

Certification Test

eLM.SigmaTrac.01 – 07: SigmaTrac eLearning/Sales



NOTE: This test covers the topics in eLM.SigmaTrac.01, eLM.SigmaTrac.02, eLM.SigmaTrac.03, eLM.SigmaTrac.05, eLM.SigmaTrac.06, eLM.SigmaTrac.07.

Name: _____ Title: _____
Company: _____ Email: _____
Address: _____
Phone Number: _____ Fax number: _____
Supervisor's Name/ Title: _____
Name of Yaskawa Rep: _____
Test Date: _____

Taking the Certification Test

No demo unit is needed to take this test. Please record all answers on this answer sheet.
Multiple-choice questions have **only one** correct answer. A passing score is 85% (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. When the test is taken during class, you will receive your score as soon as it can be graded. When taken as a CLEP test or pre-requisite enrollment test, your score will be automatically emailed to you when the test is graded.

Answer Sheet:

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

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Overview

1. What is the maximum acceleration of the Sigma Trac linear motor?
A. 1 G C. 3G E. 5 G
B. 2 G D. 4 G
2. What parameter must be set in the Sigma II SGDH amplifier when using Sigma Trac?
A. Pn280 (Linear Scale Pitch) C. Pn201 (Pulse Output Resolution)
B. Pn202 (Electronic Gear Ratio)
3. What rotary switch must be set to position "3" in the LEGEND SGDg amplifier when using Sigma Trac?
A. Switch 1 B. Switch 2 C. Switch 3

Sigma Trac Design

4. Which constant should be used when comparing competing linear motors?
A. KT B. KM C. KF D. KL
5. Which are benefits of caged ball bearing technology?
A. Better lubrication retention C. Longer life
B. Less noise D. All of the above
6. Is a serial converter built into the Sigma Trac design, or is it necessary to order one when using Sigma Trac?
A. Built In B. Order One
7. What is the pitch of the Renishaw linear encoder scale used with Sigma Trac?
A. 78 nanometers C. 20 nanometers
B. 20 microns D. 78 microns
8. What is the highest resolution possible with Sigma Trac?
A. 78 nanometers D. 78 microns
B. 20 microns E. 8192 counts per revolution
C. 20 nanometers
9. What is the purpose of Yaskawa's sub teeth technology?
A. Creates a patented magnetic monopole
B. Cancels the force of magnetic attraction between the iron core and magnet track
C. Reduces cogging force
D. Allows Sigma Trac to take a bite out of the competition

Sigma Trac vs. Ballscrew

10. Of the two types of ballscrews, which has the best performance?
A. Rolled B. Ground C. Ball Bearing D. Recirculating
11. Why can it be a problem to have a ballscrew positioning system with long stroke?
A. Torque is limited due to the diameter of the screw.
B. Speed is limited due to the resonant frequency.
C. Backlash is increased due to the bandwidth
12. Which is true about the initial purchase price of a precision ground ballscrew positioning system vs. Sigma Trac?
A. The precision ground ballscrew system is 20% more expensive than Sigma Trac.
B. The Sigma Trac is \$20 more expensive than the precision ground ballscrew system.
C. The Sigma Trac is 20% more expensive than the precision ground ballscrew system.
D. Both systems cost about the same
13. What is the bandwidth of the Sigma Trac?
A. 5-15 kHz B. 1.6 GHz C. 40 Hz D. 60 Hz
14. Which of the following are benefits to using Sigma Trac instead of a precision ground ballscrew positioning system?
A. Lower backlash, power loss, and maintenance
B. Higher rigidity and bandwidth
C. Higher speed, acceleration, resolution, and accuracy
D. Higher machine throughput and machine life
E. All of the above

Sigma Trac Technology

15. There are many mechanical parts in a linear motor system, but a linear motor technically consists of what **two** parts?
- A. Linear encoder and magnet track
 - B. Moving coil and magnet track
 - C. Linear bearings and moving coil
 - D. Linear bearings and magnet track
 - E. All of the above
16. What types of Yaskawa linear motors are available?
- A. G,F,T
 - B. F,L,H
 - C. C,L,R
 - D. C,I,T
 - E. R,N,T
17. What sets the coreless G-Type apart from the others?
- A. Sub Teeth technology and lowest cost
 - B. Highest acceleration for light loads
 - C. Highest power density and force output
 - D. High cogging force and low resolution
18. What sets the flat iron core F-type linear motor apart from the others?
- A. Sub-teeth technology and lowest cost
 - B. Highest acceleration for light loads
 - C. Highest power density and force output
 - D. High cogging force and low resolution
19. What sets the balanced iron core T-type linear motor apart from the others?
- A. Sub-teeth technology and lowest cost
 - B. Highest acceleration for light loads
 - C. Highest power density and force output
 - D. High cogging force and low resolution
20. What linear motor is used in the Sigma Trac?
- A. Coreless G-type
 - B. Flat Iron Core F-type
 - C. Balanced Iron Core T-type

Sigma Trac Myths

21. Why isn't the Sigma Trac as expensive as it may seem to be?
- A. The initial purchase price for a Sigma Trac is actually less than a comparable ground ballscrew system.
 - B. Manufacturers and distributors are offering mail-in rebates on Sigma Trac products.
 - C. Greater initial cost is offset by ease of installation and maintenance, and performance benefits.
22. Why doesn't Sigma Trac jump during initialization?
- A. Sigma Trac does a very slow initialization move that is hardly noticeable.
 - B. Initialization is not necessary because Sigma Trac linear motors use an absolute encoder
 - C. Sigma Trac uses Hall-Effect sensors to detect the magnetic pole location at power up.
 - D. Sub-teeth technology cancels the cogging force, manifested as a jumping motion.
23. Which are valid methods to control the transfer of heat to the payload?
- A. Use a more efficient linear motor coil
 - B. Use thermal insulation
 - C. Use air or liquid cooling
 - D. All of the above
24. What is true about Sigma Trac?
- A. The iron core is not attracted to the magnet track
 - B. The iron core can accelerate light loads faster than a coreless motor
 - C. Sigma track can achieve position stability in the nanometer range