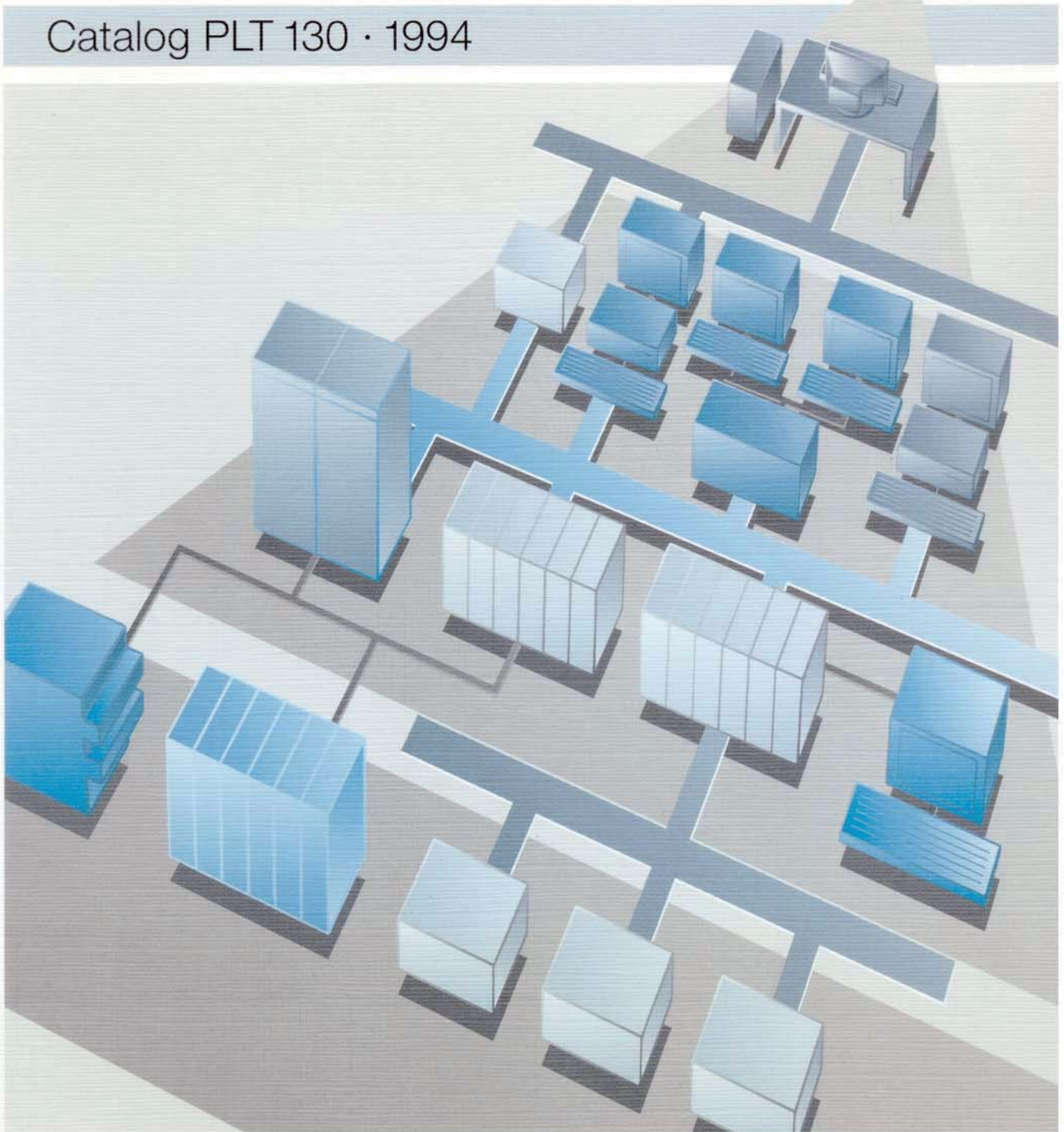


**SIEMENS**

# TELEPERM M

CS 275 Bus System

Catalog PLT 130 · 1994



# SIEMENS

## TELEPERM M

CS 275 Bus System

Catalog PLT 130 · 1994

This catalog is no longer available in printed form. However, it can still be used to obtain information and for ordering spare parts. Certain products from this catalog are no longer available. Your Siemens partner will offer appropriate substitutes wherever possible.



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# Summary

The TELEPERM M process control system consists of functionally different components which are optimized for the various problems encountered in process automation. Because of their modular design, these components are also referred to as systems.

The TELEPERM M process control system is divided into

- AS automation systems,
- OS operation and monitoring systems and
- CS 275 bus system.

The CS 275 bus system is responsible for communication between all TELEPERM M components and to components of other systems by means of serial data transmission on stranded conductors (local bus) or coaxial cables (remote bus), if applicable also via optical fibers. Data exchange is mainly between the AS automation systems themselves as well as between automation systems, OS operation and monitoring systems and central configuring console and the AS and OS systems.

In order to satisfy the high demands made on data communication in process control technology, the CS 275 bus system has been particularly optimized for the following demands:

- Efficient data transmission
- High data reliability and availability
- Uniform system time
- Automatic establishment of communication.

The CS 275 bus system has exceptional real-time properties. Every bus participant is provided with the current process data at all times. The capacity of the bus system is large enough such that sufficient reserve is available for transmitting messages (e. g. process alarms) even with a high cyclic loading.

Automatic test routines guarantee data reliability. The user can configure which messages must be acknowledged by the receiver. The failure of a bus component has no influence on the communication between the other participants.

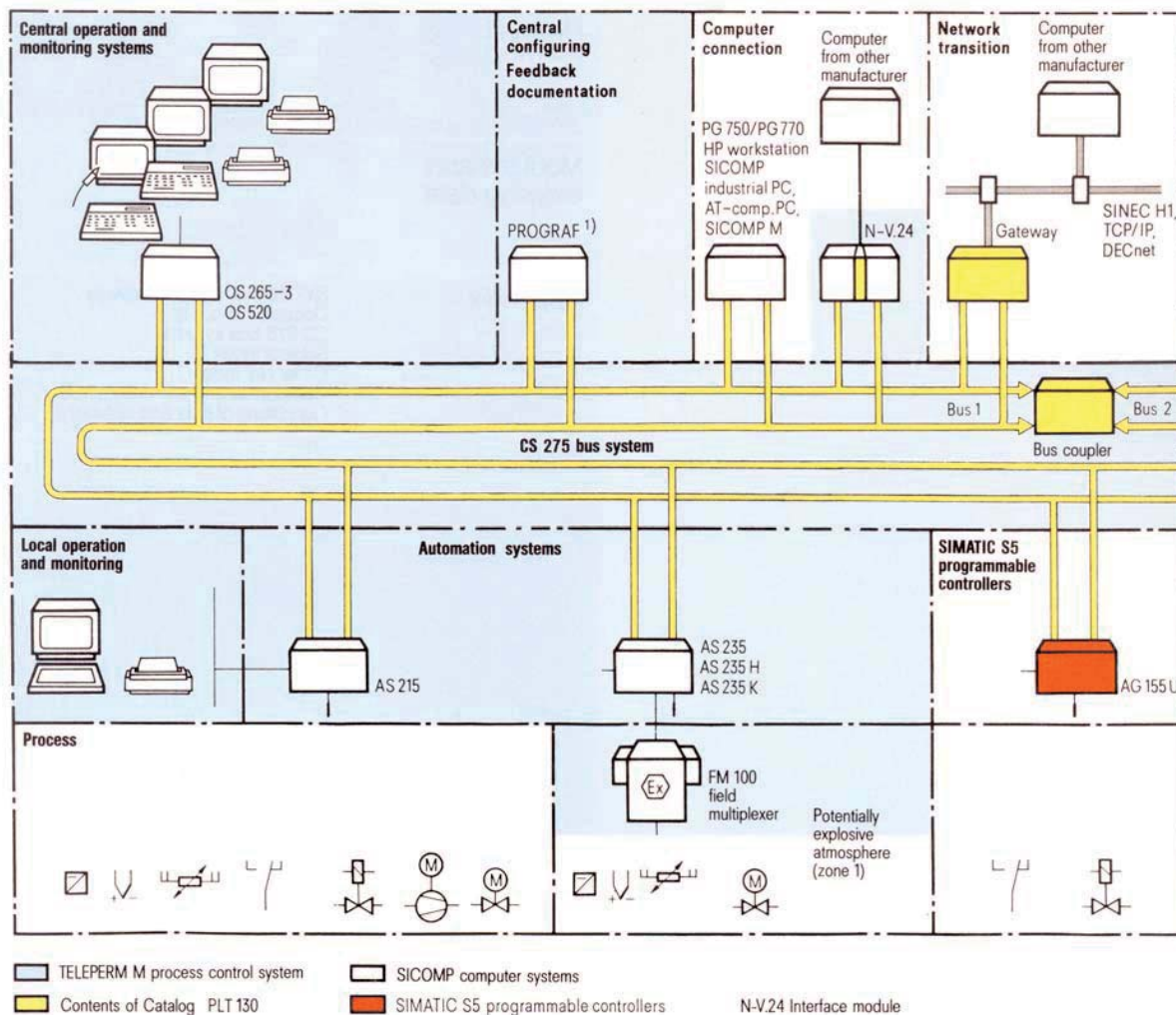


Fig. 1/1 TELEPERM M, process control system, summary, including system-integrated links to SICOMP computer systems, SIMATIC S5 programmable controllers and the SINEC communication network

1) Not for AS 215 and OS 520 systems.

The bus system can be designed in redundant form if extremely high demands are placed on the availability. This does not result in additional configuring requirements.

Events are always recorded with the exact time since the individual bus participants can synchronize their clocks via the bus system.

The simple configuring is one of the most important characteristics of the CS 275 bus system. Convenient system functions are used to establish the connection, intervention by the operator is not required. The parameters to be transmitted (analog/binary values, messages etc.) are already declared when configuring the automation systems and the operation and monitoring systems. The establishment of the connection for the operation and monitoring systems is carried out automatically when starting up, it is merely necessary to enter a coupling command for connections between automation systems.

Optimum utilization of the high performance of the CS 275 bus system is only guaranteed with a large number of participants if certain rules are observed when configuring the bus and if it is ensured that the cyclic bus loading does not exceed 70 % of the bus capacity. Thus 30 % are available for acyclic data transfer (e. g. messages).

In the case of a specific configuration, the cyclic bus loading is independent of

- the configuration of the transmitter blocks in the automation systems,
- the transmission mode selected and
- the processing cycle of the transmitter blocks.

Information on the establishment of data transfer with the coupling blocks for data exchange via the CS 275 bus system is included in the publication "Configuring guidelines" in the Manual "CS 275 bus system". This publication describes the determination of the cyclic bus loading using the bus loading characteristics and lists the cyclic bus loading for a selected configuration.

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# Mode of operation 2

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## Mode of operation

### Transfer control, data protection and transfer

#### Transfer control

Sequential data transmission systems require a transfer control unit for organization of the data traffic on the line. This unit organizes and coordinates the data traffic so that only one subscriber transmits data on the bus at a time. This transfer control function is decentralized in the CS 275 bus system. The availability of the data transmission system is therefore mainly determined by the line length.

Data transfer control in the CS 275 bus system operates according to the token principle, i. e. each participant (local bus interface module) accepts the transfer control function (master function) from time to time.

In a system with  $n$  participants, there is only one participant in the master condition at any one time, all other  $(n-1)$  participants are in the slave condition. The change of the master function from one participant to another is called master transfer. Since every participant can assume the master function, this function has  $n$ -times redundancy in a token system.

The "bus protocol" also specifies how a participant becomes master and how this status is transferred within the system. The protocol complementary methods for the assignment of the master function to a participant are:

- Time-out-controlled master transfer
- Request-controlled master transfer
- Instruction-controlled master transfer

#### Data protection

Data protection is achieved in the CS 275 bus system by generating line and column parities and is referred to as block parity.

The following errors are detected by the data protection:

- 1-bit, 2-bit and 3-bit errors,
- Hamming distance  $d = 4$
- Odd bit errors, 1-, 3-, 5-, 7- and 9-fold errors, independent of location
- Error bursts < 11 bit long
- Error pattern (with exception of rectangular format).

The bit error rate of  $p = 10^{-5}$  satisfies the requirements of IEC-SC-65-WG6 for process buses. According to this, an undetected transmission error in a message may occur on average once in every 1000 years (at 250 kbit/s).

#### Data transfer

Blocks in the TELEPERM M system components are available for a cyclic and a sporadic (acyclic) data transfer via the bus system:

Dedicated transmitter and receiver blocks handle all functions associated with data transfer. Thus, the data transfer can be established easily by configuring, just as the automation functions.

The user need only carry out the following to produce communication:

- The inputs of the transmitter block must be provided with the addresses of the data to be transmitted
- The transmitter block must be inserted into the processing sequence
- The outputs of the corresponding receiver block must be linked accordingly in another automation system
- The receiver block must be inserted into the processing sequence
- The connection to the transmitter must be established using a coupling instruction.

This presents the following advantages:

- Easy configuring of communication (only the transmitter and receiver blocks must be configured, not the interface modules for 20-m local bus)
- Messages to several subscribers are simply transmitted on the bus (several receiver blocks can access one transmitter block)
- Symbolic addressing (block name and number)
- Complete documentation of all connections by self-documentation of systems
- The communication procedure can be configured in a still simpler manner in full-graphic mode on the screen by means of the configuring tool PROGRAF and can also be documented in the same representation (see page 2/5).

#### Cyclic data transfer

Analog values are transmitted cyclically with the coupling blocks AKS/AKE, binary values with the BKS/BKE blocks and characters with the ZKS/ZKE blocks.

There are also further functions in addition to the cyclic data transfer.

These functions include image updating in an OS operation and monitoring system. The updating time is < 2 s in the TELEPERM M process control system. In order to guarantee this value, the bus system provides a function "Read parameters". This enables up to 30 different parameters per message to be read from one AS system. The functional sequence is as follows:

The OS system sends the request to the bus system to read the corresponding parameters from several AS systems for image updating. The addresses of these parameters have already been converted to on-line-accessible parameters from the symbolic addresses of the configuration during the system start-up. Thus, the bus interface modules can read the desired information out of the automation system memory by DMA, generate corresponding reply messages and return these to the corresponding OS systems.

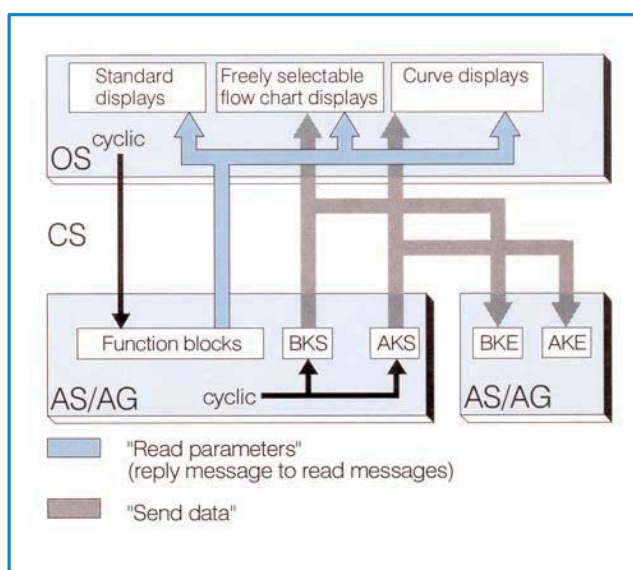


Fig. 2/1 Cyclic data transfer, example OS/AS and AS/AS

## Addressing, transmission modes

This method has the following important advantages:

- There is far less loading on the bus system since only the information is read from the automation system which is currently displayed on the monitor channels
- Data need only be stored at one position as a result of the distributed data base principle. Modifications are therefore only necessary at one position
- No special planning for the OS systems is required in the automation systems (exception: curve display)
- Acces to information in the automation systems by another computer is possible without additional planning (by using the function "Read parameters").

The cyclic data exchange is also used for a life test of all participants connected to the CS 275 bus by an OS operation and monitoring system. Each failure and also the return of a participant is supervised and signalled.

### Sporadic data transfer

Sporadic data transfer is necessary to rapidly pass on modifications in the process control system to other participants. Typical examples are faults or changes in status (e. g. motor on/off) which detects the automation system. Messages exchanged between several automation systems are transmitted by means of the coupling blocks MKS/MKE.

A status word is assigned to each function block for processing with standardized operation and monitoring as well as to driver blocks for I/O modules with standardized display. The changes in signal are detected event-controlled by the status word or by the MKS block, provided with the actual time (MKS only) and transferred to the bus system. This then transfers MKS messages to a maximum of 6 participants (typically OS systems and higher-level computers) which have "registered" themselves for this information when the complete system was started up. This presents the advantage that the automation system need only transmit one message with one or several destination addresses. In addition, only those stations receive the information which actually require it.

Data transfer with OS systems and computers takes place using the functions "Read parameters" and "Write parameters".

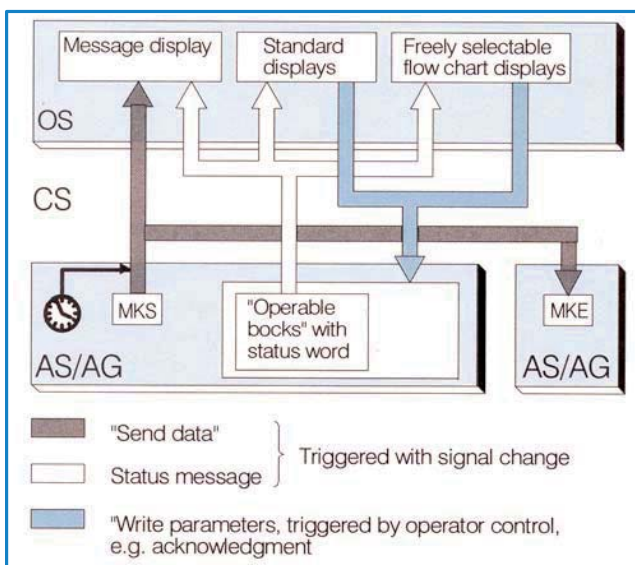


Fig. 2/2 Sporadic/acyclic data exchange, example OS/AS and AS/AS

### Addressing

The addressing of the participants of the bus system is oriented towards the transmission of messages between several autonomous buses and within a bus.

Each participant is identified by two addresses:

- Bus address (0 to 7), i. e. 8 autonomous buses are possible. 7 bus couplers are needed in this case.
- Participant address (0 to 99).

These two addresses are set on the local bus interface module using jumpers or DIP switches.

The bus coupler behaves like a participant with respect to each bus. It has an address on each bus.

### Transmission modes

A differentiation is made between two transmission modes when configuring and defining the AKS and BKS transmitter blocks:

- Direct coupling (DI)
- Common data (CD).

#### Direct coupling (DI)

The registered participants are directly addressed by the transmitter blocks, i. e. each participant only receives the data which is assigned for it. Up to 6 receivers can be registered with a transmitter block and receive the data (analog or binary values) pertaining to it with each transmission cycle of this block.

Any participant on the bus can be a receiver. Transmission can also take place via bus couplers. A receiver is entered as such in the transmitter block in the respective automation system.

The MKS block only operates in direct coupling mode.

#### Common-Data (CD)

The transmitter block sends the data simultaneously to all connected participants of a particular bus. Thus certain identical data can be planned in a transmitter block for many participants on a bus and many destination addresses can then be reached.

The CD procedure can only be used for subscribers with the same bus address. Addressing via bus couplers is not possible. The participants on a bus connected via a bus coupler can be addressed via their own CD procedure.



## Mode of operation

### Redundant operation mode, transmission reliability, synchronization

#### Redundant operation mode

The CS 275 bus system can be redundant in order to increase the availability. The interface modules for the local bus are already designed for a redundant local bus line. A bus converter UI and a connector board AF are required for connection of a redundant remote bus per remote bus cable. Different remote bus cable lengths are permissible between bus A and the redundant bus B.

The bus system is started up on bus A. Besides this, no preference is given to either bus. The bus system carries out a cyclic test to see whether a changeover criterion is satisfied. An automatic changeover is carried out if this is the case.

#### Changeover criteria

- An image of the local bus is generated through each bus line approx. every 750 ms. If the image of the passive bus contains more entries than that of the active bus, the system switches to the passive bus.
- If the images on the two bus lines are the same, but the master detects a transfer request on the passive bus, a changeover also takes place to the passive bus. A slave sends transfer requests on the passive bus if transfers are no longer possible for it on the active bus.
- If the current master fails because of a fault, the slave with the smallest participant address assumes the master function on the previously passive bus (if one exists).

The bus changeover is signalled to all bus participants.

#### Time synchronization

The real-time clocks of the particular TELEPERM M subsystems are synchronized by signals from an OS operation and monitoring system. This can be synchronized by a radio clock (DCF 77 radio transmitter) or a standard clock.

The subscribers on the CS 275 bus system must be synchronized with high accuracy. Because of it, the transit time of the synchronization message is corrected within the milliseconds range by the internal buffers of the local bus interface modules of the automation systems and programmable controllers or by bus couplers.

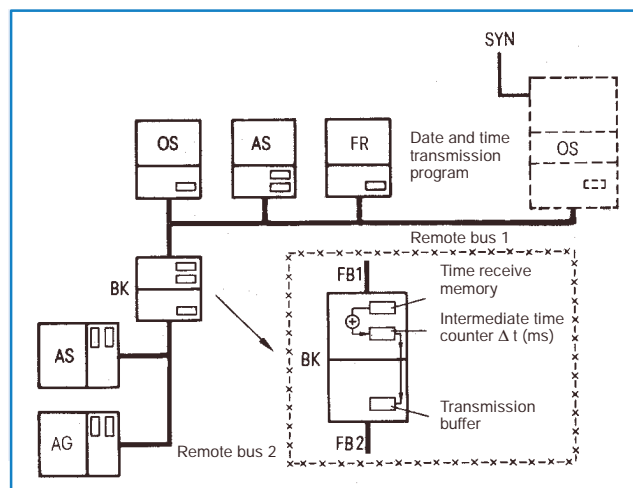


Fig. 2/3 Time generation, time synchronization

#### Transmission reliability

In addition to data security of the transmission method, the following measures ensure high transmission reliability in the physical transmission path:

- Noise immunity to IEC 255-4
- Triple screened cable, redundant
- Coarse overvoltage protection in the building entry (option)
- Fine overvoltage protection in the connector board AF (option)
- Deflection of noise using braided screens and metal front plugs
- Passive line without amplifier
- Non-reactive inductive coupling
- Appropriate signal coding on the remote bus (bipolar current signals)
- Automatic signal equalization independent of location
- Balanced (to earth) transmission
- High signal voltages
- Electrical isolation of participants on remote bus
- Distributed transfer control.

**Configuring of communication**

**Configuring of communication**

Since the communication via the CS 275 bus system is handled like the automation functions via function blocks, they can also be configured in full-graphic mode on the screen by means of the configuring tools PROGRAF. Examples for AS/AS communication are shown in Figs. 2/4 and 2/5.

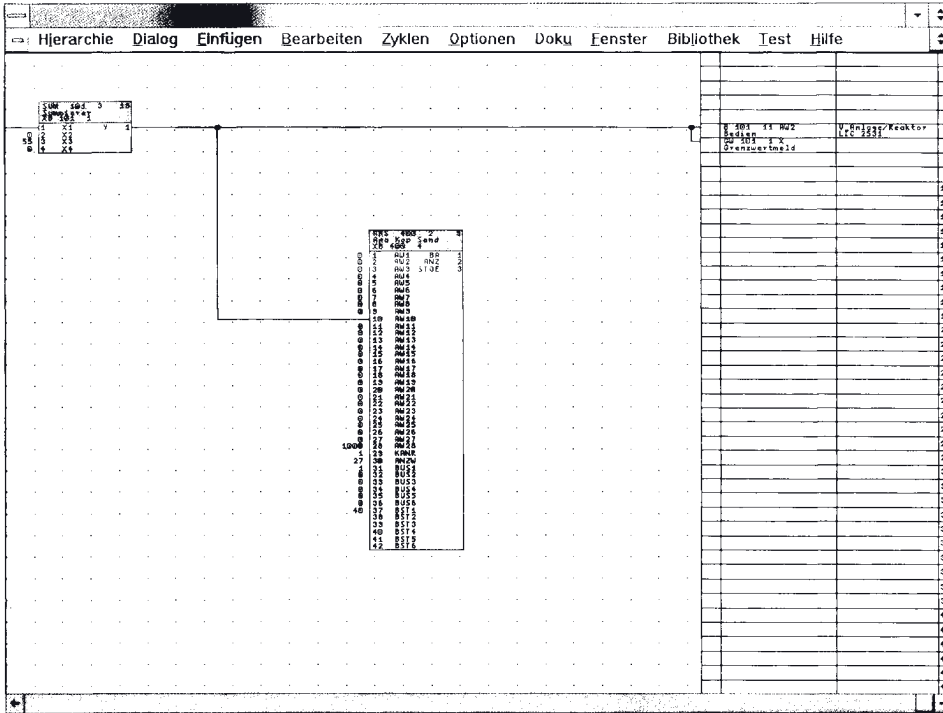


Fig. 2/4 Connection of an analog value out of an adder block to the transmitter block AKS (e. g. as subscriber 3 on bus 1 in an automation system)

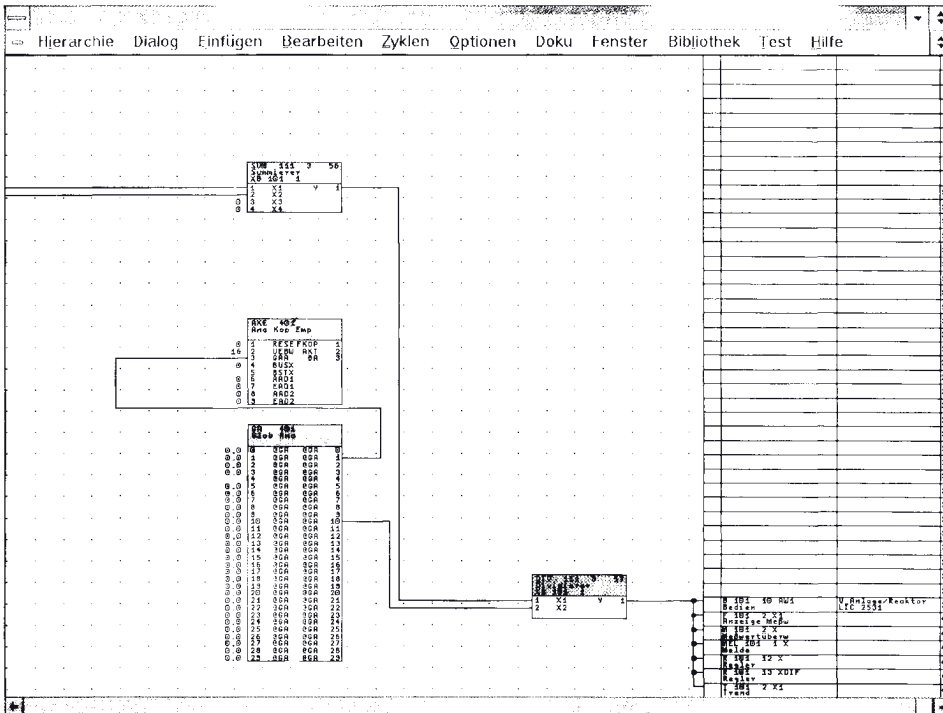


Fig. 2/5 Take-off of the transmitted analog value from the receiver module AKE/GA (e. g. as subscriber 7 on bus 1 in an automation system) and connection to a divider block

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# Design

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# Design

## General notes, local range

The CS 275 bus system is physically divided into

- a local range up to 20 m (local bus) and
- a remote range up to 4 km, or up to 12 km with bus couplers.

Each participant requires a local bus interface module to enable bus communication, redundant systems such as the AS 235 H automation system require two modules. These interface modules convert the various internal system bus interfaces of the participants into the uniform local bus interface. The transfer control function for the complete bus is transferred from participant to participant. This function is also handled by the local bus interface module of the respective participant which currently possesses the master function.

The design of the local bus interface modules depends on the participant system to be connected. Thus the modules e. g. for connection of the automation systems are of double "EUROPE" format, and those for connection of SICOMP industrial PCs are of AT format. In the local range, the local bus interface modules are connected together into a "local bus island" using cables.

Systems not belonging to TELEPERM M require additional coupling software to match their internal communication interface to that of the CS 275 bus system. This software is available, amongst others, for the connection of personal computers with MS-Windows or UNIX operating systems, for workstations and for SIMATIC S5 programmable controllers.

In the remote range, individual participants or complete local bus islands are connected to the remote bus via inductive bus couplers UI. Different designs of coaxial cable are available for the connection depending on the associated mechanical stress.

The local bus is always redundant, the remote bus can be either single or redundant.

### Local range

The transmission is on multi-conductor cables with a max. total length of 20 m.

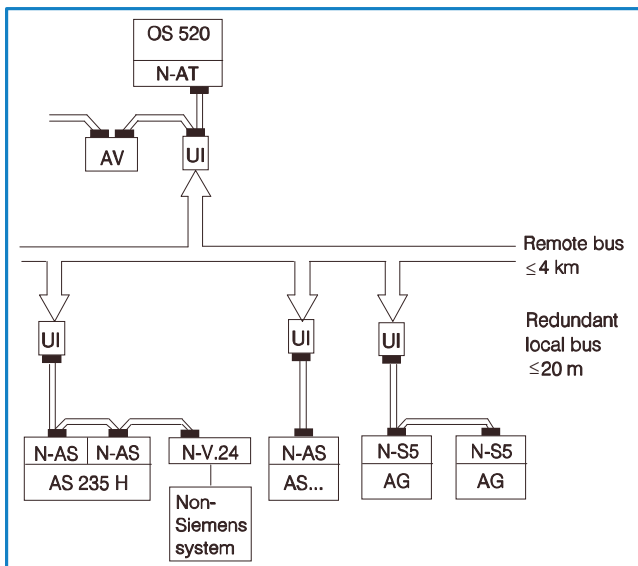
Three line signals are used. The data themselves are transmitted sequentially on one data line. A second line transmits the clock, the third is used for synchronization.

It is necessary to differentiate between electrical participants and (bus) participants when determining the maximum possible number of participants. Electrical participants are the local bus interface modules, the bus converter modules UI and connection multiplexers AV (for connection of a local bus interface module).

(Bus) participants are e.g. an AS 215 automation system (1 electrical participant) or an AS 235 H automation system (2 electrical participants). Up to 9 electrical participants are permissible on a local bus. For example, this means  $\leq 7$  bus participants for a local bus island connected to a redundant remote bus via two bus converters UI (cf. Figs. 3/1 and 3/2.)

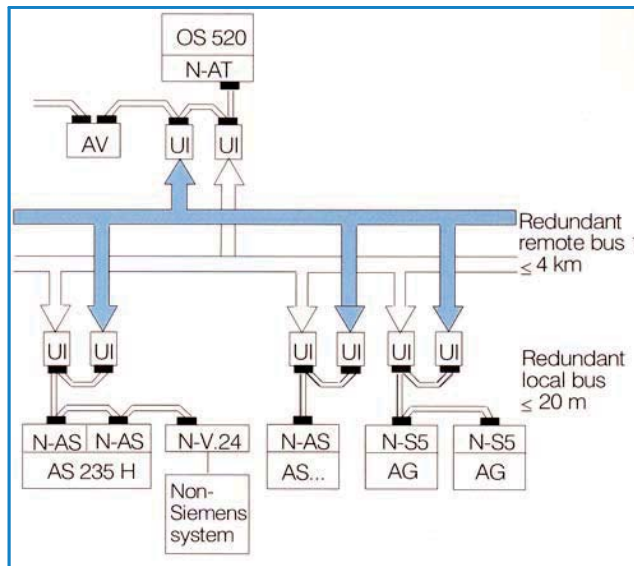
Depending on their type, the local bus interface modules can be either floating or non-floating. Certain design guidelines must be observed when connecting into a local bus island in order to prevent interferences (also refer to Manual "TELEPERM M, Information and Guidelines for Planning, Installation and Operation", Order No. C79000-G8076-C417).

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AS Automation system  
 AG SIMATIC S5 programmable controller  
 AV Connection distributor for local bus  
 N-AT, N-AS, N-V.24, N-S5 } Interface modules for 20-m local bus  
 OS Operation and monitoring system  
 UI Bus converter unit

Fig. 3/1 CS 275 bus system, example for interconnection of local bus and remote bus (non-redundant remote bus); local bus island (left) with 2 communication subscribers and 4 electric participants.



AS Automation system  
 AG SIMATIC S5 programmable controller  
 AV Connection distributor for local bus  
 N-AT, N-AS, N-V.24, N-S5 } Interface modules for 20-m local bus  
 OS Operation and monitoring system  
 UI Bus converter unit

Fig. 3/2 CS 275 bus system, example for interconnection of local bus and remote bus (redundant remote bus); local bus island (left) with 2 communication subscribers and 5 electric participants.

## Remote range, bus components

The following therefore applies:

In the case of electrically isolated local bus interface modules, the ground potential of the bus interface is decoupled from the ground potential of the subrack system. In addition, the 0-V level of the interface logic is matched to the potential of the coupling partner via the local bus cable. This prevents equalizing currents from flowing via the local bus cable in the event of voltage differences > 0.2 V between the grounds of the coupling partners. These currents would interfere with the bus traffic.

In this manner, it is possible e. g. to extend a local bus island (0-V island) consisting of basic and extension cabinets by means of external, electrically isolated local bus participants (N-AS/N-AT). Any local bus interface modules can be linked together within this local bus island since they are powered from the same power distribution subrack. The following conditions apply: max. length 20 m, max. 9 participants, where each bus converter UI also counts as one participant.

It is not permissible to mix non-floating participants with different earthing concepts, e. g. SIMATIC S5 or SICOMP M with OS 265-3 systems or interface module N-V.24 in the same local bus island.

The interface modules for the local bus have a redundant local bus interface. They are each connected to one another by only one cable which contains the redundant local bus.

The cables are fitted at one end with a front plug for connection to the local bus interface modules, the other cable end is prepared for the connection and is soldered to the front plug of the cable of the next interface module. A single front plug is required for the *n*-th local bus participant. This is not necessary for standard connections, e. g. to the bus converter UI for the remote bus, since prefabricated cables are available with looped-through wiring to up to 5 plugs.

The total length of the cables must not exceed 20 m.

### Remote range

Transmission takes place via a coaxial cable up to distances of 4 km. The signals are self-timing bipolar square-wave pulses. The coupling to the remote bus is reaction-free.

Up to 100 bus participants can communicate with one another via the remote bus. The remote bus and local bus are connected together via inductive bus converters UI. The complete bus system therefore has the same information.

Two autonomous bus systems are connected together via a bus coupler so that only the information intended for the other bus is transferred. The bus coupler is counted in each of the two autonomous bus systems as one bus participant.

## Bus components

### Local bus interface modules

Interface module for 20-m local bus Type	Required to connect the following systems and devices to the CS 275 bus system	floating	non-floating
		x	
N-AS (-8AC)	AS 215, AS 235 and AS 235 K automation system	x	
N-AS (-8AA)	AS 235 H automation system	x	
N-BK	Bus coupler	x	
N-AT	OS 520 operation and monitoring system, AT-compatible personal computers, SICOMP industrial PCs and PG 770 programmer	x	
N16-M	OS 265-3 operation and monitoring systems SICOMP M minicomputers		x
N-V.24	SICOMP industrial PCs and non-Siemens computers via V.24 or 20-mA current loop interface		x
N-S5	SIMATIC S5-155U programmable controllers		x

### Cable connectors for local bus

To connect the interface modules for 20-m local bus to one another and to the bus converter UI. A front plug is required for the last participant on the local bus.

### Front plug for local bus

Metal front plug with 2 cable inlets and contact points. The contact points must be used to connect the plug with a low inductance to the subrack.

### Connection distributor

The connection distributor has a vacant plug connection to the redundant 20-m local bus for the connection of configuring aids (SICOMP industrial PC with PROGRAF program package) and bus diagnostic aids. It must be connected to the local bus via a separate cable connector for this purpose.

### Inductive bus converter (bus converter unit UI)

A bus converter is required to connect individual participants or a local bus with several participants to a remote bus. It performs continuous signal conversion between the local bus and the remote bus or vice versa without intermediate storage. The coupling is inductive and non-reactive.

Standard locations:

- Basic cabinet of the AS 235 and AS 235 H automation system
- Basic system of the AS 235 K automation system
- OS 265-3 system cabinet
- Remote bus connection unit
- Bus coupler subrack
- Remote bus connection subrack FAZ-S5.

# Design

## Bus components

### Connector board AF

The remote bus cable is connected to the bus converter via the connector board AF.

The board is provided with a terminating resistor which can be activated using a jumper. The resistor is activated in the connector board of the first and last bus participants (Fig. 3/3).

Standard locations:

- Basic cabinet of the AS 235 and AS 235 H automation systems
- Basic system of the AS 235 K automation system
- OS 265-3 system cabinet
- Remote bus connection unit.

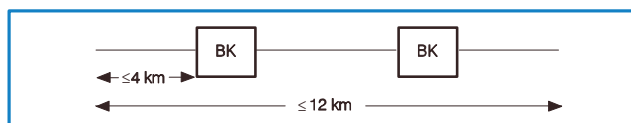
### Bus coupler

Autonomous buses are connected together via a bus coupler. Data transfer is then possible between several systems or system areas over larger distances (> 4 km) with decoupling of the data traffic on the buses.

The intermediate connection of up to 2 bus couplers is permissible for data transfer between any two participants in the complete bus system.

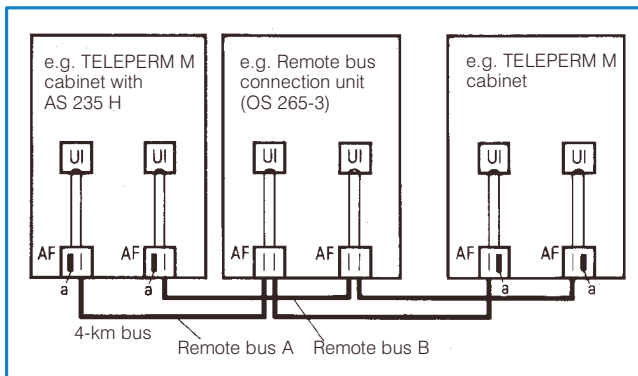
Two different structures are possible when designing a bus system with bus couplers:

- Line structure
- Hierarchical structure.



BK Bus coupler

Fig. 3/4 Bus system with linear structure



- a Terminating resistor F (activated by jumper)
- AF Connector board
- UI Bus converter

Fig. 3/3 Redundant remote bus with terminating resistors

### Remote bus connection unit

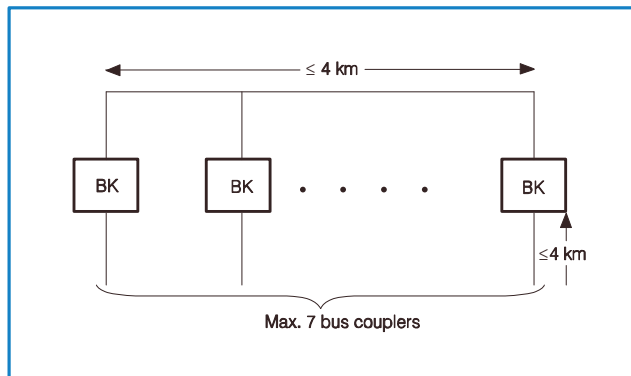
The remote bus connection unit is used to connect those bus participants to the remote bus which are not installed in TELEPERM M standard cabinets, as e. g. the OS 520 operation and monitoring system.

The power supply module, inductive bus converters, connector board for connection of one participant or of a participant group (local bus island) are fitted ready for connection in a separate housing which is to be placed underneath a table.

### Remote bus connection subrack

The remote bus connection subrack is used to connect those bus participants to the remote bus which are fitted in cabinets according to the customer requirements, e. g. SIMATIC S5-155U programmable controllers.

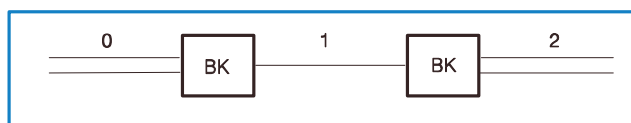
The power supply module and inductive bus converters for connection of one or several participants installed in the cabinet are accommodated in a subrack which has been prepared for installation in a cabinet.



BK Bus coupler

Fig. 3/5 Bus system with hierarchical structure

In both applications, all buses or individual buses can be redundant as desired (Fig. 3/6).



BK Bus coupler

Bus 0 and bus 2 are redundant for availability reasons. To reduce cable costs, bus 1 is not redundant and is e. g. the connection between two buildings.

Fig. 3/6 Redundant bus, example

3

**Bus components, technical data**Overvoltage protection

The participants connected to the remote bus can be extensively protected against destruction by overvoltages by means of the coarse and fine overvoltage protection units.

The coarse protection limits high-voltage signals of high power to the arc voltage. The coarse protection is able to handle brief peaks in the kA range. It is installed where the remote bus cable enters the building. The fine protection reduces the residual voltage which passes the coarse protection down to a value between the internal conductor and the screen of the remote bus cable which is harmless for the amplifier of the inductive coupler in the bus converter. The fine protection is fitted on the connector board AF.

Remote bus cable

Standard coaxial cable is used as the remote bus cable. This may be routed in potentially explosive atmospheres to DIN 57 165/VDE 0165, Section 5.6.1. It is also suitable for burial in the ground. The max. permissible length is 4000 m.

An in-house cable with smaller outer diameter and smaller permissible bending radius can be used indoors. The max. permissible length is 2000 m.

An increased tensile strength up to 25 000 N is possible using a cable with additional armoring. If protection against damage by rodents and mechanical damage is required, the cable with additional steel-tape armoring should be used.

Connection of remote bus cables

It may be necessary when using remote bus cables to connect sections together. The maximum available length of the in-house cable is 200 m, with all other types of cable 1000 m.

The type of connection depends on the type of cable. Standard and in-house cables are connected by splicing or by using RF plugs. The 2 other types of cable can be connected by splicing.

To provide protection against mechanical damage, the connection should be enclosed in a metal sleeve. The cable armoring can be electrically connected using a copper cable (e. g. as additional overvoltage protection) and secured to prevent tension. The sleeve is filled with sealing compound following assembly. All parts required can be obtained as a parts kit for splicing coaxial cables.

**Technical data**


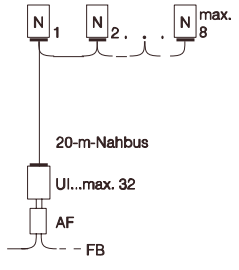
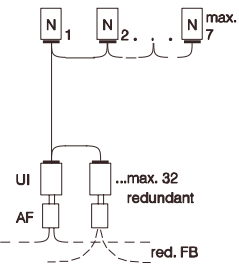
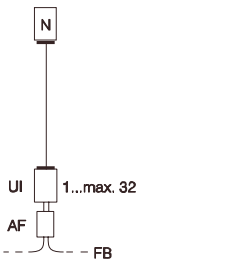
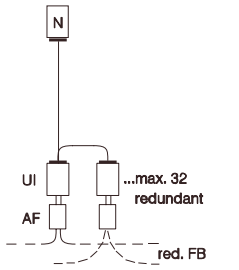
Number of participants	≤ 100, dependent on bus loading
Distance without bus coupler	Max. 4000 m
Data formats	Variable
Bus control	Distributed (token passing principle)
Data protection	Block parity
Hamming distance	$d = 4$
Noise immunity	IEC Recommendation 255-4
<u>Local bus</u>	
Number of participants	Max. 9 (bus converter UI counts as participant)
Transmission rate	250 kbit/s The transmission rate is increased to 340 kbit/s with autonomous local buses, i. e. without remote bus coupling
Data transfer rate	Up to 2800 analog values/s or up to 38400 binary values/s or a corresponding combination
Overall cable length between participant interface modules	Max. 20 m
Standard cable	12 x 2 x 0.22 m <sup>2</sup>
Signal transmission	Unbalanced
Signal level	5 V
Signal form	Unipolar
Coupling	Open collector
Redundant local bus	Standard
<u>Remote bus</u>	
Number of converters (UI)	Max. 32
Number of bus couplers	Max. 7, max. 2 between 2 communication subscribers
Transmission rate	250 kbit/s
Standard cable	2YC (mS) CY 1.6/10-75 (Z2/5) vs sw
Signal form	Bipolar current signals
Coupling	Inductive, non-reactive
Redundant remote bus	Option



# Design

## Bus configurations

### Bus configuration, examples

20-m local bus	Application	Other conditions	Cable connectors
 <p>20-m local bus</p>	<p>Small plants</p> <p>Max. 9 participants possible</p> <p>Max. 20 m bus cable</p> <p>Standard design redundant</p>	<p>Can only be used in instrumentation rooms.</p> <p>The guidelines for earthing and screening must be observed for the participants on the local bus.</p> <p>Ensure in particular that the participants have the same ground potential (equipotential bonding, 0-V island).</p> <p>Exceptions are valid for isolated local bus interface modules N-AS and N-AT.</p>	<p>N1 to N2, N2 to N3 etc.: 6DS8 201-8 . .</p> <p>Front plug on N1: 6DS9 200-8AA</p>
 <p>20-m local bus/4-km remote bus</p>	<p>Large plants</p> <p>Max. 100 participants possible</p> <p>Max. 4 km remote bus cable</p>	<p>Max. 32 bus converters UI can be used, power distribution subrack can be used for 2 bus converters UI.</p> <p>The guidelines for earthing and screening must be observed for the participants on the local bus.</p> <p>Ensure in particular that the participants have the same ground potential (equipotential bonding, 0-V island).</p> <p>Exceptions are valid for isolated local bus interface modules N-AS and N-AT.</p>	<p>N1 to UI: 6DS8 205-8 . .</p> <p>N1 to N2, N2 to N3 etc.: 6DS8 201-8 . .</p>
 <p>20-m local bus/4-km remote bus, redundant</p>	<p>Large plants</p> <p>Max. 100 participants possible</p> <p>Max. 4 km remote bus cable</p>	<p>Max. 32 bus converters UI can be used, power distribution subrack can be used for 2 bus converters UI.</p> <p>The guidelines for earthing and screening must be observed for the participants on the local bus.</p> <p>Ensure in particular that the participants have the same ground potential (equipotential bonding, 0-V island).</p> <p>Exceptions are valid for isolated local bus interface modules N-AS and N-AT.</p>	<p>N1 to U/1 and UI2: 6DS8 204-8 . .</p> <p>N1 to N2, N2 to N3 etc.: 6DS8 201-8 . .</p>
 <p>Individual participant on 4-km remote bus</p>	<p>Medium-sized plants</p> <p>Individual participant on remote bus (large distances between individual participants)</p> <p>Max. peripheral configuration of connected AS systems</p> <p>Max. 32 participants possible</p> <p>Max. 4 km remote bus cable</p>	<p>Interface module(s) for 20-m local bus and bus converter in same cabinet or subrack.</p> <p>Power distribution subrack can be used for 2 bus converters UI per cabinet.</p>	<p>N to UI: 6DS8 205-8 . .</p>
 <p>Individual participant on 4-km remote bus, redundant</p>	<p>Medium-size plants</p> <p>Individual participant on remote bus (large distances between individual participants)</p> <p>Max. peripheral configuration of connected AS systems</p> <p>Max. 32 participants possible</p> <p>Max. 4 km remote bus cable</p>	<p>Interface module(s) for 20-m local bus and bus converter in same cabinet or subrack.</p> <p>Power distribution subrack can be used for 2 bus converters UI per cabinet.</p>	<p>N to UI1 and UI2: 6DS8 204-8 . .</p>

AF Connector board "Remote bus"  
 FB Remote bus

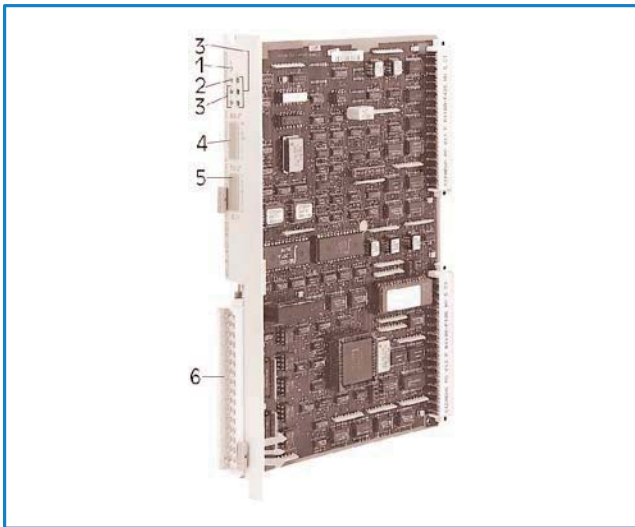
N Interface module for 20-m local bus  
 UI Inductive bus converter

# Modules and ordering data

Contents	Page
Interface modules for 20-m local bus	
N-AS	4/2
N-BK	4/3
N16-M	4/4
N-V.24	4/5
N-S5	4/7
N-AT	4/8
Bus converter UI	4/9
Connector board AF "Remote bus"	4/10
Remote bus connection unit FAE	4/11
Remote bus connection subrack S5	4/12
Bus coupler	4/13
Front plug for 20-m local bus	4/15
Cable connectors for 20-m local bus	4/15
Overvoltage protection	4/16
Remote bus cables	4/18
Connection of remote bus cables	4/19

# Interface modules for 20-m local bus (N-AS), 8 bit

## Description and ordering data



- 1 LED (yellow), signals "maintenance protocol stored"
- 2 LED (red), signals faults (line protocol faulty, receiver memory overflow)
- 3 LEDs (green)
  - D signals "Data transfer on bus"
  - M signals "Interface module has master function"
  - T signals "Bus processor busy"
  - B indicates setting of interface module on bus B
  - A indicates setting of interface module on bus A
- 4 DIP switch for function and address settings
- 5 DIP switch for function and address settings
- 6 Front plug for 20-m local bus

Fig. 4/1 Interface module N-AS for 20-m local bus, 8 bit

### Application

To connect an AS 215, AS 235, AS 235 K (6DS1 223-8AC) or AS 235 H (2 x 6DS1 223-8AA) automation system to the CS 275 bus system. The module handles all duties specifically connected with data transmission, including occasional control of data transfer.

### Design

Compact subassembly, double height, with 2 base plugs and one front plug. Front panel width 30.48 mm = 2 standard slots.

The module can be selected as desired.

### Mode of operation

#### Operational signals and fault signals

##### ■ LED W (yellow)

For maintenance staff only. It signals that diagnosis informations which occurred during operation are stored.

##### ■ LED F (red), signals the following faults:

- Line protocol faulty, e. g. faulty qualifier signal on the local bus, parity error in data byte, incorrect message format
- Receiver memory overflow, e. g. if the bus processor of the interface module does not correctly read the receiver memory.

- The bits transmitted on the 20-m local bus are returned via the receiver for checking. The fault signal occurs if the transmitted and received values differ (bit-by-bit comparison).

##### ■ LED D (green)

The receiver control unit of the interface modules signals that data transfer elements are on the bus. The brightness of the display depends on the number of transfer elements received.

##### ■ LED M (green)

Signals that the interface module has the master function.

##### ■ LEDs A and B (green)

Indicate that the interface module is set on bus A or bus B. Static light signals active bus.

##### ■ LED T (green)

Signals that the bus processor is busy. The central processor generates read and write signals. The display goes out if the central processor enters the STOP status.

### Setting of address

In order to differentiate between the individual interface modules in the autonomous bus system, each interface module must be allocated a so-called participant address. In order to differentiate between several autonomous buses connected via bus couplers, each interface module must be allocated a bus address. These two addresses are set via DIP switches on the front panel of the interface module.

Technical data	
Power supply	DC 5 V
Current consumption	1.4 A
Interfaces	Central unit bus, 8 bit Redundant 20-m local bus output, open collector, asymmetric, for connection of a cable connector with metal front plug and contact points
- Base plug - Front plug	
Weight	Approx. 0.4 kg

Ordering data	
	Order No.
<b>Interface module for 20-m local bus (N-AS), 8 bit</b>	
• for AS 215, AS 235 and AS 235 K automation systems	<b>6DS1 223-8AC</b>
• for AS 235 H automation system	<b>6DS1 223-8AA</b>

### Instructions

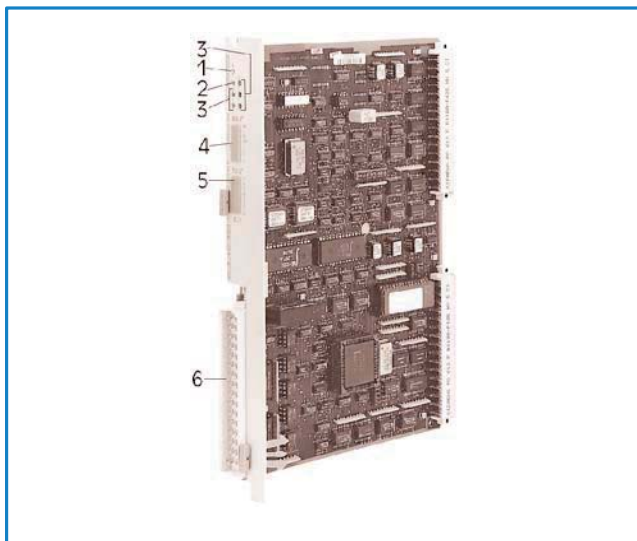
Interface module for 20-m local bus N-AS and N-BK  
 German  
 English  
 French  
 Spanish

Order No.

**C79000-B8000-C406**  
**C79000-B8076-C406**  
**C79000-B8077-C406**  
**C79000-B8078-C406**

## Interface module for 20-m local bus (N-BK)

### Description and ordering data



- 1 LED W (yellow), signals "maintenance protocol stored"
- 2 LED F (red), signals faults (line protocol faulty, receiver memory overflow)
- 3 LEDs (green)
  - D signals "Data transfer on bus"
  - M signals "Interface module has master function"
  - T signals "Bus processor busy"
  - B indicates setting of interface module on bus B
  - A indicates setting of interface module on bus A
- 4 DIP switch for function and address settings
- 5 DIP switch for function and address settings
- 6 Front plug for 20-m local bus

Fig. 4/2 Interface module for 20-m local bus (N-BK), 8 bit

### Application

The interface module N-BK is used in the remote bus/remote bus coupler.

The module handles all duties specifically connected with data transmission, including occasional control of data transfer.

### Design

Compact subassembly, double height, with 2 base plugs and one front plug.

Front panel width 30.48 mm = 2 standard slots.

The slot for the module in the subrack for the bus coupler is preset.

### Mode of operation

#### Operational signals and fault signals

##### ■ LED W (yellow)

For maintenance staff only. It signals that diagnosis informations which occurred during operation are stored.

##### ■ LED D (green)

The receiver control unit of the interface module signals that data transfer elements are on the bus. The brightness of the display depends on the number of transfer elements received.

##### ■ LED F (red) signals the following faults:

- Line protocol faulty, e. g. faulty qualifier signal on the local bus, parity error in data byte, incorrect message format
- Receiver memory overflow, e. g. if the bus processor of the interface module does not correctly read the receiver memory
- The bits transmitted on the 20-m local bus are returned via the receiver for checking. The fault signal occurs if the transmitted and received values differ (bit-by-bit comparison).

##### ■ LED M (green)

Signals that the interface module has the master function.

##### ■ LEDs A and B (green)

Indicate that the interface module is set on bus A or B. Static light signals active bus.

##### ■ LED T (green)

Signals that the bus processor is busy. The central processor generates read and write signals. The display goes out if the central processor enters the STOP status.

### Setting of address

In order to differentiate between the individual interface modules in the autonomous bus system, each interface module must be allocated a so-called participant address. In order to differentiate between several autonomous buses connected via bus couplers, each interface module must be allocated a bus address. These two addresses are set via DIP switches on the front panel of the interface module.

4

### Technical data

Power supply	DC 5 V
Current consumption	1.4 A
Interfaces	Central unit bus, 8 bit Redundant 20-m local bus output, open collector, asymmetric, for connection of a cable connector with metal front plug and contact points
- Base plug - Front plug	
Weight	Approx. 0.4 kg

### Ordering data

	Order No.
<b>Interface module for 20-m local bus (N-BK)</b> for bus coupler, 8 bit	<b>6DS1 223-8AB</b>

### Instructions

Interface module for 20-m local bus

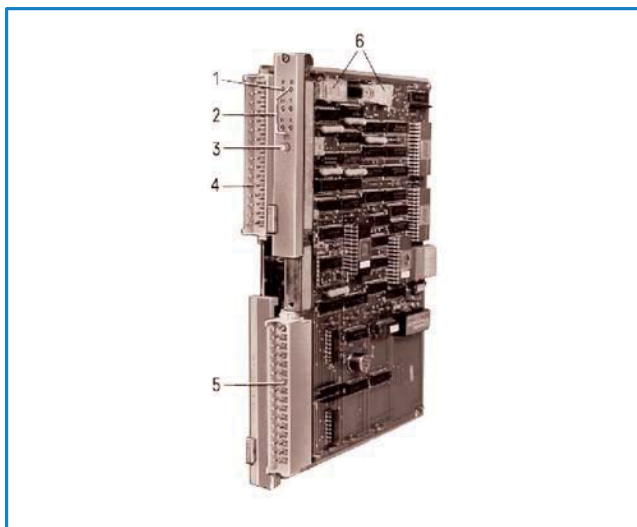
- German
- English
- French
- Spanish

Order No.

- C79000-B8000-C406**
- C79000-B8076-C406**
- C79000-B8077-C406**
- C79000-B8078-C406**

## Interface module for 20-m local bus (N16-M), 16 bit

### Description and ordering data



- 1 LED F (red), signals faults (line protocol faulty, receiver memory overflow)  
 2 LEDs (green)  
 D signals "Data transfer on bus"  
 M signals "Interface module has master function"  
 T signals "Bus processor busy"  
 B indicates setting of interface module on bus B  
 A indicates setting of interface module on bus A  
 3 DIP switch for setting the bus address and for selection of redundant/  
 non-redundant remote bus  
 4 DIP switch for setting the participant address  
 5 Front plug for 20-m local bus

Fig. 4/3 Interface module for 20-m local bus (N16-M), 16 bit

### Application

To connect the OS 265-3 operation and monitoring system and SICOMP M minicomputers to the CS 275 bus system. The SICOMP M minicomputer must be equipped with the KSN-16M coupling software to adapt bus communication. Local bus coupling (< 20 m) with other participants is only possible if these have the same earth potential. Both coupling participants must have the same earthing concept (e. g. OS 265-3 and AS 235/K/H systems). The remote bus connection unit (cf. page 4/11 must be used in all other cases and provides electrical isolation together with the bus converters UI (page 4/9).

The module handles the following duties connected with data transmission:

- Collection of parameters and processing of input/output instructions on the I/O interface channel of the SICOMP M minicomputer
- Signalling of operating statuses and faults with defined displays.

### Design

Plug-in module, triple height, with 1 base plug and 1 front plug. Front panel width 15.24 mm = 1 standard slot.

Defined slot EA 01 in the SICOMP M minicomputer.

The interface processor of the modules is an SAB 80186 chip with a 32-kbyte program memory (EPROM) and 8-kbyte data memory (RAM).

### Mode of operation

#### Handling of messages

Depending on the type and parameterization of the communication instructions, the interface module N16-M transmits and receives protected messages of various lengths up to 128 byte

via the serial bus. A message can be sent to a single bus participant, to several participants or to all participants.

Apart from certain cyclic messages, the receiver acknowledges every message received.

The transmitter is immediately informed when a message has been received without faults. In certain cases, the required data are also transmitted immediately with this feedback, thus enabling short reaction times.

The interface module N16-M stores the messages in its transmitter and receiver buffers until they are processed and transmitted and thus dynamically decouples the OS 265-3 system or the SICOMP M minicomputer from the data transfer on the bus during times of peak loading. To reduce the time required for organizational tasks, the interface module collects several messages over a specific period and combines these into a package. This is not the case if short reaction times are required.

In addition to the data messages, the interface module also generates and processes organizational messages together with the other interface modules on the CS 275 bus system. These are required, for example, to transfer the master function, for routing information, redundancy tests, monitoring and signalling information.

#### Time synchronization

The interface module receives time messages and routes these on to the OS 265-3 system or SICOMP M minicomputer. In the opposite direction, it can also receive the time from the OS 265-3 system or SICOMP M minicomputer and transmit it on the bus in order to synchronize the participants.

#### Diagnostic functions

The interface module detects and signals static and dynamic faults and any states which could be critical for the bus loading. It monitors the processes on the bus, on the interfaces to the user system and in the interface module itself.

During operation, cyclically triggered test programs carry out an extensive hardware test of the interface module. Faults are therefore early detected and malfunctions and cumulative faults are thus prevented. External bus diagnosis via the coupling software is also possible. The interface module provides a diagnostic list with 23 positions which can be read for this purpose.

#### Technical data

Power supply	+ 5 V - 12 V
Current consumption	2.8 A 0.05 A
With + 5 V	
With - 12 V	
Interfaces	SICOMP M I/O interface channel
- Base plug	Redundant 20-m local bus input/output,
- Front plug	open collector, asymmetric,
	for connection of a cable connector
	with metal front plug and contact points
Weight	Approx. 0.55 kg

#### Ordering data

	Order No.
Interface module for 20-m local bus (N16-M), 16 bit	6DS1 205-8AA

#### Instructions

Interface module for 20-m local bus (N16-M),

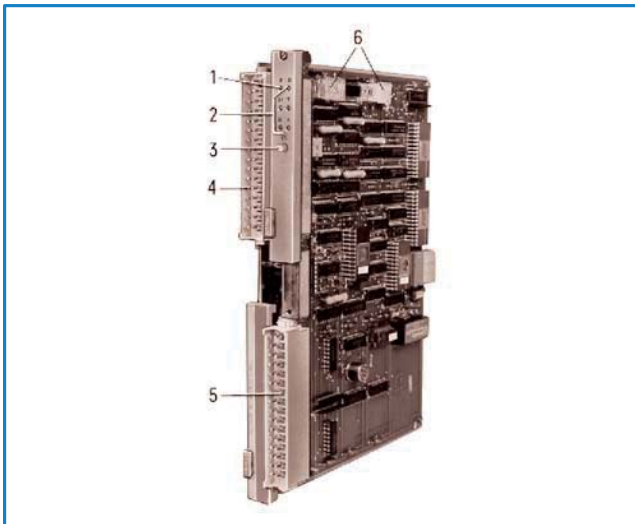
German  
 English  
 French  
 Spanish

Order No.

C79000-B8000-C128  
 C79000-B8076-C128  
 C79000-B8077-C128  
 C79000-B8078-C128

## Interface module for 20-m local bus (N-V.24)

### Description



- 1 LED F (red), signals faults (line protocol faulty, receiver memory overflow)  
 2 LEDs (green)  
 D signals "Data transfer on bus"  
 M signals "Interface module has master function"  
 T signals "Bus processor busy"  
 B indicates setting of interface module on bus B  
 A indicates setting of interface module on bus A  
 3 Reset key RS  
 4 Front plug X3 for connection of a non-Siemens computer via V.24 or 20-mA current loop interface  
 5 Front plug X4 for connection to the 20-m local bus  
 6 Jumpers for function and address settings

Fig. 4/4 Interface module for 20-m local bus (N-V.24)

voltage +5 V is loaded with 2.4 A per N-V. 24 module thereby. The number of useable interface modules N-V.24 is therefore restricted.

Possible plug-in slots:

Slot for I/O module

- In the AS 235 automation system (max. 2 modules N-V.24 per system (basic unit or extension unit))
- In the AS 235 K automation system (max. 2 modules N-V.24 per system (basic unit))
- In the AS 235 H automation system (max. 1 module N-V.24 per extension unit with 5-V module.)

Use of the N-V.24 interface module in the ES 100 K extension system or in the AS 215 automation system is not allowed.

Interfaces for non-Siemens computer  
(alternatively at front plug X3)

#### ■ V.24 interface

T x D	Transmitted data
	Information is sent to the peripheral device via this line
R x D	Received data
	Information is transferred to the system via this line
DSR	Data set ready
	Input for "data set ready" message from data circuit terminating equipment
CTS	Clear to send
	Input for "clear to send" message from data circuit terminating equipment
DTR	Data terminal ready
	Output for operating status message of N-V.24 module
RTS	Request to send
	Output signal, switches the transmitter unit of the data circuit terminating equipment
I1,I2	Internal constant-current sources

#### ■ 20-mA current loop interface

R x D	Received data
	+ 20 mA: input, - 20 mA: output
T x D	Transmitted data
	+ 20 mA: input, - 20 mA: output

### Application

For connection of non-Siemens computers to the CS 275 bus system via a V.24 or 20-mA current loop interface.

The external computer must have a V.24 or 20-mA current loop interface. Coupling software is required in the external computer to handle communication with the interface module N-V.24.

The data transmission rate can be adapted to the requirements between 110 bit/s and 9600 bit/s; for example, 120 measured values/s can be transmitted at a data transfer rate of 9600 bit/s via the serial interface.

The module handles duties specifically connected with data transmission, including occasional control of data transfer.

### Design

Compact subassembly, double height, with 1 base plug and 2 front plugs

Front panel width 30.48 mm = 2 standard slots.

The N-V.24 interface module is plugged into an I/O slot. It does not receive its supply voltage via L+ (DC 24 V) but via the supply voltage +5 V of the I/O bus for the logic. The logic supply

### Mode of operation

Communication between TELEPERM M systems and non-Siemens computers

Data transfer between TELEPERM M systems and a non-Siemens computer via the CS 275 bus system is carried out using the same messages which are used for communication between TELEPERM M systems. The defined types of order (format, coding, acknowledgement mode) and the function of the hardware interface (N-V.24) are described in the Instructions for the interface module N-V.24 and in the Manual "N-V.24, Coupling of non-Siemens computers to the CS 275 Bus System".

Coupling software must be installed in the external computer which matches the computer to the communication conditions of the N-V.24 interface.

#### Setting of address

In order to differentiate between the individual interface modules in the autonomous bus system, each interface module must be allocated a so-called participant address. In order to differentiate between several autonomous buses connected via bus couplers, each interface module must be allocated a bus address. These two addresses are set using plug-in jumpers on the front panel of the interface module.

# Interface module for 20-m local bus (N-V.24)

## Technical data and ordering data

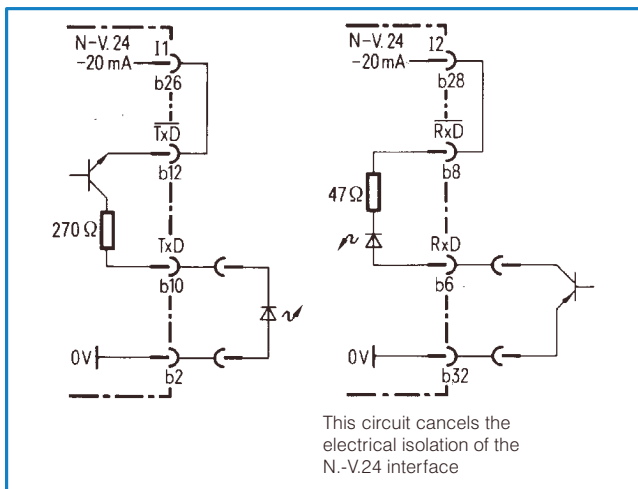


Fig. 4/5 20-mA current loop interface with internal constant-current source for transmitter (left) and receiver (right), connection example

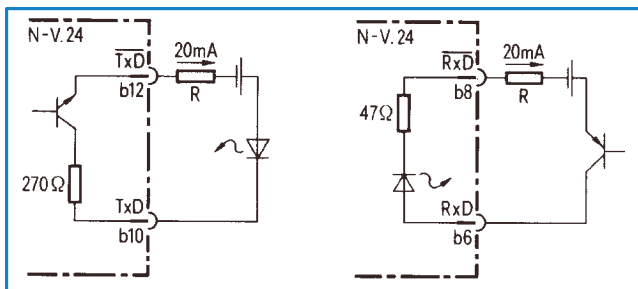


Fig. 4/6 20-mA current loop interface with external current loop for transmitter (left) and receiver (right), connection example

## Ordering data

### Interface module for 20-m local bus (N-V.24) with V.24 or 20-mA current loop interface

- with parts kit for front plug and installation instructions in German
- Without parts kit for front plug

### Parts kit for front plug for interface module 6DS1 202-8AB with installation instructions in German

### KSN-PC coupling software for SICOMP industry-standard PC or PG 750/PG 770 programmer

Order No.
6DS1 202-1AB
6DS1 202-8AB
C79458-L437-D1
See Catalog PLT 150

## Instructions

Interface module for 20-m local bus, V.24- or 20-mA current loop interface

- German
- English
- French
- Spanish

Order No.

- C79000-B8000-C3
- C79000-B8076-C3
- C79000-B8077-C3
- C79000-B8078-C3

## Manuals

N-V.24: Coupling of non-Siemens computers to the CS 275 bus system

- German
- English

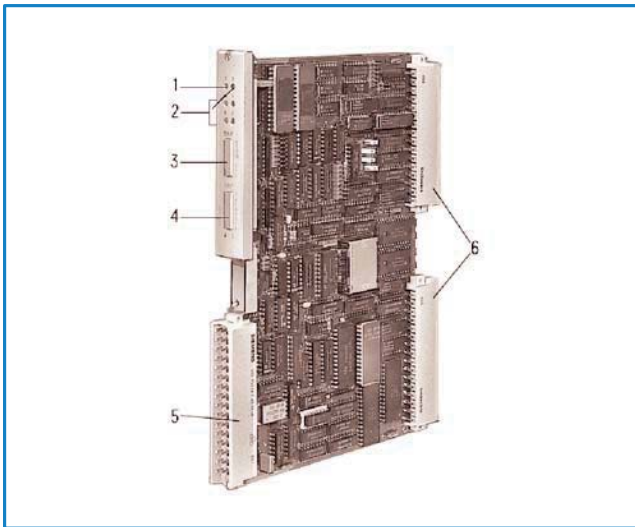
- C79000-G8000-C87
- C79000-G8076-C87

4

Technical data		
Power supply	DC 5 V	
Current consumption	2.4 A	
Interfaces	5-V power supply Serial V.24 or 20-mA current loop interface for distances up to 15 or 1000m respectively, 4-wire system	
- Base plug	Redundant 20-m local bus output, open collector, asymmetric, for connection of a cable connector with metal front plug and contact parts	
- Front plug X3		
- Front plug X4		
Weight	Approx. 0.75 kg	
	20-m local bus	V.24- or 20-mA interface
Transmission rate	340 kbit/s (autonomous) 250 kbit/s (remote bus connection via inductive converter)	110 bit/s to 9600 bit/s, can be set on module
Data protection	Horizontal parity ( $d = 4$ )	Longitudinal parity ( $d = 2$ )
Operating mode	Half-duplex	Half-duplex, contention mode
Character frame	Bus transfer element	8 bit, code-transparent
Authorization for data transmission	Token passing principle	DIN 66 020 (V.24)

## Interface module for 20-m local bus (N-S5)

### Description and ordering data



- 1 LED F (red), signals faults (line protocol faulty, receiver memory overflow)
- 2 LEDs (green)
  - D signals "Data transfer on bus"
  - M signals "Interface module has master function"
  - T signals "Bus processor busy"
  - B indicates setting of interface module on bus B
  - A indicates setting of interface module on bus A
- 3 DIP switch for function and address settings
- 4 DIP switch for function and address settings
- 5 Front plug for 20-m local bus
- 6 Base plug for connection to SIMATIC S5 bus

Fig. 4/7 Interface module for 20-m local bus (N-S5)

### Application

The module is used to connect a SIMATIC S5-155U programmable controller (CPU 946/947 or CPU 948) to the CS 275 bus system.

The KSN-S55 coupling software must be installed in the programmable controller. It enables the controller to be matched to the requirements of bus communication.

The module handles duties specifically connected with data transmission, including occasional control of data transfer.

### Design

Compact subassembly, double height, with 2 base plugs and 1 front plug.

Front panel width 20.32 mm = 1 1/3 standard slots.

Possible plug-in slots:

- Central unit 155U (CPU 946/947), slots 35, 43, 75, 83 and 107 to 131
- Central unit 155U (CPU 948), slots 19, 35, 51 and 67 to 131.

### Mode of operation

Data received via the CS 275 bus system pass through the line protocol controller of the bus interface logic in bit-serial mode and are placed into intermediate storage. The microprocessor reads the data byte-by-byte and stores them in the buffer memory of the module. Up to 70 complete messages can be stored in the buffer memory.

As soon as sufficient space is available in the dual-port RAM for a complete message, this is entered into the receiver order list of the dual-port RAM. Transmit messages are transferred from the function blocks of the KSN-S55 coupling software to the dual-port RAM system interface and entered into the transmitter order list.

### Setting of address

In order to differentiate between the individual interface modules in the autonomous bus system, each interface module must be allocated a so-called participant address. In order to differentiate between several autonomous buses connected via bus couplers, each interface module must be allocated a bus address. These two addresses are set via DIP switches on the front panel of the interface module.

### Technical data

Power supply	DC 5 V
Current consumption	1.8 A
Interfaces	Central unit of SIMATIC S5-155U programmable controller Redundant 20-m local bus output, open collector, asymmetric, for connection of a cable connector with metal front plug and contact points
- Base plug	
- Front plug	
Weight	Approx. 0.5 kg

### Ordering data

	Order No.
<b>Interface module for 20-m local bus (N-S5), 8 bit</b>	<b>6DS1 206-8AA</b>
<b>KSN-S55 coupling software</b>	See Catalog PLT 150

### Instructions

Interface module for 20-m local bus (N-S5)

German  
English  
French  
Spanish

Order No.

**C79000-B8000-C181**  
**C79000-B8076-C181**  
**C79000-B8077-C181**  
**C79000-B8078-C181**



# Interface module for 20-m local bus (N-AT)

## Description and ordering data



Fig. 4/8 Interface module for 20-m local bus (N-AT)

### Technical data

Power supply	DC 5 V/DC 12 V via AT bus
Current consumption	Approx. 1.8 A (DC 5 V)
Interfaces	AT bus of respective device
- AT plug	Redundant 20-m local bus output, open collector, asymmetric, for connection of a cable connector with metal front plug
- Front plug	
Weight	Approx. 0.7 kg

### Application

The module is used to connect the following systems/devices to the CS 275 bus system:

- OS 520 operation and monitoring system
- SICOMP industry-standard PC
- HP 9000/7xx workstation
- AT-compatible personal computer.

For adaptation to the bus communication, a coupling software must be installed in these devices (except of OS 520 system). The interface module N-AT handles duties specifically connected with data transmission, including occasional control of data transfer.

### Design

Plug-in card in long AT format with one plug on the front panel.

Slot: extension slot in AT format in the above-mentioned devices.

The interface module N-AT contains:

- An SAB 80 188 microprocessor for controlling and monitoring all functions
- A dual-port RAM system interface to the AT bus with associated control logic
- An interface to the 20-m local bus with bus interface logic.

### Mode of operation

Data received via the CS 275 bus system pass through the line protocol controller of the bus interface logic in bit-serial mode and are placed into intermediate storage. The microprocessor reads the data byte-by-byte and stores them in the buffer memory of the module.

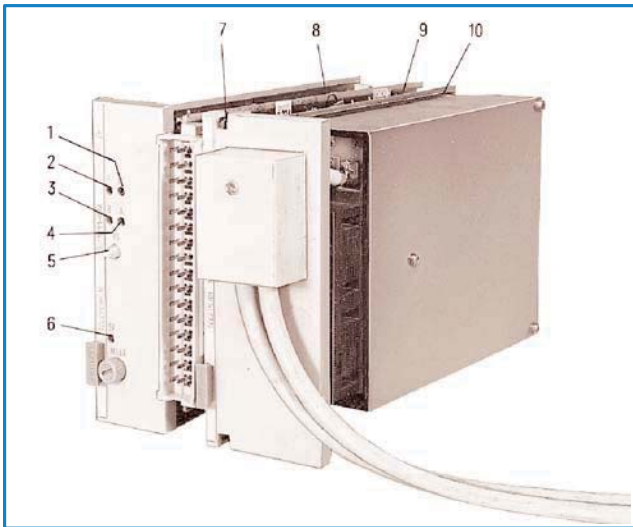
As soon as sufficient space is available in the dual-port RAM for a complete message, this is entered into the receiver order list of the dual-port RAM. Transmit messages are transferred from the coupling software to the dual-port RAM system interface and entered into the transmitter order list.

### Ordering data

		Order No.			
<b>Coupling package (hardware) to couple AT-compatible personal computers to the CS 275 bus system,</b> comprising					
- Interface module for 20-m local bus 6DS1 222-8AB for AT-compatible personal computers					
- Cable connector for 20-m local bus 6DS8 208-8KC with 1 ES 902 plug and 1 Cannon plug, 2.5 m long					
- Instructions for the interface module					
<ul style="list-style-type: none"> <li>• with German documentation</li> <li>• with English documentation</li> </ul>		<b>6DS1 222-1AB10</b> <b>6DS1 222-1AB20</b>			
<b>Cable connectors</b> for bus participants with N-AT interface module for 20-m local bus					
<ul style="list-style-type: none"> <li>• Cable connector for 20-m local bus with 3 plugs ES 902 and 1 Cannon plug to connect a remote bus connection unit with 2 UI bus converters and a connection distributor</li> <li>• Cable connector for 20-m local bus with 1 Cannon plug and one free cable end (for soldering on)</li> <li>• Cable connector for 20-m local bus with 3 Cannon plugs to connect a bus participant with N-AT interface module to another bus participant with N-AT interface module</li> </ul>					
1.5 m	<b>EC</b>	3 m	<b>MC</b>	4 m	<b>QC</b>
1.8 m	<b>GC</b>	3.3 m	<b>NC</b>	4.5 m	<b>RC</b>
2.2 m	<b>JC</b>	3.6 m	<b>PC</b>	5 m	<b>SC</b>
<b>Coupling software</b>					
<ul style="list-style-type: none"> <li>• For PC with MS-DOS and MS-Windows: <u>WIN TM</u></li> <li>• For HP 9000/7xx workstation with RTAP/Plus under UNIX: <u>CS 275-Scantask</u></li> </ul>		See Catalog PLT 150			

# Bus converter unit UI

## Description and ordering data



- 1 LED ET (green), flashes in rhythm with the messages received from the remote bus
- 2 LED F (red), signals faults (line protocol faulty, transfer element format faulty)
- 3 LED B (green), indicates setting of module on bus B
- 4 LED A (green), indicates setting of module on bus A
- 5 Reset key RS
- 6 LED SV (green), signals the presence of all operating voltages
- 7 Coding jumper
- 8 Power supply unit
- 9 Bus interface
- 10 Inductive coupler

Fig. 4/9 Bus converter 6DS4 400-8AB

### Application

To convert signals from a 20-m local bus to a 4-km remote bus. Signal coupling-in and coupling-out inductive and without feedback.

### Design

The bus converter consists of 3 single-height modules.

Front panel width:

- Power supply unit 30.48 mm = 2 standard slots
- Bus interface 15.24 mm = 1 standard slot
- Inductive coupler 45.72 mm = 3 standard slots

The bus interface module has a 20-m local bus interface and constitutes the input of the bus converter. The inductive coupler module has 2 lengths of coaxial cable fixed to the front panel. These are screwed onto the connector board AF (page 4/10) and form the connection to the remote bus cable.

Possible plug-in locations:

- AS 235 K automation system, basic unit
- AS 235 automation system, power distribution subrack in the basic cabinet
- AS 235 H automation system, power distribution subrack in the basic cabinet
- Remote bus connection unit (e. g. for OS 520 and OS 265-3 desk-top units)
- Remote bus connection subrack (e. g. for SIMATIC S5-155 U, SICOMP industry-standard PC or OS 265-3 rack-type version)
- Bus coupler (BK-FF).

<sup>1)</sup> Redundant 24 V supply only when a remote bus connection subrack 6DS4 426-8AA is used

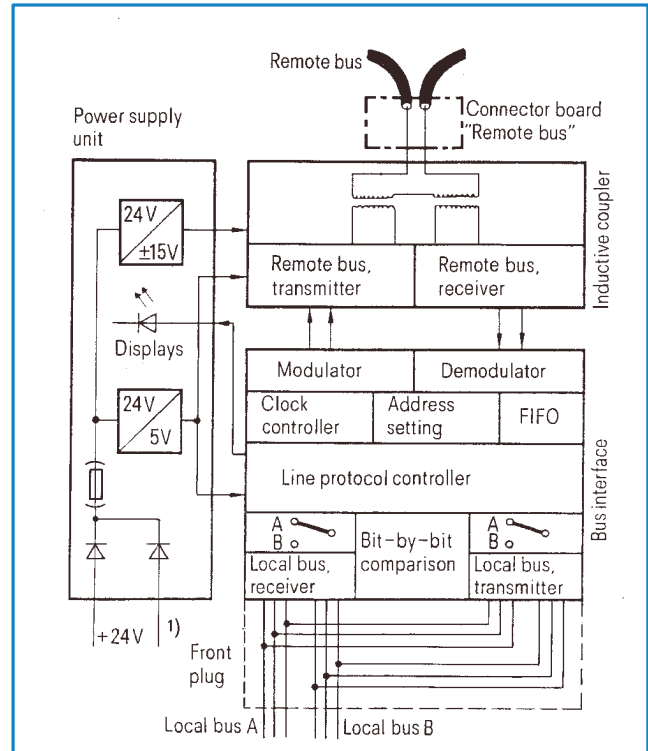


Fig. 4/10 Bus converter, function diagram

4

Technical data	
Power supply	DC 24 V (20 to 33 V)
Current consumption	450 mA
Module fuse	1.6 A medium-slow
Interfaces	
- Local bus	TTL level, open collector, asymmetric, redundant
- Remote bus	Biphase signals (levels approx. ± 1 V)
Signal coupling-in	inductive, reaction-free
Weight	Approx. 1.18 kg

Ordering data	
	Order No.
<b>Bus converter (UI),</b> consisting of power supply unit, bus interface and inductive coupler	<b>6DS4 400-8AB</b>

### Instructions

Bus converter, inductive  
 German  
 English  
 French  
 Spanish

Order No  
**C79000-B8000-C4**  
**C79000-B8076-C4**  
**C79000-B8077-C4**  
**C79000-B8078-C4**

## Connector board AF

### Description and ordering data

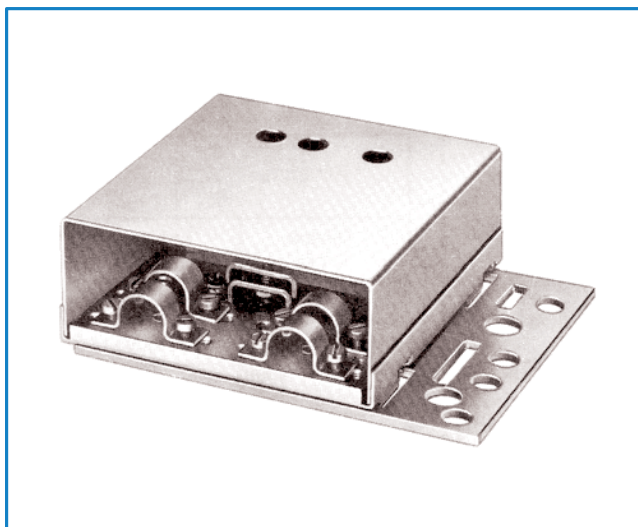


Fig. 4/11 Connector board AF "Remote bus" 6DS9 203-8DA, with mounting plate



Fig. 4/12 Connector board AF "Remote bus" 6DS9 203-8CA, without mounting plate

4

### Application

To convert the remote bus coaxial cable to the two lengths of coaxial cable fixed in the bus converter UI and to convert the standard remote bus cable and the remote bus cable for special applications to thin remote bus cable (Inhouse cable). To terminate the remote bus coaxial cable with the characteristic impedance. For uninterruptible switching on and off of remote bus participants.

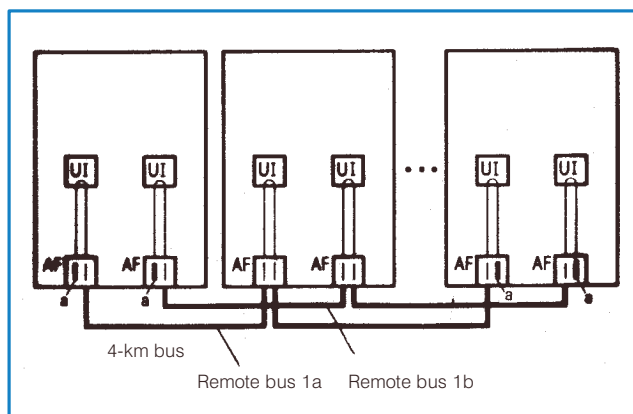
The connector board AF with mounting plate is provided for the AS 235 and AS 235 H automation systems which are installed in standard cabinets, the OS 265-3 operation and monitoring system (rack version), the bus coupler and the SIMATIC S5-155U programmable controller.

The connector board AF without mounting plate is provided for the AS 235 K automation system and for the remote bus connection unit (page 4/11).

For applications in critical environments (EMC), the connector board AF can be retrofitted with an overvoltage fine protection device.

Possible locations:

- AS 235, AS 235 H, OS 265-3 systems and SIMATIC S5: On the front right-hand cabinet member, up to 2 connector boards can be mounted on 1 cabinet member
- AS 235 K system: In the subrack on the left of the power supply assembly
- Remote bus connection unit: In the subrack.



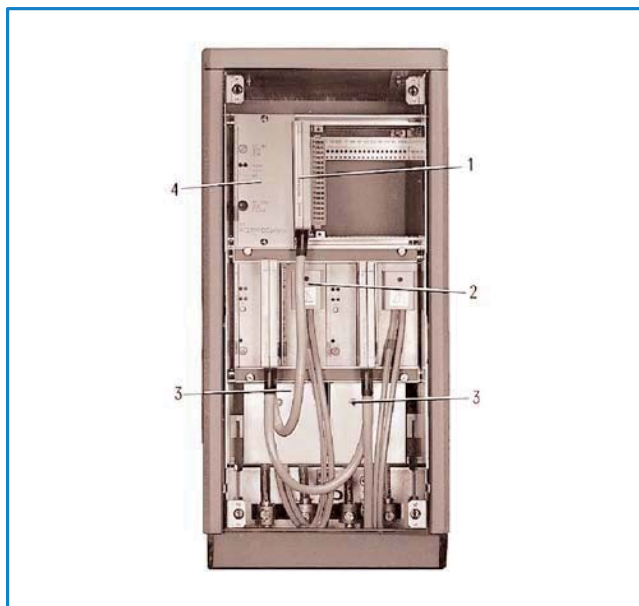
- a Terminating resistor F (activated by jumper)
- AF Connector board
- UI Bus converter

Fig. 4/13 Redundant remote bus with terminating resistors

### Ordering data

	Order No.
<b>Connector board AF "Remote bus"</b> with terminating resistor F	
• Without mounting plate	<b>6DS9 203-8CA</b>
• With mounting plate, for rack-mounted systems	<b>6DS9 203-8DA</b>
<b>Overvoltage fine protection</b> , can be retrofitted (see page 4/16)	<b>6DS9 210-8AA</b>

## Remote bus connection unit FAE



- 1 Connection distributor for 20-m local bus, 6DS9 207-8AA; for commissioning and servicing, can be retrofitted
- 2 Bus converter 6DS4 400-8AB
- 3 Connector board AF "Remote bus" 6DS9 203-8CA
- 4 Power supply module

Fig. 4/14 Remote bus connection unit, redundant design; front door removed

### Application

The remote bus connection unit connects desk-top systems, as e. g. the OS 265-3 operation and monitoring system or SICOMP industry-standard PC to a redundant or non-redundant remote bus. Electrical isolation between the local and the remote buses is achieved at the same time. Non-redundant AC 230 V power supply.

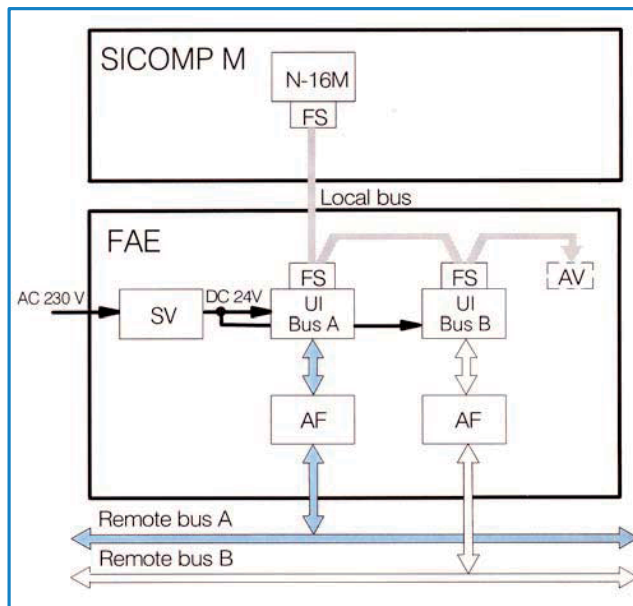
### Design

The remote bus connection unit consists of a housing for floor or wall mounting, 2 single-height subracks, a mounting rail, mains filter and power supply module for AC 50 Hz 230 V.

It provides space for the 2 bus converters (cf. page 4/9) required to convert the 20-m local bus interface to the remote bus interface. The connector boards AF for converting the cable cross-section (cf. page 4/10) are also fitted into the remote bus connection unit. One connector board is required for each bus converter.

The remote bus connection unit can be fitted with a connection distributor for 20-m local bus for commissioning and servicing. This is an open local bus interface for intermediate connection of e. g. a SICOMP industry-standard PC with PROGRAF AS/OS program package for central configuring.

The remote bus connection unit is connected to the interface module for 20-m local bus fitted in the system to be connected via a cable connector.



- AF Connector board "Remote bus" for converting the cable cross-section
- AV Connection distributor for 20-m local bus
- FS Front plug for 20-m local bus
- SV Power supply unit of bus converter
- UI Bus interface and inductive coupler of bus converter

Fig. 4/15 Remote bus connection unit, function diagram

Technical data	
Power supply	AC 50/60 Hz 230 V + 6 %/-10 %
Power consumption	Approx. 20 VA (with 2 bus converters UI)
Permissible ambient temperature	
- Operation	0 to + 40 °C
- Transport and storage	- 40 to + 70 °C
Degree of protection to DIN 40 050	IP 20
Dimensions (h x d)	500 mm x 236 mm x 313 mm
Weight	Approx. 13.5 kg (without bus converters and connector boards)

Ordering data	
	Order No.
<b>Remote bus connection unit</b> (basic unit) with slots for 2 bus converter units UI	<b>6DS4 425-8AA</b>
Options to be ordered in addition, twice in the case of a redundant bus connection:	
<b>Bus converter UI</b>	<b>6DS4 400-8AB</b>
<b>Connector board AF "Remote bus"</b>	<b>6DS9 203-8CA</b>
<b>Oversvoltage fine protection</b> , can be retrofitted	<b>6DS9 210-8AA</b>
<b>Connection distributor for 20-m local bus</b> for commissioning and servicing	<b>6DS9 207-8AA</b>
<b>Cable connector</b> with 1 plug, 0.3 m long for connection distributor for 20-m local bus	<b>6DS8 201-8MB</b>

### Instructions

Remote bus connection unit (FAE)

- German
- English
- French
- Spanish

Order No.

- C79000-B8000-C127**
- C79000-B8076-C127**
- C79000-B8077-C127**
- C79000-B8078-C127**

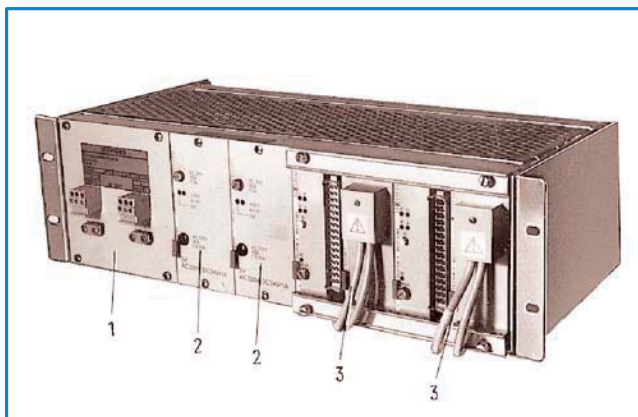
Bus converter unit, inductive

- German
- English
- French
- Spanish

- C79000-B8000-C4**
- C79000-B8076-C4**
- C79000-B8077-C4**
- C79000-B8078-C4**

# Remote bus connection subrack S5

## Description and ordering data



- 1 Mains terminals AC 230 V
- 2 Power supply modules
- 3 Bus converters UI 6DS4 400-8AB

Fig. 4/16 Remote bus connection subrack S5 6DS4 426-8CA

### Application

The remote bus connection subrack S5 connects rack-mounted systems, especially SIMATIC S5-155U programmable controllers, to a redundant or non-redundant remote bus. Electrical isolation between the local and remote buses is achieved at the same time.

Non-redundant or redundant DC 24 V or AC 230 V power supply is possible.

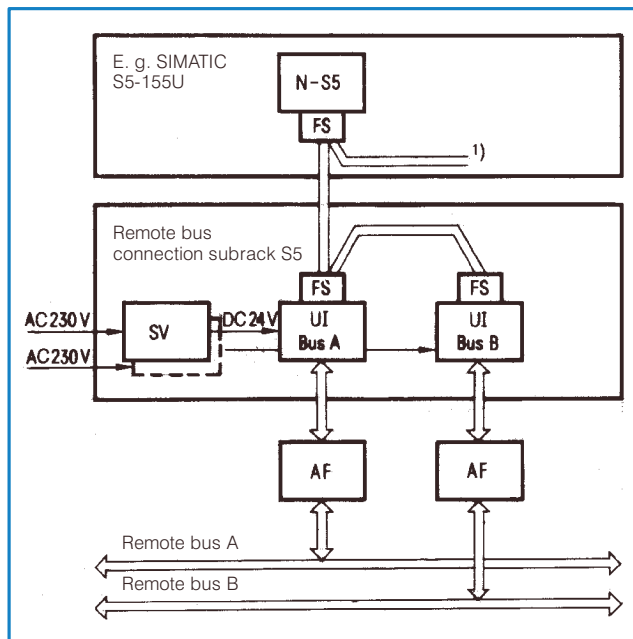
Note: The remote bus connection subrack is not used in the basic cabinets of the AS 235 and AS 235 H automation systems and in the OS 265-3 operation and monitoring system (rack version) for DC 24 V.

### Design

Single-tier 19-inch subrack with 2 slots for bus converter units UI, optionally with power supply module(s).

The power supply in the case of DV 24 V is from the cabinet supply of the programmable controller, in the case of AC 230 V via the power supply module C79451-A3276-A1 (redundant as option).

Technical data	
Power supply - 6DS4 426-8AA	DC 24 V (20 to 33 V) permissible ripple ≤ 15 %
- 6DS4 426-8BA and 6DS4 426-8CA	AC 50 Hz/60 Hz 230 V + 6 % / -10 %
Power consumption	Approx. 20 VA with 2 bus converter units
Permissible ambient temperature	
- Operation	0 to + 40 °C
- Transport and storage	- 40 to + 70 °C
Degree of protection to DIN 40 050	IP 00
Protection class (6DS4 426-8BA and 6DS4 426-8CA)	I
Dimensions (h x w x d)	134 mm x 485 mm x 260 mm
Weight	
- Subrack (empty)	Approx. 4.5 kg
- Power supply module	Approx. 1.5 kg
- Bus converter unit	Approx. 1.2 kg



- AF Connector board "Remote bus" for converting the cable cross-section
- FS Front plug for 20-m local bus
- SV Power supply unit of bus converter
- UI Bus interface and inductive coupler of bus converter

Fig. 4/17 Remote bus connection subrack S5 6DS4 426-8CA, function diagram

## Ordering data

	Order No.
<b>Remote bus connection subrack S5</b> with slots for 2 bus converters UI	
• For connection to DC 24 V, non-redundant or redundant	<b>6DS4 426-8AA</b>
• With 1 power supply module for AC 230 V for non-redundant supply to 1 or 2 bus converters UI	<b>6DS4 426-8BA</b>
• With 2 power supply modules for AC 230 V for redundant supply to 2 bus converters UI	<b>6DS4 426-8CA</b>
The following are required in addition for a remote bus connection:	
<b>Bus converter UI</b>	<b>6DS4 400-8AB</b>
<b>Connector board AF "Remote bus"</b> with mounting plate	<b>6DS9 203-8DA</b>
<b>Overtoltage fine protection</b> , can be retrofitted	<b>6DS9 210-8AA</b>

### Instructions

Remote bus connection subrack S5

- German
- English
- French
- Spanish

Bus converter, inductive

- German
- English
- French
- Spanish

Order No.

- C79000-B8000-C251**
- C79000-B8076-C251**
- C79000-B8077-C251**
- C79000-B8078-C251**

- C79000-B8000-C4**
- C79000-B8076-C4**
- C79000-B8077-C4**
- C79000-B8078-C4**

**Description**

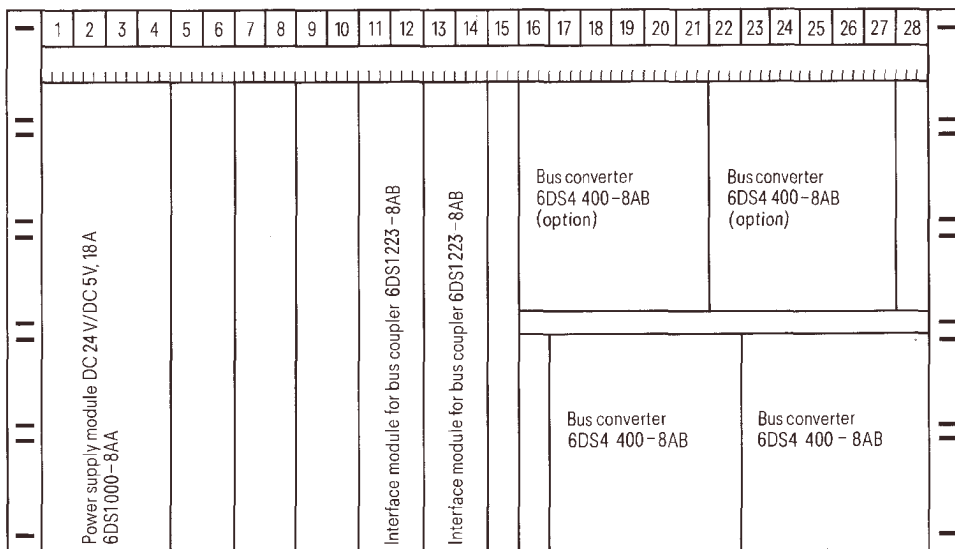


Fig. 4/18 Bus coupler (BK-FF), subrack configuration

**Application**

Bus couplers are used for data transfer between participants on independent remote buses (BK-FF). They enable decoupling of the data transfer on the buses as well as distances between two participants up to 3 x 4 km.

The bus line can be single or redundant. Bus couplers can also be used in parallel to increase the transmission performance. A maximum of two bus couplers may be connected in series between two participants which exchange information.

Parallel bus couplers

If the coupling capacity of a bus coupler is not sufficient, the transmission performance can be increased by approx. 100% by using a second bus coupler. This parallel connection of bus couplers leads to limitations in performance if one of them fails (this is not a redundant connection).

Redundant bus couplers

If the coupling capacity of a bus coupler is sufficient, a redundant system can be produced using a second bus coupler. In this case, the second bus coupler automatically takes over the coupling function if the first bus coupler fails.

**Design**

- 2 interface modules for bus coupler (N-BK),
- power supply module and
- 2 or 4 bus converters UI for remote bus coupling (BK-FF) depending on whether the remote buses are of single or redundant design.

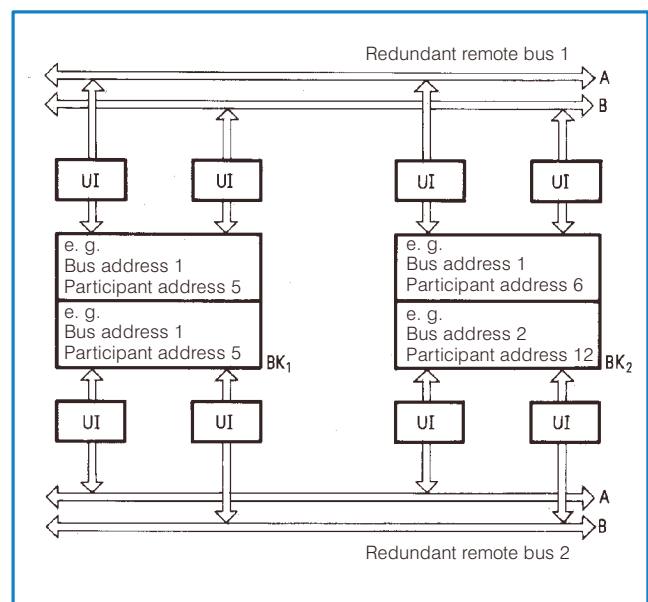
All these modules are fitted in a double-height subrack. This is completely wired and equipped with all necessary plugs and guide rails.

**Mode of operation**

A bus coupler acts like any other participant on the bus. It has an address on every bus. A participant on bus 1 sends a message to a participant on bus 2 by first addressing the bus coupler. This stores the message briefly independent of the current message transfer on bus 2 and acknowledges receipt to the transmitting participant.

The bus coupler transmits the message on bus 2 if it becomes the master on this bus. The participant to which the message is addressed accepts the message and acknowledges receipt to the bus coupler.

4

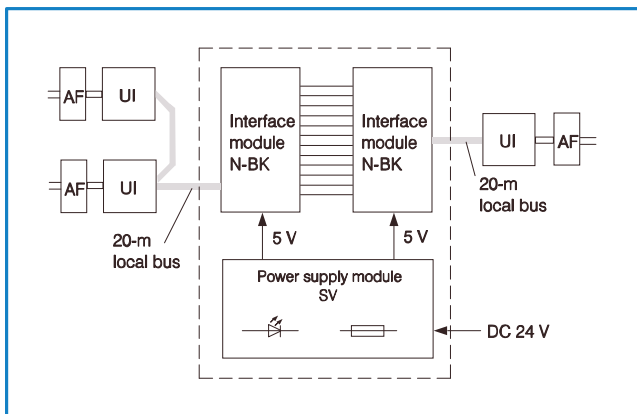


BK Bus coupler  
UI Bus converter

Fig. 4/19 Parallel bus couplers, e. g. between redundant remote buses

# Bus coupler

## Technical data and ordering data



AF Connector board "Remote bus"  
 UI Bus converter

Fig. 4/20 Bus coupler BK-FF, function diagram

The DC 5-V supply required to operate the interface module for bus coupler (N-BK) is obtained from the 24-V supply by a switching controller on the power supply module 6DS1 000-8AA.

The bus coupler subracks can be fitted either in their own cabinets or in the cabinet of an AS automation system depending on the type of remote bus coupling.

4

Technical data	
<u>Power supply module</u>	
Power supply	DC 24 V
Current consumption	1 A
<u>Bus converter unit UI</u>	
Power supply	DC 24 V
Current consumption	450 mA
Fuse	1.6 A medium-slow
<u>Interface</u>	
Remote bus	Biphase signals, level approx. $\pm 1$ V

## Ordering data

	Order No.
<b>Bus coupler</b> , consisting of	
<b>Subrack</b> provided for bus couplers for remote bus coupling (BK-FF)	6DS9 003-8CA
<b>Power supply module</b> DC 24 V/DC 5 V, 18 A	6DS1 000-8AA
<b>Interface module N-BK for bus couplers</b> , 8 bit	6DS1 223-8AB
<b>Bus converter UI</b> , required for remote bus coupling (2 off required for single remote buses, 4 off for redundant remote buses)	6DS4 400-8AB
<b>Connector board AF "Remote bus"</b> with terminating resistor F and with mounting plate, for rack-mounted systems; 1 connector board is required per bus converter unit UI if not already installed in the cabinet	6DS9 203-8DA
<b>Overvoltage fine protection</b> , can be retrofitted (see page 4/16)	6DS9 210-8AA
<b>Cable connector for 20-m local bus</b> with 3 plugs for connecting the interface modules (N-BK) to the bus converters UI (2 off required for BK-FF)	6DS8 204-8MB
<b>Cable set for power supply</b> to connect the bus coupler subrack to the power distribution subrack DC 24 V mounted in cabinet 1	
• Bus coupler subrack in cabinet 1 Tier A (height module U 2 to 7)	6DS9 908-8AA
Tier B (height module U 10 to 15)	6DS9 908-8AB
Tier C (height module U 18 to 23)	6DS9 908-8AC
Tier D (height module U 26 to 31)	6DS9 908-8AD
• Bus coupler subrack in cabinet 2 Tier A (height module U 2 to 7)	6DS9 908-8AE
Tier B (height module U 10 to 15)	6DS9 908-8AF
Tier C (height module U 18 to 23)	6DS9 908-8AG
Tier D (height module U 26 to 31)	6DS9 908-8AH

## Instructions

Bus coupler units  
 German  
 English  
 French  
 Spanish

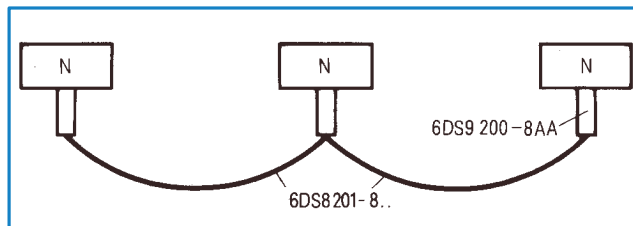
C79000-B8000-C5  
 C79000-B8076-C5  
 C79000-B8077-C5  
 C79000-B8078-C5

## Front plug for 20-m local bus

### Description and ordering data



Fig. 4/21 Front plug 6DS9 200-8AA (ES 902 plug)



N Interface module for 20-m local bus or converter unit UI

Fig. 4/22 Local bus coupling, connection of last participant

### Design

Metal front plug with 2 cable inlets and contact points. The contact points must be used to connect the plug with a low inductance to the subrack.

### Application

To connect a cable connector to the last bus participant. The front plug is only required for cable connectors 6DS8 201-8... It is already part of the cable connectors 6DS8 204-8.. and 6DS8 205-8..

### Ordering data

	Order No.
Front plug with contact points	<b>6DS9 200-8AA</b>

## Cable connectors for 20-m local bus

# 4

### Application and ordering data

### Application

To connect the interface modules for 20-m local bus to one another and to the bus converter UI. A front plug is required for the last participant on the local bus when using the cable 6DS8 201-8..

Ordering data							Order No.
<b>Cable connector for 20-m local bus</b>							
Cable connector From	To	Plug 1	Plug 2	Plug 3	Cable	Possible cable length	
Interface module for 20-m local bus, <i>n</i> th participant	Interface module for 20-m local bus, ( <i>n</i> -1)th participant ( <i>n</i> ≤ 9)	ES 902 plug	End of cable prepared for plug	—	LiYCY 12 x 2 x 0.22 VZNSi <sup>1)</sup>	0,3 to 15 m (over <i>n</i> participants ≤ 20 m)	
0.3 m <b>MB</b> 0.5 m <b>SB</b> 0.63 m <b>UB</b>	1.5 m <b>EC</b> 1.6 m <b>FC</b> 1.8 m <b>GC</b>		2.2 m <b>JC</b> 3 m <b>MC</b>		3.3 m <b>NC</b> 3.6 m <b>PC</b> 4 m <b>QC</b>	4.5 m <b>RC</b> 5 m <b>SC</b> 10 m <b>AD</b>	15 m <b>ED</b>
Interface module for 20-m local bus	Bus converter UI	ES 902 plug	ES 902 plug	—	LiYCY 12 x 2 x 0.22 VZNSi <sup>1)</sup>	0.3 to 5 m	
0.3 m <b>MB</b> 0.5 m <b>SB</b>	1.5 m <b>EC</b> 1.6 m <b>FC</b>		2 m <b>HC</b> 2.5 m <b>KC</b>	2.7 m <b>LC</b> 3 m <b>MC</b>	3.3 m <b>NC</b> 3.6 m <b>PC</b>	5 m <b>SC</b>	
Interface module for 20-m local bus	Bus converters UI1 und UI2	ES 902 plug	ES 902 plug	ES 902 plug	LiYCY 12 x 2 x 0.22 VZNSi <sup>1)</sup>	0.3 m UI1-UI2 0.3 to 5 m UI-interface module	
0.3 m <b>MB</b> 1.2 m <b>CC</b> 1.5 m <b>EC</b>	1.6 m <b>EC</b> 2 m <b>HC</b> 2.2 m <b>JC</b>		2.5 m <b>KC</b> 2.7 m <b>LC</b>	3 m <b>MC</b> 3.3 m <b>NC</b>		3.6 m <b>PC</b> 5 m <b>SC</b>	

<sup>1)</sup> SIMATIC cable.



## Overvoltage protection

### Description

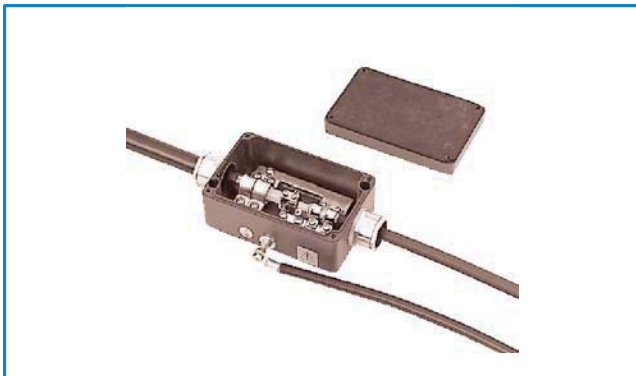


Fig. 4/23 Coarse overvoltage protection 6DS9 208-8AA



Fig. 4/24 Fine overvoltage protection 6DS9 210-8AA

# 4

### Application

The coarse and fine overvoltage protection components largely protect the participants connected to the CS 275 bus from destruction as a result of overvoltages which result from interferences in the remote bus cable. The division into coarse and fine protection means that it is possible to optimally match the overvoltage protection to the respective system.

The coarse protection limits powerful, high-voltage pulses to the arc voltage. It can briefly handle currents in the kA range.

The fine protection reduces the residual voltage between the internal conductor and screen which passes the coarse protection to a measure which is non-hazardous for the amplifier of the inductive coupler in the bus converter UI.

The use of overvoltage protection components is not mandatory for operation of the CS 275 remote bus in non-disturbed system environments. But their use is recommended if the effect of overvoltages onto remote bus cables cannot be excluded.

#### Important notes:

The coarse and fine protection components do not replace a lightning protection system installed according to the regulations.

In conjunction with the so-called primary lightning protection (connection and earthing of steel armoring, equipotential bonding etc.) you can reduce the extent of damage to the bus participants as a result of a lightning stroke, but this does not provide complete protection from the damage of lightning.

### Design

#### Coarse protection

The coarse overvoltage protection 6DS9 208-8AA is fitted in a cast aluminum housing with degree of protection IP 54 and dimensions ( $l \times w \times h$ ) 125 mm x 80 mm x 58 mm. It contains 2 lightning arresters.

It is connected via an M5 threaded bolt to the earthing system. The screens of the remote bus cables which are combined in the housing of the coarse protection can be connected if required to the earthing system either directly or via one of the two lightning arresters (floating design).

The coarse protection is suitable for all types of remote bus cables.

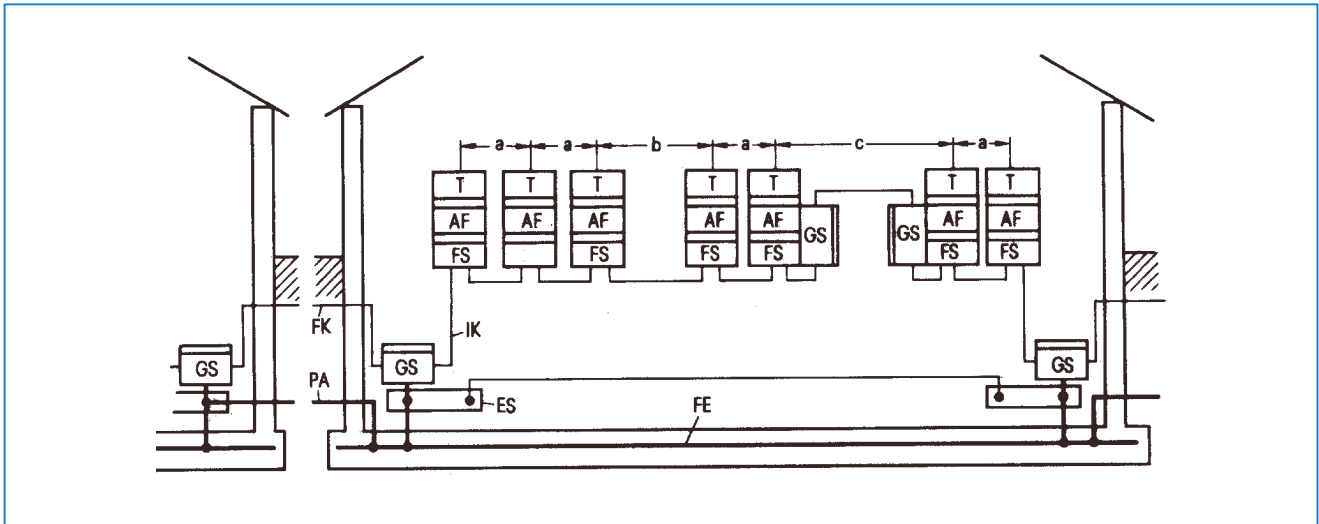
#### Fine protection

The fine overvoltage protection basically consists of two Z diodes and a terminator for the remote cable which can be connected when needed via the connecting splicing plate on the connector board AF instead of the resistor present there. These components are located on a miniature PCB which can be fitted in the connector board 6DS9 203-8CA or -8DA.

The coarse and fine protection components can also be retrofitted in existing system.

For configuring notes and ordering data see page 4/17.

## Configuring notes and ordering data



AF Connector board "Remote bus"  
 ES Grounding rail  
 FE Foundation earth  
 FK Standard remote bus cable  
 FS Fine overvoltage protection

GS Coarse overvoltage protection  
 IK Inhouse cable  
 PA Equipotential bonding  
 T Participant

Cable lengths: a < 25 m  
 b 25 to 50 m  
 c < 50 m

Fig. 4/25 Application of coarse and fine overvoltage protection components with different lengths of cable

### Configuring notes

The coarse overvoltage protection must be provided for all remote bus cables prior to their exit points from the building and also in the immediate vicinity of the foundation earth connection. The connection between the coarse protection and the foundation earth must be kept as short as possible.

The coarse protection is also recommended if the remote bus connects cabinet groups which are positioned more than 50 m from one another within a building. In this case the coarse protection must be installed directly next to the last participant before the longer inhouse cable, and connected to the potential earth of the cabinet.

The fine protection must be provided for each bus participant which is directly connected to a coarse protection component. Fine protection is required for both participants if the distance between the bus participants is > 25 m.

The cable clamps for the various types of remote bus cable are included in the delivery of the overvoltage protection.

### Ordering data

	Order No.
<b>Coarse overvoltage protection</b> for the CS 275 bus system	<b>6DS9 208-8AA</b>
<b>Fine overvoltage protection</b> for the CS 275 bus system	<b>6DS9 210-8AA</b>

For further information refer to:  
 "TELEPERM M, instructions and  
 guidelines for planning, installation and operation"  
 German  
 English

Order No.  
**C79000-G8000-C417**  
**C79000-G8076-C417**

# Remote bus cables

## Standard remote bus cable



Fig. 4/26 Standard remote bus cable

### Application

Coaxial cable 2YC(mS) CY1.6/10-75(Z2/5) vs sw is used as standard as the remote bus cable. The cable may be routed in potentially explosive atmospheres to DIN 57 165/VDE 0165, Section 5.6.1 and is also suitable for burial in the ground. Max. permissible length 4000 m.  
Coaxial cable 2YC(mS)CY 1.0/6.5-75(Z2/5)vs ws (in-house cable) can be used indoors. Max. permissible length 2000 m.

### Design

From inside to outside:

- Cu conductor, silver-coated
- Polyethylene isolation
- Braiding of Cu wires
- Plastic film
- Winding of metal ribbon
- Plastic film
- Braiding of Cu wires
- PVC sheath, black, wall thickness approx. 1.8 mm.

Calculation of the max. permissible length of the remote bus cable when using the standard and in-house cables together:

$$L_F = 4000 \text{ m} - 2 L_i$$

where  $L_i$  Length of in-house cable in m; max. 2000 m  
 $L_F$  Length of remote bus cable in m

Technical data	
External sheath	UV-resistant to VDE 0207, Part 5, oil-resistant to IPC EA-S61-402, flame-retardant to VDE 0472/A
Sheath color	Black
Remote bus cable	Black
In-house cable	white, pink longitudinal line
Sheath thickness	
Remote bus cable	Approx. 1.8 mm
In-house cable	Approx. 0.65 mm
Outer diameter	
Remote bus cable	(16.8 ± 0.5) mm
In-house cable	(9.5 ± 0.3) mm
Perm. ambient temperature	
Laying	- 5 to + 50 °C
Operation and storage	- 40 to + 70 °C
Curvature (diameter)	
Single bending	≥ 300 mm; 200 mm (In-house)
Repeated bending	≥ 600 mm; 400 mm (In-house)
Tensile strength	
Remote bus	660 N
In-house cable	240 N
Weight	
Remote bus cable	Approx. 435 kg/km
In-house cable	Approx. 155 kg/km

Ordering data	
	Order No.
<b>Standard remote bus cable</b>	<b>V45466-D21-B35</b>
Specify length in plain text (max. length available in one piece: 1000 m)	... m
<b>In-house cable</b>	<b>V45466-D17-B135</b>
Specify length in plain text (max. length available in one piece: 250 m; ring)	... m

## Remote bus cable for special applications



Fig. 4/27 Remote bus cable with additional armouring

### Application

The cable 2YC(mS)CYbY1.6/10-75(Z2/5) vs (F 0.8 vzk) sw (Order No. V45466-D21-B65) must be used if the tensile strength of the standard remote bus cable is insufficient. This has additional armouring to increase the tensile strength of the cable to 25000 N.

If protection against damage by rodents and mechanical damage is required, the cable 2YC(mS)CYbY1.6/10-75 (Z2/5) vs (2 B 0,5 vzk) sw (Order No. V45466-D21-B55) with additional steel-tape armouring should be used. This cable does not have an increased tensile strength.

### Design

Both cables have the same basic design as the standard remote bus cable (see there) but have additional armouring.

Max. permissible length of remote bus cable: see standard cable.

Technical data	
V45466-D21-B65	
Permissible ambient temperature	
Laying	- 5 to + 50 °C
Operation and storage	- 40 to + 70 °C
Outer diameter	21.3 mm
Tensile strength	25000 N
Weight	Approx. 920 kg/km
V45466-D21-B55	
Permissible ambient temperature	
Laying	- 5 to + 50 °C
Operation and storage	- 40 to + 70 °C
Outer diameter	22.1 mm
Tensile strength	660 N
Weight	Approx. 923 kg/km

Buried laying of the remote bus cable

The remote bus cable must be laid in sand and covered with a suitable material, e. g. concrete or plastic slabs. The cable should be laid on a 10-cm thick layer of sand and then covered with another 10 cm sand. A **cable for potential equilization** must be laid above the remote bus cable.

Ordering data	
	Order No.
<b>Remote bus cable with additional armouring</b>	
• To increase the tensile strength to 25000 N	<b>V45466-D21-B65</b>
• To protect against mechanical damage and damage by rodents	<b>V45466-D21-B55</b>
Specify length in plain text (max. length available in one piece: 1000 m)	... m

## Connection of remote bus cables

It may be necessary when using remote bus cables to connect sections together. The type of connection differs depending on the type of cable:

### Standard remote bus cable V45466-D21-B35 and in-house cable V45466-D17-B135

These cables can be connected by splicing or by using RF plugs.

### Remote bus cables V45466-D21-B65 and -B55

Only splicing is possible for connecting these cables. To provide additional protection against mechanical damage, the connection should be enclosed in a metal sleeve. The cable armouring can be electrically connected using a copper cable (e. g. as additional overvoltage protection) and secured to prevent tension. The sleeve is filled with sealing compound following assembly.

All parts required for the connection, both for the cable connection itself and also the sleeve and sealing compound, can be obtained as a parts kit for splicing coaxial cables. Instructions are included with the kit.

### Ordering data

	Order No.
For remote bus cables V45466-D21-B35 and V45466-D17-B135:	
<b>Parts kit for splicing coaxial cables</b> (1 kit is required per connection point)	<b>S45056-M125-A1</b>
<b>Al-foil</b> , 50 mm wide, 250 mm long; package with 100 foils (2 off required per connection point)	<b>C45197-A114-C330</b>
<b>Cable plug 4.6-16</b> (2 plugs required per connection point)	<b>SPN:684732-00</b>
<b>Coupling</b>	<b>SPN:683500</b>
<b>Heat-shrinkable sleeve</b> , length approx. 250 mm	<b>5GF2603</b>
<b>Al foil</b> , 50 mm wide, 250 mm long; package with 100 foils (2 off required per connection point)	<b>C45197-A114-C330</b>
For remote bus cables V45466-D21-B65 and V45466-D21-B55:	
<b>Parts kit for splicing coaxial cables</b> (1 kit is required per connection point)	<b>S45054-A271-A1</b>
<b>Al foil</b> , 50 mm wide, 250 mm long, package with 100 foils (2 off required per connection point)	<b>C45197-A114-C330</b>

# 4

# Appendix

# 5

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## SY-TRANS 300 CS gateway

### Description



Bild 5/1 SY-TRANS 300 CS gateway

### Application

The SY-TRANS 300 CS gateway enables bidirectional data transfer at high rates between participants on the CS 275 bus system and computers connected to an Ethernet bus (LAN according to IEEE 802.3). The standard network protocols which are alternatively available are TCP/IP, DECnet or SINEC H1 (ISO transport).

### Design

The gateway comprises the basic hardware and a software component which handles the communication server function in the computers connected to the LAN.

The basic device contains

- an AT-compatible basic PC module,
- the local bus interface module N-AT as the interface to the CS 275 bus system and
- the CP 1413 communications processor for SINEC H1 or an interface module for the Ethernet bus.

A power supply unit is used for DC 24 V oder AC 115 to 230 V.

The system software is present as firmware in EPROMs and need not be loaded. The software is different depending on the required network protocols.

As a result of the housing depth, the basic device can only be installed hanging vertically with the front panel upwards in TELEPERM M standard cabinets (also those with depth of 600 mm).

### Connections

The CS 275 interface is connected via a cable for 20-m local bus (cf. page 4/15). The transition to the CS 275 remote bus can be made via the remote bus connection unit FAE (page 4/11) or - in the case of cabinet installation - via the remote bus connection subrack S5 (page 4/12)

The SINEC H1 interface is connected via a 15-pin sub-D plug according to the SINEC H1 guidelines (cf. Catalog IK 10 "Industrial Communications Networks").

The Ethernet interface with TCP/IP or DECnet is available via a BNC plug and also via a 15-pin AUI plug <sup>1)</sup>. Thin-wire or thick-wire cables can be used for the connection.

The thin-wire cable is connected via BNC plugs - via a T-connector when looping through - if a BNC connection is also present on the computer. If the computer only has an AUI connection, a transceiver is required for each transition from AUI to thin-wire.

The software component is a communications server (client/server architecture) with a simple communication interface to the user: the library OPEN CS. This contains command procedures and library routines and can be executed in the computer under one of the following operating system platforms: VMS, OPEN VMS, ULTRIX, OSF/1, UNIX, SUN OS, SINIX, SCO UNIX, MS-DOS, Windows NT (others on enquiry).

The network protocols TCP/IP, DECnet or SINEC H1 (ISO transport) can be used in the LAN.

User applications in the computer can be readily linked to automation systems of the TELEPERM M process control system using simple library calls. The following AS automation systems can be communications partners: AS 230 <sup>2)</sup>, AS 230 K <sup>2)</sup>, AS 235, AS 235 K und AS 235 H.

Library calls are offered as standard for the following CS 275 functions:

- Y-startup
- Read parameters
- Write parameters
- Receive AKS, BKS und MKS messages.

The library OPEN CS can also be extended by further CS 275 functions for specific projects.

Further functions have already been implemented which permit the design of a fault-tolerant system.

<sup>1)</sup> AUI = Attachment Unit Interface.

<sup>2)</sup> These automation systems are no longer available.

## SY-TRANS 300 CS gateway

## Technical data and Ordering data

Technical data	
Ethernet interface IEEE 802.3 10Base2/10Base5 (thin/thick-wire) with TCP/IP oder DECnet protocol).	
SINEC H1 interface with ISO-transport protocol	
CS 275 local bus interface with CS 275 protocol	
Transmission rate	250 kbit/s
CS 275 functions available to the user	Reception of AKS messages Reception of BKS messages Reception of MKS messages Y function Read parameters Write parameters
Maximum number <i>n</i> of communications partners for SY-TRANS 300 CS	
- With TCP/IP	8
- With DECnet	5
- With SINEC H	32
Communications server	Data medium TK50, giga tape
<u>General data</u>	
Power supply	AC 115 V to 230 V or DC 24 V
Power consumption	< 50 W
Dimensions ( <i>h x w x d</i> )	178 mm x 485 mm x 429 mm
Weight	Approx. 12 kg

## Ordering data

The SY-TRANS 300 CS gateway is a product of Synobec GmbH. For advice and sales, contact:

- Siemens AG  
AUT 381 V1  
Siemensallee 84  
D-76181 Karlsruhe  
Tel. (0721) 595 2843  
Fax (0721) 595 6390  
or
- Siemens AG  
AUT 38 V51  
Siemensallee 84  
Tel. (0721) 595 6182  
Fax (0721) 595 6580

The SY-TRANS 300 CS gateway can be ordered in the following versions:

- For power supply AC 115 V to 230 V or DC 24 V
- Network protocol in LAN: TCP/IP or SINEC H1 or DECnet
- Communications server software and test software for installation tests for the following operating systems:  
VMS, OPEN VMS, Ultrix, OSF/1, UIX, SUN OS, SINIX, SCO UNIX, MS-DOS, Windows NT.  
Language versions: English or German.

Accessories:

**Transceiver**, including cable and terminating resistors for connection of AUI (attachment unit interfaces) to:

- Thin-wire cable.
- Thick-wire cable.

Documentation**Description "SY-TRANS 300 CS converter"**

German  
English

**Description " VMS/UNIX user interface"**

German  
English



## Appendix

### Documentation for CS 275 bus system

#### Ordering data

	Order No.
<p><b>Manual "CS 275 bus system"</b> including the following instructions:</p> <ul style="list-style-type: none"> <li>- "Interface module for 20 m local bus 6DS1 202-8AB" C79000-B80 ... -C3</li> <li>- "Interface module for 20 m local bus 6DS1 205-8AA" C79000-B80 ... -C128</li> <li>- "Local bus interface module N-AS 6DS1 223-8AA" C79000-B80 ... -C406</li> <li>- "Bus converter 6DS4 400-8AB" C79000-B80 ... -C4</li> <li>- "Bus couplers" C79000-B80 ... -C5</li> <li>- "Remote bus connection unit 6DS4 425-8AB" C79000-B80 ... -C127</li> <li>- "Interface module for SIMATIC S5-150U/155U programmable controllers 6DS1 206-8AA" C79000-B80 ... -C181</li> <li>- "Remote bus connection subrack S5 6DS4 426-8AA/-8BA/-8CA" C79000-B80 ... -C251</li> </ul> <p>as well as</p> <ul style="list-style-type: none"> <li>- System overview C79000-T80 ... -C301</li> <li>- Configuring guidelines C79000-T80 ... -C302</li> <li>- Spare parts list "CS 275 bus system" C79000-E80 ... -C2</li> </ul> <p style="margin-left: 20px;">German English French Spanish</p> <p><b>Manual "N-V24. coupling of non-Siemens computers to CS 275 bus system"</b>, describes the user communication interface of the CS 275 bus system and the generation of the coupling software in the non-Siemens computer</p> <p style="margin-left: 20px;">German English</p> <p><b>Manual "TELEPERM M, instructions and guidelines for planning, installation and operation"</b>, contains a.o. planning notes, installation instructions and guidelines for overvoltage protection of the CS 275 bus system</p> <p style="margin-left: 20px;">German English</p>	<p><b>C79000-G8000-C6</b> <b>C79000-G8076-C6</b> <b>C79000-G8077-C6</b> <b>C79000-G8078-C6</b></p> <p><b>C79000-G8000-C87</b> <b>C79000-G8076-C87</b></p> <p><b>C79000-G8000-C417</b> <b>C79000-G8076-C417</b></p>

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