

Automation & Control

Modicon M340

automation platform

Unity

Catalogue
June

07



Simply Smart !

telemecanique.com



This international site allows you to access all the Telemecanique products in just 2 clicks via comprehensive range data-sheets, with direct links to:

- Complete library: technical documents, catalogs, certificates, FAQs, brochures...
- Selection guides from the e-catalog.
- Product discovery sites and their Flash animations.

You will also find illustrated overviews, news to which you can subscribe, a discussion forum, the list of country contacts...

To live automation solutions every day!



Flexibility

- Interchangeable modular functions, to better meet the requirements for extensions
- Software and accessories common to multiple product families



Ingenuity

- Auto-adapts to its environment, "plug & play"
- Application functions, control, communication and diagnostics embedded in the products
- User-friendly operation either directly on the product or remotely



Simplicity

- Cost effective "optimum" offers that make selection easy for most typical applications
- Products that are easy to understand for users, electricians and automation specialists
- User-friendly intuitive programming



Compactness

- High functionality in a minimum of space
- Freedom in implementation



Openness

- Compliance with field bus, connection, and software standards
- Enabling decentralised or remote surveillance via the web with Transparent Ready products

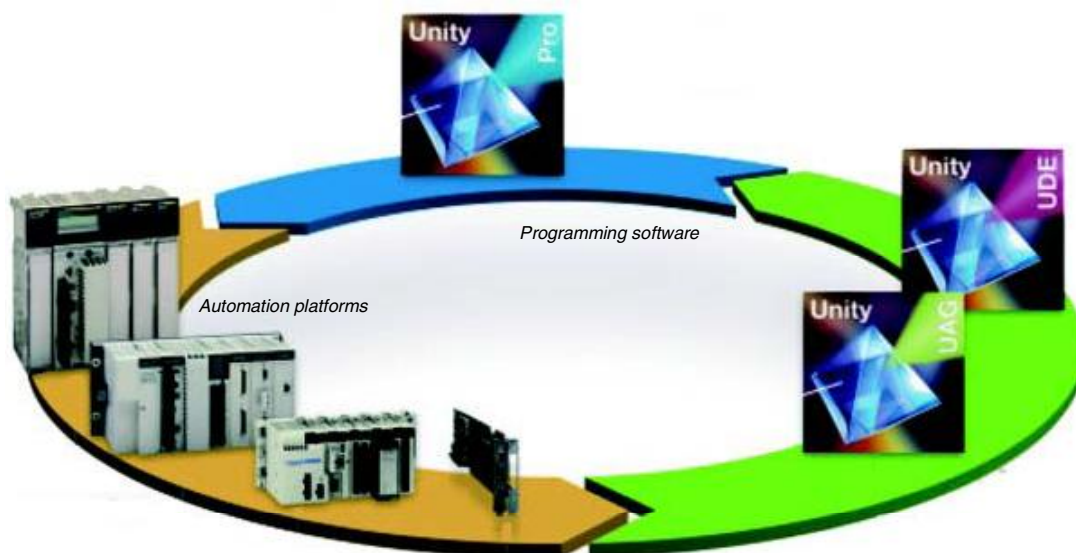
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Modicon hardware platforms and Unity software

A naturally productive pair

The family of Modicon platforms associated with Unity software offers you ingenuity, flexibility and openness to ever-increasing productivity.

Modicon M340 concentrates power and innovation, offering the optimum response to the needs of machine manufacturers. It is also the ideal companion for **Modicon Premium** and **Modicon Quantum** to satisfy the need for automation of industrial processes and infrastructures.



Modicon automation platforms

Modicon M340, the ideal solution for machine specialists

Robust, powerful and compact, the new Modicon M340 PLC is the ideal solution for machine manufacturers in applications such as secondary packaging, materials handling, textiles, printing, food processing, woodworking machines, ceramics, etc. The integration of Altivar and Lexium variable speed drives, Magelis display units and Preventa safety modules has been boosted in order to simplify the setup and use of Telemecanique solutions.

Modicon M340 is also the ideal companion for Modicon Premium and Modicon Quantum to meet the demand for automation of industrial processes and infrastructures, at the heart of Transparent Ready architectures.

Modicon Premium, the optimum solution for the manufacturing industry and infrastructures

Modicon Premium stands out as the specialist in complex machines and manufacturing processes. Its level of performance when processing Boolean, numeric instructions and instructions on tables make it the market reference. Thanks to its ability to integrate distributed architectures, Modicon Premium provides ideal solutions for infrastructure projects, particularly in the water and transport sectors.

In addition, Modicon Atrium, the version of Modicon Premium in PCI format, offers a "PC Based" alternative.

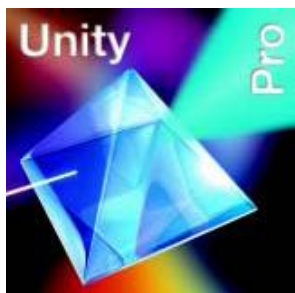
Modicon Quantum, the specialist in critical systems in the process industries and infrastructures

Capable of incredible distributed architectures, with an extensive catalog of modules complemented by several technological partnerships in the context of the Collaborative Automation program, Modicon Quantum offers a perfect response to the needs of continuous or semi-continuous industrial processes, and control of large infrastructure sites.

Capitalizing on more than 25 years' experience in the field of redundancy, Modicon Quantum is the ideal solution for applications requiring very high levels of availability. The offer is therefore suitable in native fashion for critical applications such as petrochemicals, metallurgy, cement, energy, tunnels and airports.

(*) Smarter and more intelligent, yet even easier to use.

Modicon hardware platforms and Unity software



Unity software

An organizer environment for Modicon platforms

Unity Pro is the common programming, debugging and run-time software for Modicon M340, Premium and Quantum PLCs, and Atrium slot PLCs.

As an IEC 61131-3 program, Unity Pro is based on the acknowledged standards of PL7 and Concept. It opens the doors of a complete set of new functions for increased productivity:

- State-of-the-art functionality
- Optimum standardization enabling re-use of developments
- Numerous tools for testing the program and improving system operation
- New integrated diagnostic services

Migration of existing applications is taken into account. This maximizes your software investment, reduces training costs and offers unrivaled potential for development and compatibility.

The Unity software catalog includes specialist software for even better productivity:

- Openness to developments in C language or in VBA (Visual Basic for Applications)
- Design and generation of batch/process applications with PLC/HMI integration



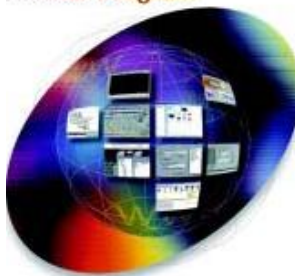
Transparent Ready

Naturally communicative

Based on Ethernet TCP/IP and Web technologies, the Modicon Transparent Ready automation platforms offer solutions to optimizing performances in electrical distribution, automation and control.

Web servers, sending e-mail, direct database access, device synchronization, I/O distribution, etc, Modicon offers you the best of Ethernet.

Collaborative Automation Partner Program



Collaborative Automation

The new world of automation

- Rather than opting for proprietary systems, Telemecanique has adopted market standards such as IEC languages, Ethernet TCP/IP, Modbus IDA, XML, OPC, IT standards, etc.
- Partnerships with recognized leading hardware and software specialists have been developed within the scope of the Collaborative Automation Partner Program, in an effort to share technology more effectively.
- You will be assured of designing the best solution without compromising on ease of integration.

Modicon M340 automation platform

Hardware base



Modicon M340 platform

New Modicon M340 platform

Equipped with astounding memory and performances, this featherweight version will imbue your applications with new momentum. Designed to operate in total synergy with other Telemecanique devices, Modicon M340 represents pure concentrated power.

Performance

- 7 Kinstructions/ms
- 4 MB of program memory
- 256 KB of data

Compact design

- 3 communication ports integrated in the processor
- H x W x D = 100 x 32 x 93 mm.
- High-density discrete I/O modules with 64 channels in a 32 mm wide format.

Communicative, with its integrated ports

- CANopen machine and installation bus
- Ethernet TCP/IP network - Transparent Ready
- Modbus serial link or character mode
- Remote access via STN, GSM, Radio or ADSL

Expert

- Counter modules with ready-to-use functions
- Function block library dedicated to motion control. MFB (*Motion Function Blocks*) to the PLCopen standard
- Advanced library of process control blocks oriented towards control of machinery

Innovative

- USB port as standard
- Embedded Web server
- Recipe file management via FTP protocol
- "Plug and Load" SD memory card
- No batteries

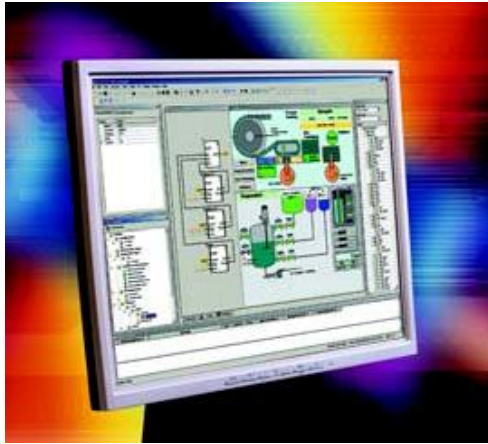
Ruggedness

- Rack architecture enabling hot swapping of modules during operation (*Hot-Swap*)
- Exceeds the standards in terms of shocks, vibrations, temperature, altitude and withstand to electrical interference.

As standard, Modicon M340 has exclusive services normally reserved for PLCs in a higher category.

Modicon M340 automation platform

Unity Pro software



Unity, software productivity

All-in-one, easy-to-use software

Unity Pro fully exploits the advantages of the graphic and contextual interfaces of Windows XP and Windows 2000 :

- Direct access to tools and information
- 100% graphics-based configuration
- Customizable toolbar and icons
- Advanced drag & drop and zoom functions
- Integrated diagnostic window

All the advantages of standardization

Unity Pro provides a complete set of functions and tools for applying the application structure to the structure of the process or machine. The program is divided into hierarchically-organized function modules containing:

- Program sections
- Animation tables
- Operator screens
- Hyperlinks

Basic functions that are used repeatedly can be encapsulated in user function blocks (DFBs) in an IEC 61131-3 language.

Time savings from re-use of modules

Once they have been tested and qualified, your standards reduce development and installation times on site, thereby optimizing quality and reducing lead times:

- Function modules that can be reused in the application or between projects by XML import/export.
- Function blocks instantiated by dragging and dropping them from the library.
- Instances that can be updated automatically to reflect modifications made in the library (if this option is selected by the user)

Maximum quality assured

The integrated PLC simulator faithfully reproduces the behavior of the target program on a PC. All the debugging tools can be used during simulation, to enhance quality before installation:

- Step-by-step program execution
- Breakpoint and watchpoint
- Real-time animations for displaying the state of the variables and the logic during operation

Reduced downtime

Unity Pro features a DFB library for application diagnostics. Integrated into the program, these DFBs can be used (depending on their function) to monitor permanent conditions relating to security and the development of a process over time. A display window provides a clear display of all system and application faults in chronological order (date-stamped at source). From this window, you can simply click to access the editor for the program in which the error occurred (search for missing conditions at source).

Online modifications can be grouped consistently in local mode on a PC and transferred directly to the PLC in a single operation in order to be taken into account in the same scan cycle. A complete range of functions provide the basis for precision control of your operations, to minimize downtime:

- Log of operator actions on Unity Pro in a protected file
- User profile and password protection
- Integrated graphic runtime screens

1 - Processors, power supplies and racks

1 - Modicon M340 processors

Processors selection guide page 1/2

■ Processor modules

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■ Power supply modules

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■ Single-rack configuration

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Modicon M340

automation platform

Modicon M340 processors

1

Modicon M340 platform for Unity Pro software offer

BMX 34 10 Standard processor



Racks	Number of racks Max. number of slots (excluding power supply module)	1 (4, 6, 8 or 12 slots) 12
Inputs/Outputs	In-rack discrete I/O (1)	512 channels (modules with 8, 16, 32 or 64 channels)
	In-rack analog I/O (1)	128/66 channels (2) (modules with 2, 4, 6 or 8 channels)
	Distributed I/O	Limited depending on the type of medium: Over Ethernet TCP/IP network via network module (63 devices with I/O Scanning function), over Modbus link (32 devices)
In-rack application-specific channels	Max. number of channels (counter and serial link)	20
	Counter (1)	2-channel (60 kHz) or 8-channel (10 kHz) modules
	Motion control	–
Integrated communication ports	Process control, programmable loops	Process control EFB library
	Ethernet TCP/IP network	–
	CANopen Master machine and installation bus	–
Communication modules	Serial link	1 in RTU/ASCII Modbus master/slave mode or in character mode (non-isolated RS232/RS485, 0.3...19.2 Kbps)
	USB port	1 programming port (PC terminal)
	Max. number of networks (1)	1 (BMX NOE 0100/0110 network module)
Internal memory capacity	Ethernet TCP/IP network	1 x 10BASE-T/100BASE-TX (Modbus TCP/IP, BOOTP/DHCP, FDR, Global Data, I/O Scanning, web server (standard, class B30 or configurable, class C30))
	Internal user RAM	2,048 Kb
	Program, constants and symbols	1,792 Kb
Memory card capacity (on processor)	Located/unlocated data	128 Kb
	Backup of program, constants and symbols	8 Mb as standard
	Hosting and display of user web pages	– (3)
Application structure	File storage	–
	Master task	1
	Fast task	1
No. of Kinstructions executed per ms	Event tasks	32
	100% Boolean	5.4 Kinstructions/ms
Rack power supply	65% Boolean + 35% fixed arithmetic	4.2 Kinstructions/ms
		24 V $\overline{\text{---}}$ isolated, 24...48 V $\overline{\text{---}}$ isolated or 100...240 V \sim power supply module
Modicon M340 processor		BMX P34 1000
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(1) The maximum values for the number of discrete I/O, analog I/O and counter channels and the number of networks are not cumulative (they are limited by the number of slots in the single-rack configuration, i.e. 11 maximum).

(2) The first value is applied to a multi-rack configuration (not available). The second value corresponds to the physical limit with a single-rack configuration.

(3) User web pages with FactoryCast module **BMX NOE 0110** (16 Mb available).

BMX 34 20 Performance processors


1 (4, 6, 8 or 12 slots)		
12		
1,024/704 channels (2) (modules with 8, 16, 32 or 64 channels)		
256/66 channels (2) (modules with 2, 4, 6 or 8 channels)		
Limited depending on the type of medium: on CANopen bus (63 devices), on Ethernet TCP/IP network via network module (63 devices with I/O Scanning function), on a Modbus link (32 devices)		
36		
2-channel (60 kHz) or 8-channel (10 kHz) modules		
MFB (Motion Function Blocks) library (control of drives or servo drives on the CANopen bus)	–	MFB (Motion Function Blocks) library (control of drives or servo drives on the CANopen bus)
Process control EFB library		
–	1 x 10BASE-T/100BASE-TX (Modbus TCP/IP, BOOTP/DHCP, FDR, class B10 standard web server)	
1 (63 slaves, 50...1,000 Kbps, class M20)	–	1 (63 slaves, 50...1,000 Kbps, class M20)
1 in RTU/ASCII Modbus master/slave mode or in character mode (non-isolated RS232/RS485, 0.3...19.2 Kbps)	–	–
1 programming port (PC terminal)		
1 (BMX NOE 0100/0110 network module)		
1 x 10BASE-T/100BASE-TX (Modbus TCP/IP, BOOTP/DHCP, FDR, Global Data, I/O Scanning, web server (standard, class B30 or configurable, class C30))		
4,096 Kb		
3,584 Kb		
256 Kb		
8 Mb as standard		
– (3)		
16 Mb (with optional card BMX RMS 008MPF)		
1		
1		
64		
8.1 Kinstructions/ms		
6.4 Kinstructions/ms		
24 V ~ isolated, 24...48 V ~ isolated or 100...240 V ~ power supply module		

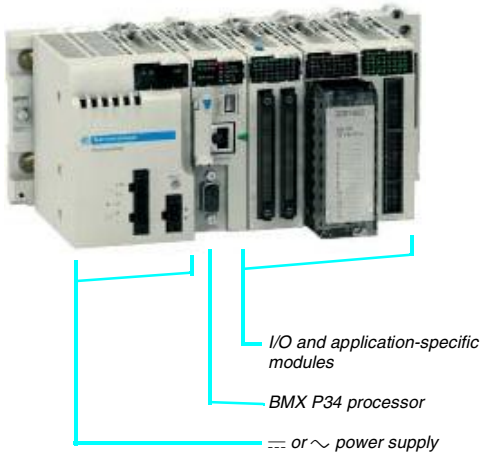
BMX P34 2010
BMX P34 2020
BMX P34 2030

1/9

Modicon M340 automation platform Processor modules

1

Modicon M340 automation platform



Presentation

Standard and Performance processors from the Modicon M340 automation platform manage an entire PLC single-rack station on which a maximum of 11 slots can be equipped with:

- Discrete I/O modules
- Analog I/O modules
- Application-specific modules (counter, Ethernet TCP/IP communication)

The four processors offered have different memory capacities, processing speeds, number of I/O and number and type of communication ports.

In addition, depending on the model, they offer a maximum (non-cumulative) of:

- 512 to 1024 discrete I/O
- 128 to 256 analog I/O
- 20 to 36 counter channels
- 0 to 2 Ethernet TCP/IP networks (with or without integrated port and network module)

Depending on the model, Modicon M340 processors include:

- A 10BASE-T/100BASE-TX Ethernet TCP/IP port
- A CANopen machine and installation bus
- A Modbus serial link
- A USB type TER port (for a programming terminal)

Each processor is supplied with a memory card used for:

- Backing up the application (program, symbols and constants)
- Activating a standard web server for the Transparent Ready B10 class integrated Ethernet port (depending on the model)

This memory card can be replaced by another type of memory card, to be ordered separately, that supports:

- Backing up the application and activating the standard web server (same as other card)
- A 16 Mb storage area for additional data organized in a file system (directories and sub-directories)

Programming Modicon M340 applications

To set up processors from the Modicon M340 automation platform, you need either:

- Unity Pro Small programming software
- Unity Pro Medium, Large or Extra Large programming software identical to that used to set up Modicon Premium and Modicon Quantum automation platforms
- With possibly, depending on requirements:
 - Unity EFB toolkit software for developing EF and EFB libraries in C language
 - Unity SFC View software for viewing and diagnostics of applications written in Sequential Function Chart language (SFC) or Grafset

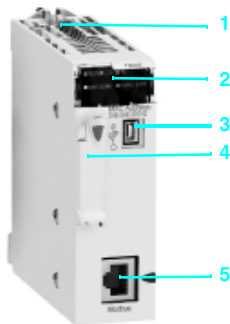
The function block software libraries provide Modicon M340 processors with the processing capability required to meet the needs of specialist applications in the following areas:

- Process control via programmable control loops (EF and EFB libraries)
- Motion control with multiple independent axis functions (MFB (*Motion Function Blocks*) library). The axes are controlled by Altivar 31/71 variable speed drives or Lexium 05/15 servo drives connected over the CANopen machine and installation bus.

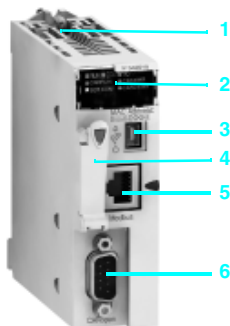
Modicon M340

automation platform

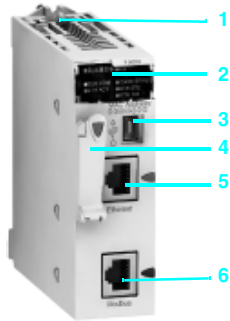
Processor modules



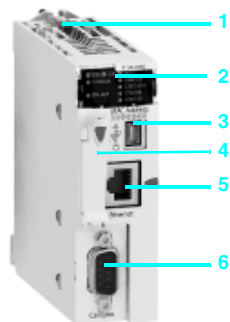
BMX P34 1000



BMX P34 2010



BMX P34 2020



BMX P34 2030

Description of BMX P34 1000/2010 processors

BMX P34 1000/2010 Standard and Performance single-format processors have the following on the front panel:

1 Safety screw for locking the module in its slot (marked 0) in the rack

2 A display block comprising 5 or 7 LEDs, depending on the model:

- ☐ RUN LED (green): Processor running (program executing)
- ☐ ERR LED (red): Processor or system fault
- ☐ I/O LED (red): I/O module fault
- ☐ SER COM LED (yellow): Activity on the Modbus serial link
- ☐ CARD ERR LED (red): Memory card missing or faulty

With, in addition, for model **BMX P34 2010**:

- ☐ CAN RUN LED (green): Integrated machine/installation bus operational
- ☐ CAN ERR LED (red): Integrated machine/installation bus fault

3 A mini B USB connector for a programming terminal (or Magelis XBT GT operator interface)

4 A slot equipped with Flash memory card for backing up the application (an LED, located above this slot, indicates recognition of or access to the memory card)

5 An RJ45 connector for the Modbus serial link or character mode link (RS 232C/RS 485, 2-wire, non-isolated)

With, in addition, for model **BMX P34 2010**:

6 A 9-way SUB-D connector for the CANopen master machine and installation bus

Description of BMX P34 2020/2030 processors with integrated Ethernet TCP/IP port

BMX P34 2020/2030 Performance single-format processors have the following on the front panel:

1 Safety screw for locking the module in its slot (marked 0) in the rack

2 A display block comprising 8 or 10 LEDs, depending on the model:

- ☐ RUN LED (green): Processor running (program executing)
- ☐ ERR LED (red): Processor or system fault
- ☐ I/O LED (red): I/O module fault
- ☐ SER COM LED (yellow): Activity on the Modbus serial link
- ☐ CARD ERR LED (red): Memory card missing or faulty
- ☐ ETH ACT LED (green): Activity on the Ethernet TCP/IP network
- ☐ ETH STS LED (green): Ethernet TCP/IP network status
- ☐ ETH 100 LED (red): Data rate on the Ethernet TCP/IP network (10 or 100 Mbps)

With, in addition, for model **BMX P34 2030**:

- ☐ CAN RUN LED (green): Integrated machine/installation bus operational
- ☐ CAN ERR LED (red): Integrated machine/installation bus fault

3 A mini B USB connector for a programming terminal (or Magelis XBT GT operator interface)

4 A slot equipped with Flash memory card for backing up the application (an LED, located above this slot, indicates recognition of or access to the memory card)

5 An RJ45 connector for connection to the Ethernet TCP/IP 10BASE-T/100BASE-TX network

Also included, depending on the model:

6 **BMX P 34 2020** processor: An RJ45 connector for the Modbus serial link or character mode link (RS 232C/RS 485, 2-wire, non-isolated)

7 **BMX P 34 2030** processor: A 9-way SUB-D connector for the CANopen master machine and installation bus

On the back panel there are two rotary switches for assigning the IP address. There are three ways to define this assignment:

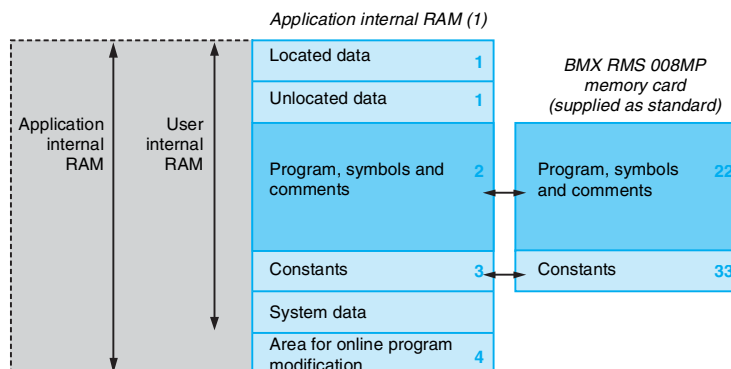
- ☐ Address set by the position of the two switches
- ☐ Address set by the application parameters
- ☐ Address set by the Ethernet TCP/IP BOOTP server

Modicon M340 automation platform

Processor modules

Memory structure

BMX P34 1000/2000 processor with memory card supplied as standard



Application internal RAM

The application memory is divided into memory areas, physically distributed in the Modicon M340 processor's internal RAM:

- 1 Application data area, which may be one of two 2 possible types:
 - Located data, corresponding to the data defined by an address (for example %MW237) with which a symbol can be associated (for example, Counter_reject).
 - Unlocated data, corresponding to data defined only by a symbol. The use of unlocated data eliminates the restrictions of managing the memory location since the addresses are assigned automatically and also allows data to be structured and re-used.

This data area is backed up automatically when the PLC is turned off by duplicating its contents in a 256 Kbyte non-volatile internal memory integrated in the processor. It is also possible to back up this memory at any time with a user program.

- 2 Program, symbols and comments area: At program level this area contains the executable binary code and IEC source code.
- 3 Constants area: This area supports the constant located data (%KWi).
- 4 Area for online program modification (see page 1/7)

The user can choose to transfer the source data to the executable program in the PLC. The fact of having the program source in the PLC means that, when an empty programming terminal is connected to the PLC, all the elements needed to debug or upgrade this application can be restored to the terminal. Comments and animation tables can be excluded from the data embedded in the PLC.

Memory card

Modicon M340 processors are supplied with an SD (*Secure Digital*) type Flash memory card. This memory card is intended for backing up the program, symbols and comments area 2 and the constants area 3.

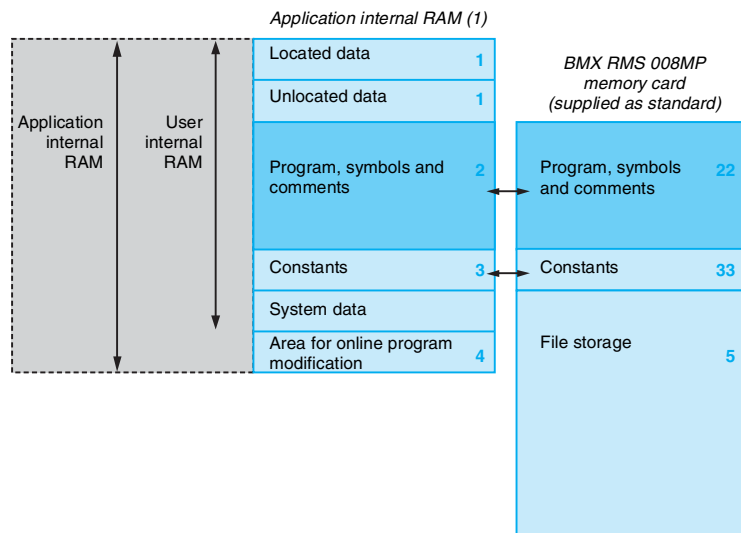
Duplication (for areas 22 and 33) and retrieval (on return of power) operations are managed automatically by the system and are therefore transparent to the user.

This card (formatted by Schneider Electric and supplied with each processor) is referenced as a replacement part **BMX RMS 008MP**.

(1) For the size of the different memory areas, see characteristics, page 1/8.

Memory structure (continued)

BMX P34 20●0 processor with BMX RMS 008MPF memory card



In place of the BMX RMS 008MP memory card (supplied as standard with each processor), **BMX P34 2010/2020/2030** processors can take the **BMX RMS 008MPF** memory card. With the three above-mentioned processors, this card also offers (in addition to the features of the BMX RMS 008MP card supplied as standard described on page 1/6):

- 5 A file storage area (for additional data, such as production data and manufacturing recipes): This area is limited to 16 Mb. These files can be managed from the application program or by any FTP client connected to the Ethernet TCP/IP port integrated in the processor.

For **BMX P34 2020/2030** processors with integrated Ethernet TCP/IP port, the **BMX RMS 008MPF** memory card also offers standard web services (Transparent Ready class B10).

The Unity Pro programming software assists the application designer with managing the structure and memory space occupation of the Modicon M340 automation platform.

Protecting the application

If necessary, it is possible to prohibit access to the application (in terms of reading or modifying the program) by only loading the executable code to the PLC. Additionally, a memory protection bit, set in configuration mode, is also available to prevent any program modification (via the programming terminal or downloads).

Modifying the program in online mode

As with Modicon Premium and Quantum platforms (with Unity Pro software), the online program modification function is available on the Modicon M340 automation platform with the option of adding or modifying the program code and data in different places in the application in a single modification session (thus ensuring modification is homogenous and consistent with the controlled process).

The application internal RAM memory area 4 authorizes these program modification or addition sessions while observing the recommendation to structure the application program in several, reasonably-sized sections.

Modicon M340

automation platform

Processor modules

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Modicon M340 Micro-PLCs have been designed to conform with the main national and international standards relating to electronic devices for industrial control systems (see pages 6/2 to 6/7 "Standards, certifications and environmental conditions").

Characteristics and performance

Processor				Standard BMX P34 1000	Performance BMX P34 2010			BMX P34 2020	BMX P34 2030
Maximum configuration	No. of racks	4, 6, 8 or 12 slots		1					
	Max. number of slots for processor and modules (excluding power supply module)			12					
Functions	Max. no. (1)	Discrete I/O		512	1,024, 704 in single-rack configuration (64 I/O x 11)				
		Analog I/O		128, 66 in single-rack configuration (4I/2Q x 11)	256, 66 in single-rack configuration (4I/2Q x 11)				
		Control channels		Programmable loops (via CONT-CTL process control EFB library)					
		Counter channels		20	36				
		Motion control		–	Independent axes on CANopen bus (via MFB library)	–	Independent axes on CANopen bus (via MFB library)		
	Integrated connections	Ethernet TCP/IP		–	1 RJ45 port, 10/100 Mbps, with Transparent Ready class B10 standard web server				
		CANopen master bus		–	1 (9-way SUB-D)	–	1 (9-way SUB-D)		
		Serial link		1 RJ45 port, Modbus master/slave RTU/ASCII or character mode (non-isolated RS 232C/RS 485), 0.3...19.2 Kbps					–
		USB port		1 port, 12 Mbps					
	Communication module	Ethernet TCP/IP		1 RJ45 port, 10/100 Mbps, with: - Transparent Ready class B30 standard web server with BMX NOE 0100 module - Transparent Ready class C30 configurable web server with BMX NOE 0110 module					
	Internal user RAM	Total capacity		Kb	2,048	4,096			
Program, constants and symbols			Kb	1,792	3,584				
Data			Kb	128	256				
Memory card	Supplied as standard (reference BMX RMS 008MP)			Backup of program, constants, symbol and data					
				–	Activation of standard web server, class B10				
	To be ordered separately (reference BMX RMS 008MPF)			–	Backup of program, constants, symbol and data				
				–	File storage, 16 Mb				
			–	Activation of standard web server, class B10					
Maximum size of object areas	Located internal bits	Maximum	bits	16,250 %Mi	32,464 %Mi				
		Default	bits	256 %Mi	512 %Mi				
	Located internal data	Maximum	Bytes	32,464 %MWi internal words, 32,760 %KW constant words					
		Default	Bytes	512 %MWi internal words, 128 %KW constant words	1,024 %MWi internal words, 256 %KW constant words				
	Max. unlocated internal data		Kb	128 (2)	256 (2)				
Application structure	Master task			1 cyclic or periodic					
	Fast task			1 periodic					
	Auxiliary tasks			–					
	Event tasks			32 (including 2 with priority)	64 (including 2 with priority)				
Execution time for one instruction	Boolean		µs	0.18	0.12				
	On words or fixed point arithmetic	Single-length words	µs	0.38	0.25				
		Double-length words	µs	0.26	0.17				
	On floating points		µs	1.74	1.16				
No. of Kinstructions executed per ms	100% Boolean		Kinst/ms	5.4	8.1				
	65% Boolean and 35% fixed arithmetic		Kinst/ms	4.2	6.4				
System overhead	Master task		ms	1.05	0.70				
	Fast task		ms	0.20	0.13				
Power consumption	With 24 V ~ voltage		mA	72	90	95	135		

(1) Only affects in-rack modules. The remote I/O on the CANopen bus are not included in these maximum numbers.

(2) The size of the located data (internal bits and data) and the size of the configuration data should be deducted from this value.

Modicon M340 automation platform

Processor modules

BMX P34 Modicon M340 processors

Modicon M340 processor modules are supplied with the **BMX RMS 008MP** Flash memory card. This card performs the following actions transparently:

- Backing up the application (program, symbols and constants) supported in the processor internal RAM that is not backed up,
- Activation of the Transparent Ready class B10 standard web server (with **BMX P34 2020/2030** Performance processors).

This card can be replaced by another card featuring a file storage option.



BMX P34 1000



BMX P34 2010/2030



BMX P34 2020



BMX RMS 008MP / MPF



BMX XCA USB H0

I/O capacity (1)	Memory capacity	Max. no. of network modules	Integrated communication ports	Reference (3)	Weight kg
Standard BMX P340 10					
512 discrete I/O 128 analog I/O 20 application-specific channels	2,048 Kb integrated	1 Ethernet TCP/IP network	Modbus serial link	BMX P34 1000	0.200

Performance BMX P340 20					
1,024 discrete I/O 256 analog I/O 36 application-specific channels	4,096 Kb integrated	1 Ethernet TCP/IP network	Modbus serial link CANopen bus	BMX P34 2010	0.210
			Modbus serial link Ethernet TCP/IP network	BMX P34 2020	0.205
			Ethernet TCP/IP network CANopen bus	BMX P34 2030	0.215

Memory card

Description	Use	Processor compatibility	Reference	Weight kg
Memory card 16 Mb	As replacement for the memory card supplied as standard with each processor, used for: - Backup of program, constants, symbol and data - File storage, 16 Mb - Activation of class B10 web server	BMX P34 20●0	BMX RMS 008MPF	0.002

Separate parts

Description	Use		Length	Reference	Weight kg
	From	To			
Terminal port/USB cordsets	Mini B USB port on the Modicon M340 processor	PC terminal type A	1.8 m	BMX XCA USB H018	0.065
		USB port	4.5 m	BMX XCA USB H045	0.110

Replacement parts

Description	Use	Processor compatibility	Reference	Weight kg
Memory card 8 Mb	Supplied as standard with each processor, used for: - Backup of program, constants, symbol and data - Activation of class B10 web server	BMX P34 1000 / 20●0	BMX RMS 008MP	0.002

(1) For I/O capacity in single-rack configuration, see characteristics, page 1/8.

Modicon M340 automation platform

Power supply modules

Presentation

BMX CPS ●●●0 power supply modules provide the power supply for each **BMX XBP ●●00** rack and the modules installed on it.

There are two types of power supply module:

- Power supply modules for AC supplies
- Power supply modules for DC supplies

Description

The power supply module is selected according to:

- The electrical line supply: 24 V --- , 48 V --- or 100...240 V \sim
- The required power (see the power consumption table on page 6/8) (1)

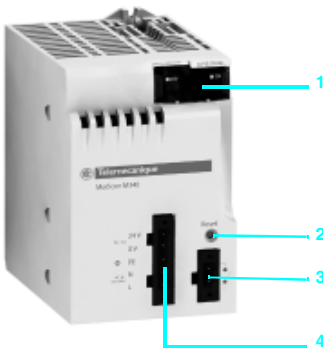
BMX CPS ●●●0 power supply modules have the following on the front panel :

- 1 A display block comprising:
 - OK LED (green), lit if rack voltages are present and correct
 - 24 V LED (green), lit when the sensor voltage is present (for BMX CPS 2000/3500 AC power supply modules only)
- 2 A pencil-point RESET pushbutton for a cold restart of the application
- 3 A 2-way connector that can take a removable terminal block (screw or spring-type) for connecting the alarm relay
- 4 A 5-way connector that can take a removable terminal block (screw or spring-type) for connecting the following:
 - --- or \sim line supply
 - Protective earth
 - Dedicated 24 V --- power supply for the input sensors (for BMX CPS 2000/3500 AC power supply modules only)

To be ordered separately:

Pack of two removable terminal blocks, depending on the model:

- Screw clamp **BMX XTS CPS10**
- Spring-type **BMX XTS CPS20**



(1) This power consumption calculation for the rack can also be performed by the Unity Pro programming software.

Modicon M340 automation platform

Power supply modules

Functions

Alarm relay

The alarm relay located in each power supply module has a volt-free contact accessible from the front of the 2-way connector.

The operating principle is as follows:

In normal operation, with the PLC in RUN, the alarm relay is activated and its contact is closed (state 1).

The relay de-energizes and its associated contact opens (state 0) whenever the application stops, even partially, due to any of the following:

- Occurrence of a blocking fault
- Incorrect rack output voltages
- Loss of supply voltage

RESET pushbutton

The power supply module in each rack has a RESET button on the front panel; when activated, this triggers an initialization sequence for the processor and the rack modules it supplies.

Pressing this pushbutton triggers a sequence of service signals, which is the same as that for:

- A power break when the pushbutton is pressed
- A power-up when the pushbutton is released

In terms of the application, these operations represent a cold start (forcing the I/O modules to state 0 and initializing the processor).

Sensor power supply

The **BMX CPS 2000/3500** AC power supply modules have an integrated 24 V \equiv voltage supply for powering the input sensors. Connection to this sensor power supply is via the 5-way connector on the front panel.

The power available on this 24 V \equiv voltage depends on the power supply model (0.45 or 0.9 A) (see characteristics on page 1/12).

Modicon M340

automation platform

Power supply modules

Characteristics

~ power supply module				BMX CPS 2010		BMX CPS 3020	
Primary	Voltage	Nominal	V	24 --- isolated		24...48 --- isolated	
		Limit (ripple included)	V	18...31.2 ---		18...62...4 ---	
	Current	Input nominal I rms	A	1 at 24 V ---		1.65 at 24 V ---; 0.83 at 48 V ---	
		Initial power-up at 25°C (1)		V	24 ---		24 ---
		I inrush	A	30		30	60
		I²t on activation	A²s	≤ 0.6		≤ 1	≤ 3
		It on activation	As	≤ 0.15		≤ 0.2	≤ 0.3
	Micro-break duration	Line (accepted)	ms	≤ 1			
Integrated protection			With internal fuse (not accessible)				
Secondary	Useful power	Max.	W	17		32	
	3.3 V --- voltage (2)	Nominal voltage	V	3.3			
		Nominal current	A	2.5		4.5	
		Typical power	W	8.25		14.85	
	24 V --- output (3)	Nominal voltage	V	24 ---			
		Nominal current	A	0.7		1.3	
		Typical power	W	16.8		31.2	
	Integrated protection on the voltages (4)			Yes, against overloads, short-circuits and overvoltages			
Max. dissipated power			W	8.5			
Max. length of power supply cable	Copper wires with 1.5 mm² cross-section		m	20		10	
	Copper wires with 2.5 mm² cross-section		m	30		15	
Insulation	Dielectric strength	Primary/secondary and primary/ground	V rms	1,500 - 50 Hz for 1 min at an altitude of 0...4,000 m			
	Insulation resistance	Primary/secondary and primary/ground	MΩ	≥ 10			
~ power supply module				BMX CPS 2000		BMX CPS 3500	
Primary	Voltages	Nominal	V	100...240 ~			
		Limit (ripple included)	V	85...264 ~			
	Frequencies	Nominal/limit	Hz	50-60/47-63			
	Power	Apparent	VA	70		120	
	Current	Input nominal I rms	A rms	0.61 at 115 V ~; 0.31 at 240 V ~		1.04 at 115 V ~; 0.52 at 240 V ~	
	Initial power-up at 25°C (1)		V	120 ~	240 ~	120 ~	240 ~
		I inrush	A	≤ 30	≤ 60	≤ 30	≤ 60
		I²t on activation	A²s	≤ 0.5	≤ 2	≤ 1	≤ 3
		It on activation	As	0.03	0.06	≤ 0.05	≤ 0.07
	Micro-break duration	Line (accepted)	ms	≤ 10			
Integrated protection			With internal fuse (not accessible)				
Secondary	Useful power	Max. overall	W	20		36	
		Max. on 3.3 V --- and 24 V --- rack output voltages	W	16.5		31.2	
	3.3 V --- voltage (2)	Nominal voltage	V	3.3			
		Nominal current	A	2.5		4.5	
		Power (typical)	W	8.25		14.85	
	24 V rack --- voltage (3)	Nominal voltage	V	24 ---			
		Nominal current	A	0.7		1.3	
		Typical power	W	16.8		31.2	
	24 V --- sensor voltage (4)	Nominal voltage	V	24 ---			
		Nominal current	A	0.45		0.9	
		Typical power	W	10.8		21.6	
	Integrated protection on the voltages (5)			Yes, against overloads, short-circuits and overvoltages			
	Maximum dissipated power			W	8.5		
Insulation	Dielectric strength	Primary/secondary (24 V/3.3 V)	V rms	1500			
		Primary/secondary (sensor 24 V)	V rms	2300			
		Primary/ground	V rms	1500			
		24 V sensor output/ground	V rms	500			
	Insulation resistance	Primary/secondary and primary/ground	MΩ	≥ 100			

(1) These values should be taken into account when starting several devices simultaneously and when sizing protection devices.

(2) 3.3 V --- voltage for the I/O module logic power supply

(3) 24 V --- voltage for the I/O module power supply and the processor

(4) 24 V --- sensor output for the sensor power supply

(5) Protected by a fuse that cannot be accessed

Modicon M340 automation platform

Power supply modules



BMX CPS 2010 / 3020



BMX CPS 2000 / 3500

References

Each **BMX XBP ●●00** rack must be equipped with a power supply module. These modules are inserted in the first two slots of each rack (marked CPS). The power required to supply each rack depends on the type and number of modules installed in the rack. It is therefore necessary to draw up a power consumption table rack by rack in order to determine the **BMX CPS ●●●0** power supply module most suitable for each rack (see page 6/8).

Power supply modules

Line supply	Available power (1)			Reference	Weight kg
	3.3 V \equiv (2)	24 V rack \equiv (2)	24 V sensor \equiv (3)	Total	
24 V \equiv isolated	8.3 W	16.5 W	–	16.5 W	BMX CPS 2010 0,290
24...48 V \equiv isolated	15 W	31.2 W	–	31.2 W	BMX CPS 3020 0,340
100...240 V \sim	8.3 W	16.5 W	10.8 W	20 W	BMX CPS 2000 0.300
	15 W	31.2 W	21.6 W	36 W	BMX CPS 3500 0.360

Separate parts

Description	Composition	Type	Reference	Weight kg
Pack of 2 removable connectors	One 5-way terminal block and one 2-way terminal block	Cage clamp	BMX XTS CPS10	0.020
		Spring-type	BMX XTS CPS20	0.015

(1) The sum of the absorbed power on each voltage (3.3 V \equiv and 24 V \equiv) should not exceed the total power of the module. See the power consumption table on page 6/8.

(2) 3.3 V \equiv and 24 V rack \equiv voltages for powering Modicon M340 PLC modules

(3) 24 V sensor \equiv voltage for powering the input sensors (voltage available via the 2-way removable connector on the front panel)

Presentation

BMX XBP 0000 racks are the basic element of the Modicon M340 automation platform in a single-rack configuration.

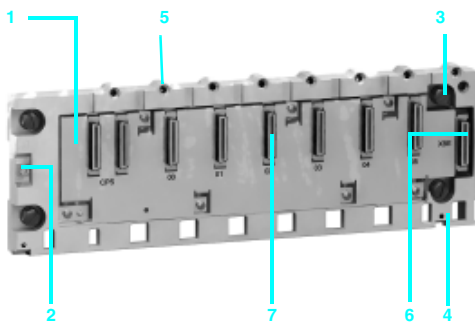
These racks perform the following functions:

- Mechanical function: They are used to install all the modules in a PLC station (power supply, processor, discrete I/O, analog and application-specific I/O). These racks can be mounted on a panel, plate or DIN rail:
 - Inside enclosures
 - On machine frames, etc.
- Electrical function: The racks incorporate a Bus X. They are used to:
 - Distribute the power supplies required for each module in the same rack
 - Distribute data and service signals for the entire PLC station
 - Hot swap modules during operation

Description

BMX XBP 0000 racks are available in 4, 6, 8 or 12-slot versions, and comprise:

- 1 A metal frame that performs the following functions:
 - Holds the Bus X electronic card and protects it against EMI and ESD type interference
 - Holds the modules
 - Gives the rack mechanical rigidity
- 2 A ground terminal for grounding the rack
- 3 Holes for mounting the rack on a frame. These holes are big enough for M6 screws.
- 4 Fixing points for the shielding connection bar
- 5 Tapped holes to take each module locking screw
- 6 A connector for an expansion module. This connector (marked XBE) is not used for this version.
- 7 40-way female 1/2 DIN connectors forming the connection between the rack and each module. When the rack is delivered, these connectors are protected by covers that should be removed before inserting the modules.
Slots for anchoring the module pins



Rack 6 slots BMX XBP 0600

To be ordered separately:

BMX XSP 0000 cable shielding connection kit, used to protect against electrostatic discharge when connecting the shielding of cordsets for connecting:

- Analog modules
- A Magelis XBT operator interface to the processor (via **BMX XCA USBH000** shielded USB cable)

This kit comprises:

- 8 A metal bar that takes the clamping rings
- 9 Two sub-bases to be mounted on the rack
- 10 A set of spring clamping rings for attaching cables with their shielding to the metal bar.
Packs of 10 **STB XSP 3000** clamping rings can be ordered in addition if required.

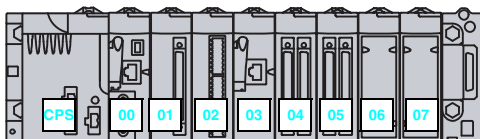
Function

Addressing modules in a single-rack configuration

Each rack must contain a power supply module and a processor module.

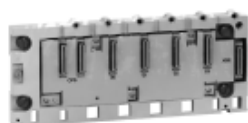
Inserting different modules in the rack:

- The power supply module always occupies the **CPS** slot.
- The processor module must always be installed in slot **00**.
- Its I/O modules and application-specific modules are installed in slot **01** to slot ...
 - **03** with a 4-slot rack
 - **05** with a 6-slot rack
 - **07** with an 8-slot rack
 - **11** with a 12-slot rack

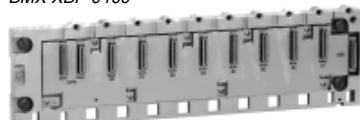


Example of installation with 8-slot rack

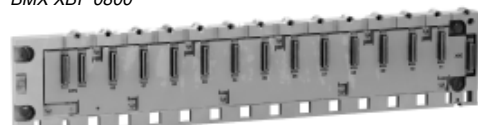
Modicon M340 automation platform



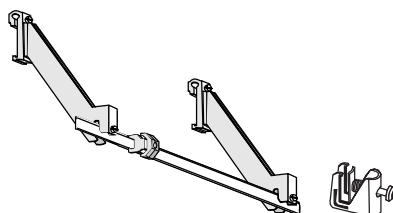
BMX XBP 0400



BMX XBP 0800



BMX XBP 1200



BMX XSP ●●00

STB XSP 30●0

Racks

Description	Type of module to be inserted	No. of slots (1)	Reference	Weight kg
Racks	BMX CPS power supply, BMX P34 processor, I/O modules and application-specific modules (counter, communication)	4	BMX XBP 0400	1.470
		6	BMX XBP 0600	1.750
		8	BMX XBP 0800	2.310
		12	BMX XBP 1200	—

Accessories

Description	For use with	Unit reference	Weight kg
Shielding connection kits comprising:	BMX XBP 0400 rack	BMX XSP 0400	0.280
- a metal bar	BMX XBP 0600 rack	BMX XSP 0600	0.310
- two sub-bases	BMX XBP 0800 rack	BMX XSP 0800	0.340
- one set of spring clamping rings	BMX XBP 1200 rack	BMX XSP1200	0.400
Spring clamping rings (pack of 5)	Cables with 1.5...6 mm ² cross-section	STB XSP 3010	0.050
	Cables with 5...11 mm ² cross-section	STB XSP 3020	0.070
Protective covers (pack of 5)	Unoccupied slots on BMX XBP ●●00 rack	BMX XEM 010	0.005

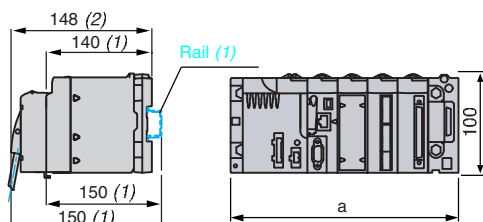
(1) Number of slots taking the processor module, I/O modules and application-specific modules (excluding power supply module).

Dimensions, mounting

BMX XBP

Common side view

Front view: BMX XBP example

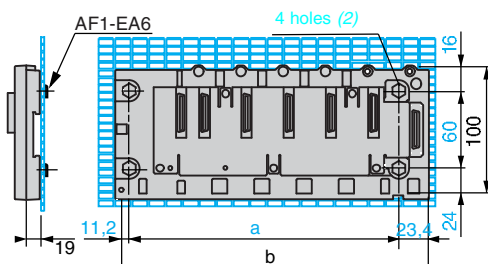


	a
BMX XBP 0400	242.4
BMX XBP 0600	307.6
BMX XBP 0800	372.8
BMX XBP 1200	503.2

(1) With removable terminal block (cage, screw or spring).
(2) With FCN connector.

Mounting the racks

On AM1 PA and AM3 PA pre-slotted plate

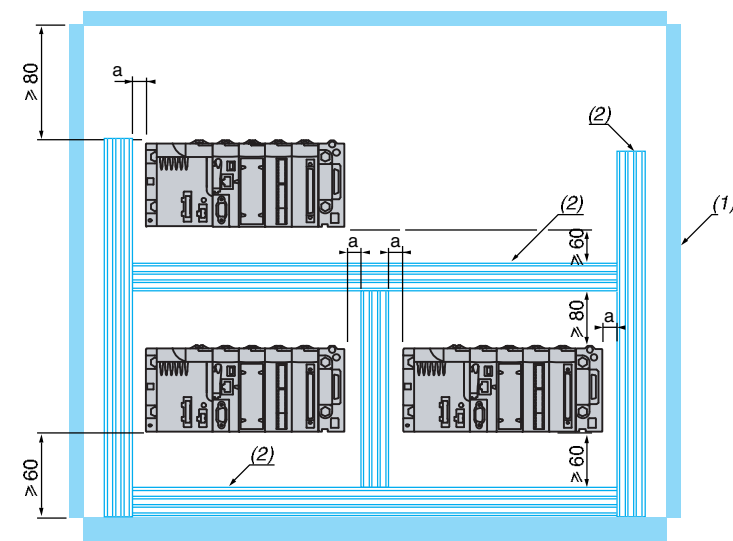


	a	b
BMX XBP 0400	207.8	242.2
BMX XBP 0600	273	307.6
BMX XBP 0800	338.2	372.8
BMX XBP 1200	468.6	503.2

(1) **On AM1 ED rail:** 35 mm wide, 15 mm deep Only possible with BMX XBP 0400/0600/0800 rack.

(2) For panel-mounting: The diameter of the fixing holes must be sufficient to accept M4, M5, M6 screws (4.32 to 6.35).

Installation rules

 $a \geq 3 \text{ mm}$

(1) *Equipment or enclosure.*

(2) Cable ducting or clip.

2.1 Discrete I/O modules

Discrete input, mixed, and output modules selection guide. page 2/2

■ Discrete I/O modules

- Presentation, description page 2/6
- Functions page 2/8
- Characteristics page 2/10
- References page 2/16
- Connections page 2/18

2.2 Analog I/O modules and process control

Analog I/O modules selection guide. page 2/22

■ Analog I/O modules

- Presentation, description page 2/24
- Connections. page 2/25
- Functions page 2/26
- Characteristics page 2/28
- References page 2/31

■ Programmable process control page 2/32

2.3 Distributed I/O

IP 67 and IP 20 distributed I/O selection guide. page 2/34

2.4 Counter modules and Motion Function Blocks

■ Counter modules

- Presentation, description page 2/36
- Functions page 2/37
- Characteristics page 2/40
- References page 2/41
- Connections. page 2/42

■ MFB, Motion Function Blocks page 2/44

Modicon M340

automation platform

Discrete I/O modules
Input modules and mixed I/O modules

Applications

16-channel input modules

Connection via cage clamp, screw clamp or spring-type removable terminals



Type

Voltage

24 V

48 V

--- or ~

24 V

~

48 V

100...120V

Modularity

(Number of channels)

16 isolated channels

Connection

Via BMX FTB 2000/2010/2020 20-way cage clamp, screw clamp or spring-type removable terminals

Isolated inputs

IEC 1131-2 conformity

Logic

Sensor compatibility in accordance with standard IEC 947-5-2

Type 3

Type 1

Type 1 (~)

Type 3

Positive

2-wire ---, 3-wire --- PNP any type

Pos. or neg.

2-wire ---/~, 3-wire --- PNP or NPN any type

—

2-wire ~

Isolated outputs

Fallback

IEC 1131-2 conformity

Protection

Logic

Module

BMX
DDI 1602BMX
DDI 1603 ▲BMX
DAI 1602 ▲BMX
DAI 1603 ▲BMX
DAI 1604

Page

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Compatibility with installation help system

Tego Dial

TeSys Quickfit

—

—

Compatibility with Advantys Telefast ABE 7 pre-wired system

Connection sub-bases

Input and output adaptor sub-bases

—

—

Passive connection sub-base Optimum "Economy"

Optimum "Miniature"

Universal

—

—

—

Relay adaptor sub-base

Fixed relays

Plug-in relays

—

—

Preformed cordsets with 40-way connector

—

Pages

—

▲ Available 4th quarter 2007

32/64-channel high-density input modules

Connection via 40-way connectors with preformed cordsets

**16/32-channel mixed I/O modules**

Connection via cage clamp, screw clamp or spring-type removable terminals



Connection via 40-way connectors with preformed cordsets



--- 24 V	
32 isolated channels	64 isolated channels
Via one 40-way connector	Via two 40-way connectors
Type 3	Non-IEC
Positive	
2-wire ---, 3-wire --- PNP any type	–

BMX DDI 3202K

BMX DDI 6402K

2/16

APE 1B24M Dialbase interface with 8I/8Q

LU9 G02 splitter boxes (8 motor starters) and BMX FCC ●●1/●●3 preformed cordsets

Depending on model, 8- or 16-channel passive sub-bases, with or without LED, with common or 2 terminals per channel

Depending on model, 16-channel active sub-bases with solid state or electromechanical, fixed or removable relays, 5...48 V ---, 24 V ---, 24 V...240 V ~ or volt-free, with common or 2 terminals per channel, screw or spring-type connection

ABE 7H20E●00

ABE 7H16C●●

ABE 7H08R●●/7H08S21,
ABE 7H16R1●/7H16R50,
ABE 7H16R2●/7H16S21,
ABE 7H16R3●/7H16R23,
ABE 7H16S43.

ABE 7S16E2●●

ABE 7P16F31●●

BMX FCC ●●1/FCC ●●3

5/10 to 5/15, 2/17

--- 24 V I/O	--- and ~ (outputs only) 24 V inputs, relay outputs
8 isolated inputs and 8 isolated outputs	
Via BMX FTB 2000/2010/2020 20-way cage clamp, screw clamp or spring-type removable terminals	
Type 3	
Positive	–

Configurable output fallback, continuous monitoring of output control and resetting of outputs in case of internal fault

Yes

Protected

Positive

Not protected

–

Protected

Positive

BMX DDM 16022

BMX DDM 16025

BMX DDM 3202K

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–

–

APE 1B24M Dialbase interface

LU9 G02 splitter boxes (8 motor starters) and BMX FCC ●●1/●●3 preformed cordsets

ABE 7H20E●00

ABE 7H16C●●

ABE 7H08R●●/7H08S21,
ABE 7H16R1●/7H16R50,
ABE 7H16R2●/7H16S21,
ABE 7H16R3●/7H16R23,
ABE 7H16S43/7H16F43

ABE 7S16E2●●

ABE 7S16S●●●/7R16S

ABE 7P16F31●●

ABE 7R16T●●●/7P16T●●●

BMX FCC ●●3

5/10 to 5/15, 2/17

Modicon M340

automation platform

Discrete I/O modules
Output modules

Applications

32/64-channel high-density output modules

Connection via 40-way connectors with preformed cordsets



Type

--- solid state

Voltage

24 V

Current

0.1 A per channel

Modularity
(Number of channels)

32 protected channels

64 protected channels

Connection

Via one 40-way connector

Via two 40-way connectors

Isolated outputs

Fallback

Configurable output fallback, continuous monitoring of output control and resetting of outputs in case of internal fault

IEC 1131-2 conformity
Protection

Yes

Current limiter with electronic tripping

Logic

Positive

–

Discrete output module

BMX DDO 3202K

BMX DDO 6402K

Page

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Compatibility with
installation help system

Tego Dial

TeSys Quickfit

–

Compatibility with
Advantys Telefast ABE 7
pre-wired system

Connection sub-bases

Input adaptor sub-bases

–

Passive sub-base

Optimum “Economy”

Optimum “Miniature”

Universal

ABE 7H20E●00

ABE 7H16C●●

ABE 7H08R●●/7H08S21,
ABE 7H16R1●/7H16R50,
ABE 7H16R2●/7H16S21,
ABE 7H16R3●
ABE 7H16F43

Relay adaptor sub-base

Fixed relays

Removable relays

ABE 7S16S●●● / 7R16S

ABE 7R16T●●●/7P16T●●●

Preformed cordsets with 40-way connector

BMX FCC●●1/FCC ●●3

Pages

5/10 to 5/15, 2/17

8/16-channel output modules

Connection via cage clamp, screw clamp or spring-type removable terminals



\equiv/\sim relay

24 V —, 24...240 V ~

2 A (lth) per channel

16 non-protected channels

Via BMX FTB 2000/2010/2020 20-way cage clamp, screw clamp or spring-type removable terminals

Configurable output fallback

Yes

—

Negative

BMX DRA 1605

2/16

—

—

—

▲ Available 4th quarter 2007

Presentation

Discrete I/O modules in the Modicon M340 offer are standard modules occupying a single slot, equipped with either of the following:

- A connector for a screw or spring-type 20-way removable terminal block
- One or two 40-way connector(s)

A wide range of discrete inputs and outputs can be used to meet whatever requirements arise in terms of:

- functions, AC or DC I/O, positive or negative logic
- modularity, 8, 16, 32 or 64 channels per module

The inputs receive signals from the sensors and perform the following functions:

- acquisition
- adaptation
- electrical isolation
- filtering
- protection against interference signals

The outputs memorize commands issued by the processor to enable control of the preactuators via the decoupling and amplification circuits.

Description

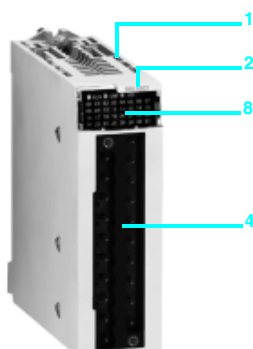
BMX D●/D●O/DRA discrete I/O modules are standard format (1 slot). They have a case, which ensures IP 20 protection of the electronics, and are locked into position by a captive screw.

I/O modules connected via 20-way removable terminal block

- 1 Rigid body providing support and protection for the electronic card
- 2 Module reference marking (a label is also visible on the right-hand side of the module)
- 3 Channel status display block
- 4 Connector taking the 20-way removable terminal block for connecting sensors or preactuators

To be ordered separately:

A **BMX FTB 20●0** 20-way removable terminal block or a preformed cordset with a 20-way removable terminal block at one end and flying leads at the other (see page 2/7).



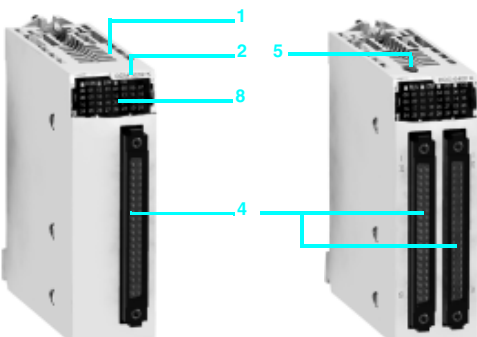
Module and 20-way removable terminal block

I/O modules connected via 40-way connector

- 1 Rigid body providing support and protection for the electronic card
- 2 Module reference marking (a label is also visible on the right-hand side of the module)
- 3 Channel status display block
- 4 One or two 40-way connectors (32 or 64 channels) (1) for connecting sensors or preactuators
- 5 With the 64-channel module, a pushbutton, which, with successive presses, displays the state of channels 0...31 or 32...63 on the block 3 (see page 2/9)

To be ordered separately, depending on the type of module:

One or two preformed cordset(s) with a 40-way connector (see page 2/7).



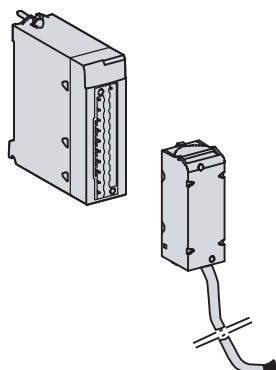
32- and 64-channel modules with for connection via 40-way connector(s)

(1) Fujitsu FCN 40-way connector

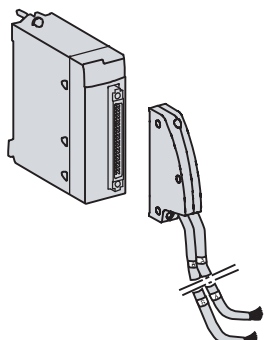
Modicon M340

automation platform

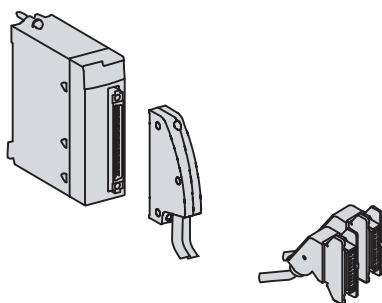
Discrete I/O modules



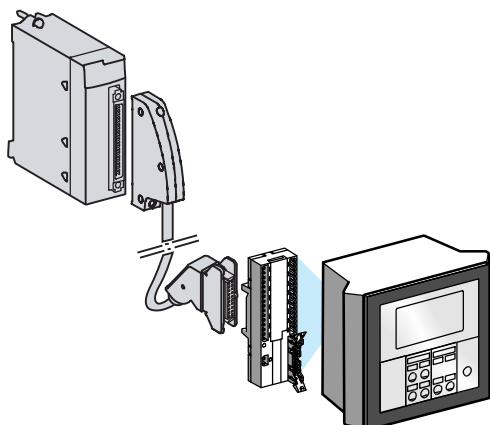
Preformed cordset with removable terminal block at one end and flying leads at the other



Preformed cordset with 40-way connector at one end and 2 flying leads at the other



Preformed cordset with 40-way connector and HE 10 connector for Advantys Telefast ABE 7 system



Example of connection to the Tego Dial installation help system

Characteristics:
pages 2/10 to 2/15

References:
pages 2/16 to 2/17

Connecting modules with removable terminal blocks

There are three types of 20-way removable terminal block:

- ☐ Screw clamp terminal block
- ☐ Cage clamp terminal block
- ☐ Spring-type terminal block

Each removable terminal block can take:

- ☐ Bare wires
- ☐ Wires equipped with DZ5-CE cable ends

One version of the removable terminal block is equipped with **BMX FTW●●1** cordsets with color-coded flying leads (3, 5 or 10 m long).

Cage clamp terminal blocks

The capacity of each terminal is:

- ☐ Minimum: One 0.34 mm² wire (AWG 22)
- ☐ Maximum: One 1.5 mm² wire (AWG 14)

BMX FTB 2000 cage clamp connectors are equipped with captive screws (maximum tightening torque 0.5 N.m).

Screw clamp terminal blocks

The capacity of each terminal is:

- ☐ Minimum: One or two 0.34 mm² wires (AWG 22)
- ☐ Maximum: Two 1.5 mm² wires (AWG 14)

BMX FTB 2010 screw clamp connectors are equipped with captive screws (maximum tightening torque 0.5 N.m).

Spring-type terminal blocks

The capacity of each terminal in the **BMX FTB 2020** spring-type terminal blocks is:

- ☐ Minimum: Two 0.34 mm² wires (AWG 22)
- ☐ Maximum: Two 1.5 mm² wires (AWG 14)

Connecting modules with 40-way connectors

Preformed cordsets with 40-way connector at one end and flying leads at the other

Preformed cordsets can be used for easy direct wire-to-wire connection between the I/O of modules with connectors 1 and the sensors, preactuators or intermediate terminals.

These preformed cordsets comprise:

- ☐ At one end, a 40-way connector 2 with either of the following:
 - One sheath 3 containing 20 wires with a cross-section of 0.34 mm² (AWG 22) (**BMX FCW ●●1**)
 - Two sheaths 4, each containing 20 wires with a cross-section of 0.34 mm² (AWG 22) (**BMX FCW ●●3**)
- ☐ At the other end 5, color-coded flying leads conforming to standard DIN 47100 (see page 2/21)

Preformed cordsets with 40-way connector and HE 10 connector(s)

Two types of cordset can be used for connecting the I/O of modules with 40-way connectors 1 to rapid wiring connection and adaptation interfaces called Advantys Telefast ABE 7 2 (see page 5/8).

These preformed cordsets comprise:

- ☐ At one end, a 40-way connector 3 with either of the following:
 - One sheath 4 containing 20 wires (**BMX FCC ●●1**)
 - Two sheaths 5 each containing 20 wires (**BMX FCC ●●3**)
- ☐ At the other end, one or two HE 10 connectors 6

Connection to Tego Dial and TeSys Quickfit systems

BMX DDI 3202K/6402K input modules and **BMX DDO 3202K/6402K** output modules 1 are designed, amongst other things, for use in conjunction with Tego Dial and TeSys Quickfit installation help systems.

The modules are easily connected using a connection cable.

Functions

Hot swapping

Due to their integrated devices, I/O modules (including application-specific modules) can be removed and connected while powered up.

Note: When the PLC is powered up and running, the I/O modules can be removed without any material risk by performing the following sequence **before** removing the module:

- Disconnect the power voltage on the outputs
- Disconnect the sensor and preactuator power supply
- Remove the terminal block or connector

I/O module assignment

Discrete I/O modules have different parameters for each channel. The channels are grouped into blocks of 4, 8 or 16 consecutive channels depending on the type of module. Each group of channels can be assigned to a specific application task (master or fast).

Protection of DC inputs

The 24 and 48 V DC inputs are constant-current type. This characteristic makes it possible to:

- ☐ Ensure minimum current in active state in compliance with the IEC standard
- ☐ Limit the current consumption when the input voltage increases, to avoid unwanted temperature rise in the module
- ☐ Reduce the current consumption on the sensor power supply provided by the PLC power supply or by a process power supply

Protection of DC outputs

All protected solid state outputs have a protective device which, when an output is active, can detect the occurrence of:

- ☐ An overload or short-circuit: This type of fault deactivates the output (tripping) and indicates a fault on the display on the module front panel (the faulty channel LED flashes, the I/O module fault LED lights up).
- ☐ Reverse polarity: This type of fault short-circuits the power supply without damaging the module. For this protection to work in optimum conditions, it is essential to place a fast-blow fuse on the power supply upstream of the preactuators.
- ☐ Inductive overvoltage: Each output is protected individually against inductive overvoltages and has a fast zener diode demagnetization circuit for electromagnets, which can reduce the output response time for some fast machines.

Reactivation of DC outputs

If a fault has caused an output to trip, the output can be reactivated using this parameter if no other terminal fault is present.

Reactivation is defined for each group of 8 channels. It has no effect on an inactive channel or one that is not faulty.

The reactivation command can be:

- ☐ Programmed: Reactivation is carried out by a command from the PLC application or via the debug screen. To avoid repeated reactivations too close together, the module automatically allows a time delay of 10 s between two reactivations.
- ☐ Automatic: Reactivation takes place automatically every 10 s until the fault disappears.

RUN/STOP command

An input can be configured to control the RUN/STOP mode for the PLC.

This is taken into account on a rising edge. A STOP command from an input has priority over a RUN command from a programming terminal or via the network.

Functions (continued)

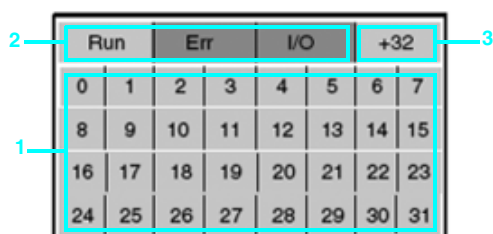
Output fallback

This parameter defines the fallback mode used by the DC solid state outputs when the PLC stops following a:

- ☐ Processor fault
- ☐ Rack fault
- ☐ Fault on the cable connecting the racks

The outputs must be set to a state that is not harmful to the application. This state, known as the fallback position, is defined for each module when the DC solid state outputs are configured. This configuration offers a choice between:

- ☐ Fallback: The channels are set to 0 or 1 according to the fallback value defined for the group of 8 corresponding channels.
- ☐ Maintain: The outputs maintain the state in which they were before the stop occurred.



I/O module diagnostics

Each discrete I/O module is equipped with a display block on the front panel centralizing all the information necessary for module control, diagnostics and maintenance. The display block comprises:

- 1 A set of 8, 16 or 32 green LEDs depending on the module modularity. Each LED is associated with one channel:
 - On: channel in state 1; Off: channel in state 0
 - Flashing: channel faulty, overloaded or short-circuited
- 2 Three LEDs indicating the module status:
 - RUN (green): On: Normal operation
 - ERR (red): On: Internal module fault; Flashing: Exchange fault between the module and the processor
 - I/O (red): On: External fault (sensor/preactuator voltage, overload, short-circuit, etc.); Flashing: Terminal block fault
- 3 A +32 LED (green) indicating, in the case of 64-channel modules, whether the set of 32 LEDs 1 displays the state of channels 0...31 (off) or the state of channels 32...63 (on). This +32 LED is activated or deactivated by a pushbutton located on top of the module.

Diagnostics via Unity Pro

Using the integrated diagnostics in Unity Pro, this local diagnostics on the module front panel is complemented by system diagnostics based on predefined screens at global hardware configuration level, module level and channel level (see pages 4/21 and 4/22).

Remote diagnostics using a web browser on a "Thin Client" PC

In addition, the diagnostics described above can be performed remotely using a simple web browser thanks to the standard web server integrated in the Modicon M340 platform (processor with integrated Ethernet port or Ethernet module), using the "ready-to-use" Rack Viewer function (see page 3/4).

Compatibility with 2-wire and 3-wire sensors

Input type	24 V Non CEI log. positive (sink)	48 V type 1 log. positive (sink)	24 V type 3 log. positive (sink)	24 V type 1	48 V type 3	100...120V type 3
Any 3-wire \equiv sensor, PNP type						
Any 3-wire \equiv sensor, NPN type				(1)		
Telemecanique 2-wire \equiv sensor or other brand, with the following characteristics: - Residual voltage in closed state ≤ 7 V - Minimum switched current ≤ 2.5 mA - Residual current in open state ≤ 1.5 mA						
Telemecanique 2-wire \equiv sensor or other brand with the following characteristics: - Residual voltage in closed state ≤ 4 V - Minimum switched current ≤ 1 mA - Residual current in open state ≤ 0.5 mA						
2-wire \sim sensor (1)						
2-wire \sim sensor						

Not compatible

Compatible

(1) The ~ 24 V inputs can be used as negative logic (source) compatible with 3-wire \equiv sensor, NPN type, but are not IEC-compliant.

Modicon M340

automation platform

Discrete I/O modules

Common characteristics

Environment

Conformity to standards	NFC 63 850, IEC 664, IEC 1131 2, UL 508, UL7 46C, CSA 22 2 no. 142
Temperature derating	The characteristics at 60°C are assured for 60% of inputs and 60% of outputs at state 1

Characteristics of DC input modules

Module			BMX DDI 1602	BMX DDI 1603	BMX DDI 3202K	BMX DDI 6402K	BMX DAI 1602	
Number of inputs			16		32	64	16	
Connection			Spring or screw-type 20-way removable terminal block		One 40-way connector	Two 40-way connectors	Spring or screw-type 20-way removable terminal block	
Nominal input values	Voltage	V	24 ---	48 ---	24 ---			
	Current	mA	3.5	2.5	2.5	1	3	
	Logic		Positive (<i>sink</i>)				Negative (<i>source</i>)	
Input limit values	At state 1	Voltage	V	≥ 11	≥ 34	≥ 11	≥ 15	≥ 14
		Current	mA	> 2 (for U ≥ 11 V)	> 2 (for U ≥ 34 V)	> 2 (for U ≥ 11 V)	> 1 (for U ≥ 15 V)	> 2
	At state 0	Voltage	V	< 5	< 10	< 5		
		Current	mA	≤ 1.5	≤ 0.5	≤ 1.5	≤ 0.5	
	Sensor power supply (ripple included)		V	19...30 (possible up to 34 V, limited to 1 hour in every 24 hours)	38...60	19...30 (possible up to 34 V, limited to 1 hour in every 24 hours)		
	Input impedance at nominal voltage		KΩ	6.8	19.2	9.6	24	6.4
Response time (filtering)	Typical	ms	4					10
	Maximum	ms	7					20
Reverse polarity			Protected				No	–
IEC 1131-2 conformity			Type 3	Type 1	Type 3	Non-IEC		
Compatibility with 2-wire/3-wire sensors			IEC 947-5-2				–	
Paralleling of inputs (1)			Yes			No		
Protection of inputs			Use an external 0.5 A fast-blow fuse per group of channels					
Insulation resistance			MΩ	>10 at 500 V ---				
Dielectric strength	Primary/Secondary	Vrms	1,500 - 50/60 Hz for 1 minute (up to 4,000 m)					
	Between groups of channels	V	–			500 ---		–
Type of input			Current sink					Resistive
Sensor voltage control threshold	OK	V	> 18 ---	> 36 ---	> 18 ---			
	Fault	V	< 14 ---	< 24 ---	< 14 ---			
Reliability	MTBF in hours	At T _{ambient} = 30°C	798,237			696,320	362,681	1,504,958
Consumption			Typical	mA				See power consumption table page 6/8
Maximum dissipated power			W	2.5	3.6	3.9	4.3	3
Temperature derating			None					

(1) This characteristic allows several inputs to be wired in parallel on the same module or on different modules for input redundancy.

Characteristics of AC input modules

Module			BMX DAI 1602	BMX DAI 1603	BMX DAI 1604	
Number of inputs			16			
Connection			Spring or screw-type 20-way removable terminal block			
Nominal input values	Voltage	V	24 ~	48 ~	100...120 ~	
	Current	mA	3	5		
	Frequency	Hz	50/60			
Input limit values	At state 1	Voltage	V	≥ 15	≥ 34	≥ 74
		Current	mA	≥ 2		≥ 2.5
	At state 0	Voltage	V	≤ 5	≤ 10	≤ 20
		Current	mA	≤ 1		
	Frequency		Hz	47...63		
	Sensor power supply (ripple included)		V	20...26	40...52	85...132
	Current peak on activation	At nominal voltage	mA	5	95	240
Input impedance at nominal voltage and F = 55 Hz			KΩ	6	9	13
Response time (filtering)	Activation		ms	15	10	
	Deactivation		ms	20		
IEC 1131-2 conformity			Type 1		Type 3	
Compatibility with 2-wire/3-wire sensors			IEC 947-5-2			
Protection of inputs			Use a external 0.5 A fast-blow fuse per group of channels			
Insulation resistance			MΩ	>10 at 500 V ---		
Dielectric strength			Vrms	1,500 - 50/60 Hz for 1 minute (up to 4,000 m)		
Type of input			Resistive		Capacitive	
Sensor voltage control threshold	OK	V	> 18	> 36	> 82	
	Fault	V	< 14	< 24	< 40	
Reliability	MTBF in hours	At T _{ambient} = 30°C	1,504,958			
Consumption	Typical		mA	See power consumption table page 6/8		
Maximum dissipated power			W	3	4	3.8
Temperature derating			None			

Characteristics of triac output module

Module			BMX DAO 1605
Number of inputs		W	16
Connection			Spring or screw-type 20-way removable terminal block
Operating voltages	Nominal	V	100...240 ~
	Limit	V	85...288 ~
Currents	Maximum	A	0.6 per channel, 2.4 per common, 4.8 for all 4 commons
	Minimum		25 mA at 100 V ~, 25 mA at 240 V ~
Maximum inrush current		A	≤ 20/cycle
Leakage current	At state 0	mA	≤ 1.5 for 120 V ~, 60 Hz, ≤ 3 for 240 V ~, 60 Hz
Residual voltage	At state 1	V	≤ 1.5
Response time	Activation	ms	≤ 1 +/- 0.5 Hz
Nominal resistive load	Deactivation	ms	≤ 1 +/- 0.5 Hz
Type of command			Passage through zero
Built-in protection			Varistor
Protection fuses			None (use an external fast-blow fuse)
Dielectric strength		Vrms	2,830 ~/3 cycles (2,000 m altitude)
Insulation resistance		MΩ	>10 at 500 V ~
Reliability			—
Consumption	Typical	mA	See power consumption table page 6/8
Maximum dissipated power			—

Characteristics of DC solid state output modules					
Module			BMX DDO 1602	BMX DDO 1612	BMX DDO 3202K
Number of inputs			16		32
Connection			Spring or screw-type 20-way removable terminal block		One 40-way connector
Output nominal values	Voltage	V	24 ---		
	Current	A	0.5		0.1
	Logic		Positive (source)	Negative (sink)	Positive (source)
Output limit values	Voltage (ripple included)	V	19...30 (possible up to 34 V, limited to 1 hour in every 24 hours)		
	Current per channel	A	0.625		0.125
	Current per module	A	10		3.2
Tungsten filament lamp power		W	6 maximum		1.2 maximum
Leakage current	At state 0	mA	< 0.5		0.1 (for U = 30 V)
Residual voltage	At state 1	V	< 1.2		< 1.5 (for I = 0.1 A)
Minimum load impedance		Ω	48		220
Response time (1)		ms	1.2		
Maximum overload time		ms	—		15
Compatibility with IEC 1131-2 DC inputs			Yes (type 3, not IEC)	Yes (not IEC)	Yes (type 3, not IEC)
Paralleling of outputs			Yes (2 max.)	Yes (3 max.)	
Switching frequency on inductive load		Hz	0.5/LI ²		
Built-in protection	Against overvoltages		Yes, by Transil diode		
	Against inversions		Yes, by reverse-mounted diode. Use a 2 A fuse on the + 24 V of the preactuators.		
	Against short-circuit and overloads		Yes, with current limiter and electronic circuit-breaker 1.5 In < Id < 2 In		Yes, with current limiter and electronic circuit-breaker 0.125 A < Id < 0.185 A
Preactuator voltage control threshold	At state 0	V	> 18		
	Fault	V	< 14		
Insulation resistance		MΩ	> 10 at 500 V ---		
Dielectric strength	Output/ground or output/internal logic	Vrms	1,500 ~ - 50/60 Hz for 1 minute		
	Between groups of channels	V	—		500 ---
Reliability	MTBF in hours	At T _{ambient} = 30°C	409,413	—	360,412
Consumption		Typical	mA See power consumption table page 6/8		
Maximum dissipated power		W	4	2.26	3.6
Temperature derating			None		See "Current per module" above

(1) All outputs are equipped with a fast demagnetization circuit for the electromagnets. Discharge time for the electromagnets < L/R.

(2) Excluding load current.

Characteristics of relay output modules

Module				BMX DRA 0805				BMX DRA 1605				
Number of inputs				8				16				
Connection				Spring or screw-type 20-way removable terminal block								
Limit operating voltages		DC	V	10...34 ---				24...125 --- (resistive load)				
		AC	V	10...264 ~				200...264 ~ (Cos φ = 1)				
Thermal current				A	3				2			
Switching load		Minimum	mA	1 at 5 V ---								
Electrical life				—				24 V	200 V	240 V		
AC load	Power cos φ = 0.7	VA	—	—				—	300 (1), 80 (2)	240 (1), 72 (2)		
		VA	—	—				—	200 (1), 60 (2)	120 (1), 36 (2)		
DC load		Power	W	—				24 (1), 7.2 (2)	—	—		
Voltage				24 V	48 V	110... 120 V	200... 240 V	24 V	200 V	240 V		
AC load	Resistive loads AC-12	Power	VA	50 (3)	50 (4), 110 (5)	110 (4), 220 (5)	220 (4)	—				
	Inductive loads AC-15 (cos φ = 0.3)	Power	VA	24 (5)	10 (6), 24 (7)	10 (8), 50 (9), 110 (10)	10 (8), 50 (11), 110 (4), 220 (12)	—	200 (1), 60 (2)	120 (1), 36 (2)		
	Inductive loads AC-14 (cos φ = 0.7)	Power	VA	—				300 (1), 80 (2)			240 (1), 72 (2)	
DC load	Resistive loads DC-12	Power	W	24 (4), 40 (13)	—				—			
	Inductive loads DC-13 (14)	Power	W	10 (7), 24 (4)	—				24 (1), 7.2 (2)	—		
Response time		Activation	ms	< 10				—				
		Deactivation	ms	< 8				< 12				
Built-in protection	Against overloads and short-circuits			None. Use a fast-blow fuse per channel or group of channels								
	Against AC inductive overvoltages			None. Use an RC circuit or ZNO surge limiter appropriate to the voltage in parallel on each output								
	Against DC inductive overvoltages			None. Use a discharge diode on each output								
Insulation resistance				MΩ	> 10 at 500 V ---							
Dielectric strength				Vrms	2,000 - 50/60 Hz for 1 minute							
Reliability	MTBF in hours	At T _{ambient} = 30°C		1,573,341				2,463,296				
Consumption				Typical	mA	See power consumption table page 6/8						
Dissipated power				W	2.7 max.				3			
Temperature derating					None							

(1) For 1 x 10⁵ operating cycles
 (2) For 3 x 10⁵ operating cycles
 (3) For 0.7 x 10⁶ operating cycles
 (4) For 1 x 10⁶ operating cycles
 (5) For 0.5 x 10⁶ operating cycles
 (6) For 5 x 10⁶ operating cycles
 (7) For 2 x 10⁶ operating cycles
 (8) For 10 x 10⁶ operating cycles
 (9) For 1.5 x 10⁶ operating cycles
 (10) For 0.15 x 10⁶ operating cycles
 (11) For 3 x 10⁶ operating cycles
 (12) For 0.1 x 10⁶ operating cycles
 (13) For 0.3 x 10⁶ operating cycles
 (14) Where L/R = 60 ms for **BMX DRA 0805** module, L/R = 7 ms for **BMX DRA 1605** module

Characteristics of mixed I/O relay module

Module				BMX DDM 16025			
				24 V $\overline{\text{---}}$ inputs		24 V $\overline{\text{---}}$ or 24...240 V \sim relay outputs	
Number of inputs/outputs				8	8		
Connection				Spring or screw-type 20-way removable terminal block			
Nominal values	Inputs	Voltage	V	24 $\overline{\text{---}}$ (positive logic)		–	
		Current	mA	3.5		–	
	Outputs	DC voltage	V	–		24 $\overline{\text{---}}$	
		Direct current	A	–		2 (resistive load)	
		AC voltage	V	–		220 \sim , Cos φ = 1	
		Alternating current	A	–		2	
Input limit values	At state 1	Voltage	V	≥ 11		–	
		Current	mA	≥ 2 (for $U \geq 11$)		–	
	At state 0	Voltage	V	5		–	
		Current	mA	≤ 1.5		–	
	Sensor power supply (ripple included)		V	19...30 (possible up to 30 V, limited to 1 hour in every 24 hours)		–	
Relay output voltage					24 V	200 V	240 V
AC load	Inductive loads AC-14 (cos φ = 0.7)	Power	VA	–	–	300 (1), 80 (2)	240 (1), 72 (2)
	Inductive loads AC-15 (cos φ = 0.35)	Power	VA	–	–	200 (1), 60 (2)	120 (1), 36 (2)
DC load	Inductive loads DC-13	Power	W	–	24 (1), 7.2 (2)	–	–
Maximum switching frequency				–	3,600 cycles/hour		
Input impedance at nominal voltage			K Ω	6.8	–		
Input response time		Typical	ms	4	–		
		Maximum	ms	7	–		
Reverse polarity on inputs				Protected	–		
IEC 1131-2 conformity				Yes, type 3	–		
Compatibility with 2-wire/3-wire sensors				IEC 947-5-2	–		
Paralleling of inputs				No	–		
Input type				Current sink	–		
Output response time		Activation	ms	–	≤ 12		
		Deactivation	ms	–	≤ 10		
Switching load		Minimum	–	5 V $\overline{\text{---}}$ /1 mA			
		Maximum	V	–	264 \sim /125 $\overline{\text{---}}$		
Mechanical durability		No. of switching operations	–	≥ 20 million			
Fuse protection				Use a external 0.5 A fast-blow fuse per group of channels	No (use one fast-blow fuse per channel or group of channels)		
Sensor voltage control thresholds		OK	V	> 18		–	
		Fault	V	< 14		–	
Insulation resistance			M Ω	> 10 at 500 V $\overline{\text{---}}$			
Dielectric strength	Primary/secondary		Vrms	1,500 - 50/60 Hz for 1 minute		–	
	Between groups of I/O		V	500 $\overline{\text{---}}$		–	
	Max. voltage		Vrms	–		2,830 \sim /cycle	
Reliability	MTBF in hours	At T _{ambient} = 30°C	912,167				
Consumption		Typical	mA	See power consumption table page 6/8			
Dissipated power			W	3.1 maximum			
Temperature derating			None				

(1) For 1×10^5 operating cycles
 (2) For 3×10^5 operating cycles
 (3) Excluding load current

Characteristics of 24 V \square mixed I/O modules

Module			BMX DDM 16022		BMX DDM 3202K			
			Inputs	Solid state outputs	Inputs	Solid state outputs		
Number of inputs/outputs			8	8	16	16		
Connection			Spring or screw-type 20-way removable terminal block		One 40-way connector			
Nominal values		Voltage	V	24 ---				
		Current	mA	3.5	500	2.5	100	
		Logic		Positive (sink)	Positive (source)	Positive (sink)	Positive (source)	
Tungsten filament lamp power			W	—	6 maximum	—	1.2 maximum	
Input limit values	At state 1	Voltage	V	≥ 11	—	≥ 11	—	
		Current	mA	> 3 (for U ≥ 11 V)	—	≥ 2 (for U ≥ 11)	—	
	At state 0	Voltage	V	5	—	5	—	
		Current	mA	≤ 1.5	—	≤ 1.5	—	
	Sensor power supply (ripple included)	Possible up to 30 V, limited to 1 hour in every 24 hours	V	19...30	—	19...30	—	
Output limit values	Voltage (ripple included)	Possible up to 30 V, limited to 1 hour in every 24 hours	V	—	19...30	—	19...30	
	Currents	Per channel	mA	—	625	—	125	
		Per module	A	—	5	—	3.2	
Input impedance at nominal voltage			KΩ	6.8	—	9.6	—	
Input response time	Typical	ms	4	—	4	—		
	Maximum	ms	7	—	7	—		
Reverse polarity on inputs				Protected	—	Protected	—	
IEC 1131-2 conformity				Yes, type 3	—	Yes, type 3	—	
Compatibility with 2-wire/3-wire sensors				IEC 947-5-2	—	IEC 947-5-2	—	
Input type				Current sink	—	Current sink	—	
Leakage current			At state 0	mA	—	< 0.5	—	0.1
Residual voltage			At state 1	V	—	< 1.2	—	< 1.5 (for I=0.1 A)
Minimum load impedance			Ω	—	48	—	220	
Output response time (1)			ms	—	1.2	—	1.2	
Max. overload time before fault state			ms	—	15	—	15	
Compatibility with IEC 1131-2 DC inputs				—	Yes (type 3, not IEC)	—	Yes (type 3, not IEC)	
Paralleling of outputs				—	Yes (2 maximum)	—	Yes (3 maximum)	
Switching frequency on inductive load			Hz	—	0.5/LI ²	—	0.5/LI ²	
Built-in protection		Against overvoltages		—	Yes, by Transil diode	—	Yes, by Transil diode	
		Against inversions		—	Yes, by reverse-mounted diode. Use a 2 A fuse on the preactuator + 24 V	—	Yes, by reverse-mounted diode. Use a 2 A fuse on the preactuator + 24 V	
		Against short-circuits and overloads		Use a external 0.5 A fast-blow fuse per group of channels	Yes, by current limiter and electronic circuit-breaker 1.5 In< Id < 2 In	Use a external 0.5 A fast-blow fuse per group of channels	Yes, by current limiter and electronic circuit-breaker 0.125 A < Id < 0.185 A	
Sensor and preactuator voltage control thresholds		OK	V	> 18				
		Fault		< 14				
Insulation resistance			MΩ	> 10 at 500 V ---				
Dielectric strength	Primary/secondary		Vrms	1,500 - 50/60 Hz for 1 minute				
	Between groups of inputs and outputs		V	500 ---				
	Outputs/ground or outputs/internal logic			—	1,500 - 50/60 Hz for 1 minute	—	1,500 - 50/60 Hz for 1 minute	
Reliability			MTBF in hours	At T _{ambient} = 30°C	447,581		432,904	
Consumption	3.3 V ---	Typical	mA	79			125	
		Maximum	mA	111			166	
	24 V --- preactuators (2)	Typical	mA	59			69	
		Maximum	mA	67			104	
Maximum dissipated power			W	3.7			4	
Temperature derating				None				

(1) All outputs are equipped with a fast demagnetization circuit for the electromagnets. Discharge time for the electromagnets < L/R.

(2) Excluding load current.

Modicon M340

automation platform

Discrete I/O modules

References

Discrete input modules

Type of current	Input voltage	Connection by (1)	IEC 1131-2 conformity	Modularity (no. of channels)	Reference	Weight kg
=	24 V (positive logic)	Screw or spring-type 20-way removable terminal block	Type 3	16 isolated inputs	BMX DDI 1602	0.115
		One 40-way connector	Type 3	32 isolated inputs	BMX DDI 3202K	0.112
		Two 40-way connectors	Non-IEC	64 isolated inputs	BMX DDI 6402K	0.145
	24 V (negative logic)	Screw or spring-type 20-way removable terminal block	Non-IEC	16 isolated inputs	BMX DAI 1602 ▲	0.115
	48 V (positive logic)	Screw or spring-type 20-way removable terminal block	Type 1	16 isolated inputs	BMX DDI 1603 ▲	0.115
	24 V	Screw or spring-type 20-way removable terminal block	Type 1	16 isolated inputs	BMX DAI 1602 ▲	0.115
~	48 V	Screw or spring-type 20-way removable terminal block	Type 3	16 isolated inputs	BMX DAI 1603 ▲	0.115
	100...120 V	Screw or spring-type 20-way removable terminal block	Type 3	16 isolated inputs	BMX DAI 1604	0.115



BMX DDI 1602



BMX DDI 3202K BMX DDI 6402K

Discrete output modules

Type of current	Output voltage	Connection by (1)	IEC 1131-2 conformity	Modularity (no. of channels)	Reference	Weight kg
= solid state	24 V/0.5 A (positive logic)	Screw or spring-type 20-way removable terminal block	Yes	16 protected outputs	BMX DDO 1602	0.120
	24 V/0.5 A (negative logic)	Screw or spring-type 20-way removable terminal block	Non-IEC	16 protected outputs	BMX DDO 1612 ▲	0.120
	24 V/0.1 A (positive logic)	One 40-way connector	Yes	32 protected outputs	BMX DDO 3202K	0.110
		Two 40-way connectors	Yes	64 protected outputs	BMX DDO 6402K	0.150
~ triac	100...240	Screw or spring-type 20-way removable terminal block	–	16 outputs	BMX DAO 1605 ▲	0.140
= or ~ relay	12...24 V =/3 A, 24...240 V~/3 A	Screw or spring-type 20-way removable terminal block	Yes	8 non-protected outputs	BMX DRA 0805	0.145
	24 V =/2 A, 240 V ~/2 A	Screw or spring-type 20-way removable terminal block	Yes	16 non-protected outputs	BMX DRA 1605	0.150



BMX DDO 1602 BMX DRA 0805/1605



BMX DDO 3202K BMX DDO 6402K

(1) By connector, module supplied with cover(s)

▲ Available 4th quarter 2007

Modicon M340

automation platform

Discrete I/O modules

BMX
DDM 160●2BMX
DDM 3202K

BMX FTB 20●0



BMX FTW ●01



BMX FCW ●01



BMX FCW ●03



BMX FCC ●01

References (continued)

Discrete mixed I/O modules

Number of I/O	Connection via (1)	No. and type of inputs	No. and type of outputs	IEC 1131 2 conformity	Reference	Weight kg
16	Screw or spring-type 20-way removable terminal block	8 (positive logic)	8, solid state 24 V $\overline{\text{---}}$ / 0,5 A	Inputs, type 3	BMX DDM 16022	0.115
			8, relay 24 V $\overline{\text{---}}$ or 24...240 V \sim	Inputs, type 3	BMX DDM 16025	0.135
32	One 40-way connector	16 (positive logic)	16, solid state 24 V $\overline{\text{---}}$ / 0,1 A	Inputs, type 3	BMX DDM 3202K	0.110

Removable connection blocks

Description	Use	Reference	Weight kg
20-way removable terminal blocks	Cage clamp	For module with 20-way removable terminal block	BMX FTB 2000
	Screw clamp	For module with 20-way removable terminal block	BMX FTB 2010
	Spring-type	For module with 20-way removable terminal block	BMX FTB 2020

Preformed cordsets for I/O modules with removable terminal block

Description	Composition	Length	Reference	Weight kg
Preformed cordsets with one end with flying leads	One 20-way terminal block	3 m	BMX FTW 301	0.850
	One end with color-coded flying leads	5 m	BMX FTW 501	1.400
		10 m	BMX FTW 1001	2.780

Preformed cordsets for I/O modules with 40-way connectors

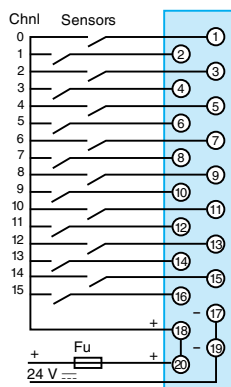
Description	No. of sheaths	Composition	Cross-section	Length	Reference	Weight kg
Preformed cordsets with one end with flying leads	1 x 20 wires (16 channels)	One 40-way connector One end with color-coded flying leads	0.324 mm ²	3 m	BMX FCW 301	0.820
				5 m	BMX FCW 501	1.370
				10 m	BMX FCW 1001	2.770
	2 x 20 wires (32 channels)	One 40-way connector Two ends with color-coded flying leads	0.324 mm ²	3 m	BMX FCW 303	0.900
				5 m	BMX FCW 503	1.490
				10 m	BMX FCW 1003	2.960
Preformed cordsets for Telefast Advantys ABE 7 sub-bases	1 x 20 wires (16 channels)	One 40-way connector One HE 10 connector	0.324 mm ²	0.5 m	BMX FCC 051	0.140
				1 m	BMX FCC 101	0.195
				2 m	BMX FCC 201	0.560
				3 m	BMX FCC 301	0.840
				5 m	BMX FCC 501	1.390
				10 m	BMX FCC 1001	2.780
	2 x 20 wires (32 channels)	One 40-way connector Two HE 10 connectors	0.324 mm ²	0.5 m	BMX FCC 053	0.210
				1 m	BMX FCC 103	0.350
				2 m	BMX FCC 203	0.630
				3 m	BMX FCC 303	0.940
				5 m	BMX FCC 503	1.530
				10 m	BMX FCC 1003	3.000

Modicon M340 automation platform

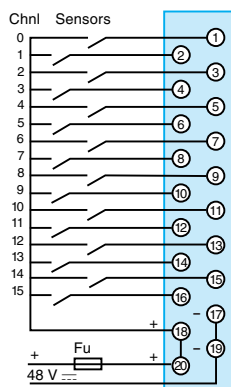
Discrete I/O modules

Input modules

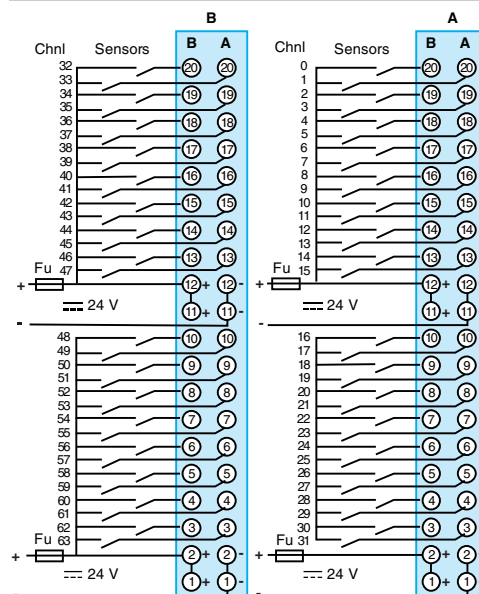
BMX DDI 1602



BMX DDI 1603



BMX DDI 3202K/6402K



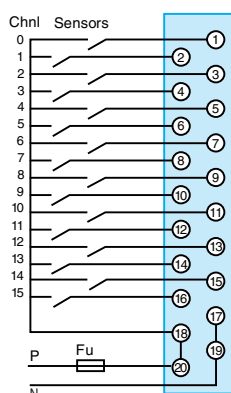
BMX DDI 3202K: Connector **A** (inputs I0...I32)

BMX DDI 6402K: Connector **A** (inputs I0...I32) and connector **B** (inputs I33...I63)

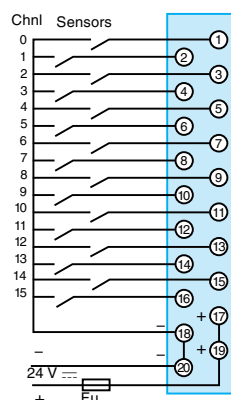
For correspondence of the FCN 40-way connector pins with the wire colors of

BMX FCW 001/003 prewired cordsets, in accordance with DIN 47100, see table on page 2/22.

BMX DAI 1602/1603/1604



BMX DAI 1602, use in 24 V AC, negative logic



P-N voltage:

24 V AC: **BMX DAI 1602**

48 V AC: **BMX DAI 1603**

100/120 V AC: **BMX DAI 1604**

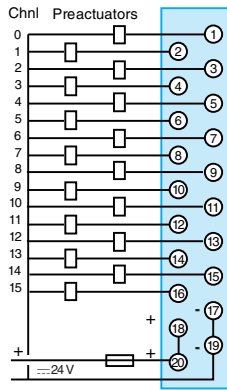
Fu: 0.5 A fast-blow fuse

Modicon M340 automation platform

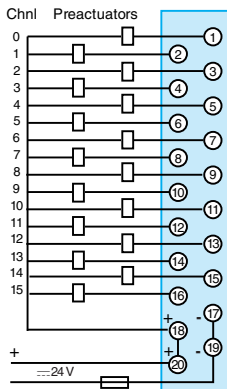
Discrete I/O modules

Output modules

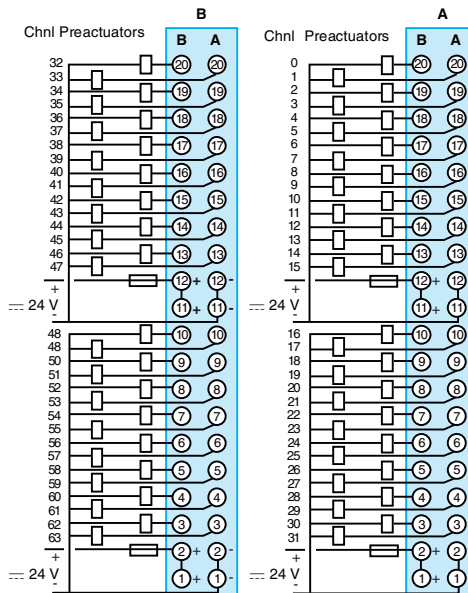
BMX DDO 1602



BMX DDO 1612



BMX DDO 3202K/6402K



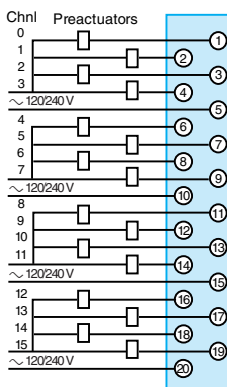
BMX DDO 3202K: Connector **A** (outputs Q0...Q32)

BMX DDO 6402K: Connector **A** (outputs Q0...Q32) and connector **B** (outputs Q33...Q63)

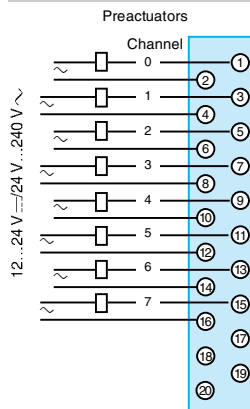
Note: For correspondence of the FCN 40-way connector pins with the wire colors of

BMX FCW ●01/●03 prewired cordsets, in accordance with DIN 47100, see table on page 2/22.

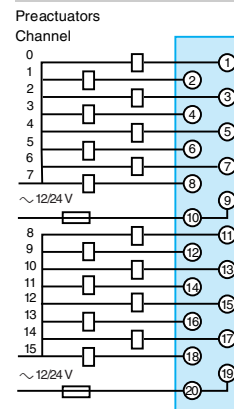
BMX DAO 1605



BMX DRA 0805



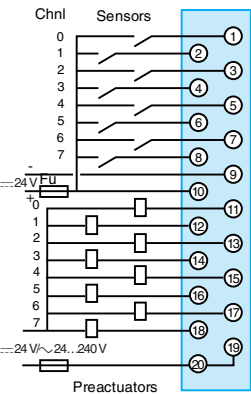
BMX DRA 1605



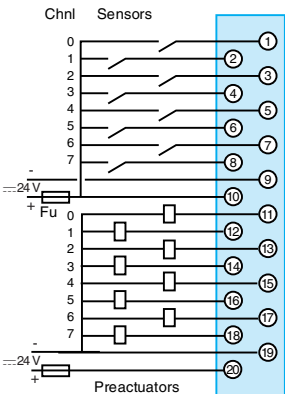
Modicon M340
automation platform
Discrete I/O modules

Mixed I/O modules

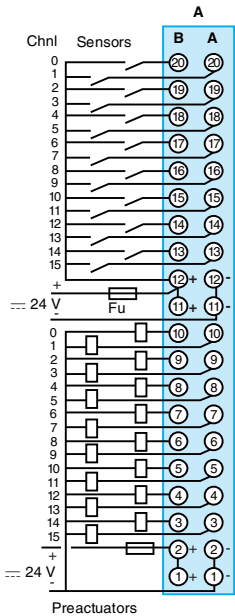
BMX DDM 16025



BMX DDM 16022



BMX DDM 3202K



Fu: 0.5 A fast-blow fuse

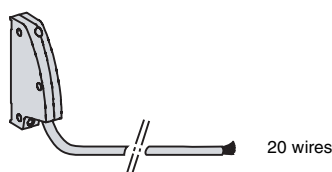
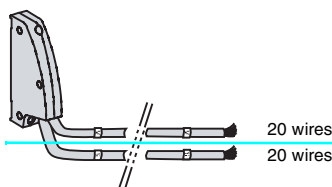
Modicon M340 automation platform

Discrete I/O modules

Cordset color codes in accordance with DIN 47100

Connection cables with 40-way connector and end(s) with flying leads BMX FCW ●01/●03

Correspondence of connector pins with the wire colors at the sheath end

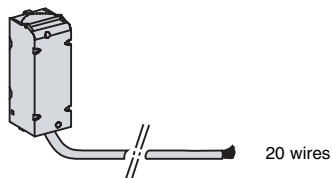
Cordset with one sheathed end with flying leads
BMX FCW ●01Cordset with two sheathed ends with flying leads
BMX FCW ●03

Connector pin no.	Color at sheath end	32/64-channel inputs	32/64-channel outputs	32-channel I/O
B20	White	Input 0/32	Output 0/32	Input 0
A20	Brown	Input 1/33	Output 1/33	Input 1
B19	Green	Input 2/34	Output 2/34	Input 2
A19	Yellow	Input 3/35	Output 3/35	Input 3
B18	Gray	Input 4/36	Output 4/36	Input 4
A18	Pink	Input 5/37	Output 5/37	Input 5
B17	Blue	Input 6/38	Output 6/38	Input 6
A17	Red	Input 7/39	Output 7/39	Input 7
B16	Black	Input 8/40	Output 8/40	Input 8
A16	Purple	Input 9/41	Output 9/41	Input 9
B15	Gray/pink	Input 10/42	Output 10/42	Input 10
A15	Red/blue	Input 11/43	Output 11/43	Input 11
B14	White/green	Input 12/44	Output 12/44	Input 12
A14	Brown/green	Input 13/45	Output 13/45	Input 13
B13	White/yellow	Input 14/46	Output 14/46	Input 14
A13	Yellow/brown	Input 15/47	Output 15/47	Input 15
B12	White/gray	+ 24 V	+ 24 V	+ 24 V
A12	Gray/brown	- 24 V	- 24 V	- 24 V
B11	White/pink	+ 24 V	+ 24 V	+ 24 V
A11	Pink/brown	- 24 V	- 24 V	- 24 V
B10	White	Input 16/48	Output 16/48	Output 0
A10	Brown	Input 17/49	Output 17/49	Output 1
B9	Green	Input 18/50	Output 18/50	Output 2
A9	Yellow	Input 19/51	Output 19/51	Output 3
B8	Gray	Input 20/52	Output 20/52	Output 4
A8	Pink	Input 21/53	Output 21/53	Output 5
B7	Blue	Input 22/54	Output 22/54	Output 6
A7	Red	Input 23/55	Output 23/55	Output 7
B6	Black	Input 24/56	Output 24/56	Output 8
A6	Purple	Input 25/57	Output 25/57	Output 9
B5	Gray/pink	Input 26/58	Output 26/58	Output 10
A5	Red/blue	Input 27/59	Output 27/59	Output 11
B4	White/green	Input 28/60	Output 28/60	Output 12
A4	Brown/green	Input 29/61	Output 29/61	Output 13
B3	White/yellow	Input 30/62	Output 30/62	Output 14
A3	Yellow/brown	Input 31/63	Output 31/63	Output 15
B2	White/gray	+ 24 V	+ 24 V	+ 24 V
A2	Gray/brown	- 24 V	- 24 V	- 24 V
B1	White/pink	+ 24 V	+ 24 V	+ 24 V
A1	Pink/brown	- 24 V	- 24 V	- 24 V

Connection cables with 20-way terminal block at one end and flying leads at the other BMX FTW ●01

Correspondence of 20-way removable terminal block pins with the wire colors (at sheath end)

Correspondence of terminal block pins with the wire colors at the sheath end

Cordset with 1 sheathed end with flying leads
BMX FTW ●01

Terminal block pin no.	Color at sheath end	16-channel inputs	8- or 16-channel outputs	16-channel I/O
1	White	Input 0	See page 2/20	Input 0
2	Brown	Input 1	See page 2/20	Input 1
3	Green	Input 2	See page 2/20	Input 2
4	Yellow	Input 3	See page 2/20	Input 3
5	Gray	Input 4	See page 2/20	Input 4
6	Pink	Input 5	See page 2/20	Input 5
7	Blue	Input 6	See page 2/20	Input 6
8	Red	Input 7	See page 2/20	Input 7
9	Black	Input 8	See page 2/20	Sensor + common power supply
10	Purple	Input 9	See page 2/20	Sensor pwr supply
11	Gray/pink	Input 10	See page 2/20	Output 0
12	Red/blue	Input 11	See page 2/20	Output 1
13	White/green	Input 12	See page 2/20	Output 2
14	Brown/green	Input 13	See page 2/20	Output 3
15	White/yellow	Input 14	See page 2/20	Output 4
16	Yellow/brown	Input 15	See page 2/20	Output 5
17	White/gray	Power supply	See page 2/20	Output 6
18	Gray/brown	+ common pwr sup.	See page 2/20	Output 7
19	White/pink	Power supply	See page 2/20	Preactuator pwr sup.
20	Pink/brown	Power supply	See page 2/20	Preactuator pwr sup.


Modicon M340

automation platform

Analog I/O modules

2

2.2

Applications		Analog inputs	
			
Type of I/O		Isolated low-level voltage inputs, resistors, thermocouples and temperature probes	
Type		Multi-range	
Range	Voltage	$\pm 40 \text{ mV}$, $\pm 80 \text{ mV}$, $\pm 160 \text{ mV}$, $\pm 320 \text{ mV}$, $\pm 640 \text{ mV}$ and $\pm 1.28 \text{ V}$	
	Current	—	
	Thermocouple, Temperature probe, Resistor	Thermocouples type B, E, J, K, L, N, R, S, T, U Temperature probes type Pt 100, Pt 1000, Ni 100, Ni 1000 and Cu 10, 2-, 3- or 4-wire Resistors 2-, 3- or 4-wire, 400Ω or $4,000 \Omega$	
Modularity		4 channels	8 channels
Acquisition period		400 ms for all 4 channels	400 ms for all 8 channels
Conversion time		—	
Resolution		16 bits	
Isolation		Between channels: 750 V --- Between channels and bus: 2,000 V --- Between channels and ground: 750 V ---	
Connection	Directly to the module	Via 40-way connector	Via two 40-way connectors
	Via preformed cordsets	BMX FCW ●01S cordsets with one end with color-coded flying leads (3 or 5 m long)	
Module		BMX ART 0414	BMX ART 0814 ▲
Page		2/32	



Compatibility with Advantys Telefast ABE 7 pre-wired system		Sub-base with 4 channels for direct connection of 4 thermocouples plus connection and provision of cold-junction compensation	
Type of module	Connection sub-base	ABE 7CPA412	
	Preformed cordsets (1.5, 3 or 5 m long)	BMX FCA●●2	
Pages		5/16 and 2/32	

▲ Available 4th quarter 2007

Analog inputs



Analog outputs



Mixed analog I/O



Isolated high-level inputs

Voltage/current

 $\pm 10\text{ V}$, $0\ldots 10\text{ V}$, $0\ldots 5\text{ V}$, $1\ldots 5\text{ V}$, $\pm 5\text{ V}$
 $0\ldots 20\text{ mA}$, $4\ldots 20\text{ mA}$, $\pm 20\text{ mA}$

—

4 channels

 Fast: $1 + (1 \times \text{no. of declared channels})\text{ ms}$
 By default, 5 ms for all 4 channels

—

16 bits

 Between channels: 300 V ---
 Between channels and bus: $2,000\text{ V}$ ---
 Between channels and ground: $2,000\text{ V}$ ---

Isolated high-level outputs

Voltage/current

 $\pm 10\text{ V}$
 $0\ldots 20\text{ mA}$, $4\ldots 20\text{ mA}$

—

2 channels

—

 $\leq 1\text{ ms}$

16 bits

 Between channels: $1,400\text{ V}$ ---
 Between channels and bus: $2,000\text{ V}$ ---
 Between channels and ground: $2,000\text{ V}$ ---

Non-isolated high-level inputs

Voltage/current

 $\pm 10\text{ V}$, $0\ldots 10\text{ V}$, $0\ldots 5\text{ V}$, $1\ldots 5\text{ V}$
 $0\ldots 20\text{ mA}$, $4\ldots 20\text{ mA}$

—

4 channels

 Fast: $1 + (1 \times \text{no. of declared channels})\text{ ms}$
 By default, 5 ms for all 4 channels

—

 14 bits in 10 V range
 12 bits in 20 mA range

 Between group of input channels and group of output channels: $1,400\text{ V}$ ---
 Between channels and bus: $2,000\text{ V}$ ---
 Between channels and ground: $2,000\text{ V}$ ---

Non-isolated high-level outputs

Voltage/current

 $\pm 10\text{ V}$
 $0\ldots 20\text{ mA}$, $4\ldots 20\text{ mA}$

—

2 channels

—

 $\leq 2\text{ ms}$

12 bits

Via 20-way removable terminals (screw or spring-type)

BMX FTW ●01S cordsets with one end with color-coded flying leads (3 or 5 m long)

BMX AMI 0410

BMX AMO 0210

BMX AMM 0600 ▲

2/32



4-channel sub-base for direct connection of 4 inputs, delivers and distributes 4 protected isolated power supplies

ABE 7CPA410

BMX FCA●●0

5/16 and 2/32

Presentation

The analog I/O module offer consists of:

- Three isolated analog input modules:
 - 4 analog high-speed channels (16 bits), voltage or current, **BMX AMI 0410**
 - 4 and 8 analog channels (15 bits + sign) for thermocouples, Pt, Ni or Cu temperature probes, **BMX ART 0414/0814**
- One analog output module with 2 voltage/current channels, **BMX AMO 0210**
- One mixed module (12 bits) with 4 analog input channels and 2 analog output channels, non-isolated, voltage or current, **BMX AMM 0600**

Analog I/O modules are equipped with a connector for a 20-way removable terminal block, except for **BMX ART 0414/0814** analog input modules with thermocouples/temperature probes, which are equipped with a 40-way connector.

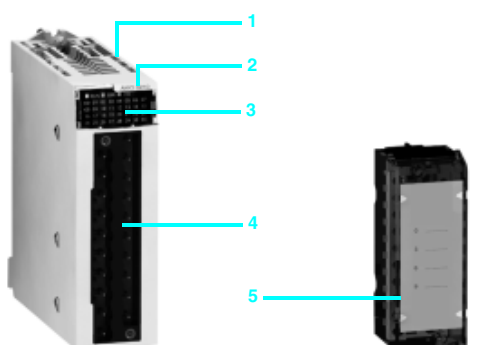
All analog modules occupy a single slot in the **BMX XBP ●●●** racks. These modules can be installed in any slot in the rack, except the first two (PS and 00) reserved for the power supply module in the **BMX CPS ●●●** rack and the **BMX P34 ●●●** processor module respectively.

The power supply for the analog functions is supplied by the backplane bus (3.3 V and 24 V). Analog I/O modules are hot-swappable (see page 2/9).

In a Modicon M340 single-rack configuration, the maximum number of analog channels is limited by the number of slots available in the rack (11 slots maximum).

Description

BMX AM●/ART analog I/O modules are standard format (1 slot). They have a case, which ensures IP 20 protection of the electronics, and are locked into position by a captive screw.



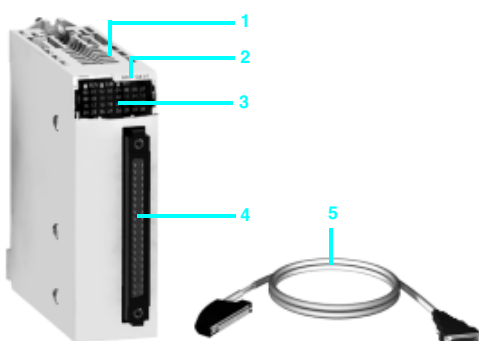
I/O modules connected via 20-way removable terminal block

BMX AM● analog I/O modules have the following on the front panel:

- 1 A rigid body providing support and protection for the electronic card
- 2 A module reference marking (a label is also visible on the right-hand side of the module).
- 3 A module and channel status display block
- 4 A connector taking the 20-way removable terminal block, for connecting sensors or preactuators on screw or spring-type terminals

To be ordered separately:

- 5 A **BMX FTB 20●●** 20-way removable terminal block or preformed cordsets with 20-way terminal block at one end and flying leads at the other (**BMX FTW ●01S** or, with 25-way SUB-D connector, **BMX FCA ●●●**) for direct connection to Advantys Telefast ABE 7 sub-bases (see page 2/31).



I/O modules connected via 40-way connector

BMX ART 0●14 analog input modules have the following on the front panel:

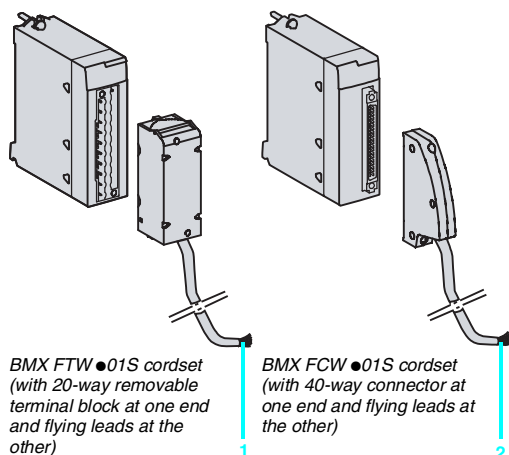
- 1 A rigid body providing support and protection for the electronic card
- 2 A module reference marking (a label is also visible on the right-hand side of the module)
- 3 A module and channel status display block
- 4 A 40-way connector for connecting the sensors

To be ordered separately:

- 5 Preformed cordsets with 40-way connector at one end and flying leads at the other (**BMX FCW ●01S** or, with 25-way SUB-D connector, **BMX FCA ●●2**) for direct connection to Advantys Telefast ABE 7 sub-bases (see page 2/32).

To be ordered separately irrespective of the type of module:

- A shielding connection kit to protect against electrostatic discharge, consisting of a metal bar and two sub-bases for mounting on the rack supporting the analog modules
- A set of **STB XSP 3020** clamping rings for the shielding braids of analog signal cables.



Connecting modules with removable terminal blocks

BMX AMI 0410/AMO 0210/AMM 0600 modules with 20-way terminal block

These 20-way removable terminal blocks are the same as those used for discrete I/O modules (screw clamp, cage clamp or spring-type). See page 2/8.

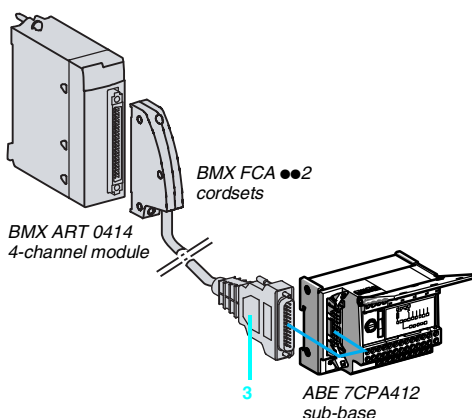
One version of the removable terminal block is equipped with a 3 or 5 m long cordset with color-coded flying leads (**BMX FTW ●01S**). These preformed cordsets, with reinforced shielding have, at the other end **1**, color-coded flying leads conforming to standard DIN 47100.

Connecting modules with 40-way connectors

BMX ART 0●14 modules with 40-way connectors

Two types of cordset are available:

- Preformed cordsets with reinforced shielding (**BMX FCW ●01S**) have, at the other end **2**, color-coded flying leads conforming to standard DIN 47100. They are available in 3 or 5 m lengths, and provide easy direct wire-to-wire connection of the analog sensors via terminal blocks.
- Preformed cordsets with reinforced shielding (**BMX FCA ●02**) which have at the other end **3**, a 25-way SUB-D connector. They are available in 1.5, 3 or 5 m lengths, and provide direct connection to the Advantys Telefast **ABE 7CPA412** sub-base (see below).



Use with Advantys Telefast ABE 7 sub-bases

Using the Advantys Telefast ABE 7 pre-wired system makes it easier to install the modules since the inputs (or outputs) can be accessed using screw terminals. Two special sub-bases are available:

Advantys Telefast ABE 7CPA410 sub-base

The Advantys Telefast **ABE 7CPA410** sub-base is mainly used in conjunction with the **BMX AMI 0410** voltage/current analog 4-input module. It is used to:

- Connect the four sensors directly
- Remotely locate the input terminals in voltage mode
- Power the 4...20 mA conditioners one channel at a time with a 24 V voltage, protected and limited to 25 mA, while maintaining isolation between channels
- Protect the current impedance matching resistors integrated in the sub-base against overvoltages

Connection is via the **BMX FCA ●02** cordset (1.5, 3 or 5 m long).

Advantys Telefast ABE 7CPA412 sub-base

The Advantys Telefast **ABE 7CPA412** sub-base is specially designed as a wiring interface for the **BMX ART 0414** and **BMX ART 0814** thermocouple modules. It is used to:

- Connect the four thermocouple probes
- Provide external cold-junction compensation with a temperature probe integrated in the sub-base
- Ensure continuity of the shielding

The **BMX ART 0814** module requires two Advantys Telefast **ABE 7CPA412** sub-bases. The connection with each sub-base is made via a **BMX FCA ●02** cordset (1.5, 3 or 5 m long).

BMX AMI 0410 analog input modules

The **BMX AMI 0410** module is a high-level analog input module with 4 isolated inputs (16 bits).

Used with sensors or transmitters, it performs monitoring, measurement and process control functions for continuous processes.

For each input, the **BMX AMI 0410** module offers the following ranges:

- Voltage ± 10 V, ± 5 V, 0...10 V, 0...5 V and 1...5 V
- Current 0...20 mA, 4...20 mA and ± 20 mA, depending on the choice made during configuration

The module operates with voltage inputs. It includes four reading resistors connected to the terminal block to form the current inputs.

Functions

The **BMX AMI 0410** module includes the following functions:

- Adaptation and multiplexing:
 - Physical connection to the process
 - Protection of the module against overvoltages
 - Protection of the current reading resistors
 - Adaptation of input signals by analog filtering
 - Scanning of input channels by solid state multiplexing, by optical commutator switches
- Adaptation to input signals: Gain selection, drift compensation
- Conversion: 24-bit analog/digital converter
- Conversion of input measurements to a unit that is suitable for the user:
 - Taking account of the alignment coefficients to be applied to measurements, as well as the module autocalibration coefficients
 - Measurement filtering, depending on the configuration parameters
 - Measurement scaling, depending on the configuration parameters
- Interface and communication with the application:
 - Receipt of the configuration parameters for the module and its channels
 - Transmission of measured values to the application, as well as module status
- Module power supply
- Module monitoring and indication of any faults to the application:
 - Conversion circuit test
 - Channel range overshoot test and watchdog test.

BMX ART 0414/0814 analog input modules

BMX ART 0414/0814 modules are multirange input modules with 4 or 8 low-level isolated inputs (15 bits + sign) respectively.

Depending on the choice made during configuration, the modules offer, for each of the inputs, the following range:

- Temperature probe: Pt100, Pt1000, Cu10, Ni100 or Ni1000, with open-circuit detection
- Thermocouple: B, E, J, K, L, N, R, S, T or U, with broken wire detection
- Resistor: 0...400 or 0...4000 Ω 2-, 3- or 4-wire
- Voltage: ± 40 mV, ± 80 mV, ± 160 mV, ± 320 mV, ± 640 mV, ± 1.28 V.

Functions

BMX ART 0414/0814 modules offer the following functions

- Adaptation and current source per channel:
 - Accepting an overload of ± 7.5 V
 - Autocalibration of the analog module offset as close as possible to the input terminal
 - Selection of the cold-junction compensation sensor included in the Advantys Telefast **ABE 7 CPA412** sub-base or externally by the Pt 100 probe
- Adaptation to input signals: Based on a low offset amplifier internal to the A/D converter
- Conversion: 16-bit converter
- Conversion of input measurements to a unit that is suitable for the user:
 - Taking account of the alignment coefficients to be applied to measurements, as well as the module autocalibration coefficients
 - Measurement filtering, depending on the configuration parameters
 - Measurement scaling, depending on the configuration parameters
- Interface and communication with the application:
 - Receipt of the configuration parameters for the module and its channels
 - Transmission of measured values to the application, as well as module status
- Module monitoring and indication of any faults to the application:
 - Conversion circuit test
 - Channel range overshoot test and watchdog test.

BMX AMO 0210 analog output module

The **BMX AMO 0210** module is a module with 2 high-level isolated outputs (15 bits + sign). It offers, for each of them, the ranges:

- ☐ Voltage: ± 10 V
- ☐ Current: 0...20 mA and 4...20 mA

The range is selected during configuration.

Functions

The **BMX AMO 210** module includes the following functions:

- Physical connection to the process
- Protection of the module against overvoltages
- Adaptation of the output signals:
 - ☐ Voltage or current adaptation by software configuration
 - ☐ Protection of the outputs against short-circuits and overloads
- Conversion to 15 bits with sign with redefinition of data
- Conversion of application values into data that can be used by the digital/analog converter:
 - ☐ Use of factory calibration parameters
- Interface and communication with the application:
 - ☐ Managing exchanges with the processor
 - ☐ Geographical addressing
 - ☐ Receipt of the configuration parameters for the module and its channels
 - ☐ Transmission of module status to the application
- Module monitoring and indication of any faults to the application:
 - ☐ Output power supply test
 - ☐ Channel range overshoot test
 - ☐ Output fault presence test
 - ☐ Watchdog test.

BMX AMM 0600 mixed analog I/O module

The **BMX AMM 0600** mixed module is a module with 4 inputs 14/12 bits and 2 outputs 12 bits, non-isolated between one another. It offers, for each of them, the ranges:

- ☐ Voltage: ± 10 V, 0...10 V, 0...5 V and 1...5 V
- ☐ Current: 0...20 mA and 4...20 mA.

Functions

The **BMX AMM 0600** module has the following functions:

- Protection of the module against overvoltages
- Adaptation to the different actuators: voltage or current output
- Conversion of digital signals (10 bits or 12 bits depending on the range) to analog signals
- Conversion of application data into data that can be used by the digital/analog converter
- Module monitoring and fault indication to the application: Converter test, range overshoot test, watchdog test.

Characteristics of BMX AMI 0410 analog input modules

Input module		BMX AMI 0410	
Input type		Isolated high-level inputs	
Number of channels		4	
Nature of inputs	Voltage	$\pm 10\text{ V}$, $0\ldots 10\text{ V}$, $0\ldots 5\text{ V}$, $1\ldots 5\text{ V}$, $\pm 5\text{ V}$	
	Current	$0\ldots 20\text{ mA}$, $4\ldots 20\text{ mA}$, $\pm 20\text{ mA}$ (via protected internal $250\ \Omega$ resistors)	
Analog/digital conversion		24 bits	
Voltage/current range		$\pm 10\text{ V}$	$\pm 5\text{ V}$ $0\ldots 5\text{ V}$ $0\ldots 10\text{ V}$ $1\ldots 5\text{ V}$ $0\ldots 20\text{ mA}$ $4\ldots 20\text{ mA}$ $\pm 20\text{ mA}$
Maximum conversion value		$\pm 11.4\text{ V}$	$\pm 30\text{ mA}$
Resolution		0.35 mV	
Input impedance	Typical	M Ω	10 (irrespective of the input level)
Permitted overload on the inputs	Voltage range	V	$\pm 30\text{ ---}$
	Current range	mA	± 90 or short-circuit to $+ 24\text{ V ---}$
Voltage/current internal conversion resistor		Ω	— 250
Precision of internal conversion resistor			— 0.1% - 15 ppm/°C
Filtering		1 st order digital filtering	
Read cycle time	Fast	ms	1 + 1 x no. of channels used (periodic reading of no. of declared channels)
	Default	ms	5 for 4 channels (periodic reading of all channels)
Measurement errors (1)	At 25°C	%FS	0.075% 0.15% (2)
	Maximum at $0\ldots 60^\circ\text{C}$	%FS	0.1% 0.3% (2)
Temperature drift			15 ppm/°C 30 ppm/°C
Recalibration		Internal	
Common mode between channels		dB	120
Digital value format		$\pm 10,000$ by default, $\pm 32,000$ in user scale	
Isolation	Between channels	V	$\pm 300\text{ ---}$
	Between channels and bus	V	2,000 ---
	Between channels and ground	V	2,000 ---
Consumption	Typical	mA	See power consumption table page 6/8

Characteristics of BMX ART 0414/0814 analog input modules

Input module			BMX ART 0414		BMX ART 0814	
Input type			Isolated inputs, low-level voltage, resistors, temperature probes, thermocouples			
Number of channels			4		8	
Nature of inputs			± 40 mV; ± 80 mV; ± 160 mV; ± 320 mV; ± 640 mV; ± 1.28 V			
Analog/digital conversion			Σ Δ 16 bits			
Resolution			mV	15 + sign		
Filtering			1 st order digital filtering			
Read cycle time			ms	400 with temperature probes (1...4) 200 with thermocouples (1...4)	400 with temperature probes (1...8) 200 with thermocouples (1...8)	
Permitted overload on the inputs			V	± 7.5 ---		
50/60 Hz rejection	Differential mode	Typical	dB	60		
	Common mode	Typical	dB	120		
Cold junction compensation		External compensation by Pt100 probe		<div><input type="checkbox"/> Using the dedicated Advantys Telefast ABE 7CPA412 sub-base including the probe</div> <div><input type="checkbox"/> Using a 2-wire temperature probe wired on channel 0 and/or 4</div> <div><input type="checkbox"/> Using a 3-wire temperature probe wired on channel 3 and/or 7</div>		
Recalibration			Internal			
Isolation	Between channels		V	750 ---		
	Between channels and bus		V	2,000 ---		
	Between channels and ground		V	750 ---		
Consumption		Typical	mA	See power consumption table page 6/8		

(1) %FS: Error as a % of full scale

(2) Including the conversion resistor error

Characteristics of BMX ART 0414/0814 analog input modules

Input ranges for BMX ART 0414/0814 modules

Voltage range			± 40 mV	± 80 mV	± 160 mV	± 320 mV	± 640 mV	± 1.28 V
Typical input impedance		MΩ	10					
Maximum conversion value			± 102.5%					
Maximum resolution		mV	40/2 ¹⁴	80/2 ¹⁴	160/2 ¹⁴	320/2 ¹⁴	640/2 ¹⁴	1280/2 ¹⁴
Measurement errors (1)	At 25°C	%FS	0.05					
	Maximum at 0...60°C	%FS	0.15					
Temperature drift		ppm/°C	30					
Resistor range			400 Ω			4,000 Ω		
Type			2-, 3- or 4-wire					
Maximum conversion value			± 100%					
Maximum resolution		mV	400/2 ¹⁴			4,000/2 ¹⁴		
Measurement errors (1)	At 25°C	%FS	0.12					
	Maximum at 0...60°C	%FS	0.2					
Temperature drift		ppm/°C	25					
Temperature probe ranges			Pt100	Pt1000	Cu10	Ni100	Ni1000	
Measurement range		°C	According to IEC: -200...+850 According to US/JIS: -100...+450			-100...+260	-60...+180	
Resolution		°C	0.1					
Detection type			Open circuit (detection on each channel)					
Measurement errors (1)	At 25°C (2)	°C	± 2.1			± 4	± 2.1	0.7
	Maximum at 0...60°C	°C	± 2			± 4	± 3.0	1.3
Max. wiring resistance	4-wire	Ω	50	500	50	500		
	2/3-wire	Ω	20	200	20	200		
Temperature drift			30 ppm/°C					
Thermocouple ranges			B	E	J	K	L	
Measurement range		°C	+130...+1820	-270...+1000	-200...+760	-270...+1370	-200...+900	
Resolution		°C	0.1					
Detection type			Open circuit (detection on each channel)					
Measurement errors (1)	At 25°C	°C	± 3.5	± 3.7	± 2.8	± 3.7	± 3.0	
	Maximum at 0...60°C	°C	± 5	± 5	± 4.5	± 5	± 4.5	
Temperature drift		ppm/°C	25					
Thermocouple ranges (continued)			N	R	S	T	U	
Measurement range		°C	+270...+1300	-50...+1769	-50...+1769	-270...+400	-200...+600	
Resolution		°C	0.1					
Detection type			Open circuit (detection on each channel)					
Measurement errors (1)	At 25°C	°C	± 3.7	± 3.2	± 3.2	± 3.7	± 2.7	
	Maximum at 0...60°C	°C	± 5	± 4.5	± 4.5	± 5	± 4.5	
Temperature drift		ppm/°C	25					

(1) %FS: Error as a % of full scale. ± 1 °C with Pt100 temperature probe range, - 100...+ 200 °C
(2) Excluding error caused by the wiring

2

2.2

Characteristics of the BMX AMO 0210 analog output module

Module		BMX AMO 0210	
Output type		Isolated high-level outputs	
Number of channels		2	
Ranges	Voltage	± 10 V	
	Current	0...20 mA and 4...20 mA	
Resolution	bits	15 + sign	
Conversion time	ms	≤ 1	
Output power supply		Internal power supply via rack	
Output ranges		Voltage	Current
Adjustment range	Nominal	V ± 10 V	0...20 mA, 4...20 mA
	Maximum	V ± 11.25 V	24 mA
Load impedance	Ω	$\geq 1,000$	≤ 600
Detection type		Short-circuit	Open circuit
Measurement errors (1)	At 25°C	%FS	0.10
	Maximum at 0...60°C	%FS	0.25
Temperature drift		40 ppm/°C	
Recalibration		None, factory-calibrated	
Fallback mode (2)		Default or configurable	
Isolation	Between channels	V rms	1,400 V ---
	Between channels and bus	V rms	2,000 V ---
	Between channels and ground	V rms	2,000 V ---
Consumption	Typical	mA	See power consumption table page 6/8

Characteristics of BMX AMM 0600 mixed analog I/O module

Module		BMX AMM 0600	
Channel type		Non-isolated high-level inputs	Non-isolated high-level outputs
Number of channels		4	2
Ranges		± 10 V 0...5 V 0...10 V 1...5 V 0...20 mA 4...20 mA	± 10 V 0...20 mA 4...20 mA
Maximum conversion value	Voltage	V ± 11.25	± 11.25 ---
	Current	mA ---	0...30 0...24 mA
Resolution	bits	14 12 13 12 12	12 11
Filtering		1 st order digital filtering by firmware	
Precision of internal conversion resistor		250 Ω , 0.1% - 15 ppm/°C	
Read cycle time	Fast	ms 1 + 1 x no. of channels used (periodic reading of no. of declared channels)	---
	Default	ms 5 for 4 channels	---
Conversion time		ms ---	≤ 2
Permitted overload on the input channels	Voltage	V ± 30	± 11.25 ---
	Current	mA ---	--- 0...24
Measurement errors (1)	At 25°C	%FS 0.25 0.35	0.25
	Maximum at 0...60°C	%FS 0.35 0.50	0.60
Temperature drift		30 ppm/°C 50 ppm/°C	100 ppm/°C
Recalibration		Internal	None, factory-calibrated
Fallback mode (2)		---	Default or configurable
Isolation	Between group of input channels and group of output channels	V 1,400 ---	
	Between channels and bus	V 2,000 ---	
	Between channels and ground	V 2,000 ---	
Consumption	Typical	mA	See power consumption table page 6/8

(1) %FS: Error as a % of full scale

(2) Default: Output at 0 (V or mA). Configurable: Hold last value or set at predefined value for each channel.

Modicon M340

automation platform

Analog I/O modules



BMX AMI 0410



BMX ART 0414 BMX ART 0814



BMX FTB 2000



BMX FTW 001S



ABE 7CPA41



BMX FCA 001



BMX FCA 002

References

Analog input modules

Input type	Input signal range	Resolution	Connection	No. of channels	Reference	Weight kg
Isolated high-level inputs	± 10 V, 0...10 V, 0...5 V, 1...5 V, ± 5 V, 0...20 mA, 4...20 mA, ± 20 mA	16 bits	Via cage clamp, screw clamp or spring-type removable terminal block	4 fast channels	BMX AMI 0410	—
Isolated low-level inputs	Temperature probe, thermocouple, ± 40 mV, ± 80 mV, ± 160 mV, ± 320 mV, ± 640 mV, ± 1.28 V, 0...400 Ω , 0...4000 Ω	15 bits + sign	40-way connector	4 channels 8 channels	BMX ART 0414 BMX ART 0814 ▲	— —

Analog output module

Output type	Output signal range	Resolution	Connection	No. of channels	Reference	Weight kg
Isolated high-level outputs	± 10 V, 0...20 mA, 4...20 mA	16 bits	Via cage clamp, screw clamp or spring-type removable terminal block	2 channels	BMX AMO 0210	—

Mixed analog I/O module

Channel type	Signal range	Resolution	Connection	No. of channels	Reference	Weight kg
Mixed I/O, non-isolated	± 10 V, 0...10 V, 0...5 V, 1...5 V, 0...20 mA, 4...20 mA	14 bits or 12 bits depending on the range	Via cage clamp, screw clamp or cage spring-type removable terminal block	I: 4 channels Q: 2 channels	BMX AMM 0600 ▲	—

Connection accessories for analog modules (1)

Description	For use with modules	Type, composition	Length	Reference	Weight kg
20-way removable terminal blocks	BMX AMI 0410	Cage clamp	—	BMX FTB 2000	—
	BMX AMO 0210	Screw clamp	—	BMX FTB 2010	—
	BMX AMM 0600	Spring-type	—	BMX FTB 2020	—
Preformed cordsets	BMX AMI 0410	One 20-way removable terminal block	3 m	BMX FTW 301S	—
	BMX AMO 0210		5 m	BMX FTW 501S	—
	BMX AMM 0600	One end with color-coded flying leads	—	—	—
	BMX ART 0414	One 40-way connector	3 m	BMX FCW 301S	—
	BMX ART 0814 (2)	One end with color-coded flying leads	5 m	BMX FCW 501S	—
	—	—	—	—	—

Advantys Telefast ABE 7 pre-wired system

Advantys Telefast ABE 7 sub-bases	BMX AMI 0410	Distribution of isolated power supplies Delivers 4 protected isolated power supplies for 4...20 mA inputs Direct connection of 4 inputs	—	ABE 7CPA410	0.180
	BMX ART 0414 BMX ART 0814	Connection and provision of cold junction compensation for thermocouples Direct connection of 4 inputs	—	ABE 7CPA412	0.180
Preformed cordsets for ABE 7CPA41 sub-bases	BMX AMI 0410	One 20-way removable terminal block and one 25-way SUB-D connector for ABE 7CPA410 sub-base	1.5 m	BMX FCA150	—
			3 m	BMX FCA300	—
			5 m	BMX FCA500	—
	BMX ART 0414 BMX ART 0814	One 40-way connector and one 25-way SUB-D connector for ABE 7CPA412 sub-base	1.5 m	BMX FCA152	—
			3 m	BMX FCA302	—
			5 m	BMX FCA502	—

(1) The shielding on the cordsets carrying the analog signals must always be connected to the BMX XSP000 shielding connection kit mounted under the rack holding the analog modules (see page 1/15).

(2) The BMX ART 0814 8-channel module requires two ABE 7CPA412 sub-bases and two BMX FCA002 cordsets.

▲ Available 4th quarter 2007