

## Weighing Electronics

SIWAREX weighing electronics for SIMATIC  
Platform/hopper scale

### SIWAREX WP521 ST / WP522 ST

#### Overview



SIWAREX WP521 ST (left) and SIWAREX WP522 ST weighing modules

SIWAREX WP521 ST / 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 / 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 with or without failed SIMATIC CPU
- Optional direct connection of an operator panel via Ethernet port (Modbus TCP/IP)
- Optional direct connection of a remote display via RS485 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  $\pm 4$  million parts and a measuring rate of 100/120 Hz
- Simple commissioning by means of HMI/CPU or PC software SIWATOOL V7 via the Ethernet interface
- Recovery-point for the simple restoration of all parameters
- Automatic calibration 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. Every weighing function (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 standard mounting 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, RS485 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

WP521 ST and WP522 ST provide simple weighing applications such as platform or hopper scales (ST = Standard). The basic functions zeroing, taring and tara 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 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 von 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 possible worldwide by means of SIWATOOL. Please refer to the information at <http://www.siemens.com/industrialsecurity>

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



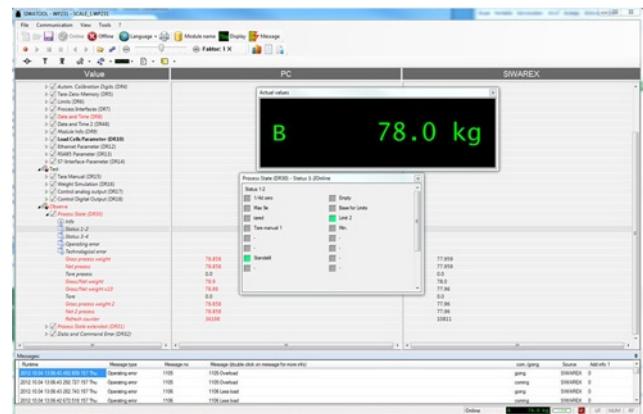
### Software SIWATOOL V7

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 window

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### SIWAREX WP521 ST / WP522 ST

#### Technical specifications

SIWAREX WP521 ST, WP522 ST		SIWAREX WP521 ST, WP522 ST	
<b>Weighing modes</b>	<ul style="list-style-type: none"> <li>Non-automatic scales, e.g. platform and hopper scales</li> </ul>	<b>Compatible sensors</b>	Analog load cells / full-bridge strain gauges (1-4 mV/V) in 4-wire or 6-wire system
<b>Ports</b>	<ul style="list-style-type: none"> <li>1 x SIMATIC S7-1500 system bus</li> <li>1 x Ethernet (SIWATOOL, Modbus TCP/IP)</li> <li>1 x RS485 (Modbus RTU or remote display) per channel</li> <li>3 x digital outputs (24 V DC) per channel</li> <li>4 x digital outputs (24 V DC short-circuit proof) per channel</li> </ul>	<b>Load cell powering</b>	Supply voltage (regulated via feedback) 4.85 V DC
<b>Functions</b>	<ul style="list-style-type: none"> <li>3 limits</li> <li>Zeroing</li> <li>Tare</li> <li>Tare specification</li> <li>Zero adjustment</li> <li>Trace function for signal analysis</li> <li>Internal restore point</li> <li>SIMATIC S7-1500 integrated and/or stand-alone operation</li> </ul>	Permissible load resistance	<ul style="list-style-type: none"> <li><math>R_{Lmin}</math> &gt; 40 <math>\Omega</math></li> <li><math>R_{Lmax}</math> &lt; 4 100 <math>\Omega</math></li> </ul>
<b>Parameter assignment</b>	<ul style="list-style-type: none"> <li>By means of function block in SIMATIC S7-1500 and HMI</li> <li>Using SIWATOOL V7</li> <li>Using Modbus TCP/IP</li> <li>Using Modbus RTU</li> </ul>	With SIWAREX IS Ex interface	<ul style="list-style-type: none"> <li><math>R_{Lmin}</math> &gt; 50 <math>\Omega</math></li> <li><math>R_{Lmax}</math> &lt; 4 100 <math>\Omega</math></li> </ul>
<b>Remote display (see accessories)</b>		<b>Load cell characteristic</b>	1 ... 4 mV/V
Connection	via RS 485	<b>Permissible range of the measurement signal (with 4 mV/V sensors)</b>	-21.3 ... +21.3 mV
Display	Additional display for weight value	<b>Max. distance of load cells</b>	800 m (2 624 ft)
<b>Measuring accuracy</b>		<b>Connection to load cells in Ex zone 1</b>	Optionally via SIWAREX IS Ex interface
Error limit according to DIN 1319-1 of full-scale value at 20 °C $\pm$ 10 K (68 °F $\pm$ 10 K)	0.05%	<b>Certificates</b>	<ul style="list-style-type: none"> <li>ATEX Zone 2</li> <li>UL</li> <li>KCC</li> <li>EAC</li> <li>RCM</li> <li>FM</li> <li>IECEX</li> </ul>
Internal resolution	Up to $\pm$ 4 million parts	<b>Auxiliary power supply</b>	
<b>Number of measurements/second</b>	100 or 120 (selectable)	Rated voltage	24 V DC
<b>Filter</b>	<ul style="list-style-type: none"> <li>Low-pass filter 0.05 ... 50 Hz</li> <li>Average value filter</li> </ul>	Max. power consumption WP521 ST / WP522 ST	120 mA / 200 mA
<b>Weighing functions</b>		Max. power consumption SIMATIC Bus	35 mA @ 15 V
Weight values	<ul style="list-style-type: none"> <li>Gross</li> <li>Net</li> <li>Tare</li> </ul>	<b>IP degree of protection according to DIN EN 60529; IEC 60529</b>	IP20
Limit values	<ul style="list-style-type: none"> <li>2 x Min/Max</li> <li>1 x empty</li> </ul>	<b>Climatic requirements</b>	
Zeroing	Per command	$T_{min(IND)} \dots T_{max(IND)}$ (operating temperature)	
Tare	Per command	<ul style="list-style-type: none"> <li>Horizontal installation</li> <li>Vertical installation</li> </ul>	-10 ... +60 °C (14 ... 140 °F) -10 ... +40 °C (14 ... 104 °F)
Tare specification	Per command	<b>EMC requirements</b>	according to IEC 61000-6-2:2004; IEC 61000-6-4:2007+A1:2011
		<b>Dimensions (W x H x D)</b>	35 x 147 x 129 mm (1.38 x 5.79 x 5.08 in)

Selection and ordering data	Article No.		Article No.
<b>Weighing module TM SIWAREX WP521 ST</b> Single-channel, for platform or hopper scale with analog load cells (1–4 mV/V), 1 x LC, 4 x DQ, 3 x DI, 1 x RS 485, Ethernet port, including shielding set.	7MH4980-1AA01	<b>Accessories</b> <b>SIWAREX JB junction box, aluminum housing</b> For connecting up to 4 load cells in parallel, and for connecting multiple junction boxes.	7MH4710-1BA
<b>Weighing module TM SIWAREX WP522 ST</b> Two-channel, for two separate platform or hopper scales with analog load cells (1–4 mV/V), per channel 1 x LC, 4 x DQ, 3 x DI, 1 x RS 485, Ethernet port, including shielding set.	7MH4980-2AA01	<b>SIWAREX JB junction box, stainless steel housing</b> For connecting up to 4 load cells in parallel.	7MH4710-1EA
<b>SIMATIC S7-1500, front connector with screw-type terminals</b> 40-pole, for 35 mm wide modules, including 4 jumper links and cable ties	6ES7592-1AM00-0XB0	<b>SIWAREX JB junction box, stainless steel housing (ATEX)</b> For parallel connection of up to 4 load cells (for zone allocation, see manual or type-examination certificate).	7MH4710-1EA01
<b>SIMATIC S7-1500, front connector with push-in technology</b> 40-pole, for 35 mm wide modules, including 4 jumper links and cable ties	6ES7592-1BM00-0XB0	<b>Ex interface SIWAREX IS</b> 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"> <li>• Short-circuit current &lt; 199 mA DC</li> <li>• Short-circuit current &lt; 137 mA DC</li> </ul>	7MH4710-5BA 7MH4710-5CA
<b>SIWATOOL V4 &amp; V7</b> Service and commissioning software for SIWAREX weighing modules	7MH4900-1AK01	<b>Load cell cable (optional)</b> <b>Cable Li2Y 1 x 2 x 0.75 ST + 2 x (2 x 0.34 ST) – CY</b> For connecting SIWAREX electronic weighing systems to junction box (JB), extension box (EB) and Ex interface or between two JBs.	
<b>Ethernet cable patch cord 2 m (7 ft)</b> For connecting SIWAREX WP52x ST to a PC (SIWATOOL V7 or Modbus TCP/IP)	6XV1850-2GH20	For permanent installation. Occasional bending is possible.	
<b>Remote display (optional)</b> The digital remote displays can be connected directly to the SIWAREX WP231 via the RS 485 interface. Suitable remote display: S102 <i>Siebert Industrieelektronik GmbH</i> <i>Postfach 1180</i> <i>D-66565 Eppelborn, Germany</i> <i>Tel.: +49 6806/980-0</i> <i>Fax: +49 6806/980-999</i> Internet: <a href="http://www.siebert-group.com/en">http://www.siebert-group.com/en</a> Detailed information is available from the manufacturer.		External diameter: approx. 10.8 mm (0.43 in) Permissible ambient temperature -40 ... +80 °C (-40 ... +176 °F). Sold by the meter. <ul style="list-style-type: none"> <li>• Sheath color: orange</li> <li>• For potentially explosive atmospheres. Sheath color: blue.</li> </ul>	7MH4702-8AG 7MH4702-8AF
		<b>Commissioning</b> <b>Commissioning charge for one static scale with SIWAREX module</b> (Travel and setup charge must be ordered separately) Scope: <ul style="list-style-type: none"> <li>• Recording of data</li> <li>• Checking of mechanical installation of the scale</li> <li>• Checking of electrical wiring and function</li> <li>• Static adjustment of the scale</li> </ul> Requirements: <ul style="list-style-type: none"> <li>• Mechanical design functional</li> <li>• Modules electrically wired and tested</li> <li>• Adjustment weights available</li> <li>• Free access to scale</li> </ul>	9LA1110-8SN50-0AA0
		<b>Flat charge for travel and setup in Germany</b>	9LA1110-8RA10-0AA0