SIEMENS

Commissioning a SIWAREX FTA dosing station with SIWATOOL FTA

Quick Guide

For modules with order number 7MH4900-2AA01

Contents

Introduction

SIWAREX FTA is a calibratable and versatile weighing electronics for SIMATIC S7, C7 and PCS7. It can be used for automatic and non-automatic weighing, e.g. for the production of mixtures, filling, loading, monitoring and bagging.

Purpose of this document for functional safety

This programming manual contains important information that you will require to commission and use the device.

It is aimed at persons who install the device mechanically, connect it electrically, parameterize and commission it, as well as at service and maintenance engineers.

Notes on warranty

The contents of this programming manual shall not become part of or modify any prior or existing agreement, commitment or legal relationship. All obligations on the part of Siemens AG are contained in the respective sales contract, which also contains the complete and solely applicable warranty conditions. Any statements on the device versions described in the programming manual do not create new warranties or modify the existing warranty.
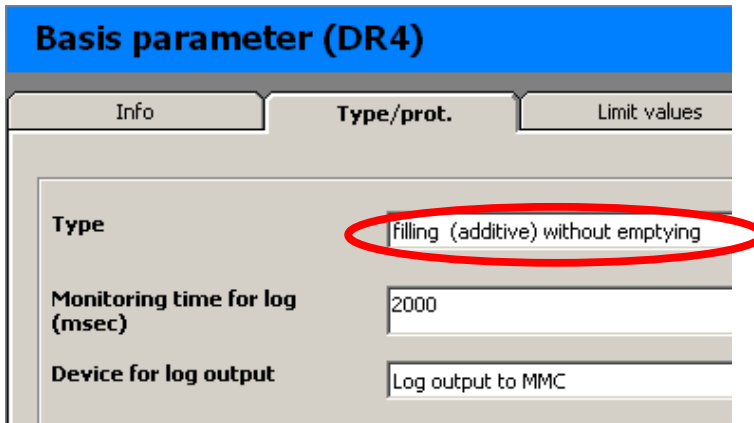
The content reflects the technical status at the time of printing. We reserve the right to make technical changes in the course of further development.

Validation of this document

This documentation is only valid in conjunction with the manual SIWAREX FTA.

2 DR 4 – Basis parameter

This parameter is used to select the suitable dosing procedure..
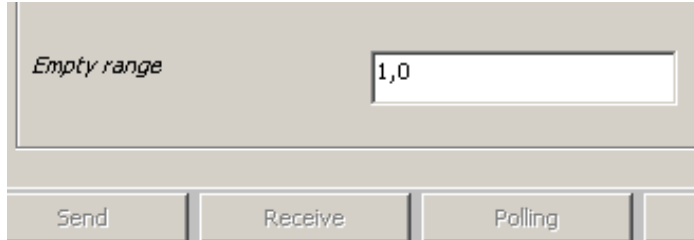

Vorhandene Optionen:
- 0 - weighing (additiv)
- 1 - weighing (subtractiv)
- 2 - filling (additive) and emptying
- 3 - filling (additive) without emptying
- 4 - filling (subtractive) without emptying
- 5 - check weight
- 6 - discontinuous totalizing
- 7 - filling (additive)./(Big-bag)
- 8 - filling (subtractiv)/(Big-bag)
- 9 – filling (subtractive) and emptying

In this example we use filling (additive) without emptying. The scale doses individual amounts in single action. Emptying the scale is not part of the automatic operation cycle. The net weight increases with increasing load on the scale. The weighing procedure is clarified by the following image.
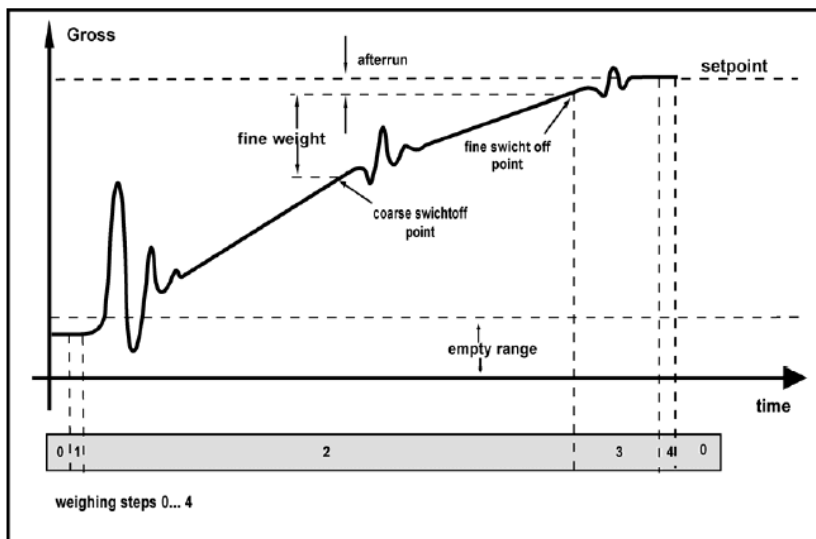
DR 4 – Empty Range

The value for the empty range is a limit value. If the weight value is below this limit value, SIWAREX FTA determines an "empty" status which is output as status information.
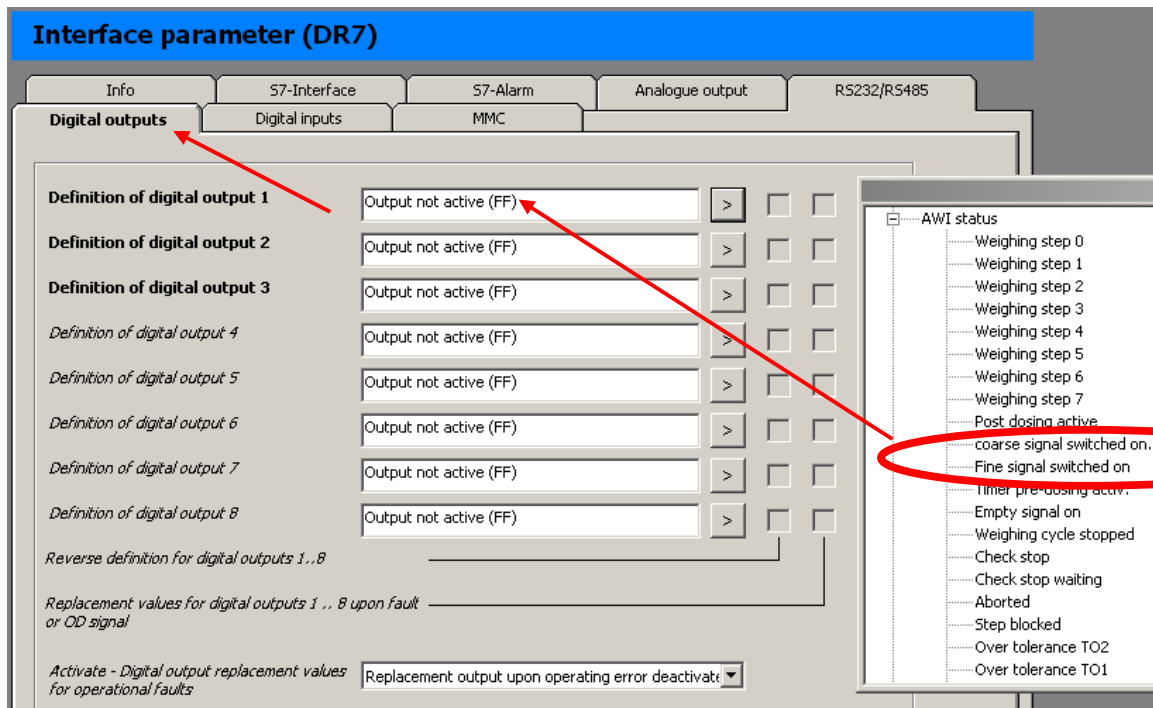
Empty range	1,0

Send	Receive	Polling	

Press the button „Send".

3 DR 7 Interfaces

The parameters that define the behaviour of the SIWAREX FTA on the interfaces are defined in DR7. If an interface is not used the default values can be left alone.
Usually two digital outputs are used for dosing: One digital output is assigned to the signal coarse and another to fine. After the dosing has started both DO (coarse and fine) are active, then after a certain value is reached (see DR 22) only fine is active, then both DO are off.

The assignment of the DO is made in the DR7, Digital outputs.

Press the button „Send". It is recommended to press after while the button "receive" to check that

the data's don't change and therefore were correctly accepted by the system.

4 DR20 Enter the dosing setpoint

The set value for a weighing procedure that can change often in a process is passed onto the scale through DR 20. Normally, the set weight is changed when switching materials.
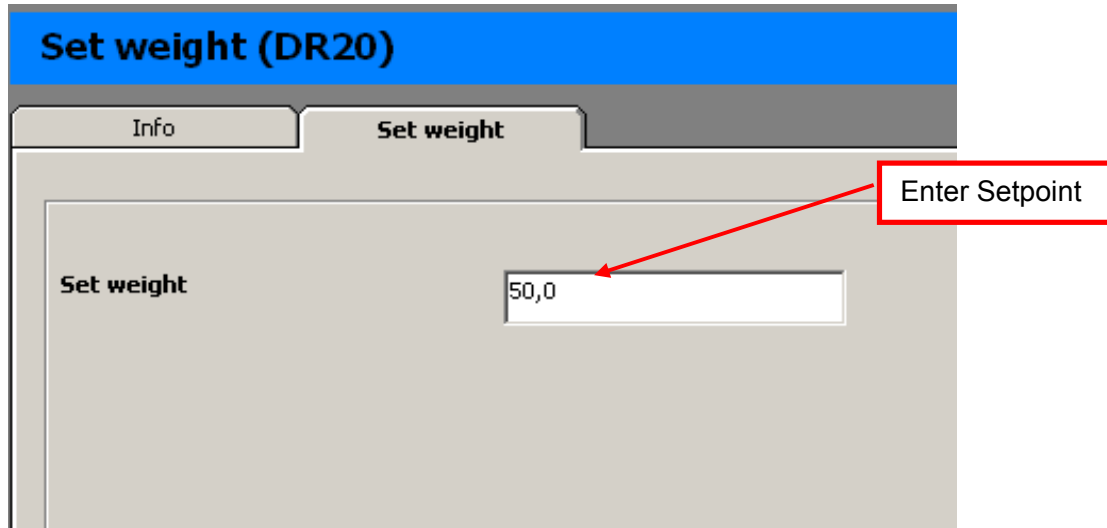
Press the button „Send".

5 DR 22 Scale parameter 1

The weighing parameters that change often are defined in DR 22. Normally, these parameters are changed for switching materials and are sent to the SIWAREX FTA.

4 values can be defined for the tolerance evaluation. Based on this value, the results of the automatic operation are tested with reference to the set value.
The values are defined so that TO2 > TO1 and TU2 > TU1
The tolerance evaluation is performed after switching the fine signal off if the scale stabilises and stands still.

The following image shows the progress of the tolerance evaluation over time.
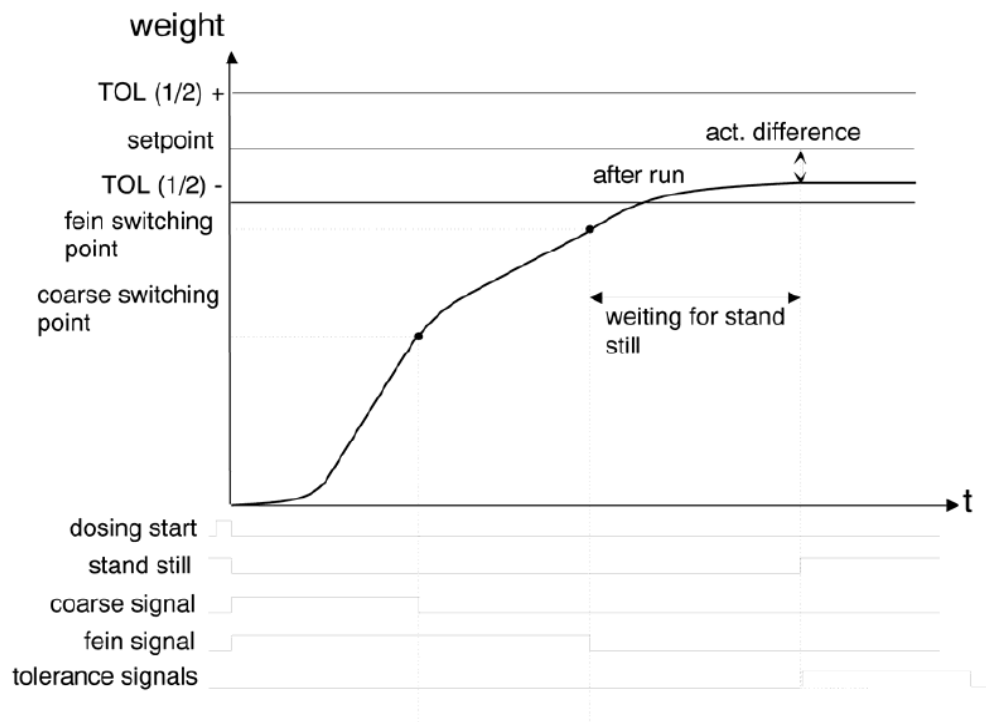
Scale param. 1 (DR22)

Info	Weigh. Para. 1

Maximum weighing time (msec)	0
Trailing weight	1,0
Fine weight	20,0
Shut-off correction value	0,0
Timer pre-dosing (msec)	0
Tolerance limit TO1	0,2
Tolerance limit TU1	0,2
Tolerance limit TO2	0,5
Tolerance limit TU2	0,5

The trailing weight should correspond with the amount to add to the amount of the dosage from the coarse- and fine-signal after switching the fine signal off. This means, the fine shut-off point can be calculated as follows:
Fine shut-off point = Set value – trailing weight

The fine weight entry should correspond with the material amount that was dosed during the fine signal (after switching off the coarse signal until switching off the fine signal). The defined value should be measured so that the material flow can be stabilised by the time that the fine signal is switched off.
This means, the coarse
shut-off point can be calculated as follows:
coarse shut-off point = Set value – Fine weight – Trailing weight

6 DR 23 Scale parameter 2

These scale parameters don't depend on the changing material properties within a limited extent. Therefore they are not changed often.

Scale parameter 2 (DR23)

| Controller | Empty/Load | |
| Info | Weigh. para. 2 | Tare / Zeroing |

Text selection for automatic logging	No autom. logging after the weighing procedure
Max. single set weight	90,0
Inhibition time coarse (msec)	500
Inhibition time Fine (msec)	500
Inhibition time for weight (msec)	0
Default value for analogue output with coarse in %	60
Default value for analogue output with fine in %	20
Depth of average value filter	0

DR 23 - Inhibition time – Coarse (Fine)

After coarse signal activation, the scale can start to oscillate, causing significant deviations in measurement values in the scale's switch-off points. If the evaluation of the weight value is not expedient during these oscillations, the coarse inhibition time can be defined. The coarse inhibition time is activated together with the coarse signal, and weight determination is blocked for the duration of the defined inhibition time, meaning the measurement failure (operating error 17) is eliminated.

This prevents the coarse signal from switching off prematurely

Scale parameter 2 (DR23)

| Info | Weigh. para. 2 | |
| Controller | Empty/Load | |

Controller behaviour upon dosage failure	Reset controller
Selection for type of controller	No controller
Control factor proportional controller %	30
Maximum one-time control access	1,0
Controller optimum Plus	0,0
Controller optimum Minus	0,0
Set value fine time (msec)	3000
Control factor fine time controller %	20

DR 23 – Controller

Two controllers are integrated in SIWAREX FTA, usually the proportional controller for correcting the trailing weight is used.

The proportional controller sets the trailing weight to adjust it to the actual trailing amounts.

The determined deviation of the weighing net value from the weighing set value is multiplied with the defined control factor (Control factor Proportional controller) and is used for the next filling as a correction set amount.

The trailing weight for the following weighing procedures is calculated according to the following formula:

$$G(n+1) = G_n + (S – A)_n \cdot C/100\%$$

$G(n+1)$ Trailing weight for the next weighing procedure
G_n Trailing weight for the last weighing procedure
S Set weight
A Net weight for the last weighing procedure
C Control factor for proportional controller in %
n Current weighing procedure
n+1 Following weighing

7 DR 31 Process status

The current states and data in the scale can be monitored using process values 1 (DR30) and 2 (DR31).
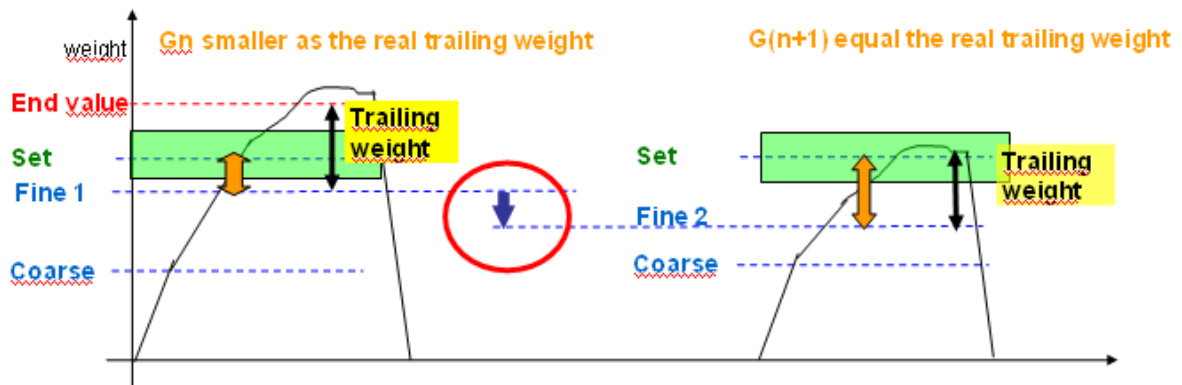

Current trailing weight
The trailing weight that is being used.

Current fine weight
The fine weight that SIWAREX FTA is using at the moment
These two values are for reading, you don't need to change it in DR31.

The graphics below explain the automatic procedure

Dosing was not good	Dosing OK
The end value is too high because the trailing weight that was used is too high.	The trailing weight was automatically optimized thru SIWAREX FTA.

If you have any issues or suggestions regarding the related products or documents, please feel free to contact:

Technical support for SIWAREX:

Siemens AG
Industry Automation (IA)
Sensors and Communication
Process Instrumentation
D-76181 Karlsruhe
Germany

Tel: +49 721 595 2811
Fax: +49 721 595 2901

E-mail: siwarex.hotline.aud@siemens.com

Website: www.siemens.com/siwarex