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MOTION APPLICATION TECHNICAL DOCUMENT

System Applications Engineering Group

SUBJECT: MP940 START UP PROCEDURE

Document Type: *MP940 Product*
Topic:

SUMMARY:

Following is the procedure for Setup of MP940 & SGDH Servo.

1. For MotionWorks User
2. For MotionWorks+ User

Appendices are included for additional look-up data and reference
Appendix A 1 - Initializing Servo Amplifier Procedure
Appendix A 2 - MotionWorks Folder Setup Procedures
Appendix A 3 - Max Torque Reference Table (%) for OWC002
Appendix A 4 - Unexpected Alarms

ENVIRONMENT:

SGDH Version : 000E
MP940 Version : A02, A03
MotionWorks : 3.51 or later
MotionWorks Plus : 1.5 or later

PROCEDURE:

1. For MotionWorks User

- 1. Attach the MP940 to SGDH and wire input power according to Users Manuals.
- 2. Set the MP940 dip switch as “MEMORY CLEAR” (only "INIT" and "TEST" are ON).
- 3. Apply control power to both the MP940 and the SGDH (make sure the control power is applied to both the MP940 and SGDH within 3 seconds of each other). Immediately, the MP940 "RDY" and "RUN" LEDs will blink (this means the MP940 is initialized properly and all memory is cleared). The SGDH LED readout will blink “bb” (trying to establish communications). Wait several seconds until the SGDH displays “AE0”. This display indicates DPR (Dual Port Ram) communications timeout.
- 4. If the SGDH is NOT factory configured (ie: not brand new out of the box), it will be necessary to Initialize the SGDH. This is done by executing Fn005, Fn006, and Fn014 from the SGDH front panel.
  Fn005: Default set for SGDH user constants
  Fn006: Clear Alarm history.
  Fn014: Reset Alarm

  For detailed initialization procedure see Appendix A 1

- ❑ 5. Set the MP940 dip switch as normal operation (only RUN is ON).

- ❑ 6. Cycle control power of both MP940 and SGDH (make sure the control power is applied to both the MP940 and SGDH within 3 seconds of each other). The MP940s "RDY" and "RUN" LED should be steady ON. After several seconds, the SGDH display will indicate “AE0”.

- ❑ 7. Start MotionWorks and open the "Order Folder". Right click on the "Controller Folder" and select "Online"(check must appear next to the selection). Right click on the "Controller Folder" again and select "LOG ON" to connect.

If an Order and Controller Folder had not been set up, see Appendix A 2 for procedure.

- ❑ 8. Open the Controller Folder. Open the Definition Folder. Then open the Module Configuration file, and save the screen that appears in the Engineering Manager window.

- ❑ 9. Open each module and save the default configuration. This is necessary to establish a link from the MP940 system to each module.
  SERIAL: open cir#1 and save, open cir#2 and save
  LIO: open and save
  SVA: open, in “Fixed parameter” tab, set parameter #1=”AXIS USED” (note that this is set by default for MP940 firmware versions 03 and higher), and save.

- ❑ 10. Cycle control power of both MP940 and SGDH (make sure the control power is applied to both the MP940 and SGDH within 3 seconds of each other).

- ❑ 11. Set Pn parameters of SGDH for MP940 (can be done with Digital Operator).
  - Open "SERVO PACK" in SVA module definition.
  - Select "Default Set" in ‘Edit’ menu and execute.
  - If the system does not have P-OT, N-OT, reset data of Pn50A from 2881H to 8881H and Pn50B from 8883H to 8888H.
  - Save data.

  Refer Table 1 SGDH Parameter for MP940 for Manual Setting

- ❑ 12.Cycle power of both SGDH and MP940. (take care by applying power first to the Mp940 then the SGDH within 3 sec of each other).

- ❑ 13.Check SGDH indicates “bb” and MP940 indicates "RDY" and "RUN" LED are ON.

****SPECIAL NOTE**

- ❑ 14.Should the SGDH display indicate an **A9F** alarm ***see appendix A 4 for details.***

- MotionWorks software and the system status table below can be used for troubleshooting an A9F alarm. Please refer to CPU error status address SW00041 to help determine the cause of the alarm.

System status list

Name	Register number	Content		
System reservation	SW00030 ～ SW00039	(unused)		
CPU status	SW00040	SB000400	READY	0: Conversation/self-diagnosis abnormality 1:Normality
		SB000401	RUN	0: Shutdown 1:(*S) is driving.
		SB000402	ALARM	0: Normality 1:Warning
		SB000403	ERROR	0: Normality 1:Abnormality
		SB000404	RESUME	0: New drive
		SB000405	Start status	0: Recovery usually
		SB000406	System reservation	(unused)
		SB000407	WEN	0: 1 which cannot be written:It is possible to write (*O).
		SB000408	System reservation	(unused)
		SB000409	System reservation	(unused)
		SB00040A	System reservation	(unused)
		SB00040B		
		SB00040C		
		SB00040D		
		SB00040E	Shutdown demand	0: RUN selection 1:STOP selection
		SB00040F	System reservation	(unused)
CPU error status	SW00041	SB000410	Major fault	1: WDGE and undefined instruction Refer to SW00050 for details.
		SB000411	Program memory error	1: The program memory is abnormal.
		SB000412		
		SB000413	System reservation	(unused)
		SB000414		
		SB000415		
		SB000416		
		SB000417		
		SB000418	User operation error	1: User operation error
		SB000419	I/O error	1: Input/output error
		SB00041A	Illegal interruption generation	1: Illegal interruption generation
		SB00041B	Transmission error	1: LIO transmission error
		SB00041C	SVA	1: Abnormal detection
		SB00041D	CNTR	1: Abnormal detection
		SB00041E	Communication option (M-Link/DEVICE-NET)	1: Abnormal detection
		SB00041F	CERF breakdown	1: Abnormal detection

10-8

- 15.**Start up is completed**.

2. For MotionWorks+ User

- ❑ 1. Attach the MP940 to SGDH and wire input power according to Users Manuals.

- ❑ 2. Set the MP940 dip switch as “MEMORY CLEAR” (only "INIT" and "TEST" are ON).

- ❑ 3. Apply control power to both SGDH and MP940 (make sure the control power is applied to both the MP940 and SGDH within 3 seconds of each other). Immediately, the MP940 "RDY" and "RUN" LEDs will blink (this means the MP940 is initialized properly and all memory is cleared). The SGDH LED readout will blink “bb” (trying to establish communications). Wait several seconds until the SGDH displays “AE0”. This display indicates DPR (Dual Port Ram) communications timeout.

- ❑ 4. If the SGDH is NOT factory configured (ie: not brand new out of the box), it will be necessary to initialize the SGDH. This is done by executing Fn005, Fn006, and Fn014 from the SGDH front panel.
  Fn005: Default set for SGDH user constants
  Fn006: Clear Alarm history.
  Fn014: Reset Alarm

  For detailed initialization procedure see Appendix A 1

- ❑ 5. Set the MP940 dip switch as normal operation (only "RUN" is ON).

- ❑ 6. Set Pn parameters of SGDH for MP940 (can be done with Digital Operator).

  Refer Table 1 SGDH Parameter when connecting MP940 for Manual Setting

- ❑ 7. Cycle control power of both MP940 and SGDH (make sure the control power is applied to both the MP940 and SGDH within 3 seconds of each other). MP940s "RDY" and "RUN" LED should be steady ON. After several seconds, the SGDH will display “AE0”.

- ❑ 8. Start MotionWorks+ and open a project file by a left mouse click on "File" of the menu bar. Left mouse click on "Tools" of the menu bar to select the "Configuration Wizard".

- ❑ 9. Select "Update System" and click on the "Next" button. The fourth screen will ask when to perform a "System Download". Select "Yes", then "Next", to reach the "Start Update" button. Click "Start Update", then "Next", to start the “System Download” and follow the instructions. Configuration wizard will execute “Memory Clear”, then “Module Configuration Download”. After download, click on "OK" to "Run Initial Device Configuration”. Follow the instructions and "Transfer Files" **TO** the controller.

- ❑ 10. Cycle control power of both MP940 and SGDH (make sure the control power is applied to both the MP940 and SGDH within 3 seconds of each other).

- ❑ 11. Check SGDH indicates “bb” and MP940 indicates "RDY" and "RUN" LED are ON.

****SPECIAL NOTE**

- ❑ 12.Should the SGDH display show an **A9F** alarm ***see appendix A4 for details.***

- 13.**Start up is completed**.

Table 1 SGDH Parameter when connecting MP940

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

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.	
	2	/P-CON Signal Mapping (Pcontrol when low.)	0 to F	Same as above.	1: SI1
	3	P-OT Signal Mapping (Ovetravel when high.)	0 to F	Same as above.	2: SI2
Pn50B	0	N-OT Signal Mapping (Over-travel when high.)	0 to F	Same as above.	3: SI3
	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

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 toF	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 (Disab ling 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 SGDH servo amplifier, only the following modes are compatible: Pn50A.1=7, Pn50A.3=8, and Pn50B.0=8.

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

A 1 Initializing Servo Amplifier Procedure

1. Press “Modeset” key on built-in key pad until Fn000 appears.
2. Increment up to Fn005.
3. Press the “Data” key until “InIt” appears.
4. Press “Modeset” key, “InIt” will flash, then “done” will flash, and then “InIt” reappears
5. Hold “Data” key until Fn005 appears.
6. Increment up to Fn006.
7. Press the “Data” key until “TrClr” appears.
8. Press “Modeset” key. “done” will flash and “InIt” reappears.
9. Press “Data” key until Fn006 appears.
10. Increment up to Fn014.
11. Press “Data” key until “InIt” appears.
12. Press “Modeset” key . “done” will flash and “InIt” reappears.
13. Press “Data” key until Fn014 appears to exit.
14. Recycle power to the system.

A 2 MotionWorks Folder Setup Procedure

1. Go to the File Menu. Select New, 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 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.

A 3 Torque Limit Values (%) for OWC002

SGMAH Standard Servo Motor Rated Values and Specifications

Voltage		200V						100V			
Servo Motor: SGMAH-		A3A	A5A	01A	02A	04A	08A	A3B	A5B	01B	02B
Rated Output	kW	0.03	0.05	0.1	0.2	0.4	0.75	0.03	0.05	0.1	0.2
Rated Current	A(rms)	0.44	0.64	0.91	2.1	2.8	4.4	0.66	0.95	2.4	3.0
Max. Instantaneo	A(rms)	1.3	2.0	2.8	6.5	8.5	13.4	2.0	2.9	7.2	9.0
Torque Limit Val	%	295	313	308	310	304	305	303	305	300	300

SGMPH Standard Servo Motor Rated Values and Specifications

Voltage		200V					100V	
Servo Motor: SGMPH-		01A	02A	04A	08A	15A	01B	02B
Rated Output	kW	0.1	0.2	0.4	0.75	1.5	0.1	0.2
Rated Current	A(rms)	0.89	2.0	2.6	4.1	7.5	2.2	2.7
Max. Instantaneo	A(rms)	2.8	6.0	8.0	13.9	23.0	7.1	8.4
Torque Limit Val	%	315	300	308	339	307	323	311

SGMGH Standard Servo Motor (1500 r/min) Rated Values and Specifications

Voltage		200V									
Servo Motor: SGMGH-		05A□A	09A□A	13A□A	20A□A	30A□A	44A□A	55A□A	75A□A	1AA□A	1EA□A
Rated Output	kW	0.45	0.85	1.3	1.8	2.9	4.4	5.5	7.5	11.0	15.0
Rated Current	A(rms)	3.8	7.1	10.7	16.7	23.8	32.8	42.1	54.7	58.6	78.0
Max. Instantaneo	A(rms)	11	17.0	28	42	56	84	110.0	130	140	170.0
Torque Limit Val	%	289	239	262	251	235	256	261	238	239	218
Voltage		400V									
Servo Motor: SGMGH-		05D□A	09D□A	13D□A	20D□A	30D□A	44D□A	55D□A	75D□A	1AD□A	1ED□A
Rated Output	kW	0.45	0.85	1.3	1.8	2.9	4.4	5.5	7.5	11.0	15.0
Rated Current	A(rms)	1.9	3.5	5.4	8.4	11.9	16.5	20.8	25.4	28.1	37.2
Max. Instantaneo	A(rms)	5.5	8.5	14.0	20.0	28.0	40.5	55.0	65.0	70.0	85.0
Torque Limit Val	%	289	243	259	238	235	245	264	256	249	228

SGMGH Standard Servo Motor (1000 r/min) Rated Values and Specifications

Voltage		200V							
Servo Motor: SGMGH-		03A□B	06A□B	09A□B	12A□B	20A□B	30A□B	44A□B	60A□B
Rated Output	kW	0.3	0.6	0.9	1.2	2.0	3.0	4.4	6.0
Rated Current	A(rms)	3.0	5.7	7.6	11.6	18.5	24.8	32.9	46.9
Max. Instantaneo	A(rms)	7.3	13.9	16.6	28.0	42.0	56.0	84.0	110.0
Torque Limit Val	%	243	244	218	241	227	226	255	235

A 3 Max Torque Reference Table (%) for OWC002(*cont.*)

SGMSH Start Servo Motor Rated Values and Specifications

Voltage		200V					
Servo Motor: SGMSH-		10A□A	15A□A	20A□A	30A□A	40A□A	50A□A
Rated Output	kW	1.0	1.5	2.0	3.0	4.0	5.0
Rated Current	A(rms)	5.7	9.7	12.7	18.8	25.4	28.6
Max. Instantaneo	A(rms)	17	28.0	42	56	77	84
Torque Limit Val	%	298	289	331	298	303	294
Voltage		400V					
Servo Motor: SGMSH-		10D□A	15D□A	20D□A	30D□A	40D□A	50D□A
Rated Output	kW	1.0	1.5	2.0	3.0	4.0	5.0
Rated Current	A(rms)	2.8	4.7	6.2	8.9	12.5	13.8
Max. Instantaneo	A(rms)	8.5	14.0	19.5	28	38	42
Torque Limit Val	%	304	298	315	315	304	304

SGMDH Standard Servo Motor Rated Values and Specifications

Voltage		200V		
Servo Motor: SGMDH-		22A□A□B	32A□A□B	40A□A□B
Rated Output	kW	2.2	3.2	4.0
Rated Current	A(rms)	15.7	20.9	23.2
Max. Instantaneo	A(rms)	54	73.0	77
Torque Limit Val	%	344	349	332

SGMUH Standard Servo Motor Rated Values and Specifications

Voltage		400V			
Servo Motor: SGMUH-		10D□A	15D□A	30D□A	40D□A
Rated Output	kW	1.0	1.5	3.0	4.0
Rated Current	A(rms)	2.7	4.1	8.1	9.6
Max. Instantaneo	A(rms)	8.5	14.0	28	38.5
Torque Limit Val	%	315	341	346	401

A 4 Unexpected Alarms

MotionWorks Users

- 1.Should the SGDH display indicate an **A9F** alarm, this may be due to, but not limited to:
  - External Encoder disconnected - when the external encoder has been enabled unintentionally through MotionWorks or MotionWorks+ and needs to be disabled**.(MP940 memory clear may be required.)**
  - 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 look at address IWC00F to find out which parameter setting is out of range).
    If the alarm is related to a torque limit out of range, see appendix A 3 "Max Torque Reference Table" for selection of the correct value and enter this into address OWC002 of the "Set Up Parameters" tab.
  - 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. Even if ILC00A is currently less than OWC00F, the alarm will remain. You must clear the alarm to remove it.

MotionWorks+ Users

- 1.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 unintentionally through MotionWorks+ and needs to be disabled**.(MP940 memory clear may be required.)**
  - Local I/O disconnected - when programming specifies the use of local I/O and it is not connected.
  - Exceeding Torque Limit - if the alarm is related to torque limit out of range, see appendix A 3 Max Torque Reference Table for selection of the correct value.
    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 appendix A 3 "Max Torque Reference Table" (multiply this result with –1 to make it a negative number). After this is changed, it is necessary to Compile and Download for the MP940 to accept the changes.
  - Parameter and Definition changes - when System Parameters, Variable, Constant, System Variable, I/O, and Table Definitions have been changed but not compiled**.(You must Save and Compile each change before recycle of power to the system.)**