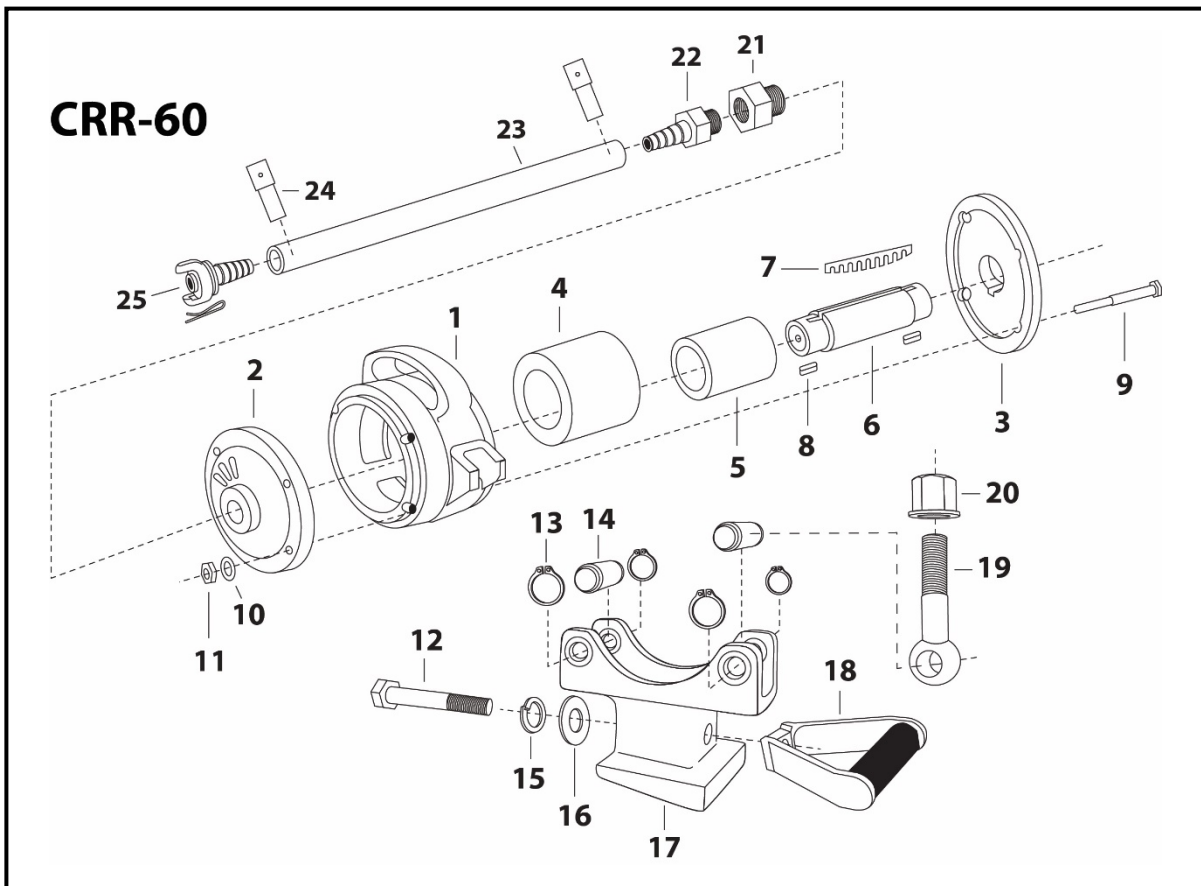
ASSEMBLY AND TESTING

- 1.** Replace Vane in the Rotor Shaft, **REMEMBER:** THE VANE MUST BE PUT BACK IN THE SAME POSITION AS IT WAS AT DISASSEMBLY. When looking at the Inlet Port on the Rotor Shaft position the slotted side of the Vane to the right. The slotted side of the Vane should point away from the exhaust ports in the Front Endplate.
- 2.** Install Small Roller and then Large Roller.
- 3.** Replace the two (2) Keys and press Endplates back onto Housing. Be sure that all holes are aligned BEFORE pressing Endplates into place. It is helpful to use two of the Housing Thru-Bolts to assure proper alignment of both Endplates and Housing before pressing Endplates into place. Insert and tighten all four (4) Socket-Head Cap Bolt Kits to 65 ft/lbs of torque in an even cross pattern. After running the Vibrator for several minutes, it is good practice to re-torque all four (4) Bolt Kit Hex Nuts.
- 4.** Replace Hose Whip.
- 5.** Pour 1-1/4" ounces of VIBRA-LUBE Vibrator Oil into the Hose Whip and allow it to flow into the Vibrator. The unit is now ready to be returned to service.

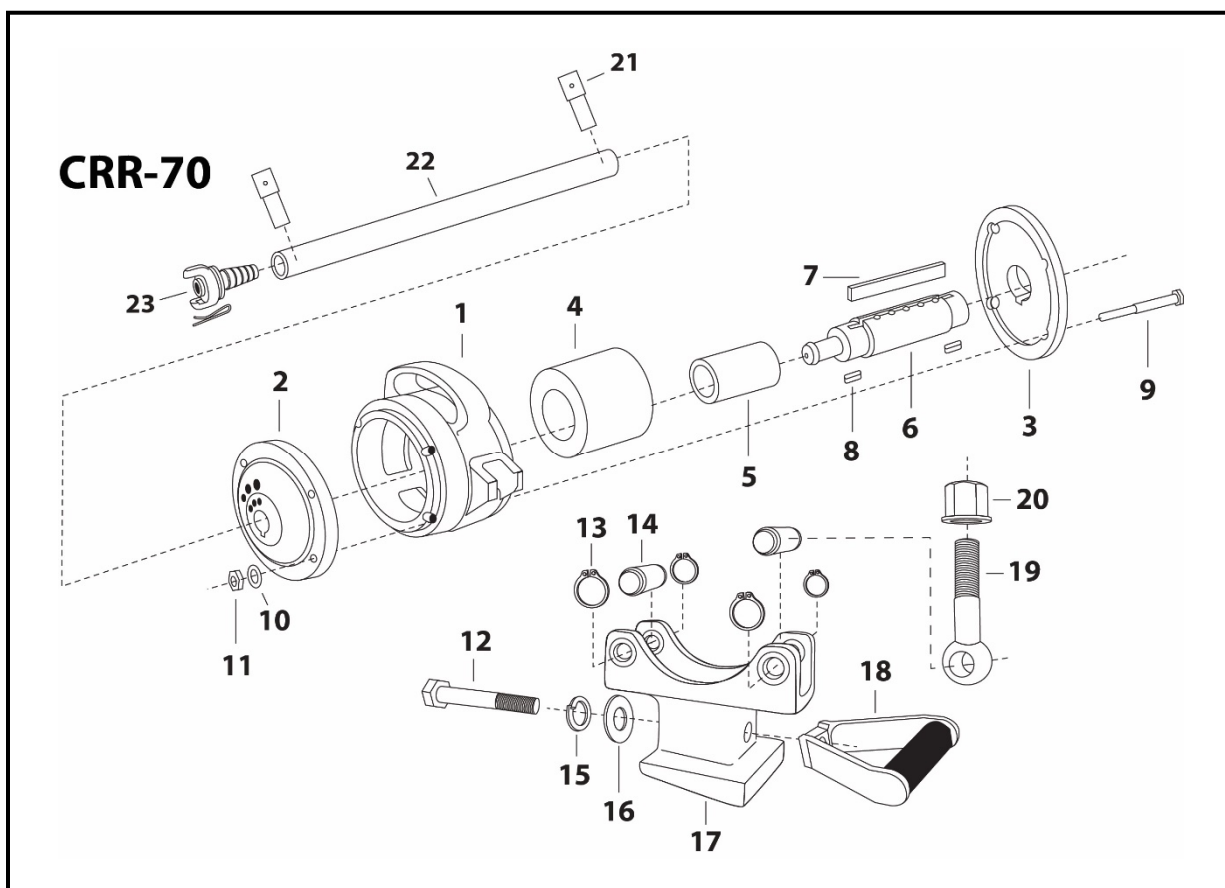
APPENDIX A: EXPLODED VIEW PARTS CUT



Item #	Part #	Description	Req		Item #	Part #	Description	Req
1	32-17879	Housing	1		15	75-90900	Lock Washer	1
2	32-14148	Front Endplate	1		16	75-80900	Washer	1
3	32-14142	Rear Endplate	1		17	32-17871	Base	1
4	32-14154	Outer Roller	1		18	32-17801	Side Handle	1
5	32-14146	Inner Roller	1		19	32-17321	Tie Rod	1
6	32-14143	Rotor Shaft	1		20	32-17875	Nut w/ Washer	1
7	32-14144	Vane	1		21	32-14158	Thread Adapter	1
8	32-14237	Key	2		22	3514	Hose Barb	1
9-11	32-16261	Bolt Kit	1		23	83-00075-HD	Air Hose	2
12	75-12924	Bolt	1		24	F5	Band Clamp	2
13	32-17873	Ret Ring	4		25	AM6	Coupling	1
14	32-17874	Pin	2					



Item #	Part #	Description	Req	Item #	Part #	Description	Req
1	32-17879	Housing	1	15	75-90900	Lock Washer	1
2	32-14148	Front Endplate	1	16	75-80900	Washer	1
3	32-14142	Rear Endplate	1	17	32-17871	Base	1
4	32-14145	Outer Roller	1	18	32-17801	Side Handle	1
5	32-14146	Inner Roller	1	19	32-17321	Tie Rod	1
6	32-14143	Rotor Shaft	1	20	32-17875	Nut w/ Washer	1
7	32-14144	Vane	1	21	32-14158	Thread Adapter	1
8	32-14237	Key	2	22	3514	Hose Barb	1
9-11	32-16261	Bolt Kit	1	23	83-00075-HD	Air Hose	2
12	75-12924	Bolt	1	24	F5	Band Clamp	2
13	32-17873	Ret Ring	4	25	AM6	Coupling	1
14	32-17874	Pin	2				



Item #	Part #	Description	Req		Item #	Part #	Description	Req
1	32-17879	Housing	1		14	32-17874	Pin	2
2	32-14108	Front Endplate	1		15	75-90900	Lock Washer	1
3	32-14101	Rear Endplate	1		16	75-80900	Washer	1
4	32-14104	Outer Roller	1		17	32-17871	Base	1
5	32-14105	Inner Roller	1		18	32-17801	Side Handle	1
6	32-14102	Rotor Shaft/Hose Fitting	1		19	32-17321	Tie Rod	1
7	32-14183	Vane	1		20	32-17875	Nut w/ Washer	1
8	32-14103	Key	2		21	F4	Band Clamp	2
9-11	32-16261	Bolt Kit	1		22	83-00058	Air Hose	2
12	75-12924	Bolt	1		23	AM5	Coupling	1
13	32-17873	Ret Ring	4					

APPENDIX B: PERFORMANCE DATA

CRR Series

Model	Unbal	FREQUENCY (VPM)			FORCE OUTPUT (LBS)			AIR CONSUMPTION (CFM)		
	In-Lbs	40 PSI	60 PSI	80 PSI	40 PSI	60 PSI	80 PSI	40 PSI	60 PSI	80 PSI
CRR-50	1.40	9200	12500	14000	3250	5500	7020	42	55	60
CRR-60	3.40	105000	10000	12500	5200	8950	10395	35	49	52
CRR-70	3.80	9500	9200	11000	12000	13300	14580	48	60	70

APPENDIX C: TROUBLESHOOTING

Use the Table below as a guide to help solve possible operational problems. If you experience any Symptoms not covered in the Table, or the Cause(s) is determined not to be the reason(s), call **WORKMASTER** or your Regional **WORKMASTER** Distributor for assistance.

PROBLEM	POSSIBLE CAUSES
Lack of Power	- Air Supply Too Small - Hose Too Small - Fitting(s) Too Small - Dirty Air - Air Pressure Too Low - Airline Filter Clogged - Insufficient Lubrication - Incorrect Lubricant - Worn End Plates - Air Leakage - Worn Air Vane
Speed Too Low	- Air Supply Too Small - Hose Too Small - Fitting(s) Too Small - Dirty Air - Air Pressure Too Low - Airline Filter Clogged - Insufficient Lubrication - Incorrect Lubricant - Worn End Plates - Weak Mount - Mount Breakage - Worn Air Vane
Speed Too High	- Air Pressure Too High
Air "Blow-By"(Won't Run)	- Dirty Air - Water in Air - Insufficient Lubrication - Incorrect Lubricant - Worn Air Vane
Exhaust Freezes	- Water in Air
Parts Rusting	- Water in Air - Insufficient Lubrication - Incorrect Lubricant
Can't Adjust Speed	- Air Supply Too Small - Hose Too Small - Fitting(s) Too Small - Air Pressure Too Low - Filter Screen Clogged
Rough ID of Cylinder	- Dirty Air - Air Pressure Too High - Insufficient Lubrication
Breakage of Internal Parts	- Dirty Air - Water in Air - Air Pressure Too High
"Hunting" (Varying) Speed	- Dirty Air - Air Pressure Too Low - Insufficient Lubrication - Incorrect Lubricant
High Air Consumption	- Air Pressure Too High - Worn End Plates - Operation at Too High Speed - Air Leakage
"Erratic" Start-Up	- Air Supply Too Small - Hose Too Small - Fitting(s) Too Small - Worn Air Vane - Air Pressure Too Low

PROBLEM	POSSIBLE CAUSES
Stalling	- Dirty Air - Air Pressure Too Low - Airline Filter Clogged - Insufficient Lubrication - Incorrect Lubricant - Worn Air Vane - Inlet Clogged; Restricted; Closed
Excessive Noise	- Fitting(s) Too Small - Dirty Air - Water in Air - Air Pressure Too High - Air Pressure Too Low - Airline Filter Clogged - Insufficient Lubrication - Operation at Too High Speed - Air Leakage - Weak Mount - Mount Breakage

APPENDIX D: AIR SUPPLY PIPING

Use the Table below as a guide for sizing the airlines routed to your Vibrator. Never pipe air directly into the Vibrator. Instead, use a rubber Hose Whip (at least 2-foot long) to connect your airline to the Vibrator. The Hose Whip will absorb the shock generated by operating the Vibrator. This will save wear and tear on your Vibrator, its fittings & couplings, and air supply piping. The appropriate Hose Whip can be purchased from your Regional **WORKMASTER** Distributor.

Recommended Pipe Size for Compressed Air Flow to 125 PSI									
Air Volume	Pipe Length – feet (')								
	Nominal Pipe Diameter – inches (")								
CFM	25'	50'	75'	100'	150'	200'	300'	500'	1000'
6	1/2"	1/2"	1/2"	1/2"	1/2"	1/2"	1/2"	3/4"	3/4"
18	1/2"	1/2"	1/2"	3/4"	3/4"	3/4"	3/4"	1"	1"
30	3/4"	3/4"	3/4"	3/4"	1"	1"	1"	1-1/4"	1-1/4"
45	3/4"	3/4"	1"	1"	1"	1"	1-1/4"	1-1/4"	1-1/4"
60	3/4"	1"	1"	1"	1-1/4"	1-1/4"	1-1/4"	1-1/2"	1-1/2"
90	1"	1"	1-1/4"	1-1/4"	1-1/4"	1-1/4"	1-1/2"	1-1/2"	2"
120	1"	1-1/4"	1-1/4"	1-1/4"	1-1/2"	1-1/2"	1-1/2"	2"	2"
150	1-1/4"	1-1/4"	1-1/4"	1-1/2"	1-1/2"	2"	2"	2"	2-1/2"
180	1-1/4"	1-1/2"	1-1/2"	1-1/2"	2"	2"	2"	2-1/2"	2-1/2"
240	1-1/4"	1-1/2"	1-1/2"	2"	2"	2"	2-1/2"	2-1/2"	3"
300	1-1/2"	2"	2"	2"	2"	2-1/2"	2-1/2"	3"	3"
360	1-1/2"	2"	2"	2"	2-1/2"	2-1/2"	2-1/2"	3"	3"

APPENDIX E: COMPRESSED AIR SYSTEM

View the plant's air supply as a power transmission utility system. Correctly designed, installed, and maintained, no other utility is as powerful, economical, and unique as your Compressed Air System. The top performance of any air-driven device only occurs when the required operating PSI (air pressure) and CFM (air volume) are supplied, maintained, and controlled. Be sure to:

1. Eliminate or compensate for air leaks in pipes, couplings, valves, and fittings.
2. Check that the ID of the couplings & supply hose are at least the size of the Opener's NPT tapped inlet port (eg, 1" NPT inlet = ID Hose > 1").

Use a **Filter** (< 40µm) to make sure the air supply is kept as clean and dry as possible. An air tool operated with excess moisture or contaminants in the system will suffer poor performance, premature wear, increased maintenance and downtime, and higher noise levels. The filter must be drained regularly, and its filtration element regularly cleaned or replaced. A **Regulator w/ gauge** is required so that the air tool's force, frequency, energy (air) consumption and noise can be adjusted and controlled. A **Lubricator** will extend the air tool's life. The Lubricator must be correctly sized, pressurized, oil-flow adjusted, and installed as close to the air tool as practical.

The lubrication rate must be tailored to specific needs. Precise control is difficult to achieve – it's affected by airflow (CFM), air pressure (PSI), oil level, temperature, and viscosity. **Do not over-lubricate.** Most devices need only a small amount of oil. Oil flooding causes: (1) sluggish operation; (2) oil laden exhaust air which causes: (a) back-pressure due to clogged mufflers; (b) product or atmosphere contamination. Regularly check Lubricator's oil level. Use only **WORKMASTER** recommended oil (eg, **WORKMASTER's TOOL-LUBE Air Tool Oil PN: 36-21010**), or a *high-grade* air motor oil.

APPENDIX F: HAND-HELD TACHOMETER

The Hand-Held Tachometer is used to measure the frequency (vibrations per minute – VPM) of a running Vibrator. We recommend the **WORKMASTER VIBRA-TAK™** Slide Rule Tachometer which is the simplest and easiest to carry and use tachometer on the market.

VIBRA-TAK Tachometer; Std Speed; 2,000 to 20,000 VPM



Part #: 31-10000

HOW TO USE:

1. Press the bullet nose against the airline feeding the Vibrator, about 6 -12" away from the Vibrator's inlet.
2. Move tuning slide up/down scale until Reed reaches maximum "throw."
3. Multiply reading by 1000 vibrations-per-min.
4. The "throw" of the Reed is in direct proportion to speed and amplitude. Each 1/2" of "throw" equals .001" amplitude.

Ask about other Railcar Products

Such as . . .

Our RAILCAR GATE
OPENERS



WORKMASTER has the Railcar Gate Opener you need to eliminate the safety and productivity problems with the dangerous, dirty, and slow job of unloading railcars. We offer the industry's most complete line of Openers for hopper bottom railcars. Based on factors such as number of cars loaded, unloading site conditions including available utilities (compressed air pressure and volume, 3-phase power, etc), site security, and budget, a Customer can choose between a number of wheeled-cart, beam-mount, and portable Gate Openers available in pneumatic, electric, Battery, or manual power.

WORKMASTER

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