KEY TECHNOLOGY
A DURAVANT COMPANY

Iso-Flo® Technical Manual

Revision P
English

Notices

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Customer will (a) cause each person who receives or uses the equipment described in this manual to read and comply with all safety instructions in this manual and any other safety notices that Key Technology makes available from time to time; (b) instruct its employees and others who use the equipment in its proper use; and (c) implement and enforce the safety provisions of all product safety notices, warnings, instructions or similar documentation that Key Technology provides from time to time. Customer will not remove any shields, guards, or other safety devices from this equipment.

Disclaimer

The information contained in this manual is representative of typical systems and may not apply to specific applications or to equipment that have been customized to meet your requirements. Performance of the equipment is dependent on many factors not within the scope of this manual and should be considered with relation to the entire processing line.

The information contained in this manual does not alter, expand or supplement Key Technology's warranty, and the only warranty that will apply is the warranty in Key Technology's Terms and Conditions of Sale referenced above.

This manual is intended only as an installation and maintenance reference for typical systems and is subject to change through revisions and additions without notification.

The English version of this manual is the original instructions. All other languages are translations of the original instructions.

Trademark Acknowledgments

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Safety Awareness

Introduction

All installation and maintenance personnel must read this chapter before working on an Iso-Flo® shaker or an Iso-Drive®. Employees who are unable to read English should have it read to them in a language that is fully understood. If you need further explanation, contact Key Technology, Inc. (Key®) immediately. For telephone numbers, refer to *Customer Service* in the Introduction chapter of this manual.

Signal Word Definitions

DANGER

Indicates a hazardous situation which, if not avoided, will result in death or serious injury.

WARNING

Indicates a hazardous situation which, if not avoided, could result in death or serious injury.

CAUTION

Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

Important

Indicates an item strongly affecting the installation, maintenance, or operation of this equipment.

Note

Indicates a comment or explanation regarding this equipment.

Hazard-Alert Messages

The safety labels shown in Figure 1-1 through Figure 1-3 are affixed to the Iso-Flo shaker.

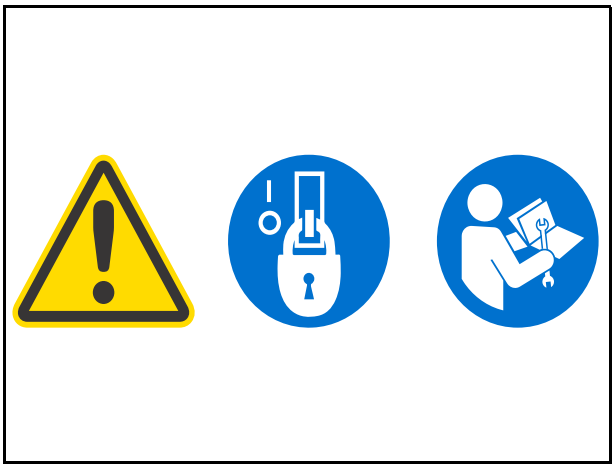

Figure 1-1 *Affixed to the Iso-Flo Shaker: Warning, Lock out in De-energized State. Refer to Technical Manual for Service*

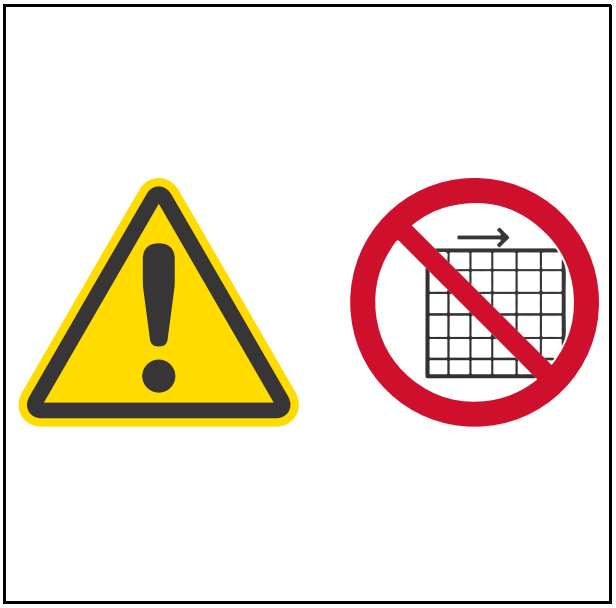

Figure 1-2 *Affixed to the Iso-Flo Shaker: Warning, Do Not Operate Without All Guards in Place*

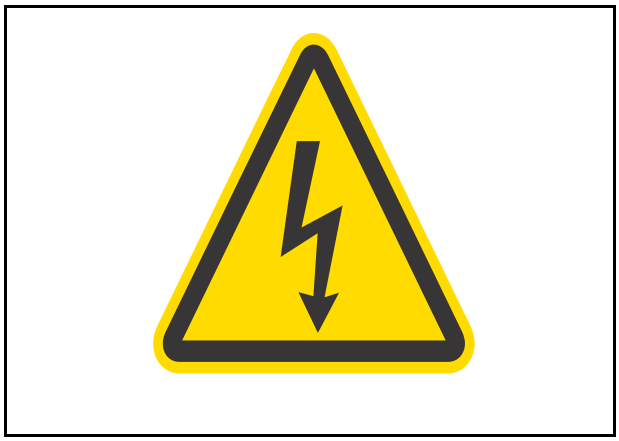

Figure 1-3 *Electrical Hazard— Affixed to the Shaker Adjacent the Electrical Disconnect Box*

GENERAL SAFETY RECOMMENDATIONS

- Ensure that all safety guards and shields are securely fastened in place before starting the conveyor.
- Before attempting to operate the conveyor, read the Software chapter of this manual.
- Before attempting to install or maintain the conveyor, read the applicable procedures contained within this manual.
- Permit only authorized, properly trained personnel to install, operate or maintain the conveyor.
- Before removing any safety guards or covers, turn off and lock out power and air to the conveyor.
- Keep the work area clean to prevent accidents and product contamination.
- Use this equipment only for tasks that are designated or intended. Follow all specifications for space, clearance, utilities and environment which are provided on the equipment drawings.
- Keep the conveyor in good working order at all times by performing regularly scheduled maintenance (per the Maintenance Schedule provided in this manual), and conducting periodic safety inspections. Correct all unsafe conditions immediately.
- Do not wear torn or loose clothing or jewelry around equipment with moving parts.
- Always wear approved eye and ear protection.
- Do not walk or stand on the equipment. It is not safe as a walkway or platform. Personal injuries or damage to equipment or parts may occur.
- For questions regarding the safe operation or maintenance of the Iso-Flo shaker contact Key Technology.
- Follow proper procedures for turning on or off the Iso-Flo vibratory conveyor.
- Ensure that there is proper supervision while operating or performing maintenance on the conveyor.
- When an abnormal phenomenon happens, like excessive vibrations or noise, turn off the conveyor immediately and contact maintenance personnel.
- Only use original components for maintenance of the Iso-Flo conveyor.
- Report any unsafe condition or action of the conveyor to responsible persons.
- Never place objects on the conveyor.
- Unless otherwise directed, turn off and lock out power and air to the shaker during cleaning and maintenance.
- Only use mild cleaning materials and cleaning products for the Iso-Flo vibratory conveyor.

Introduction

Contents

Introduction

Customer Service

Key Technology provides customer service through all of our offices. The corporate headquarters and European office offers 24-hour customer support. The Australia and Mexico offices offer customer support for their locations during normal business hours.

Support includes:

- Telephone support for all Key® equipment
- Prompt delivery of parts orders
- On-site service calls by our field service engineers

CONTACT INFORMATION

Corporate Headquarters, Walla Walla, WA, USA

Tel: +1 877 878-4631

Fax: +1 509 394-3386

Emergency Tel (after hours): +1 509 520-2888

Key Technology, Beusichem, Netherlands

Tel: +31 345 509 900

Emergency Tel (after hours): +31 345 509 915

E-mail - Part Sales: bvpartsales@key.net

E-mail - Technical Support: techsupport@key.net

Visit our website at www.key.net for all other locations

SERVICE CALLS

When calling for customer service, please have the following information at hand:

- Company name and location of your plant
- Equipment name, model, and serial number found on the equipment drawings and the nameplate (Figure 2-1 and Figure 2-2)
- Complete description of problem (including all details, equipment drawing numbers measurements, and frame grabs or log files available)
- Name of the person at your plant requesting assistance
- Your telephone and fax numbers

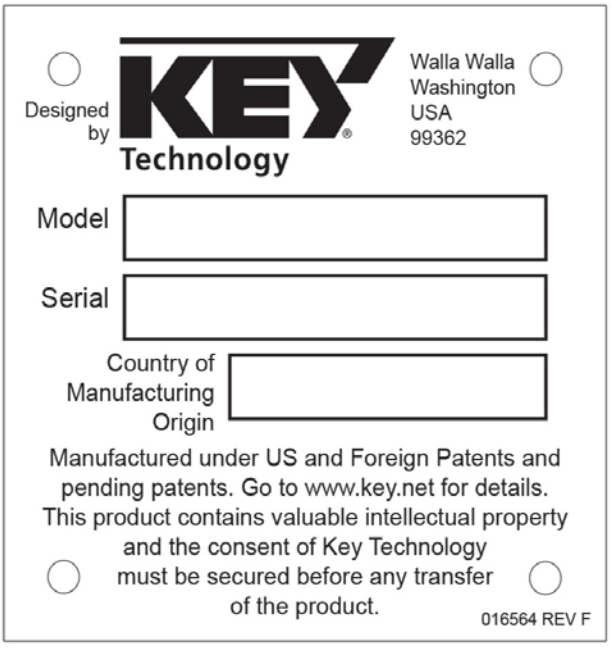

Figure 2-1 *Iso-Flo Name Plate - Non CE Version*

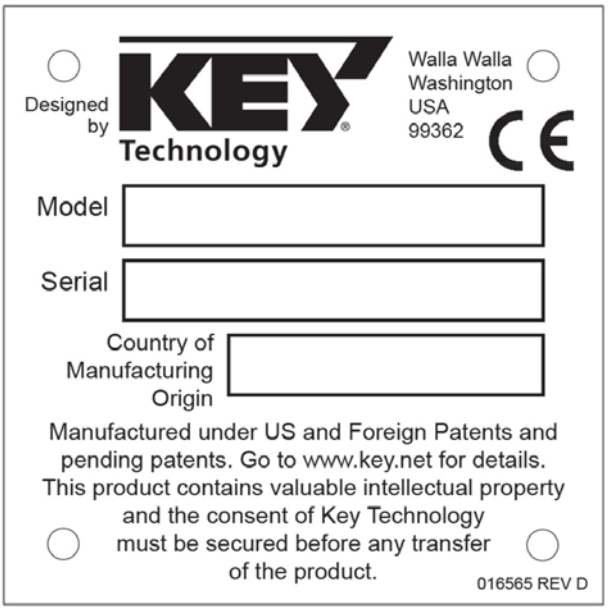

Figure 2-2 *Iso-Flo Name Plate - CE Version*

ORDERING PARTS

When ordering parts, please provide the following information:

- Company name and location of your plant
- Equipment name, model and serial number found on the equipment drawings and the nameplate (Figure 2-1 and Figure 2-2)
- Name of the person at your plant requesting the parts
- Your company purchase order number

Manual Overview

This manual provides instruction on safety, installation, operation, maintenance, and troubleshooting of Iso-Flo® equipment.

Iso-Flo vibratory shakers are designed in various configurations to meet the needs of different types of food processing, as well as nonfood applications. As a result, your equipment may differ slightly from the illustrations in this manual. When this is the case, refer to the equipment drawings.

System Overview

DESCRIPTION

Iso-Flo vibratory shakers are unique in the following respects:

- The main driving force, a vibrating motor, acts on the stationary frame and not on the vibrating bed. The frame evenly transmits this force to the bed through multiple flexible arm springs.
- Each Iso-Flo shaker is designed so that only minimal external forces result from proper operation.

PRIMARY COMPONENTS

The Iso-Flo shaker's primary components are illustrated in Figure 2-3. Even though a bed frame below the stationary frame is more common, the above bed frame is shown in Figure 2-3 to display the motor and drive more clearly.

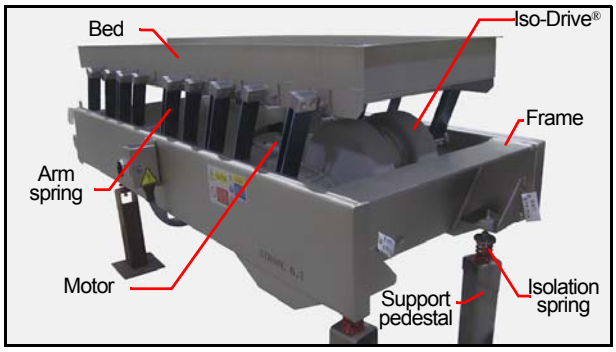

Figure 2-3 *Primary Components of an Iso-Flo Shaker*

Floor Support Pedestals and Columns

Floor support pedestals and columns are secured to the plant floor to support Iso-Flo equipment, and to establish the precise elevation and angle in floor mounted applications. Pedestal sizes vary.

Isolation Springs

Isolation springs support the frame on the support pedestals, isolating most of the vibration from the Iso-Flo shaker. Some applications use air mounts, rubber isolators, or casters instead of isolation springs.

Frame

The frame provides the structural support for the unit and is available in stainless or mild steel, plate or tube design.

Drives

Iso-Drive®

The Iso-Drive attaches to the frame and provides the linear vibrating force for the system. For Iso-Drive information, refer to the Iso-Drive Service Manual (Key part number 012013).

Electric Vibratory Motor

Dual, vibratory electric motor (EVM) drives may be used instead of an Iso-Drive. These drives attach to the frame and provide the linear vibrating force for the system. For vibratory motor drive information see the Appendix or contact the Key Service department, Key PN 019573.

Motor

The motor powers the Iso-Drive and may be either electric or hydraulic.

Arm Springs

Arm springs connect the bed to the frame and deliver the driving force from the frame. High temperature, and stress contoured springs are used, depending upon the application.

Bed

The bed conveys product as a result of the frequency, magnitude, and direction of vibration.

COMMON OPTIONS

Available options include screens, diverters, gates, chutes, bed dividers, flared infeed, and bias discharge.

Screens

Rod Screens

Round or triangular shaped rods in either a crossflow or parallel flow arrangement are typically used for dewatering (Figure 2-4 & Figure 2-5).

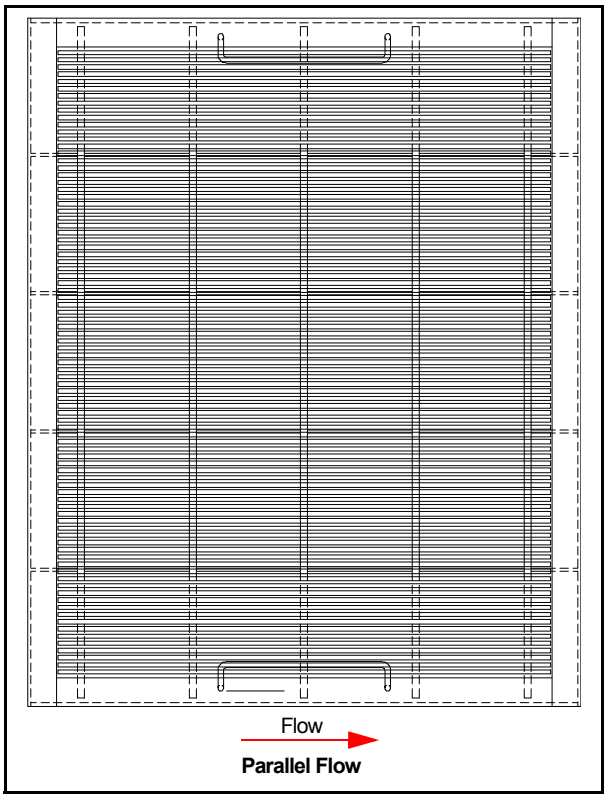

Figure 2-4 *Rod Screens*

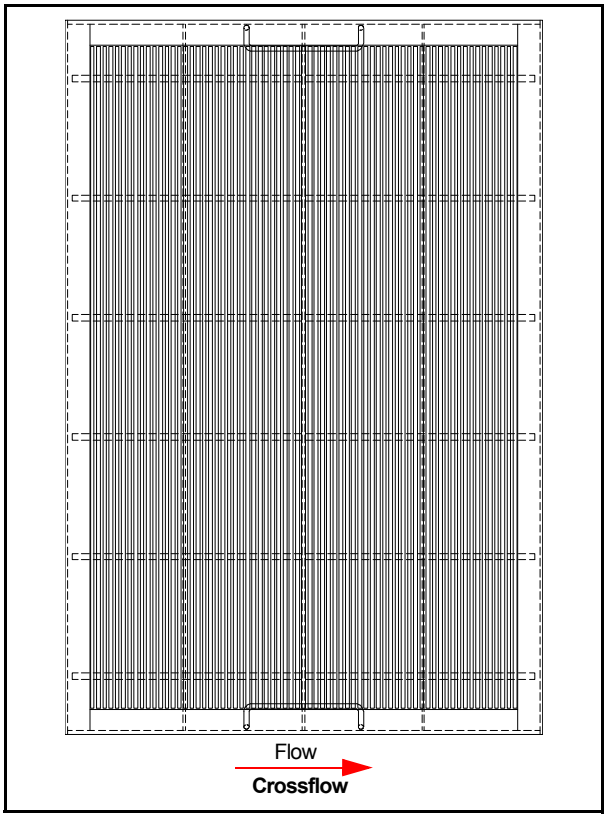

Figure 2-5 *Rod Screens*

Wire Mesh Screens

Wire mesh screens are frequently used for dewatering or fines removal (Figure 2-6).

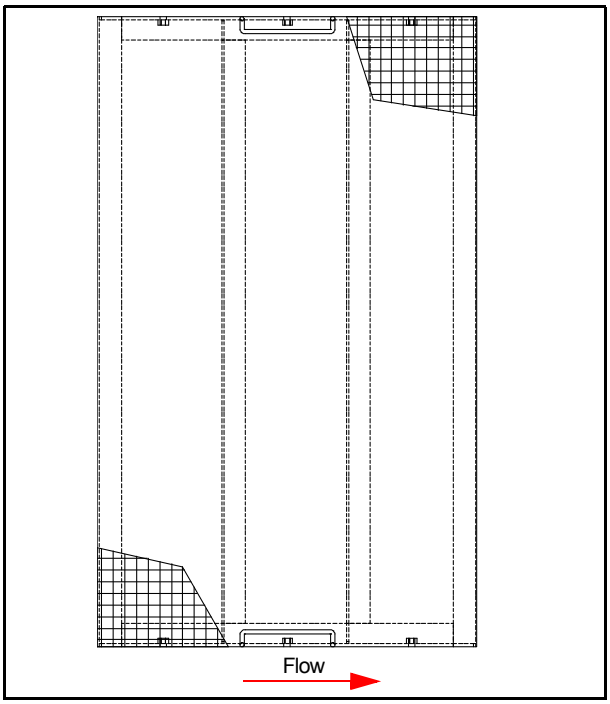

Figure 2-6 *Wire Mesh Screens*

Punch Plate Screens

Punch plate screens are often used for separation by size (Figure 2-7).

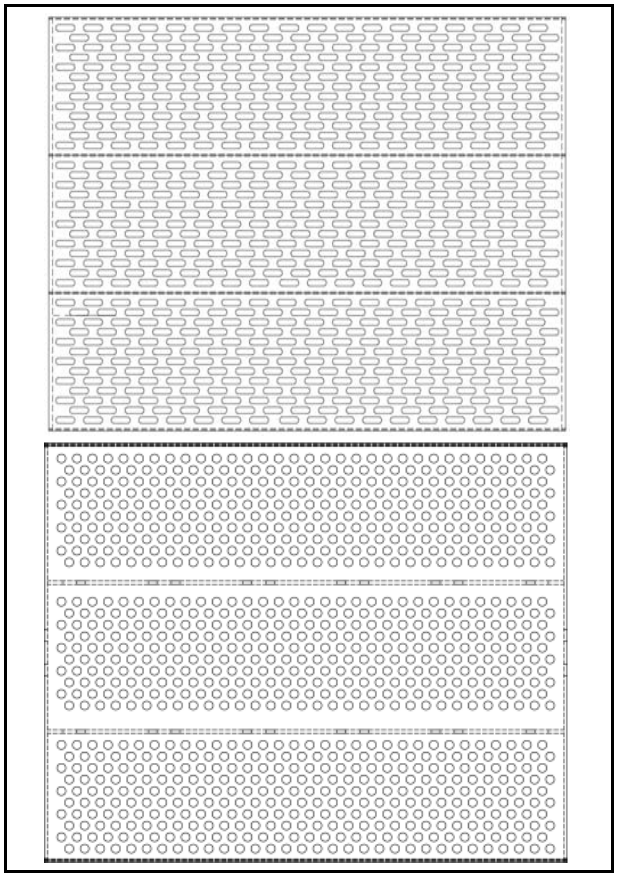

Figure 2-7 *Punch Plate Screens*

Screen Fasteners

Screen fasteners are used to connect screens to Iso-Flo shaker beds. Five types are available: Vector-Lock™ PRO, Vector-Lock, toggle, prism clamps, or bolts. For more information on fasteners, refer to the Operation chapter.

Engineering Information

DESIGN SPEED AND STROKE

Iso-Flo shakers must run at design speed and not exceed the design stroke stenciled on the shaker frame.

Design Speed

When the frame is motionless during operation, the speed (rpm) of the unit is the "design speed". Design speed depends only on the weight of the bed and the stiffness of the arm springs. The shaker will go out of tune if there is any change to the bed weight, arm spring stiffness, or the drive rpm. A regular tune-up, as described in the Maintenance chapter, will keep the Iso-Flo shaker operating at design speed.

Design Stroke

Design stroke is the stroke of the bed when the shaker is running at design speed. At the design stroke, the frame is motionless, while the shaker is operating at peak efficiency. The design stroke changes only if there is any change to the Iso-Drive weight size, EVM drive weight setting, bed weight (usually due to a buildup of some substance, such as starch or ice), drive rpm, or to the arm spring stiffness. When operating, the shaker should run within 1/32" (1 mm) to design stroke, which is defined on the equipment drawing.

For more information on the stroke, refer to the Operation and Maintenance chapters.

VIBRATION ISOLATION

A perfectly tuned Iso-Flo shaker requires only static support. However, in practice the frame does undergo some displacement. This is very small during normal operation and larger during startup and shutdown. Refer to the equipment drawings for dynamic and static load information.

Frame Motion During Normal Operation

A frame amplitude of 1/64" (0.5 mm) [or 1/32" stroke (1 mm)] is considered allowable during normal operation. Frame motion greater than this indicates an improperly tuned shaker.

Frame Motion During Stopping/Starting

As the shaker stops, the frame moves with amplitudes of up to 1/4" (6 mm) [or strokes up to 1/2" (13 mm)] in both horizontal and vertical directions. This motion takes place between 200 and 300 rpm and may continue for several cycles while the shaker is slowing down.

Note

The use of a variable-frequency drive (VFD) may increase the amount and duration of frame motion during starting or stopping. Be sure to set the acceleration and deceleration ramp times of the VFD to under one second.

Transmission of Dynamic Forces

Iso-Flo shakers are typically mounted on four flexible isolators that support its dead weight. During normal operation, the isolators may transmit dynamic forces between 0 and ± 66 pounds (± 30 kg) per support. The actual value depends on the machine's size and adjustment.

When an Iso-Flo shaker is stopping, it undergoes several cycles of greater motion. This usually occurs when the machine is running between 200 and 300 rpm. Under this transient condition, the shaker generates dynamic forces between ± 24 and ± 530 pounds (± 11 and ± 240 kg) per support. Actual values depend on the size of the machine.

OVERHEAD INSTALLATION

DANGER

For ceiling suspended applications, eye bolts are to be suspended from overhead using load rated wire rope and fittings only. Failure to install this equipment properly could result in total equipment loss and serious injury, possibly resulting in death to persons working in the vicinity.

Iso-Flo shakers lend themselves to suspension style mounting. When overhead suspension is specified, Key supplies the appropriate frame brackets and eye bolts. You must provide wire rope and the appropriate fittings that are load rated for your installation.

The overhead structure used to anchor and support your Iso-Flo shaker must be evaluated for its suitability for this purpose.

Important

To provide additional safety, Key Technology strongly recommends the addition of load rated safety cables to all ceiling suspended shakers.

Installation

Contents

Installation

Overview

It is important to read all of the information provided here before attempting the installation of your shaker. The installation procedures often direct you to other documentation, such as the equipment drawings that come with your shaker and to the manufacturer's literature shipped with the equipment.

WARNING

This equipment is not balanced or stable until it is correctly mounted and leveled. Improperly installed equipment can be dangerous, inefficient, and costly.

Receiving the Shipment

MANUFACTURER'S LITERATURE

Iso-Flo® Technical Manual

This manual provides instruction on safety, installation, operation, maintenance, and troubleshooting of the Iso-Flo shaker. The information in this manual pertains to all Iso-Flo shakers. Some points may differ on your equipment, depending on the specific design.

Key Technology's Iso-Drive® Service Manual

If your Iso-Flo shaker includes Key Technology's Iso-Drive, a service manual will be included as well, Key PN 012013.

Engineering Drawings

The equipment drawings provide information specific to your Iso-Flo shaker.

Key Technology Equipment Drawings

Dwg. No. = Model Number
Job No. = Serial Number

Key Technology BV Equipment Drawings

Dwg. No. = Item Number
Description (end) = Type (MV XXX/YYYY/ZZ)

- X = Type of Shaker
- Y = Length of Shaker (mm)
- Z = Width of Shaker (dm)

HANDLING PRECAUTIONS

When unloading and moving the shaker from the truck to the permanent location, use extreme care not to damage any part of the equipment.

Important

When moving an Iso-Flo shaker, use the appropriate lifting equipment and always lift the equipment by the frame, never by the bed.

DAMAGE ASSESSMENT

Before installing the Iso-Flo shaker, carefully inspect all components for shipping damage and loose fasteners. If fasteners are loose, refer to the Maintenance chapter for required torque specifications.

Installation Preparation

SAFETY PRECAUTIONS

Before beginning the installation, read and understand all safety precautions listed in the Safety chapter of this manual, and give special consideration to all text headed with **DANGER**, **WARNING**, **CAUTION**, **IMPORTANT**, and **NOTE**.

If you do not fully understand these precautions, contact Key Customer Service for further explanation.

Important

To provide additional safety, Key Technology strongly recommends the addition of load rated safety cables to all ceiling suspended shakers.

SELECTING A PROPER LOCATION

When selecting a location for Iso-Flo vibrating shakers, consider the following:

- Plant layout requirements
- Ability of the site to support the static and dynamic loads introduced by the equipment
- Cleaning and maintenance clearance
- Required mounting surface of steel or reinforced concrete
- Vibration sensitive equipment in vicinity (see *Engineering Information/Vibration Isolation* in the Introduction chapter)

Proximity, Space, and Clearance Requirements

Refer to the equipment drawings for proximity, space, and clearance requirements specific to your Iso-Flo shaker.

Utility Requirements

Refer to the equipment drawings for utility requirements specific to your Iso-Flo shaker.

TRANSPORTING THE ISO-FLO SHAKER

WARNING

Use extreme care when lifting, transporting, and lowering the shaker. Lift the shaker under the frame, never the bed.

Note

When transporting the Iso-Flo shaker, be advised that the drive motor (infeed) end may be heavier than the discharge end.

REQUIRED TOOLS AND EQUIPMENT

Refer to Table 3-A for a list of tools and equipment needed for installation.

Table 3-A

Common Tools Needed for Installation
4-foot or 5-foot level
Basic mechanic's tools
C-clamps
Chalk line
Concrete drill bits
Drill motor
Equipment drawings
Hammer drill
Lifting equipment (e.g., jacks, forklift, crane, hoist)
Lock out tag and padlock
Measuring tape
Plumb bob
Steel drill bits
Transit
Welder

FLOOR MOUNTING REQUIREMENTS

Floor Support Pedestals and Columns

Typically Key Technology provides the column or pedestal supports. Either type of support structure may be used to support the shaker. When building your own support structures, size the mounts so the first natural frequency of any member is at least two times the shaker's design speed. Contact Key Technology for more information. For support mounting guidelines refer to Figure 3-1, Figure 3-2, and Table 3-B.

Isolation Mounts

Isolation mounts are used to isolate the vibration of the shaker from the column or pedestal supports (Figure 3-3). Isolation mounts supplied by Key are designed and built to match the equipment. Refer to the equipment drawings for proper location of isolation mounts.

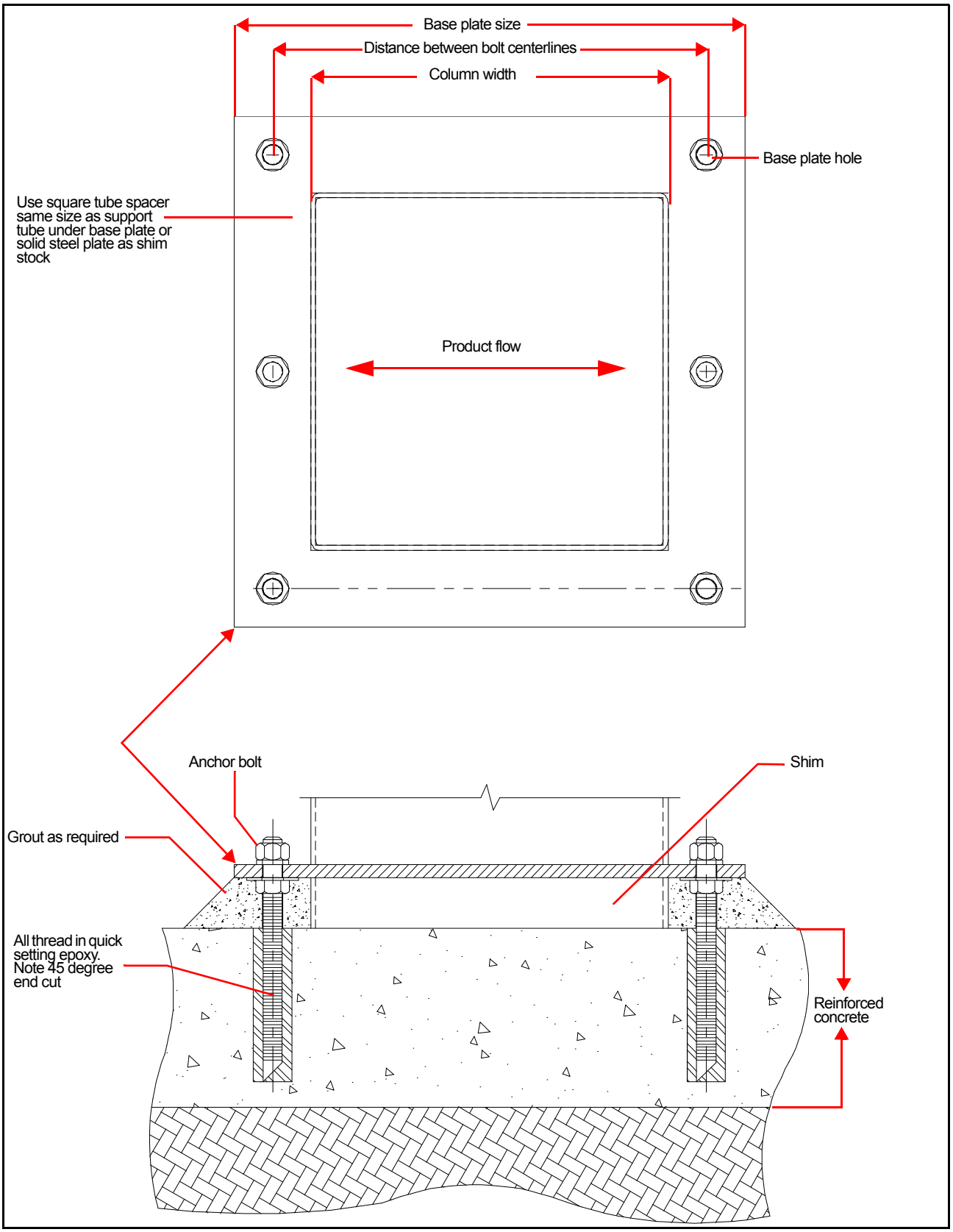

Figure 3-1 *Floor Installation for Columns—Option 1*

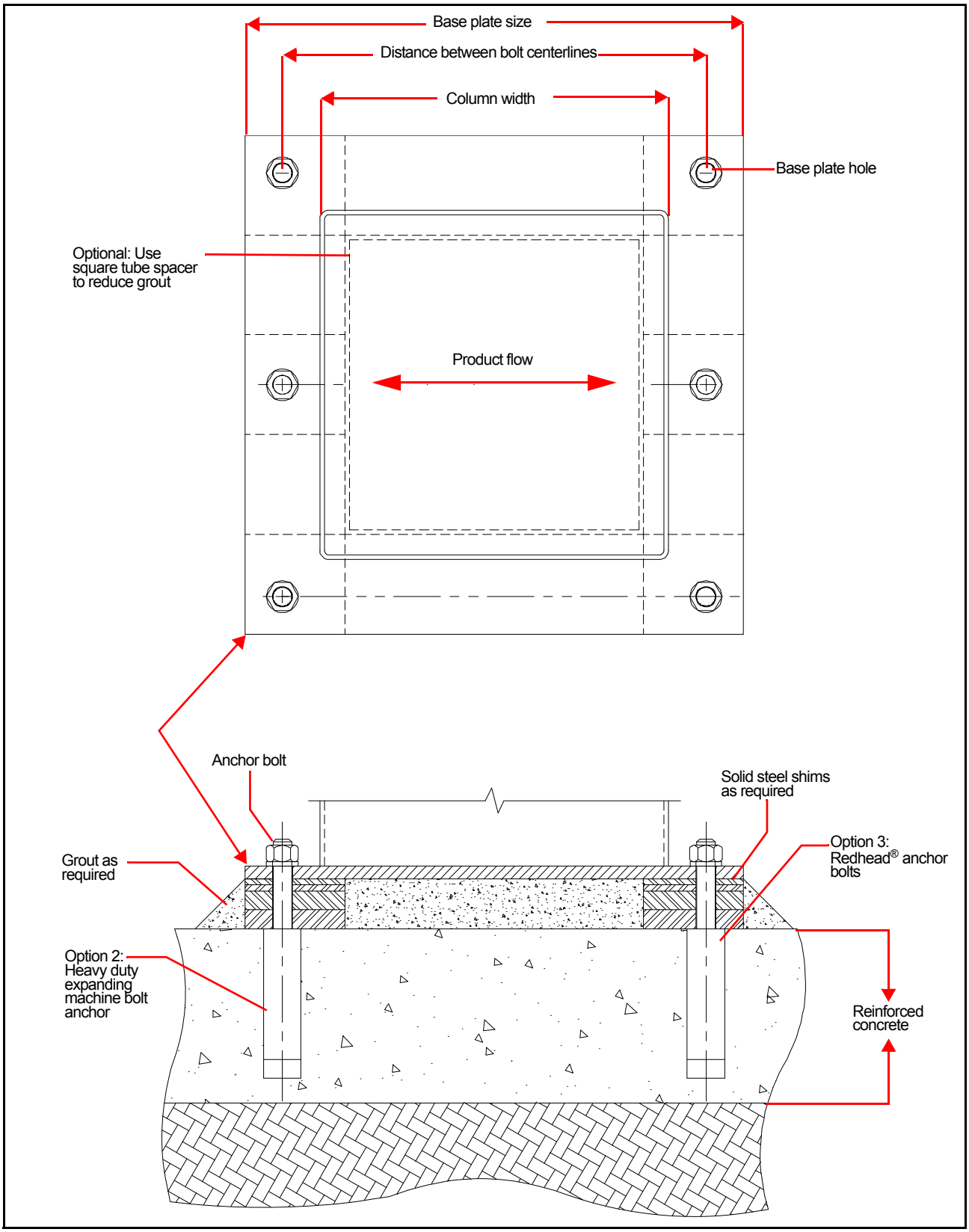

Figure 3-2 *Floor Installation for Columns—Options 2 and 3*

Table 3-B

Requirements for Floor Mounting inches (mm)					
Column Width	**Minimum Depth of Reinforced Concrete**	**Anchor Bolt Diameter**	**Distance Between Bolt Centerlines**	**Base Plate Size**	**Base Plate Hole Diameter**
4 (102)	3 (76)	5/8 (M16)	Refer to the equipment drawings		
6 (152)	3 (76)	5/8 (M16)			
8 (203)	4 (102)	5/8 (M16)			
10 (254)	6 (152)	3/4 (M18)			
12 (305)	6 (152)	3/4 (M18)			
14 (356)*	6 (152)	3/4 (M18)			
* 14 (356) columns require an extra bolt in the middle on each side (Figure 3-1 and Figure 3-2)					

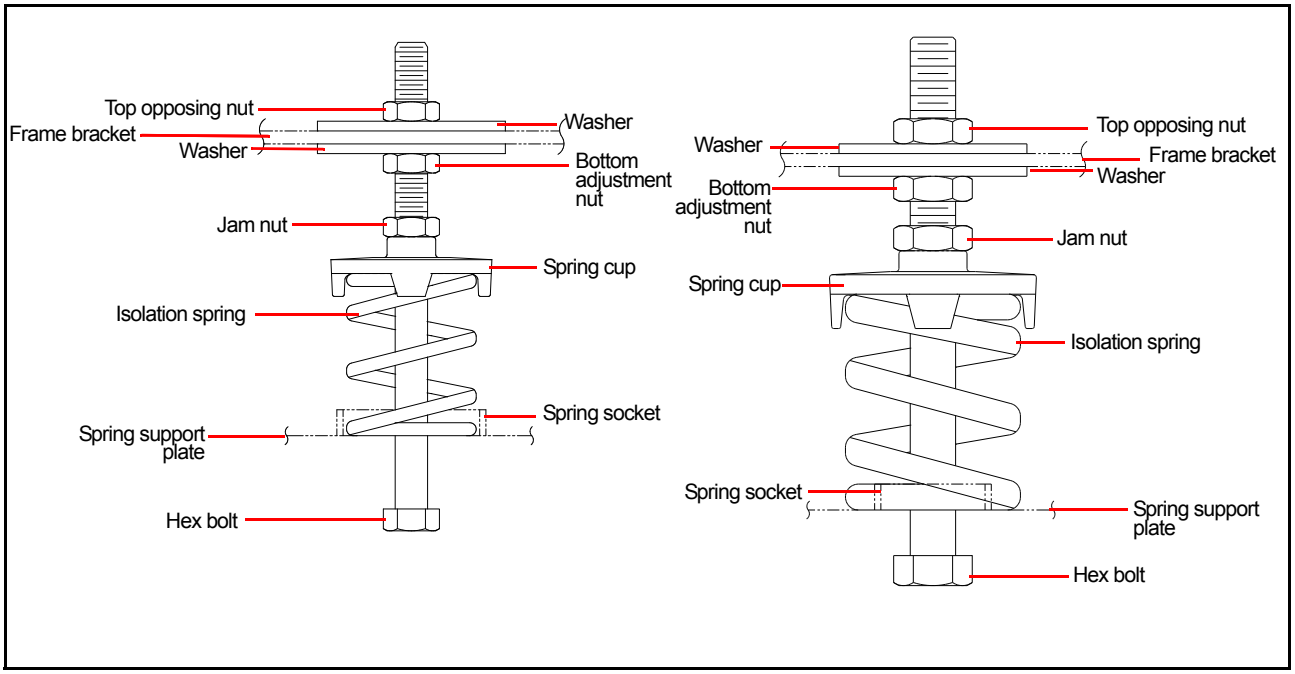

Figure 3-3 *Floor Isolation Mounts—ALC (left) and AWC (right)*

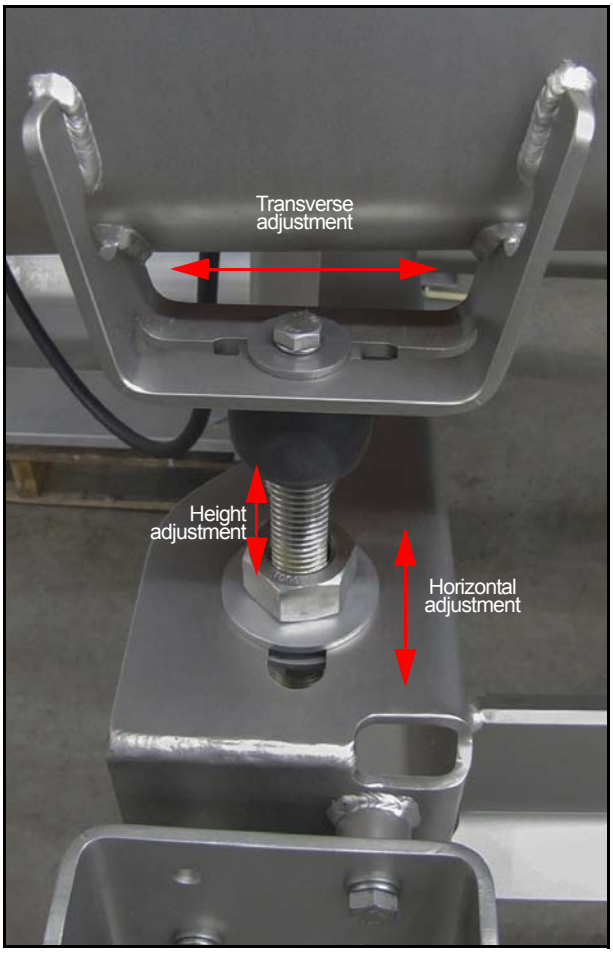

Figure 3-4 *New Isolation Mount 3-Axis Adjustment*

Installation Procedures

INSTALLATION AND STARTUP

Before proceeding with the following installation procedures, have in hand the equipment drawing set and this Iso-Flo Technical Manual. All referenced figures, pages and tables can be located in this Technical Manual.

Important

Observe safety procedures for all operations.

1. Upon receiving your Iso-Flo shaker, match the shaker's model number with the drawing number on page one of the drawing set cover sheet. In the event you need to call Key for information, you will need to have this number available.
2. Review this Installation chapter.
3. Verify there has been no shipping damage to the equipment and that all components are present.
4. Refer to this Installation chapter for proper installations of floor or overhead supports.
5. Verify all isolation springs are installed in proper locations (see equipment BOM). There are several types of isolation springs: Coil, Marshmellow and new rubber type (Figure 3-5 to Figure 3-8).
6. Set the initial spring height per Figure 3-9 and Table 3-D.
7. Verify that the isolation spring hex bolts are centered in the holes of the supports and not touching the side of the hole.
8. Set the slope of the shaker according to the specifications noted on the cover sheet of the equipment drawing set.
9. Verify that both the bed and frame have at least 1.5" (38mm) of clearance from all mating equipment.
10. Confirm that all pedestal slip joints are 100% welded.
11. Verify the correct motor type is installed. Check voltage, frequency, current, HP and rpm rating are all accurate.

Important

If a variable frequency drive (VFD) is required, set the acceleration and deceleration ramp times to one second or less. This will eliminate excessive frame motion during starting and stopping modes.

12. Verify that there are no rigid electrical, air or water connections to frame or bed. All connections must have at least one inch of movement for starting and stopping modes.
13. Verify correct motor rotation. See Figure 3-13 and Figure 3-14.
14. Prior to startup, confirm that all components (screens, screen clamps, diverters, cylinders, valves, chutes, gates, as applicable) are installed, properly secured and functional.

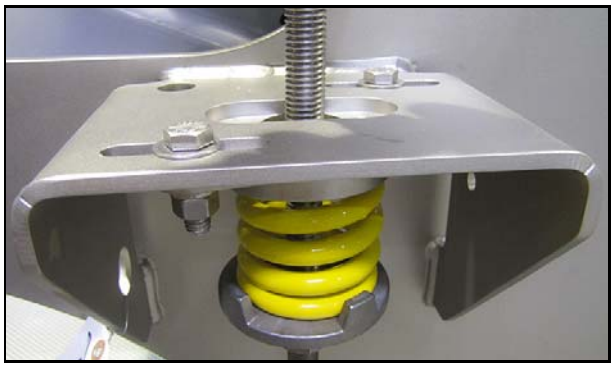

Figure 3-5 *Coil Isolation Spring-Ceiling ALC*

Figure 3-6 *Coil Isolation Spring-AWC Floor Mount*

Figure 3-7 *Rubber Marshmellow Isolation Springs*

Figure 3-8 *New Rubber Isolation Springs*

To install the Iso-Flo shaker on the floor or deck:

1. Locate the supports on the floor or deck in accordance with dimensions given on the equipment drawings.
2. Shim the bottoms of support columns or pedestals so that the following conditions exist:
   A. Tops of pedestals/columns at the infeed end are level within ± 1/8" (3 mm) and conform with center line dimensions on the equipment drawings.
   B. Tops of pedestals/columns at the discharge end are level within ± 1/8" (3 mm) and conform with dimensions on the equipment drawings.
3. Verify the hex bolts are firmly bottomed out in the threads of the spring cups. The length of threaded rod above the top of the spring cup should be 3 7/8" (98 mm) (Figure 3-3).

4. Set the bottom adjustment nut on the hex bolts to achieve 1 13/16" (46 mm) for both ALC and AWC (Figure 3-9).

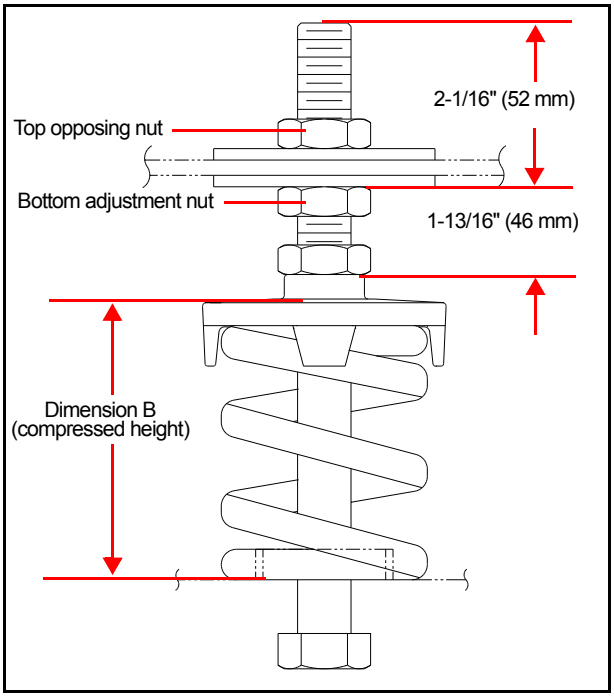

Figure 3-9 *Dimension to Measure When Leveling*

Important

The isolation springs specified for the infeed end may not be the same as those specified for the discharge end of Iso-Flo shakers.

5. Place the isolation spring into the correct spring sockets by placing the spring cup hex bolt through the spring and through the pedestal, resting the cup on top of the spring. Repeat for each support.

Note

Refer to the equipment drawings to determine the correct locations of the isolation spring assemblies.

6. Remove the top opposing nuts and top washer from the hex bolts and place the shaker onto the springs (Figure 3-9).

WARNING

Keep the lifting equipment under the shaker during this procedure, the shaker is not stable until it is leveled and opposing nuts are tightened.

DANGER

Before placing the weight of the shaker on the isolation spring supports:

- Make sure the floor plates are properly installed in accordance with Figure 3-1, Figure 3-2, and Table 3-B.
- If adjustable (telescoping) supports are used, weld the slip joints all around first.
- Make sure fingers are clear of spring coils.

7. Adjust the bottom adjusting nut until the springs on opposite sides are within 1/4" (6 mm) of being compressed equally. Refer to Dimension B in Figure 3-9 and Table 3-C for the correct compression height for the ALC or AWC springs.
8. Reinstall the top washer and tighten the top opposing nuts.

Important

When loaded, if the spring height is less than the minimum allowable value shown in Table 3-C, the spring must be replaced.

Table 3-C

Standard Coil Springs and Color Codes					
Type-Size	**Outer Spring Color**	**Inner Spring Color**	**Minimum Compressed Loaded Height Inches (mm) *Refer to Figure 3-9, Dimension "B"**	**Maximum Compressed Loaded Height Inches (mm) *Refer to Figure 3-9, Dimension "B"**	**Maximum Load Pounds (Kg)**
ALC-92	Brown	None	3 3/16" (81)	3 9/16" (90)	75 (34)
ALC-93	Orange	None	3 3/16" (81)	3 9/16" (90)	135 (61)
ALC-94	Green	None	3 3/16" (81)	3 9/16" (90)	195 (88)

Table 3-C

Standard Coil Springs and Color Codes					
Type-Size	**Outer Spring Color**	**Inner Spring Color**	**Minimum Compressed Loaded Height Inches (mm) *Refer to Figure 3-9, Dimension "B"**	**Maximum Compressed Loaded Height Inches (mm) *Refer to Figure 3-9, Dimension "B"**	**Maximum Load Pounds (Kg)**
ALC-95	Red	None	3 3/16" (81)	3 9/16" (90)	270 (122)
ALC-96	Yellow	None	3 3/16" (81)	3 9/16" (90)	360 (163)
ALC-97	White	None	3 1/4" (83)	3 5/8" (92)	450 (204)
ALC-98	Purple	None	3 5/16" (84)	3 11/16" (94)	540 (245)
ALC-99	Blue	None	3 3/8" (86)	3 3/4" (95)	660 (299)
AWC-98	Black	None	4 1/16" (103)	4 3/8" (111)	540 (245)
AWC-99	Black/White	None	4 1/16" (103)	4 3/8" (111)	660 (299)
AWC-1600	Gray	None	4 1/16" (103)	4 3/8" (111)	960 (435)
AWC-1626	Gray	Gray	4 1/16" (103)	4 3/8" (111)	1320 (599)

Table 3-D

Rubber Isolators					
Isolator	**Minimum Load Pounds (Kg)**	**Maximum Load Pounds (Kg)**	**Minimum Deflection Inches (mm)**	**Maximum Deflection Inches (mm)**	**Thread**
Ø30 x 30	46.3 (21)	77 (35)	.15 (3.91)	.21 (5.36)	M8 x 20
Ø40 x 40	66 (30)	132.3 (60)	.14 (3.5)	.28 (7.16)	M8 x 23
Ø50 x 50	132.3 (60)	220.5 (100)	.23 (5.8)	.38 (9.76)	M10 x 30
Ø70 x 45	220.5 (100)	419 (190)	.15 (3.71)	.28 (7)	M10 x 30
Ø75 x 55	264.6 (120)	485 (220)	.19 (4.92)	.36 (9)	M12 x 30
Ø100 x 75	441 (200)	882 (400)	.26 (6.56)	.52 (13.1)	M16 x 45
Ø125 x 55	882 (400)	1323 (600)	.20 (5)	.31 (7.8)	M16 x 45
Ø150x 75	1323 (600)	2205 (1000)	.28 (7)	.46 (11.6)	M16 x 45
Ø200 x 100	2205 (1000)	4409 (2000)	.35 (8.75)	.70 (17.9)	M20 x 45

Important

Check the equipment drawings for the proper installation angle. Ensure the shaker is at the designated angle and the springs on opposite sides are within 1/4" (6 mm) of being compressed equally.

Note

If supports have been installed correctly, the spring hex bolts will be approximately centered in the holes of the spring support plates. If not, reposition the shaker as required.

DANGER

If the supports must be re-shimmed to center the hex bolts, ensure the shaker weight is supported by other means (e.g., hoist, forklift, crane).

OVERHEAD INSTALLATION

DANGER

For ceiling support applications eye bolts are to be suspended from overhead using load rated wire rope and fittings only. Failure to install this equipment properly could result in total equipment loss and serious injury possibly resulting in death to persons working in the vicinity.

To install the Iso-Flo shaker overhead:

1. Design the overhead supports in accordance with the guidelines in the Introduction chapter.
2. Identify the location for installation in accordance with dimensions given on the equipment drawings.
3. Referring to Figure 3-10 and Figure 3-11, suspend the turnbuckles or eye bolts from the ceiling using load rated wire rope and fittings. Make sure there are adequate threads at the end of the all thread to attach the isolation springs.
4. Position the shaker frame so the frame brackets are aligned with the suspended supports.
5. Thread the all thread through the isolation spring cup and attach the jam nuts to the bottom and top of the all thread. Repeat for each support.
6. Place the isolation spring assembly under the correct spring socket and thread the all thread into the turnbuckle or eyebolt. Repeat for each support.

Note

Refer to the equipment drawings to determine the correct locations of the isolation spring assemblies.

Important

The isolation springs specified for the infeed end may not be the same as those specified for the discharge end.

7. Lower the machine onto the isolation springs.

DANGER

Before placing the weight of the shaker on the isolation spring supports:

- Make sure hangers are properly secured to the ceiling.
- Ensure fingers are clear of the springs.

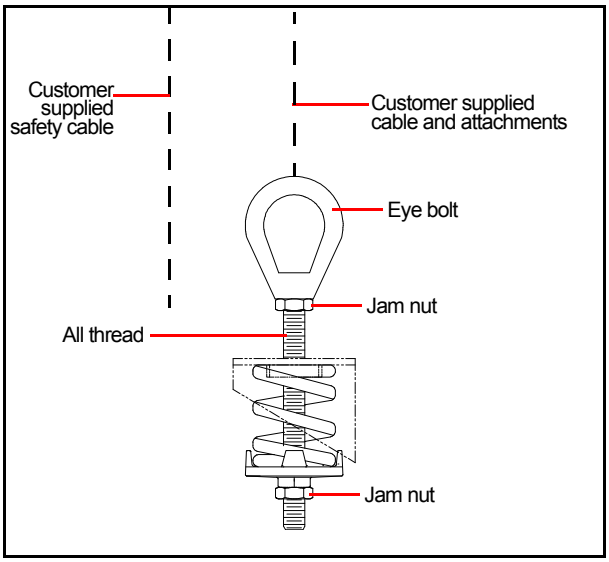

Figure 3-10 *Overhead Suspension Assembly - Eye Bolt*

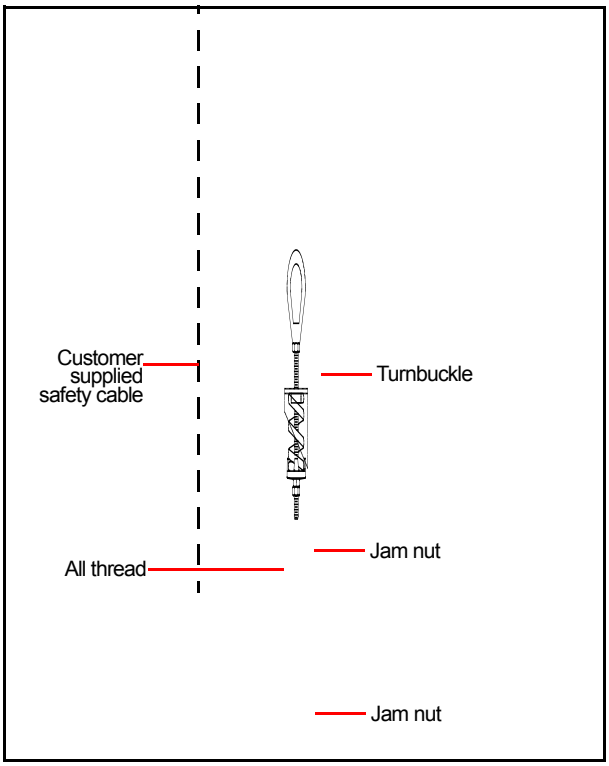

Figure 3-11 *Overhead Suspension Assembly - Turnbuckle*

8. Adjust the turnbuckle or spring cup so the springs on opposite sides are within 1/4" (6 mm) of being compressed equally.

Important

If your shaker is designed to operate at an angle, check the equipment drawings for the proper installation angle. It is most important to maintain the designed angle to within 1.5 degrees of the design angle. Ensure the shaker is at the designated angle and the springs on opposite sides are within 1/4" (6 mm) of being compressed equally.

9. Tighten the jam nuts to the spring cup and to the turnbuckle or eye bolt. Lock them in place. Repeat for each connection.
10. Re-check all fasteners for tightness.

Important

To provide additional safety, Key Technology strongly recommends the addition of load rated safety cables to all ceiling suspended shakers.

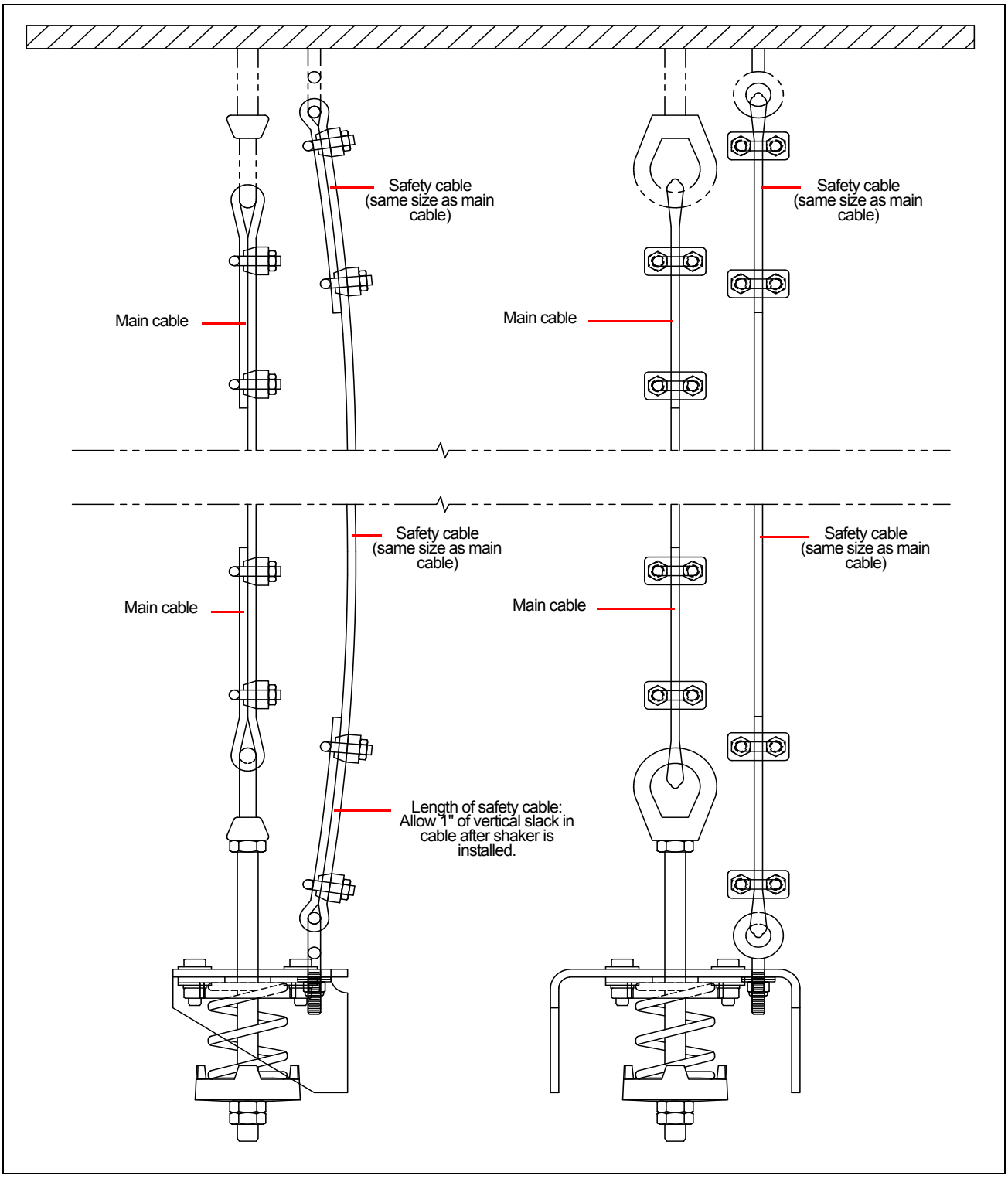

Figure 3-12 *General Information for Overhead Installations*

WIRING

1. Make the electrical connection, using at least 18" (457mm) of flexible conduit at the motor. The conduit should not be stretched tight to allow for 1" (25mm) of frame movement. Do not use rigid connections.

   The electrical connection must be performed by a qualified electrician in accordance with NEC and local codes. At a minimum, the ability to physically lock out power to the unit must be supplied.

Important

If the shaker is hydraulically driven, refer to Appendix A and the equipment drawings for connection information. Ensure that there is clearance for at least 1" (25mm) of frame movement, unless otherwise specified.

2. Verify that both the bed and frame have at least 1 1/2" (38mm) of clearance from adjacent objects, unless otherwise specified on the equipment drawings.

WARNING

To avoid potentially dangerous conditions and damage to the equipment, do not attach anything else to the frame or bed without first consulting Key Technology.

3. Wire the motor for clockwise rotation. When facing the pulley end of the drive motor, wire the motor so the pulley turns in clockwise rotation, as shown in Figure 3-13. There is a directional arrow decal on the motor indicating proper clockwise rotation.

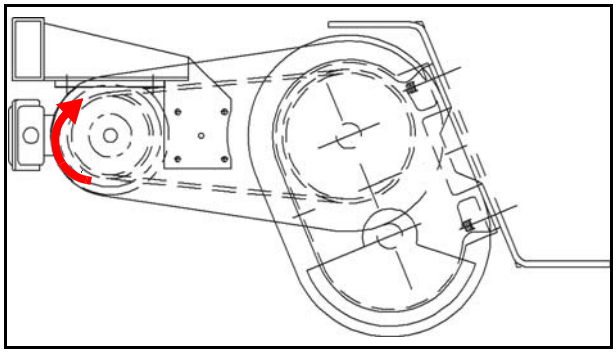

Figure 3-13 *Iso-Drive® Motor Rotation*

Important

It is extremely important to wire the motor for clockwise rotation. The shaker uses an adjustable sheave on the motor shaft to adjust the speed of the Iso-Drive®. A hazard may arise if the sheave's key or setscrew fails and the motor is rotating in the wrong direction. If the key or setscrew fails on an incorrectly rotating motor, the sheave may tighten up under motor torque and cause severe over stroking and rapid arm spring failure. On a correctly rotating motor the sheave's key failure will result in a slower conveyance speed but no equipment damage.

DANGER

Running the motor without the drive guard can result in injury or death due to the exposed belt and pulleys. This procedure must be performed by a qualified electrician or mechanic.

4. If your shaker uses vibratory motors, one motor must rotate clockwise and the other counterclockwise (Figure 3-14). Weights for vibratory motors are set at the factory to achieve the desired stroke. Verify stroke after startup.

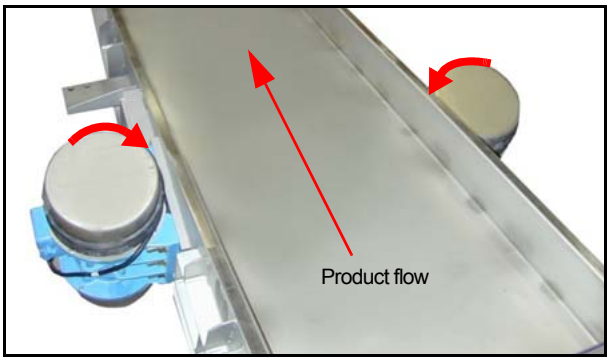

Figure 3-14 *Rotation of Vibratory Motors*

DANGER

Running the vibratory motor without the drive guard can result in injury or death if the motor weight becomes separated from the equipment. Motor covers should be kept in place at all times.

5. Attach any water and air inlets or outlets, using flexible connections and allowing at least 1" (25mm) of frame movement.

Note

Improper wiring of stacked drives will result in vertical displacement of product with a single motor failure. Refer to the Engineering drawings for proper wiring.

MAINTENANCE: 30 DAYS OF OPERATION

1. Re-torque all 3/8" (M10) arm spring bolts to 25 ft/lbs. These arm spring bolts have been factory lubricated.
2. Check operating temperatures of the Iso-Drives, gear box, and motor.
3. Adjust tension on screen clamps, if required.
4. Adjust tension on pneumatic and manual slide gates, if required.
5. Adjust air pressure for all cylinders, if required.
6. Adjust tension on diverters (manual or auto types), if required.

MAINTENANCE: 1,500 HOURS OF OPERATION

1. After the initial 1,500 hours break-in period, replace the oil in the Iso-Drives and gear boxes. See Table 5-B for oil amounts.

Note

The correct quantity of oil depends on the size of the drive and the mounting position.

2. If equipped with EVM type drives, remove the drive weight covers and confirm the weight settings and bolt tightness. Refer to the cover sheet of the equipment drawings for design percentage specifications.

MODIFICATION

Never modify, alter, or change the design of any Iso-Flo shakers manufactured by Key Technology. If modification is desired, contact Key Customer Service.

Note

Use only spare parts recommended by Key Technology.

Operation

Contents

Operation

Operation Procedures

Daily, weekly, monthly and annual inspections should be performed on the Iso-Flo® shaker. Refer to the Appendix for these procedures.

START-UP PROCEDURE

To start-up the Iso-Flo shaker:

1. Make all repairs noted in the daily inspection.
2. Restore power to the Iso-Flo shaker.

> **Note**
>
> Vibratory motors will synchronize within 1-3 seconds after start-up. Irregular bed movement during start-up and shutdown on shakers using vibratory motors is normal.

3. If your shaker is hydraulically powered, adjust the valve feeding the hydraulic motor drive until the stroke indicator matches the design stroke.
4. Listen for any unusual noise. Notify Maintenance personnel if you cannot determine the cause and correct the problem.
5. Monitor the stroke at least once per shift.

For start-up procedures for equipment with EVM drives, reference *Iso-Flo Shakers with EVM Drive* in the Appendix.

STROKE INDICATOR

Depending upon the construction of your shaker, it will be equipped with either a circle-style or a V-style stroke indicator (Figures 4-1, 4-2 and Figure 4-4). The indicator is affixed to both sides of the shaker's bed and acts as a gauge for determining the shaker's stroke during operation.

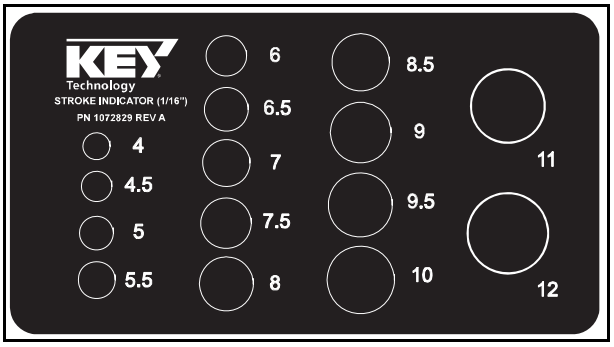

Figure 4-1 *Circle-Style Stroke Indicator Decal*

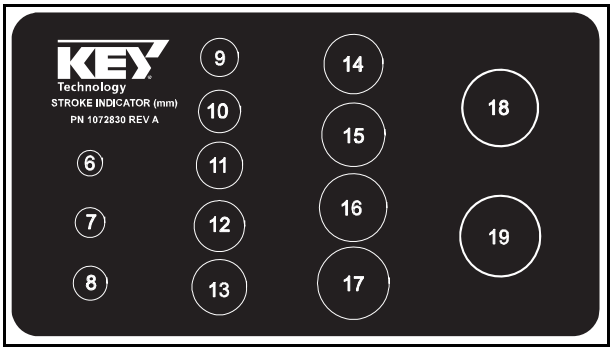

Figure 4-2 *Circle-Style Stroke Indicator Decal - Metric*

If the placement of the stroke indicators is inconvenient, contact Key Customer Service for extra decals.

MONITORING THE DESIGN STROKE

The reading on the stroke indicator should not exceed the design stroke stenciled on both sides of the Iso-Flo frame. When the shaker is operating at the designated stroke, the frame should be nearly motionless, and the shaker should be operating at maximum efficiency. Refer to the equipment drawings for the design stroke.

> **Note**
>
> On shakers using vibratory motors, the weights must be set to the values specified on the equipment drawings. To adjust the weight, contact Key Customer Service.

Several operating factors can affect the stroke:

- The movement of product can affect the stroke approximately 1/32" (1 mm), which is acceptable unless frame movement increases noticeably.

- The arm springs can soften over time. It may be necessary to add additional arms to each side.
- A significant build-up on the bed (e.g., product fines, starch, or ice) can affect the stroke. Remove any build-up from the bed.
- Weight added to the bed or frame can result in stroke deviation. Contact Key Customer Service prior to attaching anything to an Iso-Flo shaker's bed.
- Any change in rpm will increase or decrease stroke and make the shaker run out of tune.

Reading the Circle-style Stroke Indicator

If the circles indicating the design stroke are not touching, the shaker is over stroking (Figure 4-3).

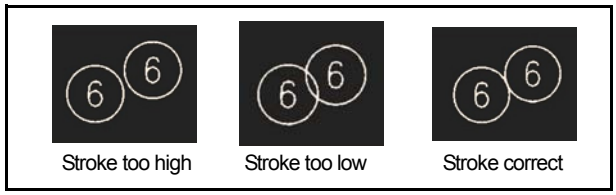

Figure 4-3 *Stroke Readings*

If the circles indicating design stroke are overlapping, the shaker is under-stroking.

The reading where the two circles are touching is the stroke at which the shaker is running. This should be the design stroke.

If the machine is operating above the design stroke stenciled on the frame, contact your Maintenance supervisor.

Reading the V-style Stroke Indicator

Important

Operating Iso-Flo equipment above the design stroke or significantly below the stroke stenciled on the frame can result in equipment damage, and may void your warranty.

While the shaker is in operation the stroke indicator will appear blurred (Figure 4-4). The point where the two lines intersect is the stroke. In Figure 4-4, the stroke is "6" (6/16"). If the machine is operating above the design stroke stenciled on the frame, contact your maintenance supervisor.

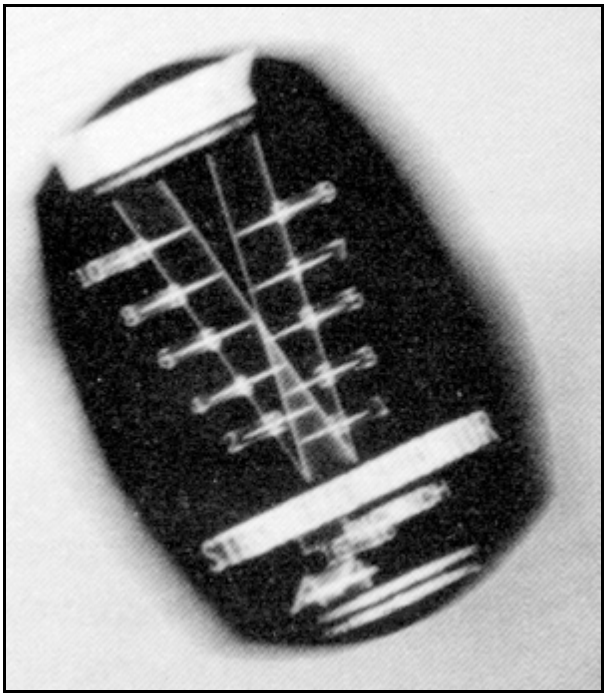

Figure 4-4 *V-style Stroke Indicator During Operation*

CHANGING SCREENS

Iso-Flo shakers use screens for various reasons, such as dewatering or separating products. Several types of screens are available, depending upon the application. For details on screen types, refer to the Introduction chapter.

Most screens are connected to the bed with clamps that allow easy removal and replacement. When a screen is removed or replaced, Key recommends stopping the shaker to eliminate damage to clamp assemblies.

If you must change the screens while the shaker is in operation, have the replacement screens ready for installation before loosening the clamps. Replace only one screen at a time.

If you need to run the shaker without the screens, adjust and tighten the clamps so they do not rattle or become damaged.

Important

The use of screens not manufactured by Key may result in equipment damage and may void your warranty.

VECTOR-LOCK™ PRO CLAMP APPLICATIONS

The Vector-Lock PRO clamp (Figure 4-5) has a claw that inserts itself into a hole in the screen frame and bed. The claw allows for tension to be applied to hold the screen in place when the handle of the clamp is pushed towards the bed. The clamp should not require any adjustment once properly installed.

Vector-Lock PRO seals are used for dewatering applications (Figure 4-6).

To install the seal onto the claw portion of the clamp:

1. Open the clamp and loosen the mounting hardware.
2. Remove the bolt closest to the claw and pull the clamp away from the bed allowing the seal to be placed on the claw. The seal should be oriented so that the sealing surface will press against the bed when the clamp is closed.
3. After the seal is properly installed, replace the bolt and pull the end of the clamp opposite the seal, away from the bed while the mounting hardware is tightened. This will ensure there is a proper amount of force pressing against the seal when the clamp is closed.

Figure 4-5 *Vector-Lock PRO Clamp*

Figure 4-6 *Vector-Lock PRO Seal*

Engaging the Vector-Lock PRO Clamp

> **⚠ CAUTION**
>
> To avoid pinching or possible injury to fingers, be sure to use the palm and not fingers when operating the Vector-Lock PRO clamp.

To engage the Vector-Lock PRO clamp:

1. Place the palm of your hand against the handle and press it towards the bed.
2. If the clamp does not close, check for the following:
   - Obstruction of the hole
   - Bent or stretched claw
   - Improperly seated seal
   - Improper screen orientation/fit

Disengaging the Vector-Lock PRO Clamp

To disengage the Vector-Lock PRO clamp:

- Grasp the handle of the Vector-Lock clamp firmly and pull the handle away from the bed

Changing Screens with a Vector-Lock PRO Clamp

To change a screen with a Vector-Lock PRO clamp:

1. Turn off and lock out power to the shaker.
2. Disengage the clamps by pulling the clamp handles away from the shaker bed.
3. Lift the screen from its supports.
4. Taking care to place the screen with the correct sides up, position the new screen in place. Be sure to align screen hole with the matching holes in the Iso-Flo frame.

5. Re-engage the clamps by placing your open palm on the handle and pressing it towards the bed. The clamps should hold the screen tight.
6. Restore power to the shaker

VECTOR-LOCK APPLICATIONS

A Vector-Lock clamp has a hook-shaped bolt that is inserted into matching holes in the screen frame and bed (Figure 4-7). Tension is applied to hold the screen in place when the handle of the clamp is pivoted toward the bed.

The bottom of the bolt is threaded, allowing tightening of the nyloc nut with a socket wrench while the clamp is loose. The clamp should be adjusted so that you can close it with one hand and the screen is held securely. The clamps must be tight enough to hold the screens firmly in place.

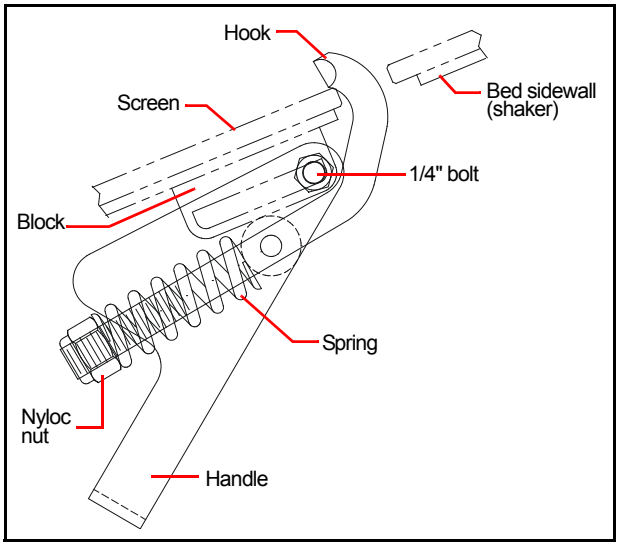

Figure 4-7 *Vector-Lock Clamp Components*

Engaging the Vector-Lock Clamp

To engage the Vector-Lock clamp:

1. Pivot the handle and move the 1/4" (M6) bolt to the back of the slot in the block (Figure 4-8).

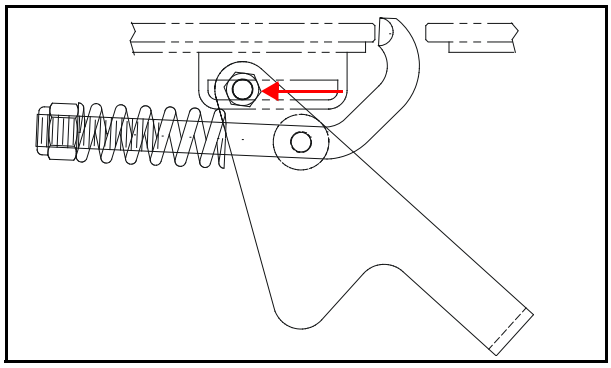

Figure 4-8 *Vector-Lock Clamping Procedure*

2. Insert the hook through the side of the shaker and into the screen hole.
3. Maintain pressure on the hook with your forefinger while rotating the handle until the 1/4" (M6) bolt is forward in the slot (Figure 4-9).
4. Adjust the nyloc nut until the handle is approximately perpendicular to the side of the shaker. At this point, you should feel tension on the hook.
5. Continue rotating the handle in the same direction until it snaps in place (Figure 4-10). If the hook pops out of the hole, or if it is difficult to clamp the screen, check for the following:
   - Hook is placed incorrectly in the hole
   - Hook is bent or stretched
   - Hole is out of alignment
   - Nyloc nut is incorrectly adjusted

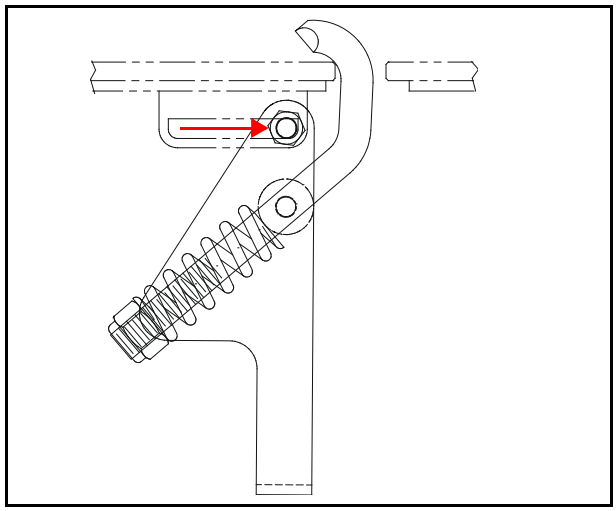

Figure 4-9 *Vector-Lock Clamping Procedure*

Disengaging the Vector-Lock Clamps

To disengage the Vector-Lock Clamp:

1. Grasp the handle and rotate it away from the side of the shaker until it is positioned as shown in Figure 4-9).
2. Rotate the handle and push the 1/4" (M6) bolt to the back of the slot in the block until tension is removed from the hook.
3. Remove the hook from the screen, as shown in Figure 4-8.

Changing Screens with a Vector-Lock Clamp

To change screens attached with Vector-Lock clamps:

1. Turn off and lock out power to the shaker.
2. Release the clamps by rotating the handles away from the shaker.

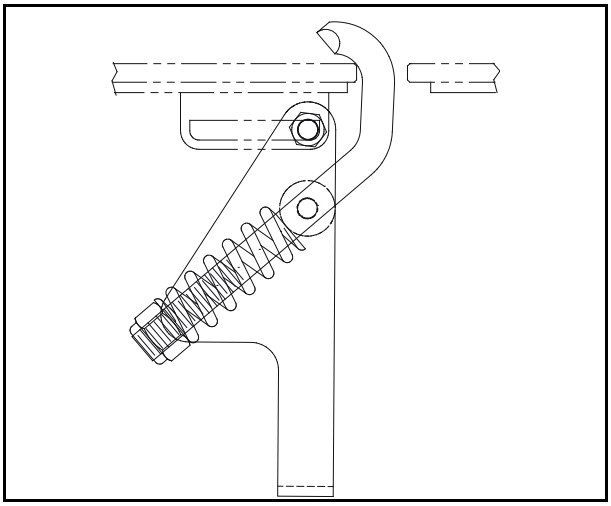

Figure 4-10 *Vector-Lock Clamping Procedure*

3. Lift the screen from its supports.
4. Taking care to get the correct side up, position the new screen. Be sure to align the holes in the screen frames with the new holes in the Iso-Flo frame.
5. Insert the clamp hooks into the matching holes.
6. Pivot the handle toward the shaker to lock the screen in place. If you cannot push the handle into place with one hand, adjust the nyloc nut at the bottom of the clamp bolt and try again. The clamp should hold the screen tight.
7. Restore power to the shaker.

Disengaging the Vector-Lock Clamp

To disengage the Vector-Lock Clamp:

1. Grasp the handle and rotate it away from the side of the shaker until it is positioned as shown in Figure 4-9.
2. Rotate the handle and push the 1/4" (M6) bolt to the back of the slot in the block until tension is removed from the hook.
3. Remove the hook from the screen as shown in Figure 4-8.

Changing Screens with a Vector-Lock Clamp

To change screens attached with Vector-Lock clamps:

1. Turn off and lock out power to the shaker.
2. Release the clamps by rotating the handles away from the shaker.
3. Lift the screen from its supports.
4. Taking care to get the correct side up, position the new screen. Be sure to align the holes in the screen frames with the holes in the Iso-Flo frame.
5. Insert the clamp hooks into the matching holes.
6. Pivot the handle toward the shaker to lock the screen in place. If you cannot push the handle into place with one hand, adjust the nyloc nut at the bottom of the clamp bolt and try again. The clamp should hold the screen tight.
7. Restore power to the shaker.

Toggle Clamp Applications

The toggle clamp presses a metal binder on top of the screen to hold it in place (Figure 4-11). The clamp hook is inserted through a slot in the bed and the over the lip at the bottom of the binder. The clamp applies downward pressure on the binder, securing the screen.

Adjusting the toggle clamp requires the use of a wrench to loosen or tighten a nyloc nut against a tension spring on the lower part of the bolt. Push the handle up to release the clamp.

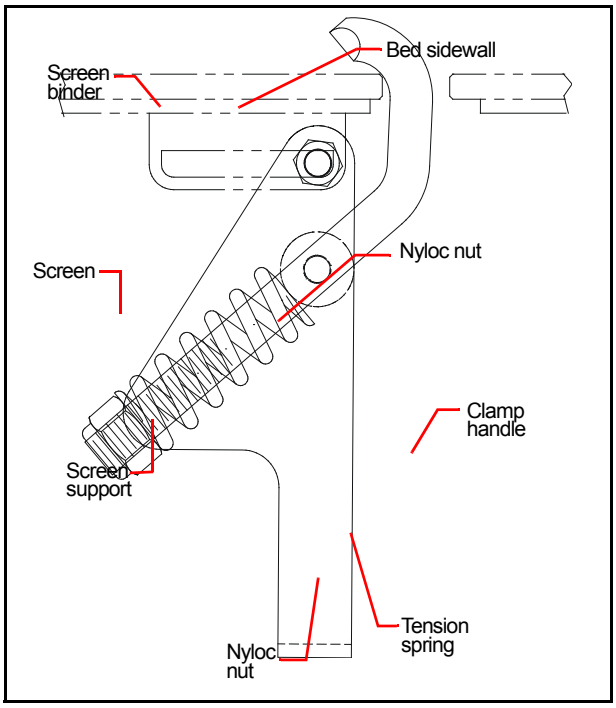

Figure 4-11 *Toggle Clamp*

Changing Screens with a Toggle Clamp

To change screens attached with toggle clamps:

1. Turn off and lock out power to the shaker.
2. Release the clamps by pulling the handles up.
3. Lift the binders off the screen.
4. Lift the screen from its supports.
5. Position the new screen on the supports, taking care to get the right side up and leaving no gaps where product could fall through.
6. Place the binders on top of the new screen with the open side toward the bed and the lip facing up from the bottom (Figure 4-11). Make sure the binder is positioned across the full length of the screen.
7. Insert the clamp hooks into the slots and over the binder's lip.
8. Push the clamp handles down to lock the screen in place. If you cannot push the handle into place with one hand, adjust the hex nut on the bottom of the clamp bolt and try again. The clamp should hold the screen tight.
9. Restore power to the conveyor.

Prism Clamp Applications

The Prism clamp is inserted between the shaker deck and screen, and bolted to the shaker's side plate.

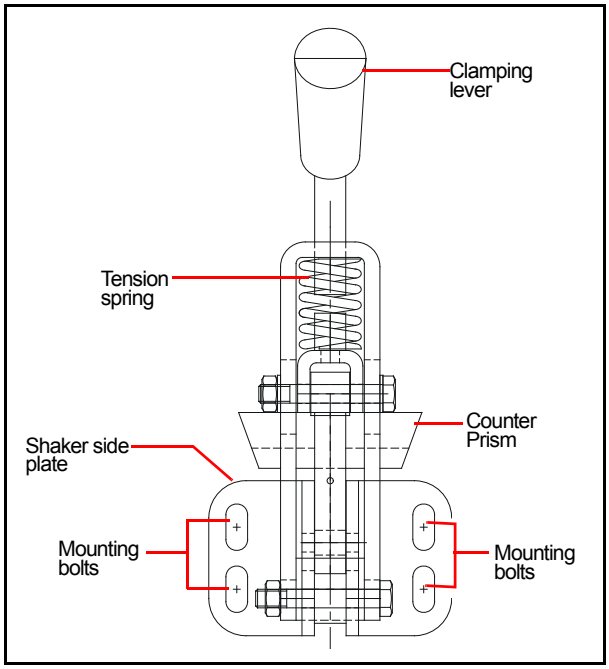

Figure 4-12 *Prism Clamped to Shaker*

Changing Screens with a Prism Clamp

To change screens attached with prism clamps:

1. Turn off and lock out power to the shaker.
2. Pull the handle out to disengage the tension roller.
3. Pivot the clamping lever to the horizontal position as shown in Figure 4-13.

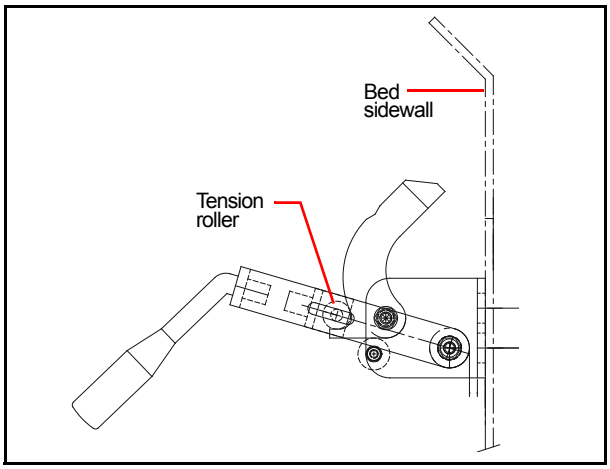

Figure 4-13 *Prism in Disengaged Position*

4. Lift the screen from the supports.

5. Position the new screen on the supports, taking care to get the right side up and leaving no gaps where product could fall through.
6. Pivot the clamping lever to the vertical position until the tension roller locks into place (Figure 4-14).
7. Restore power to the shaker.

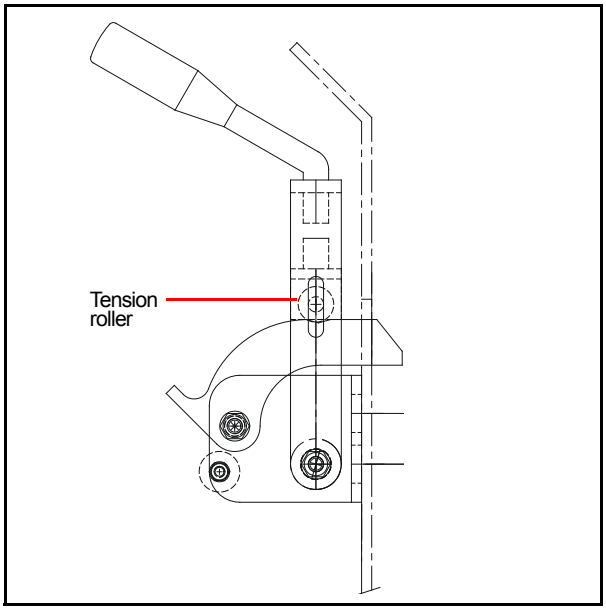

Figure 4-14 *Prism in the Engaged Position*

Split Screen Clamp Applications

The split screen clamp applies pressure to the edge of the screen holding it against the outside of the bed wall. The clamp is connected to the bed with a bolt through a slot in a rib on the outside of the bed.

Changing Screens with a Split Screen Clamp

To change screens attached with split screen clamps:

1. Turn off and lock out power to the shaker.
2. Rotate the handles on the clamp counterclockwise to loosen the clamp.
3. Allow the loosened clamp to rest at the bottom of the slot in the rib.
4. Pull the screen out of the shaker.
5. Slide the new screen into the shaker, taking care to get the right side up and leaving no gaps where product could fall through.
6. Raise the clamp and hold it against the edge of the screen.
7. Rotate the handles on the clamp clockwise to tighten the clamp.
8. Restore power to the shaker.

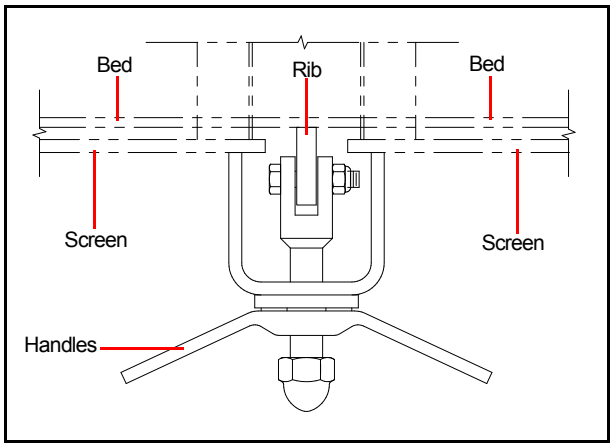

Figure 4-15 *Split Screen Clamp Diagram*

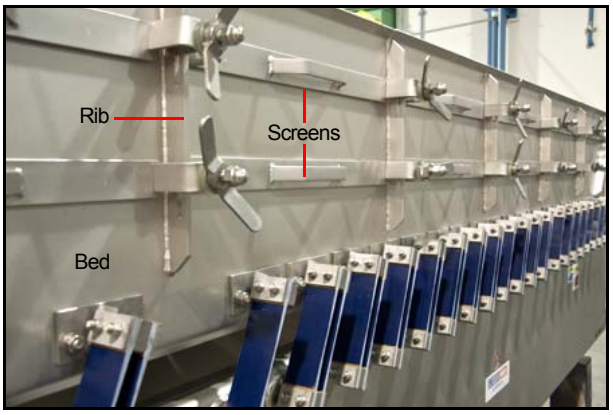

Figure 4-16 *Split Screen Clamps in Use*

Cleanup Procedure

⚠ WARNING

Turn off and lock out power to the shaker prior to wash-down.

Clean the Iso-Flo shaker regularly, in accordance with local health and safety guidelines and requirements. Depending upon the conditions, you may choose to use one or more of the following:

- Hot or cold, high- or low-pressure water
- Compressed air
- Appropriate scrapers, brushes, and scouring pads

- Appropriate cleaning solutions

Important

Before using a cleaning solution, read the Safety Data Sheet (SDS) to be sure it is appropriate for the materials to be cleaned.

Maintenance

Contents

Maintenance

Shutdown Requirement

It is important to turn off and lock out power prior to performing any maintenance on an Iso-Flo® shaker.

Important

When an Iso-Flo shaker is turned off, the speed decreases causing increased frame motion for a short time. If connected to the inverter/VFD, adjust ramp time to 1-2 seconds

Tune-up Procedure

Iso-Flo shakers are balanced systems that allow for a few speed and stroke adjustments.

If you are unable to tune the shaker using the following step-by-step procedure (Figure 5-1), or want to modify it beyond its original design, contact Key® Customer Service at 1-877-878-4631. Have your model number available.

Tools/Supplies

- Basic mechanic's tools
- Equipment drawings (sheet 1, shaker specifications)
- Lock out tag and padlock
- Photo or laser-type tachometer or strobe light
- Torque wrench

To tune an Iso-Flo shaker:

1. If the shaker is connected to a VFD, verify and document the actual speed (rpm), stroke, and frequency settings before starting the tune-up procedure,.
2. Using a photo or laser-type tachometer or strobe light, take an rpm reading of the motion of the bed (not motor rotation).
3. Check the stroke of the shaker using the stroke indicator decal or etched stroke plate affixed to the side of the bed (Figure 4-1, Figure 4-2, Figure 4-3 andFigure 4-4).
4. Listen for unusual noise that may indicate a problem, and address.
5. Turn off and lock out the power source to the shaker.
6. Check the drive belt tension for a potentially loose belt or motor sheave. Confirm the drive belt and motor rotation is clockwise when viewing the belt and motor sheave/shaft. If rotation is not clockwise, re-wire the motor.
7. Clean away any substance build-up such as ice, starch, or other debris.
8. Verify that you are using only Key Technology arm springs and phenolic shims.
9. Referring to the equipment drawings, verify the number and positions of spring arms for your shaker. Verify also that spring arms are in satisfactory condition.
10. Tighten any loose arm bracket assembly bolts. Torque the 1/2" (M10) arm bracket bolts to 55 ft/lbs (74.25 Nm) lubricated. The 3/8" (M10) arm spring bolts torque to 25 ft/lbs (34 Nm) lubricated. If 1/2" bolts are loose, first ensure proper angle is correct before re-torque (Figure 5-13).

Note

Hardware used should be stainless steel. Do not use plated hardware or nyloc nuts.

11. Check for cracks in the bed or frame. Contact Key Customer Service prior to repairing any structural damage.
12. Check the weight distribution on all four isolation springs. Adjust the bottom adjusting nuts to level shaker, if necessary (Figure 3-3). If your shaker operates at an angle, check the equipment drawings for the correct angle and adjust accordingly. If isolation springs are compressed, refer to Table 3-C for size, color and load rates of isolation springs. See the Installation chapter for further information.
13. Ensure all isolation spring hex bolts are centered in the pedestal holes. If not, re-shim or relocate the supports as required. Refer to the Installation chapter for further information.
14. Ensure there is at least 1 1/2" (38mm) clearance between the shaker and any other object, unless otherwise specified.
15. Ensure all electrical, water, and air connections are flexible, allowing for at least 1" (25mm) of frame motion.

16. Restore power to the shaker. If connected to VFD control, confirm the design Hz/frequency.
17. As mentioned in item 2, verify again the stroke and take an rpm reading of the bed motion and compare the reading to the designed specifications, stroke and speed listed on the cover sheet of the equipment drawings.

    If the shaker is not running at the design rpm, turn off and lock out the power to the shaker. Perform the necessary adjustments. To increase the rpm to the design speed, close the variable pitch motor sheave (turn clockwise). To decrease the rpm to the design speed, open the sheave (turn counter-clockwise).

Frame motion can occur with both an over-stroking and under-stroking situation. If the shaker is over-stroking, add additional spring arms to bring the stroke back to the design stroke. If the shaker is under-stroking, remove spring arms to increase stroke to the design stroke.

Important

What is modified on one side of the shaker must be modified on the opposite side. Never add, remove, or replace only one arm spring. Always add, remove, or replace arm springs in pairs.

18. If the stroke of the shaker is at or slightly below the value listed on the equipment drawings “design stroke”, the shaker is ready for operation, providing there is 1/16" or less frame motion.
19. If all of the previous steps are completed and the shaker still has a frame motion of 3/32" or more, check the stroke reading. If the stroke reading is not at the design stroke, or the stroke is not readable (not enough motion), then the Iso-Drive® could need repair. Refer to the Iso-Drive Service Manual for details, or contact Key Customer Service Mechanical Department.
20. If the shaker has dual Iso-Drives, check the timing of the two drives according to the instructions later in this chapter (Figure 5-27).
21. If the shaker uses EVM drives (no drive belts), ensure that one motor rotates clockwise and the other counter-clockwise (Figure 3-14).

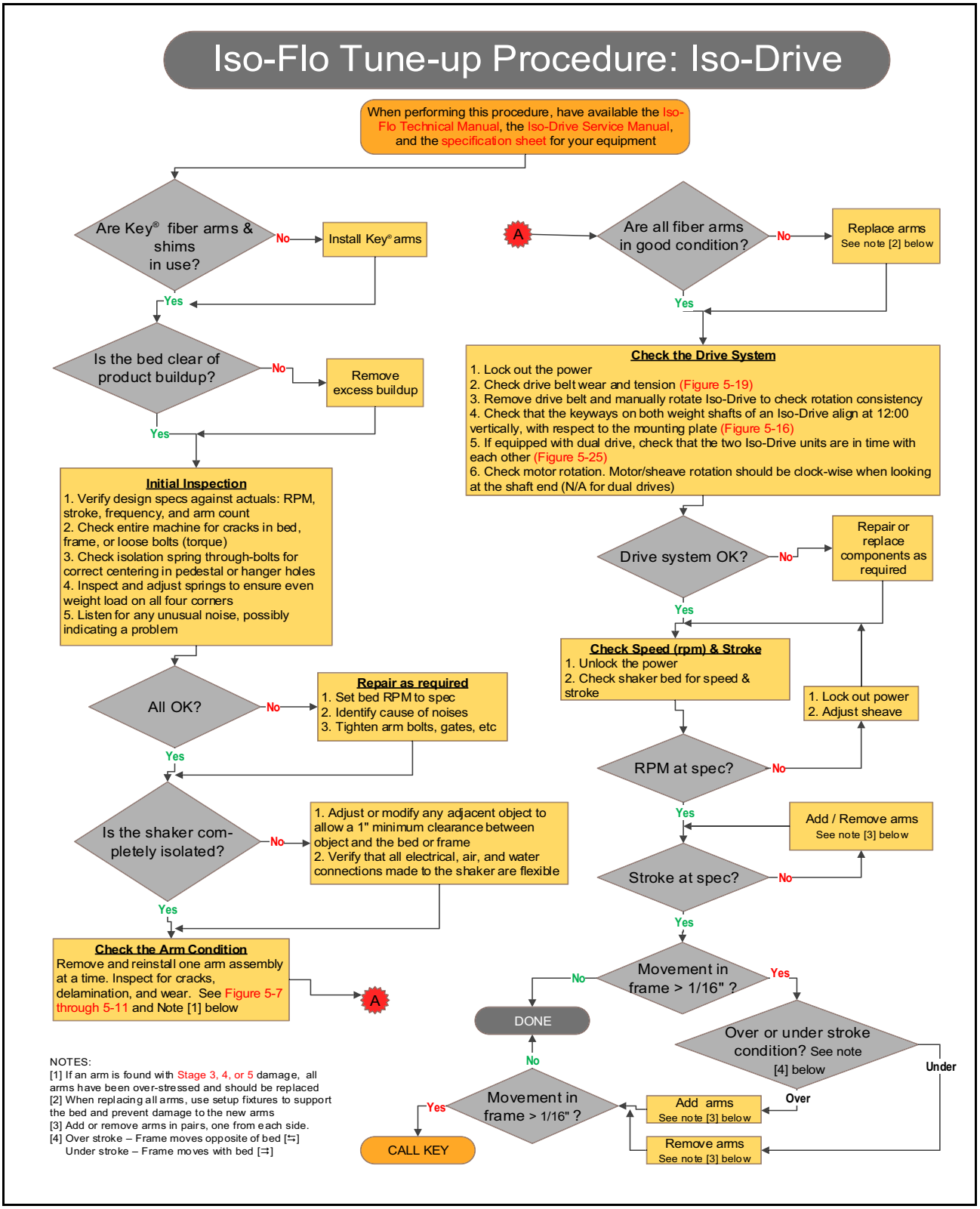

Figure 5-1 *Iso-Flo Tune-up Procedure: Iso-Drive*

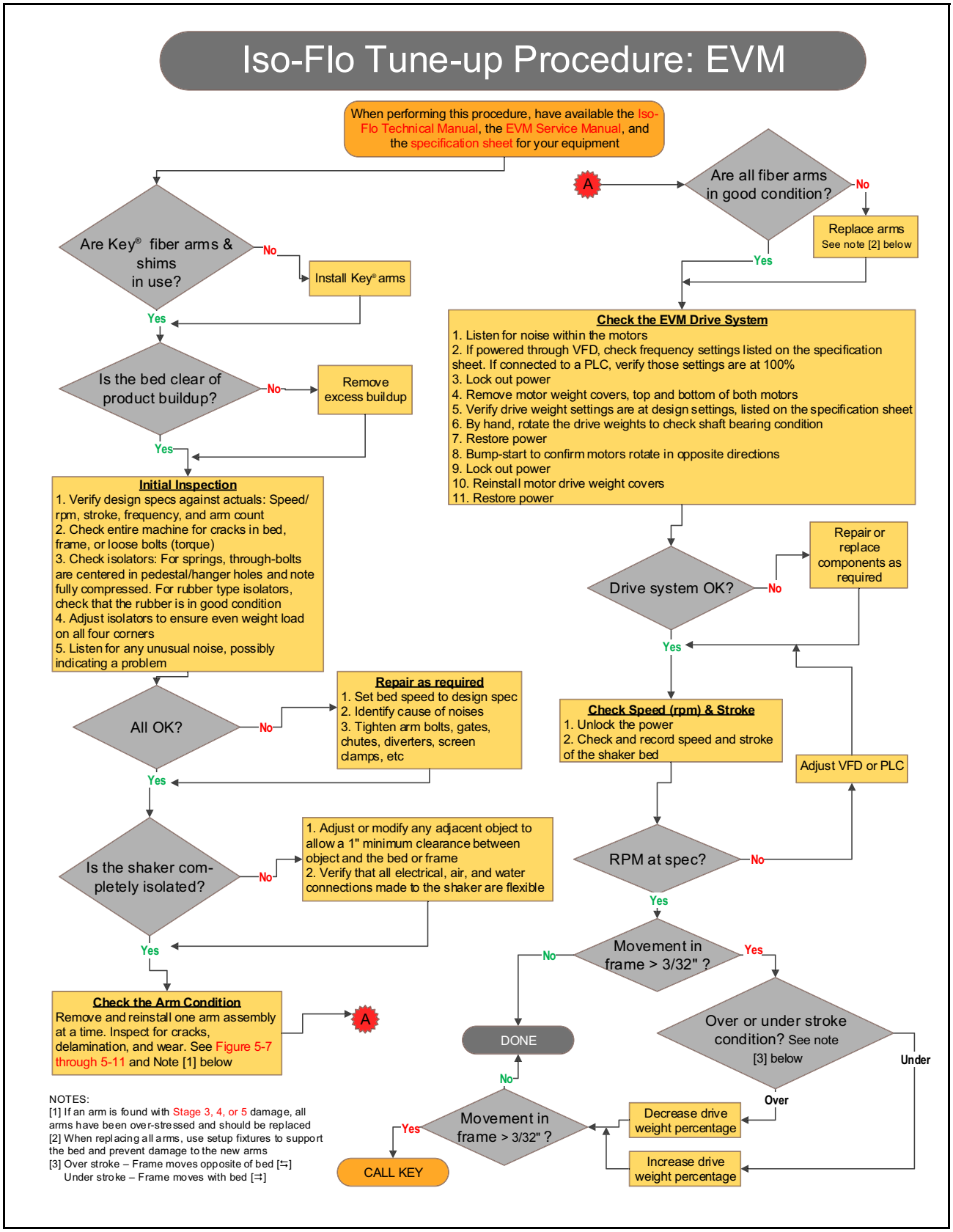

Figure 5-2 *Iso-Flo Tune-up Procedure: EVM*

Maintenance Procedures

SELF ADJUSTING SLIDE GATES

Slide Gate Maintenance

Tools/Supplies

- Basic mechanic's tools
- Lock out tag and padlock

To perform slide gate maintenance:

1. Turn off and lock out air and power to the shaker.
2. Inspect the polyurethane spring for damage or wear. Replace as required.
3. Adjust the nyloc nut clockwise against the stainless steel washer to apply pressure against the Polyurethane spring (Figure 5-3).

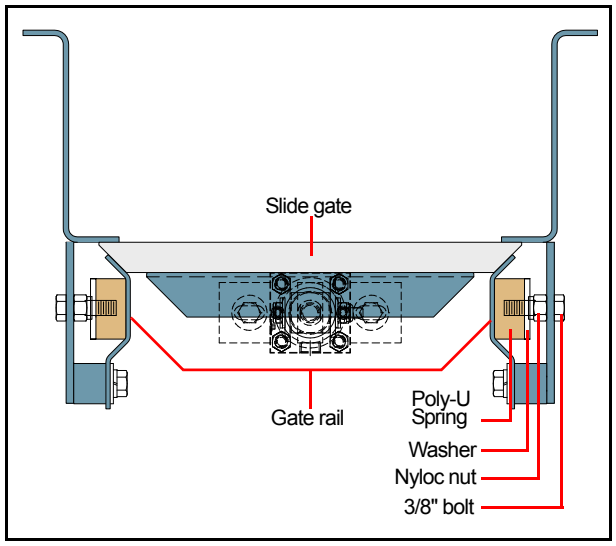

Figure 5-3 *Slide Gate Assembly*

4. Tighten the nyloc nut until the spring comes into contact with the slide gate rails.
5. Turn an additional 1/2 turn clockwise for the adjustment.
6. Repeat on the opposite side of the gate.
7. Restore power and air to the shaker.

Slide Gate Polyurethane Spring Replacement

To replace the polyurethane spring:

1. Turn off and lock out air and power to the shaker.
2. Remove the 3/8" (M10) bolt from the side plate.

Tools/Supplies

- Basic mechanic's tools
- Blue Loctite®
- Lock out tag and padlock

3. Remove the spring from the slide gate assembly.
4. Install the new spring into the assembly and tighten the 3/8" (M10) bolt using blue Loctite®.

Important

Avoid bonding the nyloc nut with Loctite®.

5. Restore air and power to the shaker.

ARM SPRINGS

Iso-Flo shakers are configured differently and as a result, have different types, sizes, and numbers of arm springs.

An arm spring assembly may be single or multiple assemblies (Figure 5-4 and Figure 5-5).

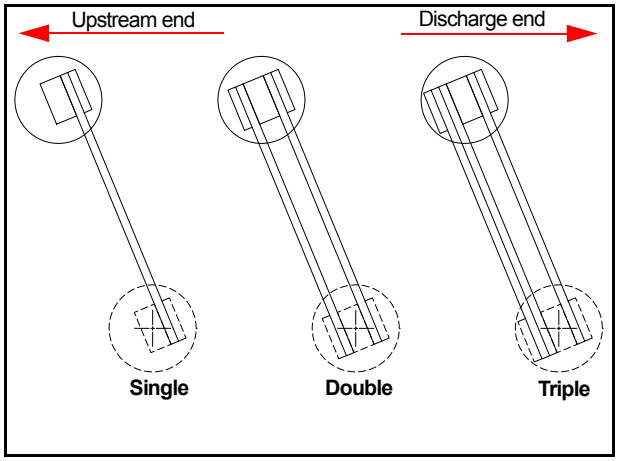

Figure 5-4 *Arm Spring Assemblies*

Figure 5-5 *Arm Springs—Double (left) and Single (right)*

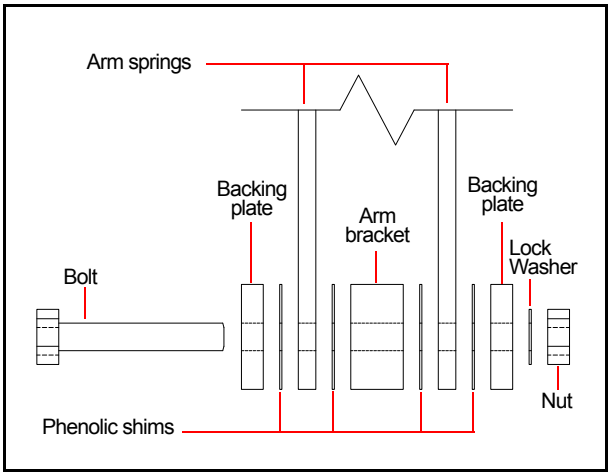

Figure 5-6 *Double Arm Spring Assembly Components*

Arm Spring Inspection

Note

Dismantling more than one arm spring assembly at a time could result in warping or shifting of the bed if setup options are not used. (Figure 5-32).

If an arm spring is loose in the assembly, it could be damaged. When damage is suspected, dismantle only one arm spring assembly at a time (Figure 5-6).

While the spring assembly is apart, clean and check the backing plates for sharp edges or warpage. Replace any backing plates showing signs of damage. In addition, replace all phenolic shims and lock washers.

When reassembling the arm springs be careful to install the phenolic shims so they are flush with the ends of the arms.

Check each arm spring for any of the following stages of damage:

Stage One: The first sign of damage appears at the holes hidden under the backing plate (Figure 5-7).

Figure 5-7 *Stage One—Behind the Backing Plate*

Stage Two: Closely spaced parallel lines running lengthwise in the fiber near the backing plate (Figure 5-8).

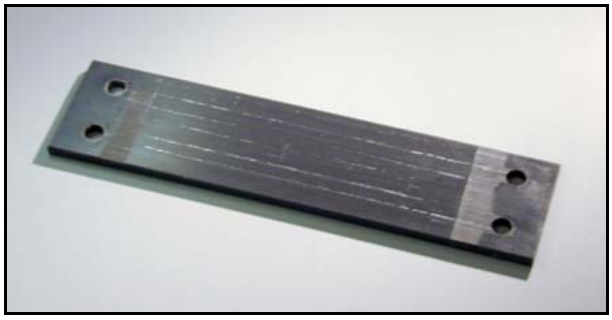

Figure 5-8 *Stage Two*

Stage Three: Delamination, a separation of layers where the damaged area is a lighter color (Figure 5-9).

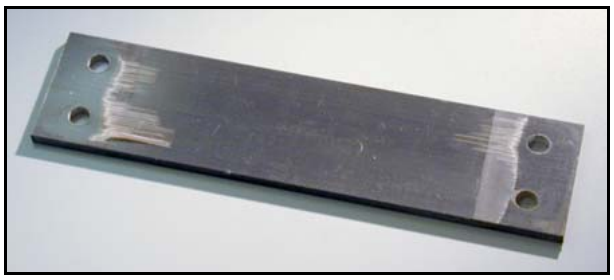

Figure 5-9 *Stage Three*

Important

If you find an arm spring with delamination, Key recommends that you replace all arm springs. The wear on one spring indicates the amount of stress the other springs have undergone.

Stage Four: Fractures or cracks in the fiber sometimes visible near the back plate; often hidden under the back plate (Figure 5-10).

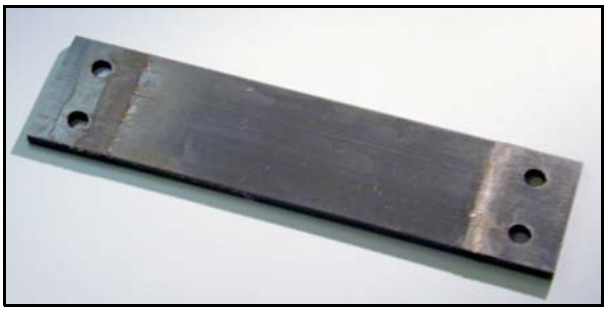

Figure 5-10 *Stage Four*

Stage Five: Breakage of the arm spring (Figure 5-11).

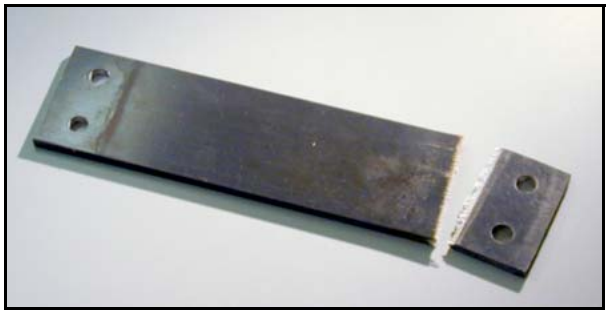

Figure 5-11 *Stage Five*

Arm Spring Replacement

Tools/Supplies

- Basic mechanic's tools
- Lock out tag and padlock
- Set-up arms
- Torque wrench
- Clamps

1. Turn off power, lock out and tag out shaker and any adjacent equipment, if required.
2. Remove and replace worn spring arms at the four corners first, one corner at a time. Install steel set-up arm fixtures (Figure 5-32 and Figure 5-36) Key recommends installing these fixtures on the upstream side of the arm bracket, as shown. Two arm fixtures in the mid-section of the shaker are required on beds that are 12' or longer. This will prevent sagging of the bed and ensure that the designed arm angle is maintained.
3. Be sure to remove all remaining hardware and phenolic shims, in addition to the worn arm springs.
4. Confirm that the bed is aligned and squared in the frame (Figure 5-35).

Important

Key recommends installing the set-up arm fixtures on the upstream side of the arm bracket.

5. Tighten all bolts in the set-up fixtures after alignment is confirmed.
6. Clean all arm brackets on both bed and frame, removing dirt, oil, and any other product debris. Check to be sure that debris is not left in bolt holes.
7. If bolt-on brackets are used on the bed, confirm there is proper arm bracket alignment (Figure 5-13).
   A. Loosen 1/2" bolts.
   B. Install transfer jig by clamping to the welded arm bracket of the frame first. (Figure 5-30)
   C. Insert the pins into the bolt-on arm bracket and clamp the arm bracket to the transfer jig firmly. This ensures the proper arm bracket alignment and will center up the holes on the bed.
   D. Tighten and torque 1/2" bolts to 55 ft/lbs.
8. Refer to the shaker drawings for the correct number of spring arms and phenolic shims and their exact location.
9. Install new spring arms, phenolic shims and all new hardware (leave all shims and hardware attached loosely at this time). Lubricate all bolts with food grade anti-seize. **Do not force bolts into position.** Make sure that the bolts are inserted so that the head of the bolt is on the bottom/upstream side of the bracket, and the nut is on the upper/downstream side of the bracket (Figure 5-5). This position will aid in necessary clearances from the 1/2" nuts and allow access for the 3/8" nut to be torqued. Do not torque the head of the bolts, unless access to the nut will not permit.

Important

Key highly recommends replacing lock washers with each new spring arm installation or bolt/nut replacement. Replacement of all hardware with the installation of every third set of springs arms is also recommended.

10. When previous steps are completed, snug all 3/8" arm bolts. After all bolts are snug, torque the bolts to 25 ft/lbs.

11. Remove the steel set-up arms, one at a time. Install the recommended spring arm assembly, per the shaker drawings and tighten/torque to designed specifications.
12. Compare and confirm that all spring arm assemblies are placed correctly on both sides of the shaker, per the equipment drawings.
13. Confirm that no hardware, parts or tools are inside or on the shaker.
14. Remove locks to the shaker and restore power.
15. Confirm that the shaker is operating at designed specifications listed on equipment drawings (speed, stroke, and frequency). If the shaker is not operating at design specifications, re-tuning is required. Reference the *Tune-up* section of this chapter for details.

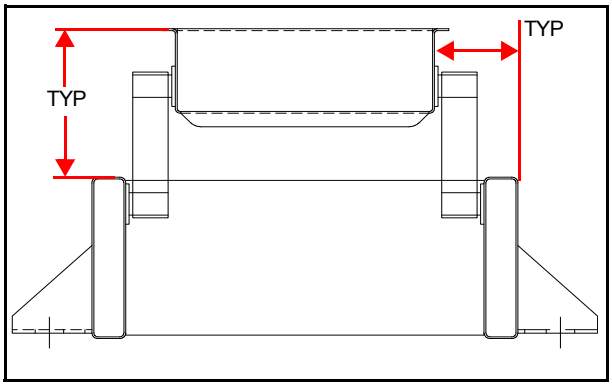

Figure 5-12 *Shaker Bed Square Within the Frame*

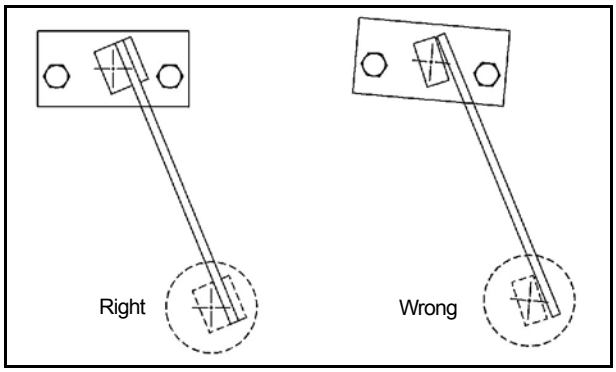

Figure 5-13 *Arm Bracket Alignment*

Weld-on Arm Bracket Replacement

Important

In addition to these instructions, reference also *Weld-on Arm Bed Replacement* later in this section.

When an arm bracket is damaged, also check the companion bracket for damage, as both may require replacement. Upon request, Key will provide information or drawings specific to your shaker to aid in the replacement procedure.

Tools/Supplies

- Angle grinder
- Basic mechanic's tools
- Clamps
- Level
- Lock out tag and padlock
- Protractor or electronic level
- Set-up arms
- Torque wrench
- Welder

To replace a weld-on arm bracket:

1. Turn off and lock out power to the shaker.
2. Remove the arm assembly and the broken arm bracket(s) from the shaker.
3. Clean the damaged area, repair any cracks, and grind flush.
4. See the *Weld-on Arm Bed Replacement* section later in this chapter for welding procedures.
5. Position the set-up arms on the shaker, using the original holes in the bed or the remaining arm bracket. Bolt the set-up arm onto the shaker, snugging the 3/8" (M10) bolts tights enough to hold the bed bracket and frame bracket parallel (Figure 5-13). Snug the 1/2" (M12) bed bracket bolts to take up any slack or misalignment.
6. Set the arm assembly at the same angle as the drive plate's mounting surface (Figure 5-14). When positioned correctly, clamp the bracket(s) in place and weld.

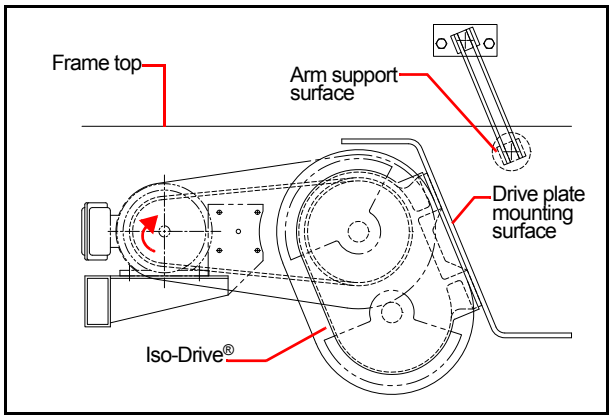

Figure 5-14 *Drive Plate Mounting Surface and Arm Support Surface are Parallel*

7. Allow the bracket to cool.

8. Remove the set-up arms and reassemble the arm spring assembly.
   A. Rebuild the arm spring assembly using the correct number of arms, shims and backing plates. Be careful to install the phenolic shims flush with the ends of the arms.
   B. Bring the bed arm bracket and frame arm bracket in parallel by lightly snugging the 3/8" (M10) bolts first, leaving the 1/2" (M12) bolts loose.
   C. Torque the 1/2" (M12) bolts to 55 ft-lbs (74.25 Nm) lubricated.
   D. Torque the 3/8" (M10) bolts to 25 ft-lb (34 Nm) lubricated.
9. Restore power to the shaker.

DRIVE BELT

Drive Belt Replacement

Single Drive

Tools/Supplies

- 18" to 24" steel straight edge
- Basic mechanic's tools
- Lock out tag and padlock

To replace the drive belt on a single drive:

1. Turn off and lock out power to the shaker
2. Remove the drive belt guard cover.
3. Relieve tension on the belt by loosening the motor and sliding it toward the IsoDrive on the motor mount.
4. Remove the belt.
5. Inspect the sheaves for damage.
6. Place the belt over the sheaves and in the grooves, without forcing them over the sides of the grooves.
7. Apply tension to the belt by increasing the center distance until the belt is snug.
8. Ensure that the drive sheave and the driven sheave are aligned using a straight edge.
9. Check the tension on the new belt. Refer to *Tensioning the Drive Belt(s)* later in this chapter.
10. Replace all guards and restore power to the shaker.

Jackshaft Dual Drive

Tools/Supplies

- 18" to 24" steel straight edge
- Basic mechanic's tools
- Lock out tag and padlock

To change the drive belts on a jackshaft dual drive shaker:

1. Turn off and lock out power to the shaker.
2. Relieve tension on the belt by loosening the motor and sliding it on the Iso-Drive.
3. Remove the spacer coupling guard.
4. Remove the spacer coupling.

Important

Make note of the index marks on the two flanges. During reinstallation, you will need to realign them (Figure 5-15).

5. Remove the belt guard and belts.
6. Inspect the sheaves for damage.
7. Install a new set of properly matched belts. Check the sheave alignment and place the belts over the sheaves and in the grooves without forcing them over the sides of the grooves.
8. Apply tension to the belts by increasing the center distance until the belt is snug.
9. Ensure that the drive sheave and the driven sheave are aligned using a straight edge.
10. Slip the belt guard cover onto the shaft.
11. Install the spacer coupling with the marks on the flanges aligned. This step resets the timing, if the timing coupler was not replaced.
12. Tension the belts. Refer to *Tensioning the Drive Belt(s)* later in this chapter.
13. Replace all guards and restore power to the shaker.

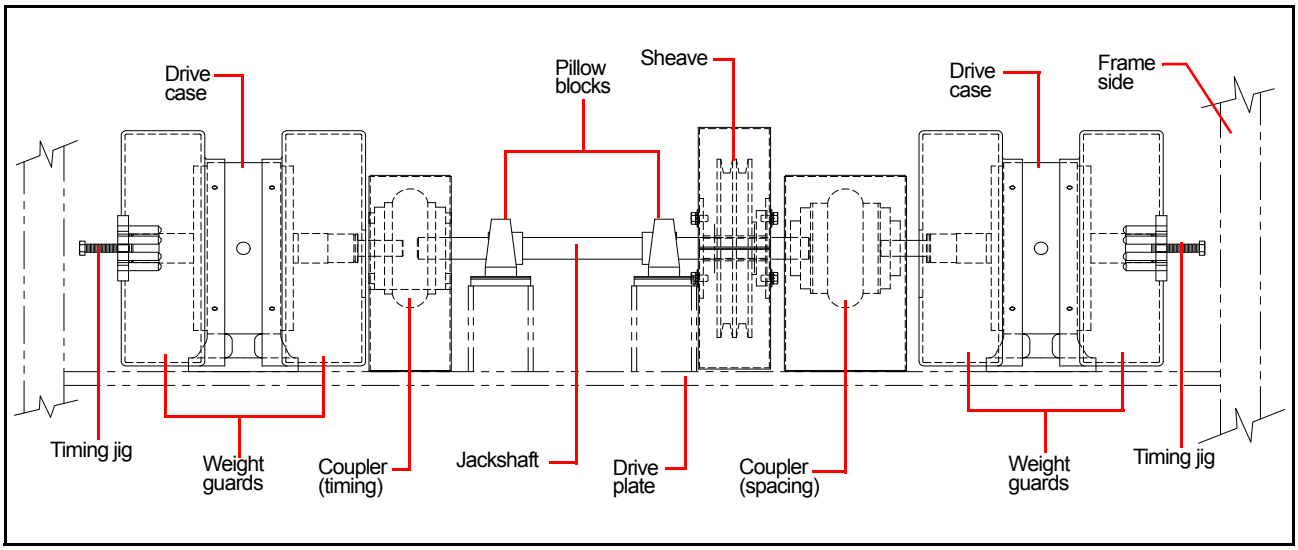

Figure 5-15 *Dual Iso-Drive with Two Couplings*

Close-Coupled Dual Drive

Tools/Supplies

- 18" to 24" steel straight edge
- Basic mechanic's tools
- Lock out tag and padlock

To change the drive belt on a close-coupled dual drive:

1. Turn off and lock out power to the shaker.
2. Remove all guard covers.
3. Relieve the tension on the belt by loosening the motor and sliding it toward the Iso-Drive.
4. Loosen the 10 coupling bolts on the flange and remove the spacing coupler element (Figure 5-16).
5. Remove the belts.
6. Inspect the sheaves for damage.
7. Install a new set of properly matched belts.
8. Install the coupler element. Torque fasteners to 24 ft-lb (32.5 Nm) un-lubricated.
9. Time the drives. Refer to *Timing Dual Iso-Drive® Units* later in this chapter.
10. Ensure that the drive sheave and the driven sheave are aligned using a straight edge.
11. Tension the belts. Refer to *Tensioning the Drive Belt(s)* and Figure 5-17.
12. Replace all guards and restore power to the shaker.

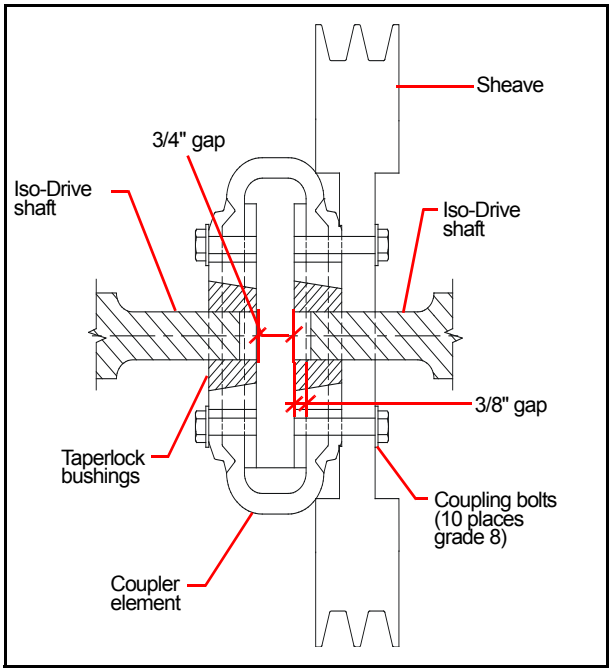

Figure 5-16 *Close-coupled Dual Iso-Drive Connection with no Jackshaft*

Tensioning the Drive Belt(s)

The drive belt should be tensioned correctly to guard against slippage or excessive wear on the belt or bearings. Belt tension must be sufficient to overcome slipping under maximum peak load.

Tools/Supplies

- 18" to 24" steel straight edge
- Basic mechanic's tools
- Belt tensioning tool
- Calculator
- Lock out tag and padlock

To tension the drive belts:

1. Turn off and lock out power to the shaker
2. Tension belt using 5 lbs force (small drives)/6 lbs force (large drives) to achieve 1/4" belt deflection Figure 5-17.

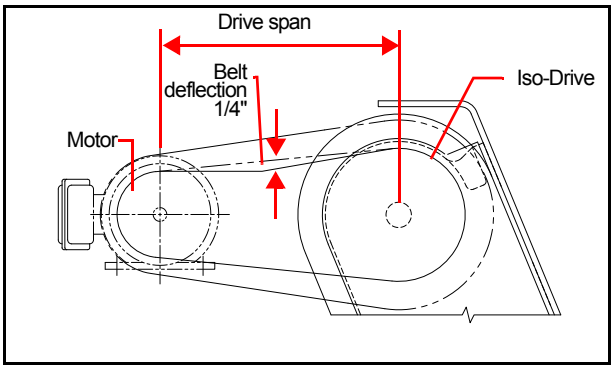

Figure 5-17 *Drive Belt Measurement and Deflection*

3. Replace the guard and restore power to the shaker.

MOTOR MAINTENANCE

Contact Key Customer Service for motor maintenance information.

VIBRATORY DRIVE MAINTENANCE

Dual vibratory electric motor drives attach to the frame and generate the system drive force (Figure 5-18). Contact Key Customer Service for vibratory drive maintenance information.

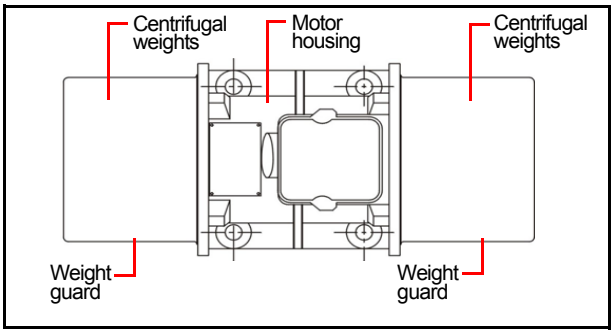

Figure 5-18 *Vibratory Drive*

ISO-DRIVE MAINTENANCE

Note

Refer to the Iso-Drive Service Manual for regular maintenance information.

Some shakers have dual Iso-Drive units, in which case the dual drives must be synchronized to operate efficiently. This section contains instructions for identifying, removing, and installing single and dual Iso-Drive systems, as well as timing the dual drives.

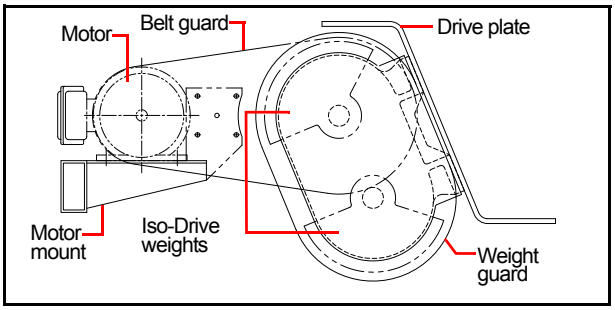

Figure 5-19 *Iso-Drive*

Identifying the Iso-Drive

The Iso-Drive is available in two sizes, 438 (small) and 634 (large). Each size has two possible configurations, right- or left-hand, all of which may be mounted vertically or horizontally (Table 5-A and Figure 5-20).

Table 5-A

Iso-Drive Part Numbers		
Model	**Configuration**	**Part Number**
438	Right-hand	022812
438	Left-hand	022813
634	Right-hand	021995
634	Left-hand	021994

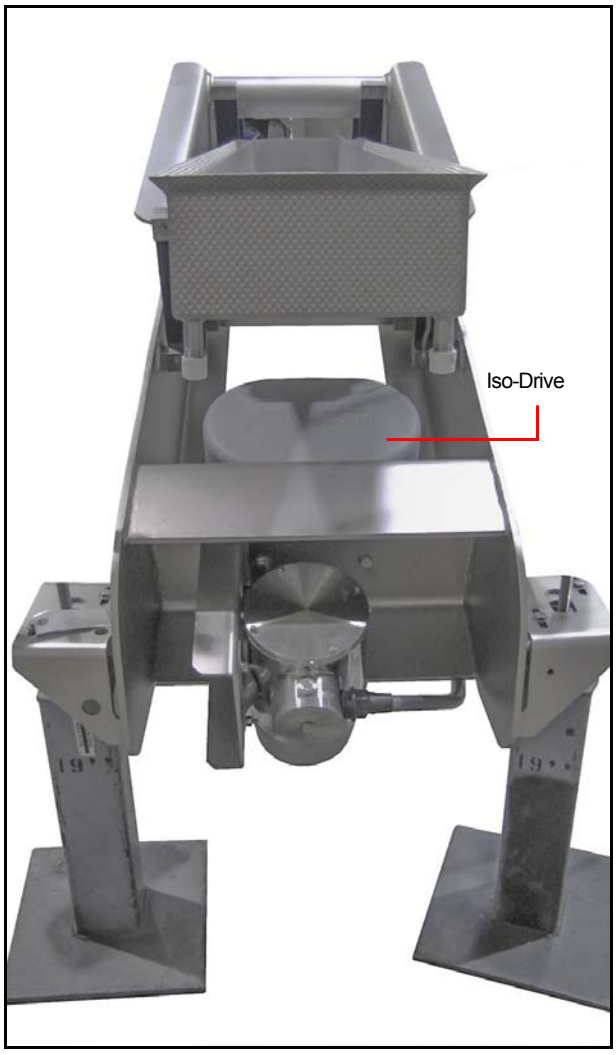

Figure 5-20 *Horizontal Iso-Drive*

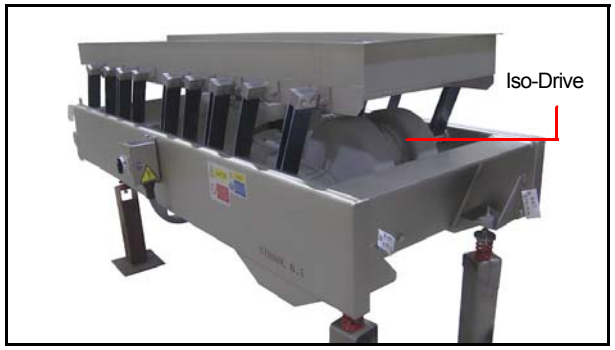

Figure 5-21 *Vertical Iso-Drive*

To determine the configuration of an Iso-Drive:

1. Place the Iso-Drive base down on a bench or the floor.
2. Stand facing the drive lengthwise with the longest shaft nearest you. If the longest shaft points to the right, you have a right-hand drive. If it points to the left, you have a left-hand drive.

Iso-Drive Removal

Tools/Supplies

- Basic mechanic's tools
- Lock out tag and padlock
- Snap-ring pliers

To remove an Iso-Drive:

1. Turn off and lock out power to the shaker.
2. Remove the drive guard.
3. Remove the drive belt.
4. Remove the back guard.
5. Remove the Iso-Drive weight guards.
6. Remove the drive weight setscrews.

Note

Drive weights contain two setscrews. Remove the first setscrew to access the second setscrew in the drive weight.

7. Remove the snap ring from the drive shaft.
8. Remove the drive weights.
9. Remove the Iso-Drive mounting bolts.

CAUTION

Iso-Drives are extremely heavy. Use caution when lifting and transporting the Iso-Drive units.

Single Iso-Drive Installation

Tools/Supplies

- 18" to 24" steel straight edge
- Basic mechanic's tools
- Lock out tag and padlock
- Mobil 1® 5w-30 synthetic oil
- Snap-ring pliers

1. Referring to Figure 5-22, determine the mounting position of the drive for placement of the vent and plug.

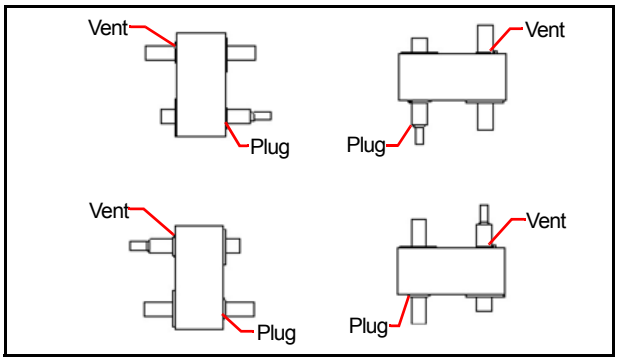

Figure 5-22 *Right-hand Iso-Drive Case in Different Mounting Positions*

2. Remove the plastic plugs and install the new vent fitting on the top end of the drive.
3. Install the 1/8" NPT pipe plug with thread sealer on the bottom end of the drive.
4. Referring to Table 5-B, fill the drive with Mobil 1® 5w-30 synthetic oil.

Table 5-B

Iso-Drive® Oil Levels		
Model	**Oil Level for Horizontal Drive (liters)**	**Oil Level for Vertical Drive (liters)**
438	12 oz. (0.36)	8 oz. (0.24)
634	60 oz. (1.78)	32 oz. (0.95)

Note

When a food grade lubricant is required, use Lubriplate® SFGO-68 manufactured by Fiske Brothers Refining Co. Agency qualifications: USDA H-1; meeting requirements of 21CFR 178.3570 "Lubricants with incidental food contact". Canadian approval applied for. Recommended oil change interval is identical to that for Mobil 1®.

5. Clean the Iso-Drive base and drive plate mounting area on the frame. Both surfaces must be flat and free of any deformities (i.e. burrs, dents, or rust).
6. Attach the new Iso-Drive to the frame using new grade 5 bolts, nuts, and lock washers. Refer to the equipment drawings for bolt specification. Do not use:
   - Stainless steel bolts, unless otherwise noted on the equipment drawings
   - Old or rusted, untreated, mild steel bolts
   - Lubricated fasteners

   Use a torque wrench to assure proper torque on bolts.

   Model 438 (small drive): To fasten the small drive to the frame, torque the 1/2" (M12) bolts to 71 ft-lb (96 Nm) un-lubricated.

   Model 634 (large drive): To fasten the large drive to the frame, torque the 5/8" (M16) bolts to 143 ft-lb (194 Nm) un-lubricated.

Note

If your Iso-Drive is mounted with high tensile strength stainless steel bolts (17-4 PH), torque the 1/2" (M12) bolts to 58 ft-lb (79 Nm) lubricated, or the 5/8" (M16) bolts to 115 ft-lb (156 Nm) lubricated, using food grade anti-seize. To determine if your shaker is equipped with high tensile strength stainless steel bolts refer to the assembly parts list under Drive Components, or call Key Customer Service.

7. Prior to installing the weights, perform the following:
   A. Examine the weights to be sure they are identical. The size is stamped on each weight.
   B. Check the drive shafts and weights for rust or burrs. If necessary, clean them with a fine abrasive. When cleaning the shaft, buff out any grooves, using a circular motion; do not polish in lengthwise strokes.
   C. Apply a small amount of anti-seize compound to the shafts to ease future disassembly procedures.
   D. Check the keys for damage and replace, if necessary.
8. Push the weights all the way to the shoulder of the shaft to prevent off-center forces from occurring. Tighten the keeper setscrews and install the four external snap rings.
9. Rotate the weights manually and check all clearances (weights should rotate freely).
10. Attach the plastic weight guards to the Iso-Drive.
11. Attach the back panel of the drive guard to the guard bracket on the motor base.

12. Install and align the drive sheaves on the corresponding motor and drive shafts. On electric motors, install the variable-pitch sheave on the motor shaft.
13. Install and tension the drive belt.
14. Install the guard covers and restore power to the shaker.

Installing an Iso-Drive on a Dual Drive System

Tools/Supplies

- 18" to 24" steel straight edge
- Basic mechanic's tools
- Lock out tag and padlock
- Snap-ring pliers

To install an Iso-Drive on a dual drive system:

1. Referring to Figure 5-22, determine the mounting position of the drive for placement of the vent and plug.
2. Remove the plastic plugs and install the new vent fitting on the top end of the drive.
3. Install the 1/8" NPT pipe plug with thread sealer on the bottom end of the drive.
4. Fill the drive with Mobil 1® 5w-30 synthetic oil. Refer to Table 5-B for the amount of oil necessary.

> **Note**
>
> When a food grade lubricant is required, use Lubriplate® SFGO-68 manufactured by Fiske Brothers Refining Co. Agency qualifications: USDA H-1; meeting requirements of 21CFR 178.3570 "Lubricants with incidental food contact". Canadian approval applied for. Recommended oil change interval is identical to that for Mobil 1®.

5. Clean the Iso-Drive base and the drive plate mounting area on the frame. Both surfaces must be flat and free of any deformation (i.e. burrs, dents, or rust).
6. Attach the new Iso-Drive to the frame using new grade 5 bolts, nuts, and lock washers. Refer to the equipment drawings for bolt specification. Do not use:
   - Stainless steel bolts, unless otherwise noted on the equipment drawings.
   - Old or rusted, untreated, mild steel bolts
   - Lubricated fasteners

   Use a torque wrench to assure proper torque on bolts.

   Model 438 (small drive): To fasten the small drive to the frame, torque the 1/2" (M12) bolts to 71 ft-lb (96 Nm) un-lubricated.

   Model 634 (large drive): To fasten the large drive to the frame, torque the 5/8" (M16) bolts to 143 ft-lb (194 Nm) un-lubricated.

> **Note**
>
> If your Iso-Drive is mounted with high tensile strength stainless steel bolts (17-4 PH), torque the 1/2" (M12) bolts to 58 ft-lb (79 Nm) lubricated, or the 5/8" (M16) bolts to 115 ft-lb (156 Nm) lubricated, using food grade anti-seize. To determine if your shaker is equipped with high tensile strength stainless steel bolts refer to the assembly parts list under Drive Components, or call Key Customer Service.

7. Check the drive shafts alignment with a straight edge or a set of machined alignment sleeves. Realignment may be necessary if the jackshaft has been moved. If adjustment is needed, use shims and/or move the bearings accordingly. Contact Key Customer Service for tolerances or specific procedures. After each adjustment, check the alignment of the dual drives on both ends of the jackshaft.
8. Prior to installing the weights, perform the following:
   A. Examine the weights to be sure they are identical. The size is stamped on each weight.
   B. Check the drive shafts and weights for rust or burrs. If necessary, clean them with a fine abrasive. When cleaning the shaft, buff out any grooves, using a circular motion; do not polish in lengthwise strokes.
   C. Apply a small amount of anti-seize compound to the shafts to ease future disassembly procedures.
   D. Check the keys for damage and replace, if necessary.
9. Push the weights all the way to the shoulder of the shaft to prevent off-center forces from occurring. Tighten the keeper setscrews and install the four external snap rings.
10. Rotate the weights manually and check all clearances.
11. Slide the coupling bushings and flanges on the drive shafts.
12. Position the coupling bushings so they are 3/8" beyond the end of the shaft (Figure 5-16). Ensure the key stock fills the entire keyway slot on the Iso-Drive

shafts. The key must protrude out of the bushing to facilitate the use of the timing jigs.

13. Tighten the coupling bushing on the Iso-Drive drive shaft.
14. Perform the *Timing Dual Iso-Drive Units* procedure.
15. Attach the plastic weight guards to the Iso-Drive when applicable.

Timing Dual Iso-Drive Units With Perpendicular Fixture

Important

There are separate procedures for timing dual drives and close-coupled dual drives. Be sure to refer to the correct procedure.

When dual Iso-Drive units are installed, the two drives must be synchronized to impart oscillating motion simultaneously in like directions. Failure to synchronize the drives will result in erratic motion through the structure, causing inefficient product movement, premature arm spring failure, and possibly breakage of the structure. The frame width of the shaker determines the type of connection between the two drives.

Close-coupled: Used for all dual drive shakers with inside frame widths up to 54 5/8" (1387 mm) (Figure 5-16).

Jack Shaft: Used for all dual drive shakers with inside frame widths over 54 5/8" (1385 mm) (Figure 5-15). This design incorporates a jackshaft supported by block bearings to connect the two drives.

The following timing procedures address dual and close-coupled dual Iso-Drive units. The procedure for timing dual Iso-Drive units calls for two timing jigs of the same size, made to the specifications provided in Figure 5-23 and Figure 5-27.

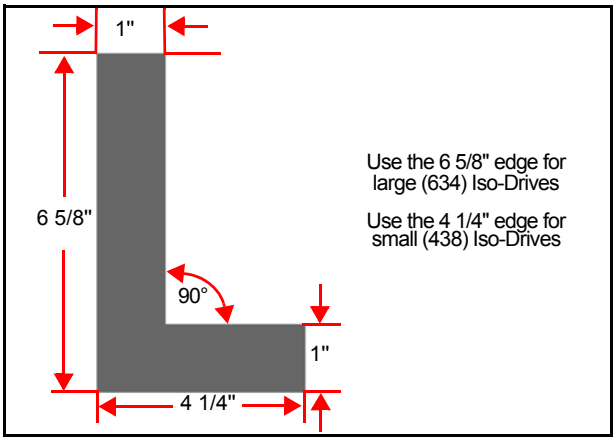

Figure 5-23 *Timing Jig Specifications*

Tools/Supplies

- Basic mechanic's tools
- Lock out tag and padlock
- Timing jigs

To time dual Iso-Drive units:

1. Turn off and lock out power to the shaker.
2. Assemble and tighten both flanges on the spacer coupling. Install the timing coupling, leaving one flange loose.
3. Using the timing jigs, rotate both drives until their keys are against the jigs. For multiple views of jig placement see Figure 5-24 (perpendicular) through Figure 5-27 (parallel). Ensure that both jigs are perpendicular to the drive plate.

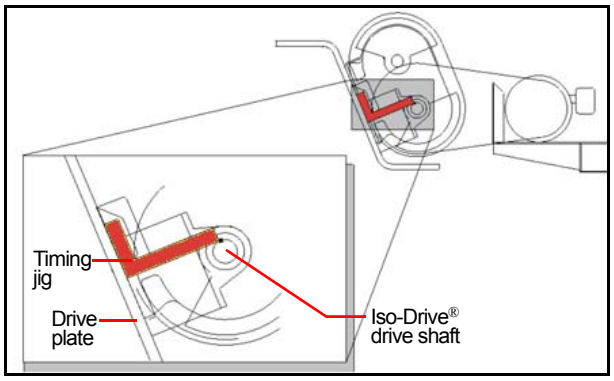

Figure 5-24 *Timing Jig Against Iso-Drive Drive Shaft Key—Dual Units*

4. While the shafts are in this position against the jigs, tighten the coupling bolts in the remaining flange. Remove the jigs and rotate the drives by hand. All drives should move freely and in unison, and the four weights on a given shaft of both drives should be at the same angle (i.e. the four top weights line up at the same angle and the four bottom weights line up at the same angle).

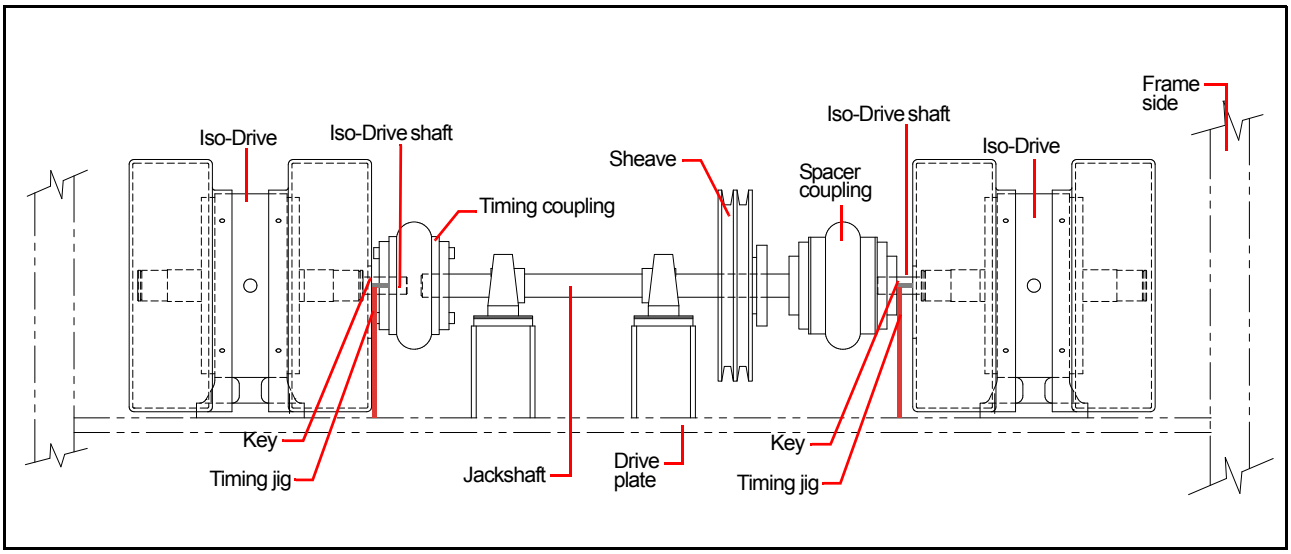

Figure 5-25 *Placement of Timing Jigs on Dual Drives*

Timing Dual Large Iso-Drive Units With Parallel Fixture

To time dual large Iso-Drive units:

Tools/Supplies

- Basic mechanic's tools
- Lock out tag and padlock
- Timing jigs

1. Turn off and lock out power to the shaker.
2. Assemble and tighten both flanges on the spacer coupling. Install the timing coupling, leaving one flange loose.
3. Remove the outside weights on both the left and right Iso-Drive units.
4. Rotate one drive at a time until the keys on the outside weight shaft are facing outwards and opposite of each other. Take the dual drive timing fixture (Figure 5-26) and slide it onto both shafts at the same time (Figure 5-27). This will hold each drive in the same position.
5. While the shafts are in this position, tighten the coupling bolts in the remaining flanges. Remove the fixtures and rotate the drives by hand. All drives should move freely and in unison. The four weights on a given shaft of both drives should be at the same angle (i.e. the four top weights line up at the same angle and the four bottom weights line up at the same angle.)

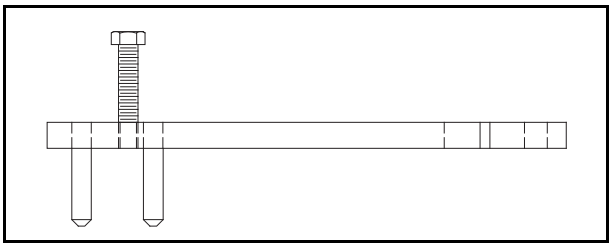

Figure 5-26 *Timing Jig, Key PN 432822.1*

Figure 5-27 *Timing Jig Against Iso-Drive Drive Shaft Key*

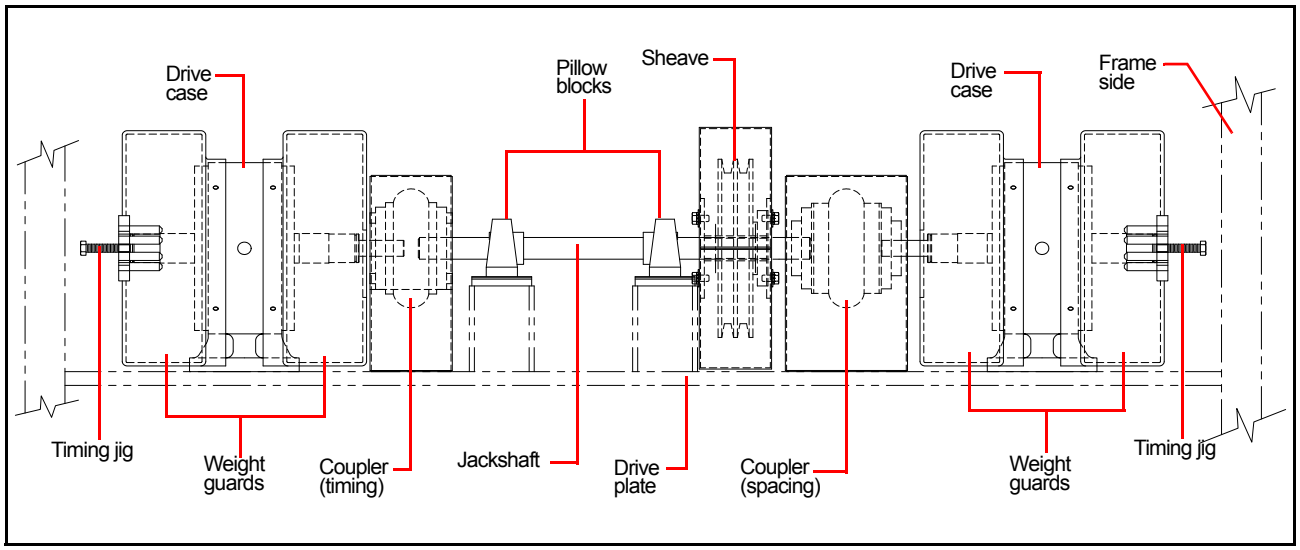

Figure 5-28 *Dual Iso-Drive with Timing Jig Placed*

Timing Close-Coupled Dual Drives

Tools/Supplies

- Basic mechanic's tools
- Lock out tag and padlock
- Timing jigs

To time close-coupled dual drives:

1. Turn off and lock out power to the shaker.
2. Install the coupling element and tighten all coupling bolts on the sheave side. Leave the coupling bolts opposite the sheave loose. Torque the bolts to 24 ft-lb (32.5 Nm) un-lubricated.
3. Insert the timing jigs as shown in Figure 5-28 or Figure 5-29. Ensure both jigs are perpendicular to the drive plate.
4. Tighten the coupling bolts opposite the sheave.
5. Remove the jigs and rotate the drives by hand. All drives should move freely and in unison, and the four weights on a given shaft of both drives should be at the same angle (i.e. the four top weights line up at the same angle and the four bottom weights line up at the same angle).
6. Replace all guards and restore power to the shaker.

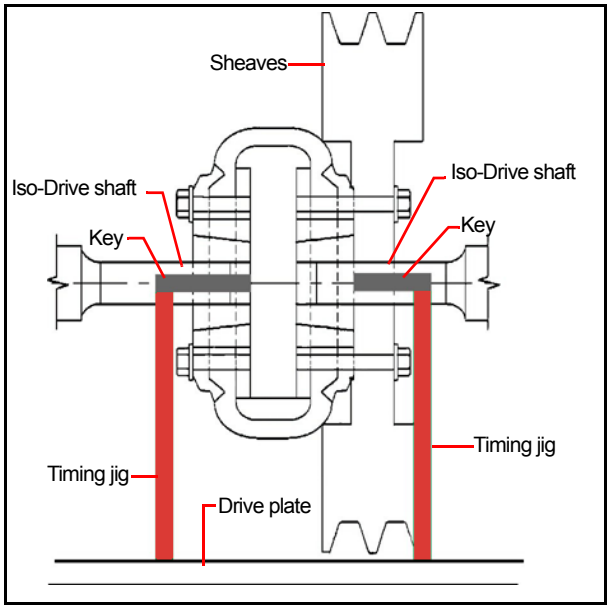

Figure 5-29 *Placement of Timing Jigs on Close-coupled Drives*

SHAKER BED REPLACEMENT

During bed replacement, you must use temporary steel set-up arms at each corner of the shaker. If the bed is over 12' long (3.6 meters), or of heavy construction, it may require additional set-up arms to prevent sagging in the middle. Set-up arms can be ordered from Key Technology Parts Sales, or you can make them on-site according to the specifications provided in Figure 5-32. In addition, you will need a transfer jig built, as specified in Figure 5-31. This can be made from the set-up arm shown in either Figure 5-31 or Figure 5-32.

Specifications for set-up arms:

- Dimensions on set-up arms are identical to arm springs
- Set-up arms shown can be used for 8", 10", 11", and 12" arms
- Suggested material is 1/2" x 2 1/2" MS CR Flat Bar, 12 mm x 60 mm MS CR for Key BV arms

Figure 5-30 *Arm Transfer Jig for Marking Arm Hole Locations -To Realign Beds With Bolt-on Arm Brackets, Key P/N 1077800*

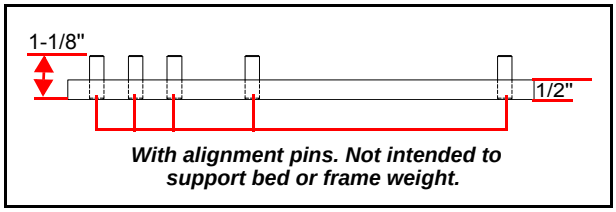

Figure 5-31 *Arm Transfer Jig- Key P/N 1077800*

- Tolerance of hole centers should be held to ± 1/64" (0.5 mm)

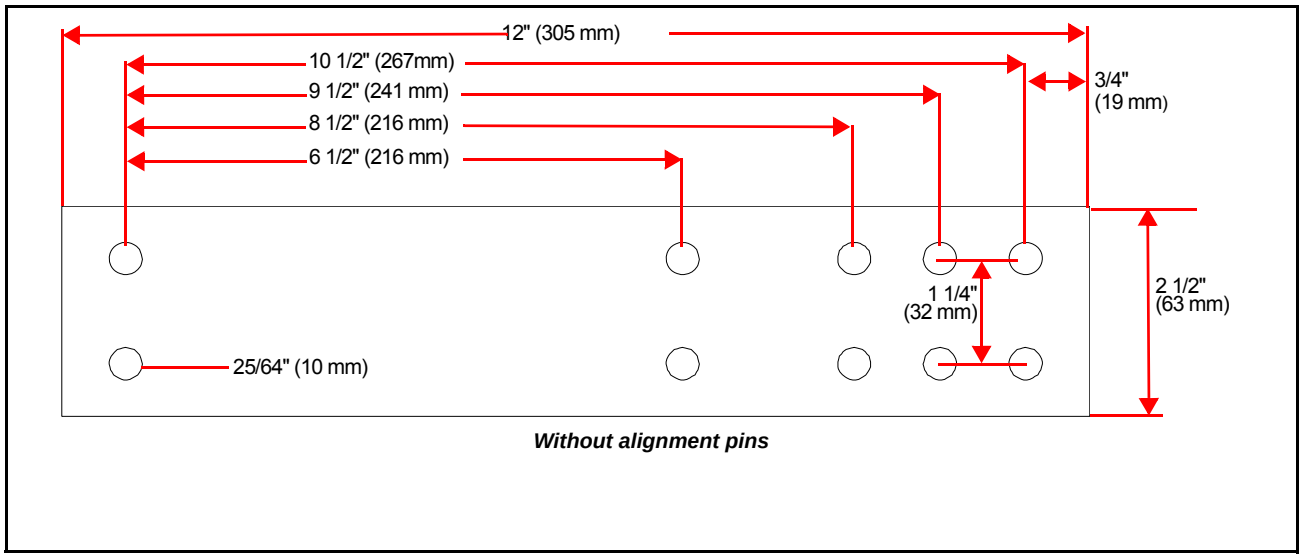

Figure 5-32 *Set-up Arm for Bed Replacement, Key P/N 429816.1*

Bolt-on Arm Bed Replacement

Tools/Supplies

- 4' straight edge
- Basic mechanic's tools
- C-clamp
- Drill and drill bits
- Grinder
- Lifting equipment
- Lock out tag and padlock
- Metal cutting disks
- Protractor or electronic level
- Set-up arms
- Support blocks
- Transfer jig
- Transfer punch
- Welder
- Equipment drawings

To replace an Iso-Flo bed with bolt-on arms:

1. Turn off and lock out power to the shaker.
2. When the replacement bed arrives at your plant, verify that the bed is correct. Compare the number of arms, arm locations, and dimensions of the original bed with the drawings supplied with the replacement bed.
3. Take off the old bed by removing all 1/2" (M12) arm bracket bolts. Remove all arm assemblies, phenolic shims and hardware.
4. Insert the new replacement bed onto the frame per the specified location noted on the new bed's supplied reference drawings. Level the bed and block up mid-section to prevent sagging.
5. Install the temporary set-up fixtures (Figure 5-32 and Figure 5-36). Two should be installed on the infeed corner frame brackets and two on the discharge end corner frame brackets. The fixtures are to be bolted to the back side/upstream side of frame bracket as shown in Figure 5-36.

⚠ CAUTION

Do not attempt to replace a bed without using steel set-up arms.

6. Bolt the infeed bed arm bracket to the set-up fixture, using the 3/8" (M10) bolts, according to the specification on the supplied drawings. Confirm that the bolt-on arm bracket is located on the back side/upstream side of the fixture. Tighten all bolts.

Important

Not all "T" style arm bracket bolt holes are symmetrical, and can be installed upside down (Figure 5-33 only).

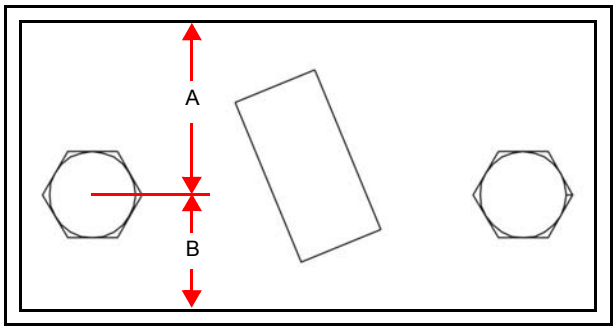

Figure 5-33 *Bolt-on Arm Bracket*

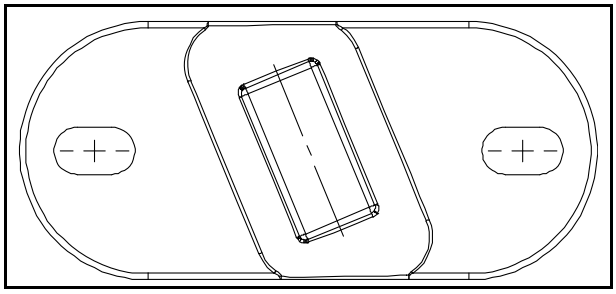

Figure 5-34 *New Style Bolt-on Arm Bracket*

7. Install the replacement bed by bolting the first arm bracket on the infeed end of the frame to the pre-punched hole in the bed. Confirm the location of this hole with the drawings supplied and the original bed. Repeat on the other side of the bed. Snug the bolts.
8. Referring to the equipment drawings, raise the discharge end of the bed to the specified height. Ensure that the bed is level and square within the frame (Figure 5-35).

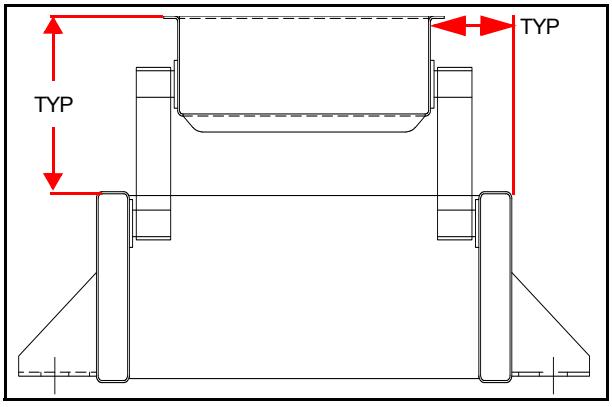

Figure 5-35 *Shaker Bed Square Within the Frame*

9. If the bed is over 12' (3.6 meters) in length or excessively heavy and sags, additional blocking may be necessary to maintain a level position. If so, an additional set of fixtures are required to be located to the mid-section. Procedures for installing fixtures to the mid-section apply the same as the four corners.
10. When the bed has been set in place and leveled and square within the frame check to be sure that the bed has been bolted to the infeed end starter holes (one only per side). Proceed to attaching the discharge end arm bracket:
    A. Bolt the discharge bed arm brackets to the set-up fixtures, as mentioned in item 6.

Important

The discharge end of the bed will <u>not</u> have pre-punched locator holes like the infeed end. It is <u>critical</u> that the correct height is maintained when blocking up the discharge end.

    B. Lay out hole placements for the two discharge end brackets (two per arm bracket). Also lay out the one remaining un-punched hole at the infeed end arm bracket. Be sure to use a 17/32" transfer punch, then circle the punch marks with a permanent marker.
    C. Remove the arm brackets and drill an 1/8" starter hole.
    D. Drill the final hole size using a 17/32" bit.
    E. Ream and de-burr all holes to ensure there are no remaining metal shavings.
    F. Reattach those same discharge end bed brackets to the set-up fixture and install to the bed using 1/2" bracket bolts. Tighten and torque to 55 ft/lbs.

Note

Leaving all set-up fixtures securely attached, proceed to the layout of the remaining bed arm brackets.

11. Clamp the transfer jig (Figure 5-30) to the back side of the frame arm bracket, taking care to use the correct arm size. Attach the bed arm bracket to the opposite end and the same side of the jig and clamp it in place.
12. Before transferring the layout marks for the holes to the bed, take care to use the correct arm brackets, right hand vs. left hand, and the correct orientation, bolt holes down per Figure 5-33. Compare to the four corner brackets and double-check placement with the supplied drawings.
13. Using the transfer jig (Figure 5-30), mark the correct placement of the remaining bed arm brackets for the holes to be drilled on the new bed. Be sure to use a 17/32" transfer punch and circle those same punch marks with a permanent marker.

14. Unclamp the transfer jig and leave the bed arm bracket with the matching frame bracket. Do not interchange bed brackets. After the frame and bed brackets are used to mark the bed, they are considered a set and must be used together.
15. Drill all holes using a 17/32" drill bit. Then ream and de-burr all holes to ensure there are no remaining metal shavings.
16. Use 1/2" (M12) bolts to attach the bed brackets to the bed. Leave bolts loose for now.
17. Assemble new arm springs, new shims and hardware. Refer to the equipment drawings of the new replacement bed for the exact location and quantities. Make sure all stainless steel bolts are lubricated prior to assembly.
18. Tighten 3/8" (M10) bolts to the frame first and then snug the 3/8" bolts to the bed bracket next. Note, the welded frame bracket dictates the alignment angle for the bolt-on bed bracket. Reference Figure 5-13 for proper alignment.
19. Tighten and torque the 1/2" (M12) bolts for the bed brackets to 55 ft/lbs (74.25 Nm) lubricated.
20. Tighten and torque all remaining 3/8" (M10) arm spring bolts to 25 ft/lbs (34 Nm) lubricated.
21. With all arm springs bolted and torqued to the bed and frame, replace the set-up arm fixtures with correct arm spring assemblies in the mid-section first, if applicable. Then install the arm spring assemblies at the four corners (one corner at a time). Torque the fasteners using the same sequence as in Steps 17-20.
22. Restore power and tune equipment to the designed specifications listed on the supplied replacement drawings. Note that the design specifications (speed/rpm's and stroke) may have change with the new bed vs. the older bed. Refer to the *Tune-up Procedure* at the beginning of this section.

Weld-on Arm Bed Replacement

Procedures for replacing weld-on arm beds vary. If the following procedure is unclear or does not pertain to your application, contact Key Customer Service for details on replacing a weld-on arm bed.

To replace an Iso-Flo bed with weld-on arms:

1. When the replacement bed arrives at your plant, verify that the bed is correct. Compare the number of arms, arm locations, and dimensions of the original bed with the drawings supplied with the replacement bed.
2. Turn off and lock out power to the shaker.

Tools/Supplies

- 4' straight edge
- Basic mechanic's tools
- C-clamp
- Grinder
- Lifting equipment
- Lock out tag and padlock
- Metal cutting disks
- Protractor or electronic level
- Set-up arms
- Support blocks
- Transfer jig
- Transfer punch
- Welder

3. Remove the old bed by removing the 3/8" (M10) arm bolts and arm springs from both the bed and the frame.
4. Clean all arm brackets on the frame.

Important

Clean away any substance build-up such as starch, ice, and any product debris. Ensure debris is not left in the bolt holes. Dirt and debris under spring arms and shims will cause misalignment and premature wear, and will shorten the life span of the spring arms and shims.

5. Insert the bed into approximately the correct position.
   A. For a bed above the frame configuration, place blocks and shims completely across the top of the frame to the correct height of the bed above the frame, then place the bed in position on the blocks.
   B. For a bed below the frame configuration, place blocks and shims completely across the top of the bed to the correct spacing below the frame. Hoist the bed until the blocks are snug against the frame and secure it in place with nylon straps.
   C. For a bed through the frame configuration (cantilever, dog leg, over/under), use the two methods described above.
6. Install the temporary steel set-up arms, two on the infeed corner frame brackets and two on the discharge corner frame brackets.

Note

If the bed is over 12' in length (3.6 meters), or if bed sags additional blocking may be necessary to maintain a level position.

Note

Requires 3/8" x 1-3/4" bolts. Only hand-tighten the bolts at this step.

CAUTION

Do not attempt to replace a bed without using steel set-up arms located at the four corners.

Always position the steel set-up arms on the back side (upstream side or infeed side) of the frame brackets. Insert the bolts through the steel set-up arms first, then through the frame brackets. The lock washers and nuts should be against the frame bracket and facing upwards to ensure the arm brackets are in the correct position (Figure 5-36).

Figure 5-36 *Proper Set-up Arm Attachment*

Important

The set-up arms must remain bolted in place until all other arm brackets and clips have been welded in position.

Use a set-up arm with locator pins to locate and tack weld all arm brackets and clips in position before final welding begins.

7. Referring to the equipment drawings, verify that the bed is evenly centered and in the correct location.
8. Referring to the equipment drawings, verify that the infeed and discharge ends of the bed are at the correct height.
9. Place straight edges across the infeed and discharge ends of the bed. Visually inspect the straight edges to verify that they are parallel, ensuring that the bed is not twisted or sagging at one corner.
10. Clean the mating surface of the bed and the bed arm brackets.
11. Bolt the bed arm brackets to the set-up fixtures.

Note

Requires 3/8" x 1-3/4" bolts. Only hand tighten the bolts at this step.

12. Referring to the equipment drawings, verify the position of the bed arm brackets.
13. Tighten all 3/8" x 1-3/4" bolts.
14. Clamp the arm brackets against the bed.
15. Tack weld the arm brackets to the bed at four evenly-spaced positions around the arm bracket (twelve o'clock, three o'clock, six o'clock and nine o'clock).

Note

Use the GTAW-S (TIG) process to make the tack welds with the following schedule:

- Wire Type: 308L
- Wire Size: .045" to 3/32"
- Gas: Argon, torch shielding
- Flow Rate: 15 to 25 cubic feet per hour
- Electrode Specification: Tungsten
- Gas Nozzle or Cup Size: .250" to .625"
- Position: All
- Amperes: 70A to 120A

16. Grind all tack welds flush and clean the area around the arm brackets.
17. Remove the clamps.
18. Finish welding the four corner arm brackets using a two-pass, equal-length weld technique (Figure 5-37).
    A. Make the first weld pass starting at the eleven o'clock position and ending at the five o'clock position.
    B. While the first half of the first weld is cooling, move to the opposite side of the bed and make the first weld pass on that arm bracket.

Note

A weld pass should never begin or end on a tack weld. Beginning or ending on a tack weld may result in a defective weld over time.

CAUTION

Read, understand and follow this welding procedure. Failure to follow this procedure will result in heat distortion and misalignment of arm brackets.

Important

Circular arm brackets require sequence welding per WLD-0003 standards. Use the GMAW-S (MIG) process as described in this procedure. This procedure applies only to beds manufactured with 304 stainless steel materials.

Note

Use water and air mist spray (preferred) or 1/2" thick copper chill bars on the back side of the weld (heat effective zone) as the weld progresses.

If correctly used, the spray cooling process will not allow any discoloration or heat marks on the back side of the base metal.

Copper chill bars will allow heat distortion and discoloration. Copper chill bars must be kept cool by dipping into water after each weld pass.

CAUTION

Be sure that no spray water comes in contact with the molten weld. If water or other contaminant comes in contact with the molten weld, the weld must be removed and replaced.

    C. While the first half of the second weld is cooling, move back to the first side of the bed and complete the second half of the first weld. Complete as much of this weld as possible without removing the set-up arm.
    D. While the second half of the first weld is cooling, move to the opposite side of the bed and complete the second half of the second weld.
    E. Repeat this procedure for the two arm brackets at the other end of the shaker bed.
19. Use a transfer jig (Figure 5-30) to position and tack weld all remaining arm brackets on one side of the bed. Begin at the infeed end of the bed and proceed toward the discharge end. Tack weld only at this step.
20. Use the transfer jig to position and tack weld all remaining arm brackets on the other side of the bed.
21. Use the two-pass welding procedure described above to complete welding the arm brackets. As there are no set-up arms to interfere with the welding process, these welds may be completed in entirety.
    A. Begin with the arm bracket closest to the infeed end of the shaker bed. Weld only the front (downstream) side of the arm bracket.
    B. On the same side of the bed, skip three arm brackets and weld only the front side of the fourth arm bracket.
    C. Continue to skip three arm brackets and weld the fourth until you reach the discharge end of the bed.
    D. Return to the infeed end of the bed and continue the "weld one, skip three" process until all arm brackets on one side of the bed are welded on the front side only.
    E. Move to the opposite side of the bed and weld the front side of all the arm brackets using the "weld one, skip three" process as described above.
    F. Move back to the first side of the bed and weld the rear (upstream) side of all the arm brackets using the "weld one, skip three" process as described above.

G. Move to the opposite side of the bed and weld the rear side of all the arm brackets using the “weld one, skip three” process as described above.

Note

Welding schedule for GMAW-S (MIG) process:

- Process Mode: Short Arc
- Weld Type: Fillet
- Position: All
- Wire Type: 308 LSI
- Wire Diameter: .035"
- Gas Type: Tri-Mix (90% He, 7.5% Ar, 2.5% CO_2)
- Flow Rate: 30 to 50 CFM
- Amperes: 135A to 150A
- Volts (arc): Synergic
- Travel: Downhill
- Base Metal and Thickness Range: 1.5" to 10 GA
- Weld Passed: Single pass only
- Weld Size: 3/16" +1/16" to -1/32"

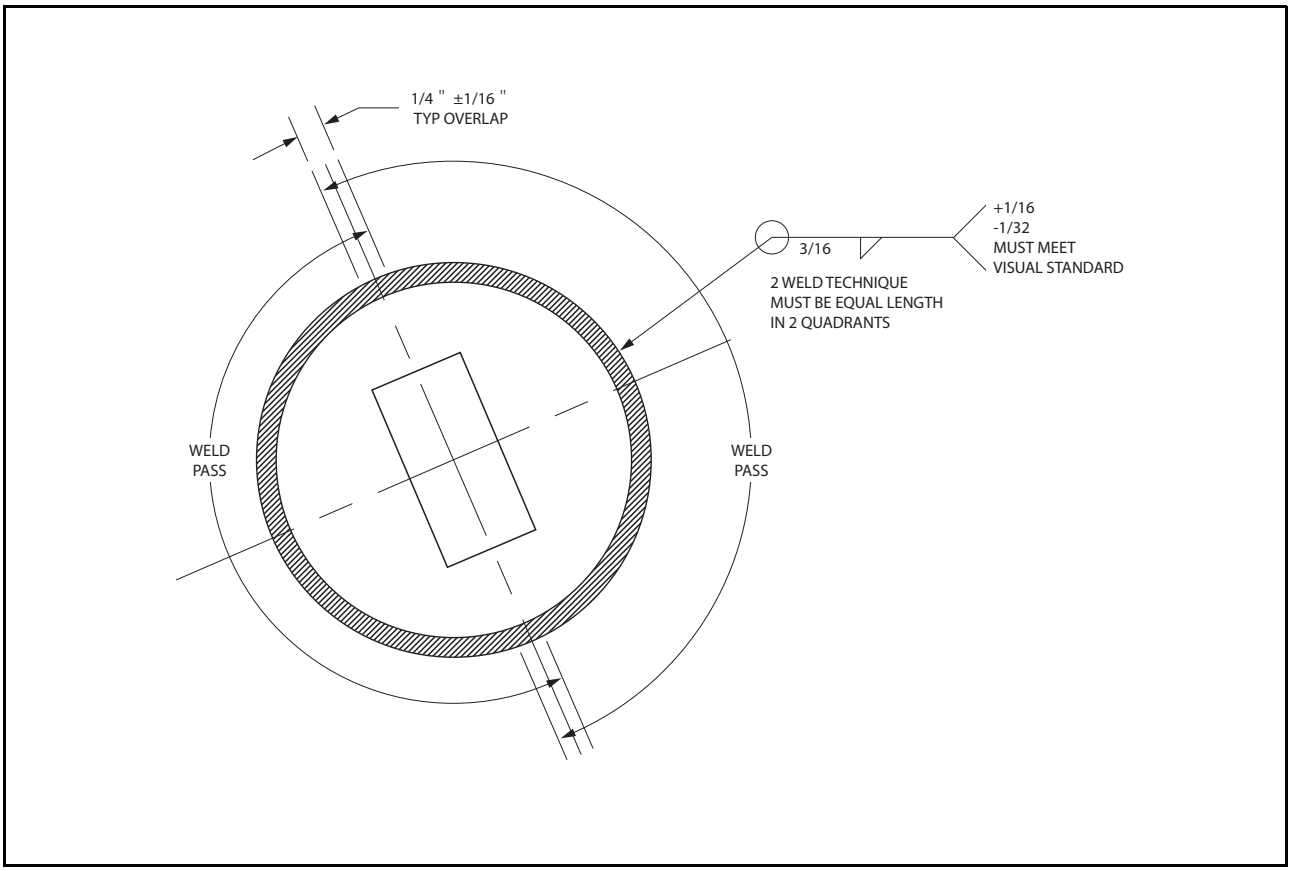

Figure 5-37 *Placement of Timing Jigs on Dual Drives*

22. Clean all welds and weld spatter from the weld areas, particularly the front and back of the arm bracket surfaces.

Important

Be sure to completely remove all weld spatter.

23. Referring to the equipment drawings, assemble the arm springs. See *Arm Spring Replacement* earlier in this chapter.

Note

Replace all bolts, nuts, flat washers, lock washers, phenolic shims and arm springs with new hardware.

A. Hand tighten all 3/8" (M10) bolts on all arm spring assemblies.

B. Snug all bolts with a wrench or socket and ratchet after all arm spring assemblies are in position.

C. Using a torque wrench, tighten all bolts to 25 ft. lb. (34 Nm), lubricated.

24. Remove the set-up arms and install arm spring assemblies one corner at a time.

A. Remove the set-up arm on one corner of the bed.

B. Finish the weld on the corner arm bracket.

C. After the weld cools, install the arm spring assembly as described above.

D. Repeat the set-up arm removal, welding and arm spring installation for each remaining corner.

25. Restore power to the shaker.

26. Perform the *Tune-up Procedure* described earlier in this chapter.

FRAME REPLACEMENT

During frame replacement, you must use temporary steel set-up arms at each corner of the shaker. If the bed is over 12' long (3.6 meters), or of light construction, it may require additional set-up arms to prevent sagging in the middle. Set-up arms can be ordered from Key Technology Parts Sales, or you can make them on site according to the specifications provided in Figure 5-32 and Figure 5-36. In addition, you will need a transfer jig built as specified in Figure 5-31. This can be made from the set-up arm shown in Figure 5-32.

CAUTION

Do not attempt to replace a frame without using steel set-up arms.

Tools/Supplies

- 4' straight edge
- Basic mechanic's tools
- C-clamps
- Grinder
- Lifting equipment
- Lock out tag and padlock
- Metal cutting disks
- Protractor or electronic level
- Set-up arms
- Support blocks
- Transfer jig
- Welder

To replace the Iso-Flo frame:

1. When the replacement frame arrives at your plant, verify that the frame is correct. Compare the number of arms, arm locations, and dimensions of the original bed with the drawings supplied with the replacement frame.
2. Turn off and lock out power to the shaker.
3. Remove the 3/8" (M10) arm bolts and lift the bed from the frame.

Important

Do not remove the bolt-on or weld-on bed arm brackets from the bed.

4. Remove and retain all frame drive components.
5. Remove the existing frame from the processing line.
6. Set the new frame into position.
7. Refer to the equipment drawing for new or additional spring replacements, replace as required.
8. Reinstall all frame drive components removed in Step 4.
9. Position the bed onto the frame.
10. Install the temporary set-up arms, two on the infeed corner bed brackets and two on the discharge corner bed brackets.

Note

The frame is supplied with the first two arm mounting brackets welded to the frame.

11. Bolt the infeed frame arm brackets to the set-up arms according to the specifications on the supplied drawings. Snug all 3/8" (M10) bolts.
12. Referring to the equipment drawings, raise the discharge end of the bed to the specified height. Ensure that the bed is level and square within the frame (Figure 5-35).
13. If the bed is over 12' in length (3.6 meters), or if bed sags, additional blocking may be necessary to maintain a level position.
14. Bolt the discharge end frame arm brackets to the set-up arms, one on each side.
15. When the bed is level and square within the frame, clamp the discharge arm brackets to the frame, and weld into place.
16. Using the transfer jig, position the remaining frame brackets. Clamp one end of the jig to the bed arm bracket clamping a frame arm bracket to the opposite end of the transfer jig.
17. Position the frame arm bracket to the correct arm length.

Important

Refer to the engineering drawings for the correct arm length.

18. Clamp the frame arm bracket against the frame and tack weld.
19. Position all remaining frame arm brackets on both sides of the frame and tack weld as described in the *Weld-on Arm Bed Replacement* section earlier in this chapter.
20. Using a MIG welder, finish welding the frame arm brackets into position.

Note

You must follow the welding procedure described in the *Weld-on Arm Bed Replacement* section of this chapter to provide adequate heat dissipation while welding. Not following the described procedure will cause the frame to bow resulting in arm mis-alignment and possibly the total loss of the frame.

21. Assemble the arm springs. Refer to the equipment drawings of the new frame for arm locations and quantities.
22. Snug all 3/8" (M10) bolts.
23. Torque all 3/8" (M10) bolts to 25 ft-lb (34 Nm) lubricated.
24. With all arm springs bolted and torqued to the frame and bed, replace the set-up arms with arm springs (one corner at a time). Torque the 3/8" (M10) bolts to 25 ft-lb (34 Nm) lubricated.
25. Restore power to the shaker.
26. Perform the *Tune-Up Procedure* described earlier in this chapter.

System Sanitation

Contents

System Sanitation

General Sanitation and Cleaning Instructions

SAFETY

Cleaning and sanitizing involves handling potentially hazardous chemicals. Familiarize yourself with the Hazard Communication Standard that is mandated by OSHA within the US. The HCS aligns with the Globally Harmonized System (GHS). The GHS is the global system for the classification and labelling of chemicals. Your company must provide Safety Data Sheet (SDS) documentation supplied by the Manufacturer. These SDS sheets list the physical and health hazards of chemicals.

Important

Always be sure to follow Manufacturers' instructions and warnings.

Your company's Hazard Communication Training provides the required Personal Protection Equipment (PPE) for the chemical detergents and sanitizers being used for sanitation.

Important

Always read the SDS and the labels on chemical containers.

1. Store chemicals in approved containers in a cool, well-ventilated area. Different classes of chemicals, e.g. acids, bases, oxidizers, etc. should be stored in separate areas, or on separate shelves.
2. Always wear your PPE, such as goggles, face shields, and respirators to protect against mists, vapors, and fumes that could potentially be harmful. Be sure to wear proper clothing, such as gloves, apron, and in some cases a full body suit to protect against caustic chemicals. Non-skid chemical-resistant footwear may also be required, as the floor can become very slippery with the use of detergents.
3. When using chemicals, always work in a well-ventilated area.
4. If a spill occurs, clean up the area immediately, as many chemicals are corrosive and can adversely affect surfaces.
5. Never mix chemicals unless instructed to do so by the Manufacturer.
6. Dissolve dry chemicals in cold water, not hot.
7. Clearly label chemical solutions. Identify the concentration and preparation date on the label.

WARNING

Read the label of all chemical solutions before using. You should never have to smell or taste a chemical to identify it.

8. Always shut down the machine prior to cleaning and sanitizing.
9. Rinse all equipment thoroughly with fresh, clean water after each use.

WHAT IS CLEANING?

- Manually removing product residue, debris, or coarse particles of dirt.
- Cleaning any surfaces which come into direct or indirect contact with the product.
- Pre-rinsing surfaces with potable water at the prescribed pressure and temperature.
- Scheduled washing with the recommended cleaning agents at the prescribed concentration, observing the correct contact time and temperature.
- Post-cleaning rinse of surfaces with potable water at the prescribed pressure and temperature.
- Scheduled sanitation with the recommended sanitizing agents at the prescribed concentration, observing the correct contact time and temperature.
- Post-sanitizing rinse of surfaces with potable water at the prescribed pressure and temperature.

Important

Stainless steel components should never be allowed to come into contact with iron. Cleaning with a steel brush and/or steel wool causes irreversible corrosion. In the event that corrosion does occur, it is important to counteract it as quickly as possible.

SYSTEM SHUTDOWN

1. Bypass product flow to the shaker and wait for all product to clear the machine.
2. Check to be sure that guards are present on all electrical components and bearings.
3. Wear appropriate protection PPE for skin, eyes and respiratory passages according to the SDS sheets of the detergent and sanitizer.

CLEANING FREQUENCY

Equipment cleaning should be performed prior to each use and after any use of 6-8 hours.

WHAT IS SANITATION?

- The removal and reduction of pathogenic microorganisms on a clean surface to safe levels.
- Food contact surfaces must be free of bacteria that may contaminate product.
- Any structures near the machine must also be kept free of bacteria that could contaminate equipment, tools, or employees.
- Non food contact surfaces must be clean and free of build-up and debris. If these surfaces are not sanitized biofilms can occur that can lead to cross contamination or environmental and incidental contamination.

STANDARD CLEANING METHOD

Important

If chemical products are used the applicable SDS sheets should be referenced, as well as the product labels.

Preparations

Before starting to clean, a number of preparatory steps must be taken:

1. All foodstuffs, raw materials and packaging materials must be removed from the production room.
2. If necessary, equipment must be partially or completely disassembled.
3. Remove product residue, debris, and coarse particles of dirt.

Pre-Rinse

1. Pre-rinse all parts with water then rinse thoroughly from top to bottom and in one horizontal direction from back to front, to avoid scattering of debris on surfaces that have already been pre-rinsed.
2. The pre-rinse is complete when all visual soil has been removed.

Important

Never direct a high-pressure nozzle at electrical components, control panels, valves, stroke indicator labels, all warning labels, and/or air parts. Preferably, reduce to mid-pressure, up to a maximum of 15 bars.

WARNING

When using high-pressure water for cleaning, aerosol conditions can occur. In an aerosol condition dirt, microorganisms and cleaning agents can be expelled into the air, creating a re-contamination of clean objects and unhealthy air quality.

Sanitizing

Important

Be sure to pre-rinse and clean the equipment prior to sanitizing.

All food-contact surfaces including surfaces of tools and equipment must be cleaned and sanitized as frequently as necessary to prevent unsanitary conditions and the adulteration of product

1. Sanitize all parts according to the chemical manufacturers instructions. Contact time can vary. The sanitizing solution should not be allowed to dry.
2. After sanitizing, the surface should be rinsed with an generous amount of clean potable water.

CLEANING AGENTS

Important

If chemical products are use, refer to the product labels and applicable SDS sheets for information and recommendations.

Cleaning

Alkaline agents are effective all-purpose cleaners, and are recommended for the cleaning process.

Sanitizing

For sanitizing, citric acid is recommended. Citric acid has been proven to kill bacteria, mold, and mildew and is an effective general disinfectant and cleaning agent. It has also been shown to remove soap scum, hard water stains, calcium deposits, lime, and rust. In addition, citric acid serves as a preservative in many cleaning solutions.

Sanitizer's that contain chlorine or iodine are not recommended. These halogens have an undesirable effect on the equipment and can lead to issues with corrosion.

The recommended concentration of sanitizer must be strictly followed. In practice, a surface will already be wet before sanitizing begins. This means that when the sanitizer solution is applied, a further dilution will occur. Allowance should be made for this fact when making up the solution.

Important

If cleaning takes an extended period of time with a weak concentration of sanitizer, there is a chance that microorganisms may start to adapt themselves to the agent causing it to lose its effectiveness. To prevent this resistance, it is advised to change sanitizer products at intermittent periods.

Non-Metallic Components

Cleaning agents containing acids (low pH-value) or lye (high pH-value) can have a negative affect on plastics.

Although careful selection of plastics has been made, plastics can become brittle and porous over time. This can lead to cracks and splits, which are difficult or impossible to clean adequately. This can result in remigration, i.e. the bacteria can start to creep through the cracks.

Equipment must be checked on a regular basis (at minimum every 6 months) for the integrity of all materials used.

Some Key Technology sorter conveyors have wear components incorporating polymers as follows:

- Belts of polyester, polyurethane or PVC
- Infeed rollers lagged with polyurethane

Most of the chemicals used for equipment cleaning and sanitizing eventually degrade the properties of polymers and reduce their useful life. The effect of chemicals containing chlorine on polyurethane is particularly severe.

Keeping equipment in a proper sanitary condition should always be the first priority. There are some measures that can be taken to maximize the life of the conveyor belt and roller lagging.

1. Advise your sanitation chemical supplier about the presence of any polymers. As appropriate, also be aware of polymers when mixing and applying sanitizer.
2. Before applying chemicals, using clear water, remove as much soil as possible. User water at the temperature specified by your sanitation and plant safety departments, not exceeding 140°F (60°C).
3. Be cautious not to mix sanitation chemicals to a concentration higher than the chemical supplier and your sanitation department recommend.
4. Do not leave cleaning and sanitizing chemicals on belts and rollers longer than the required time. Rinse thoroughly with clear water at the end of the specified time.
5. Strong acids such as hydrochloric, nitric or sulfuric acids should not come in contact with belts or roller lagging.
6. Solvents such as benzene, gasoline, MEK, trichloroethylene or turpentine should never be applied to belts or roller lagging. If belts and roller lagging develop greasy stains, use a soap solution and a soft scrub brush rather than using these solvents.

Troubleshooting

Contents

Troubleshooting

Troubleshooting Guide

Table 6-A

General Performance		
Symptom(s)	**Possible Cause**	**Recommended Action**
Arm spring failure	Stroke too high	Tune the shaker (p. 5-1)
	Rpm too high	Tune the shaker (p. 5-1)
	Loose arm or missing assembly bolts	Tighten or install bolts (p. 5-3)
	Warped metal backing plates	Replace backing plates (p. 5-6)
	Sand trapped between spring and backing plate	Disassemble, clean, and replace
	Missing phenolic shims	Install phenolic shims (p. 5-6)
	Incorrectly aligned arm mounts	Realign arm mounts
	Too few arm springs	Add arm springs (p. 5-7)
	Worn out arm springs	Replace arm springs (p. 5-7)
	Excessive operating temperature	Call Key Customer Service. See p. 2-1 for telephone numbers
	Broken isolation springs	Replace isolation springs
	Bed misaligned with frame	Align bed
	Improperly installed phenolic shims	Check installation and correct, if needed
	Extra weight attached or welded to bed	Remove added weight
	Operating equipment over maximum product capacity rates	Return equipment to recommended capacity rates
	Excessive product build-up	Clean bed, removing extra build-up, including ice and starch

Table 6-A

General Performance		
Symptom(s)	**Possible Cause**	**Recommended Action**
Cracks in bed or frame (if the Iso-Flo shaker bed or frame is cracked, contact Key Customer Service immediately for repair instructions)	Operating at excessive stroke	Tune the shaker (p. 5-1)
	Broken or incorrectly aligned isolation springs	Realign or replace isolation springs
	Stationary weight added to shaker	Remove added weight
	Running with loose screens or clamps	Tighten or replace clamps (p. 4-3)
	Frame movement, in excess of 3/32"	Tune the shaker (p. 5-1)
	Incorrectly aligned gates	Realign gates
	Bed is making contact with mating equipment	Mating equipment clearances must be maintained
	Running with loose gates or diverters	Adjust to prevent loose or rattling components
	Incorrect drive weights	Install correct size drive weights
	Isolation thru-bolts making contact with supports	Center up the adjustment of the thru-bolts, placing them in the center of the hole
	Broken or mis-aligned mounts	Repair damaged mounts, or replace
	Modifications to the bed or frame have been made without Key Engineering approval	Contact Key Engineering
	Rigid utility connections to frame or bed	Relocate conduit or install flexible conduit
	Over capacity of product	Operate at designed product capacity listed on equipment drawings

Table 6-A

General Performance		
Symptom(s)	**Possible Cause**	**Recommended Action**
Frame movement	Rigid utility connection to frame	Remove rigid connection
	Incorrect arm spring placement or type	Replace arm springs (p. 5-7)
	Loose or incorrect support structure	Refer to *Floor Support Pedestals and Columns* (p. 3-2)
	Stationary weight has been added to the bed, causing the center of gravity to be offset	Remove added weight
	Increase or decrease in motor's rpm	Tune the shaker (p. 5-1)
	Iso-Drive® gears out of time	Refer to the Iso-Drive® Service Manual
	Loose or changed drive parts	Refer to the Iso-Drive® Service Manual
	Modified, twisted, or broken frame	Call Key Customer Service. See p. 2-1 for telephone numbers
	Other vibrating equipment touching the machine	Refer to *Proximity, Space, and Clearance Requirements* (p. 3-2)
	Buildup of product on bed	Clean bed (p. 4-7)
	Dual EVM drive rotation incorrect	Wire motors so that drive motor rotations are opposite (p. 3-12)
	Incorrect isolation spring location	Refer to the equipment drawings
	Isolation spring adjustments making contact with supports	Center the bolts in the mounting holes
Isolation spring failure	Spring not aligned properly between mounts	Refer to *Installation and Startup* (p. 3-6)
	Wrong size spring	Replace isolation spring (p. 3-7)
	Corrosive environment	Call Key Customer Service. See p. 2-1 for telephone numbers
	Stall frequency too low	
	Excessive frame movement	Tune the shaker (p. 5-1)
	Other vibrating equipment moving frame support	Refer to *Proximity, Space, and Clearance Requirements* (p. 3-2)
	Incorrect location of springs	Refer to the equipment drawings
	Bed or frame making contact with mating equipment	Adjust distance between mating equipment to maintain 1 1/2" of clearance between mating equipment
	Improper loading (most common with ceiling mounted equipment)	Make adjustments to correct loading. Confirm correct type and color of isolation spring

Table 6-A

General Performance		
Symptom(s)	**Possible Cause**	**Recommended Action**
Product bouncing in spots	Loose screens or broken bed	Tighten clamps, replace bed (p. 4-3, 5-17)
	Bed flat bars broken	Weld
Product moving erratically	Iso-Drive® gears out of time	Refer to the Iso-Drive Service Manual
	Unsynchronized dual drives	Refer to *Timing Dual Iso-Drive Units* (p. 5-14)
Vertical product build-up, product not conveying	Improper wiring. Motor(s) may not be working properly and/or energized.	Refer to proper wiring of stacked drives in the Engineering drawings. Verify that both motors are energized and operational.
Rattling noise	Loose clamps, screens, gates, diverters or arm springs	Tighten or replace arm springs and clamps (p. 4-3, 5-4)
Stroke different on opposite sides of the frame or orbital rearing	Dual drives not timed properly	See *Timing Dual Iso-Drive Units* (p. 5-15)
	Spring rate discrepancy: • A combination of good and bad arm springs • Wrong arm spring replacements	Refer to the equipment drawing, some designs require more arm springs on one side
	Frame or cross tubes cracked	Repair cracks, find root cause of cracks and correct
Stroke too high	Arm springs softened, worn, or fractured	Replace arm springs (p. 5-6)
	Loose or damaged arm springs	Replace arm springs (p. 5-6)
	Rpm too high/VFD exceeds frequency rate	Adjust drive sheave outward. Refer to *Drive Belt Replacement* (p. 5-9)
	Weight attached to bed	Remove added weight
	Oversized weights may be installed.	Change Iso-Drive weights. Refer to the *Iso-Drive Service Manual*
	Overloaded shaker	Adjust product capacity
	Dual electric vibratory motor drive weight setting too high	Adjust drive weight setting per equipment drawings
	Buildup of product on bed	Clean bed (p. 4-7, 6-1)
	Wrong type or incorrect number of spring arms	Confirm spring arm type and/or number needed, then install or correct
	Loose, broken, or missing arm spring bolts	Tighten or replace bolts

Table 6-A

General Performance		
Symptom(s)	**Possible Cause**	**Recommended Action**
Stroke too low	Loose drive belt	Tension the drive belt (p. 5-10)
	Rpm too low. VFD or PLC may note be at design settings	Adjust drive sheave inward. Check the drive belt placement. Refer to the *Drive Belt Replacement* section of this manual (p. 5-9)
	Iso-Drive in disrepair	Refer to the Iso-Drive Service Manual
	Incorrect number of arm springs	Remove arms (p. 5-5)
	Broken or failed arm springs	Replace all arm springs (p. 5-6)
	Dual electric vibratory motor drive weight too low	Adjust drive weight setting per equipment drawings

Iso-Flo Operating Characteristics

BED

1. Increase in bed weight will increase stroke and change frame movement.
2. Decrease in bed weight will decrease stroke and change frame movement.

SPEED/RPM

1. Increase in rpm will increase stroke and change frame movement.
2. Decrease in rpm will decrease stroke and change frame movement.

ARM SPRINGS

1. Increase in total arm springs will decrease stroke and change frame movement.
2. Decrease in total arm springs will increase stroke and change frame movement.

ISO-DRIVE

1. Increase in drive weights size will increase stroke and change frame movement.
2. Decrease in drive weight size will decrease stroke and change frame movement.

Appendix

Appendix

Iso-Flo® Shakers with Hydraulic Drive

DANGER

Turn off and lock out the power source prior to performing shaker or hydraulic drive maintenance.

COMPONENTS

Hydraulic drive motors may be mounted directly to the Iso-Drive® input shaft, or separately connected with a V-belt.

CONTROL VALVES

A hydraulic motor must have its speed controlled by a pressure-compensated flow control valve. The valve must assure flow accuracy of ± 2 to 3 percent, with minimal pressure drop. These should be lockable types located close to the hydraulic motors.

Hydraulic motors can be started and stopped by a quick-acting, manually operated open/close lockout valve. Locate the valve near the motor with easy access so it can serve as an "emergency shut-off" valve for each motor.

SHAKER SPEED CONTROL

The speed and stroke of an Iso-Flo shaker is based on the system's design. The design stroke is stenciled on the shaker frame.

In a hydraulic system, it is essential that the correct design rpm is maintained to within 30 rpm. Otherwise, damage may occur to the arm springs or the bed. The use of a flow control valve will assure that over-stroke does not occur.

If the operation of upstream or downstream equipment will affect hydraulic flow and pressure to the shaker, isolate it from the rest of the hydraulic system.

DAILY INSPECTION

Check the Iso-Flo equipment for signs of wear or damage. Damage to vibrating equipment can progress quickly. Key recommends immediate repair of any problems discovered.

For daily inspection of the Iso-Flo shaker:

1. Visually monitor the equipment stroke. Operate only at the designed stroke specified on the cover sheet of the equipment drawings. Refer to the *Design Stroke* section in the Introduction of this manual.

Note

As stroke increases beyond 1/16" of designed "max stroke", add arms to the equipment to maintain the original design stroke.

2. Inspect for product build-up. This can create product flow issues and can result in over-stroking due to excessive added weight.
3. Look for compression on the isolation springs. See Table 3-C and Table 3-D for specifications.
4. Inspect the frame for excessive motion during normal operation. 1/32" (1mm) in frame movement is acceptable.

Important

Do not exceed the 1/16" frame movement recommended for the Iso-Flo shaker.

5. Inspect for oil leaks from the Iso-Drive and gear boxes, if applicable.
6. Listen for any unusual noise. Screens, gates and diverters should not be allowed to rattle.

Iso-Flo® Shakers with Horizontal EVM Drive

Figure 8-1 *Horizontal Electric Vibratory Motor (EVM)*

DRIVE INSTALLATION TOOL

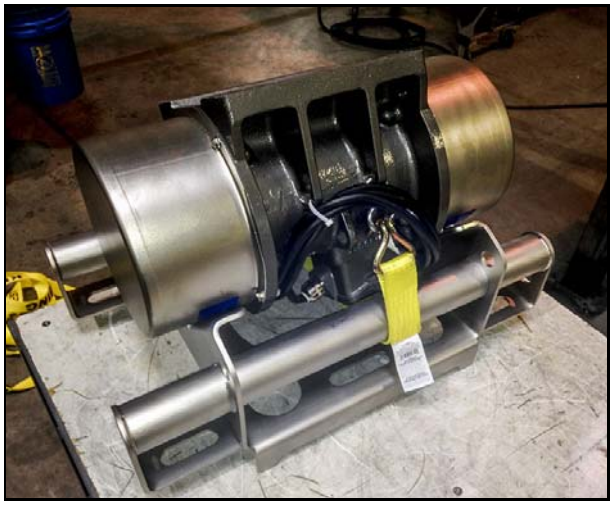

Figure 8-2 *Drive Installation Tool with Drive Attached*

The mounted position of the EVM drive provides an awkward position for installation and removal. The drive installation tool is designed to install and remove EVM drives easily, and provide several lifting options.

Tools/Supplies

- Basic mechanic's tools, standard and metric
- Standard rigging equipment

There are three ways to lift the drive in the installation tool:

1. Lifting with a forklift
2. Lifting with a jack
3. Lifting with a jack, using attached rigging and clevises.

Lifting with a Forklift

To lift the drive installation tool and drive with a forklift:

1. Inspect all rigging, lifting devices and hardware. Verify that these items are load rated for this application, and in good condition.
2. Place the forks of the forklift in the space allotted for this form of lifting (Figure 8-3).

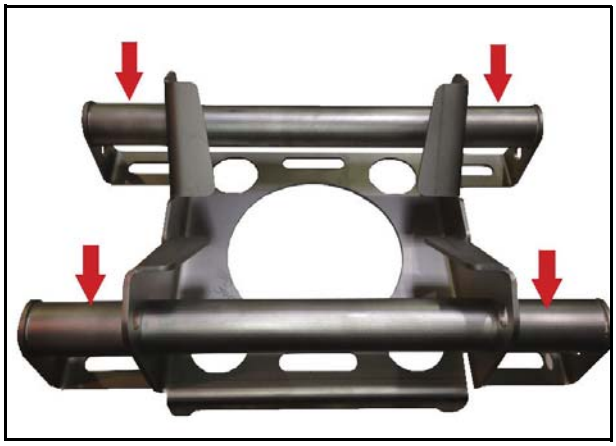

Figure 8-3 *Lifting Location for Forklift Forks*

3. Confirm that the drive installation tool is properly seated on the forks before lifting the device.
4. Prior to lifting or lowering a drive with the drive installation tool, confirm that the drive is securely fastened.
5. The drive installation tool can now be used to safely install or remove a drive.

Lifting with a Jack

To lift the drive installation tool and drive with a jack:

1. Prior to lifting the drive installation tool, inspect all rigging, lifting devices and hardware to assure they are load-rated for the given application and in good condition.
2. To use a jack for lifting, place the drive installation tool safely on the jack.

⚠ CAUTION

Be sure that the drive installation tool is safely placed, and will not fall or tip during operation. Rigging may be necessary.

3. Prior to lifting or lowering the drive, confirm that the drive is safely secured to the drive installation tool (Figure 8-2).
4. The drive installation tool can now be used to safely install or remove a drive.

Lifting from Above with Rigging

To lift the drive installation tool and drive from above with rigging:

1. Prior to lifting the drive installation tool inspect all rigging, lifting devices and hardware and confirm that all items are load-rated for the given application, and in good condition.
2. Attach lifting clevises to the four designated lifting points on the installation tool (Figure 8-4).

Figure 8-4 *Drive Installation Tool with Clevis at Lifting Point*

3. Attach the rigging to the clevises, and confirm that the installation tool will be lifted in a level orientation.
4. If the drive is to be installed or removed from a spot where the original lifting eyes cannot be utilized, extensions may need to be inserted at the forklift lifting points (Figure 8-5).

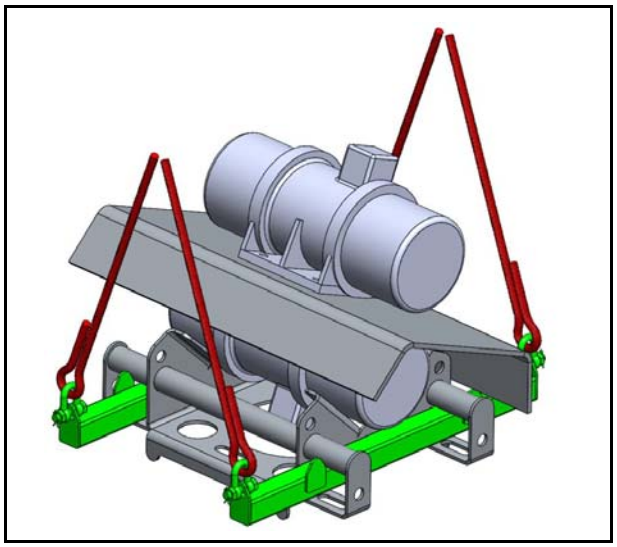

Figure 8-5 *Drive Installation Tool with Lifting Extensions Inserted at Forklift Lifting Slots*

5. Prior to lifting or lowering any drive, confirm that the drive is safely secured to the installation tool (Figure 8-2).
6. The device can now be used to safely install or remove drives.

START-UP PROCEDURE

When the EVM drives begin to speed up, they will work to sync with each other. The vertical forces conveyed to the shaker as the drives are working to speed up will create a startup "hop" in the vertical direction of the drive.

To avoid this "hop" it is important that the following startup procedure is followed. The solution is to align the drive weights opposite one another so that no extraneous forces are passed to the system. To accomplish this, the drive start times are staggered by a timer, one for each drive.

It is preferable to run the drives on an inverter to allow for shaker tuning and to stop the drives quickly. Using the inverter to slow down the drives also keeps them from exciting the low frequency modes of the system during shutdown.

To start up the Iso-Flo Shaker:

1. Make all repairs noted in the daily inspection.
2. Restore power to the Iso-Flo shaker.
3. Upon run signal to the inverter, power is directly supplied to motor one from motor starter one.
4. Simultaneously the on-delay timer is started.
5. When the delay time has expired, start motor two.
6. When the stop signal is heard, the inverter will break both motors evenly. Reference wiring diagram 1074718, included in your drawing set
7. Listen for any unusual noise. Notify maintenance personnel if you cannot determine the cause and correct the problem.
8. Monitor the stroke at least once per shift.

Equipment Inspection

DAILY INSPECTION

Check the Iso-Flo equipment for signs of wear or damage. Damage to vibrating equipment can progress quickly. Key recommends immediate repair of any problems discovered.

For daily inspection of the Iso-Flo shaker:

1. Visually monitor the stroke. Operate only at the designed stroke specified on the cover sheet of the equipment drawings. Refer to the *Design Stroke* section in the Introduction.

> **Note**
>
> As the stroke increases beyond 1/16" of designed stroke, add arms to maintain the stroke.

2. Check for product build-up. This creates product flow issues and can result in over-stroking due to excessive added weight.
3. Inspect the isolation (coil) springs for compression. See Table 3-C for specifications.
4. Observe the frame in motion to be sure there is no excessive movement during normal operation. 1/32" (1mm) in frame movement is acceptable. Be sure not to exceed 1/16" in frame movement.
5. Check for oil leaks from the Iso-Drive/Gear Boxes, if applicable.
6. Listen for any unusual noise. Screen, gate and diverter should not be allowed to rattle.

WEEKLY INSPECTION

Check the Iso-Flo equipment for signs of wear or damage. Damage to vibrating equipment can progress quickly. Key recommends immediate repair of any problems discovered.

For weekly inspection of the Iso-Flo shaker:

1. Confirm the designed operating speed of the bed. Operate within 30 rpm's of the specification found on the cover sheet of the equipment drawings.
2. Check the clearance of the mating equipment. A distance of 1.5" must be maintained for starting and stopping.
3. Inspect the bed, frame, and support structures for possible damage.
4. Confirm proper tension of screen clamps, if applicable.
5. Inspect fiber arm springs for cracks, delamination or damage. See Figure 5-7 through Figure 5-11 for specifics.
6. Inspect the ground strap for proper connection.
7. Perform the tasks found in the *Daily Inspection* list in addition to this weekly list.

MONTHLY INSPECTION

Check the Iso-Flo equipment for signs of wear or damage. Damage to vibrating equipment can progress quickly. Key recommends immediate repair of any problems discovered.

For monthly inspection of the Iso-Flo shaker:

1. Inspect all bed components, including the slide gates, flip gates, drop-out chutes, diverters, wear strips, hold-downs, cylinders, valves, pressure settings, pressure tensions, screens and screen pockets.
2. Check the drive belts for wear and tension, if applicable/required.
3. Verify that the drive weight and motor belt guards are in place, secured, and undamaged.
4. Grease all bearings and fittings, if applicable.
5. Confirm all electrical connections are tightly secured and sealed.
6. Inspect isolation spring assemblies, hex bolts and jam nuts (Figure 3-9).
7. If overhead ceiling supports have been used, refer to Figure 3-10 through Figure 3-12, then inspect all thread, eye bolts, turnbuckles, jam nuts and safety cables.
8. Perform the tasks found in the *Daily Inspection* and *Weekly Inspection* lists, in addition to this list.

ANNUAL INSPECTION

Check the Iso-Flo equipment for signs of wear or damage. Damage to vibrating equipment can progress quickly. Key recommends immediate repair of any problems discovered.

For the annual inspection of the Iso-Flo shaker:

1. Change oil in the Iso-Drives. See Table 5-B for quantity.
2. Replace the drive belts. Confirm sheave, motor alignments, and belt tension.
3. Re-torque the drive bolts. See the *Iso-Drive Maintenance* section in the Maintenance chapter of this manual.
4. Checking the timing of the dual drives (Figure 5-27).
5. Inspect and measure compression of the isolation coil springs (Table 3-C).
6. If equipped with EVM drives, remove covers and verify weight settings. Refer to the drawing cover sheet for designed settings.

7. Thoroughly inspect the arm springs. Re-torque 3/8" (M10) bolts to 25 ft/lbs, lubricated.

Important

Do not over-torque. Any arm springs that are delaminated, fractured, or cracked will need replacement. If one arm spring is damaged, all arm springs and shims will need to be replaced, not just the damaged items. If the full set of arm springs is not replaced, premature weakening of the new arms can occur, resulting in increased stroke and excessive frame movement.

Important

Driving the bolts into position will damage the arm springs. Bolts should be inserted into position and moved in the holes, without binding. If bolts are binding the position of the bolts should be reviewed and adjusted.

SOUND MEASUREMENT REPORT

Machine measured: Iso-Flo

Date: April 2, 2014

MEASUREMENT PARAMETERS

Instrument Used: AMPROBE SM-20-A (Serial #10040082). Measurements were taken following the measurement guidelines in the Machinery Safety Directive, 89/392/EEC, Annex 1, Part 1.7.4(f), and as amended by Directive 91/368/ECC.

READING POSITIONS

The sound level meter was placed at a height of 1.6m above the floor with the machine resting in its normal position on the floor. The machine was located inside the Walla Walla manufacturing building in the shaker assembly area. Measurement positions are listed in Table A below.

1. 1m from infeed end of machine
2. 1m from right side of machine
3. 1m from left side of machine
4. 1m from discharge end of machine

Machine State at Time of Readings

A. Shaker Running

Table A

Reading Values				
	1	**2**	**3**	**4**
A	73	73.7	74.4	74.3

Glossary

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Glossary

Glossary of Technical Terms

Arm springs	Connect the bed to the frame and deliver the driving force from the frame
Bed	Conveys the product as a result of frequency, magnitude, and direction of vibration
Design speed	The speed (rpm or Hz) of the unit is the “design speed”
Design stroke	The design stroke is the stroke of the bed when the shaker is running at design speed
Drive motor	Powers the Iso-Drive®
Dual Iso-Drive	Attaches to the frame and provides the linear vibrating force for the system
Fasteners	Used to connect screens to Iso-Flo® shaker beds
Frame	Provides the structural support for the unit
Iso-Drive	Attaches to the frame and provides the linear vibrating force for the system
Isolation springs	Springs that support the frame on the support pedestals and isolate most of the vibration to the Iso-Flo
Option	Component(s) for a specific application in addition to or in place of the standard Iso-Flo components
Phenolic shim	Used between the arm springs, arm brackets, and backing plates to shield the arm from damage
Prism clamp	Used to connect screens to Iso-Flo shaker beds
Screens	Installed on some shaker beds for a variety of purposes such as sorting, grading, and dewatering
Split-screen Clamp	Used to connect screens to Iso-Flo shaker beds
Support pedestals	Pedestals secured to the plant floor to support Iso-Flo equipment
Stroke indicator	A decal that acts as a gauge for determining the shaker’s stroke
Toggle clamp	Used to connect screens to Iso-Flo shaker beds
Vector-Lock™ or Vector-Lock PRO clamp	Used to connect screens to Iso-Flo shaker beds
Vibratory motors	Attaches to the frame and provides the linear vibrating force for the system

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Original English Version

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10/26/2016

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