7929 SW Burns Way
Suite B
Wilsonville, OR

Phone: 503 344-5085
Fax: 503 682-9014
sales@rinehartmotion.com

Current Offset Calculation for the RMS Inverter

Revision 0.6

7929 SW Burns Way
Suite B
Wilsonville, OR

Phone: 503 344-5085
Fax: 503 682-9014
sales@rinehartmotion.com

Revision History

Version	Description of Versions / Changes	Responsible Party	Date
0.1	Initial version	Azam Khan	8/10/2010
0.2	Corrected document name in the footer section.	Azam Khan	1/18/2011
0.3	Updated the document to reflect updates in the RMS GUI application.	Azam Khan	6/20/2011
0.4	Updated the document for reflect the new process for PM150 DZR.	Azam Khan	2/28/2012
0.5	Updated GUI addresses for Ia_raw, Ib_raw, and Ic_raw to point to the filtered values.	Azam Khan	3/15/2012
0.6	Added description for Ia/Ib/Ic_Offset_EEPROM parameters. Replaced Ia_/Ib_/Ic_raw with Ia_/Ib_/Ic_ADC_Fil.	Azam Khan	9/17/2012

Table of Contents

7929 SW Burns Way
Suite B
Wilsonville, OR

Phone: 503 344-5085
Fax: 503 682-9014
sales@rinehartmotion.com

1 Safety First:

ATTENTION

When you see this sign, PAY ATTENTION! This indicates that something important is about to be said, that concerns your safety and the proper operation of the equipment.

DANGER

When you see this sign, you are being alerted to an IMMEDIATE DANGER that could cause severe injury or even death. You MUST review these sections carefully an do everything possible to comply with installation and operation requirements, or you risk injury or death to yourself or anyone else who uses the equipment or the vehicle. Failure to comply with safety requirements will void all warranties and could expose you as the installer to liability in the event of an injury. Use the equipment in the manner in which it was intended.

CAUTION

When you see this sign, you are being advised that the issue under discussion has a serious safety or equipment reliability implication. Use caution and be conservative. Use equipment in the manner described in this User's Manual. Safety is entirely the responsibility of the installer of this equipment. RMS has done everything it can to ensure that the traction controller itself conforms to international standards for safety, including electrical safety spacing on printed circuit boards and in connectors and wiring harnesses, and for electromagnetic compatibility with other systems on a typical vehicle. This does NOT mean that your installation will be safe, or that it will not interfere with other systems on board your vehicle. It is your responsibility as the installer to review this entire User's Manual, to understand the implications of each and every section, and to know what might be unique about your system application that presents a unique hazard or potential safety issue – and to solve it.

RMS is committed to helping you solve these problems, but cannot take responsibility for the application of this traction controller. We can only promise to meet the specifications for this product and that it meets international safety standards when used in accordance with the instructions in this Manual.

7929 SW Burns Way
Suite B
Wilsonville, OR

Phone: 503 344-5085
Fax: 503 682-9014
sales@rinehartmotion.com

2 Introduction

PMxxx controllers have three phase current channels, i.e., Ia, Ib, and Ic for Phase A, Phase B, and Phase C, respectively. The offsets need to be calculated accurately to measure the DC current. In most cases, these offsets are automatically calculated and accounted for by the controller.

This document provides a step by step guide to calculate current offsets for the PMxxx controller.

2.1 Current Offset Calculation Procedure

Please note that high voltage is required for this calibration.

1. Apply 12-V power to the Inverter.
2. Start the GUI application from the project folder.
3. Click on “EEPROM View” tab and set all Current Offset EEPROM parameters to 2048 which is equivalent to ‘0’ Amps:

RMS GUI Parameter	GUI ADDRESS	Value Range	Description
Ia_Offset_EEPROM	0x0126	1843 – 2253	The offset values are in ADC counts. Each offset should be set to 2048 which is the 0-Amps mid-point. There are 205 counts allowed for calibration in both positive and negative direction. 1 count is equal to (I_AD_Max / 2048) Amps. So if the max allowed current for your hardware is 500 Amps, 1 count = 0.244141 Amps. 205 counts = 50 Amps. This means that each phase current can be calibrated between ±50 Amps, in this particular case. Reversing the logic, if the offset value is known to be 10 Amps, for example. The count value should be entered as 41 counts (10 / 0.244141) approximately.
Ib_Offset_EEPROM	0x0127		
Ic_Offset_EEPROM	0x0128		

4. Click on ‘Program EEPROM’ button to program the values. Follow the instructions on the GUI pop-up window.

5. Recycle 12-V power to the inverter. Refresh the GUI view and confirm that EEPROM parameters are set to 2048 (‘0’ Amps).

6. Click on the “Memory View” tab. From the “Symbol List”, select the following parameters by keeping the CTRL key pressed:

GUI Parameter Name	GUI Parameter Address
Open_Loop_Command(0=OFF)	0x0006
Omega_tst/4	0x0007
Ia_ADC_Fil	0x00EA
Ic_ADC_Fil	0x00EB
Ic_ADC_Fil	0x00EC

7. Click on "Add (to Watch List)" button to bring the above parameters to the window on right side. Click "Refresh" button to monitor the parameters in the watch list.

8. Set the Open_Loop_Command to 1, omega_tst/4 to 0, and enable the inverter via VSM or CAN. Torque or Speed commands will be ignored in this open loop mode.

9. Click on the “Memory View” tab. From the “Symbol List”, select the following parameters by keeping the CTRL key pressed:

GUI Parameter Name	GUI Parameter Address
Ia_Offset_Command	0x0019
Ia_Offset_Command	0x001A
Ia_Offset_Command	0x001B

10. Set the command parameters as follows:
    - Ia_Offset_Command = Ia_ADC_Fil
    - Ib_Offset_Command = Ib_ADC_Fil
    - Ic_Offset_Command = Ic_ADC_Fil

7929 SW Burns Way
Suite B
Wilsonville, OR

Phone: 503 344-5085
Fax: 503 682-9014
sales@rinehartmotion.com

11. Click on the “Memory View” tab. From the “Symbol List”, select the following parameters and add to the watch list:

GUI Parameter Name	GUI Parameter Address
Ia_corr_(Ampsx10)	0x00ED
Ib_corr_(Ampsx10)	0x00EE
Ic_corr_(Ampsx10)	0x00EF

12. Make sure that the corrected current values read are equal or very close to ‘0’ Amps. Tweak Ia_/Ib_/Ic_Offset_Command parameters furhter, if necessary.

13. Click on “EEPROM View” tab and enter offset data for EEPROM parameters as follows:
    - Ia_Offset_EEPROM = Ia_Offset_Command
    - Ib_Offset_EEPROM = Ib_Offset_Command
    - Ic_Offset_EEPROM = Ic_Offset_Command

14. Click on ‘Program EEPROM’ button to program the values. Follow the instructions on the GUI pop-up window.

15. Set the open loop command back to 0. Recycle 12-V power to the inverter. Refresh the GUI view and confirm that EEPROM parameters have been programmed with the correct values.