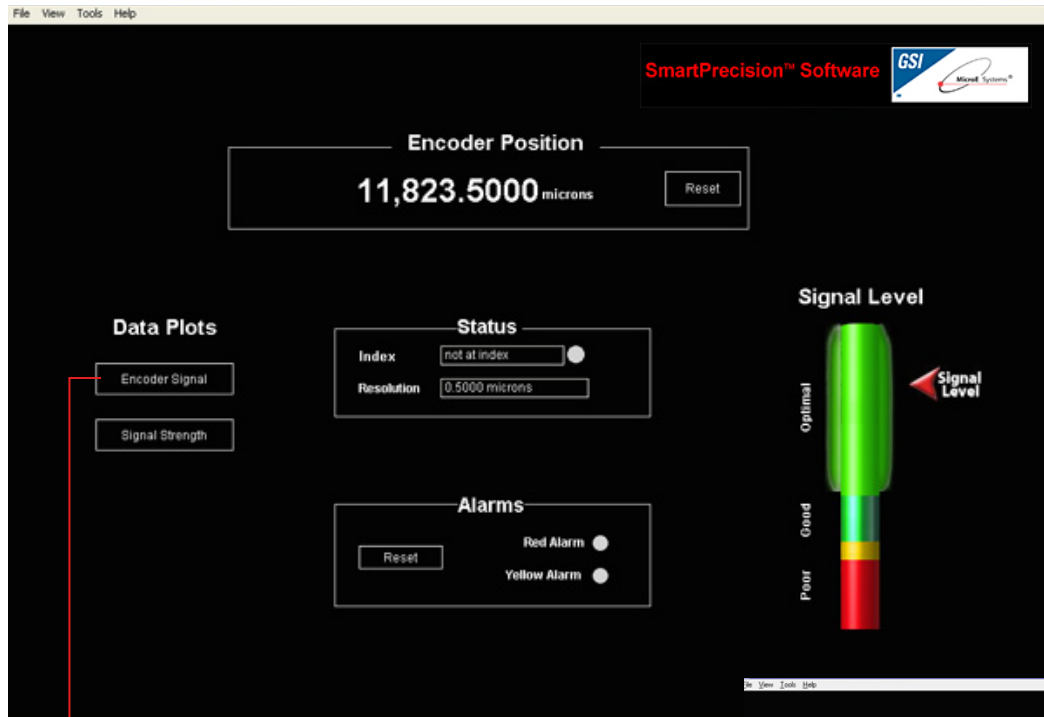


SmartPrecision™ Software for Mercury™ 1500 Series Encoder Systems



SmartPrecision Software makes Mercury the industry's easiest to use encoder. It helps you set up, use, and diagnose Mercury 1500 encoders with the click of a mouse. Compatible with Windows 95, 98, ME, NT, 2000 and XP.

Install Mercury Encoder System

- Align sensor using *Signal Level* display and *Encoder Signal* data plot
- Locate index and see when sensor is over the scale's index mark
- Verify sensor output over length of scale using the *Signal Strength* plot

Monitor Mercury Encoder Operation

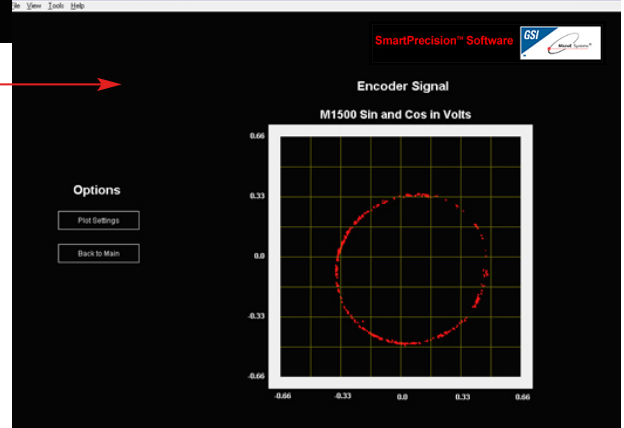
- Read encoder position in engineering units of your choice
- Capture *Signal Level* alarms

Diagnose Mercury Encoder Performance

- Screen capture *Lissajous* plots and email them to MicroE for rapid diagnostic support

System Description

The SmartPrecision Software system includes Software on CD and a computer cable. A SmartPrecision Alignment Tool for Mercury 1500 encoders, model SSAT1500, is required.



The encoder signal plot, or Lissajous plot, reveals the underlying strength and uniformity of the sensor's output.

How to Order SmartPrecision Software

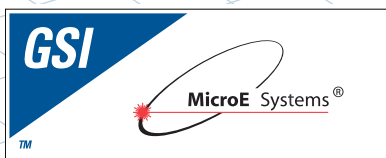
To purchase the SmartPrecision Software system, order Model Number: SSWA-AT.

Note: software is also available for Mercury programmable models, as well as Mercury 1800 and 1000 encoder models.

All Specifications are subject to change. All data is accurate to the best of our knowledge. MicroE Systems is not responsible for errors.

SmartPrecision™ Software

Installation Manual



Overview

SmartPrecision Software Version 5.2 works with the following Mercury encoder models:

Mercury 3500Si*, Mercury 3500*, Mercury 3000SiDAA, Mercury 3000DAA, Mercury 3000*, Mercury 3000Si*, Mercury 2000*, Mercury 3100*, Mercury 2100*, Mercury 1500**, Mercury 1000** and the above equipped with vacuum sensors. SmartPrecision Software for Mercury 1800 encoders is not part of version 5.2 and is supplied on a separate CD.

* when connected to a Computer Interface Adapter

** when connected to a SmartPrecision Alignment Tool

Note that the software performs different functions when used with the different Mercury encoder models.



Setup and Status screen when used with Mercury 3500, 3000, 2000, 3100 and 2100 encoders



Setup and Status screen when used with Mercury 3500Si and 3000Si encoders



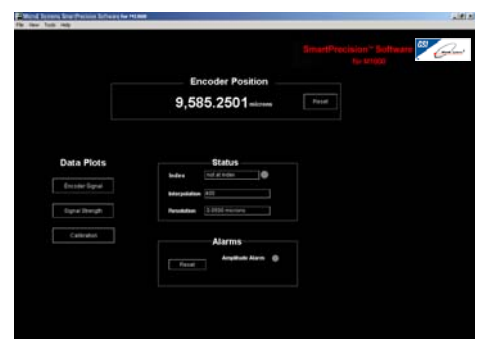
Setup and Status screen when used with Mercury 3000SiDAA and 3000DAA encoders



Setup and Status screen when used with Mercury 1000 encoders



Setup and Status screen when used with Mercury 1500 encoders



Setup and Status screen when used with Mercury 1800 encoders

The software helps you configure, install, align, monitor and diagnose the encoder.

Warnings

With Mercury 3000DAA, 3500Si, 3500, 3000, 3000Si, 2000, 3100, and 2100 encoders: Do not use the SmartPrecision Software to change the encoder's interpolation or maximum frequency settings while the motion system is in closed-loop control.

With Mercury 1000 encoders: Do not attempt to use the encoder for motion control feed back while the encoder is connected to the SmartPrecision Alignment Tool.

Computer Requirements

SmartPrecision Software requires a PC with the following minimum specifications:

- Windows 98, ME, NT (Service Pack 4 or higher), 2000 or XP (Windows 2000 or XP only for M3000SiDAA and M3000DAA models). Note: the computer's hard disk must be formatted using FAT32 or NTFS. SmartPrecision Software cannot be installed on a computer that uses FAT16 for the file system.
- 400MHz
- 128Mb RAM
- 800 x 600 or higher display resolution with High Color (16 bit color)
- 20Mb free disk space
- one USB port (M3000SiDAA and M3000DAA models) or one serial port (RS-232) available (COM1 - COM8) for all other models.

Note: Applications that continuously scan the com ports, such as Palm Desktop or Hot Sync Manager, must be closed before running SmartPrecision Software.

System Description

The SmartPrecision Software system includes:

- Software on CD
- Computer Interface Adapter (when required)
- PC Serial Port cable or USB cable
- 120VAC 60Hz or 220VAC 50Hz Power Adapter (when required)

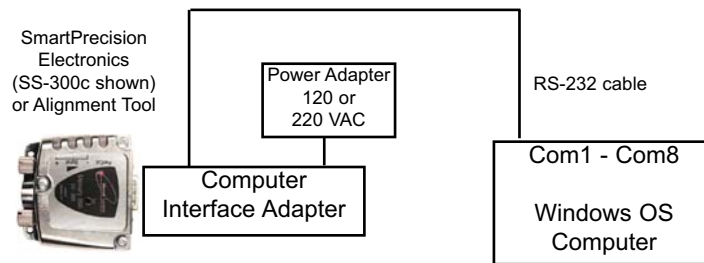
Installing the software

Insert the CD into your computer's CD drive. The installation program will start automatically, unless your computer is set to disable autostart. In that event, run Setup.exe from the CD. Note: when using Windows NT, 2000 or XP you must have Administrator rights on your computer to install this software. Proceed through the dialog boxes until finished. You may run the SmartPrecision Software immediately without rebooting your computer. The software is optimized to run with screen resolutions of 800 x 600, 1024 x 768 or 1280 x 1024 and requires your computer display to be configured for High Color (16 bit color). Do not use Windows "appearance" schemes with Large or Extra Large fonts enabled.

Getting Started - all models except M3000SiDAA and M3000DAA

Verify that the Computer Interface Adapter or Alignment Tool is not powered. The green light on the Computer Interface Adapter labeled "On" must not be illuminated. Connect the cables and electronics as shown below. Be sure to fully seat the encoder's connector into the Computer Interface Adapter / Alignment Tool. Power up the Computer Interface Adapter / Alignment Tool and Mercury encoder by either plugging in the Power Adapter or setting the "External/System" switch on the Computer Interface Adapter to the appropriate position. The green LED labeled "On" will light when the Computer Interface Adapter is powered.

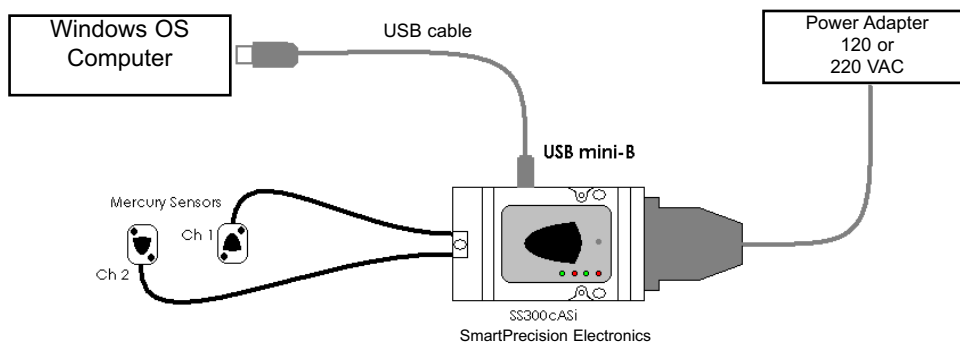
Note: do not disconnect the Mercury encoder from the Computer Interface Adapter / Alignment Tool while it is powered. Turn off power to the Computer Interface Adapter / Alignment Tool by reversing the instructions above before disconnecting the Mercury encoder.



Getting Started – M3000SiDAA and M3000DAA models

Verify that the Power Adapter is unplugged from the AC outlet. Connect the cables and electronics as shown below. Power up the electronics by plugging the Power Adapter into your AC outlet. The green LEDs labeled "Pwr 1" and "Pwr 2" will light, according to whether sensors are connected, when the electronics module is powered.

Note: do not disconnect the Mercury encoder from the Power Adapter while it is powered. Unplug the Power Adapter from the AC outlet before disconnecting the 25-pin connector from the encoder.

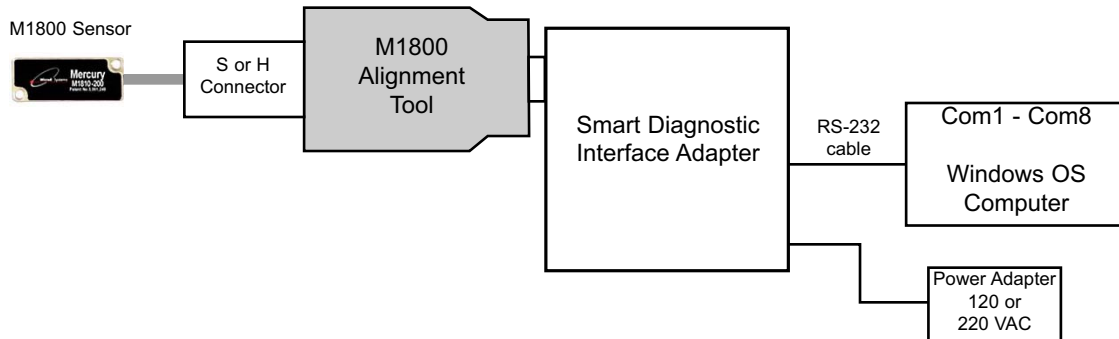


Getting Started – M1800 models

Verify that the Smart Diagnostic Interface Adapter and Alignment Tool are not powered. The green power LED on the Alignment Tool must not be illuminated. Connect the cables and electronics as shown below. Be sure to fully seat the encoder's 26-pin D connector (for model M1800S) or 10x2 Micro-connector (for model M1800H) into the M1800 Alignment Tool. Power up the Computer Interface Adapter / Alignment Tool and Mercury encoder by plugging the Power Adapter into the Smart Diagnostic Interface Adapter. Make sure that the "System / Ext. Power" switch is set to "Ext. Power". The green "Power" LED will light when the M1800 Alignment Tool is powered. (Do not plug any Power Adapters into the M1800 Alignment Tool.)

Note: do not disconnect the Mercury encoder from the Alignment Tool while it is powered. Turn off power to the Interface Adapter / Alignment Tool by reversing the instructions above before disconnecting the Mercury encoder.

Do not connect to any other connectors on the Smart Diagnostic Interface adapter.

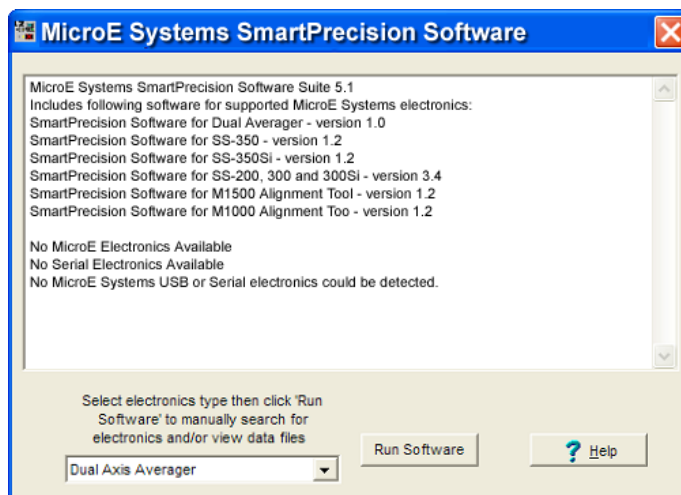


Starting up the SmartPrecision Software – all models

When you start the SmartPrecision Software it automatically searches your computer's USB and COM ports (COM1 - COM8) for a SmartPrecision Electronics module (included with Mercury 3500Si, 3500, 3000SiDAA, 3000DAA, 3000, 3000Si, 2000, 3100 and 2100 encoder systems) or an Alignment Tool and displays the window below (except when used with Mercury 1800 encoders, when a smaller message box appears). If the software finds compatible electronics, it automatically detects and configures itself for the correct encoder, closes the window shown below and then displays the Status and Setup window and updates the Encoder Position and Signal Strength displays (where applicable) continuously.

All models except M1800: If no encoder is found, the Select Electronics Drop Down List Box will be enabled. To manually run one of the six applications in the software suite to try searching for specific electronics, or to load and display data files without electronics connected (Demo Mode), select the type of electronics from the list to make it highlighted and click Run Software. The window shown below will close and the appropriate SmartPrecision Software will run. You can also click Help to view the Help File.

M1800 models: If no encoder is found, a dialog box with buttons labeled No, Retry, and Help appears. Click No to exit the program, Retry to attempt communicating again, or Help to view troubleshooting instructions.



After communications are established, if communication with SmartPrecision electronics stops for more than 5 seconds (e.g. power off) then a "Warning" dialog box will appear, allowing you to try to resume communications, scan all COM ports again, run the software in Demo Mode, or use Help.

Detailed Information for any of the individual SmartPrecision Software applications that comprise the SmartPrecision Software suite can be found under Help in the Main Menu of each application.

Software Features and Functions when used with Mercury 3500Si, 3500, 3000SiDAA, 3000DAA, 3000, 3000Si, 2000, 3100 and 2100

The SmartPrecision Software compliments the four colored LEDs on the SmartPrecision module. Use the Software to:

- Reprogram the Mercury encoder electronics
 - *Set interpolation in integer steps from x4 to x4096 (Mercury 3500), x4 to x1024 (Mercury 3000DAA, 3000 and 3100) or x4 to x256 (Mercury 2000 and 2100)
 - *Set the encoder's maximum A-quad-B output frequency to match your controller's input capacity (Mercury 3500, 3000DAA, 3000, 2000, 3100 and 2100)
 - *Set the index mode and Si communication settings (Mercury 3500Si, 3000SiDAA and 3000Si)
- Install the Mercury encoder system
 - *Align the sensor using the Signal Level display and the Encoder Signal data plot
 - *Locate the index (reference mark) and see when sensor is over the scale's index mark*
 - *Verify the sensor's output over the length of the scale using the Signal Strength plot
 - *Capture alarms while the motion system operates unattended
- Monitor the encoder's operation
 - *Read the encoder position in engineering units of your choice
 - *Read the encoder's hour meter to monitor system usage
- Diagnose the encoder and motion system
 - *Capture signal data and email it to MicroE for rapid diagnostic support
 - *Monitor alarms, view the alarm history log

The software's Encoder Position readout, Signal Strength display, Alarms, Encoder Signal (Lissajous) plot, Signal Strength vs. Position plot and Encoder Position plot help you accomplish all of the above. For example, you can verify your control system's position measurements with the SmartPrecision Software's position readout or run your system overnight to see if any encoder alarms occur. The Encoder Signal plot is another way to verify proper alignment of the sensor to the scale and the Signal Strength plot lets you verify that the encoder is performing correctly over the entire length of the scale. All plots give you a means to acquire and store data to computer disk in ASCII format; the data can be displayed again at a later date using the software's File, Load command or emailed to MicroE Systems for technical support.

IMPORTANT: When using the Index/Calibration push button on the encoder's connector or Alignment Tool, the software must be closed or you must be viewing the software's main screen to perform these operations. The Index/Calibration button is disabled when any of the SmartPrecision Software data plots are displayed.

To update interpolation or maximum output frequency settings for multiple SmartPrecision Electronics modules follow this procedure:

1. Start the SmartPrecision Software.
2. Verify that the Computer Interface Adapter is not powered.
3. Plug the SmartPrecision Electronics module to be updated into the Computer Interface Adapter.
4. Apply power to the Computer Interface Adapter.
5. Use the software to make the necessary changes.
6. Remove power from the Computer Interface Adapter.
7. Unplug the SmartPrecision Electronics module.
8. Wait for the "Warning: Cannot communicate with SmartPrecision Electronics" dialog box to appear. This should take about 5 seconds.
9. Plug in the next SmartPrecision Electronics module to be updated.
10. Apply power to the Computer Interface Adapter.
11. Click the Retry button on the software's Warning dialog box.
12. Repeat steps 5 through 11 as required.

You can run two copies of the software with two encoders on one computer by opening two copies of the SmartPrecision software and running one "instance" for each encoder. You must have two serial ports on your computer (COM1 - COM8) available, two Computer Interface Adapters, and a multi-use software license.

Software Features and Functions when used with Mercury 1000

The SmartPrecision Software compliments the four colored LEDs on the Alignment Tool. Use the Software to:

- Install the Mercury encoder system
 - *Align the sensor using the Signal Level display and the Encoder Signal data plot
 - *Optimize the Mercury 1000 encoder's gain and offset automatically with the click of a mouse
 - *Verify the sensor's output over the length of the scale using the Signal Strength plot
- Monitor the encoder's operation
 - *Read the encoder position in units of signal periods

The software's Encoder Position readout, Signal Strength display, Alarm, Encoder Signal (Lissajous) plot and Signal Strength vs. Position plot help you accomplish all of the above. The Encoder Signal plot can help you verify proper alignment of the sensor to the scale and the Signal Strength plot lets you verify that the encoder is performing correctly over the entire length of the scale.

IMPORTANT: When using the Calibration push button on the Alignment Tool, the software should be in the Encoder Setup display to monitor the status of calibration. Calibration can also be initiated from this display using the Setup M1000 button.

Software Features and Functions when used with Mercury 1500

The SmartPrecision Software compliments the four colored LEDs on the Alignment Tool. Use the Software to:

- Install the Mercury encoder system
 - *Align the sensor using the Signal Level display and the Encoder Signal data plot
 - *Verify the sensor's output over the length of the scale using the Signal Strength plot
- Monitor the encoder's operation
 - *Read the encoder position in units of quadrature counts

The software's Encoder Position readout, Signal Strength display, Alarm, Encoder Signal (Lissajous) plot and Signal Strength vs. Position plot help you accomplish all of the above. The Encoder Signal plot can help you verify proper alignment of the sensor to the scale and the Signal Strength plot lets you verify that the encoder is performing correctly over the entire length of the scale.

Troubleshooting

Can't Find Electronics at Startup (all models except M3000SiDAA and M3000DAA)

At Start-up, SmartPrecision Software scans COM1 - COM8 of the PC to determine if there are any MicroE Systems serial port electronics connected. The software will call the appropriate SmartPrecision Software to communicate with the first electronics that it identifies.

Below is a list of likely reasons why the software does not identify any serial port devices:

- One of the connections has not been made. Check to make sure that the 9-pin serial cable is connected to COM1 - COM8 on the computer and to the Computer Interface Adapter. Be sure to fully seat the encoder's connector into the Computer Interface Adapter or Alignment Tool.
- There is no power to the Computer Interface Adapter or Alignment Tool. A green LED on the Adapter or Alignment Tool labeled "On" is lit when there is power. Ensure that all power connections are made. When using a Computer Interface Adapter, ensure that the "External/System" power switch is in the proper position ("External" if you are powering the Adapter with the 120VAC or 220VAC power adapter or "System" if powering from the 15-pin D connector).
- All COM ports are already in use. Modems, docking stations or other electronics could be using these ports. Verify that no software for a PDA, mouse or other device is running and has control over the serial port. Check the Device Manager in Windows under Control Panel, System to verify that a COM port is available in the hardware.

Can't Find M3000SiDAA or M3000DAA Electronics at Startup

At Start-up, SmartPrecision Software scans all MicroE USB devices connected to the PC and determines if they are M3000SiDAA or M3000DAA electronics. The software will call the SmartPrecision Software for M3000SiDAA / M3000DAA to communicate with the first device that it identifies as a M3000SiDAA or M3000DAA.

Below is a list of likely reasons why the software does not identify any USB devices:

- There are no M3000SiDAA or M3000DAA electronics connected to the PC. This can be because the USB cable is not connected, or because the electronics are not powered.
- Another instance of the software is already running and the electronics are communicating to that instance of the software. Verify that only one instance of the software (Windows task) is running.
- The USB Driver for the M3000SiDAA / M3000DAA has not been installed properly. If the M3000SiDAA / M3000DAA connections and power have been verified, the M3000SiDAA / M3000DAA should be shown in Device Manager as 'USBXpress Device' under category 'Universal Serial Bus Controllers'. To open the device manager, Go to Control Panel > System > Hardware > Device Manager.

Troubleshooting and further information are available in the software's Help system. View it by clicking Start, Programs, MicroE Systems, SmartPrecision Software Help.

Contacting MicroE Systems

technical support for software: softwaresupport@microesys.com

All other inquiries: info@microesys.com

