Overview

Weighing electronics TM SIWAREX WP521 ST (left) and
TM SIWAREX WP522 ST (right)

The TM SIWAREX WP521 ST and WP522 ST (ST = Standard) are versatile weighing modules for the SIMATIC S7-1500 Advanced Controller family. With these electronic weighing systems, simple weighing applications, such as platform or hopper scales, can be seamlessly integrated into the S7-1500 automation environment.

Benefits

SIWAREX WP521 ST and WP522 ST offer the following key advantages:

- Uniform design technology and consistent communication in SIMATIC S7-1500
- Uniform configuration with TIA Portal
- Single (WP521 ST) and dual-channel (WP522 ST) variants are available
- Operation possible without or with failed SIMATIC CPU
- Optional direct connection of an operator panel via Ethernet port (Modbus TCP/IP)
- Optional direct connection of a remote display via RS 485 interface
- Modbus TCP/IP interface
- Modbus RTU interface
- Three digital inputs and four digital outputs
- Measurement of weight or force with a high resolution of up to ± 4 million parts and a measurement rate of 100/120 Hz
- Simple commissioning by means of HMI/CPU or PC software SIWA-TOOL V7 via the Ethernet interface
- Recovery point for simple restoration of all parameters
- Automatic calibration is possible without the need for calibration weights
- Module can be replaced without renewed adjustment of scale
- Automatic impedance monitoring of the connected load cells
- Direct use in hazardous area zone 2
- Up to eight 350 ohm load cells can be connected per channel
- High EMC resistance

Application

SIWAREX WP521 ST and WP522 ST are the optimum solution for the integration of non-automatic scales, such as platform or hopper scales, into the SIMATIC S7-1500 automation environment. The two modules have the basic weighing functions: zeroing, taring and tare specification. Three limit values can also be freely defined and, if required, also output via the digital outputs. All further available status information can also be flexibly linked to the outputs. The digital inputs can be used for the direct wiring of pushbuttons, for example. All weighing functions (e.g. zeroing) can be freely and flexibly assigned to each input.

Design

SIWAREX WP521 ST and WP522 ST are technology modules of the SIMATIC S7-1500 Advanced Controller family and therefore communicate directly with the SIMATIC S7-1500 controller via the system bus. Additional expensive communication cards are therefore not required when using SIWAREX weighing technology.
The compact, 35 mm wide weighing modules can be mounted directly on the SIMATIC DIN rail. Assembly is therefore extremely easy and consistent with the remaining automation.
The modules are delivered ex works with a shielding set, comprising a shield clamp, shielding bracket and 24 V DC supply element with screw-type terminals. This set is assembled with an appropriate front connector (must be ordered separately, see accessories and ordering data) and therefore guarantees optimum hardware design and EMC immunity.
The power supply, load cells, RS 485 interface and the digital inputs/outputs are also connected via the removable front connector. An RJ45 port is available on the bottom of the module for the Ethernet connection (SIWATOOL and Modbus TCP/IP).

Function

SIWAREX WP521 ST and WP522 ST provide simple weighing applications such as platform or hopper scales (ST = Standard). The basic functions zeroing, taring and tare specification can easily be issued by the CPU/HMI via the ready-made function block or alternatively via a 24 V signal at one of the three digital inputs.
The ready-made function block provides full access to all parameters. Commissioning, maintenance and operation of the scales can be performed fully from the CPU or HMI – without additional programming work. The free "Ready-for-use" software (can be downloaded in the Siemens Online Support) also contains fully fledged HMI configuration, which can be transferred to your own project as you wish and freely edited. Customer- and plat-specific weighing applications can therefore be realized in an instant. In addition, languages can be added easily and quickly with the help of the corresponding functions of the TIA Portal.
As an alternative to the CPU/HMI, the module can also be put into operation and maintained conveniently and without a knowledge of SIMATIC via the PC software SIWATOOL V7. This simplifies work considerably for the service staff as no interventions in the controller are required.
The automatic impedance monitoring of the module also increases plant safety and availability. The total impedance of the connected cells is determined as the reference value during commissioning. You can also freely define from which percentage deviation from the reference value a corresponding status bit is to be set. In the event of an error (e.g. severing of a load cell cable), this bit can generate corresponding alarms in the controller and initiate measures. The impedance is continuously monitored every 100 ms.
Up to eight 350-ohm load cells switched in parallel can be connected per scale (per channel).
The modules can be integrated into the plant network via the Ethernet interface of the modules, so that during servicing, remote access is easily possibly worldwide by means of SIWATOOL . Please refer to the information at http://www.siemens.com/industrialsecurity

Weighing Electronics

SIWAREX for SIMATIC

Function (Continued)

A firmware update of the modules can be performed via the TIA Portal (MMC card or by file selection) or SIWATOOL V7.
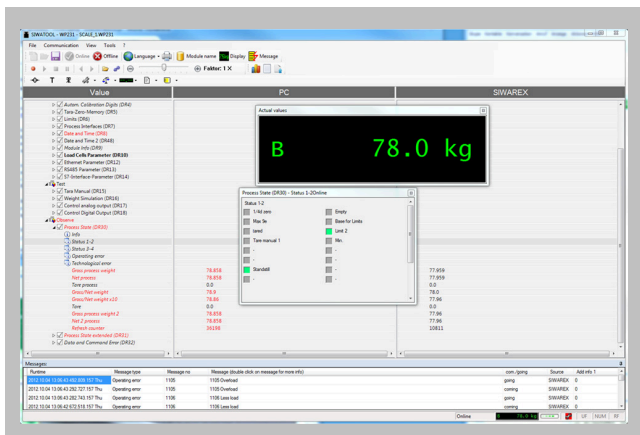

Software SIWATOOL V7

The software SIWATOOL V7 for Windows operating systems is optionally available for commissioning and servicing. The software is free of charge and part of the configuration package (see accessories).

The program enables the scales to be parameterized and commissioned 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 the power fail-safe diagnostics buffer is also a useful feature for troubleshooting. A trace can also be started and read. This trace records all the weight values and status information in 10 ms intervals. The data can be read out using SIWATOOL V7 and exported to spreadsheet programs, thus enabling highly granular investigation and optimization.

The following are just some of the tasks that can be carried out using SIWATOOL V7:

• Parameter assignment and calibration of the scale

• Testing of scale properties

• Recording and analysis of weighing sequence (trace)

• Firmware update

• Creation/loading of external backup files

SIWATOOL V7, layout of the program windows

Selection and ordering data

	Article No.
Weighing electronics TM SIWAREX WP521 ST	7MH4980-1AA01
Single-channel, for platform scales or hopper scales with analog load cells (1 - 4 mV/V), 1 × LC, 4 × DQ, 3 × DI, 1 × RS 485, Ethernet port, including shielding set.	
Weighing electronics TM SIWAREX WP522 ST	7MH4980-2AA01
Two-channel, for two separate platform scales or hopper scales with analog load cells (1 - 4 mV/V), per channel 1 × LC, 4 × DQ, 3 × DI, 1 × RS 485, Ethernet port, including shielding set.	
SIMATIC S7-1500, front connector with screw-type terminals	6ES7592-1AM00-0XB0
40-pin, for 35 mm wide modules, including 4 jumper links and cable ties	
SIMATIC S7-1500, front connector with push-in technology	6ES7592-1BM00-0XB0
40-pin, for 35 mm wide modules, including 4 jumper links and cable ties	
SIWATOOL V4 & V7	7MH4900-1AK01
Service and commissioning software for SIWAREX weighing modules	
Ethernet cable patch cord 2 m (7 ft)	6XV1850-2GH20
For connecting SIWAREX WP52x ST to a PC (SIWATOOL V7 or Modbus TCP/IP)	
Accessories	
SIWAREX EB extension box	7MH4710-2AA
For extending sensor cables	
SIWAREX JB junction box, aluminum housing	7MH5001-0AA20
For connecting up to 4 load cells in parallel, and for connecting multiple 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)	
SIWAREX IS Ex interface	
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.	
• Short-circuit current < 199 mA DC	7MH4710-5BA
• Short-circuit current < 137 mA DC	7MH4710-5CA
Cable (optional)	
Cable Li2Y 1 × 2 × 0.75 ST + 2 × (2 × 0.34 ST) – CY	
For connecting SIWAREX electronic to junction box (JB), extension box (EB), digital junction box (DB), Ex interface (IS) or between two extension boxes. For permanent installation. Occasional bending is possible. External diameter: approx. 10.8 mm (0.43 inch)	

Selection and ordering data (Continued)

	Article No.
Permissible ambient temperature -40 ... +80 °C (-40 ... +176 °F) Sold by the meter.	
• Sheath color: orange	**7MH4702-8AG**
• Sheath color (for hazardous atmospheres): blue	**7MH4702-8AF**
Remote display (optional)	
The digital remote displays can be connected directly to the SIWAREX WP231 via the RS 485 interface. Suitable remote display: S102	
Siebert Industrieelektronik GmbH PO Box 1180 D-66565 Eppelborn Tel.: +49 6806/980-0 Fax: +49 6806/980-999	
http://www.siebert-group.com/en Detailed information is available from the manufacturer.	

Technical specifications

SIWAREX WP521 ST / WP522 ST	
Weighing modes	• Non-automatic scales, e.g. platform and hopper scales
Ports	• 1 × SIMATIC S7-1500 system bus
	• 1 × Ethernet (SIWATOOL, Modbus TCP/IP)
	• 1 × RS 485 per channel (Modbus RTU or remote display)
	• 3 × digital inputs per channel (24 V DC)
	• 4 × digital outputs (24 V DC short-circuit proof) per channel
Functions	• 3 limits
	• Zeroing
	• Tare
	• Tare specification
	• Zero adjustment
	• Trace function for signal analysis
	• Internal restore point
	• SIMATIC S7-1500 integrated and/or stand-alone operation
Parameter assignment	• Using function block in SIMATIC S7-1500 and HMI
	• Using SIWATOOL V7
	• Using Modbus TCP/IP
	• Using Modbus RTU
Remote display (see accessories)	
Connection	Via RS 485
Display	Additional display for weight value
Measuring accuracy	
Error limit according to DIN 1319-1 of full-scale value at 20 °C ± 10 K (68 °F ± 10 K)	0.05%
Internal resolution	Up to ± 4 million parts
Number of measurements/second	100 or 120 (selectable)
Filter	• Low-pass filter 0.05 ... 50 Hz
	• Average value filter
Weighing functions	

Technical specifications (Continued)

SIWAREX WP521 ST / WP522 ST	
Weight values	• Gross
	• Net
	• Tare
Limit values	• 2 × min/max
	• 1 × empty
Zeroing	Per command
Tare	Per command
Tare specification	Per command
Compatible sensors	Analog load cells / full-bridge strain gauges (1-4 mV/V) in 4-wire or 6-wire system
Load cell powering	
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 the measurement signal (with 4 mV/V sensors)	-21.3 ... +21.3 mV
Max. distance of load cells	800 m (2 624 ft)
Connection to load cells in Ex zone 1	Optionally via SIWAREX IS Ex interface
Certificates	• ATEX Zone 2
	• UL
	• KCC
	• EAC
	• RCM
	• FM
	• IECEx
Auxiliary power supply	
Rated voltage	24 V DC
Max. power consumption WP521 ST / WP522 ST	120 mA / 200 mA
Max. power consumption SIMATIC Bus	35 mA @ 15 V
IP degree of protection 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	According to IEC 61000-6-2:2004; IEC 61000-6-4:2007+A1:2011
Dimensions (W × H × D)	35 × 147 × 129 mm (1.38 × 5.79 × 5.08 inch)