

Weighing Electronics



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Weighing Electronics

Stand-alone integrators

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 proven 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 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 set-point where the controller is controlling the process. If the band is too narrow, the reading will center around the set-point. 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 set-point and variables altered during the process. A derivative rate prevents the control from shifting too dramatically on process upsets or startups.

Batch Control – A predetermined quantity of material is accumulated, and the integrator will alarm, notifying that the batch process is completed.

Linearization – Locations where the ideal belt scale or flowmeter location has been compromised or where there is a high variety in belt tension or flow cause the belt scale or flowmeter to report non-linearly. The integrator linearization function smooths out the result to provide an accurate report of the process.

Multi-span – The integrator can be calibrated for up to 8 different feed conditions that would produce varying load or rate characteristics. A span correction is added to the measurement to realize maximum accuracy.

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

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

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

Technical specifications

Integrator selection guide

Criteria	Milltronics BW500 and BW500/L	Milltronics SF500
Applications and compatibility	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, PID ¹⁾ , batching ¹⁾	Rate, totalized weight, PID, batching
Analog output	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
Alarm relay	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, 31 VA	100/115/200/230 V AC ± 15 % 50/60 Hz, 31 VA
Approvals	CSA _{US/C} , FM, CE, Measurement Canada, NTEP, MID, OIML ¹⁾ , RCM, SABS, GOST, STAMEQ	CSA _{US/C} , FM, CE, RCM

¹⁾ Available with BW500 only.

²⁾ BW500/L: Two programmable SPST Form A contacts.

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, ProfiNet, Modbus TCP/IP, EtherNet/IP, 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
- Inclinator 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 proven 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 (DeviceNET, ProfiNet, Modbus, TCP/IP, EtherNet/IP, and Profibus DP)	Optional	Optional
Modbus	Standard	Standard
Ratio Blending and Batching	Standard	N/A
Moisture and incline compensation	<ul style="list-style-type: none"> • With optional I/O card, or • Parameter set 	Parameter set
Multi Span	Standard	N/A
RD500 connectivity	Standard	Standard
Relay output	5	2
Time/date stamped printing	Standard	N/A
mA output	3 ¹⁾	1
mA input	2 ¹⁾	0

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

Weighing Electronics

Stand-alone integrators

Milltronics BW500 and BW500/L

Technical specifications

Milltronics BW500 and BW500/L		Milltronics BW500 and BW500/L	
Mode of operation		Power supply	
Measuring principle	Belt scale integrator	Standard	100/115/200/230 V AC \pm 15 %, 50/60 Hz, 31 VA Fuse, FU1: 2AG, Slo Blo, 2 A, 250 V or equivalent
Typical application	<ul style="list-style-type: none"> Compatible with Milltronics belt scales or equivalent 1, 2, 4¹⁾, or 6¹⁾ load cell scales Compatible with LVDT equipped scales, with use of optional interface board (remotely mounted) 	Controls and displays	
Inputs		Displays	Illuminated 5x7 dot matrix liquid crystal display with 2 lines of 40 characters each
Load cell	0 ... 45 mV DC per load cell	Programming	Via local keypad and/or Dolphin Plus interface
Speed sensor		Memory	Program and parameters stored in non-volatile Flash memory, upgradeable via Dolphin Plus interface
• Pulse train	<ul style="list-style-type: none"> 0 ... 5 V low, 5 ... 15 V high 1 ... 3 000 Hz, or Open collector switch, or Relay dry contact 	Communications	<ul style="list-style-type: none"> Two RS 232 ports One RS 485 port SmartLinX compatible
Auto zero	Dry contact from external device	mA I/O board	
mA	See optional mA I/O board ¹⁾	Inputs	2 programmable 0/4 ... 20 mA for PID control and on-line calibration, optically isolated, 0.1 % of 20 mA resolution, 200 Ω input impedance
Auxiliary	5 discrete inputs for external contacts, each programmable for either: display scrolling, totalizer 1 reset, zero, span, multi-span, print, batch reset, PID function or online calibration, 2nd speed sensor	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
Outputs (load and speed)		Output supply	Isolated 24 V DC at 50 mA, short circuit protected
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)	Approvals	
Load cell	10 V DC compensated excitation for strain gauge type, 6 cells max, 150 mA max.	BW500	CE, CSA _{US/C} , FM, Measurement Canada, NTEP, MID, OIML, RCM, , GOST-R, SABS, STAMEQ
Speed sensor(s)	12 V DC, 150 mA max. excitation	BW500/L	CE, CSA _{US/C} , FM, RCM, GOST-R
Remote totalizer 1	Contact closure 10 ... 300 ms duration, open collector switch rated 30 V DC, 100 mA max.	Options	
Remote totalizer 2	Contact closure 10 ... 300 ms duration, open collector switch rated 240 V AC/DC, 100 mA max.	<ul style="list-style-type: none"> 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 	
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	209 W x 285 H x 92 D mm (8.2 W x 11.2 H x 3.6 D inch)		
Weight	2.6 kg (5.7 lb)		

¹⁾ BW500 only.

Selection and ordering data	Article No.	Order Code
Milltronics BW500 and BW500/L A full-feature, powerful integrator designed for use with both belt scales and weighfeeders	7MH7152-	
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 communications³⁾		
SmartLinux ready	0	
SmartLinux PROFIBUS DP module	2	
SmartLinux DeviceNet module	3	
SmartLinux ProfiNet module	4	
SmartLinux EtherNet I/P module	5	
SmartLinux MODBUS TCP I/P module	6	
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, RCM	A	
Further designs Please add "-Z" to article no. and specify order code(s).		
Stainless steel tag (69 x 50 mm), Measuring-point number/identification (max 27 characters), specify in plain text.		Y15
Manufacturer's test certificate: According to EN 10204-2.2		C11
OIML/MID approval additional nameplate (submit application data with order)		Y77
NTEP approval additional nameplate (submit application data with order)		Y78
Stainless steel, sun/weather shield 357 x 305 x 203 mm (14 x 12 x 8 inch) (finished unit is field mounted with enclosure)		S50
Stainless steel enclosure, 304 (1.4301), [406 x 305 x 152 mm (16 x 12 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

◆ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol.

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.

Weighing Electronics

Stand-alone integrators

Milltronics BW500 and BW500/L

Selection and ordering data

Milltronics BW500 and BW500/L

Instruction manuals

BW500 and BW500/L, English

7ML1998-5DK05

BW500 and BW500/L, German

7ML1998-5DK35

BW500, French

7ML1998-5DK12

BW500, Spanish

7ML1998-5DK23

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

Additional instruction manuals

LVDT Conditioner Card Instruction Manuals, English

7ML1998-5EF01

LVDT Conditioner Card Instruction Manuals, German

7ML1998-5EF31

SmartLinX PROFIBUS DP, English

7ML1998-1AQ03

SmartLinX PROFIBUS DP, German

7ML1998-1AQ33

SmartLinX PROFIBUS DP, French

7ML1998-1AQ12

SmartLinX DeviceNet, English

7ML1998-1BH02

Note: The appropriate SmartLinX instruction manual should be ordered as a separate line on the order.

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

Optional equipment

Auxiliary I/O cards spare

7MH7723-1BJ

LVDT Conditioners in Nema 4 enclosure (to interface LVDT belt scale without internal pre-amplifier)

7MH7723-1AJ

Supply voltage regulators, 120 V AC, 60 Hz

7MH7726-1AN

SITRANS RD100 Remote displays, see RD100 on page 2/13

SITRANS RD200 Remote displays, see RD200 on page 2/15

SITRANS RD300 Remote displays, see RD300 on page 2/19

SITRANS RD500 web, datalogging, alarming, Ethernet, and modem support for instrumentation, see page 2/23

7ML5750-1AA00-0

Large LED display, 150 mm (6 inch) high characters

A5E31871009

SIMATIC Touch panel 277, 6 inch

6AV6643-0AA01-1AX0

SIMATIC Touch panel TP277B, 6 inch

6AV6642-0BA01-1AX1

SIMATIC Multi-panel MP277, 8 inch

6AV6643-0CB01-1AX1

Programmed MMC for SIMATIC panel TP277

7MH7726-1AW

Programmed MMC for SIMATIC panel TP177B

7MH7726-1AX

Programmed MMC for SIMATIC panel MP277

7MH7726-1AY

Article No.

Article No.

Spare parts

Display card

7MH7723-1AF

Motherboard

7MH7723-1AH

Batteries, 3 V, lithium

7MH7723-1ES

Fuses, 2 A, 250 V, BW500, BW500/L, and SF500, spare

7MH7723-1DG

Lid with overlay and keypad for BW500 and BW500/L

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

PROFIBUS DP module

7ML1830-1HR

DeviceNet module

7ML1830-1HT

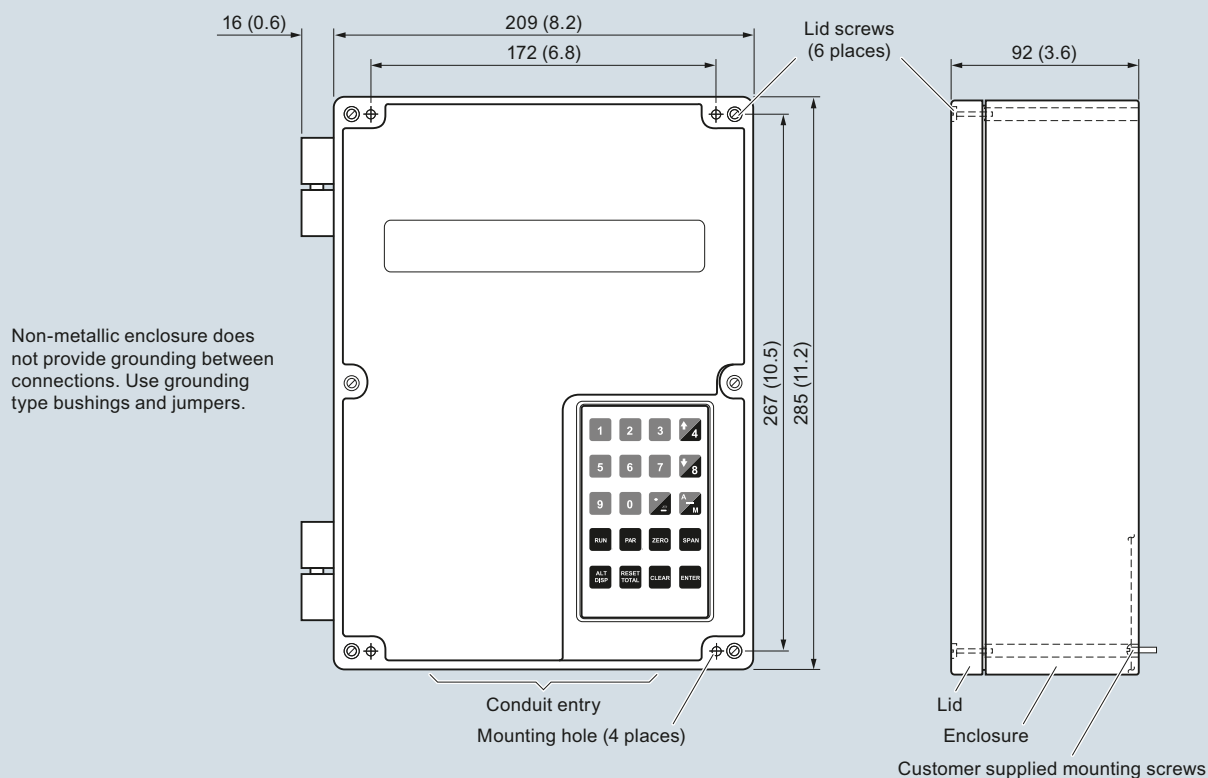
ProfiNet IO module

7ML1830-1PM

Modbus TCP I/P, EtherNet I/P module

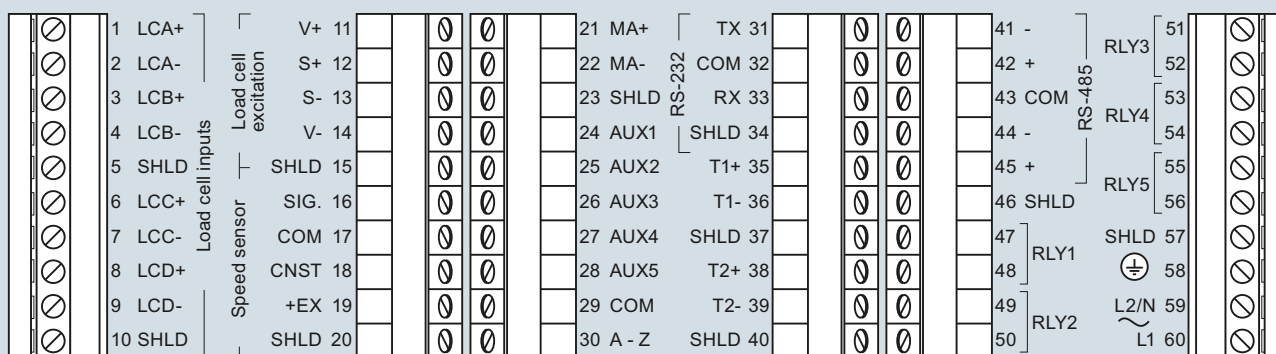
7ML1830-1PN

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 (1 000 ft) max.
- Two/four/six¹⁾ 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 (1 000 ft) max.
- Speed sensor: Belden 8770, 3 wire shielded, 18 AWG (0.75 mm²) or equivalent, 300 m (1 000 ft)
- Auto zero: Belden 8760, 1 pair, twisted/shielded, 18 AWG (0.75 mm²) or equivalent, 300 m (1 000 ft) max.
- Remote total: Belden 8760, 1 pair, twisted/shielded, 18 AWG (0.75 mm²) or equivalent, 300 m (1 000 ft) max.

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

Weighing Electronics

Stand-alone integrators

Milltronics SF500

Overview



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

Application

Milltronics SF500 operates with any solids flowmeter with up to two strain gauge load cells or LVDT sensor. The SF500 processes sensor signals for accurate flow rate and totalized weight of bulk solids. It can take on lower level control functions traditionally handled by other devices, and it supports popular industrial communication buses. Its proven load cell balance function eliminates matching of load cells.

The PID function may be used for rate control of pre-feeding devices and/or control of additives with two internal PID controllers. Operating in tandem with two or more solids flowmeters or weighfeeders, the SF500 may be used for ratio blending and controlling additives. Batching, load out, and alarm functions are also provided by the SF500.

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

Benefits

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

Technical specifications

Milltronics SF500		Milltronics SF500	
Mode of operation		Controls and displays	
Measuring principle	Flowmeter integrator	Display	Illuminated 5 x 7 dot matrix liquid crystal display with 2 lines of 40 characters each
Typical application	<ul style="list-style-type: none"> 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) 	Programming	Via local keypad and/or Dolphin Plus interface
Input		Memory	<ul style="list-style-type: none"> 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
Load cell/LVDT	0 ... 45 mV DC per load cell or LVDT interface card	Communications	Two RS 232 ports One RS 485 port SmartLinx compatible
Auto zero	Dry contact from external device	Approvals	
mA	See optional mA I/O board	CE, CSA _{US/C} , FM, RCM	
Auxiliary	5 discrete inputs for external contacts, each programmable for either: display scrolling, totalizer 1 reset, zero, span, multi-span, print, batch reset, PID function, or on-line calibration	Options	
Output		<ul style="list-style-type: none"> Dolphin Plus: Windows based software interface. Refer to associated product documentation. SmartLinx modules: protocol specific modules for interface with popular industrial communications systems. Refer to associated product documentation. LVDT interface card: for interface with LVDT based solids flowmeters mA I/O board <ul style="list-style-type: none"> Inputs: 2 programmable 0/4 ... 20 mA for PID control or online calibration, optically isolated, 0.1 % ... 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 	
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	209 W x 285 H x 92 D mm (8.2 W x 11.2 H x 3.6 D inch)		
Weight	2.6 kg (5.7 lb)		
Power supply			
Standard	100/115/200/230 V AC \pm 15 %, 50/60 Hz, 31 VA Fuse, FU1: 2AG, Slo Blo, 2 A, 250 V or equivalent		

Weighing Electronics

Stand-alone integrators

Milltronics SF500

Selection and ordering data

Milltronics SF500

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

Input voltage

AC voltage

Auxiliary input/output boards¹⁾

None

Board with 2 analog inputs and 2 analog outputs

Feature software

Standard

Auxiliary memory

None

Data communications²⁾

SmartLinx Ready

SmartLinx PROFIBUS DP module

SmartLinx DeviceNet module

SmartLinx ProfiNet module

SmartLinx EtherNet I/P module

SmartLinx MODBUS TCP I/P module

Enclosures

Standard enclosure, no entry holes

Standard enclosure, 4 entries, for M20 glands

Trade approval stickers

No trade approval sticker

Not legal for Canadian and EU trade sticker

Approvals

CE, CSAus/c, FM, RCM

Further designs

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

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

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

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

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

- With window
- Without window

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

- With window
- Without window

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

Painted mild steel, heated enclosure with viewing
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)

Article No.

7MH7156-

1

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Instruction manuals

SF500, English

SF500, French

SF500, German

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

Additional instruction manuals

SmartLinx PROFIBUS DP, English

SmartLinx PROFIBUS DP, German

SmartLinx PROFIBUS DP, French

SmartLinx DeviceNet, English

Note: The appropriate SmartLinx instruction manual should be ordered as a separate line on the order.

LVDT Conditioner Card Manuals, English

LVDT Conditioner Card Manuals, German

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

Optional equipment

Milltronics analog I/O cards

LVDT Conditioners in NEMA 4 enclosure (to interface LVDT belt scale without internal pre-amplifier)

SITRANS RD100 Remote displays - see RD100 on page 2/13

SITRANS RD200 Remote displays - see RD200 on page 2/15

SITRANS RD300 Remote displays - see RD300 on page 2/19

SITRANS RD500 web, datalogging, alarming, ethernet, and modem support for instrumentation - see on page 2/23

Spare parts

Display card

Lids with overlay and keypad

Motherboard

Batteries, 3 V, lithium

Fuses, 2 A, 250 V, BW500, BW500/L, and SF500, spare

LVDT Conditioners in Nema 4 enclosure (to interface LVDT belt scale without internal pre-amplifier)

Auxiliary I/O cards spare

Cables to connect BW500/SF500 keypad to motherboard

Keypads spare for BW500, BW500/L, and SF500

PROFIBUS DP module

DeviceNet module

ProfiNet IO module

Modbus TCP I/P, EtherNet I/P module

Article No.

7ML1998-5CN02

7ML1998-5CN11

7ML1998-5CN31

7ML1998-1AQ03

7ML1998-1AQ33

7ML1998-1AQ12

7ML1998-1BH02

7ML1998-5EF01

7ML1998-5EF31

7MH7723-1BJ

7MH7723-1AJ

7ML5750-1AA00-0

7MH7723-1AF

7MH7723-1AG

7MH7723-1AH

7MH7723-1ES

7MH7723-1DG

7MH7723-1AJ

7MH7723-1BJ

7MH7723-1CB

7MH7723-1CD

7ML1830-1HR

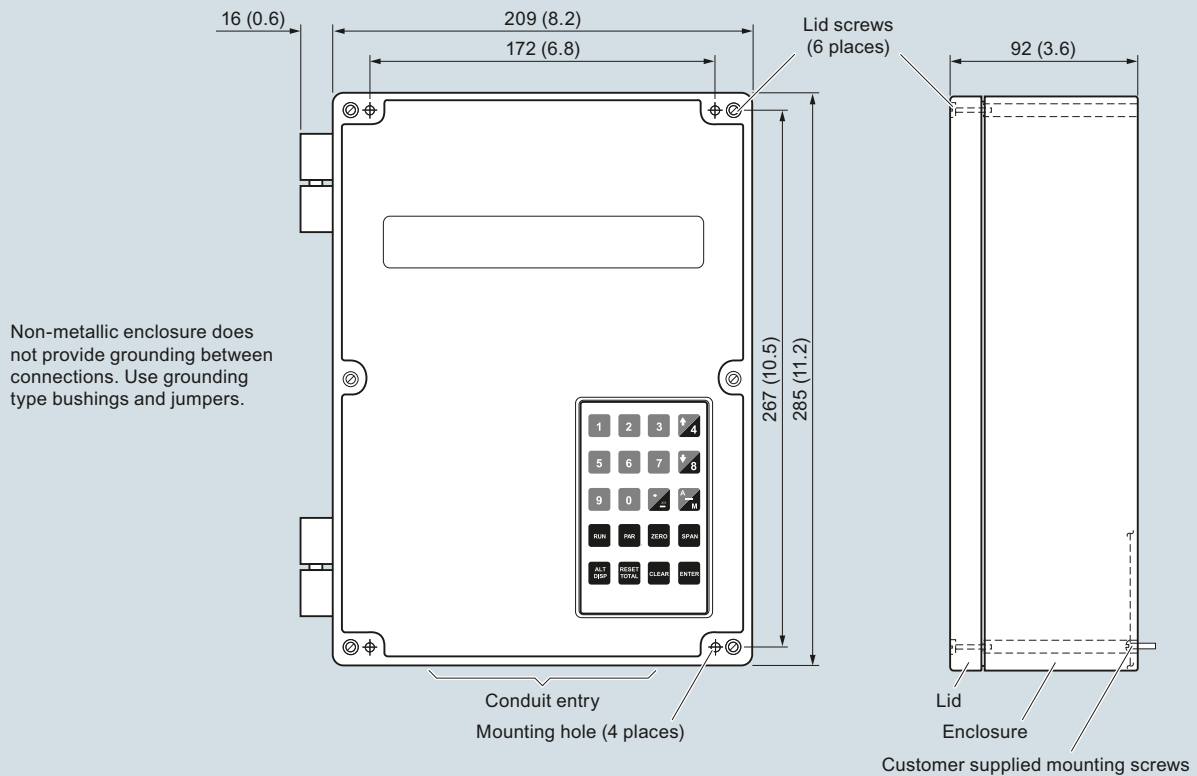
7ML1830-1HT

7ML1830-1PM

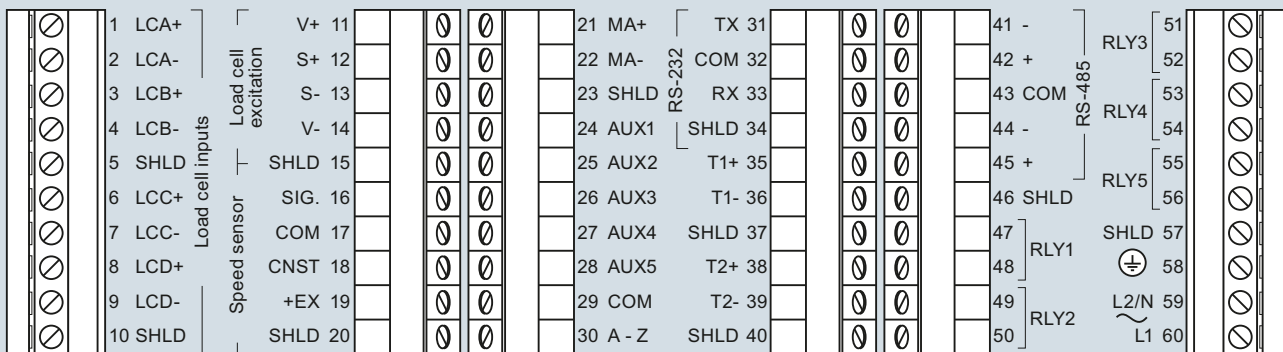
7ML1830-1PN

¹⁾ Required for PID control and online calibration.

²⁾ Required for industrial communications.

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 (1 000 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 (1 000 ft) max.
- Auto zero: Belden 8760, 1 pair, twisted/shielded, 18 AWG (0.75 mm²) or equivalent, 300 m (1 000 ft) max.
- Remote total: Belden 8760, 1 pair, twisted/shielded, 18 AWG (0.75 mm²) or equivalent, 300 m (1 000 ft) max.

Milltronics SF500 connections

Weighing Electronics

Accessories for stand-alone integrators

Dolphin Plus Software

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

Article No.

Dolphin Plus

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.

RS 485 to RS 232 converters

No

Yes

ComVerter

No

Yes

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)

Kits containing one 9-pin D-Sub to RJ11 adapter and one 2.1 m (82.7 ft) telephone cable with two male jacks

ComVerter, Infrared link

7ML1841-

AA 0

0

1

0

1

7ML1830-1HA

7ML1830-1MC

7ML1830-1MM

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	
<u>Ambient conditions</u>	
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.

SITRANS RD100

Display	<ul style="list-style-type: none"> • 1.0 inch (2.54 cm) high LCD • Numeric range from -1 000 ... +1 999
Certificates and approvals	
Hazardous	<ul style="list-style-type: none"> • Intrinsically Safe <ul style="list-style-type: none"> • 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 <ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 2 inch (5.08 cm) pipe mounting kit (zinc plated or stainless steel) • Panel mounting kit

Selection and ordering data

Article No.

SITRANS RD100

A 2-wire loop powered, NEMA 4X enclosed remote digital display for process instrumentation.

7ML5741-

A A 0 0 - 0

Conduit hole location (½ inch)

None	▶	1
Bottom	▶	2
Rear	▶	3
Top	▶	4

Instruction manuals

English

7ML1998-5JU01

French

7ML1998-5JU11

German

7ML1998-5JU31

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

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

Accessories

Panel mount kits

7ML1930-1BN

2 inch (5.08 cm) pipe mounting kit (zinc plated seal)

7ML1930-1BP

2 inch (5.08 cm) pipe mounting kit (stainless steel, Type 304, EN 1.4301)

7ML1930-1BQ

- We can offer shorter delivery times for configurations designated with the Quick Ship Symbol

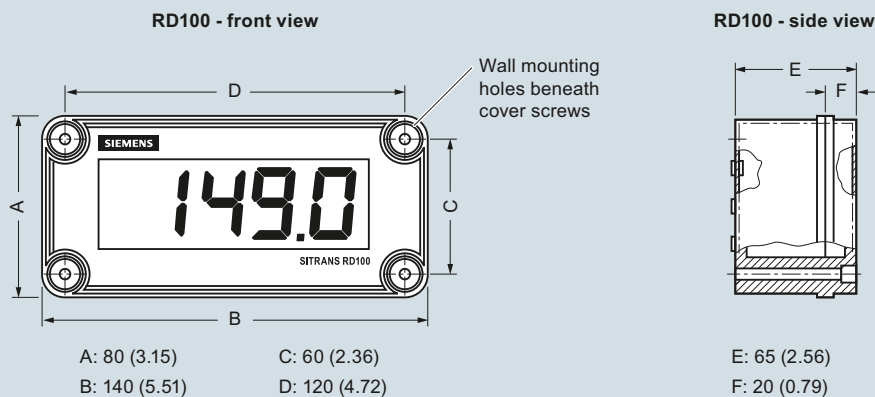
- ▶ Available ex stock when configured with the following options only:
Input voltage: 1, Transmitter supply: B, Output: A, Communication: 0.

Weighing Electronics

Accessories for stand-alone integrators

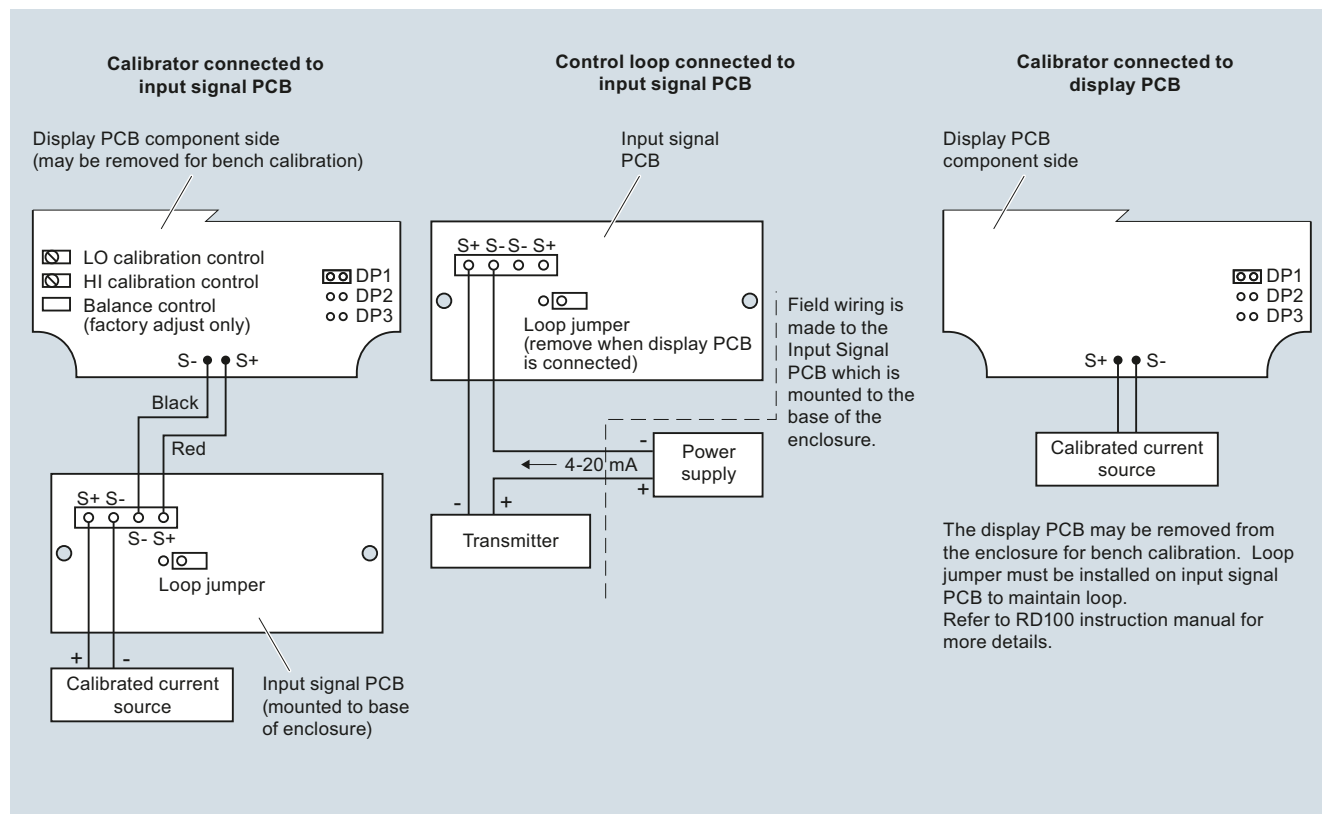
SITRANS RD100

Dimensional drawings



SITRANS RD100 dimensions in mm (inch)

Schematics



SITRANS RD100 connections

Overview

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

Benefits

- Easy setup and programming via front panel buttons or remotely using RD software
- Display readable in sunlight
- Universal input: accepts current, voltage, thermocouple and RTD signals
- Single or dual 24 V DC transmitter power supply
- Serial communication using built in protocol or 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
- Other features include: 4 to 20 mA analog output option, supports pump alternation control, and optional NEMA 4 and 4X FIELD ENCLOSURES
- 2X option for 30.5 mm (1.2 inch) high, red LED display

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.

Weighing Electronics

Accessories for stand-alone integrators

SITRANS RD200

Technical specifications

SITRANS RD200	
Mode of operation	
<ul style="list-style-type: none"> Measuring principle Measuring points 	Analog to digital conversion <ul style="list-style-type: none"> 1 instrument Remote monitoring of 100 instruments with PC and RD software
Input	
Measuring range	
<ul style="list-style-type: none"> Current Voltage Thermocouple temperature 	<ul style="list-style-type: none"> 4 ... 20 mA, 0 ... 20 mA 0 V DC ... 10 V DC, 1 ... 5 V, 0 ... 5 V Type J: -50 ... +750 °C (-58 ... +1 382 °F) Type K: -50 ... +1 260 °C (-58 ... +2 300 °F) Type E: -50 ... +870 °C (-58 ... +1 578 °F) Type T: -180 ... +371 °C (-292 ... +700 °F) Type T, 0.1 resolution: -180.0 ... +371 °C (-199.9 ... +700 °F)
<ul style="list-style-type: none"> RTD temperature 	<ul style="list-style-type: none"> 100 Ω RTD: -200 ... +750 °C (-328 ... +1 382 °F)
Output signal	
<ul style="list-style-type: none"> Output Relays Communications 	<ul style="list-style-type: none"> PDC output 4 ... 20 mA (optional) Modbus RTU 2 SPDT Form C relays, rated 3 A at 30 V DC or 3 A at 250 V AC, non-inductive, auto-initializing (optional) <ul style="list-style-type: none"> RS 232 with PDC or Modbus RTU RS 422/485 with PDC or Modbus RTU
Accuracy	
<ul style="list-style-type: none"> 4 ... 20 mA optional output Process input Thermocouple temperature input 	<ul style="list-style-type: none"> ± 0.1 % FS ± 0.004 mA ± 0.05 % of span ± 1 count, square root: 10 ... 100 % FS 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)
<ul style="list-style-type: none"> RTD temperature input 	<ul style="list-style-type: none"> 100 Ω RTD: ± 1 °C (± 1 °F)
Rated operating conditions	
<ul style="list-style-type: none"> Ambient conditions Storage temperature range Operating temperature range 	<ul style="list-style-type: none"> -40 ... +85 °C (-40 ... +185 °F) 0 ... 65 °C (32 ... 149 °F)
Design	
Weight	269 g (9.5 oz) (including options)
Material (enclosure)	<ul style="list-style-type: none"> 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

SITRANS RD200	
Electrical connection	
<ul style="list-style-type: none"> mA output signal Electrical connection and relay connection 	2-core copper conductor, twisted, shielded, 0.82 ... 3.30 mm ² (18 ... 12 AWG), Belden 8 760 or equivalent is acceptable 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)
<ul style="list-style-type: none"> Single power supply: Dual power supplies: 	One 24 V DC ± 10 % at 200 mA max. Two 24 V DC ± 10 % at 200 mA and 40 mA max.
External loop power supply	35 V DC max.
Output loop resistance	<ul style="list-style-type: none"> 24 V DC, 10 ... 700 Ω max. 35 V DC (external), 100 ... 1 200 Ω max.
Displays and controls	
<ul style="list-style-type: none"> Display Memory Programming 	<ul style="list-style-type: none"> 14 mm (0.56 inch) high LED 2X option for 30.5 mm (1.2 inch) high, red LED Numeric range from -1 999 ... +9 999 Four digits, automatic lead zero blanking Eight intensity levels Non-volatile Stores settings for minimum of 10 years if power is lost Primary: front panel Secondary: meter copy or PC with SITRANS RD software
Certificates and approvals	CE, UL, cUL
Options	
<ul style="list-style-type: none"> Enclosures Mounting 	Plastic, steel and stainless steel (Type 304, EN 1.4301) NEMA 4 and 4X enclosures <ul style="list-style-type: none"> 2 inch (5.08 cm) pipe mounting kit (zinc plated seal) 2 inch (5.08 cm) pipe mounting kit (stainless steel, Type 304, EN 1.4301)

Selection and ordering data		Article No.	Accessories		Article No.
SITRANS RD200		7ML5740-	Accessories		
A universal input, panel mount remote digital display for process instrumentation.			SITRANS RD200 copy cables 2.1 m (7 ft)		7ML1930-1BR
Input voltage			SITRANS RD200 RS 232 serial adapters (copy cable included)		7ML1930-1BS
85 ... 265 V AC, 50/60 Hz;		▶ 1	SITRANS RD200 RS 422/485 serial adapters (copy cable included)		7ML1930-1BT
90 ... 265 V DC, 20 W max.			RS 232 to RS 422/485 isolated converters		7ML1930-1BU
12 ... 36 V DC; 12 ... 24 V AC, 6 W max.		▶ 2	RS 232 to RS 422/485 non-isolated converters		7ML1930-1BV
Transmitter supply			SITRANS RD200 RS 232 and RS 485 isolated multi-input adapter boards		7ML1930-1BW
None		▶ A	USB to RS 422/485 isolated converters		7ML1930-1BX
Single 24 V DC transmitter supply ¹⁾		▶ B	USB to RS 422/485 non-isolated converters		7ML1930-1BY
Dual 24 V DC transmitter supply ¹⁾²⁾		▶ C	USB to RS 232 converter		7ML1930-6AK
Output			RD Software CD for 1 ... 100 displays		7ML1930-1CC
None		▶ A	Low cost polycarbonate plastic enclosures for 1 display		7ML1930-1CF
2 relays		▶ B	2 inch (5.08 cm) pipe mounting kit (zinc plated seal) only available with 7ML19301CF		7ML1930-1BP
4 ... 20 mA output		▶ C	2 inch (5.08 cm) pipe mounting kit (stainless steel, Type 304, EN 1.4301) only available with 7ML19301CF		7ML1930-1BQ
Communication			<u>Thermoplastic enclosures</u>		
Modbus enabled		▶ 0	For use with 1 display		7ML1930-1CG
Approvals			For use with 2 displays		7ML1930-1CH
CE, UL, cUL		▶ 1	For use with 3 displays		7ML1930-1CJ
Display size			For use with 4 displays		7ML1930-1CK
Standard		▶ 0	For use with 5 displays		7ML1930-1CL
2X		▶ 1	For use with 6 displays		7ML1930-1CM
Instruction manuals			<u>Stainless steel enclosures (Type 304, EN 1.4301)</u>		
English		7ML1998-5JS01	For use with 1 display		7ML1930-1CN
French		7ML1998-5JS11	For use with 2 displays		7ML1930-1CP
Spanish		7ML1998-5JS21	For use with 3 displays		7ML1930-1CQ
German		7ML1998-5JS31	For use with 4 displays		7ML1930-1CR
Note: The instruction manual should be ordered as a separate line item.			For use with 5 displays		7ML1930-1CS
This device is shipped with the Siemens Milltronics manual DVD containing ATEX Quick Starts and instruction manuals.			For use with 6 displays		7ML1930-1CT
Other instruction manuals			<u>Steel enclosures</u>		
SITRANS RD enclosures, English		7ML1998-5JX01	For use with 1 display		7ML1930-1CU
SITRANS RD enclosures, German		7ML1998-5JX31	For use with 2 displays		7ML1930-1CV
SITRANS RD serial adapters, English		A5E31979195	For use with 3 displays		7ML1930-1CW
SITRANS RD serial adapters, German		A5E31979197	For use with 4 displays		7ML1930-1CX
SITRANS RD software, English		7ML1998-5JW01	For use with 5 displays		7ML1930-1CY
SITRANS RD software, German		7ML1998-5JW31	For use with 6 displays		7ML1930-1DA

◆ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ◆.

▶ Available ex stock when configured with the following options only:
Input voltage: 1, Transmitter supply: B, Output: A, Communication: 0.

¹⁾ Available with input voltage option 1 only.

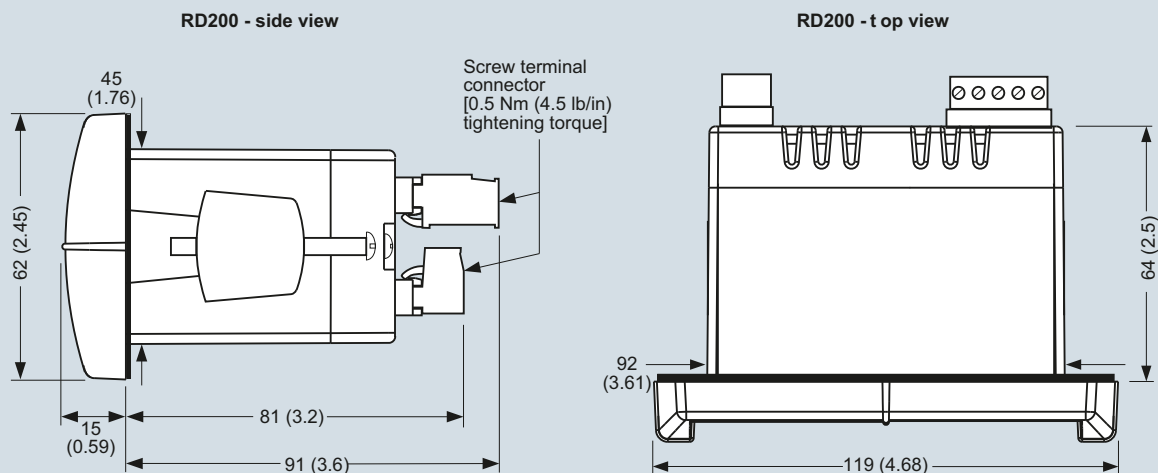
²⁾ Available with output option C only.

Weighing Electronics

Accessories for stand-alone integrators

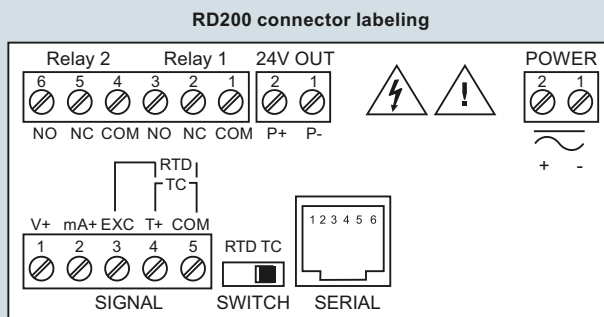
SITRANS RD200

Dimensional drawings

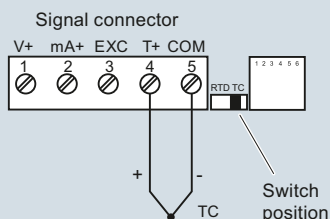


SITRANS RD200, dimensions in mm (inch)

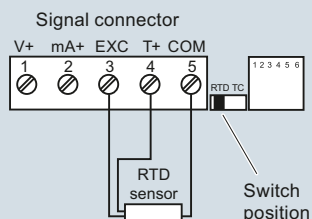
Schematics



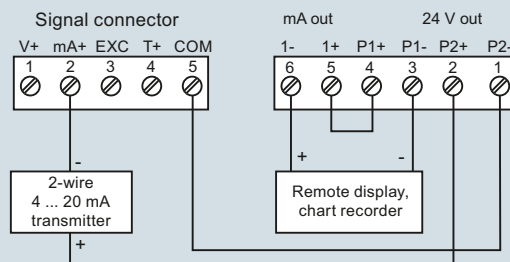
Thermocouple input connections



Three-wire RTD input connections

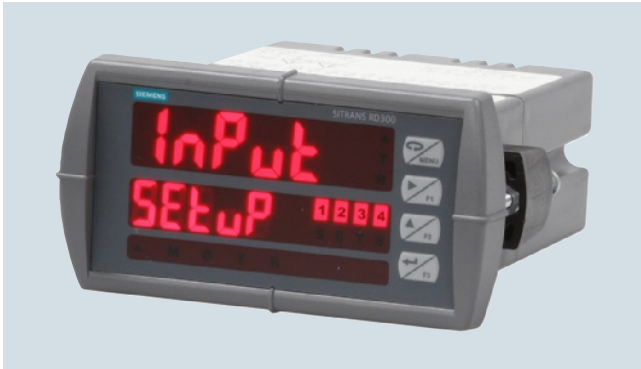


4 ... 20 mA output and input signal powered by meter



SITRANS RD200 connections

Overview



The SITRANS RD300 is a panel mount remote digital display for process instrumentation and acts as a multi-purpose, easy to use, rate/totalizer ideal for flow rate, total, and control applications.

Benefits

- Easy setup and programming via front panel buttons or remotely using RD software
- Display readable in sunlight
- Input: accepts current and voltage
- Single or dual 24 V DC transmitter power supply
- Serial communication using built in protocol or Modbus RTU
- Supports up to 8 relays and 8 digital I/O for process control and alarming
- 32-Point linearization, square root or exponential linearization
- Multi-pump alternation control
- Supports total, grand total or non-resettable grand total
- 9-digit totalizer with total overflow feature
- Large dual-line, 6-digit display
- Configure, monitor, and datalog from a PC
- Dual-input option with math functions: addition, difference, average, multiplication, division, minimum, maximum, weighted average, ratio, concentration

Application

The RD300 is a remote display for level, flow, pressure, weighing, and other process instruments. This display also acts as a multi-purpose, easy to use rate/totalizer ideal for flow rate, total, and control applications.

Data can be remotely collected, logged and presented on your local computer using the free downloadable RD Software. The display accepts a single or dual input of current and voltage. This makes the RD300 an ideal fit for use with most field instruments.

The RD300 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, flow, pressure and weighing instrument values, PC monitoring and data logging with RD Software.

Weighing Electronics


Accessories for stand-alone integrators

SITRANS RD300

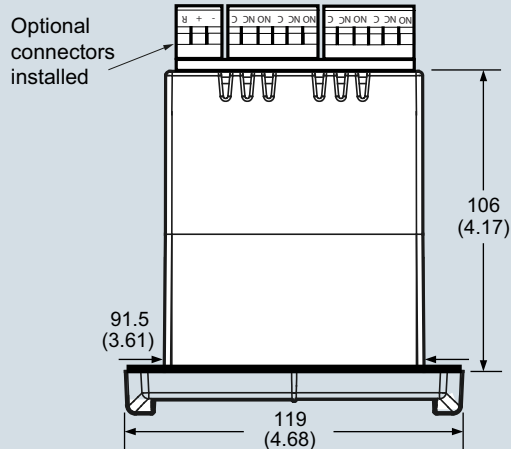
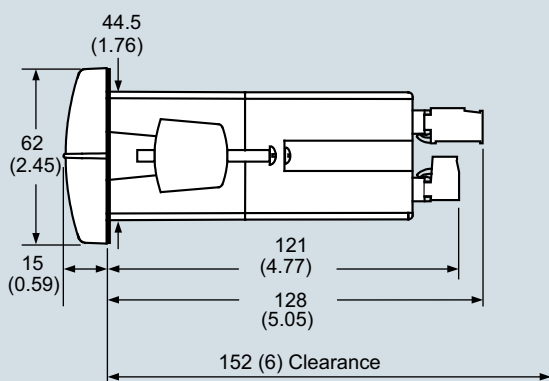
Technical specifications

SITRANS RD300	
Mode of operation	
Measuring points	1 or 2 instruments
Input	
Measuring range	
• Current	4 ... 20 mA, 0 ... 20 mA
• Voltage	0 V DC ... +10 V DC, 1 ... 5 V, 0 ... 5 V
Output signal	
Output	<ul style="list-style-type: none"> • 4 ... 20 mA (optional) • Modbus RTU
Relays	2 or 4 SPDT (Form C) internal and/or 4 SPST (Form A) external; rated 3 A at 30 V DC and 125/250 V AC resistive load; 1/14 HP (50 W) at 125/250 V AC for inductive loads (optional)
Communications	<ul style="list-style-type: none"> • RS 232 with Modbus RTU • RS 422/485 with 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
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)	<ul style="list-style-type: none"> • 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 mm ² (18 ... 12 AWG), Belden 8 760 or equivalent is acceptable
Electrical connection and relay connection	Copper conductor according to local requirements, rated 3 A at 250 V AC

SITRANS RD300	
Power supply	
Input voltage option	85 ... 265 V AC, 50/60 Hz; 90 ... 265 V DC, 20 W max. or jumper selectable 12/24 V DC ± 10 %, 15 W max
Transmitter power supply	Terminals P+ & P-: 24 V DC ± 10 %, 12/24 V DC powered models selectable for 24, 10, or 5 V DC supply (internal jumper J4), 85 ... 265 V AC models rated at 200 mA max, 12/24 V DC powered models rated at 100 mA max, at 50 mA max for 5 or 10 V DC supply.
External loop power supply	35 V DC max.
Output loop resistance	<ul style="list-style-type: none"> • 24 V DC, 10 ... 700 Ω max. • 35 V DC (external), 100 ... 1 200 Ω max.
Displays and controls	
Main display	0.6 inch (15 mm) high, red LEDs
Second display	0.46 inch (12 mm) high, red LEDs, 6-digits: each (-99 999 ... 999 999)
Memory	<ul style="list-style-type: none"> • Non-volatile • Stores settings for minimum of 10 years if power is lost
Programming	<ul style="list-style-type: none"> • Primary: front panel • Secondary: Meter Copy or PC with SITRANS RD Software
Certificates and approvals	
CE, UL, cUL	
Options	
Enclosures	Plastic, steel and stainless steel (Type 304, EN 1.4301) NEMA 4 and 4X enclosures

Selection and ordering data	Article No.	Selection and ordering data	Article No.
SITRANS RD300 Dual line remote digital display compatible with PI instruments	7ML5744  - 0 A	Operating instructions <u>Single input process and flow R/T Mtr</u> English French German <u>Dual input process Mtr</u> English German Note: The operating instructions should be ordered as a separate line on the order.	A5E31917845 A5E31948924 A5E31948919 A5E33481367 A5E33481387
Input voltage 85 ... 265 V AC, 50/60 Hz; 90 ... 265 V DC, 20 W max. 12 ... 36 V DC; 12 ... 24 V AC, 6 W max.	1 2	Other operating instructions SITRANS RD DIN-rail mounting kit, English SITRANS RD DIN-rail mounting kit, German SITRANS RD expansion modules, English SITRANS RD expansion modules, German SITRANS RD serial communications accessories, English SITRANS RD serial communications accessories, German	A5E31979181 A5E31979184 A5E31979173 A5E31979176 A5E31979195 A5E31979197
Output None 2 relays 4 relays 4 ... 20 mA output 2 relays and 4 ... 20 mA output 4 relays and 4 ... 20 mA output	A B C D E F	Accessories DIN-rail mounting kit 4 Relays expansion module 4 Digital I/O Module Dual output 4 ... 20 mA expansion module for dual input meter Meter copy cable RS 232 serial adapter RS 422/485 serial adapter RD300 USB serial adapter USB to RS 232 converter Snubber Plastic enclosure for 1 Meter Plastic enclosure for 2 Meters Plastic enclosure for 4 Meters Plastic enclosure for 5 Meters Plastic enclosure for 6 Meters	7ML1930-6AB 7ML1930-6AC 7ML1930-6AD 7ML1930-6AP 7ML1930-6AE 7ML1930-6AF 7ML1930-6AG 7ML1930-6AJ 7ML1930-6AK 7ML1930-6AL 7ML1930-6AM 7ML1930-6AN 7ML1930-1CK 7ML1930-1CL 7ML1930-1CM
Type Single input process and flow R/T Mtr Dual input process Mtr	A B		
Display Standard SunBright	0 1		
Approvals UL & C-UL & CE	0		

Dimensional drawings



SITRANS RD300 dimensions

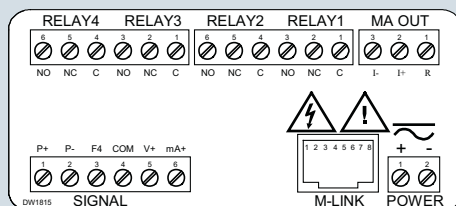
Weighing Electronics

Accessories for stand-alone integrators

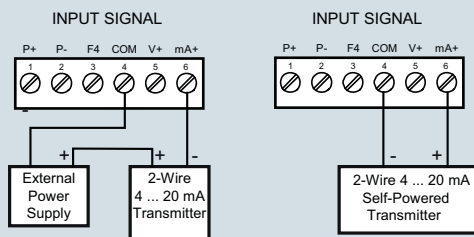
SITRANS RD300

Schematics

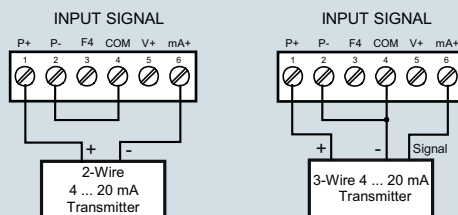
Connector labeling for fully loaded single input meter



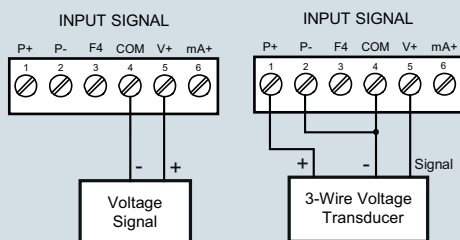
Transmitter powered by external supply or self-powered



Transmitter powered by internal supply



Voltage Input Connections



SITRANS RD300 connections

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 to 20 mA), voltage (0 to 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, 3G, and PSTN provide flexible remote communications options
- Supports up to 128 devices with the flexible I/O modules and supports addressing for Modbus serial devices via RS 232 and RS 485 serial ports
- Integrated FTP server and client support FTP data synchronization to central servers
- Compact flash slot supports up to 2 gigabytes of expandable memory for data capture and storage, 1 gigabyte 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
- Optional 3G Modem offers VPN support

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 Modbus RTU devices.

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 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

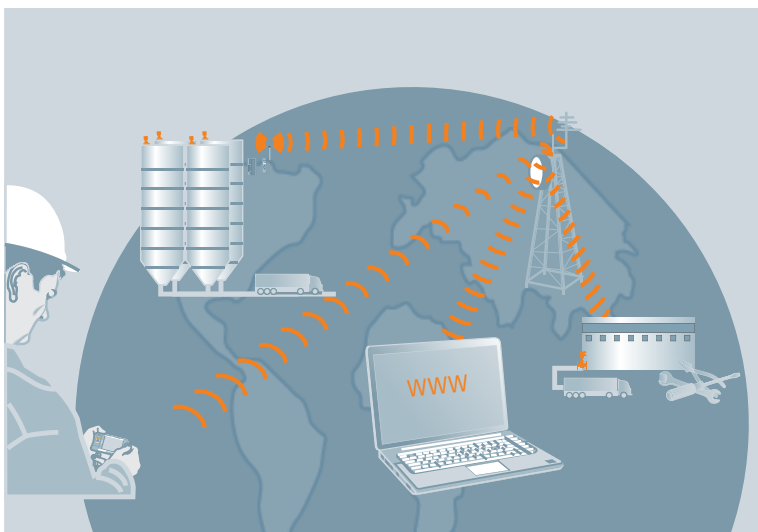
recipients to ensure that appropriate actions are taken by personnel.

The RD500 supports modems, providing flexibility for applications in which GSM/GPRS/3G 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



With SITRANS RD500, monitor inventory levels, process, environmental, and remote maintenance applications, and get web access to most types of field instrumentation, including flow, level, pressure, temperature measurement, and weighing.

Weighing Electronics

Accessories for stand-alone integrators

SITRANS RD500

Technical specifications

SITRANS RD500	
Mode of operation	
• Measuring principle	Remote data monitor
• Measuring points	<ul style="list-style-type: none"> Up to 128 standard input/outputs Addressing for Modbus serial devices
Input	See table on page 2/25
Output	See table on page 2/25
Accuracy	See table on page 2/25
Rated operating conditions	
Storage temperature range	-30 ... +70 °C (-22 ... +158 °F)
Operating temperature	0 ... 50 °C (32 ... 122 °F)
Operating and storage humidity	80 % max relative humidity, non-condensing, from 0 ... 50 °C (32 ... 122 °F)
Design	
Material (enclosure)	High impact plastic and stainless steel
Installation category	I
Pollution degree	2
Weight	456.4 g (15.1 oz)
Mounting	Snaps onto standard DIN style top hat (T) profile mounting rails according to EN 50022 – 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	<ul style="list-style-type: none"> 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 Gbytes)

SITRANS RD500	
Certificates and approvals	
• Safety	<ul style="list-style-type: none"> UL listed to U.S. and Canadian safety standards for use in Class I, II and III, Division 1 and 2 hazardous locations CE, RCM
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)

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 thermocouple module
Article No.	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 thermocouple input module provides high density signal measurement for data acquisition applications and accepts wide range of thermocouple types
Accuracy	Not applicable	Not applicable	± 0.1 % of span	± 0.1 % of span	$\pm (0.2$ % of span, 1 °C) 0 ... 50 °C (32 ... 122 °F); $\pm (0.1$ % 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	$\pm (0.3$ % 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 at 125 V AC	Not applicable	Not applicable	Not applicable	Not applicable

Note

To ensure the secure operation of a plant or machine it is necessary to take additional, suitable preventive action (e.g. cell protection concept) and to integrate the automation and drive components into a state-of-the-art holistic industrial security concept for the entire plant or machine. Please find further information at: <http://www.siemens.com/industrialsecurity>

Weighing Electronics

Accessories for stand-alone integrators

SITRANS RD500

Selection and ordering data

SITRANS RD500

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

Communications connection

Ethernet¹⁾

Digital communications to instruments

RS 485 Modbus RTU

Input configuration modules

Note: one RD500 supports 16 input modules

RD500 8 channel 0/4 ... 20 mA input module

RD500 8 channel ± 10 V input module

RD500 8 digital inputs, 6 relay outputs module

RD500 8 digital inputs, 6 solid state outputs module²⁾

RD500 6 channel input, RTD module

RD500 8 channel thermocouple module

Operating Instructions

Application manual, English

Application manual, German

Note: Additional Operating Instructions should be ordered as a separate line item.

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

Other Operating Instructions

RD500 Remote Data Manager manual, English: web access, alarm event handling, and data capture

RD500 Remote Data Manager manual, German: web access, alarm event handling, and data capture

RD500 8 channel 0/4 ... 20 mA input module manual, English

RD500 8 channel 0/4 ... 20 mA input module manual, German

RD500 8 channel ± 10 V input module manual, English

RD500 8 channel ± 10 V input module manual, German

RD500 8 inputs, 6 relay outputs module manual, English

RD500, 8 inputs, 6 relay outputs module manual, German

RD500 8 inputs, 6 solid state outputs module manual, English

RD500 8 inputs, 6 solid state outputs module manual, German

RD500 6 channel input, RTD module manual, English

RD500 6 channel input, RTD module manual, German

RD500 8 channel thermocouple module manual, English

RD500, 8 channel thermocouple module manual, German

Article No.

7ML5750

A 0 0 - 0

1

A

7ML1930-1EP

7ML1930-1EQ

7ML1930-1ER

7ML1930-1ES

7ML1930-1ET

7ML1930-1EU

7ML1998-5MA01

7ML1998-5MA31

7ML1998-5MK01

7ML1998-5MK31

7ML1998-5MB01

7ML1998-5MB31

7ML1998-5MC01

7ML1998-5MC31

7ML1998-5MD01

7ML1998-5MD31

7ML1998-5ME01

7ML1998-5ME31

7ML1998-5MF01

7ML1998-5MF31

7ML1998-5MJ01

7ML1998-5MJ31

Article No.

Accessories

Multitech GPRS modem, external

Industrial CompactFlash card, 2 Gbyte

Industrial CompactFlash card, 1 Gbyte

RJ11 serial to terminal block RS 232

RJ45 serial to terminal block RS 485

GPRS Modem antenna

RD500 Spare Module base

RD500 Spare End terminator

5' Ethernet Cat 5e Red X/O cable for configuration

USB cable type A to B

3G external ethernet modem MTCBA-H4-EN2-P1²⁾

• We can offer shorter delivery times for configurations designated with the Quick Ship Symbol

7ML1930-1EX

7ML1930-1FB

7ML1930-1FC

7ML1930-1FD

7ML1930-1FE

7ML1930-1FF

7ML1930-1FG

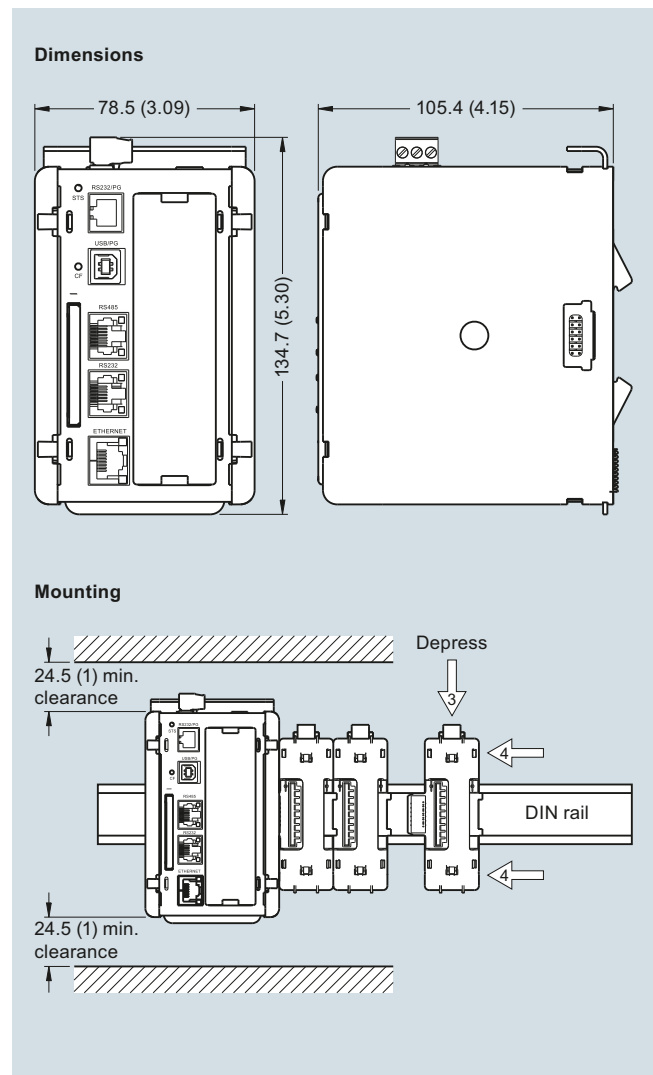
7ML1930-1FH

7ML1930-1FM

7ML1930-1FN

7ML1930-1GJ

Dimensional drawings



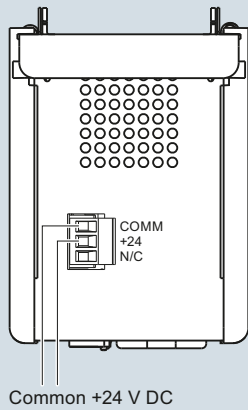
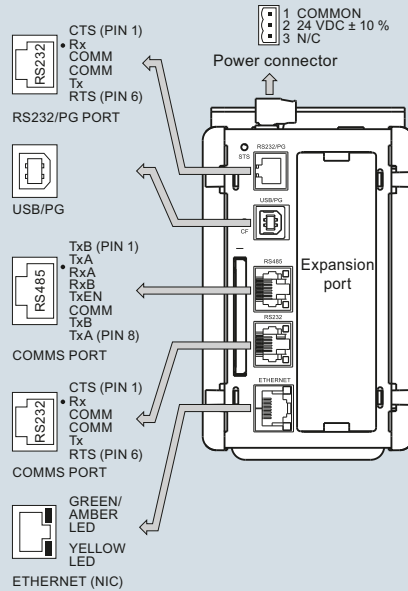
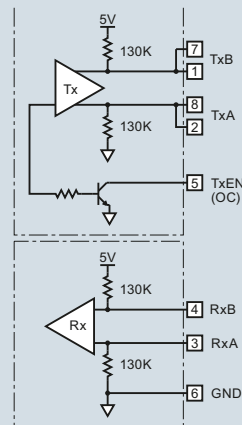
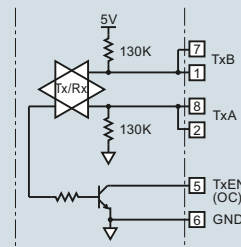
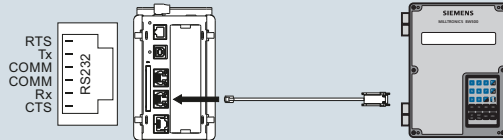
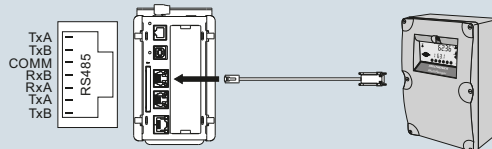
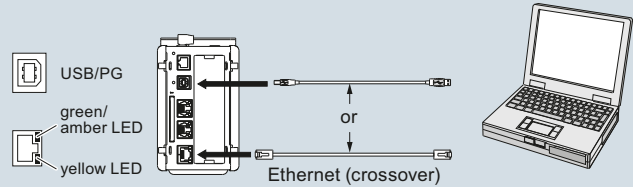
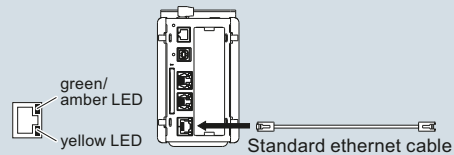
SITRANS RD500, dimensions in mm (inch)

¹⁾ Configuration limited to 16 modules.

²⁾ Antenna, power cord, and cable included.

Schematics

2

Power connection

RD500 port pin outs

**RS 422/485
4-wire connections**

**RS 485
2-wire connections**

Communication ports
RS 232

RS 485

Configuration ports

Ethernet connection (Port 3)


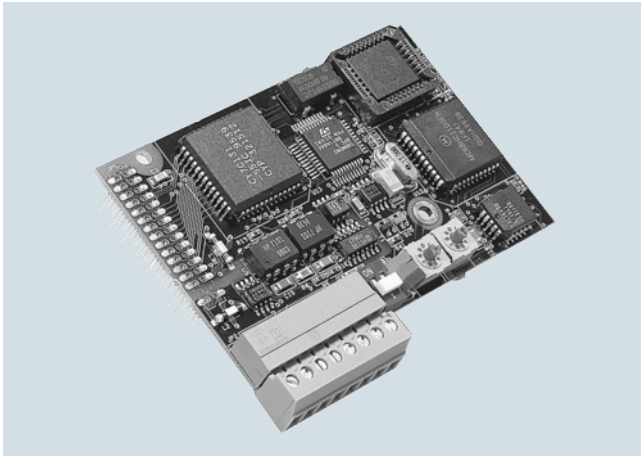
SITRANS RD500 connections

Weighing Electronics

Accessories for stand-alone integrators

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
- Scalable application layer allows for optimized network bandwidth and memory requirements
- Modules available for PROFIBUS DP, ProfiNet, Modbus TCP/IP, EtherNet/IP 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

SmartLinx modules

Module type	PROFIBUS DP
Interface	RS 485 (PROFIBUS standard)
Transmission rate	All valid PROFIBUS DP rates from 9 600 kbps to 12 Mbps
Rack address	0 ... 99
Connection	Slave
SmartLinx module compatibility	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • Milltronics BW500 • Milltronics SF500
Module type	ProfiNet IO module
Interface	RJ 45 female
Transmission rate	10/100 Mbit/s
Address	IP address through dip switches or via DCP or DHCP
Connection	Slave/server
SmartLinx module compatibility	<ul style="list-style-type: none"> • Milltronics BW500 • Milltronics SF500
Module type	Modbus TCP/IP, EtherNet/IP
Interface	RJ 45 female
Transmission rate	10/100 Mbit/s
Address	IP address through dip switches or via DCP or DHCP
Connection	Slave/server
SmartLinx module compatibility	<ul style="list-style-type: none"> • Milltronics BW500 • Milltronics SF500

Selection and ordering data

Article No.

SmartLinx modules

PROFIBUS DP modules	7ML1830-1HR
DeviceNet modules	7ML1830-1HT
ProfiNet IO module	7ML1830-1PM
Modbus TCP I/P, EtherNet I/P	7ML1830-1PN

Instruction manuals

<u>PROFIBUS communications module</u>	
English	7ML1998-1AQ03
French	7ML1998-1AQ12
German	7ML1998-1AQ32
DeviceNet, English	7ML1998-1BH02

Overview

Automation with integral weighing and proportioning technology

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

Requirements on scales in industrial processes

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

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

Production automation places the following demands on weighing technology:

- Flexibility with respect to typical scale functions
- Simple expansion of the weighing system
- adaptability to the automation task, and
- Integrated communications concept

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

- sensor technology,
- controller and
- actuator technology

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



Weighing electronics SIWAREX WP321 incorporated in SIMATIC ET 200SP

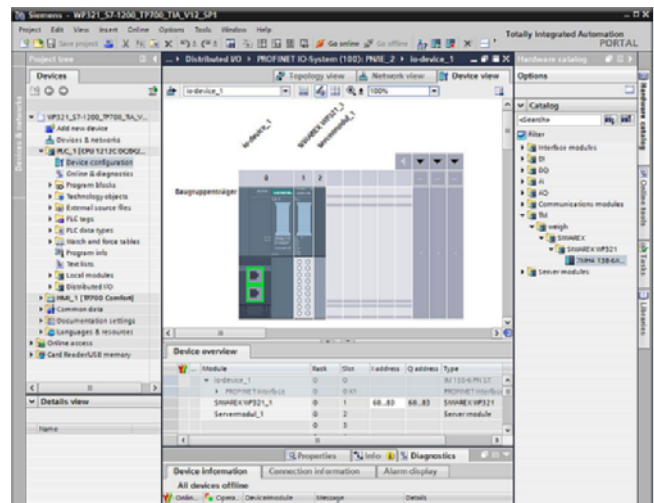
Distribution of weighing functions within automation system

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

- High operational reliability
- Simple operation
- Very good reproducibility
- High accuracy

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

- Integration (hardware/software)
- Flexibility
- Standardization



Hardware configuration TIA portal with weighing electronics SIWAREX WP321

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.

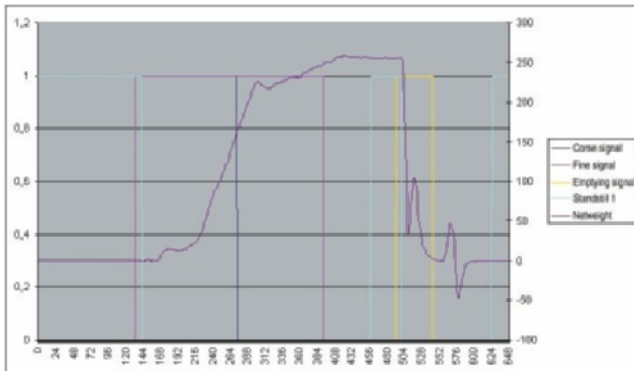
Weighing Electronics

SIWAREX - PLC-based weighing electronics

Introduction

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).
- 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. With a distributed architecture, i.e. with integration of the components into the scale, the weighing system is easily transformed into an autonomous "field device" connected to the automation technology through the open PROFIBUS or PROFINET.



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

SIWAREX weighing systems in automation

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

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

This means:

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

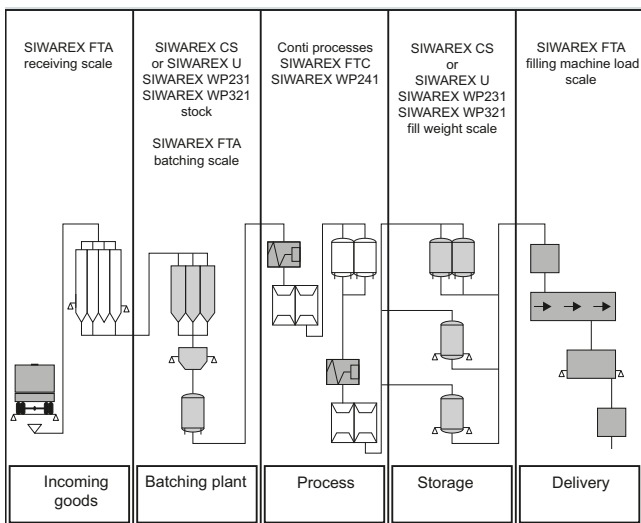
Material parameters

Component ID	1	Maximum weighing time	0
Name	Flour	In flight value	1.00
Device number	1	Fine weight	1.00
Name	Scale 1	Fine switch off correction	0.00
Command by start	651	Timer for predosing	0
Command by continue	103	Tolerance limit TO1	1.00
Bin no.	1	Tolerance limit TU1	1.00
Route on	<input checked="" type="checkbox"/>	Tolerance limit TO2	1.50
Fine optimization	<input checked="" type="checkbox"/>	Tolerance limit TU2	1.50
Component selection: 1		Display Compo + Compo - back	

Sample material parameters in SIMATIC HMI

SIWAREX - weighing electronics - uniform SIMATIC system basis

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



Applications of SIWAREX weighing technology in the production process

Integrated automation solutions with weighing technology

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

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

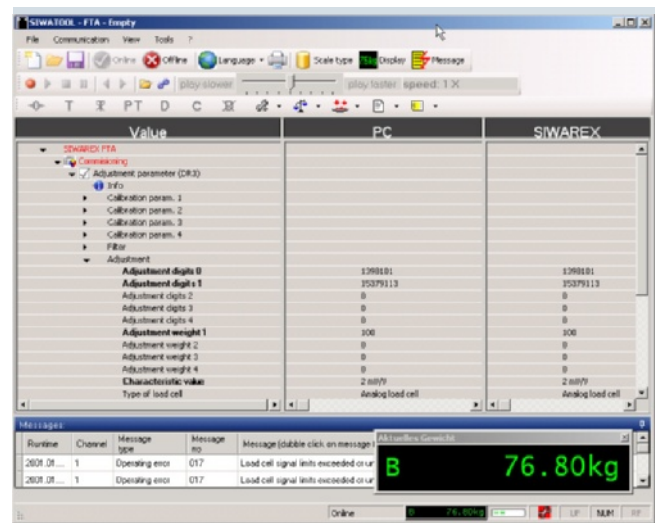
The ET 200 I/O station is designed as a modular system. The weighing electronics are selected from the module catalog and placed in the rack of the modular I/O station. The software addresses the weighing electronics as if they were modules plugged into the central controller of an automation system.

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

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

The advantages of direct integration at a glance:

- Low-cost system integration because no additional coupling modules are required
- Low configuration costs due to the integrated system design
- System-compatible module behavior (diagnostics interrupts, hardware interrupts, command output disables, etc.)
- Tailor-made, low-cost weighing systems due to expansion with standard SIMATIC components
- High plant availability
- Easy installation thanks 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.

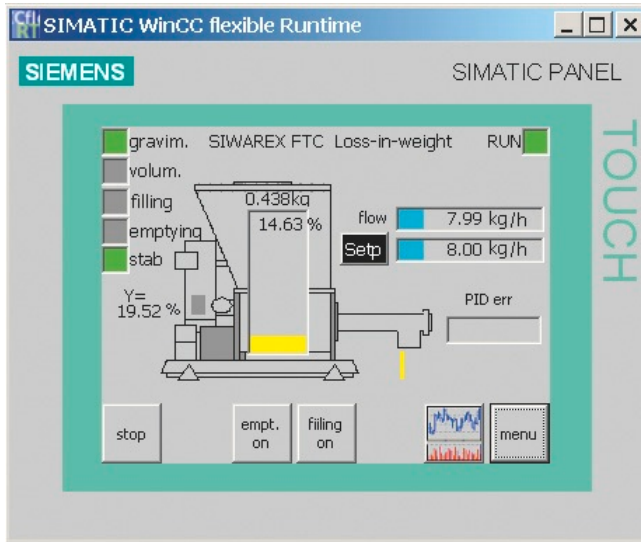
When the correct bus modules are used, the SIWAREX U, SIWAREX CS, SIWAREX FTA, SIWAREX FTC and SIWAREX CF weighing electronics can even be replaced under power. A replaced module is automatically detected by the automation system. Thanks to the transparent data management, the scales parameters saved 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.

Weighing Electronics

SIWAREX - PLC-based weighing electronics

Introduction



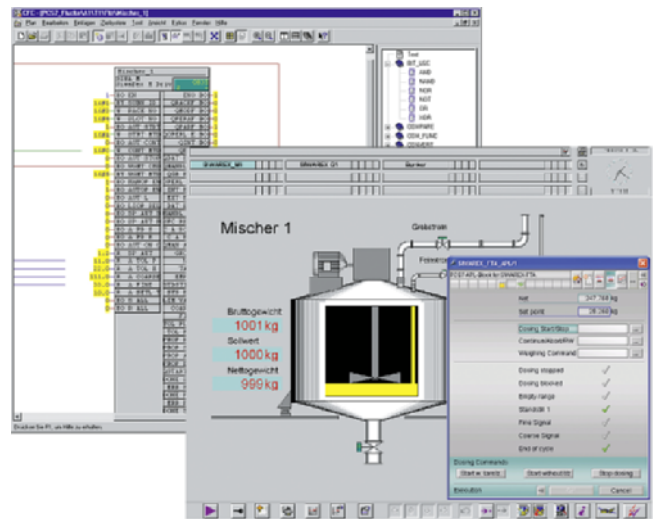
Scale faceplate of a differential proportioning weigher

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	Platform scales, container weighers, vehicle scales, silos	SIWAREX WP231 for S7-1200 SIWAREX WP321 for ET 200SP SIWAREX FTA ¹⁾ , max. resolution 16 million parts SIWAREX U for S7 300 and ET 200M SIWAREX CS for ET 200S
Force measurements	Rolling mills, monitoring of loads and belt tensions, overload protection, torque measurements	SIWAREX WP231 for S7-1200 SIWAREX WP321 for ET 200SP SIWAREX FTC for S7-300 und ET200M SIWAREX CF for ET 200S
Dosing	Batching plants, batch processes, proportioning recipes, single-scale and multi-scale systems	SIWAREX FTA ¹⁾ (OIML R-51)
Dosing	Batching plants, in continuous operation, proportioning recipes, single-scale and multi-scale systems	SIWAREX FTC (operating mode - differential proportioning weigher)
Filling, fast filling	Filling machines, weighing and sack filling machines, big bag	SIWAREX FTA ¹⁾ (OIML R-61)
Loading, high-speed 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 measurement	Bulk flow meter (baffle plate)	SIWAREX FTC (operating mode - flow meter)
Conveyor scale	Measurement of belt load, conveyed quantity, loading according to setpoint	SIWAREX FTC (conveyor scale operating mode) SIWAREX WP241 for S7-1200

¹⁾ Suitable for applications that require legal-for-trade certification.

Weighing Electronics

SIWAREX - PLC-based weighing electronics

Introduction**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

- | | | |
|--|--|--|
| <input type="checkbox"/> Non Automatic Weighing Instrument | <input type="checkbox"/> Truck/Wagon scale static | <input type="checkbox"/> Checkweigher |
| <input type="checkbox"/> Platform Scale | <input type="checkbox"/> Automatic filling/Big Bag scale | <input type="checkbox"/> Solid flow meter |
| <input type="checkbox"/> Vessel/Silo/level measurement | <input type="checkbox"/> Dosing scale | <input type="checkbox"/> Weighfeeder |
| <input type="checkbox"/> Truck scale | <input type="checkbox"/> Belt scale | <input type="checkbox"/> Loss in weight dosing scale |
| <input type="checkbox"/> Force measurement | | |

Type of material: _____

Requested features

- | | | |
|---|--|---|
| <input type="checkbox"/> Basic weighing functions | <input type="checkbox"/> Error control and logging | <input type="checkbox"/> Fast weight value processing |
| <input type="checkbox"/> Recording of weighing sequence | <input type="checkbox"/> Preventive diagnostics | <input type="checkbox"/> Legal-for-trade |
| <input type="checkbox"/> With Ex approval | Zone type/number: _____ | |

CPU integration

- | | | | | |
|--|--|---------------------------------------|----------------|--------------------------------|
| <input type="checkbox"/> SIMATIC S7-1200 directly | <input type="checkbox"/> SIMATIC S7-1500 | <input type="checkbox"/> SIMATIC PCS7 | Version: _____ | <input type="checkbox"/> Other |
| <input type="checkbox"/> SIMATIC S7-300 directly | <input type="checkbox"/> WINCC flex | Version: _____ | Name: _____ | |
| <input type="checkbox"/> SIMATIC S7-300/400 with bus | Type: _____ | | | |

SIWAREX Mechanic

Load cells

Total maximum weight: _____ Dead load : _____ Required precision: _____
 Load cells quantity: _____ Number of support points: _____

- | | | | |
|---|---|---|---|
| <input type="checkbox"/> Vibration (Motor, Mixer, etc.) | <input type="checkbox"/> Guide elements required? | <input type="checkbox"/> Lift up protection | <input type="checkbox"/> Diagnostics |
| <input type="checkbox"/> High overload protection | <input type="checkbox"/> High measuring rate | <input type="checkbox"/> Ex Protection | <input type="checkbox"/> Stainless steel required ? |

Special application requirements

- | | | |
|---|--|--|
| <input type="checkbox"/> Pictures available | <input type="checkbox"/> Drawing available | <input type="checkbox"/> Retrofit of an old installation |
|---|--|--|

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

© Siemens AG

www.siemens.com/weighingtechnology

Please send by fax: +49 (721) 595 2901

Overview



SIWAREX WP321 is a versatile and flexible weighing module for the seamless integration of a static scale into the SIMATIC automation environment.

The electronic weighing system is integrated in the SIMATIC ET 200SP series and uses all the features of a modern automation system, such as integrated communication, operator control and monitoring, the diagnostic system and configuration tools in the TIA Portal, SIMATIC Step 7 and WinCC flexible.

Benefits

The electronic weighing system described here is characterized by decisive advantages:

- Uniform modular design and integrated communication in SIMATIC ET200SP
- Parameterization of the scales via the control panel, CPU or PC
- Flexible configuration options in SIMATIC TIA Portal and SIMATIC STEP 7
- Measuring of weights and forces with a resolution of up to +/- 2 million parts
- 100 Hz/120 Hz measurement rate (efficient 50/60 Hz interference frequency suppression)
- Internal scale monitoring of freely definable limit values
- Easy commissioning using the "SIWATOOL" software
- Automatic calibration is possible without the need for calibration weights
- Modules can be replaced without recalibrating the scale
- Direct use in ATEX Zone 2 possible
- Wide range of status and diagnostic information
- "Ready-for-use" sample program

Application

SIWAREX WP321 is the optimum solution wherever strain gage sensors, such as load cells, force sensors or torque measuring shafts, are used for measuring tasks.

The SIWAREX WP321 is suitable for the following applications:

- Non-automatic scales, e.g. platform scales
- Fill-level monitoring of silos and hoppers
- Measuring of crane and cable loads
- Force measurements
- Monitoring of belt tensions
- Setup of scales in hazardous areas

Design

SIWAREX WP321 is a technology module (TM) of the SIMATIC ET 200SP series and is thus linked to the controller in a distributed manner by means of an ET 200SP interface module (Profibus/Profinet).

The following BaseUnits (Type A0) can be used for integration:

For opening a new potential group:

BU15P-16+A10+2D (6ES7193-6BP20-0DA0)

BU15P-16+A0+2D (6ES7193-6BP00-0DA0)

For continuing the potential group:

BU15P-16+A10+2B (6ES7193-6BP20-0BA0)

BU15P-16+A0+2B (6ES7193-6BP00-0BA0)

The load cells or force sensors are connected to the terminals of the BaseUnit. This means that modules can be replaced quickly, easily and without any wiring work.

Weighing Electronics

SIWAREX - PLC-based weighing electronics

SIWAREX WP321

Function

The primary task of the weighing electronics is to determine the current weight and force values on the basis of the signals supplied by the connected sensors. Thanks to the seamless integration into the SIMATIC environment, values can be processed directly and in any available programming language of the CPU.

If the freely selectable and internally monitored values are exceeded or undershot, this is reported directly to the controller.

A variety of status and diagnostic information can also be read out and evaluated in the CPU without difficulty.

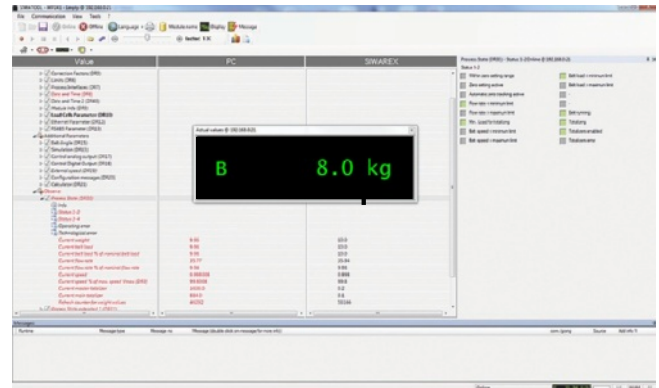
The SIWAREX WP321 is calibrated in the factory. This not only permits automatic calibration of the scales (without the need for calibration weights), but also the replacement of modules without the need for recalibration.

Via the integral RS 485 port, a PC can be connected for setting the parameters of the weighing electronics using the "SIWATOOL" software. A USB RS 485 interface converter is required for this purpose.

Thanks to its seamless integration into the SIMATIC environment, the use of SIWAREX weighing electronics requires no complicated or expensive communication drivers for the scales.

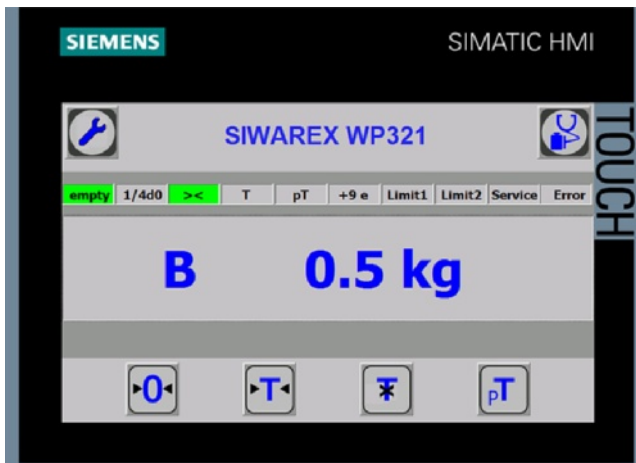
Programmable weighing applications tailored to any situation can be created and then adapted or extended at any time in combination with the functionalities of the TIA Portal and of the SIMATIC Manager and WinCC flexible.

Likewise, WP321 enables scales to be set up in hazardous areas. Depending on the zone and the load cells used, the use of the SIWAREX IS Ex interface may also be necessary.



SIWAREX WP321 SIWATOOL

SIWATOOL is a service software tool which enables you to calibrate the module quickly and efficiently on site, set or reset parameters, or perform diagnostics in the event of a fault. Furthermore, complete backup files can be created for the scales, which can be uploaded to a new module with a few mouse clicks, so that the module continues to operate exactly as it did before the backup, without the need for any recalibration. It is even possible to upload configuration files that were created offline, or to read out the error buffer. No special SIMATIC knowledge is required to use SIWATOOL. It is connected via the RS 485 port of the module which requires the use of a USB RS 485 interface converter. Please refer to the WP321 manual for further recommendations.



SIWAREX WP321 Ready for use

For an easy introduction to the integration of the module into the TIA Portal and SIMATIC Manager, a "Ready for use" sample project is available free of charge. This project demonstrates the integration of the module into the hardware configuration and contains the function block for communication between the CPU and SIWAREX. It also contains a ready-made data block that contains all the parameters for the scales. The "Ready for use" project is rounded off with a touch panel configuration feature, which not only permits complete commissioning of the scales from the panel, but also includes an "operator view" that can be used as an example for the normal operation of the scales.

Technical specifications

SIWAREX WP321	
Integration in automation systems	
SIMATIC S7-300, S7-400, S7-1200 and S7-1500	Via SIMATIC ET 200SP interface module (PROFIBUS or PROFINET)
Other manufacturers (with restrictions)	Via SIMATIC ET 200SP interface module (PROFIBUS or PROFINET)
Communication interfaces	<ul style="list-style-type: none"> • SIMATIC ET 200SP backplane bus • RS485 (SIWATOOL, Siebert remote indicator)
Optional remote weight indicator (via RS 485)	Siebert S102
Commissioning options for the scale	<ul style="list-style-type: none"> • using SIWATOOL (PC software) • using CPU / Touch Panel
Measuring accuracy	
according to DIN 1319-1 of full-scale value at 20 °C ± 10 K	0.05 %
Internal resolution	up to ± 2 million parts
Number of measurements/second (internal)	100 / 120 Hz
Digital filter	Variable adjustable low-pass and average filter
Typical applications	<ul style="list-style-type: none"> • Non-automatic scales • Force measurements • Fill-level monitoring • Belt tension monitors
Weighing functions	
Weight values	<ul style="list-style-type: none"> • Gross • Net • Tare
Limits	<ul style="list-style-type: none"> • Min/max • Empty
Zeroing function	Via command by controller or HMI
Tare function	Via command by controller or HMI
External tare specification	Via command by controller or HMI
Calibration commands	Via command by controller or HMI

SIWAREX WP321	
Load cells	Strain gauges in 4-wire or 6-wire system
Load cell excitation	
Supply voltage (value applies at sensor, cable-related voltage drops of up to 5 V are controlled)	4.85 V DC ± 2 %
Permissible load resistance	
• R _{Lmin}	> 40 Ω
• R _{Lmax}	< 4 100 Ω
With SIWAREX IS Ex interface	
• R _{Lmin}	> 50 Ω
• R _{Lmax}	< 4 100 Ω
Load cell characteristic	1 ... 4 mV/V
Permissible range of measuring signal	-21.3 ... +21.3 mV
Max. distance of load cells	1000 m (459.32 ft)
Connection to load cells in Ex zone 1	Optionally via SIWAREX IS Ex interface (compatibility of the load cells must be checked)
Approvals	<ul style="list-style-type: none"> • ATEX Zone 2 (manufacturer declaration) • UL available soon • FM available soon
Max. cable length	1 000 m
Transmission rate	9 600 ... 115 000 bit/s
Auxiliary power supply	
Rated voltage	24 V DC
Max. power consumption	typ. 0.1 A @ 24 V DC (0.2 A max.)
Max. power consumption SIMATIC Bus	30 mA
IP degree of protection to DIN EN 60529; IEC 60529	IP20
Climatic requirements T_{min} (IND) ... T_{max} (IND) (operating temperature)	
Vertical installation in SIMATIC S7 ¹⁾	-25 ... +60 °C (-13 ... 140 °F)
Horizontal installation in SIMATIC S7 ¹⁾	-25 ... +60 °C (-13 ... 140 °F)
EMC requirements according to	IEC 61000-6-2, IEC 61000-6-4, OIML-R76-1
Dimensions (width)	15 mm (2.76 inch)

¹⁾ The S7 standard modules may not be operated at temperatures below 0 °C.
For operating conditions below 0 °C, SIMATIC modules from the SIPLUS series must be used.

Weighing Electronics

SIWAREX - PLC-based weighing electronics

SIWAREX WP321

Selection and ordering data

SIWAREX WP321 Single-channel weighing electronics for scales in SIMATIC ET200SP

Article No.

7MH4138-6AA00-0BA0

SIWAREX WP321 manual

Available in a range of languages
Free download from the Internet at:

www.siemens.com/weighing-technology

SIWAREX WP321 "Ready for Use"

TIA Portal and SIMATIC Manager sample configuration

Free download from the Internet at:

www.siemens.com/weighing-technology

SIWAREX WP321 configuration package on CD-ROM

7MH4138-1AK01

- "Ready for use" software for operating a scale with SIWAREX WP321 and a touch panel (in many different languages)
- SIWATOOL V7.0 calibration tool
- Device manuals (PDF files in a variety of languages)

Accessories (mandatory)

BaseUnit (Type A0 – one BaseUnit required for each WP321)

- For opening a new potential group
 - BU15P-16+A0+2D or
 - BU15P-16+A10+2D
- For continuing the potential group
 - BU15P-16+A0+2B
 - BU15P-16+A10+2B

6ES7193-6BP00-0DA0

6ES7193-6BP20-0DA0

6ES7193-6BP00-0BA0

6ES7193-6BP20-0BA0

Shielded connection for BaseUnit (5 units / for 5 scales) For laying the load cell cable

6ES7193-6SC00-1AM0

Accessories (optional)

SIWAREX JB junction box, aluminum housing

7MH4710-1BA

For connecting up to 4 load cells in parallel, and for connecting several junction boxes, see page 3/66

SIWAREX JB junction box, stainless steel housing

7MH4710-1EA

For connecting up to 4 load cells in parallel, see page 3/68

SIWAREX JB junction box, stainless steel housing (ATEX)

7MH4710-1EA01

For parallel connection of up to 4 load cells
(for zone allocation, see manual or type-examination certificate)

Article No.

Ex interface, type SIWAREX IS

With ATEX approval, but **without UL and FM approvals**, for intrinsically-safe connection of load cells, including device manual

Suitable for the SIWAREX U, CS, MS, FTA, FTC, M, CF, WP231 and WP321 weighing modules

Approved for use in the EU

- Short-circuit current < 199 mA DC

7MH4710-5BA

- Short-circuit current < 137 mA DC

7MH4710-5CA

Cables (optional)

Cables Li2Y 1 x 2 x 0.75 ST + 2 x (2 x 0.34 ST) – CY, orange sheath

7MH4702-8AG

To connect SIWAREX U, CS, MS, FTA, FTC, M, CF, WP231, WP241 and WP321 to the junction box (JB), extension box (EB) and Ex interface (Ex I) or between two JB's, for fixed laying, occasional bending permitted, approx. 10.8 mm (0.43") outer diameter, for ambient temperature -40 to +80 °C (-104 to +176 °F)

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

7MH4702-8AF

To connect SIWAREX U, CS, MS, FTA, FTC, M, CF, WP231, WP241 and WP321 to the junction box (JB), extension box (EB) and Ex interface (Ex I) or between two JB's, for fixed laying, occasional bending permitted, approx. 10.8 mm (0.43") outer diameter, for ambient temperature -40 to +80 °C (-104 to +176 °F)

RS485/USB converter

Commercial converter with FTDI chip, e.g. USB-Nano from CTI. See under:

<http://www.cti-shop.com/RS485-Konverter/USB-Nano-485>

Remote display

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

Siebert Industrie Elektronik GmbH

P.O. Box 1180

D-66565 Eppelborn

Tel.: +49 6806/980-9

Fax: +49 6806/980-999

Internet: <http://www.siebert.de>

Detailed information is available from manufacturer.

Overview



SIWAREX WP231 is a versatile weighing module for all simple weighing and force measuring tasks. The compact module is easy to install in the SIMATIC S7-1200 automation system. It can also be operated without a SIMATIC CPU.

Benefits

SIWAREX WP231 offers the following key advantages:

- Uniform design technology and consistent communication in SIMATIC S7-1200
- Uniform configuration with TIA Portal
- Operation without SIMATIC CPU possible
- Direct connection of an operator panel via Ethernet
- Direct connection of a remote display via RS 485 interface
- Modbus TCP/IP interface
- Modbus RTU interface
- Four digital inputs and outputs, one analog output
- Measurement of weight or force with a high resolution of up to ± 4 million parts and an accuracy of 0.05%
- Simple adjustment of scale using the SIWATOOL V7 program via the Ethernet interface
- Recovery-point for the simple restoration of all parameters
- Supports automatic adjustment without adjustment weights
- Supports replacement of module without renewed adjustment of scale
- Use in hazardous area zone 2

Application

SIWAREX WP231 is the optimum solution wherever strain gauge sensors, such as load cells, force sensors or torque measuring shafts, are used for measuring tasks. The following are typical SIWAREX WP231 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
- Scales in zone 2 hazardous areas
- Force measuring, container weighing, platform scales and crane scales

Design

SIWAREX WP231 is a compact technology module in SIMATIC S7-1200 and allows direct connection to S7-1200 components via a sliding connector. The rail mounting of the 70 mm (2.76 inch) wide weighing module means that it is extremely easy to mount/wire.

The power supply, load cells, the RS 485, digital input/outputs and the analog output are connected via the screw connector of the weighing module. A RJ45 connector is used for the Ethernet connection.

Function

The primary task of SIWAREX WP231 is the measurement and conversion of sensor voltage into a weight value. Up to three interpolation points are used for the weight calculation. The signal can also be digitally filtered if required.

Weighing functions

There are commands available for zeroing and taring. Up to three different tare default values can be activated for this. SIWAREX WP231 is factory-calibrated. This means the scale can be automatically adjusted without adjustment weights, and modules can be replaced without the need to readjust the scale.

Monitoring and control of the scale signals and states

In addition to weight determination, the SIWAREX WP231 monitors two freely programmable limits (optionally min/max) as well as the empty range. It signals violations of the limits.

Consistent and uniform communication between all system components enables fast, reliable and cost-effective integration and diagnostics in process plants.

Weighing Electronics

SIWAREX - PLC-based weighing electronics

SIWAREX WP231

Integration in the plant environment

SIWAREX WP231 is directly integrated into the SIMATIC S7-1200 via the SIMATIC bus. All scale parameters can be read and edited by the CPU. Therefore a complete commissioning of the scales by the CPU or by a connected HMI device is possible.

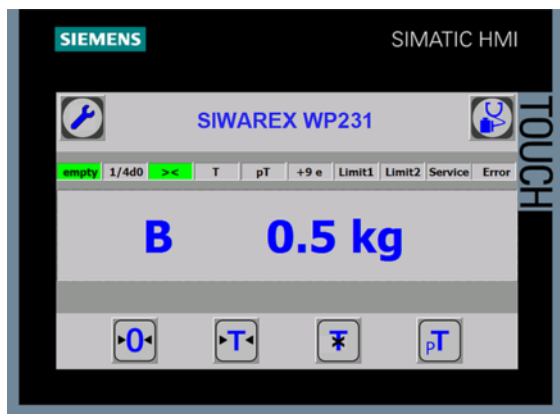
A wide variety of connection options are provided via the RS 485 and Ethernet interface:

- Via Modbus TCP/IP or Modbus RTU, control panels can be connected and it is also possible to communicate with various automation systems.
- A remote display can also be connected to the RS 485.
- A PC for configuring the SIWAREX WP231 can be connected to the Ethernet interface.

Weight value, status, tare, commands and messages are transmitted via the SIMATIC I/O area. The parameters of the data records can be set via SIWATOOL or with an operator panel connected directly to the weighing electronics.

SIWAREX WP231 can be integrated into the plant software with the aid of a ready-made function block. In contrast to serially linked weighing electronics, SIWAREX WP231 does not need costly additional modules to link it to SIMATIC.

Used in conjunction with SIWAREX WP231, it is possible to configure freely programmable, modular weighing systems in SIMATIC, which can be adapted to company-specific requirements as needed.



In addition to the configuration package, a fully-featured SIWAREX WP231 "Ready for use" software is also available free-of-charge. It shows beginners how to integrate the module in a STEP 7 program and offers a basis for application programming. This allows you to connect the scale either directly to the SIMATIC CPU or to an operator panel connected directly to the SIWAREX WP231.

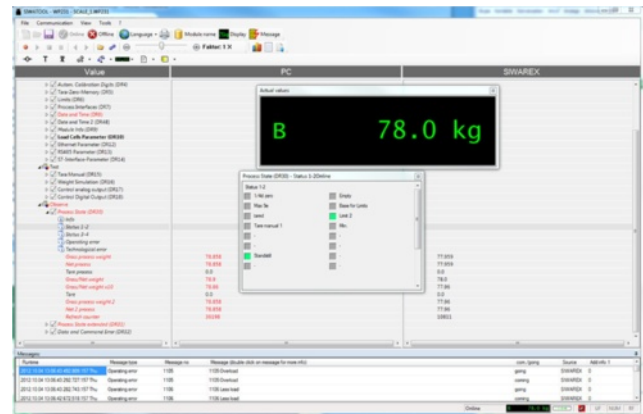
Software

SIWATOOL V7 is a special program for commissioning and servicing and runs with Windows operating systems.

The program enables the user to perform scale adjustment without requiring automation engineering skills. During servicing, the technician can use a PC to analyze and test the procedures in the scale. Reading the diagnostics buffer from the SIWAREX WP231 is extremely helpful when analyzing events.

The following are just some of the tasks that can be carried out using SIWATOOL V7:

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



SIWATOOL V7 calibration software, layout of the individual program windows

It is also extremely helpful to analyze the diagnostics buffer which can be saved together with the parameters following reading out from the module.

Trace mode is provided to optimize the weighing sequences in the SIWAREX WP231 weighing module. The recorded weight values and associated states can be displayed as trends using SIWATOOL V7 and MS Excel.

Upgrading firmware

An additional program function can be used to download a new firmware version onto the SIWAREX WP231 on site. This means that firmware upgrades can be carried out on site as required anywhere in the world.

Technical specifications

SIWAREX WP231	
Integration in automation systems	
S7-1200	Directly via SIMATIC bus
<ul style="list-style-type: none"> Operator panel Automation systems from other manufacturers (possible with limitations) 	Via Ethernet (Modbus TCP/IP) or RS 485 (Modbus RTU)
Communication interfaces	<ul style="list-style-type: none"> SIMATIC S7-1200 backplane bus RS 485 Ethernet
Connection of remote displays (via RS 485)	Display for weight value
Adjustment of scale settings	PC configuration software SIWATOOL (Ethernet) or directly connected operator panel (Modbus)
Measuring accuracy	
Error limit according to DIN 1319-1 of full-scale value at 20 °C ± 10 K (68 °F ± 10 K)	0.05 %
Internal resolution	Up to ± 4 million parts
Number of measurements/second	100 / 120 Hz
Filters	<ul style="list-style-type: none"> Low-pass filter 0.1 ... 50 Hz Mean value filter
Weighing functions	
Weight values	<ul style="list-style-type: none"> Gross Net Tare
Limits	<ul style="list-style-type: none"> Min/max Empty
Zeroing function	Per command
Tare function	Per command
Tare specification	Per command
Load cells	Strain gauges in 4-wire or 6-wire system

SIWAREX WP231	
Load cell excitation	
Supply voltage (regulated via feedback)	4.85 V DC
Permissible load resistance	
• R_{Lmin}	> 40 Ω
• R_{Lmax}	< 4 100 Ω
With SIWAREX IS Ex interface	
• R_{Lmin}	> 50 Ω
• R_{Lmax}	< 4 100 Ω
Load cell characteristic	1 ... 4 mV/V
Permissible range of the measurement signal	-21.3 ... +21.3 mV
Max. distance of load cells	500 m (229.66 ft)
Connection to load cells in Ex zone 1	Optionally via SIWAREX IS Ex interface
Ex approvals	<ul style="list-style-type: none"> ATEX Zone 2 UL FM available soon
Auxiliary power supply	
Rated voltage	24 V DC
Max. power consumption	200 mA
Max. power consumption SIMATIC Bus	3 mA
IP degree of protection to DIN EN 60529; IEC 60529	IP20
Climatic requirements T_{min} (IND) ... T_{max} (IND) (operating temperature)	
Vertical installation	-10 ... +55 °C (14 ... 131 °F)
Horizontal installation	-10 ... +40 °C (14 ... 104 °F)
EMC requirements according to	EN 45501
Dimensions	70 x 75 x 100 mm (2.76 x 2.95 x 3.94 inches)

Weighing Electronics

SIWAREX - PLC-based weighing electronics

SIWAREX WP231

Selection and ordering data

Article No.

Article No.

SIWAREX WP231
Weighing electronics for scales
in SIMATIC S7-1200

7MH4960-2AA01

SIWAREX S7-1200
device manual

Available in a range of languages

Free download on the Internet at:

www.siemens.com/weighing-technology

**SIWAREX WP231 "Ready for
Use"**

Complete software package for
non-automatic scale (for S7-1200
and a directly connected opera-
tor panel)

Free download from Internet at:

www.siemens.com/weighing-technology

Configuration package
SIWAREX WP231 on CD-ROM
for TIA Portal V11

7MH4960-2AK01

- "Ready for use" software for op-
erating a scale with
SIWAREX WP231 and a touch
panel (in a variety of languages)
- SIWATOOL V7.0 calibration tool
- Device manuals (PDF files in a
variety of languages)

Ethernet cable patch cord 2 m
(7 ft)

6XV1850-2GH20

For connecting SIWAREX WP231
to a PC (SIWATOOL), SIMATIC
CPU, panel, etc.

Remote display (optional)

The digital remote displays can
be connected directly to the
SIWAREX WP231 via the RS 485
interface.

Suitable remote display:

S102

Siebert Industrielektronik
GmbH

P.O. Box 1180

D-66565 Eppelborn, Germany

Tel.: +49 6806/980-0

Fax: +49 6806/980-999

Internet: <http://www.siebert.de>

Detailed information is available
from manufacturer.

Accessories

SIWAREX JB junction box,
aluminum housing

7MH4710-1BA

For connecting up to 4 load cells
in parallel, and for connecting
several junction boxes,
see page 3/66

SIWAREX JB junction box,
stainless steel housing

7MH4710-1EA

For connecting up to 4 load cells
in parallel, see page 3/68

Ex interface, type SIWAREX IS

With ATEX approval, but **without**
UL and FM approvals, for intrin-
sically-safe connection of load
cells, including device manual

Suitable for the SIWAREX U, CS,
MS, FTA, FTC, M, CF and WP231
weighing modules

Approved for use in the EU

- Short-circuit current
< 199 mA DC

7MH4710-5BA

- Short-circuit current
< 137 mA DC

7MH4710-5CA

Cables (optional)

Cables Li2Y 1 x 2 x 0.75 ST +
2 x (2 x 0.34 ST) – CY,
orange sheath

7MH4702-8AG

To connect SIWAREX U, CS, MS,
FTA, FTC, M, CF, WP231, WP241
and WP321 to the junction box
(JB), extension box (EB) and Ex
interface (Ex I) or between two
JBs, for fixed laying, occasional
bending permitted, approx.
10.8 mm (0.43 inch) outer diame-
ter, for ambient temperature
-40 ... +80 °C (-104 ... +176 °F)

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

7MH4702-8AF

To connect SIWAREX U, CS, MS,
FTA, FTC, M, CF, WP231, WP241
and WP321 to the junction box
(JB), extension box (EB) and Ex
interface (Ex I) or between two
JBs, for fixed laying, occasional
bending permitted, approx.
10.8 mm (0.43 inch) outer diame-
ter, for ambient temperature
-40 ... +80 °C (-104 ... +176 °F)

Ground terminal for connecting
the load cell cable shield to the
grounded DIN rail

6ES5728-8MA11

Overview



SIWAREX WP241

SIWAREX WP241 is a flexible weighing module for belt scales. The compact module is easy to install in the SIMATIC S7-1200 automation system. It can also be operated as a standalone module, i.e. without a SIMATIC CPU.

Benefits

SIWAREX WP241 offers the following key advantages:

- Uniform design technology and consistent communication in SIMATIC S7-1200
- Uniform configuration with TIA Portal
- Operation without SIMATIC CPU possible
- Direct connection of an operator panel via Ethernet
- Four digital inputs and outputs, one analog output
- Measurement of weight with a high resolution of up to ± 4 million parts
- Calibration approval MID in accordance with OIML R50 (available soon)
- Simple adjustment of belt scales using the SIWATOOL V7 program via the Ethernet interface - even without knowledge of SIMATIC
- Replacement of module possible without renewed calibration of the scale
- Use in hazardous area zone 2
- Different calibration methods: With test weights, test chain, automatically or via material batch.
- Specification of belt inclination angle
- 6 totalization memories
- Simulation of speed and belt load for test purposes
- Comprehensive diagnostics functions
- Logging/log book

Application

SIWAREX WP241 is the optimal solution wherever belt scales are used that demand high accuracy, high user-friendliness, and flexible system integration. The typical applications of the SIWAREX WP241 are determining the current material flow rate, belt load and belt speed. Furthermore, 6 totalizers are available for evaluating the amount of material conveyed.

Design

SIWAREX WP241 is a compact technology module in the SIMATIC S7-1200, and it allows direct connection to S7-1200 components via a sliding connector. Thanks to standard rail mounting, the installation and wiring outlay for the 70 mm-wide (2.76 inch) weighing module are very low.

The power supply, load cells, RS 485, digital input/outputs, and analog output are connected via the screw connector of the weighing module. An RJ45 connector is used for the Ethernet connection.

Function

The primary task of the SIWAREX WP241 is to measure the speed of the belt, to measure and convert the sensor voltage to a weight value, and to precisely calculate the amount of material conveyed or material flow rate.

The volume of material conveyed can be recorded in 6 totalization memories: The accumulated totalization memory determines the conveyed material over the entire operating time of the scale (can only be reset by loading the factory settings), the main total is used in applications that need to be officially calibrated (available soon). The four remaining totalization memories are freely available, e.g. for recording the daily or weekly totals.

Four different options are available for rapid commissioning:

- **Automatic calibration**
The calibration is calculated automatically using the load cell parameters entered. Only the zero point has to be calculated on the actual plant.
- **Calibration with calibration weights or test weights**
Test weights are secured to the weighing equipment and the conveyor belt is started. The calibration values are calculated while the belt is running. The zero point must also be calculated.
- **Calibration with test chain**
Instead of test weights, a chain of a known weight can be placed on the measuring points of the belt. The calibration values are calculated as for calibration with test weights.
- **Calibration via material test**
This method can be used if a volume of material is available, but neither test weights nor a chain are available. The material can either be preweighed or weighed afterwards. The material is passed over the belt scale, and the weighing module calculates the calibration characteristic automatically.

If "Automatic set to zero" is active, the electronic weighing system automatically executes a "set to zero" procedure when the belt reaches the "set to zero" area.

Weighing Electronics

SIWAREX - PLC-based weighing electronics

SIWAREX WP241

Extensive diagnostics functions are available. Diagnostic messages are output to the different interfaces. In simulation mode, both the speed and the belt load can be specified by the user, i.e. simulated. This makes it possible to test many functions in advance without operating belt scales. The digital inputs/outputs and the analog output can also be simulated for testing purposes. The "Trace" function is very helpful for optimizing the plant or when troubleshooting. This records the weighing history stored in the internal module memory (including material flow rate, belt load, speed) and exports it to Excel in a graphical format.

Monitoring of the scale signals and states

The SIWAREX WP241 monitors the belt load, the material flow rate, and the belt speed, and it signals if the limits are exceeded. The respective limits can be parameterized as required.

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

Integration in the plant environment

SIWAREX WP241 can be directly integrated into the SIMATIC S7-1200 via the SIMATIC bus. Standalone operation without SIMATIC is also possible.

A wide variety of connection options are provided via the RS 485 and Ethernet interface. Via Modbus TCP/IP or Modbus RTU, control panels can be connected and it is also possible to communicate with various automation systems. A PC for programming the SIWAREX WP241 via SIWATOOL can be connected to the Ethernet interface.

SIWAREX WP241 can be integrated into the system software using all standard PLC programming languages from the TIA Portal. In contrast to serially linked electronic weighing systems, SIWAREX WP241 does not need costly additional modules to link it to SIMATIC.

Used in conjunction with SIWAREX WP241, it is possible to configure freely programmable, modular weighing systems in SIMATIC, which can be adapted to company-specific requirements as needed.

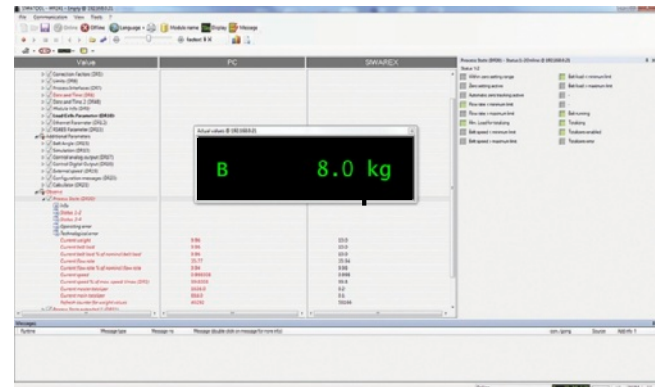
In addition to the configuration package, fully-featured SIWAREX WP241 "Ready for use" software is also available free-of-charge. It shows beginners how to integrate the module in a STEP 7 program and offers a basis for application programming. This allows you to connect the scale either directly to the SIMATIC CPU or to an operator panel connected directly to the SIWAREX WP241.

Software

There is also the option of using a Windows PC for commissioning and servicing. The program SIWATOOL enables the belt scales to be set without prior knowledge of the automation system, as required. During servicing, the technician can use a PC to quickly and simply analyze and test the procedures in the scale.

The following are just some of the tasks that can be carried out using SIWATOOL V7:

- Parameterization and calibration of the scale
- Testing/Simulation of scale properties
- Recording, analysis and export of scale traces ("Trace")
- Creation of backup files for rapidly replacing modules without calibration



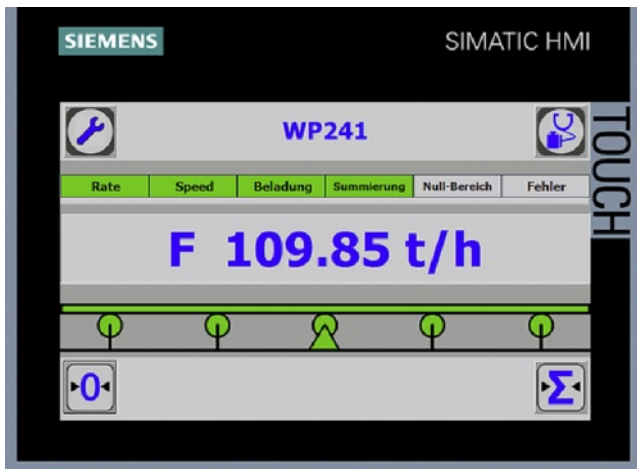
SIWATOOL commissioning software

It is also extremely helpful to analyze the diagnostics buffer which can be saved together with the parameters following reading out from the module.

Trace mode is provided to optimize the weighing sequences in the SIWAREX WP241 weighing module. The recorded weight values and associated states can be displayed as trends using SIWATOOL V7 and MS Excel.

Upgrading firmware

An additional program function can be used to download a new firmware version onto the SIWAREX WP241 on site. This means that firmware upgrades can be carried out on site as required anywhere in the world.



SIWAREX WP241 "Ready for use"

Technical specifications

SIWAREX WP241	
Integration in automation systems	
S7-1200	Directly via SIMATIC bus
<ul style="list-style-type: none"> Operator Panel (not from the SIMATIC Basic series) Automation systems from other manufacturers (possible with limitations) 	Via Ethernet (Modbus TCP/IP) or RS 485 (Modbus RTU)
Communication interfaces	<ul style="list-style-type: none"> SIMATIC S7-1200 backplane bus RS 485 (Modbus RTU) Ethernet (Modbus TCP/IP & SIWATOOL)
Commissioning of the scale	PC configuration software SIWATOOL (Ethernet) or Operator Panel (Modbus / S7-1200)
Calibration approval	MID according to OIML R50 (available soon)
Internal resolution	Up to ± 4 million parts
Number of measurements/second (internal)	100 / 120 Hz
Updating time for material flow rate	100 ms
Filter for conveyor load	Low-pass filter (limit frequency 0.05 ... 50 Hz)
Filter for belt speed	Low-pass filter (limit frequency 0.05 ... 50 Hz)
Weighing functions	
Readout data	<ul style="list-style-type: none"> Weight Belt load Material flow rate Accumulated total Main total Free totals 1 ... 4 Belt speed
Limits (min/max)	<ul style="list-style-type: none"> Belt load Material flow rate Belt speed
Zeroing function	On command or automatic zero tracking

SIWAREX WP241	
Load cells	Strain gauges in 4-wire or 6-wire system
Load cell excitation	
Supply voltage (regulated via feedback)	4.85 V DC
Permissible load resistance	
<ul style="list-style-type: none"> R_{Lmin} R_{Lmax} 	> 40 Ω < 4100 Ω
With SIWAREX IS Ex interface	
<ul style="list-style-type: none"> R_{Lmin} R_{Lmax} 	> 50 Ω < 4100 Ω
Load cell characteristic	1 ... 4 mV/V
Permissible measurement signal range	-21.3 ... +21.3 mV
Max. distance of load cells	500 m (229.66 ft)
Connection to load cells in Ex zone 1	Optionally via SIWAREX IS Ex interface
Ex approvals, Zone 2	<ul style="list-style-type: none"> ATEX Zone 2 UL FM available soon
Auxiliary power supply	
Rated voltage	24 V DC
Max. power consumption	200 mA
Max. power consumption SIMATIC Bus	3 mA
IP degree of protection to DIN EN 60529; IEC 60529	IP20
Climatic requirements $T_{min} (IND) \dots T_{max} (IND)$ (operating temperature)	
Vertical installation	-10 ... +55 °C (14 ... 131 °F)
Horizontal installation	-10 ... +40 °C (14 ... 104 °F)
EMC requirements according to	EN 45501
Dimensions	70 x 75 x 100 mm (2.76 x 2.95 x 3.94 inches)

Weighing Electronics

SIWAREX - PLC-based weighing electronics

SIWAREX WP241

Selection and ordering data

Article No.

Article No.

SIWAREX WP241 Electronic weighing system for scales in SIMATIC S7-1200

7MH4960-4AA01

SIWAREX S7-1200 device manual

Available in a range of
languages

Free download on the Internet at:

<http://www.siemens.com/weighing-technology>

SIWAREX WP241 "Ready for Use"

Complete software package for
belt scales (for S7-1200 and a
directly connected operator
panel)

Free download on the Internet at:

<http://www.siemens.com/weighing-technology>

Configuration package SIWAREX WP241 on CD-ROM for TIA Portal V12

7MH4960-4AK01

- "Ready for Use" software for operating a scale with SIWAREX WP241 and a touch panel (in a variety of languages)
- SIWATOOL V7.0 calibration tool
- Device manuals (PDF files in a variety of languages)

Ethernet cable patch cord 2 m (7 ft)

6XV1850-2GH20

For connecting SIWAREX WP241
to a PC (SIWATOOL), SIMATIC
CPU, panel, etc.

Accessories

SIWAREX JB junction box, aluminum housing

7MH4710-1BA

For connecting up to 4 load cells
in parallel, and for connecting
several junction boxes,
see page 3/66

SIWAREX JB junction box, stainless steel housing

7MH4710-1EA

For connecting up to 4 load cells
in parallel, see page 3/68

Ex interface, type SIWAREX IS

With ATEX approval, but **without
UL and FM approvals**, for intrin-
sically-safe connection of load
cells, including device manual

Suitable for the SIWAREX U, CS,
MS, FTA, FTC, M, CF and WP231
weighing modules

Approved for use in the EU

- Short-circuit current
< 199 mA DC
- Short-circuit current
< 137 mA DC

7MH4710-5BA

7MH4710-5CA

Cables (optional)

Cables Li2Y 1 x 2 x 0.75 ST + 2 x (2 x 0.34 ST) – CY, orange sheath

7MH4702-8AG

To connect SIWAREX U, CS, MS,
FTA, FTC, M, CF and
SIWAREX WP231 to the junction
box (JB), extension box (EB) or
Ex interface (Ex I) or between
two JBs, for fixed laying, occa-
sional bending is possible,
approx. 10.8 mm (0.43 inch)
outer diameter, for ambient tem-
perature -40 ... +80 °C
(-104 ... +176 °F)

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

7MH4702-8AF

To connect the junction box (JB)
or extension box (EB) in a poten-
tially explosive atmosphere to the
Ex interface (Ex I), for fixed lay-
ing, occasional bending permit-
ted, blue PVC insulating sheath,
approx. 10.8 mm (0.43 inch)
outer diameter, for ambient tem-
perature
-40 ... +80 °C (-104 ... +176 °F)

Ground terminal for connect- ing the load cell cable shield to the grounded DIN rail

6ES5728-8MA11

Overview



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

Benefits

SIWAREX CS offers the following key advantages:

- Uniform design technology and consistent communication in SIMATIC
- Uniform configuration with SIMATIC
- Use in distributed plant concept through connection to PROFIBUS DP or PROFINET via ET 200S
- Measurement of weight or force with a high resolution of 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 gauge sensors, such as load cells, force sensors or torque measuring shafts, are used for measuring tasks. The following are typical SIWAREX CS applications:

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

Design

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

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

Function

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

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

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

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

Reading of the process data from the SIWAREX CS via the distributed I/O is possible with all head modules. In the case of PROFIBUS head modules that support the DP V1 protocol and PROFINET head modules the data record communication can additionally be used for reading out the data and performing settings.

Group diagnostics and hardware interrupts are possible with all PROFIBUS head modules with DP V1 and PROFINET modules. Head modules with DP V0 support group diagnostics, but not the hardware interrupts.

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

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

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

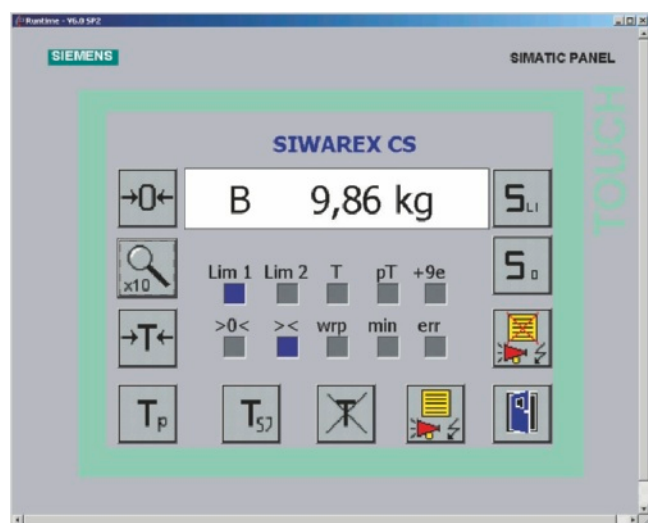
In contrast to serially linked weighing electronics, SIWAREX CS does not need costly additional modules to link it to SIMATIC.

Used in conjunction with SIWAREX CS, it is possible to configure freely programmable, modular weighing systems in SIMATIC.

Weighing Electronics

SIWAREX - PLC-based weighing electronics

SIWAREX CS



Scale faceplate in the SIWAREX CS "Getting started" software

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

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

The diverse diagnostics 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). Zone 1 - It can also be used in zone 1 by implementing an optional Ex interface, whereby SIWAREX CS must be installed in a safe area.

Technical specifications

SIWAREX CS	
Integration in automation systems	
• S7-400, S7-300, C7	Through ET 200S
• IM151-7 CPU	Through backplane bus
• Automation systems from other manufacturers (possible with limitations)	Through ET 200S
Communication interfaces	SIMATIC S7 (ET 200S backplane bus), RS 232, TTY
Connection of remote display (via serial TTY interface)	Display for weight value
Adjustment of scales settings	Using SIMATIC S7/C7 IM151-7 CPU or SIWATOOL CS PC parameter assignment software (RS 232)
Measuring accuracy	
Error limit to DIN 1319-1 of full-scale value at 20 °C ± 10 K	0.05 %
Internal resolution	65 535
Data format of weight values	2 byte (fixed-point)
Number of measurements/second	50
Digital filter	0.05 ... 5 Hz (in 7 steps), mean value filter

SIWAREX CS	
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 impedance	
• R_{Lmin}	> 87 Ω
• R_{Lmax}	< 4 010 Ω
With SIWAREX IS Ex interface:	
• R_{Lmin}	> 87 Ω
• R_{Lmax}	< 4010 Ω
Load cell characteristic	1 mV/V to 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
Intrinsically-safe load cell powering	Optional (SIWAREX IS Ex interface)
External load cell powering	Possible up to 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 supply	
Rated voltage	24 V DC
Max. current consumption	150 mA
IP degree of protection to EN 60529; IEC 60529	IP20
Climatic requirements	
$T_{min} (IND)$ to $T_{max} (IND)$ (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)

Selection and ordering data		Article No.
SIWAREX CS Weighing electronics for scales in SIMATIC ET 200S	7MH4910-0AA01	Remote displays (option) The digital remote displays can be connected directly to the SIWAREX CS through the TTY interface. <u>The following remote display can be used:</u> 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.
SIWAREX CS Manual Available in a range of languages Free download on the Internet at: http://www.siemens.com/weighing-technology		
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/weighing-technology		
Configuration package SIWAREX CS on CD-ROM for TIA portal and STEP 7 <ul style="list-style-type: none"> Software for SIWATOOL CS scale adjustment (in a range of languages) Manuals available on CD (in a range of languages) SIWAREX CS "Getting started" SIWATOOL cable from SIWAREX U/CS with serial PC interface, for 9-pin PC interfaces (RS 232), length 3 m (9.84 ft)	7MH4910-0AK02 7MH4607-8CA	Accessories SIWAREX JB junction box, aluminium housing For connecting up to 4 load cells in parallel, and for connecting several junction boxes, see page 3/66 SIWAREX JB junction box, stainless steel housing For connecting up to 4 load cells in parallel, see page 3/68
Installation material (mandatory)		Ex interface, type SIWAREX IS With ATEX approval, but without UL or FM approval 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. <ul style="list-style-type: none"> With short-circuit current < 199 mA DC With short-circuit current < 137 mA DC
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	7MH4710-5BA
Shield connection terminal Contents: 5 items, sufficient for 5 cables Note: one shield connection terminal is required each for the <ul style="list-style-type: none"> scales connection and TTY interface or RS 232 interface 	6ES7193-4GB00-0AA0	7MH4710-5CA
N busbar, galvanized 3 x 10 mm (0.12 x 0.39 inch), 1.0 m (3.28 ft) long	8WA2842	Cables (optional) Cable Li2Y 1 x 2 x 0.75 ST + 2 x (2 x 0.34 ST) - CY, orange sheath for connecting SIWAREX U, CS, MS, FTA, FTC and CF to the junction box (JB), extension box (EB) or Ex interface (Ex-I) or between two JB's, for fixed laying, occasional bending permitted, 10.8 mm (0.43 inch) outer diameter, for ambient temperature -40 ... +80 °C (-40 ... +176 °F)
Feeder terminal for N busbar	8WA2868	
		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 (-40 ... +176 °F)
		Cable LiYCY 4 x 2 x 0.25 mm² For TTY (connect 2 pairs of conductors in parallel), for connection of a remote display

Weighing Electronics

SIWAREX - PLC-based weighing electronics

SIWAREX U

Overview



SIWAREX U is a versatile weighing module for all simple weighing and force measuring tasks. The compact module can be integrated into SIMATIC automation systems without any problems. Complete data access is possible via the SIMATIC.

Benefits

SIWAREX U offers the following key advantages:

- Uniform design technology and consistent communication in SIMATIC
- Use in distributed plant concept through connection to PROFIBUS 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 typical applications of SIWAREX U are:

- Fill level monitoring of silos and bunkers
- Monitoring of loads on cranes and cables
- Measuring the loading on conveyor belts
- Overload protection of industrial elevators or rolling mills
- Balances in hazardous areas (using an Ex interface)
- Monitoring of belt tension

Design

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

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

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

Function

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

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

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

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

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

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

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

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

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

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

Using the SIWATOOL U software, the SIWAREX weighing modules can be set up with the convenience of Windows independently 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	<ul style="list-style-type: none"> • S7-300 Direct integration • S7-400 (H) Through ET 200M • PCS 7 (H) Through ET 200M • C7 Through IM or ET 200M • Automation systems from other vendors Through ET 200M • Stand-alone (without SIMATIC CPU) Possible with IM 153-1
Communication interfaces	<ul style="list-style-type: none"> • SIMATIC S7 (P bus) • RS 232 • TTY
Connection of remote displays (through TTY serial interface)	Gross, channel 1, 2 or default value 1, 2
Adjustment of scales settings	Through SIMATIC (P bus) or PC using SIWATOOL U (RS 232)
Measuring properties	
Error limit to DIN 1319-1 of full-scale value at 20 °C ± 10 K	0.05 %
Internal resolution ADC	65535
Data format of weight values	2 byte (fixed-point)
Number of measurements/second	50
Digital filter	0.05 ... 5 Hz (in 7 steps), mean value filter
Weighing functions	
Weight values	Gross
Limit values	2 (min./max.)
Zero setting function	Per command
Load cells	Strain gages in 4-wire or 6-wire system
Load cell powering	
Supply voltage U_s (rated value)	6 V DC ¹⁾
Max. supply current	≤ 150 mA per channel
Permissible load impedance	
• R_{Lmin}	> 40 Ω per channel
• R_{Lmax}	< 4010 Ω
With Ex(i) interface:	
• R_{Lmin}	> 87 Ω per channel
• R_{Lmax}	< 4010 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)

SIWAREX U	
Intrinsically-safe load cell powering	Optional (Ex interface) with SIWAREX IS
Auxiliary power supply	
Rated voltage	24 V DC
Max. current consumption	150 mA (single-channel) / 240 mA (two-channel)
Current consumption on back-plane bus	≤ 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⁾ Load cell supply changed to 6 V DC as compared to 7MH4601-1AA01 or ... 1BA01.

²⁾ Up to 1000 m possible under certain conditions, provided the recommended cable is used (see Accessories).

Weighing Electronics

SIWAREX - PLC-based weighing electronics

SIWAREX U

Selection and ordering data

SIWAREX U

for SIMATIC S7 and ET 200M, incl. bus connector, weight 0.3 kg (0.661 lb)

Single-channel version¹⁾ for connecting one scale

Two-channel version²⁾ for connecting two scales

7MH4950-1AA01

7MH4950-2AA01

SIWAREX U Manual

Available in a range of languages
Free download on the Internet at:

<http://www.siemens.com/weighing-technology>

SIWAREX U configuration package for TIA portal and STEP 7

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 and TIA-Portal
- SIWAREX U Manual on CD (in a range of languages), new design
- HSP Hardware Support Package for integrating SIWAREX U in STEP 7

7MH4950-1AK02

SIWAREX U configuration package for PCS7 S7, version 7.0 and V7.1

suitable for 7MH4950-1AA01 and 7MH4950-2AA01

on CD-ROM

- Function block for the CFC
- Faceplate
- SIWATOOL U commissioning software
- Manual

7MH4950-3AK61

SIWAREX U configuration package for PCS7, version 8.0

Suitable for 7MH4950-xAA01

- Function block for the CFC
- Faceplate
- SIWATOOL U commissioning software
- Manual

7MH4950-3AK62

SIWAREX U APL configuration package for PCS7, version 8.0, Update 1

Suitable for 7MH4950-xAA01

- Function block for the CFC
- APL-style faceplate
- SIWATOOL U commissioning software
- Manual

7MH4950-3AK65

SIWATOOL connecting cable

from SIWAREX U/CS with serial PC interface, for 9-pin PC interfaces (RS 232), length 3 m (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)

6ES7390-5CA00-0AA0

Note:

one shield connection terminal each is required for:

- Scale connection
- RS 485 interface
- RS 232 interface

S7 DIN rail

- 160 mm (6.30 inch)
- 480 mm (18.90 inch)
- 530 mm (20.87 inch)
- 830 mm (32.68 inch)
- 2 000 mm (78.74 inch)

6ES7390-1AB60-0AA0

6ES7390-1AE80-0AA0

6ES7390-1AF30-0AA0

6ES7390-1AJ30-0AA0

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

PS 307-1E; 5 A

PS 307-1K; 10 A

6ES7307-1BA00-0AA0

6ES7307-1EA00-0AA0

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, see page 3/66

7MH4710-1BA

SIWAREX JB junction box, stainless steel housing

for connecting up to 4 load cells in parallel, see page 3/68

7MH4710-1EA

Article 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.	
<ul style="list-style-type: none"> • With short-circuit current < 199 mA DC 	7MH4710-5BA
<ul style="list-style-type: none"> • With short-circuit current < 137 mA DC 	7MH4710-5CA
Cables (optional) Cable Li2Y 1 x 2 x 0.75 ST + 2 x (2 x 0.34 ST) - CY, orange sheath for connecting SIWAREX U, CS, MS, FTA, FTC and CF to the junction box (JB), extension box (EB) or Ex interface (Ex-I) or between two JB's, for fixed laying, occasional bending permitted, 10.8 mm (0.43 inch) outer diameter, for ambient temperature -40 ... +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 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 (-40 ... +176 °F)	7MH4702-8AF
Cable LiYCY 4 x 2 x 0.25 mm² 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.

Weighing Electronics

SIWAREX - PLC-based weighing electronics

SIWAREX FTA

Overview



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

It has the corresponding scale approvals and is also suitable for legal-for-trade weighing systems.

The SIWAREX FTA 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 FTA is characterized by the following features:

- Uniform design, and totally integrated communication in SIMATIC S7 and SIMATIC PCS 7
- Standardized configuration with SIMATIC
- Direct use in the SIMATIC automation system
- Use in the distributed plant concept through the connection to PROFIBUS DP/PROFINET via ET 200M
- Measurement of weight or force with high resolution of 16 million intervals
- High accuracy 3 x 6 000d, legal-for-trade high accuracy
- Use with analog strain-gage load cells of types SIWAREX R and SIWAREX WL200
- Alternative option of connecting individual load cells from the manufacturers METTLER TOLEDO, Wipotec and PESA
- Legal-for-trade display with SIMATIC standard operator panels
- Stepless or stepped dosing 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 the weighing process
- 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 legal-for-trade dosing systems, such as filling plants, loading stations, bagging stations, rotopackers, mixers or test stations.

Typical fields of application include:

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

Design

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

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

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

Function

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

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

Weighing functions

The SIWAREX FTA is easy to parameterize according to 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.

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

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

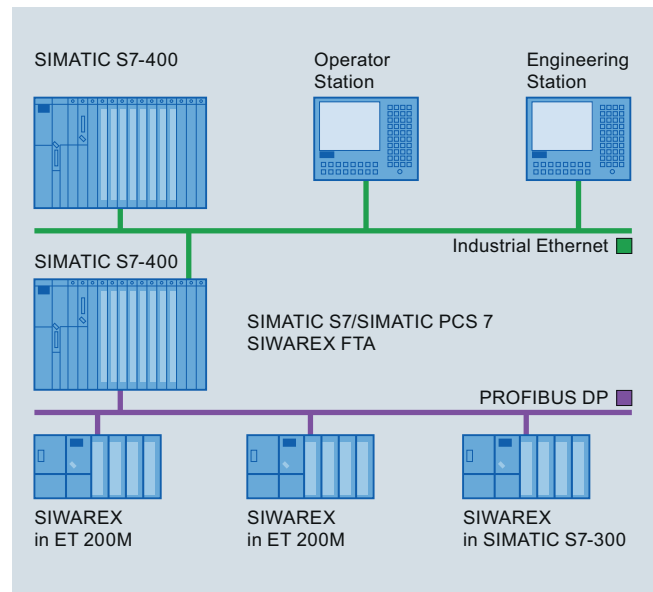
Integration in SIMATIC

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

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

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

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



SIMATIC S7/PCS 7 configuration with SIWAREX FTA

Software

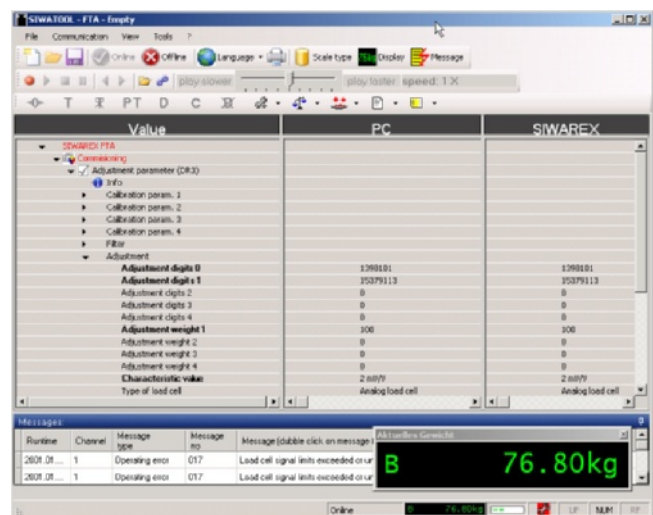
SIWATOOL FTA commissioning software

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



Settings in SIWAREX FTA software

Weighing Electronics

SIWAREX - PLC-based weighing electronics

SIWAREX FTA

Fast advanced parameterization of the module can be carried out using the "Fast parameterization" function. Answering just a few questions approximately presets the parameters.

It is also extremely helpful to analyze the diagnostics buffer which can be saved together with the parameters following reading out from the module.

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

Upgrading of firmware

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

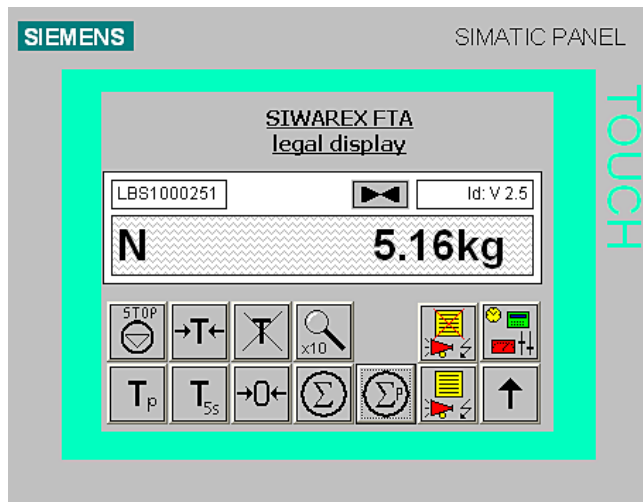
Reading out of weighing reports

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

SIWAREX FTA – simple configuration

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

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



Scale faceplate in the SIWAREX FTA "Getting started" software

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 through ET 200M
S7-400 (H)	Through ET 200M
PCS 7 (H)	Through ET 200M
Communication interfaces	
S7	Through backplane bus
RS 232	For SIWATOOL or printer connection
RS 485	For remote display or digital load cell
Module parameterization	Using SIMATIC S7 Using SIWATOOL 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
Internal/external updating rate	400/100 Hz
Several parameterizable digital filters	Critically damped, Bessel, Butterworth (0.05 ... 20 Hz), mean-value filter
Weighing functions	
Non-automatic weighing machine	OIML R76
Automatic weighing machine	OIML R51, R61, R107
Load cells	Strain gages in 4-wire or 6-wire system
3 characteristic value ranges	1, 2 or 4 mV/V
Load cell powering	
Supply voltage U_S (rated value)	10.3 V DC
Max. supply current	184 mA
Permissible load cell resistance	
• R_{Lmin}	> 56 Ω
• R_{Lmax}	> 87 Ω with Ex interface
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 supply	
Rated voltage	24 V DC
Max. power consumption	500 mA
Current consumption from backplane bus	Typ. 55 mA

SIWAREX FTA	
Inputs/outputs	
Digital inputs	7 DI electrically isolated
Digital outputs	8 DO electrically isolated
Counter input	Up to 10 kHz
Analog output	
• Current range	0/4 ... 20 mA
• Updating rate	100 Hz
Approvals	
EU type approval (CE, OIML R76)	
EU prototype test to MID (OIML R51, R61, R107)	
Degree of protection according to EN 60529; IEC 60529	
IP20	
Climatic requirements	
$T_{\min}(\text{IND}) \dots T_{\max}(\text{IND})$ (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.

Weighing Electronics

SIWAREX - PLC-based weighing electronics

SIWAREX FTA

Selection and ordering data

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.
Note: Observe approval conditions for applications with obligation of verification. We recommend using our calibration set and contacting our SIWAREX hotline.

Article No. **7MH4900-2AA01**

SIWAREX FTA Manual

Available in a range of languages
Free download from the Internet at:

<http://www.siemens.com/weighing-technology>

SIWAREX FTA "Getting started"

Sample software shows beginners how to program the scales in STEP 7.

Free download from the Internet at:

<http://www.siemens.com/weighing-technology>

SIWAREX FTA configuration package for TIA portal and STEP 7, 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

Article No. **7MH4900-2AK02**

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

Article No. **7MH4900-2AK62**

SIWAREX FTA configuration package for SIMATIC PCS 7, Version 8.0 on CD-ROM

- HSP hardware support package for integrating SIWAREX FTA/FTC in STEP 7
- Function block for the CFC
- Faceplate
- SIWATOOL FTA commissioning software
- Manual

Article No. **7MH4900-2AK63**

SIWAREX FTA APL configuration package for SIMATIC PCS 7, Version 8.0, Update 1 on CD-ROM

- HSP hardware support package for integrating SIWAREX FTA/FTC in STEP 7
- Function block for the CFC
- APL-style faceplate
- SIWATOOL FTA commissioning software
- Manual

Article No. **7MH4900-2AK65**

Calibration set for SIWAREX FTA

For verification of up to 5 scales comprising:

- 3 x inscription foil for labeling
- 1 x protection foil
- 10 x EU verification marks (black M on green background)
- Guidelines for verification, verification certificates and approvals, adaptable label, SIWAREX FTA Manual on CD-ROM

Article No. **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

Article No. **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

Article No. **7MH4900-2AM01**

SIWATOOL cable

from SIWAREX FTA with serial PC interface, for 9-pin PC interfaces (RS 232)

- 2 m long (6.56 ft)
- 5 m long (6.56 ft)

Article No. **7MH4702-8CA**
Article No. **7MH4702-8CB**

Front connector, 40-pin

Required for each SIWAREX module

- With screw contacts
- With spring-loaded terminals

Article No. **6ES7392-1AM00-0AA0**
Article No. **6ES7392-1BM01-0AA0**

Shield contact element

Sufficient for one SIWAREX FTA module

Article No. **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

Article No. **6ES7390-5CA00-0AA0**

Weighing Electronics

SIWAREX - PLC-based weighing electronics

SIWAREX FTA

	Article No.	<i>Cables (optional)</i>	Article No.
S7 DIN rail <ul style="list-style-type: none"> • 160 mm (6.30 inch) • 480 mm (18.90 inch) • 530 mm (20.87 inch) • 830 mm (32.68 inch) • 2 000 mm (78.74 inch) 	6ES7390-1AB60-0AA0 6ES7390-1AE80-0AA0 6ES7390-1AF30-0AA0 6ES7390-1AJ30-0AA0 6ES7390-1BC00-0AA0	Cable Li2Y 1 x 2 x 0.75 ST + 2 x (2 x 0.34 ST) - CY, orange sheath for connecting SIWAREX U, CS, MS, FTA, FTC and CF to the junction box (JB), extension box (EB) or Ex interface (Ex-I) or between two JB's, for fixed laying, occasional bending permitted, 10.8 mm (0.43 inch) outer diameter, for ambient temperature -40 ... +80 °C (-40 ... +176 °C)	7MH4702-8AG
PS 307 load power supply (only required if 24 V DC is not available) 120/230 V AC; 24 V DC <ul style="list-style-type: none"> • PS 307-1B; 2 A • PS 307-1E; 5 A • PS 307-1K; 10 A 	6ES7307-1BA00-0AA0 6ES7307-1EA00-0AA0 6ES7307-1KA00-0AA0	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 (-40 ... +176 °C)	7MH4702-8AF
MMC memory For data recording up to 16 Mbyte, only for legal-for-trade applications R76, R51 and R107	7MH4900-2AY20	Cable LiYCY 4 x 2 x 0.25 mm² For TTY (connect 2 pairs of conductors in parallel), for connection of a remote display	7MH4407-8BD0
Remote displays (option) The Siebert S102 and S302 remote digital displays 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, see page 3/66	7MH4710-1BA		
SIWAREX JB junction box, stainless steel housing for connecting up to 4 load cells in parallel, see page 3/68	7MH4710-1EA		
Ex interface, type SIWAREX IS With ATEX approval, but without UL or FM approval 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. <ul style="list-style-type: none"> • With short-circuit current < 199 mA DC • With short-circuit current < 137 mA DC 	7MH4710-5BA 7MH4710-5CA		

Weighing Electronics

SIWAREX - PLC-based weighing electronics

SIWAREX FTC

Overview



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

Benefits

SIWAREX FTC is characterized by 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 $3 \times 6\,000\,d$
- Use with analog strain-gage load cells of types SIWAREX R and SIWAREX WL200
- Alternative option of connecting 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
- Volume measurement
- Material loading, summation
- Flowrate/flow control
- Belt load measurement
- Belt scale/weighfeeder
- Loss-in-weight scale
- Force measurement

Design

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

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

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

Function

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

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

Weighing functions

The following operating modes can be set:

Weight measurement and force measurement

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

For this purpose, the configuration package can be selected.

Conveyor scale / weighfeeder

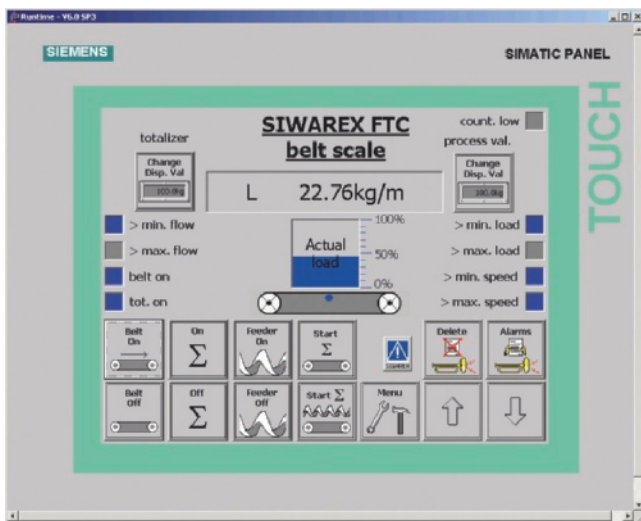
The functions of a conveyor scale are implemented in this operating mode. Calculations are performed for the typical process values; belt load, flowrate and belt speed. Commands can be used to control the belt and display the required values. A weighfeeder can be implemented by activating the SIMATIC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

Weighing Electronics

SIWAREX - PLC-based weighing electronics

SIWAREX FTC

2



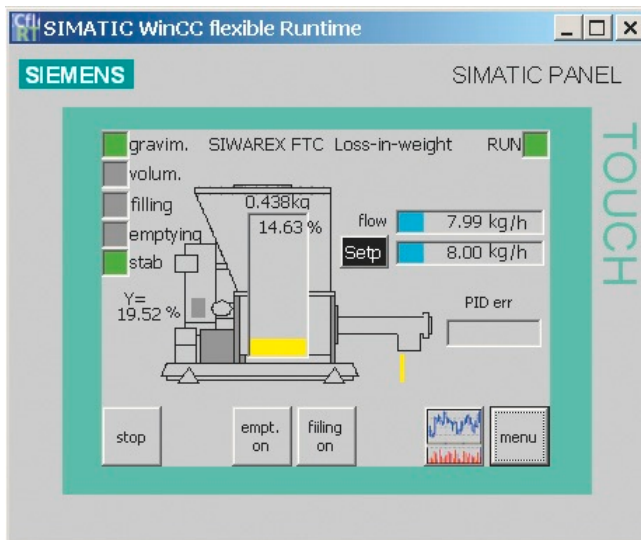
Scale faceplate of a conveyor scale

Differential proportioning weigher - Loss-in-weight

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

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

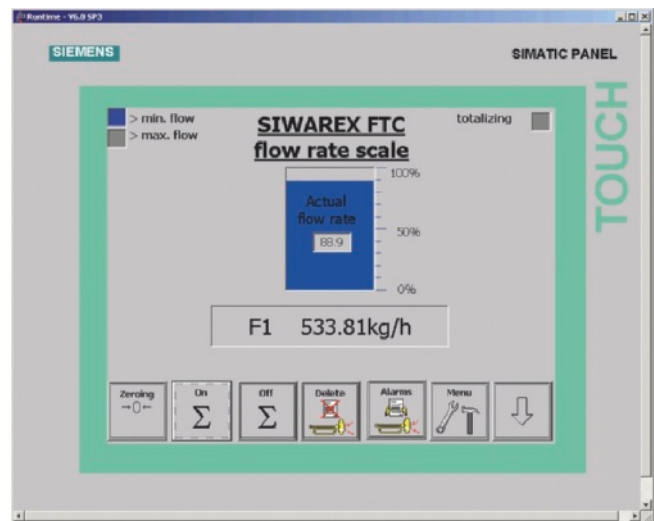
The high measurement resolution, real-time signal processing, detection and filtering of signals in the weighing electronics enable extremely high proportioning accuracy.



Scale faceplate of a differential proportioning weigher

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.

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

A module can be replaced without recalibrating the scales. When using "active bus modules", replacement is also possible during operation.



Applications of SIWAREX FTC

Integration in SIMATIC

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

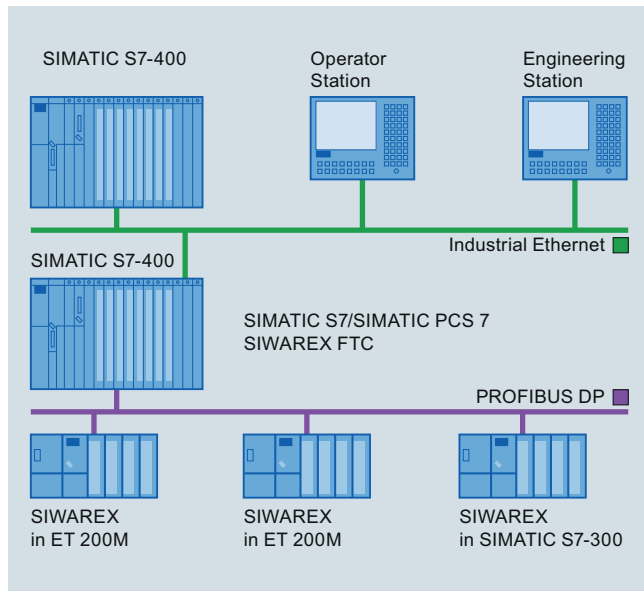
The right combination of SIMATIC components can produce optimum solutions for small, medium-size and large plants. The scales are operated and monitored using SIMATIC standard operator panels. Needless to say, these operator panels can also be simultaneously used for the operator control and monitoring of the plant.

Weighing Electronics

SIWAREX - PLC-based weighing electronics

SIWAREX FTC

Customized or sector-specific solutions can be developed extremely quickly using the configuration package and example applications for SIMATIC.



SIMATIC S7/PCS 7 configuration with SIWAREX FTC (medium-sized plants)

Software

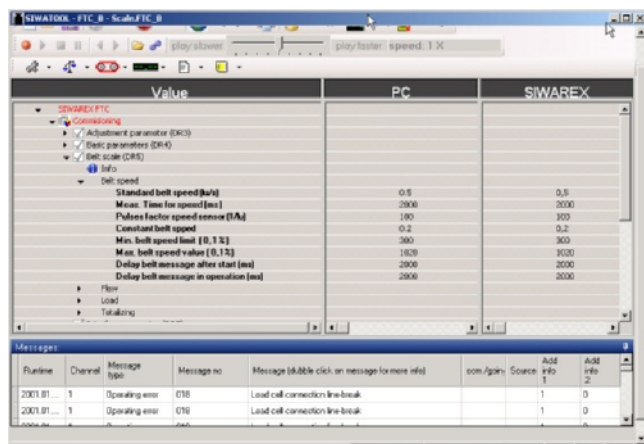
Adjustment of the scale using SIWATOOL FTC

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



Settings in SIWAREX FTC 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 checking 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.

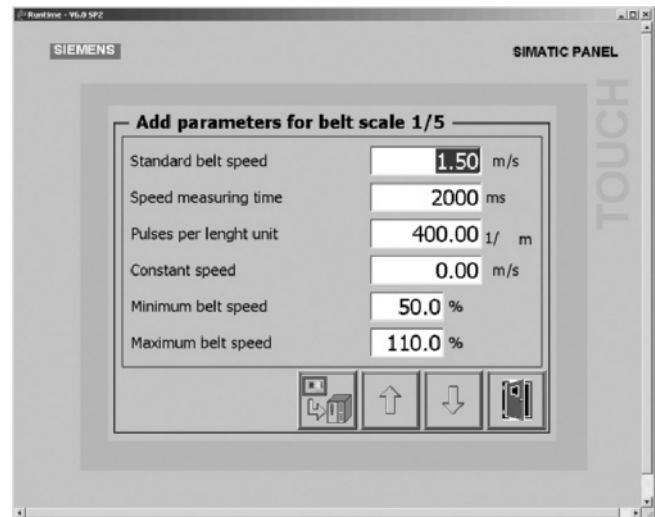
Reading out of weighing reports

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

SIWAREX FTC – simple configuring

Integration in SIMATIC can result in freely-programmable, modular weighing systems for conveyor scales, bulk flow meters and differential proportioning weighers, 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 conveyor 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 conveyor scale can then be easily implemented in SIMATIC together with a touch panel (TP/OP/MP) as the operator panel.



Scale faceplate in the SIWAREX FTC "Getting started" software

Technical specifications

SIWAREX FTC	
Use in automation systems	
S7-300	Directly or via ET 200M
S7-400 (H)	Through ET 200M
PCS 7 (H)	Through ET 200M
Communication interfaces	
S7	Through backplane bus
RS 232	For SIWATOOL or printer connection
RS 485	For remote display or digital load cell
Module parameterization	
	Using SIMATIC S7
	Using SIWATOOL FTC software (RS 232)
Measuring properties	
Accuracy to EN 45501	$3 \times 6\,000 \text{ d} \geq 0.5 \text{ } \mu\text{V/e}$
Internal resolution	± 8 million parts
Internal/external updating rate	400/100 Hz
Several parameterizable digital filters	
	Critically damped, Bessel, Butterworth (0.05 ... 20 Hz), mean-value filter
Weighing functions	
	<ul style="list-style-type: none"> • Non-automatic weighing machine, force measurement • Conveyor scale • Differential proportioning weigher • Bulk flow meter
Load cells	
	Strain gages in 4-wire or 6-wire system
3 characteristic value ranges	1, 2 or 4 mV/V
Load cell powering	
Supply voltage U_S (rated value)	10.3 V DC
Max. supply current	184 mA
Permissible load cell resistance	
• R_{Lmin}	$> 56 \text{ } \Omega$ $> 87 \text{ } \Omega$ with Ex interface
• R_{Lmax}	$\leq 4\,010 \text{ } \Omega$
Max. distance of load cells	
When using the recommended cable:	
Standard	1 000 m (3280 ft)
In hazardous area ¹⁾	
• For gases of group IIC	300 m (984 ft)
• For gases of group IIB	1 000 m (3280 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 supply	
Rated voltage	24 V DC
Max. power consumption	500 mA
Current consumption from backplane bus	Typ. 55 mA

SIWAREX FTC	
Inputs/outputs	
Digital inputs	7, electrically isolated
Digital outputs	8, electrically isolated
Counter input	Up to 10 kHz
Analog output	
• Current range	0/4 ... 20 mA
• Updating rate	100 Hz
Degree of protection according to EN 60529; IEC 60529	
	IP20
Climatic requirements	
$T_{min} \text{ (IND)} \dots T_{max} \text{ (IND)}$ (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.

Weighing Electronics

SIWAREX - PLC-based weighing electronics

SIWAREX FTC

Selection and ordering data

SIWAREX FTC

Weighing electronics for S7-300 and ET 200M.

Applications: Conveyor scales, force measurement, differential proportioning weighers and bulk flow meters

SIWAREX FTC_B Manual for conveyor scales

Available in a range of languages

Free-of-charge download from the Internet at:

<http://www.siemens.com/weighing-technology>

SIWAREX FTC_L Manual for bulk flow meters and differential proportioning weighers

Available in a range of languages

Free-of-charge download from the Internet at:

<http://www.siemens.com/weighing-technology>

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 from the Internet at:

<http://www.siemens.com/weighing-technology>

SIWAREX FTC "Getting started" for solids flowmeters

Sample software shows beginners how to program the scales in STEP 7 for bulk flow meter mode

Free download from the Internet at:

<http://www.siemens.com/weighing-technology>

SIWAREX FTC "Getting started" for differential proportioning weighers

Sample software shows beginners how to program the scales in STEP 7 for differential proportioning weigher mode

Free download from the Internet at:

<http://www.siemens.com/weighing-technology>

SIWAREX FTC_B configuration package, for TIA portal and STEP 7, on CD-ROM (conveyor scale)

- HSP Hardware Support Package for integrating SIWAREX FTA/FTC in STEP 7
- "Getting started" for conveyor scales
- Commissioning software SIWATOOL FTC_B for conveyor scales
- Manual

Article No.

7MH4900-3AA01

Article No.

SIWAREX FTC_L configuration package for TIA portal and STEP 7, on CD-ROM (bulk flow meter, loss-in-weight feeder)

- HSP hardware support package for integrating SIWAREX FTA/FTC in STEP 7
- "Getting started" for solids flow meters
- "Getting started" for loss-in-weight feeders
- Commissioning software SIWATOOL_L for bulk flow meters and loss-in-weight feeders
- Manual

7MH4900-3AK04

SIWAREX FTC_B configuration package for PCS 7 Version 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
- Commissioning software SIWATOOL FTC_B for conveyor scales
- Manual

7MH4900-3AK63

SIWAREX FTC_B configuration package for PCS 7 Version V8.0 on CD-ROM (conveyor scale)

- HSP hardware support package for FTA/FTC package
- Function block for the CFC
- Faceplate
- SIWATOOL commissioning software
- Manual

7MH4900-3AK65

SIWAREX FTC_L configuration package for PCS 7 V7.0 and V7.1 on CD-ROM (loss-in-weight scale)

- HSP hardware support package for integrating SIWAREX FTA/FTC in STEP 7
- Function block for the 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)
- 5 m long (16.40 ft)

7MH4702-8CA

7MH4702-8CB

Article No.		Article No.	
40-pin front plug with screw contacts		SIWAREX JB junction box, aluminium housing	7MH4710-1BA
Required for each SIWAREX module		For connecting up to 4 load cells in parallel, and for connecting several junction boxes, see page 3/66	
• With screw contacts	6ES7392-1AM00-0AA0	SIWAREX JB junction box, stainless steel housing	7MH4710-1EA
• With spring-loaded terminals	6ES7392-1BM01-0AA0	For connecting up to 4 load cells in parallel, see page 3/68	
Shield contact element	6ES7390-5AA00-0AA0	Ex interface, type SIWAREX IS	
Sufficient for one SIWAREX FTC module		With ATEX approval, but without UL or FM approval 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.	
Shield connection terminal	6ES7390-5CA00-0AA0	• With short-circuit current < 199 mA DC	7MH4710-5BA
Contents: 2 units (suitable for cable with diameter 4 ... 13 mm)		• With short-circuit current < 137 mA DC	7MH4710-5CA
Note: one shield connection terminal each is required for:		Cables (optional)	
• Scale connection		Cable Li2Y 1 x 2 x 0.75 ST + 2 x (2 x 0.34 ST) - CY, orange sheath	7MH4702-8AG
• RS 485 interface		for connecting SIWAREX U, CS, MS, FTA, FTC and CF to the junction box (JB), extension box (EB) or Ex interface (Ex-I) or between two JB's, for fixed laying, occasional bending permitted, 10.8 mm (0.43 inch) outer diameter, for ambient temperature -40 ... +80 °C (-40 ... +176 °F)	
• RS 232 interface		Cable Li2Y 1 x 2 x 0.75 ST + 2 x (2 x 0.34 ST) - CY, blue sheath	7MH4702-8AF
S7 DIN rail		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 (-40 ... +176 °F)	
• 160 mm (6.30 inch)	6ES7390-1AB60-0AA0	Cable LiYCY 4 x 2 x 0.25 mm²	7MH4407-8BD0
• 480 mm (18.90 inch)	6ES7390-1AE80-0AA0	For TTY (connect 2 pairs of conductors in parallel), for connection of a remote display	
• 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		
Remote display (option)			
The Siebert S102 and S302 remote digital display can be directly connected to the SIWAREX FTC via an RS 485 interface. (not suitable for mode "Conveyor scale")			
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.			

Weighing Electronics

Force measurements

SIWAREX CF

Overview



Automation with integral force measuring technology

In addition to accuracy when measuring force, incorporating force measuring technology in modern automation systems is also a significant feature.

Similar to the weighing modules, the force measuring modules form the basis of the identical concept for measuring technology and incorporating automation. The description concerning this is found in chapter "Weighing electronics".

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-gauge sensors, such as load cells, force sensors or torque measuring shafts, are used for measuring tasks. The following are typical SIWAREX CF applications:

- Monitoring of crane and cable loads
- Measurement of load of conveyor belts
- Overload protection in rolling mills
- Monitoring of belt tension
- Force measurement in testing machines
- Torque and pressure measuring

Design

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

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

Function

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

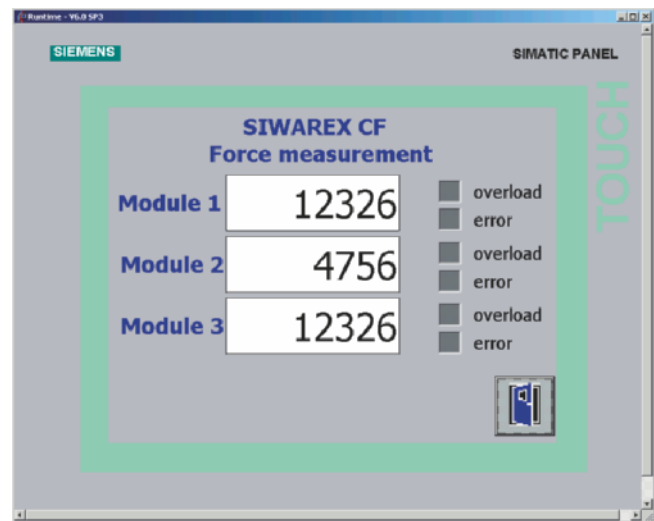
The signal is amplified, coarse-filtered, and then converted to a digital value. A connectable digital filter can additionally reduce noise on the measuring signal.

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

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

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

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



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

In contrast to analog or digitally connected transmitters, SIWAREX M 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	Through ET 200S
Automation systems from other vendors	Possible through ET 200S with IM 151-1
Communication interfaces	SIMATIC S7 (ET 200S backplane bus), 8 bytes I/O area
Module parameterization	Not required (module is pre-parameterized)
Measuring properties	
Error limit to DIN 1319-1 of full-scale value at 20 °C ± 10 K	≤ 0.15 %
Signal resolution	14 bits plus 1 bit sign
Number of measurements/second	50
Low-pass filter	Without or 2 Hz
Sensors	In accordance with the principle of expansion measurement (full bridge), 4-wire connection
Sensor feed	
Supply voltage, short-circuit-proof	6 V DC ± 5 %
Permissible sensor resistance	
• R_{Lmin}	> 250 Ω
• R_{Lmax}	< 4010 Ω
Permissible sensor cell coefficient	Up to 4 mV/V
Permissible range of the measuring signal	-25.2 ... +25.2 mV

SIWAREX CF	
Auxiliary power supply	
Rated voltage	24 V DC
Max. current consumption	150 mA
Current consumption on backplane bus	Typ. 10 mA
Connection to sensors in Ex zone 1	Optionally via SIWAREX IS Ex interface
Ex approval zone 2 and safety	ATEX 95, cUL _{US} Haz. Loc.
IP degree of protection to EN 60529; IEC 60529	IP20
Climatic requirements $T_{min (IND)}$ to $T_{max (IND)}$ (operating temperature)	
• Vertical installation	0 ... +60 °C
• Horizontal installation	0 ... +40 °C
EMC requirements according to	NAMUR NE21, Part 1 89/386/EEC
Dimensions	30 x 80 x 50 mm (1.18 x 3.15 x 1.97 inch)

Weighing Electronics

Force measurements

SIWAREX CF

Selection and ordering data

SIWAREX CF

Weighing module for strain-gauge sensors in SIMATIC ET 200S

(SIWAREX CF configuring package not required)

Article No.

7MH4920-0AA01

SIWAREX CF manual

- German
- English

Free download on the Internet at:

<http://www.siemens.com/weighing-technology>

SIWAREX CF "Getting started"

Sample software for easy acquaintance with programming in STEP 7.

Free download on the Internet at:

<http://www.siemens.com/weighing-technology>

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 mm x 10 mm
(0.12 in. x 0.39 in.),
1.5 m (4.92 ft.) long

8WA2842

Feeder terminal for N busbar

8WA2868

Article No.

Accessories

SIWAREX EB extension box

for extending sensor cables

7MH4710-2AA

Ex interface, type SIWAREX IS

With ATEX approval, but **without UL or 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

Cables (optional)

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

For connecting 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 in.) outer diameter, for ambient temperature -40 to +80 °C (-40 ... +176 °F)

7MH4702-8AG

Overview



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

Benefits

- Uniform design and totally integrated communication in SIMATIC S7 and SIMATIC PCS 7
- Uniform configuration with SIMATIC
- Direct use in the SIMATIC automation system
- Use in distributed plant concept through connection to PROFIBUS DP/PROFINET using ET 200M
- Bidirectional force measurement with ± 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

You can find more detailed description and additional technical specifications on SIWAREX FTC on page 2/60.

Weighing Electronics

Accessories for PLC-based weighing electronics

SIWAREX IS Ex interface

Overview



As well as the weighing modules and load cells, further parts are also required to configure a scale. We offer a range of terminal boxes for connecting cables and special interface modules for scales used in Ex zones.

The recommended cables and connecting cables are listed together with the weighing modules.

The SIWAREX IS Ex interface can be used for the SIWAREX U, CS, MS, FTA, FTC, M and CF weighing modules. It contains 6 safety barriers and has the designation to ATEX and EN 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.

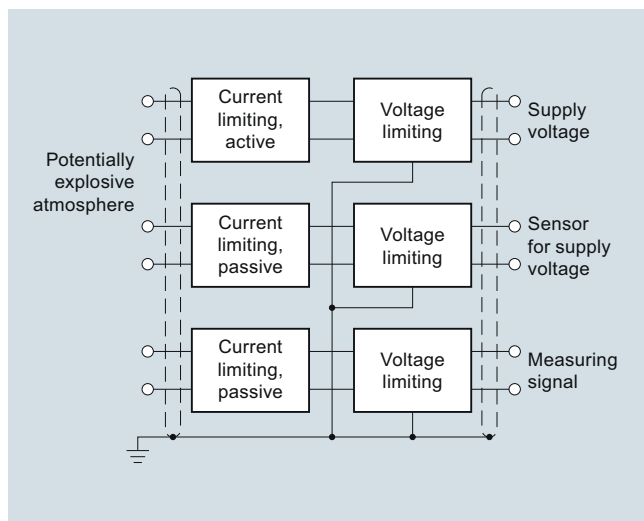
The SIWAREX IS only interferes with the load cell signal to a very small extent and is therefore approved for scales requiring verification.

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

Function

Principle of operation

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



Function chart

Technical specifications

Ex interface, type SIWAREX IS	Standard	Low-current version
<i>Non-intrinsically-safe circuits</i>		
Load cell powering		
Rated voltage U_{n1}	10 V DC	
Permissible error voltage	250 V AC	
Internal resistance of the load cells	$\geq 87 \Omega$	$\geq 180 \Omega$
Total	$< 4\,010 \Omega$	
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	
<i>Power current intrinsically safe</i>		
Load cell powering		
No-load voltage U_{01}	$\leq 13.1 \text{ V DC}$	
Voltage against equipotential bonding cond.	$\leq 6.6 \text{ V DC}$	
Short-circuit current I_{K1}	$\leq 120 \text{ mA}$	$\leq 58 \text{ mA}$
Sensor line		
No-load voltage U_{02}	$\leq 14.4 \text{ V DC}$	
Voltage against equipotential bonding cond.	$\leq 7.2 \text{ V DC}$	
Short-circuit current I_{K2}	$\leq 25 \text{ mA}$	
Measuring signal line		
No-load voltage U_{03}	$\leq 12.8 \text{ V DC}$	
Voltage against equipotential bonding cond.	$\leq 6.4 \text{ V DC}$	
Short-circuit current I_{K3}	$\leq 54 \text{ mA}$	
Total connection values (when circuits are connected together)		
No-load voltage U_0	$\leq 14.4 \text{ V DC}$	
Short-circuit current I_K	$\leq 199 \text{ mA}$	$\leq 137 \text{ mA}$
Power P_O	$\leq 1.835 \text{ W}$	$\leq 1.025 \text{ W}$
<u>For gas group II C</u>		
Max. permissible external capacitance C_{a3}	500 nF	450 nF
Max. permissible external inductance L_a	0.15 mH	0.5 mH
<u>For gas group II B</u>		
Max. permissible external capacitance C_{a3}	2 000 nF	
Max. permissible external inductance L_a	1 mH	2 mH
General data		
Housing dimensions	See dimensional drawings	
Weight, approx.	500 g	
UL/CSA certification	Available soon	
Permissible ambient temperature		
• During operation	-10 ... +60 °C (14 ... 140 °F) (for vertical mounting)	

Ex interface, type SIWAREX IS	Standard	Low-current version
<ul style="list-style-type: none"> During operation for legal-for-trade medium accuracy weighing machines During transportation and storage 	-10 ... +40 °C (14 ... 104 °F) (for vertical mounting)	
Permissible relative humidity	≤ 95 %	
Degree of protection	IP20	
Type of explosion protection	Intrinsic safety "i"	
	[EEx ib] II C to ATEX	

Selection and ordering data

Article 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 or FM approval.**

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.

Cables (optional)

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

For connecting 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 (-40 ... +176 °F)

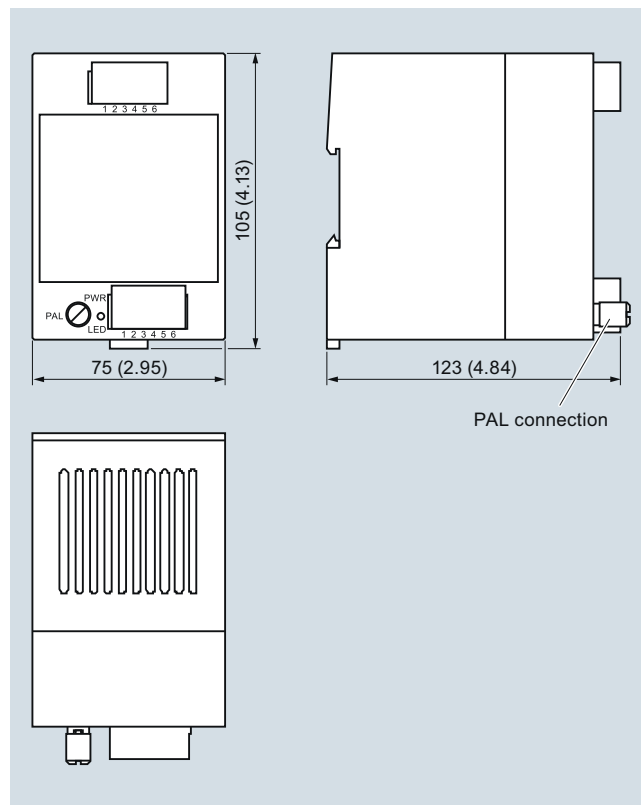
7MH4702-8AG

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 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 (-40 ... +176 °F)

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Dimensional drawings



SIWAREX IS Ex interface, dimensions in mm (inch)

Weighing Electronics

Notes

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