

Weighing Electronics

SIWAREX - PLC-based weighing modules

SIWAREX CS

Overview



SIWAREX CS weighing electronics

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 gage 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 for industrial lifts and rolling mills
- Weighing in potentially explosive areas (zone 2 directly, or 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 onto a terminal module. The power supply is connected via a power module and an internal power supply rail.

The load cells and the serial interface are connected via the terminal module connections. The use of the terminal module enables replacement of the module without the need to undo connection 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 diagnosis in industrial processes.

All master modules support the readout of process data from SIWAREX CS via peripherals. In the case of PROFIBUS master modules that support the protocol DP V1 and PROFINET master modules, it is also possible to use data record communication to read out data and input settings.

Group diagnostics and process alarms are possible with all PROFIBUS master modules with DP V1 and PROFINET modules. Master modules with DP V0 support group diagnosis, but not process alarms.

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.

A PC can be connected via the RS 232 interface to parameterize the SIWAREX CS.

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.

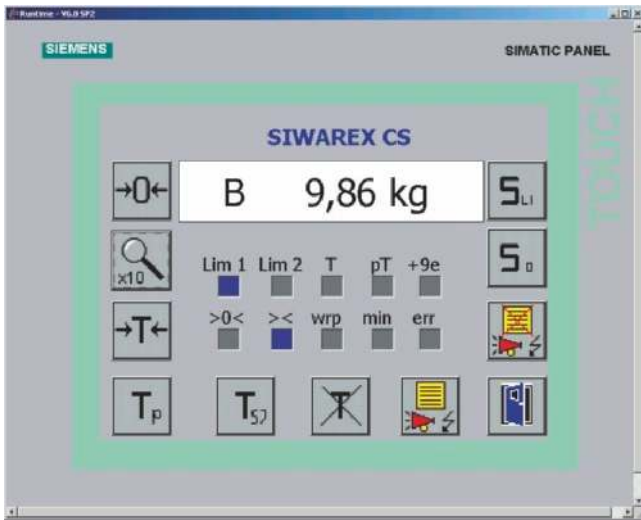
Used in conjunction with SIWAREX CS, it is possible to configure freely programmable, modular weighing systems in SIMATIC.

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Function (continued)



Scale faceplate in the SIWAREX CS software "Getting started"

In addition to the configuration package, the ready-to-use SIWAREX CS software "Getting started" is also available free-of-charge and shows beginners how to integrate the module in a STEP 7 program and offers a basis for application programming. A SIWAREX CS scale is then easy to implement in SIMATIC, for use together with a SIMATIC panel as operator panel.

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

The diverse diagnostic 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). 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	via ET 200S
IM151-7 CPU	Through backplane bus
Automation systems from other manufacturers (possible with limitations)	via ET 200S
Communication interfaces	SIMATIC S7 (ET 200S backplane bus), RS 232, TTY
Connection of remote displays (through TTY serial interface)	Display for weight value
Adjustment of scale settings	using SIMATIC S7/C7 IM151-7 CPU or SIWATOOL CS PC parameterization software (RS 232)
Measuring accuracy	
Error limit to DIN 1319-1 of full-scale value at 20 °C ± 10 K	0.05 %
Internal resolution	65 535
Data format of weight values	2 byte (fixed-point)

Number of measurements/s	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}	< 4 010 Ω
Load cell characteristic	1 ... 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 (3 280 ft)
Intrinsically-safe load cell powering	Optional (SIWAREX IS Ex interface)
External load cell powering	≤ 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	
Rated voltage	24 V DC
Max. current consumption	150 mA
IP degree of protection acc. to DIN EN 60529; IEC 60529	IP20
Climatic requirements	
$T_{min} (IND) \dots T_{max} (IND)$ (operating temperature)	
• Vertical installation	-10 ... +60 °C (14 ... 140 °F)
• Horizontal installation	-10 ... +40 °C (14 ... 104 °F)
EMC requirements according to	EN 61326, EN 45501 NAMUR NE21, Part 1
Dimensions	80 x 125 x 130 mm (3.15 x 4.92 x 5.12 inch)

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Selection and Ordering data

Order No.

Order No.

SIWAREX CS

Weighing electronics for scales in SIMATIC ET 200S

7MH4910-0AA01

SIWAREX CS Manual

Available in a range of languages
Free download on the Internet at:
<http://www.siemens.com/weighingtechnology>

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/weighingtechnology>

Configuration package SIWAREX CS on CD-ROM for SIMATIC S7, version V5.4 or higher

- Software for SIWATOOL CS scale adjustment (available in a range of languages)
- Manuals available on CD (in a range of languages)
- SIWAREX CS "Getting started"

7MH4910-0AK01

SIWATOOL connection cable D) from SIWAREX U/CS with serial PC interface, for 9-pin PC interfaces (RS 232), 3 m long (9.84 ft)

7MH4607-8CA

Installation material (mandatory)

Terminal module

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

6ES7193-4CG20-0AA0
or compatible

Shield contact element

Contents 5 items, sufficient for 5 cables

6ES7193-4GA00-0AA0

Shield connection terminal

Contents: 5 items, sufficient for 5 cables

Note: one shield connection terminal is required each for the

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

6ES7193-4GB00-0AA0

N busbar, galvanized

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

8WA2842

Feeder terminal for N busbar

8WA2868

Remote displays (option)

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

The following remote display can be used: S102

Siebert Industrielektronik GmbH

P.O. Box 1180

D-66565 Eppelborn

Tel.: +49 6806/980-0

Fax: +49 6806/980-999

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

Detailed information available from manufacturer.

Accessories

SIWAREX JB junction box, aluminium housing

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

7MH4710-1BA

SIWAREX JB junction box, stainless steel housing

for connecting up to 4 load cells in parallel

7MH4710-1EA

Ex interface, type SIWAREX Pi

With UL and FM approvals, but **without ATEX approval** for intrinsically safe connection of load cells
Suitable for weighing modules SIWAREX U, CS, MS, FTA and FTC.
Not approved for use in the EU.

7MH4710-5AA

Manual for Ex interface SIWAREX Pi

C71000-T5974-C29

Ex interface, type SIWAREX IS

With ATEX approval, but **without UL and FM approvals** for intrinsically safe connection of load cells, incl. manual
Suitable for weighing modules SIWAREX U, CS, MS, FTA, FTC and CF.
Approved for use in the EU.

- With short-circuit current < 199 mA DC

7MH4710-5BA

- With short-circuit current < 137 mA DC

7MH4710-5CA

Cable (optional)

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

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

7MH4702-8AG

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

to connect the junction box (JB) or extension box (EB) in a potentially explosive atmosphere to the Ex interface (Ex-I), for fixed laying, occasional bending permitted, blue PVC insulating sheath, approx. 10.8 mm (0.43 inch) outer diameter, for ambient temperature -40 ... +80 °C (104 ... +176 °F)

7MH4702-8AF

Cable LiYCY 4 x 2 x 0.25 mm² D)

for TTY (connect 2 pairs of conductors in parallel), for connection of a remote display

7MH4407-8BD0

D) Subject to export regulations AL: N, ECCN: EAR99H.