MANUFACTURER DOCUMENT PACKAGE

# Manufacturer's Manual

Reference package for procurement and maintenance review

SIEMENS

## 6GK7343-5FA00-0XE0

**CP 343-5 PROFIBUS COMMUNICATION PROCESSOR**

Used with the applicable SIMATIC S7-300 CP 343-5 configuration.

REFERENCE PACKAGE

OFFICIAL DOCUMENT

Selected official manufacturer pages follow this cover.

Source: Siemens CP 343-5 for PROFIBUS Manual Part B2, C79000-G8976-C160-02, November 2002; supported services and technical data.

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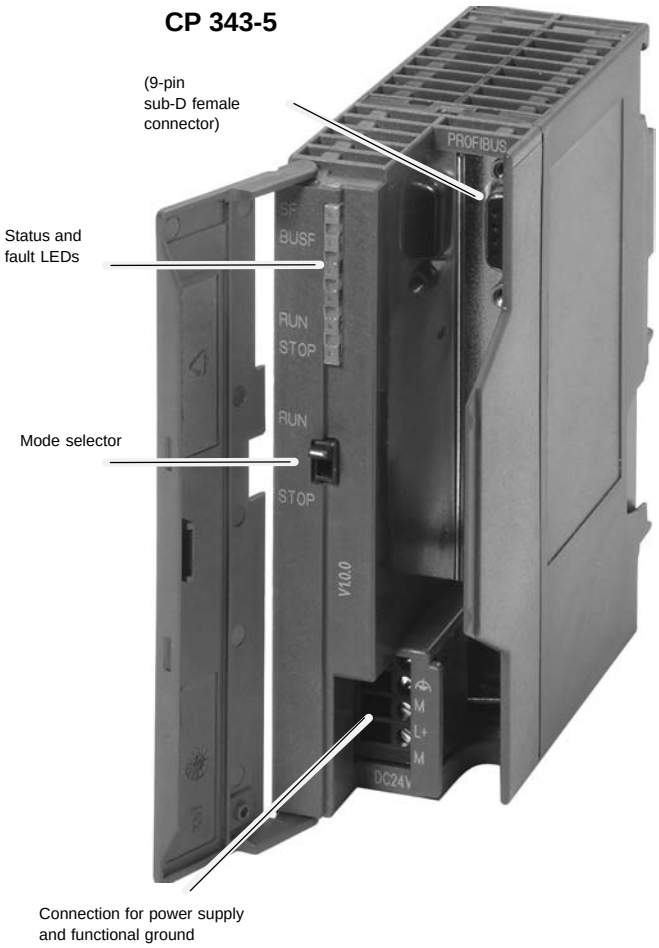
# S7–CPs for PROFIBUS

**Manual Part B2**

## CP 343-5

6GK7 343-5FA01-0XE0 version 2 and higher (firmware version V4.1 and higher)

for SIMATIC S7–300 / C7–300



# 1 Features / Services

## Application

The CP 343-5 communications processor is designed for operation in a SIMATIC S7-300 / C7-300 programmable logic controller. It allows the S7-300 / C7-300 to be attached to a PROFIBUS fieldbus system.

## Services

The current version of the CP 343-5 supports the following communication services:

- PROFIBUS–FMS (complying with EN 50170, FMS client and server functionality)

  as FMS master for the following types of connection:

  – MMAC: Master–master acyclic

  – MSAC: Master–slave acyclic

  – MSAC_SI: Master–slave acyclic with slave initiative

  – MSCY: Master slave cyclic

  – BRCT (broadcast): Sending to all FMS stations

- S7 communication and PG/OP communication

  – PG functions with upload / download of FM modules, configuration / diagnostics and routing

  – operator control and monitoring functions (HMI)

  – server for data exchange on one-sided configured connections without communication blocks in the S7 station

- S5–compatible communication (SEND/RECEIVE interface) over FDL connections of the following type:

  – specified FDL connections

  – Free layer 2 connections (SDA, SDN)

  – Broadcast

  – Multicast

The CP 343-5 services mentioned above can be used at the same time independently from one another.

## Configuring

STEP 7 from version V5.1 SP3 and higher, and the installation of the NCM for PROFIBUS optional package, delivered with STEP 7, are necessary for configuration.

The module can be configured via the MPI or LAN/PROFIBUS.

**Note**

If you change the bus parameters in the configuration data, you can only download these configuration data to the CP via the MPI.

## Programming – Using Blocks

”Off–the–peg” blocks (FCs/FBs) form the interface in your STEP 7 user program to some of the communication services available with the PROFIBUS CP. You will find a detailed description of these blocks in the NCM S7 for PROFIBUS manuals.

**Notice**

We recommend that you always use the latest block versions for all module types.

You will find information on the latest block version and links to download the current blocks in our Customer Support on the Internet:

http://www4.ad.siemens.de/view/cs/en/8797900

If you are using older block types, this recommendation only applies if you also have the latest firmware version.

You will find further information and Internet addresses in the Preface of the General Part of this manual.

## Replacing a Module without a Programming Device

The CP supports the option of storing the configuration data of the CP in the CPU. If you use this option, you can replace the module without having to reload the configuration data from the programming device.

The configuration data are then stored in the load memory of the CPU. The stored configuration data are protected from power outage by battery backup or by plugging an EPROM card into the CPU.

# 2 Installation and Commissioning

## Procedure / Steps

Table 2-1

| Step | Comments |
|---|---|
| 1. Install the CP on the S7 standard rail.<br>2. Establish the connection to the backplane bus using the enclosed bus connector. | You can use slots 4 to 11 in racks 0 to 3 for the CP (connected by IM 360/361).<br>Proceed as explained in the sections on installation and wiring, described in detail in /1/ . |
| **Note**<br>The CP cannot be used in an expansion rack connected by an IM 365! Reason: The IM 365 does not connect the required communication bus through to the expansion rack. | |
| 3. Connect the CP to the power supply. | To wire up the power supply and CPU, follow the detailed instructions in /1/. |
| **Notes**<br>• The CPU, CP and IM (if used) must be connected to the same power supply.<br>• Only wire up the S7-300 / C7-300 with the power switched off!<br>• When shipped, the CP has a jumper inserted between the M terminals and the functional ground. If you want to ground the reference potential, do not remove the jumper between the M terminals and functional ground (see also /1/ particularly the sections on installing an S7-300 with a grounded reference potential and installing an S7-300 with an ungrounded reference potential). | |
| 4. Connect the CP to PROFIBUS. | |
| 5. Commissioning is completed by downloading the configuration data. | For further details, especially regarding node initialization, please refer to /2/. |

# 3 Displays and Mode Selector

## LEDs Displaying the Status of the CP

The different combinations of the four LEDs on the front panel indicate the status of the CP:

Table 3-1

| SF (red) | BUSF (red) | RUN (green) | STOP (yellow) | CP Operating Mode |
|---|---|---|---|---|
| ○ | ○ | ☀ | ● | Starting up (STOP->RUN) |
| ○ | ○ | ● | ○ | Running (RUN) |
| ○ | ○ | ● | ☀ | Stopping (RUN->STOP) |
| ○ | ○ | ○ | ● | Stopped (STOP) |
| ● | ○ | ○ | ● | Stopped (STOP) with errors |
| ○ | ● | ● | ○ | Running (RUN) with disturbances on PROFIBUS |
| ○ | ○ | ○ | ☀ | Ready to begin firmware download (mode active for 10 seconds) |
| ○ | ○ | ☀ | ○ | Downloading firmware |
| ● | ● | ○ | ○ | Invalid firmware downloaded |
| ● | ● | ○ | ☀ | Waiting for firmware update (CP contains incomplete firmware) |
| ☀ | ☀ | ☀ | ☀ | Module fault / system error |

Key: ● on ○ off ☀ flashing

**Note**

Read the explanations of the modes of operation in the NCM S7 for PROFIBUS Manual /2/.

## Controlling the Operating Mode

There are different ways in which you can control the mode of the CP 343-5, as follows:

- Mode selector
- NCM S7 for PROFIBUS configuration software
- SIMATIC Manager in STEP 7

To control the mode from STEP 7 / NCM S7 for PROFIBUS, the mode selector must be set to RUN.

## Mode Selector

With the mode selector, you can set the following modes:

- Switch from STOP to RUN:

  The CP reads the configured and/or modified data into the work memory and then changes to the RUN mode.

- Switch from RUN to STOP:

  The CP changes to the STOP mode. Established connections (FDL, FMS and S7 connections) are closed.

  In the STOP mode, configuring and performing diagnostics on the CP 343-5 are possible.

**Note**

Refer to the information on downloading the database to the CP in the manual /2/.

# 4 Performance Data

## 4.1 Supported Transmission Rates

The transmission rate is set with the SIMATIC STEP 7 configuration software. For permitted values, see Table 6-1 in Section 6.

## 4.2 Characteristics of FMS Connections

The following data are important for operating FMS connections:

Table 4-1

| Component | Explanation / Values |
|---|---|
| Number of FMS connections | Maximum of 16 |
| User data length | 237 bytes for READ<br>233 bytes for WRITE and REPORT |
| Configurable variables | 256 server variables and 256 variable descriptions that can be loaded from the partner. These can be distributed as required on the maximum number of configurable FMS connections. The value applies to elementary data types or arrays of elementary data types.<br>This value does not apply to complex data types (STRUCT)! Note the information in the manual /2/ about using complex data types (STRUCT). |

### Cycle Load Caused by FMS Connections

When calculating the reaction times with FMS connections, the run time of the function blocks (FBs) in the S7-300 CPU (314-1 see Table 4-2 ) is the decisive factor.

The table below shows the cycle load resulting from the available FCs in ms. The values were obtained using a data length of 230 bytes (array).

Table 4-2

| Component / FB | FB Number | Job Trigger in ms (first call) | Job Active in ms (next call) | Job Complete without Errors in ms (last call) |
|---|---|---|---|---|
| IDENT | FB 2 | 1.8 | 0.2 | 5.5 |
| READ | FB 3 | 2.2 | 0.2 | 7.6 |

Table 4-2 , Fortsetzung

| Component / FB | FB Number | Job Trigger in ms (first call) | Job Active in ms (next call) | Job Complete without Errors in ms (last call) |
|---|---|---|---|---|
| REPORT | FB 4 | 8.0 | 0.2 | 1.8 |
| STATUS | FB 5 | 1.8 | 0.2 | 2.2 |
| WRITE | FB 6 | 7.6 | 0.2 | 2.0 |

## Further Notes on FMS

Please note the following:

In FMS server mode, the CP occupies an unconfigured communication bus connection on the S7 CPU.

Note that the S7 CPU 314 supports a maximum of 4 (newer CPU types a maximum of 12) unconfigured K bus connections! If, for example, you operate a PG and an OP with the S7 CPU, two unconfigured K bus connections are still free.

**Note**

To allow module replacement without a PG, settings on the CPU must be modified. Open the Properties dialog of the CPU in HW Config; in the “Monitoring time for...” box in the “Startup” tab, check and, if necessary, increase the following values:

– “Transfer of parameters to modules”

Depending on your system (station configuration), you may need to increase the following parameter:

– “Ready message from modules”

## 4.3 Characteristics of S5-compatible Communication (SEND/RECEIVE Interface) on FDL Connections

The following information is important for operating FDL connections (specified, free layer 2 (SDA and SDN), broadcast, multicast):

Table 4-3

| Characteristics: | Explanation / Values |
|---|---|
| **Total** number of FDL connections that can be operated | Maximum of 16 |
| Size of the transferable data area on FDL connections | 1–240 bytes maximum per specified FDL connection (for sending and receiving)<br>Free layer 2, broadcast and multicast:<br>1 to 236 bytes of user data can be transferred per job. The job header requires an additional 4 bytes. |

### Reaction Times for FDL Connections

The reaction times for FDL connections are largely dependent on the time required to execute the function blocks (AG-SEND, AG-RECV) on the S7-300 / C7–300 CPU.

Table 4-4

| Component | Explanation / Values | |
|---|---|---|
| Run time on the CPU 314-1 (6ES7 314-1AE04-0AB0) | per AG_SEND block call:<br>• 6.0 ms with 240 bytes | per block call AG_RECV:<br>• 7.5 ms with 240 bytes |

### Performance of the FDL Connections

Refer to the following table for transmission rates with FDL connections dependent on

- frame length (number of bytes)
- the type of CPU

The values were measured while sending frames successively (at a transmission rate of 1.5 Mbps; bus profile standard; 9 nodes).

Table 4-5 Number of FDL Frames per Second

| Frame length / CPU Type / Transmission rate | CPU 314 / 1.5 Mbps |
|---|---|
| 8 bytes | 129 / s |
| 128 bytes | 130 / s |
| 240 bytes | 122 / s |

## 4.4 Characteristics of S7 Communication

The following data are important for operating S7 connections:

Table 4-6

| Characteristics: | Explanation / Values |
|---|---|
| Number of S7 connections | Max.16 [1)] |

1) The actual possible number of S7 connections that can be operated depends on the type of CPU being used.

# 4.5 Parallel Use of Communication Services (Multiprotocol Mode)

## Performance

Using the various available communication services at the same time affects communication performance:

- With a large number of connections (16 FMS connections) and more than eight S7 connections, FMS performance may drop.
- With cyclic NCM diagnostics, the update time should be set to 3 seconds, otherwise communication performance can drop.

# 5 Compatibility with the Previous Product

## 5.1 Extended functionality Compared with Previous Product

The CP 343-5 Basic (6GK7 343-5FA01-0XE0) described here can be used as a replacement for the previous product CP 343-5 Basic (6GK7 343-5FA00-0XE0).

### Extended Functions with 6GK7 343-5FA01-0XE0

The CP 343-5 described here also supports transmission rates > 1.5 Mbps.

## 5.2 Replacing Older Modules / Replacing Defective Modules

### Replacing a Module

Use the following procedure when replacing an older module with one of those described here:

Table 5-1

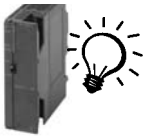
| Module Used Until Now | Configuration Procedure |
|---|---|
| 6GK7 343-5FA00-0XE0 | **Configuration unchanged (replacing a defective module)**<br>If you do not require any extended functionality compared with the functions provided by the old CP (for example transmission rate), no changes to the configuration are necessary.<br>During commissioning, simply remember the following distinction:<br>• If you selected the option of storing the configuration data of the old CP on the CPU, this configuration data will be downloaded to the CP automatically during start up.<br>• Otherwise download the configuration data to the CP again from your PG/PC.<br>**Extending the Configuration (using new functions)**<br>If you want to use the extra possibilities provided by the new CP, follow the steps below:<br>1. Replace the previously configured CP 343-5 with the new module with order number 6GK7 343-5FA01-0XE0 in STEP 7 / HW Config. You will find the new module in the hardware catalog.<br>2. Complete your configuration according to your requirements, for example using the Properties dialog of the PROFIBUS subnet.<br>3. Use the FBs (V1.5 or higher) shipped with STEP 7 V5.1 or higher for FMS and regenerate the instance data blocks.<br>4. Save, compile, and download the configuration data and blocks to the CPU or CP again. |

**Note**

If you cannot fill the slot left empty after replacing the module by moving the other modules back one slot, remember to insert a dummy module (6ES7 370-0AA01-0AA0).

In this case, the address switch on the back of the module must be set to “Non-Address-Mode” (NA).

## Information in the Online Help and the Documentation for NCM S7 for PROFIBUS



The additional information “for newer modules” in both the online help of STEP 7 / NCM S7 and in the NCM S7 for PROFIBUS manual apply to the CP described here. Look for the symbol shown here.

## Compatibility

The CP 343-5 functions differently compared with the previous module. Make sure you are aware of the effects in your user program. The following table provides you with an overview.

Table 5-2 Changed Reaction

| Situation | Until Now | Now |
|---|---|---|
| Receive buffer for AG_RECV is too small | If the receive buffer is too small, data are received up to the buffer size.<br>The call is acknowledged with error message $8185_H$. | If the receive buffer is too small, **no** data are received.<br>The call is acknowledged with error message $80B1_H$. |

**Notice**

When writing new user programs, you should always use the latest versions of the blocks. You will find Information on the current block versions and download links for the current blocks on the Internet at:

http://www4.ad.siemens.de/view/cs/de/8797900

# 6 Technical Specifications

## General Technical Specifications

Table 6-1

| Technical Specifications | Value |
|---|---|
| Supported Transmission Rates | 9.6 Kbps, 19.2 Kbps, 45.45 Kbps<br>93.75 Kbps, 187.5 Kbps, 500 Kbps<br>1.5 Mbps, 3 Mbps, 6 Mbps, 12 Mbps |
| Interfaces | |
| Attachment to PROFIBUS | 9-pin sub-D female connector |
| Maximum current consumption on the PROFIBUS interface with network components attached (for example, optical network components) | 100 mA at 5V |
| Power supply | 24 V DC |
| Current consumption<br>- from 24 V:<br>- from S7-300 / C7-300 backplane bus | <br>0.25 A typical<br>150 mA typical |
| Cable cross section for 24V | 0.25...2.5 $mm^2$ |
| Power loss | 6 W |
| • Permissible ambient temperature according to /1/, the following temperature ranges must not be exceeded in S7-300 / C7-300 tiers<br>- horizontal installation<br>- vertical installation<br>• Transportation/storage temperature<br>• Relative humidity max.<br>• Altitude | <br><br>0 to 60°C<br>0 to 40°C<br>–40 °C to +70 °C<br>95% at +25 °C<br>up to 2000 m above sea level |
| Dimensions W x H x D (mm) | 40 x 125 x 120 |
| Weight | approx. 300 g |

All the information in the Section “General Technical Specifications” in /1/ on the following topics also applies to the CP 343-5

- Electromagnetic compatibility
- Transportation and storage conditions
- Mechanical and climatic ambient conditions
- Specifications for insulation tests, protection class, and protection level