

INSTALLATION, OPERATION, AND MAINTENANCE MANUAL



This manual must be read by installation, operating, and maintenance personnel, prior to receipt of the equipment. Subsequently, please keep this manual in an accessible location for future reference. In the interest of continual technical advancement, ACTION reserves the right to amend specifications or designs without prior notice and without incurring obligations. Last revised on 8/16/21. For further assistance, please contact ACTION at the number listed below.

ACTION VIBRATORY EQUIPMENT

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ACTION VIBRATORY EQUIPMENT

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ACTION VIBRATORY EQUIPMENT

Thank you for selecting Action Vibratory Equipment for your vibratory equipment requirements.

Included for your reference is a copy of our Installation, Operation, and Maintenance Manual.

After thoroughly reviewing the manual, please sign, date, and return this form via mail or scan to email.

As a representative for your company, your signature below indicates that you have received the Installation, Operation, and Maintenance Manual and thoroughly reviewed its contents. As a safety precaution, have all personnel, including subcontractors, fully review the manual prior to working on or around vibratory equipment.

Signature _____

Print Name _____

Title _____

Company _____

Date _____

If any questions arise during the review of the Installation, Operation, and Maintenance Manual or for any other reason, please do not hesitate to call and we will respond immediately.

Please leave this manual in an accessible location for future reference.

Do not sell or transfer possession of your equipment without including the Installation, Operation, and Maintenance Manual.

(COPY – RETURN ORIGINAL)

ACTION VIBRATORY EQUIPMENT

CONGRATULATIONS

Action Vibratory Equipment (ACTION) would like to thank and gratefully acknowledge you for purchasing our equipment. Each ACTION conveyor has been manufactured to provide reliable performance. The conveyor(s) you have purchased have been built to exacting quality control standards with traditional ACTION craftsmanship. We hope you will enjoy many years of reliability with your new ACTION conveyor(s).

Please read the Installation, Operation, and Maintenance Manual carefully and completely to ensure safe and correct operation. Should you now, or at any time in the future, have a question concerning your ACTION vibrating conveyor(s), please do not hesitate to contact us.

If your conveyor(s) need(s) service, please follow the instructions outlined in the Installation, Operation, and Maintenance Manual and/or call us directly for assistance.

Our objective at ACTION is to earn your confidence and satisfaction with a quality product and the kind of service you have come to expect when purchasing an ACTION product. You have our assurance that we are firmly committed to that end and are making an earnest effort at every level to achieve it.

COPYRIGHT, PATENTS & TRADEMARKS

ACTION makes no warranty of any kind about the Installation, Operation, and Maintenance Manual, including, but not limited to, the implied warranties of merchantability and fitness for a particular purpose.

Disclaimer

All statements, technical information, and recommendations in this manual and in any guides or related documents are believed reliable, but the accuracy and completeness thereof are not guaranteed or warranted, and they are not intended to be, nor should they be understood to be, representations or warranties concerning the products described. ACTION reserves the right to make changes in the specifications of the products described in this manual at any time without notice and without obligation to notify any person of such changes.

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Trademarks

- TAPER-SLOT® Screen
- VIBRA-SNAP® Screen
- MAG-SORT® Metal Re-Claimer
- DENSE-OUT® Vibratory AIR Separator
- SUB-PAN FREE™
- SIMPLE-SORT®
- VIBRA-DISCHARGER® Metering Feeder

Patents

- VIBRA-SNAP® Screen = US Pat. 7,344,032 / US Pat. 7,654,394 / US Pat. 8,757,392 / CDN Pat. 2,569,471 / CDN Pat. 2,802,930 / CDN Pat. 2,856,767 / CH Pat. ZL 2012800578237 / EPC 1765524 / Pat. Pend.
- MAG-SORT® Metal Re-Claimer = US Pat. 7,438,187

ACTION VIBRATORY EQUIPMENT

GENERAL INFORMATION

Do not sell your equipment without the Installation, Operation, and Maintenance Manual.

Keep the Installation, Operation, and Maintenance Manual in an easily accessible place for future reference.

ACTION assumes no responsibility for equipment installed in violation of any code or regulation.

Changes or modifications not expressly approved in writing by ACTION will void the warranty. ACTION does not warrant against damage due to accident, misuse, alteration, or improper maintenance.

ACTION reserves the right to make changes in conveyors built and/or sold by them at any time without incurring any obligation to make the same or similar changes on equipment previously built and/or sold by them.

ACTION warrants to the first person that purchases said equipment for purposes other than resale. Please refer to warranty information for additional specifications.

Improper installation, adjustment, alteration, service, or maintenance can cause serious injury or property damage. If you need assistance or additional information, please consult with the factory. When requesting assistance, please provide the serial number, date of purchase, and a complete description of the problem. Do not rely on self-proclaimed experts, please give ACTION a call.

The information contained herein is intended for use by individuals possessing adequate electrical and mechanical experience. ACTION, or seller cannot be responsible for the interpretation of this information, nor can it assume any liability in connection with its use. You are responsible for making sure that your equipment is properly installed, leveled, supported, maintained, etc. Always observe all governing codes and ordinances.

ACTION may occasionally integrate components built by other manufacturers. The literature provided with these components has been made a part of the Installation, Operation, and Maintenance Manual by inclusion in the Appendix section.

INSPECTION OF CONVEYORS

All units are tested and tuned at the factory prior to shipping. Final settings are recorded for future reference. Equipment in this shipment has been inspected at the factory and released to the transportation company without known damage. ACTION **CANNOT** enter claims for damages. Upon acceptance, the carrier assumes responsibility for its safe arrival. If you receive a damaged shipment, a claim must be made with the carrier. Please inspect equipment for evidence of rough handling during shipment. If damage is found, report the damage immediately to the delivering agency.

Replacement parts may be purchased from ACTION (Phone 503-537-1111). Be certain that all loose packaged materials as listed on the bill of lading are received. Please notify truck driver of any shortage and file a claim for loss.

Installation, Operation, and Maintenance Manuals and other services are available for all current and past model vibratory equipment. Please call 503-537-1111.

MARKING

All conveyors are complete with at least one nameplate indicating design stroke, rpm, and conveyor serial number. Conveyor sections are sequentially marked with a section number on the downstream flange. When ordering parts, please reference the conveyor serial number as found on the nameplate.

ORDERING PARTS

When ordering parts, please include the complete information pertaining to each part, the serial number and type of conveyor, as well as any other pertinent information. The serial number of the conveyor is stamped on the stroke plate, which is typically located near the drive. The General Arrangement Drawing has also been included in the back of this manual for your reference. Always specify in your order by what means of shipment you wish the parts to be sent. If this matter is left to our judgment, we will ship by the least expensive method. Prices are Ex-works Newberg, Oregon unless otherwise noted.

CONTINUOUS TECHNICAL SUPPORT

Although on site service is normally not required, an on-site warranty service may be requested. In addition to per diem rates, the technician's travel expenses (transportation, lodging, meals, etc.) are payable by the customer. Experienced vibratory specialists are also available to perform:

- Equipment Inspections
- System Analysis
- Preventative Maintenance Training
- Installation and Start-Up
- Equipment Modifications and Troubleshooting

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LOCKOUT / TAGOUT

LOCKOUT PROCEDURE

Employers should ensure that a job safety analysis has been performed on all work-related tasks. Job safety analysis is a procedure used to review methods or steps for a task to identify potential hazards. Employees are encouraged to participate in job safety analysis. The task can be broken down to a sequence of steps or actions, which are used to identify hazards connected to the task or produced by the environment. Once the hazards are known, the proper solutions can be developed to eliminate or control hazards.

Employers should establish an energy control program in accordance with the requirements of OSHA 29 CFR Part 1910.147. The program should include procedures and employee training to ensure that equipment is locked out and rendered inoperative, before any employee, subcontractors, etc., performs servicing or maintenance on a piece of equipment.

All maintenance tasks should be carried out only when equipment is locked out. Employees should ensure that equipment operates properly and does not require excessive maintenance.

Employers should develop, implement, and enforce a written safety program. The implementation and enforcement of a comprehensive safety program should include task-specific safety procedures and employee training. Training is a critical element in an integrated safety program and should include the communication of task-specific safety procedures and training in the avoidance and abatement of these hazards. Employees should have the knowledge, training, and experience to perform the job that he/she is designated. Knowledge and competency are normally achieved through training or experience or a combination of both. Every new employee should work under the close supervision of a designated person until the employee is able to demonstrate the ability to safely perform the new job independently. A safety program should provide the employee with training on task-specific safety procedures.

Lockout/Tagout Procedures are intended to protect personnel working on or around the equipment by preventing accidental start up and exposure to hazardous energy release such as electrical shocks and stored energy. The procedure requires that individual locks and tags are placed on controls, shutoff switches, valves, or other devices to prevent usage until the person who installed the lock removes it. Never attempt to operate any control device when it is locked and tagged out.

1. Notify all applicable personnel, including supervisors, that a lockout is being initiated and provide the reason for the lockout.
2. If the equipment is running, use the normal stopping procedure to shut off the equipment. Once the unit is shut down double check that the shaft position of the unit is in "zero-mechanical state" – no stored energy (refer to page 36).
3. Disconnect or isolate all applicable energy sources from the affected machine, equipment, system, or function. If the equipment is hydraulic, the needle valve of all accumulators must be opened to relieve pressure.
4. Install individual assigned locking device(s) to the energy isolating devices and apply appropriate warning signs to prevent usage.
5. Observe all appropriate safety measures.
6. Always identify and locate shut off switches and controls that isolate hazardous energy.
7. Ensure that there is a stable working area.
8. Verify that no personnel are exposed to the equipment being locked out. Perform the normal start-up procedure for the equipment being locked out and ensure that the equipment does not start before service or maintenance is performed.
9. The equipment is now properly locked out.

NOTE: All operators should have their own lockout lock.

START-UP PROCEDURE

When the job for which the equipment was locked out is completed, check the equipment area, and verify that no personnel are exposed.

After maintenance is complete and the area is clear, notify all affected people and remove each assigned locking device(s) from the energy isolating devices. If applicable, close needle valves on all accumulators.

The energy isolating devices may now be operated to restore power to the equipment.

In cases where ACTION equipment is augmented by systems or machinery supplied by others, the responsibility for the safety and suitability of resultant systems rests solely with the purchaser. ACTION will supply only such safety

ACTION VIBRATORY EQUIPMENT

devices as shown on the General Arrangement Drawing(s). It is the responsibility of the purchaser to ensure that all required safety devices are obtained and properly installed. Purchaser agrees to hold ACTION harmless from any claims based upon the construction of or absence of safety devices.

LOCKOUT / TAGOUT

ACTION always offers options such as: fiberglass metal detector sections, metal detectors, screens, liners, stroke control, magnetic trap, central lube kit, etc., which may enhance a systems efficiency and/or safety. Please refer to the fold-out of our corporate brochure for other options and/or call for assistance.

NOTE: Appreciate the power of the machine. Depending upon actual rpm, a vibrating conveyor can move a given trough weight (1,000 lbs. to 20,000 lbs.) at an acceleration of 2 to 5 g's. This is derived from the equation of particle motion, $F = ma$, where F = Force, m = mass, and a = acceleration expressed as units of length divided by time squared. In a gravitational system, the weight of an object is the force exerted upon it by gravity. Designating this weight as W and the acceleration due to gravity as g , which = approx. 32.2 ft/s², the formula can be expressed as $W = mg$.

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SAFETY

Safety must be a part of every operation and every employee's responsibility at all levels. Individuals bear the primary responsibility for working safely. A little common sense and precaution can prevent most accidents from occurring. Accident prevention should be considered of primary importance in all phases of operation. The prevention of accidents is a basic requirement that each supervisor should integrate into his or her regular management function. It is equally the duty of each employee to accept and follow established safety regulations and procedures. If an employee is ever in doubt about how to do a job or task safely, it is his or her duty to ask a qualified person for assistance. Unsafe conditions must be reported immediately, no employee is required to work at a job known to be unsafe or dangerous to their health. Without question, any successful safety program must embody proper attitudes towards injury and illness prevention on the part of supervisors and employees. Through cooperative efforts between all personnel, the objective of zero accidents and injuries can be obtained.

We highly recommend that employers obtain a copy of Provision and Use of Work Equipment Regulations (PUWER). PUWER regulations were made under the Health and Safety of Work Regulations (MHSWR) in 1992 and were redrafted on December 5, 1998. For full information, it is advisable to refer to the Approved Code of Practice and Guidance, published by the HSE.

Observe all safety rules given herein along with owner and Government standards and regulations. Know and understand lockout/tagout procedures as defined by American National Standards Institutes (ANSI) z244.1-1982, *American National Standard for Personal Protection – Lockout/Tagout of Energy Sources – Minimum Safety Requirements* and Occupational Safety and Health Administration (OSHA) Federal Register, Part IV, 29 CFR Part 1910, *Control of Hazardous Energy Source (Lockout/Tagout); Final Rule*.

WARNING SIGNS

DANGER is used to indicate an imminently hazardous situation which, if not avoided, will result in death or serious injury if the warning is ignored.

WARNING is used to indicate a potentially hazardous situation which, if not avoided, could result in death or serious injury if the warning is ignored.

CAUTION is used to indicate a potentially hazardous situation which, if not avoided, may result in minor or moderate injury or property damage if the warning is ignored.

NOTE: Hazard is defined as something with the potential to cause harm.

Safety is extremely important when installing and operating vibratory equipment. A vibrating conveyor can cause serious bodily injury and is considered dangerous moving machinery. Using proper tools, clothing, and procedures, serious injury and property damage can be avoided. Accidents are typically the result of someone's carelessness or neglect. No amount of instruction or training can replace common sense, sound judgment, and acceptable safety procedures when working on or around vibratory equipment. Please consult with your safety director and ACTION if safety questions arise that are not covered herein.

A few general safety precautions are listed below. All personnel, sub-contractors, etc. should be required to review and comply with the procedures and safety guidelines set forth in this manual. Failure to do so may result in serious bodily injury and/or property damage. It is the purchaser's responsibility to ensure that all safety devices/procedures are obtained and properly installed. Purchaser agrees to hold ACTION harmless from any claims based upon the construction of, or absence of, safety devices, including any claims, loss or expense for injury or damage arising from the use of the goods. ACTION hereby disclaims any liability for injuries or damage resulting from use or application of product contrary to instructions and specifications contained herein. ACTION's liability shall be limited to repair or replacement of product shown to be defective. NOTE: Due to factors beyond ACTION's control, it is not possible for ACTION to anticipate every possible circumstance that can involve a potential hazard. Before proceeding to operate, service or repair any item, the operator or service worker must ensure that each action or procedure used is safe for all personnel, and that it will not damage the conveyor or any of its components or make them unsafe for others to use. Most importantly, think before you act and be careful.

1. **WARNING.** ALWAYS refer to ACTION General Arrangement Drawings and Installation, Operation, and Maintenance Manuals for installation, operation, and maintenance procedures.
2. **WARNING.** DO NOT put conveyor(s) into service until the machinery into which it will be incorporated has been shown to conform to all applicable safety directives.
3. **WARNING.** DO NOT use ACTION equipment for any use other than that for which it is intended. If any questions arise, refer to ACTION General Arrangement Drawings or contact the manufacturer.
4. **WARNING.** DO NOT operate vibratory equipment until the path of material flow is clear of any obstructions, all operating personnel are standing clear of the equipment, all shipping braces have been removed, and the equipment has been fully checked for loose bolts, properly anchored, etc.

ACTION VIBRATORY EQUIPMENT

SAFETY

5. **WARNING.** DO NOT operate equipment that is damaged, improperly adjusted, or not completely and securely assembled.
6. **DANGER.** NEVER operate the conveyor if the drive guard and/or shields are missing. Rotating machinery can grab loose clothing and body parts.
7. **WARNING.** NEVER operate the equipment without all required safety devices in position and operable. Any caution and warning stickers affixed to the equipment should always remain in plain view of operating and maintenance personnel.
8. **WARNING.** NEVER walk, sit, or lean on or under the troughs, covers, grid sections, or any portion of the equipment while it is in operation or not locked out electrically.
9. **WARNING.** NEVER place hands or feet in any equipment openings until the equipment has completely come to rest (bearings cooled) and electric power has been completely locked out to a “zero-mechanical state” with all safety steps in position, etc.
10. **WARNING.** Hazards from machinery are mainly mechanical. These include (but are not limited to) crushing, shearing, entanglement, stabbing, friction, loss of stability, and the feed/ejection of parts.
11. **WARNING.** ALWAYS lock out electric power to a “zero-mechanical state” to the equipment before performing any maintenance, inspection, or service on the equipment. Conveyor drive must be stopped in the lower neutral position for any maintenance (see page 36 for drive alignment). Do not remove guards until properly locked out.
12. **WARNING.** Equipment adjacent to ACTION equipment may also require lockout during ACTION equipment inspection and maintenance. Determine all necessary lockout requirements before any work is performed.
13. **WARNING.** ALWAYS wear properly fitted safety glasses with adequate top and side protection that complies with ANSI Z 87.1 (or your applicable national standard) when completing work on or around the equipment. Material noise on the conveyor deck may damage your hearing. Wear sound barriers (ear plugs or ear muffs) to protect your hearing. Clothing must be sturdy and snug fitting but allow complete freedom of movement. Avoid loose-fitting jackets, scarves, neckties, jewelry, flared or cuffed pants, or anything that could become entangled.
14. **WARNING.** ALWAYS use safety glasses, certified safety boots, and helmets, during all phases of equipment operation.
15. **WARNING.** You must be in good physical condition and mental health – not under the influence of any substance (drugs, alcohol), which might impair vision, dexterity, or judgment when completing any work on the equipment. Your reflexes, perceptions, attentiveness, and judgment can be affected by even a small amount of alcohol.
16. **WARNING.** Personnel working on or around said equipment must have the ability to read and understand instructions in the English language. Personnel lacking enough visual and aural capacity should not be allowed to perform any work on or around said equipment.
17. **WARNING.** You can be injured, and your equipment could be damaged if you try to do service work on a conveyor without knowing enough about it. Be sure you have enough knowledge, experience, the proper replacement parts, and tools before you attempt any conveyor maintenance task. If you have any doubt, please contact ACTION for assistance.
18. **WARNING.** When performing any repairs, it is strongly recommended that maintenance personnel work in pairs so that immediate assistance is available if required.
19. **WARNING.** ALWAYS have a clear view of the material loading and unloading points on the equipment, as well as immediate access to all emergency stop and safety devices for the equipment.
20. **WARNING.** ALWAYS keep the equipment area clean and free of combustible materials, gasoline, and other flammable vapors and liquids. Wipe up spilled oil, grease, or water to minimize the risk of slips and falls.
21. **CAUTION.** DO NOT allow the accumulation of rubbish, tools, discarded parts, or any other materials to clutter the path of material flow. Keep the area around and under the equipment free of spilled material or debris.
22. **DANGER.** ALWAYS regularly check for any signs of corrosion or excessive wear on the wire rope and safety cables, which are required on all suspension-mounted units. All cable clips should be checked regularly for tightness to prevent cable slippage.
23. **DANGER.** ALWAYS be sure to follow proper grounding procedures when welding on equipment. Failure to ground can result in injury and property damage (if not grounded, bearings at the drive could arc with associated roller pitting and subsequent failure, etc.). Electric shock can kill.

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SAFETY

24. **DANGER.** ALWAYS make periodic checks of all electric motor cables for wear or damage. All ground wires should be securely and properly fastened. Remove any corrosion. Electrical shock can result in death or severe personal injury. Do not allow anything to rest on cords.
25. **WARNING.** ALWAYS be sure that the conveyor is shut off and locked out before removing any “undesirable” object or material from conveyor pan or from beneath the conveyor.
26. **DANGER.** ALWAYS be sure when working on equipment, especially in basement areas, that “upstairs” equipment is not in operation. Falling materials can result in severe bodily injury.
27. **WARNING.** Some parts of the conveyor such as bearings may be hot because of equipment operation. Never check bearing temperatures with your hand. Use a non-contact temperature gun. After maintenance work is completed, be sure that all bolts are torqued to specifications listed on page 16, and ensure that all covers, guards, shields, and safety devices are properly secured into place.
28. **WARNING.** Prevent falls. Do not stand in a vibrating conveyor while conveyor operates. Do not overreach. Always keep proper footing and balance.
29. **WARNING.** Shifting components can cause personal injury. Do not put fingers in bolt holes or between heavy parts.
30. **CAUTION.** Conveyors contain components that are too heavy for one person to lift. When servicing, use approved lifting devices and get assistance from other workers when needed.
31. **WARNING.** Avoid contact with grease.
32. **WARNING.** Use a hook or rake to remove material(s) from trough. Do not remove by hand.
33. **WARNING.** ALWAYS consult the Installation, Operation, and Maintenance Manual prior to servicing.
34. **CAUTION.** ALWAYS wear gloves when handling parts with sharp edges and/or when subjected to corrosion.
35. **DANGER.** Heavy components such as vibratory conveyors can cause serious personal injury and equipment damage if handled improperly. Before lifting any conveyor, section, or part thereof, check the approximate total weight as listed on each General Arrangement Drawing. Care should always be taken to ensure adequate capacity in any equipment for any given lift.

The static weight of each respective conveyor can be found in the lower left corner of each General Arrangement Drawing. Use only approved lifting cables and choose a reputable crane service that is experienced in moving this type of equipment. To minimize hazard, assembly personnel must be experienced in moving heavy equipment. Always follow safe hoisting practices, as outlined in ANSI B30.16 safety code for hoists.

Care must be taken when lifting each vibrating conveyor or section thereof. Make sure that the load is balanced about its center of gravity.

36. **WARNING.** The installation of heavy equipment can produce many pinch points. To minimize hazard, assembly personnel must be experienced in moving heavy equipment.
37. **WARNING.** Do not operate a conveyor having unusual vibrations, sounds or with anything wrong or apparently wrong. Danger may be present that the operator cannot see. Determine and correct the cause of unusual conditions and make certain that the conveyor can be operated safely.
38. **WARNING.** Do not operate conveyors having worn or damaged parts (especially worn or damaged suspension components).
39. **WARNING.** Unlike size reduction equipment constructed from special alloy non-sparking materials, most vibrating conveyor troughs are formed from mild steel. Special trough materials can be provided upon request.
40. **WARNING.** Keep the ventilation slots of the motor enclosure free of obstruction.
41. **WARNING.** When simple machines (conveyors) are incorporated into production lines or other complex machines, the safety-related control systems (by customer) may need to be more complex to suit. Accidents can occur when shortcuts are taken to meet production goals. For information on control reliability, please refer to: OSHA 1910.217 (b)(13) Control Reliability; ANSI B.11.19-1990, Section 2.12 Definitions; ANSI B.11.19-1990, Section 5.5.1 Control Reliability; ANSI B.11.20-1990, Section 6.13 Control Component Failure Protection.

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SAFETY

42. **WARNING.** If equipment will be installed in an enclosed area, gas level or dust content must be tested before using a cutting torch or welding. Using a cutting torch or welding in an area with gas or dust may cause an explosion.
43. **WARNING.** Visible rust in an electrical panel indicates prior water or moisture penetration and may indicate the presence of hidden damage which could present a potential hazard. If there is any evidence of rust in a panel, a thorough inspection by an electrician should be arranged as a precaution.

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SAFETY

Starting the system is a critical phase of the operating procedure, due to lack of familiarity with the new equipment. The equipment should not be operated unless all hoppers, discharge chutes, covers, guards, shields, etc. are in place. Prior to start-up, the equipment and operating area should be inspected to ensure that all equipment and components are properly connected and securely fastened, and that all tools, bolts, and debris, have been removed.

Items such as railings, walkways, location of equipment, training of personnel, and painted safe operator zones (see page 14) are the responsibility of the owner/user and should comply with all local codes. To enhance safety and to prevent unauthorized tampering or use of equipment, trained operators are to remain in designated areas (see page 14) while equipment is in operation.

Operators and start-up personnel are encouraged to wear safety glasses, helmets, and certified safety boots, during all phases of equipment operation.

WARNING. Prevent personal injury. Stop motor and lock out electrical power before attempting to make repairs. Personnel, including operators, authorized to perform a Disconnect and Lockout procedure, must be assigned individual, heavy duty, locking devices. These personnel must be certain which switches or other energy-isolating devices apply to the equipment being locked out. Any questions on this matter should be addressed to supervisors and completed in accordance with plant rules or OSHA approved procedures.

Controls (locking systems, programmable safety systems, etc.) are always by customer (except for the Stroke Control Unit (SCU), if purchased. Every conveyor must be fitted with a control to bring it to a complete stop safely. The energy supply to the conveyor must be removed once the stop has been achieved. The emergency stop switch actuator may take different forms, depending on the application in which it is being used, for example: mushroom-headed buttons, bars, levers, kick-plates, pressure-sensitive cables. Emergency stops should have priority over all other controls and should not allow an automatic restart.

MATERIAL SAFETY DATA SHEETS (MSDS)

To transfer MSDS information from our suppliers to our customers, ACTION will provide this service on customer request. All customer requests need to be specific because of the volume and complexity of the MSDS system. To correctly identify the appropriate MSDS, the ACTION part number must be known. Inquiries concerning the MSDS information can be addressed to the ACTION Engineering Department.

MISCELLANEOUS SAFETY AND OPERATING REFERENCES	
1. Code of Federal Regulations, (OSHA) Section 29 Part 1910.95, 132, 133, 134, 139, 251, 252, 253, 254, AND 1000. U.S. Government Printing Office, Washington, DC 20402	5. AWS F4.1 "Recommended Safe Practices for Welding and Cutting Containers." The American Welding Society, 550 NW Lejeune Rd., P.O. Box 351040, Miami, FL 33135
2. ANSI Z49.1 "Safety in Welding and Cutting."	6. NFPA 51B "Fire Prevention in Cutting and Welding Processes."
3. ANSI Z87.1 "Practice for Occupational and Educational Eye and Face Protection."	7. NFPA-7 "National Electrical Code" National Fire Protection Association, Battery Park, Quincy, MA 02269
4. ANSI Z88.2 "Standard Practice for Respiratory Protection." American National Standards Institute, 1430 Broadway, New York, NY 10018	8. CSA Standard W117.2. "Safety in Welding, Cutting and Allied Processes" Canadian Standards Association, 178 Rexdale Blvd., Rexdale, Ontario, Canada M9W 1R3

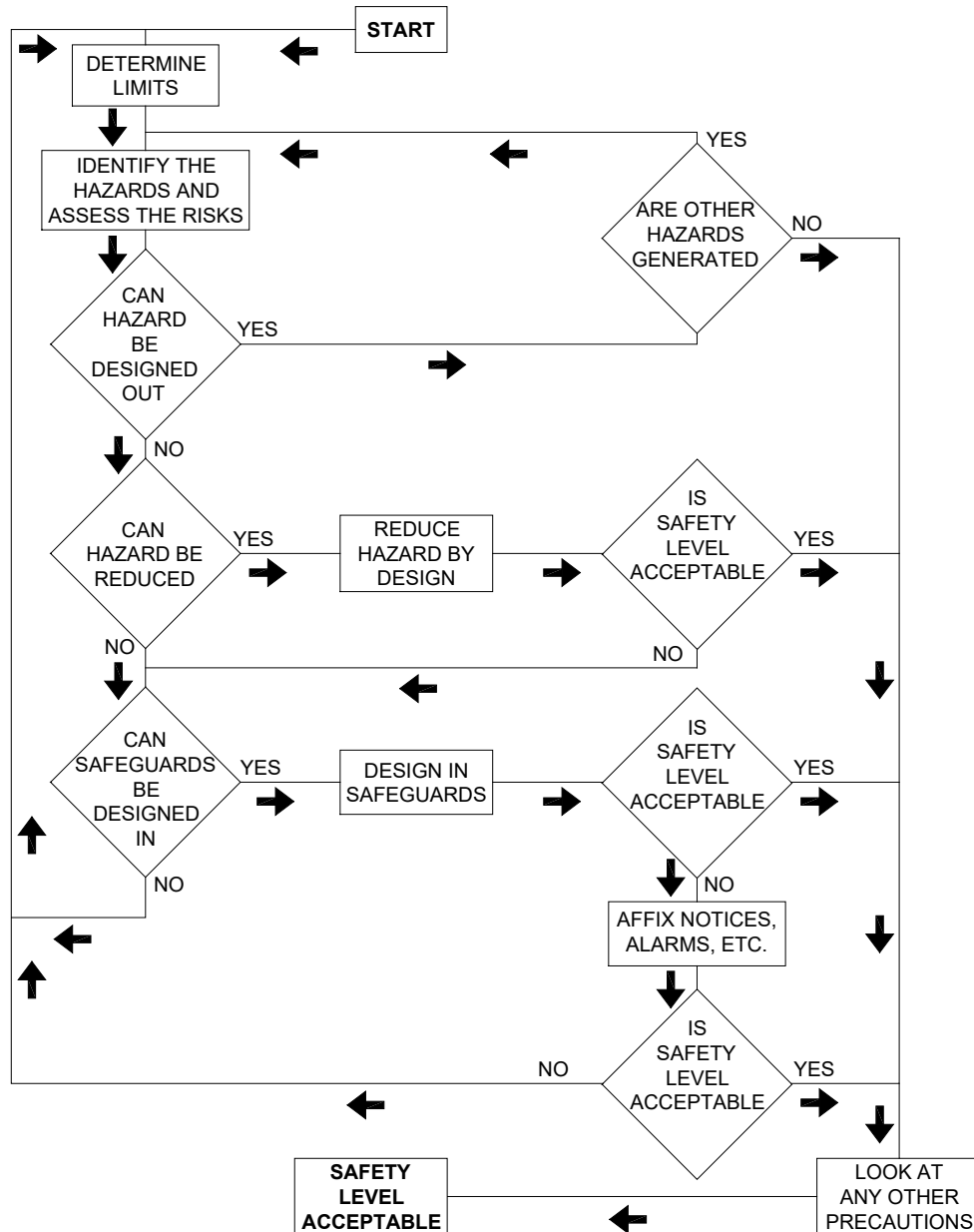
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RISK ASSESSMENT

Machinery must be safe to use, and the best way to achieve this is through good design and proper working practices. ACTION considers safety throughout the design of each conveyor to achieve the highest possible levels of safety. ACTION conveyor designs reduce hazards by selecting suitable design features and limit exposure by reducing the need for operator intervention.

Employers should also provide a “suitable and sufficient assessment” of the risks their employees are exposed to while at work. Whenever risks are considered unacceptable, control measures must be introduced to reduce the risks. The systematic method for identifying and eliminating risks is shown in the flowchart below (Figure A).

NOTE: Numerous scientifically proven systems are available to produce enough risk assessment data to help guide employers in performing a risk assessment/hazard analysis.

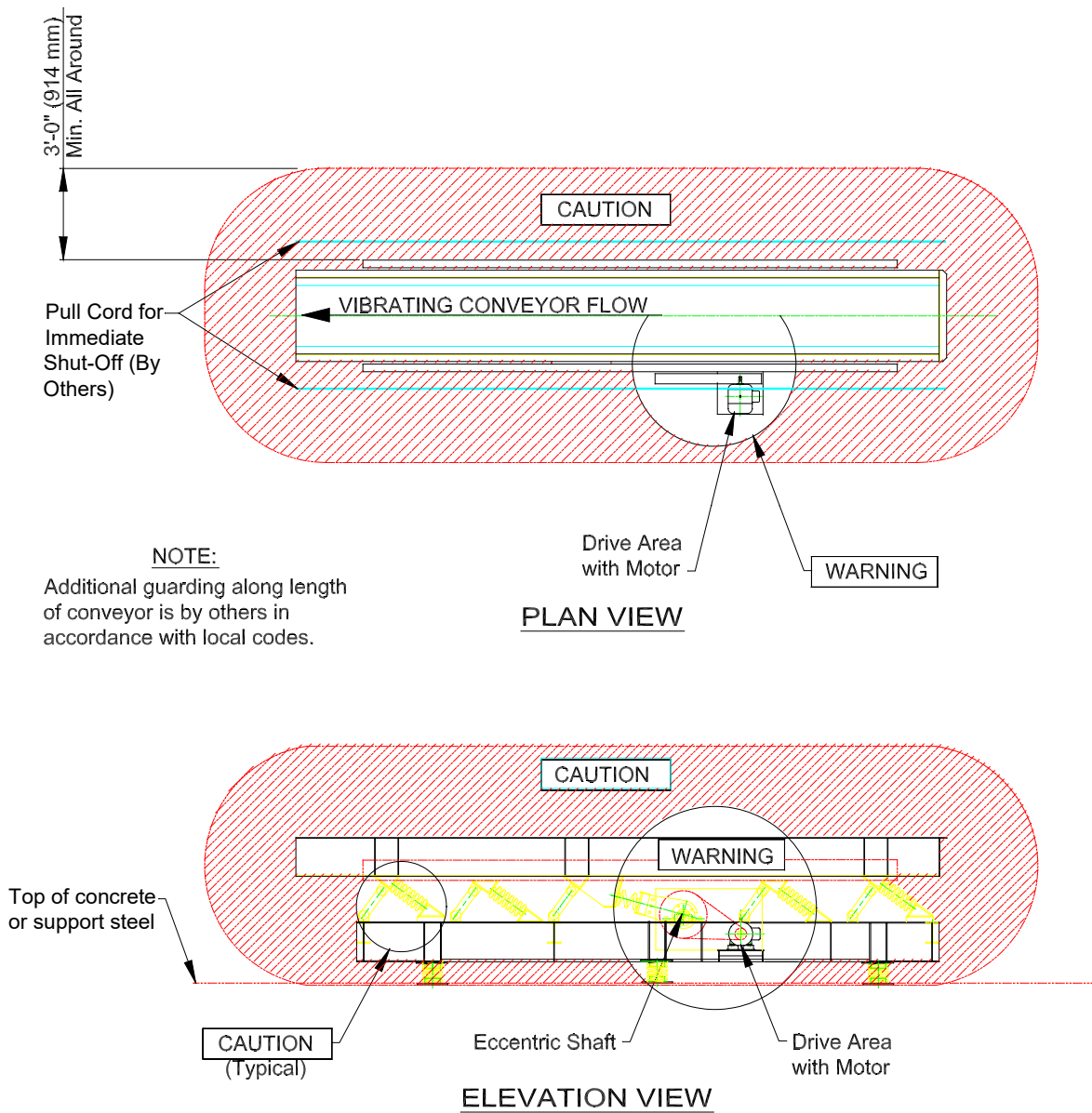


FLOWCHART FOR SYSTEMATIC IDENTIFICATION OF RISKS

FIGURE “A”

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OPERATIONAL SAFETY ZONES



The following symbols are used to draw attention to operational safety zones:

- | | |
|----------------|---|
| CAUTION | Moving machinery with many pinch points which COULD result in minor personal injury or property damage. |
| WARNING | Drive area with eccentric shaft and motor which COULD result in severe personal injury or death. |

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CHART OF MINIMUM RECOMMENDED CLEARANCES (AT REST)

CLEARANCE	LOCATION
3'-0" (914.4 mm)	Along either side of the conveyor
3" (76.2 mm)	From underside of trough to top of downstream conveyor or stationary surface
1" (25.4 mm)	Overlapping chute-work (from stationary chute side to inside of conveyor wall)
3" (76.2 mm)	Non-overlapping chute work (from bottom of chute to top of conveyor flange, boot connections can be utilized as necessary)
6" (50.8 mm)	Beneath conveyor base – optional (keeps debris away from components)
½" (12.7 mm)	From underside of trough to top of chipper spout
¼" (6.35 mm)	From vertical outside of conveyor spout to chipper anvil
3" (76.2 mm)	From bottom of under slung balancer to floor
1" (25.4 mm)	From underside of fiberglass section to top of metal detector (Rens or M.D.I.)

NOTE: Vibrating conveyors should always operate in an unobstructed manner without restriction or interference. The above clearance recommendations are minimums. Please review your local safety ordinances and take any additional steps that may be necessary to make sure that you are 100% compliant. Always refer to the General Arrangement Drawing(s) that is submitted for your approval for additional information that may be pertinent for proper installation. All equipment designs combine sound engineering principles with fundamental built-in safety. You are completely responsible for foundations and/or supports, anchor bolts, or embedded steel for mounting unit in place, leveling, motor controls, electrical wiring, all necessary chute work, hoppers or skirts, maintenance, etc., including unloading and erection of said equipment.

REFER TO INSTALLATION (GENERAL) ON PAGES 20 AND 21 PRIOR TO POSITIONING EQUIPMENT.

ACTION VIBRATORY EQUIPMENT

RECOMMENDED TORQUES (NUT TORQUE)

BOLT DIAMETER	THREADS / INCH	TORQUE REQUIRED - FOOT LBS. (DRY THREADS) SAE GRADE 5	TORQUE REQUIRED - FOOT LBS. (DRY THREADS) SAE GRADE 8
3/32" (2.38mm)	48	2.3	3.3
1/4" (6.38mm)	20	10	14
5/16" (7.94mm)	18	19	29
3/8" (9.53mm)	16	33	47
1/2" (12.70mm)	13	75	110
5/8" (15.88mm)	11	150	210
3/4" (19.05mm)	10	260	380
7/8" (22.23mm)	9	430	600
1" (25.40mm)	8	640	910
1 1/8" (28.58mm)	7	790	1290
1 1/4" (31.75mm)	7	1120	1820
1 1/2" (38.10mm)	6	1950	3160

CAUTION. Do not substitute standard bolts for high strength bolting. The preceding approximate values are based on turning the nut with the head of the bolt remaining stationary. To avoid bolt and/or nut damage when using an impact wrench, run up nut in separate pulse cycles until contact is made and is "snug-tight" to the parts being bolted, then tighten.

Reaction springs and rocker arms utilize a constant torque locknut that consists of a nut body and spring steel elliptical insert. This constant torque locknut can be adjusted, readjusted, removed, repositioned, and reused as often as required. The unique two-piece construction reduces preload "scatter" in assembled joints. The locknut is designed so that the insert (locking feature) raises away from the nut body (loading feature) upon application. This creates "isolation" from the load: the nut body carries the load and the insert does the locking.

Power wrenching is not recommended until the lead thread of the insert is engaged by hand turning. Only after the initial hand-installation should the nut be fully installed by hand or power wrench to the "pull down" position.

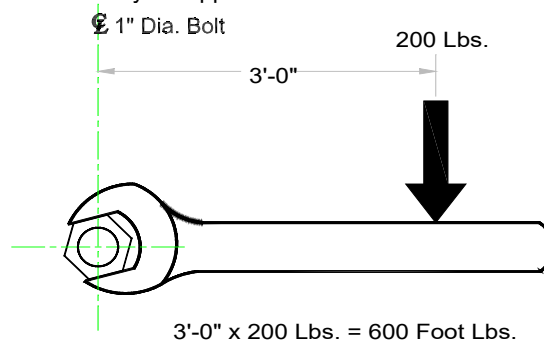
It is desirable to have 2 1/2 threads extended beyond the top of the insert.

Make sure all parts and threads are clean and undamaged, thereby insuring the best assembly.

If using a lubricant, torque values will vary but will typically be 20% - 25% less than tabulated dry torque values.

Above torque values are for non-lubricated, unplated carbon steel fasteners. It is recommended that the fasteners be a minimum of grade 5 and a maximum of grade 8. Constant torque locknuts create an interference fit: lubrication is especially important on bolt diameters of 1 1/4" and larger. For fasteners made of stainless steel or other materials, the torques requirements will vary. Please consult ACTION accordingly.

Safety programs and high-quality tools help prevent worker fatigue and injuries. Reducing worker fatigue will help keep production consistent and cut the number of repetitive motion injuries. To avoid accidents, tools and the work area should be inspected regularly. Worn components should be replaced and unsafe conditions should be rectified as soon as possible. Use the correct tool for your application.



TORQUE EXAMPLE (1" BOLT)

ACTION VIBRATORY EQUIPMENT

MAJOR COMPONENT TOOL LIST

<u>Component Part #</u>	<u>Bolt Diameter</u>	<u>Tool(s) Required</u>
		<u>Bolt Head</u> <u>Nut</u>
Drive Springs		
DS015BA	1"	1 1/2" Wrench 1 5/8" Wrench
DS025BA	1"	1 1/2" Wrench 1 5/8" Wrench
DS045TNBA	5/16" Set Screws	1 7/8" Wrench 1/4" Allen
DS065TNBA	5/16" Set Screws	1 7/8" Wrench 1/4" Allen
DS090TNBA	3/8" Set Screws	2 1/4" Wrench 5/16" Allen
DS120TNBA	3/8" Set Screws	2 1/4" Wrench 5/16" Allen
DS150TNBA	3/8" Set Screws	2 1/4" Wrench 5/16" Allen
Reaction Springs ⁽¹⁾		
SDS77W1209	3/4"	1 1/8" Wrench 1 1/4" Wrench
SDS77W1212	3/4"	1 1/8" Wrench 1 1/4" Wrench
SD76W1212	1"	1 1/2" Wrench 1 5/8" Wrench
SD76W1215	1"	1 1/2" Wrench 1 5/8" Wrench
SD96W71	1"	1 1/2" Wrench 1 5/8" Wrench
Contour Composite Spring		
CCS1	5/8"	15/16" Wrench 1 1/16" Wrench
Rocker Arms		
SDS91X10	3/4"	1 1/8" Wrench 1 1/4" Wrench
SD91X65	1"	1 1/2" Wrench 1 5/8" Wrench
SD96X72	1 1/4"	1 7/8" Wrench 2" Wrench
Bearings ⁽²⁾		
XQX11596 Pillow Block	1/4" Set Screws	3/16" Allen
XQY11596 Pillow Block	1/4" Set Screws	3/16" Allen
XWV20796 Pillow Block	5/16" Set Screws	1/4" Allen
XWW20796 Pillow Block	5/16" Set Screws	1/4" Allen
XQC21596 Pillow Block	5/16" Set Screws	1/4" Allen
XQD21596 Flange	5/16" Set Screws	1/4" Allen
XYF30796 Flange	5/16" Set Screws	1/4" Allen
XCP40096 Flange	3/8" Set Screws	5/16" Allen

NOTES: ⁽¹⁾ Reaction Spring wrenches are available for purchase from ACTION.

⁽²⁾ ACTION recommends utilizing a 4"- 6" x 1/2" diameter pipe cheater when torquing bearing set screws. Loctite 242 or equivalent must be used on all bearing collar set screws. Flange and pillow block bearings mount with 3/4" diameter bolts requiring a 1 1/8" wrench and a 1/4" wrench.

*The above tool list is for major components only and should not be considered comprehensive.

ACTION VIBRATORY EQUIPMENT

IMPORTANT GUIDELINES

WARNING. Do not attempt to install, operate, or maintain conveyors without reading this manual first. Identified procedures and instructions are designed to help prevent hazards or unsafe practices.

1. Do not allow conveyor to overstroke.
2. Always utilize remote feed systems wherever possible (feed conveyors, feed chutes, etc.).
3. Do not change weight of conveyor(s) shaking assemblies without consulting ACTION. All machines are test run and tuned at the factory. No weight adjustment should be required unless field modifications have been made to the equipment.
4. Do not restrict movement of pan and/or balancer.
5. Do not allow rain, snow, ice, etc., to accumulate on any vibratory surface.
6. Do not allow machine to operate with loose bolts or fasteners.
7. Do not operate conveyor(s) unless all hoppers, discharge chutes, covers, and/or guards are in place and in good repair. Guards are fixed in place and can only be removed with the aid of tools.
8. Do not operate non-isolated conveyors without first anchoring securely to foundation.
9. Do not handle conveyor(s) by the pan. Lift under base.
10. Do not operate conveyor(s) without first removing shipping braces.
11. Do not weld high temperature pan sections together.
12. Do not force pan, balancer, or base out of neutral position when installing.
13. Do not change motor or shaft sheave size without consulting ACTION.
14. Do not lubricate rocker arms.
15. Do not use substitute parts. Parts are precisely designed for use with our conveyors. ACTION does not warrant equipment using substitute parts.
16. All conveyor modifications must be approved by ACTION. Failure to consult ACTION prior to modifications will void all warranties. For detailed information on welding and cutting practices, it is strongly recommended that you purchase "Safety on Welding and Cutting – ANSI Standard Z49.1" from the American Welding Society or CSA Standard W117.2-1974. The misuse of welding and cutting equipment can be hazardous. The welding/cutting process is used in many potentially dangerous environments such as elevated heights, areas of limited ventilation, close quarters, around water, in hostile environments, etc., and it is important that the operators are aware of the dangers associated with working in these types of conditions. Be certain that the operator(s) are trained in safe practices for environments in which they are expected to work and under competent supervision. **BE AWARE OF PROPER GROUNDING PROCEDURES. DO NOT PASS CURRENT THROUGH BEARINGS.**
17. Rpm and stroke are unique to each conveyor. Do not assume that multiple conveyors have identical strokes. Refer to the stroke plate or the General Arrangement Drawing for design rpm and stroke.
18. Equipment must be supplied with the proper voltage and frequency. External wiring, connections, and interlock devices must be installed in accordance with the latest national electrical codes, local codes, and local utility requirements. Only competent, authorized journeyman electricians should attempt to install, modify, and/or maintain the electrical system. Motor wiring diagrams have been omitted from this book because of the many possible variations. Have the installer show you the location of the circuit breaker or fuse. Mark it for easy reference. Proper wire sizes and ground protection must be provided according to applicable local and national electrical codes. There is little that can be done without obtaining a permit from the local municipality. Many deficiencies of an electrical system are in fact, code violations as well.
19. Do not work on the conveyor without following appropriate safety procedures (lock-out/tag-out). Vibrating conveyors are to be considered dangerous moving machinery.
20. Do not use substitute fasteners, especially locknuts. Fasteners should be purchased from ACTION.
21. Do not extend or cut conveyor overhangs or discharges without consulting ACTION.
22. Time spent keeping the conveyor(s) and surrounding area clean **is not** wasted time.
23. Training and familiarity of equipment is the responsibility of the customer. ACTION personnel are available for instruction.

ACTION VIBRATORY EQUIPMENT

IMPORTANT GUIDELINES

24. If the feeder is equipped with a high frequency rotary vibrator, please refer to the installation, operations, and maintenance manual for that motor. A copy has been included in the appendix for your reference.
25. If significant trough wear or cracking is found, please contact ACTION for help in assessing the damage and determining what action should be taken.
26. Refer to General Arrangement Drawing for actual machine dimensions.
27. Conveyor(s) have been tested and tuned at the factory. Do not attempt to re-tune, re-calibrate, or time conveyor(s).
28. Conduct periodic inspections of the conveyor(s) for signs of damage or wear. Diligent use of the Maintenance Checklist is required. (Please refer to pages 42, 43, and 44).
29. Bearings, rocker arms, and springs typically weigh less than 60 pounds. When replacing other parts (eccentric shaft, motor, etc.) with a weight more than 60 pounds, please use a forklift or crane to avoid physical injury.
30. A Maintenance Checklist has been included on pages 42, 43, and 44. Diligent use of the Maintenance Checklist is required to monitor the conveyor(s) performance. Should a problem occur that requires factory assistance, you will be asked to forward copies (documentation) of the Maintenance Checklist. Regular in-service inspections and preventative maintenance programs not only help reduce overall maintenance costs but may also prevent serious shutdowns by forewarning of problems that could cause these shutdowns. Regular inspections, periodic minor adjustments, regular cleaning and lubrication, and replacement of worn parts can help preserve good performance and operation of your equipment.

Various codes also regulate inspection and maintenance programs. Attention must be given to applicable federal standards, OSHA regulations, national standards, and state and local codes, which may include mandatory rules relating to conveyor inspection and maintenance. The user should become familiar with all applicable codes for his area and be guided accordingly.

The user should revise the inspection interval, add additional units, or provide a similar form to suit conditions that may exist. Written, dated, and signed inspection reports are mandatory under OSHA regulations, and many states safety codes. It is strongly recommended that the Maintenance Checklist as found on pages 42, 43, and 44 are completed by a qualified person designated with the responsibility for conveyor operation and safety or an inspector appointed by this person. File and review these reports after each inspection.

31. Have all installation, operation, maintenance, and repair work performed by competent people. A competent person is someone who has reached the age of 18 and has undergone suitable training and enough practical instruction in several safety-related areas. The employer should appoint competent personnel in writing. Each employee should also sign the PUWER Regulations or other applicable safety ordinances indicating his/her understanding.
32. While "retorquing" as a way of checking tightness is common in many pm procedures, it violates basic mechanical principles and does more harm than good. Tightening an already tight connection can ruin the connection.

ACTION EQUIPMENT COMPANY, INC. WILL NOT ASSUME THE RESPONSIBILITY FOR ANY FAILURE OF OUR EQUIPMENT DUE TO EXCESSIVE STROKE CAUSED BY CUSTOMER MODIFICATION, NEGLIGENCE, OR IMPROPER INSTALLATION.

ACTION VIBRATORY EQUIPMENT

INSTALLATION (GENERAL)

DESIGN CONSIDERATIONS

Materials flow and machine placements are important considerations for safe, efficient performance and ease of service. ACTION can provide design assistance to assure optimum performance of the total system, of which the conveyor may be only a small part. A general discussion of several important factors continues below.

INFEED REQUIREMENTS

Infeed to the TAPER-SLOT® Screen must be uniform in rate, free of surges, and must be distributed evenly across the width of the screen to maximize performance. Infeed chute work must not be supported by the TAPER-SLOT® Screen.

OUTFEED REQUIREMENTS

The outfeed of the TAPER-SLOT® Screen commonly consists of two parts, the Accepts fraction and the Oversize fraction. Some screens may be arranged to grade the infeed material into more than two splits. All discharge chute work must not be supported by the TAPER-SLOT® Screen. Enough surge capacity should be allowed in the design of all outfeed chutes.

DISCHARGE CHUTE

The vibratory discharge chute directs material from the conveyor into containers or conveyors. The interfacing with containers or conveyors is often overlooked. To provide proper material flow, please provide stationary chute wall slopes that do not restrict material flow or contribute to bridging or snagging.

DISCHARGE CONVEYOR

The discharge conveyor moves material from the discharge chute to downstream equipment. The type of conveyor used (rubber belt, steel pan, chain, augers, etc.) will depend on the type of material and requirements of downstream equipment.

ELEVATION OF THE CONVEYOR

The height at which the conveyor is installed should be selected to allow proper infeed and discharge of material from the conveyor. When determining the amount of overhead clearance required above the conveyor, the size characteristics of the bulk material to be fed into the conveyor, and clearance required by materials handling equipment must be considered. Experience has shown that if a unit is difficult to access, it will not receive maintenance of proper frequency and quality. It has also been shown that service time is greatly reduced when adequate clearances are provided. If unit is elevated, a service platform should be located at the same level as the conveyor base, conforming to all OSHA safety requirements. In addition, crane hoist rails should be provided for removal of various conveyor assemblies (screens, pan sections, etc.).

INITIAL MACHINE START-UP

Please refer to pages 24 and 25 for specific installation procedures.

FOUNDATIONS AND SUPPORTS

Please refer to the General Arrangement Drawing submitted for your review and approval when determining the required foundation(s). Dynamic reactions are listed on the General Arrangement Drawing and should be carefully considered when designing foundations. Please consult with a qualified civil engineer for foundation assistance; there are many factors to consider. Due to a wide range of complex variables, no hard and fast rules can be drawn. For preliminary surveys of an application, please consult with the factory for rough "rules of thumb" guidance.

Also, note that a relatively small vibratory deflection at the point of origin can manifest itself as a much larger deflection in an area that might be considered remote or distant. This is because all physical materials have properties of elasticity, form, loading and location which enable the material to resonate at a natural frequency if given an exciting force. Therefore, a conveyor installed in the basement of a manufacturing facility which produces an imperceptible displacement in the basement foundation may cause a computer monitor to shake in a second story control room.

Care should be exercised in the design and preparation of conveyor foundations. Consideration should also be given to local ordinances and seismic requirements, etc. The conveyor(s) must be installed on a foundation or structure designed to handle static (weight of the conveyor, support structure, peripheral equipment, and the weight of the material to be handled) and dynamic loads produced by the conveyor (please refer to our General Arrangement Drawing for specific loads). The foundation requirements for each conveyor, as with any piece of equipment, will vary depending upon the load-carrying capacity of the soil. The mounting surface should be straight and true to prevent binding or stressing conveyor components that could lead to premature failure.

Vibrating conveyor support design is different from the usual foundation or support design in that most supporting structures are designed so as not to exceed a maximum stress, considerable deflection being permissible. Vibrating conveyor supports must be designed for considerably less deflection than the average structural design. For

ACTION VIBRATORY EQUIPMENT

INSTALLATION (GENERAL)

industrial buildings where conveyors are installed, vibrations of amplitudes of .005" or .0025" plus and minus deflection are usually unobjectionable. It will not, however, be a vibration that is imperceptible. At frequencies of 500 cpm, vibration amplitudes of .005" may be felt.

Vibrating conveyors exert a horizontal and vertical reaction into the foundation and/or support structure. The design of your conveyor support and the amount of concrete mass in your construction depend upon the size and type of your conveyor (balanced, unbalanced, counter-balanced, isolated, etc.) and the soil composition. Typical foundation drawings can be found on pages 22 and 23.

The use of piling for unbalanced conveyor supports should be avoided. Piling is subject to bending from the horizontal component of the dynamic reaction.

Keep in mind that concrete is not as stiff as steel. With the same Moment of Inertia, a concrete beam will deflect ten times as much as a steel beam with the same loading.

Whenever possible, isolate the conveyor's supporting structure and foundation from adjacent building structures, especially those areas expected to contain vibration sensitive equipment, i.e., lasers, optics, electrical controls, etc.

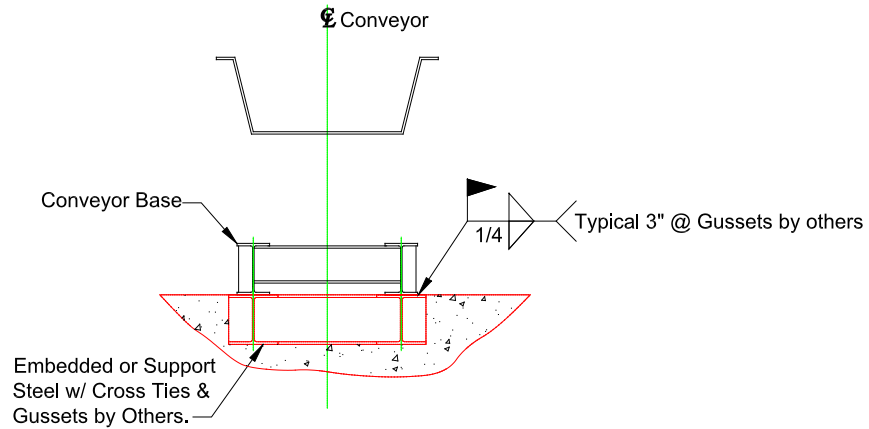
Whenever possible, it is a good idea to provide walkways around conveyor to aid in servicing the unit.

OSHA NOTICE: OSHA REGULATION NO. 1910.212 (5B). MACHINES DESIGNED FOR A FIXED LOCATION SHALL BE SECURELY ANCHORED TO PREVENT WALKING OR MOVING.

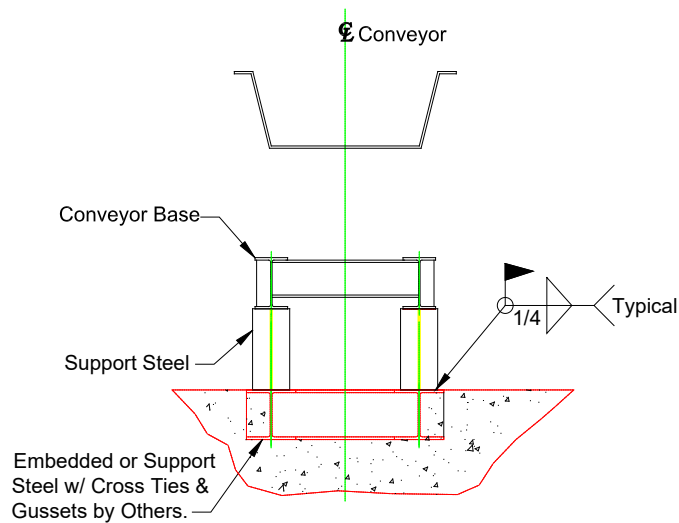
ACTION VIBRATORY EQUIPMENT

COMMON INSTALLATION OPTIONS

(TYPICAL CROSS SECTIONS)



BASE WELDED TO EMBEDDED STEEL



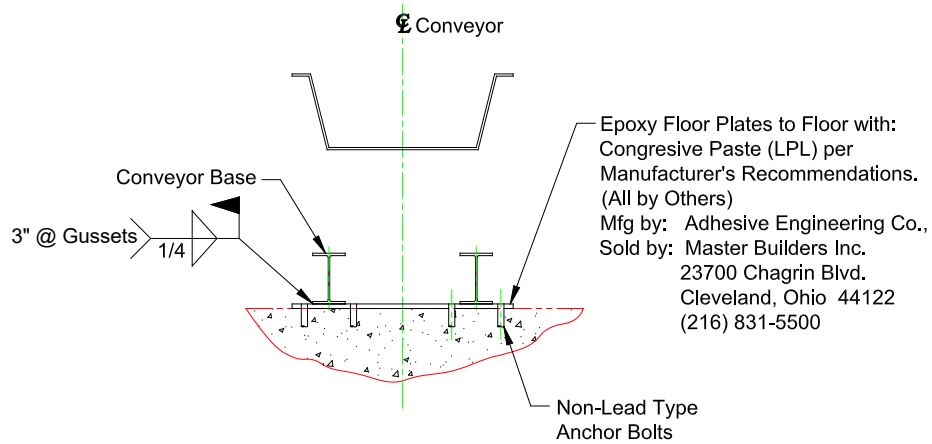
INTEGRAL BASE LEGS WELDED TO EMBEDDED STEEL

AECO assumes no responsibility for designing supporting structures/foundations. Dynamic reactions are shown on the Contract Arrangement Drawing and should be considered prior to installation.

ACTION VIBRATORY EQUIPMENT

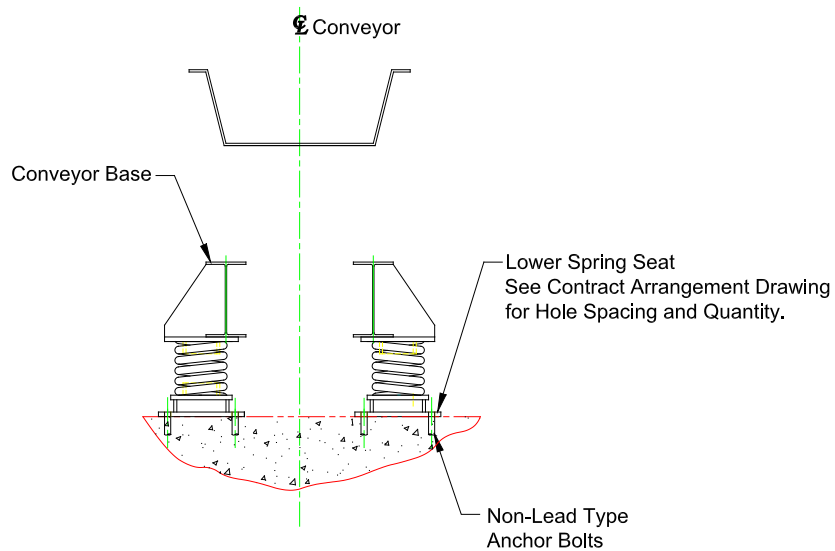
COMMON INSTALLATION OPTIONS

(TYPICAL CROSS SECTIONS)



BASE WELDED TO FLOOR PLATES

Please refer to the AECO Contract Arrangement Drawing for proper location along conveyor length.



ISOLATION SPRINGS w/ LOWER SPRING SEATS ANCHORED TO CONCRETE

AECO assumes no responsibility for designing supporting structures/foundations. Dynamic reactions are shown on the Contract Arrangement Drawing and should be considered prior to installation.

ACTION VIBRATORY EQUIPMENT

INSTALLATION INSTRUCTIONS

Prior to placing the equipment in its place, please consider the following:

- Is the location selected practical?
 - Do all clearances between the equipment exceed the minimums as shown in Clearance Table on page 13?
 - Is there enough space for servicing the equipment and other equipment?
1. Contact your local building officials to obtain a permit and information on any installation restrictions or inspection requirements in your area. Also, notify your insurance company that you are installing new equipment.
 2. Conveyor sections should be handled carefully during unloading and positioning by lifting beneath the base and not beneath the pan or balancer. Use spreader bars or slings to avoid crushing or bending of the conveyor pan. Use lifting eyes when available.
 3. Install conveyor/conveyor sections exactly as shown on the General Arrangement Drawings. Special care should be taken in preparing the foundation, as proper anchoring is essential for proper operation.
 4. Maintain adequate clearances all around trough and moving machinery under operation.
 5. Firm anchoring of conveyors to their foundation is necessary for proper operation.
 6. Access room should be available around conveyor(s) for periodic inspection and maintenance purposes. Since both sides of conveyor(s) may require maintenance service, do not install against walls or other obstructions that will limit accessibility.
 7. Set conveyor sections on the foundation in proper sequence as marked and as shown on the General Arrangement Drawing.
 8. Shipping braces are used to help prevent damage and misalignment of conveyor sections during shipping and handling. The shipping braces should remain in place until all conveyor sections are properly aligned, joined, and firmly attached to support structure. Shipping braces are painted yellow or marked with red tape for ease of identification.
 9. Shim between base and foundation wherever necessary to level bottom of pans across their width and longitudinally, if required. If anchor bolts hold down the conveyor, shims should be installed between conveyor base/legs and support structure near the anchor bolts. Several methods of anchoring conveyor bases to foundations can be found on pages 22 and 23. Any shims used should be welded to the conveyor base member. Correct alignment of the conveyor is crucial for maximum component life and trouble-free service. Alignment should be checked in three planes prior to welding. You may use the conveyor structural frame members to check the longitudinal alignment of the conveyor. The supporting members should be level laterally and in line through the length of the conveyor within 1/8" (3.18mm). If the conveyor is to be inclined or declined, base beams must remain flat. Conveyor(s) will not operate properly if base beams are twisted, arched, sagged, or bent.
 10. Bolt pans and bases together with bolts, washers, and locknuts provided. To check the conveyor for straightness prior to welding, run a taut piano wire the length of the conveyor at the top of the structural frame member. Base straightness may also be checked with a transit, engineer's level or a laser-leveling device.
 11. After the conveyor pan has been properly aligned, weld bases to embedded steel or supporting steel and weld shims to bases as indicated on the General Arrangement Drawing(s). All welding should be in accordance with good welding practices. If the conveyor base has three (3) members, be certain that the center beam has been properly anchored. NOTE: If the conveyor is welded to 1" (25.40mm) steel plates anchor bolted to a foundation, it is necessary that all the 1" (25.40mm) steel plates be set to reasonable shimming tolerance to attain a level or uniform slope. The 1" (25.40mm) steel plates should not be installed on individual concrete piers or pads that are not tied structurally together. Such individual piers or pads can settle separately and can cause severe misalignment and ultimate failure.
 12. Do not make any changes and/or additions to the conveyor(s) without first consulting ACTION. Adding or removing anything will affect the operation of the machine and may cause damage.
 13. Set motors and connect V-Belt Drives if not already assembled.
 14. Make electrical connections to motors. The method for starting should be direct online for all sizes. A push button starter with magnetic or thermal overloads is recommended. For special applications consult ACTION. Except for feeders (see page 39), motors may rotate either clockwise or counterclockwise.
 15. Slots and openings on the enclosure surrounding the motor fan are provided for ventilation. To ensure reliable operation and to protect motor from overheating, these openings must not be blocked or covered.

ACTION VIBRATORY EQUIPMENT

INSTALLATION INSTRUCTIONS

16. Check drive alignment on each conveyor and reset if necessary following procedures outlined on page 36. This is normally not required since conveyors are assembled and test-run at the factory prior to shipment.
17. Check that all bolts and nuts at field splices have been torqued to specified levels as shown on page 16.
18. Balanced conveyors are installed per the above procedure. The final step to complete a balanced unit is to connect the counterbalance member. If a unit is an isolated design, shimming under isolation spring seats may be necessary to achieve proper isolation spring compression and support (see General Arrangement Drawing). Failure to do so could cause erratic operation or structural failure of base members and/or support structure.
NOTE: The base of a balanced and isolated conveyor is structurally designed to span the isolation points.
19. Install hoods, chutes, guards, shields, motion detectors, stroke monitors, etc., as detailed on the General Arrangement Drawings.
20. When dust covers are used, be sure to have a negative air pressure connection drawing enough air (cfm) in through the cover openings to prevent the passage of dust through the openings and into the atmosphere. If flexible boots are utilized, system internal pressure, temperature exposure, abrasion, and displacement properties of the material should be investigated for proper boot selection. Air systems should be installed in accordance with industry and regulatory standards. Please consult with pneumatic experts for proper design.
21. Feeders beneath a hopper function primarily as a shut-off valve for the flow of material. For an installation of this type, the hopper design is equally as important as the design of the feeder. Please consult with ACTION for proper hopper design.
22. Do not make changes or additions to conveyor(s) without consulting ACTION. ACTION presets speeds and strokes, as indicated on General Arrangement Drawings, and is stamped on each conveyor's nameplate for ease of reference.
23. Review Operating Instructions on page 26 before starting conveyors. See page 27 for proper stroke plate reading instructions.
24. Should machine relocation become necessary, it is extremely important to protect the machine frame against undue stress. In addition, shipping braces should be re-installed prior to relocation.
25. **WARNING.** Vibratory equipment is potentially dangerous and must be guarded in compliance with OSHA standards for the application for which they are intended. It is the responsibility of the user to provide and maintain proper guarding.

ACTION VIBRATORY EQUIPMENT

OPERATING INSTRUCTIONS

To obtain maximum conveyor life with a minimum of maintenance, please observe the following:

1. Before starting, check to be sure that each conveyor is clear of any interference and that all personnel are clear of conveyor. Be certain that all installation welding and bolting has been completed according to the installation section of this manual and the equipment General Arrangement Drawings.
2. Initial start up of each conveyor should consist of a quick start and stop cycle to be sure that clearances are adequate. If satisfactory, conveyor may then be restarted and left running.
3. Conveyor(s) should always run quietly when not carrying material in pan. Correct any noises immediately by checking for loose bolts, insufficient clearances, broken foundation welds, etc. Investigate unusual noises immediately.
4. After the machine is running, check the stroke and shaft rpm. The stroke and shaft rpm should closely match the test settings labeled (stamped) on the Stroke Plate. If a discrepancy is found, call ACTION immediately. Since all conveyor(s) are test-run and tuned at the factory, no weight adjustments should be required unless field modifications have been made to the equipment.
5. To perform satisfactorily, a vibrating conveyor must have identical strokes throughout its full length. It cannot have a varying stroke due to trough deflections. Should any portion of the trough vibrate with a smaller stroke than that for which it was designed, there would be a slow-down of conveying speed in that section of the trough.
6. Vibrating conveyors are volumetric in their capacity and have a maximum instantaneous rate at which they can handle material. They do not have overload capacities such as an electric motor, which may be operated at two or three times their rated horsepower for very short periods of time. The required overload capacity of a conveyor must be determined and designed from the start.
7. Too much or too little grease can damage your bearings. Use only recommended grease and quantities as set forth in the schedule shown on page 31.
8. Incorrect locknuts or improperly tightened locknuts can lead to component damage. To avoid expensive conveyor repairs, tighten locknuts to the proper torque specifications as listed on page 16. Be sure to use the proper nuts, bolts, and other fasteners.
9. Do not allow conveyors to operate with a build-up of material on their pan. Material build-up (additional shaking weight) will cause the conveyor to overstroke and lead to premature component failure.
10. Do not allow material to accumulate or build-up under or around conveyor pans, balancer, or moving components. This condition can cause component failure and/or fractures in fabricated structural members.
11. To avoid unnecessary downtime, recommended spare parts should always be kept on hand.
12. Cracks or broken welds should be repaired immediately.
13. Help eliminate the risk of fire. Clean up around the vibrating conveyor prior to welding or burning. Hidden hydraulic or air lines that are exposed to open flame or elevated temperatures can ignite. Keep sparks, flames, and smoking materials away from flammable items.
14. Check condition of all labels and safety decals. Replace if missing, damaged, or difficult to read.

NOTE: Implementation of installation and operating instructions, both at start-up and thereafter, is necessary to assure the long-term, trouble-free operation for all vibrating conveyors. Failure to follow instructions can void your warranty.

ACTION VIBRATORY EQUIPMENT

STROKE PLATE

The ACTION stroke plate is a proprietary tool designed to visually measure displacement amplitude (vibratory movement or stroke) and is typically located on the guard side of each vibrating conveyor. Stroke is the primary indicator of the conveyor's operating condition. ACTION's stroke plate replaces antiquated, hard to read stroke estimating devices with a quick, easy, and precise alternative. If you have a balanced conveyor, individual stroke plates will be found on both the pan and the balancer. Irrespective of each other, stroke readings on the pan and balancer should be checked daily. In addition to measuring stroke, the stroke plate also lists the actual, "as tested" stroke, shaft rpm, and conveyor serial number. Please note that deviations in rpm can substantially affect strokes. Strokes above or below design stroke will affect conveyor performance and can result in component damage. Please refer to the serial number as listed on the stroke plate when ordering parts.

Before attempting to determine the stroke, make sure that all guarding is in place and that correct safety procedures have been followed (safety glasses, hard hat, etc.). Keep hands or other items clear of the conveyor while visually reading the stroke plate. If the stroke plate becomes dirty, clean the stroke plate during a shutdown, after the conveyor has been properly locked out, etc.

To determine the stroke, attempt to visualize the dot, located to the right of each respective number, in the circle located on the right side of the yellow inlay. As a helpful hint, start checking with the stroke as indicated (stamped) on the stroke plate. Look for the dot that appears to project its image onto the center of the target (bullseye). A dot that is located slightly to the left or right of center indicates a stroke of plus or minus 1/16". Corrective action should be taken to resolve over-stroke or under-stroke conditions in excess of 1/8" (refer to problem solving chart as necessary).

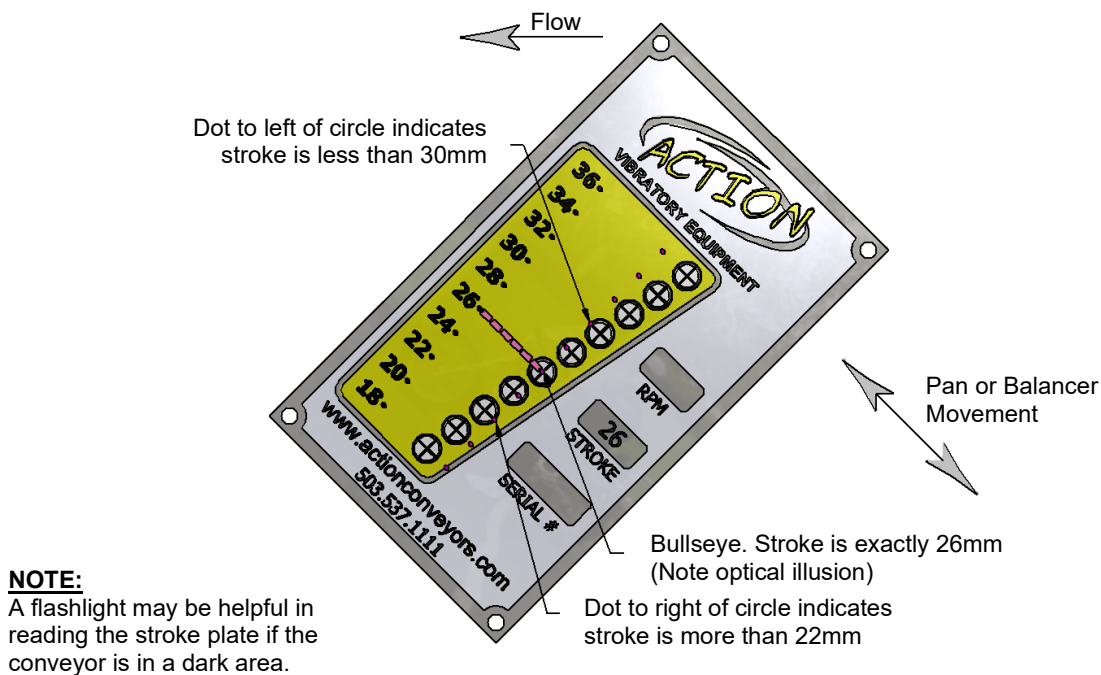


FIGURE "B"

STROKE PLATE DURING OPERATION WITH A 26mm (~1") STROKE

ACTION VIBRATORY EQUIPMENT

BEARINGS

GENERAL BEARING REPLACEMENT GUIDELINES:

It is no secret that many bearings fail to reach their expected life because they were not handled properly. The following tips will help you ensure that your bearings live a long, productive life:

1. **Store bearings properly.** Bearings should be left in their original packaging until they are to be used and should be stored in a clean, dry place with minimum temperature fluctuations. Improper storage can result in corrosion and false brinelling (scuffing) of the raceways.
2. **Keep the work area as clean as possible when changing bearings.** There is a payoff for efforts to keep dirt and moisture out of the bearings and housings. Please take whatever precautions are practical. Make sure that work surfaces are clean and dry. Keep bearings wrapped or covered with plastic until ready to mount them. Hard particle contamination that enters bearings dramatically shortens operating life. Seals help reduce the amount of contamination but cannot prevent it.
3. **Use proper tools and techniques.** Avoid use of hard objects to strike bearings. Never use a torch to heat a bearing.
4. **Use the right lubricant and quantity.** In addition to lubricating the bearings, grease also forms a barrier that restricts the entry of contaminants. If there is not enough grease, contaminants may enter freely, and the bearings may run dry. On the other hand, if there is too much grease, the churning created by the bearing's movement will generate excessive heat. Water contamination of 1% can cut bearing life in half.
5. **Replenish the lubricant at proper intervals.** Grease deteriorates in use because of temperature, contamination, and mechanical stress. Please refer to lubrication table on page 31. In general, more frequent replenishment of smaller quantities is better than occasional replenishment of larger quantities. Because conditions vary widely, experimentation and careful observation are the best way to determine the proper interval for an application.
6. **Keep housings and shaft in good condition.** Proper fits and support are vital to bearing operation. Poor bearing support can cause excessive heat generation, uneven wear and seizure. Bearing housings can crack if dropped.
7. **Monitor bearings to avoid unexpected downtime.** Many bearing problems can be detected far enough in advance to include replacement in regular maintenance plans rather than waiting for a breakdown to create an emergency.

TYPES OF BEARING FAILURE – TYPICAL CAUSES

50%	Contamination
30%	Marginal Lubrication
17%	Other
3%	Fatigue Life

Investigate the cause of bearing failure. Bearings are often replaced during normal maintenance procedures and the root cause of the problem is not always immediately discovered. This makes elimination of the failure source much more difficult since the equipment is back in service.

BEARING REPLACEMENT:

1. Lock out and tag electrical power to conveyor motor.
2. Make sure that eccentric shaft is in the lower neutral position.
3. If replacing bearing on drive side, remove V-Belt guard, belts, and large eccentric shaft sheave.
4. Remove bearing bolts and loosen bearing set collar screws. Remove bearing(s) from shaft as required. It may be necessary to allow the eccentric shaft to cool prior to removing bearing(s). If bearing set screws were tightened properly there will be indentations in the shaft. Smooth imperfections with a file and thoroughly clean the eccentric shaft with a cleaning solvent prior to replacing with new bearing(s). When replacing bearings, check shaft for wear and damage. If found, repair before mounting the bearings. Both shafts and housings should be periodically checked for diameter roundness, and taper as applicable. If any shaft scarring is visible, the shaft will likely need to be repaired.
5. Replace with "Rexnord" Bearing(s) furnished by ACTION. Do not substitute! All bearings have special seals and internal clearances set by the factory specifically for vibratory application. In addition, ACTION's Rex Bearings also utilize a 2nd adjustment screw which is unavailable from local distributors. Substitute, lower quality bearings often have more contact between rollers and the raceways due to surface irregularities which can result in shorter life. See page 30 for bearing setting procedures.

ACTION VIBRATORY EQUIPMENT

BEARINGS

6. Bolt flange bearings to connecting arms with hi-tensile bolts and with grease fittings facing up. Torque in accordance with values on page 16. Do not tighten set collar screws to shaft at this time.
7. Bolt pillow block bearings loosely to base.
8. Align drive as described on page 36.
9. Following prudent safety procedures, jog conveyor "on" for two seconds, then "off". Jogging the conveyor allows the flange bearings to find their neutral position on the shaft. Lock out and tag electrical power, then tighten flange bearing set collar screws to shaft. The set screws should be located at 180° from the shaft offset. Ensure that threads have been coated with Loctite No. 242 and are properly torqued to values listed on page 16. **BE SURE TO TORQUE BEARING SET SCREWS PROPERLY. A 6" LONG PIPE CHEATER IS EXTREMELY USEFUL WHEN TIGHTENING "CUP" POINT SET SCREWS.** "Cup" point set screws are designed to dig into the eccentric shaft to hold bearing in place. A damaged or bent allen wrench is a small price to pay for the guarantee of properly tightened bearing set screws.
10. Periodically check new bearings for excessive heat during the initial set-up period (20 hours).
11. Pillow block bearings should be level across the conveyor width. Bearing levelness across conveyor width may be checked with a taught string or piano wire.

BEARING LUBRICATION

All Rexnord Roller Bearings are pre-lubricated with Mobilgrease XHP 222 grease of NLGI No. 2 consistency and are free of any chemical impurities such as free acid or free alkali or any mechanical impurities such as dirt, rust, metal particles or abrasives. Bearings are designed for re-lubrication and should be re-lubricated at regular intervals in accordance with "Rexnord" recommendations shown on page 31 included herein.

Bearings should run quietly without clunking or knocking noises. Typical bearing temperatures will generally range from 110°F to 160°F. Bearing temperature can be measured anywhere on the housing.

Do not over-grease! Over-greasing can cause bearings to overheat and freeze on eccentric shaft. Bearings should be re-lubricated slowly while rotating the shaft whenever possible. Bearing temperatures often increase when greasing.

Do not mix grease without first checking with supplier to ensure that they are compatible. Mobilgrease XHP 222 has a lithium complex type thickener. All greases with lithium complex thickener should be compatible.

When lubricating bearings, check to be sure all bearing set collars and the micro-lock screw (which maintains internal bearing clearance) are tight. If set collars are loose, add Loctite and re-tighten to the torque specified on page 16. If the micro-lock screw is loose, add loctite and re-tighten. Ensure that grease nipples are clean to prevent the introduction of contaminants into bearings.

Grease in a bearing acts to prevent excessive wear of parts and aids in the dissipation of heat within the bearing. It is very important that the grease maintain its proper consistency during operation of the bearing under the conditions for which it was selected. It must not be too fluid, and it must not channel. Proper greasing allows rollers to "float" on a film of oil effectively, providing less opportunity for damage due to race/roller contact.

NOTE: Correct, regular greasing of bearings and keeping set collars and micro-lock screws tight are essential to long bearing life. Failure to do so can result in premature bearing and eccentric shaft replacement.

ACTION VIBRATORY EQUIPMENT

BEARINGS

THE SOLUTION TO PRECISE BEARING ADJUSTMENT

The facts speak for themselves. A key to long bearing life is the ability to easily and precisely set internal bearing clearances which is why ACTION's vibratory equipment utilizes specially designed Rex Roller Bearings that are equipped with (2) Micro-Lock Clearance Adjustment Positions.

Precise control of internal clearances when setting bearings at our manufacturing facility or in the field translates directly to longer bearing life. Unlike other bearings, ACTION's proprietary Rex Roller Bearing can be adjusted radially by approximately .001 per position and is unmatched with 24 available positions.

Adjustment Procedure:

Please note that bearings shipped separately for field-installation **may** require fine-tuning even though pre-set at the factory. Please skip step no. 1 and refer to step no. 2 for fine-tuning and refer to the troubleshooting guide included herein as necessary.

All bearings mounted on a vibrating conveyor that have been shipped from ACTION's facility are fully tested and operating temperatures have been recorded. If bearings are serviced properly, **it is highly unusual and normally not necessary** to re-set internal clearances.

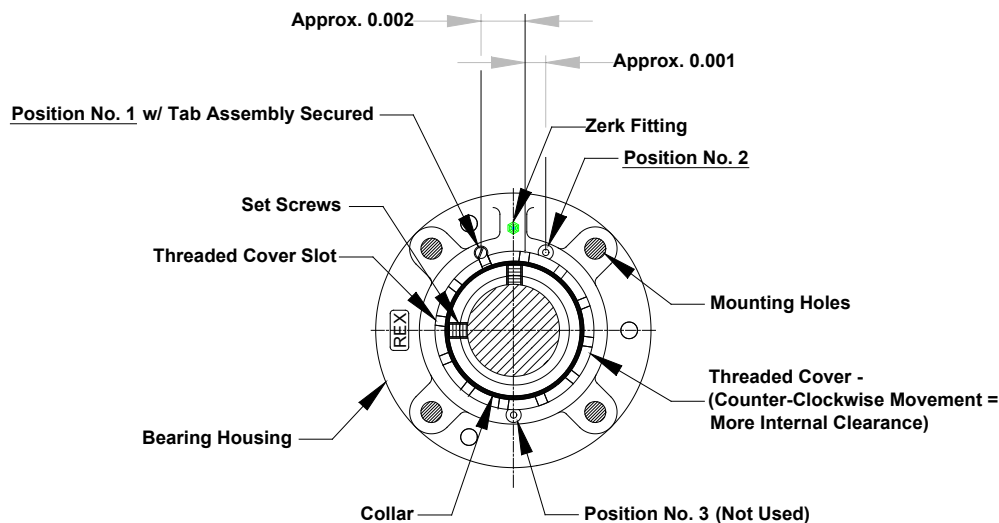
Please skip step no. 1 and refer to step no. 2 for fine-tuning and refer to the troubleshooting guide included herein as necessary. Do not attempt to fine-tune until after 30 minutes of operation. If adjustment is required, please note that an adjustment about .002 (2 position changes in either direction) should be satisfactory. Be sure to monitor bearing temperature closely during the first few hours of operation. Please do not hesitate to call ACTION if you have any questions.

Step No.1 The internal clearance adjustment procedure is initially accomplished by turning the threaded cover clockwise until the bearing inner race resists rotation and misalignment. This removes axial clearance. As a reference, please be sure to make a mark at the 'zero tolerance' starting point.

Step No.2 The threaded cover is then turned counterclockwise until one of the slots in the threaded cover is aligned with Micro-lock Clearance Adjustment Screw Position No. 1 or No. 2 as found on the bearing housing (see below). If the threaded cover matched up initially with Micro-lock Clearance Adjustment Screw Position No. 1 your next incremental step to gain additional clearance would be at Micro-lock Clearance Adjustment Screw Position No. 2. In other words, as the threaded cover rotates counterclockwise, the match between the positions and the threaded cover slots will alternate between position no. 1 and no. 2. Please consult the factory for specific internal clearance recommendations based on your conveyor's RPM and shaft diameter. After selecting the proper internal tolerance, the Micro-lock tab assembly is then secured. Next, rap the end face of the inner race on the side opposite the threaded cover until the bearing rotates and misaligns freely. Micro-lock Clearance Adjustment Screw Position No. 3 should not be used.

To remove internal clearance, please follow step no. 2 with the threaded cover turning in a clockwise direction.

Plan View of ACTION's Precision Rex Roller Flange Bearing



Note: The above adjustment process is identical for pillow block bearings

ACTION VIBRATORY EQUIPMENT

BEARING LUBRICATION (COPIED VERBATIM FROM REXNORD LUBRICATION SHEET)

GENERAL INFORMATION AND SELECTION

The information given here will aid proper lubrication for the great majority of Rexnord applications. For special service conditions not covered, consult the Rex Engineering Department.

It is very important that a properly selected bearing for a given application also be properly lubricated. The lubricant in a bearing must reduce friction, protect against corrosion, and seal out contamination.

The four basic factors that govern the choice of a grease are speed, load, ambient temperature, and operating conditions such as acids, water, fumes, etc.

STANDARD GREASE

All standard Rex factory units except Duplex Units are prelubricated with a grease of NLGI No. 2 consistency, having a drop point of 150° F above the bearing unit housing temperature, is generally satisfactory.

STANDARD GREASE FILL

Rex Bearings to be applied under average operating conditions should be filled with the amount of grease by weight as shown in the LUBRICATION TABLE using either a grease gun or hand packing operation which will be approximately 1/3 housing capacity.

SPECIAL GREASE APPLICATIONS

For unusual conditions where bearings experience extremes of loads, speeds, and/or temperature, special lubricants may be necessary. Various combinations of load-speed-temperature produce widely different effects, but "normal" operation can be expected to result in a housing temperature 30° - 60° above ambient. Unusual conditions may increase this temperature differential.

Stated as "Rules of Thumb", the following are guides to the definition of "unusual" conditions:

HEAVY LOAD	Greater than .25 x C Rating
HIGH SPEED	Bolt Type Ratings in Capacity Table
HIGH TEMPERATURE	Housing temperature 200° F+
LOW TEMPERATURE	Housing temperature below 0° F

Choice of specific type of lubrication, like any selection, should be a joint selection determined by handling most severe requirement first, then accommodating as many other desired results as is possible within the confines of the original selection. Consult the Rex Engineering Department for assistance involving the conditions above.

RELUBRICATION

Bearings should be re-lubricated at regular intervals. The type of service will determine the frequency and amount of lubrication.

It is essential to use grease that is free of acid, alkali, abrasive fillers, or dirt. When equipment will be idle for some time, addition of fresh grease before shutting down will assure maximum protection to the bearing races. This is particularly important for equipment exposed to weather.

Mounted units are provided with hydraulic grease fittings to allow periodic relubrication as required. Units for shaft sizes 3/4-inch to 4-inch are tapped for 1/8-inch pipe tap and units for shafts above 4 inches are tapped for 1/4-inch pipe tap.

To ensure accurate measurement of the grease required for relubrication, a metering grease gun can be used. If a booster type is available, determine the number of strokes per ounce of grease by pumping grease onto a sensitive scale. The given number of strokes will give you the required amount of grease.

General guidelines for relubrication procedures i.e., frequency and amount shown in the Lubrication Tables are based upon the average application conditions with standard clearances, moderate loads, etc., which yield housing temperatures of 150° F or less. Lubrication practices indicate that the relubrication frequency should be doubled for every 20° F increases above that level. Individual experience plus specific application conditions i.e., ambient temperature, operating temperature, exposure to fluids, fumes, etc., should be used to develop relubrication programs.

CAUTION CONCERNING MIXING OF GREASES

The components within any one good grease (oil, soap, additives) are mutually compatible. However, this does not mean that any two greases, even if apparently of the same type, can be mixed without some physical or performance change. The mixing of any two specific greases should be checked with the lubricant manufacturer.

It is recommended that before changing to a grease with a different base, the original grease should be completely removed with a solvent before re-lubricating.

SOLVENTS

When cleaning bearings, the heavier petroleum solvents, such as kerosene, should be used with caution because they do not evaporate readily. Any small amount left in the bearing cavity will dissolve the raw lubricant and change its properties.

OIL LUBRICATION

Rex housing designs do not include oil sumps, thus are not readily used with static oil lubrication. However, recirculating oil systems can be adapted, providing adequate drain size to present and oil light seals incorporated.

Oils used for adjacent gears are generally suitable for bearings, but the oil should flow freely at all operating temperatures to provide good lubrication. Where necessary, channels or fingers should be provided to ensure a continuous supply of oil to the bearings.

LUBRICATION TABLE (Based on 40-hour week)

SHAFT SIZE - INCHES			SIZE CODE	GREASE REQUIRED, OZ.		RECOMMENDED NO. OF MONTHS BETWEEN RELUBRICATION					
NORMAL DUTY SERIES 2000	HEAVY DUTY SERIES 5000	ADAPTER SERIES 9000		LUBRICATE REBUILT UNITS	RELUBRICATE UNITS	RPM					
						100	300	500	1000	1750	3000
¾ - 1	...	...	2	0.4	0.1	12	8	5	2	1	½
1 1/8 - 1 ¼	...	...	thru	0.5	0.1						
1 7/16 - 1 ½	1 7/16	...	4	0.6	0.1						
1 11/16 - 1 ¾	1 ½ - 1 11/16	...	5	0.8	0.2	8	5	3	1	½	...
1 15/16 - 2	1 15/16	...		0.9	0.2						
2 1/16 - 2 ¼	2 - 2 3/16	1 15/16 - 2		1.1	0.2						
2 3/8 - 2 ½	2 7/16	2 3/16	9	1.5	0.3	6	4	2	1	½	...
2 11/16 - 3	2 ½ - 2 15/16	2 7/16 - 2 ½	2.8	0.5							
3 3/16 - 3 ½	3 1/16 - 3 7/16	2 11/16 - 2 15/16	10	3.7	0.6						
3 11/16 - 4	3 11/16 - 4	3 3/16 - 3 7/16	thru	6.9	1.1	4	2	1	½	...	...
...	4 3/16 - 4 7/16	3 11/16 - 4	12	8.4	1.5						
...	4 15/16 - 5	4 3/16 - 4 7/16	13	14.3	2.5						
...	5 7/16	4 15/16 - 5		22.1	4.0	4	2	1	½	...	...
...	5 15/16 - 6	5 7/16		25.3	4.5						
...	6 15/16 - 7	5 15/16 - 6 7/16	16	33.0	6.0						

NOTE: GREASES DEGRADE MORE RAPIDLY AT HIGHER OPERATING TEMPERATURES. RELUBRICATE MORE FREQUENTLY IF BEARING OPERATING TEMPERATURE IS HIGH. FOLLOW RECOMMENDED GREASE AMOUNT ABOVE.

ACTION VIBRATORY EQUIPMENT

ROCKER ARM REPLACEMENT

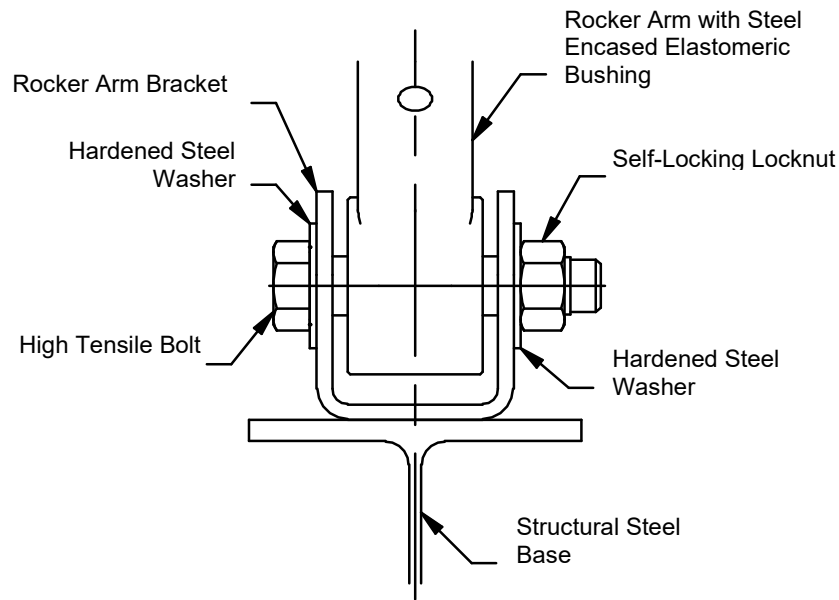


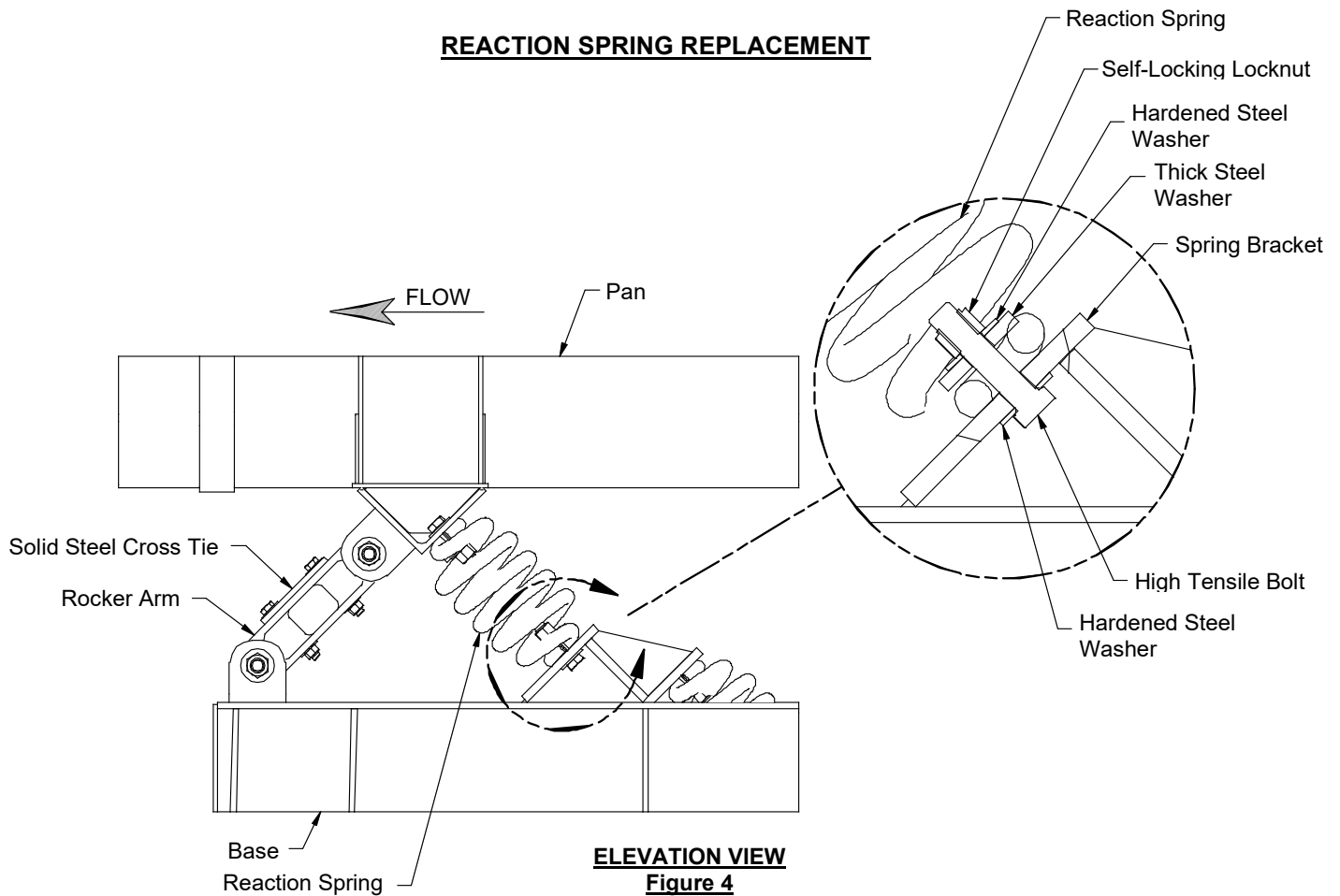
FIGURE 1

- Lock out and tag electrical power to conveyor motor.
 - Support conveyor or balancer at correct height. Change one (1) arm at a time.
 - Remove locknut, washers, and hi-tensile bolt at each end of arm. (First – remove solid steel crosstie bolts and crosstie if any). Remove rocker arm.
 - Inspect Rocker Arm Bracket for wear and replace if necessary. If the Rocker Arm Bracket requires replacement, please consult ACTION for proper rocker arm installation angle. If bolts were loose, serrated ends of bushing may have eroded the inside surface of the arm bracket, preventing proper clamping force to be obtained.
 - Replace arm bolts with a new grade 5 bolt, and with our self-locking locknut.
 - Check rocker arm bushings for wear. Press new bushings into rocker arm if necessary. Bushings have universal serrations and may be pressed into the rocker arm without regard to orientation.
 - Replace Rocker Arm with new fasteners as shown. Tighten bolts/locknuts to the proper torque. Proper tightening of the rocker arm fastener will embed serrated teeth into the rocker arm clips and prevent rotation of the inner sleeve of the bushing. The outer sleeve of the bushing is a press fit into the ends of the rocker arms. Reinstall solid steel crosstie if applicable. Proper torque of the fastener is critical to assure that serrated teeth embed properly.
 - After a short run-in period, retighten bolts/locknuts to the proper torque.
- NOTE: It is convenient to stock a few rocker arms complete with new bushings already pressed in. When replacement is necessary, these arms can be installed to minimize downtime and new bushings can be pressed into the rocker arms that were removed at a later more opportune time. When pressing bushings, use a fixture to hold the arm steady and a punch slightly under the diameter of the outer sleeve of the bushing. **To avoid bushing damage, do not press on the center of the bushing.**

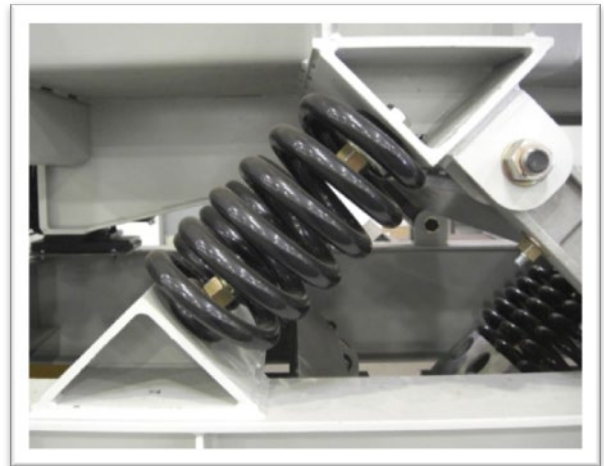


ACTION VIBRATORY EQUIPMENT

REACTION SPRING REPLACEMENT



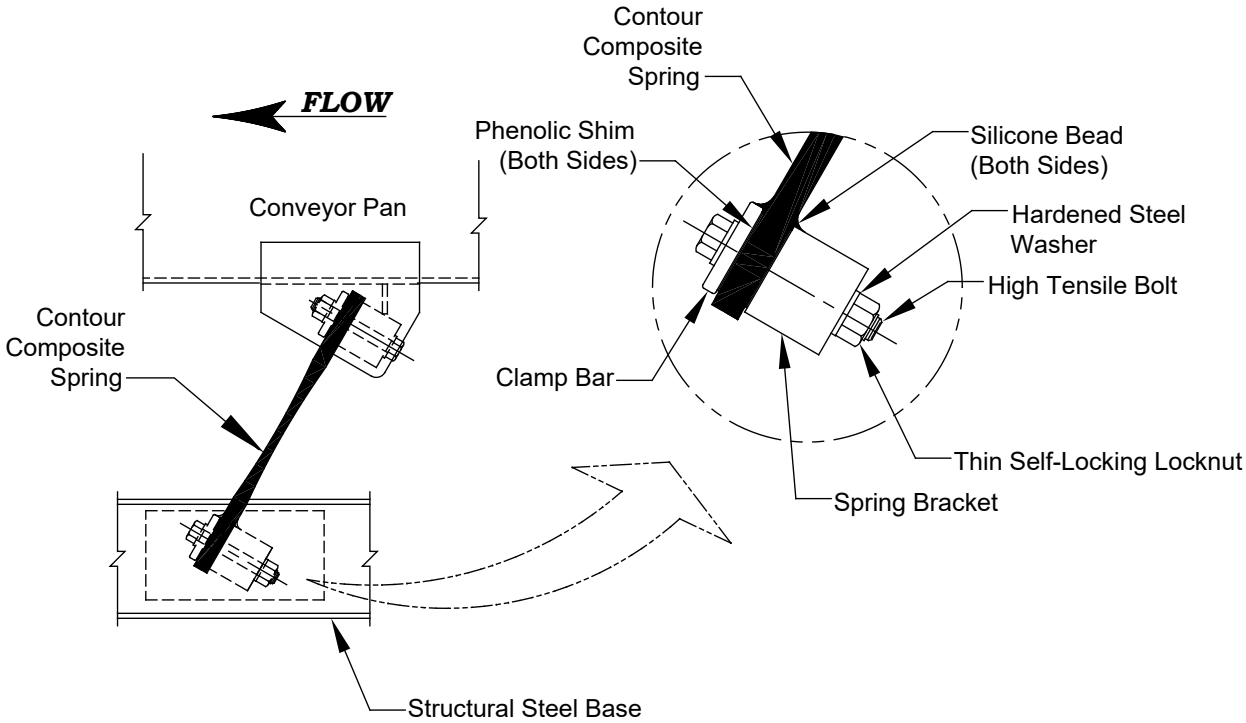
- Lock out and tag electrical power to conveyor motor.
- Remove nuts, bolts, and washers at each end of the spring.
- Jack the pan slightly to free spring and allow it to be removed. It is important not to hammer the coils of the springs because nicks will cause stress concentration and eventual spring failure.
- Install new spring with steel washers, bolts, and locknuts as shown above.
- Tighten bolts/locknuts to the proper torque.
- After a short run-in period, re-tighten all bolts/locknuts.
- Springs with visible cracks should be replaced.



NOTE: Ensure that no paint or other foreign matter exists between the mounting surface of the spring and face of the spring bracket.

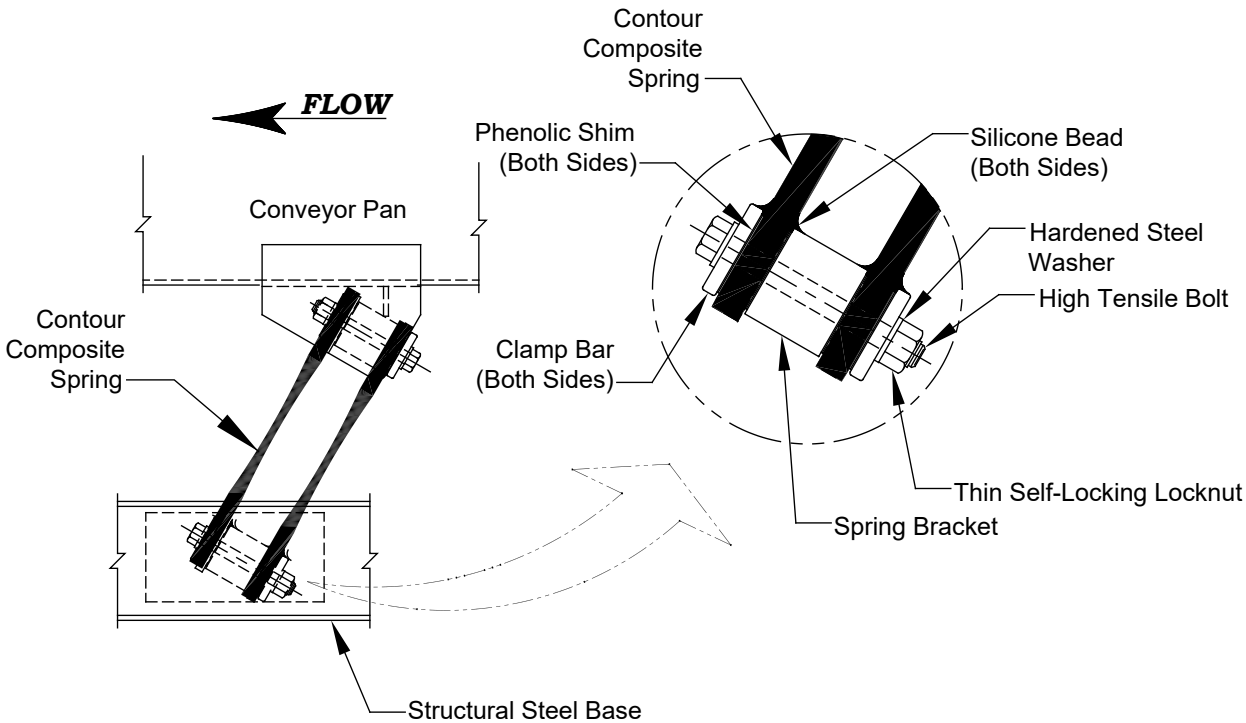
ACTION VIBRATORY EQUIPMENT

CONTOUR COMPOSITE SPRING



ELEVATION VIEW - SINGLE

FIGURE "E"



ELEVATION VIEW - DOUBLE

FIGURE "F"

ACTION VIBRATORY EQUIPMENT

CONTOUR COMPOSITE SPRING REPLACEMENT

(REFER TO FIGURES “E” AND “F” ON PAGE 34)

1. Lock out and tag electrical power to conveyor motor (refer to page 6).
2. The contour composite spring is specifically designed for vibratory use with a pre-selected spring rate. To avoid severe and costly problems, we highly recommended that you do not use substitute products.
3. Remove bolts at top and bottom of composite spring. Remove spring, clamp bars and phenolic spacers. Clean clamp bars and phenolic spacers of old silicone. Reassemble with new spring. Tighten bolts to specified torque on page 16.
4. Apply a silicone bead at clamp bar edges on top of bottom connection only, as shown, before running conveyor.
5. For proper operation and long life, keep area around springs free from material obstructions. Vibrating conveyors with associated parts should always operate in an unobstructed manner. If a double spring (see Figure “F”) arrangement, blow out between springs to avoid material build-up.
6. Always replace one (1) spring at a time. If a ‘single’ as shown in figure “E”, always mount composite spring to front (downstream surface) of spring bracket.
7. Composite springs are sensitive to temperature. Temperatures above 150° can adversely affect performance and life.
8. When installing composite springs, be careful not to nick or gouge any surface.
9. After installation is complete, check actual conveyor stroke(s) on the pan and balancer (if present). Design stroke is shown on the stroke plate and is also listed on the General Arrangement Drawing (this drawing can be found at the back of the manual). If spring quantities match the General Arrangement Drawing and the stroke is still over or under design stroke, please refer to the problem-solving section of the manual (pages 45, 46, and 47) or call the factory for assistance. To avoid problems, stroke(s) should be within $\pm 1/8$ " of design stroke at any time.

ACTION VIBRATORY EQUIPMENT

DRIVE ALIGNMENT

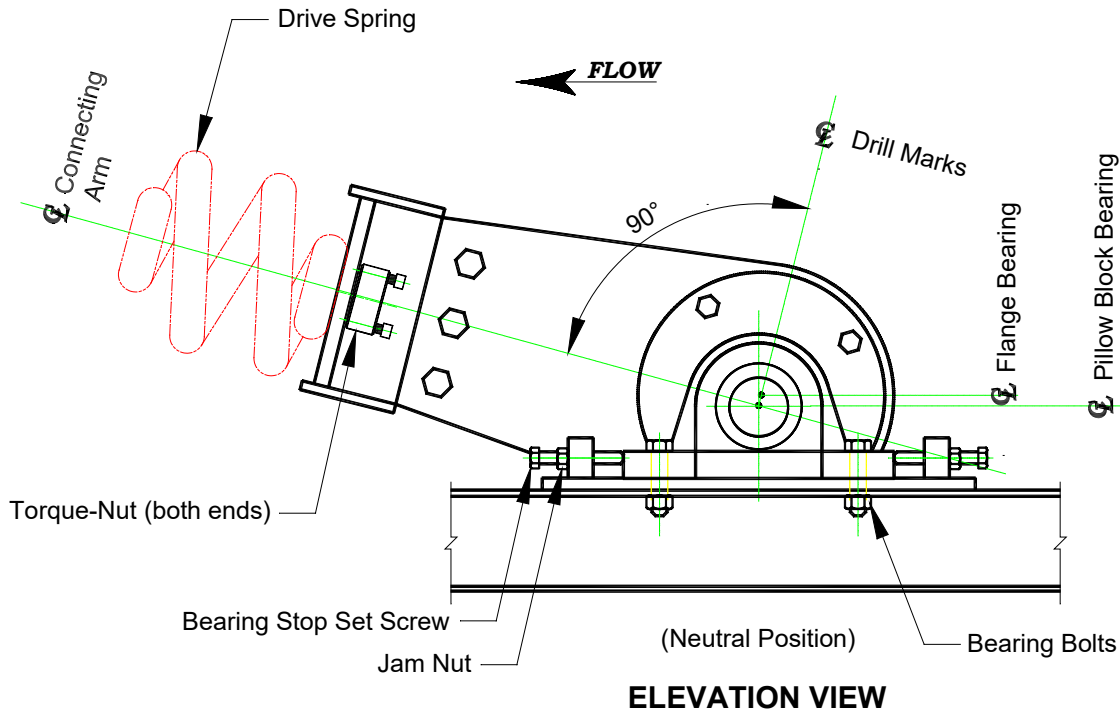


FIGURE "G"

For the conveyor to operate properly, the drive must be set with the conveyor at rest so that the eccentric shaft center drill marks are a 90° to the center line of the connecting arms. This drive alignment is made with pan drive connecting arms hooked to pan and balancer (optional) disconnected. This is accomplished by the following procedure:

1. Lock out and tag out electrical power to conveyor motor (refer to page 6).
2. Remove the V-Belt guard and loosen V-Belts to eliminate tension on eccentric shaft. DO NOT use the v-belt nor sheave to pull oneself to the machine.
3. Loosen pillow block bearing bolts and bearing stop screws with locknuts.
4. Rotate eccentric shaft until drill marks on end of shaft are 90° to centerline of drive connecting arms. Pillow block bearings will shift to the center of stroke position. Please note that the conveyor trough at rest (mid-stroke), will normally seek its neutral position.
5. Tighten pillow block bearing bolts.
6. Tighten pillow block bearing stop screws and locknuts.
7. Check torques on pillow block and flange bearing set collar screws. Use Loctite and torque as specified on page 16.
8. Check V-Belt sheaves for alignment, tighten V-Belts, and replace V-Belt guard.
9. After a short run-in period, check to be sure that shaft drill marks have remained at 90° to centerline of drive connecting arms.

ACTION VIBRATORY EQUIPMENT

DRIVE SPRING REPLACEMENT

REFER TO FIGURE “H” ON PAGE 38.

Replacement of balance bar drive springs can be done independently of the pan drive springs; however, to replace pan drive springs, it may be necessary to remove the balance bar drive springs to access the pan springs.

TO REPLACE BALANCE BAR DRIVE SPRING(S):

1. Lock out and tag electrical power to the conveyor motor (refer to page 6).
2. Remove V-Belt guard to allow access to the large eccentric shaft sheave.
3. If torque nuts are used on spring fasteners, review page 39 for proper installation and removal procedures.
4. Loosen and remove drive spring connecting bolts, nuts, and washers at both ends of the spring. Remove spring.
5. Unbolt drive spring connecting bracket from balance bar connecting arm.
6. Install new spring by first bolting to the balance bar drive bracket. Rotate spring to be sure that bolt eyes on right-hand spring are pointed 180° from bolt eyes on left-hand spring.
7. Re-bolt spring connecting bracket to the new drive spring.
8. Lift outer balance bar connecting arm up to centerline position and re-bolt to spring connecting bracket. Manually jog eccentric shaft sheave to insert bolts if necessary.
9. Be sure that connecting arms are set square to the eccentric shaft.
10. Tighten spring and connecting arm fasteners per torque chart on page 16 and page 39.
11. Manually jog the sheave on eccentric shaft to be sure drive is free to move.
12. Check to be sure, with conveyor at rest, that shaft drill marks have remained at 90° to centerline of drive connecting arms. If not, drive should be aligned as described on page 36.
13. Replace V-Belt guard.
14. After a short run-in period, re-tighten all bolts and locknuts.

CAUTION. Drive spring fasteners must be properly torqued to prevent premature spring failure.

TO REPLACE PAN DRIVE SPRING(S):

1. Lock out and tag electrical power to the conveyor motor (refer to page 6).
2. Remove V-Belt guard to allow access to the large eccentric shaft sheave.
3. If torque nuts are used on spring fasteners, review page 39 for proper installation and removal procedures.
4. Disconnect balance bar drive spring from balance bar drive bracket and allow arm to rotate out of the way if the unit is a balanced conveyor.
5. Remove pan drive spring fasteners and drive spring.
6. Jack pan at drive bracket or manually rotate large sheave on eccentric shaft to allow new spring(s) to fit between the drive bracket and the drive spring connecting bracket.
7. To replace only one drive spring, position new spring between drive bracket and the drive spring connecting bracket and fasten bolts, washers, and locknuts to each end to hold spring in place.
8. To replace all drive springs; raise/jack connecting arms along with spring connecting bracket to correct centerline location. Then position new springs between drive bracket and the drive spring connecting bracket and fasten bolts, washers, and locknuts to each end to hold springs in place.
9. Rotate spring to be sure that bolt eyes on right-hand spring are pointed 180° from bolt eyes on left-hand spring.
10. Tighten spring bolts/locknuts to specified torques on page 16 and page 39.
11. Remove all jacks and check to be sure that drive is free to move by manually jogging the large sheave on the eccentric shaft.
12. Reconnect balance bar drive spring by re-bolting to balance bar bracket and torque as specified on page 16 and page 39.
13. Manually jog the sheave on eccentric shaft to be sure drive is free to move.

ACTION VIBRATORY EQUIPMENT

DRIVE SPRING REPLACEMENT

REFER TO FIGURE "H" ON PAGE 38.

14. Check to be sure, with conveyor at rest, that shaft drill marks have remained at 90° to centerline of drive connecting arms. If not, drive should be aligned as described on page 36.
15. Replace V-Belt guard.
16. After a short run-in period, re-tighten all bolts and locknuts to specified torques on page 16.

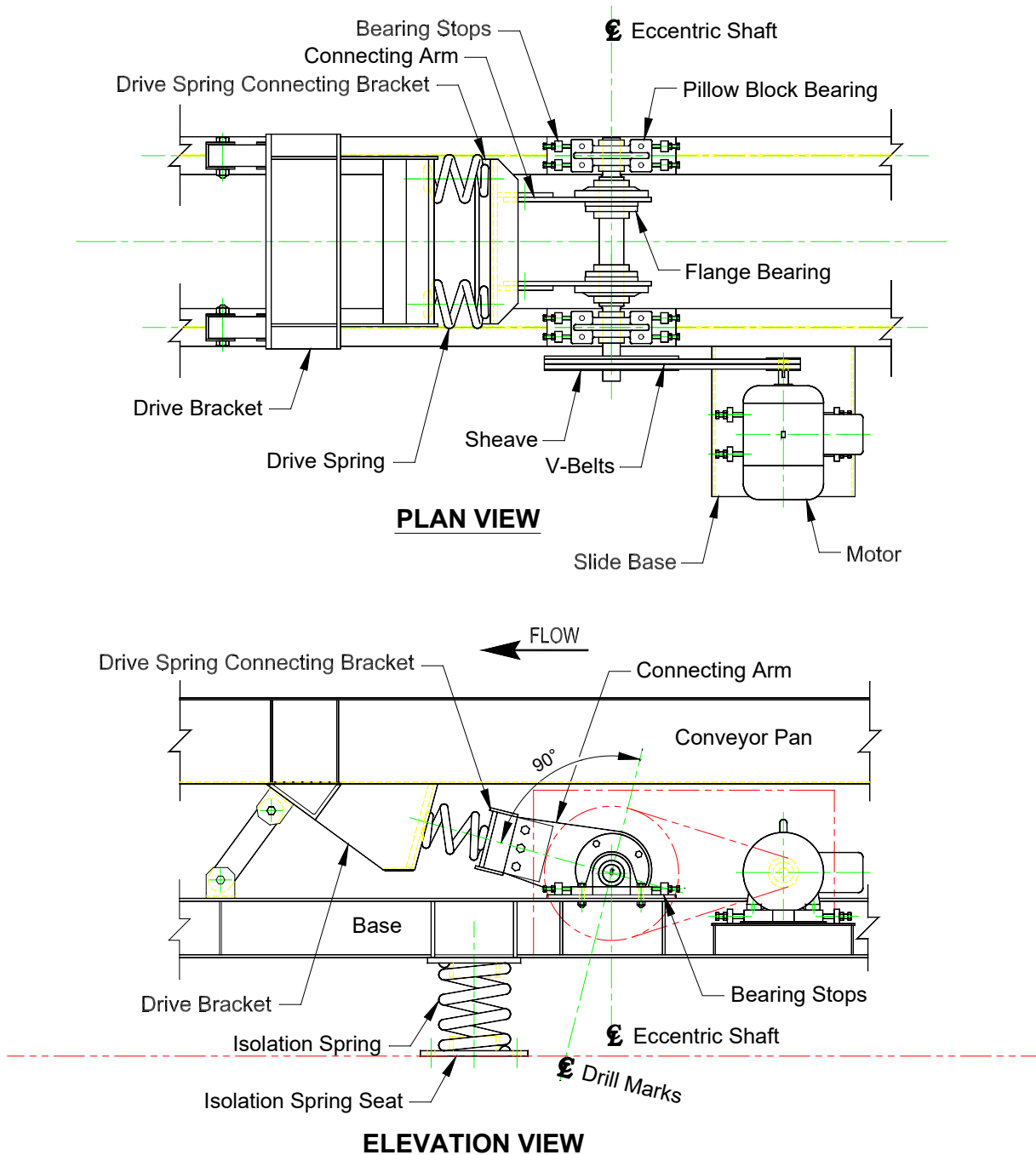


FIGURE "H"

ACTION VIBRATORY EQUIPMENT

TORQUE NUT INSTALLATION PROCEDURE

Torque nuts are used for connecting the drive springs to the drive bracket for mounting the feeder motor to the exciter plate / drive bracket face.

BEFORE TIGHTENING

JACKBOLT TORQUE:

- For 1" dia., use 23 ft-lbs.
- For 1¼" dia., use 23 ft-lbs.
- For 1½" dia., use 40 ft-lbs.

PREPARATION:

Make sure the jack bolt tips are flush (or recessed) with bottom of nut body.

Lubricate thread of main stud.

Slide hardened washer onto the stud.

Lubricate the washer face and/or jack bolt tips

TIGHTENING SEQUENCE

- Step 1 Spin the tensioner down on the main thread until it seats against the washer.
- Step 2 1" Torque Nut – (Figure "J")
At 30% to 70% target torque, tighten (3) jack bolts at 120° apart
1 ¼" and 1 ½" Torque Nut – (Figure "K")
At 30% to 70% target torque, tighten (4) jack bolts at 90° apart (12:00, 6:00, 3:00, 9:00)
- Step 3 At 100% target torque, tighten the same (4) jack bolts.
- Step 4 At 100% target torque, tighten all jack bolts in a circular pattern (1 round only).
- Step 5 Repeat "Step 4" until all jack bolts are "stabilized" (less than 20-degree rotation). This usually requires 2-4 additional passes.

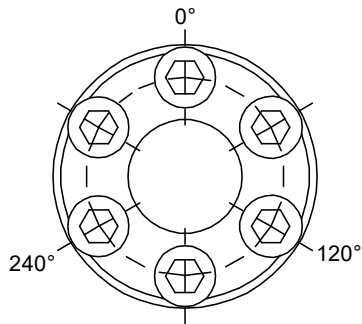


FIGURE J

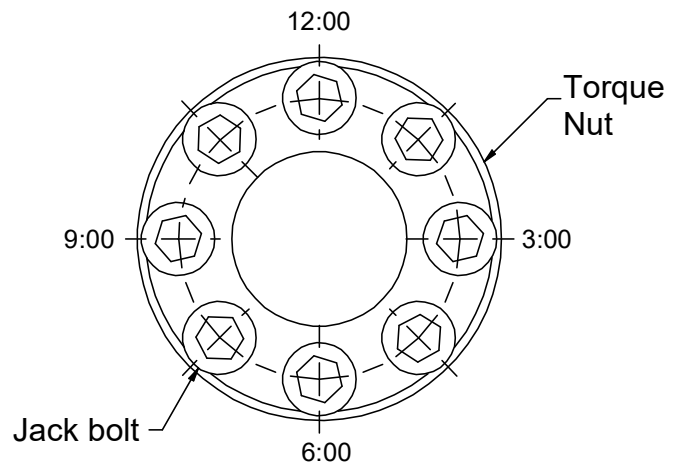


FIGURE K

TORQUE NUT REMOVAL PROCEDURE

CAUTION

Removal requires strict procedures! Jack bolts must be unloaded gradually. If some jack bolts are fully unloaded prematurely, the remaining jack bolts will carry the entire load and may be hard to turn. With extreme abuse, a jack bolt tip can deform making removal difficult.

Preparation: Spray jack bolts with penetrating oil or hydraulic oil prior to start (especially if product is rusted).

Step 1 Loosen each jack bolt ¼ turn following a circular pattern around the tensioner (round only). Note: As you move around and get back to the 1st jack bolt, it will be tight again.

Step 2 Repeat a 2nd round as above.

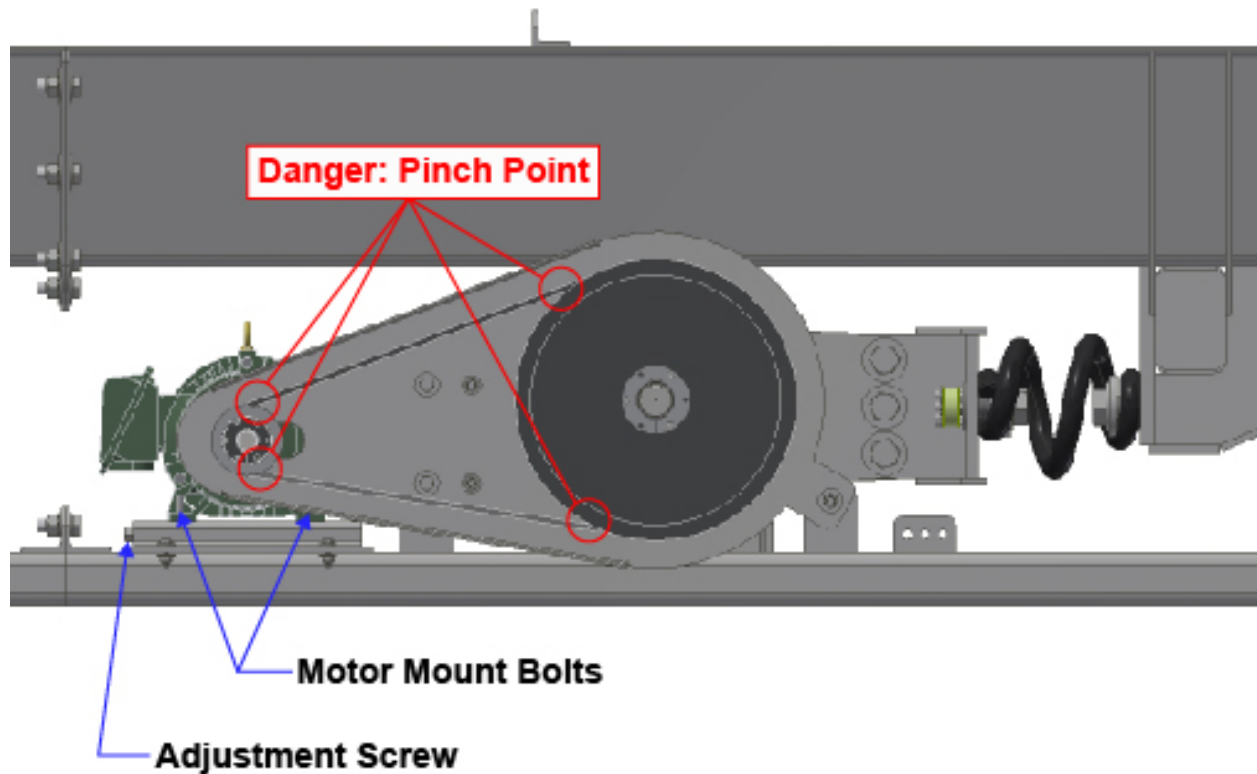
Step 3 Repeat a 3rd round as above.

Step 4 Continue until jack bolts are loose. Remove, clean (if necessary, and re-lubricate the jack bolts prior to next use.

Use a torque wrench for proper tensioning. Air impacts are not recommended.

ACTION VIBRATORY EQUIPMENT

V-BELT REPLACEMENT



1. Lock out and tag out electrical power to conveyor motor (refer to page 6)
2. Remove the V-Belt guard.
3. Loosen, do not remove, the four nuts holding the motor to the motor mount
4. Turn the motor mount adjustment screw moving the motor towards the eccentric shaft far enough that the belts can easily be removed. DO NOT use pry bars to remove or install v-belts.
5. Remove the old v-belts
6. Install new v-belts (only use OEM recommended belts)
7. Turn the motor mount adjustment screw moving the motor away from the eccentric shaft to tighten v-belts (see Belt Tension Chart below for belt manufacturers tension values)
8. Tighten the four nuts holding the motor to the motor mount
9. Install the belt guard

Belt Tension Chart

Belt Profile	Diameter of the Small Pulley d_d [mm]	SIMPLIFIED DEFAULT VALUES OF THE STATIC STRAND FORCE [N]	
		Initial Installation new V-Belts	New Installation operation after running-in (.5 – 4 hours)
BX	≤ 125	450	350
	$> 125 \leq 160$	500	400
	$> 160 \leq 200$	600	450
	> 200 *		

- Tension values for these pulleys must be calculated

ACTION VIBRATORY EQUIPMENT

Feeders

Motor counterweights have been pre-set at the factory to appropriate force, do not attempt to re-set without consulting ACTION. Trough strokes can vary dramatically as counterweights are changed. Motor setting and operating direction are listed on certified General Arrangement Drawings and have been included in the back of this manual for your reference.

Do not attempt to run feeder without guarding in place.

Motor direction for feeders is important, do not change direction without consulting ACTION.

To attain and maintain proper material flow, please consult with ACTION for feeder design (length, width, headload considerations, decline, etc.).

To attain and maintain proper material flow, please consult with ACTION for hopper design (hopper opening size, hopper slope, etc.). Material not conveying is often a result of poor hopper design.

The in-feed hopper and feeder should be designed together for a fully integrated system capable of handling your bulk material. If storage bins or hoppers performed without problems, there would be limited requirements for bin feeders. A 'standard' hopper may not work for your material.

The motor mounting surface has been machined to exacting tolerances to provide a suitable surface for motor mounting. Any modifications to this surface will likely result in bearing failure.

Brute force units with dual motors will synchronize themselves.

Customer to provide adequate ventilation to maintain an ambient motor temperature of less than 40°C.

Motor(s) must be properly grounded.

The feeder motor has a recommended operational ambient temperature and mounting surface temperature range of - 22° to 104° F (-30° to 40° C). If operating the motor in environments beyond these temperatures, call ACTION, as the feeder motor may require rating reduction, more frequent lubrication, or lubrication substitution.

Store feeder motor in an ambient temperature not less than 41° F (5° C) with a relative humidity not more than 60%.

1. **WARNING.** When wiring feeder motor in accordance with National Electrical Code Article 430 by a qualified electrician, please be sure to leave slack in the electrical cable so that the cable does not become taut during vibration and cause stress on wire connections. On applications where moisture is present, leave enough slack in power cable to prevent moisture from running down cable into feeder motor.
2. **WARNING.** Feeder motor must be grounded using the power supply ground wire. Failure to properly ground feeder motor can cause severe injury or death.
3. **WARNING.** Thermistors and thermostats are intended for motor winding protection or to limit external motor surface temperatures. They do not replace overload protection. Always install overload protection. Failure to do so could result in severe injury or death. Determine size of overload protection according to NEC Article 430, and have it installed by a qualified electrician only.
4. **CAUTION.** For equipment using two feeder motors, the two motors must be electrically interlocked. If using a single contactor, each motor must be provided with separate overload protection. The motor control circuit must be arranged so that if one motor become de-energized, the other motor will automatically and immediately become de-energized. Failure to properly interlock motors could result in severe damage to equipment if one vibrator fails.
5. **CAUTION.** Do not run vibrator with eccentric weights removed. Running vibrator with eccentric weights removed will damage bearings.
6. **WARNING.** When checking shaft rotation with end cap removed, keep hands away from swinging weights. Weights can crush fingers.
7. **WARNING.** Before adjusting eccentric weights or inspecting feeder motor, turn off and lock out/tag out energy source to vibrator.
8. **CAUTION.** Do not operate vibrator with end caps removed. Dust accumulating around the vibrator shaft could cause unit to fail.
9. **CAUTION.** Adjust both sets of eccentric weights to same setting number (mirror images), or force output will be uneven and damage vibrator.
10. **WARNING.** Do not allow motor current to exceed nameplate rating. If feeder motor is operated continuously with line current above nameplate rating, feeder motor can be damaged. Do not operate feeder motor at frequencies higher than specified on the nameplate.

ACTION VIBRATORY EQUIPMENT

11. **CAUTION.** Allow feeder motor to cool to ambient temperature before working on it.
12. **CAUTION.** Use only prescribed grease in feeder motor. If different grease is used, the feeder motor can be damaged, and the warranty will be void. Use only prescribed amount of grease to lubricate feeder motor. Too much grease will cause bearings to overheat and result in premature bearing failure.
13. **CAUTION.** Do not attempt to repair feeder motor or replace bearings yourself. If you attempt to do so during the warranty period, the warranty may be void.

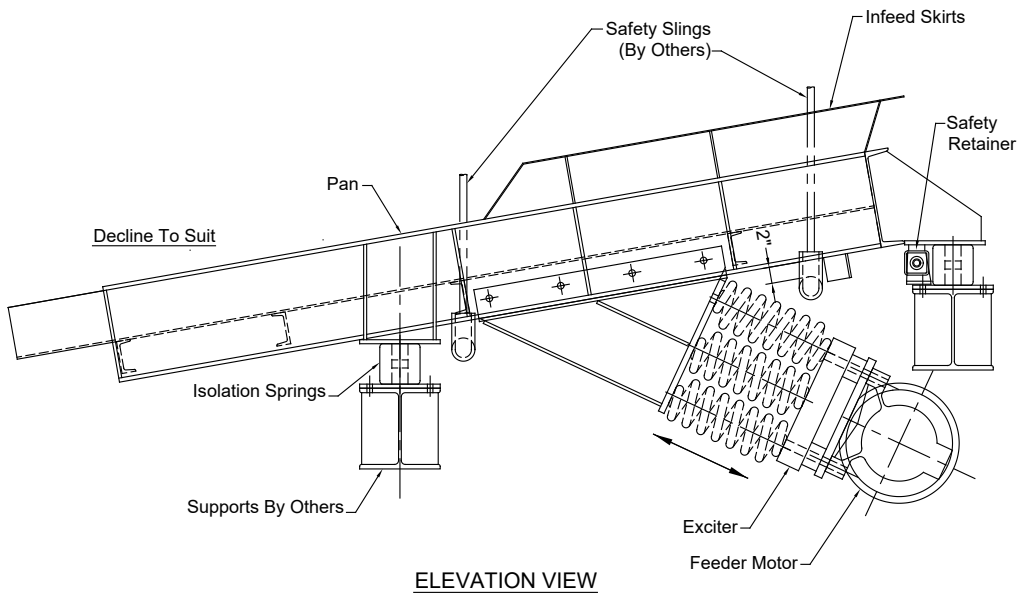
NOTE. Eccentric weights are attached to the shaft. The adjustable weight rotates around the shaft.

Foot mounted feeders can become dislodged or hop off their isolation springs. Feeders suspended from overhead by cables can fall due to damaged cables or support structures. Safety considerations dictate the customer must provide safety slings capable of supporting the feeder and its contents in the event the feeder falls from its' supports.

The slings should be sized and located to catch the feeder within 2" of its' original position.

VIBRATORY EQUIPMENT APPLICATIONS CALL FOR SPECIAL CARE IN MOTOR DESIGN AND REPAIR

Feeders, conveyors, and other two-mass or brute force designs require special drive motor construction and repair services. This is since many high-performance applications must be able to withstand 10 G's or more of acceleration. Typically, the motors for demanding direct drive applications have double extended shafts, making high quality motor construction extremely important for long service life. For trouble-free operation and less maintenance, vibratory drive motors usually include high quality design features such as roller bearings with special clearances, cages and inner ring designs. Drip or vacuum impregnated windings and terminal block cord connections are also used to withstand vibratory operating conditions. Special knowledge and consideration are also needed for motor service. Repair centers must rebuild motors to exact manufacturing standards and specifications, using only high-quality OEM parts. Proper dynamic load testing with test tables is also required to assure long service life for rebuilt motors. Technicians must also be aware of the need for correct lubricants to assure long bearing life.



ACTION VIBRATORY EQUIPMENT

INSPECTION SCHEDULE AND MAINTENANCE CHECKLIST

Conveyor No. (MFGRS)_____ Inspected by_____ Date_____

WARNING. Please do not attempt to inspect any area which is likely dangerous to the inspector or other persons or damage the property or its systems or components.

INTRODUCTION

You can simplify the job of maintenance if you do it systematically instead of haphazardly. In short, don't neglect minor repairs – they won't go away. Anticipate them by inspecting your equipment on a regular basis.

The following checklists and inspection schedule will help you evaluate the condition of your equipment and provides a starting point in the event of a problem. The following pages do not represent a technically exhaustive or all-encompassing evaluation and does not include any engineering, design or code compliance, advice. Since there is always the possibility of unobservable deficiencies while inspecting, please make every effort to be as thorough as possible and give us a call if any questions or concerns arise. We will do our best to help.

YES	NO	QUESTION
()	()	Has the conveyor been modified or have any repairs been performed?
()	()	Does the foundation or support steel exhibit any signs of cracking, fatigue, movement?
()	()	Is there excessive dirt or debris around components? Is clean-up required?
()	()	Is equipment located where normal noise levels will not be objectionable or beyond OSHA standards?
()	()	Any "handy man" or do-it yourself modifications to wiring?
()	()	Loss of pan integrity as evidenced by cracking, holes, broken welds, etc.?
()	()	Are safety devices installed to protect systems, components, and personnel from unsafe conditions?
()	()	Are the stroke plates in place on the pan and balancer?
()	()	Are there any unusual noises?
()	()	Are there any pan or balancer interferences?
()	()	Are the guards in place?
()	()	Is there material build-up on the pan or sub-pan?
()	()	Are there any loose bolts?
()	()	Have the bearings been lubricated consistently?
()	()	Is the equipment safe to use?
()	()	Has the drive been "re-set" at any time?
()	()	Have the drive belts or sheaves been replaced?
()	()	Have drive bearings been replaced?
()	()	Has the application changed since original installation?
()	()	Is vibration consistent and at design stroke?
()	()	Is the material travel speed satisfactory?
()	()	Is the pan size sufficient?
()	()	Does the material "track" straight down the pan without substantial weaving?
()	()	Are you proficient at reading the stroke plate?
()	()	Is the equipment designed properly for your application?

ACTION VIBRATORY EQUIPMENT

INSPECTION SCHEDULE AND MAINTENANCE CHECKLIST

CONVEYOR NO. (MFGRS) _____

INSPECTED BY _____

DATE _____

COMPONENT OR PART	MINIMUM RECOMMENDED INSPECTION INTERVAL				CONDITION (check column best indicating condition when part or unit is inspected. Use note column to the right if condition is not listed below.)					CORRECTIVE ACTION NOTES
	WEEKLY	MONTHLY	SEMI-ANNUAL	ANNUAL	ADJUSTMENT REQUIRED	REPAIR REQUIRED	REPLACEMENT REQUIRED	LUBRICATION REQUIRED	CLEANING OR PAINTING REQUIRED	
REACTION SPRINGS	☐									
CONTOUR COMPOSITE SPRINGS	☐									
DRIVE SPRINGS	☐									
ISOLATION SPRINGS	☐									
ROCKER ARMS (BUSHINGS)	☐									
DRIVE SHAFT	☐									
BEARINGS	☐									
MOTOR(S)			☐							
GUARD(S) & COVERS	☐									
TROUGH (INCLUDES BRACKETS)	☐									
BASE (INCLUDES BRACKETS)	☐									
BALANCER (INCLUDES BRACKETS)	☐									
FASTENERS	☐									
MISCELLANEOUS OPTIONS										
SCREEN(S)		☐								
FIBERGLASS SECTION		☐								
IMPACT / WEAR LINER		☐								
MAGNETIC TRAP		☐								
GENERAL CONDITION		☐								
STROKE CONTROL UNIT (SCU)	☐									
OTHER (FILL-IN)										

(Indicate corrective action taken during inspection and note date. For corrective action to be done after inspection, a designated person must determine that the existing deficiency does not constitute a safety hazard before allowing unit to operate. When corrective action is completed, describe and note date in this column.)

ALWAYS LOCKOUT BEFORE ANY INSPECTION OR ADJUSTMENT.

ACTION VIBRATORY EQUIPMENT

INSPECTION SCHEDULE AND MAINTENANCE CHECKLIST

Conveyor No. (MFGRS) _____ Inspected by _____ Date _____

LIST STROKES

PAN _____

BALANCER _____

BASE _____

LIST RPMS

ECCENTRIC SHAFT _____

MOTOR _____

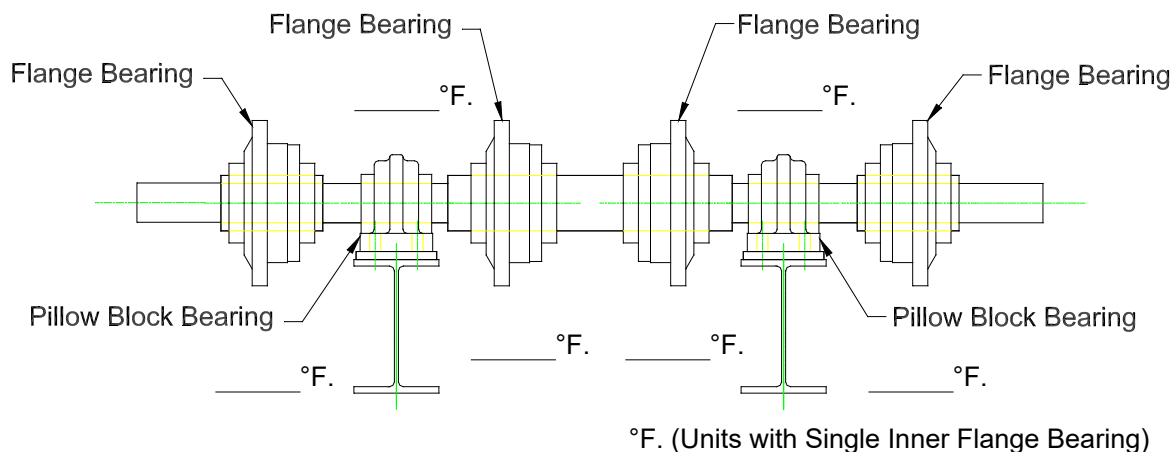
WHEEL SETTING _____
(Feeders Only)

_____ Total number of hours in operation

_____ Material travel speed (FPM)

_____ Material burden depth

(If your daily working time is longer than normal or operating conditions are unusual, shorten the maintenance checking intervals accordingly.)



Please check one:

☐ Drive Left☐ Drive Right

TYPICAL CROSS SECTION OF ECCENTRIC SHAFT WITH BEARINGS

Thoroughly examine each conveyor after any incident that could jeopardize the safety of man or machine. Any defect that is reported must be remedied before putting conveyor back into service. Please list any repairs or alterations that must be made to remedy any defects.

Diligent use of the Maintenance Checklist is required to monitor conveyor(s) performance. For each unit purchased, please forward **PAGES 42, 43, 44** of the inspection schedule and maintenance checklist within 2 weeks of initial startup. Should a problem occur thereafter, you will be asked to forward copies (documentation) of the Maintenance Checklist. Diligently keep all copies in a binder for future reference. To meet minimum safety requirements, information should be kept available for inspection for 2 years. ACTION suggests that information be retained indefinitely.

KEEP FOREIGN MATTER AWAY FROM MOVING PARTS. THE USEFUL LIFE OF ANY PIECE OF EQUIPMENT CAN BE EXTENDED BY CONSISTENT AND SOUND MAINTENANCE PRACTICES.

ACTION VIBRATORY EQUIPMENT

PROBLEM SOLVING

This section provides information regarding the most frequently encountered problems, as well as many quick and simple solutions. If you continue to experience problems and this section fails to provide solutions, please feel free to contact ACTION.

CAUTION. It is imperative before doing any work on or around your vibrating conveyor(s), that the maintenance and/or observances are done per the guidelines outlined in this manual. Failure to observe safety procedures could result in bodily harm and/or property damage. Please have all maintenance people review this manual prior to beginning any work.

<u>PROBLEM</u>	<u>POSSIBLE CAUSE</u>	<u>POSSIBLE REMEDY</u>
<u>Overstroke</u>	Loose spring bolts Broken reaction springs Broken drive springs Material adhering to pan Additional weight added to pan such as skirting or chutes, etc. Hooded conveyor is plugged Sheave changed - drive speed too fast Rust / corrosive conditions	Tighten spring bolts per recommended torques Replace immediately and check with number called for on the unit drawing Replace drive springs Clean build-up Remove or add an additional spring(s) - consult ACTION – Conveyor must be at design stroke Check for plug and remove Refer to unit drawing and correct sheave on shaft giving proper rpm Deflect corrosion causing substance away from springs
<u>Understroke</u>	Removal of fixed weight Conveyor base movement Pan hitting stationary equipment Line voltage too low – motor runs too slow Wrong motor rotation on two (2) motor units Misalignment of the drive Eccentric shaft fails Loose foundation bolts Belts and sheaves worn Sheave changed - drive speed too slow Bearing failure	Add weight or remove springs Secure base to foundation and/or supports Check clearances on general arrangement drawing and page 14 of this manual Check connections/voltage Motors should rotate in opposite direction of each other Re-align drive Replace eccentric shaft Tighten and/or replace Replace worn belts and/or sheaves Refer to unit drawing and put correct sheave on shaft giving correct rpm Replace bearing
<u>Noise</u>	Loose bolts Clunking bearing Material interference V-Belt Misalignment Drive bearing internal clearance too loose Failed Fastener(s) Broken spring (Metal on metal sound) Worn rocker arm bushing(s) Broken rocker arm Weld breakage	Check spring bolts, rocker arm bolts, drive bolts, anchor bolts, etc. and tighten to recommended torques Failed bearing – replace/re-set tolerances Clear interference Align sheaves Adjust clearance, monitor bearing temperature Replace Replace spring Replace bushing(s) Replace rocker arm Contact ACTION
<u>Hot bearings or bearing failure</u>	<u>Too hot</u> ...the standard Rex bearing with Mobilith AW2 lubrication can run up to 200°F. <u>Shaft slippage</u> ...an undersize shaft will cause heat due to the inner race slipping on the shaft. Mark the inner race and shaft with a paint pen and run for a short time to identify shaft slippage. <u>Excessive grease</u> ...over lubrication at moderate to high speeds can cause a bearing to run hot. <u>Tight internal clearance</u> ...a bearing can heat up enough to cause it to thermally grow and lock up. <u>Poor alignment</u> ...Rex bearings need to be aligned within ± 1.5 degrees otherwise the bearing will run hot and noisy.	If a significant difference (more than 75°F) in operating temperature occurs with a new bearing in the same application position, a problem may exist. Measure the exact shaft size. Replace or repair shaft to OEM specification. A shaft tolerance of nominal size $-.001$ is generally satisfactory for moderate load applications for collar mounted bearings. Remove grease fitting and run bearing while closely monitoring the operating temperature of the bearing. 1/3 of bearing housing is filled with grease at the factory. If severe, too much grease could "pop-out" bearing seals. Rex bearings have adjustable internal clearance. Rotate the threaded cover counterclockwise one notch and reseal outer race by driving on the inner race from the opposite side. Refer to page 29 for adjustment procedure. Once the bearing is mounted, measure from the end of the inner race/collar to the face of the threaded cover in four places around the shaft. This measurement should be equal within $.060$ inches for most bearings.

ACTION VIBRATORY EQUIPMENT

<u>PROBLEM</u>	<u>POSSIBLE CAUSE</u>	<u>POSSIBLE REMEDY</u>
	<u>Installation preload</u>...during installation the bearings could be accidentally preloaded. <u>Poor lubricant quality</u>...dried out grease does not offer the necessary lubrication and heat dissipation required. Understroke or overstroke Material Interference Drive Misalignment Damaged rollers due to improper or absent ground when welding on or around conveyor Old bearing Improper bearing handling Lubrication absent or bearings over-greased Defective bearing Eccentric shaft bent	When installing a new bearing, always leave the inner race of one collar mounted bearing loose during the first few minutes of operation. Then go back and tighten the inner race securely. This should be done on the bearing furthest from the drive. Lubricate more frequently. When bearings run more hours, run at higher temperatures, run in dirty application the lubrication frequency must be increased. Refer to page 31 for bearing lubrication. 1. Look for broken springs 2. Add or subtract springs to obtain design stroke (see General Arrangement Drawing for quantities) Clean up Re-align drive - follow procedures set forth in manual, page 36 Replace Replace, new bearings have closer tolerances Replace with uncontaminated bearings Lube bearing per manual specifications, page 41 Replace Replace shaft
<u>Noisy Bearing</u>	<u>Shaft slippage</u>...an undersize shaft will cause noise and heat due to the inner race slipping on the shaft. Mark the inner race and shaft with a paint pen and run for a short time to identify shaft slippage. <u>Lack of lubrication</u>...dried out grease does not offer the necessary lubrication and heat dissipation required. Loose or extra internal clearance can cause noise. <u>Poor alignment</u>...Rex bearings need to be aligned within ± 1.5 degrees otherwise the bearing will run hot and noisy. <u>Installation damage</u>...the bearing raceways can be damaged during installation. <u>Failing bearing</u>...as raceways fail the bearing will become noisy. Vibration analysis equipment can be used to monitor life.	Measure the exact shaft size. Replace or repair shaft to OEM specifications. A shaft tolerance of nominal size $\pm .001$ is generally satisfactory for moderate load applications for collar mounted bearings. Lubricate more frequently. When bearings run more hours, run at higher temperatures, run in dirty applications the lubrication frequency must be increased. Rex bearings have adjustable internal clearance. Rotate the threaded cover clockwise one position and monitor operating temperature. See page 30 for adjustment procedure. Once the bearing is mounted, measure from the end of the inner race/collar to the face of the threaded cover in four places around the shaft. This measurement should be within .060 inches for most bearings. Apply any driving force directly to the inner race not the housing. Do not allow the shaft to hang by one bearing, always support the entire shaft. Less than 5% of all bearing failures are due to spalling type fatigue. Most bearing failures are a result of contamination or poor lubrication.
<u>Loosening or Breaking Collars</u>	<u>Shaft slippage</u>...an undersize shaft will cause noise and heat due to the inner race slipping on the shaft. Mark the inner race and shaft with a paint pen and run for a short time to identify shaft slippage.	Measure the exact shaft size. Replace or repair shaft to OEM specifications. A shaft tolerance of nominal size $\pm .001$ is generally satisfactory for moderate load applications for collar mounted bearings.
<u>Rocker Arm Failure</u>	Loose bolts Bushing failure Overstroke Material build-up	Tighten bolts to proper torque - refer to page 16 Replace bushing - refer to page 32 Reduce stroke, replace bushings Clean up
<u>Spring Failure</u>	Material build-up Loose bolts Fatigue due to overstroke	Clean up Tighten bolts to proper torque - refer to page 16 Replace spring & reduce stroke
<u>Material not conveying</u>	Trough understroking Obstruction in trough Conveyor incline too steep R.P.M. too slow Failed rocker legs	Remove springs as necessary to increase stroke to specified level as shown on stroke plate or increase speed (rpm) of the drive and maintain design stroke (install larger motor sheave in V-Belt drive - one size larger) Remove obstruction Reduce incline Increase rpm & maintain design stroke Replace rocker leg and/or rocker leg rubber bushing
<u>Material conveying to one side</u>	Rocker leg failure or loose bolts Isolation spring breakage Material build-up under pan, base or balancer Material loaded on side of conveyor	Replaced rocker leg and/or rocker leg rubber bushings and tighten bolts Replace isolation spring Clean-up Correct loading

ACTION VIBRATORY EQUIPMENT

<u>PROBLEM</u>	<u>POSSIBLE CAUSE</u>	<u>POSSIBLE REMEDY</u>
	Structural failure Broken reaction spring Metal structure added to pan Base movement Drive arms not parallel with centerline of conveyor Unsymmetrical reaction spring arrangement Conveyor was not installed level	Contact ACTION Replace Remove or balance Secure base Adjust, see drive alignment page 36 Move springs to symmetrical pattern Shim conveyor as necessary
<u>Conveyor will not start</u>	Additional weight added to pan such as skirting, liners, or chutes, etc. Wrong motor sheave Insufficient electrical power Obstruction to pan and/or balancer-movement Shaft is not properly aligned Shipping braces not removed Interferences such as chutework are prohibiting pan from moving Starting load too high Starter rating wrong No power to conveyor Wrong voltage or frequency Motor burned out Wrong motor	Remove weight - consult factory, horsepower may need to be increased and springs added Replace with proper sheave Check power supply Remove obstruction Refer to page 46 for proper alignment Remove shipping braces Modify chutework to gain clearance Check allowable unbalanced load Replace with proper starter Check switches, circuit breakers or fuses, and connections in power supply lines Check current rating on motor data plate against power supply Replace motor. Check input power supply. Check motor connections Install proper motor
<u>Cannot find conveyor serial number</u>	Missing stroke plate with stamped serial number	The serial number can also be found on the lower right-hand corner of the certified General Arrangement Drawing located at the back of this manual.
<u>Motor Failure</u>	Improper voltage Disconnect or starter Single phasing Bad bearing or windings	Verify proper voltage on General Arrangement Drawing Check overload heater size, reset Check cable and connection, wire lead Replace motor. Do not use substitute fasteners. Tighten bolts to proper torques as specified on page 16.

Since each conveyor is specifically designed to suit a specific application, please note that some or all the “causes” as listed in this problem-solving section may not be applicable. Please feel free to contact us directly for additional help.

ACTION VIBRATORY EQUIPMENT

SPECIFIC APPLICATION NOTES

SCREENING

Wire mesh screens are not as rugged as perforated type screens. Upon replacing wire mesh type screens, consult ACTION for proper tensioning.

MAGNETIC TRAPS

Magnetic Traps must be cleaned periodically with cleaning intervals based on the amount of metal being trapped. The magnetic trap is designed to capture small ferrous pieces prior to the metal detector eliminating the need for constant metal detector monitoring. The magnetic trap is a secondary feature and should not be considered as a fool proof, metal stopping safety feature. Magnetic traps should always be used in conjunction with a metal detector "customer tuned" to suit required sensitivities.

WARNING: Extreme care should be utilized when installing/removing magnet. Magnetic clamping forces can cause severe injury or appendage loss.

LIQUIDS

Vibrating conveyors will not convey liquids. If water is unavoidable, a means must be made to drain it away. Rain drains and/or sloping the conveyor are good options.

Where excessive moisture conditions prevail, special consideration may have to be given to more frequent painting of the conveyor(s) and coil spring system. Additional painting can help fight corrosion and should be considered as a preventative maintenance procedure where necessary.

MISC.

Units located beneath size reduction machines can be susceptible to component failure if material spills beyond the load area. Please make sure that the chutework interface is adequate. If water is utilized in the shredding process, please direct away from vibratory components.

EQUIPMENT WARRANTY

The equipment is warranted for a period of twelve (12) months from the date of initial operation or two thousand (2,000) hours of use whichever occurs first, but not later than fifteen (15) months from the date of shipment, to be free from defects in material and workmanship disclosed under normal use and operation. (Some individual components carry their own warranty, and such warrantees shall be honored accordingly). If the Purchaser notifies the Seller in writing of any claimed defect in the equipment and if, after appropriate tests and inspections by the Seller, the equipment is found not to be in conformity with this warranty, the Seller will, at its option and expense, either repair the same or provide a replacement therefore, Ex-Works Newberg, Oregon and/or other shipping points. This warranty shall not apply to any goods that have been repaired or altered by anyone other than ACTION. This warranty does not cover wear parts including but not limited to conveyor belts, boot connections, conveying surfaces, regular consumables, etc. No goods will be accepted for return unless authorized in writing.

The foregoing Warranty is non-transferable, and the Seller makes no warranty with respect to:

- 1) Failures not reported to the Seller within the warranty period above specified.
- 2) Failures or damage due to negligence, accident, abuse, improper use, storage, or maintenance, or abnormal conditions of temperature, moisture, dirt or corrosion, or build-up on pan, balancer, or beneath conveyor.
- 3) The costs of dismantling and installation of the equipment.

ACTION VIBRATORY EQUIPMENT

NOTES

