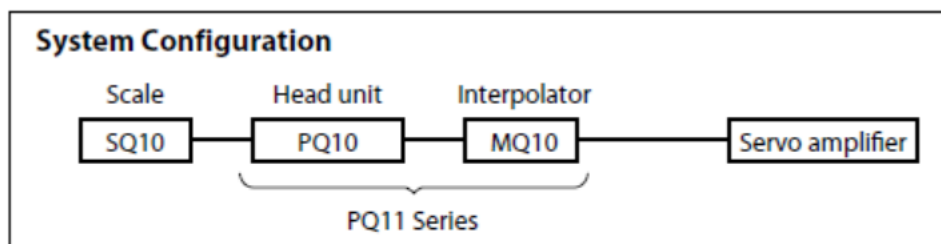


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Follow the steps below to get the linear motor up and running with the Magnescale PQ11 Series encoder. The process below requires use of SigmaWin+ ver. 7 which can be downloaded from yaskawa.com. Below is a system diagram depicting the layout of the scale, head unit, interpolator, and amplifier.



The encoder cable that connects the SmartScale Interpolator (MQ10) to the Yaskawa SERVOPACK must first be created by the user. The following components are needed to make this cable:

1. Plug: MDR10114-300PE (3M)
2. *Shell: MDR10314-52F0-008 (3M)
3. **Yaskawa Flexible Encoder Cable: JZSP-CMP10-XX-E (where XX denotes length in meters: 03, 05, 10, 15, 20)



*The shell portion of this connector must use a latching mechanism rather than screws since there is not enough spacing between the connector and the Mitutoyo connector.

**Other encoder cable option: Yaskawa Flexible Raw Encoder Cable: JZSP-CSP29-XX-E & Yaskawa SERVOPACK Connector Kit JZSP-CMP9-1-E

Using the pin-out provided in the PQ11 Series Instruction Manual and in the Yaskawa Sigma 7 Technical Supplement, the female end of the JZSP-CMP10-XX-E encoder cable will be replaced by the plug and shell depicted above.

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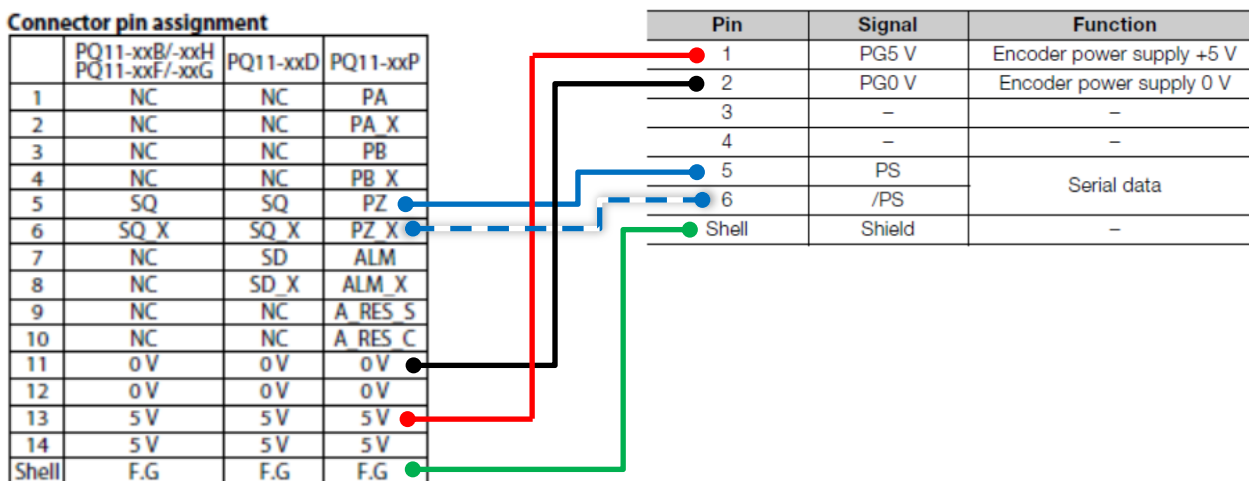
Magnescale Pin-Out

Connector pin assignment

	PQ11-xxB/-xxH PQ11-xxF/-xxG	PQ11-xxD	PQ11-xxP
1	NC	NC	PA
2	NC	NC	PA X
3	NC	NC	PB
4	NC	NC	PB X
5	SQ	SQ	PZ
6	SQ X	SQ X	PZ X
7	NC	SD	ALM
8	NC	SD X	ALM X
9	NC	NC	A RES S
10	NC	NC	A RES C
11	0V	0V	0V
12	0V	0V	0V
13	5V	5V	5V
14	5V	5V	5V
Shell	F.G	F.G	F.G

Yaskawa Encoder Pin-Out

Pin	Signal	Function
1	PG5 V	Encoder power supply +5 V
2	PG0 V	Encoder power supply 0 V
3	-	-
4	-	-
5	PS	Serial data
6	/PS	
Shell	Shield	-



Note: Either pin 11 or 12 needs to be wired to pin 2 of the encoder connector. The same is true for pins 13 & 14 wiring to pin 1 of the encoder connector. Therefore, only 4 connections need to be made as well as ensuring that the shield is ground to the shell.

Once all cabling is correct, proceed to the following guide to set-up the encoder.

SigmaWin+ ver. 7

1. When the SmartSCALE interpolator is powered, ensure that the LED indicator displays "FINE" meaning that the clearance between the scale and head unit is correct. If not, adjust according to the manufacturer's specification. Refer to the Magnescale documentation for the exact specification, in this example the gap specification is 0.185 ± 0.1 mm.

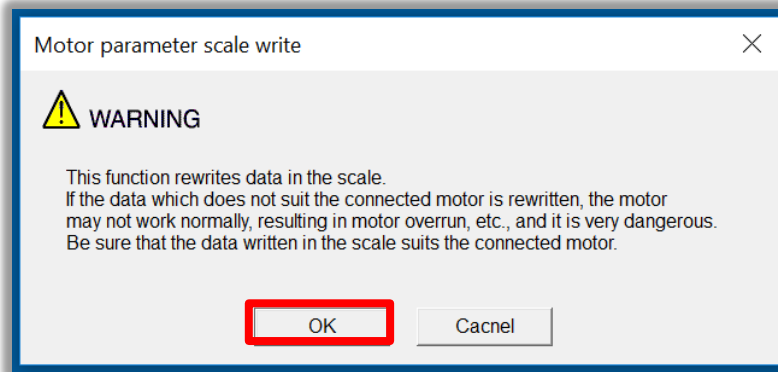


2. Once SigmaWin+ is up and running and is connected to the amplifier, import the correct motor parameter file by selecting "Motor parameter scale write" under the "Encoder Setting" menu. Select "OK".

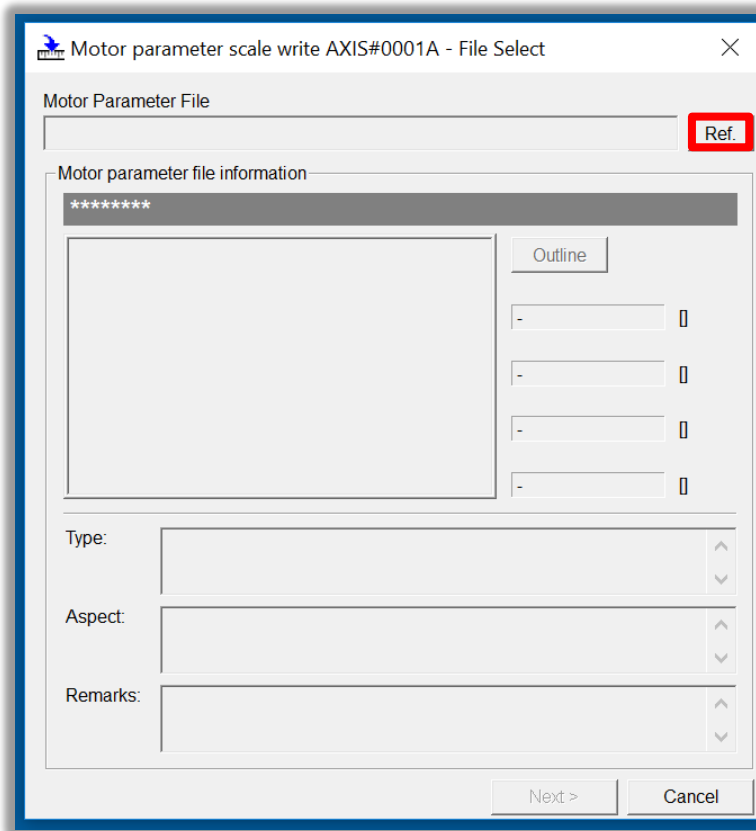
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- a. Click the "Ref." button, then select the appropriate .mcf file to import based on the connected motor.

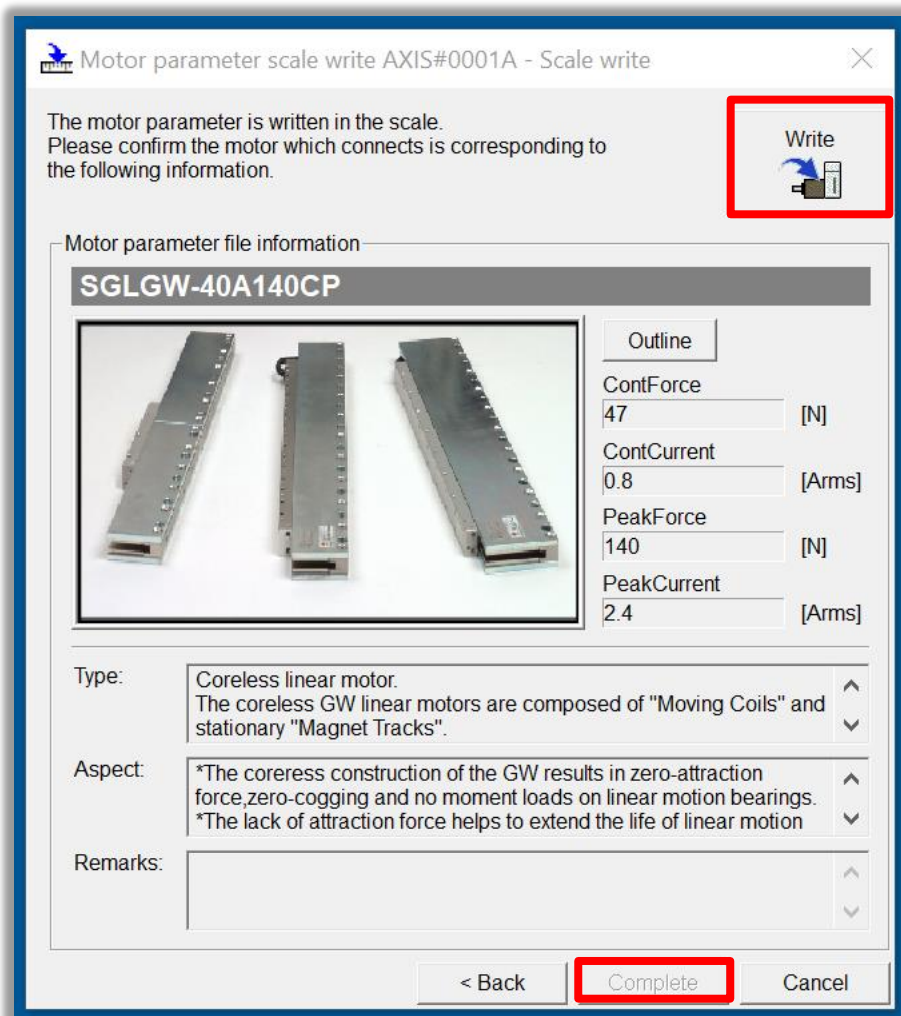


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- b. Click the "Write" button, Click "Yes" in the Scale write pop-up window, then click the "Complete" button once the parameter write is completed.



- c. Cycle power to the SERVOPACK.
3. The next step depends on the system.
 - If the system has a PQ11 Series encoder without a pole sensor (PQ11-xxF), advance to section 3a.

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- If the system has a PQ11 Series encoder with a pole sensor (PQ11-xx**G**) but the pole sensor will not be used (pole detect will be used), advance to section 3a.
- If the system has a PQ11 Series encoder and will use the pole sensor (PQ11-xx**G**) for pole detection, advance to section 3b.
- a. 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
---------	-----------------------	---	------------------------

- b. Since this encoder uses hall sensors, change parameter Pn080.0 selection to “0: Enables selection” and write the parameter to the SERVOPACK.

Pn080.0	Hall Sensor Selection	–	0 : Enables selection
---------	-----------------------	---	-----------------------

- c. Cycle power to the SERVOPACK or perform software reset.
4. Linear encoder pitch should be 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 0.048828 [um/Pulse].

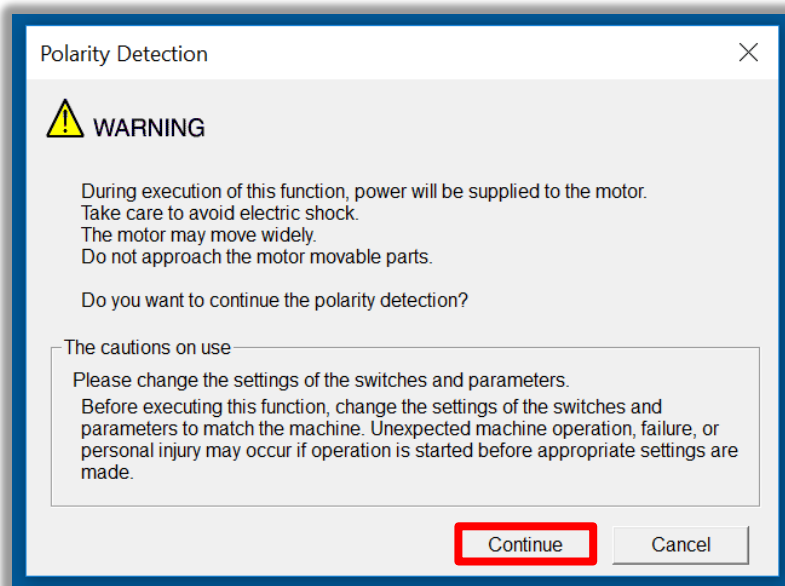
Motor	Model/Type	Number	Manufacturing Date	SW Ver.	Remarks
1	Motor	SGLGW-40A140CP	1995.95		[Resolution] : 0.048828 [um/Pulse] [Encoder type] : incremental
	Encoder	JZDP-S031-252	*****	2014.10	

- 5. If hall sensors were enabled as described in section 3b, skip this step. If hall sensors were disabled as described in section 3a, 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.

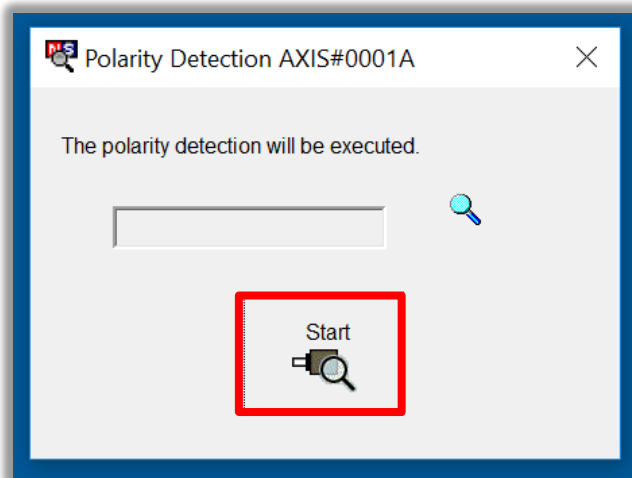
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- a. Click the "Start" button to begin polarity detection.

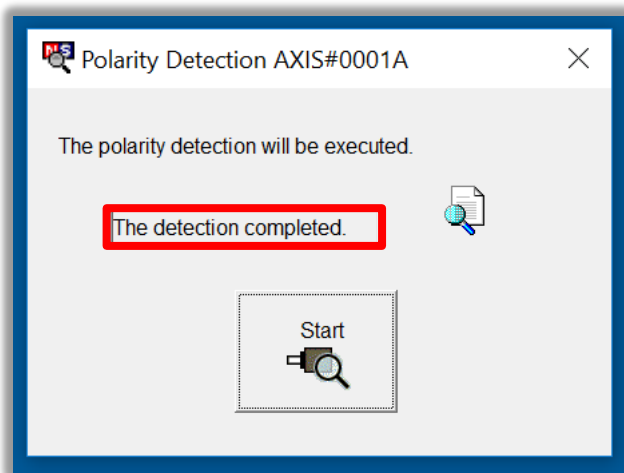


- b. Once polarity detection has completed, the motor should be function properly.

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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.

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.

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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.