

8AC126.60-1

1 General information

The AC126 plug-in module is equipped with an EnDat 2.2 encoder interface. This module can be used to evaluate encoders installed in B&R servo motor motors as well as encoders for external axes (encoders that sample any machine movement). The input signals are monitored. This makes it possible to detect open or shorted lines as well as encoder supply failures.

During startup, the plug-in module is automatically identified, configured and its parameters set by the ACOPOS servo drive operating system.

EnDat 2.2 encoder

EnDat 2.2 is a standard developed by Johannes Heidenhain GmbH (www.heidenhain.de) and is used in applications that demand high resolution and precision. Position data is transferred digitally via the serial port. With no analog signals, the number of cable conductors is reduced. EnDat 2.2 encoders also provide internal read/write parameter memory.

With absolute position measurement (the absolute position is sampled serially), a homing procedure for referencing is usually not required. Where necessary, a multi-turn encoder (4096 revolutions) should be installed. To save costs, a single-turn encoder and a reference switch can also be used. In this case, a homing procedure must be carried out.

The parameter memory in the encoder is used by B&R to store motor data (among other things). In this way, the ACOPOS drive system is always automatically provided the correct motor parameters and limit values. This parameter memory is referred to as the "embedded parameter chip".

EnDat 2.2 encoders with battery-backed multi-turn function:

When equipped with the optional 8AXB000.0000-0 battery module, the module also supports encoders with battery-backed multi-turn functionality. These are gearless multi-turn encoders that would lose position data in the event of a power failure. The battery voltage is automatically monitored by the encoder itself.

2 Order data

Model number	Short description	Figure
	Plug-in modules	
8AC126.60-1	ACOPOS plug-in module, EnDat 2.2 encoder interface	
	Required accessories	
	EnDat 2.2 cables	
8BCF0005.1221B-0	EnDat 2.2 cable, length 5 m, 4x 0.14 mm ² + 4x 0.35 mm ² , 12-pin female springtec EnDat connector, 9-pin male DSUB servo connector, can be used in cable drag chains	
8BCF0007.1221B-0	EnDat 2.2 cable, length 7 m, 4x 0.14 mm ² + 4x 0.35 mm ² , 12-pin female springtec EnDat connector, 9-pin male DSUB servo connector, can be used in cable drag chains	
8BCF0010.1221B-0	EnDat 2.2 cable, length 10 m, 4x 0.14 mm ² + 4x 0.35 mm ² , 12-pin female springtec EnDat connector, 9-pin male DSUB servo connector, can be used in cable drag chains	
8BCF0015.1221B-0	EnDat 2.2 cable, length 15 m, 4x 0.14 mm ² + 4x 0.35 mm ² , 12-pin female springtec EnDat connector, 9-pin male DSUB servo connector, can be used in cable drag chains	
8BCF0020.1221B-0	EnDat 2.2 cable, length 20 m, 4x 0.14 mm ² + 4x 0.35 mm ² , 12-pin female springtec EnDat connector, 9-pin male DSUB servo connector, can be used in cable drag chains	
8BCF0025.1221B-0	EnDat 2.2 cable, length 25 m, 4x 0.14 mm ² + 4x 0.35 mm ² , 12-pin female springtec EnDat connector, 9-pin male DSUB servo connector, can be used in cable drag chains	
	Optional accessories	
	Battery Modules	
8AXB000.0000-00	8AC126.60-1 accessory set for encoder buffering consisting of: Battery module with 3.6 V lithium battery	

Table 1: 8AC126.60-1 - Order data

Advice:

Both 8BCF EnDat 2.2 cables and 8CH hybrid motor cables can be used for wiring the module.

3 Technical data

Model number	8AC126.60-1
General information	
Module type	ACOPOS plug-in module
B&R ID code	0xBD5A
Slot ¹⁾	Slots 2, 3 and 4
Max. power consumption	4.4 W
Certifications	
CE	Yes
UL	cULus E225616 Power conversion equipment
KC	Yes
Encoder connection ²⁾	
Module-side connection	9-pin female DSUB
Status indicators	UP/DN LEDs, BAT LED
Electrical isolation	
Encoder - ACOPOS	No
Encoder monitoring	Yes
Max. encoder cable length	100 m Depends on the cross section of the power supply wires of the encoder cable ³⁾
Encoder power supply	
Output voltage	Typ. 12 V
Load capacity	300 mA ⁴⁾
Protective measures	
Overload-proof	Yes
Short-circuit proof	Yes
Synchronous serial interface	
Signal transmission	RS485
Baud rate	6.25 Mbit/s
Ambient conditions	
Temperature	
Operation	
Nominal	5 to 40°C
Maximum	55°C
Storage	-25 to 55°C
Transport	-25 to 70°C

Table 2: 8AC126.60-1 - Technical data

Model number	8AC126.60-1
Relative humidity	
Operation	5 to 85%
Storage	5 to 95%
Transport	Max. 95% at 40°C

Table 2: 8AC126.60-1 - Technical data

- 1) The AC126 is an encoder module. It is also possible to connect multiple encoder modules. In this case, the encoder module in the smallest slot automatically serves as motor feedback.
- 2) Only B&R 8BCF EnDat 2.2 cables are permitted to be used for wiring the module.
- 3) Maximum encoder cable length l_{max} can be calculated as follows (the maximum permissible encoder cable length of 100 m is not permitted to be exceeded):

$$l_{max} = 2.5 * A / [(I_G + 0.03) * \rho]$$

I_G ... Max. current consumption of the encoder [A]

A ... Cross section of the power supply wires [mm²]

ρ ... Specific resistance [Ω mm²/m] (e.g. for copper: $\rho = 0.0178$)

- 4) An additional reserve is available for the terminating resistors.

4 Status indicators

UP/DN LEDs

The UP/DN LEDs are lit depending on the rotational direction and the speed of the connected encoder.

UP LED ... Lit when the encoder position changes in the positive direction.

DN LED ... Lit when the encoder position changes in the negative direction.

The faster the encoder position changes, the brighter the respective LED is lit.

BAT LED

The BAT LED is used to monitor the backup battery on the optional battery module 8AXB000.0000-00.

Color	Description	
Green/Red	Green (lit)	Backup pattery voltage OK
	Red (lit)	Backup battery voltage too low or line break
	LED not lit	No encoder with battery-backed multi-turn functionality connected to module

Table 3: BAT Status LED - AC126

5 Firmware

The firmware is part of the operating system for the ACOPOS servo drives. Firmware is updated by updating the ACOPOS operating system.

6 Changing/Inserting the battery module 8AXB000.0000-00

Caution!

The following conditions must be met for the position of the encoder position to be maintained when changing battery module 8AXB000.0000-00:

- The 8AC126.60-1 plug-in module for which the 8AXB000.0000-00 battery module should be exchanged is installed in an ACOPOS servo drive.
- The battery backed encoder is connected to this 8AC126.60-1 plug-in module.
- The ACOPOS servo drive is supplied with 24 VDC (at least one of the three LEDs – RUN, READY or ERROR – on the ACOPOS servo drive is lit).

Information:

The color of the BAT LED on the 8AC126.60-1 plug-in module changes to red and the plug-in module reports an error as soon as the 8AXB000.0000-00 battery module is removed. The encoder position is retained as long as the ACOPOS servo drive continues to be supplied with 24 VDC. The BAT LED remains red until a new 8AXB000.0000-00 battery module is inserted and the error is acknowledged. Then the BAT LED returns to green.

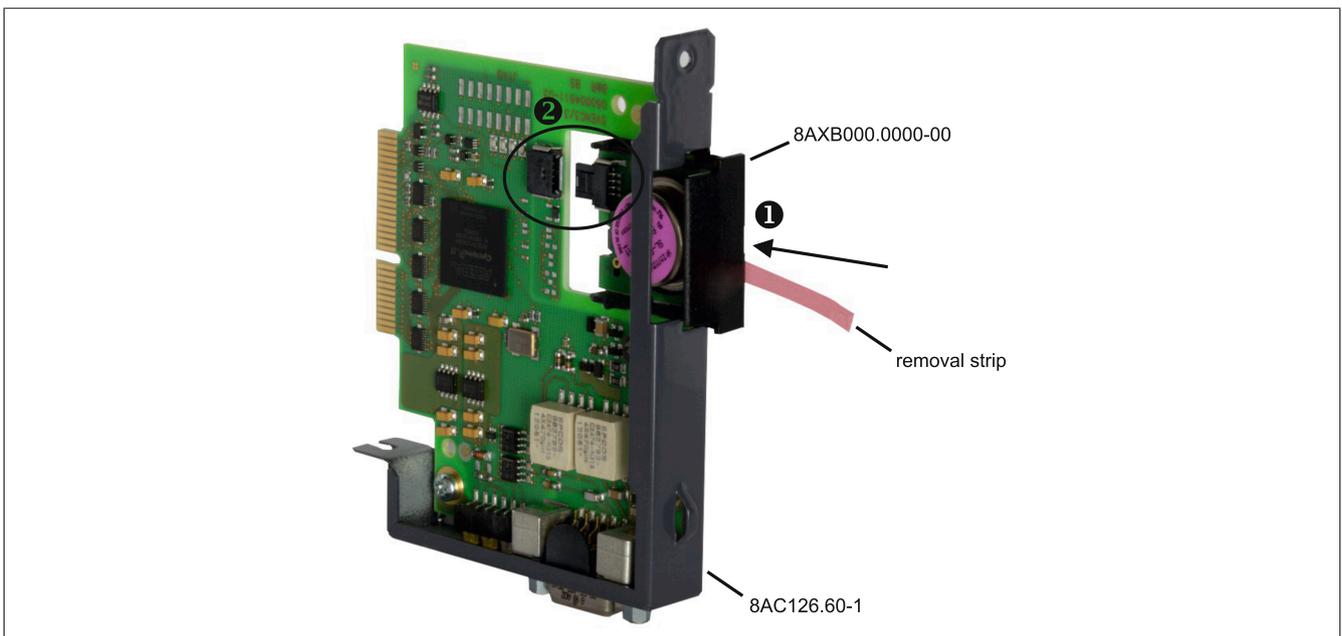


Figure 1: Changing/Inserting the battery module 8AXB000.0000-00

- 1 Battery module 8AXB000.0000-00
- 2 Battery removal strip
- 3 Plug-in module 8AC126.60-1

Procedure for changing/inserting

If battery module 8AXB000.0000-00 (1) is already used in plug-in module 8AC126.60-1 (3):

1. Pull the battery removal strip (2) until battery module 8AXB000.0000-00 (1) is released from the plug-in module.
2. Pull battery module 8AXB000.0000-00 (1) out of the recess of the plug-in module.
3. Insert battery module 8AXB000.0000-00 (1).

Inserting battery module 8AXB000.0000-00 (1):

1. Carefully insert battery module 8AXB000.0000-00 (1) into the recess of plug-in module 8AC126.60-1 ACOPOS (3) as shown. It is important to ensure that the battery removal strip (2) does not get caught so that the battery module (1) can be pulled out again.
2. Slide the battery module (1) into the recess until the connector of the battery module engages in the plug-in module.

Caution!

The battery module 8AXB000.0000-00 should be replaced every 6 years. The replacement intervals recommended by B&R reflect the batteries' average service life and operating conditions. It does not represent the maximum buffer duration.

Warning!

The 8AXB000.0000-00 battery module must be replaced by another 8AXB000.0000-00 battery module. The battery module may explode if handled improperly. Do not recharge, disassemble or dispose of in fire.

Information:

The status of the battery is provided to the application software by a status bit. The application software must ensure an appropriate response to undervoltage. The drive is not stopped automatically.

7 Wiring

7.1 Pinout

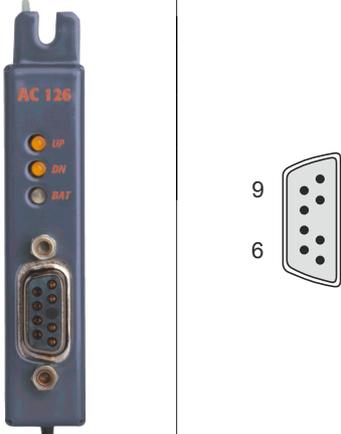
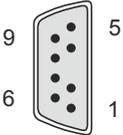
Figure	X11	Pin	Name	Function
		1	U+	Encoder power supply 12 V
		2	VBATT	Battery output 3.6 V
		3	---	Keying
		4	D	Data input / output
		5	T	Clock output
		6	COM (1)	Encoder supply 0 V
		7	COM (2)	Battery output 0 V
		8	D\	Data input / output inverted
		9	T\	Clock output inverted

Table 4: AC126 EnDat 2.2 interface - Pinout

Danger!

The connections for the encoders are 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.

Information:

If an encoder with battery-backed multi-turn functionality is to be connected, pins 2 and 7 must be wired to the encoder and a 8AXB000.0000-00 battery module must be used.

Information:

Only 8BCF EnDat 2.2 cables from B&R may be used to connect the module.

7.2 Input/Output circuit diagram

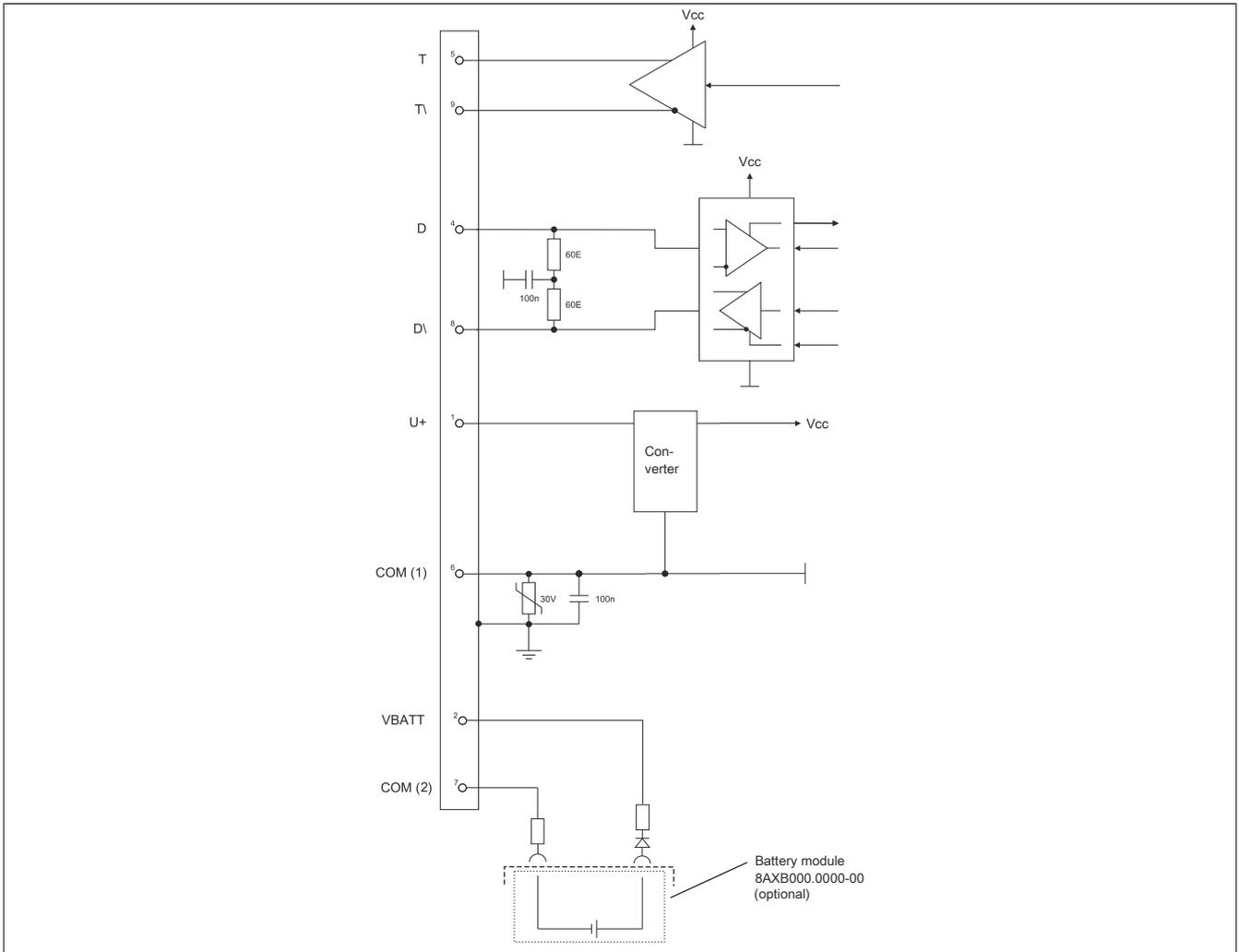


Figure 2: Input/output circuit diagram - EnDat 2.2 interface 8AC126.60-1