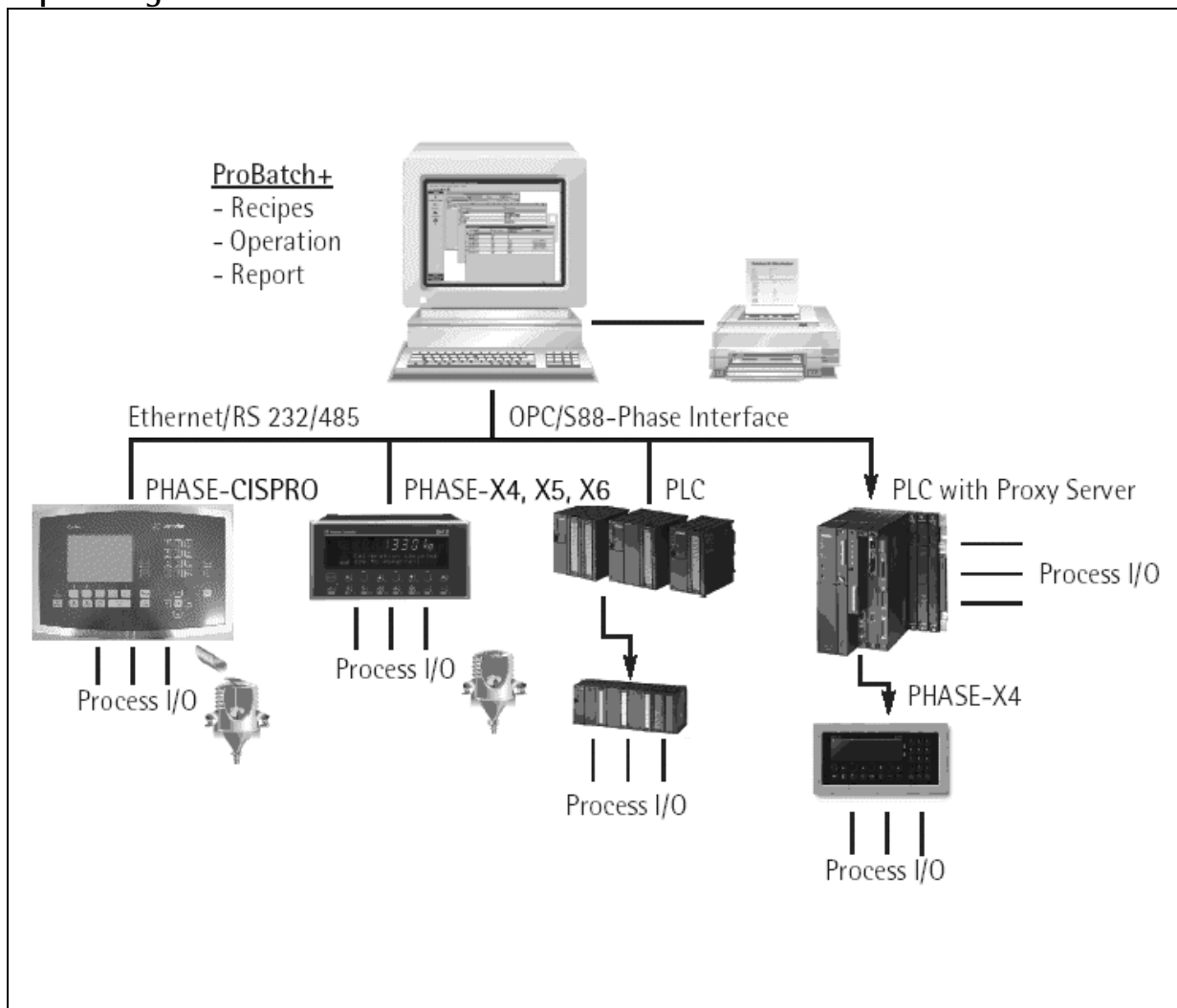


## Recipe and Report Manager

### ProBatch+ PR 8400/00

#### Operating Manual



Operating Manual  
for PR 8400

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# Contents

<b>1</b>	<b>Introduction</b>	<b>7</b>
1.1	<b>General introduction</b>	<b>7</b>
1.1.1	Further manuals	7
1.1.2	System survey	7
1.1.3	Safety instructions	8
1.1.4	Instructions for unpacking	8
1.1.5	Brands, trade marks	9
1.1.6	Intended use of ProBatch+	9
1.1.7	Exemption from liability	9
1.1.8	Disposal	9
1.2	<b>Technical data</b>	<b>10</b>
1.2.1	System requirements on PC hardware and software	10
1.3	<b>Risk consideration</b>	<b>11</b>
1.4	<b>ProBatch+ updates</b>	<b>11</b>
1.5	<b>Licences for ProBatch+</b>	<b>12</b>
1.5.1	Survey	12
1.5.2	Entry of licences	13
1.5.2.1	Entry of licences into the hardware dongle	13
1.5.2.2	Ordering further licences	15
1.6	<b>Installation</b>	<b>16</b>
1.6.1	Installing the ProBatch+ program	16
1.6.2	Installation directories	16
1.7	<b>Communication</b>	<b>17</b>
1.7.1	RS-232 cable for X4/X5/X6	17
1.7.2	Ethernet port for X4/X5/X6 / Combics Pro	17
<b>2</b>	<b>System concept</b>	<b>18</b>
2.1	<b>Survey</b>	<b>18</b>
2.2	<b>Batch controllers connected to ProBatch+</b>	<b>19</b>
2.3	<b>Operating modes</b>	<b>19</b>
2.3.1	Open mode	20
2.3.2	Open mode with external PLC	21
2.3.3	Classic mode	23
<b>3</b>	<b>Quick start</b>	<b>24</b>
3.1	<b>General</b>	<b>24</b>
3.1.1	Preparing X4 / X5 / X6 / Combics Pro	24
3.2	<b>Quick start, open mode</b>	<b>24</b>
3.2.1	Step 1: Installing the software	24
3.2.2	Step 2: Connecting Phase Controllers	24
3.2.3	Step 3: Starting the PR1792 OPC server	25
3.2.4	Step 4: Test of the OPC server	27
3.2.5	Step 5: Starting ProBatch+	29
3.2.6	Step 6: Terminating ProBatch+	29

---

<b>3.3</b>	<b>Quick start, classic mode</b>	<b>30</b>
3.3.1	Step 1: Installing the software	30
3.3.2	Step 2: Connecting Batch Controller X4/X5/X6	30
3.3.3	Step 3: Starting ProBatch+	31
3.3.4	Step 4: Terminating ProBatch+	31
<b>4</b>	<b>System</b>	<b>32</b>
<b>4.1</b>	<b>System general</b>	<b>32</b>
<b>4.2</b>	<b>Commissioning, setting up ProBatch+</b>	<b>33</b>
4.2.1	Start ProBatch+	33
4.2.2	Configuration	33
<b>4.3</b>	<b>User, access privileges</b>	<b>34</b>
<b>4.4</b>	<b>ProBatch+ configuration in open mode</b>	<b>35</b>
4.4.1	Weighing Point Parameters, open mode	36
4.4.2	Simulation	38
4.4.3	Detection of replaced instruments (signatures)	38
<b>4.5</b>	<b>Configuration of ProBatch+ in classic mode</b>	<b>39</b>
4.5.1	Weighing Point Parameters, classic mode	41
<b>4.6</b>	<b>Main recipe parameter</b>	<b>42</b>
4.6.1	Production line	43
4.6.1.1	Batch Parameters	44
4.6.1.2	Report Parameters	46
<b>4.7</b>	<b>Name of Application</b>	<b>47</b>
<b>4.8</b>	<b>Directory</b>	<b>47</b>
<b>4.9</b>	<b>Backup Databases</b>	<b>48</b>
4.9.1	Backup Databases	48
4.9.2	Restore Databases	48
4.9.3	Compact Databases	48
<b>4.10</b>	<b>Reset Productionline</b>	<b>49</b>
<b>4.11</b>	<b>Control Weighing Point (Batch Server)</b>	<b>49</b>
<b>4.12</b>	<b>Windows Settings</b>	<b>49</b>
<b>4.13</b>	<b>Edit Text</b>	<b>50</b>
<b>4.14</b>	<b>Select Language</b>	<b>50</b>
<b>4.15</b>	<b>Debug Telegrams</b>	<b>51</b>
<b>4.16</b>	<b>Debug Batch Server</b>	<b>51</b>
4.16.1	Debug Level 'Off'	51
4.16.2	Debug Level 1	52
4.16.3	Debug Level 2	53
<b>4.17</b>	<b>Debug Script</b>	<b>54</b>
<b>4.18</b>	<b>Batch Server Logfile</b>	<b>55</b>

---

<b>5</b>	<b>ProBatch+ editors</b>	<b>56</b>
5.1	Editors general	56
5.2	Function in selection and editor windows	56
5.3	Component table	57
5.3.1	General	57
5.3.2	Component parameters	58
5.3.2.1	Name	59
5.3.2.2	WP	59
5.3.2.3	Parameter	59
5.3.2.4	SPM-Outputaddress	59
5.3.2.5	SPM-Inputaddress	59
5.3.2.6	Batch Report	59
5.3.2.7	Production Report	59
5.3.2.8	Overshoot	60
5.3.2.9	+ Tolerance, - Tolerance	60
5.3.2.10	Preset Point	60
5.3.2.11	Minimum Flowrate	60
5.3.2.12	Calming time	60
5.3.2.13	Restart mode	61
5.3.3	Batch mode	64
5.3.3.1	Batchable components	65
5.3.3.2	G-component (subsequent setpoint correction)	66
5.3.3.3	Batch mode D1	66
5.3.3.4	Batch mode D2	66
5.3.3.5	Batch mode D1_TARE	67
5.3.3.6	Batch mode D3 (time)	67
5.3.3.7	Batch mode D4 (stop)	67
5.3.3.8	Batch mode D4_DIALOG (dialog)	68
5.3.3.9	Batch mode D4_MESSAGE (message)	69
5.3.3.10	Batch mode D5 (wait bit)	69
5.3.3.11	Batch mode D6 (set bit)	69
5.3.3.12	Batch mode D7 (delete bit)	69
5.3.3.13	Batch mode D8 (acknowledge)	69
5.3.3.14	Batch mode RW, RQ, RL	69
5.3.3.15	Synchronization component / correction recipe	70
5.3.3.16	Script component	70
5.3.3.17	Analog components	72
5.3.3.18	Other batch modes	72
5.3.4	Material tracking (Lot Nr.) Combics Pro, Label Printing	73
5.3.5	Lot-No Evaluation	73
5.4	Recipe structure	74
5.4.1	Sequence control	75
5.4.2	Recipe	76
5.4.2.1	Recipe total mode	78
5.4.2.2	Calculation Setpoint	80
5.4.3	Subrecipe	80
5.4.4	Main Recipe	81
5.5	Productionplan	83
<b>6</b>	<b>Operation</b>	<b>85</b>
6.1	Operation general	85
6.2	Program operation	85
6.2.1	Function keys	85

---

---

<b>6.3</b>	<b>ProBatch+ program description</b>	<b>86</b>
6.3.1	ProBatch+ operating functions	87
<b>6.4</b>	<b>User</b>	<b>88</b>
6.4.1	Login	88
6.4.2	Logout	88
6.4.3	Set Password	88
<b>6.5</b>	<b>ProBatch+ main window</b>	<b>89</b>
6.5.1	General	89
6.5.2	Proces survey	90
<b>6.6</b>	<b>Alarm icon</b>	<b>91</b>
<b>6.7</b>	<b>Message icon</b>	<b>91</b>
<b>6.8</b>	<b>Production manager</b>	<b>91</b>
<b>6.9</b>	<b>Production</b>	<b>92</b>
6.9.1	Single Start of Production	93
6.9.2	Single Start of Production for Main Recipe	94
6.9.2.1	Priorities, synchronous / asynchronous start	95
6.9.3	Start Production Plan	96
6.9.4	Process Control	97
6.9.5	Main Process Control	98
<b>6.10</b>	<b>Report</b>	<b>99</b>
6.10.1	Production and batch reports	100
6.10.2	Main Recipe Report	102
6.10.3	Alarm Report	104
6.10.4	Message Report	104
6.10.5	Exporting reports (Crystal Reports Generator)	105
<b>6.11</b>	<b>Stock/Consumption</b>	<b>106</b>
6.11.1	Stock	106
6.11.2	Consumption	106
6.11.3	Production Quantity	106
6.11.4	Supply	106
6.11.5	Suppliers	106
<b>7</b>	<b>Script</b>	<b>107</b>
<b>7.1</b>	<b>Survey</b>	<b>107</b>
7.1.1	Differences between IEC-61131 and the ScriptEngine	107
7.1.2	Implicit configuration, resources and tasks	107
7.1.3	No functions, function blocks and programs	107
7.1.4	Only Structured Text	107
<b>7.2</b>	<b>Language</b>	<b>108</b>
7.2.1	Character set	108
7.2.2	Identifiers	108
7.2.3	Comments	109
<b>7.3</b>	<b>Data types</b>	<b>109</b>
7.3.1	Numeric data types	110
7.3.2	Logic data types	110
7.3.3	String data types	110
<b>7.4</b>	<b>Variable declaration</b>	<b>111</b>
7.4.1	Global variables	112

---

---

7.4.2	External variables	112
7.4.3	Local variables	112
<b>7.5</b>	<b>Constants</b>	<b>113</b>
7.5.1	Numeric constants (values)	113
7.5.2	String constants (text)	113
7.5.3	Logic constants (operation)	113
<b>7.6</b>	<b>Expression</b>	<b>114</b>
7.6.1	Numeric expressions (values)	114
7.6.2	String expressions (text)	114
7.6.3	Logic expressions (condition)	114
<b>7.7</b>	<b>Program structure</b>	<b>115</b>
7.7.1	Variable:=expression;	115
7.7.2	IF ... THEN ... ELSE ... END_IF	115
7.7.3	FOR ... DO ... END_FOR	116
7.7.4	REPEAT ... UNTIL ... END_REPEAT	116
7.7.5	WHILE ... DO ... END_WHILE	116
7.7.6	EXIT	116
7.7.7	RETURN	116
<b>7.8</b>	<b>General function definition</b>	<b>117</b>
<b>7.9</b>	<b>Numeric functions</b>	<b>117</b>
7.9.1	ABS( )	117
7.9.2	MAX( ), MIN( )	117
7.9.3	SQRT( )	118
7.9.4	SIN( ), COS( ), TAN( )	118
7.9.5	ASIN( ), ACOS( ), ATAN( )	118
7.9.6	EXP( )	118
<b>7.10</b>	<b>String functions</b>	<b>119</b>
7.10.1	LEFT( )	119
7.10.2	RIGHT( )	119
7.10.3	MID( )	120
7.10.4	LEN( )	120
7.10.5	FIND( )	121
7.10.6	INSERT( )	121
7.10.7	DELETE( )	122
7.10.8	REPLACE( )	122
<b>7.11</b>	<b>Functions for logic data types</b>	<b>123</b>
7.11.1	ROL( )	123
7.11.2	ROR( )	123
7.11.3	SHL( )	123
7.11.4	SHR( )	123
<b>7.12</b>	<b>ScriptEngine functions</b>	<b>124</b>
7.12.1	ALARM( )	124
7.12.2	STOP( )	124
7.12.3	MESSAGE_BOX( )	124
7.12.4	INPUT_BOX( )	125
7.12.5	BEEP( )	126
7.12.6	WAIT( )	126
<b>7.13</b>	<b>Recipe parameter functions</b>	<b>127</b>
7.13.1	GET_RECIPE_PARAMETER( )	127
7.13.2	GET_RECIPE_LINE_COUNT( )	127
7.13.3	GET_RECIPE_LINE_PARAMETER( )	128
7.13.4	SET_RECIPE_LINE_PARAMETER( )	128

---

---

7.13.5	SET_REPORT_TEXT( )	129
7.13.6	GET_RECIPES_LINE( )	129
7.13.7	Return value of recipe parameter functions	129
<b>7.14</b>	<b>ScriptEngine examples</b>	<b>130</b>
7.14.1	Confirming a dosing step	130
7.14.2	Calculating a setpoint for the next components	131
7.14.3	Write a message into the alarm table	133
7.14.4	Display the material ident of a script	133
7.14.5	Write a multiplication table into the alarm table	133
7.14.6	Checking all string functions	134
<b>7.15</b>	<b>Reserved words</b>	<b>136</b>
<b>8</b>	<b>Applications with ProBatch+</b>	<b>137</b>
8.1	Applications general	137
8.2	Databases	137
8.3	Report configuration	138
8.3.1	Crystal Reports Generator	138
8.4	DDE description	139
8.4.1	DDE set specifications	139
8.4.2	DDE definitions in ProBatch+	139
8.4.3	DDE variables	140
8.4.4	DDE client command	142
8.4.4.1	Display boxes	145
<b>9</b>	<b>Service</b>	<b>146</b>
9.1	Trouble shooting	146
9.1.1	ProBatch+ maintenance	146
9.1.2	Trouble shooting at the ProBatch+ part of the installation	146
9.1.3	Trouble shooting at the batching part of the installation	147
9.2	Error messages	147
<b>10</b>	<b>Index</b>	<b>151</b>



## 1 INTRODUCTION

### 1.1 General introduction

#### 1.1.1 Further manuals

This operating manual describes the operation of the PR 8400 Pro Batch+ Recipe and Report Management System.

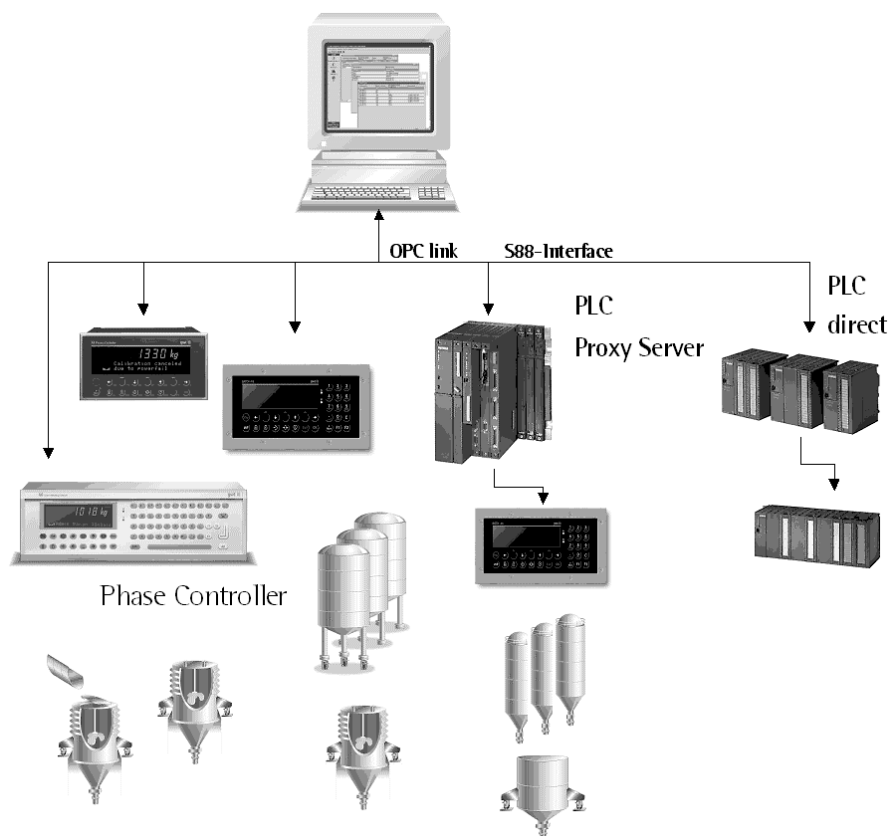
The installation of a proxy server program example on a PLC is explained in the proxy server manual. The user is expected to be in possession of the manuals for PC, Windows and the connected batching controllers. Knowledge of the basic terminology for batching processes and of personal computer and Windows operation is useful. Please, consult the Windows literature, if you have questions concerning fundamental subjects. This manual deals only with ProBatch+-specific subjects.

For the technical details of installation and engineering, we refer to the system documentation of the instruments X4, X5, X6 and Combics Pro and further instruments and programs. The operation is described in the manuals for the 'Batch Controller' and 'Phase Controller' applications.

#### 1.1.2 System survey

**ProBatch+** or **PR 8400** is a recipe and report management system for control and monitoring of a batching system using Batch Controller X4/X5/X6, PhaseController X4/X5/X6 and Combics Pro. Simultaneous operation of several instruments and production lines is possible.

### ProBatch+ concept



The ProBatch+ program is a recipe and report manager for control and monitoring of batching systems with X4 / X5 / X6 / Combics Pro. Simultaneous operation of several batch controllers and production lines is possible. ProBatch+ has the function of a master for batching controllers and can be configured for a wide range of installations. For this purpose, the following tables are kept in ProBatch+ :

- superordinate:                    system settings, reports
- per batching device: components, recipes and reports for the production line

ProBatch+ covers components and recipe management, process control, storage of production data and process monitoring in the status plan. Independent of weighing point data, fields with weight values are displayed with/without digits behind the decimal point, analog values are stored and displayed after conversion.

Access checking by means of various access levels permits separation between various users and the system installer. Preparations are made by a system administrator and by the technical service during initial installation.

All main functions are accessible via the menu bar. Dependent on access level, the user can open all or only defined menu items. For user SYSTEM, all menu items and function keys are accessible.

### **1.1.3 Safety instructions**

ProBatch+ is installed on the hard disk of the PC, which need not be opened for this purpose (for this, see also hints in section Installation). The PC with ProBatch+ and X4, X5, X6 and Combics Pro are electrical apparatus, which may be operated only by trained personnel. Maintenance and repair may be done only by trained and authorized persons (who are familiar with the involved hazards). Before opening the units, disconnect the supply voltage, because live parts can be exposed. Detailed information is given in the relevant instrument manuals.

### **1.1.4 Instructions for unpacking**

Scope of delivery: ProBatch+ is delivered on one CD together with the operating manual. Special instructions for unpacking: Do not remove the packaging by means of sharp-edged tools.

### **1.1.5 Brands, trade marks**

All other brand or product names are trade names or registered trade names of their respective manufacturer or holder.

The terms MS-DOS, MS-Windows, Windows 2000, Windows Xp and MS-Access are registered trademarks of the Microsoft Company.

Crystal Reports Generator is a registered trademark of CRYSTAL, a Seagate Software Company.

### **1.1.6 Intended use of ProBatch+**

ProBatch+ is the operating level for batching instruments X4, X5, X6 and Combics Pro. At Maximum 16 instruments (1 Wp each) can be connected.

A batching installation with ProBatch+ must be set up and operated by trained and qualified personnel.

### **1.1.7 Exemption from liability**

The ProBatch+ program is state-of-the-art. No warranty is taken for correctness, mainly in connection with the third-party software and hardware required for operation of this program.

The manufacturer is not liable for damage caused by other parts of the installation or incorrect use of ProBatch+ .

The above conditions are recognized by using the program.

### **1.1.8 Disposal**

CDs are special waste. Please, follow the regulations of your local waste disposal organization.

## 1.2 Technical data

ProBatch+ supports up to 16 production lines (PL) and 16 weighing points (WP) with max. 16 instruments X4/X5/X6 Combics Pro. An instrument may have max. 2 WPs. Several productions can run simultaneously on a device with production lines and up to 16 partial installations (WP), however, only one recipe at a time can be handled on a PL.

ProBatch+ rel. 2.0 was designed for Windows 2000 and Windows XP. The databases of the ProBatch+ rel. 1.0 can be converted to rel. 2.0.

The PR 8400.EXE program runs optimally in SVGA mode 1024\*768 pixels. Databases MS-Access 2000 are stored in path .....\\DB. Reports can be printed/stored. Data conditioning is possible e.g. by means of the Crystal Reports Generator or by the assistants in MS-Access 2000 format.

Each production line can comprise up to 9999 components, recipes and plans per instrument.

Basic package: - Recipe editing, modification and production, reports

Options:

- Production with a X4/X5/X6, Combics Pro (max. 16 instruments)
- Production plan, consumption and stock control
- DDE access
- PR 8400 control via X4/X5/X6, Combics Pro

### 1.2.1 System requirements on PC hardware and software

The hardware prerequisites are identical to those of Windows 2000 / XP. ProBatch+ does not run correctly with devices and programs, which do not correspond to the specified minimum equipment.

CPU Intel P4, 2GHz

1.024 GB RAM

10 GB free memory capacity on a fast hard disk (excl. Windows)

17-inch colour monitor SVGA 1024\*768 pixel resolution (small fonts)

Operating system Windows 2000 or XP

1 free serial interface (COM2 or COM1) or Ethernet card 10/100 Mbits/sec

Printer port LPT1 with printer

Recommendation: Uninterruptible power supply (UPS) with PC interface, i.e. the PC is shut down automatically in open mode, when the capacity of the UPS is low.

Only one ProBatch+ and one batch server per PC are permitted.

For the installation you need administrator rights on the PC. For operation only user rights are needed.

### 1.3 Risk consideration

For the case of trouble, a sufficient protection against damage (e.g. EMERGENCY OFF) must be provided in the installation.

To avoid data loss and damage to the databases, the PC supply voltage must not be interrupted. Recommendation: Install an uninterruptible power supply and compress and save the data regularly.

ProBatch+ must not be interrupted. Never reset the PC whilst ProBatch+ is running. During start-up and shut-down, the databases are packed (compressed).

During program installation, the folders are copied into Windows directories. Already existing folders with identical name risk to be overwritten. E.g. language-specific messages of other programs may be lost. Moreover, other programs can hinder or interfere with the ProBatch+ operation. Correct operation can be expected only within a computer environment, which complies perfectly with the above-mentioned specifications.

### 1.4 ProBatch+ updates

Updates for this product are available at [www.sartorius-mechatronics.com](http://www.sartorius-mechatronics.com).

## 1.5 Licences for ProBatch+

### 1.5.1 Survey

All parts of the ProBatch+ program are copyright-protected and must not be used for commercial purposes without licence. For operation in production plants, the connected batching controllers must be provided with additional licences, e.g. PR 8400/11 or PR1740/11.

If a licence (PR1740/xx or PR8400/xx) is missing, the function related with the licence is activated only for about 1 hour. Licences PR1713/xx or PR1792/13 are required for operation.

The licences permit the following ProBatch+ functions:

The prepared interface to the Crystal Reports Generator requires the commercially available Crystal Reports Generator, if the reports shall be conditioned in a different way.

The following functions in ProBatch+ are possible with the licences:

#### Licences for Open Mode:

Open Mode	Function
Type of batching controller: Batch server	
PR1713/32 phase batching licence	Activates batching for the Phase Controller. This licence is included in the phase controller scope of delivery.
PR1792/13 OPC server licence	Activates the access by the OPC server. This licence is included in the phase controller scope of delivery.
PR8400/11 for 4 weighing points PR8400/12 for 8 weighing points PR8400/13 for 12 weighing points PR8400/14 for 16 weighing points	Basic licence for production. The Recipe control runs on the PC. According to the number of weighing points (incl. logical weighing points) the corresponding licence must be enabled.
PR8400/21	Starting of the production plan and of consumption and stock control. The licence permits order planning and order management in ProBatch+. This licence must be provided only once.
PR8400/31	DDE data exchange with other Windows programs. This licence must be provided only once.
PR8400/41	Production start and control at the batching controller This licence must be provided only once.

All PR8400/xx licences are loaded in the hardware dongle, which must be connected with the computer continuously for operation.

## Licences for Classic Mode:

Classic Mode Type of batch controller X4/X5/X6	Function
PR1713/20 or PR1713/21	Activates batching for the Batch Controller. Recipe control runs on the controller. This licence is included in the Batch Controller scope of delivery.
PR1740/11	Each batching controller must be enabled for production by an own licence.
PR1740/21	Starting of the production plan and of consumption and stock control. The licence permits order planning and order management in ProBatch+. Only one of the batching controllers must be provided with this licence.
PR1740/31	DDE data exchange with other Windows programs. Each batching controller must be provided with this licence.
PR1740/41	Production start and control at the batching controller ProBatch+ control via Batch X4/X5/X6. Each batching controller must be provided with this licence.

## 1.5.2 Entry of licences

- Licences with PR84xx/xx are enabled via the hardware dongle. Enter the licences with the program "Dongle Maintenance Tool".
- All other licences are entered at the instrument.  
See Installation Manual PR5610 = X5, X6 / PR5510 = X4, Combics Pro.

Each licence number, which is entered in batching controller, is related to the batching controller board number, which, in turn, is related to the serial (LO) number. For help during entry of the licence number, see instrument documentation.

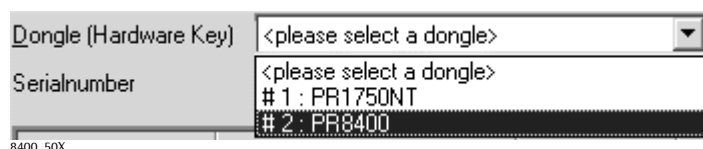
## 1.5.2.1 Entry of licences into the hardware dongle

Install program "Dongle Maintenance Tool" (DongleUpdater.exe).

Insert the dongle into the computer.

Start the dongle maintenance tool .

Select the dongle from the list.

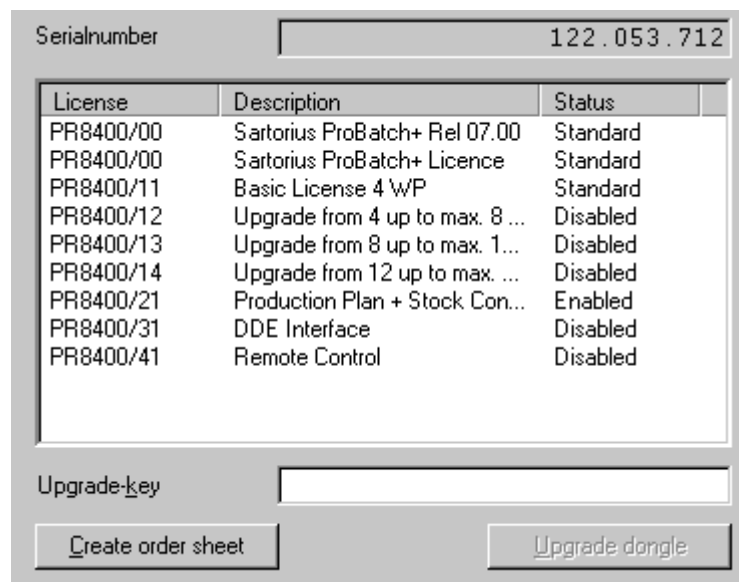


Serial number and available licences are displayed.

*Standard:* This licence is activated as standard.

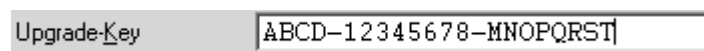
*Disabled:* The licence is not activated.

*Enabled:* The licence is activated.



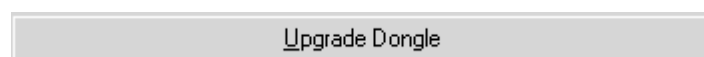
8400\_51X

Enter the 'Upgrade key' .



8400\_52X

Click on the 'Upgrade' button.



8400\_53X

A message is displayed.



8400\_54X

After clicking on 'OK', the new licence is loaded into the dongle.



1.5.2.2 Ordering further licences

Click on button 'Create order sheet'.

A text file is opened, which can be edited, printed out and mailed.

F A X			
(Send this order FAX to your local distributor)			
AN / TO:	VON / FROM		
_____	_____		
FIRMA / COMPANY:	FIRMA / COMPANY:		
_____	_____		
NAME:	NAME:		
_____	_____		
TELEFON / PHONE:	TELEFON / PHONE:		
_____	_____		
FAX:	FAX:		
_____	_____		
SEITEN / PAGES:	DATE / TIME:		
_____	_____		
<b>Order for PR8400 Licenses for Hardware Key (Dongle) Serial No 122.053.712:</b>			
9405 384 00001	: PR8400/00	: Sartorius ProBatch+ Rel 07.00	(Standard)
9405 384 00001	: PR8400/00	: Sartorius ProBatch+ Licence	(Standard)
9405 384 00111	: PR8400/11	: Basic License 4 WP	(Standard)
9405 384 00121	: PR8400/12	: Upgrade from 4 up to max. 8 WP	<input type="checkbox"/> Check to order
9405 384 00131	: PR8400/13	: Upgrade from 8 up to max. 12 WP	<input type="checkbox"/> Check to order
9405 384 00141	: PR8400/14	: Upgrade from 12 up to max. 16 WP	<input type="checkbox"/> Check to order
9405 384 00211	: PR8400/21	: Production Plan + Stock Control	Enabled
9405 384 00311	: PR8400/31	: DDE Interface	<input type="checkbox"/> Check to order
9405 384 00411	: PR8400/41	: Remote Control	<input type="checkbox"/> Check to order
Bitte gewünschte Lizenzen ankreuzen. / Please mark options with a cross to order.			
<b>Software licenses are copyrighted by Sartorius</b>			
Sartorius Mechatronics T&H GmbH		Phone +49.40.67960-303	
Meiendorfer Straße 205		Fax +49.40.67960-383	
22145 Hamburg, Germany		www.sartorius-mechatronics.com	

## 1.6 Installation

The ProBatch+ program is delivered on CD.

The technical prerequisites on the PC for installation of ProBatch+ are listed in section 1.2.1. Please, also note the risk consideration.

### 1.6.1 Installing the ProBatch+ program

For installation, start Windows and then, start the relevant set-up program on the CD (SETUP.EXE). SETUP unpacks compressed files and copies them into the directories.

De-installation is possible via the system control.

### 1.6.2 Installation directories

Databases of ProBatch+ version 1.0 found in the specified directories are converted into the new format during the first start of ProBatch+. The old databases remain unchanged.

The installation program creates a new directory, e.g. \ProBatch+ (installation directory) with the .EXE program and a sub-directory:

\DB for databases 840002C1.MDB, 840002P1.MDB, 840002R1.MDB and Crystal Report files.

The path for the ProBatch+ program created by the installation program need not be identical with the data path of ProBatch+, which can be changed also subsequently using menu [System]-[Configuration]-[Directory].

Changing to a different working directory will create empty databases in the new directory (unless already existing), whereas database 840002C1.MDB with the language and window definitions remains in path \DB. Every directory can comprise up to 9999 components per device, recipe and production plan.

Before the program can be used, it must be set up by user SYSTEM. He starts ProBatch+ under Windows (by double-clicking on the application icon (SYSTEM password after initial installation). After logging in, all functions are accessible via the menu items in the menu bar.

### 1.7 Communication

The communication must be activated on each batching controller. For adjusting the I/O configuration, see instrument documentation. Several instruments connected to the ProBatch+ PC must have the same Baudrate and different device addresses.

The simplest case of communication between ProBatch+ and a batching controller is the connection using RS-232 (V-24) interface and a cable as described in the next chapter.

Alternatively, connection via a bus system for sender and receiver is possible. For this RS485 is used for up to 16 Instruments. The advantage of a bus system compared to a RS-232 point-to-point connection is a considerably higher speed (up to 19600 Baud) over large distances.

On the PC, a special plug-in module or a converter can be used. The connection must be built up by means of a 4-wire BUS system. Details and a circuit diagram are given in the X4/X5/X6 / Combics Pro documentation. The BUS must be switched as described in the documentation.

#### 1.7.1 RS-232 cable for X4/X5/X6

For X5 interface "builtin" or an option card PR 1713/04 has to be used (RS 232). Communication protocol EW-COM V3 must be selected.

Pin allocation of cable plugs (connected pin no. in the same line):

for:	<b>PC RS-232</b>	<b>PC RS-232</b>	<b>X4</b>	<b>X5</b>
			Builtin	builtin
Type:	<b>25-pole</b> 10cm socket	<b>9-pole</b> 3m tel.cable socket 4*0,2	<b>9-pole</b> plug	<b>5-pole</b> terminal block
	Pin no.	Pin no.	Pin no.	Pin no.
	2	3	3	3
	3	2	2	2
	7	5	5	5
	4	7	7	
	5	8		
	6	1		
	8	4		
	20	6		

(links in the connector)

- Project engineering and workshop documents: For wiring, debugging, see special documentation of X4/X5/X6 and Combics Pro.

#### 1.7.2 Ethernet port for X4/X5/X6 / Combics Pro

When using the Ethernet port, 'Network' must be selected as a ComPort. Take care that the IP address corresponds to the instrument address.

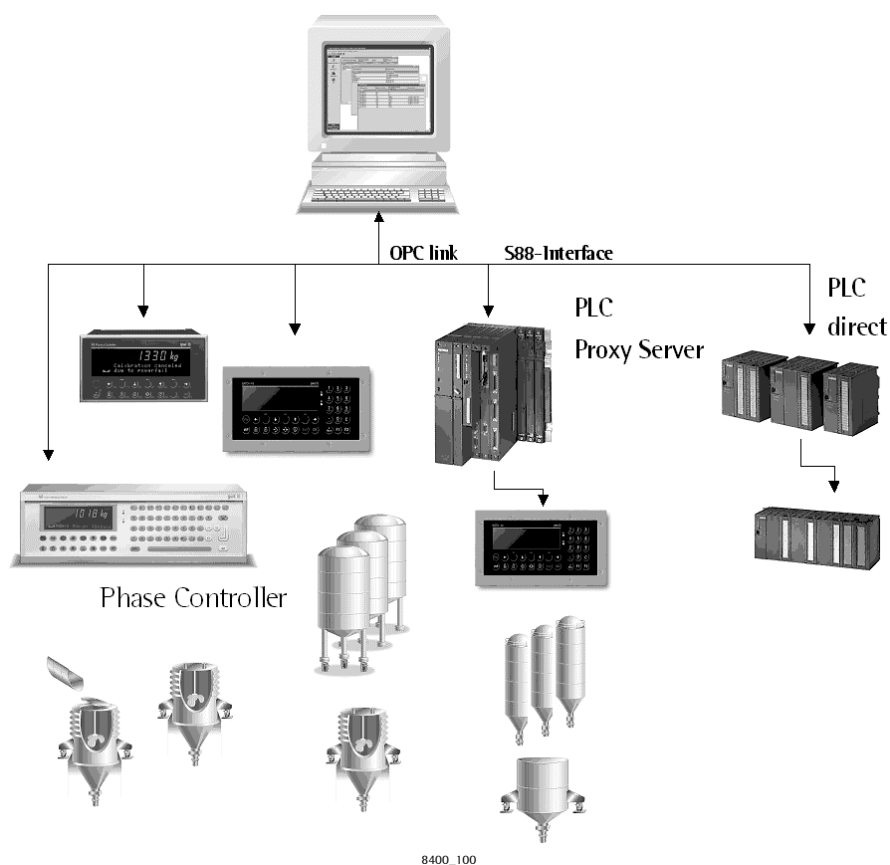
In X4/X5/X6 / Combics Pro, the address can be defined in menu [Setup]-[Network Parameter].

## 2 SYSTEM CONCEPT

### 2.1 Survey

**ProBatch+** or **PR 8400** is a recipe and report management system for control and monitoring of a batching installation by means of instruments Batch Controller X4/X5/X6, Phase Controller X4/X5/X6, Combics Pro. Several batching controllers and production lines can operate simultaneously, whereby ProBatch+ functions as a master for the batching controllers.

### ProBatch+ concept



ProBatch+ includes component and recipe control, process control, production data storage and process monitoring in the status plan. The weight values are displayed in fields. The analog values are stored and displayed after conversion.

Various access privileges to several access levels permit separation of the basic settings and independent operation by several users. Preparations are made during initial installation by a system manager and the technical service.

All main functions are accessible via the menu bar. Dependent of access level, all or only defined menu items are available for a user. User SYSTEM has access to all menu items and function keys. The database is based on MS-Access 2000 and is stored in path \DB. Reports can be printed/stored. Data conditioning is possible e.g. by means of Crystal Reports Generator or MS-Access 2000 assistant.

## 2.2 Batch controllers connected to ProBatch+

Various batch controllers can be connected to ProBatch+ .

- X4 with application 'Batch Controller' or 'Phase Controller'
- X5/X6 with application 'Batch Controller' or 'Phase Controller'
- Combics Pro with application 'Phase Controller'

In the further text of this manual, these instruments are called batch controllers.

A "batch X4/X5/X6" can be e.g. a device PR5510 (X4) or PR5610 (X5) or PR5710 (X6) with application 'Batch Controller'.

## 2.3 Operating modes

The two methods for configuration of the ProBatch+ system are:

### **Open mode:**

The recipe control (batch server) runs on the PC and supports up to 16 phase controllers X4/X5/X6 or Combics Pro.

### **Classic mode:**

The recipe control runs in the batch controller, up to 16 weighing points Batch Controller X4/X5/X6.

The two modes (classic mode and open mode) can be used together in a configuration.

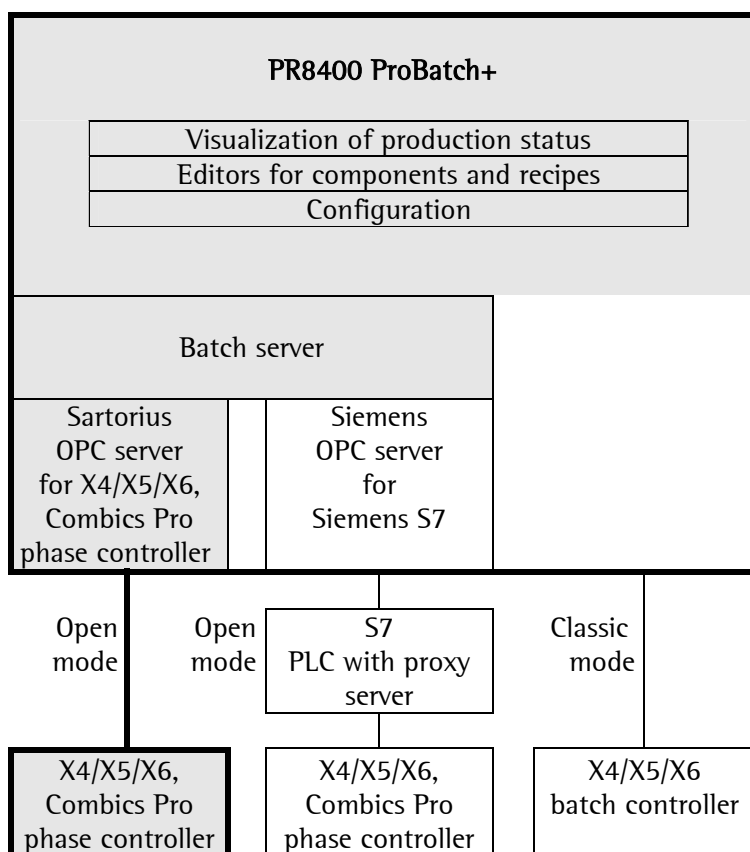
2.3.1 Open mode

ProBatch+ functions as the master for the batch server with phase controllers X4/X5/X6, Combics Pro and/or Siemens S7. As opposed to the classic mode, the recipe control (only one) runs on the PC. Max. 16 batching instruments, max. 16 weighing points and max. 16 production lines are permissible.

	Max. no. of w.points	Max. no. of prod. lines
Batch server (only one)	16	16

For ProBatch+ operation in open mode, set the **batching device type** to **Batch server**. See configuration of ProBatch+, open mode.

Each phase can be assigned to exactly one weighing point (double access via OPC is not permissible: Simultaneous access to phase controllers X4/X5/X6 e.g. via Ethernet or RS232 or PROFIBUS-DP is not permissible. This does not apply to read only data accesses.



In open mode, the recipe control runs in the batch server of ProBatch+. The instruments with the phase controller are connected via serial cable or via Ethernet.

The batch server can communicate with several instruments via OPC server PR1792.

At batch start, the recipe remains in the PC. Only the active batching phase is downloaded into the instruments and started.

The batching device handles the batching phase independently. ProBatch+ visualizes the actual status.

Please, note that the valve(s) for coarse and fine batching are connected with the batching device. An external PLC is not used.

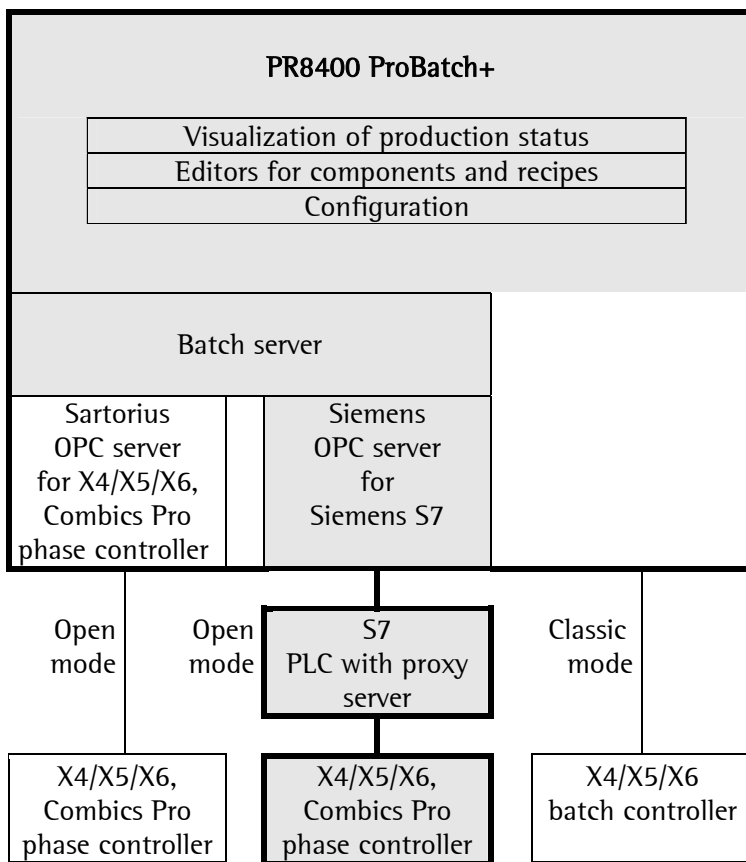
In a recipe the weighing points could be in different instruments.

2.3.2 Open mode with external PLC

In the open mode, an external PLC can be connected between the batching device and the recipe control in the PC. Any logic data functions can be programmed in this external PLC. For instance, a request for a batch start can be delayed, until all required material paths were enabled. Or coordination of the resources used in common, e.g. product paths, hoppers and valves, is possible. During PLC programming, the PLC logic can be coordinated with the ProBatch+ recipe procedure. This mode can be used also for special production steps, which are controlled exclusively by a PLC.

The proxy server is a program for a PLC (e.g. Siemens S7). It permits a communication link for data and control instructions between ProBatch+ on the PC and the connected 'phase controllers'. Thereby, the system data of the weighing points connected to the PLC are also available in the PLC. The actual work program of the PLC can use the proxy server for communication, evaluate the data of the phase controllers and exchange data with them.

Further conditions and configurations are as described in the previous chapter.



In open mode, the recipe control runs in the ProBatch+ batch server.

Dependent on the possible PLC and server functions, the PC is connected with the S7 PLC.

The instruments with the X4/X5/X6, Combics Pro phase controller are connected with the Siemens PLC via Profibus.

The batch server can communicate with several instruments via the Siemens OPC server.

When starting a batch, the recipe remains in the PC. Only the active batching phase is downloaded into the instrument via the proxy server in the Siemens S7, and started.

Any logic functions can be programmed in the S7.

The instrument handles the batching phase independently. ProBatch+ visualizes the actual status.

**Simple example:**

Assuming that 2 weighing points were configured in ProBatch+. WP1 is on the left X5 and WP 2 is on the right X5.

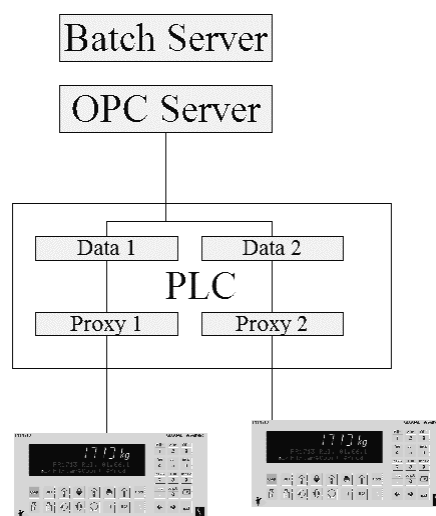
Let's also assume that 2 components were created:

- 'WATER'. Batch mode 'B1' (for detailed information, see phase controller help). A B1 phase sets the scale tare and fills the reactor until reaching the setpoint (e.g. 300 kg). WP 1 is used.
- 'DISCHARGE'. Batch mode B8 is only the discharge function. WP 1 is also used.

... and that there is a simple recipe, in which the first line is 'WATER' (100 kg) and the second line is 'DISCHARGE'.

When starting this simple recipe, the two recipe lines are sent to the batch server by the ProBatch+ GUI program. The batch server handles the recipe line by line:

- The first line is 'WATER'. The batch server checks which weighing point is required for this process step (WP 1). Now, the batch server starts a B1 phase on WP 1, which is located on the left X5.
- As already mentioned, the batch server is connected with the PLC rather than directly with the instrument. Each weighing point must have a 'proxy instance', which is handled on the PLC. An example for a proxy phase code e.g. for S7 300 and S7 400 is included in the scope of delivery. Each proxy instance has an own data block, which can be read and written by means of the S7 OPC server. The status of the instrument phase is determined by the proxy phase and copied into the private data block.
- The batch server waits, until the WP1 phase is IDLE (free, unused). Then it sends all required parameters to the data block.
- Next, the batch server writes command START into the data block.
- The proxy server sends the parameters and the command via the fieldbus interface to the 'real' phase in X4/X5/X6.
- The status of the instrument phase changes to RUNNING and the coarse/fine valve signals are activated. Now, the user PLC program must be matched to the phase. The PLC can reserve a product path (a phase parameter 'SPM\_OUT' can be used to distinguish the paths) and activate the valves.
- When the instrument phase detects that sufficient material was added, the valve signal is deactivated and the phase status changes to DONE.
- The PLC closes the valve and enables the path.
- Now, the batch server collects all information on the last process step (e.g. actual weight, start time, end time ...) and sends command RESET. The phase status returns to IDLE.
- The batch server can start the next recipe line (DISCHARGE in our example).



This was a rather simplified example. Some properties of the batch server are:

- ✓ The batch server can serve several production lines at a time. Production lines comprise one or several WPs.
- ✓ WPs can be used by several production lines.
- ✓ As many active phases as there are WPs are possible.
- ✓ The batch server has an internal script language.

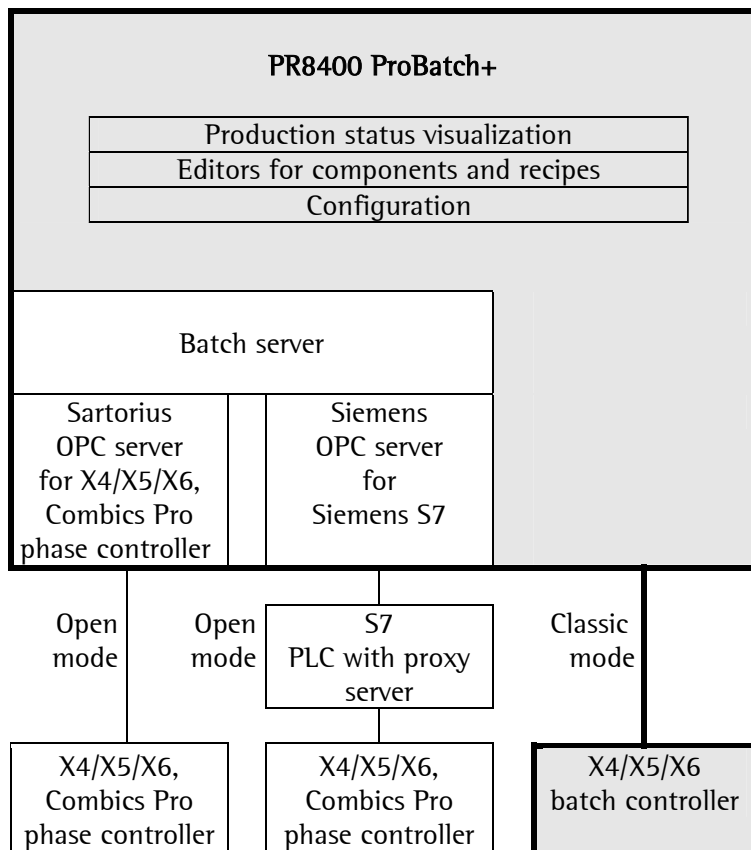


2.3.3 Classic mode

ProBatch+ functions as the master for batching units X4/X5/X6. Every batching device has its own recipe control.

Max. 16 batching devices, max. 16 weighing points and max. 16 production lines are possible.

Batching devices	Max. no. of WPs	Max. no. of production lines
Batch X5/X6	2	1
Batch X4	1	1



Der classic mode is comparable to the operating mode of recipe controller PR1740.

The instrument with the program Batch is connected directly via serial cable or Ethernet.

When a batch is started, the recipe and all required components are downloaded into the batch controller and started.

The batching device handles the recipe independently. ProBatch+ visualizes the actual status.

## 3 QUICK START

### 3.1 General

The following steps are required:

- connecting the instrument(s)
- setting up the system
- defining the components
- editing the recipes
- starting a single production
- displaying the report

#### 3.1.1 Preparing X4 / X5 / X6 / Combics Pro

Note: For adjustment and calibration / verification of the instrument, see installation documentation of the instrument.

### 3.2 Quick start, open mode

In open mode, each instrument controls only the actual batching phase. Recipe control is on the PC.

Required steps:

The database of the previous version (ProBatch+ 1.00) can be converted, provided that the database is in the same directory.

#### 3.2.1 Step 1: Installing the software

Install the software on your PC.

#### 3.2.2 Step 2: Connecting Phase Controllers

The phase controller software must be installed on the X4/X5/X6/Combics Pro.

ProBatch+ uses the PR1792 OPC server for communication with the instrument.

Now, we will explain step by step how to connect a batching device with the PR1792 OPC server. In this example, we start from the assumption that we connect the phase controller with PR 1792 via a serial line. The steps are similar for other instruments, or for Ethernet.

You need:

Phase controller

PR1792/13 (identical with PR1791/13) software licence for the OPC server (see below)

PR1713/32 software licence for phase control

USB dongle: PR8400/11, 4 weighing points (PR8400/12 for 8 , PR8400/13 for 12 or PR8400/14 for 16 weighing points)

PC with CD ROM and Windows 2000 or Windows XP

Special serial cable for the phase controller

Start the phase controller. Press **Setup**.

Scroll to sub-menu **Serial Ports**. Press **OK** (the rightmost button).

Note that you can scroll through the menu items using the scroll keys. You can open a menu item by pressing **OK** . For exit from a menu item, press key **EXIT**. When you have made a change, a prompt whether you want to store the changes is displayed.

Make sure that:

the operator device is not set to **Built-in RS232** interface,

that the printer is not set to **Built-in RS232** interface.

Select **Serial I/O setup Built-in RS232** and press **Return**.

Set protocol **EW-COM V3** ,



Set Baudrate to 19k2 .

Set the 'slave Address' to 'A'. This is the address of the instrument for the serial bus (e.g. RS485, RS422). We will use the built-in RS232, i.e. only one instrument per serial line can be used.

The parity is even (cannot be changed).

The number of bits is 8 (cannot be changed).

Press EXIT.

When you have made a change, a prompt if you want to store the changes is displayed. Confirm with YES.

Scroll to Setup / Software Parameter. Confirm with Return.

Press EXIT .

When you have made a change, a prompt if you want to store the changes is displayed. Confirm with YES.

Scroll to menu item Licence Setup. Press Return.

Make sure that the PR1792/13 OPC server licence is activated.

Check, if the PR1713/32 phase controller licence is activated.

You can order the licence number at Sartorius. Please, note that you need the **board number** to obtain a licence. See phase controller X4/X5/X6 menu [Setup]-[Show Boardnumber] or [Setup]-[License Settings] at Combics Pro.

Keep key 'EXIT' pressed, until 'PhaseController' is displayed (the communication does not function during set-up). Connect a serial cable for the 'builtin RS232' (for wiring diagram, see phase controller documentation).

Connect it with the COM1 or COM2 port of your PC.

### 3.2.3 Step 3: Starting the PR1792 OPC server

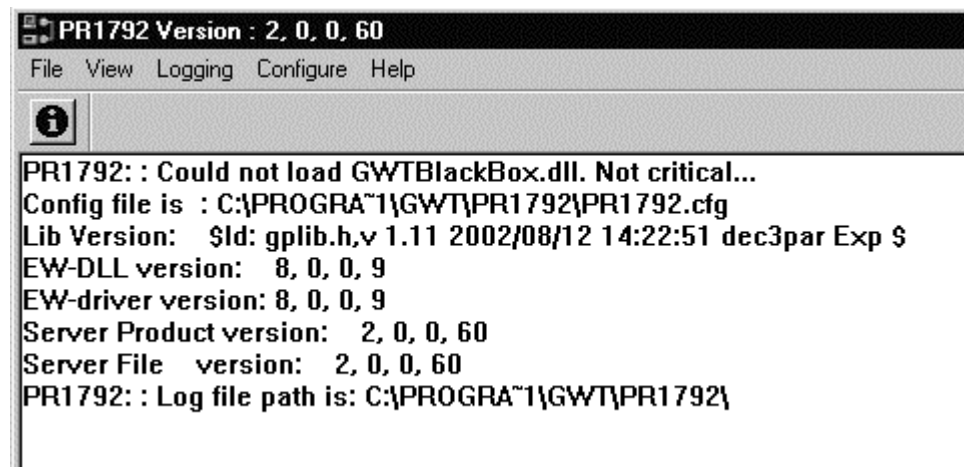
The PR 1792 OPC server is started either by an OPC client or by the operator for interface configuration.

Start PR1792 with: [Start]-[All Applications]-[Sartorius]-[PR1792]-[PR1792 OPC Server]

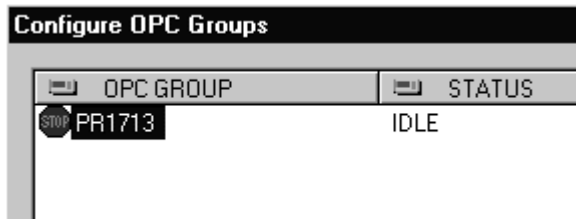


The icon of the OPC server is located at the bottom right in the system 'tray'.

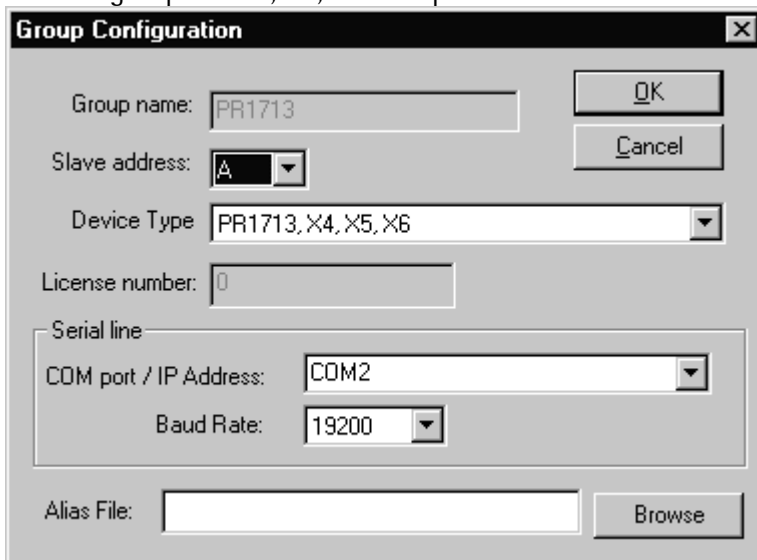
"PR1792 OPC Server"



At first, configure the OPC 'group' for the phase controller. Every instrument has an own OPC group. The OPC server is delivered already with a standard group, which is configured as 'PR1713'. Press button Info, you can select also menu [Configure]-[Show / Edit Group Configuration]. This starts the Configure OPC Groups window.



Click on group for 'X4, X5, X6' and press Edit:



8400\_01x

Select the slave address (it must be identical to the address adjusted during instrument set-up. Select the COM port to which you have connected the serial cable. Now, select the Baudrate (19200 in our example).

It is important in order to make the settings correctly (slave address, device type, ComPort and Baudrate), otherwise, the OPC server cannot communicate with the device.

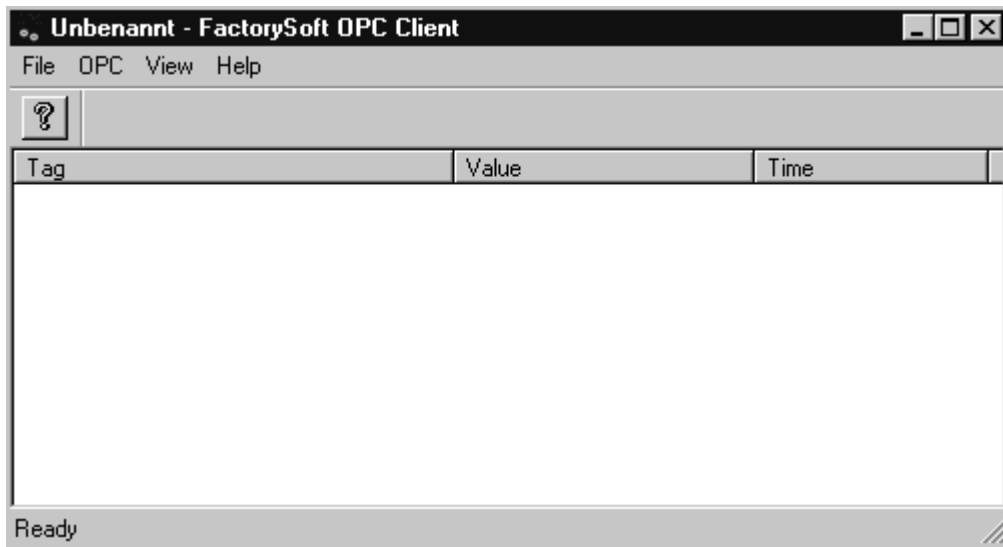
Now, your settings should be identical to those shown in the figure above. Click on 'OK'.

Now, Configure OPC Groups should look exactly like shown above. As you can see, the 'PR1713' group (device) is IDLE, because no OPC client is connected. Note that a second program was started (ewdrv\_01.exe). This is a low-level communication server.

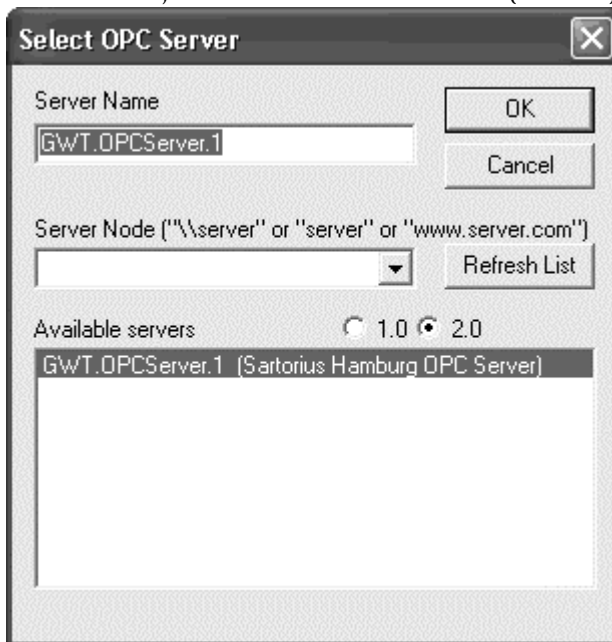
For this reason, please, don't close the program. Every time you start PR1792 again, it will try to start ewdrv\_01.exe too.

### 3.2.4 Step 4: Test of the OPC server

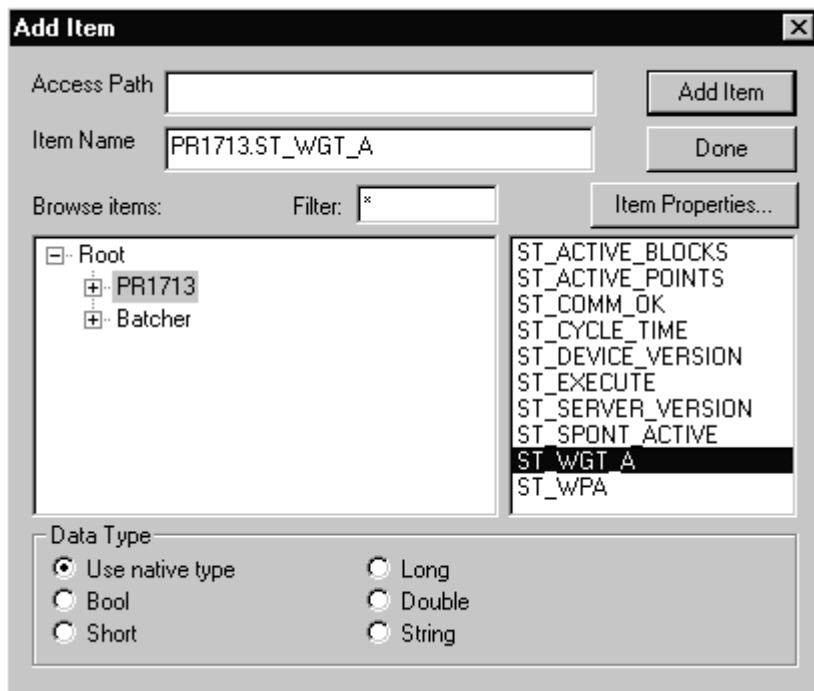
Now, we will test the OPC server with an OPC client application. Start the OPC test client with: [Start]-[Applications]-[Sartorius]-[PR1792]-[OPC Test Client].



Click on OPC, close the GWT.OPCServer.1 (PR1792) and select it.



Click on **OK**. Unless an error message is displayed, you are connected with the PR1792 OPC server. Now, add an 'Item' (menu item OPC/Add Item):



A complete item name comprises the group name ('PR1713' in our case), a dot ('.') and the local item name. Please, enter 'PR1713.ST\_WGT\_A'. 'ST\_WGT\_A' is a predefined item, which contains a character string with the actual weight data. Click on **Add Item** and then on **Done**.

Tag	Value	Time
PR1713.ST_WGT_A	306 kg	10/24/02 12:25:20

When you see a weight value like the one shown above, the OPC connection was successful and you can proceed with the next step.

Note that the values change from **Bad** to the actual weight values (as shown above). Column **Time** contains the last time stamp (the time at which the last changed value was received). Please, have a look at PR1792 window Configure OPC Groups (click on button **Info**):

OPC GROUP	STATUS
PR1713	OK: DEVICE ALIVE
Batcher	IDLE

Note that the group status of the phase controller has changed from **IDLE** to **OK: DEVICE ALIVE** and that the traffic light is green. When the traffic light is red, there is no direct connection. For error messages, please, have a look at the PR1792 main window.

### 3.2.5 Step 5: Starting ProBatch+

Connect the PR8400/11 USB dongle (software licence for 4 weighing points).

Start ProBatch+ with: [Start]-[Applications]-[Sartorius]-[ProBatch+]

Log in as user **System** with password **System**.

Create a **Batching Controller**, menu [System]-[Configuration]-[ProBatch+].

Set **Batch Server** as **Type of Batching Controller**.

Create a **weighing point**.

Set the **OPC server** to **GWT.OPCServer.1**

Set the group defined in **OPC Server PR1792** as **OPC group**.

Set **OPC Item MB1024**, first weighing point in the phase controller.

Adjust the **Full Scale** with **Unit**.

Create a **production line**, **allocate** the weighing point(s) and leave the configuration.

Create a **component** with identification **D3** using **batch mode = D3** (timer), **activate** the **batch** and **production report** for this component.

Create a **recipe**, enter component **D3** and adjust **setpoint 10** seconds.

**Start** the recipe / production with the default parameters, in menu [Production]-[Single Start of Production].

Have a look at the **process window**, for gross weight, recipe, components, setpoint and the actual values.

After production, check the **batch report** or the **production report** .

### 3.2.6 Step 6: Terminating ProBatch+

ProBatch+ can be closed at any time, no matter if the production is still running or already finished.

In order to terminate the programs correctly, an uninterruptible power supply is required.

### 3.3 Quick start, classic mode

In the classic mode (Like PR1740), each batching controller is provided with its own recipe control. Materials and recipes are loaded into the batch controller before starting.

Attention: The classic mode does NOT work with Combics Pro!

#### 3.3.1 Step 1: Installing the software

Install the software on your PC.

#### 3.3.2 Step 2: Connecting Batch Controller X4/X5/X6

The relevant batching software must be installed on Batch Controller X4/X5/X6.

Now, we will show you step by step how to connect a batching device to ProBatch+. In this example, let's assume that we want to connect a batch controller via a serial cable to the PC. The steps are similar for other instruments, or for a connection by means of the Ethernet.

You need:

Batch controller

PR1740/11 and PR1713/21 software licence

PC with CDROM and Windows 2000 or Windows XP

Special serial cable for the batch controller (see below).

Start the batch controller and press **Setup**.

Scroll to sub-menu **Serial Ports**. Press **OK** (the button at the bottom left). Note that you can scroll through the menu items using the scroll keys. You can open a menu item by pressing key **OK**. For exit from a menu item, press key **EXIT**. When you have made a change, a prompt whether you want to store the changes is displayed when leaving the menu item.

Make sure that:

the operator device is not set to **Builtin RS232** interface,

the printer is not set to **Builtin RS232** interface.

Select the **Serial I/O setup Builtin RS232** and confirm it.

Set protocol **EW-COM V3**.

Adjust Baudrate **19k2**.

Set 'slave Address' to 'A'. This is the address of the instrument for the serial bus (e.g. RS485, RS422).

We will use the built-in RS232, i.e. only one instrument per serial line can be used.

The parity is even (cannot be changed).

The number of bits is 8 (cannot be changed).

Press **EXIT**

When you have made a change, a prompt whether you want to store the change is displayed. Reply **YES**.

Scroll to **Setup / Software Parameter**. Press **Return**.

Press **EXIT**

When you have made a change, a prompt whether you want to store the change is displayed. Reply **YES**.

Scroll to menu item **Licence Setup**. Press **Return**.

Make sure that PR1713/21 is enabled.

Make sure that PR1740/11 is enabled.





You can order the licence numbers from Sartorius. Please, note that you need the **board number** to receive a licence. See menu [Setup]-[Show Boardnumber].  
Scroll to menu item Software Parameter. Press Return.  
Check, if parameter [Report to] is set to [communication].  
Check the number of possible recipe lines.  
Make sure that the 'Sub recipe' is activated, if you want to work with sub-recipes.  
Press 'EXIT', until 'Batch Controller' is displayed (the communication does not function during set-up. Connect a serial cable for the 'Builtin RS232' (for wiring diagram, see the installation manual).  
Connect the cable to COM1 or COM2 of your PC.

### 3.3.3 Step 3: Starting ProBatch+

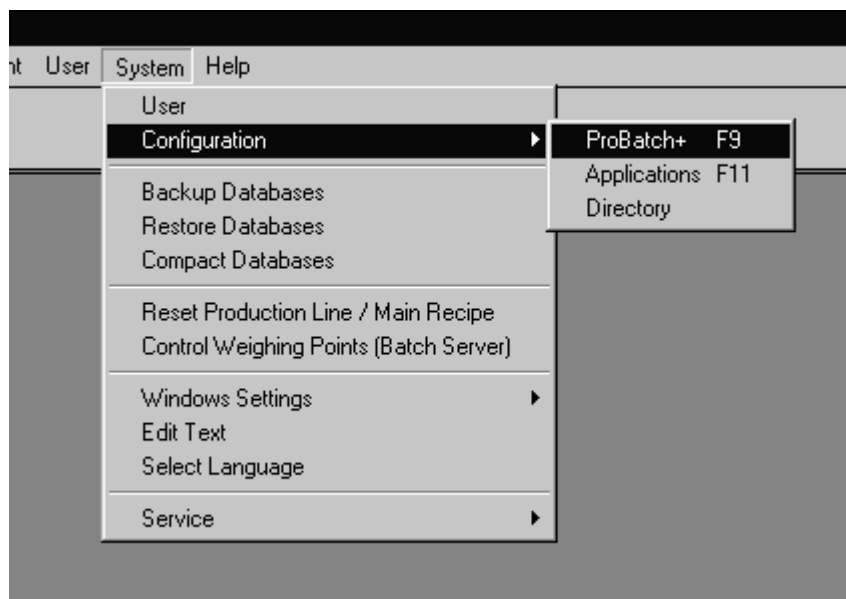
Start ProBatch+ with: [Start]-[Applications]-[ Sartorius]-[ProBatch+]-[PR8400]  
Log in as user System with password System.  
Create a batching device in menu [System]-[Configuration]-[ProBatch+].  
Select the batch controller type: X4/X5/X6  
Select the communication parameters. Select Network for Ethernet, or select ComPort and adjust the slave address for serial communication with Baudrate.  
Create a weighing point.  
Set a weighing point address.  
Set the full scale with unit.  
Create a production line, allocate the weighing point to the production line and leave the configuration.  
Create a component with identification D3 using batch mode = D3 (timer) and activate the batch and production report fort this component.  
Create a recipe, enter the D3 component and adjust setpoint 10 sec.  
Start the recipe / production with start parameters [Production]-[Single Start of Production].  
Have a look at the process window to check the gross weight, the recipe, the components, the setpoint and the actual values.  
After the production, display the batch report or the production report.

### 3.3.4 Step 4: Terminating ProBatch+

In order to prevent data loss and damage to the databases, the operator cannot close the ProBatch+ during production! All running productions must be finished.

## 4 SYSTEM

### 4.1 System general



8400\_55

This menu is used to determine the basic system data such as working directory, batching devices, production lines and global parameters. Normally, these settings are done only once (during **Installation**). Data changes in this area can have decisive consequences for the system function. The user must have logged in with the system privilege, e.g. SYSTEM. A user with system privilege can change the **field width**, e.g. in the production plan.

The data are provided with cross-references. Only data which were not used so far can be changed, unless data based on this information are deleted previously. The following order is applicable:

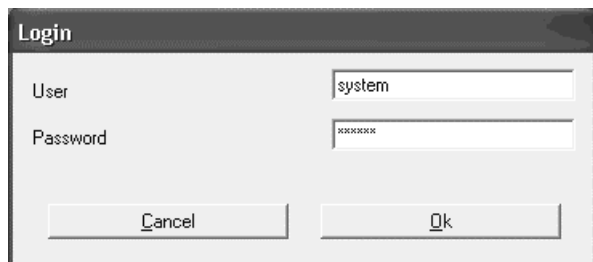
**Batching device -> Weighing point -> Production line -> Component -> Recipe -> Plan**

Report parameters and batching parameters are assigned to the production line, where they are set up in menu [System]-[Configuration]-[ProBatch+]-[Production Line Parameters].

## 4.2 Commissioning, setting up ProBatch+

### 4.2.1 Start ProBatch+

After installation and start, ProBatch+ must be set for the first time. The system manager logs in with **SYSTEM** for user and password.



For safety reasons, the password should be changed immediately after log-in in menu [User]-[Set Password]. Enter the new, secret password (max. 20 characters) into field Password in input window Set Password. Upper or lower case letters are unimportant.

The tasks of the system manager are:

Setting up the user password for ProBatch+.

If necessary, setting up a new working directory: [System]-[Configuration]-[Directory].

Setting up the batching device(s) with weighing point(s) and production line(s): [System]-[Configuration]-[ProBatch+].

For this purpose, buttons [Weighing Point Parameters] and [Production Line Parameters] can be used.

Defining the system parameters. For this purpose, buttons [Batch Parameters] and [Report Parameters] in window [Production Line] can be used.

If necessary, define other application programs (start/activating from ProBatch+) in [System]-[Configuration]-[Applications].

Setting up components, recipes and creating production plans (if necessary).

Subsequently, ProBatch+ is readily set up for production.

### 4.2.2 Configuration

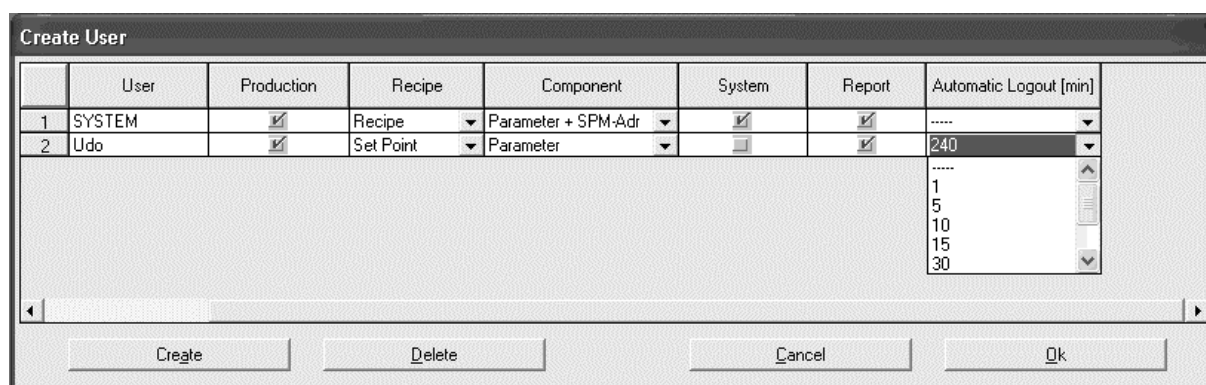
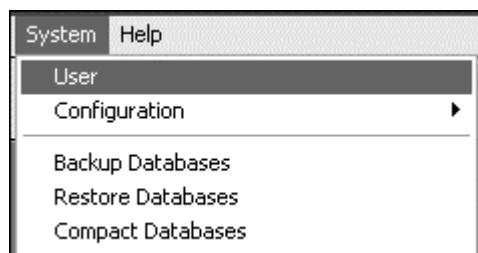
The basic system data are determined in this section, such as batching device with weighing point parameters and production line parameters.

The settings for applications (start/activation) and directory are global parameters for ProBatch+ and not dependent on a production line.

Batch parameters and report parameters are assigned to the production line. They are set up in menu [System]-[Configuration]-[ProBatch+] with [Production Line Parameters]. By clicking on button [Print], the configuration data for devices, production lines, weighing points, etc. can be printed in a table.

### 4.3 User, access privileges

Window [Create User] contains a table for definition of changing of users and their access privileges to ProBatch+. User SYSTEM is always defined and has all access privileges. The system manager can set up max. 50 lines with users for different functions.

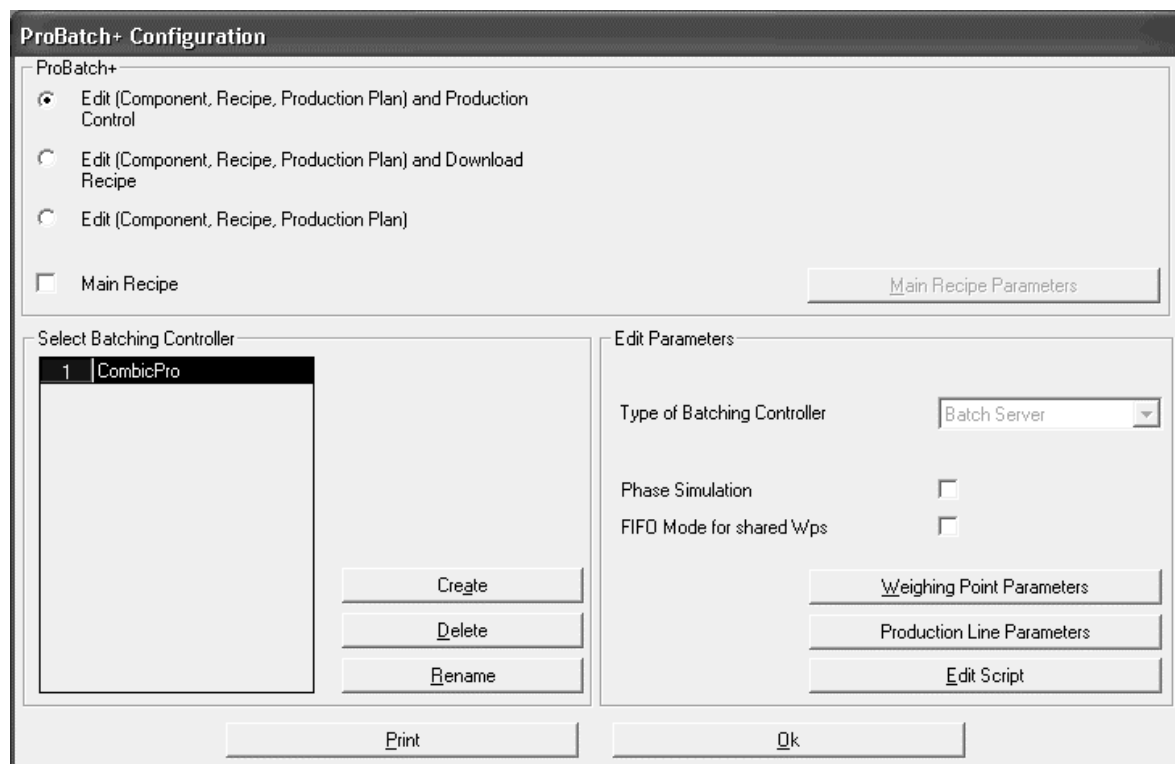


Description	Explanation
User	User name, max. 20 upper/lower case letters (no comparison for upper/lower case)
Password	Password, max. 20 upper and lower case letters (no comparison for upper/lower case)
Production	<input checked="" type="checkbox"/> = Start production by individual recipe or with production plan
Recipe	Select from list: no access or recipe change with setpoint or only setpoint change permitted.
Component	Select from list: no access or component change inclusive of SPM addr. or component change exclusive of SPM addr.
System	<input checked="" type="checkbox"/> = System configuration (safety-relevant), all menus in <b>System</b> : e.g. parameter setting, back-up
Report	<input checked="" type="checkbox"/> = only display, print and delete reports
Automatic Logout (min)	Automatic user logout, if no operation is carried out after a period of the time set in minutes (1, 5, 10, 15, 30, 60, 120, 240) . ----- User remains always logged in.
Create	Permits definition of new users by opening an empty line.
Delete	deletes the selected users. Before deleting, a prompt for confirmation is displayed. All changes are only effective when logging in for the next time. The SYSTEM user cannot be deleted.
Cancel	To the old setting remains unchanged.
Ok	To save current changes and leave the window.

## 4.4 ProBatch+ configuration in open mode

The selected batch controller operates in the open mode, if [Batch Server] was selected as [Type of Batching Controller].

Access to window [System]-[Configuration]-[ProBatch+] is possible only with system privileges.



8400\_02

Required procedure for creating and configuring an installation (specifications are interdependent in the following order):

### ProBatch+

#### Mode for ProBatch+

- Edit (Component, Recipe, Production Plan) and Production Control  
-full function
- Edit (Component, Recipe, Production Plan) and Download Recipe  
- ProBatch+ is used for editing and downloading of the recipes into the batching devices
- Edit (Component, Recipe, Production Plan)  
- ProBatch+ is used for data editing/change/display e.g. on a second PC with the same ProBatch+ database.

#### FIFO Mode for shared WPs

If activated, the WPs are assigned in FIFO-mode (in order of requests)

#### Main Recipe

= main recipes can be edited and started. Starting a production for single recipes is disabled.

Production plan creation/start is de-activated, for description, see chapter 5.4.4.

### Select Batching Controller

Setting up and selecting a batching controller:

**Create:** The name (max. 20 characters) for the batching controller can be entered.

**Delete:** The marked device can be deleted.

**Rename:** To overwrite the name.

### Edit Parameters

#### Type of Batching Controller

For the **open mode**, batching controller type [Batch Server] must be selected.

#### Phase Simulation

- If activated, the recipe sequence (phases) in the batch server is simulated. In this mode, an external instrument is not required. Please, note that the simulation can be only a rough approximation to the 'real' system. However, most batch modes can be used purposefully. The simulated weighing points are adapted to the settings in ProBatch+.

#### Weighing Point Parameters

A weighing point must be edited always by clicking on button [Weighing Point Parameters] (chapter 4.5.1).

#### Production Line Parameters

Editing a production line is done by clicking on [Production Line Parameters].

#### Edit Script

Editing of global script parameters. See Chapter Scripts.

### Print

Prints the batching controller data.

#### 4.4.1 Weighing Point Parameters, open mode

**Weighing Point Parameters - [CombicPro]**

Select Weighing Point

1	WP-A
2	WP-B

Create  
Delete  
Rename

Edit Wp

Name: WP-A

WP-Address: A

Liquid Counter:

Full Scale: 3000 kg

Max. Residue: 99,00 %

OPC Server: GWT.OPCServer.1

OPC Group / Item Address: CombicsPro MB1024

Label Printer: \\gwthhsprt\D006

Ok

8400\_05

The weighing point data are stored in the weighing point parameters (database). Normally, this is done during initial commissioning. When this weighing point is used by components and recipes subsequently, weighing point address and unit cannot be changed any more (unless all recipes and components dependent on this weighing point are deleted previously). For editing a new weighing point, click on **Create** and enter the weighing point data of the instrument. Click with the right mouse key to display the configuration of a connected instrument in the window, e.g.: A: 1000 kg .

<b>Name</b>	An additional text (max. 30 characters) for description of the weighing point which is used in all other windows instead of the Wp ident can be defined.
<b>WP Address</b>	An instrument can have one or two weighing points. These weighing points are described with the address A or B.
<b>Liquid Counter</b>	Weighing points A or B can be defined in Phase Controller X5/X6, Combics Pro (see documentation). When activating the checkbox for the liquid counter, a field in the component definition for parameter density is inserted. Only batch modes B1 - B3, G1 - G3 are permissible with liquid counter.
<b>Full Scale</b>	The full scale of display and the digits behind the decimal point must correspond to the full scale of display of the instrument.
<b>Max. Residue</b>	The maximum residue indicates the maximum value which may be in the hopper before batching start. If the residue is too high, an alarm message at production start is output. With max. residue=0, the test during production start is omitted.
<b>Label Printer</b>	Selection of network printer per weighing point

#### OPC Server

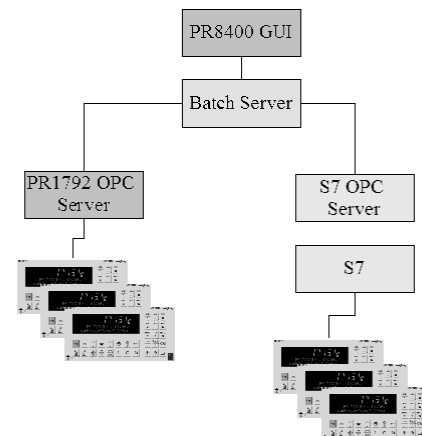
GWT.OPCServer.1 for the instruments, Phase Controller X4/X5/X6, Combics Pro.

OPC.SimaticNet for connection of a Siemens PLC with the proxy server program.

OPC.xyz further OPC servers for manufacturers of other PLC systems are in preparation.

The batch server process (atlbatch.exe) is started automatically by ProBatch+ and is handled as a background process. The batch server is the central processing and coordination unit. The instruments can be addressed via the OPC servers.

- Can be connected directly with instruments X5 or X4 – by direct use of the PR1792 OPC servers. -> GWT.OPCServer.1
- Can be connected also 'via' an S7 PLC – by using the S7 OPC server. In this case, the PLC process steps can be synchronized very easily with the batching steps. -> OPC.SimaticNet



8400\_48

#### OPC Group / Item Address

OPC Server = GWT.OPCServer.1

The group name is defined in the PR1792 (GWT.OPCServer). E.g. X4, X5, X6.

PR1792 must be configured before ProBatch+ is started.

**Item Address:**

MB1024 for the first weighing point of phase controller X4/X5/X6, Combics Pro  
or

MB1344 for the second weighing point of phase controller X5/X6, Combics Pro

OPC Server = OPC.SimaticNet

Only one parameter: Example: 'S7:[S7\_1]DB1'

#### 4.4.2 Simulation

The batch server can be operated in simulated mode. In this mode, no external instrument is required. This mode can be activated in ProBatch+ (F9 configuration).

The batch server simulates the behaviour of an external instrument.

**Please note, that the simulation can be only a rough approximation to the 'real' system.**

However, most batch modes can be used purposefully.

The simulated weighing points are adapted to the settings in ProBatch+.

#### 4.4.3 Detection of replaced instruments (signatures)

Signatures are used for detection of instrument replacement. During initialization, the batch server writes a "unique" signature into the S7 and/or instrument communication data structure.

A replaced instrument can be detected by means of the signature.

With ProBatch+, the same procedure is used, in order to make sure that the batch server still uses the same configuration (number of weighing points, number of production lines ...) as the ProBatch+.

When e.g. stopping the ProBatch+ and making changes to the database, the configuration (WP, recipes, production lines, etc.) of ProBatch+ and batch server may not correspond any more when restarting the ProBatch+ .

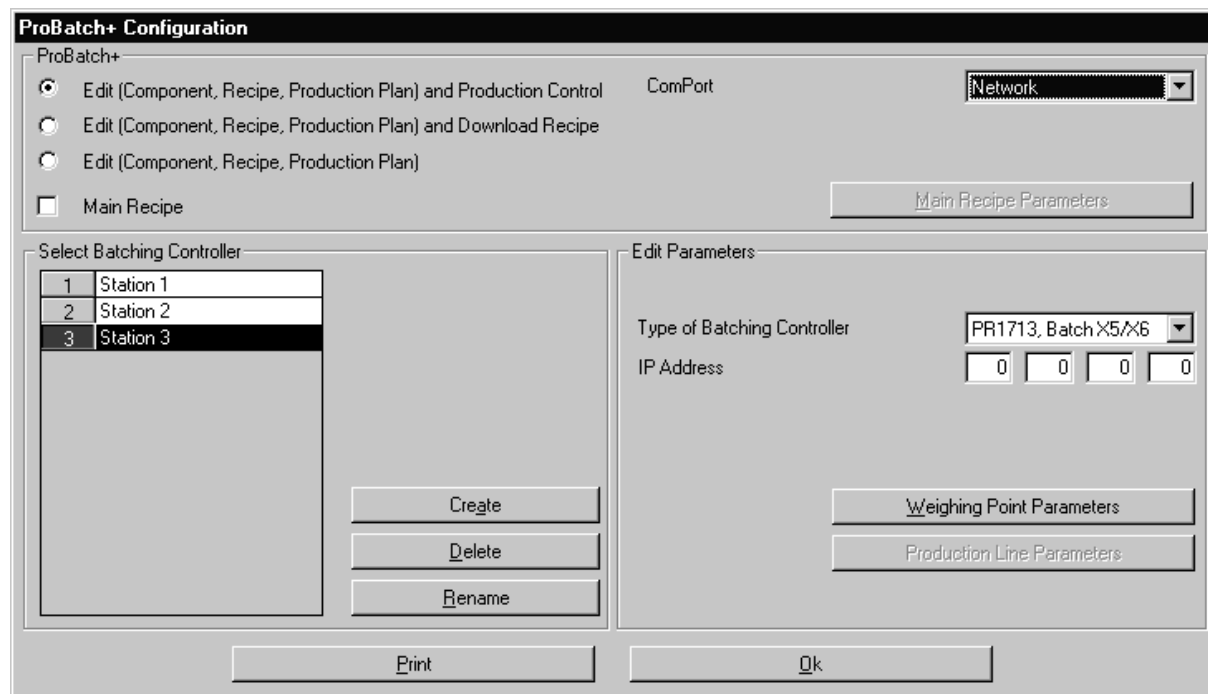
In this case, the ProBatch+ re-initializes the batch server and displays an error message.



## 4.5 Configuration of ProBatch+ in classic mode

The selected batching controller operates in classic mode, when Batch X4/X5/X6 was selected in parameter [Type of Batching Controller].

Access to menu [System]-[Configuration]-[ProBatch+] is possible only with system privilege. This window contains the interface parameters for the PC and for the already defined instruments. You can rename or delete (unless used otherwise) and define max. 16 batch controllers.



Required procedure for creation and configuration of an installation (the specifications are interdependent in this order):

### ProBatch+

#### ComPort

You can select, if the communication for the selected batch controller should be via a serial line or via network.

With ComPort set to Network, the **IP Address** must be specified.

Unless ComPort is set to Network, the ComPort address (**COM1, COM2,...**) must be selected at the PC. In this case, the **Device address** must be selected.

#### Baudrate

Baudrate on the PC (e.g.: 19200). The Baudrate must be set identically on all instruments.

#### Mode for ProBatch+

- Edit (Component, Recipe, Production Plan) and Production Control  
- full function
- Edit (Component, Recipe, Production Plan) and Download Recipe  
- ProBatch+ is used for editing and download of recipes into the batching devices
- Edit (Component, Recipe, Production Plan)  
- ProBatch+ is used for data editing/changing/display e.g. on a second PC with the same ProBatch+ database.

#### Main Recipe

= Main recipe can be edited and started, production plan editing/start is de-activated, for description, see chapter 5.4.4.

**Select Batching Controller**

Setting up and selecting a batching controller:

**Create:** The name (max. 20 characters) for the batching controller can be entered.

**Delete:** The marked device can be deleted.

**Rename:** To overwrite the name.

**Edit Parameters****Device Address / IP Address**

Device address from A to Z for communication / IP address with network

Type Batch X4/X5/X6

Note that the IP address must correspond to the device address. E.g. with Batch X5, the address is adjustable in menu [Setup]-[Network Parameter].

**Type of Batching Controller**

For the **classic mode**, Batch X4/X5/X6 are selectable as type.

**Weighing Point Parameters**

A weighing point must be defined always by clicking on button [Weighing Point Parameters] (chapter 4.5.1).

**Production Line Parameters**

Definition of a production line is always using button [Production Line Parameters].

**Print**

For print-out of the batching controller data

## 4.5.1 Weighing Point Parameters, classic mode

8400\_04

The weighing point data are specified in the weighing point parameters (database). Normally, this is done during initial commissioning. If this weighing point is used by components and recipes subsequently, weighing point address and unit cannot be changed any more (unless all recipes and components dependent on this weighing point are deleted). For definition of a new weighing point, click on **Create** and enter the instrument weighing point data. Click on the right mouse key to display the configuration of a connected instrument in the window, e.g.: A: 600 kg. Weighing points, which were defined without existing in the batching device are displayed with error status in the process survey.

<b>Name</b>	An additional text (max. 30 characters) for description of the weighing point which is used in all other windows instead of the Wp Id can be defined.
<b>WP Address</b>	A batching device can have one or several weighing points. These weighing points are identified with the weighing point address: A or B.
<b>Liquid Counter</b>	Can be defined as weighing points A or B in Batch X5/X6 (see documentation). In ProBatch+, they are created as weighing point with the values defined in Batch X5/X6 by <b>Select Weighing Point</b> . When activating the checkbox for the liquid counter, a field for parameter density is inserted in the component definition. Only batch modes B1- B3, G1- G3 are permissible with liquid counter.
<b>Full Scale</b>	The full scale and the digits behind the decimal point must correspond to the instrument full scale of display.
<b>Max. Residue</b>	The maximum residue indicates the maximum value which may be in the hopper before batching start. If the residue is too large, an alarm message is output at production start. With max. residue=0, the test during production start is omitted.
<b>Label Printer</b>	Selection of network printer per weighing point

## 4.6 Main recipe parameter

= Main recipe activated, for description, see Main recipe

**Main Recipe Parameters**

Header Strings

Order Ident String: Auftrag

Customer Ident String: Kunde

Header String

Report Setup

Print Production Report

Print Batch Report

Store Report

Sequence Number

Sequence Number: 7

Batch Setup

Production With Recipe Total

Cancel

Ok

8400\_58

You can use the fields for Order Ident String and Customer Ident String as required and change the specifications in the fields. Enter the required text into the relevant input field. A text for the header of the batch and production report, which will be displayed or printed out at the beginning of each report can be defined in the two following lines.

### Print Production Report

= the production reports are printed out immediately after report creation.

### Print Batch Report

= batch reports are printed immediately after completion of the batch.

### Store Report

= the reports are stored in the database after creation.

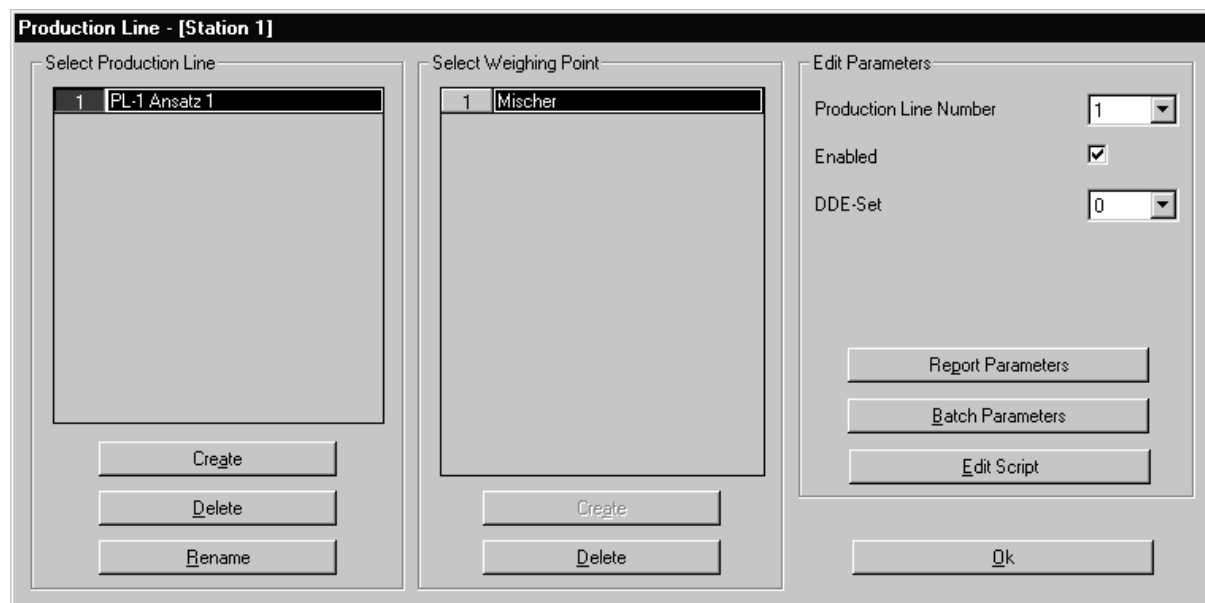
### Sequence Number

A unique batch sequence number for each production line (8 digits, default value is 1). The consecutive number is displayed in the window for process control. If necessary, the user can determine a new number.

### Production With Recipe Total

= The production is always started with the recipe total.

4.6.1 Production line



8400\_06

Type of batching device	Maximum number of production lines
Batch X4/X5/X6, (classic mode)	1
Batch server, (open mode)	16

The production line ident is unambiguous and can be defined only once for all batching devices. The name of a production line can be independent thereof (the production line ident is proposed). Each production line has its own units (weighing points), components and recipes.

The previously defined weighing points of a batching device are allocated to one or several production lines. Thereby, common weighing points can be created. Subsequent changes for the selected production line are possible in 'Edit Parameters' :

One recipe at a time on each production line can be handled in parallel to the other production lines. The production status is displayed individually for each production line and each weighing point. Adjustments as e.g. for the division of a production into batches can be made in the window opened by clicking on button **Batch Parameters**. The report parameters can be adapted in **Report Parameters**.

**Production Line Number**

Only free numbers (1 - N) from the list are selectable.

**Enabled**

= enabled

**DDE Set**

For DDE access, a free set (out of 16 sets, or 0) for this production must be selected.

The DDE Set (1 to 16) allocates the available DDE variables to a defined production line (with min. one weighing point). A DDE licence is required. Specify 0, unless DDE should be used.

**Edit Script**

Can be used for editing or changing the production line script parameters, see chapter 7.

## 4.6.1.1 Batch Parameters

**Batch Parameters - [PL2]**

Production

Set Point in %

Batch Setup

Equal Batches

Max Batch, Rest To Complete

Max Batch, Rest Equally Divided Over The Last 2

N \* Batch

Production With Recipe Total

Load Recipe when set points has changed

Sequence Number

Sequence Number

Start Mode

With release of production at device

With release of each charge at device

8400\_07

**Set Point in %**

Select, if the setpoint should be specified as a weight or as a percentage of the recipe total at production start.

Not activated: the setpoint is entered as a weight.

Activated: the setpoint is specified in % of the recipe total.

**Batch Setup**

Select between a production with N batches and 3 different algorithms for automatic determination of the batch size.

**Automatic calculation of the batch size:**

In this case, the **Reference Weight** of the recipe is the decisive value for batch calculation, maximum batch size. A production order which exceeds this weight is divided into smaller, producible batches according to the selected algorithm, whereby a maximum number of 999 batches are possible (higher weights are limited to this value).

**Equal Batches**

Equal batches up to the reference weight are defined. Batch calculation: Production total divided by next integer number of (total/reference weight).

**Max Batch, Rest To Complete**

Batch size is always = reference weight, any rest in the last batch.

**Max Batch, Rest Equally Divided Over The Last 2**

Batch is always = reference weight, except with the last 2 batches of the production. The remaining weight is distributed to 2 equal batches, in order to prevent minimum rests.

**N \* Batch**

Number of batches and batch size are selectable in the production plan or at production start.

**Production With Recipe Total**

= A production is always started with the recipe total. Only possible, if batch mode N\* Batch

was selected.

#### Load Recipe when set points have changed

= The recipe is reloaded automatically with the next batch, if the component setpoints of a recipe have changed during a current production. This function is carried out only in N \* Batch mode.

#### Sequence Number

An unambiguous sequence number (8 digits, default value is 1) can be defined in section Batch Parameters for each production line during system set-up. The consecutive numbers are displayed in the process control window and output in the batch report. If necessary, the operator can set a new number.

#### Start Mode

With release of production at device

With release of each charge at device

= triggers the event in batching controller, otherwise the function is switched off:

Production line	Event
1	21
2	22
3	23
4	24

The batching controller requires a special user-related program which also includes on-site operation. The real allocation to input area 1 depends on the PLC program, where it is programmable.

Not available in open mode!

## 4.6.1.2 Report Parameters

**Report Parameters - [PL-1 Ansatz 1]**

Header Strings

Order Ident String: Auftrag

Customer Ident String: Kunde

Header String: ABC

Header String: DEF

Report Setup

Print Production Report

Print Batch Report

Store Report

Store Flow Alarm

Cancel

Ok

8400\_08

**Header Strings / Ident String**

The order and customer ident strings can be used as required and the ident strings can be changed. Enter the required text into the relevant input fields. A text for the header of batch and production report, which is inserted at the beginning of each report, can be defined in the two following lines.

**Report Setup: Print / Store**

A batch report is made automatically after each batch.

The report set-up determines what shall be done with the reports. Print-out can be automatic or on request. The Windows print manager should always be activated previously (after printer selection in Windows), otherwise, the error messages cannot be handled. For creating a report, please, tick the required checkbox:

- Print Production Report  
 = Reports are printed out immediately after completion of the report.
- Print Batch Report  
 = The reports are printed out immediately.
- Store Report  
 = The reports are stored in the report file immediately after completing.
- Store Flow Alarm  
 = Appearing flow alarms are stored.



## 4.7 Name of Application

Menu item [System]-[Configuration]-[Applications] permits creating buttons for starting/activating other Windows Applications. In field **Text for Button** you can specify a short text for the button in the menu bar, which is displayed instead of the application name. Click on the button to activate the application. The effect is identical to task changing by means of Alt-Tab. This function can be called up repeatedly.

Field **Name of Application** contains the task name (the program description in the task bar) of the Windows application to be activated. Whilst the application is running in the background, the name can be selected from the task list (Strg-Esc).

For starting the application, please enter the complete path and the name of application into field **EXE Path**. Clicking in the input field activates button **Select Application**. Please, select the required application in the dialogue box.

In field **Parameter**, you can determine additional arguments which are stored in the application and are also available when starting the application. This permits e.g. starting ACCESS with an application.

ProBatch+ always tries to activate the relevant application, but unless it was already started, ProBatch+ tries to start the application as specified in the **EXE Path**.

## 4.8 Directory

Access to window **Select Working Directory** is via menu [System]-[Configuration]-[Directory]. The path of the working directory can be defined in this window.

Several working directories can be defined, however, only one at a time can be used. Click on "Ok" to store your selection.

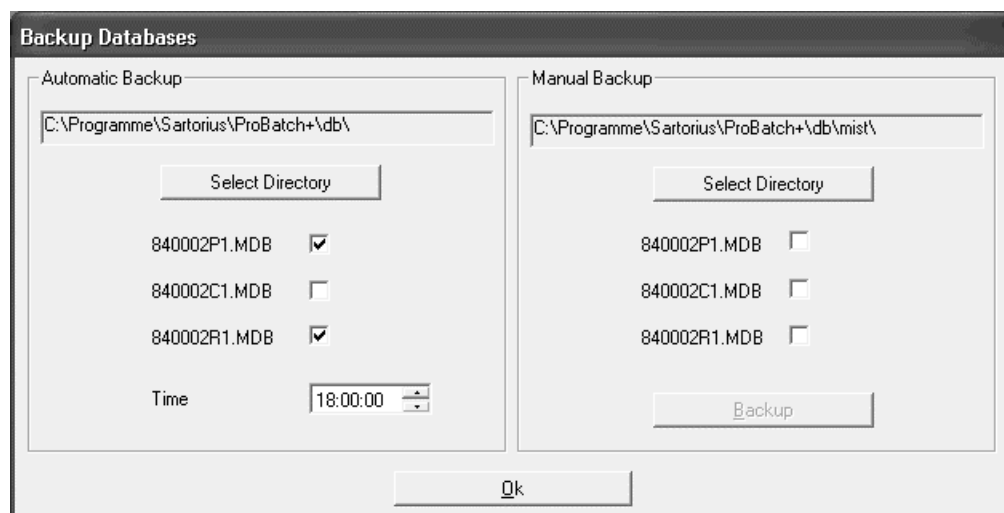
Unless a database was found in the directory, the new working directory is created by means of the empty databases 840002R1.MDB and 840002P1.MDB. Existing databases are not overwritten. Each working directory can comprise up to 9999 components, recipes and plans.

## 4.9 Backup Databases

All Data are contained in 3 databases:

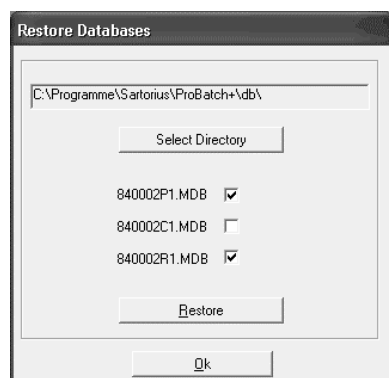
840002P1.MDB database	840002R1.MDB database	840002C1.MDB database
Recipes, components, weighing point parameters, production line parameters, report parameters, .....	Batch and production reports, alarm and message reports	User settings, window settings, languages

### 4.9.1 Backup Databases



Function [System]-[Backup Databases] copies one or all ProBatch+ databases from the current working directory, or database 840002C1.mdb from installation directory .../db into the backup directory manually or automatically. New backup directories can be created (edit destination path). For automatic daily back-up the time has to be specified. Back-up is not possible whilst a production is running.

### 4.9.2 Restore Databases



Function [System]-[Restore Databases] copies all selected ProBatch+ databases from the backup directory back into the working or installation directory ....db. Restoring is not possible whilst a production is running!

### 4.9.3 Compact Databases

The size of databases increases continuously due to the use of ProBatch+. Deleting data sets does not reduce the database size directly, because the data sets are only marked as deleted whilst remaining in the database. Data sets marked as deleted are deleted automatically at the next restart of ProBatch+.

The operator can compress the databases (during a break) via menu [System]-[Compact Databases]. The procedure can take some time. This function should be used from time to time, if ProBatch+ runs without interruption.

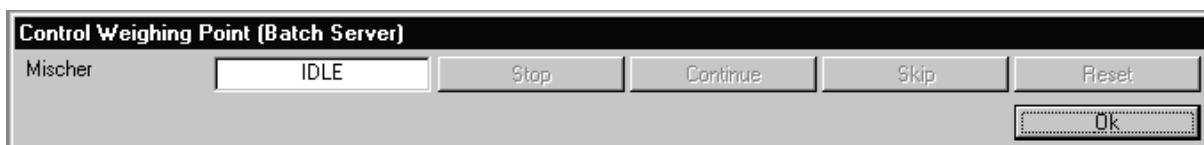
## 4.10 Reset Productionline

Menu [System]-[Reset Productionline / Mainrecipe] can be used for reset of a previously selected production line. The production line is stopped and the production is canceled. The data of the current production are deleted. This function is an emergency function which should be used only, if the synchronization of the instrument and ProBatch+ does not function any more after an error ("crash"), e.g. when a production remains to be done in ProBatch+ and the production line does not react.



If Mainrecipe was activated, reset only via the production line is not possible.  
The Mainrecipe must be reset!

## 4.11 Control Weighing Point (Batch Server)



8400\_10

The window shows the status (SP88) of all weighing points/phases, which are allocated to the batch server. Each weighing point can be controlled via buttons (Stop, Continue, Skip, Reset). Opening this window requires the system privilege. This is an emergency function which should be used only in exceptional cases, e.g. if the operation by means of process control is not possible any more.

## 4.12 Windows Settings

The window settings are valid for the production control windows as well as for the recipe and production plan editor. The settings for window position and size can be changed as in Windows, if menu [System]-[Windows Settings]-[Resize On] is activated.

The setting of column width in the table mask can be changed only with the system privilege. All settings are saved in database 840002C1.MDB.

### Window Process Control:

Window position and window size (by clicking with the right mouse key) as well as font size, line height and column width are adjustable in window Process Control. For this, position the mouse cursor on the relevant window/control.

### Window Edit Recipe and Production Plan:

The column width can be adjusted by clicking with the right mouse key. For this, the mouse cursor must be positioned on the relevant window/control.

### Operation:

- right mouse key, position of control element
- Shift key and right mouse key, adjustment of font size and control
- Control key and right mouse key, adjustment of control/window size

When changing a column, the right border of the table is shifted. System configuration for the user and disabling the access to defined functions (e.g. Set Breakpoint: Stop before handling the next

line) are possible by adjusting a column width of zero. Display of minimized columns is only possible again after resetting the window settings. Individual field widths and button sizes can also be changed for making full use of the screen size. An increased font size can cause shortening of lines (at front and end with centered text) or re-arranging after a space.

Menu item [System]-[Windows Settings]-[Reset] can be used to re-activate the basic setting. The basic setting of the windows is restored.

Enabling for changes of the window settings is via menu item [System]-[Windows Settings]-[Resize On].

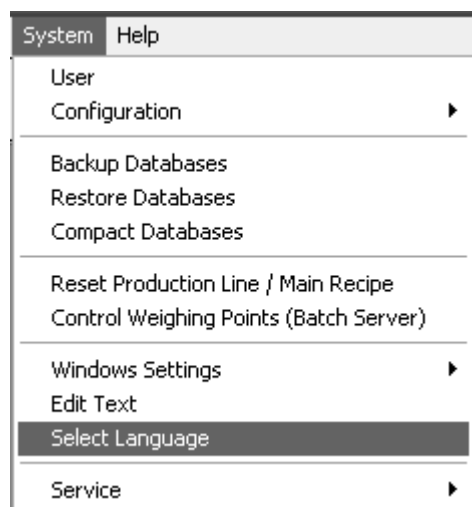
Menu item [System]-[Windows Settings]-[Resize Off] can be used to disable changes to the window settings.

### 4.13 Edit Text

ProBatch+ supports languages English, English (US), German, French, Netherlands, Swedish, Spanish, Finnish, Danish and Italian. All texts in the operator interface and most message texts are stored in database 840002C1.MDB. Each language version is stored in a separate column. Copyright messages (in English) and version number are parts of the program and cannot be edited.

The texts can be changed in menu [System-Edit Text] or by means of the database program. Each table line starts with the ProBatch+ keyword, followed by the columns for the languages. Column \* is available for definition of other language versions. All fields must contain a displayable text. A letter following on a & is underlined in the menu text and can be selected directly using the [Alt] key function.

### 4.14 Select Language



In this menu, the ProBatch+ language (English, French, German, ....) can be changed during runtime. The setting is stored in the registration using key ProBatch+ .

## 4.15 Debug Telegrams

Menu [System]-[Service]-[Debug Telegrams] can be used to  activate/de-activate storage of the telegram communication between ProBatch+ and the batching devices. This function should be used only for servicing or diagnosis. All telegrams are written into the alarm database and displayed in the alarm window.

Alarme			
	Produktionslinie	Alarm	
1	Instrument 10	Rx qlsr[02][00000000][00][0000][00]	25.06.2002 11:12:20
2	Instrument 10	Tx lsr[02][36000000]	25.06.2002 11:12:20
3	Instrument 10	Rx qlsbA[00][0000000000000000][00000000][00][00][0000]	25.06.2002 11:12:20
4	Instrument 10	Tx lsbA	25.06.2002 11:12:20
5	Instrument 10	Rx qlsr[01][35000000][00][1000][00]	25.06.2002 11:12:20
6	Instrument 10	Tx lsr[01][36000000]	25.06.2002 11:12:20
7	Instrument 10	Rx qlsbT[00][0000000000000000][00004000][00][00][0000]	25.06.2002 11:12:20
8	Instrument 10	Tx lsbT	25.06.2002 11:12:20
9	Instrument 10	Rx qlsbA[00][0000000000000000][00000000][00][00][0000]	25.06.2002 11:12:20

## 4.16 Debug Batch Server

In menu [System]-[Service]-[Debug Telegrams], the batch server writes debug messages into a <Date-time>.txt file in the application directory. Menu **Batch Server Logfile** opens the logfile in the notepad editor.

The 2 levels for logging are:

- Level1 writes only the most important batch server actions into the logfile,
- Level2 writes every batch server action into the logfile.

### 4.16.1 Debug Level 'Off'

The default setting for the Debug Level is 'Off'. Only few messages are reported (e.g. batch server start time, error, etc.).

```
2003-11-07-10:25:14.865 Batch Server starting
2003-11-07-10:25:14.875 Path   : c:\code\pr1740pp\atlbatch\debugu\atlbatch.exe
2003-11-07-10:25:14.885 Version:
2003-11-07-10:25:16.347 Opening database...
2003-11-07-10:25:17.318 database open...
2003-11-07-10:25:17.879 Warning: no valid hardware key attached! All recipes will be held in 60
minutes
2003-11-07-10:26:57.512 Batch Server init:
Hard Reset   : yes
simulationMode : yes
```

### 4.16.2 Debug Level 1

Every recipe start and every phase status change are stored. Please, note that the system could be slow, if Debug Level 1 or Debug Level 2 are selected.

```

2003-11-07-10:32:24.252 Prodline 1:idle -> starting
2003-11-07-10:32:24.272 ProdLine 1 start
2003-11-07-10:32:24.282 Phase::wp1 reserve ProdLine: 1
2003-11-07-10:32:24.292 Phase::wp2 reserve ProdLine: 1
2003-11-07-10:32:24.292 Prodline 1:starting -> running
2003-11-07-10:32:24.412 ProdLine 1 Start Phase
2003-11-07-10:32:24.422 Phase::wp1 start ProdLine: 1 RecipeLine: 2
2003-11-07-10:32:24.432 ProdLine 1 Start Phase
2003-11-07-10:32:24.452 Phase::wp2 start ProdLine: 1 RecipeLine: 1
2003-11-07-10:32:24.563 Phase::wp1 ... started ProdLine: 1 RecipeLine: 2
2003-11-07-10:32:24.563 Phase::wp2 ... started ProdLine: 1 RecipeLine: 1
2003-11-07-10:32:24.583 ProdLine 1 ReclineInfo (at end of phase): WP:1 PL:1 ErrorCode:0
NewSetpoint:0 WpFlags:80 WpError:0 NewOvershoot:0
2003-11-07-10:32:24.593 Phase::wp1 reset ProdLine: 1 RecipeLine: 2
2003-11-07-10:32:24.613 ProdLine 1 ReclineInfo (at end of phase): WP:2 PL:1 ErrorCode:0
NewSetpoint:0 WpFlags:80 WpError:0 NewOvershoot:0
2003-11-07-10:32:24.623 Phase::wp2 reset ProdLine: 1 RecipeLine: 1
2003-11-07-10:32:24.723 Phase::wp1 ... idle ProdLine: 1
2003-11-07-10:32:24.723 Phase::wp2 ... idle ProdLine: 1
2003-11-07-10:32:24.833 Phase::wp1 release ProdLine: 1
2003-11-07-10:32:24.833 Phase::wp2 release ProdLine: 1
2003-11-07-10:32:24.843 Prodline 1:Recipe (batch) completed !!!
2003-11-07-10:32:24.853 Prodline 1:running -> completed
2003-11-07-10:32:25.243 ProdLine 1 reset
2003-11-07-10:32:25.243 Prodline 1:completed -> idle

```

Let's have a closer look at several lines:

```
Prodline 1:idle -> starting
```

A recipe was started by ProBatch+ on production line 1. Production line 1 was free and changed over to status 'starting'.

Production line 1 is the first production line on ProBatch+. Production line 2 is the second one, etc. Please, note that the phases are handled by weighing points (WP) within X5.

Now, production line 1 starts the phases in the same order as listed in the recipe for each weighing point:

```

2003-11-07-10:32:24.422 Phase::wp1 start ProdLine: 1 RecipeLine: 2
...
2003-11-07-10:32:24.452 Phase::wp2 start ProdLine: 1 RecipeLine: 1

```

The recipe example contains a recipe line for production line 1 and a recipe line for production line 2.

```
2003-11-07-10:32:24.563 Phase::wp1 ... started ProdLine: 1 RecipeLine: 2
```

This line is always printed, when the batch server detects status 'RUNNING' on the real instrument.

```
2003-11-07-10:32:24.583 ProdLine 1 ReclineInfo (at end of phase): WP:1 PL:1 ErrorCode:0  
NewSetpoint:0 WpFlags:80 WpError:0 NewOvershoot:0  
2003-11-07-10:32:24.593 Phase::wp1 reset ProdLine: 1 RecipeLine: 2
```

The first line is printed, when the batch server detects that a phase has changed from status 'RUNNING' to status 'COMPLETE'. After receiving all relevant information from the instrument, the batch server sends command 'Reset' to the instrument (WP1).

```
2003-11-07-10:32:24.723 Phase::wp1 ... idle ProdLine: 1
```

The batch server has detected that the phase in the instrument is in status 'IDLE'.

### 4.16.3 Debug Level 2

This level is intended only for specialists. A lot of additional information is stored at this level.

### 4.17 Debug Script

Menu [System]-[Service]-[Debug Script] activates and de-activates script code debugging. With function Debug Script activated, a new column **Debug** is displayed in the process control window/recipe table. When a script component is active, the operator can open window **Debug Script** by clicking on button 'X5 A' . With the checkbox in column **Break Script** activated, a breakpoint is set on the first code line to be handled in the script.

The screenshot shows the 'Process Control - [PL-1 Ansatz 1 - Mischer]' window. It contains several data tables and control buttons.

Production Line	WP	Gross	Recipe	Component	Name	Set Point	Actual Value	Status
PL-1 Ansatz 1	Mischer	133 kg	test	Script	Script			BATCH

Production					Batch		
Kunde	Auftrag	Set Point	Actual Value	Sequence Number	Break	Set Point	Actual Value
		20 kg	0 kg	11	<input type="checkbox"/>	20 kg	

Break	Break Script	WP	Component / Recipe	Name	Set Point	Actual Value
<input type="checkbox"/>	<input type="checkbox"/>	Mischer	Netto	Netto	20 kg	20 kg
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Mischer	Script	Script		

Buttons: Start, Stop, Restart, Skip, Repeat, Skip All, Skip, Continue, Stop, Ok

8400\_12

The screenshot shows the 'Debug Script - [Mischer - Script]' window. It features a script editor on the left and a variable table on the right.

Script	Variable	Value
1 VAR	1 sMatId	
2 nRecipeLineCount: INT;	2 nRecipeLineCount	0
3 nRecipeLine: INT;	3 nRecipeLine	0
4 sMatId: STRING;	4 sts	0
5 sts: INT;		
6 END_VAR		
7		
8 sts:=GET_RECIPE_LINE_COUNT(nRecipeLineCount);		
9 sts:=GET_RECIPE_LINE(nRecipeLine);		
10 sts:=GET_RECIPE_LINE_PARAMETER(nRecipeLine);		
11		
12 sts:=MESSAGE_BOX(1,		
13 'Line '+INT_TO_STRING(nRecipeLine)+		
14 ' of '+INT_TO_STRING(nRecipeLineCount)+		
15 ' is %N'+sMatId+'', 'OK');		
16		

8400\_13x



Script code debugging can be done using the following buttons:



Start the code (only when stopped)



Stop the code (only if running)



Skip a function.



Single step, handles a code line



**Breakpoint On/Off**, (set/reset). Script code handling stops at a breakpoint, if the code is running.



Reset all breakpoints



Open and handle variables

The instantaneously active program line is highlighted by a different colour.

## 4.18 Batch Server Logfile

Menu [System]-[Service]-[View Batch Server Logfile] opens the logfile of the batch server. The logfile is used to store internal batch server messages. You can open the current logfile in ProBatch+:

A new logfile is created every day. Earlier logfiles can be found in 'C:\Program Files\Sartorius\ProBatch+'. Logfiles which are older than 5 days are deleted automatically.

In how much detail the messages are stored in the logfile can be changed in ProBatch+. See 4.16.

## 5 PROBATCH+ EDITORS

### 5.1 Editors general

During initial commissioning, ProBatch+ creates empty tables in the databases, which must be filled in purposefully before the first use. After commissioning, it may be necessary to change or extend the existing tables for components, recipes, plan and any configuration data. This task is completed by the editors.

Thereby, input fields, listboxes or options fields are used. ProBatch+ device and configuration are normally determined during installation (see chapter Installation, Commissioning). All other data are based on this information in the following order (the data listed on the left are required):

**Batching Device -> Weighing Point -> Production Line -> Component -> Recipe -> Production Plan**

When changing or deleting, the inverse order must be followed. You can change data only, unless they were used otherwise. Parts of the configuration can always be changed, if necessary. Before and after working on the editors, the data should be saved in order to reconstruct the old condition in case of doubt.

### 5.2 Function in selection and editor windows

The following rules are generally applicable in all windows:

- Ok** leaves the window (and saves the data in editors)
- Cancel** (if provided) leaves the window without modification

Selection window:

Component, recipe and plan are allocated to a defined production line. Therefore, a selection window for the production line is opened first. All idents for the selected production line are displayed in the list below. Only the buttons with black inscription can start an action. The following buttons are always available:

- Edit** starts the editor for the ident selected previously from the list
- Create** opens input window for new ident, then for the editor window
- Delete** deletes the selected ident (unless used otherwise)
- Rename** opens an input window for new ident instead of selected ident
- Print** in horizontal format on a form the column width of which can be matched

Additional buttons for copying (production plan, recipe) or searching (recipe, component):

- Copy** makes a copy of the selected ident under a new ident
- Find** You can specify substitute characters: \* for all or ? for one character. Unless a corresponding character string is found, a message is displayed.

Editor window:

Tabular structure for plan and recipe, except with component (see there). Start with 'Append Line' with an empty table. Only the buttons with black inscription can start a corresponding action. The following buttons are always available:

- Insert Line** insert a line before the actual position
- Append Line** append a line in the actual position
- Delete Line** delete a line in the actual position
- ..... Show** with plan: display recipe, with recipe: display component

After clicking on the number of a table line, the following buttons are available:

**Delete**    deletes a selected line  
**Cut**        line is copied and deleted  
**Copy**       line is copied

After cutting or copying a table line, the following buttons are available:

**Insert**     inserts a line (also possible several times) into another table of the same production line

## 5.3 Component table

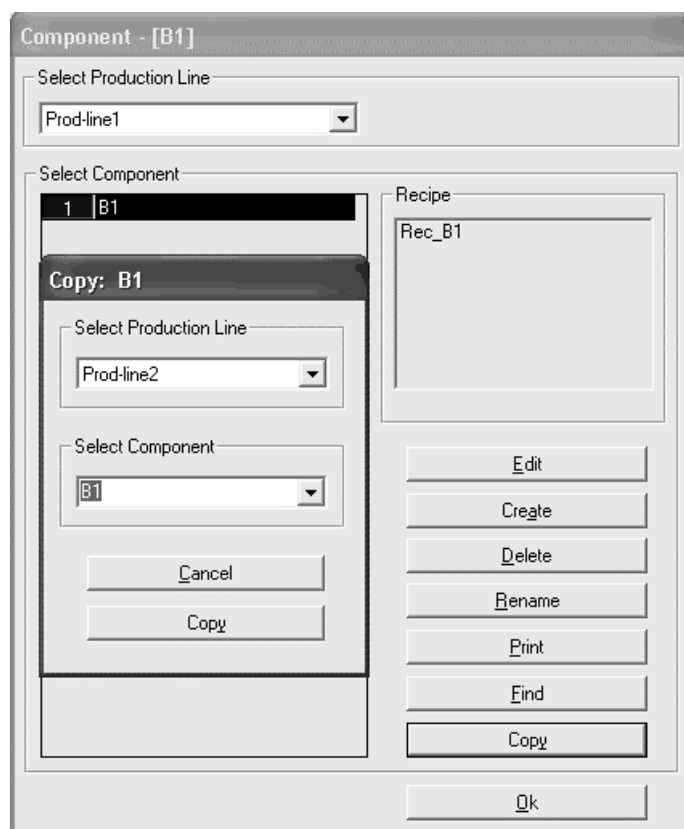
### 5.3.1 General



Opens the selection window for the component editor:

The components are allocated to the production lines. Components for weighing points, which are allocated to several production lines simultaneously (common weighing points), need to be created only for one of these production lines (autom. creation also on the other lines).

The table is in alphabetical order according to the ident, which contains the allocation to the weighing point. The SPM addresses are specified in the component table. Apart from real components, it can contain manual additions and (auxiliary) dummy components.



8400\_21

#### Select Production Line:

Components are allocated to production lines. All components of the selected production line are displayed.

#### Recipe:

List of recipes in which the current component is used

#### Edit:

The parameters for the selected component can be entered / changed.

#### Create:

Entry of a new component name, subsequently, the mask as in Edit appears.

#### Delete:

The selected component is deleted. With components which are used in a recipe, an error message will appear.

#### Rename:

The previous name is displayed and can be overwritten.

#### Print:

Printing of all components with the associated parameters.

#### Find:

Search for component names, \* is used as a wildcard.

#### Copy

After component selection, it can be copied to a different production line. If the component exist already in that line, it is asked whether it can be overwritten.

### 5.3.2 Component parameters

After selecting Edit, the following mask appears:

Dependent on batch mode, the number of parameters is different:

Batch mode	A1,A2	B1-B6, G1-G6	B8	D1,D2	D3-D8,RL,RQ,RW
Parameter	Name	Name	Name	Name	Name
	Wp	Wp	Wp	Wp	Wp
	SPM addresses	SPM addresses	SPM addresses	SPM addresses	SPM addresses
	Report modes	Report modes	Report modes	Report modes	Report modes
	Min.	Overshoot			No fields
	Max.	Preset Point	Preset Point		
	Unit	+ Tolerance		+ Tolerance	
		- Tolerance		- Tolerance	
		Min Flowrate			
		Calming Time	Discharge time		
		Restart Mode			
	Parameter	Parameter	Parameter	Parameter	Parameter

### 5.3.2.1 Name

Optional additional name, proposal: component ident

### 5.3.2.2 WP

Select the weighing point from the list by opening it.

### 5.3.2.3 Parameter

Additional variable assignment for dosing modes D4\_DIALOG, D4\_MESSAGE and D1\_TARE.  
Variable assignment for function blocks programmed by the user himself (non-standard batch modes). Text max. 240 characters. Strings must be in single quotation marks ( e.g. 'string' ). The parameter string is sent completely (with comment) to the instrument.

### 5.3.2.4 SPM-Outputaddress

Function of the output address: Component handling activates this output bit. The default value of -1 must be set to the correct value during component definition. -1 means that there is no output address.

The output address is a bit address (integer number up to 8191) in marker area M (storage capacity for 1024\*8 bits), which is activated by component handling. The real allocation to output area Q depends on the PLC program, in which it is programmable.

Enter the required address as a number, or:  
Click on the arrow up to increase the displayed value.  
Click on the arrow down to decrease the displayed value.

### 5.3.2.5 SPM-Inputaddress

Function of the input address: Component handling is activated only, when this enable bit is set. The default value of -1 must be set to the correct value during component definition. With address -1, the component is always enabled.

The input address is a bit address (integer number up to 8191) in marker area M (storage capacity for 1024\*8 bits), which is read by component handling. The real allocation to input area I depends on the PLC program, where it is programmable.

Enter the required address as a number, or:  
Click on the arrow up to increase the displayed value.  
Click on the arrow down to decrease the displayed value.

### 5.3.2.6 Batch Report

= select report

By defining the report mode you can select, if a line for the component is printed in the batch reports. The setting does not affect the recipe total mode.

### 5.3.2.7 Production Report

= select report

By defining the report mode you can select, if a line for the component is printed in the production reports. The setting does not affect the recipe total mode.

### 5.3.2.8 Overshoot

All material which still reaches the hopper after valve closing is called overshoot. The default value must be selected so that it is slightly below the preset point. Only the overshoot part flown before elapse of the calming time is included in the report.

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

### 5.3.2.9 + Tolerance, - Tolerance

The tolerance is specified as a weight and can be determined independently +Tol for weight above setpoint and with -Tol for weight below setpoint .

Tolerance errors are followed by post-batching and overshoot correction for the component.

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 done 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.

### 5.3.2.10 Preset Point

**Normal batching:** The preset point determines the moment at which (setpoint – preset point - overshoot) the coarse batching valve is closed.

**During discharging (B8):** After weight below preset point, the hopper is considered as discharged. Only the adjusted discharge time must elapse before the valve closes. The selected time value should be high enough to ensure that all material is still discharged.

### 5.3.2.11 Minimum Flowrate

If the component flow should not be monitored:  
Enter a minimum flowrate of zero.

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

### 5.3.2.12 Calming time

Enter the time in seconds which shall elapse before the tolerance test. This time can depend on the

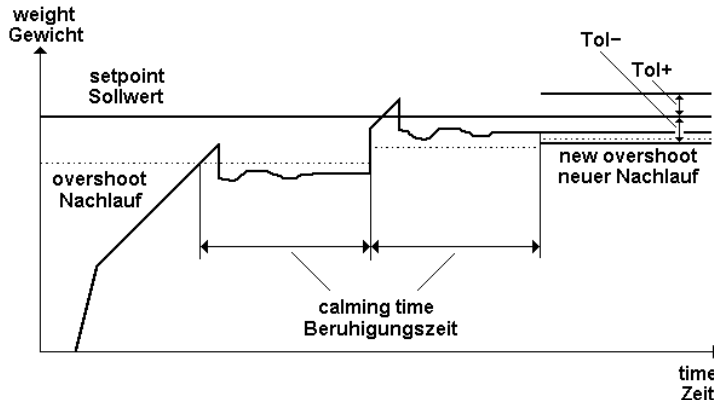
- component consistency (solid, lumpy, liquid) or
- batching method (screw, vibrator, valve) or
- mechanical construction of the batching installation.

The tolerance check for weight is only correct after standstill.

5.3.2.13 Restart mode

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

Example: Restart mode 4



After the calming time, the measured weight is below -Tol. A new overshoot value is calculated. As the difference from the setpoint is higher than the overshoot value, a correction can be started. After waiting again until the calming time has elapsed, the weight is within -Tol , but still below the setpoint. The overshoot value is corrected again. Further correction is not possible.

With a tolerance alarm, batching stops and the operator has the opportunity for process intervention. In this case, the process can be continued ('Go') or aborted ('A').

Calculation of modified overshoot values:

new_overshoot =	$old\_overshoot - (Setpoint - actual\_weight) / 2$
corrected_overshoot =	$old\_overshoot - (Setpoint - actual\_weight)$

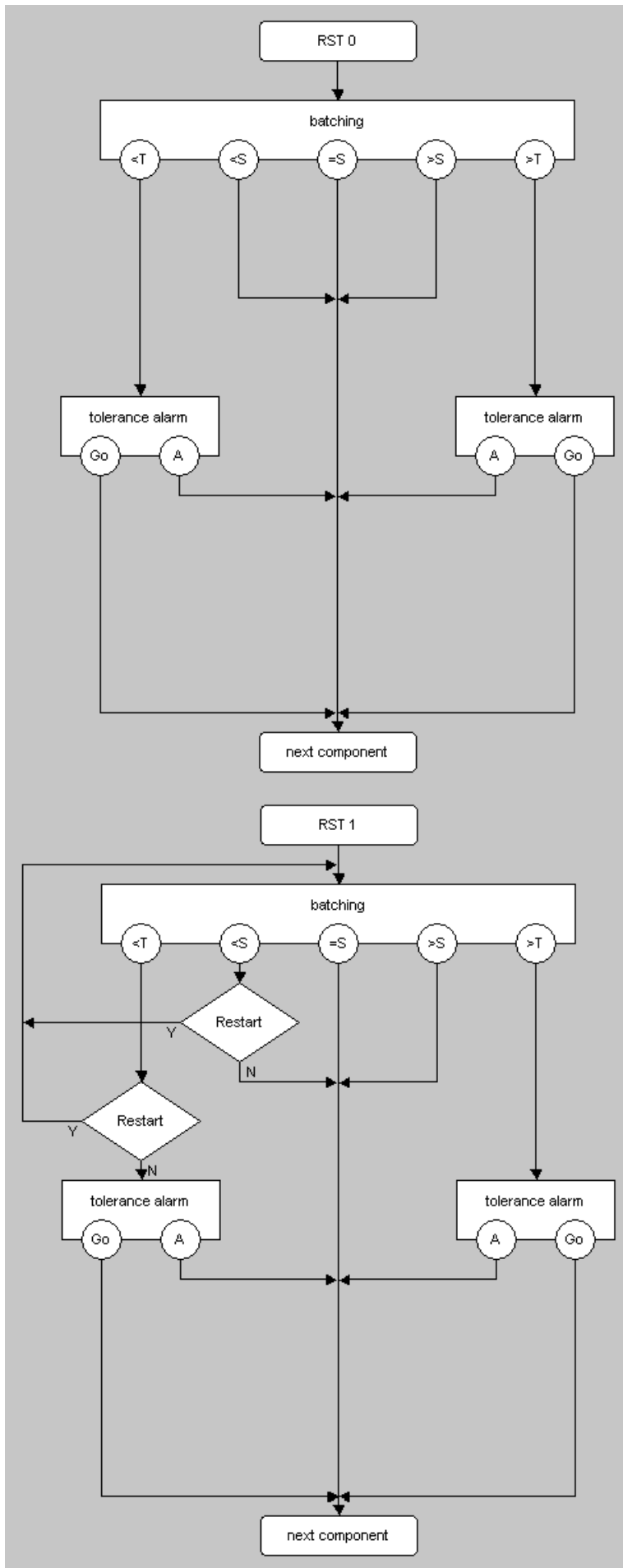
Click on the required option field:

Restart Mode	
No Correction	<input checked="" type="radio"/> Mode 0
Correction, No Optimizing	<input type="radio"/> Mode 1
No Correction, Optimizing	<input type="radio"/> Mode 2
First Correction, Then Optimizing	<input type="radio"/> Mode 3
First Optimizing, Then Correction	<input type="radio"/> Mode 4

Signification of symbols in the following diagrams

- <T weight below Tol-
- <S weight below setpoint
- = setpoint reached exactly
- >S weight above setpoint
- >T weight above Tol+

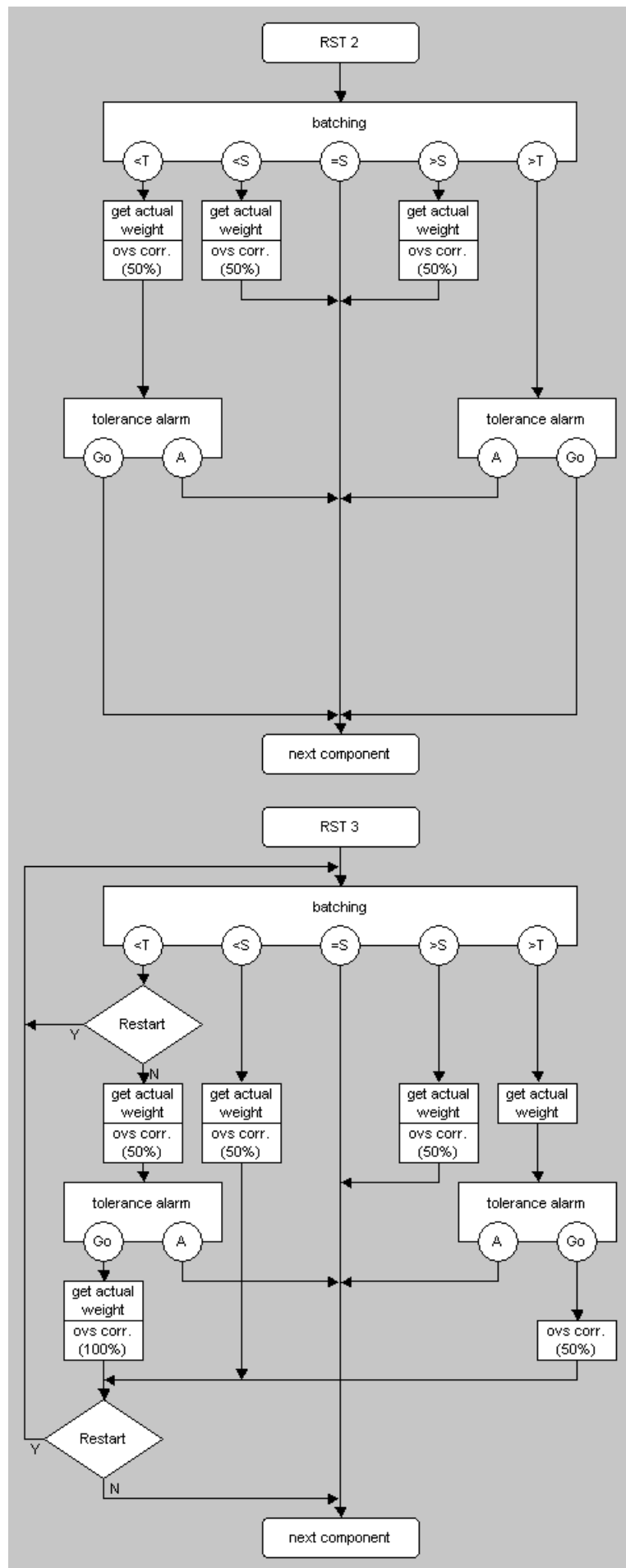
- Go entry: go on batching
- A entry: abort batching



**Restart mode = 0:**  
Neither correction nor new overshoot calculation

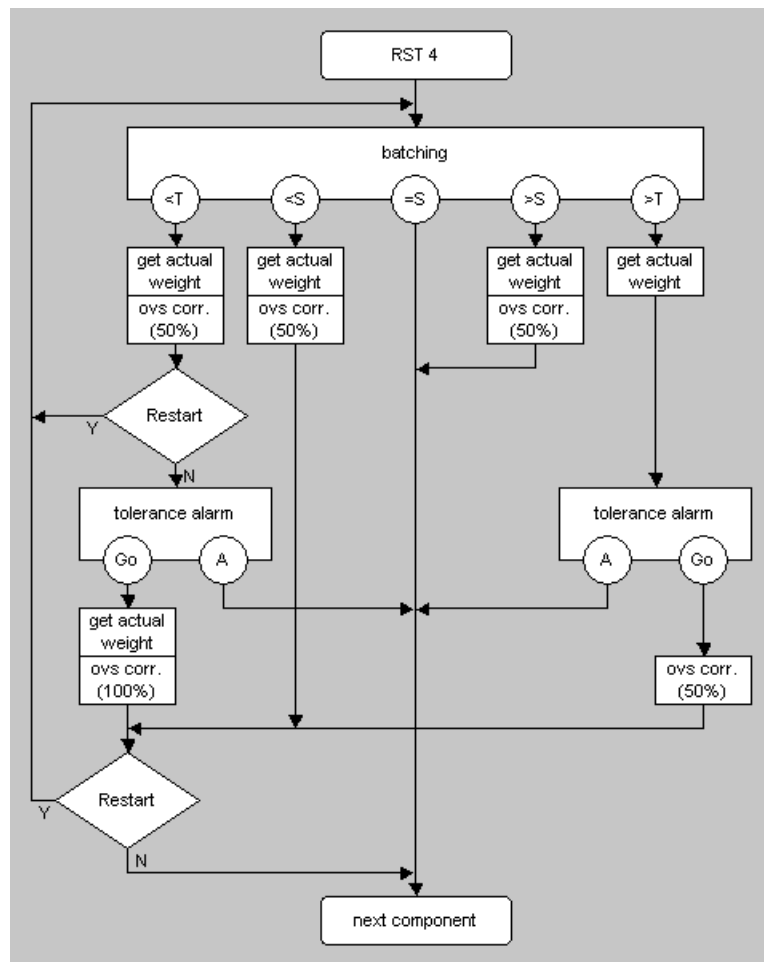
**Restart mode = 1:**  
Check only, if correction is possible.  
No overshoot correction.





**Restart mode = 2:**  
Only a new overshoot is calculated in this mode. Correction is omitted.

**Restart mode = 3:**  
Check for correction and calculate new overshoot.



Restart mode = 4:  
Calculate new overshoot and check for correction.

### 5.3.3 Batch mode

Each component can be a process step in a recipe. They 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" was 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. For user-defined/written batch modes, e.g. D4\_DIALOG, also refer to the operating manual of the "Phase Controller" application.

#### Batchable components B1-B6, G1-G6, B8

A field for parameter density is introduced during component definition, if the weighing point was specified with 'X' in the checkbox for liquid counter. Only batch modes B1- B3, G1- G3 are permissible. The density field contains the counter multiplier within 99,9999 - 0,00001. Text field 'Parameter' is filled automatically with P=nnnnnn and the value is sent to the batch controller.

Manual components                    D1, D2, D1\_TARE

Dummy components                    D3-D8, D4\_DIALOG, D4\_MESSAGE, RW RL, RQ

Dummy components for control: non-batchable recipe entries, which control defined actions in the installation via SPM and PLC, e.g. timers, switch on/off, temperature control, motors. The SPM addresses for input and output are used in the function block.

Analog components                    A1, A2

Script component                      Script

### 5.3.3.1 Batchable components

**Batchable components:** All components for which automatic coarse + fine batching by weighing into/from silos is possible.

#### Net batching

Batch mode **B1** is the normal batch component for charge batching. Dosing is preceded by a tare step, i.e. the net weight is zero when starting the batch. The recipe setpoint for this component is the net weight.

##### Setpoint calculation:

$$\begin{aligned} \text{Setpoint} &= \text{tare} + \text{setpoint} \\ \text{Coarse\_switch\_off} &= \text{setpoint} - \text{preset} - \text{overshoot} \\ \text{Fine\_switch\_off} &= \text{setpoint} - \text{overshoot} \end{aligned}$$

#### Charge batching

Batch mode **B2** is used for top-up charge batching. Batching is not preceded by a tare step, i.e. the last net weight remains unchanged. The recipe setpoint for this component is the net weight based on the previous tare.

##### Setpoint calculation:

$$\begin{aligned} \text{Setpoint} &= \text{old\_tare} + \text{setpoint} \\ \text{Coarse\_switch\_off} &= \text{setpoint} - \text{preset} - \text{overshoot} \\ \text{Fine\_switch\_off} &= \text{setpoint} - \text{overshoot} \end{aligned}$$

#### Gross batching

Batch mode **B3** is used for charge batching to an absolute value. Before batching, the tare is set to zero. The net weight is equal to the gross weight. The recipe setpoint for this component is the gross weight.

##### Setpoint calculation:

$$\begin{aligned} \text{Setpoint} &= \text{setpoint} \\ \text{Coarse\_switch\_off} &= \text{setpoint} - \text{preset} - \text{overshoot} \\ \text{Fine\_switch\_off} &= \text{setpoint} - \text{overshoot} \end{aligned}$$

#### Discharge batching

Batch mode **B4** is the normal batch component for discharge batching according to B1. Batching is preceded by taring, i.e. the net weight is zero at batch start. The recipe setpoint for this component is the net weight.

##### Setpoint calculation:

$$\begin{aligned} \text{Setpoint} &= \text{tare} - \text{setpoint} \\ \text{Coarse\_switch\_off} &= \text{setpoint} + \text{preset} + \text{overshoot} \\ \text{Fine\_switch\_off} &= \text{setpoint} + \text{overshoot} \end{aligned}$$

#### Charge/discharge batching

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

##### Setpoint calculation:

$$\begin{aligned} \text{Setpoint} &= \text{old\_tare} - \text{setpoint} \\ \text{Coarse\_switch\_off} &= \text{setpoint} + \text{preset} + \text{overshoot} \\ \text{Fine\_switch\_off} &= \text{setpoint} + \text{overshoot} \end{aligned}$$

#### Gross discharge batching

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.

##### Setpoint calculation:

$$\begin{aligned} \text{Setpoint} &= \text{setpoint} \\ \text{Coarse\_switch\_off} &= \text{setpoint} + \text{preset} + \text{overshoot} \\ \text{Fine\_switch\_off} &= \text{setpoint} + \text{overshoot} \end{aligned}$$

#### Total discharge

Discharge mode **B8** is used for total discharge. Before batching, the tare is set to zero. The net weight is equal to the gross weight. The recipe setpoint for this component is a gross weight. As discharging to ideal zero is rarely possible, batching is done at least until reaching rest value TAR. Subsequently, the system waits, until the calming time has elapsed to discharge all rests, if possible. There is no fine flow.

##### Setpoint calculation:

$$\text{Setpoint} = \text{rest\_value}$$

**Additional parameter**

For the batch mode B1...B6 additional parameters could be set with the parameter field:

Flow warning delay:

Parameterfield in PR8400	Function
Flowdelay=10s	The flow warning will not be active before the given time (e.g. 10 seconds). This function could be used, when the material is transported via long pipes. Then it is normal, that after opening the valve, it takes time before the material reaches the hopper.

Material flow proportion Coarse / Fine:

Parameterfield in PR8400	Function
Adjust=0.125	The parameter is used for a more detailed adjustment of the flow warning. A fine- / coarse flow ratio of 1/8 is assumed. A different ration could be entered with this parameter.

**5.3.3.2 G-component (subsequent setpoint correction)**

The G-component can batch in modes G1 - G6. Mode G1-6 correspond to modes B1-B6.

The G-component is used, if it is not possible to batch a component accurately, so that the setpoints of other components have to be recalculated.

Example:

The G-component has a setpoint of 1000kg, the batched weight is 1100kg, then the setpoints of all components with a weight in the setpoint (also manual components) are multiplied by 1100/1000 to reach the quantity relation as determined in the recipe.

For components which have to be recalculated, the checkbox (**\* Setpoint**) in the recipe line has to be activated (see chapter 5.4.2.2.).

If the recipe has components on more than 1 weighing point, note that only components which were not started so far can be recalculated. Recalculation for all components can be forced by using the Sync component (see chapter 5.3.3.15) as a second line after the G-component. This ensures that all components on other weighing points wait for recalculation.

**5.3.3.3 Batch mode D1**

A manual component D1 is batched manually by the operator. It is acknowledged by a signal or switch. For this, its input SPM\_IN must be defined. Output SPM\_OUT requests the operator 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 weight.

**5.3.3.4 Batch mode D2**

A manual component D2 behaves almost exactly like D1. However, the component is used for preweighed manual additions which are too small for being measured exactly by this weighing point.

Therefore, the setpoint rather than the actual value measured after the calming time is recorded in the report.

<b>Setpoint calculation</b> Setpoint = tare + setpoint
---

### 5.3.3.5 Batch mode D1\_TARE

This manual component (for PhaseController only) does function as a D1-component, but the operator at the scale will tare manually. The name of the component and the setpoint is displayed. The dialog is completed by the 'OK' key or the softkey 'Tare'.

Example

Parameterfield in PR8400

Display in PhaseController

Mat.123                      1.4 ks  
   # Tare #

Optional an additional dialog, for input of a value, could be configured before the tare-dialog. Therefore the following variables could be written into the parameter field:

dsp1='Display text'

dsp2='Unit'

dialog=1            (see D4\_DIALOG-component)

Example

Parameterfield in PR8400

dsp1='Temperatur'  
 dsp2='C'  
 dialog=2

Display in PhaseController

Temperatur                      100 C

### 5.3.3.6 Batch mode D3 (time)

The timer component waits, until the specified time has elapsed. The time is entered with a resolution of 1 msec. The timer accuracy is  $\pm 100$  ms (not guaranteed).

setpoint = time\_in\_ms

### 5.3.3.7 Batch mode D4 (stop)

The stop component is used for making a break of unpredictable duration. Waiting for SPM input address is omitted ! Restart by signal restart.

### 5.3.3.8 Batch mode D4\_DIALOG (dialog)

The **Dialog** component (for PhaseController only) is used for making a dialog with the operator to read in a value. Waiting for SPM input address is omitted! The dialog is completed by the 'OK' key. Therefore the following three variables could be written into the parameter field:

1.	dialog=xy	x = 0: prompt texts are given by the 'dsp1' variable. x > 0: prompt text from database of the PhaseController, y: dialogue type. See table below
2.	dsp1='abc'	Optional: 'abc' is the message in the first display line
3.	dsp2='cde'	Optional: 'cde' is the unit for numeric entries in line 2

The phase checks parameter 'dialog' ( MOD 10 >= 1 AND MOD 10 <= 9 = TRUE ). x can be any number and is used to mark a special dialogue from the text database.

y is the dialogue type. The text for the unit dsp2 should not be longer than 16 characters.

'---' is returned when aborting the phase..

Dialog	Type	Function	Return
x1	DINT	Enter integer	'OK:<integer>' or '---'
x2	REAL	Enter decimal number	'OK:<real>' or '---'
x3	WEIGHT	Enter weight in the format of the actual unit	OK:<weight>' or '---'
x4	STR20	Text max. 20 characters	'OK:<text>' or '---'
x5		Softkey dialogue: Ok	'OK'
x6		Softkey dialogue: Ok + abort	'OK' or '---'
x7		Softkey dialogue: YES + No	'Yes', 'NO' or '---'
x8		Softkey dialogue: YES + abort + No	'Yes', 'NO' or '---'
x9		Softkey dialogue: softkeys of dsp2	'KEY1', 'KEY2' or 'KEY3' or '---'

#### Example

##### Parameterfield in PR8400

```
dsp1='Temperatur'
dsp2='C'
dialog=2
```

##### Display in PhaseController

```
Temperatur          100 C
```

This example shows how the temperature from the keyboard is read with a fixed input prompt and unit. Dialogue phase text parameters:

The operator has typed in '100'. The return value is shown in the report of ProBatch+.

### 5.3.3.9 Batch mode D4\_MESSAGE (message)

The Message component (for PhaseController only) is used for sending a message to the operator. Waiting for SPM input address is omitted! The dialog is completed by the 'OK' key.

Example

Parameterfield in PR8400	Display in PhaseController
	<pre>Waiting... # OK #</pre>

Via the parameter field, the message text could be defined.

Example

Parameterfield in PR8400	Display in PhaseController
<pre>dsp1='Part 1 ready'</pre>	<pre>Part 1 ready # OK #</pre>

### 5.3.3.10 Batch mode D5 (wait bit)

The SPM waiting component sets the output address SPM\_OUT to status TRUE and waits for status TRUE of the SPM input address.

### 5.3.3.11 Batch mode D6 (set bit)

The SPM set component sets output SPM\_OUT to TRUE.

### 5.3.3.12 Batch mode D7 (delete bit)

The SPM delete component sets output SPM\_OUT to FALSE.

### 5.3.3.13 Batch mode D8 (acknowledge)

The SPM acknowledge component waits for status TRUE of input SPM\_IN and sets output SPM\_OUT to FALSE.

### 5.3.3.14 Batch mode RW, RQ, RL

RW (Wait), RL (Release), RQ (Request) are used for production line synchronization in the recipe. Only production lines running on the same instrument can 'share' common weighing points. Assuming a weighing point WX "shared resource" for several production lines:

- RW** If WX should not be started at recipe start, an RW component (wait component) must be used as a first process step for WX in the recipe. The following recipe lines of WX are not handled until started from another point in the recipe (RQ component).
- RQ** The RQ component (request component) requests a weighing point WX and makes an attempt to start the process steps of this weighing point. WX must be specified as an input parameter of the RQ component. RQ remains active, until WX was started.
- RL** The RL component (release component) can be used for resetting weighing point to the "wait" status. Subsequently, WX can be requested by another production line. RL is process step of weighing point WX. All subsequent process steps of this weighing point must be activated by another request (RQ).

The SPM input/output addresses of RW/RQ/RL can be used for synchronization, for process interlocking or for general status display.

### 5.3.3.15 Synchronization component / correction recipe

The Sync component is a dummy component working as a control command in the recipe.

As the Sync component is defined automatically it is not necessary (and not permitted) to create it by means of the component editor. The sync component is valid for all weighing points used in the recipe.

The recipe is stopped at the position of the Sync component, this means that all components prior to the Sync component are processed and the production goes to a 'free' status. Components following on the Sync component are started only, if the Sync component is terminated by the operator (select the Sync component in menu **Process Control** and click on button **Skip**).

The Sync component can be used to halt the production and to start a **correction recipe**. The production goes to a 'free' status as soon as the Sync component is reached. In menu **Recipe Start**, the correction recipe can be selected and started by clicking on button **Start Correction Recipe**.

This action is possible max. 10 times.

After finishing the correction recipe, the normal recipe can be continued by giving the skip command for the Sync component in the **Process Control** menu.

The amounts batched in the correction recipe appear as extra lines in the batch report and are marked by an asterisk (\*).

### 5.3.3.16 Script component

The script component can be used to realize customer-specific applications, e.g. at the instrument IEC 61131 level. The scripts are input as a component into ProBatch+ and handled by the batch server as a phase with a special batch mode (**script**). This script has access to a global RAM, similar to the instrument's SPM memory.

The script language is part of the International Electrotechnical Commission 61131 Structured Text. The main differences are:

#### Implicit configuration, resources and tasks

IEC 61131 requires determination of configuration, resources and task, in order to assign the programmed variables and functions to defined parts of a PLC. This is not necessary with the ScriptEngine of ProBatch+. However, the assignment might be as follows:

IEC 61131	≠	ProBatch+
Configuration	-	Batch server
Resources	-	Production line
Task	-	Recipe

#### No functions, function blocks and programs

In the ScriptEngine, every script is handled as a program.

Global variables (batch server, production line, recipe) remain unchanged as long as the configuration is not changed, because the batch server keeps the data in a continuous memory process. When changing the configuration by adding or removing weighing points and/or production lines, all variables are reset.

#### Script code in ST

Every script has exactly one worksheet for the code in ST (Structured Text). The worksheet can be changed only, unless the recipe is active. After every change, the worksheet is checked by the VAR compiler.



**Variable area**

Variables can be stored in different places and have a different lifetime:  
in a script (available whilst the script is running).

In the recipe, in order to exchange data between various scripts in the recipe (available whilst the recipe/batch is running). These variables are re-initialized at every recipe start.

They can be stored on a production line, in order to permit data exchange between various recipes in a production line (the batch server and thus the production lines are not available, as long as the variables are being initialized).

**Batch server global variables**

These variables are created during initialization by the batch server and can be written and read by all scripts.

**Production lines global variables**

There is a worksheet for global variables for each production line. It can be changed only, unless the production line is active. With every change, the worksheet is translated by the VAR compiler and the resulting DIT is stored in the production line.

**Recipe global variables**

A worksheet for global variables is possible for each recipe. It can be changed only, unless the recipe is active. With every change, the worksheet is translated by the VAR compiler and the resulting DIT is stored in the production line.

**Script local variables**

Every script has exactly one worksheet for local variables. In this worksheet, the external variables are also defined. Changing the worksheet is possible only, unless the recipe is active. After every change, the worksheet is checked by the VAR compiler.

**Debug script**

A debug window can be opened from ProBatch+. In this window, you can:

Display and change variable values (both script local and global)

Scripts can be halted, handled line by line, continued and stopped.

See chapter 7.

5.3.3.17 Analog components

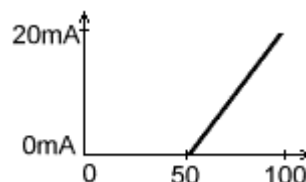
**Analog components:** Parameters Max, Min and Unit. The values are loaded into the batch controller when using the component. The setpoint in the batch controller is converted into digits for the analog output, or read as an actual value from the analog input. The SPM addresses are word addresses, which are assigned to the hardware in the PLC program.

**Batch mode A1**

The analog component sends the setpoint to the internal PLC. The analog value is scaled by parameters Min and Max.

$$\text{Analog\_value} = \frac{(\text{setpoint} - \text{min}) * 4095}{\text{max} - \text{min}}$$

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

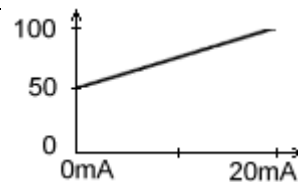


**Batch mode A2**

The analog component reads an actual value from the internal PLC and returns it. The value is included into the report..

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

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



Min and Max are dependent on the hardware configuration of plug-in card.

	Card configuration		
Min	0 V to	0 mA to	4 mA to
Max	10 V	20 mA	20 mA

An IEC61131 program must write the relevant values from the SPM output address (SPM\_OUT) to an analog output card or read it from an analog input card and write it into the SPM input address (SPM\_IN).

5.3.3.18 Other batch modes

**Other batch modes** are programmable as a function block in IEC 61131 using programming/development tool PR 1750. The first two characters of the batch mode must correspond with a known mode and the same parameters must be used. New modes can be imported by means of file INSTANCE.LST created by PR 1750 in the ProBatch+ working directory (copied manually). The new batch mode is displayed below the old one in the selection window. Example: 'B1\_USER' is displayed additionally as batch mode with B1 -- B1\_USER in INSTANCE.LST. Parameters of this component can be transmitted to the instrument in their text field.

### 5.3.4 Material tracking (Lot Nr.) Combics Pro, Label Printing

For manual components (Phase mode only) Lot-Numbers can be generated. During processing of the same material different Lot-Numbers can be successively assigned using Combics Pro. Storage is done in the database of the PC.

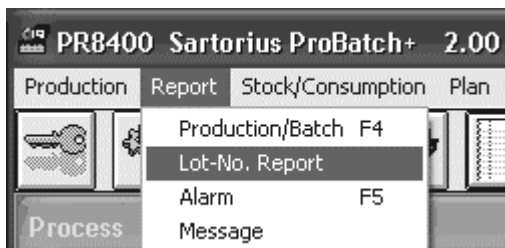
**Print label** If activated: Label with Lot-No. will be printed

**Number of copies** Number of copies (1 - 10)

**Label File** Name of Label file, it must contain 'LotLabel'. As default 'LotLabel.rpt is used.

### 5.3.5 Lot-No Evaluation

The menu for the evaluation of Lot-Numbers is called as follows:



Date/Time	Recipe	Component	Lot-No.	Quantity

The selection of Lot-Numbers can be done:

- for one / all recipes
  - for one / all components
  - for one / all Lot-Numbers
- over the selected time period.

With **Batch Report** the report belonging to the selected Lot-Number can be printed.

## 5.4 Recipe structure

A recipe comprises a logic sequence of process steps concerning materials, intermediate products, final products or control and monitoring functions. All process steps of a recipe are handled sequentially. Line numbers are successive and are updated automatically when inserting or deleting a recipe line.

### Recipe:

A recipe is generally valid for a defined production line. Only materials or process steps for this production line can be used in the recipe.

If weighing points are allocated to several lines, the recipe must include lines for sequence control (reservation and release procedure) if at least two lines are used simultaneously. Components which are defined on the common weighing point are available for both lines. The recipe can be enabled or disabled (for production) for the production line on which it shall be handled.

Each component can be a process step in a recipe. The user himself must take care that the logic rules are followed, e.g. a B3 component must have at least the weight of the sum of all previous B1 components. Determine the process step by the batch mode during component definition, e.g. "B(x)" for real components and "D(x)" for dummy components. If a guide component "G(x)" was selected, the setpoints of the following components are displayed during production as calculated from the recipe. In the report, the actual setpoints related to the guiding value are output.

### Subrecipe:

A subrecipe can be used like a component in a recipe. It simplifies the recipe structure, if an identical sequence of components is used in several recipes, see chapter 5.4.3.

### Main recipe:

A main recipe can comprise several production lines, each having its own recipe. A production line can only run on one batching device. Therefore with Batch Controller X5/X6 2 weighing points can be used.

If productions work with several Batch Controllers, it is possible to define production lines per batching device, which work with the allocated weighing points. The production lines are allocated to the main recipe and handled with a predetermined priority. See chapter 5.4.4.

### 5.4.1 Sequence control

Example: classic mode or open mode with batch server: with Wp\_A, Wp\_B (common) and Wp\_C, with 2 production lines (PL):

PL1 with Wp\_A and Wp\_B PL2 with Wp\_B and Wp\_C

The two lines shall produce in parallel and use weighing point Wp\_B alternately. For sequence control, the recipe controller in the instrument provides a list with weighing points and recipe control tags. If weighing points have to be available alternately to several production lines, a reservation and enabling procedure with RW, RL, RQ must be provided in the recipe. As long as PL2 uses Wp\_B (or is stopped), PL1 stops in line Wp\_A\_RQ in status "BATCH". When cancelling this line, the batch is finished on both lines (the recipe is considered as done). The recipes start with the WP which does not start with RW. Both control tags for PL1 and PL2 are active. Wp\_B (if idle) is requested with RQ. RQ remains active, until Wp\_B is started. If the lines with RW and RQ are missing, Wp\_B is supposed to be released when ProBatch+ starts, otherwise, error message "Cant start .." is displayed.

#### Example A:

---

##### PL1: Recipe RQ\_RW\_WPB

Component	Setp./Param.	Comment
Wp_A_D3	00:00:10.0	Only D3 timers are used in these examples
Wp_A_RQ	Wp_B	Requests and starts Wp_B an
Wp_A_D3	00:00:11.0	Handled after sequence in Wp_B
Wp_B_RW		Waits for start of Wp_B, PL1 runs despite busy Wp
Wp_B_D3	00:00:12.0	

##### PL2: Recipe RQ\_RW\_B\_C

Component	Setp./Param.	Comment
Wp_C_D3	00:00:15.0	Only D3 timers are used in these examples.
Wp_C_RQ	Wp_B	Waits and starts Wp_B
Wp_C_D3	00:00:16.0	Handled after sequence in Wp_B
Wp_B_RW		Waits for start of Wp_B, PL2 runs despite busy Wp
Wp_B_D3	00:00:17.0	

#### Example B:

---

##### PL1: Recipe 2 x RQ RL

Component	Setp./Param.	Comment
Wp_A_D3	00:00:10.0	Only D3 timers are used in these examples
Wp_A_RQ	Wp_B	Requests and starts Wp_B
Wp_A_D3	00:00:25.0	Handled after sequence in Wp_B
Wp_A_RQ	Wp_B	Requests and starts Wp_B
Wp_A_D3	00:00:16.0	Handled after sequence in Wp_B
Wp_B_RW		Waits for start of Wp_B, PL1 runs despite busy Wp
Wp_B_D3	00:00:12.0	
Wp_B_RL	Wp_B released and waits for restart, PL2 uses the Wp temporarily for batching	
Wp_B_D3	00:00:13.0	

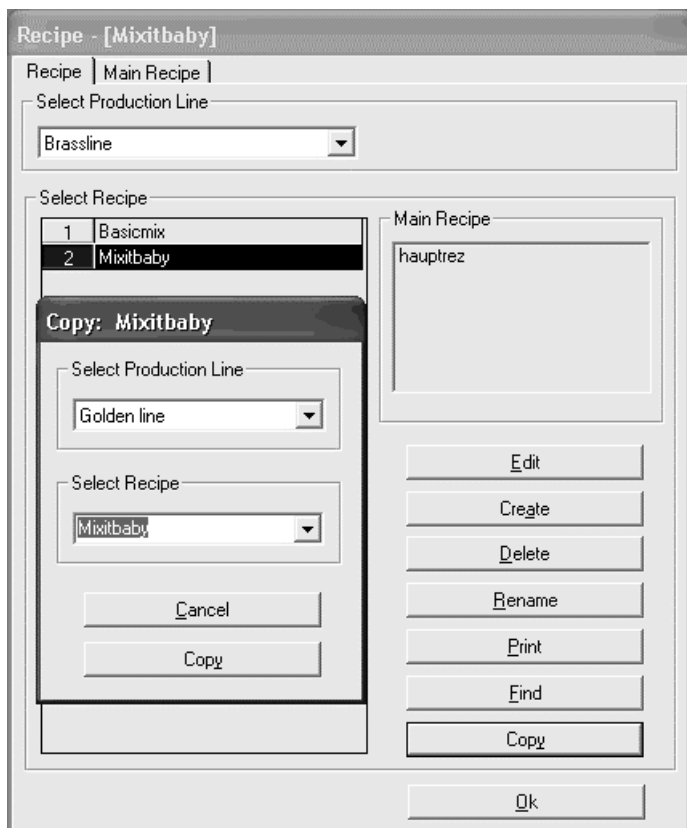
##### PL2: Recipe RQ\_RW\_B\_C

Component	Setp./Param.	Comment
Wp_C_D3	00:00:15.0	Only D3 timers are used in these examples
Wp_C_RQ	Wp_B	Requests and starts Wp_B
Wp_C_D3	00:00:16.0	Handled after sequence in Wp_B
Wp_B_RW		Waits for start of Wp_B, PL2 runs despite busy Wp
Wp_B_D3	00:00:17.0	

## 5.4.2 Recipe



Opens the selection window for the recipe editor:

**Select Production Line:**

Recipes are allocated to production lines. All recipes of the production line are displayed.

**Main Recipe:**

List of main recipes in which the actual one is used.

**Edit:**

The parameters for the selected recipe can be entered / changed. Components must have been created already for the production line.

**Create:**

Entry of a new recipe name. Subsequently, the mask as in Edit appears.

**Delete:**

The selected recipe is deleted. With recipes allocated to a production line which is included in a main recipe, an error message is displayed.

**Rename:**

The previous name is displayed and can be overwritten.

**Print:**

Prints the selected recipe with the associated parameters.

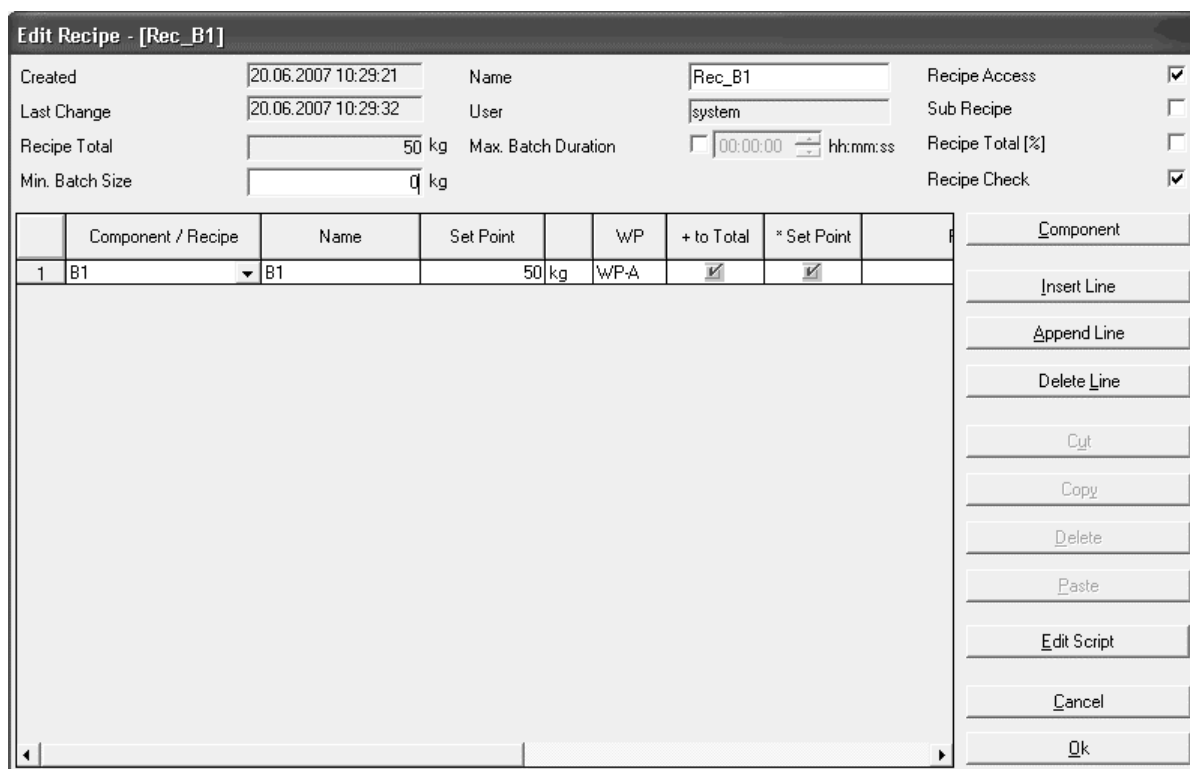
**Find:**

Search for recipe names, \* is used as a wildcard.

**Copy:**

The previous name is displayed and can be overwritten. An additional recipe with the same components is created. A recipe can be copied to another production line. Therefore the components for the target production line must already exist, otherwise an error message will be generated.

After selecting Edit recipe, the following mask is displayed:



Editor window **Edit Recipe** contains the header of the recipe, the recipe lines and the buttons for handling. Fields **Created**, **Last Change**, **Recipe Total** (only if **Recipe Total [%]** is deactivated) and **User** in the recipe header are filled in automatically.

Description	Explanation
<b>Name</b>	The displayed recipe name can be changed.
<b>Reference Weight</b>	Max. producible weight of a batch of this recipe. Used for automatic batch calculation. Only visible when Batch Parameter N * Batch is deactivated !! (window Batch Parameters)
<b>Recipe Total (except with N*)</b>	When Recipe Total [%] is deactivated: This is the sum of setpoints of the individual components with unit (if + to Total is activated). The recipe total cannot be entered. With Recipe Total [%] activated: The recipe total must be entered. In this case, the component setpoints must be entered in % of the recipe total (note '+ to Total').
<b>Min. Batch Size</b>	Check at recipe start. Error message with batch setpoint < Min. Batch Size. Only visible with Batch Parameter N * Batch is activated !! (window Batch Parameters)
<b>Max. Batch Duration</b>	<input checked="" type="checkbox"/> = If activated, a message in the alarm window will be generated, when the time set is exceeded.
<b>Recipe Access</b>	<input checked="" type="checkbox"/> = permitted, the recipe may be produced
<b>Sub Recipe</b>	<input checked="" type="checkbox"/> = this recipe can be used also as a subrecipe
<b>Recipe Total [%]</b>	<input checked="" type="checkbox"/> = relative amount of component setpoints in relation to the Recipe Total, if + to Total is not activated: with unit
<b>Recipe Check</b>	<input checked="" type="checkbox"/> = Recipe simulation is active
<b>Component/Recipe</b>	Select a component / subrecipe from the list. 'Name', 'Wp' and unit (t, kg, g or lbs) are as given in the database.
<b>Set Point</b>	Component setpoint

- + to Total  = See recipe total mode, chapter 5.4.2.1.  
 \* Set Point  = See Calculation setpoint, chapter 5.4.2.2

**Insert Line** will add a line ahead of the marked line, whilst **Append Line** will add a line behind the marked line.

**Delete Line** deletes the marked line.

**Cut, Copy and Delete** can be used after marking one or several lines.

**Paste** can be used after Cut or Copy for the same or another table for the same production line.

**Edit Script:** The script parameters for this recipe can be edited.

### 5.4.2.1 Recipe total mode

- + to Total  = component is totaled,  
 otherwise the component is ignored when calculating the recipe total

The recipe total mode can be used to determine for B1- B6, G1- G6 and D1- D2, if the component is included into the recipe total. For instance, if a recipe contains two B1 components, one B3 component and one B8 component successively, the B3 component corresponds to the recipe total and is marked. The B1 component is not marked, otherwise, the recipe sum is wrong. The setting can be changed before each recipe start. This setting does not affect the report mode. The recipe total mode is independent of the calculation mode.

Recipe		
B1	80 kg	T
B1	40 kg	T
sum:	120 kg	
Recipe setpoint=120 kg		

Marking

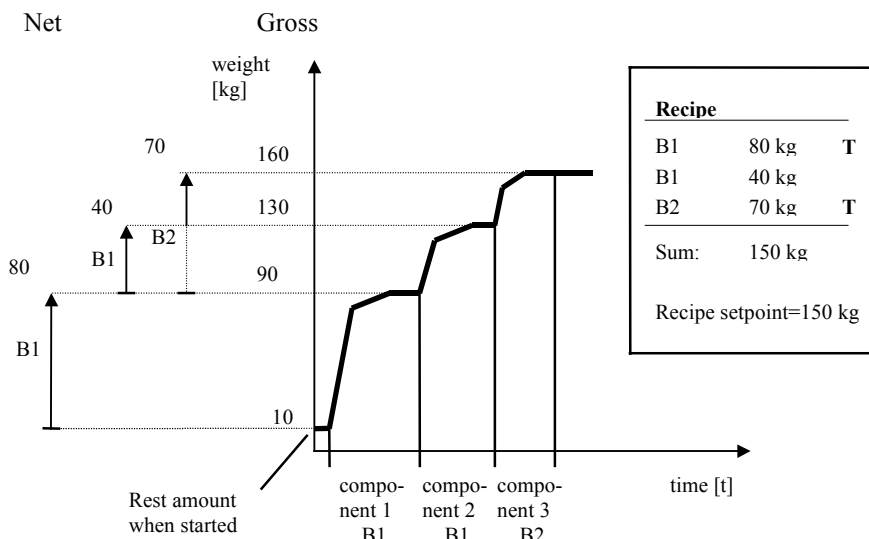
Recipe sum =  $\Sigma$  all lines with T

Start value of the recipe

In this recipe with filling components, all amounts are added to the recipe total. In this example, the recipe sum is calculated with 120 kg. If the recipe starts at 120 kg, all components are batched with the setpoints specified in the recipe lines. In this case, the recipe total is equal to the recipe setpoint. With a different recipe setpoint, all recipe line setpoints are adapted proportionally.



If the recipe is extended by one B2- or B3 component, a faulty recipe sum is calculated. When extending with a B2 component, the previous B1 component must not be used for calculation of the recipe sum. 'Charge' batch mode B2 is based on the last tare value of B1 and its setpoint is the setpoint of the previous component.



When using a B3 component instead of the B2 component, only the B3 component must have the marking 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
Sum 60 kg	Sum 100 kg	Sum 80 kg	B1 20 kg	B3 180 kg T
			B3 180 kg T	B1 20 kg T
			Sum 180 kg	Sum 200 kg

Take care that the total mode is set correctly when using components B2, B3, B5 and B6.

### 5.4.2.2 Calculation Setpoint

\* Setpoint  = function activated

Setpoint calculation is used to determine, whether the material is recalculated at recipe start. With e.g. a recipe total of 100 kg and a material portion of 20 kg, the material setpoint with a production of 300 kg would remain 20 kg without setpoint calculation, and would be 60 kg with setpoint calculation.

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

Setpoint calculation is independent of the recipe total mode.

Example:

Recipe 1				after scaling	Recipe 2				after scaling	Recipe 3				after scaling
B1	50 kg	T	S	100 kg	B1	50 kg	S	100 kg	B1	50 kg	S	50 kg		
B1	50 kg	S		100 kg	B1	50 kg	S	100 kg	B1	50 kg	S	75 kg		
B2	100 kg	T	S	200 kg	B3	150 kg	T S	300 kg	B3	200 kg	T S	300 kg		
<hr/>					<hr/>					<hr/>				
Σ	150 kg			300 kg	Σ	150 kg		300 kg	Σ	200 kg		300 kg		
Recipe setpoint=300 kg					Recipe setpoint=300 kg					Recipe setpoint=300 kg				
Scaling factor = 2					Scaling factor = 2					Scaling factor = 1,5				

In the third example, the first component is not to be scaled. The setpoint of the recipe line is batched independently of the scaling factor. The calculation mode is independent of the total mode.

### 5.4.3 Subrecipe

Subrecipes simplify the recipe structure.

When using a defined sequence in several recipes, it may be written as a subrecipe. The subrecipe is called up like a component in a recipe.

The subrecipe is started as soon as all components ahead of the subrecipe call were handled.

All components behind the subrecipe wait for the moment at which the subrecipe is finished.

For marking a recipe as a subrecipe, **Subrecipe** =  in the recipe editor must be activated.

The setpoint for the subrecipe is defined in the recipe call, all setpoints in the subrecipe are recalculated when starting the subrecipe.

Edit Recipe - [sub-heat]						
Created	03.07.2002 12:24:41	Name	sub-heat	Recipe Access	<input checked="" type="checkbox"/>	
Last Change	03.07.2002 12:24:41	User	system	Subrecipe	<input checked="" type="checkbox"/>	
Recipe Total	0 kg	Min. Batchsize	0 kg	Recipe Total [%]	<input type="checkbox"/>	
Component / Recipe	Name	Setpoint	Wp	+ to Total	* Setpoint	Parameter

Within the subrecipe, calling up the same or another subrecipe is not permitted. The Sync component (see chapter 5.3.3.15) must not be used in a subrecipe.

During editing of a recipe by means of the Recipe Editor, the recipes marked as subrecipes can be selected like a component. Subrecipes are marked by an asterisk (\*<Recipeld>).

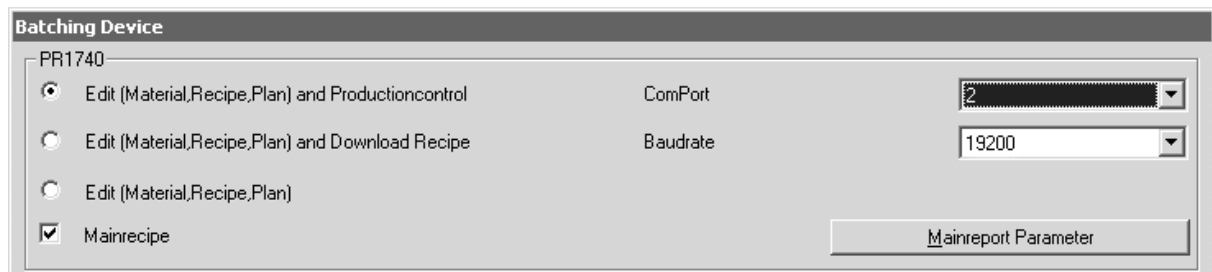
Note: A recipe which contains subrecipes is not a main recipe!

### 5.4.4 Main Recipe

A main recipe is used to start several recipes of an extensive production plant simultaneously. Each recipe must run on a different production line.

**Classic mode:** A production line can be allocated to only one instrument. On a Batch X4/X5/X6, there may be 1 production line.

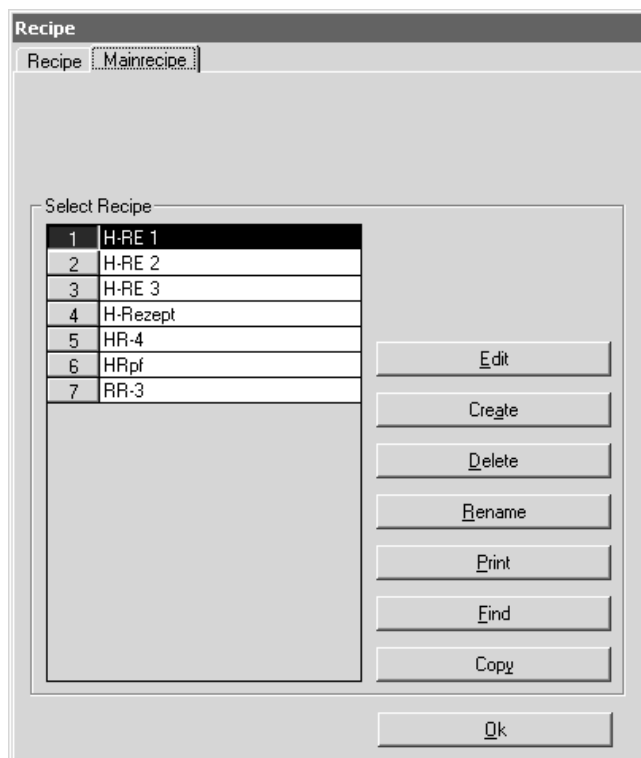
**Open mode:** Max 16. production lines can be defined for the batch server.



Creation and operation of main recipes is activated by ticking **Mainrecipe** =  in window **Configuration ProBatch+**.

Now, production starting for single recipes is blocked. Recipes contained in a main recipe cannot be deleted.

When starting the recipe editor, the main recipe is displayed.



#### Select Recipe:

Created main recipes are displayed and can be selected.

#### Edit:

Recipes for the associated lines can be selected. Recipes have to be created previously.

#### Create:

Entry of a new main recipe name. Subsequently, the mask as in Edit is displayed.

#### Delete:

The selected main recipe is deleted. Deleting is preceded by a safety prompt.

#### Rename:

The previous name is displayed and can be overwritten.

#### Print:

Prints the selected main recipe with the associated production lines.

#### Find:

Search for main recipe names, \* is used as a wildcard.

#### Copy:

The name is displayed and can be overwritten for the copy.

After selecting Edit main recipe, the following mask is displayed:

**Edit Recipe - [H-RE 2]**

Created: 04.06.2002 15:14:00      Name: H-RE 2

Last Change: 26.06.2002 14:00:24      User: system

Recipe Total: 0 kg      Recipe Access:

Min. Batchsize: 10 kg      Max. Batchsize: 1000 kg

Productionline	Recipe	Name	N *	Setpoint	* Setpoint	Priority
Linie 1	Porkfeed	Porkfeed	1	0 kg	<input checked="" type="checkbox"/>	1
Linie2	Superfill	Superfill	1	0 kg	<input checked="" type="checkbox"/>	9

Buttons: Show Recipe, Cancel, Ok

Editor window 'Edit Recipe' contains the recipe header and the lines for the production line (one line per production line). Fields **Created**, **Last Change**, **Recipe Total** and **User** are filled in automatically.

Description	Explanation
Name	The displayed main recipe name can be changed.
Recipe Total	Sum of setpoints of all recipes of this main recipe.
Min.Batch Size	Check when starting the main recipe. Error message, if batch setpoint < min. batch size.
Max.Batch Size	Check when starting the main recipe. Error message, when batch setpoint > max. batch size.
Recipe Access	<input checked="" type="checkbox"/> = activated, otherwise, the recipe cannot be produced.
Production Line	There is a main recipe line for each production line.
Recipe	The recipe is displayed and can be changed.
Name	The recipe name is displayed.
N *	Number of batches in the recipe.
Setpoint	Recipe setpoint.
* Setpoint	<input checked="" type="checkbox"/> = See Calculation Setpoint, chapter 5.4.2.2
Priority	Definition of priorities (1 highest ... 16 lowest) for processing on the lines, see chapter 6.9.2.1.

Show Recipe displays the selected recipe.

## 5.5 Productionplan

The plan opens the selection window for the plan editor:

A production plan can be used to group several productions. Production plans are allocated to production lines.

When checkbox Main Recipe in window Configuration ProBatch+ is ticked, neither production plan creation nor starting are possible!



### Select Production Line:

Production plans are allocated to the production lines. All plans of the selected production line are displayed.

### Set Ready:

Sets all production lines of the selected plan to READY. They can be handled again.

### Edit:

The selected production plan can be edited.

### Create:

Enter the ident of the new plan. The mask starts as after clicking on Edit.

### Delete:

Deletes the marked production plan after acknowledgement of the safety prompt.

### Rename:

The previous name is displayed and can be overwritten.

### Print:

Prints the selected plan

### Copy:

The previous name is displayed and can be overwritten.

After selecting Edit Production Plan, the following mask is displayed:

Edit Productionplan - [Plan A]										
	Recipe	Name	Recipe Total	Special Order	Cust Single Order	Prod. Number	N *	Setpoint	Auto Start	Status
1	Supermix	Supermix	50 kg	Au-2963	Kd-1074	400	1	50 kg	<input checked="" type="checkbox"/>	READY
2	Supermix	Supermix	50 kg	Au-2963	Kd-1074	401	1	50 kg	<input checked="" type="checkbox"/>	READY

<input type="button" value="Delete"/>	<input type="button" value="Cut"/>	<input type="button" value="Delete Line"/>	<input type="button" value="Show Recipe"/>
<input type="button" value="Paste"/>	<input type="button" value="Copy"/>	<input type="button" value="Append Line"/>	<input type="button" value="Cancel"/>
		<input type="button" value="Insert Line"/>	<input type="button" value="Ok"/>

Editor window 'Edit Production Plan' comprises header line, order lines and buttons for handling. Each plan can include max. 999 lines. In the plan, you can use only recipes which exist already for the production line. The selected recipe is displayed. The status field informs on the production status in the plan by 'READY', 'SKIP', 'DONE'. Only productions which are running when opening the window get status 'BATCH'.

With the window open, the status display is frozen until opening the window again.

Description	Explanation
Recipe:	Select from the selection list, name and recipe total are not displayed
Order:	Optional, enter the data
Customer:	Optional, enter the data
Production Number:	Optional, enter the data
N * :	Number of productions
Setpoint:	Setpoint for the production line, in % or in weight dependent on parameter setting
Auto Start	<input checked="" type="checkbox"/> = automatic start, otherwise manual enabling
Status	Select from list, e.g. READY or SKIP

A line is inserted ahead of the marked line after clicking on **Insert Line**, and behind the marked line after **Append Line**.

**Delete Line** will delete the marked line.

**Cut**, **Copy** and **Delete** can be used after marking one or several lines.

**Paste** can be used for the same or another production plan after **Cut** or **Copy**.

## 6 OPERATION

### 6.1 Operation general

ProBatch+ operation is interactive by means of the well-known Windows methods. Generally, ProBatch+ functions are started by buttons in selection and editing windows. You can operate ProBatch+ using mouse or keyboard in all windows. Main functions are allocated to function keys.

The operation is completely identical with the Microsoft Windows program operation.

### 6.2 Program operation

You can operate ProBatch+ using mouse or keyboard in all windows.

- 1.) Using the *mouse* by clicking in the menu. Always note the markings in the fields which are displayed after clicking (e.g. selecting).
- 2.) Using the *keyboard* by pressing key "Alt" simultaneously with the underlined letter of the main menu item, and by pressing the key with the underlined letter in the submenu.
- 3.) By pressing the function key displayed behind a menu item, whereby no menu item from the menu bar may be marked (if necessary, press key "ESC" previously).

Unless you use a mouse, you can move over the screen by means of the arrow keys. The input fields in the windows are accessible by means of the tabulator key (mostly on the left beside letter Q). Passing through selection fields is possible using the arrow keys or the return key.

Generally, functions are started by clicking on buttons in ProBatch+ selection and editor windows.

#### 6.2.1 Function keys

Key	Function
F1	Help, contents
F2	Single production, start recipe
F3	Start production plan or from plan
F4	Production/batch reports
F5	Open / print alarm report
F8	User log-in
F9	System, Batching device - Configuration
F11	System, Name of application
Alt-X	Start recipe / main recipe

### 6.3 ProBatch+ program description

ProBatch+ is the operating level for batching installations with Batch X4/X5/X6 or Phase Controller X4/X5/X6, Combics Pro and comprises component, recipe management, process survey (in the status plan), process control and production data storage. ProBatch+ supports up to 16 production lines with max. 16 batching devices and 16 weighing points. Several productions can run simultaneously on a device, however, only one recipe at a time can be handled on a production line.

The recipe can contain only lines for one production line. Partial installations (weighing points) can be used in common with other production lines. With common weighing points, the recipe must contain interlockings for a correct production sequence.

A search function with components, recipes and recipe start facilitates ident finding in large data quantities. The search word starts full text searching, also with \* and ? as a substitute character.

Hint for correct application: **ProBatch+ must always be finished correctly to prevent dabases from being damaged (data loss).** A batching installation with ProBatch+ must be operated by trained and qualified personnel on a suitable computer after set-up.



### 6.3.1 ProBatch+ operating functions

The operation comprises the following operating functions and sub-functions:

- Production
  - Single Start of Production
    - \* Main Recipe, only with main recipe activated
    - \* Recipe, only, if main recipe not activated
  - \* Start Production Plan, only if main recipe not activated
  - Production Manager
    - \* Main Recipe Orders, only with main recipe activated
    - Recipe Orders,
  - Lot No.
  - Alarm
  - Message
- Reports
  - Production/batch
    - \* Main Recipe, only with main recipe activated
    - Recipe
  - Alarm
  - Message
- Stock/Consumption
  - Stock
  - Consumption
  - Production Quantity
  - Supply
  - Suppliers
- \* Plan (Production Plan Table), only with main recipe not activated
- Recipe (Recipe Table)
  - \* Main Recipe, only with main recipe activated
  - Recipe
- Comp. (Component Table)
- User
  - Login
  - Set Password
  - Logout
- System
  - User
  - Configuration
    - Batching Device
    - Name of Application
    - Directory
  - Backup Databases
  - Restore Databases
  - Compact Databases
  - Reset Production Line/Main Recipe
  - Windows Settings)
    - Reset
    - Resize On
    - Resize Off
  - Edit Text
  - Select Language
  - Service
- Help
  - Probatch+ Help, Script Help, Batch Server Help, Phase Controller Help, S7 Proxy Help
  - Info

Some functions can be called up directly via function keys.

## 6.4 User



Max. 50 users are possible in ProBatch+. Enabling of the operating functions per user is described in chapter 4.3. Only one user at a time can be logged in. Each user must log in before access to ProBatch+, all operating functions to which he is authorized are enabled. Therefore, the access should be protected regularly by a new password.

Log-in time and date are included in the message report. A user can be logged in automatically when starting. He is logged out automatically when another user logs in, or by selecting function Logout. The new user will have the access privileges defined for him.

### 6.4.1 Login



Description	Explanation
User	Enter your user name. Take care that it is written correctly. Upper and lower case are without importance.
Set Password	Specify your password. Take care that it is written correctly. Upper and lower case are without importance.
Ok	You are logged in with your access privileges.

The password is not displayed during entry.  
Unless you want to log in, click on 'Cancel'.  
A user can log out after completing his work.

### 6.4.2 Logout

You are logged out by ProBatch+, when you click on Ok.

Unless you want to log out, click on 'Cancel'.

### 6.4.3 Set Password

Description	Explanation
Set Password	Enter a new password. Take care to write it correctly. Upper and lower case are unimportant.
Repeat Password	Enter your password again. Take care to write it correctly. Upper and lower case are unimportant.
Ok	The old password is replaced.

With "Repeat Password", the password entered previously is not displayed. Unless you want to change your password, click on 'Cancel'. After errors or cancellation, the old password remains unchanged.

## 6.5 ProBatch+ main window

### 6.5.1 General

All operating, report and editing functions are accessible via the menu bar. The **main functions** are allocated additionally to icons or function keys. The possible main functions depend on the **start parameters**. Dependent on his access privilege, the user can open all or only defined menu items – these topics are displayed in black, their icons are visible. For user SYSTEM, all menu items and function keys are accessible.

The ProBatch+ main window is shown below. The icon bar contains status fields with date/time and with the logged in user.

Program operation is completely identical to the Microsoft Windows conventions.

Main menu:



8400\_31

In this example, function Plan is not accessible.

## 6.5.2 Proces survey

Process										
Production Line	W/P	Gross		Recipe	Component	Name	Set Point		Actual Value	Status
PL-1 Ansatz 1	Mischer	165	kg							IDLE
PL2	WPC									ERROR

8400\_56

Field contents for Production Line, Wp, weighing point gross weight (with unit) and status are displayed spontaneously. During batching, the other fields are also filled in: handled recipe, ident and name of the actual component, setpoint, actual component weight, status field. Fields with weight values are displayed with/without digits behind the decimal point dependent on weighing point data.

## Status lines in the menu window

## Wp

Weighing point ident of the production line.

Click on the weighing point to open window Process Control for this weighing point. In this window, the recipe window contains only recipe lines for the selected weighing point: Recipe - WP (x). For explanations, see window Process Control.

## Gross

Gross weight of the weighing point with unit for weight: t, kg, g or lbs

## Recipe

During batching: recipe name.

## Component, Name

During batching: Name of the actual component

## Set Point

During batching: Component setpoint

## Actual Value

During batching: Actual component weight

## Status

Information on the present weighing point STATUS, e.g. IDLE, LOAD, BATCH, REPORT, STOP, etc.

- IDLE** The production line is inactive and waits for orders
- LOAD** A production order (recipe) is loaded into the batching device or in the batch server
- WAIT** A production order is in the batching device or in the batch server and must be started manually. Starting is possible in window Process Control. For this, parameter "Auto Start" must be deactivated at production start.
- BATCH** Signals that the production is active. During production, setpoint and actual value can be monitored in the status line. The process values are measured and the alarms are displayed.
- STOP - N** Indicates that the production was stopped in window Process Control. The status remains unchanged, until the production is reactivated or cancelled. N -> Stop reason: 4= Manual, 5=Tolerance, 6=Timeout, 7=Analog error (ADC), 8=Mains failure.
- ABORTED** is displayed shortly after canceling a batch.
- ERROR** indicates that the weighing point is not accessible, or does not exist. Possible reasons: communication interrupted, a weighing point which does not exist on ProBatch+ was created, the device is defective, or programmed incorrectly.

### 6.6 Alarm icon



The list contains all received alarms, e.g.:

Alarm			
	Productionline	Alarm	
1	el	Communication Off	09.07.01 11:05:56
2	System	aA: Please update to version PR1713 2.00	09.07.01 11:05:55
3	System	aP: Please update to version PR1730 3.10	09.07.01 11:05:55
4	System	aG: Please update to version PR1713 2.00	09.07.01 11:05:55

Ok

The latest alarm is in the topmost line. The alarms are stored in a database.

### 6.7 Message icon



The list contains received messages, e.g.:

Messages			
	Productionline	Message	
1	System	system logged in	09.07.01 11:05:47
2	System	PR1740 started	09.07.01 11:05:42
3	System	PR1740 stopped	09.07.01 11:00:55
4	System	system logged out	09.07.01 11:00:55

Ok

The latest message is in the topmost line. The messages are stored in a database.

### 6.8 Production manager



Buffer for started orders, which, nevertheless, are waiting for free production lines. If there are still orders in the production manager, and you want to finish ProBatch+ , these orders are brought to your attention.

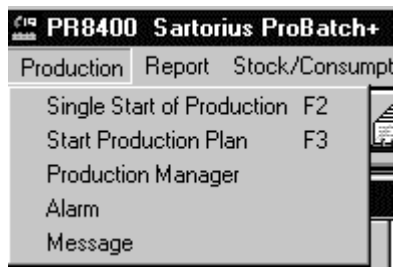
You can mark and delete individual orders (without creation of a report), or you can mark all orders by clicking on the first field in the table header and delete all by clicking on the button.

Size, position, arrangement of controls in the window as well as fonts and font size can be changed by user 'SYSTEM' (as in Process Control).

Production Manager								
Recipe Queue:		Main Recipe Queue						
	Production Line	Recipe			Production Number	N *	Set Point	Auto Start
1	PL-1 Ansatz 1	Mix11			0	5	0,000 kg	<input checked="" type="checkbox"/>

8400\_32

## 6.9 Production



8400\_33

Up to 16 production lines with an own recipe can operate simultaneously on several batching devices, 1 recipe per line. There may be common weighing points in the recipe. Sequence control must be defined in the recipe. With different weighing points, all digits behind the decimal point for the production total can be specified and output in reports. You can start a single production (also from the plan) or a prepared production plan (with start mode for handling).

If checkbox **Main recipe** in window [Setup]-[Configuration]-[ProBatch+] is activated, the production plan cannot be started or edited.

If the production line is busy, orders are buffered in the production manager, until the line can handle the following production.

The production can be distributed to several batches (according to parameter setting). When starting the first and the last batch of a production, an SPM bit within 418 – 421 of the instrument is set (dependent on production line). This bit can be used e.g. by a PLC to get information on a production start or end, or for intervention into the production sequence, for instance selection of valves or transport routes.

The number of batches is determined by the recipe setpoint referred to the **reference weight**. The ProBatch+ parameter settings determine, if production is in weight or in per cent of the recipe total (batch factor), how batches are calculated and distributed and if the batches can be enabled manually.

**Production Control (Stop, Continue, Skip)** is always possible in the Process Control window whilst the production is running. The process survey includes a line with information for each weighing point. After stopping the current production, the relevant buttons are enabled.

## 6.9.1 Single Start of Production



Single start of production is by entry of all required data into the fields of window "Start Recipe". Select the production line first, and then the required recipe from the list.

Button **Edit Recipe** or **Show Recipe** (dependent of the access privileges) can be used for display and editing of the relevant recipe.

Fields **Name** and **Recipe Total** are read from the database. With a very high number of recipes in the selection list, access via button **Find** is quicker than by means of the scroll bar.

The inscriptions of fields **Order Ident** and **Customer Ident** can be changed: (e.g. "Order Ident" -> "Process Number") or (e.g. "Customer Ident" -> "Cust Single Order"). Entry is in menu: [System]-[Configuration]-[ProBatch+ ]-[Production Line Parameters]-[Report Parameters].

Description	Explanation
Order	e.g. ordernumber, optional
Customer	e.g. customername, optional
Prod.Number	The production number is stored in the reports.
N*	Enter number of batches, max. 9999.
Set Point	Enter setpoint in % (default value= 100) or weight.
Auto Start	<input checked="" type="checkbox"/> = start immediately, otherwise wait for start enabling at the PC
Start Production	Starts a production
Start Correction Recipe	Starts a secondary production whilst the current production is stopped by a Sync component.

If the production is busy, the order is buffered in the production manager. The production total is distributed to batches according to parameter setting.

6.9.2 Single Start of Production for Main Recipe



The main recipe is started by entry of all required data into the fields of window **Start Recipe**.

Button **Edit Main Recipe** or **Show Main Recipe** (dependent of access privileges) can be used for display and editing of the relevant recipe. This function is also accessible to operators who have only the production access privilege (in this case, only **Show Main Recipe**).

Field **Name** and **Recipe Total** are read from the database. With a very high number of recipes in the listbox, access via button **Find** is quicker than by means of scroll bar.

The inscriptions in fields **Order Ident** and **Customer Ident** can be changed: (e.g. "Order Ident" -> "Order Extracharges") or (e.g. "Customer Ident" -> "Customer Single"). Entry is in menu: [Setup]-[Configuration]-[ProBatch+]-[Main Recipe Parameters].

Description	Explanation
Order	e.g. order number, optional
Customer	e.g. customer name, optional
Prod.Number	The production number is stored in the reports
N*	Enter number of batches, max. 9999.
Setpoint	Enter the setpoint in % (default value= 100) or weight
Synchronous Start	<input checked="" type="checkbox"/> = activated , see chapter 6.9.2.1.
Start Production	Start order

Checkbox **Auto Start** is omitted for main recipes, start is without further enabling. If the production line is busy, the order will be buffered in the production manager. The production total is distributed to batches according to parameter setting.



6.9.2.1 Priorities, synchronous / asynchronous start

The priority ( 1 = highest ... 16 = lowest) determines the order in which the lines of a main recipe are handled. If e.g. two lines have the same priority, the recipes will start at the same time. If recipes have more than one batch, synchronization of batches is omitted.

For starting a main recipe, all lines required in the main recipe must be free.

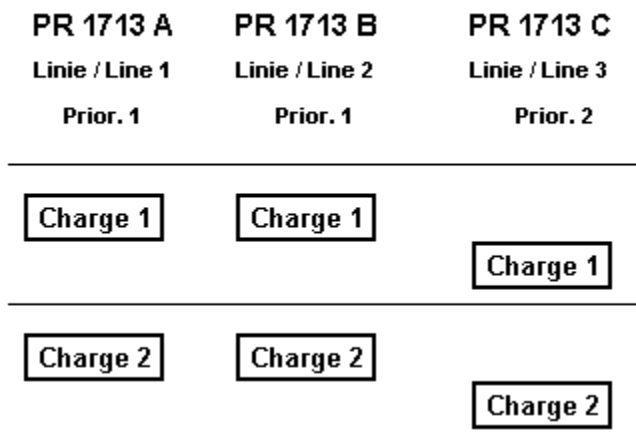
A line with low priority starts only, when all lines with higher priority have finished their batches.

With synchronous start, the next batch of a main recipe is started only, when all charges on the lines were processed.

With asynchronous start, the next batch of a main recipe can already start, even when lines with lower priority still weren't handled.

Example for 3 Batch X5:

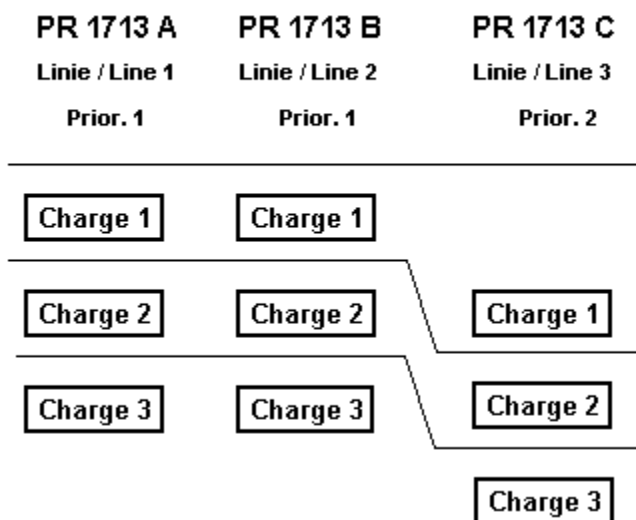
**synchr. Start**



Batch 1 of line 3 starts only, when lines with priority 1 were processed.

Batch 2 of line 1 and 2 starts only, when batch 1 of line 3 was processed.

**asynchr. Start**



Batch 1 of line 3 starts only, when the lines with priority 1 were processed.

Batch 2 of lines 1 and 2 starts, when batch 1 of lines 1 and 2 was processed, at the same time batch 1 of line 3 is started

### 6.9.3 Start Production Plan

This function is possible only, if the checkbox for main recipe in window [Setup]-[Configuration]-[ProBatch+] is not activated. The **production plan licence** for at least one batching device. is required.

The operator can start a ready-made plan or a production from the plan. In selection window "Start Production Plan" all production plans of a selected production line are displayed. Select the production line first and then the required production plan from the lists.

Button for setting the required plan ready: clicking will set all productions in the plan to Ready, i.e. they can be handled again.

Start a selected plan with defined orders by clicking on **Start Production Plan**. The production starts with the first order. Orders for a busy production line are buffered in the production manager. The start mode is determined in the production plan.

Start production from plan: At first, select the production line in selection window "Start Production Plan", then select the required production plan from the list. Click on **Start Production From Plan**. The selected plan will be opened: Start From Production Plan - [x].

Button **Show Recipe** displays the recipe header and all lines. During display, button "Show Component" can be used to view the component definition for each selected line. This function is enabled also for operators with production access privilege. The two windows can be left only with Cancel. Modifications are not stored.

	Recipe	Name	Recipe Total	Special Order	Cust Single Order	Prod. Number	N *	Setpoint	Auto Start	Status
1	Supermix	Supermix	50 kg	Au-2963	Kd-1074	400	1	50	<input checked="" type="checkbox"/>	READY

Select production(s): click on line number(s), drag the mouse, or Shift-click.

optional e.g. new order number with modification

optional e.g. new customer name with modification

optional e.g. enter new setpoint with modification

Auto Start:  = start immediately, otherwise, wait for start enable at the PC

'Start Production' : start order

If button Start Production appears in gray, no production is selected.

**Changing the default values:** Before starting, you can change the order and production parameters by overwriting. The new data in the line are not stored in the plan. Select the required order or orders in the plan for starting. If the production line is busy, orders are buffered in the production manager. When all orders were handled, the production stops, until you start another production

### 6.9.4 Process Control

After clicking on the buttons in the process survey, window Process Control opens:  
 at the production line for all weighing points in the recipe,  
 at the weighing point for the recipe part of the selected weighing point.

Display of the process survey is continued additionally and can be used for switching over between display of production lines or individual weighing points in window Process Control. The field selected last is displayed.

In batch mode, the overall process with batch, recipe and production can be monitored. The other buttons are enabled only after stopping the batch and controlling process interventions are possible. Functions Skip, Skip All, Repeat and Continue must be acknowledged before handling in "ProBatch+".

View of buttons with explanation:

The screenshot shows the 'Process Control - [Linie 1]' window. It is divided into three main sections: Production, Batch, and Recipe. The Production table shows a single order with a setpoint of 55 kg and an actual value of 0 kg. The Batch table shows 'Batch 1 / 1' with a setpoint of 55 kg. The Recipe table lists two components: 'Extrazucker' (110 kg) and 'Supersalt' (55 kg). At the bottom, there are buttons for 'Skip - [Beh 100]', 'Continue - [Beh 100]', 'Stop - [Beh 100]', and 'Ok'. On the right side, there are buttons for 'Start', 'Stop', 'Restart', 'Skip', 'Repeat', and 'Skip All'.

Production					Batch 1 / 1				
Cust Single Order	Special Order	Setpoint	Actual Value	Sequence Number	Break	Setpoint	Actual Value		
375	1024	55 kg	0 kg	134	1	55 kg			

Recipe							
	Break	Wp	Component / Recipe	Name	Setpoint	Actual Value	
1	<input type="checkbox"/>	Beh 100	Extrazucker	Extrazucker	110 kg		
2	<input type="checkbox"/>	Beh 100	Supersalt	Supersalt	55 kg		

In the example, the recipe is loaded and the process is at batch start. In every line a **Breakpoint** for testing which stops the process step before line handling can be set. The weighing point - [Beh 100] is selected. Therefore the text of buttons in window 'Recipe' relates to Wp Beh 100. Clicking on the other weighing points also changes the function of the buttons accordingly.

#### Production

During batching: the table shows the actual production with setpoint, actual values and a sequence number.

#### Batch x / x

During batching: the table shows the batch plan for the started production. If the weight does not exceed a batch, there is only 1 batch.

#### Button in window Batch

During batching: You can stop the process on all weighing points.

Subsequently, the other buttons for process control are enabled.

#### Window Recipe

During batching, recipe lines with the setpoint and actual value for the component are displayed.

If you reached this window by clicking on a weighing point in the process survey, you will see only lines for the selected weighing point, otherwise you see all recipe lines.

#### Button in window Recipe

During batching: You can stop the process on the specified weighing point.

Subsequently, the other buttons for process control will be enabled.

#### Breakpoint

A breakpoint in the recipe line or in the batch plan line is set by clicking in the relevant checkbox.

Before handling the line, the process stops and waits for manual enabling by the operator at the PC with ProBatch+. The breakpoint enforces a "Stop -2".

### 6.9.5 Main Process Control

Window Main Process Control is always opened, as soon as checkbox Main Recipe in window [Setup]-[Configuration]-[ProBatch+] is activated. The Process survey is displayed additionally and can be used for switching over between display of the production lines or of the individual weighing points in window Process Control. The field selected last is displayed.

During batching, you can monitor the overall process with batch recipe and production. The other buttons are enabled only after stopping the batch and controlling process interventions are possible. Functions Skip, Skip All, Repeat and Continue must be acknowledged before handling.

View of the buttons with explanation:

The screenshot shows the 'Main Process Control - [Control01]' window. It is divided into three main sections:

- Main Production:** A table with columns: Recipe, Kunde, Auftrag, Set Point, Actual Value. The first row shows 'Control01', an empty 'Kunde' field, an empty 'Auftrag' field, '10 kg' for 'Set Point', and '0 kg' for 'Actual Value'.
- Main Recipe Batch - [Batch No 1]:** A table with columns: Batch No, Break, Set Point, Actual Value. The first row shows '1', a checked 'Break' checkbox, '10 kg' for 'Set Point', and an empty 'Actual Value' field.
- Main Recipe - [Batch No 1]:** A table with columns: Production Line, Recipe, Set Point, Actual Value, Status. The first row shows 'PL-1 Ansatz 1', 'Mix11', '10 kg' for 'Set Point', an empty 'Actual Value' field, and 'WAIT' for 'Status'.

At the bottom right, there are six buttons arranged in a 3x2 grid: 'Skip All', 'Skip', 'Restart All', 'Restart', 'Stop All', and 'Stop'.

8400\_34

#### Main Production

During batching: the table shows the actual main recipes with ident and order information, setpoint and actual value.

#### Buttons in Main Recipe Batch

During batching, buttons Stop All and Stop are accessible after selecting a batch. Subsequently, the other buttons can be used.

#### Main Recipe

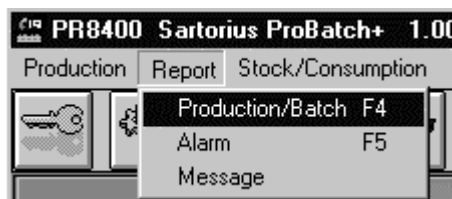
During batching, the production lines with the related recipes, setpoints and process values are displayed here.

Clicking on the production line will open window Process Control for the selected line. see chapter 6.9.4 .

#### Breakpoint

By activating checkbox **Break** you can set a breakpoint in one of the lines of the main batch plan. Before handling this line, the process is stopped and waits for manual activation by the user at the PC with ProBatch+.

## 6.10 Report



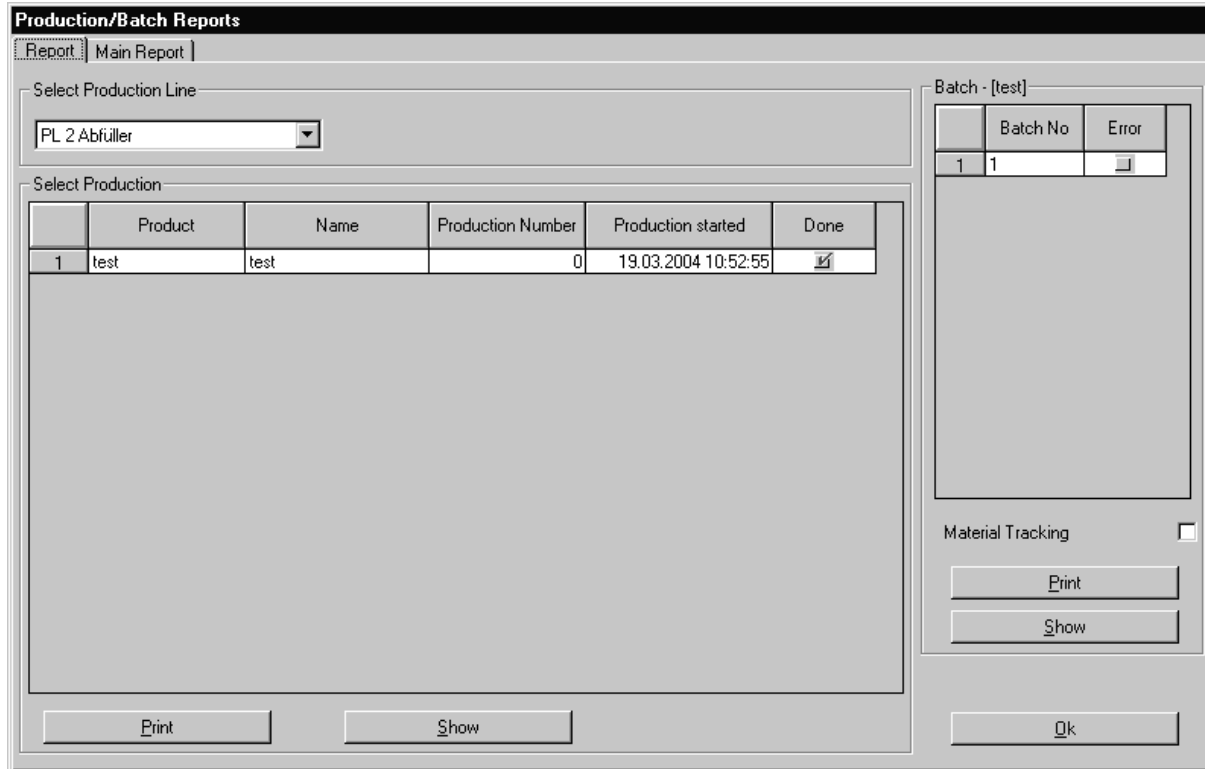
8400\_35

Reports are stored in the database. Reports can be displayed, printed out or deleted.

Reports of batches and productions can be deleted separately from the database after selecting a report. If the production has always only one batch, the batch report can be omitted. The reports are provided with the actual date/time for production or batch start or end. In the production report, the total of all good batches is specified with "Production Total". The consumptions of all (also faulty) batches are indicated in the following material table.

The reports are generated in a standard format by the Crystal Reports Generator. Structure and layout of the report print-outs can be changed by means of the commercially available programs. Alarm, message, batch and production reports can be displayed in the window, printed out or saved as a file.

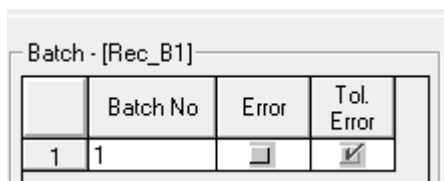
6.10.1 Production and batch reports



8400\_36

In the left part of window "Select Production" there is only a tick in column 'Done' with the productions finished. In the right part of the window "Batch - [x]" a tick in column 'Error' indicates that the batch was faulty. Errors are marked in the error column in batch report and production report. The significations are:

- \* cancellation, faulty batch
- skipped, not handled



= It is shown, that at least 1 tolerance alarm was present.

Description	Explanation
Select Production Line	All productions of the selected production line are displayed. Reports are allocated to production lines.
Select Production	Click on the production line number. All batch reports of this production are displayed.
Print	Prints the selected production(s, also several ones, max. 80). Faulty batches are not totalized.
Show	Displays the selected production on the monitor. Faulty batches are not totalized.
Select Batch	Click on the line number(s) of batch(es), batch(es) are selected.
Material tracking	<input checked="" type="checkbox"/> = The component lines in the batch report are extended by fields Lot No., Order No., Delivery No., Date and Time. The fields in the database are also extended.
Print	Prints the selected batch(es, also several ones, max. 80)
Show	Displays the selected batch

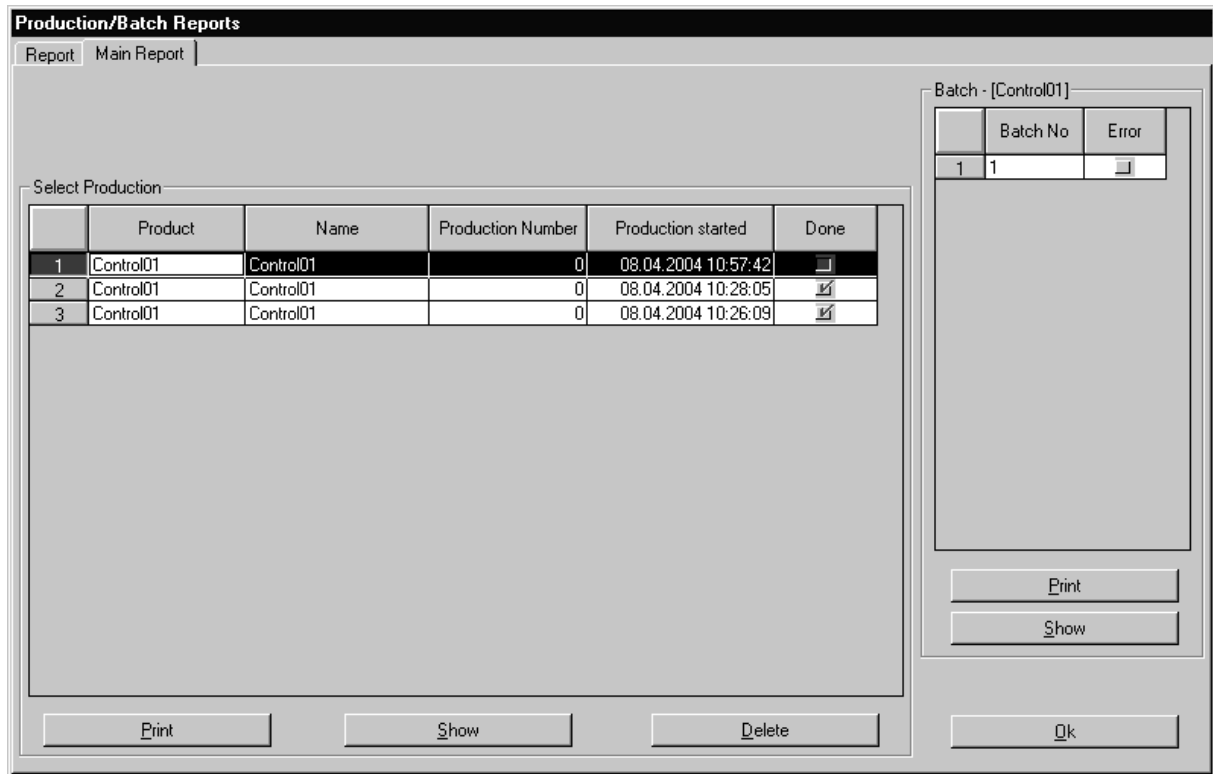
In the window displayed after clicking on 'Show' the buttons of the Crystal Reports Generator are available for printing and **exporting** of the displayed data. With alarm, message, batch and production report, the operator can display, print or save the report in the window. The reports are generated in a standard format by the **Crystal Reports Generator**. Structure and layout of the print-outs can be changed using the commercially available tool.

**Delete:** You can delete selected reports. When deleting, all batch reports of the production are also deleted.

Click on the column with line numbers in the table header for selecting all productions or batches. The selected reports can be printed out only with sufficient memory capacity in the printer waiting queue.

6.10.2 Main Recipe Report

With checkbox Main Recipe in window [System]-[Konfiguration]-[ProBatch+] activated, selection between Report and Main Report is possible after selecting Report and Production/Batch.



8400\_37

In the left part of the window, "Select Production", there is a tick in column 'Done' only with finished productions. In the right part of the window, "Batch", a tick in column 'Error' indicates that the batch was faulty. Errors are marked in the error column in batch report and production report. The significations are:

- \* cancellation, faulty batch
- # tolerance alarm
- skipped, not handled

Description	Explanation
Select Production	Click on the production line number. All batch reports of the production are displayed.
Print	Prints the selected production(s, also several ones, max. 80)
Show	Displays the selected production
Select Batch	Click on batch line number(s), selects batch(es).
Print	Prints selected batch(es, also several ones, max. 80)
Show	Displays the selected batch

In the window displayed after clicking on 'Show', the buttons of the Crystal Reports Generator are available for printing and **exporting** the displayed data. Alarm, message, batch and production report can be displayed in the window, printed out or saved as a file. The reports are created in a standard format by the **Crystal Reports Generator**. Structure and layout of print-outs can be changed by means of the commercially available tool.

**Delete:** You can delete selected reports. When deleting, all batch reports of the production are also deleted.

Click on the column with line numbers in the table header for selecting all productions or batches. The selected reports can be printed out only with sufficient memory capacity in the Windows printer waiting queue.



Production Report Example:

Mixing Unit 50  
Department Special Mixes

### Production Report

**Time of start** 02.07.2002 14:08:52  
**Time of finish**  
**User** system  
**Productionnumber** 150  
**Product** HR-4  
**Production Setpoint** 165 kg  
**Production Total** 105 kg  
**Number of Batches** 3  
**Recipe Created** 04.06.2002 16:18:05  
**Recipe Changed** 10.06.2002 14:52:55

Productionline	Line 1	Setpoint	165 kg		
Recipe	Supermix	Act-Value	105 kg		
Line	Material	Name	Act-Value	Setpoint	Error
1	Extrazucker	Extrazugar	224 kg	220 kg	
2	Supersalt	Supersalt	105 kg	110 kg	

### 6.10.3 Alarm Report

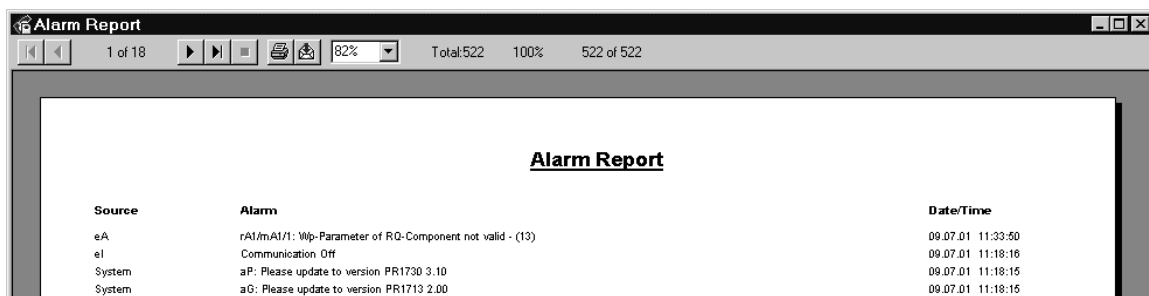
Contains e.g. the alarms of each production line and error messages from communication. Select in window "Alarm Report":

Description	Explanation
Select Production Line	Always select from list first, * for all lines
Show	Displays alarms for the selected production line
Print	Prints alarms for the selected production line
Delete	Deletes alarms for the selected production line

The Crystal Reports Generator buttons are available in the window displayed after clicking on 'Show' for printing and exporting the displayed data.

Click on Ok, unless you want an alarm list.

Example for an alarm report :



### 6.10.4 Message Report

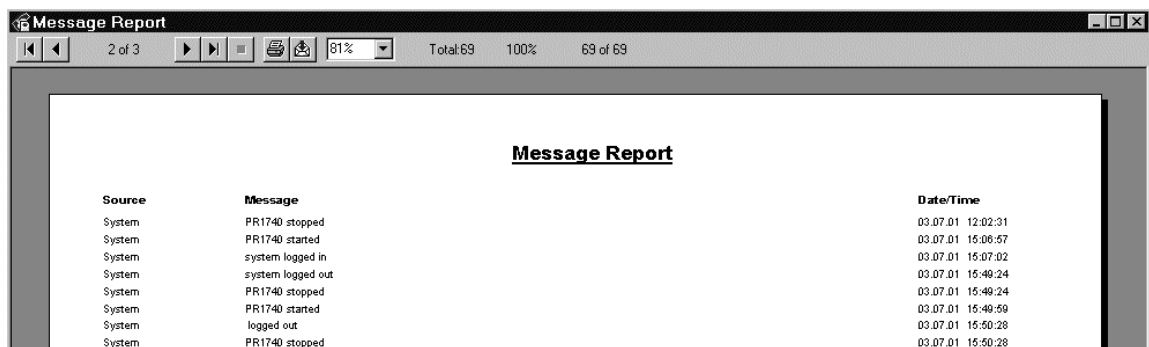
Contains e.g. the alarm messages and other system events. Select in window „Message Reports“.

Description	Explanation
Select Production Line	Always select from the list first, * for all lines
Show	Displays messages for the selected production line
Print	Prints messages for the selected production line
Delete	Deletes messages for the selected production line

In the window displayed after clicking on 'Show', the buttons of the Crystal Reports Generator are available for printing and exporting the displayed data.

Click on Ok, unless you want a message list.

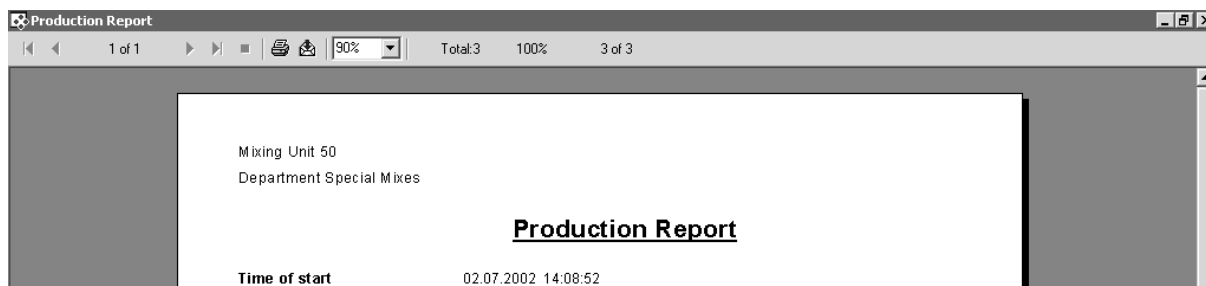
Example for a Message Report :



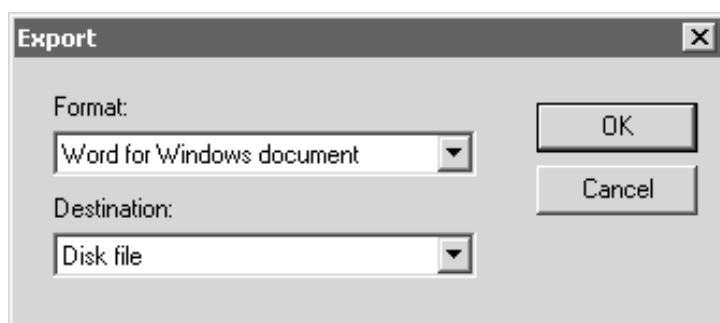
### 6.10.5 Exporting reports (Crystal Reports Generator)

After clicking on 'Show', the window is built up by the Crystal Reports Generator, version 8.5. according to the previous selection.

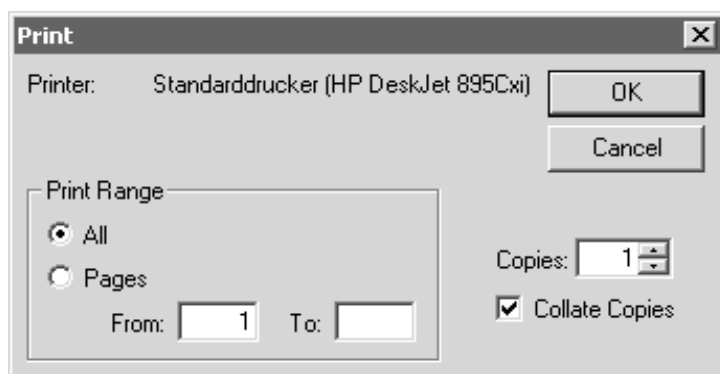
Independent of the dialogue language selection made for ProBatch+, the dialogue language for Crystal Reports is always English.



The buttons in the headline can be used for paging in the document, reducing / increasing the size, printing or exporting as a file.



For exporting, select an export filter from list 'Format', and 'Disk file' in Destination.



Select the print range in 'Print Range'.

With several pages, you can print out all or only defined pages.

Print-out is on the standard printer as selected in Windows.

## 6.11 Stock/Consumption

ProBatch+ calculates the stock and the consumption of components and production sums automatically. Supplies and suppliers can also be stored in databases.

For this function, the following licence is required: PR1740/20, PR1740/21 or PR8400/21

### 6.11.1 Stock

Batch modes B1, B2, B4, B5, G1, G2, G4, G5, D1 and D2 can be used to provide a survey of the overall production line stocks. The stock quantities are stored in the component table in the 840002P1.MDB database.

A specific stock value can be entered manually via button **Set Stock**. The value must be  $\geq 0$ . If the component quantity to be batched is  $\geq 0$ , ProBatch+ subtracts this value automatically from the stock value. The report can be printed out via Crystal Reports.

### 6.11.2 Consumption

You can provide yourself with a survey of the daily consumption of one or all components within a selected time period for a production line. You can select, whether a survey for all recipes or for one recipe is required. The report can be printed out by means of CrystalReports.

Component selection is limited to components with batch modes B1, B2, B4, B5, G1, G2, G4, G5, D1 and D2. Only recipes and components stored in the report database (840002R1.mdb) can be selected.

Consumption						
Production Line		Recipe		Component		08.03.2004
*		*		*		08.04.2004
						per day
						00:00:00
						23:59:59
						<input checked="" type="checkbox"/>
	Date	Production Line	Recipe	Component	Consumption	
1	29.03.2004	PL-1 Ansatz 1	*	Netto	111	kg
2	30.03.2004	PL-1 Ansatz 1	*	Netto	150	kg
3	07.04.2004	PL-1 Ansatz 1	*	Netto	0	kg
4						
5					261	kg

8400\_38

If the checkbox is activated the amounts are registered per day in the selected time span. If it is deactivated, the amounts are only registered for the total time span.

### 6.11.3 Production Quantity

You can also provide yourself with a survey of the daily production quantity within a selected period of time for one of the production lines. The report can be printed out by means of CrystalReports. Only recipes stored in the report database (840002R1.mdb) can be selected.

### 6.11.4 Supply

You can provide a survey of all supplies in a selected period of time. Supplier, production line and component can be entered as an additional filter. A new supply can be entered by means of button **Create** in window **Supply**. The report can be printed out by means of CrystalReports.

### 6.11.5 Suppliers

A survey of all suppliers with the following details is possible: Name (30 characters), address, phone and fax number. The report can be printed out by means of CrystalReports.

## 7 SCRIPT

### 7.1 Survey

The ScriptEngine is a supplement of ProBatch+. Scripts are used as components in recipes, in order to handle local actions on the running PC.

Scripts are used for easy and flexible realization of customer-specific process requirements. These can be e.g. setpoint humidity corrections, special synchronizations of recipe steps, or particular operator dialogues.

#### 7.1.1 Differences between IEC-61131 and the ScriptEngine

The ScriptEngine is programmed in a language, which is very similar to IEC-61131. The main differences are:

#### 7.1.2 Implicit configuration, resources and tasks

IEC-61131 requires determination of configurations, resources and tasks for assignment of programmed variables and code to particular parts of one or several PLCs. This is not required with the ProBatch+ ScriptEngine. However, the following assignment is possible:

IEC 61131	↔	ProBatch+
Configuration	-	Batch Server
Resources	-	Production line
Task	-	Recipe

#### 7.1.3 No functions, function blocks and programs

In the ScriptEngine, every script is handled as a program.

Global variables remain unchanged as long as the configuration is not changed, because the batch server keeps the data in a permanent memory process.

When changing the configuration by adding or removing weighing points and/or production lines, all variables are reset.

#### 7.1.4 Only Structured Text

The ScriptEngine supports only Structured Text.

## 7.2 Language

The ScriptEngine is based on a language, which is very similar to Structured Text in IEC-61131. Consequently, there is a lot of correspondence with Pascal.

### 7.2.1 Character set

The following characters are permissible in the script:

A...Z, a...z	letters
0...9	numbers
_	underscore
(* , *)	comment start and end
+ , - , * , / , **	numeric operators
> , < , >= , <= , <> , =	comparison operators
#	separators between type and value, base and value
.	decimal point, addressed variable
'	limitation of character strings
:	separates variable name and variable type
;	terminates commands
:=	assignment
( , )	nested expressions, function arguments
,	sequence of arguments or variables
[ , ]	field access
&	“and“ operator
..	range list

### 7.2.2 Identifiers

Identifiers Bezeichner such as variable names or (not used in the ScriptEngine) function and function block names must always start with a letter, followed by letters, numbers or underscores. Identifiers may neither be terminated with an underscore nor contain several successive underscores.

Reserved words cannot be used as identifiers.

### 7.2.3 Comments

Comments start with a `(*` and also end with a `*)`. Any text is permissible within a comment. Nested comments are not permissible.

#### Example

```
i:=i+1;    (* comment behind a command *)

(* this comment
extends over
several lines and
ends in this line *)

(*****
(* These are several comments *)
(* One in each line!      *)
*****)

(* each %$@!"$3+-&% (in disorder) can be written in a comment *)

(* the compiler will reject (* nested comments *) *)

(* as well as comments which
are not terminated
... before the script end
```

### 7.3 Data types

IEC-61131 defines several elementary data types. These are grouped into "General types". In some function descriptions, types as ANY\_REAL or ANY\_NUM are used. In this case, any suitable elementary data type can be used. If the return value of a function is described with a general data type, the function returns a value of the type of the first parameter transferred to this function.

General types	ANY				
	Numeric data types			Logic data types	String data types
	ANY_NUM		ANY_REAL	ANY_BIT	
Elementary data types	ANY_INT		ANY_REAL		
	USINT UINT UDINT ULINT	SINT INT DINT LINT	REAL LREAL	BOOL BYTE WORD DWORD LWORD	STRING

IEC-61131 data types `DATE`, `DATE_AND_TIME`, `TIME_OF_DAY` and `TIME` and Sartorius extensions `WEIGHT`, `DEVICE`, `FILE` are not supported and rejected by the ScriptEngine.

### 7.3.1 Numeric data types

Numeric data types are used for calculations.

Type	Min. value		Max. value		Used capacity
USINT	0	0	$2^8-1$	255	1 byte
UINT	0	0	$2^{16}-1$	65535	2 bytes
UDINT	0	0	$2^{32}-1$	4294967295	4 bytes
ULINT	0	0	$2^{64}-1$	18446744073... ...709551615	8 bytes
SINT	$-2^7$	-128	$2^7-1$	127	1 byte
INT	$-2^{15}$	-32768	$2^{15}-1$	32767	2 bytes
DINT	$-2^{31}$	-2147483648	$2^{31}-1$	2147483647	4 bytes
LINT	$-2^{63}$	-9223372036... ...854775808	$2^{63}-1$	9223372036... ...854775807	8 bytes
REAL	$+/-1,18*10^{-38}$		$+/-3,4*10^{38}$		4 bytes
LREAL	$+/-1,18*10^{-308}$		$+/-3,4*10^{308}$		8 bytes

### 7.3.2 Logic data types

Logic data types are used to create bit patterns and Boolean expressions. Permissible as operators are AND, OR and XOR, in order to construct a condition (see condition).

Type	Min. value		Max. value		Required storage capacity
BOOL	0	0	1	1	1/8 bytes
BYTE	0	0	$2^8-1$	255	1 byte
WORD	0	0	$2^{16}-1$	65535	2 bytes
DWORD	0	0	$2^{32}-1$	4294967295	4 bytes
LWORD	0	0	$2^{64}-1$	18446744073709551615	8 bytes

### 7.3.3 String data types

String data types

TYPE	Max. length	Required storage capacity
STRING	255	256 bytes
STRING (len)	as defined in len (max 255)	len+1 byte



## 7.4 Variable declaration

Variables are used to store values for being used subsequently. Variables can be declared at different points. The variable lifetime and visibility is different dependent on the positioning of declared variables.

Batch server global variable	These variables can be read and written at any time by all script components.
Production line global variables	Variables which are declared with the production line can be read and written by all script components running under this production line.
Recipe global variables	Variables which are declared in the recipe can be read and written by all script components. Thus data can be handed over between script components within a recipe.
Local variables	These variables are valid only in the relevant script component.

Table for variable declaration:

KEYWORD	permissible in	visible for	initialized	applicable for
VAR_GLOBAL	Batch server	all scripts	at batch server start	data used in common by recipes running on different production lines
VAR_GLOBAL	Production line	all scripts in all recipes which are started on this production line	at batch server start	data used in common by recipes running on the same production line
VAR_GLOBAL	Recipes	all scripts in the same recipe	at recipe start	data used in common in one recipe
VAR_EXTERNAL	Script component	only within the script	at recipe start connected with the relevant VAR_GLOBAL	declaration of access to one of the above data
VAR	Script component	only within the script	at recipe start	local data

### 7.4.1 Global variables

Global variables can be declared for the batch server, for each production line and for each recipe.

```
VAR_GLOBAL
  variable_name : variable_type;
  variable_name : variable_type;
  (* ... and more ... *)
END_VAR
```

See 'Variable declaration' for visibility and access.

### 7.4.2 External variables

External variables can be declared only for script components. They are required for using global variables within the script.

```
VAR_EXTERNAL
  variable_name : variable_type;
  variable_name : variable_type;
  (* ... and more ... *)
END_VAR
```

### 7.4.3 Local variables

Local variables can be declared only for script components.

```
VAR
  variable_name : variable_type;
  variable_name : variable_type;
  (* ... and more ... *)
END_VAR
```

## 7.5 Constants

### 7.5.1 Numeric constants (values)

Constants	Calculates
1234	is of type INT
DINT#1234	is of type DINT
123.456	is of type REAL
LREAL#123.456	is of type LREAL
123E10	is of type REAL

### 7.5.2 String constants (text)

Expression	Calculates
' '	an empty character string
'ABCDEFG'	a character string with 7 characters
'\$\$'	character \$
'\$ ''	character '
'\$12'	character in hexadecimal form
'\$L' oder '\$0A'	line feed
'\$N' oder '\$0A'	new line
'\$P' oder '\$0C'	new page
'\$R' oder '\$0D'	carriage return
'\$T' oder '\$09'	tabulator

### 7.5.3 Logic constants (operation)

Expression	Calculates
TRUE	
FALSE	

## 7.6 Expression

### 7.6.1 Numeric expressions (values)

Expression	Calculates
Numeric variable	
Numeric constant	
Value + value	
Value - value	
Value * value	
Value / value	
Priority	
a * b + c * d	( a * b ) + ( c * d )
a + b * c + d	a + ( b * c ) + d

### 7.6.2 String expressions (text)

Expression	Calculates
Text + text	connects character strings

### 7.6.3 Logic expressions (condition)

Logic expressions always return either TRUE or FALSE. The result can be allocated to a variable.

Expression	Calculates
Variable type BOOL	
TRUE or FALSE	
Expression > expression Expression < expression Expression >= expression Expression <= expression Expression = expression Expression <> expression	compares with expressions of the same type
Condition AND condition Condition OR condition Condition XOR condition NOT condition	combines logic expressions
Priority	
a AND b OR c AND d	(a AND b) OR (c AND d)
a OR b AND c OR d	a OR (b AND c) OR d

## 7.7 Program structure

Command	Description
<code>variable\:=expression:ASSIGNMENT</code>	Assign the result of an expression to a variable
<code>IF...THEN...ELSE...END_IF:IF_THEN</code>	Conditional execution
<code>FOR...DO...END_FOR:FOR_DO</code>	Repetition loop
<code>REPEAT...UNTIL...END_REPEAT:REPEAT_UNTIL</code>	Repeat commands 1..n times, until the condition is true
<code>WHILE...DO...END_WHILE:WHILE_DO</code>	Repeat condition 0..n times, until the condition is true
<code>EXIT</code>	Leave the loop before the condition is met
<code>RETURN</code>	Leave the script before the end

### 7.7.1 Variable:=expression;

The expression is calculated and the result is assigned to the specified variable. The result of the expression and the variable must be of the same type.

#### Examples

```
i:=1;
j:=a+b;
binom:=a*a+2*a*b+b*b;
message:='Error '+INT_TO_STRING(error_number)+' occurred!';
```

### 7.7.2 IF ... THEN ... ELSE ... END\_IF

Dependent on a condition, either a command sequence or a different command sequence is executed.

#### General syntax:

##### Simple form

```
IF condition THEN
    one or several commands;
END_IF;
```

##### Extended form

```
IF condition THEN
    one or several commands;
ELSE
    one or several commands;
END_IF;
```

##### Even more complex

```
IF condition THEN
    one or several commands;
ELSIF condition THEN      (* repeat as many times *)
    one or several commands; (* as required      *)
ELSE
    one or several commands;
END_IF;
```

### 7.7.3 FOR ... DO ... END\_FOR

Count from the start value to the end value in a variable and execute one or several commands for each value. The start expression must be lower or equal to the end expression.

NOTE: The count variable and the expressions for start and end value must be of type `INT` .

#### General syntax

```
FOR variable:=int_start_expression TO int_end_expression DO
    one or several commands;
END_FOR;
```

### 7.7.4 REPEAT ... UNTIL ... END\_REPEAT

Repeat one or several commands, until the condition is met. If the condition comes true before reaching the loop, the commands will be handled exactly once.

#### General syntax

```
REPEAT
    one or several commands;
UNTIL condition END_REPEAT;
```

### 7.7.5 WHILE ... DO ... END\_WHILE

Execute one or several commands whilst the condition is true. If the condition is untrue before reaching the loop, the commands won't be executed at all.

#### General syntax

```
WHILE condition DO
    one or several commands;
END_WHILE;
```

### 7.7.6 EXIT

Exit can be used for early exit from a loop.

#### General syntax

```
(* FOR or WHILE or REPEAT loop *)
....(* some statements *)
    EXIT;
    (* some statements *)
(* end of FOR or WHILE or REPEAT loop *)
```

#### Example

```
FOR i:=1 TO 100 DO
    IF i*i>50 THEN
        EXIT; (* leaves the loop at i=8 *)
    END_IF;
END_FOR
```

### 7.7.7 RETURN

Return can be used to leave the script before finishing.

## 7.8 General function definition

A function has input parameters and a output parameter. Each parameter have a specific data type.

Format:

```
FUNCTION(parameter1:STRING, parameter2:INT):INT
```

This function has two input parameter with the data type STRING and INT. It returns a value with with the data type INT.

Example:

```
VAR
  sts      : INT;
END_VAR

sts:=FUNCTION('Textstring',5);
```

## 7.9 Numeric functions

Name	Description
ABS	Absolute value
MAX, MIN	Max or Min value
SQRT	Square root
SIN, COS, TAN	Sinus, Cosinus and Tangens function
ASIN, ACOS, ATAN	Arcussinus, -cosinus und -tangens function
EXP	Exponential function
LN	Natural Log (Base e)
LOG	Log Base 10

### 7.9.1 ABS( )

ABS calculates the positive value (without polarity sign) of the numeric expression.

Format:

```
ABS(ANY_NUM):ANY_NUM
```

### 7.9.2 MAX( ), MIN( )

MIN returns the lowest value of all parameters.

MAX returns the highest value of all parameters.

Format:

```
MAX(ANY_NUM, ANY_NUM):ANY_NUM
```

```
MIN(ANY_NUM, ANY_NUM):ANY_NUM
```

Note:

All arguments and the returned value must be of the same type.

Example:

We read the setpoint for recipe lines 1...4 and write the highest setpoint into the alarm table.

```

maxSetpoint:=0.0;
FOR nLine:=1 TO 4 DO
    sts:=GET_RECIPE_LINE_PARAMETER(nLine,'bSetpoint',oneSetpoint);
    maxSetpoint:=MAX(maxSetpoint,oneSetpoint);
END_FOR;
sts:=ALARM('Setpoint maximal '+REAL_TO_STRING(maxSetpoint));

```

### 7.9.3 SQRT( )

**SQRT** returns the square root of the positive real value.

Format:

SQRT(ANY\_REAL):ANY\_REAL

### 7.9.4 SIN( ), COS( ), TAN( )

**SIN** returns the sinus (-1.0...+1.0) for an angle described as a real value (2\*PI results in a full circle).

**COS** returns the cosinus (-1.0...+1.0) for an angle described as a real value (2\*PI results in a full circle).

**TAN** returns the tangent (-∞...+∞) for an angle described as a real value(2\*PI results in a full circle).

Format:

SIN(ANY\_REAL):ANY\_REAL

COS(ANY\_REAL):ANY\_REAL

TAN(ANY\_REAL):ANY\_REAL

### 7.9.5 ASIN( ), ACOS( ), ATAN( )

**ASIN** returns a value (-PI\*0.5...+PI\*0.5) for a real sinus value within -1.0 ... +1.0.

**ACOS** returns an angle (0...PI) for a real cosinus value within -1.0 ... +1.0 .

**ATAN** returns an angle (-PI\*0.5...+PI\*0.5) for a real tangent value (-∞...+∞).

Format:

ASIN(ANY\_REAL):ANY\_REAL

ACOS(ANY\_REAL):ANY\_REAL

ATAN(ANY\_REAL):ANY\_REAL

### 7.9.6 EXP( )

**EXP** exponential to e of a real value.

LN(ANY\_REAL):ANY\_REAL

**LN** natural logarithm (-∞...+∞) of a real value >0.0.

LOG(ANY\_REAL):ANY\_REAL

**LOG** decimal logarithm(-∞...+∞) of a real value >0.0.

Format:

EXP(ANY\_REAL):ANY\_REAL



## 7.10 String functions

String functions are used to handle text expressions:

Name	Description
LEFT	leftmost character in a character string
RIGHT	rightmost character
MID	character in the middle
LEN	length of a character string
FIND	search for a character string
INSERT	insert a character string into another one
DELETE	delete part of the character string
REPLACE	replace part of a character string

### 7.10.1 LEFT( )

LEFT returns `L` characters from the left end of character string `IN`.

Format:

```
LEFT(IN:STRING, L:INT):STRING
```

When `L` is negative or equal to zero, an empty string is returned.

When `L` is higher or equal to length `IN`, only `IN` is returned (it is not completed).

Example

```
VAR
  str      : STRING;
  part_str : STRING;
END_VAR

str:='appletree';
part_str:=LEFT(str,5);

(* part_str equates 'apple' *)
```

### 7.10.2 RIGHT( )

RIGHT returns `L` characters from the right end of character string `IN`.

Format:

```
RIGHT(IN:STRING, L:INT):STRING
```

When `L` is negative or equal to zero, an empty string is returned.

When `L` is higher or equal to the length of `IN`, only `IN` is returned (it is not completed).

Example

```
VAR
  str      : STRING;
  part_str : STRING;
END_VAR

str:='appletree';
part_str:=RIGHT(str,4);

(* part_str equates 'tree' *)
```

### 7.10.3 MID( )

MID returns **L** characters from **IN** starting with character **P**.  
The returned character string does not have more than **L** characters.

Format:

```
MID(IN:STRING, L:INT, P:INT):STRING
```

When **P** or **L** are negative or equal to zero, an empty string is returned.

When **P** is higher than the length of **IN**, an empty string is returned.

Example

```
VAR
  str      : STRING;
  part_str : STRING;
END_VAR

(*      vvvv----- len 4 pos 2 *)
(*      123456789          *)
str:='brainless';
part_str:=MID(str,4,2);

(* part_str equates 'rain' *)
```

### 7.10.4 LEN( )

LEN returns the number of characters in a character string **IN** as an integer value.

Format:

```
LEN(IN:STRING):INT
```

Example "Check password length"

```
VAR
  sts : INT;
  password : STRING;
  prompt : STRING;
END_VAR
prompt:='Please, enter your password';

REPEAT:REPEAT_UNTIL
  sts:=INPUT_BOX(0,prompt,password,'OK');
  IF:IF_THEN LEN(password)<4 THEN
    sts:=ALARM('Password too short');
    prompt:='Please, enter min. 4 characters';
  END_IF;
UNTIL:REPEAT_UNTIL LEN(password)>=4 END_REPEAT;
```

### 7.10.5 FIND()

FIND searches for character string IN2 in character string IN1.

Format:

LEN(IN:STRING):INT

The returned position is 1..length(IN1)-length(IN2)+1 for the correspondence found first.

Returns zero, if the pattern is found.

Example:

```

VAR
  text : STRING;
  part : STRING;
  sts  : INT;
  pos  : INT;
END_VAR

(*
** The user shall enter a list
*)
text:='';
sts:=INPUT_BOX(1,'Please, enter some values',text,'OK');
(*
** search for ',' as a separator
*)
REPEAT
  pos:=FIND(text,',');          (* was ',' found ? *)
  IF pos<>0 THEN                (* yes *)
    part:=LEFT(text,pos-1);     (* take part before ',' *)
    sts:=ALARM('ENTRY:'+part); (* write part as an alarm *)
    text:=MID(text,255,pos+1);  (* take remainder behind ',' *)
  ELSE                          (* no other ',' *)
    sts:=ALARM('LAST:'+text);  (* write remainder as *)
  END_IF;
UNTIL pos=0 END_REPEAT;        (* until no ',' are left any more *)

```

### 7.10.6 INSERT()

INSERT inserts string IN2 into string IN1 after the P-th character.

Format:

INSERT(IN1:STRING, IN2:STRING, P:INT):STRING

If P is zero, IN2 is inserted before IN1.

If P is equal to the length of IN1, IN2 is appended to IN1.

If P is higher than the length of IN1, IN1 is not used.

If P is negative, IN1 is not changed.

Example

```

VAR
  new_str : STRING;
  str     : STRING;
  part_str : STRING;
END_VAR
(* 123 *)
(* v insert behind pos 1 *)
str:='mom';
part_str:='ushro';
new_str:=INSERT(str,part_str,1);

(* new_str equates 'mushroom' *)

```

### 7.10.7 DELETE()

**DELETE** deletes **L** characters from character string **IN** starting with the **P<sub>th</sub>** character.

Format:

**DELETE(IN:STRING, L:INT, P:INT):STRING**

When **P** is negative, zero or higher than length **IN**, nothing is deleted.

When **L** is negative or zero, nothing is deleted.

When **P + L** is higher than or equal to length **IN**, only the leftmost characters **P-1** are returned.

Example

```
VAR
  new_str : STRING;
  str     : STRING;
END_VAR
(*      12345678          *)
(*      vvvvv delete starting with char 2 len 5 *)
str:='mushroom';
new_str:=DELETE(str,5,2);

(* new_str equates 'mom' *)
```

### 7.10.8 REPLACE()

**REPLACE** replaces **L** characters in character string **IN1** by character string **IN2** starting with the **P<sub>th</sub>** character.

It is a combination of **DELETE** and **INSERT**.

Format:

**REPLACE(IN1:STRING, IN2:STRING, L:INT, P:INT):STRING**

When **P** <= zero, or when **P** > than **IN1**, no change is made.

When **L** < zero, no change is made.

When **L** = zero, only **INSERT** is executed.

When **IN2** = "", only **DELETE** is executed.

Example

```
VAR
  new_str : STRING;
  str     : STRING;
  part_str : STRING;
END_VAR
(*      vv----- len 2 pos 4 *)
(*      123456789 *)
str:='corektion';
part_str:='rec';
new_str:=REPLACE(str,part_str,2,4);

(* new_str equates 'correction' *)
```

## 7.11 Functions for logic data types

### 7.11.1 ROL( )

**ROL** rotates the bits in IN left by N bits. The bits shifted out on the left will be re-inserted on the right.

Format:

ROL(IN:ANY\_BIT, N:INT):ANY\_BIT



8400\_39

### 7.11.2 ROR( )

**ROR** rotates the bits in IN right by N bits. The bits shifted out on the right will be re-inserted on the left.

Format:

ROR(IN:ANY\_BIT, N:INT):ANY\_BIT



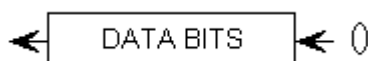
8400\_40

### 7.11.3 SHL( )

**SHL** shift the bits in IN left by N bits. New bits receive value 0.

Format:

SHL(IN:ANY\_BIT,N:INT):ANY\_BIT



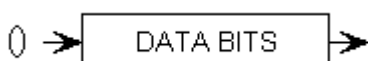
8400\_41

### 7.11.4 SHR( )

**SHR** shifts the bits in IN right by N bits. New bits receive value 0.

Format:

SHR(IN:ANY\_BIT,N:INT):ANY\_BIT



8400\_42

## 7.12 ScriptEngine functions

ScriptEngine functions normally communicate either with

- the batch server, or
- with the operator.

### 7.12.1 ALARM( )

Writes the TEXT into the alarm table.

Format:

ALARM(TEXT:STRING):INT

For an example, see example for alarm :ALARM\_EXAMPLE.

The return value is always zero. NOTE: with an excessive number of alarms, there will be an overflow in the alarm waiting queue. In this case, many earlier alarms are lost.

### 7.12.2 STOP( )

Writes the TEXT into the alarm table and stops the script. Then the script line can only be skipped.

Format:





STOP(TEXT:STRING):INT

### 7.12.3 MESSAGE\_BOX( )

Displays TEXT in a message box .

Format:

MESSAGE\_BOX(TYPE:INT, TEXT:STRING, BUTTONS:STRING):INT

Parameter	Description			
TYP	Selects the icon which should be displayed in a message box.			
	1	2	3	4
				
	With all other values, no icon is displayed.			
TEXT	Is the message displayed for the operator.			
Tasten	Is a character string with the text for max. 3 keys, separated by ' '. Surrounding spaces are removed. If the remaining character string is longer than 16 characters, it will be truncated.			

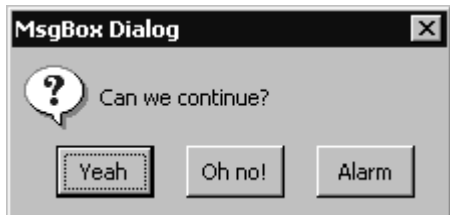
MESSAGE\_BOX returns which key was actuated (1...3) or 0 in case of error.

If the recipe line is stopped, the message box is deactivated and can be neither used nor closed.

If the recipe line is canceled, the message box is deleted.

Example

The following script shows a small message box and reacts on the operator keys.



8400\_47E

```

VAR
    answer : INT;
    sts    : INT;
END_VAR













REPEAT
    answer:=MESSAGE_BOX(2, 'Can we continue?', 'Yeah|Oh no!|Alarm');
    IF answer=2 THEN (* oh no *)
        sts:=STOP('Oh no, we can not continue');
    END_IF;
    IF answer=3 THEN (* alarm *)
        sts:=ALARM('Something seems to go wrong');
    END_IF;
UNTIL answer=1 END_REPEAT; (* until user clicks Yeah *)
    
```

### 7.12.4 INPUT\_BOX( )

Enables the operator to enter a new value for VALUE. TEXT is displayed.

Format:

INPUT\_BOX(TYPE:INT, TEXT:STRING, VALUE:ANY, BUTTONS:STRING):INT

Parameter	Description								
TYPE	Selects the icon which should be displayed in the message box.								
	<table style="width: 100%; text-align: center;"> <tr> <td>1</td> <td>2</td> <td>3</td> <td>4</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> </tr> </table>	1	2	3	4				
1	2	3	4						
									
	With all other values, no icon will be displayed.								
TEXT	Is the message displayed for the operator.								
VALUE	Must be a variable. The variable content is displayed to the operator.								
BUTTONS	Is a character string with text for max. 3 keys, separated by ' '. Surrounding spaces are deleted. If the remaining character string is longer than 16, it will be truncated.								

INPUT\_BOX returns which key was operated (1...3) or 0 in case of an error.

If the recipe line is stopped, the message box will be deactivated and can be neither used nor closed.

If the recipe line is cancelled, the message box will be deleted.

### 7.12.5 BEEP()

Generates a sound on the BatchServer PC.

Format:

BEEP(FREQ:INT):INT

Example:

```
VAR
  i:INT;
result:INT;
END_VAR
FOR:FOR_DO i:=1 TO 10 DO
  result:=BEEP(100*i);
END_FOR;
i:=0;
```

### 7.12.6 WAIT()

Delays execution of the script, until the condition WHAT becomes TRUE.

Format:

WAIT(WHAT:BOOL):BOOL

Example:

```
some_global_variable:=123;
done:=WAIT(some_global_variable<>123);
```



## 7.13 Recipe parameter functions

### 7.13.1 GET\_RECIPE\_PARAMETER( )

Reads a parameter from the recipe.

Format:

GET\_RECIPE\_PARAMETER(NAME:STRING, VALUE:ANY):INT

NAME	TYPE	Comment
iRecipeId	STRING	current recipe name
iChargeNr	INT	current batch number
iChargeMax	INT	the overall number of batches used for starting the recipe

### 7.13.2 GET\_RECIPE\_LINE\_COUNT( )

Returns the number of lines from the current recipe.

Format:

GET\_RECIPE\_LINE\_COUNT(COUNT:INT):INT

Example:

```
VAR
  count : INT;
  line  : INT;
  total : REAL;
  setp  : REAL;
  sts   : INT;
END_VAR
```

```
sts:=GET_RECIPE_LINE_COUNT(count);
total := REAL#0.0;
FOR line := 1 TO count DO
  sts:=GET_RECIPE_LINE_PARAMETER(line, 'bSetpoint', setp);
  total := total + setp;
END_FOR;
```

**7.13.3 GET\_RECIPE\_LINE\_PARAMETER( )**

Reads a parameter for a defined recipe line.

Format:

GET\_RECIPE\_LINE\_PARAMETER(LINE:INT, NAME:STRING, VALUE:ANY):INT

NAME	TYPE	Comment
iRecipeLine	UINT	line number in the recipe
iSPMin	UINT	number of the enable bit for the component.
iSPMout	UINT	component output bit.
iRstMode	UINT	restart mode
iCalTime	UINT	calming time in 100 ms
oSig	DINT	phase signature
bSetpoint	REAL	weight setpoint
oActual	REAL	batched weight
iPreset	REAL	preset coarse / fine
bOvershoot	REAL	current overshoot on/off
iNegTol	REAL	abs. negative tolerance
iPosTol	REAL	abs. positive tolerance
iFlowRate	REAL	warning limit for flow monitoring
iMinScale	REAL	min. value for 0 mA
iMaxScale	REAL	max. value for 20 mA
iPLineID	SINT	production line
iRecipeID	STRING(20)	recipe ident
iMatID	STRING(20)	material ident
iBatchMode	STRING(20)	Batch mode as B1
bTextpar	STRING(160)	Text parameter input/output

**7.13.4 SET\_RECIPE\_LINE\_PARAMETER( )**

Changes a parameter for a defined recipe line.

Format:

SET\_RECIPE\_LINE\_PARAMETER(LINE:INT,NAME:STRING,VALUE:ANY):INT

For detailed information related to the parameters.

### 7.13.5 SET\_REPORT\_TEXT()

Changes report text parameter for the recipe line of the current script.

Format:

```
SET_REPORT_TEXT(TEXT:STRING):INT
```

### 7.13.6 GET\_RECIPE\_LINE()

Returns the recipe line for the currently handled script.

Format:

```
GET_RECIPE_LINE(COUNT:INT):INT
```

### 7.13.7 Return value of recipe parameter functions

All recipe parameter functions share the same return values:

Value	Text	Command
0	E_OK	Success
991	E_NO_SERVER	Batch Server not running
991	E_NO_PRODLINE	No such production line line activ
991	E_NO_RECIPE	No such recipe activ
991	E_NO_RECIPE_PARAMETER	Parameter NAME specifies a non existent parameter
991	E_NO_RECIPE_LINE	Parameter LINE specifies a non existent recipe line
991	E_NO_RECIPE_LINE_PARAMETER	Parameter NAME specifies a non existent parameter

Note:

The return value should be checked on each use of a recipe parameter function.

```
sts:=GET_RECIPE_LINE(my_recipe_line);
IF sts<>0 THEN
    sts:=STOP('GET_RECIPE_LINE failed '+INT_TO_STRING(sts));
END_IF;
```

## 7.14 ScriptEngine examples

### 7.14.1 Confirming a dosing step

Occasionally, it is necessary to confirm a batch step by means of a signature. The following script displays setpoint, component, batch mode and actual weight of the recipe line before the script and requests the operator to enter his name for confirmation.

#### Variables

```
VAR
  sts : INT;
  my_recipe_line : INT;
  recipe_name:STRING;
  button : INT;

  name : STRING;
  message : STRING;
  bSetpoint:REAL;
  oActual:REAL;
  iMatId:STRING;
  iBatchMode:STRING;
END_VAR
```

#### The script

At first, the recipe line of the script must be determined. Unless this is possible (for any reasons whatsoever), the script is stopped.

```
sts:=GET_RECIPE_LINE(my_recipe_line);
IF sts<>0 THEN
  sts:=STOP('GET_RECIPE_LINE failed '+INT_TO_STRING(sts));
END_IF;
```

Make sure that this line is not the first line in the recipe.

```
IF my_recipe_line<2 THEN
  sts:=STOP('ACK_DOSING must not run as first line');
END_IF;
```

Subsequently, several data on the component handled previously are collected.

```
sts:=GET_RECIPE_PARAMETER('iRecipeId', recipe_name);
sts:=GET_RECIPE_LINE_PARAMETER(my_recipe_line-1, 'bSetpoint', bSetpoint);
sts:=GET_RECIPE_LINE_PARAMETER(my_recipe_line-1, 'iMatID', iMatId);
sts:=GET_RECIPE_LINE_PARAMETER(my_recipe_line-1, 'iBatchMode', iBatchMode);
sts:=GET_RECIPE_LINE_PARAMETER(my_recipe_line-1, 'oActual', oActual);
```

A message character string for the operator is generated.

```
message:='Line '+INT_TO_STRING(my_recipe_line-1)+
  ' of '+recipe_name+'was:$N'+
  'iMatId="'+iMatId+'" '+
  'iBatchMode="'+iBatchMode+'"$N'+
  'bSetpoint='+REAL_TO_STRING(bSetpoint)+' '+
  'oActual='+REAL_TO_STRING(oActual);
```

An input prompt for the input box is generated.

```
name:='<please enter your name>';
```

Now, the operator is prompted to confirm. If he clicks on Cancel, the recipe line is stopped.

```
REPEAT:REPEAT_UNTIL
  button:=INPUT_BOX(1, message, name, 'OK|Cancel');
```

```

IF button=2 THEN
  sts:=STOP('Rejected');
END_IF;
UNTIL:REPEAT_UNTIL LEFT(name,1)<>'<' END_REPEAT;

```

Finally, his name is written into the report text.

```
sts:=SET_REPORT_TEXT('Accepted by'+name);
```

### 7.14.2 Calculating a setpoint for the next components

The following script shows how to determine actual values, calculate values and change setpoints. A recipe might look e.g. as shown below:

Component	BatchMode
Water	B1
Sand	B1
Paint	B1
More water	B1
Calculate	SCRIPT
TRUCK 1	B4
TRUCK 2	B4
TRUCK 3	B4

The calculation script calculates the total of water, sand, paint and More water (e.g. 80kg+500kg+1kg+30kg=531kg), counts the number of trucks (e.g. 3) and fills the same quantity (e.g. 531kg/3 = 177kg) into each truck.

#### Variable

```

VAR
  RecipeLineCount  : INT; (* number of lines in the recipe *)
  CurrentRecipeLine : INT; (* recipe line of the script *)
  Line             : INT; (* to loop over some recipe lines *)
  sts              : INT; (* result of GET/SET functions *)
  n                : INT; (* used for result of STOP *)
  BatchMode       : STRING;
  Material         : STRING;
  Actual          : REAL;
  Total           : REAL;
  TruckCount      : REAL;
END_VAR

```

#### The script

At first, the total number of recipe lines and the current recipe line number of the script must be found out.

```
sts:=GET_RECIPE_LINE_COUNT(RecipeLineCount);
sts:=GET_RECIPE_LINE(CurrentRecipeLine);
```

All recipe lines before the script are examined (1 TO CurrentRecipeLine-1), the batch mode is determined and the actual value for all B1 components (BatchMode='B1') is determined and totalized.

(Note: lines for error checking are marked in gray, to highlight the main functions).

```
Total:=0.0;

FOR Line:=1 TO CurrentRecipeLine-1 DO
```

```

sts:=GET_RECIPE_LINE_PARAMETER(Line,'iBatchMode',BatchMode);
IF sts<>0 THEN n:=STOP('GET_RECIPE_LINE_PARAMETER
failed:'+INT_TO_STRING(sts));END_IF;
IF BatchMode='B1' THEN
  sts:=GET_RECIPE_LINE_PARAMETER(Line,'oActual',Actual);
  IF sts<>0 THEN n:=STOP('GET_RECIPE_LINE_PARAMETER
failed:'+INT_TO_STRING(sts));END_IF;
  Total:=Total+Actual;
END_IF;
END_FOR;

```

The result can be displayed for trouble shooting (delete this line, if you use the script for a production):

```
sts:=ALARM('Total of B1 is '+REAL_TO_STRING(Total));
```

Subsequently, all recipe lines (TruckCount:=TruckCount+1.0) behind the script (CurrentRecipeLine+1 TO RecipeLineCount) the material of which starts with LKW (truck) are counted (LEFT(Material,5)='LKW').

```

TruckCount:=0.0;
FOR Line:=CurrentRecipeLine+1 TO RecipeLineCount DO
  sts:=GET_RECIPE_LINE_PARAMETER(Line,'iMatID',Material);
  IF sts<>0 THEN n:=STOP('GET_RECIPE_LINE_PARAMETER
failed:'+INT_TO_STRING(sts));END_IF;
  IF LEFT(Material,3)='LKW' THEN
    TruckCount:=TruckCount+1.0;
  END_IF;
END_FOR;

```

Another trouble shooting message.

```
sts:=ALARM('Count of Truck is '+REAL_TO_STRING(TruckCount));
```

The required total for each truck is calculated (rather simple).

```
Total:=Total/TruckCount;
```

Another trouble shooting action.

```
sts:=ALARM('Each truck should get '+REAL_TO_STRING(Total));
```

Finally, the lines behind the script are handled once more and the setpoint is changed, if a truck with B4 component is concerned.

```

FOR Line:=CurrentRecipeLine+1 TO RecipeLineCount DO
  sts:=GET_RECIPE_LINE_PARAMETER(Line,'iBatchMode',BatchMode);
  IF sts<>0 THEN n:=STOP('GET_RECIPE_LINE_PARAMETER
failed:'+INT_TO_STRING(sts));END_IF;
  sts:=GET_RECIPE_LINE_PARAMETER(Line,'iMatID',Material);
  IF sts<>0 THEN n:=STOP('GET_RECIPE_LINE_PARAMETER
failed:'+INT_TO_STRING(sts));END_IF;
  IF LEFT(Material,3)='LWK' AND BatchMode='B4' THEN
    sts:=SET_RECIPE_LINE_PARAMETER(Line,'bSetpoint',Total);
    IF sts<>0 THEN n:=STOP('SET_RECIPE_LINE_PARAMETER
failed:'+INT_TO_STRING(sts));END_IF;
  END_IF;
END_FOR;

```

### 7.14.3 Write a message into the alarm table

#### Variables

```
VAR
    text    : STRING;
    button  : INT;
    result  : INT;
    recipe_line:INT;
END_VAR
```

#### The script

```
result:=GET_RECIPE_LINE(recipe_line);
button:=INPUT_BOX(1,INT_TO_STRING(recipe_line)+'Alarm?',text,'Yes|No');
IF button=1 THEN
    result:=ALARM('RL'+INT_TO_STRING(recipe_line)+':'+text);
END_IF;
```

### 7.14.4 Display the material ident of a script

```
VAR
    nRecipeLineCount:INT;
    nRecipeLine:INT;
    sMatId:STRING;
    sts:INT;
END_VAR

sts:=GET_RECIPE_LINE_COUNT(nRecipeLineCount);
sts:=GET_RECIPE_LINE(nRecipeLine);
sts:=GET_RECIPE_LINE_PARAMETER(nRecipeLine,'iMatID',sMatId);

sts:=MESSAGE_BOX(1,
'Line '+INT_TO_STRING(nRecipeLine)+
' of '+INT_TO_STRING(nRecipeLineCount)+
' is$N'+sMatId+'"', 'OK');
```

### 7.14.5 Write a multiplication table into the alarm table

This is a little load test for the alarm function:

#### Variables

```
VAR
    i:INT;
    j:INT;
    s:STRING;
    ok:INT;
END_VAR
```

#### Code

```
ok:=ALARM('**START1**');
FOR i:=1 TO 10 DO
    FOR j:=1 TO 10 DO
        s:=INT_TO_STRING(i)+'*'+
            INT_TO_STRING(j)+'='+
            INT_TO_STRING(i*j);
        ok:=ALARM(s);
    END_FOR;
END_FOR
ok:=ALARM('**DONE**');
```

### 7.14.6 Checking all string functions

#### VARIABLES

```
VAR
  i:INT;
  j:INT;
  s:STRING;
  ok:INT;
END_VAR
```

#### LEFT

```
FOR i:=-2 TO 10 DO
  s:=LEFT('ABCDEFGF',i);
  ok:=ALARM('LEFT('+INT_TO_STRING(i)+
    ')="'+s+'");
END_FOR;
```

#### RIGHT

```
FOR i:=-2 TO 10 DO
  s:=RIGHT('ABCDEFGF',i);
  ok:=ALARM('RIGHT('+INT_TO_STRING(i)+
    ')='$'+s+'$');
END_FOR;
```

#### INSERT

```
FOR i:=-2 TO 10 DO
  s:=INSERT('ABCDEFGF','XYZ',i);
  ok:=ALARM('INSERT('+INT_TO_STRING(i)+
    ')='$'+s+'$');
END_FOR;
```

#### MID

```
FOR i:=-2 TO 10 DO
FOR j:=-2 TO 10 DO
  s:=MID('ABCDEFGF',i,j);
  ok:=ALARM('MID('+INT_TO_STRING(i)+
    ', '+INT_TO_STRING(j)+
    ')='$'+s+'$');
END_FOR;
END_FOR;
```

#### DELETE

```
FOR i:=-2 TO 10 DO
FOR j:=-2 TO 10 DO
  s:=DELETE('ABCDEFGF',i,j);
  ok:=ALARM('DELETE('+INT_TO_STRING(i)+
    ', '+INT_TO_STRING(j)+
    ')='$'+s+'$');
END_FOR;
END_FOR;
```

#### REPLACE

```
FOR i:=-2 TO 10 DO
FOR j:=-2 TO 10 DO
  s:=REPLACE('ABCDEFGF','XYZ',i,j);
```



```
ok:=ALARM(REPLACE('+INT TO STRING(i) +  
, '+INT TO STRING(j) +  
' )='$'+s+'$');  
END_FOR;  
END_FOR;  
  
ok:=ALARM('*** ALL DONE ***');
```

## 7.15 Reserved words

Although not all parts of IEC 61131 are implemented in the ScriptEngine, the following words are detected as reserved and cannot be used as variable names.

A:ABS ASIN ACOS ATAN ACTION ADD AND ANY ANY\_BIT ANY\_DATE ANY\_INT ANY\_NUM  
ANY\_REAL ARRAY ASIN AT ATAN

B:BOOL BY BYTE

C:CASE CONCAT CONFIGURATION CONSTANT COS CYCLE

D:DATE DATE\_AND\_TIME DELETE DEVICE DINT DIV DO DT DWORD

E:ELSE ELSIF EN END ACTION END\_CASE END\_CONFIGURATION END\_FOR END\_FUNCTION  
END\_FUNCTION\_BLOCK END\_IF END\_PROGRAM END\_REPEAT END\_RESOURCE END\_STEP  
END\_STRUCT END\_TRANSITION END\_TYPE END\_VAR END\_WHILE EQ EXIT EXP EXPT

F:FALSE FILE FIND FOR FROM FUNCTION FUNCTION\_BLOCK

G:GE GT

I:IF INITIAL\_STEP INSERT INT INTERVAL

L:LE LEFT LEN LIMIT LINT LN LOG LREAL LT LWORD

M:MAX MID MIN MOD MUL MUX

N:NE NOT

O:OF OK ON OR

P:PRIORITY PROGRAM

R:READ\_ONLY READ\_WRITE REAL REPEAT REPLACE RESOURCE RETAIN RETURN RIGHT ROL  
ROR

S:SEL SHL SHR SIN SINGLE SINT SQRT STEP STRING STRUCT SUB

T:TABLE TAN TASK THEN TIME TIME\_OF\_DAY TO TOD TRANSITION TRUE TYPE

U:UDINT UINT ULINT UNTIL USINT

V:VAR VAR\_ACCESS VAR\_EXTERNAL VAR\_GLOBAL VAR\_IN\_OUT VAR\_INPUT VAR\_OUTPUT

W:WHILE WITH WORD WEIGHT

X:XOR

---

## 8 APPLICATIONS WITH PROBATCH+

### 8.1 Applications general

In addition to the solutions offered by ProBatch+, customer-specific solutions can be realized by means of additional programs on your PC.

In combination with MS-Access, or with InTouch, or with Crystal Reports Generator, application-related solutions which cannot be realized by ProBatch+ alone due to a lack of programmability are possible. Related to a required different report layout, in particular, a different report structure and layout can be programmed by means of an external program. For detailed information related to programming, please, refer to the relevant program documentation.

### 8.2 Databases

In “shared“ access mode, data can be read and written by other programs during operation (except during **Compression** or during log-in and log-out).

Database **840002C1.MDB** exists only once in path \DB in the installation directory and is used with every working directory. The definitions for the national language, window items and temporary tables, e.g. for process control, are stored in this database.

During installation, or during selection of a different working directory, an empty database is created unless a database is found in the working directory or installation directory.

Database **840002P1.MDB** in the working directory contains the tables for batching devices, production lines, components, recipes and plans.

Database **840002R1.MDB** in the working directory contains all production data, reports, alarms and messages.

Databases, tables and field can be opened in “shared mode“ in MS-Access (also whilst ProBatch+ is running), whereby additional information on every field can also be requested.

### 8.3 Report configuration

The reports conditioned by ProBatch+ have a predefined standard structure which cannot be changed by means of ProBatch+. If you want to change the report structure or layout, you have to use the Crystal Reports Generator (available from specialized dealers), or to program a solution using a database program (e.g. MS-Access).

#### 8.3.1 Crystal Reports Generator

All report layouts were made by means of product Crystal Reports version 8.5.

Manufacturer: Business Objects  
North American Corporate Headquarters  
3030 Orchard Parkway  
San Jose, CA 95134  
Tel: +1 408 953 6000  
Tel: +1 800 527 0580  
Fax:+1 408 953 6001  
<http://www.businessobjects.com/>

The user can match the standard report according to his particular requirements. Changes of the report layout are made at the user's own risk. After changing, the correct function of ProBatch+ cannot be guaranteed any more.

Unless you use a special language version of Crystal Reports Generator, the texts are limited to mode 'output on window'.

#### Interface between ProBatch+ and Crystal Reports

Crystal Reports works for the production and batch reports on tables TMP\_REP\_PRODUCTION, TMP\_REP\_BATCH und TMP\_REP\_MATERIAL.

The texts can be changed by the operator in window **Edit Text**, using the relevant key word (RPT\_...). The specified formulas have to exist in \*.RPT report files, otherwise ProBatch+ will signal an error.

## 8.4 DDE description

ProBatch+ offers an optional DDE interface for connection with other applications. ProBatch+ can be only data source (server).

DDE stands for "Dynamic Data Exchange" and is a communication protocol developed by Microsoft, for exchanging current variables between Windows programs. DDE introduces a "CLIENT SERVER" interdependence between two running programs. The server program provides data and accepts inquiries from the inquiring program. The inquiring program is called the client (destination). Not all Windows programs support DDE. Some programs, e.g. Excel or InTouch can be both client and server. ProBatch+ also supports Net DDE, i.e. data exchange via network with another PC is also possible. Under Windows a Net-DDE announcement of the application PR8400 with the topic **DDESET\_X** (X=1...16) has to be made manual. For example: with the program 'DDEShare' from Microsoft. The DDE interface enables a process graphic (InTouch) via which the batch process can be monitored and controlled to be linked with ProBatch+.

In order to receive data from another program, the client program opens a channel to the server program by specification of the application: path (network node name), DDE-address. The server program must be started. When the client program starts a conversation to another DDE program, it requests a message from the server program, as soon as the value of the defined data content changes. Data conversations remain active, until client or server programs are finished, or communication stops. DDE is a very efficient data exchange method, because communication starts only in case of data change after starting the conversation. In conjunction with ProBatch+, a sufficient timeout (e.g. 5- 60 s) must be defined during DDE configuration, to prevent a timeout to the client also with slow operations.

### 8.4.1 DDE set specifications

DDE data exchange with the device is via a free DDE set. Allocation of a DDE set to a production line is in window **Production Line**. Select an available DDE set within 1 – 16. Unless you want DDE support, select 0. The selected DDE set determines via which channel ProBatch+ can send and receive the DDE data. When linked to other applications, the relevant channel for DDE access in the client must be activated. ProBatch+ can be only server.

### 8.4.2 DDE definitions in ProBatch+

ProBatch+ accepts client commands (via variable DDESET\_X(0)) from Windows programs and from Batch X4/X5/X6, if sent via communication by means of function COM\_TXRX(), only in classic mode, and with licence PR8400/40 enabled.

Whenever a client sends a command to ProBatch+ via DDESET\_X(0), the client has to evaluate the ProBatch+ DDE reply first (variable DDESET\_X(1)) before it can send another command.

```
Application      : PR8400
Topic            : DDESET_X
Item             : DDESET_X(N)
                  X = 1 - 16    -> number of DDE set (allocation in the batching device controller editor)
                  N = 0 - 255   -> DDE string variable
```

```
See:      → String variable explanation
          → Wp status                    → client/ server
          → master/ slave                 → display boxes
```

### 8.4.3 DDE variables

N	Explanation of DDE variables for 1 production line
0	Client command to ProBatch+
1	Server reply from ProBatch+
2	Master telegram to Batch X4/X5/X6, telegram via communication with the device which establishes the communication with other programs, only in <b>classic mode!!!</b>
3	Slave reply from Batch X4/X5/X6, reply via communication with the device which establishes the communication with other devices, only in <b>classic mode!!!</b>
4	Production number
5	Order ident
6	Customer ident
7	Plan ident
8	Sequence number
9	Alarm, last alarm message
10 *	Batch number (is index BATCH_NUMBER for table BATCH): number of the current batch; -1 unless production
11	Production status, figure according to status field content 0=idle, 1,2,3=wait, 4=batch, 5=stop, 6=abort, 7=error
12 *	current recipe, recipe ident
13	recipe name
14	recipe total
15	production setpoint
16	production actual value
17	max. number of batches
18	RepProdNumber (index in the report table, 840002R1.mdb)
19	RepBatchNumber (index in the report table, 840002R1.mdb)

**DDE variables for weighing point A**

- 20 \* actual component ident, material ident
- 21 actual gross weight with unit, or error(x)
- 22 \* actual value of recipe line, e.g. actual component net value, or timer
- 23 Wp status, figure according to status field content  
0=IDLE, 1=BATCH, 2=STOP\_BREAK, 3=WAIT\_FOR\_STOP, 4=STOP\_MANUELL,  
5=STOP\_TOLERANCE, 6=STOP\_TIMEOUT, 7=STOP\_ADC\_ERROR,  
8=STOP\_POWERDOWN, 9=ABORT
- 24 \* Wp flags, 16 bits for weighing point status, coarse, fine, discharge, variable contents only available when a production is busy
- Bit 0discharge
  - Bit 1fine
  - Bit 2coarse
  - Bit 3idle
  - Bit 4material flow alarm during batching
  - Bit 5tares during batching
  - Bit 6analog value invalid during batching
  - Bit 7idle
  - Bit 8minus on the Wp
  - Bit 9tares on the Wp
  - Bit 10 - 12 idle
  - Bit 13 display dimmed
  - Bit 14 zero within 1/4 d
  - Bit 15 standstill
- 25 \* Wp-act.recipe line (index for table RECIPE):  
actual recipe line no.; -1 unless Wp is active in the recipe, variable contents only available when a production is busy
- 26 \* Component name, variable contents only available when a production is busy
- 27 \* Component setpoint, variable contents only available when a production is busy
- 28 \* SPM input address, variable contents only available when a production is busy
- 29 \* SPM output address, variable contents only available when a production is busy

**DDE variables for weighing point B**

30 - 39 see above

**DDE variables for weighing point C...**

40 - ... etc., see above

200-255 Writing / changing on this long integer DDE-variables results in a writing in the corresponding SPM-variables of the Batch X4/X5/X6, only if **Classic Mode!!!**

\* = variable content only available when a production is running

Note for status information: the status information with 16 bits is sent as a numeric string (in ASCII) and corresponds to an integer. For e.g. number 12, hex ASCII values 31 and 32 are sent. Conversion requires the ASCII string to be transformed into an integer number with polarity sign.

## 8.4.4 DDE client command

For control of ProBatch+ from other programs:

Client sends command to ProBatch+ in variable DDESET\_X(0), reply from ProBatch+ in variable DDESET\_X(1).

Every command is replied by ProBatch+. Unless there is an error, Ok or the requested data is transmitted, otherwise an error message is output.

For Batch X4/X5/X6 with function COM\_TXRX(), classic mode, all commands are available (see also PR 1750 online help). Upper and lower case permitted.

Client (N=0) commands	Reply string in server (N=1) of ProBatch+
----- (upper/lower case permitted)	
Commands for CLIENT	Parameters
RESET_PRODLINE	Stopping and cancellation of a production on Batch X4/X5/X6 or Batch Server and reset of all internal variables in ProBatch+ for the current production line
START_RECIPE <RecipIdent>, <CustomerIdent>, <OrderIdent>, <ProdNumber>, <Cycle>, <Setpoint>, <Startmode>	Starts a recipe on the actual production line. Empty strings for customer ident, order ident and production number are permitted. The setpoint decimal point must be always '.' The start mode must be always 'AUTO' or 'MANUAL'.
START_PLAN <PlanIdent>	Start production plan for the actual production line
BATCH_START	Start batch, when batch waiting for start
BATCH_STOP	Stop batch, when batch is running
BATCH_REPEAT	Cancels the running batch and restarts it, when the batch had stopped
BATCH_CONTINUE	Continues the actual batch, if the batch has stopped
BATCH_SKIPALL	Cancels all batches, when the actual batch has stopped
BATCH_SKIP	Cancellation of the actual batch and attempt to start the next batch
WP_STOP <WplIdent>	Stops the batch on WplIdent
WP_SKIP <WplIdent>	Cancels the actual recipe line on WplIdent
WP_CONTINUE <WplIdent>	Continue batch on WplIdent
PROD_END_ON_NEXT_BATCH	Cancels the production after finishing the next batch
BATCH_BREAK_ON <BatchNumber>	Sets a breakpoint for a batch before the batch starts
BATCH_BREAK_ON_NEXT	Sets a breakpoint for the next batch before the batch was started
BATCH_BREAK_OFF <BatchNumber>	Resets the breakpoint for the batch number
WP_BREAK_ON <Recipeline>	Sets a breakpoint for the recipe line before the recipe line was started
WP_BREAK_OFF <Recipeline>	Resets a breakpoint for the recipe line
START_MAINRECIPE <MainRecipID>, <CustomerID>, <OrderID>, <ProdNumber>, <Cycle>, <SetPoint>, <StartMode>	Starts a main recipe, empty strings for customer ident, order ident and production number are permissible. The setpoint decimal point must be '.'. For a synchronous start, the start mode must be 'SYNC', and 'NOSYNC' for an asynchronous start
MAINPROD_STOP <MainProdNumber>	Stops a main recipe, MainProdNumber is a key (MAINPROD_NUMBER) in table MAINPRODUCTION
MAINPROD_CONTINUE <MainProdNumber>	Continuation of a main recipe, MainProdNumber is a key



	(MAINPROD_NUMBER) in table MAINPRODUCTION
MAINBATCH_STOP <MainProdNumber>, <MainBatchNumber>	stops a batch of a main recipe, MainProdNumber and MainBatchNumber are keys (MAINPROD_NUMBER, MAINBATCH_NUMBER ) in table MAINBATCH
MAINBATCH_SKIP <MainProdNumber>, <MainBatchNumber>	Cancellation of a batch of a main recipe, MainProdNumber and MainBatchNumber are keys (MAINPROD_NUMBER, MAINBATCH_NUMBER ) in table MAINBATCH
MAINBATCH_SKIPALL <MainProdNumber>	Cancels a main recipe with all batches, MainProdNumber is a key MAINPROD_NUMBER) in table MAINPRODUCTION
MAINBATCH_CONTINUE <MainProdNumber>, <MainBatchNumber>	Restart of a batch from a main recipe, MainProdNumber and MainBatchNumber are keys (MAINPROD_NUMBER, MAINBATCH_NUMBER ) in table MAINBATCH
DB_OPEN <DbName>	Opens a user-defined database, <DbName> with full path name! Only one user-defined database at a time can be opened.
DB_CLOSE	Closes the user-defined database
SQL <DbName> <SQLQuery>	Realizes an SQL inquiry <DbName>.MDB, when DbName is one of the 3 ProBatch+ databases. When DbName = 'EXTERNAL ' the user-defined database is used (must be opened with DB_OPEN). The client access to the process variables is via DDE and SQL inquiry. Thereby, SQL database (e.g. SQL 840002P1, SQL 840002R1), commands and field(s) must be specified. The inquiry can relate to several fields and the reply can contain several lines. A line is created by <CR-LF>. The fields within a line are separated by <TAB>.
	Example: Inquiry for the actual production of a production line. The client receives the relevant information via SQL inquiry: "SQL 840002C1 Select RECIPE_IDENT, PROD_SETPOINT, PROD_START_DATE From PRODUCTION Where PRODLINE_IDENT = xxxxxx". The reply data are as follows: RECIPE_IDENT <TAB> PROD_SETPOINT <TAB> PROD_START_DATE <CR-LF>
	Another example for an SQL inquiry can be the insertion of data into databases 840002P1.MDB or 840002R1.MDB, in order to create a component or a recipe, or to start a production.
ACTIVATE <Application>	Activates another application, the application must be running
EXECUTE <Application>	Starts another application
BEEP	Sends 'beep' to the PC
ALARM <Alarm>	Writes an alarm into the alarm table. The alarm window is opened.
OPEN_ALARM	Opens the alarm window
MESSAGE <Message>	Writes a message into the message table/window
OPEN_MESSAGE	Opens the message window
PRT_NEWPAGE	Sends a new page to the standard printer
PRT_PRINT <Text>	Sends text to the standard printer
PRT_ENDDOC	Sends 'end of document' to the standard printer, the overall text is printed out
PRT_FONTNAME <FontName>	Sets the fonts for the standard printer

PRT_FONTSIZE <FontSize>	Sets the font size for the standard printer
PRT_FONTBOLD <TRUE/FALSE>	Sets or resets bold printing for the standard printer
PRT_FONTUNDERLINE <TRUE/FALSE>	Sets or resets the underlining for the standard printer
PRT_FONTITALIC <TRUE/FALSE>	Sets or resets the ITALIC letters for the standard printer
DDE_GET <DDESetNumber>, <DDENumber1>, <DDENumber2>, ...	Fetches the content of one or several DDE numbers of a defined DDE set: return <String1><Tab><String2>
DDE_SET <DDESetNumber>,<DDENumber>,<String1><Tab><String2>...	Sets one or several DDE numbers with string1, DDEnumber+1 with string2,... DDE set: 1-8, DDEnumber up to 255 DDEnumber max. 255, numbers which are already used by ProBatch+ excepted (see above). The DDE channel can be used for the data transport between several instruments or to the DDE level of the PC and vice versa. Example: DDE_SET 1,100,Hello "Hello" in DDESET_1 (100)
PRINT_REPPROD <xxx>	Print production report with REPPROD_NUMBER = xxx
PRINT_REPBATCH <xxx>,<yyy>	Print batch report with REPPROD_NUMBER = xxx and REPBATCH_NUMBER = yyy
DELETE_REP <xxx>	Delete production report with REPPROD_NUMBER = xxx
LOAD_RECIPE <Recipeldent1>,<Recipeldent2>	Loads one or several recipes into Batch X4/X5/X6, not available in <b>open mode</b>
WRITE_INFO <xxxx>	Open INFO line in ProBatch+ and display xxxxx
CLOSE_INFO	Close INFO line in ProBatch+
CLOSE_CONTROL	Closes the process control window
OPEN_CONTROL <Productionline>	Opens the process control window for a production line
LANGUAGE <Language>	Switch over to different language
RUN_SCRIPT <ScriptName><Para>	Runs a Vb script in file 'RemoteScript.TXT' with optional parameters
GET_CONTROLDB	Returns the actual name of the control database (e.g. 840002C1) without extension
GET_PROJECTDB	Returns the actual name of the project database (e.g. 840002P1) without extension
GET_REPORTDB	Returns the actual name of the report database (e.g. 840002R1) without extension
WRITE_LINEPRINTER <PrinterName>,<String>	Writes a string to a PC line printer. When a control character (CR/LF) should be sent, a space must be appended to the string. PrinterName can be LPT1: or LPT2: ... .

8.4.4.1 Display boxes

Client (N=0) commands                      reply string in server (N=1) of ProBatch+

**MBX** <Button1-Text>,<Button2-Text>,<Message>

Display message box in ProBatch+.

Reply by button1/2 = button1/2 text.

Example:            MBX No,Yes,Hello World

'No' provides No in (1), 'Yes' fills the variable (1) with Yes



**IBX** <Button1-Text>,<Button2-Text>,<Message>,<Prompt>

Display input box in ProBatch+ .

Reply with Button2 = input text,

with button1 = button1 text.

Example:            IBX No,Yes,Hello,World

'No' provides No in (1),

'Yes' packs entered strings into (1): World wide



**LBX** <Button1-Txt>,<Button2-Txt>,<Message>,<Tag1>,<CR>,<Tag2>,<CR>,<Tag3>....

Create listbox in ProBatch+. Reply with button2 = TagN text, with button1 = button1 text.

Example:            LBX No,Yes,Hello,World

Tag2

Tag3

'No' provides No in (1),

'Yes' packs the selected string in (1): World



## 9 SERVICE

### 9.1 Trouble shooting

- **Repair** For maintenance and repair, see X4, X5, X6 and Combics Pro documentation.

In case of trouble or instrument communication hang-up: initialize batching device  
With trouble in the ProBatch+ database: restore the last actual back-up.

When re-ordering (e.g. replacement for a damaged ProBatch+), evidence of correct licencing by the regular documents rather than by the CD is required.

#### 9.1.1 ProBatch+ maintenance

We recommend regular maintenance, in order to maintain the optimum function of ProBatch+. Data back-up protects the data against loss and data maintenance prevents overloading of the hard disk. Maintenance consists of the following activities:

- Checking, if date and time are correct
- Storage and print-out of the long-term storage data
- Back-up of important data
- Deletion of old data
- We recommend to reboot Windows 2000 / xp at intervals of at least 2 – 4 weeks, in order to prevent shortage of resources.

To avoid data loss in case of power failure, the PC should be connected to an uninterruptible power supply.

For maintenance of program, installation and operator, the responsible person should have experience in the fields of PC application and Sartorius batching systems. In case of trouble, the cause must be located first.

#### 9.1.2 Trouble shooting at the ProBatch+ part of the installation

In case something does not function, ProBatch+ offers some help which can be useful for location of the trouble cause.

- The alarm messages displayed directly as windows on the screen.
- The Batch Server logfiles can be used for checking the individual actions.

If the mouse port or a non-existing port was selected in [Setup]-[Configuration]-[Batching Device], message "Comport not existing ..." is displayed.

In both cases, the interface description can be corrected by re-entry into [Setup]-[Configuration]-[Batching Device].

### 9.1.3 Trouble shooting at the batching part of the installation

Unless the batching device is able to produce the loaded recipe with the specified batch size, an error message is sent to ProBatch+. An error message is output also for over and underload (indicator error). For explanation of the trouble cause, see the instrument explanation.

- Project engineering and workshop documents: wiring, trouble shooting  
see installation manual for the instrument

## 9.2 Error messages

### General ProBatch+ error messages

The following messages are created by ProBatch+ and displayed on ProBatch+ in the alarm list.

As the message text can be changed in ProBatch+, the symbolic name is also specified here.

#### Init batch server, wrong signature!

MSG\_BATCHSERVER\_WRONG\_SIGNATURE

The configuration of batch server and ProBatch+ database do not correspond. The batch server is initialized with the ProBatch+ settings.

#### Wrong production line or weighing point

MSG\_BE\_ERR\_1

ProBatch+ tries to use a production line or a weighing point which is unknown to the batch server. Try to reset all production lines. Unless this is a help, enter F9, start the simulation and press OK. The batch server is reinitialized. Press F9 again, deactivate the simulation and press OK again.

#### Errors from script engine, invalid DIT (e.g. wrong compiler)

MSG\_BE\_ERR\_101

First, try to recompile the scripts used in the recipe (production line scripts, component scripts, recipe scripts and other scripts). Unless this is helpful, please, check, if you have overwritten a new version with an old one. It might be a conflict between ScriptCompiler.dll, which is used by ProBatch+ to create scripts and the script interpreter of the batch server.

#### No recipe available

MSG\_BE\_ERR\_12

This message should not occur at all. Please, contact : [technical.support.hh@sartorius.com](mailto:technical.support.hh@sartorius.com).

#### An OPC variable could not be read from server

MSG\_BE\_ERR\_14

A problem in the OPC connection occurred. Please, check the OPC server.

#### Action not possible

MSG\_BE\_ERR\_15

This message is displayed always, if an action is not possible or not permissible. In simulation mode, e.g. no messages can be sent to the instrument, because there is no communication.

#### Weighing point not connected

MSG\_BE\_ERR\_16

A recipe is checked by the batch server before starting. If one of the WPs used in the recipe is not connected or switched on, this message is displayed.

#### Weighing point in error state

MSG\_BE\_ERR\_17

A recipe is checked by the batch server before starting. This message is displayed, if one of the weighing points used in the recipe is in state ERROR.

#### Wrong state

MSG\_BE\_ERR\_18

Presently unused.

**Error during simulation**

MSG\_BE\_ERR\_19

Presently not used.

**Cannot start OPC server**

MSG\_BE\_ERR\_2

The batch server has tried to start the OPC server, but without success. Please, check, if the OPC server was installed and registered correctly. You can use Start/Programs/Sartorius/PR1792/OPC\_client for checking: Click on 'Connect'. The OPC server must be displayed on the list of available OPC servers.

**Invalid OPC group name**

MSG\_BE\_ERR\_20

Selection of the device OPC name is during weighing point configuration in ProBatch+. Make sure the same name is configured in the OPC server

**Recipe has empty lines, e.g. 123 567**

MSG\_BE\_ERR\_21

When checking the recipe, the batch server has found an empty recipe line. Please, check the recipe.

**Recipe simulation had over or underflow**

MSG\_BE\_ERR\_22

When testing the recipe, the batch server checks, if the weighing point gross weight value is higher than the weighing point FSD (max. value), or if it might become smaller than 0. The test starts with the actual gross weight at test time. Please, note that this test cannot be completely perfect due to runtime effects and other recipes running in parallel. The test can be switched off in the recipe.

**Double RQ or RL in recipe**

MSG\_BE\_ERR\_23

Please, check, if the recipe contains two or more RQ or RL components. For instance, RQ RQ is not permitted.

**No syncs in sub recipe allowed**

MSG\_BE\_ERR\_24

The SYNC component is not permitted in the subrecipe.

**Found at least one weighing point (phase) in state 'unknown' (99)**

MSG\_BE\_ERR\_25

Whenever the batch server starts a phase in X5, the internal phase status of the batch server changes from 'IDLE' to 'STARTING' and a timeout is initiated. Unless the device has reacted after about 60 seconds, the internal phase condition is set to 'unknown' (99). The same applies to other state changes (z.B. done-> idle). Please, check the true status of the device.

**No licence for additional weighing point**

MSG\_BE\_ERR\_26

A valid USB dongle must be installed on ProBatch+. Various licence combinations are available.

**Production active**

MSG\_BE\_ERR\_3

Starting a recipe whilst the production line handles another recipe is not possible.

**Recipe not ok**

MSG\_BE\_ERR\_4

The batch server has found errors in the recipe (e.g. empty). For detailed information, please, have a look at the messages in the batch server logfile: [System]-[Service]-[View Batch Server Log File].

**Weighing point not found**

MSG\_BE\_ERR\_5

---

This message should not occur. Please, contact: [technical.support.hh@sartorius.com](mailto:technical.support.hh@sartorius.com).

**Wrong state**

MSG\_BE\_ERR\_8

This message is displayed, if the internal status of the batch server does not permit the current operation.

**MSG\_BE\_ERR\_9**

Error in parameter

The batch server has found an error in the recipe line parameters. For detailed information, please, have a look at the batch server logfile [System]-[Service]-[View Batch Server Log File].

**Wrong weighing point state**

MSG\_BE\_UNKOWN\_WPSTATE

One of the internal weighing points is in state 'unknown'. For detailed information, see synchronization.

**Batch server messages**

The following messages are created by the batch server and displayed in the ProBatch+ alarm list and in the batch server logfile.

**Info: valid hardware key detected**

The batch server has found a valid hardware dongle.

**Warning: hardware key removed or replaced. All recipes will be held in one minute**

Don't remove the hardware dongle whilst the system is running.

**Warning: hardware key removed or replaced. All recipes will be held NOW**

Don't remove the hardware dongle whilst the system is running.

**Warning: no valid hardware key attached ...**

Your system is running in demonstration mode. Please, get a valid dongle for real production systems.

**All recipes will be held NOW**

Your system is running in demonstration mode and the time provided for demonstration purposes has elapsed. All recipes will be stopped now. Stop ProBatch+, and make a restart.

**Warning: only license for ... WPs (Phases) found.**

Your licence key is not sufficient for the number of weighing points which you have configured. Please, retro-fit your licence dongle.

**OpcClient::connectTo: access denied**

Your system tries to establish a connection with an OPC server running on an external PC. this is not permitted in this version.

**OpcClient::connectTo: Server execution failed**

Your system tries to establish a connection with an OPC server running on an external PC. This is not permitted for this version.

**OpcClient::connectTo: DCOM returned error...**

Your system tries to establish a connection with an OPC server running on an external PC. This is not permitted for this version.

**Warning: Phase has not reacted yet....**

Whenever the batch server sends a new command to a phase, it checks, if the phase (instrument) reacts in time. When you see this message, there might be a communication error (cable, network

overload, device reset...).

#### Could not execute RQ

The batch server was unable to handle operation 'Phase (WP) request'. This may happen, if a faulty phase identification parameter is specified in the recipe. Please, check the RQ parameters (the WP).

#### Simulated gross is greater than FSD

Before recipe starting, the batch server simulates the individual batch steps starting with the actual gross weight value. If the simulated gross weight is higher than FSD (maximum value), this message is displayed. This test can be switched off in the recipe.

#### Simulated gross is below 0

Before starting a recipe, the batch server simulates the individual batch steps. This message is displayed, when the simulated gross weight is smaller than 0. The batch server starts calculating with the actual gross weight. Please, check, if the actual gross weight is negative. This test can be switched off in the recipe.

#### RecipeLine::multiplyWith: could not read setpoint

This message should not occur at all. Please, contact: [technical.support.hh@sartorius.com](mailto:technical.support.hh@sartorius.com). The current batch server logfile should be added to your inquiry.

#### RecipeLine::setParameter: could not set parameter

The batch server has tried to set a parameter (e.g. Setpoint) and this did not function. Please, check your scripts for faulty parameter names.



## 10 INDEX

## 8

840002R1.MDB.....	137
840002C1.MDB.....	137
840002P1.MDB.....	137

## A

Access privileges.....	34
ACT.....	72
Alarm icon.....	91
Alarm report.....	104
Analog components.....	72
Analog input component.....	72
Analogausgangskomponente.....	72
Applications with ProBatch+.....	137
Asynchronous Start.....	95
Auto Start.....	93

## B

Backup Databases.....	48
Basic package.....	10
Batch mode.....	64
Batch Parameters.....	44
Batch Setup.....	44
Batchable components.....	65
Batching device.....	85
Batching device (production line set-up).....	39
BMODE_ID.....	65, 66, 72
Brands, trade marks.....	9
Breakpoint.....	97

## C

Calculation mode.....	78
Calculation Setpoint.....	80
Calming time.....	60, 61
Calming Time.....	58
Charge batching.....	65
Charge/discharge batching.....	65
Classic mode.....	23, 41
Client.....	140
Client / server.....	142
Commissioning.....	33
Communication bus.....	17
Component.....	57
Component table.....	57
Compression.....	137
Configuration.....	33, 85
Consumption.....	106
Correction recipe.....	70
Crystal Reports Generator.....	101, 102, 105
Customer.....	93, 94

## D

Data types.....	109
Database model.....	137

Databases.....	16
DDE Set.....	43
DDE set specifications.....	139
DDE-Definitionen.....	139
Debug.....	51
Debug Level.....	51
Debug Script.....	54
Debug Telegrams.....	51
Discharge batching.....	65
Discharge mode.....	65
Discharge time.....	58
Display messages.....	124
Disposal.....	9
Dummy components.....	64

## E

Edit Text.....	50
Enter value.....	125
Error messages.....	147
Ethernet port.....	17
Exemption from liability.....	9
Exporting.....	101, 102
Exporting Reports.....	105

## F

Field width.....	32
Fine switch-off point.....	61
Function key.....	85
Function keys.....	85

## G

G-component.....	66
Global parameters.....	33
Gross batching.....	65
Gross discharge batching.....	65

## H

Hardware requirements.....	10
Help, contents.....	85

## I

IEC-61131.....	107
INPUT_BOX.....	125
Installation.....	16, 32
Installation directory.....	16
Installing ProBatch+.....	16
Instructions for unpacking.....	8
Intended use.....	9
Introduction into ProBatch+.....	8

## L

Licence information.....	12
Liquid counter.....	37, 41
Log in.....	34

Log out.....	34	Production .....	92
Logfile .....	55	Production and Batch Reports.....	100
Login .....	88	Production Control .....	92
Logout.....	88	Production line.....	43
Lot-No.....	73	Production Manager .....	91
<b>M</b>		Production number.....	93
Main Process Control.....	98	Production Report.....	59
Main recipe .....	42, 74	Production sums .....	106
Main Recipe .....	81, 95, 98	Production/batch reports .....	85
Main Report.....	102	<b>Q</b>	
MANUAL .....	66	Quick Starter.....	24
Manual control.....	66	<b>R</b>	
Material tracking.....	100	Recipe .....	76
Max. Batch Duration.....	77	Recipe simulation .....	77
Max. Batch Size.....	82	Recipe structure.....	74
Message icon .....	91	Recipe total.....	78
Message Report .....	104	Recipe Total.....	77, 82
MESSAGE_BOX.....	124	Recipe total mode .....	78
Min Flowrate .....	58	Report.....	99
Min.batch size .....	77	Report configuration .....	138
Min.Batch Size.....	82	Report mode.....	59
Minimum Flowrate.....	60	Report Parameters.....	46
<b>N</b>		Requirements on PC .....	10
N* .....	94	Reserved words.....	108
Name of Application.....	85	Reset Mainrecipe .....	49
Net batching.....	65	Reset Productionline.....	49
Number of batches .....	93	Residue.....	37, 41
<b>O</b>		Restart mode.....	61
OPC Server .....	37	Restart Mode .....	58
Open / Print alarm report.....	85	Restore Databases .....	48
Open mode .....	20, 35	RS-232 cable for X4/X5/X6 .....	17
Open mode with PLC.....	21	RW, RQ, RL .....	69
Operating functions.....	87	<b>S</b>	
Operation .....	85	Safety instruction .....	8
Operator input.....	125	Scope of delivery .....	8
Options.....	10	Script .....	36, 43
Order.....	93, 94	Script component.....	70
Other batch modes.....	72	ScriptEngine.....	107
Overshoot.....	58, 60	Select Batch .....	100, 102
Overshoot correction.....	60	Select Language .....	50
<b>P</b>		Select Production .....	100, 102
Password .....	34	Select Production Line.....	100
Phase control.....	67, 68, 69	Sequence control.....	92
Phase simulation .....	36	Server.....	140
Plan.....	83	Setpoint.....	61, 93, 94
PLC system.....	21	Setting up ProBatch+ .....	33
Post-batching .....	60, 61	Setup .....	16
Power supply .....	11	Siemens S7 .....	21
ProBatch+ main window .....	89	Simulation.....	38
ProBatch+ maintenance .....	146	Single production.....	85
Preset point .....	58, 60	Single Start of Production.....	93
Print.....	100, 102	Software requirements.....	10
Priority.....	95	SPM-Inputaddress .....	59
Process Control.....	97	SPM-Outputaddress .....	59
Process survey.....	90	Start .....	93
Prod.Number .....	94	Start parameters .....	89
		Start Prodplan .....	96
		Start Production.....	93, 94

Start Production From Plan .....	96	Trouble shooting at the batching part of the installation .....	147
Start production plan .....	85	Trouble shooting at theProBatch+ part of the installation .....	146
Start Production Plan .....	96		
Start Recipe.....	85	<b>U</b>	
Stock.....	106	Updates .....	11
String variable explanation .....	140	UPS for PC .....	10, 11
Subrecipe.....	74, 80	User.....	34, 88
Subsequent setpoint correction .....	66	User log-in .....	85
Suppliers.....	106	User name .....	34
Supplies.....	106		
SVGA.....	10	<b>V</b>	
Sync component.....	70	Variables.....	111
Synchronous Start.....	94, 95		
System .....	85	<b>W</b>	
System concept .....	18	Windows Settings.....	49
<b>T</b>		<b>Z</b>	
Technical data .....	10	Zip Databases .....	48
Tolerance.....	58, 60		
Tolerance alarm.....	61		
Tolerance errors.....	60		
Tolerance test.....	61		
Total discharge.....	65		
Trouble shooting.....	146		





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