

Weighing Electronics



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Weighing Electronics

Introduction

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

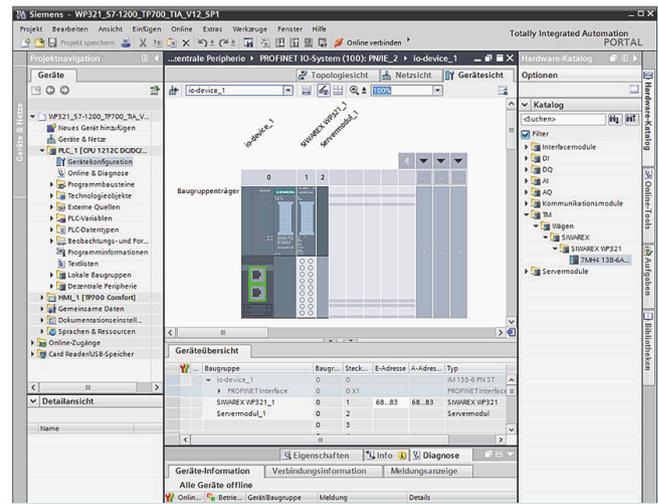
Distribution of weighing functions within automation system

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



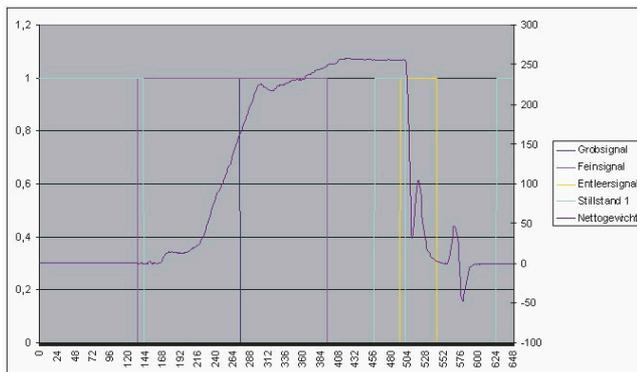
Hardware configuration TIA portal with weighing electronics SIWAREX WP321

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.

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

- Function modules and technology 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 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

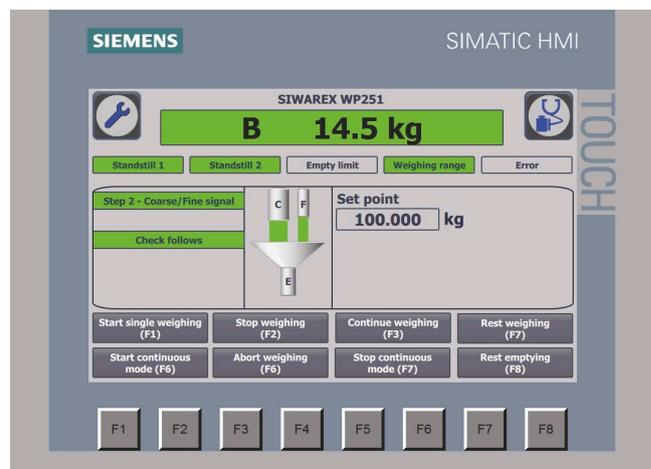
Totally Integrated Automation plays an essential role in SIWAREX weighing systems.

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 with ET 200
- Integration in the SIMATIC PCS 7 process control system
- Operator control and monitoring through SIMATIC HMI
- Uniform configuring and programming through SIMATIC software.

Proportioning control



Visualization of proportioning using SIMATIC HMI

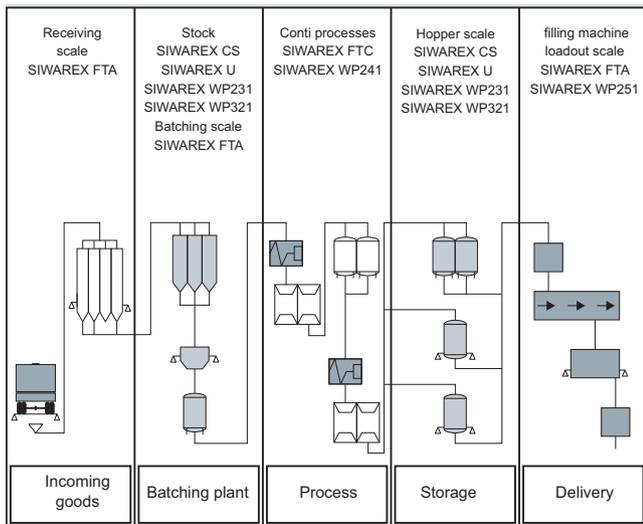
SIWAREX - weighing electronics - uniform SIMATIC system basis

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 (main-stream 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.

Weighing Electronics

Introduction

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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.

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!

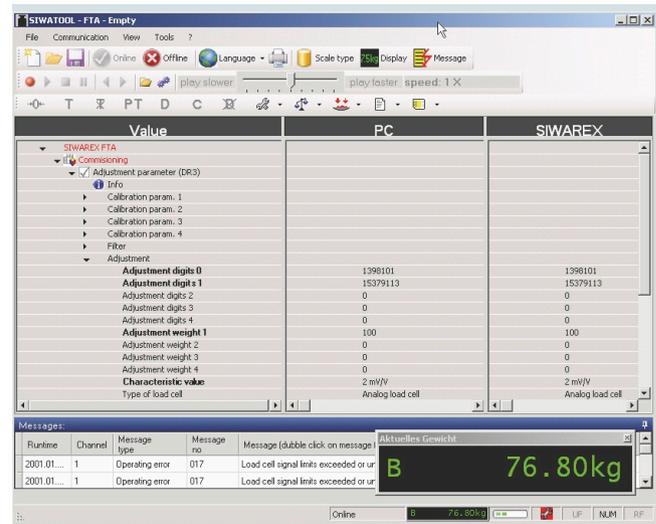
The ET 200 I/O station is designed as a modular system. The weighing electronics are selected from the module catalog and placed in the rack of the modular I/O station. The software addresses the weighing electronics as if they were modules plugged into the central controller of an automation system.

With the use of standard hardware (SIMATIC components) and standard software (STEP 7/TIA-Portal), 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.

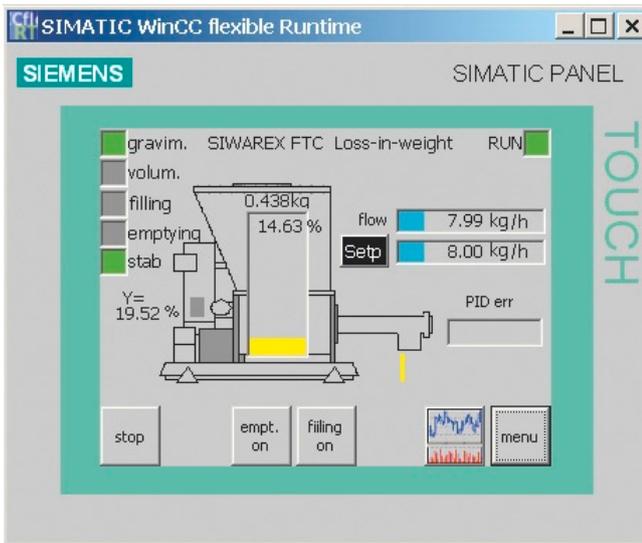
In the SIMATIC S7, for example, faults (measuring range exceeded, proportioning fault, sensor fault, etc.) are reported to the automation system via diagnostic interrupts without the need to input a single line of programming code.

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.

A replaced module is automatically detected by the automation system. Thanks to the transparent data management, the scale parameters saved in the automation system can then be transferred to the new weighing electronics. The scales are immediately available again for weighing tasks – no need to readjust with control weights (except for applications that require legal-for-trade certification).

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



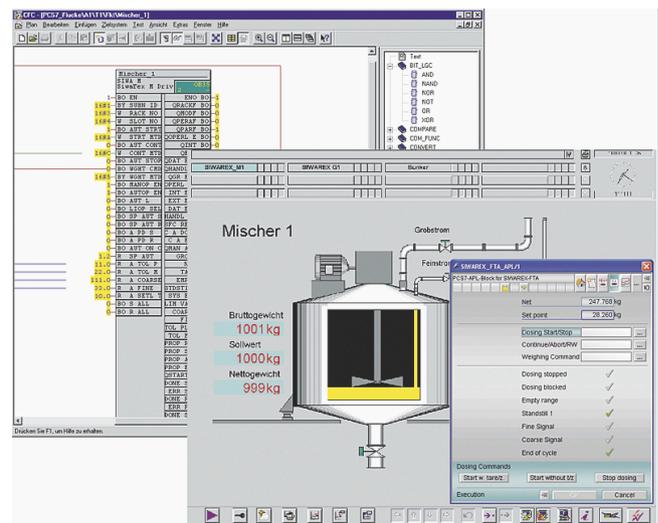
Scale faceplate of a differential proportioning weigher

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)

Weighing Electronics

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SIWAREX application table

Application	Examples	Selection	For PLC	See page
Static weight measurements	Platform scales, container weighers, vehicle scales, silos	SIWAREX WP321	ET 200SP	2/17
		SIWAREX WP231 (OIML-R76)	S7-1200	2/12; 2/66
		SIWAREX WP521 ST	S7-1500 and ET 200MP	2/8
		SIWAREX WP522 ST	S7-1500 and ET 200MP	2/8
		SIWAREX CS	S7-1200	2/22
		SIWAREX U	S7 300 and ET 200M	2/25
		SIWAREX FTA (OIML R-76)	S7-300 and ET 200M	2/35
Force measurements	Rolling mills, monitoring of loads and belt tensions, overload protection, torque measurements	AI 2xSG 4-/6-wire HS	ET 200SP	2/60
		SIWAREX WP231	S7-1200	2/12; 2/66
		SIWAREX WP521 ST	S7-1500 and ET 200MP	2/8
		SIWAREX WP522 ST	S7-1500 and ET 200MP	2/8
		SIWAREX FTC	S7-300 and ET 200M	2/46; 2/53
Dosing, batching	Batching plants, batch processes, proportioning recipes, single-scale and multi-scale systems	SIWAREX WP251 (OIML R-51)	S7-1200	2/30; 2/75
		SIWAREX FTA (OIML R-51)	S7-300 and ET 200M	2/35
Dosing (continuous)	Batching plants, in continuous operation	SIWAREX FTC (operating mode loss-in-weight)	S7-300 and ET 200M	2/46; 2/53
Filling, bagging	Filling machines, bagging machines, big bag	SIWAREX WP251 (OIML R-51/R-61)	S7-1200	2/30; 2/75
		SIWAREX FTA (OIML R-51/R-61)	S7-300 and ET 200M	2/35
Loading	Loading scales for receiving and load operations	SIWAREX FTA (OIML R-107)	S7-300 and ET 200M	2/35
		SIWAREX WP251 (OIML R-107)*	S7-1200	2/30; 2/75
Check weighing (static)	Automatic check weighing in static mode, e.g. completeness check	SIWAREX FTA (OIML R-51)	S7-300 and ET 200M	2/35
Flow measurement	Solids flow meters	SIWAREX FTC (operating mode solids flow meters)	S7 300 and ET 200M	2/46; 2/53
Belt scales	Measurement of rate, load, speed, independent resettable totalizers	SIWAREX WP241	S7-1200	2/42; 2/81
		SIWAREX FTC (operating mode belt scales)	S7 300 and ET 200M	2/46; 2/53

*= in preparation

Overview

Platform and hopper scales

Weighing silos, vessels or platforms is a standard task in the industry. The corresponding SIWAREX electronics offers comprehensive properties and functions that fulfil all requirements.

Platform scales

In the various branches of industry the use of platform weighing machines is bound to very different requirements, in particular with regard to the load classes.

While platform weighing machines are also used for small loads, road vehicle and track scales are especially suited for heavy loads.

Hopper scales

In almost every industry, liquids, powders, bulk goods or gases are produced and stored in funnels or vessels. To ensure their availability, the exact fill levels of these vessels must be known.

Weighing Electronics

SIWAREX weighing electronics for SIMATIC
Platform/hopper scale

SIWAREX WP521 ST / WP522 ST

Overview



SIWAREX WP521 ST (left) and SIWAREX WP522 ST weighing modules

SIWAREX WP521 ST / WP522 ST (ST = Standard) are versatile weighing modules for the SIMATIC S7-1500 Advanced Controller family. With these electronic weighing systems, simple weighing applications, such as platform or hopper scales, can be seamlessly integrated into the S7-1500 automation environment.

Benefits

SIWAREX WP521 ST / WP522 ST offer the following key advantages:

- Uniform design technology and consistent communication in SIMATIC S7-1500
- Uniform configuration with TIA Portal
- Single (WP521 ST) and dual-channel (WP522 ST) variants are available
- Operation possible with or without failed SIMATIC CPU
- Optional direct connection of an operator panel via Ethernet port (Modbus TCP/IP)
- Optional direct connection of a remote display via RS485 interface
- Modbus TCP/IP interface
- Modbus RTU interface
- Three digital inputs and four digital outputs
- Measurement of weight or force with a high resolution of up to ± 4 million parts and a measuring rate of 100/120 Hz
- Simple commissioning by means of HMI/CPU or PC software SIWATOOL V7 via the Ethernet interface
- Recovery-point for the simple restoration of all parameters
- Automatic calibration without the need for calibration weights
- Module can be replaced without renewed adjustment of scale
- Automatic impedance monitoring of the connected load cells
- Direct use in hazardous area zone 2
- Up to eight 350-ohm load cells can be connected per channel
- High EMC resistance

Application

SIWAREX WP521 ST and WP522 ST are the optimum solution for the integration of non-automatic scales, such as platform or hopper scales, into the SIMATIC S7-1500 automation environment. The two modules have the basic weighing functions: zeroing, taring and tare specification. Three limit values can also be freely defined and, if required, also output via the digital outputs. All further available status information can also be flexibly linked to the outputs. The digital inputs can be used for the direct wiring of pushbuttons, for example. Every weighing function (e.g. zeroing) can be freely and flexibly assigned to each input.

Design

SIWAREX WP521 ST and WP522 ST are technology modules of the SIMATIC S7-1500 Advanced Controller family and therefore communicate directly with the SIMATIC S7-1500 controller via the system bus. Additional expensive communication cards are therefore not required when using SIWAREX weighing technology.

The compact, 35 mm wide weighing modules can be mounted directly on the SIMATIC standard mounting rail. Assembly is therefore extremely easy and consistent with the remaining automation.

The modules are delivered ex works with a shielding set, comprising a shield clamp, shielding bracket and 24 V DC supply element with screw-type terminals. This set is assembled with an appropriate front connector (must be ordered separately, see accessories and ordering data) and therefore guarantees optimum hardware design and EMC immunity.

The power supply, load cells, RS485 interface and the digital inputs/outputs are also connected via the removable front connector. An RJ45 port is available on the bottom of the module for the Ethernet connection (SIWATOOL and Modbus TCP/IP).

Function

WP521 ST and WP522 ST provide simple weighing applications such as platform or hopper scales (ST = Standard). The basic functions zeroing, taring and tara specification can easily be issued by the CPU/HMI via the ready-made function block or alternatively via a 24 V signal at one of the three digital inputs.

The ready-made function block provides full access to all parameters. Commissioning, maintenance and operation of the scales can be performed fully from the CPU or HMI – without additional programming work. The free “ready-for-use” software (can be downloaded in the Siemens Online Support) also contains fully fledged HMI configuration, which can be transferred to your own project as you wish and and freely edited. Customer- and plat-specific weighing applications can therefore be realized in an instant. In addition, languages can be added easily and quickly with the help of the corresponding functions von TIA Portal.

As an alternative to the CPU/HMI, the module can also be put into operation and maintained conveniently and without a knowledge of SIMATIC via the PC software SIWATOOL V7. This simplifies work considerably for the service staff as no interventions in the controller are required.

The automatic impedance monitoring of the module also increases plant safety and availability. The total impedance of the connected cells is determined as the reference value during commissioning. You can also freely define from which percentage deviation from the reference value a corresponding status bit is to be set. In the event of an error (e.g. severing of a load cell cable), this bit can generate corresponding alarms in the controller and initiate measures. The impedance is continuously monitored every 100 ms.

Up to eight 350 Ohm load cells switched in parallel can be connected per scale (per channel).

The modules can be integrated into the plant network via the Ethernet interface of the modules, so that during servicing, remote access is easily possible worldwide by means of SIWATOOL. Please refer to the information at <http://www.siemens.com/industrialsecurity>

A firmware update of the modules can be performed via the TIA Portal (MMC card or by file selection) or SIWATOOL V7.



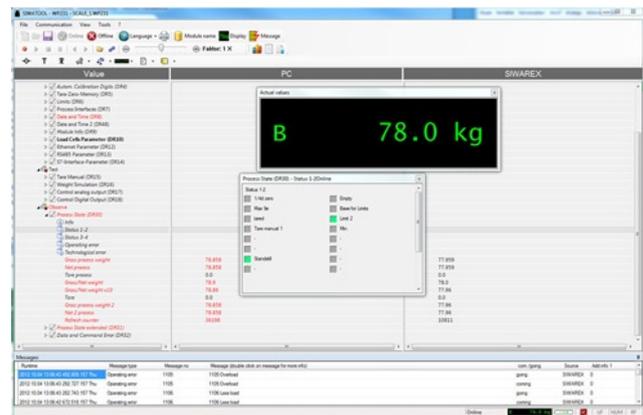
Software SIWATOOL V7

The software SIWATOOL V7 for Windows operating systems is optionally available for commissioning and servicing. The software is available to purchase and forms part of the configuration package (see accessories).

The program enables the scales to be parameterized and commissioned without the need for prior knowledge of the automation system. During servicing, the technician can use a PC to analyze and test the procedures in the scale. Reading the power fail-safe diagnostics buffer is also a useful feature for troubleshooting. A trace can also be started and read. This trace records all the weight values and status information in 10 ms intervals. The data can be read out using SIWATOOL V7 and exported to spreadsheet programs, thus enabling highly granular investigation and optimization.

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

- Parameter assignment and calibration of the scale
- Testing of scale properties
- Recording and analysis of weighing sequence (trace)
- Firmware update
- Creation/loading of external backup files



SIWATOOL V7, layout of the program window

Weighing Electronics

SIWAREX weighing electronics for SIMATIC
Platform/hopper scale

SIWAREX WP521 ST / WP522 ST

Technical specifications

SIWAREX WP521 ST, WP522 ST	
Weighing modes	<ul style="list-style-type: none"> Non-automatic scales, e.g. platform and hopper scales
Ports	<ul style="list-style-type: none"> 1 x SIMATIC S7-1500 system bus 1 x Ethernet (SIWATOOL, Modbus TCP/IP) 1 x RS485 (Modbus RTU or remote display) per channel 3 x digital outputs (24 V DC) per channel 4 x digital outputs (24 V DC short-circuit proof) per channel
Functions	<ul style="list-style-type: none"> 3 limits Zeroing Tare Tare specification Zero adjustment Trace function for signal analysis Internal restore point SIMATIC S7-1500 integrated and/or stand-alone operation
Parameter assignment	<ul style="list-style-type: none"> By means of function block in SIMATIC S7-1500 and HMI Using SIWATOOL V7 Using Modbus TCP/IP Using Modbus RTU
Remote display (see accessories)	
Connection	via RS 485
Display	Additional display for weight value
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 or 120 (selectable)
Filter	<ul style="list-style-type: none"> Low-pass filter 0.05 ... 50 Hz Average value filter
Weighing functions	
Weight values	<ul style="list-style-type: none"> Gross Net Tare
Limit values	<ul style="list-style-type: none"> 2 x Min/Max 1 x empty
Zeroing	Per command
Tare	Per command
Tare specification	Per command

SIWAREX WP521 ST, WP522 ST	
Compatible sensors	Analog load cells / full-bridge strain gauges (1-4 mV/V) in 4-wire or 6-wire system
Load cell powering	
Supply voltage (regulated via feedback)	4.85 V DC
Permissible load resistance	<ul style="list-style-type: none"> R_{Lmin} > 40 Ω R_{Lmax} < 4 100 Ω
With SIWAREX IS Ex interface	<ul style="list-style-type: none"> R_{Lmin} > 50 Ω R_{Lmax} < 4 100 Ω
Load cell characteristic	1 ... 4 mV/V
Permissible range of the measurement signal (with 4 mV/V sensors)	-21.3 ... +21.3 mV
Max. distance of load cells	800 m (2 624 ft)
Connection to load cells in Ex zone 1	Optionally via SIWAREX IS Ex interface
Certificates	<ul style="list-style-type: none"> ATEX Zone 2 UL KCC EAC RCM FM IECEX
Auxiliary power supply	
Rated voltage	24 V DC
Max. power consumption WP521 ST / WP522 ST	120 mA / 200 mA
Max. power consumption SIMATIC Bus	35 mA @ 15 V
IP degree of protection according to DIN EN 60529; IEC 60529	IP20
Climatic requirements	
$T_{min(IND)} \dots T_{max(IND)}$ (operating temperature)	
• Horizontal installation	-10 ... +60 °C (14 ... 140 °F)
• Vertical installation	-10 ... +40 °C (14 ... 104 °F)
EMC requirements	according to IEC 61000-6-2:2004; IEC 61000-6-4:2007+A1:2011
Dimensions (W x H x D)	35 x 147 x 129 mm (1.38 x 5.79 x 5.08 in)

Selection and ordering data	Article No.		Article No.
Weighing module TM SIWAREX WP521 ST Single-channel, for platform or hopper scale with analog load cells (1–4 mV/V), 1 x LC, 4 x DQ, 3 x DI, 1 x RS 485, Ethernet port, including shielding set.	7MH4980-1AA01	Accessories SIWAREX JB junction box, aluminum housing For connecting up to 4 load cells in parallel, and for connecting multiple junction boxes.	7MH4710-1BA
Weighing module TM SIWAREX WP522 ST Two-channel, for two separate platform or hopper scales with analog load cells (1–4 mV/V), per channel 1 x LC, 4 x DQ, 3 x DI, 1 x RS 485, Ethernet port, including shielding set.	7MH4980-2AA01	SIWAREX JB junction box, stainless steel housing For connecting up to 4 load cells in parallel.	7MH4710-1EA
SIMATIC S7-1500, front connector with screw-type terminals 40-pole, for 35 mm wide modules, including 4 jumper links and cable ties	6ES7592-1AM00-0XB0	SIWAREX JB junction box, stainless steel housing (ATEX) For parallel connection of up to 4 load cells (for zone allocation, see manual or type-examination certificate).	7MH4710-1EA01
SIMATIC S7-1500, front connector with push-in technology 40-pole, for 35 mm wide modules, including 4 jumper links and cable ties	6ES7592-1BM00-0XB0	Ex interface SIWAREX IS For intrinsically-safe connection of load cells. With ATEX approval (not UL/FM). Suitable for SIWAREX electronic weighing system. Compatibility of load cells must be checked. <ul style="list-style-type: none"> • Short-circuit current < 199 mA DC • Short-circuit current < 137 mA DC 	7MH4710-5BA 7MH4710-5CA
SIWATOOL V4 & V7 Service and commissioning software for SIWAREX weighing modules	7MH4900-1AK01	Load cell cable (optional) Cable Li2Y 1 x 2 x 0.75 ST + 2 x (2 x 0.34 ST) – CY For connecting SIWAREX electronic weighing systems to junction box (JB), extension box (EB) and Ex interface or between two JBs.	
Ethernet cable patch cord 2 m (7 ft) For connecting SIWAREX WP52x ST to a PC (SIWATOOL V7 or Modbus TCP/IP)	6XV1850-2GH20	For permanent installation. Occasional bending is possible.	
Remote display (optional) The digital remote displays can be connected directly to the SIWAREX WP231 via the RS 485 interface. Suitable remote display: S102 <i>Siebert Industrieelektronik GmbH</i> <i>Postfach 1180</i> <i>D-66565 Eppelborn, Germany</i> <i>Tel.: +49 6806/980-0</i> <i>Fax: +49 6806/980-999</i> Internet: http://www.siebert-group.com/en Detailed information is available from the manufacturer.		External diameter: approx. 10.8 mm (0.43 in) Permissible ambient temperature -40 ... +80 °C (-40 ... +176 °F). Sold by the meter. <ul style="list-style-type: none"> • Sheath color: orange • For potentially explosive atmospheres. Sheath color: blue. 	7MH4702-8AG 7MH4702-8AF
		Commissioning Commissioning charge for one static scale with SIWAREX module (Travel and setup charge must be ordered separately) Scope: <ul style="list-style-type: none"> • Recording of data • Checking of mechanical installation of the scale • Checking of electrical wiring and function • Static adjustment of the scale Requirements: <ul style="list-style-type: none"> • Mechanical design functional • Modules electrically wired and tested • Adjustment weights available • Free access to scale 	9LA1110-8SN50-0AA0
		Flat charge for travel and setup in Germany	9LA1110-8RA10-0AA0

Weighing Electronics

SIWAREX weighing electronics for SIMATIC
Platform/hopper scale

SIWAREX WP231

Overview



SIWAREX WP231 is a versatile, legal for trade 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
- Legal-for-trade according to OIML R-76
- 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
- Automatic calibration without the need for calibration weights
- Supports replacement of module without recalibration of scales
- Use in hazardous area zone 2
- Connection of digital force compensation load cells from WIPOTEC and Mettler-Toledo (type WM and PBK)

Application

SIWAREX WP231 is the optimum solution wherever load cells are used for measuring tasks. The following are typical SIWAREX WP231 applications:

- Non-automatic weighing instruments, also legal for trade
- 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, hopper scales and crane scales

Design

SIWAREX WP231 is a compact technology module in the SIMATIC S7-1200 and communicates directly via the system bus with S7-1200 components. 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. An 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.

Integration in the plant environment

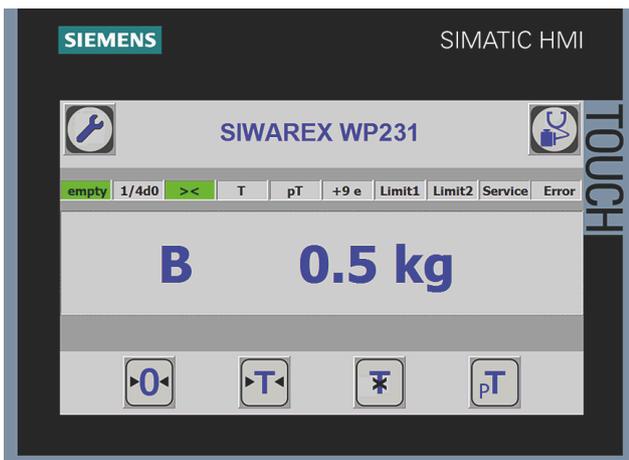
SIWAREX WP231 is directly integrated into the SIMATIC S7-1200 via the SIMATIC bus. All scale parameters can be read and edited by the CPU. Therefore a complete commissioning of the scales by the CPU or by a connected HMI device is possible. A wide variety of connection options are provided via the RS 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 TIA Portal program and offers a basis for application programming. This allows you to connect the scale application either directly to the SIMATIC CPU or to an operator panel connected directly to the SIWAREX WP231.

A "Ready for use" example program is available in the TIA Portal for legal for trade applications. This is designed so that it can be used directly with the legal trade SecureDisplay software. Required is a Windows CE-based operating panel (for example, SIMATIC Comfort Touch series).

SIMATIC Basic and Key Panels cannot be used for legal for trade applications.

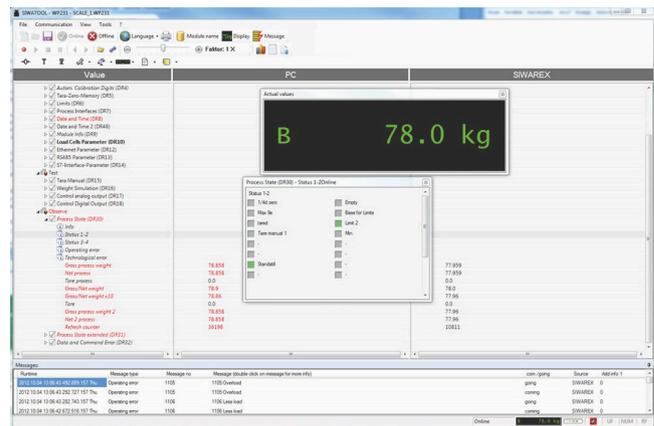
Software

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

The program enables the user to perform scale calibration 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:

- Parameter assignment and calibration 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 from the module in a backup file.

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.

Weighing Electronics

SIWAREX weighing electronics for SIMATIC
Platform/hopper scale

SIWAREX WP231

Technical specifications

SIWAREX WP231	
Integration in automation systems	
S7-1200	SIMATIC S7-1200 system bus
Operator panel and/or automation systems from other vendors	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, Siebert remote display) • Ethernet (SIWATOOL V7, Modbus TCP/IP) • Analog output 0/4 - 20 mA • 4 x digital outputs, 24 V DC floating, short-circuit proof • 4 x digital inputs, 24 V DC floating
Commissioning options	<ul style="list-style-type: none"> • Using SIWATOOL V7 • Using function block in SIMATIC S7-1200 CPU / Touch Panel • Using Modbus TCP/IP • Using Modbus RTU
Measuring accuracy	
EU type approval as non-automatic weighing instrument, trade class III	$3000 d \geq 0.5 \mu\text{V/e}$
Error limit according to DIN 1319-1 of full-scale value at $20^\circ\text{C} \pm 10\text{K}$ ($68^\circ\text{F} \pm 10\text{K}$)	0.05%
Internal resolution	Up to ± 4 million parts
Measuring frequency	100 / 120 Hz
Digital filter	Variable adjustable low-pass and average filter
Typical applications	<ul style="list-style-type: none"> • Non-automatic weighing instruments • Force measurements • Fill-level monitoring • Belt tension monitors
Weighing functions	
Weight values	<ul style="list-style-type: none"> • Gross • Net • Tare
Limit values	<ul style="list-style-type: none"> • 2 x min/max • Empty
Zeroing	Per command
Tare	Per command
Tare specification	Per command

SIWAREX WP231	
Load cells	Full-bridge strain gauges in 4-wire or 6-wire system
Load cell powering	
Supply voltage (regulated via feedback)	4.85 V DC
Permissible load resistance	
• R_{Lmin}	$> 40 \Omega$
• R_{Lmax}	$< 4\ 100 \Omega$
With SIWAREX IS Ex interface	
• R_{Lmin}	$> 50 \Omega$
• R_{Lmax}	$< 4\ 100 \Omega$
Load cell characteristic	1 ... 4 mV/V
Permissible range of the measurement signal (with 4 mV/V sensors)	-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 (compatibility of the load cells must be checked)
Approvals/certificates	<ul style="list-style-type: none"> • ATEX Zone 2 • UL • EAC • KCC • RCM • OIML R76 • Design approval 2009/23/EC (NAWI)
Calibration approval	EU type approval OIML R76
Auxiliary power supply	
Rated voltage	24 V DC
Max. power consumption	200 mA
Max. power consumption SIMATIC Bus	3 mA
IP degree of protection according to DIN EN 60529; IEC 60529	IP20
Climatic requirements	
$T_{min(IND)} \dots T_{max(IND)}$ (operating temperature)	
• Vertical installation	-10 ... +40 °C (14 ... 104 °F)
• Horizontal installation	-10 ... +55 °C (14 ... 131 °F)
EMC requirements	according to EN 45501
Dimensions	70 x 75 x 100 mm (2.76 x 2.95 x 3.94 in)

Selection and ordering data	Article No.		Article No.
SIWAREX WP231 weighing module Single-channel, legal-for-trade, for NAWI non-automatic weighing instruments (e.g. platform or hopper scales) with analog load cells (1–4 mV/V), 1 x LC, 4 x DQ, 4 x DI, 1 x AQ, 1 x RS 485, Ethernet port.	7MH4960-2AA01		
SIWAREX S7-1200 manual Available in a range of languages Free download on the Internet at: http://www.siemens.com/weighing/documentation		Remote display (optional) The digital remote displays can be connected directly to the SIWAREX WP231 via the RS 485 interface. Suitable remote display: S102 <i>Siebert Industrieelektronik GmbH</i> <i>Postfach 1180</i> <i>D-66565 Eppelborn, Germany</i> <i>Tel.: +49 6806/980-0</i> <i>Fax: +49 6806/980-999</i> Internet: http://www.siebert-group.com/en Detailed information is available from the manufacturer.	
SIWAREX WP231 "Ready for Use" Complete software package for non-automatic weighing instrument (for S7-1200 and a directly connected operator panel). Free download on the Internet at: http://www.siemens.com/weighing/documentation			
SIWAREX WP231 "Ready for Use - legal-for-trade" Software package for legal for trade non-automatic weighing instruments for S7-1200. Free download on the Internet at: http://www.siemens.com/weighing/documentation		Accessories SIWAREX JB junction box, aluminum housing For connecting up to 4 load cells in parallel, and for connecting multiple junction boxes.	7MH4710-1BA
Software SecureDisplay Software for a legal trade display on Windows CE-based Panel. SIMATIC Basic and Key Panels are excluded. Free download on the Internet at: http://www.siemens.com/weighing/documentation		SIWAREX JB junction box, stainless steel housing For connecting up to 4 load cells in parallel.	7MH4710-1EA
SIWATOOL V4 & V7 Service and commissioning software for SIWAREX weighing modules	7MH4900-1AK01	SIWAREX JB junction box, stainless steel housing (ATEX) For parallel connection of up to 4 load cells (for zone allocation, see manual or type-examination certificate).	7MH4710-1EA01
Calibration set for SIWAREX WP2xx Valid for SIWAREX WP231 K and SIWAREX WP251. For verification of up to 3 scales, comprising: <ul style="list-style-type: none"> • 3 x inscription foil for labeling • 1 x protective film • 3 x calibration protection plate • Guidelines for verification, certificates and approvals, adaptable label, SIWAREX WP 	7MH4960-0AY10	Ex interface SIWAREX IS For intrinsically-safe connection of load cells. With ATEX approval (not UL/FM). Suitable for SIWAREX electronic weighing system. Compatibility of load cells must be checked. <ul style="list-style-type: none"> • Short-circuit current < 199 mA DC • Short-circuit current < 137 mA DC 	7MH4710-5BA 7MH4710-5CA
Ethernet cable patch cord 2 m (7 ft) For connecting SIWAREX WP231 to a PC (SIWATOOL), SIMATIC CPU, panel, etc.	6XV1850-2GH20	Cable (optional) Cable Li2Y 1 x 2 x 0.75 ST + 2 x (2 x 0.34 ST) – CY For connecting SIWAREX electronic weighing systems to junction box (JB), extension box (EB) and Ex interface or between two JB's. For permanent installation. Occasional bending is possible. External diameter: approx. 10.8 mm (0.43 in) Permissible ambient temperature -40 ... +80 °C (-40 ... +176 °F). Sold by the meter. <ul style="list-style-type: none"> • Sheath color: orange • For potentially explosive atmospheres. Sheath color: blue. 	7MH4702-8AG 7MH4702-8AF
		Ground terminal for connecting the load cell cable shield to the grounded DIN rail	6ES5728-8MA11

Weighing Electronics

SIWAREX weighing electronics for SIMATIC

Platform/hopper scale

SIWAREX WP231**Selection and ordering data**

Article No.

*Commissioning***Commissioning charge for one static scale with SIWAREX module****9LA1110-8SN50-0AA0**

(Travel and setup charge must be ordered separately)

Scope:

- Recording of data
- Checking of mechanical installation of the scale
- Checking of electrical wiring and function
- Static adjustment of the scale

Requirements:

- Mechanical design functional
- Modules electrically wired and tested
- Adjustment weights available
- Free access to scale

Flat charge for travel and setup in Germany**9LA1110-8RA10-0AA0**

2

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, diagnostic system and configuration tools in the TIA Portal, SIMATIC STEP 7, WinCC flexible and PCS7.

Benefits

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

- Uniform design technology and consistent communication in SIMATIC ET 200SP
- Compact design with only 15 mm module width
- Parameterization of the scales via the control panel, CPU or PC
- Flexible configuration options in SIMATIC TIA Portal, SIMATIC STEP 7 and PCS7
- Measuring of weights and forces with a resolution of up to +/- 2 million parts
- 100 Hz / 120 Hz / 600 Hz measurement rate
- Internal scale monitoring of freely definable limit values
- Easy commissioning using the "SIWATOOL" software
- Automatic calibration 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 analog load cells are used for measuring tasks.

The SIWAREX WP321 is suitable for the following applications:

- Non-automatic weighing instrument (NAWI), e.g. platform and hopper 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 weighing electronics for SIMATIC
Platform/hopper scale

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.

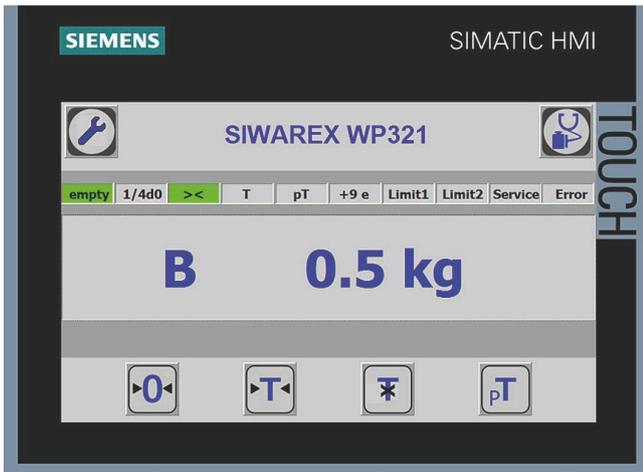
The SIWAREX WP321 is calibrated in the factory. This not only permits automatic calibration of the scales (without the need for calibration weights), but also the replacement of modules without the need for recalibration.

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.

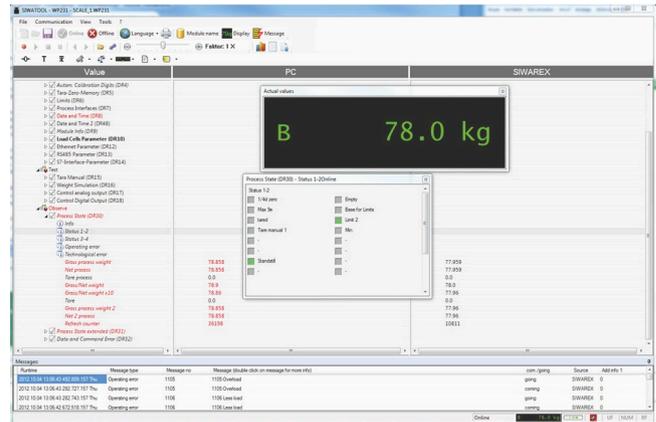
Programmable weighing applications tailored to any situation can be created and then adapted or extended at any time in combination with the functionalities of the TIA Portal and of the SIMATIC Manager and WinCC flexible.

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 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.



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.

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 RS 485 (SIWATOOL, Siebert remote display)
Commissioning options	<ul style="list-style-type: none"> Using SIWATOOL V7 Using function block in SIMATIC CPU / Touch Panel
Measuring accuracy	
according to DIN 1319-1 of full-scale value at 20 °C ± 10 K (68 °F ± 10 K)	0.05%
Internal resolution	± 2 million parts
Measuring frequency	100 / 120 / 600 Hz
Digital filter	Variable adjustable low-pass and average filter
Typical applications	<ul style="list-style-type: none"> Non-automatic weighing instruments Force measurements Fill-level monitoring Belt tension monitors
Weighing functions	
Weight values	<ul style="list-style-type: none"> Gross Net Tare
Limit values	<ul style="list-style-type: none"> 2 × min/max Empty
Zeroing	Via command by controller or HMI
Tare	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	Full-bridge strain gauges in 4-wire or 6-wire system
Load cell powering	
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	
<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 range of measuring signal (at greatest set characteristic value)	-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/certificates	<ul style="list-style-type: none"> ATEX Zone 2 UL FM EAC KCC IECEX RCM
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 according to DIN EN 60529; IEC 60529	IP20
Climatic requirements	
$T_{min(IND)} \dots T_{max(IND)}$ (operating temperature)	
<ul style="list-style-type: none"> Vertical installation in SIMATIC S7¹⁾ Horizontal installation in SIMATIC S7¹⁾ 	-25 ... +50 °C (-13 ... 122 °F) -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 (0.6 in)

¹⁾ The S7 standard modules may not be operated at temperatures below 0 °C (32 °F). For operating conditions below 0 °C (32 °F), SIMATIC modules from the SIPLUS series must be used.

Weighing Electronics

SIWAREX weighing electronics for SIMATIC
Platform/hopper scale

SIWAREX WP321

Selection and ordering data

Selection and ordering data	Article No.	Selection and ordering data	Article No.
Weighing module TM SIWAREX WP321 Single-channel, for platform or hopper scales with analog load cells (1–4 mV/V), 1 x LC, 1 x RS 485.	7MH4138-6AA00-0BA0	SIWAREX JB junction box, stainless steel housing (ATEX) For parallel connection of up to 4 load cells (for zone allocation, see manual or type-examination certificate).	7MH4710-1EA01
SIWAREX WP321 manual Available in a range of languages Free download on the Internet at: http://www.siemens.com/weighing/documentation		Ex interface SIWAREX IS For intrinsically-safe connection of load cells. With ATEX approval (not UL/FM). Suitable for SIWAREX electronic weighing system. Compatibility of load cells must be checked. Approved for use in the EU <ul style="list-style-type: none"> • Short-circuit current < 199 mA DC • Short-circuit current < 137 mA DC 	
SIWAREX WP321 "Ready for Use" TIA Portal and SIMATIC Manager sample configuration Free download on the Internet at: http://www.siemens.com/weighing/documentation		Cable (optional) Cable Li2Y 1 x 2 x 0.75 ST + 2 x (2 x 0.34 ST) – CY For connecting SIWAREX electronic weighing systems to junction box (JB), extension box (EB) and Ex interface or between two JBs. For permanent installation. Occasional bending is possible. External diameter: approx. 10.8 mm (0.43 in) Permissible ambient temperature -40 ... +80 °C (-40 ... +176 °F). Sold by the meter. <ul style="list-style-type: none"> • Sheath color: orange • For potentially explosive atmospheres. Sheath color: blue. 	7MH4710-5BA 7MH4710-5CA 7MH4702-8AG 7MH4702-8AF
SIWATOOL V4 & V7 Service and commissioning software for SIWAREX weighing modules	7MH4900-1AK01	RS 485/USB interface converter Commercially available interface converter with FTDI chip, e.g. USB-Nano from CTI http://www.cti-shop.com/RS485-Konverter/USB-Nano-485	
SIWAREX PCS7 AddOn Library for PCS7 V8.x and V9.0 <ul style="list-style-type: none"> • Support of Profinet APL faceplates and function block for: • SIWAREX U • SIWAREX FTA • SIWAREX FTC_B (belt scale) • SIWAREX WP321 Classic faceplate and function block for: <ul style="list-style-type: none"> • SIWAREX FTC_L (Loss in weight) 	7MH4900-1AK61	Remote display The Siebert S102 and S302 remote digital displays can be directly connected to the SIWAREX FTA via an RS 485 interface. Siebert Industrieelektronik GmbH Postfach 1180D-65565 Eppelborn, Germany Tel.: +49 6806/980-9 Fax: +49 6806/980-999 Internet: http://www.siebert-group.com/en Detailed information is available from the manufacturer.	
Accessories (mandatory requirement) BaseUnit (Type A0 – one BaseUnit required for each WP321) <ul style="list-style-type: none"> • For opening a new potential group <ul style="list-style-type: none"> - BU15P-16+A0+2D or - BU15P-16+A10+2D • For continuing the potential group <ul style="list-style-type: none"> - 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 For connecting up to 4 load cells in parallel, and for connecting multiple junction boxes.	7MH4710-1BA		
SIWAREX JB junction box, stainless steel housing For connecting up to 4 load cells in parallel.	7MH4710-1EA		

2

Selection and ordering data

Article No.

*Commissioning***Commissioning charge for one static scale with SIWAREX module****9LA1110-8SN50-0AA0**

(Travel and setup charge must be ordered separately)

Scope:

- Recording of data
- Checking of mechanical installation of the scale
- Checking of electrical wiring and function
- Static adjustment of the scale

Requirements:

- Mechanical design functional
- Modules electrically wired and tested
- Adjustment weights available
- Free access to scale

Flat charge for travel and setup in Germany**9LA1110-8RA10-0AA0**

Weighing Electronics

SIWAREX weighing electronics for SIMATIC
Platform/hopper scale

SIWAREX CS

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.

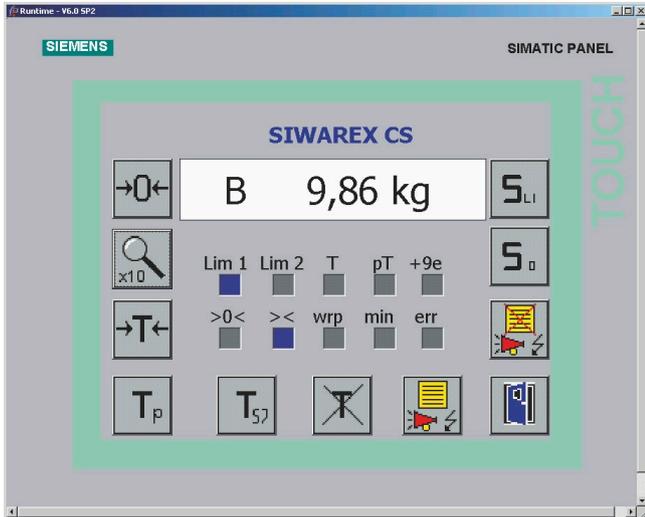
The SIWAREX CS has two serial interfaces. The TTY interface serves to connect digital remote displays. The remote displays can show the weight value with status information.

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.



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. This allows you to implement the scale very easily with an operator panel connected directly to the SIMATIC CPU.

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 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 (68 °F ± 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

Weighing functions

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

Load cells

Strain gages in 4-wire or 6-wire system

Load cell powering

Supply voltage U_s (rated value)	6 V DC typ.
Max. supply current	≤ 68 mA
Permissible load resistance	
• R_{Lmin}	> 87 Ω
• R_{Lmax}	< 4 010 Ω
With SIWAREX IS Ex interface:	
• R_{Lmin}	> 87 Ω
• R_{Lmax}	< 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)	
• Horizontal installation	-10 ... +60 °C (14 ... 140 °F)
• Vertical 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 in)

Weighing Electronics

SIWAREX weighing electronics for SIMATIC
Platform/hopper scale

SIWAREX CS

Selection and ordering data

SIWAREX CS

Weighing electronics for scales in SIMATIC ET 200S

Article No.
7MH4910-0AA01

SIWAREX CS Manual

Available in a range of languages

Free download on the Internet at:

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

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/documentation>

SIWATOOL V4 & V7

Service and commissioning software for SIWAREX weighing modules

Article No.
7MH4900-1AK01

SIWATOOL cable

from SIWAREX UJ/CS with serial PC interface, for 9-pin PC interfaces (RS 232), length 3 m (9.84 ft)

Article No.
7MH4607-8CA

Installation material (mandatory)

Terminal module

TM-E 30 mm (1.18 in) wide (required for each SIWAREX module)

Article No.
6ES7193-4CG20-0AA0
or compatible

Shield contact element

Contents 5 items, sufficient for 5 cables

Article No.
6ES7193-4GA00-0AA0

Shield connection terminal

Contents: 5 items, sufficient for 5 cables

Note: one shield connection terminal is required each for the

- scales connection and
- TTY interface or
- RS 232 interface

Article No.
6ES7193-4GB00-0AA0

N busbar, galvanized

3 x 10 mm (0.12 x 0.39 in), 1.0 m (3.28 ft) long

Article No.
8WA2842

Feeder terminal for N busbar

Article No.
8WA2868

Remote displays (option)

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

Suitable remote display:

S102

Siebert Industrieelektronik GmbH
Postfach 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 the manufacturer.

Accessories

SIWAREX JB junction box, aluminum housing

For connecting up to 4 load cells in parallel, and for connecting multiple junction boxes.

Article No.
7MH4710-1BA

SIWAREX JB junction box, stainless steel housing

For connecting up to 4 load cells in parallel.

Article No.
7MH4710-1EA

SIWAREX JB junction box, stainless steel housing (ATEX)

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

Article No.
7MH4710-1EA01

Ex interface SIWAREX IS

For intrinsically-safe connection of load cells. With ATEX approval (not UL/FM). Suitable for SIWAREX electronic weighing system. Compatibility of load cells must be checked.

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

Article No.
7MH4710-5BA

Article No.
7MH4710-5CA

Cable (optional)

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

For connecting SIWAREX electronic weighing systems to junction box (JB), extension box (EB) and Ex interface or between two JB's. For permanent installation. Occasional bending is possible.

External diameter: approx. 10.8 mm (0.43 in)

Permissible ambient temperature -40 ... +80 °C (-40 ... +176 °F).

Sold by the meter.

- Sheath color: orange
- For potentially explosive atmospheres. Sheath color: blue.

Article No.
7MH4702-8AG

Article No.
7MH4702-8AF

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 DB/PROFINET using ET 200M
- Measurement of weight or force with a high resolution of 65000 parts and an accuracy of 0.05 %
- Space saving through use of two-channel version for two scales
- Direct connection of a remote display to the TTY interface
- Simple adjustment of scale using the SIWATOOL U program
- Supports theoretical adjustment without adjustment weights
- Supports replacement of module without renewed adjustment of scale
- Can be used in Ex applications

Application

SIWAREX U is the optimum solution wherever strain 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.

Weighing Electronics

SIWAREX weighing electronics for SIMATIC
Platform/hopper scale

SIWAREX U

Technical specifications

SIWAREX U	
Integration in automation systems	
<ul style="list-style-type: none"> • S7-300 • S7-1500 • S7-400 (H) • PCS 7 (H) • Automation systems from other vendors • Stand-alone (without SIMATIC CPU) 	Direct integration Through ET 200M Through ET 200M Through ET 200M Through ET 200M 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 (68 °F ± 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 resistance	
<ul style="list-style-type: none"> • R_{Lmin} • R_{Lmax} 	> 40 Ω per channel < 4010 Ω
With Ex(i) interface	
<ul style="list-style-type: none"> • R_{Lmin} • R_{Lmax} 	> 87 Ω per channel < 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. power consumption	150 mA (single-channel) / 240 mA (dual-channel)
Current consumption on backplane 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)	
<ul style="list-style-type: none"> • Horizontal installation • Vertical installation 	0 ... +60 °C (32 ... 140 °F) 0 ... +40 °C (32 ... 104 °F)
EMC requirements according to	
	according to NAMUR NE21, Part 1; EN 61326
Dimensions	
	40 x 125 x 130 mm (1.58 x 4.92 x 5.12 in)

¹⁾ Load cell supply changed to 6 V DC as compared to 7MH4601-1AA01 and ... 1BA01.

²⁾ Possible up to 1000 m under certain conditions when using the recommended cable (accessories).

Selection and ordering data	Article No.	Article No.
SIWAREX U For SIMATIC S7 and ET 200M, incl. bus connector, weight 0.3 kg (0.661 lb)		
Single-channel version ¹⁾ for connecting one scale	7MH4950-1AA01	
Two-channel version ²⁾ for connecting two scales	7MH4950-2AA01	
SIWATOOL V4 & V7 Service and commissioning software for SIWAREX weighing modules	7MH4900-1AK01	
SIWAREX U configuration package for PCS7, version 8.0 Suitable for 7MH4950-xAA01 <ul style="list-style-type: none"> • Function block for CFC • Faceplate • Manual 	7MH4950-3AK62	
SIWAREX PCS7 AddOn Library for PCS7 V8.x and V9.0 <ul style="list-style-type: none"> • Support of Profinet APL faceplates and function block for: <ul style="list-style-type: none"> • SIWAREX U • SIWAREX FTA • SIWAREX FTC_B (belt scale) • SIWAREX WP321 Classic faceplate and function block for: <ul style="list-style-type: none"> • SIWAREX FTC_L (Loss in weight) 	7MH4900-1AK61	
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 in) <p>Note: one shield connection terminal each is required for:</p> <ul style="list-style-type: none"> • Scale connection • RS 485 interface • RS 232 interface 	6ES7390-5CA00-0AA0	
S7 DIN rail <ul style="list-style-type: none"> • 160 mm (6.30 in) • 480 mm (18.90 in) • 530 mm (20.87 in) • 830 mm (32.68 in) • 2000 mm (78.74 in) 	6ES7390-1AB60-0AA0 6ES7390-1AE80-0AA0 6ES7390-1AF30-0AA0 6ES7390-1AJ30-0AA0 6ES7390-1BC00-0AA0	
		Accessories (optional)
		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 Postfach 1180 D-66565 Eppelborn, Germany Tel.: +49 6806/980-0 Fax: +49 6806/980-999 Internet: http://www.siebert-group.com/en Detailed information is available from the manufacturer.
		SIWAREX JB junction box, aluminum housing
		For connecting up to 4 load cells in parallel, and for connecting multiple junction boxes.
		7MH4710-1BA
		SIWAREX JB junction box, stainless steel housing
		For connecting up to 4 load cells in parallel.
		7MH4710-1EA
		SIWAREX JB junction box, stainless steel housing (ATEX)
		For parallel connection of up to 4 load cells (for zone allocation, see manual or type-examination certificate).
		7MH4710-1EA01
		Ex interface SIWAREX IS For intrinsically-safe connection of load cells. With ATEX approval (not UL/FM). Suitable for SIWAREX electronic weighing system. Compatibility of load cells must be checked. <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 weighing electronics for SIMATIC

Platform/hopper scale

SIWAREX U

Selection and ordering data

Article No.

Cable (optional)

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

For connecting SIWAREX electronic weighing systems to junction box (JB), extension box (EB) and Ex interface or between two JBs.

For permanent installation. Occasional bending is possible.

External diameter:
approx. 10.8 mm (0.43 in)

Permissible ambient temperature
-40 ... +80 °C (-40 ... +176 °F).

Sold by the meter.

- Sheath color: orange
- For potentially explosive atmospheres. Sheath color: blue.

7MH4702-8AG

7MH4702-8AF

Commissioning

Commissioning charge for one static scale with SIWAREX module

(Travel and setup charge must be ordered separately)

Scope:

- Recording of data
- Checking of mechanical installation of the scale
- Checking of electrical wiring and function
- Static adjustment of the scale

Requirements:

- Mechanical design functional
- Modules electrically wired and tested
- Adjustment weights available
- Free access to scale

9LA1110-8SN50-0AA0

Flat charge for travel and setup in Germany

9LA1110-8RA10-0AA0

2

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

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

Overview

Dosing, filling, bagging scale

Typical requirements in many industries are high-precision mixing and dosing, and packing and filling at high speed. The corresponding SIWAREX electronics offer comprehensive properties and functions that fulfill all requirements - including for legal-for-trade operation.

The dosing process used in production operations depends on a variety of factors: Depending on the type and quantity of materials weighed, different dosing systems and weighing processes are required. It must be possible to fill liquid or solid goods quickly and precisely.

Weighing Electronics

SIWAREX weighing electronics for SIMATIC
Dosing/Filling/Bagging scale

SIWAREX WP251

Overview



SIWAREX WP251 electronic weighing module

SIWAREX WP251 is a flexible weighing module for dosing and filling processes. The compact module can be installed seamlessly in the SIMATIC S7-1200 automation system. It can also be used without a SIMATIC CPU in stand-alone mode.

Benefits

SIWAREX WP251 offers the following key advantages:

- Uniform design technology and consistent communication in SIMATIC S7-1200
- Uniform configuration with TIA Portal
- Legal-for-trade according to OIML R-76, R-51 and R-61
- Legal-for-trade according to OIML R-107 (available soon)
- Internal alibi memory for up to 550 000 entries
- Operation without SIMATIC CPU also possible
- Ethernet port ex works (Modbus TCP/IP / SIWATOOL)
- RS 485 interface ex works (Modbus RTU / remote display)
- Four digital inputs and outputs, one analog output ex works
- Measurement of weight and force with a high resolution of up to ± 4 million parts and an accuracy of 0.05%
- Simple calibration and setup of the scale using SIWATOOL V7 via the Ethernet interface
- Recovery-point for the simple restoration of all parameters
- Automatic calibration without the need for calibration weights
- Supports replacement of module without recalibration of scales
- Direct use in hazardous area zone 2

Application

SIWAREX WP251 is the optimum solution wherever fast and precise dosing and filling are required. The typical applications of SIWAREX WP251 are:

- Automatic catchweighing instruments (ACI) - legal-for-trade in accordance with OIML R-51
- Gravimetric filling instruments (GFI) - legal-for-trade in accordance with OIML R-61
- Non-automatic weighing instrument (NAWI) - legal-for-trade in accordance with OIML R-76
- Discontinuous Totalizing Automatic Weighing Instrument (SWT) Legal-for-trade according to OIML R-107 (in preparation)

Design

SIWAREX WP251 is a compact technology module in the SIMATIC S7-1200, and communicates directly via the system bus with the SIMATIC S7-1200 controller.

The compact weighing module with a width of 70 mm (2.76 inches) is installed using a mounting rail. This is extremely user-friendly.

The connections for the power supply, the load cells, the RS 485 port, the digital inputs/outputs, and the analog output are located on removable screw connector blocks. An RJ45 port is available for the Ethernet connection (SIWATOOL and Modbus TCP/IP).

Function

SIWAREX WP251 controls dosing and filling processes completely autonomously. The dosing valves (coarse/fine flow) can be controlled directly via the four digital outputs of the module. This achieves maximum accuracy since the weighing process is controlled completely independently of the CPU and its cycle time.

The CPU can be used to manage recipes and material parameters. These parameters and the desired setpoint are then transferred to SIWAREX WP251 by function block, and the dosing process is started. SIWAREX WP251 automatically optimizes the shut-off points, generates statistics, and logs every dosing task in the internal protocol memory that is also accessible from the CPU and can be read out by the CPU.

Diverse options are available for commissioning. The SIWAREX WP251 function block enables full access to all parameters of the SIWAREX WP251. The downloadable example application "ready-for-use" provides full data access to the weighing module, calibration options and operation of the scale - without any additional programming effort. Further, the PC service software SIWATOOL V7 that communicates via Ethernet with the SIWAREX module can be used for commissioning. Access using W-LAN is thus also possible by means of a WIFI access point. Consequently, remote access via the Internet is also no problem. For servicing purposes, centralized access to all scales from a single location is possible - worldwide. In addition, there is full access to all parameters and commands, both via the RS485 port (Modbus RTU) and via the Ethernet interface (Modbus TCP/IP), meaning that full commissioning and operation can also take place via these channels.

Weighing functions

SIWAREX WP251 provides the weighing modes Non-automatic weighing instrument, Automatic catchweighing instrument and Automatic gravimetric filling instrument.

In the operating modes Non-automatic weighing instrument and Automatic catchweighing instrument, there is a choice between filling mode and emptying mode. The entire filling or dosing process is fully controlled from SIWAREX WP251. It is only necessary to transfer a setpoint and a start command to the module. The coarse flow, fine flow and empty signals can be switched directly via the digital outputs of the module.

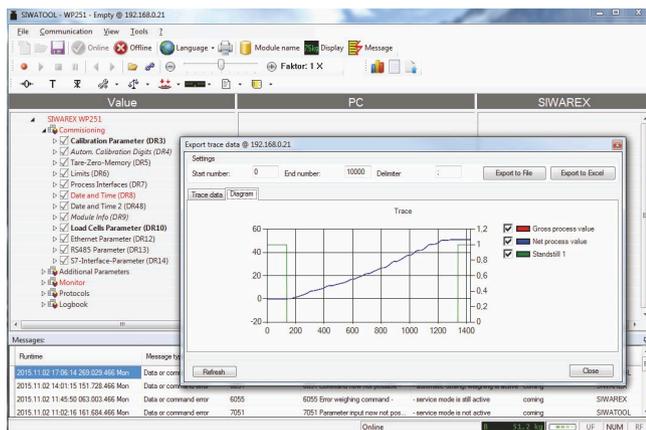
The weight, as well as all scale and dosing status bits, is available cyclically in the program code in the PLC for further evaluation. If stand-alone mode of the module is activated, there is an additional guarantee that dosing and operation of the scales can continue even in the event of a CPU stop.

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 calibration 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 SIWAREX WP251 is extremely helpful when analyzing events.

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

- Parameter assignment and calibration of the scale
- Testing of scale properties
- Recording and analysis of weighing sequence



Software SIWATOOL V7, layout of the program window

It is also extremely helpful to analyze the diagnostics buffer which can be saved together with the parameters from the module in a backup file.

Trace mode is provided to optimize the weighing sequences in the SIWAREX WP251 weighing module. The recorded weight values and associated states can be displayed as trends using SIWATOOL V7 and MS Excel.

Upgrading firmware

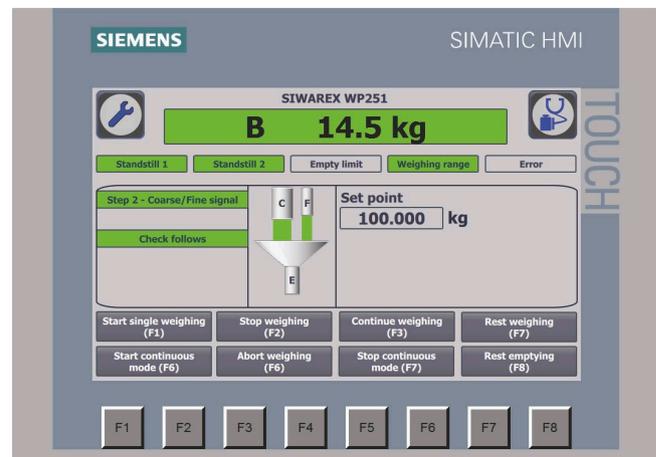
An additional program function can be used to download a new firmware version onto the SIWAREX WP251 on site. This means that firmware upgrades can be carried out on site as required anywhere in the world.

Integration

Integration into the automation environment

SIWAREX WP251 is part of the SIMATIC S7-1200 basic controller range, and is integrated seamlessly into the TIA Portal. The free function block enables full access to all parameters, actual values, setpoints, weight values and status information (e.g. limits, coarse flow signal, fine flow signal, empty signal) conveniently and without programming effort. Customized operator interfaces can thus be created in conjunction with SIMATIC HMI touch panels. Management of several languages can also be easily implemented and organized.

The example project "Ready-for-use SIWAREX WP251" is available free of charge to help you to get started quickly and simply. This TIA portal project contains both the function block and a fully fledged visualization system for commissioning, operating and monitoring the SIWAREX WP251. The visualization can be freely edited and adapted, or transferred completely into an existing HMI project.



Stand-alone mode

Alternatively, SIWAREX WP251 can also be used without a SIMATIC CPU. In this case, the module is connected with a supply voltage of 24 V DC only. In this case, a PC (e.g. using an OPC server) or a Modbus-enabled operator panel can be used for operator input. Both Modbus interfaces of SIWAREX WP251 (TCP/IP and RTU) enable access to all parameters, actual values, setpoints, weight values and status information. A customized and plant-specific operator interface can thus be created on the PC or the Modbus-enabled operator panel. Integration into third-party systems is also no problem via the Modbus interfaces.

Weighing Electronics

SIWAREX weighing electronics for SIMATIC
Dosing/Filling/Bagging scale

SIWAREX WP251

Technical specifications

SIWAREX WP251	
Weighing modes	<ul style="list-style-type: none"> Non-automatic weighing instrument (NAWI) (filling + removal) (legal-for-trade according to OIML R-76) Automatic catchweighing instruments (ACI) (filling + removal) (legal-for-trade according to OIML R-51) Gravimetric filling instruments (GFI) (legal-for-trade according to OIML R-61) Discontinuous Totalizing Automatic Weighing Instrument (SWT) (legal-for-trade according to OIML R-107 - in preparation)
Integration in automation systems	
S7-1200	SIMATIC S7-1200 system bus
Operator panel and/or automation systems from other vendors	Via Ethernet (Modbus TCP/IP) or RS 485 (Modbus RTU)
Ports	<ul style="list-style-type: none"> 1 x SIMATIC S7-1200 system bus 1 x Ethernet (SIWATOOL and Modbus TCP/IP) 1 x RS 485 (Modbus RTU or remote display) 1 x analog output (0/4 ... 20 mA) 4 x digital inputs (24 V DC, floating) 4 x digital outputs (24 V DC, floating, short-circuit proof)
Functions	<ul style="list-style-type: none"> 3 limits Tare Tare specification Zeroing Zero adjustment Statistics Automatic correction of the shut-off points Internal protocol memory for 550 000 entries Trace function for signal analysis Internal restore point Stand-alone mode or SIMATIC S7-1200 integrated
Parameter assignment	<ul style="list-style-type: none"> Full access using function block in SIMATIC S7-1200 Full access using Modbus TCP/IP Full access using Modbus RTU
Remote display	
Connection	via RS 485
Setting the scales	PC software SIWATOOL (Ethernet), S7-1200 function block and touch panel 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 or 120 (selectable)
Filter	<ul style="list-style-type: none"> Low-pass filter 0.1 ... 50 Hz Average value filter

SIWAREX WP251	
Load cells	Full-bridge strain gauges in 4-wire or 6-wire system
Load cell powering	
Supply voltage (regulated via feedback)	4.85 V DC
Permissible load resistance	<ul style="list-style-type: none"> • R_{Lmin} > 40 Ω • R_{Lmax} < 4 100 Ω
With SIWAREX IS Ex interface	<ul style="list-style-type: none"> • R_{Lmin} > 50 Ω • R_{Lmax} < 4 100 Ω
Load cell characteristic	1 ... 4 mV/V
Permissible range of the measurement signal (with 4 mV/V sensors)	-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
Certificates	<ul style="list-style-type: none"> • ATEX Zone 2 • UL • KCC • EAC • RCM
Calibration approvals	<ul style="list-style-type: none"> • EU type-examination certificate 2014/31/EU (NAWI) according to OIML R76 • EU type-examination certificate 2014/32/EU (MID) according to OIML R61 and OIML R51 • EU type-examination certificate 2014/32/EU (MID) according to OIML R107 (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 according to DIN EN 60529; IEC 60529	IP20
Climatic requirements	
T_{min} (IND) to T_{max} (IND) (operating temperature)	
• Vertical installation	-10 ... +40 °C (14 ... 104 °F)
• Horizontal installation	-10 ... +55 °C (14 ... 131 °F)
EMC requirements	according to EN 45501
Dimensions	70 x 75 x 100 mm (2.76 x 2.95 x 3.94 in)

Selection and ordering data	Article No.	Article No.
SIWAREX WP251 weighing module Single-channel, legal-for-trade, for automatic dosing and batching scales (GFI, ACI, NAWI) with analog load cells / full-bridge strain gauges (1 - 4 mV/V), 1 x LC, 4 x DQ, 4 x DI, 1 x AQ, 1 x RS 485, Ethernet port.	7MH4960-6AA01	Accessories SIWAREX JB junction box, aluminum housing For connecting up to 4 load cells in parallel, and for connecting multiple junction boxes.
SIWAREX WP251 equipment manual Available in a range of languages Free download on the Internet at: http://www.siemens.com/weighing/documentation		SIWAREX JB junction box, stainless steel housing For connecting up to 4 load cells in parallel.
SIWAREX WP251 "Ready for Use" Free download on the Internet at: http://www.siemens.com/weighing/documentation		SIWAREX JB junction box, stainless steel housing (ATEX) For parallel connection of up to 4 load cells (for zone allocation, see manual or type-examination certificate).
SIWATOOL V4 & V7 Service and commissioning software for SIWAREX weighing modules	7MH4900-1AK01	Ex interface SIWAREX IS For intrinsically-safe connection of load cells. With ATEX approval (not UL/FM). Suitable for SIWAREX electronic weighing system. Compatibility of load cells must be checked.
Calibration set for SIWAREX WP2xx Valid for SIWAREX WP231 K and SIWAREX WP251. For verification of up to 3 scales, comprising: <ul style="list-style-type: none"> • 3 x inscription foil for labeling • 1 x protective film • 3 x calibration protection plate • Guidelines for verification, certificates and approvals, adaptable label, SIWAREX WP 	7MH4960-0AY10	<ul style="list-style-type: none"> • Short-circuit current < 199 mA DC • Short-circuit current < 137 mA DC
Ethernet cable patch cord 2 m (7 ft) For connecting SIWAREX WP251 to a PC (SIWATOOL), SIMATIC CPU, panel, etc.	6XV1850-2GH20	Cable (optional) Cable Li2Y 1 x 2 x 0.75 ST + 2 x (2 x 0.34 ST) – CY For connecting SIWAREX electronic weighing systems to junction box (JB), extension box (EB) and Ex interface or between two JBs. For permanent installation. Occasional bending is possible. External diameter: approx. 10.8 mm (0.43 in) Permissible ambient temperature -40 ... +80 °C (-40 ... +176 °F). Sold by the meter. <ul style="list-style-type: none"> • Sheath color: orange • For potentially explosive atmospheres. Sheath color: blue.
Remote display (optional) The digital remote displays can be connected directly to the SIWAREX WP251 via the RS 485 interface. Suitable remote display: S102 Siebert Industrieelektronik GmbH Postfach 1180 D-66565 Eppelborn, Germany Tel.: +49 6806/980-0 Fax: +49 6806/980-999 Internet: http://www.siebert-group.com/en Detailed information is available from the manufacturer.		<ul style="list-style-type: none"> • Short-circuit current < 137 mA DC
		Ground terminal for connecting the load cell cable shield to the grounded DIN rail 6ES5728-8MA11

Weighing Electronics

SIWAREX weighing electronics for SIMATIC

Dosing/Filling/Bagging scale

SIWAREX WP251

Selection and ordering data

Article No.

Commissioning

Commissioning charge for one static scale with SIWAREX module

9LA1110-8SN50-0AA0

(Travel and setup charge must be ordered separately)

Scope:

- Recording of data
- Checking of mechanical installation of the scale
- Checking of electrical wiring and function
- Static adjustment of the scale

Requirements:

- Mechanical design functional
- Modules electrically wired and tested
- Adjustment weights available
- Free access to scale

Flat charge for travel and setup in Germany

9LA1110-8RA10-0AA0

2

Overview



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
- Uniform configuration with SIMATIC
- Direct use in the SIMATIC automation system
- Use in distributed plant concept through connection to PROFIBUS DP/PROFINET using ET 200M
- Measurement of weight or force with high resolution of 16 million intervals
- High accuracy 3 x 6 000d, legal-for-trade according to OIML R-76, R-51, R-61 and R-107
- 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 Windows-based panels, e.g. SIMATIC Comfort 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 weighing sequence
- Alibi memory with calibration capability
- 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

SIWAREX FTA is a function module of SIMATIC S7-300 which can be directly snapped onto the SIMATIC S7-300 or ET 200M backplane bus. Thanks to the snap-on mounting rail system, very little work is required to install/cable the 80 mm wide weighing module.

The load cells, the RS 485 serial interface, the analog output and the digital inputs and outputs are connected by means of the 40-pin standard front connector, the PC (RS 232) by means of a 9-pin SUB-D connector and the power supply by means of a separate 2-pin connector.

Operation of SIWAREX FTA in SIMATIC enables the weighing system to be completely integrated into the automation system.

Weighing Electronics

SIWAREX weighing electronics for SIMATIC
Dosing/Filling/Bagging scale

SIWAREX FTA

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 for the various automatic weighing functions.

The following legal-for-trade weighing functions can be parameterized:

- NAWI (**N**on-**A**utomatic **W**eighing **I**nstrument) according to OIML R76
- AGFI (**A**utomatic **G**ravimetric **F**illing **I**nstrument) according to OIML R61
- ACI (**A**utomatic **C**atchweighing **I**nstrument) according to OIML R51
- DTAWI (**D**iscontinuous **T**otalizing **A**utomatic **W**eighing **I**nstrument (Totalizing Hopper Weigher)) according to OIML R107

Monitoring and control of the load cell signals and statuses

During the weighing procedure, the SIWAREX FTA weighing module monitors and controls the load cell signals and statuses. The optimized exchange of data within SIMATIC permits direct evaluation of the load cell signals and statuses in the PLC program.

The SIWAREX FTA can easily be adapted to changes in the system technology thanks to the PLC's influence on the weighing process.

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.

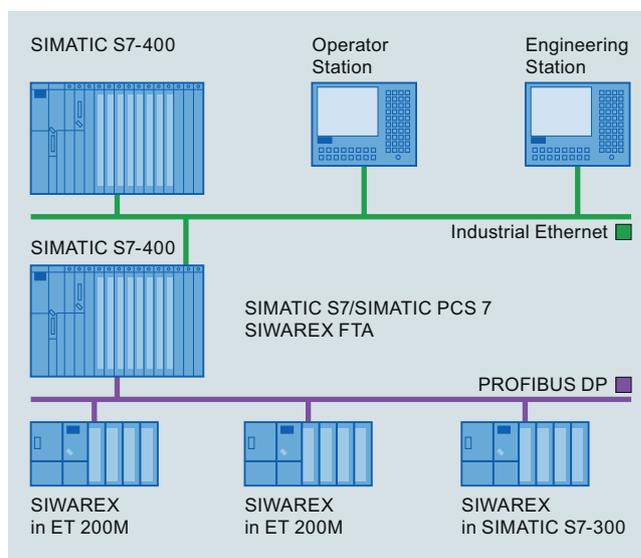
Integration in SIMATIC

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. Needless to say, these operator panels can also be simultaneously used for the operator control 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

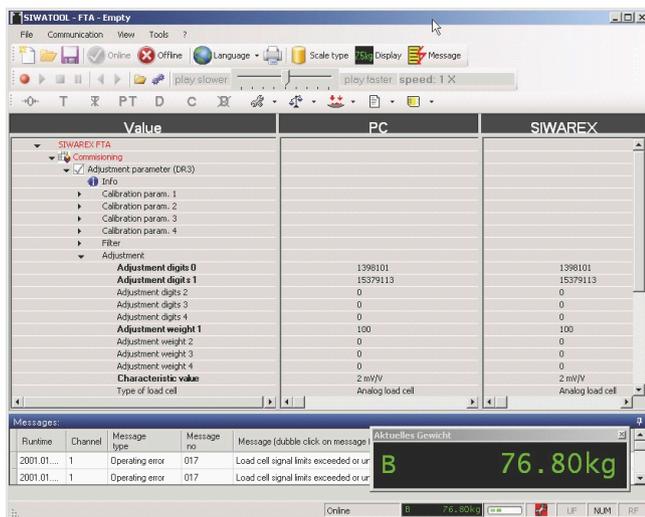
SIWATOOL FTA commissioning software

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. During 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:

- Parameter assignment and calibration of the scale
- Testing of scale properties
- Saving and printing scale data
- Recording and analysis of weighing sequence



Settings in SIWAREX FTA software

It is extremely helpful to analyze the diagnostics buffer, which can be saved together with the parameters from the module in a backup file.

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 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.

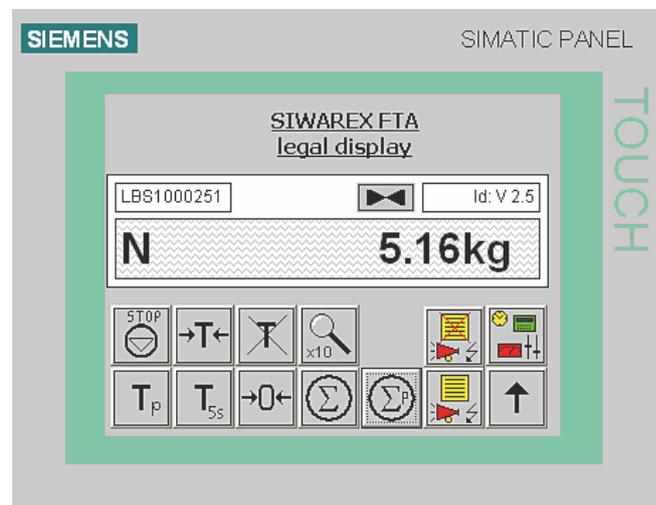
SIWAREX FTA – simple configuration

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. This allows you to connect the scale very easily to an operator panel connected directly to the SIMATIC CPU.

Configuring the legal trade display on the panel

The software SecureOCX is available in systems running WinCC flexible. It provides a function for configuration of the legal trade display directly in WinCC flexible. In the TIA Portal, the SecureDisplay software is used. This is installed directly on a Windows CE-based panel (for example, SIMATIC Comfort Touch series). There is a separate "Getting Started" for using this software in the TIA Portal. This solution requires a SIMATIC CPU with an Ethernet port. SIMATIC Basic and Key Panels cannot be used.



Scale faceplate in the SIWAREX FTA "Getting started" software

In addition, the STEP 7 program SIWAREX FTA Multiscale provides a professional basis for the implementation of batching or filling plants.

Weighing Electronics

SIWAREX weighing electronics for SIMATIC
Dosing/Filling/Bagging scale

SIWAREX FTA

Technical specifications

SIWAREX FTA	
Use in automation systems	
S7-300	Directly or through ET 200M
S7-1500	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
	> 87 Ω with Ex interface
• R_{Lmax}	≤ 4 010 Ω
Max. distance of load cells	
When using the recommended cable:	
Standard	1 000 m (3 280 ft)
In hazardous area ¹⁾	
• For gases of group IIC	300 m (984 ft)
• For gases of group IIB	1 000 m (3 280 ft)

SIWAREX FTA	
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
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} (IND) ... T_{max} (IND) (operating temperature)	
• Horizontal installation	-10 ... 60 °C (14 ... 140 °F)
• Vertical 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 in)
Weight	600 g (0.44 lb)

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

Selection and ordering data	Article No.		Article No.
SIWAREX FTA Legal-for-trade weighing electronics for automatic scales for S7-300 and ET 200M. EU type approval 3 x 6000 d Applications: proportioning, filling, bagging, loading. Note: Observe approval conditions for applications with obligation of verification. We recommend using our calibration set and contacting our SIWAREX hotline.	7MH4900-2AA01	Calibration set for SIWAREX FTA For verification of up to 5 scales comprising: <ul style="list-style-type: none"> • 3 x inscription foil for labeling • 1 x protection foil • Guidelines for verification, verification certificates and approvals, adaptable label, SIWAREX FTA Manual on CD-ROM 	7MH4900-2AY10
SIWAREX FTA Manual Available in a range of languages Free download on the Internet at: http://www.siemens.com/weighing/documentation		SIWATOOL connecting cable From SIWAREX FTA with serial PC interface, for 9-pin PC interfaces (RS 232) <ul style="list-style-type: none"> • 2 m long (6.56 ft) • 5 m long (16.40 ft) 	7MH4702-8CA 7MH4702-8CB
SIWAREX FTA "Getting started" Sample software shows beginners how to program the scales in STEP 7. Free download on the Internet at: http://www.siemens.com/weighing/documentation		Front connector, 40-pin Required for each SIWAREX module <ul style="list-style-type: none"> • With screw contacts • With spring-loaded terminals 	6ES7392-1AM00-0AA0 6ES7392-1BM01-0AA0
SIWATOOL V4 & V7 Service and commissioning software for SIWAREX weighing modules	7MH4900-1AK01	Shield contact element Sufficient for one SIWAREX FTA module	6ES7390-5AA00-0AA0
Configuration package SIWAREX FTA for SIMATIC PCS 7, Version 8.0 on CD-ROM <ul style="list-style-type: none"> • HSP hardware support package for integrating SIWAREX FTA/FTC in STEP 7 • Function block for CFC • Faceplate • Manual 	7MH4900-2AK63	Shield connection terminal Contents: 2 units (suitable for cable with diameter 4 ... 13 mm / 0.16 ... 0.51 in) Note: one shield connection terminal each is required for: <ul style="list-style-type: none"> • Scale connection • RS 485 interface • RS 232 interface 	6ES7390-5CA00-0AA0
SIWAREX PCS7 AddOn Library for PCS7 V8.x and V9.0 <ul style="list-style-type: none"> • Support of Profinet APL faceplates and function block for: <ul style="list-style-type: none"> • SIWAREX U • SIWAREX FTA • SIWAREX FTC_B (belt scale) • SIWAREX WP321 Classic faceplate and function block for: <ul style="list-style-type: none"> • SIWAREX FTC_L (Loss in weight) 	7MH4900-1AK61	S7 DIN rail <ul style="list-style-type: none"> • 160 mm (6.30 in) • 480 mm (18.90 in) • 530 mm (20.87 in) • 830 mm (32.68 inch) • 2 000 mm (78.74 in) 	6ES7390-1AB60-0AA0 6ES7390-1AE80-0AA0 6ES7390-1AF30-0AA0 6ES7390-1AJ30-0AA0 6ES7390-1BC00-0AA0
		MMC memory For data recording up to 32 MB, only for legal/for/trade applications R76, R51 and R107	7MH4900-2AY21

Weighing Electronics

SIWAREX weighing electronics for SIMATIC
Dosing/Filling/Bagging scale

SIWAREX FTA

Selection and ordering data

Article No.

Article No.

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
Postfach 1180
D-66565 Eppelborn, Germany
Tel.: +49 6806/980-0
Fax: +49 6806/980-999
Internet:
<http://www.siebert-group.com/en>

Detailed information is available from the manufacturer.

SIWAREX JB junction box, aluminum housing

7MH4710-1BA

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

SIWAREX JB junction box, stainless steel housing

7MH4710-1EA

For connecting up to 4 load cells in parallel.

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).

Ex interface SIWAREX IS

For intrinsically-safe connection of load cells. With ATEX approval (not UL/FM). Suitable for SIWAREX electronic weighing system. Compatibility of load cells must be checked.

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

7MH4710-5BA

7MH4710-5CA

Cable (optional)

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

For connecting SIWAREX electronic weighing systems to junction box (JB), extension box (EB) and Ex interface or between two JBs.

For permanent installation. Occasional bending is possible.

External diameter:
approx. 10.8 mm (0.43 in)

Permissible ambient temperature
-40 ... +80 °C (-40 ... +176 °F).

Sold by the meter.

- Sheath color: orange
- For potentially explosive atmospheres. Sheath color: blue.

7MH4702-8AG

7MH4702-8AF

Commissioning

Commissioning charge for one static scale with SIWAREX module

9LA1110-8SN50-0AA0

(Travel and setup charge must be ordered separately)

Scope:

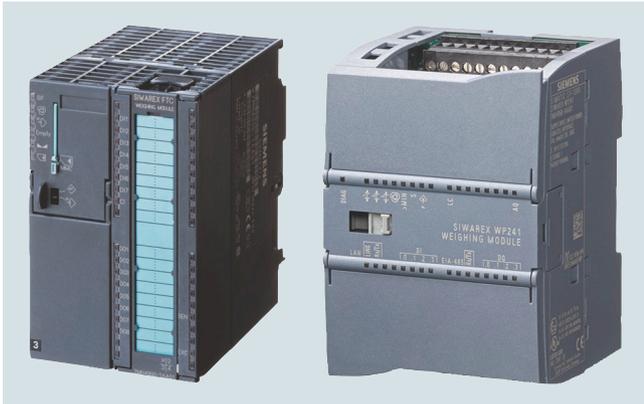
- Recording of data
- Checking of mechanical installation of the scale
- Checking of electrical wiring and function
- Static adjustment of the scale

Requirements:

- Mechanical design functional
- Modules electrically wired and tested
- Adjustment weights available
- Free access to scale

Flat charge for travel and setup in Germany

9LA1110-8RA10-0AA0

Overview**Belt scales**

The gravel, cement, coal, recycling and mining industries require exact weight measurement of the material to be conveyed using belt scales. The corresponding SIWAREX electronics offers comprehensive properties and functions that fulfil all requirements.

The Milltronics belt scales from Siemens combine simple installation and low maintenance costs (no moving parts) with higher reproducibility. This results in high productivity. With minimum hysteresis and maximum linearity, lateral forces have no influence on measuring accuracy. All load cells are equipped with overload protection.

The installation of belt scales in danger zones is also available as option. Various versions are available for high accuracy, small loads and heavy loads.

Weighing Electronics

SIWAREX weighing electronics for SIMATIC

Belt scale

SIWAREX WP241

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 ± 4 million parts
- 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

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 overall total and the four remaining totalization memories are available for use as required. 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.

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 (e.g. 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.

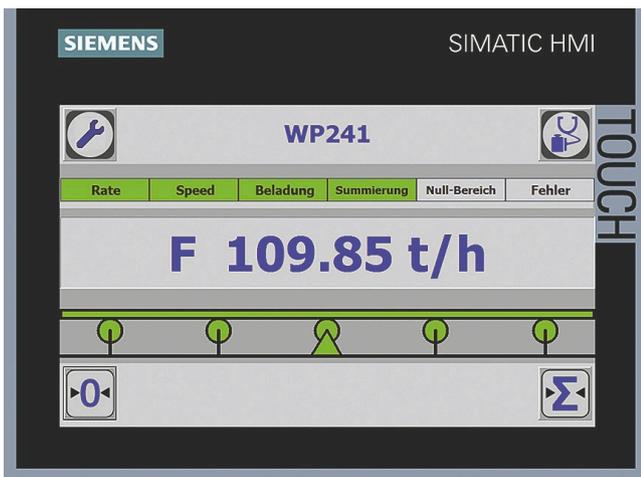
Integration in the plant environment

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.



SIWAREX WP241 "Ready for use"

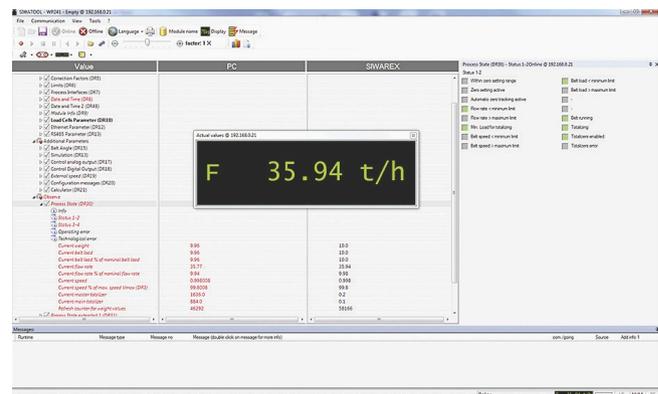
In addition to the configuration package, fully-featured SIWAREX WP241 "Ready for use" software is also available free-of-charge. It shows beginners how to integrate the module in a STEP 7 program and offers a basis for application programming. This allows you to connect the scale either directly to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



SIWAREX WP241 SIWATOOL

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.

Weighing Electronics

SIWAREX weighing electronics for SIMATIC

Belt scale

SIWAREX WP241

Technical specifications

SIWAREX WP241	
Integration in automation systems	
S7-1200	SIMATIC S7-1200 system bus
Operator panel and/or automation systems from other vendors	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 (SIWATOOL V7, Modbus TCP/IP) • Analog output 0/4 - 20 mA • 4 x digital outputs, 24 V DC floating, short-circuit proof • 4 x digital outputs, 24 V DC floating
Commissioning options	<ul style="list-style-type: none"> • Using SIWATOOL V7 • Using function block in SIMATIC S7-1200 CPU / Touch Panel • Using Modbus TCP/IP • Using Modbus RTU
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
Measuring frequency	100 / 120 Hz
Digital filter	Separate, variable adjustable low-pass and average filter for loading and speed
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
Load cells	Full-bridge strain gauges in 4-wire or 6-wire system

SIWAREX WP241	
Load cell excitation	
Supply voltage (regulated via feedback)	4.85 V DC
Permissible load resistance	<ul style="list-style-type: none"> • R_{Lmin} > 40 Ω • R_{Lmax} < 4100 Ω
With SIWAREX IS Ex interface	<ul style="list-style-type: none"> • R_{Lmin} > 50 Ω • R_{Lmax} < 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 (compatibility of the load cells must be checked)
Approvals/certificates	<ul style="list-style-type: none"> • ATEX Zone 2 • UL • EAC • KCC • RCM
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 ... +40 °C (14 ... 104 °F)
• Horizontal installation	-10 ... +55 °C (14 ... 131 °F)
EMC requirements	according to EN 45501
Dimensions	70 x 75 x 100 mm (2.76 x 2.95 x 3.94 in)

Selection and ordering data	Article No.	Article No.
SIWAREX WP241 weighing module Single-channel, for conveyor scales with analog load cells / full-bridge strain gauges (1 - 4 mV/V), 1 x LC, 4 x DQ, 4 x DI, 1 x AQ, 1 x RS 485, Ethernet port.	7MH4960-4AA01	Cable (optional) Cable Li2Y 1 x 2 x 0.75 ST + 2 x (2 x 0.34 ST) – CY For connecting SIWAREX electronic weighing systems to junction box (JB), extension box (EB) and Ex interface or between two JB's.
SIWAREX S7-1200 manual Available in a range of languages Free download on the Internet at: http://www.siemens.com/weighing/documentation		For permanent installation. Occasional bending is possible. External diameter: approx. 10.8 mm (0.43 in) Permissible ambient temperature -40 ... +80 °C (-40 ... +176 °F). Sold by the meter.
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/documentation		<ul style="list-style-type: none"> • Sheath color: orange • For potentially explosive atmospheres. Sheath color: blue.
SIWATOOL V4 & V7 Service and commissioning software for SIWAREX weighing modules	7MH4900-1AK01	Ground terminal for connecting the load cell cable shield to the grounded DIN rail
Ethernet cable patch cord 2 m (7 ft) For connecting SIWAREX WP241 to a PC (SIWATOOL), SIMATIC CPU, panel, etc.	6XV1850-2GH20	Commissioning
Accessories SIWAREX JB junction box, aluminum housing For connecting up to 4 load cells in parallel, and for connecting multiple junction boxes.	7MH4710-1BA	Commissioning charge for one belt scale with SIWAREX module (Travel and setup charge must be ordered separately) Scope: <ul style="list-style-type: none"> • Recording of data • Checking of mechanical installation of the scale • Checking of electrical wiring and function • Dynamic adjustment of the scale Requirements: <ul style="list-style-type: none"> • Mechanical design functional • Modules electrically wired and tested • Adjustment weights available • Free access to scale
SIWAREX JB junction box, stainless steel housing For connecting up to 4 load cells in parallel.	7MH4710-1EA	Flat charge for travel and setup in Germany
SIWAREX JB junction box, stainless steel housing (ATEX) For parallel connection of up to 4 load cells (for zone allocation, see manual or type-examination certificate).	7MH4710-1EA01	
Ex interface SIWAREX IS For intrinsically-safe connection of load cells. With ATEX approval (not UL/FM). Suitable for SIWAREX electronic weighing system. Compatibility of load cells must be checked. <ul style="list-style-type: none"> • Short-circuit current < 199 mA DC • Short-circuit current < 137 mA DC 	7MH4710-5BA 7MH4710-5CA	

Weighing Electronics

SIWAREX weighing electronics for SIMATIC
Belt scale

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

SIWAREX FTC is a function module of SIMATIC S7-300 which can be directly snapped onto the SIMATIC S7-300 or ET 200M backplane bus. Thanks to the snap-on mounting rail system, very little work is required to install/cable the 80 mm wide weighing module.

The load cells, the RS 485 serial interface, the analog output and the digital inputs and outputs are connected by means of the 40-pin standard front connector, the PC (RS 232) by means of a 9-pin SUB-D connector and the power supply by means of a separate 2-pin connector.

Operation of SIWAREX FTC in SIMATIC enables the weighing system to be completely integrated into the automation system.

Function

The main tasks of SIWAREX FTC are the high-precision measurement of the current weight, and the exact calculation of the conveyed quantity or flow. In "Force measurement" mode, SIWAREX FTC measures the force 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

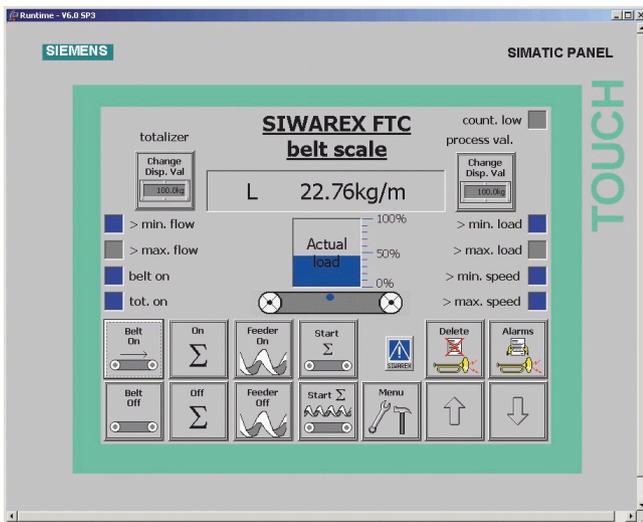
The following operating modes can be set:

Weight measurement and force measurement

In this operating mode, the weight value or the 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.



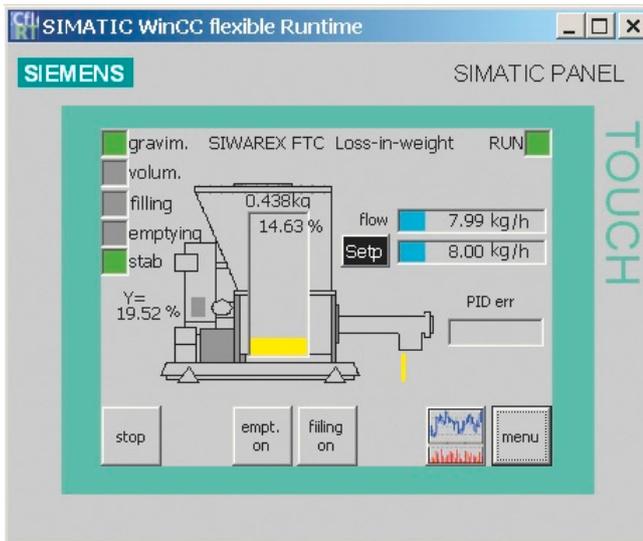
Scale faceplate of a conveyor scale

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.

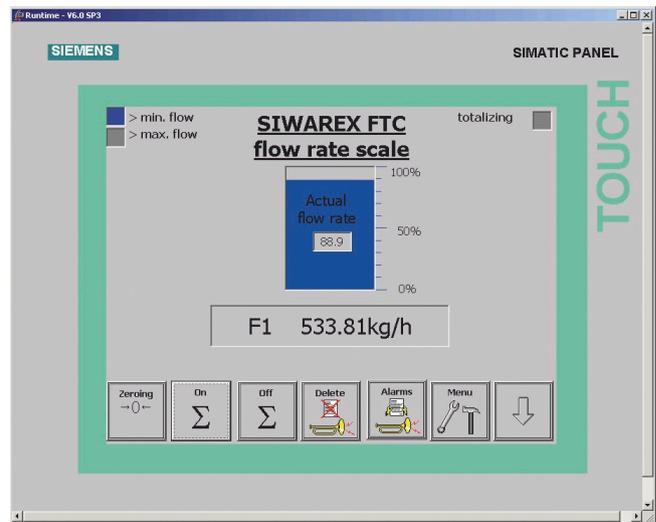
The high measurement resolution, real-time signal processing, detection and filtering of signals in the weighing electronics enable extremely high proportioning accuracy.



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.

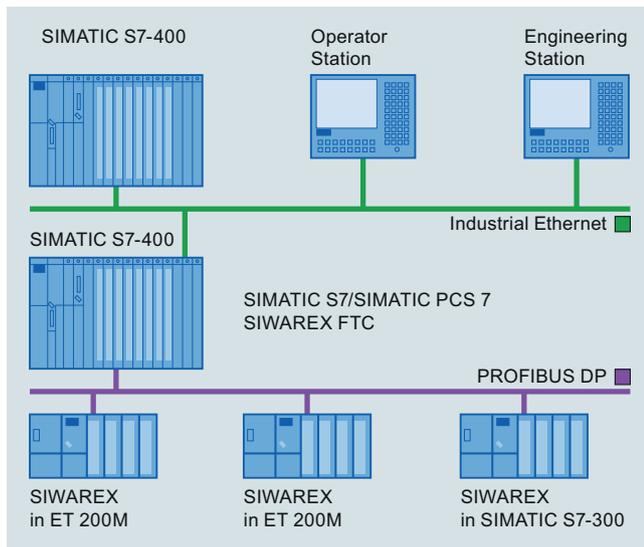
The right combination of SIMATIC components can produce optimum solutions for small, medium-size and large plants. The scales are operated and monitored using SIMATIC standard operator panels. Needless to say, these operator panels can also be simultaneously used for the operator control and monitoring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

Weighing Electronics

SIWAREX weighing electronics for SIMATIC
Belt scale

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

Value	PC	SIWAREX
Standard belt speed (m/s)	0.5	0.5
Meas. Time for speed (ms)	2000	2000
Pulses factor speed sense (1/A)	100	100
Constant belt speed	0.2	0.2
Min. belt speed limit (0.1 %)	300	300
Max. belt speed value (0.1 %)	1000	1000
Delay belt message after start (ms)	2000	2000
Delay belt message in operation (ms)	2000	2000
Flow		
Load		
Totalizing		

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 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.

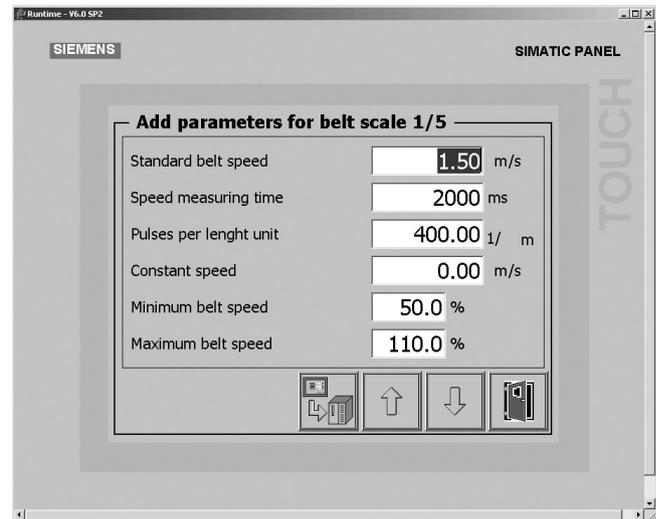
Reading out of weighing reports

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. This allows you to implement the belt scale very easily with an operator panel connected directly to the SIMATIC CPU.



Scale faceplate in the SIWAREX FTC "Getting started" software

Technical specifications

SIWAREX FTC	
Use in automation systems	
S7-300	Directly or via ET 200M
S7-1500	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 FTC software (RS 232)
Measuring properties	
Accuracy to EN 45501	$3 \times 6\,000 d \geq 0.5 \mu\text{V/e}$
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	
• $R_{L\min}$	> 56 Ω
	> 87 Ω with Ex interface
• $R_{L\max}$	$\leq 4\,010 \Omega$

SIWAREX FTC	
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
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} (IND) ... T_{\max} (IND) (operating temperature)	
• Horizontal installation	-10 ... 60 °C (14 ... 140 °F)
• Vertical 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 in)
Weight	
	600 g (0.44 lb)

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

Weighing Electronics

SIWAREX weighing electronics for SIMATIC

Belt scale

SIWAREX FTC

Selection and ordering data

	Article No.		Article No.
SIWAREX FTC Weighing electronics for S7-300 and ET 200M. Applications: Belt scales, force measurement, loss-in-weight feeders and solids flowmeters	7MH4900-3AA01	SIWAREX PCS7 AddOn Library for PCS7 V8.x and V9.0 • Support of Profinet APL faceplates and function block for: • SIWAREX U • SIWAREX FTA • SIWAREX FTC_B (belt scale) • SIWAREX WP321 Classic faceplate and function block for: • SIWAREX FTC_L (Loss in weight)	7MH4900-1AK61
SIWAREX FTC_B manual for belt scales Available in a range of languages Free download on the Internet at: http://www.siemens.com/weighing/documentation		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
SIWAREX FTC_L manual for solids flowmeters and loss-in-weight feeders Available in a range of languages Free download on the Internet at: http://www.siemens.com/weighing/documentation		40-pin front plug with screw contacts Required for each SIWAREX module • With screw contacts • With spring-loaded terminals	6ES7392-1AM00-0AA0 6ES7392-1BM01-0AA0
SIWAREX FTC "Getting started" for belt scales Sample software shows beginners how to program the scales in STEP 7 for conveyor scale mode Free download on the Internet at: http://www.siemens.com/weighing/documentation		Shield contact element Sufficient for one SIWAREX FTC module	6ES7390-5AA00-0AA0
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 on the Internet at: http://www.siemens.com/weighing/documentation		Shield connection terminal Contents: 2 units (suitable for cable with diameter 4 ... 13 mm) Note: one shield connection terminal each is required for: • Scale connection • RS 485 interface • RS 232 interface	6ES7390-5CA00-0AA0
SIWAREX FTC "Getting started" for loss-in-weight feeders Sample software shows beginners how to program scales in STEP 7 for differential proportioning weigher mode Free download on the Internet at: http://www.siemens.com/weighing/documentation		S7 DIN rail • 160 mm (6.30 in) • 480 mm (18.90 in) • 530 mm (20.87 in) • 830 mm (32.68 inch) • 2 000 mm (78.74 in)	6ES7390-1AB60-0AA0 6ES7390-1AE80-0AA0 6ES7390-1AF30-0AA0 6ES7390-1AJ30-0AA0 6ES7390-1BC00-0AA0
SIWATOOL V4 & V7 Service and commissioning software for SIWAREX weighing modules	7MH4900-1AK01	MMC memory For data recording up to 16 MB	7MH4900-2AY20

2

Selection and ordering data	Article No.	Article No.
<p>Remote display (optional)</p> <p>The Siebert S102 and S302 remote digital displays can be directly connected to the SIWAREX FTC via an RS 485 interface. (not suitable for belt scale mode)</p> <p>Siebert Industrieelektronik GmbH Postfach 1180 D-66565 Eppelborn, Germany Tel.: +49 6806/980-0 Fax: +49 6806/980-999 Internet: http://www.siebert-group.com/en</p> <p>Detailed information is available from the manufacturer.</p>		
<p>SIWAREX JB junction box, aluminum housing</p> <p>For connecting up to 4 load cells in parallel, and for connecting multiple junction boxes.</p>	7MH4710-1BA	
<p>SIWAREX JB junction box, stainless steel housing</p> <p>For connecting up to 4 load cells in parallel.</p>	7MH4710-1EA	
<p>SIWAREX JB junction box, stainless steel housing (ATEX)</p> <p>For parallel connection of up to 4 load cells (for zone allocation, see manual or type-examination certificate).</p>	7MH4710-1EA01	
<p>Ex interface SIWAREX IS</p> <p>For intrinsically-safe connection of load cells. With ATEX approval (not UL/FM). Suitable for SIWAREX electronic weighing system. Compatibility of load cells must be checked.</p> <ul style="list-style-type: none"> • With short-circuit current < 199 mA DC • With short-circuit current < 137 mA DC 	7MH4710-5BA 7MH4710-5CA	
		<p>Cable (optional)</p> <p>Cable Li2Y 1 x 2 x 0.75 ST + 2 x (2 x 0.34 ST) – CY</p> <p>For connecting SIWAREX electronic weighing systems to junction box (JB), extension box (EB) and Ex interface or between two JBs.</p> <p>For permanent installation. Occasional bending is possible.</p> <p>External diameter: approx. 10.8 mm (0.43 in)</p> <p>Permissible ambient temperature -40 ... +80 °C (-40 ... +176 °F).</p> <p>Sold by the meter.</p> <ul style="list-style-type: none"> • Sheath color: orange • For potentially explosive atmospheres. Sheath color: blue.
		7MH4702-8AG 7MH4702-8AF
		<p>Commissioning</p> <p>Commissioning charge for one belt scale with SIWAREX module (Travel and setup charge must be ordered separately)</p> <p>Scope:</p> <ul style="list-style-type: none"> • Recording of data • Checking of mechanical installation of the scale • Checking of electrical wiring and function • Dynamic adjustment of the scale <p>Requirements:</p> <ul style="list-style-type: none"> • Mechanical design functional • Modules electrically wired and tested • Adjustment weights available • Free access to scale
		9LA1110-8SM50-0AA0
		9LA1110-8RA10-0AA0
		<p>Flat charge for travel and setup in Germany</p>

Weighing Electronics

SIWAREX weighing electronics for SIMATIC

Loss-in-weight scale

Introduction

Overview



SIWAREX FTC weighing module

The very demanding task of differential dosing can be mastered without difficulty using SIWAREX FTC. The electronic weighing system provides extensive functionalities and can be commissioned in only 15 minutes using the auto setup function. The module automatically determines the most important parameters, such as dosing power, measurement time, stability and PID parameters and saves them. The parameters are continuously optimized during operation. The standard operator control and monitoring components from Siemens provide options for operating and calibrating the scales, as well as for error diagnostics.

Both single components and applications for multi-component dosing can be implemented in relation to one another.

Benefits

- High metering accuracy
- High reproducibility
- Real-time signal processing
- Openness and freedom to act for the user enable individual optimization by the company's own personnel or specialists

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

SIWAREX FTC is a function module of SIMATIC S7-300 which can be directly snapped onto the SIMATIC S7-300 or ET 200M backplane bus. Thanks to the snap-on mounting rail system, very little work is required to install/cable the 80 mm wide weighing module.

The load cells, the RS 485 serial interface, the analog output and the digital inputs and outputs are connected by means of the 40-pin standard front connector, the PC (RS 232) by means of a 9-pin SUB-D connector and the power supply by means of a separate 2-pin connector.

Operation of SIWAREX FTC in SIMATIC enables the weighing system to be completely integrated into the automation system.

Function

The main tasks of SIWAREX FTC are the high-precision measurement of the current weight, and the exact calculation of the conveyed quantity or flow. In "Force measurement" mode, SIWAREX FTC measures the force 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 or the force is determined, processed in the PLC and then displayed. For this purpose, the configuration package can be selected.

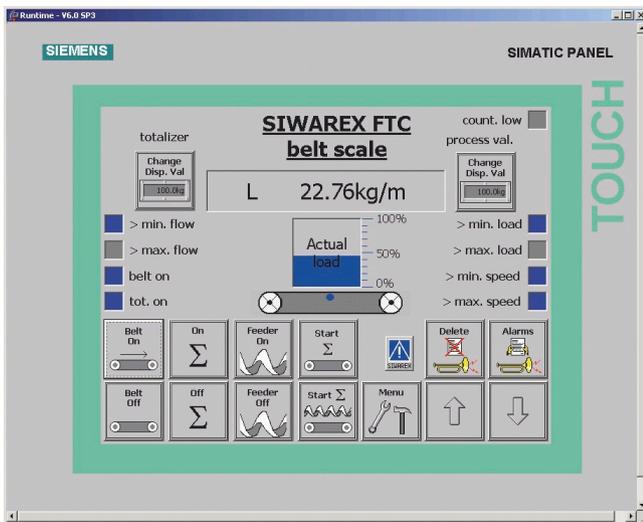
Conveyor scale / weighfeeder

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 weighing electronics for SIMATIC
Loss-in-weight scale

SIWAREX FTC



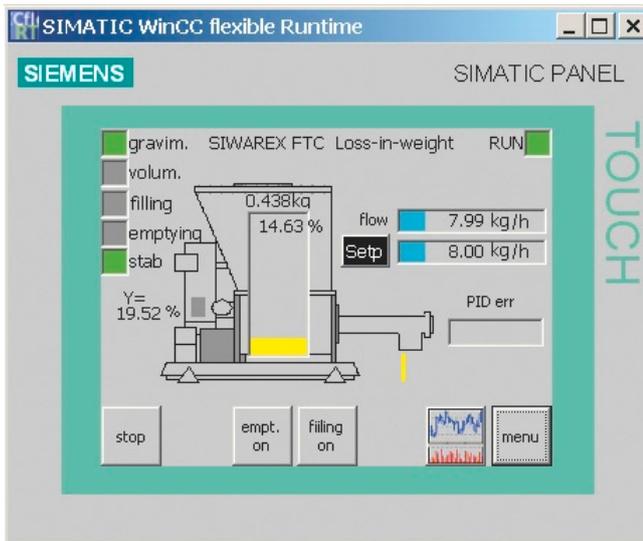
Scale faceplate of a conveyor scale

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.

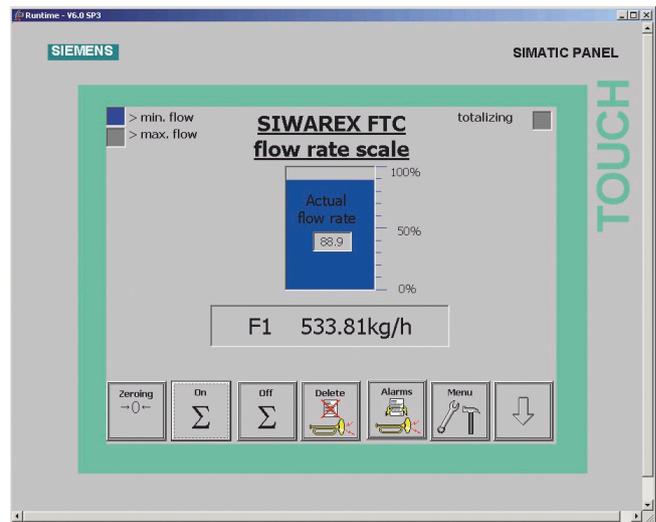
The high measurement resolution, real-time signal processing, detection and filtering of signals in the weighing electronics enable extremely high proportioning accuracy.



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.



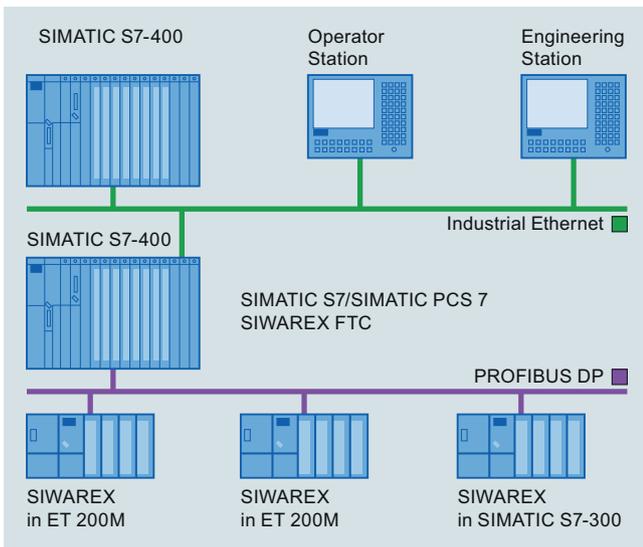
Applications of SIWAREX FTC

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.

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



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

Software

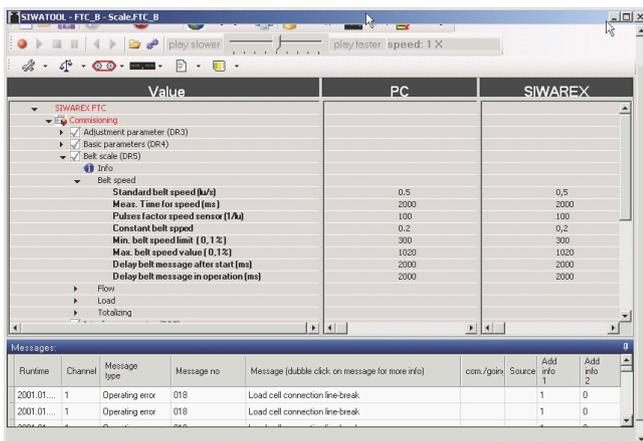
Adjustment of the scale using SIWATOOL FTC

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 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.

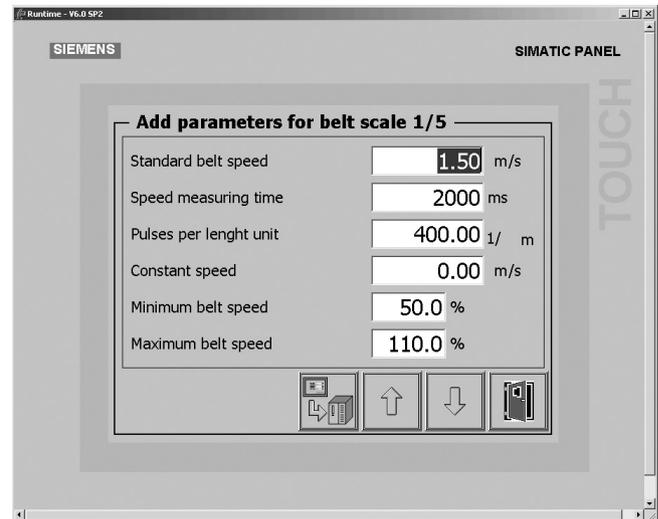
Reading out of weighing reports

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. This allows you to implement the belt scale very easily with an operator panel connected directly to the SIMATIC CPU.



Scale faceplate in the SIWAREX FTC "Getting started" software

Weighing Electronics

SIWAREX weighing electronics for SIMATIC

Loss-in-weight scale

SIWAREX FTC

Technical specifications

SIWAREX FTC	
Use in automation systems	
S7-300	Directly or via ET 200M
S7-1500	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 FTC software (RS 232)
Measuring properties	
Accuracy to EN 45501	$3 \times 6\,000 d \geq 0.5 \mu\text{V/e}$
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	
• $R_{L\min}$	> 56 Ω
	> 87 Ω with Ex interface
• $R_{L\max}$	$\leq 4\,010 \Omega$

SIWAREX FTC	
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
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} (IND) ... T_{\max} (IND) (operating temperature)	
• Horizontal installation	-10 ... 60 °C (14 ... 140 °F)
• Vertical 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 in)
Weight	
	600 g (0.44 lb)

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

Selection and ordering data	Article No.		Article No.
SIWAREX FTC Weighing electronics for S7-300 and ET 200M. Applications: Belt scales, force measurement, loss-in-weight feeders and solids flowmeters	7MH4900-3AA01		
SIWAREX FTC_B manual for belt scales Available in a range of languages Free download on the Internet at: http://www.siemens.com/weighing/documentation		SIWAREX PCS7 AddOn Library for PCS7 V8.x and V9.0 • Support of Profinet APL faceplates and function block for: • SIWAREX U • SIWAREX FTA • SIWAREX FTC_B (belt scale) • SIWAREX WP321 Classic faceplate and function block for: • SIWAREX FTC_L (Loss in weight)	7MH4900-1AK61
SIWAREX FTC_L manual for solids flowmeters and loss-in-weight feeders Available in a range of languages Free download on the Internet at: http://www.siemens.com/weighing/documentation		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
SIWAREX FTC "Getting started" for belt scales Sample software shows beginners how to program the scales in STEP 7 for conveyor scale mode Free download on the Internet at: http://www.siemens.com/weighing/documentation		40-pin front plug with screw contacts Required for each SIWAREX module • With screw contacts • With spring-loaded terminals	6ES7392-1AM00-0AA0 6ES7392-1BM01-0AA0
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 on the Internet at: http://www.siemens.com/weighing/documentation		Shield contact element Sufficient for one SIWAREX FTC module	6ES7390-5AA00-0AA0
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 on the Internet at: http://www.siemens.com/weighing/documentation		Shield connection terminal Contents: 2 units (suitable for cable with diameter 4 ... 13 mm) Note: one shield connection terminal each is required for: • Scale connection • RS 485 interface • RS 232 interface	6ES7390-5CA00-0AA0
SIWAREX FTC "Getting started" for loss-in-weight feeders Sample software shows beginners how to program scales in STEP 7 for differential proportioning weigher mode Free download on the Internet at: http://www.siemens.com/weighing/documentation		S7 DIN rail • 160 mm (6.30 in) • 480 mm (18.90 in) • 530 mm (20.87 in) • 830 mm (32.68 inch) • 2 000 mm (78.74 in)	6ES7390-1AB60-0AA0 6ES7390-1AE80-0AA0 6ES7390-1AF30-0AA0 6ES7390-1AJ30-0AA0 6ES7390-1BC00-0AA0
SIWATOOL V4 & V7 Service and commissioning software for SIWAREX weighing modules	7MH4900-1AK01	MMC memory For data recording up to 16 MB	7MH4900-2AY20

Weighing Electronics

SIWAREX weighing electronics for SIMATIC

Loss-in-weight scale

SIWAREX FTC

Selection and ordering data

Article No.

Article No.

Remote display (optional)

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

Siebert Industrieelektronik GmbH
Postfach 1180
D-66565 Eppelborn, Germany
Tel.: +49 6806/980-0
Fax: +49 6806/980-999
Internet:
<http://www.siebert-group.com/en>

Detailed information is available from the manufacturer.

SIWAREX JB junction box, aluminum housing

7MH4710-1BA

For connecting up to 4 load cells in parallel, and for connecting multiple junction boxes.

SIWAREX JB junction box, stainless steel housing

7MH4710-1EA

For connecting up to 4 load cells in parallel.

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).

Ex interface SIWAREX IS

For intrinsically-safe connection of load cells. With ATEX approval (not UL/FM). Suitable for SIWAREX electronic weighing system. Compatibility of load cells must be checked.

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

7MH4710-5BA

7MH4710-5CA

Cable (optional)

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

For connecting SIWAREX electronic weighing systems to junction box (JB), extension box (EB) and Ex interface or between two JBs.

For permanent installation. Occasional bending is possible.

External diameter:
approx. 10.8 mm (0.43 in)

Permissible ambient temperature
-40 ... +80 °C (-40 ... +176 °F).

Sold by the meter.

- Sheath color: orange
- For potentially explosive atmospheres. Sheath color: blue.

7MH4702-8AG
7MH4702-8AF

Commissioning

Commissioning charge for one belt scale with SIWAREX module

9LA1110-8SM50-0AA0

(Travel and setup charge must be ordered separately)

Scope:

- Recording of data
- Checking of mechanical installation of the scale
- Checking of electrical wiring and function
- Dynamic adjustment of the scale

Requirements:

- Mechanical design functional
- Modules electrically wired and tested
- Adjustment weights available
- Free access to scale

Flat charge for travel and setup in Germany

9LA1110-8RA10-0AA0

Overview



AI 2xSG 4/6-wire HS, ET 200SP analog input module for force and torque sensors

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.

Due to the direct connection of the force sensor to the SIMATIC-integrated evaluation electronics, there is no need for costly, difficult-to-integrate external interface converters. In addition, the measuring accuracy of SIMATIC-based solutions is increased enormously, because only one A/D conversion takes place before the measured value is available in the automation system. These properties facilitate the integration of a final product test and other tests into the SIMATIC environment.

Weighing Electronics

SIWAREX weighing electronics for SIMATIC
Force/torque measurement

AI 2xSG 4/6-wire HS

Overview



ET 200SP analog input module for force and torque sensors.

Technical specifications

SIMATIC ET 200SP, analog input module, AI 2x SG 4-, 6-Wire High Speed

General information	
Product type designation	AI 2xSG 4-/6-wire HS
Product function	
• I&M data	Yes; I&M0 to I&M3
• Measuring range scalable	Yes
• Scalable measured values	No
• Adjustment of measuring range	Yes; $\pm 0.5 \dots 320$ mV/V
Engineering with	
• STEP 7 TIA Portal configurable/ integrated as of version	V14 SP1
• STEP 7 configurable/integrated as of version	V5.6
• PROFIBUS as of GSD version/ GSD revision	V03.01.105
• PROFINET as of GSD version/ GSD revision	GSDML V2.33
Operating mode	
• Oversampling	Yes; 2 channels per module
• MSI	No
CiR – Configuration in RUN	
Reparameterization possible in RUN	Yes
Calibration possible in RUN	No
Supply voltage	
Rated value (DC)	24 V
Reverse polarity protection	Yes
Analog inputs	
Number of analog inputs	2; Differential inputs
Cycle time (all channels), min.	100 μ s
Analog input with oversampling	Yes
• Values per cycle, max.	14
• Resolution, min.	100 μ s
Input ranges	
• Strain gauges (full bridges)	Yes
Cable length	
• shielded, max.	500 m

SIMATIC ET 200SP, analog input module, AI 2x SG 4-, 6-Wire High Speed

Analog value generation for the inputs	
Measurement principle	Sigma Delta
Integration and conversion time/ resolution per channel	
• Resolution with overrange (bit including sign), max.	28 bit; 16 bits with oversampling
• Integration time, parameterizable	Yes
• Interference voltage suppression for interference frequency f1 in Hz	60 / 50 Hz / no
• Conversion time (per channel)	100 μ s
Smoothing of measured values	
• IIR low-pass filter frequency	0.01 ... 600 Hz
• IIR low-pass filter ordinal number	1 ... 4
• Notch filter frequency	0.1 ... 1 000 Hz
• Notch filter quality	5.00 ... 250.00
• Average value filter	0.1 ... 655.3 ms
Encoder	
Connection of signal encoders	
• For strain gauges (full bridges) with 4-conductor connection	Yes
• For strain gauges (full bridges) with 6-conductor connection	Yes
• Resistance of full bridge, min.	80 Ω
• Resistance of full bridge, max.	5 000 Ω
Errors/accuracies	
Temperature coefficient, zero point	$\leq \pm 0.25$ μ V/K
Temperature coefficient, span, 4-conductor connection (referred to end value)	$\leq \pm 5$ ppm/K
Temperature coefficient, span, 6-conductor connection (referred to end value)	$\leq \pm 10$ ppm/K
Basic error limit (operational limit at 25 °C)	
• Voltage, relative to input range, (+/-)	0.05 %; See manual for details

SIMATIC ET 200SP, analog input module, AI 2x SG 4-, 6-Wire High Speed	
Isochronous mode	
Isochronous operation (application synchronized up to terminal)	Yes
Filtering and processing time (TCI), min.	87 µs
Bus cycle time (TDP), min.	125 µs
Interrupts/diagnostics/status information	
Diagnostics function	Yes
Alarms	
• Diagnostic alarm	Yes
• Limit value alarm	Yes; two upper and two lower limit values in each case
Diagnostic messages	
• Monitoring the supply voltage	Yes
• Wire-break	Yes
• Short-circuit	Yes
• Group error	Yes
• Overflow/underflow	Yes
Diagnostics indication LED	
• Monitoring of the supply voltage (PWR-LED)	Yes; green PWR LED
• Channel status display	Yes; green LED
• for channel diagnostics	Yes; Red LED
• for module diagnostics	Yes; green/red DIAG LED
Potential separation	
Potential separation channels	
• between the channels and backplane bus	Yes
Isolation	
Isolation tested with	707 V DC (type test)
Standards, approvals, certificates	
Suitable for safety functions	No
Ambient conditions	
Ambient temperature during operation	
• horizontal installation, min.	-25 °C
• horizontal installation, max.	60 °C
• vertical installation, min.	-25 °C
• vertical installation, max.	50 °C
Altitude during operation relating to sea level	
• Ambient air temperature-barometric pressure-altitude	$T_{min} \dots T_{max}$ at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m) // $T_{min} \dots (T_{max} - 1 \text{ K}/100 \text{ m})$ at 795 hPa ... 701 hPa (+2 000 m ... +3 000 m)
Dimensions	
Width	15 mm
Height	73 mm
Depth	58 mm
Weights	
Weight, approx.	45 g

Selection and ordering data

Article No.

SIMATIC ET 200SP analog input module, AI 2x SG 4, 6-wire high speed**7MH4134-6LB00-0DA0**

Suitable for BU type A0 color code CC00, channel diagnostics, 28/16 bit, +/- 0.05% for full bridge strain gauges

Accessories

SIMATIC ET 200SP, BaseUnit BU15-P16+A0+2B, BU type A0, push-in terminals, without AUX terminals, bridged to the left, W x H: 15 mm x 117 mm

6ES7193-6BP00-0BA0

SIMATIC ET 200SP, BaseUnit BU15-P16+A0+2D, BU type A0, push-in terminals, without AUX terminals, new load group, W x H: 15 mm x 117 mm

6ES7193-6BP00-0DA0

SIMATIC ET 200SP, BaseUnit BU15-P16+A10+2B, BU type A0, push-in terminals, with 10 AUX terminals, bridged to the left, W x H: 15 mm x 141 mm

6ES7193-6BP20-0BA0

SIMATIC ET 200SP, BaseUnit BU15-P16+A10+2D, BU type A0, push-in terminals, without AUX terminals, new load group, W x H: 15 mm x 141 mm

6ES7193-6BP20-0DA0

SIMATIC ET 200SP, 5 shield terminals and 5 shield supports, for direct connection

6ES7193-6SC00-1AM0

Overview



SIWAREX IS New Generation

The Ex-Interface SIWAREX IS can be used for SIWAREX weighing modules. It comprises six safety barriers and has been granted the approvals stated in the technical data. The Ex interface must be installed outside the potentially explosive area. It is installed inside the control cabinet, preferably under the electronic weighing system, and fixed using a 35 mm mounting rail.

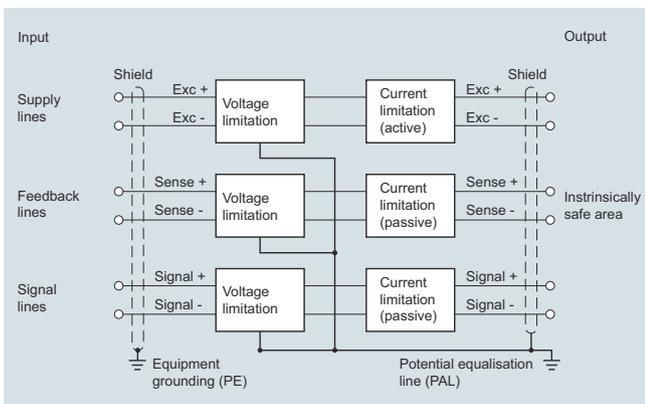
The SIWAREX IS only interferes with the load cell signal to a very small extent and is therefore approved for scales requiring verification.

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 load cells depending on input voltage	$\geq 8.7 \Omega/V$	$\geq 18 \Omega/V$
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>Intrinsically safe circuits</i>		
Load cell powering		
No-load voltage U_{01}	≤ 13.1 V DC	
Voltage against equipotential bonding cond.	≤ 6.6 V DC	
Short-circuit current I_{K1}	≤ 120 mA	≤ 58 mA
Sensor line		
No-load voltage U_{02}	≤ 14.4 V DC	
Voltage against equipotential bonding cond.	≤ 7.2 V DC	
Short-circuit current I_{K2}	≤ 25 mA	
Measuring signal line		
No-load voltage U_{03}	≤ 12.8 V DC	
Voltage against equipotential bonding cond.	≤ 6.4 V DC	
Short-circuit current I_{K3}	≤ 54 mA	
Total connection load (when circuits are connected together)		
No-load voltage U_0	≤ 14.4 V DC	
Short-circuit current I_K	≤ 199 mA	≤ 137 mA
Power P_0	≤ 1.835 W	≤ 1.025 W
For gas group II C		
Max. permissible external capacitance C_{a3}	500 nF	450 nF
Max. permissible external inductance L_a	0.15 mH	0.5 mH
For gas group II B		
Max. permissible external capacitance C_{a3}	2 000 nF	
Max. permissible external inductance L_a	1 mH	2 mH

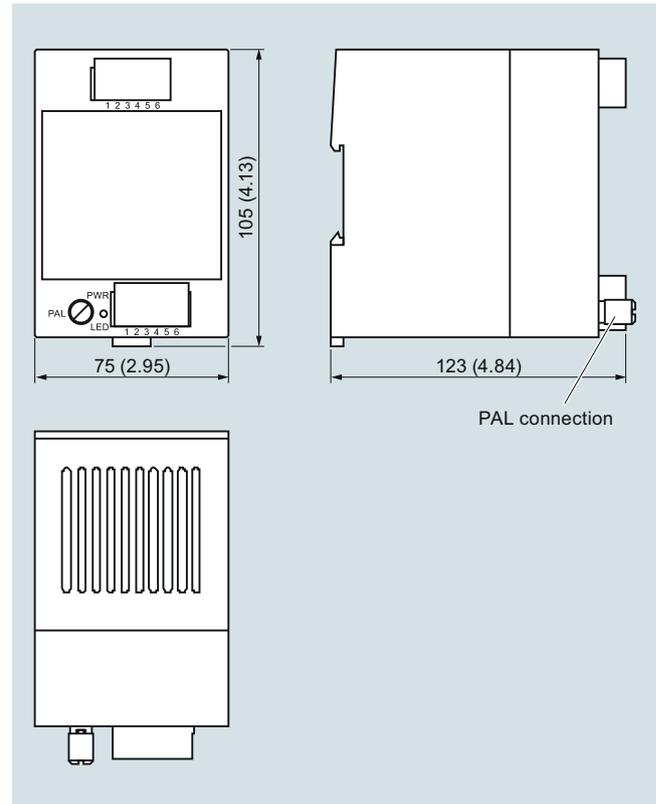
Weighing Electronics

SIWAREX weighing electronics for SIMATIC
Ex-Interface

SIWAREX IS

Ex interface, type SIWAREX IS	Standard	Low-current version
General data		
Weight, approx.	500 g	
Permissible ambient temperature		
• During operation	-10 ... +60 °C (14 ... 140 °F) (for vertical mounting)	
• During operation for legal-for-trade medium accuracy weighing machines	-10 ... +40 °C (14 ... 104 °F) (for vertical mounting)	
• During transportation and storage	-40 ... +85 °C (-40 ... +185 °F)	
Permissible relative humidity	≤ 95%	
Degree of protection	IP20	
Approvals		
EC type test certificates No.	TÜV 01 ATEX 1722 X	
Type of explosion protection	Intrinsic safety "i" II (2) G [Ex ibGb] IIC or II (2) D [Ex ib Db] IIIC	
IEC certification	IECEX TUN 06.0002 X [Ex ib Gb] IIC or [Ex ib Db] IIIC	
Calibration approval (German Testing Laboratory test certificate) according to	EN 45501, OIML R76-1, 90/384/EEC	

Dimensional drawings



SIWAREX IS Ex interface, dimensions in mm (inch)

Selection and ordering data

Article No.

Ex interface SIWAREX IS

For intrinsically-safe connection of load cells. Suitable for SIWAREX electronic weighing system. The compatibility of the load cells must be checked.

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

7MH4710-5BA

7MH4710-5CA

Cable (optional)

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

For connecting SIWAREX electronic weighing systems to junction box (JB), extension box (EB) and Ex interface or between two JBs.

For permanent installation. Occasional bending is possible.

External diameter:
approx. 10.8 mm (0.43 in)

Permissible ambient temperature
-40 ... +80 °C (-40 ... +176 °F).

Sold by the meter.

- Sheath color orange.
- For potentially explosive atmospheres. Sheath color: blue.

7MH4702-8AG

7MH4702-8AF

Overview

Stand-alone platform and hopper scales

Weighing silos, vessels or platforms is a standard task in the industry. The corresponding SIWAREX electronics offers comprehensive properties and functions that fulfil all requirements.

Platform scales

In the various branches of industry the use of platform weighing machines is bound to very different requirements, in particular with regard to the load classes.

While platform weighing machines can also be used for small loads, road vehicle and track scales are especially suitable for heavy loads.

Hopper scales

In almost every industry, liquids, powders, bulk goods or gases are produced and stored in vessels. To ensure their availability, the exact fill levels of these vessels must be known.

Weighing Electronics

Stand-alone electronics
Platform/hopper scale

SIWAREX WP231

Overview



SIWAREX WP231 is a versatile, legal for trade 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
- Legal-for-trade according to OIML R-76
- 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
- Automatic calibration without the need for calibration weights
- Supports replacement of module without recalibration of scales
- Use in hazardous area zone 2
- Connection of digital force compensation load cells from WIPOTEC and Mettler-Toledo (type WM and PBK)

Application

SIWAREX WP231 is the optimum solution wherever load cells are used for measuring tasks. The following are typical SIWAREX WP231 applications:

- Non-automatic weighing instruments, also legal for trade
- 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, hopper scales and crane scales

Design

SIWAREX WP231 is a compact technology module in the SIMATIC S7-1200 and communicates directly via the system bus with S7-1200 components. 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. An 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.

Integration in the plant environment

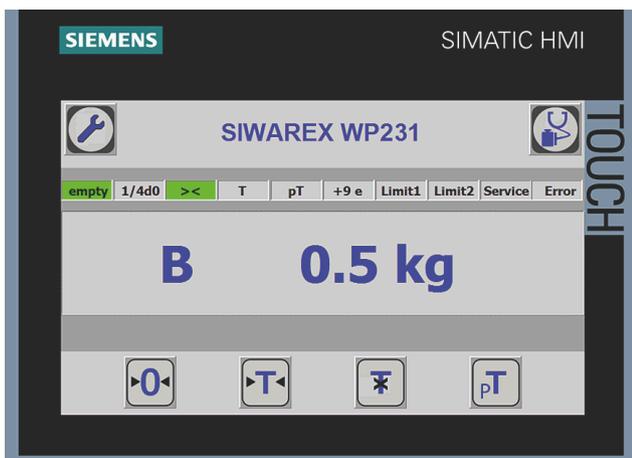
SIWAREX WP231 is directly integrated into the SIMATIC S7-1200 via the SIMATIC bus. All scale parameters can be read and edited by the CPU. Therefore a complete commissioning of the scales by the CPU or by a connected HMI device is possible. A wide variety of connection options are provided via the RS 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 TIA Portal program and offers a basis for application programming. This allows you to connect the scale application either directly to the SIMATIC CPU or to an operator panel connected directly to the SIWAREX WP231.

A "Ready for use" example program is available in the TIA Portal for legal for trade applications. This is designed so that it can be used directly with the legal trade SecureDisplay software. Required is a Windows CE-based operating panel (for example, SIMATIC Comfort Touch series).

SIMATIC Basic and Key Panels cannot be used for legal for trade applications.

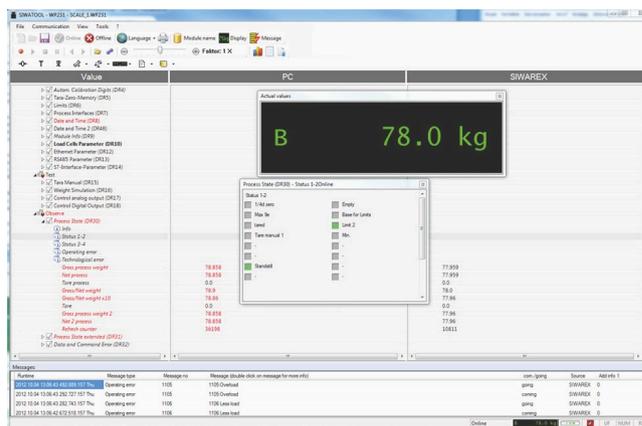
Software

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

The program enables the user to perform scale calibration 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:

- Parameter assignment and calibration 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 from the module in a backup file.

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.

Weighing Electronics

Stand-alone electronics
Platform/hopper scale

SIWAREX WP231

Technical specifications

SIWAREX WP231	
Integration in automation systems	
S7-1200	SIMATIC S7-1200 system bus
Operator panel and/or automation systems from other vendors	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, Siebert remote display) • Ethernet (SIWATOOL V7, Modbus TCP/IP) • Analog output 0/4 - 20 mA • 4 x digital outputs, 24 V DC floating, short-circuit proof • 4 x digital inputs, 24 V DC floating
Commissioning options	<ul style="list-style-type: none"> • Using SIWATOOL V7 • Using function block in SIMATIC S7-1200 CPU / Touch Panel • Using Modbus TCP/IP • Using Modbus RTU
Measuring accuracy	
EU type approval as non-automatic weighing instrument, trade class III	3000 d 0.5 μ V/e
Error limit according to DIN 1319-1 of full-scale value at 20 °C \pm 10 K (68 °F \pm 10 K)	0.05%
Internal resolution	Up to \pm 4 million parts
Measuring frequency	100 / 120 Hz
Digital filter	Variable adjustable low-pass and average filter
Typical applications	<ul style="list-style-type: none"> • Non-automatic weighing instruments • Force measurements • Fill-level monitoring • Belt tension monitors
Weighing functions	
Weight values	<ul style="list-style-type: none"> • Gross • Net • Tare
Limit values	<ul style="list-style-type: none"> • 2 x min/max • Empty
Zeroing	Per command
Tare	Per command
Tare specification	Per command

SIWAREX WP231	
Load cells	Full-bridge strain gauges in 4-wire or 6-wire system
Load cell powering	
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 (with 4 mV/V sensors)	-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 (compatibility of the load cells must be checked)
Approvals/certificates	<ul style="list-style-type: none"> • ATEX Zone 2 • UL • EAC • KCC • RCM • OIML R76 • Design approval 2009/23/EC (NAWI)
Calibration approval	EU type approval OIML R76
Auxiliary power supply	
Rated voltage	24 V DC
Max. power consumption	200 mA
Max. power consumption SIMATIC Bus	3 mA
IP degree of protection according to DIN EN 60529; IEC 60529	IP20
Climatic requirements	
T_{min} (IND) ... T_{max} (IND) (operating temperature)	
• Vertical installation	-10 ... +40 °C (14 ... 104 °F)
• Horizontal installation	-10 ... +55 °C (14 ... 131 °F)
EMC requirements	according to EN 45501
Dimensions	70 x 75 x 100 mm (2.76 x 2.95 x 3.94 in)

Selection and ordering data	Article No.		Article No.
SIWAREX WP231 weighing module Single-channel, legal-for-trade, for NAWI non-automatic weighing instruments (e.g. platform or hopper scales) with analog load cells (1–4 mV/V), 1 x LC, 4 x DQ, 4 x DI, 1 x AQ, 1 x RS 485, Ethernet port.	7MH4960-2AA01	Remote display (optional) The digital remote displays can be connected directly to the SIWAREX WP231 via the RS 485 interface. Suitable remote display: S102 <i>Siebert Industrieelektronik GmbH</i> <i>Postfach 1180</i> <i>D-66565 Eppelborn, Germany</i> <i>Tel.: +49 6806/980-0</i> <i>Fax: +49 6806/980-999</i>	
SIWAREX S7-1200 manual Available in a range of languages Free download on the Internet at: http://www.siemens.com/weighing/documentation		Internet: http://www.siebert-group.com/en Detailed information is available from the manufacturer.	
SIWAREX WP231 "Ready for Use" Complete software package for non-automatic weighing instrument (for S7-1200 and a directly connected operator panel). Free download on the Internet at: http://www.siemens.com/weighing/documentation		Accessories SIWAREX JB junction box, aluminum housing For connecting up to 4 load cells in parallel, and for connecting multiple junction boxes.	7MH4710-1BA
SIWAREX WP231 "Ready for Use - legal-for-trade" Software package for legal for trade non-automatic weighing instruments for S7-1200. Free download on the Internet at: http://www.siemens.com/weighing/documentation		SIWAREX JB junction box, stainless steel housing For connecting up to 4 load cells in parallel.	7MH4710-1EA
Software SecureDisplay Software for a legal trade display on Windows CE-based Panel. SIMATIC Basic and Key Panels are excluded. Free download on the Internet at: http://www.siemens.com/weighing/documentation		SIWAREX JB junction box, stainless steel housing (ATEX) For parallel connection of up to 4 load cells (for zone allocation, see manual or type-examination certificate).	7MH4710-1EA01
SIWATOOL V4 & V7 Service and commissioning software for SIWAREX weighing modules	7MH4900-1AK01	Ex interface SIWAREX IS For intrinsically-safe connection of load cells. With ATEX approval (not UL/FM). Suitable for SIWAREX electronic weighing system. Compatibility of load cells must be checked. • Short-circuit current < 199 mA DC • Short-circuit current < 137 mA DC	7MH4710-5BA 7MH4710-5CA
Calibration set for SIWAREX WP2xx Valid for SIWAREX WP231 K and SIWAREX WP251. For verification of up to 3 scales, comprising: <ul style="list-style-type: none"> • 3 x inscription foil for labeling • 1 x protective film • 3 x calibration protection plate • Guidelines for verification, certificates and approvals, adaptable label, SIWAREX WP 	7MH4960-0AY10	Cable (optional) Cable Li2Y 1 x 2 x 0.75 ST + 2 x (2 x 0.34 ST) – CY For connecting SIWAREX electronic weighing systems to junction box (JB), extension box (EB) and Ex interface or between two JBs. For permanent installation. Occasional bending is possible. External diameter: approx. 10.8 mm (0.43 in) Permissible ambient temperature -40 ... +80 °C (-40 ... +176 °F). Sold by the meter. <ul style="list-style-type: none"> • Sheath color: orange • For potentially explosive atmospheres. Sheath color: blue. 	7MH4710-5BA 7MH4710-5CA 7MH4702-8AG 7MH4702-8AF
Ethernet cable patch cord 2 m (7 ft) For connecting SIWAREX WP231 to a PC (SIWATOOL), SIMATIC CPU, panel, etc.	6XV1850-2GH20	Ground terminal for connecting the load cell cable shield to the grounded DIN rail	6ES5728-8MA11

Weighing Electronics

Stand-alone electronics
Platform/hopper scale

SIWAREX WP231

Selection and ordering data

Article No.

Commissioning

Commissioning charge for one static scale with SIWAREX module

9LA1110-8SN50-0AA0

(Travel and setup charge must be ordered separately)

Scope:

- Recording of data
- Checking of mechanical installation of the scale
- Checking of electrical wiring and function
- Static adjustment of the scale

Requirements:

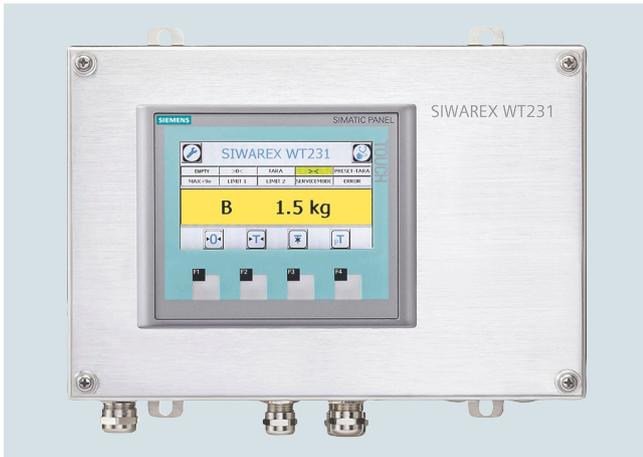
- Mechanical design functional
- Modules electrically wired and tested
- Adjustment weights available
- Free access to scale

Flat charge for travel and setup in Germany

9LA1110-8RA10-0AA0

2

Overview



SIWAREX WT231 weighing module

The SIWAREX WT231 is a weighing terminal for industrial use. Siemens standard components are installed in a stainless steel enclosure with numerous connection options. This ensures the tried and tested SIWAREX quality as standalone solution and is ideal for container weighers or platform scales.

Benefits

SIWAREX WT231 offers the following key advantages:

- Complete solution – no configuration in SIMATIC required
- Fast and easy commissioning due to intuitive operating concept
- The stainless steel enclosure permits applications in many diverse environments
- Integrated connecting terminals for up to 4 load cells
- Flexible connection to different systems through diverse interfaces
 - four digital inputs
 - four digital outputs
 - one analog output
 - RS 485 interface and Modbus RTU
- High resolution of the load cell signal of up to ± 4 million parts
- Comprehensive diagnostics functions
- Recovery-point for the simple restoration of all parameters
- Automatic calibration is possible without the need for calibration weights
- All diagnostic and error messages as well as all scale parameters in plain text
- 100 ... 240 V AC supply range

Application

SIWAREX WT231 is the optimum solution wherever strain gauge sensors, such as load cells, force sensors or torque measuring shafts, are used for measuring tasks. The typical applications of SIWAREX WT231 are:

- Non-automatic scales
- Fill level monitoring of silos and bunkers
- Measuring of crane and cable loads
- Load measuring for industrial lifts and rolling mills
- Force measuring, container weighers, platform scales and crane scales

Design

SIWAREX WT231 is a standalone weighing terminal based on the tried and tested Siemens SIWAREX WP231 products and the Siemens SIMATIC KTP 400 touch display. Supplemented with a connection board and a wide-range power supply, these components are preinstalled in a compact stainless steel enclosure. The enclosure can be wall mounted and has 9 cable entries, of which 5 are equipped with cable glands at the factory. A variety of interfaces support the integration into the plant environment.

The SIWAREX WT231 is preconfigured with the SIWAREX "Ready for use" software. This means that no further commissioning is required in SIMATIC.

Function

The primary task of SIWAREX WT231 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. The SIWAREX WT231 is calibrated at the factory. 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 WT231 monitors two freely programmable limits (optionally min/max) as well as the empty range. A violation of the limit values is signaled.

1.3.1 Limits

	Limit 1	Limit 2	Empty range
Limit "ON"	99.00 %	50.00 %	1.00 %
Delay "ON"	0.000 s	0.000 s	1.000 s
Limit "OFF"	98.00 %	49.00 %	% of 100.0 kg
Delay "OFF"	0.000 s	0.000 s	
Reference	Gross weight (% of max. weigh)		

SIWAREX WT231 operating view "Limit values"

Weighing Electronics

Stand-alone electronics
Platform/hopper scale

SIWAREX WT231

Software

The touch panel is preconfigured with the SIWAREX "Ready for use" software. Thus the user interface is clearly structured and can be operated intuitively; the languages German, English, French, and Chinese are available. The structured menu-based operation facilitates the operation of the scale and supports the user through guided commissioning.

Furthermore, a variety of diagnostics options are offered. Using the trace function, weighing histories can be recorded and exported. There is also the option of simulating the behavior of the scale with the device.

The service tool "SIWATOOL V7", which is included in the optional configuration package, is required for reading out this trace data. In addition, using SIWATOOL a scale backup can be created and reimported whenever required. Thus, in the event of an error, the WT231 can be replaced within seconds without requiring a new adjustment.

Integration

Integration in the plant environment

Using the onboard RS 485 interface and the Modbus RTU protocol, the SIWAREX WT231 can be connected to many different automation systems or a PC.

Furthermore, 4 digital inputs, 4 digital outputs, and an analog output are available. Direct, straightforward further processing of alarms or status messages is thus made possible.

Technical specifications

SIWAREX WT231	
Enclosure	Stainless steel enclosure (1.4301) with the interfaces: <ul style="list-style-type: none"> • 1 x wall bushing for power supply • 4 x wall bushing for load cell connection with EMC screw connection • 4 x wall bushing with blanking plugs • Ground connection bolt
Connection board	Internal connection board <ul style="list-style-type: none"> • Connection of up to 4 load cells • Type of analog output • Type of 24 V direct voltage
Integration in automation systems	Any automation systems Via RS 485 (Modbus RTU)
Communication interfaces	<ul style="list-style-type: none"> • RS 485 (Modbus RTU) • 4 digital outputs (24 V DC) • 4 digital inputs (24 V DC) • 1 analog output (0/4 ... 20 mA)
Commissioning options for the scale	Directly via the color touch panel and the preinstalled "Ready for use" operating software
Calibration approval	No
Internal resolution	up to ± 4 million parts
Number of measurements/second (internal)	100 Hz
Filter	<ul style="list-style-type: none"> • Low-pass filter 0.1 ... 50 Hz • Mean value filter
Weighing functions	<ul style="list-style-type: none"> • Gross • Net • Tare
Weight values	<ul style="list-style-type: none"> • Min/max • Empty
Limits	Per command
Zeroing function	Per command
Tare function	Per command
Tare specification	Per command

SIWAREX WT231	
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} > 40 Ω • R_{Lmax} < 4 100 Ω
With SIWAREX IS Ex interface	<ul style="list-style-type: none"> • R_{Lmin} > 50 Ω • R_{Lmax} < 4 100 Ω
Load cell characteristic	1 ... 4 mV/V
Permissible range of measuring signal (at greatest set characteristic value)	-21.3 ... +21.3 mV
Max. distance of load cells	500 m (229.66 ft)
Auxiliary power supply	Rated voltage 100 ... 240 V AC
Line frequency	50 ... 60 Hz
Max. power consumption	0.12 A
IP degree of protection to DIN EN 60529; IEC 60529	IP65
Climatic requirements	T_{min} (IND) ... T_{max} (IND) (operating temperature)
Vertical installation	0 ... +40 °C (32 ... 104 °F)
EMC requirements according to	EN 45501
Dimensions	264 x 185 x 97 mm (10.39 x 7.28 x 3.82 in)
Weight	4 kg (8.82 lb)

Selection and ordering data	Article No.		Article No.
SIWAREX WT231 Weighing terminal for industrial scales SIWAREX WT231 Manual In various languages. Free download on the Internet at: http://www.siemens.com/weighing/documentation	7MH4965-2AA01	Cable (optional) Cable Li2Y 1 x 2 x 0.75 ST + 2 x (2 x 0.34 ST) – CY For connecting SIWAREX electronic weighing systems to junction box (JB), extension box (EB) and Ex interface or between two JBs. For permanent installation. Occasional bending is possible. External diameter: approx. 10.8 mm (0.43 in) Permissible ambient temperature -40 ... +80 °C (-40 ... +176 °F). Sold by the meter.	
Accessories SIWATOOL V4 & V7 Service and commissioning software for SIWAREX weighing modules	7MH4900-1AK01	Sold by the meter.	
Ethernet cable patch cord 2 m (7 ft) For connecting SIWAREX WT231 to a PC (SIWATOOL), SIMATIC CPU, panel, etc.	6XV1850-2GH20	<ul style="list-style-type: none"> • Sheath color: orange • For potentially explosive atmospheres. Sheath color: blue. 	7MH4702-8AG 7MH4702-8AF
SIWAREX JB junction box, aluminum housing For connecting up to 4 load cells in parallel, and for connecting multiple junction boxes.	7MH4710-1BA	Commissioning Commissioning charge for one static scale with SIWAREX module (Travel and setup charge must be ordered separately)	9LA1110-8SN50-0AA0
SIWAREX JB junction box, stainless steel housing For connecting up to 4 load cells in parallel.	7MH4710-1EA	Scope: <ul style="list-style-type: none"> • Recording of data • Checking of mechanical installation of the scale • Checking of electrical wiring and function • Static adjustment of the scale 	
SIWAREX JB junction box, stainless steel housing (ATEX) For parallel connection of up to 4 load cells (for zone allocation, see manual or type-examination certificate).	7MH4710-1EA01	Requirements: <ul style="list-style-type: none"> • Mechanical design functional • Modules electrically wired and tested • Adjustment weights available • Free access to scale 	
		Flat charge for travel and setup in Germany	9LA1110-8RA10-0AA0

Weighing Electronics

Stand-alone electronics

Dosing/Filling/Bagging scale

Introduction

Overview



SIWAREX WP251 electronic weighing module

Typical requirements in many industries are high-precision mixing and dosing, and packing and filling at high speed. The corresponding SIWAREX electronics offers comprehensive properties and functions that fulfil all requirements.

The dosing process used in production operations depends on a variety of factors: Depending on the type and quantity of materials weighed, different dosing systems and weighing processes are required. It must be possible to fill liquid or solid goods, such as cement, quickly and precisely.

Overview



SIWAREX WP251 electronic weighing module

SIWAREX WP251 is a flexible weighing module for dosing and filling processes. The compact module can be installed seamlessly in the SIMATIC S7-1200 automation system. It can also be used without a SIMATIC CPU in stand-alone mode.

Benefits

SIWAREX WP251 offers the following key advantages:

- Uniform design technology and consistent communication in SIMATIC S7-1200
- Uniform configuration with TIA Portal
- Legal-for-trade according to OIML R-76, R-51 and R-61
- Legal-for-trade according to OIML R-107 (available soon)
- Internal alibi memory for up to 550 000 entries
- Operation without SIMATIC CPU also possible
- Ethernet port ex works (Modbus TCP/IP / SIWATOOL)
- RS 485 interface ex works (Modbus RTU / remote display)
- Four digital inputs and outputs, one analog output ex works
- Measurement of weight and force with a high resolution of up to ± 4 million parts and an accuracy of 0.05%
- Simple calibration and setup of the scale using SIWATOOL V7 via the Ethernet interface
- Recovery-point for the simple restoration of all parameters
- Automatic calibration without the need for calibration weights
- Supports replacement of module without recalibration of scales
- Direct use in hazardous area zone 2

Application

SIWAREX WP251 is the optimum solution wherever fast and precise dosing and filling are required. The typical applications of SIWAREX WP251 are:

- Automatic catchweighing instruments (ACI) - legal-for-trade in accordance with OIML R-51
- Gravimetric filling instruments (GFI) - legal-for-trade in accordance with OIML R-61
- Non-automatic weighing instrument (NAWI) - legal-for-trade in accordance with OIML R-76
- Discontinuous Totalizing Automatic Weighing Instrument (SWT) Legal-for-trade according to OIML R-107 (in preparation)

Design

SIWAREX WP251 is a compact technology module in the SIMATIC S7-1200, and communicates directly via the system bus with the SIMATIC S7-1200 controller.

The compact weighing module with a width of 70 mm (2.76 inches) is installed using a mounting rail. This is extremely user-friendly.

The connections for the power supply, the load cells, the RS 485 port, the digital inputs/outputs, and the analog output are located on removable screw connector blocks. An RJ45 port is available for the Ethernet connection (SIWATOOL and Modbus TCP/IP).

Function

SIWAREX WP251 controls dosing and filling processes completely autonomously. The dosing valves (coarse/fine flow) can be controlled directly via the four digital outputs of the module. This achieves maximum accuracy since the weighing process is controlled completely independently of the CPU and its cycle time.

The CPU can be used to manage recipes and material parameters. These parameters and the desired setpoint are then transferred to SIWAREX WP251 by function block, and the dosing process is started. SIWAREX WP251 automatically optimizes the shut-off points, generates statistics, and logs every dosing task in the internal protocol memory that is also accessible from the CPU and can be read out by the CPU.

Diverse options are available for commissioning. The SIWAREX WP251 function block enables full access to all parameters of the SIWAREX WP251. The downloadable example application "ready-for-use" provides full data access to the weighing module, calibration options and operation of the scale - without any additional programming effort. Further, the PC service software SIWATOOL V7 that communicates via Ethernet with the SIWAREX module can be used for commissioning. Access using W-LAN is thus also possible by means of a WIFI access point. Consequently, remote access via the Internet is also no problem. For servicing purposes, centralized access to all scales from a single location is possible - worldwide. In addition, there is full access to all parameters and commands, both via the RS485 port (Modbus RTU) and via the Ethernet interface (Modbus TCP/IP), meaning that full commissioning and operation can also take place via these channels.

Weighing Electronics

Stand-alone electronics

Dosing/Filling/Bagging scale

SIWAREX WP251

Weighing functions

SIWAREX WP251 provides the weighing modes Non-automatic weighing instrument, Automatic catchweighing instrument and Automatic gravimetric filling instrument.

In the operating modes Non-automatic weighing instrument and Automatic catchweighing instrument, there is a choice between filling mode and emptying mode. The entire filling or dosing process is fully controlled from SIWAREX WP251. It is only necessary to transfer a setpoint and a start command to the module. The coarse flow, fine flow and empty signals can be switched directly via the digital outputs of the module.

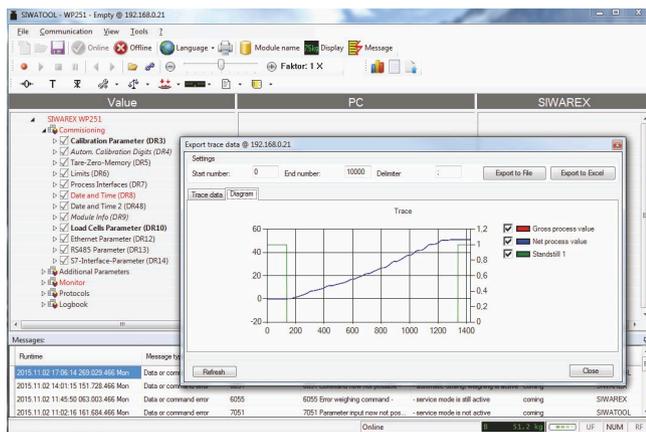
The weight, as well as all scale and dosing status bits, is available cyclically in the program code in the PLC for further evaluation. If stand-alone mode of the module is activated, there is an additional guarantee that dosing and operation of the scales can continue even in the event of a CPU stop.

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 calibration 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 SIWAREX WP251 is extremely helpful when analyzing events.

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

- Parameter assignment and calibration of the scale
- Testing of scale properties
- Recording and analysis of weighing sequence



Software SIWATOOL V7, layout of the program window

It is also extremely helpful to analyze the diagnostics buffer which can be saved together with the parameters from the module in a backup file.

Trace mode is provided to optimize the weighing sequences in the SIWAREX WP251 weighing module. The recorded weight values and associated states can be displayed as trends using SIWATOOL V7 and MS Excel.

Upgrading firmware

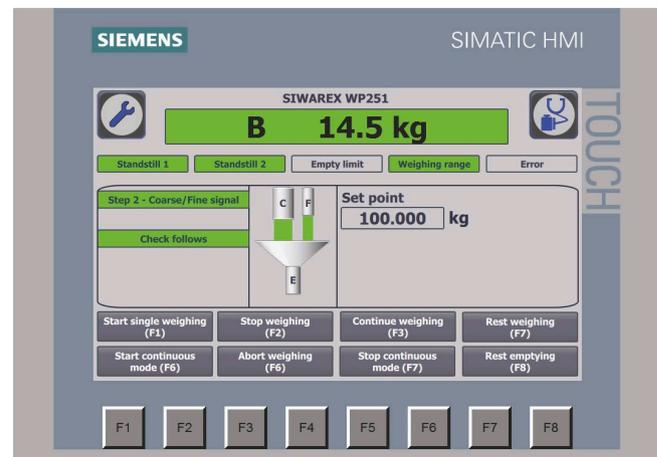
An additional program function can be used to download a new firmware version onto the SIWAREX WP251 on site. This means that firmware upgrades can be carried out on site as required anywhere in the world.

Integration

Integration into the automation environment

SIWAREX WP251 is part of the SIMATIC S7-1200 basic controller range, and is integrated seamlessly into the TIA Portal. The free function block enables full access to all parameters, actual values, setpoints, weight values and status information (e.g. limits, coarse flow signal, fine flow signal, empty signal) conveniently and without programming effort. Customized operator interfaces can thus be created in conjunction with SIMATIC HMI touch panels. Management of several languages can also be easily implemented and organized.

The example project "Ready-for-use SIWAREX WP251" is available free of charge to help you to get started quickly and simply. This TIA portal project contains both the function block and a fully fledged visualization system for commissioning, operating and monitoring the SIWAREX WP251. The visualization can be freely edited and adapted, or transferred completely into an existing HMI project.



Stand-alone mode

Alternatively, SIWAREX WP251 can also be used without a SIMATIC CPU. In this case, the module is connected with a supply voltage of 24 V DC only. In this case, a PC (e.g. using an OPC server) or a Modbus-enabled operator panel can be used for operator input. Both Modbus interfaces of SIWAREX WP251 (TCP/IP and RTU) enable access to all parameters, actual values, setpoints, weight values and status information. A customized and plant-specific operator interface can thus be created on the PC or the Modbus-enabled operator panel. Integration into third-party systems is also no problem via the Modbus interfaces.

Technical specifications

SIWAREX WP251	
Weighing modes	<ul style="list-style-type: none"> Non-automatic weighing instrument (NAWI) (filling + removal) (legal-for-trade according to OIML R-76) Automatic catchweighing instruments (ACI) (filling + removal) (legal-for-trade according to OIML R-51) Gravimetric filling instruments (GFI) (legal-for-trade according to OIML R-61) Discontinuous Totalizing Automatic Weighing Instrument (SWT) (legal-for-trade according to OIML R-107 - in preparation)
Integration in automation systems	
S7-1200	SIMATIC S7-1200 system bus
Operator panel and/or automation systems from other vendors	Via Ethernet (Modbus TCP/IP) or RS 485 (Modbus RTU)
Ports	<ul style="list-style-type: none"> 1 x SIMATIC S7-1200 system bus 1 x Ethernet (SIWATOOL and Modbus TCP/IP) 1 x RS 485 (Modbus RTU or remote display) 1 x analog output (0/4 ... 20 mA) 4 x digital inputs (24 V DC, floating) 4 x digital outputs (24 V DC, floating, short-circuit proof)
Functions	<ul style="list-style-type: none"> 3 limits Tare Tare specification Zeroing Zero adjustment Statistics Automatic correction of the shut-off points Internal protocol memory for 550 000 entries Trace function for signal analysis Internal restore point Stand-alone mode or SIMATIC S7-1200 integrated
Parameter assignment	<ul style="list-style-type: none"> Full access using function block in SIMATIC S7-1200 Full access using Modbus TCP/IP Full access using Modbus RTU
Remote display	
Connection	via RS 485
Setting the scales	PC software SIWATOOL (Ethernet), S7-1200 function block and touch panel 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 or 120 (selectable)
Filter	<ul style="list-style-type: none"> Low-pass filter 0.1 ... 50 Hz Average value filter

SIWAREX WP251	
Load cells	Full-bridge strain gauges in 4-wire or 6-wire system
Load cell powering	
Supply voltage (regulated via feedback)	4.85 V DC
Permissible load resistance	<ul style="list-style-type: none"> • R_{Lmin} > 40 Ω • R_{Lmax} < 4 100 Ω
With SIWAREX IS Ex interface	<ul style="list-style-type: none"> • R_{Lmin} > 50 Ω • R_{Lmax} < 4 100 Ω
Load cell characteristic	1 ... 4 mV/V
Permissible range of the measurement signal (with 4 mV/V sensors)	-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
Certificates	<ul style="list-style-type: none"> • ATEX Zone 2 • UL • KCC • EAC • RCM
Calibration approvals	<ul style="list-style-type: none"> • EU type-examination certificate 2014/31/EU (NAWI) according to OIML R76 • EU type-examination certificate 2014/32/EU (MID) according to OIML R61 and OIML R51 • EU type-examination certificate 2014/32/EU (MID) according to OIML R107 (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 according to DIN EN 60529; IEC 60529	IP20
Climatic requirements	
T_{min} (IND) ... T_{max} (IND) (operating temperature)	
• Vertical installation	-10 ... +40 °C (14 ... 104 °F)
• Horizontal installation	-10 ... +55 °C (14 ... 131 °F)
EMC requirements	according to EN 45501
Dimensions	70 x 75 x 100 mm (2.76 x 2.95 x 3.94 in)

Weighing Electronics

Stand-alone electronics

Dosing/Filling/Bagging scale

SIWAREX WP251

Selection and ordering data

SIWAREX WP251 weighing module

Single-channel, legal-for-trade, for automatic dosing and batching scales (GFI, ACI, NAWI) with analog load cells / full-bridge strain gauges (1 - 4 mV/V), 1 x LC, 4 x DQ, 4 x DI, 1 x AQ, 1 x RS 485, Ethernet port.

SIWAREX WP251 equipment manual

Available in a range of languages

Free download on the Internet at:

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

SIWAREX WP251 "Ready for Use"

Free download on the Internet at:

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

SIWATOOL V4 & V7

Service and commissioning software for SIWAREX weighing modules

Calibration set for SIWAREX WP2xx

Valid for SIWAREX WP231 K and SIWAREX WP251.

For verification of up to 3 scales, comprising:

- 3 x inscription foil for labeling
- 1 x protective film
- 3 x calibration protection plate
- Guidelines for verification, certificates and approvals, adaptable label, SIWAREX WP

Ethernet cable patch cord 2 m (7 ft)

For connecting SIWAREX WP251 to a PC (SIWATOOL), SIMATIC CPU, panel, etc.

Remote display (optional)

The digital remote displays can be connected directly to the SIWAREX WP251 via the RS 485 interface.

Suitable remote display: S102
 Siebert Industrieelektronik GmbH
 Postfach 1180
 D-66565 Eppelborn, Germany
 Tel.: +49 6806/980-0
 Fax: +49 6806/980-999
 Internet:
<http://www.siebert-group.com/en>
 Detailed information is available from the manufacturer.

Article No.

7MH4960-6AA01

7MH4900-1AK01

7MH4960-0AY10

6XV1850-2GH20

6XV1850-2GH20

Article No.

7MH4710-1BA

7MH4710-1EA

7MH4710-1EA01

7MH4710-5BA

7MH4710-5CA

7MH4702-8AG

7MH4702-8AF

6ES5728-8MA11

Accessories

SIWAREX JB junction box, aluminum housing

For connecting up to 4 load cells in parallel, and for connecting multiple junction boxes.

SIWAREX JB junction box, stainless steel housing

For connecting up to 4 load cells in parallel.

SIWAREX JB junction box, stainless steel housing (ATEX)

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

Ex interface SIWAREX IS

For intrinsically-safe connection of load cells. With ATEX approval (not UL/FM). Suitable for SIWAREX electronic weighing system. Compatibility of load cells must be checked.

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

Cable (optional)

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

For connecting SIWAREX electronic weighing systems to junction box (JB), extension box (EB) and Ex interface or between two JBs.

For permanent installation. Occasional bending is possible.

External diameter: approx. 10.8 mm (0.43 in)

Permissible ambient temperature -40 ... +80 °C (-40 ... +176 °F).

Sold by the meter.

- Sheath color: orange
- For potentially explosive atmospheres. Sheath color: blue.

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

Selection and ordering data

Article No.

*Commissioning***Commissioning charge for one static scale with SIWAREX module****9LA1110-8SN50-0AA0**

(Travel and setup charge must be ordered separately)

Scope:

- Recording of data
- Checking of mechanical installation of the scale
- Checking of electrical wiring and function
- Static adjustment of the scale

Requirements:

- Mechanical design functional
- Modules electrically wired and tested
- Adjustment weights available
- Free access to scale

Flat charge for travel and setup in Germany**9LA1110-8RA10-0AA0**

Weighing Electronics

Stand-alone electronics

Belt scale

Introduction

Overview



Stand-alone belt scales

The gravel, cement, coal, recycling and mining industries require exact weight measurement of the material to be conveyed using belt scales. The corresponding SIWAREX electronics offers comprehensive properties and functions that fulfil all requirements.

The Milltronics belt scales from Siemens combine simple installation and low maintenance costs (no moving parts) with higher reproducibility. This results in high productivity. With minimum hysteresis and maximum linearity, lateral forces have no influence on measuring accuracy. All load cells are equipped with overload protection.

The installation of belt scales in danger zones is also available as option. Various versions are available for high accuracy, small loads and heavy loads.

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 ± 4 million parts
- 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

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 overall total and the four remaining totalization memories are available for use as required. 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

Stand-alone electronics
Belt scale

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 (e.g. 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.

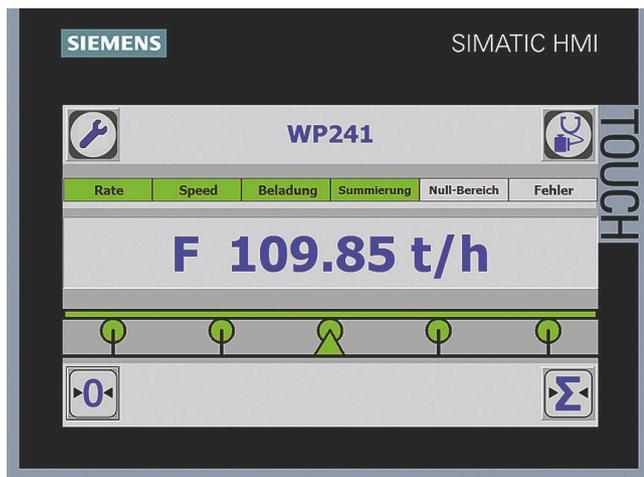
Integration in the plant environment

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.



SIWAREX WP241 "Ready for use"

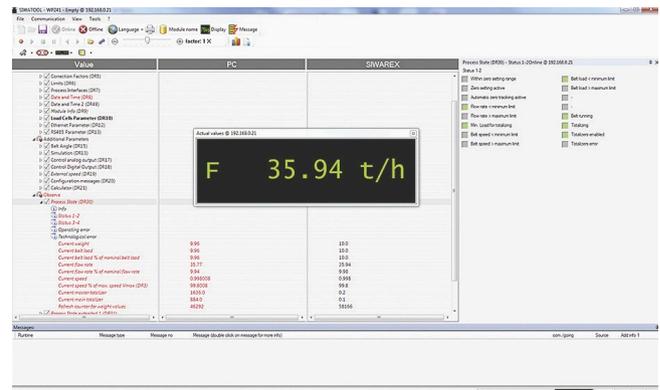
In addition to the configuration package, fully-featured SIWAREX WP241 "Ready for use" software is also available free-of-charge. It shows beginners how to integrate the module in a STEP 7 program and offers a basis for application programming. This allows you to connect the scale either directly to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



SIWAREX WP241 SIWATOOL

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.

Technical specifications

SIWAREX WP241	
Integration in automation systems	
S7-1200	SIMATIC S7-1200 system bus
Operator panel and/or automation systems from other vendors	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 (SIWATOOL V7, Modbus TCP/IP) • Analog output 0/4 - 20 mA • 4 x digital outputs, 24 V DC floating, short-circuit proof • 4 x digital outputs, 24 V DC, floating
Commissioning options	<ul style="list-style-type: none"> • Using SIWATOOL V7 • Using function block in SIMATIC S7-1200 CPU / Touch Panel • Using Modbus TCP/IP • Using Modbus RTU
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
Measuring frequency	100 / 120 Hz
Digital filter	Separate, variable adjustable low-pass and average filter for loading and speed
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
Load cells	Full-bridge strain gauges in 4-wire or 6-wire system

SIWAREX WP241	
Load cell excitation	
Supply voltage (regulated via feedback)	4.85 V DC
Permissible load resistance	<ul style="list-style-type: none"> • R_{Lmin} > 40 Ω • R_{Lmax} < 4100 Ω
With SIWAREX IS Ex interface	<ul style="list-style-type: none"> • R_{Lmin} > 50 Ω • R_{Lmax} < 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 (compatibility of the load cells must be checked)
Approvals/certificates	<ul style="list-style-type: none"> • ATEX Zone 2 • UL • EAC • KCC • RCM
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 ... +40 °C (14 ... 104 °F)
• Horizontal installation	-10 ... +55 °C (14 ... 131 °F)
EMC requirements	according to EN 45501
Dimensions	70 x 75 x 100 mm (2.76 x 2.95 x 3.94 in)

Weighing Electronics

Stand-alone electronics

Belt scale

SIWAREX WP241

Selection and ordering data

	Article No.
SIWAREX WP241 weighing module Single-channel, for conveyor scales with analog load cells / full-bridge strain gauges (1 - 4 mV/V), 1 x LC, 4 x DQ, 4 x DI, 1 x AQ, 1 x RS 485, Ethernet port.	7MH4960-4AA01
SIWAREX S7-1200 manual Available in a range of languages Free download on the Internet at: http://www.siemens.com/weighing/documentation	
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/documentation	
SIWATOOL V4 & V7 Service and commissioning software for SIWAREX weighing modules	7MH4900-1AK01
Ethernet cable patch cord 2 m (7 ft) For connecting SIWAREX WP241 to a PC (SIWATOOL), SIMATIC CPU, panel, etc.	6XV1850-2GH20
Accessories SIWAREX JB junction box, aluminum housing For connecting up to 4 load cells in parallel, and for connecting multiple junction boxes.	7MH4710-1BA
SIWAREX JB junction box, stainless steel housing For connecting up to 4 load cells in parallel.	7MH4710-1EA
SIWAREX JB junction box, stainless steel housing (ATEX) For parallel connection of up to 4 load cells (for zone allocation, see manual or type-examination certificate).	7MH4710-1EA01
Ex interface SIWAREX IS For intrinsically-safe connection of load cells. With ATEX approval (not UL/FM). Suitable for SIWAREX electronic weighing system. Compatibility of load cells must be checked.	
<ul style="list-style-type: none"> • Short-circuit current < 199 mA DC 	7MH4710-5BA
<ul style="list-style-type: none"> • Short-circuit current < 137 mA DC 	7MH4710-5CA

Article No.

Cable (optional)

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

For connecting SIWAREX electronic weighing systems to junction box (JB), extension box (EB) and Ex interface or between two JBs.

For permanent installation. Occasional bending is possible.

External diameter:
approx. 10.8 mm (0.43 in)

Permissible ambient temperature
-40 ... +80 °C (-40 ... +176 °F).

Sold by the meter.

- Sheath color: orange
- For potentially explosive atmospheres. Sheath color: blue.

7MH4702-8AG
7MH4702-8AF

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

6ES5728-8MA11

Commissioning

Commissioning charge for one belt scale with SIWAREX module

9LA1110-8SM50-0AA0

(Travel and setup charge must be ordered separately)

Scope:

- Recording of data
- Checking of mechanical installation of the scale
- Checking of electrical wiring and function
- Dynamic adjustment of the scale

Requirements:

- Mechanical design functional
- Modules electrically wired and tested
- Adjustment weights available
- Free access to scale

Flat charge for travel and setup in Germany

9LA1110-8RA10-0AA0

Overview



SIWAREX WT241 weighing terminal

The SIWAREX WT241 is a weighing terminal for belt scales. Siemens standard components are installed in a stainless steel enclosure with numerous connection options. This ensures the tried and tested SIWAREX quality as standalone solution and is ideal for belt scales.

Benefits

SIWAREX WT241 offers the following key advantages:

- Complete solution – no configuration in SIMATIC required
- Fast and easy commissioning due to intuitive operating concept
- The stainless steel enclosure permits applications in many diverse environments
- Flexible connection to different systems through
 - four digital inputs
 - four digital outputs
 - one analog output
 - RS 485 interface and Modbus RTU
- Connection to analog load cells (1 ... 4 mV/V)
- High resolution of the load cell signal of up to ± 4 million parts
- 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
- All diagnostic and error messages as well as all scale parameters in plain text
- 100 ... 240 V AC supply range
- Parameterizable pulse signal (24 V DC) for external totalizer
- Correction of material flow rate by means of correction factor

Application

SIWAREX WT241 is the optimal solution wherever belt scales are used that demand high accuracy, high user-friendliness, and comprehensive adjustment options.

The typical applications of the SIWAREX WT241 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 WT241 is a standalone weighing terminal based on the tried and tested Siemens SIWAREX WP241 products and the Siemens SIMATIC KTP 400 touch display. Supplemented with a connection board and a wide-range power supply, these components are preinstalled in a compact stainless steel enclosure. The enclosure can be wall mounted and has nine cable entries, of which five are equipped with cable glands at the factory. A variety of interfaces support the integration into the plant environment.

The integrated connection board permits the direct connection of the belt scales and of the speed sensor.

The SIWAREX WT241 is preconfigured with the SIWAREX "Ready for Use" software. This means that no further commissioning is required in SIMATIC.

Function

The primary task of the SIWAREX WT241 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. For example, for recording the daily or weekly totals.

Four different options are available for rapid commissioning:

- Automatic calibration
 - The calibration is performed automatically using the load cell parameters entered. Only the zero point has to be calculated at 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 determined while the belt is running. A zero point must also be determined.
- 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 batch
 - 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. Then 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

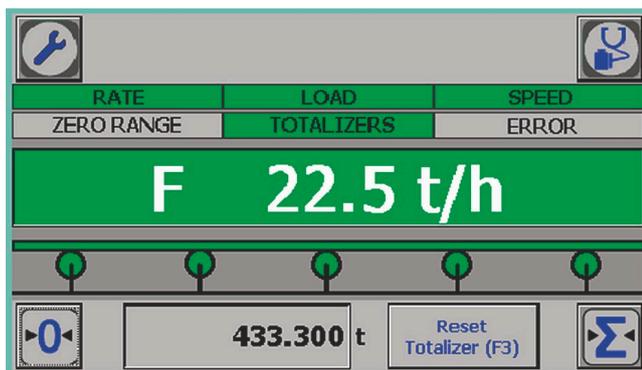
Stand-alone electronics

Belt scale

SIWAREX WT241

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. Both the digital inputs/outputs and the analog output can be simulated for test 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 (e.g. material flow rate, belt load, speed) and exports it to Excel in a graphical format.

The service tool "SIWATOOL V7", which is included in the optional configuration package, is required for reading out this trace data. In addition, using SIWATOOL a scale backup can be created and reimported whenever required. Thus, in the event of an error, the WT241 can be replaced within seconds without requiring readjustment.



SIWAREX WT241 weighing terminal operating view

Monitoring of the scale signals and states

Using the onboard RS 485 interface and the Modbus RTU protocol, the SIWAREX WT241 can be connected to many different automation systems or a PC.

Furthermore, 4 digital inputs, 4 digital outputs, and an analog output are available. Direct, straightforward further processing of alarms or status messages is thus made possible.

Software

The touch panel is preconfigured with the SIWAREX "Ready for use" software. Thus the user interface is clearly structured and can be operated intuitively; the languages German, English, French, and Chinese are available. The structured menu-based operation facilitates the operation of the scale and supports the user through guided commissioning.

Furthermore, a variety of diagnostics options are offered. Using the trace function, weighing histories can be recorded and exported. There is also the option of simulating the behavior of the scale with the device.

Technical specifications

SIWAREX WT241	
Enclosure	Stainless steel enclosure (1.4301) with the interfaces: <ul style="list-style-type: none"> • 1 x wall bushing for power supply • 4 x wall bushing for load cell connection with EMC screw connection • 4 x wall bushing with blanking plugs • Ground connection bolt
Connection board	Internal connection board <ul style="list-style-type: none"> • Connection of up to 4 load cells • Type of analog output • Connection of speed sensor • Type of 24 V direct voltage
Integration in automation systems	
Any automation systems	Via RS 485 (Modbus RTU)
Communication interfaces	<ul style="list-style-type: none"> • RS 485 (Modbus RTU) • 4 digital outputs (24 V DC) • 3 digital inputs (24 V DC) • 1 speed sensor input (24 V DC, up to 5 kHz) • 1 analog output (0/4 ... 20 mA)
Commissioning options for the scale	Directly via the color touch panel and the preinstalled "Ready for use" operating software
Calibration approval	No
Internal resolution	up to ±4 million parts
Number of measurements/second (internal)	100 Hz
Updating time for material flow rate	100 ms
Filter	
Filter for material flow rate	Low-pass filter 0.1 ... 50 Hz
Filter for weight values	Low-pass filter 0.1 ... 50 Hz
Filter for belt speed	Low-pass filter 0.1 ... 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 set to zero

SIWAREX WT241	
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	
• 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 (at greatest set characteristic value)	-21.3 ... +21.3 mV
Max. distance of load cells	500 m (229.66 ft)
Auxiliary power supply	
Rated voltage	100 ... 240 V AC
Line frequency	50 ... 60 Hz
Max. power consumption	0.12 A
IP degree of protection to DIN EN 60529; IEC 60529	IP65
Climatic requirements	
T_{min} (IND) ... T_{max} (IND) (operating temperature)	
Vertical installation	0 ... +40 °C (32 ... 104 °F)
EMC requirements according to	EN 45501
Dimensions	264 x 185 x 97 mm (10.39 x 7.28 x 3.82 in)
Weight	4 kg (8.82 lb)

Weighing Electronics

Stand-alone electronics

Belt scale

SIWAREX WT241

Selection and ordering data

	Article No.		Article No.
SIWAREX WT241 Weighing terminal for belt scales	7MH4965-4AA01	Cable (optional)	
SIWAREX WT241 Manual		Cable Li2Y 1 x 2 x 0.75 ST + 2 x (2 x 0.34 ST) – CY	
In various languages.		For connecting SIWAREX electronic weighing systems to junction box (JB), extension box (EB) and Ex interface or between two JB's.	
Free download on the Internet at:		For permanent installation. Occasional bending is possible.	
http://www.siemens.com/weighing/documentation		External diameter: approx. 10.8 mm (0.43 in)	
Accessories		Permissible ambient temperature -40 ... +80 °C (-40 ... +176 °F).	
SIWATOOL V4 & V7	7MH4900-1AK01	Sold by the meter.	
Service and commissioning software for SIWAREX weighing modules		• Sheath color: orange	7MH4702-8AG
Ethernet cable patch cord 2 m (7 ft)	6XV1850-2GH20	• For potentially explosive atmospheres. Sheath color: blue.	7MH4702-8AF
For connecting SIWAREX WT241 to a PC (SIWATOOL), SIMATIC CPU, panel, etc.		Commissioning	
SIWAREX JB junction box, aluminum housing	7MH4710-1BA	Commissioning charge for one belt scale with SIWAREX module	9LA1110-8SM50-0AA0
For connecting up to 4 load cells in parallel, and for connecting multiple junction boxes.		(Travel and setup charge must be ordered separately)	
SIWAREX JB junction box, stainless steel housing	7MH4710-1EA	Scope:	
For connecting up to 4 load cells in parallel.		• Recording of data	
SIWAREX JB junction box, stainless steel housing (ATEX)	7MH4710-1EA01	• Checking of mechanical installation of the scale	
For parallel connection of up to 4 load cells (for zone allocation, see manual or type-examination certificate).		• Checking of electrical wiring and function	
		• Dynamic adjustment of the scale	
		Requirements:	
		• Mechanical design functional	
		• Modules electrically wired and tested	
		• Adjustment weights available	
		• Free access to scale	
		Flat charge for travel and setup in Germany	9LA1110-8RA10-0AA0

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 and optional: PROFIBUS DP, Modbus TCP/IP, PROFINET, 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
- Inclinometer input with optional analog I/O card to compensate for conveyor slope
- Suitable for belt scale custody approval
- Measurement Canada, OIML, MID, EAC, and NTEP approved

2

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 electronics

Belt scale

Milltronics BW500 and BW500/L

Technical specifications

Milltronics BW500, BW500/L

Mode of operation

Measuring principle	Belt scale integrator
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)

Inputs

Load cell	0 ... 45 mV DC per load cell
Speed sensor	<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
Auto zero	Dry contact from external device
mA	See optional mA I/O board ¹⁾
Auxiliary	5 discrete inputs for external contacts, each programmable for either: display scrolling, totalizer 1 reset, zero, span, multi-span, print, batch reset, PID function or online calibration, 2nd speed sensor

Outputs (load and speed)

mA	Programmable 0/4 ... 20 mA, for rate, optically isolated, 0.1 % of 20 mA resolution, 750 Ω load max. (see optional mA I/O board)
Load cell	10 V DC compensated excitation for strain gauge type, 6 cells max, 150 mA max.
Speed sensor(s)	12 V DC, 150 mA max. excitation
Remote totalizer 1	<ul style="list-style-type: none"> Contact closure 10 ... 300 ms duration Solid state relay contact 30 V DC, 100 mA max. Max. contact on-resistance = 36 ohms Max. off-state leakage = 1 uA
Remote totalizer 2	<ul style="list-style-type: none"> Contact closure 10 ... 300 ms duration Solid state relay contact rated 240 V AC/DC, 100 mA max. Max. contact on-resistance = 36 ohms Max. off-state leakage = 1 uA
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

Milltronics BW500, BW500/L

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	<p>AC version</p> <ul style="list-style-type: none"> 100 ... 240 V AC, ±10 %, 50/60 Hz, 55 VA max. Fuse FU3 = 2AG, 2 AMP, 250 V Slo Blo <p>DC version</p> <ul style="list-style-type: none"> 10 ... 30 V DC, 26 W max. Fuse FU2 = 3.75 A resettable (not user replaceable)
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Controls and displays

Displays	Illuminated 5 x 7 dot matrix liquid crystal display with 2 lines of 40 characters each
Programming	Via local keypad and/or Dolphin Plus interface
Memory	Program and parameters stored in non-volatile Flash memory, upgradeable via Dolphin Plus interface
Communications	<ul style="list-style-type: none"> Two RS 232 ports One RS 485 port SmartLinX compatible

mA I/O board

Inputs	2 programmable 0/4 ... 20 mA for PID control and on-line calibration, optically isolated, 0.1 % of 20 mA resolution, 200 Ω input impedance
Outputs	2 programmable 0/4 ... 20 mA for PID control, rate, load, and speed output, optically isolated, 0.1 % of 20 mA resolution, 750 Ω load max
Output supply	Isolated 24 V DC at 50 mA, short circuit protected

Approvals

BW500	CE, CSA _{US/C} , FM, Measurement Canada, NTEP, MID, OIML, GOST, RCM, EAC, SABS, STAMEQ, KCC
BW500/L	CE, CSA _{US/C} , FM, RCM, EAC, KCC

Options

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

¹⁾ BW500 only.

Selection and ordering data	Article No.	Order Code
Milltronics BW500 and BW500/L A full-feature, powerful integrator designed for use with both belt scales and weighfeeders Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	7MH7152- 	Further designs Please add "-Z" to article no. and specify order code(s).
Input voltage AC voltage DC voltage	2 3	Y15 C11
Auxiliary input/output board None Board with 2 analog inputs and 2 analog outputs ¹⁾	A B	Y77 Y78
Feature software BW500, 1 ... 6 load cell input (advanced feature set) BW500/L, 1... 2 load cell input ²⁾ (basic feature set)	A B	G21 S50
Auxiliary memory None	0	
Data communications³⁾ SmartLinx ready SmartLinx PROFIBUS DP module SmartLinx DeviceNet module SmartLinx PROFINET module SmartLinx EtherNet/IP module SmartLinx Modbus TCP/IP module	0 2 3 4 5 6	A11 A12
Enclosures Standard enclosure, no entry holes Standard enclosure, 4 entries, for M20 glands	1 2	A13 A14 A15
Trade approval stickers No trade approval sticker Not legal for Canadian and EU trade sticker Legal for Canadian trade ⁴⁾⁵⁾⁶⁾ Legal for U.S. trade (NTEP) ⁴⁾⁵⁾⁶⁾ Legal for World trade (OIML), European trade (MID) ⁴⁾⁵⁾⁶⁾	A B C D E	A15 A35
Approvals CE, CSA _{US/C} , FM, RCM, EAC, KCC	A	

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 4/27 and submit with order.
 6) Available with feature software option A only.

Weighing Electronics

Stand-alone electronics

Belt scale

Milltronics BW500 and BW500/L

Selection and ordering data

Instruction manuals

BW500 and BW500/L, English

A5E33482052

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

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

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

Optional equipment

Auxiliary I/O card spare

7MH7723-1BJ

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

7MH7723-1AJ

Supply voltage regulators, 120 V AC, 60 Hz

7MH7726-1AN

Cables to connect BW500, BW500/L, and SF500 keypad to motherboard

7MH7723-1CB

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

SITRANS RD100 Remote displays, see RD100 on page 2/100

SITRANS RD200 Remote displays, see RD200 on page 2/102

SITRANS RD300 Remote displays, see RD300 on page 2/106

SITRANS RD500 web, datalogging, alarming, Ethernet, and modem support for instrumentation, see page 2/110

7ML5750-1AA00-0

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

A5E31871009

Article No.

Article No.

Spare parts

Display card

7MH7723-1AF

BW500 motherboard, AC

A5E34320772

BW500/L motherboard, AC

A5E34320773

BW500 motherboard, DC

A5E34320774

BW500/L motherboard, DC

A5E34320775

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

7MH7723-1DG

Lid with overlay and keypad for BW500

7MH7723-1AK

Lid with overlay and keypad for trade approved BW500

7MH7723-1HN

Lid with overlay and keypad for BW500/L

A5E34699647

Keypads spare for BW500, BW500/L, and SF500

7MH7723-1CD

LVDT card spare

A5E34699664

Modbus TCP/IP, EtherNet/IP module

7ML1830-1PN

PROFINET IO module

7ML1830-1PM

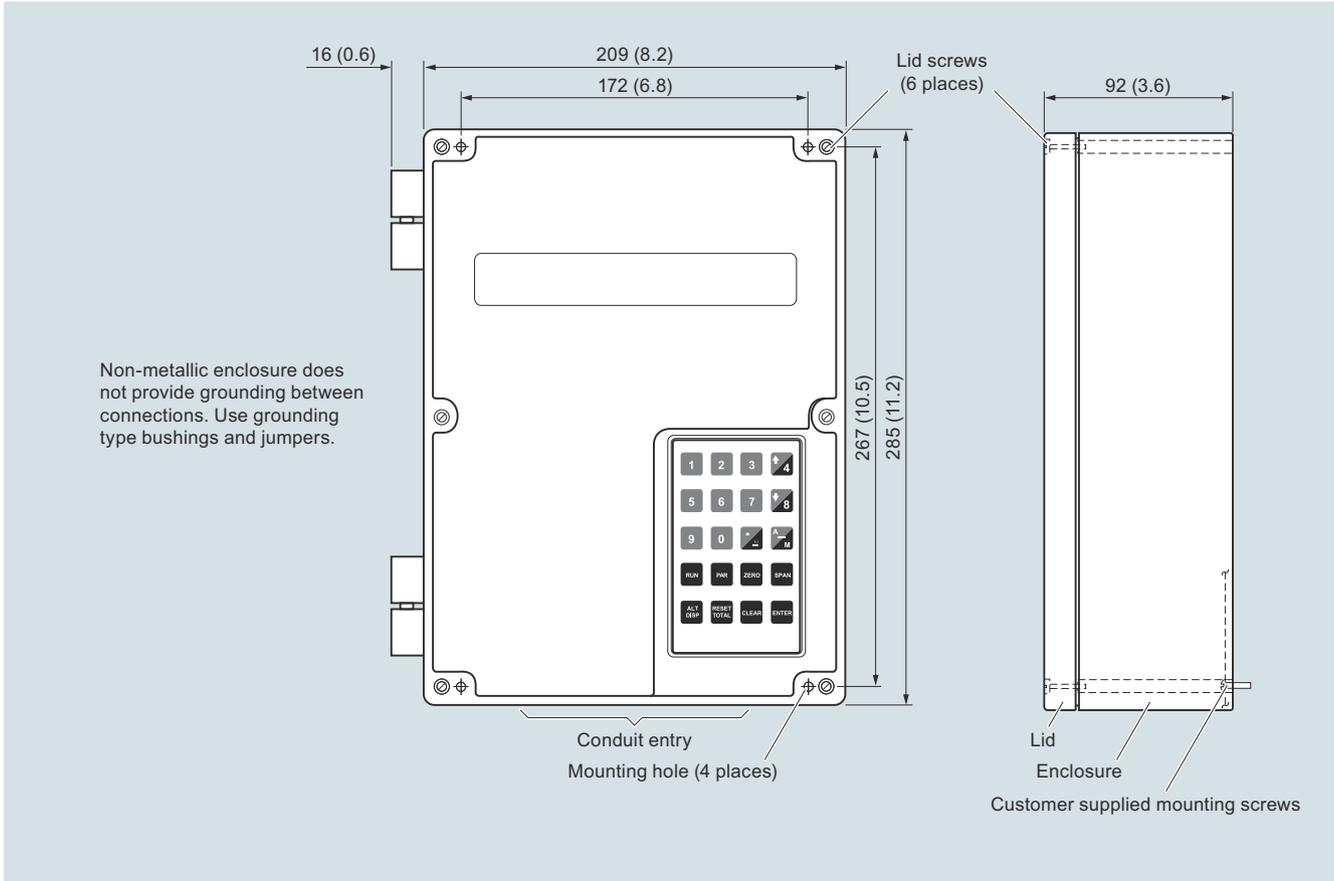
PROFIBUS DP module

7ML1830-1HR

DeviceNet module

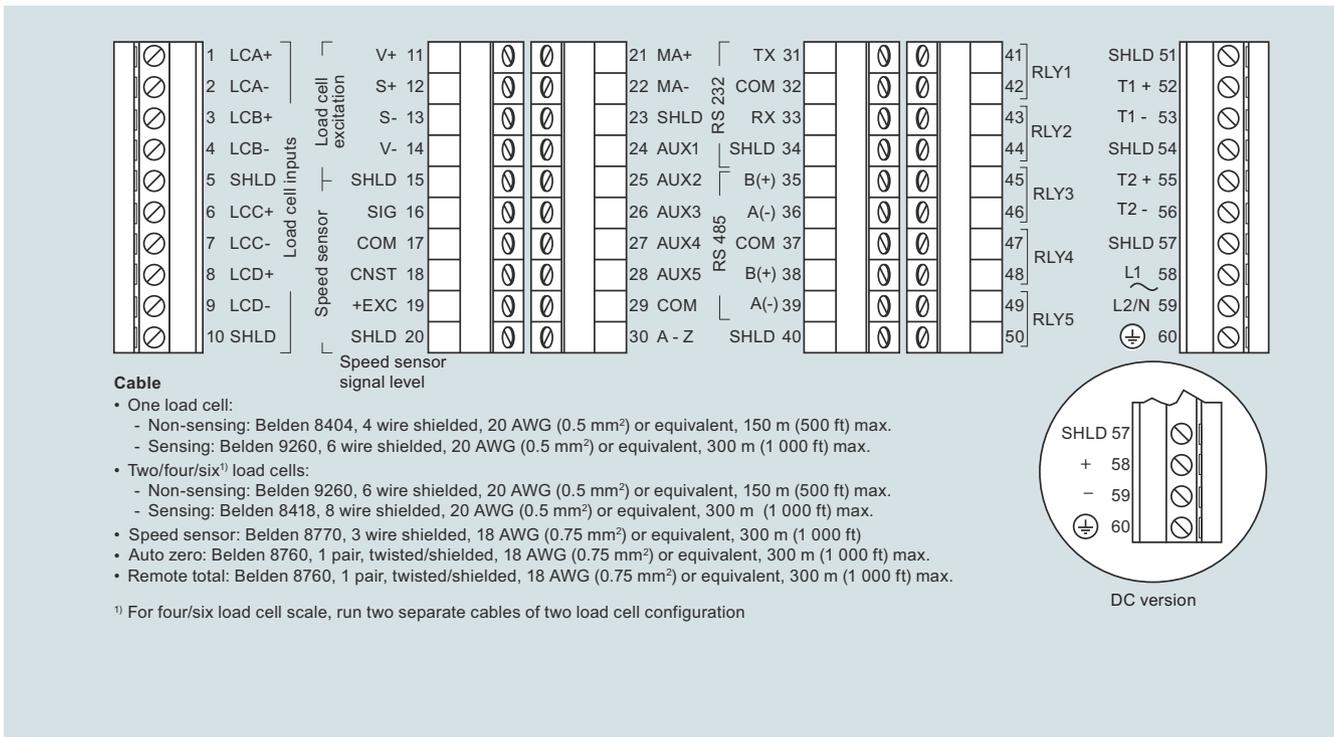
7ML1830-1HT

Dimensional drawings



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

Circuit diagrams



Milltronics BW500 and BW500/L connections

Weighing Electronics

Stand-alone electronics

Belt scale

Milltronics SF500

Overview



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

Benefits

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

Application

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

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

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

Technical specifications

Milltronics SF500		Milltronics SF500	
Mode of operation		Design	
Measuring principle	Flowmeter integrator	Material (enclosure)	Polycarbonate
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) 	Dimensions	209 W x 285 H x 92 D mm (8.2 W x 11.2 H x 3.6 D inch)
Input		Weight	2.6 kg (5.7 lb)
Load cell/LVDT	0 ... 45 mV DC per load cell or LVDT interface card	Power supply	
Auto zero	Dry contact from external device	Standard	AC version <ul style="list-style-type: none"> 100 ... 240 V AC \pm 10 %, 50/60 Hz, 55 VA max. Fuse FU3 = 2AG, 2 AMP, 250 V Slo Blo DC version <ul style="list-style-type: none"> 10 ... 30V DC, 26 W max. Fuse FU2 = 3.75 A resettable (not user replaceable)
mA	See optional mA I/O board	Controls and displays	
Auxiliary	5 discrete inputs for external contacts, each programmable for either: display scrolling, totalizer 1 reset, zero, span, multi-span, print, batch reset, PID function, or on-line calibration	Display	Illuminated 5 x 7 dot matrix liquid crystal display with 2 lines of 40 characters each
Output		Programming	Via local keypad and/or Dolphin Plus interface
mA	Programmable 0/4 ... 20 mA, for rate, optically isolated, 0.1 % of 20 mA resolution, 750 Ω load max. (see optional mA I/O board)	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 conditioner card	10 V DC compensated excitation for strain gauge type, 2 cells max., 150 mA max.	Communications	Two RS 232 ports One RS 485 port SmartLinX compatible
Remote totalizer 1	<ul style="list-style-type: none"> Contact closure 10 ... 300 ms duration Solid state relay contact 30 V DC, 100 mA max. Max. contact on-resistance = 36 ohms Max. off-state leakage = 1 μA 	Approvals	
Remote totalizer 2	<ul style="list-style-type: none"> Contact closure 10 ... 300 ms duration Solid state relay contact rated 240 V AC/DC, 100 mA max. Max. contact on-resistance = 36 ohms Max. off-state leakage = 1 μA 	CE, CSA _{US/CA} , FM, RCM, EAC, KCC	
Relay output	5 alarm/control relays, 1 SPST Form A relay contact per relay, rated 5 A at 250 V AC, non-inductive or 30 V DC	Options	
Measuring accuracy		<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 on-line 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 	
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		

Weighing Electronics

Stand-alone electronics

Belt scale

Milltronics SF500

Selection and ordering data

Article No.

Order code

Milltronics SF500

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

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

Input voltage

AC voltage

DC voltage

Auxiliary input/output 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/IP module

SmartLinX Modbus TCP/IP module

Enclosures

Standard enclosure, no entry holes

Standard enclosure, 4 entries, for M20 glands

Trade approval stickers

No trade approval sticker

Not legal for Canadian and EU trade sticker

Approvals

CE, CSA_{USC}, FM, RCM, EAC, KCC

7MH7156-



2

3

A

B

A

0

0

2

3

4

5

6

1

2

A

B

A

Further designs

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

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

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

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

LVDT conditioner card mounted and connected for
use with LVDT flowmeters

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

- With window

- Without window

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

- With window

- Without window

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

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

Instruction manuals

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

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

¹⁾ Required for PID control and online calibration.

²⁾ Required for industrial communications.

Selection and ordering data

Article No.

Optional equipment

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

Spare parts

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

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

Weighing Electronics

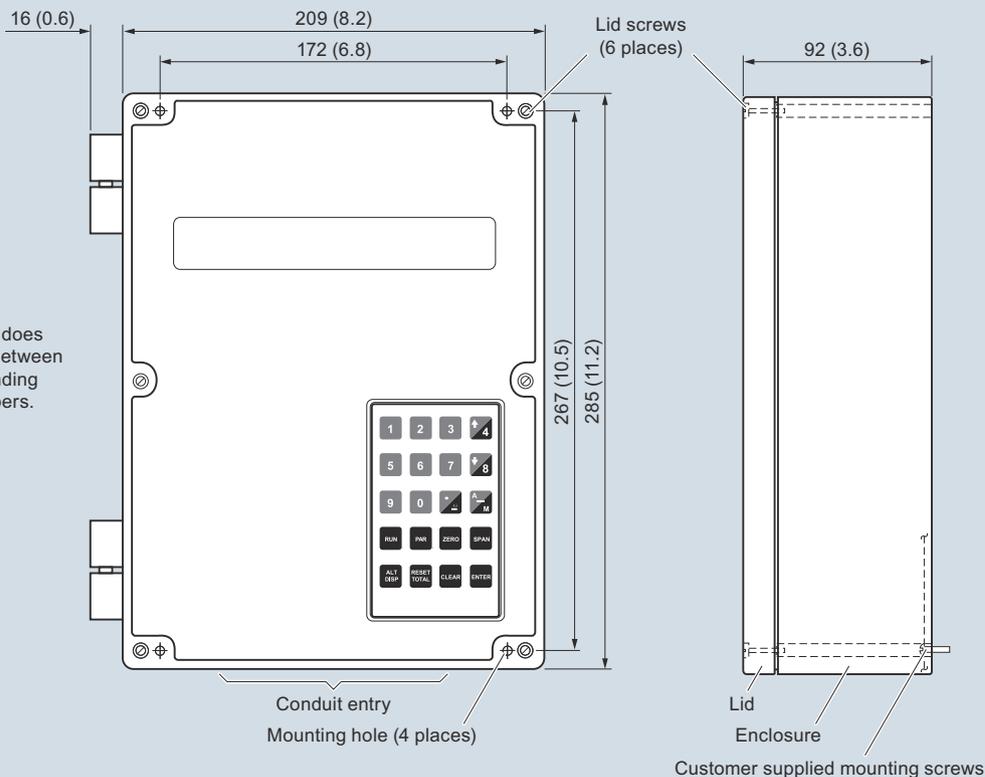
Stand-alone electronics
Belt scale

Milltronics SF500

Dimensional drawings

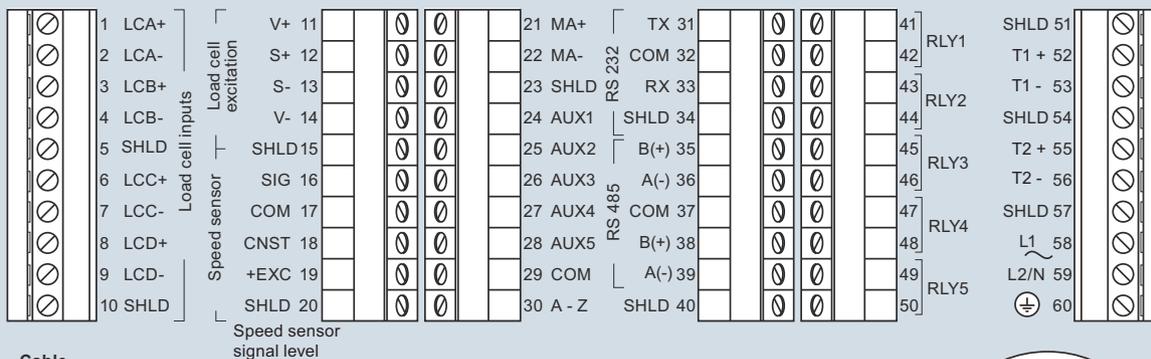
2

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



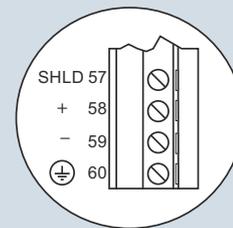
Milltronics SF500, dimensions in mm (inch)

Schematics



Cable

- One load cell:
 - Non-sensing: Belden 8404, 4 wire shielded, 20 AWG (0.5 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.



DC version

Milltronics SF500 connections

Overview



Dolphin Plus is instrument configuration software that allows you to quickly and easily configure, monitor, tune and diagnose several Siemens level devices remotely (see list below). 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
- Saving and visualization of echo profiles for a wide range of Siemens level meters
- Copying of data for programming several devices
- Quick setup and commissioning of device
- Generation of configuration reports within seconds

Note:

The Dolphin Plus software is only available in English.

Application

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

Following configuration, you can alter parameters, upload and download parameter sets to and from disk, and use parameter sets saved from other instruments. Reading of echo profiles permits fine tuning without the need for special instruments. Built-in quick start wizards and help functions guide you through the entire process.

Compatibility

Dolphin Plus is compatible with Microsoft Windows 95/98/NT4/Me/2000/XP and works with a wide range of Siemens products, including:

- SITRANS LU10
- SITRANS LU02
- SITRANS LU01

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.

Most other Siemens level devices use Simatic PDM configuration software.

Selection and ordering data

Article No.

Dolphin Plus

Instrument configuration software that 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 DVD, and a nine pin adapter with a 2.1 m (82.7 inch) cable for connection to a PC serial port.

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

RS 485 to RS 232 converters

No

Yes

ComVerter

No

Yes

Instruction manuals

Connection manual, English: included on Dolphin Plus DVD and available at

www.siemens.com/weighing/documentation

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-

A A 0

0

1

0

1

7ML1830-1HA

7ML1830-1MC

7ML1830-1MM

Weighing Electronics

Accessories for stand-alone electronics

SITRANS RD100

Overview



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

Benefits

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

Application

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

It has been approved by FM and CSA as Intrinsically Safe and non-incendive, and operates from -40 to +85 °C (-40 to +185 °F), adding only 1 V to the loop.

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

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

Technical specifications

SITRANS RD100	
Mode of operation	
Measuring principle	Analog to digital conversion
Measuring range	4 ... 20 mA
Measuring points	1 instrument only
Accuracy	
	± 0.1 % of span ± 1 count
Rated operating conditions	
Ambient conditions	
• Operating temperature range	-40 ... +85 °C (-40 ... +185 °F)
Design	
Weight	340 g (12 oz)
Material (enclosure)	Impact-resistant glass filled polycarbonate body and clear polycarbonate cover
Degree of protection	NEMA 4X, IP67
Power supply	
External loop power supply	30 V DC max.
Display	
	• 1.0 inch (2.54 cm) high LCD
	• Numeric range from -1 000 ... +1 999
Certificates and approvals	
Non-hazardous	CE
Hazardous	
• Intrinsically Safe	• CSA/FM Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G T4
	• CSA/FM Class I, Zone 0, Group IIC
	• CSA/FM Class I, Div. 2, Groups A, B, C, D
	• CSA/FM Class II and III, Div. 2, Groups F and G
• Non-incendive	
Options	
Mounting	• 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.

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

Conduit hole location (½ inch)

None
Bottom
Rear
Top

7ML5741-
A 0 0 - 0

1
2
3
4

Approvals

FM/CSA
CE

A
B

Instruction manuals

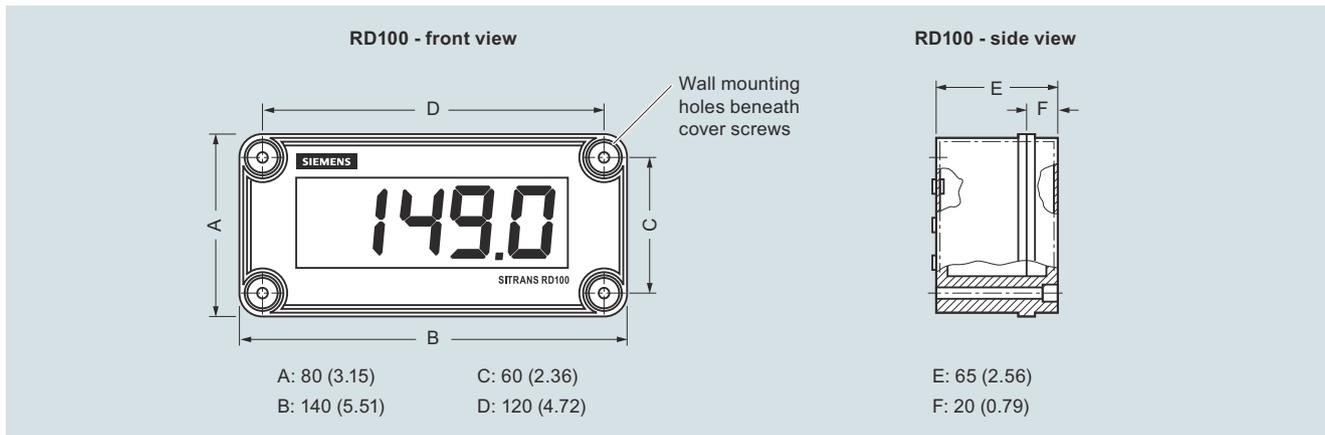
All literature is available to download for free, in a range of languages, at <http://www.siemens.com/weighing/documentation>

Accessories

Panel mount kits
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)

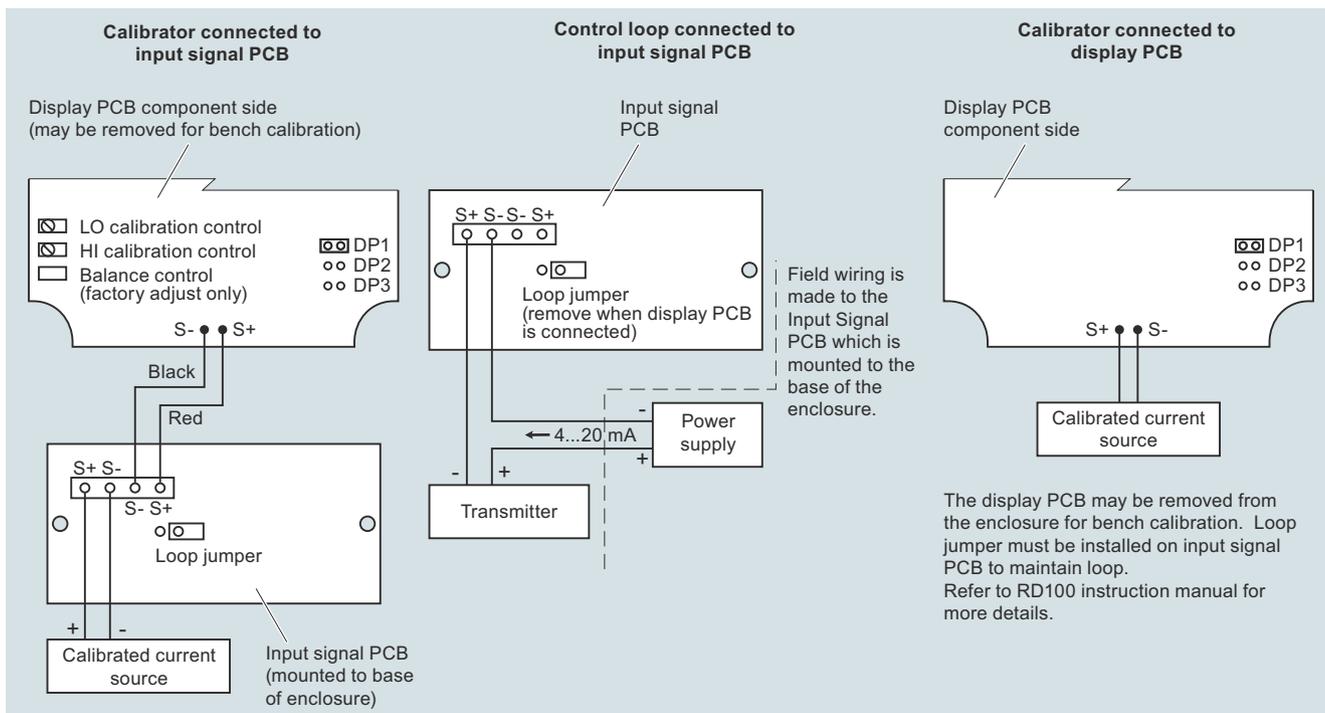
7ML1930-1BN
7ML1930-1BP
7ML1930-1BQ

Dimensional drawings



SITRANS RD100, dimensions in mm (inch)

Circuit diagrams



CE version

Figure 1: Calibrator connected to main board with no backlight

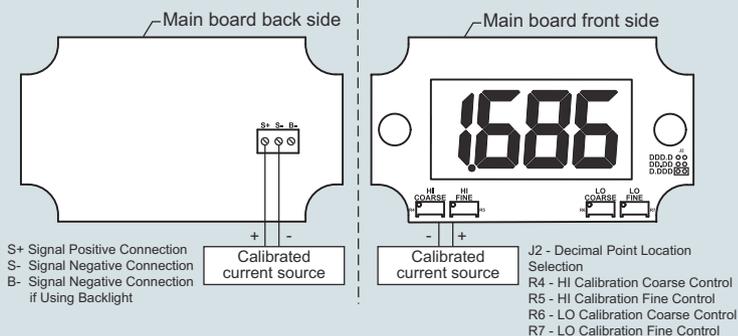
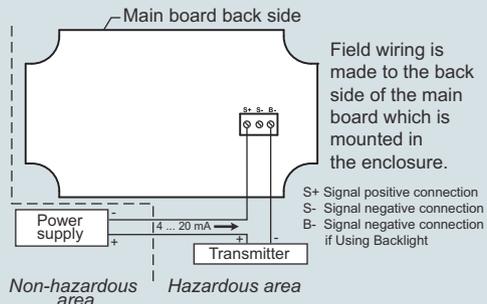


Figure 2: Control loop connected to main board with backlight



Weighing Electronics

Accessories for stand-alone electronics

SITRANS RD200

Overview



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

Benefits

- Easy setup and programming via front panel buttons or remotely using RD software
- Display readable in sunlight
- Universal input: accepts current, voltage, thermocouple, and RTD signals
- Single or dual 24 V DC transmitter power supply
- Serial communication using built in protocol or Modbus RTU
- Two optional relays for alarm indication or process control applications
- Linear or square root function supported
- Meter Copy feature to reduce setup time, cost, and errors
- RD software supports remote configuration, monitoring, and logging for up to 100 displays
- Other features include: 4 to 20 mA analog output option, 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.

Technical specifications

SITRANS RD200	
Mode of operation	
Measuring principle	Analog to digital conversion
Measuring points	<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 	<ul style="list-style-type: none"> • 4 ... 20 mA, 0 ... 20 mA • 0 V DC ... 10 V DC, 1 ... 5 V, 0 ... 5 V
<ul style="list-style-type: none"> • Thermocouple temperature 	<ul style="list-style-type: none"> • 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	
Output	<ul style="list-style-type: none"> • 4 ... 20 mA (optional) • Modbus RTU
Relays	2 SPDT Form C relays, rated 3 A at 30 V DC or 3 A at 250 V AC, non-inductive, auto-initializing (optional)
Communications	<ul style="list-style-type: none"> • RS 232 with PDC or Modbus RTU • RS 422/485 with PDC or Modbus RTU
Accuracy	
4 ... 20 mA optional output	± 0.1 % FS ± 0.004 mA
Process input	± 0.05 % of span ± 1 count, square root: 10 ... 100 % FS
Thermocouple temperature input	<ul style="list-style-type: none"> • Type J: ± 1 °C (± 2 °F) • Type K: ± 1 °C (± 2 °F) • Type E: ± 1 °C (± 2 °F) • Type T: ± 1 °C (± 2 °F) • Type T, 0.1° resolution: ± 1 °C (± 1.8 °F)
RTD temperature input	• 100 Ω RTD: ± 1 °C (± 1 °F)
Rated operating conditions	
Ambient conditions	
<ul style="list-style-type: none"> • Storage temperature range • Operating temperature range 	-40 ... +85 °C (-40 ... +185 °F) -40 ... +65 °C (-40 ... +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 RD200	
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 \pm 10 % at 200 mA max. Two 24 V DC \pm 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	
Display	<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 blinking • Eight intensity levels
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
Mounting	<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)

Weighing Electronics

Accessories for stand-alone electronics

SITRANS RD200

Selection and ordering data

SITRANS RD200

A universal input, panel mount remote digital display for process instrumentation.

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

Input voltage

85 ... 265 V AC, 50/60 Hz;
90 ... 265 V DC, 20 W max.

12 ... 36 V DC; 12 ... 24 V AC, 6 W max.

Transmitter supply

None

Single 24 V DC transmitter supply¹⁾

Dual 24 V DC transmitter supply¹⁾²⁾

Output

None

2 relays

4 ... 20 mA output

Communication

Modbus RTU

Approvals

CE, UL, cUL

Display size

Standard

2X option for 30.5 mm (1.2 inch) high, red LED

Instruction manuals

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

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

Article No.

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Article No.

Accessories

SITRANS RD200 copy cables 2.1 m (7 ft)

7ML1930-1BR

SITRANS RD200 RS 232 serial adapters (copy cable included)

7ML1930-1BS

SITRANS RD200 RS 422/485 serial adapters (copy cable included)

7ML1930-1BT

RS 232 to RS 422/485 isolated converters

7ML1930-1BU

RS 232 to RS 422/485 non-isolated converters

7ML1930-1BV

SITRANS RD200 RS 232 and RS 485 isolated multi-input adapter boards

7ML1930-1BW

USB to RS 422/485 isolated converters

7ML1930-1BX

USB to RS 422/485 non-isolated converters

7ML1930-1BY

RD200 USB serial adapter

7ML1930-6AH

USB to RS 232 converter

7ML1930-6AK

RD Software CD for 1 ... 100 displays

7ML1930-1CC

Low cost polycarbonate plastic enclosures for 1 display

7ML1930-1CF

2 inch (5.08 cm) pipe mounting kit (zinc plated seal) only available with 7ML19301-CF

7ML1930-1BP

2 inch (5.08 cm) pipe mounting kit (stainless steel, Type 304, EN 1.4301) only available with 7ML19301-CF

7ML1930-1BQ

Thermoplastic enclosures

For use with 1 display

7ML1930-1CG

For use with 2 displays

7ML1930-1CH

For use with 3 displays

7ML1930-1CJ

For use with 4 displays

7ML1930-1CK

For use with 5 displays

7ML1930-1CL

For use with 6 displays

7ML1930-1CM

Stainless steel enclosures (Type 304, EN 1.4301)

For use with 1 display

7ML1930-1CN

For use with 2 displays

7ML1930-1CP

For use with 3 displays

7ML1930-1CQ

For use with 4 displays

7ML1930-1CR

For use with 5 displays

7ML1930-1CS

For use with 6 displays

7ML1930-1CT

Steel enclosures

For use with 1 display

7ML1930-1CU

For use with 2 displays

7ML1930-1CV

For use with 3 displays

7ML1930-1CW

For use with 4 displays

7ML1930-1CX

For use with 5 displays

7ML1930-1CY

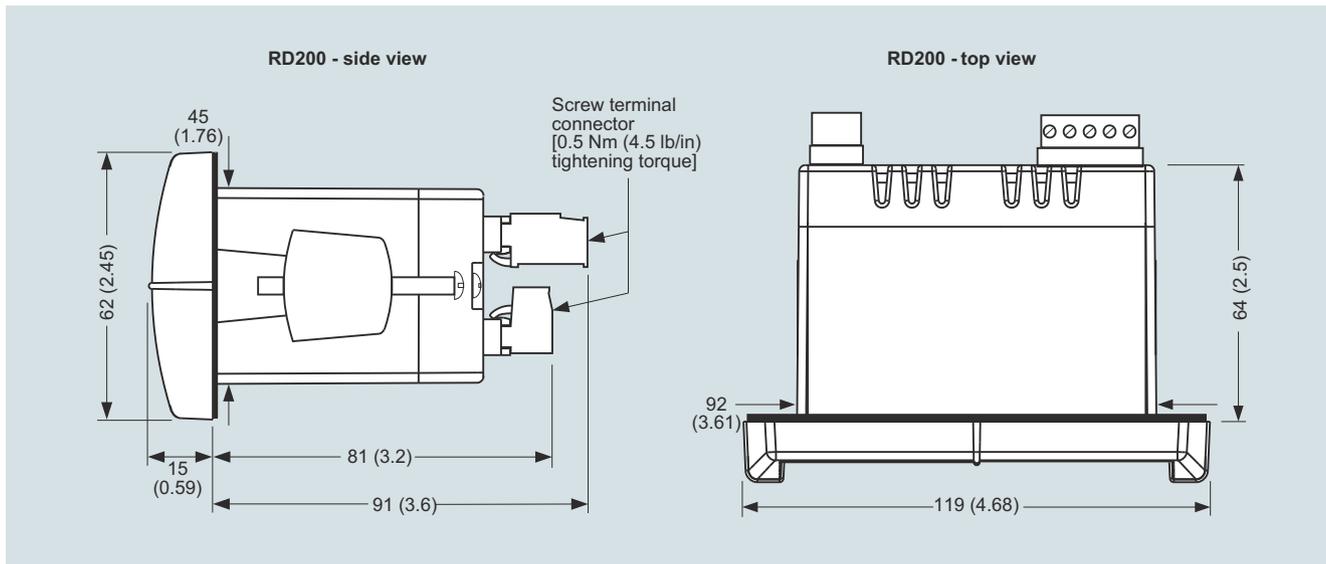
For use with 6 displays

7ML1930-1DA

¹⁾ Available with input voltage option 1 only.

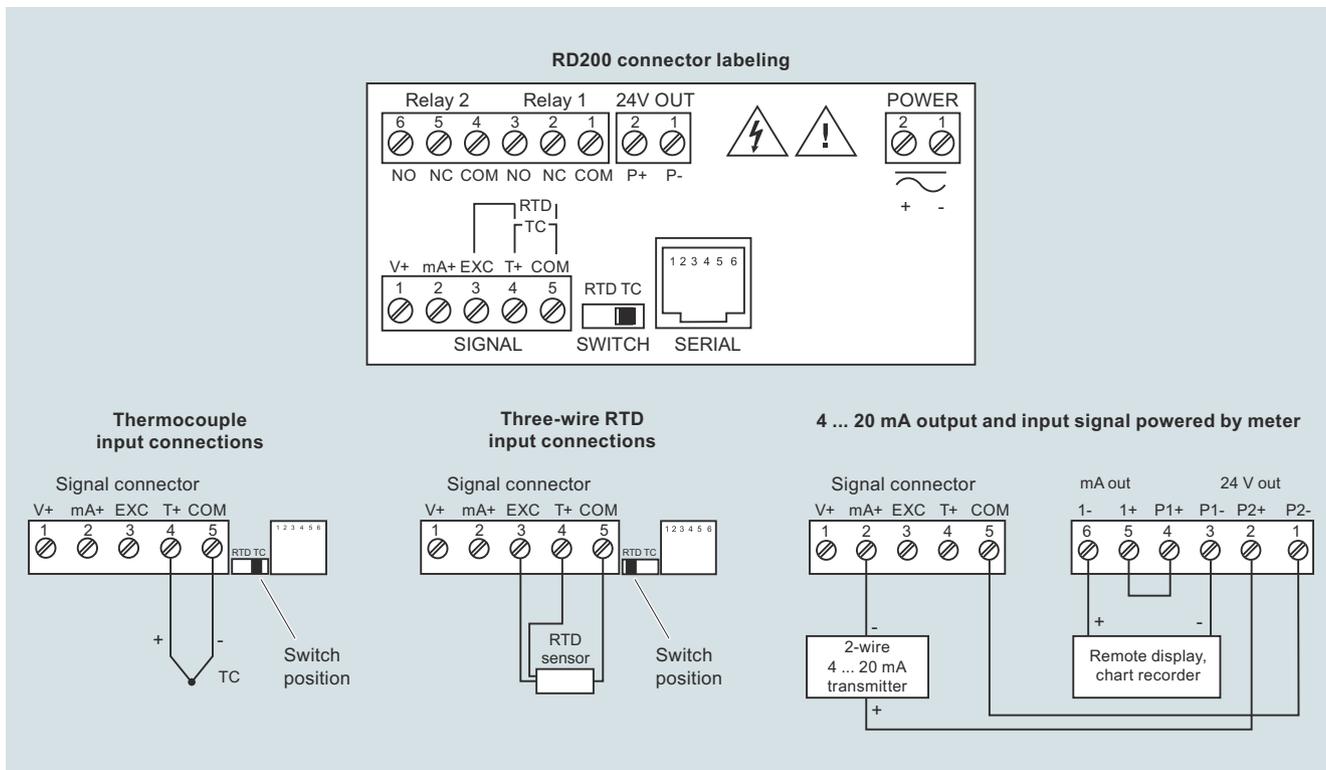
²⁾ Available with output option C only.

Dimensional drawings



SITRANS RD200, dimensions in mm (inch)

Circuit diagrams



SITRANS RD200 connections

Weighing Electronics

Accessories for stand-alone electronics

SITRANS RD300

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 using free RD software available via USB drive
- 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 RD software available via USB drive.

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.

Technical specifications

SITRANS RD300

Mode of operation

Measuring principle	Analog to digital conversion
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 • USB configuration and monitoring port

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	-40 ... +65 °C (-40 ... +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 RD300

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 3A at 250 V AC

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
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Weighing Electronics

Accessories for stand-alone electronics

SITRANS RD300

Selection and ordering data

SITRANS RD300

Dual line remote digital display compatible with PI instruments

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

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.

Output

None
2 relays
4 relays
4 ... 20 mA output
2 relays and 4 ... 20 mA output
4 relays and 4 ... 20 mA output

Type

Single input process and flow R/T Mtr
Dual input process Mtr

Display

Standard
SunBright

Approvals

UL, C-UL, and CE

Article No.

7ML5744-

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Operating instructions

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

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

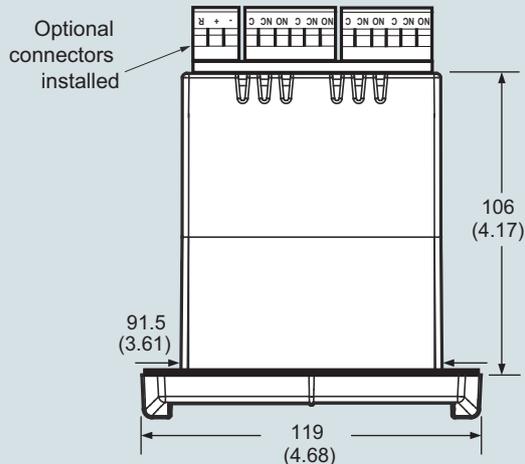
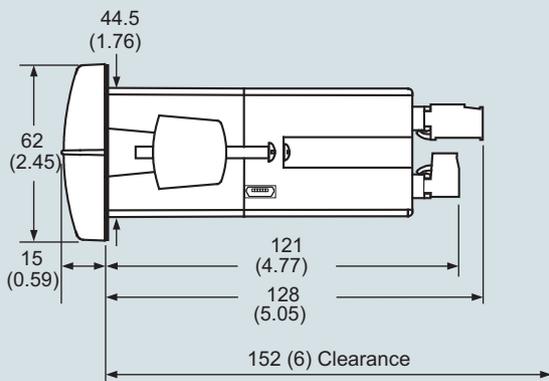
Accessories

- 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

Article No.

- 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

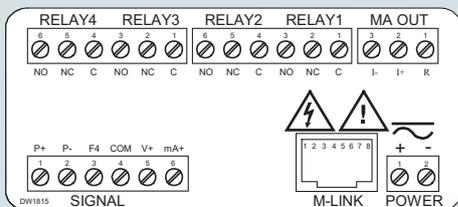
Dimensional drawings



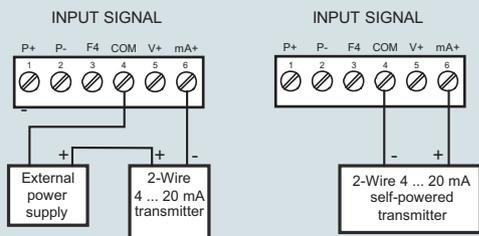
SITRANS RD300, dimensions in mm (inch)

Circuit diagrams

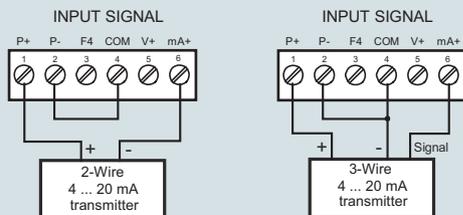
Connector labeling for fully loaded single input meter



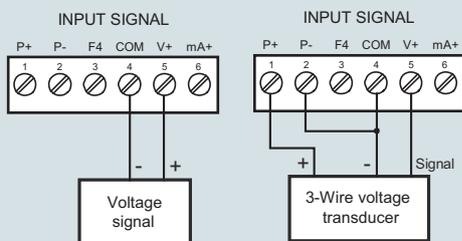
Transmitter powered by external supply or self-powered



Transmitter powered by internal supply



Voltage Input Connections



SITRANS RD300 connections

Weighing Electronics

Accessories for stand-alone electronics

SITRANS RD500

Overview



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

Benefits

- RD500 supports report and alarm events via email, SMS, and FTP transfer
- Web provides worldwide access to instrument data and RD500 configuration and setup
- Simple configuration using a standard web browser, no programming or additional software required.
- Offers scalability with optional I/O modules for current (4 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 cellular 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 and Modbus TCP via EtherNet.

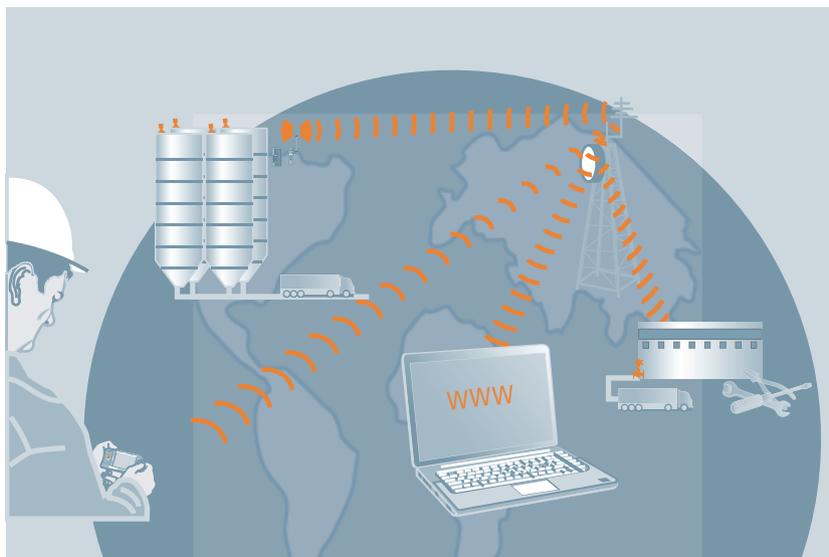
The RD500 comprises a master communications module, and up to 16 slave modules. Various module types are available, allowing up to a maximum of 128 conventional inputs and outputs. The RD500's serial ports can support addressing for Modbus RTU slave devices including field instruments.

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 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 of inventory, process, and maintenance applications, with web access to field instrumentation



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.

Technical specifications

SITRANS RD500	
Mode of operation	
Measuring principle	Remote data monitor
Measuring points	<ul style="list-style-type: none"> Up to 128 standard inputs (conventional IO, see optional IO modules) Addressing for Modbus devices (Modbus RTU and Modbus TCP)
Input	See SITRANS RD500 module specifications table
Output	See SITRANS RD500 module specifications table
Accuracy	See SITRANS RD500 module specifications table
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	1
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 MB of non-volatile Flash memory
On-board SDRAM	2 MB
Memory card	CompactFlash Type II slot for Type I and Type II cards; 1 GB (optional 2 GB)
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

SITRANS RD500	
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
RS232/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)

Weighing Electronics

Accessories for stand-alone electronics

SITRANS RD500

SITRANS RD500 Module Specifications

	8 inputs, 6 solid state outputs	8 inputs, 6 relay outputs	8 channel, 4 ... 20 mA	8 channel ± 10 V	6 channel, RTD	8 channel thermo-couple module
Order number	7ML1930-1ES	7ML1930-1ER	7ML1930-1EP	7ML1930-1EQ	7ML1930-1ET	7ML1930-1EU
Application	8 inputs, 6 outputs used to monitor contact or sensor inputs	8 inputs, 6 outputs used to monitor contact or sensor inputs	16 bit analog input module provides high density signal measurement for data monitoring applications and accepts 0/4 ... 20 mA process signals	16 bit analog input module provides high density signal measurement for data monitoring applications and accepts ± 10 V process signals	16 bit analog input module provides high-density signal measurement for data acquisition applications and accepts various RTD inputs	16 bit 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	± (0.2 % of span, 1 °C) 0 ... 50 °C (32 ... 122 °F); ± (0.1 % of span, 1 °C) 18 ... 28 °C (64 ... 82 °F); includes NIST conformity, A/D conversion errors, temperature coefficient and linearization conformity at 23 °C after 20 minutes warm-up	± (0.3 % of span, 1 °C); includes NIST conformity, cold junction effect, A/D conversion errors, temperature coefficient and linearization conformity at 23 °C after 20 minute warm-up
Mounting	Snaps onto standard DIN style top hat (T) profile mounting rails according to EN 50022 – 35 x 7.5 and - 35 x 15					
Inputs	Dip switch selectable for sink or source	<ul style="list-style-type: none"> 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: <ul style="list-style-type: none"> - Filter switch on: 50 Hz - Filter switch off: 300 Hz 	<ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> 6 single-ended resolution: full 16-bit Sample time: 67 ... 400 ms depending on number of enabled inputs 	<ul style="list-style-type: none"> 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 A at 30 V DC/ 125 V AC resistive 1/10 HP at 125 V AC	Not applicable	Not applicable	Not applicable	Not applicable

Note: in order to protect plants, systems, machines and networks against cyber threats, it is necessary to implement – and continuously maintain – a holistic, state-of-the-art industrial security concept. Siemens' products and solutions only form one element of such a concept. For more information about industrial security, <http://www.siemens.com/industrialsecurity>

Selection and ordering data	Article No.		Article No.
SITRANS RD500 The SITRANS RD500 is a remote data manager providing integrated web access, alarm event handling and data capture for instrumentation. ↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	7ML5750- A 0 0 - 0	Optional equipment Internal modem card with antenna Industrial CompactFlash card, 2 GB Industrial CompactFlash card, 1 GB RJ11 serial to terminal block RS 232 RJ45 serial to terminal block RS 485 Modem antenna RD500 spare module base RD500 spare end terminator Ethernet Cat 5e Red X/O cable for configuration, 1.52 (5 ft) USB cable type A to B Remote mount external antenna 17 ft (5 m) External cellular modem ²⁾	7ML1930-1EY 7ML1930-1FB 7ML1930-1FC 7ML1930-1FD 7ML1930-1FE 7ML1930-1FF 7ML1930-1FG 7ML1930-1FH 7ML1930-1FM 7ML1930-1FN 7ML1930-1FY 7ML1930-1GJ
Communications connection Ethernet ¹⁾	1		
Digital communications to instruments RS 485 Modbus RTU and Modbus TCP	A		
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 module ¹⁾ RD500 6 channel input, RTD module RD500 8 channel thermocouple module	7ML1930-1EP 7ML1930-1EQ 7ML1930-1ER 7ML1930-1ES 7ML1930-1ET 7ML1930-1EU		
Operating Instructions RD500 8 channel 0/4 ... 20 mA input module manual, English Note: operating Instructions should be ordered as a separate line item. All literature is available to download for free, in a range of languages, at http://www.siemens.com/weighing/documentation	7ML19985MB01	SITRANS RD100 Remote displays, see RD100 on page 2/100 SITRANS RD200 Remote displays, see RD200 on page 2/102 SITRANS RD300 Remote displays, see RD300 on page 2/106	

¹⁾ Configuration limited to 16 modules.

²⁾ Antenna, power cord, and cable included.

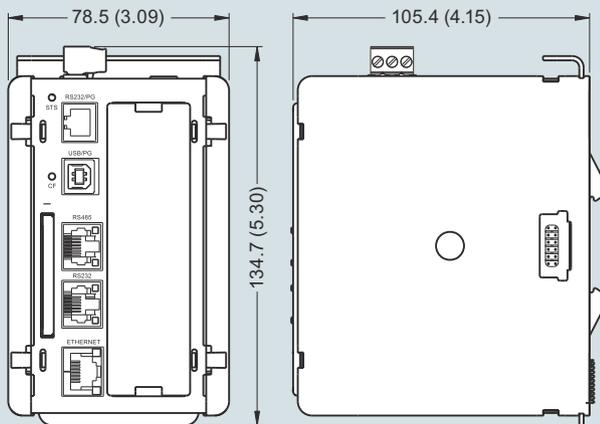
Weighing Electronics

Accessories for stand-alone electronics

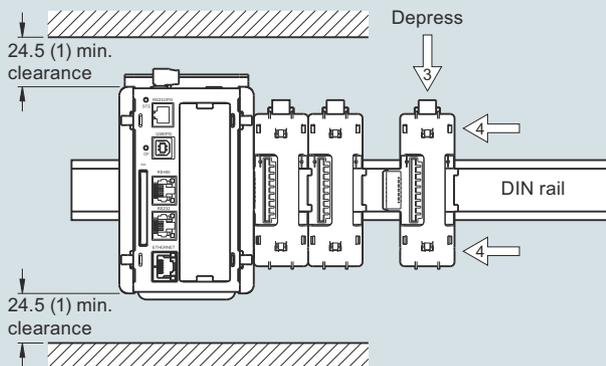
SITRANS RD500

Dimensional drawings

Dimensions



Mounting

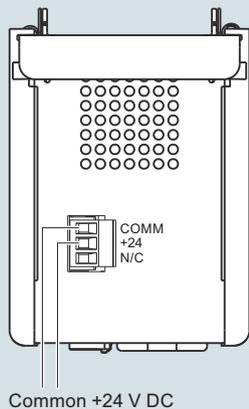


SITRANS RD500, dimensions in mm (inch)

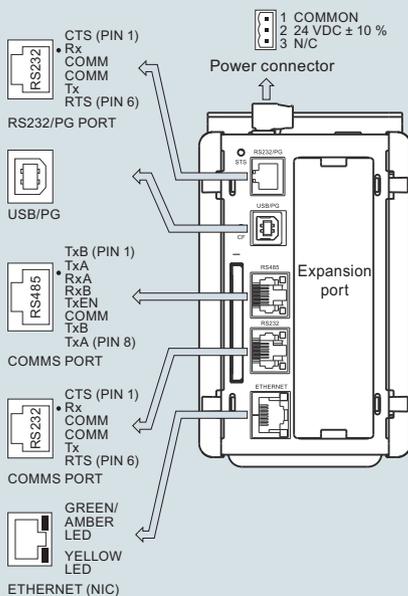
Circuit diagrams

2

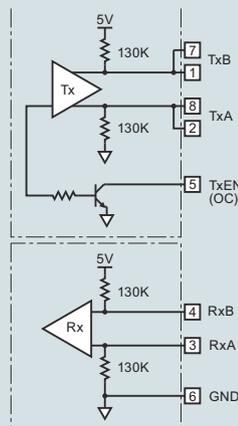
Power connection



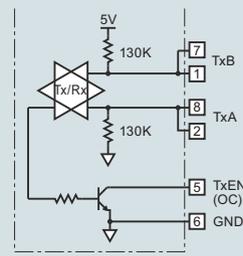
RD500 port pin outs



RS 422/485 4-wire connections

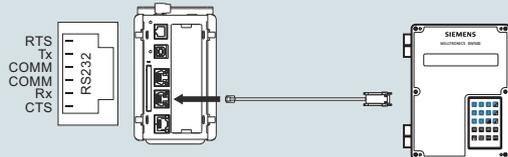


RS 485 2-wire connections

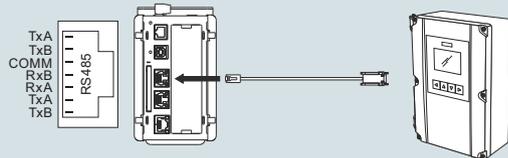


Communication ports

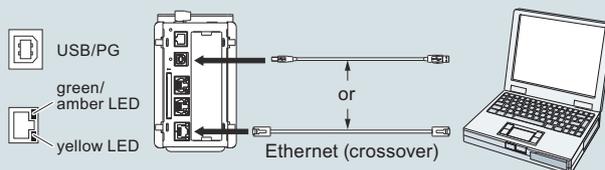
RS 232



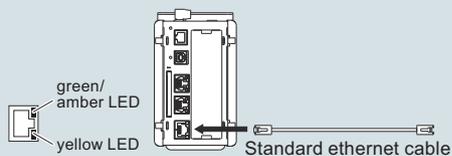
RS 485



Configuration ports



Ethernet connection (Port 3)



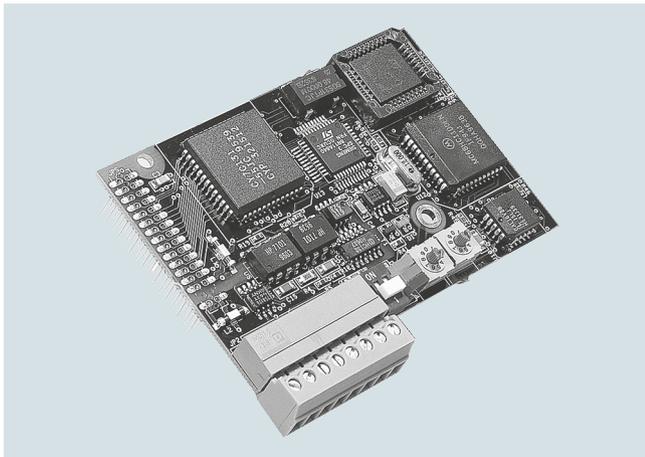
SITRANS RD500 connections

Weighing Electronics

Accessories for stand-alone electronics

SmartLinx communication modules

Overview



SmartLinx communication 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 communication 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 communication modules

PROFIBUS DP modules	7ML1830-1HR
DeviceNet modules	7ML1830-1HT
PROFINET IO module	7ML1830-1PM
Modbus TCP/IP, EtherNet/IP	7ML1830-1PN

Instruction manuals

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

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

Overview



Configuration software for easy integration

For fast, simple integration of our weighing modules, we offer configuration packages for the SIMATIC S7 automation system and the SIMATIC PCS 7 process control system.

As well as the operating tools, both PCS 7 faceplates and function blocks make the commissioning and control of the SIWAREX electronic weighing system as easy and convenient as conceivably possible.

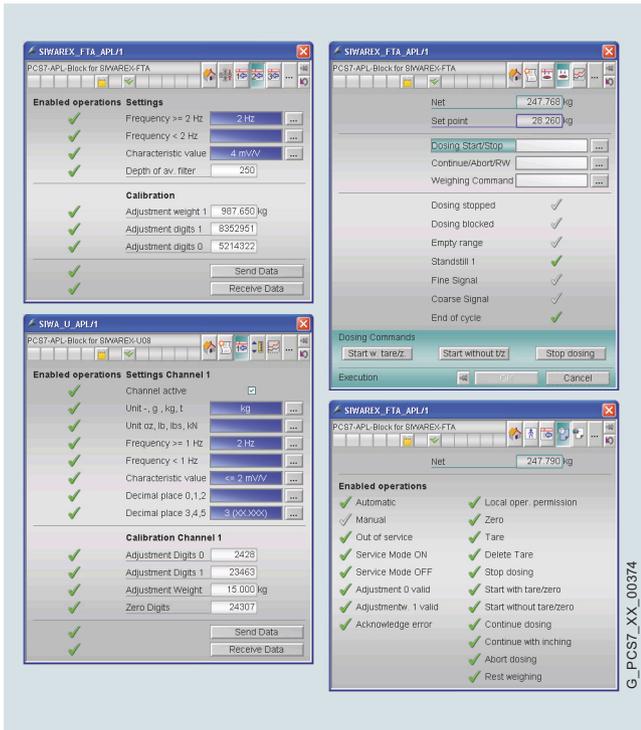
Tools and add-ons for Siemens weighing components

Our configuration packages enable uncomplicated data exchange between the SIMATIC S7 or SIMATIC PCS 7 automation system and our weighing modules. Integrated signaling behavior and maintenance functions such as the reading or writing of all weighing parameters enable high plant availability and correspondingly low downtimes.

Weighing Electronics Software

SIMATIC PCS 7 Add-ons

Overview



Level, proportioning, belt, and loss-in-weight scales in process engineering applications can be quickly and efficiently configured using pre-configured weighing blocks. The uniform design of the SIWAREX weighing controllers matching that of SIMATIC ET 200M or ET 200SP also enables easy and consistent wiring in the control cabinet.

For the SIMATIC PCS 7 process control system, Siemens offers the **SIWAREX PCS 7 AddOn Library** with function blocks for the SIWAREX U, SIWAREX FTA, SIWAREX FTC and SIWAREX WP321 weighing controllers. These weighing blocks are suitable for both standard and fault-tolerant automation systems. In high-availability automation systems, the singularly installed SIWAREX U/FTA/FTC/WP321 can be accessed via both subsystems.

The weighing blocks supplied with the faceplate not only allow the rational integration of the SIWAREX U/FTA/FTC/WP321 weighing controllers into the engineering system, they also enable user-friendly operation and commissioning of the scales via the SIMATIC PCS 7 operator stations. Integrated signaling behavior and maintenance functions such as the reading or writing of all scale parameters ensure short standstill times and help to increase the availability.

The pixel-graphics engineering with the CFC editor is very clear and easy to use. The use of prepared blocks also eliminates possible sources of errors and reduces the configuration costs.

The SIWAREX PCS 7 AddOn Library also supports the communication over PROFINET.

Note:

The function blocks and faceplates for weighing controllers can be used in combination with SIMATIC PCS 7 V8.x and V9.0.

Configuration packages for SIMATIC PCS 7 V8.x in the style of PCS 7 Standard Library for SIWAREX U and SIWAREX FTA are still available.

Design

Product overview SIWAREX configuration packages for SIMATIC PCS 7 and the associated weighing controller

Configuration packages, variants	Associated hardware (SIWAREX weighing controller)	Article number	
SIWAREX U (platform scales / level measurements) <ul style="list-style-type: none"> SIWAREX PCS 7 AddOn Library for SIMATIC PCS 7 V8.x and V9.0, Design PCS 7 Advanced Process Library (APL) Configuration package SIWAREX U for SIMATIC PCS 7 V8.x, Design PCS 7 Standard Library 	SIWAREX U (1-channel), in design of ET 200M	7MH4950-1AA01	
	SIWAREX U (2-channel), in design of ET 200M	7MH4950-2AA01	
SIWAREX FTA (automatic dosing and filling scales) <ul style="list-style-type: none"> SIWAREX PCS 7 AddOn Library for SIMATIC PCS 7 V8.x and V9.0, Design PCS 7 Advanced Process Library (APL) Configuration package SIWAREX FTA for SIMATIC PCS 7 V8.x, Design PCS 7 Standard Library 	SIWAREX FTA, in design of ET 200M	7MH4900-2AA01	
SIWAREX FTC_B (belt scales) <ul style="list-style-type: none"> SIWAREX PCS 7 AddOn Library for SIMATIC PCS 7 V8.x and V9.0, Design PCS 7 Advanced Process Library (APL) 	SIWAREX FTC, with ET 200M design	7MH4900-3AA01	
SIWAREX FTC_L (loss-in-weight scales) <ul style="list-style-type: none"> SIWAREX PCS 7 AddOn Library for SIMATIC PCS 7 V8.x and V9.0, Design PCS 7 Advanced Process Library (APL) 			
SIWAREX WP321 (platform scales / level measurements) <ul style="list-style-type: none"> SIWAREX PCS 7 AddOn Library for SIMATIC PCS 7 V8.x and V9.0, Design PCS 7 Advanced Process Library (APL) 	SIWAREX WP321, in design of ET 200SP	7MH4138-6AA00-0BA0	

Weighing Electronics

Software

SIMATIC PCS 7 Add-ons

Selection and ordering data

SIWAREX PCS 7 AddOn Library

SIWAREX PCS 7 AddOn Library for SIMATIC PCS 7 V8.x and V9.0

Consisting of function block, faceplate and manual, 2 languages (English, German), engineering license for SIWAREX weighing modules, single license for 1 installation

- APL faceplates and function block for:
 - SIWAREX U
 - SIWAREX FTA
 - SIWAREX FTC_B (belt scale)
 - SIWAREX WP321
- Classic faceplate and function block for:
 - SIWAREX FTC_L (Loss in weight)

Engineering and runtime software, software class A

Delivery package: Software and electronic documentation on CD, engineering license (certificate of license)

Associated hardware

SIWAREX U weighing controller

- SIWAREX U (1-channel)¹⁾
- SIWAREX U (2-channel)¹⁾

SIWAREX FTA weighing controller

SIWAREX FTA¹⁾

SIWAREX FTC weighing controller

SIWAREX FTC¹⁾

SIWAREX WP321 weighing controller

SIWAREX WP321¹⁾

Article No.

7MH4900-1AK61

7MH4950-1AA01
7MH4950-2AA01

7MH4900-2AA01

7MH4900-3AA01

7MH4138-6AA00-0BA0

Article No.

Configuration packages in design of PCS 7 Standard Library for SIMATIC PCS 7 V8.x

Configuration package SIWAREX U for SIMATIC PCS 7 V8.x

Consisting of function block, faceplate and manual, 2 languages (English, German), engineering license for SIWAREX U, single license for 1 installation

Engineering and runtime software, software class A

Delivery package: Software and electronic documentation on CD, engineering license (certificate of license)

Configuration package SIWAREX FTA for SIMATIC PCS 7 V8.x

Consisting of function block, faceplate and manual, 2 languages (English, German), engineering license for SIWAREX FTA, single license for 1 installation

Engineering and runtime software, software class A

Delivery package: Software and electronic documentation on CD, engineering license (certificate of license)

7MH4900-3AK62

7MH4900-2AK63

¹⁾ For further accessories (earthing terminals, etc.), refer to the corresponding device manual!!

More information

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Process Automation
Process Instrumentation, Weighing Technology

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E-mail: hotline.siwarex@siemens.com

You can find additional information on the Internet at:
<http://www.siemens.com/weighing-technology>

Overview

SIWATOOL is a service software tool which enables you to calibrate the module quickly and efficiently on site, set or reset parameters, and perform diagnostics in the event of a fault. Furthermore, complete backup files can be created for the scales before module replacement. These can be uploaded to the new module with a few mouse clicks, so that it operates exactly the same as at the point of backup of the old module without the need for any recalibration. It is even possible to upload configuration files created offline or read out the error buffer. No special SIMATIC knowledge is required to use SIWATOOL.

Benefits

- No special SIMATIC knowledge is required
- Fast adjustment and definition of parameters

Selection and ordering data

Article No.

SIWATOOL V4 & V7 Service and commissioning software for SIWAREX weighing modules	7MH4900-1AK01
Ethernet cable patch cord 2 m (7 ft) For connecting SIWAREX WP2xx and 5xx to a PC	6XV1850-2GH20
SIWATOOL connecting cable For connecting SIWAREX U/CS to a PC (RS 232), length 3 m (9.84 ft)	7MH4607-8CA
SIWATOOL connecting cable For connecting SIWAREX FTx to a PC (RS 232) • 2 m long (6.56 ft) • 5 m long (16.40 ft)	7MH4702-8CA 7MH4702-8CB

Weighing Electronics

Notes

2