Siwarex with Braumat

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Note: A Recipe with Siwarex-Steps can only be started by the Order-System with Input of the according quantity!

Features

16 (64) Scale per PCU

- Location-Groups: 127

- Locations: 255;

- Automatic correction of the coarse / fine-value according to the previous scaling.
  It has to be activated in the Parameterization Silo "OptimizeFine" DB92x.DBX118.7

Integrate following Blocks

FB41, FB637, FB639, FC637, FC638, DB636, DB894, DB895, DB896, DB898, DB920, DB921, UDT 636, UDT 637, UDT 638,

FB1220: FC637 (is calling FB637 mit DB894..)

The best is to pick this from the Simatic-Manager-Project.

For the Silos you have to use the Silo.awl Source and select the relevant Silo-Groups you have.

Integrate following symbolic:

WEIGHER_READY   M   1112.0   BOOL   Weigher standstill, empty

WEIGHER_DOSE   M   1112.1   BOOL   Dosage is running

WEIGHER_DOSE_TOL_POS M   1112.2   BOOL   Dosage finished with range overflow (tol

WEIGHER_DOSE_TOL_NEG M   1112.3   BOOL   Dosage finished with range underflow (to

WEIGHER_DOSE_OK M   1112.4   BOOL   Dosage finished without error

WEIGHER_DOSE_COARSE   M   1112.5   BOOL   Dosage coarse

WEIGHER_DOSE_FINE   M   1112.6   BOOL   Dosage fine

WEIGHER_EMPTY   M   1112.7   BOOL   Weigher is empty

WEIGHER_TARE_OK M   1113.0   BOOL   Tare finished without error

WEIGHER_TARE_ERR   M   1113.1   BOOL   Tare finished with error

WEIGHER_AUTO   M   1113.3   BOOL   Operating mode automatic

WEIGHER_HAND   M   1113.4   BOOL   Operating mode hand

WEIGHER_EN M   1113.5   BOOL   Switch over auto/hand enabled

WEIGHER_OP_OFF   M   1113.6   BOOL   Weigher is in off-mode

Define at least 2 Blocks with

1. **Check siwarex**
       CALL FC 645 // "BmWeigherUsrCallFC"
        iWeigher:=1
        iMode   :=0 //check status
        RET_VAL :=#TEMP2

And Transition:
A   M   1112.0 //   "WEIGHER_READY"

2. **Dosing**
        L   0
        T   MW 1112
        CALL FC 645 //"BmWeigherUsrCallFC"
        iWeigher:=1
        iMode   :=1 // Upward dosing with balance; 2= Downward dosing with balance
        RET_VAL :=#TEMP2

And Transition:
O   M 1112.2 // "WEIGHER_DOSE_TOL_POS"
  O   M 1112.3 // "WEIGHER_DOSE_TOL_NEG"
  O   M 1112.4 // "WEIGHER_DOSE_OK"

The Mode describes the function of the weigher

0, 16:   Status inquiry
    1:    Upward dosing with balance
    2:    Downward dosing with balance
    4: manual upward dosing with balance without indicating prop. upw. with tare
       (no flags coarse, fine)
    5:   inching prop. upw. with tare
    6: inching prop. downw. with tare
    21:     prop. upw. without tare
    22:     prop. downw. without tare
    24:     manual prop. upw. without tare
    32:     tare

SIWATOOL

Install SIWATOOL 2 FTA

In order to make adjustments you can use this Software. But it needs a serial COM! May be USB-Adapter is required?

Make a **serial cable** with 9-pin plug
cable 5 – 5
cable 3 – 2
cable 2- 3

Start Siwatool and select Wizard (Tools) and set max. Weighing range and select whether a filling scale (Silo above diff. components) or an emptying scaling.

Make adjusting of the weigher with 2 values (0 and 75% of total range).

Finish Service-Mode of the scale.

1.1   Braumat-Konfiguration

Copy siwa_fta.pcu to \windcs\pcu.00x\siwa_fta.pcu

Copy silo_gr_s1.pcu to the according folder \PCU.00x\Texte

Modify silo_gr_s1.pcu to the Silogroups you are using and change the text e.g.

```
silo_gr_s1.pcu - Editor
Datei  Bearbeiten  Format  Ansicht  ?

/*
 Datum   Name           Aktion
 ---------------------------------------------------------------------
 29.09.99  Hofmann      Neu mit Erweiterung
 28.02.00  Weber        Doppelbelegungen beseitigt
 05.07.00  Weber        Informationstext f. Dichte 1 u. 2
 04.12.00  Hammer       Namensänderung von Parametern
                        SettingTime>Setting_T, InchingTime>Inching_T
 20.01.01  Maxa         Namensänderung von Parametern, FKTANW hinzu Anpassung an comp1.def
 22.01.02  Weber & Schmitz Anpassungen für V5
*/


/* ######################################################### */
object Wgh_SILO_W_1=DB920;(*Siwarex Scale 1*)
   CID=1920;
   max=128;
   offset=100;
   length=100;
   number=DBW8;
   filename=SILOW_1;
{
   Offset            (3 ,DBW2  ,I16)=100;          (*Offset of 1st dataset*)
   DS_Length         (2,DBW4,I16)=100;             (*Dataset length*)
   silo_cnt          (1,DBW8,I16,RD);              (*silo count*)
struct
   COMPNO            (101,DBW4, I16);              (*Contiguous process input number*)

   Content           (102,DBD6, I32,HI)=0;         (*Content*)
   MaxContent        (103,DBD10,I32,HI)=0;         (*Max. content LO-WORD*)
```

Use picture SIWA_F2.bik and SIWA_F2.bmp

Prio 1-255 for same Material

Activation in Braumat V7.x:
\windcs_V7\recipe\project\PLANT.INI
[ComponentList]
;Enable recipe system for working with componentlist
Enable=1

1.2   Definition of components and weigher

Open Recipe-System, Engineering, Process-Input

Create new material, you can link to groups

Material stock

Material ID	Name
18001	Mat. SIWA F
18002	Mat. SIWA F
18003	Mat. SIWA F
*	

All materials
Weighers
- RTYP_TESTP198
- RTYP_TESTP198
- FM350-1_1   111
- TEST_003_SIWA M
- TEST_003_SIWA M
- FM350-2 K1   114
- FM350-2 K2   115
- FM350-2 K3   116
- FM350-2 K4   117
- FM350-2 K5   118
- FM350-2 K6   119
- FM350-2 K7   120
- FM350-2 K8   121
- FM350-1_2   122
- Dummy Kompon. S5
- FM350-1_1   111
- FM350-1_1   111
- TEST_004_SIWAFTA
  - Mat. SIWA FTA 1/1
  - Mat. SIWA FTA 1/2
  - Mat. SIWA FTA 1/3
- TEST_004_SIWAFTA

Close

Material types

Number   20

Edit names

Material

ID   18001
Type   Mat. SIWA FTA
Name   Mat. SIWA FTA 1/
Unit   kg

Create new one
Take over
Delete

Weigher / material assignment

Weigher   Material
TEST_004_SIWA   Mat. SIWA FTA 1/1

Settings
Assign material to weigher
Delete assignment

Settings

Info

Weigher   TEST_004_SIWAFTA
Material   Mat. SIWA FTA 1/1

Close
Take over

Name	Value	Comment
MATID	18001	material identifier
COMPNO	1	material number 1 · ...
DOSGRP	1	dosing group
ENABLE	1	release/lock
PRIORITY	1	dosing priority
FUNCTSEL	0	function select weigher
COARSEVAL	1.021	switch of value coarse [kg]
FINEVAL	0.571	switch of value fine [kg]
TOLERANCE	0	tolerance [%]
TOLMAX	0.411	limit tolerance max [kg]
TOLMIN	0.221	limit toleranz min [kg]
TOLPLUS	0.121	tolerance + [kg]
TOLMINUS	0.097	tolerance · [kg]
FL_FINE	0.123	min flow value fine [kg]
FL_COARS	0.221	min flow value coarse [kg]
SETTL_T	4	settling time [s]
INCHING_T	5	inching time [s]
SPEC_GRAV	1000	specific weight [g/dm]

Storage assignment

932_Tank1
932_Tank2
932_Tank3
932_Tank4

load into PCU
Material will be assigned to position

Free storage

Weiger optimization

Right window: Load into PCU: **Here the according link to the correct Tank has to be done.**

Material-Data are located in: \windcs_V7\recipe\COMPLIST\MATERIAL.DBF

Then Select Recipe-system, Engineering and Storage-stock and create new scale
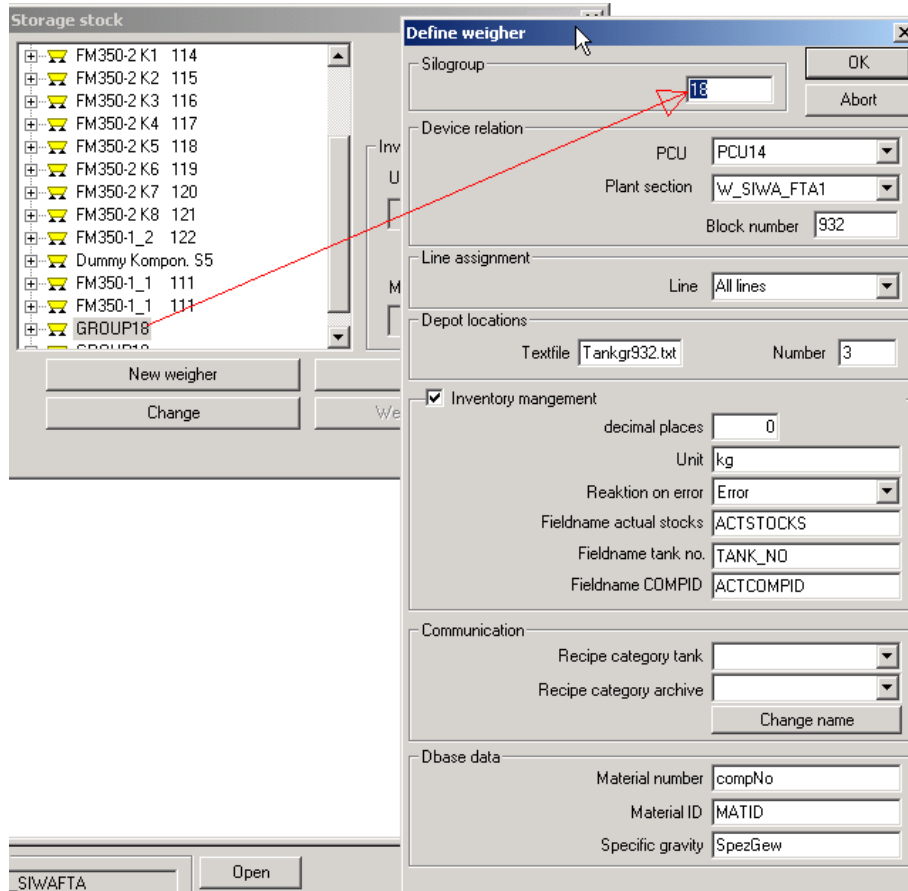
The Name has to be defined in texte.x\rtyp.txt Rtype 100

d:\windcs_V7\recipe\COMPLIST\SILON.INI:

Description in d:\windcs_V7\recipe\COMPLIST\CL_DAT\comp1.dbf

Dosing-group: sequence (if several times the same material)

Reaction at empty list: 1= cancel etc

Used Tank: for write back

Technical OP: which EOP if intermediate discharge….
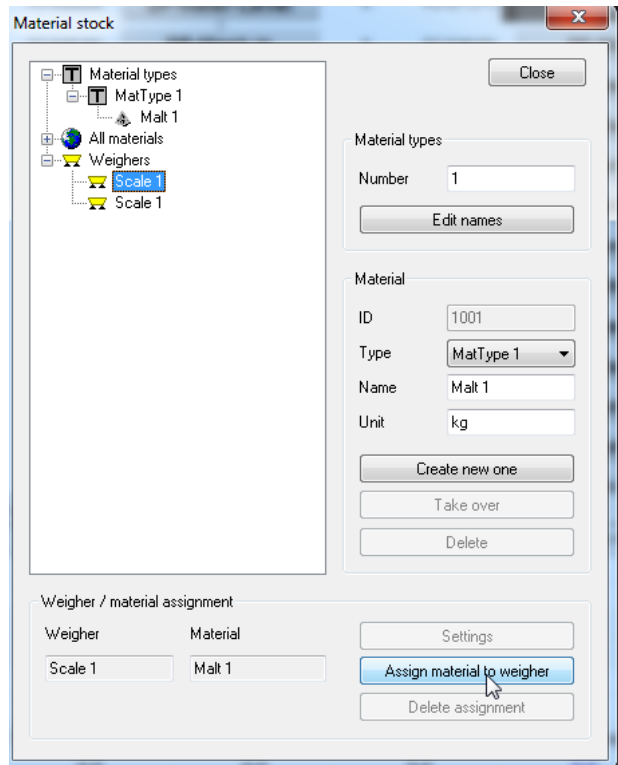
Then Assign Material to weigher

1.3 Recipe-System

Define in a Recipe a Dosing-EOP with specific Parameters
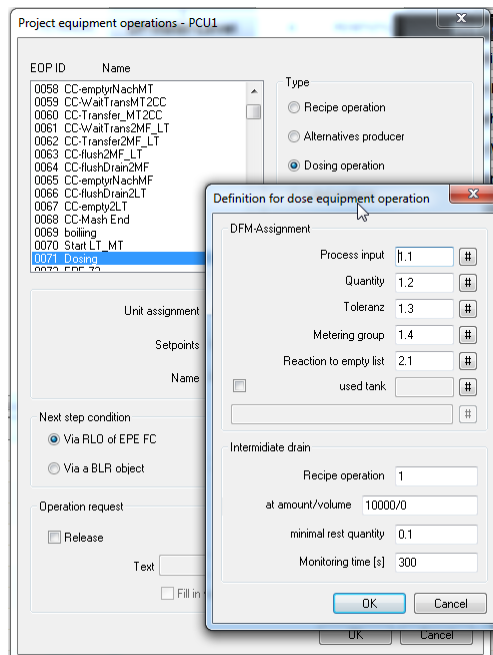
Recipe operation = EOP for discharge (in our case 332).

Define the EOP's like that

Define the File Dosreact.txt in PCU.00x with 3 lines

Ignore

Recipe load error

Remove sequence

At amount / volume: this values describes the max. kg for the scale for one component until discharge is necessary. This influences how many EOP's are genereated by the order-system.

Setup the Nominal-Size of one batch (all components together).

This is the reference-Batch.
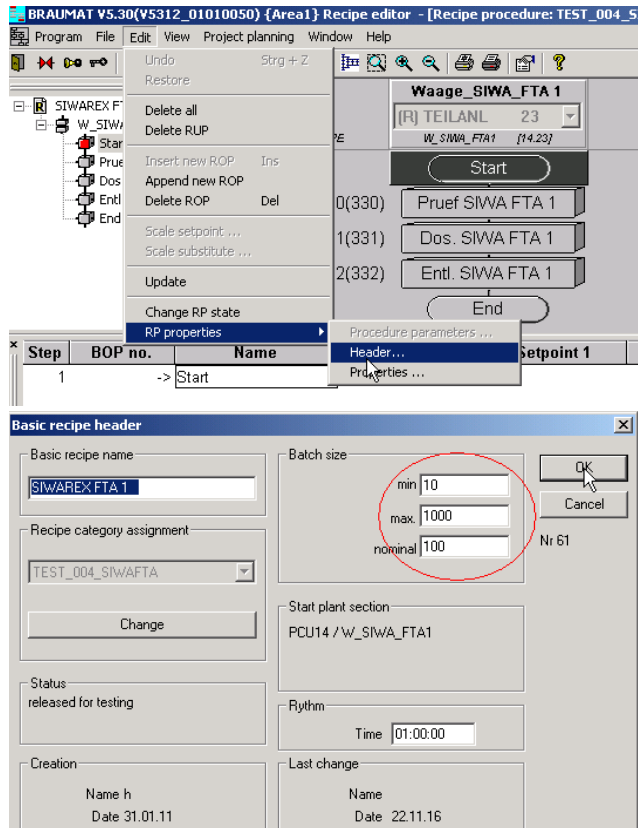
The limits for the Batch and the nominal Batch are defined in here
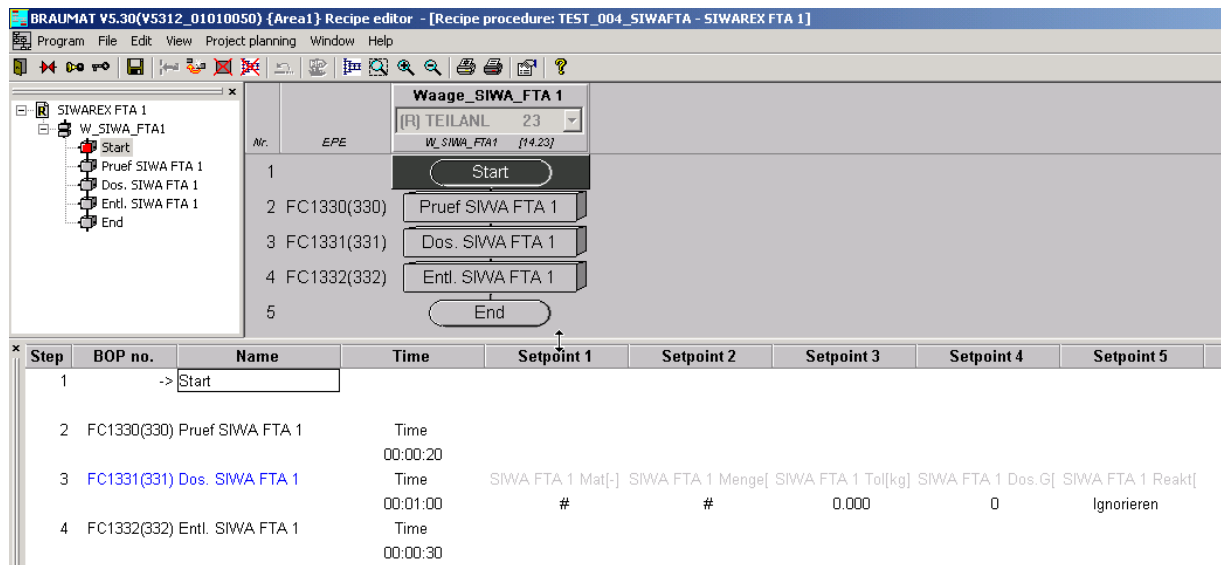
Here a small dosing recipe

Then materials can be linked to this Dosing-EOP (right click….).

1.4 Parameterization

Define a weigher and the according DBs;

The DFM correspond to the according Recipe-Definition

Input the relevant Module-Adress from the Hardware-Configuration in here!

Program   File   Edit   Options   Acknowledge   Help

	Name	D.Type	A.Type	Value	Comment	Address
1	COMPNO	I16	ENG	1	Contiguous process input number	DB 932 DBW 104
2	Priority	I16	ENG	1	Priority of emptying	DB 932 DBW 116
3	OptimizeFine	B1	ENG	0	Optimization of fine current	DB 932 DBX 118.7
4	TOLERANCE	I16	ENG	2	Tolerance (%)	DB 932 DBW 160
5	TOLMAX	I32	ENG	411	GW Tolerance Max (g)	DB 932 DBD 162
6	TOLMIN	I32	ENG	221	GW Tolerance Min (g)	DB 932 DBD 166
7	TOLPLUS	I32	ENG	123	Tolerance Plus (g)	DB 932 DBD 120
8	TOLMINUS	I32	ENG	199	Tolerance Minus (g)	DB 932 DBD 124
9	COARSEVAL	I32	ENG	1021	Coarse flow setpoint value (g)	DB 932 DBD 128
10	FINEVAL	I32	ENG	571	Fine flow setpoint value (g)	DB 932 DBD 132
11	SETTL_T	I16	ENG	4	Settling time (s)	DB 932 DBW 136
12	INCHING_T	I16	ENG	5	Inching time (s)	DB 932 DBW 138
13	MonInchRepropTime	I16	ENG	10	Monitoring time inching mode (s)	DB 932 DBW 140
14	FlowCoarseTime	I16	ENG	3	Monitoring time coarse flow	DB 932 DBW 142
15	FL_COARS	I32	ENG	221	Minimum coarse flow	DB 932 DBD 144
16	FlowFineTime	I16	ENG	3	Monitoring time fine flow (s)	DB 932 DBW 148
17	FL_FINE	I32	ENG	123	Minimum fine flow (g)	DB 932 DBD 150
18	FlowCoarseDelTime	I16	ENG	2	Delay for monitoring time coarse flow (s)	DB 932 DBW 154
19	FlowFineDelTime	I16	ENG	2	Delay for monitoring time fine flow (s)	DB 932 DBW 156
20	SPEC_GRAV	I16	ENG	1000	Specific gravity (g/l)	DB 932 DBW 158
21	Flow	I16	ENG	10	Flow per minute	DB 932 DBW 170

In this parameterization, relevant values are loaded when starting a recipe.

1.5   Procedure for starting Weighing by the order-system

A batch is started via the order system.
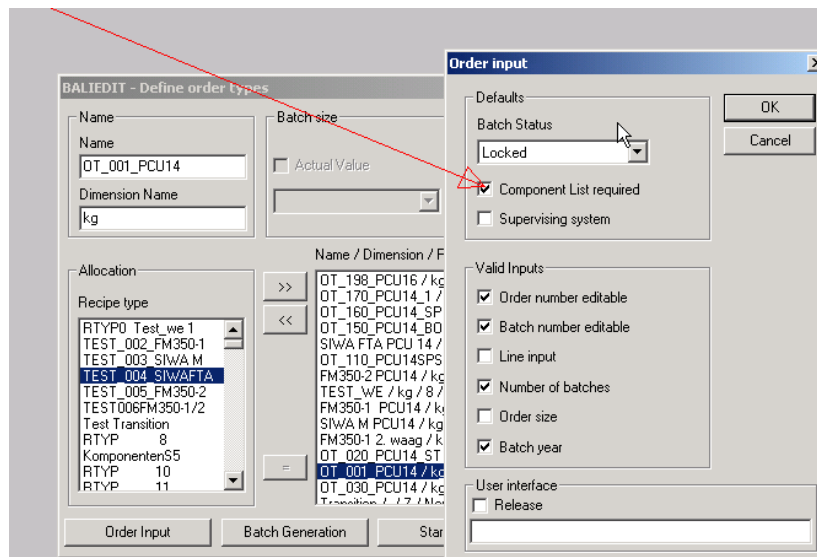
First define the recipe-Type with the check-box Component-List required

Input a Total Quantity for the Batch and start the Batch.

After saving the recipe the corresponding EOP's are generated automatic and visible with key F7
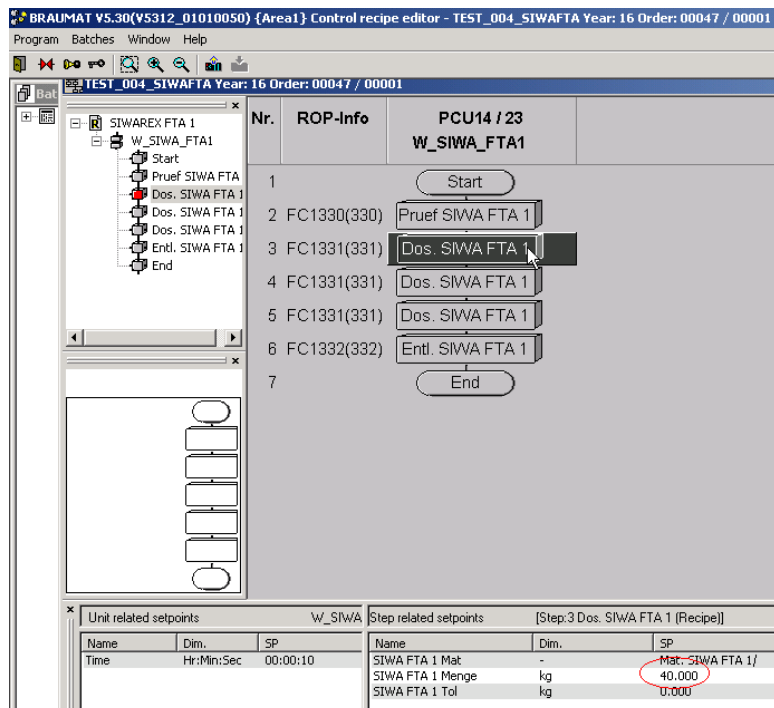
• The control recipe with corresponding dosing and emptying GOPs is loaded to the PLC and the unit is started.

• After the Setpoint is reached, the weighing stops. The tolerance test decides about a subsequent processing. Then it is jumping to the next dosing step.

Sequence - Overview

Dosage is running; Faceplate in the Process-image by the picture SIWA_F1.bik; May be needs to be adapted!

Process status 1 (DR30)

| Info | Status | Process values |

NAWI-Status

Range 1	Printing the log
Range 2	Printing not possible
Range 3	MMC inserted
Limit 1	MMC ready
Limit 2	MMC ready (trace)
Limit 3	MMC ready (log)
Tared	Trace active
Preset Tare	Through-put 1
Max. +9e	Through-put 2
¼ d Null	Empty range
Waiting f. standstill	Calibr. switch on
Standstill 1	-
Scale adjusted	prot. for S7
Command err. (DI)	Digit.LC ready
Simulation active	Stand-Alone
Service operation	Operating error

AWI status

Weighing step 0	Aborted
Weighing step 1	Step blocked
Weighing step 2	Over tol. TO2
Weighing step 3	Over tol. TO1
Weighing step 4	Good (TU1 to TO1)
Weighing step 5	Under tol. TU1
Weighing step 6	Under tol. TU2
Weighing step 7	Tolerance bad
Post dos. Active	Standstill 2
Coarse signal	Standstill 3
Fine signal	Check follows
Timer pre-dosing	disable weight
Empty signal on	Conti. mode active
Stopped	-
Check stop	Weighing cycle ended.
Check stop waiting	Load operation ended.

| Info | Status | Process values |

NAWI-Status

Range 1	Printing the log
Range 2	Printing not possible
Range 3	MMC inserted
Limit 1	MMC ready
Limit 2	MMC ready (trace)
Limit 3	MMC ready (log)
Tared	Trace active
Preset Tare	Through-put 1
Max. +9e	Through-put 2
¼ d Null	Empty range
Waiting f. standstill	Calibr. switch on
Standstill 1	-
Scale adjusted	prot. for S7
Command err. (DI)	Digit.LC ready
Simulation active	Stand-Alone
Service operation	Operating error

AWI status

Weighing step 0	Aborted
Weighing step 1	Step blocked
Weighing step 2	Over tol. TO2
Weighing step 3	Over tol. TO1
Weighing step 4	Good (TU1 to TO1)
Weighing step 5	Under tol. TU1
Weighing step 6	Under tol. TU2
Weighing step 7	Tolerance bad
Post dos. Active	Standstill 2
Coarse signal	Standstill 3
Fine signal	Check follows
Timer pre-dosing	disable weight
Empty signal on	Conti. mode active
Stopped	-
Check stop	Weighing cycle ended.
Check stop waiting	Load operation ended.

Abb: Dosing is ready and ok!

Scaling with Tolerance – Error

• The control recipe with corresponding dosing and emptying GOPs is loaded to the PLC and the unit is started.

• After the Setpoint is reached, the weighing stops. The tolerance test decides about a subsequent processing.

• The unit goes into Hold (A-). The processing steps are paused.

• Acknowledgment of the problem (switch back to A +) continues processing.

Abb: Sequence - Overview

Fig: Process diagram for SIWAREX FTA Weigher -> Unit on hold

Feature: Dosing and weighing with dynamic adjustment of the control recipe

Basic recipes (varieties) with corresponding component lists are created.

The component quantities are relative to the "nominal batch size".

Feature : Dosing and weighing with dynamic adjustment of the control recipe

Simple recipe procedures for the actual weighing/dosing are assigned to them.

The recipe procedures have special attributes regarding the absolute quantities.

Feature: Dosing and weighing with dynamic adjustment of the control recipe

Creation of a batch for desired, absolute quantity

Control recipe with multiplication of EOPs and scaling of quantities

1.6 More Information