

# SIEMENS

## SIMATIC

### BRAUMAT/SISTAR SQL DB Host V8.0.1

#### Function Manual

Security information

1

Installation and  
configuration

2

IOS server/SQL adapter  
configuration

3

Proxy Manager

4

Master data upload

5

Material events

6

MES API

7

Table descriptions

8

Miscellaneous

9

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## Legal information

### Warning notice system

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

#### **DANGER**

indicates that death or severe personal injury **will** result if proper precautions are not taken.

#### **WARNING**

indicates that death or severe personal injury **may** result if proper precautions are not taken.

#### **CAUTION**

indicates that minor personal injury can result if proper precautions are not taken.

#### **NOTICE**

indicates that property damage can result if proper precautions are not taken.

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

### Qualified Personnel

The product/system described in this documentation may be operated only by **personnel qualified** for the specific task in accordance with the relevant documentation, in particular its warning notices and safety instructions. Qualified personnel are those who, based on their training and experience, are capable of identifying risks and avoiding potential hazards when working with these products/systems.

### Proper use of Siemens products

Note the following:

#### **WARNING**

Siemens products may only be used for the applications described in the catalog and in the relevant technical documentation. If products and components from other manufacturers are used, these must be recommended or approved by Siemens. Proper transport, storage, installation, assembly, commissioning, operation and maintenance are required to ensure that the products operate safely and without any problems. The permissible ambient conditions must be complied with. The information in the relevant documentation must be observed.

### Trademarks

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### Disclaimer of Liability

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

# Table of contents

|          |                                                   |           |
|----------|---------------------------------------------------|-----------|
| <b>1</b> | <b>Security information .....</b>                 | <b>5</b>  |
| <b>2</b> | <b>Installation and configuration .....</b>       | <b>7</b>  |
| 2.1      | Overview .....                                    | 7         |
| 2.2      | Setup program .....                               | 9         |
| 2.3      | Configuration of services and databases .....     | 14        |
| 2.3.1    | SISTAR service configuration.....                 | 14        |
| 2.3.2    | Proxy configuration and diagnostics .....         | 15        |
| 2.3.3    | Archiver configuration and diagnostics .....      | 20        |
| 2.3.4    | PM-Connector configuration and diagnostics .....  | 25        |
| <b>3</b> | <b>IOS server/SQL adapter configuration .....</b> | <b>31</b> |
| 3.1      | Activation of functions.....                      | 31        |
| <b>4</b> | <b>Proxy Manager.....</b>                         | <b>35</b> |
| 4.1      | Proxy manager.....                                | 35        |
| <b>5</b> | <b>Master data upload.....</b>                    | <b>45</b> |
| 5.1      | Master data upload .....                          | 45        |
| <b>6</b> | <b>Material events .....</b>                      | <b>49</b> |
| 6.1      | Material events .....                             | 49        |
| <b>7</b> | <b>MES API.....</b>                               | <b>55</b> |
| 7.1      | Summary.....                                      | 55        |
| 7.2      | Validity checks in the MES API .....              | 58        |
| 7.3      | API calls in the change log.....                  | 61        |
| 7.4      | Notes on use.....                                 | 62        |
| <b>8</b> | <b>Table descriptions .....</b>                   | <b>65</b> |
| 8.1      | Table description of engineering data .....       | 65        |
| 8.2      | Table description of runtime data .....           | 79        |
| 8.3      | Table description, product version .....          | 96        |
| <b>9</b> | <b>Miscellaneous .....</b>                        | <b>97</b> |
| 9.1      | Application notes.....                            | 97        |



# Security information

Siemens provides products and solutions with industrial security functions that support the secure operation of plants, systems, machines, and networks.

In order to protect plants, systems, machines and networks against cyber threats, it is necessary to implement – and continuously maintain – a holistic, state-of-the-art industrial security concept. Siemens' products and solutions only form one element of such a concept.

Customer is responsible to prevent unauthorized access to its plants, systems, machines and networks. Systems, machines and components should only be connected to the enterprise network or the internet if and to the extent necessary and with appropriate security measures (e.g. use of firewalls and network segmentation) in place.

Additionally, Siemens' guidance on appropriate security measures should be taken into account. You can find more information about industrial security by visiting:  
<http://www.siemens.com/industrialsecurity>.

Siemens' products and solutions undergo continuous development to make them more secure. Siemens strongly recommends you apply product updates as soon as available and always use the latest product versions. Use of product versions that are no longer supported, and failure to apply latest updates may increase customer's exposure to cyber threats.

To stay informed about product updates, subscribe to the Siemens Industrial Security RSS Feed under  
<http://www.siemens.com/industrialsecurity>.

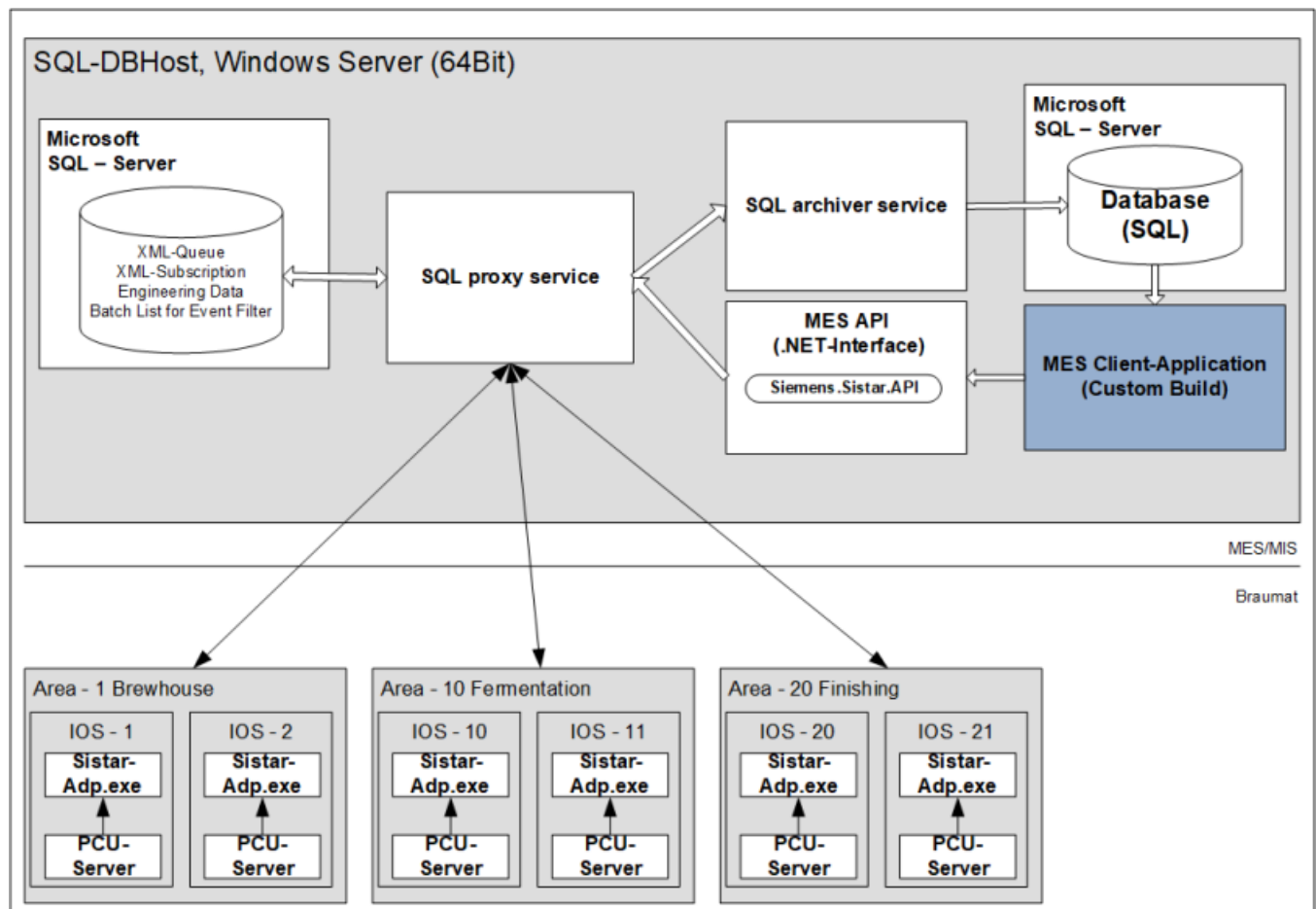


## Installation and configuration

### 2.1 Overview

#### General

The figure below shows the individual components of the "SQL adapter" and "MES API" options as well as their assignment to the PC stations SQL-DBHost and IOSxxx.



In the BRAUMAT/SISTAR process control system, the '`sistar_adp.exe`' application implements the connection between an IOS server and the SQL DBHost ("SQL proxy service" component). The SQL adapter reads production-related data from the IOS archives and sends it to the "SQL proxy service". The SQL adapter must be activated on each IOS server that is to be included in the data recording.

The "SQL proxy service" receives the engineering and production data from multiple areas and collects this data in a local database. The production data is filtered, adapted and then

### 2.1 Overview

transferred to the connected client. A queuing concept is used to handle the incoming data in order to enable the connected clients to transmit complete telegram sequences.

The "SQL archiver service" service is responsible for entering the production data in the SQL database, while the "SQL proxy service" functions as Gateway to the lower-level process control system.

The "MES-API" option is used for planning and releasing production batches by a higher-level MES. The .NET class library 'Siemens.Sistar.API' contained in it supports, for example, the implementation of an MES client application based on C# or VB (.NET) by a system integrator.

#### **PM-Connector**

In order to be able to evaluate BRAUMAT/SISTAR runtime data with the functions of the optionally available PM options (PM-QUALITY, PM-SERVER, PM-ANALYZE), they must be transferred from the "SistarData" SQL database to the PM-SERVER and PM-QUALITY data storage. This task is performed on the BRAUMAT/SISTAR side of the system by the „BRAUMAT/SISTAR-PM-Connector“ component. On the PM options side, the data is also transferred from a specific BRAUMAT/SISTAR data logger.

#### **Communication channel**

On the IOS station, the SQL adapter is started together with the PCU-Server. The SQL adapter communicates with the Proxy via TCP-IP Sockets.

In the event of a network fault or if a DB Host PC is restarted, no data is lost. The spooler between the PCU-Server and the SQL adapter buffers all telegram events. In the event of an IOS failure, the SQL adapter is immediately activated on a different node. To this end, it must also run in sleep mode on a 'standby' IOS.



## 2.2 Setup program

### Introduction

The *Process Control System; BRAUMAT/SISTAR* Vx.y DVD contains the complete software for all the applications (IOS PC station, SQL DB Host station).

You only have to install certain applications depending on the PC station. A system setup standardized for SIMATIC products will help you here.

### Preparing for installation

#### NOTICE

##### Installation requirements

- For the requirements and preparatory steps that must be met/performed before the installation, refer to the current Readme document. This is located in the base directory of the installation data medium.
- The setup program automatically checks whether the software components needed for the installation are already installed on the PC.  
If software components are missing or already present in another version, a message indicates the missing or incorrect software components. The setup program is canceled after the message is confirmed. You must install the missing software component or uninstall the incorrect software component. Then restart the setup.
- By default, the installation directory '`<program-path>\Siemens\Sistar_SQL\...`' is always valid for the "SQL-Adapter" option - independent of the product BRAUMAT or SISTAR.
- If you have installed a version prior to V7.5 (e.g. '`<program-path>\Siemens\Braumat_SQL\...`'), the setup informs you that it must first be uninstalled.
- You can find information on how to transfer the configuration settings ("SistarProxy", "SistarArchiver" and "Sistar Proxy Manager") as well as the log files of the preinstallation, if necessary, in the Readme document in section "Usage notes / What's new as of ..."

### Procedure for setup program

The SQL DB Host components SQL proxy service, SQL archiver service and MES API are installed using the system setup.

1. Insert the *Process Control System; BRAUMAT/SISTAR* DVD into the DVD drive.
2. Double-click "Setup.exe" in the product-specific "BRAUMAT" or "SISTAR" directory to start the setup.
3. An administrator login may be queried in a dialog window of the Windows User Account Control (UAC) in order to carry out the changes.
4. Setup language  
For example, "English" and "Next"
5. Welcome  
... "Next"

## 2.2 Setup program

6. Product information
  - ... Read the information in "Readme.mht" if necessary and click "Next".
7. License agreement
  - ... Select the check box "I accept the conditions of the above license agreement as well as the conditions of the Open Source license agreement. I confirm that I have read and understood the security information".
  - ... "Next"
8. User information
  - The current Windows user is displayed. The user name can be modified individually depending on the project requirements and does not refer to existing Windows users. The organization name can be entered or left blank as desired.
  - Enter the user information and "Next".
9. Installation type
  - Select the "Package installation" check box to install preselected software packages.
  - or alternatively: Select the check box "Custom installation" to install individual programs.
  - ... "Next"
10. Program packages
  - The program packages are shown.
  - Select the corresponding check boxes.

| Package                                                 | Description                                                                    |
|---------------------------------------------------------|--------------------------------------------------------------------------------|
| BRAUMAT/SISTAR IOS ...<br>• System                      | Applies to all IOS PC stations (server, client, single station, etc.)          |
| SQL Server<br>• SQL System<br>• MES API<br>• PM-QUALITY | <b>Should be installed on a separate PC station with Microsoft SQL server.</b> |

\*) Information about the functions to be activated for each PC station can be found in the Readme document in section **"Licenses and configuration limits"**

- ... "Next"
11. Programs
    - A blue check mark denotes the existence of the corresponding program.
    - For an update or re-installation, select the desired package again.
    - **The "Automation License Manager Vx.y ..." option is currently only necessary in conjunction with the "IOS System package" and should not be selected with the SQL Server packages.**
    - When a package has been selected, the readme document with the product information can be opened. In the "Target directory" box, it is also possible to set a different target folder using the "Browse" button if the package is not yet installed.
    - ... "Next"

## 12. System settings

- The Windows system settings / security settings to be made by setup are displayed.
- Select the "I accept the changes to the system settings" check box to implement the displayed settings.
- **If this does not happen, these settings have to be made manually by a system administrator to ensure seamless client-server communication.**
- ... "Next"

**Note**

The required Windows firewall settings for the SQL services are made in the "System settings" step after confirmation from the user. The user does not have to make any further settings to do this.

## 13. Setup

- The installation procedure starts.
- The software to be installed on the PC for this program selection is listed in the display window.
- The installation progress can be followed from the program icons.

## 14. Setup

- Completion message for the installation procedure
- ... "Finish"

15. Please read the following sections **before restarting the PC**. Especially the **SQL server settings as well as the drive and path names of the SQL databases should be adapted to the project requirements beforehand**, since the latter are correspondingly created during the restart and startup of the system services.

**Installation result and project-specific adjustments**

The SQL DB Host components are installed in the following Windows program or data directories:

- Programs, Documentation: '`<sys-path>\Programs (x86)\SIEMENS\Sistar_SQL\...`'
- Databases, Configuration / Log files: '`<sys-path>\ProgramData\Siemens\Sistar_SQL\Sys\...`'

The setup program installs the following components on the computer.

- Configuration tool SQL-Proxy Manager
- SQL-Service Configuration configuration tool
- SQL proxy service - Windows system service
- SQL archiver service - Windows system service
- MES API - Standard Windows .NET Assembly
- PM-QUALITY ...`<Program Files (x86)>\SIEMENS\Sistar_SQL\PM-QUALITY\` ...

Entries are also made in the Windows Start menu:

- 'Start→Apps→Siemens Automation→SIMATIC→SISTAR Proxy Manager / SISTAR Service Configuration
- 'Start→Apps→Siemens Automation→SIMATIC→Documentation→German/English'
  - SISTAR SQL Adapter Manual (PDF)
  - SISTAR SQL Adapter Manual (online help)  
The online help can also be opened in the dialogs of the configuration tools by pressing the <F1> function key.

---

#### Note

- The currently released system version supports only the joint operation of SQL proxy service and SQL archiver service on one SQL database host computer. Therefore, no differentiation is made between these two components during installation.
  - When the Setup program is finished and **before the next restart** of the computer, the 'SQL Service Configuration' configuration tool must be called. Here, the settings for the following services must first be made in the respective tabs:
    - SQL proxy service → Proxy configuration and diagnostics (Page 15)
    - SQL archiver service → Archiver configuration and diagnostics (Page 20)
  - In particular, the entries for computer names and SQL databases must be adapted to the project conditions here. Otherwise, communication errors may occur in the aforementioned services when the computer is restarted.
- 

### Project-specific user account

- The SQL services are authenticated for the SQL server exclusively by means of "Windows Authentication". SQL server-based authentication by means of DB user name and password is not supported.
- In productive operation, the SQL services are started by the Windows Service Control Manager and run without an interactive user in a service account. During installation, the setup program registers the services under the 'Local System account' NT AUTHORITY \SYSTEM.
- Alternatively, another Windows user specified by the corporate IT department can be used as the service account. This user must then be entered in the Windows Control Panel / Services for "Siemens Sistar Archiver" and "Siemens Sistar Proxy" in the Properties / "Login" tab as an alternative to the preselected "Local System Account". The settings in the "Microsoft SQL Server Management Studio" (see below) must then be made exclusively for this user.
- If a project-specific Windows user is used for the "Siemens Sistar Archiver" and "Siemens Sistar Proxy" services, ensure that this user has write access to the '`<sys-path>\ProgramData\Siemens\Sistar_SQL\Sys\...`' directory.
- The SQL services can also be started interactively via the "SQL Service Configuration" configuration tool. Usually, this tool is used to set up/generate the database and for communication in test mode. It automatically requests an administrator user. This user must have 'sysadmin' rights (generating the database with tables, etc.) in the SQL server.

- The customer is responsible for setting up user IDs and roles in the SQL server related to user applications (reports, etc.). We recommend that you observe the corresponding information from Microsoft regarding secure operation of the SQL server.
- This also applies to installation, administration and operation, as well as to security patches for the Microsoft SQL server.

### Settings in the 'Microsoft SQL Server Management Studio'

Prior to the first startup, the following rights setting must be made in the "Microsoft SQL Server Management Studio" (administrator rights required):

- Select node "<SQL SERVER name> -> Security -> Logins -> NT-AUTHORITY\SYSTEM" (**or alternative user specified by the IT department**)  
(If this user does not yet appear in the list of logins, the user must be added via "New login").
- Open the shortcut menu for this user with a right click and select the "Properties" menu command.  
The dialog "Login Properties - <...user...>" appears.
- In the tree view of the dialog, select the "Server Roles" node.
- On the right in the "Server roles" box, select the check mark for "sysadmin".
- Close "Microsoft SQL Server Management Studio".

The same sequence has to be executed for the administrator user.

### PM-Connector

To commission the BRAUMAT/SISTAR PM-Connector, some extensions have to be made after restarting the SQL DB Host and initializing the SQL databases. This can also be done via the configuration tool 'SQL Service Configuration' (see section "PM-Connector configuration and diagnostics (Page 25)").

## 2.3 Configuration of services and databases

### 2.3.1 Sistar service configuration

#### Calling the configuration tool

The configuration tool is called in the Windows Start menu as follows:

"Start→All Programs→Siemens Automation→Sistar Service Configuration"

An administrator login may be queried in a dialog window of the Windows User Account Control (UAC) in order to carry out the changes.

#### Command dialog elements

The command buttons on the outer right side have the following meanings:

- 'OK' → Save the settings and exit the dialog
- 'Apply' → Save the settings
- 'Close' → Exit the dialog without saving the settings

The following tabs contain the configuration settings of the services and add-ons.

- Proxy → Proxy configuration and diagnostics
- Archiver → Archiver configuration and diagnostics
- PM-Quality → PM-Quality Connector

These are explained in more detail in the following sections.

## 2.3.2 Proxy configuration and diagnostics

### Dialog elements

The "Proxy" tab contains a summary of the configuration settings of the Windows 'SQL proxy service'.

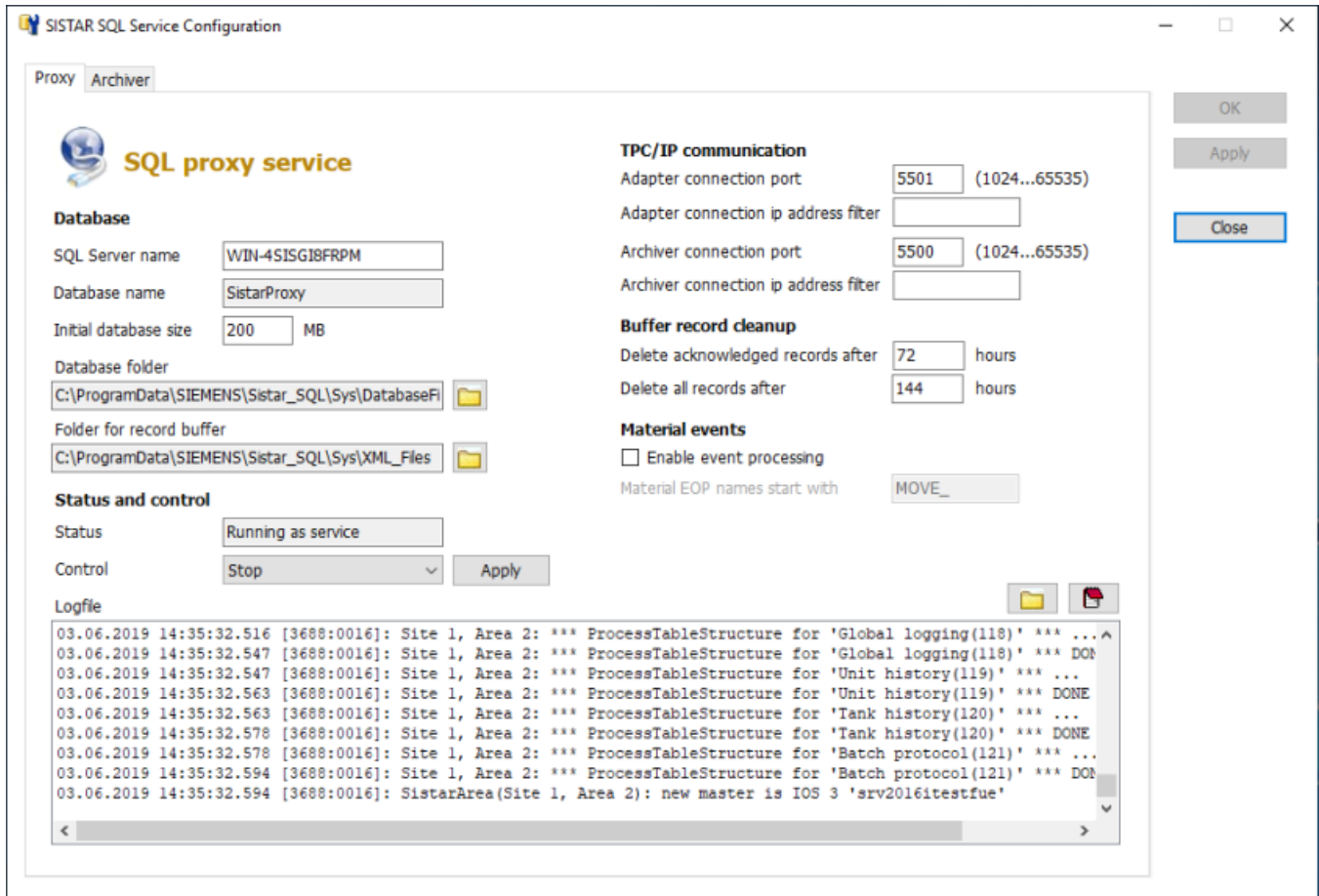


Table 2-1 The 'Database' area is used to configure the start parameters. You can make the following settings here:

| Parameter       | Default     | Description                                                                                                                                                                                         |
|-----------------|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SQL Server name | localhost   | Database instance name. The default setting is valid with a standard SQL Server product installation. The following format applies to special variants or OEM installations:<br>'<Host>\<Instance>' |
| Database name   | SistarProxy | Fixed default setting for the 'SQL proxy service'; cannot be changed.                                                                                                                               |

| Parameter                | Default | Description                                                                                                                                  |
|--------------------------|---------|----------------------------------------------------------------------------------------------------------------------------------------------|
| Initial database size    | 200     | Size of the proxy database in MB. Should be at least 100 MB. If you set this entry to '=0', no database is connected during initial startup. |
| Database folder          |         | Installation path for the proxy database files. Must be specified in the file selection menu.                                                |
| Folder for record buffer |         | Path where the proxy XML interim files are saved. Must be specified in the file selection menu.                                              |

Table 2-2 The 'TCP/IP communication' area is used to configure the connectivity of the proxy service.

| Parameter                             | Default | Description                                                                                                                                                                                                                                                                                                                                       |
|---------------------------------------|---------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Adapter connection port               | 5501    | TCP/IP port number for communication with the IOS-Server as well as for MES-API and Proxy-Manager:<br>*1)                                                                                                                                                                                                                                         |
| Adapter connection IP address filter  | <blank> | TCP/IP address string for selecting the local LAN adapter for incoming IOS-Server connection requests. The substring must uniquely identify the LAN adapter.<br>Examples:<br>192. → Class A networks<br>192.168. → Class B networks<br>192.168.3. → Class C networks<br><empty> - no restrictions, i.e. all LAN adapters allowed<br>*2)           |
| Archiver connection port              | 5500    | TCP/IP port number for communication with the SQL archiver service.<br>*1)                                                                                                                                                                                                                                                                        |
| Archiver connection IP address filter | <blank> | TCP/IP address string for selecting the local LAN adapter for incoming SQL archiver service connection requests. The substring must uniquely identify the LAN adapter.<br>Examples:<br>192. → Class A networks<br>192.168. → Class B networks<br>192.168.3. → Class C networks<br><empty> - no restrictions, i.e. all LAN adapters allowed<br>*2) |

**Note****\*1) Assigning TCP/IP port numbers**

You should retain the standard settings for the port numbers as far as possible.

If it is necessary to change these settings because of instructions issued by the company IT administration, the user is responsible for avoiding collisions.



|                                                                                                                                                                                                                                                                                                                                                         |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>NOTICE</b>                                                                                                                                                                                                                                                                                                                                           |
| <p><b>*2) Assigning TCP/IP address filters</b></p> <p>If the PC station with the proxy service has multiple LAN adapters, for example, you can use this setting to determine the LAN adapter used.</p> <p><b>This application must be checked for reasons of system security and may have to be coordinated with the company IT administration.</b></p> |

Table 2-3 The 'Buffer Record cleanup' area is used to configure the proxy queues.

| Parameter                         | Default | Description                                                                                                                                                                            |
|-----------------------------------|---------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Delete acknowledged records after | 72      | Maximum age of data sets in the SQL Proxy queue which were retrieved from the SQL archiver. They will be removed on expiration of this time.<br>The time value is specified in [h]     |
| Delete all records after          | 144     | Maximum age of data sets in the SQL Proxy queue which were not retrieved from the SQL archiver. They will be removed on expiration of this time.<br>The time value is specified in [h] |

Table 2-4 The 'Material events' area is used to activate and configure the material event filter of the proxy service.

| Parameter                     | Default        | Description                                                                                           |
|-------------------------------|----------------|-------------------------------------------------------------------------------------------------------|
| Enable event processing       | <not selected> | Activates filtering of material movement telegrams from the step protocols.                           |
| Material EOP Names start with | MOVE_          | Defines the EOP/TOP name or prefix for filtering material movement telegrams from the step protocols. |

Table 2-5 The service can be started and stopped in the 'Status and Control' area. You can make the following settings here:

| Parameter | Status / Command        | Description                          |
|-----------|-------------------------|--------------------------------------|
| Status    | Stopped                 | The service has stopped              |
|           | Running as Service      | Windows service is running           |
|           | Running as application  | Console application is running       |
| Control   | Stop                    | Stop the service                     |
|           | Start                   | Start as Windows service             |
|           | Start as an application | Start as console application         |
| Apply     |                         | Execute the selected Control command |

**Note****Properties of the SQL proxy service**

- The setup program registers the service in Windows.
- Do not run the 'SQL proxy service' service before you have adapted the start parameters.
- After the computer has been rebooted, the service is activated automatically at each system start.

**Diagnostics options****1. Log files**

The activities of the 'SQL proxy service' service are recorded in log files. The current log file is displayed in the 'Logfile' pane. Up to five backup copies of previous log files are available as circular buffer entries and can be viewed using Windows-Notepad.

|                       |                                                                                                                                                                                                                                                               |
|-----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Path for log files    | ,...ProgramData\Siemens\Sistar_SQL\sys\LogFiles'                                                                                                                                                                                                              |
| Name of the log files | The active log file is named 'SistarProxy.log' .<br>The backup copies of previous log files are named 'SistarProxy.bak1' ...<br>'SistarProxy.bak5'<br>. The log files are 'rotated' automatically as soon as the size of the active log file exceeds 1.25 MB. |

**2. Windows event viewer**

In the event of an error or in the case of certain exceptions, the following entries are logged in the Windows event display:

- Category: 'Application'
- Source: 'SistarProxyService'
- Start/end of the service
 

| ID | Type | Text                                                          |
|----|------|---------------------------------------------------------------|
| 1  | info | "SistarProxyService V7.x.y started as application (PID=xxxx)" |
| 2  | info | "SistarProxyService V7.x.y started as service (PID=xxxx)"     |
| 3  | info | "SistarProxyService V7.x.y ended as application (PID=xxxx)"   |
| 4  | info | "SistarProxyService V7.x.y ended as service (PID=xxxx)"       |

 (PID: Windows process ID)
- Status of the SQL connection
 

| ID  | Type    | Text                                                                |
|-----|---------|---------------------------------------------------------------------|
| 5   | info    | "SQL database connected: 'localhost, SistarProxy'"                  |
| 6   | info    | "SQL database disconnected: 'localhost, SistarProxy'"               |
| 103 | warning | "SQL database connect FAILED: 'localhost, SistarProxy' - '<error>'" |

- Status of the proxy queue (overflow occurs if the proxy is running but there is no connection to the archiver, for example)
  - When 80% of the elapsed deletion time 'Delete all records after' is reached:  
ID Type Text  
101 warning "Table 'sistar\_rt\_queue' warning: Deleting not acknowledged entries in XXdYYhZZmin !"
  - If entries are then deleted:  
ID Type Text  
501 error "Table 'sistar\_rt\_queue' error: X not acknowledged entries (#X-#Y) deleted !"
- Handling of the XML files
  - If the XML file cannot be deleted:  
ID Type Text  
102 warning "DeleteXmlFile '<file>' failed: <error>"
  - If directory for XML files 'Folder for record buffer' cannot be created:  
ID Type Text  
502 error "CreateDirectory '<path>' failed: <error>"
  - If the XML file cannot be written:  
ID Type Text  
503 error "Writing XML file '<file>' failed: <error>"

### 2.3.3 Archiver configuration and diagnostics

#### Dialog elements

The "Archiver" tab contains a summary of the configuration settings of the 'SQL archiver service' service.

**Sistar SQL Service Configuration**

Proxy | **Archiver**

**SQL archiver service**

**Database**

SQL Server name: WIN-4SISG18FRPM

Database name: SistarData

Initial database size: 2000 MB

Database folder: C:\ProgramData\SIEMENS\Sistar\_SQL\Sys\DatabaseFi

**Communication**

Proxy host name: localhost

Proxy listens on port: 5500

Proxy ip address filter:

**Data categories to be archived**

☒ Message archive ☒ Engineering data ☒ Trend data

☒ Step protocols ☒ Batch archive ☒ Unit history

☒ Free protocols ☒ Changelog ☒ Tank history

☒ Batch protocols

**Status and control**

Status: Running as service

Control: Stop [Apply]

**Logfile**

```

03.06.2019 14:35:19.813 [3636:0003]: Valid database version found: full version='14.0.2014.14' -> main version=
03.06.2019 14:35:19.844 [3636:0003]: XML-Catalog for archiver tables loaded: schema_version='4'
03.06.2019 14:35:21.516 [3636:0003]: Valid product version found: product_version=8.0.0.0
03.06.2019 14:35:21.516 [3636:0003]: Valid table schema version found: schema_version=4
03.06.2019 14:35:21.547 [3636:0005]: XIITcpClient: Get ip address list for host 'localhost' ...
03.06.2019 14:35:21.547 [3636:0005]: IP address filter for <localhost:5500>: <none>
03.06.2019 14:35:21.547 [3636:0005]: XIITcpClient: Server 'localhost:5500' on '127.0.0.1:5500' connect ...
03.06.2019 14:35:22.126 [3636:0005]: XIITcpClient: Server 'localhost:5500' on '127.0.0.1:5500' connected
  
```

Table 2-6 The 'Database' area is used to configure the start parameters of the Archiver service.

| Parameter       | Default    | Description                                                                                                                                                                                         |
|-----------------|------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SQL Server name | localhost  | Database instance name. The default setting is valid with a standard SQL Server product installation. The following format applies to special variants or OEM installations:<br>'<Host>\<Instance>' |
| Database name   | SistarData | Fixed default setting for the 'Sistar-Archiver'; cannot be changed.                                                                                                                                 |

| Parameter             | Default | Description                                                                                                                                     |
|-----------------------|---------|-------------------------------------------------------------------------------------------------------------------------------------------------|
| Initial database size | 2000    | Size of the archiver database in MB. Should be at least 100 MB. If you set this entry to '=0', no database is connected during initial startup. |
| Database folder       |         | Installation path for the archiver database files. Must be specified in the file selection menu.                                                |

Table 2-7 The 'TCP/IP communication' area is used to configure the connectivity of the Archiver service.

| Parameter               | Default   | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|-------------------------|-----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Proxy host name         | localhost | Host name or IP address of the computer on which the proxy is installed (usually the same computer ('localhost'))                                                                                                                                                                                                                                                                                                                                                                                           |
| Proxy listens on port   | 5500      | TCP/IP port number for communication with the Sis-tar-Proxy.                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Proxy IP address filter | <blank>   | TCP/IP address string to limit the connection partners for the connection SQL archiver service to Proxy-Service. <b>The proxy service setting is used here, which means the field cannot be edited.</b><br>Examples:<br>192.168. → all subnets and IP addresses<br>192.168.xxx.xxx permitted<br>192.168.3 → all IP addresses of subnet<br>192.168.3.xxx permitted<br>192.168.3.133 → only this IP address is permitted<br><blank> - no restrictions, which means all subnets and LAN adapters are permitted |

Table 2-8 The 'Data categories to be archived' area is used to select the scope of archiving.

| Parameter                      | Default       | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|--------------------------------|---------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Data categories to be archived | All activated | <p>The check boxes define the type of data which is archived</p> <ul style="list-style-type: none"> <li>• Message Archive<br/>Messages</li> <li>• Step protocol<br/>Step protocols</li> <li>• Free protocols<br/>Free protocols</li> <li>• Engineering data<br/>All configuration tables</li> <li>• Batch Archive<br/>Batch-related data</li> <li>• Changelog<br/>Global operator interventions</li> <li>• Unit history<br/>Unit allocation data</li> <li>• Trend data<br/>Measured value curves</li> <li>• Tank history<br/>Tank fill data</li> <li>• Batch protocols<br/>IOS batch reports (data from archive path):<br/>...\\Protocol\\BatchProt\\BP_yy\\OCat_nnn\\Order_nnnnn\\*.dbf</li> </ul> |

**Note****Assigning TCP/IP port numbers**

You should retain the standard settings as far as possible.

If it is necessary to change these settings because of instructions issued by the company's IT administration, it is the user's responsibility to avoid collisions.

Table 2-9 The service can be started and stopped in the 'Status and Control' area. You can make the following settings here:

| Parameter | Status / Command       | Description                    |
|-----------|------------------------|--------------------------------|
| Status    | Stopped                | The service has stopped        |
|           | Running as Service     | Windows service is running     |
|           | Running as application | Console application is running |

| Parameter | Status / Command        | Description                          |
|-----------|-------------------------|--------------------------------------|
| Control   | Stop                    | Stop the service                     |
|           | Start                   | Start as Windows service             |
|           | Start as an application | Start as console application         |
| Apply     |                         | Execute the selected Control command |

---

#### Note

##### Properties of the SQL archiver service

- The setup program registers the service in Windows and lists it in the Windows services window.
  - Do not run the SQL archiver service before you have adapted the start parameters.
  - After it has been started, the service is activated automatically at each system start
- 

## Diagnostics options

### 1. Log files

The activities of the 'SQL Archiver service' service are recorded in log files. The current log file is displayed in the 'Logfile' pane. Up to five backup copies of previous log files are available as circular buffer entries and can be viewed using Notepad.

|                       |                                                                                                                                                                                                                                                                     |
|-----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Path for log files    | , ...ProgramData\Siemens\Sistar_SQL\sys\LogFiles'                                                                                                                                                                                                                   |
| Name of the log files | The active log file is named 'SistarArchiver.log' .<br>The backup copies of previous log files are named 'SistarArchiver.bak1' ... 'SistarArchiver.bak5' .<br>The log files are 'rotated' automatically as soon as the size of the active log file exceeds 1.25 MB. |

### 2. Windows event viewer

In the event of an error or in the case of certain exceptions, the following entries are logged in the Windows event display:

- Category: 'Application'
- Source: 'SistarArchiverService'

- Start/end of the service
 

| ID | Type | Text                                                             |
|----|------|------------------------------------------------------------------|
| 1  | info | "SistarArchiverService V8.x.y started as application (PID=xxxx)" |
| 3  | info | "SistarArchiverService V8.x.y ended as application (PID=xxxx)"   |
| 2  | info | "SistarArchiverService V8.x.y started as service (PID=xxxx)"     |
| 4  | info | "SistarArchiverService V8.x.y ended as service (PID=xxxx)"       |

 (PID: Windows process ID)
- Status of the SQL connection
 

| ID  | Type    | Text                                                               |
|-----|---------|--------------------------------------------------------------------|
| 5   | info    | "SQL database connected: 'localhost, SistarData'"                  |
| 6   | info    | "SQL database disconnected: 'localhost, SistarData'"               |
| 103 | warning | "SQL database connect FAILED: 'localhost, SistarData' - '<error>'" |

### Starting the SQL archiver service in the foreground

Before you start the archiver in the foreground, verify the following:

- The SQL proxy service is installed and started
- The target database is installed and started
- The configuration settings are correct.

---

#### Note

We recommend that you launch the archiver via command line input after the installation. This allows you to immediately recognize error messages at the console. On successful completion of the initial start, stop the archiver and restart it as service.

---

The archiver now attempts to connect to the SQL database, taking the aforementioned settings into account. When a connection to the database is successfully established, the following lines are shown in the console window:

```
Connected : XIDbConnection { localhost<\xxx>, SistarData, , }
XITcpClient: Server [localhost:5500] connected
```

The first line indicates that an SQL database (SistarData) was integrated. The second line shows that this database is located on the local DB Host computer.

After a connection to the database has been successfully established, the SQL archiver service checks whether all predefined tables are present in the database. If this is not the case, the missing tables will be created automatically. The "Create-" commands are recorded in the log file and visualized in the command window as follows (example of the 'sistar\_eng\_site' table):

```
<datetime>: CREATE TABLE sistar_eng_site (
  site_no SMALLINT NOT NULL,
  site_name NVARCHAR2(32) NULL,
  CONSTRAINT PK_sistar_eng_site PRIMARY KEY (site_no)
  USING INDEX STORAGE( INITIAL 10K NEXT 10K )
)
STORAGE(
  INITIAL 10K
  NEXT 10K
```



```
MINEXTENTS 1  
MAXEXTENTS 121 )
```

The following message is displayed if the connection to the SISTAR proxy fails:

```
<datetime>: XITcpClient: Proxy at localhost:5500 not connected  
Verify that the SQL proxy service is running, or adjust the settings in the 'Proxy' tab.
```

## See also

Proxy configuration and diagnostics (Page 15)

## 2.3.4 PM-Connector configuration and diagnostics

### Basic principles

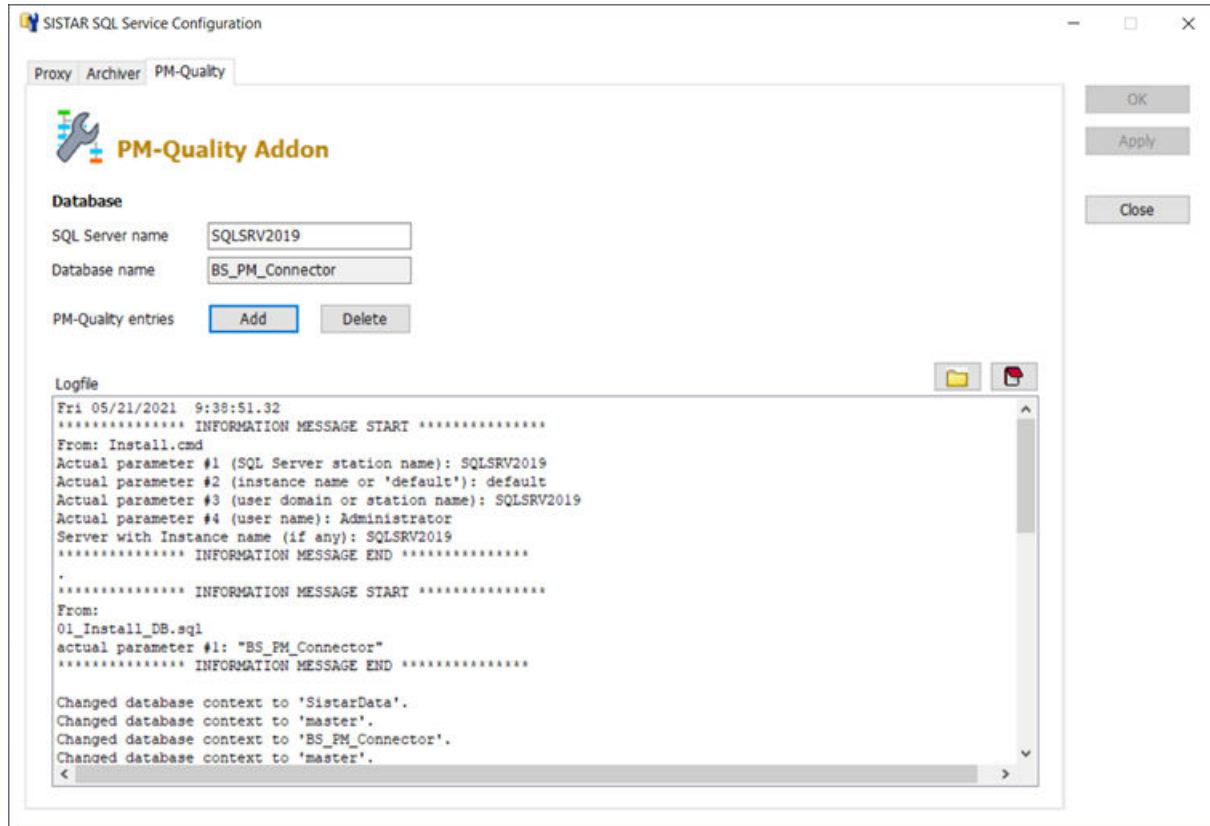
The BRAUMAT/SISTAR PM-Connector has to be activated by the user after the installation and configuration of the SQL DB Host services, "Proxy" and "Archiver".

#### Requirements:

1. The configurations of the "Proxy" and "Archiver" tabs are completed and the system has been restarted, i.e. the "SistarData" and "SistarProxy" databases exist.
2. In the SQL Server, the "SQL Server Agent" service must be started before the actions described below are performed. This can be checked and activated in the "SQL Server Management Studio".

## Dialog elements

The configuration settings of the 'BRAUMAT/SISTAR-PM-Connector' service are summarized in the "PM-Quality" tab.



- The '**Database**' area is used to configure the start parameters of the PM-Connector Service.

| Parameter       | Default         | Description                                                                                                                                                                                         |
|-----------------|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SQL Server name | localhost       | Database instance name. The default setting is valid with a standard SQL Server product installation. The following format applies to special variants or OEM installations:<br>'<Host>\<Instance>' |
| Database name   | BS_PM_Connector | Fixed default setting for the 'BRAUMAT/SISTAR-PM-Connector'; cannot be changed.                                                                                                                     |

- The PM-Connector Service can be activated or deactivated in the '**PM-QUALITY entries**' area:

| Command | Description                                                                                                                                               |
|---------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|
| Add     | A „BS_PM_Connector“ database is added to the RDBMS SQL Server.<br>"BS_PM_Connectorspooler_job" is added for cyclic data transfer in the SQL Server Agent. |
| Delete  | The database objects added with "Add" are removed from the SQL Server RDBMS.<br>Any changes made by the user are lost.                                    |

### Properties of the PM-Connector

- Activation of the connector creates objects for transferring data from "SistarData" to the PM options data store.
- All these objects are system components and may change without notice. Retrieving or changing the data in the objects is not permissible, since this could affect the function of the Connector component.
- The only two exceptions to these restrictions are the two tables "bpc\_eng\_settings" and "bpc\_rt\_log", which may be read and adapted in the case of the settings in "bpc\_eng\_setting" within the restrictions described below.

### Generated components of the PM-Connector

- Directories on the hard disk of the DB Host computer:
  - [%ProgramData%]\Siemens\Sistar\_SQL\PM-TIST\BATCHES
  - [%ProgramData%]\Siemens\Sistar\_SQL\PM-TIST\CHANGELOG
  - [%ProgramData%]\Siemens\Sistar\_SQL\PM-TIST\KOPS
  - [%ProgramData%]\Siemens\Sistar\_SQL\PM-TIST\MAT\_MOVS
  - [%ProgramData%]\Siemens\Sistar\_SQL\PM-TIST\MESSAGES
  - [%ProgramData%]\Siemens\Sistar\_SQL\PM-TIST\ONLINETAGS
  - [%ProgramData%]\Siemens\Sistar\_SQL\PM-TIST\PROCS
  - [%ProgramData%]\Siemens\Sistar\_SQL\PM-TIST\Quarantine
  - [%ProgramData%]\Siemens\Sistar\_SQL\PM-TIST\STEPS
  - [%ProgramData%]\Siemens\Sistar\_SQL\PM-TIST\TAGS
  - [%ProgramData%]\Siemens\Sistar\_SQL\PM-TIST\TANKS
  - [%ProgramData%]\Siemens\Sistar\_SQL\PM-TIST\TRENDS
- Tables in the SQL Server database "BS\_PM\_Connector":
  - bpc\_eng\_settings
  - bpc\_eng\_spool\_status
  - bpc\_eng\_spooler\_entry\_types
  - bpc\_eng\_spooler\_queue\_types
  - bpc\_rt\_csvresults\_changelog
  - bpc\_rt\_csvresults\_kops
  - bpc\_rt\_csvresults\_matmovs
  - bpc\_rt\_csvresults\_messages
  - bpc\_rt\_csvresults\_procs
  - bpc\_rt\_csvresults\_steps
  - bpc\_rt\_csvresults\_tanks
  - bpc\_rt\_csvresults\_trends
  - bpc\_rt\_log
  - bpc\_rt\_spooler
  - bpc\_rt\_spooler\_queues

- Database views in the SQL Server database "BS\_PM\_Connector":
  - vbpc\_rt\_trends
  - vbpc\_rt\_changelog
  - vbpc\_rt\_kops
  - vbpc\_rt\_matmovs
  - vbpc\_rt\_messages
  - vbpc\_rt\_procs
  - vbpc\_rt\_steps
  - vbpc\_rt\_tanks
  - vpmisc\_rt\_kops\_onltags
- Functions and procedures in SQL Server database "BS\_PM\_Connector":
  - fnGetBatchName
  - fnGetOrderName
  - fnIsLastProcEndForBatch
  - fnPreviousUnitStatusForUnit
  - fnPreviousUnitStatusForUnitAndBatch
  - sp\_bpc\_logwriter
  - sp\_bpc\_delete\_sistardata\_data
  - sp\_bpc\_UPSERT\_LastDeleteFromSpooler
  - sp\_bpc\_delete\_spool\_and\_log\_entries
  - sp\_bpc\_GenerateSpoolerEntries
  - sp\_bpc\_GenTextExportCSVFile
  - sp\_bpc\_process\_changelog\_events
  - sp\_bpc\_process\_kop\_events
  - sp\_bpc\_process\_matmov\_events
  - sp\_bpc\_process\_message\_events
  - sp\_bpc\_process\_procedure\_events
  - sp\_bpc\_process\_step\_events
  - sp\_bpc\_process\_tank\_events
  - sp\_bpc\_process\_trend\_events
  - sp\_bpc\_spoolerhandler
- The component registers a cyclically called database job in the SQL Server Agent, i.e. a variant of Microsoft SQL Server that includes the SQL Server Agent function is mandatory for the PM Connector component to work.

**Diagnostics options**

## 1. Log files

The diagnostics outputs of the PM Connector component are recorded in log files. The current log file is displayed in the "Logfile" pane. The log file behind it can be opened using Notepad.

|                       |                                                                                                                                                                                                                                                             |
|-----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Path for log files    | "...\Program Files (x86)\SIEMENS\Sistar_SQL\PM-QUALITY"                                                                                                                                                                                                     |
| Name of the log files | The current log file of the activation function is named with "InstallLog.txt". The current log file of the deactivation function is correspondingly named with "UninstallLog.txt". Only the log file of the last action is always stored in the directory. |

## 2. Log tables in the SQL server

|                                                    |                                                                                                                                                                                                                                |
|----------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| [BS_PM_Connector].<br>[dbo].[bpc_rt_log]           | If errors or certain exceptional situations occurs, entries are logged in the database.<br><br>For a table description, see section Table description of engineering data (Page 65)                                            |
| [BS_PM_Connector].<br>[dbo].<br>[bpc_eng_settings] | Adjustable parameters for the data transfer from "SistarData" to the data storage of the PM options by the BRAUMAT/SISTAR-PM-Connector<br><br>For a table description, see section Table description of runtime data (Page 79) |

**Configuration of the PM-QUALITY SISTAR/BRAUMAT coupling**

For the configuration steps required in PM-SERVER and PM-QUALITY, refer to the section "PM-QUALITY SISTAR/BRAUMAT Coupling/Instructions" of the "PM-QUALITY Server" documentation.

## IOS server/SQL adapter configuration

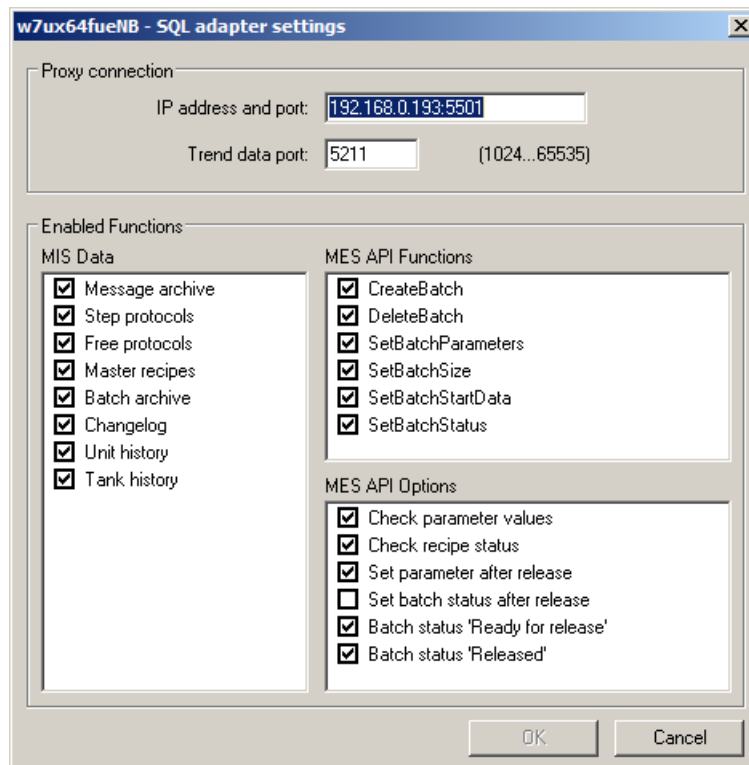
### 3.1 Activation of functions

#### Basics

The SQL adapter functions and their option settings are enabled on the process control system side via the "Site Configuration" application.

**For redundant IOS servers, an identical configuration must be entered for both servers.**

The "Configure SQL adapter" dialog in the shortcut menu of the IOS server offers the following possible selections:



## 3.1 Activation of functions

## 'Proxy connection' section

The connection data for the Windows service 'Siemens Sistar Proxy' of the DB Host computer is defined here.

| Parameter            | Description                                                                                                                                                                                                  |
|----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| IP address and port: | The IP address or HOST name plus TCP/IP port of the PC station on which the SQL proxy service is installed (area 1024 to 65535).<br>": 5501" describes the standard TCP/IP (=default value).                 |
| Port for trend data: | Local TCP/IP port for the transfer of measured value trend data (area 1024 to 65535). The SQL proxy service connects to this automatically.<br>": 5211" describes the standard TCP/IP port (=default value). |

**Note****Assigning TCP/IP port numbers**

The default settings should be retained as far as possible.

If these need to be changed in order to meet company IT administration specifications, the user is responsible for ensuring that no collisions occur.

## 'Enabled Functions / MIS Data' section

The MIS data (upload function) of the 'SQL-Adapter' on the IOS side is configured here, i.e. which archives are to be transferred to the SQL DB Host.

| Parameter       | Target table in SQL DB 'SistarData'             |
|-----------------|-------------------------------------------------|
| Message archive | → sistar_rt_messages                            |
| Step protocols  | → sistar_rt_steps<br>→ sistar_rt_step_params    |
| Free protocols  | → sistar_rt_batchprot_params                    |
| Master recipes  | → sistar_eng_reccats<br>→ sistar_eng_recipes    |
| Batch archive   | → sistar_rt_batches<br>→ sistar_rt_batch_params |
| Change log      | → sistar_rt_changelog                           |
| Unit history    | → sistar_rt_unit_history                        |
| Tank history    | → sistar_rt_tank_history                        |
| Batch reports   | → sistar_rt_batchprot_data                      |

In addition to this setting the corresponding archives must also be activated on the SQL DB Host side for 'Siemens Sistar Archiver' (see section Archiver configuration and diagnostics (Page 20)).



In the delivery state or in the case of a new installation, all archive types are enabled with the exception of the "Tank history".

### 'MES API Functions' section

The individual functions of the API can be enabled / disabled on the IOS server.

| Parameter          | Description                             |
|--------------------|-----------------------------------------|
| CreateBatch        | Enable Create batches                   |
| DeleteBatch        | Enable Delete batches                   |
| SetBatchParameters | Enable Set batch parameters             |
| SetBatchSize       | Enable Set batch size                   |
| SetBatchStartData  | Enable Set batch start time/start event |
| SetBatchStatus     | Enable Set batch status                 |

In the delivery state or in the case of a new installation and licensed option, all MES API functions are enabled.

If a locked function is called by the API, the call is blocked by the SQL adapter and acknowledged with a corresponding error ID.

→ For more information, please refer to section Summary (Page 55)

### 'MES API Options'

→ see section Validity checks in the MES API (Page 58)

### *3.1 Activation of functions*

## Proxy Manager

### 4.1 Proxy manager

#### Calling the Proxy Manager

The application is called using the following Windows Start menu:

'Start→All Programs→Siemens Automation→BRAUMAT/SISTAR SQL Proxy Manager'

#### Dialog window of the application

This dialog window displays the currently connected IOS stations and the status of the XML queue. The dialog also provides further views in which you can assign additional unit names and IDs for a higher-level system and configure the measured values to be archived.

**Configuration overview**

**Attached sites and areas**

| Site | Site Name          | Area | Area Name         | IOS-A | IOS-A Name     | Status  | IOS-B | IOS-B Name | Status | Last Upload                |
|------|--------------------|------|-------------------|-------|----------------|---------|-------|------------|--------|----------------------------|
| 2    | BRAUMAT Systemtest | 3    | ASSET-AREA 3      | 6     | w7ux64fueNB    | Offline |       |            |        |                            |
| 3    | Brewery V7         | 1    | Production AREA 1 | 1     | 8CLDev2IPC647C | Master  |       |            |        | 04.05.2015 16:29:34 +02:00 |

Queue-ID-Min:

Queue-ID-Max:

**Subscribers**

| Name         | Filter    | Queue-ID |
|--------------|-----------|----------|
| localhost_01 | BSXMPGTUV | 2314     |

Sistar Proxy: SQLSRV3:5501

| Command buttons                                                                   | Description                                                                                                                                      |
|-----------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|
|  | Same function as the "File / Settings" menu command                                                                                              |
|  | The proxy is currently not connected. Click the icon to connect the proxy                                                                        |
|  | The proxy connection is active.                                                                                                                  |
|  | Trigger 'Master Data Upload'.<br>The engineering data is uploaded from the master server to the SQL DB host <b>for the selected Site/ Area</b> . |

### "File / Settings" menu command

Opens the dialog for the definition of the TCP/IP address/port no. of the SQL proxy service. This setting is only relevant if the SQL proxy service and SQL proxy manager are running on different computers. Because this is usually not the case, you can retain the default setting Host = localhost here.

### "Overview" tab

This tab is split vertically into three sections:

#### Section 'Attached sites and areas'

This displays the list of connected IOS stations.

| Column      | Description                                                                                                                                   |
|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------|
| Site        | Site number                                                                                                                                   |
| Area        | Area number                                                                                                                                   |
| Area Name   | Area name                                                                                                                                     |
| IOS-A       | Number of the IOS-A. In the case of a redundant system, this is the IOS on which the ,sistar_adp.exe' coupling application was started first. |
| IOS-A-HOST  | Host name or IP address of the IOS-A (which was started first).                                                                               |
| Status      | Current state of IOS-A: 'Master', 'Standby' or 'Offline'                                                                                      |
| IOS-B       | Number of the redundant IOS-B. This is the IOS on which the ,sistar_adp.exe' coupling application was started second.                         |
| IOS-B-HOST  | Host name or IP address of the IOS-B (started second).                                                                                        |
| Status      | Current state of IOS-B: 'Master', 'Standby' or 'Offline'                                                                                      |
| Last Upload | Date/time of the most recent 'Master Data Upload' of this AREA                                                                                |

#### Section 'Queue ID-Min' / 'Queue ID-Max'

Displays the IDs of the queue entries.

| Column       | Description                      |
|--------------|----------------------------------|
| Queue-ID-Min | Lowest data set ID in the queue  |
| Queue-ID-Max | Highest data set ID in the queue |

### Section 'Subscribers'

Lists all clients that are logged on for receiving engineering and runtime data from the BRAUMAT IOS stations. Only the SQL archiver service is displayed in this system version.

| Column   | Description                                                                                                                                                        |
|----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Name     | Connection name                                                                                                                                                    |
| Filter   | Current filter list. Displays a list of abbreviations that indicate the telegrams received by the client. You configure it using 'SQL Service Configuration' tool. |
| Queue-ID | Current position of the queue read pointer. The position in the queue denotes the data set ID of the data set transmitted to the client most recently.             |

### 'Master Data Upload' dialog

Here you select the data categories that are to be uploaded for the site/area selected in the overview window. The selected categories are saved and are thus once again available for the subsequent sessions.

| Selection of options  | Description                                                                                                                               |
|-----------------------|-------------------------------------------------------------------------------------------------------------------------------------------|
| Upload all Data       | All engineering data is uploaded (→ identical to the corresponding function 'Master Data Upload' of the SistarAdapter on the IOS station) |
| Upload Selected Data: | Option of selective upload:                                                                                                               |

| Selection of options | Description                                                                                                                                                                                                                                                                                                                                                                                                 |
|----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Equipment            | <p>System configuration, target tables:</p> <p>sistar_eng_sites, sistar_eng_areas,<br/>sistar_eng_pcus, sistar_eng_units,<br/>sistar_eng_eops, sistar_eng_epars,<br/>sistar_eng_tanks</p> <p><b>Caution:</b></p> <p>see note "Dependency of engineering data on inventory telegrams of the tank inventory" in chapter Table description of engineering data (Page 65)/ section Table 'sistar_eng_tanks'</p> |
| Recipes              | <p>Recipe configuration, target tables:</p> <p>sistar_eng_reccats,<br/>sistar_eng_recipes,<br/>sistar_eng_ordercat_params</p>                                                                                                                                                                                                                                                                               |
| Materials            | <p>Material configuration, target tables:</p> <p>sistar_eng_materials,<br/>sistar_eng_matgroups</p>                                                                                                                                                                                                                                                                                                         |
| Tags                 | <p>Measured value configuration, target tables:</p> <p>sistar_eng_tags</p>                                                                                                                                                                                                                                                                                                                                  |
| Reset Data           | <ul style="list-style-type: none"> <li>• 1: The data records of the associated tables / areas are initially deleted and then created once again;</li> <li>• 0: Only new, changed data records are written</li> </ul> <p>Can be used to delete data no longer required (e.g. recipes were deleted).</p> <p>Default = 1 !</p>                                                                                 |

## "Units / Equipment" tab

Each unit can be additionally assigned a unit name and an equipment ID for a higher-level system. The information is entered in the "Public unit name" and "Public Equipment ID" columns of the view displayed here. The BRAUMAT unit name contained in step protocol telegrams received is transferred to the 'unit\_name' column of the 'sistar\_rt\_steps' table. The additional information configured here is transferred to the 'equipment\_name' and 'equipment\_id' columns.

| Overview Units/Equipment List of Tags Unit tags                                                          |      |      |     |      |              |                                  |                     |
|----------------------------------------------------------------------------------------------------------|------|------|-----|------|--------------|----------------------------------|---------------------|
|  <b>Unit properties</b> |      |      |     |      |              |                                  |                     |
|                                                                                                          | Site | Area | PCU | Unit | Unit name    | Public unit name                 | Public equipment ID |
| ▶                                                                                                        | 1    | 1    | 2   | 1    | S5_SEQU_1    | Site1\Area1\PCU002\S5_SEQU_1     | (null)              |
|                                                                                                          | 1    | 1    | 2   | 2    | S5_SEQU_2    | Site1\Area1\PCU002\S5_SEQU_2     | (null)              |
|                                                                                                          | 1    | 1    | 2   | 3    | S5_SEQU_3    | Site1\Area1\PCU002\S5_SEQU_3     | (null)              |
|                                                                                                          | 1    | 1    | 1   | 1    | Malzannahme  | Site1\Area1\PCU 001\Malzannahme  | (null)              |
|                                                                                                          | 1    | 1    | 1   | 2    | Malztrans    | Site1\Area1\PCU 001\Malztrans    | (null)              |
|                                                                                                          | 1    | 1    | 1   | 3    | Sel MBPF     | Site1\Area1\PCU 001\Sel MBPF     | (null)              |
|                                                                                                          | 1    | 1    | 1   | 4    | Millstar 1   | Site1\Area1\PCU 001\Millstar 1   | (null)              |
|                                                                                                          | 1    | 1    | 1   | 5    | Millstar 2   | Site1\Area1\PCU 001\Millstar 2   | (null)              |
|                                                                                                          | 1    | 1    | 1   | 6    | MBPF 01      | Site1\Area1\PCU 001\MBPF 01      | (null)              |
|                                                                                                          | 1    | 1    | 1   | 7    | MBPF 02      | Site1\Area1\PCU 001\MBPF 02      | (null)              |
|                                                                                                          | 1    | 1    | 1   | 8    | CaCl -> MBPF | Site1\Area1\PCU 001\CaCl -> MBPF | (null)              |
|                                                                                                          | 1    | 1    | 1   | 9    | Läuterbott   | Site1\Area1\PCU 001\Läuterbott   | (null)              |
|                                                                                                          | 1    | 1    | 1   | 10   | Läuter Para  | Site1\Area1\PCU 001\Läuter Para  | (null)              |
|                                                                                                          | 1    | 1    | 1   | 11   | Würzevorlauf | Site1\Area1\PCU 001\Würzevorlauf | (null)              |
|                                                                                                          | 1    | 1    | 1   | 12   | WPF          | Site1\Area1\PCU 001\WPF          | (null)              |
|                                                                                                          | 1    | 1    | 1   | 13   | Hopfen Dos   | Site1\Area1\PCU 001\Hopfen Dos   | (null)              |
|                                                                                                          | 1    | 1    | 1   | 14   | Whirlpool    | Site1\Area1\PCU 001\Whirlpool    | (null)              |
|                                                                                                          | 1    | 1    | 1   | 15   | Trubtank     | Site1\Area1\PCU 001\Trubtank     | (null)              |
|                                                                                                          | 1    | 1    | 1   | 16   | CIP Sudhaus  | Site1\Area1\PCU 001\CIP Sudhaus  | (null)              |
|                                                                                                          | 1    | 1    | 1   | 17   | CIP Aufsch   | Site1\Area1\PCU 001\CIP Aufsch   | (null)              |
|                                                                                                          | 1    | 1    | 1   | 18   | FT 01        | Site1\Area1\PCU 001\FT 01        | (null)              |
|                                                                                                          | 1    | 1    | 1   | 19   | FT 02        | Site1\Area1\PCU 001\FT 02        | (null)              |
|                                                                                                          | 1    | 1    | 1   | 20   | FT 03        | Site1\Area1\PCU 001\FT 03        | (null)              |
|                                                                                                          | 1    | 1    | 1   | 21   | FT 04        | Site1\Area1\PCU 001\FT 04        | (null)              |
|                                                                                                          | 1    | 1    | 1   | 22   | FT 05        | Site1\Area1\PCU 001\FT 05        | (null)              |
|                                                                                                          | 1    | 1    | 1   | 23   | FT 06        | Site1\Area1\PCU 001\FT 06        | (null)              |
|                                                                                                          | 1    | 1    | 1   | 24   | FT 07        | Site1\Area1\PCU 001\FT 07        | (null)              |

| Column                   | Description                                             |
|--------------------------|---------------------------------------------------------|
| Site / Area / PCU / Unit | Definition of the unit source                           |
| Unit name                | Unit name                                               |
| Public unit name         | Additional unit name (to be configured by the user).    |
| Public Equipment ID      | Additional equipment ID (to be configured by the user). |

| Command buttons                                                                   | Description                                                                                                                                                                                                                                             |
|-----------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | Delete line                                                                                                                                                                                                                                             |
|  | Insert line                                                                                                                                                                                                                                             |
|  | Save                                                                                                                                                                                                                                                    |
|  | Clear changes                                                                                                                                                                                                                                           |
|  | The entire table is filled by default with all units of all areas. The additional information is initialized as follows: <ul style="list-style-type: none"> <li>• Site ,\ Area name ,\ PCU name '\ Unit name</li> <li>• The ID remains blank</li> </ul> |
|  | Exporting the table to a file. Only the 'csv' type is supported.                                                                                                                                                                                        |

### 'List of Tags' tab

The SQL archiver service allows you to save selected measured values to the SQL server database. We recommend that you reduce your selection of measured values to the most important data in order to avoid recording large data volumes that will no longer be used in the future. This view is used to define the measured values to be archived.

In order to reduce network load, these values are called in blocks at the specified interval by the SQL proxy service on the IOS Trend Manager and saved in the 'sistar\_rt\_tag\_values' table. This interval relates to the period between two block transfers, not the period between two acquired measured values. The period between two acquired measured values is defined in the IOS measured value description list.

#### NOTICE

##### Measured value type

Only measured values with archive type '**batch**' (batch archive) or '**week**' (weekly archive) are supported here. Measurements of the 'Short-term archive' type are only present in the memory temporarily and cannot be transmitted.



Overview

Units/Equipment

List of Tags

Unit tags

Curve tag properties

|   | Site | Area | PCU | Tag | Tagname          | UoM  | Archive | Transmit                 | Interval |
|---|------|------|-----|-----|------------------|------|---------|--------------------------|----------|
| ▶ | 1    | 1    | 1   | 1   | 21_13_01TT01     | °C   | batch   | <input type="checkbox"/> | 0        |
|   | 1    | 1    | 1   | 2   | 21_12_01FV03     | %    | batch   | <input type="checkbox"/> | 0        |
|   | 1    | 1    | 1   | 3   | 21_12_01TT01     | °C   | batch   | <input type="checkbox"/> | 0        |
|   | 1    | 1    | 1   | 4   | 10_16_01LT01     | %    | batch   | <input type="checkbox"/> | 0        |
|   | 1    | 1    | 1   | 5   | 21_17_01LT02 mm  | mm   | batch   | <input type="checkbox"/> | 0        |
|   | 1    | 1    | 1   | 6   | 21_17_01P02 hl/h | HL/H | batch   | <input type="checkbox"/> | 0        |
|   | 1    | 1    | 1   | 7   | 21_17_01P03 hl/h | HL/H | batch   | <input type="checkbox"/> | 0        |
|   | 1    | 1    | 1   | 8   | 21_17_01LT01 HW  | mm   | batch   | <input type="checkbox"/> | 0        |
|   | 1    | 1    | 1   | 9   | 21_17_01TT02     | °C   | batch   | <input type="checkbox"/> | 0        |
|   | 1    | 1    | 1   | 10  | 21_17_01CD02     | ms   | batch   | <input type="checkbox"/> | 0        |
|   | 1    | 1    | 1   | 11  | 21_17_01TT01     | °C   | batch   | <input type="checkbox"/> | 0        |
|   | 1    | 1    | 1   | 12  | 21_17_01CD05     | %    | batch   | <input type="checkbox"/> | 0        |
|   | 1    | 1    | 1   | 13  | 21_16_01TT01     | °C   | batch   | <input type="checkbox"/> | 0        |
|   | 1    | 1    | 1   | 14  | 10_16_01P01 %    | %    | batch   | <input type="checkbox"/> | 0        |
|   | 1    | 1    | 1   | 29  | 21_17_01FT05     | ?    | batch   | <input type="checkbox"/> | 0        |
|   | 1    | 1    | 1   | 32  | Taktmarker       | sec  | week    | <input type="checkbox"/> | 0        |
|   | 1    | 1    | 1   | 33  | Minute           | min  | week    | <input type="checkbox"/> | 0        |
|   | 1    | 1    | 1   | 34  | Stunde           | h    | week    | <input type="checkbox"/> | 0        |
|   | 1    | 1    | 1   | 35  | Sekunde          | h    | week    | <input type="checkbox"/> | 0        |
|   | 1    | 1    | 1   | 43  | 10_16_01LT01     | hl   | batch   | <input type="checkbox"/> | 0        |
|   | 1    | 1    | 1   | 44  | 21_12_01LT01     | hl   | batch   | <input type="checkbox"/> | 0        |
|   | 1    | 1    | 1   | 45  | 21_13_01LT01     | hl   | batch   | <input type="checkbox"/> | 0        |
|   | 1    | 1    | 1   | 46  | 21_12_01TT01     | °C   | batch   | <input type="checkbox"/> | 0        |
|   | 1    | 1    | 1   | 47  | 21_13_01TT01     | °C   | batch   | <input type="checkbox"/> | 0        |

| Column                  | Description                                                                                                                                                           |
|-------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Site / Area / PCU / Tag | Definition of the measurement source                                                                                                                                  |
| Tag name                | Measured value name                                                                                                                                                   |
| UoM                     | Unit of the measured value                                                                                                                                            |
| Archive                 | Archive type of the IOS station: <ul style="list-style-type: none"> <li><b>batch</b> = Batch archive</li> <li><b>week</b> = Weekly archive</li> </ul>                 |
| Transmit                | Archive ID. Select this entry if the measured value is to be logged.                                                                                                  |
| Interval                | Call interval in seconds for requesting new values in blocks (range 0 to 32767). The shortest interval is 60 seconds, i.e. values < 60 are interpreted as 60 seconds. |

| Command buttons                                                                   | Description                                 |
|-----------------------------------------------------------------------------------|---------------------------------------------|
|  | Save                                        |
|  | Clear changes                               |
|  | Select all measured values for transmission |
|  | Select no measured values for transmission  |

### 'Unit/Tags' tab

In order to determine and visualize batch-related measurement value curves, it is necessary to assign the recorded measured values to one or several units. This assignment, as well as the recorded unit assignment by production batches in the ,sistar\_rt\_unit\_history' table, can be used to derive the batch relation of the measured values. The batch assignments are configured in the view shown below.

Overview | Units/Equipment | List of Tags | Unit tags

### Unit tag assignments

**Units**

| Site  | Area  | PCU     | Unit                           |
|-------|-------|---------|--------------------------------|
| Site1 | Area1 | PCU 001 | [01] Malzannahme               |
| Site1 | Area1 | PCU 001 | [02] Malztrans                 |
| Site1 | Area1 | PCU 001 | [03] Sel MBPF                  |
| Site1 | Area1 | PCU 001 | [04] Millstar 1                |
| Site1 | Area1 | PCU 001 | [05] Millstar 2                |
| Site1 | Area1 | PCU 001 | [06] MBPF 01                   |
| Site1 | Area1 | PCU 001 | [07] MBPF 02                   |
| Site1 | Area1 | PCU 001 | [08] CaCl <sub>2</sub> -> MBPF |
| Site1 | Area1 | PCU 001 | [09] L?uterbott                |
| Site1 | Area1 | PCU 001 | [10] L?uter Para               |
| Site1 | Area1 | PCU 001 | [11] W?rzevorlauf              |
| Site1 | Area1 | PCU 001 | [12] WPF                       |
| Site1 | Area1 | PCU 001 | [13] Hopfen Dos                |
| Site1 | Area1 | PCU 001 | [14] Whirlpool                 |
| Site1 | Area1 | PCU 001 | [15] Trubtank                  |
| Site1 | Area1 | PCU 001 | [16] CIP Sudhaus               |
| Site1 | Area1 | PCU 001 | [17] CIP Aufsich               |
| Site1 | Area1 | PCU 001 | [18] FT 01                     |
| Site1 | Area1 | PCU 001 | [19] FT 02                     |
| Site1 | Area1 | PCU 001 | [20] FT 03                     |
| Site1 | Area1 | PCU 001 | [21] FT 04                     |
| Site1 | Area1 | PCU 001 | [22] FT 05                     |
| Site1 | Area1 | PCU 001 | [23] FT 06                     |
| Site1 | Area1 | PCU 001 | [24] FT 07                     |
| Site1 | Area1 | PCU 001 | [25] FT 08                     |
| Site1 | Area1 | PCU 001 | [26] FT 09                     |
| Site1 | Area1 | PCU 001 | [27] FT 11                     |
| Site1 | Area1 | PCU 001 | [28] FT 12                     |

**Assigned tags**

| Tag                 | UoM |
|---------------------|-----|
| [0002] 21_12_01FV03 | %   |
| [0003] 21_12_01TT01 | °C  |
| [0009] 21_17_01TT02 | °C  |
| [0013] 21_16_01TT01 | °C  |

**Available tags (PCU 001)**

| Tag                     | UoM  |
|-------------------------|------|
| [0001] 21_13_01TT01     | °C   |
| [0002] 21_12_01FV03     | %    |
| [0003] 21_12_01TT01     | °C   |
| [0004] 10_16_01LT01     | %    |
| [0005] 21_17_01LT02     | mm   |
| [0006] 21_17_01P02 hl/h | HL/H |
| [0007] 21_17_01P03 hl/h | HL/H |
| [0008] 21_17_01LT01 Hw  | mm   |
| [0009] 21_17_01TT02     | °C   |
| [0010] 21_17_01CD02     | ms   |
| [0011] 21_17_01TT01     | °C   |
| [0012] 21_17_01CD05     | %    |
| [0013] 21_16_01TT01     | °C   |
| [0014] 10_16_01P01 %    | %    |
| [0029] 21_17_01FT05     | ?    |
| [0032] Taktmerker       | sec  |
| [0033] Minute           | min  |
| [0034] Stunde           | h    |
| [0035] Sekunde          | h    |
| [0043] 10_16_01LT01     | hl   |
| [0044] 21_12_01LT01     | hl   |
| [0045] 21_13_01LT01     | hl   |
| [0046] 21_12_01TT01     | °C   |
| [0047] 21_13_01TT01     | °C   |
| [0048] 21_17_01LT02     | hl   |
| [0049] 21_22_01LT02     | hl   |
| [0050] 21_26_01LT01     | hl   |
| [0051] 21_28_01LT01     | hl   |

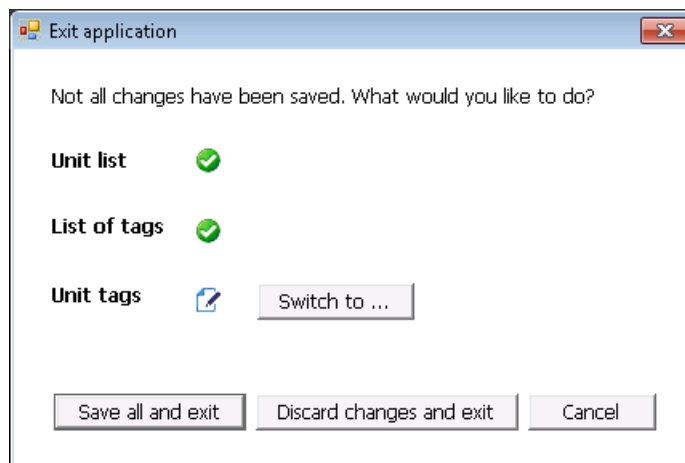
#### Procedure:

- You start by selecting a data set for the required PCU from the left pane.
- The right pane will then display a list of all measured values available for this PCU

- Assign the measured values by selecting these from the respective pane (multiple selection is possible).
- Complete or remove the assignment to this unit by clicking one of the directional buttons "<<" or ">>".
- Click "Save" to transfer the measured value assignments to the 'sistar\_eng\_unit\_tags' table.

## Exiting the application

You can use the "File / Exit" command to exit the Proxy Manager session. The program then checks whether changes made have been saved. If not, the following dialog appears:



| Symbol / Button          | Description                                             |
|--------------------------|---------------------------------------------------------|
| "Check mark" icon        | Changes made in the respective tabs were already saved. |
| "Memo" icon              | You have not yet saved all your changes                 |
| Switch to ...            | Jump to the respective tab                              |
| Save all and exit        | Save and exit the program                               |
| Discard changes and exit | Exit the program without saving your changes            |
| Cancel                   | Exit the dialog and continue your work                  |



# Master data upload

## 5.1 Master data upload

### Transfer of the configuration data

After completion of the system configuration (incl. the 'SQL adapter' option) as well as the recipe and order system, the configuration data must be transferred to the corresponding 'sistar\_eng\_xxxx' engineering tables of the SQL database.

In addition, the configuration data must be transferred to the SQL DB host every time a change is made.

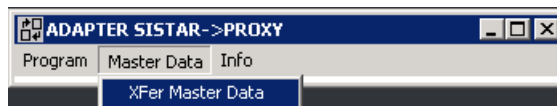
Changing the configuration means:

- Changes to the basic system configuration
- Changes to recipe categories
- Changes to master recipes
- Changes to master recipe parameters
- Changes to units
- Changes to BOPs
- Changes to DFMs
- Changes to tank data(stat), material data

### Master data upload, trigger via "SQL adapter" IOS application

To transfer the configuration data, follow these steps:

- Activate the SQL adapter window view by clicking the symbol in the taskbar.
- Select the command 'Master Data → XFer Master Data' in the menu bar.



After the prompt 'Start Master Data Upload ?' is confirmed again, the master data is uploaded to the XML queue of the SQL proxy service. The SQL archiver service reads this list and enters the

## 5.1 Master data upload

contents in the corresponding `sistar_eng_xxx` engineering tables in the "Engineering data" group.

---

### Note

- In the case of an upload, all data is always transferred (system data and recipes, etc.).
  - If the upload is initiated by a standby IOS, an additional message box is displayed.
  - It may take up to 5 seconds for the dialog box to respond. This is normal, because the SQL-Adapter communicates constantly with the SQL proxy service (waiting for commands).
- 

### Master data upload, trigger via SQL DB host application "SQL Proxy Manager"

- The upload function can also be initiated in the SQL Proxy Manager **on the SQL DB host itself**.
- The data categories "Equipment", "Recipes", "Materials" and "Tags" can also be selected individually for the upload. In addition, writing to the tables can take place with or without prior delete (see chapter Proxy manager (Page 35)).
- The trigger for upload is always forwarded to the master IOS.

## Problems with master data changes at a later time

---

### Note

#### Changes to recipe master data for existing RT batch data

- There is no versioning or history when the master data (`sistar_eng_***` engineering tables) is updated, which means, for example, that each data set for an order parameter with the relevant definitions (position, name, type, unit, limits) exists only once in the database and will be overwritten each time it is changed in the process control system and during a subsequent master data upload.
- The runtime tables `sistar_rt_***` are written during runtime (batch name, parameter name, position and values, etc.). However, not all current parameter information is transferred to the runtime tables. For batch parameters, for example, the name and value exist but not type and limits.
- In addition, the parameter position is an important assignment criterion between RT and engineering tables. This is true for the step protocols as well as the batch reports.
- If these definitions are now changed during process control system engineering, for example, new parameters are inserted or parameter limits are changed, these changes act on all batches that already exist in the runtime table. Any reports that are created later may produce incorrect results for batches that were run previously.

#### The following applies, in general:

- **It is the user's responsibility to avoid such configuration changes if the acquired batch data is still needed.**
  - When you wish to make this type of fundamental change, one solution is to introduce a new recipe category with new parameters, units of measurement and limits.
  - Generally speaking, you should only add such parameter assignments in engineering, but never modify or delete existing ones.
  - Names of recipes, plant units, etc. are never used as unique identifiers. They can be changed at any time because identification is always possible by means of unique instance IDs.
  - It is generally recommended that only instance IDs be used as identifiers in higher-level systems (MIS/MES/ERP).
  - We also recommend that you do not change the instance names after commissioning, because the non-unique and non-constant names may be used for reporting.
-





# Material events

## 6.1 Material events

### Material movements

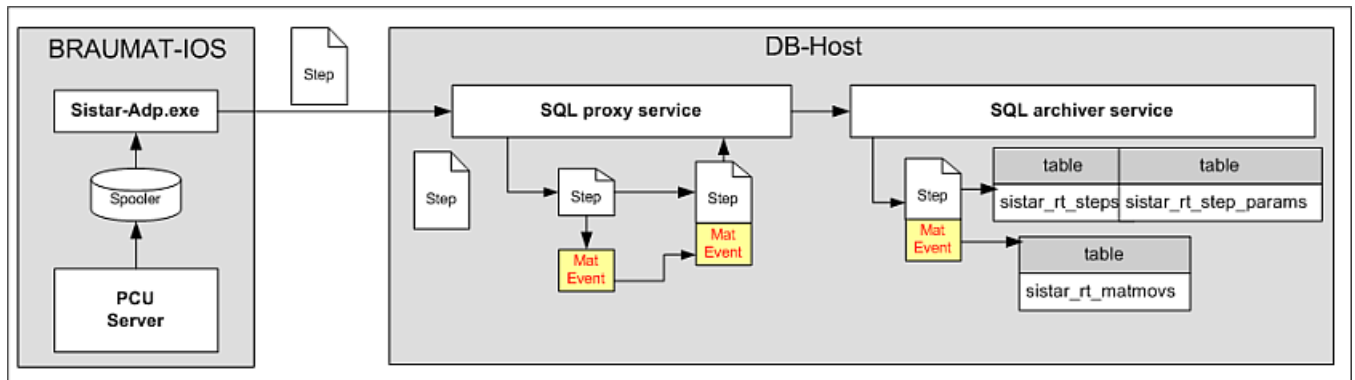
A material event describes the transfer of material from a unit or tank/silo to a different unit or tank/silo. Each material transfer contains at least information about the:

- Quantity
- Material
- Source
- Destination

Material events are usually derived from step protocols. In principle, the customer defines which step protocol entries contain the material events. Nonetheless, a function has been integrated in the SQL proxy service that is capable of filtering out material events from special predefined step protocol entries.

### Overview

The diagram in the following figure demonstrates the sequence:



### Description of the sequence:

- The Sistar adapter in the IOS server sends a step protocol telegram to the DB host.
- The SQL proxy service in the DB host checks whether the telegram contains a step protocol entry that conforms to the conventions for a material event.
- If this is the case, an additional XML fragment is added to the step protocol telegram.

- The extended step protocol telegram is transmitted to the SQL archiver service.
- The SQL archiver service decodes the telegram and saves the segments to the following separate tables:
  - 'sistar\_rt\_steps' → contains the header data of all step protocol entries
  - 'sistar\_rt\_step\_params' → contains the parameters for the step protocol entries
  - 'sistar\_rt\_matmovs' → contains the extracted material movement data of the step protocol entries

For a detailed description of these runtime tables, refer to chapter Table description of runtime data (Page 79).

The following section describes the requirements for the configuration of the recipe elements EOPs / TOPs and EPARs / DFM that are necessary to detect material movement steps, as well as the extraction and transfer of the DFM values to the material movement table.

## Step protocol requirements

- Material movement steps must have a defined EOP name, e.g. starting with "MOVE\_". However, this name prefix is user-selectable and is defined in the 'BRAUMAT/SISTAR SQL Service Configuration' configuration tool.

---

### Note

#### Changing the EOP name

Any change to the EOP name prefix will only be effective after the SQL proxy service is terminated once and restarted.

For reasons of consistency, the EOP name prefix should no longer be changed in the tables after commissioning.

---

The EOP names are determined from the naming convention "<Prefix><Extension>" (max 16 characters). The following alternatives apply to the extension:

- Alternative 1:  
The movement type – i.e. putting in storage, removing from storage or transfer – is defined by the **EOP name** "<Prefix><Type>". The following rules must be observed:
  - <Type> = "IN..." → putting into storage
  - <Type> = "OUT..." → removing from storage
  - <Type> = "THROUGH..." or "<Type> = "THRU..." → Transfer
 (e.g. putting into storage: "MOVE\_IN"; removing from storage: "MOVE\_OUT", Transfer: "MOVE\_THROUGH" or "MOVE\_THRU")
- Alternative 2:  
Here also the EOP name starts with the <Prefix>, the movement type is defined by the **content of a DFM** with the name 'mov\_evt\_type'. The actual DFM value 'mov\_evt\_type.AV' must also be made up of the combination "<Prefix><Type>". In this case, the EOP name extension (<Extension>, see above) is not evaluated.
  - 'mov\_evt\_type.AV' = "<Prefix>IN..." → putting into storage
  - 'mov\_evt\_type.AV' = "<Prefix>OUT..." → removing from storage
  - 'mov\_evt\_type.AV' = "<Prefix>THROUGH..." or "<Prefix>THRU..." → Transfer

Certain requirements must be met in the material movement EOP for the DFM name, actual value (AV), setpoint (SP), and unit of measurement (UoM) parameters so that these can be extracted and properly entered in the data set of the 'sistar\_rt\_matmovs' table. The following table describes the DFM name for each material movement type and the transfer to the data set fields.

- The values in pointed brackets ("<...>") define the general parameters that are transferred independently of the DFMs for the EOP that triggers the material movement.
- The comment field contains information on the specification value if the DFM is missing.

| Type IN<br><Standard parameter><br>or<br>DFM name | Type OUT<br><Standard parameter><br>or<br>DFM name | Type THRU / THROUGH<br><Standard parameter><br>or<br>DFM name | Transfer to<br>sistar_rt_matmovs | Comment                                   |
|---------------------------------------------------|----------------------------------------------------|---------------------------------------------------------------|----------------------------------|-------------------------------------------|
| <Site>                                            | <Site>                                             | <Site>                                                        | site_no                          |                                           |
| <Area>                                            | <Area>                                             | <Area>                                                        | area_no                          |                                           |
| <PCU-No>                                          | <PCU-No>                                           | <PCU-No>                                                      | pcu_no                           |                                           |
| <UnitID>                                          | <UnitID>                                           | <UnitID>                                                      | unit_no                          |                                           |
| <Year>                                            | <Year>                                             | <Year>                                                        | year_no                          |                                           |
| <RecipeType>                                      | <RecipeType>                                       | <RecipeType>                                                  | ordercat_no                      |                                           |
| <Order>                                           | <Order>                                            | <Order>                                                       | order_no                         |                                           |
| <Batch>                                           | <Batch>                                            | <Batch>                                                       | batch_no                         |                                           |
| <EopName> or<br>mov_evt_type.AV                   | <EopName> or<br>mov_evt_type.AV                    | <EopName> or<br>mov_evt_type.AV                               | event_type                       | *1) For details, see below                |
| <Gop_Nr>                                          | <Gop_Nr>                                           | <Gop_Nr>                                                      | eop_no                           |                                           |
| <StartTime>                                       | <StartTime>                                        | <StartTime>                                                   | start_time                       |                                           |
| <EndTime>                                         | <EndTime>                                          | <EndTime>                                                     | end_time                         |                                           |
| <Duration-SP>                                     | <Duration-SP>                                      | <Duration-SP>                                                 | monitoring_time                  |                                           |
| <Duration-AV>                                     | <Duration-AV>                                      | <Duration-AV>                                                 | duration                         |                                           |
| mat_id.AV                                         | mat_id.AV                                          | mat_id.AV                                                     | mat_id                           | Default = 0                               |
| mat_name.AV                                       | mat_name.AV                                        | mat_name.AV                                                   | mat_name                         | Default = " "                             |
| quantity.SP                                       | quantity.SP                                        | quantity.SP                                                   | quantity_setpoint                | Default = " "                             |
| quantity.AV                                       | quantity.AV                                        | quantity.AV                                                   | quantity_actval                  | Default = " "                             |
| quantity.UoM                                      | quantity.UoM                                       | quantity.UoM                                                  | uom                              | Default = " "                             |
| <StartTime>                                       | <StartTime>                                        | <StartTime>                                                   | move_start_time                  | Default = 0<br>*2) For details, see below |
| <EndTime>                                         | <EndTime>                                          | <EndTime>                                                     | move_end_time                    | Default = 0<br>*3) For details, see below |
| mov_dur_time.SP                                   | mov_dur_time.SP                                    | mov_dur_time.SP                                               | move_duration_setpoint           | Default = 0                               |
| mov_dur_time.AV                                   | mov_dur_time.AV                                    | mov_dur_time.AV                                               | move_duration_actval             | Default = 0                               |

## 6.1 Material events

| Type IN<br><Standard parameter><br>or<br>DFM name | Type OUT<br><Standard parameter><br>or<br>DFM name | Type THRU / THROUGH<br><Standard parameter><br>or<br>DFM name | Transfer to<br><b>sistar_rt_matm<br/>ovs</b> | Comment                                            |
|---------------------------------------------------|----------------------------------------------------|---------------------------------------------------------------|----------------------------------------------|----------------------------------------------------|
| mov_offset_time.AV                                | mov_offset_time.AV                                 | mov_offset_time.AV                                            | (See "Note" below)                           |                                                    |
| <site>                                            | <site>                                             | <site>                                                        | dest_site_no                                 | Default = 0                                        |
| <area>                                            | dest_area_no.AV                                    | dest_area_no.AV                                               | dest_area_no                                 | Default = 0<br>*4) For details, see below          |
| <PCU-No>                                          | dest_pcu_no.AV                                     | dest_pcu_no.AV                                                | dest_pcu_no                                  | Default = 0<br>*4) For details, see below          |
| <UnitID>                                          | dest_unit_no.AV                                    | dest_unit_no.AV                                               | dest_unit_no                                 | Default = 0<br>*4) For details, see below          |
| <Year>                                            | dest_year_no.AV                                    | dest_year_no.AV                                               | dest_year_no                                 | Default = NULL (SQL)<br>*4) For details, see below |
| <RecipeType>                                      | dest_reccat_no.AV                                  | dest_reccat_no.AV                                             | dest_ordercat_no                             | Default = NULL (SQL)<br>*4) For details, see below |
| <Order>                                           | dest_order_no.AV                                   | dest_order_no.AV                                              | dest_order_no                                | Default = NULL (SQL)<br>*4) For details, see below |
| <Batch>                                           | dest_batch_no.AV                                   | dest_batch_no.AV                                              | dest_batch_no                                | Default = NULL (SQL)<br>*4) For details, see below |
| <site>                                            | <site>                                             | <site>                                                        | src_site_no                                  | Default = 0                                        |
| src_area_no.AV                                    | <Area>                                             | src_area_no.AV                                                | src_area_no                                  | Default = 0<br>*4) For details, see below          |
| src_pcu_no.AV                                     | <PCU-No>                                           | src_pcu_no.AV                                                 | src_pcu_no                                   | Default = 0<br>*4) For details, see below          |
| src_unit_no.AV                                    | <UnitID>                                           | src_unit_no.AV                                                | src_unit_no                                  | Default = 0<br>*4) For details, see below          |
| src_year_no.AV                                    | <Year>                                             | src_year_no.AV                                                | src_year_no                                  | Default = NULL (SQL)<br>*4) For details, see below |
| src_reccat_no.AV                                  | <RecipeType>                                       | src_reccat_no.AV                                              | src_ordercat_no                              | Default = NULL (SQL)<br>*4) For details, see below |
| src_order_no.AV                                   | <Order>                                            | src_order_no.AV                                               | src_order_no                                 | Default = NULL (SQL)<br>*4) For details, see below |

| Type IN<br><Standard parameter><br>or<br>DFM name | Type OUT<br><Standard parameter><br>or<br>DFM name | Type THRU / THROUGH<br><Standard parameter><br>or<br>DFM name | Transfer to<br><b>sistar_rt_matm<br/>ovs</b> | Comment                                            |
|---------------------------------------------------|----------------------------------------------------|---------------------------------------------------------------|----------------------------------------------|----------------------------------------------------|
| src_batch_no.AV                                   | <Batch>                                            | src_batch_no.AV                                               | src_batch_no                                 | Default = NULL (SQL)<br>*4) For details, see below |
| mov_usr_par1.SP                                   | mov_usr_par1.SP                                    | mov_usr_par1.SP                                               | usr_par1_sp                                  | Default = NULL (SQL)                               |
| mov_usr_par1.AV                                   | mov_usr_par1.AV                                    | mov_usr_par1.AV                                               | usr_par1_av                                  | Default = NULL (SQL)                               |
| mov_usr_par1.UoM                                  | mov_usr_par1.UoM                                   | mov_usr_par1.UoM                                              | usr_par1_uom                                 | Default = NULL (SQL)                               |
| mov_usr_par2.SP                                   | mov_usr_par2.SP                                    | mov_usr_par2.SP                                               | usr_par2_sp                                  | Default = NULL (SQL)                               |
| mov_usr_par2.AV                                   | mov_usr_par2.AV                                    | mov_usr_par2.AV                                               | usr_par2_av                                  | Default = NULL (SQL)                               |
| mov_usr_par2.UoM                                  | mov_usr_par2.UoM                                   | mov_usr_par2.UoM                                              | usr_par2_uom                                 | Default = NULL (SQL)                               |

**Note****Further details on the individual table values**

- Movement type
  - event\_type = <Prefix>IN
  - event\_type = <Prefix>OUT
  - event\_type = <Prefix>THRU/THROUGH
  - The Type can be extended at the end in each case with user-specific strings. However, these are filtered out and are not transferred to the event\_type column.
- Start time of the material movement EOP  
The start time is calculated according to the DFM 'move\_dur\_time'
  - move\_start\_time = <StartTime> if move\_dur\_time.SP = 0 or move\_dur\_time.AV = 0 or DFM nor present
  - move\_start\_time = <StartTime> + mov\_offset\_time.AV if move\_dur\_time.SP > 0 and move\_dur\_time.AV > 0
  - If DFM 'mov\_offset\_time' is not present, the value 0 is used.
- End time of the material movement EOP  
The end time is calculated according to the DFM 'move\_dur\_time'
  - move\_end\_time = <EndTime> if move\_dur\_time.SP = 0 or move\_dur\_time.AV = 0 or DFM nor present
  - move\_end\_time = <StartTime> + mov\_offset\_time.AV + mov\_dur\_time.AV if move\_dur\_time.SP > 0 and move\_dur\_time.AV > 0
  - If DFM 'mov\_offset\_time' is not present, the value 0 is used.
- Higher priority of DFM values compared to standard parameters
  - If DFMs are also configured for standard parameters for the respective movement type, these are used instead of the standard parameters for the table entry; that is, they have a higher priority.



## 7.1 Summary

### Fundamentals

For planning and releasing production batches by a higher-level MES, the "MES API" optional package with the programming interface described below is provided.

The .NET class library contained in it supports, for example, the implementation of an MES client application based on C# or VB (.NET) by a system integrator.

A command is sent to the 'SQL-proxy service' by calling one of the following methods.

1. CreateBatch - Creating a new batch
2. DeleteBatch - Deleting a batch while it is still running
3. SetBatchSize - Setting/changing the batch size
4. SetBatchStartMode - Setting/changing the batch start type and time
5. SetBatchStatus - Changing the batch status
6. SetBatchParameters - Setting/changing the batch parameters

After an initial validity check of the transferred parameters, a corresponding command is forwarded to the SQL adapter of the active IOS server. Another validity check takes place and, in case of a positive result, the order system processes the batch. If the result of the validity check is negative, a corresponding error code is returned via the MES API.

The individual functions of the MES API can be enabled / disabled on the IOS server (see Activation of functions (Page 31) section MES API Functions).

The further display and tracking of the batches created via the MES API can be done in the same way as for batches created directly in the order system:

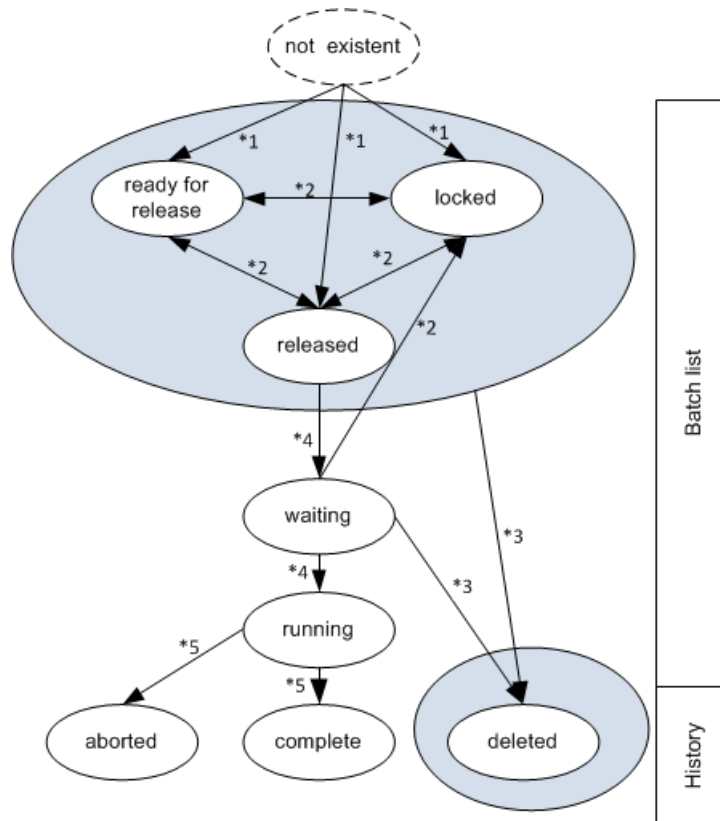
- in the "Batch Management" application in the "Order list", "Batch list" and "History" views
- in the "sistar\_rt\_batches", "sistar\_rt\_batch\_params", SQL tables when the "Batch data" category is enabled in "MIS Data" - Configuration.

### Applications:

- Production is planned on a higher-level MES and forwarded to the process control system for processing (= release on MES).
- The download status of the production job is also displayed on the MES, which means the operator can receive information on whether or not the download was successful.
- This feedback can take place at almost the same time as the planning.

### Explanation of the batch status and the status transitions

The graphic below provides a summary of the batch statuses of the process control system and the permitted status transitions:



- The highlighted area shows the status transitions that can be accessed by the MES API.
- These are the states: "ReadyForRelease", "Released", "Locked", "Deleted" (→DeleteBatch)
- The other batch statuses are exclusively managed by the process control system or its operator.
- Any API calls and status transitions that are not permitted are signaled as error code in the MES API.



### Explanation of the status transitions in interaction with the process control system order system

| Action | Description                                                                                                                                                                                                                                                                                    |
|--------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| *1     | MES-API::CreateBatch <ul style="list-style-type: none"> <li>BatchStatus = Locked</li> <li>BatchStatus = ReadyForRelease</li> <li>BatchStatus = Released</li> </ul>                                                                                                                             |
| *2     | MES-API::SetBatchState <ul style="list-style-type: none"> <li>BatchStatus = Locked</li> <li>BatchStatus = ReadyForRelease</li> <li>BatchStatus = Released</li> </ul> <b>The "released" or "waiting" status can only be exited with the option button "Set batch status after release=true"</b> |
| *3     | MES-API::DeleteBatch <p><b>Batches in status "released" or "waiting" can only be deleted with the option button "Set batch status after release=true"</b></p>                                                                                                                                  |
| *4     | IOS batch scheduler                                                                                                                                                                                                                                                                            |
| *5     | PCU batch system                                                                                                                                                                                                                                                                               |

### Application notes

#### The following general conditions are in effect for use:

- Planning of production orders takes place in batches, which means the higher-level system is responsible for dividing a production order into batches that can be produced.
- If order parameters are defined in the order category, these can be downloaded by the higher-level system as batch parameters or changed at a later time.
- An API call is generally executed synchronously and the result is returned with the return value. This means that there is no need for an "event interface".
- A transfer cycle of 3 seconds for individual API commands is in effect for the runtimes of the API calls** incl. feedback
- Multiple API clients are supported, for example, for multiple AREAs
- MES release of the order category (order input/attribute "Higher-level system")  
This functionality is available in the process control system ("Baliedit" application). Standard operators cannot plan any more batches for this 'order category'. This lock can be temporarily suspended by authorized operators.
- Locking of specific order categories for API calls is not possible.

#### Note

Batches created via the API have their start time in the future. The actual batch start is only signaled by the RT table (MIS/Upload function). The API does not contain an interface for this purpose.

## 7.2 Validity checks in the MES API

### Fundamentals

The MES API is marketed as a stand-alone product, which means as an open standard interface. Therefore, the API methods themselves or lower-level server functions must ensure a sufficient degree of security, system/data integrity, and compliance with technological automation standards.

This requirement is taken into account by the following configuration and control mechanisms:

1. The general system behavior in relation to the enabled functions of the MES API can be adjusted by means of the "Configure SQL adapter" dialog in the system configuration (see section Activation of functions (Page 31)).  
The default setting of all switches in this case = ON → All API functions have been released.
2. The following error scenarios are generally protected against by means of integrated validity checks of the MES API:  
Logical errors (access to deleted objects, deletion of running batches, etc.)  
Other errors (syntax / semantics such as faulty string syntax, call sequence, etc.)  
Checking of system value limits

To cover project-specific differences and liberties in handling the MES interface, the configuration parameters described below are available in the "Configure SQL adapter" dialog regarding the validity checks of the MES API.

Here, too, the default setting of all switches = ON → behavior is similar to the process control system application "Batch management".

### 'MES API Options' section

| Parameter                             | Description                                                                                                                                                                                                                                                                                                                          |
|---------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Check parameter values                | 0 = Do not check order parameters for limits<br>1 = Check order parameters for limits                                                                                                                                                                                                                                                |
| Check recipe status                   | 0 = Allow creation of batches for MREC/RP status ≠ 'released'<br>1 = Disable creation of batches for MREC/RP status ≠ 'released'<br>Due to the different use cases and system-specific meaning of "disabled", you can use this setting option to decide if batches can be created or not for locked recipes by means of the MES API. |
| Set parameter after release<br>*1)    | 0 = Disable setting of parameters for released batches<br>1 = Allow setting of parameters for released batches                                                                                                                                                                                                                       |
| Set batch status after release<br>*1) | 0 = Lock setting of batch status for released batches<br>1 = Allow for setting of batch status for released batches                                                                                                                                                                                                                  |

| Parameter                               | Description                                                                                            |
|-----------------------------------------|--------------------------------------------------------------------------------------------------------|
| Batch status 'Ready for release'<br>*1) | 0 = Target state "Ready for release" is available<br>1 = Target state "Ready for release" is available |
| Batch status 'Released'<br>*1)          | 0 = Target state "Released" not available<br>1 = Target state "Released" is available                  |

**CAUTION****\*1) Option for intervention in production**

The functions SetBatchParameter() and SetBatchStatus() allow the MES to intervene directly in production.

If this is not desired for security reasons, you can choose for the higher-level system to only plan the batches but for the operator at the IOS to retain sole control over release/start as well as interaction with running batches and for the MES not to have access to production.

**Validity check for 'CreateBatch'**

The special rules described below apply to the following call parameters:

**Batch parameters '*parameterList*':**

- '*useDefaultParameterValues*' = **true** : All batch parameters that are not transferred are set to the default values configured in the process control system ("*<proj-path>\bali\oparadef.ini*").
- '*useDefaultParameterValues*' = **false** : All batch parameters that are not transferred are set to =0

**Batch size '*size*':**

- '*useDefaultSize*' = **true** : The batch size is set to the nominal batch size (overwrites the transfer parameter, which can be 0).
- '*useDefaultSize*' = **false** : The value from the transfer parameter is used.

**Line number '*line*':**

- A validity check is performed for line and path recipes regarding valid/configured lines or streams
- The line number must always be preset to 1 for non-line recipes.
- Other values are rejected with error code 'EC\_INVALID\_RECIPELINE'.

**Note****'*line*' parameter in stream recipes**

Line = StreamNo + 10000 !!!

Example: 12 streams (1 ... 12) are defined for a recipe procedure. This means only the values Line = 10001, 10002, ... 10012 are valid in the 'CreateBatch' call.

→ Other values are rejected with error code 'EC\_INVALID\_RECIPELINE'.

**Order number 'order' and batch number 'batch'**

These must be managed by the MES independently, which means the batch generation defined for the order category is not taken into consideration.

**Validity check for 'SetBatchSize', 'SetBatchStatus', SetBatchStartData and 'SetBatchParameters'**

The following rules apply to these API calls:

- The following changes are possible as long as the batch has not been released yet (status= "Locked", "ReadyForRelease"):
  - Setting of batch size
  - Setting of batch status "Locked", "ReadyForRelease", "Released"
  - Setting of start mode "Immediate", "StartTime", "ByEvent", "StartTimeAuto"
  - Setting of planned start time (only makes sense when Startmode = "StartTime")
  - Setting of batch parameters
- If option button "Set batch status after release" is set:
  - Status can still be changed in the status "Released", "Waiting"
- If option button "Set parameter after release" is set:
  - Parameter / start mode / start time and batch size can still be changed in status "Released", "Waiting".

(Depending on the recipe progress, the change may not take effect)

**Validity check for 'DeleteBatch'**

- As long as a batch has not been released yet (status= "Locked", "ReadyForRelease"): Delete is possible.
- If option button "Set batch status after release" is set: Delete is still possible in status "Released", "Waiting".

## 7.3 API calls in the change log

### Core statement

All MES API calls are logged on the process control system side in the change log of the IOS server.

The change log is transferred back to the SQL table "SistarData/sistar\_rt\_changelog" with the standard method (MIS data upload). As a result, both the batch commands initiated via the MES API and the further processing by the order system are available for evaluation purposes.

The table below includes a description of the change log entries for the MES API calls.

**Table ,sistar\_rt\_changelog'**

| Column         | Log entry                                                                                                             |
|----------------|-----------------------------------------------------------------------------------------------------------------------|
| site_no        | ✓                                                                                                                     |
| area_no        | ✓                                                                                                                     |
| event_time     | ✓                                                                                                                     |
| addcounter     | ✓                                                                                                                     |
| log_type       | ✓                                                                                                                     |
| user_name      | "SistarAPI"                                                                                                           |
| ios_no         | 0                                                                                                                     |
| ios_name       | <computername SQL-DB Host>                                                                                            |
| pcu_no         | 0                                                                                                                     |
| pcu_name       | -                                                                                                                     |
| block_type     | 255                                                                                                                   |
| block_no       | 0                                                                                                                     |
| dw_no          | 0                                                                                                                     |
| bit_no         | 0                                                                                                                     |
| unit_no        | 0                                                                                                                     |
| unit_name      | <empty>                                                                                                               |
| class_name     | "Batch"                                                                                                               |
| instance_no    | 1                                                                                                                     |
| instance_name  | <recproc_name>                                                                                                        |
| attribute_name | <empty>                                                                                                               |
| reccat_no      | ✓                                                                                                                     |
| reccat_name    | ✓                                                                                                                     |
| year_no        | ✓                                                                                                                     |
| order_no       | ✓                                                                                                                     |
| batch_no       | ✓                                                                                                                     |
| value_old      | ✓                                                                                                                     |
| value_new      | ✓                                                                                                                     |
| description    | API-Call:<br>"CreateBatch", "DeleteBatch", "SetBatchSize", SetBatchStartMode", "SetBatchStatus", "SetBatchParameters" |

✓ = corresponding actual value is entered

## 7.4 Notes on use

### Fundamentals

The following implementation rules are predefined by the .NET technology:

- The API is supplied as .NET Assembly (DLL) and has an assembly version and a file version (e.g.: 7.0.1.0).
- Any reference made by a client refers to exactly one assembly version.
- As soon as the assembly version changes, the client must be compiled again to use the new version.
- Alternative: The client keeps the old assembly.

Consequences:

- The API receives its own internal version that is handed over to the proxy with each order.
- The proxy checks the version and rejects invalid versions.
- Permitted versions may be operated differently.

### Distribution and update behavior

The "Siemens.Sistar.Api.dll" is installed with the setup in the "Windows Global Assembly Cache GAC". This is the central location for Windows shared assemblies for all clients and also enables versioning.

---

#### Note

**No installation of the "Siemens.Sistar.Api.dll" in the local user directory.**

Because updates / fixes of the "Siemens.Sistar.Api.dll" are also distributed via product setup, this DLL must not be installed in a local path by the client application (as is frequently the case in the .NET environment). The client application would still load its local, outdated version.

For this reason the "Siemens.Sistar.Api.dll" must NOT be supplied by the client application! (→ **NOT redistributable**)

---

#### Use case 1: Update without interface change (error correction only):

- Assembly version should not change
- File version is updated
- Clients do not have to be adapted

#### Use case 2: Update with interface change (continued development):

- Assembly version and file version change
- All clients that want to use the new version must be compiled again
- Incompatibilities are signaled during the process and must be corrected by the user in the client

## Requirements on the MES client application

- The MES API connects via "Winsockets" exclusively by means of "localhost" to the local SQL proxy server.
- The user account under which the client application is running does not require any special permission for the MES API.
- For access of the client application to the SQL tables, the corresponding rights have to be set up in the SQL server administration.
- Multiple instances of the API classes in one process or in multiple processes are possible

## API documentation

With installation of the "MES API" option package, detailed programming documentation is made available in the EN language:

- As a general Windows chm help file "...<program files>\Siemens\Sistar\_SQL\help\SiemensSistarApi.chm"
- As a Microsoft Visual Studio help file "...<program files>\Siemens\Sistar\_SQL\help\SiemensSistarApi.msha / ...cab"  
Installation in Microsoft Visual Studio is performed manually with the menu function "HELP / Add and remove Help content". For the further procedure, please consult the Microsoft Visual Studio documentation.

## Safety instructions

| NOTICE                                                                                                                                                                                                                                                                                                                                                                     |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>The safety instructions in the system documentation apply to all computers of the automation group:</b></p> <ul style="list-style-type: none"><li>• Partitioning of the network segment in which the IOS servers including the SQL host computer are located using a firewall or similar</li><li>• Recommendations for the different system configurations</li></ul> |





## Table descriptions

### 8.1 Table description of engineering data

#### Description of the engineering tables

The tables described here contain all configuration data for the overall plant that is relevant to the recipe and order system. A unique key identifies each data set and the corresponding batch. This key (also known as "primary key") contains one or more of the following components:

- Site number
- Area number
- PCU number (Simatic controller)
- Unit number
- EOP (basic operation)
- TAG (measured value)

The following sections provide detailed information about the tables. The table columns belonging to the primary key are identified by the **'PK'** acronym in the "Attributes" column.

#### Table 'sistar\_eng\_areas'

This table contains the areas defined in the system. Each IOS server (or redundant IOS server pair) represents an area.

Table 8-1 Data management

|                                |                                                                                                                                |
|--------------------------------|--------------------------------------------------------------------------------------------------------------------------------|
| Data source / parameterization | Configuration: <ul style="list-style-type: none"> <li>• Area settings</li> </ul>                                               |
| Update event                   | Sistar-Adapter / menu command "Master Data → XFer Master Data"<br>'SQL Proxy Manager' / button "Initialize Master Data Upload" |
| Update mode                    | INSERT<br>UPDATE                                                                                                               |

Table 8-2 Data structure

| Columns          | Data type (length) | Attributes   | Comment              |
|------------------|--------------------|--------------|----------------------|
| site_no          | smallint           | PK, not null | Site number          |
| area_no          | smallint           | PK, not null | Area number          |
| area_name        | nvarchar (32)      | null         | Area name            |
| update_timestamp | datetime           | null         | Time of change (UTC) |

## 8.1 Table description of engineering data

**Table 'sistar\_eng\_eops'**

This table contains the equipment operations of the system (basic data of the step protocol) that were configured in the recipe system.

Table 8-3 Data management

|                                |                                                                                                                                |
|--------------------------------|--------------------------------------------------------------------------------------------------------------------------------|
| Data source / parameterization | 'Recipe editor' / Configuration:<br>• Edit EOP definition                                                                      |
| Update event                   | Sistar-Adapter / menu command "Master Data → XFer Master Data"<br>'SQL Proxy Manager' / button "Initialize Master Data Upload" |
| Update mode                    | INSERT<br>UPDATE                                                                                                               |

Table 8-4 Data structure

| Columns          | Data type (length) | Attributes   | Comment                                                                                              |
|------------------|--------------------|--------------|------------------------------------------------------------------------------------------------------|
| site_no          | smallint           | PK, not null | Site number                                                                                          |
| area_no          | smallint           | PK, not null | Area number                                                                                          |
| pcu_no           | Int                | PK, not null | PCU number assigned to the unit                                                                      |
| eop_no           | Int                | PK, not null | Basic operation ID                                                                                   |
| eop_name         | nvarchar (32)      | null         | Basic operation name                                                                                 |
| eop_type         | nvarchar (32)      | null         | Basic operation type, valid values:<br>• normal-operation<br>• dose-operation<br>• alternative-prod. |
| update_timestamp | datetime           | null         | Time of change (UTC)                                                                                 |

**Table 'sistar\_eng\_epars'**

This table contains the equipment parameters that are configured in the recipe system (= DFMs, digital function modules) and defined by means of equipment operation.

Table 8-5 Data management

|                                |                                                                                                                                |
|--------------------------------|--------------------------------------------------------------------------------------------------------------------------------|
| Data source / parameterization | 'Recipe editor' / Configuration<br>• Edit EOP definition<br>• Edit setpoint definition                                         |
| Update event                   | Sistar-Adapter / menu command "Master Data → XFer Master Data"<br>'SQL Proxy Manager' / button "Initialize Master Data Upload" |
| Update mode                    | INSERT<br>UPDATE                                                                                                               |

Table 8-6 Data structure

| Columns          | Data type (length) | Attributes   | Comment                                                                                                                                    |
|------------------|--------------------|--------------|--------------------------------------------------------------------------------------------------------------------------------------------|
| site_no          | smallint           | PK, not null | Site number                                                                                                                                |
| area_no          | smallint           | PK, not null | Area number                                                                                                                                |
| pcu_no           | int                | PK, not null | PCU number assigned to the unit                                                                                                            |
| eop_no           | int                | PK, not null | Basic operation ID                                                                                                                         |
| epar_pos         | smallint           | PK, not null | DFM position (1 to 24)                                                                                                                     |
| epar_no          | nvarchar (12)      | not null     | DFM number in the PCU                                                                                                                      |
| epar_name        | nvarchar (32)      | not null     | DFM name                                                                                                                                   |
| epar_type        | nvarchar (16)      | null         | DFM type, valid values: <ul style="list-style-type: none"> <li>• 16 bits</li> <li>• 32 bits</li> <li>• Setpoint</li> <li>• Text</li> </ul> |
| uom              | nvarchar (16)      | null         | DFM unit                                                                                                                                   |
| range_minimum    | float              | null         | Range of values minimum                                                                                                                    |
| range_maximum    | float              | null         | Range of values maximum                                                                                                                    |
| unit_no          | int                | PK, not null | Assigned unit number<br>=0 if no unit assignment                                                                                           |
| update_timestamp | datetime           | null         | Time of change (UTC)                                                                                                                       |

**Table 'sistar\_eng\_matgroups'**

This table contains the material groups configured in the recipe system.

Table 8-7 Data management

|                                |                                                                                                                                |
|--------------------------------|--------------------------------------------------------------------------------------------------------------------------------|
| Data source / parameterization | 'Recipe editor' / Configuration <ul style="list-style-type: none"> <li>• Material management / Materials and groups</li> </ul> |
| Update event                   | Sistar-Adapter / menu command "Master Data → XFer Master Data"<br>'SQL Proxy Manager' / button "Initialize Master Data Upload" |
| Update mode                    | INSERT<br>UPDATE                                                                                                               |

Table 8-8 Data structure

| Columns       | Data type (length) | Attributes   | Comment               |
|---------------|--------------------|--------------|-----------------------|
| site_no       | smallint           | PK, not null | Site number           |
| area_no       | smallint           | PK, not null | Area number           |
| matgroup_id   | int                | PK, not null | Material group number |
| matgroup_name | nvarchar (32)      | null         | Material group name   |

## 8.1 Table description of engineering data

| Columns          | Data type (length) | Attributes | Comment                |
|------------------|--------------------|------------|------------------------|
| comment          | nvarchar (64)      | null       | Material group comment |
| update_timestamp | datetime           | null       | Time of change (UTC)   |

**Table 'sistar\_eng\_materials'**

This table contains the materials configured in the recipe system.

Table 8-9 Data management

|                                |                                                                                                                                |
|--------------------------------|--------------------------------------------------------------------------------------------------------------------------------|
| Data source / parameterization | 'Recipe editor' / Configuration<br>• Material management / Materials and groups                                                |
| Update event                   | Sistar-Adapter / menu command "Master Data → XFer Master Data"<br>Sistar Proxy Manger / button "Initialize Master Data Upload" |
| Update mode                    | INSERT<br>UPDATE                                                                                                               |

Table 8-10 Data structure

| Columns          | Data type (length) | Attributes   | Comment              |
|------------------|--------------------|--------------|----------------------|
| site_no          | smallint           | PK, not null | Site number          |
| area_no          | smallint           | PK, not null | Area number          |
| material_id      | int                | PK, not null | Material number      |
| material_name    | nvarchar (32)      | null         | Material name        |
| comment          | nvarchar (64)      | null         | Material comment     |
| update_timestamp | datetime           | null         | Time of change (UTC) |

**Table 'sistar\_eng\_ordercat\_params'**

This table contains the batch order parameters that are configured in the order system and defined by order category.

Table 8-11 Data management

|                                |                                                                                                                                |
|--------------------------------|--------------------------------------------------------------------------------------------------------------------------------|
| Data source / parameterization | 'Batch list' / Configuration<br>• Order categories / Order parameters                                                          |
| Update event                   | Sistar-Adapter / menu command "Master Data → XFer Master Data"<br>'SQL Proxy Manager' / button "Initialize Master Data Upload" |
| Update mode                    | INSERT<br>UPDATE                                                                                                               |

## 8.1 Table description of engineering data

Table 8-12 Data structure

| Columns          | Data type (length) | Attributes   | Comment                                                                                                                                                                                                   |
|------------------|--------------------|--------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| site_no          | smallint           | PK, not null | Site number                                                                                                                                                                                               |
| area_no          | smallint           | PK, not null | Area number                                                                                                                                                                                               |
| ordercat_no      | int                | PK, not null | Order category number                                                                                                                                                                                     |
| param_pos        | smallint           | PK, not null | Order parameter position, 1 to N                                                                                                                                                                          |
| param_name       | nvarchar (32)      | null         | Unique identification of the parameter.<br>The naming convention is 'OP###_N'<br><ul style="list-style-type: none"> <li>### = Order category number</li> <li>N = Parameter index (= param_pos)</li> </ul> |
| param_type       | nvarchar(16)       | null         | Parameter type, valid values: <ul style="list-style-type: none"> <li>String</li> <li>Int</li> <li>Double</li> </ul>                                                                                       |
| param_length     | smallint           | null         | Maximum length of a parameter. <ul style="list-style-type: none"> <li>string → Number of characters</li> <li>int → Number of digits</li> <li>double → Number of digits, including "-".</li> </ul>         |
| param_precision  | smallint           | null         | Decimal places parameter; for param_type: <ul style="list-style-type: none"> <li>int or string → '0'</li> <li>double → Number of decimal places</li> </ul>                                                |
| display_name     | nvarchar(32)       | null         | Name of the order parameter in the order parameter definition                                                                                                                                             |
| uom              | nvarchar(16)       | null         | Measured value unit                                                                                                                                                                                       |
| range_minimum    | float              | null         | Range of values minimum                                                                                                                                                                                   |
| range_maximum    | float              | null         | Range of values maximum                                                                                                                                                                                   |
| default_value    | nvarchar(80)       | null         | Default for order parameters. Used for initialization when batches are created.                                                                                                                           |
| update_timestamp | datetime           | null         | Time of change (UTC)                                                                                                                                                                                      |

## 8.1 Table description of engineering data

**Table 'sistar\_eng\_pcus'**

This table contains the PCUs (Process Control Units) defined in the system. Several PCUs may be assigned to the same IOS server.

Table 8-13 Data management

|                                |                                                                                                                                |
|--------------------------------|--------------------------------------------------------------------------------------------------------------------------------|
| Data source / parameterization | Configuration:<br>• PCU settings                                                                                               |
| Update event                   | Sistar-Adapter / menu command "Master Data → XFer Master Data"<br>Sistar Proxy Manger / button "Initialize Master Data Upload" |
| Update mode                    | INSERT<br>UPDATE                                                                                                               |

Table 8-14 Data structure

| Columns          | Data type (length) | Attributes   | Comment              |
|------------------|--------------------|--------------|----------------------|
| site_no          | smallint           | PK, not null | Site number          |
| area_no          | smallint           | PK, not null | Area number          |
| pcu_no           | int                | PK, not null | PCU number           |
| pcu_name         | nvarchar (32)      | null         | PCU name             |
| update_timestamp | datetime           | null         | Time of change (UTC) |

**Table 'sistar\_eng\_reccats'**

This table contains the recipe and order categories defined in the system. A recipe category is comparable to a formula category.

Table 8-15 Data management

|                                |                                                                                                                                |
|--------------------------------|--------------------------------------------------------------------------------------------------------------------------------|
| Data source / parameterization | 'Recipe editor' / Shortcut menu of area<br>• New recipe category<br>'Batch list' / Configuration<br>• Order categories         |
| Update event                   | Sistar-Adapter / menu command "Master Data → XFer Master Data"<br>'SQL Proxy Manager' / button "Initialize Master Data Upload" |
| Update mode                    | INSERT<br>UPDATE                                                                                                               |

Table 8-16 Data structure

| Columns          | Data type (length) | Attributes   | Comment                                                                                                                                                               |
|------------------|--------------------|--------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| site_no          | smallint           | PK, not null | Site number                                                                                                                                                           |
| area_no          | smallint           | PK, not null | Area number                                                                                                                                                           |
| reccat_no        | int                | PK, not null | Recipe category number                                                                                                                                                |
| reccat_name      | nvarchar(32)       | null         | Recipe category name                                                                                                                                                  |
| ordercat_no      | int                | null         | Order category number<br>Usually identical to the recipe category number                                                                                              |
| ordercat_name    | nvarchar(32)       | null         | Order category name<br>Usually identical to the recipe category name                                                                                                  |
| uom              | nvarchar(16)       | null         | Unit for batch size                                                                                                                                                   |
| bom              | nvarchar(3)        | null         | Identifies whether or not a process input list is assigned to the recipe type. Valid values:<br><ul style="list-style-type: none"> <li>• yes</li> <li>• no</li> </ul> |
| line_no          | smallint           | null         | Production line number                                                                                                                                                |
| update_timestamp | datetime           | null         | Time of change (UTC)                                                                                                                                                  |

**Table 'sistar\_eng\_recipes'**

This table contains the master recipes defined in the recipe system.

Table 8-17 Data management

|                                |                                                                                                                                |
|--------------------------------|--------------------------------------------------------------------------------------------------------------------------------|
| Data source / parameterization | 'Recipe editor' / File / New<br><ul style="list-style-type: none"> <li>• Master recipe</li> </ul>                              |
| Update event                   | Sistar-Adapter / menu command "Master Data → XFer Master Data"<br>'SQL Proxy Manager' / button "Initialize Master Data Upload" |
| Update mode                    | INSERT<br>UPDATE                                                                                                               |

Table 8-18 Data structure

| Columns     | Data type (length) | Attributes   | Comment                  |
|-------------|--------------------|--------------|--------------------------|
| site_no     | smallint           | PK, not null | Site number              |
| area_no     | smallint           | PK, not null | Area number              |
| reccat_no   | int                | PK, not null | Recipe category number   |
| recipe_no   | int                | PK, not null | Master recipe number     |
| recipe_name | nvarchar (32)      | null         | Master recipe short name |

## 8.1 Table description of engineering data

| Columns          | Data type (length) | Attributes | Comment                                                                |
|------------------|--------------------|------------|------------------------------------------------------------------------|
| recipe_long_name | nvarchar (64)      | null       | Master recipe long name; used for visualization                        |
| nominal_size     | float              | null       | Nominal batch size that is created based on this master recipe.        |
| recproc_no       | int                | null       | Number of the recipe procedure that is assigned to this master recipe. |
| recproc_name     | nvarchar (32)      | null       | Recipe procedure name                                                  |
| product_id       | int                | null       | Product ID                                                             |
| create_user      | nvarchar (32)      | null       | Name of the operator who created the recipe.                           |
| create_time      | datetimeoffset(3)  | null       | Date/time of recipe creation                                           |
| update_user      | nvarchar (32)      | null       | Name of the operator who made the last change                          |
| update_time      | datetimeoffset(3)  | null       | Date/time of last modification                                         |
| update_timestamp | datetime           | null       | Time of change (UTC)                                                   |

## Table 'sistar\_eng\_sites'

This table contains the sites defined in the system. A site is identified by its ID and name. Usually, only one data set is stored in this table. All SQL tables use the site ID as first element of the primary key.

Table 8-19 Data management

|                                |                                                                                                                                |
|--------------------------------|--------------------------------------------------------------------------------------------------------------------------------|
| Data source / parameterization | Configuration:<br>• Site settings                                                                                              |
| Update event                   | Sistar-Adapter / menu command "Master Data → XFer Master Data"<br>Sistar Proxy Manger / button "Initialize Master Data Upload" |
| Update mode                    | INSERT<br>UPDATE                                                                                                               |

Table 8-20 Data structure

| Columns          | Data type (length) | Attributes   | Comment              |
|------------------|--------------------|--------------|----------------------|
| site_no          | smallint           | PK, not null | Site number          |
| site_name        | nvarchar (32)      | null         | Site name            |
| update_timestamp | datetime           | null         | Time of change (UTC) |



**Table 'sistar\_eng\_tags'**

This table contains the analog and digital measured values (= tags) that are configured in the system. The measured values archived in the 'sistar\_rt\_tag\_values' form a subset thereof. The measured values to be archived are defined using the 'SQL proxy manager' tool.

|                                                                                                                                                                                                                                                             |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>NOTICE</b>                                                                                                                                                                                                                                               |
| <b>Measured value type</b><br><br>Only measured values of the <b>batch archive</b> or <b>weekly archive</b> type are supported. Measured values of the <b>short-term archive</b> type are only present in the memory temporarily and cannot be transmitted. |

Table 8-21 Data management

|                                |                                                                                                                                |
|--------------------------------|--------------------------------------------------------------------------------------------------------------------------------|
| Data source / parameterization | 'Trending definition' <ul style="list-style-type: none"> <li>Table analog / digital measured values</li> </ul>                 |
| Update event                   | Sistar-Adapter / menu command "Master Data → XFer Master Data"<br>'SQL Proxy Manager' / button "Initialize Master Data Upload" |
| Update mode                    | INSERT<br>UPDATE                                                                                                               |

Table 8-22 Data structure

| Columns       | Data type (length) | Attributes   | Comment                                                                                                                                                                                         |
|---------------|--------------------|--------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| tag_id        | int                | PK, not null | Unique ID for all sites and areas in the format: 'nnnnnaa' <ul style="list-style-type: none"> <li>nnnnn = area_no * 10000 + sis-tar_tag_id</li> <li>aa = Site number (ASCII code)</li> </ul>    |
| site_no       | smallint           | not null     | Site number                                                                                                                                                                                     |
| area_no       | smallint           | not null     | Area number                                                                                                                                                                                     |
| pcu_no        | int                | not null     | PCU number                                                                                                                                                                                      |
| sistar_tag_no | int                | not null     | Measured value ID of the server IOS; unique for each area <ul style="list-style-type: none"> <li>1 to 1200 for analog measured values</li> <li>1 to 2400 for digital measured values</li> </ul> |
| tag_name      | nvarchar(32)       | null         | Measured value name                                                                                                                                                                             |
| range_minimum | float              | null         | Range of values minimum                                                                                                                                                                         |
| range_maximum | float              | null         | Range of values maximum                                                                                                                                                                         |
| uom           | nvarchar(16)       | null         | Unit for measured value                                                                                                                                                                         |

## 8.1 Table description of engineering data

| Columns          | Data type (length) | Attributes | Comment                                                                                                                                                    |
|------------------|--------------------|------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| archive          | nvarchar(16)       | null       | Archive type for saving the measured values. Valid values: <ul style="list-style-type: none"> <li>• short-term</li> <li>• week</li> <li>• batch</li> </ul> |
| actual_time      | datetimeoffset(3)  | null       | For the transmission of curve measured values, this column contains the time stamp of the most recently received measured value.                           |
| actual_value     | float              | null       | For the transmission of curve measured values, this column contains the most recently received measured value.                                             |
| actual_status    | smallint           | null       | For the transmission of curve measured values, this column contains the most recently received status of the measured value (0 → invalid, 1 → valid).      |
| update_timestamp | datetime           | null       | Time of change (UTC)                                                                                                                                       |

## Table 'sistar\_eng\_tanks'

This table includes the activated tanks (**PCU V7 or higher** / TANK class, global parameter "DS\_Count", default 128).

Table 8-23 Data management

|                                |                                                                                                                                |
|--------------------------------|--------------------------------------------------------------------------------------------------------------------------------|
| Data source / parameterization | 'Parameter assignment' / TANK class                                                                                            |
| Update event                   | Sistar-Adapter / menu command "Master Data → XFer Master Data"<br>'SQL Proxy Manager' / button "Initialize Master Data Upload" |
| Update mode                    | INSERT<br>UPDATE                                                                                                               |

**Note****Dependency of engineering data on inventory telegrams of the tank inventory**

The following instance data is only available with enabled tank inventory telegrams in the tank configuration. The update takes place according to the inventory telegrams configured in the TANK instances.

(refer to section Table description of runtime data (Page 79)

Table ,sistar\_rt\_tank\_history':

- unit\_no, unit\_name
- tank\_type\_no, tank\_type\_name
- tank\_group\_no, tank\_group\_name
- quantity\_uom
- location\_id

Table 8-24 Data structure

| Columns          | Data type (length) | Attributes   | Comment                         |
|------------------|--------------------|--------------|---------------------------------|
| site_no          | smallint           | PK, not null | Site number                     |
| area_no          | smallint           | PK, not null | Area number                     |
| pcu_no           | int                | PK, not null | PCU number assigned to the unit |
| tank_no          | int                | PK, not null | Tank number<br>(1 ... 128)      |
| tank_name        | nvarchar (32)      | null         | Tank name                       |
| unit_no          | int                | null         | Assigned unit<br>(1 ... 128)    |
| unit_name        | nvarchar (32)      | null         | Unit name                       |
| tank_type_no     | int                | null         | Tank type number                |
| tank_type_name   | nvarchar (32)      | null         | Tank type name                  |
| tank_group_no    | int                | null         | Tank group number               |
| tank_group_name  | nvarchar (32)      | null         | Tank group name                 |
| quantity_uom     | nvarchar (16)      | null         | Quantity - Unit                 |
| location_id      | int                | null         | RCS location                    |
| update_timestamp | datetime           | null         | Time of change (UTC)            |

**Table 'sistar\_eng\_unit\_tags'**

In order to determine and visualize batch-related measurement value curves, it is necessary to assign the recorded measured values to one or several units. The batch relation of the measured values can be derived from this assignment, as well as from the unit assignments recorded in the 'sistar\_rt\_unit\_history' table.

Table 8-25 Data management

|                                |                                                                         |
|--------------------------------|-------------------------------------------------------------------------|
| Data source / parameterization | 'SQL Proxy Manager' 'Unit tags' tab<br>• Assigned tags ⇔ Available tags |
| Update event                   | 'SQL Proxy Manager' 'Unit tags' tab<br>• 'Save' command button          |
| Update mode                    | INSERT<br>UPDATE                                                        |

Table 8-26 Data structure

| Columns          | Data type (length) | Attributes   | Comment                         |
|------------------|--------------------|--------------|---------------------------------|
| site_no          | smallint           | PK, not null | Site number                     |
| area_no          | smallint           | PK, not null | Area number                     |
| pcu_no           | int                | PK, not null | PCU number assigned to the unit |
| unit_no          | int                | PK, not null | Unit ID                         |
| tag_id           | int                | PK, not null | Measured value ID               |
| update_timestamp | datetime           | null         | Time of change (UTC)            |

## 8.1 Table description of engineering data

**Table 'sistar\_eng\_units'**

This table contains the units configured in the recipe system.

Table 8-27 Data management

|                                |                                                                                                                                |
|--------------------------------|--------------------------------------------------------------------------------------------------------------------------------|
| Data source / parameterization | 'Recipe editor' / Configuration<br>• Process cell data                                                                         |
| Update event                   | Sistar-Adapter / menu command "Master Data → XFer Master Data"<br>Sistar Proxy Manger / button "Initialize Master Data Upload" |
| Update mode                    | INSERT<br>UPDATE                                                                                                               |

Table 8-28 Data structure

| Columns          | Data type (length) | Attributes   | Comment                               |
|------------------|--------------------|--------------|---------------------------------------|
| site_no          | smallint           | PK, not null | Site number                           |
| area_no          | smallint           | PK, not null | Area number                           |
| pcu_no           | int                | PK, not null | PCU number assigned to the unit       |
| unit_no          | int                | PK, not null | Unit number in the range from 1 to 64 |
| unit_name        | nvarchar (32)      | null         | Unit name                             |
| update_timestamp | datetime           | null         | Time of change (UTC)                  |

**[BS\_PM\_Connector] table 'bpc\_eng\_settings'**

This table contains the setting parameters for the data transfer from "SistarData" to the data storage of the PM options by the BRAUMAT/SISTAR PM-Connector.

The parameters are preset during activation via the "Add" command and normally do not have to be changed.

Changes may require an additional change on the PM side so that the transfer can take place as intended.

Table 8-29 Data structure

| Columns         | Data type (length) | Attributes   | Comment                           |
|-----------------|--------------------|--------------|-----------------------------------|
| parameter_id    | int                | PK, not null | Identifier                        |
| parameter_name  | nvarchar(64)       | not null     | Name of the adjustable parameter  |
| parameter_value | nvarchar(max)      | not null     | Value of the adjustable parameter |
| comment         | nvarchar(max)      | null         | Comment                           |

## 8.1 Table description of engineering data

The following adjustable parameters are supported in the current version of the system:

| Identifier | Parameter name                 | Parameter value                                        | Comment                                                                                                                                          |
|------------|--------------------------------|--------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|
| 50         | logging_enabled                | 1                                                      | Set this (1) if you want logging enabled. Logs will be written to table bpc_rt_log                                                               |
| 51         | logging_trigger_enabled        | 1                                                      | (1) Enable / (0) Disable trigger logging                                                                                                         |
| 52         | logging_sproc_enabled          | 1                                                      | (1) Enable / (0) Disable stored procedure logging                                                                                                |
| 53         | logging_log_level              | 0                                                      | (0) verbose (everything)<br>(1) no debug<br>(2) no info/debug<br>(3) no info/debug/warning, only errors                                          |
| 54         | logging_delete_days            | 99                                                     | Set the number of days for keeping the log entries. Once this time has elapsed, the log files will be deleted.                                   |
| 55         | delete_logging_entries_enabled | 1                                                      | Set to 1 if you want to get rid of old logging entries.<br>(0) disable deletion                                                                  |
| 64         | spooler_delete_days            | 99                                                     | Set the number of days for keeping the log entries. Once this time has elapsed, the spooler entries will be deleted.                             |
| 65         | delete_from_spooler_enabled    | 1                                                      | Set to 1 if you want to delete spooler entries<br>(0) disable deletion                                                                           |
| 66         | spooler_delete_only_sent_data  | 1                                                      | Set (1) if only sent entries should be deleted. Set (0) all entries that are older are deleted.                                                  |
| 74         | BRAUMAT_delete_days            | 99                                                     | Set the number of days for keeping the BRAUMAT runtime data entries. Once this time has elapsed, the BRAUMAT data will be deleted in SistarData. |
| 75         | delete_from_BRAUMAT_enabled    | 1                                                      | Set (1) if you want to delete BRAUMAT runtime data entries<br>(0) disable deletion                                                               |
| 1001       | TIST_path_batches              | %programdata<br>%lsiemens\SIS-TAR_SQL\PM-TIST\BATCHES  | Target path for batch data<br>(NOT USED) (B)                                                                                                     |
| 1002       | TIST_path_procedures           | %programdata<br>%lsiemens\SIS-TAR_SQL\PM-TIST\PROCS    | Target path for procedure data (P)                                                                                                               |
| 1003       | TIST_path_steps                | %programdata<br>%lsiemens\SIS-TAR_SQL\PM-TIST\STEPS    | Target path for step data (S)                                                                                                                    |
| 1004       | TIST_path_mat_movs             | %programdata<br>%lsiemens\SIS-TAR_SQL\PM-TIST\MAT_MOVS | Target path for material movement data (M)                                                                                                       |

## 8.1 Table description of engineering data

| Identifier | Parameter name                 | Parameter value                                            | Comment                                                                                             |
|------------|--------------------------------|------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|
| 1005       | TIST_path_messages             | %programdata<br>%\\siemens\SIS-TAR_SQLIPM-TIST\MESSAGES    | Target path for messages and alarms (A)                                                             |
| 1006       | TIST_path_changelog            | %programdata<br>%\\siemens\SIS-TAR_SQLIPM-TIST\CHANGE-LOG  | Target path for change log data (C)                                                                 |
| 1007       | TIST_path_trends               | %programdata<br>%\\siemens\SIS-TAR_SQLIPM-TIST\TRENDS      | Target path for trend data (T)                                                                      |
| 1008       | TIST_path_tanks                | %programdata<br>%\\siemens\SIS-TAR_SQLIPM-TIST\TANKS       | Target path for tank data (V)                                                                       |
| 1009       | TIST_path_kops                 | %programdata<br>%\\siemens\SIS-TAR_SQLIPM-TIST\KOPS        | Target path for KOP data (K)                                                                        |
| 1010       | TIST_path_onlineTags           | %programdata<br>%\\siemens\SIS-TAR_SQLIPM-TIST\ONLINE-TAGS | Target path for online tag data (O)                                                                 |
| 5003       | CSVGEN_trend_force_unique_name | 0                                                          | (1) Force the generation of a unique trend name by concatenating sister tag id and sister tag name. |

## 8.2 Table description of runtime data

### Description of the runtime tables

The runtime tables are used to store process data that is generated in the process control system during batch processing. A unique key identifies each batch-related data set and the corresponding batch. This key (also known as "primary key") contains the following components:

- Site number
- Area number
- Year
- Order number
- Batch number
- Recipe category number

The following sections provide detailed information about the tables. The table columns belonging to the primary key are identified by the 'PK' acronym in the "Attributes" column.

Certain columns of the runtime tables have a relation to corresponding columns of the same name in the engineering tables that represent the configuration data. These assignments are defined in the following table:

| Column in 'sistar_rt_xxxx' | Engineering table          |
|----------------------------|----------------------------|
| site_no                    | sistar_eng_sites           |
| area_no                    | sistar_eng_areas           |
| unit_no                    | sistar_eng_units           |
| pcu_no                     | sistar_eng_pcus            |
| eop_no                     | sistar_eng_eops            |
| epar_no                    | sistar_eng_epars           |
| reccat_no                  | sistar_eng_reccats         |
| param_name                 | sistar_eng_ordercat_params |
| recipe_no                  | sistar_eng_recipes         |
| tag_id                     | sistar_eng_tags            |

### Table ,sistar\_rt\_batches'

The table contains information about the batches created in the system.

#### References to other tables

- The primary key consisting of the site\_no, area\_no, year\_no, reccat\_no, order\_no, batch\_no references the corresponding data sets in the tables
  - 'sistar\_rt\_batch\_params'
  - ,sistar\_rt\_batchprot\_data'
  - ,sistar\_rt\_batchprot\_params'

## 8.2 Table description of runtime data

Table 8-30 Data management

|                                      |                                                                                                                 |
|--------------------------------------|-----------------------------------------------------------------------------------------------------------------|
| Configuration / SQL adapter settings | 'Batch archive' = active                                                                                        |
| SQL archiver service settings        | 'Batch data' = active                                                                                           |
| Update event                         | <b>One</b> data set is generated in this table with each new batch. This data set is updated at batch run-time. |
| Update mode                          | INSERT<br>UPDATE (actual_status, batch_size, actual_xxx_time...)                                                |

Table 8-31 Data structure

| Columns       | Data type (length) | Attributes   | Comment                                                                                                                                                                                                                                                                           |
|---------------|--------------------|--------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| site_no       | smallint           | PK, not null | Site number                                                                                                                                                                                                                                                                       |
| area_no       | smallint           | PK, not null | Area number                                                                                                                                                                                                                                                                       |
| year_no       | smallint           | PK, not null | Year of creation, 4-digit (YYYY)                                                                                                                                                                                                                                                  |
| reccat_no     | int                | PK, not null | Recipe category number                                                                                                                                                                                                                                                            |
| order_no      | int                | PK, not null | Order number                                                                                                                                                                                                                                                                      |
| batch_no      | int                | PK, not null | Batch number                                                                                                                                                                                                                                                                      |
| actual_status | nvarchar(16)       | null         | Current batch status. Valid values: <ul style="list-style-type: none"> <li>• Created</li> <li>• Locked</li> <li>• ReadyForRelease</li> <li>• Waiting</li> <li>• Released</li> <li>• Running</li> <li>• Complete</li> <li>• Aborted</li> <li>• Deleted</li> <li>• Error</li> </ul> |
| batch_size    | float              | null         | Batch size                                                                                                                                                                                                                                                                        |
| ordercat_name | nvarchar(32)       | null         | Order category name                                                                                                                                                                                                                                                               |
| reccat_name   | nvarchar(32)       | null         | Recipe category name                                                                                                                                                                                                                                                              |
| recipe_no     | int                | null         | Recipe number                                                                                                                                                                                                                                                                     |
| recipe_name   | nvarchar(32)       | null         | Recipe short name                                                                                                                                                                                                                                                                 |
| recproc_no    | int                | null         | Recipe procedure number                                                                                                                                                                                                                                                           |
| line_no       | int                | null         | Number of the production line to be used for the allocation.                                                                                                                                                                                                                      |
| product_id    | int                | null         | Product                                                                                                                                                                                                                                                                           |
| product_name  | nvarchar(32)       | null         | Product name                                                                                                                                                                                                                                                                      |
| start_pcu_no  | int                | null         | PCU number                                                                                                                                                                                                                                                                        |
| start_unit_no | int                | null         | Unit number                                                                                                                                                                                                                                                                       |



## 8.2 Table description of runtime data

| Columns            | Data type (length) | Attributes | Comment                                                                                                                                                      |
|--------------------|--------------------|------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|
| start_mode         | nvarchar(16)       | null       | Start mode of the batch. Valid values: <ul style="list-style-type: none"> <li>• Immediate</li> <li>• Starttime</li> <li>• Event</li> <li>• ByTime</li> </ul> |
| planned_start_time | datetimeoffset(3)  | null       | Planned start time for the batch. This is only used for start mode 'Starttime'                                                                               |
| actual_start_time  | datetimeoffset(3)  | null       | Actual start time of the currently running batch. This time is derived from the start time of the first step received for this batch.                        |
| actual_end_time    | datetimeoffset(3)  | null       | Actual end time of the current batch. This time is derived from the end time of the last step received for this batch.                                       |
| insert_timestamp   | datetime           | null       | Creation time of the data set in the SQL proxy service in UTC                                                                                                |
| update_timestamp   | datetime           | null       | Time of last change to the data set in the SQL proxy service in UTC                                                                                          |
| user_data          | int                | null       | Can be used as required by the user                                                                                                                          |

**Table ,sistar\_rt\_batch\_params'**

The table contains information about the batch order parameters created for each batch.

**References to other tables**

- The header information of the corresponding batch is stored in the ,sistar\_rt\_batches' table.

Table 8-32 Data management

|                                      |                                                                                                                                 |
|--------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|
| Configuration / SQL adapter settings | 'Batch archive' = active                                                                                                        |
| SQL archiver service settings        | 'Batch data' = active                                                                                                           |
| Update event                         | A <b>data set per order parameter</b> is generated for each new batch in this table. This data set is updated at batch runtime. |
| Update mode                          | INSERT<br>UPDATE (param_value)                                                                                                  |

Table 8-33 Data structure

| Columns   | Data type (length) | Attributes   | Comment                          |
|-----------|--------------------|--------------|----------------------------------|
| site_no   | smallint           | PK, not null | Site number                      |
| area_no   | smallint           | PK, not null | Area number                      |
| year_no   | smallint           | PK, not null | Year of creation, 4-digit (YYYY) |
| reccat_no | int                | PK, not null | Recipe category number           |
| order_no  | int                | PK, not null | Order number                     |

## 8.2 Table description of runtime data

| Columns      | Data type (length) | Attributes   | Comment                                                                                                                                                                                                   |
|--------------|--------------------|--------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| batch_no     | int                | PK, not null | Batch number                                                                                                                                                                                              |
| param_name   | nvarchar(32)       | PK, not null | Unique identification of the parameter.<br>The naming convention is 'OP###_N'<br><ul style="list-style-type: none"> <li>### = Order category number</li> <li>N = Parameter index (= param_pos)</li> </ul> |
| param_value  | nvarchar(80)       | null         | Value of the parameter as string                                                                                                                                                                          |
| display_name | nvarchar(32)       | null         | Name of the order parameter in the order category                                                                                                                                                         |
| uom          | nvarchar(16)       | null         | Measured value unit                                                                                                                                                                                       |

**Table ,sistar\_rt\_batchprot\_data'**

The table contains the data records of the batch reports that can be configured in the process control system using the 'Batch reports' function and generated at runtime. If this protocol type is activated, the data of the dBase files in the IOS archive path (...\\Protocol\\BatchProt\\BP\_yy\\OCat\_nnn\\Order\_nnnnn\\\*.dbf) are successively transferred to the SQL table.

**References to other tables**

- The header information of the corresponding batch is stored in the ,sistar\_rt\_batches' table.

Table 8-34 Data management

|                                      |                                                                                                                                                                 |
|--------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Configuration / SQL adapter settings | 'Batch reports' = active                                                                                                                                        |
| SQL archiver service settings        | 'Batch protocols' = active                                                                                                                                      |
| Update event                         | <b>One</b> data set is created in this table when a batch log data set is received. This is updated during the runtime of the batch for single or total values. |
| Update mode                          | INSERT - Value type = multiple value<br>UPDATE - Value type = single value or total value                                                                       |

Table 8-35 Data structure

| Columns     | Data type (length) | Attributes   | Comment                          |
|-------------|--------------------|--------------|----------------------------------|
| site_no     | smallint           | PK, not null | Site number                      |
| area_no     | smallint           | PK, not null | Area number                      |
| year_no     | smallint           | PK, not null | Year of creation, 4-digit (YYYY) |
| reccat_no   | int                | PK, not null | Recipe category number           |
| order_no    | int                | PK, not null | Order number                     |
| batch_no    | int                | PK, not null | Batch number                     |
| kop_text_id | nvarchar(64)       | PK, not null | KOP identification               |
| kop_name    | nvarchar(64)       | not null     | KOP name                         |
| pcu_name    | nvarchar(32)       | null         | PCU name                         |
| unit_name   | nvarchar(32)       | null         | Unit name                        |
| eop_name    | nvarchar(32)       | null         | Basic operation number           |

| Columns          | Data type (length) | Attributes   | Comment                             |
|------------------|--------------------|--------------|-------------------------------------|
| param_name       | nvarchar(32)       | null         | Parameter name                      |
| kop_setpoint     | nvarchar(32)       | null         | KOP setpoint                        |
| kop_value        | nvarchar(32)       | null         | KOP actual value                    |
| kop_uom          | nvarchar(16)       | null         | KOP unit                            |
| event_time       | datetimeoffset(3)  | PK, not null | Start time of the batch from PCU    |
| mult_count       | smallint           | not null     | Data set number for multiple values |
| insert_timestamp | datetime           | not null     | Creation time of data set in UTC    |
| user_data        | int                | null         | Can be used as required by the user |

### Table ,sistar\_rt\_batchprot\_params'

The table contains information about additional batch parameters transmitted by means of the 'Free protocols' function. These must be distinguished from the batch order parameters in the ,sistar\_rt\_batch\_params' table.

#### References to other tables

- The header information of the corresponding batch is stored in the ,sistar\_rt\_batches' table.

Table 8-36 Data management

|                                      |                                                                                                                  |
|--------------------------------------|------------------------------------------------------------------------------------------------------------------|
| Configuration / SQL adapter settings | 'Free protocols' = active                                                                                        |
| SQL archiver service settings        | 'Free protocols' = active                                                                                        |
| Update event                         | On reception of a "Free protocol" for a batch, a <b>data set is created for each data field in the telegram.</b> |
| Update mode                          | INSERT<br>UPDATE (param_value)                                                                                   |

#### Note

In order to allow batch parameters to be extracted from a free protocol, the following columns must be present in the corresponding IOS definition file of the 'FEPR\_006.def' free protocol:

- AUFTR\_NR
- CHARG\_NR
- REZEPT
- REZ\_TYP

These are only accepted in the language syntax stated (DE).

Table 8-37 Data structure

| Columns | Data type (length) | Attributes   | Comment     |
|---------|--------------------|--------------|-------------|
| site_no | smallint           | PK, not null | Site number |
| area_no | smallint           | PK, not null | Area number |

## 8.2 Table description of runtime data

| Columns          | Data type (length) | Attributes   | Comment                          |
|------------------|--------------------|--------------|----------------------------------|
| year_no          | smallint           | PK, not null | Year of creation, 4-digit (YYYY) |
| reccat_no        | int                | PK, not null | Recipe category number           |
| order_no         | int                | PK, not null | Order number                     |
| batch_no         | int                | PK, not null | Batch number                     |
| start_time       | datetimeoffset(3)  | PK, not null | Start time of the batch from PCU |
| param_name       | nvarchar(32)       | PK, not null | Parameter name                   |
| param_value      | nvarchar(80)       | null         | Parameter value                  |
| insert_timestamp | datetime           | not null     | Creation time of data set in UTC |

**Table ,sistar\_rt\_changelog'**

This table contains logging information with regard to operator interventions. The system logs operations on the process, as well as changes to the parameter assignment and recipes.

Table 8-38 Data management

|                                      |                                                                     |
|--------------------------------------|---------------------------------------------------------------------|
| Configuration / SQL adapter settings | 'Change log' = active                                               |
| SQL archiver service settings        | 'Logging data' = active                                             |
| Update event                         | <b>One</b> data set is generated in this table with each operation. |
| Update mode                          | INSERT                                                              |

Table 8-39 Data structure

| Columns    | Data type (length) | Attributes   | Comment                                                                          |
|------------|--------------------|--------------|----------------------------------------------------------------------------------|
| site_no    | smallint           | PK, not null | Site number                                                                      |
| area_no    | smallint           | PK, not null | Area number                                                                      |
| event_time | datetimeoffset(3)  | PK, not null | Creation time                                                                    |
| addcounter | float              | PK, not null | Insert counter                                                                   |
| log_type   | smallint           | null         | Recording type (Index)<br>For an explanation, see column 'description'           |
| user_name  | nvarchar(32)       | null         | User ID                                                                          |
| ios_no     | int                | null         | IOS number                                                                       |
| ios_name   | nvarchar (32)      | null         | IOS name                                                                         |
| pcu_no     | int                | null         | PCU number                                                                       |
| pcu_name   | nvarchar (32)      | null         | PCU name                                                                         |
| block_type | smallint           | null         | Block type/class index<br>For an explanation, see the assignment table below *1) |
| block_no   | int                | null         | Block number                                                                     |
| dw_no      | int                | null         | Data word number                                                                 |
| bit_no     | int                | null         | Data bit number                                                                  |
| unit_no    | int                | null         | Unit number                                                                      |

## 8.2 Table description of runtime data

| Columns        | Data type (length) | Attributes | Comment                                                                          |
|----------------|--------------------|------------|----------------------------------------------------------------------------------|
| unit_name      | nvarchar(32)       | null       | Unit name                                                                        |
| class_name     | nvarchar(32)       | null       | Block/class name                                                                 |
| instance_no    | int                | null       | Block instance number                                                            |
| instance_name  | nvarchar(32)       | null       | Block instance name                                                              |
| attribute_name | nvarchar(32)       | null       | Attribute name                                                                   |
| reccat_no      | int                | null       | Recipe category number                                                           |
| reccat_name    | nvarchar(32)       | null       | Recipe category name                                                             |
| year_no        | smallint           | null       | Year of creation, 4-digit (YYYY)                                                 |
| order_no       | int                | null       | Order number                                                                     |
| batch_no       | int                | null       | Batch number                                                                     |
| value_old      | nvarchar(64)       | null       | Old value                                                                        |
| value_new      | nvarchar(64)       | null       | New value                                                                        |
| description    | nvarchar(99)       | null       | Description of the recording type<br>For associated index, see column 'log_type' |

\*1)

The block type is stored as an index. The types used here are listed in the following table:

| Index | Block type  |
|-------|-------------|
| 0     | DB          |
| 1     | DX          |
| 2     | SB          |
| 3     | PB          |
| 4     | FB          |
| 5     | FX          |
| 6     | OB          |
| 7     | MB          |
| 8     | MW          |
| 9     | IB          |
| 10    | IW          |
| 11    | QB          |
| 12    | QW          |
| 13    | COUNTER     |
| 14    | S5TIMER     |
| 15    | S5TIMER_COD |
| 16    | SY          |
| 17    | SW          |
| 36    | PIB         |
| 37    | PIW         |
| 38    | PQB         |
| 39    | PQW         |
| 50    | S7_DB       |

## 8.2 Table description of runtime data

| Index | Block type |
|-------|------------|
| 52    | S7_FC      |
| 54    | S7_FB      |
| 56    | S7_OB      |

**Table ,sistar\_rt\_matmovs'**

This table is used to store material movements. The corresponding movement telegrams are transmitted by means of the step protocols function. For this purpose, you need to fulfill specific requirements when configuring the step (refer to section Material events (Page 49)).

**References to other tables**

- The material movement telegrams are also entered as "normal" step protocols. The primary key consisting of site\_no, area\_no, pcu\_no, unit\_no, year\_no, reccat\_no, order\_no, batch\_no, eop\_no, start\_time, rop\_id, user\_prot\_id, references the associated records in the tables:
  - 'sistar\_rt\_step\_params'
  - 'sistar\_rt\_steps'

Table 8-40 Data management

|                                      |                                                                                                 |
|--------------------------------------|-------------------------------------------------------------------------------------------------|
| Configuration / SQL adapter settings | 'Step protocols' = active                                                                       |
| SQL proxy service settings           | 'Enable custom filter DLL' = active<br>'Material EOP name start with' = <Name> (default='MOVE') |
| SQL archiver service settings        | 'Stepping protocol' = active                                                                    |
| Update event                         | <b>One</b> data set is generated in this table for each movement telegram.                      |
| Update mode                          | INSERT                                                                                          |

Table 8-41 Data structure

| Columns   | Data type (length) | Attributes   | Comment                                                                           |
|-----------|--------------------|--------------|-----------------------------------------------------------------------------------|
| site_no   | smallint           | PK, not null | Site number                                                                       |
| area_no   | smallint           | PK, not null | Area number                                                                       |
| pcu_no    | int                | PK, not null | PCU number                                                                        |
| unit_no   | int                | PK, not null | Unit number. The corresponding unit name must be assigned uniquely for all areas. |
| year_no   | smallint           | PK, not null | Year of creation, 4-digit (YYYY)                                                  |
| reccat_no | int                | PK, not null | Recipe category number                                                            |
| order_no  | int                | PK, not null | Order number                                                                      |
| batch_no  | int                | PK, not null | Batch number                                                                      |

## 8.2 Table description of runtime data

| Columns                | Data type (length) | Attributes   | Comment                                                                                                                        |
|------------------------|--------------------|--------------|--------------------------------------------------------------------------------------------------------------------------------|
| event_type             | nvarchar(32)       | not null     | Event type name; usually: <ul style="list-style-type: none"> <li>• MOVE_IN</li> <li>• MOVE_OUT</li> <li>• MOVE_THRU</li> </ul> |
| recproc_no             | int                | null         | Recipe procedure number                                                                                                        |
| eop_no                 | int                | PK, not null | Basic operation number                                                                                                         |
| start_time             | datetimeoffset(3)  | PK, not null | Start time of the step from PCU                                                                                                |
| rop_id                 | int                | PK, not null | RP-specific unique identification of the recipe operation<br>*1)                                                               |
| user_prot_id           | int                | PK, not null | > 0: Identification as user step protocol<br>*2)                                                                               |
| event_time             | datetimeoffset(3)  | null         | Time of the user step protocol                                                                                                 |
| end_time               | datetimeoffset(3)  | null         | End time of the step from PCU                                                                                                  |
| monitoring_time        | int                | null         | Configured step monitoring time                                                                                                |
| duration               | int                | null         | Actual step runtime                                                                                                            |
| insert_timestamp       | datetime           | not null     | Creation time of data set in UTC                                                                                               |
| mat_id                 | int                | not null     | Material ID (may correspond to an RCS ID, for example)                                                                         |
| mat_name               | nvarchar(32)       | null         | Material name that can be defined in addition                                                                                  |
| mes_mat_id             | nvarchar(64)       | null         | Reserved for future expansions;<br>Currently, always = NULL                                                                    |
| quantity_setpoint      | nvarchar(32)       | null         | Transfer quantity setpoint                                                                                                     |
| quantity_actval        | nvarchar(32)       | not null     | Actual transfer quantity                                                                                                       |
| uom                    | nvarchar(16)       | not null     | Measured value unit                                                                                                            |
| move_duration_setpoint | int                | null         | Transfer duration setpoint                                                                                                     |
| move_duration_actval   | int                | null         | Actual transfer duration                                                                                                       |
| move_start_time        | datetimeoffset(3)  | null         | Calculated transfer start time                                                                                                 |
| move_end_time          | datetimeoffset(3)  | null         | Calculated transfer end time                                                                                                   |
| src_site_no            | smallint           | not null     | Material source: Site number                                                                                                   |
| src_area_no            | smallint           | not null     | Material source: Area number                                                                                                   |
| src_pcu_no             | int                | not null     | Material source: PCU number                                                                                                    |
| src_unit_no            | int                | not null     | Material source: Unit number                                                                                                   |
| src_year_no            | smallint           | null         | Material source: Batch year, optional                                                                                          |
| src_reccat_no          | int                | null         | Material source: Recipe category number, optional                                                                              |
| src_order_no           | int                | null         | Material source: Order number, optional                                                                                        |
| src_batch_no           | int                | null         | Material source: Batch number, optional                                                                                        |
| dest_site_no           | smallint           | not null     | Material target: Site number                                                                                                   |
| dest_area_no           | smallint           | not null     | Material target: Area number                                                                                                   |
| dest_pcu_no            | int                | not null     | Material target: PCU number                                                                                                    |

## 8.2 Table description of runtime data

| Columns        | Data type (length) | Attributes | Comment                                           |
|----------------|--------------------|------------|---------------------------------------------------|
| dest_unit_no   | int                | not null   | Material target: Unit number                      |
| dest_year_no   | smallint           | null       | Material target: Batch year, optional             |
| dest_reccat_no | int                | null       | Material source: Recipe category number, optional |
| dest_order_no  | int                | null       | Material target: Order number, optional           |
| dest_batch_no  | int                | null       | Material target: Batch number, optional           |
| usr_par1_sp    | nvarchar(32)       | null       | User data text 1                                  |
| usr_par1_av    | nvarchar(32)       | null       | User data text 2                                  |
| usr_par1_uom   | nvarchar(32)       | null       | User data text 3                                  |
| usr_par2_sp    | nvarchar(32)       | null       | User data text 4                                  |
| usr_par2_av    | nvarchar(32)       | null       | User data text 5                                  |
| usr_par2_uom   | nvarchar(32)       | null       | User data text 6                                  |

\*1) : The rop\_id is a unique identification of the ROP recipe operation within the recipe procedure. It is assigned by the "EditRec" recipe editor when you save the recipe procedure; it is updated in the recipe procedure when changes are made.

**Table ,sistar\_rt\_messages'**

The process control system messages are archived in this table. These consist of user messages and system messages of the technological blocks, recipe system and route control.

Table 8-42 Data management

|                                      |                                                                                      |
|--------------------------------------|--------------------------------------------------------------------------------------|
| Configuration / SQL adapter settings | 'Message archive' = active                                                           |
| SQL archiver service settings        | 'Process messages' = active                                                          |
| Update event                         | <b>One</b> data set is generated in this table with each message telegram of an IOS. |
| Update mode                          | INSERT                                                                               |

Table 8-43 Data structure

| Columns    | Data type (length) | Attributes   | Comment                                                                                              |
|------------|--------------------|--------------|------------------------------------------------------------------------------------------------------|
| site_no    | smallint           | PK, not null | Site number                                                                                          |
| area_no    | smallint           | PK, not null | Area number                                                                                          |
| ds_id      | nvarchar(32)       | PK, not null | Unique data set ID                                                                                   |
| msg_time   | datetimeoffset(3)  | PK, not null | Time stamp of the message                                                                            |
| msg_id     | int                | PK, not null | Message ID                                                                                           |
| msg_class  | nvarchar(2)        | PK, not null | Message class                                                                                        |
| msg_type   | nvarchar(1)        | not null     | Message type                                                                                         |
| msg_status | nvarchar(2)        | null         | Message status: <ul style="list-style-type: none"> <li>C = incoming</li> <li>G = outgoing</li> </ul> |
| msg_text   | nvarchar(99)       | null         | Message text                                                                                         |



| Columns       | Data type (length) | Attributes | Comment                                                       |
|---------------|--------------------|------------|---------------------------------------------------------------|
| unit_pcu      | int                | null       | PCU ID of the unit to which the message is assigned.          |
| unit_no       | int                | null       | Unit ID                                                       |
| unit_name     | nvarchar(32)       | null       | Unit name, if the message is assigned to a unit.              |
| pcu_no        | int                | null       | PCU number in which the message was generated                 |
| class_name    | nvarchar(32)       | null       | Block class                                                   |
| instance_no   | smallint           | null       | Block instance                                                |
| instance_name | nvarchar(32)       | null       | Block instance name                                           |
| reccat_no     | int                | null       | Recipe category number if the message is assigned to a batch. |
| reccat_name   | nvarchar(32)       | null       | Recipe category name when the message is assigned to a batch. |
| year_no       | smallint           | null       | Batch year, 4-digit (YYYY)                                    |
| order_no      | int                | null       | Order number, if the message is assigned to an order.         |
| batch_no      | int                | null       | Batch number, if the message is assigned to a batch.          |

### Table ,sistar\_rt\_step\_params'

Parameters for the individual steps are saved in this table.

#### References to other tables

- The header information of the corresponding step is stored in the ,sistar\_rt\_steps' table.

Table 8-44 Data management

|                                      |                                                                                                                                                             |
|--------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Configuration / SQL adapter settings | 'Step protocols' = active                                                                                                                                   |
| SQL archiver service settings        | 'Stepping protocol' = active                                                                                                                                |
| Update event                         | <b>One</b> data set is generated in this table for each step protocol telegram. The PCU server of the IOS transmits step protocols at the end of each step. |
| Update mode                          | INSERT                                                                                                                                                      |

Table 8-45 Data structure

| Columns   | Data type (length) | Attributes   | Comment                          |
|-----------|--------------------|--------------|----------------------------------|
| site_no   | smallint           | PK, not null | Site number                      |
| area_no   | smallint           | PK, not null | Area number                      |
| year_no   | smallint           | PK, not null | Year of creation, 4-digit (YYYY) |
| reccat_no | int                | PK, not null | Recipe category number           |
| order_no  | int                | PK, not null | Order number                     |

## 8.2 Table description of runtime data

| Columns          | Data type (length) | Attributes   | Comment                                            |
|------------------|--------------------|--------------|----------------------------------------------------|
| batch_no         | int                | PK, not null | Batch number                                       |
| pcu_no           | int                | PK, not null | PCU number from which the step protocol originates |
| eop_no           | int                | PK, not null | Basic operation number                             |
| start_time       | datetimeoffset(3)  | PK, not null | Start time of the step                             |
| rop_id           | int                | PK, not null | Recipe operation ID in recipe procedure            |
| user_prot_id     | int                | PK, not null | > 0: Identification as user step protocol          |
| param_pos        | smallint           | PK, not null | Setpoint position (1...24)                         |
| epar_no          | nvarchar(12)       | null         | DFM number x.y (group, number)                     |
| param_name       | nvarchar(32)       | null         | Parameter name                                     |
| actual_value     | nvarchar(32)       | null         | Current DFM value                                  |
| setpoint_value   | nvarchar(32)       | null         | DFM setpoint                                       |
| uom              | nvarchar(16)       | null         | Measured value unit                                |
| insert_timestamp | datetime           | not null     | Time of change in UTC                              |

**Table ,sistar\_rt\_steps'**

The header information of the step protocols is stored in this table.

**References to other tables**

- The primary key consisting of the site\_no, area\_no, year\_no, reccat\_no, order\_no, batch\_no, pcu\_no, eop\_no, start\_time references the corresponding data sets in the tables
  - 'sistar\_rt\_step\_params'
  - 'sistar\_rt\_matmovs'

Table 8-46 Data management

|                                                                          |                                                                                                                                                                           |
|--------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Configuration / SQL adapter settings                                     | 'Step protocols' = active                                                                                                                                                 |
| SQL proxy manager settings<br>(refer to section Proxy manager (Page 35)) | 'Units / Equipment' tab <ul style="list-style-type: none"> <li>Configuring the 'Public unit name' column</li> <li>Configuring the 'Public Equipment ID' column</li> </ul> |
| SQL archiver service settings                                            | 'Stepping protocol' = active                                                                                                                                              |
| Update event                                                             | <b>One</b> data set is generated in this table for each step protocol telegram. The PCU server transmits step protocols at the end of each step.                          |
| Update mode                                                              | INSERT                                                                                                                                                                    |

Table 8-47 Data structure

| Columns | Data type (length) | Attributes   | Comment                          |
|---------|--------------------|--------------|----------------------------------|
| site_no | smallint           | PK, not null | Site number                      |
| area_no | smallint           | PK, not null | Area number                      |
| year_no | smallint           | PK, not null | Year of creation, 4-digit (YYYY) |

## 8.2 Table description of runtime data

| Columns          | Data type (length) | Attributes   | Comment                                                                                                                                            |
|------------------|--------------------|--------------|----------------------------------------------------------------------------------------------------------------------------------------------------|
| reccat_no        | int                | PK, not null | Recipe category number                                                                                                                             |
| order_no         | int                | PK, not null | Order number                                                                                                                                       |
| batch_no         | int                | PK, not null | Batch number                                                                                                                                       |
| pcu_no           | int                | PK, not null | PCU number from which the step protocol originates                                                                                                 |
| unit_no          | int                | PK, not null | Unit ID                                                                                                                                            |
| eop_no           | int                | PK, not null | "Basic operation" number                                                                                                                           |
| start_time       | datetimeoffset(3)  | PK, not null | Start time of the step                                                                                                                             |
| rop_id           | int                | PK, not null | RP-specific unique identification of the recipe operation                                                                                          |
| user_prot_id     | int                | PK, not null | > 0: Identification as user step protocol                                                                                                          |
| event_time       | datetimeoffset(3)  | null         | Time of the user step protocol                                                                                                                     |
| end_time         | datetimeoffset(3)  | null         | End time of the step                                                                                                                               |
| monitoring_time  | int                | null         | Step monitoring time setpoint in [sec]                                                                                                             |
| duration         | int                | null         | Actual step monitoring time in [sec]<br>(= end_time – start_time)                                                                                  |
| ordercat_name    | nvarchar(32)       | null         | Order category name                                                                                                                                |
| reccat_name      | nvarchar(32)       | null         | Recipe category name                                                                                                                               |
| recipe_no        | int                | null         | Recipe number                                                                                                                                      |
| recipe_name      | nvarchar(32)       | null         | Recipe name                                                                                                                                        |
| recproc_no       | int                | null         | Recipe procedure number                                                                                                                            |
| product_id       | bigint             | null         | Product ID                                                                                                                                         |
| product_name     | nvarchar(32)       | null         | Product name                                                                                                                                       |
| equipment_name   | nvarchar(255)      | null         | Additional unit name for higher-level system. This name can be configured in SQL proxy manager (tab 'Units/Equipment' / column 'Public unit name') |
| equipment_id     | nvarchar(255)      | null         | Additional unit ID for higher-level system. This can be configured in SQL proxy manager (tab 'Units/Equipment' / column 'Public equipment ID')     |
| pcu_name         | nvarchar(32)       | null         | PCU name                                                                                                                                           |
| unit_name        | nvarchar(32)       | null         | Unit name                                                                                                                                          |
| eop_name         | nvarchar(32)       | null         | Long name of the BOP (basic operation)                                                                                                             |
| param_count      | int                | null         | Number of parameters for this step                                                                                                                 |
| step_status      | nvarchar(16)       | null         | Step status                                                                                                                                        |
| insert_timestamp | datetime           | not null     | Creation time of data set in UTC                                                                                                                   |
| user_data        | int                | null         | Can be used as required by the user                                                                                                                |

**Table ,sistar\_rt\_tag\_values'**

The values recorded in the measured value curves are stored in this table.

Table 8-48 Data management

|                                                                     |                                                                                                                                                                                                                                                               |
|---------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Configuration / SQL adapter settings                                | No archive type available.<br>The 'SQL proxy service' acquires the measured values at cyclic intervals.                                                                                                                                                       |
| SQL proxy manager settings<br>(see section Proxy manager (Page 35)) | 'List of tags' tab <ul style="list-style-type: none"> <li>Column 'Transmit' = active</li> <li>Column 'Interval' = &lt;0 ... 32767&gt; (value in [sec])<br/>The shortest interval is 60 seconds, i.e. values &lt; 60 are interpreted as 60 seconds.</li> </ul> |
| SQL archiver service settings                                       | 'Trend data' = active                                                                                                                                                                                                                                         |
| Update event                                                        | The measured values to be recorded ('Transmit' = active) are acquired and saved at the respective interval (value from 'Interval').                                                                                                                           |
| Update mode                                                         | INSERT                                                                                                                                                                                                                                                        |

Table 8-49 Data structure

| Columns    | Data type (length) | Attributes   | Comment                                                                                                                                                                                     |
|------------|--------------------|--------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| tag_id     | int                | PK, not null | Unique ID for all sites and areas in the format: 'nnnnnaa' <ul style="list-style-type: none"> <li>nnnnn = area_no * 10000 + sistar_tag_id</li> <li>aa = Site number (ASCII code)</li> </ul> |
| event_time | datetimeoffset(3)  | PK, not null | Timestamp of the sampling value                                                                                                                                                             |
| value      | float              | null         | Sampling value                                                                                                                                                                              |
| status     | smallint           | null         | Status of the sampling value: <ul style="list-style-type: none"> <li>0 = invalid</li> <li>1 = valid</li> </ul>                                                                              |

**Table ,sistar\_rt\_tank\_history'**

This table (same as the table 'sistar\_rt\_unit\_history') is used to save the tank allocation data.

Table 8-50 Data management

|                                      |                         |
|--------------------------------------|-------------------------|
| Configuration / SQL adapter settings | 'Tank history' = active |
| SQL archiver service settings        | 'Tank history' = active |

|              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|--------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Update event | <p>All active TANK instances are transferred completely during the PCU server startup (<b>PCU V7.0 or higher</b>, TANK parameter assignment class / global data / "DS_Count" attribute, default = 128).</p> <p>The transfer takes place according to the inventory telegrams configured in the TANK instances. The following trigger options can be configured for each instance:</p> <ul style="list-style-type: none"> <li>• FireInventoryCyclic = true / false → enable cyclic transfer<br/>InventoryCycleTime = &lt;...&gt; → cyclic transfer / configurable cycle time</li> <li>• InventoryQuantityHyst = &lt;...&gt; → change quantity by means of configurable hysteresis and FireInventoryOnChange = true</li> <li>• FireInventoryOnChange = true / false → status changes (tank status, quality status, material)</li> <li>• 'TANK'.u.xFireInventoryNow = false / true → application-based triggering (tank instance is derived from configurable assignment in the 'Sequence' attribute)</li> </ul> |
| Update mode  | INSERT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |

**NOTICE****Configuration of the inventory telegrams in engineering**

- The inventory telegrams are sent to the SQL DB Host according to the configuration of the update attributes in the TANK instances of the PCUs involved and entered in the "sistar\_rt\_tank\_history" table with INSERT. These attributes do, however, also determine the update rates in the TANK selection dialog of the order system for parameter type "Tank" or "Tank location" (PCU V7 or higher).
- The user/configuration engineer has to pay special attention to a sensible and necessary number of update telegrams during configuration, especially for the attributes "InventoryQuantityHyst", "FireInventoryOnChange" and "InventoryCycleTime".
- A configuration that is faulty or not adapted can increase the data volume in the SQL table tremendously and affect the entire coupling performance.

Table 8-51 Data structure

| Columns     | Data type (length) | Attributes   | Comment                                       |
|-------------|--------------------|--------------|-----------------------------------------------|
| site_no     | smallint           | PK, not null | Site number                                   |
| area_no     | smallint           | PK, not null | Area number                                   |
| event_time  | datetimeoffset(3)  | PK, not null | Time of change in the process control system  |
| pcu_no      | int                | PK, not null | PCU number                                    |
| tank_no     | int                | PK, not null | Tank number                                   |
| tank_type   | int                | null         | Tank type                                     |
| tank_group  | int                | null         | Tank group                                    |
| unit_no     | int                | null         | Unit number, if the entry is linked to a unit |
| location_id | int                | null         | RCS location                                  |

## 8.2 Table description of runtime data

| Columns         | Data type (length) | Attributes | Comment                                                               |
|-----------------|--------------------|------------|-----------------------------------------------------------------------|
| material_id     | int                | null       | Material ID                                                           |
| tank_status     | int                | null       | Tank status<br>up to 255 (10 at time of delivery) tank states         |
| quality_status  | int                | null       | Quality status<br>up to 255 (4 at time of delivery) quality states    |
| temperature_avg | float              | null       | Medium temperature of the active and valid/wetted temperature sensors |
| pressure_actval | float              | null       | Pressure                                                              |
| quantity_actval | float              | null       | Quantity / fill level                                                 |
| year_no         | smallint           | null       | Year of creation, 4-digit (YYYY)                                      |
| reccat_no       | int                | null       | Recipe category number                                                |
| order_no        | int                | null       | Order number                                                          |
| batch_no        | int                | null       | Batch number                                                          |
| recipe_no       | int                | null       | Recipe number                                                         |
| user_data       | int                | null       | Can be used as required by the user                                   |

**Table ,sistar\_rt\_unit\_history'**

This table is used to store unit allocation data.

Table 8-52 Data management

|                                      |                                                                                   |
|--------------------------------------|-----------------------------------------------------------------------------------|
| Configuration / SQL adapter settings | 'Unit history' = active                                                           |
| SQL archiver service settings        | 'Unit history' = active                                                           |
| Update event                         | <b>One</b> new data set is saved at each UNIT start/end (step_no 0 → n or n → 0). |
| Update mode                          | INSERT                                                                            |

Table 8-53 Data structure

| Columns     | Data type (length) | Attributes   | Comment                                                                                                       |
|-------------|--------------------|--------------|---------------------------------------------------------------------------------------------------------------|
| site_no     | smallint           | PK, not null | Site number                                                                                                   |
| area_no     | smallint           | PK, not null | Area number                                                                                                   |
| event_time  | datetimeoffset(3)  | PK, not null | Time of change in the process control system                                                                  |
| pcu_no      | int                | PK, not null | PCU number                                                                                                    |
| unit_no     | int                | PK, not null | Unit number, if the entry is linked to a unit                                                                 |
| unit_status | nvarchar(16)       | null         | Unit status (ISA-S88.01-1995) <ul style="list-style-type: none"> <li>Occupied</li> <li>NotOccupied</li> </ul> |
| step_no     | int                | null         | Step number                                                                                                   |
| year_no     | smallint           | null         | Year of creation, 4-digit (YYYY)                                                                              |

| Columns      | Data type (length) | Attributes | Comment                             |
|--------------|--------------------|------------|-------------------------------------|
| reccat_no    | int                | null       | Recipe category number              |
| order_no     | int                | null       | Order number                        |
| batch_no     | int                | null       | Batch number                        |
| recipe_no    | int                | null       | Recipe number                       |
| recproc_no   | int                | null       | Recipe procedure number             |
| recproc_name | nvarchar(32)       | null       | Recipe procedure name               |
| rup_no       | int                | null       | RUP number                          |
| rup_name     | nvarchar(32)       | null       | RUP name                            |
| user_data    | int                | null       | Can be used as required by the user |

### [BS\_PM\_Connector] table 'bpc\_rt\_log'

This table contains the diagnostics entries and error messages generated by the BRAUMAT/ Sistar PM-Connector during data transmission.

Table 8-54 Data structure

| Columns      | Data type (length) | Attributes                | Comment                                                                                  |
|--------------|--------------------|---------------------------|------------------------------------------------------------------------------------------|
| logId        | bigint             | IDENTITY(1,1)<br>not null | Identifier                                                                               |
| timestampUTC | datetime2(7)       | null                      | Timestamp of the entry in UTC                                                            |
| timestamp    | datetimeoffset(7)  | null                      | Timestamp of the entry in UTC                                                            |
| logLevel     | int                | null                      | 0: Info<br>1: Debug<br>2: Warning<br>3: Error<br>4: Severe Error<br>5: Very severe Error |
| sqlObject    | nvarchar(50)       | null                      | Affected database object                                                                 |
| Message      | nvarchar(50)       | null                      | Diagnostics or error message                                                             |
| sqlErrorCode | int                | null                      | Error code of the RDBMS SQL in the event of a system error                               |

## 8.3 Table description, product version

### System table with version information

The system table described here is supplied with the 'SQL Adapter' option. It contains information about the product version, as well as the database scheme of the tables currently installed on the DB host computer. User-created reports (with 'Stored Procedures') can use this data to create a relation to a defined database scheme and generate warning notes, if applicable.

Table 8-55 Data management

|              |                                                                                                                                    |
|--------------|------------------------------------------------------------------------------------------------------------------------------------|
| Update event | Created automatically after installation with the help of the setup program at the next restart of the SQL proxy/archiver service. |
| Update mode  | is created once                                                                                                                    |

### Table 'sistar\_system'

Table 8-56 Data structure

| Columns          | Data type (length) | Attributes   | Comment                                                                                                    |
|------------------|--------------------|--------------|------------------------------------------------------------------------------------------------------------|
| property         | nvarchar(32)       | PK, not null | Attribute name<br>product_version (current product version)<br>schema_version (current database scheme)    |
| value            | nvarchar(255)      | null         | Attribute value:<br>8.0.0.0 (=Example current product version)<br>4 (= example of current database scheme) |
| update_timestamp | datetime           | null         | Time of last change to the data set in the SQL proxy service in UTC                                        |



## Miscellaneous

### 9.1 Application notes

#### Note on creating reports

Tables and contents may change in future versions, for example due to error correction, extensions, etc.

We therefore recommend that you do not base reports and other customer-specific applications directly on the tables, and instead introduce a type of abstraction layer in the form of SQL server "views". The designations contained therein can then be maintained in a stable state for customer- or project-specific applications. For further details, refer to the SQL server documentation.

#### User extensions in tables

Changes to the SQL Adapter databases by users should be restricted to the absolute, necessary minimum. If changes cannot be avoided, the following must be observed:

- The following is permitted:
  - Adding tables/columns (table names should not begin with 'sistar\_...')
  - Adding indexes
  - Adding trigger
  - Adding stored procedures
  - Defining views
- Not permitted (at own responsibility):
  - Renaming or deleting tables/columns; changing properties (data types)
  - Changing unique keys
  - Deleting data sets of running batches
  - Modifying data contents

#### Archiving

The "SQL Adapter" optional product does not contain any of the following functions:

- Export
- Archiving
- Deleting data sets

This must be ensured by the user. Always take care not to delete data related to batches which are still running, for example.

**Recommendation:**

- Time-delayed export/archiving/deletion of concluded batch data
- Deletion of all step protocols of batches completed more than xx months ago, for example.