



# SIEMENS

Industrial Solutions and Services

## PCS 7 Driver Block Siprotec UM6x

Driver Block for  
SIMATIC S7-400 / PCS7 V6  
connected with  
**SIEMENS SIPROTEC4**  
**Multifunction Protection relay**  
over Profibus DP with Y-Switch  
**IT Plant Solutions**

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| Contents  | Page      |
|---|-----------|
| <b>1. Software-Requirements and use conditions .....</b>          | <b>3</b>  |
| <b>2. Solution principle.....</b>                                 | <b>4</b>  |
| <b>3. Installation .....</b>                                      | <b>5</b>  |
| 3.1. Step 7 block library.....                                    | 5         |
| 3.2. SIMATIC MANAGER – Hardware Config .....                      | 6         |
| 3.2.1. GSD-File .....   | 6         |
| 3.2.2. Hardware catalog .....                                     | 7         |
| 3.2.3. Hardware Configuration.....                                | 8         |
| 3.2.4. Project planning tips .....                                | 10        |
| 3.3. Device parameterisation multifunction protection relay ..... | 11        |
| 3.3.1. Parameterization 7UM61 .....                               | 11        |
| 3.3.2. Parameterization 7UM62.....                                | 12        |
| <b>4. Description of the function blocks .....</b>                | <b>13</b> |
| 4.1. Function block Y_S_2 .....                                   | 13        |
| 4.1.1. Function and Operating principle.....                      | 13        |
| 4.1.2. Calling OBs .....  | 13        |
| 4.1.3. Start-up Characteristics .....                             | 14        |
| 4.1.4. Error Handling .....                                       | 15        |
| 4.1.5. Message Characteristics .....                              | 16        |
| 4.1.6. CFC Representation.....                                    | 17        |
| 4.1.7. I/O list of the Y_S_2 block .....                          | 17        |
| 4.2. Function block SIP7UM61 .....                                | 18        |
| 4.2.1. Function and Operating principle.....                      | 18        |
| 4.2.2. Calling OBs .....  | 18        |
| 4.2.3. Start up characteristics.....                              | 19        |
| 4.2.4. Error handling.....  | 19        |
| 4.2.5. Message Characteristics .....                              | 20        |
| 4.2.6. Diagnosis .....  | 20        |
| 4.2.7. CFC Representation.....                                    | 21        |
| 4.2.8. I/O list of the SIP7UM61 .....                             | 22        |
| 4.3. Function block SIP7UM62.....                                 | 23        |
| 4.3.1. Function and Operating principle.....                      | 23        |
| 4.3.2. Calling OBs .....  | 23        |
| 4.3.3. Start up characteristics.....                              | 24        |
| 4.3.4. Error handling.....  | 24        |
| 4.3.5. Message Characteristics .....                              | 25        |
| 4.3.6. User defined commands.....                                 | 25        |
| 4.3.7. Scaling of measured values and divisors.....               | 25        |
| 4.3.8. cos Phi .....  | 26        |
| 4.3.9. Diagnosis .....  | 26        |
| 4.3.10. Annunciations.....  | 27        |
| 4.3.11. CFC Representation.....                                   | 32        |
| 4.3.12. I/O list of the SIP7UM62 .....                            | 33        |

## 1. Software-Requirements and use conditions

The library requires **SIMATIC STEP7 V5**.  
The blocks are executable in the CPU S7-41X.

**A license is necessary for the use of the driver library.**

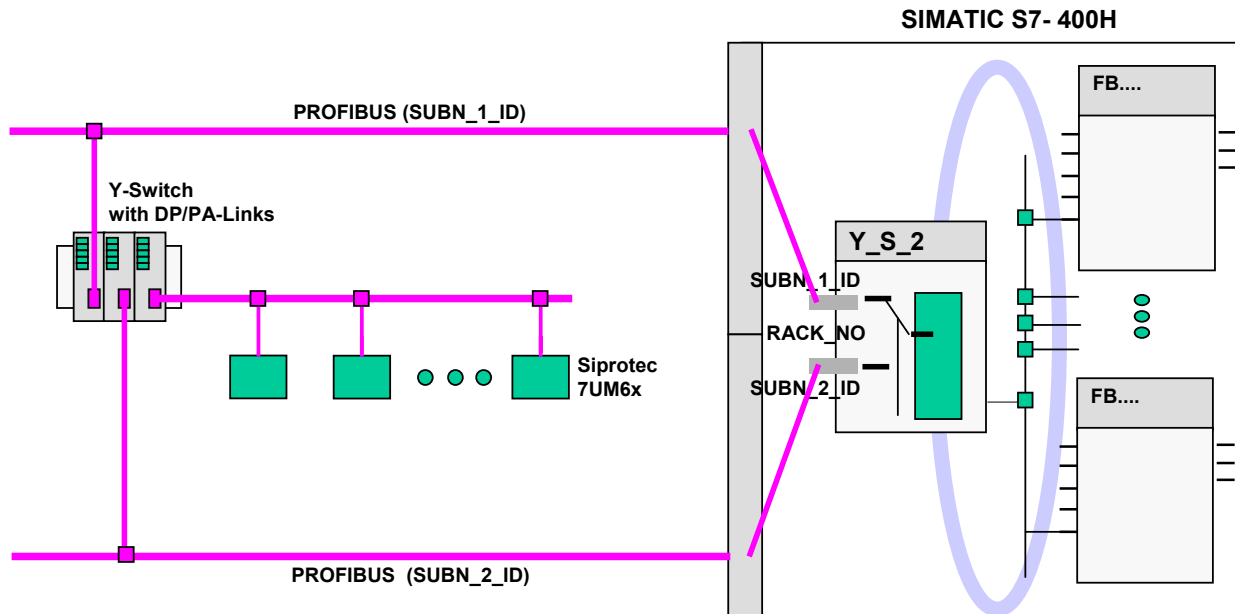
To use the blocks, you will need a license for each CPU.

The necessary GSD file is delivered by Siemens.

## 2. Solution principle

### Redundant mode with Y-Link

The devices SIPROTEC 4 (7UM6x) are connected with the Y-Link device to SIMATIC S7 H.



The hardware needed for the Y-link system is listed in the following table.

| Component                   | Amount | Reference number    |
|-----------------------------|--------|---------------------|
| PS 407 10A                  | 2      | 6ES7 307-1BA00-0AA0 |
| SIMATIC DP/PA Link IM 157   | 2      | 6ES7 157-0AA82-0XA0 |
| Y-COUPLER                   | 1      | 6ES7 197-1LB00-0XA0 |
| Bus module BM IM 157/ IM157 | 1      | 6ES7 195-7HD80-0XA0 |
| Bus module Y-Coupler        | 1      | 6ES7 654-7HY00-0XA0 |

This documentation concerns SIPROTEC4-Devices:

| Device 7UM6x | Firmware As of Version | PROFIBUS-DP communication module as of Version |
|--------------|------------------------|--|
| 7UM61        | 4.0                    | 01.03.01                                       |
| 7UM62        | 4.10                   | 02.00.05.                                      |

### 3. Installation

#### 3.1. Step 7 block library

The block is supplied as archived Step 7 library with the file name **Lib\_PCS7\_SIP-UM6x\_V22\_[Y2].zip** (xx: version).

The library is retrieved over the SIMATIC MANAGER. As target directory the catalogue **SIEMENS\STEP7\S7libs** is indicated.

After the installation the driver blocks are available in the block library **SIP\_UM6x\_Y2\_Vxx**.

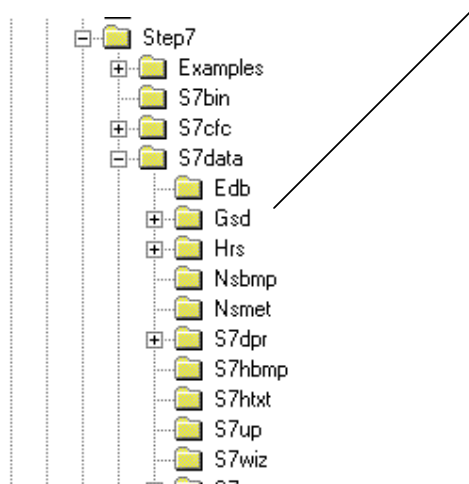


### 3.2. SIMATIC MANAGER – Hardware Config

#### 3.2.1. GSD-File

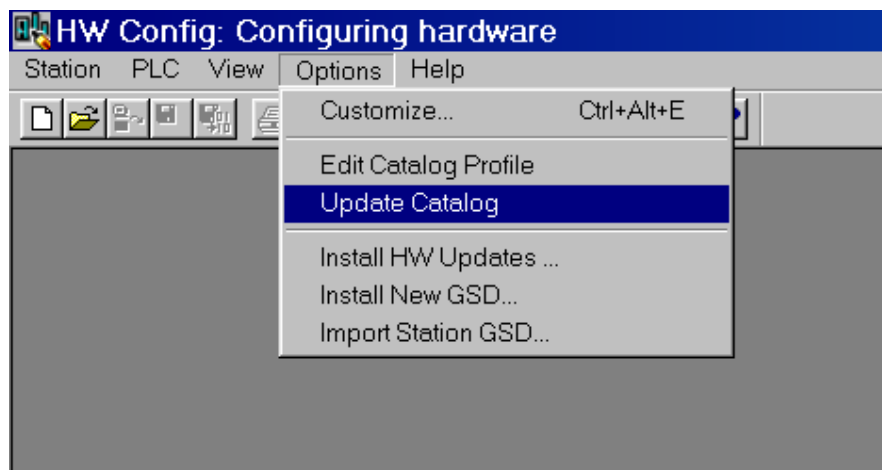
You receive the actual necessary GSD file with the device from Siemens, or over the PNO (Profibus Nutzer Organisation).

Copy the GSD-File **siem80a1.gsd** in the Step7-directory **S7data\Gsd**.



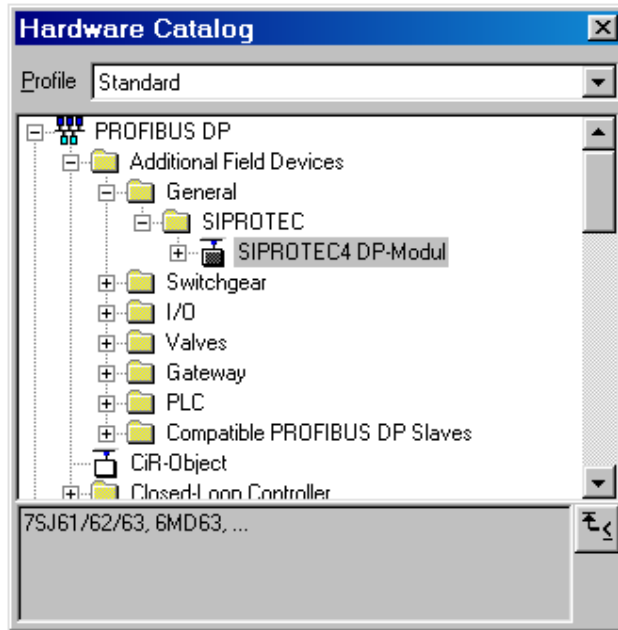
In order to insert the device in the SIMATIC Hardware catalogue (Profibus-DP) in SIMATIC - Manager (Hardware Config), you have to activate in the menu „options“ the following:

**‘Options → Update Catalog’**

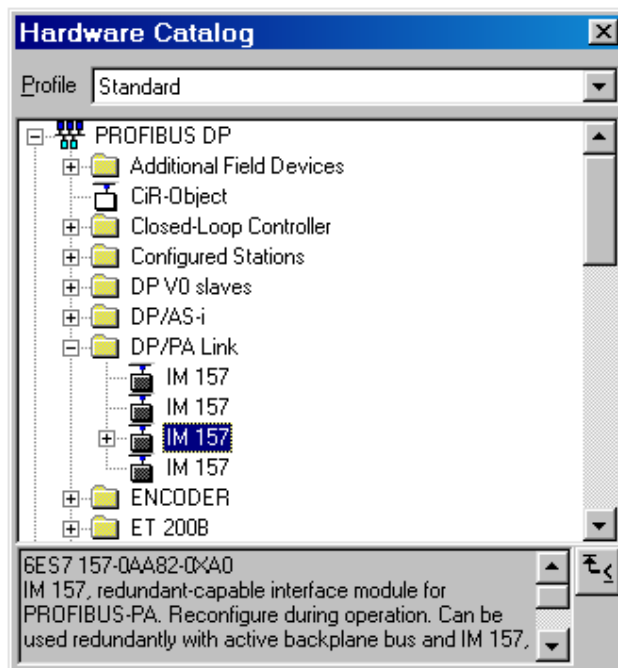


### 3.2.2. Hardware catalog

To configure the Hardware you have to select the DP slave Siprotec from the folder Siprotec.

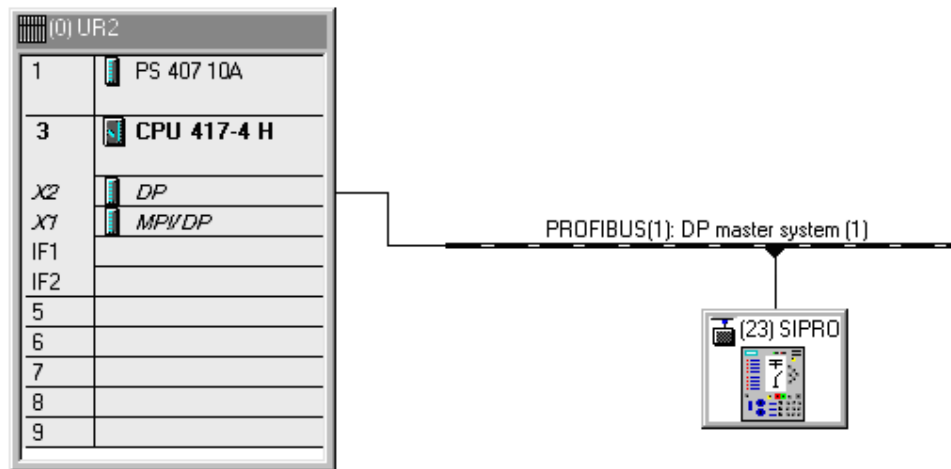


For a redundant system you also need to use the DP/PA link IM 157 with the identification number given previously.



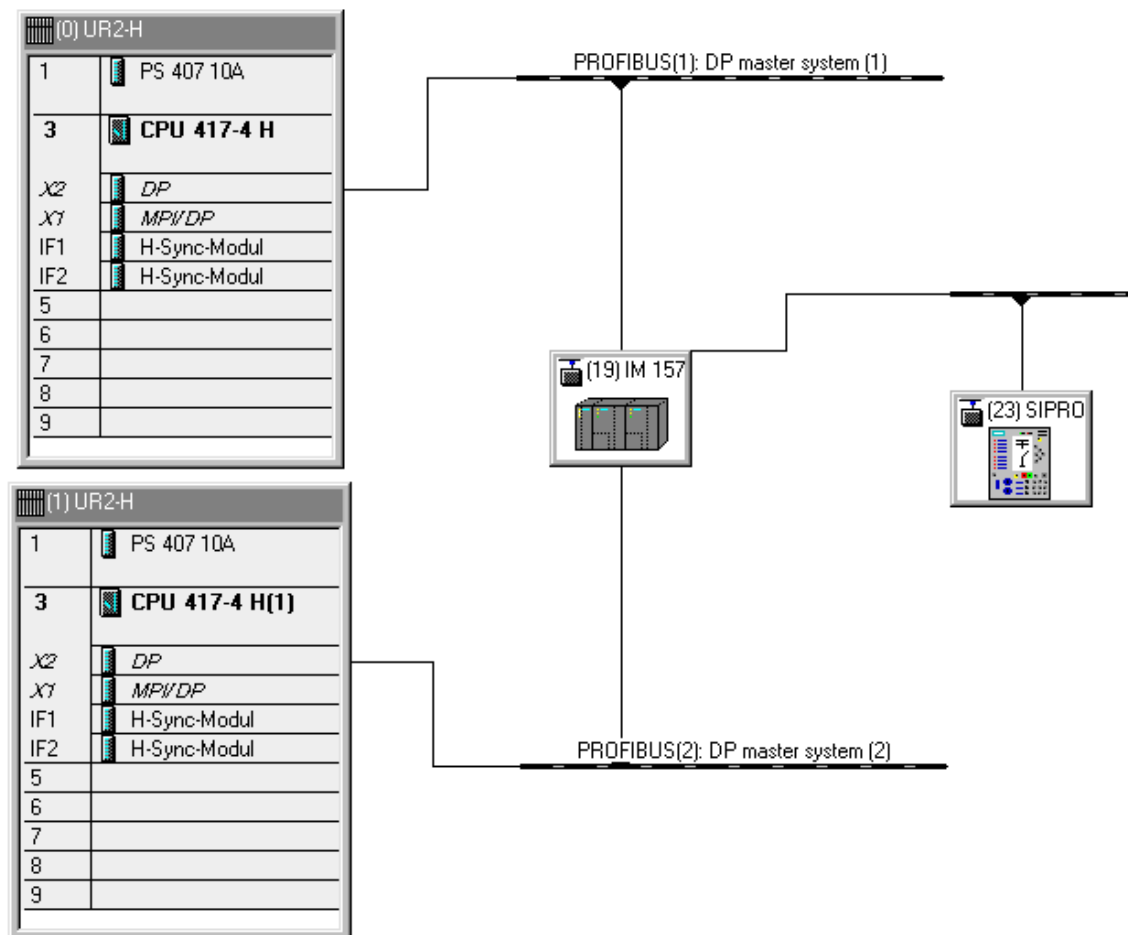
**3.2.3. Hardware Configuration**

**Stand-alone CPU:**



*HW configuration with one Siprotec device*

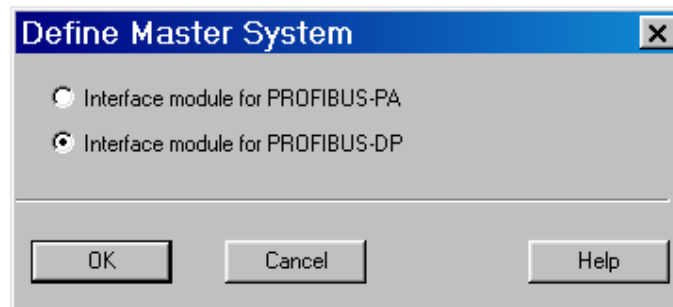
**Redundant System:**



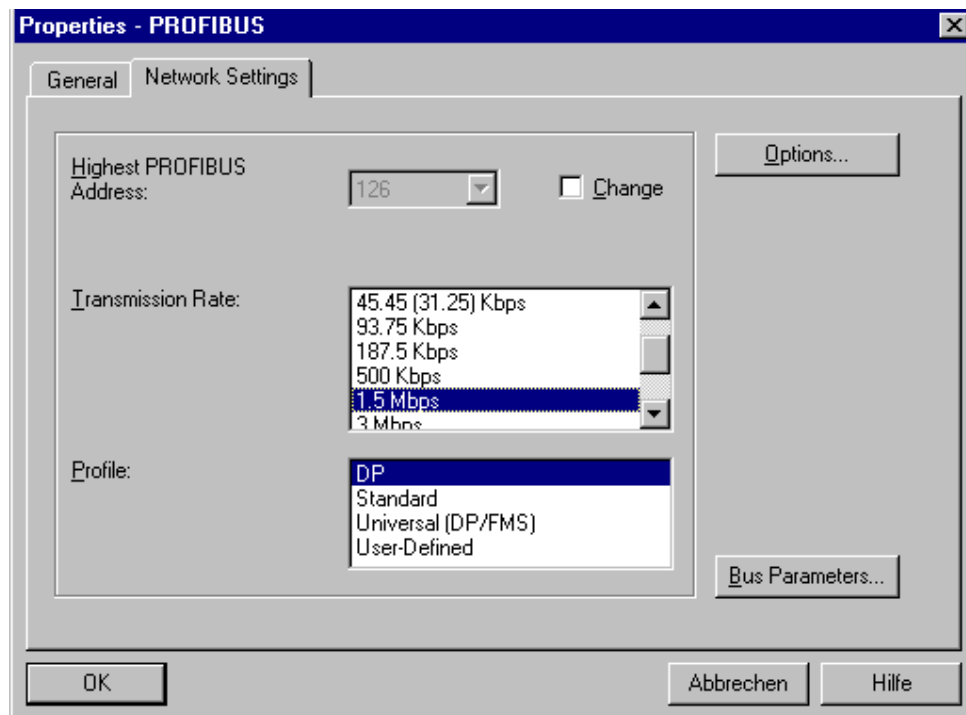
*Siprotec device with an H-System*



The Profibus DP/PA Link must be configured as DP Master system:



The Profibus Master system (CP or at the CPU) must be configured as DP Master system:



By projection over the DP Master system, you can choose the slave addresses between 3 and 125.

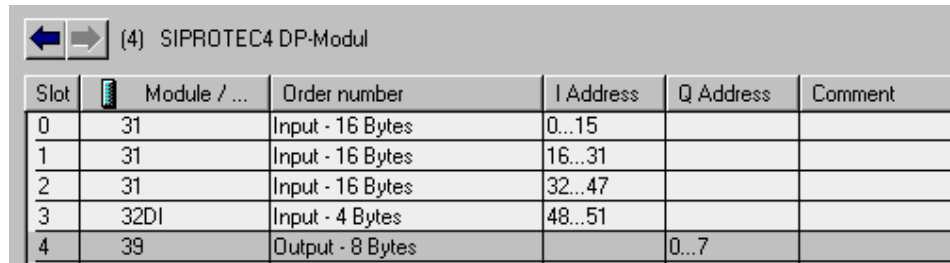


**ATTENTION!!**

- **When there are many different devices projected over the DP bus, the devices, which work with the Y-link, have to be addressed first.**  
That means that they get the lower addresses.
- The number of slaves that you can project over the DP bus is limited:
  - Up to 64 devices can be connected to the Y-link
  - The total of modules belonging to the devices connected to the Y-link is limited to 236
  - The Profibus telegram supports a maximum of 244 input bytes and 244 output bytes.

By the configuration of the PROFIBUS-DP Slave of the SIPROTEC4-Device, starting point is standard mapping for the device parameterisation:

|                                   |  |
|-----------------------------------|--|
| <b>7UM61 standard mapping 2-1</b> | Telegram data:<br>- 52 Bytes Input<br>- 8 Bytes Output |
| <b>7UM62 standard mapping 3-1</b> | Telegram data:<br>- 68 Bytes Input<br>- 8 Bytes Output |



| Slot | Module / ... | Order number     | I Address | Q Address | Comment |
|------|--------------|------------------|-----------|-----------|---------|
| 0    | 31           | Input - 16 Bytes | 0...15    |           |         |
| 1    | 31           | Input - 16 Bytes | 16...31   |           |         |
| 2    | 31           | Input - 16 Bytes | 32...47   |           |         |
| 3    | 32DI         | Input - 4 Bytes  | 48...51   |           |         |
| 4    | 39           | Output - 8 Bytes |           | 0...7     |         |

*Example: Configuration of the SIPROTEC4 DP-Module for 7UM61*

### 3.2.4. Project planning tips

#### Run sequence:

Before to download in the CPU, you have to check the run sequence (see CFC Menu: Edit\Run sequence).

In all OBs (70, 72, 82, 85, 86, 100, 122, cyclic interrupt OB), **Y\_S\_2** driver block have to be projected at the beginning of the sequence.

The driver blocks of device such as **SIP7UM61**,... etc has to be projected after it.

You have also to pay attention to the fact that RACK or SUBNET Block have not to be integrated before.

#### HKIR:

You have to use CPU Firmware as of 3.0. By HKIR, you have the possibility to erase or to insert slaves over the non redundant bus. For the Y Link, that means a telegram construction change. To be sure that the present slaves won't be disturbed during the HKIR, you can set the input **LGCADRON** to 1 before this action. You have also to check before, that **LGCADR\_0**, **LGCADR\_1**... match the logical addresses in Hardware Config. You can reset the input **LGCADRON** after the HKIR. In any case, the input **RACK\_NO** must be always correctly parameterised, also when **LGCADRON** is switched on (for the diagnosis analysis).

### 3.3. Device parameterisation multifunction protection relay

To parameterise the device you have to use the software **DIGSI valid from Version 4.21**.

Each device has many possibility of standard mapping, which provide an assignment of device data object to Profibus DP telegram position. This standard allocation will be changed for the transfer of the measured values over Profibus DP and the display of the FB-Parameter.

The change of the measured value conversion in device (scaling) takes place in DIGSI-Manager \ Parameter \ Assignment in Object properties- Dialog window of the measured value through choice of a scaling index.

The unit of the measured value will be automatically assigned and act by primary values in accordance with the parameterised nominal values of the primary power system (DIGSI: Power system data1 and Power system data 2).

**Attention:** After change of bus specific parameters (for example PROFIBUS-DP Slave address) all scaling will be reset to the default values using DIGSI till V4.3.

#### 3.3.1. Parameterization 7UM61

Starting with standard mapping 2-1 of the device 7UM61, the measured values have to be allocated to the target system interface as follow using DIGSI:

|           | Information |             |   | Quelle |    |   |   |   |   |   | Ziel |                  |   |   |   |
|-----------|-------------|-------------|---|--------|----|---|---|---|---|---|------|------------------|---|---|---|
|           | Nummer      | Displaytext | L | Typ    | BE |   |   |   |   |   |      | Messwert-Fenster | S | C |   |
|           |             |             |   |        | 1  | 2 | 3 | 4 | 5 | 6 | 7    |                  |   |   |   |
| Messwerte | 00601       | IL1 =       |   | MW     |    |   |   |   |   |   |      |                  |   | X | X |
|           | 00602       | IL2 =       |   | MW     |    |   |   |   |   |   |      |                  |   | X | X |
|           | 00603       | IL3 =       |   | MW     |    |   |   |   |   |   |      |                  |   | X | X |
|           | 00624       | UL12=       |   | MW     |    |   |   |   |   |   |      |                  |   | X |   |
|           | 00625       | UL23=       |   | MW     |    |   |   |   |   |   |      |                  |   | X |   |
|           | 00626       | UL31=       |   | MW     |    |   |   |   |   |   |      |                  |   | X |   |
|           | 00641       | P =         |   | MW     |    |   |   |   |   |   |      |                  |   | X |   |
|           | 00642       | Q =         |   | MW     |    |   |   |   |   |   |      |                  |   | X |   |
|           | 00645       | S =         |   | MW     |    |   |   |   |   |   |      |                  |   | X |   |
|           | 00644       | f =         |   | MW     |    |   |   |   |   |   |      |                  |   | X |   |
|           | 00901       | cosPhi=     |   | MW     |    |   |   |   |   |   |      |                  |   | X |   |

| Byte Offset | Object No | Measured value | Scaling-index |
|-------------|-----------|----------------|---------------|
| 14          | 601       | IA             | 2             |
| 16          | 602       | IB             | 2             |
| 18          | 603       | IC             | 2             |
| 20          | 624       | Va-b           | 2             |
| 22          | 625       | Vb-c           | 2             |
| 24          | 626       | Vc-a           | 2             |
| 26          | 641       | P              | 1             |
| 28          | 642       | Q              | 1             |
| 30          | 645       | S              | 1             |
| 32          | 644       | f              | 0             |
| 34          | 901       | cos(PHI)       | 0             |

### 3.3.2. Parameterization 7UM62

Starting with standard mapping 3-1 of device 7UM62 the measured and counter values will be allocated as follow using:

| Byte Offset | Object No | Measured Value | Scaling index |
|-------------|-----------|----------------|---------------|
| 20          | 624       | Va-b           | 2             |
| 22          | 625       | Vb-c           | 2             |
| 24          | 626       | Vc-a           | 2             |
| 26          | 641       | P              | 1             |
| 28          | 642       | Q              | 1             |
| 30          | 645       | S              | 1             |
| 32          | 644       | f              | 0             |
| 34          | 901       | cos(PHI)       | 0             |
| 36          | 721       | IAS1           | 2             |
| 38          | 722       | IBS1           | 2             |
| 40          | 723       | ICS1           | 2             |
| 44          | 627       | UE             | 0             |
| 46          | 621       | UL1E           | 2             |
| 48          | 622       | UL2E           | 2             |
| 50          | 623       | UL3E           | 2             |
| 52          | 888       | Wplmp          | 1             |
| 56          | 889       | Wqlmp          | 1             |

## 4. Description of the function blocks

### 4.1. Function block Y\_S\_2

**Type / Number**                      FB 452

#### 4.1.1. Function and Operating principle

The function block **Y\_S\_2** forms the interface between the Y-link also known as Y-Switch (2 DP/PA Links + Y-Coupler) and the blocks of the SIMATIC PCS7 libraries. It also can be interconnected with other SIMATIC S7 blocks.

It can only be used on a SIMATIC S7 with PROFIBUS-DP master properties. Beyond it the CPU must possess the reporting ability with **ALARM\_8P**.

For all the devices connected to a Y-link, the associated function blocks have to be connected via the output **RACK\_CONNECT** to the **Y\_S\_2** block with the input **CONNECT**.

The inputs **RACK\_NO** (Y-link Profibus address), **SUBN\_1\_ID** (primary DP-Master number) and **SUBN\_2\_ID** (redundant DP-Master number) must be specified like projected in Hardware Configuration.

The input **CP\_ON** must be set to 1, if the PROFIBUS DP connection is realised with CPs (e.g. CP 443-5 Ext.).

With the input **EN\_MSG=1** the PLC Process Control Messages will be enabled.

If the DP master is configured with the DP mode "DPv1", the input **DPV1\_MODE** must be set to 1 otherwise it has to be set to 0.

In addition the function **FC 501** (GET\_DBN) have to exist in the block folder of the project.

#### 4.1.2. Calling OBs

The block can be installed alternatively in the following OBs:

- Watchdog interrupt OB: e.g. OB35

The block must be installed with the same instance in the following OBs:

- OB70 for Periphery redundancy failure
- OB72 for CPU redundancy failure
- OB82 for diagnosis interrupt recognition
- OB85 for I/O access failure over Process image
- OB86 for rack or line failure recognition
- OB100 for start-up recognition
- OB122 for I/O access error recognition

---

**Caution**

The OBs listed in the preceding paragraph must be loaded into the AS, as otherwise the AS will call the respective OB when one of the triggering events occurs, and – if it finds no OB – will switch to STOP. In project design with CFC this is handled automatically, provided you are using **Y\_S\_2** driver blocks. To ensure that the CPU remains in RUN when one of these events occurs, the local data stacks (priority classes) belonging to the OBs must be increased accordingly (see manual: “System software for S7-300/400, system and standard functions”). These are to be changed in Hardware Config/CPU/Properties/local data. If the local data stack overflows the CPU switches to Stop.

---

#### 4.1.3. Start-up Characteristics

In cold start/start-up the block determines, on the basis of **SUBN\_1\_ID** and **RACK\_NO** or, in redundancy case, of **SUBN\_2\_ID** and **RACK\_NO**, whether a device with the properties of a Y-Switch is connected to the PROFIBUS-DP. In the event of an error **QPARF\_1** or **QPARF\_2** is set to 1 (see „Error Handling“).

#### 4.1.4. Error Handling

The block algorithm handles the following cases:

| Parameter    | Description  |
|--------------|--|
| QPARF_1 = 1  | Parameter setting error primary DP/PA Link.<br>Wrong DP station number (SUBN_1_ID, RACK_NO)  |
| QPARF_2 = 1  | Parameter setting error redundant DP/PA Link.<br>Wrong DP-station number (SUBN_2_ID, RACK_NO)  |
| QPERAF_1 = 1 | Periphery accesses failure.<br>The block was unable to access primary DP/PA Link.  |
| QPERAF_2 = 1 | Periphery accesses failure.<br>The block was unable to access redundant DP/PA Link.  |
| QRACKF_1 = 1 | DP device failure. No communication with primary DP/PA Link.<br>Possible causes are: PROFIBUS-DP failed, primary Link failed, not switched on, no link to the PROFIBUS-DP.     |
| QRACKF_2 = 1 | DP device failure. No communication with redundant DP/PA Link.<br>Possible causes are: PROFIBUS-DP failed, redundant Link failed, not switched on, no link to the PROFIBUS-DP. |
| QTOT_ERR = 1 | No communication to both DP/PA Links   |
| QHLV_ERR = 1 | Start-up delay of IM157 active (no communication)  |
| QPDP_ERR = 1 | Missing parameterisation, station unknown (no Communication)   |
| QCOM_ERR = 1 | Communication error to at least one station.   |

---

**Note**

In the event of a parameter assignment error or DP device failure, access is no longer made to the belonging DP/PA Link (primary or redundant). After the fault has been rectified, the block automatically resumes communication with DP/PA Link.

---

#### 4.1.5. Message Characteristics

With the input **EN\_MSG=1** you can enable the PLC Process Control Messages. In the table you will find the message texts of the driver block **Y\_S\_2** and their allocation to the driver block parameters.

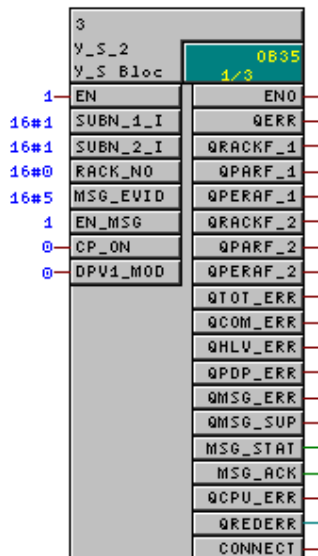
| Message number | Block parameter | Default message text                           | Message class |
|----------------|-----------------|--|---------------|
| 1              | QRACKF_1        | Comm. Failure primary DP/PA Link               | S             |
| 2              | QRACKF_2        | Comm. Failure redundant DP/PA Link             | S             |
| 3              | QPERAF_1        | Periph. failure primary DP/PA Link             | S             |
| 4              | QPERAF_2        | Periph. failure redundant DP/PA Link           | S             |
| 5              | QPARF_1         | Param. failure primary DP/PA Link              | S             |
| 6              | QPARF_2         | Param. failure redundant DP/PA Link            | S             |
| 7              | QCOM_ERR        | Failure in at least one station                | S             |
| 8              | QTOT_ERR        | Comm. Failure primary and redundant DP/PA Link | S             |

Over the ten associated values of **ALARM\_8P** the three first one are occupied with **SUBN\_1\_ID**, **SUBN\_2\_ID** and **RACK\_NO**. In associated value 4 the active Subnet number and in associated value 5 the active Rack number are copied. The other associated values are free. The following table presents the allocation of the associated values to the driver block parameters.

| Associated value | Block parameter              |
|------------------|------------------------------|
| 1                | SUBN_1_ID                    |
| 2                | SUBN_2_ID                    |
| 3                | RACK_NO                      |
| 4                | BEGL5 (active Subnet number) |
| 5                | BEGL6 (active Rack number)   |
| 6                | Free                         |
| 7                | Free                         |
| 8                | Free                         |
| 9                | Free                         |
| 10               | Free                         |



**4.1.6. CFC Representation**



**4.1.7. I/O list of the Y\_S\_2 block**

| Type | I/O Name  | Data Type | Default | Comment within Interface                   |
|------|-----------|-----------|---------|--|
| I    | SUBN_1_ID | BYTE      | 1       | Subnet ID primary Module                   |
| I    | RACK_NO   | WORD      | 0       | Rack Number Module                         |
| I    | SUBN_2_ID | BYTE      | 1       | Subnet ID red. Module                      |
| I    | MSG_EVID  | DWORD     | 2       | Message ID                                 |
| I    | EN_MSG    | BOOL      | 1       | Enable 1=Alarming                          |
| I    | CP_ON     | BOOL      | 0       | 1=Y-Link over CP                           |
| I    | DPV1_MODE | BOOL      | 0       | 1 = DPv1 mode otherwise S7 compatible      |
| O    | QERR      | BOOL      | 1       | 1=Error                                    |
| O    | QMSG_ERR  | BOOL      | 0       | ALARM_8P Error                             |
| O    | QMSG_SUP  | BOOL      | 0       | 1=Message Suppression active               |
| O    | MSG_STAT  | WORD      | 0       | ALARM_8P: STATUS Output                    |
| O    | MSG_ACK   | WORD      | 0       | ALARM_8P: ACK_STATE Output                 |
| O    | QRACKF_1  | BOOL      | 0       | 1=Rack Failure prim. gateway               |
| O    | QPERAF_1  | BOOL      | 0       | 1=I/O Module Access Failure prim. gateway  |
| O    | QPARF_1   | BOOL      | 0       | 1=Parameter Assignment Error prim. gateway |
| O    | QRACKF_2  | BOOL      | 0       | 1=Rack Failure red. gateway                |
| O    | QPERAF_2  | BOOL      | 0       | 1=I/O Module Access Failure red. gateway   |
| O    | QPARF_2   | BOOL      | 0       | 1=Parameter Assignment Error red. gateway  |
| O    | CONNECT   | BOOL      | 0       | Connect to slave                           |
| O    | QCOM_ERR  | BOOL      | 0       | 1=Slave Communication failure              |
| O    | QHLV_ERR  | BOOL      | 0       | 1=Delay for active IM157                   |
| O    | QPDP_ERR  | BOOL      | 0       | 1=Default parameterisation                 |
| O    | QCPU_ERR  | BOOL      | 0       | 1= CPU error                               |
| O    | QREDERR   | INT       | 0       | CPU error code                             |
| O    | QTOT_ERR  | BOOL      | 0       | 1=Total failure                            |

## 4.2. Function block SIP7UM61

Type / Number      FB 570

### 4.2.1. Function and Operating principle

The **SIP7UM61** block forms the interface between the Siprotec Devices 7UM61 and the blocks of the SIMATIC PCS7 libraries. It can also be interconnected with other SIMATIC S7 blocks. It can only be used on one SIMATIC S7 with PROFIBUS-DP master properties. The CPU has to support the ALARM\_8P functionalities.

As configured in the HW Config, the Profibus DP address of the device and the Subnet ID must be parameterized over the input parameters **RACK\_NO** and **SUBN\_ID**.

If the DP master is configured with the DP mode "DPV1", the input **DPV1\_MODE** must be set to 1 otherwise it has to be set to 0.

With the input **EN\_MSG=1** the PLC Process Control Messages will be enabled.

The block **SIP7UM61** can be used redundant (connected to Y Link) or not redundant.

#### Non-redundant system:

In a non-redundant system **RED\_ON** must be set to „0“.

#### Redundant system:

The input **SUBN\_ID** is not active in this configuration.

The input parameter **RACK\_CONNECT** has to be connected to the output parameter **CONNECT** of the **Y\_S\_2** Block.

The output **QRACKF** may be set to 1 if special events occur at the **Y\_S\_2** block:

- QTOT\_ERR = 1 or QPDP\_ERR = 1 or QHLV\_ERR = 1
- Diagnostics analysis.

You can also choose to give manually the logical addresses for inputs / outputs over the parameters **LGCADR\_0,...** To use this parameter, you have to set **LGCADRON** = 1.



***You have to pay attention that all the devices connected to the Y-Switch have their corresponding function blocks SIP7UM6x connected to the Y\_S\_2 block and are correctly parameterized.***

---

### 4.2.2. Calling OBs

The block can be installed alternatively in the following OBs:

- Watchdog interrupt OB: e.g. OB35

The block must be installed with the same instance in following OBs:

- OB85 for priority class error
- OB86 for rack or line failure recognition
- OB100 for start-up recognition
- OB122 for I/O access error recognition

**Caution**

The OBs listed in the preceding paragraph must be loaded into the AS, as otherwise the AS will call the respective OB when one of the triggering events occurs, and – if it finds no OB – will switch to STOP. In project design with CFC this is handled automatically, provided you are using these blocks. To ensure that the CPU remains in RUN when one of these events occurs, the local data stacks (priority classes) belonging to the OBs must be increased accordingly (see manual: "System software for S7-300/400, system and standard functions"). These are to be changed in Hardware Config/CPU/Properties/local data. If the local data stack overflows the CPU switches to Stop.

**4.2.3. Start up characteristics**

The block determines, on the basis of **SUBN\_ID** and **RACK\_NO** (or only of **RACK\_NO** in redundant mode), whether a device with the properties of an Siprotec is connected to the Profibus-DP. In the event of an error **QPARF** (and QPARF2 in redundant mode) is set to 1 (see „Error Handling“).

**4.2.4. Error handling**

The block algorithm handles the following cases:

|            |   |
|------------|---|
| QPARF = 1  | Parameter setting error. If the primary DP station number (SUBN_ID, RACK_NO) is wrong, the output is set equal to 1.                |
| QPARF2 = 1 | Parameter setting error. If the redundant DP station number (SUBN_ID2, RACK_NO) is wrong, the output is set equal to 1.             |
| QRACKF = 1 | DP device failure. No communication with the device.<br>Causes are: PROFIBUS-DP failed, Device failed, off, no link to PROFIBUS-DP. |
| QPERAF = 1 | Periphery access failure. The block was unable to access the device.  |

**Note**

Access is no longer made to the device in the event of a parameter assignment error or DP device failure. After the fault has been rectified, the block automatically resumes communication with device. The fault messages of the device must be reset by means of fault acknowledgement. Diagnostic data relating to fault messages can be read only via the parameter assignment interface.

In redundant mode, if **QPARF**= 1 and **QPARF2** = 1, the configuration of the function block is wrong or the **Y\_S\_2** block is returning a general error.

#### 4.2.5. Message Characteristics

In the table you will find the message texts of the driver block and their allocation to the driver block parameters.

| Message Number | Block parameter | Default message text | Message class |
|----------------|-----------------|----------------------|---------------|
| 1              | QRACKF          | DP device failure    | S             |
| 2              | QPARF OR QPARF2 | Parameter failure    | S             |
| 3              | QPERAF          | Access failure       | S             |

Over the associated values of ALARM\_8P are transmitted several data or parameters values which are listed in the following table.

| Associated value | Block parameter |
|------------------|-----------------|
| 1                | Act. SUBN_ID    |
| 2                | Act. RACK_NO    |

#### 4.2.6. Diagnosis

Over the status byte **QSTATE** will be displayed the following states:

| QSTATE Bit | Designation     | Comments  | Internal Object No |
|------------|-----------------|---|--------------------|
| 0          | Device OK       | 1 = Update of the device replica in the Siprotec device completed after initial start or restart  | 51                 |
| 1          | ProtActive      | 1 = At least one protection function is active  | 52                 |
| 2          | Error Sum Alarm | 1 = Error with a summary alarm ON   | 140                |
| 3          | Alarm Sum event | 1 = Alarm summary event ON  | 160                |
| 4          | Relay PICKUP    | 1 = Relay PICKUP (summary alarm)  | 501                |
| 5          | Relay Trip      | 1 = Relay general Trip command (summary alarm)  | 511                |
| 6          | Operat. cond    | 1 = suitable measured quantities present at the device inputs<br>( $V > 0,1 * V_{nom}$ , $I > 0,1 * I_{nom}$ and $10 \text{ Hz} < \text{freq.} < 70 \text{ Hz}$ ) | 5002               |
| 7          | <reserved>      |   |                    |

The "Error with a summary alarm" is ON if at least one of the following internal alarms assumes the value ON:

"Error: A/D converter", "Error: 1A/5A wrong", "Error: Neutral CT different from MLFB", "Error Board 0", "Error Board 1", "Error Board 2", "Error Board 3", "Error Board 4", "Error Board 5", "Error Board 6", "Error Board 7".

The "Alarm summary event" is indicated if at least one of the following internal alarms assumes the ON status:

"Failure: Current supervision", "Failure: Voltage supervision", "VT Fuse Failure", "Failure: Phase sequence", "Alarm: No calibration data available", "Error: Offset", "Error: Power supply", "Failure: Battery empty".

4.2.7. CFC Representation

|          |                |
|----------|----------------|
| 5        |                |
| SIP7UM61 | OB35           |
| Driver f | 1/5            |
| 16#1     | SUBN_ID QERR   |
| 16#0     | RACK_NO QRACKF |
| 0        | RED_ON QPERAF  |
| 1        | DPV1_Mod QPARF |
| 1        | EN_MSG QSTATE  |
| 0        | LGCADRON IL1   |
|          | RACK_CON IL2   |
| 16#6     | MSG_EVID IL3   |
| 0        | LGCADR_0 UL12  |
| 0        | LGCADR_1 UL23  |
| 0        | LGCADR_2 UL31  |
| 0        | LGCADR_3 P     |
| 0        | LGCADR_4 Q     |
|          | S              |
|          | Freq           |
|          | cosphi         |

4.2.8. I/O list of the SIP7UM61

| IO | Parameter    | IO Type | Comment   |
|----|--------------|---------|---|
| I  | SUBN_ID      | BYTE    | Subnetz-Nummer Profibus DP                        |
| I  | RACK_NO      | WORD    | DP Teilnehmeradresse des 7UM61                    |
| I  | RED_ON       | BOOL    | 1=Redundancy ON                                   |
| I  | DPV1_Mode    | BOOL    | 1 : DPV1 , 0 : S7 compatible                      |
| I  | EN_MSG       | BOOL    | Enable 1=Alarming                                 |
| I  | LGCADRON     | BOOL    | 1:logical adress ON (only by red.)                |
| I  | RACK_CONNECT | ANY     | Connect to Y block                                |
| I  | MSG_EVID     | DWORD   | Message ID  |
| IO | LGCADR_0     | INT     | logical adress for module 0 (only by red.)        |
| IO | LGCADR_1     | INT     | logical adress for module 1 (only by red.)        |
| IO | LGCADR_2     | INT     | logical adress for module 2 (only by red.)        |
| IO | LGCADR_3     | INT     | logical adress for module 3 (only by red.)        |
| IO | LGCADR_4     | INT     | logical adress for module 4 (only by red.)        |
| O  | QERR         | BOOL    | 1=Error   |
| O  | QRACKF       | BOOL    | 1=Rack Failure                                    |
| O  | QPERAF       | BOOL    | 1=Periphery Access Failure                        |
| O  | QPARF        | BOOL    | 1=Parameter Assignment Error                      |
| O  | QPARF2       | BOOL    | 1=Parameter Assignment Error ( for redundant bus) |
| O  | QSTATE       | BYTE    | Diagnosebyte                                      |
| O  | IL1          | REAL    | Messwert IL1                                      |
| O  | IL2          | REAL    | Messwert IL2                                      |
| O  | IL3          | REAL    | Messwert IL3                                      |
| O  | UL12         | REAL    | Verkettete Spannung L1-L2                         |
| O  | UL23         | REAL    | Verkettete Spannung L2-L3                         |
| O  | UL31         | REAL    | Verkettete Spannung L3-L1                         |
| O  | UE           | REAL    | Spannung UE                                       |
| O  | P            | REAL    | Wirkleistung P (Gesamtleistung)                   |
| O  | Q            | REAL    | Blindleistung Q (Gesamtleistung)                  |
| O  | S            | REAL    | Scheinleistung S                                  |
| O  | Freq         | REAL    | Frequenz f  |
| O  | cosphi       | REAL    | Leistungsfaktor cos(phi)                          |
| O  | QMSG_ERR     | BOOL    | ALARM_8P Error                                    |
| O  | QMSG_SUP     | BOOL    | 1=Message Suppression active                      |
| O  | MSG_STAT     | WORD    | ALARM_8P: STATUS Output                           |
| O  | MSG_ACK      | WORD    | ALARM_8P: ACK_STATE Output                        |

## 4.3. Function block SIP7UM62

Type / Number      FB 571

### 4.3.1. Function and Operating principle

The **SIP7UM62** block forms the interface between the Siprotec Devices 7UM62 and the blocks of the SIMATIC PCS7 libraries. It can also be interconnected with other SIMATIC S7 blocks. It can only be used on one SIMATIC S7 with PROFIBUS-DP master properties. The CPU has to support the ALARM\_8P functionalities.

As configured in the HW Config, the Profibus DP address of the device and the Subnet ID must be parameterized over the input parameters **RACK\_NO** and **SUBN\_ID**. If the DP master is configured with the DP mode "DPV1", the input **DPV1\_MODE** must be set to 1 otherwise it has to be set to 0.

With the input **EN\_MSG=1** the PLC Process Control Messages will be enabled.

The block **SIP7UM62** can be used redundant (connected to Y Link) or not redundant.

#### **Non-redundant system:**

In a non-redundant system **RED\_ON** must be set to „0“.

#### **Redundant system:**

The input **SUBN\_ID** is not active in this configuration.

The input parameter **RACK\_CONNECT** has to be connected to the output parameter **CONNECT** of the **Y\_S\_2** Block.

The output **QRACKF** may be set to 1 if special events occur at the **Y\_S\_2** block:

- QTOT\_ERR = 1 or QPDP\_ERR = 1 or QHLV\_ERR = 1
- Diagnostics analysis.

You can also choose to give manually the logical addresses for inputs / outputs over the parameters **LGCADR\_0,....** To use this parameter, you have to set **LGCADRON** = 1.



***You have to pay attention that all the devices connected to the Y-Switch have their corresponding function blocks SIP7UM6x connected to the Y\_S\_2 block and are correctly parameterized.***

---

### 4.3.2. Calling OBs

The block can be installed alternatively in the following OBs:

- Watchdog interrupt OB: e.g. OB35

The block must be installed with the same instance in following OBs:

- OB85 for priority class error
- OB86 for rack or line failure recognition
- OB100 for start-up recognition
- OB122 for I/O access error recognition

**Caution**

The OBs listed in the preceding paragraph must be loaded into the AS, as otherwise the AS will call the respective OB when one of the triggering events occurs, and – if it finds no OB – will switch to STOP. In project design with CFC this is handled automatically, provided you are using these blocks. To ensure that the CPU remains in RUN when one of these events occurs, the local data stacks (priority classes) belonging to the OBs must be increased accordingly (see manual: “System software for S7-300/400, system and standard functions”). These are to be changed in Hardware Config/CPU/Properties/local data. If the local data stack overflows the CPU switches to Stop.

**4.3.3. Start up characteristics**

The block determines, on the basis of **SUBN\_ID** and **RACK\_NO** (or only of RACK\_NO in redundant mode), whether a device with the properties of an Siprotec is connected to the Profibus-DP. In the event of an error **QPARF** (and QPARF2 in redundant mode) is set to 1 (see „Error Handling“).

**4.3.4. Error handling**

The block algorithm handles the following cases:

|            |   |
|------------|---|
| QPARF = 1  | Parameter setting error. If the primary DP station number (SUBN_ID, RACK_NO) is wrong, the output is set equal to 1.                |
| QPARF2 = 1 | Parameter setting error. If the redundant DP station number (SUBN_ID2, RACK_NO) is wrong, the output is set equal to 1.             |
| QRACKF = 1 | DP device failure. No communication with the device.<br>Causes are: PROFIBUS-DP failed, device failed, off, no link to PROFIBUS-DP. |
| QPERAF = 1 | Periphery access failure. The block was unable to access the device.  |

**Note**

Access is no longer made to the device in the event of a parameter assignment error or DP device failure. After the fault has been rectified, the block automatically resumes communication with device. The fault messages of the device must be reset by means of fault acknowledgement. Diagnostic data relating to fault messages can be read only via the parameter assignment interface.

In redundant mode, if **QPARF**= 1 and **QPARF2** = 1, the configuration of the function block is wrong or the **Y\_S\_2** block is returning a general error.



#### 4.3.5. Message Characteristics

In the table you will find the message texts of the driver block and their allocation to the driver block parameters.

| Message Number | Block parameter | Default message text | Message class |
|----------------|-----------------|----------------------|---------------|
| 1              | QRACKF          | DP device failure    | S             |
| 2              | QPARF OR QPARF2 | Parameter failure    | S             |
| 3              | QPERAF          | Access failure       | S             |

Over the associated values of ALARM\_8P are transmitted several data or parameters values which are listed in the following table.

| Associated value | Block parameter |
|------------------|-----------------|
| 1                | Act. SUBN_ID    |
| 2                | Act. RACK_NO    |

#### 4.3.6. User defined commands

The inputs **Comm0**, **Comm1**, ... of the driver block **SIP7UM62** allow to send user defined command, which can be routed on bytes 0 and 1 as continuous output as „source system interface“ using DIGSI. They will be executed internal as double command with Profibus DP.

#### 4.3.7. Scaling of measured values and divisors

Measured values are transferred via PROFIBUS-DP between the SIPROTEC device and the PROFIBUS-DP master as integer values (two bytes) but they are in general available in the SIPROTEC device in floating-point format as a percent-age referred to the parameterized nominal values of the primary equipment. The scaling factor you choose via the **DIGSI-Manager**.

The measured value in the SIPROTEC device (floating-point format) is multiplied by the scaling factor before transformation to an integer value (for PROFIBUS-DP). It is possible to transfer fractional digits by multiplication by a multiple of 10 in the integer value with that.

*(Manual „SIPROTEC Communication module, PROFIBUS-DP - Communication profile“)*

With the FB inputs „divisors“ you fit the measured value representation at the FB outputs as requested:

- Div\_0** current (IL1S1, IL2S1, IL3S1)
- Div\_1** voltage (UL1E, UL2E, UL3E; UL12, UL23, UL31)
- Div\_2** power (P, Q, S)
- Div\_3** UE
- Div\_4** Freq
- Div\_5** cosPhi

**4.3.8. cos Phi**

In the case of **EN\_ROUND** = 1 and **Div\_5** > 0, the output **cosPhi** is rounded. This is done to the second position after decimal point.

**Example:**

| Cosphi with<br>EN_ROUND = 0 | Cosphi with<br>EN_ROUND = 1 |
|-----------------------------|-----------------------------|
| 0,9990                      | 1,00                        |
| 0,9950                      | 1,00                        |
| 0,9949                      | 0,99                        |
| 0,9060                      | 0,91                        |

**4.3.9. Diagnosis**

Over the status byte **QSTATE** will be displayed the following states:

| <b>QSTATE Bit</b> | <b>Designation</b> | <b>Comments</b>   | <b>Internal Object No</b> |
|-------------------|--------------------|---|---------------------------|
| 0                 | Device OK          | 1 = Update of the device replica in the Siprotec device completed after initial start or restart  | 51                        |
| 1                 | ProtActive         | 1 = At least one protection function is active  | 52                        |
| 2                 | Error Sum Alarm    | 1 = Error with a summary alarm ON   | 140                       |
| 3                 | Alarm Sum event    | 1 = Alarm summary event ON  | 160                       |
| 4                 | Relay PICKUP       | 1 = Relay PICKUP (summary alarm)  | 501                       |
| 5                 | Relay Trip         | 1 = Relay general Trip command (summary alarm)  | 511                       |
| 6                 | Operat. cond       | 1 = suitable measured quantities present at the device inputs<br>( $V > 0,1 * V_{nom}$ , $I > 0,1 * I_{nom}$ and $10 \text{ Hz} < \text{freq.} < 70 \text{ Hz}$ ) | 5002                      |
| 7                 | Data valid         | 1 = Data in the PROFIBUS-DP message are valid   | -                         |

The "Error with a summary alarm" is ON if at least one of the following internal alarms assumes the value ON:

Measured value error (IN-S1 false, IN-S2 false, IE-Wdl. False, Error MU1 Bridge, Error MU2 Bridge, Error MU3 bridge, error board 0 = C-CPU-2, error board 3 = C-I/O-2, error board 5 = C-I/O-6, error board 6 = C-I/O-1), Stör. Offset, open circuit (open circuit IAS1, open circuit IBS1, open circuit ICS1, open circuit IAS2, open circuit IBS2, open circuit ICS2).

The "Alarm summary event" is indicated if at least one of the following internal alarms assumes the ON status:

Failure: current supervision (Error SI S1, Error SI S2, Error Isym S1, Error Isym S2), Failure voltage supervision (Error SVphe, Error Vsym), Failure phase sequence (Error Drehf I S1, Error Drehf I S2, Error Drehf V), Error power supply, Fuse Failure, Alarm: no calibration data available, Failure battery empty, Error Hour.

If QSTATE bit 7 messages *Data are valid* = 0, the FB outputs measured values/ metered measurands (**UL1E**, .. , **WqImp**) and messages (**QMSG\_0**, **QMSG\_1**, **QMSG\_2**) are frozen. **EN\_FREEZE** activates this functionality.

**4.3.10. Annunciations**

Over the **SIP7UM62** outputs **QMSG\_0**, **QMSG\_1**, **QMSG\_2** will be displayed the annunciations (order historically conditioned), which are allocated to the following bits:

**Assignment of QMSG 0:**

Offset gives the bit position, which are allocated with standard mapping 3-1.

| QMSG_0 Bit | Off set | Annunciation                        | Designation           | Comments                                | Internal Object No |
|------------|---------|-------------------------------------|-----------------------|---|--------------------|
| 0          | 2/4     | Overcurrent time protection I>      | 50/51 Trip            | 1 = 50/51 I> Trip                       | 1815               |
| 1          | 3/2     | Overcurrent time protection I>>     | 51/67 Trip            | 1 = 50/51/67 I>> Trip                   | 1809               |
| 2          | 3/6     | Inverse Time overcurrent protection | 51V Trip              | 1 = 51V Trip                            | 1900               |
| 3          | 4/0     | Thermal overload protection         | 49 O/L I Alarm        | 1 = 49 overload current alarm (I alarm) | 1515               |
| 4          | 4/1     | Thermal overload protection         | 49 O/L $\Theta$ Alarm | 1 = 49 Thermal overload alarm           | 1516               |
| 5          | 4/2     | Thermal overload protection         | 49 Th O/L Trip        | 1 = 49 Thermal overload trip            | 1521               |
| 6          | 4/7     | Unbalanced load protection          | 46- $\Theta$ Trip     | 1 = 46 Trip of thermal stage            | 5161               |
| 7          | 5/4     | Sensitive earth fault protection    | 50Ns-2 Trip           | 1 = 50Ns-2 Trip                         | 1223               |
| 8          | 5/5     | Stator earth fault protection       | 59/67 V0 PU           | 1 = 59N/67GN V0 picked up               | 5186               |
| 9          | 6/0     | Stator earth fault protection       | 59N/67GN Trip         | 1 = 59N/67GN trip                       | 5193               |
| 10         | 6/5     | Overvoltage protection              | 59-1 Trip             | 1 = 59-1 Overvoltage V > Trip           | 6570               |
| 11         | 6/6     | Overvoltage protection              | 59-2 Trip             | 1 = 59-2 overvoltage V >> Trip          | 6573               |
| 12         | 7/1     | Undervoltage protection             | 27-1 Trip             | 1 = 27-1 Undervoltage V < Trip          | 6539               |
| 13         | 7/2     | Undervoltage protection             | 27-2 Trip             | 1 = 27-2 Undervoltage V<< Trip          | 6540               |
| 14         | 7/7     | Frequency protection                | 81-1 Trip             | 1 = 81-1 Trip                           | 5236               |
| 15         | 8/0     | Frequency protection                | 81-2 Trip             | 1 = 81-2 Trip                           | 5237               |
| 16         | 8/1     | Frequency protection                | 81-3 Trip             | 1 = 81-3 Trip                           | 5238               |
| 17         | 8/2     | Frequency protection                | 81-4 Trip             | 1 = 81-4 Trip                           | 5239               |
| 18         | 8/3     | Overexcitation protection           | 24 warn               | 1 = 24 V/f warning stage                | 5367               |
| 19         | 8/6     | Overexcitation protection           | 24 th. Trip           | 1 = 24 Trip of thermal stage            | 5372               |

| QMSG_0 Bit | Off set | Annunciation                       | Designation  | Comments                             | Internal Object No |
|------------|---------|------------------------------------|--------------|--------------------------------------|--------------------|
| 20         | 8/7     | Overexcitation protection          | 24-2 Trip    | 1 = 24-2 trip of V/f >> stage        | 5371               |
| 21         | 9/1     | Reverse protection power           | 32R Trip     | 1 = 32R Trip                         | 5097               |
| 22         | 9/2     | Reverse protection power           | 32R+SV Trip  | 1 = 32R Trip with stop valve         | 5098               |
| 23         | 9/5     | Forward supervision power          | 32F P < Trip | 1 = 32F P < stage Trip               | 5128               |
| 24         | 9/6     | Forward supervision power          | 32F P > Trip | 1 = 32F P > stage Trip               | 5129               |
| 25         | 9/7     | Fuse Failure Monitor               | Fuse Failure | 1 = voltage transformer fuse failure | 6575               |
| 26         | 10/2    | Underexcitation protection         | 40-1 Trip    | 1 = 40 characteristic 1 Trip         | 5344               |
| 27         | 10/3    | Underexcitation protection         | 40-2 Trip    | 1 = 40 characteristic 2 Trip         | 5345               |
| 28         | 10/4    | Underexcitation protection         | 40&V < Trip  | 1 = 40 characteristic &Vexc<Trip     | 5346               |
| 29         | 10/5    | Underexcitation protection         | 40-3 Trip    | 1 = 40 characteristic 3 Trip         | 5343               |
| 30         | 10/7    | Circuit breaker failure protection | 50BF Trip    | 1 = 50BF Trip                        | 1471               |
| 31         | 11/4    | Impedance protection               | 21 Z1< Trip  | 1 = 21 Z1 < Trip                     | 3977               |

## Assignment of QMSG 1:

Offset gives the bit position, which are allocated with standard mapping 3-1.

Message positions 18 / 4 to 19/ 2 are available with 7UM62 V4.10 or higher.  
With 7UM62 V4.00 the value 0 is transmitted at these positions.

| QMSG_1 Bit | Off set | Annunciation                              | Designation     | Comments                                     | Internal Object No |
|------------|---------|---|-----------------|--|--------------------|
| 0          | 11/5    | Impedance protection                      | 21 Z1B< Trip    | 1 = 21 Z1B < Trip                            | 3978               |
| 1          | 11/6    | Impedance protection                      | 21 Z2< Trip     | 1 = 21 Z2<Trip                               | 3979               |
| 2          | 11/7    | Impedance protection                      | 21 T3> Trip     | 1 = 21 T3>Trip                               | 3980               |
| 3          | 12/0    | Binary inputs                             | Ext1 Gen. TRP   | 1 = External trip 1: General TRIP            | 4537               |
| 4          | 12/1    | Binary inputs                             | Ext2 Gen. TRP   | 1 = External trip 2: General TRIP            | 4557               |
| 5          | 12/2    | Binary inputs                             | Ext3 Gen. TRP   | 1 = External trip 3: General TRIP            | 4577               |
| 6          | 12/3    | Binary inputs                             | Ext4 Gen. TRP   | 1 = External trip 4: General TRIP            | 4597               |
| 7          | 12/5    | Inadvertent energisation protection       | 50/27 Trip      | 1 = 50/27 Trip                               | 5548               |
| 8          | 12/6    | Trip coil monitor                         | Fail: Trip cir. | 1 = 74TC Failure Trip Circuit                | 6865               |
| 9          | 13/0    | Inverse undervoltage protection           | Vp< Trip        | 1 = Inverse Undervoltage Vp<Trip             | 6527               |
| 10         | 13/6    | Rotor earth fault protection              | 64R-2 Trip      | 1 = 64R-2 Trip                               | 5399               |
| 11         | 14/3    | State of the out-of-step protection       | 78 Trip char. 1 | 1 = 78 Trip characteristic 1                 | 5071               |
| 12         | 14/4    | State of the out-of-step protection       | 78 Trip char. 2 | 1 = 78 Trip characteristic 2                 | 5072               |
| 13         | 14/7    | Differential protection                   | 87 Trip Phase A | 1 = 87 differential protection: Trip Phase A | 5672               |
| 14         | 15/0    | Differential protection                   | 87 Trip Phase B | 1 = 87 differential protection: Trip Phase B | 5673               |
| 15         | 15/1    | Differential protection                   | 87 Trip Phase C | 1 = 87 differential protection: Trip Phase C | 5674               |
| 16         | 15/2    | Differential protection                   | 87 Diff> Trip   | 1 = 87 differential prot.:Trip by IDIFF>     | 5691               |
| 17         | 15/3    | Differential protection                   | 87 Diff>> Trip  | 1 = 87 Diff>> Trip                           | 5692               |
| 18         | 4/3     | Unbalanced load protection                | 46-1 Warn       | 1 = 46-1 Current warning stage               | 5156               |
| 19         | 4/6     |   | 46-2 TRIP       | 1 = 46-2 TRIP of current stage               | 5160               |
| 20         | 18/7    | Fault indications of protection functions | Failure 64R     | 1 = Failure 64R: measuring circuit           | 5400               |

| QMSG_1 Bit | Off set | Annunciations                             | Designation     | Comments  | Internal Object No |
|------------|---------|---|-----------------|---|--------------------|
| 21         | 13/5    | Rotor ground fault protection             | 64R-1 picked up | 1 = 64R-1 picked up (Alarm)                     | 5397               |
| 22         | 18/6    | Fault indications of protection functions | Failure SGF     | 1 = Failure stator ground fault prot. 100%      | 5486               |
| 23         | 18/0    | Stator ground fault protection            | SGF100 Alarm    | 1 = Stator ground fault prot. 100%: Alarm stage | 5487               |
| 24         | 18/1    | 100%                                      | SGF100 TRIP     | 1 = Stator ground fault prot. 100%: TRIP        | 5489               |
| 25         | 19/0    | Fault indications of protection functions | Fail 64R 1-3Hz  | 1 = Failure 64R protection (1-3Hz)              | 5401               |
| 26         | 18/2    | Rotor ground fault protection 1-3 Hz      | 64R-1_3Hzpickup | 1 = 64R-1 (1-3Hz) picked up (Alarm)             | 5403               |
| 27         | 18/3    |   | 64R-2_3Hz TRIP  | 1 = 64R-2 (1-3Hz) TRIP                          | 5407               |
| 28         | 19/1    | Fault indications of protection functions |                 | Not pre-allocated                               | -                  |
| 29         | 19/2    |   |                 | Not pre-allocated                               | -                  |
| 30         | 5/0     | Sensitive ground fault protection         | Failure 64R In< | 1 = Failure 64R In<: measuring circuit          | 5396               |
| 31         | 18/5    | Restricted ground fault protection        | 87N TRIP        | 1 = 87N TRIP                                    | 5821               |

**Assignment of QMSG 2:**

Offset gives the bit position, which are allocated with standard mapping 3-1.

Message positions 19 / 3 to 19 / 7 are available with 7UM62 V4.10 or higher. User-defined double-point indications (e.g. check back indications of double commands) can be routed on the positions 19 / 4 to 19 / 7 as "Destination system interface" using the DIGSI configuration matrix. With 7UM62 V4.00 the value 0 is transmitted at these positions.

| QMSG_2 Bit | Off set | Annunciations            | Designation        | Comments          | Internal Object No |
|------------|---------|--------------------------|--------------------|-------------------|--------------------|
| 0          | 16/0    |                          |                    | Not pre-allocated | -                  |
| 1          | 16/1    |                          |                    | Not pre-allocated | -                  |
| 2          | 16/2    |                          |                    | Not pre-allocated | -                  |
| 3          | 16/3    |                          |                    | Not pre-allocated | -                  |
| 4          | 16/4    |                          |                    | Not pre-allocated | -                  |
| 5          | 16/5    |                          |                    | Not pre-allocated | -                  |
| 6          | 16/6    |                          |                    | Not pre-allocated | -                  |
| 7          | 16/7    |                          |                    | Not pre-allocated | -                  |
| 8          | 17/0    |                          |                    | Not pre-allocated | -                  |
| 9          | 17/1    |                          |                    | Not pre-allocated | -                  |
| 10         | 17/2    |                          |                    | Not pre-allocated | -                  |
| 11         | 17/3    |                          |                    | Not pre-allocated | -                  |
| 12         | 17/4    |                          |                    | Not pre-allocated | -                  |
| 13         | 17/5    |                          |                    | Not pre-allocated | -                  |
| 14         | 17/6    |                          |                    | Not pre-allocated | -                  |
| 15         | 17/7    |                          |                    | Not pre-allocated | -                  |
| 16         | 15/4    |                          |                    | Not pre-allocated | -                  |
| 17         | 15/5    |                          |                    | Not pre-allocated | -                  |
| 18         | 15/6    |                          |                    | Not pre-allocated | -                  |
| 19         | 19/3    |                          |                    | Not pre-allocated | -                  |
| 20         | 19/4    | Double-point indications | <User-defined> OFF | Not pre-allocated | -                  |
| 21         | 19/5    |                          | <User-defined> ON  | Not pre-allocated | -                  |
| 22         | 19/6    |                          | <User-defined> OFF | Not pre-allocated | -                  |
| 23         | 19/7    |                          | <User-defined> ON  | Not pre-allocated | -                  |
| 24         |         | Free                     |                    |                   | -                  |
| 25         |         | Free                     |                    |                   | -                  |
| 26         |         | Free                     |                    |                   | -                  |
| 27         |         | Free                     |                    |                   | -                  |
| 28         |         | Free                     |                    |                   | -                  |
| 29         |         | Free                     |                    |                   | -                  |
| 30         |         | Free                     |                    |                   | -                  |
| 31         |         | Free                     |                    |                   | -                  |

**4.3.11. CFC Representation**

|      |          |             |
|------|----------|-------------|
|      | 6        |             |
|      | SIP7UM62 |             |
|      | Driver f | OB35<br>1/6 |
| 16#1 | SUBN_ID  | QERR        |
| 16#0 | RACK_NO  | QRACKF      |
| 0    | RED_ON   | QPERAF      |
| 1    | DPV1_Mod | QP&RF       |
| 0    | LGCADRON | QSTATE      |
|      | RACK_CON | UL1E        |
| 1    | Div_0    | UL2E        |
| 1    | Div_1    | UL3E        |
| 1    | Div_2    | UL12        |
| 5.0  | Div_3    | UL23        |
| 1    | Div_4    | UL31        |
| 1    | Div_5    | UE          |
| 0    | EN_FREEZ | P           |
| 1    | EN_ROUND | Q           |
| 0    | LGCADR_0 | S           |
| 0    | LGCADR_1 | IL1S1       |
| 0    | LGCADR_2 | IL2S1       |
| 0    | LGCADR_3 | IL3S1       |
| 0    | LGCADR_4 | Freq        |
| 0    | LGCADR_5 | cosphi      |
| 0    | Comm0    | WpImp       |
| 0    | Comm1    | WqImp       |
| 0    | Comm2    | QMSG_0      |
| 0    | Comm3    | QMSG_1      |
| 0    | Comm4    | QMSG_2      |
| 0    | Comm5    | QFREEZE     |
| 0    | Comm6    |             |
| 0    | Comm7    |             |



**4.3.12. I/O list of the SIP7UM62**

| IO | Parameter    | IO Type | Comment   |
|----|--------------|---------|---|
| I  | SUBN_ID      | BYTE    | Subnetz-Nummer Profibus DP                              |
| I  | RACK_NO      | WORD    | DP Teilnehmeradresse des 7UM62                          |
| I  | RED_ON       | BOOL    | 1=Redundancy ON   |
| I  | DPV1_Mode    | BOOL    | 1 : DPV1 , 0 : S7 compatible                            |
| I  | LGCADRON     | BOOL    | 1=logical adress ON (only by red.)                      |
| I  | RACK_CONNECT | ANY     | Connect to Y block                                      |
| I  | EN_MSG       | BOOL    | Enable 1=Alarming                                       |
| I  | MSG_EVID     | DWORD   | Message ID  |
| IO | LGCADR_0     | INT     | logical adress for module 0 (only by red.)              |
| IO | LGCADR_1     | INT     | logical adress for module 1 (only by red.)              |
| IO | LGCADR_2     | INT     | logical adress for module 2 (only by red.)              |
| IO | LGCADR_3     | INT     | logical adress for module 3 (only by red.)              |
| IO | LGCADR_4     | INT     | logical adress for module 4 (only by red.)              |
| IO | LGCADR_5     | INT     | logical adress for module 5 (only by red.)              |
| I  | Div_0        | REAL    | Divisor 0: Strom (IL1S1,IL2S1,IL3S1)                    |
| I  | Div_1        | REAL    | Divisor 1: Spannung (UL1E,UL2E,UL3E;<br>UL12,UL23,UL31) |
| I  | Div_2        | REAL    | Divisor 2: Leistung (P,Q,S)                             |
| I  | Div_3        | REAL    | Divisor 3: UE   |
| I  | Div_4        | REAL    | Divisor 4: Freq   |
| I  | Div_5        | REAL    | Divisor 5: cosPhi                                       |
| I  | EN_FREEZE    | BOOL    | 1=Einfrieren Meßwerte und Meldungen                     |
| I  | EN_ROUND     | BOOL    | 1=round cosphi  |
| IO | Comm0        | BOOL    | Command0, continuous output                             |
| IO | Comm1        | BOOL    | Command1, continuous output                             |
| IO | Comm2        | BOOL    | Command2, continuous output                             |
| IO | Comm3        | BOOL    | Command3, continuous output                             |
| IO | Comm4        | BOOL    | Command4, continuous output                             |
| IO | Comm5        | BOOL    | Command5, continuous output                             |
| IO | Comm6        | BOOL    | Command6, continuous output                             |
| IO | Comm7        | BOOL    | Command7, continuous output                             |
| O  | QERR         | BOOL    | 1=Error   |
| O  | QRACKF       | BOOL    | 1=Rack Failure  |
| O  | QPERAF       | BOOL    | 1=Periphery Access Failure                              |
| O  | QPARF        | BOOL    | 1=Parameter Assignment Error                            |
| O  | QPARF2       | BOOL    | 1=Parameter Assignment Error ( for redundant bus)       |
| O  | QSTATE       | BYTE    | Diagnose  |
| O  | UL1E         | REAL    | Messwert UL1E   |
| O  | UL2E         | REAL    | Messwert UL2E   |
| O  | UL3E         | REAL    | Messwert UL3E   |
| O  | UL12         | REAL    | Verkettete Spannung L1-L2                               |
| O  | UL23         | REAL    | Verkettete Spannung L2-L3                               |
| O  | UL31         | REAL    | Verkettete Spannung L3-L1                               |
| O  | UE           | REAL    | Spannung UE   |

| IO | Parameter | IO Type | Comment                                   |
|----|-----------|---------|---|
| O  | P         | REAL    | Wirkleistung P (Gesamtleistung)           |
| O  | Q         | REAL    | Blindleistung Q (Gesamtleistung)          |
| O  | S         | REAL    | Scheinleistung S                          |
| O  | IL1S1     | REAL    | Strom Leiter L1 Seite 1                   |
| O  | IL2S1     | REAL    | Strom Leiter L2 Seite 1                   |
| O  | IL3S1     | REAL    | Strom Leiter L3 Seite 1                   |
| O  | Freq      | REAL    | Frequenz f                                |
| O  | cosphi    | REAL    | Leistungsfaktor cos(phi)                  |
| O  | WpImp     | REAL    | Impulszähler Wirkarbeit Wp                |
| O  | WqImp     | REAL    | Impulszähler Blindarbeit Wq               |
| O  | QMSG_0    | DWORD   | Meldungen 0                               |
| O  | QMSG_1    | DWORD   | Meldungen 1                               |
| O  | QMSG_2    | DWORD   | Meldungen 2                               |
| O  | QFREEZE   | BOOL    | 1=Einfrieren Meßwerte und Meldungen aktiv |
| O  | QMSG_ERR  | BOOL    | ALARM_8P Error                            |
| O  | QMSG_SUP  | BOOL    | 1=Message Suppression active              |
| O  | MSG_STAT  | WORD    | ALARM_8P: STATUS Output                   |
| O  | MSG_ACK   | WORD    | ALARM_8P: ACK_STATE Output                |

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