

# Certification Test

eLM.Sigma5.01.Safety (Sigma-5 Safety eLM)



**Date:** \_\_\_\_\_

**Student Name:** \_\_\_\_\_

**Company Name:** \_\_\_\_\_

**Address:** \_\_\_\_\_

**Phone:** \_\_\_\_\_

**eMail:** \_\_\_\_\_

### Taking the Certification Test

Each question will have **only one correct answer**. Please record all answers on this answer sheet. The order of the questions in the test roughly follows the order of topics. All questions are equally weighted. A passing score is 92% (1 wrong).

### Returning the Certification Test

**Option 1:** Fax this page to **Yaskawa Technical Training Services** at (847) 887-7185.

**Option 2:** E-mail the answers to all questions to [training@yaskawa.com](mailto:training@yaskawa.com). Be sure to include all of the contact information listed above.

### Receiving Your Score

**You may review your answers only if a passing score is received.** When the test is taken during the training class, you will receive your score in class as soon as it can be graded.

### **Answer Sheet:**

1	_____	_____	_____	_____
2	_____	_____	_____	_____
3	_____	_____	_____	_____
4	_____	_____	_____	_____
5	_____	_____	_____	_____
6	_____	_____	_____	_____
7	_____	_____	_____	_____
8	_____	_____	_____	_____
9	_____	_____	_____	_____
10	_____	_____	_____	_____
11	_____	_____	_____	_____
12	_____	_____	_____	_____
	_____	_____	_____	_____
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## SIGMA-5 Safety eLM

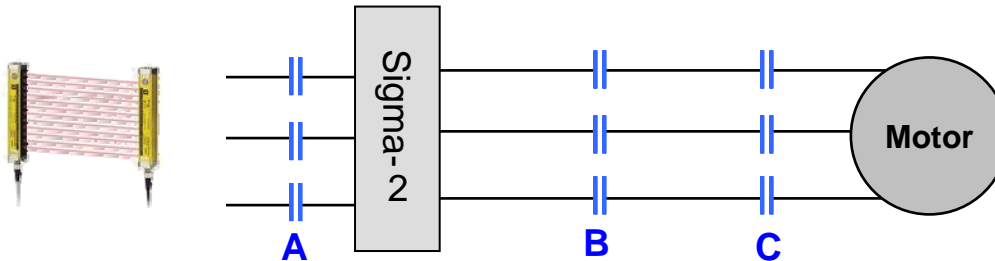
1. The Sigma-5 is certified according to which safety standard?
  - A. IEC 61131
  - B. IEC 61508
  - C. IEEE 1394
  
2. Which input(s) must be connected before the motor can enable?
  - A. /HWBB1
  - B. /HWBB2
  - C. /HWBB1 or /HWBB2
  - D. /HWBB1 and /HWBB2
  - E. EDM1
  - F. EDM2
  - G. EDM1 or EDM2
  - H. EDM1 and EDM2
  
3. What must be done if the safety feature will not be used?
  - A. Use the included JZSP-CVH03-E plug with cable
  - B. Use the included JZSP-CVH05-E shorting plug
  - C. Set parameter Pn008 to 43
  - D. The safety feature must always be wired
  
4. Under what condition does the EDM1 output open?
  - A. when either /HWBB1 or /HWBB2 are disconnected (open circuit)
  - B. when both /HWBB1 and /HWBB2 are disconnected (open circuit)
  - C. when either /HWBB1 or /HWBB2 are connected (closed circuit)
  - D. when both /HWBB1 and /HWBB2 are connected (closed circuit)
  
5. How does the motor accomplish the safety stop?
  - A. Stops by a controlled deceleration at a preset deceleration rate
  - B. Stops by removing energy; coasting to a stop or by dynamic brake
  - C. Stops by removing energy only after one complete machine cycle

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6. Consider a system with a light curtain that is connected in such a way as to remove power to the motor only, leaving the amplifier powered on.



- Which contactor(s) can be eliminated when using the safety feature with Sigma-5?
- A. Contactor A
  - B. Contactor B
  - C. Contactor C
  - D. Contactor A and B
  - E. Contactor A and C
  - F. Contactor B and C
  - G. Contactor A, B, and C
7. What safety logic is built-in for the Sigma-5 servo-on signal?
- A. Main power must be removed before the servo can enable after a safety stop
  - B. Servo will automatically re-enable after a safety stop.
  - C. Servo must be disabled before it can re-enable after a safety stop
8. Can the Sigma-5 safety feature be used to satisfy the E-STOP requirement?
- A. Yes, the Sigma-5 safety feature satisfies the requirement for all E-STOP standards
  - B. No, the Sigma-5 safety feature must never be used to as an E-STOP
  - C. It depends on the result of the safety risk analysis and the specific safety standards with which the machine must comply
9. Can the /HWBB inputs be used instead of wiring a contactor for main power?
- A. Yes, the main contactor (contactor A in diagram) is no longer required
  - B. No, the main contactor (contactor A in diagram) is still required
  - C. It depends on the result of the safety risk analysis and the specific safety standards with which the machine must comply

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10. For how long must the /HWBB signals be removed before a safety stop condition is set?
- A. 0.5  $\mu$ s
  - B. 20  $\mu$ s
  - C. 500  $\mu$ s
  - D. 20 ms
  - E. 500 ms
  - F. 10 sec
11. How long does it take the motor to turn off after a safety stop condition is set?
- A. 0.5  $\mu$ s
  - B. 20  $\mu$ s
  - C. 500  $\mu$ s
  - D. 20 ms
  - E. 500 ms
  - F. 10 sec
12. Normally the redundant inputs /HWBB1 and /HWBB2 are connected and disconnected simultaneously. If only one input signal is connected, the Sigma-5 will fault out with Alarm A.Eb1 after how much time?
- A. 0.5  $\mu$ s
  - B. 20  $\mu$ s
  - C. 500  $\mu$ s
  - D. 20 ms
  - E. 500 ms
  - F. 10 sec