Overview
Belt scales help maximize the use of raw materials, control inventories, and aid in the manufacturing of a consistent product. Milltronics belt scales from Siemens are easy to install, and require little maintenance. They produce repeatable, accurate results. These belt scales show minimal hysteresis and superior linearity, and ignore side loading. Load cell overload protection is a feature of the belt scale design. With use of approved intrinsically safe barrier strips, all belt scales can be used in hazardous locations.

Typical System
A typical belt scale system has a weigh bridge structure supported on load cells, an electronic integrator, and a belt speed sensor. The load cells measure the material weight on the belt, and send a signal to the integrator. The integrator also receives input in the form of electrical pulses from a belt speed sensor connected to a tail or bend pulley. Using these two sources of data, the integrator calculates the rate of material transferred along the belt using the equation weight x speed = rate.

Mode of operation
Siemens Milltronics belt scales only measure the vertical component of the applied force. As material moves down the conveyor belt and travels over the belt scale, it exerts a force proportional to the material load through the suspended idler directly to the load cells. The resulting force applied 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 belt loading, 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 belt scale or load cells. The stops protect the load cells from failure in the event of extreme overload forces.

Installation Tips
- Position the scale
  Locate the scale close to the tail section of the conveyor belt where tension is minimal and more consistent. Mount the scale on rigid mountings, away from equipment that may produce measurement disturbing vibrations. Avoid variable tension points, transition points, or slope change. The ideal location is a horizontal, even belt section, but you can achieve good results on slopes if the idlers are properly aligned. If the conveyor curves, locate the scale a proper distance from the tangent points of the curve. For concave curved conveyors, the recommended minimum distance is 12 m (40 ft) from the tangent points of the curve. With convex conveyors, the minimum distance is 6 m (20 ft) on the approach side, and 12 m (40 ft) on the retreat side. Be sure to install the scale a sufficient distance from the infeed section (at least one idler space) so the material has time to settle properly on the belt.
- Reduce variable belt tension
  With temperature variations, load, and other circumstances, the belt tension will change. To maintain proper tension, a gravity take-up is recommended. This is a weight designed to take up slack on the belt. A gravity take-up should move freely and place consistent tension on the belt. The use of screw take-ups should be limited to conveyors with pulley centers to 18.3 m (60 ft) or less. The amount of weight should conform to the conveyor design specifications.
- Align the idlers
  Precise idler alignment is essential. At least two idlers on each side of the scale should be aligned with the belt scale; use three or more for high accuracy applications. To check alignment, use wire, string, or fishing line across the top outer edges of the rollers and tighten enough to eliminate sag. Adjust the height of the rollers with shims until they are all even, or at least within ±0.8 mm (1/32”). All of the scale-area idlers should be the same type (size, diameter, style, trough angle, and manufacture) and should be spaced at equal distances. Locate training idlers a minimum of 9 m (30 ft) from the belt scale idler.
- Install speed sensors
  The speed sensor should be attached to the tail pulley or bend pulley shaft so the connection does not slip. It is important that the speed sensor be properly mounted as described in the instruction manual and free of excessive vibration. Whenever possible, mount the speed sensor on a solid face pulley. The use of wing- or beater-type pulleys is not recommended.
  Wheel driven speed sensors, that are applied to the return strand of the belt, should be located close to a return idler to ensure a stable drive surface.
- Wire the scale
  Follow good instrumentation wiring practices to protect the load cell and speed sensor signals from radio frequency interference and induction. Use terminal blocks, shielded cable, and grounded metal conduit for all wiring.
## Technical specifications

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Milltronics MLC</th>
<th>Milltronics MBS</th>
<th>Milltronics MUS</th>
<th>Milltronics MCS</th>
<th>Milltronics MSI</th>
<th>Milltronics MMI</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Typical industries</strong></td>
<td>Animal feed, fertilizers, food processing, tobacco</td>
<td>Aggregates, mining, animal feed</td>
<td>Aggregates, agricultural, mining, cement</td>
<td>Aggregates</td>
<td>Cement, chemicals, coal, food processing, mineral processing, mining</td>
<td>Cement, chemicals, coal, food processing, mineral processing, mining</td>
</tr>
<tr>
<td><strong>Typical applications</strong></td>
<td>Secondary industries</td>
<td>Aggregates, medium-duty</td>
<td>Aggregates, medium to heavy-duty</td>
<td>Mobile crushers, aggregates, screening plants, heavy-duty</td>
<td>Industrial heavy-duty, SABS approval</td>
<td>Industrial heavy-duty, NTEP, Measurement Canada approval</td>
</tr>
<tr>
<td><strong>Maximum capacity</strong></td>
<td>50 t/h (55 STPH) at max. belt speed</td>
<td>1500 t/h (1650 STPH) at max. belt speed</td>
<td>5000 t/h (5500 STPH) at max. belt speed</td>
<td>1200 t/h (1320 STPH) at max. belt speed</td>
<td>5000 t/h (5500 STPH) at max. belt speed</td>
<td>5000 t/h (5500 STPH) at max. belt speed</td>
</tr>
<tr>
<td><strong>Maximum belt speed</strong></td>
<td>2.0 m/s (400 fpm)</td>
<td>3.0 m/s (600 fpm)</td>
<td>3.0 m/s (600 fpm)</td>
<td>3.0 m/s (600 fpm)</td>
<td>4.0 m/s (800 fpm)</td>
<td>4.0 m/s (800 fpm)</td>
</tr>
<tr>
<td><strong>Loading range</strong></td>
<td>Light</td>
<td>Moderate</td>
<td>Moderate to heavy</td>
<td>Heavy</td>
<td>Heavy</td>
<td>Heavy</td>
</tr>
<tr>
<td><strong>Accuracy</strong></td>
<td>± 1% or better</td>
<td>± 1%</td>
<td>± 1 to 0.5%</td>
<td>± 1 to 2%</td>
<td>± 0.5% or better</td>
<td>± 0.25% or better</td>
</tr>
<tr>
<td><strong>Turn down</strong></td>
<td>5:1</td>
<td>3:1</td>
<td>4:1</td>
<td>4:1</td>
<td>5:1</td>
<td>5:1</td>
</tr>
<tr>
<td><strong>Approvals</strong></td>
<td>CE</td>
<td>CE</td>
<td>CE</td>
<td>CE</td>
<td>SABS, Measurement Canada, CE</td>
<td>NTEP, Measurement Canada, CE</td>
</tr>
</tbody>
</table>
### Belt Scale Application Questionnaire

#### Customer information
- **Contact:** ____________  
- **Company:** ____________  
- **Address:** ____________  
- **City:** ____________  
- **State/Province:** ____________  
- **Phone:** ____________  
- **E-mail:** ____________  
- **Fax:** ____________  

#### Material
- **Material being measured:** ____________  
- **Particle size:** ____________ mm / inch / mesh  
- **Corrosive state of material:**  
  - [ ] High  
  - [ ] Moderate  
  - [ ] Not corrosive

#### Conveyor
- **Application:**  
  - [ ] Inventory  
  - [ ] Load out  
  - [ ] Control  
  - [ ] Blending  
  - [ ] Legal for trade
- **Feed rate:** ____________ minimum t/hr or kg/hr or lb/hr or LTPH or STPH  
  ____________ maximum t/hr or kg/hr or lb/hr or LTPH or STPH  
- **Accuracy required:** +/- ______ %
- **Constant feed rate:**  
  - [ ] Yes  
  - [ ] No
- **Access side:** (looking in direction of belt travel):  
  - [ ] Left  
  - [ ] Right  
  - [ ] Both

#### Electrical classification at scale location:
- **Profile:**  
  - [ ] Horizontal  
  - [ ] Incline / Decline: ______ Degrees
- **Belt speed:** ____________ minimum m/sec. or ft/min.
  ____________ maximum m/sec. or ft/min.
- **Belt length:** ____________ m / ft.  
- **Belt width:** ____________ mm / in.
- **Idler diameter:** ____________ mm / in.
- **Tail pulley dia.:** ____________ mm / in.
- **Trough angle:** ____________ Degrees
- **Idler spacing:** ____________ mm / in.  
  ____________ mm / in.

#### Integrator Requirements
- **(Indicate all that apply)**

#### Power available:

#### Communications:
- [ ] AB Remote I/O  
- [ ] DeviceNet  
- [ ] PROFIBUS DP  
- [ ] RS-232 / RS-485 Modbus

#### Products suggested:
- [ ] MBS  
- [ ] MUS  
- [ ] MCS  
- [ ] MSI  
- [ ] MMI  
- [ ] MLC

#### Preferred Belt Scale Model:
- [ ] Painted mild steel  
- [ ] 304 SS  
- [ ] 316 SS  
- [ ] Other (specify) ____________

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