

# 8EAC0151.003-1

## 1 General information

Incremental encoder plug-in module 8EAC0151.003-1 can be used in the slot of an ACOPOS P3 8EI servo drive. The module includes three incremental encoder interfaces for evaluating incremental encoders with square wave signals electrically phase-shifted by 90°.

The plug-in module is primarily used to evaluate encoders installed in external motors as well as external axis encoders (i.e. encoders that detect any machine movement).

The encoder input signals are monitored. This makes it possible to detect open circuits, short circuits and failures in the encoder power supply depending on the configuration.

All 4 edges are always evaluated; the counter frequency is therefore 4x the input frequency.

When switched on, the plug-in module is automatically identified by the operating system on the ACOPOS P3 8EI servo drive.

### Information:

**The number of usable encoder interfaces on an 8EAC multi-encoder plug-in module depends on the number of axes on the ACOPOS P3 8EI servo drive in which the 8EAC plug-in module is used.**

8EI servo drives	Maximum number of usable encoder interfaces on an 8EAC plug-in module
8ElxxxxS... 1-axis modules	1
8ElxxxxD... 2-axis modules	2
8ElxxxxT... 3-axis modules	3

### Supported encoder types

- Incremental encoders with RS422 output signals
- Incremental encoders with push, pull or push-pull outputs with no complementary signal
- Incremental encoders with symmetrical push-pull outputs
- Incremental encoders with an encoder power supply of +5 V or +12 V

### Caution!

**An incorrect configuration can result in irreparable damage to the plug-in module or connected encoder!**

### Information:

**The encoder type for the multi-encoder interface is not predefined from the factory. Before commissioning, configure the encoder type in Automation Studio for each incremental encoder interface!**

## 2 Order data


Model number	Short description	Figure
	<b>Plug-in modules</b>	
8EAC0151.003-1	ACOPOS P3 plug-in module, 3 incremental encoder interfaces	
	<b>Optional accessories</b>	
	<b>Adapter cables</b>	
8ECG00X4.3151D-0	ACOPOS P3 adapter cable, length 0.4 m, for analog multi-encoder interfaces and incremental encoder interfaces, 5x 2x 0.14 mm <sup>2</sup> , 10-pin male IX connector to 15-pin female DSUB	

Table 1: 8EAC0151.003-1 - Order data

## 3 Technical data

Model number	8EAC0151.003-1
<b>General information</b>	
Short description	3 incremental encoder interfaces in one module
Module type	ACOPOS P3 plug-in module
B&R ID code	F1B2
Slot	Slot 1
Max. power consumption	In preparation
Certifications	
CE	Yes
UL	cULus E225616
Functional safety <sup>1)</sup>	Power conversion equipment
	Not relevant
<b>Encoder connection</b> <sup>2)3)</sup>	
Module-side connection	10-pin male iX industrial connector, B keying
Status indicators	None
Max. encoder cable length	In preparation
<b>Encoder power supply</b>	
Output voltage	5 V ±5% 12 V ±10% <sup>4)</sup>
Load capacity	300 mA
Sense lines	No <sup>5)</sup>
Protective measures	
Overload protection	Yes
Short-circuit proof	Yes
<b>Inputs A, B, R</b> <sup>6)7)</sup>	
Single-ended signals	
Input voltage for low	<1 V against COM (TTL 5 V) <1.8 V against COM (HTL 12 V)
Input voltage for high	>2.6 V against COM (TTL 5 V) >7 V against COM (HTL 12 V)
Maximum input voltage	-13 V / +16 V against COM
Differential signals	
Differential voltage	±0.5 V to ±5 V (RS422, TTL 5 V) ±2 V to ±13 V (HTL 12 V)
Terminating resistor	112 Ω (RS422)
<b>Incremental encoder operation</b>	
Signal form	Square wave signals
Evaluation	4x
Input frequency	Max. 6.25 MHz (RS422) Max. 200 kHz (TTL 5 V, HTL 12 V)
Counter frequency	Max. 25 MHz (RS422) Max. 800 kHz (TTL 5 V, HTL 12 V)
Reference frequency	Max. 6.25 MHz (RS422) Max. 200 kHz (TTL 5 V, HTL 12 V)
Distance between edges	Min. 40 ns (RS422) Min. 400 ns (TTL 5 V, HTL 12 V)

Table 2: 8EAC0151.003-1 - Technical data

Model number	8EAC0151.003-1
Support	
Motion system	
mapp Motion	5.3.0 and higher
ACP10/ARNC0	5.3.0 and higher
Ambient conditions	
Temperature	
Operation	
Nominal	5 to 40°C
Maximum	55°C
Storage	-25 to 55°C
Transport	-25 to 70°C
Relative humidity	
Operation	5 to 85%
Storage	5 to 95%
Transport	Max. 95% at 40°C
Mechanical properties	
Dimensions	
Width	82 mm
Length	24 mm
Depth	103 mm
Weight	72 g

Table 2: 8EAC0151.003-1 - Technical data

- 1) Achievable safety classifications (safety integrity level, safety category, performance level) are documented in the user's manual (section "Safety technology").
- 2) The data in this section applies to each of the three incremental encoder interfaces.
- 3) The encoder must be wired using a cable with a single shield and twisted pair signal lines (e.g. 4x 2x 0.14 mm<sup>2</sup> + 2x 0.5 mm<sup>2</sup>).
- 4) Depends on the configuration in Automation Studio.
- 5) With an output voltage of 5 V ± 5%, it is possible to compensate for the sensor voltage drop by configuring the cable resistance (max. 2x 4.014 Ω). When using compensation and current > 200 mA, the output voltage accuracy is reduced to ±0.5 V.
- 6) As of 6/2018: Only RS422, HTL differential, HTL push-pull and HTL pull supported.
- 7) The values refer to the input of the plug-in module.

## 4 Wiring

### 4.1 Pinout

#### Information:

**Plug-in module 8EAC is not capable of hot plugging. An 8EAC plug-in module is only permitted to be connected to or disconnected from an ACOPOS P3 8EI servo drive when power to the servo drive is switched off.**

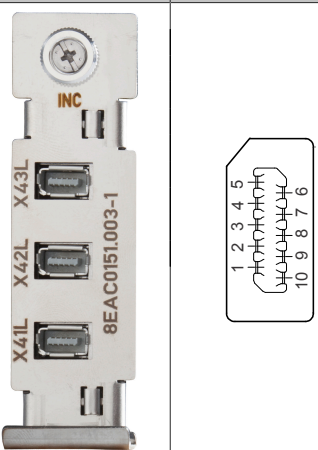
Figure	Male connector X41L / X42L / X43L	Pin	Description	Function
		1	B\ <sup>1)</sup>	Channel B inverted
		2	B	Channel B
		3	COM	Encoder power supply 0 V
		4	A\ <sup>1)</sup>	Channel A inverted
		5	A	Channel A
		6	R	Reference pulse
		7	R\ <sup>1)</sup>	Reference pulse inverted
		8	U+	Encoder supply 5 V / 12 V <sup>2)</sup>
		9	T-	Temperature sensor -
		10	T+	Temperature sensor +

Table 3: Incremental encoder interface 8EAC0151.003-1 - Pinout

- 1) These pins must be open when operating single-ended encoders.
- 2) The encoder power supply depends on the configuration in Automation Studio.

#### Danger!

**The connections for the motor temperature sensor and encoder are safely isolated circuits. These connections are therefore only permitted to be connected to devices or components that have sufficient isolation per IEC 60364-4-41 or EN 61800-5-1.**