MANUFACTURER DOCUMENT PACKAGE

# Manufacturer's Manual

Reference package for procurement and maintenance review

ABB

## PM5052-T-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<br>**Configuration limits (4): axis /2 ms**<br>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.