

## Weighing Electronics

Stand-alone electronics

Belt scale

### Milltronics SF500

#### Overview



Milltronics SF500 is a full feature integrator for use with solids flowmeters.

#### Benefits

- Automatic zero and electronic span calibration
- Alarms for rate or diagnostic error
- On-board Modbus, optional PROFIBUS DP, PROFINET, Modbus TCP/IP, EtherNet/IP, and DeviceNet
- On-line calibration and dual PID control with optional analog I/O card
- Multi-point linearizer for high turn down accuracy
- Up to 8 multi-spans for application of more than one flow condition and/or material
- Moisture meter input with optional analog I/O card for calculation of dry weight

#### Application

Milltronics SF500 operates with any solids flowmeter with up to two strain gauge load cells or LVDT sensor. The SF500 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 proven 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 SF500 may be used for ratio blending and controlling additives. Batching, load out, and alarm functions are also provided by the SF500.

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

**Technical specifications**

| Milltronics SF500                    |                                                                                                                                                                                                                                                                | Milltronics SF500                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                  |
|--------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Mode of operation</b>             |                                                                                                                                                                                                                                                                | <b>Design</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                  |
| Measuring principle                  | Flowmeter integrator                                                                                                                                                                                                                                           | Material (enclosure)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Polycarbonate                                                                                                                                                                                                                                                                                                                    |
| Typical application                  | <ul style="list-style-type: none"> <li>Compatible with SITRANS solids flowmeters or equivalent 1 or 2 load cell models</li> <li>Compatible with LVDT equipped solids flowmeters, with use of optional interface board (remotely mounted)</li> </ul>            | Dimensions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 209 W x 285 H x 92 D mm<br>(8.2 W x 11.2 H x 3.6 D inch)                                                                                                                                                                                                                                                                         |
| <b>Input</b>                         |                                                                                                                                                                                                                                                                | Weight                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 2.6 kg (5.7 lb)                                                                                                                                                                                                                                                                                                                  |
| Load cell/LVDT                       | 0 ... 45 mV DC per load cell or LVDT interface card                                                                                                                                                                                                            | <b>Power supply</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                  |
| Auto zero                            | Dry contact from external device                                                                                                                                                                                                                               | Standard                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | AC version<br><ul style="list-style-type: none"> <li>100 ... 240 V AC <math>\pm</math> 10 %, 50/60 Hz, 55 VA max.</li> <li>Fuse FU3 = 2AG, 2 AMP, 250 V Slo Blo</li> </ul> DC version<br><ul style="list-style-type: none"> <li>10 ... 30V DC, 26 W max.</li> <li>Fuse FU2 = 3.75 A resettable (not user replaceable)</li> </ul> |
| mA                                   | See optional mA I/O board                                                                                                                                                                                                                                      | <b>Controls and displays</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                  |
| Auxiliary                            | 5 discrete inputs for external contacts, each programmable for either: display scrolling, totalizer 1 reset, zero, span, multi-span, print, batch reset, PID function, or on-line calibration                                                                  | Display                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Illuminated 5 x 7 dot matrix liquid crystal display with 2 lines of 40 characters each                                                                                                                                                                                                                                           |
| <b>Output</b>                        |                                                                                                                                                                                                                                                                | Programming                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Via local keypad and/or Dolphin Plus interface                                                                                                                                                                                                                                                                                   |
| mA                                   | Programmable 0/4 ... 20 mA, for rate, optically isolated, 0.1 % of 20 mA resolution, 750 $\Omega$ load max. (see optional mA I/O board)                                                                                                                        | Memory                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <ul style="list-style-type: none"> <li>Program stored in non-volatile FLASH ROM, upgradeable via Dolphin Plus interface</li> <li>Parameters stored in battery backed RAM, 3 V NEDA 5003LC or equivalent, 10 year life</li> </ul>                                                                                                 |
| Load cell/LVDT conditioner card      | 10 V DC compensated excitation for strain gauge type, 2 cells max., 150 mA max.                                                                                                                                                                                | Communications                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Two RS 232 ports<br>One RS 485 port<br>SmartLinX compatible                                                                                                                                                                                                                                                                      |
| Remote totalizer 1                   | <ul style="list-style-type: none"> <li>Contact closure 10 ... 300 ms duration</li> <li>Solid state relay contact 30 V DC, 100 mA max.</li> <li>Max. contact on-resistance = 36 ohms</li> <li>Max. off-state leakage = 1 <math>\mu</math>A</li> </ul>           | <b>Approvals</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                  |
| Remote totalizer 2                   | <ul style="list-style-type: none"> <li>Contact closure 10 ... 300 ms duration</li> <li>Solid state relay contact rated 240 V AC/DC, 100 mA max.</li> <li>Max. contact on-resistance = 36 ohms</li> <li>Max. off-state leakage = 1 <math>\mu</math>A</li> </ul> | CE, CSA <sub>US/C</sub> , FM, RCM, EAC, KCC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                  |
| Relay output                         | 5 alarm/control relays, 1 SPST Form A relay contact per relay, rated 5 A at 250 V AC, non-inductive or 30 V DC                                                                                                                                                 | <b>Options</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                  |
| <b>Measuring accuracy</b>            |                                                                                                                                                                                                                                                                | <ul style="list-style-type: none"> <li>Dolphin Plus: Windows based software interface. Refer to associated product documentation.</li> <li>SmartLinX modules: protocol specific modules for interface with popular industrial communications systems. Refer to associated product documentation.</li> <li>LVDT interface card: for interface with LVDT based solids flowmeters</li> <li>mA I/O board               <ul style="list-style-type: none"> <li>Inputs: 2 programmable 0/4 ... 20 mA for PID control or on-line calibration, optically isolated, 0.1 % ... 20 mA resolution, 200 <math>\Omega</math> input impedance</li> <li>Outputs: 2 programmable 0/4 ... 20 mA for PID control or rate output, optically isolated, 0.1 % of 20 mA resolution, 750 <math>\Omega</math> load max</li> <li>Output supply: isolated 24 V DC at 50 mA, short circuit protected</li> </ul> </li> </ul> |                                                                                                                                                                                                                                                                                                                                  |
| Resolution                           | 0.02 % of full scale                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                  |
| Accuracy                             | 0.1 % of full scale                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                  |
| <b>Rated operating conditions</b>    |                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                  |
| Ambient conditions                   |                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                  |
| Location                             | Indoor/outdoor                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                  |
| Ambient temperature                  | -20 ... +50 °C (-5 ... +122 °F)                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                  |
| Relative humidity/ingress protection | Suitable for outdoor/<br>Type 4X/NEMA 4X/IP65                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                  |
| Installation category                | II                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                  |
| Pollution degree                     | 4                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                  |

# Weighing Electronics

## Stand-alone electronics

### Belt scale

#### Milltronics SF500

#### Selection and ordering data

Article No.

Order code

#### Milltronics SF500

A full feature, powerful integrator designed for use with solids flowmeters.

Click on the Article No. for the online configuration in the PIA Life Cycle Portal.

#### Input voltage

AC voltage

DC voltage

#### Auxiliary input/output boards<sup>1)</sup>

None

Board with 2 analog inputs and 2 analog outputs

#### Feature software

Standard

#### Auxiliary memory

None

#### Data communications<sup>2)</sup>

SmartLinx Ready

SmartLinx PROFIBUS DP module

SmartLinx DeviceNet module

SmartLinx PROFINET module

SmartLinx EtherNet/IP module

SmartLinx Modbus TCP/IP module

#### Enclosures

Standard enclosure, no entry holes

Standard enclosure, 4 entries, for M20 glands

#### Trade approval stickers

No trade approval sticker

Not legal for Canadian and EU trade sticker

#### Approvals

CE, CSA<sub>USC</sub>, FM, RCM, EAC, KCC

7MH7156-



2

3

A

B

A

0

0

2

3

4

5

6

1

2

A

B

A

#### Further designs

Please add **"-Z"** to article no. and specify order code(s).

Stainless steel tag (69 mm x 50 mm),  
Measuring-point number/identification  
(max 27 characters), specify in plain text.

Stainless steel, sun/weather shield  
357 x 305 x 203 mm (14 x 12 x 8 inch)  
(finished unit is field mounted with enclosure)

Manufacturer's test certificate:  
According to EN 10204-2.2

LVDT conditioner card mounted and connected for  
use with LVDT flowmeters

Stainless steel enclosure, 304 (1.4301),  
[406 x 305 x 152 mm (16 x 12 x 6 inch), Type 4X, IP66;  
(finished unit is mounted inside enclosure)]

- With window
- Without window

Painted mild steel, [406 x 305 x 152 mm  
(16 x 12 x 6 inch), Type 4, IP65; (finished unit is  
mounted inside enclosure)]

- With window
- Without window

Painted mild steel, anti-vibration enclosure with  
viewing window [406 x 305 x 203 mm  
(16 x 12 x 8 inch), Nema/Type 4, IP66; (finished unit is  
mounted inside enclosure)]

Painted mild steel, heated enclosure with viewing win-  
dow for use down to -50 °C (-58 °F)  
(finished unit is mounted inside enclosure)  
483 x 584 x 203 mm (19 x 23 x 8 inch)

#### Instruction manuals

All literature is available to download for free, in a  
range of languages, at

<http://www.siemens.com/weighing/documentation>

<sup>1)</sup> Required for PID control and online calibration.

<sup>2)</sup> Required for industrial communications. SmartLinx PROFINET module is certified per standard V2.2.4.

**Selection and ordering data**

Article No.

*Optional equipment*

|                                                                                                               |                        |
|---------------------------------------------------------------------------------------------------------------|------------------------|
| Auxiliary I/O card spare                                                                                      | <b>7MH7723-1BJ</b>     |
| LVDT Conditioners in NEMA 4 enclosure (to interface LVDT Flowmeter/Belt scale without internal pre-amplifier) | <b>7MH7723-1AJ</b>     |
| Cables to connect BW500/SF500 keypad to motherboard                                                           | <b>7MH7723-1CB</b>     |
| SITRANS RD100 Remote displays - see RD100 on page 2/100                                                       |                        |
| SITRANS RD200 Remote displays - see RD200 on page 2/102                                                       |                        |
| SITRANS RD300 Remote displays - see RD300 on page 2/106                                                       |                        |
| SITRANS RD500 web, datalogging, alarming, Ethernet, and modem support for instrumentation - see on page 2/110 | <b>7ML5750-1AA00-0</b> |

*Spare parts*

|                                                    |                    |
|----------------------------------------------------|--------------------|
| Display card                                       | <b>7MH7723-1AF</b> |
| Lid with overlay and keypad                        | <b>7MH7723-1AG</b> |
| SF500 motherboard, AC                              | <b>A5E34320776</b> |
| SF500 motherboard, DC                              | <b>A5E34320778</b> |
| Fuse, 2 A, 250 V, BW500, BW500/L, and SF500, spare | <b>7MH7723-1DG</b> |
| Keypad spare for BW500, BW500/L, and SF500         | <b>7MH7723-1CD</b> |
| LVDT card spare, internal to SF500                 | <b>A5E34699664</b> |
| PROFINET IO module                                 | <b>7ML1830-1PM</b> |
| Modbus TCP/IP, EtherNet/IP module                  | <b>7ML1830-1PN</b> |
| PROFIBUS DP module                                 | <b>7ML1830-1HR</b> |
| DeviceNet module                                   | <b>7ML1830-1HT</b> |

1) Required for PID control and online calibration.  
 2) Required for industrial communications.

# Weighing Electronics

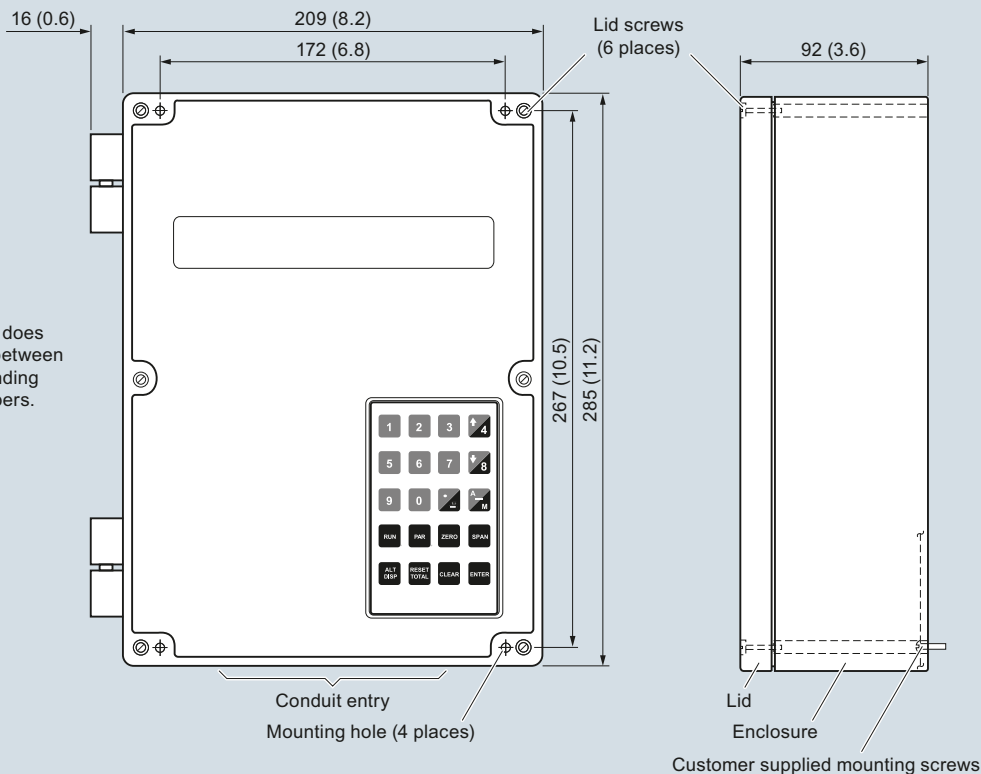
Stand-alone electronics  
Belt scale

## Milltronics SF500

### Dimensional drawings

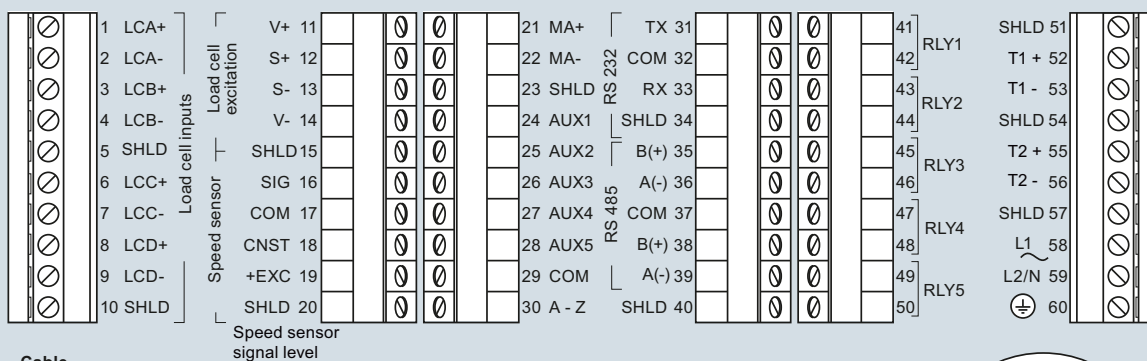
2

Non-metallic enclosure does not provide grounding between connections. Use grounding type bushings and jumpers.



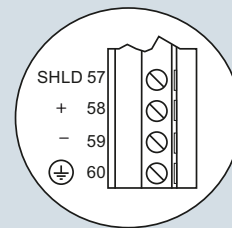
Milltronics SF500, dimensions in mm (inch)

### Schematics



**Cable**

- One load cell:
  - Non-sensing: Belden 8404, 4 wire shielded, 20 AWG (0.5 mm<sup>2</sup>) or equivalent, 150 m (500 ft) max.
  - Sensing: Belden 9260, 6 wire shielded, 20 AWG (0.5 mm<sup>2</sup>) or equivalent, 300 m (1 000 ft) max.
- Two load cells:
  - Non-sensing: Belden 9260, 6 wire shielded, 20 AWG (0.5 mm<sup>2</sup>) or equivalent, 150 m (500 ft) max.
  - Sensing: Belden 8418, 8 wire shielded, 20 AWG (0.5 mm<sup>2</sup>) or equivalent, 300 m (1 000 ft) max.
- Auto zero: Belden 8760, 1 pair, twisted/shielded, 18 AWG (0.75 mm<sup>2</sup>) or equivalent, 300 m (1 000 ft) max.
- Remote total: Belden 8760, 1 pair, twisted/shielded, 18 AWG (0.75 mm<sup>2</sup>) or equivalent, 300 m (1 000 ft) max.



DC version

Milltronics SF500 connections