

Weighing Electronics

SIWAREX - PLC-based weighing modules

SIWAREX WP231

Overview



SIWAREX WP231 is a versatile 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
- Operation without SIMATIC CPU possible
- Direct connection of an operator panel via Ethernet
- Direct connection of a remote display via RS 485 interface
- Four digital inputs and outputs, one analog output
- Measurement of weight or force with a high resolution of 1 part per million and an accuracy of 0.05 %
- Simple adjustment of scale using the SIWATOOL V7 program via the Ethernet interface
- Supports automatic adjustment without adjustment weights
- Supports replacement of module without renewed adjustment of scale
- Use in hazardous area zone 2

Application

SIWAREX WP231 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 WP231 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
- Scales in zone 2 hazardous areas
- Force measuring, container weighing, platform scales and crane scales

Design

SIWAREX WP231 is a compact technology module in SIMATIC S7-1200 and allows direct connection to S7-1200 components via a sliding connector. 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. A 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. 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 system software via the PLC programming language SCL (Structured Control Language). In contrast to serially linked weighing electronics, SIWAREX WP231 does not need costly additional modules to link it to SIMATIC.

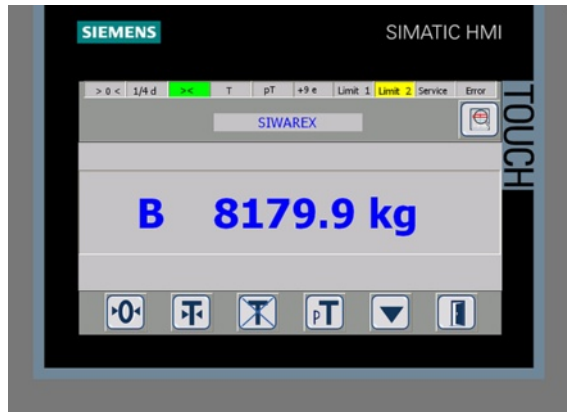
Used in conjunction with SIWAREX WP231, it is possible to configure freely programmable, modular weighing systems in SIMATIC, which can be adapted to company-specific requirements as needed.

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Function (continued)



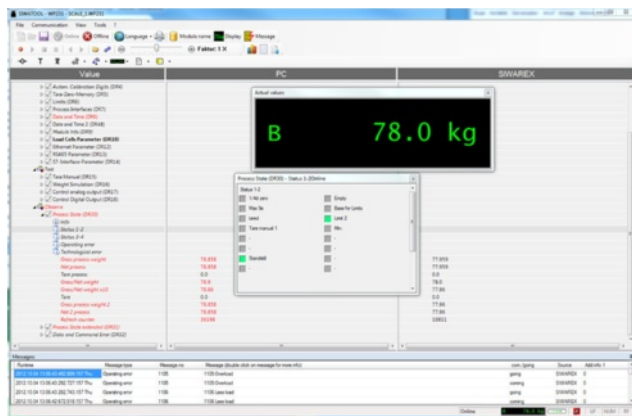
In addition to the configuration package, a fully-featured SIWAREX WP231 "Ready for use" software is also available free-of-charge. It shows beginners how to integrate the module in a STEP 7 program and offers a basis for application programming. This allows you to connect the scale either directly to the SIMATIC CPU or to an operator panel connected directly to the SIWAREX WP231.

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 adjustment 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:

- Parameterization and adjustment 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 following reading out from the module.

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.

Technical specifications

SIWAREX WP231

Integration in automation systems

S7-1200

- Operator panel
- Automation systems from other manufacturers (possible with limitations)

Directly via SIMATIC bus

Via Ethernet (Modbus TCP/IP) or RS 485 (Modbus RTU)

Communication interfaces

- SIMATIC S7-1200 backplane bus
- RS 485
- Ethernet

Connection of remote displays (via RS 485)

Display for weight value

Adjustment of scale settings

PC configuration software SIWATOOL (Ethernet) or directly connected operator panel (Modbus)

Measuring accuracy

Error limit acc. to DIN 1319-1 of full-scale value at 20 °C ± 10 K (68 °F ± 10 K)

0.05 %

Internal resolution

1 million parts

Number of measurements/second

100

Filters

- Low-pass filter 0.1 ... 50 Hz
- Mean value filter

Weighing functions

Weight values

- Gross
- Net

Limits

- Min/max
- Empty

Zeroing function

Per command

Tare function

Per command

Tare specification

Per command

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)

Connection to load cells in Ex zone 1

Optionally via SIWAREX IS Ex interface

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Technical specifications (continued)

SIWAREX WP231	
Ex approvals, Zone 2	<ul style="list-style-type: none"> • ATEX Zone 2 • UL, FM in preparation
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 ... +55 °C (14 ... 131 °F)
Horizontal installation	-10 ... +40 °C (14 ... 104 °F)
EMC requirements according to	EN 45501
Dimensions	70 x 75 x 100 mm (2.76 x 2.95 x 3.94 inch)

Selection and ordering data

Order no.

SIWAREX WP231 Weighing electronics for scales in SIMATIC S7-1200	7MH4960-2AA01
SIWAREX S7-1200 device manual Available in a range of languages Free download on the Internet at: http://www.siemens.com/weighingtechnology	
SIWAREX WP231 "Ready for Use" Complete software package for non-automatic scale (for S7-1200 and a directly connected operator panel) Free download from Internet at: http://www.siemens.com/weighingtechnology	
Configuration package SIWAREX WP231 on CD-ROM for TIA-Portal V11 <ul style="list-style-type: none"> • "Ready for Use" software for operating a scale with SIWAREX WP231 and a touch panel (in a variety of languages) • SIWATOOL V7.0 calibration tool • Device manuals (PDF files in a variety of languages) 	7MH4960-2AK01
Ethernet cable patch cord, 2 m (7 ft) for connecting SIWAREX WP231 to a PC (SIWATOOL), SIMATIC CPU, panel, etc.	6XV1850-2GH20

Remote display (optional)

The digital remote displays can be connected directly to the SIWAREX WP231 via the RS 485 interface.

The following remote display can be used:

S102

Siebert Industrieelektronik GmbH

P.O. Box 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 manufacturer.

Accessories

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

Ex interface, type SIWAREX IS

With ATEX approval, but **without UL and FM approvals**, for intrinsically-safe connection of load cells, including device manual

Suitable for the SIWAREX U, CS, MS, FTA, FTC, M, CF and WP231 weighing modules

Approved for use in the EU

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

7MH4710-5BA
7MH4710-5CA

Cable (optional)

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

7MH4702-8AG

To connect SIWAREX U, CS, MS, FTA, FTC, M, CF and SIWAREX WP231 to the junction box (JB), extension box (EB) or Ex interface (Ex I) or between two JB's, for fixed laying, occasional bending permitted, approx. 10.8 mm (0.43 inch) outer diameter, for ambient temperature

-40 ... +80 °C (-104 ... +176 °F)

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

7MH4702-8AF

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)

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Notes