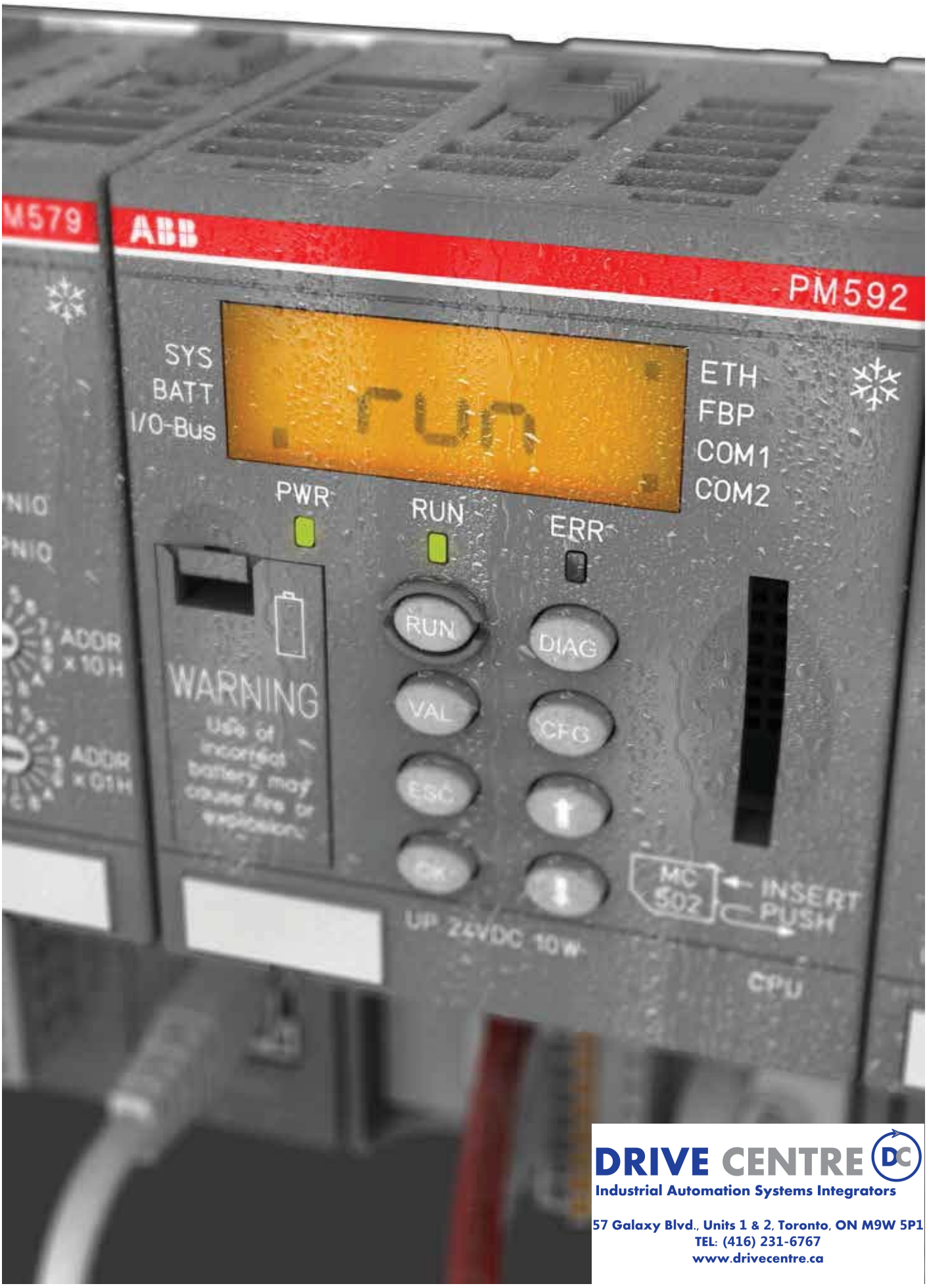

AC500-XC
PLC operating in eXtreme Conditions

AC500-XC
Key features

Resistance to:
– High humidity
– Salt mist
– Vibration
– High altitude
– Corrosive gases
– Temperature:
from -40 to +70 °C

Lower lifetime cost and many of the traditional practices are not required, such as: HVAC for the panel, shock absorbers, door sealing, etc...

All the benefits from AC500 range: Automation Builder engineering suite, I/O modules, scalable and flexible, same high performance communication, libraries and web services.

AC500-XC
Ordering data

PM573-ETH-XC

PM592-ETH-XC

PM595-4ETH-M-XC

TB511-ETH-XC

TB541-ETH-XC

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 (S500) for a total of 320 Digital I/Os or 160 Analog I/Os
- 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 CANopen® using CM588-CN-XC slave coupler
- Ethernet version provides web server and IEC 60870-5-104 remote control protocol.

Program memory	Cycle time in µs per instruction min.	Integrated communication	Type	Order code	Price	Weight (1 pce)
kB	Bit/Word/Float. point					kg
512	0.06 / 0.09 / 0.7	Ethernet (2), 2 x serial	PM573-ETH-XC (1)	1SAP330300R0271		0.150
512	0.05 / 0.06 / 0.5	2 x serial	PM582-XC	1SAP340200R0201		0.135
1024	0.05 / 0.06 / 0.5	Ethernet (2), 2 x serial	PM583-ETH-XC (1)	1SAP340300R0271		0.150
4096	0.002 / 0.004 / 0.004	Ethernet (2), 2 x serial	PM591-ETH-XC (1)	1SAP350100R0271		0.150
4096	0.002 / 0.004 / 0.004	Ethernet (2), 2 x serial	PM592-ETH-XC (1)(3)	1SAP350200R0271		0.150

AC500 CPU PM595

- 2 Ethernet interfaces with integrated switch and software configurable protocol (PROFINET, EtherCAT (4))
- 2 independent Ethernet interfaces
- 2 serial interfaces, RS232 / RS485 configurable
- Provides web server and IEC 60870-5-104 telecontrol protocol
- 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

Program memory	Cycle time in µs per instruction min.	Integrated communication	Type	Order code	Price	Weight (1 pce)
MB	Bit/Word/Float. point					kg
16	0.0006/0.001/0.001	2 x Ethernet (2 Ports switch), 2 x Ethernet (2), 2 x serial	PM595-4ETH-M-XC (3)	1SAP351500R0279		1.050

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

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
- Connection COM1: 9-pole pluggable terminal block
- Connection COM2: 9-pole Sub-D (socket).

Number of coupler slots	Connection for coupler integrated in the CPU	Type	Order code	Price	Weight (1 pce)
					kg
1	Ethernet RJ45	TB511-ETH-XC	1SAP311100R0270		0.215
2	Ethernet RJ45	TB521-ETH-XC	1SAP312100R0270		0.215
4	Ethernet RJ45	TB541-ETH-XC	1SAP314100R0270		0.215

AC500-XC
Ordering data

FM502-CMS-XC

TF501-CMS-XC

TF521-CMS-XC

CM592-DP-XC

CM579-PNIO-XC

DI524-XC

DO524-XC

AC500 Condition Monitoring CMS-XC

- 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-XC (3)	1SAP460400R0001		0.215
0	Function module terminal base for FM502, no coupler slots, 1x ETHERNET, 1x serial, spring terminals, 24VDC	TF501-CMS-XC (1)(3)	1SAP317000R0271		0.350
2	Function module terminal base for FM502, 2x coupler slots, 1x ETHERNET, 1x serial, spring terminals, 24VDC	TF521-CMS-XC (1)(3)	1SAP317200R0271		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
(3) Availability planned for Q2/2016.

Communication modules

Protocol	Connections	Type	Order code	Price	Weight (1 pce) kg
PROFIBUS® DP V0/V1 master	Sub-D socket 9 poles	CM592-DP-XC (1)	1SAP373200R0001		0.115
Ethernet (TCP/IP, UDP/IP, Modbus TCP)	2 x RJ45 - integrated switch	CM597-ETH-XC	1SAP373700R0001		0.115
CANopen® master	Terminal block 2 x 5 poles spring	CM598-CN-XC (1)	1SAP373800R0001		0.115
CANopen® slave	Terminal block 2 x 5 poles spring	CM588-CN-XC	1SAP372800R0001		0.115
PROFINET® I/O RT controller	2 x RJ45 - integrated switch	CM579-PNIO-XC	1SAP370901R0101		0.115
PROFINET® I/O RT device	2 x RJ45 - integrated switch	CM589-PNIO-XC	1SAP372900R0011		0.115

(1) Availability planned for Q1/2016.

I/O modules

- For central expansion of the AC500-XC CPU
- For decentralized expansion in combination with communication interface module (not for DC505-FBP)
- DC: channels can be configured individually as inputs or outputs
- Terminal unit required (refer to table below).

Digital I/O

Number of DI/DO/DC	Input signal	Output type	Output signal	Terminal units	Type	Order code	Price	Weight (1 pce) kg
32 / - / -	24 V DC	-	-	TU516-XC	DI524-XC	1SAP440000R0001		0.200
- / - / 16	24 V DC	Transistor	24 V DC, 0.5 A	TU516-XC	DC522-XC	1SAP440600R0001		0.200
- / - / 24	24 V DC	Transistor	24 V DC, 0.5 A	TU516-XC	DC523-XC	1SAP440500R0001		0.200
16 / - / 16	24 V DC	Transistor	24 V DC, 0.5 A	TU516-XC	DC532-XC	1SAP440100R0001		0.200
- / 32 / -	24 V DC	Transistor	24 V DC, 0.5 A	TU516-XC	DO524-XC	1SAP440700R0001		0.200
8 / 8 / -	24 V DC	Relay	230 V AC, 3 A (1)	TU532-XC	DX522-XC	1SAP445200R0001		0.200

(1) Relay outputs, changeover contacts.

AC500-XC
Ordering data

AI523-XC

Analog I/O

Number of AI/AO	Input signal	Output signal	Terminal units	Type	Order code	Price	Weight (1 pce) kg
16 / 0	0...10 V, ±10 V 0/4...20 mA PT100, PT1000, Ni1000	–	TU516-XC	AI523-XC	1SAP450300R0001		0.200
4 / 4		±10 V 0/4...20 mA	TU516-XC	AX521-XC	1SAP450100R0001		0.200
8 / 8 (max. 4 current outputs)			TU516-XC	AX522-XC	1SAP450000R0001		0.200
0 / 16 (max. 8 current outputs)	–		TU516-XC	AO523-XC	1SAP450200R0001		0.200
8 / 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	–	TU516-XC	AI531-XC	1SAP450600R0001		0.200

5

AI531-XC

Analog/digital mixed I/O

Standard I/O module with high functionality:

- 16 digital input or 16 digital output channels
- 8 configurable In/Output channels
- First two inputs are also usable as high-speed counter (up to 50 kHz) together with AC500-XC CPU, CS31 or CI5xx-XC communication interface modules
- 4 independent analog input channels configurable for voltage, current, 12 bit + sign, 1-2 wire connection
- Galvanic isolation per module
- Usable with all CI5xx modules.

DA501-XC

Number of AI/AO/DI/DO/DC	Input signal	Output type	Output signal	Terminal unit	Type	Order code	Price	Weight (1 pce) kg
4 / 2 / 16 / - / 8	24 V DC, 0...10 V, ±10 V, 0/4...20 mA, PT100, PT1000, Ni100, Ni1000	Transistor	24 V DC, 0.5 A ±10 V, 0/4...20 mA	TU516-XC	DA501-XC	1SAP450700R0001		0.200
4 / 2 / - / 16 / 8	24 V DC, 0...10 V, ±10 V, 0/4...20 mA, PT100, PT1000, Ni100, Ni1000	Transistor	24 V DC, 0.5 A ±10 V, 0/4...20 mA	TU516-XC	DA502-XC	1SAP450800R0001		0.200

CD522-XC

Multifunctional modules

Functionality	Number of DI/DO/DC	Input signal	Output type	Output signal	Terminal unit	Type	Order code	Price	Weight (1 pce) kg
Encoder module									
Encoder and PWM module	2 / – / 8	24 V DC and 2 encoder inputs	2 PWM outputs	–	TU516-XC	CD522-XC	1SAP460300R0001		0.125

- DC541-XC occupies one communication module slot on the AC500-XC CPU terminal base, no terminal block required
- Usable with all CI5xx-XC modules.

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 module									
Interrupt I/O and fast counter	– / – / 8	24 V DC	Transistor	24 V DC, 0.5 A	N/A (2)	DC541-CM-XC (1)	1SAP470000R0001		0.100

(1) Multifunctional module, refer to table on page 103 for details.
(2) Occupies a communication module slot.

AC500-XC
Ordering data

DC551-CS31-XC

CI541-DP-XC

CI581-CN-XC

CI502-PNIO-XC

CI506-PNIO-XC

Communication interface modules

Number of AI/AO/DI/DO/DC	Input signal	Output type	Output signal	Terminal units	Type	Order code	Price	Weight (1 pce) kg
For CS31-Bus								
- / - / 8 / - / 16	24 V DC	Transistor	24 V DC, 0.5 A	TU552-CS31-XC	DC551-CS31-XC	1SAP420500R0001		0.200
- / - / - / - / 16	24 V DC	Transistor	24 V DC, 0.5 A	TU552-CS31-XC	CI590-CS31-HA-XC	1SAP421100R0001		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	TU552-CS31-XC	CI592-CS31-XC	1SAP421200R0001		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	TU510-XC / TU518-XC	CI541-DP-XC	1SAP424100R0001		0.200
- / - / 8 / 8 / 8	24 V DC	Transistor	24 V DC, 0.5 A	TU510-XC / TU518-XC	CI542-DP-XC	1SAP424200R0001		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	TU510-XC / TU518-XC	CI581-CN-XC	1SAP428100R0001		0.200
- / - / 8 / 8 / 8	24 V DC	Transistor	24 V DC, 0.5 A	TU510-XC / TU518-XC	CI582-CN-XC	1SAP428200R0001		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	TU508-ETH-XC	CI501-PNIO-XC	1SAP420600R0001		0.200
- / - / 8 / 8 / 8	24 V DC	Transistor	24 V DC, 0.5 A	TU508-ETH-XC	CI502-PNIO-XC	1SAP420700R0001		0.200

From	To	Output signal	Terminal units	Type	Order code	Price	Weight (1 pce) kg
Gateway for Ethernet based protocol - PROFINET® IO RT							
PROFINET® I/O	–	3 x RS232/485 ASCII serial interfaces	TU520-ETH-XC	CI504-PNIO-XC	1SAP421300R0001		0.200
PROFINET® I/O	1 x CAN 2A/2B or CANopen® Master	2 x RS232/485 ASCII serial interfaces	TU520-ETH-XC	CI506-PNIO-XC	1SAP421500R0001		0.200

AC500-XC
Ordering data

TU516-XC

Terminal units

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

For	Supply	Connection type	Type	Order code	Price	Weight (1 pce) kg
Ethernet interface modules	24 V DC	Spring	TU508-ETH-XC	1SAP414000R0001		0.300
CANopen®/PROFIBUS® DP interface modules	24 V DC	Spring	TU510-XC	1SAP410800R0001		0.300
I/O modules	24 V DC	Spring	TU516-XC	1SAP412000R0001		0.300
CANopen®/PROFIBUS® DP interface modules	24 V DC	Spring	TU518-XC (1)	1SAP411200R0001		0.300
Ethernet gateway modules	24 V DC	Spring	TU520-ETH-XC	1SAP414400R0001		0.300
I/O modules AC / Relay	230 V AC	Spring	TU532-XC	1SAP417000R0001		0.300
CS31 interface modules	24 V DC	Spring	TU552-CS31-XC	1SAP410400R0001		0.300

(1) TU518-XC Terminal units can also be used with PROFIBUS® DP CI modules with baud rate up to 1Mbaud.

TU520-ETH-XC

Terminal units compatibility

Type	For I/O modules		For communication interface modules				
	TU516-XC	TU532-XC	TU508-ETH-XC	TU510-XC	TU518-XC	TU520-ETH-XC	TU552-CS31-XC
DA501-XC	●						
DA502-XC	●						
DC522-XC	●						
DC523-XC	●						
DC532-XC	●						
DI524-XC	●						
DX522-XC		●					
CD522-XC	●						
AI523-XC	●						
AI531-XC	●						
AO523-XC	●						
AX521-XC	●						
AX522-XC	●						
DC551-CS31-XC							●
CI590-CS31-HA-XC							●
CI592-CS31-XC							●
CI501-PNIO-XC			●				
CI502-PNIO-XC			●				
CI504-PNIO-XC						●	
CI506-PNIO-XC						●	
CI541-DP-XC				●	● (1)		
CI542-DP-XC				●	● (1)		
CI581-CN-XC					●		
CI582-CN-XC					●		

(1) Can be used with baudrate up to 1Mbaud.

TU510-XC

TU508-ETH-XC

AC500-XC
Ordering data

MC502

Accessories for AC500-XC

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 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. Packing unit includes 5 pcs	TA528	1SAP181200R0001		0.200
Communication modules	9-pole spring plug for CM574-RS/RCOM. Spare part. Packing includes 10 pcs	TA532	1SAP182000R0001		
	5-pole spring plug for CM575-DN/CM578-CN. Spare part. Packing includes 5 pcs	TA533	1SAP182100R0001		
	2x5-pole spring plug for CM588-CN. Spare part. Packing includes 5 pcs.	TA534	1SAP182200R0001		
	10-pole spring plug for DC541-CM. Spare part. Packing includes 10 pcs.	TA536	1SAP183100R0001		
Protective caps for TB, TU and CM	10 x Sub-D plastic caps 20 x RJ45 plastic caps, 3 x RJ45 female 10 x M12 plastic caps	TA535	1SAP182300R0001		0.300
AC500 CPUs PM595	Protective cap, spare-parts, 3 pieces	TA540	1SAP182600R0001		0.200
	Lithium battery for real-time-clock buffering	TA541	1SAP182700R0001		0.030
	Accessories for screw-mounting, 20 pieces	TA543	1SAP182800R0001		0.100

AC500-XC
Technical data

AC500-XC CPUs

Type	PM573-ETH-XC	PM582-XC	PM583-ETH-XC	PM591-ETH-XC	PM592-ETH-XC	PM595-4ETH-M-XC
Supply voltage	24 V DC					
Current consumption on 24 V DC						
Min. typ. (module alone)	0.110 A	0.050 A	0.110 A	0.150 A		0.400 A
Max. typ. (all couplers and I/Os)	0.810 A	0.750 A	0.810 A	0.850 A		1.2 A
User program memory - Flash EPROM and RAM	512 kB	512 kB	1024 kB	4096 kB		16384 kB
Integrated user data memory	512 kB thereof 288 kB saved	416 kB thereof 288 kB saved	1024 kB thereof 288 kB saved	5632 kB thereof 1536 kB saved		16384 kB thereof 3072 kB saved
User Flashdisk (Data-storage, program 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	1 024 kB	–	4 096 kB	8 MB		32 MB
Cycle time for 1 instruction (minimum)						
Binary	0.06 µs	0.05 µs		0.002 µs		0.0006 µs
Word	0.09 µs	0.06 µs		0.004 µs		0.001 µs
Floating-point	0.7 µs	0.5 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 allowed)					
Digital inputs / outputs	320 / 320					
Analog inputs / outputs	160 / 160					
Max. number of decentralized inputs/outputs	depends on the used standard Fieldbus (1)					
Data buffering	battery					no battery needed
Real-time clock (with battery back-up)	●					
Program execution						
Cyclical / Time controlled / Multi tasking	● / ● / ●					
User program protection by password	●					
Internal interfaces						
COM1						
RS232 / RS485 configurable	●					
Connection (on terminal bases)	pluggable spring terminal block, use TK502 cable in accessory					
Programming, Modbus® RTU, ASCII, CS31 master	●					
COM2						
RS232 / RS485 configurable	●					
Connection (on terminal bases)	Sub-D female 9 poles, use TK501 cable in accessory					
Programming, Modbus® RTU, ASCII	●					
FieldBusPlug						
Serial neutral interface	●					–
Connection (on terminal bases)	M12 male, 5 poles					–
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	RJ45	2x RJ45
Ethernet functions: online Access, ICMP (Ping), DHCP, IP configuration protocol, UDP data exchange, Modbus® TCP, HTTP (integrated Web server), IEC60870-5-104 remote control protocol, SNTP (Time synchronization), FTP server, SMTP client, Socket programming	●	–	●	●	●	●
Ethernet based Fieldbus						
Ethernet connection (on CPU module)	–					4 x RJ45 (2 x interfaces with 2-port switch
Dowloadable prototcols like: PROFINET® IO RT Controller / Device (2) EtherCAT® (2) Master / Slave	–					●
LCD display and 8 function keys	●					–
Function	RUN / STOP, status, diagnosis					Status, diagnosis
RUN / STOP, RESET push buttons	–					●
LEDs for various status display	–					●
Timers / Counters	unlimited / unlimited					
Approvals	See detailed page 154 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-XC
Technical data

Digital S500-XC I/O modules

Type		DI524-XC	DC522-XC	DC523-XC	DC532-XC	DO524-XC	DX522-XC
Number of channels per module							
Digital	inputs	32	–	–	16	–	8
	outputs	–	–	–	–	32	8 relays
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 116					
Occupies max. 1 DO or DC when used as counter		–	●	●	●	–	
Connection via terminal unit		●	●	●	●	●	●
Digital inputs							
Input signal voltage		24 V DC				–	24 V DC
Input characteristic acc. to EN 61132-2		Type 1				–	Type 1
0 signal		-3...+5 V DC				–	-3...+5 V DC
Undefined signal state		5...15 V DC				–	5...15 V DC
1 signal		15...30 V DC				–	15...30 V DC
Input time delay (0 -> 1 or 1 -> 0)		8 ms typically, configurable from 0.1 up to 32 ms				–	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 mA typically
	5 V DC	> 1 mA				–	> 1 mA
	15 V DC	> 5 mA				–	> 5 mA
	30 V DC	< 8 mA				–	< 8 mA
Digital outputs							
Transistor outputs 24 V DC, 0.5 A		–	●	●	●	●	–
Readback of 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				–
Output current							
Nominal current per channel		–	500 mA at UP = 24 V				
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.			0.5 Hz max.	2 Hz
For lamp load		–	11 Hz max. at max. 5 W				
Short-circuit / overload proofness		–	●	●	●	●	by external fuse / circuit breaker 6 A gL/gG per channel
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		–	●	●	●	●	–
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		–					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

AC500-XC
Technical data

Digital S500-XC I/O modules

Type		DI524-XC	DC522-XC	DC523-XC	DC532-XC	DO524-XC	DX522-XC
Process voltage UP							
Nominal voltage		24 V DC					
Maximum ripple		5 %					
Current consumption on UP							
Min. typ. (module alone)		0.150 A	0.100 A	0.150 A		0.050 A	0.050 A
Max. typ. (min. + loads)		0.150 A	0.100 A + load	0.150 A + load		0.100 A + load	0.050 A + load
Reverse polarity protection		●	●	●	●	●	●
Fuse for process voltage UP		10 A miniature 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-XC CPU or all communication interface modules (except DC505-FBP Fieldbus Plug module)					
Address setting		automatically (internal)					

AC500-XC
Technical data

Analog S500-XC I/O modules

Type		AX521-XC	AX522-XC	AI523-XC	AO523-XC	AI531-XC
Number of channels per module						
Individual configuration, analog	inputs	4	8	16	–	8
	outputs	4	8	–	16	–
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		●	●	●	●	●
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)				
0...10 V		4 / 4	8 / 8	16 / 16	–	8 / 8
-10...+10 V		4 / 4	8 / 8	16 / 16	–	8 / 8
0...20 mA		4 / 4	8 / 8	16 / 16	–	8 / 8
4...20 mA		4 / 4	8 / 8	16 / 16	–	8 / 8
Pt100						
-50...+400 °C (2-wire)		4 / 4	8 / 8	16 / 16	–	8 / 8
-50...+400 °C (3-wire), 2 channels		4 / 2	8 / 4	16 / 8	–	8 / 8
-50...+400 °C (4-wire)		–	–	–	–	8 / 8
-50...+70 °C (2-wire)		4 / 4	8 / 8	16 / 16	–	8 / 8
-50...+70 °C (3-wire), 2 channels		4 / 2	8 / 4	16 / 8	–	8 / 8
-50...+70 °C (4-wire)		–	–	–	–	8 / 8
Pt1000						
-50...+400 °C (2-wire)		4 / 4	8 / 8	16 / 16	–	8 / 8
-50...+400 °C (3-wire), 2 channels		4 / 2	8 / 4	16 / 8	–	8 / 8
-50...+400 °C (4-wire)		–	–	–	–	8 / 8
Ni1000						
-50...+150 °C (2-wire)		4 / 4	8 / 8	16 / 16	–	8 / 8
-50...+150 °C (3-wire), 2 channels		4 / 2	8 / 4	16 / 8	–	8 / 8
-50...+150 °C (4-wire)		–	–	–	–	8 / 8
Thermocouples of types J, K, T, N, S		–	–	–	–	●
0...10 V using differential inputs, 2 channels		4 / 2	8 / 4	16 / 8	–	8 / 8
-10...+10 V using differential inputs, 2 channels		4 / 2	8 / 4	16 / 8	–	8 / 8
Digital signals (digital input)		4 / 4	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 (for 8 AI + 8 AO), 1 s for Pt100/1000, Ni1000
Overvoltage protection		●	●	●	–	●
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 (1)	–	16 (1)	–
0...20 mA		4		–	8	–
4...20 mA		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	–

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

AC500-XC
Technical data

Analog S500-XC I/O modules

Type	AX521-XC	AX522-XC	AI523-XC	AO523-XC	AI531-XC
Process voltage UP					
Nominal voltage	24 V DC				
Maximum ripple	5 %				
Current consumption on UP					
Min. typ. (module alone)	0.150 A				0.130 A
Max. typ. (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-XC CPU or all communication interface modules (except DC505-FBP)				
Voltage supply for the module	Internally via extension bus interface (I/O bus)				–

AC500-XC
Technical data

CD522-XC encoder module

The CD522-XC 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-XC module also integrates outputs for pulses and for PWM as well as normal inputs and outputs, depending on selected encoder mode.

Type		CD522-XC
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, X3
	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
Output current		
Nominal current per channel		0.5 A at UP = 24 V
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		●

AC500-XC
Technical data

CD522-XC encoder module

Type		CD522-XC
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 at UP = 24 V
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. typ. (module alone)	0.070 A
	Max. typ. (min. + loads)	0.070 A + load
Reverse polarity protection		●
Fuse for process voltage UP		10 A miniature fuse

AC500-XC
Technical data

Analog/digital mixed I/O expansion module

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-XC	DA502-XC (1)
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 116	
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			500 mA at UP = 24 V DC	
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. typ. (module alone)			0.070 A	
Max. typ. (min. + loads)			0.070 A + load	
Reverse polarity protection			●	
Fuse for process voltage UP			10 A miniature fuse	
Approvals			See detailed page 154 or www.abb.com/plc	

(1) In preparation

DC541-CM-XC 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-XC
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		500 mA at UP = 24 V
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
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-XC
Technical data

AC500 Condition Monitoring CMS: FM502-CMS-XC

The FM502-CMS-XC 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-XC 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-XC	
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)	
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)**	**+ - 10V**
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-):		
< 1 kHz	> 1 MOhm	> 2 MOhm
5 kHz	> 100 kOhm	> 40 kOhm
10 kHz	> 60 kOhm	> 25 kOhm
20 kHz	> 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-XC
Technical data

Type	FM502-CMS-XC	
Digital outputs		
Output voltage at signal state 1	(L+) – 0.8 V	
Output current		
Nominal current per channel	0.5 A at UP = 24 V	
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)	200kHz, 500kHz 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	
Max. ripple	0,05	
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.	

(1) High Temperatures:
Operation of FM502-XC version in the operating temperature range between +60 °C and +70 °C with following deratings:
No use of 24 V encoder mode
Analog inputs: maximum number of configured input channels limited to 75 % per group AI0..AI7 and AI8..AI15

AC500-XC
Technical data

AC500-XC communication modules

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

Type	CM592-DP-XC	CM597-ETH-XC	CM598-CN-XC	CM588-CN-XC	CM579-PNIO-XC	CM589-PNIO-XC
Communication interfaces						
RJ45	–	● (x2) (2)	–	–	● (x2) (2)	● (x2) (2)
RS-232 / 485	–	–	–	–	–	–
Terminal blocks (1)	–	–	●	●	–	–
Sub-D socket	●	–	–	–	–	–
Protocols	PROFIBUS® DP master V0/V1	Ethernet (TCP/IP, UPD/IP, Modbus TCP)	CANopen® master	CANopen® slave	PROFINET® IO controller	PROFINET® IO device
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	10/100 Mbit/s	10 kbit/s to 1 Mbit/s	10 kbit/s to 1 Mbit/s	10/100 Mbit/s	10/100 Mbit/s
Co-processor	Communication processor netX 100	Communication processor netX 100	Communication processor netX 100	Communication processor netX 100	Communication processor netX 100	Communication processor netX 100
Additional features	Multi master functionality Max. Number of subscribers: - 126 (V0) - 32 (V1)	Online Access, ICMP (Pimg), DHCP, IP configuration protocol, UDP dataexchange, 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	RTC - Real-Time Cyclic prototcol, Class 1 RTA - Real-Time Acyclic protocol DCP Discovery and Configuration Prototocol LLDP - Link Layer Discovery Protocol

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

AC500-XC
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-XC	CI590-CS31-HA-XC (1)	CI592-CS31-XC
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 TUs			CS31 field bus, via terminal / redundant for CI590-CS31-HA-XC on TU552-CS31-XC		
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 base TU5xx			●	●	●
Local I/O extension					
Max. number of extension modules			max. 7 x S500 extension modules, up to 31 stations with up to 120 DIs/120 DOs or up to 32 AIs/ 32AOs per station		
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			500 mA at UP = 24 V DC		
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
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

(1) Dedicated to High Availability. Not compatible with S500-eCo I/O modules.

AC500-XC
Technical data

Communication interface modules

Type		DC551-CS31-XC	CI590-CS31-HA-XC (1)	CI592-CS31-XC
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		
Maximum ripple		5 %		
Current consumption on UP				
	Min. typ. (module alone)	0.100 A	0.100 A	0.070 A
	Max. typ. (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 154 or www.abb.com/plc		

(1) Dedicated to High Availability.

AC500-XC
Technical data

PROFIBUS®-DP modules

Type			CI541-DP-XC	CI542-DP-XC
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 TU510-XC or TU518-XC 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, fast counter from digital IO modules can be also used	
Via terminal base 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	–
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...+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.	–

PROFIBUS®-DP modules

Type		CI541-DP-XC	CI542-DP-XC
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	
Maximum ripple		5 %	
Current consumption on UP			
Min. typ. (module alone)		0.260 A	
Max. typ. (min. + loads)		0.260 A + load	
Reverse polarity protection		●	
Fuse for process voltage UP		10 A miniature fuse	
Approvals		See detailed page 154 or www.abb.com/plc	

AC500-XC
Technical data

CANopen® modules

Type			CI581-CN-XC	CI582-CN-XC
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 TU518-XC	
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-XC extension 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	
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.	–

CANopen® modules

Type		CI581-CN-XC	CI582-CN-XC
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	
Maximum ripple		5 %	
Current consumption on UP			
Min. typ. (module alone)		0.260 A	
Max. typ. (min. + loads)		0.260 A + load	
Reverse polarity protection		●	
Fuse for process voltage UP		10 A miniature fuse	
Approvals		See detailed page 154 or www.abb.com/plc	

AC500-XC
Technical data

PROFINET® IO RT device modules

Type	CI501-PNIO-XC	CI502-PNIO-XC	CI504-PNIO-XC	CI506-PNIO-XC
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 TU508-ETH-XC or TU520-ETH-XC			
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 TUs	–	–	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				
Connection via terminal unit TU5xx	–	–	●	●
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-XC extension modules. Fast counter from digital IO modules can be also used.		Valid for CI501-XC, 502-XC, 504-XC and 506-XC. All modules can have extension up to 10 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	–	● (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		–	–

(1) Not simultaneously.

AC500-XC
Technical data

PROFINET® IO RT device modules

Type	CI501-PNIO-XC	CI502-PNIO-XC	CI504-PNIO-XC	CI506-PNIO-XC
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	–	–	–
Input – 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	●	●	●	●
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			
Maximum ripple	5 %			
Current consumption on UP				
min. typ. (module alone)	0.260 A		0.150 A	
max. typ. (min. + loads)	0.260 A + load		0.150 A + load	
Reverse polarity protection	●			
Fuse for process voltage UP	10 A miniature fuse			
Approvals	See detailed page 154 or www.abb.com/plc			

AC500-XC
Technical data

CS31 functionality

	AC500-XC CPU with integrated CS31 interface	S500 I/O with communication interface DC551-CS31-XC CI590-CS31-HA-XC CI592-CS31-XC
Master	Yes, at COM1	–
Slave	No	Yes / Redundant for CI590-CS31-HA-XC
Protocols supported	ABB CS31 protocol	
Diagnosis		
Error indication	On LCD display of the CPU	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-XC for redundancy	
Connection	Plug at COM1	Screw-type or spring-type terminals
Baud rate	187.5 kbit/s	
Distance	AC500-XC: 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 I/O modules, "Fast Counter" operating modes. Not applicable for DC541-XC (1)

Operating mode, configured in the user program of the AC500-XC		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-XC
System data

Environmental conditions

Process and supply voltages

24 V DC	Process and supply voltage	24 V DC (-25 %, +30 % inclusive ripple)
	Absolute limits	18 ... 31.2 V inclusive ripple
	Ripple	< 10 %
	Protection against reverse polarity	yes
Allowed interruptions of power supply	DC supply	Interruption < 10 ms, time between 2 interruptions > 1s, PS2

Important: Exceeding the maximum process or supply voltage (< -35 V DC and > + 35 V DC) could lead to unrecoverable damage of the system. 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.

Temperature

Operating	-40 ... +70 °C	
	-40 ... -30 °C	Proper start-up of system; technical data not guaranteed
	-40 ... 0 °C	Due to the LCD technology, the display might not be readable
	-40 ... +40 °C	vertical mounting of modules possible, output load limited to 50% per group
	+60 ... +70 °C	with the following deratings:
		System is limited to max. 2 Communication Modules per Terminal Base
		Applications certified for cULus up to 60 °C
		Digital inputs: maximum number of simultaneously switched on input channels limited to 75 % per group (e.g. 8 channels => 6 channels)
		Digital outputs: output current maximum value (all channels together) limited to 75 % per group (e.g. 8 A => 6 A)
		Analog outputs only if configured as voltage output: maximum total output current per group is limited to 75 % (e.g. 40 mA => 30 mA)
		Analog outputs only if configured as current output: maximum number of simultaneously used output channels limited to 75 % per group (e.g. 4 channels => 3 channels)
Storage / Transport	-40 ... +85 °C	

Humidity

Operating / Storage	100 % r. H. with condensation

Air pressure

Operating	-1000 m .... 4000 m (1080 hPa ... 620 hPa) >2000 m (<795 hPa): max. operating temperature must be reduced by 10 K (e.g. 70 °C to 60°C)

Immunity to corrosive gases

Operating	Yes, according to: ISA S71.04.1985 Harsh group A, G3/GX IEC 60721-3-3 3C2 / 3C3

Immunity to salt mist

Operating	Yes, horizontal mounting only, according to: IEC 60068-2-52 severity level 1

Note: Unused communication sockets (RJ45, Sub-D, FBP) must be covered with TA535 Protective Caps for XC devices in case of salt mist environments.

Electromagnetic Compatibility

Radiated emission (radio disturbances)	Yes, according to: CISPR 16-2-3
Conducted emission (radio disturbances)	Yes, according to: CISPR 16-2-1, CISPR 16-1-2
Electrostatic discharge (ESD)	Yes, according to: IEC 61000-4-2, zone B, criterion B
Fast transient interference voltages (burst)	Yes, according to: IEC 61000-4-4, zone B, criterion B
High energy transient interference voltages (surge)	Yes, according to: IEC 61000-4-5, zone B, criterion B
Influence of radiated disturbances	Yes, according to: IEC 61000-4-3, zone B, criterion A
Influence of line-conducted interferences	Yes, according to: IEC 61000-4-6, zone B, criterion A
Influence of power frequency magnetic fields	Yes, according to: IEC 61000-4-8, zone B, criterion A

Note: 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. Unused sockets for Communication Modules on Terminal Bases must be covered with TA524 Dummy Communication Module. I/O-Bus connectors must not be touched during operation.

AC500-XC
System data

Mechanical data

Wiring method		Spring terminals
Degree of protection		IP20
Vibration resistance		Yes, according to: IEC 61131-2, IEC 60068-2-6, IEC 60068-2-64
Shock resistance		Yes, according to: IEC 60068-2-27
Assembly position		Horizontal Vertical (no application in salt mist environment)
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

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 +85 °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., 6 cycles
	IEC 60068-2-78, Stationary Humidity Test: 40 °C, 93 % r. H., 240 h
Insulation Test	IEC 61131-2
Vibration resistance	IEC 61131-2 / IEC 60068-26: 5 Hz ... 500 Hz, 2 g (with SD Memory Card inserted)
	IEC 60068-2-64: 5 Hz ... 500 Hz, 4 g rms
Shock resistance	IEC 60068-2-27: all 3 axes 15 g, 11 ms, half-sinusoidal
EMC Immunity	
Electrostatic discharge (ESD)	Electrostatic voltage in case of air discharge: 8 kV
	Electrostatic voltage in case of contact discharge: 6 kV
Fast transient interference voltages (burst)	Supply voltage units (DC): 4 kV
	Digital inputs/outputs (24 V DC): 2 kV
	Analog inputs/outputs: 2 kV
	Communication lines shielded: 2 kV
	I/O supply (DC-out): 2 kV
High energy transient interference voltages (surge) (1)	Supply voltage units (DC): 1 kV CM / 0.5 kV DM
	Digital inputs/outputs (24 V DC): 1 kV CM / 0.5 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
Influence of radiated disturbances	Test field strength: 10 V/m
Influence of line-conducted interferences	Test voltage: 10 V
Power frequency	30 A/m 50 Hz
Magnetic fields	30 A/m 60 Hz

(1) CM = Common Mode, DM = Differential Mode.