

Title: Fagor Absolute Encoder Set-up Guide

Product(s): Sigma-5, Sigma-7, SigmaWin+ ver. 7,
SigmaTrac II, SGL Series Linear Motors

DOC. NO. AN.MTN.16

INTRODUCTION

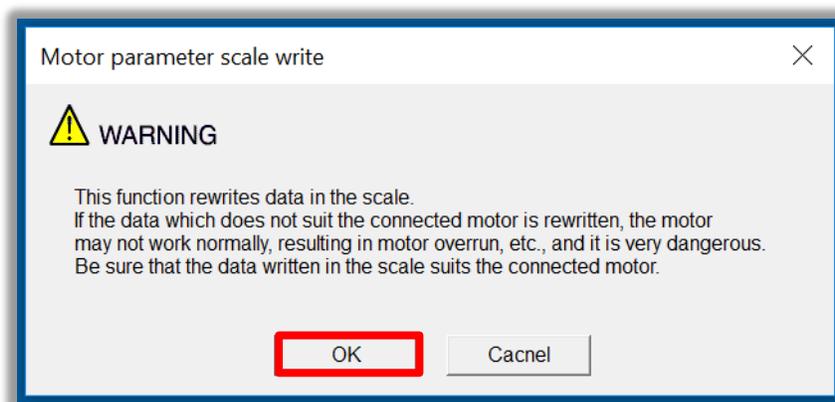
Follow the steps below to get the linear motor up and running with the Fagor absolute linear encoder. The process below requires use of SigmaWin+ ver. 7 which can be downloaded from yaskawa.com.

PRODUCT SETUP

1. When the encoder is powered, ensure that the LED indicator display is either green (best alignment) or blinking green (correct alignment). If not, adjust according to the manufacturer's specification. Refer to the Fagor documentation for the exact specification, in this example the gap specification is 0.6 ± 0.2 mm.



2. Once SigmaWin+ is up and running and is connected to the amplifier, import the correct motor parameter file by selecting "Motor parameter scale write" under the "Encoder Setting" menu. Select "OK".

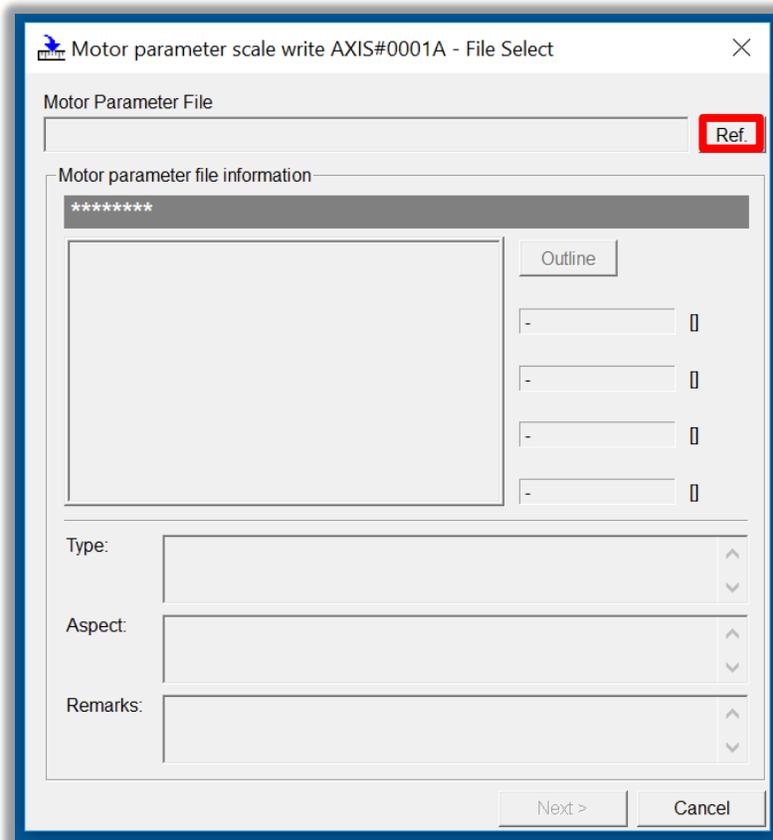


Title: Fagor Absolute Encoder Set-up Guide

Product(s): Sigma-5, Sigma-7, SigmaWin+ ver. 7,
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DOC. NO. AN.MTN.16

- a. Click the “Ref.” button, then select the appropriate .mcf file to import based on the connected motor.

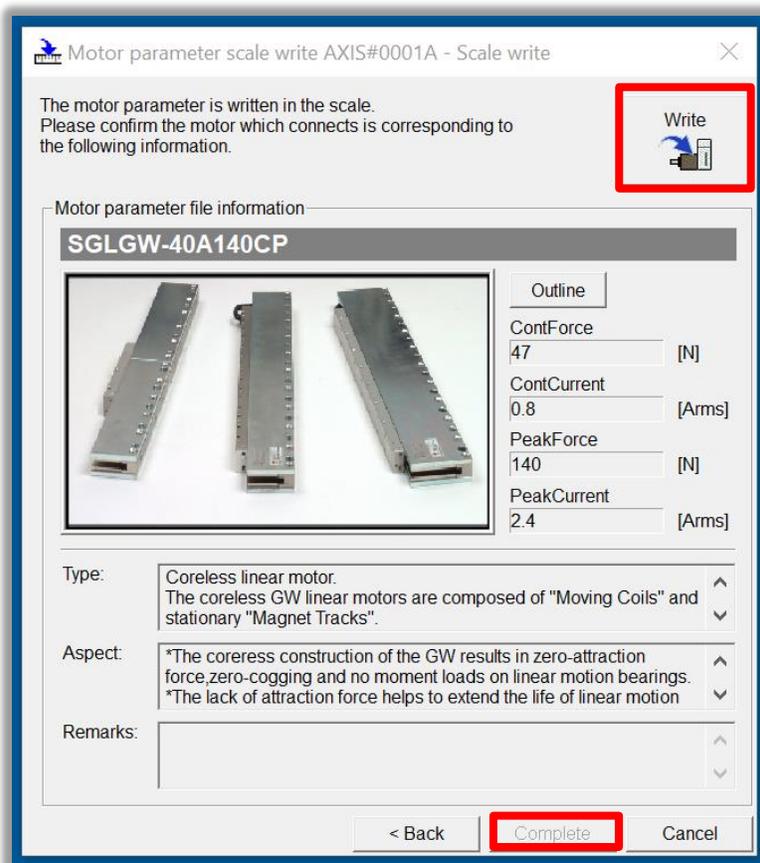


Title: Fagor Absolute Encoder Set-up Guide

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DOC. NO. AN.MTN.16

- b. Click the “Write” button, Click “Yes” in the Scale write pop-up window, then click the “Complete” button once the parameter write is completed.



- c. Cycle power to the SERVOPACK.
3. Since this encoder does not use hall sensors, change parameter Pn080.0 selection to “1: Disables selection” and write the parameter to the SERVOPACK.

Pn080.0	Hall Sensor Selection	–	1 : Disables selection
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- a. Cycle power to the SERVOPACK or perform software reset.

Title: Fagor Absolute Encoder Set-up Guide

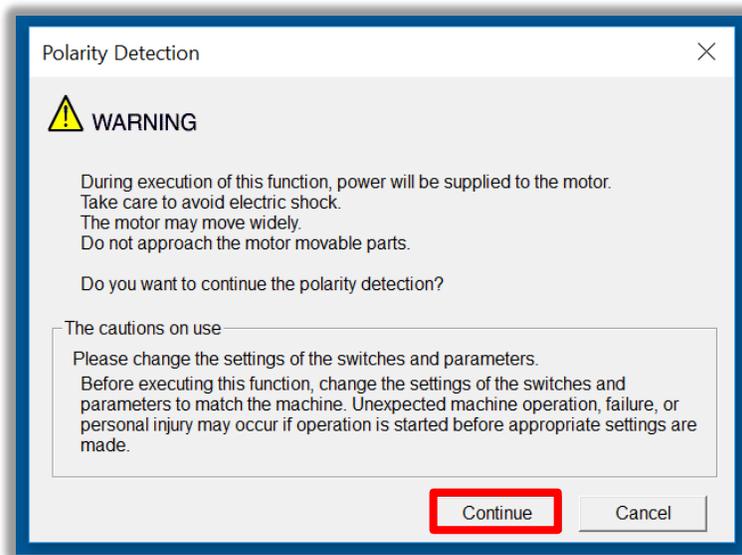
Product(s): Sigma-5, Sigma-7, SigmaWin+ ver. 7, SigmaTrac II, SGL Series Linear Motors

DOC. NO. AN.MTN.16

- Linear encoder resolution is detected automatically. Open up the “Product Information” tab under the “Basic Functions” menu to confirm that the encoder resolution was detected. For example, the resolution detected was 0.009766 [um/Pulse].

Motor	Model/Type	Number	Manufacturing Date	SW Ver.	Remarks
1	Motor	SGLGW-40A140CP	1995.95		[Resolution] : 0.009766 [um/Pulse] [Encoder type] : absolute
	Encoder	JZDP-L2A2-252	2017.10	0038	

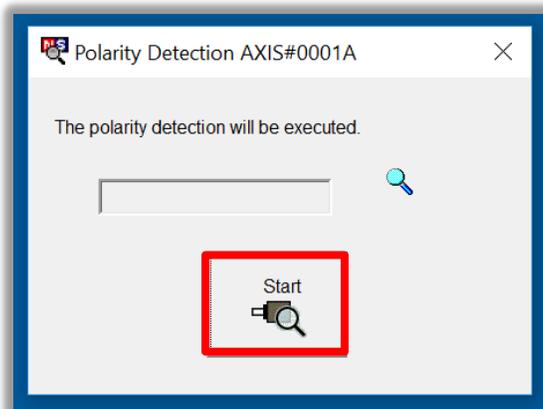
- Run “Polarity detection” under the “Encoder Setting” menu. If the Polarity detection option is grayed out, disconnect and search again for the SERVOPACK. Then reconnect with SigmaWin+ and the “Polarity detection” menu option should be available. Click “Continue” in the pop-up window.



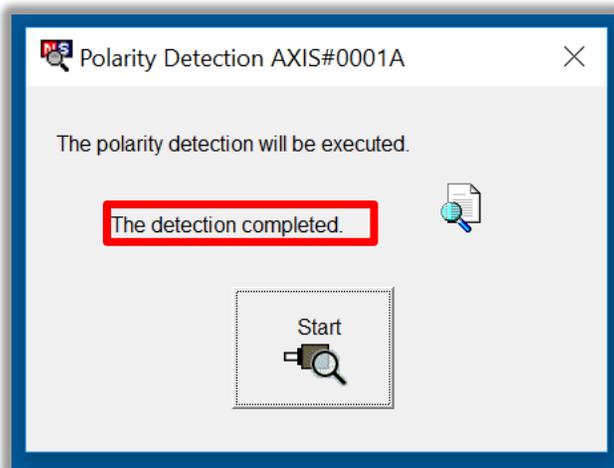
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DOC. NO. AN.MTN.16

- a. Click the “Start” button to begin polarity detection.



- b. Cycle Power to the SERVOPACK after polarity detection has completed. If the motor is jogged before cycling power, an A.C22 alarm will appear after a power cycle and polarity detection will need to be executed again.



Note: If Pn080.1 (leading phase) is written to, Pn587 will need to be set to 1 to enable re-detecting polarity otherwise an A.C22 alarm will occur upon power cycle of the drive.

Title: Fagor Absolute Encoder Set-up Guide

Product(s): Sigma-5, Sigma-7, SigmaWin+ ver. 7,
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DOC. NO. AN.MTN.16

6. The motor and encoder should be operating properly. If any issues occur, be sure to check the troubleshooting appendix at the end of this document for more information. .

The next section describes application setup notes

Title: Fagor Absolute Encoder Set-up Guide

Product(s): Sigma-5, Sigma-7, SigmaWin+ ver. 7, SigmaTrac II, SGL Series Linear Motors

DOC. NO. AN.MTN.16

APPLICATION SETUP NOTES

1. Setting Pn281

- The setup of Pn281 requires knowing the Pitch of the encoder.
- The Pitch is described in the Peripheral Device Selection Manual, Yaskawa.com document number SIEPS80000132.

i. <https://www.yaskawa.com/downloads/search-index/details?showType=details&docnum=SIEPS80000132>

Output Signal	Manufacturer	Linear Encoder Type	Model			Linear Encoder Pitch ^{*1} [μm]	Resolution [nm]	Maximum Speed ^{*2} [m/s]	Support for Polarity Sensor Input	Application to Linear Servo-motors	Application to Fully-Closed Loop Control	
			Scale	Sensor Head	Relay Device between SERVOPACK and Linear Encoder							
Encoder for Yaskawa's Serial Interface ^{*3}	Renishaw plc	Exposed	EL36Y□□050F□□□		-	12.8	50	100	-	✓	✓	
			EL36Y□□100F□□□		-	25.6	100	100	-	✓	✓	
			EL36Y□□500F□□□		-	128	500	100	-	✓	✓	
			RL36Y□□050□□□		-	12.8	50	100	-	✓	✓	
			RL36Y□□001□□□		-	0.256	1	3.6	-	✓	✓	
	RLS d.o.o.	Exposed	LA11YA Series			-	2,000	976.5	7.00	-	✓	✓
						-	2,000	488.2	3.65	-	✓	✓
						-	2,000	244.1	1.82	-	✓	✓
	Fagor Automation S. Coop.	Exposed		L2AK208		-	20	78.1	8.0	-	✓	✓
				L2AK211		-	20	9.8	8.0	-	✓	✓
		Sealed		LAK209		-	40	78.1	3.0	-	✓	✓
				LAK212		-	40	9.8	3.0	-	✓	✓
				S2AK208		-	20	78.1	3.0	-	✓	✓
				SV2AK208		-	20	78.1	3.0	-	✓	✓
				G2AK208		-	20	78.1	3.0	-	✓	✓
				S2AK211		-	20	9.8	3.0	-	✓	✓
				SV2AK211		-	20	9.8	3.0	-	✓	✓
G2AK211		-	20	9.8	3.0	-	✓	✓				
Canon Precision Inc.	Exposed		PS90-20160 glass	PH03-36E00	-	128	62.5	12.8	-	✓	✓	

✓: Applicable

*1. These are reference values for setting SERVOPACK parameters. Contact the manufacturer for actual linear encoder scale pitches.

- ii.
- As shown in the above screenshot, the pitch for Fagor L2AK211 is **20**.

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DOC. NO. AN.MTN.16

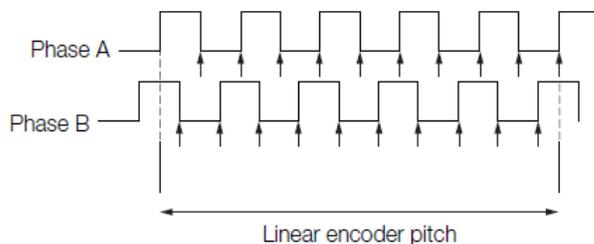
- The upper limit of Pn281 is described in the user's manual with this equation:

$$\text{Upper limit of Pn281} = \frac{\text{Linear Encoder Pitch} * 100}{\text{Pn385}} \times 72$$

- An example setting of Pn281 is also given:

Example Setting Example
 Correct setting for a linear encoder pitch of 20 μm and a maximum motor speed of 5 m/s (Pn385 = 50): Pn281 = 28 (edges/pitch)
 Incorrect setting: Pn281 = 29 (edges/pitch) (An A.041 alarm would be output.)

Example Pulse Output Example
 When Pn281 = 20 (20-edge output (5-pulse output) per linear encoder pitch)



2. Setting Pn282
 - a. This parameter is **ignored** when using Fagor SigmaLink encoders.
3. Setting Pn385
 - a. As shown in the example above (for setting Pn281), the value of **50** equates to **5 meters per second**.

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DOC. NO. AN.MTN.16

Appendix: Troubleshooting

- **A.070** alarm: Run the “Reset Motor Type Alarm” function under the “Troubleshooting” menu. Run a Software Reset after resetting the motor type alarm
- **A.040** alarm: The drive requires a motor parameter file to be imported. Import motor parameter following the instructions in **step 2** of the instructions above.
- **A.041** alarm: Set Pn281 and Pn385 to appropriate values to clear the alarm using the equation below. See the Sigma-7 series AC Servo Drive Product Manual for further details.

The setting range depends on the Servomotor’s maximum speed (Pn385) and the linear scale pitch (Pn282).* You can calculate the upper limit of the setting of Pn281 with the following formula.

$$\text{Upper limit of Pn281} = \frac{\text{Linear Encoder Pitch} \times 100}{\text{Pn385}} \times 72$$

- **A.C21** alarm: Follow the instructions given in **step 3** above.
- **A.C22** alarm: Run “Polarity detection” as described in **step 5** above.
 - If Polarity Detection cannot start, follow the guidance that appears in SigmaWin, but additionally:
 - Check Alarm History and address alarms other than A.C22.
 - Disable P-OT and N-OT (Pn50A, Pn50B).
 - If Polarity Detection fails, try the following, one at a time:
 - Increase load level Pn490, according to the amount of load on the linear stage.
 - Alternatively, disconnect the load, and try Polarity Detection with Pn490 at a default value.
 - Increase Force Limits, Pn483 & Pn484.