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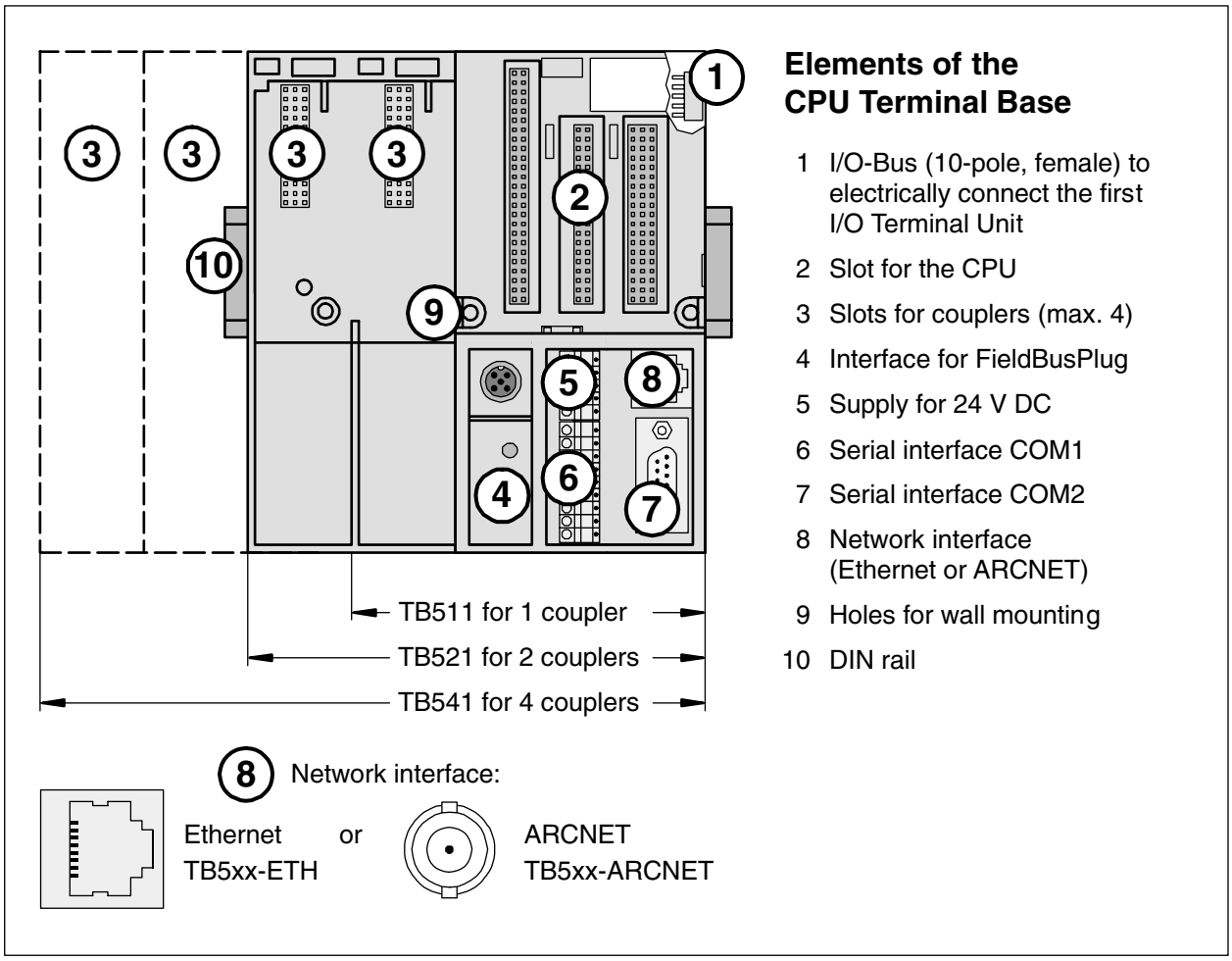
CPU Terminal Bases TB511-TB541

- TB511-ETH: 1 CPU, 1 coupler, with networking interface Ethernet RJ45
- TB521-ARCNET: 1 CPU, 2 couplers, with networking interface ARCNET BNC
- TB521-ETH: 1 CPU, 2 couplers, with networking interface Ethernet RJ45
- TB541-ETH: 1 CPU, 4 couplers, with networking interface Ethernet RJ45



Elements of the CPU Terminal Base

1 I/O-Bus (10-pole, female) to electrically connect the first I/O Terminal Unit
2 Slot for the CPU
3 Slots for couplers (max. 4)
4 Interface for FieldBusPlug
5 Supply for 24 V DC
6 Serial interface COM1
7 Serial interface COM2
8 Network interface (Ethernet or ARCNET)
9 Holes for wall mounting
10 DIN rail

Figure: CPU Terminal Bases TB 511-TB541, for CPU and couplers

The CPU Terminal Bases TB511 to TB541 are used as sockets for CPUs and communication modules (couplers) of the ABB control system AC500. Up to 7 I/O Terminal Units for I/O expansion modules can be added to these CPU Terminal Bases.

If both of the following conditions are fulfilled, **max. 10 I/O expansion modules can be connected to the I/O-Bus of the CPU:**
- PS501 as of version V1.2
- CPUs as of firmware V1.2.0

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Short description

Note: Mounting, disassembling, electrical connection and dimensioned drawings for the Terminal Bases, CPUs, communication modules, I/O Terminal Units and the I/O expansion modules are described in detail in the AC500 system data chapters.

The CPU Terminal Bases have slots for one CPU and for communication modules (couplers) as well as terminals and interfaces for power supply, expansion and networking.

Number of slots

Terminal Base	TB511	TB521	TB541
Slots for CPUs	1	1	1
Slots for communication modules	1	2	4

Terminals and interfaces

Terminal Base	TB511-		TB521-		TB541-	
available = (x)	ETH (x)	ARCNET	ETH (x)	ARCNET (x)	ETH (x)	ARCNET
Connection						
I/O-Bus	I/O interface for directly adding up to 7 I/O Terminal Units *)					
Power supply	5-pole removable terminal block with spring connections					
COM1	serial interface, 9-pole removable terminal block with spring connections					
COM2	serial interface, 9-pole SUB-D connector (female)					
Network interface (type must be equal to the type of the used CPU)	Ethernet RJ45	ARCNET BNC	Ethernet RJ45	ARCNET BNC	Ethernet RJ45	ARCNET BNC
FBP interface	Fieldbus-neutral slave interface (M12, 5-pole, male, fastening with screw)					

***)** If both of the following conditions are fulfilled, **max. 10 I/O expansion modules can be connected to the I/O-Bus of the CPU:**
- PS501 as of version V1.2
- CPUs as of firmware V1.2.0

Connections

I/O-Bus

The I/O-Bus is the I/O data bus for the S500 expansion modules. Through this bus, I/O and diagnosis data are transferred between the AC500 CPU and the I/O expansion modules. Up to 7 I/O Terminal Units (for 1 I/O expansion module each) can be added to one Terminal Base. The I/O Terminal Units have a bus input at the left side and a bus output at the right side. Thus the length of the I/O-Bus increases with the number of the I/O expansion modules used.

If both of the following conditions are fulfilled, **max. 10 I/O expansion modules can be connected to the I/O-Bus of the CPU:**
- PS501 as of version V1.2
- CPUs as of firmware V1.2.0

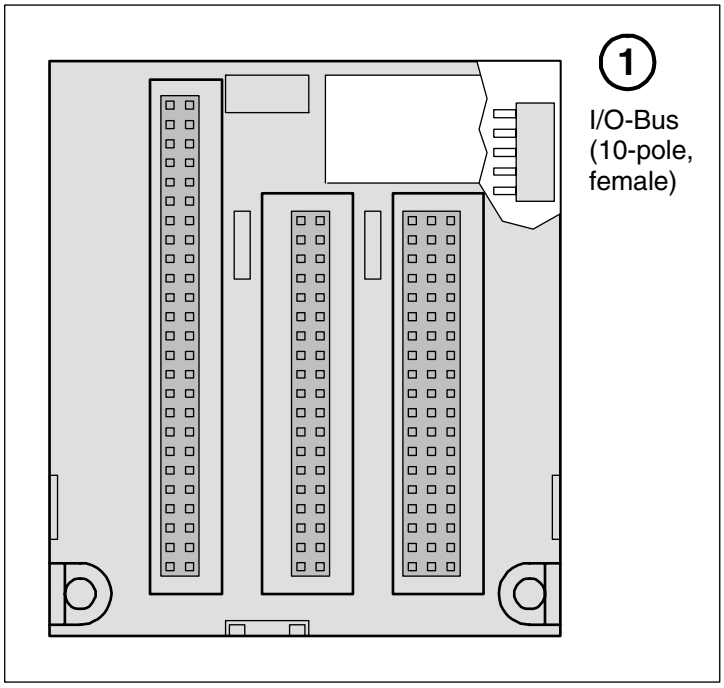
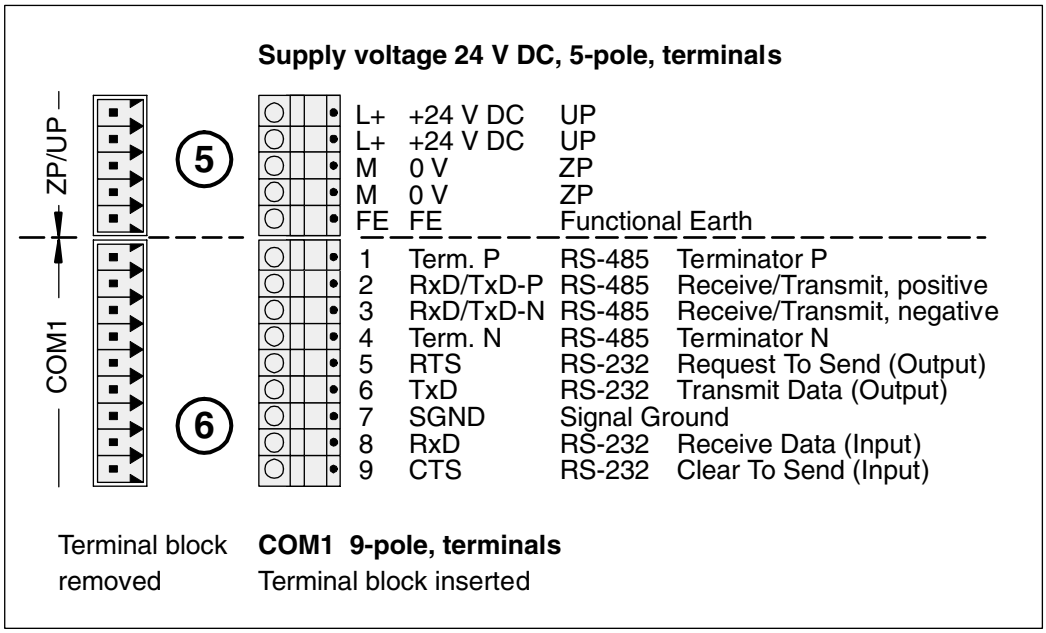


Figure: I/O-Bus

Power supply

The supply voltage of 24 V DC is connected to a 5-pole removable terminal block. ZP and UP exist twice. So it is possible to supply external sensors from these terminals, for instance.



Figure, upper part: Power supply via a 5-pole terminal block
Figure, lower part: Terminal assignment of the serial interface COM1

Important: Exceeding the maximum power supply voltage (>30 V DC) for process or supply voltages could lead to unrecoverable damage of the system. The system could be destroyed.

Important: On the CPU Terminal Bases, the terminals L+ and M are doubled. If the power supply is badly connected (e.g. +/- of power supply is connected to both L+/L+ or both M/M), a short circuit will happen and lead to a destruction of the power supply, its fuse or the Terminal Base itself.

Serial interface COM1 (see above)

The serial interface COM1 is connected to a removable 9-pole terminal block. It is configurable for RS-232 and RS-485 and can be used for

- an online access (RS-232 programming interface for PC/Control Builder)
- a free protocol (communication via the function blocks COMSND and COMREC)
- Modbus RTU, master and slave or
- a CS31 system bus (RS-485), as master only

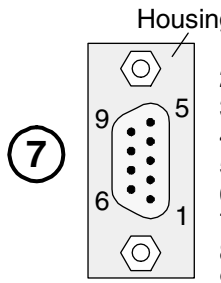
A detailed description for COM1 can be found under "Hardware AC500 / System data / System data and System construction / Serial interface COM1 or Serial interfaces".

Serial interface COM2

The serial interface COM2 is connected to a 9-pole SUB-D connector. It is configurable for RS-232 and RS-485 and can be used for

- an online access (RS-232 programming interface for PC/Control Builder)
- a free protocol (communication via the function blocks COMSND and COMREC)
- MODBUS RTU, master and slave

COM2 is not intended to establish a CS31 system bus.



7	Housing	FE	Functional Earth	
	1	FE	Functional Earth	
	2	TxD	RS-232	Transmit Data	output
	3	RxD/TxD-P	RS-485	Receive/Transmit	positive
	4	RTS	RS-232	Request To Send	output
	5	SGND	Signal Ground	0 V supply out	
	6	+5 V		5 V supply out	
	7	RxD	RS-232	Reiceive Data	input
	8	RxD/TxD-N	RS-485	Receive/Transmit	negative
	9	CTS	RS-232	Clear To Send	input

COM2 9-pole, female

Figure: Pin assignment of the serial interface COM2

A detailed description for COM2 can be found under "Hardware AC500 / System data / System data and System construction / Serial interface COM2 or Serial interfaces".

Ethernet networking interface

This interface is the connection to the internal Ethernet coupler of the CPUs PM5xx-ETH. Applications are:

- TCP/IP for PC/Control Builder (programming)
- UDP (communication via function blocks ETH_UDP_SEND and ETH_UDP_REC)
- Modbus on TCP/IP (Modbus on TCP/IP, master and slave)

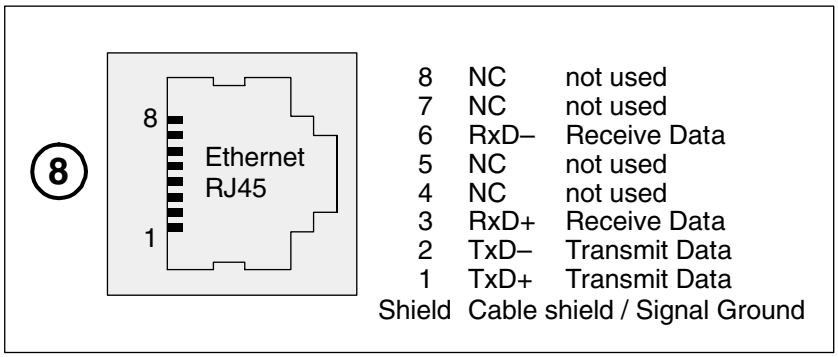


Figure: Pin assignment of the Ethernet interface

ARCNET networking interface

This interface is the connection to the internal ARCNET coupler of the CPUs PM5xx-ARCNET.

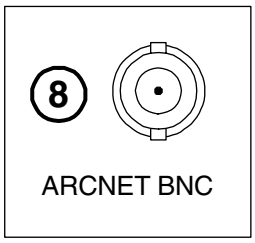


Figure: ARCNET interface

FBP interface

Through this 5-pole fieldbus-neutral interface, the AC500 CPU can be connected **as a slave** to a fieldbus master. The FieldBusPlug is fastened by a screw.

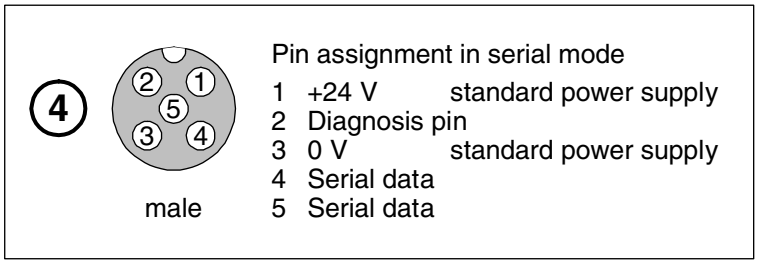


Figure: Pin assignment of the FBP interface

Technical data

Connection of the 24 V DC process voltage	with a 5-pole removable terminal block
Slots	TB511: 1 CPU, 1 communication module
	TB521: 1 CPU, 2 communication modules
	TB541: 1 CPU, 4 communication modules
Interfaces	I/O-Bus, COM1, COM2, FBP
Networking interfaces	TB5xx-ETH: Ethernet
	TB5xx-ARCNET: ARCNET
Connection system	see AC500 system data
Dimensions	for details see AC500 system data
Width x height x depth (with CPU inserted)	TB511: 95.5 x 135 x 75 mm
	TB521: 123.5 x 135 x 75 mm
	TB541: 179.5 x 135 x 75 mm
Weight	TB511: xxx g
	TB521: 215 g
	TB541: xxx g
Mounting position	horizontal or vertical

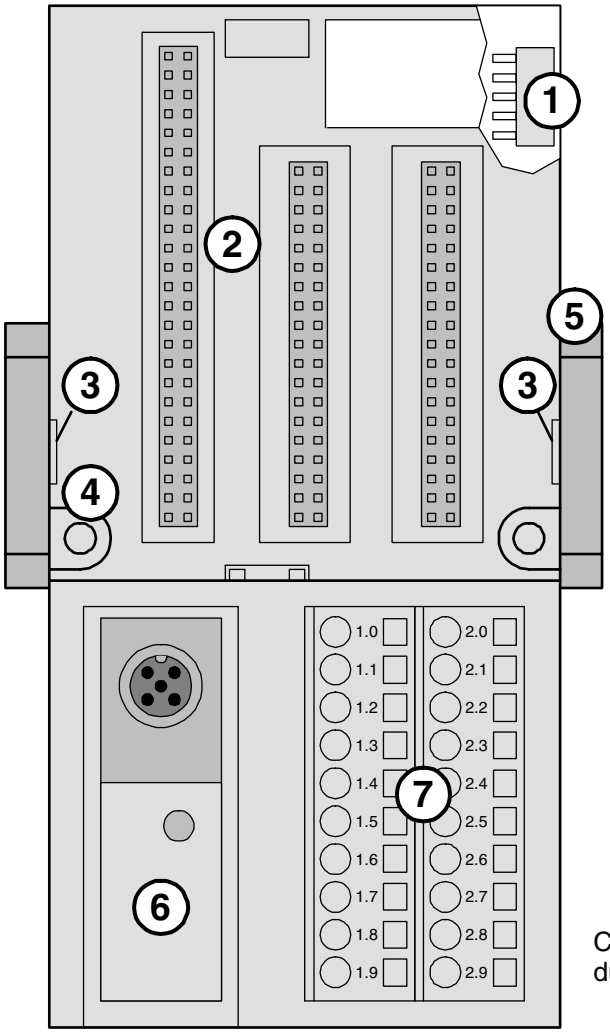
Ordering data

Order No.	Scope of delivery
1SAP 111 100 R0170	TB511-ETH, CPU Terminal Base AC500, slots: 1 CPU, 1 communication module, Ethernet RJ45 connector
1SAP 112 100 R0160	TB521-ARCNET, CPU Terminal Base AC500, slots: 1 CPU, 2 communication modules, ARCNET COAX connector
1SAP 112 100 R0170	TB521-ETH, CPU Terminal Base AC500, slots: 1 CPU, 2 communication modules, Ethernet RJ45 connector
1SAP 114 100 R0170	TB541-ETH, CPU Terminal Base AC500, slots: 1 CPU, 4 communication modules, Ethernet RJ45 connector
1SAP 212 200 R0001	TU515, I/O Terminal Unit, 24 V DC, screw-type terminals
1SAP 212 000 R0001	TU516, I/O Terminal Unit, 24 V DC, spring terminals
1SAP 217 200 R0001	TU531, I/O Terminal Unit, 230 V AC, relays, screw-type terminals
1SAP 217 000 R0001	TU532, I/O Terminal Unit, 230 V AC, relays, spring terminals

S500 Terminal Units, Overview

TU505	FBP Terminal Unit with screw-type terminals, for FBP Interface Modules	Page 2-3
TU506	FBP Terminal Unit with spring terminals, for FBP Interface Modules	2-3
TU515	I/O Terminal Unit with screw-type terminals, for expansion modules 24 V DC	2-5
TU516	I/O Terminal Unit with spring terminals, for expansion modules 24 V DC	2-5
TU531	I/O Terminal Unit with screw-type terminals, for expansion modules 230 V AC	2-7
TU532	I/O Terminal Unit with spring terminals, for expansion modules 230 V AC	2-7
TU551	CS31 Terminal Unit with screw-type terminals, for CS31 Bus Modules	2-10
TU552	CS31 Terminal Unit with spring terminals, for CS31 Bus Modules	2-10

FBP Terminal Units TU505 and TU506 for FBP Interface Modules
- TU505, FBP Terminal Unit, Screw-type Terminals
- TU506, FBP Terminal Unit, Spring Terminals



Elements of the FBP Terminal Unit

1 I/O-Bus (10-pole, female) to electrically connect the first I/O Terminal Unit

2 Plug (1 x 50-pole, 2 x 38-pole) to electrically connect the FBP Interface Module inserted

3 With a screwdriver, inserted in this place, the FBP Terminal Unit and the adjacent I/O Terminal Unit can be shoved from each other

4 Two holes for wall mounting

5 DIN rail

6 Neutral FieldBusPlug interface

7 20 screw-type or spring terminals, for signals and process voltage

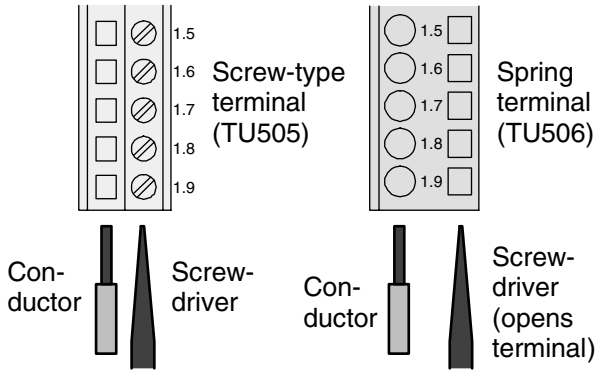


Figure: FBP Terminal Unit TU 506, for FBP Interface Modules

The FBP Terminal Units TU505 (with screw-type terminals) and TU506 (with spring terminals) are specifically designed for use with AC500/S500 FBP Interface Modules (e.g. DC505-FBP).

The FBP Interface Modules plug into the FBP Terminal Unit. When properly seated, they are secured with two mechanical locks. All the electrical connections are made through the FBP Terminal Unit, which allows removal and replacement of the FBP Interface Modules without disturbing the wiring at the FBP Terminal Unit.

Note: Mounting, disassembling and electrical connection for the Terminal Units and the FBP Interface Modules are described in detail in the S500 system data chapters.

The terminals 1.8 to 2.8 and 1.9 to 2.9 are electrically interconnected within the FBP Terminal Unit and have always the same assignment, independent of the inserted module:

Terminals 1.8 to 2.8: Process voltage UP = +24 V DC
Terminals 1.9 to 2.9: Process voltage ZP = 0 V

The assignment of the other terminals is dependent on the inserted FBP Interface Module (see the description of the FBP Interface Module).

The supply voltage 24 V DC for the module's electronic circuitry comes from the FieldBusPlug. If the FieldBusPlug is removed, the FBP Interface Module has no supply voltage. Also, all I/O expansion modules connected through the I/O-Bus have no supply for their electronic parts then.

Technical data

Number of I/O channels per module	16
Distribution of the channels into groups	2 groups of 8 channels each (1.0...1.7, 2.0...2.7), the allocation of the channels is given by the inserted FBP Interface Module
FieldBusPlug	M12, 5-pole
Rated voltage	24 V DC
Max. permitted total current	10 A (between the terminals 1.8...2.8 and 1.9...2.9)
Earthing	direct connection to the earthed DIN rail or via the screws with wall mounting
Screw-type terminals	
Type	Front terminal, conductor connection vertically with respect to the printed circuit board
Conductor cross section	
- solid	0.08 mm² to 2.5 mm²
- flexible	0.08 mm² to 2.5 mm²
- with wire-end ferrule	0.25 mm² to 1.5 mm²
Stripped conductor end	8 mm
Width of the screwdriver	3.5 mm
Fastening torque	0.6 Nm
Degree of protection	IP 20
For details	see system data / Connection system
Spring terminals	
Type	Front terminal, conductor connection vertically with respect to the printed circuit board
Conductor cross section	
- solid	0.08 mm² to 2.5 mm²
- flexible	0.08 mm² to 2.5 mm²
- with wire-end ferrule	0.25 mm² to 1.5 mm²
Stripped conductor end	7 mm, min. 5 mm
Degree of protection	IP 20
For details	see system data / Connection system
Dimensions	
Width x height x depth	67.5 x 135 x 30 mm
Weight	200 g
Mounting position	horizontal or vertical

Ordering data

Order No.	Scope of delivery
1SAP 210 200 R0001	TU505, FBP Terminal Unit, screw-type terminals
1SAP 210 000 R0001	TU506, FBP Terminal Unit, spring terminals

I/O Terminal Units TU515 and TU516 for I/O expansion modules
- TU515, I/O Terminal Unit, 24 V DC, Screw-type Terminals
- TU516, I/O Terminal Unit, 24 V DC, Spring Terminals

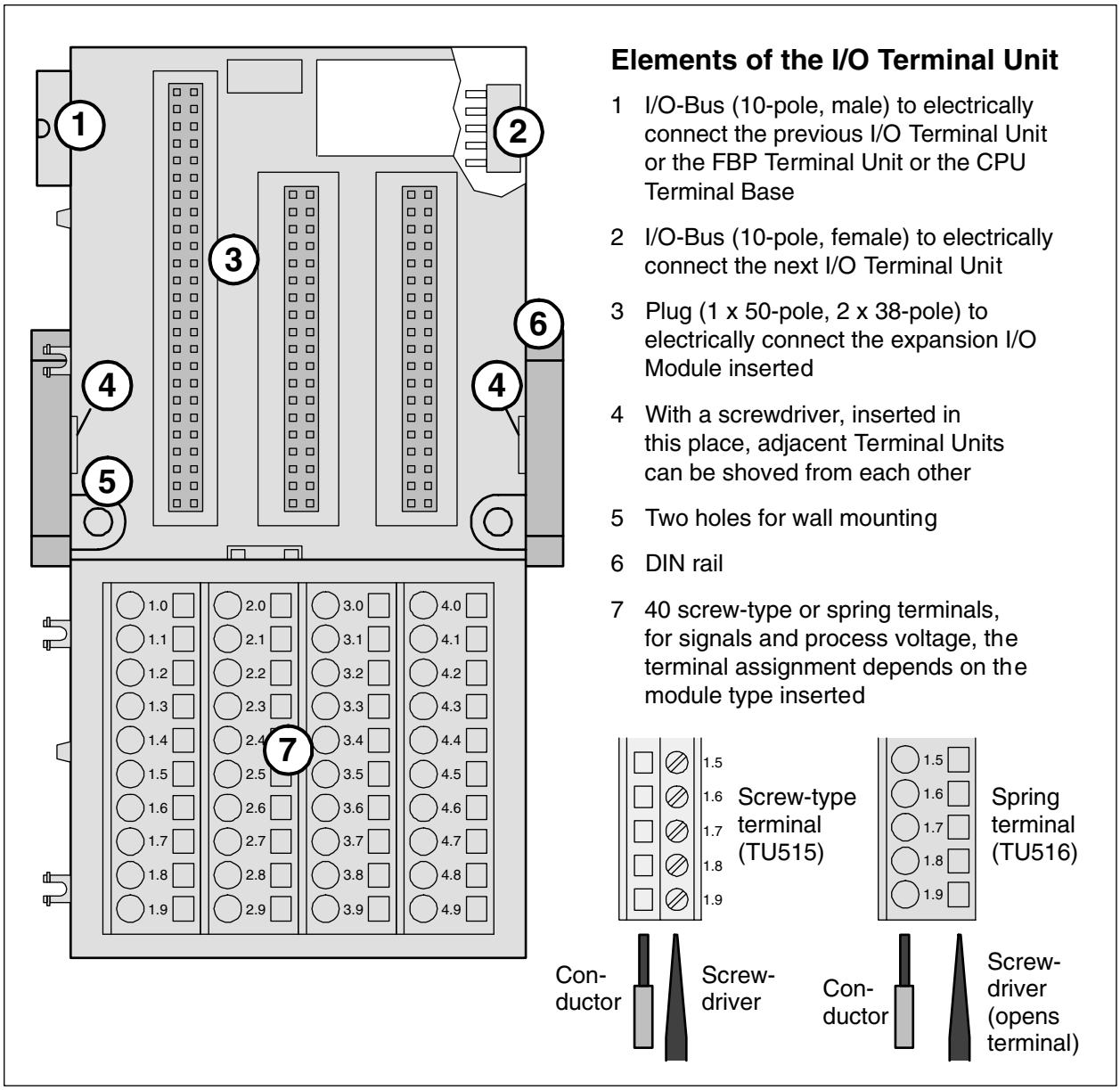


Figure: I/O Terminal Unit TU 516, for I/O expansion modules

The I/O Terminal Units TU515 (with screw-type terminals) and TU516 (with spring terminals) are specifically designed for use with AC500/S500 I/O modules that incorporate only 24 V DC or analog inputs/outputs.

The input/output modules (I/O expansion modules) plug into the I/O terminal Unit. When properly seated, they are secured with two mechanical locks. All the electrical connections are made through the Terminal Unit, which allows removal and replacement of the I/O modules without disturbing the wiring at the Terminal Unit.

Note: Mounting, disassembling and electrical connection for the Terminal Units and the expansion modules are described in detail in the S500 system data chapters.

The terminals 1.8 to 4.8 and 1.9 to 4.9 are electrically interconnected within the I/O Terminal Unit and have always the same assignment, independent of the inserted module:

Terminals 1.8 to 4.8: Process voltage UP = +24 V DC
Terminals 1.9 to 4.9: Process voltage ZP = 0 V

The assignment of the other terminals is dependent on the inserted expansion module (see the description of the used expansion module).

The supply voltage 24 V DC for the module's electronic circuitry comes from the I/O expansion bus (I/O-Bus) or from the FieldBusPlug or from the AC500 CPU.

Technical data

Number of channels per module	32
Distribution of the channels into groups	4 groups of 8 channels each (1.0...1.7, 2.0...2.7, 3.0...3.7, 4.0...4.7), the allocation of the channels is given by the inserted I/O expansion module
Rated voltage	24 V DC
Max. permitted total current	10 A (between the terminals 1.8...4.8 and 1.9...4.9)
Earthing	direct connection to the earthed DIN rail or via the screws with wall mounting
Screw-type terminals	
Type	Front terminal, conductor connection vertically with respect to the printed circuit board
Conductor cross section	
- solid	0.08 mm² to 2.5 mm²
- flexible	0.08 mm² to 2.5 mm²
- with wire-end ferrule	0.25 mm² to 1.5 mm²
Stripped conductor end	8 mm
Width of the screwdriver	3.5 mm
Fastening torque	0.6 Nm
Degree of protection	IP 20
For details	see system data / Connection system
Spring terminals	
Type	Front terminal, conductor connection vertically with respect to the printed circuit board
Conductor cross section	
- solid	0.08 mm² to 2.5 mm²
- flexible	0.08 mm² to 2.5 mm²
- with wire-end ferrule	0.25 mm² to 1.5 mm²
Stripped conductor end	7 mm, min. 5 mm
Degree of protection	IP 20
For details	see system data / Connection system
Dimensions	
Width x height x depth	67.5 x 135 x 30 mm
Weight	200 g
Mounting position	horizontal or vertical

Ordering data

Order No.	Scope of delivery
1SAP 212 200 R0001	TU515, I/O Terminal Unit, 24 V DC, screw-type terminals
1SAP 212 000 R0001	TU516, I/O Terminal Unit, 24 V DC, spring terminals

I/O Terminal Units TU531 and TU532 for I/O expansion modules
- TU531, I/O Terminal Unit, 230 V AC, Screw-type Terminals
- TU532, I/O Terminal Unit, 230 V AC, Spring Terminals

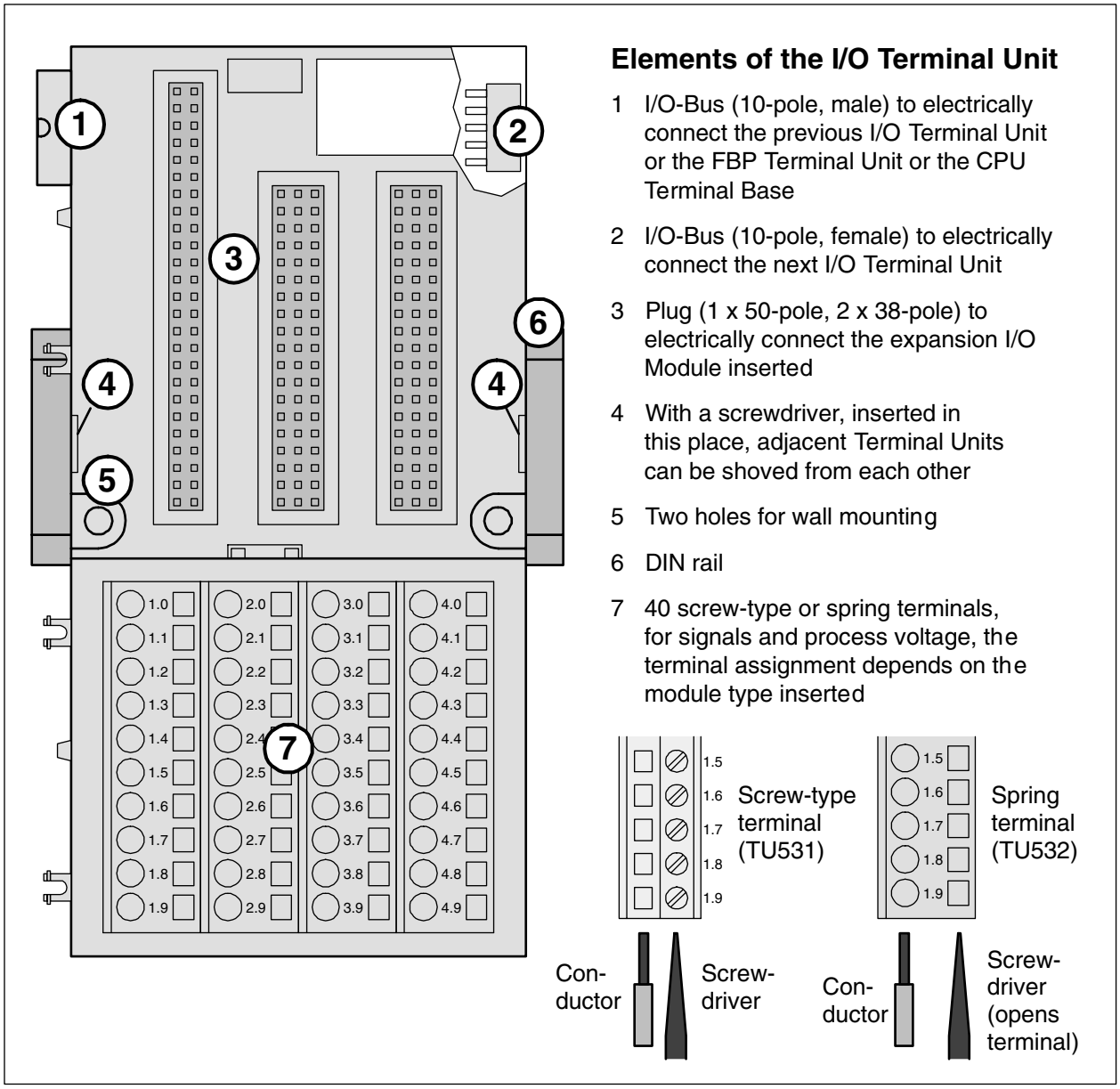


Figure: I/O Terminal Unit TU 532, for I/O expansion modules

The I/O Terminal Units TU531 (with screw-type terminals) and TU532 (with spring terminals) are specifically designed for use with AC500/S500 I/O modules that incorporate 115-230 V AC inputs and/or 230 V AC relay outputs.

The input/output modules (I/O expansion modules) plug into the I/O terminal Unit. When properly seated, they are secured with two mechanical locks. All the electrical connections are made through the Terminal Unit, which allows removal and replacement of the I/O modules without disturbing the wiring at the Terminal Unit.

Note: Mounting, disassembling and electrical connection for the Terminal Units and the expansion modules are described in detail in the S500 system data chapters.

The terminals 1.8 to 4.8 and 1.9 to 4.9 are electrically interconnected within the I/O Terminal Unit and have always the same assignment, independent of the inserted module:

Terminals 1.8 to 4.8: Process voltage UP = +24 V DC
Terminals 1.9 to 4.9: Process voltage ZP = 0 V

The assignment of the other terminals is dependent on the inserted expansion module (see the description of the used expansion module).

The supply voltage 24 V DC for the module's electronic circuitry comes from the I/O expansion bus (I/O-Bus) or from the FieldBusPlug or from the AC500 CPU.

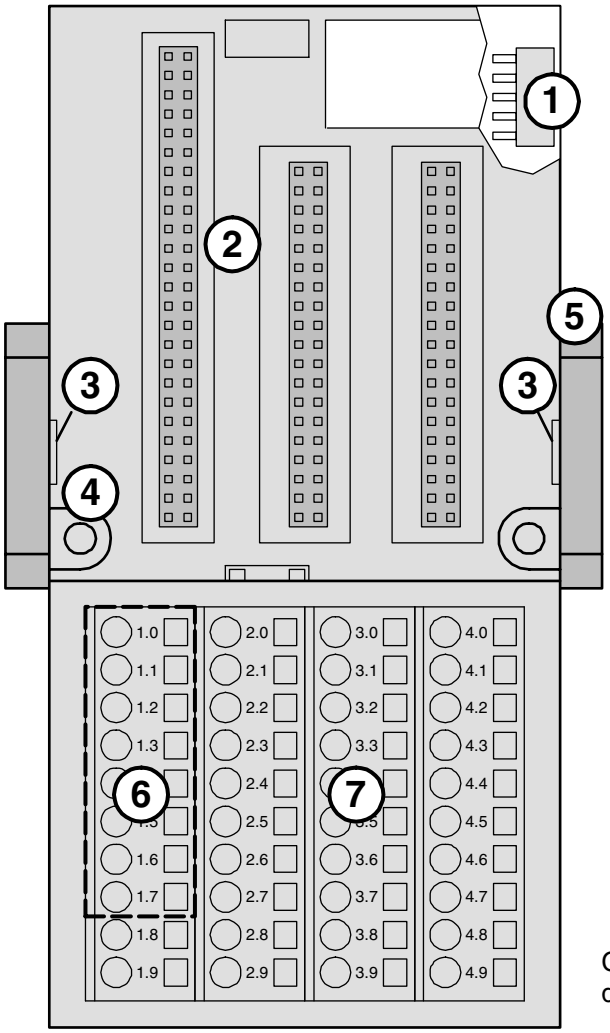
Technical data

Number of channels per module	32
Distribution of the channels into groups	4 groups of 8 channels each (1.0...1.7, 2.0...2.7, 3.0...3.7, 4.0...4.7), the allocation of the channels is given by the inserted I/O expansion module
Rated voltage	230 V AC
Max. permitted total current	10 A (between the terminals 1.8...4.8 and 1.9...4.9)
Earthing	direct connection to the earthed DIN rail or via the screws with wall mounting
Screw-type terminals	
Type	Front terminal, conductor connection vertically with respect to the printed circuit board
Conductor cross section	
- solid	0.08 mm² to 2.5 mm²
- flexible	0.08 mm² to 2.5 mm²
- with wire-end ferrule	0.25 mm² to 1.5 mm²
Stripped conductor end	8 mm
Width of the screwdriver	3.5 mm
Fastening torque	0.6 Nm
Degree of protection	IP 20
For details	see system data / Connection system
Spring terminals	
Type	Front terminal, conductor connection vertically with respect to the printed circuit board
Conductor cross section	
- solid	0.08 mm² to 2.5 mm²
- flexible	0.08 mm² to 2.5 mm²
- with wire-end ferrule	0.25 mm² to 1.5 mm²
Stripped conductor end	7 mm, min. 5 mm
Degree of protection	IP 20
For details	see system data / Connection system
Dimensions	
Width x height x depth	67.5 x 135 x 30 mm
Weight	200 g
Mounting position	horizontal or vertical

Ordering data

Order No.	Scope of delivery
1SAP 217 200 R0001	TU531, I/O Terminal Unit, 230 V AC, relays, screw-type terminals
1SAP 217 000 R0001	TU532, I/O Terminal Unit, 230 V AC, relays, spring terminals

Terminal Units TU551-CS31 and TU552-CS31 for CS31 Bus Modules
- TU551-CS31, CS31 Bus Terminal Unit, 24 V DC, Screw-type Terminals
- TU552-CS31, CS31 Bus Terminal Unit, 24 V DC, Spring Terminals



Elements of the Terminal Unit

1 I/O-Bus (10-pole, female) to electrically connect the first I/O Terminal Unit

2 Plug (1 x 50-pole, 2 x 38-pole) to electrically connect the CS31 Bus Module inserted

3 With a screwdriver, inserted in this place, adjacent Terminal Units can be shoved from each other

4 Two holes for wall mounting

5 DIN rail

6 CS31 bus interface

7 30 screw-type or spring terminals, for signals and process voltage, the terminal assignment depends on the module type inserted

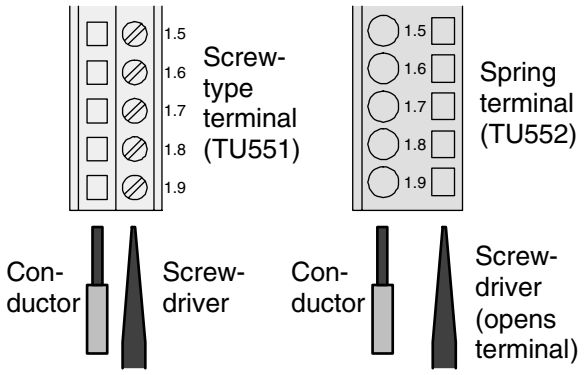


Figure: Terminal Unit TU 552-CS31, for CS31 Bus Modules (e.g. DC551-CS31)

The Terminal Units TU551-CS31 (with screw-type terminals) and TU552-CS31 (with spring terminals) are specifically designed for use with S500 CS31 Bus Modules that incorporate only 24 V DC inputs/outputs or interface signals.

The CS31 Bus Modules plug into the Terminal Unit. When properly seated, they are secured with two mechanical locks. All the electrical connections are made through the Terminal Unit, which allows removal and replacement of the CS31 Bus Modules without disturbing the wiring at the Terminal Unit.

Note: Mounting, disassembling and electrical connection for the Terminal Units and the expansion modules are described in detail in the S500 system data chapters.

The terminals 1.8 to 4.8 and 1.9 to 4.9 are electrically interconnected within the Terminal Unit and have always the same assignment, independent of the inserted module:

Terminals 1.8 to 4.8: Process voltage UP = +24 V DC
Terminals 1.9 to 4.9: Process voltage ZP = 0 V

The assignment of the other terminals is dependent on the inserted CS31 Bus Module (see the description of the used CS31 Bus Module).

The supply voltage 24 V DC for the module's electronic circuitry comes from ZP and UP.

Technical data

Number of channels per module	24
Distribution of the channels into groups	3 groups of 8 channels each (2.0...2.7, 3.0...3.7, 4.0...4.7), the allocation of the channels is given by the inserted CS31 Bus Module
CS31 field bus connector	terminals 1.0 to 1.7
Rated voltage	24 V DC
Max. permitted total current	10 A (between the terminals 1.8...4.8 and 1.9...4.9)
Earthing	direct connection to the earthed DIN rail or via the screws with wall mounting
Screw-type terminals	
Type	Front terminal, conductor connection vertically with respect to the printed circuit board
Conductor cross section	
- solid	0.08 mm² to 2.5 mm²
- flexible	0.08 mm² to 2.5 mm²
- with wire-end ferrule	0.25 mm² to 1.5 mm²
Stripped conductor end	8 mm
Width of the screwdriver	3.5 mm
Fastening torque	0.6 Nm
Degree of protection	IP 20
For details	see system data / Connection system
Spring terminals	
Type	Front terminal, conductor connection vertically with respect to the printed circuit board
Conductor cross section	
- solid	0.08 mm² to 2.5 mm²
- flexible	0.08 mm² to 2.5 mm²
- with wire-end ferrule	0.25 mm² to 1.5 mm²
Stripped conductor end	7 mm, min. 5 mm
Degree of protection	IP 20
For details	see system data / Connection system
Dimensions	
Width x height x depth	67.5 x 135 x 30 mm
Weight	200 g
Mounting position	horizontal or vertical

Ordering data

Order No.	Scope of delivery
1SAP 210 600 R0001	TU551-CS31, CS31 Bus Terminal Unit, 24 V DC, screw-type terminals
1SAP 210 400 R0001	TU552-CS31, CS31 Bus Terminal Unit, 24 V DC, spring terminals