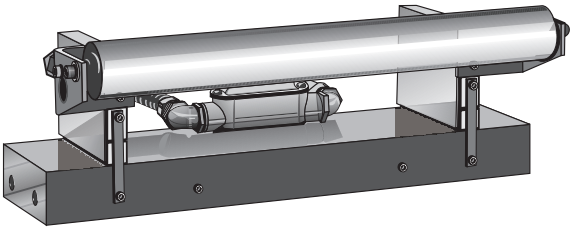
Instruction Manual • August 2003



milltronics

MLC BELT SCALE

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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Introduction

The Manual

Note:

- Please follow the installation and operating procedures for a quick, trouble-free installation, and to ensure the maximum accuracy and reliability of your Siemens Milltronics weighing system.
- The MLC is to be used only in the manner outlined in this manual or protection provided to the equipment may be impaired.

The Milltronics MLC belt scale is used in conjunction with the selected integrator and speed sensor. This manual covers only MLC installation and operating procedures. Integrator and speed sensor instruction manuals can be downloaded from www. siemens-milltronics.com.

This manual will help you set up your MLC for optimum performance. We always welcome suggestions and comments about manual content, design, and accessibility.

Please direct your comments to techpubs@siemens-milltronics.com.

Milltronics MLC Belt Scale

Milltronics MLC belt scale is a low-capacity scale for light belt loading. It is designed to be inserted into either a flat roll idler (non-troughing) belt conveyor or a flat pan slider belt conveyor for continuous weighing of dry bulk solids. The MLC is suitable for monitoring such products as fertilizer, tobacco, animal feed pellets, and sugar.

The MLC belt scale consists of the following:

- a static beam (125 mm [5"] steel channel support frame)
- two precision load cells (Each cell lead wire is run in flexible conduit, with approximately 1 m [3.28 ft] extending beyond the static beam)
- a flat roll idler
- a calibrating test rod, 22 mm (7/8") diameter
- a 25.4 mm (1") OD tube (to house the calibrating test rod)
- two mounting brackets (supports the idler, tube, and rod on the load cells)
- two shipping stops

The MLC load cells output an electrical signal proportional to load, which is applied to the selected Siemens Milltronics belt scale integrator. Thus, weighing is accomplished without interrupting the process and without affecting the process material.

Important: The MLC belt scale is an accurate and repeatable force sensor. Its performance is ultimately dependent upon the conveyor system and the quality of the installation and accuracy of the alignment.

Specifications

Accuracy

- ±1.0% of totalization over 5 to 1 operating range

Belt Width

- metric: 450 to 1200 mm
- imperial: 18 to 48"

Belt Speed

- 2.0 m/s (400 fpm) maximum

Capacity

- up to 50 t/h (depending on loading and belt speed parameters)

Conveyor Incline

- ±20° from horizontal, fixed incline
- up to ±30° with reduced accuracy

Conveyor Idler Profile

- horizontal

Idler Diameter

- metric: 50 or 60 mm
- imperial: 1.90"

Idler Spacing

- 0.5 to 1.5 m (1.5 to 5 ft)

Loading

- Minimum 1.0 kg/m (0.6 lbs/ft)
- Maximum 30 kg/m (20 lbs/ft)

Load Cell

- excitation: 10 Vdc nominal, 15 Vdc maximum
- output: 2 mV/V excitation at rated load cell capacity
- non-linearity: 0.03% of rated output
- hysteresis: 0.05% of rated output
- non-repeatability: 0.03% of rated output
- capacity: 10 or 20 lbs.
- overload: safe 150% of rated capacity, ultimate 300% of rated capacity
- temperature:
  -40 to 85°C (-40 to 185°F) operating range
  -10 to 60°C (14 to 140°F) compensated
- stainless steel construction
- mounting dimensions: identical for all capacities

Hazardous Locations

- with the use of approved intrinsically safe barrier strips

Approvals

- CE[1]

1. EMC performance available upon request.

Operation

The MLC belt scale works with an existing light-duty flat belt conveyor (handling light-density materials) and the selected Siemens Milltronics integrator. As material moving along the conveyor belt travels over the belt scale, it exerts a force proportional to the material load through the suspended idler to the load cells.

The MLC reacts only to the vertical component of the applied force. The resulting movement in each load cell is sensed by its strain gauges. When the strain gauges are excited by voltage from the electronic integrator, they produce an electrical signal proportional to weight, which is then applied to the integrator. The vertical movement of the load cells is limited by the positive overload stop incorporated into the design of the load cell.

Installation

The MLC belt scale is shipped from the factory as a single unit in a heavy-duty shipping container. The container is packed to separate each item and to provide protection during shipment. Each item should be inspected as it is removed from the container.

Notes: Be sure the conveyor design meets the installation requirements for the Siemens Milltronics MLC belt scale.

- Adjust conveyor stringers to be rigid, straight, parallel to, and square with the belt line in the area of the scale installation.
- Adjust pulleys to ensure that the conveyor belt tracks straight and centrally from the head to the tail pulley.

To limit the weight and dimensions of the idler on the scale, Siemens Milltronics provides an idler built to definite specifications as part of the scale. If a substitute or a replacement is required, please contact Siemens Milltronics. Substituting or replacing this idler with a non-spec idler could result in damage to the scale due to overloading or improper fit.

To avoid potential scale installation problems, please compare the site conditions with the MLC installation drawings available on www.siemens-milltronics.com. If you have any questions, please contact your Siemens Milltronics representative.

Welding

> **WARNING:**: Extreme care should be used when arc welding in the area of the belt scale. Ensure that no welding current can flow through the belt scale. Welding currents passing through the scale can functionally damage the load cells.

Load Cell Handling

The MLC belt scale is designed for low-capacity operation and is constructed using two 10 or 20 pound load cells. Although the load cells are protected by shipping stops that keep the cells from moving, care should be taken when handling the scale to avoid damaging the cells. The stops are metal strips about 75 mm (3") long with holes at each end for screws. One screw holds the stop to the load cell while the other screw holds the stop to the static beam (125 mm [5"] channel).

When handling the MLC during installation and set-up, make sure the stops remain in place.

Reinstall both shipping stops during maintenance or prolonged shutdown.

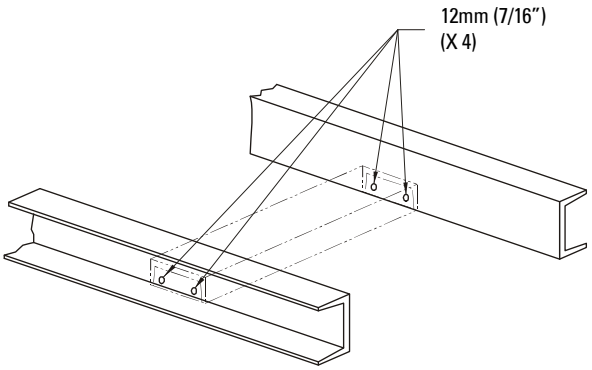
Installation Precautions

The following precautions should be observed when handling the scale.

- Do not pry on the idler, its mountings, or the cells directly.
- Do not stand or lean on the scale.
- Avoid shock from blows of a hammer when trying to position the scale during installation.
- Do not lift the MLC by its idler.
- Do not lift the MLC by the idler mounting brackets.

Installation Procedure

1. Make sure the shipping stops are in place and secure.
2. Remove the existing flat roll idler (or flat slider pan) from the area selected to locate the belt scale assembly.
3. Drill four 12 mm (7/16") diameter mounting holes. This will allow clearance for 10 mm (3/8") bolts.



Note: Slotting the holes vertically will permit greater adjustment capability.

4. Position the scale with the idler towards the head end of the conveyor and the static beam toward the tail end.
   - Make sure the belt travel sticker on the static beam points in the direction of belt travel.
   - Raise the conveyor belting to provide room for the installation of the scale.
5. Insert the scale (complete with the attached idler) into the conveyor.
   - Insert four 10 mm (3/8") bolts through the conveyor frame and through the holes in the ends of the static beam.
   - Secure with hex nuts. Finger tight only.
6. Make sure there is at least 13 mm (1/2") of clearance between the return belt and the MLC.
   - In some conveyors, it may be necessary to install a return idler roller adjacent to the scale to deflect the return belt past the scale.
7. Position the scale so that it is centered in the conveyor and square to the stringer.
   - Shim as required between the ends of the static beam and the conveyor stringer.
   - Level the static beam and tighten the bolts sufficiently to keep the static beam in place until final adjustment.

CAUTION: Off-center or off-square installation can result in poor belt tracking and scale inaccuracy.

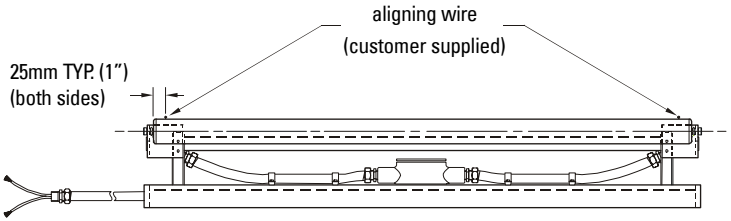
Idler Alignment

Precise alignment is very important to achieve maximum accuracy of the weighing system. Improperly aligned idlers could cause unwanted forces to be applied to the weighing idler, resulting in measurement errors.

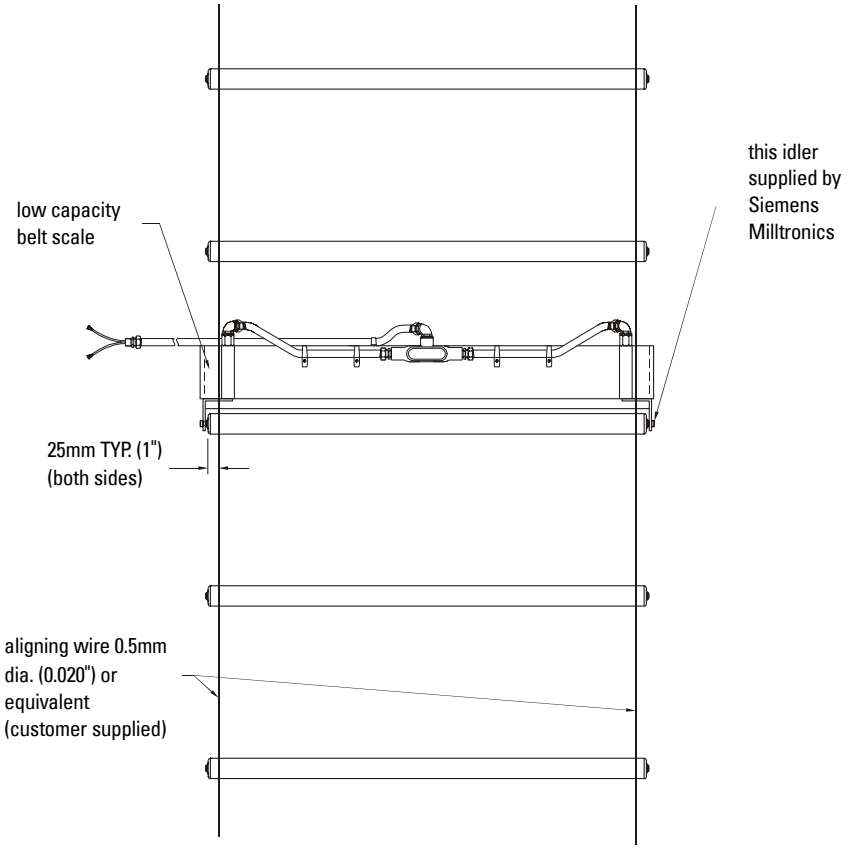
Alignment Procedure

1. Remove the shipping stops to free the weighing mechanism.
   - Keep the stops and screws stored in a convenient place for use during maintenance or at other times when protection of the cells is necessary**.**
2. Align and level the idler in the weighing area by raising or lowering the static beam in its mountings.
   - The weighing area includes the scale and at least one idler on each side of the scale. For conventional flat idler roll conveyors, two additional idler rolls should be included in the alignment procedure.
3. Adjust idlers (idlers and pans on a slider pan conveyor) vertically until they are all within ±0.8 mm (1/32") of each other.
   - Stretch a line across the top surface of each idler roll in the scale area at approximately 25 mm (1") from each end of each idler roll.
   - Use good quality wire (0.5 mm [0.020"] diameter) or equivalent nylon line to check for alignment. The wire or string aligning lines must be able to withstand sufficient tension to eliminate sag in the line.
4. Check that the idlers are centered and squared to the conveyor as in step 5 of the installation procedure.
5. Tighten the static beam mounting bolts (34 to 40.8 Nm or 25 to 30 ft lbs).
6. Carefully lower the conveyor belt onto the scale and fixed idlers.
7. Run the conveyor for at least fifteen minutes to limber the belt prior to calibration.

Front View



Plan View


low capacity
belt scale
this idler
supplied by
Siemens
Milltronics
25mm TYP. (1")
(both sides)
aligning wire 0.5mm
dia. (0.020") or
equivalent
(customer supplied)

Calibration

General

After the MLC has been installed in accordance with the installation procedure, calibration of the weighing system must be done in conjunction with the selected integrator. Refer to the integrator instruction manual for programming and calibration. The calibration is initially done using the calibrating test rod supplied with the scale. Where possible, material tests are recommended to achieve maximum accuracy. (For more information about material tests refer to the integrator manual.)

Test Load

The test load (stated in kilograms per meter or pounds per foot) for the MLC is stamped on an aluminum tag fastened to the end of the calibrating test rod. Enter this value into the integrator as the test load programming parameter.

If the actual idler spacing differs from the design data provided at time of purchase, recalculate and re-enter a new test load value as follows:

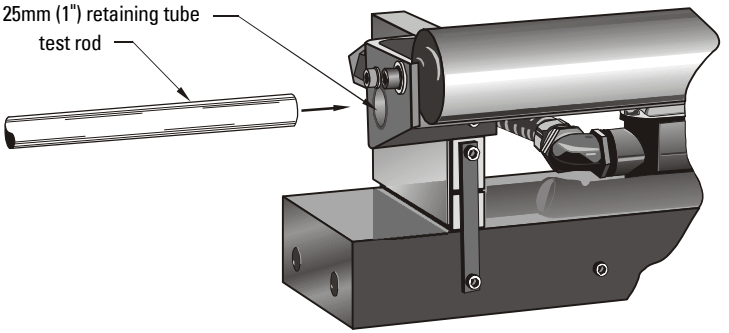
$$\text{test load (kg/m or lbs/ft)} = \frac{\text{Weight of calibrating rod (kg or lbs)}}{\text{Actual idler spacing (m or ft)}}$$

Zero

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

Span

1. Insert the calibrating test rod into the 25mm (1") diameter retainer tube that is mounted on the brackets that hold the idler to the load cells.
    - It is located immediately below and to the side of the idler and is held in place by flat washers retained by screws.



- The tube is designed to move very slightly in its mounting to eliminate mutual interference between the cells.

2. Slowly slide it all the way in until it contacts the end of the tube.
   - Approximately 10 mm (3/8") of the rod should protrude from the tube.
3. Perform the span calibration as described in the calibration section of the selected integrator instruction manual.
4. After the span calibration has been completed, remove the calibrating test rod and store it in a convenient location.

Maintenance

Because the MLC has no moving parts, the scale requires no active maintenance. Once the scale is installed into the conveyor, the conveyor becomes part of the total weighing system. If a problem develops with the conveyor, that problem may also affect the scale. For this reason, we recommend that a periodic conveyor maintenance program be established for any conveyor that incorporates a scale.

REMINDER: Re-install the shipping stops during maintenance or any other time when protection of the cells is necessary.

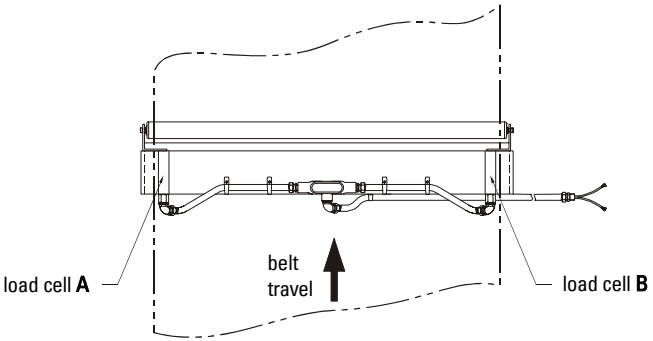
Spare Parts

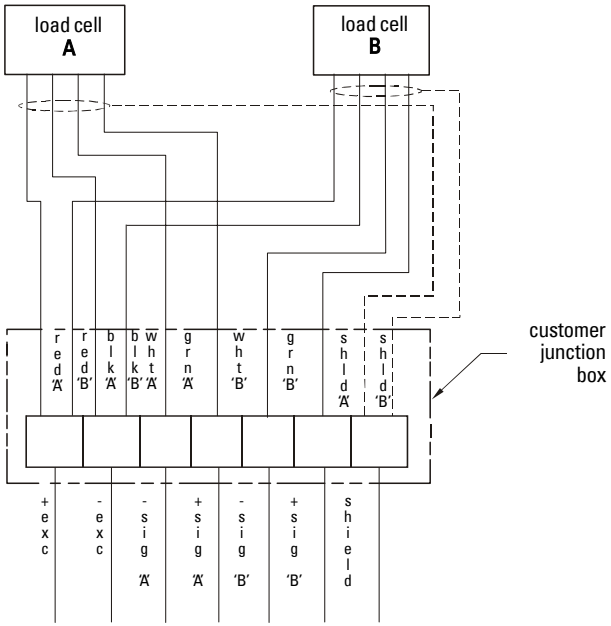
The only spare part recommended for the MLC is the load cell. Refer to the load cell nameplate for the proper size and then specify as follows when ordering.

For 10 pound cell: Milltronics Part Number PBD-23900155

For 20 pound cell: Milltronics Part Number PBD-23900156

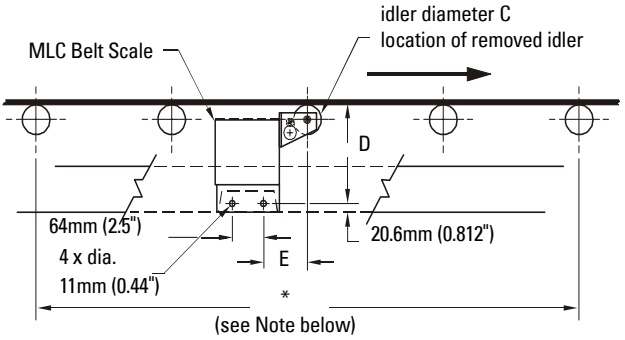
Idler: Contact your Siemens Milltronics representative. Be prepared to provide the serial number of the MLC unit.


load cell **A**
belt
travel
load cell **B**

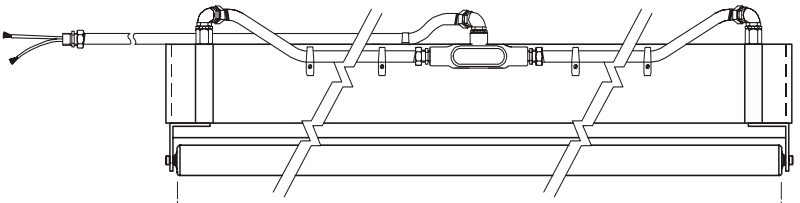

load cell
A
load cell
B
red 'A'
red 'B'
blk 'A'
blk 'B'
wht 'A'
grn 'A'
wht 'B'
grn 'B'
shld 'A'
shld 'B'
customer
junction
box
+ exc
- exc
- sig 'A'
+ sig 'A'
- sig 'B'
+ sig 'B'
shield

Dimensions

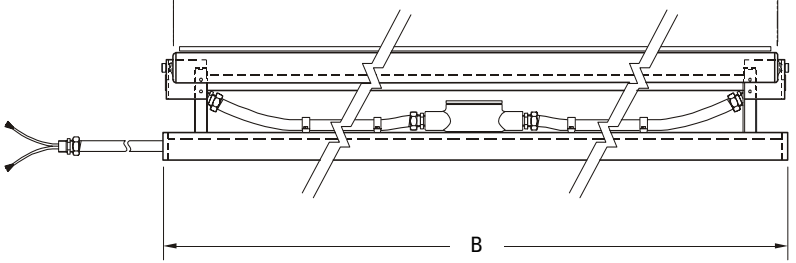
Installation



Plan View



Front View



Notes:

- For dimension values see next page.

***** For pan supported belts, the pan should be cut out to allow the MLC and at least two (preferably four) other idlers to be installed.

Metric Designs (Europe)

Belt Width	A Dimension	B Dimension	C Dimension	D Dimension	E Dimension
450 mm (17.72")	450 mm (17.72")	500 mm (19.69")	50 mm (1.97")	158 mm (6.22")	96 mm (3.78")
500 mm (19.69")	500 mm (19.69")	550 mm (21.65")	50 mm (1.97")	158 mm (6.22")	96 mm (3.78")
650 mm (25.59")	650 mm (25.59")	700 mm (27.56")	50 mm (1.97")	158 mm (6.22")	96 mm (3.78")
800 mm (31.50")	800 mm (31.50")	850 mm (33.46")	50 mm (1.97")	158 mm (6.22")	96 mm (3.78")
1000 mm (39.37")	1000 mm (39.37")	1050 mm (41.34")	60 mm (2.36")	163 mm (6.42")	96 mm (3.78")
1200 mm (47.24")	1200 mm (47.24")	1250 mm (49.21")	60 mm (2.36")	163 mm (6.42")	96 mm (3.78")

Imperial Designs (North America)

Belt Width	A Dimension	B Dimension	C Dimension	D Dimension	E Dimension
18" (457 mm)	18" (457 mm)	19" (483 mm)	1.90" (48.3 mm)	6.19" (157 mm)	3.5" (89 mm)
24" (610 mm)	24" (610 mm)	25" (635 mm)	1.90" (48.3 mm)	6.19" (157 mm)	3.5" (89 mm)
30″ (762 mm)	30" (762 mm)	31" (787 mm)	1.90" (48.3 mm)	6.19" (157 mm)	3.5" (89 mm)
36" (914 mm)	36" (914 mm)	37″ (940 mm)	1.90" (48.3 mm)	6.19" (157 mm)	3.5" (89 mm)
42" (1067 mm)	42" (1067 mm)	43" (1092 mm)	1.90" (48.3 mm)	6.19" (157 mm)	3.5" (89 mm)
48" (1219 mm)	48" (1219 mm)	49" (1245 mm)	1.90" (48.3 mm)	6.19" (157 mm)	3.5" (89 mm)

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