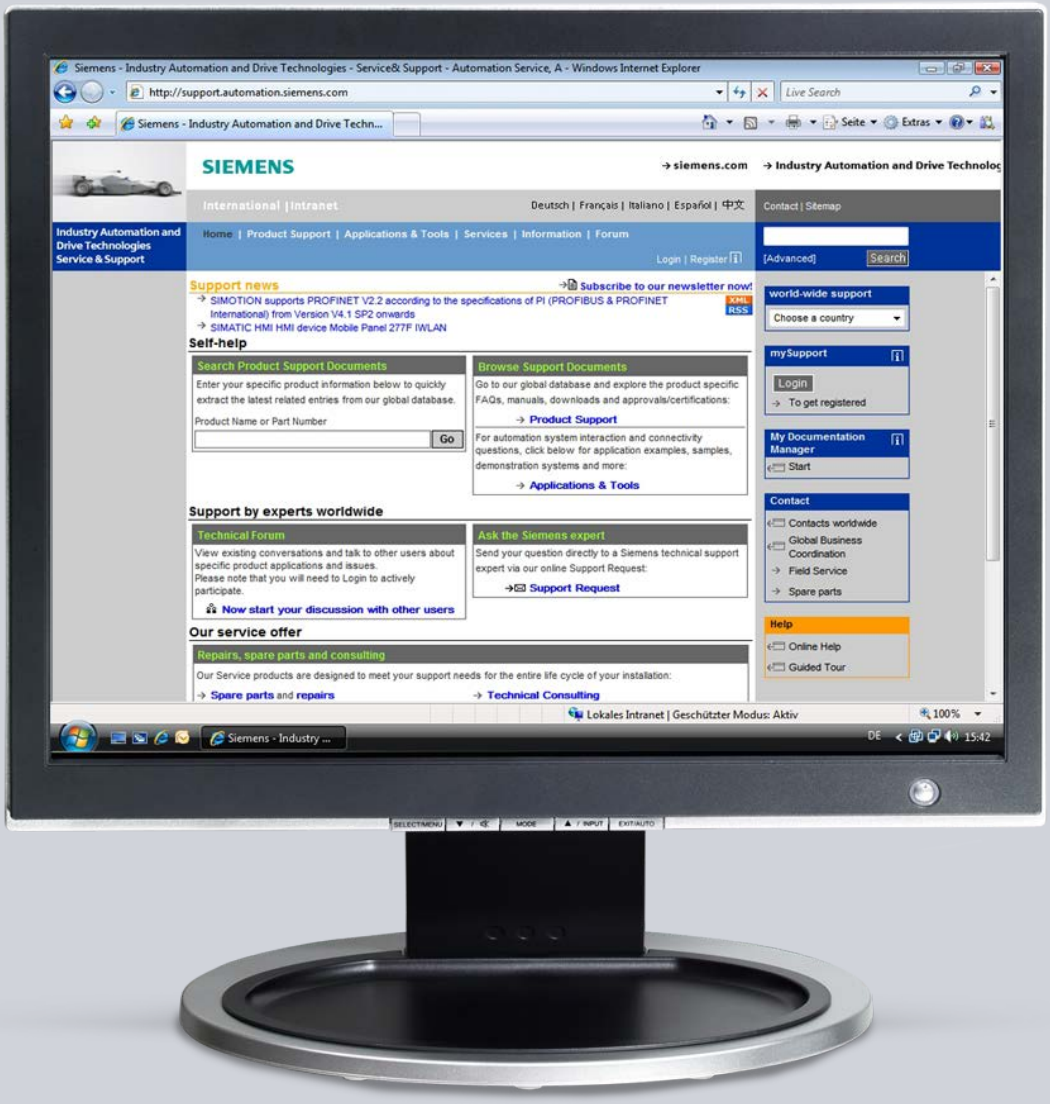
How do you connect and display non-electrical measuring points with SIMATIC powerrate?

SIMATIC powerrate

FAQ · October 2013



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Caution

The functions and solutions described in this article confine themselves predominantly to the realization of the automation task. Furthermore, please take into account that corresponding protective measures have to be taken in the context of Industrial Security when connecting your equipment to other parts of the plant, the enterprise network or the internet. Further information can be found in Entry ID: !50203404!.

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Question

How do you connect and display non-electrical measuring points with SIMATIC powerrate?

Answer

Follow the instructions and notes listed in this document for a detailed answer to the above question.

Contents

1 Introduction

The SIMATIC powerrate power data management software captures, visualizes and archives power consumption values of all the connected measuring points (measuring devices). Furthermore, these archived measured values can be output in Excel reports using the "Powerrate Reports" reporting tool supplied with SIMATIC powerrate.

The default configuration of the S7 library and the S7 sample project of SIMATIC powerrate permits electrical power values to be captured and processed (unit: 'kW') and likewise the energy values (unit: 'kWh').

The connection and processing of the energy value is done device-independent and unit-independent in SIMATIC powerrate. The link with the physical unit is done on the powerrate capture block in the S7-CPU and is then transferred to the WinCC faceplate and the Excel Report.

This gives the user the possibility of changing the physical unit to suit requirements.

Examples

Table 1-1

	Physical unit for ...		**Notes, examples**
	Energy, Volume, Quantity etc.	Power, Flow rate, Throughput etc.	
Electrical energy	kW	kWh	Electric motor
Non-electrical measured variables	m^3	m^3/h	Water, compressed air
	m^3 i.N.	m^3 i.N./h	Standard cubic meter, heating gas
	Piece	Pieces/h	Piece goods, production data
	kg	kg/min	Mass
	...	...	

2 Advantages and Benefits

The uniform and universal capturing of electrical and non-electrical consumer and production data makes it possible to synchronize the plant data relevant for energy data management and display and archive it in a standardized form.

Thanks to the same time reference of the captured values you can set the consumer data in direct relation to the production data
(to calculate key ratios, for example).

3 Configuration

There are two possible ways of configuring depending on the configuration environment used.

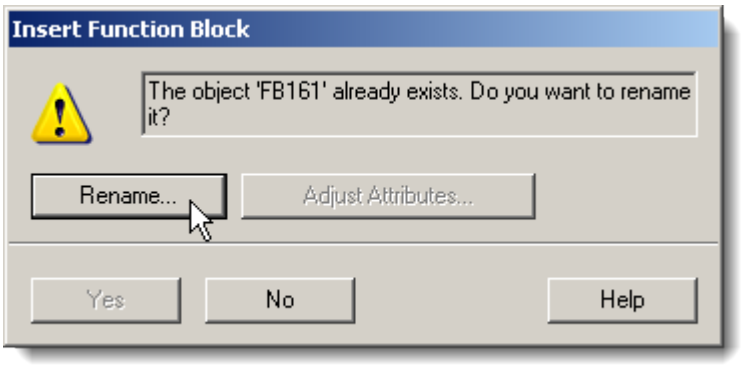
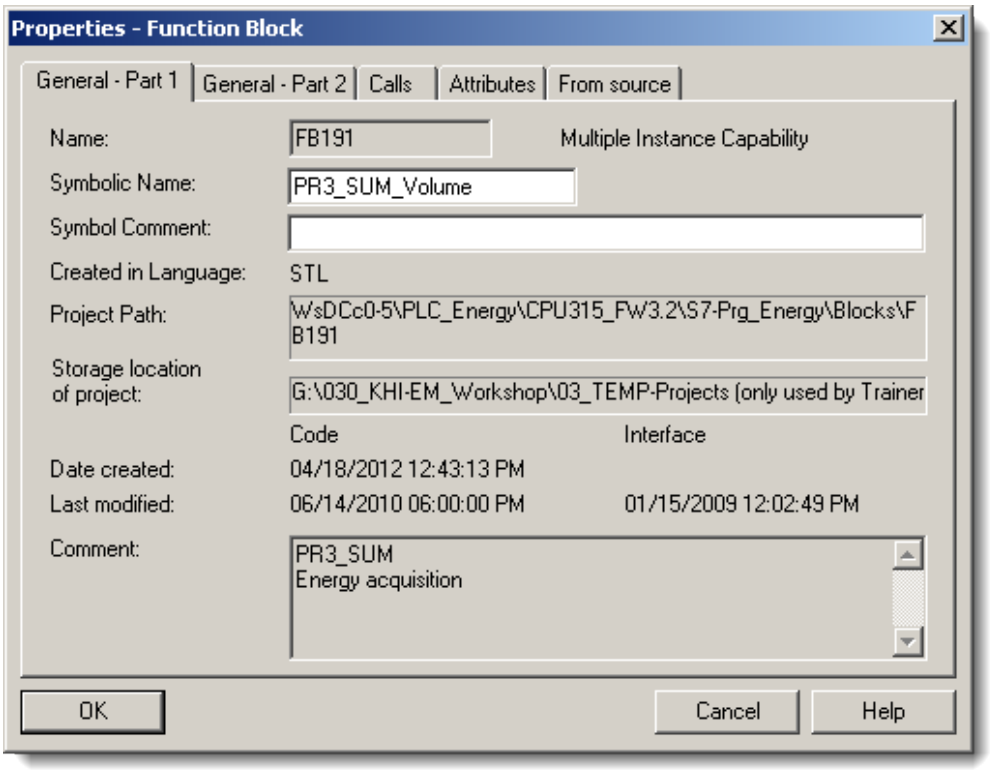
- Default: LAD/FBD/STL editor of STEP 7
- Optional: CFC (Continuous Function Chart, not included in the standard delivery package of STEP 7)

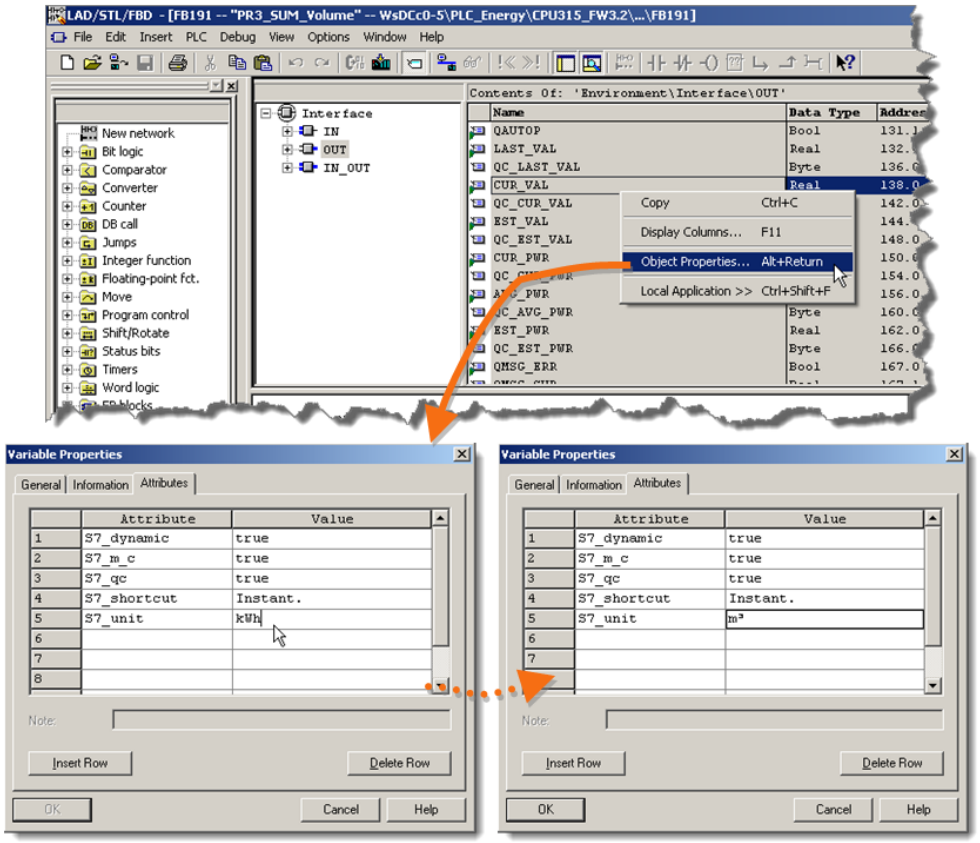
Both methods are described in this document.

Note Furthermore, S7 blocks and faceplates are designated with the prefix 'PRx_...'. The 'x' designates a wildcard and describes blocks for both S7-400 with the prefix 'PRE_...' and S7-300 with the prefix 'PR3_...'.

3.1 Using the LAD/FBD/STL Editor

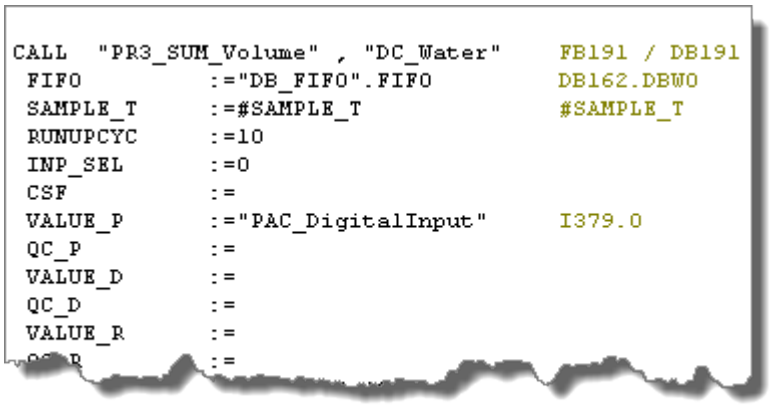
Table 3-1

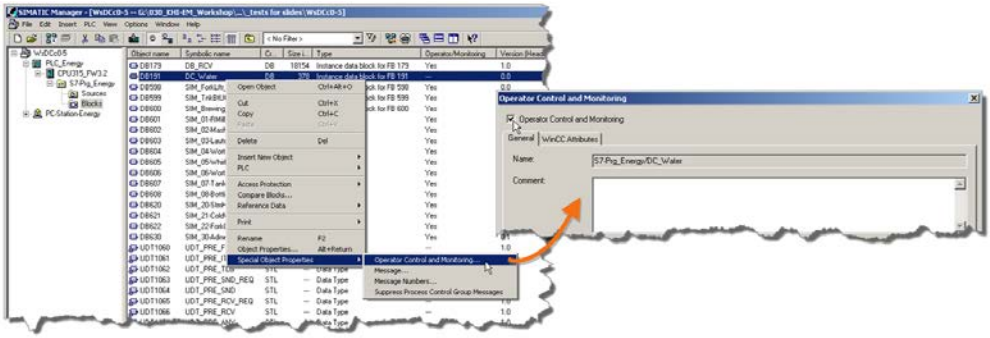
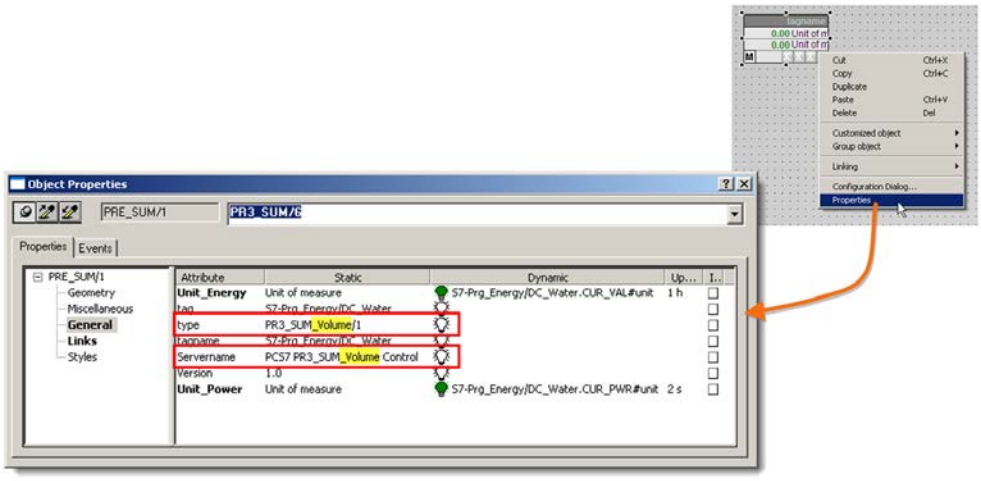
Step	Description
1.	• Duplicate the function block 'PRx_SUM' (S7-300: FB161; S7-400: FB1061). • When requested, assign a block number (FB 191, for example). 
2.	• Assign a new symbolic name for the new FB. • The name of the FB must begin with the character string 'PRx_SUM…' ('PR3_SUM_Volume', for example) so that the powerrate wizard can identify the block as a powerrate capture block. **Note** Do not use the character string 'PRx_SUMC…', because this is reserved for the special capture block for batch-oriented energy data capture. 

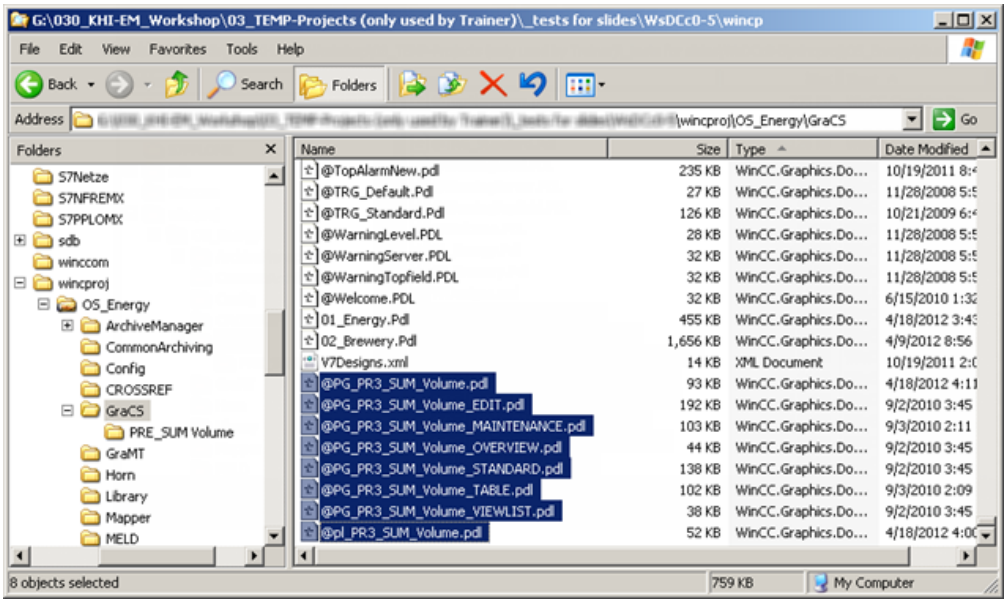
Step	Description
3.	• Open the new FB in the LAD/STL/FBD editor. • A message appears indicating that the FB is write-protected. Confirm this with the "OK" button. **Note** You can make the necessary changes despite the write protection. • In the FB interface you must change the unit attribute according to the relevant input and output parameters. • You can change the attributes via the object properties of the parameter. The corresponding attribute is 'S7_unit' and has the default value 'kWh' or 'kW'. • Change the value to the desired unit (m³, for example) 

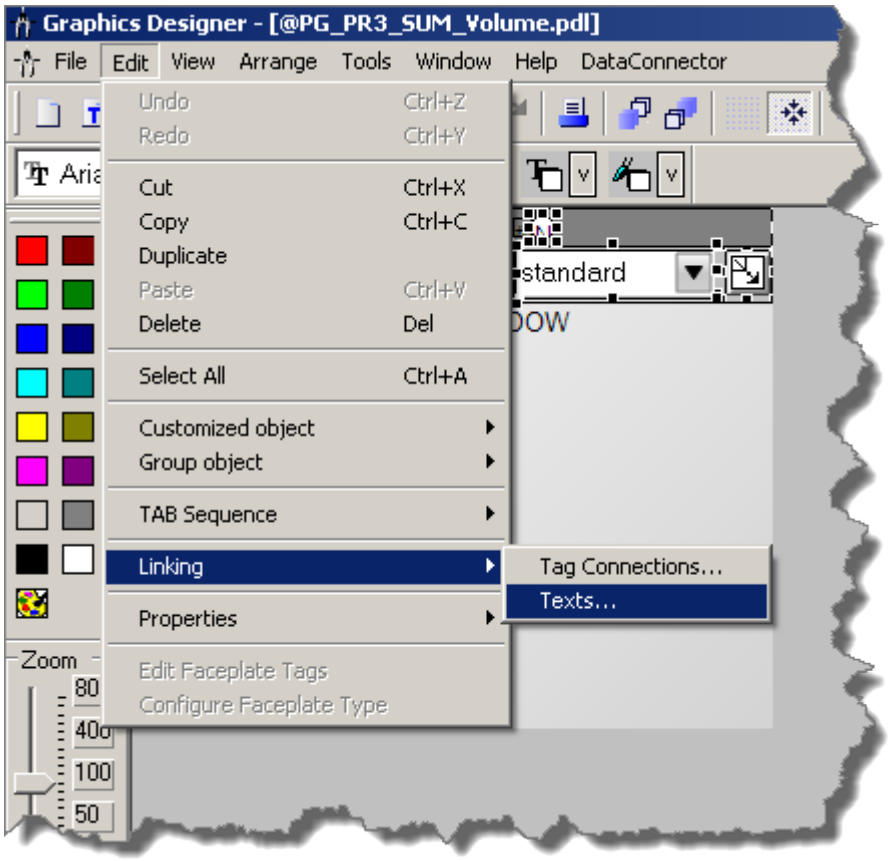
<table>
<tr><th>Step</th><th>Description</th></tr>
<tr><td>4.</td><td>The list below shows all the parameters to be modified taking the example of the "m³" and "m³/h" units.
<table>
<tr><th>Parameter type</th><th>Parameter</th><th>Example</th></tr>
<tr><td rowspan="6">Out</td><td>CUR_VAL</td><td>m³</td></tr>
<tr><td>LAST_VAL</td><td>m³</td></tr>
<tr><td>EST_VAL</td><td>m³</td></tr>
<tr><td>CUR_PWR</td><td>m³/h</td></tr>
<tr><td>AVG_PWR</td><td>m³/h</td></tr>
<tr><td>EST_PWR</td><td>m³/h</td></tr>
<tr><td rowspan="4">In/Out</td><td>V_MAN</td><td>m³</td></tr>
<tr><td>V_MAN_L1</td><td>m³</td></tr>
<tr><td>V_MAN_L2</td><td>m³</td></tr>
<tr><td>V_MAN_L3</td><td>m³</td></tr>
</table>
After changing all the attributes you save and close the FB.</td></tr>
<tr><td>5.</td><td>The FB is now ready and can be interconnected with the relevant measured value (water meter, for example).

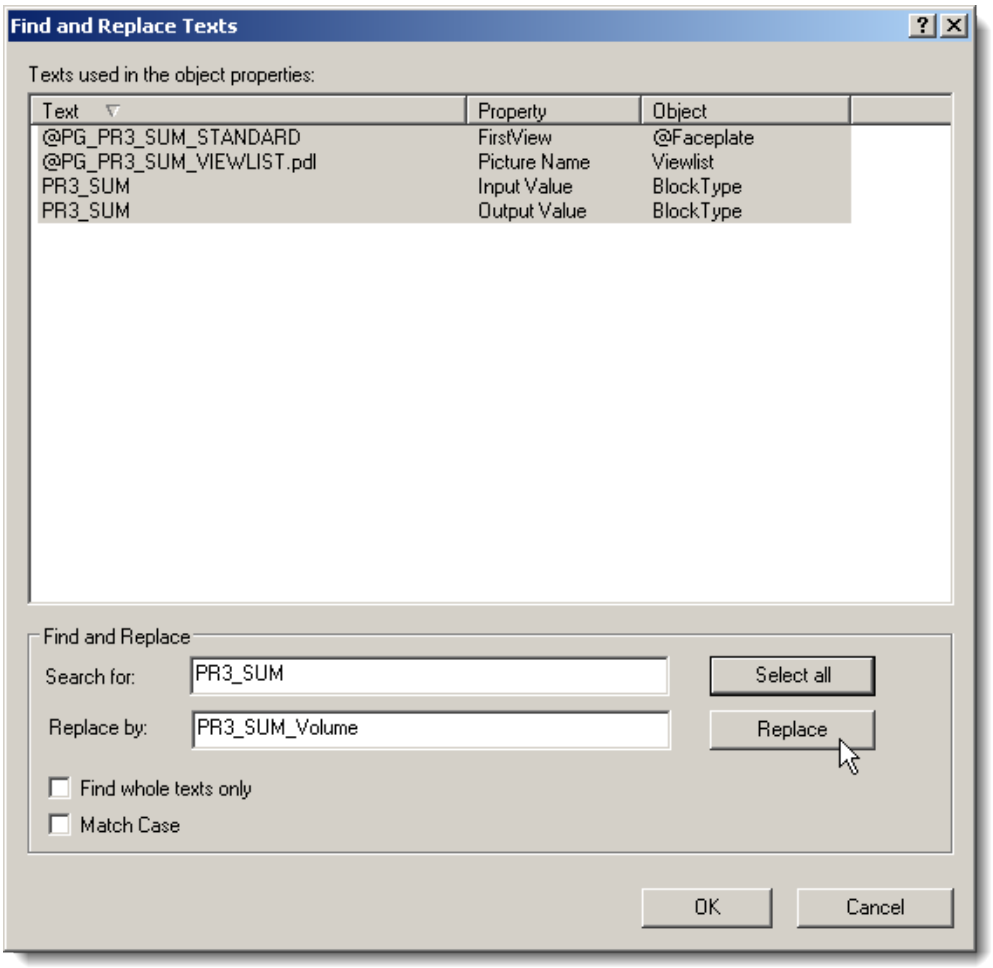
For this you call the new FB together with an instance data block (the call is similar to the default PRx-SUM blocks, in the FC103 "Energy" over OB34 every 100ms, for example).
Call the block according to the number of measuring points/measuring devices to be captured.
Create a new instance data block for each call.

Note
When assigning the symbolic name of the instance DB, choose a meaningful designation, because it will be used later for identification in the visualization and in the reports.

</td></tr>
</table>

Step	Description
6.	• Create all the necessary instance DBs. • Enable the "Operator Control and Monitoring" property in all instance DBs of the FB. • Then you compile the WinCC OS. **Note** Enabling this property creates a corresponding tag structure in the WinCC data management when the WinCC project is compiled. 
7.	Now start the powerrate wizard and update the process value archive.
8.	In the WinCC Explorer you open the "@Template_pre.pdl" powerrate picture library using the Graphics Designer. This picture was copied into the WinCC project directory beforehand when the OS project editor was run.
9.	• In the Graphics Designer you duplicate the faceplate for the PRx_SUM and open the Properties dialog. • In the Object Properties of the faceplate you change the "type" and "Servername" attributes accordingly. • In the example you must append the suffix "..._Volume" to the character string "PR3_SUM" – corresponding to the symbolic name of the new FB (in the example: "PR3_SUM_Volume", see Step 1). • Save the changes. 

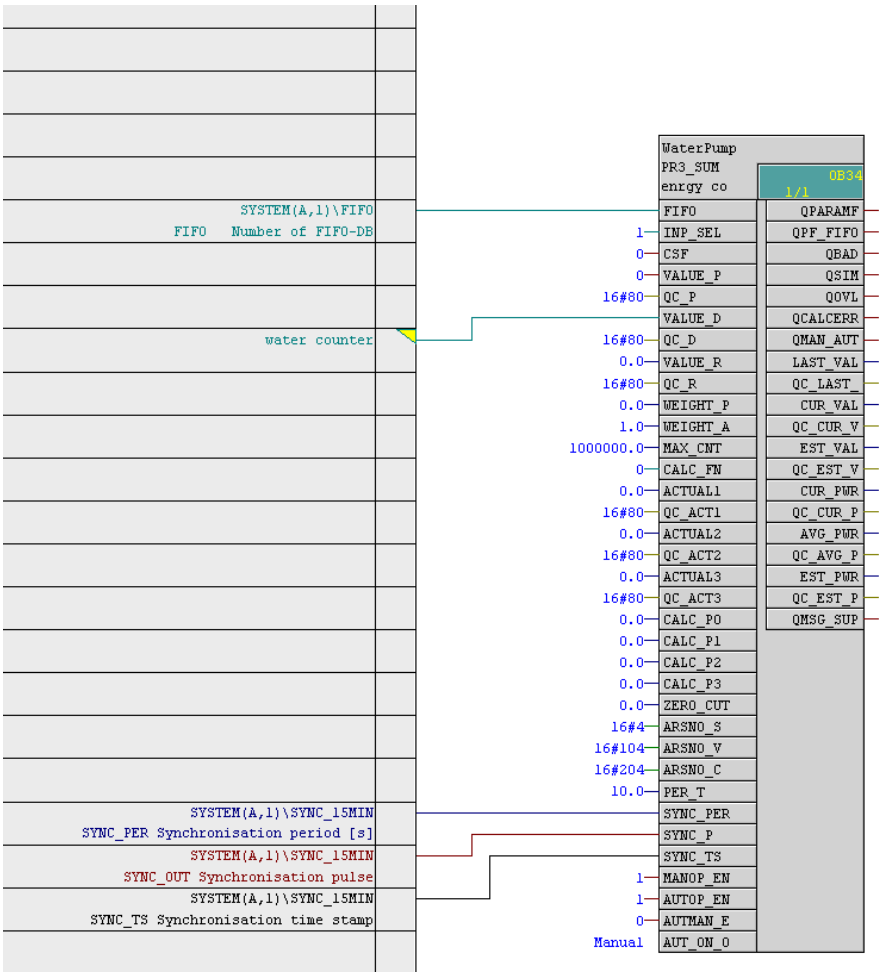
Step	Description
10.	In the file explorer (Windows Explorer, for example) you open the "GraCS" folder in the WinCC project directory. Here you find the following PRx_SUM faceplate pictures: - @PG_PRx_SUM.pdl - @PG_PRx_SUM_EDIT.pdl - @PG_PRx_SUM_MAINTENANCE.pdl - @PG_PRx_SUM_OVERVIEW.pdl - @PG_PRx_SUM_STANDARD.pdl - @PG_PRx_SUM_TABLE.pdl - @PG_PRx_SUM_VIEWLIST.pdl - @PL_PRx_SUM.pdl
11.	Duplicate these PDL files in the same directory and change the new name accordingly; for example, "@PG_PRx_SUM.pdl" to "@PG_PRx_SUM_Volume.pdl". 

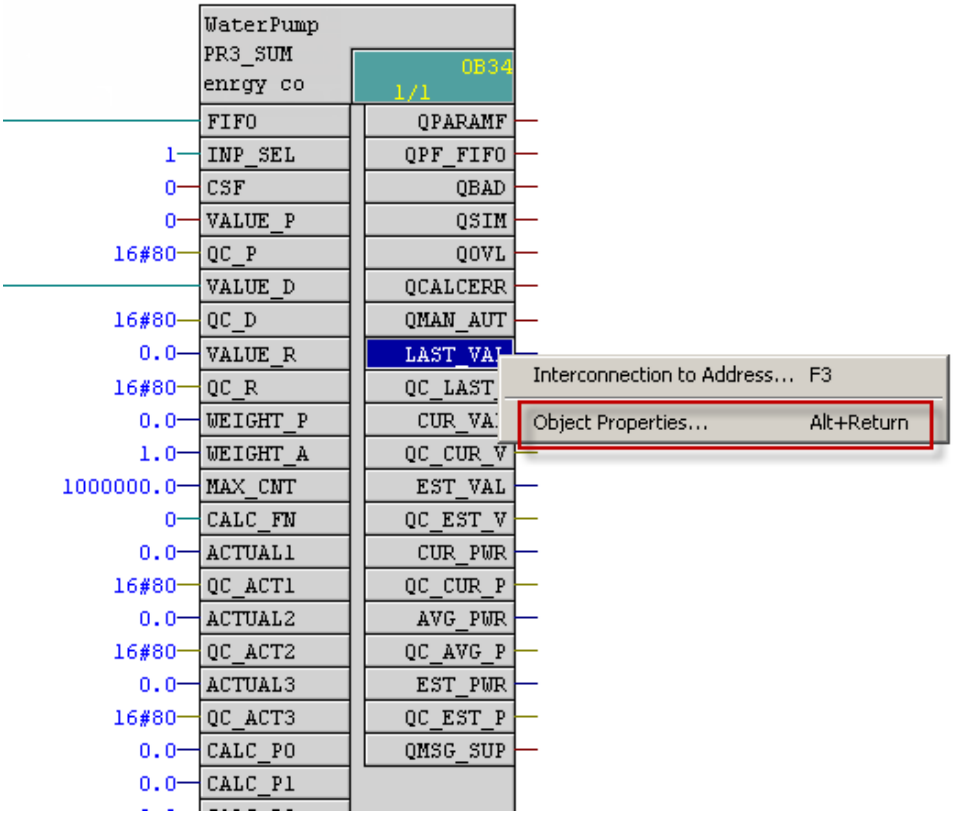
Step	Description
12.	• Open both new pictures "@PG_<block name>.pdl" and "@PL_<block name>.pdl". • In both pictures you use the "Linking" function in the Graphics Designer to change all the references and interconnections to the S7 block. • For this you use the key combination <Ctrl> + <A> to mark all the picture elements. • Open the editor through the menu "Edit > Re-wire > Texts…". 

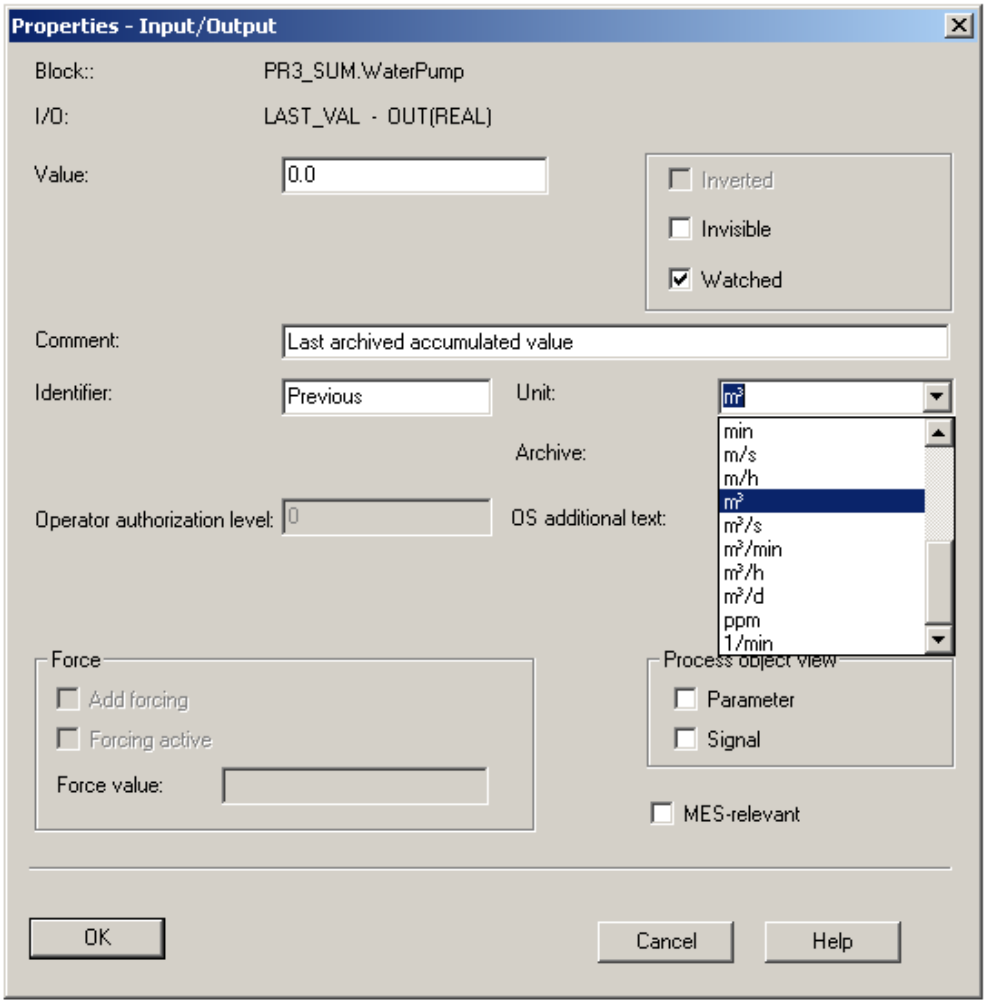
Step	Description
13.	Use the "Find and Replace" function to find the "PR3_SUM" character string and replace it with "PR3_SUM_Volume". 
14.	• Incorporate the new faceplate into your process pictures. • Then connect this to the new S7 capture blocks (like the standard "PRx_SUM" via the "Connect faceplate to measuring point" wizard in the Graphics Designer).
15.	Then transfer the changes to the CPU and start the WinCC Runtime.

3.2 Using the CFC Editor

Table 3-2

Step	Description
1.	• Insert a new "PRx_SUM" into your CFC plan. • CFC creates a new DB automatically in the background. • Assign a new name for the measuring point ('Water Pump', for example). 
2.	Interconnect as usual the CFC block of the "PRx_SUM" to your measuring point.

<table>
<tr><th>Step</th><th>Description</th></tr>
<tr><td>3.</td><td>Change the unit attribute at the following interface parameters of the CFC block.
<table>
<tr><th>Parameter type</th><th>Parameter</th><th>Example</th></tr>
<tr><td rowspan="6">Out</td><td>CUR_VAL</td><td>m³</td></tr>
<tr><td>LAST_VAL</td><td>m³</td></tr>
<tr><td>EST_VAL</td><td>m³</td></tr>
<tr><td>CUR_PWR</td><td>m³/h</td></tr>
<tr><td>AVG_PWR</td><td>m³/h</td></tr>
<tr><td>EST_PWR</td><td>m³/h</td></tr>
<tr><td rowspan="4">In/Out</td><td>V_MAN</td><td>m³</td></tr>
<tr><td>V_MAN_L1</td><td>m³</td></tr>
<tr><td>V_MAN_L2</td><td>m³</td></tr>
<tr><td>V_MAN_L3</td><td>m³</td></tr>
</table>
</td></tr>
<tr><td>4.</td><td>For this you open the "Object Properties" of each parameter.
 
</td></tr>
</table>

Step	Description
5.	In the Object Properties you now select the unit you want by one of these two methods: • Select from the drop-down list box • Enter text. 
6.	Now compile the CFC chart and then the WinCC OS.
7.	If you have created new measuring points (PRx_SUM_...) and have not run the powerrate wizard since then, start the wizard no to update the process value archive.
8.	Then transfer the changes to the CPU and start the WinCC Runtime.

4 Result

The desired units are displayed in the "PRx_SUM" faceplates regardless of the configuration method.

Figure 4-1