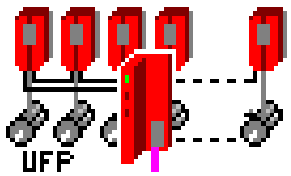
GSD file information for

the Universal Fielbus Interface UFP

for PROFIBUS DP



Contents

1 Revision status GSD file

The syntax of this GSD file is checked with the following applications:

- GSD-Editor V2.1 (Profibus User Group)
- GSD-Checker V2.2 (Profibus User Group)
- HWKonfig STEP7 Version 5.1 + Servicepack 1 (Siemens)
- ComProfibus V3.3 (Siemens)
- System configurator SYCON Version 6.26 (Hilscher)

For the universal fieldbus interface UFP11 use the following files:

SEW_6004.GSD	- GSD file
SEW6004N.BMP	- bitmap file with inverter icon
SEW6004S.BMP	- bitmap file with inverter icon
SEW6004N.DIB	- device independent bitmap file with inverter icon
SEW6004S.DIB	- device independent bitmap file with inverter icon

Version 1.40 of 01. August 2001
1st release

Note:
The latest version of the GSD files for SEW inverters can be downloaded from the SEW homepage, URL ***http://www.SEW-EURODRIVE.de.***

Do not modify the content of the GSD file. For malfunctions of the inverter due to a modified GSD file no liability can be assumed!

2 How to install the GSD file

The GSD file is supplied for project planning for the DP master. The GSD file must be copied into a special folder for your project planning software. Please refer to the manuals of your project planning software for information about the precise procedures.

The standardized GSD file can be read from all DP master systems.

2.1 How to install a new GSD file with STEP 7

1. Start the Simatic Manager program.

2. Open an existing project and start the hardware configuration tool (HW-Config).

3. Please close the Configuration window in between the HW-Config, otherwise you cannot install the new version of the GSD file.

4. Use the menu "Options / Install new GSE..." to select the new GSD file "***SEW_6004.GSD***".

5. Click OK to open the new GSD file. The Message box asks, if you really want to exchange the current GSD file with the revision 1. Choose YES to overwrite the old file. Now the new GSD and bitmap files will be loaded into the STEP7 system. The contents of the hardware catalog will be automatically updated.

   IMPORTANT: The current GSD file bases on GSD revision 1. This number is not the version number of the GSD file. Open the sew_6004.gsd file (e.g. with notepad.exe) to check the version number of the GSD file.

6. You'll find the SEW inverter in the Hardware catalog in the section:

```
PROFIBUS DP
   +--Additional Field Devices
         +--Drives
            +--SEW
               +--UFP
```

→ The new GSD file is successfully installed now.

3 Project planning for the DP master

The following section describes the scenario for the project planning for the DP master:

1) Install (copy) the GSD file in accordance with the requirements of your project planning software. Once the installation has been completed correctly, the device appears in the slave family „***Drives/SEW***“ with the designation „***UFP***“.

2) For project planning purposes, add the interface module „***UFP***“ into the PROFIBUS structure and assign the station address.

Select the process data configuration for your application. Open the folder “UFP” in the Hardware Catalog and insert the module you want to use to Slot 0 of the UFP.

3) Specify the I/O addresses for the configured process data configuration.

→ Startup PROFIBUS DP following the project planning steps. The red „BUS FAULT“ LED signals the status of the project planning process

Status of LED “BUS FAULT”:

OFF	= project planning OK
ON	= Profibus cable not attached
FLASHING	= Baudrate found, wrong project planning

4 PROFIBUS DP Configurations

It is necessary for the DP master to send the UFP a certain DP configuration in order to be able to define the type and number of input and output data used for transfer. In doing this, you have the opportunity to

- control the drives using process data
- read and write the UFP parameters using the parameter channel
- exchange a freely defined data block between UFP and DP master

4.1 DP Configuration „ONE module for all drives“

The configurations of this chapter provide only one data block for all drives attached to the UFP in the DP-Master.

In a STEP7 program you have to use only one SFC14/SFC15 function call with the corresponding length (also see configuration example with STEP7).

Module name:	**Only one data block with the length of...**
AS 1 Drive (3 PD)	... 3 words is used to control **one** drive.
AS 2 Drives (6 PD)	... 6 words is used to control **two** drives.
AS 3 Drives (9 PD)	... 9 words is used to control **three** drive.
AS 4 Drives (12 PD)	... 12 words is used to control **four** drive.
AS 5 Drives (15 PD)	... 15 words is used to control **five** drive.
AS 6 Drives (18 PD)	... 18 words is used to control **six** drive.
AS 7 Drives (21 PD)	... 21 words is used to control **seven** drive.
AS 8 Drives (24 PD)	... 24 words is used to control **eight** drive.

[AS = AutoSetup]

4.2 DP Configuration „UFP parameter + ONE Module“

A solid data block is used for the control of the drives according to chapter 4.1. Another solid data block in addition is used for the access to UFP parameters.

In a STEP7 program you have to use one SFC14/15 call for the data interchange of the UFP parameters and one further SFC14/15 call for the control of the drives.

Module name:	**The exchange of the UFP parameters is carried out via the first data block. One additional data block is used with the length of…**
AS 1 Drive (Param+3 PD)	... 3 words to control **one** drive.
AS 2 Drives (Param+6 PD)	... 6 words to control **two** drives.
AS 3 Drives (Param+9 PD)	... 9 words to control **three** drives.
AS 4 Drives (Param+12 PD)	... 12 words to control **four** drives.
AS 5 Drives (Param+15 PD)	... 15 words to control **five** drives.
AS 6 Drives (Param+18 PD)	... 18 words to control **six** drives.
AS 7 Drives (Param+21 PD)	... 21 words to control **seven** drives.
AS 8 Drives (Param+24 PD)	... 24 words to control **eight** drives.

4.3 DP Configuration „One module per drive“

An independent solid data block for each inverter is used to control the drive. This corresponds control-sided the view way on several inverters with own PROFIBUS p.c.b.
By this mechanism a control program independent of the connection topology of the drives can be used. The same control program can therefore be used both for inverters attached to the PROFIBUS directly and for inverters which are attached via the UFP to PROFIBUS.

For each inverter one call of the system functions SFC14 and SFC15 is necessary to control the drives.

Module name:	
AS 1 Drive (1 x 3PD)	One drive is controlled via one consistent data block with the length of three words.
AS 2 Drives (2 x 3PD)	Two drives are controlled via two consistent data blocks with the length of three words.
AS 3 Drives (3 x 3PD)	Three drives are controlled via three consistent data blocks with the length of three words.
AS 4 Drives (4 x 3PD)	Four drives are controlled via four consistent data blocks with the length of three words.
AS 5 Drives (5 x 3PD)	Five drives are controlled via five consistent data blocks with the length of three words.

AS 6 Drives (6 x 3PD)	Six drives are controlled via six consistent data blocks with the length of three words.
AS 7 Drives (7 x 3PD)	Seven drives are controlled via seven consistent data blocks with the length of three words.
AS 8 Drives (8 x 3PD)	Eight drives are controlled via eight consistent data blocks with the length of three words.

4.4 DP Configuration „UFP parameter + one module per drive“

One consistent data block per inverter is used for the control of the drives according to chapter 4.3. Another consistent data block in addition is used for the access to UFP parameters.

In a STEP7 program the data interchange of the UFP parameters is carried out via one SFC14/15 call and the control of the inverter over respectively one SFC14/SFC15 function call per inverter.

By this mechanism a control program independent of the connection topology of the drives can be used. The same control program can therefore be used both for drives attached to the PROFIBUS directly and for drives which are attached via the UFP to PROFIBUS.

Module name:	**The exchange of the UFP parameters is carried out via the first data block.** Über den ersten konsistenten Datenblock erfolgt der Austausch der UFP-Parameter. In addition...
AS 1 Drive (Param + 1 x 3PD)	…one drive is controlled via one consistent data block with the length of three words.
AS 2 Drives (Param + 2 x 3PD)	…two drives are controlled via two consistent data blocks with the length of three words.
AS 3 Drives (Param + 3 x 3PD)	…three drives are controlled via three consistent data blocks with the length of three words.
AS 4 Drives (Param + 4 x 3PD)	…four drives are controlled via four consistent data blocks with the length of three words.
AS 5 Drives (Param + 5 x 3PD)	…five drives are controlled via five consistent data blocks with the length of three words.
AS 6 Drives (Param + 6 x 3PD)	…six drives are controlled via six consistent data blocks with the length of three words.
AS 7 Drives (Param + 7 x 3PD)	…seven drives are controlled via seven consistent data blocks with the length of three words.
AS 8 Drives (Param + 8 x 3PD)	…eight drives are controlled via eight consistent data blocks with the length of three words.

4.5 Data consistency

Consistent data are data which have to be transmitted between the programmable controller and the drive inverter as one block at all times and are never allowed to be transmitted separately from one another.
Data consistency is very important for transmitted position values or complete positioning tasks. This is because data which is not transmitted consistently could be from different program cycles of the programmable controller, which would lead to undefined values being transmitted to the drive inverter.
With PROFIBUS-DP, data communication always takes place between the programmable controller and drives using the “Data consistency = total length” setting.

5 Program example for STEP 5

Hardware configuration with ComPROFIBUS:

You should choose a configuration of the variant "One module by drive" for STEP5 and ComPROFIBUS in principle so that you simply can access these data in the STEP5 program.

For this example two drives are operated with AutoSetup at the UFP. The configuration "**AS 2 drives (2 x 3 PD)**" is used. The process data for the single drives are defined as follows:

Process data Drive 1: PW 156, PW158, PW160
Process data Drive 2: PW 162, PW164, PW166

The consistent data access in this program example is used with the order "Last word first".

Note!
The retention of the data consistency is determined by the CPU type at the Simatic S5. Further information about the correct programming with data consistency you will find in the manuals of the S5-CPU or DP-Master.

```
//Actual values of drive 1:
L   PW 160           //Load PI3 (no function)
L   PW 158           //Load PI2 (Actual speed)
L   PW 156           //Load PI1 (Statuswort 1)

//Actual values of drive 2:
L   PW 166           //Load PI3 (no function)
L   PW 154           //Load PI2 (Actual speed)
L   PW 162           //Load PI1 (Statuswort 1)

//Setpoints for drive 1
L   KH 0
T   PW 160           //Transfer 0hex to PO3 (no function in this example)
L   KF +1500
T   PW 158           //Transfer 1500dec to PO2 (speed setpoint = 300 rpm)
L   KW#16#0006
T   PW 156           //Transfer 6hex to PO1 (control word = enable)

//Setpoints for drive 2
L   KH 0
T   PW 166           //Transfer 0hex to PO3 (no function in this example)
L   KF +5000
T   PW 164           //Transfer 1500dec to PO2 (speed setpoint = 300 rpm)
L   KW#16#0006
T   PW 162           //Transfer 6hex to PO1 (control word = enable)
```

6 Program example for STEP 7

In this chapter the commissioning and programming of the PLC Simatic S7 using STEP 7 (V5.2+SP1) is described. Two drives attached to the UFP will be controlled and commissioned with the DP configuration type “One module for all drives”. The second example shows the commissioning and programming for the DP configuration type “One module per drive”.

1st Step:

- Startup the UFP with AutoSetup for two drives.
- Install the GSD file according to chapter 2.1.

6.1 Example 1: Simple UFP Configuration

With this type of configuration you can write the most efficient S7 program (very fast cycle time) because you only have to use one SFC14 and one SFC15 function call to access the process data of all drives.

Note:

If you also want to use the same control program for drives, which are attached directly to the PROFIBUS, it is necessary to use the DP configuration “One module per drive” (see example 2).

6.1.1 Set-up the Hardware Configuration in STEP7

- Start the STEP 7 HardwareConfiguration within the STEP7-Manager

- Open the Hardware Catalog and connect the device „UFP“ of the folder „PROFIBUS DP / Additional Field Devices / Drives / SEW /” to the PROFIBUS line (see Figure 1, no. 1).

- Choose the DP configuration „***AS 2 Drives (6PD)***“ and insert this module to slot 0 (see figure 1, no. 2).

- Slot 0 now contents an empty module, this means that the UFP parameter channel is disabled. Add the following I- and Q-Addresses for the UFP:

  I-Address: PEW 516…527
  Q-Address: PAW 516…527

- Save and close the Hardware Configuration of STEP 7.

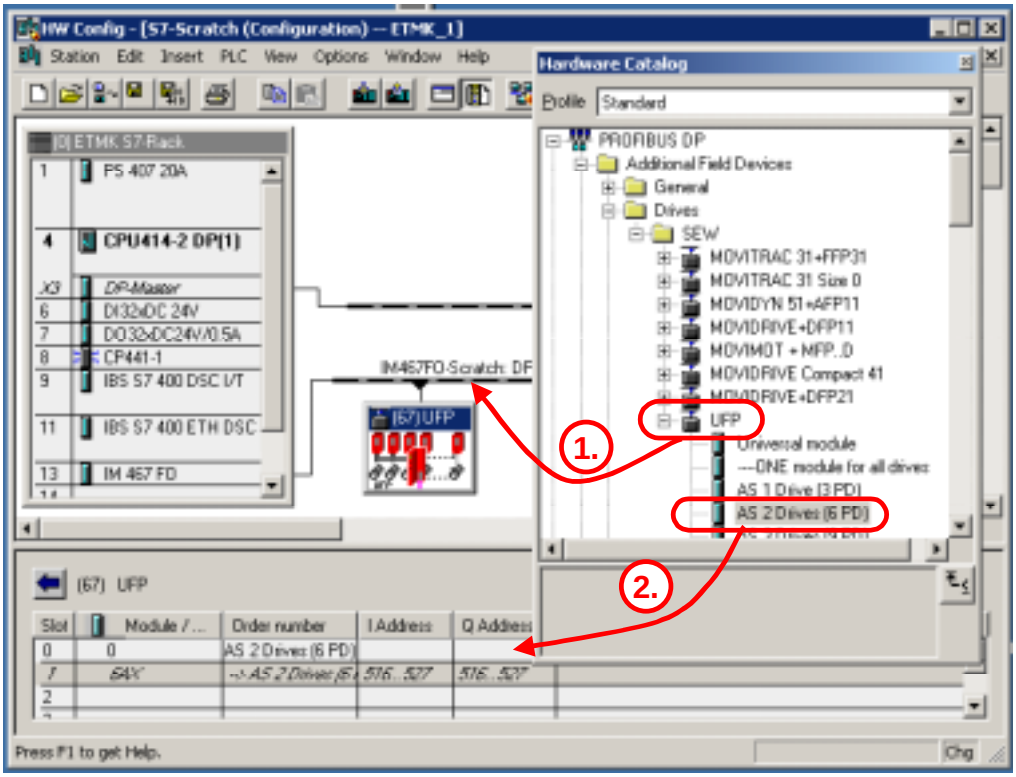


Bild 1: Set-up the UFP in the STEP7 Hardware Configuration

6.1.2 STEP7 program to control the drives

Now you have defined a consistent data block for the process data interchange with the UFP with 6 words. You have to use the system functions SFC14 and SFC15 to control the drives with Simatic S7 CPUs.

The following program example uses the data block DB 18 as a temporary process data buffer.

→ Define the data block DB18 with the length of 120 data words (data type WORD).

The assignment of the data words in this example is defined as follows:

Actual values of the 1st inverter:	DBW 0, DBW 2, DBW 4
Actual values of the 2nd inverter:	DBW 6, DBW 8, DBW 10
Setpoints of the 1st inverter:	DBW 50, DBW 52, DBW 54
Setpoints of the 2nd inverter:	DBW 56, DBW 58, DBW 60

→ In this example the PLC input 4.0 is used to control the drives. With a TRUE signal the drives will start, with a FALSE signal the drives will stop. The speed setpoint is set to 600 rpm.

Figure 2 shows the concept of the PLC program with only one SFC14 function call to get the actual values of the drives and one SFC15 function call to give the new setpoints of the drives.

With the SFC14 function call six words are transferred from the DP master into the data block DB18, data word 9…10. These data words include the actual values of the drives.

The real application program works only with the data words of DB 18. Actual values can be analysed and new setpoints can be set with the correspondig data words. The setpoints are stored in the data words 56 66.

With the SFC15 function call the six data words 56..66 are transfered to the DP master.

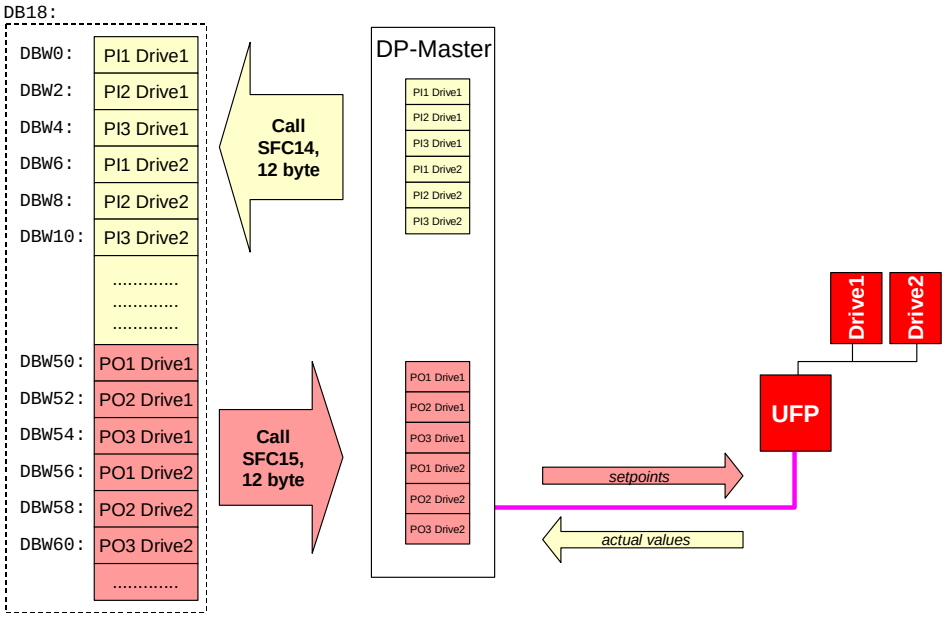


Bild 2: Concept of program example 1

PI = Process Input data word
PO = Process Output data word

STEP 7 STL-Program

The following program listing is written with STEP 7 V5.1+SP1. You can use this listing with copy&paste e.g. in your STEP 7 function block.

```
      CALL  SFC   14                    // SFC 14 copies 6 process input words
       LADDR  :=W#16#204                // from PEW 516..521
       RET_VAL:=MW 40                   // return value of SFC, 0 = ok
       RECORD :=P#DB18.DBX0.0 BYTE 12
//---------------------------------------------------------------------

//--- application to control the drives via UFP11A -----

//prepare controlword 1 for 1st and 2nd inverter
      UN    E      4.0
      SPB   stop
      L     W#16#6              // control word = enable
      SPB   go
stop: L     W#16#0               // control word = rapid stop
go:   T     DB18.DBW   56
      T     DB18.DBW   50

//prepare speed setpoint for 1st and 2nd inverter

      L     3000                // setpoint = 600 rpm (scaling 0.2rpm/digit)
      T     DB18.DBW   52
      T     DB18.DBW   58

//3rd process word not used ( set to 0)
      L     0
      T     DB18.DBW   60
      T     DB18.DBW   60
//---------------------------------------------------------------------
      CALL  SFC   15                    // SFC 15 copies 6 process output words
       LADDR  :=W#16#204                // to PAW 516...521
       RECORD :=P#DB18.DBX50.0 BYTE 12
       RET_VAL:=MW 42
```

With the notes mentioned below you simply can adapt this example program to your application.

If you…

…have used other periphery addresses for the UFP in the hardware configuration, you must adapt the **blue** highlighted addresses of the parameter *LADDR*. STEP7 permits only hexadecimal numbers.

…operate more or less than two inverters at the UFP, you must adapt the **red** highlighted length of the data pointer to your application.

…operate several UFPs at the PROFIBUS, you must adapt the data pointer for every UFP (**violet**).

…don't know how many drives you will operate at the UFP yet, you can adjust the UFP at the PROFIBUS with maximum data length. Use the DP configuration "**AS 8 drives (24 PD)**" and change the **red** highlighted length in the example program to 48 (length = 48 bytes = 24 words).

6.2 Example 2: Transparent UFP configuration

This type of configuration offers the possibility to write a uniform STEP 7 program for SEW drives. The UFP works completely transparent, so you have a direct access to the drives. By this mechanism a control program independent of the connection topology of the drives can be used. The same PLC program can therefore be used both for drives attached to the PROFIBUS directly and for drives which are attached via the UFP to PROFIBUS. You only have to change the hardware configuration.

6.2.1 Set-up the hardware configuration in STEP7

- Start the STEP 7 HardwareConfiguration within the STEP7-Manager

- Open the Hardware Catalog and connect the device „UFP“ of the folder „PROFIBUS DP / Additional Field Devices / Drives / SEW /” to the PROFIBUS line (see Figure 1, no. 1).

- Choose the DP configuration „***AS 2 Drives (2 x 3PD)***“ and insert this module to slot 0 (see figure 3, no. 2).

- Slot 0 now contents an empty module, this means that the UFP parameter channel is disabled. Slot 1 defines the three process data words for drive 1. Slot 2 defines the three process data words for drive 2.

- Add the following I- and Q-Addresses of slot 1 for the 1st inverter:

  I-Addresses for 1st inverter: PEW 516…527
  Q-Addresses for 1st inverter: PAW 516…527

- Add the following I- and Q-Addresses of slot 2 for the 2nd inverter:

  I-Addresses for 2nd inverter: PEW 524…529
  Q-Addresses for 2nd inverter: PAW 524…529

- Save and close the Hardware Configuration of STEP 7.

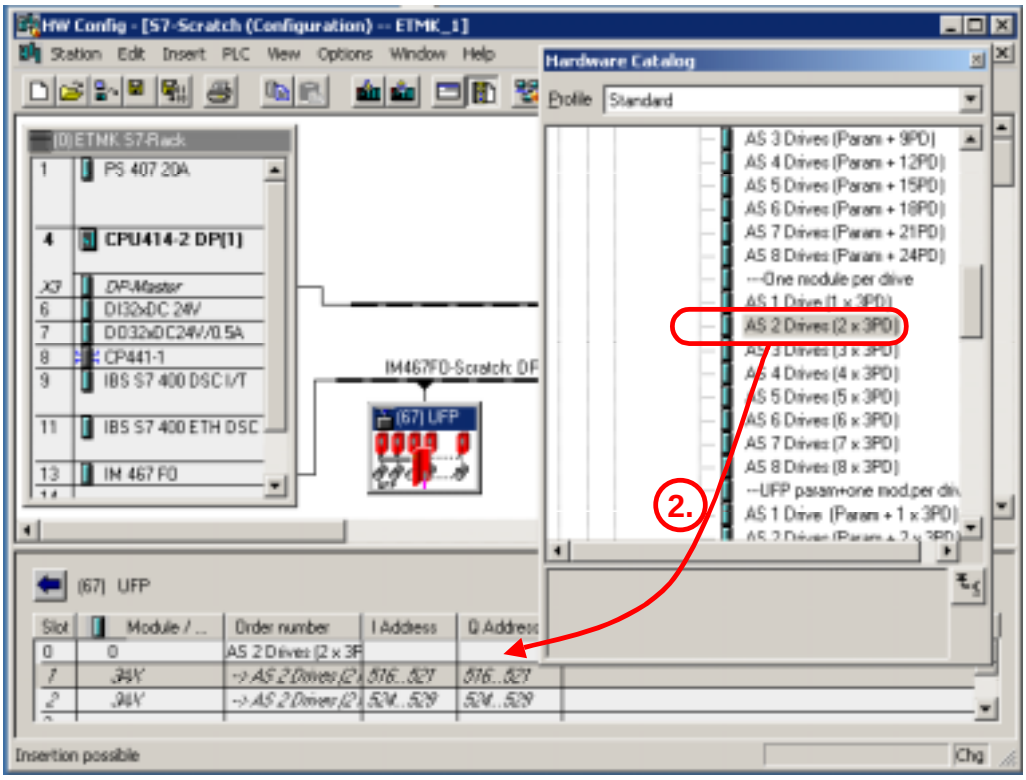


Bild 3: Transparent set-up of UFP in HWKonfig

6.2.2 STEP7 example program to control the drives

Now you have defined two consistent 3-word data blocks for the process data interchange with the UFP. You have to use the system functions SFC14 and SFC15 to control the drives with Simatic S7 CPUs.

The following program example uses the data block DB 18 as a temporary process data buffer.

→ Define the data block DB18 with the length of 120 data words (data type WORD).

The assignment of the data words in this example is defined as follows:

Actual values of the 1st inverter:	DBW 0, DBW 2, DBW 4
Actual values of the 2nd inverter:	DBW 6, DBW 8, DBW 10
Setpoints of the 1st inverter:	DBW 50, DBW 52, DBW 54
Setpoints of the 2nd inverter:	DBW 56, DBW 58, DBW 60

→ In this example the PLC input 4.0 is used to control the drives. With a TRUE signal the drives start, with a FALSE signal the drives stop. The speed setpoint is set to 600 rpm.

Figure 2 shows the concept of the PLC program with only one SFC14 function call to get the actual values of the drives and one SFC15 function call to give the new setpoints of the drives.

With the first SFC14 function call three words of drive 1 are transferred from the DP master into the data block DB18, data word 0..4. These data words include the actual values of the inverter 1.

With the second SFC14 function call three words of drive 2 are transferred from the DP master into the data block DB18, data word 6..10. These data words include the actual values of the inverter 2.

The real application program works only with the data words of DB 18. Actual values can be analysed and new setpoints can be set with the correspondig data words. The setpoints are stored in the data words 56..66.

With the first SFC15 function call the three data words 56..60 (process output words for drive 1) are transfered to the DP master. With the second SFC15 function call the three data words 62..66 (process output words for drive 2) are transfered to the DP master.

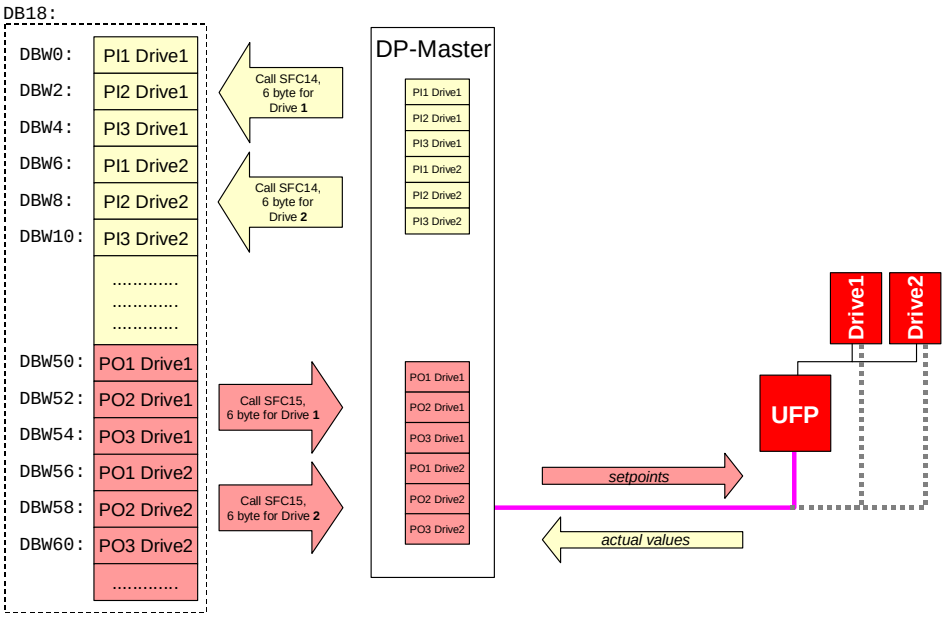


Bild 4: Program example 2 for drives attached to the UFP or directly to PROFIBUS

PO = process output data words
PI = process input data words

STEP 7 STL-Program

The following program listing is written with STEP 7 V5.1+SP1. You can use this listing with copy&paste e.g. in your STEP 7 function block.

```
      CALL  SFC   14                    // SFC 14 copies 3 PI words of drive 1
       LADDR  :=W#16#204                // from PEW 516..521
       RET_VAL:=MW 40                   // return value of SFC, 0 = ok
       RECORD :=P#DB18.DBX0.0 BYTE 6

      CALL  SFC   14                    // SFC 14 copies 3 PI words of drive 2
       LADDR  :=W#16#20C                // from PEW 524..529
       RET_VAL:=MW 42                   // return value of SFC, 0 = ok
       RECORD :=P#DB18.DBX6.0 BYTE 6
//-------------------------------------------------------------------------------

//--- Application to control the drives via UFP11A -----
//prepare control word for 1st and 2nd Inverter
      UN    E      4.0
      SPB   stop
      L     W#16#6               // control word = enable
      SPB   go
stop: L     W#16#0               // control word = rapid stop
go:   T     DB18.DBW   50
      T     DB18.DBW   56

//prepare speed setpoint for 1st and 2nd. inverter
      L     3000                 // speed setpoint = 600 rpm (scaling 0.2rpm/digit)
      T     DB18.DBW   52
      T     DB18.DBW   58

//3rd process data word not used ( set to 0)
      L     0
      T     DB18.DBW   54
      T     DB18.DBW   60

//-------------------------------------------------------------------------------
      CALL  SFC   15                    // SFC 15 copies 3 PO words to drive 1
Antrieb
       LADDR  :=W#16#204                // via PAW 516...521
       RECORD :=P#DB18.DBX50.0 BYTE 6
       RET_VAL:=MW 44

      CALL  SFC   15                    // SFC 15 copies 3 PO words to drive 2
       LADDR  :=W#16#20C                // via PAW 524...529
       RECORD :=P#DB18.DBX56.0 BYTE 6
       RET_VAL:=MW 46
```

With the notes mentioned below you simply can adapt this example program to your application.

If you…

…have used other periphery addresses for the UFP in the hardware configuration, you must adapt the **blue** highlighted addresses of the parameter *LADDR*. STEP7 permits only hexadecimal numbers.

…operate more or less than two inverters at the UFP, you have to insert an additional call of the SFC14 and SFC15 for every additional drive. Think of the adaptation of the **blue** highlighted addresses and **violet** highlighted data pointers.