



### This document pertains to all Unidrive SP models using an SM-EZMotion Module



#### DO NOT ASSUME POWER IS OFF BECAUSE THE DRIVE DISPLAY APPEARS DEAD OR NO FANS ARE HEARD. THE VOLTAGE APPLIED TO THIS DRIVE CAN BE LETHAL IF TOUCHED !

When commissioning a drive it is advantageous to achieve stable rotation of the motor prior to advanced programming. This is important to ensure the drive, motor, and feed back device are working accordingly. Once advanced programming has been added to the drive and operation is not as you intended, it may prove more difficult to diagnose any problems that arise. Knowing the motor, drive, and feedback device are operating properly is a great advantage.

The purpose of this document is to give a basic set of steps to follow during the initial commissioning of a Unidrive SP with an SM-EZ Motion module installed to achieve a motion profile. This document will cover basic set up of the drive, tuning, phasing, and achieving a basic jog motion using Power Tools Pro to configure the drive and EZ Motion module. This document can also be used in the event a drive/motor are not operating properly after an SM-EZ Motion start up has already taken place. If this is the case you must save all drive and module data before proceeding.

You can be certain the Unidrive SP, Motor, Feedback device, and SM-EZ Motion Module are operational after completing the instructions in this guide.



Do not install the SM-EZ Motion module before the first power up. Your Unidrive SP comes out of the box with open loop factory defaults loaded. We will need to set the drive motor map to your motor specifications, run the autotune/phasing test, and then run the motor.

If you have decided SM-EZ Motion was the right choice for your application then you have also chosen an induction motor with a feedback device or a servo motor. Wire the SP drive, motor, and feedback device as per manufacturer specifications.



Do not enable the drive at this time (No connection to pin 31)

When the wiring has been completed then apply power and set the parameters below into the drive. You will need the information off the motor nameplate and feed back device to set the drive up properly. Be certain you follow the instructions for the type of motor you have. Either servo or induction.

## **Confirming Drive, Motor, and feedback Operation**

### Defaulting to Closed Loop Vector and preparing to program (See next page for Servo)

- 1. Set parameter 00.00 to 1244 (1233 for Europe)
- 2. Press the red reset key
- 3. Set parameter 00.49 to L2
- 4. If the drive trips "th" set #7.15 =Volt
- 5. Set parameter 00.00 to 1254 (1253 for Europe)
- 6. Set parameter 00.48 to CL Vect
- 7. Press the red reset key
- 8. Set parameter 00.00 to 1000
- 9. Press the red reset key

#### **Basic Programming in Closed Loop Vector**

Parameter	Description	Value
0.02	Max Reference	Motor Name PLate
0.05	Reference Select	Pad (4)
0.06	Current Limit	50.0
0.17	Current Demand Filter	2.0
0.27	Encoder PPR	Encoder Name Plate
0.42	Number of Motor Poles	Motor Name Plate
0.44	Motor Voltage	Motor Name Plate
0.45	Motor Rated FL Speed	Motor Name Plate
0.46	Motor FL Amps	Motor Name Plate
0.47	Motor Frequency	Motor Name Plate
3.36	Encoder Power Supply	Encoder Name Plate
3.38	Encoder Type	Encoder Name Plate

Perform a parameter save by setting #0.00 = 1000 and pressing the red reset key.

### Automatic Tuning in Closed Loop Vector

- 1. Set #00.40 to a 1
- 2. Enable the drive (terminal 31)
- 3. Give a RUN command (green button on the keypad)
- 4. If the drive completes the autotune with no errors continue

### The following steps will cause the motor to rotate. Ensure it is safe to do so.

- 5. Disable the drive (terminal 31)
- 6. Set #00.40 to a 2
- 7. Give a RUN command (green button on the keypad)
- 8. Wait for the motor to come to a stop and disable the drive
- 9. If the drive completes the second autotune with no errors then you can ramp the motor up and down using the keypad on the drive.

### Defaulting to Servo and preparing to program

- 1. Set parameter 00.00 to 1244 (1233 for Europe)
- 2. Press the red reset key
- 3. Set parameter 00.49 to L2
- 4. If the drive trips with "th" set #7.15 = Volt
- 5. Set parameter 00.00 to 1254 (1253 for Europe)
- 6. Set parameter 00.48 to Servo
- 7. Press the red reset key
- 8. Set parameter 00.00 to 1000
- 9. Press the red reset key

### **Basic Programming in Servo Mode**

Parameter	Description	Value
0.02	Max Reference	Motor Name PLate
0.03	Accel Rate	2.0
0.04	Decel Rate	2.0
0.05	Reference Select	Pad (4)
0.06	Current Limit	50.0
0.17	Current Demand Filter	2.0
0.27	Encoder PPR Encoder Name P	
0.42	Number of Motor Poles	Motor Name Plate
0.44	Motor Voltage Motor Name Plate	
0.46	Motor FL Amps	Motor Name Plate
3.36	Encoder Power Supply	Encoder Name Plate
3.38	Encoder Type	Encoder Name Plate
6.01	Stop Mode rP	
6.08	Hold Zero Speed	OFF

Perform a parameter save by setting #0.00 = 1000 and pressing the red reset key.

### Automatic Phasing and Tuning in Servo Mode



#### The following steps will cause the motor to rotate. Ensure it is safe to do so.

- 1. Set #00.40 to a 1
- 2. Enable the drive (terminal 31)
- 3. Give a RUN command (green button on the keypad)
- 4. If the drive completes the autotune with no errors continue
- 5. Disable the drive (terminal 31)
- 6. Set #00.40 to a 2
- 7. Give a RUN command (green button on the keypad)
- 8. Wait for the motor to come to a stop and disable the drive
- 9. If the drive completes the second autotune with no errors then you can ramp the motor up and down using the keypad on the drive.

If you have completed the steps above successfully then the wiring, drive, motor, and feedback device are working properly. You have ramped the motor up and down using the enable input and the drives keypad. We can now install the SM-EZMotion module and perform simple motion.

## **Comfirming EZ Motion Operation**

Power down the drive. The manufacturer recommends 10 min. prior to seating a module in a drive slot. Insert the SM-EZ Motion module into the drive. If you do not have any other modules installed then slot three is recommended. It provides the most mounting support for the module. If you have multiple modules fill the drive slots starting with slot 3 and working towards slot 1. Power the drive back on and plug your serial communications cable between the RJ45 jack on the drive and the D-shell port on your computer. Open Power Tools Pro. The latest version can be downloaded from the link below.



http://www.emersonct.com/download\_usa/software/SMEZMotion/PowerTools Pro 3\_0e.exe

Emerson Control Techniques - Pow           File Device Options Tools View Hele           Dial	perTools Pro
New New ⊕ FM-3 ⊕ FM-4 SM-EZMotion Setup	OK Cancel Help

## Starting a new test file

Open Power Tools Pro then click New File and select SM EZMotion Setup

## Motor and Drive Set Up for Testing

Choose the drive model and operating mode



Enter motor data here. If you are unsure of the values to enter see the motor nameplate, refer to the data sheet or contact the motor manufacturer.

Emerson Control Techniques - Power File Edit Device Options Tools Vie	Tools Pro - [SM-EZMotion [AXIS_1.EZM] Created with w Window Help
	<u>ax 1, 00 0 000 000 000 0000 0000 000000000</u>
Axis 1     Axis 1     Status     Status	Slot Configuration Slot Number Slot 3 <u>*</u> Slot3 Module EZMotion <b>V</b>

Choose the Slot with your EZMotion module and configure the Slot Number and Slot Module accordingly. Set up any other modules at this time.

	Tools Pro - [SM-EZMotion [A]       ew Window Help       Image: Second Seco	Velocity       Velocity       Lecelera	200 200 50 tion 50	is v3.0e]	n Ns Ns	Select Jog0 from the menu tree and set the following: Enter 200 for Velocity
B A Homes B A Homes B Gearing A Profiles B B Programs A Network	Jog Calculations Accel Distance 6.6667 Decel Distance 6.6667	revs revs	Accel Time Decel Time	4.0000 4.0000	Seconds Seconds	Enter 50 for Deceleration

# **Confirming Communication Settings**



Modbus Setup	×			
Maximum Node Address 4				
Note Node addresses are one-based. For example, a node address of 31 indicates that there are a maximum of 31 devices.				
Configure Serial Port				
OK Cancel Help				

Communications Setup x Port Baud-ΟK C 9600 C Com 1 € Com 2 € 19200 Cancel C Com 3 SM-EZMotion only Help C Com 4 C 38400\* C Com 5 ○ 57600× C Com 6 C 115200\* C Com 7 \* Does not support CT-Comms cable C Com 8

Click on options and then choose the Communications option

**Choose Configure Serial Port** 

Confirm the settings coincide with the drive and your PC.

## Download the Set Up to the Drive



Press the button shown above to download you Power Tools Pro configuration to the module in the drive.

	erTools Pro - [SM-EZMotion [AXIS_1.EZM] Created with PTools v3.0e]         View Window Help         Communications         User Levels         Ptools Operation         ✓ Show Advanced Views	Click on <b>Options</b> , <b>Preferences</b> , then <b>Show</b> <b>Advanced Views</b> This will allow you to select the Drive Menu initialize.
Control Techniques - Power	Tools Pro - [SM-EZMotion [AXIS_1.EZM] Created with PTools v3.0e] W Window Help 월 전 ː ː ː ː ː ː ː ː ː ː ː ː ː ː ː ː ː ː	If the drive trips "th" after the SM-EZ Motion download set
Axis 1     Status     Aris Arduare	SP Drive Menu, Parameter Default Overrides: Menu, <menu#>, <param#> = <value></value></param#></menu#>	Menu.7.15 = 6
O Drive/ Encoder     Slot 1 - EZMotion     Slot 2 - empty     Slot 3 - Snplications Plus     Orive Menu Watch     Orive Menu Initialize	Menu. 5.35 = 0 'Disable Auto Switching Frequency Change Menu. 6.28 = 1 'Select clock for Trip log time stamping' set to runtime menu. 6.28 = 1 'Select clock for Trip log time stamping' set to runtime menu. 6.49 = 1 'Select clock for Trip log time stamping' set to runtime menu. 7.15 = 6 'Ar log input 3 should be a thermistor with no short circuit	In the Drive Menu Initialize file and repeat the download.

## **EZ Motion Autotune**

An autotune can be performed after a successful download has taken place and the SM-EZ Motion software is online with the drive. Go back to the motor tab under Drive/Encoder and click on the Run Auto-Tune button.

Emerson Control Techniques - PowerTools Pro - [SM-EZMotion [AXIS_1.EZM] Created with PTools v3.0e]				
🗓 File Edit Device Options Tools Vie	w Window Help			
D <b>26</b> 6 5 1440 <u>*</u> × × × × 5 6 6 9 000 8 8 8 1 7 9 10				
	Configuration Drive Type SP1402  Drive mode Servo  Motor Type 75UMB300 UL  Drive Encoder Part Motor			
Slot 2 - empty Slot 3 - Applications Plus Orive Menu Watch Slot 9 - Plus Drive Menu Initialize Setup Setup	Use Motor Data From. ddf File Motor Name 75UMB400CARA Peak Current 380 Amps rms Continuous Current Balling 190 Amps rms			

uto Tune		×	EMERSON Control Techniques - PowerTools Pro
WARNING	WARNING - This AutoTune will cause motion. Be sure all tooling an personnel are clear of machinery. Read and understand the description of the selected AutoTune before proceeding. Failure to so may result in damage to machinery or personal injury.	nd do	You must manually cycle Drive Enable ON to activate Auto Tuning. At the end of tuning you will need to cycle Drive Enable OFF then ON.
Your drive enable circuitry must be function	al to perform the drive Auto Tune.		
supply shutoff should be used for this purpo	ne Auto i une procedure or motion caused by it. I ne drive enable or main se.		1
AutoTune Steps 1) To run the AutoTune, the drive enable 2) Select the desired AutoTune Mode, an 3) Activate the drive enable input to start	must first be deactivated. d click Proceed. the AutoTune.		
4) When the AutoTune is complete, the d	rive enable must then be cycled to again enable the drive.		<b>V</b> Ensure it is safe for the
AutoTune Mode Selection	Proceed		motor to rotate
Auto Tune Mode 2	Abort		
	Cancel		Click Proceed shown to the left
Description of Selected AutoTune Mode-	in the forward direction. The drive applies rated everyont to the mater		
during the test and measures the Encoder	Phase Angle. The phase angle measurement is taken when the motor		
has stopped at the end of the test. There angle to be measured. After the phase angle measurement, a sta Inductance.	tore, there must be no load on the motor when it is at rest for the correct tionary test is performed to measure the Phase Resistance and Phase		Click OK shown above
			Disable then enable the drive
To Cours And Trans and the NM EZMAN		-	
I o Save Auto I une results to SM-E2Mbit 1) Uncheck the [Use Motor Data From .d 2] Press the [Apply to Config.] button to tr 3) Save your configuration using File Sa- 4) Download your configuration that cont 5) If desired press [Save .ddf Values] butt	n Module df File] checkbox, ansfer the tuning results to your configuration. /e. ains the tuning results using Device>Download. ton to save motor data to .ddf for use in future configurations.		The drive should now perform the autotune.
		-	1

# Testing the Jog0 Profile

Emerson Control Techniques - Power	Tools Pro - [SM-EZMotion [AXIS_1.EZM] Created with PTools v3.0e]
🛄 File Edit Device Options Tools Vie	w Window Help
Axis 1     Status     Status     Hardware     Yastup     Yastup     Yastup     Yastup     Motion     Dogs	Jog Number     0     -       Jog Name     Jog0     -       Time Base     Realtime     -       Online     Calculations
→ Jog1 → Jog1 → Tindexes → Tindexes → Profiles □ □ □ Programs → Network	Feedback       1501.7924 revs         Position Feedback       1501.7924 revs         Velocity Feedback       0. revs/m         Current Demand       2.0 %         Following Error       -0.0001 revs         Master Velocity       0.00000 Revs/s         Control Panel
Jog	Reverse Jog Forward

Go back to the Jog0 in the menu tree. If you are still online with the drive an Online tab will appear. You can click on the arrow button to jog forward or jog reverse. Test this function.

You have completed the testing of the motor, drive, feedback device, and SM-EZ Motion module. You can now move on to advanced programming of the drive.

#### Questions ?? Ask the Author:

<u>Author</u>:

**Jeff Wilcox** (716)-774-0093

e-mail: jeff.wilcox@emersonct.com

