SIEMENS

SIMATIC NET

S7-1200 - Telecontrol
CP 1242-7

Operating Instructions

Legal information

Warning notice system

This manual contains notices you have to observe in order to ensure your personal safety, as well as to prevent damage to property. The notices referring to your personal safety are highlighted in the manual by a safety alert symbol, notices referring only to property damage have no safety alert symbol. These notices shown below are graded according to the degree of danger.

⚠ DANGER

indicates that death or severe personal injury **will** result if proper precautions are not taken.

⚠ WARNING

indicates that death or severe personal injury **may** result if proper precautions are not taken.

⚠ CAUTION

with a safety alert symbol, indicates that minor personal injury can result if proper precautions are not taken.

CAUTION

without a safety alert symbol, indicates that property damage can result if proper precautions are not taken.

NOTICE

indicates that an unintended result or situation can occur if the relevant information is not taken into account.

If more than one degree of danger is present, the warning notice representing the highest degree of danger will be used. A notice warning of injury to persons with a safety alert symbol may also include a warning relating to property damage.

Qualified Personnel

The product/system described in this documentation may be operated only by **personnel qualified** for the specific task in accordance with the relevant documentation, in particular its warning notices and safety instructions. Qualified personnel are those who, based on their training and experience, are capable of identifying risks and avoiding potential hazards when working with these products/systems.

Proper use of Siemens products

Note the following:

⚠ WARNING

Siemens products may only be used for the applications described in the catalog and in the relevant technical documentation. If products and components from other manufacturers are used, these must be recommended or approved by Siemens. Proper transport, storage, installation, assembly, commissioning, operation and maintenance are required to ensure that the products operate safely and without any problems. The permissible ambient conditions must be complied with. The information in the relevant documentation must be observed.

Trademarks

All names identified by ® are registered trademarks of Siemens AG. The remaining trademarks in this publication may be trademarks whose use by third parties for their own purposes could violate the rights of the owner.

Disclaimer of Liability

We have reviewed the contents of this publication to ensure consistency with the hardware and software described. Since variance cannot be precluded entirely, we cannot guarantee full consistency. However, the information in this publication is reviewed regularly and any necessary corrections are included in subsequent editions.

Preface

Validity of this manual

This document contains information on the following product:

CP 1242-7
Order number 6GK7 242-7KX30-0XE0
Hardware product version 1, firmware version V1.0

The device is the communications processor for data transmission using GPRS for the SIMATIC S7-1200.

Figure 1   CP 1242-7

At the top right behind the hinged cover of the module housing, you will see the hardware product version printed as a placeholder "X" (for example X 2 3 4). In this case, "X" would be the placeholder for hardware product version 1.

Product name

In this document, the term "CP" is also used instead of the full product name "CP 1242-7".

Purpose of the manual

This manual describes the properties of this module and supports you when installing and commissioning the device.

The necessary configuration steps are described in the form of an overview.

You will also find instructions for operation and information about the diagnostics options of the device.

New in this issue

Editorial revision

Replaced documentation

This manual replaces the manual release 07/2011.

Required experience

To install, commission and operate the CP, you require experience in the following areas:

- Automation engineering
- Setting up the SIMATIC S7-1200
- SIMATIC STEP 7 (ab V11)
- Data transmission using GPRS and the Internet

Further information

You will find an overview of further reading and references in the Appendix of this manual.

You will also find information about training, Service & Support and who to contact in the Appendix of this manual.

License conditions

NOTICE
Open source software
Read the license conditions for open source software carefully before using the product. The acceptance of the disclaimers of liability and warranty it contains is a clear precondition of the use of open source software.
You will find license conditions in the document "Readme_OSS_CM-CP-1200_74.pdf" on the supplied data medium with the product documentation.

Table of contents

Application and properties

<div style="text-align: right; font-size: 3em;">1</div>

1.1 Connecting the S7-1200 to a GSM network

IP-based WAN communication via GPRS

Using the CP 1242-7 communications processor, the S7-1200 SIMATIC controller can be connected to GSM networks. The CP 1242-7 allows WAN communication from remote stations with a control center and inter-station communication.

The CP 1242-7 supports the following services for communication via the GSM network:

* GPRS (General Packet Radio Service)

  The packet-oriented service for data transmission "GPRS" is handled via the GSM network.

* SMS (Short Message Service)

  The CP 1242-7 can receive and send SMS messages. The communications partner can be a mobile phone or an S7-1200.

The CP 1242-7 is suitable for use in industry worldwide and supports the following frequency bands:

* 850 MHz

* 900 MHz

* 1 800 MHz

* 1 900 MHz

In countries in which the CP is approved, you will find this on the Internet on the pages of Siemens Automation Customer Support under the following entry ID:

45605894 (http://support.automation.siemens.com/WW/view/en/45605894)

On the Internet page, select the "Entry list" tab and the "Certificates" entry type.

Note

No CDMA mode

The CP is not suitable for GSM networks in which the code multiplex method "Code Division Multiple Access" (CDMA) is used.

1.2 Applications

The CP 1242-7 is intended for use in an industrial environment. The following applications are supported by the CP:

Telecontrol applications

- Sending messages by SMS

  The function is not dependent on the operating mode of the CP.

  Via the CP 1242-7, the CPU of a remote S7-1200 station can receive SMS messages from the GSM network or send messages by SMS to a configured mobile phone or an S7-1200.

- Communication with a control center

  The CP is configured in "Telecontrol" mode.

  Remote S7-1200 stations communicate via the GSM network and the Internet with a telecontrol server in the master station. The telecontrol server communicates with a higher-level control system using the integrated OPC server function.

- Inter-station communication between S7-1200 stations via a GSM network

  Depending on the GSM service being used and the mode of the CP, the inter-station communication between remote stations with a CP 1242-7 will be handled in different ways:

  – Indirect communication via a master station ("Telecontrol" mode)

    In this configuration, connections between S7-1200 stations and the telecontrol server are established in the master station. The telecontrol server forwards the messages between the stations.

  – Direct communication between stations ("GPRS direkt" mode)

    The CP requires a fixed IP address to be assigned by the GSM network provider.

TeleService via GPRS

A TeleService connection can be established between an engineering station with STEP 7 installed on it and a remote S7-1200 station via the GSM network (as of STEP 7 V11.0 SP1). For STEP 7 V11.0 SP1, you also require support package "CP 1242-7" (HSP0003001).

You can use the TeleService connection for the following purposes:

- Downloading project or program data from the STEP 7 project to the station

- Querying diagnostics data on the station

With TeleService via GPRS, a switching station is required between the remote station and engineering Station. This switching station can be a telecontrol server or, if there is no telecontrol server in the configuration, a TeleService gateway. You will find detailed information about both systems in the documentation , see References.

Other connections are not interrupted by a TeleService connection. You will find examples of the structure in the section Configuration examples (Page 14).

1.3 Modes and communications partners of the CP 1242-7

Modes and communications partners of the CP

For communication with the CP 1242-7 via GPRS, the CP is set to one of the following modes:

- Telecontrol

  This CP mode allows the GPRS station to exchange data with a telecontrol server.

  The telecontrol server is a PC with the "TELECONTROL SERVER BASIC" application that is connected to the Internet. It is generally located in the master station and is used for monitoring and control of the remote GPRS stations.

  Possible communications partners of the GPRS station with a CP 1242-7 in "Telecontrol" mode are:

  – A telecontrol server

  – A central control system (via the OPC interface of the telecontrol server)

  – An engineering station (for TeleService)

  – Up to 5 000 GPRS stations with a CP 1242-7 logged on with the telecontrol server

  You will find detailed information about the "TELECONTROL SERVER BASIC" application in the documentation, see References in the Appendix.

- GPRS direct

  This mode of the CP is used for direct communication between remote stations via the GSM network. No telecontrol server is necessary.

  To allow network nodes in public wireless networks to be directly accessible, these need to be addressed using a fixed address. Here, SIM cards with a fixed IP address are used that allow the stations to address each other directly.

  The possible communications services and security functions (for example VPN) depend on what is offered by the network provider.

  Possible communications partners of the GPRS station with a CP 1242-7 in "GPRS direct" mode are:

  – A subscriber that can be reached by the CP via an IP address (for example S7-1200 with CP 1242-7)

  – An engineering station (for TeleService)

1.4 Other properties of the CP

Other services and functions of the CP 1242-7

- Time-of-day synchronization of the CP via the Internet

  You can set the time on the CP as follows:

  – In "Telecontrol" mode, the time of day is transferred by the telecontrol server. The CP uses this to set its time.

  This time-of-day is adopted in the frames sent by the CP.

  – In "GPRS direct" mode, the CP can request the time using NTP.

  Make sure that your network provider supports NTP.

  The NTP server and the time zone are specified during configuration.

- Buffering frames on the telecontrol server

- Increased availability thanks to the option of connecting to a substitute telecontrol server

- Optimized data volume (temporary connection)

  As an alternative to a permanent connection to the telecontrol server, the CP can be configured in STEP 7 with a temporary connection to the telecontrol server. In this case, a connection to the telecontrol server is established only when required.

- Logging of a variety of data and its transfer to the telecontrol server, for example:

  – Data volumes transferred

  – ID of the wireless cell in the area of the station

  – GSM signal strength

  – Communication status

    etc.

1.5 Performance data

Types of connection establishment

The number of connections depends on the type of connection establishment:

- Active connection establishment

  The connection establishment is initiated by the local CPU.

- Passive connection establishment

  The connection establishment is initiated by the communications partner.

Number of simultaneous connections in "Telecontrol" mode

- 1 reserved connection to the telecontrol server, for example for TeleService

  When connection establishment is active also:

- Max. 5 telecontrol connections (TCON_wdc)

- Max. 5 UDP connections (send only)

Number of simultaneous connections in "GPRS direct" mode

- Max. 1 connection to an NTP server

- Max. 1 TeleService connection

The number of productive connections depends on the type of connection establishment.

- With active connection establishment:

  A total of maximum 4 connections

  – Max. 4 ISO-ON-TCP connections

    or

  – Max. 4 UDP connections (send only)

    or

  – A combination of the connection types listed above

- With passive connection establishment:

  Max. 3 ISO-ON-TCP connections

Note

Port 30000 for ISO-ON-TCP

For ISO-ON-TCP, the CP does not use port number 102 but port 30000.

User data

User data per send call with the various connection types:

- For telecontrol connections: Max. 2048 bytes

- For ISO-ON-TCP connections: Max. 2048 bytes

- For UDP connections: Max. 1472 bytes

- For SMS: Max. 160 bytes

Data buffering when there is a connection abort

Up to 1000 frames

1.6 Requirements for operation

Hardware requirements

Apart from the CP 1242-7 in the remote S7-1200, the following hardware is also required:

- A CPU with firmware version as of V2.0

- An external antenna for the CP 1242-7, see Accessories (Page 85)

- In the "Telecontrol" mode of the CP 1242-7, a PC with Internet access is required for the central telecontrol server.

- If you intend to use TeleService via GPRS, a TeleService gateway with Internet access is required for configurations without a telecontrol server. This is a PC on which the "TS Gateway" software is installed, see Accessories (Page 85).

Configuration software

- Configuration tool

  To configure the module, the following configuration tool is required:

  STEP 7 version V11.0 SP1 or higher

  For STEP 7 V11.0 SP1, you also require support package "CP 1242-7" (HSP0003001).

  To configure the module with STEP 7 version V11.0, you also require the support package "HSP0003001".

  Install HSP0003001 in STEP 7 using the menu command "Options" > "Support packages". You can install the support package from your local file system if it is already stored there or from the Internet pages of Siemens Automation Customer Support. You will find HSP0003001 at one of the following addresses:

  – 45605894 (http://support.automation.siemens.com/WW/view/en/45605894)

  – 28919804 (http://support.automation.siemens.com/WW/view/en/28919804)

  On the Internet page, select the "Entry list" tab and the "Download" entry type.

  A description of installing support packages is available in the help system of STEP 7 under the search term "Support packages".

Software for communication with a telecontrol server

The CP is configured in "Telecontrol" mode.

- The telecontrol server requires the "TELECONTROL SERVER BASIC" software.

  For the documentation, see References.

Software for TeleService functions

- STEP 7 as of version V11.0 SP1

  For STEP 7 V11.0 SP1, you also require support package "CP 1242-7" (HSP0003001).

- For the switching station:
  - For configuration with telecontrol server:

    The "TELECONTROL SERVER BASIC" software

  - For configuration without telecontrol server

    The "TS Gateway" software

    The software and the manual describing it are on the DVD that ships with the CP. For the documentation, see References.

Requirements for using GSM services

- A contract with a suitable GSM network provider
  - The contract must allow the transfer of data using GPRS.
  - The contract must allow the assignment of public IP addresses.
  - If there is to be direct communication between GPRS stations ("GPRS direct" mode), the GSM network provider must assign fixed IP addresses to the CP 1242-7 and forward the frames to the destination subscribers.

- The SIM card belonging to the contract

  The SIM card is inserted in the CP 1242-7.

- Local availability of a GSM network capable of GPRS in the range of the station

1.7 Configuration examples

Below, you will find configuration examples for stations with a CP 1242-7.
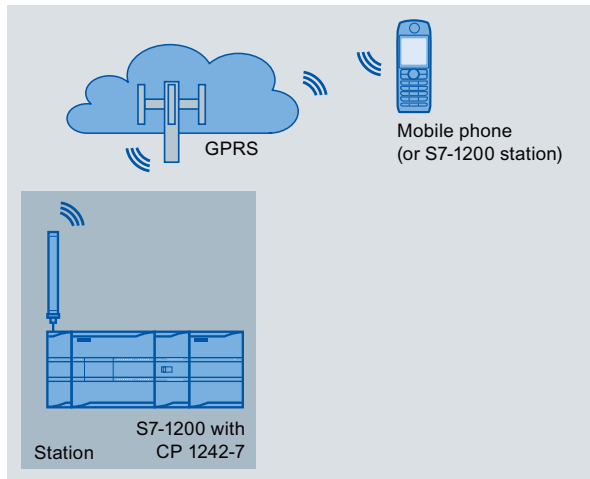
Sending messages by SMS

Figure 1-1   Sending messages by SMS from an S7-1200 station

A SIMATIC S7-1200 with a CP 1242-7 can send messages by SMS to a mobile phone or a configured S7-1200 station.
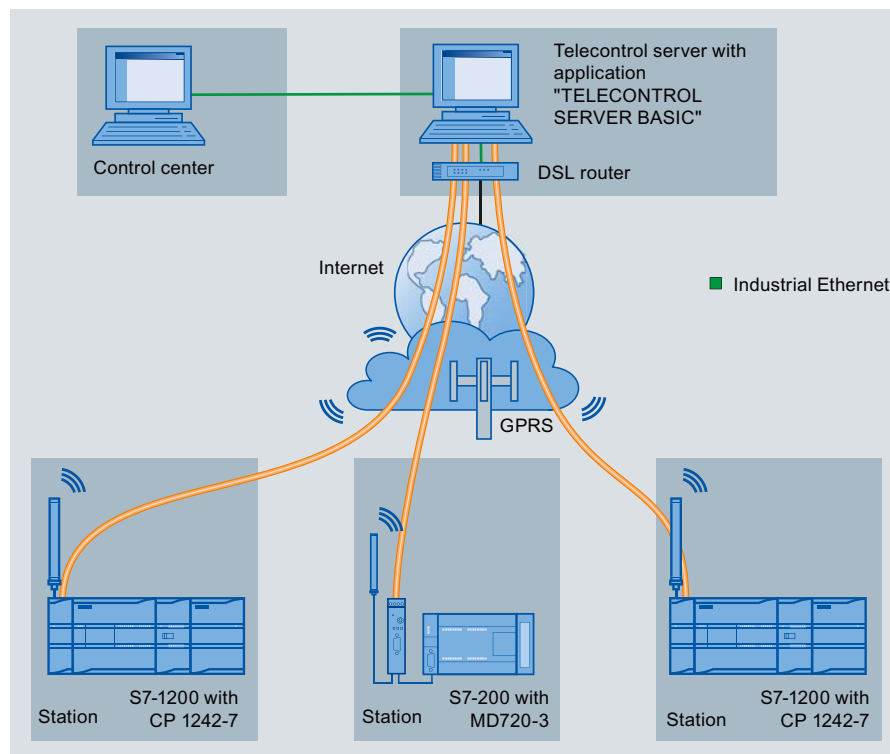
Telecontrol by a control center

Figure 1-2   Communication between S7-1200 stations and a control center

In telecontrol applications, SIMATIC S7-1200 stations with a CP 1242-7 communicate with a control center via the GSM network and the Internet. The "TELECONTROL SERVER BASIC" (TCSB) application is installed on the telecontrol server in the master station. This results in the following use cases:

● Telecontrol communication between station and control center

    In this use case, data from the field is sent by the stations to the telecontrol server in the master station via the GSM network and Internet. The telecontrol server is used to monitor remote stations.

● Communication between a station and a control room with OPC client

    As in the first case, the stations communicate with the telecontrol server. Using its integrated OPC server, the telecontrol server exchanges data with the OPC client of the control room.

    The OPC client and telecontrol server can be located on a single computer, for example when TCSB is installed on a control center computer with WinCC.

● Inter-station communication via a control center

    Inter-station communication is possible with S7 stations equipped with a CP 1242-7.

    To allow inter-station communication, the telecontrol server forwards the messages of the sending station to the receiving station.

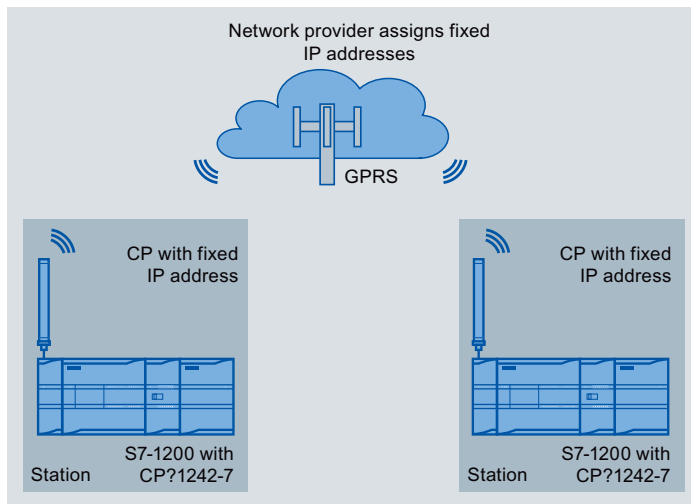## Direct communication between stations

Figure 1-3   Direct communication between two S7-1200 stations

In this configuration, two SIMATIC S7-1200 stations communicate directly with each other using the CP 1242-7 via the GSM network. Each CP 1242-7 has a fixed IP address. The relevant service of the GSM network provider must allow this.

TeleService via GPRS

In TeleService via GPRS, an engineering station on which STEP 7 is installed communicates via the GSM network and the Internet with the CP 1242-7 in the S7-1200.

Since a firewall is normally closed for connection requests from the outside, a switching station between the remote station and the engineering station is required. This switching station can be a telecontrol server or, if there is no telecontrol server in the configuration, a TeleService gateway.

● Configuration with telecontrol server:

The connection runs via the telecontrol server.

– The engineering station and telecontrol server are connected via the Intranet (LAN) or Internet.

– The telecontrol server and remote station are connected via the Internet and via the GSM network.

The engineering station and telecontrol server can also be the same computer; in other words, STEP 7 and TCSB are installed on the same computer.
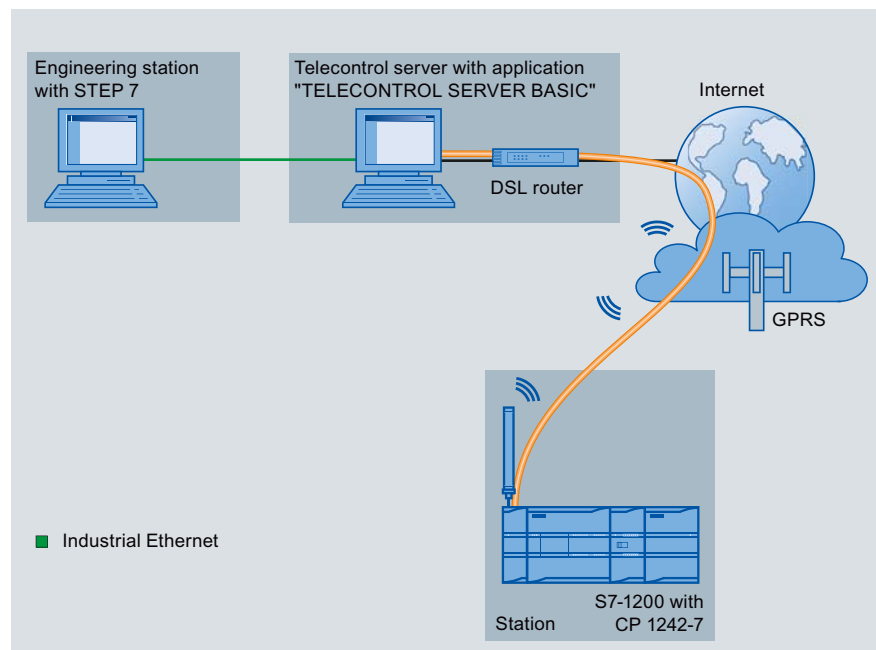

Figure 1-4   TeleService via GPRS in a configuration with telecontrol server

● Configuration without telecontrol server:

The connection runs via the TeleService gateway.

The connection between the engineering station and the TeleService gateway can be local via a LAN or via the Internet.
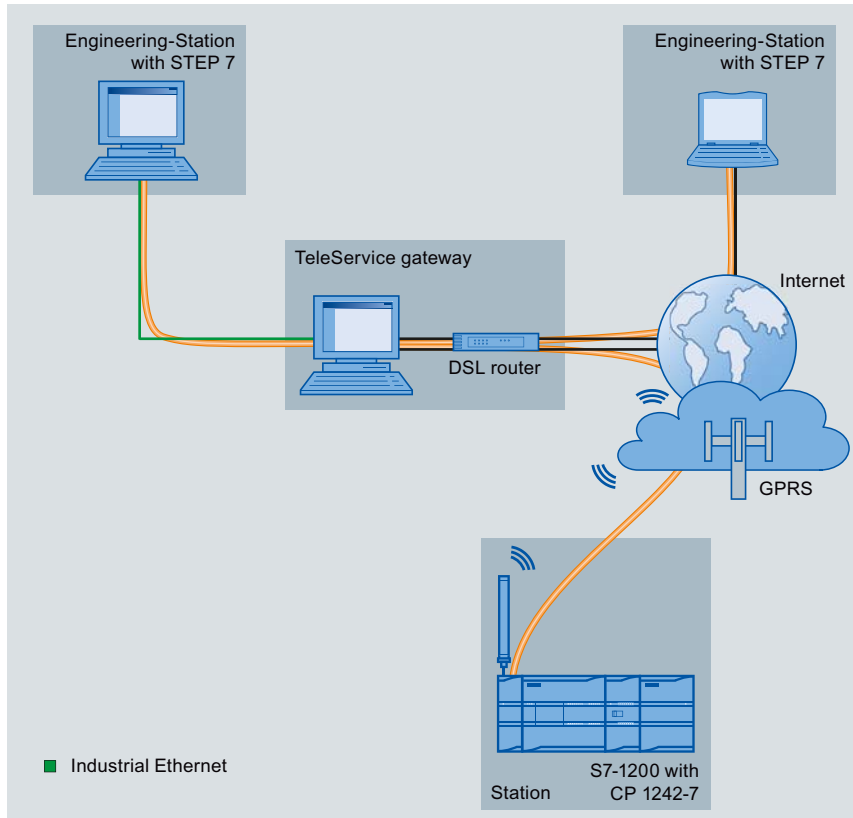
Figure 1-5   TeleService via GPRS in a configuration with TeleService gateway

Displays and connectors

<div style="text-align: right; font-size: 3em;">2</div>

2.1 Opening the housing

Location of the display elements and the electrical connectors

The LEDs for the detailed display of the module statuses are located behind the upper cover of the module housing.

The socket for the power supply is located on the top of the module.

The connector for the external antenna is located on the bottom of the module.

Opening the housing

Open the upper or lower cover of the housing by pulling it down or up as shown in the illustration. The covers extend beyond the housing to give you a grip.

Figure 2-1   Opening the housing

2.2 LEDs

LEDs of the module

The module has various LEDs for displaying the status:
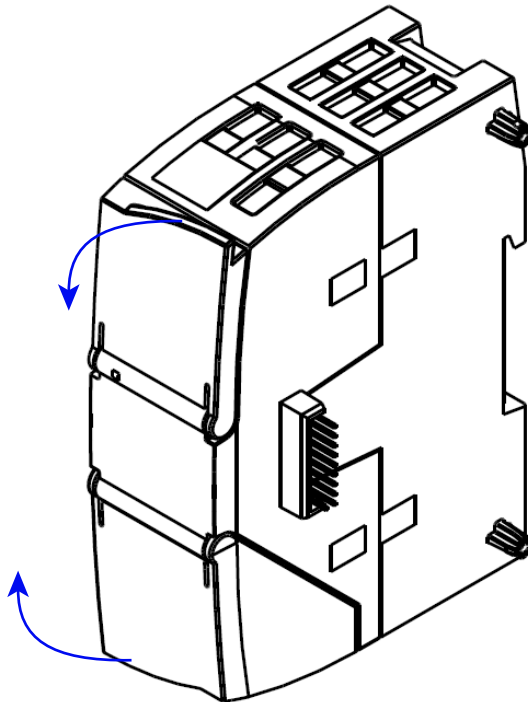
- LED on the front panel

  The "DIAG" LED that is always visible shows the basic statuses of the module.

- LEDs below the upper cover of the housing

  The LEDs below the upper cover provide more detailed information on the module status.

Table 2- 1   LED on the front panel

LED / colors	Name	Meaning
🔴🟢 red/green	DIAG	Basic status of the module

Table 2- 2   LEDs below the upper cover of the housing

LED / colors	Name	Meaning
🔴🟢 red/green	Network	Status of the network connection
🟢 green	Connect	Number of connections to the telecontrol server
🟡🟢 yellow / green	Signal quality	Signal quality of the GSM network
🟢 green	TeleService	Status of the TeleService connection

NOTICE
LED colors when the module starts up
When the module starts up, all its LEDs are lit for a short time. Multicolored LEDs display a color mixture. At this point in time, the color of the LEDs is not clear.

Display of the operating and communication status

The LED symbols in the following tables have the following significance:

Table 2- 3   Meaning of the LED symbols

Symbol	○	🟢 🟡 🔴	🟢 🟡 🔴	-
LED status	OFF	ON (steady light)	Flashing	Not relevant

The LEDs indicate the operating and communications status of the module according to the following scheme:

Table 2- 4   Display of the basic statuses of the module

DIAG (red / green)	-	Network (red / green)	Connect (green)	Signal quality (yellow / green)	TeleService (green)	Meaning
○		-	-	-	-	Power OFF
🟢 green		-	-	-	-	RUN without errors, Telecontrol or TeleService is running
🟢 green (flashing)		-	-	-	-	Startup (STOP → RUN) and other statuses, refer to the next table.
🔴 red (flashing)		-	-	-	-	Error

Table 2- 5   Display schemes for detailed module statuses

DIAG (red / green)	-	Network (red / green)	Connect (green)	Signal quality (yellow / green)	TeleService (green)	Meaning
-		○	-	-	-	No connection to the GSM network
🟢 green		🟢 green	-	-	-	Existing connection to the GSM network
🟢 green (flashing)		🟢 green (flashing)	○	-	○	Waiting for PIN (SIM card OK)
🔴 red (flashing)		🔴 red	○	-	○	SIM card defective
🔴 red (flashing)		🔴 red (flashing)	○	-	○	Wrong PIN
🔴 red (flashing)		○	○	○	○	Internal error: Station must be restarted.

DIAG (red / green)	-	Network (red / green)	Connect (green)	Signal quality (yellow / green)	TeleService (green)	Meaning
☼ green		-	◯	-	◯	• No connection to the telecontrol server or • No configuration available
● green		● green	●	-	-	Connection to the telecontrol server established
● green		● green	☼	-	-	Data transfer
-		-	-	● green	-	Good GSM network (-73 ... > -53 dBm)
-		-	-	● yellow	-	Medium strength GSM network (-89 ... -75 dBm)
-		-	-	☼ yellow	-	Weak GSM network (-109 ... -91 dBm)
-		-	-	◯	-	No GSM network (< -111 dBm)
-		-	-	-	◯	Currently no TeleService session
● green		● green	-	-	●	TeleService session running [1]
● green		-	-	-	☼	Attempted login to TeleService session

[1]   When a TeleServiceconnection is being established, the LED is lit for at least 10 minutes.

2.3   Electrical connections

Power supply

The 3-pin socket for the external 24 V DC power supply is located on the top of the module. The matching plug ships with the product.

You will find the pin assignment of the socket in section Pin assignment of the socket for the external power supply (Page 32).

Socket for 24 V DC
power supply
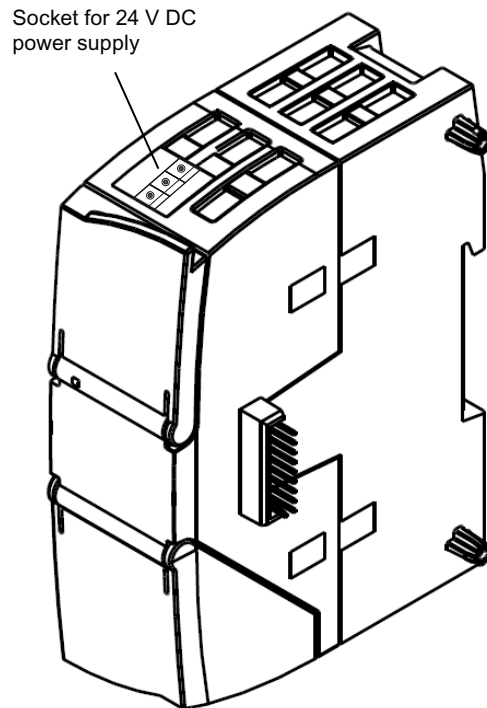
Figure 2-2   Socket for the 24 V DC power supply

Wireless interface for the GSM network

An extra antenna is required for GPRS communication in the GSM network. This is connected via the SMA socket of the CP. The SMA socket is located behind the lower front cover of the CP.

You will find a suitable antenna for indoor and outdoor use in the section Accessories (Page 85).

More detailed information on the electrical connections

For technical information on the electrical connections, refer to the section Technical specifications (Page 75).

Installing, connecting up and commissioning

3

3.1 Important notes on using the device

Safety notices on the use of the device

The following safety notices must be adhered to when setting up and operating the device and during all work relating to it such as installation, connecting up, replacing devices or opening the device.

General notices

⚠ WARNING
Safety extra low voltage
The equipment is designed for operation with Safety Extra-Low Voltage (SELV) by a Limited Power Source (LPS). (This does not apply to 100 V to 240 V devices.)
This means that only SELV / LPS complying with IEC 60950-1 / EN 60950-1 / VDE 0805-1 must be connected to the power supply terminals. The power supply unit for the equipment power supply must comply with NEC Class 2, as described by the National Electrical Code (r) (ANSI / NFPA 70).
There is an additional requirement if devices are operated with a redundant power supply:
If the equipment is connected to a redundant power supply (two separate power supplies), both must meet these requirements.

⚠ WARNING
Opening the device
DO NOT OPEN WHEN ENERGIZED.

General notices on use in hazardous areas

⚠ WARNING
Risk of explosion when connecting or disconnecting the device
EXPLOSION HAZARD
DO NOT CONNECT OR DISCONNECT EQUIPMENT WHEN A FLAMMABLE OR COMBUSTIBLE ATMOSPHERE IS PRESENT.

> ⚠ **WARNING**
>
> **Replacing components**
>
> EXPLOSION HAZARD
>
> SUBSTITUTION OF COMPONENTS MAY IMPAIR SUITABILITY FOR CLASS I, DIVISION 2 OR ZONE 2.

> ⚠ **WARNING**
>
> **Requirements for the cabinet/enclosure**
>
> When used in hazardous environments corresponding to Class I, Division 2 or Class I, Zone 2, the device must be installed in a cabinet or a suitable enclosure.

General notices on use in hazardous areas according to ATEX

> ⚠ **WARNING**
>
> **Requirements for the cabinet/enclosure**
>
> To comply with EU Directive 94/9 (ATEX95), this enclosure must meet the requirements of at least IP54 in compliance with EN 60529.

> ⚠ **WARNING**
>
> **Suitable cables for temperatures in excess of 70 °C**
>
> If the cable or conduit entry point exceeds 70 °C or the branching point of conductors exceeds 80 °C, special precautions must be taken. If the device is operated at ambient temperatures > 50 °C, the permitted temperature range of the selected cable must be suitable for the temperatures actually measured.

> ⚠ **WARNING**
>
> **Protection against transient voltage surges**
>
> Provisions shall be made to prevent the rated voltage from being exceeded by transient voltage surges of more than 40%. This criterion is fulfilled, if supplies are derived from SELV (Safety Extra-Low Voltage) only.

3.2 Warning overvoltage protection

CAUTION
Protection of the external 24 VDC power supply
If power is supplied to the module over longer 24 V power cables or networks, the coupling in of strong electromagnetic pulses onto the power supply cables is possible. This can be caused, for example by lightning strikes or switching of higher loads.
The connector of the external 24 VDC power supply is not protected from strong electromagnetic pulses. To protect it, an external overvoltage protection module is necessary. A suitable device is, for example, the Dehn Blitzductor BVT AD 24V type no. 918 402 or comparable protective element.
Manufacturer: DEHN + SÖHNE GmbH + Co. KG, Hans-Dehn-Str. 1, PO box 1640, D-92306 Neumarkt

3.3 Installing and commissioning the CP

Prior to installation and commissioning
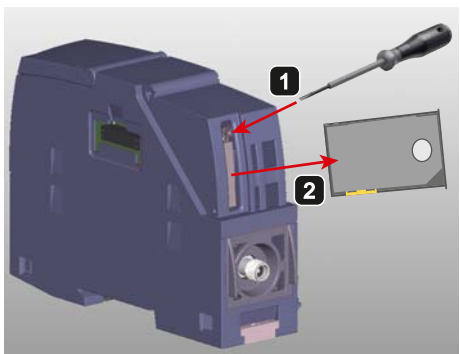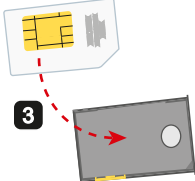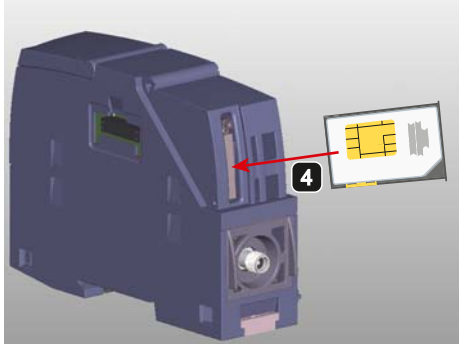
⚠ WARNING
Read the system manual "S7-1200 Programmable Controller"
Prior to installation, connecting up and commissioning, read the relevant sections in the system manual "S7-1200 Programmable Controller", refer to the documentation in the Appendix.
When installing and connecting up, keep to the procedures described in the system manual "S7-1200 Programmable Controller".

Configuration

One requirement for the commissioning of the CP is the completeness of the STEP 7 project data (see below). You should also read the section "Configuration (Page 43)".

Inserting the SIM card

Prior to installation, insert the SIM card in the CP.

Step	Execution	Notes and explanations
1	Release the slide for the SIM card on the bottom of the CP by gently pressing the release pin.	
2	Remove the slide from the housing.	
3	Insert the SIM card in the slide as illustrated.	
4	Push the slide back into the housing, where it locks gently in place.	

NOTICE
Inserting and removing the SIM card
Do not insert or remove the SIM card while the CP is operating.

Dimensions for installation
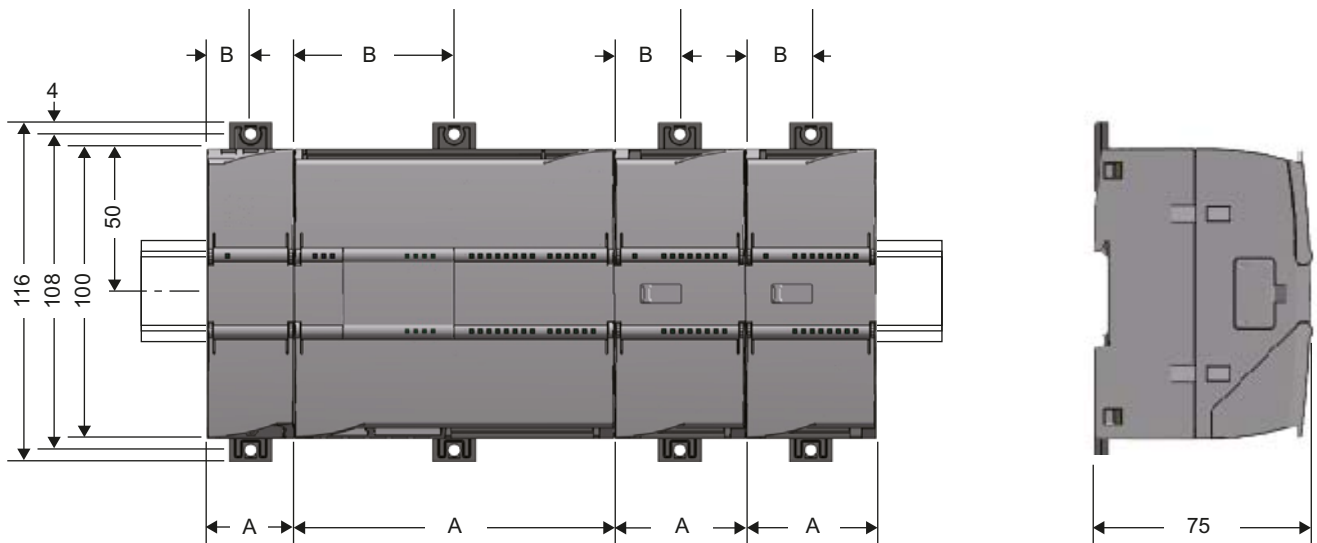
Figure 3-1   Dimensions for installation of the S7-1200

Table 3- 1   Dimensions for installation (mm)

S7-1200 devices		Width A	Width B *
CPU	CPU 1211C, CPU 1212C	90 mm	45 mm
	CPU 1214C	110 mm	55 mm
Signal modules	8 or 16 digital I/Os 2, 4 or 8 analog I/Os Thermocouple, 4 or 8 I/Os RTD, 4 I/Os	45 mm	22.5 mm
	16 analog I/Os RTD, 8 I/Os	70 mm	35 mm
Communications interfaces	CM 1241 RS-232 and CM 1241 RS-485	30 mm	15 mm
	CM 1243-5 (PROFIBUS master) CM 1242-5 (PROFIBUS slave)	30 mm	15 mm
	CP 1242-7 (GPRS CP)	30 mm	15 mm
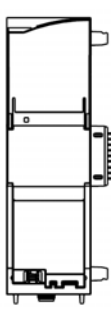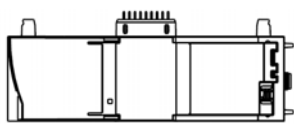
* Width B: The distance between the edge of the housing and the center of the hole in the DIN rail mounting clip

DIN rail mounting clips

All CPUs, SMs, CMs and CPs can be installed on the DIN rail in the cabinet. Use the pull-out DIN rail mounting clips to secure the device to the rail. These mounting clips also lock into place when they are extended to allow the device to be installed in a switching panel. The inner dimension of the hole for the DIN rail mounting clips is 4.3 mm.

Procedure for installation and commissioning

CAUTION
Installation location
The module must be installed so that its upper and lower ventilation slits are not covered, allowing adequate ventilation. Above and below the device, there must be a clearance of 25 mm to allow air to circulate and prevent overheating.
Remember that the permitted temperature ranges depend on the position of the installed device.

Device position / permitted temperature range	Installation location
Horizontal installation of the rack: 0 °C to 55 °C	
Vertical installation of the rack: 0 °C to 45 °C	

NOTICE
Connection with power off
Only wire up the S7-1200 with the power turned off.
Power supply from the power outputs of the CPU
The power supply of the CP must be supplied via the power outputs of the CPU.
Keep within the maximum load of the power outputs of the CPU.
You will find data relating to the current consumption and power loss of the CP in the section Technical specifications (Page 75).

Table 3- 2   Procedure for installation and connecting up

Step	Execution	Notes and explanations
1	Mount the CP on the DIN rail and connect it to the module to its right.	Use a 35 mm DIN rail. The slots to the left of the CPU are permitted.
2	Secure the DIN rail.	
3	Secure the power supply wires to the power output of the CPU.	
4	Secure the wires of the power supply to the plug supplied with the CM and insert the plug in the socket on the top of the CM.	The pinning is shown beside the socket on the top of the housing. You will also find this in the section Pin assignment of the socket for the external power supply (Page 32).
5	Connect the antenna to the SMA socket of the CP.	Lower surface of the CP
	Notice • Protect the antenna connector using suitable overvoltage protection equipment if the antenna cable is longer than 30 m. • Protect the antenna connector with suitable lightning protection if you install the antenna outdoors.	
6	Turn on the power supply.	
7	Close the front covers of the module and keep them closed during operation.	
8	The remaining steps in commissioning involve downloading the STEP 7 project data.	The STEP 7 project data of the CP is transferred when you load to the station. To load the station, connect the engineering station on which the project data is located to the Ethernet interface of the CPU. You will find more detailed information on loading in the following sections of the STEP 7 online help: • "Loading project data" • "Using online and diagnostics functions"

3.4 Pin assignment of the socket for the external power supply
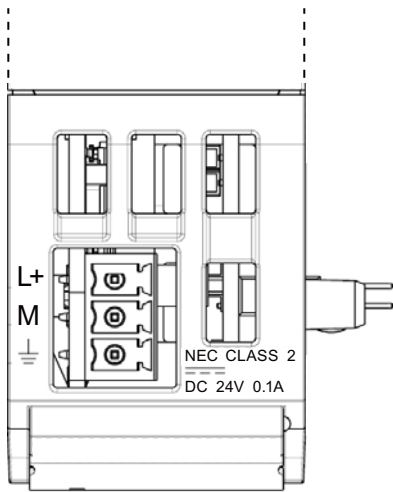
Figure 3-2   Socket for the external 24 VDC power supply (view from above)

Table 3- 3   Pin assignment of the socket for the external power supply

Pin	Labeling	Function
1	L+	+ 24 VDC
2	M	Ground reference for + 24 VDC
3	⏚	Ground connector

Notes on operation

<div style="text-align: right; font-size: 3em;">4</div>

> ⚠ **CAUTION**
>
> **Minimum clearance to the device**
>
> The device may only be operated when the distance between the device (or antenna) and user is at least 20 cm.

> **CAUTION**
>
> **Closing the front panels**
>
> To ensure interference-free operation, keep the front panels of the module closed during operation.

4.1 Connection modes and connection establishment

> **Note**
>
> **Connection interrupted by GSM network provider**
>
> When using the GPRS service, remember that existing connections can be interrupted by GSM network providers for maintenance purposes.

Connection modes

- "GPRS direct" mode

  There are no different connection modes in the "GPRS direct" mode.

- "Telecontrol" mode

  The CP can be configured for the following connection modes.

  – "Permanent" connection mode

    There is a permanent TCP connection to the telecontrol server. Following connection establishment, there is a permanent TCP connection to the telecontrol server even if data is not transferred permanently.

  – "Temporary" connection mode

    A connection is only established to the telecontrol server when required.

  If a TCP connection is established, process data is sent as soon as the telecontrol instructions are called on the CPU.

A connection is always established by the CP. If a connection established by the CP is interrupted, the CP automatically attempts to re-establish the connection.

Triggering connection establishment for permanent stations ("Telecontrol" mode)

In the "Telecontrol" mode, the permanent connection to the telecontrol server is established when the station starts up. If the connection is interrupted, the CP attempts to re-establish the connection at 15 minute intervals. Connection establishment to the main or substitute server can, however, also be initiated by a wake-up SMS (see below).

Note

Cyclic data exchange with the telecontrol server

The special settings for cyclic data exchange initiated by a telecontrol server are described in the section Data management and cyclic data exchange (Page 38).

Triggering connection establishment for temporary stations ("Telecontrol" mode)

With "temporary" stations, connection establishment can be triggered by the following events:

- Event on the local CPU that needs to be evaluated by the program.

  In terms of the program, two situations need to be distinguished:

  – Events that lead to a single connection establishment (for example alarms or commands from the operator).

  – Expiry of an interval that leads to cyclic connection establishment (for example once daily for data transmission)

- Request by a communications partner (OPC client or S7 station)

  The request from the communications partner leads to the connection being established.

- Request for TeleService by an engineering station

  The request switched by the telecontrol server or TeleService gateway does not need to be evaluated in the program.

- Wake-up SMS of the telecontrol server

  The wake-up SMS can be triggered spontaneously on the telecontrol server. It is also possible to configure cyclic sending on the telecontrol server.

- Telephone wake-up call

  The wake-up call can be sent from a telephone that has a phone number authorized in the STEP 7 project. The telephone must support the CLIP function (transfer of its own call number).

  The connection establishment with the (main) telecontrol server is triggered.

- Telephone wake-up SMS

  The wake-up SMS can be sent from a telephone that has a phone number authorized in the STEP 7 project. The telephone must support the CLIP function (transfer of its own call number) and the sending of SMS messages.

  The connection establishment with the telecontrol server specified in the SMS is triggered.

When a temporary station is woken up, all the data is transferred if this has changed since the last data transfer.

Triggering connection establishment in "GPRS direct" mode

In "GPRS direct" mode, a connection establishment is triggered by the following events:

- Event on the local CPU that is evaluated by the program.
- Request by a communications partner (not an engineering station)

  The request in the frame received from the communications partner is evaluated in the program by calling the telecontrol instructions.

- Request for TeleService by an engineering station

  The request switched by TeleService gateway does not need to be evaluated in the program.

4.2 The wake-up SMS

Right to wake-up by "authorized phone numbers"

The CP only accepts an SMS if the sending communication partner is authorized based on its phone number. These numbers are in configured for the CP in STEP 7 in the "authorized phone numbers" list.

NOTICE
"Authorized phone numbers" in the STEP 7 project
• A phone number entered here gives the sender who transfers this phone number the right to trigger connection establishment.
• If an asterisk (*) is entered in the list, the CP accepts SMS messages from all senders.
• If the list is empty, the CP cannot be woken up for connection establishment.

Wake-up call and wake-up SMS

The CP is woken by its communications partner using a wake-up call or a wake-up SMS and requested to establish the connection to the partner.

Depending on the connection type and the connection partner, the following text must be transferred in the wake-up SMS:

- For telecontrol connections:
  - Text for the wake-up SMS message for establishing a connection to the telecontrol server:

    `TELECONTROL`

  - Text for the wake-up SMS message for establishing a connection to the main telecontrol server:

    `TELECONTROL MAIN`

  - Text for the wake-up SMS message for establishing a connection to the substitute telecontrol server:

    `TELECONTROL BACKUP`

  The configuration of the telecontrol server for the CP 1242-7 is set in STEP 7 in "Telecontrol interface > Operating mode > main or substitute telecontrol server".

Note

Wake-up with a mobile phone
- One of the texts listed above can be used in a wake-up SMS message.
- With a wake-up call, the station always connects to the main telecontrol server.

- For TeleService connections:
  - Text for the wake-up SMS message for establishing a connection to the first configured TeleService server:

    `TELESERVICE`

    or

    `TELESERVICE 1`

  - Text for the wake-up SMS message for establishing a connection to the second configured TeleService server:

    `TELESERVICE 2`

  For TeleService, no extra wake-up SMS needs to be sent since the connection establishment is initiated by the engineering station.

  The configuration of the TeleService server for the CP 1242-7 is set in STEP 7 in "Telecontrol interface > TeleService settings.

4.3 Main and substitute telecontrol server

Telecontrol server: Main and substitute server

If TCSB is installed as the main and substitute server, two parallel systems are installed by TCSB and these are independent of each other. Both systems have their own database and the complete communications functions of TCSB. The two TCSB systems do not monitor each other.

Configuration of the main and substitute server

Make sure that the configuration data on the two systems are consistent with each other. You can achieve this by entering all the configuration data twice manually or after configuring the main system, by copying the database of the main system to the substitute system using operating system tools. Follow the steps outlined below:

1. Copy the database file from the following directory of the main system:

   Programdata > Siemens > Automation > TCS Basic > Data > "Smsc.sqlite"

2. Insert the database file at the same location in the file system of the substitute system.

   The existing "Smsc.sqlite" file on the substitute system is overwritten.

3. If necessary, adapt the addressing of the database server in the configuration of the substitute server under "Settings" if CMT and the database in the main system are installed on different computers.

Copying ensures the consistency of the configuration data. Since the system parameters of the main and substitute system can be configured in the CMT, following copying no editing of the system parameters of the substitute system is necessary.

Log files

Since the main and substitute system have different dynamic characteristics relating to their runtime response, the log files have different contents in the database. When you copy the database, the log files are also copied.

Interaction between the main and substitute server

In a normal situation, the stations are connected to the main telecontrol server. If the main server cannot be reached, the connection of the remote S7-1200 with the CP 1242-7 fails over from the main to the substitute server.

Switchover between the main and substitute server by the CP 1242-7

When establishing the GPRS connection to the telecontrol server, the CP automatically switches over to the substitute server after the 4th dialing attempt if the main server cannot be reached.

If the substitute server cannot be reached either, the 4th time the CP once again tries to connect to the main server.

The intervals of the redial attempts are controlled by the "Redial delay" parameter.

You will find an example in the section Redial delay (STEP 7) (Page 38).

4.4   Redial delay (STEP 7)

The "Redial delay" parameter of the CP 1242-7

In "Telecontrol" mode, the redial delay is the waiting time between the connection establishment attempts if the telecontrol server cannot be reached. It is configured in STEP 7, parameter group "Operating mode" of the CP.

A basic value is configured for the waiting time before the next connection establishment attempt. After every 3 redial attempts, the basic value is doubled up to a maximum of 900 s. Range of values: 10 to 600 s.

Example: The basic value 20 results in the following intervals for connection establishment attempts:

● three times 20 s

● three times 40 s

● three times 80 s

● etc. up to max. 900 s

If a substitute telecontrol server is configured, the 4th time the CP attempts to connect to the substitute server, in this example therefore after the following time:

● Three times 20 s redial delay +

● three times the connection monitoring time configured for the CP

(time until arrival of the TCP acknowledgment from the communications partner)

NOTICE
Depending on your contract, costs may result from each connection establishment attempt.

4.5   Data management and cyclic data exchange

Data storage in the image of the CP

The process data sent by the CPU to the CP using telecontrol instructions and intended for further transmission via GPRS is stored as an image on the CP.

When new process data is sent by the CPU to the CP, the procedure following depends on whether the remote communications partner of the CP is an S7 station or a telecontrol server.

Communications partner is an S7 station

After data is sent from the CPU to the CP, the CP sends the data to the remote communications partner immediately via GPRS.

This applies both to S7 stations that can be accessed via the telecontrol server and to stations that can be accessed directly (CP in "GPRS direct" mode).

Communications partner is a telecontrol server

The reaction of the CP after data is sent from the CPU to the CP depends on the setting of the RemeoteWdcAddress parameter of the TCON_WDC data block:

● Immediate transfer of process data to the telecontrol server

The CP compares the new process data with the image last sent to the telecontrol server and writes the new data to the image.

If the data in the image of the CP has changed, the CP immediately sends all the data of the image to the telecontrol server.

In this case, the following initial value must be assigned as the address in the memory area of the CP in the TCON_WDC data block for the RemoteWdcAddress parameter (access ID):

W#16#0

At the request of the telecontrol server, for example after a request by an OPC client, the CP sends the entire data from its image to the telecontrol server.

● No transfer to the telecontrol server

The CP does not compare the new process data with the previous image, but writes the new data to the image. Only after the telecontrol server sends a request to the CP does the CP send all the data of the image to the telecontrol server.

In this case, the following initial value must be assigned as the address in the memory area of the CP in the TCON_WDC data block for the RemoteWdcAddress parameter (access ID):

W#16#FEEDDADA

In this case, if the CP is queried by the telecontrol server, for example after a request by an OPC client, the CP sends the current data from its image.

This option is particularly suitable for cyclic data exchange initiated by a request from the telecontrol server ("cyclic communication") to supply data archives with data at fixed intervals.

The two communications options with the telecontrol server described above can also be used at the same time on the CP. To achieve this, two different TC_CON instructions must be called.

Data buffering when there is a connection abort

If the connection partner is the telecontrol server, the following applies:
If the wireless network fails, the CP stores up to 1000 send jobs with time stamps and sends these the next time the connection is established.

4.6   Calling a TeleService connection

Requirement for the engineering station

The STEP 7 project with the CP 1242-7 is stored on the engineering station.

Requirement for switching the connection

The request for connection establishment is triggered by the engineering station. To switch the connection to the remote station, a telecontrol server or a TeleService gateway is required. See also section Requirements for operation (Page 12).

Procedure for connection establishment for TeleService

Follow the steps below to establish a TeleService connection to the remote station via GPRS from the engineering station:

1. Select the CPU of the remote station in the STEP 7 project.

2. Select the "Online" > "Online & Diagnostics" menu.

   The "Online access" dialog opens.

3. Choose the entry "TeleService via GPRS" in the "Type of interface" drop-down list.

4. Choose the entry "TeleService via GPRS" in the "PG/PC interface" drop-down list.

5. Click on the 🔲 icon next to the "PG/PC interface" drop-down list.

   The "Establish remote connection" dialog box opens.

6. Make the necessary entries in this dialog.

   You will find information on the necessary entries in the tooltips of the STEP 7 online help.

Note

No TeleService connection establishment using "Online" > "Go online"

If you attempt to establish a TeleService connection by selecting the CPU and then selecting the menu or shortcut menu command "Online" > "Connect online", STEP 7 will automatically attempt to connect via Ethernet. Reason: In STEP 7, the last connection path used to download the project data is stored.

TeleService only from one STEP 7 project

You can only operate TeleService on an engineering Station from within a single STEP 7 project. TeleService from more than one STEP 7 project at any one time is not possible.

Terminating a TeleService connection

On completion of the TeleService session, terminate the TeleService connection again using the "Go offline" button. The connection is terminated after approximately 5 minutes.

Loading only in offline mode

Loading software and blocks with TeleService via GPRS by calling the function "Load to device" only works when no TeleService connection is established.

NOTICE
Canceling a TeleService connection when calling online dialogs
An existing TeleService connection is canceled when you attempt to access an additional station or a node.
When there is an existing TeleService connection, do not select any of the menu commands "Go online", "Online & Diagnostics", "Load to device", "Extended download to device" or "Accessible nodes".

4.7 Diagnostics

Diagnostics options

You have the following diagnostics options available for the module:

- The LEDs of the module

  For information on the LED displays, refer to the section LEDs (Page 20).

- STEP 7: The "Diagnostics" tab in the Inspector window

  Here, you can obtain the following information on the selected module:

  – Entries in the diagnostics buffer of the CPU

  – Information on the online status of the module

- STEP 7: Diagnostics functions in the "Online > Online and diagnostics" menu

  Here, you can obtain static information on the selected module:

  – General information on the module

  – Diagnostics status

  – Information about the telecontrol interface:
    - Network
    - Ethernet interface
    - Statistics

  You can obtain further information on the diagnostics functions of STEP 7 in the STEP 7 online help.

4.8 Downloading firmware

New firmware versions

If a new firmware version is available for the module, you will find this on the Ethernet pages of the Siemens Automation Customer Support under the following ID:

45605894 (http://support.automation.siemens.com/WW/view/en/45605894)

On the Internet page, select the "Entry list" tab and the "Download" entry type. You will find the firmware file and a description of the procedure there.

You can recognize that firmware is being loaded by the flashing LEDs of the CP, see section LEDs (Page 20).

4.9 Module replacement

Module replacement

The STEP 7 project data of the CP is stored on the local CPU. If there is a fault on the device, this allows simple replacement of this communications module without needing to load the project data to the station again.

When the station starts up again, the new CP reads the project data from the CPU.

If you replace a module, remember to take the SIM card from the old module and insert it in the new CP.

⚠ WARNING
Read the system manual "S7-1200 Programmable Controller"
Prior to installation, connecting up and commissioning, read the relevant sections in the system manual "S7-1200 Programmable Controller" (refer to the documentation in the Appendix).
When installing and connecting up, keep to the procedures described in the system manual "S7-1200 Programmable Controller".
Make sure that the power supply is turned off when installing/uninstalling the devices.

Configuration

5

5.1   Configuration in STEP 7

Configuration in STEP 7

You configure the modules, networks and connections in SIMATIC STEP 7. You will find the required version in the section Requirements for operation (Page 12).

You can configure a maximum of three CMs/CPs per station. If you insert several modules of the type CP 1242-7 in an S7-1200, you can, for example, establish redundant communications paths.

When you load the station, the configuration data of the CP is stored on the CPU.

How to configure in STEP 7

Follow the steps below when configuring:

1. Create a STEP 7 project.
2. Insert the required SIMATIC stations.
3. Insert the CPs in the relevant stations.
4. Configure the inserted CPs.

   No Ethernet network needs to be created for the GPRS communication of the CP 1242-7.

   A telecontrol server or a TeleService- gateway cannot be configured in STEP 7.
5. Save the project.

You will find more detailed information on configuring the CP in the help system of STEP 7.

5.2   Information required for configuration

To configure and commission the CP and the connected telecontrol system, the following information is required:

General information

- Own phone number of the CP (required for TeleService)
- Authorized phone numbers

  Phone numbers of the subscribers that are allowed to send a wake-up call, a wake-up SMS or a data SMS to the CP.

- APN

  Name of the GPRS access point (APN) of the GSM network provider

- APN user name

  User name for the GPRS access point of the GSM network provider

- APN password

  Password for the GPRS access point of the GSM network provider

- Subscriber number of the SMS center

- PIN of the SIM card

NOTICE
Configured PIN and PIN on the SIM card must match.
If you enter the PIN of the SIM card of the CP 1242-7 incorrectly during STEP 7 configuration and download the station, the CP stores the wrong PIN. An incorrectly entered PIN is transferred by the CP only once so that the SIM card is not locked.
If you change the PIN of the SIM card externally to the incorrectly configured PIN (new PIN of the SIM card = incorrectly entered PIN in STEP 7), the CP rejects this PIN again without checking it.
Solution after entering an incorrect PIN:
To avoid the PIN being rejected by the CP again, use a PIN that is different from the incorrectly entered PIN. Procedure:

• If the PIN of the SIM card was not changed:
  – Configure the PIN in STEP 7 with the PIN of the SIM card.
  – Reload the station.

• If the original PIN of the SIM card was changed externally to the PIN that was previously incorrectly entered in STEP 7:
  – Change the PIN of the SIM card externally to a new PIN that has not yet been incorrectly configured in STEP 7.
  – Change the configured PIN in STEP 7 to the newly assigned PIN of the SIM card.
  – Reload the station.

Information required in "Telecontrol" mode

- Address of the telecontrol server

  – IP address

  or

  – Name of the telecontrol server that can be resolved by DNS

  – Port number

  The relevant station type-dependent number of the listener port is configured in the telecontrol instructions.

  If you install a substitute telecontrol server: Address and port of the substitute telecontrol server

- DNS server address(es)

  You require the DNS server address if you address the telecontrol server using a name that can be resolved by DNS.

  – If you do not specify an address, the DNS server address is obtained automatically from the network provider (recommended procedure).

  – If you want to use a different DNS server, enter its address.

Information for TeleService

- TeleService user name

  To authenticate the user with the CP

  – Configuration of the CP in STEP 7. You can configure up to 10 TeleService users.

  – Entry at the engineering station

- TeleService password

  To authenticate the user with the CP

  – Configuration of the CP in STEP 7

  – Entry at the engineering station

- Server password

  To authenticate the CP with the telecontrol server

  – Configuration of the telecontrol server

  – Entry at the engineering station

  If no server password is configured on the telecontrol server, no server password needs to be entered when establishing the TeleService connection.

CP parameter for configuring the telecontrol server

The following parameters from the configuration of the CP 1242-7 are also required for the configuration of the telecontrol server:

● Address and port of the telecontrol server

● Project number

● Station number

● Slot of the CP

● Telecontrol password

● Authorized phone numbers

● Connection mode (permanent/temporary)

The phone number of the SIM card of the CPU and SMS text are not configured in STEP 7 but in the telecontrol instructions.

5.3 Using the telecontrol instructions

Configuring the instructions for GPRS communication

The telecontrol instructions are necessary whenever process data of the station needs to be sent to a communications partner. If you only want to use the TeleService function, telecontrol instructions are not necessary.

You will find the description of the individual telecontrol instructions and their corresponding system data types (data blocks) below.

The instructions are configured in STEP 7. After linking the telecontrol library into STEP 7, you will find the corresponding data types (TCON_xxx, IF_CONF) in the navigation of the relevant controller under "PLC data types".

Connection establishment with the "TC_CON" instruction

Connections are established via GPRS using the "TC_CON" instruction. Note that a separate "TC_CON" instruction must be called for each connection.

Once a connection is established, data can then be received with the "TC_RECV" instruction and/or sent with the "TC_SEND" instruction.

A separate connection must be established for each communications partner even if identical blocks of data are being sent.

After a successful transfer of the data, a connection can be terminated. A connection is also terminated by calling "TC_DISCON".

Note the maximum number of parallel connections in the section Performance data (Page 10).

NOTICE

Connection abort

If an existing connection is aborted by the communications partner or due to disturbances on the network, the connection must also be terminated by calling "TC_DISCON". Make sure that you take this into account in your programming.

Sending/receiving SMS messages with several senders/recipients

If you want to send an identical SMS message to several recipients, you need to establish a connection to each recipient.

If you want to receive SMS messages from different senders, you can omit entering a phone number in the "PHONE_NUMBER" parameter of the required data block "TCON_phone". When receiving messages, this is then interpreted as a placeholder for all authorized connection partners.

Application example for the "TC_CONFIG" instruction

With the "TC_CONFIG" instruction, you cannot permanently overwrite the configuration data of the CP 1242-7. This can have practical applications if you want to activate a TeleService partner temporarily by setting an input and this partner is disabled in the default configuration.

5.4 Configuring the telecontrol instructions

5.4.1 TC_CON: Establish connection via the GSM network

Meaning

The TC_CON instruction allows an S7-1200 with a CP 1242-7 to establish a connection of the following types:

- ISO-ON-TCP

  Connection partner is a CP 1242-7.

  ISO-ON-TCP connections are used only in "GPRS direct" mode.

- UDP

  Any connection partner is possible.

- SMS

  The connection partner is an SMS client.

- Telecontrol connection

  The connection partner is either a telecontrol server or another station that can be reached via the telecontrol server.

A TC_CON establishes exactly one connection. Depending on the mode of the CP 1242-7 and the protocol you are using, a maximum of 3 to 5 simultaneous connections with unique IDs (see below) are supported per CP. You will find the maximum number of simultaneous connections in the performance data of the CP.

The CONNECT parameter uses a data block (DB) with the structure of a system data type (SDT) for the connection description.

The required connection type is defined using a connection-specific SDT "TCON_..." (see below). For each of the connection types listed above, one of the following SDTs must be assigned:

- TCON_ip_rfc
- TCON_IP_V4
- TCON_phone
- TCON_WDC

The "ActiveEstablished" parameter of these SDTs also specifies whether or not connection establishment is active or passive.

For parameter settings for these SDTs, see TCON_...: SDTs for the telecontrol connection establishment (Page 61).

The ID parameter references the GPRS connection. The ID is assigned and must be unique within the CPU.

The InterfaceID parameter references the GPRS interface of the required local CP. This must be taken from STEP 7.

Call interface in FBD representation

TC_CON

BOOL	REQ	BUSY	BOOL
CONN_OUC	ID	DONE	BOOL
HW_INTERFACE	INTERFACE	ERROR	BOOL
VARIANT	CONNECT	STATUS	WORD

Explanation of the formal parameters

The following table explains all the formal parameters for the TC_CON instruction.

Parameter	Declaration	Data type	Possible values	Description
REQ	INPUT	BOOL	0, 1	The instruction is started and the status codes initialized on a rising edge. Updating of the DONE, ERROR and STATUS status codes when there is a positive edge.
ID	INPUT	CONN_OUC	1...07FF$_h$	Reference to the relevant connection. The ID is assigned. The value of ID is also required by the system data type (SDT) of the CONNECT parameter.
InterfaceID	INPUT	HW_ANY		Reference to the interface of the local CP 1242-7 (see STEP 7 > CP configuration > Telecontrol interface > "Hardware identifier")
CONNECT	INOUT	VARIANT	See also "TCON_...: SDTs for telecontrol connection establishment"	Reference to a data block for connection establishment. The SDTs of the type TCON_ip_rfc, TCON_IP_V4, TCON_phone or TCON_WDC specify the structure of the data block suitable for the relevant connection. In the SDTs, note the parameter "ActiveEstablished" (active / passive connection establishment).
ENO	OUTPUT	BOOL	0: Error 1: Error-free	Enable output If there is a runtime error with the instruction, ENO = 0 is set.
BUSY	OUTPUT	BOOL	0: Execution of the instruction not started, completed or aborted 1: The instruction is executing	Display of the processing status of the instruction
DONE	OUTPUT	BOOL	0: - 1: The instruction executed successfully	This parameter indicates whether or not the job was completed without errors. For the meaning in conjunction with the parameters ERROR and STATUS, refer to Codes of the instruction.
ERROR	OUTPUT	BOOL	0: - 1: Error	Error code For the meaning in conjunction with the parameters DONE and STATUS, refer to Codes of the instruction.
STATUS	OUTPUT	WORD		Status code For the meaning in conjunction with the parameters DONE and ERROR, refer to Codes of the instruction.

The codes BUSY, DONE and ERROR

The codes of DONE and ERROR are relevant only when BUSY = 0.

BUSY	DONE	ERROR	Meaning
0	0	0	No job being executed

You will find all other code combinations of DONE and ERROR in the following table.

When called, the instruction remains in the BUSY = 1 state for several seconds. In the following situations, the BUSY state = 1 can last for a longer time:

- On active ISO-on-TCP connections if the partner cannot be reached.
- On passive connections when no frame is received.

The codes DONE, ERROR and STATUS

The following table shows the condition codes formed based on DONE, ERROR and STATUS that must be evaluated by the user program.

DONE	ERROR	STATUS	Meaning
1	0	0000$_H$	Job executed without errors
0	0	7000$_H$	No job processing active (first instruction call)
0	0	7001$_H$	Job processing started (first instruction call)
0	0	7002$_H$	Job processing already active (renewed instruction call when BUSY = 1)
0	1	8086$_H$	Illegal value for ID
0	1	8087$_H$	Maximum number of connections reached, no further connection possible
0	1	80E3$_H$	The ID is already being used by another connection.
0	1	80E6$_H$	No query in progress (instruction call not started)
0	1	80E8$_H$	Remote partner cannot be reached: Check the connection parameters.
0	1	80EB$_H$	Request temporarily denied (TC_CON has already been called with the same destination address.)
0	1	80EC$_H$	Opening the Listener Port failed: Check the connection parameters.
0	1	80F2$_H$	The CP is in the wrong mode: • Telecontrol connections are permitted only in "Telecontrol" mode. • ISO-ON-TCP connections are permitted only in "GPRS direct" mode.
0	1	80F3$_H$	No free connection endpoint for sending data: • Use less connections or • Use less passive connections or • Turn off NTP. Remember the maximum number of simultaneous connections of the CP 1242-7.

DONE	ERROR	STATUS	Meaning
0	1	80F4$_H$	Connection endpoint cannot be generated:
			Repeat the call. If necessary, check the connection parameters.
0	1	80F6$_H$	Format error of a parameter in the called data block (wrong length, wrong format or invalid value)
			Check the configuration of the "TC_CON..." SDT.

5.4.2   TC_DISCON: Terminate connection via the GSM network

Meaning

The TC_DISCON instruction on an S7-1200 with CP 1242-7 terminates an ISO-ON-TCP, UDP, SMS or telecontrol connection that was established with the TC_CON instruction.

You will find detailed information on the connection types in the description of the TC_CON instruction.

TC_DISCON terminates the connection to the telecontrol server only logically. If you want the connection to the telecontrol server to be terminated physically, configure the connection as a "Temporary connection" in the "telecontrol server" parameter group in STEP 7.

At the TCP/IP level, the connection is retained. Temporary stations terminate the connection automatically after sending the data.

The ID parameter references the GPRS connection. The ID must be unique within the CPU and the same as the ID used with TC_CON.

The InterfacceID parameter references the GPRS interface of the required local CP. The value must be the same as that used by TC_CON for InterfacceID.

Call interface in FBD representation
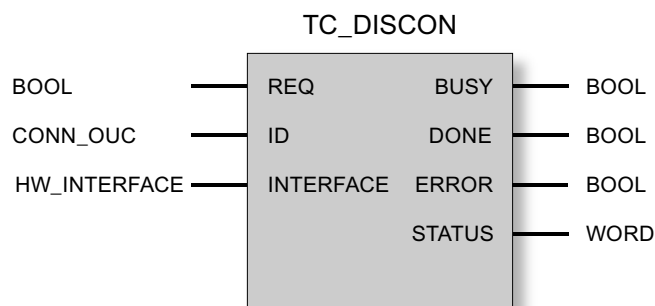
Explanation of the formal parameters

The following table explains all the formal parameters for the TC_DISCON instruction

Parameter	Declaration	Data type	Possible values	Description
REQ	INPUT	BOOL	0, 1	The instruction is started and the status codes initialized on a rising edge. Updating of the DONE, ERROR and STATUS status codes when there is a positive edge.
ID	INPUT	CONN_OUC	1...07FF$_h$	Reference to the relevant connection
InterfaceID	INPUT	HW_ANY		Reference to the interface of the local CP 1242-7 (see STEP 7 > CP configuration > Telecontrol interface > "Hardware identifier")
ENO	OUTPUT	BOOL	0: Error 1: Error-free	Enable output If there is a runtime error with the instruction, ENO = 0 is set.
BUSY	OUTPUT	BOOL	0: Execution of the instruction not started, completed or aborted 1: The instruction is executing	Display of the processing status of the instruction
DONE	OUTPUT	BOOL	0: - 1: The instruction executed successfully	This parameter indicates whether or not the job was completed without errors. For the meaning in conjunction with the parameters ERROR and STATUS, refer to Codes of the instruction.
ERROR	OUTPUT	BOOL	0: - 1: Error	Error code For the meaning in conjunction with the parameters DONE and STATUS, refer to Codes of the instruction.
STATUS	OUTPUT	WORD		Status code For the meaning in conjunction with the parameters DONE and ERROR, refer to Codes of the instruction.

The codes BUSY, DONE and ERROR

The codes of DONE and ERROR are relevant only when BUSY = 0.

BUSY	DONE	ERROR	Meaning
0	0	0	The instruction has not yet been called.

You will find all other code combinations of DONE and ERROR in the following table.

Note

When called, the instruction remains in the BUSY = 1 state for several seconds.

The codes DONE, ERROR and STATUS

The following table shows the condition codes formed based on DONE, ERROR and STATUS that must be evaluated by the user program.

DONE	ERROR	STATUS	Meaning
1	0	0000$_H$	Job executed without errors
0	0	7000$_H$	No job processing active (first instruction call)
0	0	7001$_H$	Job processing started (first instruction call)
0	0	7002$_H$	Job processing already active (renewed instruction call when BUSY = 1)
0	1	8086$_H$	Illegal value for ID
0	1	80E4$_H$	Unknown ID: No connection with this ID has been established by TC_CON.
0	1	80E6$_H$	No query in progress (instruction call not started)
0	1	80F5$_H$	Invalid connection endpoint: • Connection establishment by TC_CON failed or • Connection terminated by remote partner.
0	1	80F6$_H$	Format error of a parameter in the called data block (wrong length, wrong format or invalid value) Check the configuration of the "TC_CON..." SDT.

5.4.3 TC_SEND: Send data via the GSM network

Meaning

The TC_SEND instruction allows the sending of data via programmed connections of the following types:

● ISO-ON-TCP connections

● UDP connections

● SMS connections

  Sending of SMS messages is supported only if permitted by the configuration.

● Telecontrol connections

You will find more detailed information on the connection types in the description of the TC_CON instruction.

The ID parameter references the GPRS connection. The value of ID must correspond to the value used for ID by TC_CON.

The InterfaceID parameter references the GPRS interface of the required local CP. The value must be the same as that used by TC_CON for InterfaceID.

The amount of data to be sent is specified with the LEN parameter.

The size of the data area specified in DATA must be at least as large as the number of bytes configured for LEN. Permitted data types in the data area specified in DATA are all except BOOL and ARRAY of BOOL.

The destination address (connection partner) for the data to be sent is configured in the TC_CON instruction.

Call interface in FBD representation

```
                        TC_SEND
                 ┌──────────────────────┐
    BOOL ────────┤ REQ            BUSY ├──── BOOL
 CONN_OUC ───────┤ ID             DONE ├──── BOOL
HW_INTERFACE ────┤ INTERFACE     ERROR ├──── BOOL
    UINT ────────┤ LEN          STATUS ├──── WORD
  VARIANT ───────┤ DATA                │
                 └──────────────────────┘
```

Explanation of the formal parameters

The following table explains all the formal parameters for the TC_SEND instruction.

Parameter	Declaration	Data type	Possible values	Description
REQ	INPUT	BOOL	0, 1	The instruction is started and the status codes initialized on a rising edge. Updating of the DONE, ERROR and STATUS status codes when there is a positive edge.
ID	INPUT	CONN_OUC	1...07FF$_h$	Reference to the relevant connection
InterfaceID	INPUT	HW_ANY		Reference to the interface of the local CP 1242-7 (see STEP 7 > CP configuration > Telecontrol interface > "Hardware identifier")
LEN	INPUT	UINT	1...2048	Number of bytes of data to be sent, maximum 2048
DATA	INOUT	VARIANT		Address reference to the send data area of the CPU
ENO	OUTPUT	BOOL	0: Error 1: Error-free	Enable output If there is a runtime error with the instruction, ENO = 0 is set.
BUSY	OUTPUT	BOOL	0: Execution of the instruction not started, completed or aborted 1: The instruction is executing	Display of the processing status of the instruction
DONE	OUTPUT	BOOL	0: - 1: The instruction executed successfully	This parameter indicates whether or not the job was completed without errors. For the meaning in conjunction with the parameters ERROR and STATUS, refer to Codes of the instruction.

Parameter	Declaration	Data type	Possible values	Description
ERROR	OUTPUT	BOOL	0: - 1: Error	Error code For the meaning in conjunction with the parameters DONE and STATUS, refer to Codes of the instruction.
STATUS	OUTPUT	WORD		Status code For the meaning in conjunction with the parameters DONE and ERROR, refer to Codes of the instruction.

The codes BUSY, DONE and ERROR

The codes of DONE and ERROR are relevant only when BUSY = 0.

BUSY	DONE	ERROR	Meaning
0	0	0	No job being executed

You will find all other code combinations of DONE and ERROR in the following table.

The codes DONE, ERROR and STATUS

The following table shows the condition codes formed based on DONE, ERROR and STATUS that must be evaluated by the user program.

DONE	ERROR	STATUS	Meaning
1	0	0000_H	Job executed without errors
0	0	7000_H	No job processing active (first instruction call)
0	0	7001_H	Job processing started (first instruction call)
0	0	7002_H	Job processing already active (renewed instruction call when BUSY = 1)
0	1	8086_H	Illegal value for ID
0	1	$80E1_H$	Timeout: • Increase the value of the "Transmit timeout" in the configuration of the CP 1242-7 or • Check the connection partner.
0	1	$80E4_H$	Unknown ID: First call TC_CON.
0	1	$80E6_H$	No query in progress (instruction call not started)
0	1	$80E7_H$	Data to be sent not completely transferred: Repeat the job.
0	1	$80E8_H$	Remote partner cannot be reached.
0	1	$80E9_H$	Connection establishment by remote partner: Check the connection partner. If necessary, terminate the connection with TC_DISCON and establish it again with TC_CON.

DONE	ERROR	STATUS	Meaning
0	1	80EA$_H$	Error message from remote partner: • Check the connection partner. Enable the "TC_RECV" instruction on the communications partner. • If necessary, terminate the connection with TC_DISCON and establish it again with TC_CON.
0	1	80EF$_H$	SMS could not be sent: • Check whether the destination address (telephone number of the destination subscriber) exists. • Check whether the inserted SIM card allows sending of SMS. • Make sure that when the data block TCON_phone was created, the "Standard" option was selected for block access.
0	1	80F1$_H$	Sending of SMS messages is not enabled in the STEP 7 configuration of the CP: Enalble the "Allow SMS" option in the configuration of the CP.
0	1	80F4$_H$	Connection endpoint cannot be generated: Check the connection partner.
0	1	80F5$_H$	Invalid connection endpoint: • Connection establishment by TC_CON failed. or • Connection terminated by remote partner: First call TC_DISCON.
0	1	80F6$_H$	Format error of a parameter in the called data block (wrong length, wrong format or invalid value) Check the configuration of the "TC_CON..." SDT.

5.4.4 TC_RECV: Receive data via the GSM network

Meaning

The TC_RECV instruction allows the reception of data via programmed connections of the following types:

- ISO-ON-TCP connections
- SMS connections

  Receiving SMS messages is supported only if permitted by the configuration. To allow this, the phone number of the sender must be configured on the CP of the receiving station (authorized phone numbers) and the sender must support the CLIP function.

  The phone number of the connection partner must be entered in the "TCON_phone" SDT.

  Wake-up SMS messages are filtered out.

- Telecontrol connections

You will find more detailed information on the connection types in the description of the TC_CON instruction.

The ID parameter references the GPRS connection. The value of ID must correspond to the value used for ID by TC_CON.

The InterfaceID parameter references the GPRS interface of the required local CP. The value must be the same as that used by TC_CON for InterfaceID.
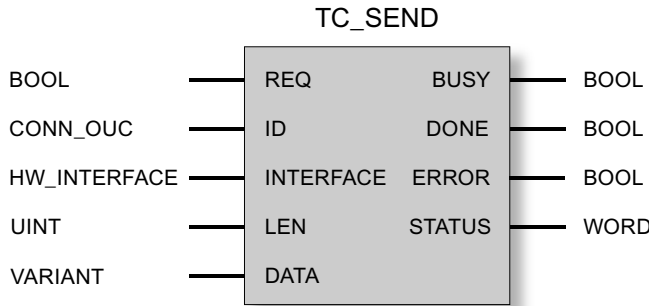
The maximum amount of data to be received is specified with the LEN parameter.

The size of the data area specified in DATA must be at least as large as the number of bytes configured for LEN. Permitted data types in the data area specified in DATA are all except BOOL and ARRAY of BOOL. The received data is interpreted as if the sending partner had used the same data types.

The DB (system data type) used for the connection description of TC_RECV must differ from a DB used for TC_SEND.

Call interface in FBD representation
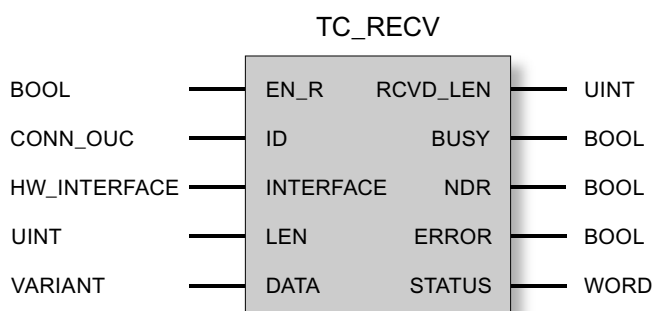
TC_RECV

BOOL	EN_R	RCVD_LEN	UINT
CONN_OUC	ID	BUSY	BOOL
HW_INTERFACE	INTERFACE	NDR	BOOL
UINT	LEN	ERROR	BOOL
VARIANT	DATA	STATUS	WORD

Explanation of the formal parameters

The following table explains all the formal parameters for the TC_RECV instruction

Parameter	Declaration	Data type	Possible values	Description
EN_R	INPUT	BOOL	0: Data reception locked 1: Data reception enabled	Enables / locks the reception of data
ID	INPUT	CONN_OUC	1...07FF$_h$	Reference to the relevant connection
InterfaceID	INPUT	HW_ANY		Reference to the interface of the local CP 1242-7 (see STEP 7 > CP configuration > Telecontrol interface > "Hardware identifier")
LEN	INPUT	UINT	1...2048	(minimum) number of bytes of data to be received, maximum 2048
DATA	INOUT	VARIANT		Address reference to the receive data area of the CPU
ENO	OUTPUT	BOOL	0: Error 1: Error-free	Enable output If there is a runtime error with the instruction, ENO = 0 is set.
RCVD_LEN	OUTPUT	UINT		Number of bytes of received data

Parameter	Declaration	Data type	Possible values	Description
BUSY	OUTPUT	BOOL	0: Execution of the instruction not started, completed or aborted 1: The instruction is executing	Display of the processing status of the instruction
DONE	OUTPUT	BOOL	0: - 1: The instruction executed successfully	This parameter indicates whether or not the job was completed without errors. For the meaning in conjunction with the parameters ERROR and STATUS, refer to Codes of the instruction.
ERROR	OUTPUT	BOOL	0: - 1: Error	Error code For the meaning in conjunction with the parameters DONE and STATUS, refer to Codes of the instruction.
STATUS	OUTPUT	WORD		Status code For the meaning in conjunction with the parameters DONE and ERROR, refer to Codes of the instruction.

The codes BUSY, DONE and ERROR

The codes of DONE and ERROR are relevant only when BUSY = 0.

BUSY	DONE	ERROR	Meaning
0	0	0	No job being executed

You will find all other code combinations of DONE and ERROR in the following table.

The codes DONE, ERROR and STATUS

The following table shows the condition codes formed based on DONE, ERROR and STATUS that must be evaluated by the user program.

DONE	ERROR	STATUS	Meaning
1	0	0000$_H$	Job executed without errors
0	0	7000$_H$	No job processing active (first instruction call)
0	0	7001$_H$	Job processing started (first instruction call)
0	0	7002$_H$	Job processing already active (renewed instruction call when BUSY = 1)
0	1	8086$_H$	Illegal value for ID
0	1	80E4$_H$	Unknown ID: First call TC_CON.
0	1	80E6$_H$	No query in progress (instruction call not started)

DONE	ERROR	STATUS	Meaning
0	1	80F5$_H$	Invalid connection endpoint: • Connection establishment by TC_CON failed. or • Connection terminated by remote partner: First call TC_DISCON.
0	1	80F6$_H$	Format error of a parameter in the called data block (wrong length, wrong format or invalid value) Check the configuration of the "TC_CON..." SDT.

5.4.5 TC_CONFIG: Transferring configuration data to a GPRS communications module

Meaning

With the TC_CONFIG instruction, parameters of a the CP 1242-7 configured in STEP 7 can be modified. The configured values are not permanently overwritten and remain valid until TC_CONFIG is called again or the station starts up again. If the STEP 7 configuration data needs to be changed permanently, the instruction needs to be called again each time the station restarts.

The CONFIG parameter points to the memory area with the configuration data. The configuration data is stored in a data block (DB). The structure of the DB is specified by the system data type (SDT) IF_CONF.

The configuration data to be modified on the CP is put together as necessary in blocks in IF_CONF "IF_CONF_..." for the individual parameters.

Parameters that are not intended to change as a result of the instruction are not entered in IF_CONF. They retain the value configured in STEP 7.

For detail information on assigning value to IF_CONF, refer to the section IF_CONF: SDT for telecontrol configuration data (Page 66).

The InterfaceID parameter references the GPRS interface of the required local CP.

Call interface in FBD representation

TC_CONFIG

BOOL	REQ	BUSY	BOOL
HW_INTERFACE	INTERFACE	DONE	BOOL
		ERROR	BOOL
VARIANT	CONFIG	STATUS	WORD

Explanation of the formal parameters

The following table explains all the formal parameters for the TC_CONFIG instruction

Parameter	Declaration	Data type	Possible values	Description
REQ	INPUT	BOOL	0, 1	The instruction is started and the status codes initialized on a rising edge. Updating of the DONE, ERROR and STATUS status codes when there is a positive edge.
InterfaceID	INPUT	HW_ANY		Reference to the interface of the local CP 1242-7
CONFIG	INOUT	VARIANT	See also "IF_CONF: SDT for telecontrol configuration data	Reference to the memory area with the collected configuration data to be modified
ENO	OUTPUT	BOOL	0: Error 1: Error-free	Enable output If there is a runtime error with the instruction, ENO = 0 is set.
BUSY	OUTPUT	BOOL	0: Execution of the instruction not started, completed or aborted 1: The instruction is executing	Display of the processing status of the instruction
DONE	OUTPUT	BOOL	0: - 1: The instruction executed successfully	This parameter indicates whether or not the job was completed without errors. For the meaning in conjunction with the parameters ERROR and STATUS, refer to Codes of the instruction.
ERROR	OUTPUT	BOOL	0: - 1: Error	Error code For the meaning in conjunction with the parameters DONE and STATUS, refer to Codes of the instruction.
STATUS	OUTPUT	WORD		Status code For the meaning in conjunction with the parameters DONE and ERROR, refer to Codes of the instruction.

The codes BUSY, DONE and ERROR

The codes of DONE and ERROR are relevant only when BUSY = 0.

BUSY	DONE	ERROR	Meaning
0	0	0	No job being executed

You will find all other code combinations of DONE and ERROR in the following table.

The codes DONE, ERROR and STATUS

The following table shows the condition codes formed based on DONE, ERROR and STATUS that must be evaluated by the user program.

DONE	ERROR	STATUS	Meaning
1	0	0000$_H$	Job executed without errors
0	0	7000$_H$	No job processing active (first instruction call)
0	0	7001$_H$	Job processing started (first instruction call)
0	0	7002$_H$	Job processing already active (renewed instruction call when BUSY = 1)
0	1	80E6$_H$	No query in progress (instruction call not started)
0	1	80EB$_H$	Query temporarily rejected (the CP is currently being configured by STEP 7).
0	1	80F6$_H$	Format error of a parameter in the called data block (wrong length, wrong format or invalid value) Check the "IF_CONF" SDT.
0	1	80F7$_H$	Wrong ID in the parameter fields of the configuration data: Check the "IF_CONF" SDT.

5.4.6 Other error messages

Other error messages

The following error messages are used for diagnostics purposes. You can obtain more information from the Siemens hotline.

DONE	ERROR	STATUS	Meaning
0	1	80E0$_H$	Internal error

5.4.7 TCON_...: SDTs for the telecontrol connection establishment

Parameter assignment of the system data types for the TC_CON instruction

To configure a telecontrol connection using the TC_CON instruction, the CONNECT parameter of the instruction is used for the connection description.

The connection description is specified by the structure of the system data type (SDT). The structure of the relevant SDT contains the parameters necessary to establish the connection with the remote communications partner.

For different connection types that depend on the remote communications partner, the following SDTs are used:

- TCON_ip_rfc for ISO-on-TCP connections to IPv4 stations
- TCON_IP_V4 for UDP connections to IPv4 stations (sending only)

- TCON_phone for connections to SMS clients
- TCON_WDC for connections to telecontrol servers or stations that can be reached via the telecontrol server.

The parameter assignment of the connection description is made in a data block of the same type as the SDT.

NOTICE
No optimized block access
When creating the data blocks, use the "Standard" option for block access.

Reserved bits are not displayed during configuration in STEP 7.

System data type TCON_ip_rfc for connections to IPv4 stations

This connection type is supported only on ISO-on-TCP connections to communications partners with a fixed IP address. The CP must be configured for the "GPRS direct" mode.

Table 5- 1   Parameters of TCON_ip_rfc

Byte	Parameter	Data type	Initial value	Description
0 ... 1	InterfaceID	HW_ANY		Reference to the interface of the local CP 1242-7 (see STEP 7 > CP configuration > Telecontrol interface > "Hardware identifier")
2 ... 3	ID	CONN_OUC	1...07FF$_h$	Reference to the GPRS connection. The ID is assigned and must be unique within the CPU. Here, the same value as that of the ID parameter of the TC_CON instruction must be used.
4	ConnectionType	BYTE	W#16#0C	Protocol variant 12 (C$_h$): ISO-on-TCP connection
5	ActiveEstablished	BOOL		Identifier for the type of connection establishment: • 0: Passive connection establishment • 1: Active connection establishment
6 ... 9	RemoteAddress	IP_V4		IP address of the connection partner
	ADDR	Array [1...4] of Byte		IP address of the relevant connection partner
10 ... 11	-	-	-	- reserved -
12 ... 15	RemoteTSelector	TSelector		Remote T selector
	TSelLen	UINT		Length of the remote T selector "RemoteTSelector"

Byte	Parameter	Data type	Initial value	Description
16 ... 47	TSel	Array [1...32] of Byte	any	Remote transport selector of the connection • When "ActiveEstablished" = 1: With active connection establishment, the T selector of the local partner must be the same as the T selector of the connection partner (passive connection establishment on the remote partner). • When "ActiveEstablished" = 0 correspondingly (passive connection establishment local, active connection establishment remote)
	LocalTSelector	TSelector		Local T selector
48 ... 49	TSelLen	UINT		Length of the local T selector "LOCAL_TSel"
50 ... 81	TSel	Array [1...32] of Byte	any	Local transport selector of the connection • When "ActiveEstablished" = 1: With active connection establishment, the T selector of the local partner must be the same as the T selector of the connection partner (passive connection establishment on the remote partner). • When "ActiveEstablished" = 0 correspondingly (passive connection establishment local, active connection establishment remote)

System data type TCON_IP_V4 for connections to IPv4 stations

This connection type is supported only for sending on UDP connections to communications partners with a fixed IP address.

To receive, ActiveEstablished = 0 must be set.

Table 5- 2   Parameters of TCON_IP_V4

Byte	Parameter	Data type	Initial value	Description
0 ... 1	InterfaceID	HW_ANY		Reference to the interface of the local CP 1242-7 (see STEP 7 > CP configuration > Telecontrol interface > "Hardware identifier")
2 ... 3	ID	CONN_OUC	$1...07FF_h$	Reference to the GPRS connection. The ID is assigned and must be unique within the CPU. Here, the same value as that of the ID parameter of the TC_CON instruction must be used.
4	ConnectionType	BYTE	W#16#0B	Protocol variant 11 (B_h): UDP connection
5	ActiveEstablished	BOOL		Identifier for the type of connection establishment: • 0: Passive connection establishment Setting for sending and receiving data. • 1: Active connection establishment Setting for sending data only.

Byte	Parameter	Data type	Initial value	Description
6 ... 7	-	-	-	- reserved -
8 ... 11	RemoteAddress	IP_V4		IP address of the connection partner
	ADDR	Array [1...4] of Byte		IP address of the relevant connection partner
12 ... 13	RemotePort	UINT	1...65535	IP port of the connection partner Not relevant if ActiveEstablished = 0
14 ... 15	LocalPort	UINT	1...65535	Local IP port ("0" is not permitted) Not relevant if ActiveEstablished = 1

System data type TCON_phone for SMS connections

> **Note**
>
> **Authorized phone numbers**
>
> The CP only accepts an SMS if the sending communication partner is authorized based on its phone number. These numbers are in configured for the CP in STEP 7 in the "authorized phone numbers" list.

Table 5- 3   Parameter TCON_phone

Byte	Parameter	Data type	Initial value	Description
0 ... 1	InterfaceID	HW_ANY		Reference to the interface of the local CP 1242-7 (see STEP 7 > CP configuration > Telecontrol interface > "Hardware identifier")
2 ... 3	ID	CONN_OUC	1...07FF$_h$	Reference to the GPRS connection. The ID is assigned and must be unique within the CPU. Here, the same value as that of the ID parameter of the TC_CON instruction must be used.
4	ConnectionType	BYTE	W#16#0E	Protocol variant 14 (E_h): SMS connection
5	ActiveEstablished	BOOL		Identifier for the type of connection establishment (not relevant for the CP 1242-7): • 0: Passive connection establishment (not relevant here) • 1: Active connection establishment
6...7	-	-	-	- reserviert -
8 ... 31	PhoneNumber	STRING[22]		Call number of the connection partner Permitted values: Plus character (+) and numbers Without an entry, no connection partner is specified (for example SMS reception from all authorized connection partners). Note the following during startup: Without an entry, TC_RECV first delivers the oldest SMS message.

System data types for connections to telecontrol servers or remote stations

You can configure the connection to the telecontrol server assigned to the S7-1200 or to a remote station that can be reached via the telecontrol server with TCON_WDC. The address data of the telecontrol server assigned to the CP can be found in STEP 7 in the "Telecontrol interface > Mode" tab of the CP. The telecontrol server or a remote station is addressed using the host name or the IP address.

The "RemoteWdcAddress" parameter of TCON_WDC specifies the Access ID of the connection partner.

Table 5- 4   Parameters of TCON_WDC

Byte	Parameter	Data type	Initial value	Description
0 ... 1	InterfaceID	HW_ANY		Reference to the interface of the local CP 1242-7 (see STEP 7 > CP configuration > Telecontrol interface > "Hardware identifier")
2 ... 3	ID	CONN_OUC	1...07FF$_h$	Reference to the GPRS connection. The ID is assigned and must be unique within the CPU. Here, the same value as that of the ID parameter of the TC_CON instruction must be used.
4	ConnectionType	BYTE	W#16#0F	Protocol variant 15 (F$_h$): Telecontrol connection using an IP address
5	ActiveEstablished	BOOL		Identifier for the type of connection establishment: • 0: Passive connection establishment • 1: Active connection establishment
6 ... 7	-	-	-	- reserved -
8 ... 11	RemoteWdcAddress	DWORD		Specifies the Access ID (hex). The access ID depends on the connection partner. • Connection to a remote CP: The access ID is made up of the following: – STEP 7 project number – Station number – Slot If the remote station has more than one GPRS-CP and you do not want to specify the path, the last byte for the slot must be set to 0. You will find the access ID in the STEP 7 project in the "CP authentication of the CP" parameter group. • Connection to the telecontrol server: Access ID = 0 • To only write to the process image: Access ID = W#16#FEEDDADA

5.4.8 IF_CONF: SDT for telecontrol configuration data

Parameter assignment of the system data type IF_CONF for the TC_CONFIG instruction

The CONFIG parameter of the TC_CONFIG instruction references the memory area with the configuration data of the CP 1242-7 to be modified. The configuration data stored in a data block is described as a structure of the system data type (SDT) IF_CONF.

IF_CONF is made up of a header followed by fields that correspond to the parameters or parameter areas of the CP in the device properties of the STEP 7 project.

The CP configuration data to be modified is collected together in IF_CONF as fields. Parameters that will not be modified are ignored in IF_CONF and remain as they were configured in the STEP 7 project.

Follow the steps below to create the IF_CONF:

1. Create a data block of the type "IF_CONF".

2. Insert the header with the three general parameters (see below).

3. Add the required fields for the parameters to be changed (see below).

4. Check the length of the variable fields and, if necessary, correct the "Length" parameter.

   Fields with strings and / or arrays have a variable length.

5. Finally, update the number of fields in the header in the "subfieldCnt" parameter.

Header of IF_CONF

Table 5- 5   IF_CONF_Header

Byte	Parameter	Data type	Initial value	Description
0 ... 1	fieldType	UINT		Field type: Must always be 0.
2 ... 3	fieldId	UINT		Field ID: Must always be 0.
4 ... 5	subfieldCnt	UINT		Total number of fields contained in the structure

General parameters of the parameter fields

Each field has the following general parameters:

- Id

  This parameter identifies the field and must not be modified.

- Length

  This parameter indicates the length of the field. The field length is specified.

- Mode

  The following values are permitted to these parameters:

Value	Meaning
1	Permanent validity of the configuration data Not relevant for the CP 1242-7
2	Temporary validity of the configuration data, including deleting of existing permanent configuration data The permanent configuration data is replaced by the parameter fields of IF_CONF.

Field for the parameter area "GPRS access"

Table 5- 6   IF_CONF_APN

Parameter	Data type	Initial value	Description
Id	UINT	4	ID of the parameter field
Length	UINT		Length of the parameter field in bytes: 174
Mode	UINT		Validity (1: permanent, 2: temporary)
AccesspointGPRS	STRING [98]		APN: Name of the access point of the GSM network provider to the Internet
AccesspointUser	STRING [42]		APN user name
AccesspointPassword	STRING [22]		APN password

Field for the parameter area "CP identification"

Table 5- 7   IF_CONF_Login

Parameter	Data type	Initial value	Description
Id	UINT	5	ID of the parameter field
Length	UINT		Length of the parameter field in bytes: 54
Mode	UINT		Validity (1: permanent, 2: temporary)
ModemName	STRING [22]		Access ID The value cannot be set.
ModemPassword	STRING [22]		Telecontrol password (max. 20 characters)

Field for the parameter area "Telecontrol server access"

This field is only used when the telecontrol server is addressed with a name that can be resolved by DNS. If the telecontrol server is addressed with its IP address, the "IF_CONF_TCS_IP_V4" field is used.

In STEP 7, the corresponding data is located in the "Mode" parameter area.

If there is more than one telecontrol server, use the field once per server.

Table 5- 8   IF_CONF_TCS_Name

Parameter	Data type	Initial value	Description
Id	UINT	6	ID of the parameter field
Length	UINT		Length of the parameter field in bytes: 266
Mode	UINT		Validity (1: permanent, 2: temporary)
TcsName	-	-	- reserved -
	STRING [254]		Name of the telecontrol server that can be resolved by DNS
RemotePort	UINT		Port of the telecontrol server
Rank	UINT		Priority of the server [1, 2] 1 = main telecontrol server, 2 = substitute telecontrol server

Field for the parameter area "Telecontrol server access"

This field is only used when the telecontrol server is addressed by its IP address. If the telecontrol server is addressed by its DNS name, the "IF_CONF_TCS_Name" field is used.

In STEP 7, the corresponding data is located in the "Mode" parameter area.

If there is more than one telecontrol server, use the field once per server.

Table 5- 9   IF_CONF_TCS_IP_V4

Parameter	Data type	Initial value	Description
Id	UINT	7	ID of the parameter field
Length	UINT		Length of the parameter field in bytes: 14
Mode	UINT		Validity (1: permanent, 2: temporary)
RemoteAddress	IP_V4		IP address of the telecontrol server
RemotePort	UINT		Port of the telecontrol server
Rank	UINT		Priority of the server [1, 2] 1 = main telecontrol server, 2 = substitute telecontrol server

Field for the "Mode" parameter area

In STEP 7, the corresponding data is located in the parameter areas "Mode" and Modem settings".

Table 5- 10   IF_CONF_GPRS_Mode

Parameter	Data type	Initial value	Description
Id	UINT	8	ID of the parameter field
Length	UINT		Length of the parameter field in bytes: 10
Mode	UINT		Validity (1: permanent, 2: temporary)

Parameter	Data type	Initial value	Description
GPRSmode	UINT		Mode of the CP: • 0 = Telecontrol • 1 = GPRS direct
TemporaryStation	BOOL		Bit 0: Temporary connection If this option is selected, the CP only establishes a temporary connection to send data. Once the frames have been transferred, the CP terminates the connection again. • 1: activated (temporary connection) • 0: deactivated (permanent connection)
SMS_Enabled	BOOL		Bit 1: Allow SMS Selecting the option allows the S7 station to send SMS messages. • 1: activated (SMS allowed) • 0: deactivated (no SMS)

Field for the "SMSC" parameter

In STEP 7, the corresponding data is located in the parameter area "Modem settings".

Table 5- 11   IF_CONF_SMS_Provider

Parameter	Data type	Initial value	Description
Id	UINT	10	ID of the parameter field
Length	UINT		Length of the parameter field in bytes: 28
Mode	UINT		Validity (1: permanent, 2: temporary)
SMSProvider	STRING [20]		Node number of the SMS center (SMSC) of the GSM network provider with which the contract was signed for this station.

Field for the "PIN" parameter

In STEP 7, the corresponding data is located in the parameter area "Modem settings".

Table 5- 12   IF_CONF_PIN

Parameter	Data type	Initial value	Description
Id	UINT	11	ID of the parameter field
Length	UINT		Length of the parameter field in bytes: 16
Mode	UINT		Validity (1: permanent, 2: temporary)
PIN	STRING [8]		PIN of the SIM card inserted in the SIM card The parameter is not relevant if the PIN was correctly configured. If the PIN was incorrectly configured, the correct PIN can be entered.

Field for monitoring times

In STEP 7, the corresponding data is located in the parameter areas "Acknowledgment monitoring" and Operating mode".

Table 5- 13   IF_CONF_TC_Timeouts

Parameter	Data type	Initial value	Description
Id	UINT	12	ID of the parameter field
Length	UINT		Length of the parameter field in bytes: 12
Mode	UINT		Validity (1: permanent, 2: temporary)
KeepAliveTimeout	-	-	- Reserved - (cannot be set)
SendTimeout	UINT		Acknowledgment monitoring time: Monitoring time for the arrival of the TCP acknowledgment from the communications partner after sending frames (seconds) Only relevant for telecontrol connections
RedialTimeout	UINT		Dialing repetition delay: Basic value for the wait time until the next attempt to establish a connection following an unsuccessful connection establishment. After every 3 attempts, the basic value is doubled up to a maximum of 900 s. Range of values: 10 to 600 s. If a substitute telecontrol server is configured, the CP attempts to connect to it at the 4th dialin attempt. Example: Basic value 20 results in the following dialing intervals: three times 20 s, three times 40 s, three times 80 s etc. up to a maximum of 900 s. Not relevant for SMS connections

Field for the "Wake up right" parameter area

Table 5- 14   IF_CONF_WakeupList

Parameter	Data type	Initial value	Description
Id	UINT	13	ID of the parameter field
Length	UINT		Length of the parameter field in bytes: 246
Mode	UINT		Validity (1: permanent, 2: temporary)
WakeupPhone [1...10]	ARRAY [1...10] of STRING [22]		Phone number subscriber authorized to wake up The asterisk (*) at the end of a call number is used a placeholder for direct dialing numbers.

Field for the "Preferred GSM networks" parameter area

Table 5- 15   IF_CONF_PrefProvider

Parameter	Data type	Initial value	Description
Id	UINT	14	ID of the parameter field
Length	UINT		Length of the parameter field in bytes: 46

Parameter	Data type	Initial value	Description
Mode	UINT		Validity (1: permanent, 2: temporary)
Provider [1...5]	ARRAY [1...5] of STRING [8]		Alternative GSM networks with priority 1 to 5 into which the CP dials. Up to 5 networks can be configured. No. 1 with highest priority, no. 5 with lowest priority.
			Entry of the Public Land Mobile Network (PLMN) of the network provider consisting of Mobile Country Code (MCC) and Mobile Network Code (MNC).
			Example (test network of Siemens AG): 26276

Field for the "DNS configuration" parameter area

Table 5- 16   IF_CONF_DNS

Parameter	Data type	Initial value	Description
Id	UINT	16	ID of the parameter field
Length	UINT		Length of the parameter field in bytes: 14
Mode	UINT		Validity (1: permanent, 2: temporary)
DNS_IP [1]	IP_V4		IP address of the 1st domain name system server
DNS_IP [2]	IP_V4		IP address of the 2nd domain name system server

Field for the "Time-of-day synchronization" parameter area

Table 5- 17   IF_CONF_NTP

Parameter	Data type	Initial value	Description
Id	UINT	17	ID of the parameter field
Length	UINT		Length of the parameter field in bytes: 24
Mode	UINT		Validity (1: permanent, 2: temporary)
NTP_IP [1]	ARRAY [1...4] of IP_V4		IP address of NTP server 1
...	...		(IP address of NTP server 2...3)
NTP_IP [4]	ARRAY [1...4] of IP_V4		IP address of NTP server 4

Block for activating / deactivating TeleService users

SDT for activating or deactivating TeleService users already configured in the STEP 7 project of the CP. In STEP 7, the corresponding data can be found in the parameter area "TeleService settings" > "TeleService user management".

Table 5- 18   IF_CONF_GPRS_UserList

Parameter	Data type	Initial value	Description
Id	UINT	19	ID of the parameter field
Length	UINT		Length of the parameter field in bytes: 506
Mode	UINT		Validity (1: permanent, 2: temporary)
StructUser [1...10]	ARRAY [1...10] of STRUCT GPRS_User		TeleService user no. 1 to max. no. 10

The array is formed from the parameter records for the TeleService users ("GPRS_User" [1...n]).

Table 5- 19   GPRS_User [n] (parameter for TeleService user)

Parameter	Data type	Initial value	Description
UserName [n]	STRING [22]		TeleService user name
Password [n]	STRING [22]		- The string must be empty! -
Diag_Allowed [n]	BOOL		- Reserved - (cannot be set)
Teleserv_Allowed [n]	BOOL		Activation of the TeleService user • 0 = user is deactivated • 1 = user is activated
FW_Load_Allowed [n]	BOOL		- Reserved - (cannot be set)

Field for setting the parameters for TeleService access (DNS name of the server)

Access data of the TeleService server (switching station).

In STEP 7, the corresponding data is located in the parameter area "TeleService settings".

If there is more than one TeleService server, use the field once per server.

Table 5- 20   IF_CONF_TS_Name

Parameter	Data type	Initial value	Description
Id	UINT	20	ID of the parameter field
Length	UINT		Length of the parameter field in bytes: 266
Mode	UINT		Validity (1: permanent, 2: temporary)
TSName	String [254]		Name of the TeleService server that can be resolved by DNS
RemotePort	UINT		Port of the engineering station
Rank	UINT		Priority of the server [1] or [2] 1 = server 1, 2 = server 2

Field for setting the parameters for TeleService access (IP address of the server)

Access data of the TeleService server (switching station).

In STEP 7, the corresponding data is located in the parameter area "TeleService settings".

If there is more than one TeleService server, use the field once per server.

Table 5- 21   IF_CONF_TS_IF_V4

Parameter	Data type	Initial value	Description
Id	UINT	21	ID of the parameter field
Length	UINT		Length of the parameter field in bytes: 14
Mode	UINT		Validity (1: permanent, 2: temporary)
RemoteAddress	IP_V4		IP address of the TeleService server
RemotePort	UINT		Port of the TeleService server
Rank	UINT		Priority of the server [1] or [2] 1 = server 1, 2 = server 2

Technical specifications

6

Table 6- 1   Technical specifications of the CP 1242-7

Technical specifications	
Order number	6GK7 242-7KX30-0XE0
Wireless interface	
Antenna connector	SMA socket
Nominal impedance	50 ohms
Wireless connection	
Maximum transmit power	• GSM 850, class 4: +33 dBm ±2dBm • GSM 900, class 4: +33 dBm ±2dBm • GSM 1800, class 1: +30 dBm ±2dBm • GSM 1900, class 1: +30 dBm ±2dBm
GPRS	Multislot class 10 device class B coding scheme 1 to 4 (GMSK)
SMS	Mode outgoing: MO service: point-to-point
Permitted ambient conditions	
Ambient temperature	
• During storage	• -40 °C to 70 °C
• During transportation	• -40 °C to 70 °C
• During operation with the rack installed horizontally	• 0 °C to 55 °C
• During operation with the rack installed vertically	
	• 0 °C to 45 °C
Relative humidity at 25 °C during operation, without condensation, maximum	95 %
Degree of protection	IP20
Power supply, current consumption and power loss	
Type of power supply	DC
Power supply / external	24 V
• minimum	• 19.2 V
• maximum	• 28.8 V
Current consumption (typical)	
• from 24 V DC	• 100 mA
• from the S7-1200 backplane bus	• 0 mA

Technical specifications	
Effective power loss (typical)	
• from 24 V DC	• 2.4 W
• from the S7-1200 backplane bus	• 0 W
24 V DC power supply	
• Min. cable cross section	• min.: 0.14 mm^2 (AWG 25)
• Max. cable cross section	• max.: 1.5 mm^2 (AWG 15)
• Tightening torque of the screw terminals	• 0.45 Nm (4 lb-in)
Electrical isolation Power supply unit to internal circuit	710 VDC for 1 minute
Dimensions and weights	
• Width	• 30 mm
• Height	• 100 mm
• Depth	• 75 mm
Weight	
• Net weight	• 133 g
• Weight including packaging	• 170 g

You will find additional functions and performance data in the section Application and properties (Page 7).

Dimension drawings

A

> **Note**
>
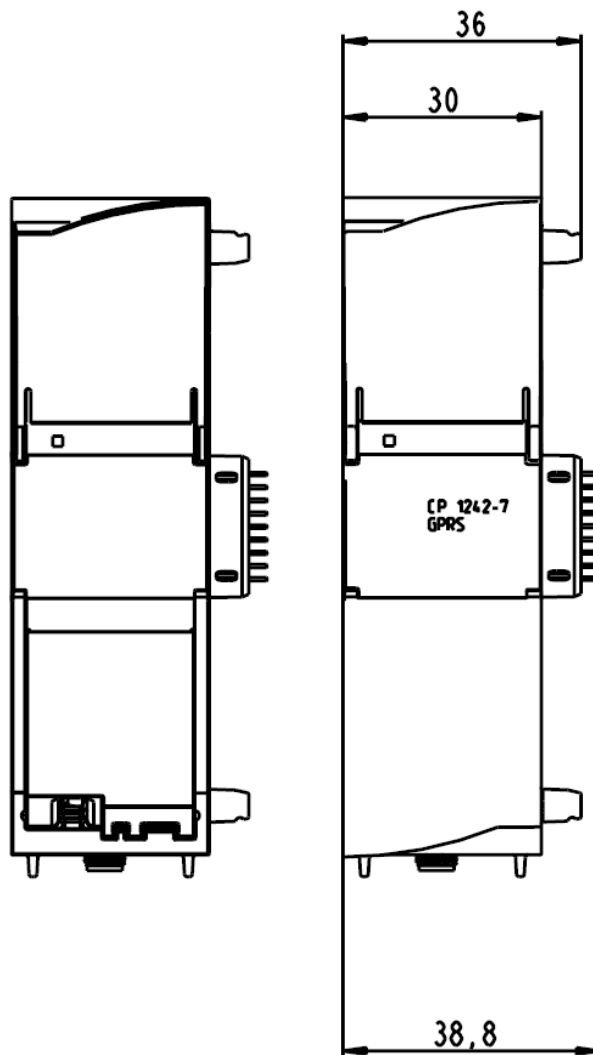> All dimensions in the drawings are in millimeters.
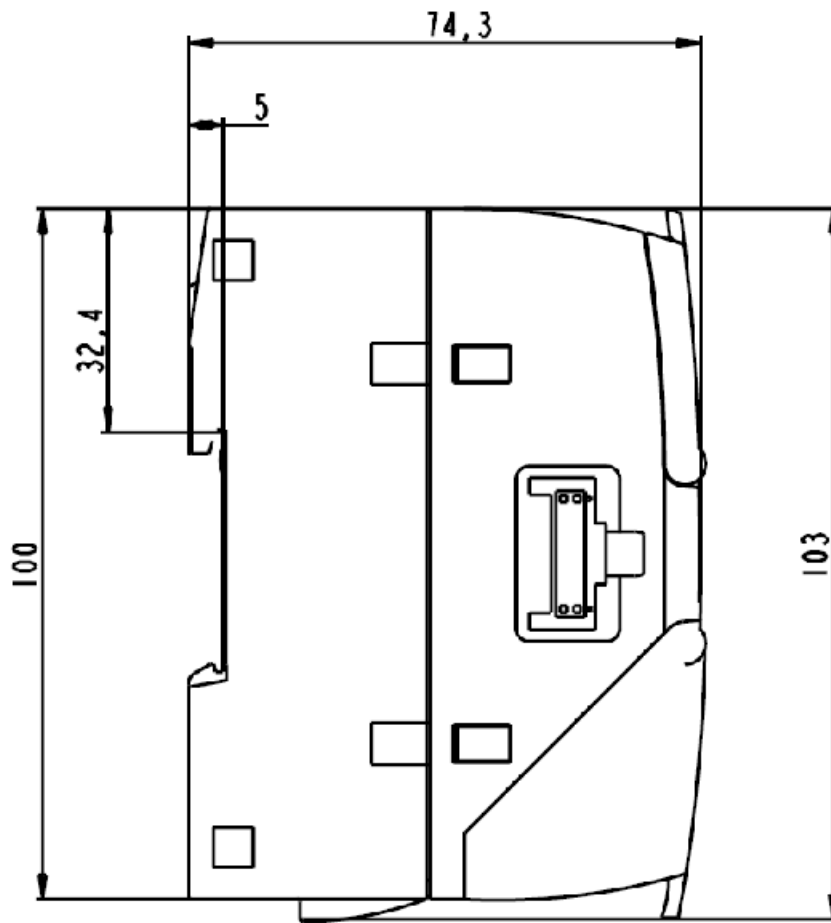

Figure A-1   CP 1242-7 - front view

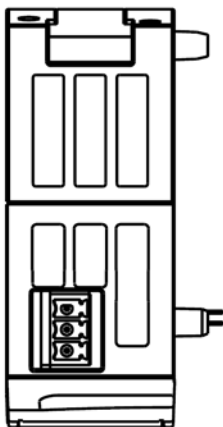Figure A-2   CP 1242-7 - side view left

Figure A-3   CP 1242-7 - view from above

Approvals

National approvals

The list of countries in which the CP 1242-7 is approved can be found on the Internet at the following address:

45605894 (http://support.automation.siemens.com/WW/view/en/45605894)

Overview of approvals and standards

The CP 1242-7 has the following approvals and meets the following standards:

- cULus LISTED IND. CONT. EQ. for HAZ.LOC.
- FM
- ATEX: KEMA 10 ATEX 0166X
- EU directives
    - EU Directive 2004/108/EEC "Electromagnetic Compatibility" (EMC Directive)
    - EU Directive 2002/95/EC (RoHS)
    - EC Directive 1999/5/EC (R&TTE)
- C-TICK
- Electromagnetic compatibility (EMC) according to the following standards:

    EN 61000-4-2, EN 61000-4-3, EN 61000-4-4, EN 61000-4-5, EN 61000-4-6, EN 61000-4-11, EN 61000-6-4

- Use in industrial environments according to EN 61000-6-4:2007 and EN 61000-6-2:2005

Approvals issued

NOTICE
Issued approvals on the type plate of the device
The specified approvals apply only when the corresponding mark is printed on the product. You can check which of the following approvals have been granted for your product by the markings on the type plate.

Standards and test specifications

The CP 1242-7 meets the following standards and test specifications. The test criteria for the module are based on these standards and test specifications.

CE declaration of conformity

The CP meets the requirements and safety objectives of the following EU directives and it complies with the harmonized European standards (EN) for programmable logic controllers which are published in the official documentation of the European Union.

- EU directive 2006/95/EEC "Electrical Equipment Designed for Use within Certain Voltage Limits" (Low Voltage Equipment Directive)

- EN 60950-1 Information Technology Equipment - Safety

- EU Directive 2004/108/EEC "Electromagnetic Compatibility" (EMC Directive)

  - Emission
    EN 61000-6-4:2007: Industrial area

  - Immunity
    EN 61000-6-2:2005: Industrial area

- EU directive 94/9/EC "Equipment and protective systems intended for use in potentially explosive atmospheres" (ATEX Explosion Protection Directive)

  - EN 60079-15:2005: Type of protection 'n':

- Directive 1999/5/EC of the European Parliament and of the Council of 9 March 1999 on radio equipment and telecommunications terminal equipment and the mutual recognition of their conformity (R&TTE)

The EC Declaration of Conformity is available for all responsible authorities at:

Siemens Aktiengesellschaft
Industry Automation
Industrielle Kommunikation SIMATIC NET
Postfach 4848
D-90327 Nürnberg
Germany

You will find the EC Declaration of Conformity for this product on the Internet at the following address:

10805878 (http://support.automation.siemens.com/WW/view/en/10805878) → Tab "Entry List"

Filter settings:
Entry type: "Certificates"
Certificate Type: "Declaration of Conformity"
Search items(s): <name of the module>

cULus approval

Underwriters Laboratories Inc. meets

- Underwriters Laboratories, Inc.: UL 508 Listed (industrial control devices)
- Canadian Standards Association: CSA C22.2 Number 142 (process control equipment)

FM certification

Factory Mutual Research (FM):
Approval Standard Class number 3600 and 3611
Approved for use in:
Class I, Division 2, Group A, B, C, D, Temperature Class T4A, Ta = 55 °C
Class I, Zone 2, Group IIC, Temperature Class T4, Ta = 55 °C

ATEX approval

EN 60079-0:2006: Potentially explosive atmosphere - general requirements

EN 60079-15:2005: Electrical apparatus for explosive gas atmospheres; Type of protection 'n'
II 3 G Ex nA II T4

Over and above this, the following conditions must be met for the safe deployment of the CP:

- Install the modules in a suitable enclosure with degree of protection of at least IP54 to EN 60529 and take into account the environmental conditions for operation of the devices.

- If the rated temperatures of 70°C at the cable entry or 80°C at the branching point of the wires are exceeded, the permitted temperature range of the selected cable must be suitable for the actual measured temperatures.

- Measures must be taken to prevent the rated voltage being exceeded by more than 40% due to transient disturbances.

C-Tick approval

The CP meets the requirements of the AS/NZS 2064 standards (Class A)

Industrial environments

The CP was developed for use in industrial environments.

Application	Requirements for emissions	Requirements for immunity
Industry	EN 61000-6-4:2007	EN 61000-6-2:2005

Electromagnetic compatibility (EMC)

The electromagnetic compatibility (EMC) of an electrical device is its capability of functioning as intended in an electromagnetic environment without emitting electromagnetic interference that could impair the operation of other electrical devices in the vicinity.

Electromagnetic compatibility - immunity	
EN 61000-4-2 Electrostatic discharge	8 kV air discharge to all surfaces 4 kV contact discharge to exposed conductive surfaces
EN 61000-4-3 Radiated electromagnetic field	300 MHz to 2 GHz, 10 V/m, 80 % AM at 1 kHz 2.0 to 2.7 GHz, 3 V/m, 80 % AM at 1 kHz
EN 61000-4-4 Fast transient bursts	2 kV, 5 kHz with coupling network to AC and DC system power 2 kV, 5 kHz with coupling clamp to inputs/outputs
EN 61000-4-5 Surge immunity (power supply)	DC systems - 2 kV common mode, 1 kV push-pull For DC systems (DC power supplies), external protection is necessary.
EN 61000-4-6 Conducted disturbances	150 kHz to 80 MHz, 10 V RMS, 80 % AM at 1 kHz
EN 61000-4-11 Voltage dips	DC systems 0 % for 1 cycle, 40 % for 12 cycles and 70 % for 30 cycles at 60 Hz

Electromagnetic compatibility - emission	
Conducted emissions	EN 61000-6-4, Class A
Emitted radiation	EN 61000-6-4, Class A

Environmental conditions

Environmental conditions - transportation and storage	
EN 60068-2-2, Test Bb, dry heat and EN 60068-2-1 Test Ab, cold	-40°C to +70°C
EN 60068-2-30, Test Db, damp heat	25°C to 55°C, 95% humidity
EN 60068-2-14, Test Na, temperature shock	-40°C to +70°C, dwell time 3 hours, 2 cycles
EN 24180-2 Free fall	0.3 m in dispatch packaging
Atmospheric pressure	1 080 to 660 hPa (corresponding to an altitude of -1 000 to 3 500 m)

Environmental conditions - operation	
Ambient temperatures / air humidity (inlet air 25 mm below device)	0 °C to 55 °C for horizontal installation of the rack 0 °C to 45 °C for vertical installation of the rack 95% relative humidity, non-condensing
Atmospheric pressure	1080 to 795 hPa (corresponding to an altitude of -1000 to 2000 m)
EN 60068-2-14, Test Nb, temperature change	5°C to 55°C, 3°C/minute
EN 60068-2-27 Mechanical shock	15 g, 11 ms pulse, 3 positive and 3 negative shocks in each of the 3 axes (half sine)
EN 60068-2-6 Sinusoidal vibration	DIN rail mount: 7 mm from 5 to 8.51 Hz, 10 m/s^2 from 8.51 to 150 Hz, 1 octave/minute

High voltage isolation test	
Circuit with 24 V/5 V rated voltage	520 VDC (type test of optical electrical isolation limits)

Protection class

- Protection class III according to EN 60950-1 (protective conductor not required)

Degree of protection

- Mechanical protection to EN 60529: IP20

  Protects against finger contact with high voltage as tested by standard probe. External protection required for dust, dirt, water and foreign objects of < 12.5 mm in diameter.

Rated voltage

Rated voltage	Tolerance
24 V DC	20.4 V DC to 28.8 V DC

Other approvals

The S7-1200 products are regularly submitted to the relevant authorities for approvals relating to specific markets and applications. If you require a list of the current approvals for individual devices, consult your Siemens contact.

Accessories

C

C.1 Antennas

GSM/GPRS antennas

The following antennas are available for use in GSM/GPRS networks and can be installed both indoors and outdoors. The antennas must be ordered separately.

Antenna ANT794-4MR

Figure C-1   Antenna ANT794-4MR

Short name	Order no.	Explanation
ANT794-4MR	6NH9 860-1AA00	Quadband antenna (900, 1800/1900 MHz, UMTS); weatherproof for indoor and outdoor areas; 5 m connecting cable connected permanently to the antenna; SMA connector, including installation bracket, screws, wall plugs

You will find detailed information in the device manual. You will find this on the Internet on the pages of Siemens Industrial Automation Customer Support under the following entry ID:

23119005 (http://support.automation.siemens.com/WW/view/en/23119005)
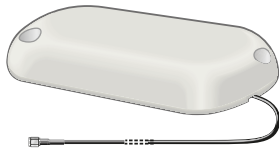
Flat antenna ANT794-3M

Figure C-2   Flat antenna ANT794-3M

Short name	Order no.	Explanation
ANT794-3M	6NH9 870-1AA00	Flat antenna (900, 1800/1900 MHz); weatherproof for indoor and outdoor areas; 1.2 m connecting cable connected permanently to the antenna; SMA connector, including adhesive pad, screws mounting possible

You will find detailed information in the device manual. You will find this on the Internet on the pages of Siemens Industrial Automation Customer Support under the following entry ID:

48729835 (http://support.automation.siemens.com/WW/view/en/48729835)

Technical specifications of the ANT794-4MR GSM/GPRS antenna

ANT794-4MR	
Order number	6NH9860-1AA00
Mobile wireless networks	GSM/GPRS
Frequency ranges	• 824 to 960 MHz (GSM 850, 900)
	• 1 710 to 1 880 MHz (GSM 1 800)
	• 1 900 to 2 200 MHz (GSM / UMTS)
Characteristics	Omnidirectional
Antenna gain	0 dB
Impedance	50 ohms
Standing wave ratio (SWR)	< 2,0
Max. power	20 W
Polarity	Linear vertical
Connector	SMA
Length of antenna cable	5 m
External material	Hard PVC, UV-resistant
Degree of protection	IP65
Permitted ambient conditions	
• Operating temperature	• -40 °C to +70 °C
• Transport/storage temperature	• -40 °C to +70 °C
• Relative humidity	• 100 %
External material	Hard PVC, UV-resistant

ANT794-4MR	
Construction	Antenna with fixed HF cable and SMA male connector
Dimensions (D x H) in mm	25 x 193
Weight	
• Antenna incl. cable	• 310 g
• Fittings	• 54 g
Installation	With supplied bracket

Technical specifications of the flat antenna ANT794-3M

Order number	6NH9870-1AA00	
Mobile wireless networks	**GSM 900**	**GSM 1800/1900**
Frequency ranges	890 - 960 MHz	1710 - 1990 MHz
Standing wave ratio (VSWR)	≤ 2:1	≤ 1,5:1
Return loss (Tx)	≈ 10 dB	≈ 14 dB
Antenna gain	0 dB	
Impedance	50 ohms	
Max. power	10 W	
Antenna cable	HF cable RG 174 (fixed) with SMA male connector	
Cable length	1.2 m	
Degree of protection	IP64	
Permitted temperature range	-40°C to +75°C	
Flammability	UL 94 V2	
External material	ABS Polylac PA-765, light gray (RAL 7035)	
Dimensions (W x L x H) in mm	70.5 x 146.5 x 20.5	
Weight	130 g	

C.2   TS Gateway

Use of TS Gateway

TS Gateway is an application used for TeleService connections via GPRS with remote SIMATIC stations of the type S7-1200.

What is a TeleService gateway?

A TeleService gateway is a PC on which the "TS Gateway" software is installed.

The TeleService gateway is not configured in STEP 7.

What functions does the TeleService gateway provide?

The TeleService gateway has the following functions:

- Switching station

  The TeleService gateway is a PC in the network that serves as the intermediary between the engineering station and remote S7 station.

  Since a firewall is normally closed for connection requests from the outside, a switching station between the remote station and the engineering station is required. This switching station can be a telecontrol server or, if there is no telecontrol server in the configuration, a TeleService gateway. The switching station directs the messages via a tunnel through the firewall. This allows access by the engineering station connected to a LAN to the S7-1200 via a router and via the APN of the network provider.

- Configuration of the SMS gateway provider

  With the help of TS Gateway, SMS gateway providers are configured that are necessary for the sending of wake-up SMS messages to the remote S7 stations.

Configuration with TeleService gateway

A TeleService gateway is intended for the following telecontrol systems in which TeleService is used with GPRS:

- Configurations without a telecontrol server

  In configurations without a telecontrol server, a TeleService gateway is required for TeleService via GPRS.

- Configurations with telecontrol server

  In configurations in which a second path needs to be established for TeleService via GPRS alongside the telecontrol server, a TeleService gateway can be used.

  This can, for example, be the case when certain people, groups or companies should not operate TeleService via the telecontrol server or when access to the stations for TeleService needs to be set up independent of the telecontrol server.

Range of performance of a TS Gateway

- Number of simultaneous TeleService connections: 1

Note

TS Gateway only for TeleService

TS Gateway is used only for the "TeleService" function via GPRS. No connections to the remote stations can be monitored and no process data can be transferred.

Main and substitute TeleService gateway

If the requirements for availability are higher, you can install TS Gateway as the main or substitute gateway. If the connection via the main system cannot be established, you can establish the TeleService connection via the substitute system. In terms of the range of functions, both systems are identical and do not monitor each other.

Requirements for TeleService with the TeleService gateway

The following requirements must be met for TeleService via a TeleService gateway:

- Engineering station connected to a LAN or with Internet access

  The engineering Station on which TeleService will be operated via GPRS requires STEP 7, version V11.0 SP1 or higher. For STEP 7 V11.0 SP1, support package "CP 1242-7" (HSP0003001) is also required.

  TeleService is started in the STEP 7 project that contains the remote station with the CP 1242-7.

- SIMATIC S7-1200

  – CPU with firmware version as of V2.0

  – Communications processor CP 1242-7

- PC for the TeleService gateway with:

  – DVD drive

  – Connection to LAN or Internet access for connecting to the engineering station

  – Internet access for connecting to the remote S7 station

  – Installation of the "TS Gateway" application

    The software ships with the CP 1242-7 (see product DVD).

References

<div style="text-align: right; font-size: 3em;">D</div>

Where to find Siemens documentation

- You will find the order numbers for the Siemens products of relevance here in the following catalogs:
  - SIMATIC NET Industrial Communication / Industrial Identification, catalog IK PI
  - SIMATIC Products for Totally Integrated Automation and Micro Automation, catalog ST 70

  You can request the catalogs and additional information from your Siemens representative.

- You will find SIMATIC NET manuals on the Internet pages of Siemens Automation Customer Support:

  Link to Customer Support (http://support.automation.siemens.com/WW/view/en)

  Enter the entry ID of the relevant manual as the search item. The ID is listed below some of the reference entries in brackets.

  As an alternative, you will find the SIMATIC NET documentation on the pages of Product Support:

  10805878 (http://support.automation.siemens.com/WW/view/en/10805878)

  Go to the required product group and make the following settings:

  → Entry list → Entry type "Manuals / Operating Instructions"

  You will find the documentation for the SIMATIC NET products relevant here on the data medium that ships with the product:
  - Product CD / product DVD or
  - SIMATIC NET Manual Collection

D.1   /1/

SIMATIC
S7-1200 Programmable Controller
System Manual
Siemens AG
order number: 6ES7298-8FA30-8BH0
Entry ID: 36932465 (http://support.automation.siemens.com/WW/view/en/36932465)

D.2   /2/

SIMATIC NET
TELECONTROL SERVER BASIC
Operating Instructions
Siemens AG
Entry ID: 42674775 (http://support.automation.siemens.com/WW/view/en/42674775)

D.3   /3/

SIMATIC NET
TS Gateway
Operating Instructions
Siemens AG
Entry ID: 48548898 (http://support.automation.siemens.com/WW/view/en/48548898)

Training, Service & Support

<div style="text-align: right; font-size: 3em;">E</div>

Online support

In addition to our product documentation, the comprehensive online information platform supports you in all aspects of our Service & Support at any time and from any location in the world. You will find this on the Internet at the following address:

(http://support.automation.siemens.com/WW/llisapi.dll?func=cslib.csinfo2&aktprim=99&lang=en)

Here, you will find the following information:

* Support news, newsletter

* Product information, Product Support, Applications & Tools

* Technical Forum

* Access to other features of our Service & Support offer:

    – Technical Consulting

    – Engineering Support

    – Field Service

      Phone: +49 (0)911 895 7444

    – Spare parts and repairs

      Phone: +49 (0)911 895 7448

    – Optimization and modernization

    – Technical Support

      Expert advice on technical questions with a wide range of demand-optimized services for all our products and systems.

      Phone: +49 (0)911 895 7222

      (https://support.automation.siemens.com/WW/llisapi.dll?func=cslib.csinfo&lang=en&objid=38718979&caller=view)

You will find contact data on the Internet at the following address:
(http://www.automation.siemens.com/partner/guiwelcome.asp?lang=en)

SITRAIN - Siemens training for automation and industrial solutions

With over 300 different courses, SITRAIN covers the entire Siemens product and system spectrum in the field of automation and drive technology. Advanced training tailored to your needs is also available. In addition to our classic range of courses, we also offer a combination of various training media and sequences. You can, for example, use self-study programs on CD-ROM or on the Internet as preparation or to consolidate training.

You will find detailed information on our training curriculum and how to contact our customer consultants at the following Internet address:

(www.siemens.com/sitrain)

Glossary

CM

Communications module

Module for communications tasks that is used in an automation system as an interface expansion of the CPU. Same interface types of a CPU and a CM are functionally identical.

CMT

Configuration and Monitoring Tool

Program user interface of TELECONTROL SERVER BASIC. Used for configuration of the telecontrol server and monitoring of the connections to the remote stations.

Communications module

→ *CM*

Communications processor

→ *CP*

CP

Communications processor

Module for expanded communications tasks that provides the CPU with additional interface types or communications options.

GPRS

General Packet Radio Service

Packet-oriented service for IP-based data transmission in GSM networks. GPRS data packets can also be transferred via the Internet. The data is transmitted using the Internet protocols TCP/IP or UDP/IP.

GPRS direct (mode)

Mode of the CP 1242-7 for direct communication between remote S7 stations via the GSM network. This mode is selected when it is known that the communications partner can be reached using a fixed IP address. This is made possible by the services of the network provider. No telecontrol server is necessary.

GPRS station

Remote S7 station with a GPRS-compliant communications module

TCSB

→ *TELECONTROL SERVER BASIC*

Telecontrol server

PC for monitoring and control of remote S7 stations linked via a public GSM network for GPRS communication. The telecontrol server is normally a centrally deployed PC with a connection to the Internet on which the "TELECONTROL SERVER BASIC" application is installed. The telecontrol server is not configured in STEP 7.

TELECONTROL SERVER BASIC

Software for GPRS communication between remote stations and the central telecontrol server. Via the integrated OPC server of TCSB, data can be exchanged with the OPC client of a central control system. TCSB allows TeleService from S7-1200 stations with a CP 1242-7 via GPRS. Communication can be handled via public networks such as GSM networks or via the Internet without requiring addressing of the remote S7 stations using fixed IP addresses.

Telecontrol(mode)

Mode of the CP 1242-7 for GPRS communication between a remote S7 station and the following partners:

- Communication with a → Telecontrol server
- Communication with other remote GPRS stations

  In communication with other remote GPRS stations, the frames are sent via the telecontrol server.

TeleService gateway

PC in the network as intermediary between the engineering station and remote S7-1200 with CP 1242-7. The "TS Gateway" software is installed on the PC. TS Gateway is used only for the "TeleService" function via GPRS. No process data can be transferred with TS Gateway. The TeleService gateway is not configured in STEP 7.

TeleService server

Switching station for data transmission between the engineering station and remote S7 station. This can be a telecontrol server or a TeleService gateway.

TS Gateway

Application on a TeleService gateway

Index

R

S

T

W