

Weighing Electronics

SIWAREX weighing electronics for SIMATIC
Dosing/filling/bagging and checking scales

SIWAREX FTA

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 weighing systems requiring official calibration.

The SIWAREX FTA function module is integrated in SIMATIC S7/PCS 7 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 $3 \times 6\,000d$, legal-for-trade according to OIML R-76, R-51, R-61 and R-107
- Use with analog strain gauge 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 ($< 1\text{ ms}$)
- 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 calibration 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 checking scale
- 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. The rail mounting of the 80 mm wide weighing module means that it is extremely easy to mount/wire.

The load cells, the RS 485 serial interface, the analog output and the digital inputs and outputs are connected 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.

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 R-76
- AGFI (**a**utomatic **g**ravimetric **f**illing **i**nstrument) according to OIML R-61
- ACI (**a**utomatic **c**atchweighing **i**nstrument) according to OIML R-51
- DTAWI (**d**iscontinuous **t**otalizing **a**utomatic **w**eighing **i**nstrument (Totalizing Hopper Weigher)) according to OIML R-107

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 calibration weights, and that modules can be replaced without readjustment of the scale. When using "active bus modules", replacement is also possible during operation.

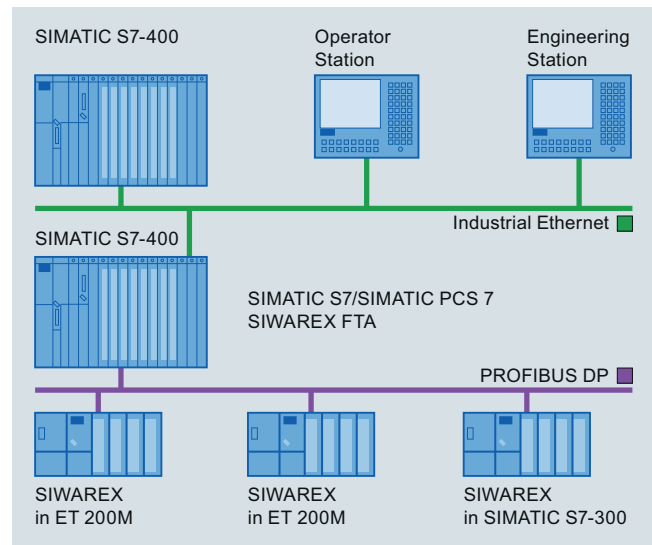
Integration in SIMATIC

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

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Function (continued)

Software

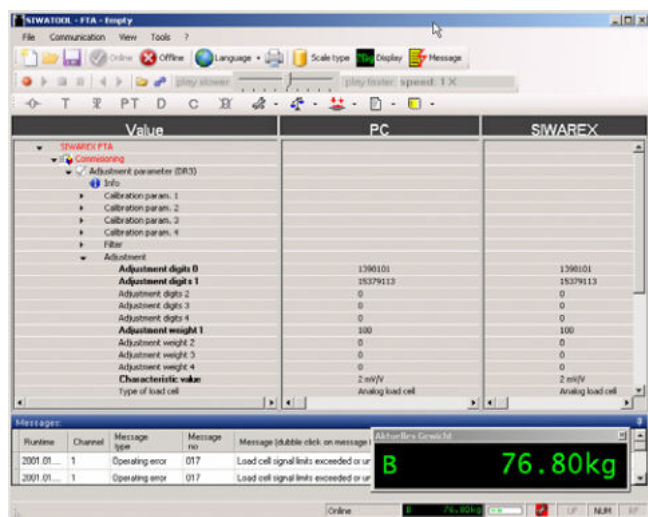
SIWATOOL FTA commissioning software

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.

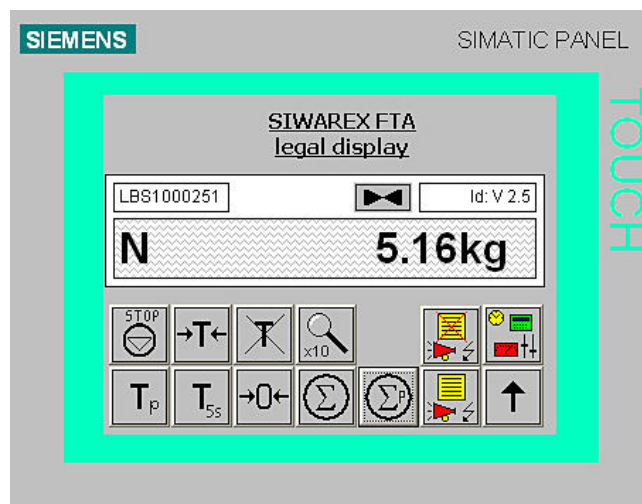
SIWAREX FTA – simple configuration

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. It 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 Secure-Display 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.

Technical specifications

SIWAREX FTA	
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 FTA software (RS 232)
Measuring properties	
EU type approval as non-automatic weighing instrument, 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 dampened, Bessel, Butterworth (0.05 ... 20 Hz), mean-value filter
Weighing functions	
Non-automatic weighing machine	OIML R-76
Automatic weighing machine	OIML R-51, R-61, R-107
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	1000 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 on 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 R-76) EU prototype test according to MID (OIML R-51, R-61, R-107)
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 × 125 × 130 mm (3.15 × 4.92 × 5.12 inch)
Weight	600 g (0.44 lb)

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

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Selection and ordering data

SIWAREX FTA

Legal-for-trade weighing electronics for automatic scales for S7-300 and ET 200M.

EU type approval 3 x 6000 d
Applications: proportioning, filling, bagging, loading.

Note: Observe approval conditions for applications requiring official calibration. We recommend using our calibration set and contacting our SIWAREX hotline.

7MH4900-2AA01

SIWAREX FTA Equipment Manual

Available in a range of languages

Free download on the Internet at:

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

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>

SIWATOOL V4 & V7

Service and commissioning software for SIWAREX weighing modules

7MH4900-1AK01

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

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

7MH4900-2AK63

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

- Supports PROFINET

APL faceplates and function blocks 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

Calibration set for SIWAREX FTA

For verification of up to 5 scales comprising:

- 3 x inscription foils for ID label
- 1 x protective film
- Guidelines for verification, verification certificates and approvals, editable label, SIWAREX FTA Equipment Manual on CD-ROM

7MH4900-2AY10

SIWATOOL connection cable

From SIWAREX FTA 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

Front connector, 40-pin

Required for each SIWAREX module

- With screw contacts
- With spring-loaded terminals

Article No.

6ES7392-1AM00-0AA0
6ES7392-1BM01-0AA0

Shield connection element

Sufficient for one SIWAREX FTA module

6ES7390-5AA00-0AA0

Shield connection clamp

Contents: 2 units
(suitable for cable with diameter 4 ... 13 mm / 0.16 ... 0.51 inch)

Note:

One shield connection clamp is required for each of the following:

- Scale connection
- RS 485 interface
- RS 232 interface

6ES7390-5CA00-0AA0

S7 DIN rail

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

6ES7390-1AB60-0AA0
6ES7390-1AE80-0AA0
6ES7390-1AF30-0AA0
6ES7390-1AJ30-0AA0
6ES7390-1BC00-0AA0

MMC memory

For data recording up to 32 MB, only for legal-for-trade applications R76, R51 and R107

7MH4900-2AY21

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
PO Box 1180
D-66565 Eppelborn
Tel.: +49 6806/980-0
Fax: +49 6806/980-999

Internet:

<https://www.siebert-group.com/en/>

Detailed information is available from the manufacturer.

SIWAREX JB junction box, aluminum housing

7MH5001-0AA20

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

SIWAREX JB junction box, stainless steel housing

7MH5001-0AA00

For connecting up to 4 load cells in parallel.

SIWAREX JB junction box, stainless steel housing (ATEX)

7MH5001-0AA01

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 systems. Compatibility of load cells must be checked separately.

- With short-circuit current < 199 mA DC

7MH4710-5BA

- With short-circuit current < 137 mA DC

7MH4710-5CA

Selection and ordering data	Article No.
<p><i>Cable (optional)</i></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 EBs. For permanent installation. Occasional bending is possible.</p> <p>External diameter: approx. 10.8 mm (0.43 inch)</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 hazardous atmospheres. Sheath color: blue. 	<p>7MH4702-8AG 7MH4702-8AF</p>
<p><i>Commissioning</i></p> <p>Commissioning charge for one static scale with SIWAREX module</p> <p>(Flat charge for travel and setup 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 • Static adjustment of the scale <p>Requirements:</p> <ul style="list-style-type: none"> • Mechanical design functional • Modules electrically wired and tested • Calibration weights available • Free access to scale 	<p>9LA1110-8SN50-0AA0</p>
<p>Flat charge for travel and setup in Germany</p>	<p>9LA1110-8RA10-0AA0</p>