TECHNICAL BULLETIN: **M/L-607**

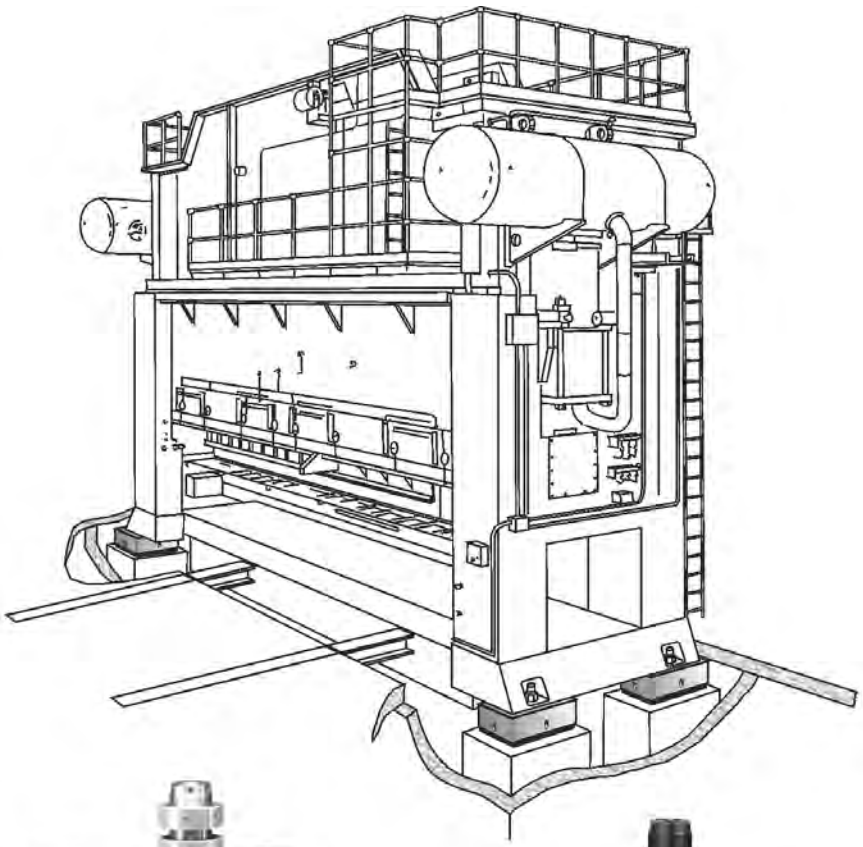
INSTALLATION INSTRUCTIONS FOR HEAVY PRESSES USING BFM™, HLM™, MXL™ and HXL™ SERIES MICRO/LEVEL® ISOLATORS

Vibro/Dynamics Machinery Mounting Systems are an investment in productivity and efficiency. To realize the full potential of your investment, familiarize yourself with this installation manual before designing and constructing your foundation and installing your press.

Case Studies have shown that the manner in which a press is installed has a significant effect on its performance and life. Results have shown that the four conditions necessary for successful, high performing, press installations are:

- Press bed in one plane (level)
- Precise alignment and parallelism of press structure
- Proper support
- Effective control of vibration

Micro/Level Isolators make it possible to quickly achieve all of these conditions with a high degree of precision. Presses installed on Micro/Level Isolators will produce high quality, repeatable, parts with minimum wear and tear on tooling and press components. Downtime, noise and vibration are greatly reduced and productivity and efficiency dramatically increased.



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Section I
DESCRIPTION OF MICRO/LEVEL® PRESS ISOLATORS

Micro/Level Isolators are custom engineered and configured for every press installation. When making isolator recommendations, Vibro/Dynamics Application Engineers look at a press' structure and drive design, its speed, stroke, and type of job (i.e., forming, blanking) to select the best isolator for the installation and the surrounding environment. This type of analysis assures that the press is properly supported and provides the optimum in vibration and structure-borne noise control.

Vibro/Dynamics Series BFM, HLM, MXL, and HXL Micro/Level Press Isolators are available in numerous sizes and load ranges for presses weighing from 50,000 lbs. to over 5,000,000 lbs. The MXL and HXL isolators feature our patented, multi-layered, modular resilient cushion configuration, allowing even more effective vibration isolation than single layer models. Our patented Hydra/Level® hydraulic-assist feature is available in the Series HLM and HXL isolators, making leveling and aligning your press even faster. All Micro/Level Isolators have the following components:

- A neoprene resilient cushion designed to provide the best combination of isolation effectiveness and machine stability. The cushions are designed and compounded to have a long effective life and are highly resistant to oils and lubricants.
- An internal heavy-duty steel bearing plate to evenly distribute the weight and dynamic forces over the entire area of the resilient cushion.
- A high strength support housing to properly support the press foot.
- A high strength leveling screw to precisely adjust the isolator height and to secure the isolator to the press foot. The isolator height adjustment provides the means to level the press, to fine-tune the support of the press structure, to reduce residual bending and twisting moments in the press and to compensate for differences in the foundation pier heights.
- A lock nut (hex or spanner) to secure the isolator to the press foot. One or two nuts are supplied depending on the diameter. (See Section II - Tables 3 and 4 and Figure 3).
- Four interlock and alignment indicator bolts or pins, one on each of the four sides of the isolator. *(Note: Do not remove or adjust these bolts or pins).*
- Press foot securing bolts to secure the press foot to the isolator. These bolts are not used for leveling. See Figure 4 for securing bolts layout pattern.
  (Supplied with BFM Series 48 & larger and MXL Series 35 and larger.)

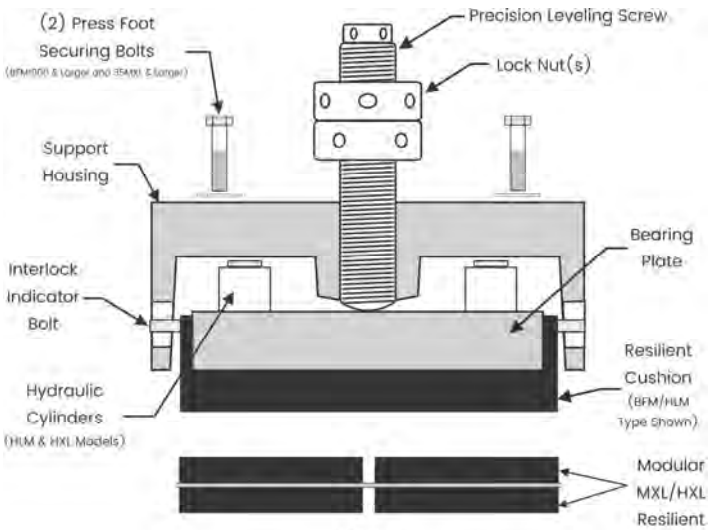


FIGURE 1
(Cutaway Side View)

Section II
MICRO/LEVEL® ISOLATOR SPECIFICATIONS

The "Series" number listed in the first column of Tables 1 and 2 represent the general isolator size category. Within each series or size, there are a number of different models. Use the following tables to determine which series and size you have and its specifications.

TABLE 1 – SERIES BFM AND HLM ISOLATOR DIMENSIONS

SERIES	MODEL*	NOMINAL DIMENSIONS (inches/mm)					APPROXIMATE SHIPPING WEIGHT	
		"W" WIDTH	"D" DEPTH	"H" LOADED HEIGHT				
				MINIMUM	MAXIMUM	ADJUSTMENT	LBS.	KGs.
20	BFM1340	20.5" 521 mm	14.5" 368 mm	6" (152 mm)	7" (178 mm)	1" 25 mm	340	155
	BFM1150			6.38" (162 mm)	7.38" (187 mm)		340	155
	BFM1230			7" (178 mm)	8" (203 mm)		350	160
21	BFM1350	20.25" 514 mm	14.25" 362 mm	8.63" (219 mm)	9.63" (245 mm)	1" 25 mm	470	215
	BFM1160			9" (229 mm)	10" (254 mm)		475	215
	BFM1170			9.63" (245 mm)	10.63" (270 mm)		480	220
26	BFM2676	26.5" 673 mm	19.5" 495 mm	8.75" (222 mm)	9.75" (248 mm)	1" 25 mm	730	330
	BFM26110			8.25" (210 mm)	9.25" (235 mm)		715	324
27	BFM1265	26.5" 673 mm	19.5" 495 mm	11.13" (283 mm)	12.13" (308 mm)	1" 25 mm	1015	460
	BFM1305			10.63" (270 mm)	11.63" (295 mm)		1000	455
32	BFM32-160	32.5" 826 mm	23.5" 597 mm	12.4" (315 mm)	13.9" (353 mm)	1.5" 38 mm	1720	780
	BFM32-190			12.4" (315 mm)	13.9" (353 mm)			
	BFM1700			12.6" (320 mm)	13.6" (345 mm)	1" (25 mm)		
33	BFM33-248	33" 838 mm	24" 610 mm	14.3" (363 mm)	15.8" (402 mm)	1.5" 38 mm	2090	950
	BFM33-288			14.1" (358 mm)	15.6" (397 mm)			
	BFM1725			13.88" (353 mm)	14.88" (378 mm)	1" (25 mm)		
48	BFM48-320	48" 1220 mm	34.75" 883 mm	20.6" (524 mm)	22.6" (574 mm)	2" 51 mm	6660	3030
	BFM48-380			20.6" (524 mm)	22.6" (574 mm)		6660	3030
	BFM48-496			21.0" (534 mm)	23.0" (584 mm)		6660	3030
	BFM1900			20.88" (530 mm)	22.88" (581 mm)		6660	3030
	BFM1950						6625	3010
68	BFM6800	68"	50"	23.63" (600 mm)	25.63" (651 mm)	2"	15750	7160

For HLM models, substitute HLM for BFM in the Model Number.

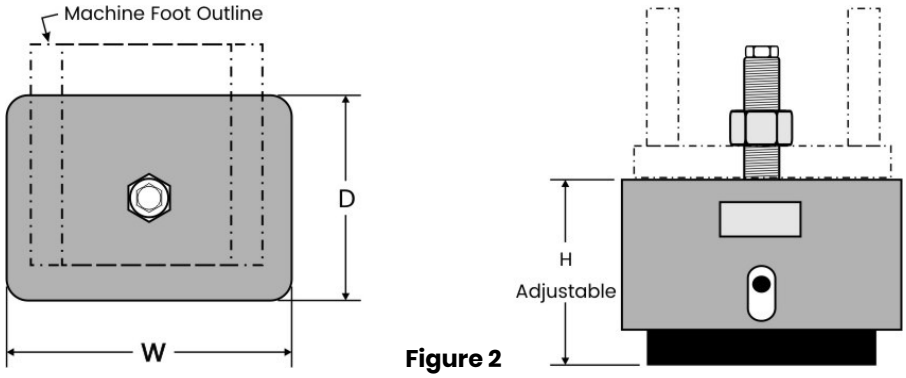


Figure 2

TABLE 2 – MXL SERIES ISOLATOR DIMENSIONS								
SERIES	MODEL*	NOMINAL DIMENSIONS (inches/mm)					APPROXIMATE SHIPPING WEIGHT	
		"W" WIDTH	"D" DEPTH	"H" LOADED HEIGHT				
				MINIMUM	MAXIMUM	ADJUSTMENT	LBS.	KGs.
24	24MXL0801	24.9" 632 mm	18.4" 467 mm	13.4" (341 mm)	14.9" (379 mm)	18.4" 467 mm	960	435
	24MXL0802			15.3" (389 mm)	16.8" (427 mm)		1020	465
	24MXL0803			17.1" (435 mm)	18.6" (473 mm)		1080	490
	24MXL0804			19.0" (483 mm)	20.5" (521 mm)		1130	515
	24MXL0951			13.4" (341 mm)	14.9" (379 mm)		960	435
	24MXL0952			15.3" (389 mm)	16.8" (427 mm)		1010	460
	24MXL0953			17.1" (435 mm)	18.6" (473 mm)		1060	485
	24MXL0954			19.0" (483 mm)	20.5" (521 mm)		1110	505
	24MXL1241			13.0" (331 mm)	14.5" (369 mm)		1020	465
	24MXL1242			14.6" (371 mm)	16.1" (409 mm)		1060	485
	24MXL1243			16.1" (409 mm)	17.6" (448 mm)		1110	505
	24MXL1244			16.9" (409 mm)	19.2" (488 mm)		1160	530
25	25MXL1441	24.9" 632 mm	18.4" 467 mm	13.3" (338 mm)	14.8" (376 mm)	18.4" 467 mm	1110	505
	25MXL1442			14.6" (371 mm)	16.1" (409 mm)		1050	480
	25MXL1443			15.9" (404 mm)	17.4" (442 mm)		1090	495
	25MXL1444			17.3" (440 mm)	18.8" (478 mm)		1130	515
	25MXL1601			12.9" (328 mm)	14.4" (366 mm)		1110	505
	25MXL1602			13.9" (354 mm)	15.4" (392 mm)		1050	480
	25MXL1603			14.9" (379 mm)	16.4" (417 mm)		1090	495
	25MXL1604			15.9" (404 mm)	17.4" (442 mm)		1130	515
33	33MXL1601	34.4" 874 mm	25.4" 645 mm	17.6" (447 mm)	19.6" (498 mm)	2" 51 mm	2250	1025
	33MXL1602			19.5" (496 mm)	21.5" (547 mm)		2250	1025
	33MXL1603			21.4" (544 mm)	23.4" (595 mm)		2550	1160
	33MXL1604			23.3" (592 mm)	25.3" (643 mm)		2650	1200
	33MXL1901			17.6" (448 mm)	19.6" (498 mm)		2250	1020
	33MXL1902			19.5" (496 mm)	21.5" (547 mm)		2350	1066
	33MXL1903			21.4" (544 mm)	23.4" (595 mm)		2450	1110
	33MXL1904			23.3" (592 mm)	25.3" (643 mm)		2550	1160
	33MXL2481			17.2" (437 mm)	19.2" (488 mm)		2700	1225
	33MXL2482			18.8" (478 mm)	20.8" (529 mm)		2800	1270
	33MXL2483			20.3" (516 mm)	22.3" (567 mm)		2900	1315
	33MXL2484			21.9" (557 mm)	23.9" (608 mm)		3000	1360
34	34MXL2881	34.4" 874 mm	25.4" 645 mm	18.7" (475 mm)	20.7" (526 mm)	2" 51 mm	2700	1225
	34MXL2882			20.0" (508 mm)	22.0" (559 mm)		2800	1270
	34MXL2883			21.4" (544 mm)	23.4" (595 mm)		2800	1270
	34MXL2884			22.7" (577 mm)	24.7" (628 mm)		2900	1315
34	34MXL3201	34.4" 874 mm	25.4" 645 mm	18.4" (468 mm)	20.4" (519 mm)	2" 51 mm	2700	1225
	34MXL3202			19.4" (493 mm)	21.4" (544 mm)		2800	1270
	34MXL3203			20.4" (519 mm)	22.4" (569 mm)		2800	1270
	34MXL3204			21.3" (542 mm)	23.3" (592 mm)		2900	1315

For HXL models, substitute HXL for MXL in the isolator's model number.

CONTINUED - TABLE 2 – MXL SERIES ISOLATOR DIMENSIONS								
SERIES	MODEL*	NOMINAL DIMENSIONS (inches/mm)					APPROXIMATE SHIPPING WEIGHT	
		"W" WIDTH	"D" DEPTH	"H" HEIGHT				
				MINIMUM	MAXIMUM	ADJUSTMENT	LBS.	KGs.
35	35MXL2401	34.75" 883 mm	33" 838 mm	21.0" (534 mm)	23.0" (584 mm)	2" 51 mm	4500	2042
	35MXL2402			22.9" (582 mm)	24.9" (633 mm)		4560	2068
	35MXL2403			24.8" (630 mm)	26.8" (681 mm)		4760	2159
	35MXL2404			26.7" (679 mm)	28.7" (729 mm)		5060	2295
	35MXL2851			21.0" (534 mm)	23.0" (584 mm)		4360	1978
	35MXL2852			22.9" (582 mm)	24.9" (633 mm)		4560	2068
	35MXL2853			24.8" (630 mm)	26.8" (681 mm)		4660	2114
	35MXL2854			26.7" (679 mm)	28.7" (729 mm)		4860	2205
	35MXL3721			20.7" (526 mm)	22.7" (577 mm)		4360	1978
	35MXL3722			22.2" (564 mm)	24.2" (615 mm)		4560	2068
	35MXL3723			23.8" (605 mm)	25.8" (656 mm)		4660	2114
	35MXL3724			25.3" (643 mm)	27.3" (694 mm)		4860	2205
36	36MXL4321	34.75" 883 mm	33" 838 mm	21.9" (557 mm)	23.9" (607 mm)	2" 51 mm	4860	2205
	36MXL4322			23.3" (592 mm)	25.3" (643 mm)		5060	2295
	36MXL4323			24.6" (625 mm)	26.6" (676 mm)		5160	2341
	36MXL4324			25.9" (658 mm)	27.9" (709 mm)		5360	2431
	36MXL4801			21.6" (549 mm)	23.6" (600 mm)	2" 51 mm	4860	2205
	36MXL4802			22.6" (575 mm)	24.6" (625 mm)		4960	2250
	36MXL4803			23.6" (600 mm)	25.6" (651 mm)		5160	2341
	36MXL4804			24.6" (625 mm)	26.6" (676 mm)		5260	2386
48	48MXL3601	50.4" 1280 mm	37.5" 953 mm	31.3" (796 mm)	33.3" (846 mm)	2" 51 mm	8800	3995
	48MXL3602			33.2" (844 mm)	35.2" (895 mm)		9000	4085
	48MXL3603			35.1" (892 mm)	37.1" (943 mm)		9300	4220
	48MXL3604			37.0" (940 mm)	39.0" (989 mm)		9500	4310
	48MXL4281			31.3" (796 mm)	33.3" (846 mm)		8800	3995
	48MXL4282			33.2" (844 mm)	35.2" (895 mm)		9000	4085
	48MXL4283			35.1" (892 mm)	37.1" (943 mm)		9300	4220
	48MXL4284			37.0" (940 mm)	39.0" (989 mm)		9500	4310
	48MXL5581			31.0" (787 mm)	33.0" (839 mm)		8800	3995
	48MXL5582			32.5" (826 mm)	34.5" (877 mm)		9000	4085
	48MXL5583			34.1" (867 mm)	36.1" (915 mm)		9200	4175
	48MXL5584			35.6" (905 mm)	37.6" (956 mm)		9400	4265
50	50MXL6481	50.4" 1280 mm	37.5" 953 mm	33.8" (859 mm)	35.8" (910 mm)	2" 51 mm	9550	4335
	50MXL6482			35.1" (892 mm)	37.1" (943 mm)		9750	4425
	50MXL6483			36.4" (925 mm)	38.4" (976 mm)		9950	4515
	50MXL6484			37.8" (961 mm)	39.6" (1011 mm)		10250	4650
	50MXL7201			33.4" (849 mm)	35.4" (900 mm)	2" 51 mm	9550	4335
	50MXL7202			34.4" (874 mm)	36.4" (925 mm)		9750	4425
	50MXL7203			35.4" (900 mm)	37.4" (950 mm)		9950	4520
	50MXL7204			36.4" (925 mm)	38.4" (976 mm)		10050	4560

For HXL models, substitute HXL for MXL in the isolator's model number.

LEVELING SCREW INFORMATION FOR VIBRO/DYNAMICS ISOLATORS

There are three basic types of Leveling Screw supplied with BFM, HLM, MXL, and HXL Model Micro/Level Isolators (see Figure 3). The type of Leveling Screw supplied depends on the diameter of the Leveling Screw and the construction of the machine foot.

"M" Style *Hex Head* Type Leveling Screws are typically used when the diameter of the screw is 3" and smaller. This style screw is also used on the smaller diameter portion of the two-piece "SD" or "Step-Down" style leveling screw. See Table 3 for dimensional data for wrench sizes.

"M" Style *Spanner Head* Type Leveling Screws are typically used when the diameter of the screw is 3.5" and larger. This type of Leveling Screw can be adjusted using two 0.5" diameter x 6" long steel rods *(supplied with the isolators)*, or an appropriate size Spanner Wrench. (See Table 4)

Table 3

"M" and "SD" STYLE HEX LEVELING SCREWS & LOCK NUTS

Leveling Screw Diameter & Pitch	Screw Head	Lock Nut	
	Distance Across Flats	Distance Across Flats	Distance Across Corners
1.50-12 UN	1.125" (29 mm)	2.25" (58 mm)	2.63" (67 mm)
1.75-12 UN	1.25" (32 mm)	2.75" (70 mm)	3.25" (83 mm)
2.00-12 UN	1.50" (38 mm)	3.13" (80 mm)	3.63" (92 mm)
2.25-12 UN	1.75" (45 mm)	3.50" (89 mm)	4.13" (105 mm)
2.50-12 UN	1.88" (48 mm)	3.88" (99 mm)	4.38" (112 mm)
2.75-12 UN	2.13" (54 mm)	4.25" (108 mm)	5.00" (127 mm)
3.00-12 UN	2.38" (61 mm)	4.63" (118 mm)	5.38" (137 mm)

Table 4

SPANNER STYLE LEVELING SCREWS & LOCK NUTS

Leveling Screw Diameter & Pitch	Leveling Screw Head Diameter	Lock Nut Head Diameter
3.5 -12 UN	3.125" (80 mm)	5.25" (134 mm)
4.0 -12 UN	3.63" (92 mm)	6.0" (153 mm)
4.5 -12 UN	4.125" (105 mm)	7.0" (178 mm)
5.0 -12 UN	4.63" (118 mm)	7.5" (191 mm)
6.0 – 8 UN	5.50" (140 mm)	9.0" (229 mm)
7.0 - 8 UN	6.5" (165 mm)	10.0" (254 mm)
8.0 - 8 UN	7.5" (191 mm)	11.0" (280 mm)

"M" STYLE HEX. HEAD LEVELING SCREW AND LOCK NUT. (One Lock Nut Usually Supplied)

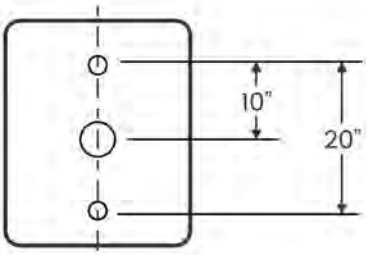
"M" STYLE SPANNER HEAD LEVELING SCREW AND LOCK NUTS. (Two Lock Nuts Are Usually Supplied)

"SD" STYLE TWO-PIECE HEX. HEAD LEVELING SCREW AND LOCK NUT. (One Lock Nut Usually Supplied)

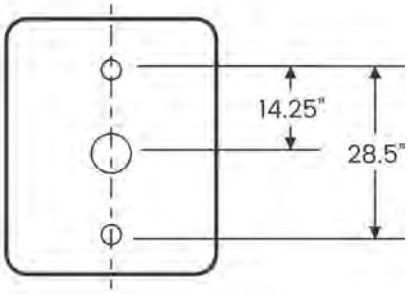
FIGURE 3

SECURING BOLT LAYOUT PATTERNS

MXL & HXL 35 to 36 Series.
(Models 35MXL/HXL & 36MXL/HXL).



BFM & HLM 48 Series and
MXL & HXL 48 to 50 Series.
(Models BFM/ HLM 1900, 1950
and 48MXL/HXL & 50MXL/HXL).



BFM & HLM 68 Series.
(Models BFM & HLM 6800)

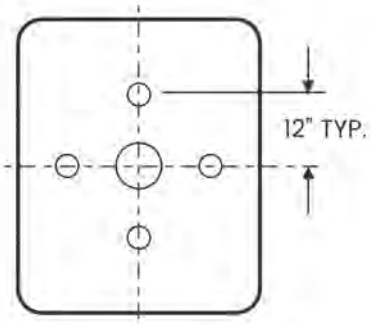


Figure 4

Section III
INSTALLATION AND ADJUSTMENT ADVISORY SERVICE AND TRAINING

ADVISORY SERVICE

Vibro/Dynamics offers several services to assist a customer's installation team. Vibro/Dynamics will send Field Service Technicians on-site to provide advisory isolator installation and adjustment instruction to the customer for products manufactured by Vibro/Dynamics LLC.

The service provides advisory instruction that includes:

1. Advising riggers and/or maintenance personnel, provided by the customer, on how to correctly install Vibro/Dynamics products in the most efficient and effective manner. The customer or its agent(s) is responsible for installation and placement of the isolators.
2. Advising riggers of the proper sequence of leveling adjustments to the Micro/Level Isolators, resulting in the optimal installation of the machine. Equipment such as lasers, optical jig transit systems, or precision machinists' levels used to determine the machine's level condition to be supplied by the customer or its agent(s). Final level and installation approval to be made by an employee or agent of the customer.
3. Providing any ancillary equipment (i.e., Hydra/Level pumps and hoses, or Lod/Sen analyzers) required to properly adjust the isolators. Vibro/Dynamics Service Technicians will activate and control only Vibro/Dynamics owned instrumentation and equipment.

Please note:

Vibro/Dynamics LLC does not permit any of its employees to work in adverse or unsafe conditions. It is the customer's responsibility to provide a safe working environment for Vibro/Dynamics' personnel at the customer's plant. Customers are requested to report any Vibro/Dynamics employee that performs in an unsafe or irresponsible manner. Customers can call Toll-Free at 1-800-842-7668.

TRAINING SESSIONS

Vibro/Dynamics offers one-day training sessions at Vibro/Dynamics Training Center in Broadview (Chicago), Illinois. This training session includes both classroom and hands-on training for riggers, millwrights, and service, maintenance, and plant engineering personnel. Each session is customized to better serve the experience level of the group and typically covers methods and techniques of properly installing and adjusting Vibro/Dynamics products, including Micro/Level, Lod/Sen, and Hydra/Level Isolators. It also covers topics such as maintenance and "helpful hints" to improve the efficiency and effectiveness of these anti-vibration machinery mounting systems. Maximum class size is 20 attendees. On-Site training sessions at your plant may also be arranged.

Please Contact Vibro/Dynamics for additional information and details.

Section IV
FOUNDATION and PIT DESIGN GUIDELINES

Incorporating the following information into your press installation design at the earliest date possible allows you to take full advantage of the productivity and efficiency enhancing capabilities of Vibro/Dynamics Machinery Mounting Systems.

A. DETERMINING PIT OR FOUNDATION DIMENSIONS

1. Foundation piers should be poured to support the press at the desired elevation, taking into account the height of the isolator.

2. To determine the finished elevation of the foundation piers:

   - Figure that the isolator's approximate installed height will be its minimum loaded height plus one-half of its leveling adjustment range. (See Isolator Specification Sheet or Section I - Tables 1 & 2 in this document.)

   - Isolator leveling adjustment range varies from 1 to 2 inches depending on the isolator model and size. For example, if your isolator has one inch of adjustment, add ½" to the isolator's minimum loaded height to approximate its final installed height.

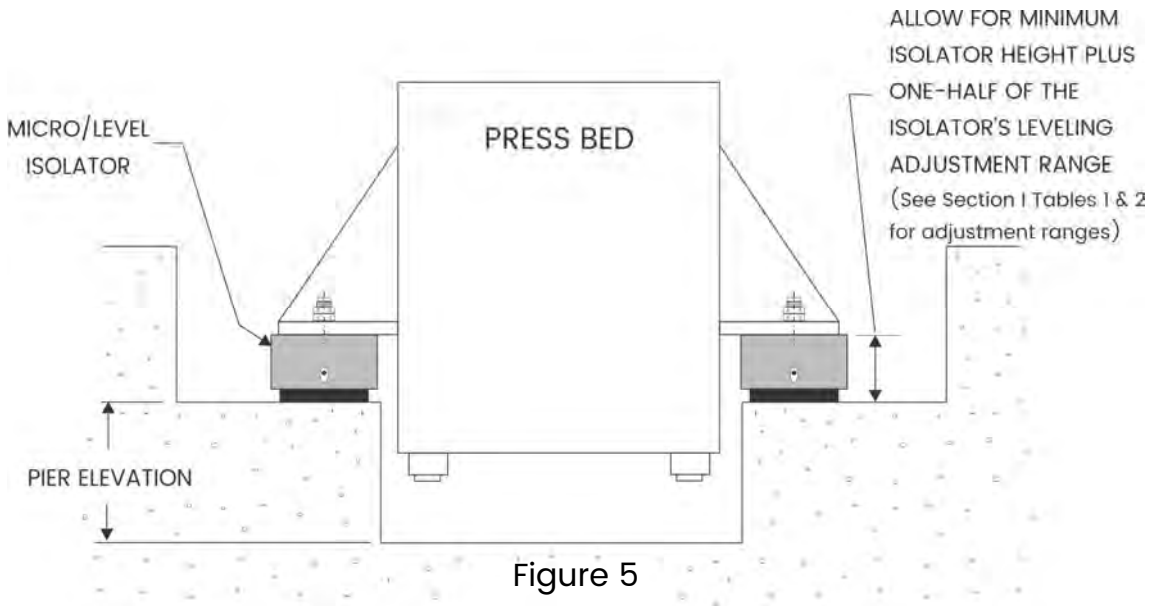


Figure 5

3. The maximum difference in elevation between foundation piers should not exceed 0.25 inch (See Figure 6). The leveling feature in Vibro/Dynamics Isolators will compensate for any remaining difference. Excessive differences, beyond the isolator's adjustment range, could result in machine elevations being too high or too low. Recommended practice to overcome excessive differences in pier elevations is to insert spacer plates between the isolators and the machine feet. Longer leveling screws may be required!
   Contact Vibro/Dynamics for recommendations should this occur.

4. The concrete surface under the isolator should be *flat*, *level* and have a *trowel* finish.
5. The slope of the foundation pier level should not to exceed 2° (0.42 inch/foot or 35mm/m).
6. The flatness of the foundation pier should not to exceed ±1/16 in (±1,6mm).

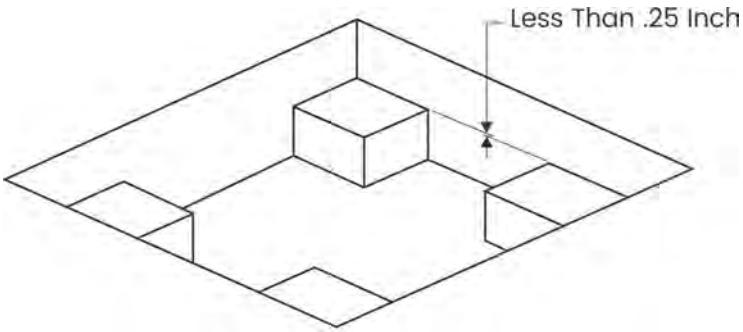


Figure 6

7. The pier should be large enough so the isolator does not overhang. There should not be any holes, cracks, or lumps in the area directly under the isolator. Remove all loose concrete, grout, chips, oil, grease, and water from the press foot and concrete surface that will support the isolator.
8. Clearance should be provided in at least one direction (X or Y) to allow for the installation and removal of the isolators. See Figure 7 and Table 5.
   Note: It may be possible to remove the isolator by moving it toward the center of the press and then into a pit, but providing clearance around the isolator is the preferred method.

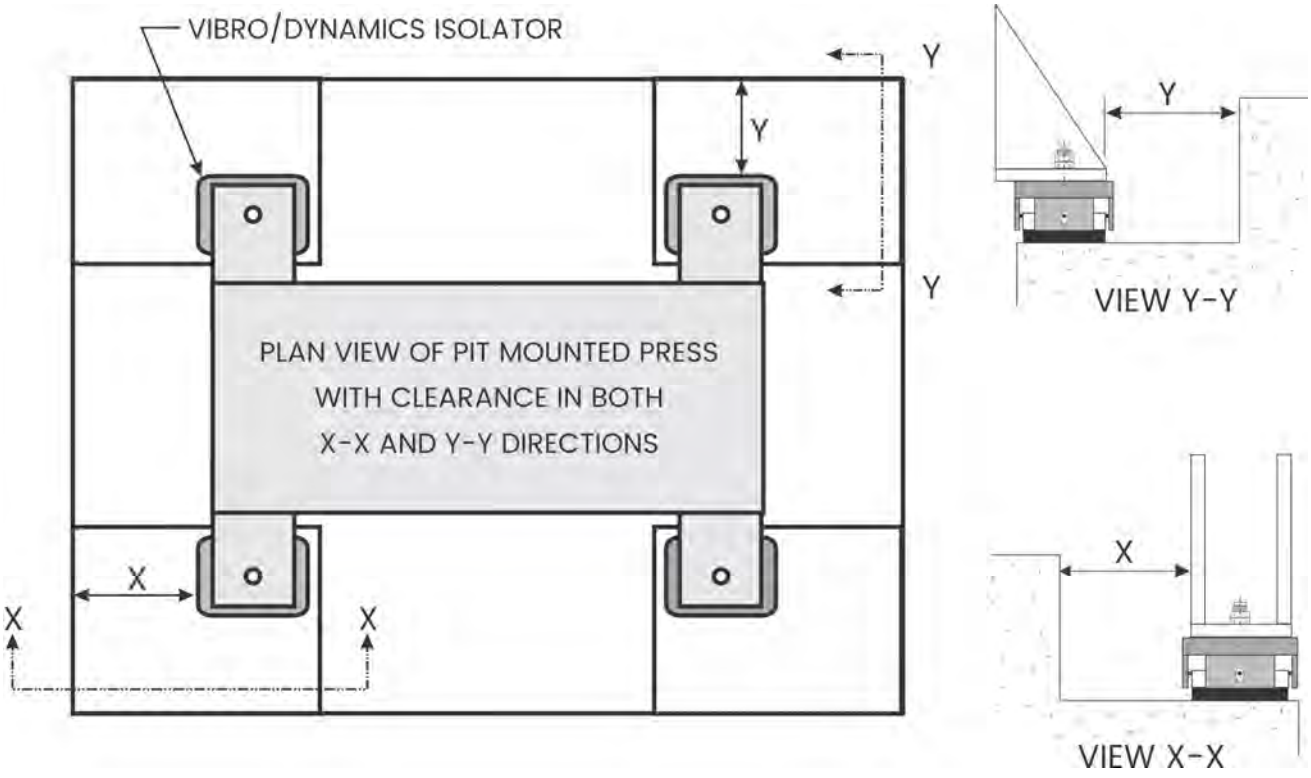


Figure 7

TABLE 5				
ISOLATOR SERIES	ISOLATOR MODEL	DIMENSION "X" (Minimum)	DIMENSION "Y" (Minimum)	LIFTING HOLE SIZE*
BFM and HLM MODELS – For Isolator Models beginning with BFM, LCM, or HLM prefix and followed by the following isolator model numbers.				
20	1340, 1150, & 1230	32" (813 mm)	26" (660 mm)	0.5-13 UNC
21	1350, 1160 & 1170	33" (838 mm)	27" (686 mm)	0.5-13 UNC
26	2660, 2676, 2690, 26100, 26110 & 26135	38" (965 mm)	31" (787 mm)	0.75-10 UNC
27	1265 & 1305			
32	1700, BFM32-xxx	46" (1170 mm)	37" (940 mm)	1-8 UNC
33	1725, BFM33-xxx			
38	1750 & 1850	46" (1170 mm)	60" (1530 mm)	1-8 UNC
48	1900, 1950, BFM48-xxx	61" (1550 mm)	48" (1220 mm)	1-8 UNC
68	6800, BFM68-xxxx	81" (2060 mm)	63" (1600 mm)	1.5-6 UNC
MXL MODELS – For isolator models beginning with the following isolator model prefixes.				
24	24MXL & 24HXL	31" 787 mm	25" 635 mm	¾-10 UNC
25	25MXL & 25HXL			
33	33MXL & 33HXL	32" 813 mm	41" 1040 mm	1-8 UNC
34	34MXL & 34HXL			
35	35MXL & 35HXL	41" 1040 mm	43" 1090 mm	1-8 UNC
36	36MXL & 36HXL			
48	48MXL & 48HXL	46" 1170 mm	60" 1530 mm	1.5-6 UNC
50	50MXL & 50HXL			

Note:

1. All isolators have lifting holes in the side of the isolator housing. The number of holes and location vary depending on the isolator model.
2. Hoist rings, or eyebolts of sufficient strength, are to be supplied by the customer.

B. ADDITIONAL PREPARATION FOR PRESSES WITH ROLLING BOLSTERS

If the press is going to be equipped with a rolling bolster, special consideration should be given to the installation of the support beams/rail that span between the floor and the press bed. Rigid connections will cause the transfer of vibration and shock into the surrounding area, causing a "short-circuit" in isolator effectiveness. Also, make sure that the foundation floor and *not* the press structure supports all floor plates and decking.
One of the following methods, shown in Figures 8 & 9, should be used. Either method will allow the press to move slightly up and down during operation and not restrict leveling adjustments.

1. METHOD ONE (Figure 8)

- Cantilevered rolling bolster beams/rails are bolted and grouted into the floor across from the press bed and bolster plate. They span the distance from the edge of the foundation pit to the edge of the press bed. The cantilever length should be as short as possible. There should be a gap (1/16" min.) between the cantilevered beam and the edge of the bed and the cantilevered beam and the supporting shelf to eliminate any rigid contacts.
- As the rolling bolster rolls over the cantilevered beam, it deflects slightly until the shelf below supports it. The elevation of the beam/rail should be adjusted accordingly.
- The end of the beam/rail can also be supported by a vertical beam supported by the foundation pit or floor similar to the floor plate and decking recommendation shown in Fig. 8.
- Beams connected to the foundation and *not* the press should be used to support all decking and floor plates.

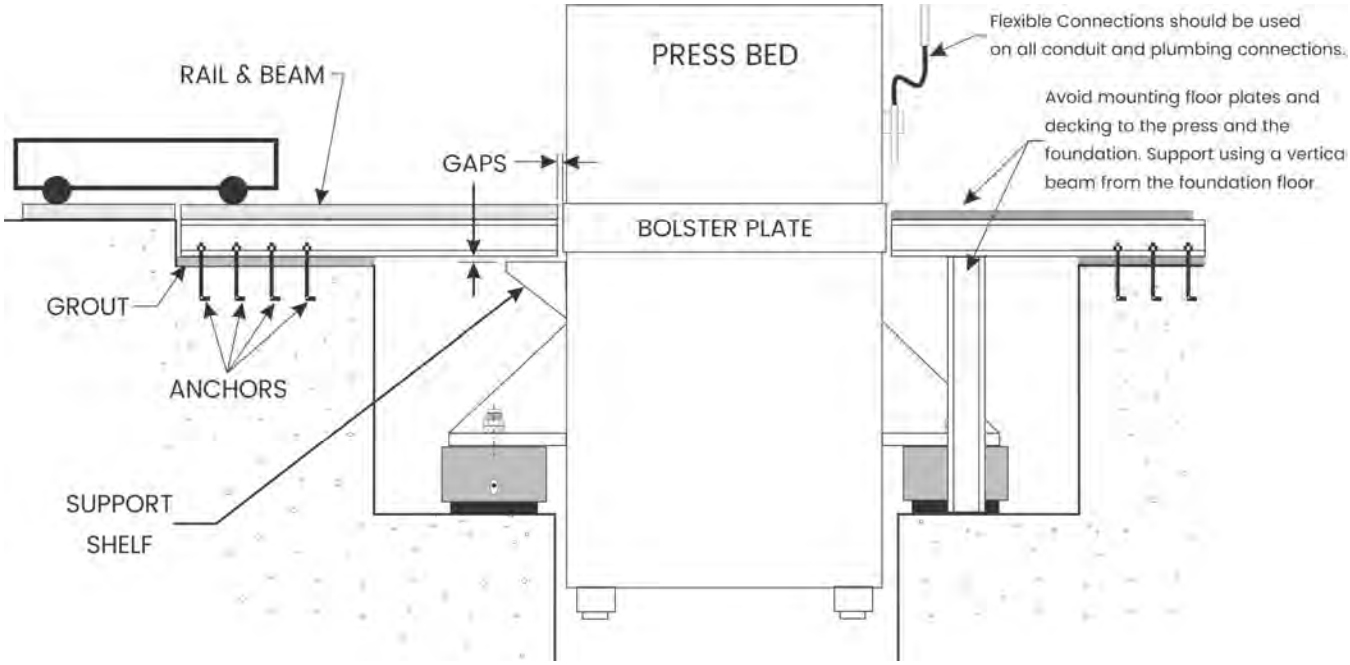


Figure 8

2. METHOD TWO (Figure 9)

- In this method, each rolling bolster beam is divided into two. One section is anchored to the floor and the other is hinged and designed to float with the press. The ends of the floating sections are supported by pivot points located at the edge of the pit and on the press bed as shown in Figure 9. The ends of the beam/rails are restricted from moving horizontally using guide pins and clearance holes or stops welded on the support shelf to contain the sides of the beam/rails.
- The mating ends of the rails are diagonally cut (see View B-B) to minimize the gap as the rolling bolster wheel travels across the split.
- All floor plate and decking should be supported as per Method One, Figure 8.

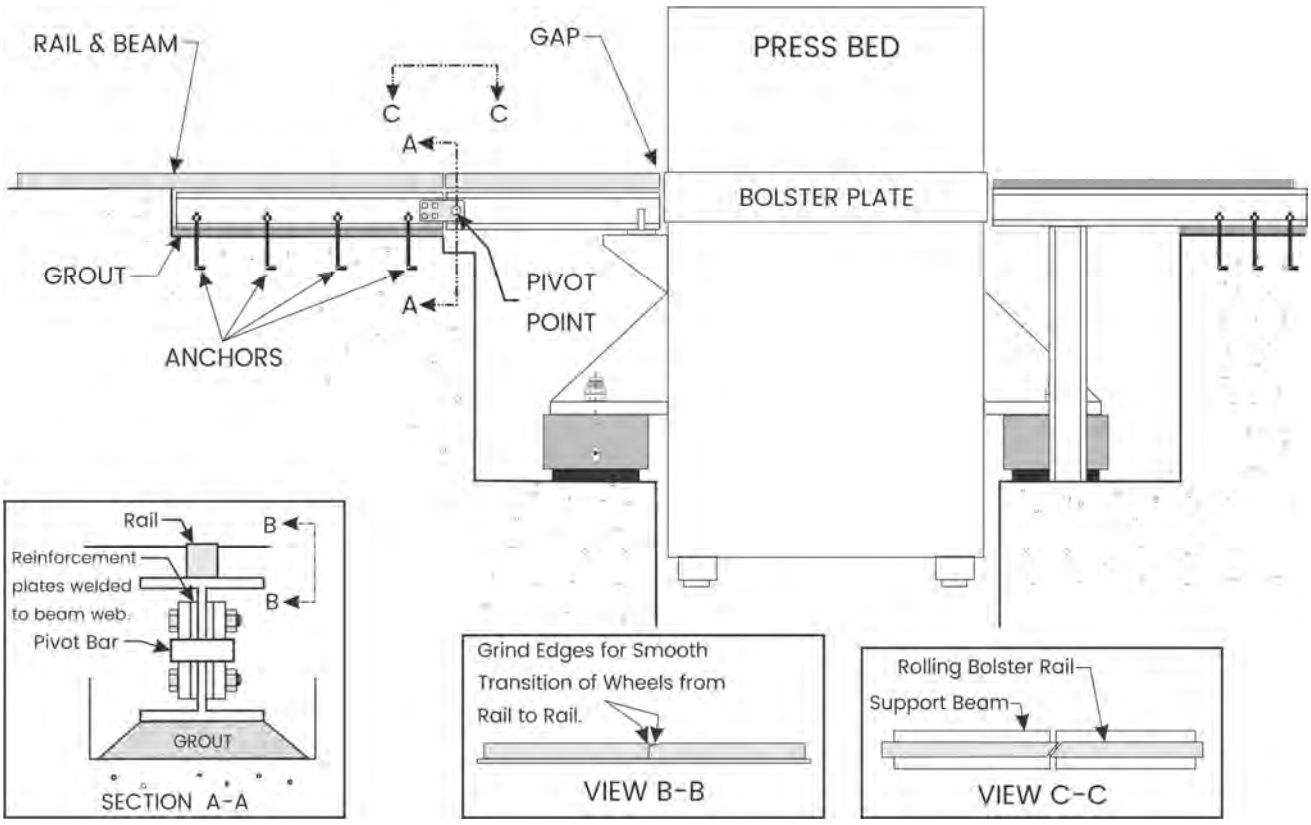


Figure 9

C. FINAL NOTES

To achieve maximum noise and vibration reduction, make sure that all plumbing and electrical connections have flexible connections. Also, make sure that the isolator housings and the press structure are not rubbing against the foundation walls.

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Section V
INSTALLATION OF MICRO/LEVEL ISOLATORS

The installation method suggested in this manual has been found to be very successful, and it minimizes the likelihood of inadvertently damaging the isolator leveling adjustment screws. If your on-site conditions do not allow the type of installation described in this manual, contact Vibro/Dynamics to discuss possible alternative methods.

A. PREPARATION OF FOUNDATION SURFACE AND MACHINE FEET

1. The concrete surface under the isolator should be *level* and *trowel* finished. There should not be any holes, cracks, or lumps in the area directly under the isolator resilient cushion. Remove all loose concrete, grout, chips, oil, grease, and water from the press foot and concrete surface that will support the isolator.

2. The bottom of the press foot must be flat and clean in the area of contact with the isolator for a uniform bearing surface. In some cases it may be necessary to scrape, file, or grind the bottoms of the machine feet flat. After cleaning, inspect the machine legs and feet, and repair or replace them if they are broken or cracked. The isolator effectiveness is not reduced if the machine foot does not cover the entire area of the isolator support housing. Internally, the heavy-duty steel bearing plate will transfer the load uniformly over the resilient cushion.

3. If the difference in elevation of the four piers exceeds the limits of the isolator height adjustment, a flat layer of grout or concrete or a grouted steel plate can be used to increase the elevation of the low piers. If a steel plate is used, it should be bolted and grouted securely into place. There should not be any holes, joints, gaps, bolt heads or other bumps under the isolators. The plate should have an area large enough so that the isolator resilient cushion does not overhang, –OR- A steel plate, ground parallel top and bottom with a hole in the center for the leveling screw, may be used as a spacer between the top of the isolator and the bottom of the press foot. Confirm that the leveling screw length is adequate.

B. INSTALLING ISOLATORS TO THE MACHINE FEET

The isolators can be installed while blocks support the press bed. The isolators can be carefully lifted into position using a forklift as shown in Figure 10. As an alternative, an overhead crane may be used by inserting hoist rings of sufficient strength into the tapped holes in the sides of the isolator housings. See Table 3, page 5 for hoist ring size details.

1. Place isolators on individual skids and remove any strapping around the isolator if present.

2. If the leveling screws are not preinstalled in the isolators, carefully thread them into the isolators until the leveling screw contacts the isolator's internal bearing plate. Make two additional full turns. *Note: In the larger isolator models (BFM 48 and 35MXL Series and larger), the isolator housing is too heavy to turn the leveling screw unless weight is removed. To remove the weight of the housing from the leveling screw, insert hoist rings into lifting holes in the sides of the isolator housing and lift the housing slightly using a forklift or other material-handling device. Once the weight is removed, turn the leveling screw the two full turns. For Isolators equipped with "SD" style leveling screws, see Appendix A for additional instructions.*

3. Place the protective sleeve *(furnished only on the larger "M" Style Leveling Screws)* over the isolator's leveling screw. Note: Two sleeves are provided with the BFM & HLM Series. The thinner (1") sleeve is placed below the longer sleeve and remains in place after the isolator is attached to the machine foot. The other is removed prior to installing the lock nuts.
4. Inspect the inside surface of the machine's mounting holes, making sure they are free of debris that could possibly break free, accumulate around the base of the isolator's leveling screw where it enters the isolator housing and possibly cause damage.
5. Position the isolator directly under the mounting hole in the press foot and then lift the isolator slowly, using caution to prevent the leveling screw being damaged by hitting or scraping the inside of the mounting hole (using the protective sleeve will help protect the threads). See Figure 10.

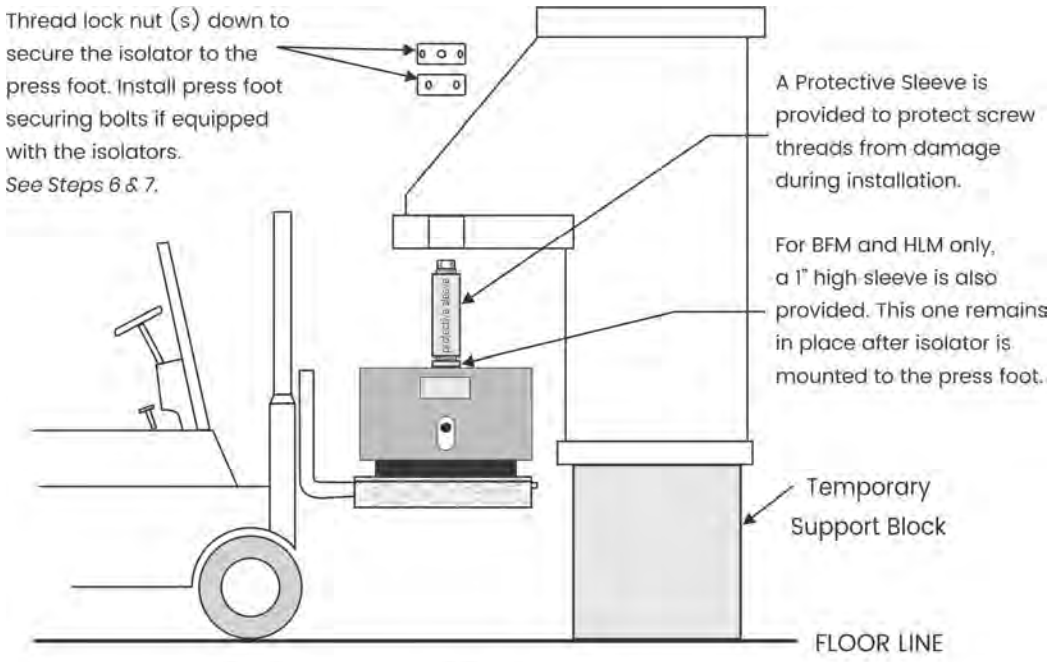

FIGURE 10

6. Continue lifting the isolator slowly until it comes into contact with the bottom of the press foot. Check each isolator to see if the leveling screw is centered in the press foot-mounting hole. See Figure 11.

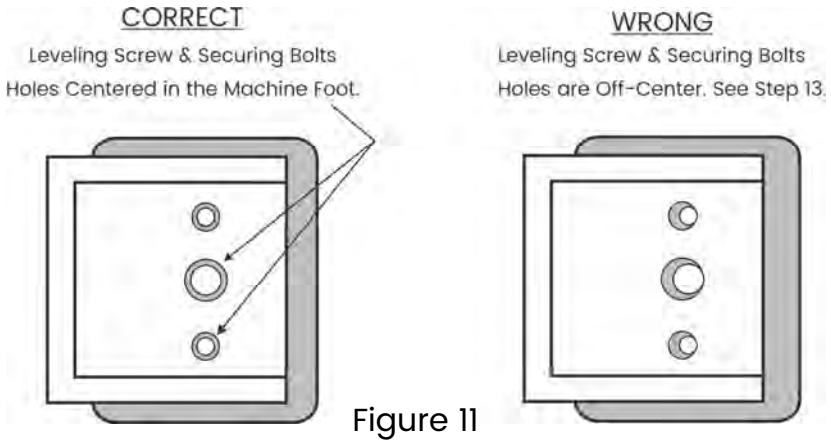

Figure 11

7. Install the isolator securing bolts if supplied with the isolator. The holes for these bolts should also be centered with their respective holes in the press feet. See Figure 11.
   Insert and tighten the securing bolts after centering the leveling screw and isolator. It is important that the leveling screw is centered in its mounting hole to protect it from damage.
8. Remove the leveling screw's long protective sleeve.
9. Thread the locknut down over the leveling screw and fasten hand tight. The resilient cushion should be centered under the support housing.
10. Check to be sure that the interlock/indicator bolts are centered *side-to-side* in their slots on all four sides of the isolator housing. See Figure 12.
11. Lower forks and repeat for each isolator. After all isolators are mounted, the press bed is ready to be placed as a unit in the press pit.
12. Micro/Level Isolators are designed to have a clearance between the support housing and the resilient cushion to provide maximum isolation effectiveness. See Figure 12.

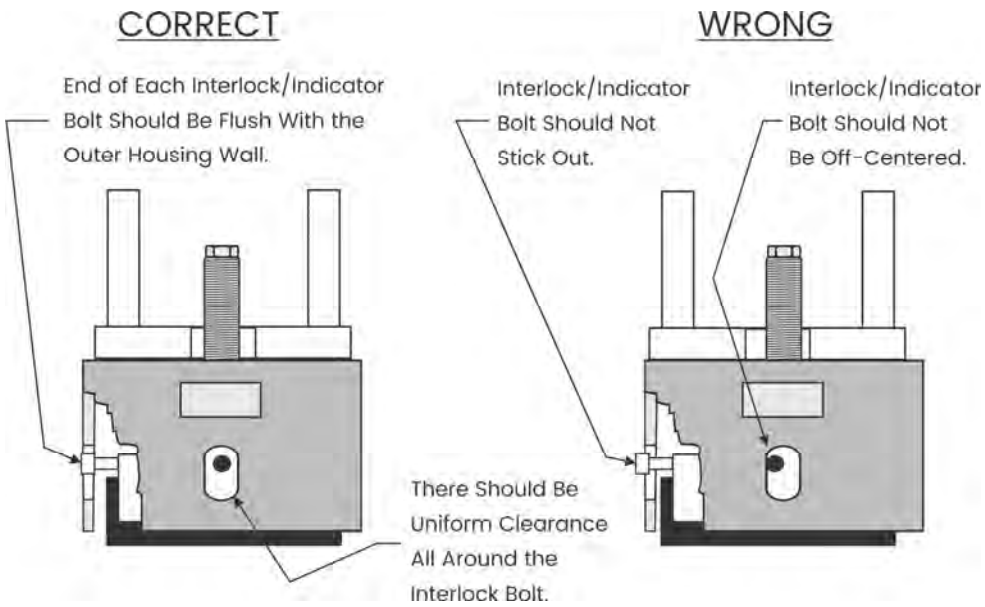

Figure 12

13. After carefully lowering the press and isolators into position on the foundation:
    - Check to see if the isolator resilient cushions are still centered. This is easily done by inspecting the four interlock/indicator bolts to see if are centered *side-to-side* in the slots and that the end of the bolts are flush with the outer surface of the support housing.
    - Check to see if the leveling adjustment screws are still centered in the machine's foot mounting holes.
14. If the isolator resilient cushion, housing and leveling screw are all centered, proceed to Section VI, page 18.

15. Use one of the following methods to re-center the isolator components and/or the isolator leveling screw in the machine foot's mounting hole. Each method requires lifting the machine with the isolator attached as per Figures 13 and 14. Lifting the isolator with the press removes weight from the internal bearing plate and resilient cushion assembly so that it may be shifted into the proper position. In the larger isolator models, the bearing plate and cushion assembly may be so heavy that the entire isolator assembly will need to be raised high enough so that the resilient cushion is lifted from the floor.

16. To center the Bearing Plate and Resilient Cushion assembly:

    - Tighten the locknut (and securing bolts if equipped) down snuggly against the press foot.
    - Lift the press until the leveling screw no longer touches the internal bearing plate.
    - Shift the resilient cushion and bearing plate into its proper position using one of the methods shown in Figure 13 or 14.

17. To center the Isolator's Leveling Screw in the machine's mounting hole:

    - Loosen the locknut, and securing bolts if present, so that the clearance between the leveling screw and the inside of the machine's mounting hole is visible.
    - Lift the press to remove weight from the isolator.
    - Shift the entire isolator until the leveling screw is centered (concentric) in the machine's mounting hole. The method used in Figure 14 works best.

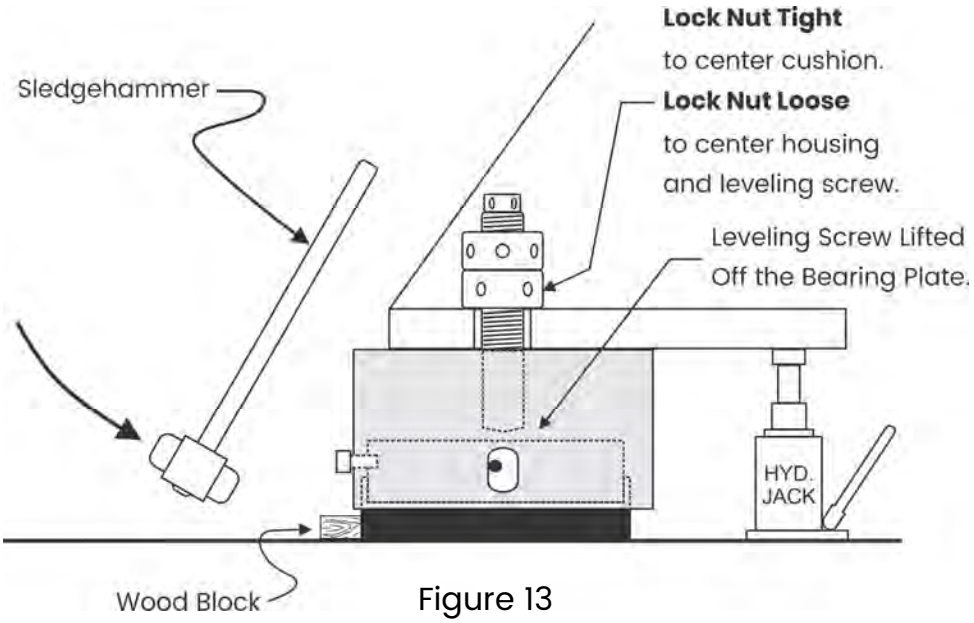

Figure 13

IMPORTANT!

Series 20 through 26 Isolators are equipped with interlock pins (tension pins), not threaded interlock bolts like the larger models. *Do not push or hit ends of interlock pins!* Pushing directly against the cushion, just below the housing, must be done to center the resilient cushions in these isolators.

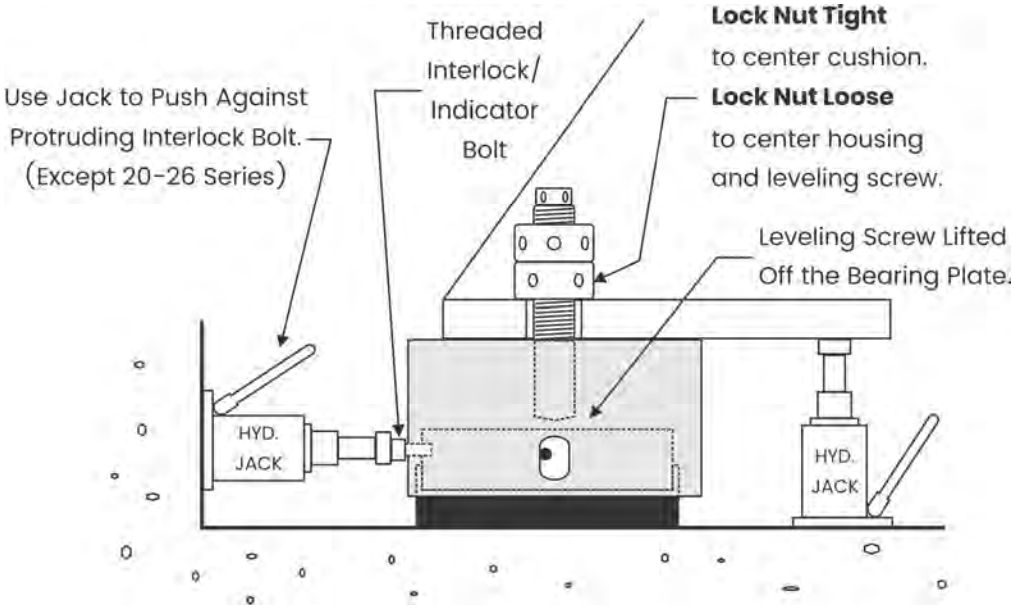
Use Jack to Push Against
Protruding Interlock Bolt.
(Except 20-26 Series)
Threaded
Interlock/
Indicator
Bolt
Lock Nut Tight
to center cushion.
Lock Nut Loose
to center housing
and leveling screw.
Leveling Screw Lifted
Off the Bearing Plate.
HYD.
JACK
HYD.
JACK

Figure 14

Section VI
LEVELING AND FINE-TUNING

The three basic goals of leveling a press bed and Fine-Tuning are:

1. *To remove any twist from the bed caused by an irregular foundation surface.*
2. *To adjust the press bed so that it is level and in one plane, and to bring the press structure and its components into precise alignment and parallelism.*
3. *To properly support the press so that its support condition equals its weight distribution while maintaining precise level and alignment.*

Micro/Level Isolators make it possible to quickly achieve all of the above goals with a high degree of precision. Presses installed on Micro/Level Isolators will produce high quality, repeatable, parts with minimum wear and tear on tooling and press components. Downtime, noise and vibration are greatly reduced and productivity and efficiency dramatically increased.

A. GENERAL INFORMATION

To achieve a precisely leveled press and an optimal fine-tuned support condition of the press structure, Vibro/Dynamics suggests leveling the machine *three* times:

1. After the press bed has been placed in the pit and prior to the stacking any press components. A flat bed allows easier assembly and alignment of press components.
2. After the press is completely stacked and just before the tie rods are shrunk. This assures that the press components are square and in proper alignment with each other prior to being compressed.
3. After the tie rods are shrunk and the press is completely assembled. This final check helps assure that the shrinking of the tie rods has not caused twist or distortion of the press.

Following the above three steps allows the press to be assembled in a stress-free state. This duplicates the set-up at the press builder's plant, and will allow the press components to be stacked in a level and properly aligned condition.

B. EQUIPMENT REQUIRED

1. **Hydraulic jacks** of sufficient capacity to remove weight from the isolators, for non- Hydra/Level equipped isolators.
2. **Leveling Devices**
   Determine the type of leveling device that will be used for the installation. Small presses typically use machinists' or electronic levels. Larger presses with wide beds are sometimes leveled using lasers or optical transits. All are acceptable. The following instructions were written for those planning to use a machinists' level.

C. MACHINISTS' LEVEL AND LOCATION PREPARATION

1. **Leveling Surface**

   Before taking level readings on the press bed or bolster plate, make sure that the locations selected for the machinists' level are clean, and free of high spots, scratches, dents or bumps. Small scratches and bumps can be removed with a fine-grained stone. A false reading will result if you put the level on a ridge or high spot.

   Remember, you are measuring this surface to tenths of thousandths of an inch. If you can't find a good spot to put the level, the bolster plate should be ground flat and level.

2. **Level Location**

   - Determine the leveling locations as specified in the service manual supplied by the machine builder. In the absence of a service manual, we suggest the locations as shown in Figure 15.

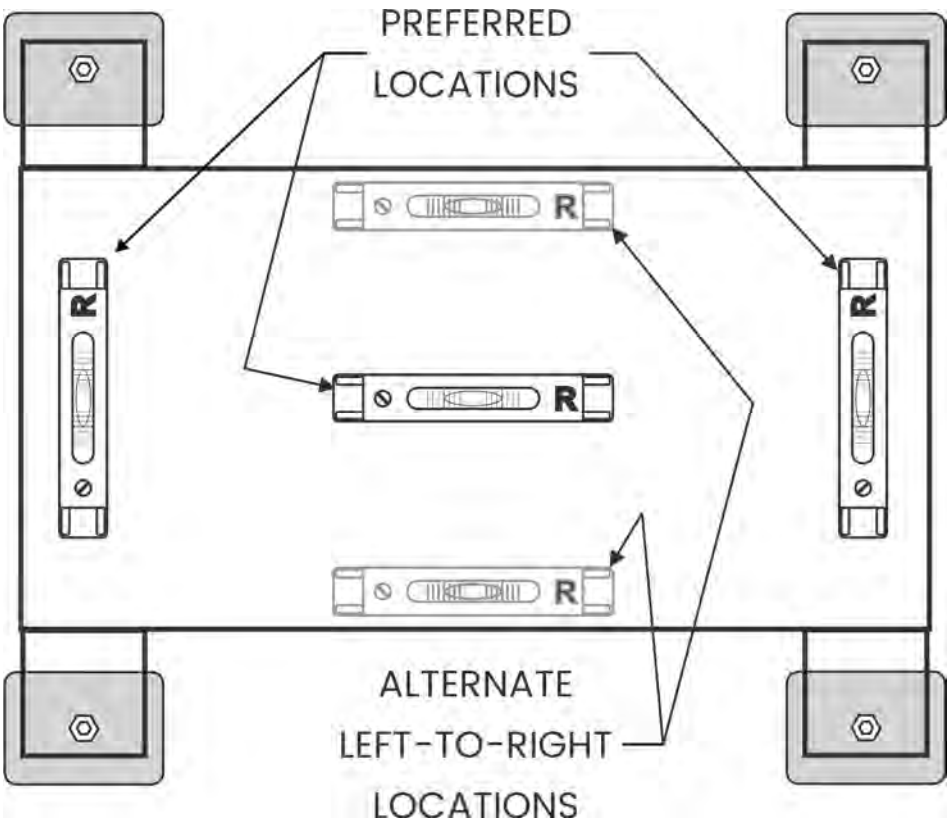

Figure 15

   - If a machinists' level is going to be used to determine level, make sure that it's properly calibrated. See Owner's Manual for calibration. A quick calibration check can be done by marking a location, recording the reading, turning the level 180 degrees around, placing it in exacting the same location, and recording that reading. If they are the same, the level calibration is good. If not, calibrate.

- Once the level locations are determined, mark the outline of the level with a felt tip pen. This puts the level back exactly at the same location every time. When you put it back again, don't let the level sit on the ink outline. Mark the Letter "***R***" on a piece of tape placed on one end of the machinists' level. Every time you put the level on the press bed, the end marked "***R***" must be either toward the ***Rear*** of the press or the ***Right*** end of the press. This eliminates doubling of any level calibration error. See Figure 16.

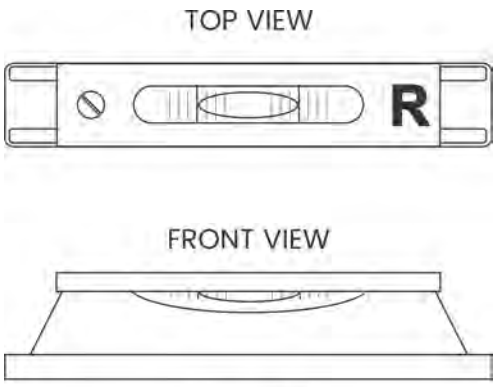

Figure 16

D. LEVELING

1. Loosen all lock nuts.
2. When adjusting the height of an isolator, remove a portion of the weight from the isolator; using either a hydraulic jack or the built-in hydraulic-assist feature on Hydra/Level isolators, just enough to allow the leveling screw to turn easily. See Figure 17.
3. When making level adjustments, the best method is to adjust the isolator, only *half way* to the perfect level setting. Adjustments are course at first and then become progressively finer. The reason is leveling is usually done using *pairs of isolators*. Level adjustments made to the second isolator will affect the first. If you were to adjust the first isolator all the way to level, adjustments made to the second isolator will cause the first isolator to overshoot the perfect level setting.

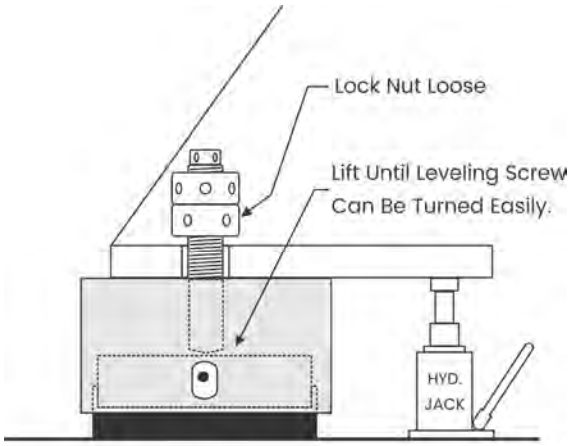

Figure 17

Leveling in the Front-to-Rear Direction

4. Using a precision machinists' level, electronic level, optical transit, or laser, check the level of the machine in the front-to-rear direction. If using a machinists' level, make sure that the "**R**" is to the **R**ear of the press.
5. If your level condition is as shown in Figure 18, the rear of the press is too low. Raise feet 1 & 2 until the press is level at both level locations. If the front of the press is low (the bubbles are reversed), raise feet 3 & 4.
6. If your level condition is as shown in Figure 19, the press is twisted. Raise feet 1 and 3 until press is level at both level locations. If the press is twisted in the other direction (the bubbles are reversed), raise feet 2 & 4.

CAUTION: Any twist in the press structure will result in increased wear and tear on the press and its tooling. Every effort should be made to remove all twist.

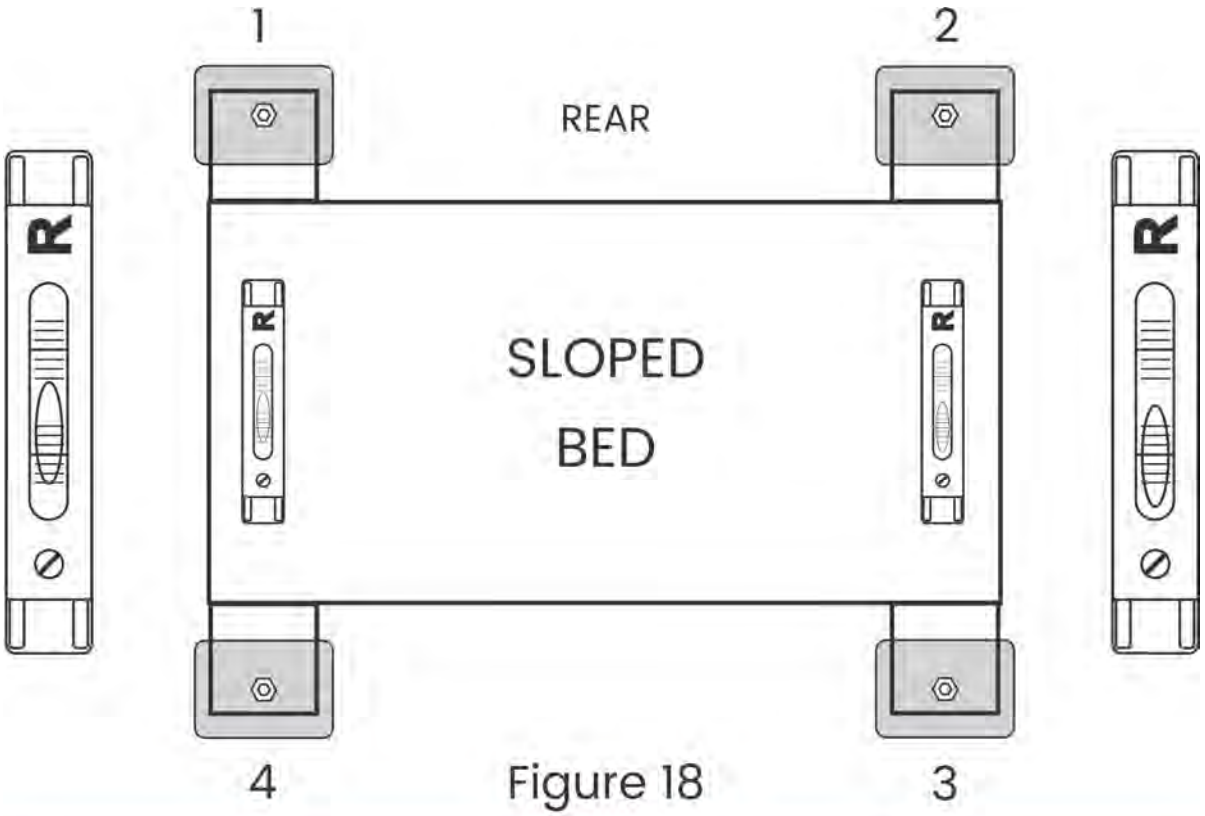

Figure 18

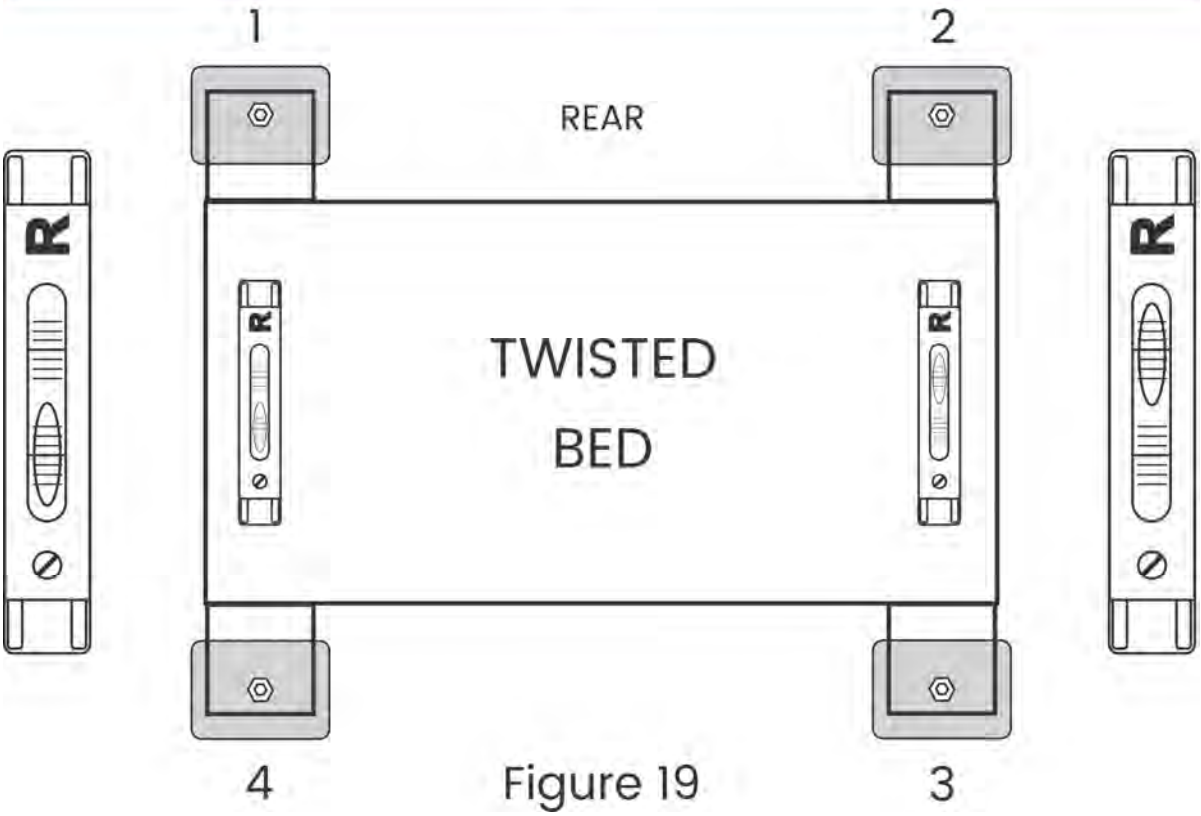

Figure 19

Leveling in the Left-to-Right Direction

7. Check the level of the machine in the Left-to-Right direction. If using a machinists' level, make sure that the "**R**" is pointed to the **R**ight side of the press.
8. If your level condition is as shown in Figure 20, the left side of the press is low. Raise feet 1 & 4 until the press is level at both level locations. If the right side of the press is low (bubbles reversed), raise feet 2 & 3.
9. Repeat Steps 4 to 8 until the press is level at all positions.

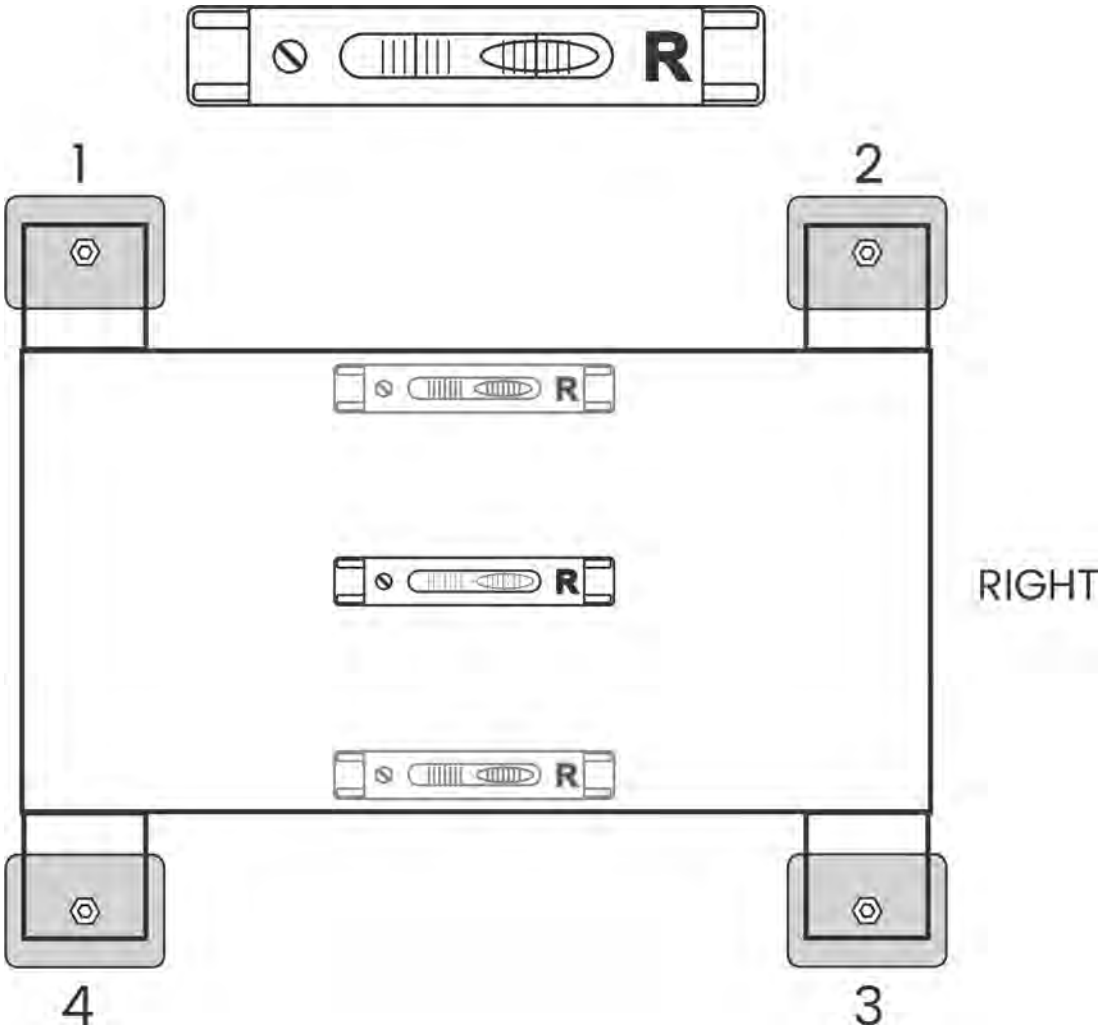

Figure 20

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Level Adjustment Inspection

10. Isolators should not be over-adjusted to compensate for extreme out-of-level floor or foundation conditions. If a severe out-of-level condition exists, a spacer plate can be inserted between the isolator and the machine foot if the leveling screw is long enough. Refer to Tables 1 & 2 or Isolator Specification Sheets for isolator dimensions and leveling adjustment ranges.
Note: The Interlock/Indicator Bolts can be used to quickly determine the amount of leveling adjustment available. See Figure 21.

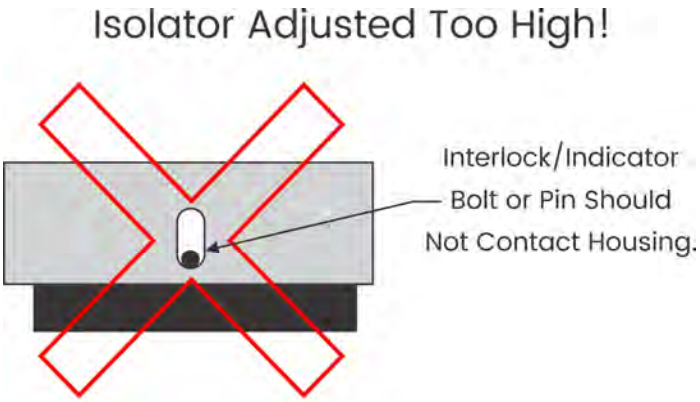


Figure 21

11. When leveling the press bed only, it may be desirable to adjust the overall isolator height so that the press bed is slightly higher than the desired final elevation. When the additional weight is added from stacking the press, the isolators will deflect (compress) downwards. Vibro/Dynamics' Application Engineers can determine the amount of deflection in advance. Then, as the weight is added to the press, the elevation will be very close the desired final elevation. For single layer resilient cushion isolators, one full turn is usually sufficient. Contact Vibro/Dynamics for deflection and settling data for multi-layered isolator models.

E. THE FINE/TUNING™ PROCESS

Fine/Tuning is usually done as a trouble-shooting procedure to reduce press motion. This process is *not* usually required if the press was carefully leveled and aligned. However, when the press bed is very rigid, it can maintain apparent level even when supported mainly by three isolators. This lack of support does not become apparent until the machine starts running and excessive press motion results. The excessive motion is caused by the press rocking on a high diagonal pair of isolators, similar to a table with one short leg. The Fine/Tuning Process can help correct this situation.

Fine/Tuning is a process of making fine adjustments to a machine's support condition without affecting the machine's level condition. This is possible because as the isolator's leveling screw is turned, that isolator supports additional weight. The additional weight deflects (compresses) the isolator's resilient member offsetting the added height due to the turning of the leveling screw. This results in very precise adjustments.

Fine/Tuning is normally performed using diagonal pairs of isolators, either feet 1 & 3 or feet 2 & 4. See Figures 18 and 19. If an adjustment is made to one of the isolators, an equal adjustment should be made to its partner isolator. This maintains the machine's level condition.

If your isolators are equipped with Vibro/Dynamics' Lod/Sen™ EFT (Electronic Fine/Tune) System, Fine/Tuning is easily and accurately determined electronically using a Lod/Sen Analyzer. See accompanying manual supplied with Lod/Sen Isolators.

It may be possible to use a Manual (non Lod/Sen) Fine/Tuning Process on lighter, high-speed presses using the energy generated by the press (press rocking) to make adjustments. Also, inspecting how much an isolator's resilient member bulges can also serve as a guide as to how much load an isolator is carrying compared to the others. *Remember*: Depending on where the machine's center-of-gravity is located, all isolators may not support an equal amount of load, so the resilient members will not bulge the same amount! Let logic be your guide.

Manual Fine/Tuning

Only one man should perform the following steps. Make sure that none of the leveling screws is rubbing against the inside surface of the mounting hole. This *will* affect the Fine/Tuning Process.

1. Loosen the Lock Nuts if tight.
2. Run the press at full speed and observe the amount of vertical motion at each support point.
3. Using a short-handled wrench, apply torque to the leveling screw of the isolator that appears to be moving the most.
4. If the leveling screw turns easily, it should be noted and returned to its original position.
   The leveling screw turns easily because the isolator is not carrying enough support and unloading as the press rocks from corner to corner. The screw will turn in a step-like sequence with the rocking of the press.
5. If the screw turns hard, it should be noted and left at its original position.
6. Continue the process until all isolators have been checked, results recorded, and a complete picture of the press' fine-tune support condition is developed.
7. Check your findings with the press's estimated weight distribution and make a determination, if any, on which isolator needs adjustment.
8. If adjustment is determined to be necessary, continue with the following steps. If not, tighten the Lock Nuts and end the process.
9. Return to the isolator whose screw turned the easiest and make a *small* adjustment while observing the effect of the adjustment on the press motion.
10. If press motion is reduced, record the amount that the leveling screw was turned and proceed to Step 12.
11. If press motion was unaffected, return the leveling screw to its original position and check the isolator that had the next greatest amount of motion. Repeat Step 10 until all isolators have been checked and then proceed to Step 12.
12. Recheck the press' level.
13. If press level is not level, turn the diagonal isolator of the one that was adjusted, an equal amount or return all isolators to their original level positions.

14. Recheck the press' level.
15. If press is level and motion reduced to a satisfactory amount, proceed to Step 16. If not, continue making fine adjustments to the diagonal pair of isolators until press is level and motion is reduced as much as possible. Proceed to Step 16.
16. End Process and tighten the Lock Nuts.

Properly functioning isolators *will* allow *some* motion. This is normal! The motion is due to the press shock energy being isolated.

If you were unable to reduce press motion to a satisfactory amount, there may be other causes. Excessive motion may result from an inadequate foundation or floor; poor soil conditions; overloading of the press; extremely off-centered tooling; or isolators that are too soft to handle the unbalanced forces generated by the press. Contact Vibro/Dynamics for assistance.

F. ADDITIONAL ADJUSTMENTS FOR PRESSES WITH ROLLING BOLSTERS

After leveling adjustments are completed, you may adjust the press elevation, if necessary, to align it with rolling bolster rails, feed lines, etc. This is accomplished by exactly adjusting all of the isolator leveling screws an equal amount. If done correctly, the press elevation will change without disturbing the level and support condition of the machine. Recheck the machine's level condition as a precaution.

Note: Refer to Tables 1 and 2 in Section II, pages 2 to 4, for isolator leveling adjustment ranges. The amount of elevation adjustment available will depend on how close the tops of the foundation pier surfaces were in relation to each other initially and the amount of isolator leveling adjustment used to level the machine. CAUTION! Do not adjust the isolator so low that the leveling screw does not have at least two full turns of adjustment after reaching the bearing plate, nor so high that the interlock bolts/pins contact the housing as per Figure 21. The following chart will help determine the number of turns required to make a desired elevation change.

LEVELING SCREW DIAMETER	HEIGHT CHANGE OF ISOLATOR	
	ONE FULL TURN	1/6 OF A TURN OR ONE FLAT
2-12 UN to 5-12 UN	0.083" (2.1 mm)	0.0139" (.36 mm)
6-8 UN to 8-8 UN	0.125" (3.2 mm)	0.021" (.53 mm)

Section VII
FINAL CHECK-OUT

1. Tighten down all lock and jam nuts on the isolators, securing them to the press feet. Hold the head of the leveling screw to prevent the screw from turning while tightening the Lock Nuts. For isolators equipped with Spanner-Type Lock Nuts, tighten the second Spanner Lock Nut down on top of the first.
2. Always make sure there are no rigid connections between an isolated press and the foundation, the floor plates, scrap shoots, or any other building structure that would provide a path for vibration to bypass the isolator and "short-circuit" isolation effectiveness.
3. Presses with rolling bolsters should have rolling bolster designs that feature cantilevered or pivoting beams. See Section IV, page 8. Rolling bolster rails should never be bolted to an isolated press.
4. Check all conduit, pipes, etc. for clearance – flexible connections are highly recommended.

APPENDIX A
Installation and Leveling Instructions for Micro/Level Isolators with "SD" Step-Down Leveling Screws

This addendum is to be used when installing Vibro/Dynamics Isolators that have an "SD" designation in the isolator's model number. For example:

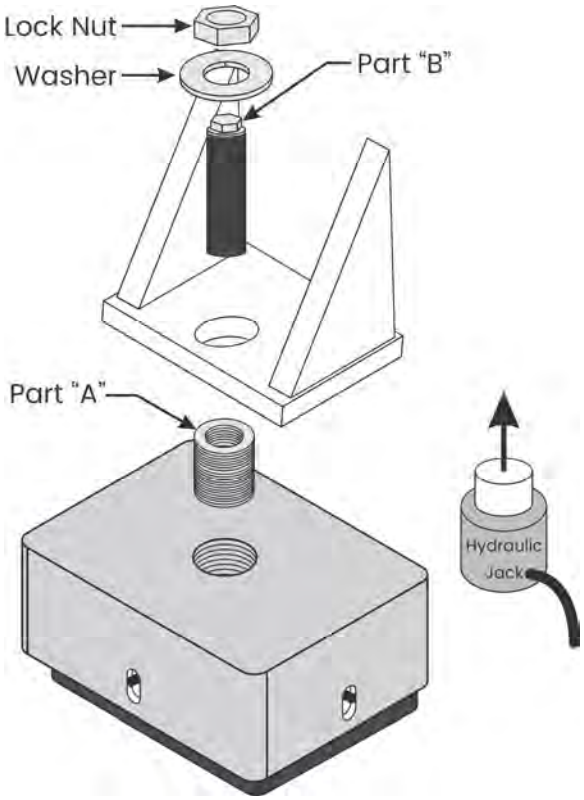
- 16M3000 1**SD**8
- BFM1265/90 1.25**SD**12
- BFM32-190 2**SD**18
- 34MXL3201 2.5**SD**24

These instructions are specifically designed to be used with the following instruction sets, but may be used with others:

- Installation Instructions for Heavy Presses using BFM, HLM, MXL, and HXL Micro/Level Isolators – Technical Bulletin M/L 607
- Installation and Leveling Instructions for Micro/Level® Isolators – Technical Bulletin M/L 674
- Installation and Leveling Instructions for MXL & HXL Micro/Level® Isolators – Technical Bulletin M/L 683

The following steps should be performed when you get to the "Installation" section of the standard instructions provided with your isolators.

1. Part "A" of the Leveling Screw is factory installed with the correct number of pre-adjustment turns. Part "B" is packaged separately.
2. Position each isolator under the machine foot as per standard instructions.
3. Carefully lower the machine onto the isolator(s), making sure that the machine's mounting hole is concentric with the tapped hole in Part "A". See standard instructions.
4. Thread Part "B" through the machine's mounting hole and then into Part "A" of the leveling screw until tight.
5. Level the machine as per the standard instructions. A hydraulic jack may be necessary to remove weight in order to turn the leveling screw.
6. End of Addendum Instructions. Follow the standard instructions to complete your installation.



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