

Weighing Electronics

SIWAREX weighing electronics for SIMATIC
Platform/hopper scale

SIWAREX U

Overview



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

Benefits

SIWAREX U offers the following key advantages:

- Uniform design technology and consistent communication in SIMATIC
- Use in distributed plant concept through connection to PROFIBUS 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.

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).

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Selection and ordering data

Selection and ordering data	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 Two-channel version ²⁾ for connecting two scales	7MH4950-1AA01 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) 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
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

Article No.

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	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. <ul style="list-style-type: none"> • With short-circuit current < 199 mA DC • With short-circuit current < 137 mA DC 	7MH4710-5BA 7MH4710-5CA

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

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

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.