

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.

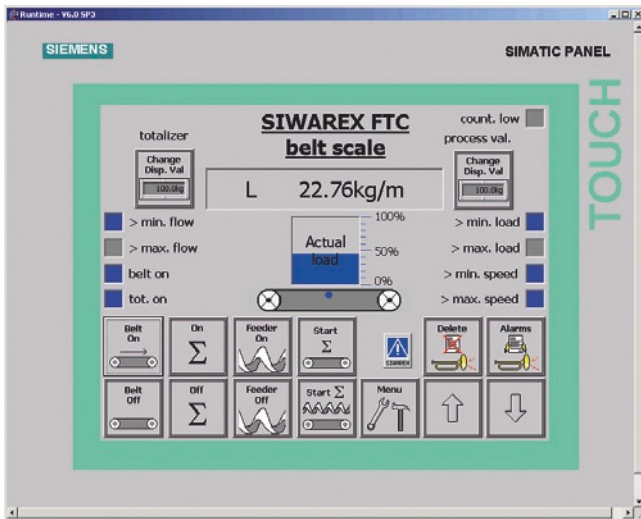
Conveyor scale / weighfeeder

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
Belt scale

SIWAREX FTC



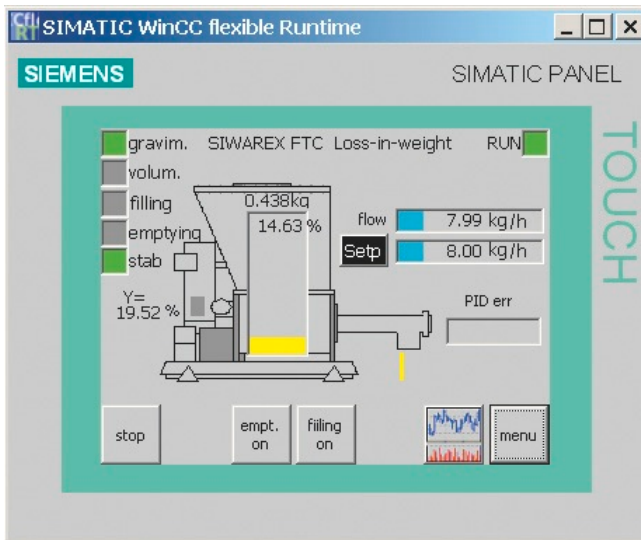
Scale faceplate of a conveyor scale

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.

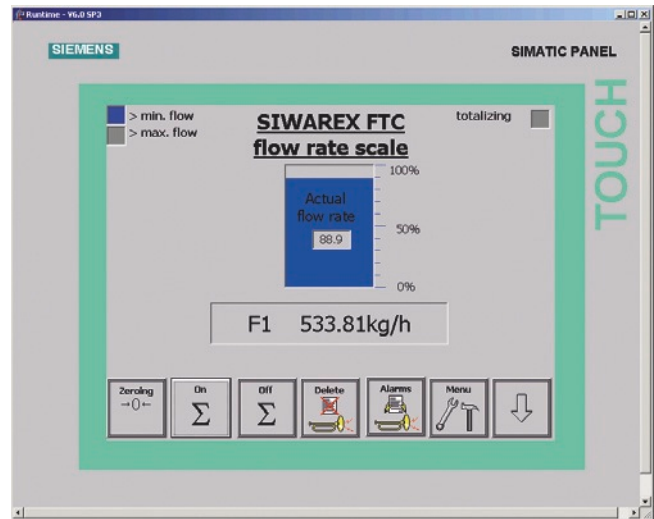
The high measurement resolution, real-time signal processing, detection and filtering of signals in the weighing electronics enable extremely high proportioning accuracy.



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.



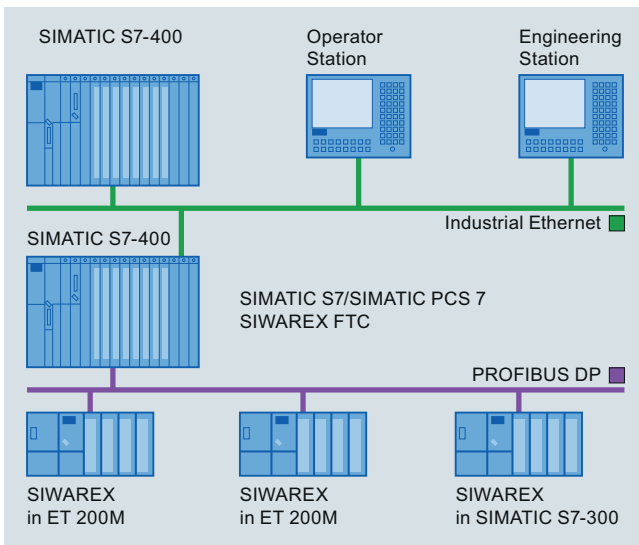
Applications of SIWAREX FTC

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

Value	PC	SIWAREX
Standard belt speed (m/s)	0.5	0.5
Meas. time for speed (ms)	2000	2000
Pulses factor speed sensor (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

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.

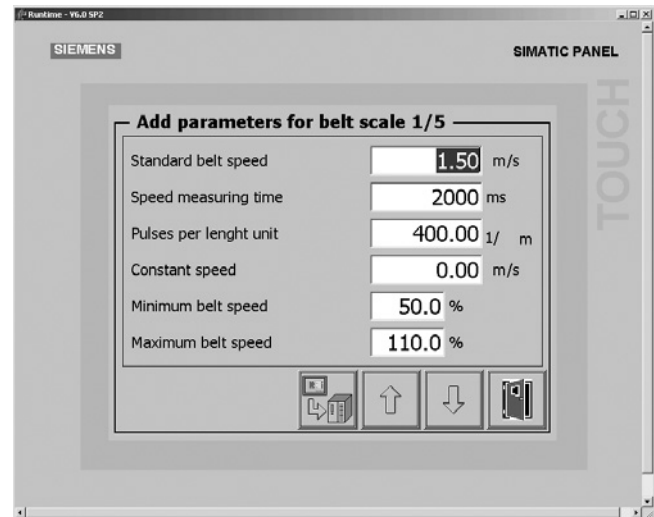
Reading out of weighing reports

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

Belt 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 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		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

Belt scale

SIWAREX FTC

Selection and ordering data

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