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# PREFACE

## CAUTIONS AND WARNINGS

### Incorrect Use Can Cause Damage



Sigma Win is an application used to operate servo systems ranging in power from 10W to 30kW. To avoid damage to machines or personal injury, please read this manual carefully. Follow all safety procedures noted in this manual and in the operations manual of the servo amplifiers and servo motors.

Please refer to the following manuals for detailed information on correct operation of the servo amplifiers.

Manual Name	Manual Number
Sigma Series SGM/SGDA User's Manual	TSE-S800-15
Sigma Series SGM*/SGDB User's Manual	TSE-S800-16
Sigma Series SGM*/DR2 User's Manual	TSE-S800-17
Sigma Series SGM*/SGDC User's Manual	TSE-S800-22
Sigma Series SGME/SGDE User's Manual (for position control)	TSE-S800-15.10
Sigma Series SGME/SGDE User's Manual (for speed/torque control)	TSE-S800-15.11
Sigma Series SGME/SGDL User's Manual (for position control)	TSE-S800-??.??
Sigma Series SGME/SGDL User's Manual (for speed/torque control)	TSE-S800-??.??
Sigma Series SGMM/SGDF User's Manual	SIE-S800-27
Sigma II Series SGM*H/SGDM User's Manual Servo Selection and Datasheets	SIE-S800-32.1

Manual Name	Manual Number
Sigma II Series SGM*H/SGDM User's Manual Design and Maintenance	SIE-S800-32.2

## **Operator Panel for Sigma II**

The Sigma II can communicate with either the Built-in Operator Panel or Sigma Win. When Sigma Win is running, the Operator Panel is disabled (all the panel LEDs are OFF and all the switches are inactive).

The Operator Panel is enabled when properly exiting Sigma Win. In case of an improper termination of Sigma Win, the Operator Panel is enabled after three minutes.

## WELCOME TO SIGMA WIN

Welcome to Sigma Win, a software tool to help set up servo applications for the Sigma Series servo amplifiers. Sigma Win provides a set of tools to simplify the setup and operation of applications, for both experienced users of Sigma servo products and novices alike.

Sigma Win provides a user-friendly graphical user interface for setup, control, monitoring, and testing of Sigma servo systems. All user functions are easy to access and complete online help is available in a single keystroke.

## FEATURES OF SIGMA WIN

Sigma Win enables full setup, monitoring, and control of any Sigma servo system through:

- Real-time monitoring of servo system data (I/O, alarms, internal registers, etc.)
- Context sensitive help on parameters and alarms.
- Graphical manual and autotuning of servo loop parameters
- Graphical dynamic and static oscilloscope for graphic view of servo system response
- Real-time monitoring of all analog and digital I/O.
- Context sensitive help on all screens, accessible via the F1 key.

## SUPPORTED DEVICES

Sigma Win supports the following Sigma series servo amplifiers::

### Sigma Series Servo Amplifiers

Servo Amplifier Name	Description
DR2-****	DR2 Sigma servo amplifier for speed, torque and position control
DR2-****-F	DR2 Sigma servo amplifier with full closed loop control
SGDA-***S	SGDA Sigma servo amplifier for speed and torque control
SGDA-***P	SGDA Sigma servo amplifier for position control
SGDB-***D	SGDB Sigma servo amplifier for speed, torque and position control
SGDC-***SA	SGDC Sigma servo amplifier for speed, torque and position control
SGDE-**S	Low-cost SGDA-***S
SGDE-**P	Low-cost SGDA-***P
SGDF-**CS	Sigma Mini servo amplifier for speed control
SGDF-**CP	Sigma Mini servo amplifier for position control
SGDL-***S	Alternative low-cost SGDA-***S
SGDL-***P	Alternative low-cost SGDA-***P

### Sigma II Series Servo Amplifiers

Servo Amplifier Name	Description
SGDM-***D	Sigma II servo amplifier for speed torque and position control
SGDM-***DA	Sigma II servo amplifier for speed torque and position control
SGDH-***E	Sigma II servo amplifier for speed torque and position control

Note: Some servo amplifiers do not support all Sigma Win functions. Therefore, any features not supported by the amplifier will be noted in this manual.

## INSTALLING SIGMA WIN

### Software Requirements

The Sigma Win software includes the following:

1. One CD-ROM labeled "Sigma Win ver. 1.00."

### System Requirements

Sigma Win requires the following minimum configuration:

- An IBM-compatible computer with a Pentium class microprocessor
- 16 megabytes of RAM (32 megabytes recommended)
- VGA monitor and graphics adapter with a resolution of at least 800 by 600 pixels
- CD-ROM Drive
- An asynchronous adapter (RS-232, RS-422) on the computer
- Sigma Servo motors and amplifiers as required
- Communication cable (YS-11 or YS-12) for servo amplifier connection to personal computer
- Windows 95, Windows 98, or Windows NT version 4.0 or higher

Note: If Microsoft Internet Explorer version 3.02 or higher is not installed, the Help files will not display correctly. No other user functions will be affected.

### Program Setup

Run the Sigma Win Setup program to set up Sigma Win. The Sigma Win Setup program decompresses the Sigma Win program and its associated files, and copies them onto your hard drive.

Exit all other programs as a precaution against program conflicts that may occur during software installation and testing.

To run the setup program:

1. Insert the CD-ROM in the CD-ROM drive (e.g., F:).



2. Select the Run option from the Start menu; type F:\SETUP. Click on **OK**. If AutoPlay is enabled, the setup program will automatically load when the CD-ROM is inserted. The dialog below will appear.

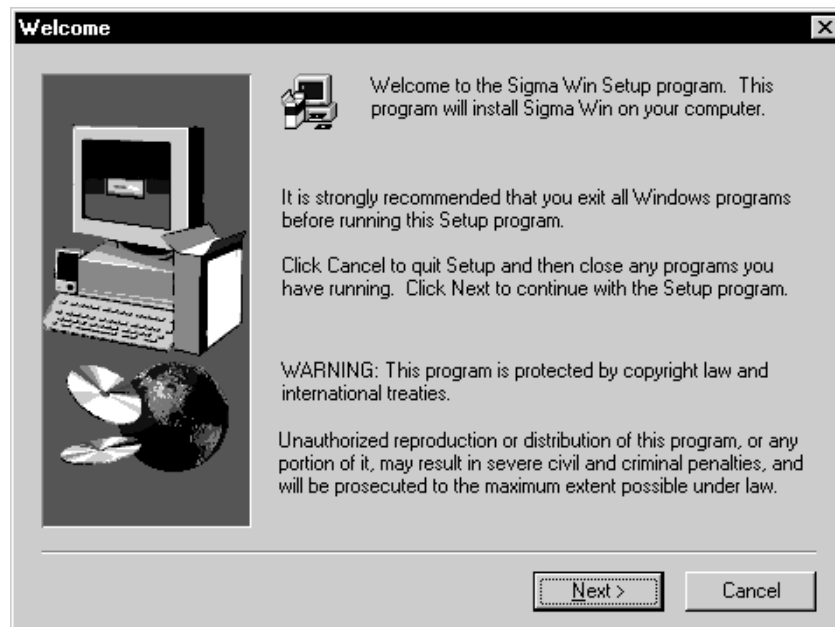


Select the desired language and press **OK**.

3. Or, explore the contents of the CD using Windows Explorer. Double-click on the F:\SETUP.EXE file.
4. The following screen displays as the setup program begins.



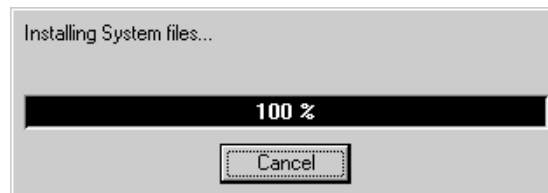
5. The informational screen shown below appears. Read the information. Press **Next** to proceed.



6. The screen shown below appears. Select the directory in which to copy the Sigma Win files. Press **Next** to proceed.



7. The installation program begins to copy the files from the CD-ROM onto the hard drive. The progress bar shown below depicts the progress of the file copy function.



Note: If Sigma Win requires a newer version of a support file located on the computer, a prompt appears inquiring whether to overwrite the current version or cancel the install process. If the new version of the support file is not installed, Sigma Win may not work properly.

9. The screen below appears when the installation process is finished.



## TECHNICAL SUPPORT

Yaskawa Electric America and its distributors are committed to customer satisfaction. Technical support is provided to all registered users subject to the terms and conditions in this document. Follow the steps below for questions regarding the installation or use of Sigma Win.

1. First, refer to this manual or the help file.

2. If further assistance is required, note the type of computer in use, and the following characteristics: operating system version, available memory and other programs running.
3. Note when the error, if applicable, occurred. Include the exact wording of any error messages.

## **AVAILABILITY AND RULES FOR USE AND DISTRIBUTION**

Distribution of Sigma Win without Yaskawa's permission is not permitted. For additional copies, contact Yaskawa or an authorized distributor.

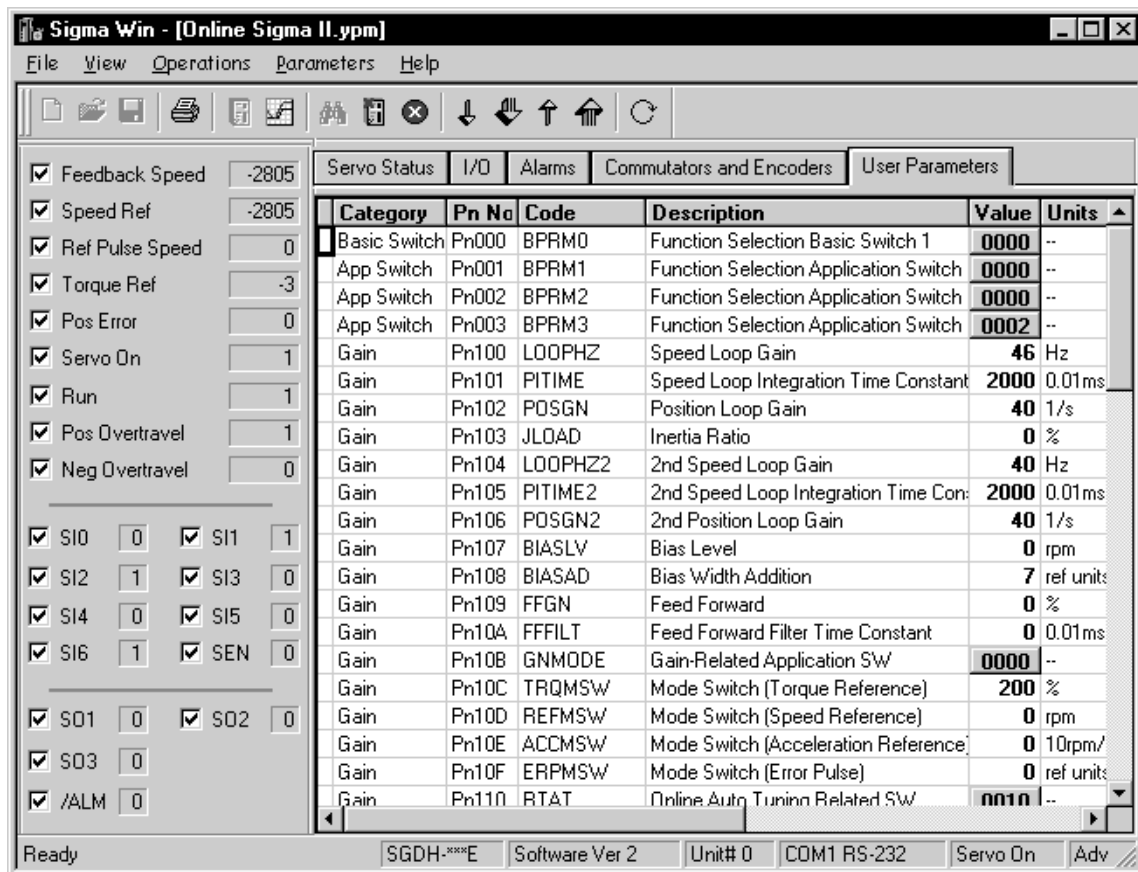
This software product is copyrighted, and all rights are reserved by Yaskawa Electric America. Users are licensed to install and use this software in a single computer. The software may be copied as needed to facilitate the user's own use; however, making copies of the software to be used for any other purpose is a violation of United States copyright laws. Contact Yaskawa or an authorized distributor for assistance.

# STARTING SIGMA WIN

## Navigating Sigma Win

This section describes how to quickly connect Sigma Win to the servo system. It guides the user through the minimal functions needed to set up Sigma Win and the servo amplifier.

A typical view of the Sigma Win main screen is shown below.



**Figure 1: Main Window of Sigma Win**

The main window of Sigma Win has four sections, the Menu and Toolbar section, the Monitor Panel Section, the Servo Data section, and the Status Bar

The Menu and Toolbar section is used to access all the functions of the application. The user can control the location and visibility of the toolbars and menus. If a servo amplifier does not support a function, the corresponding control is disabled.

Sigma Win offers two toolbars: the Main toolbar and the Servo Setup toolbar. The Main toolbar is used for file operations and program control, and for operations between the servo amplifier and the computer such as upload, download, amplifier scan, etc. The Servo Setup toolbar is used to set up, configure, and test run the servo amplifier. The menu is shown in Figure 2; the toolbars are shown in Figures 3 and 4 on the following pages.

Menus Options

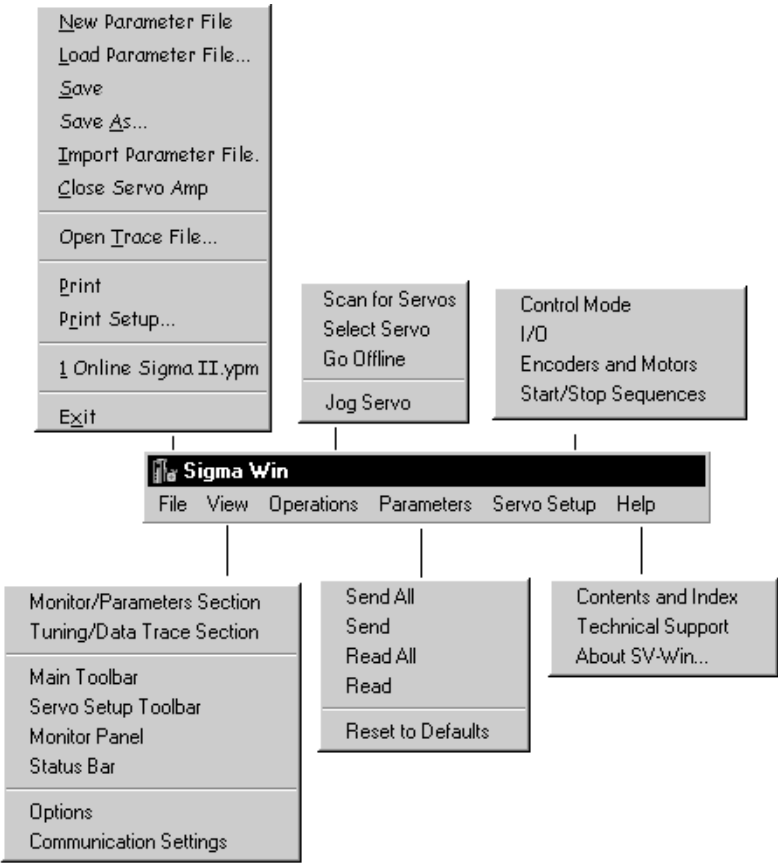

















Figure 2: Sigma Win Menu Bar

Main Setup Toolbar







Figure 3: Sigma Win Main Toolbar

This toolbar button...	Does this...
	Creates new parameter table (offline only)
	Opens/Imports existing parameter table
	Saves parameter table to file
	Prints parameter table
	Selects Monitor and Parameters mode
	Selects Tuning and Data Tracing mode
	Scans for servo amplifiers (offline only)
	Goes offline (online only)
	Closes servo amplifier
	Sends a selected parameter to servo (online only)
	Sends all parameters to servo (online only)
	Gets a selected parameter from servo (online only)
	Gets all parameters from servo (online only)
	Jogs the servomotor
	Origin search

## Servo Setup Toolbar



*Figure 4: Sigma Win Servo Setup Toolbar*

This toolbar button...	Does this...
	Sets up servo control mode
	Set up start/stop sequences
	Sets up motors and encoders
	Sets up I/O

The Monitor Panel shown below displays essential status information of the connected servo amplifier. The user selects which monitor to update, and controls the location and visibility of this section

The Monitor Panel window displays the following status information:

- ☒ Feedback Speed: 266
- ☐ Speed Ref:
- ☒ Ref Pulse Speed: 0
- ☒ Torque Ref: 0
- ☒ Pos Error: 0
- ☒ Base Block: 1
- ☒ Run: 0
- ☒ Pos Overtravel: 1
- ☒ Neg Overtravel: 1
- ☒ /COIN: 1
- ☒ /TGON: 0
- ☒ P-OT: 1
- ☒ /S-ON: 0
- ☒ N-OT: 1
- ☒ ALM: 0





**Figure 5: The Monitor Panel**

The Servo Data section (shown below) is used to monitor servo operations and adjust servo performance.

Servo Status   I/O   Alarms   Commutators and Encoders   User Parameters								
Category	Pn No	Code	Description	Value	Units	Servo	M	▲
Basic Switch	Pn000	BPRM0	Function Selection Basic Switch 1	0000	--	0000		
App Switch	Pn001	BPRM1	Function Selection Application Switch	0000	--	0000		
App Switch	Pn002	BPRM2	Function Selection Application Switch	0000	--	0000		
App Switch	Pn003	BPRM3	Function Selection Application Switch	0002	--	0002		
Gain	Pn100	LOOPHZ	Speed Loop Gain	46	Hz	46		
Gain	Pn101	PITIME	Speed Loop Integration Time Constant	2000	0.01ms	2000		
Gain	Pn102	POSGN	Position Loop Gain	40	1/s	40		
Gain	Pn103	JLOAD	Inertia Ratio	0	%	0		
Gain	Pn104	LOOPHZ2	2nd Speed Loop Gain	40	Hz	40		
Gain	Pn105	PITIME2	2nd Speed Loop Integration Time Constant	2000	0.01ms	2000		
Gain	Pn106	POSGN2	2nd Position Loop Gain	40	1/s	40		
Gain	Pn107	BIASLV	Bias Level	0	rpm	0		
Gain	Pn108	BIASAD	Bias Width Addition	7	ref units	7		
Gain	Pn109	FFGN	Feed Forward	0	%	0		
Gain	Pn10A	FFFLT	Feed Forward Filter Time Constant	0	0.01ms	0		
Gain	Pn10B	GNMODE	Gain-Related Application SW	0000	--	0000		
Gain	Pn10C	TRQMSW	Mode Switch (Torque Reference)	200	%	200		
Gain	Pn10D	REFMSW	Mode Switch (Speed Reference)	0	rpm	0		
Gain	Pn10E	ACCMSW	Mode Switch (Acceleration Reference)	0	10rpm/s	0		
Gain	Pn10F	ERPMSW	Mode Switch (Error Pulse)	0	ref units	0		
Gain	Pn110	RTAT	Online Auto Tuning Related SW	0010	--	0010		

**Figure 6: The Servo Data Section**



This section has two modes of operation: Monitors and Parameters, and Tuning and Data Tracing. Switch between the two modes using the   buttons on the toolbar. Click on the  button to select the Monitors and Parameters mode. Click on the  button to select the Tuning and Data Tracing mode.

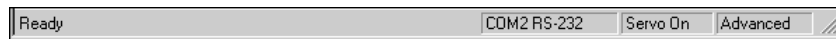
The Monitor and Parameter mode has five tabs as follows:

- Servo Status tab - monitors status registers in the amplifier
- I/O tab - monitors amplifier inputs and outputs
- Alarms tab - monitors and controls alarms
- Encoders tab - monitors encoder related registers
- Parameter tab - displays and allows editing of User Parameters on the servo amplifier.

The Tuning and Data Tracing mode has four tabs as follows:

- Autotuning tab - provides autotuning of the amplifier
- Manual Tuning tab - provides manual adjustment of tuning parameters
- Adjustments tab - provides control on zero adjustment tuning values
- Data Tracing tab - provides graphical display of servo performance (data and I/O)

The Status Bar, shown below, is used by Sigma Win to display the current status of the application and of the amplifier.



**Figure 7: The Status Bar**

The Status Bar contains seven sections or panes.

Beginning on the left, the first pane is the application message area. This pane is used to display the status of the application (e.g. "Ready," "Jogging Reverse," etc.). This pane also displays a brief description of each toolbar button function when the mouse pointer is over the button.

The second pane shows the model of the connected servo amplifier.

The third pane shows the software version of the connected servo amplifier.

The fourth pane shows the unit number (i.e., axis address) of the connected servo amplifier.

The fifth pane shows the current communication settings.

The sixth pane shows whether the amplifier is in a Servo ON or Servo OFF state.

The seventh pane shows the current user level (Advanced/Basic). The user level can be changed in the User Options Dialog (see page 63 for details).

## STARTING SIGMA WIN

### From the Start Menu



To start Sigma Win from the Start menu:

1. Click on the Start button on the Windows taskbar. The Start menu opens.
2. Choose Programs. The Programs folder opens.
3. Choose Yaskawa. The Yaskawa folder opens.
4. Click on Sigma Win.

### From My Computer or the Windows Explorer

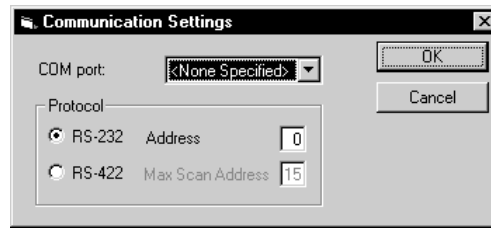
To start Sigma Win from My Computer or the Windows Explorer, navigate the Sigma Win folder and double-click SIGMAWIN.EXE. The SIGMAWIN.EXE file is located in the drive and folder that specified during installation. If the default setup was used, SIGMAWIN.EXE is in C:\PROGRAM FILES\YASKAWA\SIGMAWIN.

The screen shown below appears while the application loads. The name and version of the application and copyright information appear on the screen.



*Figure 8: The opening Screen of Sigma Win*

The first time Sigma Win runs, the Communication Setting dialog, shown below, appears. This screen is used to define the settings needed for Sigma Win to connect to the servo amplifier through the serial port.



***Figure 9: First Time Communication Setup Screen***

Select the port to which the amplifier is connected to the computer. Once selected, Sigma Win uses this as its default.

Select the protocol (RS-232/RS-422) that matches the type of communications port on the computer.

**Note:** Use an RS-422 interface card if more than one servo amplifier is desired to be connected to one serial port. (See Page 64 for details on how to connect multiple devices, and Appendix B for cable layouts).

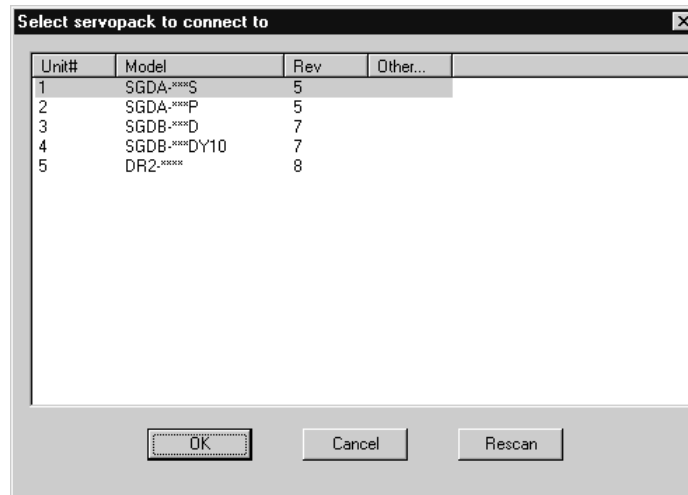
When all communication parameters are set, click on **OK**.

Sigma Win then attempts to connect to the amplifier.

Following a successful connection, Sigma Win lists the attached amplifier(s).

## Servo Amplifier Selection

After Sigma Win starts, the application scans the serial port for connected servo amplifiers. If any servo amplifiers are detected, the Servo Selection Dialog box shows the results of the scan.



*Figure 10: Servo Selection Screen*

Note: If using RS-232, only one device can be shown.

At this point, click on the device selected for connection then click **OK**, or double-click on the device.

Press **Rescan** to rescan the serial port.

Press **Cancel** to dismiss the dialog. The application reverts to a disconnected state.

After the user selects the servo amplifier, Sigma Win obtains all the user parameters from the servo amplifier and displays them in the Parameter tab.


# CONFIGURING AN APPLICATION USING SIGMA WIN

After Sigma Win has established communications and connected to the amplifier, the user can set up and test an application in a few simple steps.

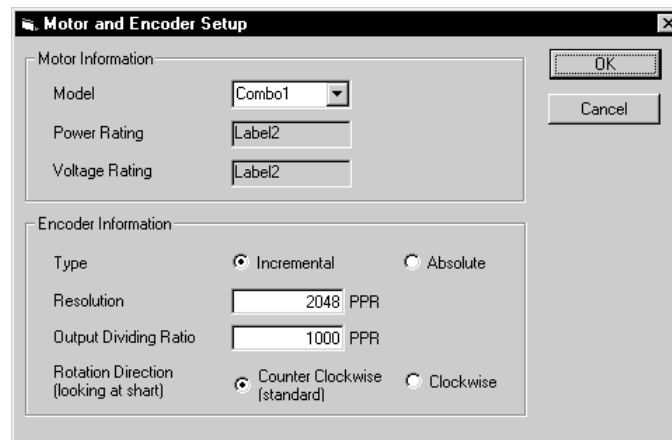
During this process, an alarm status may occur on the servo amplifier (noted by the red alarm LED on the amplifier being ON). To investigate the cause of the alarm (incorrect encoder settings, cables not attached correctly, etc.), see page 30 and Appendix A for information on how to view and clear alarms, and for troubleshooting alarms.

## STEP 1 - MOTOR AND ENCODER SETUP

After the parameters from the servo amplifier have been downloaded to the application, the user must verify that the amplifier is set up correctly for the connected motor and encoder.

To set or view the current motor and encoder settings, click on the  button in the Servo Setup Toolbar or select **Motors and Encoder** from the Servo Setup menu.

The Motor and Encoder Setup dialog appears.



*Figure 11: Motor and Encoder Setup Screen*

The application displays the present settings for motor and encoder.

Verify that the information matches the attached hardware.

If the amplifier is not configured correctly, or if the user desires to change the motor, take the following steps:


1. Click the down arrow on the Model selection box. A list of motors that can be attached to the current servo amplifier is displayed. Click on a motor to select it. While scrolling through the list, the Power and Voltage rating of each motor are displayed.
2. Click on the appropriate Encoder type selection (Incremental/Absolute).
3. In the Encoder Resolution box, type in the PPR (pulses per revolution) of the selected motor. (See the manual that was included with the motor for this data.)
4. If desired, enter a value in the Output Dividing Ratio box. This value scales the encoder count that is seen by a high level controller. One output pulse =  $\text{Resolution} / \text{Output Dividing Ratio}$
5. Select the default direction of rotation (clockwise or counter-clockwise).

Note: For Sigma II, items 2 - 4 are automatically set and are, therefore, read only.

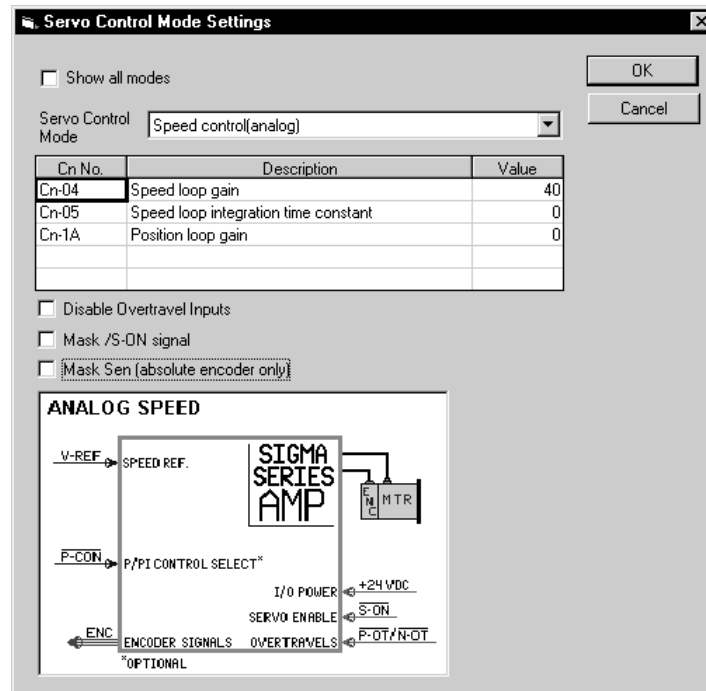
Note: This direction is as seen when looking at the motor from the shaft side.

## STEP 2 - SELECT SERVO CONTROL MODE

Sigma Series servo amplifiers can be controlled in several methods (e.g., torque control, speed control, position control, etc.). Each servo amplifier has a matching Servo Control Mode that allows the servo amplifier to be controlled in an appropriate control loop.

To select the current Servo Control Mode, click on the  button in the Servo Setup Toolbar or select **Control Mode** from the Servo Setup menu.

The dialog shown below appears:



**Figure 12: Servo Control Mode Setup Screen**


To change the mode of operation of the servo amplifier:

1. Click on the Servo Control Mode box and select the desired control mode from the list shown.
2. Verify the values of the Control Mode Parameters. Adjust the values as needed (the parameters change per control mode). The value of these parameters can be edited in the same manner as the Parameter Table tab (see page 32).
3. If needed, disable the over-travel signals (P-OT, N-OT), /S-ON signal or the SEN (absolute encoder only) signal by selecting the matching checkbox.
4. Click **OK** to accept the values, or **Cancel** to dismiss the dialog and return to the main screen without any changes.

### STEP 3 - JOG TEST

After all the previous steps have been executed, perform a no-load test run of the servo amplifier, using the Servo Jog function. The Servo Jog function tests the direction of rotation and speed settings without the need to connect to a host controller.

The Jog Test must be done before coupling the motor to the application.

 **CAUTION**

The Jog function rotates the motor at speeds up to 5000 RPM. Make sure all personnel and all equipment are away from the motor before turning the servo ON.

The jog function is accessed either from the Operations menu or by clicking the button on the Servo Setup toolbar. The following screen appears after calling the jog function:





**Figure 13: Servo Jog Screen**

**Note:** For Sigma II models, the jog screen cannot be accessed if an external /S-ON signal is applied or if the /S-ON signal is masked on.



To jog the servo amplifier:

1. Set the jog speed in the Jog Speed box (in some models the jog speed is fixed at 500 RPM and the Speed field is disabled)
2. Make sure the motor is clear from all obstructions. Click the **Servo** button to turn the servo on. When the servo signal is activated, a graphic of an LED turns green.
3. Note: If the servo signal is controlled by an external /S-ON signal applied, or the user parameter switch for masking /S-ON signal is ON, the **Servo** button will not be able to control the servo ON/OFF status.
4. To jog the motor clockwise, click on the  button and hold the left mouse button down. To jog counter-clockwise, click on  hold the left mouse button down. When the mouse button is released, the motor stops rotating within 1-2 seconds.


Click on **Close** or press the **ESC** key to return to the main Sigma Win window.

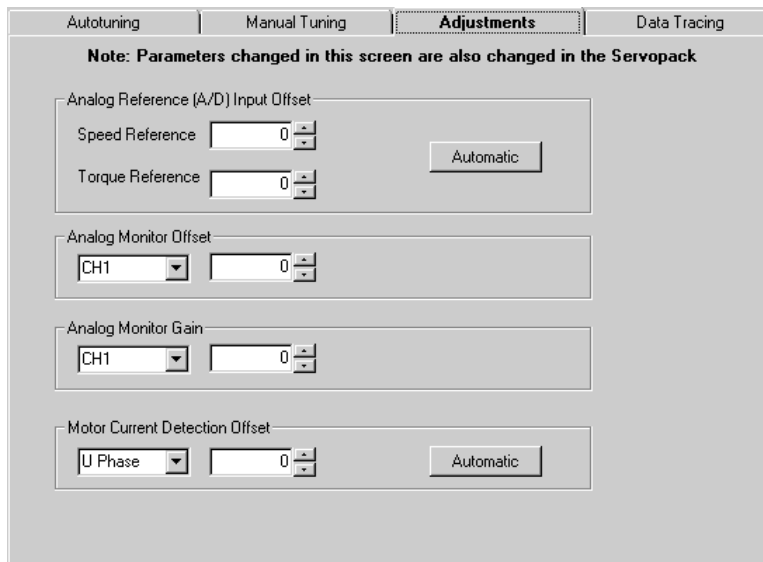
Note: The servo is turned off when the window is dismissed.

## STEP 4 - REFERENCE OFFSET ADJUSTMENTS

If the motor drifts (rotates at a very slow speed) while at zero speed, the reference offset must be adjusted

This adjustment is executed from the Adjustment tab.

To access the Adjustment functions, switch to the Monitors and Parameters mode by clicking on the  button and select the Adjustments tab. The dialog shown below appears.



*Figure 14: Adjustments Tab*


Adjust the Speed and Torque References by clicking on the **Automatic** button, located next to the Speed and Torque Reference values.

## STEP 5 - AUTOTUNING THE APPLICATION

After a successful Jog Test, connect the motor to the application. Autotune the servo amplifier to maximize the performance of the application. To autotune Sigma Series amplifiers, see the offline autotuning function. To autotune Sigma II series amplifiers, see the online autotuning function.

## STEP 6 - SAVE USER SETTINGS

When the servo amplifier is set up and ready to perform in the application, the parameter table for this application must be saved to a file for maintenance purposes.

To save the parameter table to the disk, use the **Save** item from the File menu or click on the  button. To save the parameters with other than the current file name, use the **Save As** item.

# APPLICATION MONITORING

## MONITORING

### Overview

Monitors are used to monitor the status of the servo amplifier. The monitors show values such as speed, torque or I/O status. There are two types of monitors: Numerical monitors and Bit Status monitors. Numerical monitors are used to monitor numerical values such as speed, torque and position error. Bit Status monitors are used to determine the OFF/ON status of individual I/O points such as /S-ON or /P-CON.

### Servo Monitoring

All of the monitors for the servo amplifier are displayed in three groups located on three corresponding tabs:

1. Servo Status - These monitors show the overall state of the amplifier such as motor speed, position error, Servo On status, Alarm status, etc.
2. I/O - These monitors display the ON/OFF status of amplifier inputs and outputs (internal and external).
3. Encoders - These monitors show the current state of the encoder phases and of the encoder position.

In addition to the three tabs, the most important monitors are also displayed on the Monitor Panel. The monitor panel can be positioned anywhere on the screen or can be left floating. To move the panel; locate the mouse pointer over the panel, hold down the left mouse button and drag the mouse. Release the button when the panel is in the desired location.

De-select the Monitor panel from the View menu, if desired, to discontinue viewing the Monitor panel.


In order for Sigma Win to update a particular monitor in real-time, the monitor must be selected using the checkbox located next to the desired monitor.

Note: The overall update time of the monitors depends on the total number of monitors that are selected to update.

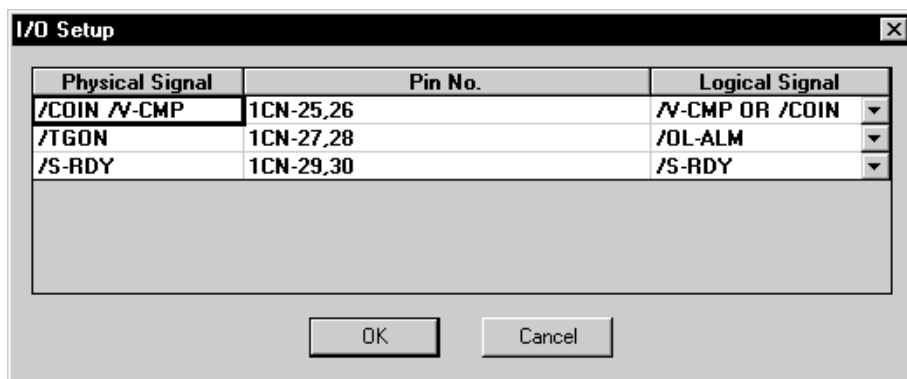
Note: During sending/receiving parameters, jogging the amplifier, and autotuning, all monitors are disabled.

## Mapping I/O Monitors

The I/O Setup monitors the selected physical I/O signals. The user must determine which logical signals are mapped to the configurable physical signals.

To view or change the current I/O mapping, click on the  button in the Servo Setup Toolbar, or select I/O from the Servo Setup menu.

The following dialog appears:

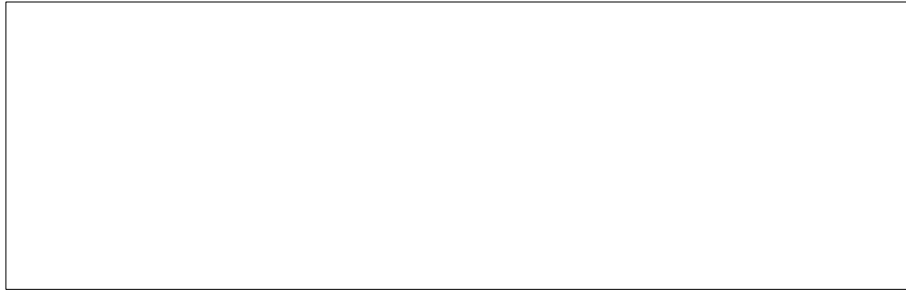


**Figure 15: I/O Setup Screen**

Note: Items in the Physical Signal column describe items in the Pin No. column.

The leftmost column lists the physical signals that can be configured. The middle column describes the connector pin number of those signals. The Logical Signal column is a list of the logical signals that can be mapped to the physical signals in a particular row.

In Sigma II Series servo amplifiers, the signals are categorized into input signals and output signals, as shown below.



***Figure 16: I/O Setup Screen for Sigma II***

To change the mapping of an I/O, click on the down arrow in the rightmost column of the desired signal. A list of available logical signals appears. Select the appropriate logical signal by clicking on it.

Click **OK** to accept the new configuration, or **Cancel** to cancel the changes and return to the main screen.

## ALARMS

### Overview

Sigma Win displays the alarm status of the amplifier. The alarm monitor on the Monitor panel indicates if there is an alarm condition. The current alarm and alarm history can then be viewed and/or cleared.

The Alarm tab as shown below contains all this information.

	Code	Description
0	[A.32]	Regenerative Overload
1	[A.51]	Overspeed
2	[A.--]	Normal Operation
3	[A.--]	Normal Operation
4	[A.--]	Normal Operation
5	[A.--]	Normal Operation
6	[A.--]	Normal Operation
7	[A.--]	Normal Operation
8	[A.--]	Normal Operation
9	[A.--]	Normal Operation

*Figure 17: Alarm Tab*

### Viewing and Clearing Alarms

The Current Alarm table notes when the servo amplifier is in an alarm state. The table shows the alarm code and brief description of the alarm.

To clear an alarm, click on the **Clear Alarm** button. However, if the cause of the alarm persists, the alarm will recur each time Sigma Win scans the amplifier, until the alarm cause is resolved. The screen is updated to reflect new alarm conditions.

Note: The operator panel on the amplifier or the hand-held operator displays “A.99” to indicate the “No alarm” state.

To obtain further details about an alarm and possible solutions, see Appendix A, or click on the right mouse button and select Help from the menu.

## **Alarm History**

The Sigma amplifiers store a history of the previous ten alarms. Sigma Win displays them in the Alarm History table. For each alarm stored, the table shows the order of the alarm, the alarm code and a brief description of the alarm.

When a new alarm occurs, the new alarm is stored as number zero and the rest of the alarms move up numerically (down on the screen) in order of their occurrence; the last alarm is discarded. Sigma Win reflects this change as soon as the new alarm is detected.

# ADVANCED TOPICS

## PARAMETERS

### Overview

This section describes how to view and edit the User Parameters in online and offline modes. The User Parameters define the characteristic of the amplifier.

User parameters can be read from or written to the servo amplifier. Sigma Win verifies the validity of the data both from and to the amplifier.

Note: In some Sigma manuals, parameters are referred to as “user constants.”

Servo Status I/O Alarms Commutators and Encoders User Parameters								
Category	Pn No	Code	Description	Value	Units	Servo	M	▲
Basic Switch	Pn000	BPRM0	Function Selection Basic Switch 1	0000	--	0000		
App Switch	Pn001	BPRM1	Function Selection Application Switch	0000	--	0000		
App Switch	Pn002	BPRM2	Function Selection Application Switch	0000	--	0000		
App Switch	Pn003	BPRM3	Function Selection Application Switch	0002	--	0002		
Gain	Pn100	LOOPHZ	Speed Loop Gain	46	Hz	46		
Gain	Pn101	PITIME	Speed Loop Integration Time Constant	2000	0.01ms	2000		
Gain	Pn102	POSGN	Position Loop Gain	40	1/s	40		
Gain	Pn103	JLOAD	Inertia Ratio	0	%	0		
Gain	Pn104	LOOPHZ2	2nd Speed Loop Gain	40	Hz	40		
Gain	Pn105	PITIME2	2nd Speed Loop Integration Time Constant	2000	0.01ms	2000		
Gain	Pn106	POSGN2	2nd Position Loop Gain	40	1/s	40		
Gain	Pn107	BIASLV	Bias Level	0	rpm	0		
Gain	Pn108	BIASAD	Bias Width Addition	7	ref units	7		
Gain	Pn109	FFGN	Feed Forward	0	%	0		
Gain	Pn10A	FFFLT	Feed Forward Filter Time Constant	0	0.01ms	0		
Gain	Pn10B	GNMODE	Gain-Related Application S'w	0000	--	0000		
Gain	Pn10C	TRQMSW	Mode Switch (Torque Reference)	200	%	200		
Gain	Pn10D	REFMSW	Mode Switch (Speed Reference)	0	rpm	0		
Gain	Pn10E	ACCMMSW	Mode Switch (Acceleration Reference)	0	10rpm/s	0		
Gain	Pn10F	ERPMSW	Mode Switch (Error Pulse)	0	ref units	0		
Gain	Pn110	RTAT	Online Auto Tuning Related S'w	0010	--	0010		

**Figure 18: User Parameter Table Tab**

Online help is available for all parameters by clicking the right mouse button while the cursor is over the desired parameter. Select Help from the resulting menu.

### Viewing and Editing Parameters

The Parameter tab displays the Parameter Table and allows you to view and edit all parameters associated with the connected servo amplifier. Different amplifiers have different sets of parameters with different values. In online mode, after connecting to the amplifier, the current set of parameter values are read from the servo



amplifier and stored in the Parameter Table. In offline mode, when loading a file from the disk, the values are read from the file. When creating a new file, the default values are read from the database.

The Parameter Table contains the following columns:

- "Changed" Flag (\*) - This column is used to indicate whether the user changed a parameter value from that which was read from the servo amplifier or loaded from a file.
- Category - Parameters are divided into groups according to functionality of the parameter.
- Cn No. or Dn No. (\*) - Each parameter has a number associated with it, for example Cn-05.
- Code - A short code that represents the parameter.
- Description(\*) - A short description of the parameter.
- Value (\*) - The current value of the parameter (not necessarily the value in the amplifier). This is the only field that can be edited.
- Units (\*) - The units in which the parameter is measured.
- Servo Value - The last known value of the parameter in the servo amplifier. When the Value field is changed in respect to this field, the Servo Value text is colored blue.
- Min - The minimum value allowed for this parameter.
- Max - The maximum value allowed for this parameter.
- Default - The factory default value for this parameter.

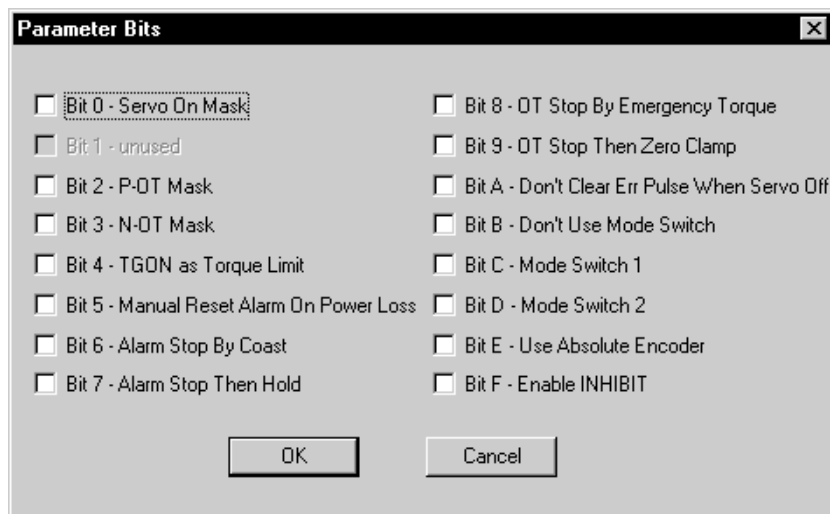
Note: Only fields marked with a \* are shown in Basic User level.

Note: To obtain further details about the function of a parameter and related information, click the mouse on the relevant row, and press the F1 key.

The list of parameters may be sorted according to any of the columns. Click once on the header of the column to sort the list of parameters in ascending order of the selected column. Click once more to sort in descending order.

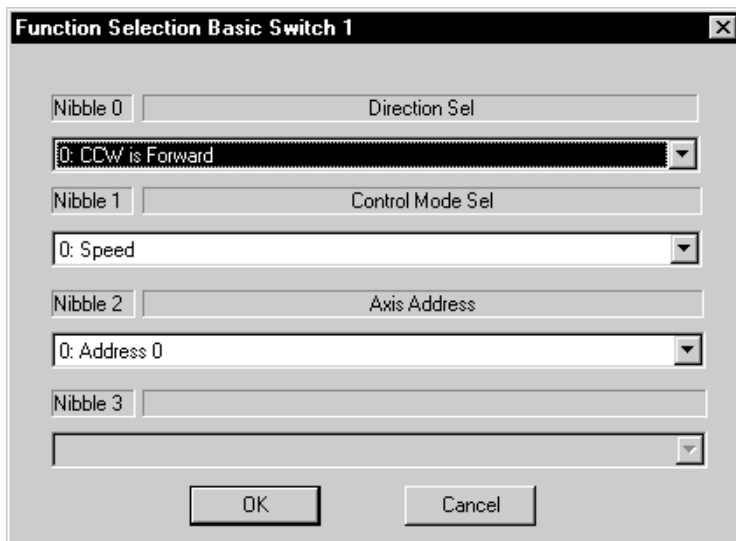
## Editing

- A value with a white background on the parameter screen represents an adjustment-type integer parameter. To edit this parameter, double-click on the field and type in the desired value, or use the two little arrows on the right side of the value. Clicking the up arrow increments the number by one, and clicking the down arrow decrements the number by one. Sigma Win verifies that the value falls in the range between the minimum value and the maximum value of the parameter ( $\text{Min} \leq \text{Value} \leq \text{Max}$ ).
- Represents a selection-type integer parameter - when this button is clicked, a list of possible values is displayed in a dropdown box beneath the button. Select a value and double-click on it; press enter, or click anywhere else on the parameter screen.
- A bit selection parameter - when this button is clicked the dialog box shown below appears. Each selection represents one bit of the parameter. A checked box means that the bit is ON (1), and an unchecked box means that the bit is OFF (0). Click **OK** to accept the values, or **Cancel** to discard all changes.



**Figure 19: Bit Selection Parameter Screen**



- A nibble selection (Sigma II only) - when this button is clicked, the dialog shown below appears. Each drop-down box contains the possible values for a parameter nibble. Select the desired values for each nibble. Click **OK** to accept the values, or **Cancel** to discard all changes.





**Figure 20: Nibble Selection Parameter Screen**

Note: Read the adjacent Units field to determine the type of field the button represents.

## Reading and Writing Parameters


The current state of the Parameter Table can be written to the servo amplifier. To send the entire Parameter Table to the amplifier, click on the  button. To send the current parameter, click on the  button.

To read the Parameter Table from the amplifier, use the  button. To read the current parameter, click on the  button.

Clicking with the right mouse button while the mouse is located over the Parameter Table can also access the read and write functions.

## Loading and Saving Parameters

The current state of the parameter table can be saved to the disk. Later, the parameter data can be retrieved and re-loaded into Sigma Win.

To save the parameter table to the disk, select the **Save** item from the File menu or click on the  button. Select the **Save As** item to save the parameters with other than the current file name.


While online, select **Import Parameter File** from the File menu.

The Import Parameter function loads the values in the file for all the existing parameters in the parameter table.

While offline, select **Open Parameter File** from the File menu.

Sigma Win parameter files have the default file extension \*.YPM.

## Printing Parameters

To print the current parameter table, select the **Print** item from the File menu or click on the  button.

## Restoring Default Parameters

Sigma Win allows restoration of the amplifier default values to the parameter table. To restore the parameters to the servo amplifier, the user must send the parameters to the servo amplifier.

Select the **Restore Defaults** item from the Parameters menu to restore the defaults of the parameter table.

## Software Reset

This feature is valid for the following Sigma servo amplifiers:

- SGDH-\*\*\*E
- SGDM-\*\*\*DA

Note: If the amplifier does not support software reset, the relevant menu selection is disabled.

After changing parameters in the servo amplifier changes do not take effect until the main power is recycled (see the appropriate Sigma amplifier users manual). In the Sigma II series, the user can use this function instead. After this function is called, the parameters in the servo amplifier all take effect without powering the servo amplifier OFF and then ON.

## AUTOTUNING

In order to obtain optimal performance from the Sigma servo amplifier, it must be tuned. This ensures that the servo system features minimal positioning time, minimal vibration, and an accurate path of motion

Servo tuning requires matching the machine configuration and rigidity. This requires a great deal of experience and is quite complicated.

Sigma servo amplifiers incorporate autotune functions that automatically measure the machine characteristics and make the necessary servo gain adjustments. Autotuning allows even an inexperienced user to tune the servo system.

The Sigma series amplifiers offer a standard autotuning function called "Offline Autotuning." Most models and version also offer an Advanced Autotune that takes longer to complete and requires more user interaction.

Sigma II series amplifiers offer "Online Autotuning," an adaptive tuning function which replaces the standard autotuning function.




### CAUTION

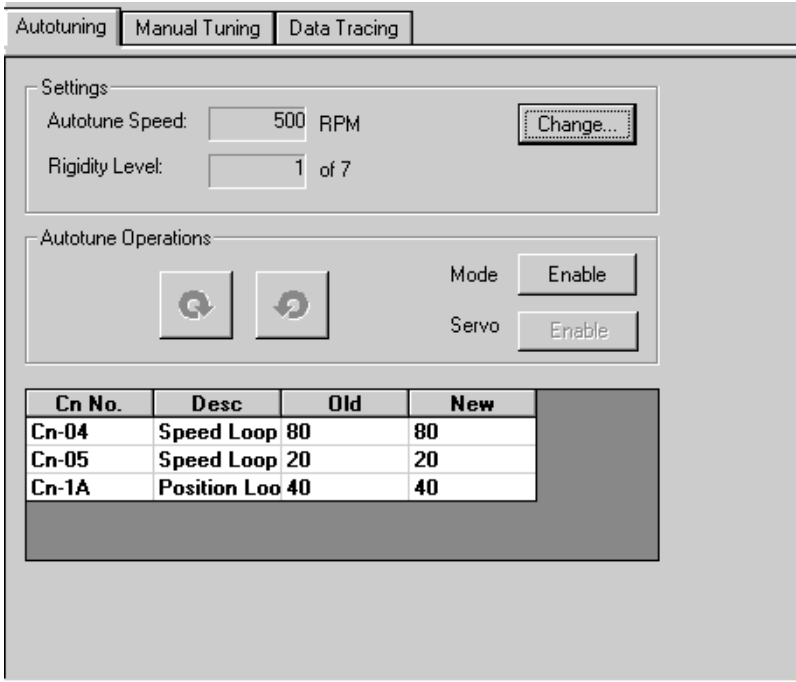
The Autotuning function rotates the motor at speeds up to 5000 RPM. Make sure all personnel and all equipment are away from the motor, and all couplings are fastened before turning the servo ON.

### Offline Autotuning

This feature is valid for the following Sigma servo amplifiers:

SGDA-***S	SGDE-***S
SGDA-***P	SGDE-***P
SGDB-***D	SGDL-***S
DR2-****	SGDL-***P
DR2-***-F	SGDF-***S
SGDC-***SA ver. 3 and higher	SGDF-***P

To access the autotune functions, switch to the Monitors and Parameters mode by clicking on the  button; select the Autotune tab. The dialog shown below appears:



Cn No.	Desc	Old	New
Cn-04	Speed Loop	80	80
Cn-05	Speed Loop	20	20
Cn-1A	Position Loo	40	40

**Figure 21: Autotune Tab - Offline Autotuning**

Offline Autotuning requires the user to set a rigidity level for the application and then initiate movement of the motor shaft. While the motor is rotating, the performance is analyzed, and the suggested parameter adjustments are displayed.

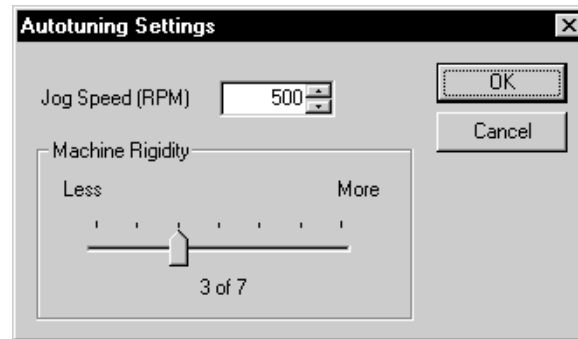
To autotune a servo system using Offline Autotuning, follow the procedure below:

1. Click on the **Standard Autotune** button to select standard autotune.
2. Verify that the autotune speed is set at the desired level.



Note: It is recommended to set the Autotune Speed to 500rpm or higher.

3. Verify that the Rigidity Level matches the servo application. If unsure about setting this, see the online help or Appendix C of this manual.

4. Press the **Change** button if either of the settings needs to be changed. The following dialog appears:



*Figure 22: Offline Autotuning Settings*


5. To change the speed setting, type in the desired speed. To change the rigidity level, move the arrow on the slider to the desired level of rigidity. Click **OK** to accept and return. Click **Cancel** to cancel the changes and return.
6. Click on the **Mode** button to start autotune mode.
7. Ensure the motor is clear from all obstructions. Click the **Servo** button to turn the servo on.
8. Note: If the servo signal is controlled by an applied external /S-ON signal, or if the user parameter switch for masking /S-ON signal is ON, the **Servo** button does not control the servo ON/OFF status.
9. To tune for motor movement in the clockwise direction of rotation, click on the  button and hold the left mouse button down. To tune for motor movement in the counter-clockwise direction of rotation, click on the  button and hold the left mouse button down.
10. Hold the mouse button down until autotuning is complete. The status bar indicates the operation status.
11. When the autotuning is complete, release the mouse button; the grid of parameters is updated to show the results. A screen prompt appears to inquire whether to save these new gains or revert to the old ones. The grid shows the old parameter values and the suggested new ones. If the prompt dialog covers the parameter grid, click on the mouse while over the caption of the prompt dialog and move the dialog until the grid values are displayed.

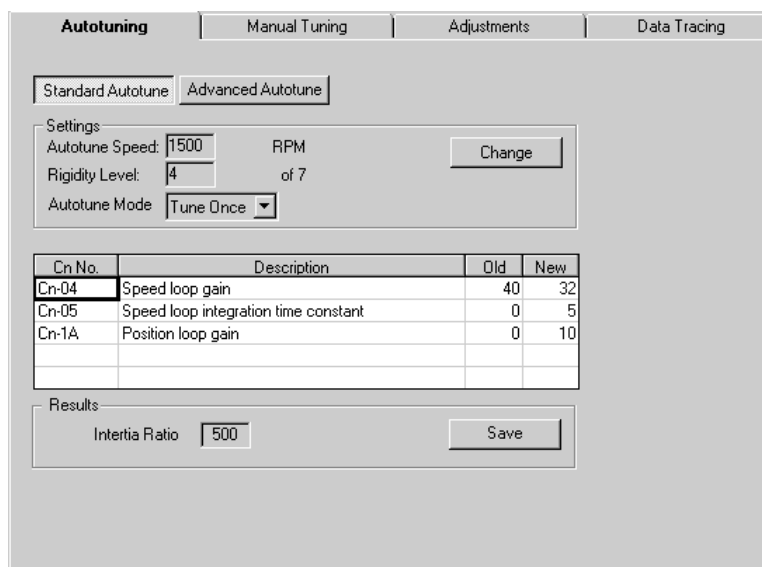
## Online Autotuning

This feature is valid for the following Sigma servo amplifiers:

- SGDM-\*\*\*D ver. 2 and higher
- SGDM-\*\*\*DA
- SGDH-\*\*\*E

Note: If the servo amplifier does not support Online Autotuning, the online autotune tab will be disabled.

To access the autotune functions, switch to the Monitors and Parameters mode by clicking on the  button (if the button is disabled, it has already been selected) and select the Autotune tab. The dialog will look like the one as shown below:



Cn No.	Description	Old	New
Cn-04	Speed loop gain	40	32
Cn-05	Speed loop integration time constant	0	5
Cn-1A	Position loop gain	0	10

**Figure 23: Autotune Tab - Online Autotuning**

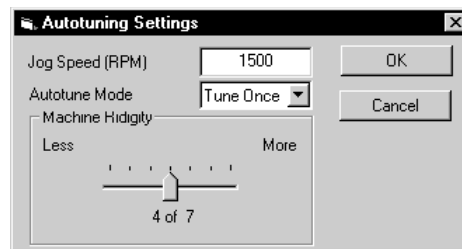
Online Autotuning requires a rigidity level be set for the application. The tuning parameters are updated as a result of the rigidity level. Once set, the amplifier uses these parameters while the application is "active" to calculate an internal inertia ratio which is the basis for the performance of the servo loop gains. The user selects whether to have this ratio calculated continuously or to have it calculated once, after power-up. When the user is satisfied with the performance, the internal ratio can be made permanent by transferring that value to a User Parameter.

Follow the steps below to autotune servo systems using Online Autotuning:

1. Click on the **Online Autotune** button to select online autotuning.



2. Verify that the rigidity level matches the servo application. If unsure how to set this, see the online help or Appendix C of this manual.
3. Verify that the autotune mode is set correctly.
4. If either of the settings must be changed, press the **Change** button. The following dialog appears:



*Figure 24: Online Autotuning Settings*


5. To change the rigidity level, move the arrow on the slider to the desired level of rigidity. Choose the correct Autotune Mode. Click **OK** to accept and return, Click **Cancel** to discard the changes and return.
6. The servo system now operates with a new level of rigidity.
7. Once satisfied with the performance of the servo system, click on **Save** to make the results of the Online Autotune permanent.

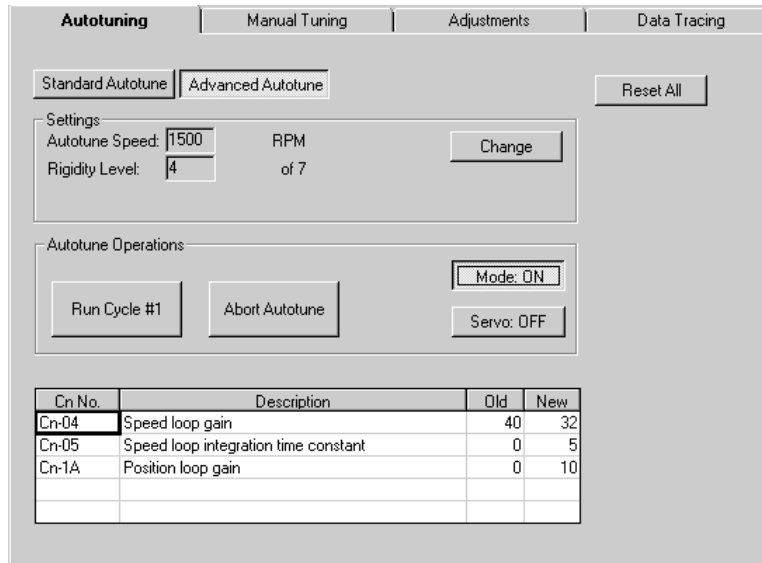
### Advanced (High Precision) Autotuning

This feature is valid for the following Sigma servo amplifiers:

SGDA-***S ver. 2 and higher	SGDE-***S ver. 1 and higher
SGDA-***P ver. 2 and higher	SGDE-***P ver. 1 and higher
SGDB-***D ver. 3 and higher	SGDL-***S ver. 1 and higher
DR2-*** ver. 3 and higher	SGDL-***P ver. 1 and higher
DR2-***-F ver. 3 and higher	SGDF-***S ver.
SGDC-***SA ver. 3 and higher	SGDF-***P ver.
SGDM-***D ver 2 and higher	SGDM-***DA
SGDH-***E	

**Note:** If the amplifier does not support Advanced Autotuning, the Advanced Autotuning button is disabled.

To access the autotune functions, switch to the Monitors and Parameters mode by clicking on the  button (if the button is disabled, it has already been selected) and select the Autotune tab. The dialog shown below appears.



Cn No.	Description	Old	New
Cn-04	Speed loop gain	40	32
Cn-05	Speed loop integration time constant	0	5
Cn-1A	Position loop gain	0	10

**Figure 25: Autotune Tab - Advanced Autotuning**

Sigma Win offers a high precision advanced autotuning function. The Advanced Autotune requires the user to set a rigidity level for the application and then initiate movement of the motor shaft. While the motor is rotating, the performance is analyzed and the suggested adjustments to parameters are displayed.

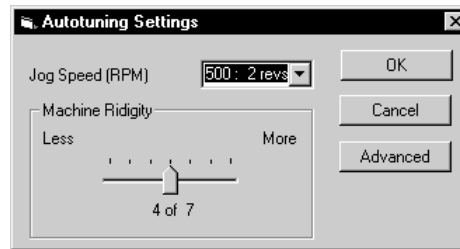
To autotune a servo system using Advanced Autotuning, follow the procedure below:

1. Click on the **Advanced Autotune** button to select advanced autotune.
2. Verify that the autotune speed is set at the desired level.

Note: It is recommended to set the Autotune Speed to 500rpm or higher.

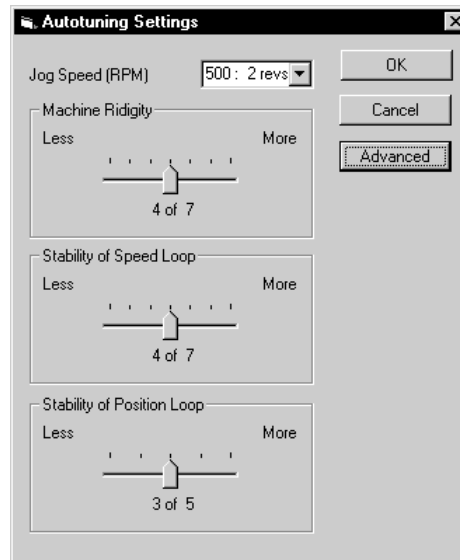
3. Verify that the Rigidity Level matches the servo application. If unsure how to set this, see the online help or Appendix C of this manual.

4. Press the Change button if either of the settings must be changed. The following dialog appears:




*Figure 26: Advanced Autotuning Settings*

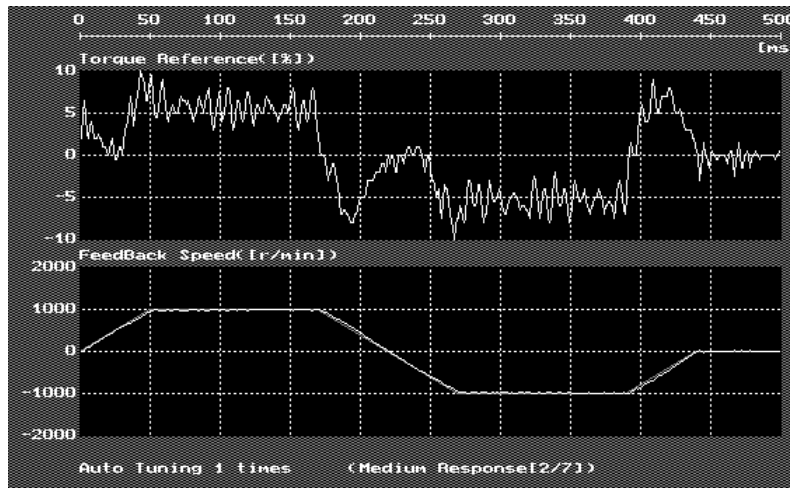
5. To change the Speed setting, type in the desired speed. To change the rigidity level, move the arrow on the slider to the desired level of rigidity.
6. If needed, click on the **Advanced** button to set the Stability of the Speed Loop and the Stability of the Position Loop. The settings dialog appears as shown below:



*Figure 27: Advanced Autotuning Settings - Expanded View*

7. Adjust the Stability setting as needed.
8. Click **OK** to accept and return. Click Cancel to cancel the changes and return.
9. Click on the **Mode** button to start autotune mode.
10. Ensure the motor is clear from all obstructions. Click the **Servo** button to turn the servo on.

11. Note: If the servo signal is controlled by an applied external /S-ON signal, or if the user parameter switch for masking /S-ON signal is ON, the **Servo** button does not control the servo ON/OFF status.
12. To start tuning, click on the  button. The motor rotates at the selected speed. After each rotation, performance data is retrieved from the amplifier. the direction of rotation will alternate between forward and reverse for each tuning cycle.
13. As soon as the data from the motor rotation is retrieved from the servo amplifier, the following graph is shown. This graph overlays the Feedback Speed (blue) with the Reference Speed (Red). The closer the two graphs are to each other, the better the results. In addition, the Torque Reference is displayed.



**Figure 28: Advanced Autotuning Results**

15. Exit the Graph Viewer

This completes one iteration of Advanced Autotuning. To tune further, repeat this procedure, beginning with step 12. This procedure can be repeated up to 7 times.

To restart the entire advanced autotuning process, click on the **Reset** button and repeat this procedure from step 2.


## TUNING

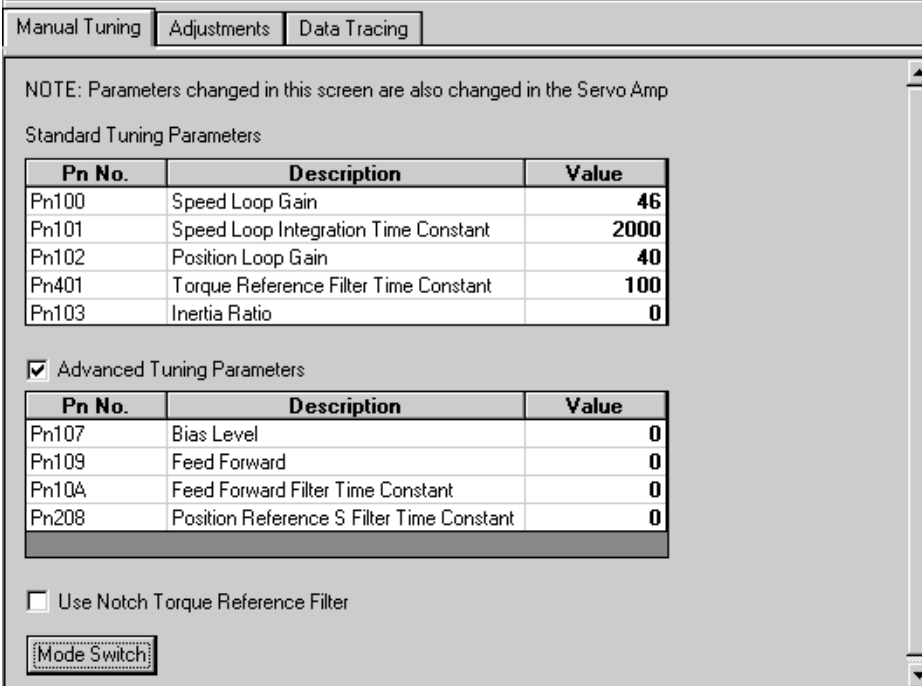
### Overview

The autotuning functions use an algorithm with a large safety margin for adjustments of gains. The autotuning functions are designed to tune as broad a spectrum of servo systems as possible. However, some systems may not be able to be tuned to a high enough degree of response to fit specific applications (e.g., machines with very low rigidity or high fluctuation of response).

In such cases, the user must tune the servo system manually. This is done by observing the results after adjusting the parameters affecting the servo loop control.

### Manual Tuning

To access the Manual Tuning functions, switch to the Monitors and Parameters mode by clicking on the  button (if the button is disabled, it has already been selected) and select the Manual Tuning tab. The dialog shown below appears.



Manual Tuning   Adjustments   Data Tracing

NOTE: Parameters changed in this screen are also changed in the Servo Amp

Standard Tuning Parameters

Pn No.	Description	Value
Pn100	Speed Loop Gain	46
Pn101	Speed Loop Integration Time Constant	2000
Pn102	Position Loop Gain	40
Pn401	Torque Reference Filter Time Constant	100
Pn103	Inertia Ratio	0

☒ Advanced Tuning Parameters

Pn No.	Description	Value
Pn107	Bias Level	0
Pn109	Feed Forward	0
Pn10A	Feed Forward Filter Time Constant	0
Pn208	Position Reference S Filter Time Constant	0

☐ Use Notch Torque Reference Filter

Mode Switch

**Figure 29: Manual Tuning Tab**

This is the Manual Tuning Tab, as it appears in the Advanced User level. If the user level were set to Basic, only the grid of Standard Tuning Parameters would be visible.

The Standard Tuning Parameters contain the basic parameters needed to tune the amplifier to the servo application. These same parameters are affected by Autotuning.

The Advanced Tuning Parameters are a grid of secondary parameters that affect the performance of the servo system.

The value of these parameters can be edited in the same manner as the Parameter Table tab. (See page 32.)

**Note:** All changes in the Manual Tuning screen are reflected immediately in the servo amplifier.

In addition to the parameter grids, there are two more selections that affect the servo systems:

**Use Secondary Torque Reference Filter** - If the servo amplifier supports the function for a secondary torque reference filter, this is enabled. Select the checkbox next to the caption, to select this option.

**Mode Switch Configuration** - Click on Mode Switch to configure the behavior of the Mode Switch operations.

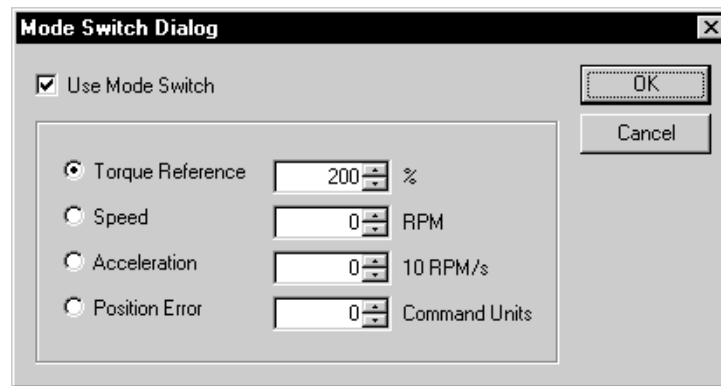
### **Setting the Mode Switch**

The Mode Switch is used to fully optimize the performance of the amplifier to achieve high speed positioning. The Mode Switch is a trigger that automatically switches over the amplifier internal speed control mode from Proportional/Integral to Proportional speed control, and vice versa when specified conditions are satisfied.

The Mode Switch can be used to

- Suppress overshooting during acceleration or deceleration (for speed control).
- Suppress undershooting during positioning, and shorten the setting time (for position control).

After the Mode Switch button is clicked, the follow dialog appears:



**Figure 30: Mode Switch Settings Screen**

To set up the Mode Switch and the trigger conditions:

1. Select the Use Mode Switch checkbox. This enables the trigger conditions.
2. Select one of the four trigger conditions (Torque Reference, Speed, Acceleration, or Position Error).
3. Enter the trigger value.
4. To disable the Mode Switch, de-select the Use Mode Switch checkbox.
5. Press **OK** to accept the setting and return. Press **Cancel** to cancel the changes and return.

## Special Adjustments

Sigma Win provides adjustments for offsets in reference signals, analog outputs, and monitors.

Use Speed and Torque reference adjustments, for example, when the amplifier is working in speed mode with no zero clamp.

Note: All changes in the Adjustment screen are reflected immediately in the servo amplifier.

The following adjustment functions are included in this tab

1. Automatic Tuning of Analog Reference Offset
2. Manual Adjustment of Speed Reference Offset
3. Manual Adjustment of Torque Reference Offset
4. Manual Adjustment of Analog Monitor Output
5. Manual Adjustment of Analog Monitor Output Gain
6. Automatic Tuning of Motor Current Offset
7. Manual Adjustment of Motor Current Offset


These features are valid for the following Sigma servo amplifiers:

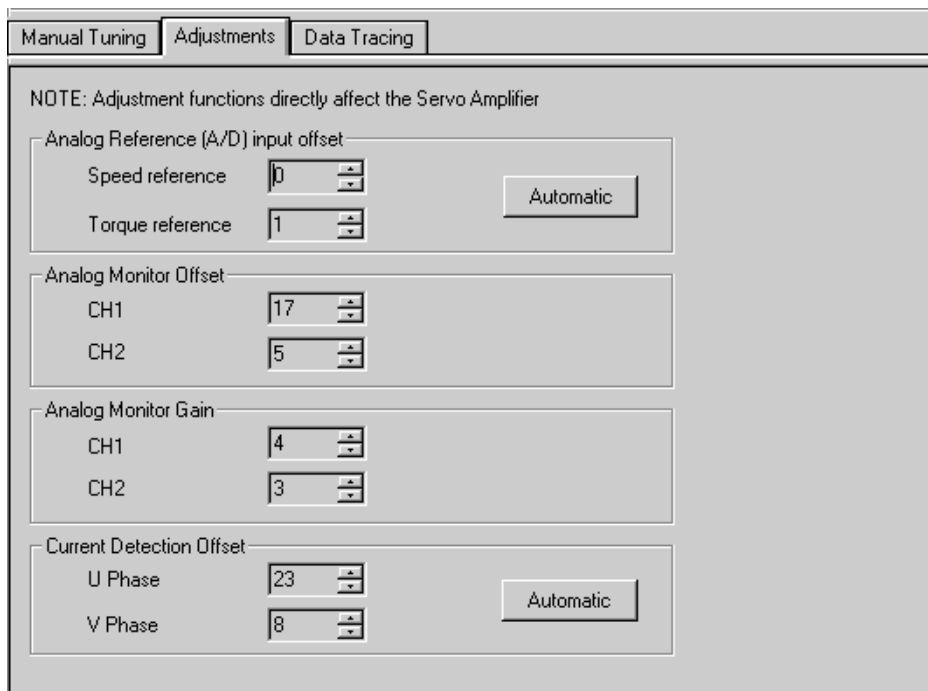
- |              |             |
|--------------|-------------|
| • SGDA-***S  | • SGDE-***S |
| • SGDB-***D  | • SGDL-***S |
| • DR2-****   | • SGDF-**CS |
| • DR2-***F   | • SGDM-***D |
| • SGDC-***SA | • SGDH-***E |
| • SGDM-***DA | •           |

Note: If the amplifier does not support special adjustments, the Adjustments tab is disabled.



Models	Available Adjustments
SGDA***S SGDB***D DR2-**** SGDC-***SA SGDE-***S SGDL-***S SGDF-**CS	1 and 2 only
SGDM-***D SGDM-***DA SGDH-***E	All adjustments

To access the Adjustments functions, switch to the Monitors and Parameters mode by clicking on the  button (if the button is disabled, it has already been selected), and select the Adjustments tab. The dialog shown below appears.



Manual Tuning Adjustments Data Tracing

NOTE: Adjustment functions directly affect the Servo Amplifier

Analog Reference (A/D) input offset

Speed reference 0

Torque reference 1

Automatic

Analog Monitor Offset

CH1 17

CH2 5

Analog Monitor Gain

CH1 4

CH2 3

Current Detection Offset

U Phase 23

V Phase 8

Automatic

**Figure 31: Adjustments Tab**

Adjustments are accomplished as follows:

- To adjust the Speed and Torque References, click an up or down arrow in the Speed Reference or Torque Reference value field. Click the up arrow to increment the number by one, and click the down arrow to decrement the number by one.
- To automatically adjust the Speed and Torque References, click on the **Automatic** button

located next to the Speed and Torque Reference values.

- To adjust the Analog Monitor Offset, first select the channel to adjust by clicking on the channel selection box and selecting one of the values. Next, click on the up or down arrow in the Analog Monitor Offset value field. Clicking the up arrow increments the number by one; clicking the down arrow decrements the number by one.
- To adjust the Analog Monitor Offset Gain, first select the channel to adjust by clicking on the channel selection box and selecting one of the values. Next, click on the up or down arrow in the Analog Monitor Offset Gain value field. Clicking the up arrow increments the number by one; clicking the down arrow decrements the number by one.
- To adjust the Motor Current Detection Offset, first select the Motor Phase to adjust by clicking on the Motor Phase selection box and selecting one of the values. Next, click on the up or down arrow in the Motor Current Detection Offset value field. Clicking the up arrow increments the number by one; clicking the down arrow decrements the number by one.
- To automatically adjust the Motor Current Detection Offset, click on the **Automatic** button located next to the Motor Current Detection Offset value field.

## DATA TRACING

### Overview

The Data Tracing function is used to display oscilloscope-style graphs that reflect the performance data of the Sigma amplifier. Sigma Win allows the user to define the parameters to track and display the graph. The user can save graphs and display them later. Sigma Win offers an option to print out the graphs with the related information regarding the performance and status of the amplifier at the time of the trace.

The Sigma Series servo amplifier has one type of data graphing standard (static) tracing. The Sigma II Series has one additional type, cyclic tracing.


The process of Data Tracing has two parts: Setup and Viewing.

### Standard (Static Data Tracing)

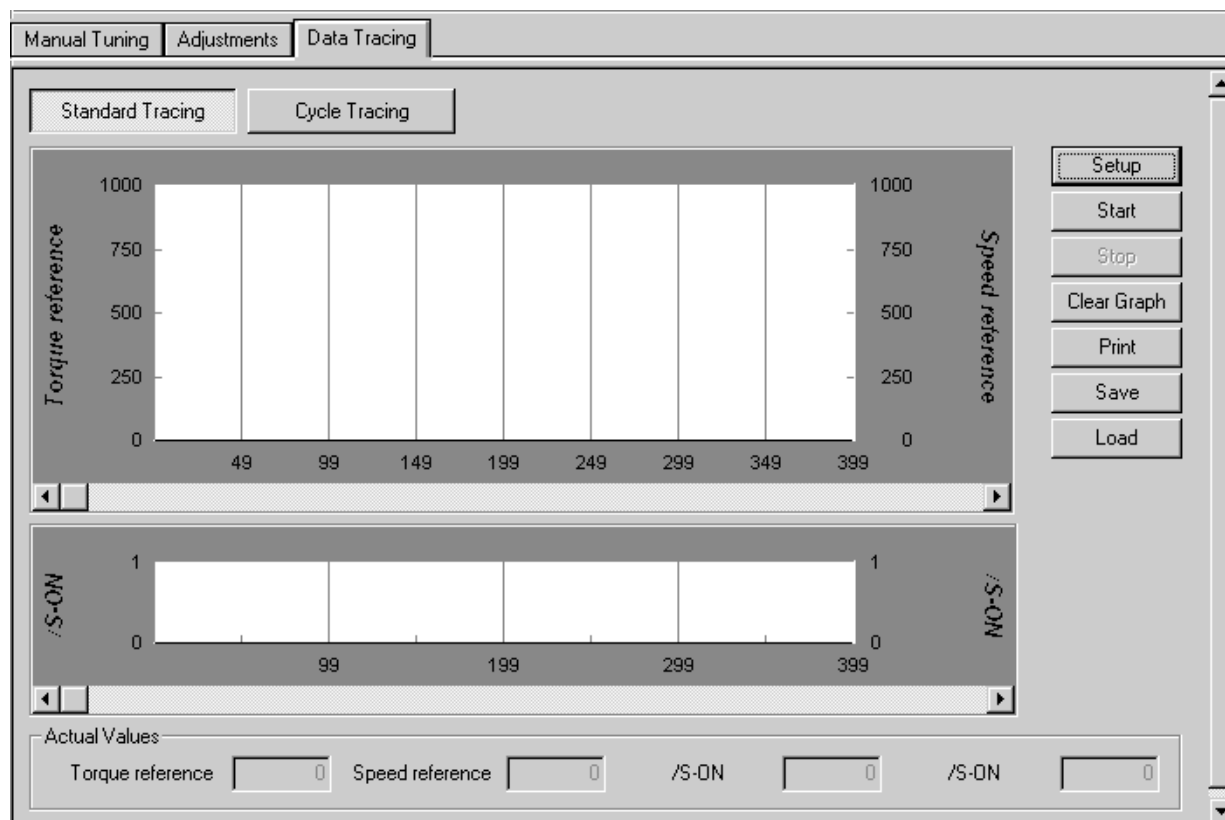
This feature is valid for the following Sigma servo amplifiers:

- SGDA-\*\*\*S
- SGDA-\*\*\*P
- SGDB-\*\*\*D
- DR2-\*\*\*\*
- DR2-\*\*\*\*-F
- SGDC-\*\*\*SA
- SGDM-\*\*\*D
- SDGH-\*\*\*E
- SGDE-\*\*\*S
- SGDE-\*\*\*P
- SGDL-\*\*\*S
- SGDL-\*\*\*P
- SGDF-\*\*\*S
- SGDF-\*\*\*P
- SGDM-\*\*\*MA

Note: If the amplifier does not support static data tracing, the standard data tracing button is disabled.

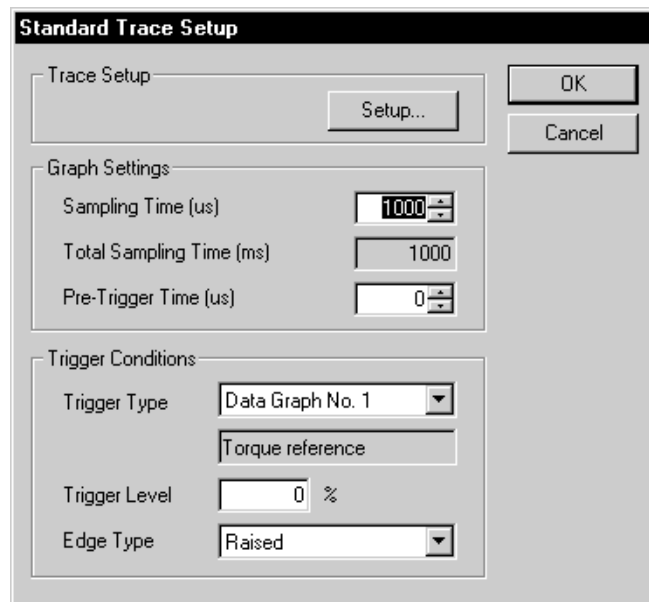
To access the standard trace screen, switch to the Monitors and Parameters mode by clicking on the  button (if the button is grayed out, it has already been selected).

Select the Data Tracing tab and click on the Standard Tracing button. The dialog shown below appears:



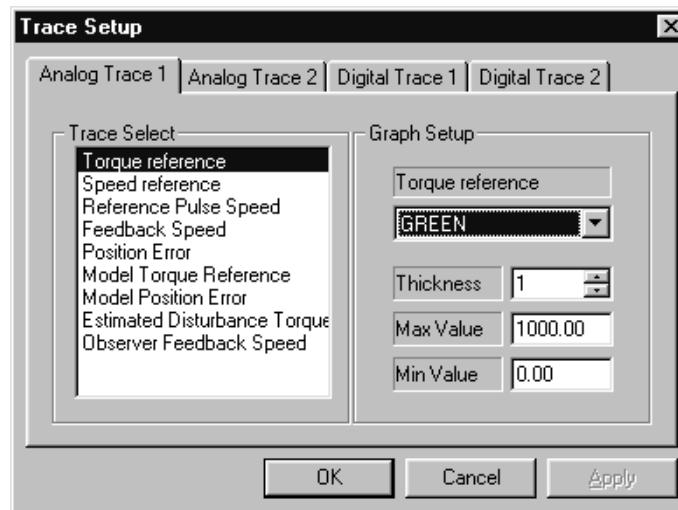
**Figure 32: Standard Data Tracing Screen**

To setup the standard tracing, click on the **Setup** button. The standard trace setup dialog appears, as shown below:



**Figure 33: Standard Data Trace Setup**

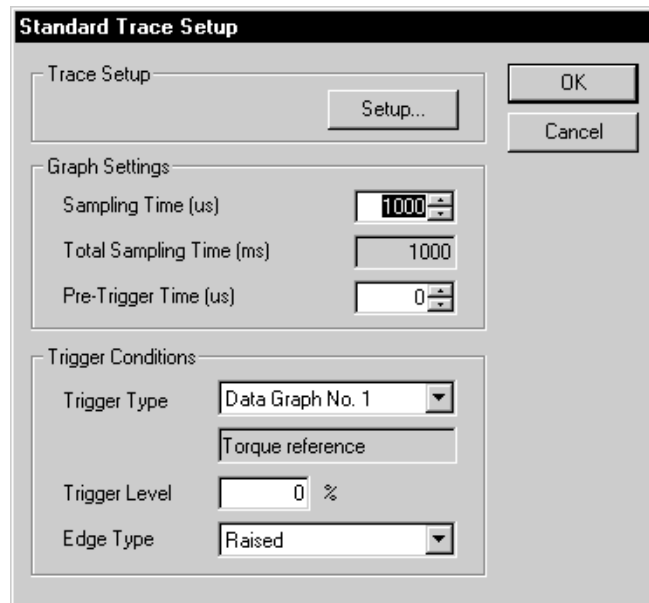
To define the data which is to be tracked, and the look of the graph, click on Setup. Up to two analog traces and two digital traces can be defined for each trace object. Select the data to be traced from the Trace Select list.



**Figure 34: Trace Setup**

Choose the color of the graph from the color drop-down box, and select the thickness of the graph lines from the thickness box. For analog traces, the range of the graph may be changed by adjusting the Maximum and Minimum values. Press

**OK** to accept the changes, or **Cancel** to discard the changes. This brings back the Standard Trace Setup dialog.

The image shows a 'Standard Trace Setup' dialog box. It has a title bar with the text 'Standard Trace Setup'. Inside, there are three main sections: 'Trace Setup', 'Graph Settings', and 'Trigger Conditions'. The 'Trace Setup' section has a 'Setup...' button. The 'Graph Settings' section contains three fields: 'Sampling Time (us)' with a value of 1000 and up/down arrows, 'Total Sampling Time (ms)' with a value of 1000, and 'Pre-Trigger Time (us)' with a value of 0 and up/down arrows. The 'Trigger Conditions' section contains four fields: 'Trigger Type' with a dropdown menu showing 'Data Graph No. 1', a text field containing 'Torque reference', 'Trigger Level' with a value of 0 and a '%' symbol, and 'Edge Type' with a dropdown menu showing 'Raised'. On the right side of the dialog, there are 'OK' and 'Cancel' buttons.

*Figure 35: Standard Data Trace Setup*

Define the Data Trace sampling settings and the trigger conditions as follows:

1. Select the fixed sample time between each data point by entering the desired sample time in the Sample Time field. Use the up arrow to increment the sample time, and the down arrow to decrement the sample time. The Total Sample Time field is updated as the Sampling Time field changes.
2. Total Sample Time = Sampling Time  $\times$  the number of points that can be cached (1000 or 500 - servo amplifier dependent).
3. Enter the desired time period for pre-trigger data to be displayed in the Pre-Trigger Time field. Use the up arrow to increment the sample time, and the down arrow to decrement the pre-trigger time.
4. Select the Trigger Type. The selections in this field depend on the user selection in the Servo Data and Servo I/O fields. The amplifier only uses one of those selected as a trigger. Another option is to select "No Trigger."
5. Enter an appropriate level in the Trigger Level field. The unit and caption of this field change in relation to the Trigger Type field.
6. In the Edge Type field, select one of the trigger edge conditions. The data tracing can be triggered on the rising edge, falling edge, or any edge of the

trigger signal. To start tracing without waiting for a trigger, choose the “none” selection.

Press **OK** to accept the settings, or **Cancel** to dismiss the changes. This completes the setup phase of standard tracing.

### Viewing Trace Graphs

To begin tracing the selected data, click on the **Start** button. The selection is transmitted to the amplifier. The data is stored as soon as the trigger occurs (if a trigger condition was selected.). When there is no trigger, the data is stored as soon as the amplifier starts to execute the command. To cancel the operation, press **Abort**.

When all the points have been cached on the amplifier, Sigma Win commands the amplifier to transmit all the data back to the computer. The data is then displayed on the graphs.

The current trace data can be saved to the disk, retrieved, and re-loaded in Sigma Win. To save the trace data to the disk, click on the **Save** button. To load trace data from the disk, click on the **Load** button.

To print the current trace, click on the **Print** button.


Sigma Win Standard Data Trace files have the default file extension \*.YDM.

### Cyclic Data Tracing

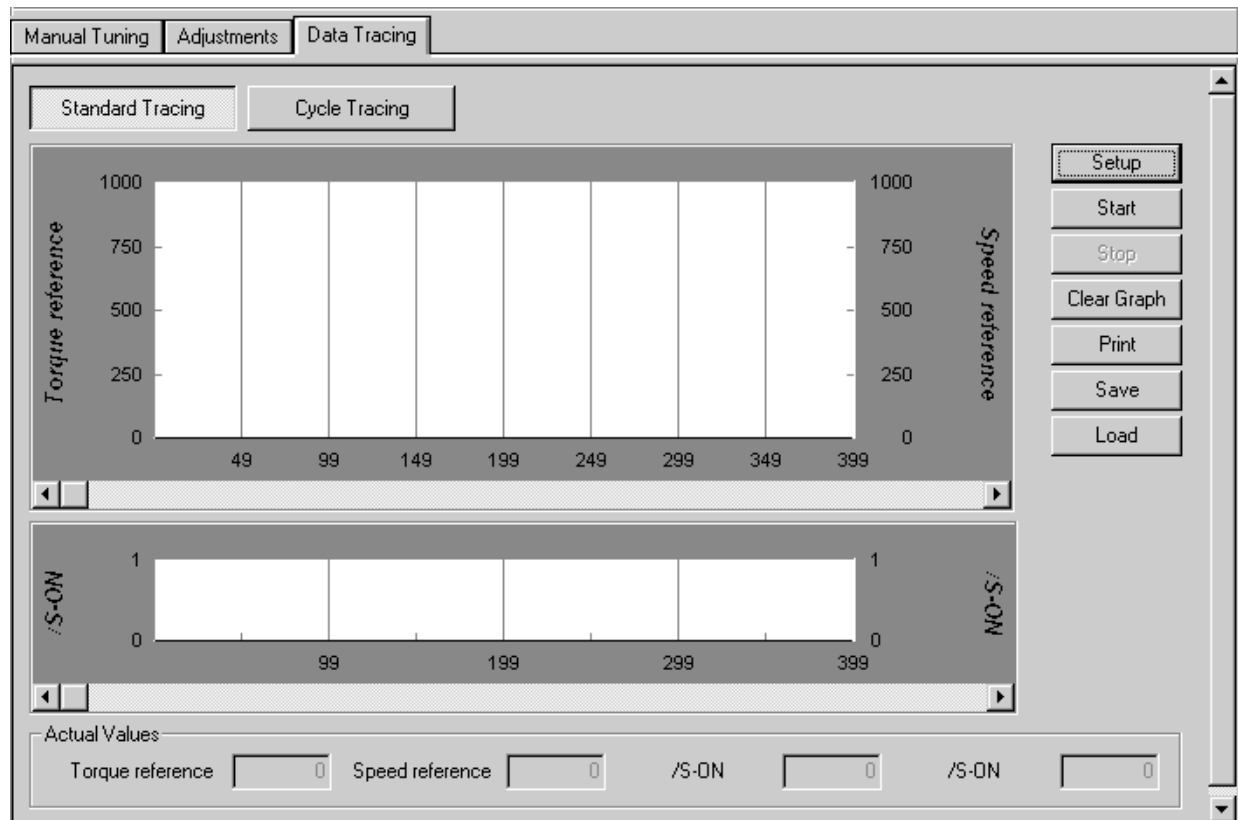
This feature is valid for the following servo amplifiers:

- SGDM-\*\*\*D
- SDGM-\*\*\*DA
- SGDH-\*\*\*E

Note: If the amplifier does not support cyclic data tracing, the cyclic tracing button is disabled.

To access the cyclic trace screen, switch to the Monitors and Parameters mode by clicking on the  button (if the button is grayed out, it is already selected). Select

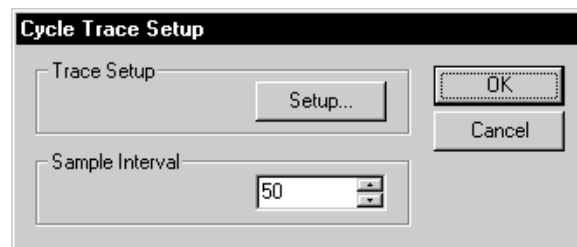
the Data Tracing tab and click on the Cyclic Tracing button. The dialog shown below appears:



*Figure 36: Cyclic Tracing Screen*

## Setup

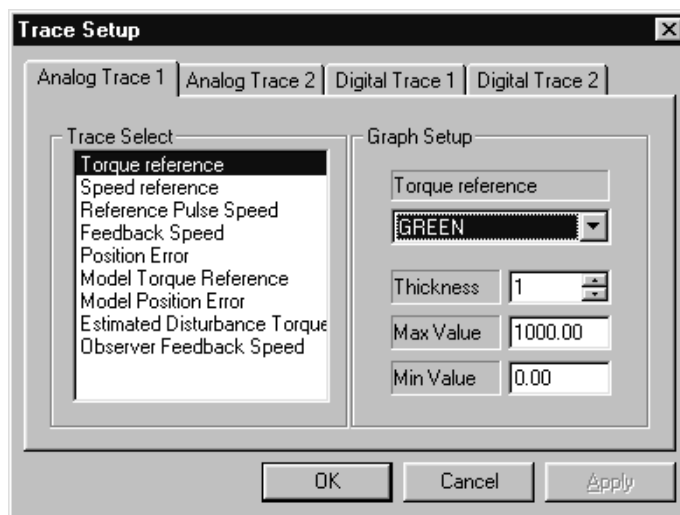
To setup the cyclic tracing, click on the **Setup** button. The cycle trace setup dialog appears, as shown below.



*Figure 37: Cyclic Trace Setup*



To define the data which is to be tracked, and the look of the graph, click on setup.



*Figure 38: Trace Setup*

Up to two analog traces and two digital traces can be defined for each trace object. Select the data to be traced from the Trace Select list.

Choose the color of the graph from the color drop-down box, and select the thickness of the graph lines from the thickness box. For analog traces, the range of the graph may be changed by adjusting the Maximum and Minimum values. Press **OK** to accept the changes, or **Cancel** to discard the changes.

Using the Sample Interval value, enter the line between samples. Press **OK** to accept the settings, or **Cancel** to dismiss the changes. This completes the setup phase of cyclic tracing.

## Viewing Trace Graphs

To begin Cyclic Tracing of the selected data, click on the **Start** button. To stop Cyclic Tracing of the selected data, click on the **Stop** button.

The graphs update in real time, as the values on the servo amplifier are updated.


The current trace can be saved to the disk, retrieved, and re-loaded in Sigma Win. To save the trace to the disk, click on the **Save** button. To load a trace to the disk, click on the **Load** button.

To print the current graphs, click on the **Print** button. Graphs can be printed only when the trace is not active.

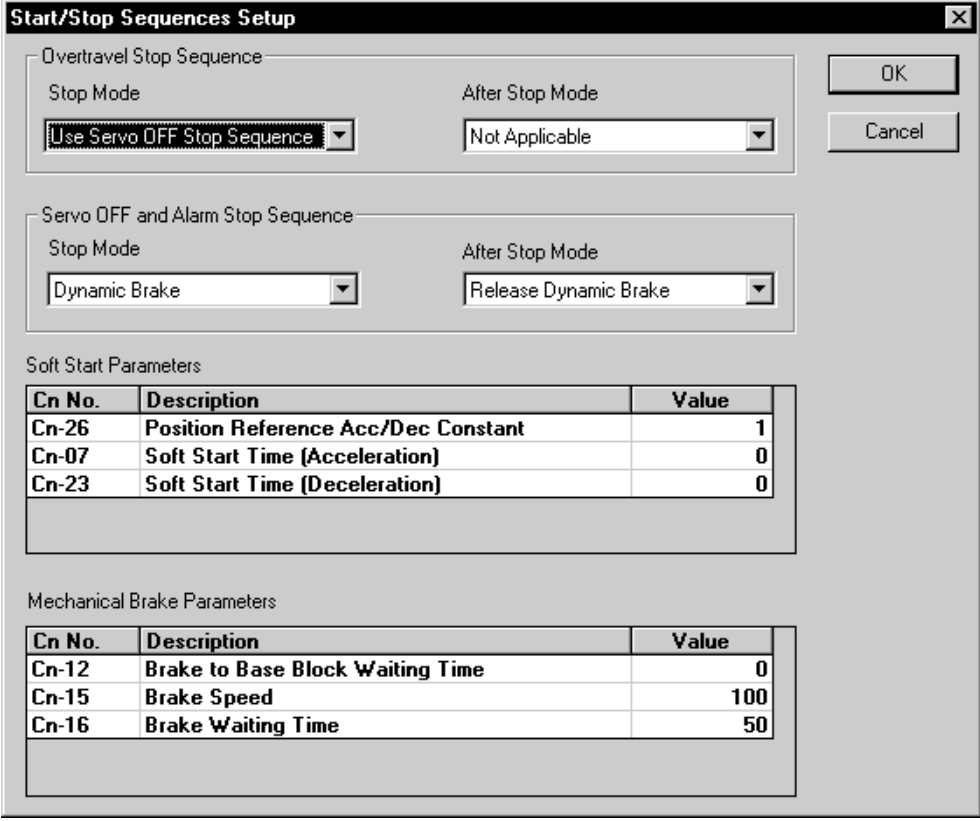
Sigma Win Cyclic Data Trace Graph files have the default file extension \*.YDG.

## START/STOP SEQUENCES

The Start and Stop Sequences are designed to customize the beginning and end of a motor rotation. These allow the application to perform smoothly and consistently, for example: hold at a vertical stopping point, limit the rate of acceleration, and smooth out the input.

To set or view the Start and Stop Sequence settings, click on the  button in the Servo Setup Toolbar or select Start/Stop from the Servo Setup menu.

The Start and Stop Sequences Setup dialog appears.



The dialog box is titled "Start/Stop Sequences Setup" and contains the following sections:

- Overtravel Stop Sequence:**
  - Stop Mode: **Use Servo OFF Stop Sequence**
  - After Stop Mode: **Not Applicable**
- Servo OFF and Alarm Stop Sequence:**
  - Stop Mode: **Dynamic Brake**
  - After Stop Mode: **Release Dynamic Brake**
- Soft Start Parameters:**

Cn No.	Description	Value
Cn-26	Position Reference Acc/Dec Constant	1
Cn-07	Soft Start Time (Acceleration)	0
Cn-23	Soft Start Time (Deceleration)	0
- Mechanical Brake Parameters:**

Cn No.	Description	Value
Cn-12	Brake to Base Block Waiting Time	0
Cn-15	Brake Speed	100
Cn-16	Brake Waiting Time	50

Buttons: OK, Cancel

**Figure 39: Start/Stop Sequences Setup Screen**

To determine how the amplifier stops for overtravels, click on the Overtravel Stop Mode field and select the desired method. Next click on the Overtravel After Stop Mode field and select the desired method.

To determine how the amplifier stops for Servo OFF or Alarms, click on Servo OFF and Alarms Stop Mode field and select the desired method. Next click on the Servo OFF or Alarms After Stop Mode field and select the desired method.

Customize the Soft Start behavior of the amplifier by editing the Soft Start Parameter values.

Customize the Mechanical Brake behavior of the amplifier by editing the Mechanical Brake Parameter values.

## ORIGIN SEARCH

This feature is valid for the following Sigma servo amplifiers:


- SGDM-\*\*\*D
- SGDM-\*\*\*DA
- SGDH-\*\*\*E

Note: If the amplifier does not support origin search, the origin search button and menu selection are disabled.

The Origin Search is designed to position the motor shaft at the origin C pulse position. This function is used when the motor shaft must be aligned with the machine.

Origin Search must be run without any couplings connected.

Note: The Origin Search function rotates the motor at a fixed speed of 60rpm.



**CAUTION**

The Origin Search function rotates the motor. Make sure all personnel and all equipment are cleared away from the motor before turning the servo ON.



*Figure 40: Origin Search Screen*

To search for the origin the servo amplifier in a forward or reverse direction do the following:



1. Make sure the motor is clear from all obstructions. Click the **Servo** button to turn the servo on. When the servo signal is activated, the LED graphic turns green.
2. Note: If the servo signal is controlled by an external /S-ON signal or the user parameter switch for masking /S-ON signal is ON, the **Servo** button does not control the servo ON/OFF status.
3. To search for the origin in a clockwise direction of rotation, click on the  button and hold the left mouse button down. To search for the origin in a counter-clockwise direction of rotation, click on the  button and hold the left mouse button down.
4. When the mouse button is released, the motor stops rotating.

Click **Close** or press the **ESC** key to return to the main Sigma Win window.




## WORKING OFFLINE

Working in the offline mode refers to using Sigma Win while not connected to a servo amplifier, or when the amplifier power is OFF. In the Offline mode, the only actions available to the user are load, edit, and save of parameter files, and display of Data Trace files. All other functions are disabled.

There are three ways to enter Offline mode.

1. While viewing the Servo Selection screen (see Figure 10, page 21), the user clicks **Cancel** to dismiss the screen and use Sigma Win without selecting an amplifier. Sigma Win is in offline mode with no data loaded.
2. During an online session with a servo amplifier, the user disconnects from the amplifier. This is achieved by selecting the Go Offline item from the Operation menu or by clicking on the  button in the main toolbar. Sigma Win goes offline, and retains the loaded data.
3. During a session with a servo amplifier, online or offline, the user closes the current session. This is achieved by clicking on the  button in the main toolbar. Sigma Win is in offline mode with no data loaded.

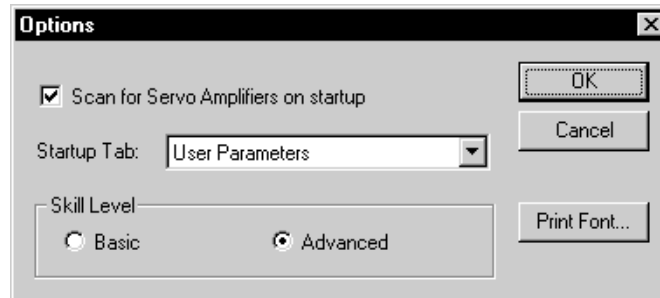
While in offline mode:

- To begin working with a new amplifier, using the default factory values, select the **New** item from the File menu or click on the  button. The Servo Selection Dialog is displayed with all the models that are included in the Sigma Win database. After the user selects the desired model, Sigma Win prompts the user for some additional information.
  1. The user is prompted to select the model with the power, voltage and rating from the list of possible models. For example, if the user selection was SDGA-\*\*\*P, the user might select the SDGA-01AP.
  2. The user is prompted to select a motor from the list of possible motors.
  3. Sigma Win then loads the default values that match the user selections.
- To load a parameter table from the disk, select the Open item from the File menu or click on the  button
- To save the parameter table to the disk, select the **Save** item from the File menu or click on the  button. To save the parameters with other than the current file name, select the **Save As** item

Sigma Win parameter files have the default file extension of \*.YPM.

## USER OPTIONS

Sigma Win also offers a few user options. To access the User Options dialog, select User Options from the View menu. The following dialog appears:



*Figure 41: User Options Screen*

### Skill Level Setting

Sigma Win has two skill levels of operation: Basic User level and Advanced User level. The Basic User level is designed to present the user with a simplified view of Sigma Win. The parameter table is simplified by displaying only important parameters as well as displaying only partial information about each parameter. In addition, some of the user functions of Sigma Win are disabled while in Basic level.

To change the user level, select the desired option in the Skill Level box

The current user level is indicated on the status bar.

### Startup Tab Setting

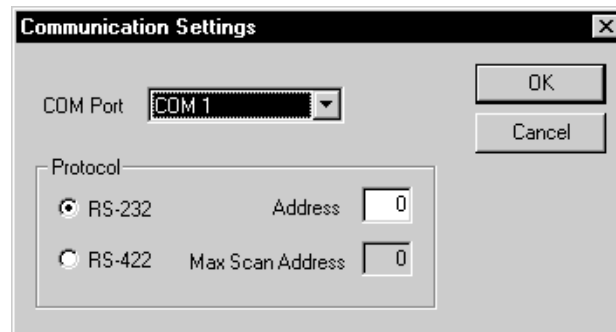
After launching Sigma Win, the parameter tab in the Monitors and Parameters section is displayed. To change the default tab, click on the arrow on the Startup Tab box and select one of the tabs in the list that is shown.

### Servo Scanning Setting

Sigma Win can be configured to automatically scan for connected servo amplifiers after the application is run. The default setting of this option is ON. To change the setting, click on the Scan checkbox.

## COMMUNICATION SETTINGS

To access the Communications Setup dialog, select Communication Settings from Options on the View menu. The following dialog displays:



*Figure 42: Communications Setup Screen*

Choose one of the available COM port selections to assign a port that Sigma Win will use to communicate with the servo amplifiers.

Select the communication protocol to use from the Protocol options.

The communication protocol is the serial interface hardware type the computer uses to communicate with the servo amplifier.

Standard Sigma Win usage is RS-232. If the servo amplifier is configured at an axis address different than 0, enter the correct address in the Address field.

### Working with Multiple Servo Amplifiers

This feature is valid for the following Sigma servo amplifiers:

- SGDA-\*\*\*S
- SGDA-\*\*\*P
- SGDB-\*\*\*D
- DR2-\*\*\*\*
- SGDM-\*\*\*D
- SGDH-\*\*\*E
- DR2-\*\*\*\*-F
- SGDC-\*\*\*SA
- SGDF-\*\*\*P
- SGDC-\*\*\*SA
- SGDM-\*\*\*MA

Note: If the amplifier does not support work with multiple amplifiers, the relevant options are disabled.

Sigma Win can be configured to communicate with multiple servo amplifiers. In order to do this; two conditions must be met.



1. The PC must have an RS-422 serial port. Select RS-422 as the Communication Protocol. Enter the highest axis address to scan for servo amplifiers. The default value is 15 (0xF).
2. Special cables must be used. See Appendix B for cable layouts.

Sigma Win can communicate with only one servo amplifier at a time. However, it can scan the serial port for all the attached servo amplifiers and display a list. The user can then choose an amplifier for connection. From that point on, all communications are with the selected servo amplifier.

# APPENDIX A - TROUBLESHOOTING

## ALARM TROUBLESHOOTING

### SGDA-\*\*\*S / SGDA-\*\*\*P

Absolute Encoder Data Error [A.00]

Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
A.00	ALO1	ALO2	ALO3	
Absolute Encoder Data Error	OFF	OFF	OFF	OFF

OFF: Output transistor is OFF

ON: Output transistor is ON

### Status When Alarm Occurred

At power ON

- Speed Control and Cn-01 Bit 1 = 0, see **F**<sup>1</sup>
- Speed Control and Cn-01 Bit 1 = 1, see A, **B**, **C**, D, E, F

At SEN signal input

- See A, **B**, **C**, D, E, F

	Cause	Remedy
A	Absolute encoder power is not supplied by the amplifier.	Use the amplifier power supply for the absolute encoder
B	Incorrect absolute encoder wiring (PA, PB, RESET, SEN signal [for speed control], etc.).	Check and correct the absolute encoder wiring

---

1. Letters appearing in boldface type represent preferred choices.

	Cause	Remedy
C	Absolute encoder malfunctioned.	Speed control (Cn-01 bit 1 = 0), Turn SEN signal OFF and back ON (see note). Speed Control (Cn-01 bit 1 = 1) or position control turn amplifier power OFF and back ON.
D	Incorrect user parameter setting. Incremental encoder used with Cn-01 Bit E set to 1.	Set Cn-01 bit E to 0.
E	Absolute encoder is defective.	Replace motor
F	Circuit board (1PWB) is defective.	Replace amplifier

Note: Alarm A.00 is reset when the power is turned OFF and then back ON. It is not reset by the normal alarm reset.

Note: Resetting the SEN Signal

When resetting the SEN signal (i.e., turning it OFF and then back ON) for any reason, keep the SEN signal at the high level for more than 1.3 seconds before turning it OFF.

#### Parameter Breakdown [A.02]

##### Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
A.02	ALO1	ALO2	ALO3	
Parameter Breakdown	OFF	OFF	OFF	OFF

OFF: Output transistor is OFF

ON: Output transistor is ON

#### Status When Alarm Occurred

At power ON

- See **A, B**

	Cause	Remedy
A	Power turned OFF while saving parameters. Alarm occurred at the next power ON.	Replace amplifier

	Cause	Remedy
B	Circuit board (1PWB) is defective.	Replace amplifier

### Parameter Setting Error [A.04]

#### Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
A.04	ALO1	ALO2	ALO3	
Parameter Setting Error	OFF	OFF	OFF	OFF

OFF: Output transistor is OFF

ON: Output transistor is ON

#### Status When Alarm Occurred

At power ON

- See A, B

	Cause	Remedy
A	An out-of-range parameter was previously loaded or set.	Reset all out-of-range parameters, otherwise reload correct parameters
B	Circuit board (1PWB) is defective.	Replace amplifier

### Overcurrent [A.10]

#### Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
A.10	ALO1	ALO2	ALO3	
Overcurrent	ON	OFF	OFF	OFF

OFF: Output transistor is OFF

ON: Output transistor is ON

#### Status When Alarm Occurred

During servomotor operation

- See **A, B, C, D, E**

When servo ON (S-ON) signal turned ON

- See **D, E**

At power ON

- See **D**

	Cause	Remedy
A	Wiring grounded between servo amplifier and servo-motor.	Check and correct wiring.
B	Servo amplifier ambient temperature exceeds 55° C.	Bring servo amplifier ambient temperature to 55°C. Note: Alarm cannot be reset while power transistor module temperature exceeds 90°C.
C	Servomotor U, V, or W phase grounded.	Replace servomotor.
D	Circuit board (1PWB) defective. Power transistor defective.	Replace servo amplifier.
E	Current feedback circuit, power transistor, DB relay, or circuit board defective.	Replace servo amplifier.

Position Error Pulse Overflow [A.31]

Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
A.31	ALO1	ALO2	ALO3	
Position Error Pulse Overflow (position control only)	ON	ON	OFF	OFF

OFF: Output transistor is OFF

ON: Output transistor is ON

**Status When Alarm Occurred**

During servomotor operation

- Overflow during high-speed operation, see **A**
- No feedback pulse returned after reference pulse input, see **B, F**
- Normal operation but overflow when large reference input, see **C, D, E**

At power ON

- See **F**

	Cause	Remedy
A	Servomotor wiring incorrect.	Check and correct wiring. (Check A-, B-, C-phase pulses correct at 2CN.)
B	Encoder wiring incorrect (disconnection, short circuit, power supply, etc.).	Check and correct wiring. (Check A-, B-, C-phase pulses correct at 2CN.)
C	Servo amplifier adjustment incorrect.	Increase speed loop gain (Cn-04) and/or position loop gain (Cn-1A).
D	Servomotor overloaded.	Reduce load torque and inertia. Otherwise, replace with larger capacity servomotor.
E	Position reference pulse frequency too high.	Decrease reference pulse frequency. Use smoothing function. Change electronic gear ratio.
F	Circuit board (1PWB) defective.	Replace servo amplifier.

Overvoltage [A.40]

Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
A.40	ALO1	ALO2	ALO3	
Overvoltage	OFF	OFF	ON	OFF

OFF: Output transistor is OFF

ON: Output transistor is ON

**Status When Alarm Occurred**

At power ON

- See **E, F**

During servomotor operation

- During motor deceleration, see **A, D**

- During normal operation, see **B**, **C**, **D**

	Cause	Remedy
A	Load inertia high and motor speed too high.	Change operating conditions. Use regenerative unit. If multiple units are used, connect all P, N terminals in parallel.
B	Load exceeds capacity of regenerative unit.	Change operating conditions.
C	Servomotor speed too high.	Reduce motor speed.
D	Servo amplifier defective.	Replace servo amplifier.
E	Input voltage too high.	Change input voltage to normal value.
F	Circuit board (IPWB) defective.	Replace servo amplifier.

### Overspeed [A.51]

#### Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
A.51	ALO1	ALO2	ALO3	
Overspeed	ON	OFF	ON	OFF

OFF: Output transistor is OFF

ON: Output transistor is ON

#### Status When Alarm Occurred

At servo ON (S-ON) signal turned ON

- See **A**, **B**, **C**, **D**, **E**
- During high-speed servomotor rotation after reference input (alarm detected at 110% maximum speed), see **A**, **B**, **C**, **D**, **E**

At power ON

- See **E**

	Cause	Remedy
A	Servomotor wiring incorrect. Encoder wiring incorrect (disconnection, short circuit, power supply, etc.).	Check and correct wiring. (Check A-, B-, C-phase pulses correct at 2CN.)

	Cause	Remedy
B	Incremental encoder power not supplied from servo amplifier.	Use the servo amplifier power supply for the encoder.
C	Noise in encoder wiring.	Separate encoder wiring from main wiring circuits.
D	Incorrect user constant (number of encoder pulses) setting.	Set user constant Cn-11 to the correct number of pulses.
E	Circuit board (1PWB) defective.	Replace servo amplifier.

### Absolute Encoder Data Error [A.70]

#### Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
A.70	ALO1	ALO2	ALO3	
Absolute Encoder Data Error	ON	ON	ON	OFF

OFF: Output transistor is OFF

ON: Output transistor is ON

#### Status When Alarm Occurred

At power ON

- See **E**

When servo ON (S-ON) signal turned ON

- See **A, B, D**

When speed reference input

- No servomotor rotation, see **B, C, D**
- During normal operation, see **D, E**

	Cause	Remedy
A	Servomotor wiring incorrect or disconnected.	Check wiring and connectors at servomotor
B	Encoder wiring incorrect or disconnected.	Check wiring and connectors at encoder



	Cause	Remedy
C	Load greatly exceeds rated torque.	Reduce load torque and inertia. Otherwise, replace with larger capacity servomotor.
D	Incremental encoder power not supplied from servo amplifier.	Use the servo amplifier power supply for the encoder.
E	Circuit board (1PWB) defective.	Replace servo amplifier.

### Encoder Error [A.80]

#### Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
A.80	ALO1	ALO2	ALO3	
Absolute Encoder Error (only if absolute encoder is used)	OFF	OFF	OFF	OFF

OFF: Output transistor is OFF

ON: Output transistor is ON

#### Status When Alarm Occurred

At power ON

- Speed Control and Cn-01 Bit 1 = 0, see **C**
- Speed Control and Cn-01 Bit 1 = 1, see **A, B, C**
- Position control, see **A, B, C**

During servomotor operation

- See **A, B, D, E**

	Cause	Remedy
A	Incorrect absolute encoder wiring (PA, PB, RESET, SEN signal [for speed control], etc.	Check and correct the absolute encoder wiring.

	Cause	Remedy
B	Absolute encoder malfunctioned.	For speed control (Cn-01 Bit 1 = 0), turn SEN signal OFF and back ON. For speed control (Cn-01 Bit 1 = 1) or position control, turn servo amplifier power OFF and back ON.
C	Circuit board (1PWB) defective.	Replace servo amplifier
D	Error occurred in absolute encoder.  Another encoder alarm displayed when SEN signal or power supply turned back ON.	For speed control (Cn-01 Bit 1 = 0), turn SEN signal OFF and back ON (if servo motor is rotating, first turn servo OFF).  For speed control (Cn-01 Bit 1 = 1) or position control, turn servo amplifier power OFF and back ON.
E	Servo amplifier miscounted pulses (positional displacement) or malfunctioned due to noise.	Separate encoder wiring from main wiring circuits. For speed control (Cn-01 Bit 1 = 0), turn SEN signal OFF and back ON (if servomotor is rotating, first turn servo OFF). For speed control (Cn-01 Bit 1 = 1) or position control, turn servo amplifier power OFF and back ON.

### Encoder Back-up Alarm [A.81]

#### Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
A.81	ALO1	ALO2	ALO3	
Absolute Encoder Back-up Error (only if absolute encoder issued)	OFF	OFF	OFF	OFF

OFF: Output transistor is OFF

ON: Output transistor is ON

#### Status When Alarm Occurred

At power ON

- Speed Control and Cn-01 Bit 1 = 0, see **B**

- Speed Control and Cn-01 Bit 1 = 1, see **A**, **C**
- Position Control, see **A**, **C**

When SEN signal turned ON Cn-01 Bit 1 = 0

- See **A**, **C**

	Cause	Remedy
A	The following power supplied to the absolute encoder all failed: +5V supply Battery (ER6V C3) Internal capacitor	Follow absolute encoder set-up procedures.
B	Circuit board (1PWB) defective.	Replace servo amplifier.
C	Absolute encoder malfunctioned.	Replace servo amplifier.

#### Encoder Checksum Error [A.82]

##### Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
A.82	ALO1	ALO2	ALO3	
Absolute Encoder Check-sum Error (only if absolute encoder is used)	OFF	OFF	OFF	OFF

OFF: Output transistor is OFF

ON: Output transistor is ON

#### Status When Alarm Occurred

At power ON

- Speed Control and Cn-01 Bit 1 = 0, see **B**
- Speed Control and Cn-01 Bit 1 = 1, see **A**, **B**
- Position Control, see **A**, **B**

When SEN signal turned ON

- Cn-01 Bit 1 = 0, see **A**
- During operation (see note), see **A**

	Cause	Remedy
A	Abnormality during absolute encoder memory check.	Follow absolute encoder set-up procedures. Replace servomotor if error occurs frequently.
B	Circuit board (IPWB) defective.	Replace servo amplifier.

Note: An absolute encoder error (A.80) is given initially if a check-sum error (A.82) is generated during operation.

The check-sum error (A.82) occurs after turning the SEN signal (or servo amplifier power supply) OFF and back ON.

However, the check-sum error (A.82) does occur during operation if the host controller is receiving the S-phase signal (serial data).

Encoder Battery Alarm [A.83]

Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
A.83	ALO1	ALO2	ALO3	
Absolute Encoder Battery Error	OFF	OFF	OFF	OFF

OFF: Output transistor is OFF

ON: Output transistor is ON

**Status When Alarm Occurred**

At power ON

- Speed Control and Cn-01 Bit 1 = 0, see **C**
- Speed Control and Cn-01 Bit 1 = 1, see **A, B**
- Position Control, see **A, B**

When SEN signal turned ON

- Cn-01 Bit 1 = 0, see **A**, **B**
- During operation (see note), see **A**, **B**

	Cause	Remedy
A	Battery not connected. Battery connection defective.	Check and correct battery connection.
B	Battery voltage below specified value. Specified values: 2.8V.	Install new battery and turn SEN signal (or servo amplifier) ON.
C	Circuit board (1PWB) defective.	Replace servo amplifier.

Note: No alarm occurs at the servo amplifier when a battery error (A.83) is generated. The battery error (A.83) occurs the next time the SEN signal (or servo amplifier) turns ON. However, the battery error (A.83) can be read during operation if the host controller is receiving the S-phase signal (serial data).

#### Absolute Encoder Error [A.84]

##### Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
A.84	ALO1	ALO2	ALO3	
Absolute Encoder Data Error (only if absolute encoder is used)	OFF	OFF	OFF	OFF

OFF: Output transistor is OFF

ON: Output transistor is ON

#### Status When Alarm Occurred

##### At power ON

- Speed Control and Cn-01 Bit 1 = 0, see **B**
- Speed Control and Cn-01 Bit 1 = 1, see **A**
- Position Control, see **A**

##### When SEN signal turned ON

- Cn-01 Bit 1 = 0, see **A**
- During operation (see note), see **A**

	Cause	Remedy
A	Absolute encoder malfunctioned.	For speed control (Cn-01 Bit 1 = 0), turn SEN signal OFF and back ON. For speed control (Cn-01 Bit 1 = 1) or position control, turn amplifier power OFF and back ON. Replace servomotor if error occurs frequently.
B	Circuit board (1PWB) defective.	Replace amplifier.

Note: No alarm occurs at the servo amplifier when a data error (A.84) is generated. The data error (A.84) occurs the next time the SEN signal (or servo amplifier) turns ON. However, the data error (A.84) can be read during operation if the host controller is receiving the S-phase signal (serial data).

### Encoder Overspeed [A.85]

#### Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
A.85	ALO1	ALO2	ALO3	
Absolute Encoder Overspeed (only if absolute encoder is used)	OFF	OFF	OFF	OFF

OFF: Output transistor is OFF

ON: Output transistor is ON

#### Status When Alarm Occurred

At power ON

- Speed Control and Cn-01 Bit 1 = 0, see **B**
- Speed Control and Cn-01 Bit 1 = 1, see **A**
- Position Control, see **A**

When SEN signal turned ON

- Cn-01 Bit 1 = 0, see **A**

	Cause	Remedy
A	Absolute encoder turned ON at a speed exceeding 400rpm.	Turn ON encoder power supply (or SEN signal or servo amplifier power supply) at a speed not exceeding 400rpm.
B	Circuit (1PWB) defective.	Replace servo amplifier.

### Reference Input Read Error [A.B1]

#### Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
A.B1	ALO1	ALO2	ALO3	
Reference Input Read Error (for speed/torque control only)	OFF	OFF	OFF	OFF

OFF: Output transistor is OFF

ON: Output transistor is ON

#### Status When Alarm Occurred

At power ON

- See **C**

During servomotor operation

- See **A, B**

	Cause	Remedy
A	Part malfunctioned in reference read-in unit (A/D converter, etc.).	Reset alarm and restart operation.
B	Part defective in reference read-in unit (A/D converter, etc.).	Replace servo amplifier.
C	Circuit board (1PWB) defective.	Replace servo amplifier.

## Overrun [A.C1]

### Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
A.C1	ALO1	ALO2	ALO3	
Servo Overrun	ON	OFF	ON	OFF

OFF: Output transistor is OFF

ON: Output transistor is ON

### Status When Alarm Occurred

At power ON

- User constant Cn-01 Bit 0= 0, see **E**

Occurred 1 to 3 seconds after power ON

- User constant Cn-01 Bit 0 = 1, see **A, B, C, D, E**

On speed reference input

- See **A, B, C, D, E**

When servo ON (S-ON) signal turned ON

- See **A, B, C, D, E**

	Cause	Remedy
A	Servomotor wiring incorrect or disconnected.	Check wiring and connectors at servomotor.
B	Encoder wiring incorrect or disconnected.	Check wiring and connectors at encoder.
C	Incremental encoder power not supplied from servo amplifier.	Use the servo amplifier power supply for the encoder.
D	Encoder defective.	Replace servomotor.
E	Circuit board (IPWB) defective.	Replace servo amplifier.



## Phase Detection Error [A.C2]

## Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
A.C2	ALO1	ALO2	ALO3	
Encoder Phase Detection Error	ON	OFF	ON	OFF

OFF: Output transistor is OFF

ON: Output transistor is ON

**Status When Alarm Occurred**

At power ON

- See **D**

Occurred 1 to 3 seconds after power ON

- See **A, B, C, D**

During servomotor operation

- See **A, B, C, D,**

	Cause	Remedy
A	Noise in encoder wiring.	Separate encoder wiring from main wiring circuits.
B	Encoder wiring incorrect or poor connection.	Check wiring and connectors at encoder.
C	Encoder defective.	Replace servomotor.
D	Circuit (1PWB) defective.	Replace servo amplifier.

## A-, B-Phase Disconnection [A.C3]

## Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
A.C3	ALO1	ALO2	ALO3	
Encoder A-, B-phase Disconnection	ON	OFF	ON	OFF

OFF: Output transistor is OFF

ON: Output transistor is ON

### Status When Alarm Occurred

At power ON

- User constant Cn-01 Bit 0= 0, see **D**

Occurred 1 to 3 seconds after power ON

- User constant Cn-01 Bit 0 = 1, see **A, B, C**

When servo ON (S-ON) signal turned ON

- See **A, B, C, D**

During servomotor operation

- See **A, B, C, D**

	Cause	Remedy
A	Encoder wiring incorrect or poor connection.	Check wiring and connectors at encoder.
B	Noise in encoder wiring.	Separate encoder wiring from main wiring circuits.
C	Encoder defective.	Replace servomotor
D	Circuit board (IPWB) defective.	Replace servo amplifier.

### C-Phase Disconnection [A.C4]

#### Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
A.C4	ALO1	ALO2	ALO3	
Encoder C-phase Disconnection	ON	OFF	ON	OFF

OFF: Output transistor is OFF

ON: Output transistor is ON

### Status When Alarm Occurred

At power ON

- User constant Cn-01 Bit 0= 0, see **C**

Occurred 1 to 3 seconds after power ON

- User constant Cn-01 Bit 0 = 1, see **A, B, C, D**

When servo ON (S-ON) signal turned ON

- See **A, B, C, D**

During servomotor operation

- See **A, B, C, D**

	Cause	Remedy
A	Encoder wiring incorrect or poor connection.	Check wiring and connectors at encoder.
B	Noise in encoder wiring.	Separate encoder wiring from main wiring circuits.
C	Encoder defective.	Replace servomotor
D	Circuit board (IPWB) defective.	Replace servo amplifier.

Power Loss Alarm [A.F3]

Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
A.F3	ALO1	ALO2	ALO3	
Power Loss Error	OFF	ON	OFF	ON

OFF: Output transistor is OFF

ON: Output transistor is ON

**Status When Alarm Occurred**

At power ON

- See **A**

During servomotor operation

- See B

	Cause	Remedy
A	Time between turning power OFF and back ON was shorter than the power holding time.	After turning power OFF, wait more than the power holding time (5 to 15s, according to type) before turning the power back ON.
B	If any of the following power supply conditions are met during motor operation: Complete power failure: half cycle of supply frequency Voltage drop: full cycle of supply frequency Note: Because of detector lag and detector margin, power loss of 30 to 55ms does not cause an alarm.	Check the power supply.  Terms Complete power failure = Power failure where voltage drops to zero Voltage drop = Power failure where voltage drops, but not to zero

### Digital Operator Display and Alarm Name [CPF00]

#### Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
CPF00	ALO1	ALO2	ALO3	
Digital Operator Transmission Error 1	Not Specified	Not Specified	Not Specified	Not Specified

Note: This alarm is not stored in alarm traceback function memory.

### Status When Alarm Occurred

#### At power ON

- Digital operator connected before servo amplifier power turned ON, see **A**, **B**, **C**, **D**

Digital operator connected to servo amplifier while power turned ON.

- See **A, B, C, D**

	Cause	Remedy
A	Cable defective or poor contact between digital operator and servo amplifier.	Check connector connections. Replace cable.
B	Malfunction due to external noise.	Separate digital operator and cable from noise source.
C	Digital operator defective.	Replace digital operator.
D	Servo amplifier defective.	Replace servo amplifier.

### Digital Operator Transmission Error [CPF01]

#### Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
CPF01	ALO1	ALO2	ALO3	
Digital Operator Transmission Error 2	Not Specified	Not Specified	Not Specified	Not Specified

Note: This alarm is not stored in alarm traceback function memory.

#### Status When Alarm Occurred

##### During operation

- See **A, B, C, D**

	Cause	Remedy
A	Cable defective or poor contact between digital operator and servo amplifier.	Check connector connections. Replace cable.
B	Malfunction due to external noise.	Separate digital operator and cable from noise source.
C	Digital operator defective.	Replace digital operator.
D	Servo amplifier defective.	Replace servo amplifier.

## Normal Operation [A.--]\*

## Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
A.99	ALO1	ALO2	ALO3	
Normal Operation	OFF	OFF	OFF	OFF

OFF: Output transistor is OFF

ON: Output transistor is ON

**Status When Alarm Occurred**

Indicates normal operation. Not an alarm.

\*Both the hand-held operator and the operator panel display “A.99” rather than A.--  
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**SGDB-\*\*\*D**

## Absolute Encoder Data Error [A.00]

## Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
A.00	ALO1	ALO2	ALO3	
Absolute Encoder Data Error	OFF	OFF	OFF	OFF

OFF: Output transistor is OFF

ON: Output transistor is ON

**Status When Alarm Occurred**

At power ON

- Cn-01 Bit 1 = 0, see **F**
- Cn-01 Bit 1 = 1, see **A, B, C, D, E, F**

At SEN signal input

- See **A, B, C, D, E, F**

	Cause	Remedy
<b>A</b>	Absolute encoder power not supplied from the servo amplifier.	Use the servo amplifier power supply for the absolute encoder
<b>B</b>	Incorrect absolute encoder wiring (PA, PB, RESET, SEN signal, etc.	Check and correct the absolute encoder wiring
<b>C</b>	Absolute encoder malfunctioned.	If Cn-01 bit 1 = 0, turn SEN signal OFF and back ON (see note). If Cn-01 bit 1 = 1, turn servo amplifier power OFF and back ON.
<b>D</b>	Incorrect user parameter setting. Incremental encoder used with Cn-01 Bit E set to 1.	Set Cn-01 bit E to 0.
<b>E</b>	Absolute encoder is defective.	Replace motor
<b>F</b>	Circuit board (1PWB) is defective.	Replace amplifier

Note: Alarm A.00 is reset when the power is turned OFF and then back ON. It is not reset by the normal alarm reset.

Note: Resetting the SEN Signal

When resetting the SEN signal (i.e., turning it OFF and then back ON) for any reason, keep the SEN signal at the high level for more than 1.3 seconds before turning it OFF.

#### Parameter Breakdown [A.02]

##### Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
A.02	ALO1	ALO2	ALO3	
Parameter Breakdown	OFF	OFF	OFF	OFF

OFF: Output transistor is OFF

ON: Output transistor is ON

#### Status When Alarm Occurred

At power ON

- See **A, B**

	Cause	Remedy
A	Power turned OFF while writing parameters. Alarm occurred at the next power ON.	Replace amplifier
B	Circuit board (1PWB) is defective.	Replace amplifier

#### Parameter Setting Error [A.04]

##### Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
A.04	ALO1	ALO2	ALO3	
Parameter Setting Error	OFF	OFF	OFF	OFF

OFF: Output transistor is OFF



ON: Output transistor is ON

### Status When Alarm Occurred

At power ON

- See **A, B**

	Cause	Remedy
A	An out-of-range parameter was previously loaded or set.	Reset all out-of-range parameters, otherwise reload correct parameters
B	Circuit board (IPWB) is defective.	Replace amplifier

Overcurrent [A.10]

### Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
A.10	ALO1	ALO2	ALO3	
Overcurrent	ON	OFF	OFF	OFF

OFF: Output transistor is OFF

ON: Output transistor is ON

### Status When Alarm Occurred

During servomotor operation

- See **A, B, D**

When servo ON (S-ON) signal turned ON

- See **C, D**

At power ON

- See **C**

	Cause	Remedy
A	Wiring grounded between servo amplifier and servomotor.	Check and correct wiring.

	Cause	Remedy
B	Servomotor U, V, or W phase grounded.	Replace servomotor.
C	Circuit board (IPWB) defective. Power transistor defective.	Replace servo amplifier.
D	Current feedback circuit, power transistor, DB relay, or circuit board defective.	Replace servo amplifier.

### Regenerative Error Detection [A.30]

#### Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
A.30	ALO1	ALO2	ALO3	
Regenerative Error Detection	ON	ON	OFF	OFF

OFF: Output transistor is OFF

ON: Output transistor is ON

#### Status When Alarm Occurred

During servomotor operation

- See **A, B**

Occurred approximately 1 second after the main circuit power ON

- See **A, B, C**

Occurred when the control power turned ON

- See **D**

	Cause	Remedy
A	Regenerative transistor is abnormal.	Replace servo amplifier.
B	Disconnection of the regenerative resistor unit.	Replace servo amplifier or regenerative resistor unit.
C	Regenerative resistor unit disconnected (for more than 6.0kW).	Check wiring of the regenerative resistor unit.
D	Servo amplifier defective.	Replace servo amplifier.

## Overvoltage [A.40]

## Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
A.40	ALO1	ALO2	ALO3	
Overvoltage	OFF	OFF	ON	OFF

OFF: Output transistor is OFF

ON: Output transistor is ON

**Status When Alarm Occurred**

At power ON

- See **A, B, C, D**

Occurred approximately 0.6 seconds after the main circuit power turned ON

- See **A, D**

Occurred when the control power turned ON

- See **E**

	Cause	Remedy
A	The power supply voltage is not within the range of specifications.	Check power supply.
B	Load exceeds capacity of the regenerative unit.	Check specifications of load inertia and overhanging load.
C	Regenerative transistor is abnormal.	Replace servo amplifier.
D	Rectifying diode defective. Fuse blown. Inrush current-limited resistor disconnected.	Replace servo amplifier.
E	Servo amplifier defective.	Replace servo amplifier.

## Overspeed [A.51]

## Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
A.51	ALO1	ALO2	ALO3	
Overspeed	ON	OFF	ON	OFF

OFF: Output transistor is OFF

ON: Output transistor is ON

**Status When Alarm Occurred**

At servo ON (S-ON) signal turned ON

- See **A**, **B**, **C**, **D**, **E**
- During high-speed servomotor rotation after reference input, see **A**, **B**, **C**, **D**, **E**

At power ON

- See **E**

	Cause	Remedy
<b>A</b>	Servomotor wiring incorrect. Encoder wiring incorrect (disconnection, short circuit, power supply, etc.).	Check and correct wiring. (Check A-, B-, C-phase pulses correct at 2CN.)
<b>B</b>	Incremental encoder power not supplied from servo amplifier.	Use the servo amplifier power supply for the encoder.
<b>C</b>	Noise in encoder wiring.	Separate encoder wiring from main wiring circuits.
<b>D</b>	Incorrect user constant (number of encoder pulses) setting.	Set user constant Cn-11 to the correct number of pulses.
<b>E</b>	Circuit board (1PWB) defective.	Replace servo amplifier.

Overload (high load), [A.72] Overload (low load) [A.71]

### Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
A.71, A.72	ALO1	ALO2	ALO3	
Overload (high load), Overload (low load)	ON	ON	ON	OFF

OFF: Output transistor is OFF

ON: Output transistor is ON

### Status When Alarm Occurred

At power ON

- See **E**

When servo ON (S-ON) signal turned ON

- See **A, B, D**

When speed reference input

- No servomotor rotation, see **B, C, D**
- During normal operation, see **C, D**

	Cause	Remedy
A	Servomotor wiring incorrect or disconnected.	Check wiring and connectors at servomotor
B	Encoder wiring incorrect or disconnected.	Check wiring and connectors at encoder
C	Load greatly exceeds rated torque.	Reduce load torque and inertia. Otherwise, replace with larger capacity servomotor.
D	Incremental encoder power not supplied from servo amplifier.	Use the servo amplifier power supply for the encoder.
E	Circuit board (1PWB) defective.	Replace servo amplifier.

## Encoder Error [A.80]

## Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
A.80	ALO1	ALO2	ALO3	
Absolute Encoder Error (only if absolute encoder is used)	OFF	OFF	OFF	OFF

OFF: Output transistor is OFF

ON: Output transistor is ON

**Status When Alarm Occurred**

At power ON

- Cn-01 Bit 1 = 0, see **C**
- Cn-01 Bit 1 = 1, see **A, B, C**

During servomotor operation

- See **A, B, D, E**

	Cause	Remedy
A	Incorrect absolute encoder wiring (PA, PB, RESET, SEN signal, etc.).	Check and correct the absolute encoder wiring.
B	Absolute encoder malfunctioned.	At Cn-01 Bit 1 = 0, turn SEN signal OFF and back ON. At Cn-01 Bit 1 = 1, turn servo amplifier power OFF and back ON.
C	Circuit board (1PWB) defective.	Replace servo amplifier
D	Error occurred in absolute encoder.  Another encoder alarm displayed when SEN signal or power supply turned back ON.	At Cn-01 Bit 1 = 0, turn SEN signal OFF and back ON (if servo motor is rotating, first turn servo OFF).  At Cn-01 Bit 1 = 1, turn servo amplifier power OFF and back ON.

	Cause	Remedy
E	Servo amplifier miscounted pulses (positional displacement) or malfunctioned due to noise.	Separate encoder wiring from main wiring circuits. At Cn-01 Bit 1 = 0, turn SEN signal OFF and back ON (if servomotor is rotating, first turn servo OFF). At Cn-01 Bit 1 = 1, turn servo amplifier power OFF and back ON.

### Encoder Back-up Alarm [A.81]

#### Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
A.81	ALO1	ALO2	ALO3	
Absolute Encoder Back-up Error (only if absolute encoder issued)	OFF	OFF	OFF	OFF

OFF: Output transistor is OFF

ON: Output transistor is ON

#### Status When Alarm Occurred

At power ON

- Speed Control and Cn-01 Bit 1 = 0, see **B**
- Speed Control and Cn-01 Bit 1 = 1, see **A, C**

When SEN signal turned ON Cn-01 Bit 1 = 0

- See **A, C**

	Cause	Remedy
A	The following power supplied to the absolute encoder all failed: +5V supply Battery (ER6V C3) Internal capacitor	Follow absolute encoder set-up procedures.
B	Circuit board (1PWB) defective.	Replace servo amplifier.

	Cause	Remedy
C	Absolute encoder malfunctioned.	Replace servo amplifier.

### Encoder Check-sum Error [A.82]

#### Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
A.82	ALO1	ALO2	ALO3	
Absolute Encoder Check-sum Error (only when 12-bit absolute encoder is used)	OFF	OFF	OFF	OFF

OFF: Output transistor is OFF

ON: Output transistor is ON

#### Status When Alarm Occurred

At power ON

- Cn-01 Bit 1 = 0, see **B**
- Cn-01 Bit 1 = 1, see **A**, **B**

When SEN signal turned ON

- Cn-01 Bit 1 = 0, see **A**
- During operation (see note), see **A**

	Cause	Remedy
A	Abnormality during absolute encoder memory check.	Follow absolute encoder set-up procedures. Replace servomotor if error occurs frequently.
B	Circuit board (IPWB) defective.	Replace servo amplifier.

Note: An absolute encoder error (A.80) is given initially if a check-sum error (A.82) is generated during operation.



The check-sum error (A.82) occurs after turning the SEN signal (or servo amplifier power supply) OFF and back ON.

However, the check-sum error (A.82) does occur during operation if the host controller is receiving the S-phase signal (serial data).

#### Encoder Battery Alarm [A.83]

##### Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
A.83	ALO1	ALO2	ALO3	
Absolute Encoder Battery Error	OFF	OFF	OFF	OFF

OFF: Output transistor is OFF

ON: Output transistor is ON

#### Status When Alarm Occurred

At power ON

- Cn-01 Bit 1 = 0, see **C**
- Cn-01 Bit 1 = 1, see **A, B**
- Position Control, see **A, B**

When SEN signal turned ON

- Cn-01 Bit 1 = 0, see **A, B**
- During operation (see note), see **A, B**

	Cause	Remedy
A	Battery not connected. Battery connection defective.	Check and correct battery connection.
B	Battery voltage below specified value. Specified values: 2.8V.	Install new battery and turn SEN signal (or servo amplifier) ON.
C	Circuit board (1PWB) defective.	Replace servo amplifier.

Note: No alarm occurs at the servo amplifier when a battery error (A.83) is generated. The battery error (A.83) occurs the next time the SEN signal (or

servo amplifier) turns ON. However, the battery error (A.83) can be read during operation if the host controller is receiving the S-phase signal (serial data).

#### Absolute Encoder Error [A.84]

##### Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
A.84	ALO1	ALO2	ALO3	
Absolute Encoder Data Error (only if absolute encoder is used)	OFF	OFF	OFF	OFF

OFF: Output transistor is OFF

ON: Output transistor is ON

#### Status When Alarm Occurred

At power ON

- Cn-01 Bit 1 = 0, see **B**
- Cn-01 Bit 1 = 1, see **A**

When SEN signal turned ON

- Cn-01 Bit 1 = 0, see **B**
- During operation (see note), see **B**

	Cause	Remedy
A	Absolute encoder malfunctioned.	At Cn-01 Bit 1 = 0, turn SEN signal OFF and then back ON. At Cn-01 Bit 1 = 1, turn amplifier power OFF then back ON. Replace servomotor if error occurs frequently.
B	Circuit board (IPEB) defective.	Replace amplifier.

Note: No alarm occurs at the servo amplifier when a battery error (A.83) is generated. The data error (A.84) occurs the next time the SEN signal (or servo amplifier) turns ON. However, the data error (A.84) can be read

during operation if the host controller is receiving the S-phase signal (serial data).

#### Encoder Overspeed [A.85]

##### Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
A.85	ALO1	ALO2	ALO3	
Absolute Encoder Overspeed (only when absolute encoder is used)	OFF	OFF	OFF	OFF

OFF: Output transistor is OFF

ON: Output transistor is ON

#### Status When Alarm Occurred

At power ON

- Cn-01 Bit 1 = 0, see **B**
- Cn-01 Bit 1 = 1, see **A**

When SEN signal turned ON

- Cn-01 Bit 1 = 0, see **A**

	Cause	Remedy
A	Absolute encoder turned ON at a speed exceeding 400rpm.	Turn ON encoder power supply (or SEN signal or servo amplifier power supply) at a speed not exceeding 400rpm.
B	Circuit (1PWB) defective.	Replace servo amplifier.

#### Heat Sink Overheated [A.A1]

##### Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
A.A1	ALO1	ALO2	ALO3	

### Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
A.A1 Heat Sink Over-heated	ON	ON	ON	ON

OFF: Output transistor is OFF

ON: Output transistor is ON

### Status When Alarm Occurred

During servomotor operation

- See **A, B, C, D**

Occurred when the control power turned ON

- See **E**

	Cause	Remedy
A	The ambient temperature of the amplifier exceeds 55°C.	Alter conditions so that the ambient temperature goes below 55°C.
B	The air flow around the heat sink is bad.	Follow installing method and provide sufficient surrounding space as specified.
C	Fan stopped.	Replace amplifier.
D	Amplifier is running under overload.	Reduce load.
E	Amplifier defective.	Replace amplifier.

### Reference Input Read Error [A.B1]

#### Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
A.B1	ALO1	ALO2	ALO3	
Reference Input Read Error	OFF	OFF	OFF	OFF

OFF: Output transistor is OFF

ON: Output transistor is ON

## Status When Alarm Occurred

At power ON

- See **C**

During servomotor operation

- See **A, B**

	Cause	Remedy
A	Part malfunctioned in reference read-in unit (A/D converter, etc.).	Reset alarm and restart operation.
B	Part defective in reference read-in unit (A/D converter, etc.).	Replace servo amplifier.
C	Circuit board (1PWB) defective.	Replace servo amplifier.

Overrun [A.C1]

Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
A.C1	ALO1	ALO2	ALO3	
Servo Overrun	ON	OFF	ON	OFF

OFF: Output transistor is OFF

ON: Output transistor is ON

## Status When Alarm Occurred

At power ON

- User constant Cn-01 Bit 0 = 0, see **E**

Occurred 1 to 3 seconds after power ON

- User constant Cn-01 Bit 0 = 1, see **A, B, C, D, E**

On speed reference input

- See **A, B, C, D, E**

When servo ON (S-ON) signal turned ON

- See **A, B, C, D, E**

	Cause	Remedy
A	Servomotor wiring incorrect or disconnected.	Check wiring and connectors at servomotor.
B	Encoder wiring incorrect or disconnected.	Check wiring and connectors at encoder.
C	Incremental encoder power not supplied from servo amplifier.	Use the servo amplifier power supply for the encoder.
D	Encoder defective.	Replace servomotor.
E	Circuit board (IPWB) defective.	Replace servo amplifier.

Phase Detection Error [A.C2]

Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
A.C2	ALO1	ALO2	ALO3	
Encoder Phase Detection Error	ON	OFF	ON	OFF

OFF: Output transistor is OFF

ON: Output transistor is ON

**Status When Alarm Occurred**

At power ON

- See **D**

Occurred 1 to 3 seconds after power ON

- See **A, B, C, D**

During servomotor operation

- See **A, B, C, D,**

	Cause	Remedy
A	Noise in encoder wiring.	Separate encoder wiring from main wiring circuits.
B	Encoder wiring incorrect or poor connection.	Check wiring and connectors at encoder.
C	Encoder defective.	Replace servomotor.
D	Circuit (1PWB) defective.	Replace servo amplifier.

A-, B-Phase Disconnection [A.C3]

#### Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
A.C3	ALO1	ALO2	ALO3	
Encoder A-, B-phase Disconnection	ON	OFF	ON	OFF

OFF: Output transistor is OFF

ON: Output transistor is ON

#### Status When Alarm Occurred

At power ON

- User constant Cn-01 Bit 0= 0, see **D**

Occurred 1 to 3 seconds after power ON

- User constant Cn-01 Bit 0 = 1, see **A, B, C, D**

When servo ON (S-ON) signal turned ON

- See **A, B, C, D**

During servomotor operation

- See **A, B, C, D**

	Cause	Remedy
A	Encoder wiring incorrect or poor connection.	Check wiring and connectors at encoder.

	Cause	Remedy
B	Noise in encoder wiring.	Separate encoder wiring from main wiring circuits.
C	Encoder defective.	Replace servomotor
D	Circuit board (1PWB) defective.	Replace servo amplifier.

### C-Phase Disconnection [A.C4]

#### Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
A.C4	ALO1	ALO2	ALO3	
Encoder C-phase Disconnection	ON	OFF	ON	OFF

OFF: Output transistor is OFF

ON: Output transistor is ON

### Status When Alarm Occurred

At power ON

- User constant Cn-01 Bit 0= 0, see **C**

Occurred 1 to 3 seconds after power ON

- User constant Cn-01 Bit 0 = 1, see **A, B, C, D**

When servo ON (S-ON) signal turned ON

- See **A, B, C, D**

During servomotor operation

- See **A, B, C, D**

	Cause	Remedy
A	Encoder wiring incorrect or poor connection.	Check wiring and connectors at encoder.
B	Noise in encoder wiring.	Separate encoder wiring from main wiring circuits.
C	Encoder defective.	Replace servomotor.



	Cause	Remedy
D	Circuit board (1PWB) defective.	Replace servo amplifier.

### Open Power Phase [A.F1]

#### Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
A.F1	ALO1	ALO2	ALO3	
Power Line Open Phase	OFF	ON	OFF	OFF

OFF: Output transistor is OFF

ON: Output transistor is ON

#### Status When Alarm Occurred

At main circuit power supply ON

- See A, B

Occurred when the control power turned ON

- See C

	Cause	Remedy
A	One phase (R, S, T) of the main circuit power supply is disconnected.	Check power supply. Check wiring of the main circuit power supply. Check MCCB, noise filter, magnetic contactor.
B	There is one phase where the line voltage is low.	Check power supply.
C	Amplifier defective.	Replace amplifier.

### Power Loss Alarm [A.F3]

#### Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
A.F3	ALO1	ALO2	ALO3	
Power Loss Error	OFF	ON	OFF	ON

OFF: Output transistor is OFF

ON: Output transistor is ON

### Status When Alarm Occurred

At main circuit power supply ON

- See **A, B**

During servomotor operation

- See **A, C**

	Cause	Remedy
A	Although power loss alarm is not necessary, its user constant is set valid.	Set the user constant Cn-01 bit 5 to 0.
B	Time between turning power OFF and back ON was shorter than 0.5 seconds.	After turning power OFF, wait for at least 0.5 seconds before turning the power back ON.
C	If any of the following power supply conditions are met during motor operation: Complete power failure: half cycle of supply frequency. Voltage drop: full cycle of supply frequency. Note: Because of detector lag or detector margin, there may be no alarm even if the above values are exceeded.	Check the power supply.  Terms Complete power failure = power failure where voltage drops to zero.  Voltage drop = power failure where voltage drops, but not to zero.

### Digital Operator Transmission Error 1 [CPF00]

#### Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
CPF00	ALO1	ALO2	ALO3	
Digital Operator Transmission Error 1	Not Specified	Not Specified	Not Specified	Not Specified

Note: This alarm is not stored in alarm traceback function memory.

### Status When Alarm Occurred

At power ON

- Digital operator connected before servo amplifier power turned ON, see **A, B, C, D**

Digital operator connected to servo amplifier while power turned ON.

- See **A, B, C, D**

	Cause	Remedy
A	Cable defective or poor contact between digital operator and servo amplifier.	Check connector connections. Replace cable.
B	Malfunction due to external noise.	Separate digital operator and cable from noise source.
C	Digital operator defective.	Replace digital operator.
D	Servo amplifier defective.	Replace servo amplifier.

## Digital Operator Transmission Error 2 [CPF01]

### Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
CPF01	ALO1	ALO2	ALO3	
Digital Operator Transmission Error 2	Not Specified	Not Specified	Not Specified	Not Specified

Note: This alarm is not stored in alarm traceback function memory.

### Status When Alarm Occurred

During operation

- See **A, B, C, D**

	Cause	Remedy
A	Cable defective or poor contact between digital operator and servo amplifier.	Check connector connections. Replace cable.
B	Malfunction due to external noise.	Separate digital operator and cable from noise source.
C	Digital operator defective.	Replace digital operator.
D	Servo amplifier defective.	Replace servo amplifier.

## Normal Operation [A.--]

### Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
A.99	ALO1	ALO2	ALO3	
Normal Operation	OFF	OFF	OFF	OFF

OFF: Output transistor is OFF

ON: Output transistor is ON

### Status When Alarm Occurred

Indicates normal operation. Not an alarm.

\*Both the hand-held operator and the operator panel display “A.99” rather than A.--.

**SGDC-\*\*\*SA**

## Absolute Encoder Data Error [A.00]

## Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
A.00	ALO1	ALO2	ALO3	
Absolute Encoder Data Error	OFF	OFF	OFF	OFF

OFF: Output transistor is OFF

ON: Output transistor is ON

**Status When Alarm Occurred**

At power ON

- Cn-01 Bit 1 = 0, see **F**
- Cn-01 Bit 1 = 1, see **A, B, C, D, E, F**

At SEN signal input

- See **A, B, C, D, E, F**

	Cause	Remedy
<b>A</b>	Absolute encoder power not supplied from the servo amplifier.	Use the servo amplifier power supply for the absolute encoder
<b>B</b>	Incorrect absolute encoder wiring (PA, PB, RESET, SEN signal, etc.	Check and correct the absolute encoder wiring
<b>C</b>	Absolute encoder malfunctioned.	If Cn-01 bit 1 = 0, turn SEN signal OFF and back ON (see note). If Cn-01 bit 1 = 1, turn servo amplifier power OFF and back ON.
<b>D</b>	Incorrect user parameter setting. Incremental encoder used with Cn-01 Bit E set to 1.	Set Cn-01 bit E to 0.
<b>E</b>	Absolute encoder is defective.	Replace motor
<b>F</b>	Circuit board (1PWB) is defective.	Replace amplifier

Note: Alarm A.00 is reset when the power is turned OFF and then back ON. It is not reset by the normal alarm reset.

Note: Resetting the SEN Signal

When resetting the SEN signal (i.e., turning it OFF and then back ON) for any reason, keep the SEN signal at the high level for more than 1.3 seconds before turning it OFF.

#### Parameter Breakdown [A.02]

##### Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
A.02	ALO1	ALO2	ALO3	
Parameter Breakdown	OFF	OFF	OFF	OFF

OFF: Output transistor is OFF

ON: Output transistor is ON

#### Status When Alarm Occurred

At power ON

- See **A, B**

	Cause	Remedy
A	Power turned OFF while writing parameters. Alarm occurred at the next power ON.	Replace amplifier
B	Circuit board (1PWB) is defective.	Replace amplifier

#### Parameter Setting Error [A.04]

##### Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
A.04	ALO1	ALO2	ALO3	
Parameter Setting Error	OFF	OFF	OFF	OFF

OFF: Output transistor is OFF

ON: Output transistor is ON

### Status When Alarm Occurred

At power ON

- See **A, B**

	Cause	Remedy
A	An out-of-range parameter was previously loaded or set.	Reset all out-of-range parameters, otherwise reload correct parameters
B	Circuit board (IPWB) is defective.	Replace amplifier

Overcurrent [A.10]

### Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
A.10	ALO1	ALO2	ALO3	
Overcurrent	ON	OFF	OFF	OFF

OFF: Output transistor is OFF

ON: Output transistor is ON

### Status When Alarm Occurred

During servomotor operation

- See **A, B, D**

When servo ON (S-ON) signal turned ON

- See **C, D**

At power ON

- See **C**

	Cause	Remedy
A	Wiring grounded between servo amplifier and servo-motor.	Check and correct wiring.

	Cause	Remedy
B	Servomotor U, V, or W phase grounded.	Replace servomotor.
C	Circuit board (IPWB) defective. Power transistor defective.	Replace servo amplifier.
D	Current feedback circuit, power transistor, DB relay, or circuit board defective.	Replace servo amplifier.

### Overvoltage [A.40]

#### Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
A.40	ALO1	ALO2	ALO3	
Overvoltage	OFF	OFF	ON	OFF

OFF: Output transistor is OFF

ON: Output transistor is ON

#### Status When Alarm Occurred

At power ON

- See **A, B, C**

Occurred approximately 0.6 seconds after the main circuit power turned ON

- See **A, C**

Occurred when the control power turned ON

- See **D**

	Cause	Remedy
A	The power supply voltage is not within the range of specifications.	Check power supply.
B	Load exceeds capacity of the regenerative unit.	Check specifications of load inertia and overhanging load.
C	Fuse blown.	Replace servo amplifier.
D	Servo amplifier defective.	Replace servo amplifier.



## Overspeed [A.51]

## Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
A.51	ALO1	ALO2	ALO3	
Overspeed	ON	OFF	ON	OFF

OFF: Output transistor is OFF

ON: Output transistor is ON

**Status When Alarm Occurred**

At servo ON (S-ON) signal turned ON

- See **A**, **B**, **C**, **D**, **E**
- During high-speed servomotor rotation after reference input, see **A**, **B**, **C**, **D**, **E**

At power ON

- See **E**

	Cause	Remedy
<b>A</b>	Servomotor wiring incorrect. Encoder wiring incorrect (disconnection, short circuit, power supply, etc.).	Check and correct wiring. (Check A-, B-, C-phase pulses correct at 2CN.)
<b>B</b>	Incremental encoder power not supplied from servo amplifier.	Use the servo amplifier power supply for the encoder.
<b>C</b>	Noise in encoder wiring.	Separate encoder wiring from main wiring circuits.
<b>D</b>	Incorrect user constant (number of encoder pulses) setting.	Set user constant Cn-11 to the correct number of pulses.
<b>E</b>	Circuit board (1PWB) defective.	Replace servo amplifier.

Overload (high load) [A.71], Overload (low load) [A.72]

### Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
A.71, A.72	ALO1	ALO2	ALO3	
Overload (high load), Overload (low load)	ON	ON	ON	OFF

OFF: Output transistor is OFF

ON: Output transistor is ON

### Status When Alarm Occurred

At power ON

- See **E**

When servo ON (S-ON) signal turned ON

- See **A, B, D**

When speed reference input

- No servomotor rotation, see **B, C, D**
- During normal operation, see **C, D**

	Cause	Remedy
A	Servomotor wiring incorrect or disconnected.	Check wiring and connectors at servomotor
B	Encoder wiring incorrect or disconnected.	Check wiring and connectors at encoder
C	Load greatly exceeds rated torque.	Reduce load torque and inertia. Otherwise, replace with larger capacity servomotor.
D	Incremental encoder power not supplied from servo amplifier.	Use the servo amplifier power supply for the encoder.
E	Circuit board (1PWB) defective.	Replace servo amplifier.

## Encoder Error [A.80]

## Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
A.80	ALO1	ALO2	ALO3	
Absolute Encoder Error (only if absolute encoder is used)	OFF	OFF	OFF	OFF

OFF: Output transistor is OFF

ON: Output transistor is ON

**Status When Alarm Occurred**

At power ON

- Cn-01 Bit 1 = 0, see **C**
- Cn-01 Bit 1 = 1, see **A, B, C**

During servomotor operation

- See **A, B, D, E**

	Cause	Remedy
A	Incorrect absolute encoder wiring (PA, PB, RESET, SEN signal, etc.).	Check and correct the absolute encoder wiring.
B	Absolute encoder malfunctioned.	At Cn-01 Bit 1 = 0, turn SEN signal OFF and back ON. At Cn-01 Bit 1 = 1, turn servo amplifier power OFF and back ON.
C	Circuit board (1PWB) defective.	Replace servo amplifier
D	Error occurred in absolute encoder.  Another encoder alarm displayed when SEN signal or power supply turned back ON.	At Cn-01 Bit 1 = 0, turn SEN signal OFF and back ON (if servo motor is rotating, first turn servo OFF).  At Cn-01 Bit 1 = 1, turn servo amplifier power OFF and back ON.

	Cause	Remedy
E	Servo amplifier miscounted pulses (positional displacement) or malfunctioned due to noise.	Separate encoder wiring from main wiring circuits. At Cn-01 Bit 1 = 0, turn SEN signal OFF and back ON (if servomotor is rotating, first turn servo OFF). At Cn-01 Bit 1 = 1, turn servo amplifier power OFF and back ON.

### Encoder Back-up Alarm [A.81]

#### Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
A.81	ALO1	ALO2	ALO3	
Absolute Encoder Back-up Error (only if absolute encoder issued)	OFF	OFF	OFF	OFF

OFF: Output transistor is OFF

ON: Output transistor is ON

#### Status When Alarm Occurred

At power ON

- Speed Control and Cn-01 Bit 1 = 0, see **B**
- Speed Control and Cn-01 Bit 1 = 1, see **A, C**

When SEN signal turned ON Cn-01 Bit 1 = 0

- See **A, C**

	Cause	Remedy
A	The following power supplied to the absolute encoder all failed: +5V supply Battery (ER6V C3) Internal capacitor	Follow absolute encoder set-up procedures.
B	Circuit board (1PWB) defective.	Replace servo amplifier.

	Cause	Remedy
C	Absolute encoder malfunctioned.	Replace servo amplifier.

### Encoder Checksum Error [A.82]

#### Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
A.82	ALO1	ALO2	ALO3	
Absolute Encoder Check-sum Error (only when 12-bit absolute encoder is used)	OFF	OFF	OFF	OFF

OFF: Output transistor is OFF

ON: Output transistor is ON

#### Status When Alarm Occurred

At power ON

- Cn-01 Bit 1 = 0, see **B**
- Cn-01 Bit 1 = 1, see **A**, **B**

When SEN signal turned ON

- Cn-01 Bit 1 = 0, see **A**
- During operation (see note), see **A**

	Cause	Remedy
A	Abnormality during absolute encoder memory check.	Follow absolute encoder set-up procedures. Replace servomotor if error occurs frequently.
B	Circuit board (IPWB) defective.	Replace servo amplifier.

Note: An absolute encoder error (A.80) is given initially if a check-sum error (A.82) is generated during operation.

The check-sum error (A.82) occurs after turning the SEN signal (or servo amplifier power supply) OFF and back ON.

However, the check-sum error (A.82) does occur during operation if the host controller is receiving the S-phase signal (serial data).

#### Encoder Battery Alarm [A.83]

##### Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
A.83	ALO1	ALO2	ALO3	
Absolute Encoder Battery Error	OFF	OFF	OFF	OFF

OFF: Output transistor is OFF

ON: Output transistor is ON

#### Status When Alarm Occurred

At power ON

- Cn-01 Bit 1 = 0, see **C**
- Cn-01 Bit 1 = 1, see **A, B**
- Position Control, see **A, B**

When SEN signal turned ON

- Cn-01 Bit 1 = 0, see **A, B**
- During operation (see note), see **A, B**

	Cause	Remedy
A	Battery not connected Battery connection defective.	Check and correct battery connection.
B	Battery voltage below specified value. Specified values: 2.8V.	Install new battery and turn SEN signal (or servo amplifier) ON.
C	Circuit board (1PWB) defective.	Replace servo amplifier.

Note: No alarm occurs at the servo amplifier when a battery error (A.83) is generated. The battery error (A.83) occurs the next time the SEN signal (or

servo amplifier) turns ON. However, the battery error (A.83) can be read during operation if the host controller is receiving the S-phase signal (serial data).

#### Absolute Encoder Error [A.84]

##### Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
A.84	ALO1	ALO2	ALO3	
Absolute Encoder Data Error (only if absolute encoder is used)	OFF	OFF	OFF	OFF

OFF: Output transistor is OFF

ON: Output transistor is ON

#### Status When Alarm Occurred

At power ON

- Cn-01 Bit 1 = 0, see **B**
- Cn-01 Bit 1 = 1, see **A**

When SEN signal turned ON

- Cn-01 Bit 1 = 0, see **B**
- During operation (see note), see **B**

	Cause	Remedy
A	Absolute encoder malfunctioned.	At Cn-01 Bit 1 = 0, turn SEN signal OFF and then back ON. At Cn-01 Bit 1 = 1, turn amplifier power OFF then back ON. Replace servomotor if error occurs frequently.
B	Circuit board (IPEB) defective.	Replace amplifier.

Note: No alarm occurs at the servo amplifier when a data error (A.84) is generated. The data error (A.84) occurs the next time the SEN signal (or servo

amplifier) turns ON. However, the data error (A.84) can be read during operation if the host controller is receiving the S-phase signal (serial data).

#### Encoder Overspeed [A.85]

##### Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
A.85	ALO1	ALO2	ALO3	
Absolute Encoder Overspeed (only when absolute encoder is used)	OFF	OFF	OFF	OFF

OFF: Output transistor is OFF

ON: Output transistor is ON

#### Status When Alarm Occurred

At power ON

- Cn-01 Bit 1 = 0, see **B**
- Cn-01 Bit 1 = 1, see **A**

When SEN signal turned ON

- Cn-01 Bit 1 = 0, see **A**

	Cause	Remedy
A	Absolute encoder turned ON at a speed exceeding 400rpm.	Turn ON encoder power supply (or SEN signal or servo amplifier power supply) at a speed not exceeding 400rpm.
B	Circuit (1PWB) defective.	Replace servo amplifier.

#### Heat Sink Overheated [A.A1]

##### Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
A.A1	ALO1	ALO2	ALO3	



### Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
Heat Sink Overheated	ON	ON	ON	ON

OFF: Output transistor is OFF

ON: Output transistor is ON

### Status When Alarm Occurred

During servomotor operation

- See **A, B, C, D**

Occurred when the control power turned ON

- See **E**

	Cause	Remedy
A	The ambient temperature of the amplifier exceeds 55°C.	Alter conditions so that the ambient temperature goes below 55°C.
B	The air flow around the heat sink is bad.	Follow installing method and provide sufficient surrounding space as specified.
C	Fan stopped.	Replace amplifier.
D	Amplifier is running under overload.	Reduce load.
E	Amplifier defective.	Replace amplifier.

### Reference Input Read Error [A.B1]

#### Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
A.B1	ALO1	ALO2	ALO3	
Reference Input Read Error	OFF	OFF	OFF	OFF

OFF: Output transistor is OFF

ON: Output transistor is ON

### Status When Alarm Occurred

At power ON

- See **C**

During servomotor operation

- See **A, B**

	Cause	Remedy
A	Part malfunctioned in reference read-in unit (A/D converter, etc.).	Reset alarm and restart operation.
B	Part defective in reference read-in unit (A/D converter, etc.).	Replace servo amplifier.
C	Circuit board (IPWB) defective.	Replace servo amplifier.

Overrun [A.C1]

Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
A.C1	ALO1	ALO2	ALO3	
Servo Overrun	ON	OFF	ON	OFF

OFF: Output transistor is OFF

ON: Output transistor is ON

### Status When Alarm Occurred

At power ON

- User constant Cn-01 Bit 0= 0, see **E**

Occurred 1 to 3 seconds after power ON

- User constant Cn-01 Bit 0 = 1, see **A, B, C, D, E**

On speed reference input

- See **A, B, C, D, E**

When servo ON (S-ON) signal turned ON

- See **A, B, C, D, E**

	Cause	Remedy
A	Servomotor wiring incorrect or disconnected.	Check wiring and connectors at servomotor.
B	Encoder wiring incorrect or disconnected.	Check wiring and connectors at encoder.
C	Incremental encoder power not supplied from servo amplifier.	Use the servo amplifier power supply for the encoder.
D	Encoder defective.	Replace servomotor.
E	Circuit board (1PWB) defective.	Replace servo amplifier.

### Phase Detection Error [A.C2]

#### Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
A.C2	ALO1	ALO2	ALO3	
Encoder Phase Detection Error	ON	OFF	ON	OFF

OFF: Output transistor is OFF

ON: Output transistor is ON

#### Status When Alarm Occurred

At power ON

- See **D**

Occurred 1 to 3 seconds after power ON

- See **A, B, C, D**

During servomotor operation

- See **A, B, C, D,**

	Cause	Remedy
A	Noise in encoder wiring.	Separate encoder wiring from main wiring circuits.

	Cause	Remedy
B	Encoder wiring incorrect or poor connection.	Check wiring and connectors at encoder.
C	Encoder defective.	Replace servomotor.
D	Circuit (1PWB) defective.	Replace servo amplifier.

A-, B-Phase Disconnection [A.C3]

### Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
A.C3	ALO1	ALO2	ALO3	
Encoder A-, B-phase Disconnection	ON	OFF	ON	OFF

OFF: Output transistor is OFF

ON: Output transistor is ON

### Status When Alarm Occurred

At power ON

- User constant Cn-01 Bit 0= 0, see **D**

Occurred 1 to 3 seconds after power ON

- User constant Cn-01 Bit 0 = 1, see **A, B, C, D**

When servo ON (S-ON) signal turned ON

- See **A, B, C, D**

During servomotor operation

- See **A, B, C, D**

	Cause	Remedy
A	Encoder wiring incorrect or poor connection.	Check wiring and connectors at encoder.
B	Noise in encoder wiring.	Separate encoder wiring from main wiring circuits.
C	Encoder defective.	Replace servomotor
D	Circuit board (1PWB) defective.	Replace servo amplifier.

## C-Phase Disconnection [A.C4]

### Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
A.C4	ALO1	ALO2	ALO3	
Encoder C-phase Disconnection	ON	OFF	ON	OFF

OFF: Output transistor is OFF

ON: Output transistor is ON

### Status When Alarm Occurred

At power ON

- User constant Cn-01 Bit 0= 0, see **C**

Occurred 1 to 3 seconds after power ON

- User constant Cn-01 Bit 0 = 1, see **A, B, C, D**

When servo ON (S-ON) signal turned ON

- See **A, B, C, D**

During servomotor operation

- See **A, B, C, D**

	Cause	Remedy
A	Encoder wiring incorrect or poor connection.	Check wiring and connectors at encoder.
B	Noise in encoder wiring.	Separate encoder wiring from main wiring circuits.
C	Encoder defective.	Replace servomotor.
D	Circuit board (1PWB) defective.	Replace servo amplifier.

## Converter Error [A.F4]

### Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
A.F3	ALO1	ALO2	ALO3	
Power Loss Error	OFF	ON	OFF	ON

OFF: Output transistor is OFF

ON: Output transistor is ON

### Status When Alarm Occurred

During servomotor operation

- See **D, E, F**

At main circuit power supply ON

- See **A, B, C**

Occurred when the control power turned ON

- See **H**

Occurred approximately 1 second after the main circuit power ON

- See **E, F, G**

	Cause	Remedy
A	One phase (L1, L2, L3) of the main circuit power supply is disconnected.	Check power supply. Check wiring of the main circuit power supply. Check MCCB, noise filter, magnetic contactor.
B	There is one phase where the line voltage is low.	Check power supply.

	Cause	Remedy
C	If any of the following power supply conditions are met during motor operation: Complete power failure: half cycle of supply frequency. Voltage drop: full cycle of supply frequency. Note: Because of detector lag or detector margin, there may be no alarm even if the above values are exceeded.	Check the power supply.  Terms Complete power failure = power failure where voltage drops to zero.  Voltage drop = power failure where voltage drops, but not to zero.
D	The power supply voltage is not within the range of specifications.	Check power supply.
E	Rectifying diode defective. Fuse blown. Inrush current-limited resistor disconnected. Regenerative transistor is abnormal.	Replace converter.
F	Disconnection of the regenerative resistor unit.	Replace converter or regenerative resistor unit.
G	Regenerative resistor unit disconnected (for more than 15 type).	Check wiring of regenerative resistor unit.
H	Converter defective.	Replace converter

### Digital Operator Transmission Error 1 [CPF00]

#### Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
CPF00	ALO1	ALO2	ALO3	
Digital Operator Transmission Error 1	Not Specified	Not Specified	Not Specified	Not Specified

Note: This alarm is not stored in alarm traceback function memory.

#### Status When Alarm Occurred

At power ON

- Digital operator connected before servo amplifier power turned ON, see **A, B, C, D**

Digital operator connected to servo amplifier while power turned ON.

- See **A, B, C, D**

	Cause	Remedy
A	Cable defective or poor contact between digital operator and servo amplifier.	Check connector connections. Replace cable.
B	Malfunction due to external noise.	Separate digital operator and cable from noise source.
C	Digital operator defective.	Replace digital operator.
D	Servo amplifier defective.	Replace servo amplifier.

## Digital Operator Transmission Error 2 [CPF01]

### Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
CPF01	ALO1	ALO2	ALO3	
Digital Operator Transmission Error 2	Not Specified	Not Specified	Not Specified	Not Specified

Note: This alarm is not stored in alarm traceback function memory.

### Status When Alarm Occurred

During operation

- See **A, B, C, D**

	Cause	Remedy
A	Cable defective or poor contact between digital operator and servo amplifier.	Check connector connections. Replace cable.
B	Malfunction due to external noise.	Separate digital operator and cable from noise source.
C	Digital operator defective.	Replace digital operator.
D	Servo amplifier defective.	Replace servo amplifier.



## Normal Operation [A.--]

### Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
A.99	ALO1	ALO2	ALO3	
Normal Operation	OFF	OFF	OFF	OFF

OFF: Output transistor is OFF

ON: Output transistor is ON

### Status When Alarm Occurred

Indicates normal operation. Not an alarm.

\*Both the hand-held operator and the operator panel display “A.99” rather than A.--  
.

**DR2-\*\*\* / DR2-\*\*\*\*-F**

Absolute Encoder Data Error [A.00]

Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
A.00	ALO1	ALO2	ALO3	
Absolute Encoder Data Error	OFF	OFF	OFF	OFF

OFF: Output transistor is OFF

ON: Output transistor is ON

**Status When Alarm Occurred**

At power ON

- Speed Control and Cn-01 Bit 1 = 0, see **F**
- Speed Control and Cn-01 Bit 1 = 1, see A, **B**, **C**, D, E, F

At SEN signal input

- See A, **B**, **C**, D, E, F

	Cause	Remedy
A	Absolute encoder power not supplied from the amplifier.	Use the amplifier power supply for the absolute encoder
B	Incorrect absolute encoder wiring (PA, PB, RESET, SEN signal [for speed control], etc.	Check and correct the absolute encoder wiring
C	Absolute encoder malfunctioned.	Speed control (Cn-01 bit 1 = 0), Turn SEN signal OFF and back ON (see note). Speed Control (Cn-01 bit 1 = 1) or position control turn amplifier power OFF and back ON.
D	Incorrect user parameter setting. Incremental encoder used with Cn-01 Bit E set to 1.	Set Cn-01 bit E to 0.
E	Absolute encoder is defective.	Replace motor
F	Circuit board (1PWB) is defective.	Replace amplifier

**Note: Resetting the SEN Signal**

When resetting the SEN signal (i.e., turning it OFF and then back ON) for any reason, keep the SEN signal at the high level for more than 1.3 seconds before turning it OFF.

**Parameter Breakdown [A.02]****Display and Outputs**

Alarm Name	Alarm Code Output			Alarm Output
A.02	ALO1	ALO2	ALO3	
Parameter Breakdown	OFF	OFF	OFF	OFF

OFF: Output transistor is OFF

ON: Output transistor is ON

**Status When Alarm Occurred**

At power ON

- See **A, B**

	Cause	Remedy
A	Power turned OFF while saving parameters. Alarm occurred at the next power ON.	Replace amplifier
B	Circuit board (1PWB) is defective.	Replace amplifier

**Parameter Setting Error [A.04]****Display and Outputs**

Alarm Name	Alarm Code Output			Alarm Output
A.04	ALO1	ALO2	ALO3	
Parameter Setting Error	OFF	OFF	OFF	OFF

OFF: Output transistor is OFF

ON: Output transistor is ON

## Status When Alarm Occurred

At power ON

- See **A, B**

	Cause	Remedy
A	An out-of-range parameter was previously loaded or set.	Reset all out-of-range parameters, otherwise reload correct parameters
B	Circuit board (1PWB) is defective.	Replace amplifier

Overcurrent [A.10]

Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
A.10	ALO1	ALO2	ALO3	
Overcurrent	ON	OFF	OFF	OFF

OFF: Output transistor is OFF

ON: Output transistor is ON

Note: Alarm A10 is reset when the power is turned OFF and back ON. It is not reset by the normal alarm reset.

## Status When Alarm Occurred

During servomotor operation

- See **A, B, C, D, E**

When servo ON (S-ON) signal turned ON

- See **D, E**

At main circuit power ON

- See **D**

	Cause	Remedy
A	Wiring grounded between servo amplifier and servo-motor.	Check and correct wiring.

	Cause	Remedy
B	Servo amplifier ambient temperature exceeds 55° C.	Bring servo amplifier ambient temperature to 55°C. Note: Alarm cannot be reset while power transistor module temperature exceeds 90°C.
C	Servomotor U, V, or W phase grounded.	Replace servomotor.
D	Circuit board (1PWB) defective. Power transistor defective.	Replace servo amplifier.
E	Current feedback circuit, power transistor, DB relay, or circuit board defective.	Replace servo amplifier.

### Fuse Blown [A.20]

#### Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
A.20	ALO1	ALO2	ALO3	
Fuse Blown	OFF	ON	OFF	OFF

OFF: Output transistor is OFF

ON: Output transistor is ON

### Status When Alarm Occurred

At control power ON

- See **A**

At main circuit power ON

- See **B, C**

	Cause	Remedy
A	Circuit board (1PWB) defective.	Replace servo amplifier.
B	Fuse is blown,	Replace servo amplifier.
C	Main circuit diode module defective.	Replace servo amplifier.

## Position Error Pulse Overflow [A.31]

## Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
A.31	ALO1	ALO2	ALO3	
Position Error Pulse Overflow (position control only)	ON	ON	OFF	OFF

OFF: Output transistor is OFF

ON: Output transistor is ON

**Status When Alarm Occurred**

During servomotor operation

- Overflow during high-speed operation, see **A**
- No feedback pulse returned after reference pulse input, see **B, F**
- Normal operation but overflow when large reference input, see **C, D, E**

At control power ON

- See **F**

	Cause	Remedy
A	Servomotor wiring incorrect.	Check and correct wiring. (Check A-, B-, C-phase pulses correct at 2CN.)
B	Encoder wiring incorrect (disconnection, short circuit, power supply, etc.).	Check and correct wiring. (Check A-, B-, C-phase pulses correct at 2CN.)
C	Servo amplifier adjustment incorrect.	Increase speed loop gain (Cn-04) and/or position loop gain (Cn-1A).
D	Servomotor overloaded.	Reduce load torque and inertia. Otherwise, replace with larger capacity servomotor.
E	Position reference pulse frequency too high.	Decrease reference pulse frequency. Use smoothing function. Change electronic gear ratio.
F	Circuit board (1PWB) defective.	Replace servo amplifier.

## Overvoltage [A.40]

## Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
A.40	ALO1	ALO2	ALO3	
Overvoltage	OFF	OFF	ON	OFF

OFF: Output transistor is OFF

ON: Output transistor is ON

**Status When Alarm Occurred**

At main circuit power ON

- See **E**

At control power ON

- See **F**

During servomotor operation

- During motor deceleration, see **A, D**
- During normal operation, see **B, C, D**

	Cause	Remedy
A	Load inertia high and motor speed too high.	Change operating conditions. Use regenerative resistor or regenerative unit.
B	Load exceeds capacity of regenerative unit.	Change operating conditions.
C	Servomotor speed too high.	Reduce motor speed.
D	Servo amplifier defective.	Replace servo amplifier.
E	Input voltage too high.	Change input voltage to normal value.
F	Circuit board (IPWB) defective.	Replace servo amplifier.

## Overspeed [A.51]

## Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
A.51	ALO1	ALO2	ALO3	

### Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
Overspeed	ON	OFF	ON	OFF

OFF: Output transistor is OFF

ON: Output transistor is ON

### Status When Alarm Occurred

At servo ON (S-ON) signal turned ON

- See A, B, C, D, E
- During high-speed servomotor rotation after reference input (alarm detected at 110% maximum speed), see A, B, C, D, E

At power ON

- See E

	Cause	Remedy
A	Servomotor wiring incorrect. Encoder wiring incorrect (disconnection, short circuit, power supply, etc.).	Check and correct wiring. (Check A-, B-, C-phase pulses correct at 2CN.)
B	Incremental encoder power not supplied from servo amplifier.	Use the servo amplifier power supply for the encoder.
C	Noise in encoder wiring.	Separate encoder wiring from main wiring circuits.
D	Incorrect user constant (number of encoder pulses) setting.	Set user constant Cn-11 to the correct number of pulses.
E	Circuit board (1PWB) defective.	Replace servo amplifier.

### Absolute Encoder Data Error [A.70]

#### Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
A.70	ALO1	ALO2	ALO3	



### Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
Absolute Encoder Data Error	ON	ON	ON	OFF

OFF: Output transistor is OFF

ON: Output transistor is ON

### Status When Alarm Occurred

At power ON

- See **E**

When servo ON (S-ON) signal turned ON

- See **A, B, D**

When speed reference input

- No servomotor rotation, see **B, C, D**
- During normal operation, see **D, E**

	Cause	Remedy
A	Servomotor wiring incorrect or disconnected.	Check wiring and connectors at servomotor.
B	Encoder wiring incorrect or disconnected.	Check wiring and connectors at encoder.
C	Load greatly exceeds rated torque.	Reduce load torque and inertia. Otherwise, replace with larger capacity servomotor.
D	Incremental encoder power not supplied from servo amplifier.	Use the servo amplifier power supply for the encoder.
E	Circuit board (1PWB) defective.	Replace servo amplifier.

### Encoder Error [A.80]

### Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
A.80	ALO1	ALO2	ALO3	

## Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
Absolute Encoder Error (only if absolute encoder is used)	OFF	OFF	OFF	OFF

OFF: Output transistor is OFF

ON: Output transistor is ON

## Status When Alarm Occurred

At control power ON

- Speed Control and Cn-01 Bit 1 = 0, see **C**
- Speed Control and Cn-01 Bit 1 = 1, see **A, B, C**

During servomotor operation

- See **A, B, D, E**

	Cause	Remedy
A	Incorrect absolute encoder wiring (PA, PB, RESET, SEN signal [for speed control], etc.	Check and correct the absolute encoder wiring.
B	Absolute encoder malfunctioned.	For speed control (Cn-01 Bit 1 = 0), turn SEN signal OFF and back ON. For speed control (Cn-01 Bit 1 = 1) or position control, turn servo amplifier power OFF and back ON.
C	Circuit board (1PWB) defective.	Replace servo amplifier
D	Error occurred in absolute encoder.  Another encoder alarm displayed when SEN signal or power supply turned back ON.	For speed control (Cn-01 Bit 1 = 0), turn SEN signal OFF and back ON (if servo motor is rotating, first turn servo OFF).  For speed control (Cn-01 Bit 1 = 1) or position control, turn servo amplifier power OFF and back ON.

	Cause	Remedy
E	Servo amplifier miscounted pulses (positional displacement) or malfunctioned due to noise.	Separate encoder wiring from main wiring circuits. For speed control (Cn-01 Bit 1 = 0), turn SEN signal OFF and back ON (if servomotor is rotating, first turn servo OFF). When Cn-01 Bit 1 = 1, turn servo amplifier power OFF and back ON.

### Encoder Back-up Alarm [A.81]

#### Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
A.81	ALO1	ALO2	ALO3	
Absolute Encoder Back-up Error (only if absolute encoder issued)	OFF	OFF	OFF	OFF

OFF: Output transistor is OFF

ON: Output transistor is ON

#### Status When Alarm Occurred

At power ON

- Speed Control and Cn-01 Bit 1 = 0, see **B**
- Speed Control and Cn-01 Bit 1 = 1, see **A, C**

When SEN signal turned ON Cn-01 Bit 1 = 0

- See **A, C**

	Cause	Remedy
A	The following power supplied to the absolute encoder all failed: +5V supply Battery (ER6V C3) Internal capacitor	Follow absolute encoder set-up procedures.
B	Circuit board (1PWB) defective.	Replace servo amplifier.

	Cause	Remedy
C	Absolute encoder malfunctioned.	Replace servo amplifier.

### Encoder Checksum Error [A.82]

#### Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
A.82	ALO1	ALO2	ALO3	
Absolute Encoder Check-sum Error (only if absolute encoder is used)	OFF	OFF	OFF	OFF

OFF: Output transistor is OFF

ON: Output transistor is ON

#### Status When Alarm Occurred

At Control power ON

- Speed Control and Cn-01 Bit 1 = 0, see **B**
- Speed Control and Cn-01 Bit 1 = 1, see **A, B**

When SEN signal turned ON

- Cn-01 Bit 1 = 0, see **A**
- During operation (see note), see **A**

	Cause	Remedy
A	Abnormality during absolute encoder memory check.	Follow absolute encoder set-up procedures. Replace servomotor if error occurs frequently.
B	Circuit board (IPWB) defective.	Replace servo amplifier.

Note: An absolute encoder error (A.80) is given initially if a check-sum error (A.82) is generated during operation.

The check-sum error (A.82) occurs after turning the SEN signal (or servo amplifier power supply) OFF and back ON.

However, the check-sum error (A.82) does occur during operation if the host controller is receiving the S-phase signal (serial data).

#### Encoder Battery Alarm [A.83]

##### Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
A.83	ALO1	ALO2	ALO3	
Absolute Encoder Battery Error	OFF	OFF	OFF	OFF

OFF: Output transistor is OFF

ON: Output transistor is ON

#### Status When Alarm Occurred

At power ON

- Speed Control and Cn-01 Bit 1 = 0, see **C**
- Speed Control and Cn-01 Bit 1 = 1, see **A, B**

When SEN signal turned ON

- Cn-01 Bit 1 = 0, see **A, B**
- During operation (see note), see **A, B**

	Cause	Remedy
A	Battery not connected Battery connection defective.	Check and correct battery connection.
B	Battery voltage below specified value. Specified values: 2.8V.	Install new battery and turn SEN signal (or servo amplifier) ON.
C	Circuit board (1PWB) defective.	Replace servo amplifier.

Note: No alarm occurs at the servo amplifier when a battery error (A.83) is generated. The battery error (A.83) occurs the next time the SEN signal (or servo amplifier) turns ON. However, the battery error (A.83) can be read during operation if the host controller is receiving the S-phase signal (serial data).

## Absolute Encoder Error [A.84]

## Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
A.84	ALO1	ALO2	ALO3	
Absolute Encoder Data Error (only if absolute encoder is used)	OFF	OFF	OFF	OFF

OFF: Output transistor is OFF

ON: Output transistor is ON

**Status When Alarm Occurred**

At power ON

- Speed Control and Cn-01 Bit 1 = 0, see **B**
- Speed Control and Cn-01 Bit 1 = 1, see **A**

When SEN signal turned ON

- Cn-01 Bit 1 = 0, see **A**
- During operation (see note), see **A**

	Cause	Remedy
A	Absolute encoder malfunctioned.	For speed control (Cn-01 Bit 1 = 0), turn SEN signal OFF and back ON. For speed control (Cn-01 Bit 1 = 1) or position control, turn amplifier power OFF and back ON. Replace servomotor if error occurs frequently.
B	Circuit board (1PWB) defective.	Replace amplifier.

**Note:** No alarm occurs at the servo amplifier when a data error (A.84) is generated. The data error (A.84) occurs the next time the SEN signal (or servo amplifier) turns ON. However, the data error (A.84) can be read during operation if the host controller is receiving the S-phase signal (serial data).

## Encoder Overspeed [A.85]

## Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
A.85	ALO1	ALO2	ALO3	
Absolute Encoder Overspeed (only if absolute encoder is used)	OFF	OFF	OFF	OFF

OFF: Output transistor is OFF

ON: Output transistor is ON

**Status When Alarm Occurred**

At control power ON

- Speed Control and Cn-01 Bit 1 = 0, see **B**
- Speed Control and Cn-01 Bit 1 = 1, see **A**
- Position Control, see **A**

When SEN signal turned ON

- Cn-01 Bit 1 = 0, see **A**

	Cause	Remedy
A	Absolute encoder turned ON at a speed exceeding 400rpm.	Turn ON encoder power supply (or SEN signal or servo amplifier power supply) at a speed not exceeding 400rpm.
B	Circuit (1PWB) defective.	Replace servo amplifier.

## Reference Input Read Error [A.B1]

## Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
A.B1	ALO1	ALO2	ALO3	

### Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
Reference Input Read Error (for speed/torque control only)	OFF	OFF	OFF	OFF

OFF: Output transistor is OFF

ON: Output transistor is ON

### Status When Alarm Occurred

At control power ON

- See **C**

During servomotor operation

- See **A, B**

	Cause	Remedy
A	Part malfunctioned in reference read-in unit (A/D converter, etc.).	Reset alarm and restart operation.
B	Part defective in reference read-in unit (A/D converter, etc.).	Replace servo amplifier.
C	Circuit board (1PWB) defective.	Replace servo amplifier.

### Overrun [A.C1]

### Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
A.C1	ALO1	ALO2	ALO3	
Servo Overrun	ON	OFF	ON	OFF

OFF: Output transistor is OFF

ON: Output transistor is ON



## Status When Alarm Occurred

At control power ON

- User constant Cn-01 Bit 0= 0, see **E**

Occurred 1 to 3 seconds after power ON

- User constant Cn-01 Bit 0 = 1, see **A, B, C, D, E**

On speed reference input

- See **A, B, C, D, E**

When servo ON (S-ON) signal turned ON

- See **A, B, C, D, E**

	Cause	Remedy
A	Servomotor wiring incorrect or disconnected.	Check wiring and connectors at servomotor.
B	Encoder wiring incorrect or disconnected.	Check wiring and connectors at encoder.
C	Incremental encoder power not supplied from servo amplifier.	Use the servo amplifier power supply for the encoder.
D	Encoder defective	Replace servomotor.
E	Circuit board (IPWB) defective.	Replace servo amplifier.

## Phase Detection Error [A.C2]

### Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
A.C2	ALO1	ALO2	ALO3	
Encoder Phase Detection Error	ON	OFF	ON	OFF
Incremental Encoder Initial Pulse Error				

OFF: Output transistor is OFF

ON: Output transistor is ON

### Status When Alarm Occurred

During servomotor operation

- See **A, B, C**

At control power ON

- See **D, E, F, G, H**

Occurred 1 to 3 seconds after power ON

- See **E, F, G**

During servomotor operation

- See **H,**

	Cause	Remedy
A	Noise in encoder wiring.	Separate encoder wiring from main wiring circuits.
B	Encoder wiring incorrect or poor connection.	Check wiring and connectors at encoder.
C	Encoder defective	Replace servomotor.
D	Noise in encoder wiring.	Separate encoder wiring from main wiring circuits.
E	Encoder wiring incorrect or poor connection.	Check wiring and connectors at encoder.
F	Encoder defective.	Replace servomotor
G	Absolute encoder is used.	Set the following user parameters: Cn-02 bit 9 = 1 Cn-11 (number of encoder pulses)

A-, B-Phase Disconnection [A.C3], External PG A-, B-phase disconnection [A.C6]

### Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
A.C3 / A.C6	ALO1	ALO2	ALO3	

## Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
A.C3: Encoder A-, B-phase Dis- connection	ON	OFF	ON	OFF
A.C6: External PG A-, B-phase Disconnec- tion (only for full-closed loop specifi- cation)				

OFF: Output transistor is OFF

ON: Output transistor is ON

## Status When Alarm Occurred

At control power ON

- User constant Cn-01 Bit 0= 0, see **D**

Occurred 1 to 3 seconds after power ON

- User constant Cn-01 Bit 0 = 1, see **A, B, C**

When servo ON (S-ON) signal turned ON

- See **A, B, C, D**

During servomotor operation

- See **A, B, C, D**

	Cause	Remedy
A	Encoder wiring incorrect or poor connection.	Check wiring and connectors at encoder.
B	Noise in encoder wiring.	Separate encoder wiring from main wiring circuits.
C	Encoder defective.	Replace servomotor
D	Circuit board (1PWB) defective.	Replace servo amplifier.

## C-Phase Disconnection, [A.C7] External PG C-phase disconnection [A.C4]

## Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
A.C4 / A.C7	ALO1	ALO2	ALO3	
A.C4: Encoder C-phase Disconnection  A.C7: External PG C-phase Disconnection (only for full-closed loop specification)	ON	OFF	ON	OFF

OFF: Output transistor is OFF

ON: Output transistor is ON

**Status When Alarm Occurred**

At main circuit power ON

- User constant Cn-01 Bit 0= 0, see **C**

Occurred 1 to 3 seconds after power ON

- User constant Cn-01 Bit 0 = 1, see **A, B, C, D**

When servo ON (S-ON) signal turned ON

- See **A, B, C, D**

During servomotor operation

- See **A, B, C, D**

	Cause	Remedy
A	Encoder wiring incorrect or poor connection.	Check wiring and connectors at encoder.
B	Noise in encoder wiring.	Separate encoder wiring from main wiring circuits.
C	Encoder defective.	Replace servomotor.

	Cause	Remedy
D	Circuit board (1PWB) defective.	Replace servo amplifier.

### Digital Operator Display and Alarm Name [CPF00]

#### Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
CPF00	ALO1	ALO2	ALO3	
Digital Operator Transmission Error 1	Not Specified	Not Specified	Not Specified	Not Specified

Note: This alarm is not stored in alarm traceback function memory.

### Status When Alarm Occurred

At control power ON

- Digital operator connected before servo amplifier power turned ON, see **A, B, C, D**

Digital operator connected to servo amplifier while power turned ON.

- See **A, B, C, D**

	Cause	Remedy
A	Cable defective or poor contact between digital operator and servo amplifier.	Check connector connections. Replace cable.
B	Malfunction due to external noise.	Separate digital operator and cable from noise source.
C	Digital operator defective.	Replace digital operator.
D	Servo amplifier defective.	Replace servo amplifier.

### Digital Operator Transmission Error [CPF01]

#### Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
CPF01	ALO1	ALO2	ALO3	

### Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
Digital Operator Transmission Error 2	Not Specified	Not Specified	Not Specified	Not Specified

Note: This alarm is not stored in alarm traceback function memory.

### Status When Alarm Occurred

During operation

- See **A, B, C, D**

	Cause	Remedy
A	Cable defective or poor contact between digital operator and servo amplifier.	Check connector connections. Replace cable.
B	Malfunction due to external noise.	Separate digital operator and cable from noise source.
C	Digital operator defective.	Replace digital operator.
D	Servo amplifier defective.	Replace servo amplifier.

### Normal Operation [A.--]

#### Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
A.99	ALO1	ALO2	ALO3	
Normal Operation	OFF	OFF	OFF	OFF

OFF: Output transistor is OFF

ON: Output transistor is ON

### Status When Alarm Occurred

Indicates normal operation. Not an alarm.

\*Both the hand-held operator and the operator panel display “A.99” rather than A.--

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**SGDE-\*\*\*S / SGDL-\*\*\*S**

## Parameter Breakdown [A.02]

## Display and Outputs

Alarm Name	Alarm Output	ALM Output
A.02		
Parameter Breakdown	OFF	OFF

OFF: Output transistor is OFF

ON: Output transistor is ON

**Status When Alarm Occurred**

At power ON

- See **A, B**

	Cause	Remedy
A	Power turned OFF during parameter write. Alarm occurred at the next power ON.	Replace amplifier
B	Circuit board (IPWB) is defective.	Replace amplifier

## Parameter Setting Error [A.04]

## Display and Outputs

Alarm Name	Alarm Output	ALM Output
A.04		
Parameter Setting Error	OFF	OFF

OFF: Output transistor is OFF

ON: Output transistor is ON

**Status When Alarm Occurred**

At power ON

- See **A, B**

	Cause	Remedy
A	An out-of-range parameter was previously loaded or set.	Reset all out-of-range parameters, otherwise reload correct parameters
B	Circuit board (1PWB) is defective.	Replace amplifier

#### Overcurrent [A.10]

##### Display and Outputs

Alarm Name	Alarm Output	ALM Output
A.10		
Overcurrent	OFF	OFF

OFF: Output transistor is OFF

ON: Output transistor is ON

#### Status When Alarm Occurred

During servomotor operation

- See **A, B, C, D, E**

When servo ON (S-ON) signal turned ON

- See **D, E**

At power ON

- See **D**

	Cause	Remedy
A	Wiring grounded between servo amplifier and servomotor.	Check and correct wiring.
B	Servo amplifier ambient temperature exceeds 50° C.	Bring servo amplifier ambient temperature to 50°C. Note: Alarm cannot be reset while power transistor module temperature exceeds 90°C.
C	Servomotor U, V, or W phase grounded.	Replace servomotor.
D	Circuit board (1PWB) defective. Power transistor defective.	Replace servo amplifier.



	Cause	Remedy
E	Current feedback circuit, power transistor, DB relay, or circuit board defective.	Replace servo amplifier.

### Position Error Pulse Overflow [A.31]

#### Display and Outputs

Alarm Name	Alarm Output	ALM Output
A.31		
Position Error Pulse Overflow	OFF	OFF

OFF: Output transistor is OFF

ON: Output transistor is ON

#### Status When Alarm Occurred

During servomotor operation

- Overflow during high-speed operation, see **A**
- No feedback pulse returned after reference pulse input, see **B, F**
- Normal operation but overflow when large reference input, see **C, D, E**

At power ON

- See **F**

	Cause	Remedy
A	Servomotor wiring incorrect.	Check and correct wiring. (Check A-, B-, C-phase pulses correct at 2CN.)
B	Encoder wiring incorrect (disconnection, short circuit, power supply, etc.).	Check and correct wiring. (Check A-, B-, C-phase pulses correct at 2CN.)
C	Servo amplifier adjustment incorrect.	Increase speed loop gain (Cn-04) and/or position loop gain (Cn-1A).
D	Servomotor overloaded.	Reduce load torque and inertia. Otherwise, replace with larger capacity servomotor.
E	Position reference pulse frequency too high.	Decrease reference pulse frequency. Use smoothing function. Change electronic gear ratio.
F	Circuit board (1PWB) defective.	Replace servo amplifier.

## Overvoltage [A.40]

## Display and Outputs

Alarm Name	Alarm Output	ALM Output
A.40		
Overvoltage	OFF	OFF

OFF: Output transistor is OFF

ON: Output transistor is ON

**Status When Alarm Occurred**

At power ON

- See **E, F**

During servomotor operation

- During motor deceleration, see **A, D**
- During normal operation, see **B, C, D**

	Cause	Remedy
A	Load inertia high and motor speed too high.	Change operating conditions. Use regenerative unit. If multiple units are used, connect all P, N terminals in parallel.
B	Load exceeds capacity of regenerative unit.	Change operating conditions.
C	Servomotor speed too high.	Reduce motor speed.
D	Servo amplifier defective.	Replace servo amplifier.
E	Input voltage too high.	Change input voltage to normal value.
F	Circuit board (1PWB) defective.	Replace servo amplifier.

## Overspeed [A.51]

## Display and Outputs

Alarm Name	Alarm Output	ALM Output
A.51		
Overspeed	OFF	OFF

OFF: Output transistor is OFF

ON: Output transistor is ON

### Status When Alarm Occurred

At servo ON (S-ON) signal turned ON

- See A, B, C, D
- During high-speed servomotor rotation after reference input (alarm detected at 110% maximum speed), see A, B, C, D

At power ON

- See D

	Cause	Remedy
A	Servomotor wiring incorrect. Encoder wiring incorrect (disconnection, short circuit, power supply, etc.).	Check and correct wiring. (Check A-, B-, C-phase pulses correct at 2CN.)
B	Incremental encoder power not supplied from servo amplifier.	Use the servo amplifier power supply for the encoder.
C	Noise in encoder wiring.	Separate encoder wiring from main wiring circuits.
D	Circuit board (1PWB) defective.	Replace amplifier.

Overload [A.70]

### Display and Outputs

Alarm Name	Alarm Output	ALM Output
A.70		
Overload	OFF	OFF

OFF: Output transistor is OFF

ON: Output transistor is ON

### Status When Alarm Occurred

At power ON

- See E

When servo ON (S-ON) signal turned ON

- See **A, B, D**

When position reference input

- No servomotor rotation, see **B, C, D**
- During normal operation, see **D, E**

	Cause	Remedy
A	Servomotor wiring incorrect or disconnected.	Check wiring and connectors at servomotor
B	Encoder wiring incorrect or disconnected.	Check wiring and connectors at encoder
C	Load greatly exceeds rated torque.	Reduce load torque and inertia. Otherwise, replace with larger capacity servomotor.
D	Incremental encoder power not supplied from servo amplifier.	Use the servo amplifier power supply for the encoder.
E	Circuit board (1PWB) defective.	Replace servo amplifier.

Overrun [A.C1]

#### Display and Outputs

Alarm Name	Alarm Output	ALM Output
A.C1		
Servo Overrun	OFF	OFF

OFF: Output transistor is OFF

ON: Output transistor is ON

#### Status When Alarm Occurred

At power ON

- User constant Cn-01 Bit 0= 0, see **E**

Occurred 1 to 3 seconds after power ON

- User constant Cn-01 Bit 0 = 1, see **A, B, C, D, E**

On position reference input

- See **A, B, C, D, E**

When servo ON (S-ON) signal turned ON

- See **A, B, C, D, E**

	Cause	Remedy
A	Servomotor wiring incorrect or disconnected.	Check wiring and connectors at servomotor.
B	Encoder wiring incorrect or disconnected.	Check wiring and connectors at encoder.
C	Incremental encoder power not supplied from servo amplifier.	Use the servo amplifier power supply for the encoder.
D	Encoder defective.	Replace servomotor.
E	Circuit board (IPWB) defective.	Replace servo amplifier.

Phase Detection Error [A.C2]

#### Display and Outputs

Alarm Name	Alarm Output	ALM Output
A.C2		
Encoder Phase Detection Error	OFF	OFF

OFF: Output transistor is OFF

ON: Output transistor is ON

#### Status When Alarm Occurred

At power ON

- See **D**

Occurred 1 to 3 seconds after power ON

- See **A, B, C, D**

During servomotor operation

- See **A, B, C, D,**

	Cause	Remedy
A	Noise in encoder wiring.	Separate encoder wiring from main wiring circuits.
B	Encoder wiring incorrect or poor connection.	Check wiring and connectors at encoder.
C	Encoder defective.	Replace servomotor.
D	Circuit (1PWB) defective.	Replace servo amplifier.

A-, B-Phase Disconnection [A.C3]

#### Display and Outputs

Alarm Name	Alarm Output	ALM Output
A.C3		
Encoder A-, B-Phase Disconnection	OFF	OFF

OFF: Output transistor is OFF

ON: Output transistor is ON

#### Status When Alarm Occurred

At power ON

- User constant Cn-01 Bit 0= 0, see **D**

Occurred 1 to 3 seconds after power ON

- User constant Cn-01 Bit 0 = 1, see **A, B, C**

When servo ON (S-ON) signal turned ON

- See **A, B, C, D**

During servomotor operation

- See **A, B, C, D**

	Cause	Remedy
A	Encoder wiring incorrect or poor connection.	Check wiring and connectors at encoder.
B	Noise in encoder wiring.	Separate encoder wiring from main wiring circuits.

	Cause	Remedy
C	Encoder defective.	Replace servomotor
D	Circuit board (1PWB) defective.	Replace servo amplifier.

### C-Phase Disconnection [A.C4]

#### Display and Outputs

Alarm Name	Alarm Output	ALM Output
A.C4		
Encoder C-phase Disconnection	OFF	OFF

OFF: Output transistor is OFF

ON: Output transistor is ON

### Status When Alarm Occurred

At power ON

- User constant Cn-01 Bit 0= 0, see **C**

Occurred 1 to 3 seconds after power ON

- User constant Cn-01 Bit 0 = 1, see **A, B, C, D**

When servo ON (S-ON) signal turned ON

- See **A, B, C, D**

During servomotor operation

- See **A, B, C, D**

	Cause	Remedy
A	Encoder wiring incorrect or poor connection.	Check wiring and connectors at encoder.
B	Noise in encoder wiring.	Separate encoder wiring from main wiring circuits.
C	Encoder defective.	Replace servomotor
D	Circuit board (1PWB) defective.	Replace servo amplifier.

## Power Loss Alarm [A.F3]

## Display and Outputs

Alarm Name	Alarm Output	ALM Output
A.F3		
Power Loss Error	OFF	ON

OFF: Output transistor is OFF

ON: Output transistor is ON

**Status When Alarm Occurred**

At power ON

- See A

During servomotor operation

- See B

	Cause	Remedy
A	Time between turning power OFF and back ON was shorter than the power holding time.	After turning power OFF, wait more than the power holding time (6 to 15s, according to type) before turning the power back ON.
B	If any of the following power supply conditions are met during motor operation: Complete power failure: half cycle of supply frequency. Voltage drop: full cycle of supply frequency Note: Because of detector lag and detector margin, power loss of 30 to 55ms does not cause an alarm.	Check the power supply.  Terms Complete power failure = Power failure where voltage drops to zero Voltage drop = Power failure where voltage drops, but not to zero

## Digital Operator Display and Alarm Name [CPF00]

## Display and Outputs

Alarm Name	Alarm Output	ALM Output
CPF00		



### Display and Outputs

Alarm Name	Alarm Output	ALM Output
Digital Operator Transmission Error 1	Not Specified	Not Specified

Note: This alarm is not stored in alarm traceback function memory.

### Status When Alarm Occurred

At power ON

- Digital operator connected before servo amplifier power turned ON, see **A, B, C, D**

Digital operator connected to servo amplifier while power turned ON.

- See **A, B, C, D**

	Cause	Remedy
A	Cable defective or poor contact between digital operator and servo amplifier.	Check connector connections. Replace cable.
B	Malfunction due to external noise.	Separate digital operator and cable from noise source.
C	Digital operator defective.	Replace digital operator.
D	Servo amplifier defective.	Replace servo amplifier.

### Digital Operator Transmission Error [CPF01]

#### Display and Outputs

Alarm Name	Alarm Output	ALM Output
CPF01		
Digital Operator Transmission Error 2	Not Specified	Not Specified

Note: This alarm is not stored in alarm traceback function memory.

### Status When Alarm Occurred

During operation

- See **A, B, C, D**

	Cause	Remedy
A	Cable defective or poor contact between digital operator and servo amplifier.	Check connector connections. Replace cable.
B	Malfunction due to external noise.	Separate digital operator and cable from noise source.
C	Digital operator defective.	Replace digital operator.
D	Servo amplifier defective.	Replace servo amplifier.

### Normal Operation [A.--]

#### Display and Outputs

Alarm Name	Alarm Output	ALM Output
A.99		
Normal Operation	OFF	OFF

OFF: Output transistor is OFF

ON: Output transistor is ON

#### Status When Alarm Occurred

Indicates normal operation. Not an alarm.

\*Both the hand-held operator and the operator panel display “A.99” rather than A.--

.

**SDGE-\*\*\*\*P / SDGL-\*\*\*\*P**

## Parameter Breakdown [A.02]

## Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
A.02	ALO1	ALO2	ALO3	
Parameter Breakdown	OFF	OFF	OFF	OFF

OFF: Output transistor is OFF

ON: Output transistor is ON

**Status When Alarm Occurred**

At power ON

- See **A, B**

	Cause	Remedy
A	Power turned OFF during parameter write. Alarm occurred at the next power ON.	Replace amplifier
B	Circuit board (IPWB) is defective.	Replace amplifier

## Parameter Setting Error [A.04]

## Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
A.04	ALO1	ALO2	ALO3	
Parameter Setting Error	OFF	OFF	OFF	OFF

OFF: Output transistor is OFF

ON: Output transistor is ON

**Status When Alarm Occurred**

At power ON

- See **A, B**

	Cause	Remedy
A	An out-of-range parameter was previously loaded or set.	Reset all out-of-range parameters, otherwise reload correct parameters
B	Circuit board (IPWB) is defective.	Replace amplifier

Overcurrent [A.10]

### Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
A.10	ALO1	ALO2	ALO3	
Overcurrent	ON	OFF	OFF	OFF

OFF: Output transistor is OFF

ON: Output transistor is ON

### Status When Alarm Occurred

During servomotor operation

- See **A, B, C, D, E**

When servo ON (S-ON) signal turned ON

- See **D, E**

At power ON

- See **D**

	Cause	Remedy
A	Wiring grounded between servo amplifier and servomotor.	Check and correct wiring.
B	Servo amplifier ambient temperature exceeds 50° C.	Bring servo amplifier ambient temperature to 50°C. Note: Alarm cannot be reset while power transistor module temperature exceeds 90°C.
C	Servomotor U, V, or W phase grounded.	Replace servomotor.

	Cause	Remedy
D	Circuit board (1PWB) defective. Power transistor defective.	Replace servo amplifier.
E	Current feedback circuit, power transistor, DB relay, or circuit board defective.	Replace servo amplifier.

### Overvoltage [A.40]

#### Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
A.40	ALO1	ALO2	ALO3	
Overvoltage	OFF	OFF	ON	OFF

OFF: Output transistor is OFF

ON: Output transistor is ON

### Status When Alarm Occurred

At power ON

- See **E, F**

During servomotor operation

- During motor deceleration, see **A, D**
- During normal operation, see **B, C, D**

	Cause	Remedy
A	Load inertia high and motor speed too high.	Change operating conditions. Use regenerative unit. If multiple units are used, connect all P, N terminals in parallel.
B	Load exceeds capacity of regenerative unit.	Change operating conditions.
C	Servomotor speed too high.	Reduce motor speed.
D	Servo amplifier defective.	Replace servo amplifier.
E	Input voltage too high.	Change input voltage to normal value.
F	Circuit board (1PWB) defective.	Replace servo amplifier.

## Overspeed [A.51]

## Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
A.51	ALO1	ALO2	ALO3	
Overspeed	ON	OFF	ON	OFF

OFF: Output transistor is OFF

ON: Output transistor is ON

**Status When Alarm Occurred**

At servo ON (S-ON) signal turned ON

- See **A**, **B**, **C**, **D**
- During high-speed servomotor rotation after reference input (alarm detected at 110% maximum speed), see **A**, **B**, **C**, **D**

At power ON

- See **D**

	Cause	Remedy
<b>A</b>	Servomotor wiring incorrect. Encoder wiring incorrect (disconnection, short circuit, power supply, etc.).	Check and correct wiring. (Check A-, B-, C-phase pulses correct at 2CN.)
<b>B</b>	Incremental encoder power not supplied from servo amplifier.	Use the servo amplifier power supply for the encoder.
<b>C</b>	Noise in encoder wiring.	Separate encoder wiring from main wiring circuits.
<b>D</b>	Incorrect user constant (number of encoder pulses) setting.	Set user constant Cn-11 to the correct number of pulses.

## Overload [A.70]

## Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
A.70	ALO1	ALO2	ALO3	

## Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
Overload	ON	ON	ON	OFF

OFF: Output transistor is OFF

ON: Output transistor is ON

**Status When Alarm Occurred**

At power ON

- See **E**

When servo ON (S-ON) signal turned ON

- See **A, B, D**

When position reference input

- No servomotor rotation, see **B, C, D**
- During normal operation, see **D, E**

	Cause	Remedy
A	Servomotor wiring incorrect or disconnected.	Check wiring and connectors at servomotor
B	Encoder wiring incorrect or disconnected.	Check wiring and connectors at encoder
C	Load greatly exceeds rated torque.	Reduce load torque and inertia. Otherwise, replace with larger capacity servomotor.
D	Incremental encoder power not supplied from servo amplifier.	Use the servo amplifier power supply for the encoder.
E	Circuit board (1PWB) defective.	Replace servo amplifier.

## Reference Input Read Error [A.B1]

## Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
A.B1	ALO1	ALO2	ALO3	

### Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
Reference Input Read Error (for speed/torque control only)	OFF	OFF	OFF	OFF

OFF: Output transistor is OFF

ON: Output transistor is ON

### Status When Alarm Occurred

At power ON

- See **C**

During servomotor operation

- See **A, B**

	Cause	Remedy
A	Part malfunctioned in reference read-in unit (A/D converter, etc.).	Reset alarm and restart operation.
B	Part defective in reference read-in unit (A/D converter, etc.).	Replace servo amplifier.
C	Circuit board (1PWB) defective.	Replace servo amplifier.

### Overrun [A.C1]

### Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
A.C1	ALO1	ALO2	ALO3	
Servo overrun	ON	OFF	ON	OFF

OFF: Output transistor is OFF

ON: Output transistor is ON

### Status When Alarm Occurred



At power ON

- User constant Cn-01 Bit 0= 0, see **E**

Occurred 1 to 3 seconds after power ON

- User constant Cn-01 Bit 0 = 1, see **A, B, C, D, E**

On position reference input

- See **A, B, C, D, E**

When servo ON (S-ON) signal turned ON

- See **A, B, C, D, E**

	Cause	Remedy
A	Servomotor wiring incorrect or disconnected.	Check wiring and connectors at servomotor.
B	Encoder wiring incorrect or disconnected.	Check wiring and connectors at encoder.
C	Incremental encoder power not supplied from servo amplifier.	Use the servo amplifier power supply for the encoder.
D	Encoder defective.	Replace servomotor.
E	Circuit board (1PWB) defective.	Replace servo amplifier.

Phase Detection Error [A.C2]

Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
A.C2	ALO1	ALO2	ALO3	
Encoder Phase Detection Error	ON	OFF	ON	OFF

OFF: Output transistor is OFF

ON: Output transistor is ON

**Status When Alarm Occurred**

At power ON

- See **D**

Occurred 1 to 3 seconds after power ON

- See **A, B, C, D**

During servomotor operation

- See **A, B, C, D,**

	Cause	Remedy
A	Noise in encoder wiring.	Separate encoder wiring from main wiring circuits.
B	Encoder wiring incorrect or poor connection.	Check wiring and connectors at encoder.
C	Encoder defective.	Replace servomotor.
D	Circuit (1PWB) defective.	Replace servo amplifier.

A-, B-Phase Disconnection [A.C3]

Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
A.C3	ALO1	ALO2	ALO3	
Encoder A-, B-phase Disconnection	ON	OFF	ON	OFF

OFF: Output transistor is OFF

ON: Output transistor is ON

### Status When Alarm Occurred

At power ON

- User constant Cn-01 Bit 0= 0, see **D**

Occurred 1 to 3 seconds after power ON

- User constant Cn-01 Bit 0 = 1, see **A, B, C**

When servo ON (S-ON) signal turned ON

- See **A, B, C, D**

During servomotor operation

- See A, B, C, D

	Cause	Remedy
A	Encoder wiring incorrect or poor connection.	Check wiring and connectors at encoder.
B	Noise in encoder wiring.	Separate encoder wiring from main wiring circuits.
C	Encoder defective.	Replace servomotor
D	Circuit board (IPWB) defective.	Replace servo amplifier.

C-Phase Disconnection [A.C4]

Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
A.C4	ALO1	ALO2	ALO3	
Encoder C-phase Disconnection	ON	OFF	ON	OFF

OFF: Output transistor is OFF

ON: Output transistor is ON

### Status When Alarm Occurred

At power ON

- User constant Cn-01 Bit 0= 0, see C

Occurred 1 to 3 seconds after power ON

- User constant Cn-01 Bit 0 = 1, see A, B, C, D

When servo ON (S-ON) signal turned ON

- See A, B, C, D

During servomotor operation

- See A, B, C, D

	Cause	Remedy
A	Encoder wiring incorrect or poor connection.	Check wiring and connectors at encoder.
B	Noise in encoder wiring.	Separate encoder wiring from main wiring circuits.
C	Encoder defective.	Replace servomotor
D	Circuit board (1PWB) defective.	Replace servo amplifier.

### Power Loss Alarm [A.F3]

#### Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
A.F3	ALO1	ALO2	ALO3	
Power Loss Error	OFF	ON	OFF	ON

OFF: Output transistor is OFF

ON: Output transistor is ON

#### Status When Alarm Occurred

At power ON

- See A

During servomotor operation

- See B

	Cause	Remedy
A	Time between turning power OFF and back ON was shorter than the power holding time.	After turning power OFF, wait more than the power holding time (5 to 15s, according to type) before turning the power back ON.

	Cause	Remedy
B	<p>If any of the following power supply conditions are met during motor operation:</p> <p>Complete power failure: half cycle of supply frequency</p> <p>Voltage drop: full cycle of supply frequency</p> <p>Note: Because of detector lag and detector margin, power loss of 30 to 55ms does not cause an alarm.</p>	<p>Check the power supply.</p> <p>Terms</p> <p>Complete power failure = Power failure where voltage drops to zero</p> <p>Voltage drop = Power failure where voltage drops, but not to zero</p>

### Digital Operator Display and Alarm Name [CPF00]

#### Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
CPF00	ALO1	ALO2	ALO3	
Digital Operator Transmission Error 1	Not Specified	Not Specified	Not Specified	Not Specified

Note: This alarm is not stored in alarm traceback function memory.

### Status When Alarm Occurred

#### At power ON

- Digital operator connected before servo amplifier power turned ON, see **A, B, C, D**

Digital operator connected to servo amplifier while power turned ON.

- See **A, B, C, D**

	Cause	Remedy
A	Cable defective or poor contact between digital operator and servo amplifier.	Check connector connections. Replace cable.
B	Malfunction due to external noise.	Separate digital operator and cable from noise source.
C	Digital operator defective.	Replace digital operator.
D	Servo amplifier defective.	Replace servo amplifier.

## Digital Operator Transmission Error [CPF01]

### Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
CPF01	ALO1	ALO2	ALO3	
Digital Operator Transmission Error 2	Not Specified	Not Specified	Not Specified	Not Specified

Note: This alarm is not stored in alarm traceback function memory.

### Status When Alarm Occurred

During operation

- See **A, B, C, D**

	Cause	Remedy
A	Cable defective or poor contact between digital operator and servo amplifier.	Check connector connections. Replace cable.
B	Malfunction due to external noise.	Separate digital operator and cable from noise source.
C	Digital operator defective.	Replace digital operator.
D	Servo amplifier defective.	Replace servo amplifier.

## Normal Operation [A.--]

### Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
A.99	ALO1	ALO2	ALO3	
Normal Operation	OFF	OFF	OFF	OFF

OFF: Output transistor is OFF

ON: Output transistor is ON

### Status When Alarm Occurred

Indicates normal operation. Not an alarm.

\*Both the hand-held operator and the operator panel display “A.99” rather than A.--

.

**SGDF-\*\*\*S / SGDF-\*\*\*S**

## Parameter Breakdown [A.02]

## Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
A.02	ALO1	ALO2	ALO3	
Parameter Breakdown	OFF	OFF	OFF	OFF

OFF: Output transistor is OFF

ON: Output transistor is ON

**Status When Alarm Occurred**

At power ON

- See **A, B**

	Cause	Remedy
A	Power turned OFF during parameter write. Alarm occurred at the next power ON.	Replace amplifier
B	Circuit board (IPWB) is defective.	Replace amplifier

## Parameter Setting Error [A.04]

## Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
A.04	ALO1	ALO2	ALO3	
Parameter Setting Error	OFF	OFF	OFF	OFF

OFF: Output transistor is OFF

ON: Output transistor is ON

**Status When Alarm Occurred**

At power ON



- See **A, B**

	Cause	Remedy
A	An out-of-range parameter was previously loaded or set.	Reset all out-of-range parameters, otherwise reload correct parameters
B	Circuit board (IPWB) is defective.	Replace amplifier

Overcurrent [A.10]

### Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
A.10	ALO1	ALO2	ALO3	
Overcurrent	ON	OFF	OFF	OFF

OFF: Output transistor is OFF

ON: Output transistor is ON

### Status When Alarm Occurred

During servomotor operation

- See **A, B, C, D**

When servo ON (S-ON) signal turned ON

- See **C, D**

At power ON

- See **C**

	Cause	Remedy
A	Wiring grounded between servo amplifier and servomotor.	Check and correct wiring.
B	Servomotor U, V, or W phase grounded.	Replace servomotor.
C	Circuit board (IPWB) defective. Power transistor defective.	Replace servo amplifier.
D	Current feedback circuit, power transistor, or circuit board defective.	Replace servo amplifier.

## Position Error Pulse Overflow [A.31]

## Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
A.31	ALO1	ALO2	ALO3	
Position Error Pulse Overflow	OFF	OFF	ON	OFF

OFF: Output transistor is OFF

ON: Output transistor is ON

**Status When Alarm Occurred**

At power ON

- See **F**

During servomotor operation

- Overflow during high-speed operation, see **A**
- No feedback pulse returned after reference pulse input, see **B, F**
- Normal operation but overflow when large reference input, see **C, D, E**

	Cause	Remedy
A	Servomotor wiring incorrect.	Check and correct wiring. (Check A-, B-, C-phase pulses correct at CN2.)
B	Encoder wiring incorrect (disconnection, short circuit, power supply, etc.).	Check and correct wiring. (Check A-, B-, C-phase pulses correct at CN2.)
C	Servo amplifier adjustment incorrect.	Increase speed loop gain (Cn-04) and/or position loop gain (Cn-1A).
D	Servomotor overloaded.	Reduce load torque and inertia. Otherwise, replace with larger capacity servomotor.
E	Position reference pulse frequency too high.	Decrease reference pulse frequency. Use smoothing function. Change electronic gear ratio.
F	Circuit board (1PWB) defective.	Replace servo amplifier.

## Overspeed [A.51]

## Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
A.51	ALO1	ALO2	ALO3	
Overspeed	ON	OFF	ON	OFF

OFF: Output transistor is OFF

ON: Output transistor is ON

**Status When Alarm Occurred**

At servo ON (S-ON) signal turned ON

- See **A**, **B**, **C**, **D**
- During high-speed servomotor rotation after reference input (alarm detected at 110% maximum speed), see **A**, **B**, **C**, **D**

At power ON

- See **D**

	Cause	Remedy
<b>A</b>	Servomotor wiring incorrect. Encoder wiring incorrect (disconnection, short circuit, power supply, etc.).	Check and correct wiring. (Check A-, B-, C-phase pulses correct at CN2.)
<b>B</b>	Incremental encoder power not supplied from servo amplifier.	Use the servo amplifier power supply for the encoder.
<b>C</b>	Noise in encoder wiring.	Separate encoder wiring from main wiring circuits.
<b>D</b>	Circuit board (1PWB) defective.	Replace servo amplifier.

## Overload [A.70]

## Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
A.70	ALO1	ALO2	ALO3	
Overload	ON	ON	ON	OFF

OFF: Output transistor is OFF

ON: Output transistor is ON

### Status When Alarm Occurred

At power ON

- See **E**

When servo ON (S-ON) signal turned ON

- See **A, B, D**

When speed reference is input

- No servomotor rotation, see **B, C, D**
- During normal operation, see **D, E**

	Cause	Remedy
A	Servomotor wiring incorrect or disconnected.	Check wiring and connectors at servomotor
B	Encoder wiring incorrect or disconnected.	Check wiring and connectors at encoder
C	Load greatly exceeds rated torque.	Reduce load torque and inertia. Otherwise, replace with larger capacity servomotor.
D	Incremental encoder power not supplied from servo amplifier.	Use the servo amplifier power supply for the encoder.
E	Circuit board (1PWB) defective.	Replace servo amplifier.

### Encoder Error [A.80]

#### Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
A.80	ALO1	ALO2	ALO3	
Encoder Error	OFF	OFF	OFF	OFF

OFF: Output transistor is OFF

ON: Output transistor is ON

### Status When Alarm Occurred

At power ON

- See **B, D**

During servomotor operation

- See **A, B, C**

	Cause	Remedy
A	Servo amplifier miscounted pulses or malfunctioned due to noise.	Separate encoder wiring from main wiring circuits turn ON amplifier power again.
B	Incorrect encoder wiring or poor connection.	Check the encoder wiring and connectors at encoder.
C	Encoder malfunctioned.	Replace amplifier.
D	Circuit board (1PWB) defective.	Replace amplifier.

Reference Input Read Error [A.B1]

Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
A.B1	ALO1	ALO2	ALO3	
Reference Input Read Error (for speed/torque control only)	OFF	OFF	OFF	OFF

OFF: Output transistor is OFF

ON: Output transistor is ON

**Status When Alarm Occurred**

At power ON

- See **C**

During servomotor operation

- See **A, B**

	Cause	Remedy
A	Part malfunctioned in reference read-in unit (A/D converter, etc.).	Reset alarm and restart operation.
B	Part defective in reference read-in unit (A/D converter, etc.).	Replace servo amplifier.
C	Circuit board (IPWB) defective.	Replace servo amplifier.

### Overrun [A.C1]

#### Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
A.C1	ALO1	ALO2	ALO3	
Servo Overrun	ON	OFF	ON	OFF

OFF: Output transistor is OFF

ON: Output transistor is ON

### Status When Alarm Occurred

At power ON

- User constant Cn-01 Bit 0= 0, see **E**

Occurred 1 to 3 seconds after power ON

- User constant Cn-01 Bit 0 = 1, see **A, B, C, D, E**

On position reference input

- See **A, B, C, D, E**

When servo ON (S-ON) signal turned ON

- See **A, B, C, D, E**

	Cause	Remedy
A	Servomotor wiring incorrect or disconnected.	Check wiring and connectors at servomotor.

	Cause	Remedy
B	Encoder wiring incorrect or disconnected.	Check wiring and connectors at encoder.
C	Incremental encoder power not supplied from servo amplifier.	Use the servo amplifier power supply for the encoder.
D	Encoder defective.	Replace servomotor.
E	Circuit board (1PWB) defective.	Replace servo amplifier.

### Phase Detection Error [A.C2]

#### Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
A.C2	ALO1	ALO2	ALO3	
Encoder Phase Detection Error	ON	OFF	ON	OFF

OFF: Output transistor is OFF

ON: Output transistor is ON

#### Status When Alarm Occurred

At power ON

- See **D**

Occurred 1 to 3 seconds after power ON

- See **A, B, C, D**

During servomotor operation

- See **A, B, C, D,**

	Cause	Remedy
A	Noise in encoder wiring.	Separate encoder wiring from main wiring circuits.
B	Encoder wiring incorrect or poor connection.	Check wiring and connectors at encoder.
C	Encoder defective.	Replace servomotor.
D	Circuit (1PWB) defective.	Replace servo amplifier.

## A-, B-Phase Disconnection [A.C3]

## Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
A.C3	ALO1	ALO2	ALO3	
Encoder A-, B-phase Disconnection	ON	OFF	ON	OFF

OFF: Output transistor is OFF

ON: Output transistor is ON

**Status When Alarm Occurred**

At power ON

- User constant Cn-01 Bit 0= 0, see **D**

Occurred 1 to 3 seconds after power ON

- User constant Cn-01 Bit 0 = 1, see **A, B, C**

When servo ON (S-ON) signal turned ON

- See **A, B, C, D**

During servomotor operation

- See **A, B, C, D**

	Cause	Remedy
A	Encoder wiring incorrect or poor connection.	Check wiring and connectors at encoder.
B	Noise in encoder wiring.	Separate encoder wiring from main wiring circuits.
C	Encoder defective.	Replace servomotor
D	Circuit board (1PWB) defective.	Replace servo amplifier.



## C-Phase Disconnection [A.C4]

### Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
A.C4	ALO1	ALO2	ALO3	
Encoder C-phase Disconnection	ON	OFF	ON	OFF

OFF: Output transistor is OFF

ON: Output transistor is ON

### Status When Alarm Occurred

At power ON

- User constant Cn-01 Bit 0= 0, see **C**

Occurred 1 to 3 seconds after power ON

- User constant Cn-01 Bit 0 = 1, see **A, B, C, D**

When servo ON (S-ON) signal turned ON

- See **A, B, C, D**

During servomotor operation

- See **A, B, C, D**

	Cause	Remedy
A	Encoder wiring incorrect or poor connection.	Check wiring and connectors at encoder.
B	Noise in encoder wiring.	Separate encoder wiring from main wiring circuits.
C	Encoder defective.	Replace servomotor
D	Circuit board (1PWB) defective.	Replace servo amplifier.

## Normal Operation [A.--]

### Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
A.99	ALO1	ALO2	ALO3	
Normal Operation	OFF	OFF	OFF	OFF

OFF: Output transistor is OFF

ON: Output transistor is ON

### Status When Alarm Occurred

Indicates normal operation. Not an alarm.

\*Both the hand-held operator and the operator panel display “A.99” rather than A.--  
.

**SGDM-\*\*\*D / SGDM-\*\*\*DA / SGDh-\*\*\*E**

## Parameter Breakdown [A.02]

## Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
A.02	ALO1	ALO2	ALO3	
Parameter Breakdown	OFF	OFF	OFF	OFF

OFF: Output transistor is OFF

ON: Output transistor is ON

**Status When Alarm Occurred**

At power ON

- See **A, B**

	Cause	Remedy
A	Power turned OFF during parameter write. Alarm occurred at the next power ON.	Initialize parameters using Fn005 and re-input user settings. Replace amplifier.
B	Circuit board (IPWB) is defective.	Replace amplifier

## Main Circuit Encoder Error [A.03]

## Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
A.03	ALO1	ALO2	ALO3	
Main Circuit Encoder Error	OFF	OFF	OFF	OFF

OFF: Output transistor is OFF

ON: Output transistor is ON

**Status When Alarm Occurred**

At power ON

- See **A**

	Cause	Remedy
A	Circuit board (1PWB or 2PWB) defective.	Replace amplifier.

#### Parameter Setting Error [A.04]

##### Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
A.04	ALO1	ALO2	ALO3	
Parameter Setting Error	OFF	OFF	OFF	OFF

OFF: Output transistor is OFF

ON: Output transistor is ON

#### Status When Alarm Occurred

At power ON

- See **A, B**

	Cause	Remedy
A	An out-of-range parameter was previously set or loaded.	Reset all parameters in range. Otherwise, re-load correct parameter.
B	Circuit board (1PWB) defective.	Replace amplifier.

#### Combination Error [A.05]

##### Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
A.05	ALO1	ALO2	ALO3	
Combination Error	OFF	OFF	OFF	OFF

OFF: Output transistor is OFF

ON: Output transistor is ON

## Status When Alarm Occurred

At power ON

- See **A, B**

	Cause	Remedy
A	The range of the servomotor capacities that can be combined has been exceeded.	Replace the servomotor so that a suitable combination is achieved.
B	Encoder parameters have not been written properly.	Replace the servomotor.

Overcurrent or Heat Sink Overheated [A.10]

Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
A.10	ALO1	ALO2	ALO3	
Overcurrent	ON	OFF	OFF	OFF

OFF: Output transistor is OFF

ON: Output transistor is ON

## Status When Alarm Occurred

During servomotor operation

- See **A, B, D, E, F, G, H**

When servo ON (S-ON) signal turned ON

- See **C, D**

At power ON

- See **C**

	Cause	Remedy
A	Wiring shorted between servo amplifier and servomotor.	Check and correct wiring.
B	Servomotor U, V, or W phase shorted.	Replace servomotor.

	Cause	Remedy
C	Circuit board (1PWB) defective. Power transistor defective.	Replace servo amplifier.
D	Current feedback circuit, power transistor, DB circuit, or circuit board defective.	Replace servo amplifier.
E	The ambient temperature of the amplifier exceeded 55°C.	Alter conditions so that the ambient temperature falls below 55°C.
F	The air flow around the heat sink is bad.	Follow the installation method and provide sufficient space as specified.
G	Fan stopped.	Replace amplifier.
H	Amplifier is operating under an overload.	Reduce load.

Note: E to H can occur with a 1.5kW to 3kW capacity amplifier.

### Regenerative Error Detected [A.30]

#### Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
A.30	ALO1	ALO2	ALO3	
Regenerative Error Detected	ON	ON	OFF	OFF

OFF: Output transistor is OFF

ON: Output transistor is ON

### Status When Alarm Occurred

During servomotor operation

- See **A, B**

Occurred when the control power turned ON

- See **D**

Occurred approximately 1 second after the main circuit power ON.

- See **A, B, C**

	Cause	Remedy
A	Regenerative transistor is abnormal.	Replace amplifier.
B	Disconnection of the regenerative resistor.	Replace amplifier or regenerative resistor.
C	Regenerative unit disconnected (for an external regenerative resistor).	Check wiring of the external regenerative resistor.
D	Amplifier defective.	Replace amplifier.

### Regenerative Overload [A.32]

#### Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
A.32	ALO1	ALO2	ALO3	
Regenerative Overload	ON	ON	OFF	OFF

OFF: Output transistor is OFF

ON: Output transistor is ON

#### Status When Alarm Occurred

During servomotor operation

- See **A, B**

	Cause	Remedy
A	Regenerative power exceeds the allowable value.	Use an external regenerative resistor that matches the regenerative power capacity.
B	Alarm occurs although an external regenerative resistor is used and the temperature rise of the regenerative resistor is small.	Correct parameter Pn600.

## Main Circuit DC Voltage Error Detected: Overvoltage [A.40]

## Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
A.40	ALO1	ALO2	ALO3	
Overvoltage	OFF	OFF	ON	OFF

OFF: Output transistor is OFF

ON: Output transistor is ON

**Status When Alarm Occurred**

During servomotor operation

- See **A, B, C, D**

Occurred when main circuit power turned ON

- See **A, D**

Occurred when the control power turned ON

- See **E**

	Cause	Remedy
A	The power supply voltage is not within the range of specifications.	Check the power supply.
B	Load exceeds capacity of the regenerative unit.	Check specifications of load inertia and overhanging load.
C	Regenerative transistor is abnormal.	Replace amplifier.
D	Rectifying diode defective.	Replace amplifier.
E	Amplifier defective.	Replace amplifier.

## Main Circuit Voltage Error Detected: Undervoltage [A.41]

## Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
A.41	ALO1	ALO2	ALO3	
Undervoltage	OFF	OFF	ON	OFF



OFF: Output transistor is OFF

ON: Output transistor is ON

### Status When Alarm Occurred

During servomotor operation

- See **A, B, C**

Occurred when main circuit power turned ON

- See **A, B, C**

Occurred when the control power turned ON

- See **D**

	Cause	Remedy
A	The power supply voltage is not within the range of specifications.	Check the power supply.
B	Fuse blown.	Replace amplifier.
C	Rectifying diode defective.	Replace amplifier.
D	Amplifier defective.	Replace amplifier.

Overspeed [A.51]

Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
A.51	ALO1	ALO2	ALO3	
Overspeed	ON	OFF	ON	OFF

OFF: Output transistor is OFF

ON: Output transistor is ON

### Status When Alarm Occurred

At servo ON (S-ON) signal turned ON

- See **A**
- During high-speed servomotor rotation after reference input, see **B, C**

At power ON

- See **D**

	Cause	Remedy
A	Servomotor wiring incorrect.	Check and correct wiring. (Check for U-, V-, and W-phase wiring errors.)
B	Position or speed reference input is too large.	Lower the reference input values.
C	Incorrect reference input gain settings.	Check and correct parameter settings.
D	Circuit board (IPWB) defective.	Replace servo amplifier.

Overload: High Load [A.71] and Overload: Low Load [A.72]

Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
A.71 and A.72	ALO1	ALO2	ALO3	
Overload: High and Overload: Low	ON	ON	ON	OFF

OFF: Output transistor is OFF

ON: Output transistor is ON

### Status When Alarm Occurred

At power ON

- See **C**

When servo ON (S-ON) signal turned ON

- See **A**

When speed reference is input

- No servomotor rotation, see **B**

- During normal operation, see **B**

	Cause	Remedy
A	Servomotor wiring incorrect or disconnected.	Check wiring and connectors at servomotor
B	Load greatly exceeds rated torque.	Reduce load torque and inertia. Otherwise, replace with larger capacity servomotor.
C	Circuit board (1PWB) defective.	Replace amplifier.

### Dynamic Brake Overload [A.73]

#### Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
A.73	ALO1	ALO2	ALO3	
Dynamic Brake Overload	ON	ON	ON	OFF

OFF: Output transistor is OFF

ON: Output transistor is ON

#### Status When Alarm Occurred

At power ON

- See **B**

When servo OFF signal turned ON

- See **A**

	Cause	Remedy
A	The product of the square of rotational motor speed and the combined inertia of the motor and load (rotation energy) exceeds the capacity of the dynamic brake resistor built into the amplifier.	Lower the rotational speed. Lower the load inertia. Minimize the use of the dynamic brake.
B	Circuit board (1PWB) defective.	Replace amplifier.

## Overload of Surge Current Limit Resistor [A.74]

### Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
A.74	ALO1	ALO2	ALO3	
Overload of Surge Current Limit Resistor	ON	ON	ON	OFF

OFF: Output transistor is OFF

ON: Output transistor is ON

### Status When Alarm Occurred

At power ON

- See **B**

When main circuit power turned ON or OFF

- See **A**

	Cause	Remedy
A	Frequently turning the main circuit power ON/OFF.	Do not repeatedly turn ON/OFF the main circuit power.
B	Circuit board (1PWB) defective.	Replace amplifier.

## Heat Sink Overheated [A.7A]

### Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
A.7A	ALO1	ALO2	ALO3	
Heat Sink Overheated	ON	ON	ON	OFF

OFF: Output transistor is OFF

ON: Output transistor is ON

### Status When Alarm Occurred

During servomotor operation

- See **A, B, C, D**

When control power turned ON

- See **E**

	Cause	Remedy
A	The ambient temperature of the amplifier exceeds 55°C.	Alter conditions so that the ambient temperature goes below 55°C.
B	The air flow around the heat sink is insufficient.	Follow installation methods and provide sufficient space.
C	Fan stopped.	Replace amplifier.
D	Amplifier is operating under overload.	Reduce load.
E	Amplifier defective.	Replace amplifier.

Note: This alarm display tends to occur only with a 30W to 1000W amplifier.

Absolute Encoder Back-up Error [A.81]

Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
A.81	ALO1	ALO2	ALO3	
Absolute Encoder Back-up Error	OFF	OFF	OFF	OFF

OFF: Output transistor is OFF

ON: Output transistor is ON

**Status When Alarm Occurred**

At power ON

- Pn002.2 = 0 or 2, see **A, B, C**

- Pn002.2 = 1, see **C**

	Cause	Remedy
A	The following power supplies to the absolute encoder all failed: <ul style="list-style-type: none"> <li>• +5V supply</li> <li>• Battery power</li> </ul>	Follow absolute encoder set-up procedure.
B	Absolute encoder malfunctioned.	Replace servomotor.
C	Circuit board (1PWB) defective.	Replace amplifier.

### Encoder Checksum Error [A.82]

#### Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
A.82	ALO1	ALO2	ALO3	
Encoder Checksum Error	OFF	OFF	OFF	OFF

OFF: Output transistor is OFF

ON: Output transistor is ON

### Status When Alarm Occurred

At power ON

- See **A, B**

When SEN signal turned ON; pn002.2 = 0 or 2

- See **A**

During operation

- See **A, B**

	Cause	Remedy
A	Error during encoder memory check.	Follow absolute encoder set-up procedure. Replace servomotor if error occurs frequently.
B	Circuit board (1PWB) defective.	Replace amplifier.

## Absolute Encoder Battery Error [A.83]

### Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
A.83	ALO1	ALO2	ALO3	
Absolute Encoder Battery Error	OFF	OFF	OFF	OFF

OFF: Output transistor is OFF

ON: Output transistor is ON

### Status When Alarm Occurred

At power ON

- Pn002.2 = 0 or 2, see **A, B, C**
- Pn002.2 = 1, see **C**

	Cause	Remedy
A	Battery not connected. Battery connection defective.	Check and correct battery connection.
B	Battery voltage below specified value ( 2.7V).	Install a new battery while the control power to amplifier is ON. After replacement, turn ON the power again.
C	Circuit board (1PWB) defective.	Replace amplifier.

Note: No alarm occurs at the amplifier if the battery error occurs during operation.

## Absolute Encoder Data Error [A.84]

### Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
A.84	ALO1	ALO2	ALO3	
Absolute Encoder Data Error	OFF	OFF	OFF	OFF

OFF: Output transistor is OFF

ON: Output transistor is ON

### Status When Alarm Occurred

At power ON

- See **A**

During operation

- See **B**

	Cause	Remedy
A	Faulty encoder.	Replace the servomotor if the problem occurs often.
B	Operational error in encoder caused by external noise.	Check and correct wiring around the encoder (grounding of the servomotor, separation between the encoder cable and the servomotor power cable, insertion of toroidal cores onto cables, etc.)

### Absolute Encoder Overspeed [A.85]

#### Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
A.85	ALO1	ALO2	ALO3	
Absolute Encoder Overspeed	OFF	OFF	OFF	OFF

OFF: Output transistor is OFF

ON: Output transistor is ON

### Status When Alarm Occurred

At power ON

- See **A, B**

	Cause	Remedy
A	Absolute encoder turned ON at a speed exceeding 200rpm.	Turn ON power supply with the servomotor stopped.



	Cause	Remedy
B	Circuit board (1PWB) defective.	Replace amplifier.

## Encoder Overheated [A.86]

## Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
A.86	ALO1	ALO2	ALO3	
Encoder Overheated	OFF	OFF	OFF	OFF

OFF: Output transistor is OFF

ON: Output transistor is ON

**Status When Alarm Occurred**

During servomotor operation

- See **A, B**

Occurred when the control power turned ON.

- See **C, D**

	Cause	Remedy
A	The ambient temperature of the servomotor is high.	Alter conditions so that the ambient temperature falls below 40°C.
B	Servomotor is operating under overload.	Reduce load.
C	Circuit board (1PWB) defective.	Replace amplifier.
D	Encoder defective.	Replace amplifier.

## Reference Speed Input Read Error [A.b1]

## Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
A.b1	ALO1	ALO2	ALO3	
Reference Speed Input Read Error	OFF	OFF	OFF	OFF

OFF: Output transistor is OFF

ON: Output transistor is ON

### Status When Alarm Occurred

At power ON

- See C

During servomotor operation

- See A, B

	Cause	Remedy
A	Error in reference read-in unit (e.g., A/D converter).	Reset alarm and restart operation.
B	Reference read-in unit faulty (e.g., A/D converter).	Replace amplifier.
C	Circuit board (IPWB) defective.	Replace amplifier.

### Reference Torque Input Read Error [A.b2]

#### Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
A.b2	ALO1	ALO2	ALO3	
Reference Torque Input Read Error	OFF	OFF	OFF	OFF

OFF: Output transistor is OFF

ON: Output transistor is ON

### Status When Alarm Occurred

At power ON

- See C

During servomotor operation

- See **A, B**

	Cause	Remedy
A	Error in reference read-in unit (e.g., A/D converter).	Reset alarm and restart operation.
B	Reference read-in unit faulty (e.g., A/D converter).	Replace amplifier.
C	Circuit board (1PWB) defective.	Replace amplifier.

### Servo Overrun [A.C1]

#### Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
A.C1	ALO1	ALO2	ALO3	
Servo Overrun	ON	OFF	ON	OFF

OFF: Output transistor is OFF

ON: Output transistor is ON

#### Status When Alarm Occurred

At power ON

- Parameter Pn50A.1 = 7, see D

Occurred 1 to 3 seconds after power ON

- See **A, B, C, D**

When servo ON (/S-ON) signal turned ON

- See **A, B, C, D**

On speed reference input

- See **A, B, C**

	Cause	Remedy
A	Servomotor wiring incorrect or disconnected.	Check wiring and connectors at servomotor.
B	Encoder wiring incorrect or disconnected.	Check wiring and connectors at encoder.

	Cause	Remedy
C	Encoder defective.	Replace servomotor
D	Circuit board (IPWB) defective.	Replace amplifier.

### Absolute Encoder Clear Error and Multi-turn Limit Setting Error [A.C8]

#### Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
A.C8	ALO1	ALO2	ALO3	
Absolute Encoder Clear Error and Multi-turn Limit Setting Error	ON	OFF	ON	OFF

OFF: Output transistor is OFF

ON: Output transistor is ON

#### Status When Alarm Occurred

At power ON

- See **A, B**

When resetting multi-turn clear encoder alarm

- See **A, B**

	Cause	Remedy
A	Encoder defective.	Replace servomotor.
B	Amplifier defective.	Replace amplifier.

### Encoder Communications Error [A.C9]

#### Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
A.C9	ALO1	ALO2	ALO3	
Encoder Communications Error	ON	OFF	ON	OFF

OFF: Output transistor is OFF

ON: Output transistor is ON

### Status When Alarm Occurred

At power ON

- See **A, B, C**

During servomotor operation

- See **A, B, C**

	Cause	Remedy
A	Encoder wiring incorrect or disconnected.	Check wiring and connectors at encoder.
B	Encoder defective.	Replace servomotor.
C	Amplifier defective.	Replace amplifier.

### Encoder Parameter Error [A.CA]

#### Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
A.CA	ALO1	ALO2	ALO3	
Encoder Parameter Error	ON	OFF	ON	OFF

OFF: Output transistor is OFF

ON: Output transistor is ON

### Status When Alarm Occurred

At power ON

- See **A, B**

	Cause	Remedy
A	Encoder defective.	Replace servomotor.
B	Amplifier defective.	Replace amplifier.

## Encoder Echoback Error [A.Cb]

## Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
A.Cb	ALO1	ALO2	ALO3	
Encoder Echoback Error	ON	OFF	ON	OFF

OFF: Output transistor is OFF

ON: Output transistor is ON

**Status When Alarm Occurred**

At power ON

- See **A, B, C**

	Cause	Remedy
A	Encoder wiring incorrect or disconnected.	Check wiring and connectors at encoder.
B	Encoder defective.	Replace servomotor.
C	Amplifier defective.	Replace amplifier.

## Multi-turn Limit Disagreement Alarm [A.CC]

## Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
A.CC	ALO1	ALO2	ALO3	
Multi-turn Limit Disagreement Alarm	ON	OFF	ON	OFF

OFF: Output transistor is OFF

ON: Output transistor is ON

**Status When Alarm Occurred**

At power ON

- See **A, B**

	Cause	Remedy
A	The amplifier Multi-turn Limit Setting parameter (pn205) has been set incorrectly.	Change the setting of parameter Pn205.
B	The multi-turn limit has not been set in the encoder.	Ensure the Multi-turn Limit Setting (Pn205) parameter in the amplifier is correct; create a Multi-turn Limit Disagreement Alarm (A.CC), and then execute the encoder multi-turn limit setting change (Fn013).

Note: This alarm only occurs for the new version of SGDM amplifiers (SGDM-\*DA).

#### Position Error Pulse Overflow [A.d0]

##### Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
A.d0	ALO1	ALO2	ALO3	
Position Error Pulse Overflow	ON	ON	OFF	OFF

OFF: Output transistor is OFF

ON: Output transistor is ON

#### Status When Alarm Occurred

At power ON

- See **E**

During servomotor operation

- Overflow occurs during high speed rotation, see **A**.
- Operation is normal, but overflow occurs when long reference is input, see **B, C, D**.

- Reference pulse is input property, but feedback pulse is not returned, see **E**.

	Cause	Remedy
A	Servomotor wiring incorrect or poor connections.	Check wiring and connectors at encoder.
B	Amplifier was not correctly adjusted.	Increase speed loop gain (Pn100) and position loop gain (Pn102).
C	Motor load was excessive.	Reduce load torque or inertia. If problem not corrected, replace with a larger capacity motor.
D	Position reference pulse frequency was too high.	Increase or decrease reference pulse frequency. Add smoothing function. Correct electronic gear ratio.
E	Circuit board (1PWB) defective.	Replace amplifier.

### Power Line Open Phase [A.F1]

#### Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
A.F1	ALO1	ALO2	ALO3	
Power Line Open Phase	OFF	ON	OFF	OFF

OFF: Output transistor is OFF

ON: Output transistor is ON

#### Status When Alarm Occurred

At main circuit power supply ON

- See **A, B**

Occurred when the control power turned ON

- See **C**.

	Cause	Remedy
A	One phase (L1, L2, or L3) of the main circuit power supply is disconnected.	Check power supply. Check wiring of the main circuit power supply. Check MCCB, noise filter, magnetic contactor.
B	There is one phase in which the line voltage is low.	Check power supply.
C	Amplifier defective.	Replace amplifier.

Note: A and B tend to occur in a 500W capacity (or higher) amplifier.



## Digital Operator Transmission Error 1 [CPF00]

### Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
CPF00	ALO1	ALO2	ALO3	
Digital Operator Transmission Error 1	Not specified	Not specified	Not specified	Not specified

### Status When Alarm Occurred

At power ON - digital operator connected before amplifier power turned ON.

- See **A, B, C, D**

Digital operator connected to amplifier while power turned ON

- See **A, B, C, D.**

	Cause	Remedy
A	Cable defective or poor contact between digital operator and amplifier.	Check connector connections. Replace cable.
B	Malfunction due to external noise.	Separate digital operator and cable from noise source.
C	Digital operator defective.	Replace digital operator.
D	Amplifier defective.	Replace amplifier.

## Digital Operator Transmission Error 2 [CPF01]

### Display and Outputs

Alarm Name	Alarm Code Output			Alarm Output
CPF01	ALO1	ALO2	ALO3	
Digital Operator Transmission Error 2	Not specified	Not specified	Not specified	Not specified

### Status When Alarm Occurred

During operation

- See **A, B, C, D.**

	Cause	Remedy
A	Cable defective or poor contact between digital operator and amplifier.	Check connector connections. Replace cable.
B	Malfunction due to external noise.	Separate digital operator and cable from noise source.
C	Digital operator defective.	Replace digital operator.
D	Amplifier defective.	Replace amplifier.

### Normal Operation [A.--]

#### Display and Outputs

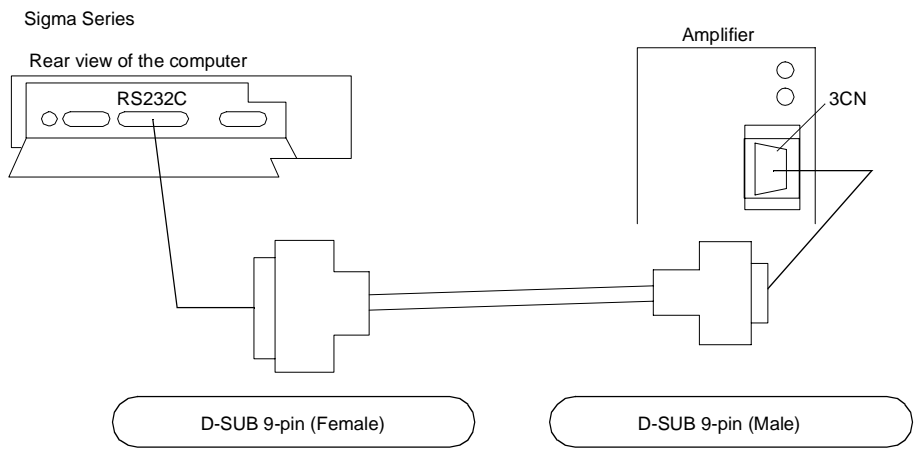
Alarm Name	Alarm Code Output			Alarm Output
A. --	ALO1	ALO2	ALO3	
Normal Operation	OFF	OFF	OFF	ON

OFF: Output transistor is OFF

ON: Output transistor is ON

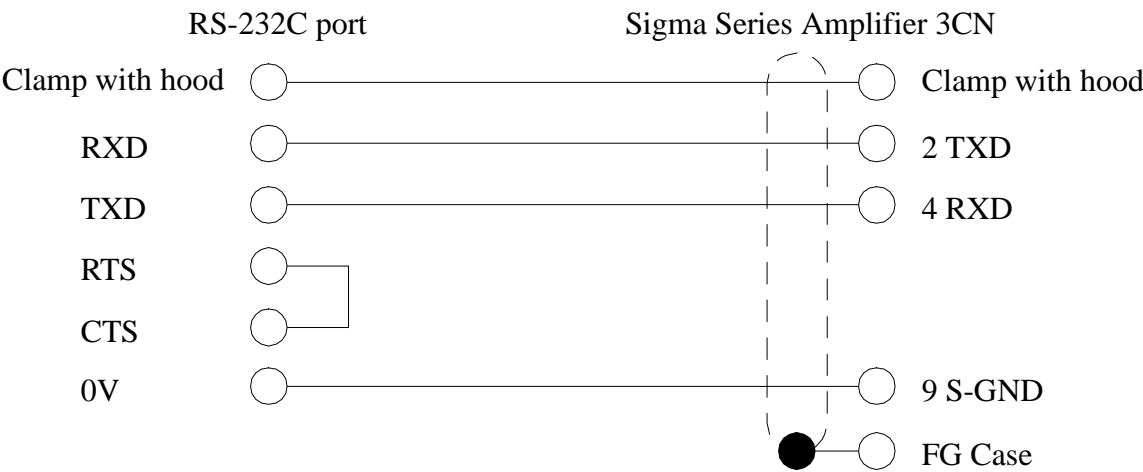
# APPENDIX B - PC to SERVO CABLES

## SIGMA SERIES CABLES



### RS-232C Single-Axis Connection

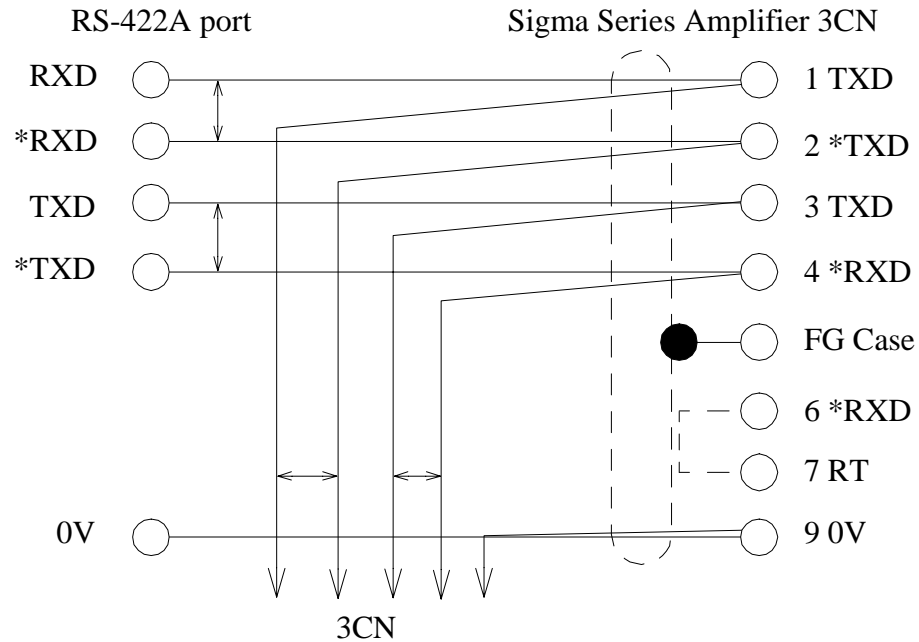
Connecting directly to the RS-232C Port



Maximum cable length: 2m

## RS-422A Multi-Axis Connection

### Connecting to the RS-422A Port

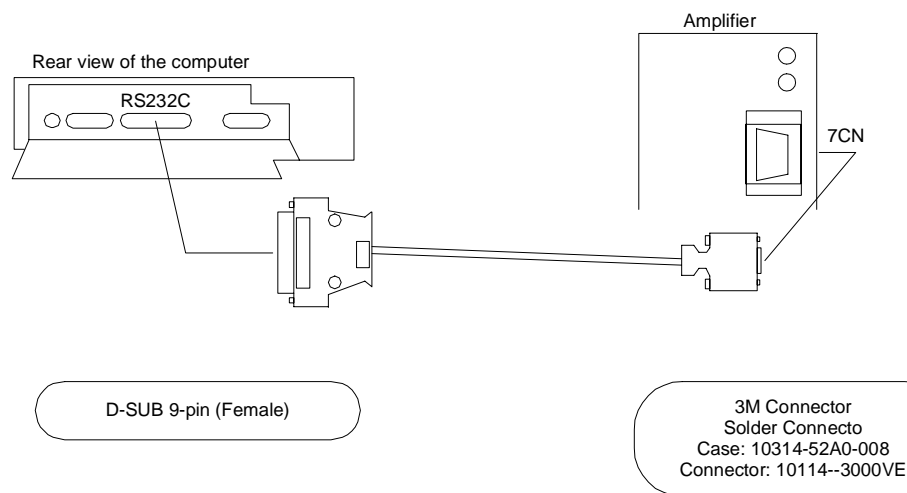


Maximum cable length: 30m

Note: Only pins 6 and 7 must be shorted on the connector farthest from the RS-422A port.

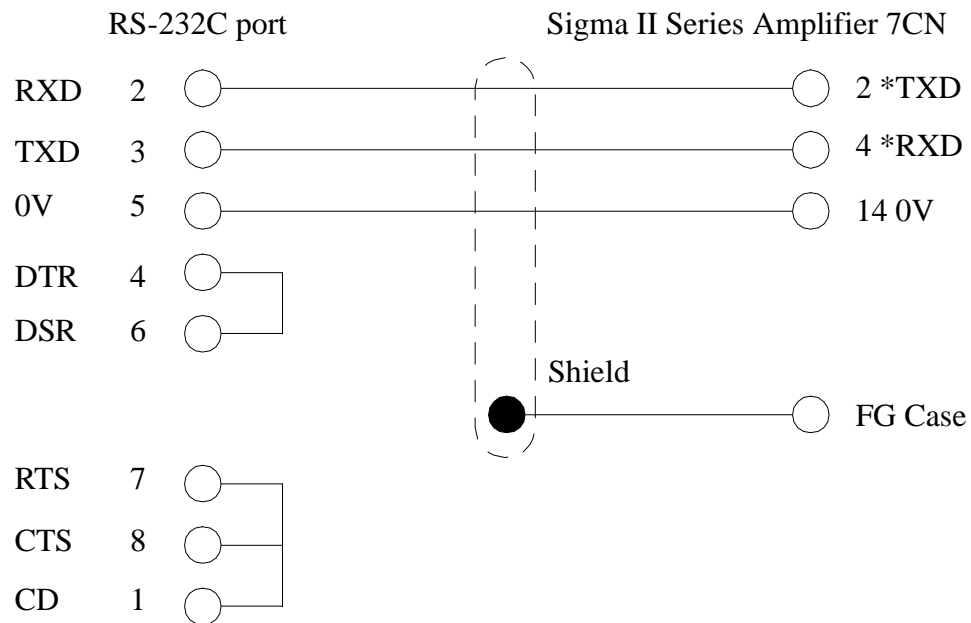
## SIGMA II SERIES CABLES

Sigma II Series



## RS-232C Single-Axis Connection

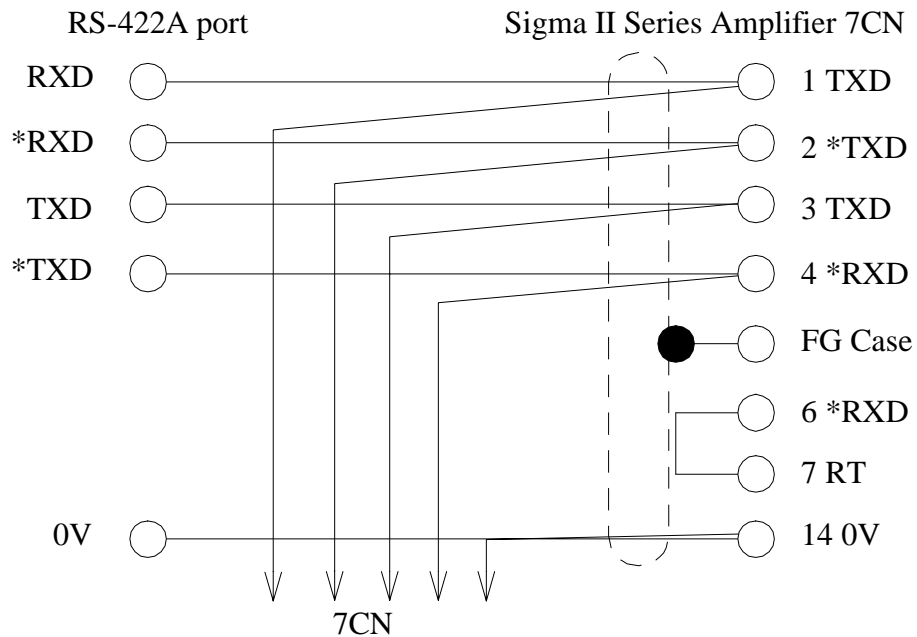
Connecting directly to the RS-232C Port



Maximum cable length: 2m

## RS-422A Multi-Axis Connection

Connecting to the RS-422A Port



Maximum cable length: 30m

Note: Only pins 6 and 7 must be shorted on the connector farthest from the RS-422A port.

# APPENDIX C - Autotuning Rigidity Levels

## SUGGESTED RIGIDITY LEVELS FOR SIGMA SERIES AMPLIFIERS

Drive Method	Suggested Rigidity Levels
Ball screw with direct drive	3-7
Ball screw with gear reduction	2-3
Timing belt	1-3
Chain	1-2
Harmonic gear	1-2

# APPENDIX D - Sigma Win Uninstall

Drive Method	Suggested Rigidity Levels
Ball screw with direct drive	3-7
Ball screw with gear reduction	2-3
Timing belt	1-3
Chain	1-2
Harmonic gear	1-2

## UNINSTALL INFORMATION

### List of Installed Files

Sigma Win installs the following files onto your hard disk in two directories

The default installation directory for the application is C:\PROGRAM FILES\YASKAWA\SIGMA WIN J

### Main Application Files

File Name	Function	Installed IN
sigmawin.exe	Main application file	Application Directory
svwin.mdb	Servo amplifier database	Application Directory
svwin.chm parameters.chm	Application help file	Application Directory
svwin.dll	Support DLL of the application	Application Directory
Parmhelper.dll	Support DLL of the application	Application Directory
Parmserver.dll	Support DLL of the application	Application Directory
Motor.db	Motor database	Application Directory

### Microsoft Foundation Class Support Files

File Name	Function	Installed IN
mfc42.dll	MFC library	Windows System Directory
Msvcr7.dll	Cc runtime lib	Windows System Directory
Olepro32.dll	Property page support (for OCX support)	Windows System Directory
Msvcirt.dll	C runtime lib	Windows System Directory
Msvcr70.dll	C runtime lib	Windows System Directory
All.dll	Atl lib	Windows System Directory

### DAO and Jet Support Files

File Name	Function	Installed IN
dao350.dll	DAO version 3.5	DAO Directory
dao2535.tlb	DAO version 2.5/3.5 backward compatible type lib	DAO Directory
Msjter35.dll	Jet and DAO error message DLL	Windows System Directory
msjint35.dll	Localized Jet and DAO error strings	Windows System Directory
msvcrt40.dll	C runtime DLL 319k version 4.20.6038	Windows System Directory
msjet35.dll	Jet database engine version 3.5	Windows System Directory
vbajet32.dll	VBA Jet expression service	Windows System Directory
vbar332.dll	VBA runtime	Windows System Directory

### Spread OCX

File Name	Function	Installed IN
ss32x25.ocx	Farpoint Spread OCX	Windows System Directory

### Chart F/X OCX

File Name	Function	Installed IN
Stxbar.dll	Chart F/X OCX	Windows System Directory
Ctx4032.ocx	Chart F/X OCX	Windows System Directory

Sigma Win creates a program menu under the Start menu (which defaults to Yaskawa Software) and creates the following three program items.

1. Sigma Win (the Sigma Win communication program)
2. Sigma Win Help (Sigma Win associated help file)
3. YTraceView (trace file viewer)

### Uninstalling Sigma Win

Follow the procedure detailed below to uninstall Sigma Win:



1. Click on the **Start** button on the Windows taskbar. The start menu opens.
2. Choose **Settings**. The Settings folder opens.
3. Choose **Control Panel**. The Control Panel folder opens.
4. Click on **Add/Remove Program**.
5. Scroll down the list of programs until Sigma Win is shown.
6. Click on **Sigma Win**.
7. Click on **Add/Remove**.
8. The Uninstaller for Sigma Win will run.