Weighing Electronics

2

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/L offers standard control functions for use with belt scales. It offers multiple language selections and industrial communication options. It can be used with a maximum of two load cell style belt scales.

The Milltronics BW500 are versatile integrators for use with a wide range of belt scales. It is NTEP and Measurement Canada certified as legal-for-trade when used with an MMI-2 belt scale and 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.

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-linearily. 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).

Technical specifications

Integrator selection guide

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

[1] Available with BW500 only

[2] BW500/L: Two programmable SPST Form A contacts

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.

Milltronics BW100

Technical specifications

Milltronics BW100	
Mode of operation	
Measuring principle	Belt scale integrator
Typical applications	Integrator for use with 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
Rated operating conditions	
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
Installation category	II
Pollution degree	4
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 ... 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 inch) multi-field liquid crystal display
Programming	Via local keypad with silicone boot and/or Dolphin interface
Memory	• Program stored in non-volatile FLASH memory, upgradeable 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 mm) or equivalent, 150 m (500 ft) max.
• Sensing	Belden 8418, 8-wire shielded, 20 AWG (0.5 mm²) or equivalent, 300 m (1000 ft) max.
Speed sensor	Belden 8770, 3-wire shielded, 18 AWG (0.75 mm²) or equivalent, 300 m (1000 ft)
Auto zero	Belden 8760, 1 pair, twisted/shielded, 18 AWG (0.75 mm²) or equivalent, 300 m (1000 ft) max
Analog output	Belden 8760, 1 pair, twisted/shielded, 18 AWG (0.75 mm²) or equivalent
Bi-polar current (comm.port)	Belden 9552, 2 pair, twisted/ shielded, 18 AWG (0.75 mm²), or equivalent, 3000 m (10,000 ft) max. loop
Remote total [t1 (DC)]	Belden 8760, 1 pair, twisted/shielded, 18 AWG (0.75 mm²) or equivalent, 300 m (1000 ft) max.
Approvals	CE, $CSA_{US/C}$, 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

Selection and Ordering data

		Order No.
Milltronics BW100	C)	**7MH7150-**
An economical integrator for use with belt scales. Standard features include; dual totalizer, analog rate output, alarm relay, linearizer and bi-polar current communications.		■■**A**■■ - ■■
Input voltage		
AC voltage		**1**
12 V DC		**2**
24 V DC		**3**
Feature software		
Standard		**A**
Data communications		
Bi-polar current		**1**
Enclosures		
Standard enclosure, no entry holes		**1**
Standard with 4 drilled entry holes for M20 glands		**3**
Trade approval stickers		
No trade approval sticker		**0**
Not legal for Canadian and EU trade sticker		**1**
Approvals		
$CSA_{US/C}$, CE (EN 61326), FM, C-TICK		**D**
Further designs		Order Code
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.		**Y15**
Painted mild steel, anti-vibration enclosure with viewing window 406 x 305 x 203 mm (16 x 12 x 8 inch), Nema/Type 4, IP66 (finished unit is mounted inside enclosure)		**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 inch)		**A35**
Acceptance test certificate: Manufacturer's test certificate M to DIN 55350, Part 18 and ISO 9000		**C11**
Stainless Steel, sun/weather shield 357 x 305 x 203 mm (14 x12 x 8 inch) (finished unit is field mounted with enclosure)		**S50**

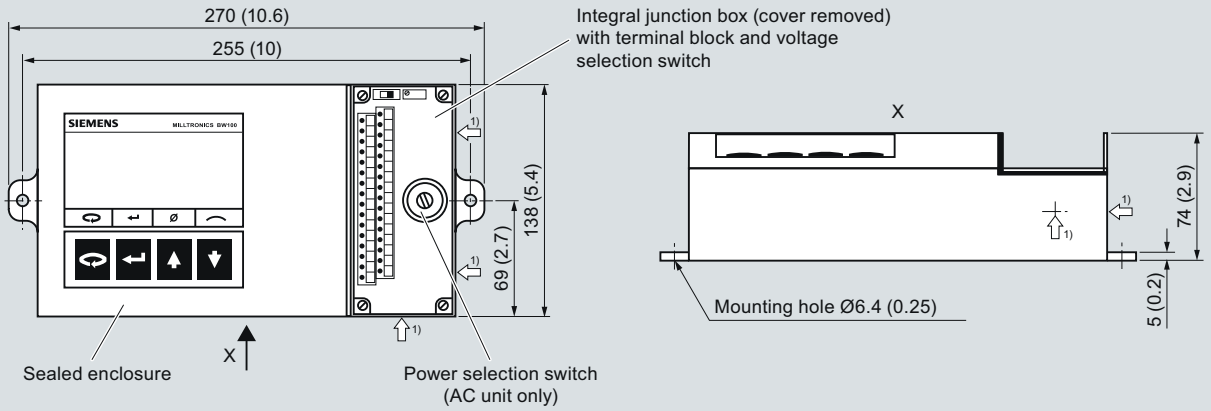
		Order No.
Milltronics BW100	C)	**7MH7150-**
An economical integrator for use with belt scales. Standard features include; dual totalizer, analog rate output, alarm relay, linearizer and bi-polar current communications.		■■**A**■■ - ■■
Instruction manuals		
• English	C)	**7ML1998-5DJ02**
• German	C)	**7ML1998-5DJ31**
• French	C)	**7ML1998-5DJ11**
• Spanish Note: The instruction manual should be ordered as a separate item on the order.	C)	**7ML1998-5DJ21**
Additional instruction manuals		
LVDT Conditioner Card Manuals, English	C)	**7ML1998-5EF01**
LVDT Conditioner Card Manuals, German	C)	**7ML1998-5EF31**
This device is shipped with the Siemens Milltronics manual CD containing the complete instruction manual library.		
Optional equipment		
LVDT Conditioners in Nema 4 enclosure (to interface LVDT belt scale without internal pre-amplifier)	C)	**7MH7723-1AJ**
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 RD500 on page 2/22	K)	**7ML5750-1AA00-0**

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

K) Subject to export regulations AL: N, ECCN: 5A991X.

Milltronics BW100

Dimensional drawings

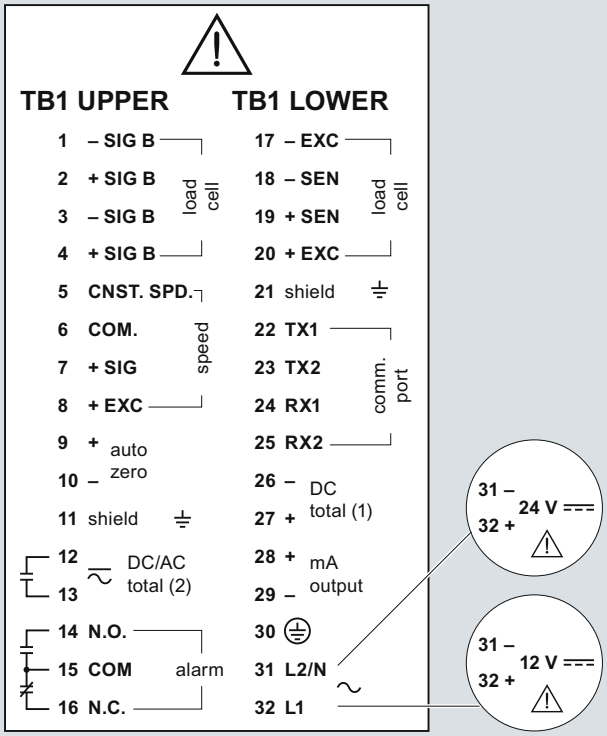


1) Conduit entry area. Recommended drilling the enclosure with a hole saw and using suitable cable glands to maintain ingress rating.

Milltronics BW100 dimensions in mm (inch)

Schematics

Terminal Block
AC Supply



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

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.

Integrator selection guide

	BW500 (advanced feature set)	**BW500/L (basic feature set)**
PID control	With optional I/O card	N/A
Differential speed detection	Standard	N/A
Online calibration	Standard	N/A
Trade approval (OIML, MID, Measurement Canada, GOST, NTEP)	Optional	N/A
Smartlinx communications (AB RIO, DeviceNET, Profibus DP)	Optional	Optional
Modbus	Standard	Standard
Ratio Blending and Batching	Standard	N/A
Moisture and incline compensation	- With optional I/O card, or - Parameter set	Parameter set
Multi Span	Standard	N/A
RD500 connectivity	Standard	Standard
Relay output	5	2
mA output	3[1)]	1
mA input	2[1)]	0

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

Milltronics BW500 and BW500/L

Technical specifications

Milltronics BW500 and BW500L	
Mode of operation	
Measuring principle	Belt scale integrator
Typical application	• Compatible with Milltronics belt scales or equivalent 1, 2, 4[1], or 6[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	
• Pulse train	• 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[1]
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, 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, 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	
• Location	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 (W x H x D)	209 x 285 x 92 mm (8.2 x 11.2 x 3.6 inch)
Weight	2.6 kg (5.7 lb)

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	
Displays	Illuminated 5x7 dot matrix liquid crystal display with 2 lines of 40 characters each
Programming	Via local keypad and/or Dolphin Plus interface
Memory	Program and parameters stored in non-volatile Flash memory, upgradeable via Dolphin Plus interface
Communications	• Two RS 232 ports • One RS 485 port • SmartLinx compatible
mA I/O board	
Inputs	2 programmable 0/4 … 20 mA for PID control and on-line calibration, optically isolated, 0.1 % of 20 mA resolution, 200 Ω input impedance
Outputs	2 programmable 0/4 … 20 mA for PID control, rate, load and speed output, optically isolated, 0.1 % of 20 mA resolution, 750 Ω load max.
Output supply	Isolated 24 V DC at 50 mA, short circuit protected
Approvals	
BW500	CE, $CSA_{US/C}$, FM, Measurement Canada, NTEP, MID, OIML, C-TICK, , GOST, SABS
BW500/L	CE, $CSA_{US/C}$, FM, C-TICK, GOST
Options	• Speed sensor: MD-36/36A, MD-256, SITRANS WS100, WS300, TASS, or RBSS, or compatible • Dolphin Plus: Windows based software interface. Refer to associated product documentation. • SmartLinx Modules: protocol specific modules for interface with popular industrial communications systems. Refer to product documentation. • LVDT interface card: for interface with LVDT based scales

[1] BW500 only

Selection and Ordering data

		Order No.
Milltronics BW500 and BW500/L	C)	**7MH7152-**
A full-feature, powerful integrator designed for use with both belt scales and weighfeeders		■■■■■ - ■■■
Input voltage		
AC voltage		**1**
Auxiliary Input/Output board		
None		**A**
Board with 2 analog inputs and 2 analog outputs[1]		**B**
Feature software		
BW500, 1 ... 6 load cell input (advanced feature set)		**A**
BW500/L, 1... 2 load cell input[2] (basic feature set)		**B**
Auxiliary memory		
None		**0**
Data communications[3]		
SmartLinx ready		**0**
Smartlinx Allen-Bradley RIO module		**1**
Smartlinx PROFIBUS DP module		**2**
Smartlinx DeviceNet module		**3**
Enclosures		
Standard enclosure, no entry holes		**1**
Standard enclosure, 4 entries, for M20 glands		**2**
Trade approval stickers		
No trade approval sticker		**A**
Not legal for Canadian and EU trade sticker		**B**
Legal for Canadian trade[4) 5) 6)]		**C**
Legal for U.S. trade (NTEP)[4) 5) 6)]		**D**
Legal for World trade (OIML), European trade (MID)[4) 5) 6)]		**E**
Approvals		
CE, CSA$_{US/C}$, FM, C-TICK		**A**
Further designs		Order Code
Please add "**-Z**" to Order No. and specify Order code(s).		
Stainless Steel tag (69 x 50 mm), Measuring-point number/identification (max 16 characters), specify in plain text.		**Y15**
Acceptance test certificate: Manufacturer's test certificate M to DIN 55350, Part 18 and ISO 9000		**C11**
Stainless Steel, sun/weather shield 357 x 305 x 203 mm (14 x12 x 8 inch) (finished unit is field mounted with enclosure)		**S50**
Stainless steel enclosure, 304 (1.4301), [406 x 305 x 152 mm (16 x12 x 6 inch), Nema/Type 4X, IP66 (finished unit is mounted inside enclosure)]		
• With window		**A11**
• Without window		**A12**
Painted mild steel, [406 x 305 x 152 mm (16 x 12 x 6 inch), Nema/Type 4, IP65; finished unit is mounted inside enclosure]		
• With window		**A13**
• Without window		**A14**
Painted mild steel, anti-vibration enclosure with viewing window 406 x 305 x 203 mm (16 x 12 x 8 inch), Nema/Type 4, IP66; finished unit is mounted inside enclosure		**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 inch)		**A35**

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 4/3 and submit with order
6) Available with Feature Software option A only

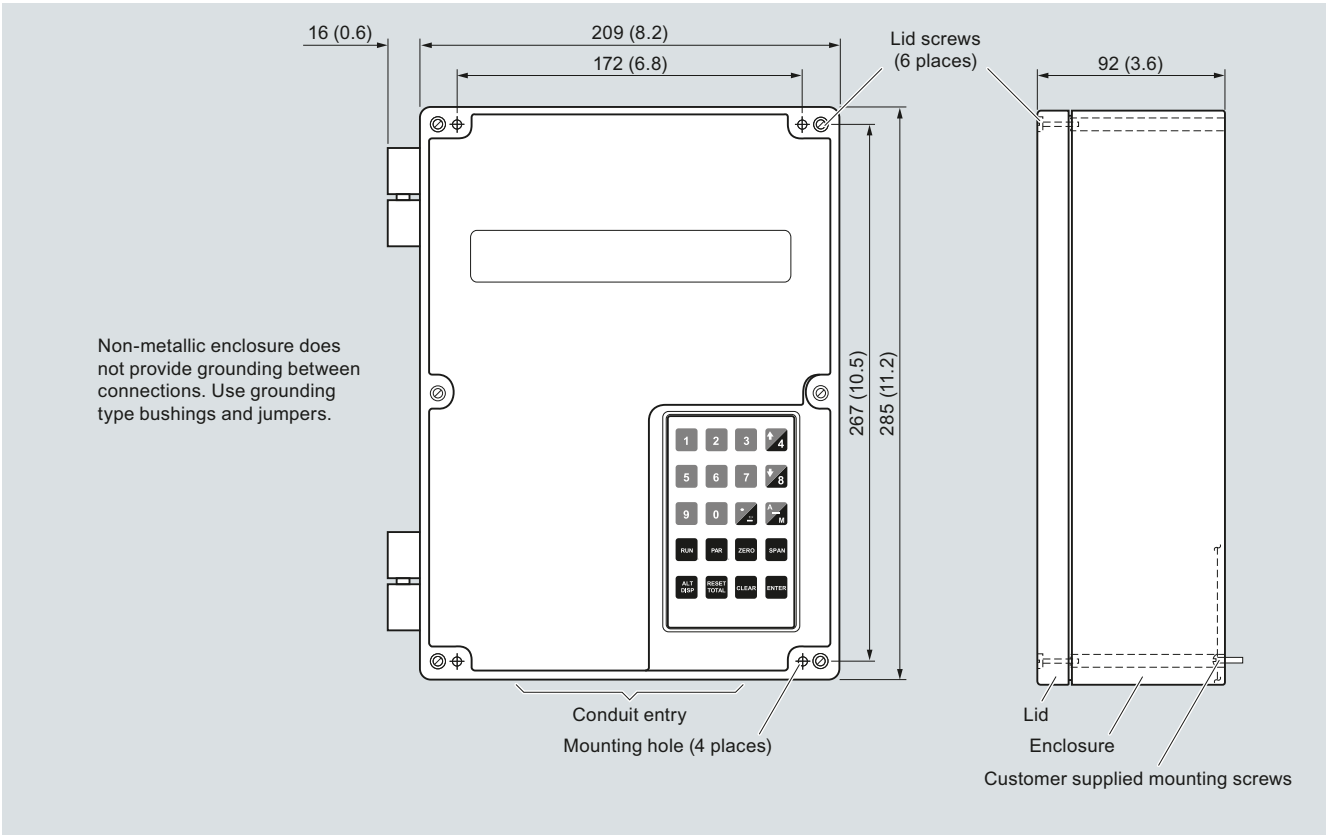
		Order No.
Milltronics BW500 and BW500/L	C)	**7MH7152-**
A full-feature, powerful integrator designed for use with both belt scales and weighfeeders		■■■■■ - ■■■
BW500 and BW500/L, German	C)	**7ML1998-5DK35**
BW500, French	C)	**7ML1998-5DK12**
BW500, Spanish Note: The instruction manual should be ordered as a separate item on the order.	C)	**7ML1998-5DK23**
Additional instruction manuals		
LVDT Conditioner Card Instruction Manuals, English	C)	**7ML1998-5EF01**
LVDT Conditioner Card Instruction Manuals, German	C)	**7ML1998-5EF31**
Smartlinx Allen-Bradley Remote I/O, English	C)	**7ML1998-1AP03**
Smartlinx PROFIBUS DP, English	C)	**7ML1998-1AQ03**
Smartlinx PROFIBUS DP, German	C)	**7ML1998-1AQ33**
Smartlinx PROFIBUS DP, French	C)	**7ML1998-1AQ12**
Smartlinx DeviceNet, English Note: The appropriate Smartlinx instruction manual should be ordered as a separate line on the order.	C)	**7ML1998-1BH02**
This device is shipped with the Siemens Milltronics manual CD containing the complete instruction manual library.		
Optional equipment		
Auxilliary I/O cards spare	C)	**7MH7723-1BJ**
LVDT Conditioners in Nema 4 enclosure (to interface LVDT belt scale without internal pre-amplifier)	C)	**7MH7723-1AJ**
Supply voltage regulators, 120 V AC, 60 Hz	C)	**7MH7726-1AN**
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 page 2/22	K)	**7ML5750-1AA00-0**
Spare parts		
Display cards		**7MH7723-1AF**
Motherboards	C)	**7MH7723-1AH**
Batteries, 3V, lithium	C)	**7MH7723-1ES**
Fuses, 2 A, 250 V, BW500, BW500/L, and SF500, spare	C)	**7MH7723-1DG**
Lid with overlay and keypad for BW500 and BW500/L	C)	**7MH7723-1AK**
Lid with overlay and keypad for trade approved BW500		**7MH7723-1HN**
Cables to connect BW500, BW500/L, and SF500 keypad to motherboard		**7MH7723-1CB**
Keypads spare for BW500, BW500/L, and SF500		**7MH7723-1CD**

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

K) Subject to export regulations AL: N, ECCN: 5A991X.

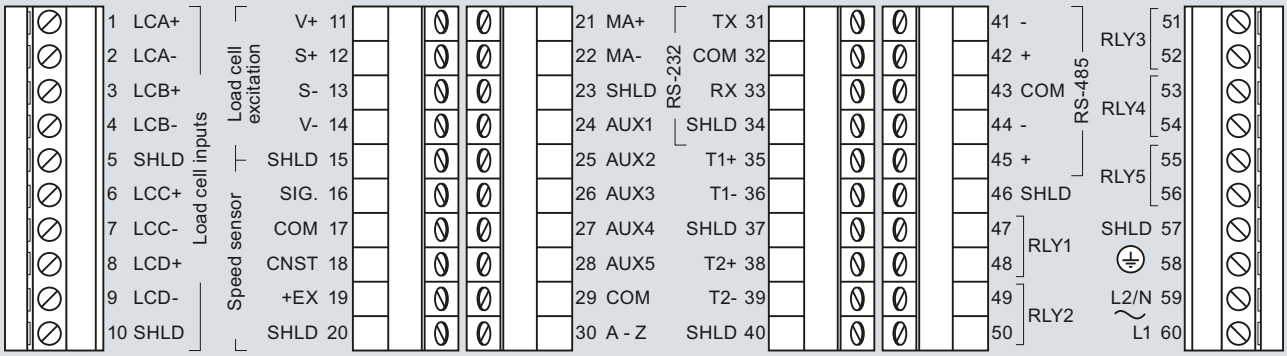
Milltronics BW500 and BW500/L

Dimensional drawings



Milltronics BW500 and BW500/L dimensions in mm (inch)

Schematics



Cable

- One load cell:
  - Non-sensing: Belden 8404, 4 wire shielded, 20 AWG (0.5 mm²) or equivalent, 150 m (500 ft) max.
  - Sensing: Belden 9260, 6 wire shielded, 20 AWG (0.5 mm²) or equivalent, 300 m (1000 ft) max.
- Two/four/six[1] load cells:
  - Non-sensing: Belden 9260, 6 wire shielded, 20 AWG (0.5 mm²) or equivalent, 150 m (500 ft) max.
  - Sensing: Belden 8418, 8 wire shielded, 20 AWG (0.5 mm²) or equivalent, 300 m (1000 ft) max.
- Speed sensor: Belden 8770, 3 wire shielded, 18 AWG (0.75 mm²) or equivalent, 300 m (1000 ft)
- Auto zero: Belden 8760, 1 pair, twisted/shielded, 18 AWG (0.75 mm²) or equivalent, 300 m (1000 ft) max.
- Remote total: Belden 8760, 1 pair, twisted/shielded, 18 AWG (0.75 mm²) or equivalent, 300 m (1000 ft) max.

[1] For four/six load cell scale, run two separate cables of two load cell configuration

Milltronics BW500 and BW500/L connections

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.

Milltronics SF500

Technical specifications

Milltronics SF500	
Mode of operation	
Measuring principle	Flowmeter integrator
Typical application	• Compatible with SITRANS 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 on-line calibration
Output	
mA	Programmable 0/4 ... 20 mA, for rate, optically isolated, 0.1 % of 20 mA resolution, 750 Ω load max. (see optional mA I/O board)
Load cell/LVDT conditioner card	10 V DC compensated excitation for strain gauge type, 2 cells max, 150 mA max.
Remote totalizer 1	Contact closure 10 … 300 ms duration, open collector switch rated 30 V DC, 100 mA max.
Remote totalizer 2	Contact closure 10 … 300 ms duration, open collector switch rated 240 V AC/DC, 100 mA max.
Relay output	5 alarm/control relays, 1 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	
• Location	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 (W x H x D)	209 x 285 x 92 mm (8.2 x 11.2 x 3.6 inch)
Weight	2.6 kg (5.7 lb)
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 5x7 dot matrix liquid crystal display with 2 lines of 40 characters each
Programming	Via local keypad and/or Dolphin Plus interface
Memory	• Program stored in non-volatile FLASH ROM, upgradeable via Dolphin Plus interface • Parameters stored in battery backed RAM, 3 V NEDA 5003LC or equivalent, 10 year life
Communications	Two RS 232 ports One RS 485 port SmartLinx compatible
Approvals	CE, $CSA_{US/C}$, 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 % … 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

Selection and Ordering data

		Order No.
Milltronics SF500	C)	**7MH7156-**
A full feature, powerful integrator designed for use with solids flowmeters		■■■■■ - ■■■
Input voltage		
AC voltage		**1**
Auxiliary input/output boards[1]		
None		**A**
Board with 2 analog inputs and 2 analog outputs		**B**
Feature software		
Standard		**A**
Auxiliary memory		
None		**0**
Data communications[2]		
SmartLinx Ready		**0**
Smartlinx A-B RIO module		**1**
Smartlinx PROFIBUS DP module		**2**
Smartlinx DeviceNet module		**3**
Enclosures		
Standard enclosure, no entry holes		**1**
Standard enclosure, 4 entries, for M20 glands		**2**
Trade approval stickers		
No trade approval sticker		**A**
Not legal for Canadian and EU trade sticker		**B**
Approvals		
CE, CSA$_{US/C}$, FM, C-TICK		**A**
Further designs		Order Code
Please add "**-Z**" to Order No. and specify Order code(s).		
Stainless Steel tag (69 mm x 50 mm), Measuring-point number/identification (max 16 characters), specify in plain text.		**Y15**
Stainless Steel, sun/weather shield 357 x 305 x 203 mm (14 x12 x 8 inch) (finished unit is field mounted with enclosure)		**S50**
Acceptance test certificate: Manufacturer's test certificate M to DIN 55350, Part 18 and ISO 9000		**C11**
Stainless steel enclosure, 304 (1.4301), [406 x 305 x 152 mm (16 x 12 x 6 inch), Type 4X, IP66 (finished unit is mounted inside enclosure)]		
With window		**A11**
Without window		**A12**
Painted mild steel, [406 x 305 x 152 mm (16 x 12 x 6 inch), Type 4, IP65 (finished unit is mounted inside enclosure)]		
With window		**A13**
Without window		**A14**
Painted mild steel, anti-vibration enclosure with viewing window 406 x 305 x 203 mm (16 x 12 x 8 inch), Nema/Type 4, IP66 (finished unit is mounted inside enclosure)		**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 inch)		**A35**

1) Required for PID control and online calibration.

2) Required for industrial communications.

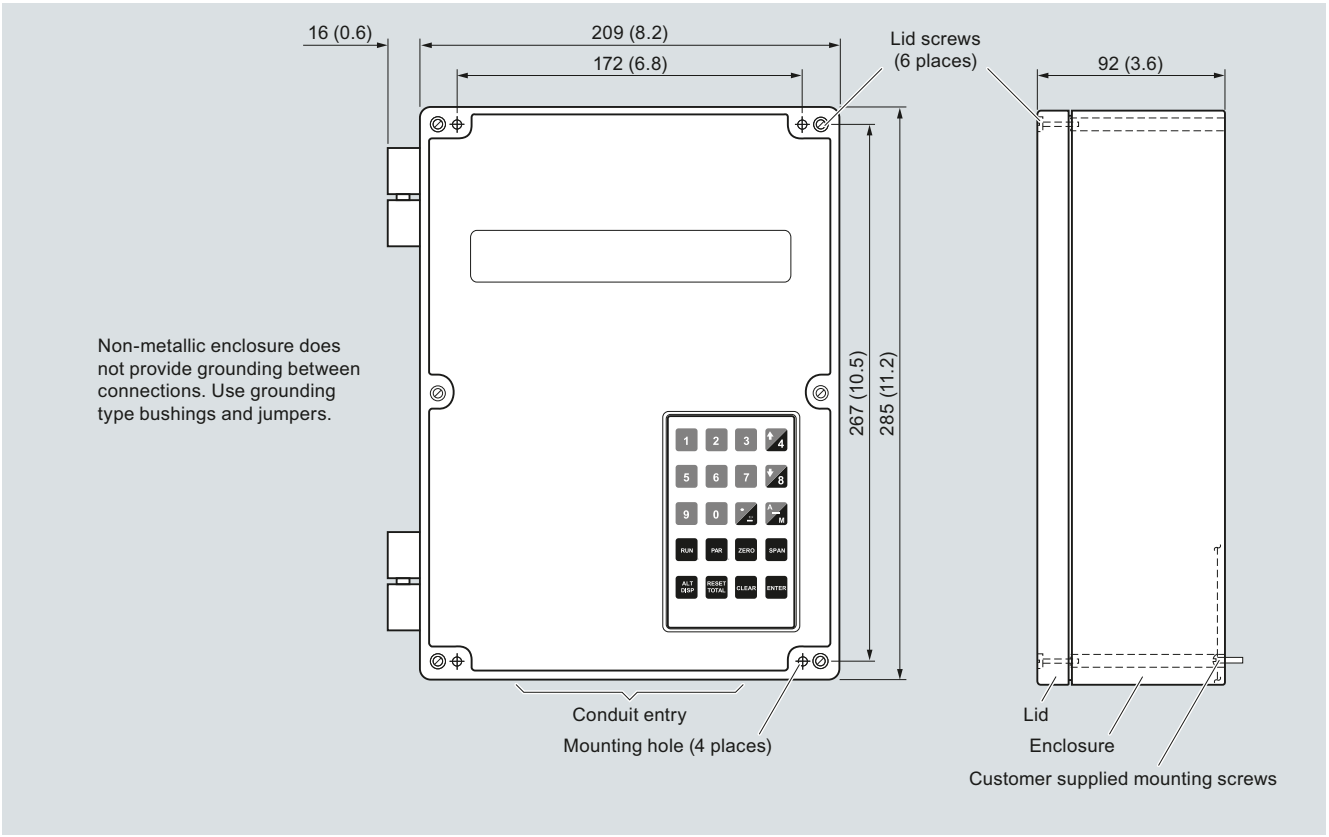
		Order No.
Instruction manuals		
SF500, English	C)	**7ML1998-5CN02**
SF500, French	C)	**7ML1998-5CN11**
SF500, German	C)	**7ML1998-5CN31**
Note: The instruction manual should be ordered as a separate item on the order.		
Additional instruction manuals		
Smartlinx Allen-Bradley Remote I/O, English	C)	**7ML1998-1AP03**
Smartlinx PROFIBUS DP, English	C)	**7ML1998-1AQ03**
Smartlinx PROFIBUS DP, German	C)	**7ML1998-1AQ33**
Smartlinx PROFIBUS DP, French	C)	**7ML1998-1AQ12**
Smartlinx DeviceNet, English	C)	**7ML1998-1BH02**
Note: The appropriate Smartlinx instruction manual should be ordered as a separate line on the order.		
LVDT Conditioner Card Manuals, English	C)	**7ML1998-5EF01**
LVDT Conditioner Card Manuals, German	C)	**7ML1998-5EF31**
This device is shipped with the Siemens Milltronics manual CD containing the complete instruction manual library.		
Optional equipment		
Milltronics analog I/O cards	C)	**7MH7723-1BJ**
LVDT Conditioners in NEMA 4 enclosure (to interface LVDT belt scale without internal pre-amplifier)	C)	**7MH7723-1AJ**
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 on page 2/22	K)	**7ML5750-1AA00-0**
Spare parts		
Displays		**7MH7723-1AF**
Lids with overlay and keypad	C)	**7MH7723-1AG**
Motherboards	C)	**7MH7723-1AH**
Batteries, 3V, lithium	C)	**7MH7723-1ES**
Fuses, 2A, 250V, BW500/SF500, spare	C)	**7MH7723-1DG**
LVDT conditioners in NEMA 4 enclosure	C)	**7MH7723-1AJ**
Auxiliary I/O cards spare	C)	**7MH7723-1BJ**
Cables to connect BW500/SF500 keypad to motherboard		**7MH7723-1CB**
Keypads spare for BW500/SF500		**7MH7723-1CD**

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

K) Subject to export regulations AL: N, ECCN: 5A991X.

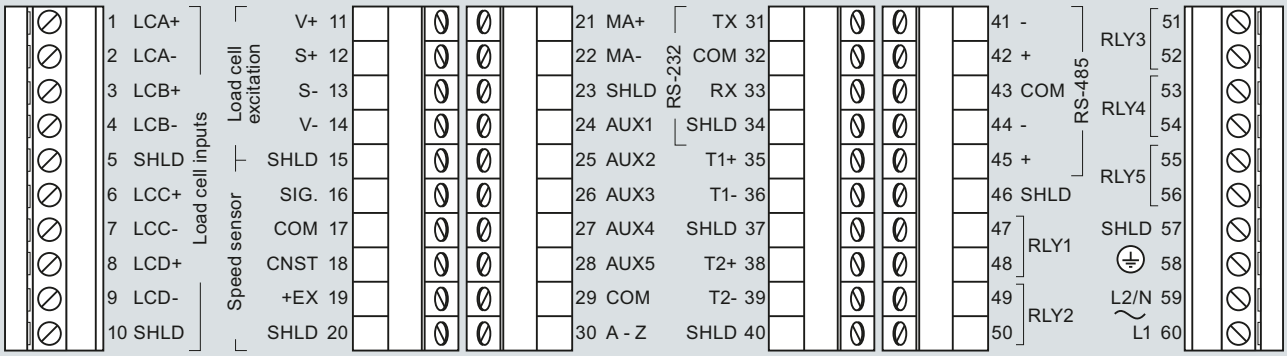
Milltronics SF500

Dimensional drawings



Milltronics SF500 dimensions in mm (inch)

Schematics



Cable

- One load cell input for single load cell or LVDT application:
  - Non-sensing: Belden 8404, 4 wire shielded, 20 AWG (0.5 mm²) or equivalent, 150 m (500 ft) max.
  - Sensing: Belden 9260, 6 wire shielded, 20 AWG (0.5 mm²) or equivalent, 300 m (1000 ft) max.
- Two load cells:
  - Non-sensing: Belden 9260, 6 wire shielded, 20 AWG (0.5 mm²) or equivalent, 150 m (500 ft) max.
  - Sensing: Belden 8418, 8 wire shielded, 20 AWG (0.5 mm²) or equivalent, 300 m (1000 ft) max.
- Auto zero: Belden 8760, 1 pair, twisted/shielded, 18 AWG (0.75 mm²) or equivalent, 300 m (1000 ft) max.
- Remote total: Belden 8760, 1 pair, twisted/shielded, 18 AWG (0.75 mm²) or equivalent, 300 m (1000 ft) max.

Milltronics SF500 connections

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 in 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 and BW500/L
- 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 a disk, and use parameter sets saved from other instruments.

Selection and Ordering data

		Order No.
Dolphin Plus	N)	**7ML1841-**
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 inch) cable for connection to a PC serial port.		**A A 0**
RS 485 to RS 232 converters		
No		**0**
Yes		**1**
ComVerter		
No		**0**
Yes		**1**
Instruction manuals		
Connection manual, English: **Included on Dolphin Plus CD and available at** 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		**7ML1830-1MC**
ComVerter, Infrared link	C)	**7ML1830-1MM**

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

N) Subject to export regulations AL: N, ECCN: 5D992.

SITRANS RD100

Overview

The SITRANS RD100 is a 2-wire loop powered, NEMA 4X enclosed remote digital display for process instrumentation.

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 inch (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

SITRANS RD100	
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 inch (25.4 mm) high LCD • Numeric range from -1000 … +1999
Certificates and approvals	
Hazardous	
• Intrinsically Safe	• CSA/FM Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G T4 • CSA/FM Class I, Zone 0, Group IIC
• Non-incendive	• CSA/FM Class I, Div. 2, Groups A, B, C, D • CSA/FM Class II and III, Div. 2, Groups F and G
Options	
Mounting	• 2 inch (50.8 mm) pipe mounting kit (zinc plated or stainless steel) • Panel mounting kit

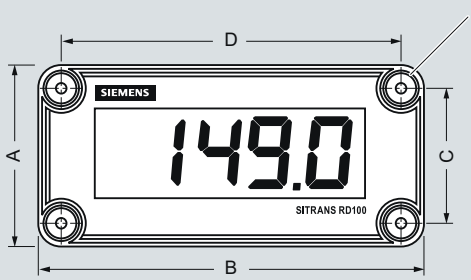
Selection and Ordering data

		Order No.
SITRANS RD100 A 2-wire loop powered, NEMA 4X enclosed remote digital display for process instrumentation.	C)	**7ML5741-** **A A 0 0 - 0**
Conduit hole location (½ inch)		
None		**1**
Bottom		**2**
Rear		**3**
Top		**4**
Instruction manuals		
English	C)	**7ML1998-5JU01**
French	C)	**7ML1998-5JU11**
German 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.	C)	**7ML1998-5JU31**
Accessories		
Panel mount kits	C)	**7ML1930-1BN**
2 inch (5.08 cm) pipe mounting kit (zinc plated seal)	C)	**7ML1930-1BP**
2 inch (5.08 cm) pipe mounting kit (stainless steel, Type 304, EN 1.4301)	C)	**7ML1930-1BQ**

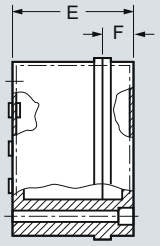
C) Subject to export regulations AL: N, ECCN: EAR99.

Dimensional drawings

RD100 - front view



RD100 - side view

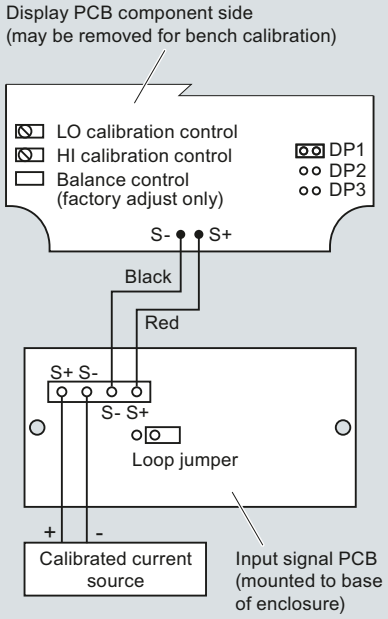


A: 80 (3.15)
B: 140 (5.51)
C: 60 (2.36)
D: 120 (4.72)
E: 65 (2.56)
F: 20 (0.79)

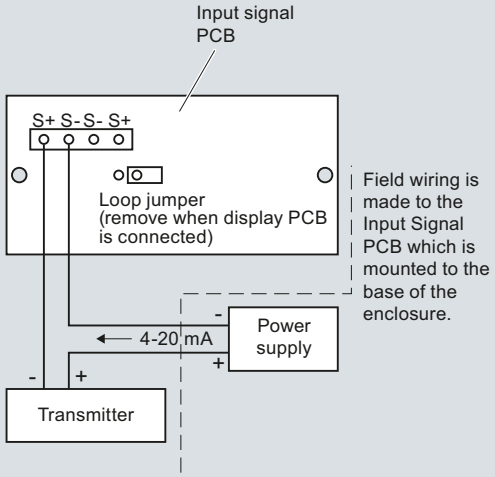
SITRANS RD100 dimensions in mm (inch)

Schematics

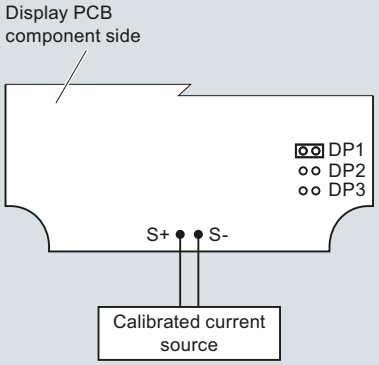
Calibrator connected to input signal PCB



Control loop connected to input signal PCB



Calibrator connected to display PCB



The display PCB may be removed from the enclosure for bench calibration. Loop jumper must be installed on input signal PCB to maintain loop.
Refer to RD100 instruction manual for more details.

SITRANS RD100 connections

SITRANS RD200

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 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

Milltronics RD200	
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 .. 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
• 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	
• Storage temperature range	-40 … +85 °C (-40 … +185 °F)
• 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 supply	One 24 V DC ± 10 % at 200 mA max.
- Dual power supplies	Two 24 V DC ± 10 % at 200 mA and 40 mA max.
External loop power supply	35 V DC max.
Output loop resistance	• 24 V DC, 10 … 700 Ω max. • 35 V DC (external), 100 … 1200 Ω max.
Displays and controls	
• Display	• 14 mm (0.56 inch) 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, $_{C}$UL
Options	
• Enclosures	Plastic, steel and stainless steel (Type 304, EN 1.4301) NEMA 4 and 4X enclosures
• Communications	Modbus RTU

SITRANS RD200

Selection and Ordering data

		Order No.
SITRANS RD200	C)	**7ML5740-**
A universal input, panel mount remote digital display for process instrumentation.		■■■■■ **- 0 A**
Input voltage		
85 ... 265 V AC, 50/60 Hz; 90 ... 265 V DC, 20 W max.		**1**
12 ... 36 V DC; 12 ... 24 V AC, 6 W max.		**2**
Transmitter supply		
None		**A**
Single 24 V DC transmitter supply[1]		**B**
Dual 24 V DC transmitter supply[1)2)]		**C**
Output		
None		**A**
2 relays		**B**
4 ... 20 mA output		**C**
Communication		
Modbus disabled		**0**
Modbus enabled		**1**
Approvals		
CE, UL, $_C$UL		**1**
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**

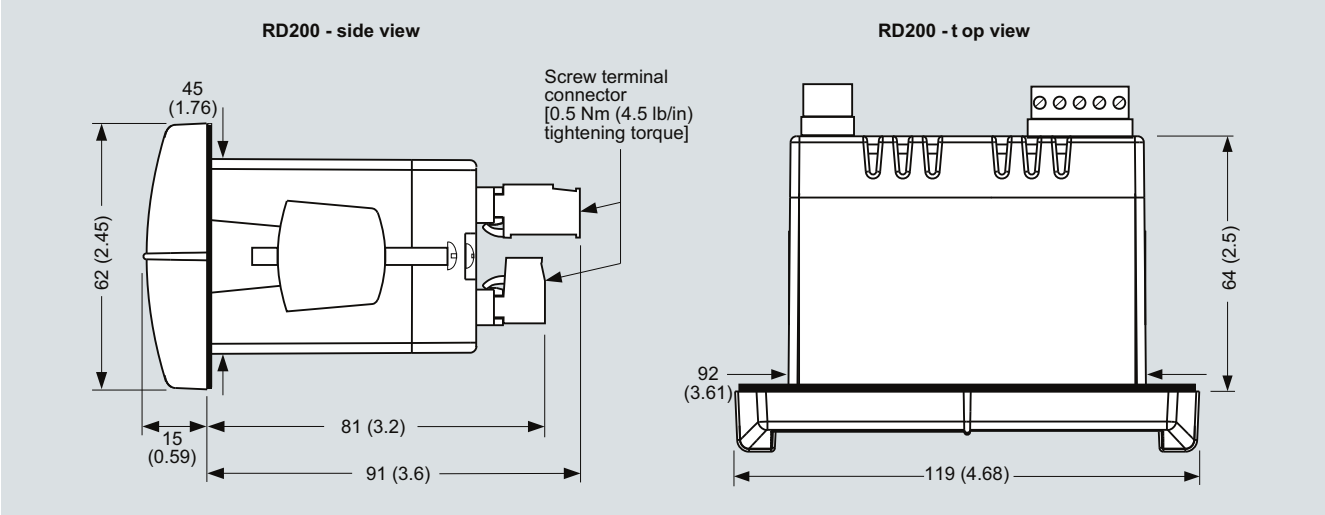
		Order No.
SITRANS RD200	C)	**7ML5740-**
A universal input, panel mount remote digital display for process instrumentation.		■■■■■ **- 0 A**
Accessories		
SITRANS RD200 copy cables 2.1 m (7 ft)	C)	**7ML1930-1BR**
SITRANS RD200 RS 232 serial adapters (copy cable included)	C)	**7ML1930-1BS**
SITRANS RD200 RS 422/485 serial adapters (copy cable included)	C)	**7ML1930-1BT**
RS 232 to RS 422/485 isolated converters	C)	**7ML1930-1BU**
RS 232 to RS 422/485 non-isolated converters	C)	**7ML1930-1BV**
SITRANS RD200 RS 232 and RS 485 isolated multi-input adapter boards	C)	**7ML1930-1BW**
USB to RS 422/485 isolated converters	C)	**7ML1930-1BX**
USB to RS 422/485 non-isolated converters	C)	**7ML1930-1BY**
USB to RS 232 converters	C)	**7ML1930-1DC**
RD Software CD for 1 ... 100 displays	C)	**7ML1930-1CC**
Modbus option enabled		**7ML1930-1CD**
Low cost polycarbonate plastic enclosures for 1 display	C)	**7ML1930-1CF**
Thermoplastic enclosures		
For use with 1 display	C)	**7ML1930-1CG**
For use with 2 displays	C)	**7ML1930-1CH**
For use with 3 displays	C)	**7ML1930-1CJ**
For use with 4 displays	C)	**7ML1930-1CK**
For use with 5 displays	C)	**7ML1930-1CL**
For use with 6 displays	C)	**7ML1930-1CM**
Stainless steel enclosures (Type 304, EN 1.4301)		
For use with 1 display	C)	**7ML1930-1CN**
For use with 2 displays	C)	**7ML1930-1CP**
For use with 3 displays	C)	**7ML1930-1CQ**
For use with 4 displays	C)	**7ML1930-1CR**
For use with 5 displays	C)	**7ML1930-1CS**
For use with 6 displays	C)	**7ML1930-1CT**
Steel enclosures		
For use with 1 display	C)	**7ML1930-1CU**
For use with 2 displays	C)	**7ML1930-1CV**
For use with 3 displays	C)	**7ML1930-1CW**
For use with 4 displays	C)	**7ML1930-1CX**
For use with 5 displays	C)	**7ML1930-1CY**
For use with 6 displays	C)	**7ML1930-1DA**

[1)] Available with input voltage option 1 only

[2)] Available with output option C only

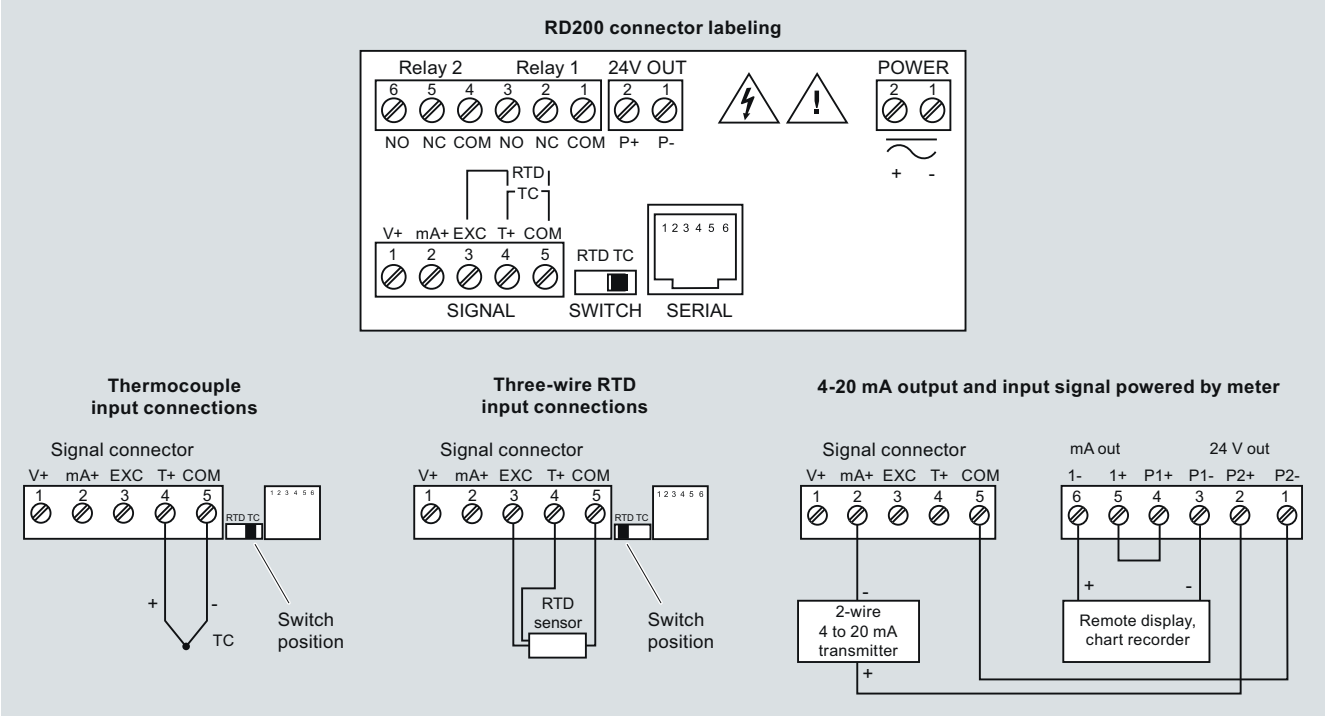
C) Subject to export regulations AL: N, ECCN: EAR99.

Dimensional drawings



SITRANS RD200 dimensions in mm (inch)

Schematics



SITRANS RD200 connections

SITRANS RD500

Overview

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

Benefits

- RD500 supports report and alarm events via email, SMS, and FTP transfer
- Web provides worldwide access to instrument data and RD500 configuration and setup
- Simple configuration using a standard web browser, no programming or additional software required.
- Offers scalability with optional I/O modules for current (4 … 20 mA), voltage (0 … 10 V), thermocouple (TC), resistance temperature detector (RTD), and digital input, output and counter
- 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 supports addressing for up to 247 Modbus serial devices via RS 232 and RS 485 serial ports
- 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, 1 Gbyte industrial compact flash card included
- Log files formats are CSV (comma separated values) for data files and HTML for report files
- Supports modbus TCP via ethernet and GPRS for easy integration into control systems

Application

The RD500 is an easy-to-use remote data monitoring solution, 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 support addressing for 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 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

Milltronics RD500	
Mode of operation	
• Measuring principle	Remote data manager
• Measuring points	• Up to 128 standard input/outputs • Addressing for up to 247 Modbus serial devices
Input	See table on page 2/24
Output	See table on page 2/24
Accuracy	See table on page 2/24
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, noncondensing, 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	CompactFlash Type II slot for Type I and Type II cards; 1 Gbyte (optional 2 Gbyte)
Certificates and approvals	
• Safety	• UL listed to U.S. and Canadian safety standards for use in Class I, II and III, Division 1 and 2 hazardous locations • CE, C-TICK
Communication	
• USB/PG port	Adheres to USB specifications 1.1. Device only using Type B connection.
• Serial ports	Format and baud rates for each port are individually software programmable up to 115, 200 baud
• RS 232/PG port	RS 232 port via RJ12
• Comms ports	RS 422/485 port via RJ45 and RS 232 port via RJ12
• Ethernet port	10 BASE-T/100 BASE-TX; RJ45 jack is wired as a NIC (Network Interface Card)

Technical specifications (continued)

SITRANS RD500 Module Specifications

	8 inputs, 6 solid state outputs	8 inputs, 6 relay outputs	8 channel, 4 … 20 mA	8 channel ± 10 V	6 channel, RTD	8 channel thermo-couple module
Order number	**7ML1930-1ES**	**7ML1930-1ER**	**7ML1930-1EP**	**7ML1930-1EQ**	**7ML1930-1ET**	**7ML1930-1EU**
Application	8 inputs, 6 outputs used to monitor contact or sensor inputs	8 inputs, 6 outputs used to monitor contact or sensor inputs	16 bit analog input module provides high density signal measurement for data monitoring applications and accepts 0/4 … 20 mA process signals	16 bit analog input module provides high density signal measurement for data monitoring applications and accepts ± 10 V process signals	16 bit analog input module provides high-density signal measurement for data acquisition applications and accepts various RTD inputs	16 bit thermo-couple input module provides high density signal measurement for data acquisition applications and accepts wide range of thermo-couple types
Accuracy	Not applicable	Not applicable	± 0.1 % of span	± 0.1 % of span	± (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 minutes warm-up	± (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
Mounting	Snaps onto standard DIN style top hat (T) profile mounting rails according to EN50022 – 35 x 7.5 and -35 x 15					
Inputs	Dip switch selectable for sink or source	Dip switch selectable for sink or source max. voltage: 30 V DC, reverse polarity protected off voltage: < 1.2 V on voltage: > 3.8 V input frequency: • filter switch on: 50 Hz • filter switch off: 300 Hz	8 single-ended ranges: 0 … 20 mA or 4 … 20 mA resolution: full 16-bit sample time: 50 … 400 ms depending on number of enabled inputs	8 single-ended ranges: 0 … 10 V DC or ± 10 V DC resolution: full 16-bit sample time: 50 … 400 ms depending on number of enabled inputs	6 single-ended resolution: full 16-bit sample time: 67 … 400 ms depending on number of enabled inputs	8 single-ended resolution: full 16-bit sample time: 50 … 400 ms depending on number of enabled inputs
Outputs	Solid state output, switched DC, contact rating 1 A DC max.	Form A, NO pairs share common terminals: 1&2, 3&4, 5&6 current rating by pair: 3 Amps at 30 V DC/125 V AC resistive 1/10 HP at125 V AC	Not applicable	Not applicable	Not applicable	Not applicable

Selection and Ordering data

		Order No.
SITRANS RD500 The SITRANS RD500 is a remote data manager providing integrated web access, alarm event handling and data capture for instrumentation.	K)	**7ML5750-** **■■A00-0**
Communications Connection		
Ethernet[1]		**1**
Digital Communications to Instruments		
RS 485 Modbus RTU		**A**
Input configuration modules		
Note: one RD500 supports 16 input modules		
RD500 8 channel 0/4 ... 20 mA input module	C)	**7ML1930-1EP**
RD500 8 channel ± 10 V input module	C)	**7ML1930-1EQ**
RD500 8 digital inputs, 6 relay outputs module	C)	**7ML1930-1ER**
RD500 8 digital inputs, 6 solid state outputs module[1]	C)	**7ML1930-1ES**
RD500 6 channel input, RTD module	C)	**7ML1930-1ET**
RD500 8 channel thermocouple module	C)	**7ML1930-1EU**
Operating Instructions		
Application manual, English	K)	**7ML1998-5MA01**
Application manual, German Note: Additional Operating Instructions should be ordered as a separate line item. This device is shipped with the Siemens Milltronics manual CD containing Quick Starts and Operating Instructions.	K)	**7ML1998-5MA31**
Other Operating Instructions		
RD500 Remote Data Manager manual, English: web access, alarm event handling, and data capture	K)	**7ML1998-5MK01**
RD500 Remote Data Manager manual, German: web access, alarm event handling, and data capture	K)	**7ML1998-5MK31**
RD500 8 channel 0/4 ... 20 mA input module manual, English	C)	**7ML1998-5MB01**
RD500 8 channel 0/4 ... 20 mA input module manual, German	C)	**7ML1998-5MB31**
RD500 8 channel ± 10 V input module manual, English	C)	**7ML1998-5MC01**
RD500 8 channel ± 10 V input module manual, German	C)	**7ML1998-5MC31**
RD500 8 inputs, 6 relay outputs module manual, English	C)	**7ML1998-5MD01**
RD500,8 inputs, 6 relay outputs module manual, German	C)	**7ML1998-5MD31**
RD500 8 inputs, 6 solid state outputs module manual, English	C)	**7ML1998-5ME01**
RD500 8 inputs, 6 solid state outputs module manual, German	C)	**7ML1998-5ME31**
RD500 6 channel input, RTD module manual, English	C)	**7ML1998-5MF01**
RD500 6 channel input, RTD module manual, German	C)	**7ML1998-5MF31**
RD500 8 channel thermocouple module manual, English	C)	**7ML1998-5MJ01**
RD500, 8 channel thermocouple module manual, German	C)	**7ML1998-5MJ31**

		Order No.
SITRANS RD500 The SITRANS RD500 is a remote data manager providing integrated web access, alarm event handling and data capture for instrumentation.	K)	**7ML5750-** **■■A00-0**
Accesories		
Multitech GPRS modem, external	C)	**7ML1930-1EX**
Industrial CompactFlash card, 2 Gbyte	L)	**7ML1930-1FB**
Industrial CompactFlash card, 1 Gbyte	L)	**7ML1930-1FC**
RJ11 serial to terminal block RS 232	C)	**7ML1930-1FD**
RJ45 serial to terminal block RS 485	C)	**7ML1930-1FE**
GPRS Modem antenna	C)	**7ML1930-1FF**
RD500 Spare Module base	C)	**7ML1930-1FG**
RD500 Spare End terminator	C)	**7ML1930-1FH**
5' Ethernet Cat 5e Red X/O cable for configuration		**7ML1930-1FM**
USB cable type A to B	C)	**7ML1930-1FN**

[1] Configuration limited to 16 modules.

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

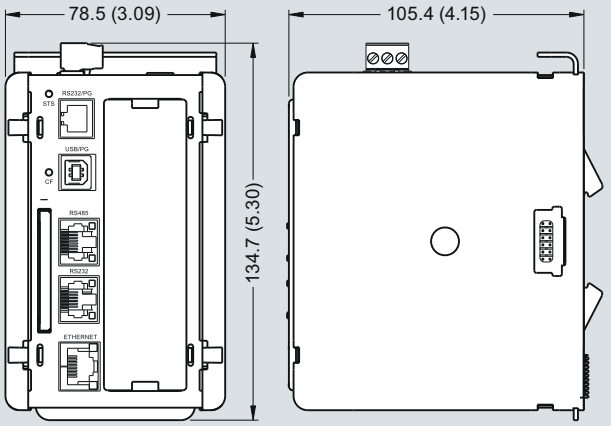
K) Subject to export regulations AL: N, ECCN: 5A991X.

L) Subject to export regulations AL: N, ECCN: 3A991X.

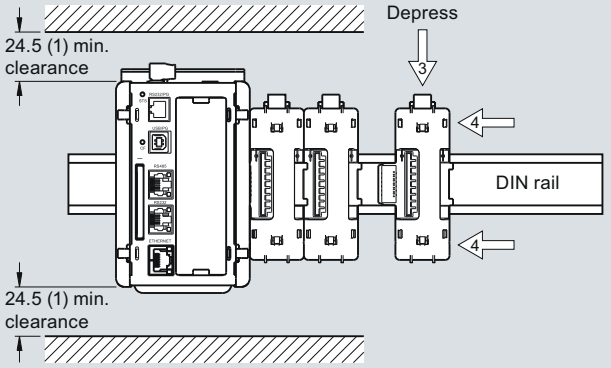
SITRANS RD500

Dimensional drawings

Dimensions

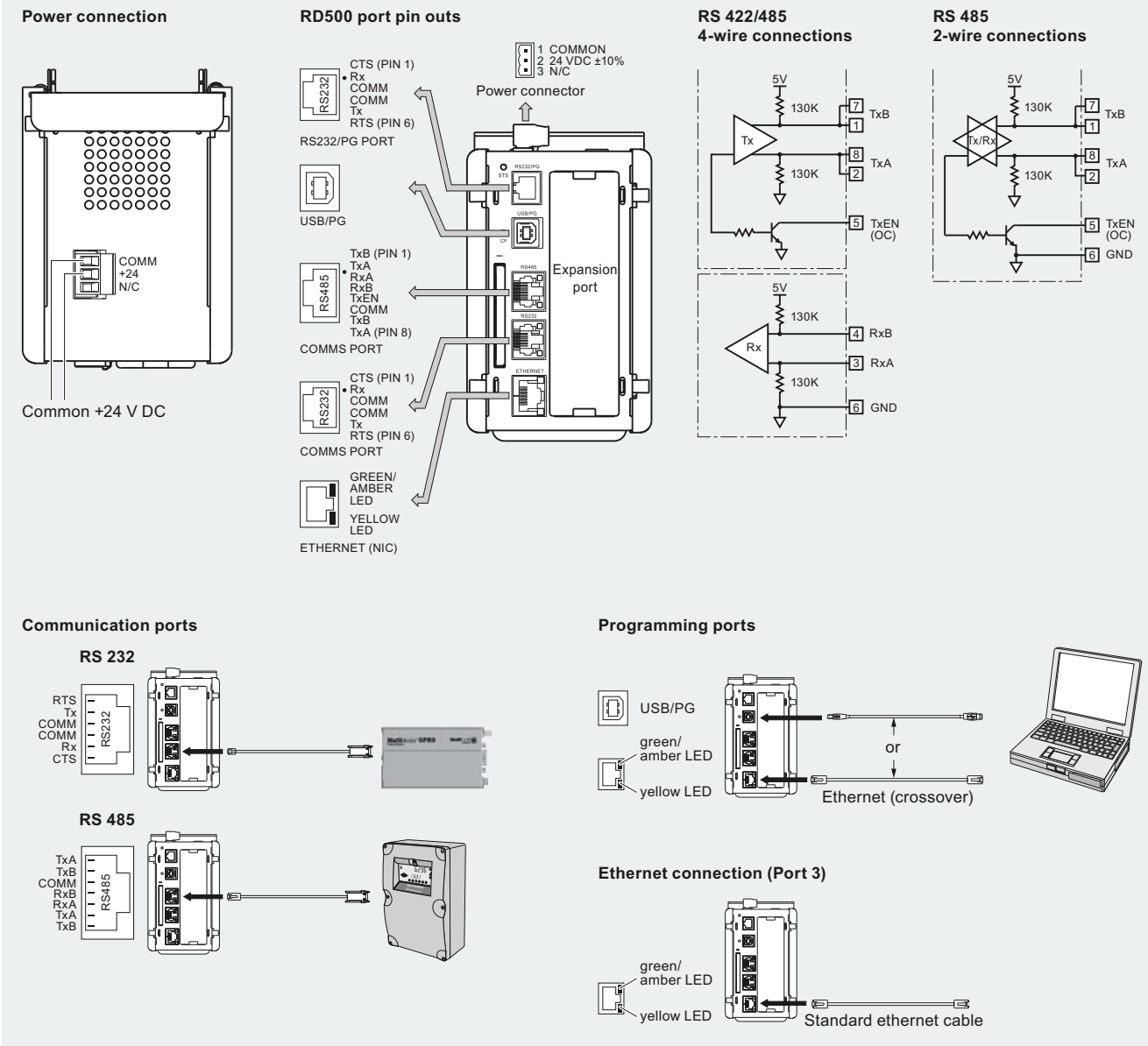


Mounting



SITRANS RD500 dimensions in mm (inch)

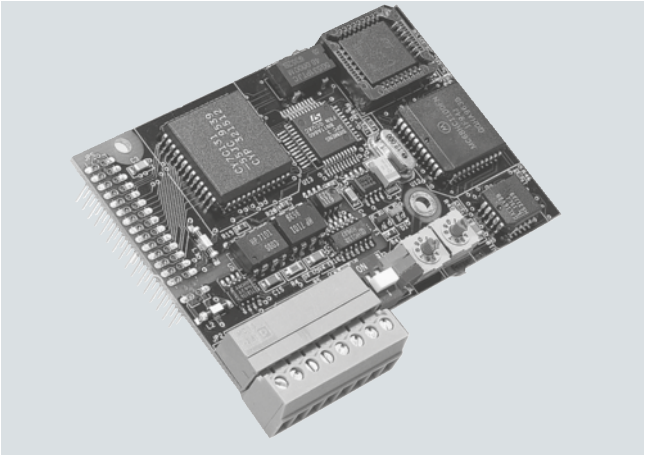
Schematics



SITRANS RD500 connections

SmartLinx

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

Smart Linx	
Module type	**Allen-Bradley Remote I/O**
Interface	RIO
Transmission rate	57.6, 115.2 or 230.4 kbps
Rack address	1 … 73, 1/4 … full rack
Connection	RIO slave
SmartLinx module compatibility	• Milltronics BW500 • Milltronics SF500

Module type	**PROFIBUS DP**
Interface	RS 485 (PROFIBUS standard)
Transmission rate	All valid PROFIBUS DP rates from 9600 kbps to 12 Mbps
Rack address	0 … 99
Connection	Slave
SmartLinx module compatibility	• Milltronics BW500 • Milltronics SF500

Module type	**DeviceNet**
Interface	DeviceNet physical layer
Transmission rate	125, 250, 500 kbps
Rack address	0 … 63
Connection	Slave (group 2)
SmartLinx module compatibility	• Milltronics BW500 • Milltronics SF500

Selection and Ordering data

		Order No.
SmartLinx modules		
Allen-Bradley Remote I/O modules	C)	**7ML1830-1HS**
PROFIBUS DP modules		**7ML1830-1HR**
DeviceNet modules		**7ML1830-1HT**
Instruction manuals		
Allen-Bradley Remote I/O communications module, English	C)	**7ML1998-1AP03**
PROFIBUS communications module		
English	C)	**7ML1998-1AQ03**
French	C)	**7ML1998-1AQ12**
German	C)	**7ML1998-1AQ32**
DeviceNet, English	C)	**7ML1998-1BH02**
Spare SmartLinx software		
Allen-Bradley data diskettes	C)	**7ML1830-1CK**
PROFIBUS DP data diskettes	C)	**7ML1830-1CL**
DeviceNet data diskettes	C)	**7ML1830-1CM**

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

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 for typical scale functions
- Simple expansion of 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
- Control
- Actuator technology

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

SIWAREX FTA weighing electronics in the S7-300 system

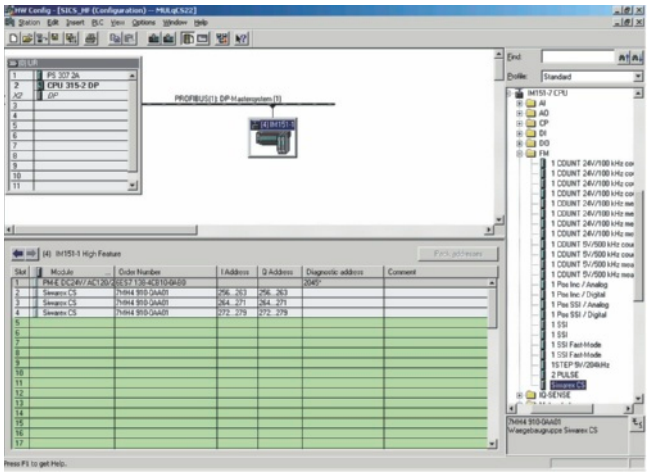
Distribution of weighing functions within automation system

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. A modern weighing solution needs to cover the following scale-related requirements:

- High reliability
- Simple operation
- Excellent reproducibility, and
- High accuracy

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

- Consistency (hardware/software)
- Flexibility
- Standardization



SIMATIC hardware configuration with SIWAREX CS weighing electronics

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.

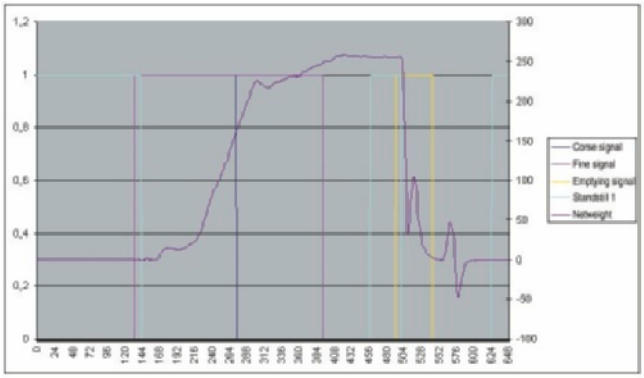
These aspects result in the following solution, which easily satisfies all requirements:

- 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

Overview (continued)

- 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 homogenous 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. In the case of distributed architecture, i.e. when the components are integrated in the scale, the weighing system is easily transformed into an autonomous "field device" connected to the automation technology through the open PROFIBUS or PROFINET.



Curve display of proportioning, recorded over the weighing electronics using SIWAREX FTA

SIWAREX weighing systems in automation

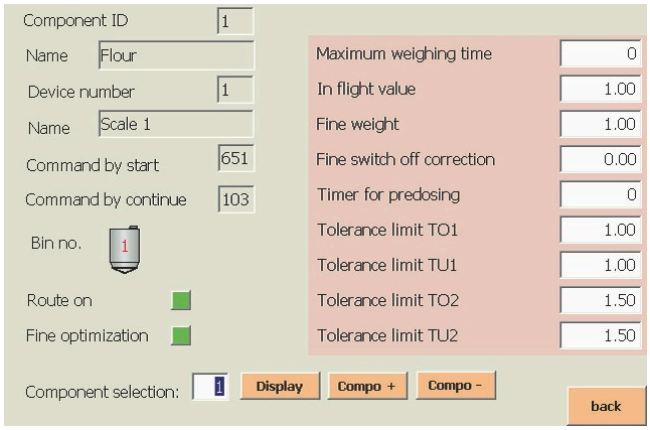
"Totally Integrated Automation" is an integral part of the SIWAREX weighing systems.

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

This means:

- Implementation of central automation concepts through 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
- Consistent configuration and programming using SIMATIC software

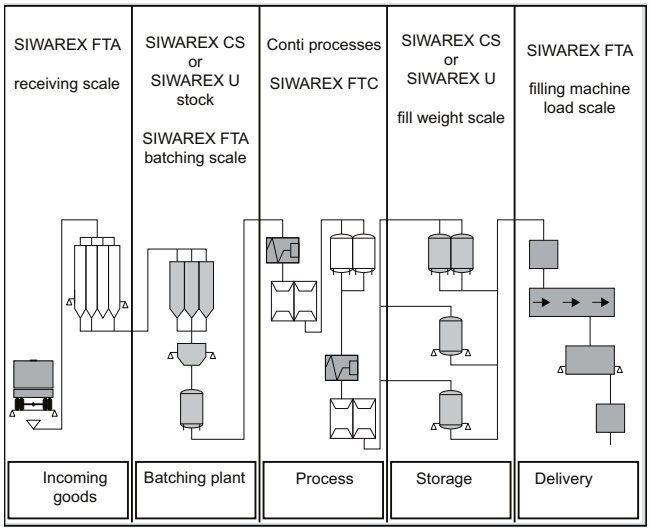
Material parameters



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 that encompasses all hierarchic levels, from the HMI through 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

Overview (continued)

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!

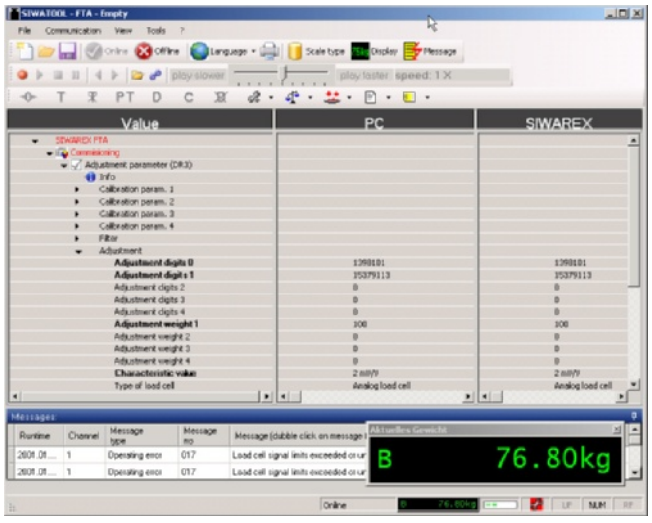
The ET 200 I/O station is designed as a modular system. The weighing electronics are selected from the module catalog and placed in the rack of the modular I/O station. The software addresses the weighing electronics as if they were modules plugged into the central controller of an automation system.

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 through expansion with standard SIMATIC components
- High plant availability
- Easy installation due to snap-on technique
- Low space requirements due to compact design



Scales can also be adjusted without an automation system

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.

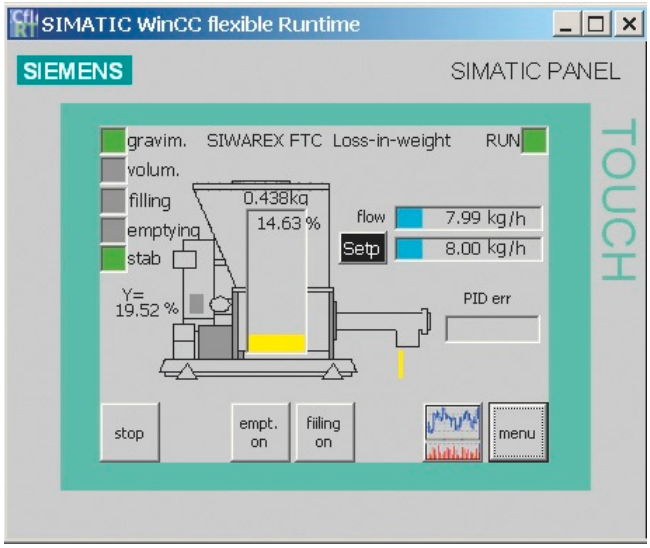
In the SIMATIC S7, for example, faults (measuring range exceeded, proportioning fault, sensor fault, etc.) are reported to the automation system via diagnostic interrupts without the need to input a single line of programming code.

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

Introduction

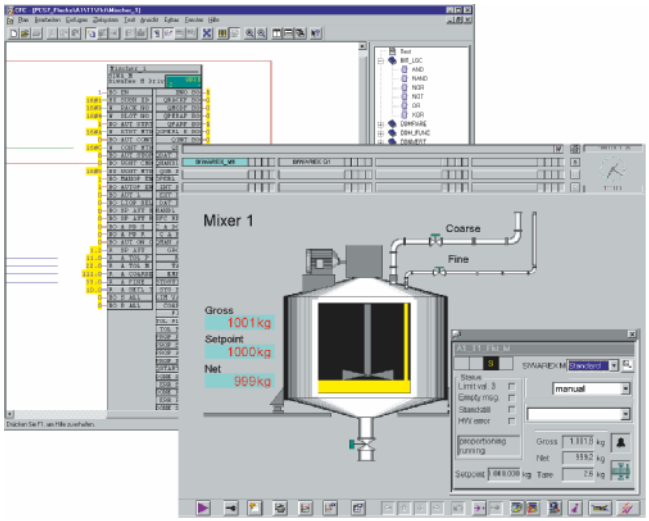
Overview (continued)

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.



Scales displayed in the ES engineering system (on the left) and on the OS operator station (on the right)

SIWAREX application table

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

[1)] Suitable for applications that require legal-for-trade certification

Overview (continued)

2

SIEMENS

Questionnaire SIWAREX

Customer information

Contact: _____ E-mail: _____

Company: _____ Prepared by : _____

Address: _____ Date : _____

City: _____ Country: _____ Notes on application: _____

Zip/Postal Code: _____ Phone: ( ) _____ Fax: ( ) _____

Electronics

Application type

- ☐ Non Automatic Weighing Instrument
- ☐ Platform Scale
- ☐ Vessel/Silo/level measurement
- ☐ Truck scale
- ☐ Force measurement
- ☐ Truck/Wagon scale static
- ☐ Automatic filling/Big Bag scale
- ☐ Dosing scale
- ☐ Belt scale
- ☐ Checkweigher
- ☐ Solid flow meter
- ☐ Weighfeeder
- ☐ Loss in weight dosing scale

Type of material: _____

Requested features

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

Zone type/number: _____

SIMATIC integration

- ☐ SIMATIC S7-200 directly
- ☐ SIMATIC S7-300 directly
- ☐ SIMATIC S7-300/400 with bus
- ☐ SIMATIC PCS7 Version: _____
- ☐ WINCC flex Version: _____
- Type: _____
- ☐ Other
- Name: _____

SIWAREX Mechanic

Load cells

Total maximum weight: _____ Dead load : _____ Required precision: _____

Load cells quantity: _____ Number of support points: _____

- ☐ Vibration (Motor, Mixer, etc.)
- ☐ Guide elements required?
- ☐ Lift up protection
- ☐ Diagnostics
- ☐ High overload protection
- ☐ High measuring rate
- ☐ Ex Protection
- ☐ Stainless steel required ?

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.

 www.siemens.com/weighingtechnology

SIWAREX U

Overview

SIWAREX U weighing electronics

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 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 DP/PROFINET using ET 200M
- Measurement of weight or force with a high resolution of 65 000 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 gage 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
- Measuring of conveyor belt loads
- Overload protection for industrial lifts and rolling mills
- Weighing in potentially explosive areas (through use of an Ex interface)
- Monitoring of belt tension

Design

SIWAREX FTC is a compact SIMATIC S7-300 function module (FM) and can be snapped directly onto the SIMATIC S7-300 or ET 200M backplane bus. The snap-on rail mounting means that it is extremely easy to mount/wire.

The load cells, power supply and the serial interface are connected via a standard 20-pin front plug.

The operation of the SIWAREX U in SIMATIC ensures the total integration of the weighing technology in the automation system.

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 be integrated not only 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), but also 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 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 scale settings	Via SIMATIC (P bus) or PC with 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 Data format of weight values	65 535 2 byte (fixed-point)
Number of measurements/s	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 U_s (rated value)	6 V DC[1)]
Maximum supply current	≤ 150 mA per channel
Permissible load resistance	
• R_{Lmin}	> 40 Ω per channel
• R_{Lmax}	< 4 010 Ω
With Ex(i) interface:	
• R_{Lmin}	> 87 Ω per channel
• R_{Lmax}	< 4 010 Ω
Permissible load cell characteristic	Up to 4 mV/V
Max. distance of load cells	500 m[2)] 150/500 m for gas group IIC 500 m[2)] for gas group IIB (see SIWAREX IS Manual)
Intrinsically-safe load cell powering	Optional (Ex interface) with SIWAREX IS
Auxiliary power	
Rated voltage	24 V DC
Maximum current consumption Current consumption from backplane bus	150 mA (single-channel)/ 240 mA (two-channel) ≤ 100 mA
Certification	ATEX 95, FM, cUL_{US} 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 (32 ... 140 °F)
• Horizontal installation	0 ... 40 °C (32 ... 104 °F)
EMC requirements according to	NAMUR NE21, Part 1 EN 61326
Dimensions	40 x 125 x 130 mm (1.58 x 4.92 x 5.12 inch)

1) Supply of load cells compared to 7MH4601-1AA01 or ... 1BA01 changed to 6 V DC

2) Up to 1 000 m (3280 ft) possible under certain conditions, provided the recommended cable is used (see Accessories).

SIWAREX U

Selection and Ordering data

	Order No.
SIWAREX U For SIMATIC S7 and ET 200M, incl. bus connector, weight 0.3 kg (6.61 lb)	
Single-channel version[1] for connecting one scale D)	**7MH4950-1AA01**
Two-channel version[2] for connecting two scales D)	**7MH4950-2AA01**
SIWAREX U manual Available in a range of languages Free download on the Internet at: http://www.siemens.com/weighingtechnology	
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 (available 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 7MH4601-1*A01 and 7MH4950-*AA01 Available in German and English on CD-ROM, module for the CFC and faceplate	**7MH4683-3BA64**
SIWAREX U configuration package for PCS7 S7, Version 7.0 and V7.1 or higher Suitable for 7MH4950-1AA01 and 7MH4950-2AA01 on CD-ROM • HSP Hardware Support • Package for integrating SIWAREX U in STEP 7 • Function block for CFC • Faceplate • SIWATOOL U commissioning software • Manual	**7MH4950-3AK61**
SIWATOOL cable from SIWAREX U/CS with serial PC interface, for 9-pin PC interfaces (RS 232), 3 m long (9.84 ft)	**7MH4607-8CA**
Installation material (mandatory)	
20-pin front plug with screw contacts (required for each SIWAREX module)	**6ES7392-1AJ00-0AA0**
Shield contact element Sufficient for two SIWAREX U modules	**6ES7390-5AA00-0AA0**
Shield connection terminal Contents: 2 units (suitable for cable with diameter 4 ... 13 mm (0.16 ... 0.51 inch)) Note: one shield connection terminal each is required for: • Scale connection • RS 485 interface • RS 232 interface	**6ES7390-5CA00-0AA0**
S7 DIN rail	
• 160 mm (6.30 inch)	**6ES7390-1AB60-0AA0**
• 480 mm (18.90 inch)	**6ES7390-1AE80-0AA0**
• 530 mm (20.87 inch)	**6ES7390-1AF30-0AA0**
• 830 mm (32.68 inch)	**6ES7390-1AJ30-0AA0**
• 2 000 mm (78.74 inch)	**6ES7390-1BC00-0AA0**
Accessories (optional)	
PS 307 load power supplies (only required if 24 V DC not available) 120/230 V AC; 24 V DC, incl. power connector	
PS 307-1B; 2 A	**6ES7307-1BA00-0AA0**
PS 307-1E; 5 A	**6ES7307-1EA00-0AA0**
PS 307-1K; 10 A	**6ES7307-1KA00-0AA0**
Labeling strips (10 units, spare part)	**6ES7392-2XX00-0AA0**
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.: +49 6806/980-0*** ***Fax: +49 6806/980-999*** 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	**7MH4710-5AA**
With UL and FM approvals, but **without ATEX approval** for intrinsically-safe connection of load cells, suitable for the SIWAREX U, CS, MS, FTA and FTC weighing modules. **Not approved for use in the EU.**	
Manual for Ex interface SIWAREX Pi	**C71000-T5974-C29**

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

Selection and Ordering data (continued)

	Order No.
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 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)	
Cables 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 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 (0.43 inch) outer diameter, for ambient temperature -40 to +80 °C (-40 ... +176 °F)	**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 area to the Ex interface (Ex-I), for fixed laying, occasional bending permitted, blue PVC insulating sheath, approx. 10.8 mm (0.43 inch) outer diameter, for ambient temperature -40 ... +80 °C (-40 ... +176 °F)	**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**

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.

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

SIWAREX CS

Overview

SIWAREX CS weighing electronics

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 65 000 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 gage 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 for industrial lifts and rolling mills
- Weighing in potentially explosive areas (zone 2 directly, or 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 onto a terminal module. The power supply is connected via a power module and an internal power supply rail.

The load cells and the serial interface are connected via the terminal module connections. The use of the terminal module enables replacement of the module without the need to undo connection 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.

All master modules support the readout of process data from SIWAREX CS via peripherals. In the case of PROFIBUS master modules that support the protocol DP V1 and PROFINET master modules, it is also possible to use data record communication to read out data and input settings.

Group diagnostics and process alarms are possible with all PROFIBUS master modules with DP V1 and PROFINET modules. Master modules with DP V0 support group diagnosis, 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.

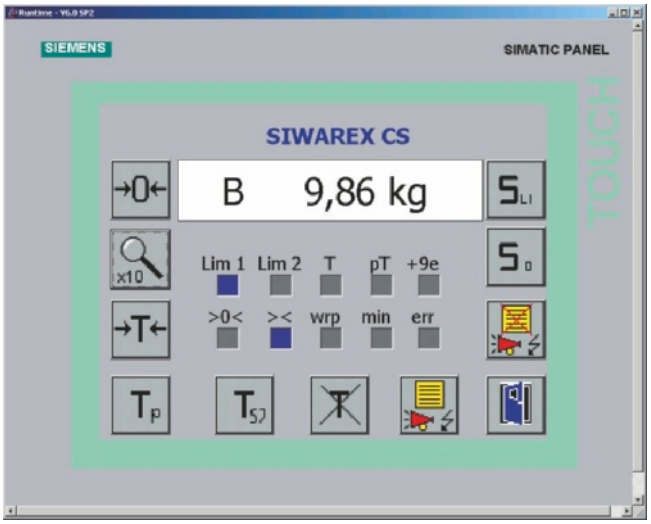
A PC can be connected via the RS 232 interface to parameterize the SIWAREX CS.

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.

Function (continued)



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 in a STEP 7 program and offers a basis for application programming. A SIWAREX CS scale is then easy to implement in SIMATIC, for use together with a SIMATIC panel as 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	via ET 200S
IM151-7 CPU	Through backplane bus
Automation systems from other manufacturers (possible with limitations)	via 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 scale 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 Data format of weight values	65 535 2 byte (fixed-point)
Number of measurements/s	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	Strain gages in 4-wire or 6-wire system
Load cell powering	
Supply voltage U_s (rated value)	6 V DC typ.
Max. supply current	≤ 68 mA
Permissible load resistance	
• R_{Lmin}	> 87 Ω
• R_{Lmax}	< 4 010 Ω
With SIWAREX IS Ex interface:	
• R_{Lmin}	> 87 Ω
• R_{Lmax}	< 4 010 Ω
Load cell characteristic	1 … 4 mV/V
Permissible range of measuring signal (at greatest set characteristic value)	-2.4 ... +26.4 mV
Max. distance of load cells	1 000 m (3 280 ft)
Intrinsically-safe load cell powering	Optional (SIWAREX IS Ex interface)
External load cell powering	≤ 24 V
Connection to load cells in Ex zone 1	Optionally via SIWAREX IS Ex interface
Ex approvals zone 2 and safety	ATEX 95, FM, cUL_{US} Haz. Loc.
Auxiliary power	
Rated voltage	24 V DC
Max. current consumption	150 mA
IP degree of protection acc. to DIN EN 60529; IEC 60529	IP20
Climatic requirements	
$T_{min (IND)}$ ... $T_{max (IND)}$ (operating temperature)	
• Vertical installation	-10 ... +60 °C (14 … 140 °F)
• Horizontal installation	-10 ... +40 °C (14 … 104 °F)
EMC requirements according to	EN 61326, EN 45501 NAMUR NE21, Part 1
Dimensions	80 x 125 x 130 mm (3.15 x 4.92 x 5.12 inch)

SIWAREX CS

Selection and Ordering data

	Order No.
SIWAREX CS Weighing electronics for scales in SIMATIC ET 200S	**7MH4910-0AA01**
SIWAREX CS Manual Available in a range of languages Free download on the Internet at: http://www.siemens.com/weighingtechnology	
SIWAREX CS "Getting started" Sample software shows beginners how to program the scales in STEP 7. Free download on the Internet at: http://www.siemens.com/weighingtechnology	
Configuration package SIWAREX CS on CD-ROM for SIMATIC S7, version V5.4 or higher • Software for SIWATOOL CS scale adjustment (available in a range of languages) • Manuals available on CD (in a range of languages) • SIWAREX CS "Getting started"	**7MH4910-0AK01**
SIWATOOL connection cable D) from SIWAREX U/CS with serial PC interface, for 9-pin PC interfaces (RS 232), 3 m long (9.84 ft)	**7MH4607-8CA**
Installation material (mandatory)	
Terminal module TM-E 30 mm (1.18 inch) 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 Note: one shield connection terminal is required each for the • scales connection and • TTY interface or • RS 232 interface	**6ES7193-4GB00-0AA0**
N busbar, galvanized 3 x 10 mm (0.12 x 0.39 inch), 1.0 m (3.28 ft) long	**8WA2842**
Feeder terminal for N busbar	**8WA2868**
Remote displays (option)	
The digital remote displays can be connected directly to the SIWAREX CS through the TTY interface. The following remote display can be used: S102 *Siebert Industrieelektronik GmbH* *P.O. Box 1180* *D-66565 Eppelborn* *Tel.: +49 6806/980-0* *Fax: +49 6806/980-999* Internet: http://www.siebert.de Detailed information available from manufacturer.	

	Order No.
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**
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 and FTC. Not approved for use in the EU.	**7MH4710-5AA**
Manual for Ex interface 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, incl. manual Suitable for weighing modules SIWAREX U, CS, MS, FTA, FTC and CF. 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)	
Cables 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 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 (0.43 inch) outer diameter, for ambient temperature -40 to +80 °C (104 ... +176 °F)	**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 (0.43 inch) outer diameter, for ambient temperature -40 ... +80 °C (104 ... +176 °F)	**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

SIWAREX MS is a versatile weighing module for all simple weighing and force measuring tasks. The compact module is easy to install in 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 65 000 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 via Ex interface
- Supports direct connection of a remote display to TTY interface

Application

SIWAREX MS is the optimum solution wherever strain gage 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
- Scales for potentially explosive areas (zone 2 or zone 1 using Ex interface SIWAREX IS or Pi)
- Monitoring of belt tension
- Force measuring, container weighers, 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.

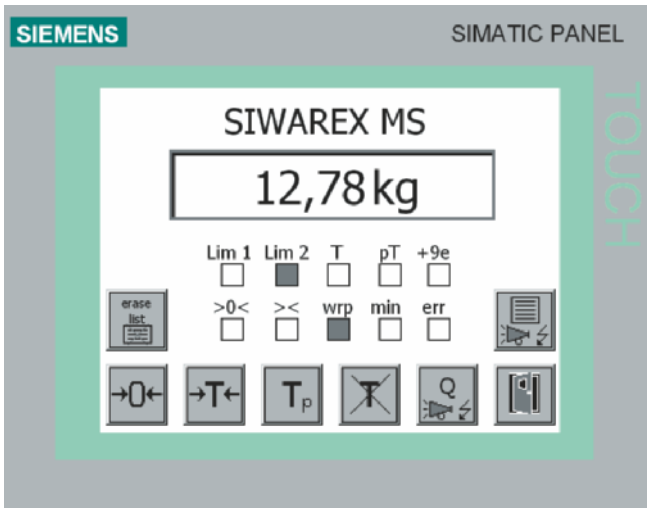
Consistent and uniform communication between all system components enables fast, reliable and cost-effective integration and diagnosis in industrial processes.

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 via 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 in the plant software via 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"

SIWAREX MS

Function (continued)

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 in a STEP 7 program and offers a basis for application programming. A complete SIWAREX MS scale is then easy to implement in SIMATIC, for use together with a SIMATIC panel as 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 weighing modules 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), and in zone 1 if an optional Ex interface is used, although SIWAREX MS itself must be installed in a safe area. The following certification conditions must be observed.

Technical specifications

SIWAREX MS	
Integration in S7-200 automation systems	• CPU222 (6ES7212-1*B23-0XB0) • CPU224 (6ES7214-1*D23-0XB0) • CPU224XP (6ES7214-2*D23-0XB0) • CPU226 (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 scale settings	via the PC parameterization software SIWATOOL MS (RS 232)
Measuring properties	
• Error limit acc. to DIN 1319-1 of full-scale value at 20 °C ± 10 K (68 °F ± 10 K)	0.05 %
• Internal resolution Data format of weight values	65 535 2 byte (fixed-point)
Number of measurements/s	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)	Typ. 6 V DC
• Max. supply current	≤ 150 mA
• Permissible load resistance	
- R_{Lmin}	> 40 Ω
- R_{Lmax}	< 4 010 Ω
With SIWAREX IS Ex interface or SIWAREX Pi	
- R_{Lmin}	> 87 Ω
- R_{Lmax}	< 4 010 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 (1 640 ft)
Intrinsically-safe load cell powering	
Connection to load cells in Ex zone 1	Optionally via SIWAREX IS Ex interface or SIWAREX Pi:
Ex approvals and safety	CE, ATEX 95, FM, cUL_{US} Haz. Loc.
Auxiliary power	
• Rated voltage	24 V DC
- Max. current consumption	130 mA
• Rated voltage (of CPU)	5 V DC
- Max. current consumption	140 mA
IP degree of protection acc. to DIN EN 60529; IEC 60529	IP20
Climatic requirements	
$T_{min (IND)}$ ... $T_{max (IND)}$) (operating temperature)	
• Vertical installation	0 ... +55 °C (32 ... +131 °F)
• Horizontal installation	0 ... +40 °C (32 ... +104 °F)
EMC requirements according to	EN 61326, EN 45501 NAMUR NE21, Part 1
Dimensions	71.2 x 80 x 62 mm (2.80 x 3.15 x 2.44 inch)

Selection and Ordering data

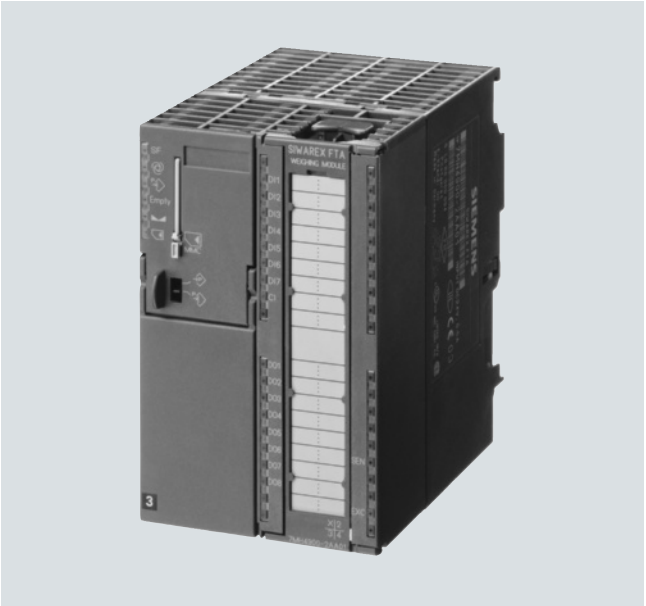
	Order No.
SIWAREX MS D) Weighing electronics for scales in SIMATIC S7-200 for applications without obligation of verification	**7MH4930-0AA01**
SIWAREX MS manual Available in a range of languages Free download on the Internet at: http://www.siemens.com/weighingtechnology	
SIWAREX MS configuration package on CD-ROM for STEP7 Micro/WIN, version 4.0 SP2 or higher • Software for SIWATOOL MS scale adjustment (available in a range of languages) • Manuals available on CD (in a range of languages) • Micro/WIN Library MicroScale for communication with SIWAREX MS	**7MH4930-0AK01**
SIWAREX MS "Getting started" Sample software show beginners how to program the scales. Free download on the Internet at: http://www.siemens.com/weighingtechnology	
SIWATOOL cable from SIWAREX FTA, FTC and MS with serial PC interface, for 9-pin PC interfaces (RS 232)	
• 2 m long (6.56 ft)	**7MH4702-8CA**
• 5 m long (16.40 ft)	**7MH4702-8CB**
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 Industrieelektronik GmbH*** ***P.O. Box 1180*** ***D-66565 Eppelborn*** ***Tel.: +49 6806/980-0*** ***Fax: +49 6806/980-999*** Internet · 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**

	Order No.
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 and FTC. **Not approved for use in the EU.**	**7MH4710-5AA**
Manual for Ex interface 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, incl. manual Suitable for weighing modules SIWAREX U, CS, MS, FTA, FTC and CF. 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)	
Cables 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 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 (0.43 inch) outer diameter, for ambient temperature -40 to +80 °C (104 ... +176 °F)	**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 (0.43 inch) outer diameter, for ambient temperature -40 ... +80 °C (104 ... +176 °F)	**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.

SIWAREX FTA

Overview



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

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

Benefits

SIWAREX FTA offers the following features:

- 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 6 000 d, legal-for-trade
- Use with analog strain gauge load cells, types SIWAREX R and SIWAREX WL200
- Alternative option available for connection of individual load cells from the manufacturers METTLER TOLEDO, Wipotec and PESA
- 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
- Theoretical adjustment without adjustment weights
- Replacement of module without renewed adjustment of scale
- Recording of weighing sequence
- Legal-for-trade alibi memory
- Can be used in Ex applications

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 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

SIWAREX FTA is a SIMATIC S7-300 function module and can be snapped directly onto the SIMATIC S7-300 or ET 200M backplane bus. The snap-on rail mounting of the 80 mm (3.15 inch) wide weighing module means that it is extremely easy to mount/wire.

The load cells, the RS 485 serial interface, the analog output and the digital inputs and outputs are connected via a standard 40-pin front plug, the PC (RS 232) is connected via a 9-pin sub-D plug and the power supply via a separate 2-pin plug.

The operation of the SIWAREX FTA in SIMATIC ensures the total integration of the weighing technology in the automation system.

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.

Function (continued)

Weighing functions

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

The following weighing functions can be parameterized:

- NSW (Non Automatic Weighing Instrument) according to OIML R76
- SWA (Automatic Gravimetric Filling Instrument) according to OIML R61
- SWE (Automatic Catchweighing Instrument) according to OIML R51
- SWT (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.

The PLC program can also be used to directly influence weighing procedures, thus allowing easy adaptation of the SIWAREX FTA to any modifications in system technology.

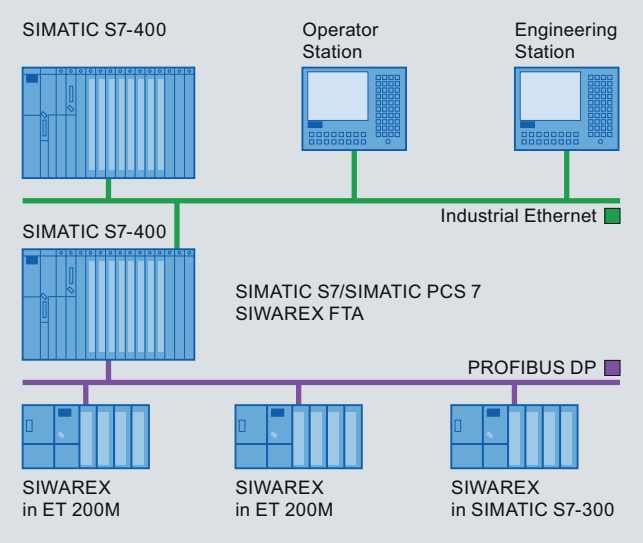
The SIWAREX FTA is already factory-calibrated. This enables the theoretical adjustment of the scale without adjustment weights, and module replacement without readjustment of the scale. When using "active bus modules", replacement is also possible during operation.

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. At the same time, these operator panels can also be 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 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.



SIMATIC S7/PCS 7 configuration with SIWAREX FTA

Software

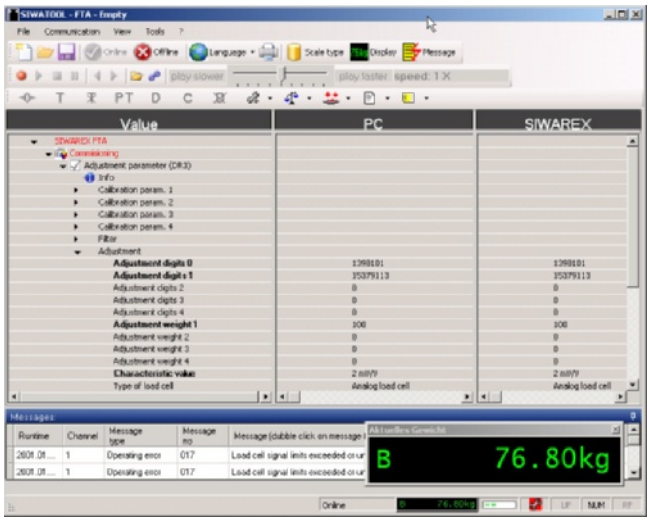
SIWATOOL FTA commissioning software

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



SIWATOOL FTA commissioning software

SIWAREX FTA

Function (continued)

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 after 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.

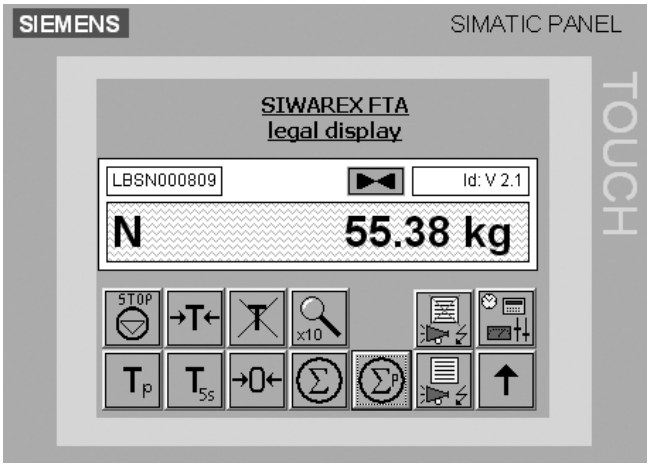
Reading out of weighing reports

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. The weighing results of a specific weighing procedure 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 in a STEP 7 program and offers a basis for application programming. A complete SIWAREX FTA scale is then easy to implement in SIMATIC together with a SIMATIC touch panel as 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	
• 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	• Via SIMATIC S7 • Via SIWATOOL FTA software (RS 232)
Measuring properties	
EU type approval as non-automatic weighing machine, trade class III	3 x 6 000 d ≥ 0.5 µV/e
Internal resolution	16 million parts
Updating rate	400/100 Hz
Several parameterizable digital filters	• Critically dampened • 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	
Technical	Strain gages in 4-wire or 6-wire system
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_{Lmin}	> 56 Ω > 87 Ω with Ex interface
• R_{Lmax}	≤ 4 010 Ω
Max. distance of load cells	
when using the recommended cable	
Standard	1 000 m (3 280 ft)
In hazardous area[1)]	
• For gases of group IIC	300 m (984 ft)
• For gases of group IIB	1 000 m (3 280 ft)
Connection to load cells in Ex zone 1	Optionally via SIWAREX IS Ex interface
Ex approvals zone 2 and safety	ATEX 95, FM, cUL$_{US}$ Haz. Loc.
Auxiliary power	
Rated voltage	24 V DC
Max. current consumption	500 mA
Current consumption from backplane bus	Typ. 55 mA

Technical specifications (continued)

SIWAREX FTA	
Inputs/outputs	
• Digital inputs	7, electrically isolated
• Digital outputs	8, electrically isolated
• Counter input	≤ 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 according to EN 60529; IEC 60529	IP20
Climatic requirements	
$T_{min\ (IND)} \cdots T_{max\ (IND)}$ (operating temperature)	
• Vertical installation	-10 ... +60 °C (14 ... 140 °F)
• Horizontal installation	-10 ... +40 °C (14 ... 104 °F)
EMC requirements	EN 61326, EN 45501, NAMUR NE21, Part 1
Dimensions	80 x 125 x 130 mm (3.15 x 4.92 x 5.12 inch)
Weight	600 g (0.44 lb)

1) For further details see Ex interface SIWAREX IS

SIWAREX FTA

Selection and Ordering data

	Order No.
SIWAREX FTA Legal-for-trade weighing electronics for automatic scales for S7-300 and ET 200M. EU type approval 3 x 6 000 d Applications: proportioning, filling, bagging, loading. **Caution**: Observe approval conditions for applications with obligation of verification. We recommend using our calibration set and contacting our SIWAREX hotline.	**7MH4900-2AA01**
SIWAREX FTA manual • Available in a range of languages • Free download on the Internet at: http://www.siemens.com/weighingtechnology	
SIWAREX FTA "Getting started" • Sample software shows beginners how to program the scales in STEP 7. • Free download on the Internet at: http://www.siemens.com/weighingtechnology	
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	**7MH4900-2AK01**
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	**7MH4900-2AK61**
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	**7MH4900-2AK62**

	Order No.
Calibration set for SIWAREX FTA For verification of up to 5 scales comprising: • 3 x inscription foil for labeling • 1 x cover foil • 10 x EU verification mark (a black M on a green background) • Guidelines for verification, verification certificates and approvals, adaptable label, SIWAREX FTA Manual on CD-ROM	**7MH4900-2AY10**
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	**7MH4900-2AL01**
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	**7MH4900-2AM01**
SIWATOOL cable from SIWAREX FTA with serial PC interface, for 9-pin PC interfaces (RS 232)	
• 2 m (6.56 ft) long	**7MH4702-8CA**
• 5 m (16.40 ft) long	**7MH4702-8CB**
Front connectors, 40-pole required for each SIWAREX module	
• With screw contacts	**6ES7392-1AM00-0AA0**
• With spring-loaded contacts	**6ES7392-1BM01-0AA0**
Shield contact element Sufficient for one SIWAREX FTA module	**6ES7390-5AA00-0AA0**
Shield connection terminal Contents: 2 units (suitable for cable with diameter 4 ... 13 mm (0.16 ... 0.51 inch)) Note: one shield connection terminal each is required for: • Scale connection • RS 485 interface • RS 232 interface	**6ES7390-5CA00-0AA0**
S7 DIN rail	
• 160 mm (6.30 inch)	**6ES7390-1AB60-0AA0**
• 480 mm (18.90 inch)	**6ES7390-1AE80-0AA0**
• 530 mm (20.87 inch)	**6ES7390-1AF30-0AA0**
• 830 mm (32.68 inch)	**6ES7390-1AJ30-0AA0**
• 2 000 mm (78.74 inch)	**6ES7390-1BC00-0AA0**

Selection and Ordering data

	Order No.
PS 307 load power supply (only required if DC 24 V is not available) 120/230 V AC; 24 V DC	
• PS 307-1B; 2 A	**6ES7307-1BA00-0AA0**
• PS 307-1E; 5 A	**6ES7307-1EA00-0AA0**
• PS 307-1K; 10 A	**6ES7307-1KA00-0AA0**
MMC memory for data recording up to 16 MB	**7MH4900-2AY20**
Remote displays (option)	
The Siebert S102 and S302 remote digital display can be directly connected to the SIWAREX FTA via an RS 485 interface. *Siebert Industrieelektronik GmbH* *P.O. Box 1180* *D-66565 Eppelborn* *Tel.: +49 6806/980-0* *Fax: +49 6806/980-999* 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 weighing modules SIWAREX U, CS, MS, FTA and FTC. **Not approved for use in the EU**.	**7MH4710-5AA**
Manual for Ex interface 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, incl. manual Suitable for weighing modules SIWAREX U, CS, MS, FTA, FTC and CF. Approved for use in the EU.	
• With short-circuit current < 199 mA DC	**7MH4710-5BA**
• With short-circuit current < 137 mA DC	**7MH4710-5CA**

	Order No.
Cable (optional)	
Cables 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 (0.43 inch) outer diameter, for ambient temperature -40 to +80 °C (104 ... +176 °F)	**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 (0.43 inch) outer diameter, for ambient temperature -40 ... +80 °C (104 ... +176 °F)	**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.

SIWAREX FTC

Overview

SIWAREX FTC weighing module

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 integrated communication, diagnostics and configuration tools.

Benefits

SIWAREX FTC offers the following features:

- 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 6 000 d
- Use with analog strain gauge load cells, types SIWAREX R and SIWAREX WL200
- Alternative option available for connection of individual load cells from the manufacturers METTLER TOLEDO, Wipotec and PESA
- 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

SIWAREX FTC is a SIMATIC S7-300 function module and can be snapped directly onto the SIMATIC S7-300 or ET 200M backplane bus. The snap-on rail mounting of the 80 mm (3.15 inch) wide weighing module means that it is extremely easy to mount/wire.

The load cells, the RS 485 serial interface, the analog output and the digital inputs and outputs are connected via a standard 40-pin front plug, the PC (RS 232) is connected via a 9-pin sub-D plug and the power supply via a separate 2-pin plug.

Operation of the SIWAREX FTA in SIMATIC ensures the total integration of the conveyor scale in the automation system.

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:

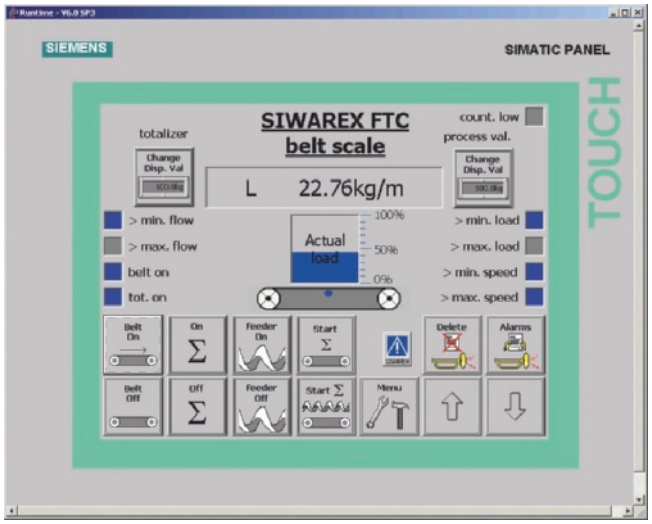
Weight measurement and force measurement

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

Function (continued)

Conveyor scale / weighfeeder

The functions of a conveyor 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.



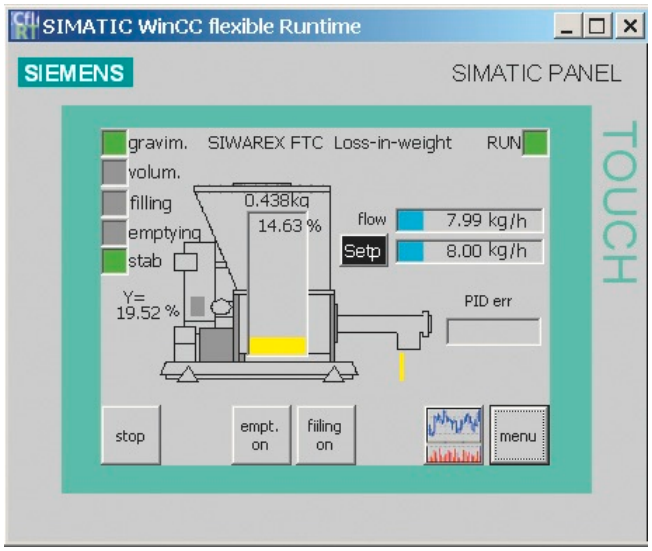
Scale faceplate of a conveyor scale

Loss-in-weight scale

The functions of a loss-in-weight scale are implemented in this operating mode. The actual weight of the container is measured and the flow rate 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.

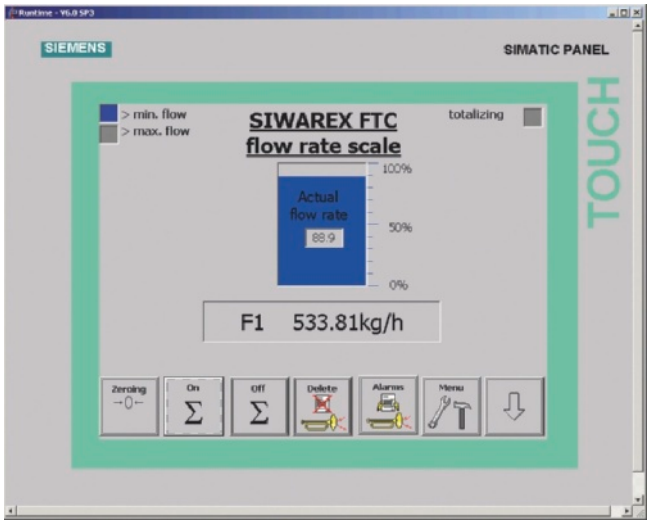
The high measurement resolution, real-time signal processing, detection and filtering of signals in the weighing electronics enable extremely high proportioning accuracy.



Scale faceplate of a loss-in-weight scale

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.



View of a bulk flow meter

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.

The PLC program can also be used to directly influence weighing procedures, thus allowing easy adaptation of the SIWAREX FTC to any modifications in system technology.

Modules can be replaced without the need to readjust the scale. When using "active bus modules", replacement is also possible during operation.

Applications of SIWAREX FTC

2

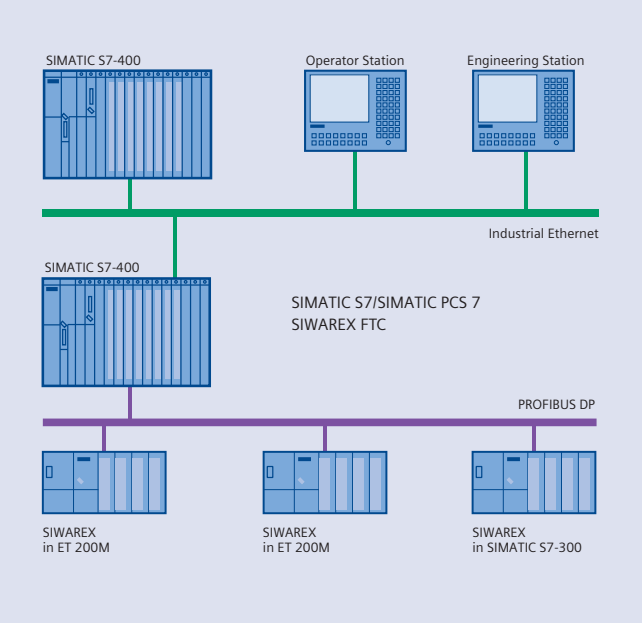
Function (continued)

Integration in SIMATIC

SIWAREX FTC is completely integrated into the SIMATIC S7. 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. At the same time, these operator panels can also be 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.



Configuration of SIMATIC S7 with SIWAREX FTC (medium-sized plant)

Software

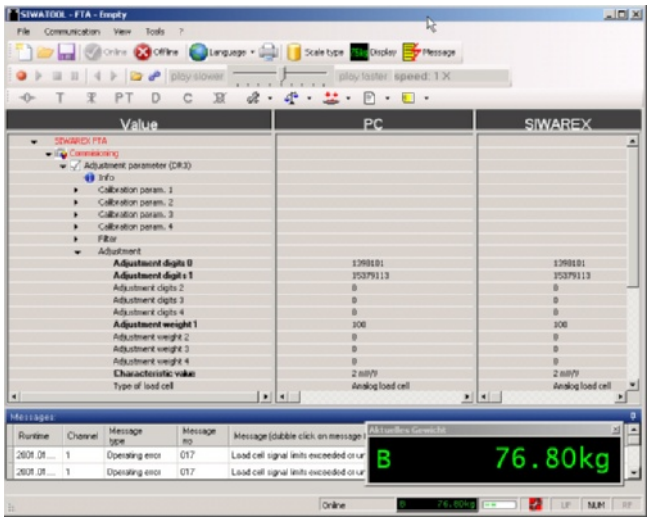
Adjustment of the scale using SIWATOOL FTC

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



SIWATOOL FTC adjustment software

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 FTC 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 FTC and MS Excel.

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

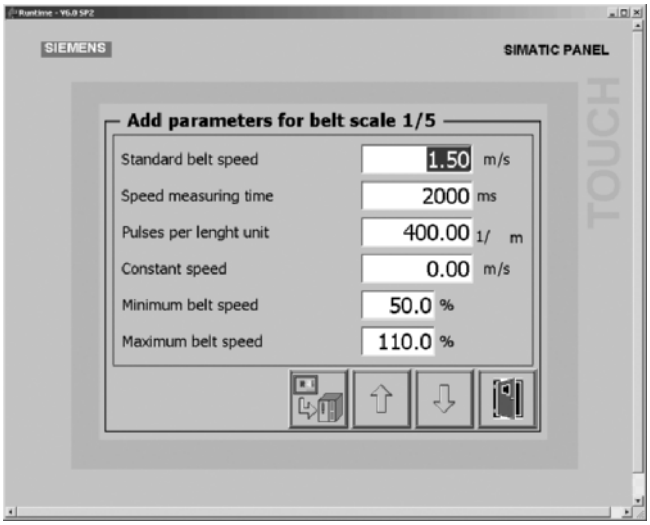
The weighing reports can be saved on an MMC (Micro Memory Card) inserted in the SIWAREX FTC.

SIWAREX FTC – simple configuring

Integration in SIMATIC can result in freely-programmable, modular weighing systems for conveyor 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 as the operator panel.

Function (continued)



Scale faceplate in the SIWAREX FTC software "Getting started"

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	• Via SIMATIC S7 • Via SIWATOOL FTC software (RS 232)
Measuring properties	
Accuracy to EN 45501	3 x 6 000 d ≥ 0.5 µV/e
Internal resolution	± 8 million parts
Internal/external updating rate	400/100 Hz
Several parameterizable digital filters	• Critically dampened • Bessel • Butterworth (0.05 ... 20 Hz) • Mean-value filter
Weighing functions	• Non-automatic weighing machine, force measurement • Conveyor scale • Loss-in-weight scale • Bulk flow meter
Load cells	
	Strain gages in 4-wire or 6-wire system
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_{Lmin}	> 56 Ω > 87 Ω with Ex interface
• R_{Lmax}	≤ 4 010 Ω
Max. distance of load cells	
when using the recommended cable	
• Standard	1 000 m (3 280 ft)
• In hazardous area[1)]	
- For gases of group IIC	300 m (984 ft)
- For gases of group IIB	1 000 m (3 280 ft)
Connection to load cells in Ex zone 1	Optionally via SIWAREX IS Ex interface
Ex approvals zone 2 and safety	ATEX 95, FM, cUL_{US} Haz. Loc.
Auxiliary power	
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	≤ 10 kHz
• Analog output	
- Current range	0/4 ... 20 mA
- Updating rate	100 Hz
Degree of protection according to EN 60529; IEC 60529	IP20
Climatic requirements	
$T_{min\ (IND)}$ ... $T_{max\ (IND)}$ (operating temperature)	
• Vertical installation	-10 ... +60 °C (14 ... 140 °F)
• Horizontal installation	-10 ... +40 °C (14 ... 104 °F)
EMC requirements	EN 61326, EN 45501, NAMUR NE21, Part 1
Dimensions	80 x 125 x 130 mm (3.15 x 4.92 x 5.12 inch)
Weight	600 g (0.44 lb)

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

SIWAREX FTC

Selection and Ordering data

	Order No.
SIWAREX FTC Weighing electronics for S7-300 and ET 200M. Applications: Conveyor scales, force measurement, Loss-in-weight scale and bulk flow meters	**7MH4900-3AA01**
SIWAREX FTC_B manual for conveyor scales • Available in a range of languages • Free download on the Internet at: http://www.siemens.com/weighingtechnology	
SIWAREX FTC_L manual for bulk flow meters and loss-in-weight scales • Available in a range of languages • Free download on the Internet at: http://www.siemens.com/weighingtechnology	
SIWAREX FTC "Getting started" for conveyor scales • Sample software shows beginners how to program the scales in STEP 7 for conveyor scale mode • Free download on the Internet at: http://www.siemens.com/weighingtechnology	
SIWAREX FTC "Getting started" for bulk flow meters • Sample software shows beginners how to program the scales in STEP 7 for conveyor scale mode • Free download on the Internet at: http://www.siemens.com/weighingtechnology	
SIWAREX FTC "Getting started" for loss-in-weight feeders • Sample software shows beginners how to program the scales in STEP 7 for conveyor scale mode • Free download on the Internet at: http://www.siemens.com/weighingtechnology	
SIWAREX FTC_B configuration package for SIMATIC S7 on CD-ROM (conveyor scale) • HSP Hardware Support Package for integrating SIWAREX FTA/FTC in STEP 7 • "Getting started" for conveyor scales • SIWATOOL FTC_B commissioning software for conveyor scales • Manual	**7MH4900-3AK01**

	Order No.
SIWAREX FTC_L configuration package for SIMATIC S7 on CD-ROM (bulk flow meter and loss-in-weight feeder) • HSP Hardware Support Package for integrating SIWAREX FTA/FTC in STEP 7 • "Getting started" for loss-in-weight feeders • "Getting started" for loss-in-weight feeders • Commissioning software SIWATOOL FTC_L for bulk flow meters and loss-in-weight feeders • Manual	**7MH4900-3AK02**
SIWAREX FTC_B V6.x configuration package on CD-ROM (conveyor scale) • HSP Hardware Support Package for integrating SIWAREX FTA/FTC in STEP 7 • Function block for CFC • Faceplate • SIWATOOL FTC_B commissioning software for conveyor scales • Manual	**7MH4900-3AK61**
SIWAREX FTC_B configuration package for PCS 7 V7.0 and V7.1 on CD-ROM (conveyor scale) • HSP Hardware Support Package for integrating SIWAREX FTA/FTC in STEP 7 • Function block for CFC • Faceplate • SIWATOOL FTC_B commissioning software for conveyor scales • Manual	**7MH4900-3AK63**
SIWAREX FTC_L configuration package for PCS 7 V7.0 and V7.1 on CD-ROM (loss-in-weight feeder) • HSP Hardware Support Package for integrating SIWAREX FTA/FTC in STEP 7 • Function block for CFC • Faceplate • Commissioning software SIWATOOL FTC_L for bulk flow meters and loss-in-weight feeders • Manual	**7MH4900-3AK64**
SIWATOOL cable from SIWAREX FTC with serial PC interface, for 9-pin PC interfaces (RS 232)	
• 2 m long (6.56 ft)	**7MH4702-8CA**
• 5 m long (16.40 ft)	**7MH4702-8CB**
40-pin front plug required for each SIWAREX module	
• With screw contacts	**6ES7392-1AM00-0AA0**
• With spring-loaded contacts	**6ES7392-1BM01-0AA0**

Selection and Ordering data (continued)

	Order No.
Shield contact element Sufficient for one SIWAREX FTC module	**6ES7390-5AA00-0AA0**
Shield connection terminal Contents: 2 units (suitable for cable with diameter 4 ... 13 mm (0.16 ... 0.51 inch) Note: one shield connection terminal each is required for: • Scale connection • RS 485 interface • RS 232 interface	**6ES7390-5CA00-0AA0**
S7 DIN rail	
• 160 mm (6.30 inch)	**6ES7390-1AB60-0AA0**
• 480 mm (18.90 inch)	**6ES7390-1AE80-0AA0**
• 530 mm (20.87 inch)	**6ES7390-1AF30-0AA0**
• 830 mm (32.68 inch)	**6ES7390-1AJ30-0AA0**
• 2 000 mm (78.74 inch)	**6ES7390-1BC00-0AA0**
PS 307 load power supply (only required if DC 24 V is not available) 120/230 V AC; 24 V DC	
• PS 307-1B; 2 A	**6ES7307-1BA00-0AA0**
• PS 307-1E; 5 A	**6ES7307-1EA00-0AA0**
• PS 307-1K; 10 A	**6ES7307-1KA00-0AA0**
MMC memory for data recording up to 16 MB	**6ES7953-8LG11-0AA0**
Remote displays (option)	
The Siebert S102 and S302 remote digital display can be directly connected to the SIWAREX FTA via an RS 485 interface. ***Siebert Industrieelektronik GmbH*** ***P.O. Box 1180*** ***D-66565 Eppelborn*** ***Tel.: +49 6806/980-0*** ***Fax: +49 6806/980-999*** 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	
SIWAREX JB junction box, stainless steel housing for connecting up to 4 load cells in parallel	**7MH4710-1BA**
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 and FTC. **Not approved for use in the EU**.	**7MH4710-1EA** **7MH4710-5AA**
Manual for Ex interface SIWAREX Pi	**C71000-T5974-C29**

	Order No.
Ex interface, type SIWAREX IS With ATEX approval, but **without UL and FM approvals** for intrinsically safe connection of load cells, incl. manual Suitable for weighing modules SIWAREX U, CS, MS, FTA, FTC and CF. 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)	
Cables 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 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 (0.43 inch) outer diameter, for ambient temperature -40 to +80 °C (-104 ... +176 °F)	**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 (0.43 inch) outer diameter, for ambient temperature -40 ... +80 °C (-104 ... +176 °F)	**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.

SIWAREX CF

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 16 000 parts and accuracy of 0.15 %

Application

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

- Monitoring of crane and cable loads
- Measuring of conveyor belt loads
- Overload protection for rolling mills
- Monitoring of belt tension
- Force measurement in testing machines
- Torque and pressure measurement

Design

SIWAREX CF is a compact function module (FM) in the SIMATIC S7 and can be snapped directly onto the ET 200S backplane bus. The snap-on rail mounting means that it is extremely easy to mount/wire.

The sensor and power supply are connected via the standard terminal housing

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.

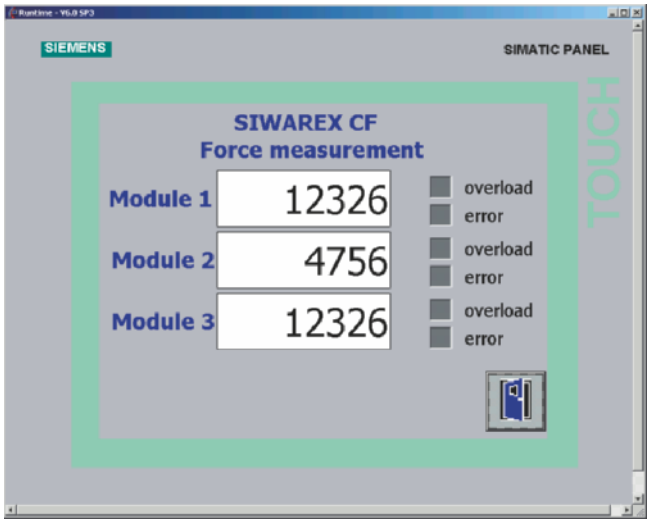
The signal is amplified, coarse-filtered, and then converted to a digital value. A connectable digital filter can additionally reduce noise on the measuring signal.

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 by averaging in the SIMATIC CPU or by converting 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

Unlike 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	Via ET 200S
Automation systems from other vendors	Via 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 acc. to DIN 1319-1 of full-scale value at 20 °C ± 10 K (68 °F ± 10 K)	≤ 0,15 %
Signal resolution	14 bits plus 1 bit sign
Number of measurements/s	50
Low-pass filter	Without or 2 Hz
Sensors	In accordance with the principle of expansion measurement (full bridge) 4-wire connection
Sensor feed	
Supply voltage, short-circuit-proof	6 V DC ± 5 %
Permissible sensor resistance	
• R_{Lmin}	> 250 Ω
• R_{Lmax}	< 4 010 Ω
Permissible sensor cell coefficient	Up to 4 mV/V
Permissible range of the measuring signal	-25.2 ... +25.2 mV
Auxiliary power	
Rated voltage	24 V DC
Maximum current consumption	150 mA
Connection to sensors in Ex zone 1	Optionally via SIWAREX IS Ex interface
Ex approval zone 2 and safety	ATEX 95, cUL_{us} Haz. Loc.
IP degree of protection to EN 60529; IEC 60529	IP20
Climatic requirements $T_{min\ (IND)} \cdots T_{max\ (IND)}$ (operating temperature)	
• Vertical installation	0 ... 60 °C (32 ... 140 °F)
• Horizontal installation	0 ... 40 °C (32 ... 104 °F)
EMC requirements according to	NAMUR NE21, Part 1 89/386/EEC
Dimensions	30 x 80 x 50 mm (1.18 x 3.15 x 1.97 inch)

SIWAREX CF

Selection and Ordering data	Order No.
SIWAREX CF Weighing module for strain-gauge sensors in SIMATIC ET 200S (SIWAREX CF configuration 'package not required)	**7MH4920-0AA01**
SIWAREX CF manual • German • English Free download on the Internet at: http://www.siemens.com/weighingtechnology	
SIWAREX CF "Getting started" Sample software shows beginners how to program in STEP 7 Free download on the Internet at: http://www.siemens.com/weighingtechnology	
Installation material (mandatory)	
Terminal module TM-E 30 mm (1.18 inch) 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	**6ES7193-4GB00-0AA0**
N busbar, galvanized 3 x 10 mm (0.12 x 0.39 inch), 1.5 m (4.92 ft) long	**8WA2842**
Feeder terminal for N busbar	**8WA2868**

	Order No.
Accessories	
SIWAREX EB extension box for extending sensor cables	**7MH4710-2AA**
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 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)	
Cables 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 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 (0.43 inch) outer diameter, for ambient temperature -40 to +80 °C (-104 ... +176 °F)	**7MH4702-8AG**

Overview

The SIWAREX FTC (Flexible Technology for Continuous Weighing) can be used flexibly for a wide variety of purposes in complex weighing tasks. Simply set the operating mode to turn it into a force measurement module. 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 ±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

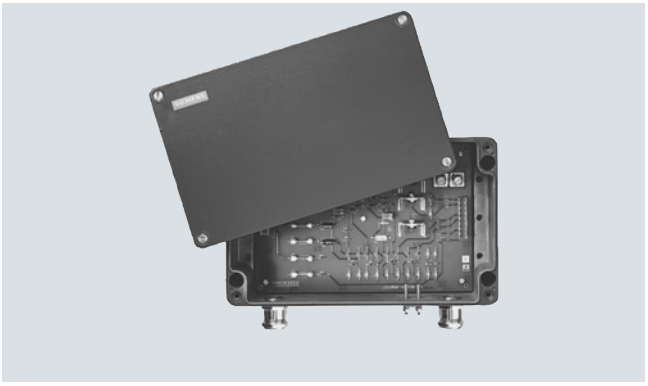
The SIWAREX FTC module is the optimum solution wherever high demands are placed on force measurement. As a result of its exceptional measuring properties, bidirectional force can be measured at high accuracy.

More information

Further descriptions and additional technical specifications on SIWAREX FTC can be found on page 2/50.

Ex interface SIWAREX Pi

Overview



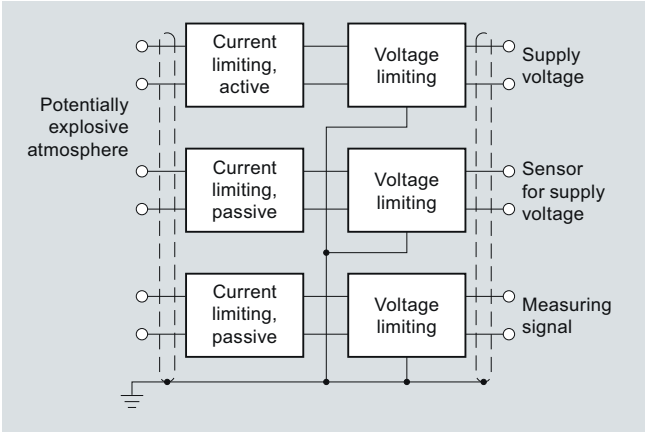
The Ex interface, type SIWAREX Pi, can be used for the SIWAREX U, CS, MS, FTA and FTC weighing modules. It contains 6 safety barriers and has FM approval for devices of Class I Div.1. The Ex interface must be installed outside the potentially explosive area.

Not approved for use in the EU.

Function

Mode of operation

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



Function chart SIWAREX Pi

Technical specifications

Ex interface, type SIWAREX Pi	
Non-intrinsically-safe circuits	
Load cell powering	
Rated voltage U_{n1}	10 V DC
Permissible error voltage	250 V AC
Internal resistance of the load cells	≥ 87 Ω
Total	< 4 010 Ω
Sensor line	
Rated voltage U_{n2}	10 V DC
Permissible error voltage	250 V AC
Measuring signal line	
Rated voltage U_{n3}	10 ... 40 mV DC
Permissible error voltage	250 V AC
Intrinsically-safe circuits	
Load cell powering	
No-load voltage U_{01}	≤ 13.2 V DC
Voltage against equipotential bonding cond.	≤ 6.6 V DC
Short-circuit current I_{K1}	≤ 122 mA
Sensor line	
No-load voltage U_{02}	≤ 14.4 V DC
Voltage against equipotential bonding cond.	≤ 7.2 V DC
Short-circuit current I_{K2}	≤ 25 mA
Measuring signal line	
No-load voltage U_{03}	≤ 12.6 V DC
Voltage against equipotential bonding cond.	≤ 6.3 V DC
Short-circuit current I_{K3}	≤ 72 mA
Total connection values	
(when circuits are connected together)	
No-load voltage U_0	≤ 14.4 V DC
Short-circuit current I_K	≤ 219 mA
Power P_O	≤ 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
Electrical connections	2 Pg screwed glands and terminals

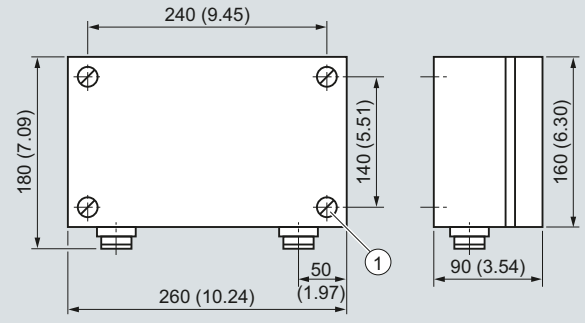
Technical specifications (continued)

Ex interface, type SIWAREX Pi	
Intrinsically-safe circuits	
General data	
Housing dimensions	See the section "Dimensional drawings"
Weight, approx.	2.2 kg (4.85 lb)
Enclosure material	die-cast aluminum
UL/CSA certification	Yes
Permissible ambient temperature	
• During operation	-10 ... +70 °C (14 ... +158 °F)
• During operation for legal-for-trade medium accuracy weighing machines	-10 ... +40 °C (14 ... +104 °F)
• During transportation and storage	-40 ... +85 °C (-40 ... +185 °F)
Permissible relative humidity	≤ 95 %
Degree of protection	IP54
Type of explosion protection	Intrinsic safety "i" FM Class I Div. 1

Selection and ordering data

	Order No.
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 CS weighing modules. Not approved for use in the EU.	**7MH4710-5AA**
Manual for Ex interface type SIWAREX Pi	**C71000-T5974-C29**
Cable (optional)	
Cables 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 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 (0.43 inch) outer diameter, for ambient temperature -40 ... +80 °C (-104 ... +176 °F)	**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 (0.43 inch) outer diameter, for ambient temperature -40 ... +80 °C (-104 ... +176 °F)	**7MH4702-8AF**

Dimensional drawings



1 Drilled hole with 7 mm diam. fixing screw

SIWAREX Pi, Ex-Interface, dimensions in mm (inch)

Ex interface SIWAREX IS

Overview

The Ex interface, type SIWAREX IS, can be used for the SIWAREX U, CS, MS, FTA, FTC and CF weighing modules. It contains 6 safety barriers and is labeled according to ATEX and EN 5001U 2D/ 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.

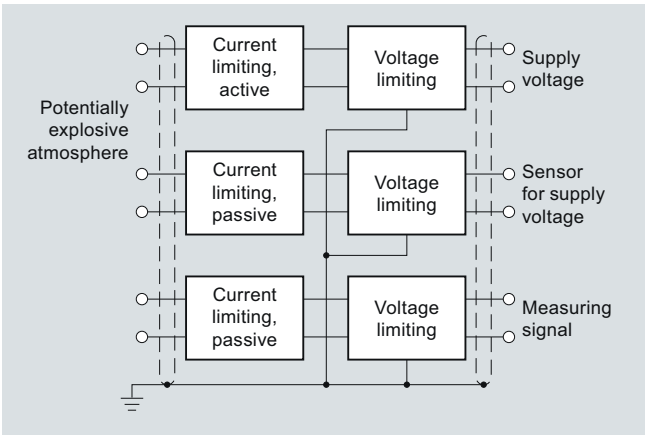
Influence of the SIWAREX IS on the load cell signal is negligible so it is approved for scales requiring verification.

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

Mode of operation

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



Function chart SIWAREX Pi

Technical specifications

Ex interface, type SIWAREX IS	Standard	Low current version
Non-intrinsically-safe circuits		
Load cell powering		
Rated voltage U_{n1}	10 V DC	10 V DC
Permissible error voltage	250 V AC	250 V AC
Internal resistance of the load cells	≥ 87 Ω	≥ 180 Ω
Total	< 4 010 Ω	< 4 010 Ω
Sensor line		
Rated voltage U_{n2}	10 V DC	10 V DC
Permissible error voltage	250 V AC	250 V AC
Measuring signal line		
Rated voltage U_{n3}	10 ... 40 mV DC	10 ... 40 mV DC
Permissible error voltage	250 V AC	250 V AC
Intrinsically-safe circuits		
Load cell powering		
No-load voltage U_{01}	≤ 13.1 V DC	≤ 13.1 V DC
Voltage against equipotential bonding cond.	≤ 6.6 V DC	≤ 6.6 V DC
Short-circuit current I_{K1}	≤ 120 mA	≤ 58 mA
Sensor line		
No-load voltage U_{02}	≤ 14.4 V DC	≤ 14.4 V DC
Voltage against equipotential bonding cond.	≤ 7.2 V DC	≤ 7.2 V DC
Short-circuit current I_{K2}	≤ 25 mA	≤ 25 mA
Measuring signal line		
No-load voltage U_{03}	≤ 12.8 V DC	≤ 12.8 V DC
Voltage against equipotential bonding cond.	≤ 6.4 V DC	≤ 6.4 V DC
Short-circuit current I_{K3}	≤ 54 mA	≤ 54 mA
Total connection values (when circuits are connected together)		
No-load voltage U_0	≤ 14.4 V DC	≤ 14.4 V DC
Short-circuit current I_K	≤ 199 mA	≤ 137 mA
Power P_O	≤ 1.835 W	≤ 1.025 W
For gas group II C		
Max. permissible external capacitance C_{a3}	500 nF	450 nF
Max. permissible external inductance L_a	0.15 mH	0.5 mH
For gas group II B		
Max. permissible external capacitance C_{a3}	2 000 nF	2 000 nF
Max. permissible external inductance L_a	1 mH	2 mH

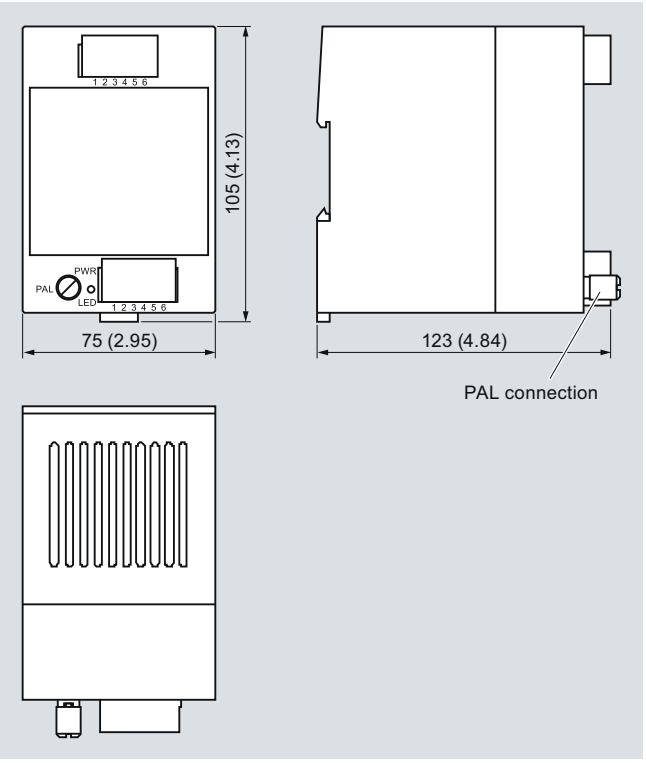
Technical specifications (continued)

Ex interface, type SIWAREX IS	Standard	Low current version
Intrinsically-safe circuits		
General data		
Housing dimensions	See "Dimensional drawings"	See "Dimensional drawings"
Weight, approx.	0.5 kg (1.10 lb)	0.5 kg (1.10 lb)
Permissible ambient temperature		
• During operation	-10 ... +60 °C (14 ... +140 °F) (for vertical installation)	-10 ... +60 °C (14 ... +140 °F) (for vertical installation)
• During operation for legal-for-trade medium accuracy weighing machines	-10 ... +40 °C (14 ... +104 °F) (for vertical installation)	-10 ... +40 °C (14 ... +104 °F) (for vertical installation)
• During transportation and storage	-40 ... +85 °C (-40 ... +185 °F)	-40 ... +85 °C (-40 ... +185 °F)
Permissible relative humidity	≤ 95 %	≤ 95 %
Degree of protection	IP20	IP20
Type of explosion protection	Intrinsic safety "i" [EEx ib] II C to ATEX	Intrinsic safety "i" [EEx ib] II C to ATEX

Selection and ordering data

	Order No.
Ex interface, type SIWAREX IS	
• With short-circuit current < 199 mA DC	**7MH4710-5BA**
• With short-circuit current < 137 mA DC	**7MH4710-5CA**
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 CF weighing modules. Approved for use in the EU.	
Cable (optional)	
Cables Li2Y 1 x 2 x 0.75ST + 2 x (2 x 0.34 ST) – CY, orange sheath to connect SIWAREX U, CS, MS, FTA, FTC 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 (0.43 inch) outer diameter, for ambient temperature -40 ... +80 °C (-104 ... +176 °F)	**7MH4702-8AG**
Cables Li2Y 1 x 2 x 0.75ST + 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 (0.43 inch) outer diameter, for ambient temperature -40 ... +80 °C (-104 ... +176 °F)	**7MH4702-8AF**

Dimensional drawings



SIWAREX IS Ex interface, dimensions in mm (inch)

Notes