

Continuous Weighing

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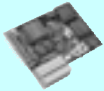
Continuous Weighing Product Overview

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	Application	Device description	Catalog page
Belt Scales			
	Low-capacity belt scale for light belt loading	Milltronics® MLC <ul style="list-style-type: none"> • Compact and easy to install • Fast reaction to vertical forces, ensuring instant response to product loading 	2/9
	Modular designed medium-duty belt scale for process indication	Milltronics MUS <ul style="list-style-type: none"> • Simple installation • Low cost, easy retrofit 	2/12
	Compact, rugged belt scale with stainless steel load cells for use in mobile crushers and aggregate screening plants	Milltronics MCS <ul style="list-style-type: none"> • Rugged design includes stainless steel load cells 	2/16
	MSI: Heavy-duty, high-accuracy single idler belt scale for process and load-out control MMI: Heavy-duty, high-accuracy multiple idler belt scale for critical process and load-out control	Milltronics MSI/MMI <ul style="list-style-type: none"> • Fast reaction compared to pivoted scales for more accurate weighing with fewer idlers • MMI can be legal for trade 	2/19
	Mechanical calibration weight lifter for MSI, MMI, and MUS belt scales	Milltronics MWL <ul style="list-style-type: none"> • Modular construction, easily adaptable for different conveyor widths • Easy to install and apply 	2/23
Speed Sensors			
	Compact, low-profile, wheel-driven return belt speed sensor	Milltronics TASS <ul style="list-style-type: none"> • Rugged design • Easy low-cost installation 	2/28
	High resolution, wheel-driven return belt speed sensor	Milltronics RBSS <ul style="list-style-type: none"> • IP65 rated • Accurate belt speed detection 	2/30
	MD-36: General purpose and hazardous rated shaft-driven speed sensor MD-256: High resolution, shaft-driven speed sensor	Milltronics MD-36/MD-256 <ul style="list-style-type: none"> • Pulley shaft or motor shaft-driven • Bi-directional for clockwise or anti-clockwise belt travel 	2/32, 2/35
Weighfeeders			
	400 Series: High-accuracy, low-capacity for minor ingredient additives 600 Series: Low- to medium-capacity for minor ingredient additives 800 Series: Medium- to high-capacity for macro ingredient additives 1200 Series: High-capacity, heavy-duty for macro ingredient additives	Milltronics Weighfeeders 400, 600, 800, 1200 Series <ul style="list-style-type: none"> • Field-proven, customized weighfeeders suit low- to high-capacity applications with high accuracy 	2/43, 2/45, 2/47 2/49
	Volumetric gate for rate control in blending, batching, or loading operations	Milltronics VG Series <ul style="list-style-type: none"> • Less space required than belt or vibratory pan feeders • Motor and speed reducer mounted for easy access 	2/51
Solids Flowmeters			
	Low- to medium-capacity flowmeter for various product sizes, densities, and fluidity in restricted spaces	Milltronics Millflo <ul style="list-style-type: none"> • Dust-tight continuous weighing • Compact rugged design for restricted space installation 	2/57

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Continuous Weighing Product Overview

	Application	Device description	Catalog page
Solids Flowmeters (con't)			
	Low- to medium capacity flowmeters for various product sizes, densities, and fluidities	Milltronics E, V, A, and C Series <ul style="list-style-type: none"> E Series: Low- to medium-capacity flowmeter V Series: Compact vertical flow, low- to medium capacity flowmeter A Series: Aerated heavy-duty low- to medium-capacity flowmeters C Series: Low- to medium-capacity flowmeter designed to NFPA Code 8503 requirements for pulverized coal and coke 	2/62, 2/68
	Out-of-the-process sensing element for series E, V, A, and C solids flowmeters	Milltronics ILE-37 and ILE-61 <ul style="list-style-type: none"> ± 1 % accuracy with high repeatability; no zero drift due to unique sensing mechanism Low maintenance with only sensing plate in the process 	2/71
	Medium- to high-capacity flowmeters for various product sizes, densities and fluidities	Milltronics L, M, and MA Series <ul style="list-style-type: none"> L Series: medium-capacity flowmeter with maximum flowrate of 300 t/h (330 STPH) M Series: high-capacity flowmeter with maximum flowrate of 900 t/h (990 STPH) MA Series: high-capacity flowmeter with maximum flowrate of 900 t/h (990 STPH) for use with aerated gravity conveyor pre-feed 	2/76
Integrators			
	Versatile integrator for use with belt scales	CompuScale III <ul style="list-style-type: none"> Simple, automatic calibration Analog mA output, and relay contact for rate alarm NTEP and Measurement Canada approved when used with MMI-2 belt scale and MD-36A speed sensor 	2/82
	Economical integrator for use with belt scales	Milltronics BW 100 <ul style="list-style-type: none"> Alarms for either rate, load, speed, or diagnostic error Multi-point linearizer function 	2/85
	BW 500: Full feature integrator for use with both belt scales and weighfeeders SF 500: Full feature integrator for use with solids flowmeters	Milltronics BW 500/SF 500 <ul style="list-style-type: none"> Up to 8 multi-spans for application of more than one feed/flow condition and material Multi-point linearizer function PID control with optional analog I/O card SmartLinx compatible Measurement Canada approved (BW 500) 	2/88, 2/92
Communications			
		SmartLinx Module <ul style="list-style-type: none"> SmartLinx modules provide direct digital connection to popular industrial fieldbus systems and telephone lines 	2/96
		External Modem Kit <ul style="list-style-type: none"> Quick and easy installation and configuration using industrial modem and comprehensive instruction manual 	2/97
		Dolphin Plus software <ul style="list-style-type: none"> Dolphin Plus for quick and easy configuring, monitoring, tuning and diagnostics of Siemens Milltronics devices 	2/99

Continuous Weighing

Product Overview



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Introduction

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 $\text{weight} \times \text{speed} = \text{rate}$.

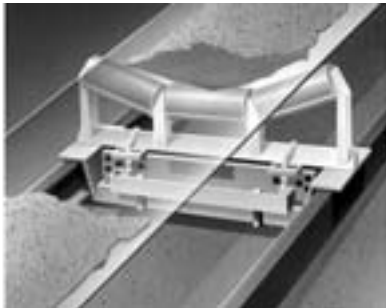


Fig. 2/1 Belt scale system

Principle 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.

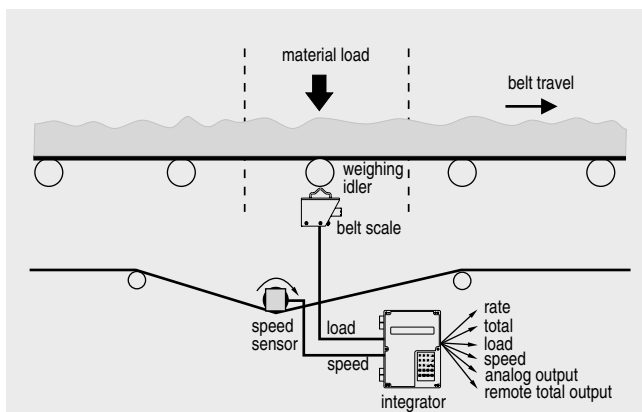


Fig. 2/2 Belt scale operation

Installation Tips

Position the scale

Locate the scale close to the tail section of the conveyor belt where tension is minimal. 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 60 m (200 ft.) on the approach side, and 9 m (30 ft.) on the retreat side. Be sure to install the scale a sufficient distance from the inflect section (at least 1 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 takeups 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 $\pm 0.8 \text{ mm}$ ($1/32''$). 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.

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.

Continuous Weighing Belt Scales

Introduction

Belt Scale Selection Guide

Criteria	Milltronics MLC	Milltronics MUS	Milltronics MCS	Milltronics MSI	Milltronics MMI
Typical industries	Animal feed, fertilizers, food processing, tobacco	Aggregates, agricultural, mining	Aggregates	Cement, chemicals, coal, food processing, mineral processing, mining	Cement, chemicals, coal, food processing, mineral processing, mining
Typical applications	Secondary industries	Aggregates, medium-duty	Mobile crushers, aggregates, screening plates, heavy-duty	Industrial heavy-duty, SABS approval	Industrial heavy-duty, NTEP, Measurement Canada approval
Maximum capacity	50 t/h (55 STPH)	5000 t/h (5500 STPH) at max. belt speed	1200 t/h (1320 STPH)	5000 t/h (5500 STPH) at max. belt speed	5000 t/h (5500 STPH) at max. belt speed
Maximum belt speed	3.5 m/s (700 fpm)	3.0 m/s (600 fpm)	3.0 m/s (600 fpm)	4.0 m/s (800 fpm)	4.0 m/s (800 fpm)
Loading range	Light to moderate	Moderate	Moderate to heavy	Moderate to heavy	Moderate to heavy
Accuracy	±1 % or better	±1 % to 0.5 %	±1 % to 2 %	±0.5 % or better	±0.25 % or better
Turn down	5:1	3:1	4:1	5:1	5:1
Approvals	CE	CE	CE	SABS, Measurement Canada, CE	NTEP, Measurement Canada, CE

Belt Scale Application Data Sheet

SIEMENS

Belt Scale Application Data Sheet

Customer Information

Contact: _____ Prepared By: _____
 Company: _____ Date: _____
 Address: _____ Notes on the Application: _____
 City: _____ Country: _____
 Zip/Postal Code: _____ Phone: () _____
 E-mail: _____ Fax: () _____

Material

Material being measured: _____ **Particle size:** _____ mm / inch / mesh

Corrosive state of material: High Moderate Not corrosive

Conveyor (Supply sketch where possible) Sketch attached

Application: Inventory Load out Control Blending Legal for trade

Feed rate: _____ minimum t/hr or kg/hr or lb/hr or LTPH or STPH **Accuracy required:** +/- _____ %
 _____ maximum t/hr or kg/hr or lb/hr or LTPH or STPH

Constant feed rate Yes No **Access side** (looking in direction of belt travel): Left Right Both

Electrical classification at scale location: _____

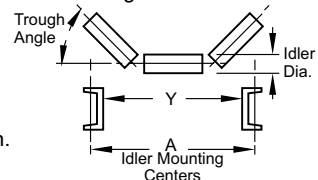
Profile: Horizontal Incline / Decline _____ Degrees Variable Incline _____ Degrees Curved

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. Y _____ mm / in.



Integrator Requirements (indicate all that apply)

Inputs required:

- 4-20 mA (specify) _____
- PID
- LVDT
- Load Cells (#): _____

Power available: _____

Outputs required:

- 4-20 mA
- PID
- Remote totalizer
- Relays (#): _____

Communications:

- AB Remote I/O
- DeviceNet
- Profibus-DP
- RS-232 / RS-485 Modbus

Products suggested: _____

Preferred Construction: Painted mild steel 304 SS 316 SS Other (specify) _____

Continuous Weighing Belt Scales

Introduction

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Continuous Weighing Belt Scales

Milltronics MLC

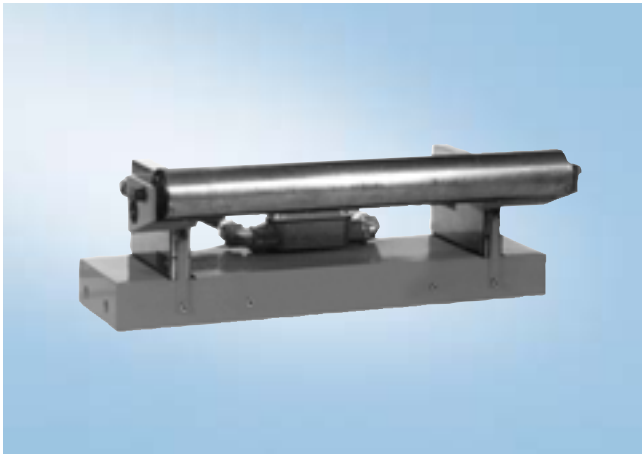


Fig. 2/3 Milltronics MLC Belt Scale

Application

Milltronics MLC belt scale is a low-capacity scale for light belt loading. The MLC is suitable for monitoring such products as fertilizer, tobacco, animal feed pellets, or sugar.

The MLC's patented use of parallelogram style load cells results in fast reaction to vertical forces, ensuring instant response to product loading. This enables it to provide outstanding accuracy and repeatability even with very light loading. The MLC may be easily installed in existing flat belt conveyors or belt feeders.

Operating with the Milltronics BW 100 or BW 500 microprocessor-based integrators, the MLC provides indication of flow rate, total weight, belt load and belt speed of bulk solids materials on a belt conveyor. A speed sensor monitors conveyor belt speed for input to the integrator. When used in conjunction with the Milltronics BW 500 integrator with PID controller, the MLC may also be used in the food industry as part of a pre-feed control system for extruders, cookers and de-hydrators.

Benefits

- Unique parallelogram style load cell design
- Designed for light product loading
- Compact and easy to install
- System includes weighing idler and test weights
- Stainless steel option
- Low cost of ownership

Technical data

Mode of operation	
Measuring principle	Strain gauge load cell measuring load on flat belt conveyor idler
Typical application	Monitor fertilizer, tobacco, animal feed pellets, sugar, cereal
Performance	
Accuracy	±1.0 % of totalization over 5 to 1 operating range
Medium conditions	
Max. material temperature	85 °C (185 °F)
Belt design	
Belt width	450 to 1200 mm in metric sizes 18 to 48" in Imperial sizes
Belt speed	2.0 m/s (400 fpm) maximum
Capacity	Up to 50 t/h
Conveyor incline	± 20° from horizontal, fixed incline Up to ± 30° with reduced accuracy
Idlers	
Conveyor idler	Horizontal
Idler diameter	50 or 60 mm or 1.90"
Idler spacing	0.5 to 1.5 m (1.6 to 5.0 ft.)
Load cell	
Construction	Stainless steel
Excitation	10 V DC nominal, 15 V DC 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	150 % of rated capacity, ultimate 300 % of rated capacity
Temperature	<ul style="list-style-type: none"> • -40 to 85 °C (-40 to 185 °F) operating range • -10 to 60 °C (14 to 140 °F) compensated
Mounting dimensions	Identical for all capacities
Hazardous locations	With use of intrinsically safe barrier strips
Approvals	CE

Continuous Weighing Belt Scales

Milltronics MLC

Dimensional drawings

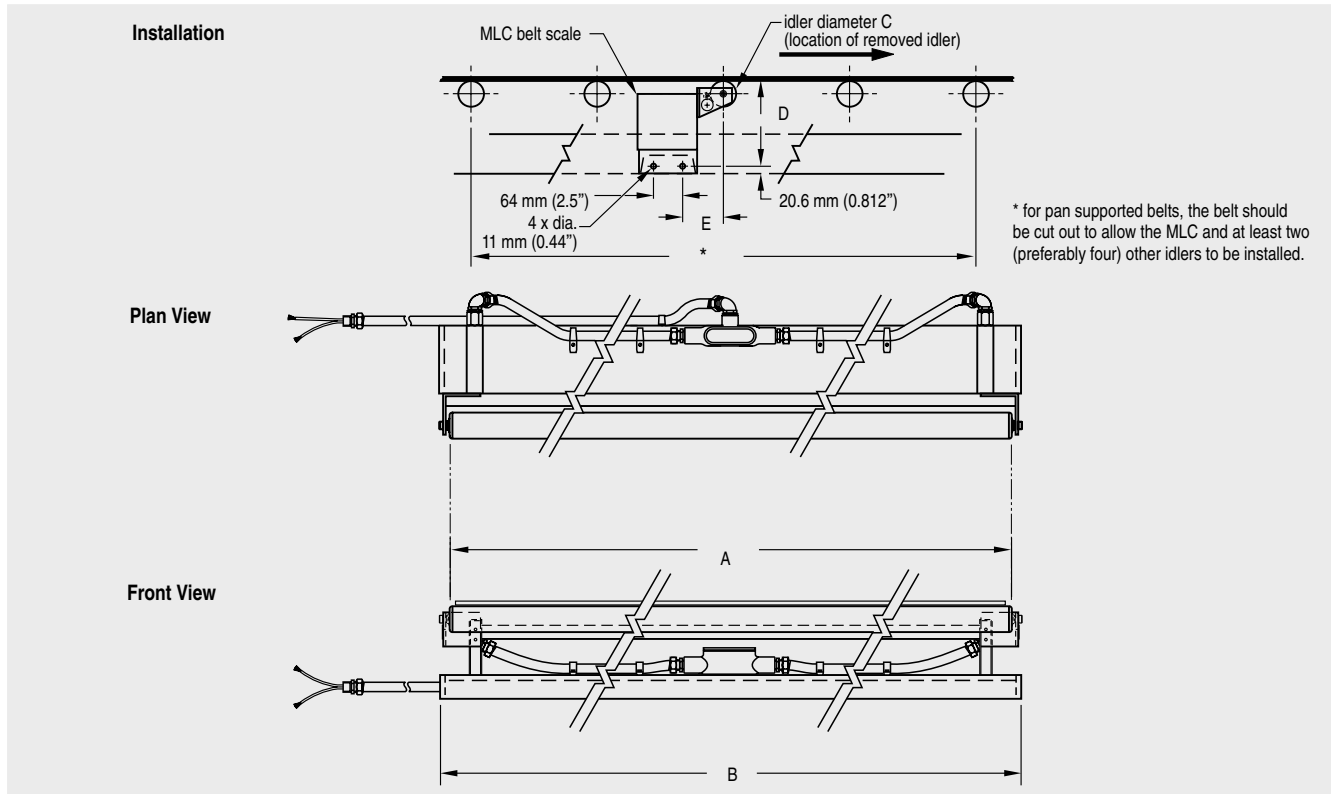


Fig. 2/4 MLC dimensions

Imperial Designs					
Scale Size	'A' Roller Width	'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)

Metric Designs					
Scale Size	'A' Roller Width	'B' Dimension	'C' Dimension	'D' Dimension	'E' Dimension
450 mm (17.72")	450 mm (17.72")	500 (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")

Continuous Weighing Belt Scales

Milltronics MLC

Connections

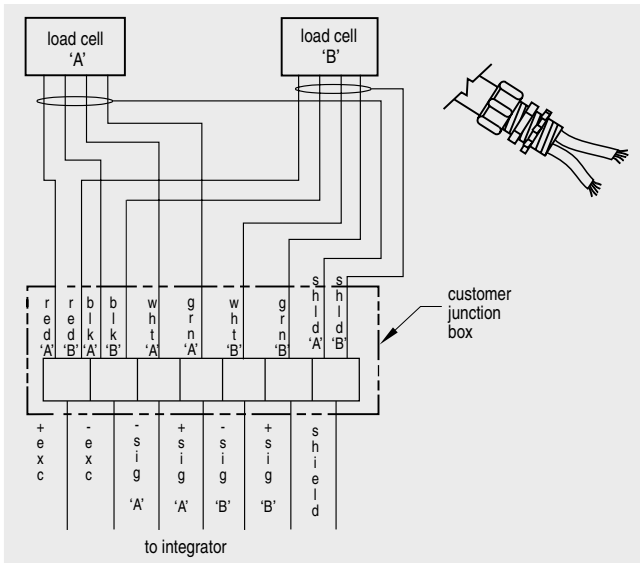


Fig. 2/5 MLC connections

Ordering data

Milltronics MLC Belt Scale
A low-capacity scale for light belt loading

Order No.

A) **7MH7126-**

Belt Width/Scale Construction

Painted mild steel

18" (457 mm)
24" (610 mm)
30" (762 mm)
36" (914 mm)
42" (1067 mm)
48" (1219 mm)

1 A
1 B
1 C
1 D
1 E
1 F

500 mm
650 mm
800 mm

1 G
1 H
1 J

1000 mm
1200 mm
450 mm

1 K
1 L
1 M

Stainless steel

18" (457 mm)
24" (610 mm)
30" (762 mm)
36" (914 mm)
42" (1067 mm)
48" (1219 mm)

2 A
2 B
2 C
2 D
2 E
2 F

500 mm
650 mm
800 mm

2 G
2 H
2 J

1000 mm
1200 mm
450 mm

2 K
2 L
2 M

Load Cell Capacity

10 lb
20 lb
not specified

A
B
X

Weighing Idler Dimensions

50 mm (1.96")
60 mm (2.4")
1.90" (48.2 mm)

1
2
5

Instruction Manual

English
German
Note: The instruction manual should be ordered as a separate item on the order.

A) **7ML1998-5FF01**
A) **7ML1998-5FF31**

Spare Parts

Load cell, 10 lb
Load cell, 20 lb

A) **PBD-23900155**
A) **PBD-23900156**

A) Subject to export regulations AL: N, ECCN: EAR99

Note: Calibration weights are included with MLC belt scale.

Continuous Weighing Belt Scales

Milltronics MUS

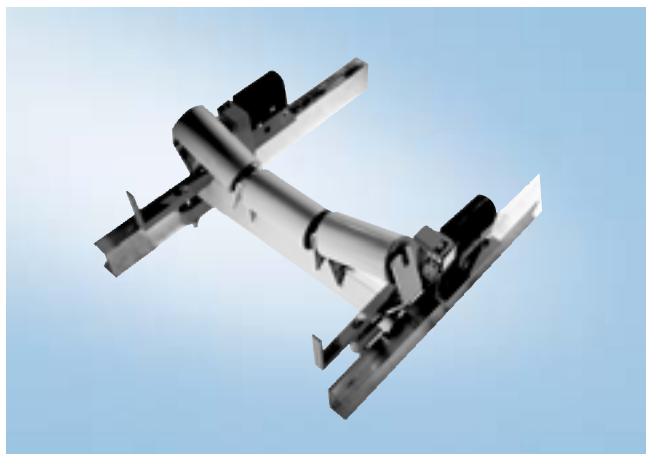


Fig. 2/6 Milltronics MUS Belt Scale

Application

Milltronics MUS belt scale is a modular-designed medium-duty belt scale for process indication. It operates with such products as aggregates, sand, or minerals, providing continuous in-line weighing at a minimal cost. With no cross bridge, this versatile unit will fit most conveyor widths and standard idlers, and product build-up is reduced.

The construction and easy assembly of the MUS ensure quick delivery to meet even the tightest of schedules. Where scales are moved from conveyor to conveyor, the MUS also provides unmatched flexibility.

Operating with the Milltronics BW 100 or BW 500 microprocessor-based integrators, the MUS provides indication of flow rate, total weight, belt load, and speed of bulk solids materials on a belt conveyor. A speed sensor monitors conveyor belt speed for input to the integrator.

Benefits

- Unique modular design
- Simple installation
- Low cost
- Easy retrofit

Technical data

Mode of operation	
Measuring principle	Strain gauge load cells measuring load on belt conveyor idlers
Typical applications	<ul style="list-style-type: none"> • Monitor fractionated stone on secondary surge belts and recirculating loads • Track daily production totals
Performance	
Accuracy	± 0.5 to 1 % of totalization over 3 to 1 operating range, application dependent
Non-repeatability	0.01 % of rated output
Non-linearity	0.02 % of rated output
Medium conditions	
Max. material temperature	65 °C (150 °F)
Belt design	
Belt width	<ul style="list-style-type: none"> • Standard duty up to 1000 mm (CEMA width up to 42") • Heavy-duty 1200 mm and up (CEMA width 48" and up) although can be applied to narrower conveyors • Refer to outline dimension section
Belt speed	Up to 3 m/s (600 fpm)
Capacity	Up to 5000 t/h at maximum belt speed
Conveyor incline	<ul style="list-style-type: none"> • ± 20° from horizontal, fixed incline • Up to ± 30° with reduced accuracy
Idlers	
Idler profile	<ul style="list-style-type: none"> • Flat to 35° • To 45° with reduced accuracy
Idler diameter	50 to 180 mm (2 to 7")
Idler spacing	0.6 to 1.5 m (2.0 to 5.0 ft.)
Load cell	
Construction	Aluminum
Excitation	10 V DC nominal, 15 V DC max.
Output	2 mV/V excitation at rated load cell capacity
Non-linearity and hysteresis	0.02 % of rated output
Non-repeatability	0.01 % of rated output
Capacity	20, 30, 50, 75, 100 kg
• standard duty ranges	50, 100, 150, 200, 500 kg
• heavy-duty ranges	150 % of rated capacity, ultimate 300 % of rated capacity
Overload	
Temperature	<ul style="list-style-type: none"> • -40 to 65 °C (-40 to 150 °F) operating range • -10 to 40 °C (15 to 105 °F) compensated
Weight	
	<ul style="list-style-type: none"> • Standard duty up to 44 lbs (20 kg), 22 lbs (10 kg) per side • Heavy-duty up to 64 lbs (30 kg), 32 lbs (15 kg) per side
Interconnection wiring (to integrator)	
	<ul style="list-style-type: none"> • < 150 m (500 ft.) 18 AWG (0.75 mm²) 6 conductor shielded cable • > 150 m (500 ft.) to 300 m (1000 ft.) 18 to 22 AWG (0.75 to 0.34 mm²) 8 conductor shielded cable
Hazardous locations	
	With use of intrinsically safe barrier strips
Approvals	
	CE

Dimensional drawings

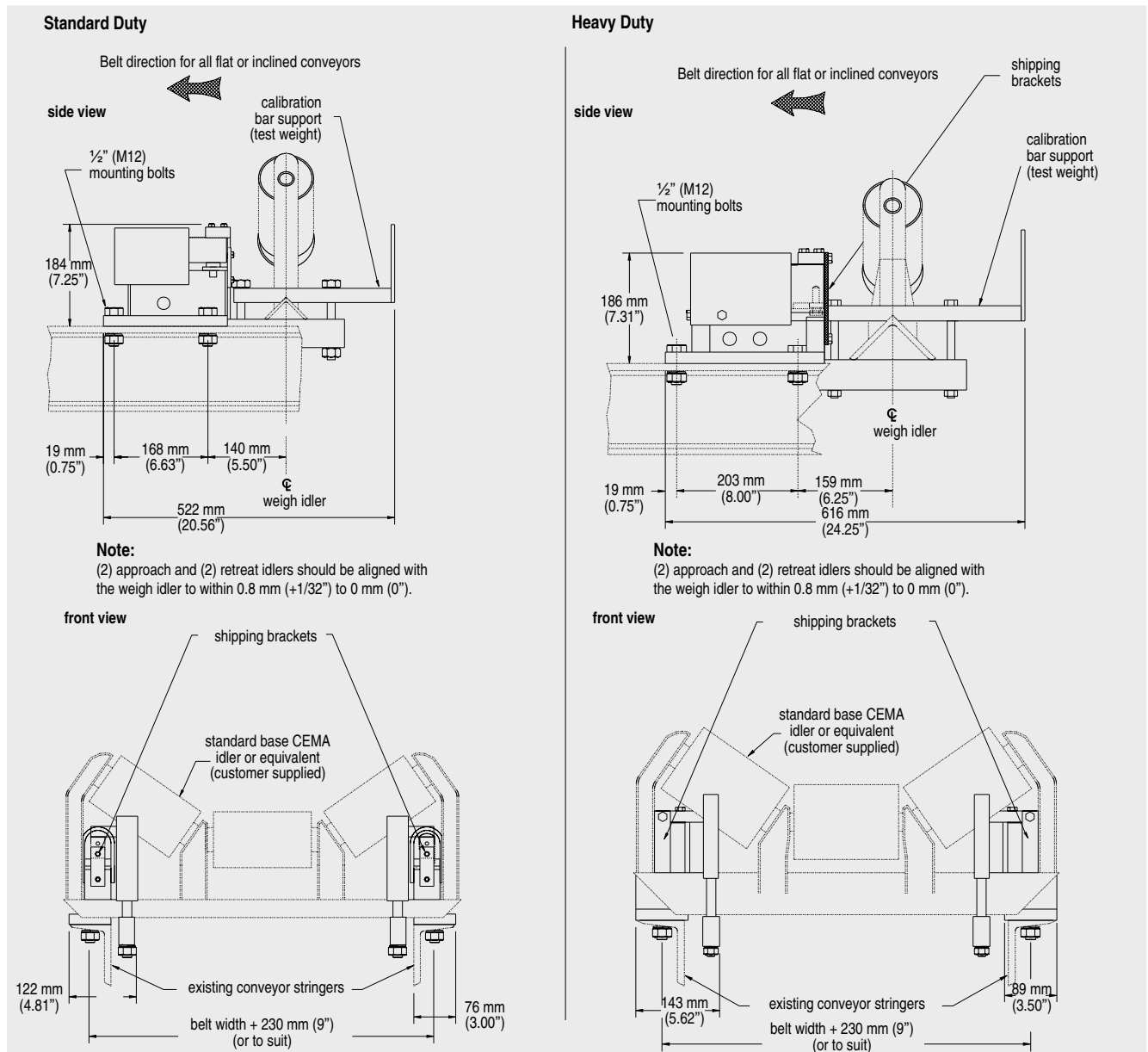


Fig. 2/7 MUS dimensions

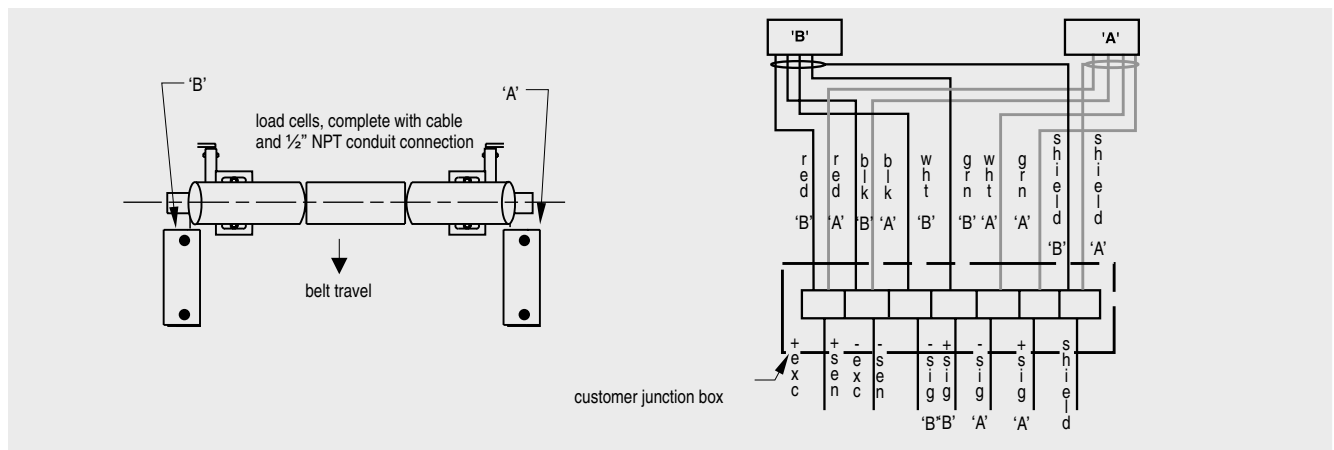


Fig. 2/8 MUS connections

Continuous Weighing Belt Scales

Milltronics MUS

Ordering data	Order No.
Milltronics MUS Belt Scale Modular-designed medium-duty scale for process indication	A) 7MH7120-0
Scale Construction Standard duty [up to 1067 mm (42") belt width] Heavy-duty [over 1067 mm (42") belt width]	1 2
Load Cell Capacity <u>Standard Duty Scale Load Cell</u> 20 kg ¹⁾ 30 kg ¹⁾ 50 kg ¹⁾ 75 kg ¹⁾ 100 kg ¹⁾ not specified <u>Heavy-Duty Scale Load Cell</u> 50 kg ²⁾ 100 kg ²⁾ 150 kg ²⁾ 200 kg ²⁾ 300 kg ²⁾ 500 kg ²⁾	AA AB AC AD AE XX BA BB BC BD BE BF
Fabrication Mild steel with epoxy paint	1
Instruction Manual English German Belt Scale Application Guidelines • English • French • German • Spanish Note: The instruction manual and application guidelines manual should be ordered as separate items on the order.	A) 7ML1998-5CQ01 A) 7ML1998-5CQ31 A) 7ML1998-5GA01 A) 7ML1998-5GA11 A) 7ML1998-5GA31 A) 7ML1998-5GA21
Spare Parts <u>Standard Duty Scale Load Cell</u> 20 kg 30 kg 50 kg 75 kg 100 kg <u>Heavy-Duty Scale Load Cell</u> 50 kg 100 kg 150 kg 200 kg 300 kg 500 kg	PBD-23900201 PBD-23900202 PBD-23900203 PBD-23900204 PBD-23900205 PBD-23900211 PBD-23900212 PBD-23900213 PBD-23900214 PBD-23900229 PBD-23900215

1) for use with scale construction option 1 only

2) for use with scale construction option 2 only

A) Subject to export regulations AL: N, ECCN: EAR99

Continuous Weighing Belt Scales

Milltronics MUS

2

Ordering data

Order No.

Flat bar calibration weights

Designed for use with the MUS belt scale. Length of bar weight is A dimension minus 3" (76 mm). Listed weight is an approximation.

A) 7MH7127 -

Bar width, Belt width and A dimension

3", 18", A=27" (686 mm), 4.63 kg	1 AA
3", 19", A=28" (711 mm), 4.82 kg	1 AB
3", 20", A=29" (737 mm), 5.02 kg	1 AC
3", 21", A=30" (762 mm), 5.21 kg	1 AD
3", 22", A=31" (787 mm), 5.40 kg	1 AE
3", 23", A=32" (813 mm), 5.59 kg	1 AF
3", 24", A=33" (838 mm), 5.78 kg	1 AG
3", 25", A=34" (864 mm), 5.98 kg	1 AH
3", 26", A=35" (889 mm), 6.17 kg	1 AJ
3", 27", A=36" (914 mm), 6.36 kg	1 AK
3", 28", A=37" (940 mm), 6.56 kg	1 AL
3", 29", A=38" (965 mm), 6.75 kg	1 AM
3", 30", A=39" (991 mm), 6.94 kg	1 AN
3", 31", A=40" (1016 mm), 7.13 kg	1 AP
3", 32", A=41" (1041 mm), 7.32 kg	1 AQ
3", 33", A=42" (1067 mm), 7.52 kg	1 AR
3", 34", A=43" (1092 mm), 7.71 kg	1 AS
3", 35", A=44" (1118 mm), 7.91 kg	1 AT
3", 36", A=45" (1143 mm), 8.10 kg	1 AU
3", 37", A=46" (1168 mm), 8.29 kg	1 AV
3", 38", A=47" (1194 mm), 8.49 kg	1 AW
3", 39", A=48" (1219 mm), 8.68 kg	1 BA
3", 40", A=49" (1245 mm), 8.87 kg	1 BB
3", 41", A=50" (1270 mm), 9.07 kg	1 BC
3", 42", A=51" (1295 mm), 9.25 kg	1 BD
3", 43", A=52" (1321 mm), 9.45 kg	1 BE
3", 44", A=53" (1346 mm), 9.64 kg	1 BF
3", 45", A=54" (1372 mm), 9.84 kg	1 BG
3", 46", A=55" (1397 mm), 10.03 kg	1 BH
3", 47", A=56" (1422 mm), 10.22 kg	1 BJ
3", 48", A=57" (1448 mm), 10.41 kg	1 BK
3", 49", A=58" (1473 mm), 10.60 kg	1 BL
3", 50", A=59" (1499 mm), 10.80 kg	1 BM
3", 51", A=60" (1524 mm), 10.99 kg	1 BN
3", 52", A=61" (1549 mm), 11.18 kg	1 BP
3", 53", A=62" (1575 mm), 11.38 kg	1 BQ
3", 54", A=63" (1600 mm), 11.57 kg	1 BR
3", 55", A=64" (1626 mm), 11.77 kg	1 BS
3", 56", A=65" (1651 mm), 11.96 kg	1 BT
3", 57", A=66" (1676 mm), 12.15 kg	1 BU
3", 58", A=67" (1702 mm), 12.34 kg	1 BV
3", 59", A=68" (1727 mm), 12.53 kg	1 BW
3", 60", A=69" (1753 mm), 12.73 kg	1 CA
4", 18", A=27" (686 mm), 6.17 kg	2 AA
4", 19", A=28" (711 mm), 6.43 kg	2 AB
4", 20", A=29" (737 mm), 6.69 kg	2 AC
4", 21", A=30" (762 mm), 6.94 kg	2 AD
4", 22", A=31" (787 mm), 7.19 kg	2 AE
4", 23", A=32" (813 mm), 7.46 kg	2 AF
4", 24", A=33" (838 mm), 7.71 kg	2 AG
4", 25", A=34" (864 mm), 7.97 kg	2 AH
4", 26", A=35" (889 mm), 8.23 kg	2 AJ
4", 27", A=36" (914 mm), 8.48 kg	2 AK
4", 28", A=37" (940 mm), 8.74 kg	2 AL
4", 29", A=38" (965 mm), 9.00 kg	2 AM
4", 30", A=39" (991 mm), 9.26 kg	2 AN
4", 31", A=40" (1016 mm), 9.51 kg	2 AP

Ordering data

Order No.

Flat bar calibration weights

Designed for use with the MUS belt scale. Length of bar weight is A dimension minus 3" (76 mm). Listed weight is an approximation.

A) 7MH7127 -

4", 32", A=41" (1041 mm), 9.77 kg	2 AQ
4", 33", A=42" (1067 mm), 10.03 kg	2 AR
4", 34", A=43" (1092 mm), 10.28 kg	2 AS
4", 35", A=44" (1118 mm), 10.55 kg	2 AT
4", 36", A=45" (1143 mm), 10.80 kg	2 AU
4", 37", A=46" (1168 mm), 11.05 kg	2 AV
4", 38", A=47" (1194 mm), 11.31 kg	2 AW
4", 39", A=48" (1219 mm), 11.57 kg	2 BA
4", 40", A=49" (1245 mm), 11.83 kg	2 BB
4", 41", A=50" (1270 mm), 12.08 kg	2 BC
4", 42", A=51" (1295 mm), 12.34 kg	2 BD
4", 43", A=52" (1321 mm), 12.60 kg	2 BE
4", 44", A=53" (1346 mm), 12.85 kg	2 BF
4", 45", A=54" (1372 mm), 13.12 kg	2 BG
4", 46", A=55" (1397 mm), 13.37 kg	2 BH
4", 47", A=56" (1422 mm), 13.62 kg	2 BJ
4", 48", A=57" (1448 mm), 13.89 kg	2 BK
4", 49", A=58" (1473 mm), 14.14 kg	2 BL
4", 50", A=59" (1499 mm), 14.40 kg	2 BM
4", 51", A=60" (1524 mm), 14.66 kg	2 BN
4", 52", A=61" (1549 mm), 14.91 kg	2 BP
4", 53", A=62" (1575 mm), 15.17 kg	2 BQ
4", 54", A=63" (1600 mm), 15.42 kg	2 BR
4", 55", A=64" (1626 mm), 15.69 kg	2 BS
4", 56", A=65" (1651 mm), 15.94 kg	2 BT
4", 57", A=66" (1676 mm), 16.19 kg	2 BU
4", 58", A=67" (1702 mm), 16.46 kg	2 BV
4", 59", A=68" (1727 mm), 16.71 kg	2 BW
4", 60", A=69" (1753 mm), 16.97 kg	2 CA

Fabrication

Standard, painted mild steel

1

A) Subject to export regulations AL: N, ECCN: EAR99

Continuous Weighing Belt Scales

Milltronics MCS

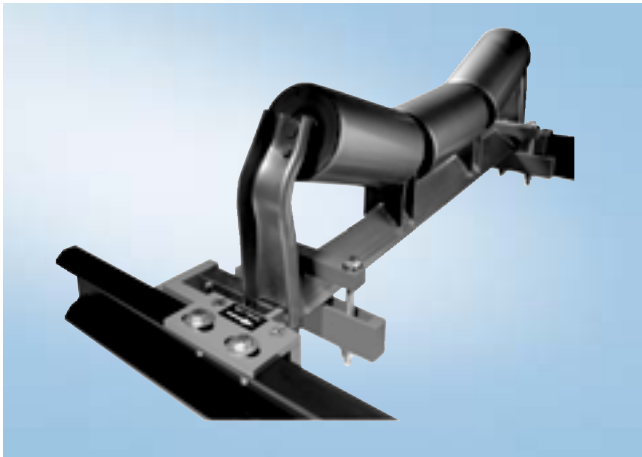


Fig. 2/9 Milltronics MCS Belt Scale

Application

Milltronics MCS belt scale is a compact, rugged belt scale with stainless steel load cells for use in mobile crushers and aggregate screening plants. It provides continuous, in-line weighing at minimal cost. The MCS stainless steel load cells ensure long-term, consistent, reliable measurement.

The modular construction and easy assembly of the MCS ensures quick delivery to meet even the tightest of schedules.

Operating with the Milltronics BW 100 or BW 500 microprocessor-based integrators, the MCS provides indication of flow rate, total weight, belt load, and belt speed of bulk solids materials on a belt conveyor.

To complete the weighing system, include a speed sensor to monitor conveyor belt speed for input to the integrator. On mobile crushing equipment, the TASS speed sensor is a compact, rugged speed sensor designed for use with the MCS.

Benefits

- Rugged design
- Low profile
- Easy retrofit
- Low cost
- Stainless steel load cells
- Calibration weight included

Technical data

Mode of operation	
Measuring principle	Strain gauge load cells measuring load on belt conveyor idlers
Typical application	Mobile crusher systems
Performance	
Accuracy	± 0.5 to 1 % of totalization over 4 to 1 operating range, application dependent
Non-repeatability	0.01 % of rated output
Non-linearity	0.02 % of rated output
Belt design	
Belt width	<ul style="list-style-type: none"> • Up to 1200 mm (48" CEMA) width • Refer to the outline dimension section
Belt speed	Up to 3 m/s (600 fpm)
Capacity	
Up to 1200 t/h (1320 STPH) at maximum belt speed	
Conveyor incline	
<ul style="list-style-type: none"> • ± 20° from horizontal, fixed incline • up to ± 30° with reduced accuracy 	
Idlers	
Idler profile	<ul style="list-style-type: none"> • Flat to 35° • To 45° with reduced accuracy
Idler diameter	100 to 150 mm (4 to 6")
Idler spacing	0.6 to 1.2 m (2.0 to 4.0 ft.)
Load cell	
Construction	Stainless steel
Excitation	10 V DC nominal, 15 V DC maximum
Output	2 mV/V excitation at rated load cell capacity
Non-linearity and hysteresis	0.02 % of rated output
Non-repeatability	0.01 % of rated output
Capacity	50, 100, 250 lb stainless steel
Overload	150 % of rated capacity, ultimate 300 % of rated capacity
Temperature	<ul style="list-style-type: none"> • -40 to 65 °C (-40 to 150 °F) operating range • -10 to 40 °C (15 to 105 °F) compensated
Weight	
Up to 20 kg (44 lbs), 10 kg (22 lb) per side	
Interconnection wiring (to integrator)	
<ul style="list-style-type: none"> • < 150 m (500 ft.) 18 AWG (0.75 mm²) 6 conductor shielded cable • > 150 m (500 ft.) to 300m (1000 ft.) 18 to 22 AWG (0.75 to 0.34 mm²), 8 conductor shielded cable 	
Hazardous locations	
With use of intrinsically safe barrier strips	
Approvals	
CE	

Dimensional drawings

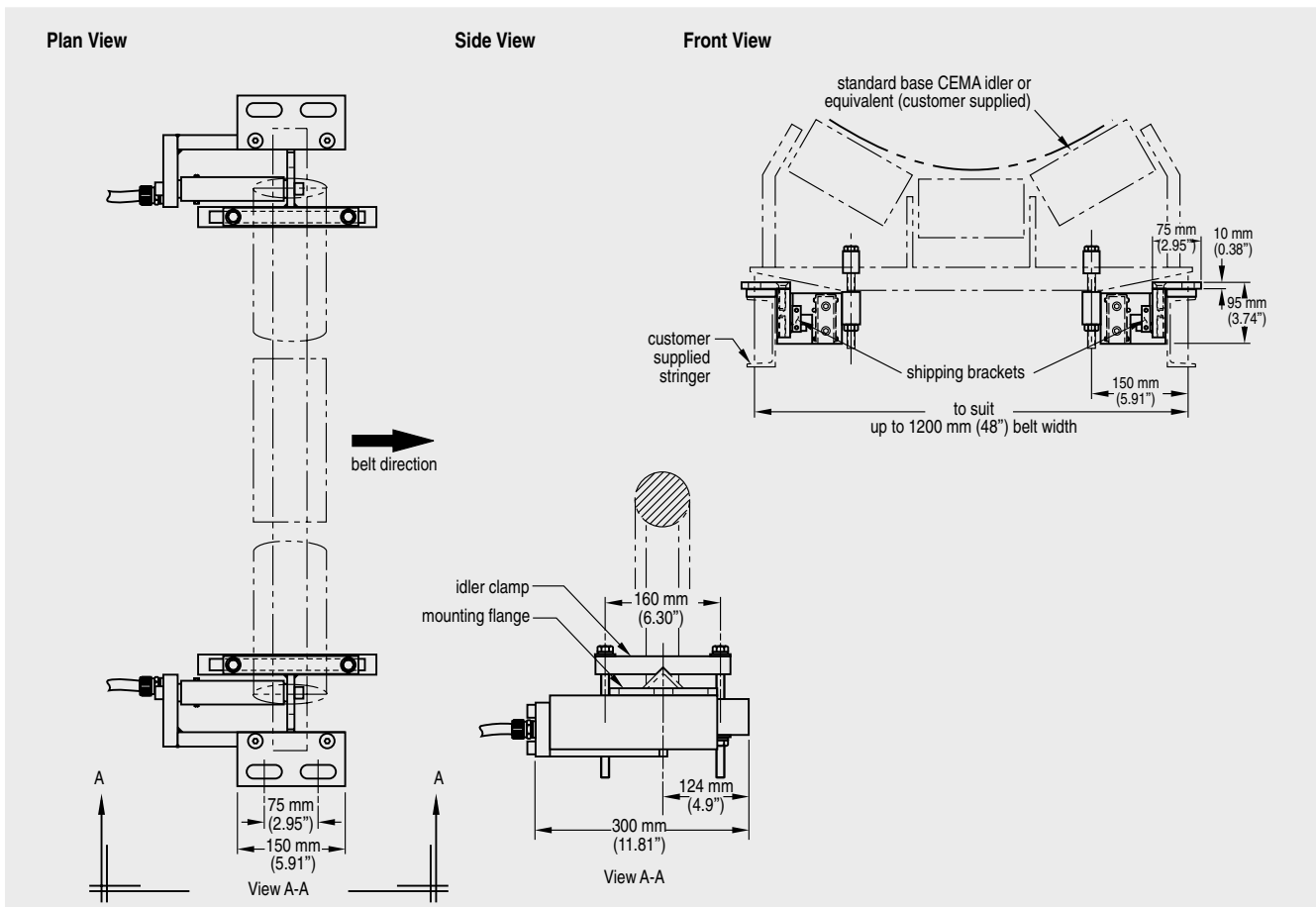


Fig. 2/10 MCS dimensions

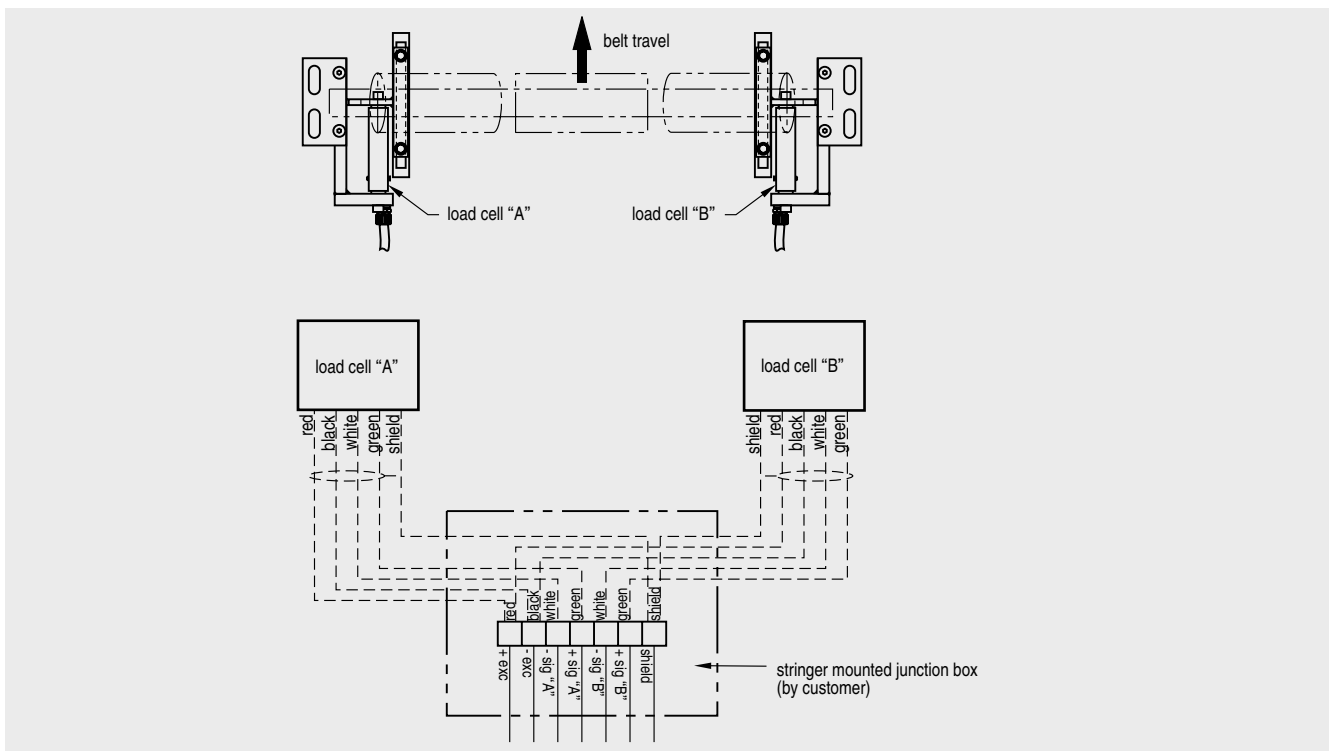


Fig. 2/11 MCS connections

Continuous Weighing Belt Scales

Milltronics MCS

Ordering data

Milltronics MCS Belt Scale

A compact, rugged belt scale with stainless steel load cells for use in mobile crushers and aggregate screening plants

Order No.

7MH7125-

0

Scale Construction

Standard duty [up to 1067 mm (42") belt width]

1

Load Cell Capacity

Load cell, 50 lb, stainless steel (use not recommended for mobile crushers)

AA

Load cell, 100 lb, stainless steel (use not recommended for mobile crushers)

AB

Load cell, 250 lb, stainless steel

AC

Not specified

BB

Fabrication

Painted mild steel

1

Instruction Manual

English

A) **7ML1998-5HN01**

German (Pending)

A) **7ML1998-5HN31**

French (Pending)

A) **7ML1998-5HN11**

Spanish (Pending)

A) **7ML1998-5HN21**

Note: The instruction manual should be ordered as a separate item on the order.

Spare Parts

Load cell, 50 lb, stainless steel

A) **PBD-23900195**

Load cell, 100 lb, stainless steel

A) **PBD-23900196**

Load cell, 250 lb, stainless steel

A) **PBD-23900197**

Note: Calibration weight and calibration weight bracket are included in MCS belt scale.

A) Subject to export regulations AL: N, ECCN: EAR99

2

Continuous Weighing Belt Scales

Milltronics MSI / MMI

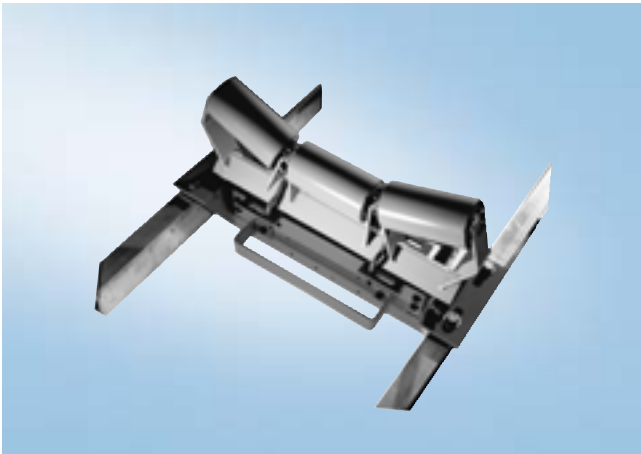


Fig. 2/12 Milltronics MSI Belt Scale

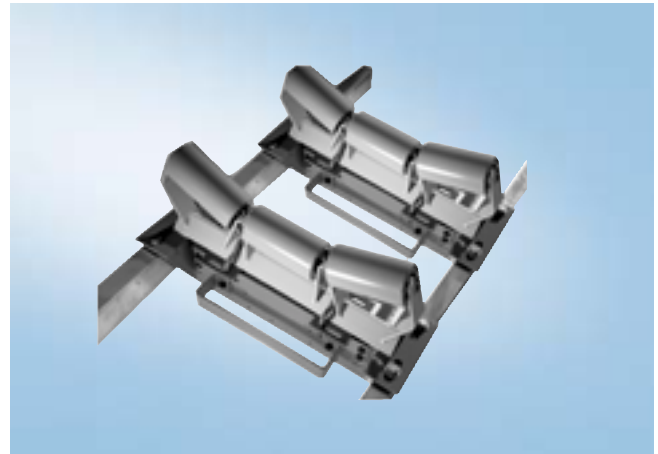


Fig. 2/14 Milltronics MMI Belt Scale

2

Application

The Milltronics MSI belt scale is a heavy-duty high-accuracy single idler scale for process and load-out control. It provides continuous in-line weighing on a variety of products in primary and secondary industries. It is proven in a wide range of tough applications from extraction - in mines, quarries and pits - to power generation, iron and steel, food processing and chemicals. The MSI is suitable for monitoring such diverse products as sand, flour, coal, or sugar.

The MSI's patented use of parallelogram-style load cells results in fast reaction to vertical forces, ensuring instant response to product loading. This enables it to provide outstanding accuracy and repeatability even with uneven loading and fast belt speeds.

Operating with the Milltronics BW 100 or BW 500 microprocessor-based integrators, the MSI provides indication of flow rate, totalised weight, belt load, and belt speed of bulk solid materials. A speed sensor monitors conveyor belt speed for input to the integrator.

The MSI is installed in a simple drop-in operation and may be secured with just four bolts. An existing idler is then attached to the MSI dynamic beam. With no moving parts, maintenance is kept to a minimum, with just periodic calibration checks required.

Benefits

- Outstanding accuracy and repeatability
- Unique parallelogram style load cell design
- Fast reaction to product loading; capable of monitoring fast-moving belts
- Rugged construction
- SABS approval (South Africa)

Mounting

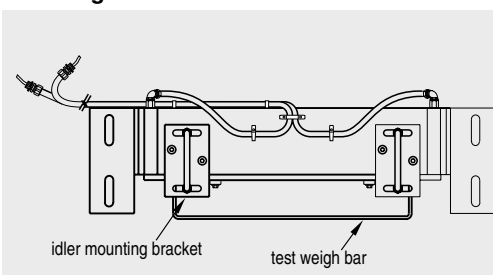


Fig. 2/13 MSI/MMI mounting

Application

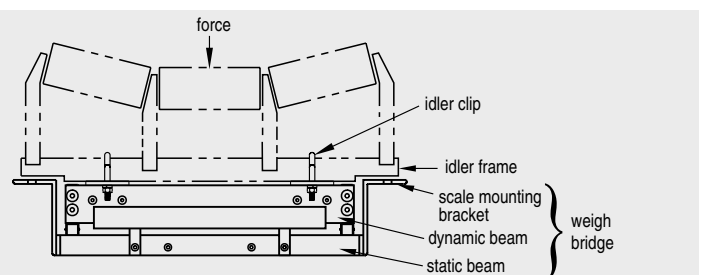
Milltronics MMI belt scale is a heavy-duty, high-accuracy multiple idler scale for critical process and load-out control. The MMI consists of two or more MSI single idler belt scales installed in series. It provides high accuracy continuous in-line weighing on a variety of products in primary and secondary industries. The MMI system is proven in a wide range of tough applications from extraction to power generation, iron and steel, food processing and chemicals. The MMI is suitable for monitoring such diverse products as fertilizer, sand, grain, flour, coal, or sugar.

The MMI's patented use of parallelogram-style load cells results in fast reaction to vertical forces, ensuring instant response to product loading. This enables it to provide outstanding accuracy and repeatability even with uneven or light loading, short idler spacing and fast belt speeds. Operating with the Milltronics BW 500 integrator or CompuScale III (for custody transfer applications), the MMI provides indication of flow rate, total weight, belt load and belt speed of bulk solids materials on a belt conveyor. A speed sensor monitors conveyor belt speed for input to the integrator.

The MMI is installed in a simple drop-in operation and may be secured with just eight bolts and existing idler sets, secured to the dynamic beam. With no moving parts, maintenance is kept to a minimum, with just periodic calibration checks required.

Benefits

- Exceptional accuracy and repeatability
- Unique parallelogram style load cell design
- Suitable for uneven or light product loading
- Capable of monitoring fast moving belts
- Low cost of ownership
- NTEP and Measurement Canada approved



Continuous Weighing Belt Scales

Milltronics MSI / MMI

Technical data

Mode of operation	
Measuring principle	Strain gauge load cells measuring load on belt conveyor idler(s)
Typical application	Control in fractionated stone blending tunnels Custody transfer
Performance	
Accuracy	± 0.5 % of totalization over 5 to 1 operating range
• MSI	
• MMI	
Medium conditions	
Material temperature	-40 to 85 °C (-40 to 185 °F)
Belt design	
Belt width	<ul style="list-style-type: none"> • 18" to 96" in CEMA sizes • Equivalent to 500 mm to 2000 mm in metric size • Refer to dimensions section
Belt speed	Up to 4 m/s (800 fpm)
Capacity	Up to 5000 t/h at maximum belt speed
Conveyor incline	<ul style="list-style-type: none"> • ± 20° from horizontal, fixed incline • Up to ± 30° with reduced accuracy
Idlers	
Idler profile	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	
Construction	Stainless steel with superior moisture protection
Excitation	10 V DC nominal, 15 V DC maximum
Output	2 mV/V excitation (nominal) at rated load cell capacity
Non-linearity and hysteresis	0.02 % of rated output
Non-repeatability	0.01 % of rated output
Capacity	<ul style="list-style-type: none"> • maximum ranges
Overload	50, 100, 250, 500, 750, 1000 lbs 150 % of rated capacity, ultimate 300 % of rated capacity
Temperature	<ul style="list-style-type: none"> • -40 to 85 °C (-40 to 185 °F) operating range • -18 to 65 °C (0 to 150 °F) compensated
Weight	See dimensions section
Hazardous locations	With use of intrinsically safe barrier strips
Approvals	CE

Dimensional drawings

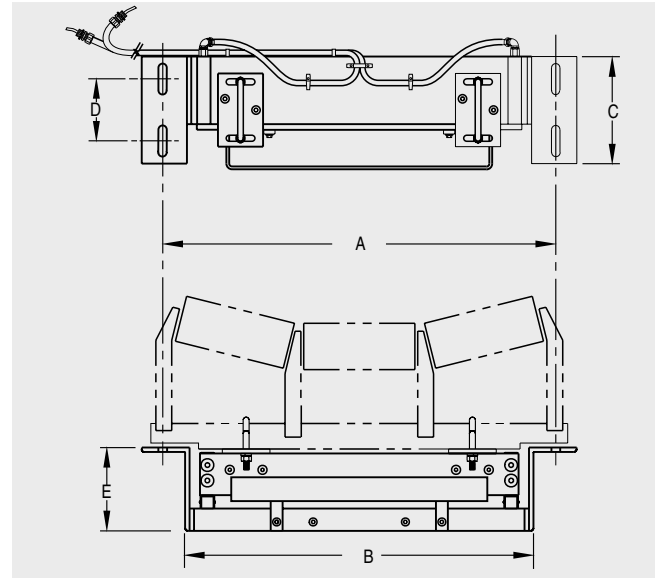


Fig. 2/15 MSI dimensions

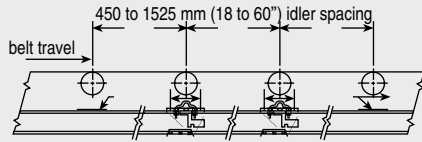
Conveyor belt width	Mounting scale width 'A'	Minimum drop-in width 'B'	'C'	'D'	'E'	Weight (approx.)
18" (457 mm)	27" (686 mm)	23.25" (591 mm)	9.5" (241 mm)	5.5" (140 mm)	7" (178 mm)	82 lbs (37 kg)
20" (508 mm)	29" (737 mm)	25.25" (641 mm)	9.5" (241 mm)	5.5" (140 mm)	7" (178 mm)	85 lbs (39 kg)
24" (610 mm)	33" (838 mm)	29.25" (743 mm)	9.5" (241 mm)	5.5" (140 mm)	7" (178 mm)	90 lbs (41 kg)
30" (762 mm)	39" (991 mm)	35.25" (895 mm)	9.5" (241 mm)	5.5" (140 mm)	7" (178 mm)	99 lbs (45 kg)
36" (914 mm)	45" (1143 mm)	41.25" (1048 mm)	9.5" (241 mm)	5.5" (140 mm)	7" (178 mm)	107 lbs (49 kg)
42" (1067 mm)	51" (1295 mm)	47.25" (1200 mm)	9.5" (241 mm)	5.5" (140 mm)	7" (178 mm)	116 lbs (53 kg)
48" (1219 mm)	57" (1448 mm)	53.25" (1353 mm)	9.5" (241 mm)	5.5" (140 mm)	7" (178 mm)	125 lbs (57 kg)
54" (1372 mm)	63" (1600 mm)	59.25" (1505 mm)	12" (305 mm)	8" (203 mm)	7" (178 mm)	175 lbs (79 kg)
60" (1524 mm)	69" (1753 mm)	65.25" (1657 mm)	12" (305 mm)	8" (203 mm)	7" (178 mm)	193 lbs (88 kg)
66" (1676 mm)	75" (1905 mm)	71.25" (1810 mm)	12" (305 mm)	8" (203 mm)	8" (203 mm)	229 lbs (104 kg)
72" (1829 mm)	81" (2057 mm)	77.25" (1962 mm)	12" (305 mm)	8" (203 mm)	8" (203 mm)	247 lbs (112 kg)

Other widths available - check configuration information. Sizes are from 18" (457 mm) to 96" (2438 mm) in 1" (25.4 mm) increments. All sizes are nominal. Note: Dimension B must be approx. 3/8" or 10 mm less than Y dimension of the conveyor (see application data sheet on page 7).

* As shown for North America; 8.5" (216 mm) Europe.

Dimensional drawings (con't)

Applications with 2 MSIs



Applications with 3 MSIs

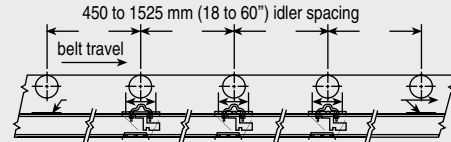


Fig. 2/16 Mounting (two or more MSI units)

Connections

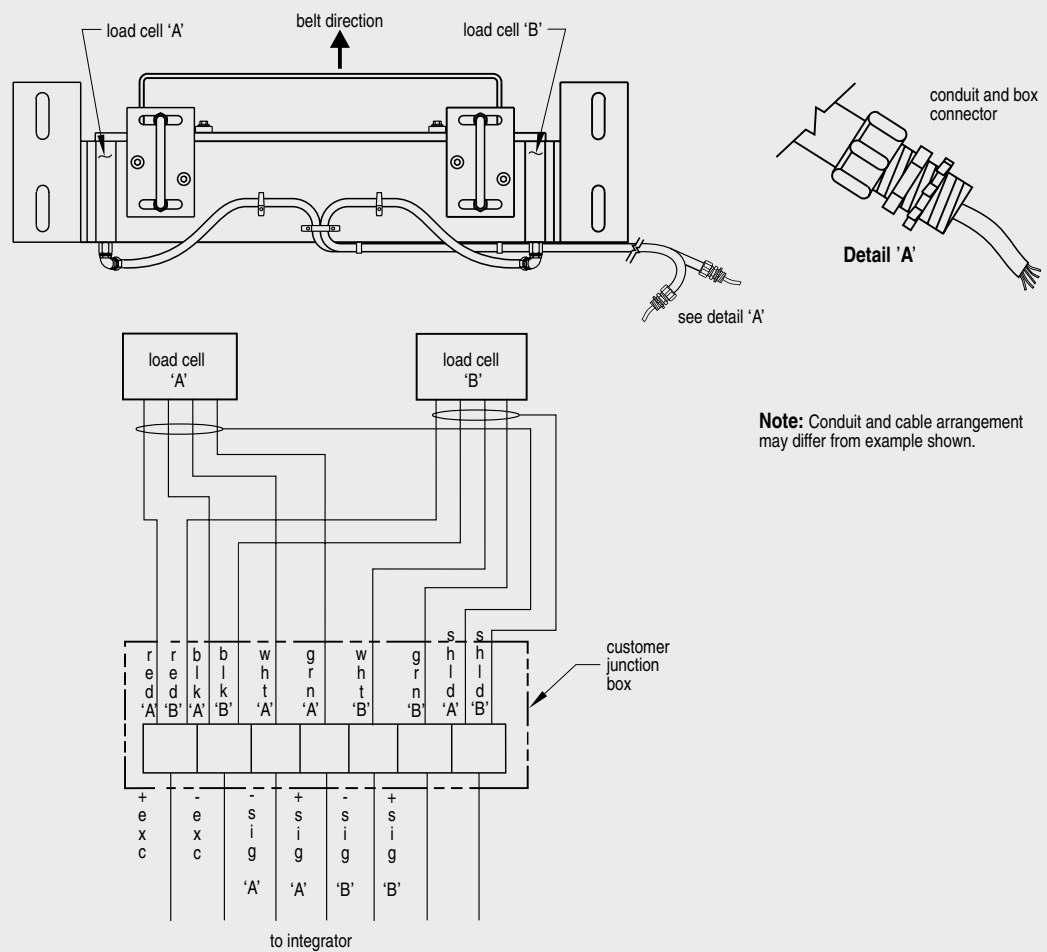


Fig. 2/17 MSI/MMI connections

Continuous Weighing Belt Scales

Milltronics MSI / MMI

Ordering data

Milltronics MSI Belt Scale

A heavy-duty high-accuracy single idler scale for process and load-out control. For MMI belt scale system, two or more MSI belt scales are required.

Scale Construction

Standard duty

Belt Width and 'A' dimension

18", 'A' = 27" (686 mm)	AA
19", 'A' = 28" (711 mm)	AB
20", 'A' = 29" (737 mm)	AC
21", 'A' = 30" (762 mm)	AD
22", 'A' = 31" (787 mm)	AE
23", 'A' = 32" (813 mm)	AF
24", 'A' = 33" (838 mm)	AG
25", 'A' = 34" (864 mm)	AH
26", 'A' = 35" (889 mm)	AJ
27", 'A' = 36" (914 mm)	AK
28", 'A' = 37" (940 mm)	AL
29", 'A' = 38" (965 mm)	AM
30", 'A' = 39" (991 mm)	AN
31", 'A' = 40" (1016 mm)	AP
32", 'A' = 41" (1041 mm)	AQ
33", 'A' = 42" (1067 mm)	AR
34", 'A' = 43" (1092 mm)	AS
35", 'A' = 44" (1118 mm)	AT
36", 'A' = 45" (1143 mm)	AU
37", 'A' = 46" (1168 mm)	AV
38", 'A' = 47" (1194 mm)	AW
39", 'A' = 48" (1219 mm)	BA
40", 'A' = 49" (1245 mm)	BB
41", 'A' = 50" (1270 mm)	BC
42", 'A' = 51" (1295 mm)	BD
43", 'A' = 52" (1321 mm)	BE
44", 'A' = 53" (1346 mm)	BF
45", 'A' = 54" (1372 mm)	BG
46", 'A' = 55" (1397 mm)	BH
47", 'A' = 56" (1422 mm)	BJ
48", 'A' = 57" (1448 mm)	BK
49", 'A' = 58" (1473 mm)	BL
50", 'A' = 59" (1499 mm)	BM
51", 'A' = 60" (1524 mm)	BN
52", 'A' = 61" (1549 mm)	BP
53", 'A' = 62" (1575 mm)	BQ
54", 'A' = 63" (1600 mm)	BR
55", 'A' = 64" (1626 mm)	BS
56", 'A' = 65" (1651 mm)	BT
57", 'A' = 66" (1676 mm)	BU
58", 'A' = 67" (1702 mm)	BV
59", 'A' = 68" (1727 mm)	BW
60", 'A' = 69" (1753 mm)	CA
61", 'A' = 70" (1778 mm)	CB
62", 'A' = 71" (1803 mm)	CC
63", 'A' = 72" (1829 mm)	CD
64", 'A' = 73" (1854 mm)	CE
65", 'A' = 74" (1880 mm)	CF
66", 'A' = 75" (1905 mm)	CG
67", 'A' = 76" (1930 mm)	CH
68", 'A' = 77" (1956 mm)	CJ
69", 'A' = 78" (1981 mm)	CK
70", 'A' = 79" (2007 mm)	CL
71", 'A' = 80" (2032 mm)	CM

Order No.

A) 7MH7122 -

A

Ordering data

Milltronics MSI Belt Scale

A heavy-duty high-accuracy single idler scale for process and load-out control. For MMI belt scale system, two or more MSI belt scales are required.

72", 'A' = 81" (2057 mm)	CN
73", 'A' = 82" (2083 mm)	CP
74", 'A' = 83" (2108 mm)	CQ
75", 'A' = 84" (2134 mm)	CR
76", 'A' = 85" (2159 mm)	CS
77", 'A' = 86" (2184 mm)	CT
78", 'A' = 87" (2210 mm)	CU
Other sizes available upon request.	

Stainless Steel Load Cell

not specified	0
50 lb (22.7 kg)	1
100 lb (45.4 kg)	2
250 lb (113.4 kg)	3
500 lb (226.8 kg)	4
750 lb (340.2 kg)	5
1000 lb (453.6 kg)	6

Fabrication

Standard, mild steel with epoxy paint	1	1
AISI 304 (1.4301), for 18" to 29" belt width scales	2	1
AISI 304 (1.4301), for 30" to 41" belt width scales	2	2
AISI 304 (1.4301), for 42" to 53" belt width scales	2	3
AISI 304 (1.4301), for 54" to 65" belt width scales	2	4
AISI 304 (1.4301), for 66" to 77" belt width scales	2	5
AISI 304 (1.4301), for 78" to 89" belt width scales	2	6
Standard, mild steel with epoxy paint (compatible with MWL weight calibration system)	4	1
Other sizes and materials available upon request.		

Instruction Manual

English, MSI manual	A) 7ML1998-5CY01
German, MSI manual	A) 7ML1998-5CY31
English, MMI manual	A) 7ML1998-5DR01
Belt Scale Application Guidelines	
• English	A) 7ML1998-5GA01
• French	A) 7ML1998-5GA11
• German	A) 7ML1998-5GA31
• Spanish	A) 7ML1998-5GA21

Note: The instruction manual and application guidelines manual should be ordered as separate items on the order.

Spare Parts

<u>Stainless steel load cell</u>	
50 lb (22.7 kg)	A) PBD-23900157
100 lb (45.4 kg)	A) PBD-23900158
250 lb (113.4 kg)	A) PBD-23900159
500 lb (226.8 kg)	A) PBD-23900160
750 lb (340.2 kg)	A) PBD-23900161
1000 lb (453.6 kg)	A) PBD-23900162
<u>Calibration weight</u>	
6.0 lb (2.7 kg)	A) 7MH7724-1AB
18.0 lb (8.2 kg)	A) 7MH7724-1AA

A) Subject to export regulations AL: N, ECCN: EAR99

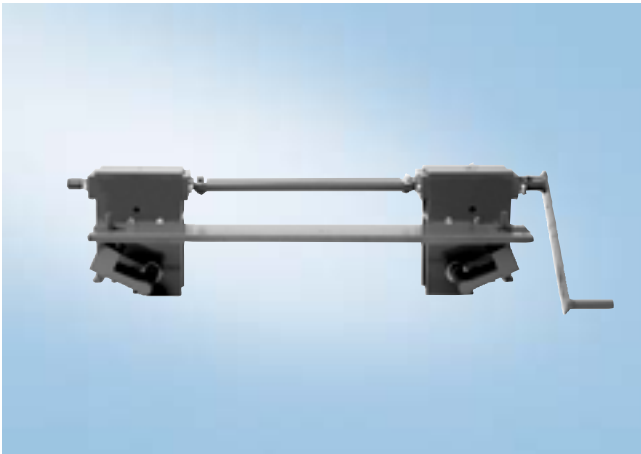


Fig. 2/18 Milltronics MWL Weight Lifter

Application

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 weights and then stores the weights securely above the belt scale calibration arms, and allows the operator to lower and apply them safely without having to lean into the conveyor. The MWL is manually operated, and uses a high mechanical advantage to enable weights up to 225 kg (500 lbs.) to be applied with very limited effort. The crank handle uses four rotations for full range of motion, and can be removed and stored for safety with the locking ball-pin which secures the MWL when it is not in use.

Two lifting pads support a base-bar weight above the test-weight brackets of the belt scale: either flat bar or horseshoe style calibration weights are applicable. 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.

Installation is easy, just four bolt holes to drill after locating the MWL gear modules (LH and RH) on the conveyor with respect to the belt scale. After running the MWL empty to ensure proper alignment, and then tightening mounting bolts, you are ready for the loading of the test weights. This is the last time that they will have to be lifted by hand.

Benefits

- Safe and easy application of belt scale reference weights with the operator remaining external to the conveyor
- Modular construction, easily adaptable to different conveyor widths
- Low profile allowing easy fit into belt conveyor
- Easy to install and apply
- Easy to store drive handle that can be applied to left or right side of MWL
- Security pin used to ensure safe storage of weight
- Can be used with new and existing applications

Technical data

Mode of operation	
Principle of operation	Mechanical gear drive
Typical application	Belt scale calibration
Medium conditions	
Max. ambient temperature	65 °C (150 °F)
Belt Design	
Belt width	<ul style="list-style-type: none"> • MUS-STD Standard Duty: up to 1000 mm or 42" CEMA width • MUS-HD Heavy-Duty: 1200 mm or 48" CEMA width and up, although the MUS-HD can be applied to narrower conveyors • MSI: 18 to 84" CEMA belt width
Idlers	
Idler spacing	20° or more troughed idlers
Idler spacing	Minimum of 610 mm (24")
Test weight capacity	
MUS-STD	Up to 80 kg (175 lbs)
MUS-HD	Up to 160 kg (350 lbs)
MSI	Up to 225 kg (500 lbs)
Crank arm	
Mechanical advantage	20:1
Number of revolutions required for raising or lowering	4
Mounting dimensions	
	See reverse for standard and heavy-duty MUS and MSI/MMI belt scales
Approvals	
	The MWL is in compliance with Directive 98/37/EC

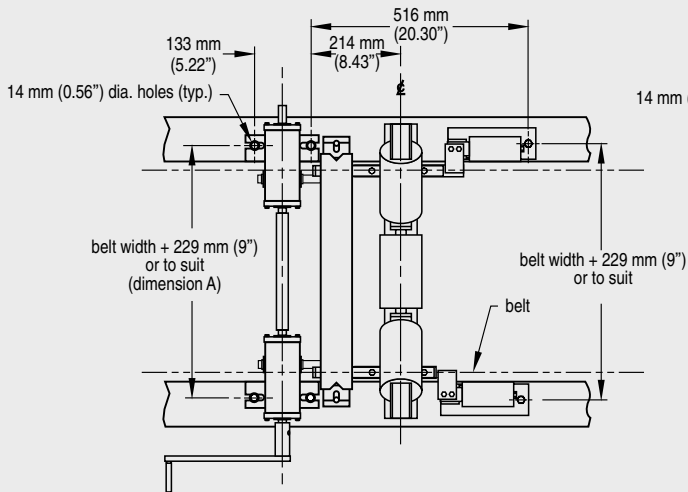
Continuous Weighing Belt Scales

Milltronics MWL Weight Lifter

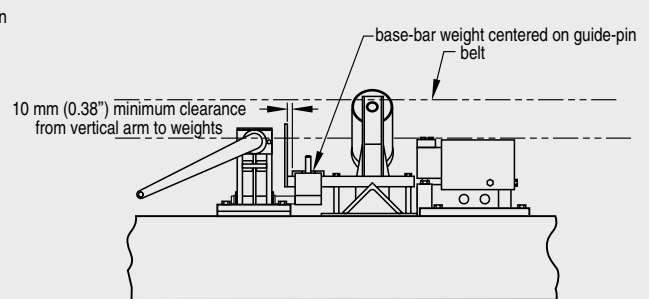
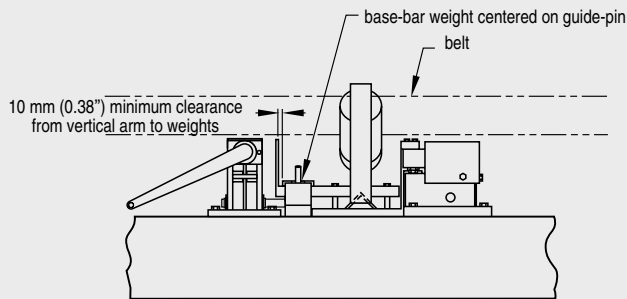
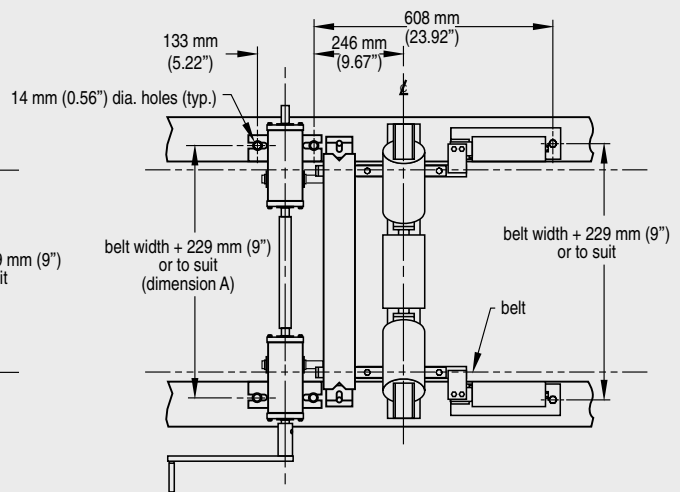
Dimensional drawings

2

MWL with MUS - STD Standard Duty Belt Scale



MWL with MUS - HD Heavy Duty Belt Scale



MWL with MSI/MMI Belt Scale

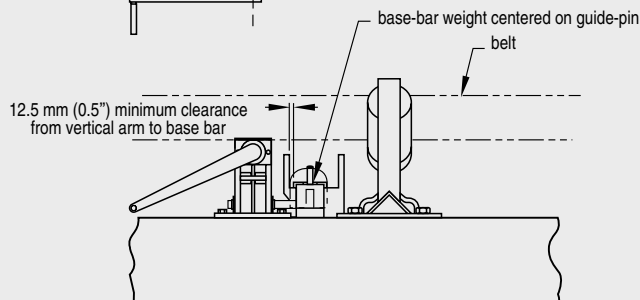
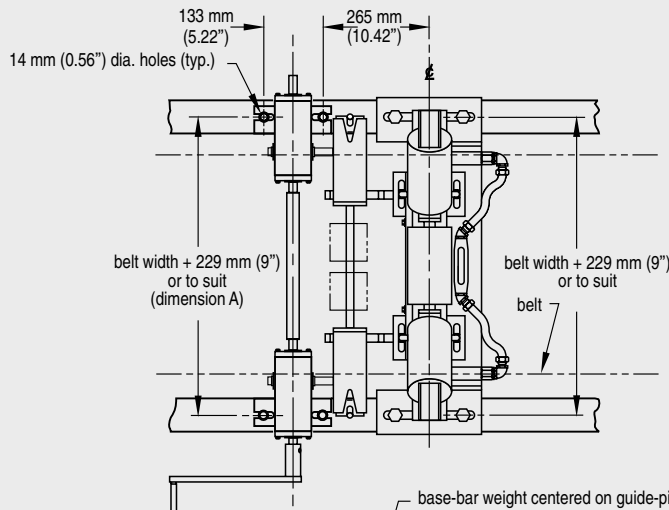


Fig. 2/19 MWL dimensions

Continuous Weighing Belt Scales

Milltronics MWL Weight Lifter

Ordering data	Order No.
Milltronics MWL Weight Lifter A mechanical calibration weight lifter for MSI, MMI, and MUS belt scales	A) 7MH7128-
Belt Width and 'A' dimension	
18", 'A' = 27" (686 mm)	AA
19", 'A' = 28" (711 mm)	AB
20", 'A' = 29" (737 mm)	AC
21", 'A' = 30" (762 mm)	AD
22", 'A' = 31" (787 mm)	AE
23", 'A' = 32" (813 mm)	AF
24", 'A' = 33" (838 mm)	AG
25", 'A' = 34" (864 mm)	AH
26", 'A' = 35" (889 mm)	AJ
27", 'A' = 36" (914 mm)	AK
28", 'A' = 37" (940 mm)	AL
29", 'A' = 38" (965 mm)	AM
30", 'A' = 39" (991 mm)	AN
31", 'A' = 40" (1016 mm)	AP
32", 'A' = 41" (1041 mm)	AQ
33", 'A' = 42" (1067 mm)	AR
34", 'A' = 43" (1092 mm)	AS
35", 'A' = 44" (1118 mm)	AT
36", 'A' = 45" (1143 mm)	AU
37", 'A' = 46" (1168 mm)	AV
38", 'A' = 47" (1194 mm)	AW
39", 'A' = 48" (1219 mm)	BA
40", 'A' = 49" (1245 mm)	BB
41", 'A' = 50" (1270 mm)	BC
42", 'A' = 51" (1295 mm)	BD
43", 'A' = 52" (1321 mm)	BE
44", 'A' = 53" (1346 mm)	BF
45", 'A' = 54" (1372 mm)	BG
46", 'A' = 55" (1397 mm)	BH
47", 'A' = 56" (1422 mm)	BJ
48", 'A' = 57" (1448 mm)	BK
49", 'A' = 58" (1473 mm)	BL
50", 'A' = 59" (1499 mm)	BM
51", 'A' = 60" (1524 mm)	BN
52", 'A' = 61" (1549 mm)	BP
53", 'A' = 62" (1575 mm)	BQ
54", 'A' = 63" (1600 mm)	BR
55", 'A' = 64" (1626 mm)	BS
56", 'A' = 65" (1651 mm)	BT
57", 'A' = 66" (1676 mm)	BU
58", 'A' = 67" (1702 mm)	BV
59", 'A' = 68" (1727 mm)	BW
60", 'A' = 69" (1753 mm)	CA
61", 'A' = 70" (1778 mm)"	CB
62", 'A' = 71" (1803 mm)	CC
63", 'A' = 72" (1829 mm)	CD
64", 'A' = 73" (1854 mm)	CE
65", 'A' = 74" (1880 mm)	CF
66", 'A' = 75" (1905 mm)	CG
67", 'A' = 76" (1930 mm)	CH
68", 'A' = 77" (1956 mm)	CJ
69", 'A' = 78" (1981 mm)	CK
70", 'A' = 79" (2007 mm)	CL
71", 'A' = 80" (2032 mm)	CM
72", 'A' = 81" (2057 mm)	CN
73", 'A' = 82" (2083 mm)	CP
74", 'A' = 83" (2108 mm)	CQ

Ordering data	Order No.
Milltronics MWL Weight Lifter A mechanical calibration weight lifter for MSI, MMI, and MUS belt scales	A) 7MH7128-
75", 'A' = 84" (2134 mm)	CR
76", 'A' = 85" (2159 mm)	CS
77", 'A' = 86" (2184 mm)	CT
78", 'A' = 87" (2210 mm)	CU
79", 'A' = 88" (2235 mm)	CV
80", 'A' = 89" (2261 mm)	CW
92", 'A' = 101" (2565 mm)	DM
93", 'A' = 102" (2591 mm)	DN
94", 'A' = 103" (2616 mm)	DP
95", 'A' = 104" (2642 mm)	DQ
96", 'A' = 105" (2667 mm)	DR
97", 'A' = 106" (2692 mm)	DS
98", 'A' = 107" (2718 mm)	DT
Customer's Scale Type	
MUS, new scale purchase, flat bar weights	1
MUS, retrofit existing scale, flat bar weights	2
MUS, heavy-duty, new scale purchase, flat bar weights	3
MUS, heavy-duty, retrofit existing scale, flat bar weights	4
MSI, new scale purchase, block weights	5
MSI, retrofit existing scale, block weights	6
MSI, new scale purchase, flat bar weights	7
MSI, retrofit existing scale, flat bar weights	8
Fabrication	
Painted mild steel	1
Other materials available upon request.	
Instruction Manual	
English	A) 7ML1998-5CR01
German (Pending)	A) 7ML1998-5CR31
Note: The instruction manual should be ordered as a separate line on the order.	

A) Subject to export regulations AL: N, ECCN: EAR99

Continuous Weighing Belt Scales

Incline Compensator/Test Chains

Ordering data	Order No.
Incline Compensator Load cell signal compensation for variable incline conveyor mounted belt scales Note: this device is not CE compliant.	A) 7MH7136 -
	A 0 0
Input Voltage 115 V AC 230 V AC	1 0
Enclosure none NEMA 4	A B
Instruction Manual English Note: The instruction manual should be ordered as a separate item on the order.	A) 7ML1998-1ER01

Ordering data	Order No.
Belt Scale peripheral equipment Junction Box, use with MUS or MSI Nema 4 Enclosure	A) PBD-51033453
A) Subject to export regulations AL: N, ECCN: EAR99	

Ordering data	Order No.
Test Chains Belt scale calibration reference when material tests are not practical. Minimum length is 4 feet (1.2m).	7MH7137 -
Weight/foot <u>Standard construction</u> 5 lb/ft. (7.45 kg/m) 7.5 lb/ft. (11.2 kg/m) 10 lb/ft. (14.9 kg/m) 15 lb/ft. (22.4 kg/m) 20 lb/ft. (29.8 kg/m) 25 lb/ft. (37.3 kg/m) 30 lb/ft. (44.7 kg/m) 35 lb/ft. (52.2 kg/m) 40 lb/ft. (60 kg/m) 50 lb/ft. (75 kg/m) 60 lb/ft. (90 kg/m) 70 lb/ft. (104 kg/m) 80 lb/ft. (119 kg/m) 90 lb/ft. (134 kg/m) <u>Zinc plated construction</u> 1.65 lb/ft. (2.46 kg/m) 5 lb/ft. (7.45 kg/m) 7.5 lb/ft. (11.2 kg/m) 10 lb/ft. (14.9 kg/m) 15 lb/ft. (22.4 kg/m) 20 lb/ft. (29.8 kg/m) 25 lb/ft. (37.3 kg/m) 30 lb/ft. (44.7 kg/m) 35 lb/ft. (52.2 kg/m) 40 lb/ft. (60 kg/m) 50 lb/ft. (75 kg/m) 60 lb/ft. (90 kg/m) 70 lb/ft. (104 kg/m) 80 lb/ft. (119 kg/m) 90 lb/ft. (134 kg/m)	0 B 0 C 0 D 0 E 0 F 0 G 0 H 0 J 0 K 0 L 0 M 0 N 0 P 0 Q 1 A 1 B 1 C 1 D 1 E 1 F 1 G 1 H 1 J 1 K 1 L 1 M 1 N 1 P 1 Q
Additional information Please add "Z" to Order No. and specify Order code(s).	
Length of the chain, specify in plain text: Y01: Total length ft.	Y01
Test chain storage reels and racks are also available upon request.	

Continuous Weighing Belt Scales

Belt Scale Peripherals

2

Ordering data

Order No.

Flat bar calibration weights

Designed for use with the MUS belt scale. Length of bar weight is A dimension minus 3" (76 mm). Listed weight is an approximation.

Note: Flat bar weights can also be used with the MWL weight calibration system and the MSI. When ordering the MSI, select fabrication option that is compatible with MWL calibration system.

A) 7MH7127 -

Bar width, Belt width and A dimension

3", 18", A=27" (686 mm), 4.63 kg	1 AA
3", 19", A=28" (711 mm), 4.82 kg	1 AB
3", 20", A=29" (737 mm), 5.02 kg	1 AC
3", 21", A=30" (762 mm), 5.21 kg	1 AD
3", 22", A=31" (787 mm), 5.40 kg	1 AE
3", 23", A=32" (813 mm), 5.59 kg	1 AF
3", 24", A=33" (838 mm), 5.78 kg	1 AG
3", 25", A=34" (864 mm), 5.98 kg	1 AH
3", 26", A=35" (889 mm), 6.17 kg	1 AJ
3", 27", A=36" (914 mm), 6.36 kg	1 AK
3", 28", A=37" (940 mm), 6.56 kg	1 AL
3", 29", A=38" (965 mm), 6.75 kg	1 AM
3", 30", A=39" (991 mm), 6.94 kg	1 AN
3", 31", A=40" (1016 mm), 7.13 kg	1 AP
3", 32", A=41" (1041 mm), 7.32 kg	1 AQ
3", 33", A=42" (1067 mm), 7.52 kg	1 AR
3", 34", A=43" (1092 mm), 7.71 kg	1 AS
3", 35", A=44" (1118 mm), 7.91 kg	1 AT
3", 36", A=45" (1143 mm), 8.10 kg	1 AU
3", 37", A=46" (1168 mm), 8.29 kg	1 AV
3", 38", A=47" (1194 mm), 8.49 kg	1 AW
3", 39", A=48" (1219 mm), 8.68 kg	1 BA
3", 40", A=49" (1245 mm), 8.87 kg	1 BB
3", 41", A=50" (1270 mm), 9.07 kg	1 BC
3", 42", A=51" (1295 mm), 9.25 kg	1 BD
3", 43", A=52" (1321 mm), 9.45 kg	1 BE
3", 44", A=53" (1346 mm), 9.64 kg	1 BF
3", 45", A=54" (1372 mm), 9.84 kg	1 BG
3", 46", A=55" (1397 mm), 10.03 kg	1 BH
3", 47", A=56" (1422 mm), 10.22 kg	1 BJ
3", 48", A=57" (1448 mm), 10.41 kg	1 BK
3", 49", A=58" (1473 mm), 10.60 kg	1 BL
3", 50", A=59" (1499 mm), 10.80 kg	1 BM
3", 51", A=60" (1524 mm), 10.99 kg	1 BN
3", 52", A=61" (1549 mm), 11.18 kg	1 BP
3", 53", A=62" (1575 mm), 11.38 kg	1 BQ
3", 54", A=63" (1600 mm), 11.57 kg	1 BR
3", 55", A=64" (1626 mm), 11.77 kg	1 BS
3", 56", A=65" (1651 mm), 11.96 kg	1 BT
3", 57", A=66" (1676 mm), 12.15 kg	1 BU
3", 58", A=67" (1702 mm), 12.34 kg	1 BV
3", 59", A=68" (1727 mm), 12.53 kg	1 BW
3", 60", A=69" (1753 mm), 12.73 kg	1 CA
4", 18", A=27" (686 mm), 6.17 kg	2 AA
4", 19", A=28" (711 mm), 6.43 kg	2 AB
4", 20", A=29" (737 mm), 6.69 kg	2 AC
4", 21", A=30" (762 mm), 6.94 kg	2 AD
4", 22", A=31" (787 mm), 7.19 kg	2 AE
4", 23", A=32" (813 mm), 7.46 kg	2 AF
4", 24", A=33" (838 mm), 7.71 kg	2 AG
4", 25", A=34" (864 mm), 7.97 kg	2 AH
4", 26", A=35" (889 mm), 8.23 kg	2 AJ
4", 27", A=36" (914 mm), 8.48 kg	2 AK
4", 28", A=37" (940 mm), 8.74 kg	2 AL

Ordering data

Order No.

Flat bar calibration weights

Designed for use with the MUS belt scale. Length of bar weight is A dimension minus 3" (76 mm). Listed weight is an approximation.

Note: Flat bar weights can also be used with the MWL weight calibration system and the MSI. When ordering the MSI, select fabrication option that is compatible with MWL calibration system.

A) 7MH7127 -

4", 29", A=38" (965 mm), 9.00 kg	2 AM
4", 30", A=39" (991 mm), 9.26 kg	2 AN
4", 31", A=40" (1016 mm), 9.51 kg	2 AP
4", 32", A=41" (1041 mm), 9.77 kg	2 AQ
4", 33", A=42" (1067 mm), 10.03 kg	2 AR
4", 34", A=43" (1092 mm), 10.28 kg	2 AS
4", 35", A=44" (1118 mm), 10.55 kg	2 AT
4", 36", A=45" (1143 mm), 10.80 kg	2 AU
4", 37", A=46" (1168 mm), 11.05 kg	2 AV
4", 38", A=47" (1194 mm), 11.31 kg	2 AW
4", 39", A=48" (1219 mm), 11.57 kg	2 BA
4", 40", A=49" (1245 mm), 11.83 kg	2 BB
4", 41", A=50" (1270 mm), 12.08 kg	2 BC
4", 42", A=51" (1295 mm), 12.34 kg	2 BD
4", 43", A=52" (1321 mm), 12.60 kg	2 BE
4", 44", A=53" (1346 mm), 12.85 kg	2 BF
4", 45", A=54" (1372 mm), 13.12 kg	2 BG
4", 46", A=55" (1397 mm), 13.37 kg	2 BH
4", 47", A=56" (1422 mm), 13.62 kg	2 BJ
4", 48", A=57" (1448 mm), 13.89 kg	2 BK
4", 49", A=58" (1473 mm), 14.14 kg	2 BL
4", 50", A=59" (1499 mm), 14.40 kg	2 BM
4", 51", A=60" (1524 mm), 14.66 kg	2 BN
4", 52", A=61" (1549 mm), 14.91 kg	2 BP
4", 53", A=62" (1575 mm), 15.17 kg	2 BQ
4", 54", A=63" (1600 mm), 15.42 kg	2 BR
4", 55", A=64" (1626 mm), 15.69 kg	2 BS
4", 56", A=65" (1651 mm), 15.94 kg	2 BT
4", 57", A=66" (1676 mm), 16.19 kg	2 BU
4", 58", A=67" (1702 mm), 16.46 kg	2 BV
4", 59", A=68" (1727 mm), 16.71 kg	2 BW
4", 60", A=69" (1753 mm), 16.97 kg	2 CA

Fabrication

Standard, painted mild steel

1

A) Subject to export regulations AL: N, ECCN: EAR99

Continuous Weighing Speed Sensors

Milltronics TASS

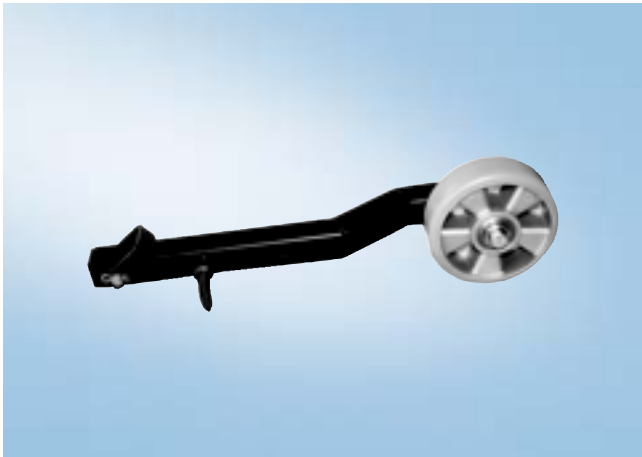


Fig. 2/20 Milltronics TASS Speed Sensor

Application

The Milltronics TASS speed sensor is a compact, low-profile, wheel-driven return belt speed sensor. It operates in conjunction with a conveyor belt scale, providing signals to an integrator which computes the rate of material being conveyed. The trailing arm speed sensor monitors conveyor belt speed, with the output signal transmitted by cable connection to the integrator.

Easily installed close to the belt scale assembly, the TASS provides a signal generated as the wheel rotates on the return belt. Pulses are generated by the internal proximity switch detecting the rotation of the five spoked wheel. The TASS is mounted to the static beam of the belt scale or to a structural cross member via a pivoting bracket assembly.

The TASS is a compact, low-profile, rugged speed sensor, most often used on mobile crusher applications where space is limited. The TASS output can be applied to any Milltronics belt scale integrator.

Benefits

- Rugged design
- Easy, low cost installation
- Compact, low-profile speed sensor
- IP65 rated

Technical data

Mode of operation	
Measuring principle	Proximity sensor provides pulse to integrator
Typical application	Mobile crusher
Input	
	<ul style="list-style-type: none"> • Bi-directional wheel rotation • 25 to 350 rpm
Output	
	<ul style="list-style-type: none"> • Magnetic proximity sensor • Open collector, NPN, sinking output, max. 200 mA • Pulses: 5 per revolution 9.947 pulses/m, 3.03 pulses/ft.
Rated operating conditions	
Operating temperature	-25 to 70 °C (-13 to 158 °F)
Design	
Trailing arm assembly	Painted mild steel
Wheel	160 mm (6.3") diameter cast aluminum with polyurethane tread
Power supply	
	10 to 35 V DC, 15 mA at 24 V DC maximum
Wiring	
Brown	+ excitation (+15 V DC)
Black	+ signal
Blue	- common
Cable	
Option	<ul style="list-style-type: none"> • 2 m, 3 conductor shielded PVC cable, 3 x 0.25 mm² (23 AWG), protected with 1000 mm of flexible conduit • 300 m (1000 ft.) maximum cable run
Approvals	
	CE

Dimensional drawings

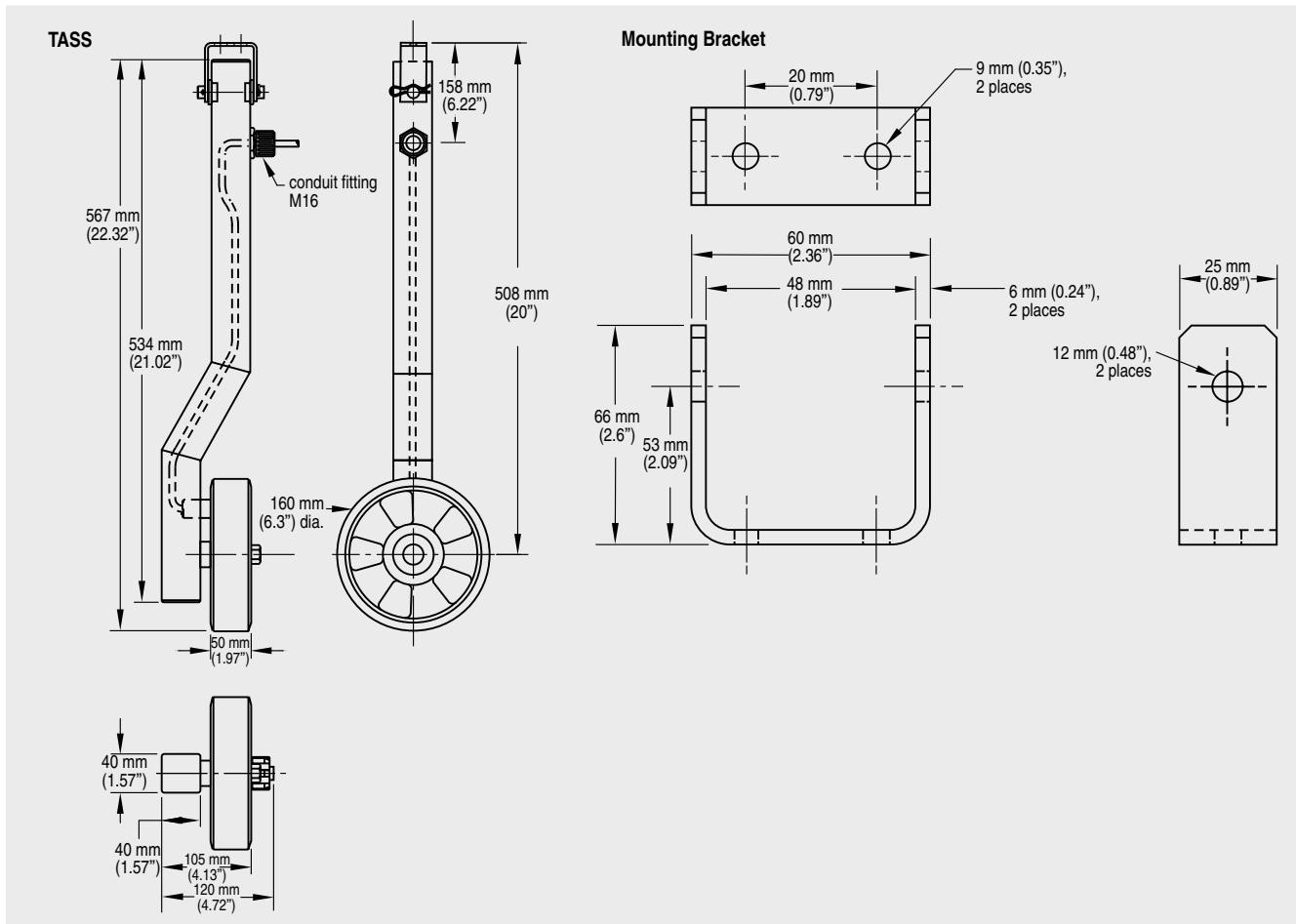


Fig. 2/21 TASS dimensions

Installation

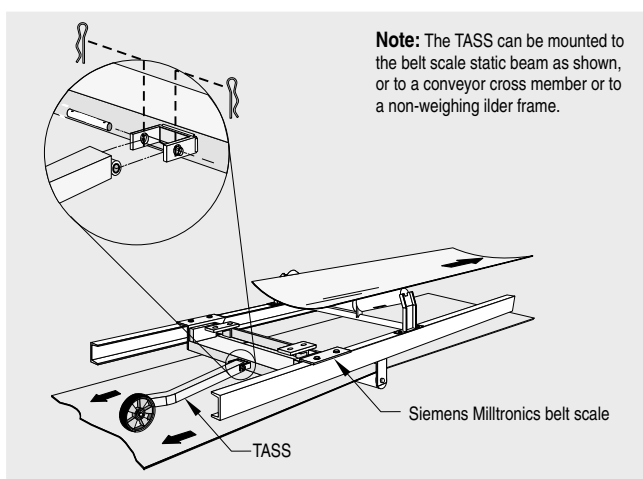


Fig. 2/22 TASS Installation

Ordering data

Milltronics TASS Speed Sensor
Compact, low-profile, wheel return belt speed sensor

Model

5 pulses per revolution

Fabrication

Painted mild steel

Mounting Options

Complete with standard mounting kit

Approvals

CE

Instruction Manual

English
Note: The instruction manual should be ordered as a separate item on the order.

Spare Parts

TASS Wheel
TASS Proximity Switch

Order No.

7MH7131-0

1

A

A

1

A) **7ML1998-5HL01**

A) **7MH7723-1AN**

A) **7MH7723-1AP**

A) Subject to export regulations AL: N, ECCN: EAR99

Continuous Weighing Speed Sensors

Milltronics RBSS



Fig. 2/23 Milltronics RBSS Speed Sensor

Application

The Milltronics RBSS speed sensor is a high resolution wheel-driven return belt speed sensor. The RBSS monitors conveyor belt speed, with the output signal transmitted by cable connection to the integrator.

Easily installed close to the belt scale assembly, the RBSS provides a signal generated as the wheel on the sensor rotates on the return belt. To secure this cost-effective unit in place, position a cross bar between stringers - either just before or after a return belt idler, or use the optional mounting bracket. The weight of the RBSS ensures positive rotation of the wheel in the middle of the return belt, and pulses from the magnetic sensor are generated by the rotation of the 60 toothed speed sprocket driven by the wheel.

The RBSS output can be applied to any Milltronics belt scale integrator.

Benefits

- Rugged design
- IP65 rated
- Easy, low cost installation
- Accurate belt speed detection

Technical data

Mode of operation	
Measuring principle	Proximity sensor provides pulse to integrator
Typical application	Aggregate belt conveyors
Input	
	Wheel rotation 2 to 450 rpm, bi-directional
Output	
	<ul style="list-style-type: none"> • 60 pulses per revolution, 2 to 450 Hz, 150.4 pulses/m (4.58 pulses/ft.) • RBSS: open collector sinking output, max. 17 mA • RBSS IS: load current, 0 to 15 mA
Rated operating conditions	
Ambient temperature	RBSS: -40 to 105 °C (-40 to 220 °F) RBSS IS: -25 to 100 °C (-14 to 212 °F)
Design	
Trailing arm	Painted mild steel
Sensor wheel	127 mm (5") diameter, polyurethane tread
Power supply	
	<ul style="list-style-type: none"> • RBSS: 5 to 18 V DC, 10 mA • RBSS IS: 5 to 25 V DC from IS Switch Isolator
Cable	
Option	<ul style="list-style-type: none"> • RBSS: 3 m, 3 conductor 22 AWG shielded cable <ul style="list-style-type: none"> - 300 m (1000 ft.) maximum cable run • RBSS IS: 2 m, 2 conductor 26 AWG PVC covered cable <ul style="list-style-type: none"> - 300 m (1000 ft.) maximum cable run to IS switch isolator - 300 m (1000 ft.) maximum cable run from IS switch isolator and integrator
Approvals	
RBSS	CE ²⁾
RBSS IS (with suitable IS switch isolator or Switch Amplifier) ¹⁾	<ul style="list-style-type: none"> • ATEX II 2 G EEx ia IIC T6 • CSA/FM Class I, Div. 1, Groups A, B, C, and D, Class II, Div. 1, Groups E, F, and G (system approval) • CE²⁾
Proximity Switch Approval Ratings (Pepperl+Fuchs #NJ0.8-5GM-N)	<ul style="list-style-type: none"> • ATEX II 2 G EEx ia IIC T6 • CSA/FM Class I, Div. 1, Groups A, B, C, and D, Class II, Div. 1, Groups E, F, and G (system approval)
Optional Switch Isolator (required for RBSS IS) ³⁾	<ul style="list-style-type: none"> • ATEX II (1) G [EEx ia] IIC • CSA/FM: Class 1, Div. 1, Groups A, B, C, and D, Class II, Div. 1, Groups E, F, and G
• Pepperl+Fuchs #KFA5-SOT2-Ex2 or #KFA6-SOT2-Ex2	

¹⁾ Approvals for RBSS IS are based on internally mounted NAMUR slotted proximity switch (Pepperl+Fuchs #NJ0.8-5GM-N) and use of suitable IS Switch Isolator (Amplifier). Please see RBSS instruction manual for more information.

²⁾ EMC performance available upon request.

³⁾ Approval ratings for the Proximity Switch and IS Switch Isolator are the property of Pepperl+Fuchs. Copies of these Approval Certificates may be obtained at www.siemens-milltronics.com.

Dimensional drawings

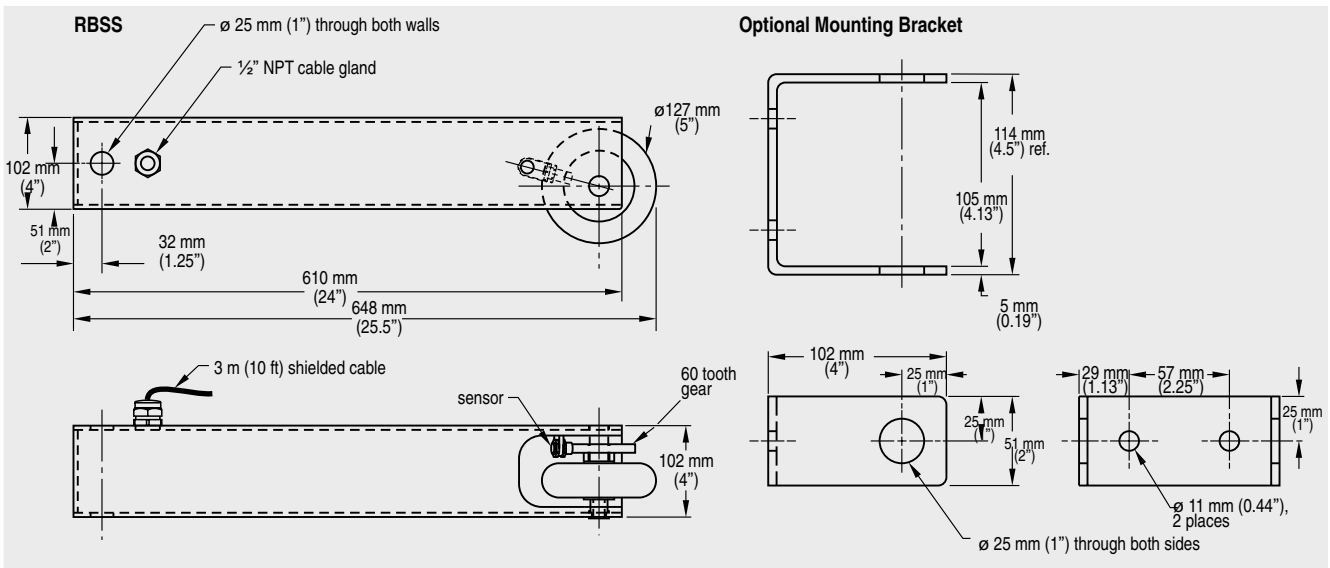


Fig. 2/24 RBSS Dimensions

Installation

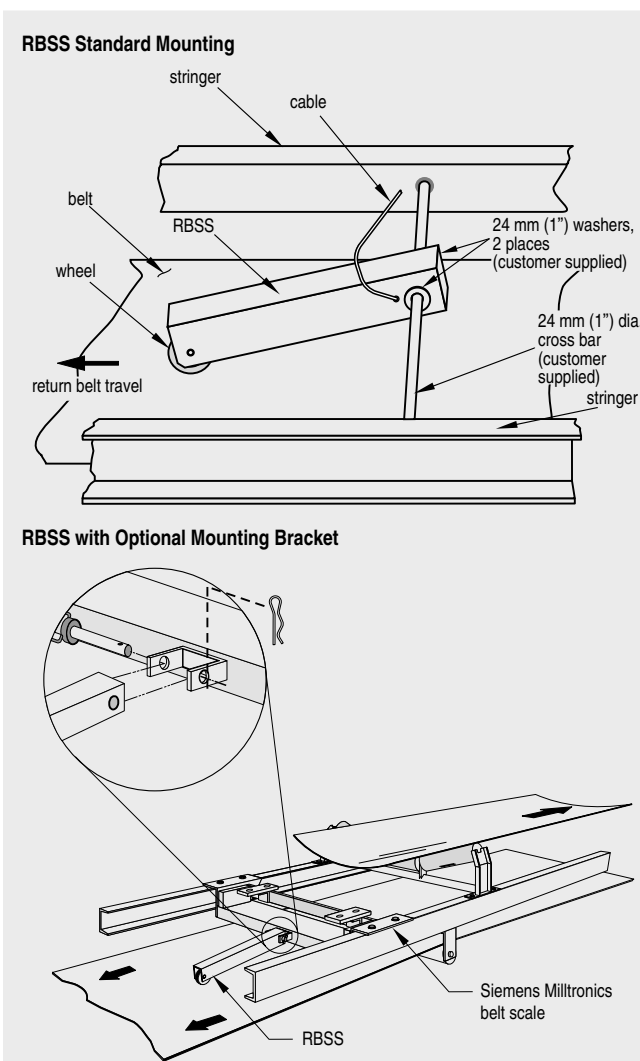


Fig. 2/25 RBSS Installation

Ordering data

Milltronics RBSS Speed Sensor

A high resolution wheel-driven return belt speed sensor

Model

60 pulses per revolution

Fabrication

Painted mild steel

Mounting Options

No mounting kit
With mounting kit

Approvals

CE
CE, ATEX II 2 G, EEx ia IIC and CSA/FM Class I, Div. 1, Groups A, B, C & D, Class II Div. 1, Groups E, F & G¹⁾

Instruction Manual

English
Note: The instruction manual should be ordered as a separate item on the order.

Optional Equipment

P & F Switch Isolator, 115 V AC, required with RBSS IS
P & F Switch Isolator, 230 V AC, required with RBSS IS

Spare Parts

Milltronics RBSS Wheel, 127 dia, polyurethane
Milltronics RBSS Proximity Switch, 54ZT
Switch, inductive, NJ0.8-5GM-N for RBSS IS (Approvals option 2)

Order No.

A) 7MH7134 -

0

1

A

A

B

1

2

A) 7ML1998-5GX01

PBD-51035295

PBD-51035296

A) 7MH7723-1AQ

A) 7MH7723-1AR

A) 7MH7723-1AS

¹⁾ Approvals option 2 requires use of Switch Isolator to interface with the belt-scale integrator.

A) Subject to export regulations AL: N, ECCN: EAR99

Continuous Weighing Speed Sensors

Milltronics MD-36



Fig. 2/26 Milltronics MD-36 Speed Sensor

Application

The Milltronics MD-36 speed sensor is a general purpose and hazardous rated shaft-driven speed sensor. It operates in conjunction with a conveyor belt scale, providing a signal to an integrator which computes the rate of material being conveyed.

The sensor is directly coupled to the motor or pulley shaft to ensure accurate belt-travel readout, eliminating problems caused by belt slippage or material build-up.

The MD-36 converts shaft rotation into a pulse train of 36 pulses per revolution using high precision dual optocouplers. The digital signal is transmitted as speed input to any Milltronics integrator for calculation of belt speed, flow rate and totalized weight.

This high resolution speed sensor provides a frequency signal proportional to the shaft speed, enabling low or varying shaft speeds to be read accurately. The quadrature type circuitry in the MD-36 non-IS models prevents erroneous speed signals due to vibration or shaft oscillation.

The MD-36 is easily mounted and is bi-directional for either clockwise or anti-clockwise rotation.

Benefits

- Standard aluminium or optional stainless steel versions available for corrosive environments
- Hazardous area approved (MD-36 and MD-36 IS aluminum)
- Reading errors due to vibration are eliminated
- High resolution, suitable for low or varying shaft speeds
- Bi-directional for either clockwise or anti-clockwise belt travel
- Pulley shaft or motor shaft-driven

Technical data

Mode of operation	
Measuring principle	Pulse from shaft rotation using slotted optical switch
Typical application	General purpose speed sensor
Input	
	Shaft rotation 0 to 2,000 rpm, bi-directional
Output	
	<ul style="list-style-type: none"> • MD-36: open collector sinking output, max. 25 mA at 15 V DC • 36 pulses/revolution: 0 to 2,000 rpm = 0 to 1200 Hz • MD-36 IS: load current 0 to 15 mA
Input:output	• 1:1 (speed ratio)
Rated operating conditions	
Ambient temperature	-40 to 55 °C (-40 to 130 °F)
Design	
Enclosure	<ul style="list-style-type: none"> • MD-36 and MD-36 IS: painted aluminum rating – Type 4/ NEMA 4/ IP65 • MD-36A: painted aluminum - general purpose • MD-36SS: 304 stainless steel - corrosive applications
Power supply	
	<ul style="list-style-type: none"> • MD-36/MD-36A/MD-36SS: +15 V DC, 25 mA from integrator • MD-36 IS: +5 to 25 V DC from IS switch isolator
Cable	
Option	<ul style="list-style-type: none"> • Belden® 8770, 3-wire shielded, 18 AWG (0.75 mm²) or equivalent • Max. run 305 m (1000 ft.)
Approvals	
MD-36	CSA & FM : Class II, Gr. E, F & G, Class III CE ²⁾
MD-36 IS (with suitable IS switch isolator) ¹⁾	ATEX: II 2 G, EEx ia IIC T6 CSA/FM: Class I, Div. 1, Groups A, B, C, and D, Class II, Div. 1, Groups E, F, and G (system approval) CE ²⁾
MD-36A, MD-36SS: Optional Switch Isolator (required for MD-36 IS) ³⁾	CE ²⁾
• Pepperl+Fuchs #KFA5-SOT2-Ex2 (115 V AC) or #KFA6-SOT2-Ex2 (230 V AC)	ATEX: II (1) G, [EEx ia] IIC CSA/FM: Class 1, Div. 1, Groups A, B, C, and D, Class II, Div. 1, Groups E, F, and G (system approval)

¹⁾ Approvals for MD-36 IS are based on internally mounted NAMUR slotted proximity switch (Pepperl+Fuchs #SJ3.5N) and use of suitable IS Switch Isolator (Amplifier). Please see MD-36 instruction manual for more information.

²⁾ EMC performance available upon request.

³⁾ Approval ratings for the Proximity Switch and IS Switch Isolator are the property of Pepperl+Fuchs. Copies of these Approval Certificates may be obtained at www.siemens-milltronics.com.

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Dimensional drawings

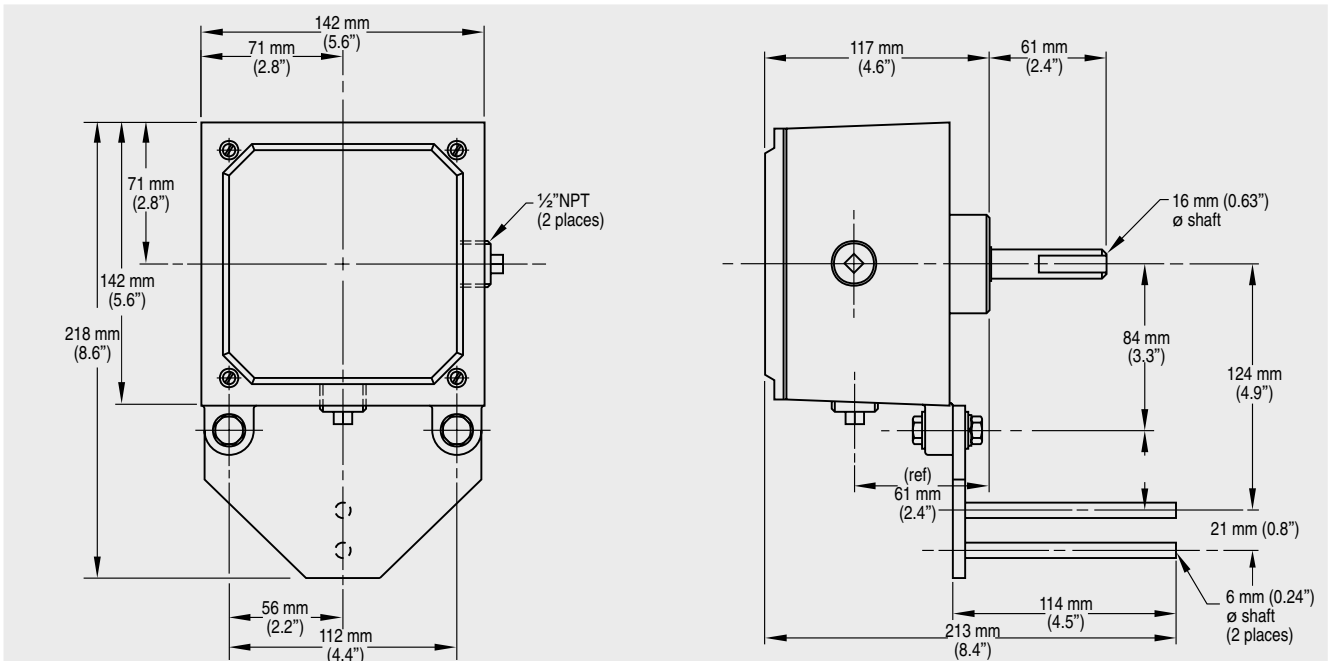


Fig. 2/27 MD-36 dimensions

Dimensions for stainless steel versions are available upon request

Connections

Description	Terminal
+15 V DC (red)	1
speed out-CW (white)	2
speed out-CCW (blue)	3
common (black)	4
ground	G

(See instruction manual for MD-36 IS wiring details)

- Determine the pulley shaft rotation on the end of the pulley shaft to which the MD-36 is attached.
- If the pulley shaft is rotating clockwise, connect the appropriate wire to terminal 2. If the pulley shaft is rotating counter clockwise, connect the appropriate wire to terminal 3.
- Do not common terminals two or three at the same time.
- Ground shield of cable at integrator only.

Mounting*

Machining on tail/bend pulley shaft per Detail 'A' (by customer) to accommodate Siemens Milltronics speed sensor when tail or bend pulley is not supplied by Siemens Milltronics. Arresting bracket is an anti-rotation device only and must not secure or support the speed sensor. Bearing life would be greatly reduced if speed sensor is not free to "float". Use anti-rotation spring to prevent mechanical oscillation of speed sensor. Grease mating surfaces to prevent seizing.

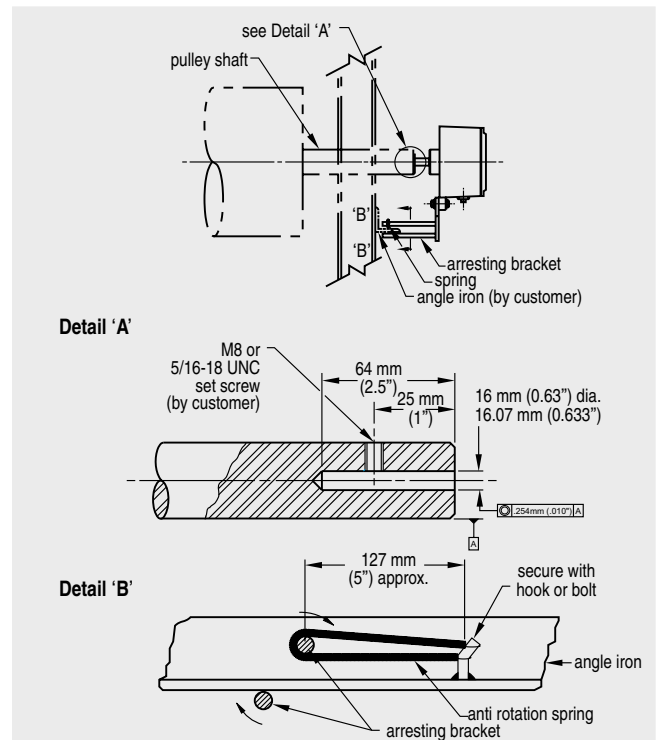


Fig. 2/28 MD-36 mounting

* Can also be mounted to motor shaft with rubber connector.

Continuous Weighing Speed Sensors

Milltronics MD-36

Ordering data	Order No.
MD-36 Speed Sensor A general purpose and hazardous rated shaft-driven speed sensor	A) 7MH7132-0
Model MD-36A, CE approval, 36 pulses per revolution MD-36 with CE & CSA Class II approval, 36 pulses per revolution MD-2000A, not CE compliant, 2048 pulses per revolution MD-36 IS, CE, 36 pulses/revolution, II 2 G, EEx ia IIC and Class I, Div 1, Groups A, B, C & D, Class II Div. 1, Groups E, F & G Note: MD-36 IS requires IS switch isolator to interface with belt scale integrator.	1 2 3 4
Enclosure Painted cast aluminum, 1/2" NPT connection Stainless steel, 304 (1.4301), cable connector for 3 to 9 mm cable	A B
Coating None Epoxy paint, for cast aluminum enclosure only	A B
Circuit Board Standard Conformal coating (tropical package), not available for MD-36 IS	1 2
Instruction Manual MD-36A/MD-36, English MD-36A/MD-36, German MD-2000A, English Note: The instruction manual should be ordered as a separate item on the order.	A) 7ML1998-5DB01 A) 7ML1998-5DB31 A) 7ML1998-5EC01
Optional Equipment P+F IS switch isolator, 115 V AC, required with MD-36 IS P+F IS switch isolator, 230 V AC, required with MD-36 IS	PBD-51035295 PBD-51035296
Spare Parts MD-36 bearing housing assembly MD-36 stainless steel bearing housing assembly MD-36A/MD-2000A bearing housing assembly MD-2000A stainless steel bearing housing assembly MD-36A/MD-36 circuit card MD-36A/MD-36 toothed disc MD-2000A circuit card, without encoder MD-2000A encoder Switch, inductive, SJ3.5-N for MD-36 IS	PBD-23250099 PBD-23250101 PBD-23250147 PBD-20300088 A) PBD-51016921 PBD-20300075 A) PBD-51026003 PBD-20300084 PBD-51035297

A) Subject to export regulations AL: N, ECCN: EAR99

Continuous Weighing Speed Sensors

Milltronics MD-256



Fig. 2/29 Milltronics MD-256 Speed Sensor

Application

The Milltronics MD-256 speed sensor is a high resolution shaft-driven speed sensor that operates in conjunction with a conveyor belt scale, providing a signal to an integrator which computes the rate of material being conveyed. At only 1.22 kg (2.68 lbs.), it is one of the lightest and most durable units ever developed for monitoring conveyor belt speed. With its rugged cast aluminium housing, it is suitable for outdoor installation, and its low weight prolongs bearing life.

It is directly coupled to a rotating tail or bend pulley shaft to ensure accurate belt-travel readout, eliminating problems caused by belt slippage or material build-up. The MD-256 converts shaft rotation into a pulse train of 256 pulses per revolution using a high precision rotary optical encoder. The digital signal is transmitted as speed input to any Milltronics integrator for calculation of belt speed, flow rate and totalized weight.

This high resolution speed sensor provides a frequency signal proportional to the shaft speed, enabling low or varying shaft speeds to be read accurately. The quadrature type shaft encoder prevents erroneous speed signals due to vibration or shaft oscillation. The MD-256 is easily mounted and is bi-directional for either clockwise or anti-clockwise belt travel.

Dimensional drawings

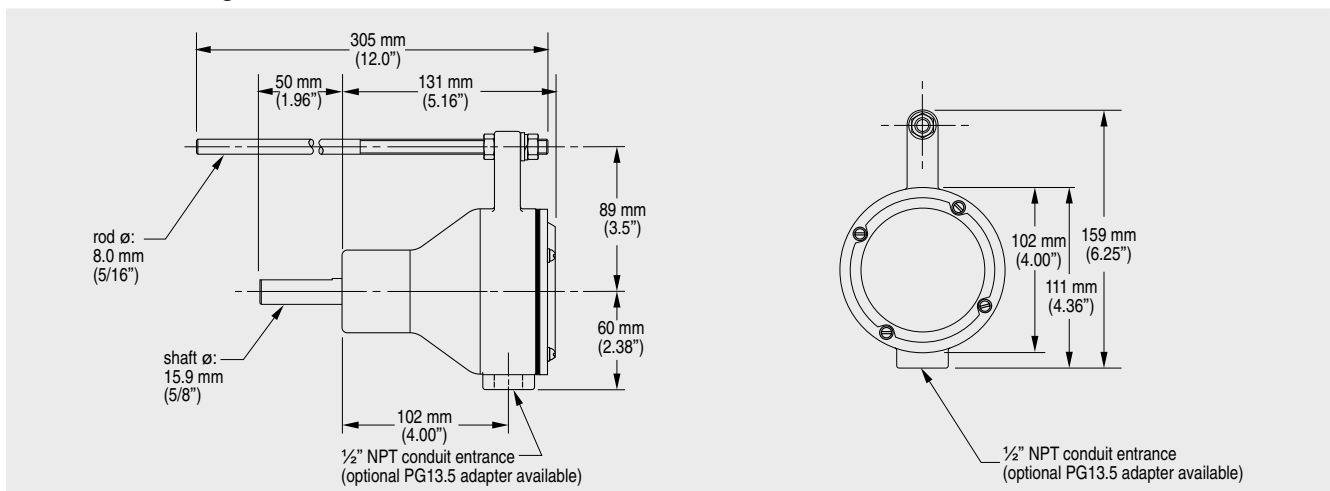


Fig. 2/30 MD-256 dimensions

Benefits

- Light and rugged design, IP65 rated
- Compact and economical
- Easy, low-cost installation
- Accurate belt speed detection
- High resolution, suitable for low or varying shaft speeds
- Bi-directional for either clockwise or counter-clockwise shaft rotation

Technical data

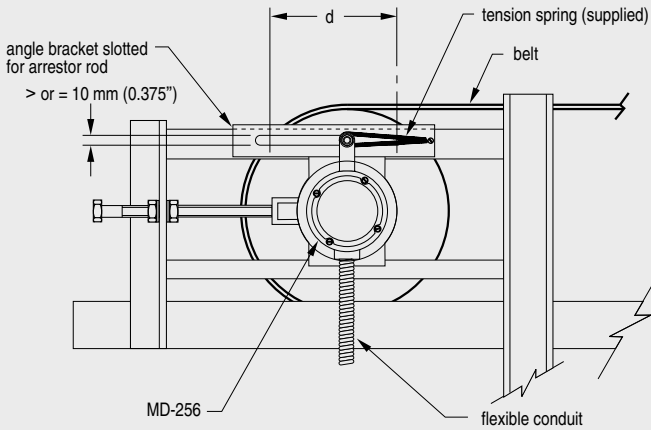
Mode of operation	
Measuring principle	Pulse from shaft rotation using high precision rotary optical encoder
Typical application	When a high resolution speed sensor is required
Input	Shaft rotation 0.5 to 470 rpm, bi-directional
Output	<ul style="list-style-type: none"> • Unidirectional open collector sinking output • +5 V DC, 25mA max. (to integrator) • 256 pulses per revolution • 2 to 2000 Hz
Rated operating conditions	
Ambient temperature	-40 to 55 °C (-40 to 131 °F)
Design	
Enclosure	<ul style="list-style-type: none"> • General purpose • Painted aluminum
Power supply	
	+10 to +15 V DC, 30 mA (from integrator)
Cable	
Option	<ul style="list-style-type: none"> • 3-wire shielded, 0.75 mm² (18 AWG) • Max. run 305 m (1000 ft.)
Approvals	
	NEMA 4X, IP65, CE

Continuous Weighing Speed Sensors

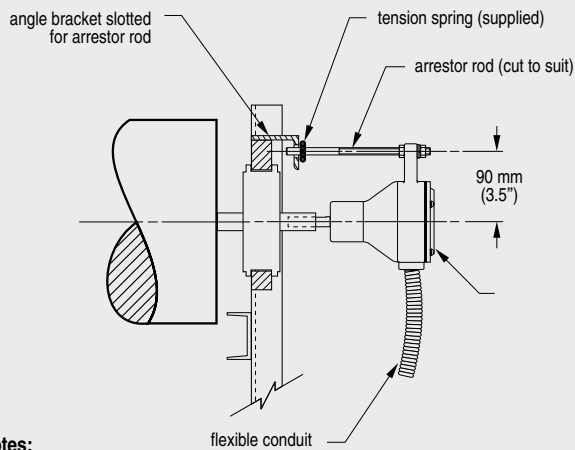
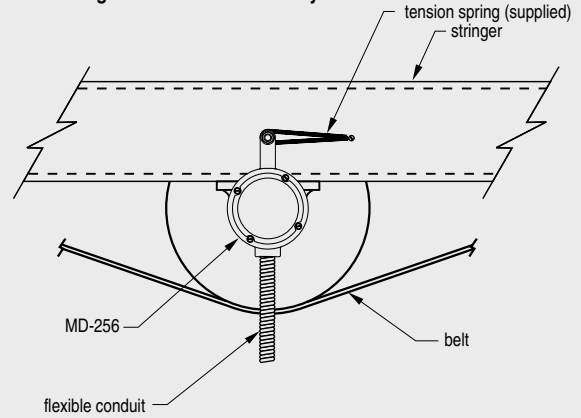
Milltronics MD-256

Mounting

Mounting to a Tail Pulley

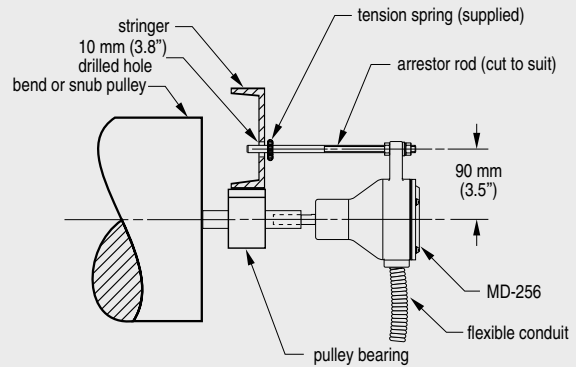


Mounting to a Bend or Snub Pulley



Notes:

Distance 'd' is the take-up travel on the tail pulley.
When adjusting the belt take-up, ensure that there is play on the arrestor rod.
If the arrestor rod is pushed against the end of its travel slot, premature bearing wear may result.



Notes:

When mounting to a bend or a snub pulley only, a 3/8" (10 mm) drilled hole is required for the arrestor rod.

Fig. 2/31 MD-256 mounting

Connections

Description	Terminal
+15 V DC	1
speed out-CW	2
speed out-CCW	3
common	4
ground	G

- Determine the pulley shaft rotation on the end of the pulley shaft to which the MD-256 is attached.
- If the pulley shaft is rotating clockwise, connect the appropriate wire to terminal 2. If the pulley shaft is rotating counter-clockwise, connect the appropriate wire to terminal 3.
- Do not common terminals two or three at the same time.
- Ground shield of cable at integrator only.

Continuous Weighing Speed Sensors

Milltronics MD-256

2

Ordering data	Order No.
Milltronics MD-256 Speed Sensor A high resolution shaft-driven speed sensor	A) 7MH7130-0
Enclosure Epoxy painted aluminum, N4X	1
Conduit Entry 1/2" NPT	A
Approvals CE	A
Connections Standard, up to 2 integrators Multiple, up to 10 integrators	1 2
Instruction Manual English German Note: The instruction manual should be ordered as a separate item on the order.	A) 7ML1998-5FJ01 A) 7ML1998-5FJ31
Spare Parts MD-256 circuit card with encoder, up to 2 integrators MD-256 circuit card with encoder, up to 10 integrators MD-256 encoder MD-256 bearing housing assembly Rubber coupling Coupling hub Enclosure cover Update kit, up to 2 integrators ¹⁾ Update kit, up to 10 integrators ¹⁾	A) PBD-51034816 A) PBD-51034811 A) PBD-20300089 A) PBD-54001408 PBD-21420010 A) PBD-24850339 PBD-54001401 A) PBD-51034812 A) PBD-51034813

¹⁾ updates original MD-256 design. Includes card complete with encoder, coupling and hub.

A) Subject to export regulations AL: N, ECCN: EAR99

Continuous Weighing Speed Sensors

Milltronics Bend Pulleys

Ordering data	Order No.
Bend Pulley, 4.5" and 6" diameter Return belt driven pulley provides rotation for shaft-driven speed sensors. 4.5" size is self-cleaning.	A) 7MH7170 -
Size 4.5" diameter self cleaning 6" diameter	1 2
Belt width/'A' dimension 18"/27", 20"/29", 500 mm/740 mm 24"/33", 650 mm/890 mm 30"/39", 800 mm/1040 mm 800 mm/1090 mm 36"/45" 1000 mm/1240 mm 42"/ 51", 1000 mm/1290 mm 48"/57", 1200 mm/1450 mm 1200 mm/1540 mm 54"/63", 1400 mm/1650 mm, for 6" diameter only 60"/69", 1400 mm/1740 mm, for 6" diameter only 66"/75", for 6" diameter only	A B C D E F G H J K L M
Finish Standard, painted mild steel AISI 316 (1.4404) stainless steel ¹⁾ AISI 316 (1.4404) stainless steel ²⁾ Epoxy painted ³⁾ Epoxy painted ⁴⁾	A B C D E
Bearings Standard size Metric size No bearings	0 1 2
Instruction Manual English Note: The instruction manual should be ordered as a separate item on the order.	A) 7ML1998-5DE01

Ordering data	Order No.
Bend Pulley, 6" diameter with 1/4" lagging Return belt driven pulley provides rotation for shaft-driven speed sensors The lagging offers self-cleaning advantages and ensures positive rotation.	A) 7MH7171 -
Size 6" diameter with 1/4" lagging	3
Belt width/'A' dimension 18"/27", 20"/29", 500 mm/740 mm 24"/33", 650 mm/890 mm 30"/39", 800 mm/1040 mm 800 mm/1090 mm 36"/45" 1000 mm/1240 mm 42"/ 51", 1000 mm/1290 mm 48"/57", 1200 mm/1450 mm 1200 mm/1540 mm 54"/63", 1400 mm/1650 mm 60"/69", 1400 mm/1740 mm 66"/75"	A B C D E F G H J K L M
Finish Standard, painted mild steel AISI 316 (1.4404) stainless steel AISI 316 (1.4404) stainless steel with corrosion resistant bearings	A B C
Bearings Standard size Metric size No bearings	0 1 2
Instruction Manual English Note: The instruction manual should be ordered as a separate item on the order.	A) 7ML1998-5DE01

A) Subject to export regulations AL: N, ECCN: EAR99

- 1) On 4.5" diameter models only the shaft is AISI 316 (1.4404) stainless steel.
 - 2) With corrosion resistant bearings. On 4.5" diameter models only the shaft is AISI 316 (1.4404) stainless steel.
 - 3) For 6" diameter models only
 - 4) With corrosion resistant bearings. For 6" diameter models only.
- A) Subject to export regulations AL: N, ECCN: EAR99

Continuous Weighing Speed Sensors

Milltronics Bend Pulleys

Ordering data	Order No.
Bend Pulley, 8" diameter Belt driven pulley for MD-36, MD-36A, MD-2000A & MD-256 belt speed sensors when customer cannot provide one.	A) 7MH7172 - 0
Size 8" diameter	4
Belt width/'A' dimension 48"/57" 1200 mm/1540 mm 54"/63", 1400 mm/1650 mm 60"/69", 1400 mm/1740 mm 66"/75", 1600 mm/1900 mm, 1600 mm/1940 mm 72"/81", 1800 mm/2100 mm 1800 mm/2140 mm 2000 mm/2300 mm, 2000 mm/2340 mm	H J K L M N P Q
Finish Standard, painted mild steel AISI 316 (1.4404) stainless steel AISI 316 (1.4404) stainless steel with corrosion resistant bearings Epoxy painted Epoxy painted with corrosion resistant bearings	A B C D E
Bearings Standard size Metric size No bearings	0 1 2
Instruction Manual English Note: The instruction manual should be ordered as a separate item on the order.	A) 7ML1998-5DE01

A) Subject to export regulations AL: N, ECCN: EAR99

Ordering data	Order No.
Bend Pulley, 8" diameter with 1/4" lagging Return belt driven pulley provides rotation for shaft-driven speed sensors The lagging offers self-cleaning advantages and ensures positive rotation.	A) 7MH7173 - 0
Size 8" diameter with 1/4" lagging	5
Belt width/'A' dimension 48"/57" 1200 mm/1540 mm 54"/63", 1400 mm/1650 mm 60"/69", 1400 mm/1740 mm 66"/75", 1600 mm/1900 mm, 1600 mm/1940 mm 72"/81", 1800 mm/2100 mm 1800 mm/2140 mm 2000 mm/2300 mm, 2000 mm/2340 mm	H J K L M N P Q
Finish Standard, painted mild steel AISI 316 (1.4404) stainless steel AISI 316 (1.4404) stainless steel with corrosion resistant bearings	A B C
Bearings Standard size Metric size No bearings	0 1 2
Instruction Manual English Note: The instruction manual should be ordered as a separate item on the order.	A) 7ML1998-5DE01

A) Subject to export regulations AL: N, ECCN: EAR99

Continuous Weighing Weighfeeders

Introduction

Introduction

Milltronics weighfeeders from Siemens can improve the accuracy of processing, blend consistencies, accountability, and record keeping. All weighfeeders come standard with belt weigh bridge, speed sensor, and an integrator is required.

Principle of Operation

The weighfeeder is used to deliver an accurate mass flow rate of material. In the majority of applications, material is profiled by an adjustable mechanical shear gate, which fixes the correct material bed depth for a given particle size.

The feed rate is then maintained and adjusted by varying the speed of the belt. However, in some cases the belt speed is constant with rate control (if any) done by a pre-feeding device.

The system consists of three components: weight and speed sensing, integration and control, and the mechanical conveying system.

Using the belt load and the belt speed signals, small incremental totals of weight per time are measured by the integrator and then the flow rate is calculated. The measured flowrate is compared against the desired flowrate and the on-board PID controller makes necessary corrections to the belt speed.

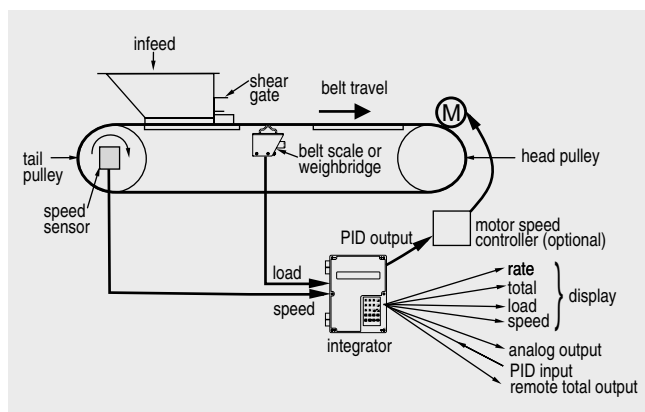


Fig. 2/32 Weighfeeder operation

Design and Applications

Milltronics Weighfeeder 400

The platform weigh bridge mounts directly to a corrosion-resistant platform load cell. The direct load design eliminates all intermediate mechanical suspension and allows material weight to be directly applied to the load cell.

This design minimizes zero drift normally caused by intermediate suspension components and allows for the use of a very sensitive precision platform load cell. Load cell size and construction are chosen for each specific application.

Milltronics Weighfeeder 600

A stainless steel platform weighdeck with a UHMW plastic slider bar assembly mounts directly to corrosion-resistant, sealed platform load cells. The direct load design eliminates all intermediate mechanical suspension and allows material weight to be directly applied to the load cells. The frame of the 600 Series is sturdy and rigid, ensuring stable and repeatable results, maximizing resolution and weighing accuracy.

Milltronics Weighfeeder 800

The Milltronics Weighfeeder 800 suspends a single weigh idler on platform load cells. Its design eliminates all moving parts in the weighing process and subsequent maintenance and replacement problems. There are no links or flexures. Two corrosion resistant precision strain gauge load cells provide weight sensing signals to integrators. This design feature minimizes zero drift and maximizes resolution and weighing accuracy.

Milltronics Weighfeeder 1200/3600

Offering pulley sizes from 300 mm (12") to 900 mm (36"), and with the use of heavy-duty idlers, the 1200/3600 Series weighfeeders offer high performance and reliability for heavy-duty operation. The 1200/3600 Series weighfeeders use the Milltronics MSI single idler belt scale with a patented design for instantaneous reading of changes in belt loading, allowing for higher accuracy and control performance. For applications with lighter loading, a dual idler weigh bridge model, featuring an adjustable tare weight compensation method and encapsulated load cell(s) is available.

Milltronics VG Series

Volumetric control is also available with Milltronics VG Series volumetric rate control gates.

Weighfeeder Selection Guide

Criteria	Milltronics Weighfeeder 400	Milltronics Weighfeeder 600	Milltronics Weighfeeder 800	Milltronics Weighfeeder 1200/3600	Milltronics VG Series
Typical industries	Bulk chemicals, tobacco, food	Bulk chemicals, grain, food, vegetables	Cement, mineral processing, coal, mining, pulp and paper	Aggregates, mining, mineral processing, cement, coal	Aggregates, coal, grains
Typical applications	High-accuracy, low-capacity for minor ingredient additives	Low- to medium-capacity for minor ingredient additives	Medium to high-capacity for macro ingredient additives	High-capacity, heavy-duty for macro-ingredient additives	Precise control in blending, batching, or loading operations
Design rate range	45 to 9,000 kg/h (100 to 20,000 lbs/h)	0.45 to 18 t/h (1000 lbs/h to 20 STPH)	4.5 to 72 t/h (5 to 80 STPH)	1200 series: 9 to 270 t/h (10 to 300 STPH) 3600 series: 290 to 725 t/h (320 to 800 STPH)	545 to 1590 t/h (600 to 1750 STPH)
Belt speed	0.005 to 0.20 m/s (1 to 40 fpm)	0.005 to 0.20 m/s (1 to 40 fpm)	0.005 to 0.20 m/s (1 to 40 fpm)	0.05 to 0.36 m/s (10 to 70 fpm)	Not applicable
Accuracy	±0.5 to 0.25 %	±0.5 %	±0.5 %	±0.5 %	±3 to 5 %
Turn down	10:1 based on load Up to 30:1 based on speed	10:1 based on load Up to 30:1 based on speed	10:1 based on load Up to 30:1 based on speed	10:1 based on load Up to 30:1 based on speed	10:1 volumetrically
Sensing element	Long length platform weigh bridge Single load cell	Platform weigh bridge Dual load cells	Single idler scale Dual load cells	Dual idler scale torque shaft or MSI belt scale	Flow detector paddle or acoustic flow sensor
Approvals	Meets USDA and FDA requirements for food processing, CE	Meets USDA and FDA requirements for food processing, CE	CE	CE	CE

Weighfeeder Application Data Sheet

SIEMENS

Weighfeeder Application Data Sheet

Customer information

Contact: _____ Prepared By: _____
 Company: _____ Date: _____
 Address: _____ Notes on the Application: _____
 City: _____ Country: _____
 Zip/Postal Code: _____ Phone: () _____
 E-mail: _____ Fax: () _____

Material

Material being measured: _____ Particle size: _____ mm/inch/mesh
 Bulk density: _____ Kg/m³ or lb/cu. ft. Moisture content: _____ %
 Temperature: _____ C/F Angle of repose: _____ Degrees Surcharge angle: _____ Degrees

Pre-Feed

(Supply sketch where possible) Sketch attached

Application: Load, Speed, Rate and Total Batch control Ratio controlled blending
 Feed type: Rotary valve Belt Screw Vibratory pan Other
 Feed rate: t/hr or kg/hr or lb/hr or LTPH or STPH
 _____ min. _____ max. _____ Nominal
 Accuracy required: +/- _____ %

Electrical classification at scale location: _____

Condition of operating environment: Wash down Sanitary Corrosive

Duty cycle: _____ Hours per day

Weighfeeder

Space limitations: Length: _____ Width: _____ Height: _____ mm/inches
 Construction: Open Closed
 Access side looking in direction of belt travel: Left Right Both
 Inlet dimensions: (L x W) _____ mm/inches Centerline length: _____ mm/inches
inlet to discharge

Installation

(indicate all that apply)

Power available: _____

Inputs required:

4-20 mA LVDT
 Variable speed
 PID
 Load Cells (#): _____

Outputs required:

4-20 mA
 PID
 Remote totalizer
 Relays (#): _____

Communications:

AB Remote I/O
 DeviceNet
 Profibus-DP
 RS-232 / RS-485 Modbus

Products recommended:

Continuous Weighing Weighfeeders

Introduction

2

Continuous Weighing Weighfeeders

Milltronics Weighfeeder 400

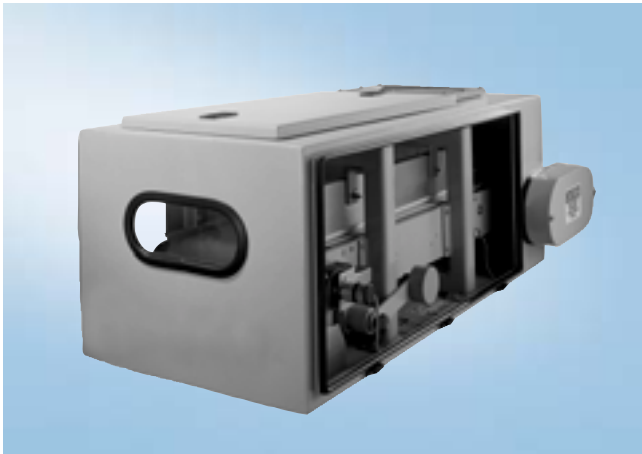


Fig. 2/33 Milltronics Weighfeeder 400

Application

The Milltronics Weighfeeder 400 is a high-accuracy, low capacity weighfeeder for minor ingredient additives. As one of the most accurate in-motion weighing systems on the market, it is specially designed for high accuracy on light loading processes. The design eliminates material build-up to ensure accurate, reliable measurement.

The unique long length platform weigh bridge mounts directly to a corrosion-resistant platform load cell. An adjustable mechanical shear gate profiles the material and fixes the correct material bed depth for a given material particle size. The belt speed can be automatically adjusted to attain the correct feed rate.

Standard components include the belt weigh bridge, speed sensor, and test chains supported by Milltronics BW100 or BW 500 microprocessor-based integrators for easy blending, batching and feed rate control.

Benefits

- High accuracy for low capacity loads
- Standard and sanitary models available
- Unique belt tension device
- Easy belt removal for replacement or cleaning
- Fast installation, easy to clean and maintain

Technical data

Mode of operation	
Measuring principle	Strain gauge load cells and digital speed sensor
Typical application	Control and monitor feed rates and blending in cereals, seeds, or minerals
Performance	
Accuracy	± 0.5 % to 0.25 %
Medium conditions	
Operating temperature	-10 to 40 °C (14 to 104 °F)
Design	
Material	Mild steel or stainless steel contact surfaces
Load Cells	<ul style="list-style-type: none"> • One (1) single point, aluminium platform (standard) • Stainless steel for corrosive and washdown environments (optional)
	<ul style="list-style-type: none"> • non-linearity ± 0.03 % • non-repeatability ± 0.02 %
Speed Sensor	Optical encoder, driven pulley mounted
Framework	<ul style="list-style-type: none"> • Precision machined, stainless or mild steel • Cantilevered design for easy belt replacement
Pulleys	115 mm (4.5") diameter, crowned and lagged
Belt support	Slider bed frame
Belting	<ul style="list-style-type: none"> • Polyester carcass with polyurethane top cover and endless finger splice for maximum weighing consistency (standard) • Variety of different belts for specific applications (optional)
Belt tension	Counter weighted stainless steel tensioning idler for consistent tension, required for high accuracy weighing
Belt cleaning	<ul style="list-style-type: none"> • Acetal blade type with counterweight at the head pulley for cleaning product side of belt • Return plow (optional)
Drive motor	<ul style="list-style-type: none"> • 0.19 kW (0.25 hp) AC or DC drive motor with direct coupled shaft or flange mounted gear reducer • Custom configurations available
Shipping weight	140 kg (300 lbs) to 230 kg (500 lbs) maximum
Approvals	For use in hazardous rated areas, consult factory

Continuous Weighing Weighfeeders

Milltronics Weighfeeder 400

Dimensional drawings

2

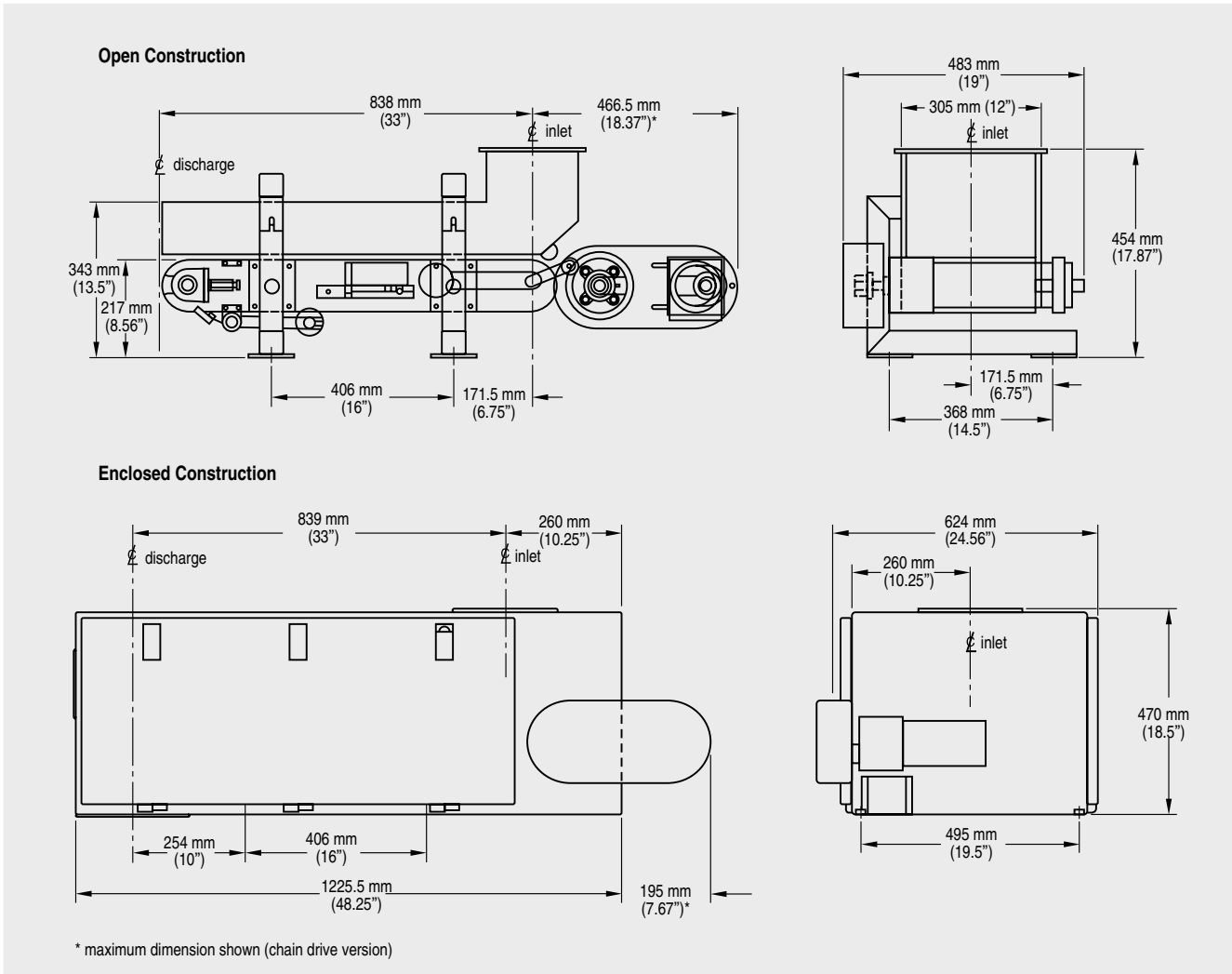


Fig. 2/34 Weighfeeder 400 Series dimensions

Ordering data	Order No.
Milltronics Weighfeeder 400	Contact factory for ordering information.
Milltronics Weighfeeder 400 SD	
Instruction Manual	
English	A) 7ML1998-5EL01
Note: The instruction manual should be ordered as a separate item on the order.	
A) Subject to export regulations AL: N, ECCN: EAR99	

Continuous Weighing Weighfeeders

Milltronics Weighfeeder 600

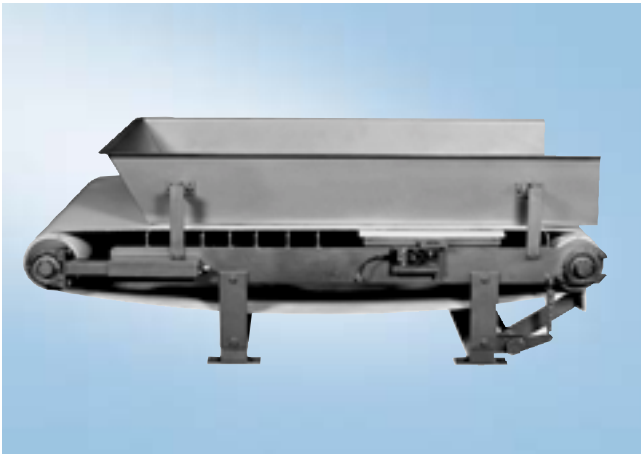


Fig. 2/35 Milltronics Weighfeeder 600

Application

The Milltronics Weighfeeder 600 is a low- to medium-capacity weighfeeder for minor ingredient additives. It has been field tested and proven in hundreds of applications.

The unit can be customized to meet exact application needs. Stainless or mild steel units are available in open or enclosed styles. Custom lengths, belt types, inlet configurations, drives, and other options are available to meet your requirements.

The MS (mild steel) model is ideal for use with chemicals, powders, or any granular product in applications not requiring washdown. The SD (sanitary duty) model is designed for the food industry where high pressure washdown is required. It meets all USDA and FDA requirements.

Its cantilevered mechanical design provides for quick belt removal and easy maintenance. It's designed to eliminate material build-up, ensuring high accuracy and reliability. The unique weigh system reduces dead load and applies live load directly to two platform load cells. Load cells are externally mounted for easy access and maintenance.

Standard components include the belt weigh bridge, speed sensor and test weights, supported by Milltronics BW 100 or BW 500 microprocessor-based integrators for easy blending, batching and feed rate control.

Benefits

- High accuracy
- Ideal for low- to medium-capacity loads
- Fast installation, easy to clean and maintain
- Flexible, rugged design allows configurations to suit many applications
- Quick delivery on custom units

Technical data

Mode of operation	
Measuring principle	Strain gauge load cells and digital speed sensor
Typical application	Control and monitor feed rates and blending of minerals or powdered additives into a process
Performance	
Accuracy	± 0.5 %
Medium conditions	
Operating temperature	-10 to 40 °C (14 to 104 °F)
Design	
Material	Mild steel or stainless steel
Load Cells	Two corrosion resistant platform type with mechanical overload protection (aluminum or stainless steel)
	<ul style="list-style-type: none"> • non-linearity ± 0.03 % • non-repeatability ± 0.02 %
Speed Sensor	<ul style="list-style-type: none"> • C-flange mounted magnetic pulse generator, adapted between motor flange and reducer input flange • Optical encoder (optional)
Framework	<ul style="list-style-type: none"> • Precision machined, stainless or mild steel • Cantilevered design for easy belt replacement
Pulleys	152 mm (6") diameter with 6 mm (¼") urethane lagging
Belt support	Edge of flatbars eliminates material buildup
Belting	<ul style="list-style-type: none"> • Polyester carcass with polyurethane top cover and static control with vulcanised endless finger splice for maximum weighing consistency (standard) • Variety of different belts for specific applications (optional)
Belt tension	Screw type, telescope module with 150 mm (6") travel (mild or stainless steel)
Belt cleaning	<ul style="list-style-type: none"> • UHMW blade type with spring tensioning at head pulley • Return plow (optional)
Drive motor	<ul style="list-style-type: none"> • 0.25 kW (1/3 HP) TEFC AC or DC motor with shaft mounted helical/worm gear reducer • Larger motors and motorized pulleys available
Shipping weight	140 kg (300 lbs) to 230 kg (500 lbs) maximum
Approvals	For use in hazardous rated areas, consult factory

Continuous Weighing Weighfeeders

Milltronics Weighfeeder 600

Dimensional drawings

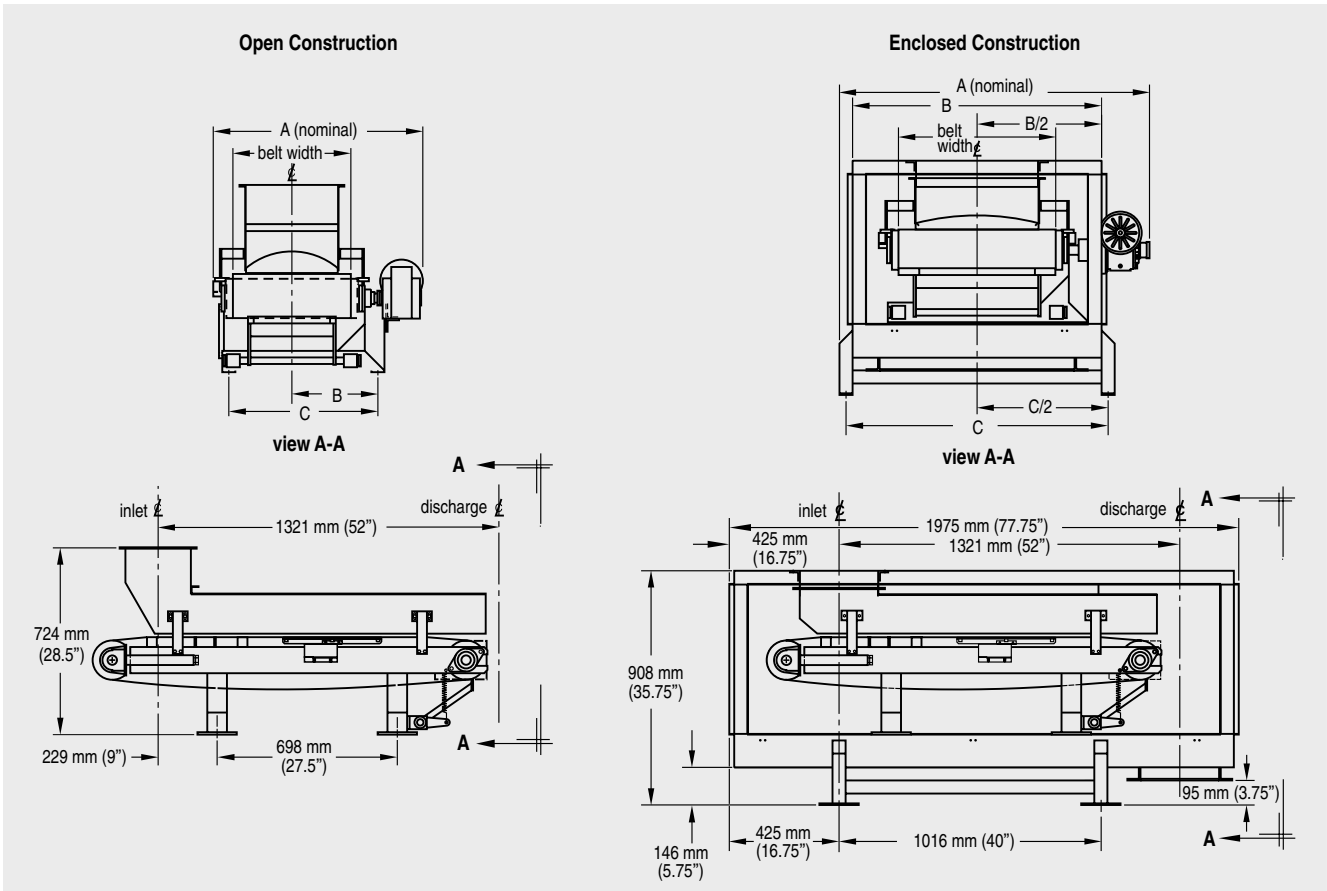


Fig. 2/36 Weighfeeder 600 Series dimensions

Open Unit			
Belt Width	A	B	C
305 mm (12")	660 mm (26")	257 mm (10.14")	425 mm (16.75")
457 mm (18")	813 mm (32")	333 mm (13.13")	578 mm (22.75")
610 mm (24")	965 mm (38")	410 mm (16.13")	730 mm (28.75")
762 mm (30")	1118 mm (44")	486 mm (19.13")	883 mm (34.75")
914 mm (36")	1270 mm (50")	562 mm (22.13")	1035 mm (40.75")
1067 mm (42")	1422 mm (56")	635 mm (25")	1187 mm (46.75")
1219 mm (48")	1575 mm (62")	711 mm (28")	1340 mm (52.75")

Enclosed Unit			
Belt Width	A	B	C
305 mm (12")	889 mm (35.38")	660 mm (26")	711 mm (28")
457 mm (18")	1051 mm (41.38")	813 mm (32")	864 mm (34")
610 mm (24")	1203 mm (47.38")	965 mm (38")	1016 mm (40")
762 mm (30")	1356 mm (53.38")	1118 mm (44")	1168 mm (46")
914 mm (36")	1508 mm (59.38")	1270 mm (50")	1321 mm (52")
1067 mm (42")	1661 mm (65.38")	1422 mm (56")	1473 mm (58")
1219 mm (48")	1813 mm (71.38")	1575 mm (62")	1626 mm (64")

Ordering data	Order No.
Milltronics Weighfeeder 600	Contact factory for ordering information.
Milltronics Weighfeeder 600 SD	
Instruction Manual	
English	A) 7ML1998-5EK01
Note: The instruction manual should be ordered as a separate item on the order.	

A) Subject to export regulations AL: N, ECCN: EAR99

Continuous Weighing Weighfeeders

Milltronics Weighfeeder 800



Fig. 2/37 Milltronics Weighfeeder 800

Application

The Milltronics Weighfeeder 800 is a medium- to high-capacity weighfeeder for macro ingredient additives. It is designed for industrial applications such as mining, cement, chemical processing, pulp and paper, and other heavy-duty industries.

Field tested and proven in hundreds of applications, it enhances profitability by ensuring accuracy, enhancing blend consistency, reducing downtime, and improving accountability and record keeping. The unique weigh system reduces dead load and applies live load directly to load cells for accurate measurement. The dual load cells are externally mounted for easy access and maintenance.

It is available in a variety of lengths from 1.5 m (62"), belt widths from under 0.5 m (18") to more than 1 m (42"), several different inlet configurations and materials of construction. It can be configured to suit various applications.

Standard components include the belt weigh bridge, speed sensor and test weights, supported by Milltronics BW 100 or BW 500 microprocessor-based integrators for easy blending, batching and feed rate control.

Benefits

- Rugged, durable design for heavy-duty applications
- Handles medium- to high-capacity loads
- Standard mild steel open or enclosed construction
- Heavy-duty 102 mm (4") diameter idlers
- Large 203 mm (8") diameter head and tail pulleys for maximum traction
- Easy to replace endless belt
- Spring tensioned belt cleaner
- Fast installation, easy to clean and maintain

Technical data

Mode of operation	
Measuring principle	Strain gauge load cells and digital speed sensor
Typical application	Industrial and process applications in feeding, blending or rati- oning in gypsum manufacturing
Performance	
Accuracy	± 0.5 %
Medium conditions	
Operating temperature	-10 to 40 °C (14 to 104 °F)
Design	
Material	Mild steel with stainless steel contact parts optional
Load Cells	Two corrosion resistant platform type with mechanical overload protection
	• non-linearity • non-repeatability
Speed Sensor	Industrial duty, digital optical encoder, tail shaft mounted
Framework	• Painted structural steel • Optional cantilevered mild steel structural frame for quick and easy belt replacement
Pulleys	200 mm (8") crowned with 6 mm (¼") rubber lagging on drive pulley for maximum traction
Idlers	Heavy-duty 100 mm (4") CEMA C with precision ground ball bearings and triple labyrinth seals for longer life
Belting	• Black nitrile rubber, 135 PIW 3-ply vulcanised endless with 'B' section (standard) • 50 mm (2") corrugated sidewalls (optional)
Belt tension	Screw type, telescoper module with 150 mm (6") travel
Belt cleaning	• Spring tensioned UHMW blade at head pulley • Return plow at tail pulley (optional)
Drive motor	• 0.37 kW (0.5 HP), TEFC, 208/230/460/575 V AC, three phase or 90/180 V DC permanent magnet - both with shaft mounted gear reducer, or reducer/chain drive • Larger/other motor sizes and voltages available
Shipping weight	410 kg (900 lbs) to 820 kg (1800 lbs) maximum
Approvals	For use in hazardous rated areas, consult factory

Continuous Weighing Weighfeeders

Milltronics Weighfeeder 800

Dimensional drawings

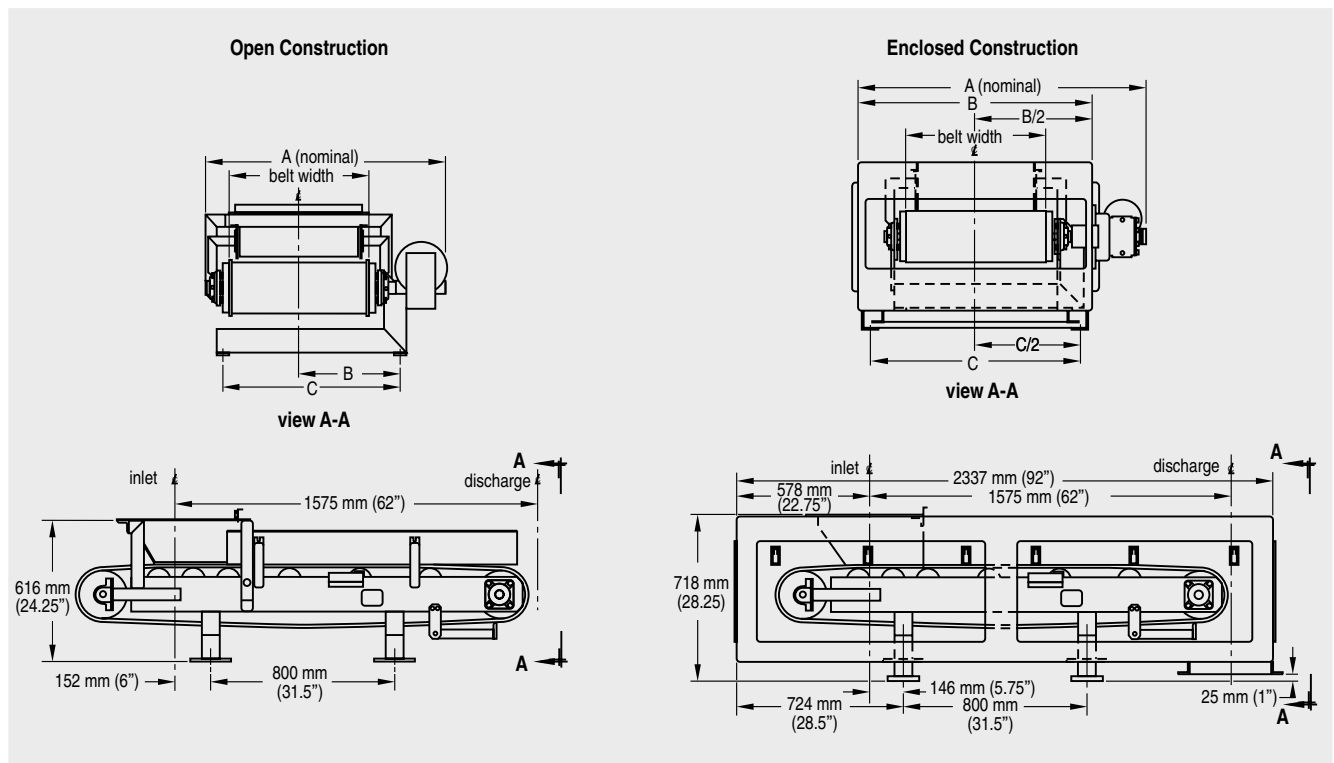


Fig. 2/38 Weighfeeder 800 Series dimensions

Open Unit			
Belt Width	A	B	C
457 mm (18")	889 mm (35")	368 mm (14.5")	622 mm (24.5")
610 mm (24")	1041 mm (41")	445 mm (17.5")	775 mm (30.5")
762 mm (30")	1194 mm (47")	521 mm (20.5")	927 mm (36.5")
914 mm (36")	1346 mm (53")	597 mm (23.5")	1080 mm (42.5")
1067 mm (42")	1499 mm (59")	673 mm (26.5")	1232 mm (48.5")

Enclosed Unit			
Belt Width	A	B	C
457 mm (18")	1100 mm (43.31")	870 mm (34.25")	762 mm (30")
610 mm (24")	1253 mm (49.31")	1022 mm (40.25")	914 mm (36")
762 mm (30")	1405 mm (55.31")	1175 mm (46.25")	1067 mm (42")
914 mm (36")	1557 mm (61.31")	1327 mm (52.25")	1219 mm (48")
1067 mm (42")	1710 mm (67.31")	1480 mm (58.25")	1372 mm (54")

Ordering data

Milltronics Weighfeeder 800

Order No.

Contact factory for ordering information.

Instruction Manual

English

Note: The instruction manual should be ordered as a separate item on the order.

A) **7ML1998-5EJ01**

A) Subject to export regulations AL: N, ECCN: EAR99

Continuous Weighing Weighfeeders

Milltronics Weighfeeder 1200 / 3600

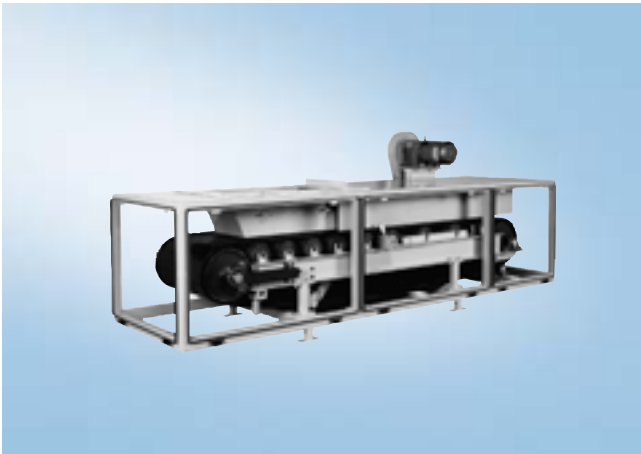


Fig. 2/39 Milltronics Weighfeeder 1200

Application

The Milltronics Weighfeeder 1200/3600 Series are high-capacity heavy-duty weighfeeders for macro ingredient additives. These units provide solid performance in rugged operating environments common to mining, aggregates, cement, minerals, and other process industries. They help improve profitability as they improve blend consistency, reduce downtime, and improve accountability and record keeping.

The 1200/3600 Series weighfeeders use the Milltronics MSI single idler belt scale with its patented design, which allows instantaneous reading of changes in belt loading allowing for higher accuracy and control performance. For applications with very light loading, a dual idler weigh bridge model, featuring an adjustable tare weight compensation method and encapsulated load cell(s) is available.

The 1200/3600 Series can be configured to suit various applications. It is available in a range of belt widths from 460 mm (18") to 1830 mm (72"), lengths from 1.98 m (78"), and with various inlet configurations and materials of construction. Options include a cantilevered frame for easier endless belt replacement, mechanical skirting, return belt ploughs, belt misalignment switches, emergency pull-cords, de-dusting hoods, sample gates, special belt construction, and belt flanging.

Standard components include belt weigh bridge, speed sensor, and test weights, all supported by Milltronics BW 100 or BW 500 microprocessor-based integrators for easy blending, batching, and feed rate control.

Benefits

- Heavy-duty design for high feeding capacity
- Heavy-duty 127 mm (5") diameter idlers
- Large 305 mm (12") diameter (1200 Series) to 914 mm (36") diameter (3600 Series) head and tail pulleys to maximize traction
- Heavy-duty pillow block and take-up bearings
- Spring-tensioned belt cleaner
- Fast installation, easy maintenance

Technical data

Mode of operation	
Measuring principle	Strain gauge load cells and digital speed detectors
Typical applications	Control feed rate or blending in steel manufacturing
Performance	
Accuracy	± 0.5 %
Medium conditions	
Operating temperature	-10 °C to 60 °C (14 °F to 140 °F) with higher temperatures available
Design	
Material	Mild steel with stainless steel contact parts optional
Load Cells	Stainless steel strain gauge load cell(s) with mechanical overload protection (MSI belt scale)
	• non-linearity • non-repeatability
Speed Sensor	Industrial duty, digital optical encoder, tail shaft mounted
Framework	• Painted structural steel • Optional cantilevered mild steel structural frame for quick and easy belt replacement
Pulleys	
	305 mm (12") crowned with 10 mm (3/8") rubber lagging on drive pulley for maximum traction and minimum belt tensions
Idlers	
	Heavy-duty 127 mm (5") CEMA C with precision ground ball bearings and triple labyrinth seals for longer life
Belting	
	• SBR rubber belting, 225 PIW 2-ply 3 mm (1/8") x 2 mm (1/16") covers vulcanized endless with 25 mm (1") flanged walls as standard • Many other types available
Belt tension	
	Screw type, telescoper module with 203 mm (8") to 305 mm (12") travel depending on application
Belt cleaning	
	• Spring tension UHMW blade at head pulley • Return plow (optional)
Drive motor	
	• 0.75 kW (1 HP), TEFC, 208/230/460 V AC, three phase or 90/180 V DC permanent magnet - both with helical gear reducer, sprocket and chain drive combination • Larger motor sizes and other drive packages available
Shipping weight	
	820 kg (1800 lbs.) to 1455 kg (3200 lbs.) typical
Approvals	
	For use in hazardous rated areas, consult factory

Continuous Weighing Weighfeeders

Milltronics Weighfeeder 1200 / 3600

2

Dimensional drawings

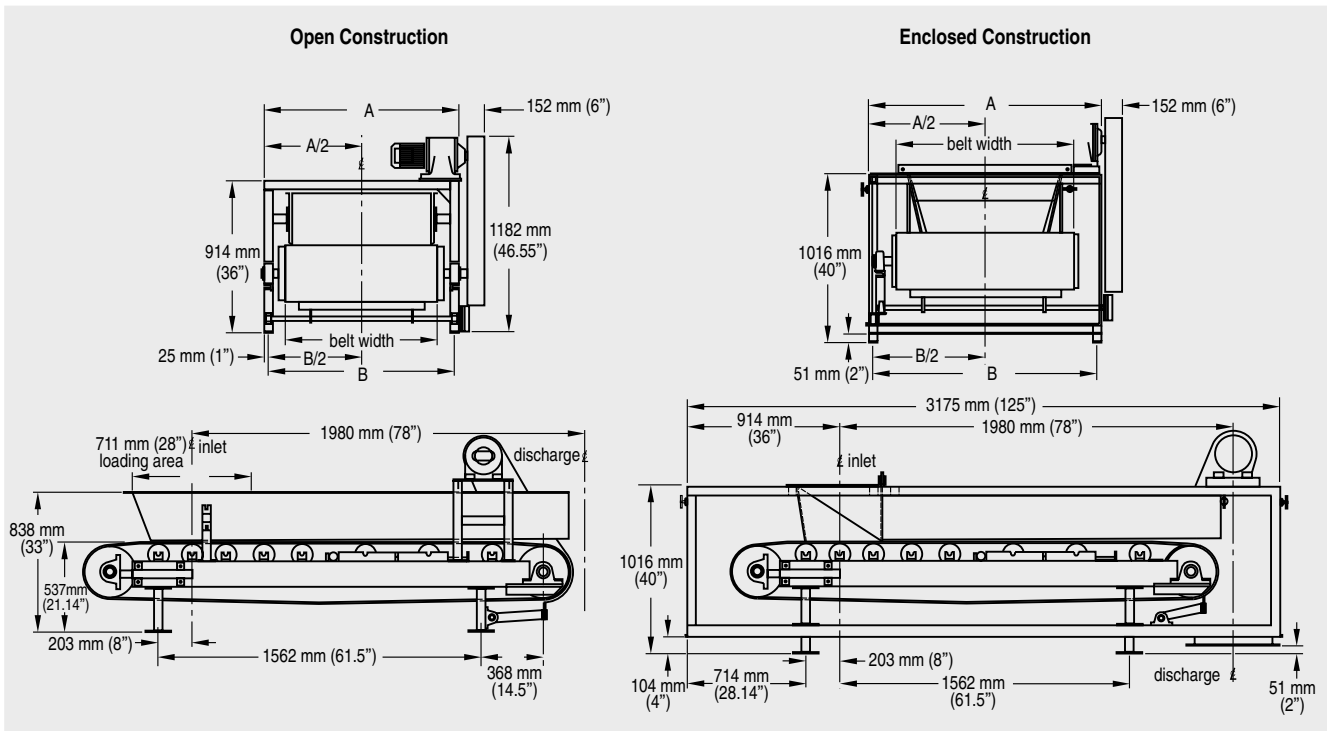


Fig. 2/40 Weighfeeder 1200 Series dimensions

Open Unit		
Belt Width	A	B
457 mm (18")	686 mm (27")	635 mm (25")
610 mm (24")	839 mm (33")	788 mm (31")
762 mm (30")	991 mm (39")	940 mm (37")
914 mm (36")	1143 mm (45")	1093 mm (43")
1067 mm (42")	1296 mm (51")	1245 mm (49")
1219 mm (48")	1448 mm (57")	1397 mm (55")

Enclosed Unit		
Belt Width	A	B
457 mm (18")	788 mm (31")	737 mm (29")
610 mm (24")	940 mm (37")	889 mm (35")
762 mm (30")	1093 mm (37")	1042 mm (41")
914 mm (36")	1245 mm (49")	1194 mm (47")
1067 mm (42")	1397 mm (55")	1347 mm (53")
1219 mm (48")	1550 mm (61")	1499 mm (59")

Note:
Also available in 1370 mm (54") and 1525 mm (60") belt widths.

Ordering data	Order No.
Milltronics Weighfeeder 1200	Contact factory for ordering information.
Milltronics Weighfeeder 1400 and larger	
Instruction Manual	
English	A) 7ML1998-5EH01
Note: The instruction manual should be ordered as a separate item on the order.	

A) Subject to export regulations AL: N, ECCN: EAR99

Continuous Weighing Weighfeeders

Milltronics VG Series Volumetric Control Gate



Fig. 2/41 Milltronics VG Series Volumetric Control Gate

Application

The Milltronics VG Series volumetric rate control gate is used for rate control in blending, batching, or loading operations. Its rugged features and precision position sensor help to improve plant efficiency. It is ideal for use with fractionated stone from 8 mesh to 4", as well as sand, gravel, and coal blending operations.

The VG costs significantly less than traditional belt or vibratory pan feeders, and allows more feed openings and live storage area. The use of alternating feed points is possible, and segregation of materials is eliminated. With its reduced headroom (at least 20 % less than belt or vibratory pan feeders), the VG is readily fitted in new locations or retrofitted, and is easily cleaned. Motor wear, maintenance, and operating costs are minimised. Its built-in mechanical overload feature helps to prevent motor or speed reducer damage, and unlike belt and vibratory feeders, the VG motor runs only while the gate is being positioned.

The VG control gate comes in three standard sizes - 12 x 16", 16 x 22" and 20 x 28" - with other sizes available.

Benefits

- Provides cost reductions
- Improves control
- For loading and blending
- Easy installation and maintenance
- Heavy-duty construction, minimal wear
- Interface with PLC
- Material flow switch verifies flow through gate
- Drip proof covers protect drive chain area

Model

Model	VG600	VG1100	VG1750
Gate Size	12" x 16"	16" x 22"	20" x 28"
Flowrate*	545 t/h (600 ton/hr)	1000 t/h (1100 ton/hr)	1590 t/h (1750 ton/hr)

* Flowrate is based on 1.6 t/m³ (100 lb/ft³) and a discharge velocity of 0.77 m/sec (150 ft./min.)

Technical data

Mode of operation	
Measuring principle	Blending control
Typical application	Blending control of fractionated stone
Medium conditions	
Operating temperature	-10 to 40 °C (14 to 104 °F)
Design	
Hanger	Hot dipped galvanized 7 gauge plate steel
Chain Drive	#50 nickel plated roller chain with adjustable take-up
Cam follower bearing	1½" diameter, double sealed
Reducer	3/4 hp rated: foot mounted C-face coupling to motor
Motor	3/4 hp, 230/460 V AC, TEFC, C-face
Limit switch	NEMA and UL Type 6P rated; 2 NO 2 NC contacts
Position sensor	Precision 5 kΩ, 10 turn potentiometer for gate position feedback Resistance to current converter by others
Optional	SITRANS AS 100 for flow verification

Continuous Weighing Weighfeeders

Milltronics VG Series Volumetric Control Gate

Dimensional drawings

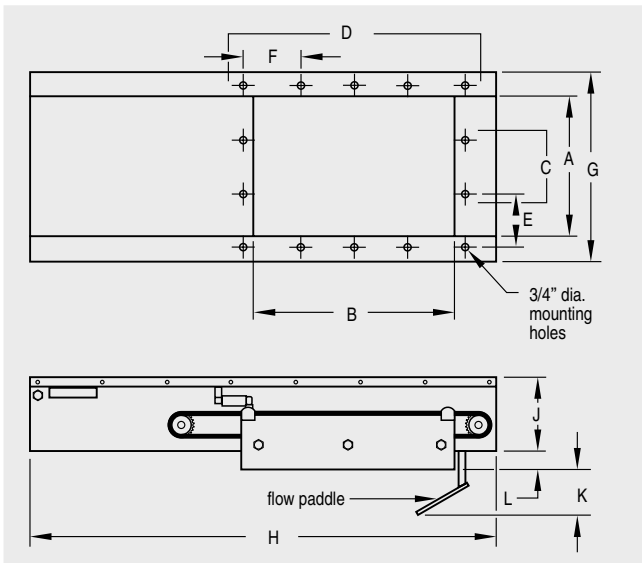


Fig. 2/42 Milltronics Volumetric Control Gate dimensions

Model	Gate Opening	Number of Holes								
		C	D	E	F	G	H	J	K	L
VG600	305 x 406 mm (12" x 16")	0	3	381 mm (15")	267 mm (10.5")	483 mm (19")	1346 mm (53")	270 mm (10.63")	162 mm (6.38")	65 mm (2.56")
VG1100	406 x 559 mm (16" x 22")	2	4	241 mm (9.5")	210 mm (8.25")	584 mm (23")	1499 mm (59")	270 mm (10.63")	162 mm (6.38")	65 mm (2.56")
VG1750	508 x 711 mm (20" x 28")	2	5	194 mm (7.63")	203 mm (8")	686 mm (27")	1651 mm (65")	270 mm (10.63")	162 mm (6.38")	65 mm (2.56")

Ordering data

VG600

VG1100

VG1750

Order No.

Contact factory for ordering information.

Introduction

Milltronics solids flowmeters from Siemens accurately measure and control flow rates of product so that quality and plant efficiency are consistently maintained. These flowmeters have a totally enclosed design to eliminate product waste or contamination and reduce plant maintenance. Since the units are dust-tight, they provide a healthier work environment, especially when hazardous substances are monitored. They are specifically designed for minimum plant down-time.

Materials

Milltronics solids flowmeters monitor dry bulk materials in sizes from powders to granules more than 25 mm (1") in diameter. Handling flow rates from 200 kg/h to 2000 t/h (440 lbs/hr to 2200 STPH). Material density varies from puffed wheat to iron ore while fluidity ranges from fluidized powder such as flyash to sluggish flowing materials such as lathe turnings.



Fig. 2/43 Solids flowmeter with sensing plate detail

Principle of Operation

Dry bulk solids material enters the flowguide producing a mechanical deflection as it strikes the flowmeter's sensing plate. It then continues on through the process unhindered, ensuring no disruption in the process or production.

The horizontal force of this deflection is converted into an electrical signal by either a deflection sensing LVDT (Linear Variable Differential Transformer) or a force sensing strain gauge load cell. The signal is then monitored and processed by the associated electronic integrator, which instantaneously displays the flow rate and integrated total weight.

Since only the horizontal force is measured, vertical force due to material build-up in the non-impinging area has no effect. There is no zero drift and the need for frequent recalibration is eliminated. To ensure correct product selection for your application, copy and fill out the Solids Flowmeter Application Data Sheet on page 55, and return it to your Siemens Milltronics representative.

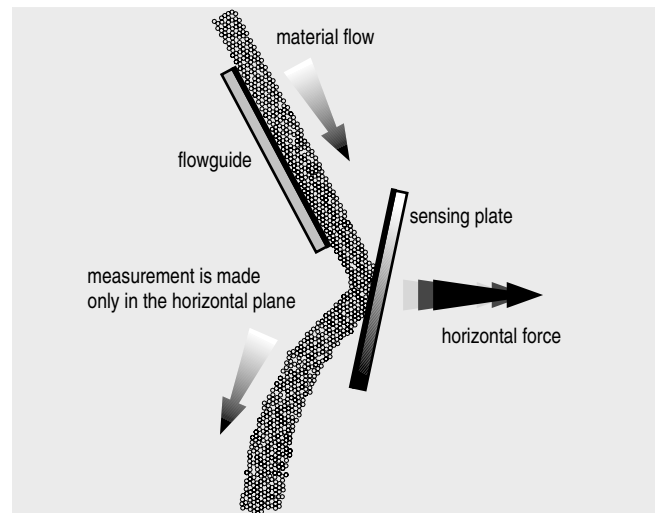


Fig. 2/45 Principle of operation

Circular Flowguide Selection Chart

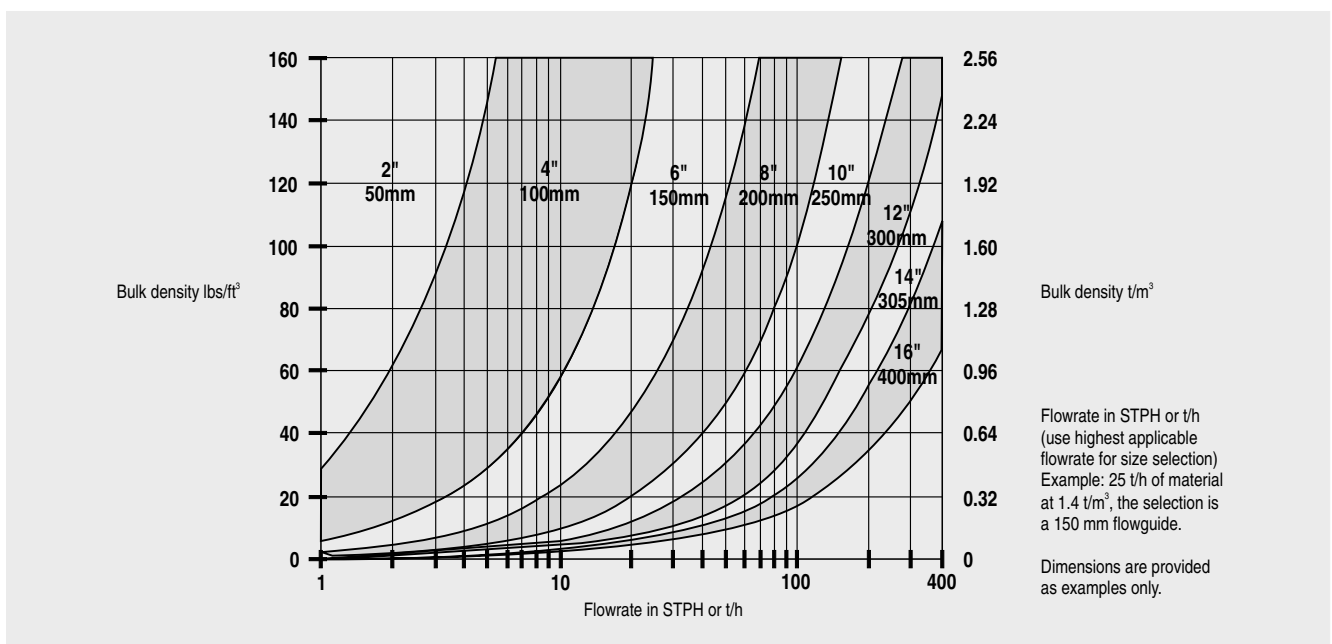


Fig. 2/44 Flowguide selection chart

Continuous Weighing Solids Flowmeters

Introduction

Solids Flowmeter Selection Guide

Criteria	Millflo	E-40/V-40	E-300/V-300	L-300	M-500/M-900
Typical industries	Food, grain, milling, animal feed	Chemicals, grain, minerals, cement	Aggregates, grain, minerals, cement	Grain, cement, animal feed, fine aggregates	Grain, cement, fine aggregates
Typical applications	Grains, seeds or nuts, plastic pellet production, pet food blending	Fly ash, lime dosing in gold ore processing, cement in aerated gravity conveyor (A-Series), pulverized coal in boiler and kiln feed (C-40)	Fly ash, lime dosing in gold ore processing, cement in aerated gravity conveyor (A-Series), gypsum flow for board forming line	Truck load-out on grains, fly ash load-out	Load-out on grains or seeds, cement in an aerated gravity conveyor system (MA-Series)
Typical capacity	100 to 230 t/h (1 to 250 STPH)	0.2 to 40 t/h (0.2 to 44 STPH)	20 to 300 t/h (22 to 330 STPH)	100 to 300 t/h (110 to 330 STPH)	M-500: 200 to 500 t/h (220 to 550 STPH) M-900: 400 to 900 t/h (440 to 990 STPH)
Maximum particle size	6 to 13 mm (0.25 to 0.5") depending on inlet size	13 mm (0.5")	25 mm (1")	25 mm (1")	25 mm (1")
Maximum product temperature	65 °C (150 °F)	232 °C (450 °F) 65 °C (150 °F) C-Series Optional: 400 °C (750 °F)	232 °C (450 °F) Optional: 400 °C (750 °F)	80 °C (185 °F)	150 °C (300 °F)
Sensing heads		ILE-37	ILE-61		
Inlet sizes	102 to 305 mm (4 to 12") in ANSI or DIN flanges	51 to 254 mm (2 to 10") in ANSI or DIN flanges	152 to 406 mm (6 to 16") in ANSI or DIN flanges	305 x 508 mm (12 x 20")	M-500: 305x533 mm (12 x 21") MA-500: 405x635 mm (16 x 25") M-900: 305x660 mm (12 x 26") MA-900: 508x940 mm (20 x 37")
Accuracy	±1 %	±1 %	±1 %	±1 %	±1 %
Turn down ¹⁾	3:1	3:1	3:1	3:1	3:1
Approvals	CE	CE, optional CSA Class I, Group C and D, Class II Group E, F, G	CE, optional CSA Class I, Group C and D, Class II Group E, F, G	CE	CE

1) Turn down can be improved to 5:1 with use of SF 500 integrator linearizer function

Common Flowmeter Infeed Types

A solids flowmeter's performance will be as repeatable and consistent as the flow of material it is measuring. The following arrangements are typical of pre-feed chute configurations used to ensure consistent flow patterns. Arrangements will vary depending on the upstream equipment or chute work. Applications should be reviewed by a Siemens solids flowmeter specialist to achieve best results. During initial setup, use pre-weighing or post-weighing of material samples to calibrate flowmeter and verify accuracy using the material sample weights.

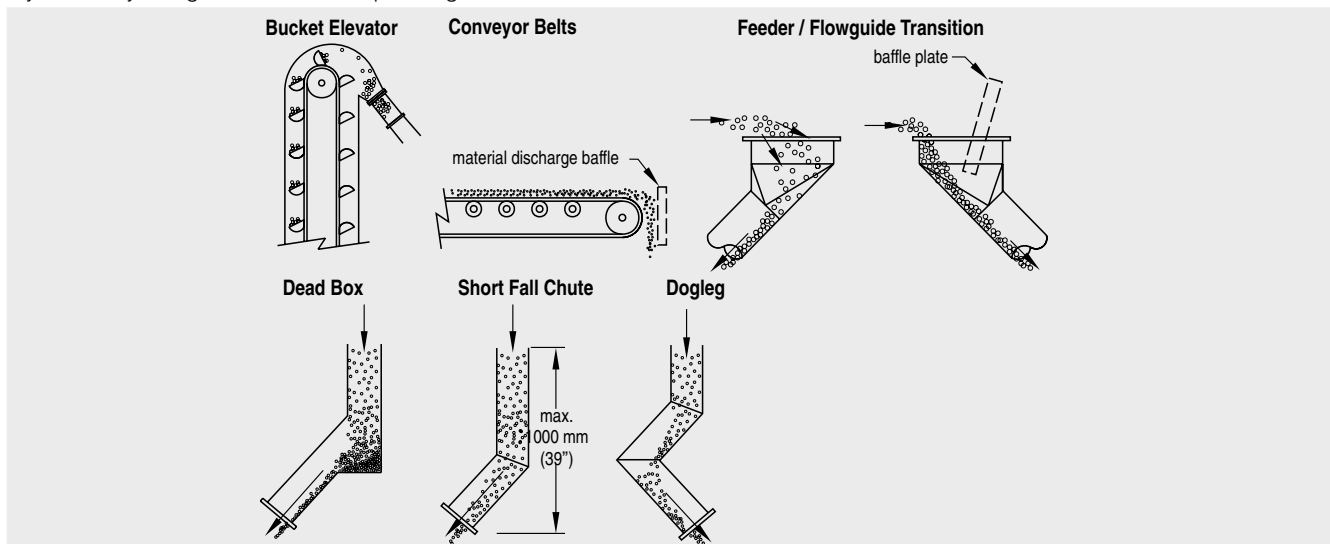


Fig. 2/46 Infeed types

Solids Flowmeter Application Data Sheet

SIEMENS

Solids Flowmeter Application Data Sheet

Customer information

Contact: _____ Prepared By: _____
 Company: _____ Date: _____
 Address: _____ Notes on the Application: _____
 City: _____ Country: _____
 Zip/Postal Code: _____ Phone: () _____
 E-mail: _____ Fax: () _____

Material Information

Material being measured: _____ Particle size: _____ mm / inch / mesh
 Bulk density: _____ kg/m³ or lb/ft³ Moisture content: _____ %
 Angle of repose: _____ degrees Is material aerated? _____ Yes _____ No
 Material temperature: _____ C / F
 Material properties: Hygroscopic Corrosive Easily aerated Abrasive Other _____
 Material flow characteristics: Smooth Sluggish Sticky/Clumping Other _____

Application Information

(Supply sketch where possible showing pre-feed and out-feed device dimensions) Sketch attached

Feed rate: _____ maximum t/hr or kg/hr or lb/hr or LTPH or STPH
 _____ normal t/hr or kg/hr or lb/hr or LTPH or STPH
 _____ minimum t/hr or kg/hr or lb/hr or LTPH or STPH
 Accuracy required: + / - _____ %
 Pre-feed type: Rotary valve Belt Screw Vibratory pan Aerated gravity conveyor Bucket elevator Other (specify) _____
 Flow rate: Constant Variable Pulsing Flowmeter will discharge into: _____
 Headroom available: _____ ft / m Temperature at flowmeter: _____ max. _____ min. C / F
 Sensing plate subjected to air flow: None Some
 Material test can be performed: Yes No
 Estimated distance from pre-feed discharge to flowmeter: _____ mm / inches
 Electrical classification in flowmeter environment: _____

Integrator Requirements

(indicate all that apply)

Power available: _____

Inputs required:	Outputs required:	Communications:
<input type="checkbox"/> 4-20 mA (specify) _____	<input type="checkbox"/> 4-20 mA	<input type="checkbox"/> AB Remote I/O
<input type="checkbox"/> PID	<input type="checkbox"/> PID	<input type="checkbox"/> DeviceNet
<input type="checkbox"/> LVDT	<input type="checkbox"/> Remote totalizer	<input type="checkbox"/> Profibus-DP
<input type="checkbox"/> Load Cells (#): _____	<input type="checkbox"/> Relays (#): _____	<input type="checkbox"/> RS-232/RS-485 Modbus

Products suggested:

Preferred Construction (flowguide and sensing plate enclosure): Painted mild steel 304 SS 316 SS Other (specify) _____

Continuous Weighing Solids Flowmeters

Introduction

2

Continuous Weighing Solids Flowmeters

Milltronics Millflo



Fig. 2/47 Milltronics Millflo Solids Flowmeter

Application

The Milltronics Millflo solids flowmeter is a low- to medium-capacity flowmeter for various product sizes, densities, and fluidities in restricted spaces. This low-cost, compact unit improves processing, increases operating efficiency, and helps to provide significant cost savings.

Operating with a microprocessor-based integrator package, the Millflo provides a display of flow rate, totalized flow and alarms. Outputs are 0/4 to 20 mA proportional to rate, and open collector output for remote totalization.

Dry bulk solids enter the flowguide producing a mechanical deflection as they strike the flowmeter sensing plate before continuing through the process unhindered. A strain gauge load cell converts the horizontal force of the deflection into an electrical signal. The integrator processes this into a display of flow rate and integrated total weight. The process is immune to the effect of product build-up as only the horizontal force is measured.

Benefits

- Dust-tight continuous weighing
- Compact rugged design for restricted space installation
- Versatile application
- Low cost, high reliability
- Full scale flowrates from 1 to 230 t/h (1 to 250 STPH)
- Process temperatures to 65 °C (150 °F)

Operation

Inlet Size	Capacity Range	Particle Size
100 mm (4")	1 to 14 t/h (1 to 15 STPH)	6 mm (0.25")
150 mm (6")	4 to 35 t/h (4.38 to 38 STPH)	10 mm (0.38")
200 mm (8")	18 to 80 t/h (20 to 87 STPH)	10 mm (0.38")
250 mm (10")	45 to 135 t/h (49 to 147 STPH)	13 mm (0.5")
300 mm (12")	90 to 230 t/h (98 to 250 STPH)	13 mm (0.5")

Note: These figures are provided for information purposes only and cannot be used for official definitions.

Capacity range may be limited by the bulk density of the product. Values above are based on a bulk density of 1.6 t/m³.

Technical data

Mode of operation	
Measuring principle	Strain gauge load cell measures impact forces
Typical application	Measuring flow of grains, seeds, nuts, selected powders and granules
Type of material measured	
Fine powder to granules up to 13 mm (0.5")	
Performance	
Accuracy	<ul style="list-style-type: none"> • ±1 %, 33 to 100 % of maximum admissible flow rate • Extended accuracy range with linearization function of integrator
Repeatability	0.2 %
Medium conditions	
Max. material temperature	65 °C (150 °F)
Design	
Material	
• housing	Painted mild steel
• sensing plate	Stainless steel
• load cell	Stainless steel
Integrators	Milltronics SF 500
Hazardous locations	With use of intrinsically safe barrier strips
Approvals	CE
Options	<ul style="list-style-type: none"> • All flowmeter sizes are available in painted mild steel or AISI 304 (1.4306) or 316 (1.4404) • ANSI or DIN flanges available on request • Internal sensing plate available with abrasion resistant and non-stick coating

Connections

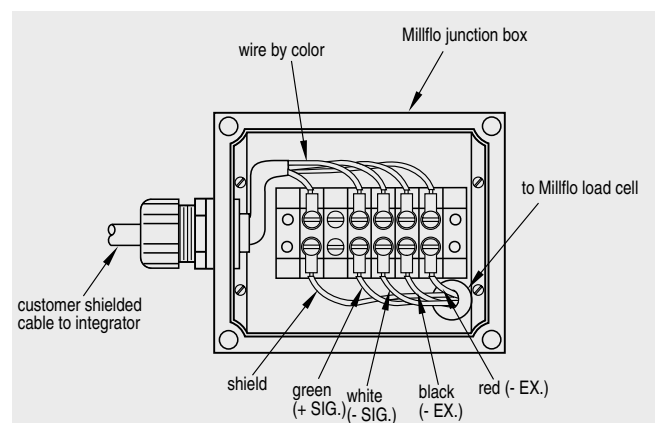


Fig. 2/48 Millflo Connections

Continuous Weighing Solids Flowmeters

Milltronics Millflo

Dimensional drawings

Millflo Dimensions					ANSI		DIN	
Size	A	B	C	D	E	F	E	F
100 mm (4")	597 mm (23.5")	203 mm (8")	660 mm (26")	413 mm (16")	108 mm (4.26")	162 mm (6.36")	105 mm (4")	155 mm (6")
150 mm (6")	838 mm (33")	254 mm (10")	914 mm (36")	660 mm (26")	162 mm (6.38")	212 mm (8.33")	155 mm (6")	206 mm (8")
200 mm (8")	1168 mm (46")	356 mm (14")	1244 mm (49")	711 mm (28")	212 mm (8.33")	315 mm (12.39")	206 mm (8")	305 mm (12")
250 mm (10")	1321 mm (52")	406 mm (16")	1397 mm (55")	813 mm (32")	265 mm (10.42")	343 mm (13.5")	260 mm (10")	336 mm (13.2")
300 mm (12")	1575 mm (62")	483 mm (19")	1651 mm (65")	914 mm (36")	315 mm (12.39")	394 mm (15.5")	305 mm (12")	387 mm (15.2")

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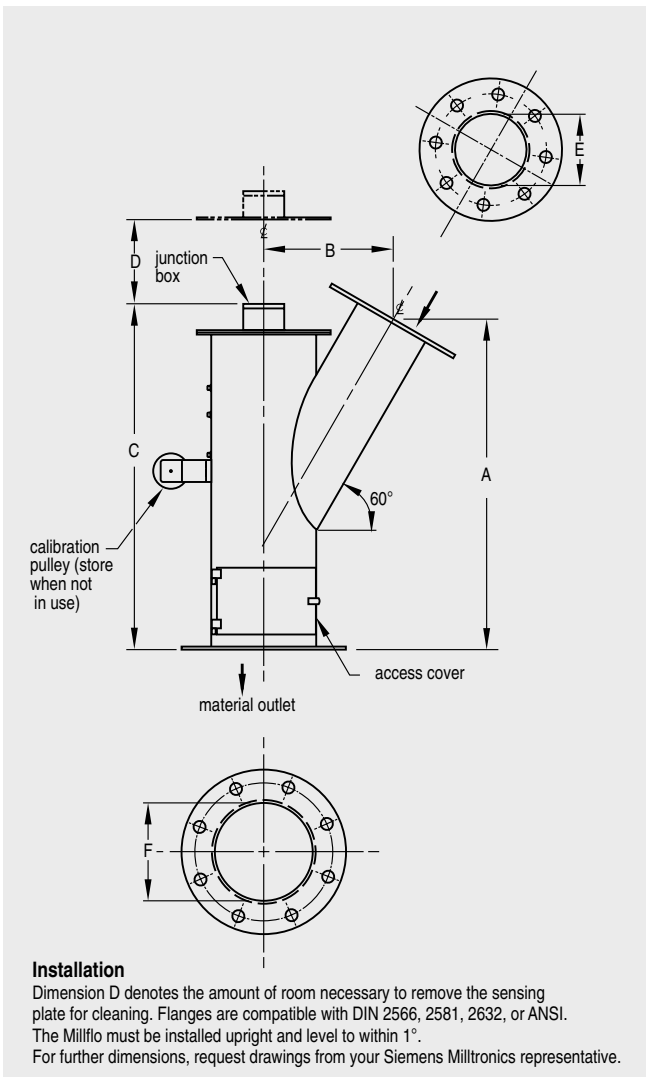


Fig. 2/49 Millflo dimensions

Note: A sensing plate is included with the Millflo. A solids flowmeter integrator and calibration weights are required to complete the measurement system.

Continuous Weighing Solids Flowmeters

Milltronics Millflo

Ordering data

Millflo Flowmeter

A low- to medium-capacity flowmeter for various product sizes, densities in restricted space, ANSI flange patterns

Order No.

A) **7MH7100-**

Size and Fabrication

4", standard orange paint
4", AISI 304 (1.4306)
4", AISI 304 (1.4306) , PTFE liner
4", AISI 316 (1.4404)
6", standard orange paint
6", AISI 304 (1.4306)
6", AISI 304 (1.4306), PTFE liner
6", AISI 316 (1.4404)
8", standard orange paint
10", standard orange paint
12", standard orange paint
10", light duty, standard orange paint

1 A
1 B
1 C
1 E
2 A
2 B
2 C
2 E
3 A
4 A
5 A
6 A

Load Cell

1 lb. (0.45 kg), stainless steel¹⁾
2 lbs. (0.91 kg), stainless steel¹⁾
5 lbs. (2.27 kg), stainless steel²⁾
10 lbs. (4.54 kg), stainless steel³⁾
20 lbs. (9.07 kg), stainless steel⁴⁾
50 lbs. (22.68 kg), stainless steel⁵⁾
100 lbs. (45.36 kg), stainless steel⁶⁾
Not specified

A
B
C
D
E
F
G
X

Sensing Plate Fabrication

AISI 304 (1.4306)¹⁾
AISI 304 (1.4306)⁷⁾
AISI 304 (1.4306)⁴⁾
AISI 304 (1.4306)⁵⁾
AISI 304 (1.4306)⁶⁾
AISI 304 (1.4306)⁸⁾
AISI 304 (1.4306) with PTFE coating¹⁾
AISI 304 (1.4306) with PTFE coating⁷⁾
AISI 304 (1.4306) with PTFE coating⁴⁾
AISI 304 (1.4306) with PTFE coating⁵⁾
AISI 304 (1.4306) with PTFE coating⁶⁾
AISI 304 (1.4306) with PTFE coating⁸⁾
AISI 304 (1.4306) with Plasma A/R liner¹⁾
AISI 304 (1.4306) with Plasma A/R liner⁷⁾
AISI 304 (1.4306) with Plasma A/R liner⁴⁾
AISI 304 (1.4306) with Plasma A/R liner⁵⁾
AISI 304 (1.4306) with Plasma A/R liner⁶⁾
AISI 304 (1.4306) with polyurethane rubber liner¹⁾
AISI 304 (1.4306) with polyurethane rubber liner⁴⁾
AISI 304 (1.4306) with polyurethane rubber liner⁵⁾
AISI 304 (1.4306) with polyurethane rubber liner⁵⁾
AISI 316 (1.4404) for 4" model
AISI 316 (1.4404) for 6" model
AISI 316 (1.4404) for 8" model
AISI 316 (1.4404) for 10" model
AISI 316 (1.4404) for 12" model
AISI 316 (1.4404) for 10" light model
AISI 316 (1.4404) with PTFE coating¹⁾
AISI 316 (1.4404) with PTFE coating⁷⁾
AISI 316 (1.4404) with PTFE coating⁴⁾
AISI 316 (1.4404) with PTFE coating⁵⁾
AISI 316 (1.4404) with PTFE coating⁶⁾
AISI 316 (1.4404) with PTFE coating⁸⁾

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Ordering data

Millflo Flowmeter

A low- to medium-capacity flowmeter for various product sizes, densities in restricted space, ANSI flange patterns

Order No.

A) **7MH7100-**

Instruction Manual

English
German
Note: The instruction manual should be ordered as a separate item on the order.

A) **7ML1998-5CS01**
A) **7ML1998-5CS31**

- 1) Size 1 only
- 2) Size 1 and 2 only
- 3) Size 2 and 3 only
- 4) Size 3 only
- 5) Size 4 only
- 6) Size 5 only
- 7) Size 2 only
- 8) Size 6 only

A) Subject to export regulations AL: N, ECCN: EAR99

2

Continuous Weighing Solids Flowmeters

Milltronics Millflo

Ordering data

Millflo Flowmeter

A low- to medium-capacity flowmeter for various product sizes, densities in restricted space, DIN flange patterns

Order No.

A) **7MH7101-**

Size and Fabrication

100 mm, standard orange paint
100 mm, AISI 304 (1.4306)
100 mm, AISI 304 (1.4306), PTFE liner
100 mm, AISI 316 (1.4404)
150 mm, standard orange paint
150 mm, AISI 304 (1.4306)
150 mm, AISI 304 (1.4306), PTFE liner
150 mm, AISI 316 (1.4404)
200 mm, standard orange paint
250 mm, standard orange paint
300 mm, standard orange paint
250 mm, light duty, standard orange paint

1 A
1 B
1 C
1 E
2 A
2 B
2 C
2 E
3 A
4 A
5 A
6 A

Load Cell

1 lb. (0.45 kg), stainless steel¹⁾
2 lbs. (0.91 kg), stainless steel¹⁾
5 lbs. (2.27 kg), stainless steel²⁾
10 lbs. (4.54 kg), stainless steel³⁾
20 lbs. (9.07 kg), stainless steel⁴⁾
50 lbs. (22.68 kg), stainless steel⁵⁾
100 lbs. (45.36 kg), stainless steel⁶⁾
Not specified

A
B
C
D
E
F
G
X

Sensing Plate Fabrication

AISI 304 (1.4306)¹⁾
AISI 304 (1.4306)⁷⁾
AISI 304 (1.4306)⁴⁾
AISI 304 (1.4306)⁵⁾
AISI 304 (1.4306)⁶⁾
AISI 304 (1.4306)⁸⁾
AISI 304 (1.4306) with PTFE coating¹⁾
AISI 304 (1.4306) with PTFE coating⁷⁾
AISI 304 (1.4306) with PTFE coating⁴⁾
AISI 304 (1.4306) with PTFE coating⁵⁾
AISI 304 (1.4306) with PTFE coating⁶⁾
AISI 304 (1.4306) with PTFE coating⁸⁾
AISI 304 (1.4306) with Plasma A/R liner¹⁾
AISI 304 (1.4306) with Plasma A/R liner⁷⁾
AISI 304 (1.4306) with Plasma A/R liner⁴⁾
AISI 304 (1.4306) with Plasma A/R liner⁵⁾
AISI 304 (1.4306) with Plasma A/R liner⁶⁾
AISI 304 (1.4306) with polyurethane rubber liner¹⁾
AISI 304 (1.4306) with polyurethane rubber liner⁴⁾
AISI 304 (1.4306) with polyurethane rubber liner⁵⁾
AISI 304 (1.4306) with polyurethane rubber liner⁵⁾
AISI 316 (1.4404) for 100 mm model
AISI 316 (1.4404) for 150 mm model
AISI 316 (1.4404) for 200 mm model
AISI 316 (1.4404) for 250 mm model
AISI 316 (1.4404) for 300 mm model
AISI 316 (1.4404) for 250 mm light mode
AISI 316 (1.4404) with PTFE coating¹⁾
AISI 316 (1.4404) with PTFE coating⁷⁾
AISI 316 (1.4404) with PTFE coating⁴⁾
AISI 316 (1.4404) with PTFE coating⁵⁾
AISI 316 (1.4404) with PTFE coating⁶⁾
AISI 316 (1.4404) with PTFE coating⁸⁾

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Ordering data

Millflo Flowmeter

A low- to medium-capacity flowmeter for various product sizes, densities in restricted space, DIN flange patterns

Order No.

A) **7MH7101-**

Instruction Manual

English
German
Note: The instruction manual should be ordered as a separate item on the order.

A) **7ML1998-5CS01**
A) **7ML1998-5CS31**

- 1) Size 1 only
- 2) Size 1 and 2 only
- 3) Size 2 and 3 only
- 4) Size 3 only
- 5) Size 4 only
- 6) Size 5 only
- 7) Size 2 only
- 8) Size 6 only

A) Subject to export regulations AL: N, ECCN: EAR99

Ordering data	Order No.
Calibration Weights	
20 g	A) 7MH7724-1AC
50 g	A) 7MH7724-1AD
100 g	A) 7MH7724-1AE
200 g	A) 7MH7724-1AF
500 g	A) 7MH7724-1AG
1000 g	A) 7MH7724-1AH
2000 g	A) 7MH7724-1AJ
5000 g	A) 7MH7724-1AK
Spare Parts	
<u>Stainless Steel Load cells</u>	
1 lb. (0.45 kg)	A) PBD-23900175
2 lbs. (0.91 kg)	A) PBD-23900176
5 lbs. (2.27 kg)	A) PBD-23900177
10 lbs. (4.54 kg)	A) PBD-23900155
20 lbs. (9.07 kg)	A) PBD-23900156
50 lbs. (22.68 kg)	A) PBD-23900157
100 lbs. (45.36 kg)	A) PBD-23900158
<u>Sensing Plate</u>	
4"/100mm, AISI 304 (1.4306)	A) PBD-23300554
6"/150mm, AISI 304 (1.4306)	A) PBD-23301357
8"/200mm, AISI 304 (1.4306)	A) PBD-23301358
10"/250mm, AISI 304 (1.4306)	A) PBD-23301359
12"/300mm, AISI 304 (1.4306)	A) PBD-23301360
4"/100mm, AISI 304 (1.4306), Plasma A/R coated	A) PBD-54001307
6"/150mm, AISI 304 (1.4306), Plasma A/R coated	A) PBD-51027372
8"/200mm, AISI 304 (1.4306), Plasma A/R coated	A) PBD-51027479
10"/250mm, AISI 304 (1.4306), Plasma A/R coated	A) PBD-51027507
12"/300mm, AISI 304 (1.4306), Plasma A/R coated	A) PBD-51027513
4"/100mm, AISI 304 (1.4306), PTFE coated	A) PBD-54001313
6"/150mm, AISI 304 (1.4306), PTFE coated	A) PBD-54001321
8"/200mm, AISI 304 (1.4306), PTFE coated	A) PBD-54001323
10"/250mm, AISI 304 (1.4306), PTFE coated	A) PBD-54001305
12"/300mm, AISI 304 (1.4306), PTFE coated	A) PBD-54001328
4"/100mm, AISI 304 (1.4306), polyurethane lined	A) PBD-51027413
6"/150mm, AISI 304 (1.4306), polyurethane lined	A) PBD-51027371
8"/200mm, AISI 304 (1.4306), polyurethane lined	A) PBD-51027463
10"/250mm, AISI 304 (1.4306), polyurethane lined	A) PBD-51027486
12"/300mm, AISI 304 (1.4306), polyurethane lined	A) PBD-51027369
4"/100mm, AISI 316 (1.4404), PTFE coated	A) PBD-54001320
6"/150mm, AISI 316 (1.4404), PTFE coated	A) PBD-54001322
8"/200mm, AISI 316 (1.4404), PTFE coated	A) PBD-54001324
10"/250mm, AISI 316 (1.4404), PTFE coated	A) PBD-54001326
12"/300mm, AISI 316 (1.4404), PTFE coated	A) PBD-54001329

A) Subject to export regulations AL: N, ECCN: EAR99

Continuous Weighing Solids Flowmeters

Milltronics E, V, and A Series



Fig. 2/50 Milltronics E, V, and A Series Flowmeters

Application

The E, V, and A Series solids flowmeters are low- to medium-capacity flowmeters for various product sizes, densities, and fluidities, particularly fine powders. With weighing mechanics located externally, they are unaffected by corrosive, abrasive, or hot materials. Handling a wide range of product sizes, densities, and fluidities including fine powders such as cement, they operate at process temperatures to 230 °C (450 °F). The flowmeters help to improve final product, increase operating efficiency, and realize significant cost savings.

Operating with the appropriate ILE sensing head and a micro-processor-based integrator package, the E, V, and A Series flowmeters provide a display of the flow rate, totalized flow, and alarms. Outputs are 0/4-20 mA proportional to rate, and open collector output for remote totalization.

Dry bulk solids enter the flow guide producing a mechanical deflection as they strike the flowmeter sensing plate before continuing through the process unhindered. The LVDT in the sensing head converts the deflection of the horizontal force into an electrical signal. The integrator processes this signal into a display of flowrate and integrated total weight. The weighing process is immune to the effect of product build-up as only the horizontal force is measured.

E Series flowmeters are totally enclosed, with external weighing mechanics, operating with corrosive, abrasive or hot materials. The A Series operates with aerated gravity conveyors, and includes integral vents and baffles for air separation. For applications with little available headroom, the V Series flowmeters provide the answer.

Benefits

- For specialized pre-feed applications
- Sensing element mounted outside process
- Flowrates from 0.2 to 300 t/h (0.2 to 330 STPH)
- Process temperature to 232 °C (450 °F)

Technical data

	E Series	V Series	A Series
Mode of operation Measuring principle	Deflection measurement using LVDT (linear variable differential transformer)		
Typical application	General purpose for most pre-feed applications	Designed for applications requiring a compact construction	Suitable for flowrate measurements downstream of an aerated gravity conveyor
Flow input Particle size	E-40: Fine powder up to 13 mm (0.5") E-300: Fine powder up to 25 mm (1")	V-40: Fine powder up to 13 mm (0.5") V-300: Fine powder up to 25 mm (1")	A-40: Fine powder up to 3 mm (0.13") A-300: Fine powder up to 3 mm (0.13")
Capacity range*	E-V-A-40 0.2 to 40 t/h (0.2 to 44 STPH) E-V-A-300 20 to 300 t/h (22 to 330 STPH)		
Performance Accuracy Repeatability	±1 %, 33 to 100 % of design capacity; extended accuracy range with linearization function of integrator ±0.2 %		
Medium conditions Product temperature (optional) Ambient temperature	-40 to 232 °C (-40 to 450 °F) -40 to 400 °C (-40 to 750 °F) -40 to 60 °C (-40 to 140 °F)	-40 to 232 °C (-40 to 450 °F) -40 to 400 °C (-40 to 750 °F) -40 to 60 °C (-40 to 140 °F)	-40 to 232 °C (-40 to 450 °F) -40 to 400 °C (-40 to 750 °F) -40 to 60 °C (-40 to 140 °F)
Design	Standard: Painted mild steel enclosure and AISI 304 (1.4306) stainless steel sensing plate Optional: Special coatings for flowguide and sensing plate		
Sensing heads	E-V-A-40: ILE-37 E-V-A-300: ILE-61		
Integrator	Milltronics SF 500		
Approvals	See ILE-37 and ILE-61 specifications		

*Flowrates are based on material bulk density and flowguide selection

Dimensional drawings

E Series

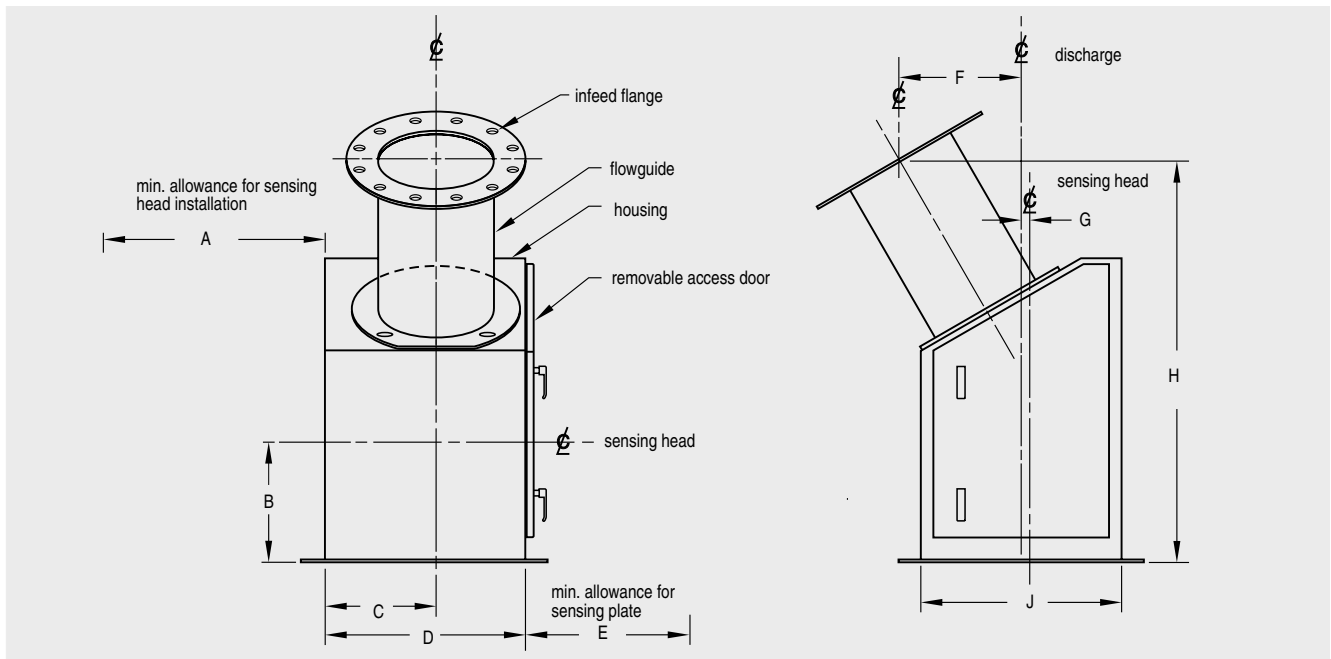


Fig. 2/51 E Series dimensions

Model	A	B	C	D	E	F	G	H	J
E-40 Series	686 mm (27")	356 mm (14")	254 mm (10")	457 mm (18")	610 mm (24")	279 mm (11")	25 mm (1")	914 mm (36")	457 mm (18")
E-300 Series	1042 mm (41")	457 mm (18")	305 mm (12")	610 mm (24")	610 mm (24")	330 mm (13")	38 mm (1.5")	1270 mm (50")	610 mm (24")

E-40 Inlet Sizes				
51 mm (2")	102 mm (4")	152 mm (6")	203 mm (8")	254 mm (10")

E-300 Inlet Sizes					
152 mm (6")	203 mm (8")	254 mm (10")	305 mm (12")	356 mm (14")	406 mm (16")

Continuous Weighing Solids Flowmeters

Milltronics E, V, and A Series

Dimensional drawings (con't)

V Series

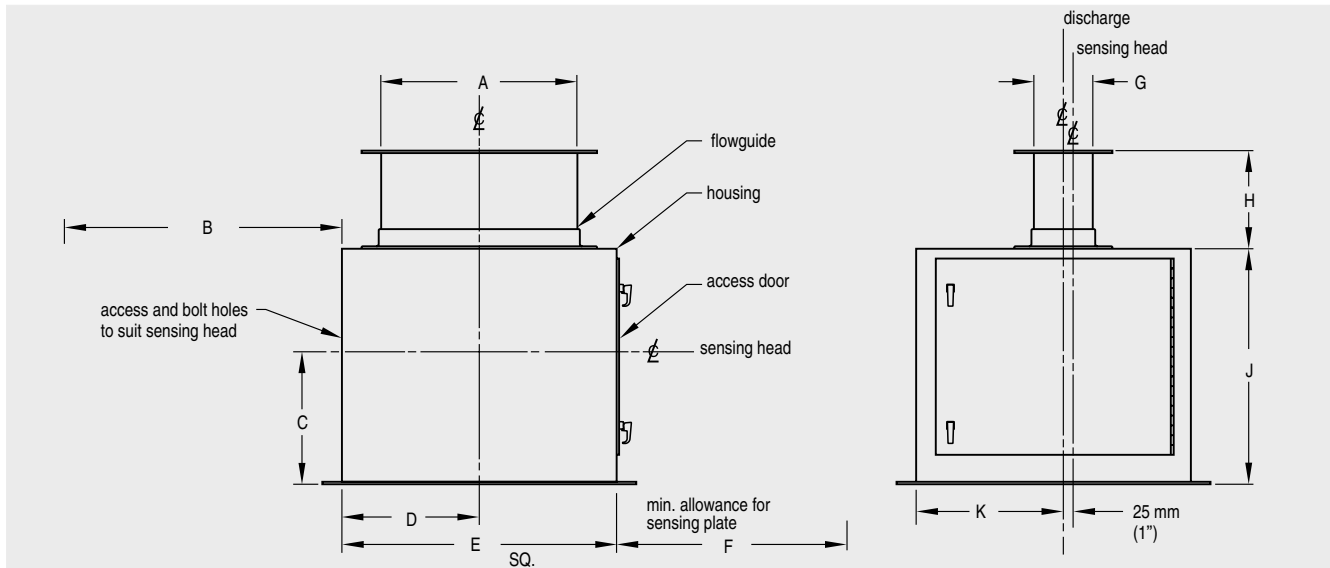


Fig. 2/52 V Series dimensions

Size	A	B	C	D	E	F	G	H	J	K
V-40 1	152 mm (6")	686 mm (27")	304 mm (12")	254 mm (10")	508 mm (20")	457 mm (18")	76 mm (3")	203 mm (8")	508 mm (20")	254 mm (10")
V-40 2	254 mm (10")	686 mm (27")	304 mm (12")	254 mm (10")	508 mm (20")	457 mm (18")	102 mm (4")	203 mm (8")	508 mm (20")	254 mm (10")
V-40 3	305 mm (12")	686 mm (27")	304 mm (12")	254 mm (10")	508 mm (20")	457 mm (18")	127 mm (5")	203 mm (8")	508 mm (20")	254 mm (10")
V-300 1	406 mm (16")	1041 mm (41")	343 mm (13.5")	305 mm (12")	610 mm (24")	762 mm (30")	127 mm (5")	254 mm (10")	610 mm (24")	330 mm (13")
V-300 2	508 mm (20")	1041 mm (41")	343 mm (13.5")	356 mm (14")	711 mm (28")	762 mm (30")	152 mm (6")	254 mm (10")	610 mm (24")	381 mm (15")

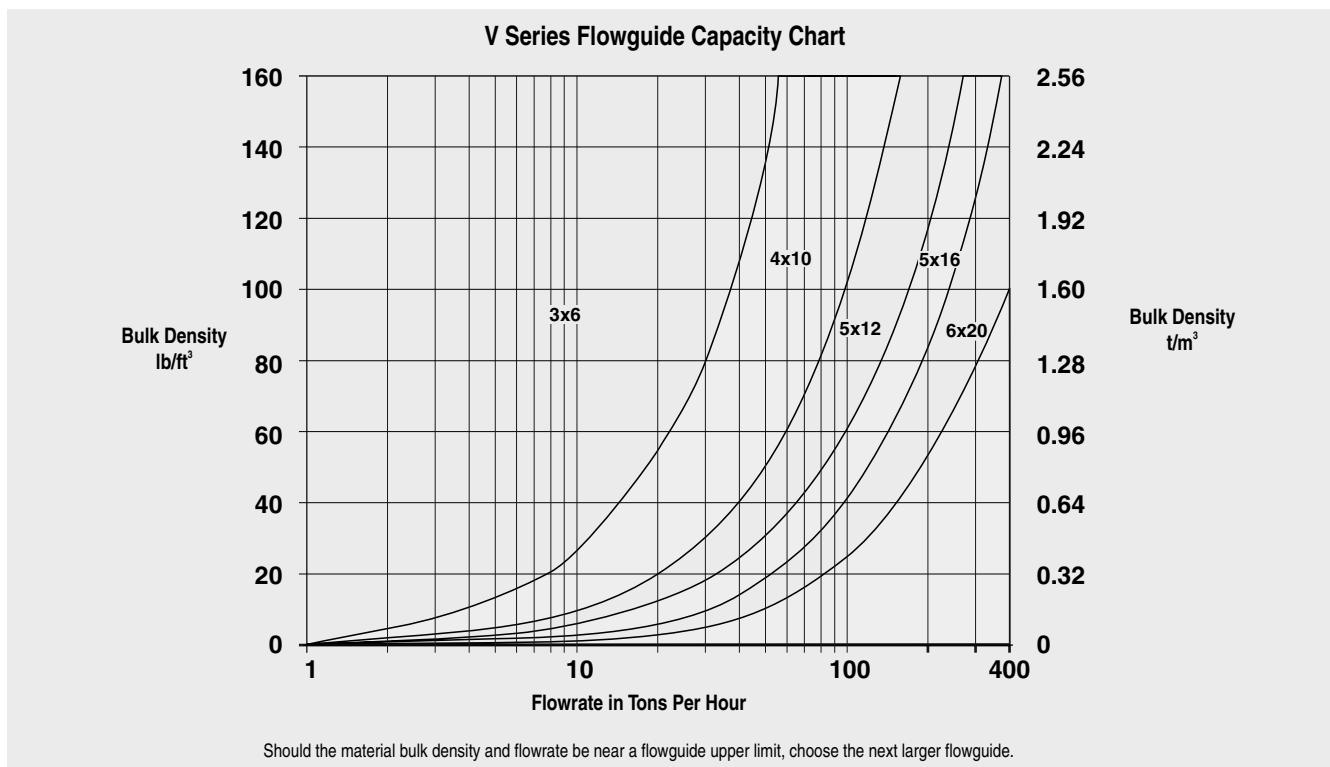


Fig. 2/53 V Series flowguide capacity chart

Dimensional drawings (con't)

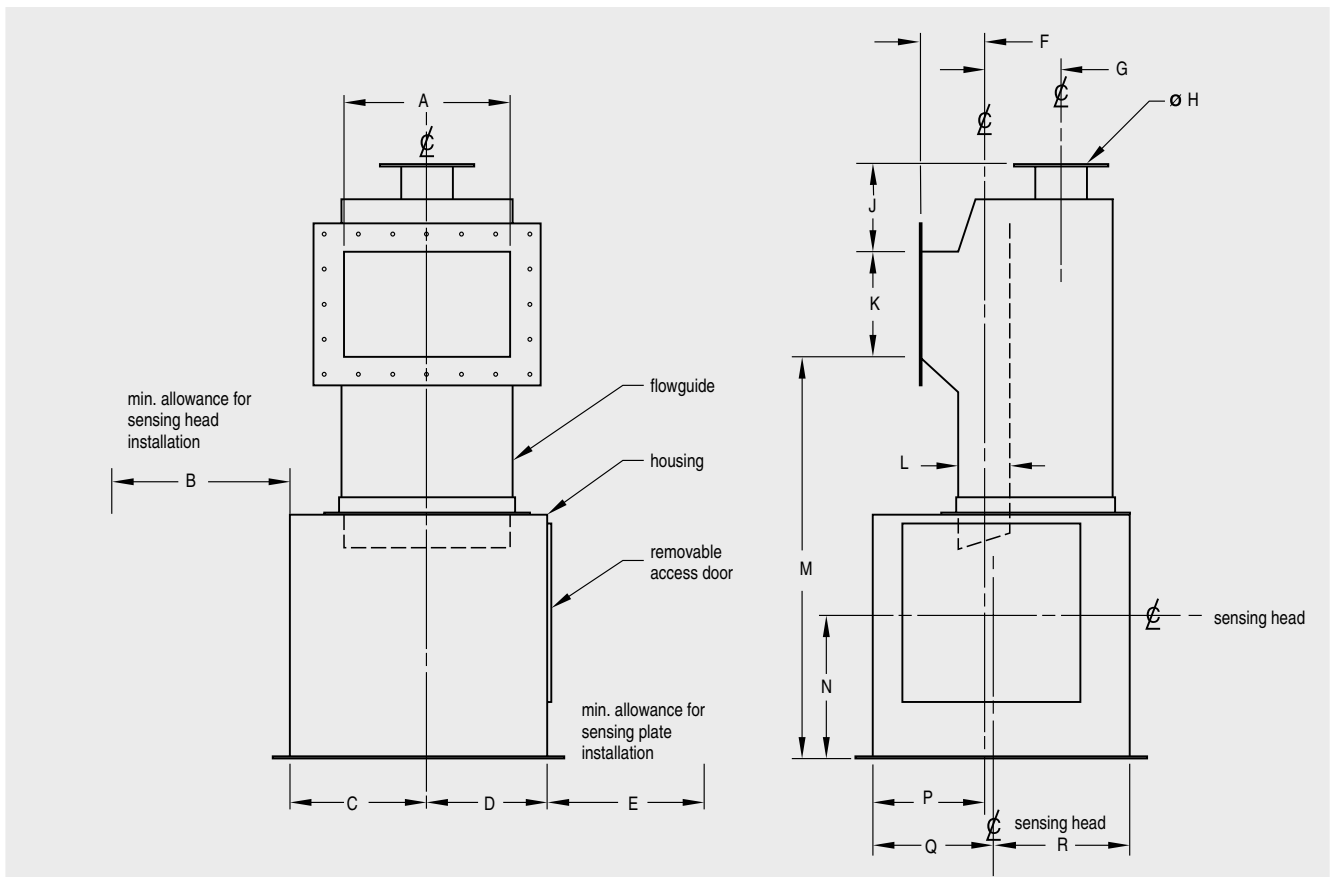


Fig. 2/54 A Series dimensions

Size	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R
A-40 1	203 mm (8")	686 mm (27")	305 mm (12")	254 mm (10")	711 mm (28")	127 mm (5")	203 mm (8")	102 mm (4")	229 mm (9")	203 mm (8")	76 mm (3")	914 mm (36")	305 mm (12")	229 mm (9")	229 mm (9")	330 mm (13")
A-40 2	305 mm (12")	686 mm (27")	305 mm (12")	254 mm (10")	711 mm (28")	127 mm (5")	203 mm (8")	102 mm (4")	229 mm (9")	203 mm (8")	102 mm (4")	914 mm (36")	305 mm (12")	229 mm (9")	229 mm (9")	330 mm (13")
A-300 1	254 mm (10")	1041 mm (41")	406 mm (16")	356 mm (14")	889 mm (35")	191 mm (7.5")	229 mm (9")	152 mm (6")	254 mm (10")	305 mm (12")	127 mm (5")	1168 mm (46")	419 mm (16.5")	330 mm (13")	356 mm (14")	406 mm (16")
A-300 2	356 mm (14")	1041 mm (41")	406 mm (16")	356 mm (14")	889 mm (35")	191 mm (7.5")	229 mm (9")	152 mm (6")	254 mm (10")	305 mm (12")	152 mm (6")	1168 mm (46")	419 mm (16.5")	330 mm (13")	356 mm (14")	406 mm (16")
A-300 3	508 mm (20")	1041 mm (41")	406 mm (16")	356 mm (14")	889 mm (35")	191 mm (7.5")	229 mm (9")	152 mm (6")	254 mm (10")	305 mm (12")	178 mm (7")	1168 mm (46")	419 mm (16.5")	330 mm (13")	356 mm (14")	406 mm (16")

Connections

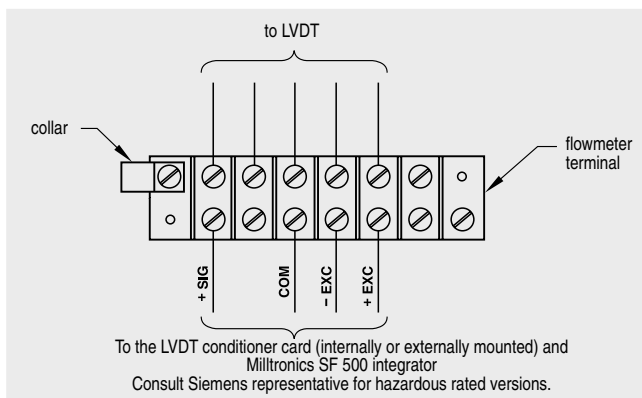


Fig. 2/55 E, V, and A Series connections

Continuous Weighing Solids Flowmeters

Milltronics E, V, and A Series

Ordering data	Order No.
E Series Flowmeters	A) 7MH7102 -
Low- to medium-capacity flowmeters for various product sizes, densities, and fluidities, particularly fine powders. A sensing plate, sensing head and integrator are required to complete the system.	0
Version	
E-40 base mount	1
E-40 side mount	2
E-300 base mount	3
Flowguide size	
No flowguide	A
2" ANSI flange pattern ¹⁾	B
4" ANSI flange pattern ¹⁾	C
6" ANSI flange pattern ²⁾	D
8" ANSI flange pattern ²⁾	E
10" ANSI flange pattern ²⁾	F
12" ANSI flange pattern ³⁾	G
14" ANSI flange pattern ³⁾	H
16" ANSI flange pattern ³⁾	J
Flowguide Construction	
No flowguide	A
Mild steel, painted	B
Mild steel, epoxy painted with zinc primer, for models 1 & 2 only	C
Mild steel, epoxy painted with zinc primer, for model 3	D
AISI 304 (1.4306) ¹⁾	E
AISI 304 (1.4306) ³⁾	F
AISI 316 (1.4404) ¹⁾	G
AISI 316 (1.4404) ³⁾	H
Other flowguide materials available upon request.	J
Cabinet Construction	
Mild steel, painted	1
Mild steel, epoxy painted with zinc primer ¹⁾	2
Mild steel, epoxy painted with zinc primer ³⁾	3
AISI 304 (1.4306) ¹⁾	4
AISI 304 (1.4306) ³⁾	5
AISI 316 (1.4404) ¹⁾	6
AISI 316 (1.4404) ³⁾	7
Instruction Manual	
English	A) 7ML1998-5CT01
Note: The instruction manual should be ordered as a separate item on the order.	

¹⁾ for models 1 and 2 only

²⁾ for models 1, 2, or 3

³⁾ for model 3 only

A) Subject to export regulations AL: N, ECCN: EAR99

Ordering data	Order No.
A Series Flowmeters	A) 7MH7106 -
Aerated heavy-duty low- to medium-capacity flowmeters for light density powders. A sensing plate, sensing head and integrator are required to complete the system.	
Version	
A-40, 40 t/h maximum design capacity	1
A-300, 300 t/h maximum design capacity	2
Flowguide size	
No flowguide	A
8" (203mm), A-40	B
10" (254mm), A-300	C
12" (305mm), A-40	D
14" (356mm), A-300	E
20" (508mm), A-300	F
Flowguide Construction	
No flowguide	A
Mild steel, painted	B
Mild steel, epoxy painted with zinc primer, for Model 1 only	C
Mild steel, epoxy painted with zinc primer, for Model 2 only	J
Other flowguide materials available upon request.	
Cabinet Construction	
Mild steel, painted	1
Mild steel, epoxy painted with zinc primer, for Model 1 only	2
Mild steel, epoxy painted with zinc primer, for Model 2 only	5
Other cabinet materials available upon request.	
Venting Flange	
ANSI flange pattern	1
DIN flange pattern	2
Instruction Manual	
English	A) 7ML1998-5CV01
Note: The instruction manual should be ordered as a separate item on the order.	

A) Subject to export regulations AL: N, ECCN: EAR99

Continuous Weighing Solids Flowmeters

Milltronics E, V, and A Series

2

Ordering data	Order No.
V Series Flowmeters Compact vertical flow, low- to medium-capacity flowmeters for various product sizes, densities, and fluidities. A sensing plate, sensing head and integrator are required to complete the system.	A) 7MH7104 - 0
Version V-40 base mount, 40 t/h max. design capacity V-40 side mount, 40 t/h max. design capacity V-300 base mount, 300 t/h max. design capacity	1 2 3
Flowguide size No flowguide 3" x 6" (76 x 152 mm) ¹⁾ 4" x 10" (102 x 254 mm) ¹⁾ 5" x 12" (127 x 305 mm) ¹⁾ 5" x 16" (127 x 406 mm) ²⁾ 6" x 20" (152 x 508 mm) ²⁾	A B C D E F
Flowguide Construction No flowguide Mild steel, painted AISI 304 (1.4306) ¹⁾ AISI 304 (1.4306) ²⁾ AISI 316 (1.4404) ¹⁾ AISI 316 (1.4404) ²⁾ AISI 304 (1.4306), with PTFE liner ¹⁾ AISI 304 (1.4306), with PTFE liner ²⁾ Mild steel, epoxy paint with zinc primer ¹⁾ Mild steel, epoxy paint with zinc primer ²⁾ Other flowguide materials available upon request.	A B C D E F J K L M
Cabinet Construction Mild steel, painted AISI 304 (1.4306) ¹⁾ AISI 304 (1.4306) ²⁾ AISI 316 (1.4404) ¹⁾ AISI 316 (1.4404) ²⁾ Mild steel, epoxy paint with zinc primer ¹⁾ Mild steel, epoxy paint with zinc primer ²⁾	1 2 3 4 5 6 7
Instruction Manual English German Note: The instruction manual should be ordered as a separate line on the order.	A) 7ML1998-5CU01 A) 7ML1998-5CU31

¹⁾ for models 1 and 2 only

²⁾ for model 3 only

A) Subject to export regulations AL: N, ECCN: EAR99

Continuous Weighing Solids Flowmeters

Milltronics C-40



Fig. 2/56 C-40 Solids Flowmeter

Application

The Milltronics C-40 solids flowmeter is a low- to medium-capacity flowmeter designed to NFPA Code 8503 requirements for pulverized coal and coke. It uses a specially modified hazardous-rated ILE-37 sensing head with an NFPA Code 8503 rated flowguide assembly. The sensing head is mounted within the high pressure rated assembly, which will contain pressure up to 50 psig generated by an internal explosion. During normal operation, the internal pressure must be less than 1 psig, but the device can handle surges up to 10 psig without damaging the sensing head's inner gasket.

Because of the unique design of the C-40, pulverized coal can be accurately monitored in normal running conditions. If an upset condition occurs, the flowmeter design protects the process, requiring only limited repair and maintenance.

A sensing plate and a solids flowmeter integrator are required to complete the system.

Benefits

- High-pressure rated assembly successfully contains pressure in case of material combustion or explosion
- NFPA Code 8503 rated flowguide assembly
- Sensing head gasketing handles minor pressure buildup
- Process temperatures to 65 °C (150 °F)
- Cost effective feeding system to suit NFPA Code 8503 requirements

Flow Rate

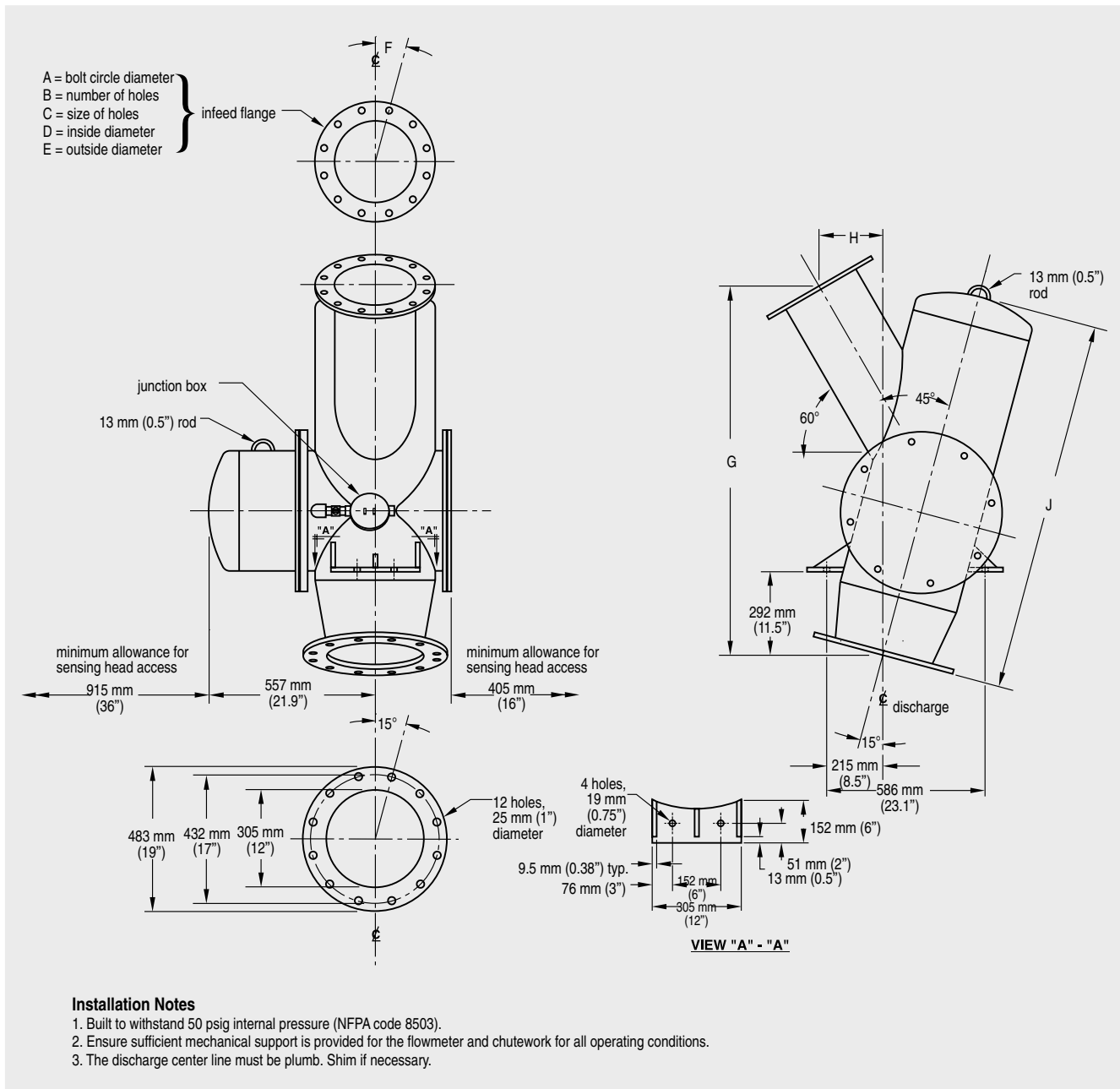
Inlet Size	Capacity Range
250 mm (10")	5 to 40 t/h (5.5 to 44 STPH)
150 mm (6")	2 to 10 t/h (2.2 to 11 STPH)

Technical data

Mode of operation	
Measuring principle	Deflection measuring LVDT
Typical application	Measuring flow of pulverized coal
Type of material measured	
Fine powder up to 12 mm (0.5") maximum	
Performance	
Accuracy	± 1 % of full scale
Repeatability	0.2 %
Ambient temperature rating	
-40 to 65 °C (-40 to 150 °F)	
Medium conditions	
Operating pressure	Less than 1 psig (with limited air-flow) Minor upsets: 10 psig
Pressure rating (upset conditions)	50 psig
Operating range	0 to 0.5 t/h min. 0 to 40 t/h max (to suit application)
Design	
Material	Painted mild steel AISI 304 (1.4306) ILE-37 sensing head with PTFE gasket
• flowguide and housing	
• sensing plate	
• sensing head	
Integrators	
Milltronics SF 500	
Approvals	
<ul style="list-style-type: none"> • NFPA code 8503 • ILE 37: CSA Class I, Groups C and D; Class II, Groups E, F and G • CE 	
Option	
alumina ceramic abrasion resistant liner for sensing plate	

Dimensional drawings

C-40 Dimensions		ANSI								
Size	Max. flowrate at bulk density	A	B (number of holes)	C	D	E	F	G	H	J
250 mm (10")	40 t/h at 0.4 t/m ³ (25 pcf)	362 mm (14.25")	12	25 mm (1")	255 mm (10.02")	406 mm (16")	15°	1250 mm (49.21")	225 mm (8.86")	1257 mm (49.50")
150 mm (6")	10 t/h at 0.4 t/m ³ (25 pcf)	241 mm (9.5")	8	22 mm (0.875")	154 mm (6.07")	279 mm (11")	22.5°	1250 mm (49.21")	225 mm (8.86")	1257 mm (49.50")



Installation Notes

1. Built to withstand 50 psig internal pressure (NFPA code 8503).
2. Ensure sufficient mechanical support is provided for the flowmeter and chutework for all operating conditions.
3. The discharge center line must be plumb. Shim if necessary.

Fig. 2/57 C-40 dimensions

Continuous Weighing Solids Flowmeters

Milltronics C-40

Ordering data	Order No.
C-40 Solids Flowmeter A low- to medium-capacity flowmeter designed to NFPA Code 8503 requirements for pulverized coal and coke. A sensing plate and integrator are required to complete the system.	A) 7MH7108-0
Model Coal scale, 40 t/h maximum design capacity	1
Flowguide size 6" ANSI flange pattern 10" ANSI flange pattern DN150 flange pattern DN 250 flange pattern	A B C D
Flowguide construction Mild steel, painted Mild steel, epoxy painted with zinc primer	A B
Cabinet construction Mild steel, painted Mild steel, epoxy painted with zinc primer	1 2
Instruction Manual English Note: The instruction manual should be ordered as a separate line on the order.	A) 7ML1998-5DQ01
Calibration Weights 20 g 50 g 100 g 200 g 500 g 1000 g 2000 g 5000 g	A) 7MH7724-1AC A) 7MH7724-1AD A) 7MH7724-1AE A) 7MH7724-1AF A) 7MH7724-1AG A) 7MH7724-1AH A) 7MH7724-1AJ A) 7MH7724-1AK

A) Subject to export regulations AL: N, ECCN: EAR99

2

Continuous Weighing Solids Flowmeters

Milltronics ILE Sensing Heads

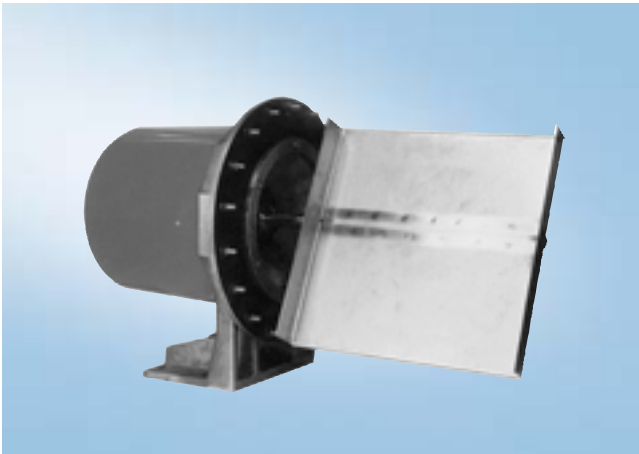


Fig. 2/58 Milltronics ILE Sensing Heads

Application

The Milltronics ILE-37 and ILE-61 Sensing Heads are out-of-the-process sensing elements for series A, E, V, and C solids flowmeters. Used in applications such as product ratioing, batch loadout, and process feed rate control, the ILE series of sensing heads has been field-proven in thousands of applications with some units providing over a quarter century of reliable performance.

The ILE sensing heads use only the horizontal force created by impact of product upon the sensing plate and then apply the horizontal deflection to a highly reliable Linear Variable Differential Transformer (LVDT).

Friction-less pivots exclude the vertical force from the sensing process and the LVDT travel range is controlled by a coil spring selected for the specified full-scale flow rate. A viscous fluid damper provides mechanical damping in the event of pulsating flows.

The LVDT converts the horizontal movement, proportional to the impact forces into an electrical signal, which is converted by the integrator to time-based flow rate indication and totalling. This method of sensing material flow has been proven best in thousands of applications all over the world.

Benefits

- Easy installation with modular assembly
- ± 1 % accuracy (or better) with high repeatability
- Totally enclosed, dust-tight, flow metering of bulk solids
- Sensing mechanism is outside the process, protected from contamination
- No zero drift, due to unique sensing mechanism
- Low maintenance; only the sensing plate is in the process
- No restriction of product flow

Technical Data

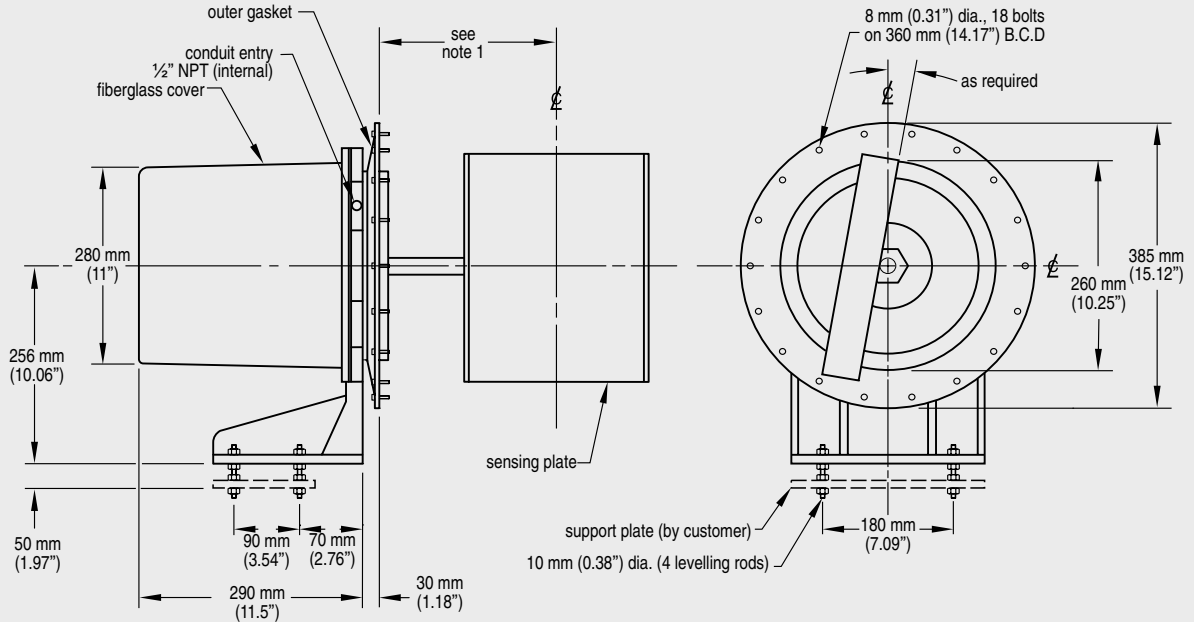
	ILE-37	ILE-61
Mode of operation Measuring principle Typical application	Deflection measurement using LVDT (linear variable differential transformer) For use in all E,V, and A Series flowmeters	
Flow input Maximum particle size Minimum flow rate Maximum flow rate	13 mm (0.5") 0 – 0.2 t/h (0 to 0.2 STPH) 0 – 40 t/h (0 to 44 STPH)	25 mm (1") 0 – 20 t/h (0 to 22 STPH) 0 – 300 t/h (0 to 330 STPH)
Performance Accuracy Repeatability Turn down	± 1 % of full scale, higher accuracy with linearizing features offered by integrators ± 0.2 % 3:1	
Medium conditions Ambient temperature • without internally mounted LVDT card • with optional internally mounted LVDT card Maximum product temperature	-40 to 60 °C (-40 to 140 °F) -40 to 50 °C (-40 to 122 °F) 232 °C (450 °F)	-40 to 60 °C (-40 to 140 °F) -40 to 50 °C (-40 to 122 °F) 232 °C (450 °F)
Design	Aluminum body, fiberglass cover, AISI 304 (1.4306) SS sensing plate	
Options	<ul style="list-style-type: none"> • CSA certified for Class I, Groups C & D; Class II Groups E, F & G; Class III hazardous areas • Epoxy paint, synergistic polymer, or PFA coating of external aluminum casting surfaces • High temperature, to 400 °C (750 °F) product temperature • Sensing Plate <ul style="list-style-type: none"> - AISI 316 (1.4404) sensing plate construction - abrasion resistant and non-stick sensing plate coating/liners • Internally mounted LVDT Conditioner Card for use with SF 500 integrator • Externally mounted LVDT Conditioner Card in NEMA 4 (IP65) enclosure for use with Milltronics SF 500 integrator when sensing head is mounted in hazardous area or with high ambient temperatures 	
Approvals	CE	CE

Continuous Weighing Solids Flowmeters

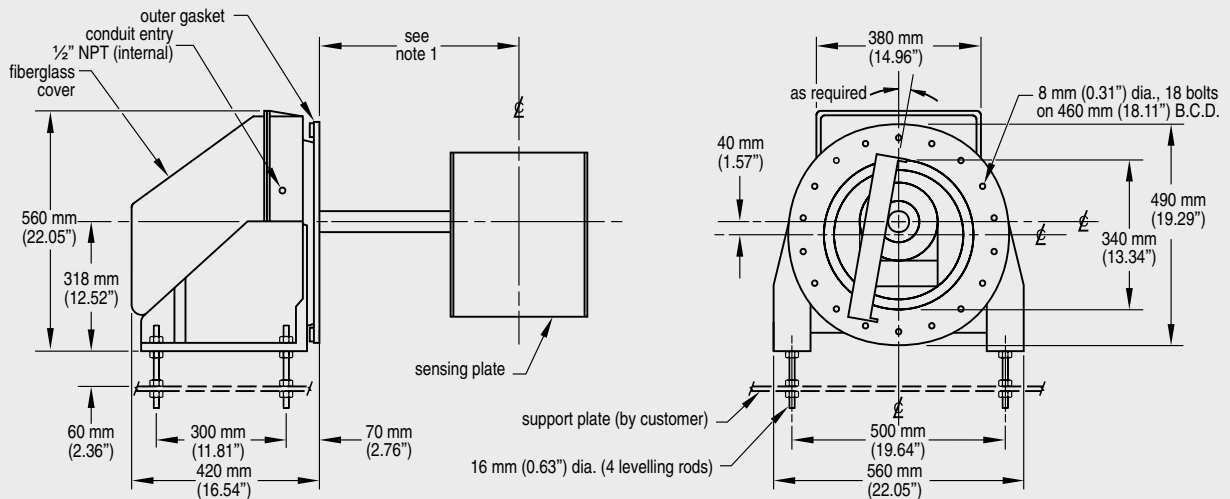
Milltronics ILE Sensing Heads

Dimensional drawings

ILE-37 Sensing Head



ILE-61 Sensing Head




Notes:


1. Refer to flowmeter drawing for sensing head mounting hole to flowguide centerline dimension.
2. Sensing head support plate should be rigid and independent of flowmeter housing.
3. Ensure outer gasket seals dust tight to flowmeter housing wall.

Fig. 2/59 ILE sensing head dimensions

Continuous Weighing Solids Flowmeters

Milltronics ILE Sensing Heads

Ordering data	Order No.
ILE-37 Sensing Head	A) 7MH7110-
Out-of-the-process sensing element for E-40, V-40, A-40 and C-40 flowguides. A flowguide, sensing plate and integrator are required to complete the system.	
Mounting	
Base	0
Side	1
Coal scale, explosion proof, CSA Class I Gr. C & D; Class II Gr. E, F & G	2
Base, explosion proof, CSA Class I Gr. C & D; Class II Gr. E, F & G	3
Side, explosion proof, CSA Class I Gr. C & D; Class II Gr. E, F & G	4
Range	
C2/A2/1000	A
C3/A2/1000	B
C4/A2/1000	C
C5/A2/1000	D
C6/A2/1000	E
C7/A2/1000	F
C8/A2/3000	G
C9/A2/3000	H
C10/A2/3000	J
C11/A3/5000	K
C12/A3/5000	L
C13/A3/5000	M
C14/A3/5000	N
C0/A2/500	P
C0/A3/500	Q
C10/A3/3000	R
Gasketing	
Silicone	A
Silicone, light duty	B
PTFE (mounting option 2 only)	E
Other gasketing material available upon request.	
Coating	
None, standard aluminum	0
Epoxy - white/aluminum, external castings only	1
Synergistic polymer	2
Other coatings available upon request.	
Sensing head mounted LVDT conditioner¹⁾	
Not required	0
Required for use with SF 500 integrator ¹⁾	1
Instruction Manual	
English	A) 7ML1998-5CW01
German	A) 7ML1998-5CW31
Note: The instruction manual should be ordered as a separate item on the order.	
Calibration Weights	
20 g	A) 7MH7724-1AC
50 g	A) 7MH7724-1AD
100 g	A) 7MH7724-1AE
200 g	A) 7MH7724-1AF
500 g	A) 7MH7724-1AG
1000 g	A) 7MH7724-1AH
2000 g	A) 7MH7724-1AJ
5000 g	A) 7MH7724-1AK
Spare parts	
Silicone inner diaphragm	A) PBD-24150005
Silicone outer diaphragm	A) PBD-23310911
PTFE inner diaphragm	A) 7MH7723-1BA
PTFE outer diaphragm	A) 7MH7723-1BB
LVDT transformer, standard	PBD-26350002
LVDT transformer, Class I and II	PBD-54000201

Ordering data	Order No.
ILE-37 Sensing Head	A) 7MH7110-
Out-of-the-process sensing element for E-40, V-40, A-40 and C-40 flowguides. A flowguide, sensing plate and integrator are required to complete the system.	
LVDT core	PBD-21450020
Damping fluid, 1000 CS, 1 lb bottle	A) PBD-51025392
Damping fluid, 3000 CS, 1 lb bottle	A) PBD-51025393
Damping fluid, 5000 CS, 1 lb bottle	A) PBD-51025394
Range spring assembly, C2	A) PBD-54000731
Range spring assembly, C3	A) PBD-54000739
Range spring assembly, C4	A) PBD-54000732
Range spring assembly, C5	A) PBD-54000733
Range spring assembly, C6	A) PBD-54000734
Range spring assembly, C7	A) PBD-54000735
Range spring assembly, C8	A) PBD-54000736
Range spring assembly, C9	A) PBD-54000737
Range spring assembly, C10	A) PBD-54000738
Range spring assembly, C11	A) PBD-54000741
Range spring assembly, C12	A) PBD-54000742
Range spring assembly, C13	A) PBD-54000743
Range spring assembly, C14	A) PBD-54000744
Leaf spring, A2, 2 springs required per sensing head	A) PBD-23311030
Leaf spring, A3, 2 springs required per sensing head	A) PBD-23311038
Guide spring, 2 springs required per sensing head	A) PBD-23311029
Circuit card, LVDT, internal mount	A) PBD-51035097

1) not applicable for mounting options 2, 3, or 4

A) Subject to export regulations AL: N, ECCN: EAR99

Continuous Weighing Solids Flowmeters

Milltronics ILE Sensing Heads

Ordering data

ILE-61 Sensing Head

Out-of-the-process sensing element for use with E-300, A-300 and V-300 flowguides. A flowguide, sensing plate and integrator are required to complete the system.

Classification

Non-hazardous

Hazardous, CSA Class I, Gr. C & D; Class II, Gr. E, F & G

Range

D1/1000 Position 1
D1/1000 Position 2
D1/1000 Position 3
D2/1000 Position 1
D2/1000 Position 2
D2/1000 Position 3
D3/3000 Position 1
D3/3000 Position 2
D3/3000 Position 3
D4/5000 Position 1
D4/5000 Position 2
D4/5000 Position 3
D5/5000 Position 1
D5/5000 Position 2
D5/5000 Position 3

Gasketing

Silicone

PTFE

Other gasketing available upon request.

Coating

None, standard aluminum

Epoxy - white/aluminum, external castings only

Other coatings available upon request.

Sensing head mounted LVDT conditioner¹⁾

Not required

required for use with SF 500 integrator (not applicable for Classification 2)

Instruction Manual

English

Note: Instruction Manual should be ordered as a separate item on the order.

Calibration Weights

20 g

50 g

100 g

200 g

500 g

1000 g

2000 g

5000 g

Spare parts

Silicone inner diaphragm

Silicone outer diaphragm

PTFE inner diaphragm

PTFE outer diaphragm

LVDT transformer, standard

LVDT transformer, class I and II

LVDT core

Damping fluid, 1000 CS, 1 lb bottle

Damping fluid, 3000 CS, 1 lb bottle

Damping fluid, 5000 CS, 1 lb bottle

Range spring assembly, D1

Range spring assembly, D2

Order No.

A) **7MH7112-**



1

2

A

B

C

D

E

F

G

H

J

K

L

M

N

P

Q

A

D

0

1

0

1

A) **7ML1998-5CX01**

A) **7MH7724-1AC**

A) **7MH7724-1AD**

A) **7MH7724-1AE**

A) **7MH7724-1AF**

A) **7MH7724-1AG**

A) **7MH7724-1AH**

A) **7MH7724-1AJ**

A) **7MH7724-1AK**

PBD-24150010

PBD-23310910

A) **7MH7723-1AL**

A) **7MH7723-1AM**

PBD-26350002

PBD-54000201

PBD-21450020

A) **PBD-51025392**

A) **PBD-51025393**

A) **PBD-51025394**

A) **PBD-54000751**

A) **PBD-54000752**

Ordering data

ILE-61 Sensing Head

Out-of-the-process sensing element for use with E-300, A-300 and V-300 flowguides. A flowguide, sensing plate and integrator are required to complete the system.

Range spring assembly, D3

Range spring assembly, D4

Range spring assembly, D5

Leaf spring, 4 required

Circuit card, LVDT, internal mount

Order No.

A) **7MH7112-**



A) **PBD-54000753**

A) **PBD-54000754**

A) **PBD-54000755**

A) **PBD-23311058**

A) **PBD-51035097**

A) Subject to export regulations AL: N, ECCN: EAR99

Continuous Weighing Solids Flowmeters

Flowmeter Sensing Plates / Peripherals

Ordering data	Order No.
Flowmeter Sensing Plates	A) 7MH7114 -
The sensing plate transfers the impact force to the sensing head of the flowmeter.	0
Flowmeter	
E-40 base mount or side moun	1
E-40 side mount for Canadian customers only	2
V-40	3
A-40	4
E-300	5
V-300	6
A-300	7
C-40	8
Plate Size	
18" x 10", for E-40 with 2, 4 or 6" flowguide, see 7MH7102	A
20" x 12", for E-40 with 8" flowguide, see 7MH7102	B
20" x 14", for E-40 with 10" flowguide, see 7MH7102	C
22" x 12", for E-300 with 6 or 8" flowguide, see 7MH7102	D
24" x 16" for E-300 with 10 or 12" flowguide, see 7MH7102	E
24" x 20" for E-300 with 14 or 16" flowguide, see 7MH7102	F
12" x 12", for A-40 with 8" flowguide, see 7MH7106	G
16" x 14", for A-40 with 12" flowguide, see 7MH7106	H
14" x 18" for A-300 with 10" flowguide, see 7MH7106	J
18" x 20" for A-300 with 14" flowguide, see 7MH7106	K
24" x 22" for A-300 with 20" flowguide, see 7MH7106	L
12" x 10", for V-40 with 3x6" flowguide, see 7MH7104	M
14" x 14", for V-40 with 4x10" flowguide, see 7MH7104	N
16" x 16", for V-40 with 5x12" flowguide, see 7MH7104	P
18" x 20", for V-300 with 5x16" flowguide, see 7MH7104	Q
20" x 24", for V-300 with 6x20" flowguide, see 7MH7104	R
12" x 12", for C-40 with 6" flowguide, see 7MH7108	S
12" x 14", for C-40 with 10" flowguide, see 7MH7108	T
Plate Material	
AISI 304 (1.4306), for flowmeter options 1 to 4 and 8 only	A
AISI 304 (1.4306), for flowmeter options 5 to 7 only	B
AISI 316 (1.4404), for flowmeter options 1 to 4 only	C
AISI 316 (1.4404), for flowmeter options 5 to 7 only	D
AISI 304 (1.4306), heavy-duty, for flowmeter options 1 to 4 only	E
AISI 304 (1.4306), heavy-duty, for flowmeter options 5 to 7 only	F
AISI 316 (1.4404), light duty, for flowmeter options 1, 2, and 3 only	G
Plate Liner	
No liner	1
Polyurethane, for flowmeter options 1 to 4 only	2
Polyurethane, for flowmeter options 5 to 7 only	3
PTFE, for flowmeter options 1 to 4 only	4
PTFE, for flowmeter options 5 to 7 only	5
Alumina ceramic tiles, for flowmeter options 1 to 4 only	6

Ordering data	Order No.
Flowmeter Sensing Plates	A) 7MH7114 -
The sensing plate transfers the impact force to the sensing head of the flowmeter.	0
Alumina ceramic tiles, for flowmeter options 5 to 7 only	7
Plasma A/R, for flowmeter options 1 to 4 only	8
Plasma A/R, for flowmeter options 5 to 7 only	0
A) Subject to export regulations AL: N, ECCN: EAR99	

Continuous Weighing Solids Flowmeters

Milltronics L, M and MA Series



Fig. 2/60 Milltronics M Series Solids Flowmeter

Application

The Milltronics L and M Series solids flowmeters are medium- to high-capacity flowmeters for various product sizes, densities and fluidities.

With two load cells and two stainless steel cables, material can be guided onto any part of the sensing plate while maintaining constant moments of force. Even with side-to-side variations in flow and changes in the material depth, the unique parallelogram force sensing mechanism provides highly accurate and repeatable weighing.

Operating with a microprocessor based integrator package, the L and M Series flowmeters display flow rate, totalized flow, and rate alarms. Outputs are 0/4 to 20 mA proportional to rate and contact closure for remote totalization. Dry bulk solids enter the flowguide producing a mechanical deflection as they strike the flowmeter sensing plate before continuing through the process unhindered. The load cells convert the horizontal force of the deflection into an electrical signal. The integrator processes this into a display of flowrate and integrated total weight. The sensing process is immune to the effect of product build-up as only the horizontal force is measured.

The L-300 flowmeter is a medium-capacity flowmeter with a maximum rate of 300 t/h (330 STPH). With load cells external to the process, the M Series flowmeters measure high capacities with a maximum rate of 900 t/h (990 STPH). For high-capacity aerated gravity conveyor pre-feed, the MA Series has a maximum rate of 900 t/h (990 STPH).

Benefits

- Unique parallelogram force sensing mechanism
- Strain gauge load cell force conversion
- Dust-tight enclosure
- Replaceable sensing plate surface

Technical Data

	L-300	M-500/M-900	MA-500/MA-900
Mode of operation	Impact force sensing with strain gauge load cells		
Measuring principle	Impact force sensing with strain gauge load cells		
Typical application	Chutes and mechanical conveyors	Chutes and mechanical conveyors	Aerated gravity conveyors only
Flow Input			
Maximum particle size	25 mm (1")	25 mm (1")	25 mm (1")
Minimum flow range	0-100 t/h (0-110 STPH)	M-500: 0-200 t/h (0-220 STPH) M-900: 0-400t/h (0-440 STPH)	MA-500: 0-200 t/h (0-220 STPH) MA-900: 0-400t/h (0-440 STPH)
Maximum flow range	0-300 t/h (0-330 STPH)	M-500: 0-500 t/h (0-550 STPH) M-900: 0-900 t/h (0-990 STPH)	MA-500: 0-500 t/h (0-550 STPH) MA-900: 0-900 t/h (0-990 STPH)
Performance			
Accuracy	± 1 % of full scale	± 1 % of full scale	± 1 % of full scale
Repeatability	± 0.2 %	± 0.2 %	± 0.2 %
Volumetric Capacity	300 m ³ /h (10600 ft ³ /hr)	M-500: 450 m ³ /h (16000 ft ³ /hr) M-900: 820 m ³ /h (29000 ft ³ /hr)	MA-500: 450 m ³ /h (16000 ft ³ /hr) MA-900: 820 m ³ /h (29000 ft ³ /hr)
Medium Conditions			
Ambient temperature	-10 to 65 °C (14 to 150 °F)	-40 to 65 °C (-40 to 150 °F)	-40 to 65 °C (-40 to 150 °F)
Maximum product temperature	85 °C (185 °F)	150 °C (300 °F)	150 °C (300 °F)
Design	Painted mild steel with stainless steel sensing plate (sensing plate wear liners are optional)		
Load Cells			
Construction	Stainless steel parallelogram	Stainless steel parallelogram	Stainless steel parallelogram
Excitation	10 V DC nominal, 15 V DC max.	10 V DC nominal, 15 V DC max.	10 V DC nominal, 15 V DC max.
Output	2 mV/V nominal	2 mV/V nominal	2 mV/V nominal
Operating range	-40 to 85 °C (-40 to 185 °F)	-40 to 65 °C (-40 to 150 °F)	-40 to 65 °C (-40 to 150 °F)
Integrator	Milltronics SF 500		
Hazardous Applications	With use of suitable intrinsically safe barriers	With use of suitable intrinsically safe barriers	With use of suitable intrinsically safe barriers
Approvals	CE	CE	CE

Dimensional drawings

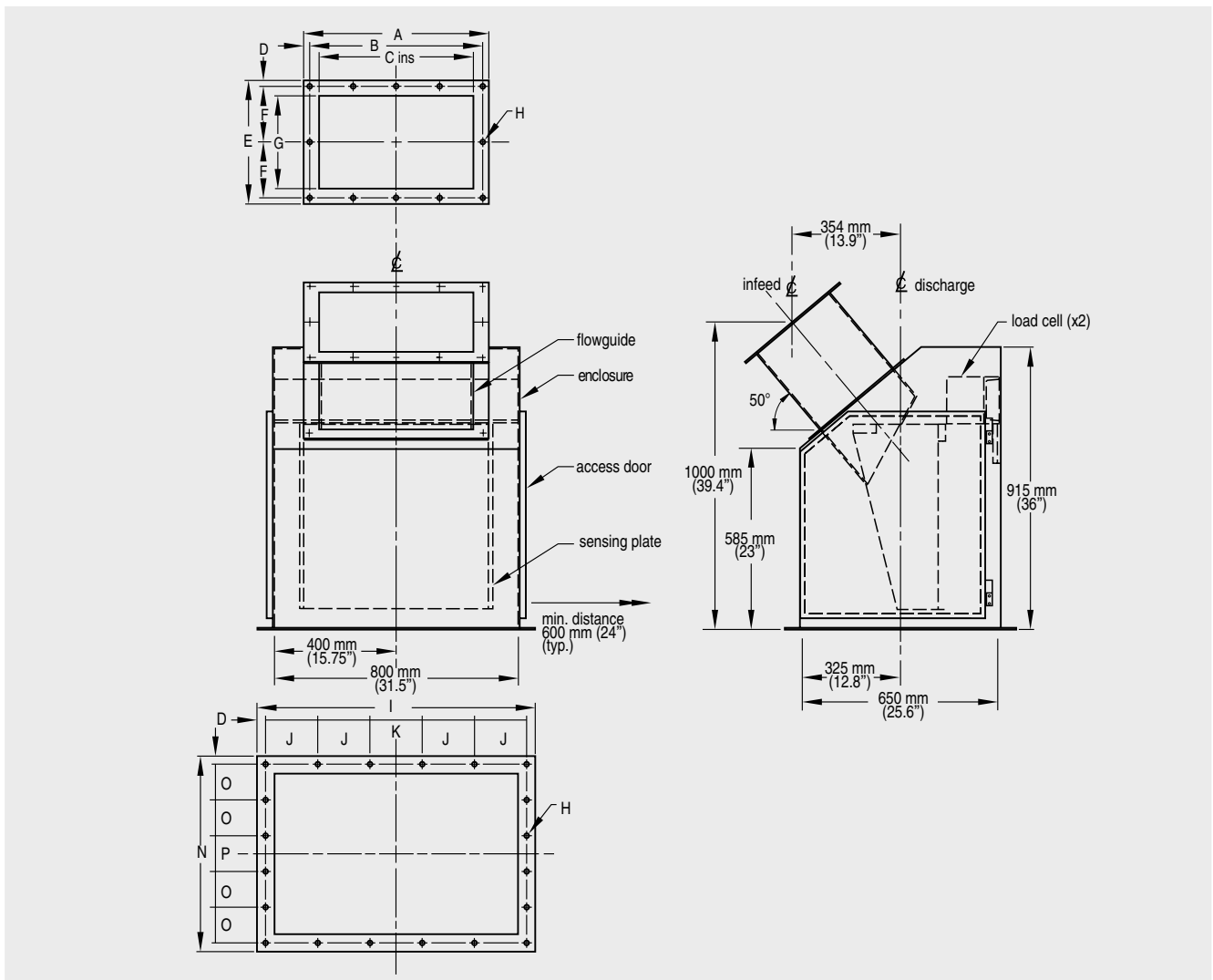


Fig. 2/61 L-300 dimensions

Dimension	L-300
A	600 mm (23.62")
B	560 mm (22.1") 4 equal spaces
C	500 mm (19.69")
D	20 mm (0.79")
E	400 mm (15.75")
F	180 mm (7.09")
G	300 mm (11.81")
H	14 mm (0.55") diameter holes
I	900 mm (35.43")
J	175 mm (6.89")
K	160 mm (6.3")
N	750 mm (29.53")
O	145 mm (5.71")
P	130 mm (5.12")

Continuous Weighing Solids Flowmeters

Milltronics L, M and MA Series

2

Dimensional drawings

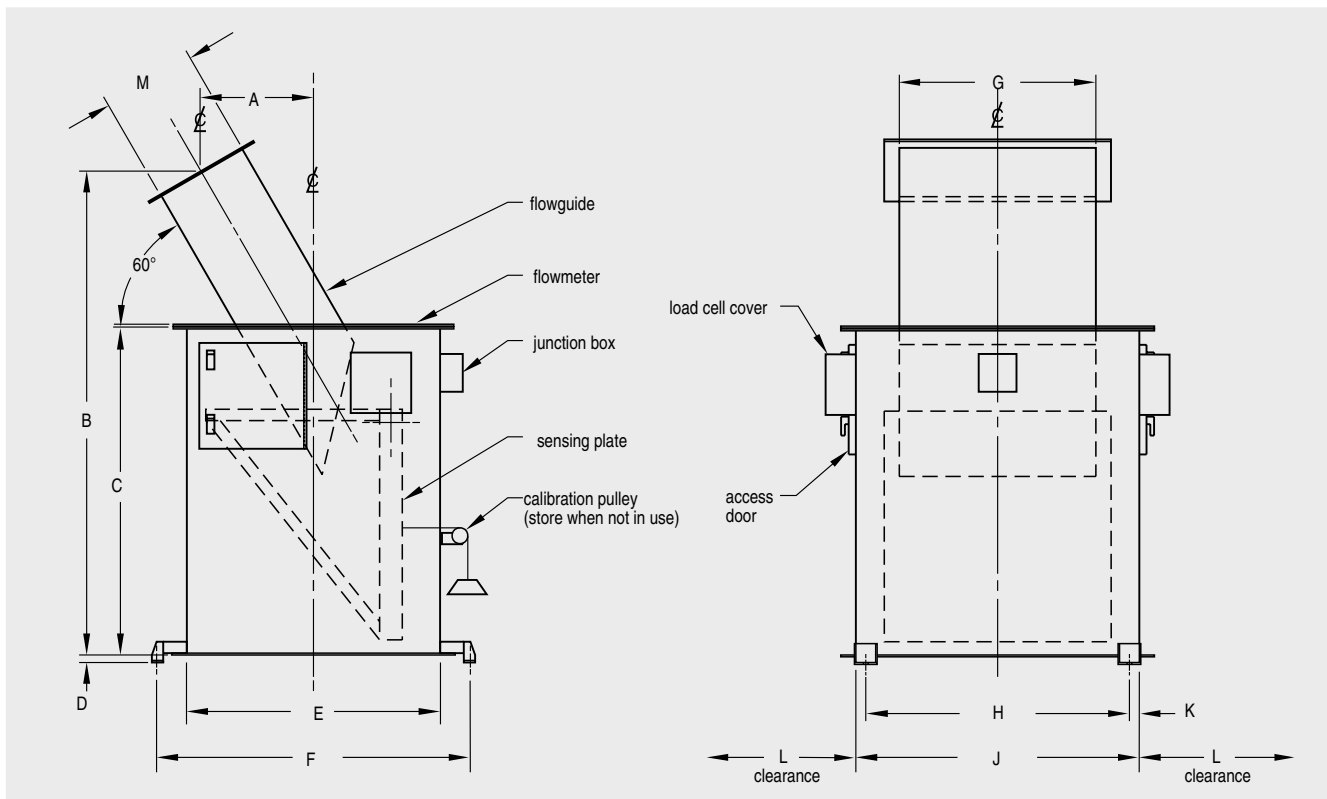


Fig. 2/62 M Series dimensions

Dimension	M-500	M-900
A	304 mm (12")	381 mm (15")
B	1500 mm (59")	1626 mm (64")
C	1102 mm (43.38")	1102 mm (43.38")
D	25 mm (1")	25 mm (1")
E	850 mm (33.5")	850 mm (33.5")
F	1054 mm (41.5")	1054 mm (41.5")
G	533 mm (21")	660 mm (26")
H	734 mm (28.88")	886 mm (34.88")
J	800 mm (31.5")	953 mm (37.5")
K	38 mm (1.5")	38 mm (1.5")
L	406 mm (16")	406 mm (16")
M	305 mm (12")	305 mm (12")

Dimensional drawings

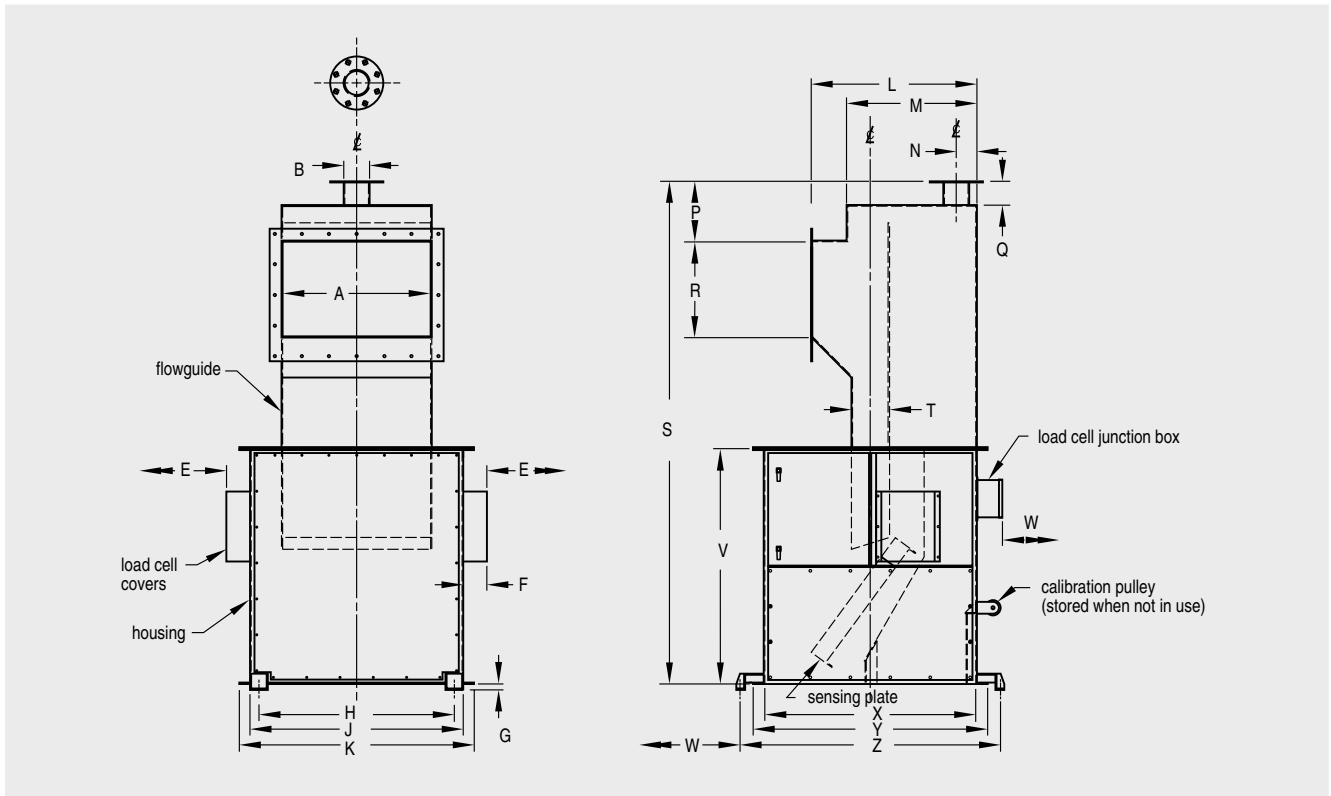


Fig. 2/63 MA Series dimensions

Dimension	MA-500	MA-900
A	635 mm (25")	940 mm (37")
B	102 mm (4") inside	152 mm (6") inside
E	610 mm (24") clearance required	610 mm (24") clearance required
F	102 mm (4")	102 mm (4")
G	25 mm (1")	25 mm (1")
H	838 mm (33")	1143 mm (45")
J	914 mm (36")	1219 mm (48")
K	1007 mm (39.63")	1311 mm (51.62")
L	711 mm (28")	762 mm (30")
M	559 mm (22")	559 mm (22")
N	89 mm (3.5")	89 mm (3.5")
P	149 mm (5.88")	152 mm (6")
Q	102 mm (4")	102 mm (4")
R	406 mm (16") inside	508 mm (20") inside
S	2156 mm (84.88")	2388 mm (94")
T	152 mm (6") inside	178 mm (7") inside
V	1010 mm (39.75")	1010 mm (39.75")
W	610 mm (24") clearance	610 mm (24") clearance
X	914 mm (36")	914 mm (36")
Y	1007 mm (39.63")	1007 mm (39.63")
Z	1118 mm (44")	1118 mm (44")

Continuous Weighing Solids Flowmeters

Milltronics L, M and MA Series

Ordering data	Order No.
Milltronics L and M Series solids flowmeter Medium-capacity (L-300) and high-capacity (M-500, M-900) solids flowmeter for various product sizes, densities and fluidity. MA Series are designed for aerated gravity conveyors. All models come complete with sensing plate. An integrator is required to complete the system.	A) 7MH7116-
Model L-300, 300 t/h maximum design capacity M-500, 500 t/h maximum design capacity M-900, 900 t/h maximum design capacity MA-500, 500 t/h maximum design capacity MA-900, 900 t/h maximum design capacity	1 2 3 4 5
Construction Painted mild steel	A
Sensing Plate Liner None Polyurethane, for model options 1, 2 or 4 only Polyurethane, for model options 3 or 5 only Alumina ceramic tiles, for model options 1, 2 or 4 only Alumina ceramic tiles, for model options 3 or 5 only	A B C D E
Load Cell 50 lb 100 lb	1 2
Instruction Manual L-300, English M-500 & MA-500, English M-900 & MA-900, English Note: The instruction manual should be ordered as a separate line on the order.	A) 7ML1998-5EQ01 A) 7ML1998-5EB01 A) 7ML1998-5EB01
Calibration Weights 20 g 50 g 100 g 200 g 500 g 1000 g 2000 g 5000 g	A) 7MH7724-1AC A) 7MH7724-1AD A) 7MH7724-1AE A) 7MH7724-1AF A) 7MH7724-1AG A) 7MH7724-1AH A) 7MH7724-1AJ A) 7MH7724-1AK
Spare parts Load cell, 50 lb, stainless steel Load cell, 100lb, stainless steel L-300, sensing plate support cable M series, sensing plate support cable MA series, sensing plate support cable L/M/MA series, test weight calibration cable L/M/MA series, test weight pulley assembly M/MA pillow block bearing	A) PBD-23900157 A) PBD-23900158 PBD-26750020 A) PBD-23300650 A) PBD-23300654 A) PBD-26750061 A) PBD-51020831 A) PBD-20250030

A) Subject to export regulations AL: N, ECCN: EAR99

Introduction

Integrators process sensor signals into operating data for continuous in-line weighing. They can take over basic control functions traditionally handled by other devices, like PID and batch control.

Principle of Operation

Milltronics integrators from Siemens incorporate patented electronic load cell balancing to perform basic and sophisticated level and flow control functions. Integrators process the speed or load signal from the sensor and perform functions to convert the data into rate or totalization. The integrator displays primary speed and load values, as well as derived values of rate and total on the LCD, or outputs the information as analog mA output, alarm relay, or remote totalizer.

The Milltronics BW 100 offers basic control functions for use with belt scales. It can be retrofitted for use with previously installed belt scale systems with a maximum of two load cells.

The CompuScale III is a versatile integrator for use with a wide range of belt scales. It is NTEP and Measurement Canada certified as legal-for-trade when used with an MMI-2 belt scale and MD-36A speed sensor.

The Milltronics BW 500 and SF 500 offer online calibration so the process does not need to be shut down to calibrate the integrator. The flowmeters also offer linearization, PID and batch control, multi-span and auto zero.

Definitions

- **PID** – Proportional, Integral, Derivative – The PID control function combines proportion, integral reset, and derivative rate to consistently control systems. A proportioning band creates an area around a setpoint where the controller is controlling the process. If the band is too narrow, the reading will center around the setpoint. If the band is too wide, the control values will take a long time to settle and will be slow to respond adequately to upset conditions. An integral reset corrects for any difference between the desired setpoint and variables altered during the process. A derivative rate prevents the control from shifting too dramatically on process upsets or startups.
- **Batch Control** – A predetermined quantity of material is accumulated, and the integrator will alarm, notifying that the batch process is completed.
- **Linearization** – Locations where the ideal belt scale or flowmeter location has been compromised or where there is a high variety in belt tension or flow cause the belt scale or flowmeter to report non-linearly. The integrator linearization function smooths out the result to provide an accurate report of the process.
- **Multi-span** – The integrator can be calibrated for up to 8 different feed conditions that would produce varying load characteristics. A span correction is added to the measurement to realize maximum accuracy.

Integrator Selection Guide

Criteria	Milltronics BW 100	Milltronics BW 500	CompuScale III	Milltronics SF 500
Applications and compatibility	Milltronics MLC, MUS, MCS, and MSI belt scales retrofit with other installed belt scale systems with a maximum of two load cells	Milltronics Weighfeeder Series 400, 600, 800, 1200 Milltronics MLC, MUS, MSI, MMI belt scales Retrofit of most other belt scale or weighfeeder systems	Milltronics MMI belt scales in legal-for-trade applications	Milltronics Millflo, E, V, A, C Series, L-300, M and MA Series flowmeters Other 1 or 2 load cell flowmeters LVDT equipped solids flowmeters, with use of optional interface board
Display output	Rate, totalized weight, belt loading, belt speed	Rate, totalized weight, belt loading, belt speed, PID, batching	Rate, totalized weight, belt loading, belt speed	Rate, totalized weight, PID, batching
Analog output	Optically isolated 4-20 mA scalable Selectable for rate, load, or speed	Optically isolated 4-20 mA scalable Option: two additional analog inputs and two outputs programmable for PID control	Optically isolated 4-20 mA scalable	Optically isolated 4-20 mA scalable Option: two additional analog inputs and two outputs programmable for PID control
Remote totalizer	Two adjustable pulsed outputs	Two adjustable pulsed outputs	One adjustable pulsed output	Two adjustable pulsed outputs
Alarm relay	One programmable form "C" (SPDT) contact rated 5 A at 250 V AC non-inductive	Five programmable form "A" (SPST) contacts rated 5 A at 250 V AC non-inductive, reversible	Two form "C" contact relays rated 5 A at 230 V AC for alarming on rate, load, or speed	Five programmable form "A" (SPST) contacts rated 5 A at 250 V AC non-inductive, reversible
Power requirements	100/115/200/230 V AC ±15 % 50/60 Hz, 15 VA Optional 12 V DC and 24 V DC	100/115/200/230 V AC ±15 % 50/60 Hz, 31 VA	115/230 V AC ±10 % 50/60 Hz, 65 VA	100/115/200/230 V AC ±15 % 50/60 Hz, 31 VA
Approvals	CSA _{NRTL/C} , FM CE	CSA _{NRTL/C} , FM CE Measurement Canada	CSA general purpose NTEP and Measurement Canada when used with MMI-2 belt scale and MD-36A speed sensor Not CE compliant	CSA _{NRTL/C} , FM CE

Continuous Weighing Integrators

CompuScale III



Fig. 2/64 CompuScale III

Application

The CompuScale III is a versatile integrator for use with conveyor belt scales. It operates with a one, two, or four load cell belt scale system; using an optional load cell pre-amplifier, the CompuScale III can receive six to eight load cell inputs. The CompuScale III provides a digital read-out of load, speed, flow rate, and totalized flow, with outputs for remote rate indication and totalization. The digital display features large, high resolution illuminated characters and graphics.

A high resolution analog-to-digital conversion scheme for setting zero and span enables quick, simple calibration. A material test may then be performed to verify system accuracy and the CompuScale III programmed to correct any deviation. It is simple to commission and easy to maintain. The unit features power loss protected memory, communications link, alarm and a real time clock. Load cells are balanced electronically by the CompuScale III.

Benefits

- Versatile integrator for wide range of belt scales
- Simple, automatic calibration
- Quick, low cost access to advanced information
- Analog mA output, and relay contact for rate alarm
- Provision for remote totalization
- Low maintenance
- NTEP and Measurement Canada approved when used with MMI-2 belt scale and MD-36A speed sensor
- Communications ports

Technical data

Mode of operation	
Measuring principle	Belt scale integrator
Typical application	NTEP weighing systems
Inputs	
Load cell	Load cell: -20 to +45 mV DC per Load cell (4 load cells max.)
LVDT	0 to 0.75 Vrms, 3 kHz
Speed sensor	5-15 V DC pulses, 2-2000 Hz
Multispan	4 contact inputs for up to 8 spans
Keypad	20 key sealed membrane with tactile feedback
Auto zero	Contact input to enable
Printer	Contact input for print request
Outputs	
Analog	<ul style="list-style-type: none"> • 4-20 mA, (0-25 mA scaleable), isolated, proportional to rate • 0.1 % resolution • 750 Ω max. load
Load cell	10 V DC, 250 mA max. (excitation)
LVDT	2.0 Vrms, 3 kHz, 50 mA rms max. (excitation)
Speed sensor	15 V DC, 150 mA max. (excitation)
Remote totalizer	<ul style="list-style-type: none"> • SPST sealed relay • 1 form 'A' contact rated 2A at 250 V AC, 100 VA max. • 25 msec. minimum contact closure duration • 15 closures per second max.
Alarm	<ul style="list-style-type: none"> • 2 multipurpose relays for rate, load or speed • 1 Form 'C' SPDT contact per relay, rated 5A at 230 V AC
Communication	1 relay, 4PDT used for communication loop dropout, rated 1A at 230 V AC
Display	Illuminated 256 x 128 dot matrix
Performance	
Resolution	0.02 % of full scale
Accuracy	0.1 % of full scale
Rated operating conditions	
<u>Ambient conditions</u>	
Location	Indoor/outdoor
Altitude	2000 m max.
Ambient Temperature	-20 to 50 °C (-5 to 122 °F)
Relative humidity/ingress protection	Suitable for outdoor/Type 4X/NEMA 4X/IP65
Installation category	II
Pollution degree	4
Design	
Material (enclosure)	NEMA 4 style, steel construction with polycarbonate window
Dimensions	330 mm W x 406 mm H x 102 mm D (13" W x 16" H x 4" D)
Weight	11.0 kg (24.3 lbs), no options

Technical data (continued)

Power supply	
Standard	100/115/200/230 V AC $\pm 10\%$, jumper selectable, 50/60 Hz, 65 VA
Fuse	
• main (FU 1)	3/4 Amp MDL SLO-BLO or equivalent
• speed sensor (FU 2)	1/4 Amp MDL SLO-BLO or equivalent
Controls and displays	
Displays	Illuminated 256 x 128 dot matrix
Communications	2 serial ports RS-232C and ± 20 mA current loop
Approvals	<ul style="list-style-type: none"> • CSA general purpose • NOT CE compliant • NTEP, Measurement Canada
Options	<ul style="list-style-type: none"> • Speed sensor: MD series speed sensors • LCPA-08 interface: for connection to MMI-3 or MMI-4 scale configurations • Incline compensator: for variable incline conveyors • Barrier Strips: for hazardous location belt scales • Enclosure heater: recommended for operating temperatures below $-10\text{ }^{\circ}\text{C}$ ($14\text{ }^{\circ}\text{F}$) or excessive humidity • Relay: food grade remote totalizer relay

Dimensional drawings

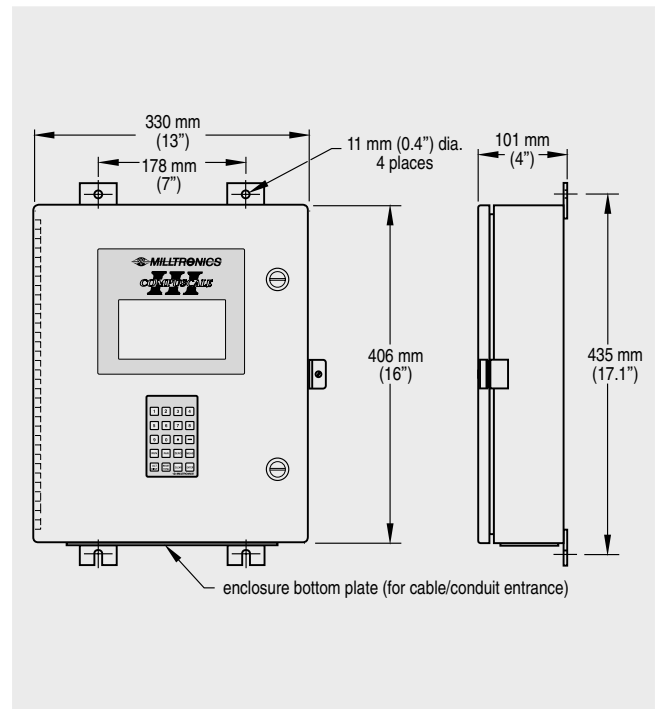


Fig. 2/66 CompuScale III dimensions

Connections

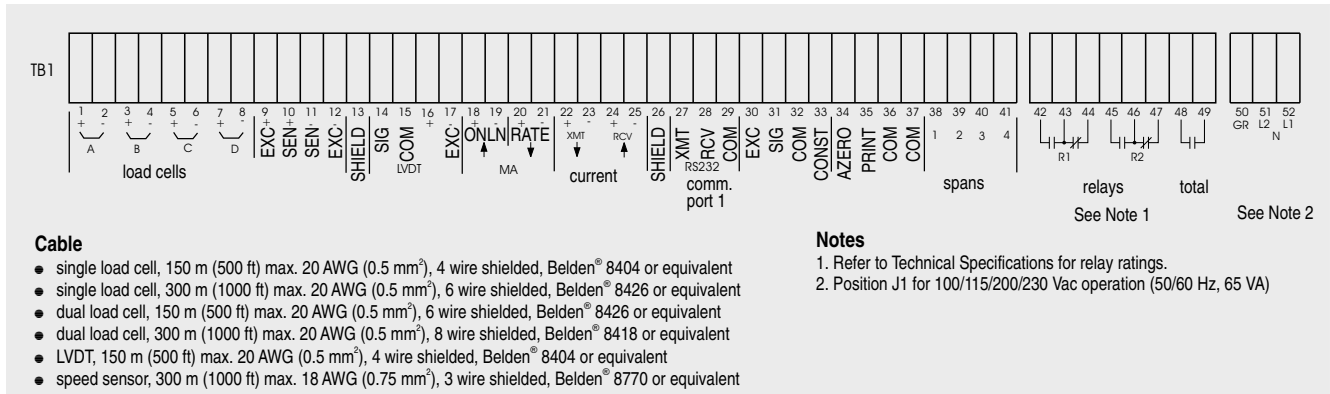


Fig. 2/65 CompuScale III connections

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Continuous Weighing Integrators

Milltronics BW 100



Fig. 2/67 Milltronics BW 100

Application

The Milltronics BW 100 integrator is an economical integrator for use with belt scales. It works with single or dual strain gauge load cell-based belt scales. With a speed sensor, it measures flow rate and totalized weight of bulk solids. It electronically balances the weigh bridge load cells to provide exceptional accuracy. The system is unaffected by uneven lateral loading so there is no need for load cell matching or mechanical balancing.

The large backlit display features a bar graph comparing current rate to full scale, reducing the possibility of human error.

The unit has a four-button control pad with tactile feedback keys used to set all parameters, or you can use Dolphin Plus software for programming and downloading through a PC or laptop.

Benefits

- Multi-field backlit LCD
- two remote totalizer contacts
- Auto zero function
- Load linearization
- Isolated mA output
- Programmable relay

Technical data

Mode of operation	
Measuring principle	Belt scale integrator
Typical applications	Integrator for use with Milltronics MLC, MUS, MCS, and MSI belt scales
Inputs	
Load cell	0-45 mV DC per load cell
Speed sensor	
• pulse train	<ul style="list-style-type: none"> • 0-5 V low, 0-15 V high 1 – 2000 Hz, or • Open collector switch, or • Relay dry contact
Auto zero	Dry contact from external device

Output	
Analog	Optically isolated 0/4 – 20 mA 750 Ω max loading Resolution: 0.1 % of 20 mA
Load cell	10 V DC compensated for strain gauge, 2 cells max.
Speed sensor	12 V DC, 50 mA max excitation
Remote totalizer 1	Contact closure 32–288 ms duration Open collector switch rated 30 V DC, 100 mA max.
Remote totalizer 2	Contact closure 32–288 ms duration Open collector switch rated 240 V AC/DC, 100 mA max.
Relay output	Programmable function 1 form 'C' SPDT relay contact rated 5A at 250 V AC, non-inductive
Performance	
Resolution	0.02 % of full scale
Accuracy	0.1 % of full scale
Rated operating conditions	
Ambient conditions	
Location	Indoor/outdoor
Altitude	2000 m max.
Ambient temperature	-20 to 50 °C (-5 to 122 °F)
Relative humidity/ingress protection	Suitable for outdoor/ Type 4X/NEMA 4X/IP65
Installation category	II
Pollution degree	4
Design	
Material (enclosure)	Polypropylene alloy
Sealed electronics compartment	
Integral junction box with terminal block for :	<ul style="list-style-type: none"> • 0.2–4 mm² solid, or • 0.2–2.5 mm² stranded (12–24 AWG)
Power supply	
Standard	100/115/200/230 V AC ± 15 %, 50/60 Hz, 15 VA
Optional	<ul style="list-style-type: none"> • 11–15 V DC, 15 W • 19–30 V DC, 15 W
Controls and displays	
Displays	38 x 100 mm (1.5 x 4") multi-field liquid crystal display
Programming	Via local keypad with silicone boot and/or Dolphin interface
Memory	<ul style="list-style-type: none"> • program stored in non-volatile FLASH memory, upgradable via Dolphin interface • parameters stored in non-volatile EEPROM
Setup	Dolphin compatible

Continuous Weighing Integrators

Milltronics BW 100

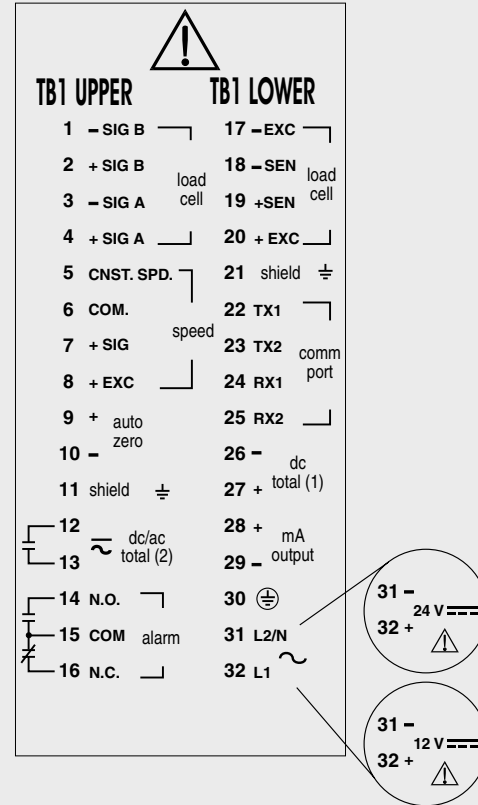
Technical data (continued)

Cable/separation	
Single load cell	
• non-sensing	Belden® 8404, 4 wire shielded, 20 AWG (0.5 mm ²) or equivalent, 150 m (500 ft.) max.
• sensing	Belden® 9260, 6 wire shielded, 20 AWG (0.5 mm ²) or equivalent, 300 m (1000 ft.) max.
Dual load cell	
• non-sensing	Belden® 9260, 6 wire shielded, 20 AWG (0.5 mm ²) or equivalent, 150 m (500 ft.) max.
• sensing	Belden® 8418, 8 wire shielded, 20 AWG (0.5 mm ²) or equivalent, 300 m (1000 ft.) max.
Speed sensor	Belden® 8770, 3-wire shielded, 18 AWG (0.75 mm ²) or equivalent, 300 m (1000 ft.)
Auto zero	Belden® 8760, 1 pair, twisted/shielded, 18 AWG (0.75 mm ²) or equivalent, 300 m (1000 ft.) max
Analog output	Belden® 8760, 1 pair, twisted/shielded, 18 AWG (0.75 mm ²) or equivalent
Bipolar current (comm.port)	Belden® 9552, 2 pair, twisted/shielded, 18 AWG (0.75 mm ²), or equivalent, 3000 m (10,000 ft.) max. loop
Remote total (t1 (dc))	Belden® 8760, 1 pair, twisted/shielded, 18 AWG (0.75 mm ²) or equivalent, 300 m (1000 ft.) max.
Approvals	CE, CSA _{NRTL/C}
Options	<ul style="list-style-type: none"> Speed sensor: MD-36, MD-256, TASS, RBSS, or equivalent Dolphin Plus: Windows® based software interface and infrared ComVerter link Incline Compensator, for signal compensation on variable incline conveyors LVDT interface card: for interface with LVDT based scales

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Windows® is a registered trademark of Microsoft Corporation.

Connections

Terminal Block AC Supply



Interconnection

All field wiring must have insulation for at least 250 V.
DC terminals shall be supplied from an SELV source in accordance with IEC-1010-1 Annex H.
For DC versions TB#31 is used for negative (-) and TB#32 is used for positive (+) connection.
Non-metallic enclosure does not provide grounding between connections. Use grounding type bushings and jumpers.

Fig. 2/69 Milltronics BW 100 connections

Dimensional drawings

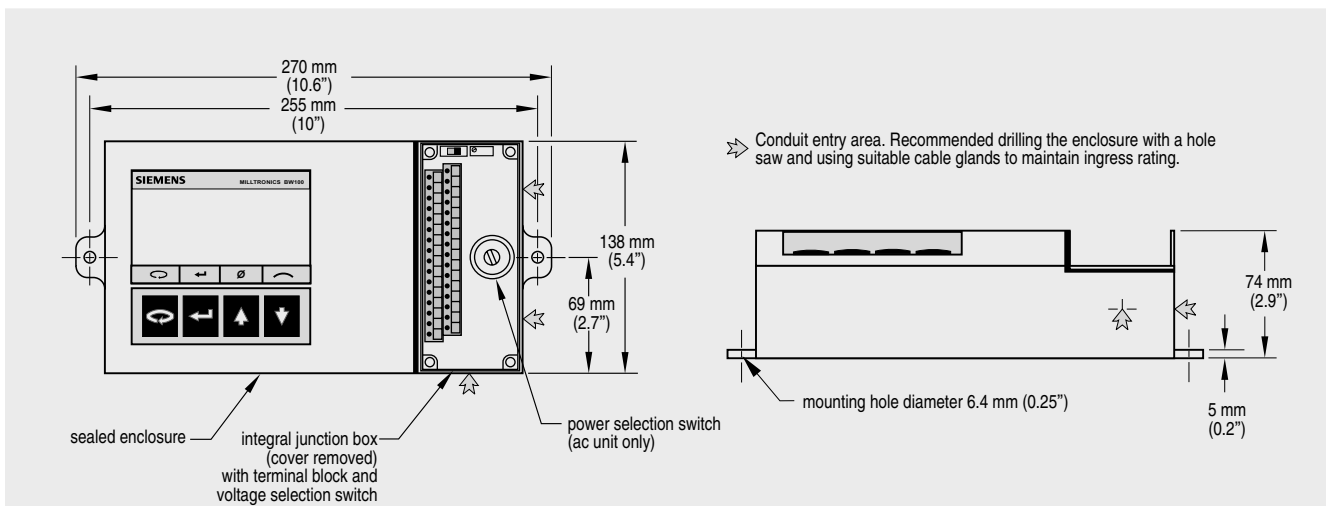


Fig. 2/68 Milltronics BW 100 dimensions

Continuous Weighing Integrators

Milltronics BW 100

2

Ordering data	Order No.
Milltronics BW 100 An economical integrator for use with belt scales	A) 7MH7150- A -
Input Voltage AC voltage 12 volts DC 24 volts DC	1 2 3
Feature Software Standard	A
Data Communications Bi-polar current	1
Enclosure Standard enclosure, no entry holes 4 drilled and tapped M20 entry holes	1 3
Trade Approval Sticker No trade approval sticker Not legal for Canadian trade sticker	0 1
Approvals CSA _{NRTL/C} , CE (EN61326), FM	D
Instruction Manual English German Note: The instruction manual should be ordered as a separate item on the order.	A) 7ML1998-5DJ01 A) 7ML1998-5DJ31
Optional Equipment LVDT Conditioner in Nema 4 enclosure (to interface A) LVDT belt scale without internal pre-amplifier LVDT Conditioner Card Instruction Manual, English A)	7MH723-1AJ 7ML1998-5EF01

A) Subject to export regulations AL: N, ECCN: EAR99

Continuous Weighing Integrators

Milltronics BW 500



Fig. 2/70 Milltronics BW 500

Application

The Milltronics BW 500 is a powerful integrator designed for use with both belt scales and weighfeeders. Operating with any belt scale with up to four strain gauge load cells, it processes belt load and speed signals for accurate flow rate and totalized weight of bulk solids. It can take on lower level control functions traditionally handled by other devices, and it supports popular industrial communication buses. Its patented load cell balance function eliminates matching of load cells.

The PID function may be used for rate control on shearing weighfeeders - where belt loading is constant - but can also control pre-feeding devices. Operating in tandem with two or more weighfeeders, the BW 500 may be used for ratio blending and controlling additives. Batching, load out, and alarm functions are also provided by the BW 500.

Dolphin Plus software may be used for programming the unit on a PC.

Benefits

- Automatic zero and electronic span calibration
- Alarms for rate, load, speed, or diagnostic error
- On-board Modbus®, optional PROFIBUS DP, Allen-Bradley® RIO and DeviceNet™
- Comprehensive weighfeeder control functions
- PID control and on-line calibration with optional analog I/O card
- Suitable for belt scale custody approval
- Measurement Canada approved

®Modbus is a registered trademark of Schneider Electric.

®Allen-Bradley is a registered trademark of Rockwell Automation.

DeviceNet™ is a trademark of Open DeviceNet Vendor Association

Technical data

Mode of operation

Measuring principle

Belt scale integrator

Typical application

- Compatible with Milltronics belt scales or equivalent 1, 2, or 4 load cell scales
- Compatible with LVDT equipped scales, with use of optional interface board (remotely mounted)

Inputs

Load cell

0-45 mV DC per load cell

Speed sensor

- pulse train

- 0-5 V low, 5-15 V high
- 1-2000 Hz, or
- Open collector switch, or
- Relay dry contact

Auto zero

Dry contact from external device

mA

See optional mA I/O board

Auxiliary

5 discrete inputs for external contacts, each programmable for either: display scrolling, totalizer 1 reset, zero, span, multispan, print, batch reset, PID function or on-line calibration

Outputs (load and speed)

mA

Programmable 0/4 to 20 mA, for rate, optically isolated, 0.1 % of 20 mA resolution, 750 Ω load max. (see optional mA I/O board)

Load cell

10 V DC compensated excitation for strain gauge type, 4 cells max, 150 mA max.

Speed sensor

12 V DC, 150 mA max. excitation

Remote totalizer 1

Contact closure 10 to 300 ms duration, open collector switch rated 30 V DC, 100 mA max.

Remote totalizer 2

Remote totalizer 2: contact closure 10 to 300 ms duration, open collector switch rated 240 V AC/DC, 100 mA max.

Relay output

5 alarm/control relays, 1 form 'A' SPST relay contact per relay, rated 5 A at 250 V AC, non-inductive or 30 V DC

Performance

Resolution

0.02 % of full scale

Accuracy

0.1 % of full scale

Rated operating conditions

Ambient conditions

Location

Indoor/outdoor

Altitude

2000 m max.

Ambient temperature

-20 to 50 °C (-5 to 122 °F)

Relative humidity/ingress protection

Suitable for outdoor/Type 4X/NEMA 4X/IP65

Installation category

II

Pollution degree

4

Design

Material (enclosure)

Polycarbonate

Dimensions

285 W x 209 H x 92 mm D (11.2 W x 8.2 H x 3.6" D)

Weight

2.6 kg (5.7 lbs)

Technical data (continued)

Power supply	
Standard	100/115/200/230 V AC $\pm 15\%$, 50/60 Hz, 31 VA fuse, FU1: 2AG, Slo Blo, 2 A, 250 V or equivalent
Controls and displays	
Displays	Illuminated 5x7 dot matrix liquid crystal display with 2 lines of 40 characters each
Programming	Via local keypad and/or Dolphin Plus interface
Memory	<ul style="list-style-type: none"> • program stored in non-volatile FLASH memory, upgradable via Dolphin Plus interface • parameters stored in battery backed RAM, 3 V NEDA 5003LC or equivalent, 10 year life
Communications	<ul style="list-style-type: none"> • Two RS-232 ports • One RS-485 port • SmartLinx® compatible
mA I/O board	
Inputs	2 programmable 0/4 - 20 mA for PID control and on-line calibration, optically isolated, 0.1 % of 20 mA resolution, 200 Ω input impedance
Outputs	2 programmable 0/4 - 20 mA for PID control, rate, load and speed output, optically isolated, 0.1 % of 20 mA resolution, 750 Ω load max
Output supply	Isolated 24 V DC at 50 mA, short circuit protected
Approvals	
CE, CSANRTL/C	
Options	
<ul style="list-style-type: none"> • Speed sensor: MD-36/36A, MD-256 or 2000A, TASS, or RBSS, or compatible • Dolphin Plus: Windows® based software interface. Refer to associated product documentation • SmartLinx® Modules: protocol specific modules for interface with popular industrial communications systems. Refer to product documentation. • Incline compensator: for load cell excitation compensation on variable incline conveyors • LVDT interface card: for interface with LVDT based scales 	

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Continuous Weighing Integrators

Milltronics BW 500

Dimensional drawings

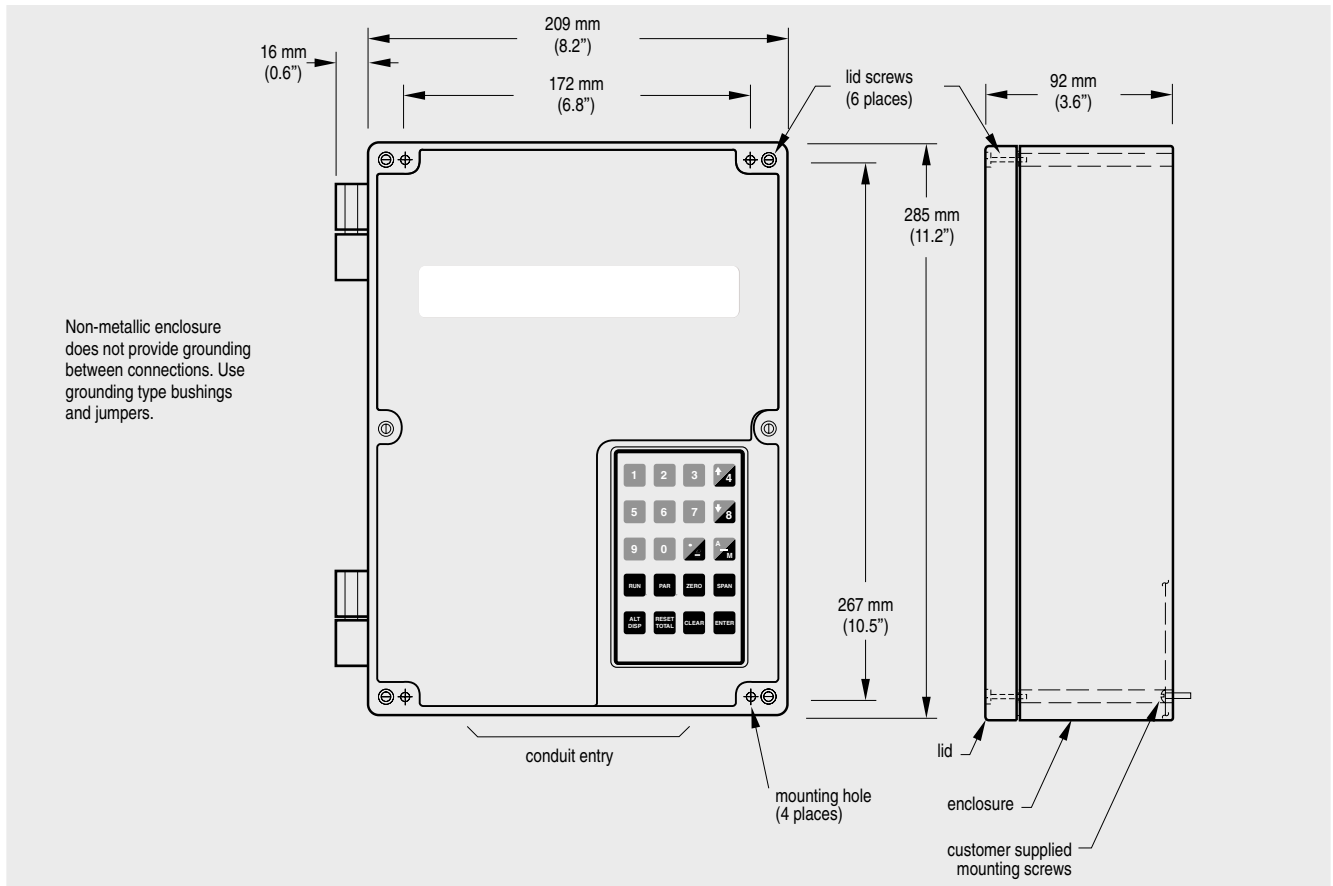
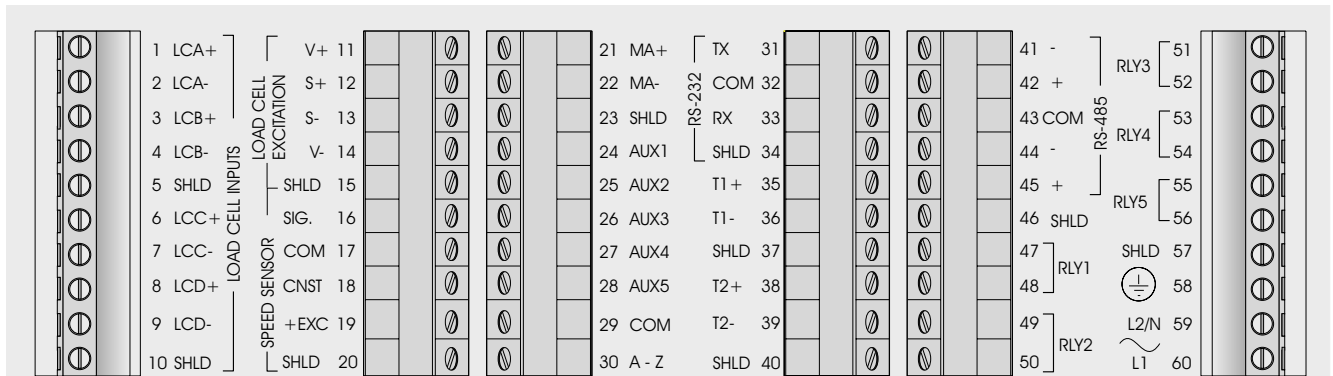


Fig. 2/71 Milltronics BW 500 dimensions

Connections



Cable

- one load cell
 - non-sensing: Belden® 8404, 4 wire shielded, 20 AWG (0.5 mm²) or equivalent, 150 m (500 ft) max.
 - sensing: Belden® 9260, 6 wire shielded, 20 AWG (0.5 mm²) or equivalent, 300 m (1000 ft) max.
- two / four* load cells:
 - * for four load cell scale, run two separate cables of two load cell configuration
 - non-sensing: Belden® 9260, 6 wire shielded, 20 AWG (0.5 mm²) or equivalent, 150 m (500 ft) max.
 - sensing: Belden® 8418, 8 wire shielded, 20 AWG (0.5 mm²) or equivalent, 300 m (1000 ft) max.
- speed sensor: Belden® 8770, 3 wire shielded, 18 AWG (0.75 mm²) or equivalent, 300 m (1000 ft)
- auto zero: Belden® 8760, 1 pair, twisted/shielded, 18 AWG (0.75 mm²) or equivalent, 300 m (1000 ft) max.
- remote total: Belden® 8760, 1 pair, twisted/shielded, 18 AWG (0.75 mm²) or equivalent, 300 m (1000 ft) max.

Fig. 2/72 Milltronics BW 500 connections

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Ordering data	Order No.
Milltronics BW 500 A powerful integrator designed for use with both belt scales and weighfeeders	A) 7MH7152-
Input Voltage AC voltage	1
Auxiliary Input/Output Board None 2 analog inputs and 2 analog outputs	A B
Feature Software Standard	A
Auxiliary Memory none	0
Data Communications SmartLinx Ready Smartlinx A-B® RIO module Smartlinx PROFIBUS DP module Smartlinx DeviceNet™ module	0 1 2 3
Enclosure Standard enclosure, no entry holes Standard enclosure, 4 entries, M20	1 2
Trade Approval Sticker No trade approval sticker Not legal for Canadian trade sticker Legal for Canadian trade	A B C
Approvals CE, CSA _{US/IC} , FM	A
Instruction Manual BW 500, English BW 500, German Note: The instruction manual should be ordered as a separate item on the order. Smartlinx Allen-Bradley® Remote I/O, English Smartlinx PROFIBUS DP, English Smartlinx PROFIBUS DP, German Smartlinx PROFIBUS DP, French Smartlinx DeviceNet™, English Note: The appropriate Smartlinx instruction manual should be ordered as a separate line on the order.	A) 7ML1998-5DK01 A) 7ML1998-5DK31 A) 7ML1998-1AP03 A) 7ML1998-1AQ03 A) 7ML1998-1AQ32 A) 7ML1998-1AQ12 A) 7ML1998-1BH02
Optional Equipment Milltronics analog I/O card LVDT Conditioner in Nema 4 enclosure (to interface A) LVDT belt scale without internal pre-amplifier LVDT Conditioner Card Instruction Manual, English	A) PBD-51033797 A) 7MH7723-1AJ A) 7ML1998-5EF01
Spare parts Display Lid with overlay and keypad Motherboard Battery, 3V, lithium	A) 7MH7723-1AF A) 7MH7723-1AG A) 7MH7723-1AH A) PBD-20200035

A) Subject to export regulations AL: N, ECCN: EAR99

Continuous Weighing Integrators

Milltronics SF 500



Fig. 2/73 Milltronics SF 500

Application

The Milltronics SF 500 is a powerful integrator designed for use with solids flowmeters. Operating with any solids flowmeter with up to two strain gauge load cells or LVDT sensor, it processes sensor signals for accurate flow rate and totalized weight of bulk solids. It can take on lower level control functions traditionally handled by other devices, and it supports popular industrial communication buses. Its patented load cell balance function eliminates matching of load cells.

The PID function may be used for rate control of pre-feeding devices and/or control of additives with two internal PID controllers. Operating in tandem with two or more solids flowmeters or weighfeeders, the SF 500 may be used for ratio blending and controlling additives. Batching, load out, and alarm functions are also provided by the SF 500.

Dolphin Plus software may be used for programming the unit with a PC.

Benefits

- Automatic zero and electronic span calibration
- Alarms for rate or diagnostic error
- On-board Modbus®, optional PROFIBUS DP, Allen-Bradley® RIO and DeviceNet™
- On-line calibration and dual PID control with optional analog I/O card
- Multi-point linearizer for high turndown accuracy
- Up to 8 multi-spans for application of more than one flow condition and/or material

Technical data

Mode of operation

Measuring principle
Typical application

Flowmeter integrator

- Compatible with Siemens Milltronics solids flowmeters or equivalent 1 or 2 load cell models
- Compatible with LVDT equipped solids flowmeters, with use of optional interface board (remotely mounted)

Input

Load cell/LVDT

0-45 mV DC per load cell or LVDT interface card

Auto zero

Dry contact from external device

mA

See optional mA I/O board

Auxiliary

5 discrete inputs for external contacts, each programmable for either: display scrolling, totalizer 1 reset, zero, span, multispans, print, batch reset, PID function, or on-line calibration

Output

mA

Programmable 0/4 - 20 mA, for rate, optically isolated, 0.1 % of 20 mA resolution, 750 Ω load max. (see optional mA I/O board)

Load cell/LVDT conditioner card

10 V DC compensated excitation for strain gauge type, 2 cells max, 150 mA max.

Remote totalizer 1

Contact closure 10 - 300 ms duration, open collector switch rated 30 V DC, 100 mA max.

Remote totalizer 2

Contact closure 10 - 300 ms duration, open collector switch rated 240 V AC/DC, 100 mA max.

Relay output

5 alarm/control relays, 1 form 'A' SPST relay contact per relay, rated 5 A at 250 V AC, non-inductive or 30 V DC

Performance

Resolution

0.02 % of full scale

Accuracy

0.1 % of full scale

Rated operating conditions

Ambient conditions

Location

Indoor/outdoor

Altitude

2000 m max.

Ambient temperature

-20 to 50 °C (-5 to 122 °F)

Relative humidity/ingress protection

Suitable for outdoor/Type 4X/NEMA 4X/IP65

Installation category

II

Pollution degree

4

Design

Material (enclosure)

Polycarbonate

Dimensions

285 W x 209 H x 92 mm D (11.2 W x 8.2 H x 3.6" D)

Weight

2.6 kg (5.7 lbs)

®Modbus is a registered trademark of Schneider Electric.

®Allen-Bradley is a registered trademark of Rockwell Automation.

DeviceNet™ is a trademark of Open DeviceNet Vendor Association

Technical data (continued)

Power supply	
Standard	100/115/200/230 V AC $\pm 15\%$, 50/60 Hz, 31 VA Fuse, FU1: 2AG, Slo Blo, 2 A, 250 V or equivalent
Controls and displays	
Display	Illuminated 5 x 7 dot matrix liquid crystal display with 2 lines of 40 characters each
Programming	Via local keypad and/or Dolphin Plus interface
Memory	<ul style="list-style-type: none"> • program stored in non-volatile FLASH ROM, upgradable via Dolphin Plus interface • parameters stored in battery backed RAM, 3 V NEDA 5003LC or equivalent, 10 year life
Communications	Two RS-232 ports One RS-485 port SmartLinx® compatible
Approvals	
CE, CSANRTL/C	
Options	
<ul style="list-style-type: none"> • Dolphin Plus: Windows® based software interface. Refer to associated product documentation. • SmartLinx® modules: protocol specific modules for interface with popular industrial communications systems. Refer to associated product documentation. • LVDT interface card: for interface with LVDT based solids flowmeters • mA I/O board <ul style="list-style-type: none"> - inputs: 2 programmable 0/4 - 20 mA for PID control or online calibration, optically isolated, 0.1 % of 20 mA resolution, 200 Ω input impedance - outputs: 2 programmable 0/4 - 20 mA for PID control or rate output, optically isolated, 0.1 % of 20 mA resolution, 750 Ω load max - output supply: isolated 24 V DC at 50 mA, short circuit protected 	

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Continuous Weighing Integrators

Milltronics SF 500

Dimensional drawings

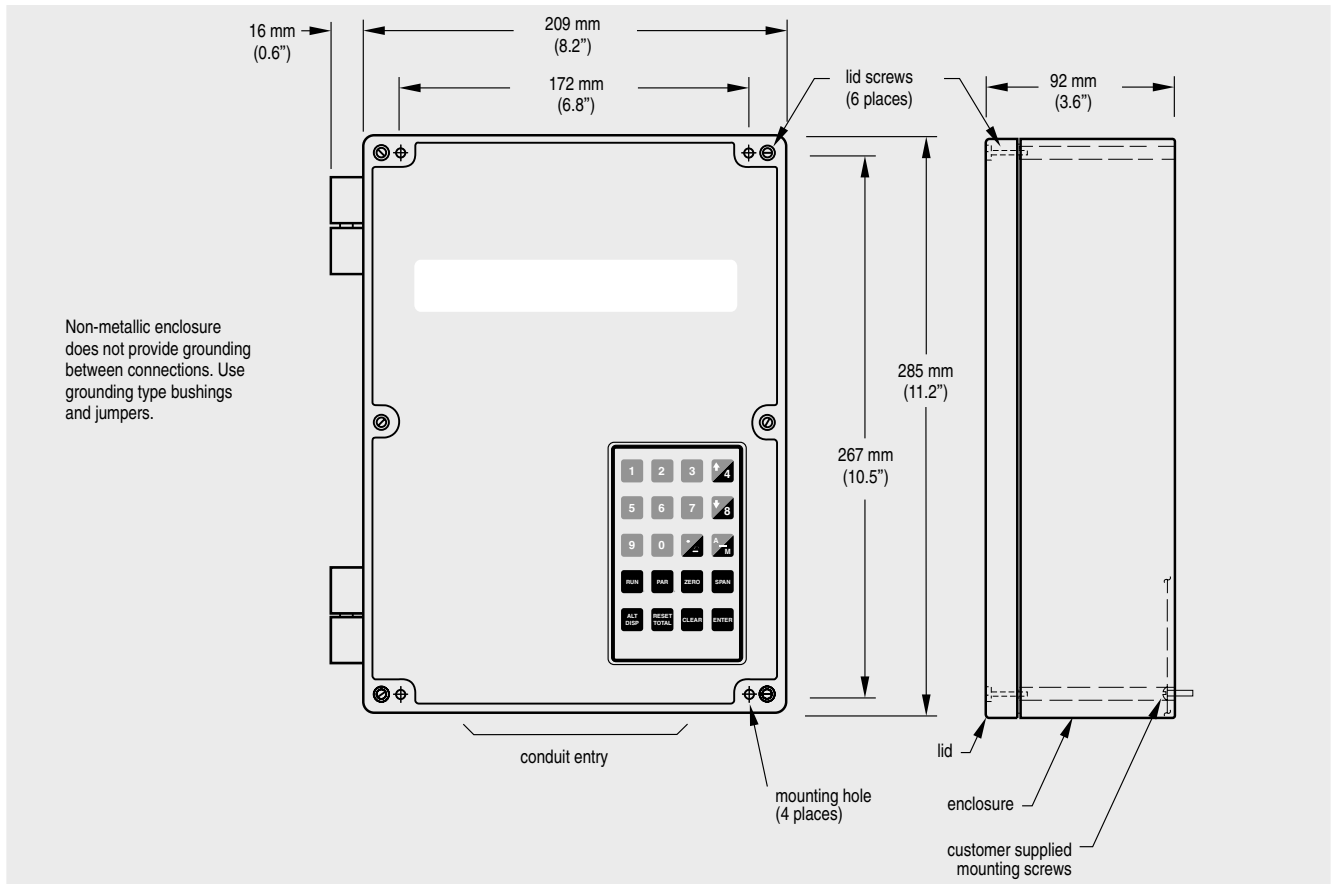


Fig. 2/74 Milltronics SF 500 dimensions

Connections

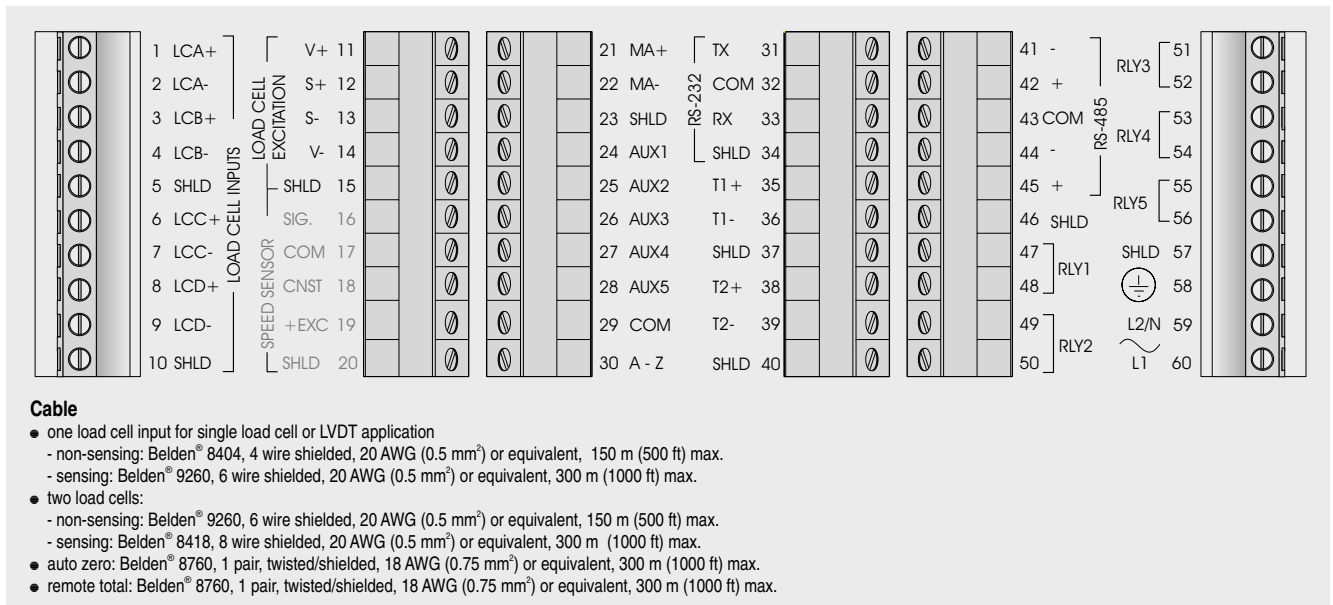


Fig. 2/75 Milltronics SF 500 connections

Belden® is a registered trademark of Belden Wire and Cable Company.

Ordering data	Order No.
Milltronics SF 500 A powerful integrator designed for use with solids flowmeters	A) 7MH7156-
Input Voltage AC voltage	1
Auxiliary Input/Output Board None 2 analog inputs and 2 analog outputs	A B
Feature Software Standard	A
Auxiliary Memory none	0
Data Communications SmartLinx Ready Smartlinx A-B® RIO module Smartlinx PROFIBUS DP module Smartlinx DeviceNet™ module	0 1 2 3
Enclosure Standard enclosure, no entry holes Standard enclosure, 4 entries, M20	1 2
Trade Approval Sticker No trade approval sticker Not legal for Canadian trade sticker	A B
Approvals CE, CSAus/c, FM	A
Instruction Manual SF 500, English SF 500, German Note: The instruction manual should be ordered as a separate item on the order. Smartlinx Allen-Bradley® Remote I/O, English Smartlinx PROFIBUS DP, English Smartlinx PROFIBUS DP, German Smartlinx PROFIBUS DP, French Smartlinx DeviceNet™, English Note: The appropriate Smartlinx instruction manual should be ordered as a separate line on the order.	A) 7ML1998-5CN01 A) 7ML1998-5CN31 A) 7ML1998-1AP03 A) 7ML1998-1AQ03 A) 7ML1998-1AQ32 A) 7ML1998-1AQ12 A) 7ML1998-1BH02
Optional Equipment Milltronics analog I/O card LVDT Conditioner in Nema 4 enclosure (to interface A) LVDT belt scale without internal pre-amplifier LVDT Conditioner Card Instruction Manual, English	A) PBD-51033797 A) 7MH7723-1AJ A) 7ML1998-5EF01
Spare parts Display Lid with overlay and keypad Motherboard Battery, 3V, lithium	A) 7MH7723-1AF A) 7MH7723-1AG A) 7MH7723-1AH A) PBD-20200035

A) Subject to export regulations AL: N, ECCN: EAR99

Continuous Weighing Communications

SmartLinx modules

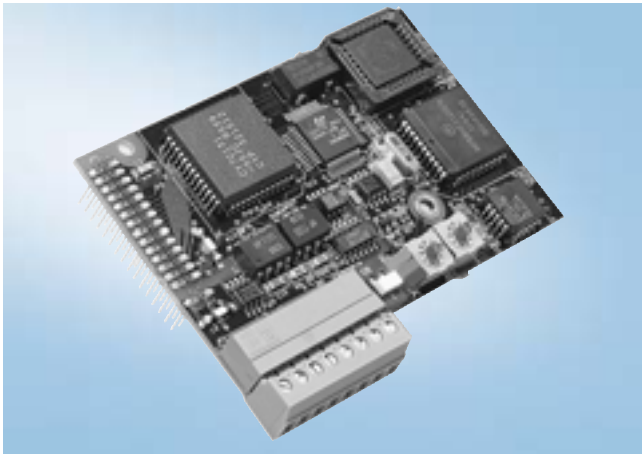


Fig. 2/76 SmartLinx module

Application

SmartLinx® modules provide direct digital connection to popular industrial communications buses and telephone lines with true plug-and-play compatibility with products manufactured by Siemens Milltronics.

They're fast and easy to install, and can be added at any time. The module simply plugs into the socket on any SmartLinx-enabled product. They require no secondary private buses or gateways and no separate wiring. There are no extra boxes to connect to your network so there's a minimum load on engineering and maintenance staff.

SmartLinx provides all data from the instrument, including measurement and status, and allows changes to operation parameters to be done over the bus or telemetry link. The user can select which data in the application layer to transfer over the bus. This selection saves bandwidth and memory, and optimizes data throughput and speeds up the network, enabling you to connect more instruments to your network.

Benefits

- Fast, easy installation
- Direct connection: no additional installation required
- Scalable application layer allows for optimized network bandwidth and memory requirements
- Modules available for PROFIBUS DP, Allen-Bradley® Remote I/O, and DeviceNet™

Technical data

Module type	Allen-Bradley® Remote I/O
Interface	RIO
Transmission rate	57.6, 115.2 or 230.4 kbps
Rack address	1 to 73, 1/4 to full rack
Connection	RIO slave
SmartLinx module compatibility	<ul style="list-style-type: none"> • Milltronics BW 500 • Milltronics SF 500

Module type	PROFIBUS DP
Interface	RS-485 (PROFIBUS standard)
Transmission rate	All valid PROFIBUS DP rates from 9600 kbps to 12 Mbps
Rack address	0 to 99
Connection	Slave
SmartLinx module compatibility	<ul style="list-style-type: none"> • Milltronics BW 500 • Milltronics SF 500

Module type	DeviceNet™
Interface	DeviceNet™ physical layer
Transmission rate in kbps	125, 250, 500
Rack address	0 to 63
Connection	Slave (group 2)
SmartLinx module compatibility	<ul style="list-style-type: none"> • Milltronics BW 500 • Milltronics SF 500

Ordering data

SmartLinx Software	Order No.
SmartLinx module	
Allen-Bradley® Remote I/O module	A) 7ML1830-1HS
PROFIBUS DP module	A) 7ML1830-1HR
DeviceNet™ module	7ML1830-1HT
Instruction Manuals	
Allen-Bradley® Remote I/O communications module, English	A) 7ML1998-1AP03
PROFIBUS communications module	
• English	A) 7ML1998-1AQ03
• French	A) 7ML1998-1AQ12
• German	A) 7ML1998-1AQ32
DeviceNet™, English	A) 7ML1998-1BH02

A) Subject to export regulations AL: N, ECCN: EAR99

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Fig. 2/77 External Modem Kit

Application

In industrial installations, the External Modem Kit allows you to communicate quickly and easily with many Siemens Milltronics products. The industrial dial-up modem is connected through an RS-232 or an RS-485 port on the product.

Containing an external industrial modem, power supply, connection cables, and a detailed instruction manual, the External Modem Kit allows quick and easy setup and communications.

The instruction manual describes how to configure the modem and each of the compatible instruments, saving time and frustration in trying to determine the correct modem settings.

The kit can be mounted using screws or a DIN rail. All components are industrial grade and can stand up to the industrial environment.

Assembly

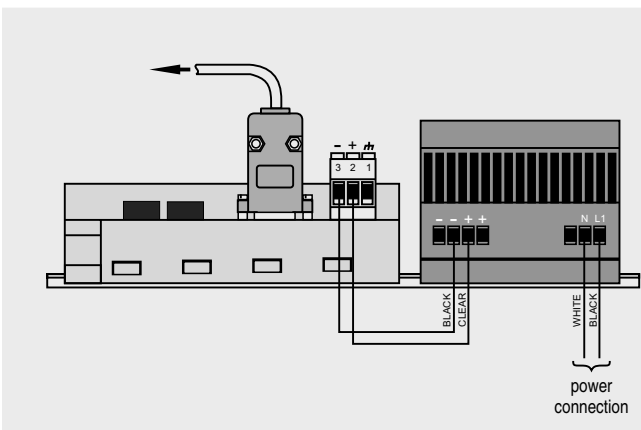


Fig. 2/78 RS-232 Modem Kit assembly

Benefits

- Siemens Milltronics approved industrial modem
- Detailed instruction manual
- All required cables included
- Speed-up commissioning of remote communications
- Reliable dial-up communications

Technical data

Model	
• RS-232	VT-Modem-1 WW, SIXNET external modem
• RS-485	VT-Modem-3 WW, SIXNET external modem
Mounting	
	DIN rail or flat panel mountable Refer to SIXNET modem manual
Operating Temperature	
	-20 to 70 °C (-4 to 158 °F)
Power Supply	
	<ul style="list-style-type: none"> • Siemens logo power supply • 120 V AC/230 V AC input • 24V/1.3 A output • DIN rail or flat panel mountable
Compatible Instruments	
• RS 232	Milltronics BW 500, Milltronics SF 500
• RS-485	Milltronics BW 500, Milltronics SF 500

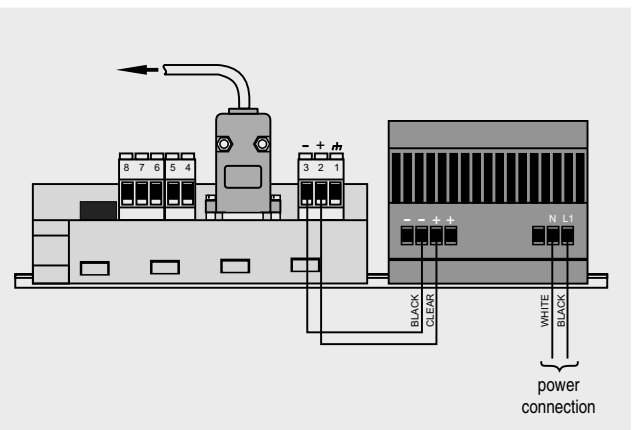


Fig. 2/79 RS-485 Modem Kit assembly

Continuous Weighing Communications

Milltronics External Modem Kit

Dimensional drawings

2

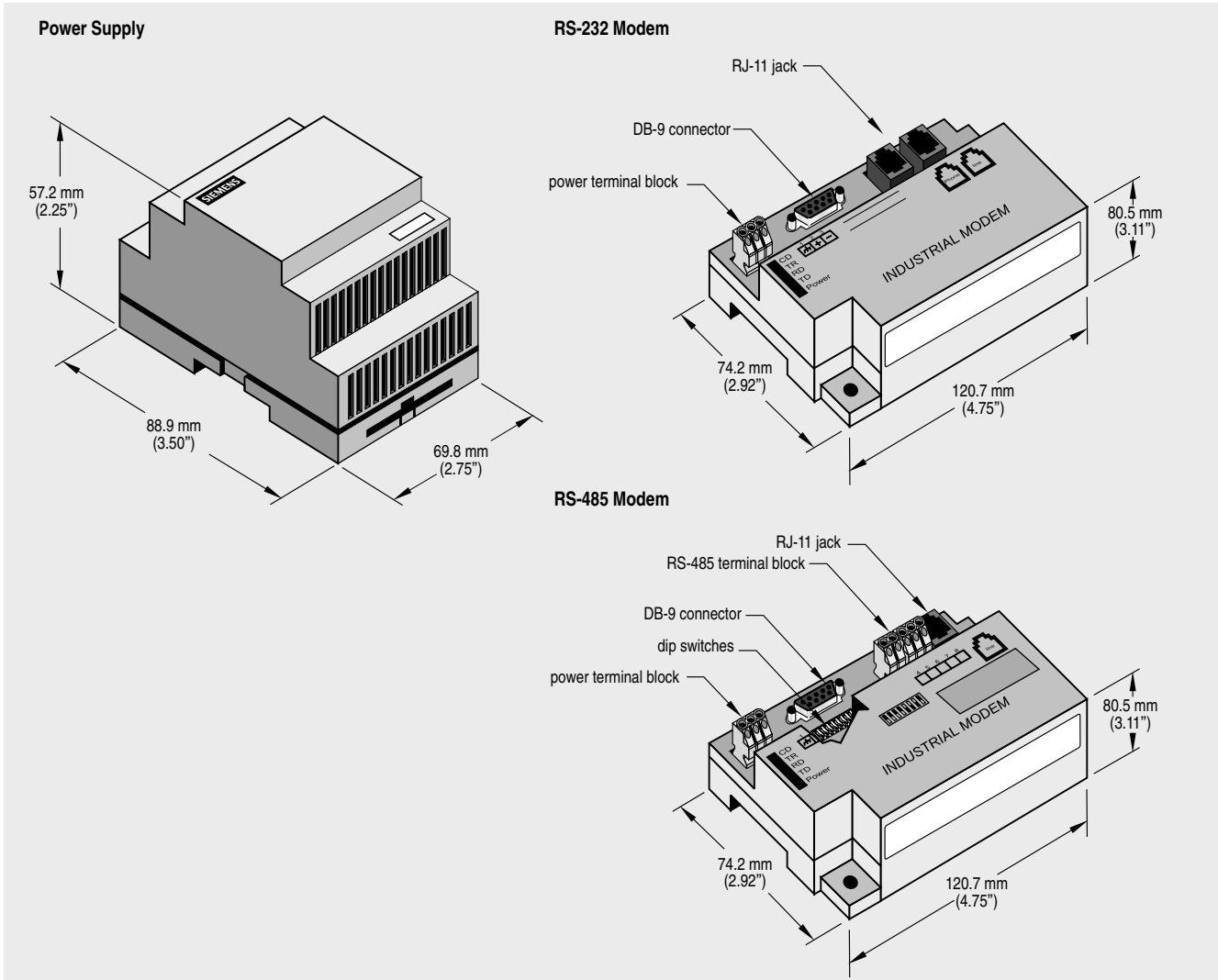


Fig. 2/80 Modem kit dimensions

Ordering data	Order No.
RS-232 External Modem Kit	B) 7ML1831-1AA
RS-485 External Modem Kit	B) 7ML1831-1AB
Instruction Manual, English	A) 7ML1998-1DP02

Note: The instruction manual should be ordered as a separate item on the order.

A) Subject to export regulations AL: N, ECCN: EAR99
 B) Subject to export regulations AL: N, ECCN: 5A991



Fig. 2/81 Dolphin Plus software

Application

The Dolphin Plus software allows you to quickly and easily configure, monitor, tune and diagnose most Siemens Milltronics devices using your desktop PC, or connected directly in the field using a laptop.

Dolphin Plus is easy to install and use. Just load the software from the CD. In minutes, you're ready to set up or modify complete parameter configurations for one or more devices.

Following configuration, several functions can be selected: fast calling of parameters, saving parameter sets on diskette, downloading parameter sets from diskette, use of parameter sets from other devices. Reading of echo profiles permits fine tuning without the need for special instruments. Quick-start wizards and help functions guide you through the entire process.

Benefits

- Real-time monitoring and adjustment of parameters
- On-screen visualization of process values
- Saving and visualization of echo profiles for a wide range of Siemens Milltronics level meters
- Copying of data for programming several devices
- Fast setup and commissioning of device
- Generation of configuration reports within seconds

Note:

The Dolphin Plus software is only available in English.

Ordering data

Dolphin Plus

Software to monitor, configure, tune, and diagnose most Siemens Milltronics instruments remotely at your desktop or laptop

Order No.

A) **7ML1841-**

AA0

RS-485 to RS-232 Converter

No

Yes

0

1

Converter

No

Yes

0

1

Instruction Manual

- Connection manual, English:
Included on Dolphin Plus CD and available at www.siemens-milltronics.com

Spare Parts

Converter, RS 485 to RS 232 (D-Sub)

A) **7ML1830-1HA**

Kit containing one 9-pin D-Sub to RJ11 adaptor and one 3 meter telephone cable with two male jacks

PBD-51033959

Converter, Infrared link

PBD-51034011

Disk Dolphin Software

A) **PBD-45000775**

Carrying Case

A) **PBD-22100338**

A) Subject to export regulations AL: N, ECCN: EAR99

Continuous Weighing Communications

Dolphin Plus software

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