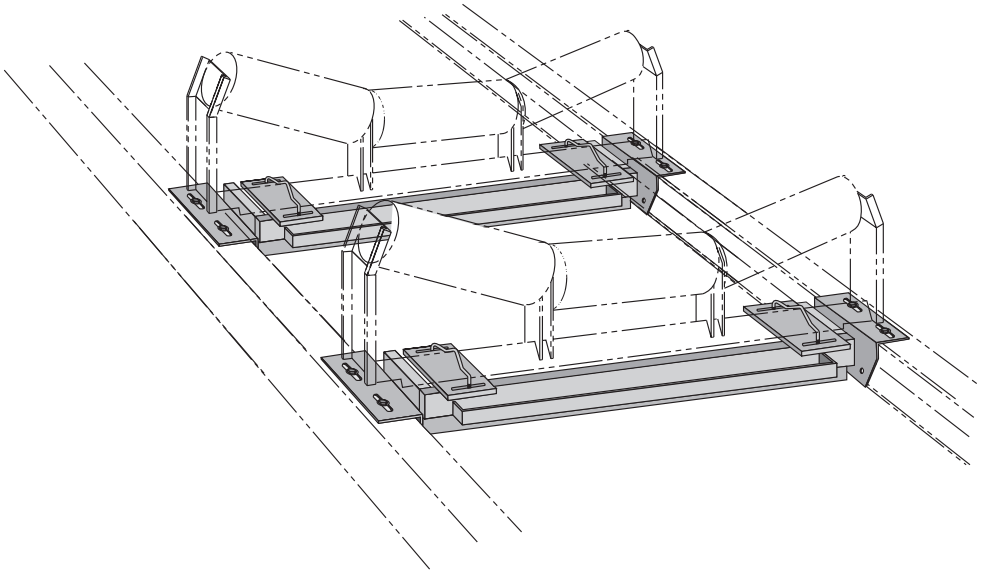
MILLTRONICS

MMI-2
2 IDLER BELT SCALE

Instruction Manual PL-327 January 2001



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Rev. 2.3

MMI-2 BELT SCALE

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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ABOUT THIS MANUAL

This instruction manual, PL-327, covers the installation, operation and maintenance of the MMI-2 belt scale.

It is imperative that this manual be read and understood before installation and start up of any component of the weighing system to which the MMI-2 is being applied. Adhering to the installation and operating procedures will insure a quick, trouble free installation and allow for the maximum accuracy and reliability of your weighing system to be achieved.

As the MMI-2 belt scale is used in conjunction with an integrator and optional speed sensor, the instruction manuals covering these components must be read as well.

ABOUT THE MMI-2

The Milltronics Multiple Idler (MMI-2) is a belt scale application using two Milltronics Single Idler (MSI) belt scales in succession. The scales are designed to be inserted into belt conveyors for continuous weighing of dry bulk solids.

Each MSI is comprised of the following:
- one weighbridge c/w two load cells with cables run in a common flexible conduit
- test weight(s)

The addition of an idler (supplied and installed by customer) to each weighbridge completes the weighing assembly. The MMI load cells provide an electronic signal, proportional to load, which is fed to the Milltronics CompuScale series integrator. Thus, weighing is accomplished without disturbing the process and without affecting the process material.

The MMI-2 is used where conveyor belt speeds or belt loading charactistics result in conditions that necessitate extending the weighing time beyond the capibilities of a single idler scale. It is also well suited for applications that require higher sustained accuracies, such as production control inventory accountability or where certification for trade purposes is required.

It is important to understand that the MMI-2 is an accurate and repeatable force sensor. Its performance is ultimately dependent upon the conveyor system and the quality of the installation and alignment.

SPECIFICATIONS

Accuracy:	» ± 0.25% of totalization over 5 to 1 operating range in factory approved installations	
Belt Width:	» 18" to 96" in CEMA sizes » 500 to 2000 mm in metric sizes » refer to Outline and Dimensions	
Belt Speed:	» up to 4 m/s (800 fpm)	
Capacity:	» up to 5000 TPH at maximum belt speed	
Conveyor Incline:	» ± 20° from horizontial, fixed incline » up to ± 30° with reduced accuracy	
Conveyor Idler:	» flat to 35° » up to 45° with reduced accuracy	
Idler Diameter:	» 50 to 180 mm (2 to 7")	
Idler Spacing:	» 0.5 to 1.5 m (1.5 to 5.0 ft)	
Load Cell:	» excitation:	» 10 V DC nominal » 15 V DC maximum
	» output:	» 2 mV / V excitation at rated load cell capacity
	» non-linearity:	» 0.02% of rated output
	» hysteresis:	» 0.02% of rated output
	» non-repeatability:	» 0.01% of rated output
	» capacity:	» maximum ranges: 50, 100, 250, 500, 750,1000 lb
	» overload:	» maximum 1000% of rated capacity
	» temperature:	» – 40 to 85 ℃ (– 40 to 185 ℉) operating range » – 15 to 65 ℃ (5 to 150 ℉) internally compensated
Approvals:	› CSA certified for general purpose	
Hazardous Locations:	› with the use of approved intrinsically safe barrier strips	
Weight:	› see chart, Outline and Dimensions	

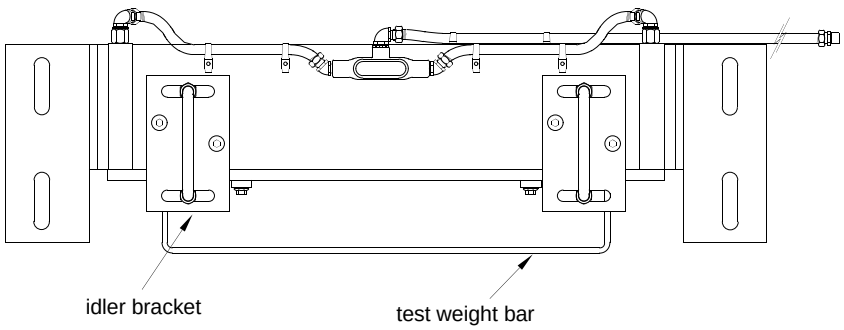
OPERATION

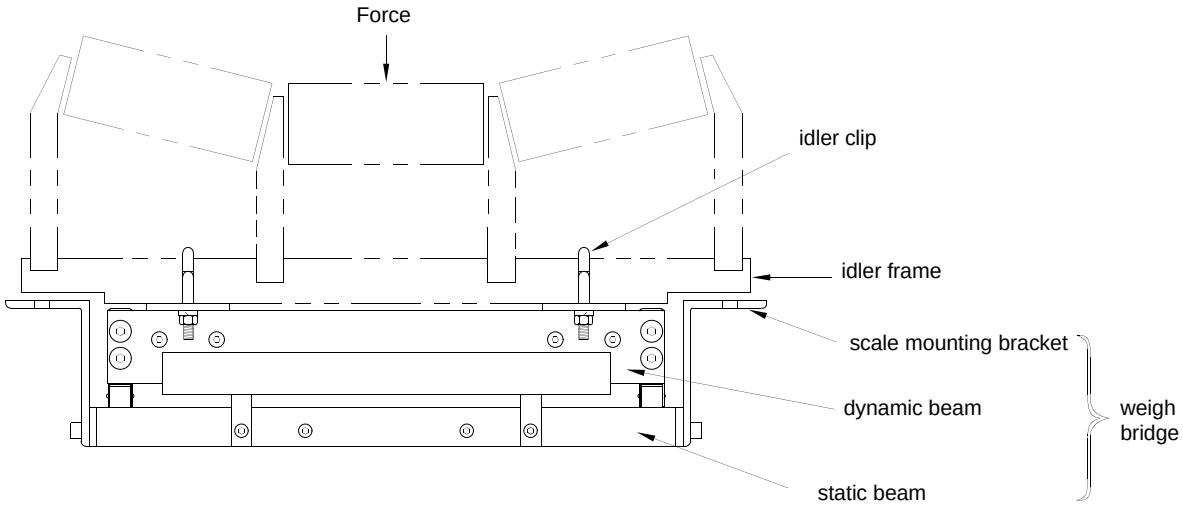
Each MSI weighbridge is designed to react to the vertical component of the force being applied to it. Each MSI consists essentially of a static assembly and a weighing assembly.

The static assembly is used to mount each MSI between the conveyor stringers and supports the weighing assembly via its load cells.

The weighing assembly supports the scale idler and transfers the weight of the material to the load cells. These are the active components in the weighing assembly.

As the material travels along the conveyor, a force is exerted through the suspended idler onto the weighing assembly. The weighing assembly is forced down proportionally. The movement in each load cell is sensed by its strain gauges. These modulate the excitiation signal from the electronic integrator to produce a signal proportional to weight, which is returned to the integrator. The movement in the load cell is limited by the positive stop incorporated in the design of the load cell.





INSTALLATION

PREAMBLE

The MMI-2 is shipped from the factory, attached to a frame for protection. Each MSI weighbridge must be removed from its shipping frame and inspected for physical damage.

Insure that the conveyor design meets the installation requirements for the Milltronics MMI-2 scale. The conveyor stringers must be rigid, straight, parallel to and square with the belt line in the area of the scale installation. The idlers to be used on the scale and at least the next two approach and retreat idlers must be of the same style and manufacture and in good condition.

Prepare the site in accordance with the Milltronics drawing(s) provided or by reference to Milltronics instruction manual PL-328, Applications Guidelines.

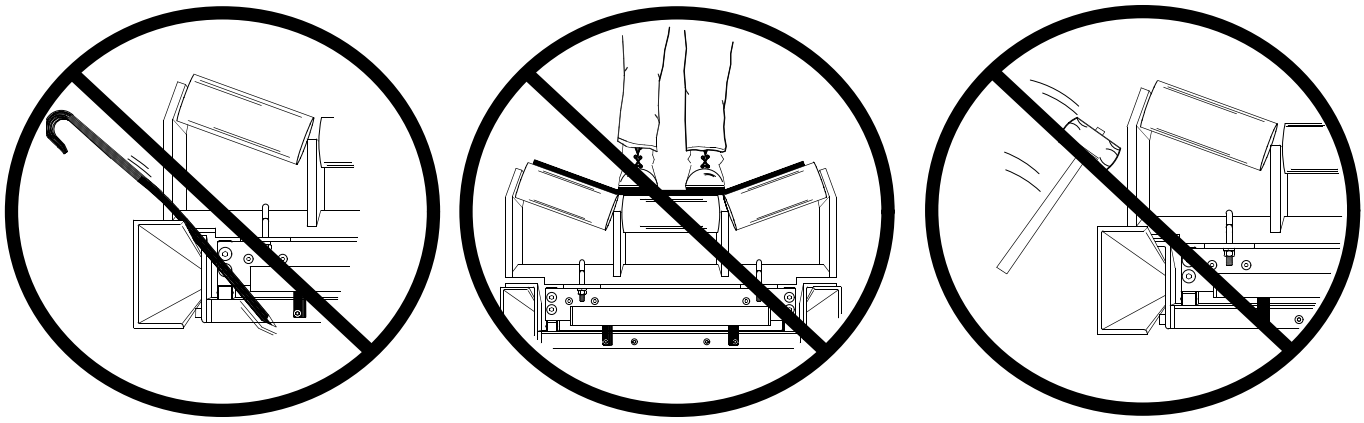
WELDING

Extreme caution should be used when arc welding in the area of the belt scale. Insure that no welding current can flow through the belt scale. Welding currents through the scale are sufficient to functionally destroy the load cells.

LOAD CELL HANDLING

The load cell can tolerate very little negative displacement, otherwise the load cell will be functionally destroyed.

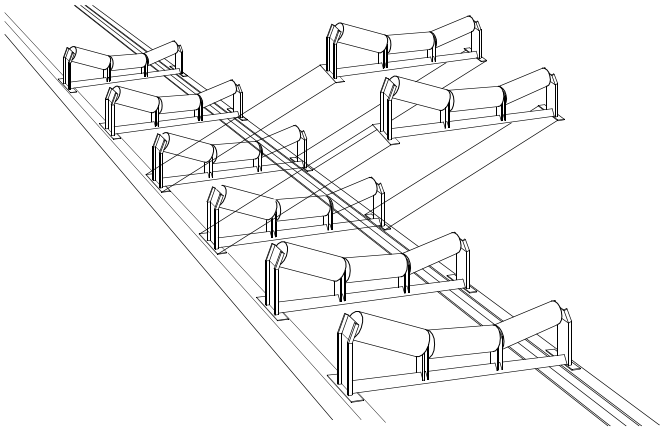
When handling the individual MSI's install both shipping stops to their vertical position to protect the load cells. Do not lift the MSI's by the weighing assembly or subject it to shock from blows of a hammer when trying to position it.



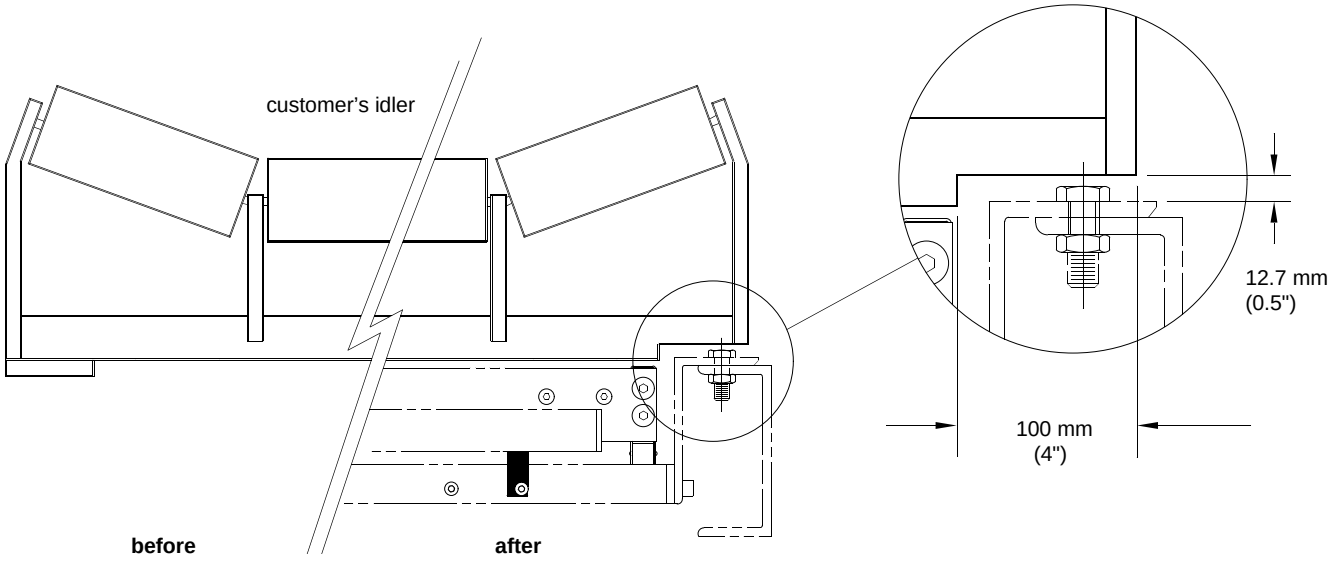
DO NOT STAND OR WALK ON THE SCALE.
OVERLOADING, SHOCK AND TWISTING OF THE SCALE CAN ALL FUNCTIONALLY DESTROY THE LOAD CELLS.

INSTALLATION PROCEDURE

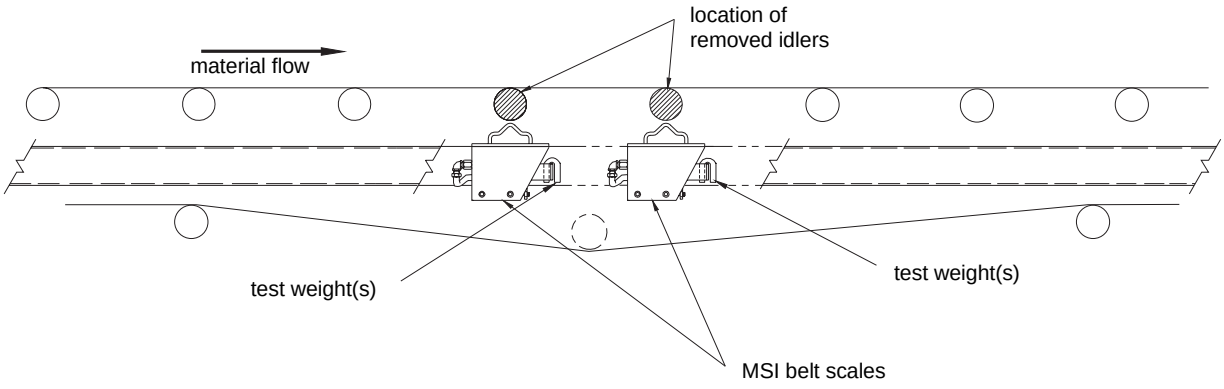
1. Remove the conveyor idlers currently at the desired points of installation.



2. Remove the foot plates and modify the idler frame at both ends of the idlers as shown .



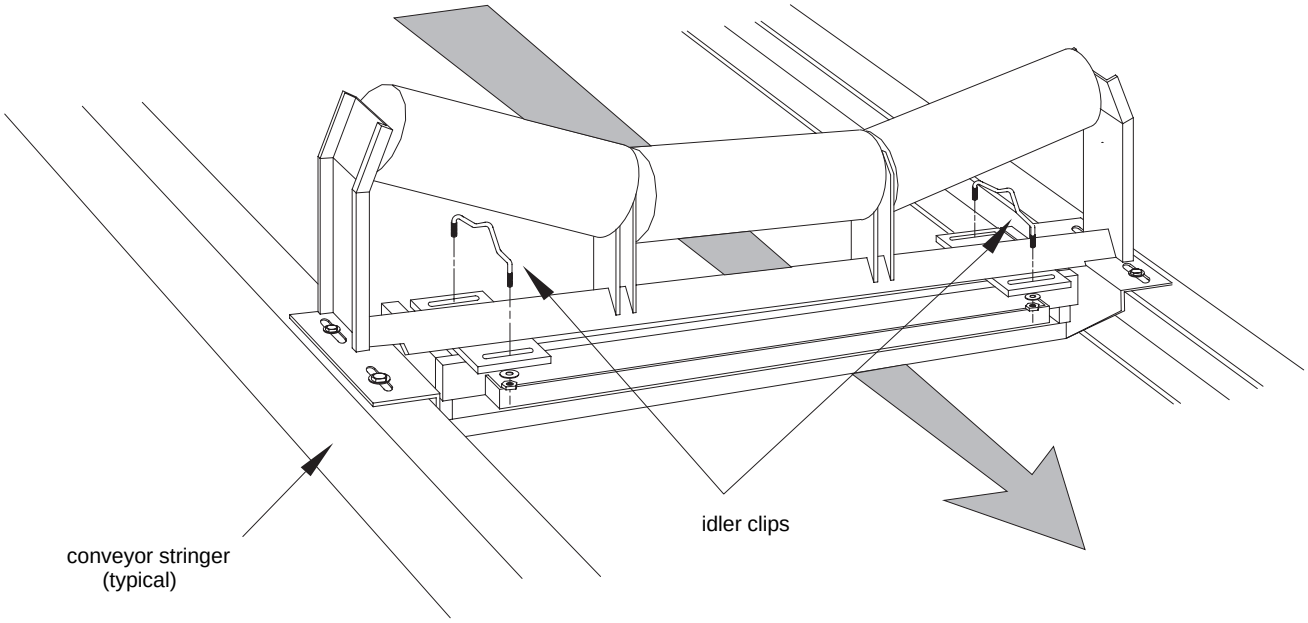
3. Insert the MSI's in the place of the removed idlers. The MSI is designed to use the existing holes in the stringer and should not require further drilling. Install the mounting bolts and nuts, but do not tighten . Remove the idler clips. Refer to Outline and Dimensions.



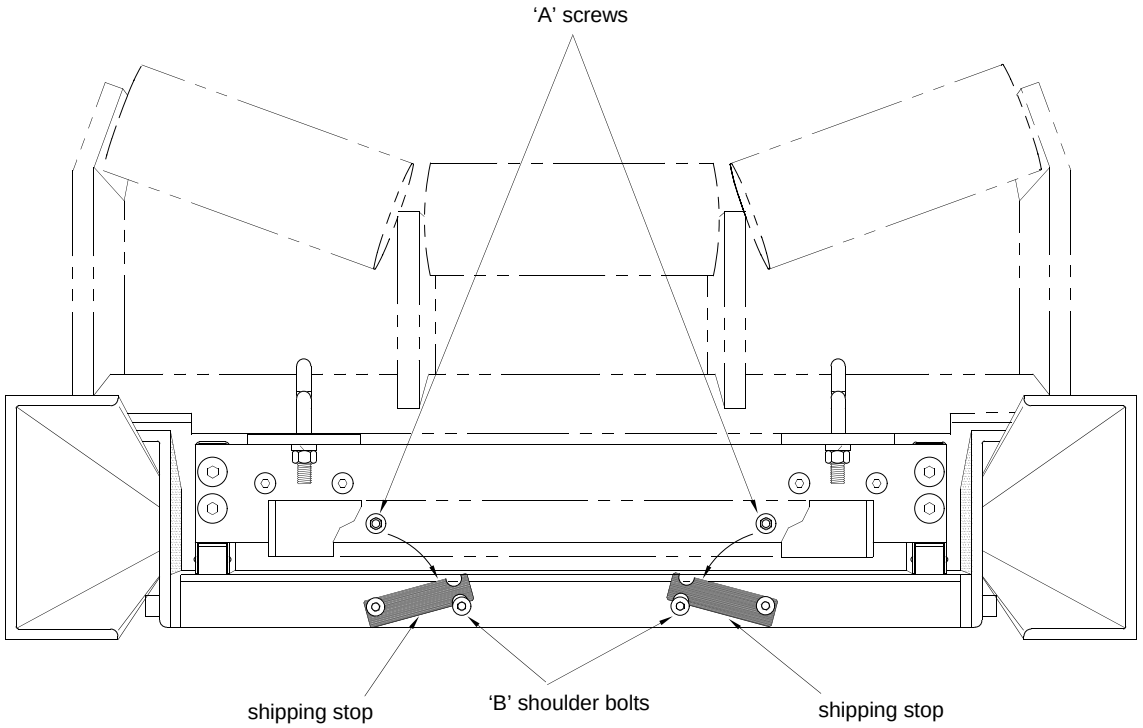
Insure that there is sufficient clearance between the return belt and the MSI and test weight (when used during the calibration procedure).

4. Position the individual MSI's such that they are centered and square to the stringer. Mount the modified idlers such that they are centered onto the scale using the idler clips. Tighten all mounting hardware. Refer to Idler Mounting for alternate idler mounting arrangements.

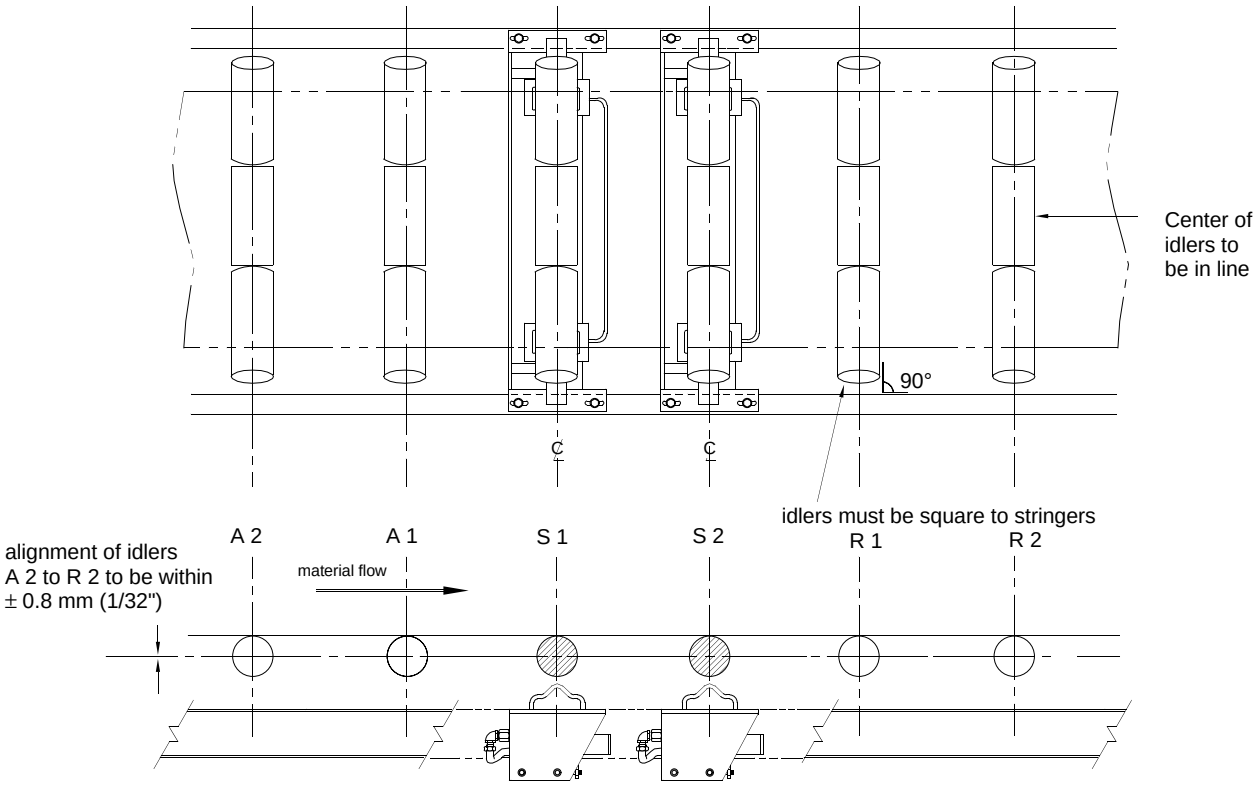
   Orient the scale so that the large arrow on the scale mounting brackets is pointing in the direction of material flow.



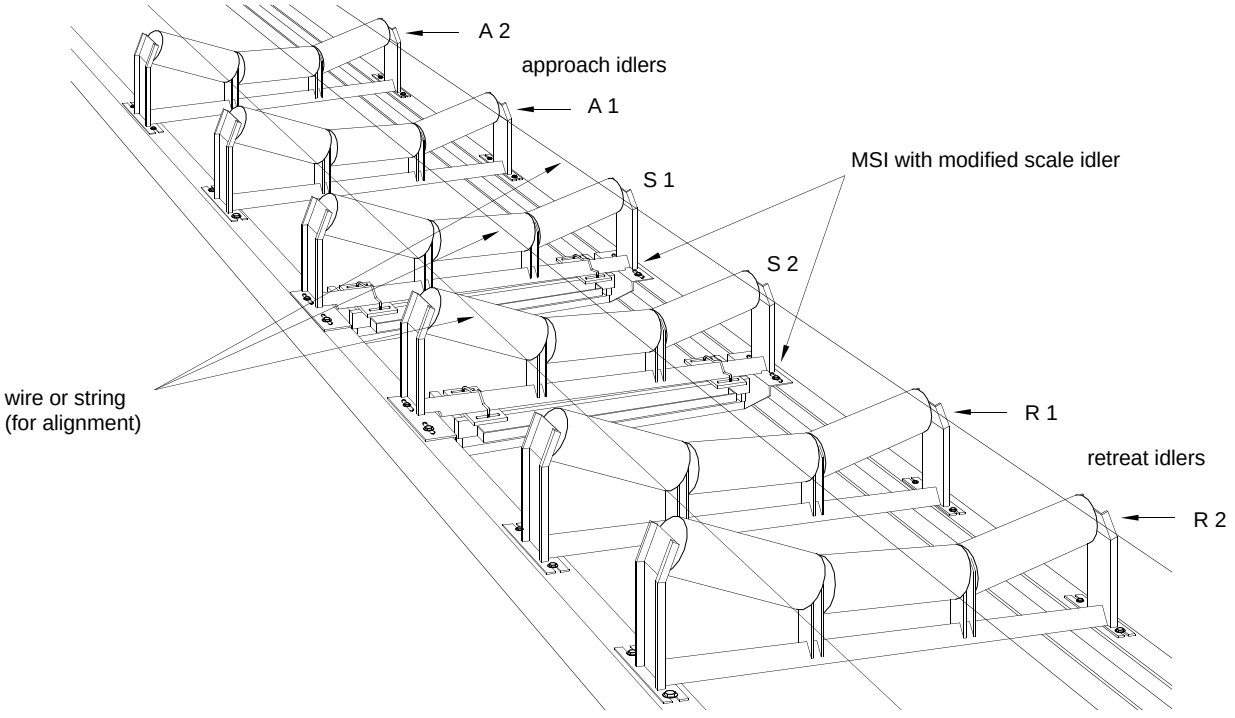
5. Release the shipping stops on each MSI in order to free the weighing mechanism. Loosen screws 'A' and rotate both shipping stops inward until the underside slots slide around the shoulder bolts 'B'. Tighten screws 'A' to secure in place.



6. The idlers in the weighing area must be properly aligned and leveled by shimming the scale idler (S#), the two approach (A#) and the two retreat idlers (R#) until they are within ± 0.8 mm (1/32") of each other. Be sure to check that the idlers are centered and squared to the conveyor during the shimming process.



7. Precise idler alignment is very important if maximum accuracy of the weighing system is to be achieved. Misaligned idlers will result in unequal forces being applied on each idler in the weighing area, causing calibration and measurement errors. Use a good quality wire or string to check for alignment. The wire or string must be able to withstand sufficient tension as to eliminate any sag. By shimming, make the necessary adjustments to bring all the rolls of the A2 through to the R2 idlers in line within 0.8 mm(1/32").



Although the accepted tolerance for idler alignement is ±0.8 mm (1/32"), the scale mounted idlers should never be lower than the adjacent idlers. Establishing good idler alignment is the most important part of the installation procedure. Scale accuracy is directly affected by alignment. Proper attention must be given here.

CALIBRATION

GENERAL

After the MMI-2 has been properly installed, calibration of the weighing system must be done in conjunction with the integrator. Refer to the integrator instruction manual for programming and calibration. The calibration is initially done using the supplied test load. Material tests are recommended to achieve maximum accuracy.

TEST LOAD

The test load value for each MSI is the same and is given on the accompanying data sheet. The value is to be entered into the dedicated programming parameter of the integrator, in kilograms per meter or pounds per feet. An equal number and mass of weights must be applied to each suspension during the span calibration function.

If the actual idler spacing differs from that recorded on the design data sheet, the test load must be recalculated as follows. Failure to do so will cause the design test load value to be in error.

$$\text{test load} = \frac{\text{total weight of all test weights per MSI}}{\text{idler spacing}} \left(\frac{\text{kg}}{\text{m}}\right) \text{OR} \left(\frac{\text{lb}}{\text{ft}}\right)$$

ZERO

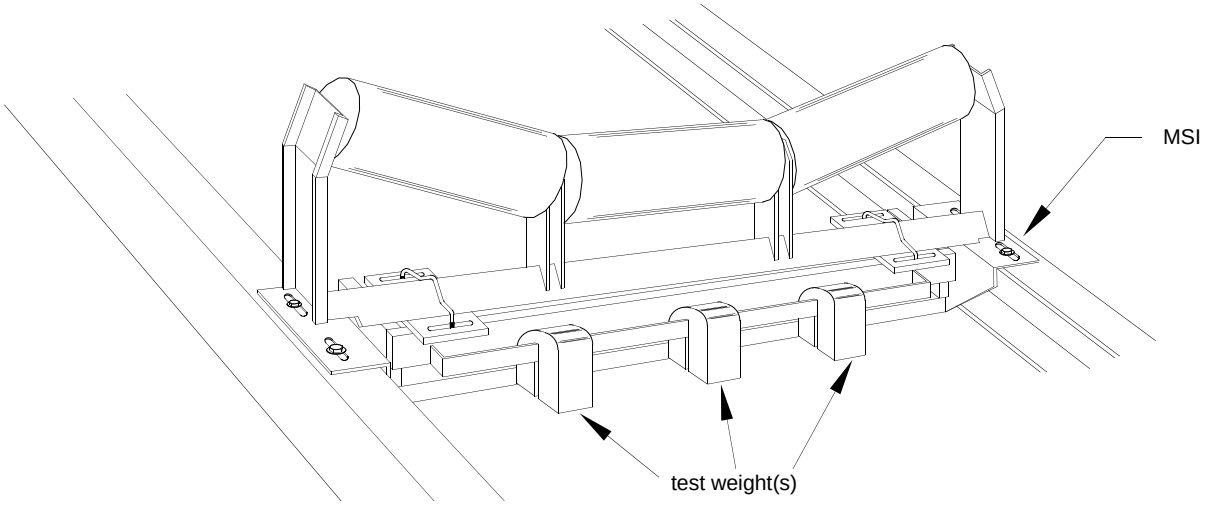
Perform the zero calibration as described in the Calibration section of the integrator manual.

SPAN

The test load used in the calibration procedure is the two sets of test weights (1 to 12) supplied, one for each MSI suspension.

Place each set of the test weights onto the calibration weight bar of the respective MSI as shown.
Perform the span calibration as described in the Calibration section of the integrator instruction manual.

After the span calibration has been completed, remove the test load and store it.



MATERIAL TEST

The MSI is guaranteed to be accurate to ±0.25% when installed on a conveyor in accordance with this manual and meeting the qualifications outlined in Manual PL-328 "MMI Applications Guidlines". This guarantee is based on calibrations performed using the test weights furnished with the scale and as previously referenced.

When the existing conditions are such that the installation of the scale cannot meet the above mentioned requirements for an approved installation it is recommended that material tests be performed. This will enable the user to compare the present scale results to the results of the material tests. The scale is then adjusted or factored so that subsequent scale calibrations with test weights will agree with actual run of material.

At least 3 samples of a minimum of 10 minutes duration at normal capacity should be taken to insure repeatability. Refer to "Material Test" and subsequent "Factoring" sections of the integrator manual.

RE-RATING

Any significant change in rate, speed and /or idler spacing from original design specifications should be referred to your local Milltronics office to insure that proper design parameters are maintained.

MAINTENANCE AND SPARE PARTS

Each weighbridge should be kept clean. Accumulations of material between the weighing assembly and static assembly as well as around each load cell can be detrimental to the weighing accuracy.

Periodically check the mechanical integrity of the scale and alignment of the stringers and idlers within the weighing area.

The integrity of the load cells can be seen when zero and span calibrations are performed. If the zero and span deviations display a continuous unidirectional drift or the system becomes uncalibratable for no apparent mechanical reason, the load cells may be suspect.

Replacement of load cell(s) will require a re-balancing of the load cells. Refer to the load cell balancing procedure for four load cells in the integrator manual.

The only spare part recommended for the MSI is the load cell. Refer to the load cell nameplate for the proper size and model number.

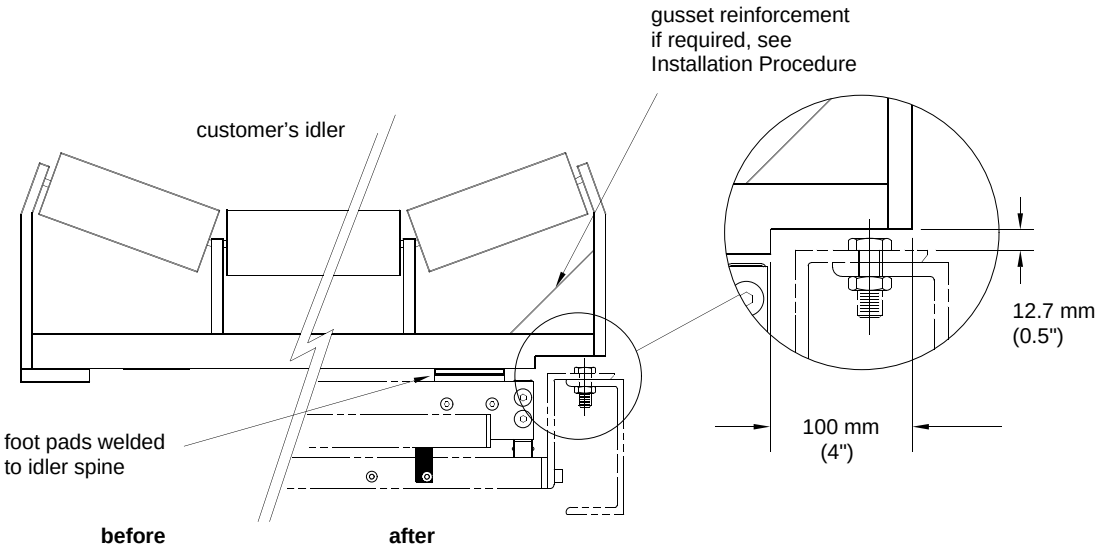
Precautions :

» when arc welding near the scale do not allow current to pass through the belt scale.
» reset the shipping stops to reduce physical shock to the load cells during maintenance.
» recalibrate after maintenance and prior to use.

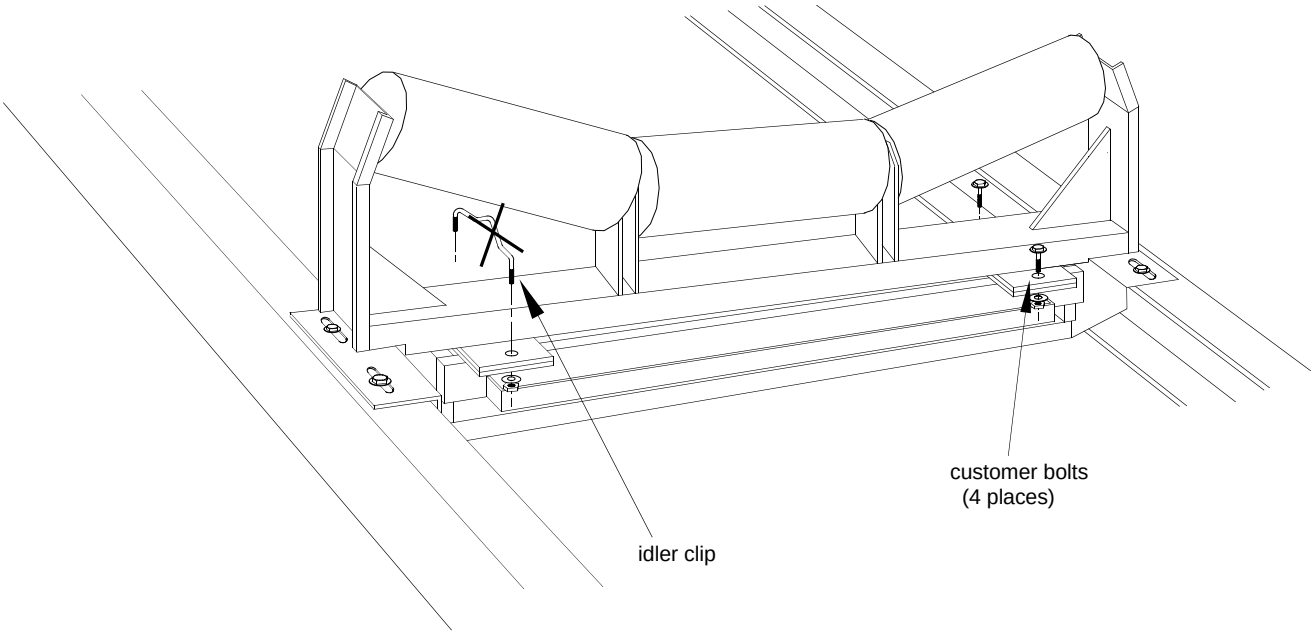
IDLER MOUNTING

The MSI is usually installed in conveyors employing conventional rigid structure idlers. Within this type of idler, construction will vary depending on the manufacture and the application. The idler depicted in the Installation Procedure uses an angle iron spine. The following depicts alternate idler construction and tips on how they should be modified and installed.

TROUGHED IDLER WITH CHANNEL SPINE

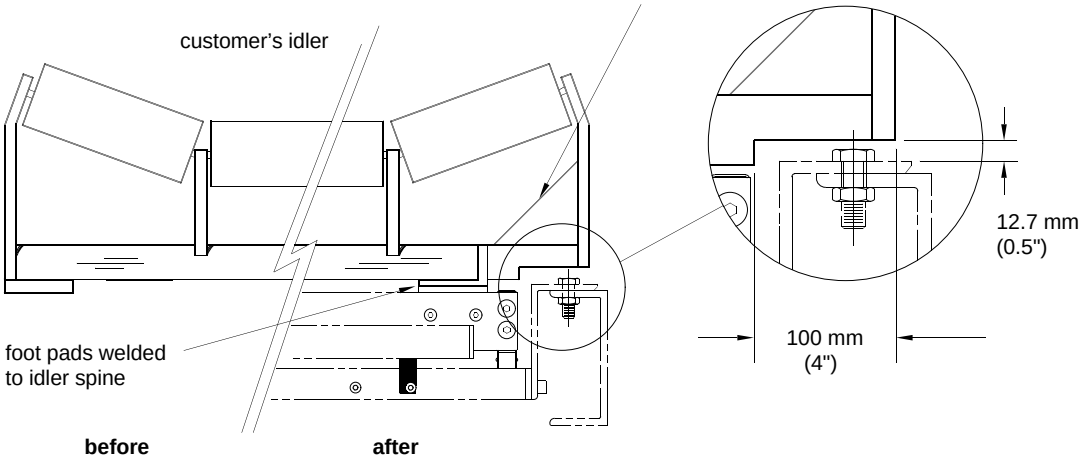


idler modification

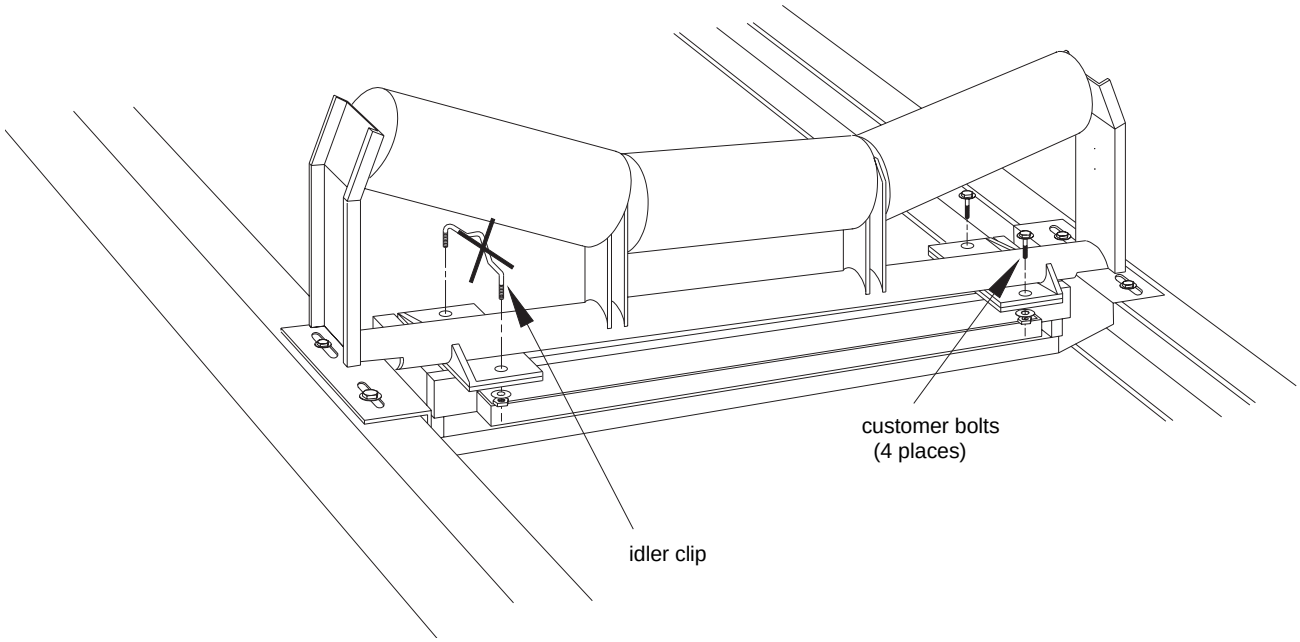


idler installation

TROUGHED IDLER WITH PIPE SPINE

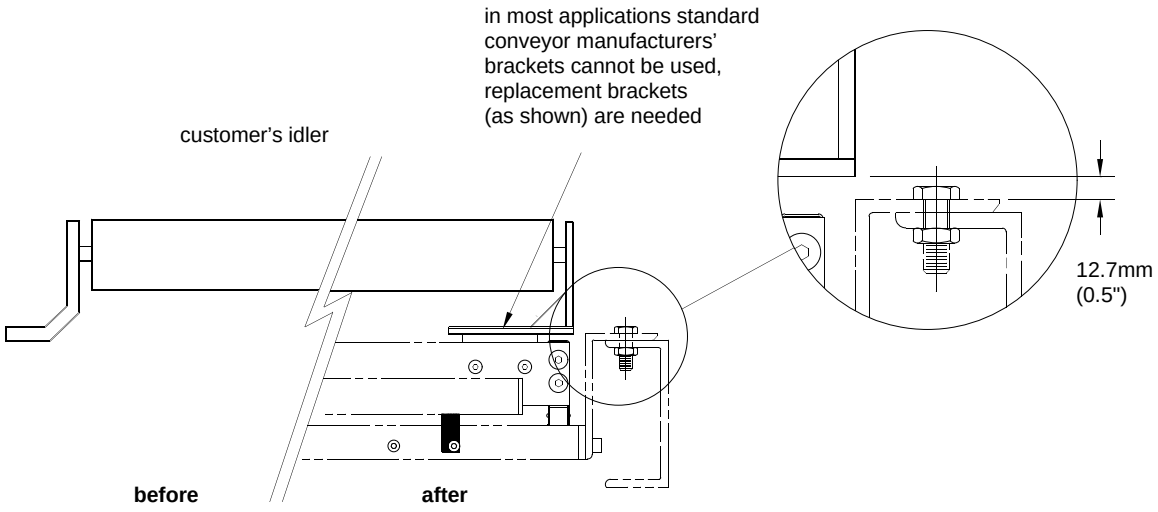


idler modification

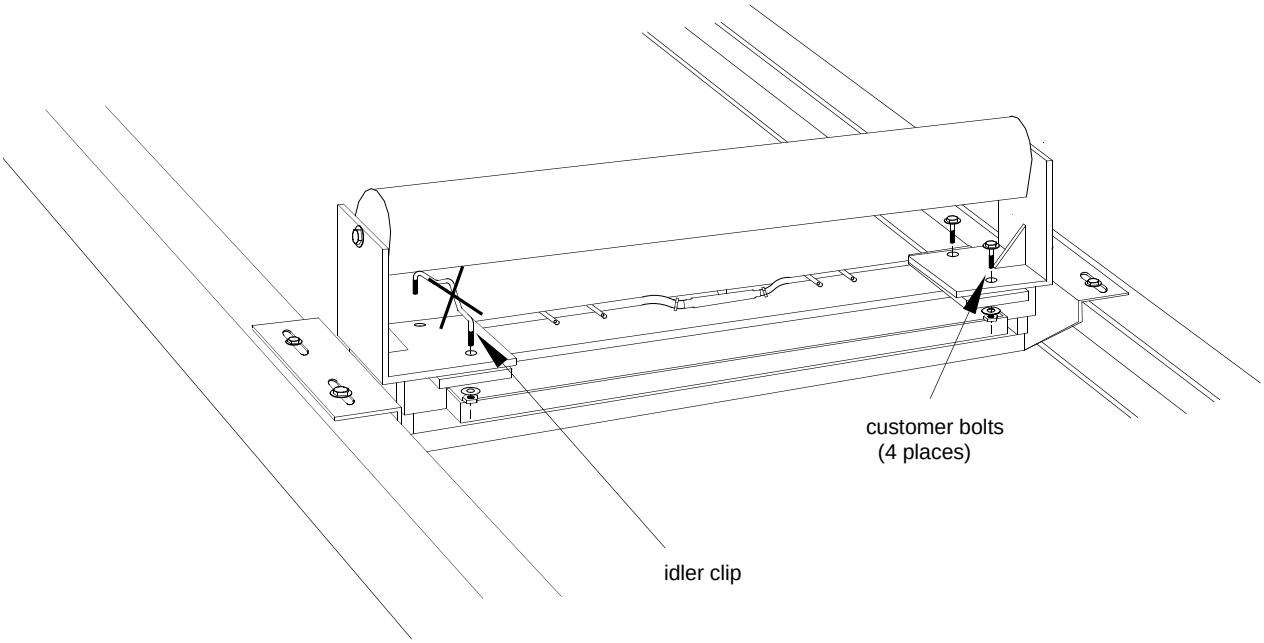


idler installation

FLAT IDLER

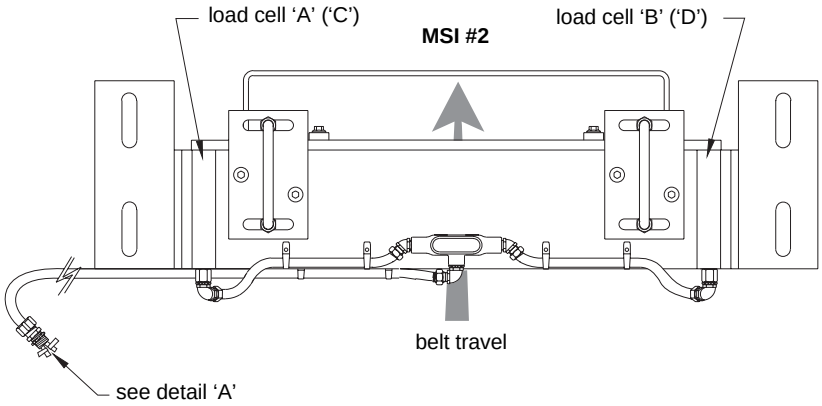


idler modification

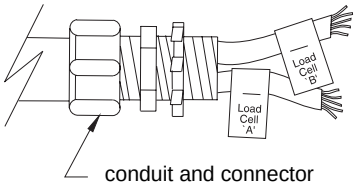


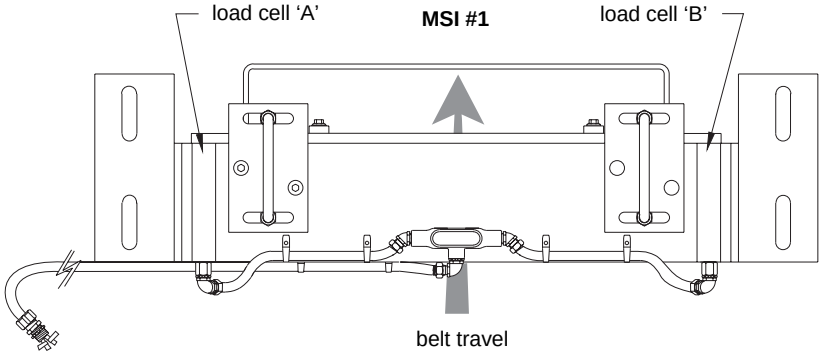
idler installation

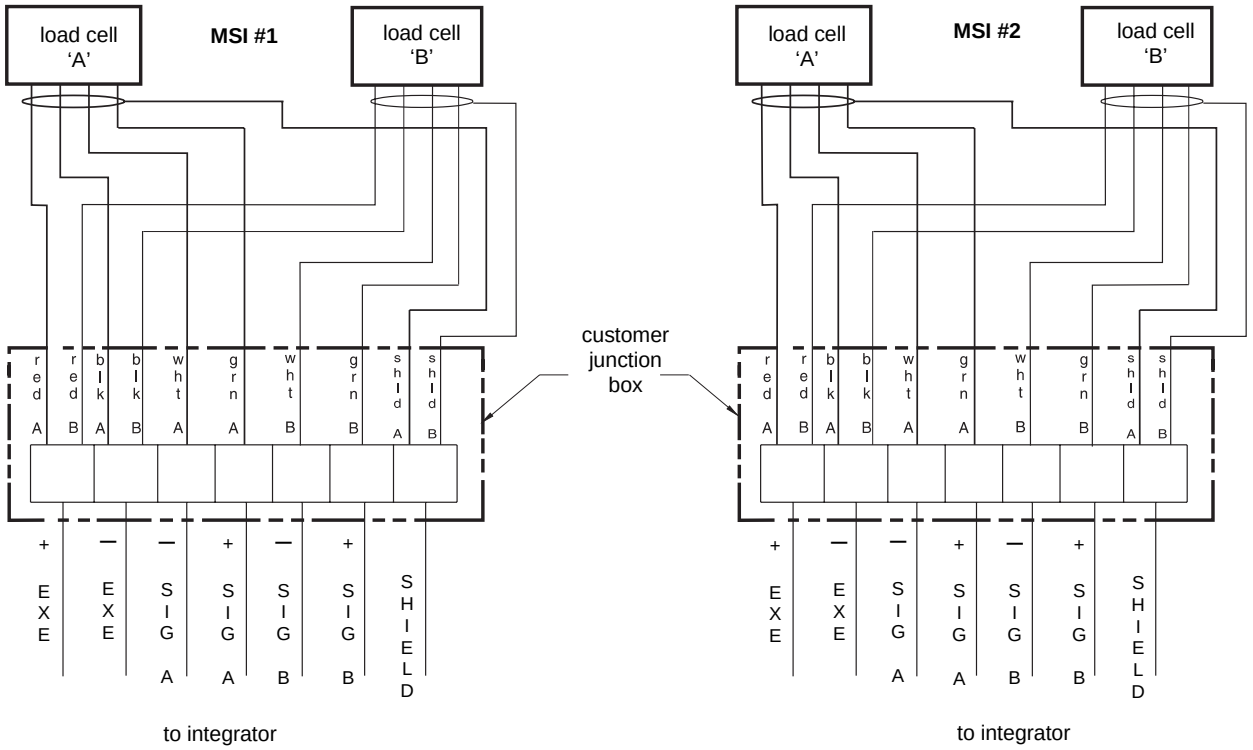
MMI-2 WIRING



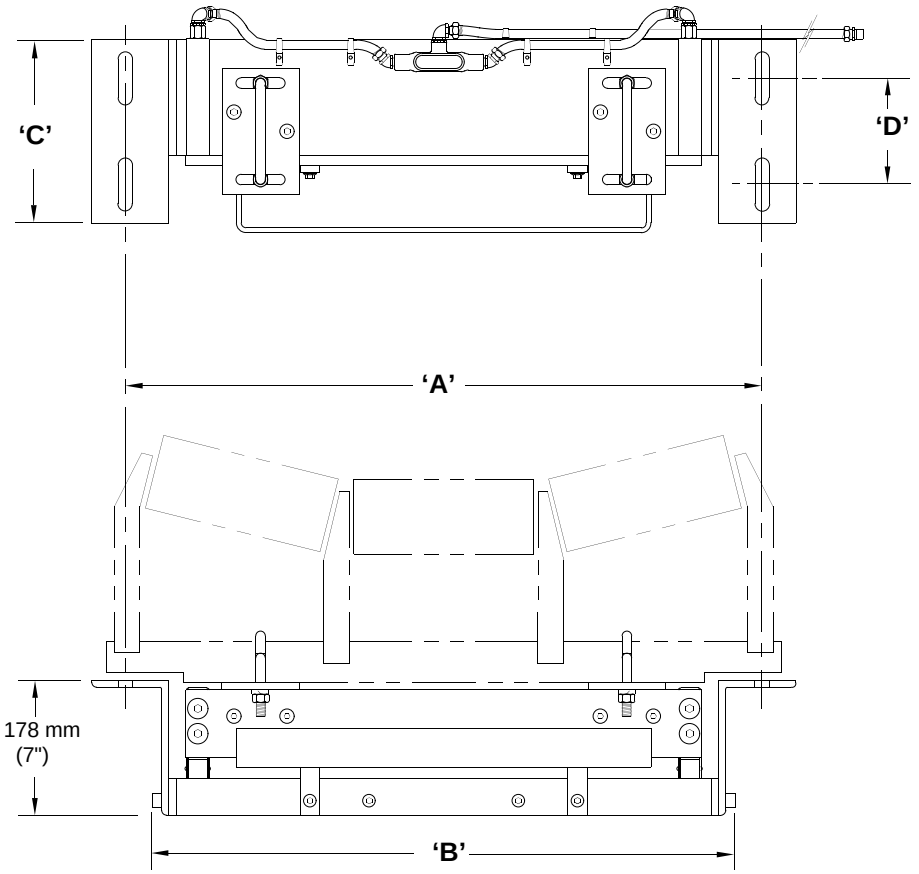
DETAIL 'A'





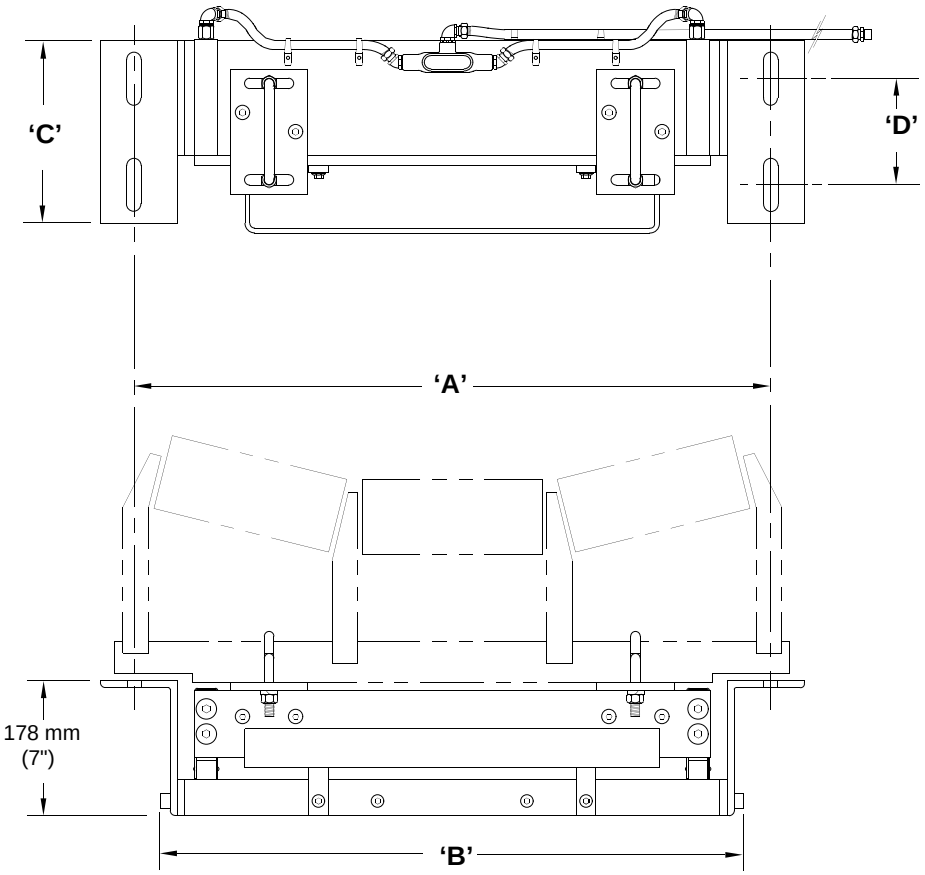


OUTLINE DIMENSIONS - CEMA



conveyor belt width	mounting scale width 'A'	minimum drop-in width 'B'	'C'	'D'	weight
18 "	27 "	24.5 "	9.5 "	5.5 "	82 lb
20 "	29 "	26.5 "	9.5 "	5.5 "	85 lb
24 "	33 "	30.5 "	9.5 "	5.5 "	90 lb
30 "	39 "	36.5 "	9.5 "	5.5 "	99 lb
36 "	45 "	42.5 "	9.5 "	5.5 "	107 lb
42 "	51 "	48.5 "	9.5 "	5.5 "	116 lb
48 "	57 "	54.5 "	12 "	8"	162 lb
54 "	63 "	60.5 "	12 "	8"	174 lb
60 "	69 "	66.5 "	12 "	8"	185 lb
72 "	81 "	78.75 "	12 "	8"	235 lb
84 "	93 "	90.75 "	12 "	8"	261 lb
96 "	105 "	102.75 "	12 "	8"	288 lb

TLINE DIMENSIONS - METRIC



conveyor belt width	mounting scale width 'A'	minimum drop-in width 'B'	'C'	'D'	weight
500 mm	740 mm	677 mm	241 mm	140 mm	37 kg
650 mm	890 mm	827 mm	241 mm	140 mm	40 kg
800 mm	1040 mm	977 mm	241 mm	140 mm	44 kg
800 mm	1090 mm	1027 mm	241 mm	140 mm	48 kg
1000 mm	1240 mm	1177 mm	241 mm	140 mm	52 kg
1000 mm	1290 mm	1227 mm	305 mm	203 mm	73 kg
1200 mm	1450 mm	1387 mm	305 mm	203 mm	78 kg
1200 mm	1540 mm	1477 mm	305 mm	203 mm	83 kg
1400 mm	1650 / 1740 mm	1587 / 1677 mm	305 mm	203 mm	88 kg
1600 mm	1900 / 1940 mm	1837 / 1877 mm	305 mm	203 mm	93 kg
1800 mm	2100 / 2140 mm	2037 / 2077 mm	305 mm	203 mm	98 kg
2000 mm	2300 / 2340 mm	2237 / 2277 mm	305 mm	203 mm	103 kg

MILLTRONICS

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