

# **MOTION APPLICATION TECHNICAL DOCUMENT**

## *System Applications Engineering Group*

**SUBJECT: MP940 START UP PROCEDURE REV C**

**Document Type:** *MP940 Product*

**Topic:** **REV C**

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### **SUMMARY:**

This Start-up procedure highlights the steps required when using an MP940 with firmware revision A05 or higher.

#### Procedures for the Setup of MP940 & SGDH:

1. *MP940 Startup Procedure*
  - *1A: for a Motion Works User*
  - *1B: for a Motion Works + User*
2. *Replacing an SGDH Servopack*
3. *Replacing an MP940 Controller or installing a new MP940+SGDH*

#### Appendixes are included for additional look-up data and reference:

*Appendix A1 – Motion Works Folder Setup Procedure*

*Appendix A2 – SGDH Parameter Setup Details*

*Appendix A3 – SGDH Input Signal Parameter Setup Detail*

*Appendix A4 – Unexpected Alarms and Errors*

### **ENVIRONMENT:**

SGDH Version : 00E or higher

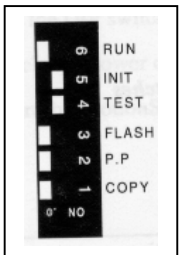
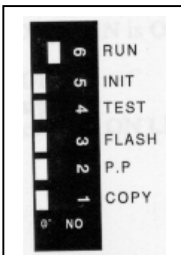
MP940 Version : A05 or higher

MotionWorks : 3.53A or higher

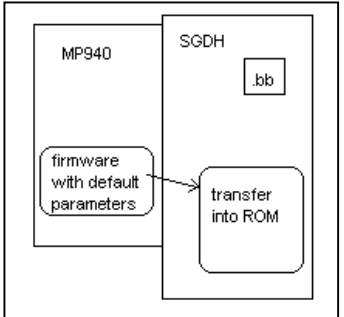
MotionWorks Plus : 2.14 or higher

## Procedure 1 - MP940 START-UP PROCEDURE

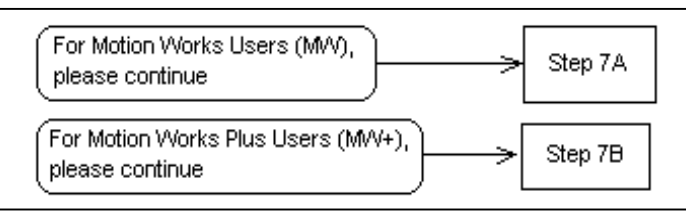
This procedure shows the steps to take to setup and start-up an MP940/SGDH system for the first time (ie. new SGDh out of the box AND new MP940 out of the box). These steps will also completely reconfigure the system should there be any question of setup condition.

<p><b>STEP 1</b> Attach MP940 to SGDh and wire input power according to users Manuals</p>	<p><b>STEP 2</b> With power off, set dip switch for memory clear</p> 	<p><b>STEP 3</b> Apply control power to both SGDh and MP940 (see note1)</p> <p><i>Immediately, the MP940 'RDY' and 'RUN' LEDs will blink (this means the MP940 is initialized properly and all memory is cleared), and the SGDh LED readout will blink "bb" (trying to establish DPR communications). Wait several seconds until the SGDh shows an "AEO" alarm, this indicates DPR (dual port ram) communications timeout.</i></p> <p><i>Note: During this step, the MP940 automatically executes functions 5,6, and 14 in the Servopack. Hence it is <u>not</u> necessary to execute manually as it was with earlier firmware versions</i></p>	<p><b>STEP 4</b> With power off, Set the MP940 dip switch as normal operation.</p> 
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- **NOTE 1 – Power Cycle Timing:** Be sure that both SGDh and MP940 control sections are powered up within a minimum of 3 sec of each other.

<p><b>STEP 5</b> Apply control power to both SGDh and MP940 (see note1).</p> <p><i>Immediately, the MP940 'RDY' LED will blink (this means the MP940 is initializing the SGDh, and transferring default parameters from the flash firmware to the SGDh's parameter), and the SGDh LED section will go blank. Wait several seconds (15 sec) until the SGDh LED section readout shows ".bb" (or "POT" and "NOT" are blinking if the over-travels are not wired and not masked).</i></p>		<p><b>STEP 6</b> Check to insure the SGDh indicates "bb" and MP940 shows 'RDY' and 'RUN' LEDs are ON. (see note 2)</p>
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- **NOTE 2 – Over Travels:** If the system does not have P-OT, N-OT, reset data of Pn50A from '2881H' to '8881H' and Pn50B from "8883H" to '8888H'. This can be done from the front panel access (See Sigma II manual YEA-SIA-S800-32.2), or from MotionWorks/MotionWorks+ in the next steps.

<p><b>STEP 7</b> <b>Hardware Start up is completed.</b></p> <p><i>(Refer Table.1 SGDh Parameter for MP940 for Manual Setting, otherwise continue for software setting)</i></p>	
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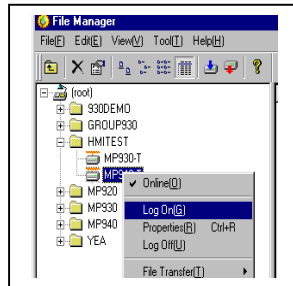
## PROCEDURE 1A – MP940 Start-Up with Motion Works

### **STEP 7A**

Start MotionWorks and Log-in ON-LINE.  
(port 1 light will blink when communicating)

*If a program already exists as in Procedure 2, then simply perform an "All File Transfer". This will automatically perform MP940 parameter setup and module configuration.*

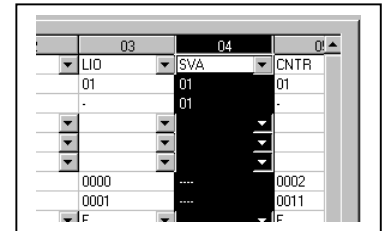
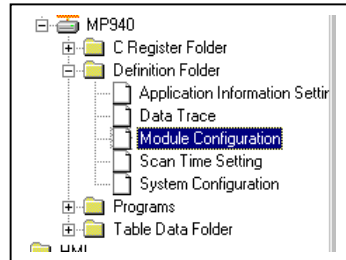
*If this is first time setup, an Order and Controller Folder will need to be set up, see Appendix A1 for procedure.*



### **STEP 8A**

Open the Controller Folder, open the Definition Folder, then open the Module Configuration file, and double click on the SVA module (at the top bar) to open it.

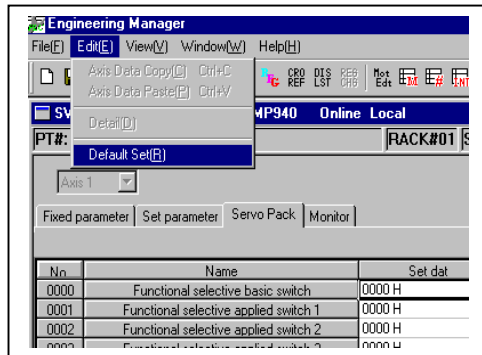
*It will ask "New File?". By clicking "OK", Motion Works will reserve a new file where Fixed Parameters, Set Parameters, and Servopack Parameters will be stored.*



### **STEP 9A**

Select the Servopack Parameters tab.  
**MW Version 3.53A** – From the 'Edit' menu bar, Select 'Copy Current Value'.  
**MW Version 3.51 and ↓** - Select 'Default Set' in 'Edit' menu, execute and save.

*This step is necessary to synchronize the MP940s data and the Motion Works File data. This step loads default data into the Motion Works File so that values are the same as those stored in the MP940 after default configuration.*



### **STEP 10A**

If the system does not have OT (over travels) wired in, it will be necessary to mask the P-OT and N-OT (positive and negative over travels).

**Pn50A from '2881H' to '8881H'**

**Pn50B from "8883H" to '8888H'**

This can be done two different ways:

- 1) From the Servopack tab by setting the proper parameter, and then saving.
- 2) From the SGD Front Panel, (See section 7.1.6 Sigma II manual YEA-SIA-S800-32.2).

Note: It may be necessary to set the Torque limit in the MP940 "Set Parameter" tab (OWC002) if an "A9F" alarm is encountered. See appendix A4 for details.

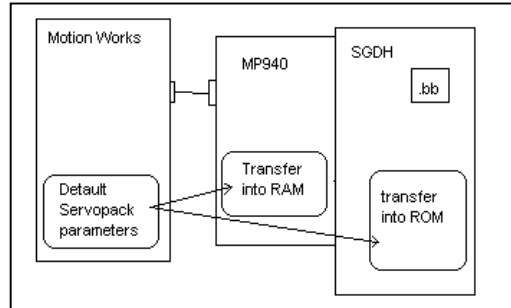
## PROCEDURE 1A – MP940 Start-Up with Motion Works

### **STEP 11A**

From the 'File' menu bar, select 'Save'.

This 'Save' operation performs a copy of all default Servopack parameters from the Motion Works File to both the MP940 and SGDh.

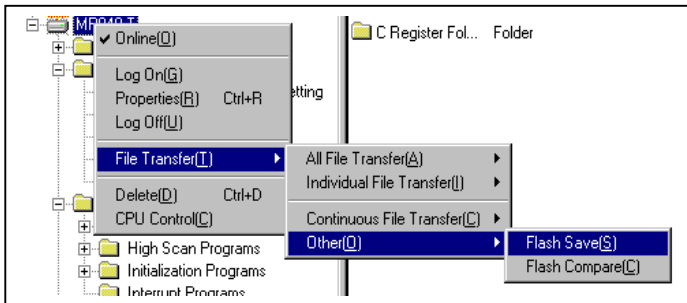
*At this point the "COPY" function is now available (this is useful when replacing an SGDh Servopack). For more info, see Procedure 2 'Replacing The SGDh Servopack'.*



*Note: At this step, default Servopack parameters are saved into the MP940s RAM. Take care that these values could be lost and change back to the Flash ROM values upon MP940 power-up, if one of these conditions are met:*

- 1) *No battery connected to MP940 and control power is lost for an extended period of time.*
- 2) *Flash switch on MP940 is selected on.*

*To change MP940 Flash, it would be necessary to transfer to Flash in Motion works as shown below. Then the application program and the Servopack parameters will be saved to flash.*



### **STEP 12A**

Cycle control power to both SGDh and MP940 (see note 1, page 2).

Upon power cycle, the parameters inside the MP940 are transferred into its RAM for runtime, and the parameters inside the SGDh are transferred into its RAM for runtime.

**Full Start up is now completed.**

## PROCEDURE 1B - Start-Up Procedure with MotionWorks +

### **STEP 7B**

Start Motion Works + and either

- 1) Open an existing demo program such as Yaskawa's Template Program (examples found on [faq.Yaskawa.com](http://faq.Yaskawa.com)). It is highly advisable to use this template program because it is fully tested and demonstrates good programming practices.
- 2) Create a new project, setup all modules, and develop a new program .

### **STEP 8B**

Next, go ON-LINE with the controller (F6 or menu select). Note that Port 1 led (on MP940) will blink when communicating.

Once the program is completed, it is ready for a full compile and download.

*Performing a Full Compile and Download will:*

- 1) *Send all MP940, SGDH, External Encoder, I/O, and Network setup parameters*
- 2) *Send the "system ladder" [MP940's core modular operating system]*
- 3) *Compile and send the User Program*

*Performing a Compile and Download will:*

- 1) *Compile and send the User Program Only*

### **STEP9B**

If the system does not have OT (over travels) wired in, it will be necessary to mask the P-OT and N-OT (positive and negative over travels).

**Pn50A from '2881H' to '8881H'**

**Pn50B from "8883H" to '8888H'**

Perform these changes from the SGDH parameter list located in the System Properties box in MW+.

It will be necessary to cycle control power for Step8B and 9B changes to take affect.

### **STEP10B**

If the MP940 Program and Register memory needs to be maintained over time, it will be necessary to either attach a battery or to copy the program to Flash (from Tools, Controller, Copy To Flash). Note that to copy the information to flash, the program must first reside in RAM (Step 8B).

*Using Battery:*

*Here, only the Run switch will be on. In this case, the program is backed up in RAM by the power of the battery, and will be executed in RAM during run-time. The last change in registers (such as from an HMI) will always remain in memory.*

*Using Flash:*

*Here, Run/Flash/Copy switches will be on. In this case, the program and register memory is backed up in Flash. Anytime the control power is cycled, the program and register data is copied from Flash to RAM for run-time. Hence, any changes in registers (such as from an HMI) will be overwritten by the original values set.*

**Full Start up is now completed.**

## PROCEDURE 2 – Replacing the SGDH Servopack

**Step 1** – replace SGDH Servopack taking care to insure all wiring is correct.

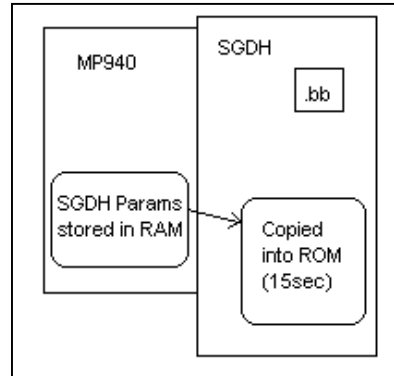
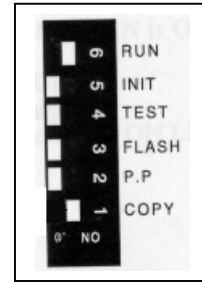
**Step 2** – Turn on “RUN” and “COPY” dip switches only.

**Step 3** – Apply control power to both MP940 and SGDH (see note 1).

Immediately, the MP940 ‘RDY’ LED will blink (this means the MP940 is initializing the SGDH), the SGDH LED section will go blank, and the default parameters will be transferred from the MP940s firmware to the SGDH. Wait several seconds (15 sec) until the SGDH LED section readout reads “.bb” (or blinks “POT” and “NOT” if the over-travels are not wired and not masked). At this point, all Servopack parameters that are stored in the MP940 are copied to the Servopacks ROM.

**Step 4** (only for MW+ users) – If over travels must be masked, they must be changed from the SGDH. Currently, MW+ does not support Servopack parameter change.

**Setup complete!**



## PROCEDURE 3 – Replacing the MP940 Controller OR Installing a new MP940 & SGDH

**Step 1** – execute steps in Procedure 1: “MP940 Start-up Procedure”

**Step 2** – For MW users, execute Step 7A in Procedure 1A.  
For MW+ users, execute Steps 7B, 8B, 9B in Procedure 1B.

**Setup complete!**

## **Appendix A1 - MotionWorks Folder Setup Procedure**

1. Go to the File Menu. Select “New,” and “Order Folder.”
2. Input “Order Name” (New Folder is created).
3. Right click on newly created folder. Select make “New” Folder, “Controller Folder”.
4. Select Controller Type (or select “MP940”).
5. Input Controller Name (Program name).
6. Go to Network. Select “Yes” for Online. (Logical Port 1: CP-217, Unit No.1, Route: No)
7. Go to Application. Enter customer data, click “ok”.

*See Motion Works Users Manual for detailed information.*

## APPENDIX A2 – SGDh Parameter Setup Details

This table shows the default SGDh parameters required when used with an MP940 controller. Step 5 of the startup procedure sets these automatically.

Parameter Number	Name	SGDh Default	Setting for MP940	Description
Pn000.1	Control Mode	0	<b>9</b>	Speed ⇄ Torque Control Mode
Pn002.0	Speed Control Mode Option	0	<b>1</b>	Torque Limit function activated from MP940 through parameter OWC002
Pn002.1	Torque Control Mode Option	0	<b>1</b>	Speed Limit function activated from the MP940 through parameter OWC01C
Pn003.0	Monitor 1	2	<b>2</b>	Torque Reference Monitor
Pn003.1	Monitor 2	0	<b>0</b>	Speed Feedback Monitor
Pn004.0	Option Board Selection	0	<b>0</b> SGDh will set inside memory automatically	Option Board Selection
Pn005.0	Brake Operation	0	<b>0</b>	Brake will be controlled by SGDh
Pn50A.0	IO Signal Mapping	0	<b>1</b>	Free Allocation
Pn50A.1	S-ON Mapping	0	<b>8</b>	*Use Command of DPRAM
Pn50A.2	P-CON Mapping	1	<b>8</b>	*Use Command of DPRAM
Pn50A.3	P-OT Mapping	2	<b>2</b> if don't use P-OT, please set <b>8</b>	SI2(CN1-42) Low Enable ( 8 : Disable P-OT )
Pn50B.0	N-OT Mapping	3	<b>3</b> if don't use N-OT, please set <b>8</b>	SI3(CN1-43) Low Enable ( 8 : Disable N-OT )
Pn50B.1	ALM-RST Mapping	4	<b>8</b>	*Use Command of DPRAM
Pn50B.2	P-CL Mapping	5	<b>8</b>	*Use Command of DPRAM
Pn50B.3	N-CL Mapping	6	<b>8</b>	*Use Command of DPRAM
Pn50C.0	SPD-D Mapping	8	<b>8</b>	
Pn50C.1	SPD-A Mapping	8	<b>8</b>	
Pn50C.2	SPD-B Mapping	8	<b>8</b>	
Pn50C.3	C-SEL Mapping	8	<b>8</b>	*Use Command of DPRAM
Pn50D.0	ZCLAMP Mapping	8	<b>8</b>	*Use Command of DPRAM
Pn50D.1	INHIBIT Mapping	8	<b>8</b>	
Pn50D.2	G-SEL Mapping	8	<b>8</b>	*Use Command of DPRAM
Pn511.0	DEC Mapping	8	<b>1</b>	SI1(CN1-41) Low Enable
Pn511.1	EXT1 Mapping	8	<b>4</b>	SI4(CN1-44) Low Enable
Pn511.2	EXT2 Mapping	8	<b>5</b>	SI5(CN1-45) Low Enable
Pn511.3	EXT3 Mapping	8	<b>6</b>	SI6(CN1-46) Low Enable



## APPENDIX A3 – SGDh Input Signal Parameter Setup Detail

The following tables show the details of Pn50A, 50B, 50C, 50D, 511 from appendix A1.

### B.3 Input Signal Selections

The following list shows input signal selections and their default settings.

Parameter	Digit Place	Name	Setting	Description	Default Setting
Pn50A	0	Input Signal Allocation Mode	0	Sets the input signal allocation for the sequence to the same one as for the SGDh servo amplifier.	0
			1	Possible to freely allocate the input signals.	
	1	/S-ON Signal Mapping (Servo ON when low.)	0	Inputs from the SI0 (CN1-40) input terminal.	0: SI0
			1	Inputs from the SI1 (CN1-41) input terminal.	
			2	Inputs from the SI2 (CN1-42) input terminal.	
			3	Inputs from the SI3 (CN1-43) input terminal.	
			4	Inputs from the SI4 (CN1-44) input terminal.	
			5	Inputs from the SI5 (CN1-45) input terminal.	
			6	Inputs from the SI6 (CN1-46) input terminal.	
			7	Sets signal ON.	
			8	Sets signal OFF.	
			9	Inputs the reverse signal from the SI0 (CN1-40) input terminal.	
			A	Inputs the reverse signal from the SI1 (CN1-41) input terminal.	
			B	Inputs the reverse signal from the SI2 (CN1-42) input terminal.	
			C	Inputs the reverse signal from the SI3 (CN1-43) input terminal.	
D	Input the reverse signals from the SI4 (CN1-44) input terminal.				
E	Inputs the reverse signal from the SI5 (CN1-45) input terminal.				
F	Inputs the reverse signal from the SI6 (CN1-46) input terminal.				
Pn50A	2	/P-CON Signal Mapping (Pcontrol when low.)	0 to F	Same as above.	1: SI1
	3	P-OT Signal Mapping (Overtavel when high.)	0 to F	Same as above.	2: SI2
	Pn50B	0	N-OT Signal Mapping (Overtavel when high.)	0 to F	Same as above.
1		/ALM-RST Signal Mapping (Alarm reset when low.)	0 to F	Same as above.	4: SI4
2		/P-CL Signal Mapping (Torque control when low.)	0 to F	Same as above.	5: SI5
3		/N-CL Signal Mapping (Torque control when low.)	0 to 8	Same as above.	6: SI6

...Appendix A3 continued.....

Parameter	Digit Place	Name	Setting	Description	Default Setting
Pn50C	0	/SPD-D Signal Mapping (Internal Set Speed Selection)	0 to F	Same as above.	8: OFF
	1	/SPD-A Signal Mapping (Internal Set Speed Selection)	0 to F	Same as above.	8: OFF
	2	/SPD-B Signal Mapping (Internal Set Speed Selection)	0 to F	Same as above.	8: OFF
	3	/C-SEL Signal Mapping (Control Mode Switching)	0 to F	Same as above.	8: OFF
Pn50D	0	/ZCLAMP Signal Mapping (Zero Clamping)	0 to F	Same as above.	8: OFF
	1	/INHIBIT Signal Mapping (Disabling Reference Pulse)	0 to F	Same as above.	8: OFF
	2	/G-SEL Signal Mapping (Gain Switching)	0 to F	Same as above.	8: OFF
	3	(Reserved)	0 to F	Same as above.	8: OFF

**Note:** \* When Pn50A.0 is set to 0 for the SGD servo amplifier, only the following modes are compatible: Pn50A.1=7, Pn50A.3=8, and Pn50B.0=8.

.... Appendix A3 continued....

Parameter	Digit Place	Name	Setting	Contents	Factory Setting
Pn511	0	/DEC Signal Mapping (Deceleration when low.)	1	Inputs from the SI1 (CN1-41) input terminal.	8: OFF
			2	Inputs from the SI2 (CN1-42) input terminal.	
			3	Inputs from the SI3 (CN1-43) input terminal.	
			4	Inputs from the SI4 (CN1-44) input terminal.	
			5	Inputs from the SI5 (CN1-45) input terminal.	
			6	Inputs from the SI6 (CN1-46) input terminal.	
			7	Sets signal ON.	
			8	Sets signal OFF.	
			9	Inputs the reverse signal from the SI0 (CN1-40) input terminal.	
			A	Inputs the reverse signal from the SI1 (CN1-41) input terminal.	
			B	Inputs the reverse signal from the SI2 (CN1-42) input terminal.	
			C	Inputs the reverse signal from the SI3 (CN1-43) input terminal.	
			D	Inputs the reverse signal from the SI4 (CN1-44) input terminal.	
			E	Inputs the reverse signal from the SI5 (CN1-45) input terminal.	
	F	Inputs the reverse signal from the SI6 (CN1-46) input terminal.			
	1	/EXT1 Signal Mapping (EXT1 when low.)	0 to 3	Sets signal OFF.	8: OFF
			4	Inputs from the SI4 (CN1-44) input terminal.	
			5	Inputs from the SI5 (CN1-45) input terminal.	
			6	Inputs from the SI6 (CN1-46) input terminal.	
			7	Sets signal ON.	
			8	Sets signal OFF.	
			D	Inputs the reverse signal from the SI4 (CN1-44) input terminal.	
			E	Inputs the reverse signal from the SI5 (CN1-45) input terminal.	
			F	Inputs the reverse signal from the SI6 (CN1-46) input terminal.	
			9 to F	Sets signal OFF.	
	2	/EXT2 Signal Mapping (EXT2 when low.)	0 to F	Same as above.	8: OFF
3	/EXT3 Signal Mapping (EXT3 when low.)	0 to F	Same as above.	8: OFF	

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## **APPENDIX A4 – Unexpected Alarms**

- Should the SGDh display show an **A9F** alarm, this may be due to, but not limited to
- External Encoder disconnected - when the external encoder has been enabled through MotionWorks or MotionWorks+.
  - The I/O350 module disconnected - when the I/O350 module has been enabled through MotionWorks.
  - Set Parameter or Fixed Parameter out of range - in Module Definition : SVA (You should reference address IWC00F to find out which parameter setting is out of range). If the error is related to a torque limit out of range, see the file “MP940 Max Torque Reference Table” file for selection of the correct value.
    - MW users: Enter this new value in step 10A above (OWC002).
    - MW+ users: To change the torque limit, go to file menu Project/Data/System Variable Definition and change “sLimit\_Positive\_Torque” from -300% to the value shown in the “MP940 Max Torque Reference Table” file (be sure to multiply by -1 to make it a negative number), (use “sLimit\_Torque” for MW+ 1.56 and higher). After this is changed, it is necessary to Compile and download for the MP940 to accept the changes.
  - Exceeding an error window - For example, if ILC00A (position deviation) **is ever greater than** OWC00F (deviation error detection setting), an A9F alarm will be generated and remain latched. Once latched, even if the current value of ILC00A changes to less than of OWC00F, an alarm clear must be issued to remove the A9F.

Please refer to CPU error status address SW00041 to help determine the cause of the alarm. For more information regarding the breakout, refer to the MP940 Software Manual.