

Certification Test

Sigma FSP eLearning



Taking the Certification Test

A demo unit may be helpful, but is not required to take this test. Please record all answers on this answer sheet. Multiple-choice questions have **only one** correct answer unless specifically noted. A passing score is 90% (3 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 and **all** contact info below to training@yaskawa.com.

Receiving Your Score

You may review your answers only if a passing score is received. Contact Technical Training Services via email or phone to receive your score.

Answer Sheet:

1 _____	9 _____	17 _____	25 _____
2 _____	10 _____	18 _____	26 _____
3 _____	11 _____	19 _____	27 _____
4 _____	12 _____	20 _____	28 _____
5 _____	13 _____	21 _____	29 _____
6 _____	14 _____	22 _____	
7 _____	15 _____	23 _____	
8 _____	16 _____	24 _____	

Contact Information:

Name: _____ Title: _____

Company: _____ Email: _____

Address: _____

Phone Number: _____ Fax number: _____

Supervisor's Name/ Title: _____

Name of Yaskawa Rep: _____

Test Date: _____

FlexWorks New Project Wizard

1. In the Basic Selection screen of the wizard, what control method should be selected for the Sigma FSP to be controlled by a program written in FlexWorks?
 - A. Programming
 - B. Position Control
 - C. Yaskawa Option Board

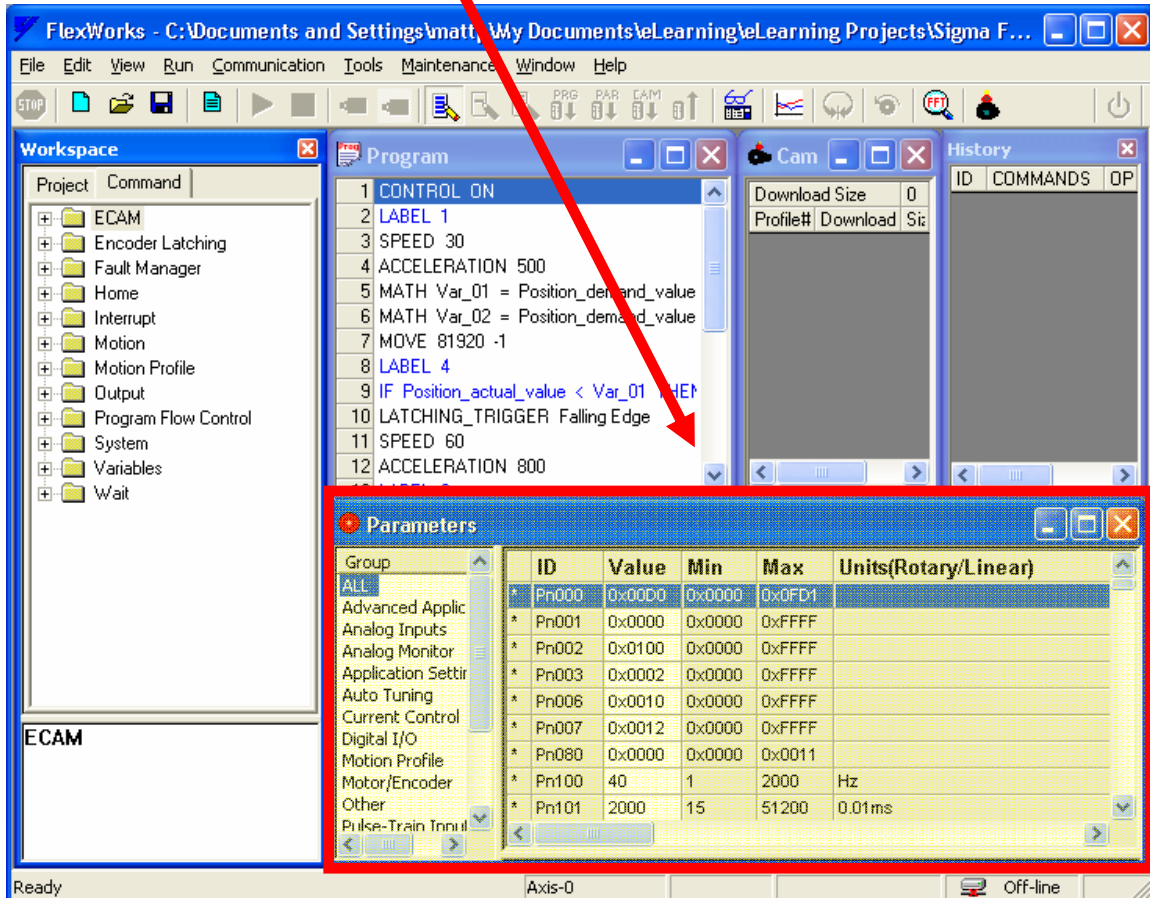
2. What are the default programming units for position?
 - A. Inches
 - B. mm
 - C. 0.001 Inch
 - D. 0.001 mm
 - E. Encoder Counts

3. Which parameter sets the level of position error that is acceptable for a positioning move to be complete?
 - A. Pn2C0: Motion End Window
 - B. Pn2C4: Pulse Train Synchronized Window
 - C. Pn500: Position Completed Width

4. Can the Home Switch input be assigned to the same input as P-OT or N-OT?
 - A. Yes
 - B. No

5. What is the default function of the FAST output **before it is programmed**?
 - A. Acts like a zone or PLS output with a response time of 125 microseconds
 - B. Works like the /COIN output (turns on when position error is low)
 - C. Latches the position of the motor's encoder within 62.5 microseconds

6. When online are the parameter values displayed in the FlexWorks "Parameters" window always the same as the parameter values stored in the Sigma FSP?
- A. Yes
 - B. No



7. After finishing the wizard and going online, what action is required to send the parameters to the Sigma FSP?
- A. None; The parameters are sent automatically when going online
 - B. Choose "Upload Project"
 - C. Choose "Download Parameters"
 - D. Choose "Download Program"

Indexing

Move_D

8. Assuming the SPEED has been set to 20, what needs to be entered in the "Motion Time" argument for the motor to move at this speed?

- A. 20
- B. 5
- C. 0
- D. -1
- E. -20

MOVE_D

Distance	Motion Time [ms]
100000000	

PROGRAM Cancel

9. What is the result of the following MOVE_D command? (Assume no errors are produced when running the program.)

- A. Moves the motor 4000 User Units and waits 100ms after the move is done
- B. Moves the motor 4000 User Units in 100ms.
- C. Waits 100ms and then moves the motor 4000 User Units

MOVE_D

Distance	Motion Time [ms]
4000	100

PROGRAM Cancel

10. If the motor is at a position of 350 (*Position_actual_value* = 350), what two commands are possible to move it back to position 0 (*Position_actual_value* = 0) in exactly one second?

- A. MOVE_D 350 1000 or MOVE_D 0 1000
- B. MOVE_D -350 1000 or GO_D 0 1000
- C. MOVE_D 0 1000 or GO_D 0 1000
- D. GO_D 350 1000 or MOVE_D 0 1000
- E. GO_D -350 1000 or MOVE_D 0 1000

11. What command is used to set the deceleration rate to 2000?

- A. DECELERATION 2000
- B. ACCELERATION 2000
- C. SET_VAR Deceleration 2000

12. What command is used to set the profile speed to 1200 before using a MOVE_D command?

- A. SPEED 1200
- B. SLIDE 1200
- C. SLIDE_ANALOG 1200
- D. SET_VAR Speed_Reference 1200

13. What must be done to ensure that the program resides in the Sigma FSP?
- A. Nothing: While online the program you see in FlexWorks always resides in the Sigma FSP
 - B. Use "Download Program"
 - C. Use "Download Parameters" and then "Reset Drive"

14. Given the following program, where should a LOOP command be inserted so that the motor does 3 move-delay sequences?

- A. Between 01 and 02
- B. Between 02 and 03
- C. Between 03 and 04
- D. Between 04 and 05
- E. After 05

01	CONTROL	ON
02	LABEL	1
03	MOVE_D	4000 100
04	DELAY	600
05	END	

15. For the above situation, what should the LOOP command be?

- A. LOOP 1 2 LABEL 1
- B. LOOP 1 2 1
- C. LOOP 1 3 1
- D. LOOP 1 3 LABEL 1

16. What parameter is used to cause the program to execute on power-up?

- A. <write parameter number on answer sheet>

Registration

17. What capability is implemented by registration?

- A. The speeds of multiple moves are registered in an array
- B. The move distance is changed based on sensor input
- C. The dwell time between moves is changed based on a variable
- D. All of the above

18. Which of the following inputs can be used for registration?

- | | | |
|------------|------------|------------|
| A. Input 0 | D. Input 3 | G. Input 6 |
| B. Input 1 | E. Input 4 | H. Input 7 |
| C. Input 2 | F. Input 5 | I. Input 8 |

19. How long does it take to latch the position of the encoder?

- A. 62.5 microseconds
- B. 125 microseconds
- C. 2 milliseconds

20. What command is used to enable the registration input ("arm the latch")?

- A. ARM_LATCH
- B. LATCHING_TRIGGER
- C. REGISTRATION_DISTANCE
- D. Latched_motor_postion

21. What condition should be checked to detect when the encoder position has been latched?
- A. Latched_position_ready = 1
 - B. Latched_motor_position > 0
 - C. Latched_master_position > 0
 - D. Latched_encoder_position = 1
22. What command will cause the motor to move an additional 2300 User Units past the latched position of the motor?
- A. ARM_LATCH 2300
 - B. LATCHING_TRIGGER 2300
 - C. REGISTRATION_DISTANCE 2300
 - D. Latched_motor_position = 2300
 - E. Latched_motor_position + 2300
 - F. Latched_motor_position 2300

Consider the following program for the next 2 questions.

23. This program will not accomplish registration. Which line has the error?

- A. Line 01
- B. Line 03
- C. Line 06
- D. Line 07
- E. Line 08
- F. Line 09

```
01 CONTROL ON
02 LABEL 1
03 SPEED 30
05 ACCELERATION 500
06 MOVE_D 81920 -1
07 LATCHING_TRIGGER Falling Edge
08 WAIT_VAR Latched_position_ready = 1
09 REGISTRATION_DISTANCE 2300
10 WAIT_EXACT -1
11 DELAY 500
12 LOOP 1 1000 1
13 END
```

24. Assume the above error has been corrected. If the speed should change after the sensor latches the motor position, where should that SPEED command be inserted for fastest performance?
- A. Between 05 and 06
 - B. Between 06 and 07
 - C. Between 08 and 09
 - D. Between 10 and 11

Blended Moves

Consider the following program for the next 5 questions.

The program should:

- i. Move the motor at a speed of 30 User Speed Units
- ii. When the motor is located 2600 User Units from the start of the move, the speed should change to 1300
- iii. Then if input 01 turns on within 1 second after the first speed change, the speed should reduce to 270

```
01 CONTROL ON
02 LABEL 1
03 SPEED 30
04 ACCELERATION 500
05 MOVE 81920 -1
06 SPEED 1300
07 WAIT_INPUT 1 = 0 1000
08 SPEED 270
09 WAIT_EXACT -1
10 DELAY 500
11 LOOP 1 1000 1
12 END
```

The program has one error and two commands are missing.

25. With this program as shown, the speed of the move never changes at all.

This is due to a programming error. What line has the error?

- | | | |
|------------|------------|------------|
| A. Line 01 | C. Line 05 | E. Line 07 |
| B. Line 03 | D. Line 06 | F. Line 08 |

Assume the programming error has been corrected when answering the following questions.

26. Var_01 should contain the expected position of the motor when it is located 2600 User Units from the start of the move. What command accomplishes this?

- A. SET_VAR Var_01 2600
- B. SET_VAR Var_01 Position_actual_value + 2600
- C. MATH Var_01 = 2600
- D. MATH Var_01 = Position_actual_value + 2600
- E. WRITE_VAR Var_01 2600
- F. WRITE_VAR Var_01 Position_actual_value + 2600

27. Where should the above command be inserted?

- A. Between 04 and 05
- B. Between 05 and 06
- C. Between 06 and 07
- D. Between 08 and 09

28. What command will cause the speed to change to 1300 when the motor is located 2600 user units from the start of the move?

- A. SET_VAR Var_01 Position_actual_value + 2600
- B. MATH Var_01 = Position_actual_value + 2600
- C. WRITE_VAR Var_01 Position_actual_value + 2600
- D. WAIT_VAR Position_actual_value >= Var_01
- E. WAIT_VAR Position_actual_value <= Var_01
- F. WAIT_VAR Var_01 >= Position_actual_value
- G. WAIT_VAR Var_01 >= 2600
- H. WAIT_VAR Position_actual_value >= 2600

29. Where should this command be inserted?

- A. Between 05 and 06
- B. Between 06 and 07
- C. Between 07 and 08
- D. Between 10 and 11