AC500
Key features

—

A high performance PLC:
- Large memory up to 160 MB
- Highly modular
- From 8 to +80 000 I/Os
- More communication possibilities (Ethernet, Internet, PROFINET, PROFIBUS, Modbus, CANopen, EtherCAT, EthernetIP, OPC UA, OPC DA, IEC 60870-5-104, IEC61850, MQTT, ...)

—

Common AC500 platform benefits: Automation Builder engineering suite, I/O modules, scalable and flexible

—

- Eight programming languages available (five IEC 61131-3, CFC, C-code and C++)
- Object oriented engineering
- Virtual controller
- Webvisu
- Data logging
- SD card for program back-up
- High Availability (HA) option
- Screw or spring terminal for I/Os
- Extensive programming libraries

AC500
Ordering data

AC500 CPUs

- 2 internal serial interfaces, RS232 / RS485 configurable
- Display and 8 function keys for diagnosis and status
- Centrally expandable with up to 10 I/O modules, 320 I/Os (S500 and/or S500-eCo modules allowed)
- Simultaneous operation of up to 4 external communication modules in any desired combination
- Optional SD card for data storage and program backup
- Can also be used as slave on PROFIBUS DP, CANopen or PROFINET IO using CM582-DP, CM588-CN, CM589-PNIO or CM589-PNIO-4 communication modules
- Ethernet version provides web server and IEC 60870-5-104 remote control protocol

Program memory kB	Cycle time in µs per instruction min. Bit/Word/Float. point	Integrated communication	Type	Order code	Price	Weight (1 pce) kg
128	0.06 / 0.09 / 0.7	2 x serial	PM572	1SAP130200R0200		0.135
512	0.06 / 0.09 / 0.7	Ethernet (1), 2 x serial	PM573-ETH	1SAP130300R0271		0.150
512	0.05 / 0.06 / 0.5	2 x serial	PM582	1SAP140200R0201		0.135
1024	0.05 / 0.06 / 0.5	Ethernet (1), 2 x serial	PM583-ETH	1SAP140300R0271		0.150
1024	0.004 / 0.008 / 0.008	Ethernet (1), 2 x serial	PM585-ETH	1SAP140500R0271		0.150
2048	0.002 / 0.004 / 0.004	Ethernet (1), 2 x serial	PM590-ETH	1SAP150000R0271		0.150
2048	0.002 / 0.004 / 0.004	ARCNET BNC, 2 x serial	PM590-ARCNET	1SAP150000R0261		0.150
4096	0.002 / 0.004 / 0.004	Ethernet (1), 2 x serial	PM591-ETH	1SAP150100R0271		0.150
4096	0.002 / 0.004 / 0.004	2 x Ethernet (1), 1 x serial	PM591-2ETH (3)	1SAP150100R0277		0.150
4096	0.002 / 0.004 / 0.004	Ethernet (1), 2 x serial	PM592-ETH (2)	1SAP150200R0271		0.150

AC500 Machine controller kits

- Complete product bundle providing all the needed devices for a machine controller delivered under one single order code

Program memory kB	Cycle time in µs per instruction min. Bit/Word/Float. point	Contents / Integrated communication	Type	Order code	Price	Weight (1 pce) kg
1024	0.004 / 0.008 / 0.008	PM585-ETH, CM579-ETHCAT, TB511-ETH Ethernet (1), 2 x serial, EtherCAT Master	PM585-MC-KIT	1SAP140500R0379		0.500
2048	0.002 / 0.004 / 0.004	PM590-ETH, CM579-ETHCAT, TB521-ETH, TA524 Ethernet (1), 2 x serial, EtherCAT Master	PM590-MC-KIT	1SAP150000R0379		0.500

(1) Provides integrated web server and IEC 60870-5-104 remote control protocol on each interface independently.
(2) Provides integrated 4 GB flashdisk for user data storage and data logging.
(3) Only to be used with dedicated terminal base TB523-2ETH.

PM572

PM592

PM585-MC-KIT

AC500
Ordering data

AC500 CPU PM595

- 2 Ethernet interfaces with integrated switch and software configurable protocol (PROFINET, EtherCAT or Ethernet e.g. Modbus TCP)
- 2 independent Ethernet interfaces for programming, online access, web server, Modbus TCP, IEC 60870-5-104 protocol e.g.
- 2 serial interfaces, RS232 / RS485 configurable
- Centrally expandable with up to 10 I/O modules (S500 and/or S500-eCo modules allowed)
- Simultaneous operation of up to 2 external communication modules in any desired combination, no need of additional terminal base

Program memory MB	Cycle time in µs per instruction min. Bit/Word/Float. point	Integrated communication	Type	Order code	Price	Weight (1 pce) kg
16	0.0006/0.001/0.001	2 x Ethernet for Fieldbus (2 Ports switch), 2 x Ethernet (1), 2 x serial	PM595-4ETH-F (2)	1SAP155500R0279		1.050

(1) Provides integrated web server and IEC 60870-5-104 remote control protocol on each interface independently.
(2) Provides integrated 4 GB flashdisk for user data storage and data logging.

PM595-4ETH-F

AC500
Ordering data

Terminal base

- For mounting and connection of the CPUs and communication modules, not needed for PM595
- 1 to 4 plug-in communication modules
- Connection for communication coupler integrated in the CPU
- I/O interface for direct connection of up to 10 expansion modules
- Fieldbus-neutral FieldBusPlug-Slave interface not for TB523-2ETH
- Connection COM1: 9-pole pluggable terminal block
- Connection COM2: D-Sub 9 (not for TB523-2ETH).

Number of coupler slots	Connection for coupler integrated in the CPU	Type	Order code	Price	Weight (1 pce) kg
1	ARCNET BNC	TB511-ARCNET (2)	1SAP111100R0260		0.215
2	ARCNET BNC	TB521-ARCNET (2)	1SAP112100R0260		0.215
1	Ethernet RJ45	TB511-ETH	1SAP111100R0270		0.215
2	Ethernet RJ45	TB521-ETH	1SAP112100R0270		0.215
2	2x Ethernet RJ45	TB523-2ETH (1)	1SAP112300R0277		0.250
4	Ethernet RJ45	TB541-ETH	1SAP114100R0270		0.215

Note: These TBs are compatible with previous AC500 CPU versions (R01xx) and new ones (R02xx).
(1) Can only be used together the PM591-2ETH.
(2) Can be only used with PM590-ARCNET CPU.

TB511-ETH

TB541-ETH

AC500
Ordering data

AC500 Condition Monitoring CMS

- PLC integrated condition monitoring and fast protection for high frequency signals (vibration, current, voltage, speed/encoder)
- FM502-CMS module needs function module terminal base TF5x1 for direct interfacing to CPU, communication couplers, other I/O
  - for stand-alone or control/safety integrated condition monitoring
- PM592 CPU to be used on same TF5x1 for data storage and signal processing or communication
  - C-code interface for own complex diagnosis algorithmns, 4GB Flash disk for raw fingerprints and indicator trending
- FM502-CMS module:
  - 16 fast, precise analog inputs, all synchronously sampled; configurable as IEPE or +-10V
  - individual measurement configuration (start,stop,trigger) per channel
  - per channel up to 50ksamples/s and 24bit ADC resolution, adjustable sampling
  - encoder inputs (5V or 24V) up to 300kHz counter; 12 modes, incl. absloute SSI (1MHz)
  - fast data logging, compact WAV-Files delivered automatically to CPU, incl. synchronized encoder signal if configured
  - analogue values always available for fast protection in I/O image of CPU
- Included in Automation Builder: Configuration, libraries for CMS control and wav file handling, examples
- Available download package: Signal processing library, example programs with simple diagnosis, logging and automated triggering (2)

Number of coupler slots	Description	Type	Order code	Price	Weight (1 pce) kg
n.a.	Function Module for Condition Monitoring Systems, 16AI, 2DI, 2DC, 1x Encoder (A, B, Z)	FM502-CMS	1SAP260400R0001		0.215
0	Function module terminal base for FM502, no coupler slots, 1x ETHERNET, 1x serial, spring terminals, 24 V DC	TF501-CMS (1)	1SAP117000R0271		0.350
2	Function module terminal base for FM502, 2x coupler slots, 1x ETHERNET, 1x serial, spring terminals, 24 V DC	TF521-CMS (1)	1SAP117200R0271		0.400

(1) Can only be used together with FM502 and PM592-ETH
(2) Download of Package under “Application Examples” at www.abb.com/plc

FM502-CMS

TF501-CMS

TF521-CMS

AC500
Ordering data

AC500 V3 CPUs

- 1x internal serial interface, RS232 / RS485 configurable (ACSII or Modbus RTU Master/Slave)
- 2x independant Ethernet interfaces which can also be used as switch and software configurable protocols like ModbusTCP, PROFINET IO Controller (2)(3), Ethernet IP Adapter (2)(3), EtherCAT Master (2)(3), IEC60870-5-104 or IEC61850 (3)
- Web server with WebVisu HTML5 Remove RTV for use with CP600 with Web interface
- 1x internal CAN interface, with CANopen Master/Slave (2), CAN 2A/2B and J1939 protocols
- Display and 8 function keys for diagnosis and status
- Centrally expandable with up to 10 I/O modules, 320 I/Os (S500 and/or S500-eCo modules allowed)
- Simultaneous operation of several external communication modules in any desired combination
- To be used exclusivelly with new TB56xx-2ETH
- Optional SD card for data storage and program backup
- To be used only with Automation Builder 2.x

Program and Data memory MB	Cycle time in µs per instruction min. Bit/Word/Float. point	Integrated communication	Type	Order code	Price	Weight (1 pce) kg
8	0.020 / 0.020 / 0.120	2 x Ethernet with configurable protocols PROFINET IO Controller (2)(3) / EtherCAT Master (2)(3) or EthernetIP (2)(3), 1 x serial, 1x CAN interface	PM5630-2ETH (1) (4)	1SAP131000R0278		0.135
80	0.010 / 0.010 / 0.010	2 x Ethernet with configurable protocols PROFINET IO Controller (2)(3) / EtherCAT Master (2)(3) or EthernetIP (2)(3), 1 x serial, 1x CAN interface	PM5650-2ETH (1) (4)	1SAP141000R0278		0.135
160	0.002 / 0.002 / 0.002	2 x Ethernet with configurable protocols PROFINET IO Controller (2) / EtherCAT Master (2) or EthernetIP (2)(3), 1 x serial, 1x CAN interface	PM5670-2ETH (1) (4)	1SAP151000R0278		0.135
160 / 8GB Flash disk	0.002 / 0.002 / 0.002	2 x Ethernet with configurable protocols PROFINET IO Controller (2) / EtherCAT Master (2) or EthernetIP (2)(3), 1 x serial, 1x CAN interface	PM5675-2ETH (1) (4)	1SAP151500R0278		0.150

(1) Ethernet communication provides integrated web server, IEC 60870-5-104 remote control protocol and OPC UA Server on each interface independently.
(2) In preparation
(3) Some communication protocols are licensed see following lines
(4) Only to be used with dedicated terminal base TB56xx-2ETH

PM5630-2ETH

PM5650-2ETH

PM5670-2ETH

PM5675-2ETH

Feature licenses

Some HW or FW features need to be licensed to be used on the new CPU. Which allows:

- more flexibility
- better adaptation to the needs

License Type	CPU runtime license to be used on internal Ethernet interface	Type	Order code
HW	Modbus TCP HA runtime license	PS5601-HA-MTCP	1SAP195400R0101
HW	IEC 61850 protocol runtime license	PS5602-61850	1SAP195600R0101
HW	Runtime license for KNX controller	PS5604-KNX	1SAP195800R0101
HW	BACnet protocol B-BC; runtime license (1)	PS5607-BACnet-BC	1SAP195550R0101

(1) In preparation

AC500
Ordering data

AC500 V3 Terminal base

- For mounting and connection of the AC500 V3 CPUs only and communication modules
- 0, 1, 2, 4 or up to 6 (2) plug-in communication modules
- Connection for communication coupler integrated in the CPU
- I/O interface for direct connection of up to 10 expansion modules
- Connection COM1: 9-pole pluggable spring terminal block
- Connection CAN: 2x 5-pole pluggable spring terminal block
- 2x RJ45 Ethernet interfaces with configurable switch functionality

Number of coupler slots	Connection for coupler integrated in the CPU	Type	Order code	Price	Weight (1 pce) kg
0	2x RJ45 for Ethernet, 1x serial COM1 with pluggable spring connector and 1x2x5 poles pluggable spring connector for CAN/CANopen interface	TB5600-2ETH	1SAP110300R0278		0.165
1		TB5610-2ETH	1SAP111300R0278		0.190
2		TB5620-2ETH	1SAP112300R0278		0.215
4		TB5640-2ETH	1SAP114300R0278		0.265
6		TB5660-2ETH (2)	1SAP116300R0278		0.315

2) In preparation

TB5600-2ETH

TB5610-2ETH

TB5620-2ETH

TB5640-2ETH

AC500
Ordering data

Communication modules

Protocol	Connections	CPU V3 Support	Type	Order code	Price	Weight (1 pce) kg
PROFIBUS DP V0/V1 master	D-Sub 9	-	CM592-DP	1SAP173200R0001		0.115
PROFIBUS DP V0/V1 slave	D-Sub 9	-	CM582-DP	1SAP172200R0001		0.115
Ethernet (TCP/IP, UDP/IP, Modbus TCP)	2 x RJ45 - integrated switch	-	CM597-ETH	1SAP173700R0001		0.115
CANopen master	Terminal block 2 x 5 poles spring	(1)	CM598-CN	1SAP173800R0001		0.115
CANopen slave	Terminal block 2 x 5 poles spring	-	CM588-CN	1SAP172800R0001		0.115
PROFINET I/O RT controller	2 x RJ45 - integrated switch	Yes	CM579-PNIO	1SAP170901R0101		0.115
PROFINET IO RT device	2 x RJ45 - integrated switch	(2)	CM589-PNIO	1SAP172900R0011		0.115
PROFINET IO RT with 4 devices	2 x RJ45 - integrated switch	(2)	CM589-PNIO-4	1SAP172900R0111		0.115
EtherCAT master	2 x RJ45	Yes	CM579-ETHCAT	1SAP170902R0101		0.115
Serial + co-processor	2 x RS-232/485 on spring terminal blocks	-	CM574-RS	1SAP170400R0201		0.115
Serial RCOM	2 x RS-232/485 (1 x RCOM/1 x Console)	-	CM574-RCOM	1SAP170401R0201		0.115

(1) Only with CAN 2A/2B protocol
(2) In preparation

—
CM592-DP

—
CM574-RS
CM574-RCOM

—
CM598-CN

—
CM579-PNIO

I/O modules

- Hot swap capable when mounted on hot swap terminal unit
- For central expansion of the AC500 or AC500-eCo CPUs
- For decentralized expansion in combination with communication interface modules on CS31, PROFINET IO, EtherCAT, Modbus TCP, PROFIBUS DP, CANopen modules
- DC and AC: Channels can be configured individually as inputs or outputs
- Plug-in electronic modules, terminal unit required (refer to table below).

Digital I/O

Number of DI/DO/DC	Input signal	Output type	Output signal	Terminal units Screw / Spring	Type	Order code	Price	Weight (1 pce) kg
32 / – / –	24 V DC	–	–	TU515 / TU516	DI524	1SAP240000R0001		0.200
– / – / 16	24 V DC	Transistor	24 V DC, 0.5 A	TU515 / TU516	DC522	1SAP240600R0001		0.200
– / – / 24	24 V DC	Transistor	24 V DC, 0.5 A	TU515 / TU516	DC523	1SAP240500R0001		0.200
16 / – / 16	24 V DC	Transistor	24 V DC, 0.5 A	TU515 / TU516	DC532	1SAP240100R0001		0.200
8 / 8 / –	24 V DC	Relay	230 V AC, 3 A (2)	TU531 / TU532	DX522	1SAP245200R0001		0.300
8 / 4 / –	230 V AC	Relay	230 V AC, 3 A (2)	TU531 / TU532	DX531	1SAP245000R0001		0.300
– / 32 / –	–	Transistor	24 V DC, 0.5 A	TU515 / TU516	DO524	1SAP240700R0001		0.200
– / 8 / –	–	Transistor	24 V DC, 2 A	TU541 / TU542	DO526	1SAP240800R0001		0.200

(2) Relay outputs, changeover contacts.

—
DO524

AC500
Ordering data

Analog I/O

Number of AI/AO/AC	Input signal	Output signal	Terminal units Screw / Spring	Type	Order code	Price	Weight (1 pce) kg
16 / 0 / 0	0...10 V, ±10 V 0/4...20 mA, PT100, PT1000, Ni1000	–	TU515 / TU516	AI523	1SAP250300R0001		0.200
4 / 4 / 0		±10 V 0/4...20 mA	TU515 / TU516	AX521	1SAP250100R0001		0.200
0 / 0 / 8 (max. 4 current outputs)			TU515 / TU516	AC522 (1)	1SAP250500R0001		0.200
8 / 8 / 0 (max. 4 current outputs)			TU515 / TU516	AX522	1SAP250000R0001		0.200
0 / 16 / 0 (max. 8 current outputs)	–		TU515 / TU516	AO523	1SAP250200R0001		0.200
8 / 0 / 0	0…5 V, 0…10 V, ±50 mV, ±500 mV, 1 V, ±5 V, ±10 V, 0/4…20 mA, ±20 mA, PT100, PT1000, Ni1000, Cu50, 0…50 kΩ, S, T, N, K, J	–	TU515 / TU516	AI531	1SAP250600R0001		0.200

(1) In preparation

Analog/digital mixed I/O

Number of AI/AO/DI/DO/DC	Input signal	Output type	Output signal	Terminal unit Screw / Spring	Type	Order code	Price	Weight (1 pce) kg
4 / 2 / 16 / - / 8	24 V DC/0…10 V, -10…+10 V, 0…20 mA, 4…20 mA, PT100, PT1000, Ni100, Ni1000	Transistor	24 V DC, 0.5 A/ -10…+10 V, 0…20 mA, 4…20 mA	TU515 / TU516	DA501	1SAP250700R0001		0.200
4 / 2 / - / 16 / 8				TU515 / TU516	DA502 (1)	1SAP250800R0001		0.200

(1) In preparation

Multifunctional modules

- Not hot swap capable

Functionality	Number of DI/DO/DC	Input signal	Output type	Output signal	Terminal units Screw / Spring	Type	Order code	Price	Weight (1 pce) kg
Encoder and PWM module	2 / – / 8	24 V DC and 2 encoder inputs A/B/C differential	2 PWM outputs	24 V DC, 0.1 A	TU515 / TU516	CD522	1SAP260300R0001		0.125
Positioning module	0 / 8 / 0	4 inputs 0...10 V for position feedback	4 H-bridge outputs	24 V DC, 4 A	TU541 / TU542	PD501-4CH (1)	1SAP260100R0001		0.200

(1) In preparation

Fast I/O module for direct mounting on the terminal base of the AC500 CPU

Functionality	Number of DI/DO/DC	Input signal	Output type	Output signal	Terminal unit	Type	Order code	Price	Weight (1 pce) kg
Interrupt I/O and fast counter	– / – / 8	24 V DC	Transistor	24 V DC, 0.5 A	N/A (2)	DC541-CM (1)	1SAP270000R0001		0.100

(1) Multifunctional module, refer to table on page 110 for details. Terminal block for I/O signal connection included.
(2) Occupies a communication module slot.

—
AO523

—
AI531

—
DA501

—
CD522

—
DC541-CM

AC500
Ordering data

Communication interface modules

Number of AI/AO/DI/DO/DC	Input signal	Output type	Output signal	Terminal units Screw / Spring	Type	Order code	Price	Weight (1 pce) kg
For CS31-Bus								
- / - / 8 / - / 16	24 V DC	Transistor	24 V DC, 0.5 A	TU551-CS31 / TU552-CS31	DC551-CS31	1SAP220500R0001		0.200
- / - / - / - / 16	24 V DC	Transistor	24 V DC, 0.5 A	TU551-CS31 / TU552-CS31	CI590-CS31-HA	1SAP221100R0001		0.200
4 / 2 / 8 / - / 8	24 V DC/ 0...10 V, -10...+10 V, 0...20 mA, 4...20 mA, PT100, PT1000, Ni100, Ni1000	Transistor	24 V DC, 0.5 A/ -10...+10 V, 0...20 mA, 4...20 mA	TU551-CS31 / TU552-CS31	CI592-CS31	1SAP221200R0001		0.200
For PROFIBUS-DP								
4 / 2 / 8 / 8 / -	24 V DC/ 0...10 V, -10...+10 V, 0...20 mA, 4...20 mA, PT100, PT1000, Ni100, Ni1000	Transistor	24 V DC, 0.5 A/ -10...+10 V, 0...20 mA, 4...20 mA (1)	TU509/TU510/ TU517/TU518	CI541-DP	1SAP224100R0001		0.200
- / - / 8 / 8 / 8	24 V DC	Transistor	24 V DC, 0.5 A	TU509/TU510/ TU517/TU518	CI542-DP	1SAP224200R0001		0.200
For CANopen								
4 / 2 / 8 / 8 / -	24 V DC/ 0...10 V, -10...+10 V, 0...20 mA, 4...20 mA, PT100, PT1000, Ni100, Ni1000	Transistor	24 V DC, 0.5 A/ -10...+10 V, 0...20 mA, 4...20 mA	TU509/TU510/ TU517/TU518	CI581-CN	1SAP228100R0001		0.200
- / - / 8 / 8 / 8	24 V DC	Transistor	24 V DC, 0.5 A	TU509/TU510/ TU517/TU518	CI582-CN	1SAP228200R0001		0.200
For Ethernet based protocol - EtherCAT								
4 / 2 / 8 / 8 / -	24 V DC/ 0...10 V, -10...+10 V, 0...20 mA, 4...20 mA, PT100, PT1000, Ni100, Ni1000	Transistor	24 V DC, 0.5 A / -10...+10 V, 0...20 mA, 4...20 mA	TU507-ETH / TU508-ETH	CI511-ETHCAT	1SAP220900R0001		0.200
- / - / 8 / 8 / 8	24 V DC	Transistor	24 V DC, 0.5 A	TU507-ETH / TU508-ETH	CI512-ETHCAT	1SAP221000R0001		0.200
For Ethernet based protocol - PROFINET IO RT								
4/2/8/8/-	24 V DC/ 0...10 V, -10...+10 V, 0...20 mA, 4...20 mA, PT100, PT1000, Ni100, Ni1000	Transistor	24 V DC, 0.5 A/ -10...+10 V, 0...20 mA, 4...20 mA	TU507-ETH / TU508-ETH	CI501-PNIO	1SAP220600R0001		0.200
-/-/8/8/8	24 V DC	Transistor	24 V DC, 0.5 A	TU507-ETH / TU508-ETH	CI502-PNIO	1SAP220700R0001		0.200
For Ethernet based protocol - Modbus TCP								
4/2/8/8/-	24 V DC/ 0...10 V, -10...+10 V, 0...20 mA, 4...20 mA, PT100, PT1000, Ni100, Ni1000	Transistor	24 V DC, 0.5 A/ -10...+10 V, 0...20 mA, 4...20 mA	TU507-ETH / TU508-ETH	CI521-MODTCP	1SAP222100R0001		0.200
-/-/8/8/8	24 V DC	Transistor	24 V DC, 0.5 A	TU507-ETH / TU508-ETH	CI522-MODTCP	1SAP222200R0001		0.200

—
CI541-DP

—
CI581-CN

—
CI511-ETHCAT

—
CI501-PNIO

—
CI521-MODTCP

AC500
Ordering data

Communication interface modules

From	To	Output signal	Terminal units	Type	Order code	Price	Weight (1 pce) kg
Gateway on Ethernet based protocol - PROFINET IO RT							
PROFINET I/O	–	3 x RS232/422/485 ASCII serial interfaces	TU520-ETH	CI504-PNIO	1SAP221300R0001		0.200
PROFINET I/O	1x CAN 2A/2B or CANopen Master	2 x RS232/422/485 ASCII serial interfaces	TU520-ETH	CI506-PNIO	1SAP221500R0001		0.200

CI504-PNIO

Hot swap terminal units

For loadless hot swapping of digital and analog expansion modules, when used in configurations with communication interface modules or AC500 CPU supporting hot swap. Hot swapping of attached expansion module mounted on hot swap terminal unit is supported by AC500 V3 CPU modules as of PM5630-2ETH, AC500 V2 CPU modules as of PM585-ETH, CI501-PNIO, CI502-PNIO, CI541-DP, CI542-DP, CI521-MODTCP and CI522-MODTCP. AC500-S safety I/O modules cannot be used in configurations containing hot swap terminal units. Mixed configurations of hot swap terminal units with normal terminal units for digital and analog expansion modules are possible. In the installation hot swap terminal units can be idenfied by the word Hot Swap and a white frame around the connection terminal area.

For	Supply	Connection type	Type	Order code	Price	Weight (1 pce) kg
I/O modules - for Hot Swap (1)	24 V DC	Spring	TU516-H	1SAP215000R0001		0.300
I/O modules AC / relay - for Hot Swap (1)	230 V AC	Spring	TU532-H	1SAP215100R0001		0.300
High current I/O module - for Hot Swap (1)	24 V DC	Spring	TU542-H	1SAP215200R0001		0.300

(1) I/O module as of index F0 needed for Hot Swap

TU516-H

AC500
Ordering data

Terminal units

For digital and analog expansion modules and interface modules. Please note: for modules with relay outputs, terminal units for 230 V AC (TU531 / TU532) are required.

For	Supply	Connection type	Type	Order code	Price	Weight (1 pce) kg
Ethernet communication interface modules	24 V DC	Screw	TU507-ETH	1SAP214200R0001		0.300
		Spring	TU508-ETH	1SAP214000R0001		0.300
Ethernet gateway modules	24 V DC	Spring	TU520-ETH	1SAP214400R0001		0.300
CANopen / PROFIBUS DP (1) communication interface modules	24 V DC	Screw	TU517	1SAP211400R0001		0.300
		Spring	TU518	1SAP211200R0001		0.300
PROFIBUS DP / CANopen communication interface modules	24 V DC	Screw	TU509	1SAP211000R0001		0.300
		Spring	TU510	1SAP210800R0001		0.300
I/O modules	24 V DC	Screw	TU515	1SAP212200R0001		0.300
		Spring	TU516	1SAP212000R0001		0.300
I/O modules AC / relay	230 V AC	Screw	TU531	1SAP217200R0001		0.300
		Spring	TU532	1SAP217000R0001		0.300
High current I/O module (DO526, PD501-4CH)	24 V DC	Screw	TU541	1SAP213000R0001		0.300
	24 V DC	Spring	TU542	1SAP213200R0001		0.300
CS31 interface modules	24 V DC	Screw	TU551-CS31	1SAP210600R0001		0.300
		Spring	TU552-CS31	1SAP210400R0001		0.300

(1) TU517/TU518 Terminal units can also be used with PROFIBUS DP CI54x modules up to 1 Mbit/s.

—
TU515

—
TU520-ETH

—
TU510

—
TU518

—
TU508-ETH

AC500
Ordering data

Terminal units compatibility

Type	For I/O modules			For communication interface modules				
	TU515 TU516 TU516-H	TU541 TU542 TU542-H	TU531 TU532 TU532-H	TU507-ETH TU508-ETH	TU509 TU510	TU517 TU518	TU520-ETH	TU551-CS31 TU552-CS31
DA501	●							
DA502	●							
DC522	●							
DC523	●							
DC532	●							
DI524	●							
DX522			●					
DX531			●					
DO524	●							
DO526		●						
CD522	● (2)							
AC522	●							
AI523	●							
AI531	●							
AO523	●							
AX521	●							
AX522	●							
PD501-4CH		● (2)						
DC551-CS31								●
CI590-CS31-HA								●
CI592-CS31								●
CI501-PNIO				●				
CI502-PNIO				●				
CI504-PNIO							●	
CI506-PNIO							●	
CI511-ETHCAT				●				
CI512-ETHCAT				●				
CI521-MODTCP				●				
CI522-MODTCP				●				
CI541-DP					●	● (1)		
CI542-DP					●	● (1)		
CI581-CN					●	●		
CI582-CN					●	●		

(1) Can be used with baud rate up to 1 Mbaud.
(2) CD522 cannot be used on TU516-H and PD501-4CH cannot be used on TU542-H.

AC500
Ordering data

Accessories for AC500

For	Description	Type	Order code	Price	Weight (1 pce) kg
AC500 CPUs COM1	Programming cable Sub-D / terminal block, length 5 m	TK502	1SAP180200R0101		0.400
AC500 CPUs COM2	Programming cable Sub-D / Sub-D, length 5 m	TK501	1SAP180200R0001		0.400
AC500 CPUs	Memory card (2 GB SD card)	MC502	1SAP180100R0001		0.020
	Lithium battery for data buffering	TA521	1SAP180300R0001		0.100
I/O modules	Pluggable marker holder for I/O modules, packing unit incl. 10 pcs. Template available in the AC500 online help	TA523	1SAP180500R0001		0.300
AC500 CPU´s, interface module, communication module and I/O modules	White labels, packing unit incl.10 pcs.	TA525	1SAP180700R0001		0.100
Terminal base	Communication Module, blind cap	TA524	1SAP180600R0001		0.120
CPU terminal base	Accessories for screw mounting, packing unit includes 10 pcs	TA526	1SAP180800R0001		0.200
	5-pole power plug for AC500. Spare part. Can be plugged to CPU terminal base TB5x1. Packing unit includes 5 pcs	TA527	1SAP181100R0001		0.200
	9-pole COM1 plug for AC500. Spare part. Can be plugged to CPU terminal base TB5x1 or on TU520-ETH. Packing unit includes 5 pcs	TA528	1SAP181200R0001		0.200
Communication modules	9-pole spring plug for CM574-RS/RCOM. Spare part. Packing unit includes 10 pcs	TA532	1SAP182000R0001		
	5-pole spring plug for CM575-DN/CM578-CN. Spare part. Packing unit includes 5 pcs	TA533	1SAP182100R0001		
	2x5-pole spring plug for CM588-CN and CM598-CN. Spare part. Packing unit includes 5 pcs.	TA534	1SAP182200R0001		
	10-pole spring plug for DC541-CM. Spare part. Packing unit includes 10 pcs.	TA536	1SAP183100R0001		
AC500 V2 training case	PM583-ETH + TB521-ETH + CM579-PNIO + DA501 + CI502-PNIO + CP6607 + Case + 115-230 V AC power supply + Ethernet cables + demo program + SD memory card + simulation stand	TA515-CASE	1SAP182400R0002		7.000
AC500 V3 training case	PM5630-2ETH + TB5620-2ETH + CM579-PNIO + DA501 + CI502-PNIO + CP6607 + Case + 115-230 V AC power supply + Ethernet cables + demo program + SD memory card + simulation stand	TA5450-CASE	1SAP187700R0001		7.000
AC500 CPUs PM595	Protective cap, spare-parts. Packing unit includes 3 pcs	TA540	1SAP182600R0001		0.200
	Lithium battery for real-time-clock buffering	TA541	1SAP182700R0001		0.030
	Accessories for screw-mounting. Packing unit includes 20 pcs	TA543	1SAP182800R0001		0.100

—
MC502

—
AC500 training case
CPU, I/Os, HMI

AC500
Technical data

AC500 CPUs

Type	PM572	PM573-ETH	PM582	PM583-ETH	PM585-ETH
Supply voltage	24 V DC				
Current consumption on 24 V DC					
Min. (module alone)	0.050 A	0.110 A	0.050 A	0.110 A	0.150 A
Max. (all couplers and I/Os)	0.750 A	0.810 A	0.750 A	0.810 A	0.850 A
User program memory – Flash EPROM and RAM	128 kB	512 kB	512 kB	1024 kB	1024 kB
Integrated user data memory	128 kB thereof 12 kB saved	512 kB thereof 288 kB saved	416 kB thereof 288 kB saved	1024 kB thereof 288 kB saved	2560 kB thereof 1536 kB saved
User Flashdisk (Data-storage, programm access or also external with FTP)	–				
Plug-in memory card	Depending on SD-Card used : no SD-HC card allowed, use MC502 accessory				
Web server's data for user RAM disk	–	1 024 kB	–	4 096 kB	4 096 kB
Data buffering	battery				
Real-time clock (with battery back-up)	●				
Cycle time for 1 instruction (minimum)					
Binary	0.06 µs	0.06 µs	0.05 µs	0.05 µs	0.004 µs
Word	0.09 µs	0.09 µs	0.06 µs	0.06 µs	0.008 µs
Floating-point	0.7 µs	0.7 µs	0.5 µs	0.5 µs	0.008 µs
Max. number of centralized inputs/outputs					
Max. number of extension modules on I/O bus	up to max. 10 (S500 and/or S500-eCo modules allowed)				
Digital inputs/outputs	320/320				
Analog inputs/outputs	160/160				
Max. number of decentralized inputs/outputs	depends on the used standard Fieldbus (1)				
Program execution					
Cyclical / Time controlled / Multi tasking	●/●/●				
User program protection by password	●				
Internal interfaces					
COM1					
RS232 / RS485 configurable	●				
Connection (on terminal bases or CPU module)	pluggable spring terminal block, use TK502 cable in accessory				
Programming, Modbus RTU, ASCII, CS31 master	●				
COM2					
RS232 / RS485 configurable	●				
Connection (on terminal bases or CPU module)	D-Sub 9 female, use TK501 cable in accessory				
Programming, Modbus RTU, ASCII	●				
FieldBusPlug					
Serial neutral interface	●				
Connection (on terminal bases)	M12 male, 5 pole				
Functions	programming cable UTF-21-FBP, slave communication depending on FieldBusPlug used (PROFIBUS DP, CANopen, DeviceNet)				
Ethernet					
Ethernet connection (on terminal bases)	–	RJ45	–	RJ45	RJ45
Ethernet functions: Programming, TCP/IP, UDP/IP, Modbus TCP, integrated Web server, IEC60870-5-104 remote control protocol, MQTT, SNTP (simple Network Time Protocol), DHCP, FTP server HTTP, SMTP, PING	–	●	–	●	●
Ethernet based Fieldbus					
Ethernet connection (on CPU module)	–				
Downloadable protocols like: PROFINET IO RT Controller / EtherCAT Master	–				
CPU display	LC display and 8 function keys				
Function	RUN / STOP, status, diagnosis				
LEDs for various status display	Run, Stop, Error				
Timer/Counter	unlimited/unlimited				
Approvals	See detailed page 248 or www.abb.com/plc				

(1) e.g. CS31 Fieldbus: up to 31 stations with up to 120 DIs / 120 DOs or up to 32 AIs / 32 AOs per station.

AC500
Technical data

AC500 CPUs

Type	PM590-ETH	PM591-ETH	PM591-2ETH	PM592-ETH	PM595-4ETH-F
Supply voltage	24 V DC				
Current consumption on 24 V DC					
Min. (module alone)	0.150 A	0.150 A	0.150 A	0.150 A	0.400 A
Max. (all couplers and I/Os)	0.850 A	0.850 A	0.850 A	0.850 A	1.2 A
User program memory – Flash EPROM and RAM	2048 kB	4096 kB	4096 kB	4096 kB	16384 kB
Integrated user data memory	3072 kB thereof 1536 kB saved	5632 kB thereof 1536 kB saved	5632 kB thereof 1536 kB saved	5632 kB thereof 1536 kB saved	16384 kB thereof 3072 kB saved
User Flashdisk (Data-storage, programm access or also external with FTP)	-			Yes, 4 GB Flash non removable	
Plug-in memory card	Depending on SD-Card used : no SD-HC card allowed, use MC502 accessory				
Web server's data for user RAM disk	8 MB				32 MB
Data buffering	battery				
Real-time clock (with battery back-up)	●				
Cycle time for 1 instruction (minimum)					
Binary	0.002 µs	0.002 µs	0.002 µs	0.002 µs	0.0006 µs
Word	0.004 µs	0.004 µs	0.004 µs	0.004 µs	0.001 µs
Floating-point	0.004 µs	0.004 µs	0.004 µs	0.004 µs	0.001 µs
Max. number of centralized inputs/outputs					
Max. number of extension modules on I/O bus	up to max. 10 (S500 and/or S500-eCo modules allowed)				
Digital inputs/outputs	320/320				
Analog inputs/outputs	160/160				
Max. number of decentralized inputs/outputs	depends on the used standard Fieldbus (1)				
Program execution					
Cyclical / Time controlled / Multi tasking	●/●/●				
User program protection by password	●				
Internal interfaces					
COM1					
RS232 / RS485 configurable	●				
Connection (on terminal bases or CPU module)	pluggable spring terminal block, use TK502 cable in accessory				
Programming, Modbus RTU, ASCII, CS31 master	●				
COM2					
RS232 / RS485 configurable	●				
Connection (on terminal bases or CPU module)	D-Sub 9 female, use TK501 cable in accessory				
Programming, Modbus RTU, ASCII	●				
FieldBusPlug					
Serial neutral interface	●				–
Connection (on terminal bases)	M12 male, 5 pole				–
Functions	programming cable UTF-21-FBP, slave communication depending on FieldBusPlug used (PROFIBUS DP, CANopen, DeviceNet)				–
Ethernet					
Ethernet connection (on terminal bases)	RJ45	RJ45	2 x RJ45	RJ45	2 x RJ45
Ethernet functions: Programming, TCP/IP, UDP/IP, Modbus TCP, integrated Web server, IEC60870-5-104 remote control protocol, MQTT, SNTP (simple Network Time Protocol), DHCP, FTP server HTTP, SMTP, PING	●	●	●	●	●
Ethernet based Fieldbus					
Ethernet connection (on CPU module)	–				4 x RJ45 (2 x interfaces with 2-port switch)
Downloadable protocols like: PROFINET IO RT Controller / EtherCAT Master or Ethernet like ModbusTCP	–				●
CPU display	LC display and 8 function keys				
Function	RUN / STOP, status, diagnosis				RUN / STOP, status, diagnosis, RESET
LEDs for various status display	Run, Stop, Error				●
Timer/Counter	unlimited/unlimited				
Approvals	See detailed page 248 or www.abb.com/plc				

(1) e.g. CS31 Fieldbus: up to 31 stations with up to 120 DIs / 120 DOs or up to 32 AIs / 32 AOs per station.
(2) Availability on demand

AC500
Technical data

AC500 V3 CPUs

Type	PM5630-2ETH	PM5650-2ETH	PM5670-2ETH	PM5675-2ETH
Supply voltage	24 V DC			
Current consumption on 24 V DC				
Min. typ. (module alone)	0.150 A	0.200 A	0.250 A	0.250 A
Max. typ. (all couplers and I/Os)	0.850 A	0.900 A	0.950 A	0.950 A
User program memory / User Data memory Web server's data – Flash EPROM and DRAM	8 MB	80 MB	160 MB	160 MB
User data memory saved	256 KB	256 KB	1.5 MB	1.5 MB
User Flashdisk (Data-storage, programm access or also external with FTP)				8 GB Flash non removable
Plug-in memory card	Depending on SD-Card used : SD / SDHC supported, use MC502 preferably accessory			
Web server's data for user RAM disk	8 MB	No limitation, included into the global User Program/ Data memory		
Data buffering	battery			
Real-time clock (with battery back-up)	●			
Cycle time for 1 instruction (minimum)				
Binary	0.02 µs	0.01 µs	0.002 µs	0.002 µs
Word	0.03 µs	0.01 µs	0.002 µs	0.002 µs
Floating-point	0.12 µs	0.01 µs	0.002 µs	0.002 µs
Communication modules supported				
Max. number of communication modules on TBs	up to 2	Up to 6 depending on available terminal bases (2)		
Type of communication module supported	CM579-PNIO, CM589-PNIO, CM579-ETHCAT, CM582-DP (2), CM592-DP (2) , CM597-ETH (2) and CM598-CN (2)			
Max. number of centralized inputs/outputs				
Max. number of extension modules on I/O bus	up to max. 10 (S500 and/or S500-eCo modules allowed)			
Digital inputs/outputs	320/320			
Analog inputs/outputs	160/160			
Max. number of decentralized inputs/outputs	depends on the used standard Fieldbus (1)			
Program execution				
Cyclical / Time controlled / multi tasking	●/●/●			
User program protection by password	●			
Internal interfaces				
COM1				
RS232 / RS485 configurable	●			
Connection (on terminal bases or CPU module)	pluggable spring terminal block, use TK502 cable in accessory			
Modbus RTU Master/Slave, ASCII	●			
CANopen				
Serial interface	CAN serial interface			
Connection (on terminal bases)	Pluggable spring terminal block, 2x 5 poles			
Functions	CANopen Master / Slave (2) communication, CAN 2A/2B, J1939 protocol			

(1) e.g. CANopen Fieldbus: up to 127 stations with up to 320 Digital channels or up to 160 Analog channels per station.
(2) In preparation
(3) Feature is licensed

AC500
Technical data

AC500 V3 CPUs

Type	PM5630-2ETH	PM5650-2ETH	PM5670-2ETH	PM5675-2ETH
Ethernet	2x independent Ethernet interfaces for several uses			
Ethernet connection (on terminal bases)	2x RJ45 with 2x separated interfaces and MAC-Address, could be used as 2-port switch with 1x interface			
Ethernet functions:				
Online Access, ICMP (Ping), DHCP	●			
IP configuration protocol	●			
UDP data exchange, Network variables	●			
Modbus TCP Client / Server	●			
IEC60870-5-104 remote control protocol	●			
HTTP / HTTPs (integrated Web server)	●			
SNTP (Time synchronization)	●			
FTP / FTPs server	●			
SMTP client	●			
Socket programming	●			
WebVisu for data visualisation on webserver HTML5	●			
Valid for all CPU before OPC UA MQTT protocol	●			
OPC UA Server (Micro Embedded Device Server) with security	●			
Ethernet Switch on ETH1 / ETH2	●			
Ethernet based Fieldbus				
Downloadable protocols (licensed feature):	available on one Ethernet interface, the other interface can be sometimes used as switch			
IEC 61850 server	● (3)	● (3)	● (3)	● (3)
PROFINET IO RT Controller	● (2)(3)	● (2)(3)	● (2)	● (2)
EtherCAT Master	● (2)(3)	● (2)(3)	● (2)	● (2)
EthernetIP Adapter	● (2)(3)	● (2)(3)	● (2)(3)	● (2)(3)
CPU display	LC display and 8 function keys			
Function	RUN / STOP, status, diagnosis			
LEDs for various status display	●			
Timer/Counter	unlimited/unlimited			
Approvals	See detailed page 248 or www.abb.com/plc			

(1) e.g. CANopen Fieldbus: up to 127 stations with up to 320 Digital channels or up to 160 Analog channels per station.
(2) In preparation
(3) Feature is licensed

AC500
Technical data

Digital S500 I/O modules

Type			DI524	DC522	DC523	DC532
Number of channels per module						
Digital	inputs		32	–	–	16
	outputs		–	–	–	–
Configurable channels DC (configurable as inputs or outputs)			–	16	24	16
Additional configuration of channels as						
Fast counter			configuration of max. 2 channels per module, operating modes see table on page 126			
Occupies max. 1 DO or DC when used as counter			–	●	●	●
Connection via terminal unit			●	●	●	●
Digital inputs						
Input signal voltage			24 V DC			
Input characteristic acc. to EN 61132-2			Type 1			
0 signal			-3...+5 V DC			
Undefined signal state			5...15 V DC			
1 signal			15...30 V DC			
Input time delay (0 -> 1 or 1 -> 0)			8 ms typically, configurable from 0.1 up to 32 ms			
Input current per channel						
At input voltage		24 V DC	5 mA typically			
		5 V DC	> 1 mA			
		15 V DC	> 5 mA			
		30 V DC	< 8 mA			
Digital outputs						
Transistor outputs 24 V DC, 0.5 A			–	●	●	●
Readback of output			–	●	●	●
Switching of load 24 V			–	●	●	●
Output voltage at signal state 1			–	process voltage UP minus 0.8 V		
Output current						
Nominal current per channel			–	0.5 A		
Maximum (total current of all channels)			–	8 A		
Residual current at signal state 0			–	< 0.5 mA		
Demagnetization when switching off inductive loads			–	by internal varistors		
Switching frequency						
For inductive load			–	0.5 Hz max.		
For lamp load			–	11 Hz max. at max. 5 W		
Short-circuit / overload proofness			–	●	●	●
Overload indication (I > 0.7 A)			–	after approx. 100 ms		
Output current limiting			–	yes, with automatic reclosure		
Proofness against reverse feeding of 24 V signals			–	●	●	●
Process voltage UP						
Nominal voltage			24 V DC			
Current consumption on UP						
Min. (module alone)			0.150 A	0.100 A	0.150 A	
Max. (min. + loads)			0.150 A	0.100 A + load	0.150 A + load	
Reverse polarity protection			●	●	●	●
Fuse for process voltage UP			10 A fast acting fuse			
Connections for sensor voltage supply. Terminal 24 V and 0 V for each connection. Permitted load for each group of 4 or 8 connections: 0.5 A			–	8	4	–
Short-circuit and overload proof 24 V DC sensor supply voltage			–	●	●	–
Maximum cable length for connected process signals						
Cable	shielded		1000 m			
	unshielded		600 m			
Potential isolation						
Per module			●	●	●	●
Between channels	input		–	–	–	–
	output		–	–	–	–
Voltage supply for the module			internally via extension bus interface (I/O bus)			
Fieldbus connection			via AC500 CPU or all communication interface modules			
Address setting			automatically (internal)			

AC500
Technical data

Digital S500 I/O modules

Type			DX522	DX531	DO524	DO526
Number of channels per module						
Digital	inputs		8	8	–	–
	outputs		8 relays	4 relays	32	8
Configurable channels DC (configurable as inputs or outputs)			–	–	–	–
Additional configuration of channels as						
Fast counter			configuration of max. 2 channels per module, operating modes see page 126	–	–	–
Occupies max. 1 DO or DC when used as counter			–	–	–	–
Connection via terminal unit			●	●	●	●
Digital inputs						
Input signal voltage			24 V DC	230 V AC or 120 V AC	–	–
Frequency range			–	47…63 Hz	–	–
Input characteristic acc. to EN 61132-2			Type 1	Type 2	–	–
0 signal			-3...+5 V DC	0...40 V AC	–	–
Undefined signal state			5...15 V DC	> 40 V AC...< 74 V AC	–	–
1 signal			15...30 V DC	74...265 V AC	–	–
Input time delay (0 -> 1 or 1 -> 0)			8 ms typically, configurable from 0.1 up to 32 ms	20 ms typically	–	–
Input current per channel						
At input voltage		24 V DC	5 mA typically	–	–	–
		5 V DC	> 1 mA	–	–	–
		15 V DC	> 5 mA	–	–	–
		30 V DC	< 8 mA	–	–	–
		40 V AC	–	< 5 mA	–	–
		74 V AC	–	> 6 mA	–	–
Digital outputs						
Transistor outputs 24 V DC			–	–	●	●
Readback output			–	–	–	–
Relay outputs, supplied via process voltage UP, changeover contacts			●	●	–	–
Switching of load	24 V		●	●	●	●
	230 V		●	●	–	–
Output voltage at signal state 1			–	–	process voltage UP minus 0.8 V	process voltage UP minus 0.4 V
Output current						
Nominal current per channel			–	–	0.5 A	2 A
Maximum (total current of all channels)			–	–	8 A	16 A
Residual current at signal state 0			–	–	< 0.5 mA	< 0.1 mA
Demagnetization when switching off inductive loads			–	–	yes	yes
Switching frequency						
For inductive load			2 Hz		0.5 Hz max.	2 Hz max.
For lamp load			11 Hz max. at max. 5 W			11 Hz max. 48 W
Short-circuit / overload proofness			by external fuse / circuit breaker. 6 A gL/gG per channel		●	by external fuse 10A fast
Overload indication (I > 0.7 A)			–	–	after approx. 100 ms	–
Output current limiting			–	–	yes, with automatic reclosure	–
Resistance against reverse feeding of 24 V signals			–	–	●	●

AC500
Technical data

Digital S500 I/O modules

Type		DX522	DX531	DO524	DO526
Contact rating					
For resistive load, max.		3 A at 230 V AC 2 A at 24 V DC		–	–
For inductive load, max.		1.5 A at 230 V AC 1.5 A at 24 V DC		–	–
For lamp load		60 W at 230 V AC 10 W at 24 V DC		–	–
Lifetime (switching cycles)					
Mechanical lifetime		300 000		–	–
Lifetime under load (DC13)		300 000 at 24 V DC / 2 A 200 000 at 120 V AC / 2 A 100 000 at 230 V AC / 3 A		–	–
Spark suppression for inductive AC load		external measure depending on the switched load		–	–
Demagnetization for inductive DC load		external measure: free-wheeling diode connected in parallel to the load		–	–
Process voltage UP					
Nominal voltage		24 V DC			
Current consumption on UP					
Min. (module alone)		0.050 A	0.150 A	0.050 A	0.050 A
Max. (module + loads)		0.050 A + load	0.150 A + load	0.100 A + load	0.100 A + load
Reverse polarity protection		●	●	●	●
Fuse for process voltage UP		10 A			
Maximum cable length for connected process signals					
Cable	shielded	1000 m			
	unshielded	600 m			
Potential isolation					
Per module		●	●	●	●
Between the channels	input	–	● (per 2)	–	–
	output	●	●	–	–
Voltage supply for the module		internally via extension bus interface (I/O bus)			
Fieldbus connection		via AC500 CPU or all communication interface modules			
Address setting		automatically (internal)			

AC500
Technical data

Analog S500 I/O modules

Type		AX521	AX522	AC522	AI523	AO523	AI531
Number of channels per module							
Individual configuration, analog	inputs	4	8	–	16	–	8
	outputs	4	8	–	–	16	–
	configurable	–	–	8	–	–	–
Signal resolution for channel configuration							
-10...+10 V		12 bits + sign					15 bits + sign
0...10 V		12 bits					15 bits
0...20 mA, 4...20 mA		12 bits					15 bits
Temperature: 0.1 °C		●	●	●	●	–	0.1/0.01
Monitoring configuration per channel							
Plausibility monitoring		●	●	●	●	●	●
Wire break & short-circuit monitoring		●	●	●	●	●	●
Analog Inputs AI							
Signal configuration per AI		max. number per module and with regard to the configuration: AIs / Measuring points (depending on the use of 2/3-wire connection or differential input)					
-50...+50 mV, -500...+500 mV, -1...+1 V, -5...+5 V, 0...+5 V		–	–	–	–	–	8 / 8
0...10 V		4 / 4	8 / 8	8 / 8	16 / 16	–	8 / 8
-10...+10 V		4 / 4	8 / 8	8 / 8	16 / 16	–	8 / 8
0...20 mA		4 / 4	8 / 8	8 / 8	16 / 16	–	8 / 8
4...20 mA		4 / 4	8 / 8	8 / 8	16 / 16	–	8 / 8
-20...+20 mA		–	–	–	–	–	8 / 8
Pt100							
-50...+400 °C (2-wire)		4 / 4	8 / 8	8 / 8	16 / 16	–	8 / 8
-50...+400 °C (3-wire), 2 channels		4 / 2	8 / 4	8 / 4	16 / 8	–	8 / 8
-50...+400 °C (4-wire)		–	–	–	–	–	8 / 8
-50...+70 °C (2-wire)		4 / 4	8 / 8	8 / 8	16 / 16	–	8 / 8
-50...+70 °C (3-wire), 2 channels		4 / 2	8 / 4	8 / 4	16 / 8	–	8 / 8
-50...+70 °C (4-wire)		–	–	–	–	–	8 / 8
Pt1000							
-50...+400 °C (2-wire)		4 / 4	8 / 8	8 / 8	16 / 16	–	8 / 8
-50...+400 °C (3-wire), 2 channels		4 / 2	8 / 4	8 / 4	16 / 8	–	8 / 8
-50...+400 °C (4-wire)		–	–	–	–	–	8 / 8
Ni1000							
-50...+150 °C (2-wire)		4 / 4	8 / 8	8 / 8	16 / 16	–	8 / 8
-50...+150 °C (3-wire), 2 channels		4 / 2	8 / 4	8 / 4	16 / 8	–	8 / 8
-50...+150 °C (4-wire)		–	–	–	–	–	8 / 8
Cu50 -200...+200 °C		–	–	–	–	–	8 / 8
Resistor 0...50 kΩ		–	–	–	–	–	8 / 8
Thermocouples of types J, K, T, N, S		–	–	–	–	–	●
0...10 V using differential inputs, 2 channels		4 / 2	8 / 4	8 / 4	16 / 8	–	8 / 8
-10...+10 V using differential inputs, 2 channels		4 / 2	8 / 4	8 / 4	16 / 8	–	8 / 8
Digital signals (digital input)		4 / 4	8 / 8	8 / 8	16 / 16	–	8 / 8
Input resistance per channel		voltage: > 100 kΩ current: approx. 330 Ω				–	voltage: > 100 kΩ current: approx. 330 Ω
Time constant of the input filter		voltage: 100 µs current: 100 µs				–	voltage: 100 µs current: 100 µs
Conversion cycle		2 ms (for 8 AI + 8 AO), 1 s for Pt100/1000, Ni1000				–	1 ms 1 s for Pt100/1000, Ni1000
Overvoltage protection		●	●	●	●	–	●

AC500
Technical data

Analog S500 I/O modules

Type		AX521	AX522	AC522	AI523	AO523	AI531
Data when using the AI as digital input							
Input	time delay	8 ms typically, configurable from 0.1 up to 32 ms				–	8 ms typically, configurable from 0.1 up to 32 ms
	signal voltage	24 V DC				–	24 V DC
Signal	0	-30...+5 V				–	-30...+5 V
	1	13...30 V				–	13...30 V
Analog outputs AO							
Possible configuration per AO		Max. number of AOs per module and with regard to the configuration:					
-10...+10 V		4	8	8	–	16	–
0...20 mA		4	4	4	–	8	–
4...20 mA		4	4	4	–	8	–
Output	resistance (burden) when used as current output	0...500 Ω			–	0...500 Ω	–
	loading capability when used as voltage output	Max. ±10 mA			–	Max. ±10 mA	–
Process voltage UP							
Nominal voltage		24 V DC					
Current consumption on UP							
Min. (module alone)		0.150 A					0.130 A
Max. (min. + loads)		0.150 A + load	0.150 A + load		–	0.150 A + load	
Reverse polarity protection		●	●	●	●	●	●
Max. line length of the analog lines, conductor cross section > 0.14 mm²		100 m					
Conversion error of analog values caused by non-linearity, calibration errors ex works and the resolution in the nominal range		0.5 % typically, 1 % max.					Voltage: 0.1 % typically, current/ resistor 0.3 % typically
Potential isolation							
Per module		●	●	●	●	●	–
Fieldbus connection		Via AC500 CPU or all communication interface modules					
Voltage supply for the module		Internally via extension bus interface (I/O bus)					–

(1) Half can be used on current (the other half remains available).

AC500
Technical data

CD522 encoder module

The CD522 module offers accuracy and dynamic flexibility for a customized solution. It has two independent encoder inputs onboard and is easily configured using the Automation Builder software for 10 different operation modes and for frequencies up to 300 kHz (depending on CPU cycle time). The CD522 module also integrates outputs for pulses and for PWM as well as normal inputs and outputs, depending on selected encoder mode.

Type			**CD522**
Functionality			
Digital inputs/outputs			24 V DC, dedicated inputs/outputs can be used for specific counting functions. All unused inputs/outputs can be used as input/output with standard specification.
	Input options		Catch/Touch operation, counter value stored in separate variable on external event (rising or falling)
			Set to preset counter register with predefined value
			Set to reset counter register
	End value output		Output set when predefined value is reached
	Reference point initialization (RPI) input for relative encoder initialization		●
High-speed counter/encoder			
Integrated counters	Counter characteristics		2 counters (24 V DC, 5 V DC, differential and 1 Vpp sinus input)
	Counter mode		one 32 bits or two 16 bits
	Relative position encoder		X1, X2, X4
	Absolute SSI encoder		●
	Time frequency meter		●
	Frequency input		up to 300 kHz
PWM/pulse outputs			
Output mode specification	Number of outputs		2
	Push pull output		24 V DC, 100 mA max
	Current limitation		Thermal and overcurrent
PWM mode specification	Frequency		1…100 kHz
	Value		0…100 %
Pulse mode specification	Frequency		1…15 kHz
	Pulse emission		1…65535 pulses
	Number of pulses emitted indicator		0…100 %
Frequency mode specification	Frequency output		100 kHz
	Duty Cycle		Set to 50 %
Number of channels per module			
Digital	input		2
	output		2
Configurable channels DC (configurable as inputs or outputs)			8
Additional configuration of channels as			
Fast counter			Integrated 2 counter encoders
Connection via terminal unit			●
Digital Inputs			
Input	signal voltage		24 V DC
	time delay		8 ms typically configurable from 0.1 up to 32 ms
Input current per channel			
At input voltage		24 V DC	Typically 5 mA
		5 V DC	> 1 mA
		15 V DC	> 5 mA
		30 V DC	< 8 mA
Digital outputs			
Output voltage at signal state 1			UP – 0.8 V

AC500
Technical data

CD522 encoder module

Type		CD522
Output current		
Nominal current per channel		0.5 A
Maximum (total current of all channels)		8 A
Residual current at signal state 0		< 0.5 mA
Demagnetization when switching off inductive loads		By internal varistors
Switching frequency		
For inductive load		Max. 0.5 Hz
For lamp load		Max. 11 Hz with max. 5 W
Short-circuit / Overload proofness		●
Overload indication (I > 0.7 A)		After approx. 100 ms
Output current limiting		●
Proofness against reverse feeding of 24 V signals		●
Maximum cable length for connected process signals		
Cable	shielded	1000 m
	unshielded	600 m
Potential isolation		
Per module		●
Technical data of the high-speed inputs		
Number of channels per module		6
Input type		24 V DC, 5 V DC / Differential / Sinus 1 Vpp
Frequency		300 kHz
Technical data of the fast outputs		
Number of channels		2
Indication of the output signals		Brightness of the LED depends on the number of pulses emitted (0 % to 100 %) (pulse output mode only)
Output current		
Rated value, per channel		100 mA
Maximum value (all channels together, configurable outputs included)		8 A
Leakage current with signal 0		< 0.5 mA
Rated protection fuse on UP		10 A fast
De-magnetization when inductive loads are switched off		with varistors integrated in the module
Overload message (I > 0.1 x A)		Yes, after ca. 100 ms
Output current limitation		Yes, automatic reactivation after short-circuit/overload
Resistance to feedback against 24 V signals		Yes
Process voltage UP		
Nominal voltage		24 V DC
Maximum ripple		5 %
Current consumption on UP		
Min. (module alone)		0.070 A
Max. (min. + loads)		0.070 A + load
Reverse polarity protection		●
Fuse for process voltage UP		10 A miniature fuse

AC500
Technical data

Analog/digital mixed I/O expansion modules

For all modules: max cable length for connected process signals is 1000 m for shielded cable and 600 m for unshielded ones. For all Input modules, the signal resolution for channel configuration is: -10…+10 V: 12 bit + sign; 0…10 V, 0…20 mA, 4…20 mA: 12 bits.

Type			DA501	DA502
Number of Channels per Module				
Digital		inputs	16	–
		outputs	–	16
Analog		inputs	4	4
		outputs	2	2
Digital configurable channels DC (configurable as inputs or outputs)			8	8
Additional configuration of channels as				
Fast counter			Yes	
Occupies max. 1 DO or DC when used as counter			Configuration of max. 2 channels per module. Operating modes see table on page 126	
Connection via terminal unit TU 5xx			●	
Digital inputs				
Input	signal voltage		24 V DC	
	characteristic acc. to EN 61132-2		Type 1	
0 signal			-3...+5 V DC	
Undefined signal state			5...15 V DC	
1 signal			15...30 V DC	
Residual ripple, range for		0 signal	-3...+5 V DC	
		1 signal	15...30 V DC	
Input time delay (0 -> 1 or 1 -> 0)			8 ms typically, configurable from 0.1 up to 32 ms	
Digital outputs				
Transistor outputs 24 V DC, 0.5 A			●	
Readback of output			●	
Outputs, supplied via process voltage UP			●	
Switching of 24 V load			●	
Output voltage at signal state 1			Process voltage UP - 0.8 V	
Output current				
Nominal current per channel			0.5 A	
Maximum (total current of all channels)			4 A	
Residual current at signal state 0			< 0.5 mA	
Demagnetization when switching off inductive loads			By internal varistors	
Analog inputs AI			Max. number per module and with regard to the configuration: AIs / Measuring points	
Signal configuration per AI			●	
0…10 V / -10 … +10 V			4 / 4	
0…20 mA / 4…20 mA			4 / 4	
RTD using 2/3 wire needs 1/2 channel(s)			4 / 2	
0…10 V using differential inputs, needs 2 channels			4 / 2	
-10…+10 V using differential inputs, needs 2 channels			4 / 2	
Digital signals (digital input)			4 / 4	
Data when using the AI as digital input				
Input		time delay	8 ms typically, configurable from 0.1 up to 32 ms	
		signal voltage	24 V DC	
Outputs, single configurable as				
Possible configuration per AO			●	
-10…+10 V			●	
0…20 mA / 4…20 mA			●	
Output resistance (load) when used as current output			0...500 Ω	
Output loading capability when used as voltage output			±10 mA max.	
Potential isolation				
Per module			●	
Process voltage UP				
Nominal voltage			24 V DC	
Maximum ripple			5 %	
Current consumption on UP				
Min. (module alone)			0.070 A	
Max. (min. + loads)			0.070 A + load	
Reverse polarity protection			●	
Fuse for process voltage UP			10 A fast	
Approvals			See detailed page 248 or www.abb.com/plc	

AC500
Technical data

Positioning module PD501-4CH
The module is intended for positioning with 24 V DC motors. The movement of 4 motors can be controlled in forward and reverse direction. One analog input per axis is provided to read back the position.

Type	PD501-4CH
Number of channels per module	
Digital outputs	4
Analog inputs	4
Sensor supply output	1
Digital outputs	
Type of outputs	Full H bridge with transistor
Rating of outputs	24 V DC, 4 A
Analog inputs	
Input type	Voltage
Input range	0 to 10 V
Error at 25°C	0.5 %
Resolution	12 bit
Sensor supply output	
Output voltage	10 V DC
Accuracy	0.1 %
Max. load current	90 mA
Overload protection	●
Process voltage UP	
Nominal voltage	24 V DC
Potential isolation	
Per module	●
Between digital output channels	In groups of 2 outputs
Between analog and digital channels	●

AC500
Technical data

DC541-CM interrupt I/O and fast counter module

In the operating mode counter, the channels can be configured as follows:
Input, Output, 32-bit up/down counter (uses C0...C3) as a 32-bit counter without limit, 32-bit periodic counter as a 32-bit counter with a limit, limiter for a 32-bit counter (limit channel 0), 32-bit up counter (forward counter) with the frequencies 50 kHz, 5 kHz and 2.5 kHz, pulse-width modulation (PWM) with a resolution of 10 kHz, time and frequency measurement, frequency output.

Type			DC541-CM
Number of channels per module			
Configurable channels DC (configurable as inputs or outputs)			8
Additional configuration of channels as			
Fast counter			Yes
Connection via CPU terminal base. Occupies one communication module slot			●
Digital inputs			
Input	signal voltage		24 V DC
	characteristic acc. to EN 61132-2		Type 1
0 signal			-3...+5 V DC
Undefined signal state			5...15 V DC
1 signal			5...30 V DC
Input time delay (0 -> 1 or 1 -> 0)			20 µs Clamp to clamp - 300 µs with interrupt task
Input current per channel			
At input voltage		24 V DC	5 mA typically
		5 V DC	> 1 mA
		15 V DC	> 5 mA
		30 V DC	< 8 mA
Digital outputs			
Transistor outputs 24 V DC, 0.5 A			●
Readback of output			●
Switching of 24 V load			●
Output voltage at signal state 1			Process voltage UP minus 0.8 V
Output current			
Nominal current per channel			0.5 A
Maximum (total current of all channels)			4 A
Residual current at signal state 0			< 0.5 mA
Demagnetization when switching off inductive loads			yes
Potential isolation			
Per module			●
Voltage supply for the module			Internally via backplane bus

Interrupt I/O table

Configuration as		Configuration for channel no.					Max. no. of channels for this function	Remarks and notes regarding possible alternative combinations of the remaining channels (a and b)
		Chan. 0	Chan. 1	Chan. 2	Chan. 3	Chan. 4-7		
Mode 1: Interrupt functionality								
Interrupt	Digital input	1	1	1	1	4	8	Each channel can be configured individually as interrupt input or output
	Digital output	1	1	1	1	4	8	
Mode 2: Counting functionality								
Digital I/Os PWM (1)	Digital input	1	1	1	1	4	8	Usual input
	Digital output	1	1	1	1	4	8	Usual output
	PWM, resolution 10 kHz	1	1	1	1	4	8	Outputs and pulsed signal with and adjustable on-off ratio

(1) Counter and fast counter data available on technical documentation.

AC500
Technical data

AC500 Condition Monitoring CMS: FM502-CMS
The FM502-CMS function module offers precision and dynamic flexibility for customized solutions in condition monitoring, precise measurement or fast data logging applications. It has 16 fast, precise and synchronized analog inputs with 50k Samples/s (SPS), 24bit ADC resolution, completed with encoder inputs (incremental or absolute) with counter and additional DI and DC inputs/outputs onboard. It is easily configured using the Automation Builder software and the special libraries. Overall it has 12 different operation modes. One FM502 function module can be placed on the right side of PM592-ETH CPU with a special function module terminal base TF5x1, to interface directly to the CPU. While long measurements can be flexibly configured, started and stopped, all inputs are available in the I/O Image of CPU for immediate use (measurement, protection, control, ...)

Type	**FM502-CMS**	
Data storage		
Fast user data memory of FM502	128 MB (ca. 33 million Samples: e.g 40 s record length on 16 channels at 50k SPS or 5.8 h record lenght on 16 channels at 100 SPS or 93 h on 1 channel at 100 SPS)	
File Format delivered to PM592 flash	WAV (compact binary) per channel, all channels in one *.zip w. time stamp	
Analog inputs		
Number of channels	16 (synchronous sampled)	
Resolution	24 bit ADC, stored in DINT in WAV file (4byte per value)	
Accurracy at +25 °C	< +/- 0.1 %	
Accurracy over operating temperature and vibration	< +/- 0.5 %	
Sample rate / Bandwidth (High, 0 dB)	50k SPS / 20 kHz to 100 SPS / 40 Hz (digitally downsampled, selectable per channel)	
Indication of the input signal	One bicolor LED per channel for configuration, measurement status, error messages	
Input option:	**IEPE (with Sensor supply current)**	**+ - 10 V**
Bandwidth low (- 3 dB)	digital < 0.1 Hz	digital < 0.1 Hz or DC (selectable)
Pass band high (- 3 dB)	analog > 90 kHz, digital > 24.5 kHz	
Stop band high (> - 100 dB)	analog > 1 MHz, digital > 27.5 kHz	
Dynamic Range (SFDR)	> 100 dB	
SINAD (300 Hz/1 kHz sine, 50 k SPS) 0dB from full scale	< -90 dB	< - 95 dB
IEPE Current Source per channel	Typ. 4.2 mA (+/- 7 % over temperature)	(n.a.)
Resistance AI- to M (ground)	Typ ~ 27Ohm (PTC)	
Channel input impedance (AI+/AI-):		
< 1kHz	> 1 MOhm	> 2 MOhm
5kHz	> 100 kOhm	> 40 kOhm
10kHz	> 60 kOhm	> 25 kOhm
20kHz	> 40 kOhm	> 8 kOhm
Error detection	Short circuit, open wire	
Max. cable length, shielded (depending on sensor)	100 m	
Digital inputs/outputs		
	24 V DC, dedicated inputs/outputs can be used for specific counting functions.	
	All unused inputs/outputs can be used as normal input/output with standard specification.	
Channels and types	2 DI + 2 DC (configurable inputs/outputs); Type 1, LED indication	
Input options	Catch/Touch operation, counter value stored in separate variable on external event (rising or falling)	
	Set to preset counter register with predefined value	
	Set to reset counter register	
End value output	Output set when predefined value is reached	
Reference point initialization (RPI) input for relative encoder initialization	●	
Input current p. channel @ V DC		
24 V DC	Typically 5 mA	
5 V DC	> 1 mA	
15 V DC	> 5 mA	
30 V DC	< 8 mA	

AC500
Technical data

Type	FM502-CMS	
Digital outputs		
Output voltage at signal state 1	(L+) – 0.8 V	
Output current		
Nominal current per channel	0.5 A	
Residual current at signal state 0	< 0.5 mA	
Demagnetization when switching off inductive loads	By internal varistors	
Switching frequency		
For inductive load	Max. 0.5 Hz	
For lamp load	Max. 11 Hz with max. 5 W	
Short-circuit / Overload proofness	●	
Overload indication (I > 0.7 A)	After approx. 100 ms	
Output current limiting	●	
Resistance against reverse feeding of 24 V signals	●	
Maximum cable length for connected process signals		
shielded	1000 m	
unshielded	600 m	
High-speed counter/encoder		
Integrated counters		
Counter characteristics	2 counters (24 V DC, 5 V DC, differential RS422: 5 V or 1 Vpp sinus input)	
Counter mode	one counter 32 bits or two counters 16 bits	
Relative position encoder	X1, X2, X3	
Absolute SSI encoder	●	
Time frequency meter	●	
Frequency input	up to 300 kHz	
Additional configuration of channels as		
Fast counter	Integrated 2 counter encoders	
high-speed inputs		
Number of channels, type per module	3 (A,B,Z), type 1	
Input type	24 V DC	5 V DC / Differential / Sinus 1 Vpp
Frequency	up to 300 kHz (input filter: 50,500, 5 k, 20 k Hz)	
Input frequency max. (frequency measurement only)	100 kHz (accuracy -0 %/+3 %)	
Max. cable length, shielded (depending on sensor)	300 m	100 m
Fast outputs		
SSI CLK output B	f. optical Interface (according SSI): Pin 1.3	RS-422 differential (according SSI) Pins 1.3, 1.4
Output delay (0->1 or 1->0)	Max. 0.35 µs	
Output current	≤ 10 mA	
Switching frequency (selectable)	200 kHz, 500 kHz and 1 MHz	
Short-circuit proof / overload proof	Yes	
Output current limitation	Yes, automatic reactivation after short-circuit/overload	
Resistance to feedback against 24V signals	Yes	
Resistance to feedback against reverse polarity	Yes	
Max. cable length, shielded (depending on sensor)	100 m	
Process voltage L+		
Nominal voltage	24 V DC	
Current consumption from L+ (FM502 and PM592, no communication module)	Max. 0.43 A + max. 0.5 A per output	
Inrush current from L+ (at power up, FM502 and PM592, no communication module)	1.2 A^2s	
Electrical isolation	Yes, (PM592 and FM502 to other I/O-Bus modules)	
Max. power dissipation within the FM502 module	6.5 W (outputs unloaded)	
5-V-encoder supply output		
Nominal voltage	5 V DC (+/- 5 %), 100 mA max.	

AC500
Technical data

AC500 communication modules

- Up to 4 communications modules can be used on an AC500 CPU
- No external power supply required.

Type	CM592-DP	CM582-DP	CM597-ETH	CM598-CN	CM588-CN	CM579-PNIO
Communication interfaces						
RJ45	–	–	● (x 2) (2)	–	–	● (x 2) (2)
RS-232 / 485	–	–	–	–	–	–
Terminal blocks (1)	–	–	–	●	●	–
Sub-D socket	●	●	–	–	–	–
Protocols	PROFIBUS DP V0/V1 master	PROFIBUS DP V0/V1 slave	Ethernet (TCP/IP, UPD/IP, Modbus TCP)	CANopen master	CANopen slave	PROFINET IO controller
CPU interface	8 kB Dual-port memory	8 kB Dual-port memory	8 kB Dual-port memory	8 kB Dual-port memory	8 kB Dual-port memory	8 kB Dual-port memory
Transfer Rate	9.6 kbit/s to 12 Mbit/s	9.6 kbit/s to 12 Mbit/s	10 / 100 Mbit/s	10 kbit/s to 1 Mbit/s	10 kbit/s to 1 Mbit/s	100 Mbit/s
Co-processor						
Memory	–	–	–	–	–	–
Additional features	Multi master functionality Max. Number of subscribers: • 126 (V0) • 32 (V1)	–	Online access, ICMP (Ping), DHCP, IP configuration protocol, UDP data exchange, Modbus TCP	CAN 2.0A CAN 2.0B CANopen	NMT Slave PDO SDO server Heartbeat Nodeguard	RTC - Real-time Cyclic Protocol, Class 1 RTA - Real-time Acyclic Protocol DCP Discovery and Configuration Protocol CL-RPC - Connectionless Remote Procedure Call

Type	CM589-PNIO	CM589-PNIO-4	CM579-ETHCAT	CM574-RS	CM574-RCOM
Communication interfaces					
RJ45	● (x 2) (2)	● (x 2) (2)	● (x 2)	–	–
RS-232 / 485	–	–	–	● (x 2)	● (x 2)
Terminal blocks (1)	–	–	–	● (x 2)	● (x 2)
Sub-D socket	–	–	–	–	–
Protocols	PROFINET IO device	PROFINET IO 4 x devices	EtherCAT master	Serial COM ASCII, Modbus RTU, CS31	Serial RCOM/RCOM+
CPU interface	8 kB Dual-port memory	8 kB Dual-port memory	8 kB Dual-port memory	8 kB Dual-port memory	8 kB Dual-port memory
Transfer Rate	100 Mbit/s	100 Mbit/s	10 / 100 Mbit/s	9.6 kBit/s up to 187.5 kBit/s	2,4 kBit/s to 19.2 kBit/s
Co-processor				Programmable CPU like PM57x with PowerPC 50 MHz processor	
Memory	–	–	–	256 kB program memory 384 kB data memory	–
Additional features	RTC - Real-time Cyclic Protocol, Class 1 RTA - Real-time Acyclic Protocol DCP Discovery and Configuration Protocol LLDP - Link Layer Discovery Protocol	RTC - Real-time Cyclic Protocol, Class 1 RTA - Real-time Acyclic Protocol DCP Discovery and Configuration Protocol LLDP - Link Layer Discovery Protocol	CoE (Can over Ethercat) process data (PDO) (cyclic) CoE Mailbox data (SDO) (acyclic) Distributed Clock (32-bit, 64-bit)	• Stand alone CPU in coupler module housing allowing to be used as standard serial interface or as free programmable serial interface coupler. • Independant internal CPU programmable for own communication protocol or data processing. • 2 x CS31 master, Modbus master/slave, free configurable, protocols ASCII.	–

(1) Plug-in terminal block included.
(2) 10 / 100 Mbit/s, full/half duplex with auto-sensing, 2-port switch integrated

AC500
Technical data

Communication interface modules
For all modules: max cable length for connected process signals is 1000 m for shielded cable and 600 m for unshielded ones. For all Input modules, the signal resolution for channel configuration is: -10…+10 V: 12 bits + sign; 0…10 V, 0…20 mA, 4…20 mA: 12 bits. Temperature: 0.1 °C.

Type		DC551-CS31	CI590-CS31-HA (1)	CI592-CS31
Communication Interface				
Protocol		Proprietary CS31 bus protocol on RS485 interface		
ID configuration		Per rotary switches on front face from 00d to 99d		
Field bus connection on terminal units		CS31 field bus, via terminal / redundant for CI590-CS31-HA on TU551-CS31 or TU552-CS31		
Number of Channels per Module				
Digital	inputs	8	–	8
	outputs	–	–	–
Analog	inputs	–	–	4
	outputs	–	–	2
Digital configurable channels DC (configurable as inputs or outputs)		16	16	8
Additional configuration of channels as				
Fast counter		Configuration of max. 2 channels per module		
Occupies max. 1 DO or DC when used as counter		●	●	●
Connection				
Via terminal unit TU5xx		●	●	●
Local I/O extension				
Max. number of extension modules		max. 7 x S500 extension modules (standard or eCo), up to 31 stations with up to 120 DIs/120 DOs or up to 32 AIs/32AOs per station		
			not for S500-eCo I/O modules	
Digital inputs				
Input	signal voltage	24 V DC		
	characteristic acc. to EN 61132-2	Type 1		
0 signal		-3...+5 V DC		
Undefined signal state		5...15 V DC		
1 signal		15...30 V DC		
Residual ripple, range for	0 signal	-3...+5 V DC		
	1 signal	15...30 V DC		
Input time delay (0 -> 1 or 1 -> 0)		8 ms typically, configurable from 0.1 up to 32 ms		
Digital outputs				
Transistor outputs 24 V DC, 0.5 A		●		
Readback of output		●		
Outputs, supplied via process voltage UP		●		
Switching of 24 V load		●		
Output voltage at signal state 1		Process voltage UP - 0.8 V		
Output current				
Nominal current per channel		0.5 A		
Maximum (total current of all channels)		8 A	8 A	4 A
Residual current at signal state 0		< 0.5 mA		
Demagnetization when switching off inductive loads		By internal varistors		
Analog inputs AI		Max. number per module and with regard to the configuration: AIs / Measuring points		
Signal configuration per AI		–		●
0…10 V / -10…+10 V		–		4 / 4
0…20 mA / 4…20 mA		–		4 / 4
RTD using 2/3 wire needs 1/2 channel(s)		–		4 / 2
0…10 V using differential inputs, needs 2 channels		–		4 / 2
-10…+10 V using differential inputs, needs 2 channels		–		4 / 2
Digital signals (digital input)		–		4 / 4

(1) Dedicated to High Availability.

AC500
Technical data

Communication interface modules

Type		DC551-CS31	CI590-CS31-HA (1)	CI592-CS31
Data when using the AI as digital input				
Input	time delay	–		8 ms typically, configurable from 0.1 up to 32 ms
	signal voltage	–		24 V DC
Outputs, single configurable as				
Possible configuration per AO		–		●
-10…+10 V		–		●
0…20 mA / 4…20 mA		–		●
Output	resistance (load) when used as current output	–		0...500 Ω
	loading capability when used as voltage output	–		±10 mA max.
Potential isolation				
Per module		●	●	●
Between fieldbus interface against the rest of the module		●	●	●
Voltage supply for the module		By external 24 V DC voltage via terminal UP		
Process voltage UP				
Nominal voltage		24 V DC		
Current consumption on UP				
	Min. (module alone)	0.100 A	0.100 A	0.070 A
	Max. (min. + loads)	0.100 A + load	0.100 A + load	0.070 A + load
Reverse polarity protection		●		
Fuse for process voltage UP		10 A miniature fuse		
Approvals		See detailed page 248 or www.abb.com/plc		

(1) Dedicated to High Availability.

AC500
Technical data

PROFIBUS-DP modules

Type			CI541-DP	CI542-DP
Communication Interface				
Protocol			PROFIBUS DP (DP-V0 and DP-V1 slave)	
ID configuration			Per rotary switches on front face from 00h to FFh	
Field bus connection on terminal units			Sub-D 9 poles on TU509, TU510 preferred but TU517/TU518 can be used with baud rate up to 1Mbaud	
Number of Channels per Module				
Digital		inputs	8	8
		outputs	8	8
Analog		inputs	4	–
		outputs	2	–
Digital configurable channels DC (configurable as inputs or outputs)			–	8
Additional configuration of channels as				
Fast counter (onboard I/O)			Configuration of max. 2 DI channels per module	
Occupies max 1 DO or DC when used as counter			●	
Connection				
Local I/O extension			●	
Max. number of extension modules			max. 10 x S500 extension modules (standard or eCo modules allowed). Fast counter from digital IO modules can be also used.	
Via terminal unit TU5xx			●	
Digital inputs				
Input	signal voltage		24 V DC	
	characteristic acc. to EN 61132-2		Type 1	
0 signal			-3...+5 V DC	
Undefined signal state			5...15 V DC	
1 signal			15...30 V DC	
Residual ripple, range for		0 signal	-3...+5 V DC	
		1 signal	15...30 V DC	
Input time delay (0 -> 1 or 1 -> 0)			8 ms typically, configurable from 0.1 up to 32 ms	
Digital outputs				
Transistor outputs 24 V DC, 0.5 A			●	
Readback of output			–	● (on DC outputs)
Outputs, supplied via process voltage UP			●	
Switching of 24 V load			●	
Output voltage at signal state 1			Process voltage UP - 0.8 V	
Output current				
Nominal current per channel			0.5 A	
Maximum (total current of all channels)			8 A	
Residual current at signal state 0			< 0.5 mA	
Demagnetization when switching off inductive loads			By internal varistors	
Analog Inputs AI			Max. number per module and with regard to the configuration: AIs / Measuring points	
Signal configuration per AI			4	–
0...10 V / -10...+10 V			4 / 4	–
0...20 mA / 4...20 mA			4 / 4	–
RTD using 2/3 wire needs 1/2 channel(s)			4 / 2	–
0...10 V using differential inputs, needs 2 channels			4 / 2	–
-10...+10 V using differential inputs, needs 2 channels			4 / 2	–
Digital signals (digital input)			4 / 4	–
Data when using the AI as digital input				
Input	Input time delay		8 ms typically, configurable from 0.1 up to 32 ms	–
	signal voltage		24 V DC	–

AC500
Technical data

PROFIBUS-DP modules

Type			CI541-DP	CI542-DP
Outputs, single configurable as				
Possible configuration per AO			●	–
-10…+10V			●	–
0…20 mA / 4…20 mA			●	–
Output	resistance (load) when used as current output		0...500 Ω	–
	loading capability when used as voltage output		±10 mA max.	–
Potential isolation				
Per module			●	●
Between fieldbus interface against the rest of the module			●	●
Between the channels		input	–	–
		output	–	–
Voltage supply for the module			By external 24 V DC voltage via terminal UP	
Process voltage UP				
Nominal voltage			24 V DC	
Current consumption on UP				
Min. (module alone)			0.260 A	
Max. (min. + loads)			0.260 A + load	
Reverse polarity protection			●	
Fuse for process voltage UP			10 A miniature fuse	
Approvals			See detailed page 248 or www.abb.com/plc	

AC500
Technical data

CANopen modules

Type			CI581-CN	CI582-CN
Communication interface				
Protocol			CANopen slave, DS401 profile selectable using rotary switches	
ID configuration			Per rotary switches on front face for CANopen ID node from 00h to 7Fh and 80h to FFh for CANopen DS401 profile	
Field bus connection on terminal units			Terminal blocks on TU517/TU518 or TU509/TU510	
Number of channels per module				
Digital		inputs	8	8
		outputs	8	8
Analog		inputs	4	–
		outputs	2	–
Digital configurable channels DC (configurable as inputs or outputs)			–	8
Additional configuration of channels as				
Fast counter (onboard I/O)			Configuration of max. 2 DI channels per module	
Occupies max. 1 DO or DC when used as counter			●	●
Connection				
Local I/O extension			●	
Max. number of extension modules			max. 10 x S500 extension modules (standard or eCo modules are allowed)	
Via terminal unit TU5xx			●	●
Digital inputs				
Input	signal voltage		24 V DC	
	characteristic acc. to EN 61132-2		Type 1	
0 signal			-3...+5 V DC	
Undefined signal state			5...15 V DC	
1 signal			15...30 V DC	
Residual ripple, range for		0 signal	-3...+5 V DC	
		1 signal	15...30 V DC	
Input time delay (0 -> 1 or 1 -> 0)			8 ms typically, configurable from 0.1 up to 32 ms	
Digital outputs				
Transistor outputs 24 V DC, 0.5 A			●	
Readback of output			–	● (on DC outputs)
Outputs, supplied via process voltage UP			●	
Switching of 24 V load			●	
Output voltage at signal state 1			Process voltage UP - 0.8 V	
Output current				
Nominal current per channel			0.5 A	
Maximum (total current of all channels)			8 A	
Residual current at signal state 0			< 0.5 mA	
Demagnetization when switching off inductive loads			By internal varistors	
Analog Inputs AI			Max. number per module and with regard to the configuration: AIs / Measuring points	
Signal configuration per AI			4	–
0…10 V / -10…+10 V			4 / 4	–
0…20 mA / 4…20 mA			4 / 4	–
RTD using 2/3 wire needs 1/2 channel(s)			4 / 2	–
0…10 V using differential inputs, needs 2 channels			4 / 2	–
-10…+10 V using differential inputs, needs 2 channels			4 / 2	–
Digital signals (digital input)			4 / 4	–
Data when using the AI as digital input				
Input		time delay	8 ms typically, configurable from 0.1 up to 32 ms	–
		signal voltage	24 V DC	–

AC500
Technical data

CANopen modules

Type			CI581-CN	CI582-CN
Outputs, single configurable as				
Possible configuration per AO			●	–
-10…+10 V			●	–
0…20 mA / 4…20 mA			●	–
Output	resistance (load) when used as current output		0...500 Ω	–
	loading capability when used as voltage output		±10 mA max.	–
Potential isolation				
Per module			●	●
Between fieldbus interface against the rest of the module			●	●
Between the channels		input	–	–
		output	–	–
Voltage supply for the module			By external 24 V DC voltage via terminal UP	
Process voltage UP				
Nominal voltage			24 V DC	
Current consumption on UP				
Min. (module alone)			0.260 A	
Max. (min. + loads)			0.260 A + load	
Reverse polarity protection			●	
Fuse for process voltage UP			10 A miniature fuse	
Approvals			See detailed page 248 or www.abb.com/plc	

AC500
Technical data

PROFINET IO RT device modules

Type			CI501-PNIO	CI502-PNIO	CI504-PNIO	CI506-PNIO
Communication interface						
Ethernet Interface						
Main protocol			PROFINET IO RT device			
ID Device configuration			By rotary switch on the front side, from 00h to FFh			
Ethernet connection on terminal units			2 x RJ45 with switch functionality for simple daisy chain on TU507-ETH or TU508-ETH or TU520-ETH			
Gateway Interface						
Gateway to			–	–	3 x RS232 / RS422 / RS485 ASCII serial interfaces	CAN / CANopen Master + 2 x RS232 / RS422 / RS485 ASCII serial interfaces
Fieldbus Protocol used			–	–	–	CAN 2A/2B Master - CANopen Master (1)
CAN physical interface			–	–	–	1 x 10 poles pluggable spring connector
Baudrate			–	–	–	Baudrate up to 1 MBit/s, Support for up to 126 CANopen Slaves
Serial interface			–	–	3 x RS232 / RS422 or RS485	2 x RS232 / RS422 or RS485
Protocol used			–	–	ASCII	ASCII
Baudrate			–	–	Configurable from 300 bit/s to 115200 bit/s	
Fieldbus or serial connection on terminal units			–	–	3 x pluggable terminal blocks with spring on TU520-ETH	
Number of channels per module						
Digital		inputs	8	8	–	–
		outputs	8	8	–	–
Analog		inputs	4	–	–	–
		outputs	2	–	–	–
Digital configurable channels DC (configurable as inputs or outputs)			–	8	–	–
Additional configuration of channels as						
Fast counter (onboard I/O)			Configuration of max. 2 DI channels per module		–	–
Occupies max. 1 DO or DC when used as counter			●		–	–
Connection						
Local I/O extension			●		●	●
Max. number of extension modules			max. 10 x S500 extension modules (standard or eCo modules allowed). Fast counter from digital IO modules can be also used.		Valid for CI501, 502, 504 and 506. All modules can have extension up to 10 modules	
Via terminal unit TU5xx			●	●	●	●
Digital inputs						
Input	signal voltage		24 V DC		–	–
	characteristic acc. to EN 61132-2		Type 1		–	–
0 signal			-3...+5 V DC		–	–
Undefined signal state			5...15 V DC		–	–
1 signal			15...30 V DC		–	–
Residual ripple, range for		0 signal	-3...+5 V DC		–	–
		1 signal	15...30 V DC		–	–
Input time delay (0 -> 1 or 1 -> 0)			8 ms typically, configurable from 0.1 up to 32 ms		–	–
Digital outputs						
Transistor outputs 24 V DC, 0.5 A			●		–	–
Readback of output			–	● (on DC outputs)	–	–
Outputs, supplied via process voltage UP			●		–	–
Switching of 24 V load			●		–	–
Output voltage at signal state 1			Process voltage UP - 0.8 V		–	–

(1) Not simultaneously.

AC500
Technical data

PROFINET IO RT device modules

Type			CI501-PNIO	CI502-PNIO	CI504-PNIO	CI506-PNIO
Output current						
Nominal current per channel			500 mA at UP = 24 V DC		–	–
Maximum (total current of all channels)			8 A		–	–
Residual current at signal state 0			< 0.5 mA		–	–
Demagnetization when switching off inductive loads			By internal varistors		–	–
Analog inputs AI			Max. number per module and with regard to the configuration: AIs / Measuring points			
Signal configuration per AI			4	–	–	–
0…10 V / -10… +10 V			4 / 4	–	–	–
0…20 mA / 4…20 mA			4 / 4	–	–	–
RTD using 2/3 wire needs 1/2 channel(s)			4 / 2	–	–	–
0…10 V using differential inputs, needs 2 channels			4 / 2	–	–	–
-10…+10 V using differential inputs, needs 2 channels			4 / 2	–	–	–
Digital signals (digital input)			4 / 4	–	–	–
Data when using the AI as digital input						
Input		time delay	8 ms typically, configurable from 0.1 up to 32 ms	–	–	–
		signal voltage	24 V DC	–	–	–
Outputs, single configurable as						
Possible configuration per AO			●	–	–	–
-10…+10 V			●	–	–	–
0…20 mA / 4…20 mA			●	–	–	–
Output	resistance (load) when used as current output		0…500 Ω	–	–	–
	loading capability when used as voltage output		±10 mA max.	–	–	–
Potential isolation						
Per module			●	●	●	●
Between Ethernet interface against the rest of the module			●	●	●	●
Voltage supply for the module			By external 24 V DC voltage via terminal UP			
Process voltage UP						
Nominal voltage			24 V DC			
Current consumption on UP						
min. (module alone)			0.260 A		0.150 A	
max. (min. + loads)			0.260 A + load		0.150 A	
Reverse polarity protection			●			
Fuse for process voltage UP			10 A miniature fuse			
Approvals			See detailed page 248 or www.abb.com/plc			

(1) Not simultaneously.

AC500
Technical data

EtherCAT modules

Type		CI511-ETHCAT	CI512-ETHCAT
Communication interface			
Protocol		EtherCAT slave with CAM-Switch configurable function on the digital outputs	
ID Device configuration		Address is defined by position on Ethernet bus	
Field bus connection on TUs		2 x RJ45 with switch functionality for simple daisy chain on TU507-ETH or TU508-ETH	
Number of channels per module			
Digital	inputs	8	8
	outputs	8	8
Analog	inputs	4	–
	outputs	2	–
Digital configurable channels DC (configurable as inputs or outputs)		–	8
Additional configuration of channels as			
Fast counter (onboard I/O)		–	
Occupies max. 1 DO or DC when used as counter		–	
Connection			
Local I/O extension		●	
Max. number of extension modules		max. 10 x S500 extension modules (standard or eCo modules allowed). Fast counter from digital IO modules can be also used.	
Via terminal unit TU5xx		●	
Digital inputs			
Input signal voltage		24 V DC	
Input characteristic acc. to EN 61 132-2		Type 1	
0 signal		-3...+5 V DC	
Undefined signal state		5...15 V DC	
1 signal		15...30 V DC	
Residual ripple, range for	0 signal	-3...+5 V DC	
	1 signal	15...30 V DC	
Input time delay (0 -> 1 or 1 -> 0)		8 ms typically, configurable from 0.1 up to 32 ms	
Digital outputs			
Transistor outputs 24 V DC, 0.5 A		●	
Readback of output		–	● (on DC outputs)
Outputs, supplied via process voltage UP		●	
Switching of 24 V load		●	
Output voltage at signal state 1		Process voltage UP - 0.8 V	
Output current			
Nominal current per channel		500 mA at UP = 24 V DC	
Maximum (total current of all channels)		8 A	
Residual current at signal state 0		< 0.5 mA	
Demagnetization when switching off inductive loads		By internal varistors	
Analog inputs AI		Max. number per module and with regard to the configuration: AIs / Measuring points	
Signal configuration per AI		4	–
0...10 V / -10 V... +10 V		4 / 4	–
0...20 mA / 4...20 mA		4 / 4	–
RTD using 2/3 wire needs 1/2 channel(s)		4 / 2	–
0...10 V using differential inputs, needs 2 channels		4 / 2	–
-10...+10 V using differential inputs, needs 2 channels		4 / 2	–
Digital signals (digital input)		4 / 4	–
Data when using the AI as digital input			
Input	time delay	8 ms typically, configurable from 0.1 up to 32 ms	–
	signal voltage	24 V DC	–

AC500
Technical data

EtherCAT modules

Type		CI511-ETHCAT	CI512-ETHCAT
Outputs, single configurable as:			
Possible configuration per AO		●	–
-10…+10 V		●	–
0…20 mA / 4…20 mA		●	–
Output resistance (load) when used as current output		0…500 Ω	–
Output loading capability when used as voltage output		±10 mA max.	–
Potential isolation			
Per module		●	●
Between Ethernet interface against the rest of the module		●	●
Between the channels	input	–	–
	output	–	–
Voltage supply for the module		By external 24 V DC voltage via terminal UP	
Process voltage UP			
Nominal voltage		24 V DC	
Current consumption on UP			
min. (module alone)		0.260 A	
max. (min. + loads)		0.260 A + load	
Reverse polarity protection		●	
Fuse for process voltage UP		10 A miniature fuse	
Approvals		See detailed page 248 or www.abb.com/plc	

AC500
Technical data

Modbus TCP modules

Type		CI521-MODTCP	CI522-MODTCP
Communication interface			
Ethernet Interface			
Main protocol		Modbus TCP	
ID Device configuration		By rotary switch on the front side, from 00h to FFh	
Ethernet connection on terminal units		2 x RJ45 with switch functionality for simple daisy chain on TU507-ETH or TU508-ETH	
Number of channels per module			
Digital	inputs	8	8
	outputs	8	8
Analog	inputs	4	–
	outputs	2	–
Digital configurable channels DC (configurable as inputs or outputs)		–	8
Additional configuration of channels as			
Fast counter (onboard I/O)		Configuration of max. 2 DI channels per module	
Occupies max. 1 DO or DC when used as counter		●	
Connection			
Local I/O extension		●	
Max. number of extension modules		max. 10 x S500 extension modules (standard or eCo modules allowed). Fast counter from digital IO modules can be also used.	
Via terminal unit TU5xx		●	●
Digital inputs			
Input	signal voltage	24 V DC	
	characteristic acc. to EN 61132-2	Type 1	
0 signal		-3...+5 V DC	
Undefined signal state		5...15 V DC	
1 signal		15...30 V DC	
Residual ripple, range for	0 signal	-3...+5 V DC	
	1 signal	15...30 V DC	
Input time delay (0 -> 1 or 1 -> 0)		8 ms typically, configurable from 0.1 up to 32 ms	
Digital outputs			
Transistor outputs 24 V DC, 0.5 A		●	
Readback of output		–	● (on DC outputs)
Outputs, supplied via process voltage UP		●	
Switching of 24 V load		●	
Output voltage at signal state 1		Process voltage UP - 0.8 V	
Output current			
Nominal current per channel		500 mA at UP = 24 V DC	
Maximum (total current of all channels)		8 A	
Residual current at signal state 0		< 0.5 mA	
Demagnetization when switching off inductive loads		By internal varistors	
Analog inputs AI		Max. number per module and with regard to the configuration: AIs / Measuring points	
Signal configuration per AI		4	–
0...10 V / -10... +10 V		4 / 4	–
0...20 mA / 4...20 mA		4 / 4	–
RTD using 2/3 wire needs 1/2 channel(s)		4 / 2	–
0...10 V using differential inputs, needs 2 channels		4 / 2	–
-10...+10 V using differential inputs, needs 2 channels		4 / 2	–
Digital signals (digital input)		4 / 4	–

(1) Not simultaneously.

AC500
Technical data

Modbus TCP modules

Type			CI521-MODTCP	CI522-MODTCP
Data when using the AI as digital input				
Input		time delay	8 ms typically, configurable from 0.1 up to 32 ms	–
		signal voltage	24 V DC	–
Outputs, single configurable as				
Possible configuration per AO			●	–
-10…+10 V			●	–
0…20 mA / 4…20 mA			●	–
Output	resistance (load) when used as current output		0...500 Ω	–
	loading capability when used as voltage output		±10 mA max.	–
Potential isolation				
Per module			●	●
Between Ethernet interface against the rest of the module			●	●
Voltage supply for the module			By external 24 V DC voltage via terminal UP	
Process voltage UP				
Nominal voltage			24 V DC	
Current consumption on UP				
	min. (module alone)		0.260 A	
	max. (min. + loads)		0.260 A + load	
Reverse polarity protection			●	
Fuse for process voltage UP			10 A miniature fuse	
Approvals			See detailed page 248 or www.abb.com/plc	

(1) Not simultaneously.

AC500
Technical data

CS31 functionality

	AC500 CPU with integrated CS31 interface	S500 I/O with communication interface DC551-CS31 CI590-CS31-HA CI592-CS31
Master	Yes, at COM1	–
Slave	No	Yes / Redundant for CI590-CS31-HA
Protocols supported	ABB CS31 protocol	
Diagnosis		
Error indication	On LCD display of the CPU / AC500-eCo error LED	Via module LEDs
Online diagnosis	Yes	
Error code	Errors are recorded in the diagnosis system of the CPU	
Associated function blocks	Yes	
Physical layer	RS485 / 2 x RS485 for CI590-CS31-HA for redundancy	
Connection	Plug at COM1	Screw-type or spring-type terminals
Baud rate	187.5 kbit/s	
Distance	AC500-eCo: up to 50 m and up to 500 m using the isolator TK506 / AC500: up to 500 m; up to 2000 m using a repeater	
Max. number of modules on fieldbus	31 modules max. Please note: The CS31 bus interface occupies one or two module addresses (if counters are configured onboard or if the module is a mixed digital analog module). Depending on the configuration, or if the module contains also mixed digital analog I/O, connected extension modules can occupy further module addresses.	
Configuration	Using configuration tool (included in Automation Builder software suite)	
Station address configuration	No	Using rotary switches (99 max.)

Digital and mixed signal I/O modules, “Fast Counter” operating modes. Not applicable for DC541 or eCo-I/O modules (1)

Operating mode, configured in the user program of the AC500		Occupied inputs DI or DC	Occupied outputs DO or DC	Maximum counting frequency kHz
0	No counter	0	0	–
1	One count-up counter with “end value reached” indication	1	1	50
2	One count-up counter with “enable” input and “end value reached” indication	2	1	50
3	Two up/down counters	2	0	50
4	Two up/down counters with 1 counting input inverted	2	0	50
5	One up/down counter with “dynamic set” input	2	0	50
6	One up/down counter with “dynamic set” input	2	0	50
7	One up/down counter with directional discriminator For synchro transmitters using two counting pulses with an offset of 90° (track A and B)	2	0	50
8	–	0	0	–
9	One up/down counter with directional discriminator and double evaluation For synchro transmitters using two counting pulses with an offset of 90° towards each other (track A and B)	2	0	30
10	One up/down counter with directional discriminator and fourfold evaluation For synchro transmitters using two counting pulses with an offset of 90° towards each other (track A and B)	2	0	15

(1) See technical documentation for details.

AC500
System data

Environmental Conditions

Process and supply voltages		
24 V DC	Voltage	24 V (-15 %, +20 %)
	Protection against reverse polarity	yes
Allowed interruptions of power supply	DC supply	Interruption < 10 ms, time between 2 interruptions > 1 s, PS2
Important: Exceeding the maximum process and supply voltages could lead to unrecoverable damage of the system. The system could be destroyed. For the supply of the modules, power supply units according to PELV or SELV specifications must be used. The creepage distances and clearances meet the requirements of the overvoltage category II, pollution degree 2.		
Assembly position		
Horizontal	●	
Vertical	●	
Temperature		
Operating	0 °C ... +60 °C	Preferred mounting position horizontal. Other mounting positions see manual.
Storage / Transport	-40 °C ... +70 °C	
Humidity		
Operating / Storage		Max 95 % r. H. without condensation
Air pressure		
Operating		-1000 m ... 2000 m (1080 hPa ... 800 hPa)
Storage		<3500 m (>660 hPa)
Electromagnectic Compatibility		
Radiated emission (radio disturbances)		Yes, Yes, in accordance with CISPR 16-2-3
Conducted emission (radio disturbances)		Yes, Yes, in accordance with CISPR 16-2-1, CISPR 16-1-2
Electrostatic discharge (ESD)		Yes, in accordance with IEC 61000-4-2, zone B, criterion B
		Electrostatic voltage in case of air discharge: 8 kV
		Electrostatic voltage in case of contact discharge: 6 kV
Fast transient interference voltages (burst)		Yes, in accordance with IEC 61000-4-4, zone B, criterion B
		Supply voltage units (DC): 2 kV
		Supply voltage units (AC): 2 kV
		Digital inputs/outputs (24 V DC): 1 kV
		Digital inputs/outputs (120...240 V AC): 2 kV
		Analog inputs/outputs: 1 kV
		Communication lines shielded: 1 kV
		I/O supply (DC-out): 2 kV
High energy transient interference voltages (surge)		Yes, in accordance with IEC 61000-4-5, zone B, criterion B
		Supply voltage units (DC): 1 kV CM* / 0.5 kV DM*
		Supply voltage units (AC): 2 kV CM* / 1 kV DM*
		Digital inputs/outputs (24 V DC): 1 kV CM* / 0.5 kV DM*
		Digital inputs/outputs (120...240 V AC): 2 kV CM* / 1 kV DM*
		Analog inputs/outputs: 1 kV CM* / 0.5 kV DM*
		Communication lines shielded: 1 kV CM*
		I/O supply (DC-out): 0,5 kV CM* / 0.5 kV DM*
		* CM = Common Mode, * DM = Differential Mode
Influence of radiated disturbances		Yes, in accordance with IEC 61000-4-3, zone B, criterion A
		Test field strength: 10 V/m
Influence of line-conducted interferences		Yes, in accordance with IEC 61000-4-6, zone B, criterion A
		Test voltage: 10 V
Influence of power frequency magnetic fields		Yes, in accordance with IEC 61000-4-8, zone B, criterion A
		30 A/m 50 Hz
		30 A/m 60 Hz

WARNING!
Risk of malfunctions and damages to persons!
Unused slots for communication modules are not protected against contact discharge. Dust and Dirt may cause contact problems and malfunctions.
Unused slots for Communication Modules must be covered with Dummy Communication Modules ("TA524 - Dummy Communication Module").
I/O-Bus connectors must not be touched during operation.
In order to prevent malfunctions, it is recommended that the operating personnel discharge themselves prior to touching communication connectors or perform other suitable measures to reduce effects of electrostatic discharges.

AC500
System data

Environmental Conditions

Environmental Tests		
Storage		IEC 60068-2-1 Test Ab: cold withstand test -40 °C / 16 h
		IEC 60068-2-2 Test Bb: dry heat withstand test +70 °C / 16 h
Humidity		IEC 60068-2-30 Test Db: Cyclic (12 h / 12 h) Damp-Heat Test 55 °C, 93 % r. H. / 25 °C, 95 % r. H., 2 cycles
Vibration resistance		IEC 61131-2 / IEC 60068-2-6: 15 Hz ... 150 Hz, 1 g (with SD Memory Card inserted)
Shock resistance		IEC 60068-2-27: all 3 axes 15 g, 11 ms, half-sinusoidal
Mechanical Data		
Wiring method		Spring terminals / Screw terminals
Degree of protection		IP 20
Assembly on DIN rail	DIN rail type	According to IEC 60715
		35 mm, depth 7.5 mm or 15 mm
Assembly with screws	Screw diameter	4 mm
	Fastening torque	1.2 Nm

Main dimensions mm, inches

Type	Nr communication modules	Length L	
		mm	inches
TB511-ETH	1	**95.5**	3.76
TB521-ETH / TB523-2ETH	2	**123.5**	4.86
TB541-ETH	4	**179.5**	7.07
TB5600-2ETH	0	**67.5**	2.66
TB5610-2ETH	1	**95.5**	3.76
TB5620-2ETH	2	**123.5**	4.86
TB5640-2ETH	4	**179.5**	7.07