8AC123.60-1

1 General information

The AC123 ACOPOS plug-in module is used to optionally connect industrial standard incremental encoders and absolute encoders with a synchronous serial interface (SSI) to ACOPOS servo drives. This makes it possible to implement an electronic gearbox for which the master movement is scanned by an external encoder. If the encoder resolution is sufficiently high, it is also possible to use motor feedback for induction motors.

With incremental encoders, the maximum counter frequency is 800kHz. Single and multi-turn encoders with a maximum of 31 bits at 200 kbaud can be read as SSI absolute encoders.

Position detection is cyclically initiated by the module and is exactly synchronized with the controller clock of the ACOPOS servo drive. The input signals are monitored for both encoder types. This makes it possible to detect open circuits, conductor faults and failures in the encoder power supply.

With incremental encoders the counter frequency and distance between edges is also monitored. With absolute encoders, the parity bit is evaluated and a plausibility check carried out.

2 Order data

Model number	Short description	Figure
	Plug-in modules	
8AC123.60-1	ACOPOS plug-in module, incremental encoder and SSI absolute encoder interface	

Table 1: 8AC123.60-1 - Order data

3 Technical data

Model number	8AC123.60-1
General information	
Module type	ACOPOS plug-in module
B&R ID code	0x1067
Slot [1]	Slots 2, 3 and 4
Power consumption	Max. 7.5 W Depends on the current consumption of the connected encoder [2]
Certifications	
CE	Yes
UL	cULus E225616 Power conversion equipment
KC	Yes
Encoder inputs	
Quantity	1
Signal transmission	Differential signal transfer
Module-side connection	15-pin female DSUB connector
Status indicators	UP/DN LEDs
Electrical isolation	
Encoder - ACOPOS	Yes
Encoder monitoring	Yes
Max. encoder cable length [3]	50 m

Table 2: 8AC123.60-1 - Technical data

Model number	8AC123.60-1
Encoder power supply	
Load capacity	
5 VDC	350 mA
15 VDC	350 mA
Short-circuit proof, overload protection	Yes
Supply voltages	Internal, either 5 V or 15 V
Sense lines	
For 5 VDC	Yes, 2, compensation of max. 2 V
For 15 VDC	No
Incremental encoders	
Counter size	32-bit
Input frequency	Max. 200 kHz
Evaluation	4x
Signal form	Square wave pulse
Counter frequency	Max. 800 kHz
Reference frequency	Max. 200 kHz
Distance between edges	Min. 0.6 µs
Inputs	A, A\, B, B\, R, R\
Differential voltage inputs A, B, R	
Minimum	2.5 V
Maximum	6 V
SSI absolute encoder	
Keying	Gray, binary
Baud rate	200 kbit/s
Word size	Max. 31-bit
Differential voltage clock output - 120 Ω	
Minimum	2.5 V
Maximum	5 V
Differential voltage data input	
Minimum	2.5 V
Maximum	6 V
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

Table 2: 8AC123.60-1 - Technical data

1) The AC123 is a single encoder module. It is also possible to insert multiple encoder modules. In this case, the encoder module in the slot with the lowest number is automatically used for motor feedback.
2) The power consumption of the plug-in module can be approximated using the following formula:
   P_{Module} [W] = $P_{Encoder}$ [W] . k + 0.6 W
   The power consumed by the encoder $P_{Encoder}$ is calculated from the selected encoder supply voltage (5 V / 15 V) and the current required:
   $P_{Encoder}$ [W] = $U_{Encoder}$ [V] . $I_{Encoder}$ [A]
   The following values must be used for k:
   k = 1.2 (for 15 V encoder supply)
   k = 1.75 (for 5 V encoder supply)
3) The maximum cable length requires at least one 4x 2x 0.14 mm² + 2x 0.5 mm² cable. The sense lines must be used.

4 Status indicators

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.

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 Wiring

6.1 Pinout

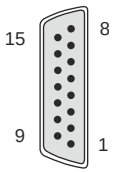
Figure	X11	Pin	Name	Function	
				Incremental mode	SSI mode
		1	A	Channel A	---
		2	A\	Channel A inverted	---
		3	B	Channel B	---
		4	B\	Channel B inverted	---
		5	RD	Reference pulse	Data input
		6	RD\	Reference pulse inverted	Data input inverted
		7	T	---	Clock output
		8	T\	---	Clock output inverted
		9	5 V out / 0.35 A	Encoder power supply 5 V	
		10	Sense 5 V	Sense 5 V	
		11	Sense COM	Sense 0V	
		12	COM (7 - 9, 13)	Encoder supply 0 V	
		13	15 V out / 0.35 A	Encoder power supply 15 V	
		14	A1	Activate encoder supply [1)]	
		15	A2	Activate encoder supply [1)]	

Table 3: AC123 incremental encoder and SSI absolute encoder interface - Pinout

1) To activate the encoder supply, pins 14 and 15 must be connected in the encoder cable connector.
Caution: To read from SSI encoders, the encoder supply also has to be activated if the encoder is supplied externally!

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 in accordance with IEC 60364-4-41 or EN 61800-5-1.

6.2 Input/Output circuit diagram

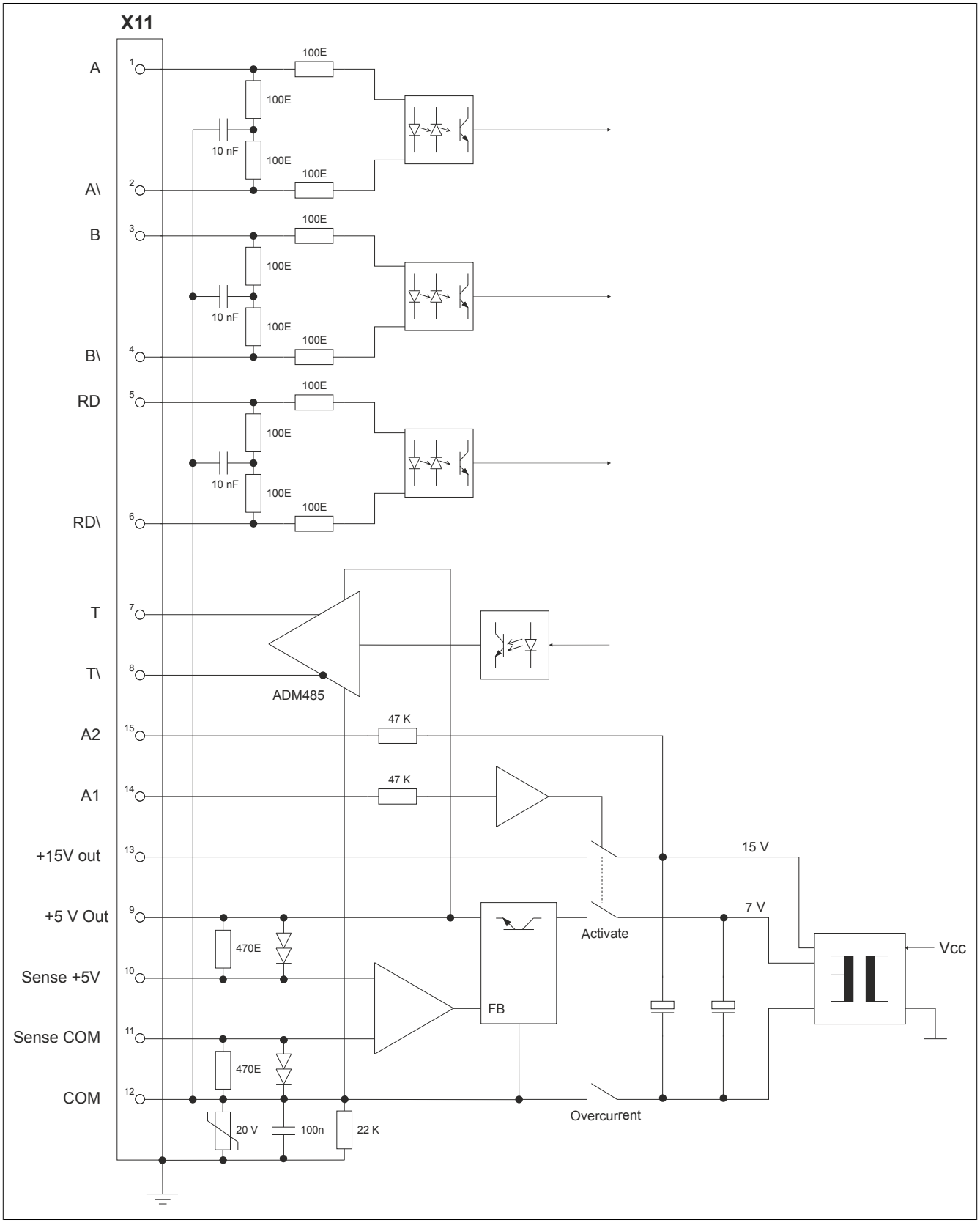


Figure 1: AC123 - Input/Output circuit diagram