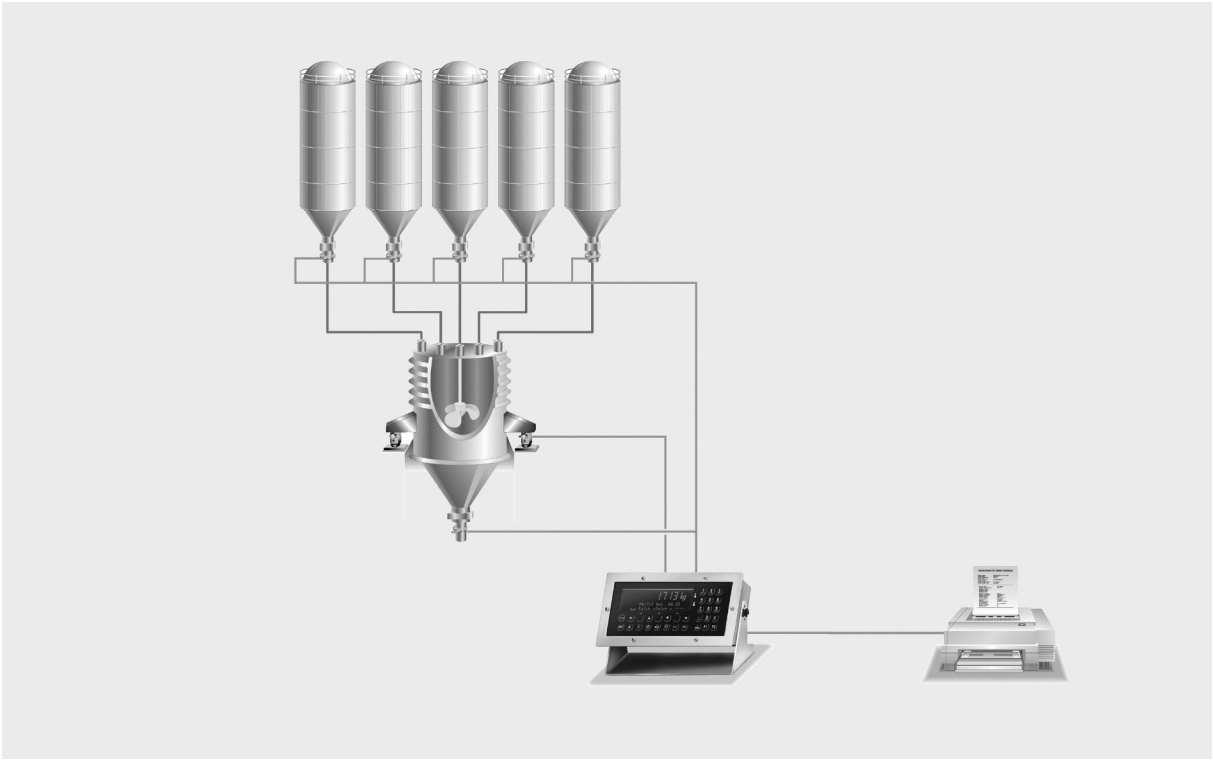
# X4, X5, X6 - Application
# Batch Controller

## Operating Manual



| | | | |
|---|---|---|---|
| Operating Manual | 9499 050 61203 | Edition 3 | 08.01.2008 |
| For PR 5510/20 | Release 3.00 |  | |
| For PR 5610/20 | Release 3.00 |  | |
| For PR 5710/20 | Release 3.00 |  | |

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**Wichtig**

# Contents

# 1. Introduction

## 1.1. General

### 1.1.1. Further manuals

The operation for the Batch Controller X4, X5, X6 is described in this manual, comprising all batching functions. For general setup and installation please refer to the Installation Manual. The installation, configuration and calibration are described in the Installation Manual. The connection to PR 8400 is described in the PR 8400 Manual.

### 1.1.2. Delivery state for BATCH-X4

The batching license PR 1713/21is part of the delivery scope.

The Batch Controller contains a defined set of hardware options:

**SLOT 1:**
The digital I/O card PR 5510/12 with 6 opto input channels and 12 opto output channels is built-in.

**SLOT 2:**
Free

**SLOT 3:**
Free

**SLOT 4:**
Free

### 1.1.3. Delivery state for BATCH-X5, -X6

The batching license PR 1713/21is part of the delivery scope.

The Batch Controller contains a defined set of hardware options:

**SLOT 1:**
The digital I/O card PR 1713/17 with 6 opto input channels and 8 opto output channels is built-in.

**SLOT 2:**
The digital I/O card PR 1713/17 with 6 opto input channels and 8 opto output channels is built-in.

**SLOT 3:**
Free

**SLOT 4:**
Free

### 1.1.4. Batch Controller

The **Batch Controller** (license PR 1713/21) batches complex recipes:

- charge or discharge batching in net mode
- charge or discharge batching in gross mode
- charge or discharge batching without tare (top-up)
- discharge to setpoint
- total discharge
- manual components
- guide component for recalculation of setpoints
- timer components
- tolerance checking
- minimum material flow monitoring
- functions via digital inputs and outputs
- automatic overshoot correction
- generation of consumption reports
- generation of production reports
- generation of batch reports
- connection of remote display

The Batch Controller can be connected to a PR 1740 / PR 8400 Recipe Management System.

### 1.1.5. Additional Software Options

- With the license PR1713/30 the Phasen-Interface of the Batch Controller may be used. See Chapter 11.9.3.
- With the license PR1713/31 a set of communication commands of the PR16xx may be used. See Chapter 14.
- The licenses PR1740/10 /20 /30 /40 are used together with PR1740 / PR8400.

### 1.1.6. Additional option cards

List of the optional upgrade moduls for the Batch Controller BATCH-X4, BATCH-X5 and BATCH-X6.

It is possible to build max. 4 moduls. For detail information you have to read the considering Installation Manual.

The built-in cards in SLOT 1 and SLOT 2 can be replaced by other option cards.

Possible fitting of the different cards into the slots:

| | **For BATCH-X5 and BATCH-X6** | Slot 1 | Slot 2 | Slot 3 | Slot 4 |
|---|---|---|---|---|---|
| PR1713/04 | serial I/O card with RS232 and RS 485 | • | • | • | |
| PR1713/06 | analog output card 1 output 0/4...20 mA | • x1 | • x1 | • x1 | |
| PR1713/07 | analog I/O card 1 output 0/4...20 mA, 4 inputs (0-10 V, 0 - 20 mA) | • x1 | • x1 | • x1 | |
| PR1713/08 | BCD output card with 1 input and 24 outputs | • x2 | • x2 | •+ | |
| PR1713/12 | digital I/O card with 4 opto inputs and 4 opto outputs | •+ | •+ | • | |
| PR1713/13 | DIOS Master for Interbus-S INLINE modules | | | • | |
| PR1713/14 | Ethernet interface | | | | • x1 |
| PR1713/15 | digital I/O card with 4 opto inputs and 4 relay outputs | •+ | •+ | • | |
| PR1713/17 | digital I/O card with 6 opto inputs and 8 opto outputs | • Standard | • Standard | • | |
| PR1721/11<br>PR1721/21 | Profibus interface for Batch X5<br>Profibus interface for Batch X6 | | | | • x1 |
| PR1721/12<br>PR1721/22 | Interbus interface for Batch X5<br>Interbus interface for Batch X6 | | | | • x1 |
| PR1721/14<br>PR1721/24 | Devicenet interface for Batch X5<br>Devicenet interface for Batch X6 | | | | • x1 |

| | |
|---|---|
| • Standard | = Fitted as standard in the delivery condition |
| • | = Can be fitted additionally |
| • x1 | = Note restrictions due to high current consumption ! |
| • x2 | = In Slot1 the top terminal strip is covered by Slot 2. In Slot2 the top terminal strip is covered by Slot 3. |
| •+ | = Preferred position ( digital I/O is initialized, BCD card does not cover any connections ) |
| | = Is not supported by hardware or software |

If a card is inserted in Slot 4, no 2nd analog output card allowed.

| | For BATCH-X4 | Slot 1 | Slot 2 | Slot 3 | Slot 4 |
|---|---|---|---|---|---|
| PR 5510/04 | Serial I/O RS485/422 + RS232 | • | • | | |
| PR 5510/06 | Analog out | | | • x1 | |
| PR 5510/07 | 1 Analog out / 4 analog in | • x1 | • x1 | | |
| PR 5510/08 | BCD out / 24 out, 1 in, CC | • | • | | |
| PR 5510/09 | BCD out / 24 out, 1 in, CE | • | • | | |
| PR 5510/12 | Digital I/O 6/12 opto | • | • | | |
| PR 5510/13 | DIOS master | • | | | |
| PR 5510/14 | Ethernet interface | | | | • x1 |
| PR 1721/31 | Profibus interface | | | | • x1 |
| PR 1721/32 | Interbus interface | | | | • x1 |
| PR 1721/34 | Devicenet interface | | | | • x1 |
| PR 1721/35 | CC-Link | | | | • x1 |

| | |
|---|---|
| • | = Can be fitted additionally |
| • x1 | = Note restrictions due to high current consumption! * |

If a card is inserted in Slot n° 4, no 2nd analog output card allowed.

# 2. Operating Interface

## 2.1. Display


The **Weight Display** allows display of 7 digits for weight plus a decimal point. The weight unit can be selected as tons, kilograms, grams or lbs. The display is capable of handling two lines of alphanumeric characters in addition to the numeric output. The other symbols of the display are listed below:

| Status-indicator | Description |
|---|---|
| B<br>G | Gross weight is displayed<br>**Gross = Net + Tare**<br>( G only active in NTEP mode) |
| NET | Net weight is displayed |
| T | Tare or initial weight is displayed. This is the weight stored in memory. |

| Status-indicator | Description |
|---|---|
|  | The weight value is within center of zero |
|  | The weight is in standstill |
|  | Batching is active |
|  | Flashing, there is an alarm or manual component |

## 2.2. Keypad

The keys between the Batch Controller X4, X5 and X6 have nearly the same functions. Differences are given. The Symbols of the front panel keys are given below:

| Indicator keys | Description |
|---|---|
|  | While pressing this key, the gross weight is displayed (B – gross weight). |
|  | While pressing this key, the tare weight is displayed. |
|  | Set/reset tare. The actual gross value is stored in the tare memory, provided that:<br>- weight standstill<br>- indicator not in error status |

| Indicator keys | Description |
|---|---|
|  | Print-out |
|  | Key for switch-over between weighing point A, B and C=A+B. not valid for Batch- Controllers |
|  | Set gross weight to zero, provided that:<br>- weight standstill<br>- weight within zero set range<br>- not tared<br>- batching is not active |

| Menu keys | Description |
|---|---|
|  | Exit from the actual menu and continue operation at the next higher level. |
|  | Softkey: select function |
|  | Scroll down through menu functions |
|  | Scroll up through menu functions |
|  | Display of further menu functions, which are indicated by the double arrow ⁝. |

| Edit keys | Description |
|---|---|
|  | Move cursor left during editing and selection of values, if ⁝ is displayed. For Batch-X4 the More-key  LED has to be off. |
|  | Move cursor right during editing and selection of values, if ⁝ is displayed. For Batch-X4 the More-key  LED has to be off. |
|  | Enter / execute / confirm. For Batch-X6 is an additional key  |
|  | Backspace / delete. For Batch-X4 as a 2nd function over the key  . The LED from the More-key  has to be on. |

| Function keys | Description |
|---|---|
|  | Stops the batching process. |
| | |

| Function keys | Description |
|---|---|
|  | Programmable function key, not used with Batch-Controllers |
|  | Programmable function key, not used with Batch-Controllers |

### 2.2.1. Exceptional feature for BATCH-X4

| Mode | Description |
|---|---|
| Input mode | To succeed to the input mode you have to press the More-key until the LED from the More-key shines. The cursor is flashing now. Numbers and characters could be entered and deleted now. |
| Editing mode | If the LED from the More-key shines, press shortly the More-key. Now the LED from the More-key does not shine anymore, but the cursor still flashes. Now the cursor could be moved. |

## 2.3. Entering alphanumerical characters

In the alphanumeric entry mode, a cursor is flashing in the entry field. This mode is accessible by pressing a key from the alphanumeric keypad. If the More-key LED of BATCH-X4 is not flashing, press the More-key until it is flashing.


The alphanumeric keys have got more than one assignment. After pressing a key for the first time, the relevant first character, e.g. 'A' is displayed in the cursor position. After pressing for the second time, e.g. 'B' instead of 'A' is displayed; 'C' is displayed after pressing for the third time, etc. After the last signification, the first one is displayed again.

Pressing another character key (for BATCH-X5, -X6 also ) completes the entry of a character. To complete an entry, the key has to be used.

If only numeric values are required for an entry, letters are not selectable. Therefore, values such as 555 can be entered by pressing the key successively three times without using the arrow key.

Because of the duplicate function keys the numbers and letters stand right at the buttom at the keys from BATCH-X4.

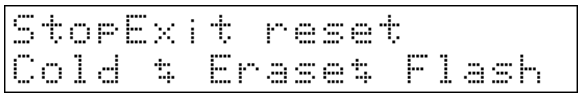
| Key | | Character | Remarks |
|---|---|---|---|
| X5 | X4 | For BATCH-X4 only with the **activated** More-key | |
| 1 | 1 | # " ( ) = $ ? ! % 1 | |
| 2 ABC | 2 ABC | A B C a b c 2 | |
| 3 DEF | 3 DEF | D E F d e f 3 | |
| 4 GHI | 4 GHI | G H I g h i 4 | |
| 5 JKL | 5 JKL | J K L j k l 5 | |
| 6 MNO | 6 MNO | M N O m n o 6 | |
| 7 PQRS | 7 PQRS | P Q R S p q r s 7 | |
| 8 TUV | 8 TUV | T U V t u v 8 | |
| 9 WXYZ | 9 WXYZ | W X Y Z w x y z 9 | If a value has a polarity sign, it can be entered by pressing the dot key or once for minus or twice for plus. |
| . | . | — + * / : ; _ ' @ , < > | |
| 0 ÄÖÜ | 0 ÄÖÜ | Ä Ö Ü ä ö ü ß 0 | A space can be entered using the key or . |
| C | C | | A character will be removed by pressing the clear key for BATCH-X5 or the clear key for BATCH-X4. |

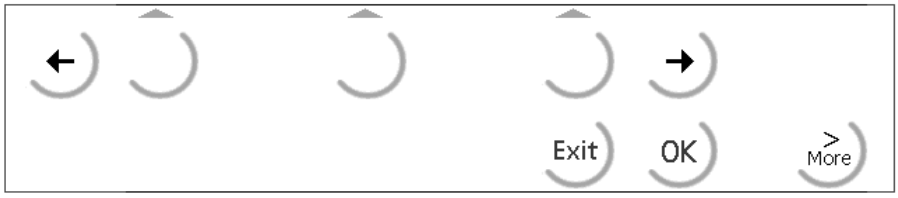
## 2.4. Operating concept

The operating concept will be explained for the BATCH-X5 System Controller, because the handling between the different Batch Controller X4, X5 and X6 is very similar. If it is necessary devations from the operating of the different Controller will be explained.

### 2.4.1. Operating via softkeys

The Batch Controller operation is menu-guided. For this purpose the controller has a softkey-functionality:
Three softkeys below the display marked by an upward-direction arrow correspond to the function described in the lower text display line. For the BATCH-X6 Controller these softkeys have this design .



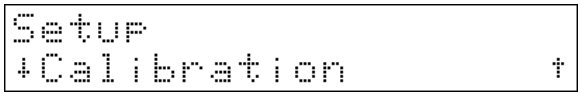



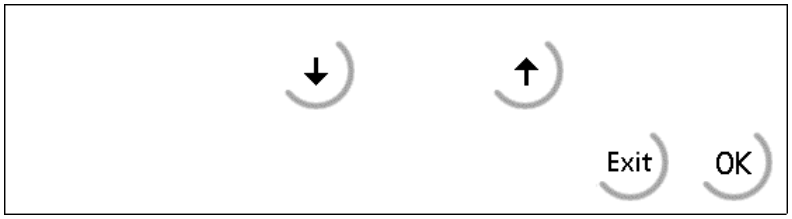

Menu items are selected with .

If more than three functions can be selected, the character indicates that further items can be displayed with the keys , and .

A menu can be left with , the operation is continued at the next higher level.

### 2.4.2. Selection via scroll buttons



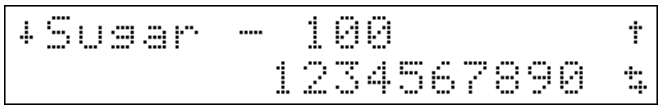

The functions in the menu can be scrolled in forward direction using the scroll down key or in reverse direction using the scroll up key .

The key is used to leave the menu item and to continue at the next higher level.

The key selects the item indicated in

### 2.4.3. Selection in Tables

As scrolling would require pressing too many keys with long tables, the table can be accessed directly with alphanumeric keys:




Instead of using ↓ or ↑ to select e.g. a component from the component table (see chapter 2.4.2) More can be used. Consequently the cursor in the highest line flashes. Now the first character of the component name has to be entered to access the component beginning with the entered letter. If more than one character is required, enter the number of characters to clearly identify the component.
For BATCH-X4 you have to certain that for the selection of a component over input of indications of the name you have to press first briefly the More-key. Now the cursor in the highest line flashes. Press now the More-key until the LED lights. For input you have to proceed like it is described above forwards.

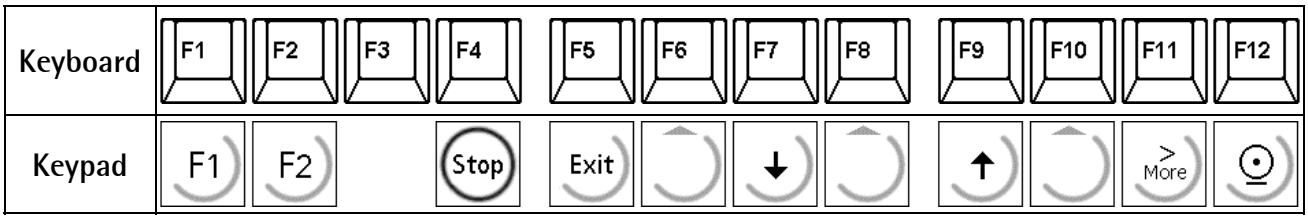
**Example selecting a component:**

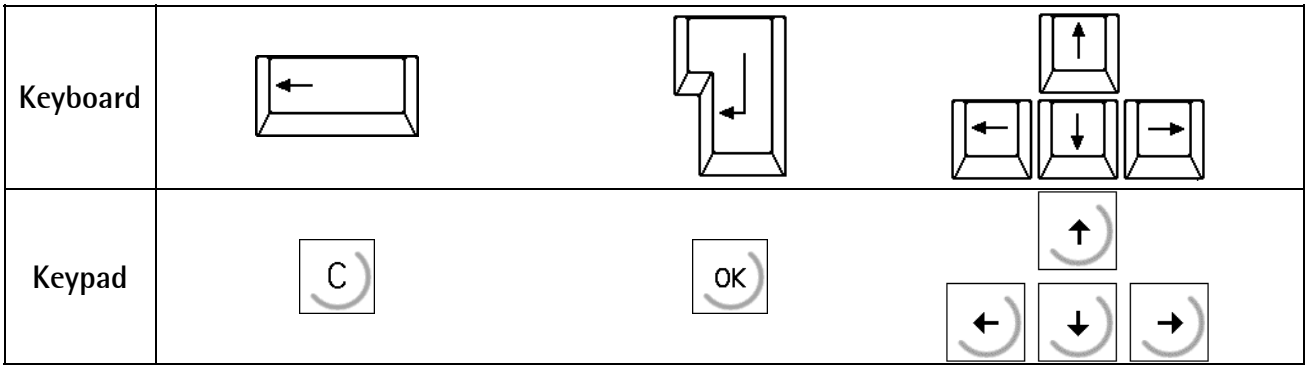
| Component table | Direct access with key **'B'** | Direct access with key **'B'** and **'A'** |
|---|---|---|
| A | B_ | BA_ |
| ABC | BA | BABX300 |
| Azucar - 500 | BABX300 | BCT700 |
| B | BCT700 | Bulk - 200 |
| BA | Bulk - 200 | C |
| BABX300 | C | DEF |
| BCT700 | DEF | Flour - 635 |
| Bulk - 200 | Flour - 635 | Sugar - 100 |
| C | Sugar - 100 | |
| DEF | | |
| Flour - 635 | | |
| Sugar - 100 | | |

This function can be used for recipe selection in the same way.

## 2.5. Input over external PC-keyboard

The Batch Controller have an alphanumeric key field and a connection for a PC keyboard with DIN-Plug (on the rear side of housing). Thus the operation of the Batch Controller can be made also by an external PC keyboard. Both functions are equivalent and are alternatively applicable.



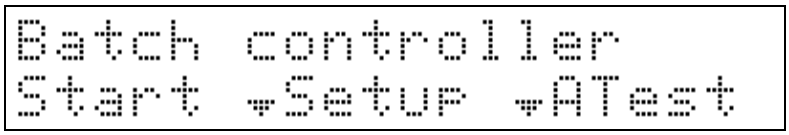




In the delivering condition the external keyboard is adjusted as an US keyboard. If a German keyboard will be used, you have to change the character set with [ Strg][F2 ] into German. With [Strg][F1] you can return again to the delivering condition (US).
The LEDs from the PC keyboard will be not triggered.

For detail informations please refer to the Installation Manual.

# 3. Main menu

When the unit is ready for operation and batching is not active, the main menufunctions are accessible.




Menu items can be selected with the corresponding softkey :

| Softkey | Function |
|---|---|
| [Start] | Batch functions |
| [Setup] | Configuration, calibration, serial port definition, initial data |
| [Atest] | Start test mode of internal weighing point |

## 3.1. Switching on the Batch Controller

After switching on the mains voltage the alphanumeric display will be show "Batch Controller". The main menu is active only thereafter.

If any further option card has to be installed or moved to another slot, this has to be done before data are entered (components, recipes, I/O configuration). After mounting the card a [Cold]-Start has to be performed.

To enter the boot menu there are three possibilities:

1. Menu [Setup]-[Reboot], [Warm]- Start is possible
2. Pressing Stop at switching on the instrument
3. Pressing Stop + Exit , ([Setup]-[Software Parameter]-[Reset on stop+exit] = 1 or 5 s.), [Warm]-Start is not possible

Care has to be taken, that a [Cold]-Start is only performed if necessary (e.g. a new option card has been installed), as all recipes and components will be deleted!

For further details please refer to the chapter in the Installation Manual.

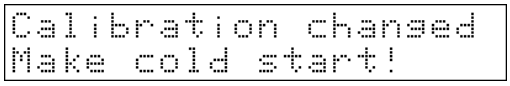
# 4. Setup

## 4.1. Setup menu

The [Setup] menu is described in the Installation Manual

To prevent that unauthorized persons are entering the setup menu, it can be locked by a key-switch, see chapter 10.4.

Care has to be taken that the calibration data are not altered after components and recipes have been entered. If e.g. the weight unit is changed later from e.g. kg to lb a coldstart has to be performed, that means losing all RAM data (components, recipes, reports etc.)




Message if calibration was changed later, continue with OK.

### 4.1.1. Setup-tree

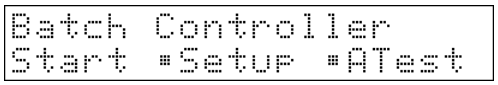
Setup

| | |
|---|---|
| - Config | **see Config Tree** |
| - Weighingpoints | see installation manual |
| - Set Clock | see installation manual |
| - Serial Ports | see installation manual |
| - Software Parameter | see installation manual |
| - Network Parameter | see installation manual |
| - Show Boardnumber | see installation manual |
| - License Setup | see installation manual |
| - Print Setupdata | see installation manual |
| - Refresh Display | see installation manual |
| - I/O Slots | see installation manual |
| - Show Version | see installation manual |
| - Reboot | see installation manual |

## 4.2. Config menu

The configuration data which are specific for Batch Controller will be entered in this menu. They will be saved in the EAROM and thus they will be secured in the case of power failures and after implementing a [Cold]-start.

Select with [Setup] .




Select with [Exit] or [Config] and confirm with [OK] .

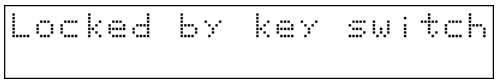
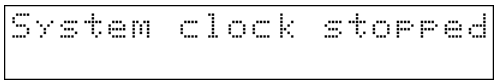
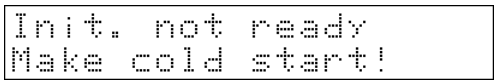

### 4.2.1. Config tree

| | |
|---|---|
| Config | Configuration for Batch Controller |
| - Edit | |
| - Input config. | Function allocated to installed inputs if available |
| - Slot 1 | Input configuration for slot 1 |
| - Slot 2 | Input configuration for slot 2 |
| - Slot 3 | Input configuration for slot 3 |
| - Output config. | Function allocated to installed outputs |
| | Output configuration for slot 1 |
| | Output configuration for slot 2 |
| | Output configuration for slot 3 |
| - Start name | 1 - 20 alphanumerical characters for recipe name |
| - Start value | Amount to be batched |
| - Start cycle number | No of batches, 1 - 999 (999 = infinite) |
| - Batchrep.auto prt | Generation of reports |
| | No batchreport, last batch report is stored |
| Batch report is generated | |
| - Recipe start mode | |
| | Dialogue [Yes], [No] appears before production start |
| - WP: A limit 1 on | Amount 0 - FSD |
| - WP: A limit 1 off | Amount 0 - FSD |
| - WP: A limit 2 on | Amount 0 - FSD |
| - WP: A limit 2 off | Amount 0 - FSD |
| - Recipe-Memory in | |
| - Batch Controller | normal dosingstart. All recipe data in Batch Controller |
| - PR8400 | dosingstart but all recipe data in PR8400 on PC |
| - Start with order number [Yes], [No] | Only if " Recipe-Memory in"=PR8400: Enter an order number during start. |
| - Start with customer number [Yes], [No] | Only if " Recipe-Memory in"=PR8400: Enter a customer number during start. |
| - Start with production number [Yes], [No] | Only if " Recipe-Memory in"=PR8400: Enter a production number during start. |
| - Print | Print configuration data |

### 4.2.2. Change configuration

Select with [Edit]


**Possible messages**

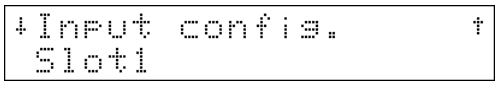
| | |
|---|---|
|  | Entering the of the Setup-Data is locked by activating of SPM-Bit 1329. |
|  | The clock has to be set. |
|  | The coldstart was aborted and not all parameters are initialized. Make a coldstart. |
|  | Calibration was modified. Some parameter must be new initialized. Make a coldstart. |

### 4.2.3. Digital Input/Output configuration

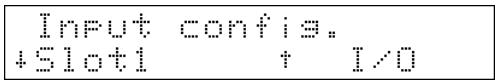
A function could be configured to each input and output. This will be reached through input from the addresses of each function. The possible function addresses (SPM-adresses) are listed in chapter 10 .

Example in slot 1:

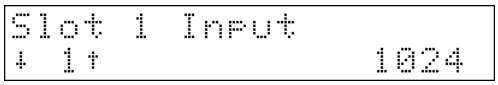
Select with or [Input config.], confirm with .



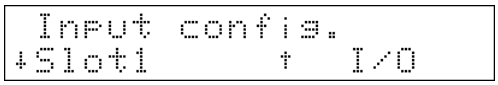

Select with or [Slot 1], confirm with .



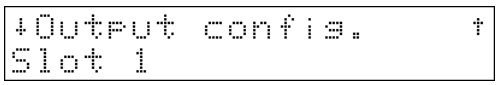

After pressing 4 numeric digits (1024 - 1535) can be entered to define the SPM input address.



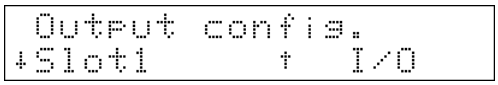

Press to continue operation at the next higher level.



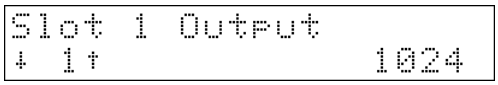

Select with or [Output config.], confirm with .



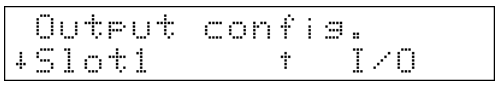

Select with or [Slot 1], confirm with .




After pressing 4 numeric digits (1024 - 1535) can be entered to define the SPM output address.




Press to continue operation at the next higher level.

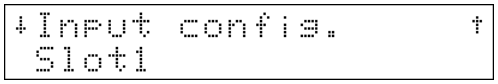



Other option cards could be installed in the various slots.
All cards with single inputs and outputs could be configured in the same way.
After installation of a card a [Cold]-start has to be performed!

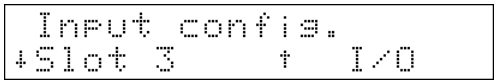
### 4.2.4. DIOS Master configuration

The input/output are extended by 32 with Interbus-Inline modules. The DIOS Master option can only be installed for BATCH-X5 and BATCH-X6 in slot 3, for installation please refer to the Installation Manual. After installation of the card a [Cold]-start has to be performed!
The possible function addresses (SPM-adresses) are listed in chapter 10.

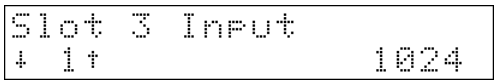
Select with ↓ or ↑ [Input config.], confirm with OK.



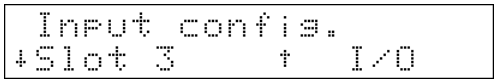

Select with ↓ or ↑ [Slot 3], confirm with OK.



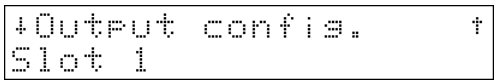

After pressing OK 4 numeric digits (1024 - 1535) can be entered to define the SPM input address.



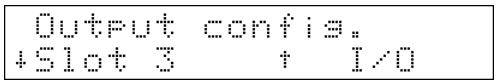

Press Exit to continue operation at the next higher level.



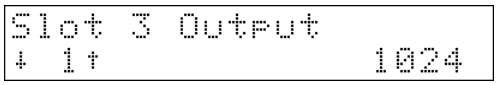

Select with ↓ or ↑ [Output config.], confirm with OK.



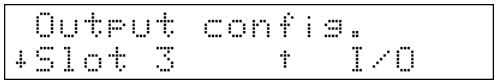

Select with ↓ or ↑ [Slot 3], confirm with OK.




After pressing OK 4 numeric digits (1024 - 1535) can be entered to define the SPM output address.




Press Exit to continue operation at the next higher level.



### 4.2.4.1. Interbus-Inline modules

The Interbus-Inline modulesare used to extend the I/O system by 32 inputs and 32 outputs.
The modules have to be connected to the DIOS master (PR 1713/13) option to be installed in slot 3.
The following table shows the location of the connection to the PR 1713/13 (1.1, 1.2, 1.3, 2.1 and 2.2), the output signals (1, 2, ... 32) and the input signals (1, 2, ... 32).

| IBS IL 24 BK-T/LC | IB IL 24 DO 16 | IB IL 24 DO 16 | IB IL 24 DI 16 | IB IL 24 DI 16 |
|---|---|---|---|---|

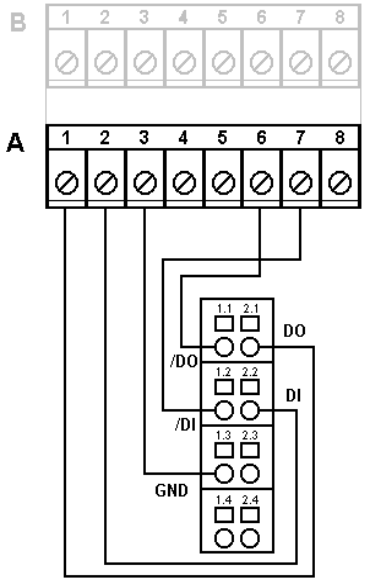
| BA RC BK-T | RD LD | UL | US UM | 1 2 3 4 | 1 2 3 4 | 1 2 3 4 | 1 2 3 4 | 1 2 3 4 | 1 2 3 4 | 1 2 3 4 | 1 2 3 4 | 1 2 3 4 | 1 2 3 4 | 1 2 3 4 | 1 2 3 4 | 1 2 3 4 | 1 2 3 4 | 1 2 3 4 | 1 2 3 4 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1.1 2.1 | | | | 1 2 | 5 6 | 9 10 | 13 14 | 17 18 | 21 22 | 25 26 | 29 30 | 1 2 | 5 6 | 9 10 | 13 14 | 17 18 | 21 22 | 25 26 | 29 30 |
| 1.2 2.2 | | | | | | | | | | | | | | | | | | | |
| 1.3 2.3 | | | | | | | | | | | | | | | | | | | |
| 1.4 2.4 | | | | 3 4 | 7 8 | 11 12 | 15 16 | 19 20 | 23 24 | 27 28 | 31 32 | 3 4 | 7 8 | 11 12 | 15 16 | 19 20 | 23 24 | 27 28 | 31 32 |

**BUS TERMINAL** **32 OUTPUTS** **32 INPUTS**

The Interbus modules have to be mounted in the sequence as shown above.

| Order Nos. for PHOENIX INTERBUS modules: | | Qty. |
|---|---|---|
| Interbus-Bus-Terminal with 16 inputs and 16 outputs: | | 1 |
| IBS IL 24BK DIO 16/16 | Order No. 2742586 | |
| Interbus-Inline-Terminal with 16 inputs | | 1 |
| IB IL 24 DI 16 | Order No. 2726230 | |
| Interbus-Inline-Terminal with 16 outputs | | 1 |
| IB IL 24 DO 16 | Order No. 2726272 | |
| Interbus connectors for inputs | | 10 |
| IB IL SCN-12-ICP | Order No. 2727611 | |
| Interbus connectors for outputs | | 10 |
| IB IL SCN-12-OCP | Order No. 2727624 | |

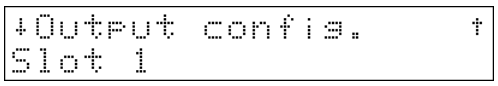
**Connection of Interbus-Bus-Terminal to PR 1713/13**



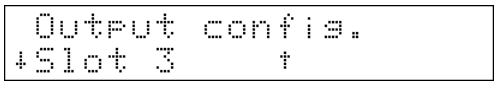
### 4.2.5. Analog Input/Output configuration

The analog input/output or the analog output option can be installed in slot 1, 2 or 3, for installation please refer to the Installation Manual. After installation of the card a [Cold]-start has to be performed!

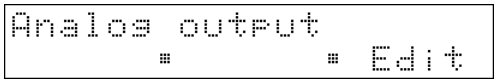
Select with ↓ or ↑ [Output config.], confirm with OK.




Select with ↓ or ↑ [Slot 3], confirm with OK




Analog output card is installed in slot 3, select with ○ [Edit]




Then the following settings can be done for the analog output:

| **[Analog value]** | description |
|---|---|
| [Gross] | output of gross |
| [Net/Gross] | output of net, if not tared: output of gross |
| [Net/0 mA] | output of net, if not tared: output of 0 mA |
| [Net/4 mA] | output of net, if not tared: output of 4 mA |
| [Net/20mA] | output of net, if not tared: output of 20 mA |
| [A1 BMode] | output of A1 setpoint in recipe line |

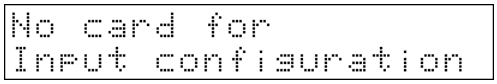
| **[Analog range]** | description |
|---|---|
| [4..20mA] | 0 to FSD is output as 4 to 20 mA |
| [0..20mA] | 0 to FSD is output as 0 to 20 mA |

| **[ADU error]** | description |
|---|---|
| [0mA] | If ADU in error state: set output to 0 mA |
| [4mA] | If ADU in error state: set output to 4 mA |
| [20mA] | If ADU in error state: set output to 20 mA |
| [Hold] | If ADU in error state: output keeps last value |

| **[Below zero]** | description |
|---|---|
| [0mA] | If weight below zero: set output to 0 mA |
| [4mA] | If weight below zero: set output to 4 mA |
| [20mA] | If weight below zero: set output to 20 mA |
| [Hold] | If weight below zero: output keeps last value |

| **[Above FSD]** | description |
|---|---|
| [0mA] | If weight above FSD: set output to 0 mA |
| [4mA] | If weight above FSD: set output to 4 mA |
| [20mA] | If weight above FSD: set output to 20 mA |
| [Hold] | If weight above FSD: output keeps last value |

The analog cards have no input configuration. If an analog input/output card is installed in e.g. slot 3 and [Input config.] is selected for slot 3 the following message appears:



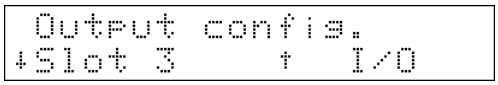

The analog input channels are configured only by DIP switches S201 and S202, see Installation Manual.

### 4.2.6. BCD Output configuration

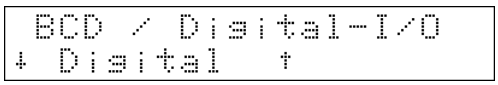
Weight values in BCD coded or individual digital output functions can be assigned to the BCD-option over function addresses.

Select with ↓ or ↑ [Output config.], confirm with OK.


Select with ↓ or ↑ [Slot 3], confirm with OK




Select with ↓ or ↑. [Digital] is used for 24 digital outputs (e.g. component signals). [BCD] is used if weight values in 5 decades plus status signals shall be output.



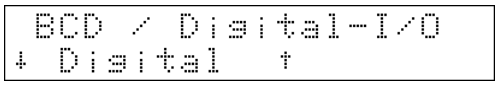

If [BCD] has been selected:

| **[BCD]** | description |
|---|---|
| [Gross] | 5 decades gross weight |
| [Net] | 5 decades net weight |
| [Tare] | 5 decades tare weight |
| [Follow displ] | 5 decades current weight display |

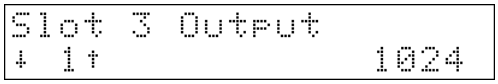
In the 6th decade the four bits are used as follows:

| | |
|---|---|
| Bit 21 | sign, minus=1 |
| Bit 22 | standstill |
| Bit 23 | data valid |
| Bit 24 | tare active |

Select with ↓ or ↑. [digital] for 24 digital outputs (e.g. component signals), confirm with OK.




Enter SPM output addresses for channel 1 ... 24.

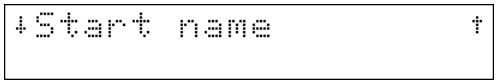



For further information please refer to the Installation Manual

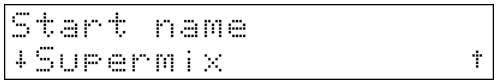
### 4.2.7. Start configuration

All parameters (Start-name, -value and -cycle number) entered in the start configuration will not be asked during manual start anymore, see chapter 8.1. The parameters will be empty or set to zero after a [Cold]-start.

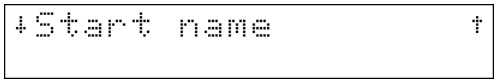
Select with ↓ or ↑ [Start name], confirm with OK.
The menu for selecting a recipe appears only, if the license PR1713/21 is entered.



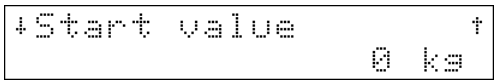

Select with ↓ or ↑ the recipe name, confirm with OK.



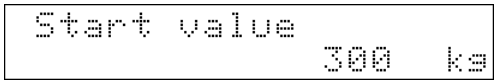

If no recipe should be in the start configuration, enter Exit



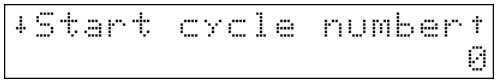

Select with ↓ or ↑ [Start value], confirm with OK.



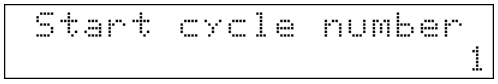

Enter numeric value for recipe setpoint, confirm with OK.




Select with ↓ or ↑ [Start cycle number], confirm with OK.

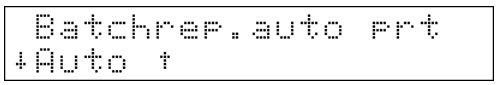



Enter numeric value for number of cycles OK.



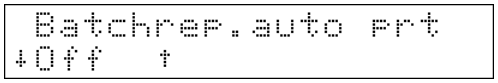

If the number of cycles is set unequal to zero, this parameter will not be asked during start and the number of cycles will be performed.

Select with ↓ or ↑ [Batch rep. auto prt]. Batch reports are printed with [Auto]. Requirement:
[Setup]-[Software Parameter]-[Report to] has to be set to [application].

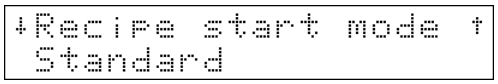



Reports which have not been printed or have not been taken by the communication (e.g. PR 8400) are waiting in a queue. The maximum number of reports depends on the available memory. The last batch report can always be selected for printing.

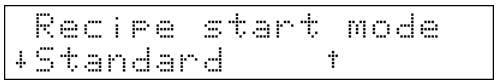
If [Off] is selected, no report is printed automatically, the last report can be printed with [LBatch].



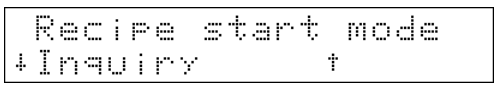

It can be configured, whether a recipe is started directly or a further menu shall appear:




If [Standard] is selected with OK, a start is done without confirmation

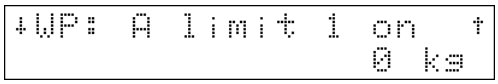



If [Inquiry] is selected with OK, a further menu appears during start dialogue.

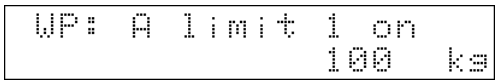


### 4.2.8. Limit switches

Select with ↓ or ↑ [WP: A limit on].



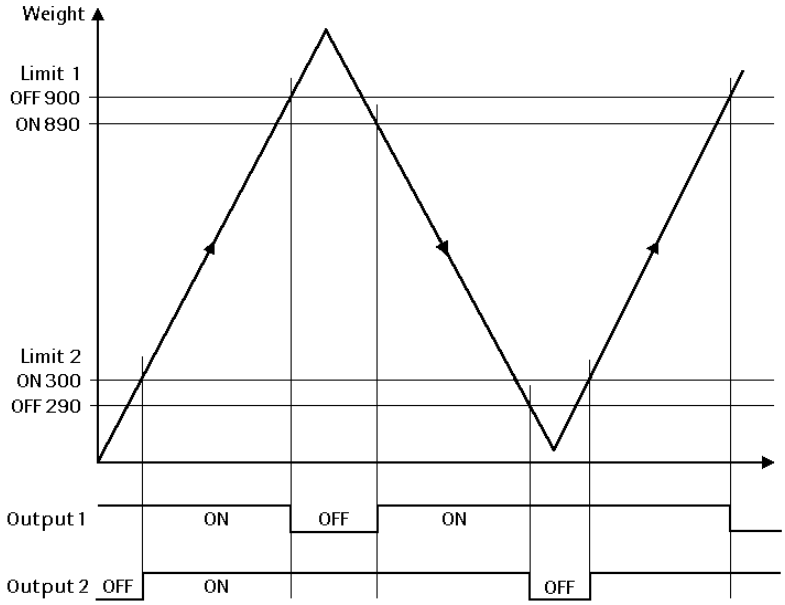

Select with OK, enter numeric value for the limit 1 on .



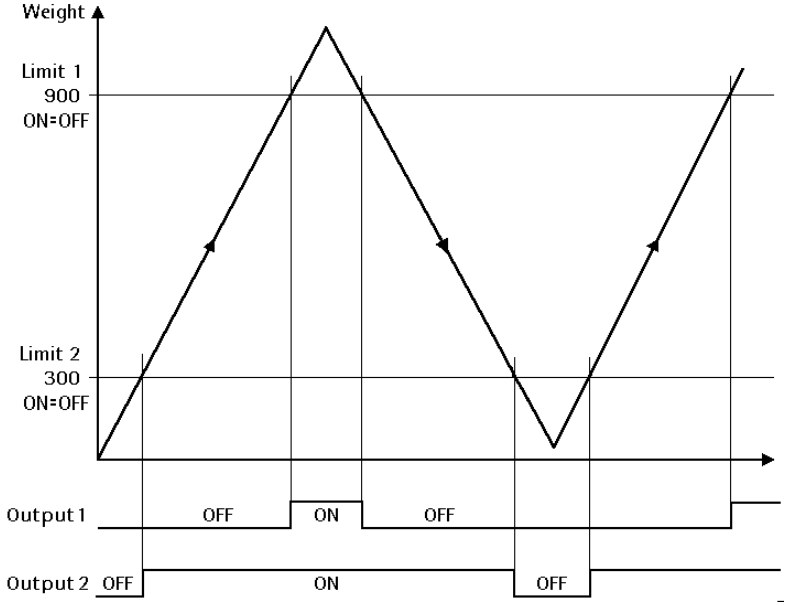

In the same way the limit values for limit 1 off, limit 2 on and limit 2 off have to be defined.

For output addressing of limit 1 and limit 2 refer to chapter 10 .

**Example:**
The output signal of limit switch 1 shall switch OFF above 900 kg, limit switch 2 shall switch OFF below 290 kg, both limit switches have a hysteresis of 10 kg. In the case of power down (both limit switches OFF) the switches indicate underfilling and overfilling at the same time.



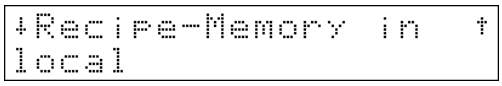

If the limit values for ON and OFF are equal the limit switch switches on, if the weight increases over the value and switches off, if the weight decreases below the value.



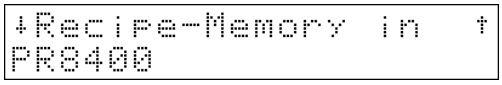
### 4.2.9. Recipe start from Front panel

There are two possibilities for a recipe start from the front panel:
1. "Batch Controller": All component- and recipe data are stored in the Batch Controller.
2. "PR8400": All component- and recipe data are stored in the connected PC and will be managed by the PC-program PR8400. With the begin of the start procedure a list of all recipe names is loaded from the PR8400 into the batcher. From this list, the operator may choose a recipe and send a start request to the PR8400. Then the PR8400 starts the recipe as if the operation had been done on the PC.
To start a recipe, the PC-program PR8400 must be running.

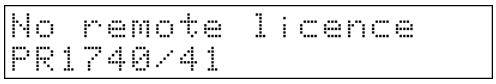
Select with ↓ or ↑ [Recipe-Memory in].




Select with OK, "Batch Controller" or "PR8400".




If " PR8400" is selected and the license PR1740/41 for remote start is not entered, a message is displayed:




### 4.2.10. Start with order number

If the parameter "Recipe-Memory in" is configured to "PR8400", it could be selected if a order number must be entered during the start procedure.

Select with ↓ or ↑ [Start with OrderNr].


Select with OK, "Yes" or "No".


### 4.2.11. Start with customer number

If the parameter "Recipe-Memory in" is configured to "PR8400", it could be selected if a customer number must be entered during the start procedure.

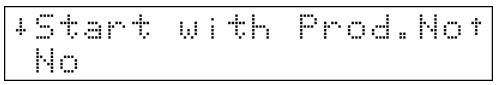
Select with ↓ or ↑ [Start with Cust.No].


Select with OK, "Yes" or "No".

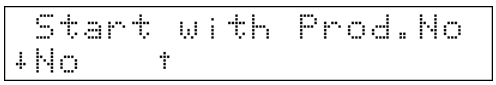

### 4.2.12. Start with production number

If the parameter "Recipe-Memory in" is configured to "PR8400", it could be selected if a production number must be entered during the start procedure.

Select with ↓ or ↑ [Start with Prod.No].




Select with OK, "Yes" or "No".



### 4.2.13. Factory settings

Parameter settings on delivery or after [Erase].

| Parameter | Value |
|---|---|
| Configuration of inputs and outputs | See below |
| Start name | |
| Start value | 0 kg |
| Start cycle number | 0 |
| Batchrep.auto prt | Off |
| Recipe start mode | Standard |
| WP: A limit 1 on | 0 kg |
| WP: A limit 1 off | 0 kg |
| WP: A limit 2 on | 0 kg |
| WP: A limit 2 off | 0 kg |
| Recipe-Memory in | Batch Controller |
| Start with order number | No |
| Start with customer number | No |
| Start with production number | No |

#### 4.2.13.1. Default settings for digital input/output cards for BATCH-X4

This allocation is valid for the delivery state for BATCH-X4 or after [Erase]:

| Eingangsbeschreibung | SPM-Adr. | Steckplatz | Channel | Pin |
|---|---|---|---|---|
| WP-A start recipe, last recipe start. Restart | 1312 | **Slot 1** | 1 | 14-32 |
| WP-A stop | 1313 | PR 5510/12 | 2 | 15-33 |
| WP-A restart | 1314 | | 3 | 16-34 |
| WP-A abort | 1315 | | 4 | 17-35 |
| WP-A quit manual component D1, D2 | 1317 | | 5 | 18-36 |
| | | | 6 | 19-37 |

| Ausgangsbeschreibung | SPM-Adr. | Steckplatz | Channel | Pin |
|---|---|---|---|---|
| WP-A coarse | 1280 | **Slot 1** | 1 | 2-20 |
| WP-A fine signal | 1281 | PR 5510/12 | 2 | 3-21 |
| WP-A discharge | 1282 | | 3 | 4-22 |
| WP-A stopped | 1283 | | 4 | 5-23 |
| WP-A recipe active | 1284 | | 5 | 6-24 |
| WP-A tolerance alarm | 1285 | | 6 | 7-25 |
| | | | 7 | 8-26 |
| | | | 8 | 9-27 |
| | | | 9 | 10-28 |
| | | | 10 | 11-29 |
| | | | 11 | 12-30 |
| | | | 12 | 13-31 |

### 4.2.13.2. Default settings for digital input/output cards for BATCH-X5 and BATCH-X6

This allocation is valid for the delivery state for BATCH-X5 and BATCH-X6 or after [Erase]:

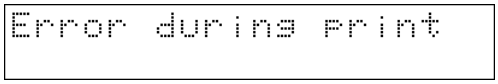
| Input description | SPM address | Slot | Channel | Terminal |
|---|---|---|---|---|
| WP-A start recipe, last recipe start. Restart | 1312 | **Slot 1** | 1 | B1-B7 |
| WP-A stop | 1313 | PR 1713/17 | 2 | B2-B7 |
| WP-A restart | 1314 | | 3 | B3-B7 |
| WP-A abort | 1315 | | 4 | B4-B7 |
| WP-A quit manual component D1, D2 | 1317 | | 5 | B5-B7 |
| | | | 6 | B6-B7 |
| | | **Slot 2** | 1 | B1-B7 |
| | | PR 1713/17 | 2 | B2-B7 |
| | | | 3 | B3-B7 |
| | | | 4 | B4-B7 |
| | | | 5 | B5-B7 |
| | | | 6 | B6-B7 |

| Output description | SPM address | Slot | Channel | Terminal |
|---|---|---|---|---|
| WP-A coarse | 1280 | **Slot 1** | 1 | A1-B8 |
| WP-A fine signal | 1281 | PR 1713/17 | 2 | A2-B8 |
| WP-A discharge | 1282 | | 3 | A3-B8 |
| WP-A stopped | 1283 | | 4 | A4-B8 |
| WP-A recipe active | 1284 | | 5 | A5-B8 |
| WP-A tolerance alarm | 1285 | | 6 | A6-B8 |
| | | | 7 | A7-B8 |
| | | | 8 | A8-B8 |
| | | **Slot 2** | 1 | A1-B8 |
| | | PR 1713/17 | 2 | A2-B8 |
| | | | 3 | A3-B8 |
| | | | 4 | A4-B8 |
| | | | 5 | A5-B8 |
| | | | 6 | A6-B8 |
| | | | 7 | A7-B8 |
| | | | 8 | A8-B8 |

### 4.2.14. Print configuration data

Select with [Print]


**Error Message**



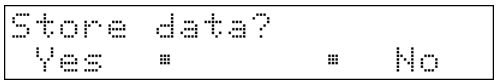

Message appears if e.g. [Setup]-[SerialPorts]-[Printer device at] is set to [none]

For print-out example and layout, see 9 .

### 4.2.15. Exit of the configuration

.
From the main menu of the configuration
Press key
When parameters were changed, the following menu is displayed:

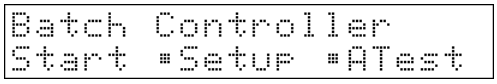
- Yes The altered parameters are stored in EAPROM
- No All changes are canceled.
- Exit Editing can be continued.



# 5. Batching

## 5.1. General

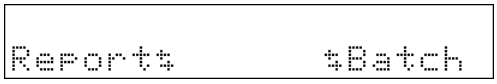
All batching functionscould be reached with "Start" from the main men.



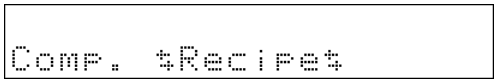

### 5.1.1. Batch Controller works with recipes (standard)

The batch license PR1713/20 or **PR1713/21** (factory setting) had been entered and for the start of a batch process with recipes has been configured:
[Setup]->[Software Parameter]->[S88.01 Interface] = off (factory setting)

After pressing [Start] the functions [Batch] and [Report] are access able. With  or  further functions can be selected.




Initially with  [Comp.] the components have to be entered and with [Recipe] the recipes have to be entered.

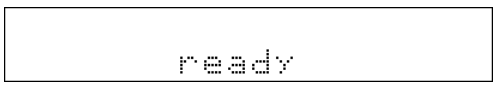



| Softkey | Function |
|---|---|
| [Report] | Selects a report |
| [Batch] | Starts a batch process |
| [Comp.] | Defining and editing components |
| [Recipe] | Defining and editing recipes |

### 5.1.2. Batch Controller works with phase interface

With the phase interface only a single batch phase will be started. The complete recipe is controlled by a host system.
The batch license PR1713/30 had been entered and for the start of a batch process with recipes has been configured:
[Setup]->[Software Parameter]->[S88.01 Interface] = on

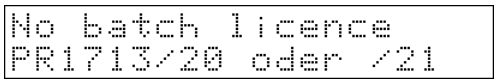
After pressing of [Start] the status monitor is displayed.
With 'Exit' the main menu could be reached.



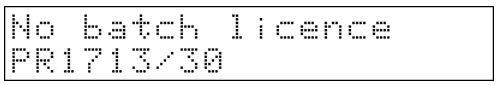

The start of batch with the phase interface could only be done via fieldbus or DDE/OPC communication. The actual status will be displayed and the operator could stop, restart or abort a batch process.

### 5.1.3. Messages on "Start"

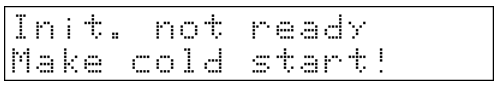
After pressing the "Start"-softkey, some messages could appear.



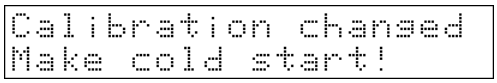

The batcher works with recipes. But no dosing license PR1713/20 or PR1713/21 is entered.
Cause:
The license PR1713/21 had been deleted.



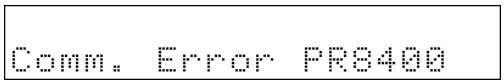

The batcher works with phases. In the Software-Parameters "S88.01 Interface = on" is configured. But no dosing license PR1713/30 is entered.




The coldstart was aborted and not all parameters are initialized. Make a coldstart.




Calibration was modified. Some parameter must be new initialized. Make a coldstart.



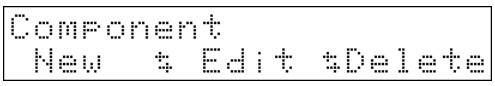

The batch start mode was configured to select recipes in the PC-program PR8400 and start them from "Batch Controller ".
The communication line to PR8400 is not active.

## 5.2. Start tree

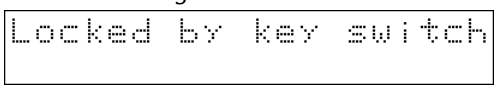
| | |
|---|---|
| Start | Start menu for Batch Controller |
| - Report | |
| - Consum | Consumed amounts |
| - Clear | Single, All |
| - Show | Single, All |
| - Print | Single, All |
| - Prodct | Produced amounts |
| - Clear | Single, All |
| - Show | Single, All |
| - Print | Single, All |
| - LBatch | Last batch report |
| - Batch | |
| - Recipe | Select recipe |
| - Recipe setpoint | Amount to be batched per cycle |
| - Number of cycles | Number of batches |
| - Comp. | |
| - New | Name, 18 alphanumeric characters., ident 10 numeric characters |
| - Edit | Select component |
| - BMode | Batch mode, B1- B8 or G1 - G6 or D1 - D8 or A1, A2 |
| - SPM in | SPM address input |
| - SPM out | SPM address output |
| - Preset | Switchover from coarse to fine, 0 - FSD |
| - OVRShoot | Overshoot, 0 - FSD |
| - Tol+ | Tolerance above setpoint, 0 - FSD |
| - Tol- | Tolerance below setpoint, 0 - FSD |
| - Minflow | Rate per minute for coarse (12,5% at fine), 0=off |
| - Calmtime | Calming time (in sec.) 0-999 |
| - RST Mode | Restart mode, 0 - 4 |
| - Delete | Delete component, Single or All |
| - Print | Print component, Single or All |
| - Recipe | |
| - New | Name, 18 alphanumeric characters., ident 10 numeric characters |
| - Edit | Select recipe, select component |
| Line setpoint | Setpoint for selected component |
| Total mode | Totalizing, 1=on or 0=off |
| Calculation mode | Setpoint scaling, 1=on or 0=off |
| Append new line? | Add further component, Yes or No |
| - Delete | Delete recipe, Single or All |
| - Print | Print recipe, Single or All |

# 6. Component handling

By selecting [Start]-[Comp.] the following menu appears:




Possible messages



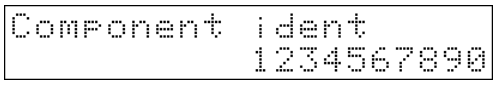

Viewing and changing of the data is locked by activating of SPM-Bit 1330.

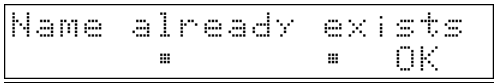
## 6.1. Entering new component

Defining a componentwith name and ident is done with **[New]:**

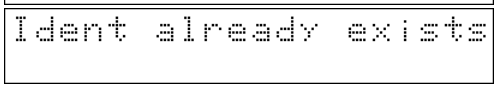
Enter alphanumerical characters (max. 18) for the component name. Confirm with [OK].


Enter numerical characters (max. 10) for the component ident. Confirm with [OK].




Error message if component name has been already defined. After pressing [OK] a new name can be entered.




Error message if component ident has been already defined. After pressing [OK] a new ident can be entered.

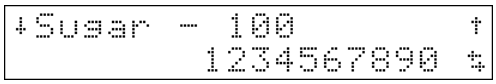
Pressing key [Exit] leaves the entry of a new component.

## 6.2. Component editing

With **[Edit]** the component parameters can be entered / edited. Before editing the component has to be defined with [New]. As exception a default component with the name [Example component] and the ident [0] is always present. If required the component 'Example component 0' can be deleted.

Default component:

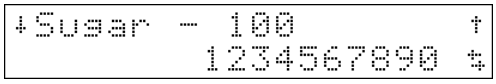

Select with ↓ or ↑ the component, confirm with OK.



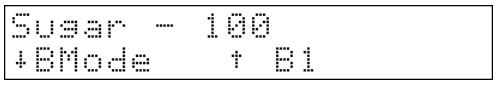

A number of specific parameters allocated to the component can be easily read and changed. The parameter set depends on the type of component (batch mode):

| **Parameters for components depending on batch mode** | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| [BMode] | Batch mode | B1 - B6 | B8 | G1 - G6 | D1, D2 | D3 – D5 | D6, D7 | D8 | A1, A2 |
| [SPM in] | SPM input address | × | × | × | × | × | | × | × |
| [SPM out] | SPM output address | × | × | × | × | × | × | × | × |
| [Preset] | Preset point | × | × | × | | | | | |
| [Waittime] | Wait time | | × | | | | | | |
| [OVRShoot] | Overshoot | × | | × | | | | | |
| [Tol+] | Tolerance above setpoint | × | | × | × | | | | |
| [Tol-] | Tolerance below setpoint | × | | × | × | | | | |
| [Minflow] | Min. flow rate | × | | × | | | | | |
| [CalmTime] | Calming time | × | | × | | | | | |
| [RST Mode] | Restart mode | × | | × | | | | | |
| [Analog+] | Max. analog value | | | | | | | | × |
| [Analog-] | Min. analog value | | | | | | | | × |

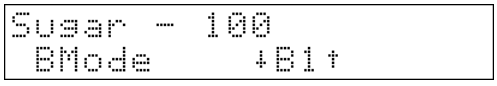
**Select the component** with ↓ or ↑ and confirm with OK.




The selected component name is displayed in the upper line. In the bottom line the parameter can be selected with ↓ or ↑.

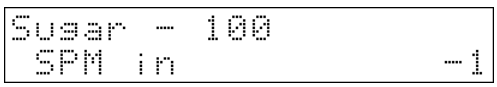



For altering the parameter OK has to be pressed. Now with ↓ or ↑ the **batch mode [Bmode]** can be selected and confirmed with OK.



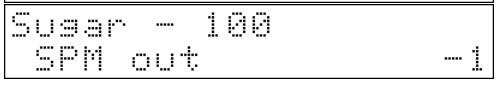

Select with ↓ or ↑ the **SPM input address [SPM in]**


After pressing OK the SPM input address can be altered by entering a numerical value (-1 = default = always enabled) and confirmed with OK, (Range 1024 – 1535, ).




Select with ↓ or ↑ the **SPM output address [SPM out]**

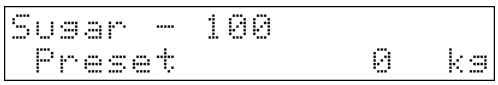

After pressing OK the SPM output address can be altered by entering a numerical value (-1 = default = no output)



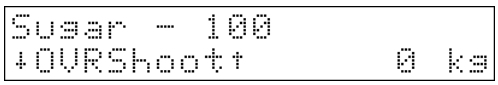
and confirmed with OK, (Range 1024 - 1279).

Select with ↓ or ↑ the **preset point [Present]**


After pressing OK the preset point can be altered by entering a numerical value (0 = default) and confirmed with OK



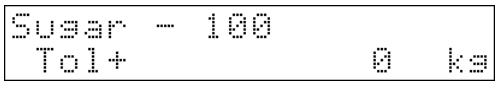

Select with ↓ or ↑ the **overshoot [OVRShoot]**




After pressing OK the overshoot can be altered by entering a numerical value (0 = default) and confirmed with OK

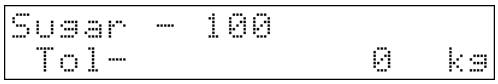

Select with ↓ or ↑ the **tolerance above** setpoint **[Tol+]**


After pressing OK the tolerance above setpoint can be altered by entering a numerical value (0 = default) and confirmed with OK



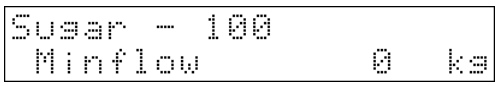

Select with ↓ or ↑ the **tolerance below** setpoint **[Tol-]**


After pressing OK the tolerance below setpoint can be altered by entering a numerical value (0 = default) and confirmed with OK

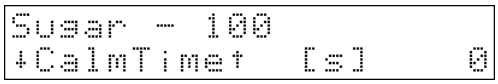



Select with ↓ or ↑ the **minimum flow rate** per minute **[Minflow]**


After pressing OK the minimum flow rate can be altered by entering a numerical value (0 = default) and confirmed with OK




Select with ↓ or ↑ the **calming time** in sec. **[CalmTime]**




After pressing OK the calming time can be altered by entering a numerical value (0 = default) and confirmed with OK


Select with ↓ or ↑ the **restart mode [RST Mode]**.


After pressing OK the restart mode can be altered by entering a numerical value from 0 - 4 (0 = default) and confirmed with OK


The menu can be left at any point with Exit, all changes are automatically stored.

### 6.2.1. Batch Mode

Each component is treated as a process step in a recipe. Determine the process step with the batch mode during component definition, e.g. "BX" for real components and "DX" for dummy components. If a guide component "GX" is selected, the setpoints of the following components are displayed as calculated from the recipe during a production. The actual setpoints referred to the guiding value are output in the reports.
The batch modes is selected for each component individually, see chapter 6.2.

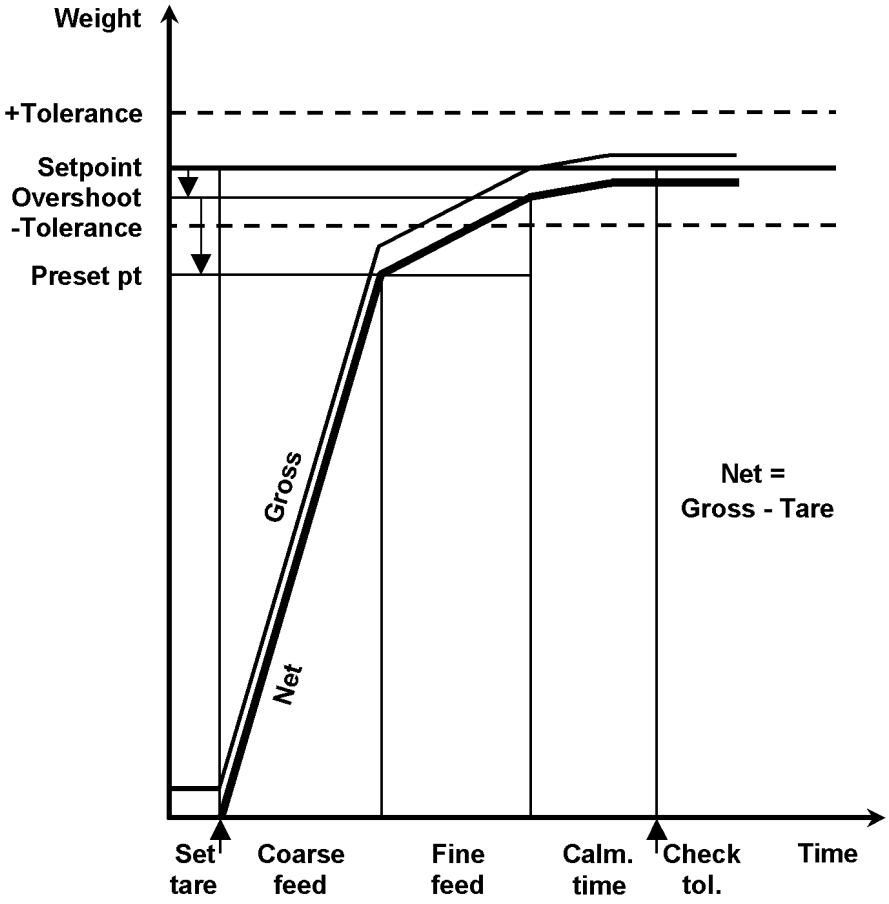
| | |
|---|---|
| Batch able components | B1-B6, B8, G1-G6 |
| Manual components | D1, D2 |
| Dummy components | D3-D8 |
| Analog components | A1, A2 |

### 6.2.2. Batch able components

Batch able components**:** The batch mode has to be selected to define a charge or discharge process step and controls the component, coarse, fine and discharge output signals.

### 6.2.2.1. Batch mode B1 Charge net

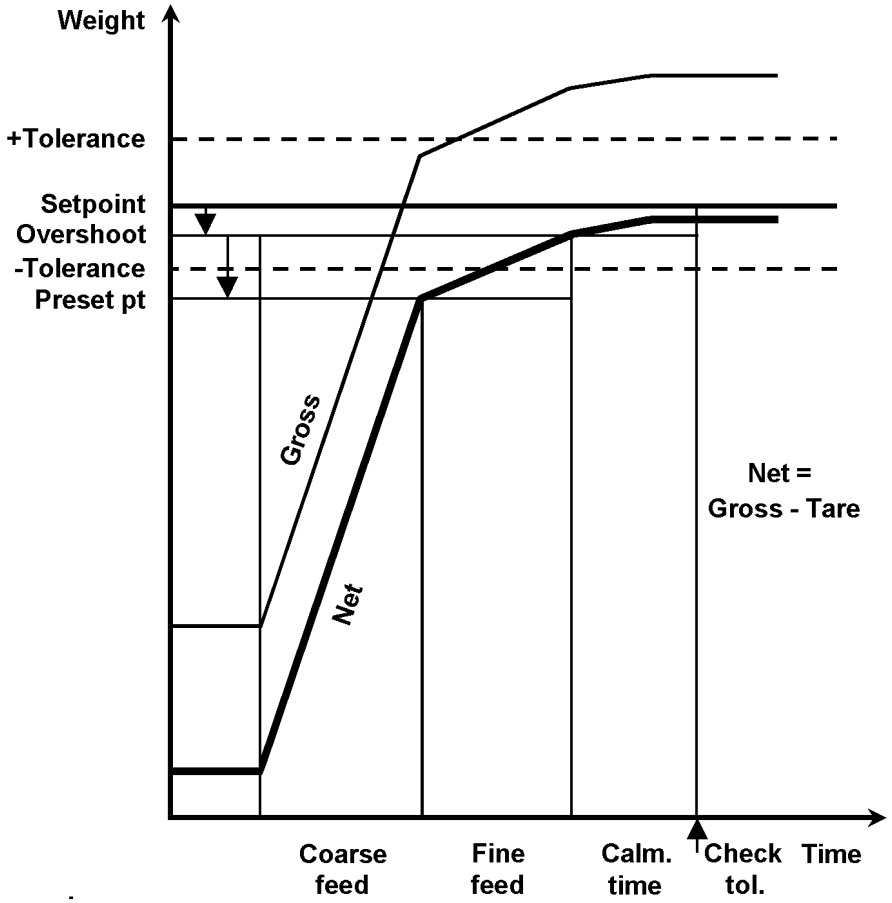
The batch mode B1 is used for charge batching applications based on net weight with the following steps:




| | |
|---|---|
| Tare: | The current gross weight is stored as tare and the net weight starts from zero. |
| Coarse: | The material is batched in coarse feed rate until the switch off level (preset point) is reached. |
| Fine: | The material is batched in fine feed rate until the switch off level (overshoot) is reached. |
| Calming time: | Delay time to get the material in the hopper settled. |
| Tolerance check: | The batched weight is checked according to the tolerance values. |

### 6.2.2.2. Batch mode B2 Charge top up

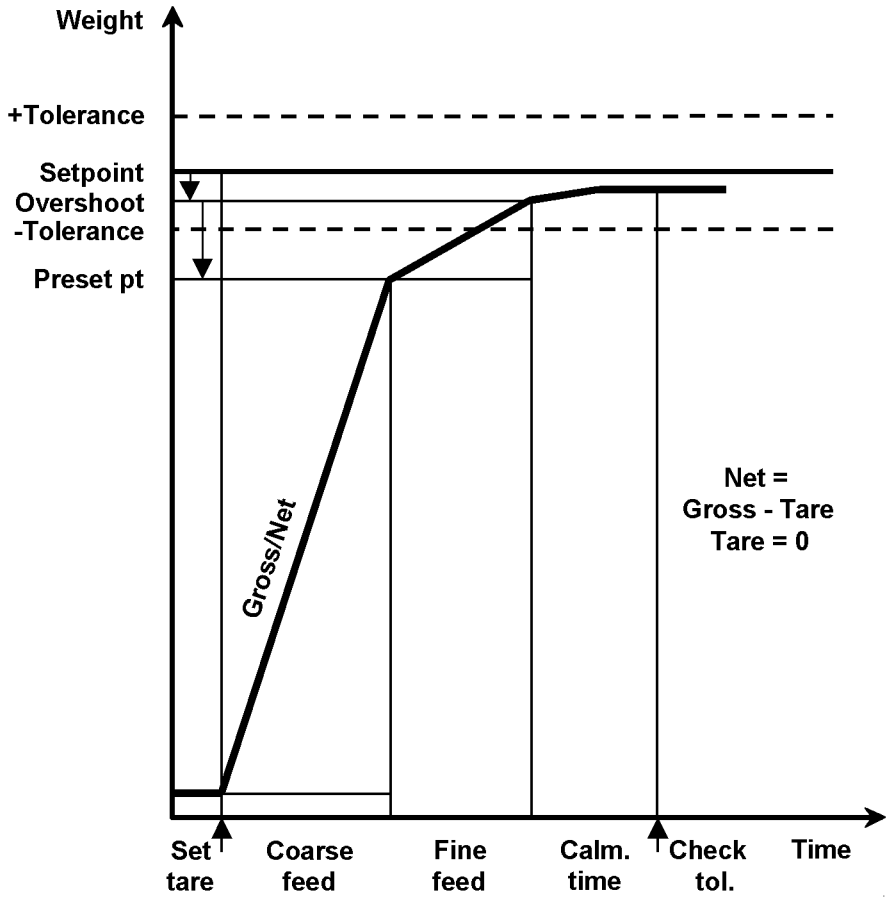
The batch mode B2 is used for charge batching applications based on net weight for top up batching processes with barrels or containers, which are typically still partly filled. It works with the following steps:




| | |
|---|---|
| Tare: | Batching is not preceeded by a tare step, the last net weight remains unchanged. The tare from the last component remains valid. |
| Coarse: | The material is batched in coarse feed rate until the switch off level (preset point) is reached. |
| Fine: | The material is batched in fine feed rate until the switch off level overshoot is reached. |
| Calming time: | Delay time to get the material in the hopper settled. |
| Tolerance check: | The batched weight is checked according to the tolerance values. |

### 6.2.2.3. Batch mode B3 Charge gross

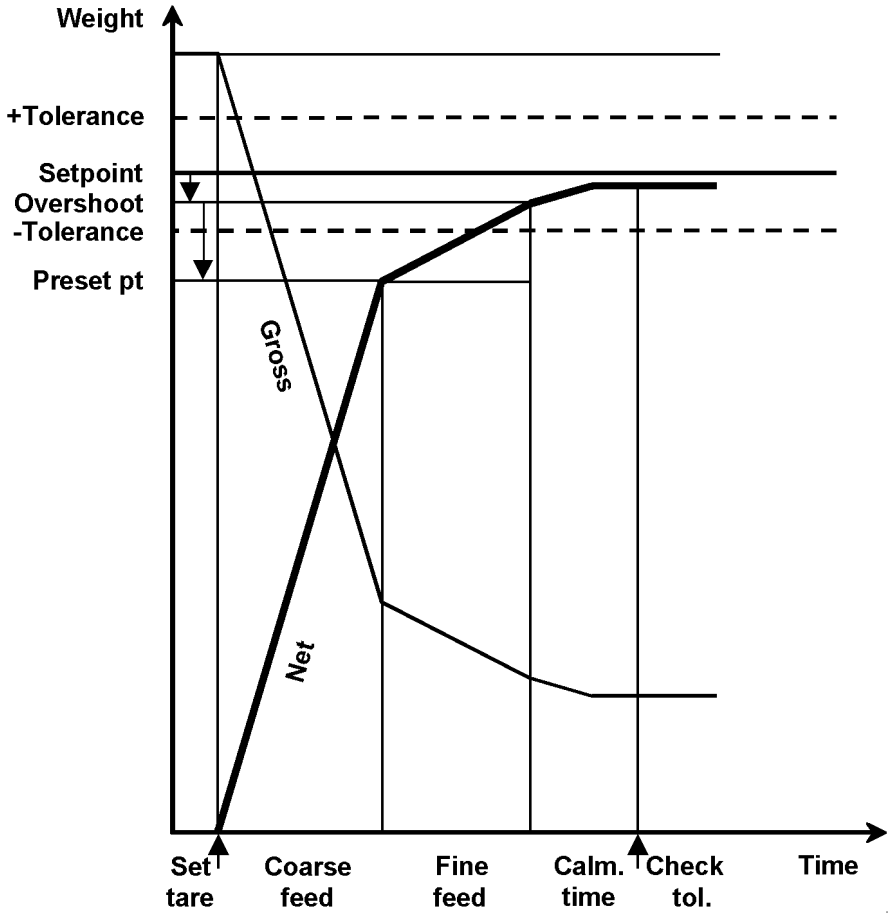
The batch mode B3 is used for charge batching applications based on gross weight with the following steps:




| | |
|---|---|
| Tare: | The tare is set to zero. Therefore gross and net weight are the same. The gross weight continues with the previous gross weight. |
| Coarse: | The material is batched in coarse feed rate until the switch off level preset point is reached. |
| Fine: | The material is batched in fine feed rate until the switch off level overshoot is reached. |
| Calming time: | Delay time to get the material in the hopper settled. |
| Tolerance check: | The batched weight is checked according to the tolerance values. |

### 6.2.2.4. Batch mode B4 Discharge net

The batch mode B4 is used for discharge batching applications based on net weight with the following steps:



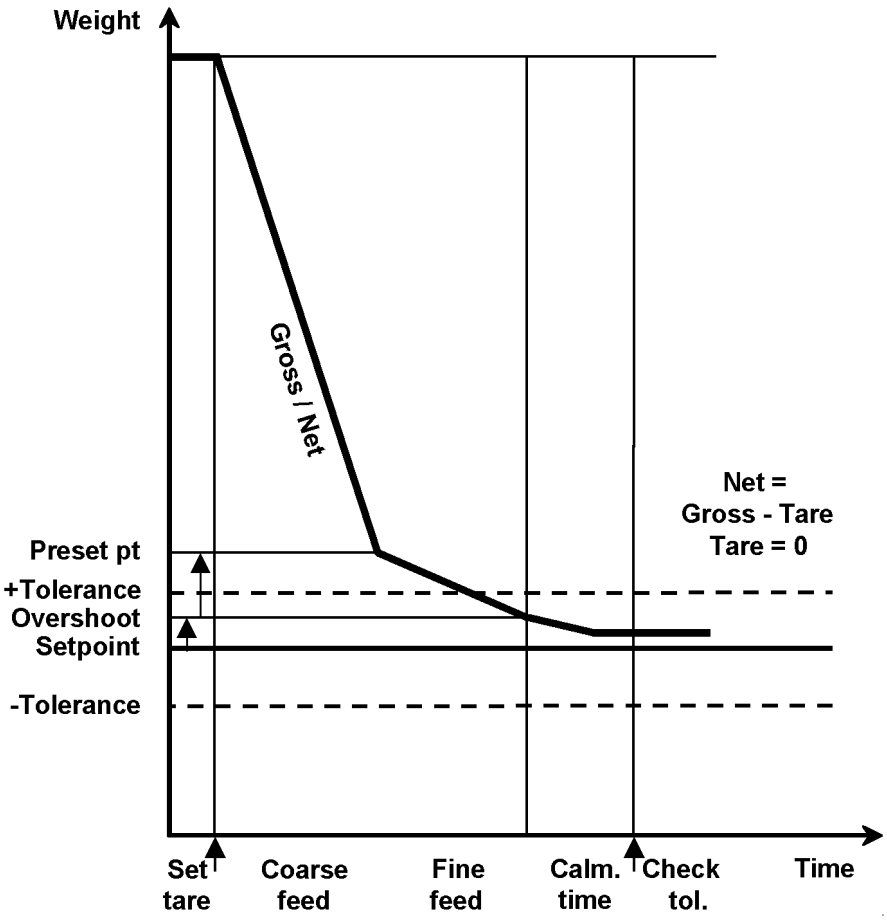

| | |
|---|---|
| Tare: | The current gross weight is stored as tare and the net weight starts from zero. |
| Coarse: | The material is batched in coarse feed rate until the switch off level preset point is reached. |
| Fine: | The material is batched in fine feed rate until the switch off level overshoot is reached. |
| Calming time: | Delay time to get the material in the hopper settled. |
| Tolerance check: | The batched weight is checked according to the tolerance values. |

### 6.2.2.5. Batch mode B5 Discharge top down

Batch mode **B5** is used for discharge batching according B2. Batching is not preceeded by taring, i.e. the last net weight remains unchanged. The recipe setpoint for this component is the net weight.

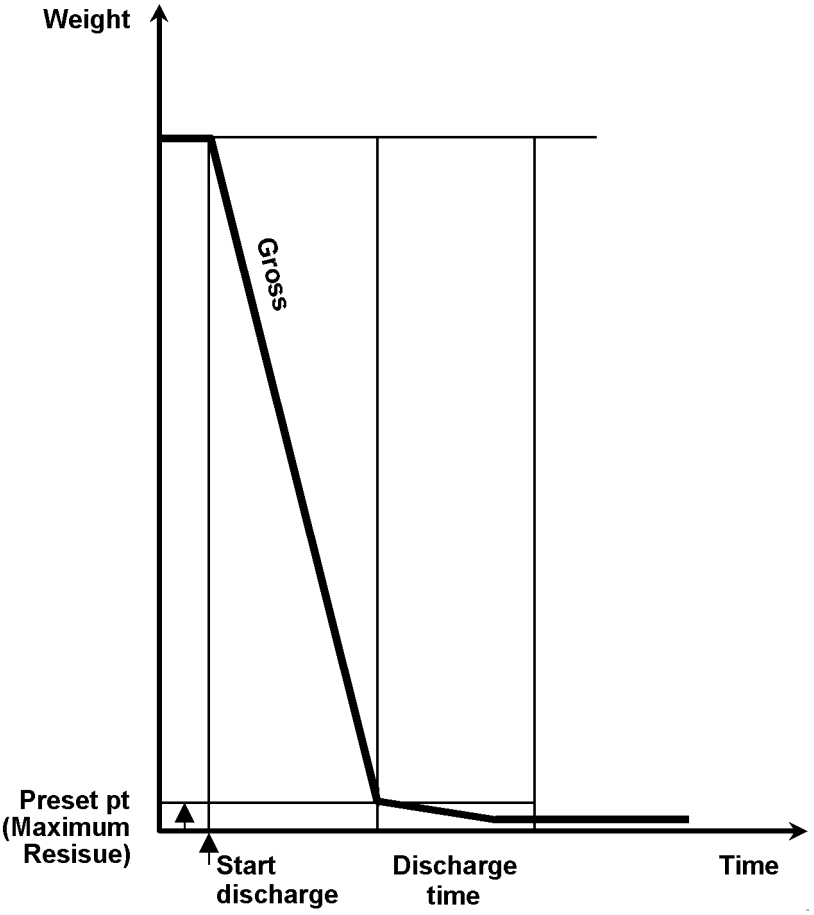
### 6.2.2.6. Batch mode B6 Discharge gross

Batch mode **B6** is used for discharge batching to an absolute value. Before dosing, the tare is set to zero. The net weight is equal to the gross weight. The input value for this component is the gross weight.



### 6.2.2.7. Batch mode B8 Total discharge

The batch mode B8 is used for total discharge of a hopper, vessel or container based on the gross weight. The discharge process continues until the specified maximum residue is reached. Then the valve is kept open for a specified time and the process is finished.




Discharge: The material is batched in discharge feed rate until the gross weight is below the maximum residue (preset point). This parameter is stored under [Preset].

Discharge time: Afterwards the valve is kept open for some seconds to get further material out. This parameter is stored under [Waittime].

### 6.2.3. Guide components

If a guide component **GX** was selected, the setpoints of the following components are displayed as calculated from the recipe during a production. Thus the prescription quantitative proportion remains unchanged. The actual setpoints referred to the guiding value are output in the reports.
The GX componentcan batch in modes G1 - G6. The modes 1-6 correspond to the modes B1-B6.
The GX component is used, if it is not possible to accurately batch a component, so that the setpoints of other components have to be recalculated.
Example: The GX component has got a setpoint of 1000kg, the batched weight is 1100kg, then the setpoints of all following components with a weight in the setpoint (manual components too) are multiplied by 1100/1000 to reach the quantity relation as described in the recipe.
For components which have to be recalculated, the calculation mode has to be set to [1], see chapter 7.2.5.

### 6.2.4. Manual components

The manual component **D1** is batched manually by a user. It is acknowledged by  [Acknwl] or an input signal**. In both cases the SPM_in for the D1 component has to be set to 1808, see chapter 10.4.** Output SPM_out requests the user to start filling in material. Batching is preceded by taring, i.e. the net weight is zero when starting the batch. The input value for this component is the net**.**

The manual component **D2** behaves almost exactly like D1. It is acknowledged by  [Acknwl] or an input signal**. In both cases the SPM_in for the D2 component has to be set to 1808, see chapter 10.4.** The component is used for pre-weighed manual additions which are too small for being measured exactly by this weighing point. Therefore, the setpoint instead of the actual weight value is recorded in the batch report.

### 6.2.5. Dummy components

**Dummy components** are non-batch able recipe lines, to control defined actions e.g. timer, switch on/off, temperature control, motors. The SPM addresses for input and output are used.

**D3** The **timer** component waits until the specified time has elapsed. The setpoint (time) is entered in seconds.

**D4** The **stop** component is used for making a pause of unpredictable duration. Waiting for SPM_in is not done! Restart by the control signal 'restart'

**D5** The SPM **waiting** component sets output address SPM_out to status TRUE and waits for status TRUE of input address SPM_in. It is acknowledged by  [Acknwl] or an input signal**. In both cases the SPM_in for the D5 component has to be set to 1810, see chapter 10.4.**

**D6** The SPM **set** component sets output SPM_out to TRUE. Waiting for SPM_in is not done!

**D7** The SPM **reset** component sets output SPM_out to FALSE. Waiting for SPM_in is not done!

**D8** The SPM **acknowledge** component waits for status TRUE of input SPM_in and sets output SPM_out to FALSE. It is acknowledged by  [Acknwl] or an input signal**. In both cases the SPM_in for the D8 component has to be set to 1810, see chapter 10.4.**

### 6.2.6. Analog components

**Analog components**: Parameters Max, Min and Unit. The values are loaded into Batch Controller when using the component. The setpoint is converted into digits for the analog output, or read as actual value from the analog input. The SPM addresses are word addresses, which are assigned to the hardware in the internal routing program, see chapter 10.4.

**Output** (PR 1713/06 or PR 1713/07 required)

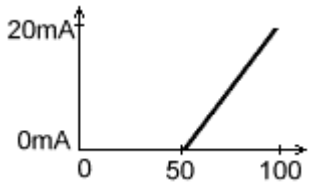
**A1** The analog value is scaled by parameters Min and Max. The analog function block sends the scaled setpoint to the given output address.

$$\text{analog\_value} = \frac{(\text{target} - \text{min}) * 20000}{\text{max} - \text{min}}$$

At the SPM-output address the output address MW100 had to be entered. The internal routing program copies the value to the analog output card.

Example: In the recipe line setpoints (target) are given between 50 and 100 and should generate an analog signal between 0mA and 20mA.

Max=100, Min=50



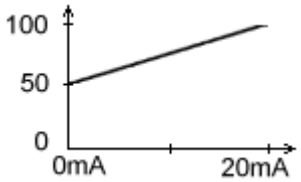

**Input** (PR 1713/07 required)

$$\text{actual\_value} = \frac{\text{analog\_input\_value}}{3000} * (\text{max} - \text{min}) + \text{min}$$

**A2** This analog function block reads an actual value from the internal routing program and returns it. This value is shown in the batch report. The values of the analog input channels 1...4 are copied to the addresses MW 96...99. One of these addresses had to be entered at the SPM-input address.

Example: An analog measured value should be read in to a value between 50 and 100.

Max=100, Min=50




Min and Max are depending of the hardware configuration of plug-in module PR 1713/06

.

| | Plug-in module | | |
|---|---|---|---|
| Min | 0 V | 0 mA | 4 mA |
| Max | 10 V | 20 mA | 20 mA |

The values from SPM_out address are transferred to an analog output card or the values from an analog input card are transferred to the SPM_in.

### 6.2.7. SPM output address

Output address function: Component handling activates this output bit. The default value of -1 must be set to the correct value corresponding to a digital output channel on the digital output card. A value -1 means, that there is no output address.

The output address is a bit address (for components 1024 to 1279) in the SPM area and is activated by component handling.
For allocation of SPM addresses see chapter 10.1 and 10.4.

### 6.2.8. SPM input address

Input address function: Component handling is activated only when this enable bit is set. The default value of -1 must be set to the correct value corresponding to a digital input channel on the digital input card. A value of -1 means, the component is always enabled.

The input address is a bit address (for enable inputs 1024 to 1279) in the SPM area, which is read by component handling.
For allocation of SPM addresses see chapter 10.1 and 10.4.

### 6.2.9. Preset Point

**Charge batching (B1-B3), Discharge batching (B4-B7):**
The preset point determines the moment at which (setpoint - preset point - overshoot) the batching cycle is switching from coarse to fine feed (closing the coarse valve).

**Discharge batching (B8):**
The preset point is the weight amount at which the hopper is considered as discharged. Additionally the valve is kept open for the duration of the discharge time. The selected time value shall ensure that the hopper is discharged totally.

### 6.2.10. Overshoot

All material, which reaches the hopper after the fine valve closing, is called overshoot. The initial value must be set to take into account the amount of material which is still on the way to the hopper and depends strongly on the feeding system.
The initial overshoot should be set to a larger value than expected, to prevent that the first cycle ends above TOL+.
Only the overshoot part flown before elapsing of the calming time is registered.

The overshoot is determined only with activated tolerance check. It is optimized for the batching process and corrected in the table, dependent of RST Mode (1-4; 0=no correction). The next batch of this component works with corrected values.

### 6.2.11. Tol+, Tol-

The tolerance is specified as a weight and can be determined independently with Tol+ for weight above setpoint and with Tol- for weight below setpoint.
Batching below Tol- is followed by post-batching, the overshoot correction for the component depends on the selected RST Mode.

Tolerance errors generate a tolerance alarm which must be acknowledged. Moreover, an exceeded setpoint tolerance causes a production stop for a process step.

No tolerance check is made with a zero in both fields. In this case, overshoot correction and post-batching are omitted. The overshoot value remains fixed, the restart mode remains without effect on batching.

### 6.2.12. Minimum Flowrate

**For monitoring the component flow:**
Enter the minimum component flow per minute. Monitoring is also done for short batching times. The value is converted internally into the measuring time. This is the min. flowrate for 'coarse' (or 12,5% thereof for 'fine' batching) otherwise, a flow warning is output after approx. 30 seconds. Depending on measuring time, resolution and total to be batched, the flow warning will also be output earlier.

The component flow can vary during normal operation, e.g. the material starts flowing slowly after opening the valve, until reaching a maximum value. With decreasing level, the flowrate is reduced again.

**For not monitoring the component flow:**
Enter zero as Flowrate.

### 6.2.13. Calming time

In the course of the weighing process a construction can be shifted into oscillations by different material streams. To avoid external forces during the weighing determination process, enter the time in seconds which shall pass before the tolerence check begins, so that the oscillations can be fade.

This time can depend on the
- Component consistency (solid, lumpy, liquid) or
- Feeding system (screw, vibrator, valve) or
- Mechanical construction of the batching installation.

The calming time has to ensure that the tolerance check is done on a stable weight value.

### 6.2.14. Restart mode (RST Mode) .

.

If the batching cycle is stopped by a tolerance alarm, or if a correction is possible with the weight below the setpoint, the defined restart modedetermines the behaviour. A correction is possible with the batched weight below fine switch-off point after the calming timeAs a prerequisite, the tolerance check must always be activated

**Example: RST Mode 4**

After the calming time, the measured weight is below Tol-. A new overshoot value is calculated. If the difference to the setpointis higher than the overshoot value, a correction can be started. After waiting again until the calming time has elapsed, the weight is within the tolerance band, but still below the setpoint. The overshoot value is corrected again. Further correction is not possible. With a tolerance alarmbatching stops and the user has the opportunity for process intervention. In this case, the process can be continued (Con) or aborted (Abr).

Calculation of modified overshoot values:

| | | | | |
|---|---|---|---|---|
| new_overshoot | = | old_overshoot | - | ( Setpoint - actual_weight )/2 |
| corrected_overshoot | = | old_overshoot | - | ( Setpoint - actual_weight ) |

Selecting the RST Mode:

| Characteristics | RST Mode |
|---|---|
| No post-batching, no optimization | 0 |
| Post-batching, no optimization | 1 |
| No post-batching, with optimization | 2 |
| Post-batching first, before optimization | 3 |
| Optimization first, before post-batching | 4 |

**Abbreviations for RST Mode diagrams**

weight below Tol-

weight below setpoint

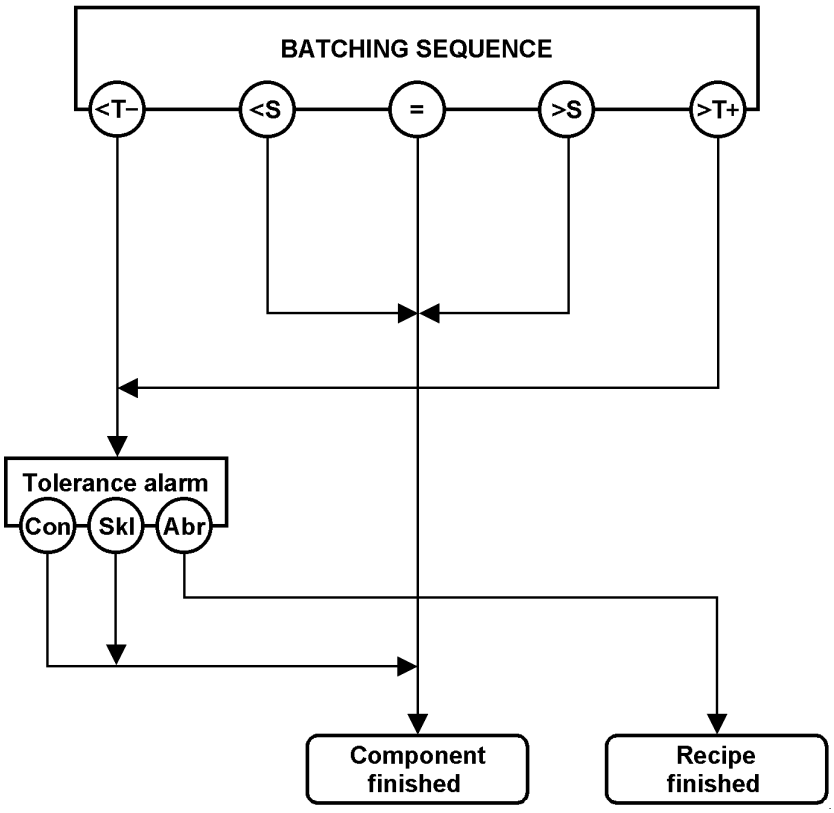
setpoint reached exactly

weight above setpoint

weight above Tol+

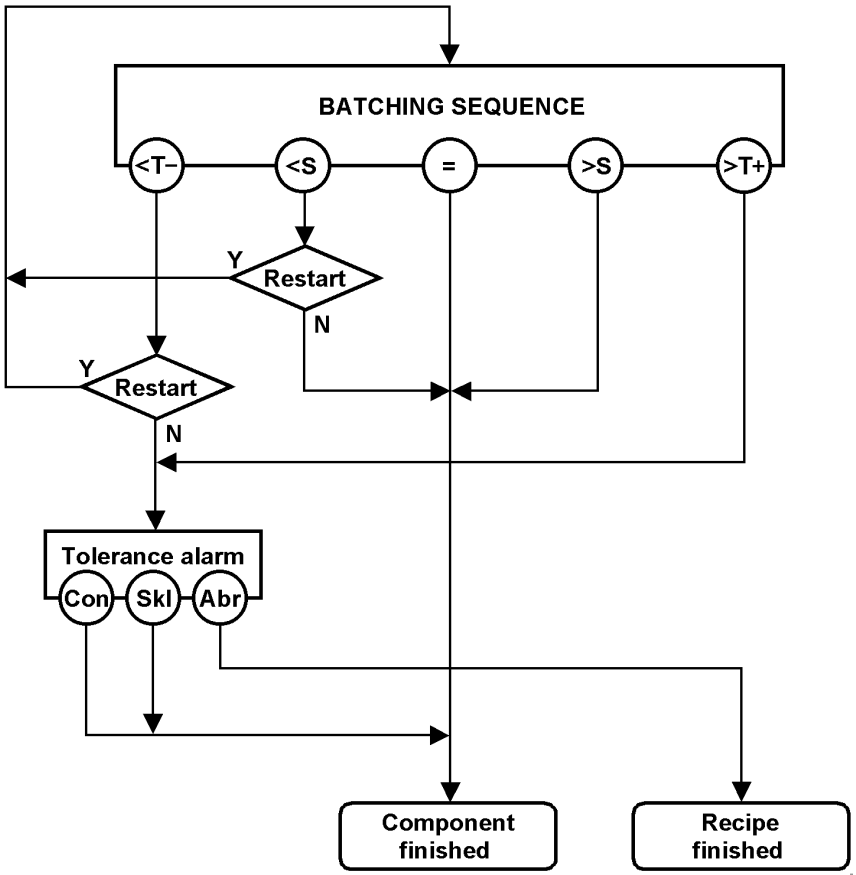
| | |
|---|---|
| Con | continue: go on (correct overshoot, if RST Mode 2-4) |
| Skl | skip line: component finished |
| Abr | abort recipe: recipe finished |
| OVS | Overshoot |

## RST Mode 0



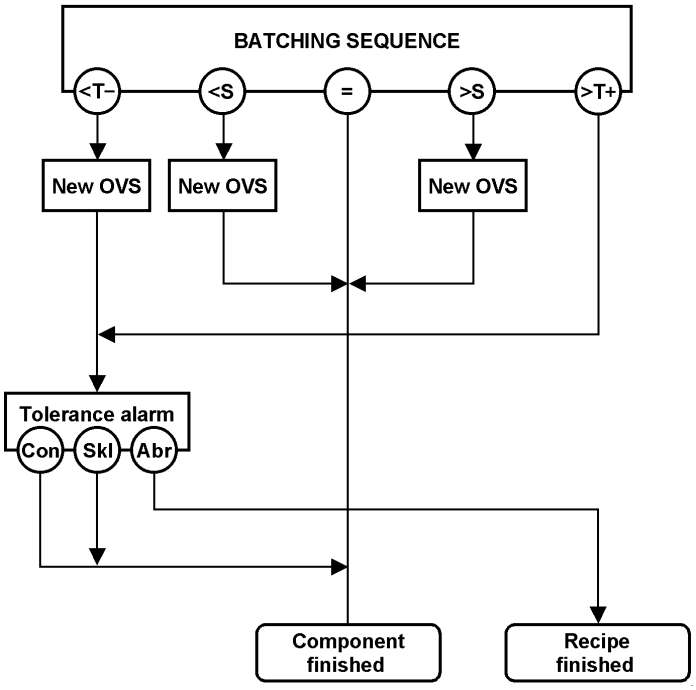

No overshoot correction is done

## RST Mode 1



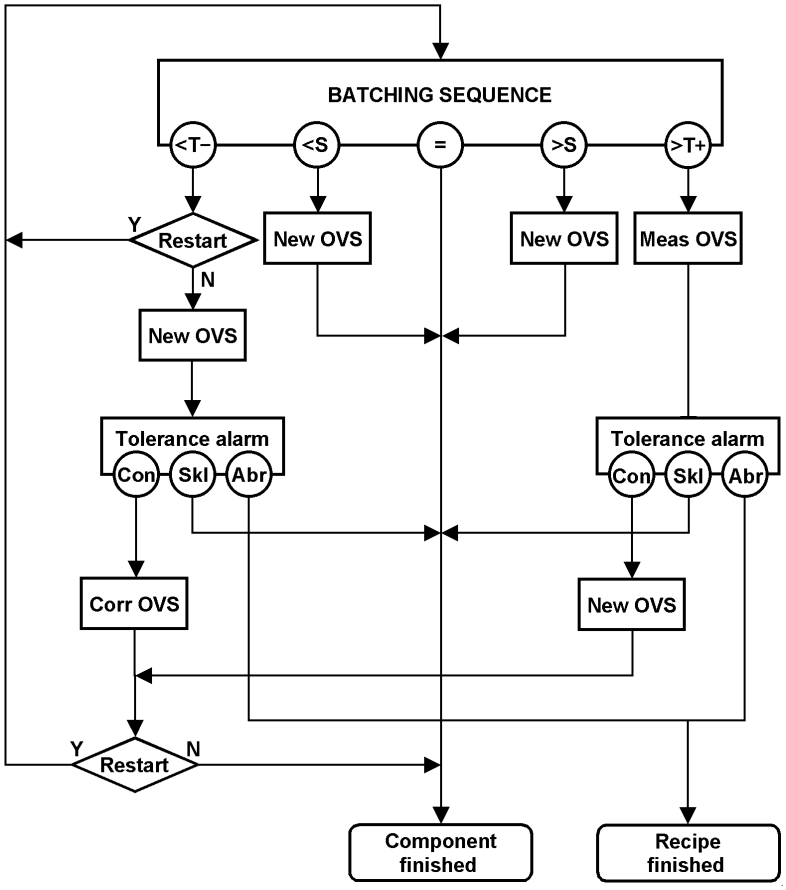

Check only if correction is possible

**RST Mode 2**

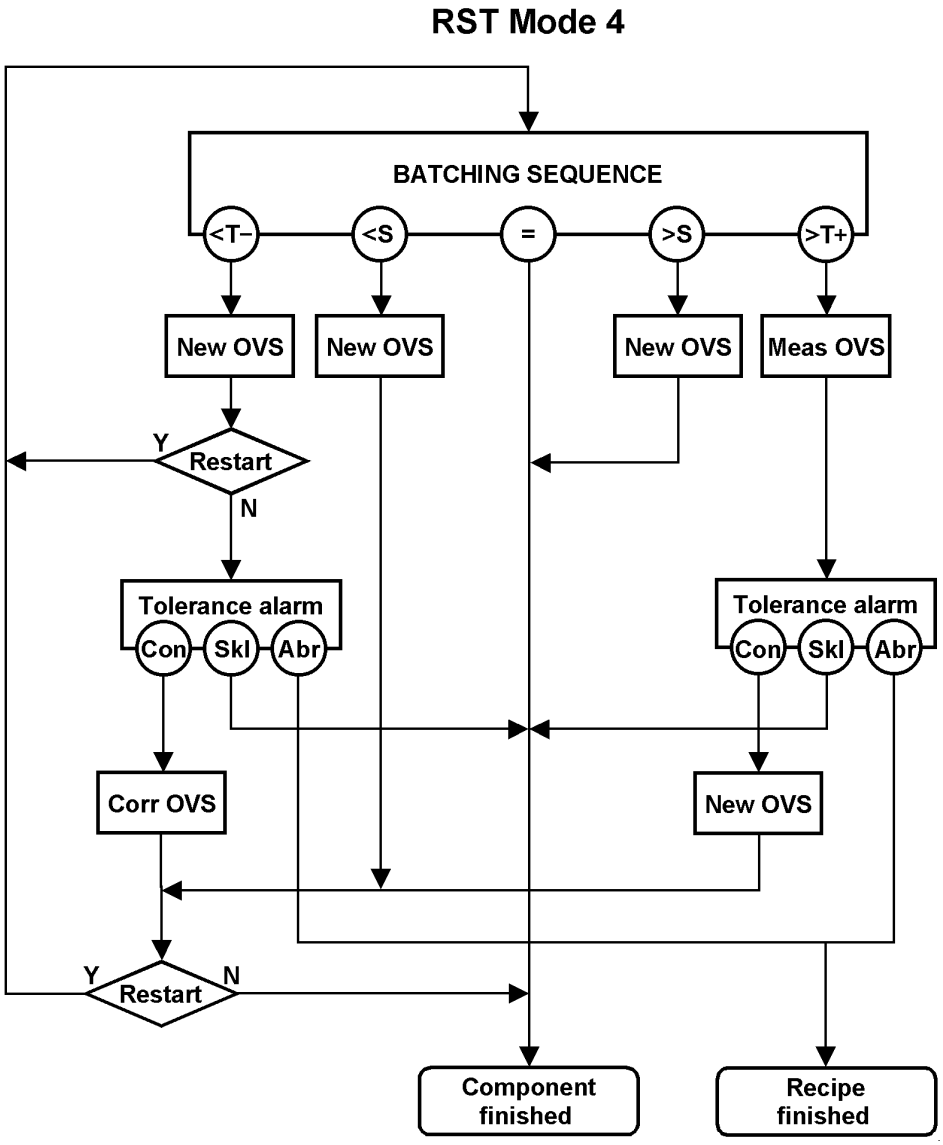



Calculate only a new overshoot

**RST Mode 3**




Test for correction and calculate new overshoot




Calculate new overshoot and test for correction

Note:
If the tolerance is exceeded the actual weight is measured before the toleranzalarm message. On a restart this weight is used for calculation the new overshoot value. The operator could remove the exceeding material and overshoot calculation is done correctly.

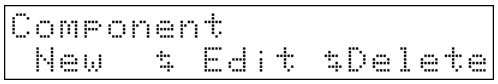
## 6.3. Deleting components

Deleting individual or all componentsis done with function [Start]-[Comp.]-[Delete].

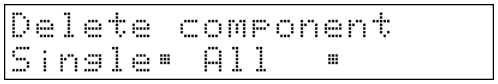
### 6.3.1. Deleting individual components

If the instrument has been used for a longer period and the components have been changed frequently, it can be the case that several components are not used anymore.

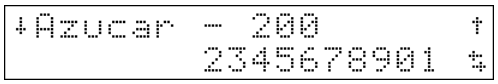
For component deleting press [Delete]

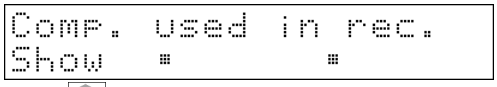



For deleting a specific component select with [Single]



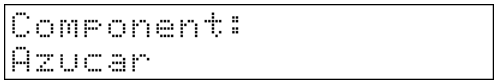

Select with [↓] or [↑] the component to be deleted, confirm with [OK]. The component is deleted without acknowledgement.




Error message if the component is used in a recipe.

With [Show] the component name of the component to be deleted is shown.

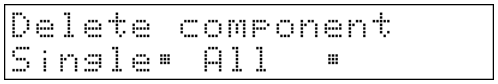


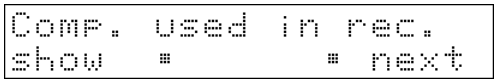

After pressing [OK] the name of the first recipe found using the component to be deleted is shown.


### 6.3.2. Deleting all components

Shall all components be delete you can easily remove all components by using the function [Start]-[Comp.]-[Delete]-[All]. The components which are still used in a recipe are shown (if required), all unused components are deleted:

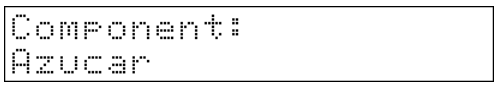
For deleting all components select with [All]. All components not used in a recipe are deleted without acknowledgement.



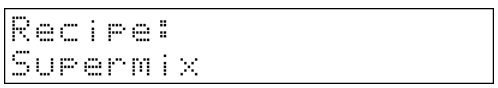



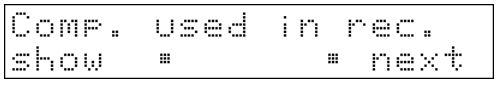

Error message if one or more components are used in several recipes.

With [Show] the component name of the first component (used in a recipe) to be deleted is shown.




After pressing [OK] the name of the first recipe found using the component to be deleted is shown.

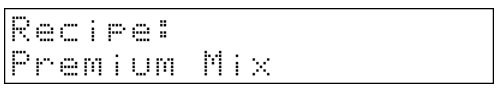



With [OK] the error message appears again.

With [next] and [show] the component name of the further component to be deleted is shown.

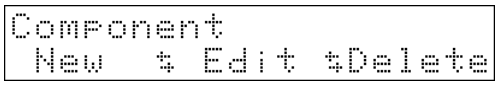

After pressing [OK] the name of the recipe found using the component to be deleted is shown.



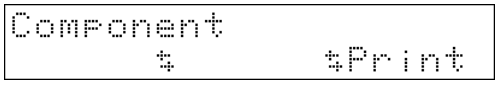
## 6.4. Printing components

Individual or all componentsare printed with function [Start]-[Comp.]-[Print]:

Select further menu items with [More].

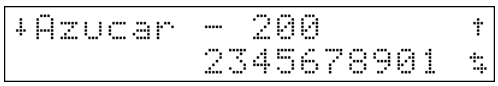



Select with [Print]



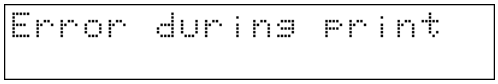

Select with [Single]


Select with [↑] or [↓] the component to be printed and press [OK].




If all components have to be printed, select with [All]


**Error Message**

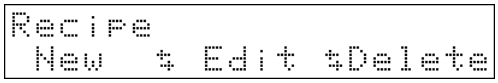



Message appears if e.g. [Setup]-[SerialPorts]-[Printer device at] is set to [none]

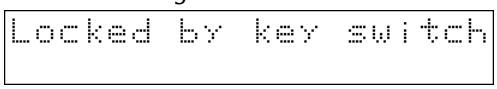
For print-out example and layout, see chapter 9 .

# 7. Recipe handling

By selecting [Start]-[Recipe] the following menu appears:




Possible messages

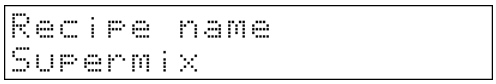



Viewing and changing of the data is locked by activating of SPM-Bit 1330.

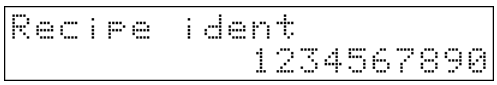
## 7.1. Entering new recipe

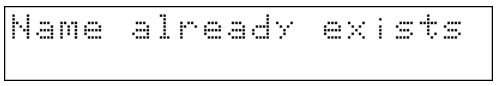
Defining a recipewith name and ident is done with [New]:
(The license PR1713/21 had to be entered.)

With [New] a new recipe can be defined: Enter alphanumerical characters (max. 18) for the recipe name. Confirm with OK.

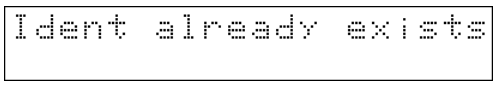



Enter numerical characters (max. 10) for the recipe ident. Confirm with OK.




Error message if recipe name has been already defined.
After pressing OK a new name can be entered.




Error message if recipe ident has been already defined.
After pressing OK a new ident can be entered.

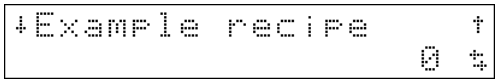
- Pressing key Exit leaves the entry of a new recipe.

## 7.2. Editing a recipe

Edit individual recipeswith [Edit]:

With [Edit] the components are allocated to recipe lines and a set of parameters per component is defined. Before editing a recipe it has to be defined with [New]. As exception a default recipe with the name [Example recipe] and the ident [0] is always present. If required the recipe 'Example recipe0' can be deleted.

Default recipe:




A recipe contains several lines. Each line holds different parameters:

Example:

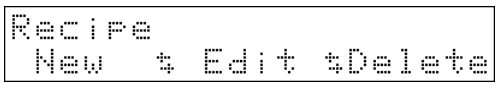
| Line | Componentename (dosing mode) | Setpoint | Total mode | Calculation mode |
|---|---|---|---|---|
| 1 | Sugar (B1) | 100kg | 1 | 1 |
| 2 | Flour (B1) | 200kg | 1 | 1 |
| 3 | Eggs (B1) | 50kg | 1 | 1 |
| 4 | Milk (B1) | 50kg | 1 | 1 |
| 5 | Mixing (D3) | 5 minutes | | |

The parameter set changes depending on the component type:

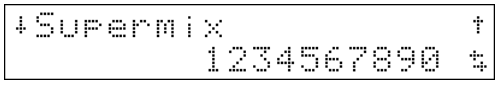
| Component line parameters depending on component type / batch mode | | | |
|---|---|---|---|
| | B1 - B6<br>G1 - G6<br>D1, D2 | A1<br>D3 | A2<br>B8<br>D4 - D8 |
| Line setpoint | ✕ | ✕ | |
| Total mode | ✕ | | |
| Calculation mode | ✕ | | |

The values of the setpoints in the recipe lines (Line setpoint) are relative. In the example above the recipe sum is 400kg. If the recipe is started with e.g. 100kg (recipe setpoint), all line setpoints are recalculated.

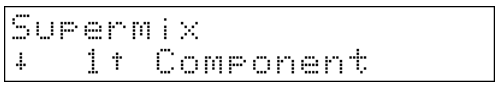
Select with [Edit]



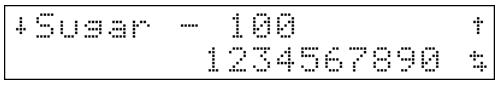

Select with or the recipe to be edited and confirm with



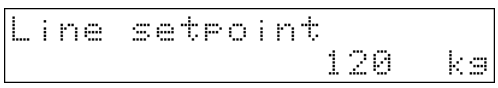

Below the recipe name the first recipe line and the component name for the first line (in this case the default component) appear.



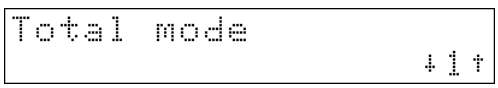

Press and select the **component** for the first line with or .



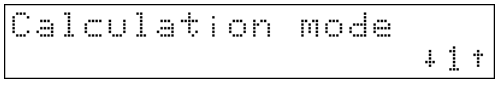

After pressing the numeric **setpoint** value for the component has to be entered and confirmed with




Select with or whether the component weight has to be added to the total :1 = yes = default, 0 = no. Confirm with . For detailed description see chapter 7.2.4

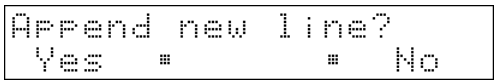



Select with or whether the component weight has to be recalculated depending on the recipe setpoint :1 =

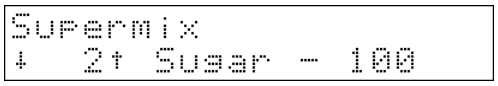


yes = default, 0 = no. Confirm with [OK]. For detailed description see chapter 7.2.5

With [Yes] the next recipe line is selected, with [No] the last recipe line is shown. The maximum no. of recipe lines is defined in [Setup]-[Software Parameter]-[Lines per recipe] and is set as default to 10.




If [Yes] was selected the recipe name and the recipe line number and the last selected component name appears. The same sequence as with recipe line 1 can be followed now.

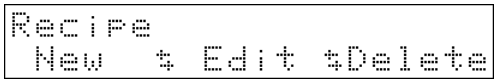



**Note:** There are no empty lines in the recipe. If the recipe is scrolled in the forward direction with , the question [Append new line?] appears automatically after the last recipe line.

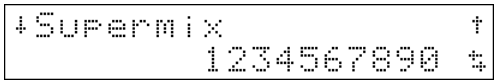
### 7.2.1. Insert recipe line

For inserting an additional line in a recipe the following procedure has to be followed:

Select with [Edit]

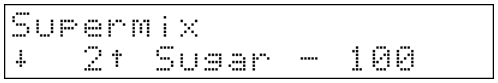



Select with [↓] or [↑] the recipe to be edited and confirm with [OK]

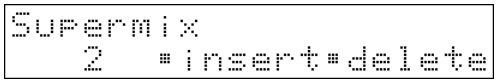



Below the recipe name the first recipe line and the component name for the first line appear.

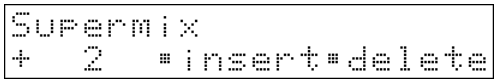

Select with [↓] or [↑] the recipe line number where the new component has to be inserted, press corresponding to the recipe line



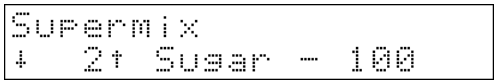

Press the [insert] to insert a copy of the existing recipe line 2




A + sign appears for a second to indicate that a copy of line 2 has been inserted as a new line 3. The old line 3 becomes then line 4, the old line 4 becomes 5 and so on.



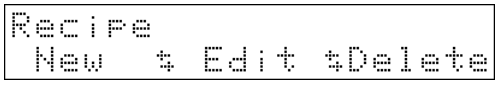

Press corresponding to the recipe line number and the new line 2 appears and can be edited.



### 7.2.2. Delete recipe line

For deleting a line in a recipe the following procedure has to be followed:

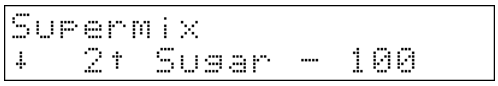
Select with [Edit]



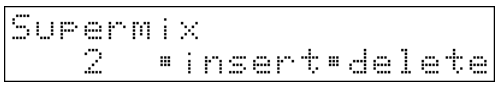

Select with ↓ or ↑ the recipe to be edited and confirm with OK


Below the recipe name the first recipe line and the component name for the first line appear.

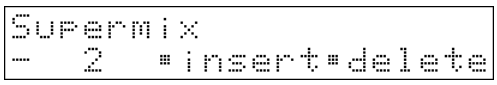

Select with ↓ or ↑ the recipe line number where the line should be deleted and press corresponding to the recipe line



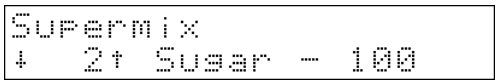

Press the [delete] to delete the recipe line 2




A - sign appears for a second to indicate that a line had been deleted. As example if line 2 is deleted, the old line 3 becomes 2, the old line 4 becomes 3 and so on



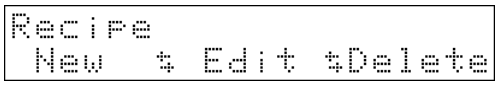

Press corresponding to the recipe line number and the old line 3 appears as line 2 and can be edited.



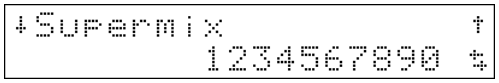

### 7.2.3. Example

Entering a timer component (D3) is done as follows:

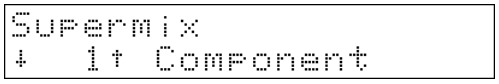
Select with [Edit]



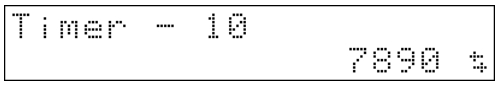

Select with ↓ or ↑ the recipe to be edited and confirm with OK



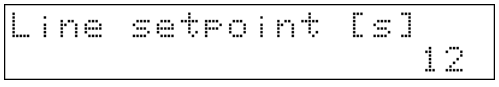

Below the recipe name the first recipe line and the component name for the first line appear.




Press OK and select the timer component for the first line with ↓ or ↑.



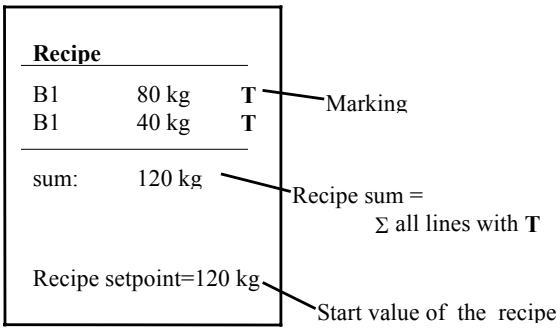

After pressing OK the time in seconds has to be entered and confirmed with OK



### 7.2.4. Recipe total mode (Total mode)

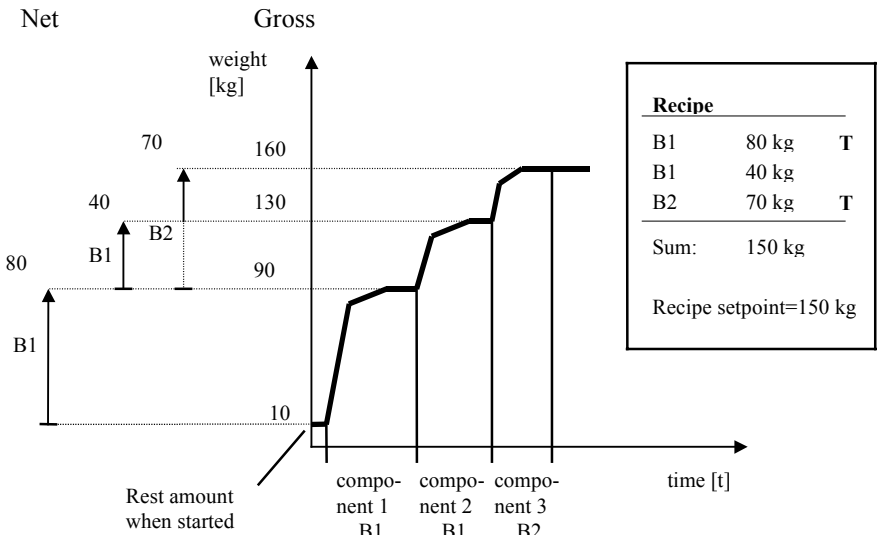
.

For components B1-B6, G1-G6 and D1-D2 it can be defined, whether the amounts of the recipe line should be added to the recipe sum. This marking is an element of the recipe line (Total mode). The recipe sum is the base for the setpoint scaling. The recipe total mode is independent of the calculation mode




In this recipe with fill components, all amounts are added to the recipe total. In this example the recipe sum is calculated to 120 kg. If the recipe is started with 120 kg, all components are batched with the setpoints given in the recipe lines. In this case the recipe sumis the same as the recipe setpoint. With a different recipe setpoint, all recipe line setpoints are adapted proportional.

If the recipe is extended by a B2- or B3-component, then a wrong recipe sum is calculated. With the extension of a B2-component, the previous B1-component must not be used for the calculation of the recipe sum.
The 'top-up'-batch B2 is based on the last tare from the B1 and contains in its setpoint so to speak the setpoint of the previous component.




If using a B3 instead of the B2 component, only the B3-component must have the mark for the recipe total.

Example:

| Recipe 1 | | | Recipe 2 | | | Recipe 3 | | | Recipe 4 | | | Recipe 5 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| B1 | 20 kg | T | B1 | 50 kg | | B4 | 20 kg | T | D1 | 100 kg | | B1 | 50 kg | |
| B1 | 20 kg | T | B1 | 40 kg | | B4 | 40 kg | | B2 | 120 kg | | B1 | 50 kg | |
| D1 | 20 kg | T | B3 | 100 kg | T | B5 | 60 kg | T | B3 | 150 kg | | B2 | 100 kg | |
| | | | | | | | | | B1 | 20 kg | | B3 | 180 kg | T |
| | | | | | | | | | B3 | 180 kg | T | B1 | 20 kg | T |
| Sum | 60 kg | | Sum | 100 kg | | Sum | 80 kg | | Sum | 180 kg | | Sum | 200 kg | |

When using components B2, B3, B5 and B6, pay attention to the correct setting of recipe total mode.

### 7.2.5. Setpoint scaling (Calculation mode)

The setpoints of each recipe line are recalculated according to the recipe setpointon each new recipe start. A setpoint scalingis done. If [Calculation mode] is set to [1] the setpoint of the recipe line will be recalculated at the recipe start. In general all dosing components will be scaled, then the amount of the executed batch is changed by the scaling factor.

$$\text{Scaling\_factor} = \frac{\text{Recipe\_setpoint}}{\text{Recipe\_sum}}$$

Example:

| Recipe 1 | | | | after scaling |
|---|---|---|---|---|
| B1 | 50 kg | **T** | **S** | 100 kg |
| B1 | 50 kg | | **S** | 100 kg |
| B2 | 100 kg | **T** | **S** | 200 kg |
| Σ | 150 kg | | | 300 kg |

Recipe setpoint=300 kg

Scaling factor = 2

| Recipe 2 | | | | after scaling |
|---|---|---|---|---|
| B1 | 50 kg | | **S** | 100 kg |
| B1 | 50 kg | | **S** | 100 kg |
| B3 | 150 kg | **T** | **S** | 300 kg |
| Σ | 150 kg | | | 300 kg |

Recipe setpoint=300 kg

Scaling factor = 2

| Recipe 3 | | | | after scaling |
|---|---|---|---|---|
| B1 | 50 kg | | | 50 kg |
| B1 | 50 kg | | **S** | 75 kg |
| B3 | 200 kg | **T** | **S** | 300 kg |
| Σ | 200 kg | | | 300 kg |

Recipe setpoint=300 kg

Scaling factor = 1,5

In the third example the first component should not be scaled. Then the setpoint of the recipe line is batched independently of the scale factor.
The calculation mode is independent of the recipe total mode.

## 7.3. Simulation

Before each recipe start it is checked if this production can theoretically run. All components for this recipe must exist. During the recipe test run, neither the maximum weight of the hopper (FSD) should be exceeded, nor the weight should go below zero. The weighing point has to be free and should not be in an error state. Without these conditions the recipe cannot be started.

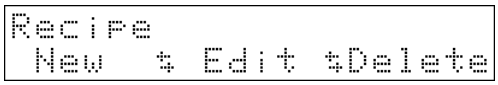
This recipe simulation may be switched off:
[Setup]-[Software parameter]-[Recipe simulation]

## 7.4. Deleting recipes

Deleting single or all recipeswith function [Start]-[Recipe]-[Delete]:
(The license PR1713/21 had to be entered.)

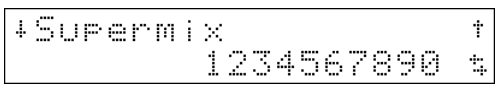
### 7.4.1. Deleting individual recipes

Select with [ ] [Delete]




Select with [ ] [Single]


Select with [↓] or [↑] the recipe to be deleted and confirm with [OK]. The recipe will be deleted without acknowledgement.

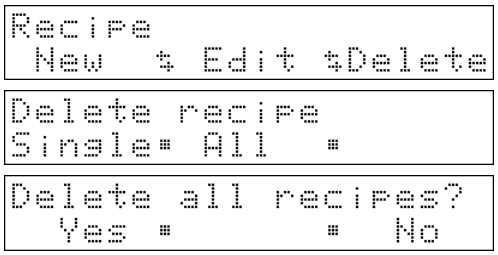


### 7.4.2. Deleting all recipes

Select with [Delete]

Select with [All]

Safety question to prevent the user to delete all recipes.




## 7.5. Printing recipes

Printing individual or all recipeswith function [Start]-[Recipe]-[Print]:

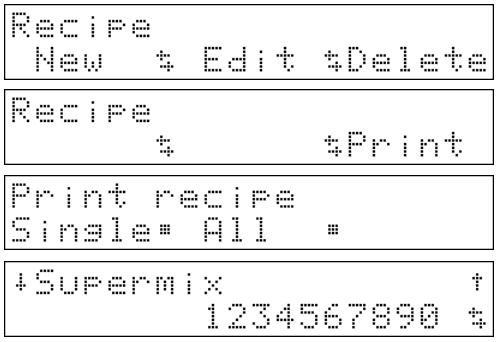
### 7.5.1. Print individual recipes

Select with [More] further functions

Select with [Print]

Select with [Single]

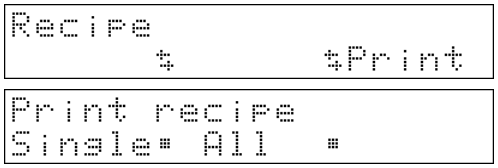
Select with [↓] or [↑] the recipe to be printed and press [OK]. The selected recipe will be printed.



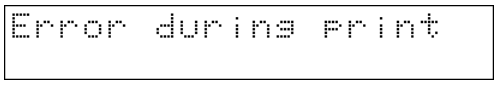

### 7.5.2. Print all recipes

Select with [Print]

Select with [All]. All recipes will be printed




### 7.5.3. Error message during printing




Message appears if e.g. [Setup]-[SerialPorts]-[Printer device at] is set to [none]

For print-out example and layout, see chapter 9 .

## 7.6. Subrecipe

**This function can only be used if the Batch Controller is controlled from the PR 8400.**
Subrecipesare simplifying the recipe structure.
If a certain sequence is used in several recipes, it can be written as a subrecipe. The subrecipe is called like a component in a recipe.
The subrecipe is started when all components before the subrecipe call have been processed.
All components after the subrecipe are waiting up to the moment the subrecipe is finished.
To assign a recipe as a subrecipe, a checkbox (Subrecipe) in the Recipe Editor of PR **8400**has to be activated.
A setpoint for the subrecipe is defined in the recipe call, all setpoints of the subrecipe are recalculated at start of the subrecipe.

Before using subrecipes set in [Setup]-[Software Parameter]-[Subrecipe] to [enabled] !

Visualization of a subrecipe in Batch Controller is as follows:

The subrecipe name is shown, in the bottom line the # indicates that a subrecipe is running.

```
X-TRA-MIX
#   1%Salt -  200
```

With  the upper line shows the batch mode and the difference weight. The lower line shows the current cycle number and the component setpoint. At this level no subrecipe indication is made.

```
B1      D          25  kg
1   *%  S         100  kg
```

Either the recipe or the subrecipe is shown on the display, as the processing is done in a sequential way on WP-A.
The differentiation between recipes and subrecipes is done by the # in the recipe line.

```
WP-A ready
Recipe active
```

Message if all components on WP-A have been processed and other WPs are still active.

Example for switching between recipe and subrecipe:

The recipe is active with component 5

```
Supermix
  5%Sugar -  100
```

Component 6 is a subrecipe, therefore recipe line 1 of the subrecipe is shown.

```
X-TRA-MIX
#   1%Salt -  200
```

After finishing the subrecipe, the recipe will be continued with the next line of the recipe.

```
Supermix
  7%Pepper -  300
```

**Stop, continue, skip line**

The menu items are acting on the subrecipe. A subrecipe cannot be aborted. To abort the recipe, the subrecipe has to be finished first.
With a subrecipe the [abort recipe] function is not possible.

```
          skip
continue*line*
```

**Messages during batching**

```
* tolerance alarm *
#   1%Salt -  200
```

The # sign indicates that the tolerance alarm is generated for the component in subrecipe line 1.

# 8. Batch process

## 8.1. Starting a batch process

The start of a batch could be done on several ways:

- from the front panel (standard)
- by a digital input
- with DDE / OPC communication
- with fieldbus communication
- with EW-communication or by PR8400
- from the front panel, but via PR8400
- start of a phase with DDE /OPC communication
- start of a phase with fieldbus communication

Note:
For the start of a batch process with recipes, set the config parameter to:
[Setup]->[Software Parameter]->[S88.01 Interface] = off. (factory setting)

For the start of a batch process with the phase interface, set the config parameter to:
[Setup]->[Software Parameter]->[S88.01 Interface] = on.

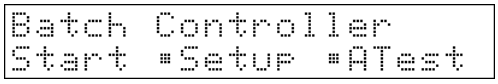
The menu for selecting a recipe appears only, if the license PR1713/21 is entered.

### 8.1.1. Start from the front panel (standard)

:

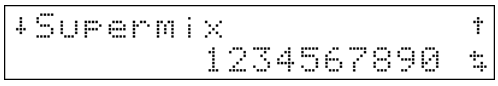
In the configuration, the parameter "Recipe-memory in" is set to "PR5610" (factory setting). All component- and recipe data are stored local in the batch controller.
The batching procedure is started by selecting [Start]-[Batch]

Select with [Start]

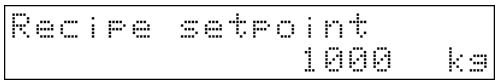



Select with [Batch]

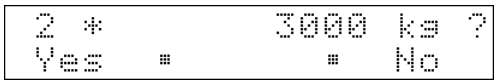

Select with [↓] or [↑] the recipe to be started and press [OK].




Enter a numeric value for the recipe setpoint

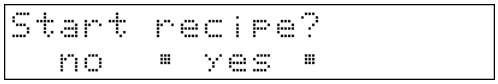



If the entered value is larger FSD, the batcher automatically suggest a splitting into the necessary number of cycles.
Yes: two cycles with 3000 kg will be batched
No: the start procedure will be aborted




Enter the number of cycles to be batched.
999 is an unlimited number of cycles.


With [yes] the batching is started. The question only appears if [Setup]-[Config]-[Recipe start mode] was set to [inquiry]. With [no] only the entered data is stored.




During configuration, a value can be assigned to the parameters recipe name, setpoint and cycle number, see chapter 4.2.7. When starting the batch, these parameters are not displayed for entry anymore (e.g. the number of cyclesis always one. An entry at each start is omitted.)

This function is useful if the dosing start is triggered by a digital input, so the setpoint had to be entered before manually.

### 8.1.2. Start from the front panel (via PR8400)

In the configuration, the parameter "Recipe-memory in" is set to "PR8400". All component- and recipe data are stored in the connected PC and will be managed by the PC-program PR8400. With the begin of the start procedure a list of all recipe names is loaded from the PR8400 into the batcher. From this list, the operator may choose a recipe and send a start request to the PR8400. Then the PR8400 starts the recipe as if the operation had been done on the PC.
To start a recipe, the PC-program PR8400 must be running.
The batching procedure is started by selecting [Start]-[Batch]

Select with [Start].

```
Batch Controller
Start ▪Setup ▪ATest
```

Select with [Batch].

```
PR8400 Recipes
      ▪       ▪Batch
```

Now, a list with all recipe names is loaded from PR8400 into the batch controller.

```
Read PR8400 Recipes
```

Select with [↓] or [↑] the recipe, which should be started and press [OK].

```
Select Recipe      ↓↑
Supermix
```

If this option is selected in the configuration, an order number could be entered during the start procedure.

```
Order:
ABC-12345
```

If this option is selected in the configuration, an customer could be entered during the start procedure.

```
Customer:
Meier AG
```

If this option is selected in the configuration, an production number could be entered during the start procedure.

```
Prod.Nummer:
2001007
```

Enter the number of cycles to be batched.
999 is an unlimited number of cycles.

```
Number of cycles
                  27
```

Enter a numeric value for the recipe setpoint

```
Recipe setpoint
            1000  kg
```

If a minimum setpoint value is defined for this recipe and the given setpoint is lower, a message appears:

```
RSetp.Min=     20 kg
```

With [yes] the batching is started. The question only appears if [Setup]-[Config]-[Recipe start mode] was set to [inquiry]. With [no] only the entered data is stored.

```
Start recipe?
  no  ▪ yes ▪
```

The request to start via the PR8400 is send to the PC.

```
Start PR8400-Recipe
```

If a start if not carried out in 10 seconds, a message appears:

```
Recipe Start Error!
Check>>PR8400 ▪ OK
```

During configuration, a value can be assigned to the parameters recipe name, setpoint and cycle number, see chapter 4.2.7. When starting the batch, these parameters are not displayed for entry anymore (e.g. the number of cyclesis always one. An entry at each start is omitted.)

This function is useful if the dosing start is triggered by a digital input, so the setpoint had to be entered before manually.

### 8.1.3. Start with a digital input or DDE / OPC communication

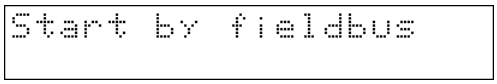
Setting the SPM Bit MX1312 to TRUE a recipe is started. If the value of MB165 = 0, the last recipe with the last setpoint is started. If a number is stored in MB165 (e.g. 3), the n-th recipe is started from the alphabetically sorted list of recipe names (e.g. the third).
With up to eight digital inputs MX1327 (value 1) to MX1320 (value 128) the value could be set binary.

An operator message appears on the display for 2 seconds.


### 8.1.4. Start with fieldbus communication

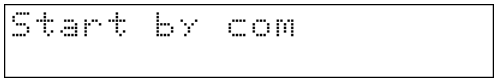
The recipe start via fieldbus communication is described in chapter 11".

An operator message appears on the display for 2 seconds.




### 8.1.5. Start with EW-communication or PR8400

An operator message appears on the display for 2 seconds.




A start via EW-communication may also be possible without a running "Start"-program. Then no status display is visualized for the operator.

### 8.1.6. Start of a dosing phase via DDE / OPC communication

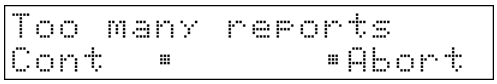
The start of a dosing phase is comparable with the start via the fieldbus interface. The parameter are written to SPM-Addresses instead of fieldbus addresses.
The "Start"-Program must be running.

### 8.1.7. Start of a dosing phase via fieldbus communication

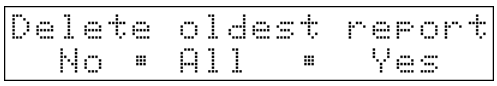
The recipe start via fieldbus communication is described in chapter 11.

### 8.1.8. Messages during the start of a recipe

After each recipe report is generated. If no more memory is available a message appears.
"Cont": it should be batched nevertheless. Then the oldest report must be deleted.
"Abort": The batch start is aborted.
One cause could be, that in the Software-Parameter the report is configured to be generated also for communication, although no communication is reading the reports.



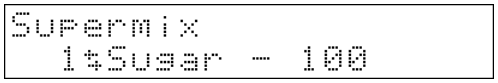

"No": The batch start is aborted.
"All": All reports will be deleted.
"Yes": Only the oldest report will be deleted.



## 8.2. Status display

During batching, the process status is displayed. There are several display forms selectable:

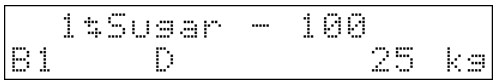
1) The upper line shows the current recipe name.
In the lower line the current recipe line and the component name are shown.



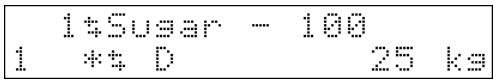

2) With  the upper line shows the batch mode and the difference weight. The lower line shows the current cycle number and the component setpoint.


As long as  corresponding to the cycle number is pressed, the total number of cycles is shown.


3) The upper line shows the current recipe line and the component name. In the lower line the batch mode and the difference weight are shown.

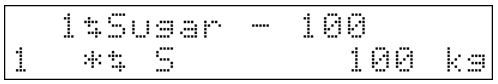



As long as  corresponding to the cycle number is pressed, the total number of cycles is shown.




4) The upper line shows the current recipe line and the component name. In the lower line the batch mode and the setpoint weight are shown.


As long as  corresponding to the cycle number is pressed, the total number of cycles is shown.



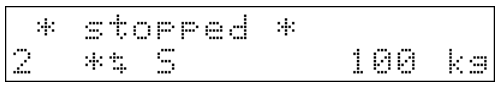


By pressing the gross key the gross weight is shown for approximately 3 sec. on the weight display.


By pressing the tare key the tare weight is shown for approximately 3 sec. on the weight display

## 8.3. Stopping a batch process

The batch process can be stopped manually by pressing  .




The flashing 'batching active' sign indicates that the batch process is stopped.

For further actions see chapter 8.4

## 8.4. Continue, skip, abort

For using these functions the batch processmust be in stop condition. When pressing the stop key again, the following menu appears:

Press Stop


**[continue]**

Pressing [continue] instructs the Batch Controller to continue in case of a tolerance alarm or a manual stop. Depending on the error cause and restart mode, the operation is continued by post-batching.

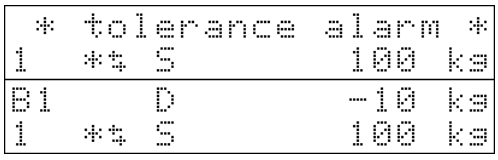
**[skip line] .**

Pressing [skip line] the current recipe line is skippedAll following recipe lines are continued normally. In case of a tolerance alarm, the recipe controller is instructed to abort only this line, because the error cannot be removed. The recipe can continue with the next recipe line.

**[abort recipe] .**

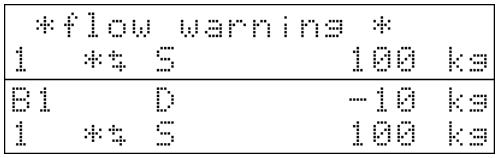
Pressing [abort recipe] the current recipe line is skippedIf further cycle(s) have to be batched, it can be decided whether the actual cycle should be aborted or all cycles should be aborted.


## 8.5. Messages during batching




If tolerance monitoring is activated by entry of the Tol+ and Tol- above zero a tolerance alarmcan be generated during batching. If the currently batched amount exceeds the tolerance, this message flashes in the upper line and the recipe goes in stop condition automatically.

Different reactions on a tolerance alarm are possible, see chapter 8.4




If flow monitoring is activated, a flow warningcan be generated during batching. If the material flow exceeds the min. flow rate (e.g. due to clogging), a message flashes in the first line. The recipe is continuously checking the flow rate. The warning extinguishes automatically, when the material flow is in range.

If required the process can be stopped with Stop, see chapter 8.3.

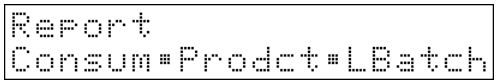
## 8.6. Selecting a report

Menu [Start]-[Report] has to be selected.
The following reports are selectable:

- Consumption report (per component)
- Production report (per recipe)
- Last batch report

Select with [Report]


Select with the required function




In [Setup] the physical interface has to be defined where the report is printed, e.g. [Setup]-[Serial Ports]-[Printer device at]-[Builtin RS232].
The reports have to be activated in the configuration. At [Setup]-[Software parameter]- [Report to] it can be selected if and for what purpose the recipe controller generates a report.

[none] no report is generated
[communication] if PR 8400 is connected
[application] if local printer is connected
[communic. & appl.] (PR 8400* localprinter is connected) *needs R>=1.05.0004
[application +Prod.] if IEC 61131 programs are using the production report table

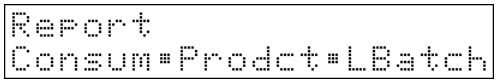
Generated reports have to be read and deleted. If reports are generated for e.g. communication, the communication has to delete the batch reports. If not, the data base is filled until no free memory space is left and no new batch can be started.

### 8.6.1. Consumption report

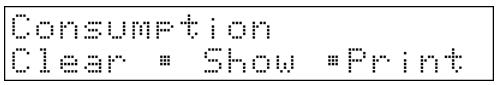
The consumption sum is added for each component:

#### 8.6.1.1. Clear consumption sum

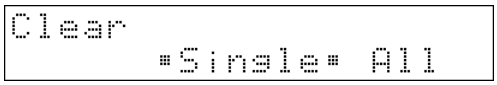
Select with [Consum]



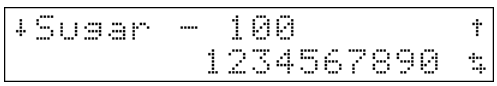

Select with [Clear]



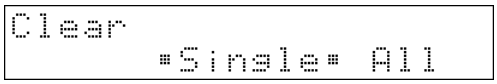

Select with [Single]



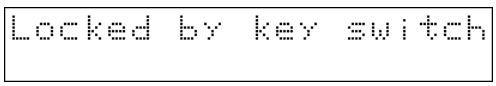

Select with or the component's consumption to be deleted and confirm with .




Select with [All]. The consumed amounts of all components are deleted.




Clearing of the data is locked by activating of SPM-Bit 1330.

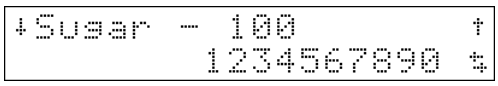


### 8.6.1.2. Show consumption sum

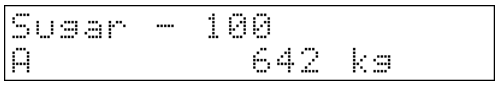
Select with [Show]


Select with [Single]


Select with or the component's consumption to be shown and confirm with .

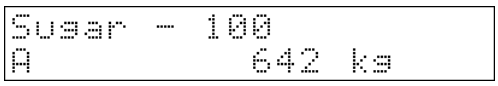



The selected component and the related amounts are shown.




Select with [All]

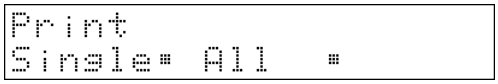

With or or the component can be selected, the related amounts are shown in the lower line. At the end of the table a return to the consumption menu is done.



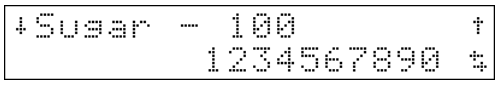

### 8.6.1.3. Print consumption sum

Select with [Print]

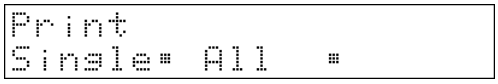

Select with [Single]




Select with or the component's consumption to be printed and confirm with . After printing a return to the consumption menu is done.

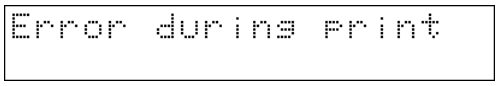



Select with [All]. After printing a return to the consumption menu is done.




**Error Message**

Message appears if e.g. [Setup]-[SerialPorts]-[Printer device at] is set to [none]



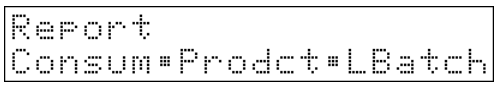

For print-out example and layout, see chapter 9 .

### 8.6.2. Production report

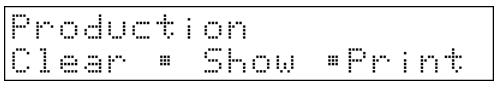
The production sum is added for each recipe.

#### 8.6.2.1. Clear production sum

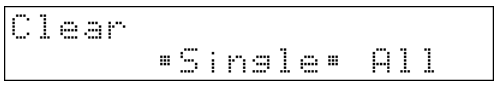
Select with [Prodct]



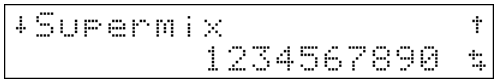

Select with [Clear]



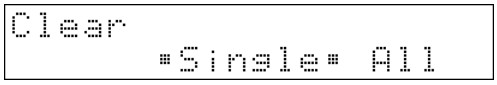

Select with [Single]



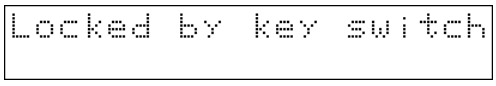

Select with or the recipe for which the produced amounts have to be cleared and confirm with . After clearing a return to the production menu is done.




Select with [All]. After clearing a return to the production menu is done.

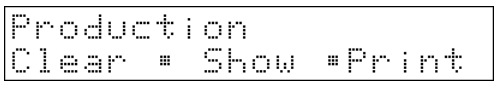



Clearing of the data is locked by activating of SPM-Bit 1330.



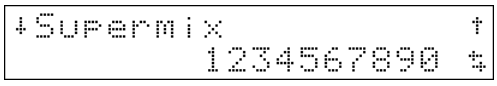

#### 8.6.2.2. Show production sum

Select with [Show]

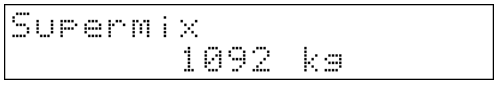



Select with [Single]


Select with or the recipe's production to be shown and confirm with .

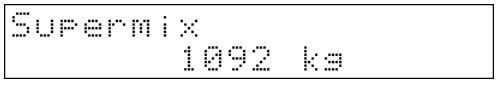



The selected recipe name and the related amounts are shown.



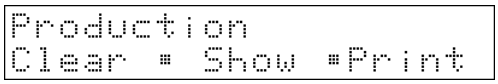

Select with [All]


With or or the recipe can be selected, the related amounts are shown in the lower line. At the end of the table a return to the production menu is done.



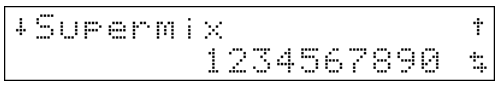
### 8.6.2.3. Print production sum

Select with [Print]

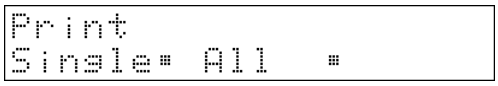



Select with [Single]


Select with [↓] or [↑] the recipe's production to be printed and confirm with [OK]. The amounts are printed.

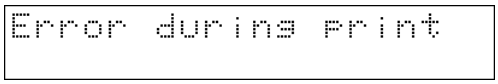



Select with [All]. After printing a return to the production menu is done.




**Error Message**

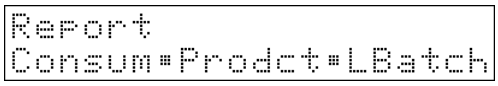
Message appears if e.g. [Setup]-[SerialPorts]-[Printer device at] is set to [none]




### 8.6.3. Last batch report

In menu [Start]-[Report]-[LBatch] printing of the last batch reportcan be selected:

Select with [LBatch] to print the last batch report.




Note: In menu [Setup]-[Config]-[Edit]-[Batchrep.auto prt] can be selected whether an actual batch report is printed automatically [Auto] after each batch. If the [Batchrep.auto prt] is set to [Off], no report is printed, but [LBatch] can be selected to print the last batch report.

For print-out example and layout, see chapter 9 .

# 9. Print-outs

## 9.1. Print-out examples

The Batch Controller has various reports for print-out. Some of these reports can be configured freely by PC program "Nice Label Express".

| | Configurable with "Nice Label Express" |
|---|---|
| 1. Weight print-out. | Yes |
| 2. Batch report | Yes |
| 3. Consumption report | Yes |
| 4. Production report | Yes |
| 5. Component data | No |
| 6. Recipe data | No |
| 7. Configuration data | No |
| 8. Setup-Data | No |

### 9.1.1. Weight print-out

By pressing the print key  on the instrument front panel, a simple weight print-out can be started.
The key functions also without running main program.
With "Error ... " displayed on the scale, printing is not possible.
The scale name appears only, if it was defined.
Unless a Nice Label Express layout was defined, a simple weight report in the following format is printed out.
When using "Nice Label Express", layout "PRINT.lbl" must be used for editing.
The data made available in the relevant layout are explained in section "Nice Label Express".

**Print-out example:**

```
30.10.2003  11:06:59 Gross:  00.277 kg
```

### 9.1.2. Batch report

How to print out a batch report is described in section "Last batch report".
Unless a Nice Label Express layout was defined, the report will be printed out in the following format.
When using "Nice Label Express", layouts "*.lbl" must be used for editing.

The delivery note comprises three different print-outs:
the report header (English "BATH_E.lbl", local language "BATH_D.lbl"),
several lines (English "BATL_E.lbl", local language "BATL_D.lbl"),
the report footer (English "BATF_E.lbl", local language "BATF_D.lbl"),
The data made available in the relevant format are explained in section "Nice Label Express".

**Print-out example:**

```
Batch report
Date              : 19.02.2002  14:35:59

Recipe            : Supermix

Sequence number   : 5
Setpoint          :       200 kg
Total             :       151 kg
Start time        : 19.02.2002  13:57:22
Stop time         : 19.02.2002  13:58:36
Charge number     : 2/69
Status of recipe  : aborted

Line Component          batched value       Setpoint   Status
-------------------------------------------------------------------
  1 Sugar - 100                 101 kg          100 kg OK
  2 Azucar - 200                 50 kg          100 kg aborted
```

### 9.1.3. Consumption report

How to print out a batch report is described in section "Consumption report".
Unless a Nice Label Express layout was defined, the report will be printed out in the following format.
When using "Nice Label Express", layouts "*.lbl" must be used for editing.

The consumption report comprises three different print-outs:
the report header (English "CONSH_E.lbl", local language "CONSH_D.lbl"),
several lines (English "CONSL_E.lbl", local language "CONSL_D.lbl"),
the report footer (English "CONSF_E.lbl", local language "CONSF_D.lbl"),
The data made available in the relevant format are explained in section "Nice Label Express".

**Print-out example:**

```
Consumption report
Date: 15.03.2002  13:56:17

Component            WP Consumption
-----------------------------------
Sugar-640            A      558,4 kg
Sugar-210            A       24,3 kg
Flour-fine           A     1330,8 kg
Egg powder           A      572,0 kg
Spice mixture-25     A        0,0 kg
Spice mixture-30     A        0,0 kg
Spice mixture-38     A      104,3 kg
```

### 9.1.4. Production report

How to print out a batch report is described in section "Production report".
Unless a Nice Label Express layout was defined, the report will be printed out in the following format.
When using "Nice Label Express", layouts "*.lbl" must be used for editing.

The production report comprises three different print-outs:
the report header (English "PRODH_E.lbl", local language "PRODH_D.lbl"),
several lines (English "PRODL_E.lbl", local language "PRODL_D.lbl"),
the report footer (English "PRODF_E.lbl", local language "PRODF_D.lbl"),
The data made available in the relevant format are explained in section "Nice Label Express".

**Print-out example:**

```
Production report
Date: 19.02.2002  14:28:24

Recipe               Production sum
-----------------------------------
Supermix                  446,2 kg
Biscuits                  502,0 kg
Cookies                   338,1 kg
Sand cake                1847,4 kg
```

### 9.1.5. Component data

The component data print-out is described in section "Component handling".

**Print-out example:**

```
Component name   : Azucar - 200
Component ident  : 2345678901

Date             : 01.02.2002  15:28:17
Batchmode        : B1
SPM in           : -1
SPM out          : 1024
Preset           : A         20 kg
Overshoot        : A         15 kg
Tolerance +      : A          2 kg
Tolerance -      : A          2 kg
Minimum flow     : A          1 kg
Calming time     : 3s
Restart mode     : 3
```

### 9.1.6. Recipe data

The recipe data print-out is described in section "Recipe handling".

**Print-out example:**

```
Recipe name    : SUPERMIX
Recipe ident   : 1234567890

Date           : 19.02.2002  13:08:31
Setpoint       : 600 kg


                                  Calculation   total
Line Component          Setpoint     mode      mode
-------------------------------------------------
  1  Sugar - 100           300 kg      1         1
  2  Azucar - 200          200 kg      1         1
```

### 9.1.7. Configuration data

The configuration data print-out is described in section "Configuration".

**Print-out example:**

```
Configuration data
Date  . . . . . : 2003.10.28 12:48
Application . . . : Batch Controller
Version . . . . . : Rel 2.20 rev. 2003-07-13
--------------------------------------------------
Input configuration
Slot 1
 input    1: 1312
 input    2: 1313
 input    3: 1314
 input    4: 1315
 input    5: 1317
 input    6:   -1
Slot 2
 input    1:   -1
 input    2:   -1
 input    3:   -1
 input    4:   -1
 input    5:   -1
 input    6:   -1
Slot 3
 no card for input configuration

Output configuration
Slot 1
 output   1:  1280
 output   2:  1281
 output   3:  1282
 output   4:  1283
 output   5:  1284
 output   6:  1285
 output   7:    -1
 output   8:    -1
Slot 2
 output   1:    -1
 output   2:    -1
 output   3:    -1
 output   4:    -1
 output   5:    -1
 output   6:    -1
 output   7:    -1
 output   8:    -1
Slot 3
 no card for output configuration

Predefined name for recipe start  . . . :
Predefined value for recipe start . . . :      0 kg
Predefined cycle number for recipe start: 0
Recipe start mode . . . . . : Standard
Limit value 1 on for WP-A . . . . . :      0 kg
Limit value 1 off for WP-A  . . . . . :      0 kg
Limit value 2 on for WP-A . . . . . :      0 kg
Limit value 2 off for WP-A  . . . . . :      0 kg
Automatic batch report  . . . . . : Off
Recipe start mode . . . . . : PR5610
Customer ID required  . . . . . : No
Order ID required . . . . . : No
Productions Nr. required  . . . . . : No
```

### 9.1.8. Setup-Data

The set-up data print-out is described in the Installation Manual.

## 9.2. Nice Label Express

Reports could be printed directly from the program or via a configuration file from "Nice Label Express (NLE)". With this file, the layout of a report could be altered. The name of the NLE-file is e.g. "PRINT.lbl". Does no layout file exist from NLE, the report is printed in a fixed form. In the delivery condition, all print-outs are not made via NiceLabelExpress (= no NLE files are included).
To create a self-defined report, program Nice Label Express is required. With these reports, all variable contents ( e.g. weights ) and fixed texts ( e.g. "Sequence number" ) are transmitted to the report via variables.
As fixed texts are also transmitted into the print report, the user can create his language adaptations in many cases using "TranslateIt" also for NLE. In this case, "Nice Label Express" is not necessary.
For "Nice Label Express", a fixed variable structure from the application is made available.

| Variable for NLE | Type | Description | Weighing printout | Batch report | | | Consumption | | | Production | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | header | line | footer | header | line | footer | header | line | footer |
| datetime | STR20 | Date Time | X | X | X | X | X | X | X | X | X | X |
| seqnum | UDINT | Sequence number | | X | | | | | | | | |
| wgtini | WEIGHT | Zero weight | | | | | | | | | | |
| gross | WEIGHT | gross weight | X | | | | | | | | | |
| net | WEIGHT | net weight | X | | | | | | | | | |
| tare | WEIGHT | tare weight | X | | | | | | | | | |
| setpoint | WEIGHT | setpoint | | X | X | X | | | | | | |
| actual | WEIGHT | actual weight (report line, Sum) | | X | X | X | | | | | | |
| wp_id | STR2 | weighing point "A" | | | | | | X | | | | |
| | | | | | | | | | | | | |
| matnam | STR18 | Component name | | | X | | | X | | | | |
| matnum | UDINT | Component number | | | | | | X | | | | |
| matcons | WEIGHT | Component consumption | | | | | | X | | | | |
| | | | | | | | | | | | | |
| recnam | STR18 | Recipe name | | X | | X | | | | | X | |
| recnum | UDINT | Recipe number | | | | | | | | | X | |
| recline | UINT | Recipe line number | | | X | | | | | | | |
| recprod | WEIGHT | Recipe production sum | | | | | | | | | X | |
| | | | | | | | | | | | | |
| repstrt | STR20 | Report start time | | X | | X | | | | | | |
| reptstop | STR20 | Report stop time | | X | | X | | | | | | |
| repactch | UINT | Report: actual charge | | X | | | | | | | | |
| repmaxch | UINT | Report: maximum charge | | X | | | | | | | | |
| repalm | STR20 | Report: alarms | | X | X | | | | | | | |

# 10. Signal controls

## 10.1. Digital in- and output modules

All signals are located in an internal memory range and may be used for multiple purpose. Each status- and control signal has its own address, which is defined in the SMP-layout.

Digital inputs could copy their status to such an address. Also the state of an internal signal may be copied to a digital output.
With DDE / OPC communication SPM-addresses could be read or write.

The address range 1024 to 1279 is free for any signals; e.g. component signals.
The other addresses are fixed defined for status- and control signals and functions.

Care has to be taken that the SPM address selected is not used by the system already and that the SPM address is not used twice.

The SPM addresses of the I/O cards are not changed after a [Cold]-start. The component SPM parameters are lost, as the components are erased.

## 10.2. Digital input- and output modules

Digital inputs and outputs may be configured to give out status signal or copy control signal to a SPM-address. See chapter 4.2.3 .

### 10.2.1. Copy to digital outputs

Random signal bits in the address range of 1024 to 1535 could be configured to a digital output.

Example:
Coarse and fine signals should be configured to two digital outputs. The signals on the addresses 1280 and 1281 are predefined and are set corresponding during batching.
Writing the address 1280 in the configuration of output 1 on slot 1 will cause that the status of this address in copied to the output.

**SPM-Layout**
**Address range**
Batching signals for coarse and fine.

| | |
|---|---|
| 1280 | WP-A coarse [r] |
| 1281 | WP-A fine [r] |

Copy to digital outputs

configuration
of the digital outputs

card 1

| Output | Address |
|---|---|
| 1 | 1280 |
| 2 | 1281 |

### 10.2.2. Copy from digital inputs

From a digital input, signals could be configured to be copied to any signal bits the range of 1024 to 1535.

Example:
The weighing point A should be set tared and reset tared from a digital input. The addresses 1336 and 1337 are predefined. If a active signal is copied to these addresses the weighing point is set to tare or reset tared.
Writing the address 1336 in the configuration of input 1 on slot 1 will cause that the status of the input is copied to the address.

**SPM-Layout**
**Address range**
Control signals for tare and reset tare.

| | |
|---|---|
| 1336 | WP-A set tare [w] |
| 1337 | WP-A reset tare [w] |


**configuration**
**of the digital inputs**
card 1

| Output | Address |
|---|---|
| 1 | 1336 |
| 2 | 1337 |

### 10.2.3. Signals of manual components D1, D2

The components for manual weighing D1 and D2 need an 'Acknowledge'-signal from the operator.
In the component parameter 'SPM_in' the address 1808 has to be entered.
For a digital input card use address 1317 for the 'Acknowledge'-signal in the configuration. On a signal change from 0->1 the address 1808 is aktivated once.
For a DDE / OPC access use address 1808 for the 'Acknowledge'-signal.
Parallel to that a operator may press a key on the front.
The digital input, DDE / OPC access and operator achknowledge may be used at the same time.

### 10.2.4. Signals of dummy components D5, D8

The dummy components D5 and D8 wait for an input signal.
In the component parameter 'SPM_in'. the address 1810 has to be entered in the configuration. On a signal change from 0->1 the address 1818 is aktivated once.
For a digital input card use address 1318 for the input signal.
For a DDE / OPC access use address 1810 for the input signal.
The digital input and DDE / OPC access may be used at the same time.

### 10.2.5. Output of component signals

To identify different components, a address between 1024 and 1279 had to be entered in component parameter 'SPM-out'. The active component will set the bit on this address.
In a second step, this bit had to be configured to a digital output.

**Configuration of the components**

| Component | Parameter SPM-output address |
|---|---|
| Flour | 1024 |
| Sugar | 1025 |
| Salt | 1026 |
| Water | 1027 |

Copy in the address range

**SPM-Layout Address range**

| | |
|---|---|
| 1024 | Field for free use 256 bits [r/w] component signals |
| 1025 | |
| 1026 | |
| 1027 | |
| | |
| 1280 | WP-A coarse [r] |
| 1281 | WP-A Fine [r] |

Copy to digital outputs

**Configuration of the digital outputs**

card 1

| Output | Address |
|---|---|
| 1 | 1280 |
| 2 | 1281 |
| 3 | 1024 |
| 4 | 1025 |
| 5 | 1026 |
| 6 | 1027 |

The example above needs a minimal number of outputs. However the coarse and fine signals must be combined external with the individual components.
This could also be configured intern. Therefore AND connections for 16 different component signals are defined. 16 logical AND-gates combine the addresses 1024...1031 with the coarse signal. Additional 16 logical AND-gates combine the addresses 1024...1031 with the fine signal.
The number of the needed digital outputs is increased, but these signals could be given directly to the valves.
E.g.
Card 1, output 2: coarse signal for "sugar"-valve and
Card 2, output 2: fein signal for "sugar"-valve.

**Configuration of the components**

| Component | Parameter SPM-output address |
|---|---|
| Flour | 1024 |
| Sugar | 1025 |
| Salt | 1026 |
| Water | 1027 |

Copy in the address range

**SPM-Layout Address range**

| | |
|---|---|
| 1024 | Field for free use 256 bits [r/w] component signals |
| 1025 | |
| 1026 | |
| 1027 | |
| | |
| 1344 | WP-A coarse signal (1280) AND component signal (1024) [r] |
| 1345 | 1280 AND 1025 |
| 1346 | 1280 AND 1026 |
| 1347 | 1280 AND 1027 |
| | |
| 1360 | WP-A Fine signal (1281) AND component signal (1024) [r] |
| 1361 | 1281 UND 1025 |
| 1362 | 1281 UND 1026 |
| 1363 | 1281 UND 1027 |

Copy to digital outputs

**Configuration of the digital outputs**

card 1

| Output | Address |
|---|---|
| 1 | 1344 |
| 2 | 1345 |
| 3 | 1346 |
| 4 | 1347 |

card 2

| Output | Address |
|---|---|
| 1 | 1360 |
| 2 | 1361 |
| 3 | 1362 |
| 4 | 1363 |

## 10.3. Analog input and output modules

Is an analog card PR1713/06 or PR1713/07 is plugged in a slot, analog values are automatically copied to or from specific SPM-addresses.

**Inputs:**
Analog inputs 1...4 are written as 16-Bit values to the addresses MW 96, MW 97, MW 98 and MW 99. If more than one analog input card is plugged, only inputs of the card with the lowest slot number are copied.

Input of an analog value into a recipe:
With the use in a recipe the component parameter 'SPM-in' had to be set to the corresponding word address 96...99 (batch mode: "A2"). Then the component is able to read in an analog measured value into a running recipe.
Read and write with DDE/OPC:
If an analog card is pluged in, the analog inputs 1...4 could be read on the addresses MW 96, MW 97, MW 98 and MW 99.
If no analog card is pluged in, on the addresses MW 96, MW 97, MW 98 and MW 99. could be written.

**Outputs:**
From address DW 100 a 16 bit value is read and giving out with a analog card as analog value.

Output of a weight value as analog value:
In the output configuration of the analog card the parameter "Analog value" must be set to "Gross" (Net...). Then the address MW100 is cyclically written with a scaled weight value.
Output of an analog value from a recipe:
In the output configuration of the analog card the parameter "Analog value" must be set to "A1 BMode". With the use in a recipe the component parameter 'SPM-out' had to be to the word address 100, to send out an analog control value from a running recipe. (batch mode: "A1")
Output of an analog value from DDE/OPC:
In the output configuration of the analog card the parameter "Analog value" must be set to "A1 BMode". Then the address MW100 could be written with a output value.

## 10.4. SPM-Layout

The SPM may be accesseddirectly via DDE, OPC, EWCOM, DUST or ModBus. The ranges

- MB 0 ... MB 127
- MB 704 ... MB 1023

are defined with Firmware functions.
Weight values are in DINT-format in 'kg' or. 'lb', according to the calibration of the scale.
[w] Address for writing
[r] Address for reading

| Address | MSBit in MX | Format | Function |
|---|---|---|---|
| MX 139 | 139 | BOOL | WP-A set zero [w] |
| MX 140 | 140 | BOOL | WP-A set Tare [w] |
| MX 141 | 141 | BOOL | WP-A reset tare [w] |
| MX 155 | 155 | BOOL | WP-B set zero [w] |
| MX 156 | 156 | BOOL | WP-B set tare [w] |
| MX 157 | 157 | BOOL | WP-B reset tare [w] |
| MX 430 | 430 | BOOL | Key switch to lock 'Setup', copy of the corresponding digital input [r/w] |
| | | | |
| MD 16 | 512 | DWORD | WP-A weight value [r] |
| MX 568 | 568 | BOOL | WP-A stand still [r] |
| MX 569 | 569 | BOOL | WP-A zero inside ¼ d [r] |
| MX 570 | 570 | BOOL | WP-A inside zero set range [r] |
| MX 574 | 574 | BOOL | WP-A tared [r] |
| MX 575 | 575 | BOOL | WP-A sign [r] |
| | | | |
| MD 18 | 576 | DWORD | WP-B weight value [r] |
| MX 632 | 632 | BOOL | WP-B stand still [r] |
| MX 633 | 633 | BOOL | WP-B zero inside ¼ d [r] |
| MX 634 | 634 | BOOL | WP-B inside zero set range [r] |
| MX 638 | 638 | BOOL | WP-B tared [r] |
| MX 639 | 639 | BOOL | WP-B sign [r] |
| | | | |
| before MB 128 | before 1024 | | reserved for firmwarefunctions |
| | | | |
| MX1024 ... MX 1279 | | | Field for free configuration: 256 Bits [r/w] |
| | | | |
| MX 1280 | 1280 | BOOL | WP-A coarse [r] |
| MX 1281 | 1281 | BOOL | WP-A fine [r] |
| MX 1282 | 1282 | BOOL | WP-A discharge [r] |
| MX 1283 | 1283 | BOOL | WP-A stopped [r] |
| MX 1284 | 1284 | BOOL | WP-A recipe active [r] |
| MX 1285 | 1285 | BOOL | WP-A tolerance alarm [r] |
| MX 1286 | 1286 | BOOL | WP-A flow warning [r] |
| MX 1287 | 1287 | BOOL | WP-A tolerance alarm or flow warning [r] |
| | | | |
| MX 1296 | 1296 | BOOL | WP-A tared active [r] |
| MX 1297 | 1297 | BOOL | WP-A zero inside ¼ d [r] |
| MX 1298 | 1298 | BOOL | WP-A stand still [r] |
| MX 1299 | 1299 | BOOL | WP-A limit 1 [r] |
| MX 1300 | 1300 | BOOL | WP-A limit 2 [r] |

| | | | |
|---|---|---|---|
| MX 1301 | 1301 | BOOL | WP-A weight valid (no Error 2, 3, 7) [r] |
| MX 1302 | 1302 | BOOL | WP-A Inverted signal of 'weight valid' [r] |
| | | | |
| MX 1312 | 1312 | BOOL | Start recipe, last recipe is started. Restart [w] |
| MX 1313 | 1313 | BOOL | WP-A Stop [w] |
| MX 1314 | 1314 | BOOL | WP-A restart [w] |
| MX 1315 | 1315 | BOOL | WP-A Abort (actual cycle only) [w] |
| MX 1316 | 1316 | BOOL | WP-A Abort recipe line [w] |
| MX 1317 | 1317 | BOOL | for digital input: acknowledge manual component D1, D2<br>Use 1808 in the component param. 'SPM_in'. [w] |
| MX 1318 | 1318 | BOOL | for digital input: Input signal of dummy component D5, D8<br>Use 1810 in the component param. 'SPM_in'. [w] |
| MX 1319 | 1319 | BOOL | Abort of all cycles of a recipe [w] |
| | | | |
| MB 165 | 1320 | BYTE | Recipe number for batch start [w]<br>Bit 1320...1327 (LSB->1327) |
| | | | |
| MX 1328 | 1328 | BOOL | Print (same function as  on the front panel) [w] |
| MX 1329 | 1329 | BOOL | key switch: lock operator access to [Setup] [r/w] |
| MX 1330 | 1330 | BOOL | key switch: lock operator access to tables [r/w] |
| MX 1333 | 1333 | BOOL | hold output value for slot 1 [r/w] |
| MX 1334 | 1334 | BOOL | hold output value for slot 2 [r/w] |
| MX 1335 | 1335 | BOOL | hold output value for slot 3 [r/w] |
| | | | |
| MX 1336 | 1336 | BOOL | WP-A set tare [w] |
| MX 1337 | 1337 | BOOL | WP-A reset tare [w] |
| MX 1338 | 1338 | BOOL | WP-A set zero [w] |
| | | | |
| MX 1344 | 1344 | BOOL | WP-A coarse signal (1280) AND component signal (1024) [r] |
| MX 1345 | 1345 | BOOL | WP-A coarse signal (1280) AND component signal (1025) [r] |
| MX 1346 | 1346 | BOOL | WP-A coarse signal (1280) AND component signal (1026) [r] |
| MX 1347 | 1347 | BOOL | WP-A coarse signal (1280) AND component signal (1027) [r] |
| MX 1348 | 1348 | BOOL | WP-A coarse signal (1280) AND component signal (1028) [r] |
| MX 1349 | 1349 | BOOL | WP-A coarse signal (1280) AND component signal (1029) [r] |
| MX 1350 | 1350 | BOOL | WP-A coarse signal (1280) AND component signal (1030) [r] |
| MX 1351 | 1351 | BOOL | WP-A coarse signal (1280) AND component signal (1031) [r] |
| | | | |
| MX 1352 | 1352 | BOOL | WP-A coarse signal (1280) AND component signal (1032) [r] |
| MX 1353 | 1353 | BOOL | WP-A coarse signal (1280) AND component signal (1033) [r] |
| MX 1354 | 1354 | BOOL | WP-A coarse signal (1280) AND component signal (1034) [r] |
| MX 1355 | 1355 | BOOL | WP-A coarse signal (1280) AND component signal (1035) [r] |
| MX 1356 | 1356 | BOOL | WP-A coarse signal (1280) AND component signal (1036) [r] |
| MX 1357 | 1357 | BOOL | WP-A coarse signal (1280) AND component signal (1037) [r] |
| MX 1358 | 1358 | BOOL | WP-A coarse signal (1280) AND component signal (1038) [r] |
| MX 1359 | 1359 | BOOL | WP-A coarse signal (1280) AND component signal (1039) [r] |
| | | | |
| MX 1360 | 1360 | BOOL | WP-A fine signal (1281) AND component signal (1024) [r] |
| MX 1361 | 1361 | BOOL | WP-A fine signal (1281) AND component signal (1025) [r] |
| MX 1362 | 1362 | BOOL | WP-A fine signal (1281) AND component signal (1026) [r] |
| MX 1363 | 1363 | BOOL | WP-A fine signal (1281) AND component signal (1027) [r] |
| MX 1364 | 1364 | BOOL | WP-A fine signal (1281) AND component signal (1028) [r] |
| MX 1365 | 1365 | BOOL | WP-A fine signal (1281) AND component signal (1029) [r] |
| MX 1366 | 1366 | BOOL | WP-A fine signal (1281) AND component signal (1030) [r] |
| MX 1367 | 1367 | BOOL | WP-A fine signal (1281) AND component signal (1031) [r] |
| | | | |
| MX 1368 | 1368 | BOOL | WP-A fine signal (1281) AND component signal (1032) [r] |
| MX 1369 | 1369 | BOOL | WP-A fine signal (1281) AND component signal (1033) [r] |
| MX 1370 | 1370 | BOOL | WP-A fine signal (1281) AND component signal (1034) [r] |
| MX 1371 | 1371 | BOOL | WP-A fine signal (1281) AND component signal (1035) [r] |

| | | | |
|---|---|---|---|
| MX 1372 | 1372 | BOOL | WP-A fine signal (1281) AND component signal (1036) [r] |
| MX 1373 | 1373 | BOOL | WP-A fine signal (1281) AND component signal (1037) [r] |
| MX 1374 | 1374 | BOOL | WP-A fine signal (1281) AND component signal (1038) [r] |
| MX 1375 | 1375 | BOOL | WP-A fine signal (1281) AND component signal (1039) [r] |
| | | | |
| MW 96 | 1536 | DWORD | Analog input value 1, for batch mode A2 [r/w] |
| MW 97 | 1552 | DWORD | Analog input value 2, for batch mode A2 [r/w] |
| MW 98 | 1568 | DWORD | Analog input value 3, for batch mode A2 [r/w] |
| MW 99 | 1584 | DWORD | Analog input value 4, for batch mode A2 [r/w] |
| MW 100 | 1600 | DWORD | Analog output value, for batch mode A1 [r/w] |
| | | | |
| MW 112 | 1792 | WORD | Status for phase batching [r] |
| MX 1792 | 1792 | BOOL | Ready [r] |
| MX 1793 | 1793 | BOOL | Run [r] |
| MX 1794 | 1794 | BOOL | Done [r] |
| MX 1795 | 1795 | BOOL | Held [r] |
| MX 1796 | 1796 | BOOL | Aborted [r] |
| MX 1800 | 1800 | BOOL | Parameter error [r] |
| MX 1801 | 1801 | BOOL | Flow warning [r] |
| MX 1802 | 1802 | BOOL | Tolerance error [r] |
| MX 1803 | 1803 | BOOL | Interlock error [r] |
| MX 1804 | 1804 | BOOL | Active [r] |
| | | | |
| MX 1808 | 1808 | BOOL | acknowledge manual component D1, D2: (see 1317)<br>Use this address in the component param. 'SPM_in'. [w] |
| MX 1810 | 1810 | BOOL | Input signal of dummy component D5, D8: (see 1318)<br>Use this address in the component param. 'SPM_in'. [w] |
| | | | |
| MB 228 | 1824 | BYTE | control6 [w] |
| MX 1824 | 1824 | BOOL | Start recipe OR phase [w] |
| MX 1825 | 1825 | BOOL | Restart [w] |
| MX 1826 | 1826 | BOOL | Enable phase [w] |
| MX 1827 | 1827 | BOOL | Stop or Hold [w] |
| MX 1828 | 1828 | BOOL | Abort [w] |
| MX 1829 | 1829 | BOOL | Reset [w] |
| | | | |
| MB 229 | 1832 | BYTE | control7 |
| MX 1832 | 1832 | BOOL | use actual weight as fixtare [w] |
| MX 1833 | 1833 | BOOL | tare with fixtare value [w] |
| | | | |
| MD 64 | 2048 | DINT | Limit 1 on [w] |
| MD 65 | 2080 | DINT | Limit 1 off [w] |
| MD 66 | 2112 | DINT | Limit 2 on [w] |
| MD 67 | 2144 | DINT | Limit 2 off [w] |
| | | | |
| MD 68 | 2144 | DINT | Fixtare value [w] |
| | | | |
| MD 70 | 2240 | DINT | Report: moved weight of recipe or phase [r] |
| MB 284 | 2272 | BYTE | Report: error status [r] |
| MX 2272 | 2272 | BOOL | aborted [r] |
| MX 2273 | 2273 | BOOL | out of tolerance [r] |
| MX 2274 | 2274 | BOOL | parameter error [r] |
| MD 72 | 2304 | DINT | Report: Setpoint [r] |
| | | | |
| MB 296 | 2368 | STRING | Component name, length 18, Phase dosing with extended status display [w] |
| | | | |
| MB 316 | 2528 | USINT | Batch mode (1...8). Phase dosing [w] |
| | | | |
| MD 82 | 2624 | DINT | Preset value, Phase dosing [w] |
| MD 83 | 2656 | DINT | Overshoot value, Phase dosing [r/w] |

| | | | |
|---|---|---|---|
| MD 84 | 2688 | DINT | Tolerance value, Phase dosing + [w] |
| MD 85 | 2720 | DINT | Tolerance value, Phase dosing - [w] |
| MD 86 | 2752 | DINT | maximum flow rate, Phase dosing [w] |
| MD 87 | 2784 | DINT | Calming time, Phase dosing [w] |
| MB 352 | 2816 | USINT | restart mode, Phase dosing [w] |
| | | | |
| MB 360 | 2880 | BYTE | Start error [r]<br>1: Error in recipe database<br>2: Recipe not found<br>3: Setpoint=0 or > FSD<br>4: Batch mode not valid<br>15: not enough memory space<br>51...93: correspond to Error messages on text display 1...43. See "Error messages"<br>101: Error in report database |
| MB 364 | 2912 | BYTE | Start mode [w]<br>0: ready for start<br>1: Recipe start via Fieldbus or DDE/OPC with recipe name<br>2: Recipe start via Fieldbus or DDE/OPC with recipe number<br>3: Phase start via Fieldbus or DDE/OPC<br>4: Phase start via Fieldbus or DDE/OPC with extended status display<br>5: Recipe start via Front panel<br>6: Recipe start via PLC<br>7: Recipe start via EW-Communication or PR8400 |
| | | | |
| MB 372 | 2976 | STRING | Recipe name, length 18, Phase dosing with extended status display [w] |
| | | | |
| MW 196 | 3136 | UINT | Recipe number [w] |
| | | | |
| MW 198 | 3168 | INT | Recipe line.<br>Phase dosing with extended status display: [w];<br>recipe [r] |
| MW 200 | 3200 | UINT | Cycle number.<br>Phase dosing with extended status display [w];<br>recipe [r] |
| MD 101 | 3232 | DINT | Setpoint [w] |
| | | | |
| MD 134 | 4288 | UDINT | Sequence number [r] |
| | | | |
| MB 704<br>to<br>MB 771 | 5632<br>to<br>6168 | | reserved |
| MB 800<br>to<br>MB 1023 | 6400<br>to<br>8191 | | reserved |

# 11. Fieldbus

PR5610 can become a fieldbus slave for Profibus, Interbus-S or DeviceNet by inserting a fieldbus interface card (PR1721) into Slot 4 for communication of one or several PR1756 with a communication master (e.g. Siemens S7 Profibus). Data processing at the fieldbus is at intervals of 20 ms.
Weights are always DINT in 'kg' or 'lb', dependent of scale configuration.

## 11.1. Configuration

Configuration parameters in menu section [Setup]-[Fieldbus]:

| | |
|---|---|
| [Protocol] | The protocol, e.g. Profibus-DP, can be selected. |
| [Scale Interface] | For using the fieldbus interface as described here, parameter [Scale Interface] must be set to 'enabled'. |

**Configuration parameters in menu [Setup]-[Software Parameter]:**

| | |
|---|---|
| [S88.01 Interface] | For activating the **phase interface** of the batch controller (single-component batching), parameter [S88.01 Interface] must be set to **'on'**. Additionally, license PR 1713/30 must be entered during [License Setup].<br>For starting complete **recipes** via the fieldbus, parameter [S88.01 Interface] must be set to **'off'**. Additionally, license PR 1713/20 or PR 1713/21 must be entered during [License Setup]. |

## 11.2. Application protocol

The interface works with a 2 * 8-byte write window and a 2 * 8-byte read window. The windows are allocated to the weighing points. The fieldbus exchanges data cyclically with each slave. This means: in every cycle, 8 bytes are written and 8 bytes are read, also if no data contents are changed. Via window 2 ( allocated to WP B ), the firmware functions and WP-specific functions are available. The functions related to the instrument are handled via window 1 (allocated to WP A).
The application protocol described here is independent of the selected fieldbus and explained as seen from the fieldbus master.

### 11.2.1. Read window

In this window, data are transmitted from the slave (Scale) to the master.
The first four bytes are used for reading a data value. The type of these data is written in byte 4. The data type corresponds to the requirement in the write data window.
Bytes 6 and 7 contain status bits independent of the read value data type.
For status bit reading and writing of direct control bits, a procedure is not required. The general system bits and the status bits are always present and need not be requested in particular. The direct control bits are also available continuously.

| | |
|---|---|
| Byte 0 | read data: MSB |
| Byte 1 | " |
| Byte 2 | " |
| Byte 3 | read data: LSB |
| Byte 4 | Echo of read data type request |
| Byte 5 | status bits |
| Byte 6 | status bits |
| Byte 7 | status bits |

Procedure for reading a parameter:

1. Write the data / parameter type into byte 4 of the write window (e.g. net weight) as read data type request.
2. Wait, until in 4th byte of the read window, the echo of read data type request is equal to the read data type request of the 4$^{th}$ byte in the write window.
3. Now, the value is available in byte 0 to 3.

### 11.2.2. Write window

This window is used to transmit data from the master to the slave (scale).
The first four bytes are used for writing a data value. The type of these data is described in byte 5.
The bits in byte 6 and 7 are independent of the write value data type in direct access.

| | |
|---|---|
| Byte 0 | write data: MSB |
| Byte 1 | " |
| Byte 2 | " |
| Byte 3 | write data: LSB |
| Byte 4 | read data type request |
| Byte 5 | write data type |
| Byte 6 | direct control bits |
| Byte 7 | direct control bits |

Procedure for parameter writing:

1. wait, until write_handshake = 0 in the read window (PR1713 is ready to receive new data)
2. write value in byte 0 to 3
3. write data type in byte 5 (write data type request )
4. wait, until write_handshake = 1 (Log Controller confirms data reception) write 0 in byte 5 (write data type request) -> write_handshake is set to 0.

## 11.3. Data formats

Various data formats are used in the interface description:

**DINT** Most data values are transmitted in the form of a four-byte double-integer value; 32-bit values with polarity sign.

Example: write the fixtare weight value 844.

Write window: byte number / value

| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|
| 00 | 01 | 03 | 4C | | 1F | | |

Example: read negative gross weight value -2.

Read window: byte number / value

| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|
| FF | FF | FF | FE | 08 | | | |

**UINT** Positive 16-bit value.

Example: line number = 1, 2, 3...65535

Write window: byte number / value

| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|
| | | 00 | 1A | | 9D | | |

**USINT** Positive 8-bit value.

Example: restart mode = 0, 1, 2, 3 or 4

Write window: byte number / value

| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|
| | | | 01 | | 87 | | |

**Characters** ASCII characters; 8-bit number.

Example: recipe names [characters1...4] = hex52, 45, 43, 31 for name 'REC1'

byte number / Write window: value

| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|
| 52 | 45 | 43 | 31 | | 96 | | |

The **REAL** format to IEEE 754 ; IEC 60559

```
REAL  : 32 Bit = 1 Bit sign,  8 Bit Exponent bias  127, 23 Bit Mantissa
```

Example:

```
200 = 43 48 00 00

  4  3  4  8  0  0  0  0
0100 0011 0100 1000 0000 0000 0000 0000
s|        |                           |
 eee eeee e                           |
         1.mmm mmmm mmmm mmmm mmmm mmmm

Sign     = 0
Exponent = 10000110= 134 - bias 127 = 7
```

**Mantissa = 1.100 1000 0000 0000 0000 0000 = 1,5625 * 2^7 = 200**

STRING is always 20 characters long and transmitted in portions of 5 * 4 characters.

## 11.4. Read data

All read values are addressed by read data type request

| Value in byte 4<br>Read data type request<br>All other addresses are reserved | | Read data in byte 0...3 (parameters) |
|---|---|---|
| Dec | Hex | |
| 4 | 04 | Exponent/unit/step width |
| 8 | 08 | Gross [DINT] |
| 9 | 09 | Net [DINT] |
| 10 | 0A | Tare [DINT] |
| 12 | 0C | Gross x 100 |
| 14 | 0E | FSD value [DINT] |
| 24 | 18 | Limit1_on value [DINT] |
| 25 | 19 | Limit1_off value [DINT] |
| 26 | 1A | Limit2_on value [DINT] |
| 27 | 1B | Limit2_off value [DINT] |
| 31 | 1F | Fixtare [DINT] |
| 50 | 32 | Read 32 bit on SPM-Address 1024...1055 [DINT] |
| 51 | 33 | Read 32 bit on SPM-Address 1056...1087 [DINT] |
| 52 | 34 | Read 32 bit on SPM-Address 1088...1119 [DINT] |
| 53 | 35 | Read 32 bit on SPM-Address 1120...1151 [DINT] |
| 54 | 36 | Read 32 bit on SPM-Address 1152...1183 [DINT] |
| 55 | 37 | Read 32 bit on SPM-Address 1184...1215 [DINT] |
| 56 | 38 | Read 32 bit on SPM-Address 1216...1247 [DINT] |
| 57 | 39 | Read 32 bit on SPM-Address 1248...1279 [DINT] |
| 67 | 43 | Actual value during the batch phase [DINT] |
| 81 | 51 | Report: set-point [DINT] |
| 83 | 53 | Report: actually handled weight [DINT] |
| 84 | 54 | Report: error [UINT] |
| 125 | 7D | Batch mode [characters 1...4] or for phase [USINT] 1...8 |
| 126 | 7E | Batch mode [characters 5...8] |
| 129 | 81 | Preset point [DINT] |
| 130 | 82 | Overshoot [DINT] |
| 131 | 83 | Tolerance + [DINT] |
| 132 | 84 | Tolerance - [DINT] |
| 133 | 85 | Minimum flow [DINT] |
| 134 | 86 | Calming time [DINT] |
| 135 | 87 | Restart mode [USINT] |
| 178 | B2 | Batch status [UINT]: upper byte: start error [USINT], lower byte: start mode [USINT] 1...4: see write data 178. 5: manually started, 6: started by a digital input |
| from 200 | | This address area is reserved for additional user programming. It is used neither by the firmware nor by the Batch Controller application program in the future. |
| 204 | CC | reserved |
| 236 | EC | reserved |

Fixed functions can be activated via the bits of bytes 6 and 7 according to the table given below.

| | bit 7 | bit 6 | bit 5 | bit 4 | bit 3 | bit 2 | bit 1 | bit 0 |
|---|---|---|---|---|---|---|---|---|
| **Byte 5** | write hand-shake | power fail | error $2^2$ | error $2^1$ | error $2^0$ | status $2^2$ | status $2^1$ | status $2^0$ |
| **Byte 6** | parameter error | | coarse | fine | discharge | tare ac-tive | calibr. changed | test active |
| **Byte 7** | out of calibration | standstill | within zero set range | zero within 1/4d | below zero | higher than overload | higher than FSD | Error in analog converter |

Note: The addresses and control bits shown with gray background are handled by the firmware part of the interface. All signals are edge triggered. The Controller react on changes only.

**Byte 5**

| | |
|---|---|
| Write handshake | 0 = PR 1713 is ready to receive new data |
| Power fail | RAM-data had changed due to a power failure (without batterie buffering) or a cold-start.<br>The "Power fail" status must be reset by setting the signal "Reset power fail" (bit 5 of byte 7) of the write data. |
| Error: ($2^2$ + $2^1$ + $2^0$)<br>0: O.K.<br>1: Param. error<br>2: Fatal error<br>3: Tol. error<br>4: Flow error | <br>no error<br>parameter error<br>fatal error<br>tolerance alarm<br>flow warning (actual flow < minimum flow) |
| Status: ($2^2$ + $2^1$ + $2^0$)<br>0: ready<br>1: run<br>2: done<br>3: hold/stop<br>4: abort | <br>Batching status is **ready** for restart<br>Batching **runs** (even if flow or tolerance alarm is present)<br>Batching **finished**<br>Batching is **stopped**<br>Batching is **aborted** |

**Byte 6**

| | |
|---|---|
| Parameter error | after each write the parameter will be checked for validity, if it is not valid, the bit will be set and the parameter will be ignored |
| | |
| Batch valve signals:<br>Coarse | <br>batch valve signal coarse flow |
| Fine | batch valve signal fine flow |
| Discharge | batch valve signal discharge |
| Tare active | scale is tared |
| Calibration changed | Calibration is changed. If this bit is set, the weighing parameter (Expo/Unit/Step) had to be read again. It will be set after power-on. FSD has to be read again to reset this bit. |
| Test active | scale is in test mode |

Byte 7

| | |
|---|---|
| Out of calibration | Weight outside W&M conditions. Weight value shows no unit anymore. See W&M conditions: Setup -> weighingpoints |
| Standstill | scale is in standstill condition |
| Within zero set range | scale is within zero set range |
| Zero within 1/4d | scale is zero (+/-weight < 1/4d) |
| Below zero | scale is below zero |
| Higher than overload | scale is loaded above FSD + overload range |
| Above FSD | scale is above FSD (maximum scale value FSD e.g. 5000kg), but lower than FSD + overload. |
| Error in analog converter | scale is in error condition e.g. 'err 3'. Instead of a weight an error number is shown in the display and in gross, net or tare weight. |

## 11.5. Write data

All write values are addressed by write data type request. The data typical for a WP are accessible via various write windows. Access to the WP-independent data is via the write window of WP A or WP B.

| Value in byte 5 Write data type_request | | Write data in byte 0...3 (parameters) | |
|---|---|---|---|
| Dec | Hex | | |
| 0 to 15 | 00 to 0F | reserved | |
| 24 | 18 | Limit1_on value [DINT] | |
| 25 | 19 | Limit1_off value [DINT] | |
| 26 | 1A | Limit2_on value [DINT] | |
| 27 | 1B | Limit2_off value [DINT] | |
| 31 | 1F | Fixtare [DINT] | |
| 50 | 32 | Write 32 bit on SPM-Address 1024...1055 [DINT] | |
| 51 | 33 | Write 32 bit on SPM-Address 1056...1087 [DINT] | |
| 52 | 34 | Write 32 bit on SPM-Address 1088...1119 [DINT] | |
| 53 | 35 | Write 32 bit on SPM-Address 1120...1151 [DINT] | |
| 54 | 36 | Write 32 bit on SPM-Address 1152...1183 [DINT] | |
| 55 | 37 | Write 32 bit on SPM-Address 1184...1215 [DINT] | |
| 56 | 38 | Write 32 bit on SPM-Address 1216...1247 [DINT] | |
| 57 | 39 | Write 32 bit on SPM-Address 1248...1279 [DINT] | |
| 112 | 70 | Set zero | no write data required |
| 113 | 71 | Tare | no write data required |
| 114 | 72 | Reset tare | no write data required |
| 115 | 73 | Activate test | no write data required |
| 116 | 74 | Reset test | no write data required |

Write data

| Value in byte 5<br>Write data type_request | | Write data in byte 0...3 (parameters) |
|---|---|---|
| Dec | Hex | |
| 120 | 78 | Component name for display [characters 1...4] |
| 121 | 79 | Component name for display [Characters 5...8] |
| 122 | 7A | Component name for display [Characters 9...12] |
| 123 | 7B | Component name for display [Characters 13...16] |
| 124 | 7C | Component name for display [Characters 17...20] |
| 125 | 7D | Batch mode [characters1...4]; for start mode 3 or 4 (phase) [USINT] 1...8 |
| 126 | 7E | Batch mode [characters5...8] |
| 129 | 81 | Component parameter preset-point [DINT] |
| 130 | 82 | Overshoot [DINT] |
| 131 | 83 | Tolerance + [DINT] |
| 132 | 84 | Tolerance - [DINT] |
| 133 | 85 | Minimum flow [DINT] |
| 134 | 86 | Calming time [DINT] in steps of 100ms |
| 135 | 87 | Restart mode [DINT] |
| 150 | 96 | Recipe name for display; [characters1...4] |
| 151 | 97 | Recipe name for display; [Characters5...8] |
| 152 | 98 | Recipe name for display; [Characters9...12] |
| 153 | 99 | Recipe name for display; [Characters13...16] |
| 154 | 9A | Recipe name for display; [Characters17...20] |
| 155 | 9B | Recipe number (unless a name was selected) [UINT] |
| 157 | 9D | Line number for display [UINT] |
| 175 | AF | Cycle number for display [UINT] |
| 177 | B1 | Set-point for a recipe start or a phase [DINT] |
| 178 | B2 | Start mode: [USINT]<br>1=with a given name,<br>2=for a recipe number,<br>3=for a batch phase,<br>4=for a batch phase with extended status display<br>The start error is set to zero. |
| from 200 | from C8 | The address range is kept free for the additional user programming. This area will not be used either by the firmware or by the Batch Controller application program in the future. |
| 204 | | reserved |
| 236 | | reserved |

Direct control bits (write bits for the fieldbus master)

| | bit 7 | bit 6 | bit 5 | bit 4 | bit 3 | bit 2 | bit 1 | bit 0 |
|---|---|---|---|---|---|---|---|---|
| **Byte 6** | Start | Restart | | Stop | Abort | Reset/ abort line | | |
| **Byte 7** | Use as fixtare | Set fix-tare | Reset powerfail | Test off | Test on | Reset tare | Tare | Set zero |

**Note:** The addresses and control bits with gray background are handled by the firmware part of the interface. All control bits react only on a 0 -> 1 transition. To detect a transition, the respective status has to be present for at least 40ms.

**Byte 6**

| | |
|---|---|
| Start | start recipe or phase |
| Restart | restart batch |
| | |
| Stop | stop batch |
| Abort | abort batch |
| Reset | skip line in the recipe<br>reset phase from status 'done' or 'aborted' -> 'ready' |
| | |

**Byte 7**

| | |
|---|---|
| Use as fixtare | set the fixtare value to the actual weight |
| Set fixtare | tare the scale with the fixtare value |
| Reset power fail | reset power fail flag |
| Test off | deactivate analog test |
| Test on | activate the analog test |
| Reset tare | reset tare |
| Tare | set tare |
| Set zero | set the scale to zero, if the weight is within the zero set range |

## 11.6. Reading weights

### 11.6.1. Weight value

For reading weights, only the required weight type must be written into byte 4 of the write window (read data type request ). When the weight value is available, the type is returned in byte 4 of the read window. If the weight request remains unchanged, the most recent weight is always updated.
Parallel to that, the status information in byte 7 has to be read.

Write window: byte number / value

| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|
| | | | | 08 | | | |

Read window: byte number / value

| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|
| 00 | 00 | 11 | B4 | 08 | | | |

The displayed numeric value is read out without units and digits behind the decimal point.
Negative values are represented in 2 complement.

Example: Negative weight is -12

Read window: byte number / value

| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|
| FF | FF | FF | F4 | 08 | | | |

### 11.6.2. Exponent, unit, step width

Exponent, weight unit and step width are normally unchanged with a scale and need to be read only once by type 4.

Write window: byte number / value

| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|
| | | | | 04 | | | |

Read window: byte number / value

| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|
| 02 | 03 | 02 | 00 | 04 | | | |

The signification of the first three single bytes is:

Byte 0: exponent
- 0 = 0000 no digits behind the decimal point
- 1 = 000.0
- 2 = 00.00
- 3 = 0.000

Byte 1: unit
- 1 = mg
- 2 = g
- 3 = kg
- 4 = t
- 5 = lb (pounds)
- 6 = l (liters)

Byte 2: step width 1, 2, 5, 10, 20, 50

In this example, the previous weight must be read as 45,32kg with step width 2 .

## 11.7. Taring, zero setting ...

For handling scale functions such as taring and zero setting, the individual bits in byte 7 of the write window are used (assignment). The relevant function is handled by a 0-1 transition of the corresponding bit. For detecting the transition, the respective status has to be present for at least 40ms.

**Signification of bits in write byte 7**

Bit 7 Set the fixtare value to the actual weight
Bit 6 Tare the scale with the fixtare value
Bit 5 Reset power fail flag
Bit 4 Deactivate analog test
Bit 3 Activate the analog test
Bit 2 Reset tare
Bit 1 Set tare
Bit 0 Set the scale to zero, when the weight is within the zero set range.

Example:

When the scale is within the permitted zero set range, this function is handled once.

| Write window: | byte number | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|---|---|
| | value | | | | | | | | 01 |

## 11.8. Set limits

Example:

| Write window: | byte number | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|---|---|
| | value | 00 | 00 | 00 | 64 | | 18 | | |

The limit 1 weight value in decimal representation at address 24 (hex 18) is: 100.
The displayed numeric value is written without units and digits behind the decimal point. Normally, exponent, weight unit and step width do not undergo further changing with a scale and can be read once by type 4. See definition in section **Read weights**.

## 11.9. Starting a batch or a recipe

PR 1713 is provided with a built-in recipe controller, which handles a complete recipe. All components and recipes must be stored in the PR 1713 database. A recipe can be started by recipe start via the fieldbus interface. Subsequently, handling is done independently. Whilst a recipe is running, status information can be read out. After recipe end, a report is made.

Alternatively, a single batch can be used; the batch phase controller. Hereby, only one batch at a time is started. No components or recipes on the PR 1713 are required. Therefore, management of a recipe with calculation of the individual line set-points must be done by the fieldbus master. The single batch with batch valve control runs independently.

PR 1713 can be configured for one or another controller. Switching over via the fieldbus is not possible.

A batch can be started in various modes:
1) Start of a recipe with a recipe name
2) Start of a recipe with a number (nth entry in the alphabetically sorted list of recipe names)
3) Start of a single batch phase
4) Start of a single batch phase with extended status display (name, line number...)

This start mode must be set in address 178 (hex B2). After finishing the recipe or the phase, the start mode is reset to zero. Now, report data can be read.

Write window:

| byte number | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|---|
| value | 00 | 00 | 00 | 03 | | B2 | | |

A set-point must be set for the recipe or a phase in address 177.

In any case, program [Start] must be started by the uppermost operating level. This is a prerequisite for visualization, manual intervention and correct reporting.

### 11.9.1. Batch mode 1: starting a recipe with a recipe name

For starting a recipe with the batch controller, license PR 1713/20 is required. For storage of various recipes in the database, one of which shall be selected for starting, license PR 1713/21 is required.

The following setups have to be done:
In menu [Setup]-[Fieldbus Parameter]-[Scale Interface] = enabled,
in menu [Setup]-[Software Parameter]-[report to] = Application,
in menu [Setup]-[Software Parameter]-[S88.01 Interface] = off.

For this purpose, the fieldbus master must set several parameters only once:
1) Recipe name: 20 ASCII characters in address 150 to 154 (only with license PR 1713/21)
2) Set-point: DINT value to address 177

Before starting, all components and recipes must be entered at the PR 1713. Download/modification via fieldbus is not possible.
Consequently, only the recipes stored in the database can be started.

**Starting:**
1) Start mode: USINT 1 to address 178
2) Start bit: set bit 7 of byte 6 from 0 to 1 (1 has to be present for at least 40ms)

-> Now, the batch is started.

During batching, the user can display the actual process status. For this, see also chapter status display.

At the beginning of a batch start, the start error code (read address 178) is set to zero. Unless starting was possible, the error cause must be read out on this address. It remains unchanged until the next start.

Remark: A list of **error codes** can be found in the **Appendix**

Corresponding messages are displayed on PR 1713. Acknowledgement is either by pressing the ‚quit' key at the instrument, or by writing the last start mode in address 178 via the fieldbus interface. This action also acknowledges the start error.

### 11.9.2. Batch mode 2: starting a recipe with a number

This mode is mainly identical to mode 1. A number instead of a recipe name is transmitted. PR 1713 starts the nth recipe from the alphabetically sorted recipe name list of the database. Management of this procedure by the master is simpler. However, care must be taken not to remove or to insert new recipes on PR 1713.

Note: Recipe names can also start with a number.

For this, some parameters must be set only once by the fieldbus master:
1) Recipe number: UINT n (1 ...) to address 155 (only with license PR 1713/21)
2) Set-point: DINT value to address 177

**Starting:**
1) Start mode: USINT 2 to address 178
2) Start bit: set bit 7 of byte 6 from 0 to 1 (1 has to be present for at least 40ms)

-> Now, batching is started.

### 11.9.3. Batch mode 3: Starting a batch phase

For using the batch phase the license PR 1713/30 must be entered.

The following setups have to be done:
In menu [Setup]-[Fieldbus Parameter]-[Scale Interface] = enabled,
in menu [Setup]-[Software Parameter]-[Report to] = Application,
in menu [Setup]-[Software Parameter]-[S88.01 Interface] = on.
Remark: After setting the S88.01 Interface to on, a **[Cold]-start** is required.

For this, the fieldbus master must set several parameters only once:
- Batch mode: USINT 1...8 (corresponds to batch mode B1...B8)
- Preset-point: DINT
- Overshoot: DINT (write is only possible if phase is in 'ready' state
- Tolerance +: DINT
- Tolerance -: DINT
- Minimum flow: DINT
- Calming time: DINT
- Restart mode: USINT (0 ...4)
- Set-point: DINT

For enabling PR 1713 to display the actual batch status, program [Start] must be started. Press softkey [Start] " ready " is displayed. Now, the unit is ready to start the batch phase.

**Starting:**
1) Start mode: USINT 3 to address 178
2) Start bit: set bit 7 of byte 6 to 1(1 has to be present for at least 40ms)

-> Now, batching starts.

During batching, the user can display the actual batching status. For this, see also chapter status display.

During batching, the actual batch status can be read out via the field bus. The fieldbus master can control via the control bits in byte 6. For this, see section "Batch phase control".
In parallel, manual operator intervention into the process, e.g. for stopping a batch, is possible.
If the overshoot has to be corrected, it will be automatically written to the overshoot parameter (Address 130).

### 11.9.4. Batch mode 4: Starting a batch phase with extended status display

For using the function batch phase the license PR 1713/30 must be entered

The following setups have to be done:
In menu [Setup]-[Fieldbus Parameter]-[Scale Interface] = enabled,
in menu [Setup]-[Software Parameter]-[Report to] = Application,
in menu [Setup]-[Software Parameter]-[S88.01 Interface] = on.
Remark: After setting the S88.01 Interface to on, a **cold** start is required.

For this, the fieldbus master must set several parameters only once.
For executing a phase:
- Batch mode: USINT 1...8 (corresponds to batch mode B1...B8)
- Preset-point: DINT
- Overshoot: DINT (write is only possible if phase is in 'ready' state
- Tolerance +: DINT
- Tolerance -: DINT
- Minimum flow: DINT
- Calming time: DINT
- Restart mode: USINT (0 ...4)
- Set-point: DINT

For showing on the PR 1713 display:
- Recipe name: 20 ASCII characters to address 150 to 154
- Component name: 20 ASCII characters to address 120 to 124
- Line number UINIT value to address 157
- Cycle number UINIT to address 175

For enabling PR 1713 to display the actual batch status, program [Start] must be started. Press softkey [Start] " ready " is displayed. The unit is ready to start the phase.

**Starting:**
1) Start mode: USINT 4 to address 178
2) Start bit: set bit 7 of byte 6 to 1 (1 has to be present for at least 40ms)

-> Now, batching starts.

During the batch, the user can display the actual process status. For this, see also chapter status display.

If the overshoot has to be corrected, it will automatically written to the overshoot parameter (Address 130).

**Note:**
Set-point, recipe name, component name, recipe line number, cycle number and batch mode are taken over once when starting. They can be changed after starting for the next phase.

## 11.10. Batch control

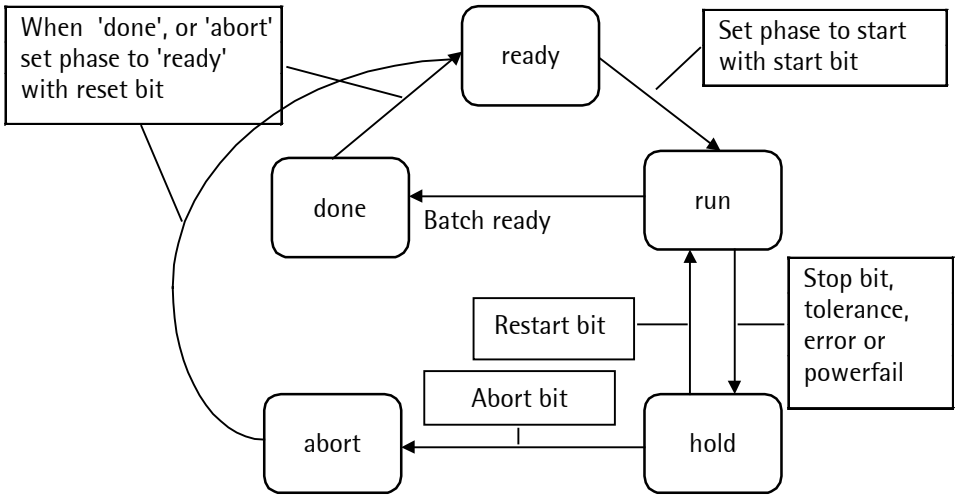
### 11.10.1. Recipe control (Start mode 1 and 2)

The recipe controller manages the overall recipe sequence with several lines. Control is via the direct control bits in byte 6. Note that the signals react only on a 0-1 transition.
The status 0 and 1 have to be present for at least 200ms.
In status 'ready', the controller is ready to start a new recipe. After starting, the recipe status is 'run'.
If the recipe was completed correctly, the controller returns to status 'ready' and remains there. When the batch report is ready, the start mode is reset to zero. In this status, the report data can be read out.
The overshoot parameter optimized by the process can also be read out.
In case of an alarm, the status changes to 'stop'. The same can be done by the 'Stop' bit.
Using the 'restart' signal, the batch is reset to status 'run'
From the 'Stop' status, the actual line can be aborted by 'Abort line'..
With the 'abort' bit, the controller goes to status 'abort' and aborts the batch. Subsequently, it changes to status 'ready' automatically.

### 11.10.2. Batch phase control ( Start mode 3 and 4)

There are different internal batch phase controller statuses. In status 'ready', the controller is ready to start a new phase, 'ready' is displayed.
After a phase start, the batch condition is 'run'. The actual values of the batch phase are displayed.
If a batch is completed correctly, the controller changes to status 'done' and remains there. 'done' is displayed. When the batch report is ready, the start mode is reset to zero. In this status, the report data can be read out. An overshoot parameter optimized by the process can also be read now.

For enabling the controller for a new start, the fieldbus master must bring the controller to 'ready' using the 'reset bit'. This can also be done by the operator, by pressing the PR 1713 'Quit' key. In case of an alarm, the status changes to 'hold'. The phase is stopped. This can be done also by the 'stop' bit or by pressing the 'stop' key.
The 'restart' signal sets the batch to status 'run'.
The 'abort' bit sets the controller to status 'abort' and aborts the batch. For enabling the controller for a new start, the fieldbus master must bring the controller to status 'ready' using the 'reset' bit.
After a warmstart the 'Powerfail'-Bit has to be reset.

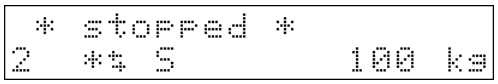



Control is via the direct control bits in byte 6. Note that the signals react only on a 0-1 transition.

### 11.10.3. Manual operation

An operator can stop, restart, or abort a process via the PR 1713 key. For this, see also operating manual PR 1713.

The red stop key can always be used for stopping a batch process manually. The displayed stop message blinks.



## 11.11. Reading the batch status

The batch status can always be read out via read byte 5 and 6.
The valve signals output by PR 1713, i.e. coarse, fine and discharge, are copied into bits 5, 6 and 7 of byte 6.

The statuses for all start modes (i.e. recipe controller and batch phase) are coded in binary form and can be read out via bits 0, 1 and 2 of byte 5.
The alarms are also coded in binary form and can be read out via bits 3, 4 and 5 of byte 5.
When setting the start mode to zero, the reports can be read out

**Start modes 1 and 2**

Status: $(2^2 + 2^1 + 2^0)$

| | |
|---|---|
| 0: ready | Recipe controller is not active (restart is possible) |
| 1: run | Recipe busy (general: with or without error) |
| 2: done | No signification |
| 3: hold | The batch is stopped |
| 4: abort | The batch is aborted |

Error: $(2^2 + 2^1 + 2^0)$

| | |
|---|---|
| 0: O.K. | no error |
| 1: Param error | parameter error |
| 2: Fatal error | fatal error |
| 3: Tol error | tolerance alarm |
| 4: Flow error | flow warning (actual flow < minimum flow) |

**Start modes 3 and 4**

Status: $(2^2 + 2^1 + 2^0)$

| | |
|---|---|
| 0: ready | Status of batch phase is 'ready' (restart is possible) |
| 1: run | The batch runs without error |
| 2: done | The batch is completed |
| 3: hold | The batch is stopped |
| 4: abort | The batch phase is aborted |

Error: $(2^2 + 2^1 + 2^0)$

| | |
|---|---|
| 0: O.K. | no error |
| 1: Param error | parameter error |
| 2: Fatal error | fatal error |
| 3: Tol error | tolerance alarm |
| 4: Flow error | flow warning (actual flow < minimum flow) |

## 11.12. Reading out the batch report

After each recipe or batch phase, a report on the completed operation is provided.
Report preparation is acknowledged by deleting the start mode. Thereby, the lower byte of read address 178 is zero. As long as this acknowledgement was made, the reports are not available. For the report, the following values must be read out:
81: Set-point of batch phase or recipe. This value is identical to the start value.
83: Actually batched weight value
84: Possible errors, which occurred during batching.
130: The overshoot parameter optimized by the process can be read.

Error code for report error at read address 84:
Bit 7: Batching aborted
Bit 6: Tolerance alarm
Bit 5: Parameter error

With start mode 1 and 2 , in [Setup]-[Software Parameter]-[Report to] has to be set to Application as a prerequisite for generating a report. In this case, the batch report can be printed. See operating manual.

Example: reading out the batched weight on address 83 (hex 53):

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Write window: | byte number | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| | value | | | | | 53 | | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Read window: | byte number | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| | value | 00 | 00 | 05 | AF | 53 | | | |

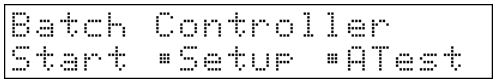
In this example, 1455 kg were actually batched.

## 11.13. Error table

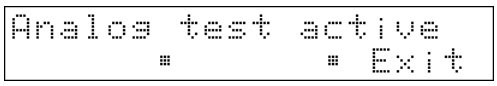
| | | |
|---|---|---|
| Start error<br>Read address<br>178 | 1 | Recipe table cannot be opened |
| | 2 | Recipe unknown |
| | 3 | Recipe line table cannot be opened |
| | 4 | No recipe lines available |
| | 5 | Component table cannot be opened |
| | 6 | No material present |
| | 7 | Bach mode unknown |
| | 8 | Internal error |
| | 9 | No function block with this name present |
| | 10 | Recipe lines are not numbered successively |
| | 11 | PLC bit address not valid |
| | 12 | No function block present |
| | 13 | Type of function block wrong |
| | 14 | Function block has got parameter error |
| | 15 | No free memory space |
| | 16 | Function block parameter error |
| | 17 | Weighing point name not valid |
| | 18 | Analog part not installed |
| | 19 | Simulation error |
| | 20 | Weighing point cannot be reserved |
| | 21 | Weighing point error |
| | 22 - 29 | Internal |
| | 30 | Production table cannot be opened |
| | 31 | Production table cannot be written |
| | 32 | Recipe is already running |
| | 33 - 34 | Internal |
| | 35 | No free memory space |
| | 36 | No license for production |
| | 37 | Set-point is negative |
| | 38 | Too many active weighing points in recipe |
| | 39 | Weighing point not valid |
| | 40 | Weighing point parameter in request component is not valid |
| | 41 | Batch mode not valid |
| | 42 | No memory space for text parameter (Recipe line, component) |
| | 43 | Production line number not valid |

# 12. Analog test

During the calibration of the device a test value is calculated automatically and stored in the EAROM. This value is scaled to the full scale deflection (e.g. 5000).




When the analog test is activated, the measuring signal is disconnected from the load cell. Depending on the calibration the value is displayed as the actual test value
or as the difference between the original stored test value and the actual test value (e.g. 0000).




The analog testremains active, until it is terminated by [Exit] or .

# 13. Tables

## 13.1. Material table

```
MATERIAL :STRUCT
     MAT_IDENT  : STR20;
     PL_ID : STR1;
     WP_ID : STR1;
     BMODE : STR20;
     SPM_IN     : UINT;
     SPM_OUT    : UINT;
     CONSUMP    : WEIGHT;
     STOCK : WEIGHT;
     PRESET     : WEIGHT;
     OVS   : WEIGHT;
     PTOL  : WEIGHT;
     MTOL  : WEIGHT;
     FLOW  : WEIGHT;
     CALMTIME   : TIME;
     REPMODE    : USINT;
     RSTMODE    : USINT;
     NAME  : STR30;
     TEXT  : STR240;
END_STRUCT;
```

## 13.2. Recipe table

### 13.2.1. Recipe header table

Each recipe has one entry in this table

```
RECIPE     : STRUCT
     REC_IDENT  : STR20;
     PL_ID : STR1;
     SETPOINT   : WEIGHT;
     PRODSUM    : WEIGHT;
     NAME  : STR30;
END_STRUCT;
```

### 13.2.2. Recipe line table

In this table are all recipe lines of all recipes

```
RECIPE_LINE      : STRUCT
      REC_IDENT  : STR20;
      PL_ID : STR1;
      LINE  : UINT;
      MAT_IDENT  : STR20;
      TOTMODE    : USINT;
      CALMODE    : USINT;
      SETPOINT   : WEIGHT;
      TEXT  : STR240;
END_STRUCT;
```

## 13.3. Report table

### 13.3.1. Report header table

Each report has one entry in this table

```
REPORT_HEADER    : STRUCT
      REC_IDENT  : STR20;
      PL_ID : STR1;
      SEQNUM     : UDINT;
      SETPOINT   : WEIGHT;
      TOTAL : WEIGHT;
      PROD_NUM   : UDINT;
      CUST_NUM   : UDINT;
      TIMESTART  : DATE_AND_TIME;
      TIMESTOP   : DATE_AND_TIME;
      ACTCHARGE  : UINT;
      MAXCHARGE  : UINT;
      ALARMFLAG  : WORD;
      DELFLGCOM  : BOOL;
      DELFLGPRT  : BOOL;
      TEXT  : STR240;
END_STRUCT;
```

### 13.3.2. Report line table

In this table are all report lines of all reports

```
REPORT_LINE      : STRUCT
      SEQNUM     : UDINT;
      PL_ID : STR1;
      LINE  : UINT;
      MAT_IDENT  : STR20;
      ALARMFLAG  : WORD;
      SETPOINT   : WEIGHT;
      ACTUALW    : WEIGHT;
      OVS   : WEIGHT;
      DELFLGCOM  : BOOL;
      DELFLGPRT  : BOOL;
      TEXT  : STR240;
END_STRUCT;
```

# 14. PR 1613 commands

.
This function enables the use of a selected set of PR 1613 commandsThe license PR 1713/31 must be entered.

The batch start command deletes all recipes and components. Then one component and one recipe with one line is created and started.
Control commands like start, stop or abort can be set via communication and/or by manual operator.
The visualization of the batch process is identical to a manually started recipe. The menu [Start] has to be entered!
After finalizing the batch a report is generated. As only one (the last) batch report is stored, it has to be read out before the next batch is started.

## 14.1. Main commands for indicator function

| command | answer | description |
|---|---|---|
| WGA | QGAwwwwwemz | read gross weight |
| WNA | QNAwwwwwemz | read net weight |
| WTA | QTAwwwwwemz | read tare weight |
| WDA | QDAwwwwwemz | read difference weight |
| | | wwwwwe = weight with exponent<br>(e.g. '002340' = 0.00234kg; 001005 = 100kg)<br>m = standstill<br>z = zero, 1/4d |
| WZA | Q | set indicator to zero |
| WSA | Q | tare |
| WFA | Q | reset tare |
| | | |

## 14.2. Error messages for PR 1613 commands

| Error | description |
|---|---|
| E20000 | unknown command |
| EC0000 | not found |
| EA0000 | table could not be opened |
| E10000 | analog error |
| E65000 | wrong batch mode |
| E10000 | general error |

## 14.3. L-commands for batching

The L-commands are based on 5 digit weight representation (PR 1613) , therefore care has to be taken that only 5 digit calibration formats are used in the instrument.

| command | description |
|---|---|
| LBnnaaaaddwwwwwepppppeooooeettttteffffffe | dd = dosing mode [B1 to B6, D1, D2]<br>oooooe = overshoot<br>ttttte = tolerance<br>ffffffe = flow |
| LBnnaaaaB8wwwwwepppppeyyyy | yyyy = wait time in sec for total discharge |
| | nn = identification number [00..99]<br>aaaa = SPM-address, always 0 [0000]<br>wwwwwe = setpoint with exponent<br>pppppe = preset<br>x... = don't care |
| **answer** | **description** |
| QLBnn-gggggessss | ggggge = gross weight at start<br>ssss = status bits |

| command | answer | description |
|---|---|---|
| LP | QLPnn | stop |
| LG | QLGnn | continue |
| LA | QLAnn | abort |
| LSxxxxxxxx | QLSAnn-wwwwwessssxxxx | nn = identification number<br>wwwwe : gross weight<br>ssss : status bits<br>xxxx : don't care |
| LC1, LC0 | Q | set/reset continuous status read. The answer of the status command is always present and can be read without any further command. |
| LR | QLRddnn-oooooessssswwwwwe | read report<br>oooooe : new overshoot<br>ssssse : setpoint<br>wwwwwe : actual batched weight |

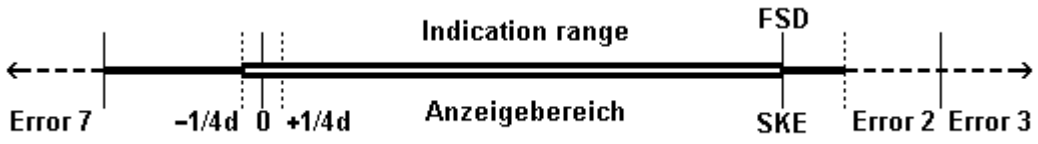
| | | |
|---|---|---|
| LV | QLV1713/00-<br>v.vvaaaaaa_dd010000000000 | v.vv : sw version of application e.g. 1.12<br>aaaaa : FSD. 5 digits (with dec. point 6 digits)<br>_ : space |

# 15. Error messages

## 15.1. Error messages on the weight display

The errorstatuses of the analog part are output on the weight display. They are displayed in code as 'Error X' .


| Display | Description |
|---|---|
| Error 1 | Internal processor overflow (faulty calibration values) |
| Error 2 | The input voltage is above f.s.d. + overload |
| Error 3 | The input voltage is above the permissible value of 36mV. However, the message can also be due to an error in the analog part or load cell, or a cable break. |
| Error 6 | Sense-voltage out of tolerance |
| Error 7 | Negative input voltage or faulty load cell connection |
| Error 8 | ADC error, e.g. hardware defective or overloaded |



## 15.2. Error messages on the text display

These error messages are generated by the Batch Controller.

| Display | Description |
|---|---|
| Dbase error | Opening or writing a table in the database was not possible. The table is reserved by another program, or not existing. |
| Table is empty | No table contents were found. |
| Name already exist | An attempt to insert a new item with a name which already exists in this table into the database was made. The names in a table must be different. |
| Comp. used in rec. | An attempt to delete a component which is used in a recipe was made. Therefore, the component must be removed from the recipe previously. |
| Start error: ## | Error during batch start, ##=error number.<br>1: recipe table cannot be opened<br>2: unknown recipe<br>3: recipe line table cannot be opened<br>4: no recipe lines existing<br>5: material table cannot be opened<br>6: no material existing<br>7: unknown batch mode<br>8: internal error<br>9: no function module of this name existing<br>10: recipe lines are not numbered continuously<br>11: invalid PLC bit address<br>12: no function module existing<br>13: faulty function module type<br>14: parameter error in the function module<br>15: no free memory space<br>16: parameter error in the function module<br>17: invalid weighing point name<br>18: analog section not installed<br>19: simulation error<br>20: weighing point cannot be reserved<br>21: weighing point in error condition<br>22-29: internal<br>30: production table cannot be opened<br>31: production table cannot be written<br>32: a recipe is already running<br>33,34: internal<br>35: no free memory space<br>36: no license for a production<br>37: negative setpoint<br>38: too many active weighing points in the recipe<br>39: invalid weighing point<br>40: weighing point parameter in the request component is invalid<br>41: invalid batch mode for the reactor<br>42: no memory for the text parameter (recipe line, material)<br>43: invalid production line number<br>44: more than one recipe but no license PR1713/21<br>45: more recipe lines as in Software parameter "max recipe lines" defined |
| recipe not starting<br>Start timeout | The recipe controller was unable to handle the recipe. |
| no batch license<br>PR 1713 /21 | Batching license PR 1713/21 is not activated. |
| Analog test failed | Analog test can not be activated. Weighing point is not free or in error. |
| * invalid weight * | only under W&M-mode: NO standstill during taring,report => stop |

# 16. Index

## R



## S



## T

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