MANUFACTURER DOCUMENT PACKAGE

Manufacturer's Manual

Reference package for procurement and maintenance review

ABB

PM5012-R-ETH

ETHERNET PROGRAMMABLE CONTROLLER

Used with the applicable AC500-eCo V3 configuration.

REFERENCE PACKAGE **OFFICIAL DOCUMENT**

Selected official manufacturer pages follow this cover.

Source: ABB PLC Automation Catalog 3ADR020077C0204 Rev. H; physical pages 116 and 126-128

AC500-eCo

Ordering data

AC500-eCo V3 CPUs

- Three performance classes CPU (Basic, Standard and Pro) with large memory
- From low-entry and cost-sensitive to large and complex applications
- One or two independent Ethernet interfaces with integrated switch functionality
- Up to three RS232 or RS485 serial interfaces using option boards
- Micro memory card slot for data storage and program backup
- Real time clock for Standard and Pro CPU, optional for Basic
- Web server functionality with HTML5 Web visualization for Standard and Pro CPU
- Minimum cycle time per instruction: Bit 0.02 µs, Word 0.02 µs, Floating point 0,6 µs.
- High amount of onboard I/Os with relay or transistor outputs
- Onboard high-speed I/Os with motion control function for up to 4 axis PTO
- Extendable with up to three digital, analog or serial option boards
- Standard and Pro version can be locally extended with up to 10 I/O modules (S500 and/or S500-eCo modules can be mixed)
- 24 V DC power supply.

Total user program memory	Onboard I/Os	Relay / Transistor outputs	Integrated communication	Option board slots for extension	Power supply	Type	Order code	Weight (1 pce)
kB	DI/DO/DC							kg
Basic CPU PM5012-x-ETH: 1MB CPU, Ethernet interface, onboard digital I/O, not extendable, 1 slot for option board								
1 MB (thereof 256 kB Program code and Data) (2)(3)	6 / 4 / –	Transistor	1x Ethernet	1	24 V DC	PM5012-T-ETH	1SAP122600R0172	0.225
	6 / 4 / –	Relay	1x Ethernet	1	24 V DC	PM5012-R-ETH	1SAP122700R0172	0.235
Standard CPU PM5032-x-ETH: 2MB CPU, Ethernet interface, RTC and micro memory card, onboard digital I/O, extendable, 2 slots for option board								
2 MB (thereof 512 kB Program code and Data + 1.5 MB Web max.) (2)(3)	12 / 8 / 2	Transistor	1x Ethernet	2	24 V DC	PM5032-T-ETH	1SAP123400R0172	0.253
	12 / 6 / 2	Relay	1x Ethernet	2	24 V DC	PM5032-R-ETH	1SAP123500R0172	0.268
Standard CPU PM5052-x-ETH: 4MB CPU, Ethernet interface, RTC and micro memory card, onboard digital I/O, extendable, 3 slots for option board								
4 MB (thereof 768 kB Program code and Data + about 3 MB Web max.) (2)(3)	12 / 8 / 2	Transistor	1x Ethernet	3	24 V DC	PM5052-T-ETH	1SAP124000R0172	0.257
	12 / 6 / 2	Relay	1x Ethernet	3	24 V DC	PM5052-R-ETH	1SAP124100R0172	0.273
Pro CPU PM50x2-T-2ETH: 8MB CPU with two Ethernet interface, RTC and micro memory card, onboard digital I/O, extendable, 3 slots for option board								
8 MB (thereof 1 MB Program code and Data + 7 MB Web max.) (2)(3)	12 / 8 / 2	Transistor	2x independent Ethernet with switch	3	24 V DC	PM5072-T-2ETH	1SAP124500R0173	0.265
8 MB (thereof 1 MB Program code and Data + 7 MB Web max.) extended wide temperature (2)(3)	12 / 8 / 2	Transistor	2x independent Ethernet with switch	3	24 V DC	PM5072-T-2ETHW (1)	1SAP124400R0173	0.265
18 MB (thereof 1 MB Program code and Data + 16 MB Web max.) (2)(3)	12 / 8 / 2	Transistor	2x independent Ethernet with switch	3	24 V DC	PM5082-T-2ETH	1SAP124600R0173	0.265
24 MB (thereof 3 MB Program code and Data + 21 MB Web max.) (2)(3)	12 / 8 / 2	Transistor	2x independent Ethernet with switch	3	24 V DC	PM5092-T-2ETH	1SAP124700R0173	0.265

Terminal block sets are necessary for each AC500-eCo V3. The terminal blocks must be ordered separately.

(1) Wide extended temperature -20 °C … +70 °C. From production Index B0, the CPU PM5072-T-2ETHW will be usable from -40 °C … + 70 °C.

(2) The maximum downloadable application size which is shown in Automation Builder contains all the user program code+user data+web server and infrastructure data. The size is depending on the CPU Type (see the value in the technical data pages).

(3) Memory size of V2 versus V3 CPUs is not comparable. Projects have a different and separate user program code and data memory calculation in Automation Builder 2.4.0 version or later: System, configuration and web server parts are not counted anymore. This results in typically about 50 % lower memory usage compared to V2, and even lower memory usage compared to V3 projects compiled in Automation Builder 2.3.0 or before.

AC500-eCo

Technical data

AC500-eCo V3 CPUs

Type	PM5012-T-ETH	PM5012-R-ETH	PM5032-T-ETH	PM5032-R-ETH	PM5052-T-ETH	PM5052-R-ETH	PM5072-T-2ETH(W)	PM5082-T-2ETH	PM5092-T-2ETH
Supply voltage	24 V DC								
Current consumption on 24 V DC									
Min. typ. (module alone)	0.150 A	0.150 A	0.200 A	0.200 A	0.200 A	0.200 A	0.250 A	0.250 A	0.250 A
Max. typ. (all I/Os)	0.150 A	0.850 A	0.900 A	0.900 A	0.900 A	0.900 A	0.950 A	0.950 A	0.950 A
Type of processor / Processor clock frequency	TI ARM Cortex-A9 32-bit-RISC / 300 MHz							600 MHz	800 MHz
Total RAM memory / Total Flash memory	128 MB / 128 MB								
User program memory	1 MB	1 MB	2 MB	2 MB	4 MB	4 MB	8 MB	18 MB	24 MB
Maximum downloadable application size	1 MB	1 MB	5 MB	5 MB	7 MB	7 MB	9 MB	18 MB	24 MB
Thereof User program code and data (dynamically allocated) (1)	256 kB	256 kB	512 kB	512 kB	768 kB	768 kB	1 MB	2 MB	3 MB
Thereof User web server Data max.	–	–	1.5 MB	1.5 MB	3 MB	3 MB	7 MB	16 MB	21 MB
User data memory saved in FLASH	8 kB	8 kB	32 kB	32 kB	32 kB	32 kB	100 kB	100 kB	100 kB
Thereof VAR Retain persistent	4 kB	4 kB	16 kB	16 kB	16 kB	16 kB	36 kB	36 kB	36 kB
Thereof % M memory (e.g. Modbus register)	4 kB	4 kB	16 kB	16 kB	16 kB	16 kB	64 kB	64 kB	64 kB
User flash disk (Data-storage, programm access or also external with FTP)	–								
Plug-in memory card (onboard micro memory card socket)	● Depending on micro memory card used: use MC5102 preferably								
Data buffering	Flash EPROM memory								
Real-time clock (with Goldcap back-up)	Optional, use option board TA5131-RTC		●						
Cycle time for 1 instruction (minimum)									
Binary / Word / Floating-point	0.02 µs / 0.05 µs / 0.60 µs							0.01 µs / 0.01 µs / 0.01 µs	
Program execution									
Cyclical / Time controlled / multi tasking	● / ● / ●								
User program protection by password	●								
Minimun cycle time configurable for cyclical task	10 ms		5 ms		2 ms		1 ms		0.5 ms
Min. Onboard EtherCAT Master cycle time	–	–	–	–	–	–	2 ms	1 ms	
Motion control with EtherCAT onboard **Configuration limits (4): axis /2 ms** Performance indication example (5)	–	–	–	–	–	–	**4**	**8**	**12**
Number of synchr. axis in 1 ms (5)	–	–	–	–	–	–	–	4	6
Number of synchr. axis in 2 ms (5)	–	–	–	–	–	–	4	8	12
Number of synchr. axis in 4 ms (5)	–	–	–	–	–	–	8	16	24
Onboard digital inputs									
Channels	6 (thereof 4 high-speed 5 kHz)		12						
Functionality	up to 6 standard or		up to 12 standard or						
Fast counter	up to 2 (5kHz)		up to 4 (100 kHz)						
A/B Encoder with frequency measurement	up to 1 A/B encoder (5 kHz) without touch/reset input		up to 2 A/B encoder (200 kHz) with without Touch/Reset inputs						
Interrupt inputs with only one common interrupt task (no single task per input)	up to 4		up to 4						
Signal voltage	24 V DC		24 V DC						
Onboard digital outputs									
Channels									
Transistor	4 (thereof 4 high speed 5 kHz)	–	8 (thereof 4 high speed 200 kHz and 4 with 5 kHz)	–	8 (thereof 4 high speed 200 kHz and 4 with 5 kHz)	–	8 (thereof 4 high speed 200 kHz and 4 with 5 kHz)		
Functionality	Up to 4 standard or	–	up to 8 standard or	–	up to 8 standard or	–	up to 8 standard or		
PTO with pulse signal and direction	–	–	up to 4 (200 kHz) (3)	–	up to 4 (200 kHz) (3)	–	up to 4 (200 kHz) (3)		

(1) Memory size of V2 versus V3 CPUs is not comparable. Projects have a different and separate User Program code and Data memory calculation in Automation Builder 2.4.0 version or later: System, configuration and web server parts are not counted anymore. This results in typically about 50 % lower memory usage compared to V2, and even lower memory usage compared to V3 projects compiled in Automation Builder 2.3.0 or before. (2) Maximum downloadable application size: contains user program code, data, web server memory, infrastructure. This is the maximum size of the application which can be downloaded into a CPU with Automation Builder. This value is displayed and splitted into different categories in the resource window of AB SW. (3) Depending on hardware revision (e.g. from Rx17x) (4) PTO, encoder and virtual axis included.
(5) Depending on application complexity the available performance is limited and shared, pure EtherCAT axis may only support a lower real axis count especially at lower cycle time depending on mapped objects: Configuration limits are higher to also count for other mapped axis types (4).

AC500-eCo

Technical data

AC500-eCo V3 CPUs

Type	PM5012-T-ETH	PM5012-R-ETH	PM5032-T-ETH	PM5032-R-ETH	PM5052-T-ETH	PM5052-R-ETH	PM5072-T-2ETH(W)	PM5082-T-2ETH	PM5092-T-2ETH
PTO with CC/CCW pulse outputs	–	–	up to 2 (200 kHz)	–	up to 2 (200 kHz)	–	up to 2 (200 kHz)		
PTO (SW using PWM) pulse and direction	–	–	up to 4 (200 kHz)	–	up to 4 (200 kHz)	–	up to 4 (200 kHz)		
PWM	up to 4 (100 Hz)	–	up to 4 (30 kHz) and up to 4 (100 Hz)	–	up to 4 (30 kHz) and up to 4 (100 Hz)	–	up to 4 (30 kHz) and up to 4 (100 Hz)		
Limit switch	up to 4	–	up to 8	–	up to 8	–	up to 8	up to 8	up to 8
Residual current at signal state 0	< 0.5 mA								
Demagnetization when switching off inductive loads	must be provided externally								
Relay	–	4	–	6	–	6	–	–	–
Functionality	–	Standard output	–	Standard output	–	Standard output	–	–	–
Rated voltage	24 V DC	230 V AC	24 V DC	230 V AC	24 V DC	230 V AC	24 V DC	24 V DC	24 V DC
Nominal current per channel	0.5 A resistive	2 A resistive	0.5 A resistive	2 A resistive	0.5 A resistive	2 A resistive	0.5 A resistive	0.5 A resistive	0.5 A resistive
Onboard digital input /output configurable channels									
Channels	–	–	2 digital in/output configurable						
As digital input used	–	–	up to 2						
Signal voltage	–	–	24 V DC						
Functionality	–	–	Standard input						
As digital output transistor used	–	–	up to 2 standard	up to 2 standard or	up to 2 standard	up to 2 standard or	up to 2 standard	up to 2 standard	up to 2 standard
PTO with pulse signal and direction	–	–	–	up to 1 (200 kHz)	–	up to 1 (200 kHz)	–	–	–
PTO with CC/CCW pulse outputs	–	–	–	up to 1 (200 kHz)	–	up to 1 (200 kHz)	–	–	–
PWM	–	–	–	up to 2 (30 kHz)	–	up to 2 (30 kHz)	–	–	–
Limit switch	–	–	–	up to 2	–	up to 2	–	–	–
Rated voltage	–	–	24 V DC	24 V DC	24 V DC	24 V DC	24 V DC	24 V DC	24 V DC
Nominal current per channel	–	–	0.5 A resistive	0.5 A resistive	0.5 A resistive	0.5 A resistive	0.5 A resistive	0.5 A resistive	0.5 A resistive
Max. number of centralized inputs/outputs									
Max. number of extension modules on I/O bus	–		up to max. 10 (S500 and/or S500-eCo I/O modules allowed)						
Maximum size of process image variable on I/O bus		**onboard I/O + option board**	**128 Byte input and 128 Byte output**		**no limit within 10 I/O modules**				
Digital	inputs	only onboard 6 + 1 option board	320 + 12 + max. 2DC as 2DI + opt. boards (2)		320 + 12 + max. 2DC as 2DI + option boards				
	outputs	only onboard 4 + 1 option board	320 + 8/6 + max. 2DC as 2DO + opt. boards (2)		320 + 8/6 + max. 2DC as 2DO + option boards				
Analog	inputs	only 1 option board	max. 64 including option boards (2)		160 + option boards				
	outputs	only 1 option board	max. 64 including option boards (2)		160 + option boards				
Max. number of decentralized inputs/outputs	depends on the used standard fieldbus (1)								
Option board slots for extension	Each slot can be used for all type of existing option boards, same option board for serial interface or digital/analog I/O extension can be used on several slots per CPU								
Max. number of option board slots max.	1		2		3				
Type of option board									
KNX communication address switch	–						TA5130-KNXPB only on 1 slot		
Real-time clock (with Goldcap back-up)	TA5131-RTC		–						
Serial interface	TA5141-RS232I, TA5142-RS485/TA5142-RS485I								
CAN Serial interface			TA5146-CN (3)						
Digital in/output channels	TA5101-4DI, TA5105-4DOT, TA5110-2DI2DOT								
Analog in/output channels	TA5120-2AI-UI, TA5122-2AI-TC (1), TA5123-2AI-RTD, TA5126-2AO-UI, TA5128-2AI1AO								

(1) In preparation

(2) Depending on the used S500-eCo or mostly S500 I/O module types, the maximum amount of channel can be lower than these values e.g. using DC532 with high speed counter or AI/AO523 with 16 analog channels. The limit on number of channels is then always given by the maximum size on process image variable within the maximum of 10 I/O modules.

(3) Maximum 2 TA5146-CN are supported by the AC500-eCo CPU V3.

AC500-eCo

Technical data

AC500-eCo V3 CPUs

Type	PM5012-T-ETH	PM5012-R-ETH	PM5032-T-ETH	PM5032-R-ETH	PM5052-T-ETH	PM5052-R-ETH	PM5072-T-2ETH(W)	PM5082-T-2ETH	PM5092-T-2ETH
Internal interfaces for communication									
COMx	No onboard serial interface, only using additional option boards for serial communication TA5141-RS232I, TA5142-RS485, TA5142-RS485I								
Number of serial interface maximum	1		2		3				
RS232 isolated	● (TA5141-RS232I)								
RS485 non isolated / Isolated	● (TA5142-RS485) / ● (TA5142-RS485I)								
Connection	pluggable spring terminal block delivered with option board								
Modbus RTU Master/Slave, ASCII	●								
Ethernet	1x Ethernet Interface						2x independent Ethernet interfaces for several uses		
Ethernet connection (on the CPU itself)	1x RJ45						2x RJ45 could be used as 2-port switch with 1x interface		
Ethernet functions (1):									
Ethernet Switch on ETH1 / ETH2 with 2x separated interfaces and MAC-Address	–	–	–	–	–	–	●		
Online Access, ICMP (Ping), DHCP	●								
Nb of parallel connections	4		4				6		
IP configuration protocol	●								
UDP data exchange, Network variables	● / ●								
HTTP / HTTPs (integrated Web server)	–		●						
Nb of parallel connections (3)	–		2				4		
Web Visu for data visualisation on web server HTML5	–		●						
NTP (Time synchronization) Server / Client	● / ●								
FTP / FTPs server	–		●						
Nb of parallel connections	–		2						
SNMP (manager and agent)	–		●						
SMTP client	–		●						
Socket programming	●								
Modbus TCP Client / Server	● / ●								
CPU as client can communicate with a max. number of servers (e.g. CI52x) in parallel	8		13		20		30	40	50
CPU as Server can simultaneously respond to a max. number of clients (e.g. SCADA) in parallel	3		8		10		15	20	25
IEC 60870-5-104 remote control protocol - Support 2nd connection	–						●		
Nr of free tags	–						1000		
Control Station - Nb connections	–						–		
Sub-Station - Nb connections	–						5		
DNP3 outstation with security (2)	–						●		
Nr of objects	–						400	700	
Nr of master connections	–						8		
OPC UA Server (Micro Embedded Device Server) with security	–		●						
Nr of free tags	–		125		250		1000	3000	5000
Nr of Connections	–		5				10		
min sampling rate (limit)	–		1000 ms						
OPC DA Server AE	●								
Nr of Connections	4		4				6		

(1) Using parallel protocols on the same and/or different port reduces the bandwidth and the CPU performance. Not all the limits can be achieved at the same time using all the features, it's also depending on the CPU load and the maximum memory size.
(2) Feature is licensed, runtime license per CPU.
(3) Open visualizations from Automation Builder are counted as connections, too.