Weighing Electronics
Stand-alone electronics
Belt scale

SIWAREX WT241

Overview

SIWAREX WT241 weighing terminal

The SIWAREX WT241 is a weighing terminal for belt scales. Siemens standard components are installed in a stainless steel enclosure with numerous connection options. This ensures the tried and tested SIWAREX quality as standalone solution and is ideal for belt scales.

Benefits

SIWAREX WT241 offers the following key advantages:

• Complete solution – no configuration in SIMATIC required
• Fast and easy commissioning due to intuitive operating concept
• The stainless steel enclosure permits applications in many diverse environments
• Flexible connection to different systems through
  - four digital inputs
  - four digital outputs
  - one analog output
  - RS 485 interface and Modbus RTU
• Connection to analog load cells (1 … 4 mV/V)
• High resolution of the load cell signal of up to ± 4 million parts
• Different calibration methods: with test weights, test chain, automatically or via material batch.
• Specification of belt inclination angle
• 6 totalization memories
• Simulation of speed and belt load for test purposes
• Comprehensive diagnostics functions
• Logging/log book
• All diagnostic and error messages as well as all scale parameters in plain text
• 100 ... 240 V AC supply range
• Parameterizable pulse signal (24 V DC) for external totalizer
• Correction of material flow rate by means of correction factor

Application

SIWAREX WT241 is the optimal solution wherever belt scales are used that demand high accuracy, high user-friendliness, and comprehensive adjustment options.

The typical applications of the SIWAREX WT241 are determining the current material flow rate, belt load, and belt speed. Furthermore, 6 totalizers are available for evaluating the amount of material conveyed.

Design

SIWAREX WT241 is a standalone weighing terminal based on the tried and tested Siemens SIWAREX WP241 products and the Siemens SIMATIC KTP 400 touch display. Supplemented with a connection board and a wide-range power supply, these components are preinstalled in a compact stainless steel enclosure. The enclosure can be wall mounted and has nine cable entries, of which five are equipped with cable glands at the factory. A variety of interfaces support the integration into the plant environment.

The integrated connection board permits the direct connection of the belt scales and of the speed sensor.

The SIWAREX WT241 is preconfigured with the SIWAREX "Ready for Use" software. This means that no further commissioning is required in SIMATIC.

Function

The primary task of the SIWAREX WT241 is to measure the speed of the belt, to measure and convert the sensor voltage to a weight value, and to precisely calculate the amount of material conveyed or material flow rate.

The volume of material conveyed can be recorded in 6 totalization memories: The accumulated totalization memory determines the conveyed material over the entire operating time of the scale (can only be reset by loading the factory settings), the main total is used in applications that need to be officially calibrated (available soon). The four remaining totalization memories are freely available. For example, for recording the daily or weekly totals.

Four different options are available for rapid commissioning:

• Automatic calibration
  The calibration is performed automatically using the load cell parameters entered. Only the zero point has to be calculated at the actual plant.
• Calibration with calibration weights or test weights
  Test weights are secured to the weighing equipment and the conveyor belt is started. The calibration values are determined while the belt is running. A zero point must also be determined.
• Calibration with test chain
  Instead of test weights, a chain of a known weight can be placed on the measuring points of the belt. The calibration values are calculated as for calibration with test weights.
• Calibration via material batch
  This method can be used if a volume of material is available, but neither test weights nor a chain are available. The material can either be preweighed or weighed afterwards. The material is passed over the belt scale. Then the weighing module calculates the calibration characteristic automatically.

If "Automatic set to zero" is active, the electronic weighing system automatically executes a "set to zero" procedure when the belt reaches the "set to zero" area.

Extensive diagnostics functions are available. Diagnostic messages are output to the different interfaces. In simulation mode, both the speed and the belt load can be specified by the user, i.e. simulated. This makes it possible to test many functions in advance without operating belt scales. Both the digital inputs/outputs and the analog output can be simulated for test purposes. The "Trace" function is very helpful for optimizing the plant or when troubleshooting. This records the weighing history stored in the internal module memory (e.g. material flow rate, belt load, speed) and exports it to Excel in a graphical format.

The service tool "SIWATOOL V7", which is included in the optional configuration package, is required for reading out this trace data. In addition, using SIWATOOL a scale backup can be created and reimported whenever required. Thus, in the event of an error, the WT241 can be replaced within seconds without requiring readjustment.
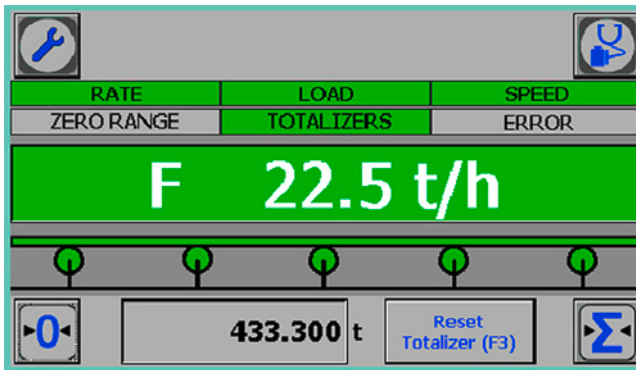
SIWAREX WT241 weighing terminal operating view

Monitoring of the scale signals and states

Using the onboard RS 485 interface and the Modbus RTU protocol, the SIWAREX WT241 can be connected to many different automation systems or a PC.

Furthermore, 4 digital inputs, 4 digital outputs, and an analog output are available. Direct, straightforward further processing of alarms or status messages is thus made possible.

Software

The touch panel is preconfigured with the SIWAREX "Ready for use" software. Thus the user interface is clearly structured and can be operated intuitively; the languages German, English, French, and Chinese are available. The structured menu-based operation facilitates the operation of the scale and supports the user through guided commissioning.

Furthermore, a variety of diagnostics options are offered. Using the trace function, weighing histories can be recorded and exported. There is also the option of simulating the behavior of the scale with the device.

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■ **Technical specifications**

SIWAREX WT241	
Enclosure	Stainless steel enclosure (1.4301) with the interfaces: • 1 x wall bushing for power supply • 4 x wall bushing for load cell connection with EMC screw connection • 4 x wall bushing with blanking plugs • Ground connection bolt
Connection board	Internal connection board • Connection of up to 4 load cells • Type of analog output • Connection of speed sensor • Type of 24 V direct voltage
Integration in automation systems	
Any automation systems	Via RS 485 (Modbus RTU)
Communication interfaces	• RS 485 (Modbus RTU) • 4 digital outputs (24 V DC) • 3 digital inputs (24 V DC) • 1 speed sensor input (24 V DC, up to 5 kHz) • 1 analog output (0/4 ... 20 mA)
Commissioning options for the scale	Directly via the color touch panel and the preinstalled "Ready for use" operating software
Calibration approval	No
Internal resolution	up to ±4 million parts
Number of measurements/second (internal)	100 Hz
Updating time for material flow rate	100 ms
Filter	
Filter for material flow rate	Low-pass filter 0.1 ... 50 Hz
Filter for weight values	Low-pass filter 0.1 ... 50 Hz
Filter for belt speed	Low-pass filter 0.1 ... 50 Hz
Weighing functions	
Readout data	• Weight • Belt load • Material flow rate • Accumulated total • Main total • Free totals 1 … 4 • Belt speed
Limits (min./max.)	• Belt load • Material flow rate • Belt speed
Zeroing function	On command or automatic set to zero

SIWAREX WT241	
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)
Auxiliary power supply	
Rated voltage	100 ... 240 V AC
Line frequency	50 ... 60 Hz
Max. power consumption	0.12 A
IP degree of protection to DIN EN 60529; IEC 60529	IP65
Climatic requirements	
$T_{min (IND)} \cdots T_{max (IND)}$ (operating temperature)	
Vertical installation	0 ... +40 °C (32 ... 104 °F)
EMC requirements according to	EN 45501
Dimensions	264 x 185 x 97 mm (10.39 x 7.28 x 3.82 in)
Weight	4 kg (8.82 lb)

■ **Selection and ordering data**

	Article No.
SIWAREX WT241 **Weighing terminal for belt scales**	**7MH4965-4AA01**
SIWAREX WT241 Manual In various languages. Free download on the Internet at:	
http://www.siemens.com/weighing/documentation	
Accessories	
SIWATOOL V4 & V7 Service and commissioning software for SIWAREX weighing modules	**7MH4900-1AK01**
Ethernet cable patch cord 2 m (7 ft) For connecting SIWAREX WT241 to a PC (SIWATOOL), SIMATIC CPU, panel, etc.	**6XV1850-2GH20**
SIWAREX JB junction box, aluminum housing For connecting up to 4 load cells in parallel, and for connecting multiple junction boxes.	**7MH4710-1BA**
SIWAREX JB junction box, stainless steel housing For connecting up to 4 load cells in parallel.	**7MH4710-1EA**
SIWAREX JB junction box, stainless steel housing (ATEX) For parallel connection of up to 4 load cells (for zone allocation, see manual or type-examination certificate).	**7MH4710-1EA01**

	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 belt scale with SIWAREX module (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 • Dynamic adjustment of the scale Requirements: • Mechanical design functional • Modules electrically wired and tested • Adjustment weights available • Free access to scale	**9LA1110-8SM50-0AA0**
Flat charge for travel and setup in Germany	**9LA1110-8RA10-0AA0**

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