



SIWAREX® U – PCS7

Advanced Process Library

Version 12/2013



Safety

This manual contains notices you have to observe in order to ensure your personal safety, as well as to prevent damage to property. The notices referring to your personal safety are highlighted in the manual by a safety alert symbol, notices referring only to property damage have no safety alert symbol. These notices shown below are graded according to the degree of danger.

 DANGER
indicates that death or severe personal injury will result if proper precautions are not taken.
 WARNING
indicates that death or severe personal injury may result if proper precautions are not taken.
 CAUTION
with a safety alert symbol, indicates that minor personal injury can result if proper precautions are not taken.
CAUTION
without a safety alert symbol, indicates that property damage can result if proper precautions are not taken.
NOTICE
indicates that an unintended result or situation can occur if the corresponding information is not taken into account.

If more than one degree of danger is present, the warning notice representing the highest degree of danger will be used. A notice warning of injury to persons with a safety alert symbol may also include a warning relating to property damage.

Qualified Personnel

The device/system may only be set up and used in conjunction with this documentation. Commissioning and operation of a device/system may only be performed by **qualified personnel**. Within the context of the safety notes in this documentation qualified persons are defined as persons who are authorized to commission, ground and label devices, systems and circuits in accordance with established safety practices and standards.

Prescribed Usage

Note the following:

 WARNING
This device may only be used for the applications described in the catalog or the technical description and only in connection with devices or components from other manufacturers which have been approved or recommended by Siemens. Correct, reliable operation of the product requires proper transport, storage, positioning and assembly as well as careful operation and maintenance.

Trademarks

All names identified by ® are registered trademarks of the Siemens AG. The remaining trademarks in this publication may be trademarks whose use by third parties for their own purposes could violate the rights of the owner.

Disclaimer of Liability

We have reviewed the contents of this publication to ensure consistency with the hardware and software described. Since variance cannot be precluded entirely, we cannot guarantee full consistency. However, the information in this publication is reviewed regularly and any necessary corrections are included in subsequent editions.

Advanced Process Library

Version 12/2013

Content

1 Preamble.....	1-1
1.1 PURPOSE OF THE INFORMATION	1-1
1.2 REQUIRED BASIC KNOWLEDGE.....	1-1
1.3 SCOPE OF THIS MANUAL	1-1
1.4 FURTHER SUPPORT	1-1
2 Scope of Delivery	2-2
3 Overview.....	3-3
3.1 GENERAL	3-3
3.2 BENEFITS.....	3-3
3.3 APPLICATION RANGE	3-3
3.4 STRUCTURE	3-4
3.5 FUNCTION	3-4
3.6 COMMISSIONING AND SERVICE WITH SIWATOOL U	3-4
4 Description of the function blocks	4-6
4.1 FUNCTION BLOCK SIWAU08	4-6
4.1.1 <i>Data-Record structure of SIWAREX modules</i>	4-6
4.2 FUNCTION BLOCK CMD_SU08.....	4-9
4.3 FUNCTION BLOCK MOD_SU08	4-10
5 Description of the Faceplates.....	5-11
5.1 GENERAL	5-11
5.2 TYPICALS	5-11
5.3 OPERATOR FACEPLATE	5-12
5.3.1 <i>Default View</i>	5-13
5.3.2 <i>Operation Channel 1 / 2 view</i>	5-14
5.3.3 <i>Calibration Channel 1 / 2 View</i>	5-15
5.3.4 <i>Limits Channel 1 / 2 View</i>	5-16
5.3.5 <i>Parameter View</i>	5-16
5.3.6 <i>Preview View</i>	5-17
5.3.7 <i>Trends View</i>	5-17
5.3.8 <i>Messages, Memo and Batch View</i>	5-17
6 Configuration Example	6-18
7 Shortcuts.....	7-19

Bilder

FIG. 3-1	COMMISSIONING SOFTWARE SIWATOOL U.....	3-5
FIG. 4-1	FUNCTION BLOCK SIWAU08	4-8
FIG. 4-2	FUNCTION BLOCK CMD_SU08 CONNECTED TO SIWAU08 DRIVER BLOCK.....	4-9
FIG. 4-3	FUNCTION BLOCK MOD_SU08.	4-10
FIG 5-1	DEFAULT VIEW	5-13
FIG. 5-2	OPERATION CHANNEL 1 VIEW	5-14
FIG. 5-3	CALIBRATION CHANNEL 1 VIEW.....	5-15
FIG. 5-4	LIMITS CHANNEL 1 VIEW	5-16
FIG. 5-5	PARAMETER VIEW.....	5-16
FIG. 5-6	PREVIEW VIEW.....	5-17

Tabellen

TABLE 1-1	VALIDITY OF THIS MANUAL.....	1-1
TABLE 5-1	TYPICALS OVERVIEW	5-12

1 Preamble

1.1 Purpose of the Information

This manual contains all the information required to configure a plant using SIWAREX U in PCS7. For information about the functionality of the SIWAREX module please refer to the manual of it.

1.2 Required Basic Knowledge

In order to understand the manual, certain knowledge concerning the SIMATIC automation technology especially PCS7 is required. Weighing technology knowledge is also an asset.

1.3 Scope of this Manual

This manual refers to the SIWAREX U module:

Type	Name	Order number	from product status (Version)	
SIWAREX U	SIWAREX U	7MH4950-1AA01	HW 1.0	FW 1.1
		7MH4950-2AA01		

Table 1-1 Validity of this manual

PCS7 Version 8.0 Update 1 is required.

1.4 Further Support

Do you have more questions regarding the use of SIWAREX U? Then please contact your Siemens representative in the office or business location that is responsible for your area, technical support for SIWAREX Tel.: +49 (0)721 595 2811 or open a Support Request www.siemens.com/automation/support-request.

Updated information on SIWAREX Weighing Technology as well as the newest versions of the SIWAREX user manuals can be found on the respective Internet Site.

<http://www.siemens.com/weighing-technology>

2 Scope of Delivery

The block is used to integrate the SIWAREX U into the PCS7. The integration of SIWAREX U APL requires PCS7 Version V8.0 Update 1.

While configuring the hardware configuration in the SIMATIC Manager, the basic features of the module needs to be defined:

- The peripheral address of the module
- Enabling the diagnostic alarms
- Enabling the process alarms

Note: The diagnostic alarms have to be activated to ensure the correct function of the function block.

SIWAREX U requires 16 bytes in the in- and output area.

Other scale specific parameters that are also changed while the control program is running can be defined in three different ways:

- Using the SIWATOOL U commissioning software (full parameter access)
- Using the function block inputs/outputs and commands for sending / reading of data records (full parameter access)
- In the OS using the Faceplate (not all parameters are available)

This package includes the following components:

- CFC function blocks for scale functionality (SiwaU08), command controlling in automatic mode (CMD_SU08) and maintenance (MOD_SU08)
- Text libraries for use with message texts
- Example – faceplate: can be extended or modified using the Faceplate Designer.
- Example-Project
- SIWATOOL U commissioning software
- Manuals and Documentations

3 Overview

3.1 General

SIWAREX U (Compact Scale) is a versatile and flexible weighing module, which can be used wherever static scales are integrated into the automation system.

PCS7 blocks enable SIWAREX U to be integrated into PCS7. The faceplates provide calibration, operation and monitoring features of the scale(s) and can be customized.

3.2 Benefits

- o Easy integration of static scales into PCS7
- o Easy execution of commands in automatic mode
- o Integration to PCS7 Maintenance Station
- o Ready-To-Use faceplates available

3.3 Application Range

SIWAREX U is the optimal solution wherever signals from strain gauge sensors or load cells need to be measured. As weighing electronics, SIWAREX U offers good accuracy with a measuring time of 20 ms.

SIWAREX U is optimally equipped for the following applications:

- o Level monitoring of silos and bunkers
- o Measurement of crane and rope loads, other unidirectional force measurements
- o Load measurement for industrial elevators or rolling mills
- o Weighing in ex-areas (with SIWAREX IS Ex interface)
- o Belt tension measurement

3.4 Structure

The project is made up of two parts:

- SIWAREX U APL PCS7 AS function blocks
- SIWAREX U APL PCS7 OS faceplates

By the ALARM_8P messaging system messages from SIWAREX U are displayed to the operator. The message texts are stored in the text library provided.

3.5 Function

The primary task of SIWAREX U is the measurement of the current weight value from the sensor(s). Because of the seamless integration into SIMATIC, there is the option of processing the weight value directly in the PLC.

SIWAREX-specific function blocks are available for an easy integration. These are used for transferring commands and reading/writing data records into the SIWAREX modules. The scales can be calibrated, operated and monitored by the faceplate.

3.6 Commissioning and Service with SIWATOOL U

A complete commissioning is possible with the Siwau08 function block in a CFC.

Adjustment parameters (data record 3 and 4) can be modified, the scales calibrated and readjusted directly from the faceplates.

The limits of both channels (data record 21 and 22) can be entered via the faceplate.

It is possible to commission the module using the SIWATOOL PC program too.

SIWATOOL U is included in the SIWAREX U configuration package for PCS7. The program must be installed on a PC before commissioning can be performed. The PC is connected to the SIWAREX U using a RS232 cable (available as an accessory).

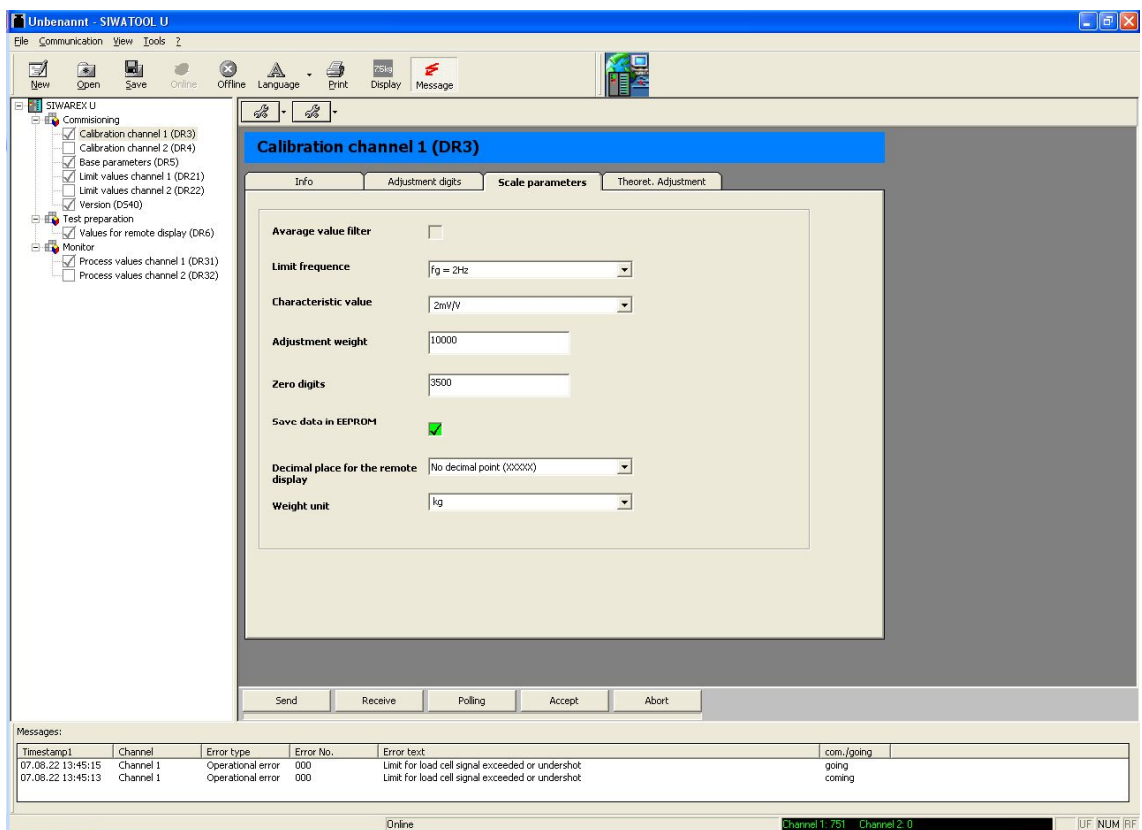


Fig. 3-1 Commissioning software SIWATOOL U

Note:

All data should be read into the CPU after the parameters for SIWAREX U have been defined/modified by SIWATOOL. Data in SIWAREX U will then be synchronized with data in the PCS7 project.

4 Description of the function blocks

4.1 Function block SiwaU08

The block is for controlling a single or dual-channel Siwarex-U module. Data is transferred cyclically via the I/O interface and the different data records are read from the module or transferred to the module noncyclically by commands.

For a detailed description of the SiwaU08 block and important information, please refer to the chapter "SiwaU08 driver block" inside the file *MANUALS \ MANUALS_PCS7 \ SiwaU08_manual_eng.chm* on your software disc or open the online help via F1 in SIMATIC Manager.

4.1.1 Data-Record structure of SIWAREX modules

All parameters of SIWAREX modules are structured in data records (DR). These DR need to be read or written from the SIWAREX into the PLC or from PLC into SIWAREX with special command codes (see SIWAREX U manual). A DR can only be read / written completely! It's not possible to read or write only a single parameter within a DR! Therefore the following steps are recommended in order to read / write parameters from / into the SIWAREX module:

Example:

The module is running in Automatic mode and a limit-value of channel 1 should be changed:

The limit-values of channel 1 are within data record 21 (see SIWAREX U manual). As it is not sure, that the data of DR21 in the CPU are the latest, it's recommended to read DR21 first from the SIWAREX module into the CPU first. In Automatic mode the function block CMD_SU08 can be used to execute this (and all other) command in a very easy way: The input parameter "RD_DR21" needs to be set TRUE. Afterwards the DR21 is read from the SIWAREX into the CPU.

After that the desired limit-value can be edited directly on the function block. At the end the now modified DR21 must be written back into the SIWAREX module. This can be triggered by a positive edge on the input parameter "WR_DR21" of the CMD_SU08 command block.

All data records to which the S7 control system has access are available as individual parameters of the function block. The parameters of the readable data records contain the ending '_O' for output. The parameters of the writeable data records end in '_M' for manual and are transferred to WinCC for visualization purposes. Where applicable the manual inputs can also be connected in the AS program, but these can then no longer be enabled in WinCC.

When reading the data records from the SIWAREX the values from the SIWAREX are adopted for the parameters "_M" and "_O" both in automatic as well as in manual mode.

When writing the data records to the SIWAREX the manual parameter "_M" is used as the source. After the data record 3 or 4 has been transferred to the module it is automatically read back.

Note:

The SIWAREX U module internally works with a 16-Bit Integer value. One bit is used for the sign (+/-). Therefore the other 15-Bit result in a maximum resolution of the weight value of +/- 32768. This is important for the maximum possible resolution of a scale, which depends on the nominal load of the scale:
If a 1kg resolution is required, the scale connected to the SIWAREX U module can be loaded up to max. 32768kg! If the nominal load is higher, the resolution must be defined in 10kg steps, two decimal points and the weight unit tons → 327.68t would be the maximum presentable weight of the scale.

All other parameters which are related to weight (e.g. limit values) must be entered in the same format then (xxx,xx t)!

All weight values from the data record are also available as inputs or outputs of the REAL data type. Before writing a data record the scaled REAL values are converted to a fixed point value which is transferred to the module; this is done using the decimal places set for the relevant channel (output DecPlaceX_O). The non-scaled input may not be changed by the user as it is overwritten upon conversion. All non-scaled inputs are marked in the block comment with "for internal use". The decimal place must be configured in all cases before entering the weight values. Otherwise there is a danger that the unscaled weight value will be altered on account of the number format. Once a data record has been read with scaled values the fixed-point numbers that have been read are also converted and provided as the REAL value. Non-scaled outputs are marked with "NC" ("not scaled") in the parameter name and they can be connected further.

There is some technical weighing data (e.g. number of decimal places) coded in bit groups in data records 3 and 4 in the SIWAREX U. From the function block the individual bits in these groups are consolidated into one byte and provided as an input or as an output at the block interface. These values are coded and decoded in the same way as the process for the scaling of the weight values after reading or before writing the corresponding data record. The number values of these inputs/outputs are recoded to the relevant technical weighing data.

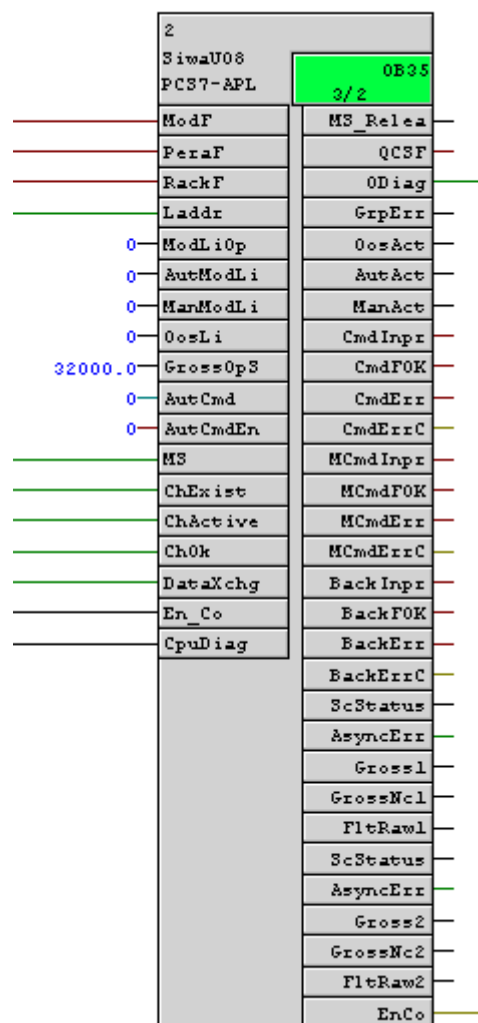


Fig. 4-1 Function block SiwaU08

Note:

If a single channel SIWAREX U card is used, once-only all data from the SIWAREX module needs to be read in the CPU. This can be done with the faceplate and the button "Receive all data" or in the CFC with the command code 605. Afterwards all unused Parameter of channel 2 are hidden in the faceplate.

4.2 Function block CMD_SU08

The CMD_SU08 block is used as a front-end block for automatic commands of the driver block for controlling a Siwarex-U module (SiwaU08) in Automatic mode.

For a detailed description of the CMD_SU08 block and important information, please refer to the chapter "CMD_SU08 command block" inside the file *MANUALS \ MANUALS_PCS7 \ SiwaU08_manual_eng.chm* on your software disc or open the online help via F1 in SIMATIC Manager.

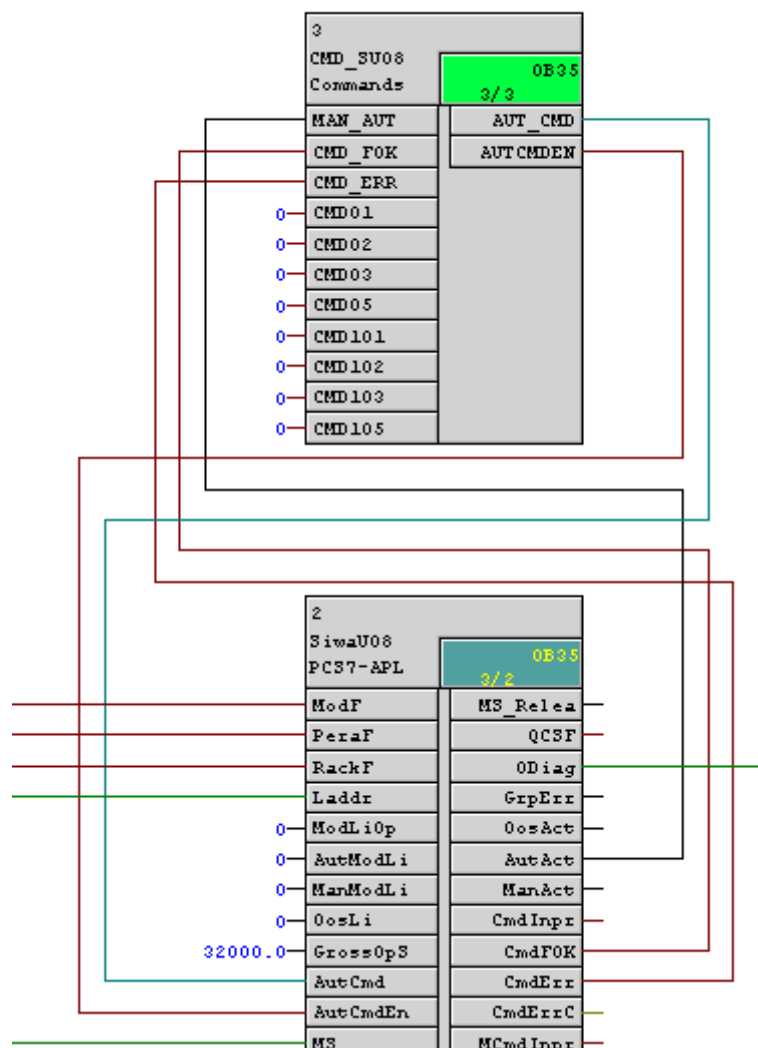


Fig. 4-2 Function block CMD_SU08 connected to SiwaU08 driver block

4.3 Function block MOD_SU08

The block is used as the interface for a Siwarex scale module to the PCS 7 Maintenance Station.

For a detailed description of the MOD_SU08 block and important information, please refer to the chapter “MOD_SU08 maintenance block” inside the file *MANUALS \ MANUALS_PCS7 \ SiwaU08_manual_eng.chm* on your software disc or open the online help via F1 in SIMATIC Manager.

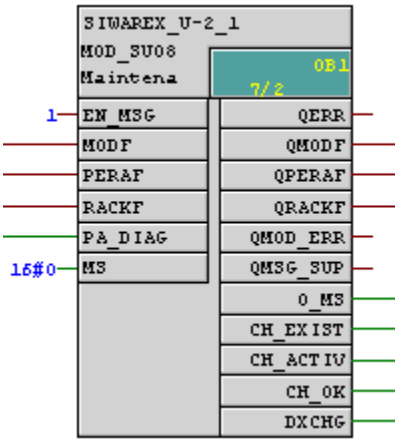


Fig. 4-3 Function block MOD_SU08.

5 Description of the Faceplates

5.1 General

Operation and monitoring of the scale via WinCC faceplates is described below.

Descriptions of the individual scales parameters and scale functions are provided in the SIWAREX U manual and are not part of this manual.

The example faceplate for the SIWAREX U modules was created with the Faceplate Designer from PCS7. The WinCC images can be modified according to individual requirements.

Every time a new faceplate-view is opened, the displayed parameters are read out of the SIWAREX automatically. In addition the data displayed in the faceplate can be updated at any time by clicking the "Receive Data" button.

Note: After compiling the OS the "OS project editor" has to be executed once.

5.2 Typical

The call for the SIWAREX faceplates can be configured in the Graphics Designer (Dynamic Wizard -> Picture Functions -> Picture selection via measurement point). The faceplates themselves can be called up via the Typical provided.

5 different typicals are available.

The typical is defined in the properties of the function block SiwaU08. A checkmark for "Create block icon" must be set and the desired typical-style defined by entering the corresponding number:

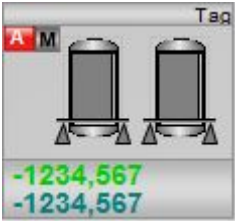
Typical	Selection Number	Description
	1	Symbol for dual-channel modules
	2	Symbol for dual-channel modules with scalesymbol
	3	Symbol for single-channel modules
	4	Symbol for single-channel modules with scalesymbol

Table 5-1 Typical overview

5.3 Operator Faceplate

All views of the sample faceplate including their functions are shown in the following sections.

5.3.1 Default View

The default view displays the current weight value and some basic status information of the scale(s). The operator can switch between Automatic / Manual / Out Of Service.

If a single-channel SIWAREX U is used, the command "Receive all Data" needs to be executed once. After that all unused parameters of channel 2 are hidden automatically.

In Automatic mode, only reading of data records is permitted.

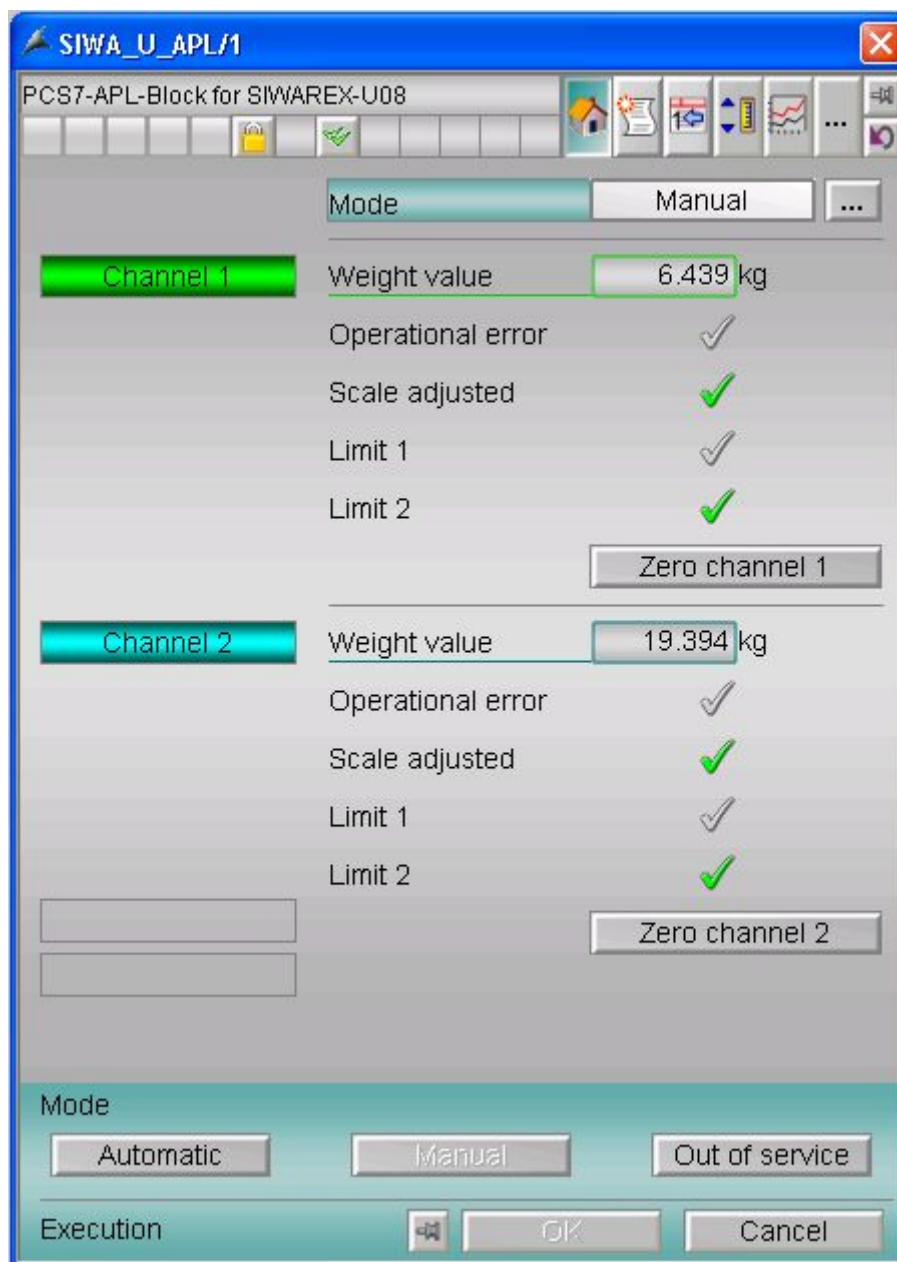


Fig 5-1 Default View

5.3.2 Operation Channel 1 / 2 view

Two separated, but identical views (channel 1 and 2) for operation are available:

The scale can be calibrated and set to zero:

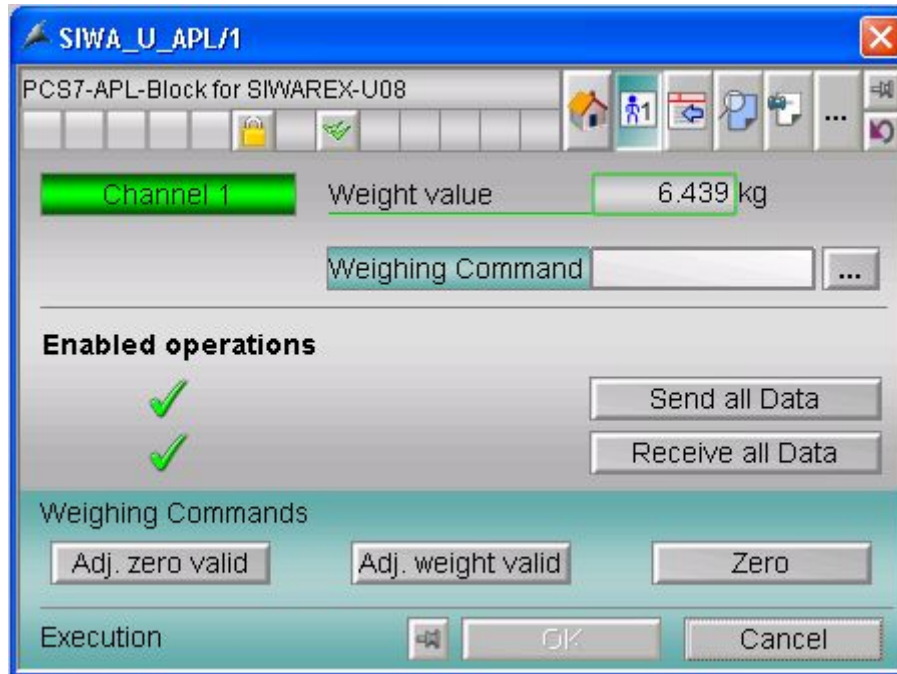


Fig. 5-2 Operation Channel 1 View

5.3.3 Calibration Channel 1 / 2 View

Two separated, but identical views (channel 1 and 2) for operation are available. All scale specific parameter can be entered. In addition it is possible to activate / deactivate the channels completely. If a channel is deactivated all corresponding parameters and commands in the faceplate are deactivated automatically.

The screenshot shows a software window titled "SIWA_U_APL/1" with a subtitle "PCS7-APL-Block for SIWAREX-U08". The interface is divided into two main sections: "Enabled operations Settings Channel 1" and "Calibration Channel 1".

Enabled operations Settings Channel 1

Enabled operations	Settings Channel 1
✓	Channel active ☒
✓	Unit -, g , kg, t kg
✓	Unit oz, lb, lbs, kN
✓	Frequency >= 1 Hz 2 Hz
✓	Frequency < 1 Hz
✓	Characteristic value ≤ 2 mV/V
✓	Decimal place 0,1,2
✓	Decimal place 3,4,5 3 (XX.XXX)

Calibration Channel 1

✓	Adjustment Digits 0 2428
✓	Adjustment Digits 1 23463
✓	Adjustment Weight 15.000 kg
✓	Zero Digits 24307

At the bottom right, there are two buttons: "Send Data" and "Receive Data".

Fig. 5-3 Calibration Channel 1 View

5.3.4 Limits Channel 1 / 2 View

Two separated, but identical views (channel 1 and 2) for operation are available. Each channel can be monitored with two different independent limits. The limits are defined by a Switch-ON and a Switch-OFF value.

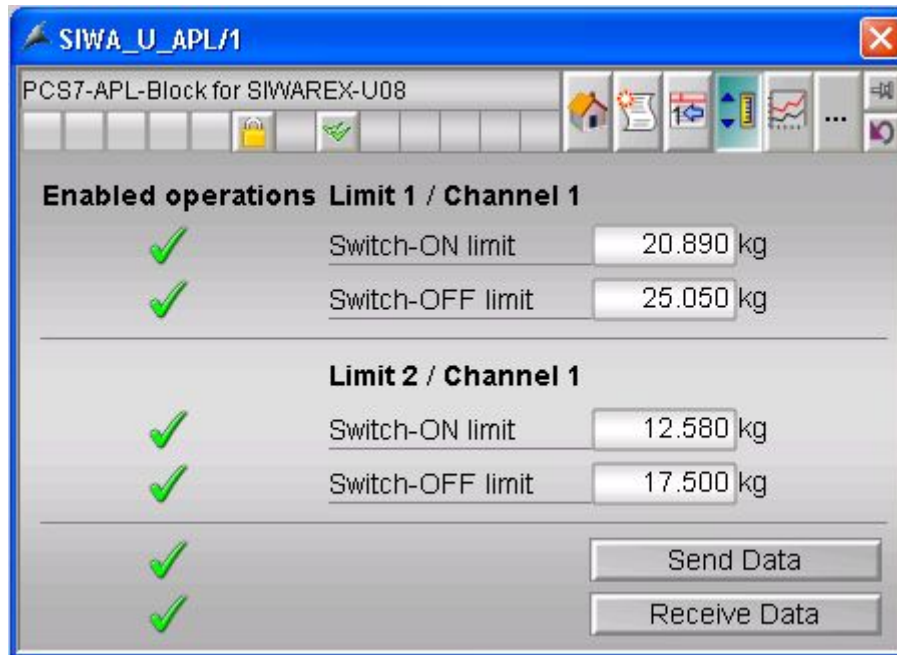


Fig. 5-4 Limits Channel 1 View

5.3.5 Parameter View

The standard APL function "Release for maintenance" is available.

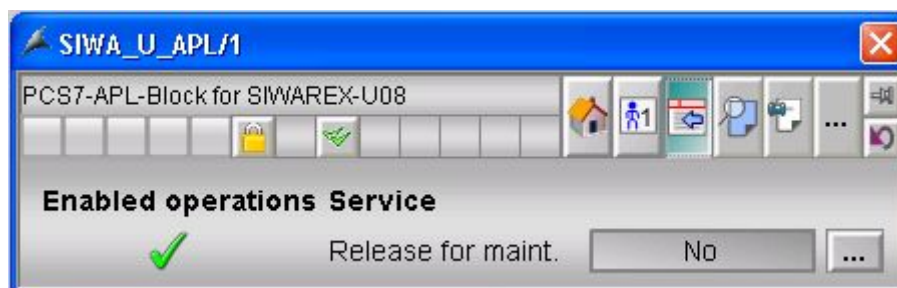


Fig. 5-5 Parameter View

5.3.6 Preview View

Overview of the enabled commands and the current weight value.



Fig. 5-6 Preview View

5.3.7 Trends View

The current weight value is logged as a trend in the faceplate. It is possible to modify the scaling of the value-axis with the function block input "GrossOpScale". The standard setting of the maximum value is scaled to 32000.

5.3.8 Messages, Memo and Batch View

These are the APL standard views for Messages, Memo and Batch. For further information please refer to the Standard-APL help.

6 Configuration Example

After the installation of the setups, an example project in SIMATIC Manager is available (zXy70_16_SiwarexU08). This example-project helps to understand how the SIWAREX function blocks have to be used in a PCS7 configuration. The example is prepared for two SIWAREX U cards. Exemplary one of the two scales is addressed with the SiwaU08 block and the CMD_U08 command block, the other with the SiwaU08 block only.

For adapting the example project to a real application, the following points need to be checked:

- the hardware configuration
- connections must be secured
- correct addresses of the SIWAREX modules must be connected to SiwaU08 function block

7 Shortcuts

AS	Automation system
CFC	Continuous Function Chart (PCS7)
DO	Digital output
DI	Digital input
DR	Data record
FB	Function block
HSP	Hardware Support Package
HW	Hardware
OS	Operator Station
PC	Personal-Computer
SFC	System Function Call (System function)
SIWATOOL	Windows-Software Commissioning and Service of SIWAREX U