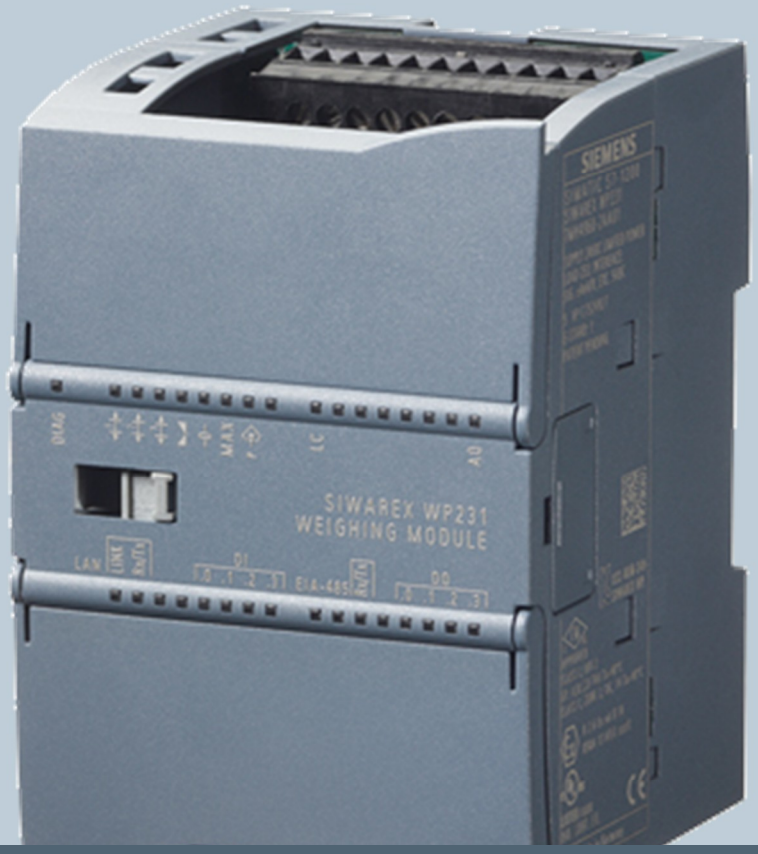
SIEMENS



Weighing technology

FAQs
SIWAREX WP231

“How can a WIPOTEC digital load cell be used with WP231?”

V1.0 – July 2016

Siemens.com/weighing

1. Table of contents

General

This document describes, how WIPOTEC digital load cell can be used with a SIWAREX WP231 weighing controller and therefore seamlessly gets integrated into the S7-1200 automation environment. This document is based on the assumption, that the load cell was already ordered for the usage together with a SIWAREX weighing controller (correct pre-configuration).

2. Hardware requirements

1.) Weighing module SIWAREX WP231. Order number 7MH4960-2AA01.

2.) WIPOTEC load cell with activated „SIWAREX-protocol“ and firmware FS911 V1.690 resp. FS276 V3.560 or higher.

NOTE: Please specify already in your order of the load cell, that it will be connected to a SIWAREX weighing controller. Thus the load cell is delivered already with the right pre-configuration. Therefore a parametrization by WINTERM is not necessary. If a parametrization by WINTERM is required, all required steps are described on the WIPOTEC Product Support Disc.

3. Software requirements

1.) SIWAREX WP231 firmware V3.0.4 or higher. The firmware of the SIWAREX WP231 can be updated by the service tool SIWATOOL V7. The latest firmware is available online on https://support.industry.siemens.com/cs/ww/en/view/75231231

2.) SIWATOOL V7 with latest data base files. SIWATOOL V7 is part of the WP231 software package with the order number 7MH4960-2AK01.
The latest data base files can be downloaded on
https://support.industry.siemens.com/cs/ww/en/view/75231231

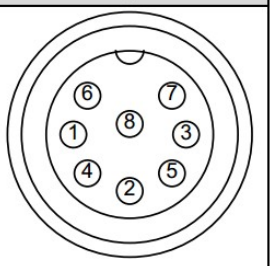
3.) For integration into the S7-1200 PLC, the WP231 function block is required. The block is available for download on:
https://support.industry.siemens.com/cs/ww/en/view/66825585

4.) WIPOTEC load cell with firmware FS911 V1.690 resp. FS276 V3.560 (depending on type of load cell) or higher. If the load cell was not ordered for operation with SIWAREX, a parametrization with WINTERM is required. The necessary steps are described on the WIPOTEC Product Support Disc.

4. Electrical connection of load cells with plug connector

SIWAREX WP231 communicates by a RS485/RS422 point-to-point connection with the load cell. Therefore the following wiring between cell and WP231 is required:

WP231 connection	Load cell pin	Comment
T+	**-**	Jumper to D+‘
T-	**-**	Jumper to D-‘
D+‘	**2**	RS422 positive send
D-‘	**4**	RS422 negative send
D+	**1**	RS422 positive receive
D-	**6**	RS422 negative receive
1L+	**7**	Supply voltage +24V DC
1M	**3**	Supply voltage M
⏚	**8**	Ground

Pin	SIGNAL	Description	1
1	RX+	Pos receive cable	
2	TX+	Pos send cable	
3	GND	Reference potential voltage	
4	TX-	Neg send cable	
5	Trigger	24V input signal	
6	RX-	Neg receive cable	
7	+24VDC	Power supply	
8	PE	Ground	

5. Electrical connection of load cells with terminal block (Type SW-D-FS)

Terminal X1	SIGNAL	WP231 connection
1	Current pass channel 7 [8.]	
2	Current pass channel 6 [8.]	
3	Current pass channel 2 [8.]	
4	Current pass channel 1 [8.] [9.]	
5	0V load cell supply voltage [1.]	1M
6	24V load cell supply voltage [2.]	1L+
7	24V load cell supply voltage [2.]	
8	0V load cell supply voltage [1.]	
9	Binary input 1 [8.]	
10	Binary input 2 [8.]	
11	Binary input 3 [8.]	
12	Binary input 4 [8.]	
13	Binary output 1 [8.]	
14	Binary output 2 [8.]	
15	Binary output 3 [8.]	
16	Binary output 4 [8.]	

Terminal X2	SIGNAL			
1	Current pass channel 4 [3.] [8.]			
2	Current pass channel 4 [3.] [8.]			
3	Current pass channel 3 [4.] [8.]			
4	Current pass channel 3 [4.] [8.]			
5	Current pass channel 5 [8.]			
		RS422	**CAN**	
6	Interface 1: [7.]	RX-	CANGND	D-
7	Interface 1: [7.]	RX+	--	D+
8	Interface 1: [7.]	--	CANL [5.]	
9	Interface 1: [7.]	TX-	CANL [5.]	D-‘
10	Interface 1: [7.]	TX+	CANH [6.]	D+’
11	Interface 1: [7.]	--	CANH [6.]	
12	Interface 2: GND2			

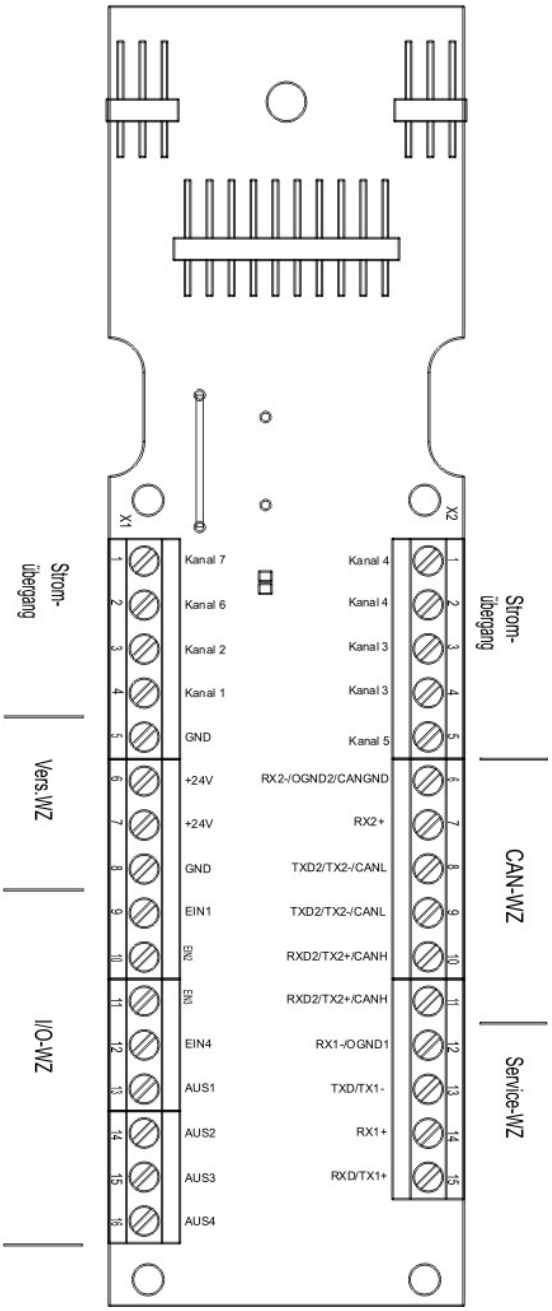
13	Interface 2: TxD	
14	Reserved	
15	Interface 2: RxD	
--	--	

[1.) 2.) 3.) 4.) 5.) 6.)] The signal/potential is available on 2 terminals for distribution reasons. Both terminals are equivalent.

[7.)] Interface 1 be delivered from factory as RS422 or CAN.

[8.)] Option

[9.)] Internally connected to housing



6. Parametrization of SIWAREX WP231

The parameterization of the WP231 module by SIWATOOL V7 is described in the following. SIWATOOL needs to be installed on a Windows based PC and the Ethernet port needs to be set to a fixed IP address inside the range 192.168.0.x (x must be unlike 21). The subnet mask needs to be set to 255.255.255.0

After starting SIWATOOL, the IP address of the WP231 needs to be checked:

The factory default IP address of all WP231 is 192.168.0.21

Afterwards the connection to the module needs to be established by a click on the “Online” button.

SIWATOOL V7 shows now, that a connection was established („Online“ and a green, moving status bar):

SIWATOOL is divided into three columns: in the column “Value“ all parameters of the WP231 module are listed in a tree view.

In column „PC“ all offline-parameter in the PC are listed and editable.

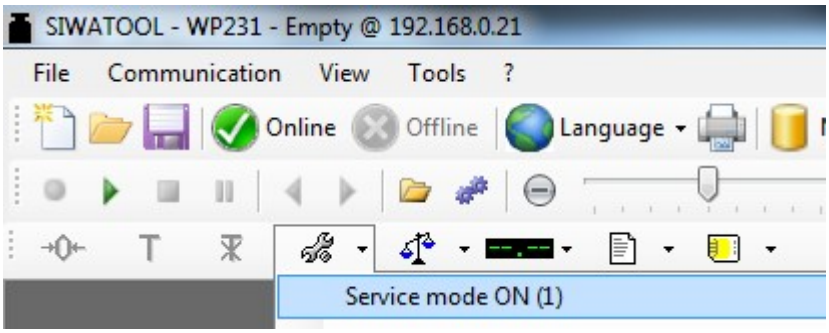
In column „SIWAREX“ all active parameter inside the WP231 are visible. In case of a difference between “SIWAREX” and “PC” parameter, the correspondent parameter(s) are marked red.

The parameter of all SIWAREX modules are structured in data records. These data records are read out of the SIWAREX resp. written into the SIWAREX as a complete package always!

The reading and writing of single parameters within a data record is not possible! Therefor the following sequence of steps should be considered always:

1.) Read the data record of the desired parameter(s) out of SIWAREX (alternatively "Receive all data" in the "Communication" menu.
2.) Edit the desired parameter(s)
3.) Send the data record of the parameter(s) into SIWAREX

In order to be able to edit the calibration parameters (DR3) WP231 needs to be in service mode. Therefore the command "Service mode ON (1)" needs to be triggered:



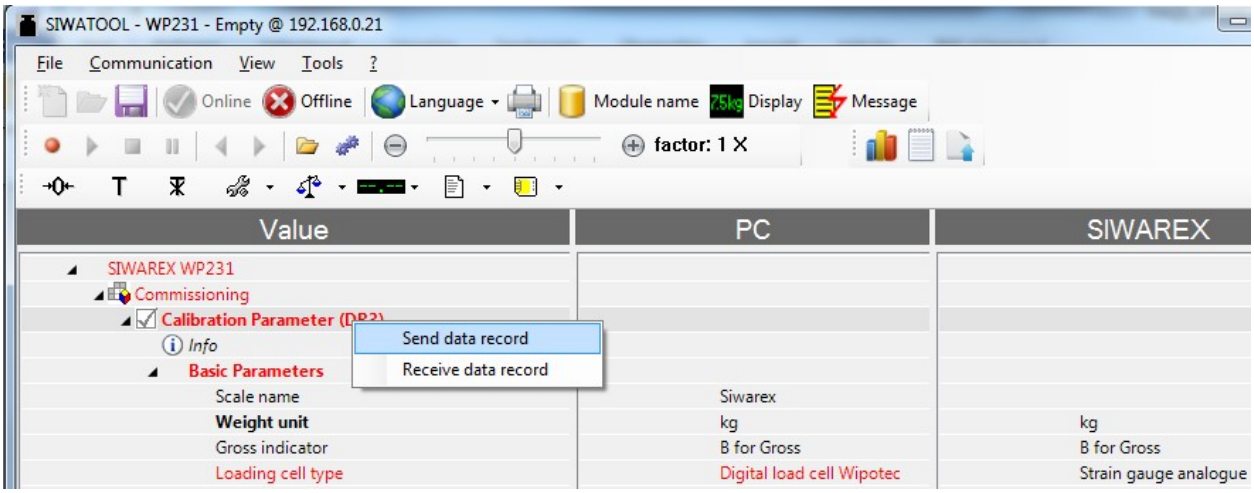
As soon as the service mode is active, SIWATOOL V7 indicates this on the right bottom by a red wrench symbol: 

The following parameters need to be edited now:

- Data record 3 (Calibration Parameters)

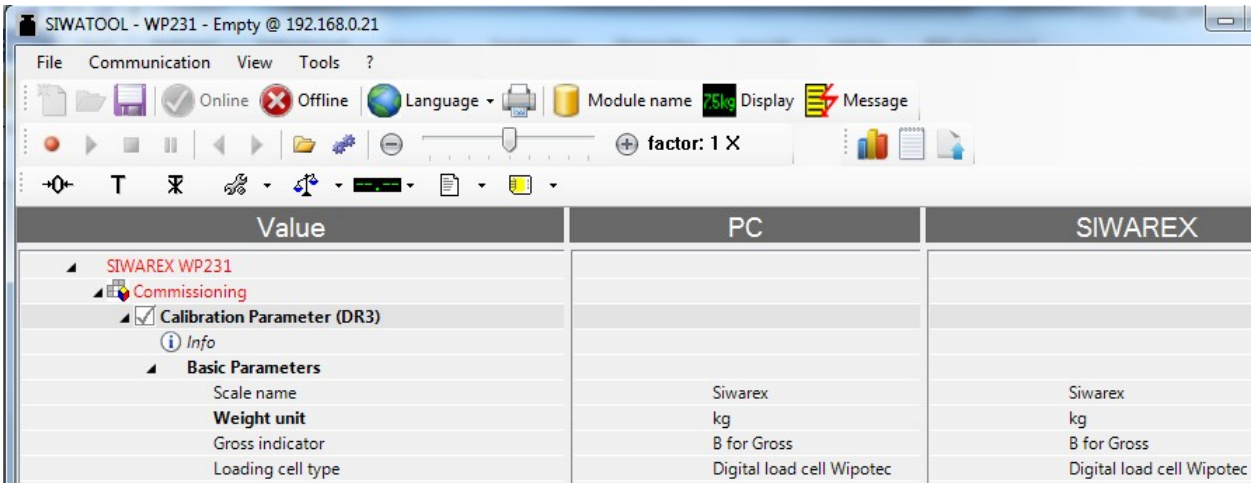
  → Basic Parameters

  ➔ Scale name: free selectable name of the scale
  ➔ Weight unit: self-explanatory (e.g. „mg")
  ➔ Gross indicator: „B" or „G" for indication of gross weight
  ➔ Load cell type: „Digital load cell Wipotec"
  ➔ Minimum weight (in d): 0
  ➔ Maximum weight: Max. capacity of the load cell in the selected weight unit (e.g. 100000 in case of a 100g cell and „mg" as weight unit).
  ➔ Resolution d: see chapter characteristic curve



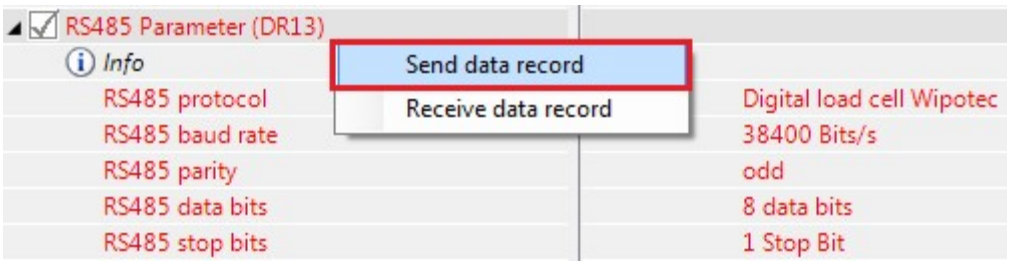
By a right click on the name of the data record (here “Calibration Parameter (DR3)“) a Popup-menu appears and offers the options to send or receive the data record into/from the SIWAREX. This handling is identical for all other data records.

After sending the data record successfully into the SIWAREX all parameters should be marked in black → the offline data in the PC and the online data in the SIWAREX are identical:



After that the RS485 interface (data record 13) needs to be set up and send to the SIWAREX WP231 like below:

RS485-protocol	→	„Digital load cell Wipotec“
RS485-Baudrate	→	„38400 Bit/s“
RS485-parity	→	„odd“
RS485-data bits	→	„8 data bits“
RS485-stop bits	→	„1 stop bit“



The setup of the WP231 is finished. For establishing the communication with the load cell, the command „Start communication with digital load cell (905)“ (see service commands) needs to be triggered now. This command needs to be triggered for the first initial communication or after a change inside the interface parameter only. After that WP231 establishes the communication always automatically after startup.

7. Calibration / Determination of the characteristic curve

For the operation of a scale, a calibration needs to be performed. Here typically a zero and a defined reference point are detected, which represent the characteristic curve of the scale.

Digital load cells from Wipotec are shipped calibrated. After installation or a change of location a calibration with reference weights on installation side should be performed anyway.

The examples below show how the required steps for calibrating WP231:

Example: **Load cell type:** SW100/400
Max: 100g
d: 1mg

A) SIWAREX WP231 shall provide the weight in milligram steps

First of all, the service mode needs to be switched on by command “Service mode ON (1)”.

The data below need to be entered in data record 3:

Resolution d = 1 (full milligram steps)
Calibration weight 0 = 0
Calibration weight 1 = XXX
(XXX = mass of the used reference weight in milligram).

With an empty scale (mechanical dead load only) the calibration command „Calibration point 0 valid (60)“ needs to be triggered. After that WP231 should display a weight of 0mg in the weight display in SIWATOOL.

Afterwards the defined reference weight (calibration weight 1) needs to be applied on the scale / load cell and the command „Calibration point 1 valid (61)“ needs to be triggered. After that WP231 should display the weight of the reference weight in the weight display in SIWATOOL.

In a final step, all parameters of the WP231 should be read out by “Communication → Receive all data” and be stored as a backup-file via “File → Save as…”.

Now the service mode should be switched off again by the command „Service mode OFF (2)“.

B) SIWAREX WP231 shall provide the weight in gram steps

First of all, the service mode needs to be switched on by command “Service mode ON (1)”.

The data below need to be entered in data record 3:

Resolution d = 1 (full gram steps)
Calibration weight 0 = 0
Calibration weight 1 = XXX
(XXX = mass of the used reference weight in gram).

With an empty scale (mechanical dead load only) the calibration command „Calibration point 0 valid (60)“ needs to be triggered. After that WP231 should display a weight of 0mg in the weight display in SIWATOOL.

Afterwards the defined reference weight (calibration weight 1) needs to be applied on the scale / load cell and the command „Calibration point 1 valid (61)“ needs to be triggered. After that WP231 should display the weight of the reference weight in the weight display in SIWATOOL.

In a final step, all parameters of the WP231 should be read out by “Communication → Receive all data” and be stored as a backup-file via “File → Save as…”.

Now the service mode should be switched off again by the command „Service mode OFF (2)“.

C) SIWAREX WP231 shall provide the weight in gram steps with three decimals

First of all, the service mode needs to be switched on by command “Service mode ON (1)”.

The data below need to be entered in data record 3:

Resolution d = 0.001 (equals three decimals)
Calibration weight 0 = 0
Calibration weight 1 = XXX
(XXX = mass of the used reference weight in gram).

With an empty scale (mechanical dead load only) the calibration command „Calibration point 0 valid (60)“ needs to be triggered. After that WP231 should display a weight of 0mg in the weight display in SIWATOOL.

Afterwards the defined reference weight (calibration weight 1) needs to be applied on the scale / load cell and the command „Calibration point 1 valid (61)“ needs to be triggered. After that WP231 should display the weight of the reference weight in the weight display in SIWATOOL.

In a final step, all parameters of the WP231 should be read out by “Communication → Receive all data” and be stored as a backup-file via “File → Save as…”.

Now the service mode should be switched off again by the command „Service mode OFF (2)“.

8. Transfer of default load cell parameters at startup

SIWAREX WP231 provides the weight value in a 10ms clock to the S7-1200 PLC. In data record 3 a floating average and a low pass filter can be setup for filtering the weight values from the load cell. Therefore the following default settings are sent by WP231 automatically to the digital load cell at startup of the communication:

R = 10 → Average filter = 10

By doing this, WP231 sends every 10ms a new weight value to the PLC, which was already averaged 10 times inside the load cell.

QF = 99 → frequency of the low pass filter = 99Hz

By doing this, the load cell internal low pass filter is more or less deactivated, so that the SIWAREX internal filter in DR3 can be used for filtering the signal.

9. Transfer of specific load cell parameters at startup

In data record 59 SIWAREX WP231 provides a character string in which all available WINTERM commands can be entered. If the string is empty (factory default), the default parameter R=10; QF=99; S; are send to the load cell at startup of the communication between SIWAREX and load cell. If the string is filled with WINTERM commands, these commands are send to the load cell at startup of the communication between SIWAREX and load cell.

Example (DR59):

Parameter string : R=255;QF=5;S;
Display duration : 2000

After triggering the command „Start communication with digital load cell (905)“ the load cell internal average and low pass filters are set to 255 / 5Hz. The load cell responses to the commands are always displayed for 2000ms in the weight display in SIWATOOL resp. in the PLC.

10. Service and Support

In case of questions about SIWAREX:

hotline.siwarex@siemens.com

+49 721 595 2811 (08:00 am – 17:00 pm German time)

In case of questions about digital load cells from WIPOTEC:

service@wipotec.com

+49 631 34146 4357