

Presentation

BMXEHC0200 and **BMXEHC0800** counter modules for the Modicon X80 modules platform are used to count the pulses generated by a sensor or to process the signals from an incremental encoder.

The two modules differ in their number of counter channels, maximum input frequencies, functions, and auxiliary input and output interfaces:

Counter module	No. of channels	Maximum frequency	Integrated functions	No. of physical inputs	No. of physical outputs
BMXEHC0200	2	60 KHz	Upcounting Downcounting Period meter Frequency meter Frequency generator Axis control	6	2
BMXEHC0800	8	10 KHz	Upcounting Downcounting Measurement	2	–

The sensors used on each channel can be:

- 2-wire 24 V proximity sensors
- 3-wire 24 V proximity sensors
- 10/30 V output signal incremental encoders with push-pull outputs

BMXEHC0200/0800 counter modules can be used to meet the demands of applications such as:

- Alarm generation on empty unwinder status using the ratio
- Sorting small parts using the period meter
- Single electronic cam using the dynamic setting thresholds
- Speed control using the period meter

These standard format modules can be installed in any available slot on a Modicon X80 platform. They are hot-swappable.

In a Modicon X80 PLC configuration, the number of **BMXEHC0200/0800** counter modules should be added to the number of application-specific modules (communication). The function parameters are set by configuration using EcoStruxure Control Expert (1) software.

Description

BMXEHC0200/0800 counter modules are standard format. They occupy a single slot in **BM•XBP•••** racks. They come in a plastic case, which provides IP20 protection of the electronics, and are locked into position by a captive screw.

BMXEHC0200 module, 2 channels, 60 KHz

The front panel of the **BMXEHC0200** counter module features:

- 1 Module and channel status display block
- 2 16-way connector for connecting the sensors of counter 0
- 3 16-way connector for connecting the sensors of counter 1
- 4 10-way connector for connecting:
 - Auxiliary outputs
 - Sensor power supplies

To be ordered separately:

- A **BMXXTSHSC20** kit containing two 16-way connectors and one 10-way connector (see [page 6/5](#))
- A **BMXXSP••00** shielding connection kit if the rack is not already equipped with one (see [page 2/5](#))

BMXEHC0800 module, 8 channels, 10 KHz

The front panel of the **BMXEHC0800** counter module features:

- 1 Module and channel status display block
- 2 Connector taking the **BMXFTB20•0** 20-way removable terminal block **3** (same as that of I/O modules)

To be ordered separately:

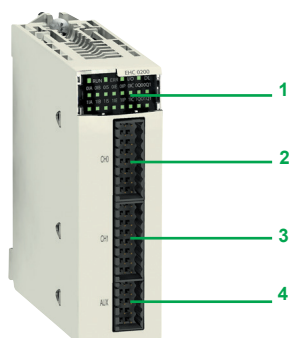
- A 20-way removable terminal block **3** (caged, screw clamp, or spring-type) (see [page 4/13](#))
- A **BMXXSP••00** shielding connection kit if the rack is not already equipped with one (see [page 2/5](#))

(1) EcoStruxure Control Expert software continues the Unity Pro range of software and corresponds to versions ≥ 14 of Unity Pro.

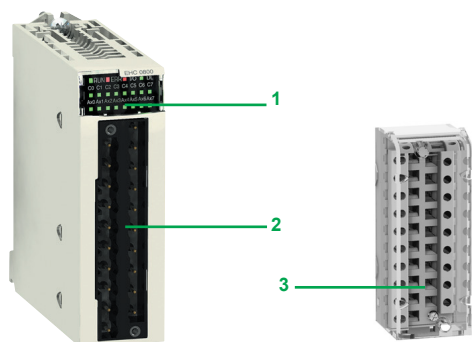


EcoStruxure Control Expert monitor

6



BMXEHC0200



BMXEHC0800

BMXFTB20•0

Operating modes for module BMXEHC0200

8 configurable modes	Frequency meter	This mode measures a frequency, speed, data rate, or an event stream. As standard, this mode measures the frequency received on the IN_A input. This frequency is expressed in Hz (number of pulses/second), with a precision of 1 Hz. The maximum frequency on the IN_A input is 60 kHz. The maximum cyclic ratio at 60 kHz is 60%.
	Event counting	This mode is used to determine the number of events received. In this mode, the counter calculates the number of pulses applied to the IN_A input at time intervals defined by the user. The module counts the pulses applied to the IN_A input each time the pulse for this input lasts longer than 5 μs (without anti-bounce filter).
	Period measurement	This mode is used to: ■ Determine the duration of an event ■ Determine the time between 2 events ■ Time and measure the execution time of a process It measures the time elapsed during an event or between 2 events (IN_A input) according to a selectable time base of 1 μs, 100 μs, or 1 ms. The IN_SYNC input can be used to enable or stop a measurement. The module can carry out a maximum of 1 measurement every 5 ms. The shortest measurable pulse is 100 μs, even if the unit defined by the user is 1 μs. The maximum measurable duration is 4,294,967,295 units (unit to be defined).
	Ratio counting	Ratio counting mode only uses the IN_A and IN_B inputs. There are 2 possible modes: ■ Ratio 1: Used to divide 2 frequencies. This is intended for applications such as flowmeters, mixers, etc. ■ Ratio 2: Used to subtract 2 frequencies. This is intended for the same applications, but for those requiring more precise regulation (more similar frequencies). Ratio 1 mode gives the results in thousandths for better accuracy (a display of 2,000 corresponds to a value of 2) and ratio 2 mode gives the results in Hz. The maximum frequency that the module can measure on the IN_A and IN_B inputs is 60 kHz.
	Downcounting	This mode is used to list a group of operations. In this mode, activating the synchronization function starts the counter which, starting from a user-defined preset value, decreases with each pulse applied to the IN_A input, until it reaches 0. This downcounting is made possible when the enable function has been activated. The counting register is thus updated at 1 ms intervals. One basic use of this mode is to signal, using an output, the end of a group of operations (when the counter reaches 0). The shortest pulse applied to the IN_SYNC input is 100 μs. The maximum frequency applied to the IN_SYNC input is 1 pulse every 5 ms. The maximum user-defined preset value is 4,294,967,295. The maximum count value is 4,294,967,295 units.
	Loop (modulo) counting	This mode is used in packaging and labeling applications where actions are repeated on sets of moving objects: ■ In upcounting, the counter increases until it reaches the user-defined "modulo - 1" value. On the next pulse, the counter is reset to 0 and upcounting restarts. ■ In downcounting, the counter decreases until it reaches 0. On the next pulse, the counter is reset to the user-defined "modulo - 1" value. Downcounting can then restart. The maximum frequency applied to the IN_A and IN_B inputs is 60 kHz. The maximum frequency of the modulo event is 1 event every 5 ms. The maximum modulo value is 4,294,967,296 (possible by declaring 0 in the modulo adjust value).
	32-bit counter counting	This mode is mainly used in axis following. The maximum frequency applied simultaneously to the IN_A and IN_B inputs is 60 kHz. The maximum frequency of the referencing event is 1 event every 5 ms. The counter value is between -2,147,483,648 and +2,147,483,647.
	Width modulation	In this operating mode, the module uses an internal clock generator to supply a periodic signal on the module's O0 output. Only the O0 output is affected by this mode, as the O1 output is independent of it. The maximum output frequency is 4 kHz. As O0 is a source output, a load resistor is necessary for the O0 output signal to change to 0 at the correct frequency. The cyclic ratio adjustment range varies according to the frequency of the O0 output.

Operating modes for module BMXEHC0800

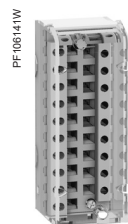
5 configurable 16-bit modes	Frequency meter	This mode measures a frequency, speed, rate, or data stream control. As standard, this mode measures the frequency received on the IN_A input. This frequency is expressed in Hz (number of pulses per second), with a precision of 1 Hz. The maximum frequency on the IN_A input is 10 kHz. The maximum cyclic ratio at 10 kHz is 60%.
	Event counting	This mode is used to determine the number of events received. In this mode, the counter calculates the number of pulses applied to the IN_A input at time intervals defined by the user. As an option, it is possible to use the IN_AUX input during a period of time, provided that the enable bit has been configured. The module counts the pulses applied to the IN_A input each time the pulse for this input lasts longer than 50 μs (without anti-bounce filter). Pulses with less than 100 ms synchronization are lost.
	Downcounting	This mode is used to list a group of operations. In this mode, when counting is enabled (software validation via the valid_sync command), a rising or falling edge on the IN_AUX input causes a value, defined by the user, to be loaded in the counter. The latter decreases with each pulse applied to the IN_A input until it reaches the value 0. Downcounting is made possible when the force_enable command is high (software positioning). The smallest pulse applied to the IN_AUX input varies according to the selected filter level. The maximum frequency applied to the IN_AUX input is 1 pulse every 25 ms.
	Loop (modulo) counting	This mode is used in packaging and labeling applications where actions are repeated on sets of moving objects. The counter increases with each pulse applied to the IN_A input until it reaches the user-defined "modulo - 1" value. On the next pulse in the upcounting direction, the counter is reset to 0 and upcounting restarts. The maximum frequency applied to the IN_A input is 10 kHz. The smallest pulse applied to the IN_AUX input varies according to the selected filter level. The maximum frequency of the modulo event is 1 event every 25 ms. The maximum modulo value is 65,536 units.
	Up/down counter	This mode is used for an accumulation, upcounting, or downcounting operation on a single input. Each pulse applied to the IN_A input produces: ■ Upcounting of pulses if the IN_AUX input is high ■ Downcounting of pulses if the IN_AUX input is low The counter values vary between the limits -65,536 and +65,535. The maximum frequency applied to the IN_A input is 10 kHz. Pulses applied to the IN_A input after a change of direction are only upcounted or downcounted after a period corresponding to the delay for taking account of the state of the IN_AUX input due to the programmable filter level on this input.
One 32-bit mode	32-bit counter counting	32-bit counter counting mode is available for channels 0, 2, 4, and 6 (channels 1, 3, 5, and 7 are now inactive). It behaves in the same way as the up/down counting mode using up to 3 physical inputs. It enables simultaneous upcounting and downcounting. The counter values vary between the limits -2,147,483,648 and +2,147,483,647 (31 bits + sign). The maximum frequency applied to the IN_A and IN_B inputs is 10 kHz. The smallest pulse applied to the IN_AUX input is defined according to the filtering applied to this input. The maximum frequency of loading the preset value is 1 every 25 ms.



BMXEHC0200



BMXEHC0800



BMXFTB2000

References

X80 counter modules (1)

Description	No. of channels	Characteristics	Reference	Weight kg/lb
Counter modules for 24 V ---	2	60 kHz counting	BMXEHC0200	0.112/ 0.247
2 and 3-wire sensors and 10/30 V --- incremental encoders with push-pull outputs	8	10 kHz counting	BMXEHC0800	0.113/ 0.249

Connection accessories (2)

Description	Composition	Unit reference	Weight kg/lb
Pack of connectors for BMXEHC0200 module	Two 16-way connectors and one 10-way connector	BMXXTSHSC20	0.021/ 0.046
20-way removable terminal blocks for BMXEHC0800 module	Caged	BMXFTB2000	0.093/ 0.205
	Screw clamp	BMXFTB2010	0.075/ 0.165
	Spring	BMXFTB2020	0.060/ 0.132

Shielding connection kit Comprising a metal bar and two support bases for mounting on rack for X80 counter modules See [page 2/5](#) —

(1) Typical consumption: See the power consumption table available on our website www.se.com.

(2) The shielding on the cordsets carrying the counter signals must always be connected to the **BMXXSP0000** shielding connection kit mounted under the rack that holds the **BMXEHC0200** module (see [page 2/3](#)).



BMXERT1604T/BMXERT1604H

Presentation

The **BMXERT1604T/H** time-stamping module is a complete solution providing a SCADA with a sequence of events that are time-stamped at source, enabling the user to analyze the source of any abnormal behavior in an automated system.

The SOE (sequence of events) is displayed in the alarms log or in the list of events for a client such as a SCADA.

Each event in the SOE is a change of value (transition) of a discrete I/O detected by a time-stamping module.

Advantages

Using the time-stamping system has the following advantages:

- No PLC programming
- Direct communication between the time-stamping modules and the client; if the time-stamping modules are in a Quantum Ethernet I/O drop, the bandwidth of the PLC communication is not used
- Consistency of the I/O values between the process (time-stamping modules) and the client
- Consistency is maintained irrespective of the operating mode
- No loss of events under normal operating conditions
- Management of Hot Standby configurations on the PLC and/or SCADA redundancy

Composition of a time-stamping architecture

X80 Remote I/O drop adapter

The **BMXERT1604T/H** module can be at the source of any discrete I/O signal located in the drop with a resolution of 10 ms. To help ensure no event is lost, all events are stored and kept in a buffer located in the product until OFS takes them.

The NTP protocol is used to synchronize the X80 Remote I/O drop adapter (BM●CRA312●0).

X80 Time-stamping module

The **BMXERT1604T/H** time-stamping module has 16 discrete inputs which carry out the time-stamping at source outputs with a resolution of 1 ms.

To help ensure no event is lost, all events are stored and kept in a buffer located in the product until OFS takes them.

This module can be placed either in an RIO drop, or in a local rack equipped with a X80 Remote I/O drop adapter which is synchronized via the DCF 77 or IRIG-B standards.

OFS V3.60 software

OFS V3.60 software is used to access events stored in the various buffers in the architecture and to place them in the SCADA via the standard OPC DA protocol. For further information, consult our website www.se.com.

AVEVA Plant SCADA

AVEVA Plant SCADA receives events transmitted by OFS and displays them in the SOE or in the list of alarms. For further information, consult our TPP partner website www.se.com/en/partners/technology-partners/.

Performance

Performance	Event source module	Value
Between two identical source modules in the same rack	BMXERT1604T	1.6 < resolution < 3.3 ms
	BMXERT1604H	
	BM●CRA31210	10 ms
Between two different inputs in the same source module	BMXERT1604T	1 ms
	BMXERT1604H	
	BM●CRA31210	1 scan
Maximum buffer	BMXERT1604T BMXERT1604H	255 groups (1)
Maximum number of discrete inputs/outputs monitored by the PLC for the entire time-stamping module	BMXERT1604T	400 discrete inputs (2)
	BMXERT1604H	
	BM●CRA31210	2,048 discrete I/Os (2)
Maximum number of I/O and memory available	BMXERT1604T	16 discrete inputs on module
	BMXERT1604H	255 groups (3)
	BM●CRA31210	256 discrete I/O configured 4,000 events in internal buffer
Maximum number of source modules in an Ethernet remote drop	BM●CRA31210	1 per drop
	BMXERT1604T	
	BMXERT1604H	9 per drop
Maximum number of sources of events polled by OFS	BMXERT1604T BMXERT1604H	500 sources per second (2)

References

X80 Time-stamping modules

Description	Input type	Reference	Weight kg/lb
Multifunction time-stamping input module	16 discrete inputs	BMXERT1604T	0.119/ 0.262
Multifunction time-stamping input module for severe environments		BMXERT1604H	

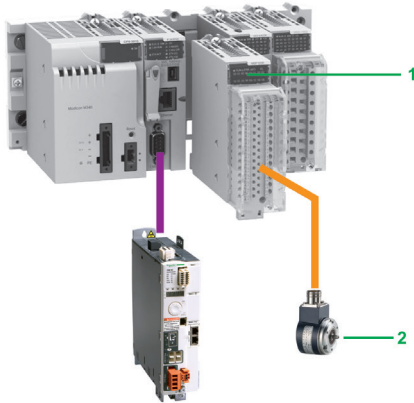
Connection accessories for time-stamping modules

Description	For use with modules	Type, composition	Length	Reference	Weight kg/lb
28-way removable terminal blocks	BMXERT1604T BMXERT1604H	Caged	–	BMXFTB2800	0.111/ 0.245
		Spring	–	BMXFTB2820	0.080/ 0.176

(1) A group is a set of 1 to 16 events detected in the same cycle.

(2) This maximum value is not an absolute value. It depends on the overall system dynamics (total number of scanned items and number of events generated by the system).

(3) The event number contained in one group varies within 1..16. It depends on how many channels get the events occurred within same sampling window (0.5ms).



Modicon X80 modules platform with Modicon M340 processor

Presentation

The **BMXEAE0300** SSI encoder interface module **1** for the Modicon automation platform (1) is a 3-channel standard synchronous serial interface module designed for use with SSI absolute encoders **2**.

The **BMXEAE0300** module enables SSI encoder values to be processed on PAC platforms for applications requiring accurate position/angular control, such as:

- Hydro power, e.g. dam inlet gate position control
- Wind power, e.g. wind turbine blade pitch control
- Complex motion loop control, e.g. ship elevator, blast furnace, flame cutting, etc.

The **BMXEAE0300** module provides a migration path from Premium (with **TSXCTY2C** measurement and counter module) to the Modicon X80 modules platform SSI solution to compete in the above market segments.

Like any other application-specific module, the **BMXEAE0300** module is installed in the rack slots (01 to 11). The number of modules is limited by the maximum number of application-specific channels permitted according to the CPU type (consult our website www.se.com).

Dam inlet gate control

Inlet gate control enables the water level in a dam to be monitored and controlled:

- The SSI encoder provides the PLC with accurate feedback of the gate position for precise monitoring of gate opening, adjustment, and positioning.
- The SSI interface converts the signals from the SSI encoders and transmits them to the CPU.

Wind turbine blade pitch control

Pitch control is required for adjusting the angle of the wind turbine blades in relation to the wind direction and strength, in order to achieve optimum energy conversion efficiency.

- The SSI absolute encoder is frequently used to feed back the position of the blade due to its reliability and robustness.
- Typically, the position of each of the three blades is read by the SSI encoders and then transmitted to the CPU via the SSI interface for motion loop control. Sometimes, 3 additional SSI inputs act as backup. Therefore, this new offer is adequately sized for the channel density.

Description

The **BMXEAE0300** SSI encoder interface module is standard format (1 slot). Its housing provides IP20 protection of the electronics and it is locked in each slot (**01** to **11**) by a captive screw.

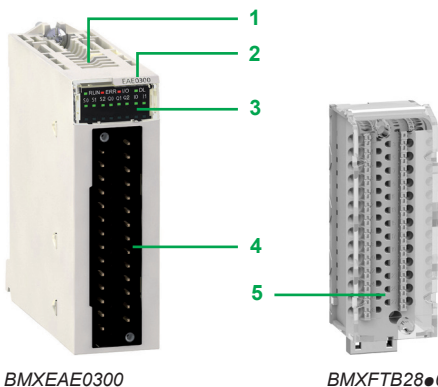
The front panel of the **BMXEAE0300** module features:

- 1** A rigid housing providing support and protection for the electronic card
- 2** The module reference marking (a label is also visible on the right-hand side of the module)
- 3** A display block indicating:
 - Module status via 4 LEDs:
 - RUN (green): module operating status
 - ERR (red): internal fault detected in the module or a fault detected between the module and the rest of the configuration
 - I/O (red): external fault detected
 - DL (green): firmware download status
 - Status of the 3 SSI channels via 8 LEDs:
 - Sx (green): channel x input (x = 0, 1, or 2)
 - Qx (green): reflex output for channel x (x = 0, 1, or 2)
 - IO/1 (green): capture inputs for the 3 SSI channels
- 4** A connector for a 28-way terminal block, for connecting to a removable caged or spring terminal block on sensors and preactuators

To be ordered separately:

- 5** A **BMXFTB2800** 28-way removable caged terminal block or **BMXFTB2820** spring terminal block, supplied with a channel identification label (see [page 6/11](#))
 - A shielding connection kit to help protect against electrostatic discharge, consisting of a metal bar and two sub-bases for mounting on the rack: **BMXXSP●●00** (reference dependent on the number of slots in the rack) (see [page 2/5](#))
 - A set of clamping rings **STBXSP30●0** for the connection cable shielding braids (reference dependent on the cable diameter) (see [page 2/5](#))

(1) Only for the Modicon automation platforms compatible with Modicon X80 modules platform



BMXEAE0300

BMXFTB28●0

Module specifications and functions

Specifications

The **BMXEAE0300** SSI encoder interface module is a 3-channel, synchronous serial interface, absolute encoder interface for Modicon PLCs. It supports:

- 3 channels of SSI inputs (DATA pair, CLK pair, 24 VDC field power supply to encoder)
- 1 reflex output for each SSI channel (Q)
- 2 capture inputs for the 3 SSI channels (CAP_IN0, CAP_IN1)
- 8 to 31 bits data width
- 4 baud rates (100 kHz, 200 kHz, 500 kHz, and 1 MHz)
- Capture and compare functions

Basic and optional functions

The following table presents the main functions of the **BMXEAE0300** module:

Function	Basic/ optional	Description
Absolute SSI encoder value acquisition	Basic	The position values of the SSI channel are automatically read by the module within 1 ms, unless the channel is disabled.
Modulo	Optional for motion	The modulo function limits the dynamics of the position value to within the power of 2. An event (if enabled) detects the passing of the modulo. The reflex output can also be detected when the modulo is passed (if configured).
Reduction	Optional for motion	This function reduces the intrinsic resolution of the encoder by a value defined by the "reduction" parameter. This reduction is carried out by a shift in the bit field provided by the encoder.
Offset	Optional for motion	The correction function of the encoder offset systematically corrects the offset produced by the encoder at mechanical position "0". The user enters the absolute encoder offset parameter.
Capture	Optional for events	The two capture input registers (per channel) enable the PLC program to carry out a dynamic measurement function between two points. The capture action can be triggered by two capture inputs. The event will be triggered at each capture.
Compare	Optional for events	Two independent comparators (per channel), with thresholds that can be modified by adjustment (explicit exchange), are able to generate an event or reflex output when the threshold is crossed.

Main features

- Supported by EcoStruxure Control Expert (1).
- Supports absolute encoder 24 V model with standard SSI interface, including Telemecanique Sensors OsiSense SSI encoders. For further information, consult the website www.tesensors.com.
- Standards and approvals: CE, UL, CSA, C-Tick, GOST, etc.

References

X80 SSI encoder interface module (2)

Description	Number of channels	Description per channel	Reference	Weight kg/lb
SSI encoder interface module	3 SSI channels	1 reflex output for each SSI channel 2 capture inputs for the 3 SSI channels 8 to 31 bits data width 4 baud rates: 100 kHz, 200 kHz, 500 kHz, 1 MHz Capture and compare functions	BMXEAE0300	0.138/ 0.304

Cabling accessories

Description	Description, use	Reference	Weight kg/lb
28-way removable terminal block	Caged	BMXFTB2800	0.111/ 0.245
	Spring	BMXFTB2820	0.080/ 0.176
Shielding connection kit for BMXEAE0300 module (3)	Comprising a metal bar and two support bases for mounting on rack	See page 2/5	—

(1) EcoStruxure Control Expert software continues the range of Unity Pro software and corresponds to versions ≥ 14 of Unity Pro.

(2) Typical consumption: See the power consumption table available on our website www.se.com.

(3) The shielding on the cables carrying the power supply to the module, each SSI channel, the capture inputs, and the reflex outputs (if any of them is wired) must always be connected to the **BMXXSP●●00** shielding connection kit mounted under the rack holding the **BMXEAE0300** module (see [page 2/3](#)).



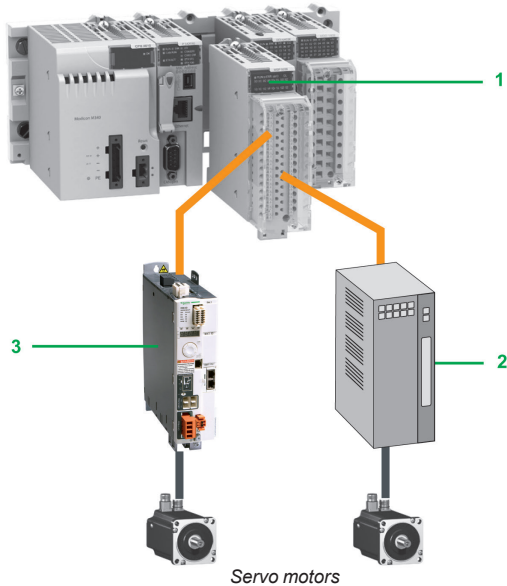
EcoStruxure Control Expert monitor



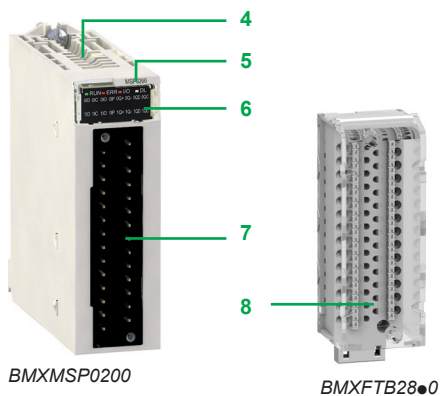
BMXEAE0300



BMXFTB28●0



Servo motors



BMXMSP0200

BMXFTB2800



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Presentation

The **1 BMXMSP0200** motion control pulse train output (PTO) module for the Modicon X80 modules platform is used for controlling third-party variable speed drives **2**, which have an integrated position loop and inputs that are compatible with open collector outputs.

The **BMXMSP0200** Motion control module is also directly compatible with the Lexium 32C and 32M **3** servo drive ranges, which have an integrated pulse control interface.

The **BMXMSP0200** motion control PTO module has two independent PTO channels. Like any other application-specific module, it is installed in the rack slots (labeled **01** to **11**). The number of modules is limited by the maximum number of application-specific channels permitted according to the CPU type:

- Standard **BMXP341000**: Maximum of 20 application-specific channels (1)
- Performance **BMXP342000**: Maximum of 36 application-specific channels (1)
- **BMEP5810**: Maximum of 24 application-specific channels (1)
- **BMEP5820**: Maximum of 32 application-specific channels (1)
- **BMEP5830** and **BMEP5840**: Maximum of 64 application-specific channels (1)
- **BMEP585040**: Maximum of 180 application-specific channels (1)
- **BMEP586040**: Maximum of 216 application-specific channels (1)

Description

The **BMXMSP0200** motion control module is standard format (1 slot). Its housing provides IP20 protection of the electronics and it is locked in each slot (**01** to **11**) by a captive screw.

The front panel of the **BMXMSP0200** motion control module features:

- 4** A rigid body providing support and protection for the electronic card
- 5** A module reference marking (a label is also visible on the right-hand side of the module)
- 6** A display block indicating:
 - Module status via 4 LEDs (RUN, ERR, I/O, and DL)
 - Status of the auxiliary inputs, 4 per channel
 - Status of the PTO outputs, 2 per channel
 - Status of the auxiliary outputs, 2 per channel
- 7** A connector for a 28-way terminal block, for connecting to a removable spring terminal block on sensors and preactuators

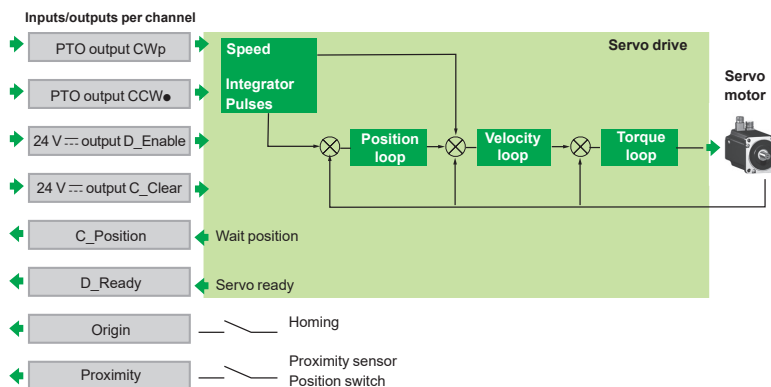
To be ordered separately:

- 8** A **BMXFTB2800** 28-way removable caged terminal block or **BMXFTB2820** spring terminal block, supplied with a channel identification label (see [page 6/11](#))
- A shielding connection kit to help protect against electrostatic discharge, consisting of a metal bar and two sub-bases for mounting on the rack: **BMXXSP0000** (reference dependent on the number of slots in the rack) (see [page 2/5](#))
- A set of clamping rings **STBXSP3000** for the connection cable shielding braids (reference dependent on the cable diameter) (see [page 2/5](#))

(1) Application-specific channels: **BMXEHC0200** (2-channel) and **BMXEHC0800** (8-channel) counter modules, **BMXMSP0200** (2-channel) motion control module, **BMXNOM0200** (2-channel) and **BMXNOR0200H** (1-channel) serial communication modules, **BMEAH0812** (8-channel) analog input module and **BMEAH00412** (4-channel) analog output module, **BMXAE0300** (3-channel) SSI module and **BMXERT1604T/H** (16-channel) discrete input module.

Operation

Block diagram of a BMXMSP0200 module channel



BMXMSP0200



BMXFTB2800

References

X80 Motion control module (1)

Description	Number of channels	Description per channel	Reference	Weight kg/lb
PTO module	2	2 x 200 kHz max. PTO outputs 2 x 24 V ---/50 mA auxiliary outputs 4 x 24 V --- auxiliary inputs	BMXMSP0200	0.145/ 0.320

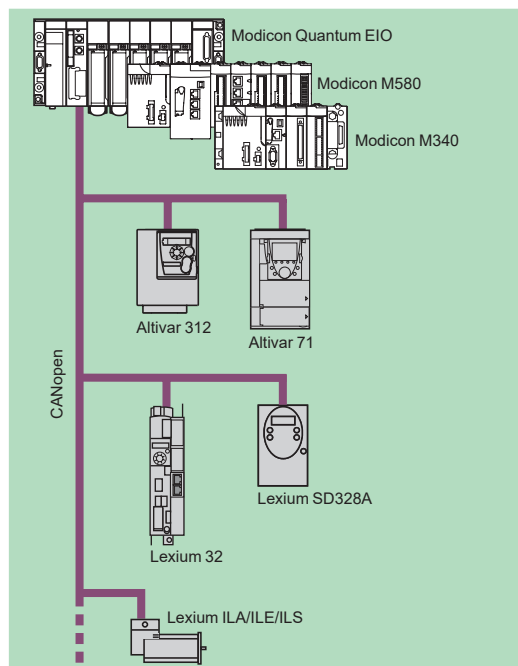
Cabling accessories

Description	Description, use	Length	Reference	Weight kg/lb
28-way removable terminal block	Caged	—	BMXFTB2800	0.111/ 0.245
	Spring	—	BMXFTB2820	0.080/ 0.176

Connection cable for daisy chain or pulse control (2)	From BMXMSP0200 (screw clamp terminal block) module to Lexium 32C or 32M (RJ45 connector) (cable with flying leads at one end and an RJ45 connector at the other)	3 m/9.84 ft	VW3M8223R30	—
Shielding connection kit for module BMXMSP0200	Comprising a metal bar and two support bases for mounting on rack	—	See page 2/5	—

(1) Typical consumption: See the power consumption table available on our website www.se.com.

(2) The shielding on the cordsets carrying the motion control signals must always be connected to the **BMXXSP●●00** shielding connection kit mounted under the rack holding the **BMXMSP0200** module (see [page 2/3](#)).



MFB: Motion control distributed over CANopen



Presentation

MFB (Motion Function Blocks) is a library of function blocks integrated in EcoStruxure Control Expert (1) used to set up motion control in the architectures of drives and servo drives on CANopen buses:

- Altivar 312: For asynchronous motors from 0.18 to 15 kW/0.25 to 20 HP
- Altivar 71: For synchronous or asynchronous motors from 0.37 to 500 kW/0.5 to 700 HP
- Lexium 32: For servo motors from 0.15 to 7 kW/0.20 to 10 HP
- Lexium ILA/ILE/ILS: Integrated motor drives from 0.10 to 0.35 kW/0.13 to 0.47 HP
- Lexium SD328A: For 3-phase stepper motors from 0.35 to 0.75 kW/0.47 to 1 HP

In compliance with PLCopen specifications, the MFB library allows both easy and flexible motion programming with EcoStruxure Control Expert (1), as well as axis diagnosis.

In maintenance operations, drives can be replaced quickly thanks to drive parameter download blocks.

Setting up drives on the CANopen network is facilitated through Motion Tree Manager organization in the EcoStruxure Control Expert (1) browser, making it easy for users to access the application drives.

Applications

The features of the Motion Function Blocks library are particularly suitable for machines with independent axes. In the case of these modular/special machines, MFB function blocks are an ideal solution for controlling single axes. The following are typical applications for this type of architecture:

- Automatic storage/removal
- Material handling
- Palletizers/depalletizers
- Conveyors
- Packaging, simple labeling application
- Grouping/ungrouping
- Adjustment axes in flexible machines, etc.

Functions

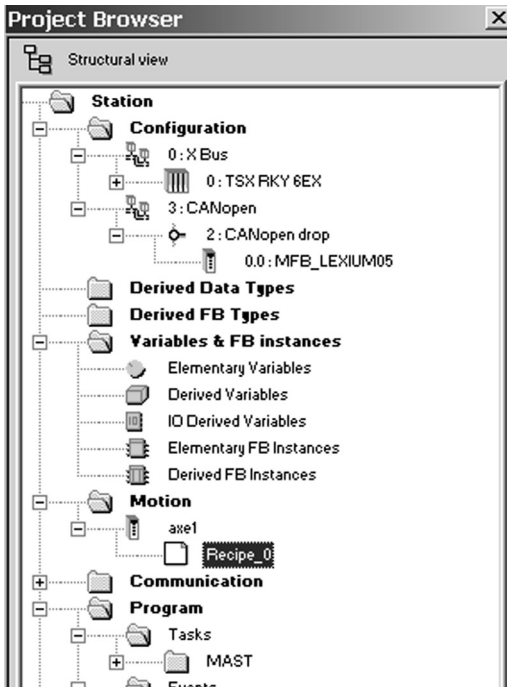
The table below lists the function blocks of the MFB library and the compatible drives. The prefix indicates the block family:

- MC: Function block defined by the Motion Function Blocks PLC Open standard
- TE: Function block specific to Schneider Electric products
- Lxm: Function block specific to Lexium servo drives

Type	Function	Function block	Altivar 312	Altivar 71	Lexium 32	Lexium ILA/ILE/ILS	Lexium SD328A
Management and motion	Read an internal parameter	MC_ReadParameter					
	Write an internal parameter	MC_WriteParameter					
	Read the current position	MC_ReadActualPosition					
	Read the instantaneous speed	MC_ReadActualVelocity					
	Acknowledge detected error messages	MC_Reset					
	Stop any active movement	MC_Stop					
	Axis coming to standstill	MC_Power					
	Movement to absolute position	MC_MoveAbsolute					
	Relative movement	MC_MoveRelative					
	Additional movement	MC_MoveAdditive					
	Homing	MC_Home					
	Movement at given speed	MC_MoveVelocity					
	Read diagnostic data	MC_ReadAxisError					
	Read servo drive status	MC_ReadStatus					
	Torque control	MC_TorqueControl					
	Read actual torque value	MC_ReadActualTorque					
	Manual control	MC_Jog					
Save and restore parameters (FDR)	Read drive parameters and store in PLC memory	TE_UploadDriveParam					
	Write drive parameters from PLC memory	TE_DownloadDriveParam					
Advanced Lexium functions	Read a motion task	Lxm_UploadMTask					
	Write a motion task	Lxm_DownloadMTask					
	Start a motion task	Lxm_StartMTask			(1)		
	Set the reduction ratio, signed	Lxm_GearPosS			(1)		
System	Communication with the servo drive	TE_CAN_Handler					

Compatible

(1) The Lxm_StartMTask and Lxm_GearPosS function blocks are only compatible with Lexium 32 (LXM32M) servo drives.



Motion Tree Manager integrated in the EcoStruxure Control Expert browser

Motion Tree Manager

Motion Tree Manager is associated with MFB library of EcoStruxure Control Expert (1) and integrated in its browser. It provides specific assistance for:

- Axis object management
- Axis variable definition
- Drive parameter management

Motion Tree Manager automatically creates links between the CANopen bus configuration and the MFB function block data using a limited amount of configuration data.

General axis parameters

In this tab, the designer is prompted to define:

- The name of the axis that will identify it in the browser for the entire application
- The address of the drive on the CANopen bus

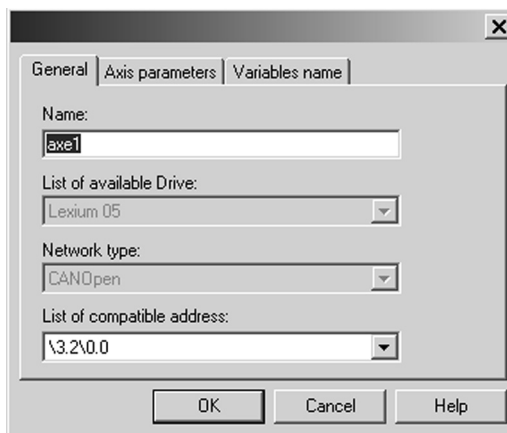
Axis parameters

The drop-down lists in this tab are used to determine the exact type of drive: family, version.

Variable names

This last tab is used to identify data structures:

- **Axis_Reference**: Used by the function block instances for the axis in question
- **CAN_Handler**: Used to manage communication with the drive via the CANopen network



General parameters: Axis name and address

Recipe definition

The recipes attached to the axis are the data structures containing the adjustment parameters of a given drive. This data is used when:

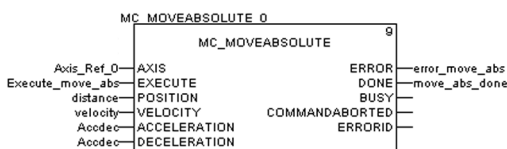
- Changing the drive with restoration of the context during "Faulty Device Replacement" (FDR) maintenance
- Changing the manufacturing program of the machine and calling up an appropriate set of parameters: servo control gains, limitations, etc. adapted to the weight and size of the moving parts
- Saving parameters in the initial values of the PLC application

Programming, diagnostics, and maintenance

Communication between the PLC and drive is automatically set up by the system as soon as a TE_CAN_Handler instance is declared in the EcoStruxure Control Expert (1) task with which the axis is associated. Movements are then programmed by sequencing function blocks from the library in the user's chosen EcoStruxure Control Expert (1) editor (LD, ST, FBD).

The two function blocks, MC_ReadStatus, and in some cases MC_ReadAxisError, are useful for determining the overall status of the axis, as well as the code of the active detected errors.

The function blocks TE_UploadDriveParam and TE_DownloadDriveParam allow the application to save the drive parameters (recipe) and to then quickly reload them into another drive when it is necessary to change the original one.



MFB: Programming a movement in absolute mode

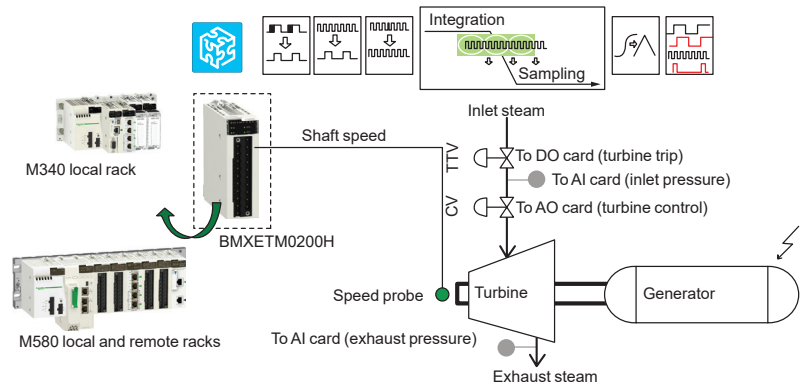
(1) EcoStruxure Control Expert software continues the Unity Pro range of software and corresponds to versions ≥ 14 of Unity Pro.

Presentation

The **BMXETM0200H** frequency input module offers turbine shaft and engine speed monitoring functionality for general purpose turbomachinery control (TMC) applications. It can be integrated into Modicon M340 and M580 standard and high-availability systems.

TMC applications include prime movers, driven equipment, auxiliaries, mechanical retrofits, and protection. With the Modicon Package solution, the frequency input and measurement function is available for the following general purpose TMC application types:

- Large hydro turbines
- Small steam turbine generators
- Small hydro turbines
- Small mechanical drive gas turbines
- Diesel generators
- Reciprocating compressors
- Packaged air compressors
- Single-stage mechanical drive turbines: pumps



TMC governor control system architecture

Functionality

The purpose of the **BMXETM0200H** module is to monitor the turbine shaft or engine speed. It is designed to receive electrical pulses generated by the gear tooth sensing probe, cam, and crank etc. and convert these pulses into a numerical value. The measured value of the turbine shaft rotating velocity is highly accurate with a fast refresh rate.

With the **BMXETM0200H** module providing frequency input and measurement, Modicon PACs build up a closed loop control system as part of the turbomachinery governor. This control mechanism will automatically track and direct the speed of driven equipment (such as a generator or compressor) and a prime mover (such as a turbine or engine) under varying load conditions with the aim of:

- maintaining the selected speed
- limiting slow and fast speeds
- helping to protect mechanical parts and customer investment by anticipating overspeeds by means of its acceleration and jerk detection capability



BMXETM0200H

Module specifications
Availability and compatibility Available for Modicon M340 and M580 standalone and HSBY platforms, on local rack or RIO rack with hot swapping supported.
Ambient operating temperature Hardened with extended temperature range from -25...70 °C/-13...158 °F and conformal coating.
Measurement performance Two frequency input channels for 1 V and 1 Hz signal up to a maximum of 500 KHz with 100 KHz, 10 KHz, and 1 KHz input filters.
Supported signal source device type Speed sensor inputs support passive pickup, active speed sensor (output OC, TTL, ST), potential transformer, and incremental encoder.
Digital reflex outputs 1 positive 24 VDC reflex digital output per channel controlled from an embedded comparator.
Error detection Detects broken wire and probe health status.
Dedicated TMC functions A set of dedicated TMC functions for turbine shaft monitoring, including: ■ Frequency pattern recognition up to 512 pulses per pattern ■ Acceleration and jerk detection ■ Phase angle and ratio detection between channels ■ Scaling factor for RPM measurement up to 1,024 teeth per revolution ■ Alarm bits that can be time-stamped by the Modicon M580 controller
Software configuration Configurable using EcoStruxure Control Expert (1) or Unity Pro V11 (S, L, and XL) with TMC Hotfix integrated.

Reference			
X80 Frequency input module			
Description	Composition	Reference	Weight kg/lb
Turbomachinery frequency input module (2 channels) for severe environments	1 ms cycle time	BMXETM0200H	0.124/
	2 digital reflex outputs 2 discrete inputs (for frequency measurement functions)		0.273

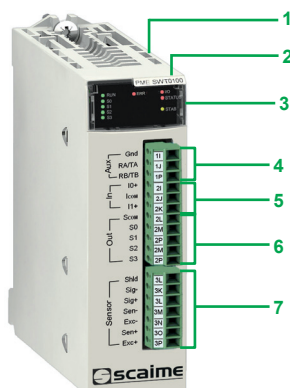
(1) EcoStruxure Control Expert software continues the Unity Pro range of software and corresponds to versions ≥ 14 of Unity Pro.

Technology

Partner

Schneider
Electric

PMESWT0100 Scaime partner
weighing module



PMESWT0100

Presentation

The **PMESWT0100** Scaime partner weighing module is integrated in a Modicon X80 modules platform with an Ethernet + X-bus **BMEXBP●●00(H)** rack and a Modicon M580 **BMEP58●0●0** PLC or in a Modicon X80 RIO drop with an Ethernet + X-bus **BMEXBP●●00(H)** rack and a **BMECRA31210** adapter.

With this module, it is possible to go beyond the scope of a simple weighing application: it is suitable for static weighing applications such as silo level measurement and scale weighing; it is also well suited to low-speed dynamic weighing applications such as filling, dosing, and material transfer.

The Modicon X80 modules platform can manage the whole weighing environment as well as the whole machine or industrial process associated with the weighing system.

Indeed, weighing data is accessible by the PLC via implicit exchanges or explicit commands. Once the weighing signal is received, it is processed and transferred by the weighing module to the Modicon M580 PLC via the Ethernet backbone.

This Ethernet weighing transmitter offline configuration, online calibration, monitoring, and weighing diagnostics are achieved using EcoStruxure Control Expert (1) software via FDT/DTM.

The Scaime partner weighing module has been developed to comply with the general standards and certifications of the Modicon X80 modules platform. For more information, see [page 10/2](#) or consult our website www.se.com.

Description

The **PMESWT0100** weighing module features the following:

- 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 Screw clamp terminals for connecting an external HMI output
- 5 Screw clamp terminals for connecting discrete reflex inputs
- 6 Screw clamp terminals for connecting discrete reflex outputs
- 7 Screw clamp terminals for connecting input load cells

Main characteristics

Measurement input

1 weighing channel per module, comprising up to 8 load cells connected via junction box

Input load cell supply voltage

5 V $\overline{\text{---}}$

Internal resolution

24-bit converter

User resolution

Up to 1,000,000, factory-calibrated 500,000 at 2 mV/V

Internal measurement rate

6 to 400 measurements per second

External measurement rate

100 measurements per second

Discrete reflex outputs

Number of applications

4 positive logic outputs, 2 for dosing and 2 for threshold monitoring

Maximum voltage

55 V $\overline{\text{---}}$

Nominal current

400 mA

Response time

2 ms discrimination

Discrete inputs

Number of applications

2 positive logic inputs, weighing functions

Low voltage range

0...3 V $\overline{\text{---}}$

High voltage range

9...28 V $\overline{\text{---}}$

High current

20 mA at 24 V $\overline{\text{---}}$

(1) EcoStruxure Control Expert software continues the Unity Pro range of software and corresponds to versions ≥ 14 of Unity Pro.



PMESWT0100

References			
X80 Weighing module			
Description	Composition	Reference	Weight kg/lb
Scaime partner weighing module (1) (1 weighing channel per module)	- Load cell input 100 measurements/s (for 1 to 8 load cells) - 4 discrete reflex outputs (for threshold monitoring and dosing) - 2 discrete inputs (for weighing functions) - 1 output for an external HMI	PMESWT0100 (2)	0.233/ 0.514
Technology Partner Schneider Electric			

(1) Partner Product, sold by SE and Scaime. Supported by Scaime, see our website www.se.com/en/partners/technology-partners/
(2) To order this product, please contact our Customer Care Center.