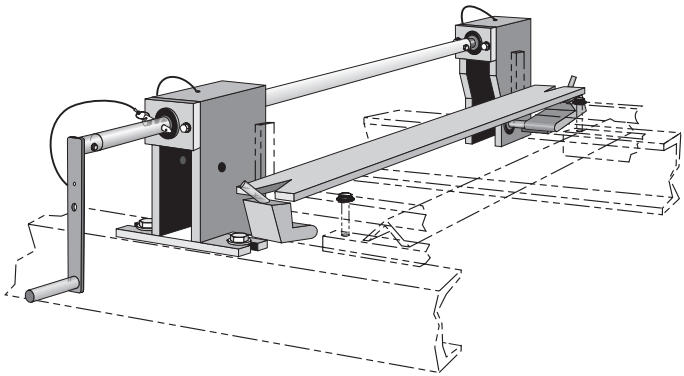
Instruction Manual • August 2003



milltronics

MWL WEIGHT LIFTER

SIEMENS

Safety Guidelines

Warning notices must be observed to ensure personal safety as well as that of others, and to protect the product and the connected equipment. These warning notices are accompanied by a clarification of the level of caution to be observed.

Qualified Personnel

This device/system may only be set up and operated in conjunction with this manual. Qualified personnel are only authorized to install and operate this equipment in accordance with established safety practices and standards.

Warning: This product can only function properly and safely if it is correctly transported, stored, installed, set up, operated, and maintained.

Note: Always use product in accordance with specifications.

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Table of Contents

Milltronics MWL Weight Lifter: Introduction

Note: Please follow the installation and operating procedures to ensure a quick, trouble-free installation, and to allow for the maximum accuracy and reliability of your Milltronics Weighing System

Milltronics MWL weight lifter is a mechanical calibration weight lifter for MSI, MMI, and MUS belt scales. The MWL mechanically raises and lowers the static calibration weights used to calibrate Milltronics belt scales. It stores the weights securely between the belt strands, above the calibration-weight support arms, and allows the operator to lower and apply the weights safely without having to lean into the conveyor.

The MWL is manually operated, and utilizes a high mechanical advantage to enable weights up to 225 Kg (500 lbs.) to be applied with very limited effort. The crank handle can be attached to either the left or right crank body. It uses 4 revolutions for full range of motion, and can be removed and stored for safety on the locking ball-pin which secures the MWL when it is not in use.

Two lifting pads support a base-bar weight above the calibration-weight supports of the belt scale: either flat bar or horseshoe style calibration weights are available. Locating notches in the base-bar weight engage the calibration weights securely on the lifting pads in the stored position, and the worm gear drive locks the lifting pads in place. A manually-applied locking-pin secures the MWL when the calibration-weights are in the stored position.

Applications

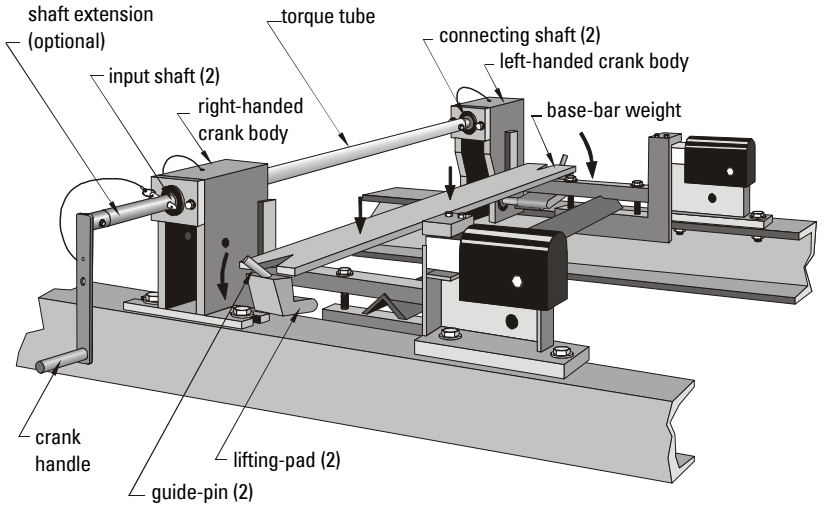
The MWL is designed to work with the following Milltronics belt scales:

- MUS-STD MIlltronics Standard Universal Scale
- MUS-HD Milltronics Heavy-Duty Universal Scale
- MSI Milltronics Single Idler Scale
- MMI Milltronics Multiple Idler Scale (combination of 2 MSI Scales)

Belt scale manuals can be downloaded from the Siemens Milltronics website at: www.siemens-milltronics.com

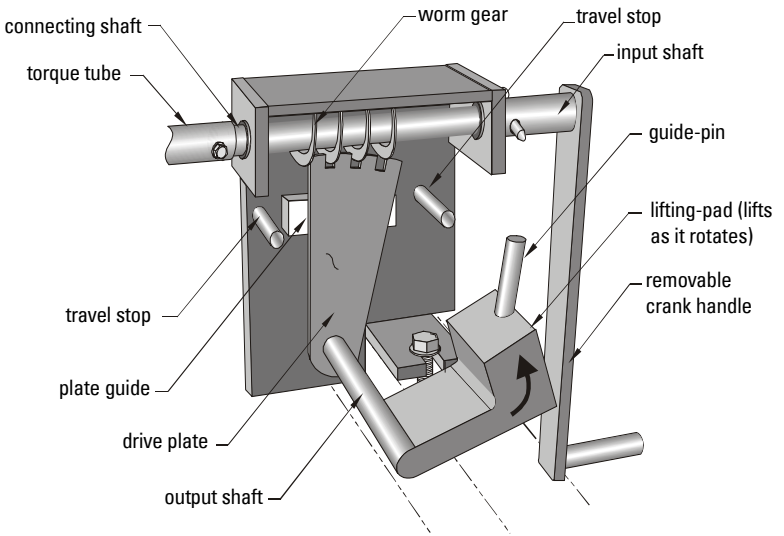
MWL Components

- a left-handed and right-handed crank body, each connected to a lifting-pad with guide-pin
- torque tube, to connect the left and right crank shafts
- crank handle, to be mounted to either the left or right input shaft
- optional shaft extension; adds 102 mm (4") to handle shaft length
- base-bar weight (either flat bar or horshoe style) to support other supplied calibration weights
- U-clamp to secure flat bar calibration weights



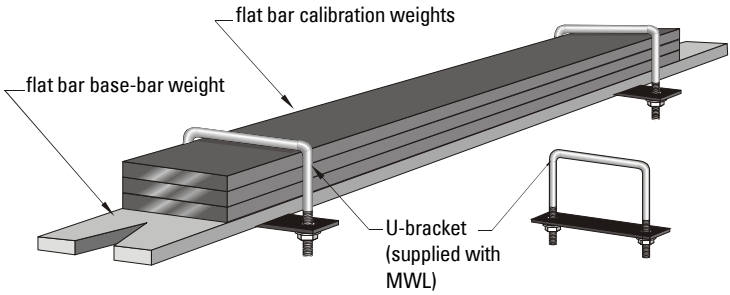
Cut-away view of Gear Drive

(Left-hand, clockwise-rotating crank-body shown)

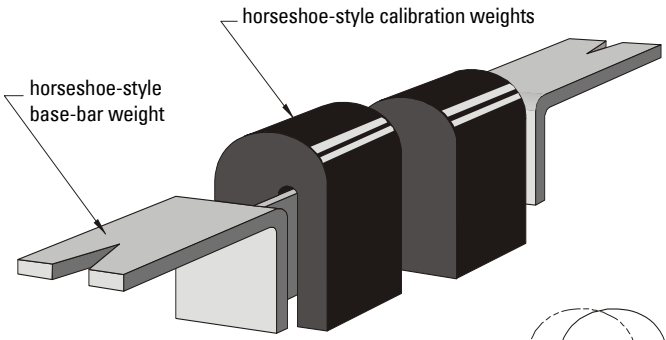


Calibration Weight Arrangement

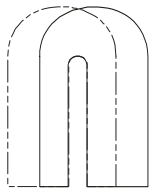
Flat Bar Style Calibration Weights



Horseshoe Style Calibration Weights



The horseshoe weights are not symmetrical:
an offset channel locates them on the base-bar weight.
Rotate alternate weights through 180^0 so that the weights are staggered, to stabilize the base-bar weight.



offset

Specifications

Belt Width

- MUS-STD Standard Duty: up to 1000 mm; CEMA width 42"
- MUS-HD Heavy Duty: 1200 mm and up; CEMA width 48" : can also be applied to narrower conveyors
- MSI: 500 to 2000 mm; CEMA width 18" to 84" (prepared for use with MWL)
- MMI: consists of 2 MSI scales, 2 MWL units are required

Idler Spacing

- Minimum of 610 mm (24")

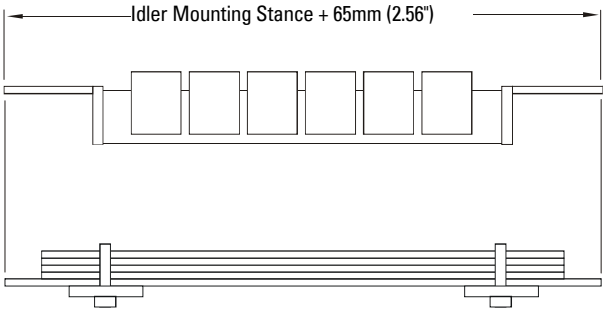
Calibration Weight Capacity

- MUS-STD: up to 175 lbs. (80 kg)
- MUS-HD: up to 350 lbs. (160 kg)
- MSI singly, (or MMI system): up to 500 lbs. (225 kg)

Crank Arm

- Mechanical Advantage: 20:1
- Number of Revolutions required for raising or lowering: 4

Calibration Weight Dimensions



Mounting Dimensions

- See detail installation drawings on page 18, page 19, and page 21, for MUS-STD Standard Duty, MUS-HD Heavy Duty, and MSI belt scales.

Approvals

- The MWL Milltronics Weight Lifter is in compliance with Directive 98/37/EC.

Installation

The Milltronics belt scale must be completely installed before you install the MWL. Please refer to the belt scale installation manual for installation details.

Note: Check that there will be sufficient clearance for the MWL. (See detail, **Check Clearance for Conveyor Belt**: page 7.) Clearance can be created artificially by shimming the idlers in the scale area.

The MWL installation has eight stages:

- Drilling the crank body mounting holes
- Mounting the crank bodies
- Mounting the torque shaft
- Installing the crank handle
- Testing the unloaded MWL
- Installing the calibration weights
- Testing the loaded MWL
- Shimming the MWL (if required)

1. Drill left and right crank body mounting holes

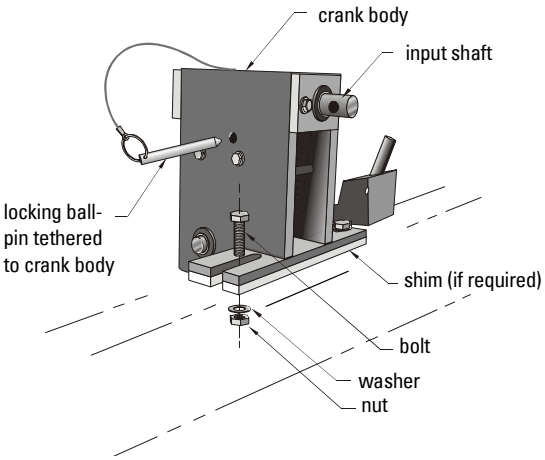
- Refer to the appropriate MWL installation drawing for your Milltronics belt scale.
- Measure and mark the locations of the mounting holes for each of the crank bodies. The left-handed unit turns clockwise to raise weights and the right-handed unit turns counter-clockwise: handing is marked on the crank bodies.
- Drill these holes as specified for 12mm (1/2") mounting hardware.

2. Mount left-handed and right-handed crank body

- Refer to the shim thickness tables on page 12 to determine whether you need to shim the MWL. Shimming is not always required: it is more likely to be required with the MUS scale, and less likely with the other models.
- If necessary, select and position the appropriate size shim(s).

- Loosely mount each crank body to the conveyor stringers using 12mm (1/2") bolts, nuts, and washers.

Right-hand (counter-clockwise rotating) Crank Body Shown

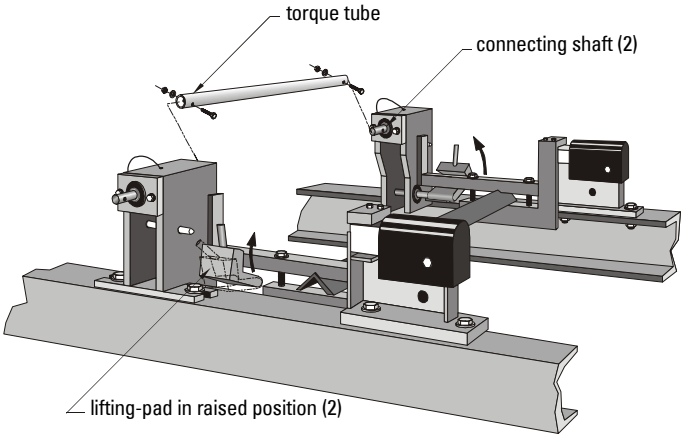


Note: The crank bodies must be left loose to allow for the torque shaft installation.

3. Mount torque shaft / Check clearance for conveyor belt

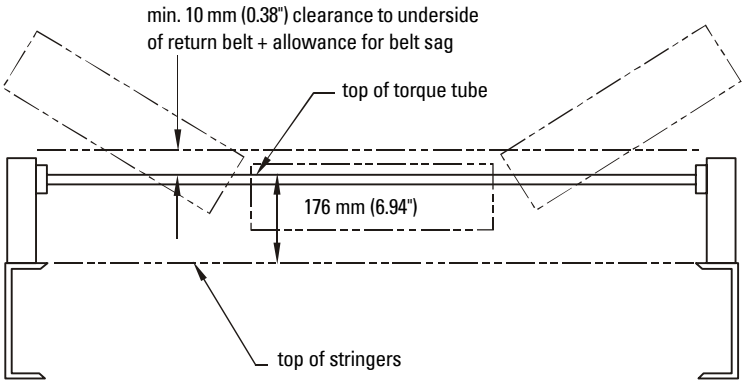
- Leave the locking ball-pins in place to hold the lifting pads of both crank bodies in the raised position.
- Place the torque tube over the connecting shafts of the left and right crank bodies.
- Loosely install the bolts, nuts, and washers that hold the torque tube onto the connecting shafts.
- Hand tighten the bolts, nuts, and washers that mount the crank bodies to the stringers.

- Hand tighten the bolts, nuts, and washers that hold the torque tube onto the connecting shafts.



Check Clearance for Conveyor Belt

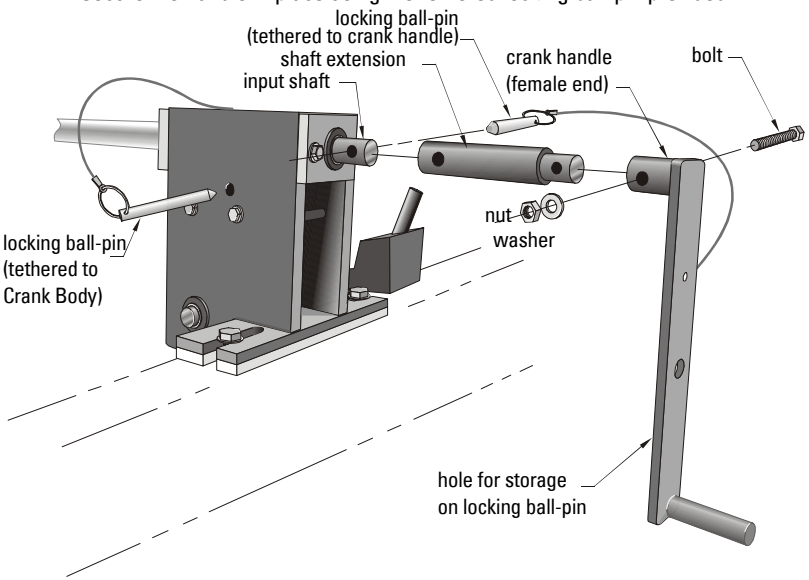
- Ensure there is 10mm (0.38") minimum clearance from the top of the torque tube to the underside of the return belt: inadequate clearance will cause the belt to wear.
- Allow additional clearance for belt sag.
- If necessary, shim the idlers in the scale area until the clearance is adequate. (See the Belt Scale Instruction Manual for detailed shim procedures.)



4. Install crank handle

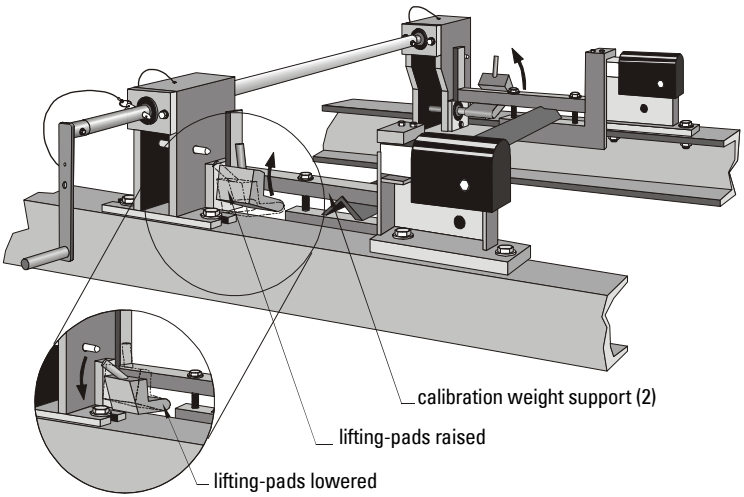
- Determine whether it will be more convenient to have the handle attached to the left-handed or the right-handed crank body, and if the shaft extension is required.
- Remove the plastic cap from the input shaft on the selected side.
- If the shaft extension is required, slide the female end of the extension over the exposed input shaft, and secure the extension with a bolt, nut, and washer.
- Slide the female end of the handle over the exposed input shaft (or shaft extension).

- Secure the handle in place using the tethered locking ball-pin provided.



5. Test the unloaded MWL / Align crank bodies

- Remove the locking ball-pins from each of the crank bodies. The ball-pin on the access side will serve as a locking safety pin when the weights are stored.
- Turn the crank handle and watch the lifting pads move up and down.
- Check to see whether any binding occurs during the process. If there is any binding or hesitation, the crank bodies need to be aligned to each other.

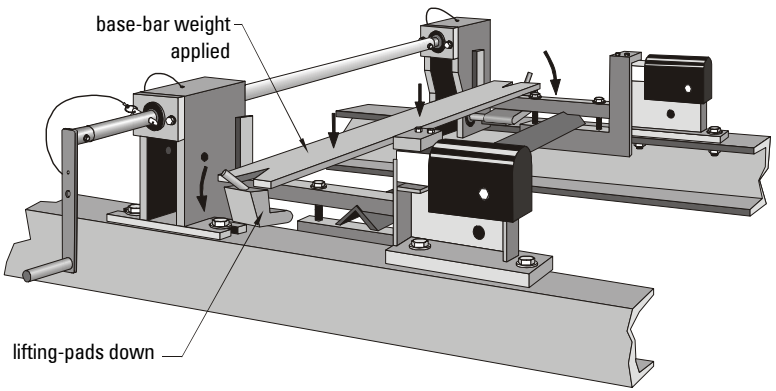


Align the crank bodies to each other, if necessary

a. Loosen the two bolts that mount each crank body.
b. Turn the crank handle until the lifting pads have completed at least one complete cycle from a raised to a lowered position: this process should automatically align the crank bodies.
c. Retighten the bolts that mount the two crank bodies.
d. Check again, and repeat the process until the MWL operates smoothly, with no resistance.

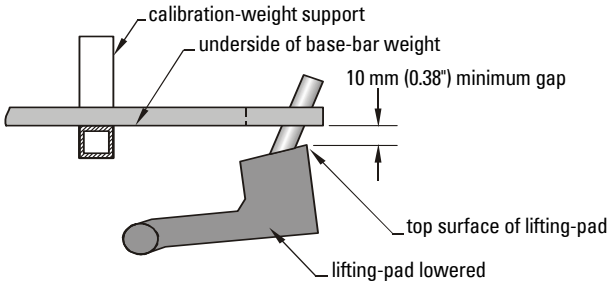
6. Install calibration weights / Check for clearance

Note: Ensure adequate base-bar weight clearance before adding calibration weights.

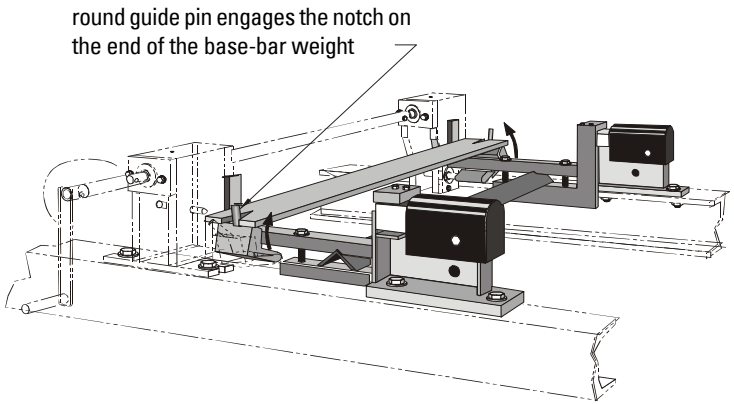


- Turn the crank handle until the lifting pads are fully lowered.
- Place the base-bar weight into position on the calibration-weight supports of the Milltronics belt scale.

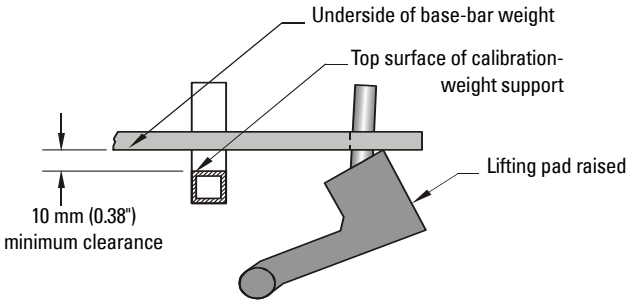
- Ensure there is 10mm (0.38") minimum clearance between the underside of the base-bar weight and the top of the lowered MWL lifting pads. If necessary, shim the belt scale and adjacent idlers to achieve this clearance.



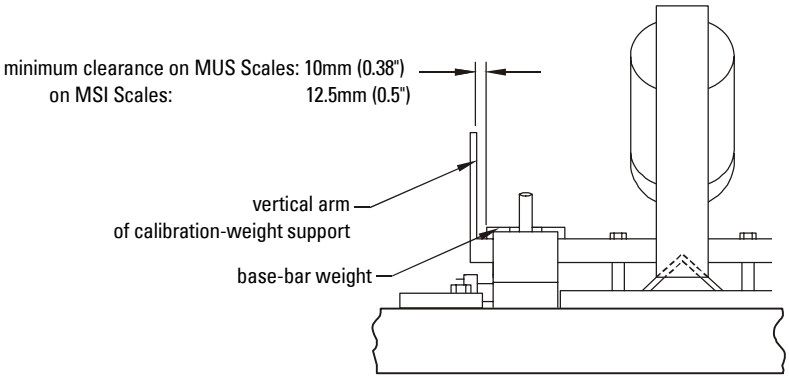
- Gently turn the crank handle until the lifting pads are fully raised: you may need to guide the notches in the base-bar weight onto the round guide-pin initially.



- Ensure there is 10 mm (0.38") minimum clearance between the underside of the base-bar weight and the top surface of the calibration-weight support when the lifting pads are fully raised. If necessary, shim the MWL to achieve this clearance.

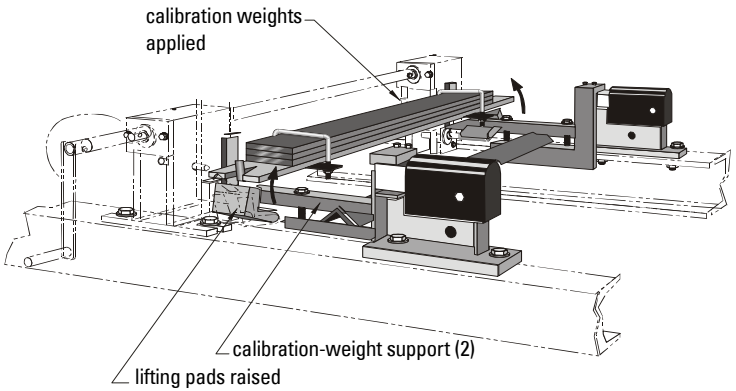


- Ensure there is sufficient clearance between the side of the base-bar weight and the vertical arms of the calibration-weight support arm, or support bracket: (see dimensions shown below). If necessary, move the two crank bodies further from the calibration-weight supports to achieve this clearance.



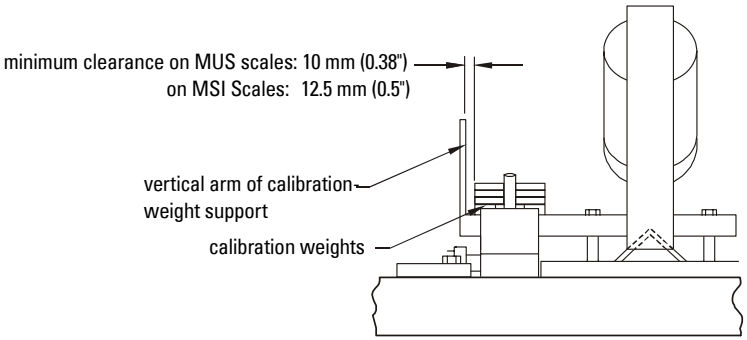
- Recheck the crank body alignment: (See "Align the crank bodies to each other, if necessary" on page 9).

7. Test the loaded MWL



- Keep the lifting-pads raised, and add the other calibration weights
- Check again to ensure there is 10mm (0.38") minimum clearance between the side of the stacked weights and the vertical arms of the calibration-weight

supports. If necessary, move the two crank bodies further from the calibration-weight supports to achieve this clearance.



- Recheck the crank body alignment: (See "Align the crank bodies to each other, if necessary" on page 9)

8. Shim the MWL (if required) / Recheck base-bar weight for clearance

When the MWL is used with the MUS belt scale, due to the wide variety of idler types and sizes, it may be necessary to shim the MWL for proper operation.

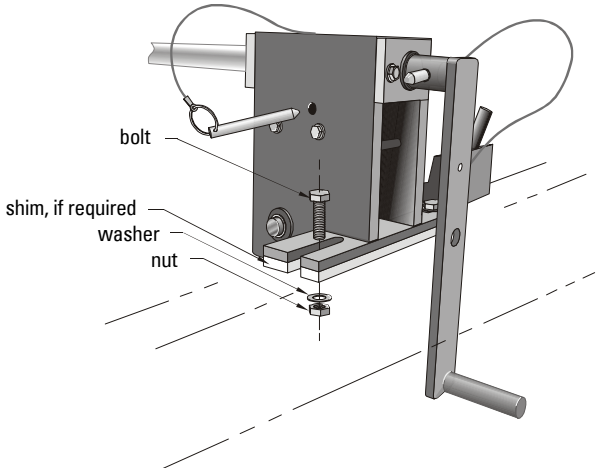
Note: These tables are provided as a guideline only: shimming is often not required

Angle Spine:		
Angle Size	**Shim Thickness**	**Number of shims**
2"		none
2-1/2"	0.31" (8mm)	1
3 "	0.31" (8mm)	2
3-1/2"	0.31" (8mm)	3
4"	0.31" (8mm)	4

Channel Spine:		
Channel Size	**Shim Thickness**	**Number of shims**
3"		none
4"	0.31" (8mm)	1
5"	0.31" (8mm)	1
6"	0.31" (8mm)	2

- Compare your idler spine to the spine type and size in the tables above, for a guide to the size of shims you may require.
- Select shims that will allow you to adjust the MWL crank bodies to the correct level.
- Remove the bolt, nut, and washer on one crank body and position the shim between the crank body and the conveyor stringer: it should not be necessary to loosen or remove the torque tube connecting the two crank bodies.
- After the shim is in position, re-install and tighten the bolt, nut, and washer.

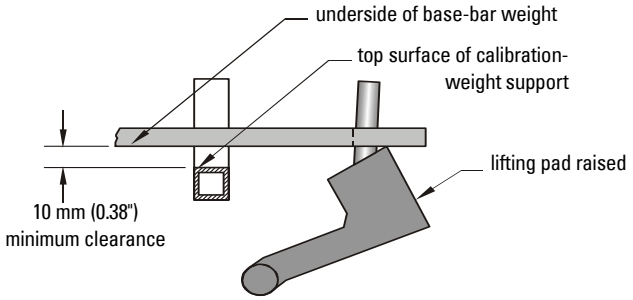
- Repeat the same procedure with the other crank body, then recheck the crank body alignment. (See next page for details.)



Recheck crank body alignment

- After shimming, raise and lower the lifting pads to check whether there is any binding or hesitation. If there is, repeat the alignment procedure on page 9.
- Raise the lifting pads again and check the clearance between the underside of the base-bar weight and the top surface of the calibration-weight support.

Shim Tables



- Repeat the shimming procedure until the lifting pads raise the calibration weights at least 10 mm (0.38") above the calibration-weight supports.
- Tighten the torque shaft bolts and the crank-body mounting bolts, then recheck all clearances.

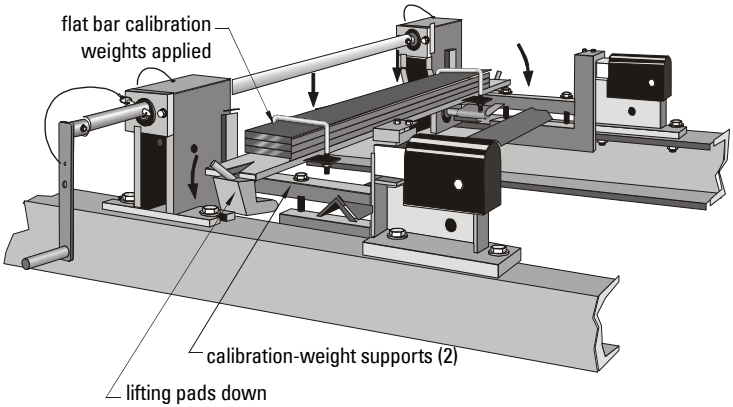
The MWL installation is now complete.

Operation

Note: To ensure accurate calibration, you must keep the area between the MWL lifting pads and the calibration weights clear of buildup during the calibration routine. (See Maintenance procedures on page 17.)

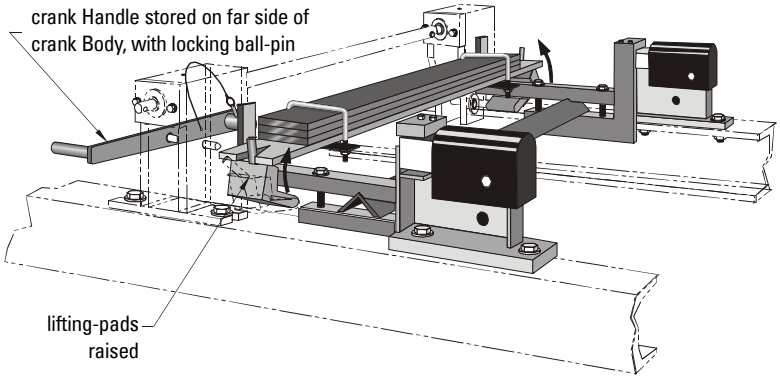
Applying calibration weights

Simply turn the crank handle until the calibration weights are fully lowered onto the calibration-weight supports of the belt scale. (Please see the manuals for the Milltronics Belt Scale and the Integrator, for the appropriate calibration procedures.)



Storing calibration weights

After you have completed the scale calibration procedure, turn the crank handle until the lifting-pads are fully raised.



Storing crank handle

Remove the crank handle and store it. (See next page for details.)

Remove the crank handle and store it, to prevent it from impeding traffic or material when the conveyor is in operation.

- Remove the locking ball-pin tethered to the crank handle, and remove the handle.
- Use the locking ball-pin tethered to the crank body nearest to the handle to secure the MWL from unintended use and to store the crank handle.
- Insert the locking ball-pin through the hole in the crank handle, and into the insertion point in the center of the crank body. Two clips on the side of the crank body help to hold the handle in position.
- Cover the input shafts with a guard, if they present a hazard to personnel when the MWL is not in use.

Maintenance Procedures

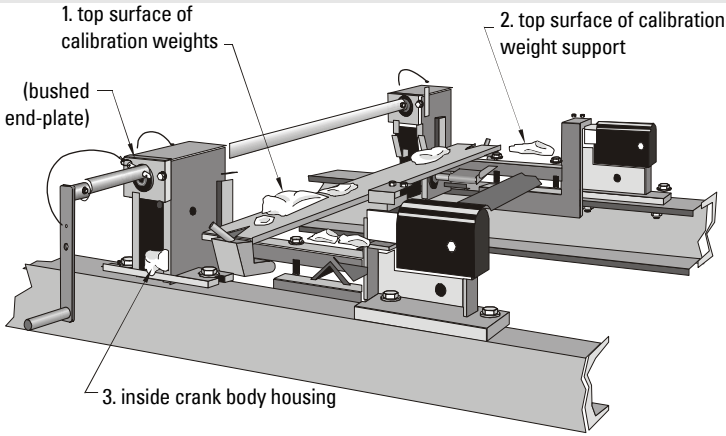
Removing material accumulation

To ensure that the belt scale will provide optimal accuracy, periodically inspect the area around the calibration weights and remove any material build-up.

The calibration weights must remain consistent to calibrate the scale correctly. If material accumulates on top of them, the added weight will cause the calibration procedure to produce poor results. The top surface of the calibration-weight supports must also be kept clean for the scale to produce accurate results.

Material should not accumulate inside the crank body housings under normal operating conditions, but it is a good idea to inspect them periodically.

Note: Before starting a calibration procedure, be sure to check that there is no material accumulation in the three areas described below:



1. Remove any material build-up from the top of the calibration weights.
2. Remove any material build-up from the top surface of the calibration-weight supports between the calibration weights and the conveyor scale.
3. Check inside the MWL crank body and inspect the worm gear drive: if material has accumulated here, remove it with an air stream or other suitable device.

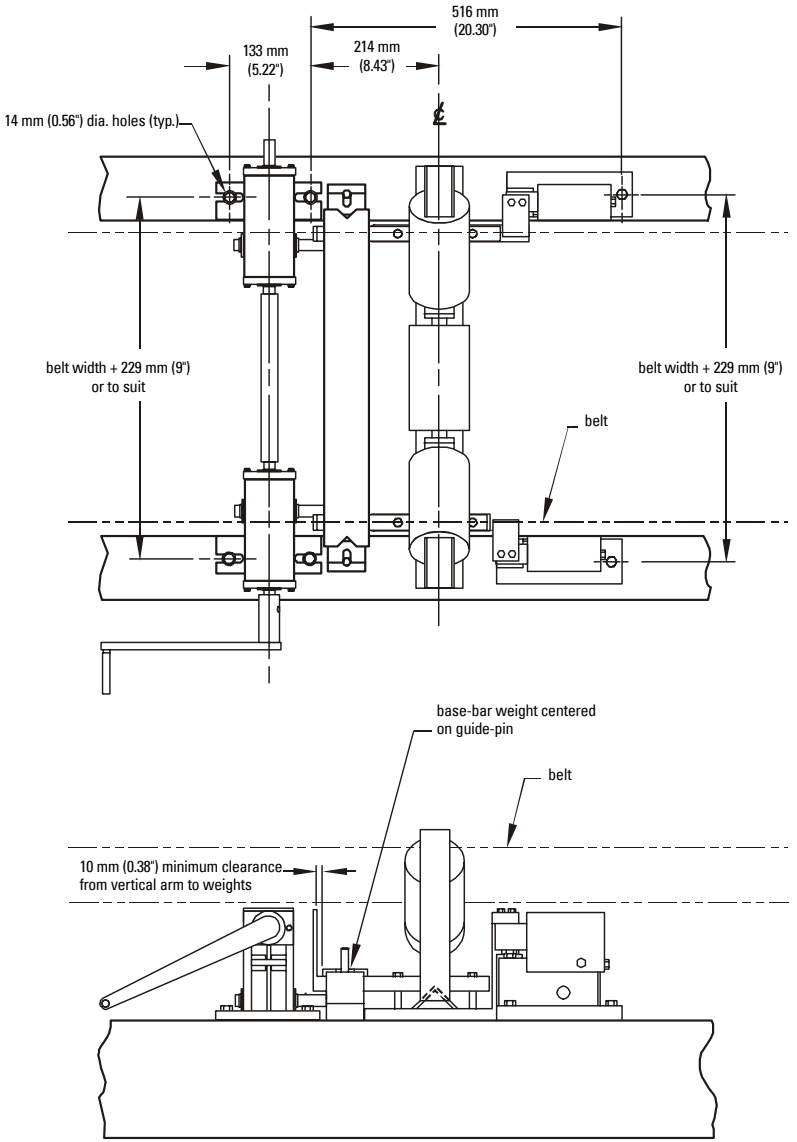
Note: The worm gear and notched plate are normally not accessible to the human hand: do not force any foreign matter into the area during operation.

Greasing

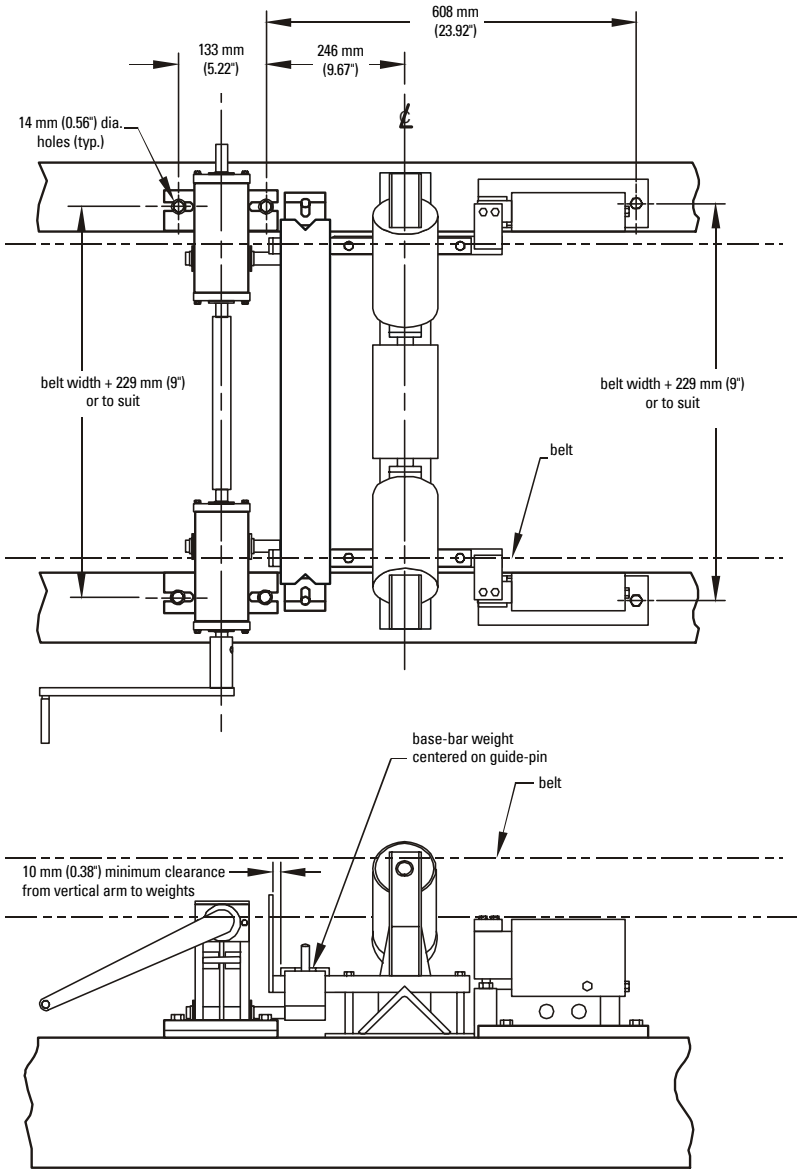
On both crank bodies, the teeth of the drive plate are greased at the factory. They should not require further greasing for a number of operations, depending on operating conditions. Inspect the drive plate periodically, but apply grease only when it is required. You may need to remove the bushed end-plates temporarily, to gain access to the teeth and worm gear.

Appendix I: Installation Drawings

MWL Installation Drawing for the MUS-STD Standard Duty Belt Scale



MWL Installation Drawing for the MUS-HD Heavy Duty Belt Scale



Retrofitting an MUS-HD Heavy Duty Belt Scale:

See next page for details.

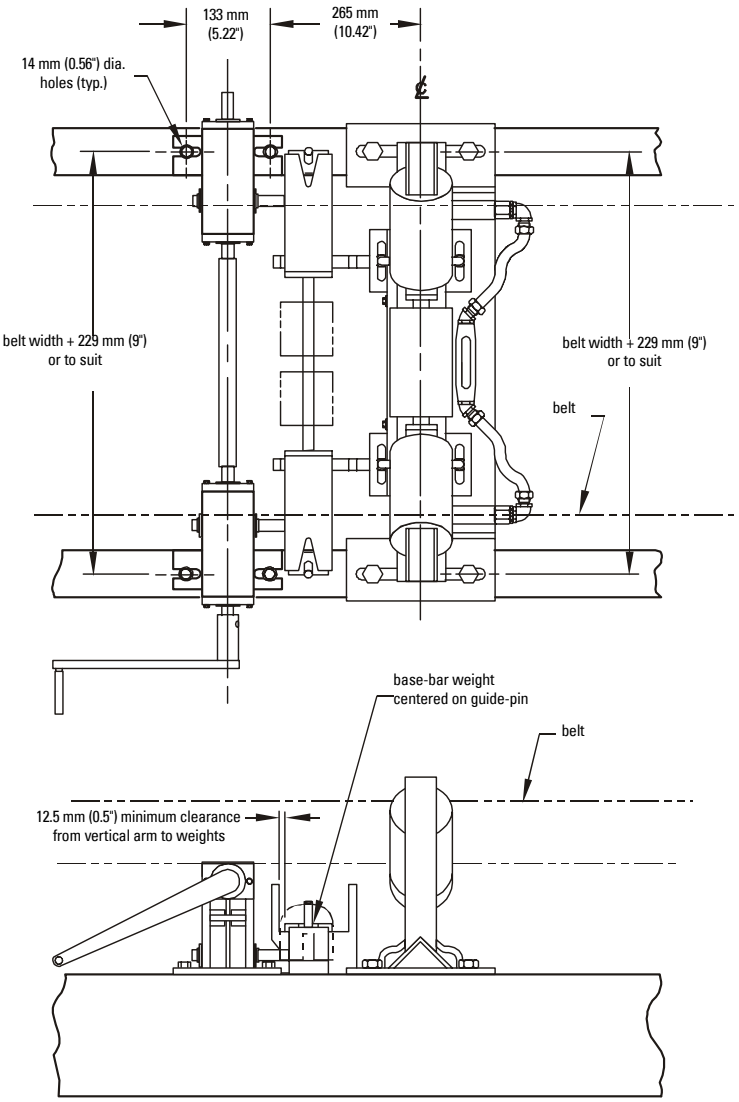
Retrofitting an MUS-HD Heavy Duty Belt Scale:

Two new idler clamping brackets are supplied with the MWL. These brackets provide better clearance for the base-bar weight and the flat bar calibration weights.

- Replace the existing idler clamping brackets with the new idler clamping brackets, one at a time, re-using the existing bolts, nuts, and washers.
- Tighten the nuts securely while ensuring that the clamping brackets remain parallel to the run of the conveyor stringers.

Please see the MUS instruction manual for further details.

MWL Installation Drawing for the MSI or MMI Belt Scale

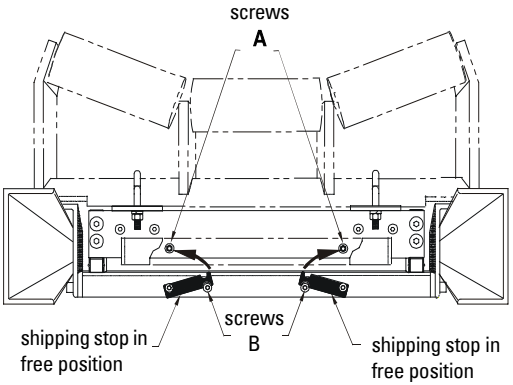


Retrofitting an MSI or MMI Belt Scale:

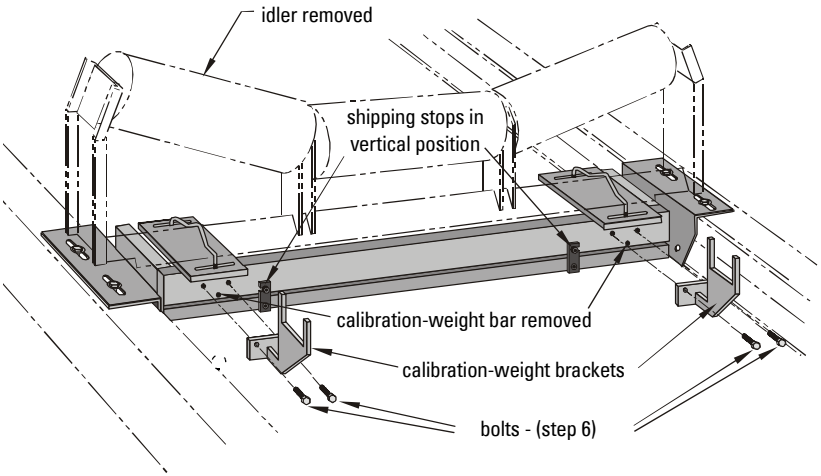
Two new calibration-weight brackets are supplied with the MWL to replace the existing calibration-weight bar. New bolts are supplied, but you will also need a C-clamp, metric Allen keys, and metric wrenches.

Note: Take care to protect the load cells from impact or prying forces during installation of the new calibration-weight brackets.

1. Rotate the shipping stops on the MSI into a vertical position, and tighten screws **A** to secure the stops in place. This will help to protect the load cells from damage while the calibration-weight brackets are being installed.

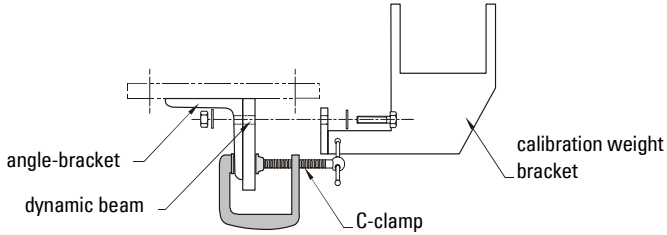


2. Remove the idler.



3. Remove the two socket-head cap-screws that secure the calibration-weight bar, then remove the calibration-weight bar from the dynamic beam of the belt scale.

4. Clamp the bottom of the idler support angle-brackets to the dynamic beam, using two C-clamps.



5. Remove the four socket flat-head bolts that secure the idler support angle-brackets.
6. Mount the new calibration-weight brackets using the same holes as the idler support angle brackets. Use the new bolts and nuts supplied with the MWL, and hand-tighten the nuts.
7. Align the new calibration-weight brackets with each other vertically and horizontally.
8. Tighten the nuts and bolts firmly to secure all four brackets. Torque value = 54.6 Nm (40 ft-lbs.)
9. Remove the C-clamps.
10. Re-install the idler and check idler alignment as described in the Belt Scale Instruction Manual.
11. Free the weighing mechanism: loosen screws **A** and rotate the 2 shipping stops inward and down, over screws **B** (See step 1, page 22). Tighten screws **A** to secure them in place.

Appendix II: Customer Calculation Sheet

Calculation of Total Calibration Weight Mass

Record the value of the base bar and weights to be attached. The weights should be recorded in kilograms or pounds, depending on the units system. In the case of 100mm (4") flat bar weights, the U-bolts which secure the bars each weigh 0.43 gm. (0.95 lb).

Weight of Base Bar _____ kg. or lb.

Mass of Calibration Weights _____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

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_____

Grand Total_____kg. or lb.

Calculation of Load Reference Values

Calibration Reference Value in kilograms/metre = $\frac{\text{Grand Total in kg}}{\text{Idler Spacing in m}}$

Or

Calibration Reference Value in lb/foot = $\frac{\text{Grand Total in pounds}}{\text{Idler Spacing in feet}}$

Using the Factoring Function of the Belt Scale Integrator

If the belt scale system has been pre-calibrated, as in the case of an MWL retrofit, the belt scale system should be zeroed. The Factor function of the Integrator should be used to accurately determine the value of the calibration weights in terms of the existing span calibration. (See the Integrator manual for more detail.)

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