SIEMENS

SIMATIC NET

Produktinformation	**Stand**
Product information	**Dated**
Information produit	**Edition**
Informazioni sul prodotto	**Versione**
Información sobre el producto	**Edición**
C79000–Z8964–C032–03	**12/98**

6GK7 342-5DA01-0XE0

PROFIBUS CP 342-5

SIMATIC S7 300

Hinweis / Note / Avertissement / Avvertenza / Indicación

Achtung

Vor der Inbetriebnahme Hinweise in der entsprechenden aktuellen Dokumentation beachten. Die Bestelldaten hierfür entnehmen Sie bitte den Katalogen oder wenden Sie sich an Ihre örtliche SIEMENS-Niederlassung.

Die Inbetriebnahme ist solange untersagt, bis festgestellt wurde, daß die Maschine, in die diese Komponente eingebaut werden soll, den Bestimmungen der Richtlinie 89/392/EWG entspricht.

Attention

Prior to startup you must observe the notes in the relevant documentation. For ordering data of the documentation please refer to catologs or contact your local SIEMENS representative.

Startup must not take place until it is established that the machine, which is to accommodate this component, is in conformity the guideline 89/392/EEC.

Attention

Avant la mise en service, respecter les instructions de la documentation actuelle correspondante. Pour les références de commande de la documentation, veuillez-vous reporter aux catalogues ou consulter votre agence locale SIEMENS.

La mise en service est interdite tant que la machine dans laquelle est incorporé ce composant n'est pas conforme aux prescriptions de la directive 89/392/CEE.

Attenzione

Prima della messa in funzione, osservare attentamente le avvertenze riportate nella documentazione corrente. Per i dati di ordinazione consultare i cataloghi oppure rivolgersi alla locale fidale SIEMENS.

La messa in funzione è vietata fino a quando non è stato acctertato che macchina, in cui il componente deve essere installato, non rispetta le disposizioni della direttiva 89/392/CCE.

Atención

Antes de la puesta en marcha observar las indicaciones contenidas en la documentatción actual correspondiente. La referencia de la misma puede consultarse en los catáloges o solicitarse a su agencia SIEMENS local.

Está prohibida la puesta en marcha hasta comprobar que la máquina en donde va a incorporarse este componente cumple lo especificado en la directiva 89/392/CCE.

english

Contents

1 CP 342-5 Communications Processor

Application

The CP 342-5 communications processor is intended for operation with an S7-300 programmable logic controller. It allows the S7-300 to be connected to a PROFIBUS field bus system.

Design

The module is designed to match the components intended for the S7-300 programmable logic controller and has the following characteristics:

➢ Compact module for simple installation on the S7 rail

➢ Operator controls and displays only on the front panel

➢ Direct backplane bus interconnection of modules using the accompanying backplane module connector

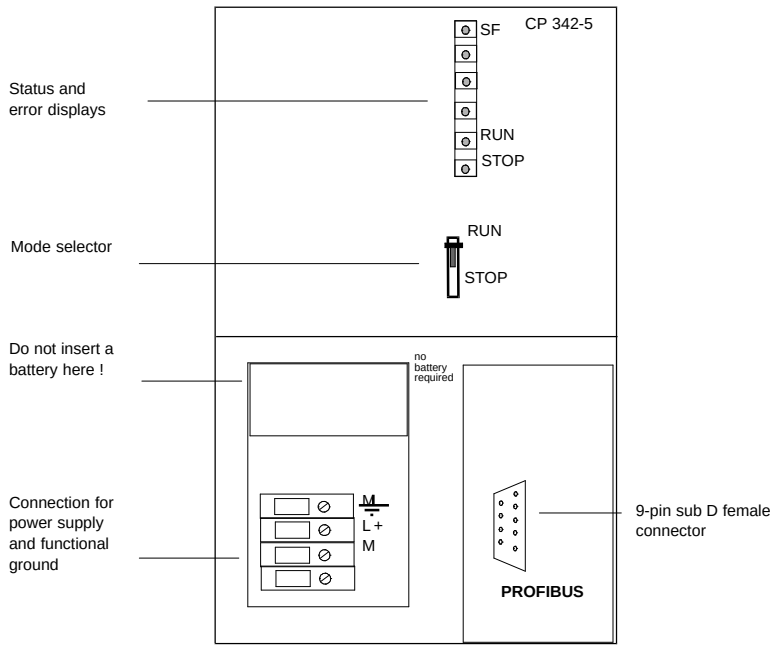

Figure 1 Front Panel of the CP 342-5

Configuration

Configuration is possible via MPI or LAN/PROFIBUS.

1.1 Characteristics

Services

The current version of the CP 342-5 supports the following communication services:

➢ PROFIBUS-DP

- as DP master with the functions for PROFIBUS DP complying with EN 50170
- as DP slave (PROFIBUS DP complying with EN 50170, DP Slave)

➢ SIMATIC communication with SEND/RECEIVE interface via FDL connections of following types:

- Specified FDL connections
- Free layer 2 connections
- Broadcast
- Multicast

➢ S7 communication with

- PG functions (including routing without alternative paths)
- Operator control and monitoring functions (HMI)
- Data exchange using communication function blocks

The services of the CP 342–5 listed here can all be used at the same time independent of each other.

☞ **Note however, that the CP 342–5 can only be operated as DP master or DP slave but not both. The DP mode can also be completely deselected.**

PG Functions

Using the PG functions, modules in a central rack can also be accessed via the CP, for example the FM 354, FM 355 (extended PG functions).

Upload functions from FM modules as well as SDB creation via FM configuration software for the ”exchange of modules without PG” are, however, not possible.

PG functions across multiple subnets are supported (routing) if you have STEP 7 / NCM S7, V5.00 or higher.

Note: Dynamic switchover to alternative paths (for example if there is a problem on one of the possible transmission paths) is not supported.

Module Replacement without PG

The CP supports the option of storing the CP configuration data on the CPU. If you use this option, you can replace a module without having to download the configuration data from the programming device. If you then replace the CP, the configuration data are downloaded from the CPU automatically when the CP starts up. This functionality is available only with STEP 7 / NCM S7, V5.00 or higher.

☞ **While the configuration data are being downloaded from the CPU to the CP, no further connection for setting parameters or for diagnostics must be established to the CPU!**

Configuration

For configuring, you require STEP 7. For FDL connections and diagnostic functions, you also require the optional package NCM S7 for PROFIBUS. Note the following points about the different versions of the configuration software:

➢ STEP 7 / NCM S7, V5.00 or higher

This version is required for the following functions:

– Module replacement without PG

– Routing PG functions

➢ STEP 7 / NCM S7, V4.02 and higher

With this version, the CP 342-5 with order number 6GK7342-5DA0**1**-0XE0 is displayed in the module catalog.

➢ STEP 7 / NCM S7, V2.1 to V4.01

With these versions only the CP 342-5 with order number 6GK7342-5DA0**0**-0XE0 can be configured

Configuration data created with these versions and this order number can also be loaded unchanged under STEP 7 / NCM S7, V4.02 or higher.

The CP is then only capable of the range of functions of the CP 342-5 with order number 6GK7342-5DA0**0**-0XE0.

When you download the configuration data to the CP, you will see a warning displayed indicating that the hardware configuration of the configuration data and the CP are different! When you use diagnostic functions (STEP 7 diagnostics or NCM diagnostics) on the CP, the order number 6GK7342-5DA0**0**-0XE0 is displayed if the DP master mode is configured!

➢ For more information about selecting slaves in the Hardware Configuration, refer to /2/ Section 3.4.

When using the CP 342-5 with order number 6GK7342-5DA0**1**-0XE0 as described here, you can select the slaves available in the standard catalog.

If you are using the CP 342-5 with order number 6GK7342-5DA0**0**-0XE0, DP standard slaves are supported. You must therefore select DP slaves available in the subcatalog “CP 342-5 as DP Master”.

➢ Downloading configuration data to the CP

If you modify the bus parameters in the configuration data, you can only download the configuration data to the CP via MPI!

DP Mode

➢ SYNC/FREEZE functions and use with ET200M:

The ET200M I/O systems assigned to SYNC/FREEZE groups with STEP 7 **must not** contain modules of the type FM or CP.

➢ SYNC/FREEZE functions and assignment of the DP slaves:

If you configure the CP 342-5 with order number 6GK7342-5DA0**1**-0XE0, its DP slaves must only be assigned to one SYNC and one FREEZE group.

1.2 Performance

1.2.1 Transmission Rates

The transmission rate is set with the SIMATIC STEP 7 configuration software. The following values are permitted:

Table 1

Feature	Values
Transmission rates that can be set during configuration	9.6 Kbps 19.2 Kbps 45.45 Kbps 93.75 Kbps 187.5 Kbps 500 Kbpss 1.5 Mbps

1.2.2 Basic Data of the DP Interface/DP Master

General Data

The following data are important if you want to operate the CP 342-5 as a DP master:

Table 2

Feature	Explanation / Values
Number of DP slaves that can be operated	64 maximum The number that is actually possible depends on the size of the configuration data for the DP slaves. If you have complex slave configuration data, the possible number may be lower. If this is the case, you will receive a message when the possible number is exceeded.

Table 2 , Fortsetzung

Size of the DP data areas (total): – DP input area – DP output area	 240 bytes maximum 240 bytes maximum
Size of the DP data areas (per DP slave): – DP input area – DP output area	 240 bytes maximum 240 bytes maximum
Size of the DP diagnostic data:	240 bytes per DP slave

Extended Master Functions

The CP 342-5 supports the following:

➢ Sync/Freeze

➢ Shared Input/Output

Reaction Times of a DP Master

To calculate the reaction times when operating the module as a DP master, two components are of fundamental importance: the run time of the function blocks required for DP processing in the S7-300 CPU (DP-SEND, DP-RECV) and the DP polling cycle time.

Table 3

Components	Explanation / Values (Guidelines)
Run time in the CPU 314-1	per DP–SEND, DP–RECEIVE block: 1 ms at 16 bytes 2 ms at 240 bytes

Table 3 , Fortsetzung

DP polling cycle time that can be achieved at 1.5 Mbps	1.5 ms + n* 0.3 ms at 1 byte input and 1 byte output per DP slave 1.5 ms + n* 0.5 ms at 16 bytes inputs and 16 bytes outputs per DP slave n = number of DP slaves

☞ **The reaction times listed above are only intended as a guideline and only apply to a single-master configuration when no other services (for example PG functions) are processed on the CP.**

For information about setting the DP delay time, refer to Section 1.2.6.

1.2.3 Basic Data of the DP Interface / DP Slave

The following characteristics are important for successful data transfer to a DP slave:

Table 4

Feature	**Explanation / Values**
Device database file (*.GSD)	File name: SIEM9001.GSD You can obtain device database files as follows: By modem from the mailbox in the Interface Center, Fürth Tel. 0911-737972 (from outside Germany +49-911-737972 On the Internet http.\\www.ad.siemens.de under “Support, Training and Service...Customer Support, Downloads”
Vendor ID	9001H
Size of the DP data areas (total): – DP input area – DP output area	 86 bytes maximum 86 bytes maximum

Table 4 , Fortsetzung

Min. slave interval	5 ms
SYNC / FREEZE	not supported
User-specific data	not supported

Reaction Times of a DP Slave

To calculate the reaction times when operating the module as a DP slave, the run time of the function blocks required for DP processing in the S7-300 CPU (DP-SEND, DP-RECV) is the decisive factor.

Table 5

Component	**Explanation / Values**
Run time in the CPU 314-1	per DP-SEND, DP-RECV block: 1 ms at 16 bytes 2 ms at 86 bytes

☞ **The reaction times listed above are only intended as a guideline and only apply when no other services (for example PG functions) are processed on the CP.**

Points to Note with DP

The following DP master class 2 jobs are **not** supported:

– DDLM_Get_Master_Diag

– DDLM_Act_Param

1.2.4 Basic Data of the SEND/RECEIVE Interface via FDL Connections

The following data are important when operating FDL connections (Specified, Free Layer 2 (SDA and SDN), Broadcast, Multicast):

Table 6

Feature	Explanation / Values
Total number of FDL connections that can be operated.	maximum 16
Size of the transferable data area for FDL connections	maximum 240 bytes per specified FDL connection (for sending and receiving); Free layer 2, broadcast and multicast: Up to 236 bytes of user data can be transferred per job buffer. The job header occupies an additional 4 bytes.

Reaction Times of FDL Connections

To calculate the reaction times when operating with FDL connections, the run time of the function blocks required in the S7-300 CPU (AG-SEND, AG-RECV) is the decisive factor.

Table 7

Component	Explanation / Values
Run time in the CPU 314-1	per AG-SEND, AG-RECV block: 1 ms for 16 bytes 2 ms for 240 bytes

1.2.5 Basic Data for S7 Communication

The following characteristic data are important for operating S7 connections:

Table 8

Feature	Explanation / Values
Number of S7 connections that can be operated	16 maximum 1)

1) The actual number of S7 connections that can be operated depends on the CPU type you are using. There are further restrictions if you operate in mixed mode. Refer to Section 1.2.6 for more information.

1.2.6 Using Parallel Communications Services

Performance

If you want to use the available communications services at the same time, there are restrictions in terms of communication performance.

The following table shows the transmission rate for FDL connections dependent on the following:

➢ The frame length (number of bytes)

➢ The number of connections

The values were measured when sending and receiving in direct succession (at a transmission rate of 1.5 Mbps, bus profile universal, two stations, no DP delay time).

Table 9 Number of Frames Per Second

Number of Connections / Frame Length	1	4	8	16
1 byte	77 / s	92 / s	92 / s	92 / s
100 bytes	73 / s	88 / s	88 / s	88 / s
240 bytes	67 / s	82 / s	83 / s	84 / s

Based on the information in Table 9, parallel operation has the following effects:

➢ 16 FDL connections + 2 S7 connections + 2 PG/HMI connections

Performance lost approximately 10 %

➢ 16 FDL connections (frame length 240 bytes) plus DP mode [1)]

– with a DP delay time of 10 ms, a loss of performance of approximately 20% can be measured for FDL (parallel S7 connections do not influence the loss of performance)

1) DP mode with the following DP configuration:
44 DP slaves with 116 bytes of input data and 109 bytes of output data

☞ **Recommendation: In the mixed mode – DP + FDL + S7 functions – a delay time > 5 ms should be selected.**

Number of Connections in Mixed Mode

If you use a connection configuration involving the maximum number of FDL connections (16) and the use of DP at the same time, the maximum number of S7 connections reduces from 16 to 12.

1.3 Other Features

Configuration and diagnostics must not be used simultaneously.

When you configure the CP 342–5, there must be no diagnostic functions active via MPI.

Reloading the Hardware Configuration with Modified Bus Parameters via PROFIBUS:

Problem-free operation is only possible when the bus parameters on all the nodes attached to the PROFIBUS are identical. If you modify the bus parameters on one node, the hardware configuration must be downloaded again to all attached modules. This is only possible via PROFIBUS when only one module is active on the network and all others are deactivated (in other words module by module) otherwise there will be disturbances on the bus (the affected CP342–5 would boot continuously). The alternative is to download the hardware configuration again via MPI.

Returning to the RUN mode in the SIMATIC Manager after downloading the system data via the LAN

With the keyswitch of the CPU set to RUN–P, you can download the system data of the CPU in the Simatic Manager. The CPU receives a software instruction and changes from RUN to STOP.

After the download, you cannot return the CPU to the RUN mode automatically. The message: ”ONLINE: the connection was terminated” appears.

You must then change the CPU back to the RUN mode with the PLC –> Operating Mode function.

1.4 Displays and Mode Selector

LED Display

The LED display on the front panel of the CP 342-5 has three display elements:

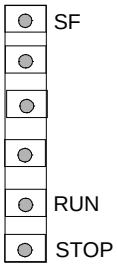

Figure 2 LED Display

CP Operating Status

The LEDs indicate the status of the CP as shown in the following table:

STOP LED (yellow)	RUN LED (green)	SF LED (red)	CP–Mode
●	☀	○	Startup or firmware being loaded
○	●	○	RUN
☀	●	○	STOPPING
☀	○	○	Waiting for firmware update (takes 10 seconds)
☀	○	●	Waiting for firmware update (CP currently has incomplete firmware)
●	○	○	STOP
○	○	●	STOP with error
○	●	☀	RUN; however problems on PROFIBUS or DP slave(s) missing on PROFIBUS
☀	☀	☀	Module fault or error/ system error

Key: ● on ○ off ☀ flashing

☞ **Refer to the NCM S7 for PROFIBUS /2/ manual for detailed information about operating modes.**

Controlling the Operating Mode

There are two ways in which you can control the operating mode of the CP 342-5, as follows:

➢ Using the mode selector

➢ Using the NCM S7 for PROFIBUS configuration software

Mode Selector

You can set the following operating modes with the mode selector:

➢ Switch from STOP to RUN:
The CP enters configured and/or loaded data in the work memory and changes to the RUN mode.

➢ Switch from RUN to STOP:
The CP changes to the STOP mode. Established connections (FDL and S7 connections) are terminated and DP slaves are no longer supplied with data.

In the STOP mode, it is possible to configure the CP 342-5 and run diagnostic functions.

The CP operating mode can only be controlled by NCM S7 PROFIBUS when the mode selector is set to RUN.

☞ **Refer to the manual /2/ for detailed information about downloading a database to the CP.**

2 Installation

2.1 Module Accessories

What You Require

Some of the accessories you require to install the module on the rail are supplied with the communications processor. You must nevertheless order extra accessories. The table below lists and explains the required accessories.

Table 10

Supplied with the module	Must be ordered extra	Explanation
1 bus connector		For electrical interconnection of the modules.
	SIMATIC NET PROFIBUS connector	Depending on the type of attachment to SIMATIC NET PROFIBUS, certain attachment components are necessary (SIMATIC NET PROFIBUS bus terminal, bus connector).
	SIMATIC NET PROFIBUS LAN cables	A variety of different cable types can be ordered for different applications.

2.2 How to Install the Module

Steps

Installing the CP 342-5 involves the following steps:

➢ Fitting the module to the S7 rail. The connection to the backplane bus is established with the accompanying bus connector.

You can install the CP in slots 4 through 11 in racks 0 through 3 (connected via the IM 360/361).

Follow the detailed instructions in /1/:

Chapter 5 Installing an S7-300

Chapter 6 Wiring an S7-300

☞ **The CP cannot be operated in an expansion rack connected via the IM 365! Reason: the required communication bus is not routed via the IM 365 to the expansion rack.**

➢ Connecting the power supply.

Follow the detailed instructions in /1/, particularly with regard to the wiring between the power supply and the CPU. This is described in

Section 6.2 Wiring the Power Supply and CPU

☞ **Make sure that you connect the CP 342-5 and the CPU to a common power supply. If the CP and CPU are at different potentials, communication problems may arise on the backplane bus of the S7-300.**

When wiring the power supply and the CP 342-5, use flexible wires with a cross-sectional area of 0.25 to 2.5 mm^2.

➢ Connecting to PROFIBUS

Follow the instructions on the next page.

☞ **Switch off the power before wiring the S7-300!**

☞ **Remember that you must not insert a battery in the CP 342-5!**

Configuring

Depending on the communication services you are using, configuring involves the following steps:

➢ Node initialization

This configuration step is always required. for details, see /2/.

➢ Configuring connections:

This is necessary if you use the communication services S7 functions and FDL connections (SEND/RECEIVE interface). For details, see /2/ or /4/.

➢ Configuring DP

This is necessary when the DP mode is used. For details, see /2/ or /4/.

PG/PC Connection for Configuration

You can use the programming device for configuring as follows:

➢ via MPI

➢ via LAN / PROFIBUS

The CP 342-5 must first be supplied with the PROFIBUS address (for details on node initialization, refer to /2/).

2.3 Connection to SIMATIC NET PROFIBUS

Electrical Connection

There are two ways of attaching to SIMATIC NET PROFIBUS using the following:

➢ Bus connector
The SIMATIC NET PROFIBUS LAN cable is led to the CP 342-5.

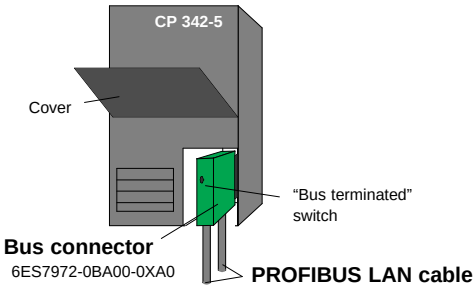

Figure 3 Connecting to PROFIBUS Using a Bus Connector

➢ Bus terminal
The SIMATIC NET PROFIBUS LAN cable is led to the bus terminal. The CP 342-5 is connected using the cable integrated in the bus terminal.

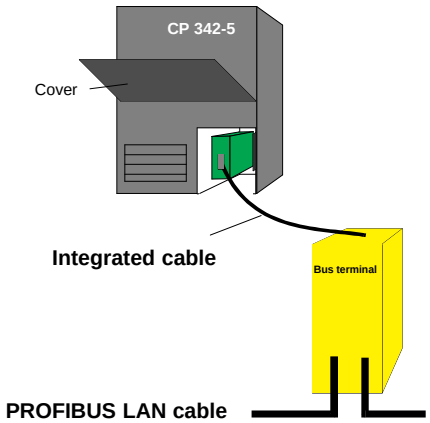

Figure 4 Connecting to PROFIBUS using a Bus Terminal

Optical Connection

The optical link module is available to attach the module to SIMATIC NET PROFIBUS using either plastic or glass optical cables.

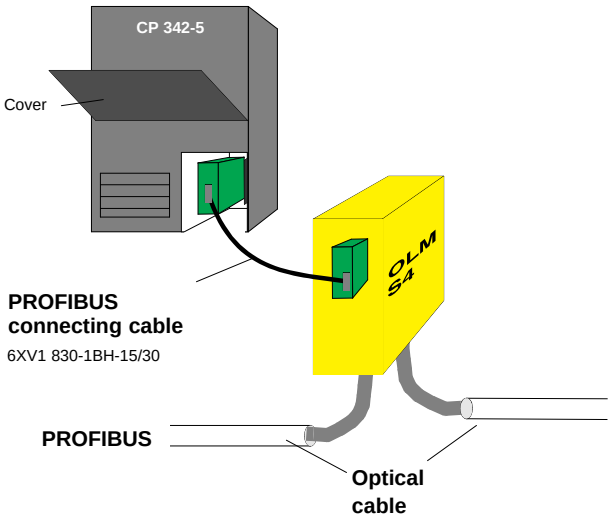

Figure 5 Connecting to PROFIBUS Using an Optical Link Module

3 Technical Data

3.1 General Technical Data

Table 11

Dimensions and Weight	
Dimensions W x H x D (mm)	80x125x120
Weight	approx. 600 g

Table 12

Voltages, Currents, Operating Conditions	
Power supply	24 V DC
Current consumption - from 24 V: - from S7-300 backplane bus	 0.25 A typical 70 mA typical
Power loss	6 W
Permitted ambient temperature: as stated in /1/, for operation of an S7-300 tier - for horizontal installation - for vertical installation,	 0 to 60˚C 0 to 40˚C

The information in /3/, Section ”General Technical Data” also applies to the CP 342-5 , particularly:

➢ Electromagnetic compatibility

➢ Transport and storage

➢ Mechanical and climatic environmental conditions

➢ Information about insulation checks, class of protection and degree of protection

3.2 Pinouts

PROFIBUS Interface Socket

The following table shows the pinout of the electrical interface for connecting to SIMATIC NET PROFIBUS (9-pin sub D female connector).

			Used with
Pin No.	Signal Name	PROFIBUS Designation	RS 485
1	PE	Protective ground	yes
2	SIL	-	-
3	RxD/TxD-P	Data line - B	yes
4	RTS (AG)	Control - A	-
5	M5V2	Data reference potential	yes
6	P5V2	Power supply plus	yes
7	BATT	-	-
8	RxD/TxD-N	Data line - A	yes
9	RTS (PG)	Control - B	-

3.3 Notes on the CE Mark on SIMATIC NET Products

Product Name

CP 342-5 Order number: 6GK7 342-5DA01-0XE0

EU EMC Directive 69/336/EEC

The SIMATIC NET products listed above meet the requirements of the EU Directive 89/336/EEC ”Electromagnetic Compatibility.

CE

The EU conformity certificates are kept for the authorities responsible according to the EU directives listed above at the following address:
Siemens Aktiengesellschaft
Bereich A&D
Industrielle Kommunikation SIMATIC NET (A&D PT2)
Postfach 4848D–90327 Nürnberg
Federal Republic of Germany

Area of Application

The product is designed for industrial application.

Area of application	Requirements	
	Emission	Immunity
Industrial	EN 50081-2 : 1993	EN 50082-2 : 1995

Directive on Machines

The product remains a component in compliance with Article 4(2) of the EU directive on machines 89/392/EEC.
According to the directive on machines, we are obliged to point out that this product is intended solely for installation in a machine. Before the final product is started up, it must be established that it conforms to the directive 89/392EEC.

Installation Guidelines

This product meets the requirements providing you adhere to the installation guidelines described in /1/ and /3/.

4 References

/1/	For installing and starting up the CP 342-5: Manual: S7-300 Programmable Controller, Installation and Hardware
/2/	For using and configuring the CP 342-5: Manual: SIMATIC NET NCM S7 for PROFIBUS, Volume 1 and Primer
/3/	For installing and operating a SIMATIC NET PROFIBUS network: Industrial Communications Networks PROFIBUS Networks Manual
/4/	For information on configuring: User's Guide to STEP 7
/5/	For information on communication: Communication with SIMATIC manual

Order Numbers

The order numbers for the SIEMENS documentation listed above can be found in the catalogs "SIMATIC NET Industrial Communication, Catalog IK 10" and "SIMATIC Programmable Logic Controllers SIMATIC S7 / M7 / C7" – Components for Fully Integrated Automation, Catalog ST 70".

These catalogs, additional information and details of available training courses can be ordered from SIEMENS branches and subsidiaries.

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