<table>
<thead>
<tr>
<th>Page</th>
<th>Section</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2/2</td>
<td>Stand-alone Integrators</td>
<td>Introduction</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Milltronics BW100</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Milltronics BW500</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Milltronics SF500</td>
</tr>
<tr>
<td>2/15</td>
<td>Accessories</td>
<td>Dolphin Plus Software</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SITRANS RD100</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SITRANS RD200</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SITRANS RD500</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SmartLinx</td>
</tr>
<tr>
<td>2/27</td>
<td>SIWAREX - PLC-based weighing modules</td>
<td>Introduction</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SIWAREX U</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SIWAREX CS</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SIWAREX MS</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SIWAREX FTA</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SIWAREX FTC</td>
</tr>
<tr>
<td>2/53</td>
<td>Force Measurements</td>
<td>SIWAREX CF</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SIWAREX FTC</td>
</tr>
<tr>
<td>2/56</td>
<td>Accessories for PLC-based weighing modules</td>
<td>Pi Ex interface</td>
</tr>
<tr>
<td></td>
<td></td>
<td>IS Ex interface</td>
</tr>
</tbody>
</table>
Introduction

Overview

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.

Mode 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 BW100 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 Milltronics BW500 is a versatile integrator for use with a wide range of belt scales. It is NTEP, OIML, MID and Measurement Canada certified as legal-for-trade when used with an MMI-2 belt scale and WS Series speed sensor.

The Milltronics BW500 and SF500 offer online calibration so the process does not need to be shut down to calibrate the integrator. Both models 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.

Technical specifications

Integrator selection guide

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Milltronics BW100</th>
<th>Milltronics BW500</th>
<th>Milltronics SF500</th>
</tr>
</thead>
<tbody>
<tr>
<td>Applications and compatibility</td>
<td>Milltronics MLC, MBS, MUS, MCS, MSI, and WD600 belt scales Retrofit with other installed belt scale systems with a maximum of two load cells</td>
<td>SITRANS WW100, WW200, WW300; Milltronics MLC, MBS, MUS, MCS, MSI, MM and WD600 belt scales; or equivalent 1.2, 4, or 6 load cell scales Retrofit of most other belt scale or weighfeeder systems</td>
<td>Milltronics E, V, A Series flowmeters Other 1 or 2 load cell flowmeters LVDT equipped solids flowmeters, with use of optional interface board</td>
</tr>
<tr>
<td>Display output</td>
<td>Rate, totalized weight, belt loading, belt speed</td>
<td>Rate, totalized weight, belt loading, belt speed, PID1, batching1</td>
<td>Rate, totalized weight, PID, batching</td>
</tr>
<tr>
<td>Analog output</td>
<td>Optically isolated 4 ... 20 mA scalable Selectable for rate, load, or speed</td>
<td>Optically isolated 4 ... 20 mA scalable Option: two additional analog inputs and two outputs programmable for PID control1</td>
<td>Optically isolated 4 ... 20 mA scalable Option: two additional analog inputs and two outputs programmable for PID control</td>
</tr>
<tr>
<td>Remote totalizer</td>
<td>Two adjustable pulsed outputs</td>
<td>Two adjustable pulsed outputs</td>
<td>Two adjustable pulsed outputs</td>
</tr>
<tr>
<td>Alarm relay</td>
<td>One programmable SPDT Form C contact rated 5 A at 250 V AC non-inductive</td>
<td>Five programmable SPST Form A contacts rated 5 A at 250 V AC non-inductive, reversible2</td>
<td>Five programmable SPST Form A contacts rated 5 A at 250 V AC non-inductive, reversible</td>
</tr>
<tr>
<td>Power requirements</td>
<td>100/115/200/230 V AC ± 15 % 50/60 Hz, 15 VA Optional 12 V DC and 24 V DC</td>
<td>100/115/200/230 V AC ± 15 % 50/60 Hz, 31 VA</td>
<td>100/115/200/230 V AC ± 15 % 50/60 Hz, 31 VA</td>
</tr>
<tr>
<td>Approvals</td>
<td>CSAUS/C, FM, CE, C-TICK</td>
<td>CSAUS/C, FM, CE, Measurement Canada, NTEP, MID, OIML, C-TICK, SABS, GOST</td>
<td>CSAUS/C, FM, CE, C-TICK</td>
</tr>
</tbody>
</table>

1) Available with BW500 only
2) BW500/L: Two programmable SPST Form A contacts

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 or rate characteristics. A span correction is added to the measurement to realize maximum accuracy.

Differential Speed Detection – Dual point belt speed sensing is used for monitoring speed at two different points in the system. The two speed sensors are typically applied on belt conveyors to give an alarm if excessive slip between the head pulley and tail pulley is detected (BW500 only).

Incline Compensation – By receiving a mA signal proportional to conveyor slope, the conveyor loading can be re-calculated to compensate for changes in angle (BW500 only).

Moisture Compensation – By receiving a mA signal proportional to moisture content, the conveyor load or rate can be re-calculated to read dry weight (BW500 or SF500 only).
Overview

Milltronics BW100 is an economical integrator for use with belt scales.

Benefits

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

Application

Milltronics BW100 integrator 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.
**Technical specifications**

### Mode of operation

- Measuring principle: Belt scale integrator
- Typical applications: Milltronics MBS, MLC, WD600, MUS, MCS, and MSI belt scales

### Inputs

- **Load cell**
  - 0 ... 30 mV per load cell, dual load cell applications
  - 0 ... 45 mV per load cell, single load cell applications

- **Speed sensor**
  - Pulse train
    - 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 SPDT Form C relay contact rated 5 A at 250 V AC, non-inductive

### Measuring accuracy

- **Resolution**
  - 0.02 % of full scale

- **Accuracy**
  - 0.25 % of full scale mA range below 50 μA
  - 0.1 % of full scale mA range between 50 μA and 20 mA

### Ambient conditions

- **Location**: Indoor/outdoor
- **Ambient temperature**: -20 ... +50 °C (-5 ... +122 °F)
- **Relative humidity/ingress protection**: Suitable for outdoor/Type 4X/NEMA 4X/IP65

### Design

- **Material (enclosure)**: Polypropylene alloy
- **Sealed electronics compartment**
- **Integral junction box with terminal block for**:
  - 0.2 ... 4 mm² solid, or
  - 0.2 ... 2.5 mm² stranded (12 to 24 AWG)

### Power supply

- **Standard**
  - 100/115/200/230 V AC ± 15 %, 50/60 Hz, 15 VA
- **Optional**
  - 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**
  - program stored in non-volatile Flash memory, upgradable via Dolphin interface
  - parameters stored in non-volatile EEPROM

### Setup

- **Dolphin compatible**

### Cable/separation

- **Single 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.

- **Dual load cell**
  - **Non-sensing**
    - Belden® 9260, 6 wire shielded, 20 AWG (0.5 mm²) or equivalent, 300 m (1000 ft) max.
  - **Sensing**
    - Belden® 8418, 8 wire shielded, 20 AWG (0.5 mm²) or equivalent, 300 m (1000 ft) max.

### Approvals

- CE, CSAUS, FM, C-TICK, GOST

### Options

- Speed sensor: SITRANS WS100, WS300, 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

---

Belden® is a registered trademark of Belden Wire and Cable Company.
Windows® is a registered trademark of Microsoft Corporation.
# Selection and Ordering data

<table>
<thead>
<tr>
<th>Order No.</th>
<th>Order Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Milltronics BW100</td>
<td>C) 7MH7150-77A77</td>
</tr>
</tbody>
</table>

An economical integrator for use with belt scales. Standard features include: dual totalizer, analog rate output, alarm relay, linearizer and bi-polar current communications.

### Input voltage

<table>
<thead>
<tr>
<th>Voltage</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AC voltage</td>
<td>1</td>
</tr>
<tr>
<td>12 V DC</td>
<td>2</td>
</tr>
<tr>
<td>24 V DC</td>
<td>3</td>
</tr>
</tbody>
</table>

### Feature software

<table>
<thead>
<tr>
<th>Feature</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard</td>
<td>A</td>
</tr>
</tbody>
</table>

### Data communications

<table>
<thead>
<tr>
<th>Communication</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bi-polar current</td>
<td>1</td>
</tr>
</tbody>
</table>

### Enclosures

<table>
<thead>
<tr>
<th>Enclosure Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard enclosure, no entry holes</td>
<td>1</td>
</tr>
<tr>
<td>Standard with 4 drilled entry holes for M20 glands</td>
<td>3</td>
</tr>
</tbody>
</table>

### Trade approval stickers

<table>
<thead>
<tr>
<th>Sticker Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>No trade approval sticker</td>
<td>0</td>
</tr>
<tr>
<td>Not legal for Canadian and EU trade sticker</td>
<td>1</td>
</tr>
</tbody>
</table>

### Approvals

<table>
<thead>
<tr>
<th>Approvals Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSAAut, CE (EN 61326), FM, C-TICK</td>
<td>D</td>
</tr>
</tbody>
</table>

### Further designs

Please add "Z" to Order No. and specify Order code(s).

- Stainless Steel tag (69 mm x 50mm)
  - Measuring-point number / identification (max 16 characters), specify in plain text.
  - Order Code: Y15
- Painted mild steel, anti-vibration enclosure with viewing window (finished unit is mounted inside enclosure) 406 x 305 x 203 mm (16" x 12" x 8")
  - Nema/Type 4, IP66
  - Order Code: A15
- Painted mild steel, heated enclosure with viewing window 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")
  - Acceptance test certificate: Manufacturer’s test certificate M to DIN 55350, Part 18 and ISO 9000
  - Stainless Steel, sun/weather shield 357 x 305 x 203 mm (14 x12 x 8") (finished unit is field mounted with enclosure)
  - Order Code: A35
  - Order Code: C11
  - Order Code: S50

### Instruction manuals

<table>
<thead>
<tr>
<th>Language</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>English</td>
<td>C) 7ML1998-5DJ02</td>
</tr>
<tr>
<td>German</td>
<td>C) 7ML1998-5DJ31</td>
</tr>
<tr>
<td>French</td>
<td>C) 7ML1998-5DJ11</td>
</tr>
<tr>
<td>Spanish</td>
<td>C) 7ML1998-5DJ21</td>
</tr>
</tbody>
</table>

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

### Additional instruction manuals

<table>
<thead>
<tr>
<th>Language</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>LVDT Conditioner Card Manuals, English</td>
<td>C) 7ML1998-5EF01</td>
</tr>
<tr>
<td>LVDT Conditioner Card Manuals, German</td>
<td>C) 7ML1998-5EF31</td>
</tr>
</tbody>
</table>

This device is shipped with the Siemens Milltronics manual CD containing the complete instruction manual library.

### Optional equipment

<table>
<thead>
<tr>
<th>Equipment Type</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>LVDT Conditioners in Nema 4 enclosure (to interface LVDT belt scale without internal pre-amplifier)</td>
<td>C) 7MH7723-1AJ</td>
</tr>
<tr>
<td>SITRANS RD100 Remote displays - see RD100 on page 2/16</td>
<td>7ML5750-1AA000</td>
</tr>
<tr>
<td>SITRANS RD200 Remote displays - see RD200 on page 2/18</td>
<td>7ML5750-1AA000</td>
</tr>
<tr>
<td>SITRANS RD500 web, datalogging, alarming, ethernet, and modem support for instrumentation - see page 2/23</td>
<td>7ML5750-1AA000</td>
</tr>
</tbody>
</table>

C) Subject to export regulations AL: N, ECCN: EAR99.
Weighing Electronics
Stand-alone Integrators

Milltronics BW100

Dimensional drawings

Milltronics BW100 dimensions

Schematics

Milltronics BW100 connections
Overview

Milltronics BW500 is a full feature integrator for use with both belt scales and weighfeeders.

Milltronics BW500/L is an integrator for use in basic belt scale or weighbelt applications.

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
- Differential speed detection with second speed sensor
- Moisture meter input with optional analog I/O card for calculation of dry weight
- Inclinometer input with optional analog I/O card to compensate for conveyor slope
- Suitable for belt scale custody approval
- Measurement Canada, OIML, MID, GOST, and NTEP approved

Application

Milltronics BW500 and BW500/L operate with a belt scale and a speed sensor. Belt load and speed signals are processed for accurate flow rate and totalized weight of bulk solids.

BW500 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 BW500 may be used for ratio blending and controlling additives. Batching, load out, and alarm functions are also provided by the BW500.

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

<table>
<thead>
<tr>
<th></th>
<th>BW500 (advanced feature set)</th>
<th>BW500/L (basic feature set)</th>
</tr>
</thead>
<tbody>
<tr>
<td>PID control</td>
<td>With optional I/O card</td>
<td>N/A</td>
</tr>
<tr>
<td>Differential speed detection</td>
<td>Standard</td>
<td>N/A</td>
</tr>
<tr>
<td>Online calibration</td>
<td>Standard</td>
<td>N/A</td>
</tr>
<tr>
<td>Trade approval</td>
<td>Optional</td>
<td>N/A</td>
</tr>
<tr>
<td>Smartlinx communications (AB RIO, DeviceNET, Profibus DP)</td>
<td>Optional</td>
<td>Optional</td>
</tr>
<tr>
<td>Modbus</td>
<td>Standard</td>
<td>Standard</td>
</tr>
<tr>
<td>Ratio Blending and Batching</td>
<td>Standard</td>
<td>N/A</td>
</tr>
<tr>
<td>Moisture and incline compensation</td>
<td>- With optional I/O card, or</td>
<td>Parameter set</td>
</tr>
<tr>
<td></td>
<td>- Parameter set</td>
<td></td>
</tr>
<tr>
<td>Multi Span</td>
<td>Standard</td>
<td>N/A</td>
</tr>
<tr>
<td>RD500 connectivity</td>
<td>Standard</td>
<td>Standard</td>
</tr>
<tr>
<td>Relay output</td>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td>mA output</td>
<td>3¹</td>
<td>1</td>
</tr>
<tr>
<td>mA input</td>
<td>2</td>
<td>0</td>
</tr>
</tbody>
</table>

¹ mA input/output for BW500 is based on I/O card

© Siemens AG 2011
Weighing Electronics
Stand-alone Integrators

Milltronics BW500 and BW500/L

Technical specifications

Mode of operation
Measuring principle
Belt scale integrator
Typical application
• Compatible with Milltronics belt scales or equivalent 1, 2, 4\textsuperscript{1)}, or 6\textsuperscript{1)} 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
• 0 ... 5 V low, 5 ... 15 V high
• 1 ... 3000 Hz, or
• Open collector switch, or
• Relay dry contact
Auto zero
Dry contact from external device
mA
See optional mA I/O board (BW500 only)
Auxiliary
5 discrete inputs for external contacts, each programmable for: display scrolling, totalizer 1 reset, zero, span, multispan, print, batch reset, PID function or online calibration, 2nd speed sensor

Outputs (load and speed)
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
10 V DC compensated excitation for strain gauge type, 4 cells max., 150 mA max.
Speed sensor(s)
12 V DC, 150 mA max. excitation
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 (BW500/L: 2 alarm relays), 1 SPST Form A relay contact per relay, rated 5 A at 250 V AC, non-inductive or 30 V DC

Measuring accuracy
Resolution
0.02 % of full scale
Accuracy
0.1 % of full scale

Rated operating conditions
Ambient conditions
Indoor/outdoor
Ambient temperature
-20 ... +50 °C (-5 ... +122 °F)
Relative humidity/ingress protection
Suitable for outdoor/Type 4X/NEMA 4X/IP65
Installation category
II
Pollution degree
4

Power supply
Standard
100/115/200/230 V AC ± 15 %, 50/60 Hz, 31 VA fuse, FJ1: 2AG, Slo Blo, 2 A, 250 V or equivalent

Design
Material ( enclosure)
Polycarbonate
Dimensions
209 W x 285 H x 92 mm D (8.2 W x 11.2 H x 3.6" D)
weight
2.6 kg (5.7 lbs)

Controls and displays
Displays
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
Program and parameters stored in non-volatile FLASH memory, upgradable via Dolphin Plus interface
Communications
• Two RS-232 ports
• One RS-485 port
• SmartLinx\textsuperscript{\textregistered} compatible

mA I/O board\textsuperscript{1)}
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:
BW500
CE, CSA\textsubscript{\textregistered} US/C, FM, Measurement Canada, NTEP, MID, OIML, C-TICK, GOST, SABS
BW500/L
CE, CSA\textsubscript{\textregistered} US/C, FM, C-TICK, GOST

Options
• Speed sensor: MD-36/36A, MD-256, SITRANS WS100, WS300, TASS, or RBSS, or compatible
• Dolphin Plus: Windows\textsuperscript{\textregistered} based software interface. Refer to associated product documentation.
• SmartLinx\textsuperscript{\textregistered} Modules: protocol specific modules for interface with popular industrial communications systems. Refer to product documentation.
• LVDT interface card: for interface with LVDT based scales

\textsuperscript{1)} BW500 only

Windows\textsuperscript{\textregistered} is a registered trademark of Microsoft Corporation. SmartLinx\textsuperscript{\textregistered} is a registered trademark of SmartLinx Corporation.
### Weighing Electronics
#### Stand-alone Integrators

**Milltronics BW500 and BW500/L**

### Selection and Ordering data

<table>
<thead>
<tr>
<th>Order No.</th>
<th>Milltronics BW500 and BW500/L</th>
</tr>
</thead>
<tbody>
<tr>
<td>7MH7152-07</td>
<td>A full-feature, powerful integrator designed for use with both belt scales and weighfeeders</td>
</tr>
</tbody>
</table>

**Input voltage**

- AC voltage

**Auxiliary Input/Output board**

- Board with 2 analog inputs and 2 analog outputs

**Feature software**

- BW500, 1 ... 6 load cell input (advanced feature set)
- BW500/L, 1 ... 2 load cell input (basic feature set)

**Auxiliary memory**

- None

**Data communications**

- SmartLinx ready
- SmartLinx Allen-Bradley® RIO module
- SmartLinx PROFIBUS DP module
- SmartLinx DeviceNet™ module

**Enclosures**

- Standard enclosure, no entry holes
- Standard enclosure, 4 entries, for M20 glands
- Standard enclosure, 17 entries, M20 glands

**Trade approval stickers**

- Not legal for Canadian and EU trade sticker
- Legal for World trade (OIML), European trade
- Legal for U.S. trade (NTEP)
- Legal for Canadian trade
- Not legal for Canadian and EU trade sticker
- No trade approval sticker

**Approvals**

- CE, CSA, NTEP, FM, C-TICK
- C-TICK
- C-TICK

**Further designs**

- Stainless steel tag (69 x 50 mm)
- Measuring-point number / identification (max 16 characters), specify in plain text
- Acceptance test certificate: Manufacturer’s test certificate M to DIN 55350, Part 18 and ISO 9000
- Legal for U.S. trade (NTEP)
- Legal for World trade (OIML), European trade

### Selection and Ordering data

<table>
<thead>
<tr>
<th>Order No.</th>
<th>BW500, BW500/L</th>
</tr>
</thead>
<tbody>
<tr>
<td>7ML1998-5DK05</td>
<td>English</td>
</tr>
<tr>
<td>7ML1998-5DK35</td>
<td>German</td>
</tr>
<tr>
<td>7ML1998-5DK12</td>
<td>French</td>
</tr>
<tr>
<td>7ML1998-5DK23</td>
<td>Spanish</td>
</tr>
</tbody>
</table>

**Instruction manuals**

- BW500, BW500/L, English
- BW500, BW500/L, German
- BW500, BW500/L, French
- BW500, BW500/L, Spanish

**Additional instruction manuals**

- LVDT Conditioner Card Instruction Manuals, English
- LVDT Conditioner Card Instruction Manuals, German
- SmartLinx Allen-Bradley® Remote I/O, English
- SmartLinx PROFIBUS DP, English
- SmartLinx PROFIBUS DP, German
- SmartLinx DeviceNet™, English

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

**Optional equipment**

- Auxiliary I/O cards spare
- LVDT Conditioners in Nema enclosure (to interface LVDT belt scale without internal pre-amplifier)
- Supply voltage regulators, 120 V AC, 60 Hz
- SITRANS RD100 Remote displays - see RD100 on page 2/16
- SITRANS RD200 Remote displays - see RD200 on page 2/18
- SITRANS RD500 web, datalogging, alarming, ethernet, and modem support for instrumentation - see 2/23

**Spare parts**

- Keypads spare for BW500, BW500/L, and SF500
- Lid with overlay and keypad for BW500/L
- Lid with overlay and keypad for BW500 and spare
- Batteries, 3V , lithium
- Motherboards
- Display cards
- Batteries, 3V, lithium
- Fuses, 2 A, 250 V
- Cables to connect BW500, BW500/L, and SF500
- Lid with overlay and keypad for BW500 and BW500/L
- Cables to connect BW500, BW500/L, and SF500 keypad to motherboard
- Keypads spare for BW500, BW500/L, and SF500
- Cables to connect BW500, BW500/L, and SF500 to motherboard

**Additional information**

- Subject to export regulations AL: N, ECCN: EAR99.

**Order No.**

<table>
<thead>
<tr>
<th>Order Code</th>
<th>Y15</th>
<th>C11</th>
<th>S50</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Further designs**

- Painted mild steel, anti-vibration enclosure with viewing window (finished unit is mounted inside enclosure)
  - 406 x 305 x 152 mm (16 x 12 x 6"), Nema/Type 4, IP66 (finished unit is mounted inside enclosure)

- Painted mild steel, heated enclosure with viewing window 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")

---

1) Required for PID control and online calibration, available with Feature Software option A only
2) Available with Auxiliary I/O option A, and Trade approval stickers A, B only
3) Required for industrial communications
4) Requires use with applicable certified MSI or MMI
5) Complete specification data sheet on page 2/4 and submit with order
6) Available with Feature Software option A only

© Siemens AG 2011
Weighing Electronics
Stand-alone Integrators

Milltronics BW500 and BW500/L

Dimensional drawings

Schematics

Milltronics BW500 and BW500/L connections

Belden® is a registered trademark of Belden Wire and Cable Company.
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, Allen-Bradley®, RIO 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 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 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.

®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
# Weighing Electronics

## Stand-alone Integrators

<table>
<thead>
<tr>
<th>Milltronics SF500</th>
</tr>
</thead>
</table>

## Technical specifications

### Mode of operation
- **Measuring principle:** Flowmeter integrator
- **Typical application:**
  - 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, multispan, print, batch reset, PID function, or online 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 SPST Form A relay contact per relay, rated 5 A at 250 V AC, non-inductive or 30 V DC

### Measuring accuracy
- **Resolution:** 0.02 % of full scale
- **Accuracy:** 0.1 % of full scale

### Rated operating conditions
- **Ambient conditions:** Indoor/outdoor
- **Ambient temperature:** -20 ... +50 °C (-5 ... +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:** 209 W x 285 H x 92 mm D (8.2 W x 11.2 H x 3.6” D)
- **Weight:** 2.6 kg (5.7 lbs)

## Power supply
- **Standard:** 100/115/200/230 V AC ± 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:** Program and parameters stored in non-volatile FLASH memory, upgradable via Dolphin Plus interface
- **Communications:**
  - Two RS-232 ports
  - One RS-485 port
  - SmartLinx® compatible

## Approvals
- **CE, CSAUS/C, FM, C-Tick**

## Options
- **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**
  - 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

---

© Siemens AG 2011

Windows® is a registered trademark of Microsoft Corporation.

SmartLinx® is a registered trademark of Smartlinx Corporation.
Weighing Electronics
Stand-alone Integrators

Milltronics SF500

Selection and Ordering data

<table>
<thead>
<tr>
<th>Order No.</th>
<th>Selection and Ordering data</th>
</tr>
</thead>
<tbody>
<tr>
<td>7MH7156-</td>
<td>Milltronics SF500</td>
</tr>
<tr>
<td>C</td>
<td>A full feature, powerful integrator designed for use with solids flowmeters</td>
</tr>
<tr>
<td>1</td>
<td>Input voltage</td>
</tr>
<tr>
<td>A</td>
<td>AC voltage</td>
</tr>
<tr>
<td>0</td>
<td>Auxiliary input/output boards</td>
</tr>
<tr>
<td>A</td>
<td>None</td>
</tr>
<tr>
<td>7</td>
<td>Board with 2 analog inputs and 2 analog outputs</td>
</tr>
<tr>
<td>7</td>
<td>Feature software</td>
</tr>
<tr>
<td>A</td>
<td>Standard</td>
</tr>
<tr>
<td>7</td>
<td>Auxiliary memory</td>
</tr>
<tr>
<td>7</td>
<td>None</td>
</tr>
<tr>
<td>0</td>
<td>Data communications</td>
</tr>
<tr>
<td>0</td>
<td>SmartLinx® Ready</td>
</tr>
<tr>
<td>1</td>
<td>SmartLinx A-BI® RIO module</td>
</tr>
<tr>
<td>2</td>
<td>SmartLinx PROFIBUS DP module</td>
</tr>
<tr>
<td>3</td>
<td>SmartLinx DeviceNet™ module</td>
</tr>
<tr>
<td>1</td>
<td>Enclosures</td>
</tr>
<tr>
<td>1</td>
<td>Standard enclosure, no entry holes</td>
</tr>
<tr>
<td>2</td>
<td>Standard enclosure, 4 entries, for M20 glands</td>
</tr>
<tr>
<td>A</td>
<td>Trade approval stickers</td>
</tr>
<tr>
<td>A</td>
<td>No trade approval sticker</td>
</tr>
<tr>
<td>B</td>
<td>Not legal for Canadian and EU trade sticker</td>
</tr>
<tr>
<td>A</td>
<td>Approvals</td>
</tr>
<tr>
<td>A</td>
<td>CE, CSAUSC, FM, C-TICK</td>
</tr>
<tr>
<td>Y15</td>
<td>Further designs</td>
</tr>
<tr>
<td>S50</td>
<td>Please add “-Z” to Order No. and specify Order code(s).</td>
</tr>
<tr>
<td>C11</td>
<td>Stainless Steel tag (69 mm x 50 mm), Measuring-point number/identification (max 16 characters), specify in plain text.</td>
</tr>
<tr>
<td>A11</td>
<td>Stainless Steel, sun/weather shield</td>
</tr>
<tr>
<td>A12</td>
<td>357 x 305 x 203 mm (14 x12 x 8&quot;) (finished unit is field mounted with enclosure)</td>
</tr>
<tr>
<td>A13</td>
<td>Acceptance test certificate: Manufacturer’s test certificate M to DIN 55350, Part 18 and ISO 9000</td>
</tr>
<tr>
<td>A14</td>
<td>Stainless steel enclosure, 304 (1.4301), 304L (1.4501), 406 x 305 x 152 mm (16&quot; x 12&quot; x 6”), Type 4X, IP66, (finished unit is mounted inside enclosure)</td>
</tr>
<tr>
<td>A15</td>
<td>With window</td>
</tr>
<tr>
<td>A35</td>
<td>Without window</td>
</tr>
<tr>
<td>A16</td>
<td>Painted mild steel, [406 x 305 x 152 mm (16&quot; x 12&quot; x 6”), Type 4, IP65, finished unit is mounted inside enclosure]</td>
</tr>
<tr>
<td>A17</td>
<td>With window</td>
</tr>
<tr>
<td>A18</td>
<td>Without window</td>
</tr>
<tr>
<td>A19</td>
<td>Painted mild steel, anti-vibration enclosure with viewing window (finished unit is mounted inside enclosure) [406 x 305 x 203 mm (16 x12 x 8”), Type 4, IP65]</td>
</tr>
<tr>
<td>A20</td>
<td>With window</td>
</tr>
<tr>
<td>A21</td>
<td>Without window</td>
</tr>
<tr>
<td>A22</td>
<td>Painted mild steel, heated enclosure with viewing window 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”)</td>
</tr>
</tbody>
</table>

Selection and Ordering data

<table>
<thead>
<tr>
<th>Order No.</th>
<th>Selection and Ordering data</th>
</tr>
</thead>
<tbody>
<tr>
<td>7MH7773-1BJ</td>
<td>Milltronics analog I/O cards</td>
</tr>
<tr>
<td>C</td>
<td>LVDT Conditioners in NEMA 4 enclosure (to interface LVDT belt scale without internal pre-amplifier)</td>
</tr>
<tr>
<td>7MH7723-1AJ</td>
<td>SITRANS RD100 Remote displays - see RD100 on page 2/16</td>
</tr>
<tr>
<td>C</td>
<td>SITRANS RD200 Remote displays see RD200 on page 2/18</td>
</tr>
<tr>
<td>7MH7723-1BD</td>
<td>SITRANS RD500 web, datalogging, alarming, ethernet, and modem support for instrumentation - see 2/23</td>
</tr>
<tr>
<td>7MH7772-1AF</td>
<td>Spare parts</td>
</tr>
<tr>
<td>7MH7772-1AG</td>
<td>Displays</td>
</tr>
<tr>
<td>7MH7772-1AH</td>
<td>Lids with overlay and keypad</td>
</tr>
<tr>
<td>7MH7723-1ES</td>
<td>Motherboards</td>
</tr>
<tr>
<td>7MH7723-1DS</td>
<td>Batteries, 3V, Lithium</td>
</tr>
<tr>
<td>7MH7723-1DG</td>
<td>Fuses, 2A, 250V, BW500/SF500, spare</td>
</tr>
<tr>
<td>7MH7723-1DJ</td>
<td>LVDT conditioners in NEMA 4 enclosure</td>
</tr>
<tr>
<td>7MH7723-1BE</td>
<td>Auxiliary I/O cards spare</td>
</tr>
<tr>
<td>7MH7772-1BE</td>
<td>Cables to connect BW500/SF500 keypad to motherboard</td>
</tr>
<tr>
<td>7MH7772-1BC</td>
<td>Keypads spare for BW500/SF500</td>
</tr>
<tr>
<td>7MH7772-1CD</td>
<td>C) Subject to export regulations AL: N, ECON: EAR99.</td>
</tr>
</tbody>
</table>

© Siemens AG 2011
Weighing Electronics
Stand-alone Integrators

Milltronics SF500

Dimensional drawings

Milltronics SF500 dimensions

Schematics

Milltronics SF500 connections

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

Dolphin Plus is instrument configuration software that allows you to quickly and easily configure, monitor, tune and diagnose several Siemens weighing devices remotely. Remote access is available using your desktop PC or connected directly in the field using a laptop.

Benefits

- Real-time monitoring and adjustment of parameters
- On-screen visualization of process values
- 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.

Compatibility

Dolphin Plus works with a wide range of Siemens products, including:

- Milltronics BW500
- Milltronics SF500

Connection to a Siemens instrument may be a direct RS-232 serial connection or via an RS-485 converter or Siemens infrared ComVerter, depending on the instrument being configured.

Meets VDE 2187 user interface requirements.

Application

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, you can alter parameters, upload and download parameter sets to and from disk, and use parameter sets saved from other instruments.

---

### Selection and Ordering data

<table>
<thead>
<tr>
<th>Selection and Ordering data</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dolphin Plus</td>
<td>7ML1841-</td>
</tr>
<tr>
<td>Instrument configuration software to quickly and easily configure, monitor, tune and diagnose most Siemens Milltronics devices remotely, from your desktop PC or connected directly in the field using a laptop. Dolphin Plus Software includes a software CD, and a nine pin adapter with a 2.1 m (82.7&quot;) cable for connection to a PC serial port.</td>
<td></td>
</tr>
<tr>
<td>RS-485 to RS-232 converters</td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>0</td>
</tr>
<tr>
<td>Yes</td>
<td>N) 1</td>
</tr>
<tr>
<td>ComVerter</td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>0</td>
</tr>
<tr>
<td>Yes</td>
<td>N) 1</td>
</tr>
</tbody>
</table>

Instruction manuals

Connection manual, English:

- Included on Dolphin Plus CD and available at [www.siemens.com/processautomation](http://www.siemens.com/processautomation)

### Spare parts

- Converters, RS 485 to RS 232 (D-Sub) C) 7ML1830-1HA
- Kits containing one 9-pin D-Sub to RJ11 adapter and one 2.1 m (82.7") telephone cable with two male jacks
- ComVerter, Infrared link C) 7ML1830-1MM

C) Subject to export regulations AL: N, ECCN: EAR99.

N) Subject to export regulations AL: N, ECCN: SD992.
The SITRANS RD100 is a 2-wire loop powered, NEMA 4X enclosed remote digital display for process instrumentation.

### Overview

#### Benefits
- Easy setup
- Approved for hazardous locations
- NEMA 4X, IP67 impact-resistant enclosure
- Simple two-step calibration
- Two modes of input allow for easy servicing, with no interruption of loop required

#### Application

The RD100 is very versatile. It can be installed indoors or outdoors, in hot or cold environments, and in safe or hazardous areas.

It has been approved by FM and CSA as Intrinsically Safe and non-incendive, and operates from -40 to +85 °C (-40 to +185 °F), adding only 1 V to the loop. The RD100 has a large 1" (2.54 cm) high display making it easy to read.

Calibration consists of a quick two-step process involving the adjustment of only two non-interacting potentiometers.

Key Applications: Remotely displays process variables in level, flow, pressure, temperature and weighing applications, in a 4 to 20 mA loop.

### Technical specifications

#### Mode of operation
- Measuring principle: Analog to digital conversion
- Measuring range: 4 ... 20 mA
- Measuring points: 1 instrument only

#### Accuracy
- ± 0.1 % of span ± 1 count

#### Rated operating conditions
- Ambient conditions
- Operating temperature range: -40 ... +85 °C (-40 ... +185 °F)

### Design
- Weight: 340 g (12 oz)
- Material (enclosure): Impact-resistant glass filled polycarbonate body and clear polycarbonate cover
- Degree of protection: NEMA 4X, IP67

#### Power supply
- External loop power supply: 30 V DC max.

#### Display
- 1.0" (2.54 cm) high LCD
- Numeric range from -1000 ... +1999

#### Certificates and approvals

### Selection and Ordering data

**Order No.**

<table>
<thead>
<tr>
<th>Description</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>SITRANS RD100 A 2-wire loop powered, NEMA 4X enclosed remote digital display for process instrumentation.</td>
<td>7ML5741-0AA000-0</td>
</tr>
</tbody>
</table>

**Conduit hole location (½")**

<table>
<thead>
<tr>
<th>Location</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>1</td>
</tr>
<tr>
<td>Bottom</td>
<td>2</td>
</tr>
<tr>
<td>Rear</td>
<td>3</td>
</tr>
<tr>
<td>Top</td>
<td>4</td>
</tr>
</tbody>
</table>

**Instruction manuals**

- English: 7ML1998-5JU01
- French: 7ML1998-5JU11
- German: 7ML1998-5JU31

Note: The instruction manual should be ordered as a separate line item.

This device is shipped with the Siemens Milltronics manual CD containing ATEX Quick Starts and instruction manuals.

### Accessories

- Panel mount kits: 7ML1930-1BN
- 2" (5.08 cm) pipe mounting kit (zinc plated seal): 7ML1930-1BP
- 2" (5.08 cm) pipe mounting kit (stainless steel, Type 304, EN 1.4301): 7ML1930-1BQ

C) Subject to export regulations AL: N, ECCN: EAR99.
Dimensional drawings

SITRANS RD100 dimensions

Schematics

SITRANS RD100 connections
Overview

The SITRANS RD200 is a universal input, panel mount remote digital display for process instrumentation.

Benefits

- Easy setup and programming via front panel buttons or remotely using RD software
- Display readable in sunlight
- Universal input: accepts current, voltage, thermocouple and RTD signals
- Single or dual 24 V DC transmitter power supply
- Serial communication using built in protocol or optional Modbus® RTU
- Two optional relays for alarm indication or process control applications
- Linear or square root function supported
- Meter Copy feature to reduce setup time, cost or errors
- RD software supporting remote configuration, monitoring and logging for up to 100 displays

Application

The RD200 is a universal remote display for level, flow, pressure, temperature, weighing, and other process instruments. Data can be remotely collected, logged and presented from as many as 100 displays on your local computer using the free downloadable RD Software.

The display accepts a single input of current, voltage, thermocouple, and RTD. This makes the RD200 an ideal fit for use with most field instruments. The RD200 can be set up as a standard panel mount, or combined with optional enclosures to allow it to house up to 6 displays.

Key Applications: Tank farms, pump alternation control, local or remote display of level, temperature, flow, pressure and weighing instrument values, PC monitoring and data logging with RD Software.
Technical specifications

Mode of operation

- Measuring principle
  Analog to digital conversion
- Measuring points
  1 instrument
  Remote monitoring of 100 instruments with PC and RD Software

Input

Measuring range

- Current
  4 ... 20 mA, 0 ... 20 mA
- Voltage
  0 V DC ... +10 V DC, 1 ... 5 V, 0 ... 5 V
- Thermocouple temperature
  Type J: -50 ... +750 °C (-58 ... +1382 °F)
  Type K: -50 ... +1260 °C (-58 ... +2300 °F)
  Type E: -50 ... +870 °C (-58 ... +1578 °F)
  Type T: -180 ... +371 °C (-292 ... +700 °F)
  Type T, 0.1° Resolution: -180.0 ... +371 °C (-199.9 ... +700 °F)
- RTD temperature
  100 Ω RTD: -200 ... +750 °C (-328 ... +1382 °F)

Output signal

- Output
  PDC output
  4 ... 20 mA (optional)
  Modbus (optional)
- Relays
  2 SPDT Form C relays, rated 3 A at 30 V DC or 3 A at 250 V AC, non-inductive, auto-initializing (optional)
- Communications
  RS-232 with PDC or Modbus RTU
  RS-422/485 with PDC or Modbus RTU

Accuracy

- 4 ... 20 mA optional output
  ± 0.1 % FS ± 0.004 mA
- Process input
  ± 0.05 % of span ± 1 count, square root: 10 ... 100 % FS
- Thermocouple temperature input
  Type J: ± 1 °C (± 2 °F)
  Type K: ± 1 °C (± 2 °F)
  Type E: ± 1 °C (± 2 °F)
  Type T: ± 1 °C (± 2 °F)
  Type T, 0.1° Resolution: ± 1 °C (± 1.8 °F)
- RTD temperature input
  ± 100 Ω RTD: ± 1 °C (± 1 °F)

Rated operating conditions

Ambient conditions

- Operating temperature range
  0 ... +65 °C (+32 ... +149 °F)

Design

- Weight
  269 g (9.5 oz) (including options)
- Material (enclosure)
  1/8 DIN, high impact plastic, UL94V-0, color: gray
  Optional plastic, steel and stainless steel (Type 304, EN 1.4301) NEMA 4 enclosures
- Degree of protection
  Type 4X, NEMA 4X, IP65 (front cover); panel gasket provided

Electrical connection

- mA output signal
  2-core copper conductor, twisted, shielded, 0.82 ... 3.30 mm² (18 ... 12 AWG); Belden® 8760 or equivalent is acceptable
- Electrical connection and relay connection
  Copper conductor according to local requirements, rated 3 A at 250 V AC

Power supply

- Input voltage option 1
  85 ... 265 V AC, 50/60 Hz; 90 ... 265 V DC, 20 W max.
- Input voltage option 2
  12 ... 36 V DC; 12 ... 24 V AC, 6 W max.
- Transmitter power supply
  One or two isolated transmitter power supplies (optional)
  - Single power supplies:
    ± 24 V DC ± 10 % at 200 mA max.
  - Dual power supplies:
    ± 24 V DC ± 10 % at 200 mA max.
- External loop power supply
  35 V DC max.
- Output loop resistance
  4 ... 20 mA (optional)

Displays and controls

- Display
  14 mm (0.56") high LED
  Numeric range from -1999 ... +9999
  Four digits, automatic lead zero blanking
  Eight intensity levels
- Memory
  Non-volatile
  Stores settings for minimum of 10 years if power is lost
- Programming
  Primary: front panel
  Secondary: Meter Copy or PC with SITRANS RD Software

Certificates and approvals

CE, UL, CUL

Options

- Enclosures
  Plastic, steel and stainless steel (Type 304, EN 1.4301) NEMA 4 and 4X enclosures
- Communications
  Modbus RTU

®Modbus is a registered trademark of Schneider Electric.
®Belden is a registered trademark of Belden Wire and Cable Company.
# Weighing Electronics
## Accessories

### SITRANS RD200

<table>
<thead>
<tr>
<th>Selection and Ordering data</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>SITRANS RD200 A universal input, panel mount remote digital display for process instrumentation.</td>
<td>C) 7ML 5740 - 0 A</td>
</tr>
</tbody>
</table>

**Input voltage**
- 85 ... 265 V AC, 50/60 Hz; 90 ... 265 V DC, 20 W max.
- 12 ... 36 V DC; 12 ... 24 V AC, 6 W max.

**Transmitter supply**
- None
- Single 24 V DC transmitter supply
- Dual 24 V DC transmitter supply

**Output**
- None
- 2 relays
- 4 ... 20 mA output

**Communication**
- Modbus disabled
- Modbus enabled

**Approvals**
- CE, UL, CUL

**Instruction manuals**
- English C) 7ML1998-5JS01
- German C) 7ML1998-5JS31

Note: The instruction manual should be ordered as a separate line item.

This device is shipped with the Siemens Milltronics manual CD containing ATEX Quick Starts and instruction manuals.

**Other Instruction manuals**
- SITRANS RD Enclosures, English C) 7ML1998-5JX01
- SITRANS RD Enclosures, German C) 7ML1998-5JX31
- SITRANS RD Serial Adapters, English C) 7ML1998-5JV01
- SITRANS RD Serial Adapters, German C) 7ML1998-5JV31
- SITRANS RD Software, English C) 7ML1998-5JW01
- SITRANS RD Software, German C) 7ML1998-5JW31

**Accessories**

- SITRANS RD200 copy cables 2.1 m (7 ft) C) 7ML1990-1BR
- SITRANS RD200 RS-232 serial adapters (copy cable included) C) 7ML1990-1BS
- SITRANS RD200 RS-422/485 serial adapters (copy cable included) C) 7ML1990-1BT
- RS-232 to RS-422/485 isolated converters C) 7ML1990-1BU
- RS-232 to RS-422/485 non-isolated converters C) 7ML1990-1BV
- SITRANS RD200 RS-232 and RS-485 isolated multi-input adapter boards C) 7ML1990-1BW
- USB to RS-422/485 isolated converters C) 7ML1990-1BX
- USB to RS-422/485 non-isolated converters C) 7ML1990-1BY
- USB to RS-232 converters C) 7ML1990-1DC
- RD Software CD for 1 ... 100 displays C) 7ML1990-1CD
- Modbus option enabled C) 7ML1990-1CF
- Low cost polycarbonate plastic enclosures for 1 display C) 7ML1930-1CG
- Stainless steel enclosures (Type 304, EN 1.4301) C) 7ML1930-1CN
- For use with 1 display C) 7ML1930-1CP
- For use with 2 displays C) 7ML1930-1CQ
- For use with 3 displays C) 7ML1930-1CR
- For use with 4 displays C) 7ML1930-1CS
- For use with 5 displays C) 7ML1930-1CT
- For use with 6 displays C) 7ML1930-1DA

1) Available with input voltage option 1 only.
2) Available with output option C only.

C) Subject to export regulations AL: N, ECCN: EAR99.

© Siemens AG 2011
Dimensional drawings

SITRANS RD200 dimensions

Schematics

SITRANS RD200 connections
Overview

The SITRANS RD500 is a remote data manager providing integrated web access, alarm event handling, and data capture for instrumentation.

Benefits

- RD500 supports report and alarm events via email, SMS, and FTP transfer
- Web server provides worldwide access to instrument data log and RD500 configuration and setup
- Offers scalability with optional I/O modules for current (4 ... 20 mA), voltage (0 to 10 V), thermocouple (TC), resistance temperature detector (RTD), and digital I/O
- 10 base-TI 100 Base-TX ethernet and support for GSM, GPRS, and PSTN provide flexible remote communications options
- Supports up to 128 devices with the flexible I/O modules and up to 247 Modbus serial devices
- Integrated FTP server and client supports FTP data synchronization to central servers
- Compact flash slot supports up to 2 Gbyte of expandable memory for data capture and storage
- Log files formats are CSV (comma separated values) for data files and HTML for report files

Application

The RD500 is an easy-to-use remote data manager, using a web-based application and hardware modules. The unique modular approach allows a variety of process signals to be monitored, while the serial ports allow data to be collected from any Modbus RTU device.

The RD500 comprises a master communications module, and up to 16 slave modules. Various module types are available, allowing up to a maximum of 128 conventional inputs and outputs. The RD500’s serial ports can collect data from up to 247 Modbus RTU slave devices including field instruments.

The RD500’s built-in web server, FTP, and email client allows the process to be monitored remotely. Alarm notifications are communicated through email and SMS text messages to one or more recipients to ensure that appropriate actions are taken by personnel.

The RD500 supports external modems, providing flexibility for applications in which GSM/GPRS cellular or landline connectivity is desired. The RD500 is configured via a web-based interface - a standard browser is all the software you need to configure your system.

Key Applications: Remote monitoring, inventory management, web enabled instrumentation or other devices

Technical specifications

Mode of operation

- Remote data manager
- up to 128 standard input/outputs
- 247 Modbus serial devices

Input

See table on page 2/23

Output

See table on page 2/23

Accuracy

See table on page 2/23

Rated operating conditions

- Storage temperature range: -30 ... +70 °C (-22 ... +158 °F)
- Operating temperature: 0 ... +50 °C (+32 ... +122 °F)
- Operating and storage humidity: 80 % max. relative humidity, non-condensing, from 0 ... +50 °C (+32 ... +122 °F)

Design

- Material (enclosure): High impact plastic and stainless steel
- Installation category: I
- Pollution degree: 2
- Weight: 456.4 g (15.1 oz)
- Mounting: Snaps onto standard DIN style top hat (T) profile mounting rails according to EN50022 -35 x 7.5 and -35 x 15

Power

- 24 V DC ± 10 %
- 400 mA min. (1 module)
- 3.5 Amps max. (16 modules)
- Must use Class 2 or SELV-rated power supply

Display

- Status LEDs
  - STS - Status LED indicates condition of master
  - TX/RX - Transmit/Receive LEDs show serial activity
  - Ethernet - Link and activity LEDs
  - CF - CompactFlash LED indicates card status and read/write activity

Memory

- On-board user memory: 4 Mbytes of non-volatile Flash memory
- On-board SDRAM: 2 Mbytes
- Memory card: Compact Flash Type II slot for Type I and Type II cards; 2 Gbytes

Certificates and approvals

Safety

- UL Listed to U.S. and Canadian safety standards UL508 and CSA C22.2 No. 14-M05 (File No. E302106)
- IEC 61010-1, EN 61010-1: Safety requirements for electrical equipment for measurement, control, and laboratory use, Part 1.
## SITRANS RD500 Module Specifications

<table>
<thead>
<tr>
<th>Order number</th>
<th>Application</th>
<th>Accuracy</th>
<th>Mounting</th>
</tr>
</thead>
<tbody>
<tr>
<td>7ML1930-1ES</td>
<td>8 inputs, 6 outputs used ... monitor contact or sensor inputs</td>
<td>Not applicable</td>
<td>Snaps onto standard DIN style top hat (T) profile mounting rails according to EN50022 -35 x 7.5 and -35 x 15</td>
</tr>
<tr>
<td>7ML1930-1ER</td>
<td>8 inputs, 6 outputs used ... monitor contact or sensor inputs</td>
<td>± 0.1 % of span</td>
<td></td>
</tr>
<tr>
<td>7ML1930-1EP</td>
<td>16 bit analog input module provides high density signal measurement for data monitoring applications and accepts 0/4-20 mA process signals</td>
<td>± 0.1 % of span</td>
<td></td>
</tr>
<tr>
<td>7ML1930-1EO</td>
<td>16 bit analog input module provides high density signal measurement for data monitoring applications and accepts ± 10 V process signals</td>
<td>± (0.2 % of span; +1 °C) 0 ... 50 °C (32 ... 122 °F); ± (0.1 % of span; +1 °C) 18 ... 28 °C (64 ... 82 °F); includes NIST conformity, A/D conversion errors, temperature coefficient and linearization conformity at 23 °C after 20 minute warm-up</td>
<td></td>
</tr>
<tr>
<td>7ML1930-1ET</td>
<td>16 bit analog input module provides high density signal measurement for data monitoring applications and accepts various RTD inputs</td>
<td>± (0.3 % of span; +1 °C); includes NIST conformity, cold junction effect, A/D conversion errors, temperature coefficient and linearization conformity at 23 °C after 20 minute warm-up</td>
<td></td>
</tr>
<tr>
<td>7ML1930-1EU</td>
<td>16 bit thermocouple input module provides high density signal measurement for data acquisition applications and accepts wide range of thermocouple types</td>
<td>± (0.5 % of span; +1 °C); includes NIST conformity, cold junction effect, A/D conversion errors, temperature coefficient and linearization conformity at 23 °C after 20 minute warm-up</td>
<td></td>
</tr>
</tbody>
</table>

## Inputs

<table>
<thead>
<tr>
<th>Dip switch selectable for sink or source</th>
<th>Max. voltage: 30 V DC, reverse polarity protected Off voltage: &lt; 1.2 V On voltage: &gt; 3.8 V Input frequency: - Filter switch on: 50 Hz - Filter switch off: 900 Hz</th>
</tr>
</thead>
<tbody>
<tr>
<td>8 single-ended Ranges: 0 ... 20 mA or 4 ... 20 mA</td>
<td>Resolution: Full 16-bit Sample time: 50 ... 400 ms depending on number of enabled inputs</td>
</tr>
</tbody>
</table>

## Outputs

<table>
<thead>
<tr>
<th>Solid state output, switched DC, contact rating 1 A DC max.</th>
<th>Form A, NO Pairs share common terminals: 1&amp;2, 3&amp;4, 5&amp;6 Current rating by pair: 3 A at 30 V DC/125 V AC resistive 1/10 HP at 125 V AC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not applicable</td>
<td>Not applicable</td>
</tr>
</tbody>
</table>

**Notes:**
- A/D is a registered trademark of Schneider Electric.
- RS232/PG port RS232 port via RJ12
- Ethernet port 10 BASE-T/100 BASE-TX; RJ45 jack is wired as a NIC (Network Interface Card)

© Siemens AG 2011
## SITRANS RD500

### Selection and Ordering data

<table>
<thead>
<tr>
<th>Component</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>SITRANS RD500</td>
<td>7ML5750</td>
</tr>
</tbody>
</table>

The SITRANS RD500 is a remote data manager providing integrated web access, alarm event handling and data capture for instrumentation.

### Communications Connection

- **Ethernet**
  - Configuration limited to 16 modules.

### Digital Communications to Instruments

- **RS-485 Modbus® RTU**

### Input configuration modules

**Note**: one RD500 supports 16 input modules

- RD500 8 channel 0/4 ... 20 mA input module: 7ML1930-1EP
- RD500 8 channel ± 10 V input module: 7ML1930-1EQ
- RD500 8 digital inputs, 6 relay outputs module: 7ML1930-1ES
- RD500 6 channel input, RTD module: 7ML1930-1ET
- RD500 8 channel thermocouple module: 7ML1930-1EU

### Operating Instructions

- Application manual, English: 7ML1998-5MA01
- Application manual, German: 7ML1998-5MA31

- This device is shipped with the Siemens Milltronics manual CD containing Quick Starts and Operating Instructions.

### Other Operating Instructions

- RD500 Remote Data Manager manual, English: web access, alarm event handling, and data capture: 7ML1998-5MK01
- RD500 Remote Data Manager manual, German: web access, alarm event handling, and data capture: 7ML1998-5MK31
- RD500 8 channel 0/4 ... 20 mA input module manual, English: 7ML1998-5MB01
- RD500 8 channel ± 10 V input module manual, German: 7ML1998-5MB31
- RD500 8 channel ± 10 V input module manual, English: 7ML1998-5MC01
- RD500 8 channel ± 10 V input module manual, German: 7ML1998-5MC31
- RD500 8 inputs, 6 relay outputs module manual, English: 7ML1998-5MD01
- RD500 8 inputs, 6 relay outputs module manual, German: 7ML1998-5MD31
- RD500 8 inputs, 6 solid state outputs module manual, English: 7ML1998-5ME01
- RD500 8 inputs, 6 solid state outputs module manual, German: 7ML1998-5ME31
- RD500 6 channel input, RTD module manual, English: 7ML1998-5MF01
- RD500 6 channel input, RTD module manual, German: 7ML1998-5MF31
- RD500 8 channel thermocouple module manual, English: 7ML1998-5MJ01
- RD500, 8 channel thermocouple module manual, German: 7ML1998-5MJ31

### Optional equipment

- Multitech GPRS modem, external: 7ML1930-1EX
- Industrial CompactFlash card, 2 Gbyte: 7ML1930-1FB
- Industrial CompactFlash card, 1 Gbyte: 7ML1930-1FC
- RJ11 serial to terminal block RS-232: 7ML1930-1FD
- RJ45 serial to terminal block RS-485: 7ML1930-1FE
- GPRS Modem antenna: 7ML1930-1FF
- RD500 Spare Module base: 7ML1930-1FG
- RD500 Spare End terminator: 7ML1930-1FH
- 5’ Ethernet Cat 5e Red X/O cable for configuration: 7ML1930-1FM
- USB cable type A to B: 7ML1930-1FN

**Note**: Configuration limited to 16 modules.

C) Subject to export regulations AL: N, ECCN: EAR99.

---

**Modification**: June 2011
SITRANS RD500 connections

Schematics

Power Connection

RD500 Port Pin Outs

RS-232

RS-485

Communication Ports

RS-422/485 4-wire Connections

RS-485 2-wire Connections

Programming Ports

Ethernet (Crossover)

Ethernet Connection (Port 3)
Overview

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

Benefits

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

Application

Many Siemens Milltronics products include Modbus® communications. For additional communication modules, SmartLinx cards are the answer.

They are 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. 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.

Technical specifications

<table>
<thead>
<tr>
<th>Module type</th>
<th>Allen-Bradley® Remote I/O</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interface</td>
<td>RIO</td>
</tr>
<tr>
<td>Transmission rate</td>
<td>57.6, 115.2 or 230.4 kbps</td>
</tr>
<tr>
<td>Rack address</td>
<td>1 ... 73, 1/4 to full rack</td>
</tr>
<tr>
<td>Connection</td>
<td>RIO slave</td>
</tr>
</tbody>
</table>
| SmartLinx module compatibility | • Milltronics BW500  
                                  • Milltronics SF500 |

<table>
<thead>
<tr>
<th>Module type</th>
<th>PROFIBUS DP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interface</td>
<td>RS-485 (PROFIBUS standard)</td>
</tr>
<tr>
<td>Transmission rate</td>
<td>All valid PROFIBUS DP rates from 9.6 ... 12 Mbps</td>
</tr>
<tr>
<td>Rack address</td>
<td>0 ... 99</td>
</tr>
<tr>
<td>Connection</td>
<td>Slave</td>
</tr>
</tbody>
</table>
| SmartLinx module compatibility | • Milltronics BW500  
                                  • Milltronics SF500 |

<table>
<thead>
<tr>
<th>Module type</th>
<th>DeviceNet™</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interface</td>
<td>DeviceNet™ physical layer</td>
</tr>
<tr>
<td>Transmission rate in kbps</td>
<td>125, 250, 500</td>
</tr>
<tr>
<td>Rack address</td>
<td>0 ... 63</td>
</tr>
<tr>
<td>Connection</td>
<td>Slave (group 2)</td>
</tr>
</tbody>
</table>
| SmartLinx module compatibility | • Milltronics BW500  
                                  • Milltronics SF500 |

Selection and Ordering data

<table>
<thead>
<tr>
<th>SmartLinx modules</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Allen-Bradley® Remote I/O modules</td>
<td>7ML1830-1HS</td>
</tr>
<tr>
<td>PROFIBUS DP modules</td>
<td>7ML1830-1HR</td>
</tr>
<tr>
<td>DeviceNet™ modules</td>
<td>7ML1830-1HT</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Instruction manuals</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Allen-Bradley® Remote I/O communications module, English</td>
<td>7ML1998-1AP03</td>
</tr>
<tr>
<td>PROFIBUS communications module</td>
<td></td>
</tr>
<tr>
<td>• English</td>
<td>7ML1998-1AQ03</td>
</tr>
<tr>
<td>• French</td>
<td>7ML1998-1AQ12</td>
</tr>
<tr>
<td>• German</td>
<td>7ML1998-1AQ32</td>
</tr>
<tr>
<td>DeviceNet™, English</td>
<td>7ML1998-1BH02</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Spare SmartLinx software</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Allen-Bradley data diskettes</td>
<td>7ML1830-1CK</td>
</tr>
<tr>
<td>PROFIBUS DP data diskettes</td>
<td>7ML1830-1CL</td>
</tr>
<tr>
<td>DeviceNet data diskettes</td>
<td>7ML1830-1CM</td>
</tr>
</tbody>
</table>

© Siemens AG 2011
Overview

Automation with integral weighing and proportioning technology

In addition to the accuracy when weighing and proportioning, incorporation of weighing technology into modern automation systems serves to increase the sustained success of a company.

Requirements on scales in industrial processes

The weighing and proportioning system is of significant importance in many industrial processes, where many different weighing tasks have to be handled. Both programmable controllers (PLC) and process control systems (PCS) are used to automate production processes.

There are many different types of scales that work together with automation systems, depending on requirements.

Production automation places the following demands on weighing technology:

- flexibility with respect to typical scale functions,
- simple expansion of the weighing system,
- adaptability to the automation task, and
- integrated communication concept.

Scales that are able to satisfy these demands can be classified as part of the automation system. In this sense, the scale is an intelligent automation object comprising:

- sensor technology
- controller and
- actuator technology

and carries out its tasks according to the definitions of the control system.

Distribution of weighing functions within automation system

The distribution of weighing functions within automation systems has been subject to constant change in recent years. The reasons for this can be found in the search for an efficient solution for weighing tasks in the automation environment. The performance of hardware components is no longer the only reason for deciding to use a specific solution architecture. The demands placed on a modern weighing solution include the following scale-related requirements:

- high operational reliability,
- simple operation,
- very good reproducibility, and
- high accuracy

as well as the requirements associated with the following automation properties:

- uniformity (hardware/software),
- flexibility, and
- standardization.

Application-compatible implementation leads to the following three aspects:

- The demands for accuracy and reproducibility require the use of special, high-quality function units for signal recording, signal adaptation, A/D conversion and preprocessing, as well as open-loop and closed-loop control functions. The task means that the weighing signals must be resolved in up to 16 million digitization steps. During proportioning and filling, material flows must be controlled over binary scale signals with a time resolution of up to less than one millisecond.

- A range of other application-specific functions are also required to perform the overall task. It is therefore essential to take into account the complete value chain in the production process. These might include the automatic filling of supply hoppers or the unloading of the final product - so that a system is required that supports simple implementation of the necessary functions.

- It is also necessary to ensure full integration of the weighing systems into the total automation technology wherever possible. This covers not only communication, but also requires functional integration and the engineering of all automation functions using standard tools.

These aspects result in the following solution, which easily satisfies all requirements:

- Function modules for weighing systems that contain the required hardware and firmware as standard, in order to satisfy the high accuracy requirements and time-critical tasks. These function modules contain all the features of the standard automation system and are therefore completely compatible.

- Use of standard automation systems for the implementation of application-specific tasks. This not only enables the use of the standards already generally applied for engineering, visualization, archiving etc., but also supports full integration into the total automation technology without the need for any further adaptation. Sector-specific and application-specific solutions can be implemented particularly flexibly in this case. Special weighing and process methods or recipes can be protected from access by third-parties by means of software protection (know-how protected).
Introduction

- This concept sees the weighing system as an automation object integrated in the total automation solution. The aforementioned total compatibility means that the standard automation functions and the weighing functions combine to form a homogeneous entity for the user and meet the demands for uniformity, ease of use and flexibility on the basis of existing standards.
- This solution means that the component architecture can be central or distributed. The advantage of a central architecture is the time-optimized interaction between control CPU and weighing processor. With a distributed architecture, i.e. with integration of the components into the scale, the weighing system is easily transformed into an autonomous "field device" connected to the automation technology through the open PROFIBUS or PROFINET.

SIWAREX weighing systems in automation

Totally Integrated Automation plays an essential role in SIWAREX weighing systems.

A key feature is the total integration of SIWAREX into the SIMATIC world.

This means:
- Implementation of central automation concepts by direct integration in SIMATIC S7
- Implementation of distributed automation concepts by direct integration in SIMATIC NET
- Integration in the SIMATIC PCS 7 process control system
- Operator control and monitoring through SIMATIC HMI
- Uniform configuring and programming through SIMATIC software.

Material parameters

<table>
<thead>
<tr>
<th>Component ID</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>Flour</td>
</tr>
<tr>
<td>Device number</td>
<td>1</td>
</tr>
<tr>
<td>Command by start</td>
<td>651</td>
</tr>
<tr>
<td>Command by continue</td>
<td>103</td>
</tr>
<tr>
<td>Bin no.</td>
<td>1</td>
</tr>
<tr>
<td>Route on</td>
<td></td>
</tr>
<tr>
<td>Fine optimization</td>
<td></td>
</tr>
</tbody>
</table>

Sample material parameters in SIMATIC HMI

**SIWAREX - weighing electronics - uniform SIMATIC system basis**

By investing in SIWAREX weighing modules, you are investing in the uniform SIMATIC system basis on which the automation components of the entire production process can build – from incoming goods (upstream area) to the production process (mainstream area) down to the filling machine at the end of the production chain (downstream area) – a system basis which encompasses all hierarchic levels from the human-machine interface to the PROFIBUS DP or PROFINET fieldbus. Why use specialized technology for each weighing or proportioning problem when a uniform basis is available for all individual problem solutions? With SIWAREX, Siemens has created this uniform basis.

Applications of SIWAREX weighing technology in the production process
Integrated automation solutions with weighing technology

SIWAREX weighing modules are ideally suited to integrated automation solutions using weighing technology. SIWAREX can be used for every SIMATIC solution regardless of whether it is integrated into the SIMATIC S7 automation system in the form of a module or used as a distributed I/O with the SIMATIC S7 or C7.

The highlight: SIWAREX modules are integrated into the automation system with the same engineering tools as all other automation components. This is an excellent solution which reduces engineering costs and training expenses!

The ET 200 I/O station is designed as a modular system. The weighing electronics are selected from the module catalog and placed in the rack of the modular I/O station. The software addresses the weighing electronics as if they were modules plugged into the central controller of an automation system.

With the use of standard hardware (SIMATIC components) and standard software (STEP 7), freely programmable, modular weighing systems are available which can be inexpensively adapted to specific plant requirements, e.g. by means of:

- Additional SIMATIC digital outputs for controlling a mixer, heater, agitator, etc.
- Additional functions implemented in STEP 7 for determining and controlling the material flow or for correcting the setpoint based on material moisture.

The advantages of direct integration at a glance:

- Low-cost system integration because no additional coupling modules are required
- Low configuration costs due to the uniform system concept
- System-compatible module behavior (diagnostic interrupts, process interrupts, command output disables, etc.)
- Tailor-made low-cost weighing systems due to expansion with standard SIMATIC components
- High plant availability
- Easy installation due to snap-on technique
- Low space requirements due to compact design

High plant availability – to ensure that production does not come to a halt

Apart from the advantage that configuration know-how is only required for a single system, there are also enormous advantages in terms of plant availability.

In the SIMATIC S7, for example, faults (measuring range exceeded, proportioning fault, sensor fault, etc.) are reported to the automation system via diagnostic interrupts without the need to input a single line of programming code.

Error messages from the weighing electronics are automatically transferred to the automation system. The diagnostic information enables easy location of the module from which the message originated.

Using a programmer or the plant visualization, operating personnel are then able to localize the fault, display its cause and, if necessary, replace the defective module.

When the correct bus modules are used, the SIWAREX U, SIWAREX CS, SIWAREX FTA, SIWAREX FTC and SIWAREX CF weighing electronics can even be replaced under power. A replaced module is automatically detected by the automation system. Thanks to the transparent data management, the scales parameters saved in the automation system can then be transferred to the new weighing electronics. The scales are immediately available again for weighing tasks – no need to readjust with control weights (except for applications that require legal-for-trade certification).

Because SIWAREX weighing systems are made solely of standard components (e.g. SIWAREX weighing modules, SIMATIC digital input/outputs, etc.), spare parts inventories are very easy to handle.

Scale faceplate of a loss-in-weight scale

Scales can also be adjusted without an automation system.
Introduction

Standard programming in the SIMATIC PCS 7 process control system as in the SIMATIC S7 automation system

While the weighing modules used with the SIMATIC S7 automation system are usually integrated into the system with the typical PLC programming languages; STL (Statement List), LAD (Ladder diagram) or FBD (Function Block Diagram), configuration in the SIMATIC PCS 7 process control system is usually implemented by means of graphic interconnection in the CFC (Continuous Function Chart). Configuration is used instead of programming.

The scales are displayed in the ES (engineering system) as “technology blocks” in the CFC. At the OS (operator station), however, faceplates are used to display the scales in the WinCC visualization system.

The faceplates can be used to monitor the weight values and operate the scales.

SIWAREX application table

<table>
<thead>
<tr>
<th>Application</th>
<th>Examples</th>
<th>Selection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Static weight measurements, high accuracy</td>
<td>Platform scales, container weighers, vehicle scales</td>
<td>SIWAREX FTA(^1), max. resolution 16 million parts</td>
</tr>
<tr>
<td>Static weight measurements, medium accuracy</td>
<td>Container weighers, silos</td>
<td>SIWAREX U for S7 300 and ET 200M SIWAREX CS for ET 200S SIWAREX MS for S7 200</td>
</tr>
<tr>
<td>Force and torque measurements</td>
<td>Rolling mills, monitoring of loads and belt tensions, overload protection, torque measurements</td>
<td>SIWAREX FTC (bidirectional) SIWAREX CF for ET 200S (bidirectional) SIWAREX MS for S7 200 (bidirectional)</td>
</tr>
<tr>
<td>Proportioning (intermittent)</td>
<td>Batching plants, batch processes, proportioning recipes, single-scale and multi-scale systems</td>
<td>SIWAREX FTA(^1) (OIML R-51)</td>
</tr>
<tr>
<td>Proportioning (continuous)</td>
<td>Batching plants, in continuous operation, proportioning recipes, single-scale and multi-scale systems</td>
<td>SIWAREX FTC (operating mode – loss-in-weight scale)</td>
</tr>
<tr>
<td>Filling, fast filling</td>
<td>Filling machines, weighing and sack filling machines, big bag</td>
<td>SIWAREX FTA(^1) (OIML R-61)</td>
</tr>
<tr>
<td>Loading, fast loading</td>
<td>Loading scales for receiving and load operations</td>
<td>SIWAREX FTA(^1) (OIML R-107)</td>
</tr>
<tr>
<td>Static quantity control</td>
<td>Automatic weight control in static mode, e.g. following filling</td>
<td>SIWAREX FTA(^1) (OIML R-51)</td>
</tr>
<tr>
<td>Flow measurement (continuous)</td>
<td>Bulk flow meter (baffle plate)</td>
<td>SIWAREX FTC (operating mode - flow meter)</td>
</tr>
<tr>
<td>Conveyor scale, weighfeeder</td>
<td>Measurement of belt load, conveyed quantity, loading according to setpoint</td>
<td>SIWAREX FTC (conveyor scale operating mode) and PID control</td>
</tr>
</tbody>
</table>

\(^1\) Suitable for applications that require legal-for-trade certification
## Questionnaire SIWAREX

**Customer information:**
- **Contact:**
- **Company:**
- **Address:**
- **City:**
- **Country:**
- **Zip/Postal Code:**
- **E-mail:**
- **Fax:**
- **Prepared by:**
- **Date:**
- **Notes on the Application:**
- **Phone:**

## Electronics

**Application type**
- Non Automatic Weighing Instrument
- Platform scale
- Vessel/Silo/level measurement
- Truck scale
- Force measurement

**Type of material:**

**Requested features**
- Basic weighing functions
- Recording of weighing sequence
- With Ex approval
- Error control and logging
- Preventive diagnostics
- Legal-for-trade
- Fast weight value processing

**SIMATIC integration**
- SIMATIC S7-200 directly
- SIMATIC S7-300 directly
- SIMATIC S7-300/400 with bus
- SIMATIC PCS7

**Zone type/number:**

**Mechanic**

**Load cells**
- Total maximum weight: ___________
- Dead load: ___________
- Load cells quantity: ___________
- Vibration (Motor, Mixer, etc.): ___________
- Guide elements required?: ___________
- Lift up protection: ___________

**Special application requirements**
- Pictures available: ___________
- Drawing available: ___________
- Retrofit of an old installation: ___________

---

This questionnaire is only a guideline. For special configurations refer to your Siemens contact person.

© Siemens AG 2011  
www.siemens.com/weighingtechnology
Overview

SIWAREX U is a versatile weighing module for all simple weighing and force measuring tasks. The compact module is easy to install in all SIMATIC automation systems. Complete data access is then possible via the SIMATIC.

Benefits

SIWAREX U offers the following key advantages:
- Uniform design technology and consistent communication in SIMATIC
- Use in distributed plant concept through connection to PROFIBUS DB/PROFINET using ET 200M
- Measurement of weight or force with a high resolution of 65000 parts and an accuracy of 0.05 %
- Space saving through use of two-channel version for two scales
- Direct connection of a remote display to the TTY interface
- Simple adjustment of scale using the SIWATOOL U program
- Supports theoretical adjustment without adjustment weights
- Supports replacement of module without renewed adjustment of scale
- Can be used in Ex applications

Application

SIWAREX U is the optimum solution wherever strain gauge sensors, such as load cells, force sensors or torque measuring shafts, are used for measuring tasks. The following are typical SIWAREX U applications:
- Fill level monitoring of silos and bunkers
- Monitoring of crane and cable loads
- Measurement of load of conveyor belts
- Overload protection in industrial elevators and rolling mills
- Scales for potentially explosive areas (can be implemented by using an Ex interface)
- Monitoring of belt tension

Design

The SIWAREX U is a compact function module (FM) of the SIMATIC S7-300 and can be snapped directly onto the SIMATIC S7-300 or ET 200M backplane bus. Assembly and wiring are also greatly simplified by using rails with snap-on technology.

The load cells, the power supply and the serial interfaces are connected through the 20-pin standard front plug.

Operation of the SIWAREX U in SIMATIC means that complete integration of the weighing technology into the automation system is provided.

Function

SIWAREX U is available with either one or two measuring channels. One measuring channel is required for each set of scales.

The primary task of SIWAREX U is the measurement of sensor voltage and the conversion of this measurement into a weight value. The signal can also be digitally filtered if required.

As well as determining weights, the SIWAREX MS monitors two freely programmable limits (min./max. as required).

The SIWAREX U comes factory-calibrated. This means that theoretical adjustment of the scale is possible without adjustment weights, and that modules can be replaced without the need to readjust the scale. When using "active bus modules", replacement is also possible during operation.

Consistent and uniform communication between all system components enables fast, reliable and cost-effective integration and diagnosis in industrial processes.

The SIWAREX U has two serial interfaces. The TTY interface serves to connect up to four digital remote displays. In addition to the two weight values of weighing channels 1 and 2, another two values can be set via SIMATIC and indicated on the remote displays.

A PC for adjusting the scale can be connected through the RS 232 interface.

SIWAREX U can not only be integrated in the plant software using the classic PLC programming languages; STL (Statement List), LD (Ladder Diagram) SFC (Sequential Function Chart) or SCL (Structured Control Language), it can also be integrated by means of graphical configuration with CFCs (Continuous Function Chart), where faceplates are provided in PCS 7 for visualization of the scales.

In contrast to serially linked weighing electronics, SIWAREX U does not need costly additional modules to link it to SIMATIC.

Integration in SIMATIC produces freely-programmable, modular weighing systems which can be modified according to operational requirements.

The SIWATOOL U software uses the familiar Windows interface and can be used to set the SIWAREX weighing modules, independent of the automation system. Input masks allow all parameters for the weighing modules to be specified, saved and printed for plant documentation.

The diverse diagnostic options provided by SIWATOOL U ensure fast fault locating in online mode.

The SIWAREX U weighing module can be used for potentially explosive areas (zone 2). The load cells can be provided with an intrinsically-safe power supply through an optional Ex interface.
Technical specifications

SIWAREX U

Integration in automation systems:
- S7-300: Direct integration
- S7-400 (H): Via ET 200M
- PCS 7 (H): Via ET 200M
- C7: Via IM or ET 200M

Automation systems from other vendors:
- Via ET 200M
- Stand-alone (without SIMATIC CPU): Possible with IM 153-1

Communication interfaces
- • SIMATIC S7 (P bus)
- • RS 232
- • TTY

Connection of remote displays (through TTY serial interface):
- Gross, channel 1, 2 or default value 1, 2

Adjustment of scales settings
- over SIMATIC (P bus) or PC using SIWATOOL U (RS 232)

Measuring properties
- Error limit to DIN 1319-1 of full-scale value at 20 °C ± 10 K
  - 0.05 %
- Internal resolution ADC: 65535
- Data format of weight values: 2 byte (fixed-point)

Number of measurements/second: 50

Digital filter: 0.05 ... 5 Hz (in 7 steps), mean-value filter

Weighing functions
- Weight values: Gross
- Limit values: 2 (min./max.)
- Zero setting function: Per command

Load cells
- Strain gages in 4-wire or 6-wire system

Load cell powering
- Supply voltage $V_s$ (rated value): 6 V DC
- Max. supply current: ≤ 150 mA per channel
- $R_{L_{min}}$: > 40 Ω per channel
- $R_{L_{max}}$: < 4010 Ω
- With Ex(i) interface:
  - $R_{L_{min}}$: > 87 Ω per channel
  - $R_{L_{max}}$: < 4010 Ω

Permissible load cell characteristic: Up to 4 mV/V

Max. distance of load cells:
- 500 m²
- 150/500 m for gas group IIC
- 500 m² for gas group IIB (see SIWAREX IS Manual)

Intrinsically-safe load cell powering
- Optional (Ex interface) with SIWAREX IS

Power supply
- Rated voltage: 24 V DC
- Max. current consumption:
  - 150 mA (single-channel)
  - 240 mA (two-channel)
- Current consumption from backplane bus: ≤ 100 mA

Certification
- ATEX 95, FM, cULus Haz. Loc.

IP degree of protection to DIN EN 60529; IEC 60529
- IP20

Climatic requirements
- $T_{min}$ (IND) to $T_{max}$ (IND) (operating temperature)
  - Vertical installation: 0 ... +60 °C
  - Horizontal installation: 0 ... +40 °C

EMC requirements according to:
- NAMUR NE21, Part 1
- EN 61326

Dimensions:
- 40 x 125 x 130 mm

Selection and Ordering data

Order No.

SIWAREX U for SIMATIC S7 and ET 200M, incl. bus connector, weight 0.3 kg
- Single-channel version for connecting one scale
- Two-channel version for connecting two scales

7MH4950-1AA01
7MH4950-2AA01

SIWAREX U Manual

Available in a range of languages
Free download on the Internet at: www.siemens.com/weighing-technology

SIWAREX U configuration package for SIMATIC S7 version 5.4 or higher
- on CD-ROM
  - PC SIWATOOL U software (available in a range of languages), new design
  - Sample program "Getting started" – ready to use application for SIMATIC S7
  - SIWAREX U Manual on CD (in a range of languages), new design
  - HSP Hardware Support Package for integrating SIWAREX U in STEP 7

7MH4950-1AK01

SIWAREX U configuration package for PCS 7, version 6.x
- suitable for 7MH4601-1AA01 and 7MH4950-*AA01
  - In German and English on CD-ROM, module for the CFC and faceplate

7MH4683-3BA64

SIWAREX U configuration package for PCS7 S7 version V7.0 and V7.1
- suitable for 7MH4950-1AA01 and 7MH4950-2AA01
  - on CD-ROM
    - HSP Hardware Support
    - Package for integration of SIWAREX U in STEP 7
    - Function block for the CFC chart
    - Faceplate
    - SIWATOOL U setting software
    - Manual

7MH4950-3AK61

SIWATOOL cables
- From SIWAREX U/CS with serial PC interface, for 9-pin PC interfaces (RS 232), 3 m long

7MH4607-8CA

Modification June 2011
Weighing Electronics
SIWAREX - PLC-based weighing modules

SIWAREX U

**Installation material (mandatory)**

<table>
<thead>
<tr>
<th>Description</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>20-pin front plug with screw contacts</td>
<td>6ES7392-1AJ00-0AA0</td>
</tr>
<tr>
<td>Shield contact element</td>
<td>6ES7390-5AA00-0AA0</td>
</tr>
<tr>
<td>Shield connection terminal</td>
<td>6ES7390-5CA00-0AA0</td>
</tr>
<tr>
<td>S7 DIN rail</td>
<td>6ES7390-1AB60-0AA0&lt;br&gt;6ES7390-1AE80-0AA0&lt;br&gt;6ES7390-1AF30-0AA0&lt;br&gt;6ES7390-1AJ30-0AA0&lt;br&gt;6ES7390-1BC00-0AA0</td>
</tr>
<tr>
<td>Accessories (optional)</td>
<td></td>
</tr>
<tr>
<td>PS 307 load power supplies&lt;br&gt;(only required if 24 V DC not available)</td>
<td>6ES7307-1BA00-0AA0&lt;br&gt;6ES7307-1EA00-0AA0&lt;br&gt;6ES7307-1KA00-0AA0</td>
</tr>
<tr>
<td>Labeling strips&lt;br&gt;(10 units, spare part)</td>
<td>6ES7392-2XX00-0AA0</td>
</tr>
</tbody>
</table>

**Remote displays (option)**

The digital remote displays can be connected directly to SIWAREX U through a TTY interface.

The following remote displays can be used:

- S102, S302
- Siebert Industrieelektronik GmbH
  P.O. Box 1180
  D-66565 Eppelborn
  Tel.: 06806/980-0
  Fax: 06806/980-999
  Internet: http://www.siebert.de

Detailed information available from manufacturer.

**SIWAREX JB junction box, aluminium housing**

- for connecting up to 4 load cells in parallel, and for connecting several junction boxes | 7MH4710-1BA |

**SIWAREX JB junction box, stainless steel housing**

- for connecting up to 4 load cells in parallel | 7MH4710-1EA |

**Ex interface, type SIWAREX Pi**

- With UL and FM approvals, but *without ATEX approval* for intrinsically-safe connection of load cells, suitable for the SIWAREX U, CS, MS, FTA, FTC and M weighing modules.
- Not approved for use in the EU.

**Manual for Ex interface type SIWAREX Pi**

- C71000-T5974-C29

**SIWAREX IS Ex interface**

- With ATEX approval, but *without UL and FM approvals*, for intrinsically-safe connection of load cells, including manual, suitable for the SIWAREX U, CS, MS, FTA, FTC, M and CF weighing modules.
- Approved for use in the EU.

- With short-circuit current < 199 mA DC | 7MH4710-5BA |
- With short-circuit current < 137 mA DC | 7MH4710-5CA |

**Cable (optional)**

- Cable Li2Y 1 x 2 x 0.75 ST + 2 x (2 x 0.34 ST) - CY, orange sheath<br>to connect SIWAREX U, CS, MS, FTA, FTC, M and CF to the junction box (JB), extension box (EB) or Ex interface (Ex-I) or between two JBs, for fixed laying, occasional bending permitted, 10.8 mm outer diameter, for ambient temperature -40 ... +80 °C | 7MH4702-8AG |

- Cable Li2Y 1 x 2 x 0.75 ST + 2 x (2 x 0.34 ST) - CY, blue sheath<br>to connect the junction box (JB) or extension box (EB) in a potentially explosive atmosphere to the Ex interface (Ex-I), for fixed laying, occasional bending permitted, blue PVC insulating sheath, approx. 10.8 mm outer diameter, for ambient temperature -40 ... +80 °C | 7MH4702-8AF |

- Cable LiYCY 4 x 2 x 0.25 mm²<br>for TTY (connect 2 pairs of conductors in parallel), for connection of a remote display with short-circuit current < 199 mA DC, suitable for use in the EU | 7MH4407-8BD0 |

D) Subject to export regulations AL: N, ECCN: EAR99H.

---

1) Compatible with 7MH4601-1AA01; supply of load cells changed to 6 V DC.
2) Compatible with 7MH4601-1BA01; supply of load cells changed to 6 V DC.
**Overview**

SIWAREX CS is a versatile weighing module for all simple weighing and force measuring tasks. The compact module is easy to install in all SIMATIC automation systems. Data can be accessed directly in the SIMATIC.

**Benefits**

SIWAREX CS offers the following key advantages:

- Uniform design technology and consistent communication in SIMATIC
- Uniform configuration with SIMATIC
- Use in distributed plant concept through connection to PROFIBUS DP or PROFINET via ET 200S
- Measurement of weight or force with a high resolution of 65000 parts and an accuracy of 0.05 %
- Direct connection of a remote display to the TTY interface
- Simple adjustment of scale using the SIWATOOL CS program via the RS 232 interface
- Supports theoretical adjustment without adjustment weights
- Supports replacement of module without renewed adjustment of scale
- For use in Ex zone 2, intrinsically-safe load cell powering for zone 1 using Ex interface.

**Application**

SIWAREX CS is the optimum solution wherever strain gauge sensors, such as load cells, force sensors or torque measuring shafts, are used for measuring tasks. The following are typical SIWAREX CS applications:

- Non-automatic weighing machines
- Fill level monitoring of silos and bunkers
- Measuring of crane and cable loads
- Load measuring of industrial lifts and roll trains
- Weighing in potentially explosive areas (zone 2 direct, zone 1 using Ex interface SIWAREX IS)
- Monitoring of belt tension
- Force measuring, container weighers, platform scales and crane scales

**Design**

SIWAREX CS is a compact function module (FM) in the SIMATIC ET 200S and can be plugged directly into a terminal module. The power supply is connected through a power module and the internal power rail.

The load cells and the serial interfaces are connected through the terminals of the terminal module. Using the terminal module enables the module to be replaced without disconnecting the connecting cables.

**Function**

The primary task of SIWAREX CS is the measurement of sensor voltage and the conversion of this measurement into a weight value. Up to 3 interpolation points are used for the weight calculation. The signal can also be digitally filtered if required.

As well as determining weights, the SIWAREX CS monitors two freely programmable limits (min./max. as required) and notifies SIMATIC if these values are exceeded.

The SIWAREX CS comes factory-calibrated. This means that theoretical adjustment of the scale is possible without adjustment weights, and that modules can be replaced without the need to readjust the scale.

Consistent and uniform communication between all system components enables fast, reliable and cost-effective integration and diagnosis in industrial processes.

With all head modules it is possible to read out the process data from the SIWAREX CS through the peripherals. In the case of PROFIBUS head modules, which support the DP V1 protocol, and PROFINET head modules it is possible in addition to use record communication for reading out the data and for making settings.

Group diagnostics and process alarm are possible with all PROFIBUS head modules supporting DP V1 and with PROFINET modules. Head modules with DP V0 support group diagnostics but not process alarms.

The SIWAREX CS has two serial interfaces. The TTY interface serves to connect digital remote displays. The remote displays can show the weight value with status information.

To parameterize the SIWAREX CS, a PC can be connected over the RS 232 interface.

SIWAREX CS can be integrated in the plant software using the classic PLC programming languages; STL (Statement List), LD (Ladder Diagram) SFC (Sequential Function Chart) or SCL (Structured Control Language).

In contrast to serially linked weighing electronics, SIWAREX CS does not need costly additional modules to link it to SIMATIC.

Used in conjunction with SIWAREX CS, it is possible to configure freely programmable, modular weighing systems in SIMATIC.
Weighing Electronics
SIWAREX - PLC-based weighing modules

SIWAREX CS

Scale faceplate in the SIWAREX CS software "Getting started"

In addition to the configuration package, the ready-to-use SIWAREX CS software "Getting started" is also available free-of-charge and shows beginners how to integrate the module into a STEP 7 program and offers a basis for application programming. A SIWAREX CS scale can then be simply implemented in SIMATIC together with a touch panel (TP/OP/MP) as the operator panel.

Using the SIWATOOL CS software, the SIWAREX weighing modules offer Windows convenience and are quick to get up and running. Screen forms allow all user-definable parameters of the weighing modules to be specified, saved and printed for plant documentation.

The diverse diagnostic options provided by SIWATOOL CS ensure fast fault locating in online mode.

The SIWAREX CS weighing module can be used in potentially explosive areas (zone 2). It can also be used in zone 1 by implementing an optional Ex interface, whereby SIWAREX CS must be installed in a safe area.

### Technical specifications

**SIWAREX CS**

| Integration in automation systems | S7-400, S7-300, C7 | Through ET 200S
| IM151-7 CPU | Through backplane bus |
| Automation systems from other manufacturers (possible with limitations) | Through ET 200S |

| Communication interfaces | SIMATIC S7 (ET 200S backplane bus), RS 232, TTY |
| Connection of remote displays (through TTY serial interface) | Display for weight value |
| Adjustment of scales settings | Using SIMATIC S7/C7 IM151-7 CPU or SIWATOOL CS PC parameterization software (RS 232) |
| Measuring accuracy | Error limit to DIN 1319-1 of full-scale value at 20 °C ± 10 K: 0.05 % |
| Internal resolution ADC | 65535 |
| Data format of weight values | 2 byte (fixed-point) |
| Number of measurements/second | 50 |
| Digital filter | 0.05 … 5 Hz (in 7 steps), mean-value filter |

### Weighing functions

| Weight values | Gross, net |
| Limit values | 2 (min./max.) |
| Zero setting function | Per command |
| Tare function | Per command |
| Tare specification | Per command |

### Load cells

| Load cells | Strain gages in 4-wire or 6-wire system |

### Load cell powering

| Supply voltage $U_s$ (rated value) | 6 V DC typical |
| Max. supply current | $\leq 68 \text{ mA}$ |
| Permissible load impedance | $R_{L_{\text{min}}} > 87 \Omega$ |
| $R_{L_{\text{max}}} < 4010 \Omega$ |

With SIWAREX IS Ex interface:

| $R_{L_{\text{min}}} > 87 \Omega$ |
| $R_{L_{\text{max}}} < 4010 \Omega$ |

### Load cell characteristic

| 1 mV/V ... 4 mV/V |
| -2.4 ... +26.4 mV |

### Intrinsic-safety load cell powering

| Optional (SIWAREX IS Ex interface) |

### Power supply

| Rated voltage | 24 V DC |
| Max. current consumption | 150 mA |

### IP degree of protection to EN 60529; IEC 60529

| IP20 |

### Climatic requirements

| $T_{\text{min}}$ (IND) to $T_{\text{max}}$ (IND) (operating temperature) |
| Vertical installation | -10 ... +60 °C |
| Horizontal installation | -10 ... +40 °C |

### EMC requirements according to EN 61326, EN 45501

| NAMUR NE21, Part 1 |

### Dimensions

| 80 x 125 x 130 mm |
## Selection and Ordering data

<table>
<thead>
<tr>
<th>Description</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>SIWAREX CS</td>
<td>7MH4910-0AA01</td>
</tr>
<tr>
<td>Weighing electronics for scales in SIMATIC ET 200S</td>
<td></td>
</tr>
<tr>
<td>SIWAREX CS Manual</td>
<td></td>
</tr>
<tr>
<td>available in a range of languages</td>
<td></td>
</tr>
<tr>
<td>Free download on the Internet at:</td>
<td></td>
</tr>
<tr>
<td><a href="http://www.siemens.com/weighing-technology">www.siemens.com/weighing-technology</a></td>
<td></td>
</tr>
<tr>
<td>SIWAREX CS &quot;Getting started&quot;</td>
<td></td>
</tr>
<tr>
<td>Sample software shows beginners how to program the scales in STEP 7.</td>
<td></td>
</tr>
<tr>
<td>Free download on the Internet at:</td>
<td></td>
</tr>
<tr>
<td><a href="http://www.siemens.com/weighing-technology">www.siemens.com/weighing-technology</a></td>
<td></td>
</tr>
<tr>
<td>Configuration package</td>
<td>7MH4910-0AK01</td>
</tr>
<tr>
<td>SIWAREX CS on CD-ROM for SIMATIC ST, version V5.4 or higher</td>
<td></td>
</tr>
<tr>
<td>• Software for SIWATOOL CS scale adjustment (in a range of languages)</td>
<td></td>
</tr>
<tr>
<td>• Manuals available on CD (in a range of languages)</td>
<td></td>
</tr>
<tr>
<td>• SIWAREX CS &quot;Getting started&quot;</td>
<td></td>
</tr>
<tr>
<td>SIWATOOL cable from SIWAREX U/CS with serial PC interface, for 9-pin PC interfaces (RS 232), 3 m long</td>
<td>7MH4607-8CA</td>
</tr>
<tr>
<td>Installation material (mandatory)</td>
<td></td>
</tr>
<tr>
<td>Terminal module TM-E 30 mm wide (required for each SIWAREX module)</td>
<td>6ES7193-4CG20-0AA0</td>
</tr>
<tr>
<td>Shield contact element</td>
<td>6ES7193-4GA00-0AA0</td>
</tr>
<tr>
<td>Contents 5 items, sufficient for 5 cables</td>
<td></td>
</tr>
<tr>
<td>Shield connection terminal</td>
<td>6ES7193-4GB00-0AA0</td>
</tr>
<tr>
<td>Contents: 5 items, sufficient for 5 cables</td>
<td></td>
</tr>
<tr>
<td>Note: one shield connection terminal is required each for the</td>
<td></td>
</tr>
<tr>
<td>• scales connection and</td>
<td></td>
</tr>
<tr>
<td>• TTY interface or</td>
<td></td>
</tr>
<tr>
<td>• RS 232 interface</td>
<td></td>
</tr>
<tr>
<td>N busbar, galvanized</td>
<td>8WA2842</td>
</tr>
<tr>
<td>3 x 10 mm, 1.0 m long</td>
<td></td>
</tr>
<tr>
<td>Feeder terminal for N busbar</td>
<td>8WA2868</td>
</tr>
</tbody>
</table>

## Accessories

<table>
<thead>
<tr>
<th>Description</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>SIWAREX JB junction box, aluminium housing</td>
<td>7MH4710-1BA</td>
</tr>
<tr>
<td>for connecting up to 4 load cells in parallel, and for connecting several junction boxes</td>
<td></td>
</tr>
<tr>
<td>SIWAREX JB junction box, stainless steel housing</td>
<td>7MH4710-1EA</td>
</tr>
<tr>
<td>for connecting up to 4 load cells in parallel</td>
<td></td>
</tr>
<tr>
<td>Ex interface, type SIWAREX Pi</td>
<td>7MH4710-5AA</td>
</tr>
<tr>
<td>With UL and FM approvals, but without ATEX approval, for intrinsically-safe connection of load cells, suitable for the SIWAREX U, CS, MS, FTA, FTC and M weighing modules. Not approved for use in the EU.</td>
<td></td>
</tr>
<tr>
<td>Manual for Ex interface type SIWAREX Pi</td>
<td>C71000-T5974-C29</td>
</tr>
<tr>
<td>Ex interface, type SIWAREX IS</td>
<td></td>
</tr>
<tr>
<td>With ATEX approval, but without UL and FM approvals for intrinsically-safe connection of load cells, including manual, suitable for the SIWAREX U, CS, MS, FTA, FTC, M and CF weighing modules. Approved for use in the EU.</td>
<td></td>
</tr>
<tr>
<td>• With short-circuit current &lt; 199 mA DC</td>
<td>7MH4710-5BA</td>
</tr>
<tr>
<td>• With short-circuit current &lt; 137 mA DC</td>
<td>7MH4710-5CA</td>
</tr>
</tbody>
</table>

## Cable (optional)

<table>
<thead>
<tr>
<th>Description</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cable Li2Y 1 x 2 x 0.75 ST + 2 x (2 x 0.34 ST) - CY, orange sheath</td>
<td>7MH4702-8AG</td>
</tr>
<tr>
<td>to connect SIWAREX U, CS, MS, FTA, FTC, M and CF to the junction box (JB), extension box (EB) or Ex interface (Ex-I) or between two JBs, for fixed laying, occasional bending permitted, 10.8 mm outer diameter, for ambient temperature -40 ... +80 °C</td>
<td></td>
</tr>
<tr>
<td>Cable Li2Y 1 x 2 x 0.75 ST + 2 x (2 x 0.34 ST) - CY, blue sheath</td>
<td>7MH4702-8AF</td>
</tr>
<tr>
<td>to connect the junction box (JB) or extension box (EB) in a potentially explosive atmosphere to the Ex interface (Ex-I), for fixed laying, occasional bending permitted, blue PVC insulating sheath, approx. 10.8 mm outer diameter, for ambient temperature -40 ... +80 °C</td>
<td></td>
</tr>
<tr>
<td>Cable LiYC 4 x 2 x 0.25 mm² D)</td>
<td>7MH4407-8BD0</td>
</tr>
<tr>
<td>for TTY (connect 2 pairs of conductors in parallel), for connection of a remote display</td>
<td></td>
</tr>
</tbody>
</table>

---

© Siemens AG 2011

**Modification June 2011**
SIWAREX MS

Overview

SIWAREX MS is a versatile weighing module for all simple weighing and force measuring tasks. The compact module is easy to install in the SIMATIC S7-200 automation systems. The data for the actual weight can be accessed directly in the SIMATIC CPU without the need for any additional interfaces.

Benefits

SIWAREX MS offers the following key advantages:

- Uniform design technology and consistent communication in SIMATIC S7-200
- Uniform configuration with STEP 7 Micro/WIN
- Measurement of weight or force with a high resolution of 65000 parts and an accuracy of 0.05 %
- Simple configuration with the ready to use software "Getting started"
- Simple adjustment of the scale using the SIWATOOL MS PC program via the RS 232 interface
- Supports theoretical adjustment without adjustment weights
- Supports replacement of module without renewed adjustment of scale
- For use in Ex zone 2, intrinsically-safe load cell powering for zone 1 over Ex interface
- Supports direct connection of a remote display to TTY interface

Application

SIWAREX MS is the optimum solution wherever strain gauge sensors, such as load cells, force sensors or torque measuring shafts, are used for measuring tasks. The following are typical SIWAREX MS applications:

- Non-automatic weighing machines
- Simple discontinuous weighing processes
- Fill level monitoring of silos and bunkers
- Measuring of crane and cable loads
- Load measuring for industrial lifts and rolling mills
- Weighing in potentially explosive areas (zone 2 or zone 1 using Ex interface SIWAREX IS or PI)
- Monitoring of belt tension
- Force measuring, weighing hoppers, platform scales and crane scales

Design

SIWAREX MS is a compact module in SIMATIC S7-200 and can be directly mounted on a 35-mm rail to EN 50022, but is also suitable for direct wall mounting. The power supply, load cells and the optional remote display are all connected using screw-type terminals. The serial RS 232 interface is connected over a 9-pin Sub-D connector.

Function

The primary task of SIWAREX MS is the measurement of sensor voltage and the conversion of this measurement into a weight value. Up to 3 interpolation points are used for the weight calculation. The signal can also be digitally filtered if required.

As well as determining weights, the SIWAREX MS monitors two freely programmable limits (min./max. as required) and quickly notifies the SIMATIC CPU using status bits if these values are exceeded.

The SIWAREX MS comes factory-calibrated. This means that theoretical adjustment of the scale is possible without adjustment weights, and that modules can be replaced without the need to readjust the scale.

Consistent and uniform communication between all system components enables fast, reliable and cost-effective integration and diagnosis in industrial processes.

The SIWAREX MS has two serial interfaces. The TTY interface serves to connect digital remote displays. The remote displays show the weight value with status information.

A PC for parameterizing the SIWAREX MS can be connected through the RS 232 interface. Alternatively, this interface can also be used for serial connection (SIWAREX protocol) to a host computer (e.g. PC).

SIWAREX MS is integrated into the plant software over STEP 7-Micro/WIN 32. In contrast to serially linked weighing electronics, SIWAREX MS does not need costly additional modules to link it to SIMATIC.

Used in conjunction with SIWAREX MS, it is possible to configure freely programmable, modular weighing systems comprising one or more scales in SIMATIC S7-200.

Scale faceplate in the SIWAREX MS software "Getting started"

In addition to the configuration package, the ready-to-use SIWAREX MS software "Getting started" is available free-of-charge and shows beginners how to integrate the module into a STEP 7 program and offers a basis for application programming. A complete SIWAREX MS scale is then easy to implement in SIMATIC together with a touch panel (TP/OP/MP) as the operator panel. It is also used in the Micro Automation Set 6.
The software for scale adjustment, SIWATOOL MS, can be used to set the SIWAREX weighing modules using the familiar Windows interface without the need for SIMATIC expertise. Screen forms allow all user-definable parameters of the weigh beams to be specified, saved and printed for plant documentation. The diverse diagnostic options provided by SIWATOOL MS ensure fast fault locating in online mode.

The SIWAREX MS weighing module can also be used in potentially explosive areas (zone 2). It can also be used in zone 1 by implementing an optional Ex interface, although SIWAREX MS must be installed in a safe area. The following certification conditions must be observed.

### Technical specifications

#### SIWAREX MS

| Integration in S7-200 automation systems | • CPU 222 (6ES7212-1*B23-0XB0) | • CPU 224 (6ES7214-1*D23-0XB0) | • CPU 224XP (6ES7214-2*D23-0XB0) | • CPU 226 (6ES7216-2*D23-0XB0) |
| Communication interfaces | SIMATIC S7 Bus, RS 232, TTY |
| Connection of remote displays (through TTY interface) | Weight value (gross, net) |
| Adjustment of scales settings | Using PC parameterization software SIWATOOL MS (RS 232) |
| Measuring properties | Error limit to DIN 1319-1 of full-scale value at 20 °C ± 10 K 0.05 % 65535 2 byte (fixed-point) |
| Number of measurements/second | 50 or 30 |
| Digital filter | 0.05 ... 5 Hz (in 7 steps), mean-value filter |
| Weighing functions | Weight values Gross, net Limit values 2 (min./max.) Zero setting function Per command Tare function Per command Tare specification Per command |
| Load cells | Strain gages in 4-wire or 6-wire system |
| Load cell powering | Supply voltage $U_s$ (rated value) 6 V DC typical Max. supply current $\leq$ 150 mA Permissible load impedance $R_{L\text{min}}$ > 40 Ω $R_{L\text{max}}$ < 4010 Ω With SIWAREX IS Ex interface or SIWAREX Pi: $R_{L\text{min}}$ > 87 Ω $R_{L\text{max}}$ < 4010 Ω |

#### Load cell characteristic 1 mV/V ... 4 mV/V

#### Permissible range of measuring signal (at greatest set characteristic value) -2.4 ... +26.4 mV

#### Max. distance of load cells 500 m

#### Intrinsically-safe load cell powering

#### Connection to load cells in Ex zone 1 Optionally over SIWAREX IS Ex interface or SIWAREX Pi:

#### Ex approvals and safety CE, ATEX 95, FM, cULus Haz. Loc.

#### Power supply

| Rated voltage 24 V DC |
| Max. current consumption 130 mA |
| Rated voltage (from CPU) 5 V DC |
| Max. current consumption 140 mA |

#### IP degree of protection to EN 60529; IEC 60529 IP20

#### Climatic requirements $T_{\text{min}}$ (IND) to $T_{\text{max}}$ (IND) (operating temperature)

| Vertical installation 0 ... +55 °C |
| Horizontal installation 0 ... +40 °C |

#### EMC requirements according to EN 61326, EN 45501 NAMUR NE21, Part 1

#### Dimensions 71.2 x 80 x 62 mm
## Weighing Electronics

**SIWAREX - PLC-based weighing modules**

<table>
<thead>
<tr>
<th>Selection and Ordering data</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>SIWAREX MS D)</td>
<td>7MH4930-0AA01</td>
</tr>
<tr>
<td>Weighing electronics for scales in SIMATIC S7-200 for applications without obligation of verification</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SIWAREX MS Manual available in a range of languages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Free download on the Internet: <a href="http://www.siemens.com/weighing-technology">www.siemens.com/weighing-technology</a></td>
</tr>
</tbody>
</table>

### Configuration package

**SIWAREX MS on CD-ROM for STEP7 Micro/WIN, version 4.0 SP2 or higher**
- Software for SIWATOOL MS scale adjustment (in a range of languages)
- Manuals available on CD (in a range of languages)
- Micro/WIN Library MicroScale for communication with SIWAREX MS

<table>
<thead>
<tr>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>7MH4930-0AK01</td>
</tr>
</tbody>
</table>

**SIWAREX MS “Getting started”**

Sample software show beginners how to program the scales.

Free download on the Internet: [www.siemens.com/weighing-technology](http://www.siemens.com/weighing-technology)

**SIWATOOL cable**

from SIWAREX M, FTA, FTC, MS with serial PC interface, for 9-pin PC interfaces (RS 232)
- 2 m long
- 5 m long

<table>
<thead>
<tr>
<th>7MH4702-8CA</th>
</tr>
</thead>
<tbody>
<tr>
<td>7MH4702-8CB</td>
</tr>
</tbody>
</table>

**Shield clamps for shield termination**

Pack of 10; 1 item required for each shielded cable

| 6ES5728-8MA11 |

### Remote displays (option)

The digital remote displays can be connected directly to the SIWAREX MS through the TTY interface.

The following remote display can be used: S102

**Siebert Industrielektronik GmbH**

P.O. Box 1180
D-66565 Eppelborn
Tel.: 06806/980-0
Fax: 06806/980-999

[Internet: http://www.siebert.de](http://www.siebert.de)

Detailed information available from manufacturer.

### Accessories

**SIWAREX JB junction box, aluminium housing**

for connecting up to 4 load cells in parallel, and for connecting several junction boxes

| 7MH4710-1BA |

**SIWAREX JB junction box, stainless steel housing**

for connecting up to 4 load cells in parallel

| 7MH4710-1EA |

### Configuration package

**Ex interface, type SIWAREX Pi**

With UL and FM approvals, but without ATEX approval for intrinsically safe connection of load cells, suitable for weighing modules SIWAREX U, CS, MS, FTA, FTC and M.

Not approved for use in the EU.

<table>
<thead>
<tr>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>7MH4710-5AA</td>
</tr>
</tbody>
</table>

**Manual for Ex interface type SIWAREX Pi**

| C71000-T5974-C29 |

**Ex interface, type SIWAREX IS**

With ATEX approval, but without UL and FM approvals for intrinsically-safe connection of load cells, including manual, suitable for the SIWAREX U, CS, MS, FTA, FTC, M and CF weighing modules.

Approved for use in the EU.

- With short-circuit current < 199 mA DC
- With short-circuit current < 137 mA DC

| 7MH4710-5BA |
| 7MH4710-5CA |

### Cable (optional)

**Cable Li2Y 1 x 2 x 0.75 ST + 2 x (2 x 0.34 ST) - CY, orange sheath**

to connect SIWAREX U, CS, MS, FTA, FTC, M and CF to the junction box (JB), extension box (EB) or Ex interface (Ex-I) or between two JBs, for fixed laying, occasional bending permitted, 10.8 mm outer diameter, for ambient temperature -40 ... +80 °C

| 7MH4702-8AG |

**Cable Li2Y 1 x 2 x 0.75 ST + 2 x (2 x 0.34 ST) - CY, blue sheath**

to connect the junction box (JB) or extension box (EB) in a potentially explosive atmosphere to the Ex interface (Ex-I), for fixed laying, occasional bending permitted, blue PVC insulating sheath, approx. 10.8 mm outer diameter, for ambient temperature - 40 ... +80 °C

| 7MH4702-8AF |

**Cable LiYCY 4 x 2 x 0.25 mm²**

D) for TTY (connect 2 pairs of conductors in parallel), for connection of a remote display

| 7MH4407-8BD0 |

D) Subject to export regulations AL: N, ECCN: EAR99H.
Overview

The SIWAREX FTA (Flexible Technology, Automatic Weighing Instrument) is a versatile and flexible weighing module for industrial use. It can be used for automatic and non-automatic weighing, e.g. for the production of mixtures, filling, loading, monitoring and bagging.

It has been assigned appropriate scale approvals and is also suitable for calibration plants.

The SIWAREX FTA function module is integrated in SIMATIC S7/PCS7, and uses the features of this modern automation system, such as integral communication, diagnostics and configuration tools.

Benefits

- Uniform design, and totally integrated communication in SIMATIC S7 and SIMATIC PCS 7
- Uniform configuration with SIMATIC
- Direct use in the SIMATIC automation system
- Use in distributed plant concept through connection to PROFIBUS DP/PROFINET using ET 200M
- Measurement of weight or force with high resolution of 16 million intervals
- High accuracy 3 x 6000 d, legal-for-trade
- Optimized measuring accuracy through use of METTLER TOLEDO weighing modules and Modulo WM and Modulo WMH weighing platforms
- Optimized measurement speed through use of Wipotec load cells, type EC and IW
- Connection of digital load cells in accordance with the string vibration measurement method from PESA is possible
- Legal-for-trade display with SIMATIC standard operator panels
- Continuous or stepped feed control
- Exact switching of dosing signals (< 1 ms)
- Parameterizable inputs and outputs
- Parameterizable for highly versatile applications
- Flexible adaptation to different requirements with SIMATIC
- Simple adjustment of scale using the SIWATOOL FTA program

Application

The SIWAREX FTA weighing module is the optimum solution wherever high demands are placed on accuracy and speed. Thanks to its outstanding measuring properties, weights can be measured with extreme accuracy in up to three ranges.

SIWAREX FTA can be used to design legal-for-trade dosing systems, such as filling plants, loading stations, bagging stations, rotopackers, mixers or test stations.

Typical fields of application include:
- Filling of liquids
- Bagging of solid matter (also big bag)
- Proportioning as deduction weighing or fill weighing
- Checking of individual quantities
- Loading or receiving of materials
- Static checkweigher
- Check weigher (in combination with Wipotec load cells)

Design

The SIWAREX FTA is a function module of the SIMATIC S7-300 and can be snapped directly onto the SIMATIC S7-300 or ET 200M backplane bus. The installation/cabling requirements of the 80-mm wide weighing module are extremely low as a result of the DIN rail assembly and snap-on technique.

A standard 40-pin front plug is used to connect the load cells, the RS 485 serial interface, the analog output and the digital inputs/outputs, a 9-pin Sub-D plug to connect the PC (RS 232), and a separate 2-pin plug to connect the power supply.

Operation of the SIWAREX FTA in SIMATIC means that complete integration of the weighing technology into the automation system is guaranteed.

Function

The main tasks of the SIWAREX FTA are the high-precision measurement of the current weight in up to three measuring ranges, and exact control of the weighing procedures.

The weighing module controls the weighing procedures fully automatically. However, integration in SIMATIC means that it is also possible to directly influence the weighing procedures using a PLC program. This means that the tasks can be sensibly divided: the very fast weighing functions are implemented in the SIWAREX FTA, the interlocking and logic functions in the SIMATIC CPU.
Weighing Electronics
SIWAREX - PLC-based weighing modules

SIWAREX FTA

Weighing functions

The SIWAREX FTA is easy to parameterize according to the various automatic weighing functions.

The following weighing functions can be parameterized:

- Non Automatic Weighing Instrument according to OIML R76
- Automatic Gravimetric Filling Instrument according to OIML R61
- Automatic Catchweighing Instrument according to OIML R51
- Discontinuous Totalizing Automatic Weighing Instrument (Totalizing Hopper Weigher) according to OIML R107

Monitoring and control of the load cell signals and statuses

During the weighing procedure, the SIWAREX FTA weighing module monitors and controls the load cell signals and statuses.

The optimized exchange of data within SIMATIC permits direct evaluation of the load cell signals and statuses in the PLC program.

Influencing of the weighing sequences by the PLC means that the SIWAREX FTA can be easily adapted to any modifications in system technology.

The SIWAREX FTA is already factory-calibrated. This means that the theoretical adjustment of the scale is possible without adjustment weights, and that modules can be replaced without readjustment of the scale. When using “active bus modules”, replacement is also possible during operation.

Integration in SIMATIC

SIWAREX FTA is completely integrated into the SIMATIC S7 and SIMATIC PCS 7. Users can freely configure their automation solution – including the weighing application.

The right combination of SIMATIC components can produce optimum solutions for small, medium-size and large plants. The scales are operated and monitored using SIMATIC standard operator panels. These operator panels (also touch panels such as the TP177B) can also be simultaneously used for the operation and monitoring of the plant.

Customized or sector-specific solutions can be developed extremely quickly using the configuration package and example applications for SIMATIC. The following Figure shows a typical configuration of a medium-size plant.

The ready-to-use function blocks for the automation system and the faceplates for the operator station are used for the configuration in SIMATIC PCS 7.

Software

SIWATOOL FTA commissioning software

SIWATOOL FTA is a special program for commissioning and servicing and runs with Windows operating systems.

The program enables the scales to be set without the need for prior knowledge of the automation system. When servicing, the technician can use a PC to analyze and test the procedures in the scale. Reading out the diagnostics buffer from the SIWAREX FTA is extremely helpful when analyzing events.

The following are just some of the tasks that can be carried out using SIWATOOL FTA:

- Parameterization and adjustment of the scale
- Testing of scale properties
- Saving and printing scale data
- Recording and analysis of weighing sequence

The following Figure shows the design of the individual program windows.

Fast advanced parameterization of the module can be carried out using the “Fast parameterization” function. Answering just a few questions approximately presets the parameters.
It is also extremely helpful to analyze the diagnostics buffer which can be saved together with the parameters following reading out from the module.

The SIWAREX FTA weighing module includes a trace mode for optimization of weighing sequences. The recorded weight values and associated statuses can be displayed as traces using SIWATOOL FTA and MS Excel.

Upgrading of firmware
A further program function can be used to download a new firmware version onto the SIWAREX FTA on site. This means that firmware upgrades can be carried out on site as required anywhere in the world.

Reading out of weighing reports
The weighing reports are saved on an MMC (Micro Memory Card) inserted in the SIWAREX FTA for the duration specified by the weights and measures act. If complaints are received concerning a particular weighing procedure, the associated data can be read out of the MMC using SIWATOOL.

SIWAREX FTA – simple configuration
Integration in SIMATIC results in freely-programmable, modular weighing systems which can be modified according to operational requirements.

The ready-to-use SIWAREX FTA software "Getting started" is also available free-of-charge and shows beginners how to integrate the module into a STEP 7 program and offers a basis for application programming. A SIWAREX FTA scale can then be simply implemented in SIMATIC together with a touch panel (TP/OP/MP) as the operator panel - even for legal-for-trade applications.

Scale faceplate in the SIWAREX FTA software "Getting started"
In addition, the STEP 7 programs SIWAREX FTA Multiscale and SIWAREX FTA Multifill provide a professional basis for implementation of batching plants or filling plants.

## Technical specifications

### SIWAREX FTA

**Use in automation systems**

<table>
<thead>
<tr>
<th>System</th>
<th>Interface</th>
</tr>
</thead>
<tbody>
<tr>
<td>S7-300</td>
<td>Directly or via ET 200M</td>
</tr>
<tr>
<td>S7-400 (H)</td>
<td>Via ET 200M</td>
</tr>
<tr>
<td>PCS 7 (H)</td>
<td>Via ET 200M</td>
</tr>
</tbody>
</table>

**Communication interfaces**

<table>
<thead>
<tr>
<th>Interface</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>S7</td>
<td>Through backplane bus</td>
</tr>
<tr>
<td>RS 232</td>
<td>For Siwatool or printer connection</td>
</tr>
<tr>
<td>RS 485</td>
<td>For remote display or digital load cell</td>
</tr>
</tbody>
</table>

**Module parameterization**

Using SIMATIC S7
Using SIWATOOL FTA software (RS 232)

**Measuring properties**

EU type approval as non-automatic weighing machine, trade class III
Internal resolution: 3 x 6000 d ≥ 0.5 µV/e
Internal/external updating rate: 16 million parts/400/100 Hz

**Several parameterizable digital filters**

Critically damped, Bessel, Butterworth (0.05 ... 20 Hz), mean-value filter

**Weighing functions**

Non-automatic weighing machine
OIML R76

Automatic weighing machine
OIML R51, R61, R107

**Load cells**

Strain gages in 4-wire or 6-wire system
3 characteristic value ranges: 1, 2 or 4 mV/V

**Load cell powering**

Supply voltage $U_S$ (rated value): 10.3 V DC
Max. supply current: 184 mA
Permissible load cell resistance
- $R_{L\text{min}} > 56 \Omega$
- $R_{L\text{max}} > 87 \Omega$ with Ex interface
- $R_{L\text{max}} \leq 4010 \Omega$

**Max. distance of load cells**

When using the recommended cable:

- Standard: 1000 m (500 m legal-for-trade)
- In hazardous area: 1000 m
- For gases of group IIC: 300 m
- For gases of group IIB: 1000 m

**Connection to load cells in Ex zone 1**

Optionally via SIWAREX IS Ex interface

**Ex approvals zone 2 and safety**

ATEX 95, FM, cULus Haz. Loc.

**Power supply**

Rated voltage: 24 V DC
Max. current consumption: 500 mA
Current consumption from backplane bus: Typ. 55 mA
## Weighing Electronics

**SIWAREX - PLC-based weighing modules**

| **SIWAREX FTA** |
|-----------------|-----------------|
| **Inputs/outputs** |                  |
| Digital inputs | 7 electrically isolated |
| Digital outputs | 8 electrically isolated |
| Counter input | Up to 10 kHz |
| Analog output |                  |
| • Current range | 0/4 ... 20 mA |
| • Updating rate | 100 Hz |
| **Approvals** | EU type approval (CE, OIML R76) |
| | EU prototype test to MID (OIML R51, R61, R107) |
| **Degree of protection to DIN EN 60529; IEC 60529** | IP20 |
| **Climatic requirements** |                  |
| $T_{\text{min}}$ (IND) ... $T_{\text{max}}$ (IND) (operating temperature) |                  |
| • Vertical installation | -10 ... 60 °C |
| • Horizontal installation | -10 ... 40 °C |
| **EMC requirements** | EN 61326, EN 45501, NAMUR NE21, Part 1 |
| **Dimensions** | 80 x 125 x 130 mm |
| **Weight** | 600 g |

1) For further details, see Ex interface, type SIWAREX IS
# Selection and Ordering data

<table>
<thead>
<tr>
<th>SIWAREX FTA</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Legal-for-trade weighing electronics for automatic scales for S7-300 and ET 200M. EU type approval 3 x 6000 d. Applications: proportioning, filling, bagging, loading. Note: Observe approval conditions for applications with obligation of verification. We recommend using our calibration set and contacting our SIWAREX hotline.</td>
<td>7MH4900-2AA01</td>
</tr>
</tbody>
</table>

## SIWAREX FTA Manual
- Available in a range of languages
- Free download from the Internet at: [www.siemens.de/waegetechnik](http://www.siemens.de/waegetechnik)

## SIWAREX FTA "Getting started"
- Sample software shows beginners how to program the scales in STEP 7.
- Free download from the Internet at: [www.siemens.de/waegetechnik](http://www.siemens.de/waegetechnik)

## SIWAREX FTA configuration package for SIMATIC S7 on CD-ROM
- HSP Hardware Support Package for integrating SIWAREX FTA/FTC in STEP 7
- SIWAREX FTA "Getting started"
- SIWATOOL FTA commissioning software
- Flexible software for legal-for-trade display in WinCC
- Manual

## SIWAREX FTA configuration package for PCS 7 V6.x on CD-ROM
- HSP Hardware Support Package for integrating SIWAREX FTA/FTC in STEP 7
- Function block for CFC
- Faceplate
- SIWATOOL FTA commissioning software
- Manual

## SIWAREX FTA configuration package for PCS 7 V7.0 on CD-ROM
- HSP Hardware Support Package for integrating SIWAREX FTA/FTC in STEP 7
- Function block for CFC
- Faceplate
- SIWATOOL FTA commissioning software
- Manual

## Calibration set for SIWAREX FTA
- For verification of up to 5 scales comprising:
  - 3 x inscription foil for labeling
  - 1 x protection foil
  - 10 x EU verification marks (black M on green background)
  - Guidelines for verification, verification certificates and approvals, adaptable label, SIWAREX FTA Manual on CD-ROM

## SIWAREX Multiscale
- STEP 7 software for SIWAREX FTA
- Control of one or more scales for a scalable number of components and any number of recipes.
- Applications: batching plants, mixers in production process, CD-ROM

## SIWAREX Multifill
- STEP 7 software for SIWAREX FTA
- Control of filling and bagging processes for one or more filling stations and any number of materials, CD-ROM

## SIWATOOL cable
- From SIWAREX FTA with serial PC interface, for 9-pin PC interfaces (RS 232)
- 2 m long
- 5 m long

## 40-pin front plug with screw contacts
- (required for each SIWAREX module), alternatively with spring-loaded contacts

## 40-pin front plug with spring-loaded contacts
- (required for each SIWAREX module), alternatively with screw contacts

## Shield contact element
- Sufficient for one SIWAREX FTA module

## Shield connection terminal
- Contents: 2 units (suitable for cable with diameter 4 ... 13 mm)
- Note: one shield connection terminal each is required for:
  - Scale connection
  - RS 485 interface
  - RS 232 interface

## S7 DIN rail
- 160 mm
- 480 mm
- 530 mm
- 830 mm
- 2000 mm

© Siemens AG 2011
## Weighing Electronics

### SIWAREX - PLC-based weighing modules

#### SIWAREX FTA

<table>
<thead>
<tr>
<th>Order No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>6ES7307-1BA00-0AA0</td>
<td>PS 307 load power supply (only required if DC 24 V is not available) 120/230 V AC; 24 V DC</td>
</tr>
<tr>
<td>6ES7307-1EA00-0AA0</td>
<td>6ES7307-1KA00-0AA0</td>
</tr>
<tr>
<td>7MH4900-2AY20</td>
<td>MMC memory for data recording up to 16 MByte</td>
</tr>
</tbody>
</table>

#### Cable (optional)

<table>
<thead>
<tr>
<th>Order No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>7MH4770-2AY20</td>
<td>Cable Li2Y 1 x 2 x 0.75 ST + 2 x (2 x 0.34 ST) - CY, orange sheath to connect SIWAREX U, CS, MS, FTA, FTC, M and CF to the junction box (JB), extension box (EB) or Ex interface (Ex-I) or between two JBs, for fixed laying, occasional bending permitted, 10.8 mm outer diameter, for ambient temperature -40 ... +80 °C</td>
</tr>
<tr>
<td>7MH4770-2BA00</td>
<td>Cable Li2Y 1 x 2 x 0.75 ST + 2 x (2 x 0.34 ST) - CY, blue sheath to connect the junction box (JB) or extension box (EB) in a potentially explosive atmosphere to the Ex interface (Ex-I), for fixed laying, occasional bending permitted, blue PVC insulating sheath, approx. 10.8 mm outer diameter, for ambient temperature -40 ... +80 °C</td>
</tr>
<tr>
<td>7MH4770-2CA00</td>
<td>Cable Li2Y 1 x 2 x 0.75 ST + 2 x (2 x 0.34 ST) - CY, black sheath to connect SIWAREX U, CS, MS, FTA, FTC, M and CF to the junction box (JB), extension box (EB) or Ex interface (Ex-I) or between two JBs, for fixed laying, occasional bending permitted, black PVC insulating sheath, approx. 10.8 mm outer diameter, for ambient temperature -40 ... +80 °C</td>
</tr>
<tr>
<td>7MH4407-8BD0</td>
<td>Cable LiYCY 4 x 2 x 0.25 mm² to connect a remote display for TTY (connect 2 pairs of conductors in parallel), for connection of a remote display</td>
</tr>
</tbody>
</table>

#### Remote display (optional)

- The Siebert S102 and S302 remote digital display can be directly connected to the SIWAREX FTA via an RS 485 interface.

#### Ex interface, type SIWAREX Pi

- With UL and FM approvals, but without ATEX approval for intrinsically-safe connection of load cells, suitable for the SIWAREX U, CS, MS, FTA, FTC and M weighing modules.
- Not approved for use in the EU.

#### Ex interface, type SIWAREX IS

- With ATEX approval, but without UL and FM approvals for intrinsically-safe connection of load cells, including manual, suitable for the SIWAREX U, CS, MS, FTA, FTC, M and CF weighing modules.
- Approved for use in the EU.
  - With short-circuit current < 199 mA DC
  - With short-circuit current < 137 mA DC
Overview

The SIWAREX FTC (Flexible Technology for Continuous Weighing) is a versatile and flexible weighing module for conveyor scales, loss-in-weight scales and bulk flow meters. It can also be used to record weights and measure force. The SIWAREX FTC function module is integrated in SIMATIC S7/PCS7, and uses the features of this modern automation system, such as integral communication, diagnostics and configuration tools.

Benefits

- Uniform design, and totally integrated communication in SIMATIC S7 and SIMATIC PCS 7
- Uniform configuration with SIMATIC
- Direct use in the SIMATIC automation system
- Use in distributed plant concept through connection to PROFIBUS DP/PROFINET using ET 200M
- Measurement of weight or force with high resolution of 16 million intervals
- High accuracy 3 x 6000 d
- Optimized measuring accuracy through use of METTLER TOLEDO weighing modules and Modulo WM and Modulo WMH weighing platforms (specially for loss-in-weight scales and small mass flows)
- Optional connection to PESA load cells
- Display with SIMATIC standard operator panels
- Parameterizable inputs and outputs
- Parameterizable for highly versatile applications
- Flexible adaptation to different requirements with SIMATIC
- Simple adjustment of scale using the SIWATOOL FTC program
- Theoretical adjustment without adjustment weights
- Replacement of module without renewed adjustment of scale
- Recording of weighing sequence
- 8 totalization memories with different digit intervals
- Can be used in Ex applications

Application

The SIWAREX FTC weighing module is the optimum solution wherever high demands are placed on continuous weighing procedures. Thanks to its outstanding measuring properties, weights can be measured with extreme accuracy in up to three ranges. In the case of force measurements, the value can be measured bidirectionally.

Typical applications for SIWAREX FTC include:
- Flowrate/flow measurement
- Belt volume measurement
- Material loading, summation
- Flowrate/flow control
- Belt load measurement

Design

The SIWAREX FTC is a function module of the SIMATIC S7-300 and can be snapped directly onto the SIMATIC S7-300 or ET 200M backplane bus. The installation/cabling requirements of the 80-mm wide weighing module are extremely low as a result of the DIN rail assembly and snap-on technique.

A standard 40-pin front plug is used to connect the load cells, the RS 485 serial interface, the analog output and the digital inputs/outputs, a 9-pin Sub-D plug to connect the PC (RS 232), and a separate 2-pin plug to connect the power supply.

Operation of the SIWAREX FTC in SIMATIC means that complete integration of the conveyor scale into the automation system is guaranteed.

Function

The main tasks of SIWAREX FTC are the high-precision measurement of the actual weight in up to three measuring ranges, and the exact calculation of the conveyed quantity and flow. In “Force measurement” mode, the force is measured bidirectionally.

The conveyed quantity can be recorded in 8 totalization memories. Through integration in SIMATIC it is also possible to directly control scale operation by means of a PLC program. This means that the tasks can be sensibly divided: the weighing functions are implemented in the SIWAREX FTC, the interlocking and logic functions for the plant control in the SIMATIC CPU.

Weighing functions

The following operating modes can be set:
- Weight measurement and force measurement

In this operating mode, the weight value/force is determined, processed in the PLC and then displayed.
Belt scale/ weighfeeder

The functions of a belt scale are implemented in this operating mode. Calculations are performed for the typical process values: belt load, flowrate and belt speed. Commands can be used to control the belt and display the required values. A weighfeeder can be implemented by activating the SIMATIC PID controller.

Loss-in-weight scale

The functions of a differential proportioning weigher are implemented in this operating mode. The actual weight of the container is measured and the flowrate is regulated according to the preset setpoint.

Application-specific parameters, such as proportioning parameters, device and material characteristics, can be set directly in SIWAREX FTC. Various commands are available that have been fine-tuned to the requirements of the loss-in-weight scale, such as proportioning (manual, automatic, gravimetric, volumetric), filling and emptying.

The high measurement resolution, real-time signal processing, detection and filtering of signals in the weighing electronics enable extremely high proportioning accuracy.

Bulk flow meter

The functions of a bulk flow meter are implemented in this operating mode. The calculations for the typical process values; flow and conveyed quantity, are performed in the SIWAREX module. Application-specific parameters for setting the scales and commands for their operation are also available.

Monitoring and control of the load cell signals and statuses

The SIWAREX FTC weighing module monitors the statuses during the weighing process, and informs the operator of any irregularities. The optimized exchange of data within SIMATIC permits direct evaluation of the load cell signals in the PLC program.

Influencing of the weighing sequences by the PLC means that the SIWAREX FTC can be easily adapted to any modifications in system technology.

The SIWAREX FTC is already factory-calibrated. This means that the theoretical adjustment of the scale is possible without adjustment weights, and that modules can be replaced without readjustment of the scale. If "active bus modules" are used, modules can also be hot-swapped.
Integration in SIMATIC

SIWAREX FTC is completely integrated into the SIMATIC S7 and SIMATIC PCS 7. Users can freely configure their automation solution – including the weighing application.

The right combination of SIMATIC components can produce optimum solutions for small, medium-size and large plants. The scales are operated and monitored using SIMATIC standard operator panels. These operator panels (also touch panels, such as the TP177B) can also be simultaneously used for the operation and monitoring of the plant.

Customized or sector-specific solutions can be developed extremely quickly using the configuration package and example applications for SIMATIC. The following Figure shows a typical configuration of a medium-size plant.

The ready-to-use function blocks for the automation system and the faceplates for the operator station are used for the configuration in SIMATIC PCS 7.

Software

Adjustment of the scale using SIWATOOL FTC

SIWATOOL FTC is a special program for adjusting and servicing the scale and runs with Windows operating systems.

The program enables the scales to be commissioned without the need for prior knowledge of the automation system. When servicing, the technician can use a PC to analyze and test the procedures in the scale. Reading out the diagnostics buffer from the SIWAREX FTC is extremely helpful when analyzing events.

The following are just some of the tasks that can be carried out using SIWATOOL FTC:
- Parameterization and adjustment of the scale
- Testing of scale properties
- Saving and printing scale data
- Recording and analysis of weighing sequence

Upgrading of firmware

A further program function can be used to download a new firmware version onto the SIWAREX FTC on site. This means that firmware upgrades can be carried out on site as required anywhere in the world.

Reading out of weighing reports

The totalization memories can be saved on a MMC (Micro Memory Card) inserted into the SIWAREX FTC.

SIWAREX FTC – simple configuring

Integration in SIMATIC can result in freely-programmable, modular weighing systems for belt scales, bulk flow meters and loss-in-weight scales, which can be modified to meet operational requirements.

A free version of the ready-to-use SIWAREX FTC software “Getting started” is also available respectively for the belt scale, bulk flow meter and loss-in-weight feeder modes. It shows beginners how to integrate the module into a STEP 7 program and provides a basis for application programming. A SIWAREX FTC belt scale can then be easily implemented in SIMATIC together with a touch panel (TP/OP/MP) as the operator panel.
Technical specifications

SIWAREX FTC

Use in automation systems
- S7-300: Directly or via ET 200M
- S7-400 (H): Via ET 200M
- PCS 7 (H): Via ET 200M

Communication interfaces
- S7: Through backplane bus
- RS 232: For SIWATOOL or printer connection
- RS 485: For remote display or digital load cell

Module parameterization
- Using SIMATIC S7
- Using SIWATOOL FTC software (RS 232)

Measuring properties
- Accuracy to EN 45501: 3 x 6000 d ≥ 0.5 μV/e
- Internal resolution: +/- 8 million parts
- Internal/external updating rate: 400/100 Hz

Several parameterizable digital filters
- Critically damped, Bessel, Butterworth (0.05 ... 20 Hz), mean-value filter

Weighing functions
- Non-automatic weighing machine, force measurement
- Conveyor scale
- Differential proportioning weigher
- Bulk flow meter

Load cells
- Strain gages in 4-wire or 6-wire system
- 3 characteristic value ranges: 1, 2 or 4 mV/V

Load cell powering
- Supply voltage $U_s$ (rated value): 10.3 V DC
- Max. supply current: 184 mA
- Permissible load cell resistance:
  - $R_{L_{\text{min}}}$: > 56 Ω
  - $R_{L_{\text{max}}}$: > 87 Ω with Ex interface
  - ≤ 4010 Ω

Max. distance of load cells
- When using the recommended cable:
  - Standard: 1000 m
  - In hazardous area:
    - For gases of group IIC: 300 m
    - For gases of group IIB: 1000 m

Connection to load cells in Ex zone 1
- Optionally via SIWAREX IS Ex interface

Ex approvals zone 2 and safety
- ATEX 95, FM, cULUS Haz. Loc.

Power supply
- Rated voltage: 24 V DC
- Max. current consumption: 500 mA
- Current consumption from backplane bus: Typ. 55 mA

Inputs/outputs
- Digital inputs: 7 electrically isolated
- Digital outputs: 8 electrically isolated
- Counter input: Up to 10 kHz
- Analog output:
  - Current range: 0/4 ... 20 mA
  - Updating rate: 100 Hz

Degree of protection to DIN EN 60529; IEC 60529
- IP20

Climatic requirements
- $T_{\text{min}}$ (IND) ... $T_{\text{max}}$ (IND) (operating temperature): -10 ... 60 °C
- Vertical installation: -10 ... 40 °C
- Horizontal installation: -10 ... 40 °C

EMC requirements
- EN 61326, EN 45501, NAMUR NE21, Part 1

Dimensions
- 80 x 125 x 130 mm

Weight
- 600 g

1) For further details, see Ex interface, type SIWAREX IS

Modification: June 2011
## Selection and Ordering data

<table>
<thead>
<tr>
<th>Description</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SIWAREX FTC</strong>&lt;br&gt; Weighing electronics for S7-300 and ET 200M. Applications: Belt scales, force measurement, loss-in-weight scales and bulk flow meters</td>
<td>7MH4900-3AA01</td>
</tr>
<tr>
<td><strong>SIWAREX FTC_B Manual for belt scales</strong>&lt;br&gt; Available in a range of languages&lt;br&gt; Free download from the Internet at: <a href="http://www.siemens.de/waegetechnik">www.siemens.de/waegetechnik</a></td>
<td></td>
</tr>
<tr>
<td><strong>SIWAREX FTC_L Manual for bulk flow meters and loss-in-weight scales</strong>&lt;br&gt; Available in a range of languages&lt;br&gt; Free download from the Internet at: <a href="http://www.siemens.de/waegetechnik">www.siemens.de/waegetechnik</a></td>
<td></td>
</tr>
<tr>
<td><strong>SIWAREX FTC_B &quot;Getting started&quot; for belt scales</strong>&lt;br&gt; Sample software shows beginners how to program the scales in STEP 7 for belt scale mode&lt;br&gt; Free download from the Internet at: <a href="http://www.siemens.de/waegetechnik">www.siemens.de/waegetechnik</a></td>
<td></td>
</tr>
<tr>
<td><strong>SIWAREX FTC_B &quot;Getting started&quot; for bulk flow meters</strong>&lt;br&gt; Sample software shows beginners how to program the scales in STEP 7 for bulk flow meter mode&lt;br&gt; Free download from the Internet at: <a href="http://www.siemens.de/waegetechnik">www.siemens.de/waegetechnik</a></td>
<td></td>
</tr>
<tr>
<td><strong>SIWAREX FTC_B &quot;Getting started&quot; for loss-in-weight scales</strong>&lt;br&gt; Sample software shows beginners how to program the scales in STEP 7 for loss-in-weight scale mode&lt;br&gt; Free download from the Internet at: <a href="http://www.siemens.de/waegetechnik">www.siemens.de/waegetechnik</a></td>
<td></td>
</tr>
<tr>
<td><strong>SIWAREX FTC_B configuration package for SIMATIC S7 on CD-ROM (belt scale)</strong>&lt;br&gt; HSP Hardware Support Package for integrating SIWAREX FTA/FTC in STEP 7&lt;br&gt; &quot;Getting started&quot; for belt scales&lt;br&gt; Commissioning software SIWATOOL FTC_B for belt scales&lt;br&gt; Manual</td>
<td>7MH49000-3AK02</td>
</tr>
<tr>
<td><strong>SIWAREX FTC_B configuration package for SIMATIC S7 on CD-ROM (bulk flow meter, loss-in-weight feeder)</strong>&lt;br&gt; HSP Hardware Support Package for integrating SIWAREX FTA/FTC in STEP 7&lt;br&gt; &quot;Getting started&quot; for bulk flow meters&lt;br&gt; &quot;Getting started&quot; for loss-in-weight feeders&lt;br&gt; Commissioning software SIWATOOL FTC_B for bulk flow meters and loss-in-weight feeders&lt;br&gt; Manual</td>
<td>7MH49000-3AK61</td>
</tr>
<tr>
<td><strong>SIWAREX FTC_B configuration package for PCS 7 V6.x, V7.x on CD-ROM (belt scale)</strong>&lt;br&gt; HSP Hardware Support Package for integrating SIWAREX FTA/FTC in STEP 7&lt;br&gt; Function block for CFC&lt;br&gt; Faceplate&lt;br&gt; Commissioning software SIWATOOL FTC_B for belt scales&lt;br&gt; Manual</td>
<td>7MH49000-3AK63</td>
</tr>
<tr>
<td><strong>SIWAREX FTC_B configuration package for PCS 7 V7.0, V7.1 on CD-ROM (bulk flow meter, loss-in-weight feeder)</strong>&lt;br&gt; HSP Hardware Support Package for integrating SIWAREX FTA/FTC in STEP 7&lt;br&gt; Function block for CFC&lt;br&gt; Faceplate&lt;br&gt; Commissioning software SIWATOOL FTC_B for belt scales&lt;br&gt; Manual</td>
<td>7MH49000-3AK64</td>
</tr>
<tr>
<td><strong>SIWATOOL cable from SIWAREX FTC with serial PC interface, for 9-pin PC interfaces (RS 232)</strong>&lt;br&gt; 2 m long&lt;br&gt; 5 m long</td>
<td>7MH4702-8CA 7MH4702-8CB</td>
</tr>
<tr>
<td><strong>40-pin front plug with screw contacts</strong>&lt;br&gt; (required for each SIWAREX module), alternatively with spring-loaded contacts</td>
<td>6ES7392-1AM00-0AA0</td>
</tr>
<tr>
<td><strong>40-pin front plug with spring-loaded contacts</strong>&lt;br&gt; (required for each SIWAREX module), alternatively with screw contacts</td>
<td>6ES7392-1BM01-0AA0</td>
</tr>
</tbody>
</table>
## Weighing Electronics

### SIWAREX - PLC-based weighing modules

#### SIWAREX FTC

<table>
<thead>
<tr>
<th>Description</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shield contact element Sufficient for one SIWAREX FTC module</td>
<td>6ES7390-5AA00-0AA0</td>
</tr>
<tr>
<td>Shield connection terminal Contents: 2 units (suitable for cable with diameter 4 ... 13 mm)</td>
<td>6ES7390-5CA00-0AA0</td>
</tr>
<tr>
<td>Note: one shield connection terminal each is required for:</td>
<td></td>
</tr>
<tr>
<td>- Scale connection</td>
<td></td>
</tr>
<tr>
<td>- RS 485 interface</td>
<td></td>
</tr>
<tr>
<td>- RS 232 interface</td>
<td></td>
</tr>
<tr>
<td>S7 DIN rail</td>
<td></td>
</tr>
<tr>
<td>160 mm</td>
<td>6ES7390-1AB00-0AA0</td>
</tr>
<tr>
<td>480 mm</td>
<td>6ES7390-1AC00-0AA0</td>
</tr>
<tr>
<td>530 mm</td>
<td>6ES7390-1AD00-0AA0</td>
</tr>
<tr>
<td>830 mm</td>
<td>6ES7390-1AE00-0AA0</td>
</tr>
<tr>
<td>2000 mm</td>
<td>6ES7390-1AF00-0AA0</td>
</tr>
<tr>
<td>PS 307 load power supply (only required if DC 24 V is not available)</td>
<td></td>
</tr>
<tr>
<td>120/230 V AC; 24 V DC</td>
<td>6ES7307-1BA00-0AA0</td>
</tr>
<tr>
<td>PS 307-1E; 5 A</td>
<td>6ES7307-1CA00-0AA0</td>
</tr>
<tr>
<td>PS 307-1K; 10 A</td>
<td>6ES7307-1KA00-0AA0</td>
</tr>
<tr>
<td>MMC memory for data recording up to 16 MByte</td>
<td>7MH4900-2AY20</td>
</tr>
</tbody>
</table>

### Remote displays (option)

The Siebert S102 and S302 remote digital display can be directly connected to the SIWAREX FTC via an RS 485 interface. (not suitable for mode "Belt scale")

Siebert Industrielelektronik GmbH
P.O. Box 1180
D-66565 Eppelborn
Tel.: 06806/980-0
Fax: 06806/980-999
Internet: [http://www.siebert.de](http://www.siebert.de)

Detailed information available from manufacturer.

#### SIWAREX JB junction box, aluminium housing

for connecting up to 4 load cells in parallel, and for connecting several junction boxes

<table>
<thead>
<tr>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>7MH4710-1BA</td>
</tr>
</tbody>
</table>

#### SIWAREX JB junction box, stainless steel housing

for connecting up to 4 load cells in parallel

<table>
<thead>
<tr>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>7MH4710-1EA</td>
</tr>
</tbody>
</table>

#### Ex interface, type SIWAREX IS

With ATEX approval, but **without UL and FM approvals** for intrinsically-safe connection of load cells, including manual, suitable for the SIWAREX U, CS, MS, FTA, FTC, M and CF weighing modules. Approved for use in the EU.

- With short-circuit current < 199 mA DC
- With short-circuit current < 137 mA DC

<table>
<thead>
<tr>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>7MH4710-5BA</td>
</tr>
<tr>
<td>7MH4710-5CA</td>
</tr>
</tbody>
</table>

#### Cable (optional)

**Cable Li2Y 1 x 2 x 0.75 ST + 2 x (2 x 0.34 ST) - CY, orange sheath**

to connect SIWAREX U, CS, MS, FTA, FTC, M and CF to the junction box (JB), extension box (EB) or Ex interface (Ex-I) or between two JBs, for fixed laying, occasional bending permitted, 10.8 mm outer diameter, for ambient temperature -40 ... +80 °C

<table>
<thead>
<tr>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>7MH4702-8AG</td>
</tr>
</tbody>
</table>

**Cable Li2Y 1 x 2 x 0.75 ST + 2 x (2 x 0.34 ST) - CY, blue sheath**

to connect the junction box (JB) or extension box (EB) in a potentially explosive atmosphere to the Ex interface (Ex-I), for fixed laying, occasional bending permitted, blue PVC insulating sheath, approx. 10.8 mm outer diameter, for ambient temperature -40 ... +80 °C

<table>
<thead>
<tr>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>7MH4702-8AF</td>
</tr>
</tbody>
</table>

**Cable LiYCY 4 x 2 x 0.25 mm²**

for TTY (connect 2 pairs of conductors in parallel), for connection of a remote display

D) Subject to export regulations AL: N, ECCN: EAR99H.

<table>
<thead>
<tr>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>7MH4407-8BD0</td>
</tr>
</tbody>
</table>
Overview

SIWAREX CF is a transmitter for connecting strain-gauge sensors for tasks such as measuring force and torque. The compact module is easy to install in all SIMATIC automation systems. Complete data access to the current measured values is then possible via the SIMATIC.

Benefits

SIWAREX CF offers the following key advantages:
- Uniform design technology and consistent communication thanks to integration in SIMATIC
- Uniform configuration with SIMATIC
- Use in distributed plant concept through connection to PROFIBUS DP/PROFINET using ET 200S
- Bidirectional measuring with a resolution of 16000 parts and accuracy of 0.15 %

Application

SIWAREX CF is the optimum solution wherever strain-gauge sensors, such as load cells, force sensors or torque measuring shafts, are used for measuring tasks. The following are typical SIWAREX CF applications:
- Monitoring of crane and cable loads
- Measurement of load of conveyor belts
- Overload protection in rolling mills
- Monitoring of belt tension
- Force measurement in testing machines
- Torque and pressure measuring

Design

SIWAREX CF is a compact function module (FM) of the SIMATIC S7 and can be snapped direct onto the SIMATIC ET 200S backplane bus. Assembly and wiring are also greatly simplified by using rails with snap-on technology.

The sensors and the power supply are connected via the standard connection block.

Function

SIWAREX CF provides the voltage supply required by the EMS. The force produces a corresponding measuring signal, which is then further processed in the SIWAREX CF module.

The signal is amplified, coarse-filtered, and then converted to a digital value. A connectable digital filter can additionally reduce noise on the measuring signal.

The digital value is available to the user internally in SIMATIC and can be processed in the control program. For example, the user could further suppress noise through averaging in the SIMATIC CPU or perform a conversion to physical units. The result can be displayed on an operator panel according to requirements.

Consistent and uniform communication between all system components enables fast, reliable and cost-effective integration and diagnosis in industrial processes.

SIWAREX CF can be integrated into the plant software using the classic PLC programming languages; STL (Statement List), LAD (Ladder Diagram) FBD (Function Block Diagram) or SCL (Structured Control Language).

Integration into SIMATIC can result in freely-programmable, modular force measuring systems which can be modified according to operational requirements. The ready-to-use SIWAREX CF software "Getting started" is available free-of-charge and shows beginners how to integrate the module into a STEP 7 program and offers a basis for application programming. This supports the display of the measured values in a SIMATIC panel (TP/OP/MP).

Measured values from three modules in the SIWAREX CF "Getting started" software

In contrast to analog or digitally connected transmitters, SIWAREX CF does not need costly additional modules to link it to SIMATIC.

After the module has been configured in SIMATIC and installed, it is ready for immediate operation. An additional parameterization tool is not required.

The current data are read into the SIMATIC via the I/O area.
# Technical specifications

**SIWAREX CF**

## Integration in automation systems
- S7-400, S7-300, C7
- Automation systems from other vendors: Possible through ET 200S with IM 151-1

## Communication interfaces
- SIMATIC S7 (ET 200S backplane bus), 8 bytes, I/O area

## Module parameterization
- Not required (module is pre-parameterized)

## Measuring properties
- Error limit to DIN 1319-1 of full-scale value at 20 °C ± 0.15 %
- Signal resolution: 14 bits plus 1 bit sign
- Number of measurements/second: 50
- Low-pass filter: Without or 2 Hz
- Sensors: In accordance with the principle of expansion measurement (full bridge)

### Sensor feed
- Supply voltage, short-circuit-proof: 6 V DC ± 5 %
- Permissible sensor resistance:
  - \( R_{L_{\text{min}}} \) > 250 \( \Omega \)
  - \( R_{L_{\text{max}}} \) < 4010 \( \Omega \)
- Permissible sensor cell coefficient: Up to 4 mV/V
- Permissible range of the measuring signal: -25.2 ... +25.2 mV

## Power supply
- Rated voltage: 24 V DC
- Max. current consumption: 150 mA
- Current consumption from backplane bus: Typ. 10 mA

## Connection to sensors in Ex zone 1
- Optionally via SIWAREX IS Ex interface

## Ex approval zone 2 and safety
- ATEX 95, cULus Haz. Loc.

## IP degree of protection to EN 60529; IEC 60529
- IP20

## Climatic requirements
- Min. (\( T_{\text{min}} \)) to Max. (\( T_{\text{max}} \)) (operating temperature):
  - Vertical installation: 0 ... +60 °C
  - Horizontal installation: 0 ... +40 °C

## EMC requirements according to NAMUR NE21, Part 1 and 89/386/EEC

## Dimensions
- 30 x 80 x 50 mm

---

# Selection and Ordering data

**Order No.**

<table>
<thead>
<tr>
<th>SIWAREX CF</th>
<th>7MH4920-0AA01</th>
</tr>
</thead>
<tbody>
<tr>
<td>SIWAREX CF manual</td>
<td>German, English</td>
</tr>
<tr>
<td>Free download on the Internet at:</td>
<td><a href="http://www.siemens.com/weighing-technology">www.siemens.com/weighing-technology</a></td>
</tr>
</tbody>
</table>

**SIWAREX CF “Getting started”**

Sample software for easy acquaintance with programming in STEP 7.

Free download on the Internet at: www.siemens.com/weighing-technology

**Installation material (mandatory)**

**Terminal module**
- TM-E 30 mm wide (required for each SIWAREX module)
- 6ES7193-4CG20-0AA0 or compatible

**Shield contact element**
- Contents: 5 items, sufficient for 5 cables
- 6ES7193-4GA00-0AA0

**Shield connection terminal**
- Contents: 5 items, sufficient for 5 cables
- One shield terminal element is required per sensor cable

## N busbar, galvanized
- 3 x 10 mm, 1.5 m long
- 8WA2842

## Feeder terminal for N busbar
- 8WA2868

**Accessories**

**SIWAREX EB extension box**
- for extending sensor cables
- 7MH4710-2AA

**SIWAREX IS Ex interface**
- With ATEX approval, but without UL and FM approvals, for intrinsically-safe connection of load cells, including Manual, suitable for the SIWAREX U, CS, MS, FTA, FTC and M weighing modules.
- Approved for use in the EU.
- With short-circuit current < 199 mA DC
- With short-circuit current < 137 mA DC
- 7MH4710-5BA

**Cable (optional)**
- Cable Li2Y 1 x 2 x 0.75 ST + 2 x (2 x 0.34 ST) - CY, orange sheath
  - to connect SIWAREX U, CS, MS, FTA, FTC, M and CF to the junction box (JB), extension box (EB) or Ex interface (Ex-I) or between two JBs, for fixed laying, occasional bending permitted, 10.8 mm outer diameter, for ambient temperature -40 ... +80 °C
  - 7MH4702-8AG
Overview

The SIWAREX FTC (Flexible Technology for Continuous Weighing) can be flexibly used for a wide variety of purposes in complex weighing tasks. The SIWAREX FTC module becomes a force measurement module by simply setting the operating mode. The SIWAREX FTC function module is integrated in SIMATIC S7/PCS7, and uses the features of this modern automation system, such as integral communication, diagnostics and configuration tools.

Benefits

- Uniform design and totally integrated communication in SIMATIC S7 and SIMATIC PCS 7
- Uniform configuration with SIMATIC
- Direct use in the SIMATIC automation system
- Use in distributed plant concept through connection to PROFIBUS DP/PROFINET using ET 200M
- Bidirectional force measurement with $\pm 8$ million parts at a measuring rate of 100 measurement per second
- Display with SIMATIC standard operator panels
- Parameterizable inputs and outputs
- Can be parameterized for a huge range of situations
- Flexible adaptation to different requirements with SIMATIC
- Simple adjustment using the SIWATOOL FTC program
- Supports replacement of module without renewed adjustment
- Recording of measuring sequence
- Can be used in Ex applications

Application

The SIWAREX FTC module is the optimum solution wherever high demands are placed on force measurement. As a result of its exceptional measuring properties, bidirectional force can be measured at high accuracy.

More information

A more detailed description and additional technical specifications on SIWAREX FTC can be found under "Weighing electronics".

The SIWAREX FTC (Flexible Technology for Continuous Weighing) can be flexibly used for a wide variety of purposes in complex weighing tasks. The SIWAREX FTC module becomes a force measurement module by simply setting the operating mode. The SIWAREX FTC function module is integrated in SIMATIC S7/PCS7, and uses the features of this modern automation system, such as integral communication, diagnostics and configuration tools.
The SIWAREX Pi Ex interface can be used for the SIWAREX U, CS, MS, FTA, FTC and M weighing modules. It contains 6 safety barriers and has FM approval for devices of Class I Div 1. The Ex interface must be installed outside the potentially explosive area. Not approved for use in the EU.

## Function
### Principle of operation
The safety barriers limit current and voltage in the power, sensor and measuring signal lines of load cells installed in the potentially explosive area.

### Technical specifications

<table>
<thead>
<tr>
<th>SIWAREX Pi Ex interface</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Non-intrinsically-safe circuits</strong></td>
</tr>
<tr>
<td><strong>Load cell powering</strong></td>
</tr>
<tr>
<td>Rated voltage (U_{n1}) &amp; 10 V DC</td>
</tr>
<tr>
<td>Permissible error voltage &amp; 250 V AC</td>
</tr>
<tr>
<td>Internal resistance of the load cells (total) &amp; (\geq 87 \Omega)</td>
</tr>
<tr>
<td><strong>Sensor line</strong></td>
</tr>
<tr>
<td>Rated voltage (U_{n2}) &amp; 10 V DC</td>
</tr>
<tr>
<td>Permissible error voltage &amp; 250 V AC</td>
</tr>
<tr>
<td><strong>Measuring signal line</strong></td>
</tr>
<tr>
<td>Rated voltage (U_{n3}) &amp; 10 (\ldots) 40 mV</td>
</tr>
<tr>
<td>Permissible error voltage &amp; 250 V AC</td>
</tr>
<tr>
<td><strong>Intrinsically-safe circuits</strong></td>
</tr>
<tr>
<td><strong>Load cell powering</strong></td>
</tr>
<tr>
<td>No-load voltage (U_{01}) &amp; (\leq 13.2) V DC</td>
</tr>
<tr>
<td>Voltage against equipotential bonding cond. &amp; (\leq 6.6) V DC</td>
</tr>
<tr>
<td>Short-circuit current (I_{k1}) &amp; (\leq 122) mA</td>
</tr>
<tr>
<td><strong>Sensor line</strong></td>
</tr>
<tr>
<td>No-load voltage (U_{02}) &amp; (\leq 14.4) V DC</td>
</tr>
<tr>
<td>Voltage against equipotential bonding cond. &amp; (\leq 7.2) V DC</td>
</tr>
<tr>
<td>Short-circuit current (I_{k2}) &amp; (\leq 25) mA</td>
</tr>
<tr>
<td><strong>Measuring signal line</strong></td>
</tr>
<tr>
<td>No-load voltage (U_{03}) &amp; (\leq 12.6) V DC</td>
</tr>
<tr>
<td>Voltage against equipotential bonding cond. &amp; (\leq 6.3) V DC</td>
</tr>
<tr>
<td>Short-circuit current (I_{k3}) &amp; (\leq 72) mA</td>
</tr>
</tbody>
</table>

**Total connection values**

(when circuits are connected together)

| Power \(P_0\) & \(\leq 1.93\) W |
| For gas group II C |
| Max. permissible external capacitance \(C_{a3}\) & 210 nF |
| Max. permissible external inductance \(L_a\) & 0.3 mH |
| For gas group II B |
| Max. permissible external capacitance \(C_{a3}\) & 890 nF |
| Max. permissible external inductance \(L_a\) & 1 mH |
### SIWAREX Pi Ex interface

#### General data

| Dimensional drawings
| Housing dimensions | See dimensional drawing |
| Weight, approx. | 2200 g |
| UL/CSA certification | Yes |
| Permissible ambient temperature |
| • During operation | -10 ... +70 °C |
| • During operation for legal-for-trade medium accuracy weighing machine | -10 ... +40 °C |
| • During transportation and storage | -40 ... +85 °C |
| Permissible relative humidity | ≤ 95 % |
| Degree of protection | IP54 |
| Type of explosion protection | Intrinsic safety “i” FM Class I Div. 1 |

#### Dimensional drawings

1 Drilled hole with 7 mm diam. fixing screw
Electrical connections: 2 Pg screwed glands and terminals
Housing material: die-cast aluminum
SIWAREX Pi Ex interface, dimensions in mm

#### Selection and Ordering data

<table>
<thead>
<tr>
<th>Instruction</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Order No.</td>
<td>7MH4710-5AA</td>
</tr>
<tr>
<td>Ex interface, type SIWAREX Pi</td>
<td>With UL and FM approvals, but without ATEX approval for intrinsically-safe connection of load cells, suitable for the SIWAREX U, CS, MS, FTA, FTC, CS and M weighing modules. Not approved for use in the EU.</td>
</tr>
<tr>
<td>Manual for Ex interface type SIWAREX Pi</td>
<td>C71000-T5974-C29</td>
</tr>
</tbody>
</table>

#### Cable (optional)

<table>
<thead>
<tr>
<th>Cable</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>7MH4702-8AG</td>
<td>Cable Li2Y 1 x 2 x 0.75 ST + 2 x (2 x 0.34 ST) - CY, orange sheath to connect SIWAREX U, CS, MS, FTA, FTC, M and CF to the junction box (JB), extension box (EB) or Ex interface (Ex-I) or between two JBs, for fixed laying, occasional bending permitted, 10.8 mm outer diameter, for ambient temperature -40 ... +80 °C</td>
</tr>
<tr>
<td>7MH4702-8AF</td>
<td>Cable Li2Y 1 x 2 x 0.75 ST + 2 x (2 x 0.34 ST) - CY, blue sheath to connect the junction box (JB) or extension box (EB) in a potentially explosive atmosphere to the Ex interface (Ex-I), for fixed laying, occasional bending permitted, blue PVC insulating sheath, approx. 10.8 mm outer diameter, for ambient temperature -40 ... +80 °C</td>
</tr>
</tbody>
</table>
Overview

The SIWAREX IS Ex interface can be used for the SIWAREX U, CS, MS, FTA, FTC, M and CF weighing modules. It contains 6 safety barriers and has the designation to ATEX and EN 50011 II(2)G[EEx ib] IIC. The Ex interface must be installed outside the potentially explosive area. It should be accommodated in the switchgear cabinet, preferably underneath the weighing electronics, and is secured using a 35-mm rail to EN 50 022.

The SIWAREX IS only interferes with the load cell signal to a very small extent and is therefore approved for scales requiring verification.

The connection is made at the front using two clamp-type plugs. A separate screw terminal is available for connection of the equipotential bonding conductor (EBC).

Function

**Principle of operation**

The safety barriers limit current and voltage in the power, sensor and measuring signal lines of load cells installed in the potentially explosive area.

**Function chart**

Technical specifications

### Non-intrinsically-safe circuits

**Load cell powering**

<table>
<thead>
<tr>
<th>Ex interface, type SIWAREX IS</th>
<th>Standard</th>
<th>Low-current version</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated voltage $U_{n1}$</td>
<td>10 V DC</td>
<td></td>
</tr>
</tbody>
</table>

### Intrinsically-safe circuits

**Load cell powering**

<table>
<thead>
<tr>
<th>Ex interface, type SIWAREX IS</th>
<th>Standard</th>
<th>Low-current version</th>
</tr>
</thead>
<tbody>
<tr>
<td>No-load voltage $U_{01}$</td>
<td>$\leq 13.1$ V DC</td>
<td>$\leq 6.6$ V DC</td>
</tr>
<tr>
<td>Voltage against equipotential bonding cond.</td>
<td>$\leq 120$ mA</td>
<td>$\leq 58$ mA</td>
</tr>
</tbody>
</table>

**Sensor line**

<table>
<thead>
<tr>
<th>Ex interface, type SIWAREX IS</th>
<th>Standard</th>
<th>Low-current version</th>
</tr>
</thead>
<tbody>
<tr>
<td>No-load voltage $U_{02}$</td>
<td>$\leq 14.4$ V DC</td>
<td>$\leq 7.2$ V DC</td>
</tr>
<tr>
<td>Voltage against equipotential bonding cond.</td>
<td>$\leq 25$ mA</td>
<td></td>
</tr>
</tbody>
</table>

**Measuring signal line**

<table>
<thead>
<tr>
<th>Ex interface, type SIWAREX IS</th>
<th>Standard</th>
<th>Low-current version</th>
</tr>
</thead>
<tbody>
<tr>
<td>No-load voltage $U_{03}$</td>
<td>$\leq 12.8$ V DC</td>
<td>$\leq 6.4$ V DC</td>
</tr>
<tr>
<td>Voltage against equipotential bonding cond.</td>
<td>$\leq 54$ mA</td>
<td></td>
</tr>
</tbody>
</table>
## Dimensional drawings

![SIWAREX IS Ex interface, dimensions in mm](image)

### Selection and Ordering data

<table>
<thead>
<tr>
<th>Ex interface, type SIWAREX IS</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>• With short-circuit current &lt; 199 mA DC</td>
<td>7MH4710-5BA</td>
</tr>
<tr>
<td>• With short-circuit current &lt; 137 mA DC</td>
<td>7MH4710-5CA</td>
</tr>
</tbody>
</table>

With ATEX approval, but **without UL and FM approvals** for intrinsically-safe connection of load cells, including manual, suitable for the SIWAREX U, CS, MS, FTA, FTC, M and CF weighing modules.

Approved for use in the EU.

### Cable (optional)

- **Cable Li2Y 1 x 2 x 0.75 ST + 2 x (2 x 0.34 ST) - CY, orange sheath**
  - To connect SIWAREX U, CS, MS, FTA, FTC, M and CF to the junction box (JB), extension box (EB) or Ex interface (Ex-I) or between two JBs, for fixed laying, occasional bending permitted, 10.8 mm outer diameter, for ambient temperature -40 ... +80 °C
  - 7MH4702-8AG

- **Cable Li2Y 1 x 2 x 0.75 ST + 2 x (2 x 0.34 ST) - CY, blue sheath**
  - To connect the junction box (JB) or extension box (EB) in a potentially explosive atmosphere to the Ex interface (Ex-I), for fixed laying, occasional bending permitted, blue PVC insulating sheath, approx. 10.8 mm outer diameter, for ambient temperature -40 ... +80 °C
  - 7MH4702-8AF