E5022A, B Hard Disk Read/Write Test System and E5010B, E5011A Spinstand

Site Preparation and Installation Manual

5th Edition

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Notices

The information contained in this document is subject to change without notice.

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Manual Printing History

The manual's printing date and part number indicate its current edition. The printing date changes when a new edition is printed. (Minor corrections and updates that are incorporated at reprint do not cause the date to change.) The manual part number changes when extensive technical changes are incorporated.

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Safety Symbol

General definitions of safety symbols used on the instrument or in manuals are listed below.

Instruction Manual symbol: the product is marked with this symbol when it is necessary for the user to refer to the instrument manual.

Alternating current.

⎓ Direct current.

| On (Supply).

O Off (Supply).

 In position of push-button switch.

 Out position of push-button switch.

 Frame (or chassis) terminal. A connection to the frame (chassis) of the equipment which normally include all exposed metal structure.

WARNING **This warning sign denotes a hazard. It calls attention to a procedure, practice, condition or the like, which, if not correctly performed or adhered to, could result in injury or death to personnel.**

CAUTION This Caution sign denotes a hazard. It calls attention to a procedure, practice, condition or the like, which, if not correctly performed or adhered to, could result in damage to or destruction of part or all of the product.

NOTE Note denotes important information. It calls attention to a procedure, practice, condition or the like, which is essential to highlight.

Typeface Conventions

Bold	Boldface type is used when a term is defined. For example: icons are symbols.
Italic	Italic type is used for emphasis and for titles of manuals and other publications.
[Hardkey]	Indicates a hardkey labeled “Hardkey.”
Softkey	Indicates a softkey labeled “Softkey.”
[Hardkey] – Softkey1 – Softkey2	Indicates keystrokes **[Hardkey] – Softkey1 – Softkey2.**

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1 Overview

This chapter describes the organization of this manual and the installation procedure of the Agilent E5022A/B Hard Disk Read/Write Test System.

Manual Preamble

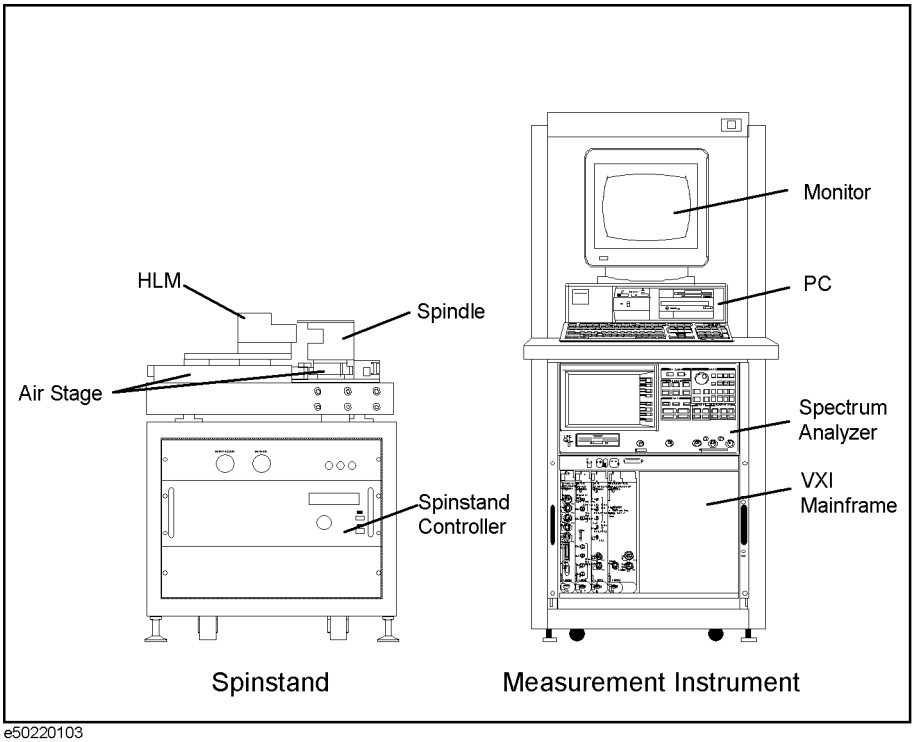
This manual describes topics related to installation of the Agilent E5022A/B Hard Disk Read/Write Test System and the Agilent E5010B, E5011A Spinstand. The information contained in each chapter is as follows.

Chapter 1	This chapter describes the organization of this manual, the configuration of the system, and the overall installation process. It also includes the difference in the installation process depending on options and equipment required for the installation. Before installation, you need to understand this chapter.
Chapter 2	This chapter describes site preparation procedure.
Chapter 3	This chapter describes how to install the system. It contains information on installing spinstand, racking instruments, connecting the cables, supplying air to the spinstand, and so forth.

System Configuration

The Agilent E5022A/B Hard Disk Read/Write Test System is a system to test heads of hard disks, consisting of the components of the following basic configuration.

Figure 1-1 **Example of System Configuration**



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NOTE

Figure 1-1 shows the basic system configuration integrated into the system rack option (Option 701). For information about the system rack option, refer to the “System Rack Option” on page 11.

Hardware

Measurement Instruments (Agilent E5022A, E5022B)

This part consists of various measurement instruments that measure signals from the spinstand and a PC used as a controller. All instruments except the spectrum analyzer are configured as VXI modules and will be stored in the VXI main frame.

Spinstand (Agilent E5010B, E5011A)

This part emulates the internal mechanism of a hard disk drive. It consists of a spindle to rotate a disk, a head loading mechanism (HLM) to load/unload the head onto/from the disk, diagonal air stages to simulate the relative position of the hard disk and the head, and a spinstand controller to control motion of the air stages and the spindle.

Software

Software required to operate the system is pre-installed at our factory before shipped. For details on the software, refer to the Operation Manual and Programming Manual that come with the Agilent E5022A/B.

Options

The Agilent E5022A/B Hard Disk Read/Write Test System allows you to select various options to meet your installation environment and measurements. This section, among them, briefly describes the system rack option (option 700/701) and the oscilloscope option (option 102[*1]/103) on which the installation process depends. For details on the difference in the installation procedure depending on these options, refer to Chapter 3, “Installation.”

System Rack Option

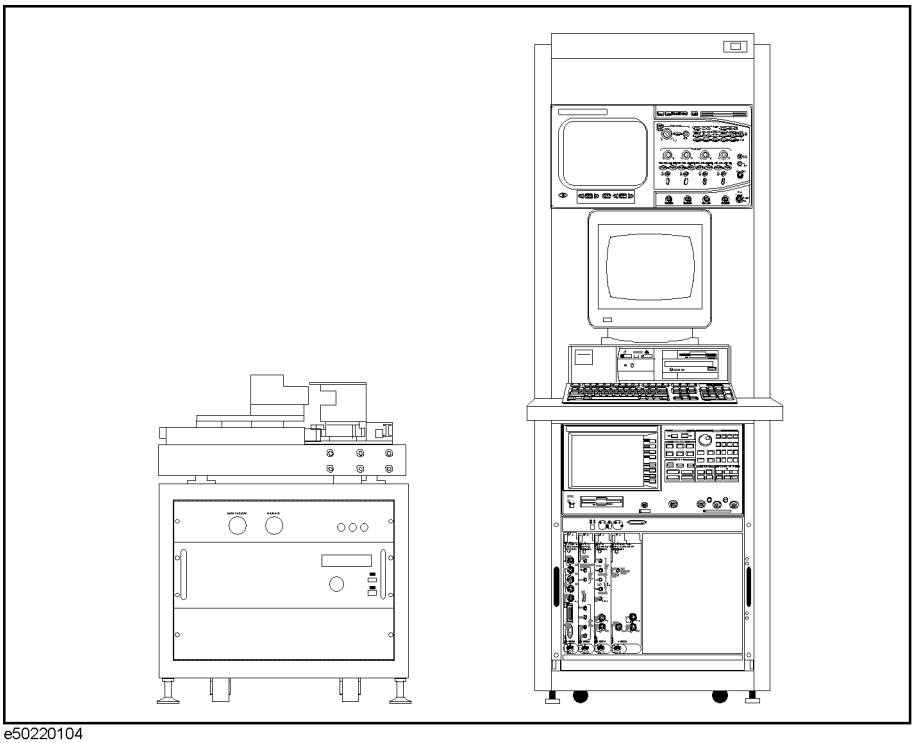
For the Agilent E5022A/B Hard Disk Read/Write Test System, the following two kinds of system rack options are available.

Option 700	2-m high system rack for system with option 102/103 oscilloscope.
Option 701	1.6-m high system rack for system without option 102/103 oscilloscope.

System Configuration with the System Rack Option

With the system rack option (option 700/701), all instruments will be installed inside the system rack except the spinstand. Figure 1-2 shows the 2-m high system rack (option 700) with the oscilloscope (option 102/103) integrated.

Figure 1-2 **Example of the System Configuration with the System Rack Option**



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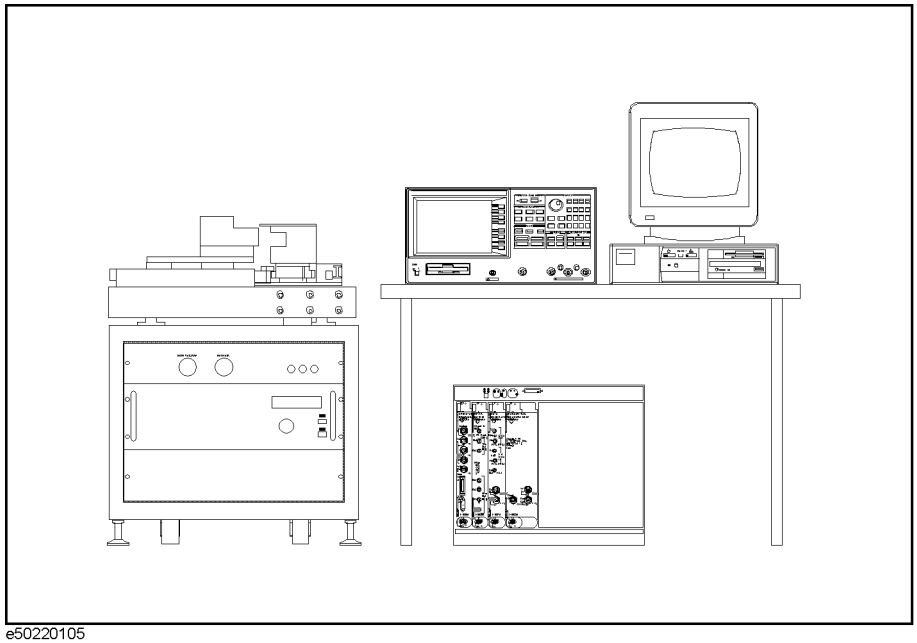
*1.obsolete option

System Configuration without the System Rack Option

Without the system rack option (option 700/701), you can combine instruments freely depending on your installation site. Individual instruments, the PC, and the Monitor are packed separately and shipped. Install the instruments at the installation site that you have decided according to Chapter 2, “Site Preparation.”

Figure 1-3 **Example of the System Configuration without the System Rack Option**



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Other Options

Option 102[*1]	adds the Agilent 54820A box type 2 GSa/s oscilloscope.
Option 103	adds the Agilent 54845A box type 8 GSa/s oscilloscope.
Option 104	replaces the Agilent E5040A VXI spectrum analyzer module with the Agilent 4395A.

Tools Required for Installation

The following tools are required for installation.

Table 1-1 Required Tools

Tools	Size	Purpose
Open end wrench	5/16”	Cable extension connectors on spinstand
	9/16”	Fixing legs of spinstand
	11/16”	Granite bed fixing nuts
Monkey wrench	Large	Fixing legs of spinstand
Hex key (Allen wrench)	1/16”	Removing ground contact electrode
	3/32”	Removing ground contact electrode
	5/32”	Fixing bolts of air-float stages / shroud assembly
	5/16”	Granite bed fixing bolts
Torque limiting wrench	8 mm-11 kgf•cm	SMC cable connector
	6 mm-3.5 kgf•cm	SMA cable connector
TORX® screwdriver	T10	Head amplifier attachment
	T15	System rack
Slotted screwdriver	5.5 mm	Serial cable connector
Phillips screwdriver	Ph#1	Rack mounting screws
	Ph#2	Opening panels of spinstand
Pozidriv screwdriver	Pz#1	VXI modules
Level		Level spinstand
Chain nose pliers		General purpose
Diagonal cutting pliers		Cutting cable ties, etc.
Knife		Opening carton, etc.
Antistatic wrist band		Prevent ESD

2 Site Preparation

This chapter describes information on what you need to prepare before system installation.

Overview

This chapter describes preparation in advance of installation. The following items will be covered.

- Carry-in route
- System dimension and weight
- Power supply
- Air requirement
- Environmental considerations
- Check list

Carry-in Route

Check the following items so that the system can be moved to the place where the system will be installed.

— Vehicle access road

— Steps, slopes, and gaps through the carrying-in route

— Temperature of the temporary storage area

— Space to unpack the spinstand

— Door size within the site

— (When installing upstairs,) elevator size and the maximum load.

— Entrance of the clean room

System Dimension and Weight

Figure 2-1 Dimension of the system rack

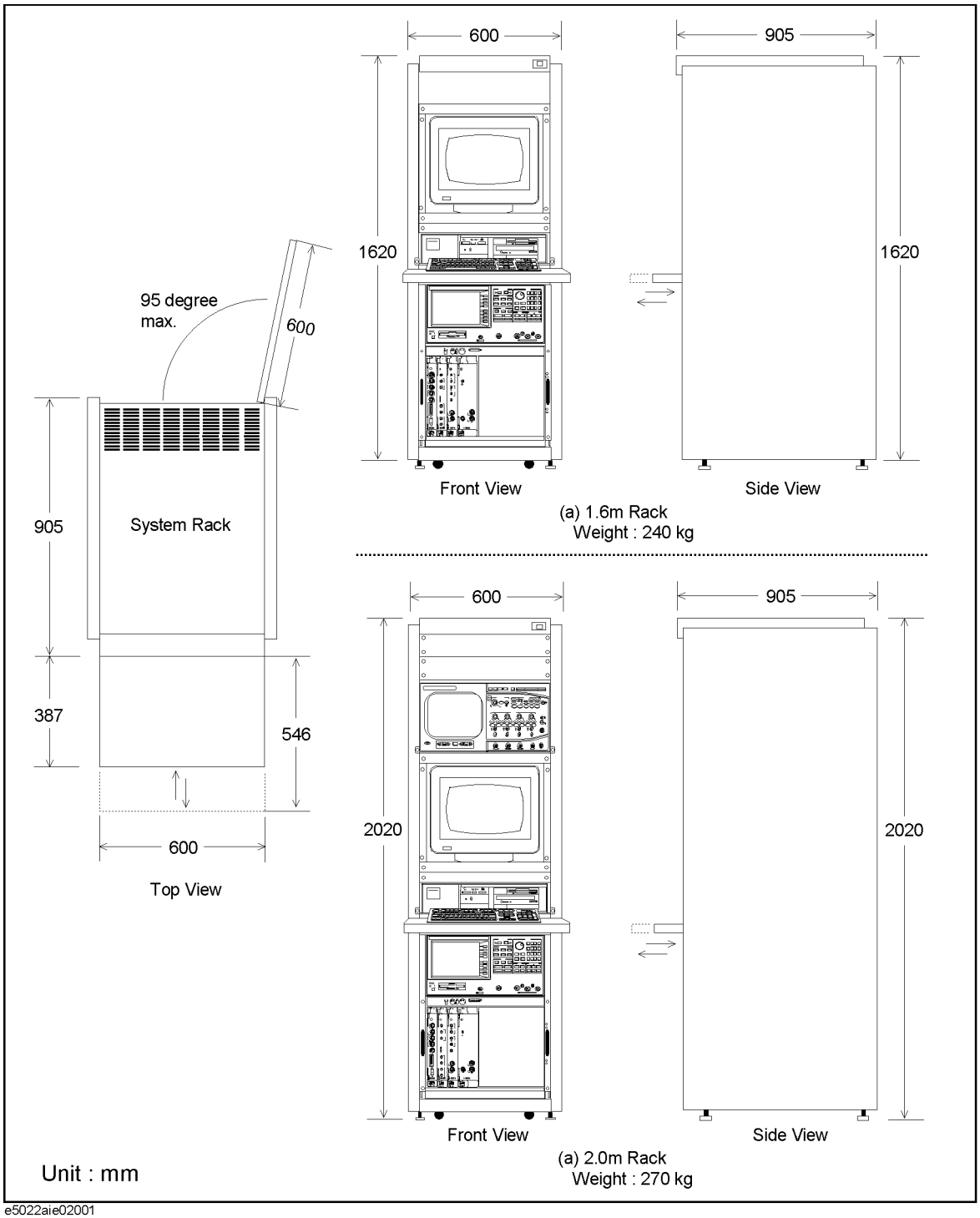

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Figure 2-2 Dimension of the Spinstand (E5010B)

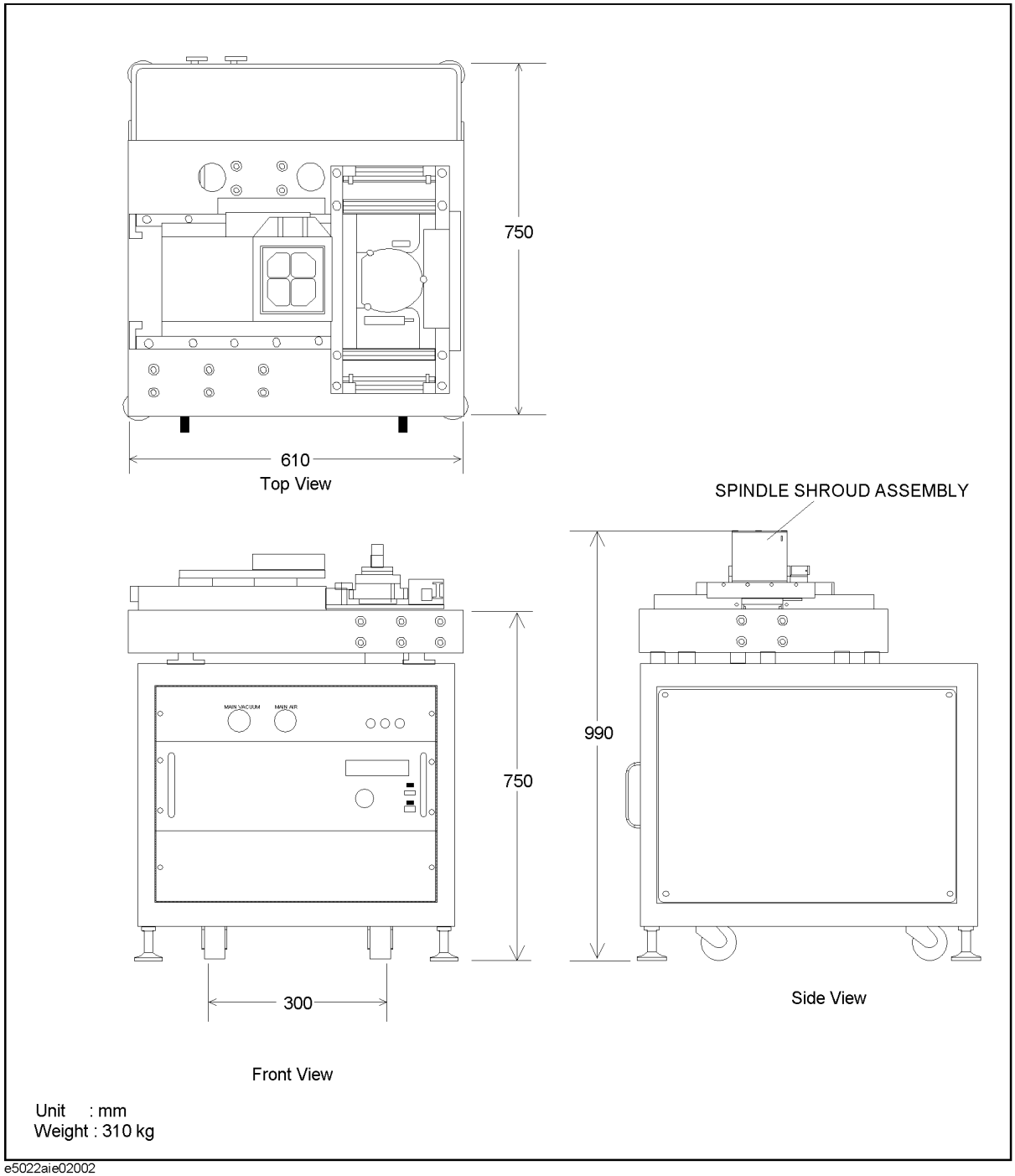

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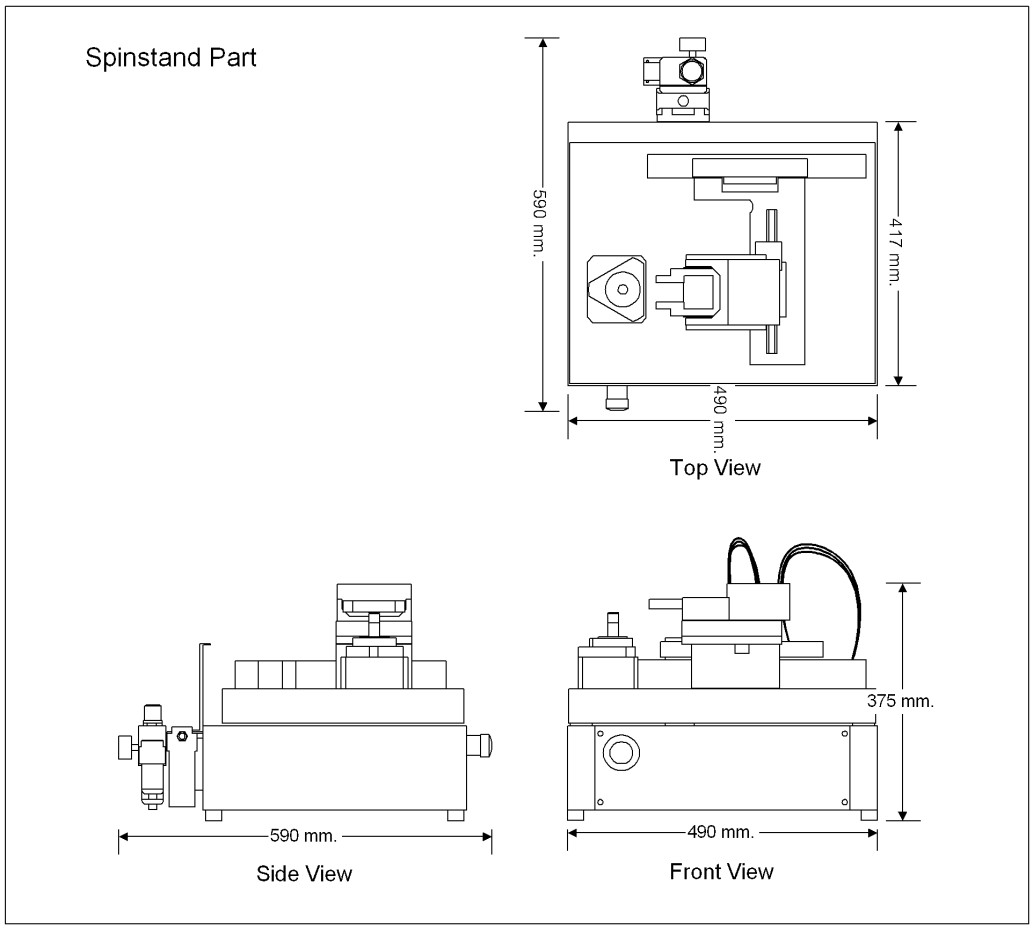
Figure 2-3 **Dimension of the Spinstand (E5011A)**



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Modules / Instruments Mechanical Specification

Table 2-1

Module		Dimension	Weight
E8401A VXI Mainframe		352 mm H × 425 mm W × 631 mm D	19 kg (w/o modules) 28 kg (incl. modules)
4395A Spectrum Analyzer (Option 104)		235 mm H × 425 mm W × 553 mm D	21 kg
54820A / 54845A Oscilloscope (Option 102*1/103)		216 mm H × 437 mm W × 440 mm D	10.6 kg (54820A) 12 kg (54845A)
E5010B Spinstand		990 mm H*2 × 610 mm W × 750 mm D	310 kg
E5011A Spinstand	Spinstand Part	375 mm H*3 × 490 mm W × 590 mm D*4	68 kg
	Controller Part	222 mm H × 483 mm W × 432 mm D*5	32 kg

*1. Obsolete option.
*2. Includes spindle shroud assembly.
*3. Not includes cables and air tubes.
*4. Includes emergency stop switch.
*5. Not includes front handle and cables connected on the rear panel.

Environmental Considerations

To ensure Agilent E5022 system performance, be sure to comply with the following environmental conditions.

Table 2-2

Item	Specification
Temperature	+18 °C to +28 °C (+64.4 °F to +82.4 °F)
Relative Humidity	15%RH to 80%RH
Air Cleanness	< Class 10,000

Power Supply

This section describes the requirements of power supply.

Power Supply Requirements

Table 2-3 shows power requirements of the Agilent E5022 system.

Table 2-3 Power Requirements

Instrument	Line Voltage Rating	Line Frequency	Maximum Power Consumption
VXI Mainframe with VXI Modules	90-264 Vac	47-66 Hz	340 W (w/o E5039A Bit Error Module)
			390 W (w/ E5039A Bit Error Module)
Option 104*1 Spectrum Analyzer (4395A)	90-132 Vac, 198-264 Vac	47-63 Hz	300 VA
Option 102*2/103 Oscilloscope (54820A/54845A)	90-132 Vac, 198-264 Vac	47-440 Hz	390 W
Monitor	90-264 Vac	47-63 Hz	100 W
PC	90-127 Vac, 200-240 Vac	47-63 Hz	60 W
Spinstand (E5010B)	90-132 Vac, 198-264 Vac	47-63 Hz	1600 VA
Spinstand (E5011A)	90-132 Vac, 198-264 Vac	47-53 Hz, 57-63 Hz	1000 VA

*1. E5022A only.
*2. Obsolete option.

Power Cables

No System Rack Option Configuration

The following table shows the power cords furnished with the Agilent E5022.

Table 2-4 Power Cables Supplied

Option	Country	Voltage (Nominal)	Cable Part Number	Qty.	PDU Model Number*1
Option 800	Japan	100 V	8120-4753	5	E4455A
			8120-5400	1*2	
Option 801	U.S.	120 V	8120-1378	5	E4455A
			8120-2371	1*2	
Option 802	Indonesia	220 V	8120-1351	6	E4457B
Option 803	Thailand	220 V	8120-1378	6	E4457B
Option 804	Philippines	110 V	8120-1378	5	E4455A
			8120-2371	1*2	
Option 805	China	220 V	8120-8376	6	E4457B
Option 806	Hong Kong	220 V	8120-1351	6	E4457B
Option 807	Singapore	230 V	8120-1351	6	E4457B
Option 808	Malaysia	240 V	8120-1351	6	E4457B

*1. Applied only with option 700/701 system rack cabinet ordered.
*2. For VXI mainframe power supply.

Table 2-5 Plug Type

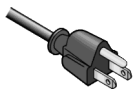
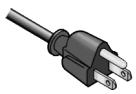
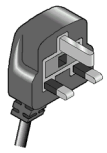
Part Number: 8120-4753 Plug: JIS C 8303, 125 V, 12 A Japan	
Part Number: 8120-1378 Plug: NEMA 5-15P, 125 V, 10 A U.S., Philippines, Thailand	
Part Number: 8120-8376 Plug: GB 1002, 250 V, 10 A China	

Table 2-5 **Plug Type**

Part Number: 8120-1351 Plug: BS 1363/A, 250 V, 10 A Hong Kong, Singapore, Malaysia, Philippines	

System Rack (Option 700/701) Configuration

When the E5022 is ordered with system rack option 700 or 701, one of the following power distribution unit (PDU) is installed in the rack when shipped from the factory.

Table 2-6 **System Rack Power Distribution Unit**

PDU Model Number	Voltage	Receptacles*1	Power Cord	Plugs
E4455A	100-120 V	9×NEMA 5-15R 1×IEC-320 C13	Attached 2 m	NEMA 5-20P 
E4457B	200-240 V	10×IEC-320 C13*2	Attached 2 m	No Plug (unterminated)*3

*1. One IEC-320 C13 receptacle is reserved for fan, if being used.
*2. Five jumper cables (Agilent P/N 1820-1860) used to connect the instruments to the PDU are furnished to the system rack option.
*3. Three-wire plug for the PDU must be prepared before installation.

NOTE For 200-240 V configuration, no main power plug is connected to the PDU. You must prepare three-wire plug that meets your local regulations before installation.

Additional Power Outlets

Prepare additional power outlets for instruments for maintenance.

Air Requirement

This section provides the necessary air requirements for the Agilent E5022 system.

Compressed Air

The compressed air is used for the following purposes.

- Air bearing for the spindle
- Floating the air stages
- Load/unload action of the HLM (Head Loading Mechanism)

Prepare compressed air meets the specification below:

Item	Specification	
	E5010B	**E5011A**
Air Pressure Range	670 kPa to 730 kPa (98 psi to 105 psi)	620 kPa (90 psi) minimum
Temperature Range	Room Temperature ±2.8 °C (Room Temperature ±5 °F)	Room Temperature ±2.8 °C (Room Temperature ±5 °F)
Air Consumption*1 (per system)	0.70×10^{-3} m^3/s (2.52 m^3/h, 1.48 scfm)	0.75×10^{-3} m^3/s (2.72 m^3/h, 1.6 scfm)
Air Tube Diameter	9.5 mm (3/8")*2	

*1. under the condition of spindle rotation: 7200 rpm, both stages: freefloat
*2. Use an adapter tube (Agilent P/N E5010-60004) furnished with the system to use 10 mm air tube.

NOTE Use as much as dry and clean air. Although air filter and mist separator are built-in to the spinstand, supplying moist or dirty air could shorten their life.

Vacuum

The vacuum is used for the following purpose.

- Locking down the stages to the granite bed
- Fixing a media to the disk clamp

Prepare vacuum meets the specification below.

Item	Specification	
	E5010B	**E5011A**
Minimum Vacuum[*1]	–70 kPa (–20.5 inHg, –521 mmHg)	–70 kPa (–20.5 inHg, –521 mmHg)
Vacuum Consumption (per system)	0.22×10^{-3} m^3/s (0.79 m^3/h, 0.47 scfm)	0.22×10^{-3} m^3/s (0.79 m^3/h, 0.47 scfm)
Vacuum Tube Diameter	9.5 mm (3/8”)[*2]	

*1. At specified air consumption.
*2. Use an adapter tube (Agilent P/N E5010-60004) furnished with the system to use 10 mm air tube.

Check List

The following list is a site preparation checklist to help you see at a glance what you have already done and what remains to be done.

Check each check item off as it's completed. If the item does not pertain, mark the item "N/A" (not applicable).

- Carry-in route
  - Vehicle access road
  - Steps / slopes / gaps through the carrying-in route
  - Temperature of the temporary storage area
  - Space to unpack the system
  - Door size within the site
  - (When installing upstairs) elevator size and maximum load
  - Entrance of the clean room
- Floor plan
  - Space for operation and servicing at the front and rear of the cabinet
  - Space for personnel safety, comfort, and freedom of movement
- Power supply
  - System rack power supply
  - Spinstand power supply
  - (When no system rack) measurement instruments, PC power supply
- Air / vacuum
  - Compressed air pressure
  - Vacuum air pressure or vacuum pump
  - Air tube diameter
  - Air tube adapter
  - Air tube layout
- Environment
  - Temperature
  - Relative humidity
  - Air cleanness
  - Vibration

3 Installation

This chapter describes how to install the Agilent E5022A/B Hard Disk Read/Write Test System.

Overview

This chapter describes the installation of the Agilent E5022A/B system. The installation procedure differs depending on the system configuration. For the difference of the installation procedure, refer to “Installation Procedure” on page 31.

NOTE Before installing the system, you should decide your installation site, prepare its environment, carry in the product, and check the contents of the package. This section is written, assuming that these preparations and checks are completed. For details, refer to Chapter 2, “Site Preparation.”

Installation Procedure

The install process of the Agilent E5022A/B Hard Disk Read/Write Test System differs, depending on the options selected. For the difference, refer to Table 3-1.

Table 3-1 Installation procedure

	Standard	Option		
		102*1/103 (Oscilloscope)	104 (Repl. E5040A w/ 4395A)	700/701 (System Rack)
System rack installation				√
PC integration				√
Instruments installation	√			
Spinstand installation	√			
Cable connection (common part)	√			
Oscilloscope connection		√		
GPIB connection		√	√	
Air connection	√			
Power cable connection	√			

*1. Option 102 is discontinued.

Difference in Packaging due to the System Rack Option

Packaging differs depending on whether the system rack option is included.

With System Rack Option

For the system configuration with the system rack option (option 700/701), all instruments (including optional oscilloscopes) except the PC and the monitor are shipped with integrated into the system rack. In the installation process, you need to mount the PC and the monitor after installing the system rack.

Without System Rack Option

For the system configuration without the system rack option (option 700/701), individual instruments, the PC, and the monitor are separately packaged and shipped. Install the instruments at your installation site that you have decided according to Chapter 2, “Site Preparation.”

NOTE This product is shipped with VXI modules installed into the VXI mainframe, regardless of whether the system rack option is chosen. Therefore, there is not need to install VXI modules.

Setting Instrument Addresses

This section describes the instrument addresses and how to set them.

NOTE All the instruments' addresses are set when shipped from factory.

VXI Modules

The address switches' default values are shown in Table 3-2.

Table 3-2 VXI Module Addresses

Module	Address	Switch Settings*1
E8491B	0	00000000
E5035A,B	5	00000101
E5036A	6	00000110
E5037A,B,C	7	00000111
E5038A,B	8	00001000
E5039A,B	9	00001001
E5040A	10	00001010
E5041A	11	00001011

*1. From bit 7 to bit 0

GPIB

A spectrum analyzer and an oscilloscope (optional) are connected via GPIB. Their GPIB addresses are shown in Table 3-3.

Table 3-3 GPIB Addresses

Module	Address	How to set address
Spectrum Analyzer (4395A)	17	Press **[Preset] - [Local] - SET ADDRESSES - ADDRESS: 4395 - [1] - [7] - [x1]** keys to enter address.
Oscilloscope (54820A)	7	• Using mouse, click the mouse icon on the right top corner of the screen • Select **[Utilities] - [Remote Interface...]** • Select GPIB address as 7.
Oscilloscope (54845A)	7	(same as above)

Setting Line Voltage

This section describes line voltage settings for the instruments. If you use the system without changing the original specification at your purchase, there is no need to set the voltage.

NOTE

See “Setting Line Voltage for the Spinstand (E5010B)” on page 49 or “Setting Line Voltage for the Spinstand (E5011A)” on page 62 for line voltage setting for the spinstand.

Setting Line Voltage for the Instruments

All instruments (including optional oscilloscopes) except the PC and its monitor have automatic voltage setting capability. Therefore, there is no need to set their line voltage. The line voltage to the PC and its monitor should be set correctly according to the documents that come with the equipment.

Setting Line Voltage for the System Rack

The PDU (Power Distribution Unit) inside the system rack is equipped with the plug that meets the specification of your order. Contact your local Agilent Technologies Sales Office if you want to change the PDU.

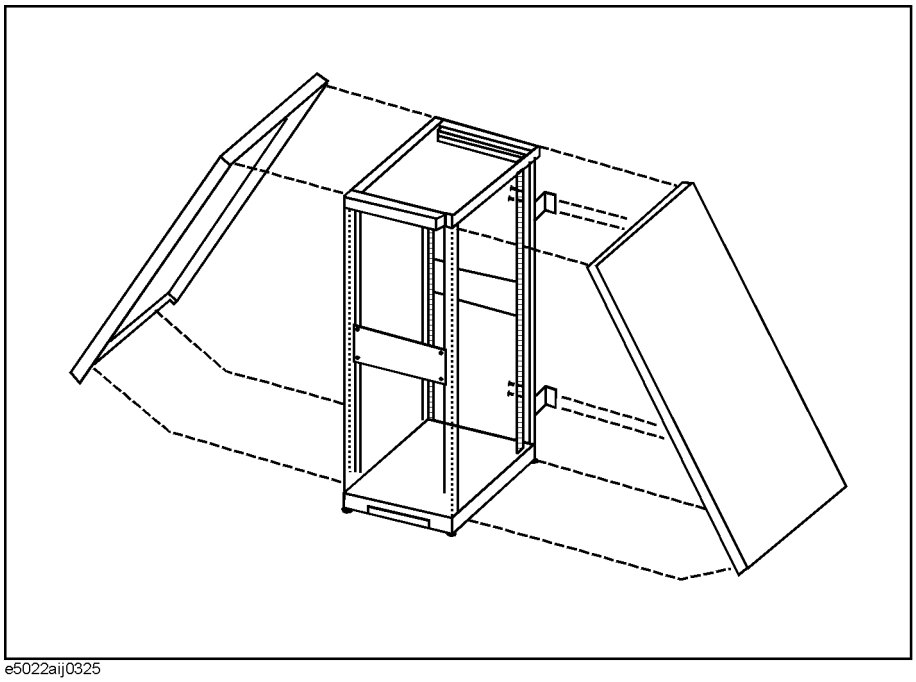
Installing the System Rack (Option 700 and 701 only)

Fix the system rack to the site selected according to the “Site Preparation Manual.”

Installing the PC

Follow these steps to integrate the PC into the system rack.

Step 1. Remove the side panel from the system rack.



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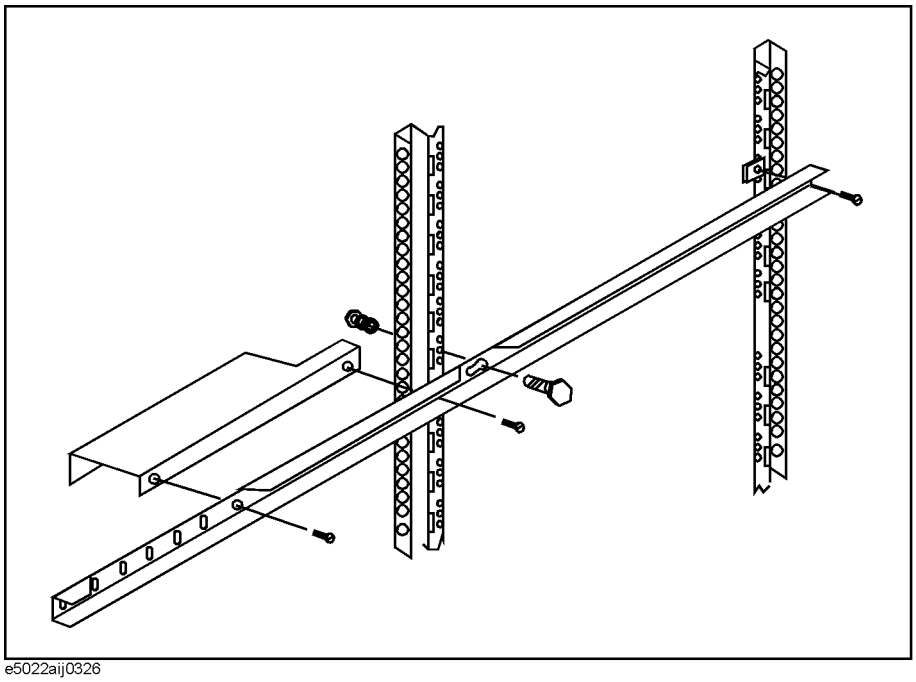
Step 2. Set the PC in the system rack.

Step 3. Attach the sliding rail to the system rack.



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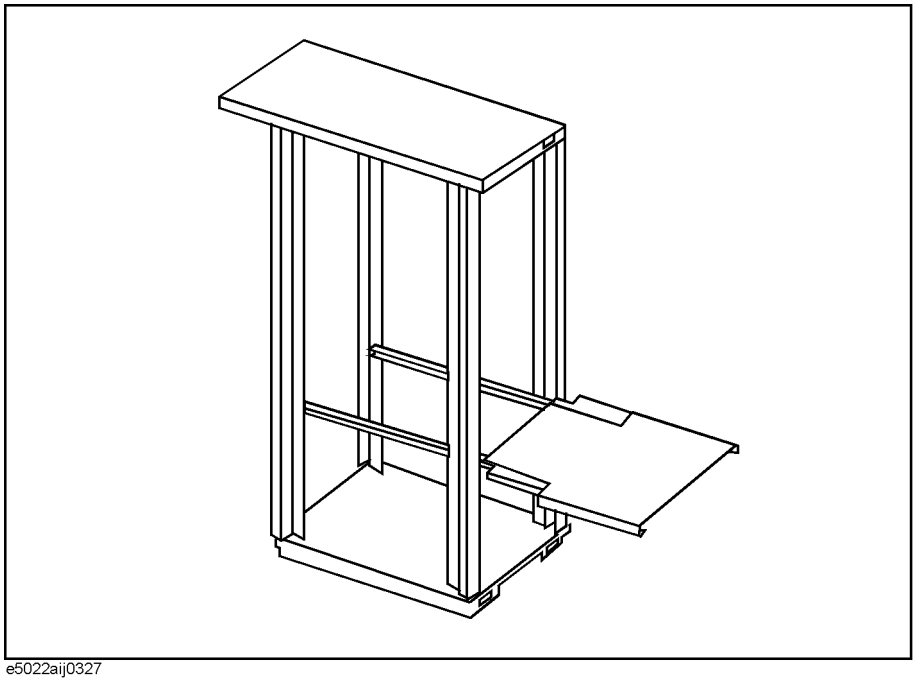
Step 4. Set the slab top in the system rack.



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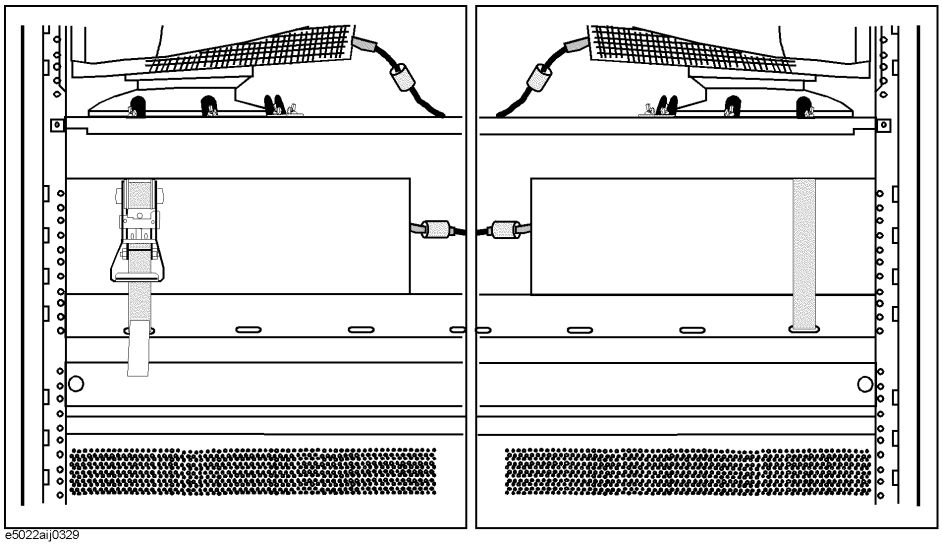
Step 5. Fix the PC with the fixing belt.



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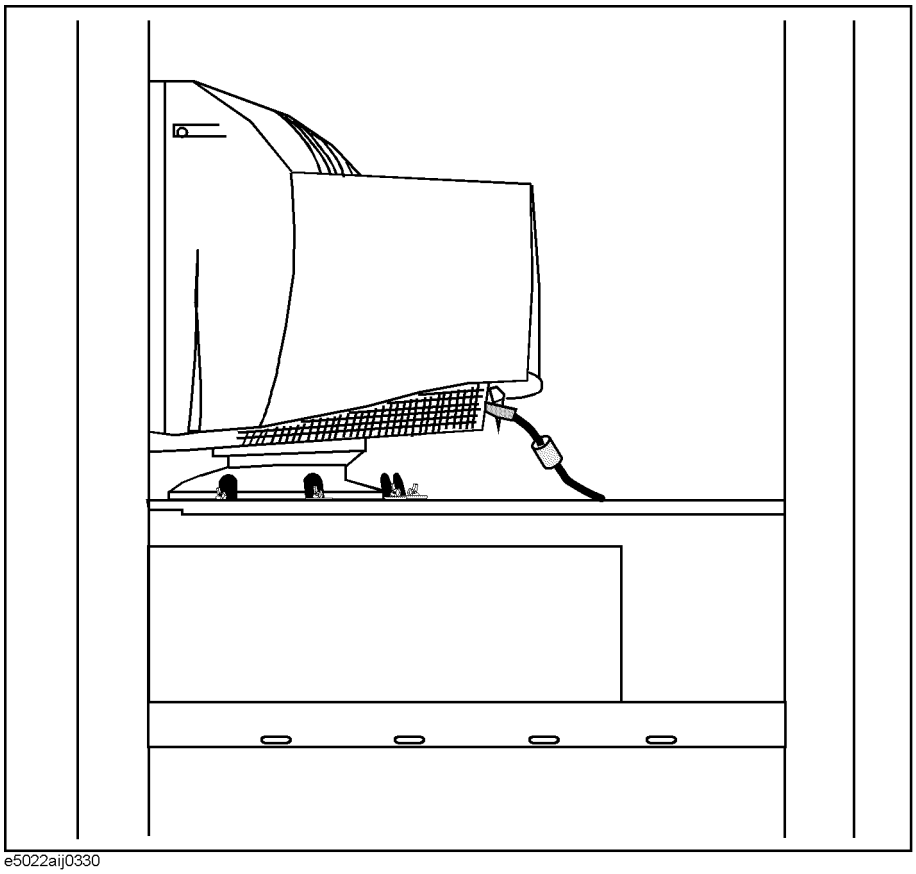
Step 6. Set the monitor in the system rack.



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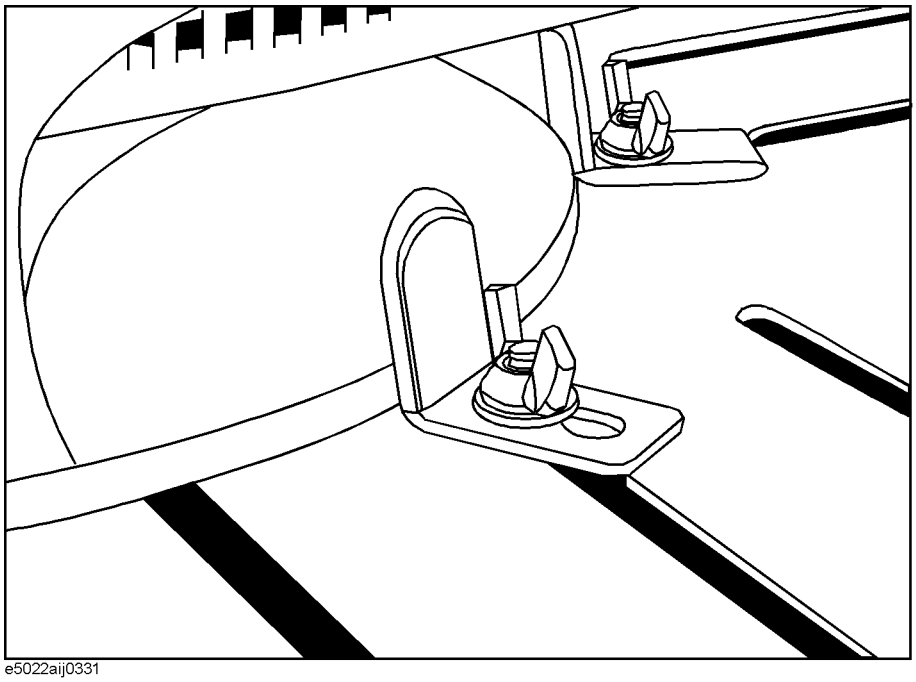
Step 7. Fix the monitor to the slab top.



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Step 8. Connect the PC and the monitor with the cables.

Step 9. Attach the side panel on the system rack.

Installing the VXI Modules

This section describes how to install each VXI module in the VXI mainframe.

NOTE The VXI modules are pre-installed in the VXI mainframe when shipped from the factory.

Tools Required

- #1 Pozidriver

Table 3-4 Recommended Slot for each VXI Module

Slot No.	VXI Module Locations (Standard Config.)	VXI Module Locations (with E5039A)
0	E8491B	E8491B
1	E5035A,B	E5035A,B
2	E5037A,B,C	E5037A,B,C
3	E5036A	E5039A,B
4	E5038A,B	E5036A
5		E5038A,B
6	E5040A	
7		E5040A
8	E5041A*1	
9	(Blank)*2	E5041A*1
10 to 12		(Blank)*2

*1. Optional module.
*2. Attach appropriate filler panels.

Step 1. Referring to Table 3-4, attach filler panels using a #1 Pozidriver.

Step 2. Pulling two levers of each VXI module, slide the module into the VXI mainframe slot.

Step 3. Push the module until the levers down by themselves.

Step 4. Press the levers down completely.

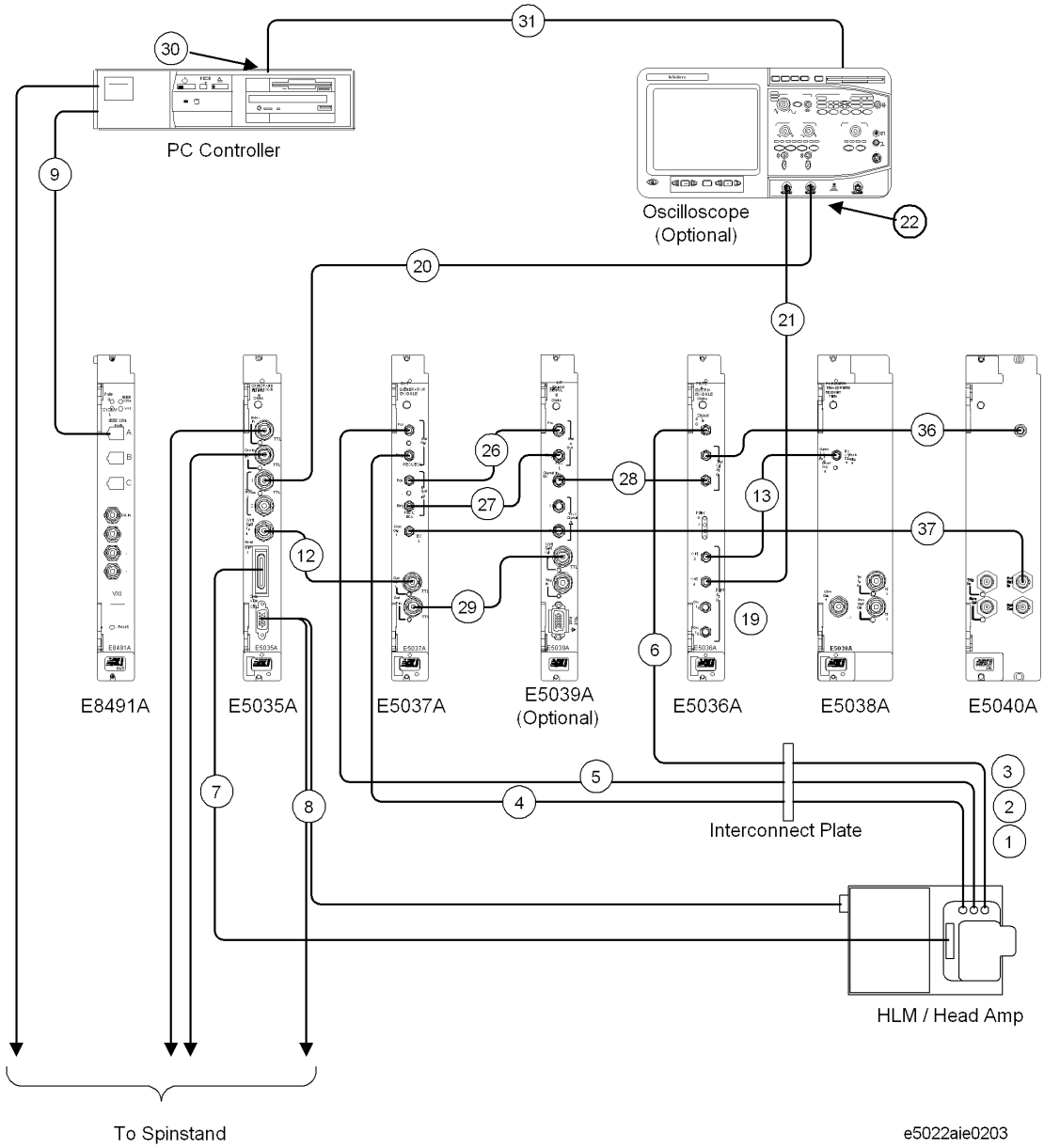
Step 5. Secure the module with two screws attached on the front panel by using the #1 Pozidriver.

Step 6. Repeat the above steps for rest of VXI modules.

Connecting Cables (E5022A, E5022B)

Figure 3-1 shows the overall connection diagram including the optional oscilloscope and the E5039A bit error test module. The spinstand, the E5041A dual counter module, and the 4395A optional spectrum analyzer are not shown in this figure.

Figure 3-1 Overall Cable Connection Diagram (except Spinstand)



Connecting the VXI Modules

Figure 3-2 **Cable Connection (VXI Modules)**

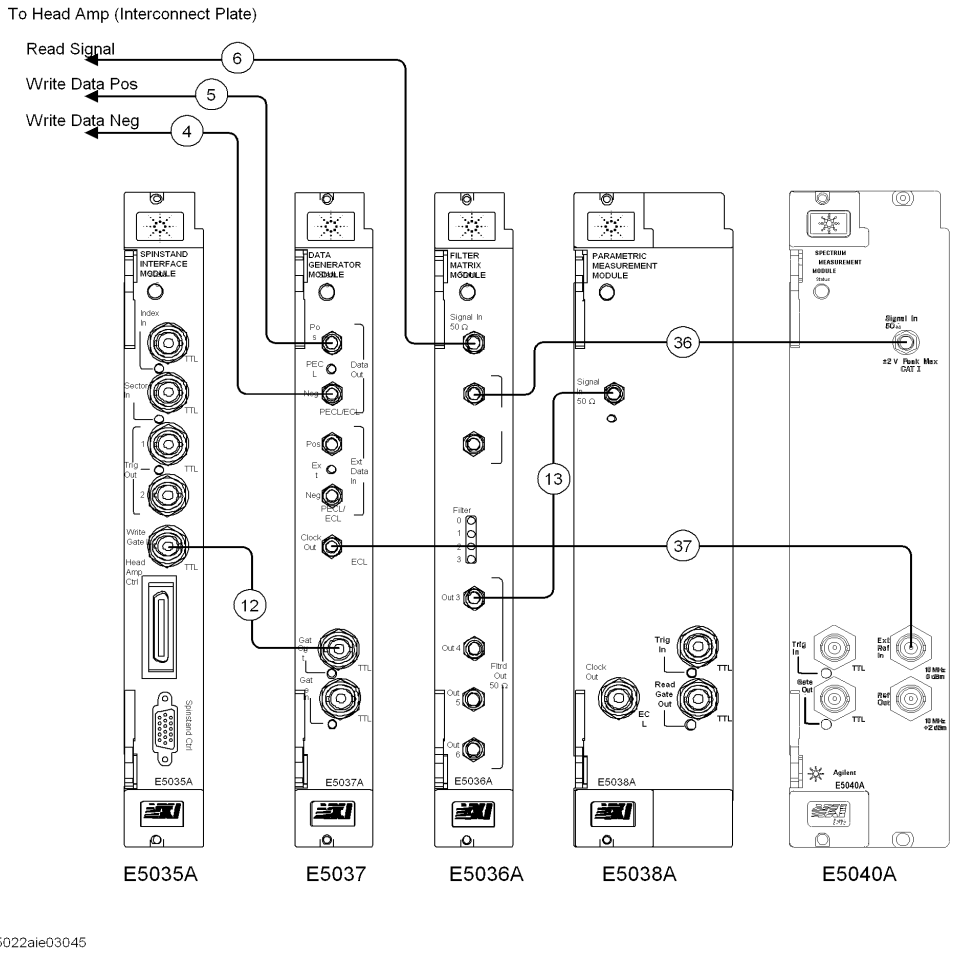


Table 3-5 **Cable Connection (VXI Modules)**

No.	Description	Connection		Part Number
4	SMC(f)-SMC(f) Cable	Interconnect Plate*1	E5037 “Data Out Neg”	E5022-61622
5	SMC(f)-SMC(f) Cable	Interconnect Plate*2	E5037 “Data Out Pos”	E5022-61620
6	SMC(f)-SMC(f) Cable	Interconnect Plate*2	E5036A “Signal In”	E5022-61618
12	BNC(m)-BNC(m) Cable	E5035A “Write Gate In”	E5038A “Read Gate Out”	E5022-61607
13	SMA(m)-SMA(m) Cable	E5036A “Filtrd Out 3”	E5038A “Signal In”	E5022-61606
36	SMA(m)-SMA(m) Cable	E5036A “Thru Out 1”	E5040A “Signal In”	E5022-61642
37	SMA(m)-BNC(f) Cable	E5037A/B “Clock Out”	E5040A “Ext Ref In”	E5022-61641

*1.Connect to the appropriate connectors with referring to the cable markers on the SMA(m)-SMA(m) cables.

Connecting the E5039A Bit Error Test Module (Optional)

NOTE This procedure is needed only if the system is configured with the Agilent E5039A Bit Error Test Module.

Figure 3-3 Cable Connection of the Agilent E5039A (Option)

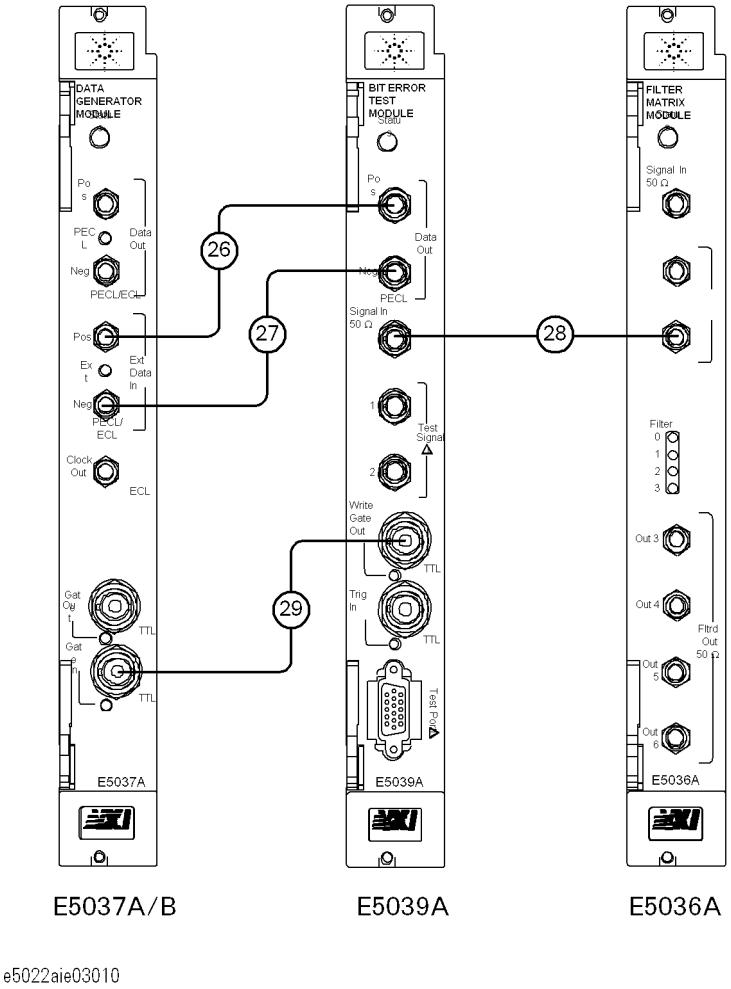


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Table 3-6 Cable Connection (E5039A)

No.	Description	Connection		Part Number
26	SMC(f)-SMC(f) Cable	E5037A “Ext Data In Pos”	E5039A “Data Out Pos”	E5039-61001
27	SMC(f)-SMC(f) Cable	E5037A “Ext Data In Neg”	E5039A “Data Out Neg”	E5039-61002
28	SMC(f)-SMC(f) Cable	E5039A “Signal In 50 Ω”	E5036A “Thru Out 50 Ω”	E5039-61003
29	BNC(m)-BNC(m) Cable	E5037A “Gate In”	E5039A “Write Data Out”	E5039-61004

Connecting the E5041A Dual Counter Module (Optional)

NOTE This procedure is needed only if the system is configured with the Agilent E5041A Dual Counter Module.

Figure 3-4 Cable Connection of the Agilent E5041A (Option)

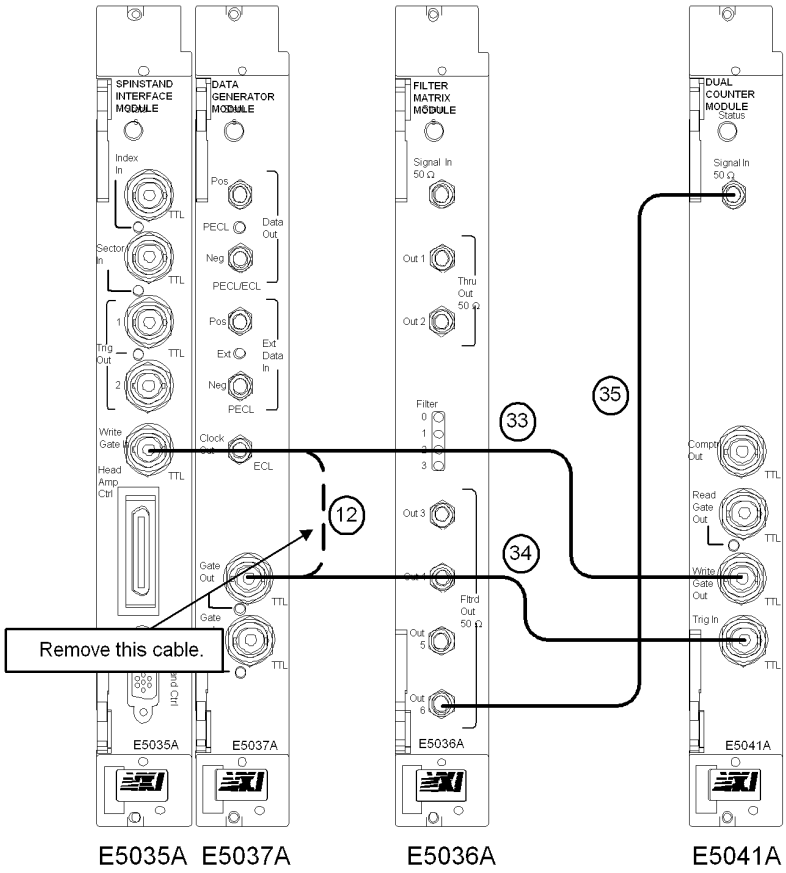

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Table 3-7 Cable Connection (E5041A)

No.	Description	Connection		Part Number
33	BNC(f)-BNC(f) Cable	E5035A “Write Gate In”	E5041A “Write Gate Out”	E5041-61601
34	BNC(f)-BNC(f) Cable	E5037A “Gate Out”	E5041A “Trig In”	E5041-61602
35	SMA(m)-SMA(m) Cable	E5036A “Fltrd Out 5”	E5041A “Signal In 50 Ω”	E5041-61603

Terminating unused connectors

Figure 3-5 Terminator Connection

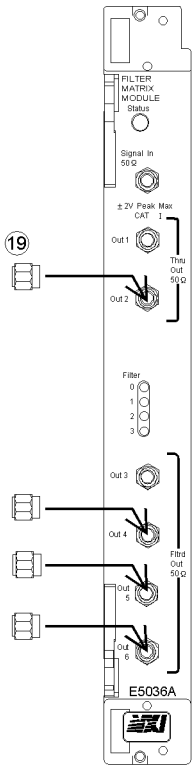

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Table 3-8 Terminator Connection

No.	Description	Connection		Part Number
19	50 Ω Terminator	-	-	1810-0118

Connecting the Oscilloscope (Option 102/103)

NOTE This procedure is needed only if the system is configured with the optional oscilloscope.

Connecting Option 102*1

Connect the cables for option 102 (2 GSa/s Oscilloscope) as shown in Figure 3-6 and Table 3-9.

Figure 3-6 Cable Connection (Option 102)

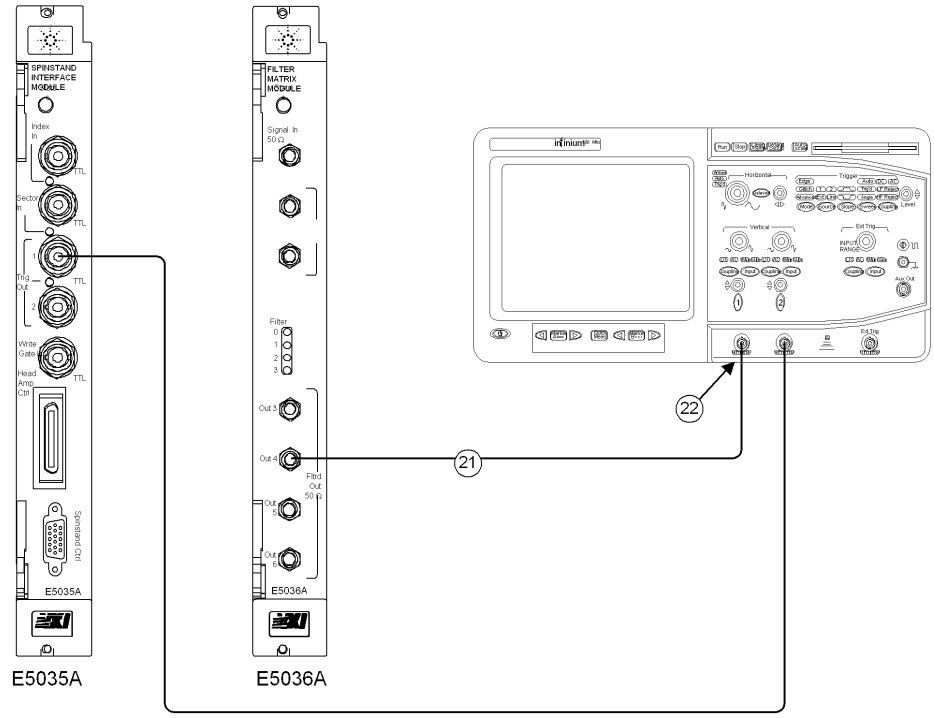

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Table 3-9 Cable Connection (Option 102)

No.	Description	Connection		Part Number
20	BNC(m)-BNC(m) Cable	E5035A Trig Out 1	54820A Ch 2	E5022-61611
21	SMA(m)-SMA(m) Cable	E5036A Filtrd Out 4	54820A Ch 1	E5022-61610
22	SMA(f)-BNC(m) Adapter	-	-	1250-1700

NOTE Store the terminators you removed from the Agilent E5035A to mount the oscilloscope in a safe place for future use.

*1. Option 102 is discontinued.

Connecting Option 103

Connect the cables for option 103 (8 GSa/s Oscilloscope) as shown in Figure 3-7 and Table 3-10.

Figure 3-7 Cable Connection (Option 103)

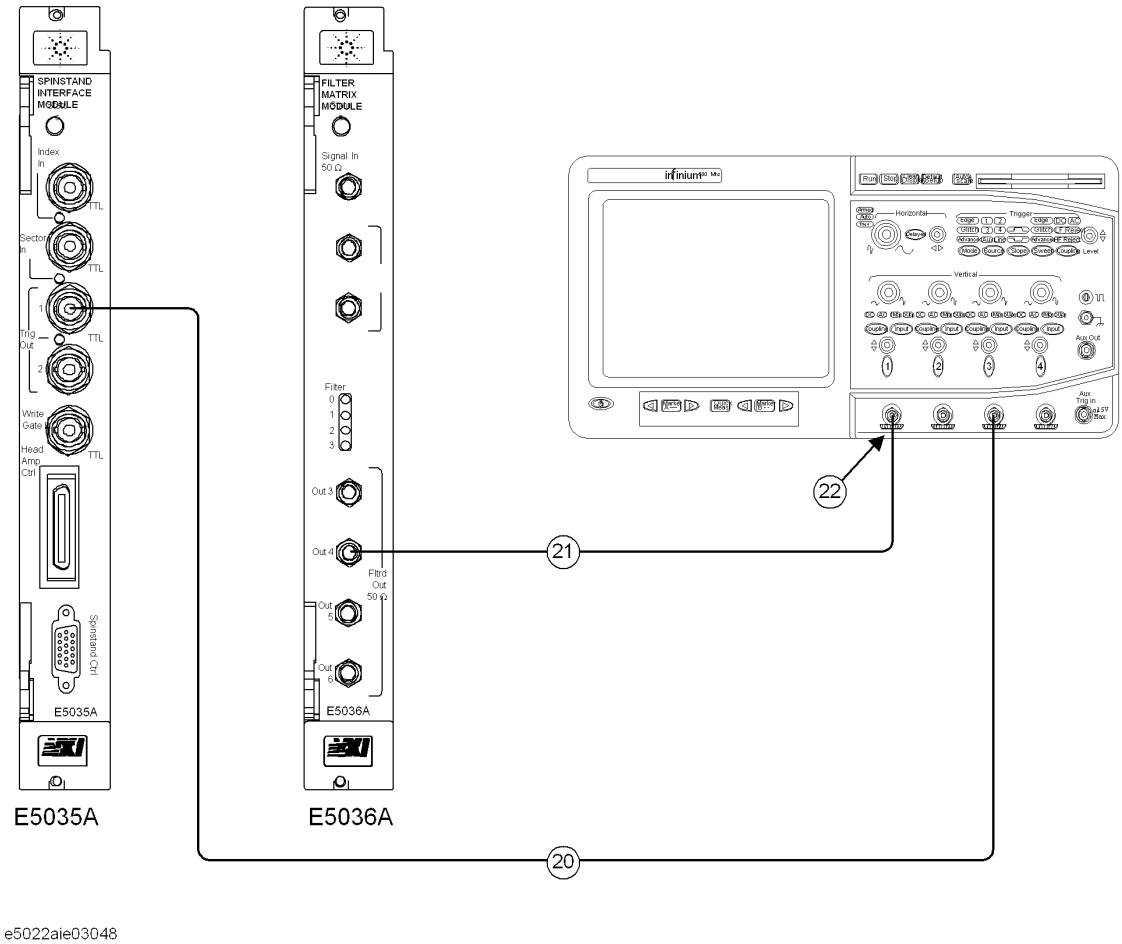

Table 3-10 Cable Connection (Option 103)

No.	Description	Connection		Part Number
20	BNC(m)-BNC(m) Cable	E5035A Trig Out 1	54845A Ch 3	E5022-61611
21	SMA(m)-SMA(m) Cable	E5036A Filtrd Out 4	54845A Ch 1	E5022-61610
22	SMA(f)-BNC(m) Adapter	-	-	1250-1700

NOTE Store the terminators you removed from the Agilent E5035A to mount the oscilloscope in a safe place for future use.

Connecting the 4395A Spectrum Analyzer (Option 104)

NOTE This procedure is needed only if the system is configured with option 104.

For the system with option 104, the 4395A Spectrum Analyzer is connected instead of the E5040A VXI Spectrum Analyzer Module.

Figure 3-8 Cable Connection (Spectrum Analyzer)

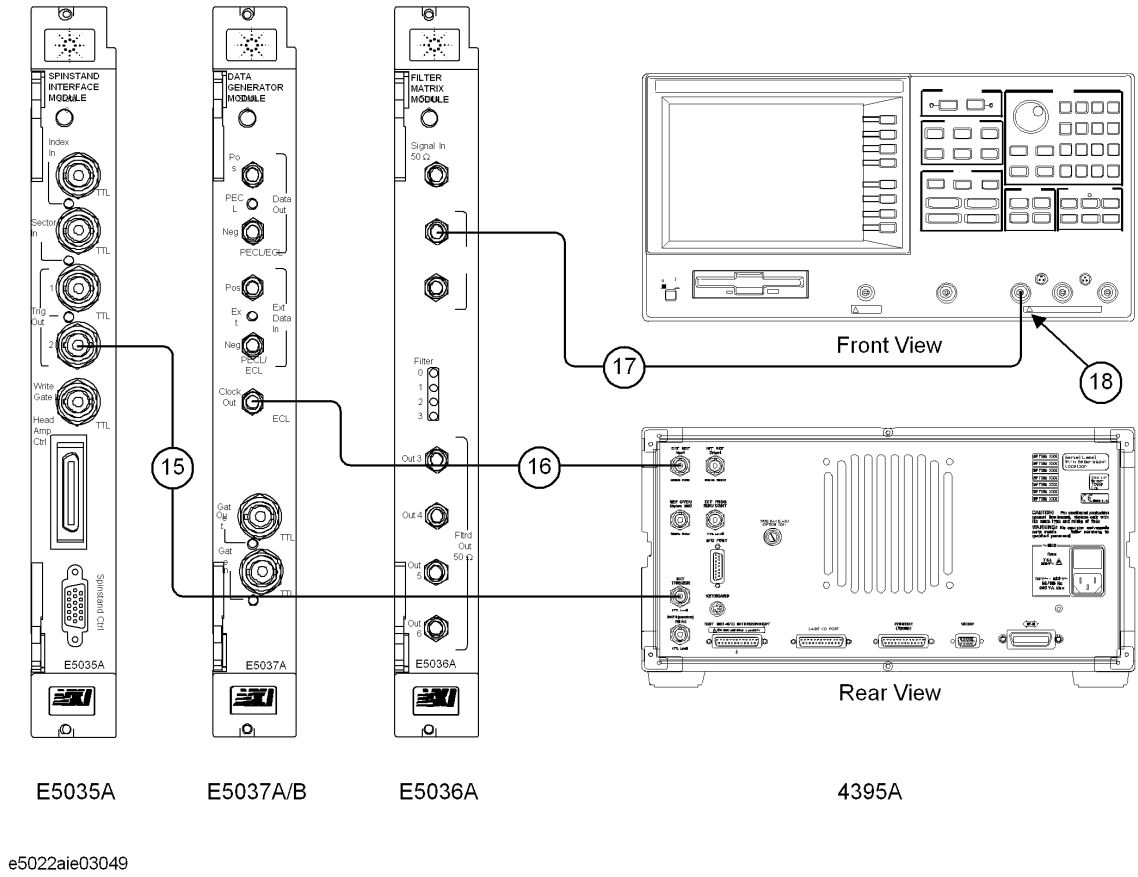

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Table 3-11 Cable Connection (Spectrum Analyzer)

No.	Description	Connection		Part Number
15	BNC(m)-BNC(m) Cable	E5035A “Trig Out 2”	4395A “Ext Trigger”	E5022-61613
16	SMA(m)-BNC(m) Cable	E5037A/B “Clock Out”	4395A “Ext.Ref.Input”	E5022-61614
17	SMA(m)-SMA(m) Cable	E5036A “Filtrd Out 1”	4395A “R Input”	E5022-61623
18	SMA(m)-N(m) Adapter	-		1250-1250

Connecting the PC Controller

Figure 3-9 PC Controller Connection

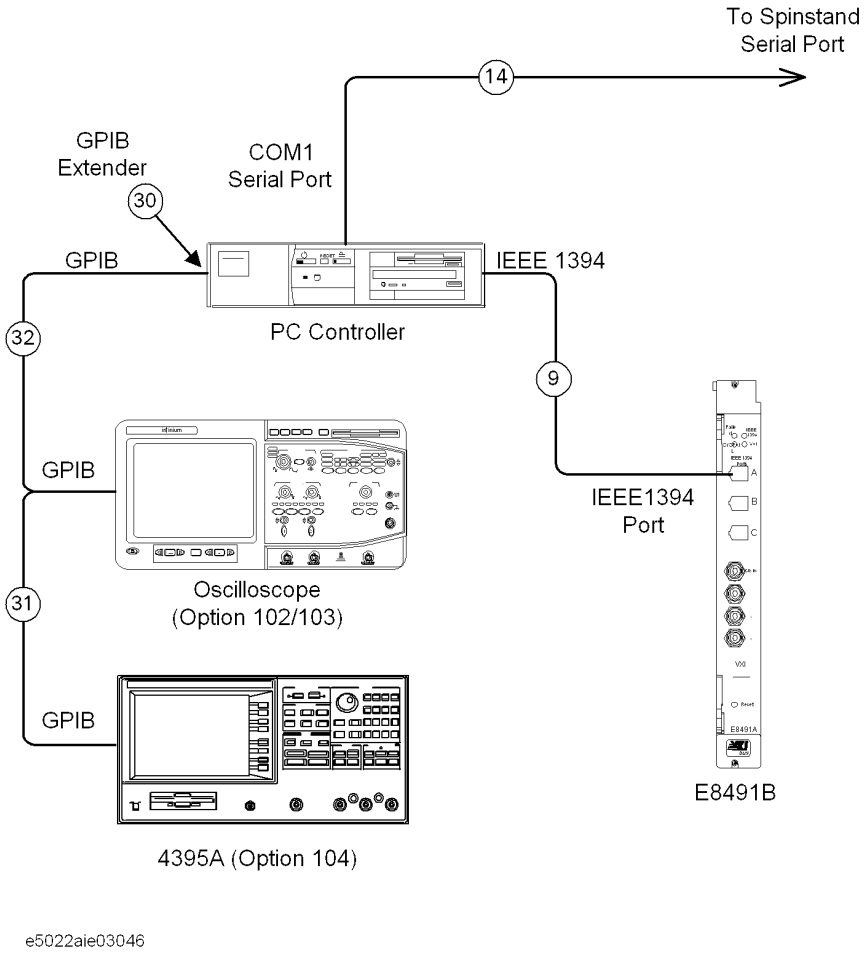

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Table 3-12 Cable Connection (PC Controller)

No.	Description	Connection		Part Number
9	IEEE-1394 Cable	PC IEEE-1394 Port*1	E8491B “IEEE 1394”*1	8120-8688
14	Serial Cable	PC COM1 Port	Spinstand Serial Port	E5022-61628
30	GPIB Adapter Extender*2	PC GPIB Connector	-	10834A
31	GPIB Cable, 2 m	PC GPIB Connector	4395A (Option 104)	10833B
32	GPIB Cable, 2 m	PC GPIB Connector	54820A (Option 102) 54845A (Option 103)	10833B

*1. Any IEEE-1394 port can be used on both E8491B and PC.
*2. The GPIB Extender is used if the GPIB connector is difficult to connect to the PC when the PC’s rear panel is sunk.

Installing the Spinstand (E5010B)

CAUTION Do not push a granite bed when carrying the spinstand. Push a frame from rear side or pull handles on the front panel of the spinstand. Pushing the granite bed may cause getting out of joint.

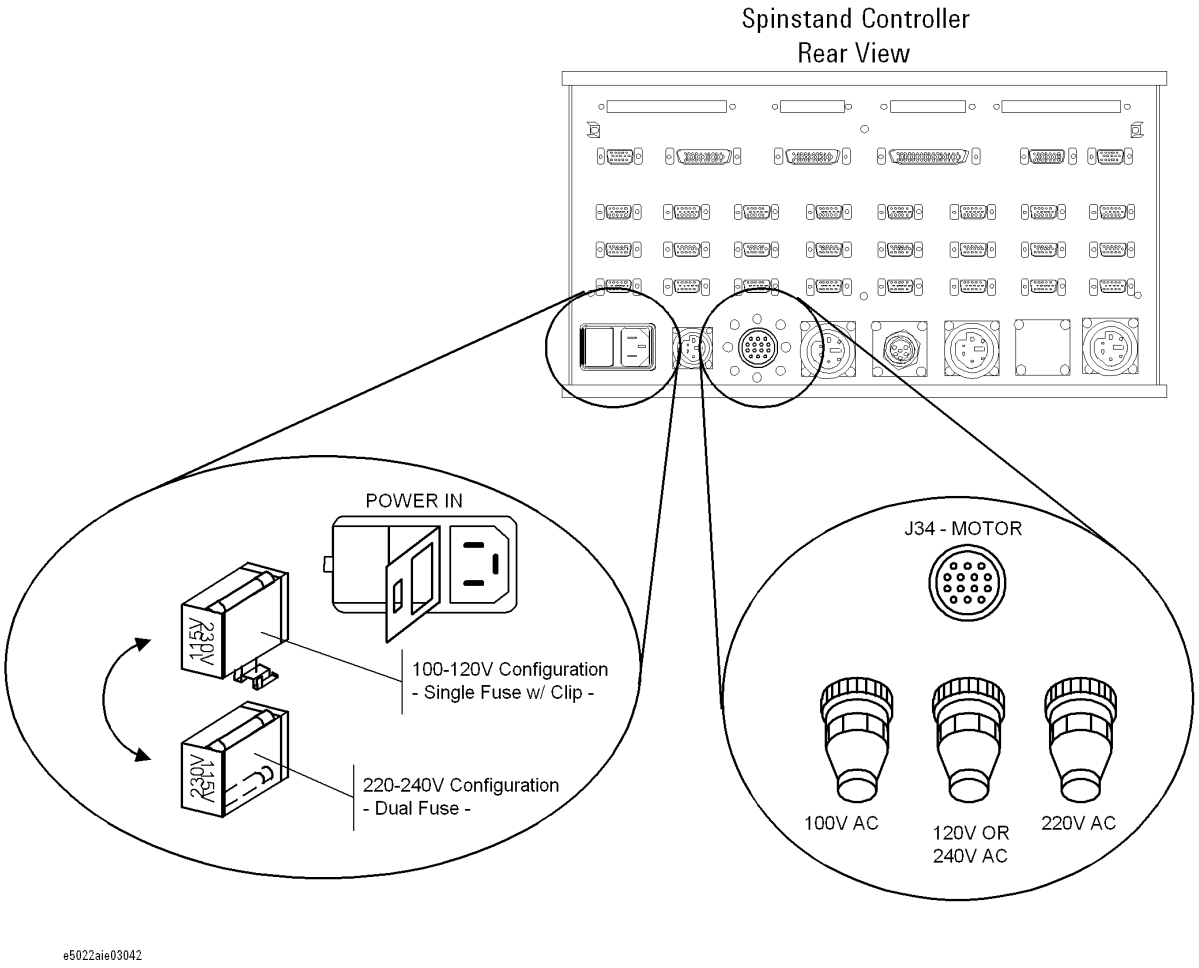
Setting Line Voltage for the Spinstand (E5010B)

The line voltage to the spinstand is set by a combination of the fuse holder and the voltage setting plug. Refer to Table 3-13 to set a correct combination.

Table 3-13 Line Voltage Settings

Line Voltage (Nominal)	Applicable Voltage Range	Fuse Holder Direction	Fusing	Applicable Voltage Plug
100 Vac	87 - 110 Vac	“115V”	1×15 A 1×FUSE CLIP	“100V AC”
120 Vac	104.4 - 132 Vac	“115V”		“120 OR 240V AC”
220 Vac	191.4 - 242 Vac	“230V”	2×8 A	“220V AC”
230/240 Vac	207 - 264.5 Vac	“230V”		“120 OR 240V AC”

Figure 3-10 **Setting Line Voltage for the Spinstand (E5010B)**

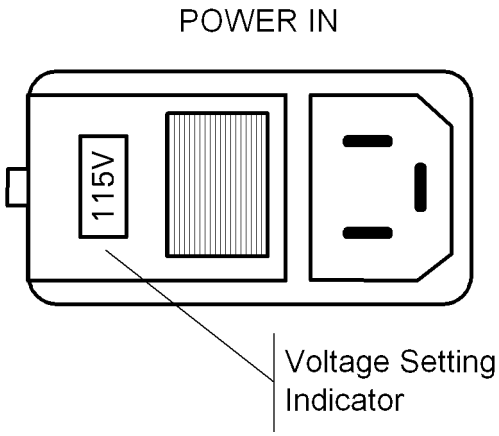


Setting the Fuse Holder

Open the rear panel of the spinstand and check the voltage setting indicator on the POWER IN connector as shown in Figure 3-11.

If the indication does not match with your line voltage, follow these steps to change the fuse box.

Figure 3-11 **Voltage Setting Indicator on POWER IN Connector**



To set to 115 V

Step 7. Open the rear panel of the spinstand.

Step 8. Remove the power cable from the spinstand controller.

Step 9. Open the fuse box cover.

Step 10. Attach the fuse clip to the fuse box and insert a 15-ampere fuse.

Step 11. Close the cover.

Step 12. Plug in the power cable.

To set to 230 V

Step 1. Open the rear panel of the spinstand.

Step 2. Remove the power cable from the spinstand controller.

Step 3. Open the fuse box cover.

Step 4. Remove the fuse clip from the fuse box and insert two 8-ampere fuses.

Step 5. Close the cover.

Step 6. Plug in the power cable.

Setting the Voltage Setting Plug

There are three types of voltage setting plugs. Open the rear panel of the spinstand and check that a correct plug that meets your power supply is plugged in at the J34 MOTOR connector of the spinstand controller. If the plug is not correct, replace it with a correct one.

Release the Granite Bed

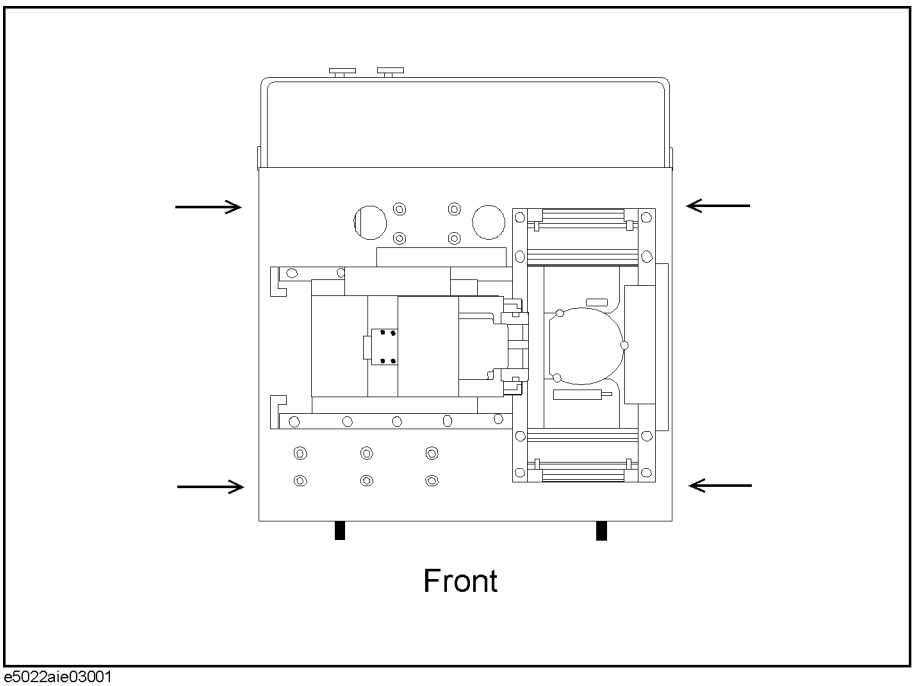
To prevent from being damaged during transportation, the spinstand is shipped with its various parts fixed. Release those parts as follows, and then set up the spinstand.

The granite bed which is located on the top of the spinstand is fixed to the spinstand frame with four bolts as shown in Figure 3-12. Loosen the bolts by following these steps.

Tools Required

- #2 Phillips screwdriver
- 11/16” wrench (less than 10 mm thick)
- 5/16” hex key

Figure 3-12 **Locations of the Granite Bed Fixing Bolts (Top View)**



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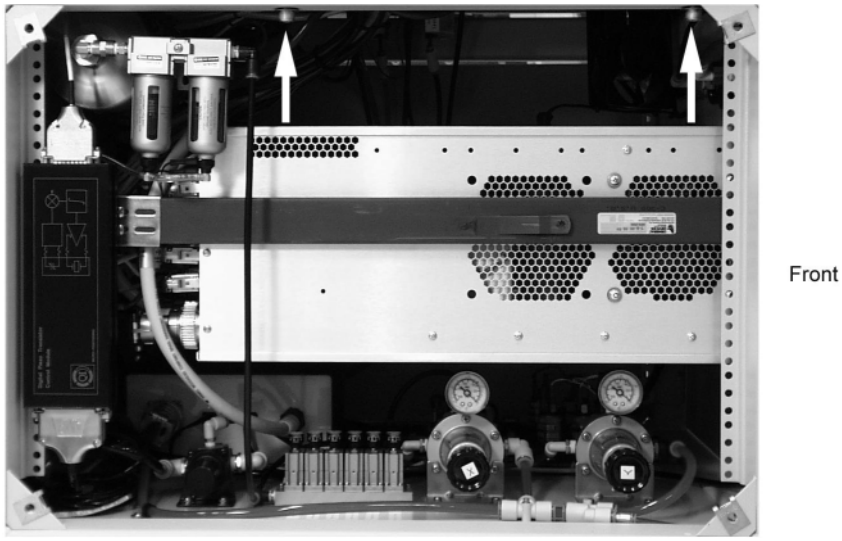
Step 1. Remove side panels on both sides of the spinstand with a #2 Phillips screwdriver.

Figure 3-13 **Locations of the Granite Bed Fixing Bolts (Side View)**



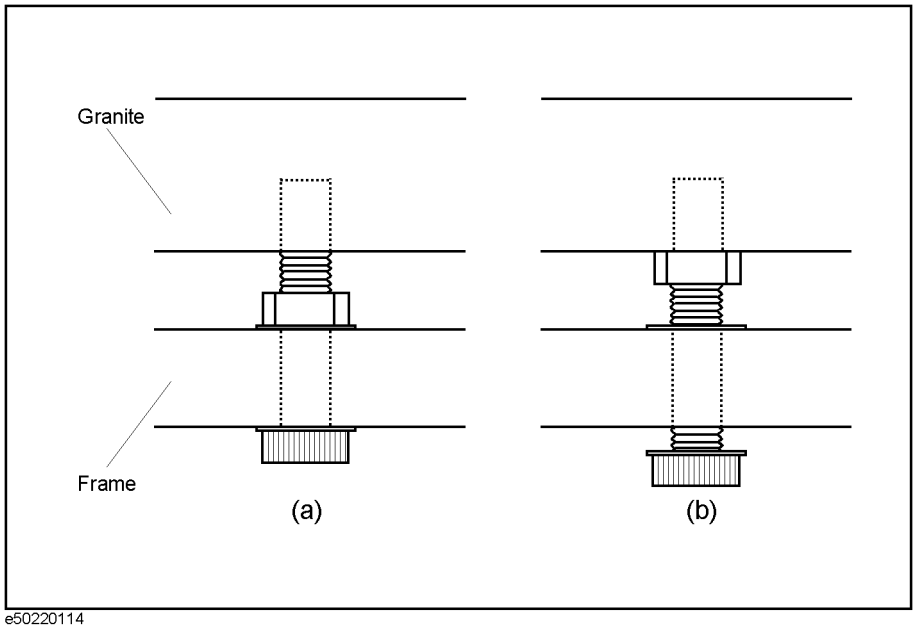
Step 2. Loosen a nut which locks the bolt to the spinstand frame using a 11/16” wrench.

Step 3. Holding the nut not to rotate with the wrench, rotate the bolt about 1 cm away with a 5/16” hex key to release the granite bed from the spinstand frame.

NOTE Do not remove away the bolt from the granite bed. If removed, the bed will drop off from the joint.

Step 4. Lock the nut to the granite bed side to fix the bolt as shown in Figure 3-14 (b).

Figure 3-14



Step 5. Repeat the above steps for the rest of three bolts.

Step 6. Restore the side panels on the spinstand.

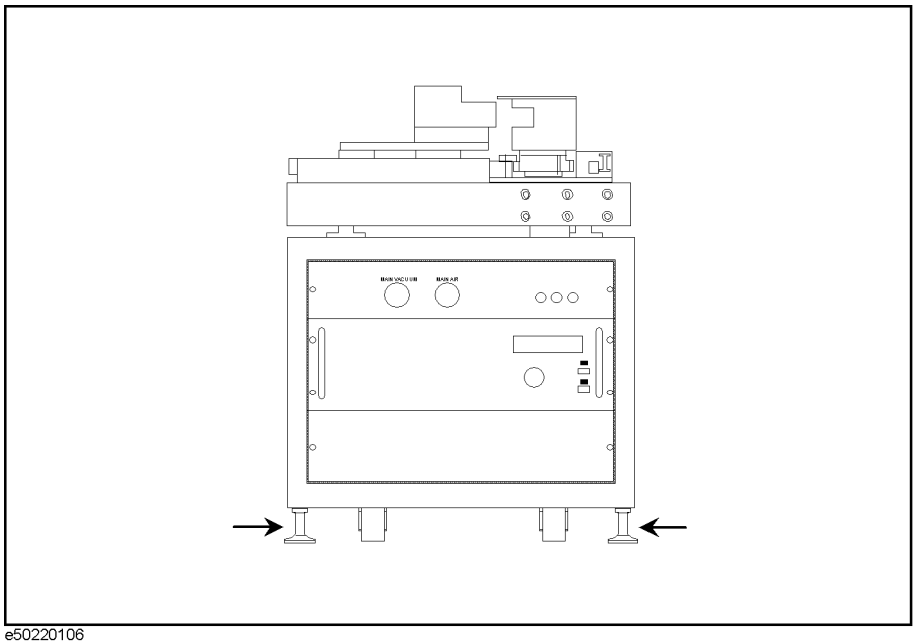
Fixing the Spinstand

Follow these steps to fix the spinstand feet shown in Figure 3-15.

Tools Required

- Level
- Large monkey wrench
- 9/16” wrench

Figure 3-15 **Leveling the spinstand**



Step 7. Loosen securing nuts of the spinstand feet with a large monkey wrench.

Step 8. Using your fingers but not any tools, turn counterclockwise each spinstand foot to extend it until reaching the floor.

Step 9. Put a level on the granite bed in parallel position to the front panel.

Step 10. Extend two front feet about 1 cm maintaining horizontal level using a 9/16” wrench.

Step 11. Change the level direction to orthogonal position to the front panel.

Step 12. Extend one of the rear feet until the level is horizontally adjusted using the wrench.

Step 13. Using your fingers but not the wrench, extend the last rear foot until it reaches the floor.

Step 14. Check that all the feet evenly support the load

Step 15. Secure the feet by the securing nuts with the large monkey wrench.

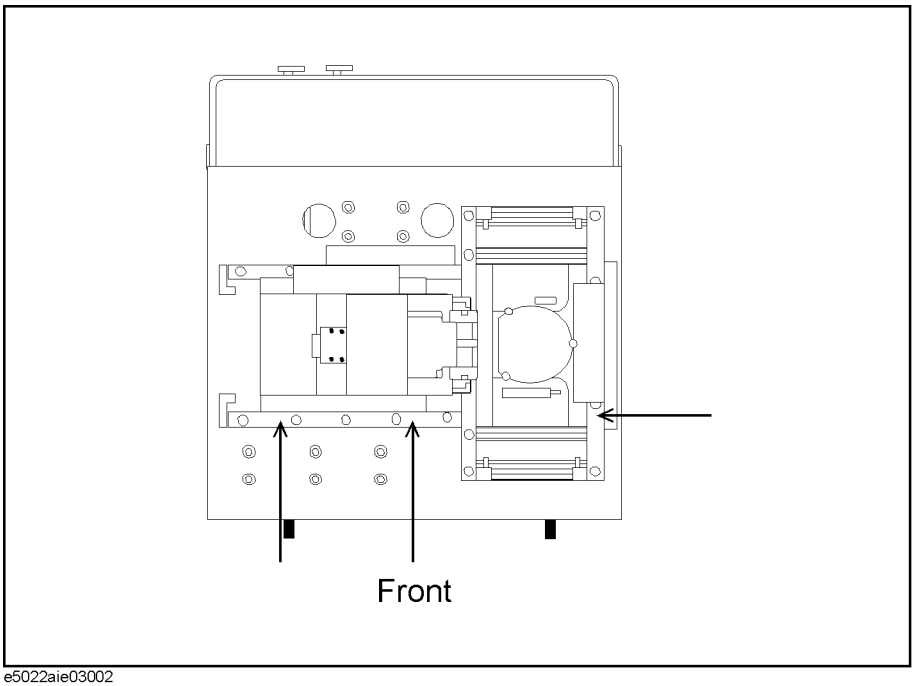
Removing the Air Stage Securing Screws

Tools Required

- 5/32” hex key

Step 1. Remove three screws that secure the air stages with a 5/32” hex key. The air stages are secured at the points shown in Figure 3-16.

Figure 3-16 **Locations of the Air Stage Fixing Screws**



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NOTE Store the screws in a safe place. They will be used to secure the air stages again when you send back it for repairing or relocate the system.

Removing the Spindle Cover / Attaching the Shroud Assembly

The spindle is secured by a spindle cover to prevent the spindle from rotate accidentally.

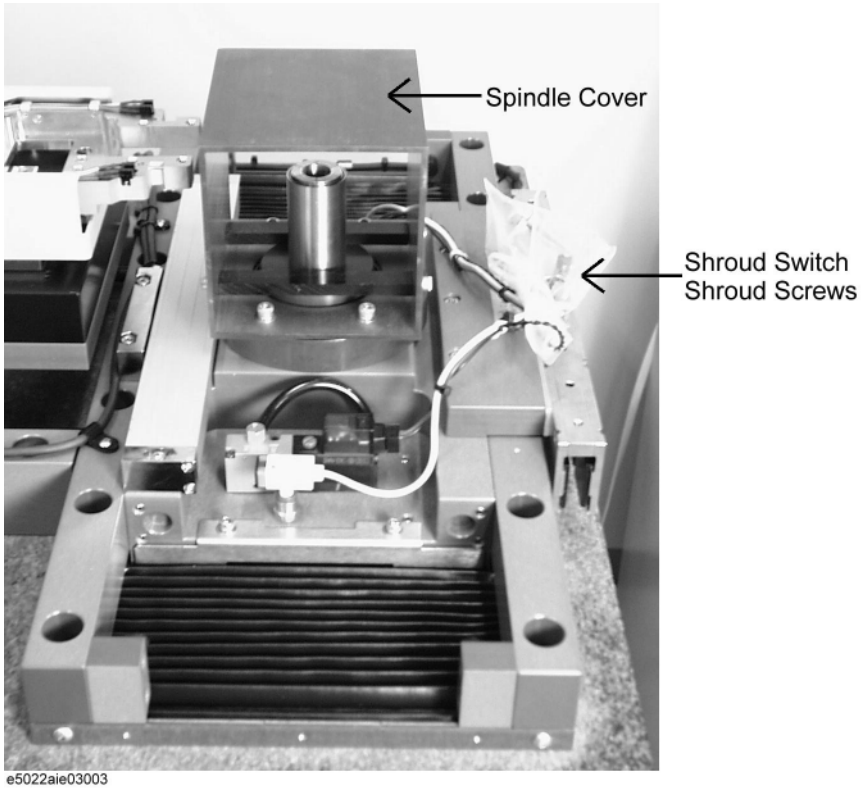
Tools Required

- 5/32” hex key
- T10 TORX® screwdriver

Step 1. Remove a spindle cover by unscrewing four screws with 5/32” hex key.

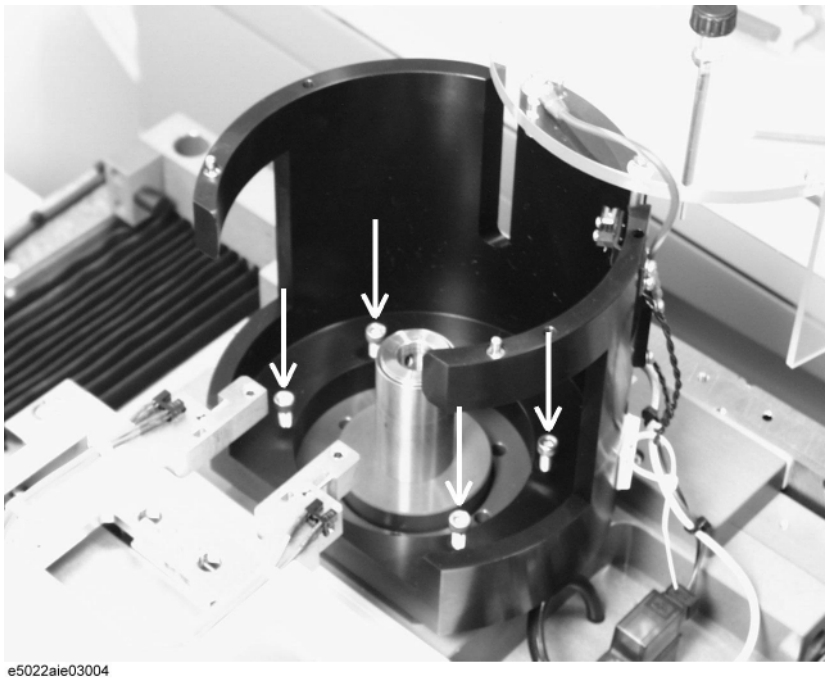
CAUTION Do not rotate the spindle without providing compressed air to the spinstand. Doing so may cause fatal damage of the spindle assembly.

Figure 3-17



Step 2. Attach the shroud assembly in place of the spindle cover with four screws furnished to the spinstand using a 5/32” hex key.

Figure 3-18 **Locations of the Screws**



Step 3. Attach the shroud switch to the shroud with two screws furnished to the spinstand using a T10 TORX® screwdriver.

Step 4. Fix the shroud switch cable to a cable tie mount on the shroud with a cable tie.

Providing Air Connection

The spinstand requires two kinds of air lines: compressed air and drawing air (vacuum). The compressed air is used for air bearing of the air spindle, floating air stages, and loading/unloading head. The vacuum air is used to lock down the air stages, and to clamp medium.

NOTE Procedures for connecting air lines described in this document assumes that all the facilities required for the lines are prepared at the installation site. For details on air equipment, refer to Chapter 2, “Site Preparation.”

NOTE Make sure that air is operated within the limits of system use. Failure to do so could result system malfunction and unwanted accident.

Specification of Compressed Air

Use compressed air that meets the following specification.

Table 3-14 Specification of Compressed Air

Air Pressure Range	0.67 MPa to 0.73 MPa (98 psi to 105 psi)
Temperature Range	Room temperature ±2.8°C (Room temperature ±5°F)
Minimum Flow Rate	0.7×10^{-3} m^3/s (1.48 scfm)
Tube Diameter	3/8 inch or 10 mm*1

*1. Use an adapter tube (Agilent p/n E5010-60004) furnished with the system to connect a 10-mm tube.

Specification of Vacuum

Use vacuum that meets the following specification.

Table 3-15 Specification of Vacuum

Minimum Air Pressure	–70 kPa (–20.5 inHg)
Minimum Flow Rate	0.22×10^{-3} m^3/s (0.47 scfm)
Tube Diameter	3/8 inch or 10 mm*1

*1. Use an adapter tube (Agilent p/n E5010-60004) furnished with the system to connect a 10-mm tube.

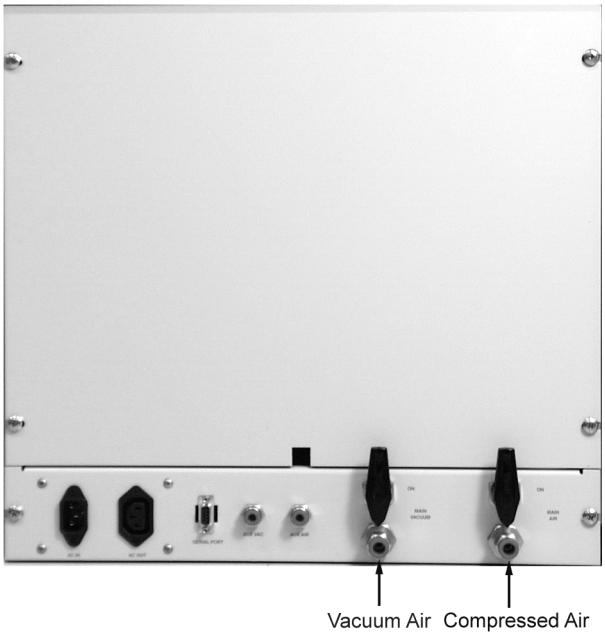
Connecting Air Tubes

Follow these steps to connect the air tubes.

Step 1. Connect the compressed air tube to the air connector marked “MAIN AIR” on the rear panel of the spinstand.

Step 2. Connect the vacuum air tube to the air connector marked “MAIN VACUUM” on the rear panel of the spinstand.

Figure 3-19 **Air Tube Connection**



NOTE The spinstand air connectors fit 3/8 inch air tubes. Using the adapter tube furnished with the system (Agilent p/n E5010-60004) allows you to connect them 10-mm air tubes.

Step 3. Turn both MAIN AIR and MAIN VACUUM valves on.

Step 4. Confirm the reading of the main air gauge which is on the front panel is within the range shown in Table 3-14.

Step 5. Confirm the reading of the vacuum gauge on the front panel is within the range shown in Table 3-15.

Connecting Spinstand (E5010B)

Figure 3-20 Cable Connection (E5010B Spinstand)

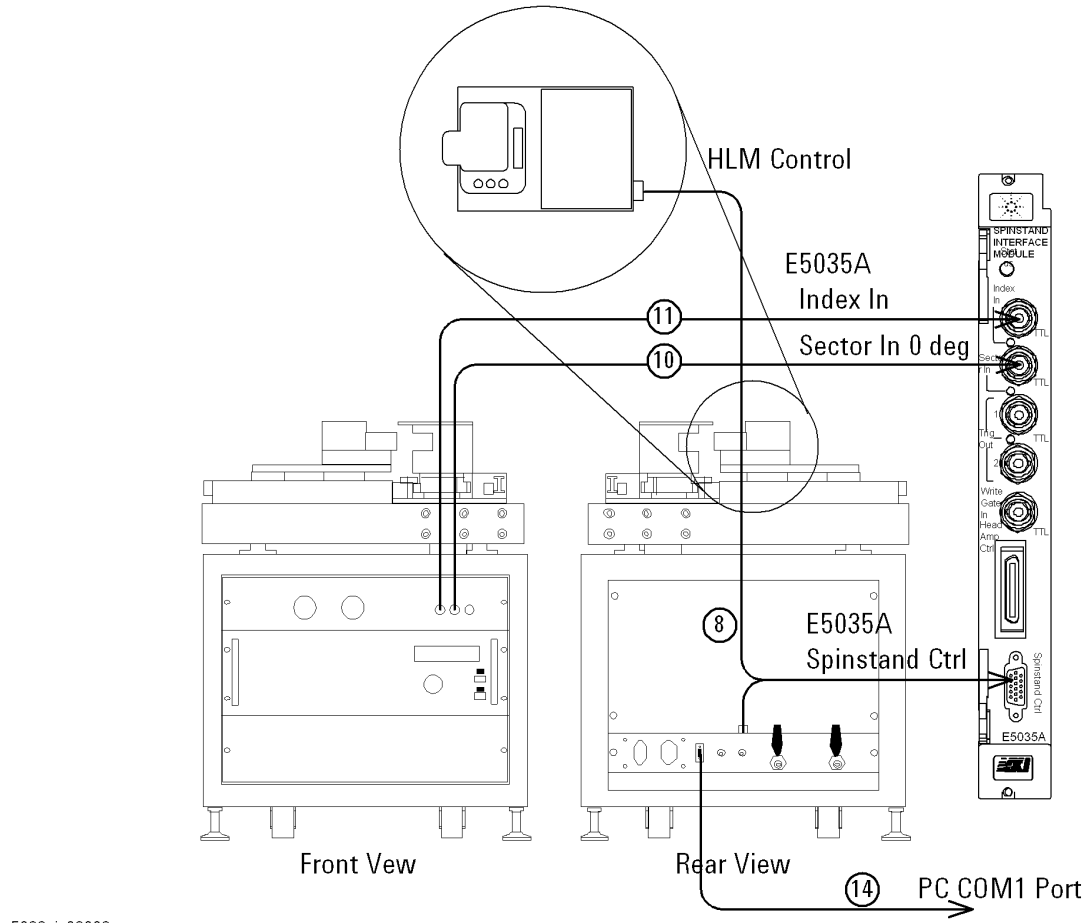


Table 3-16 Cable Connection (E5010B Spinstand)

No.	Description	Connection		Part Number
8	Spinstand-HLM Interconnection Cable*1	E5035A “Spinstand Ctrl”	Spinstand Rear Panel (already connected inside)	E5022-61601
		HLM Control		
10	BNC(m)-BNC(m) Cable	E5035A “Index In”	Spinstand “Index Out”	E5022-61608
11	BNC(m)-BNC(m) Cable	E5035A “Sector In”	Spinstand “Sector 0°”	E5022-61609
14	Serial Cable	Spinstand Serial Port	PC COM1 Port	E5022-61628

*1. This cable is already connected to the piezo control unit and the piezo power supply unit inside of the spinstand.

Figure 3-21 **Cable Connection (Head Amplifier Cables)**

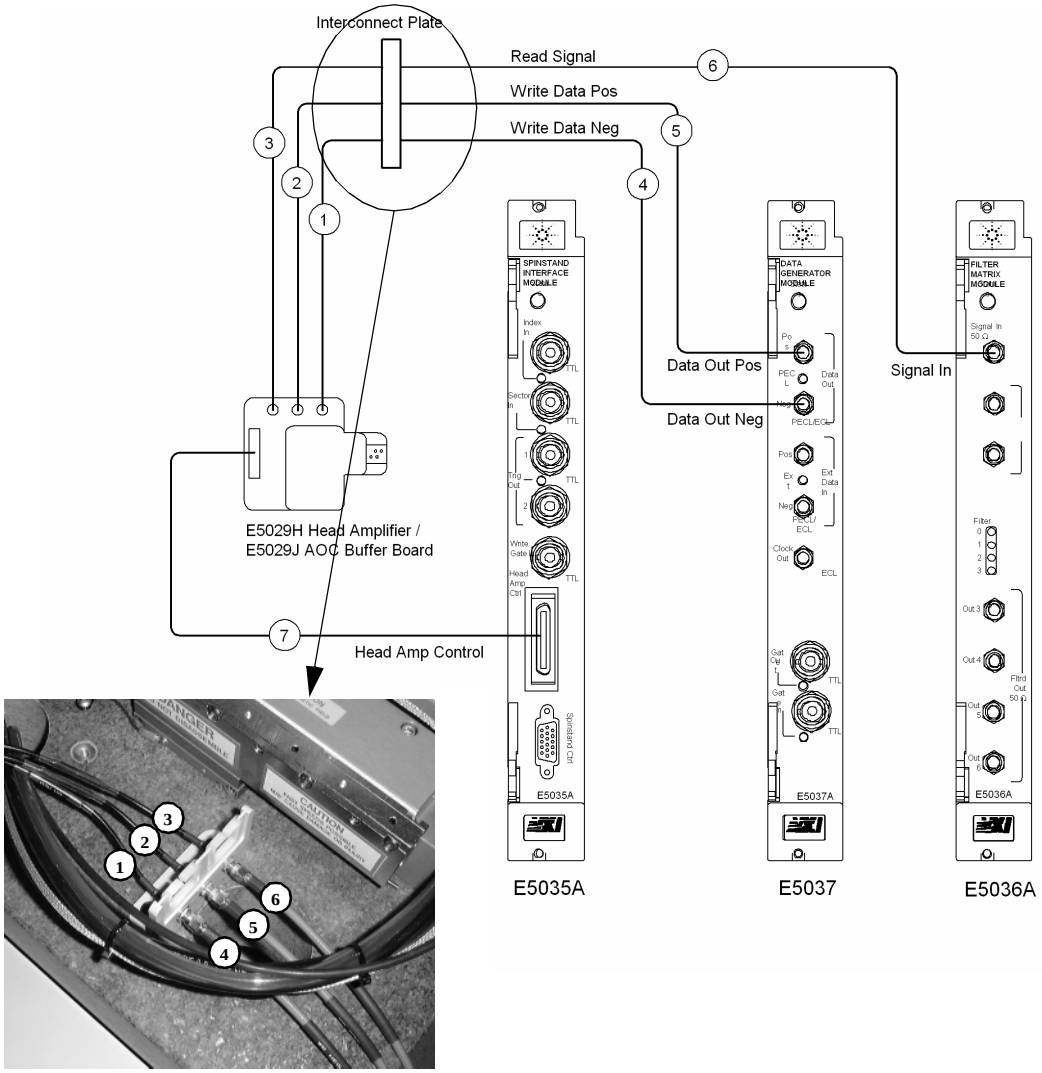


Table 3-17 **Cable Connection (Head Amplifier Cables)**

No.	Description	Connection		Part Number
1	SMA(m)-SMA(m) Cable*1	Head Amp “Write Data Neg”	Interconnect Plate	E5022-61639
2	SMA(m)-SMA(m) Cable*1	Head Amp “Write Data Pos”	Interconnect Plate	E5022-61638
3	SMA(m)-SMA(m) Cable*1	Head Amp “Read Signal”	Interconnect Plate	E5022-61637
4	SMC(f)-SMC(f) Cable	Interconnect Plate*2	E5037A “Data Out Neg”	E5022-61622
5	SMC(f)-SMC(f) Cable	Interconnect Plate*2	E5037A “Data Out Pos”	E5022-61620
6	SMC(f)-SMC(f) Cable	Interconnect Plate*2	E5036A “Signal In”	E5022-61618
7	Head Amp Control Cable	Head Amp Control	E5035A “Head Amp Ctrl”	E5022-61640

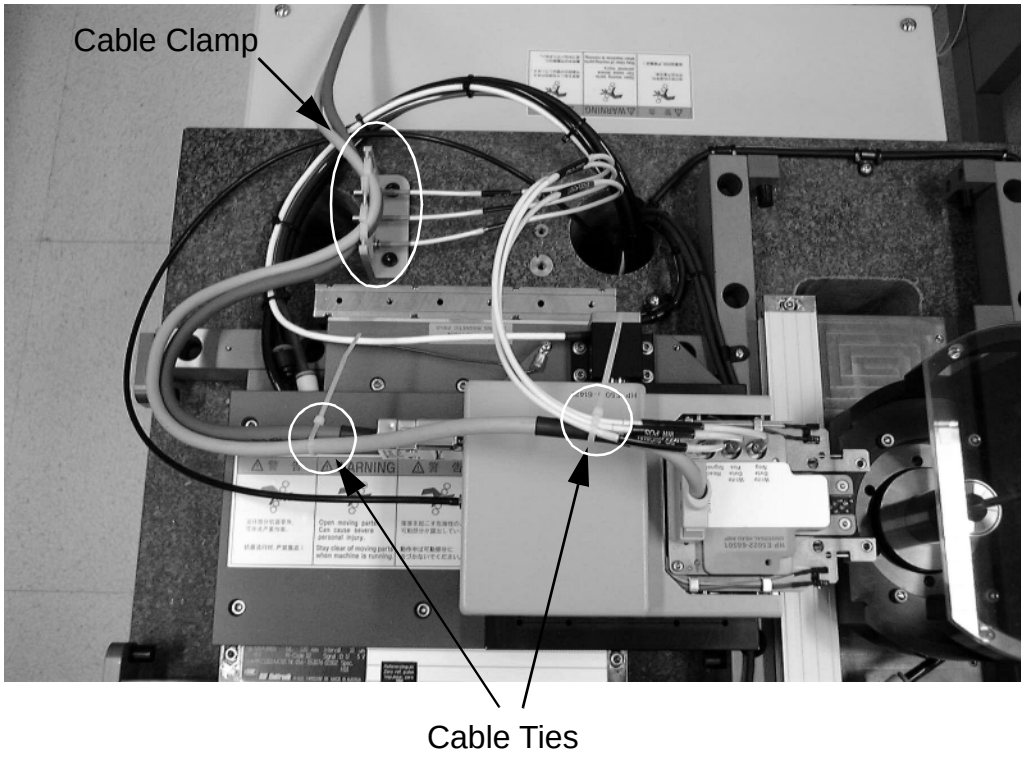
*1. These cables are already connected to the interconnect plate on the granite bed.
*2. Connect to the appropriate connectors with referring to the cable markers on the SMA(m)-SMA(m) cables.

Wiring Arrangement around the Air Stages

There are some cables wired around the air stages on the granite bed. The cables must be arranged so that they don't obstruct moving of the air stages.

Refer to Figure 3-22 for the cable wiring and where to attach cable ties.

Figure 3-22 **Cable Wiring Arrangement**



Installing the Spinstand (E5011A)

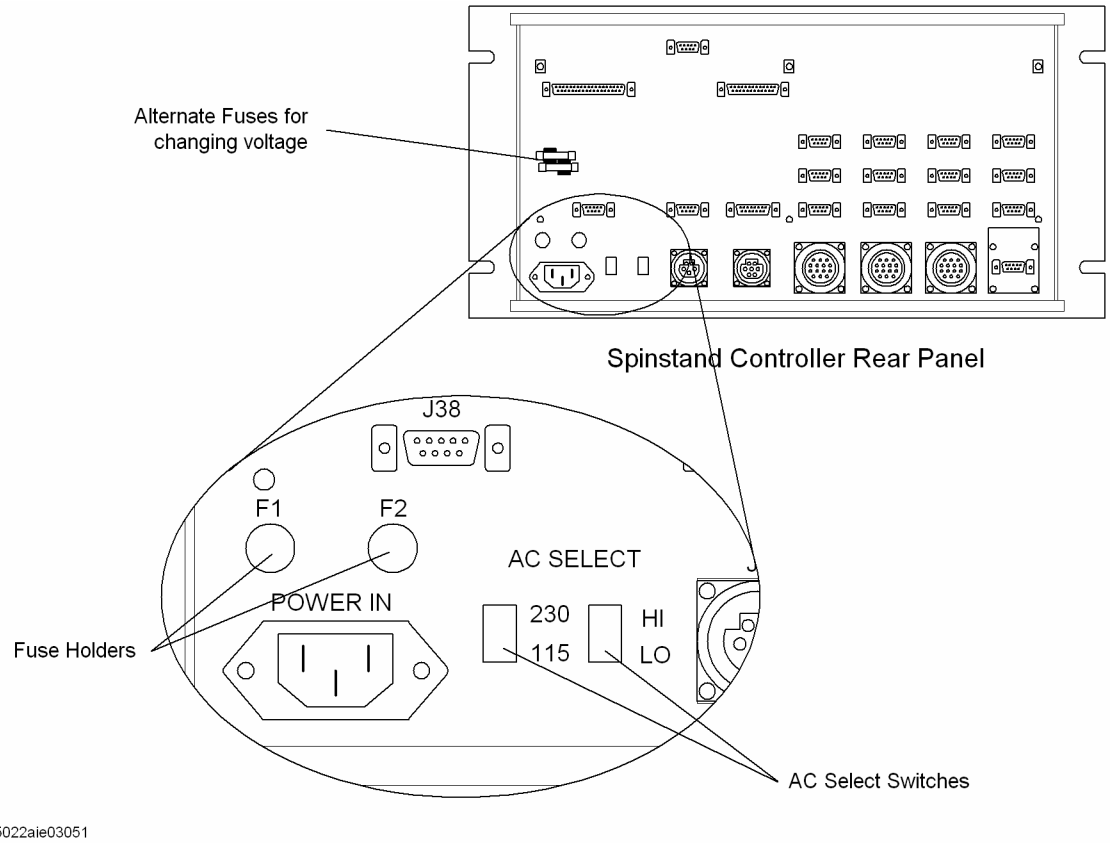
Setting Line Voltage for the Spinstand (E5011A)

The line voltage to the spinstand is set by a combination of two AC SELECT switches on the spinstand controller rear panel. Refer to Table 3-18 to set a correct combination.

Table 3-18 Line Voltage Settings

Line Voltage (Nominal)	Applicable Voltage Range	AC SELECT Switch	Fusing	
			F1	F2
100 Vac	90 - 110 Vac	115 / LO	Dummy Slug	15 A
120 Vac	108 - 132 Vac	115 / HI	Dummy Slug	15 A
220 Vac	198 - 242 Vac	230 / LO	8 A	8 A
240 Vac	216 - 264 Vac	230 / HI	8 A	8 A

Figure 3-23 Setting Line Voltage for the Spinstand (E5011A)



e5022aie03051

Locate the Spinstand

Locate the spinstand on level and stable place.

Tools Required

- Level

CAUTION

Do not stack the spinstand on the controller.

Do not put the controller vertically.

Connecting Spinstand and Controller

Connect the spinstand and controller with referring to Table 3-19.

Figure 3-24 **Cable Connection between Spinstand and Controller**

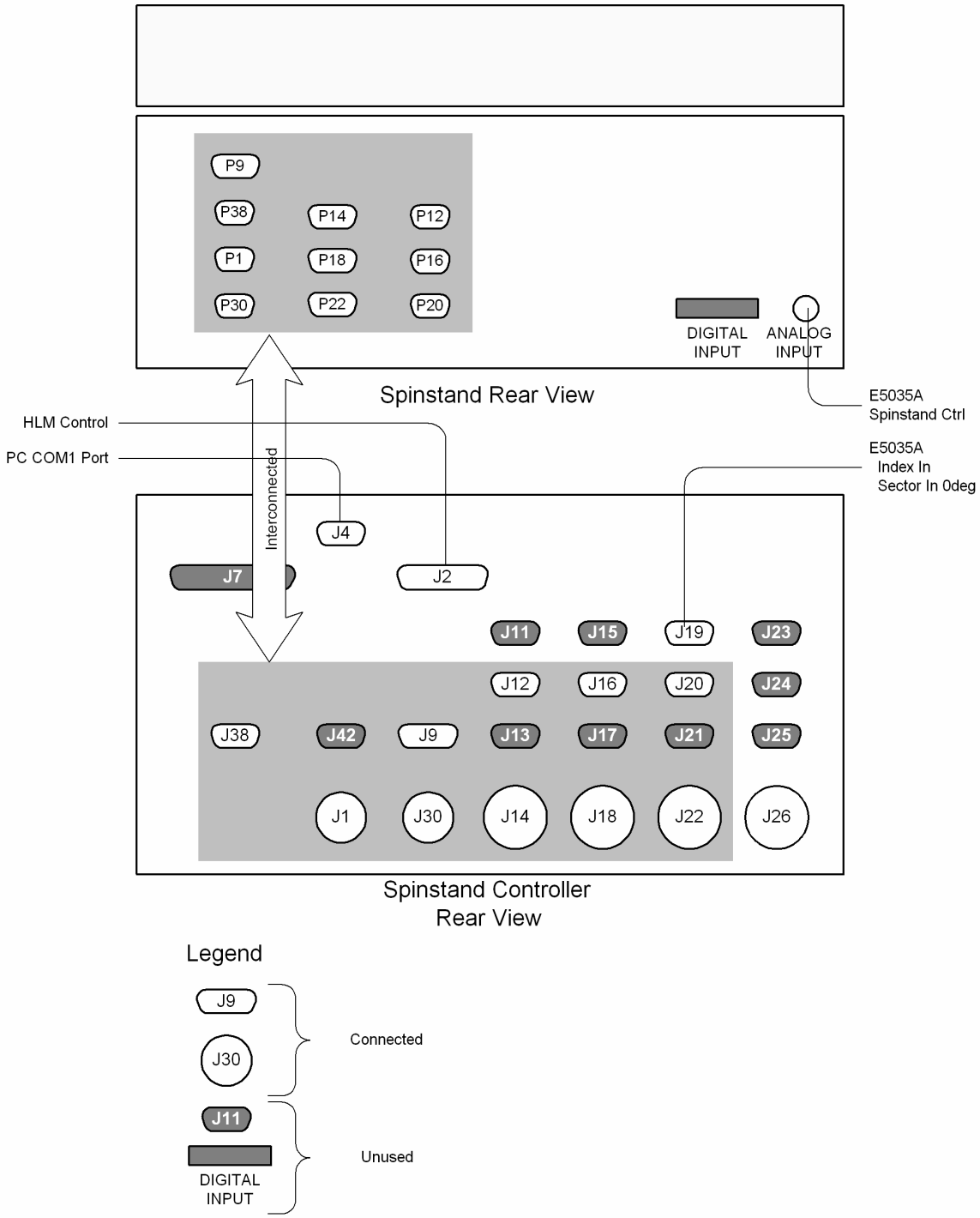


Table 3-19 Cable Connection between Spinstand and Controller

Connection		Part Number
Spinstand	**Controller**	
P14	J14	E5011-65721
P18	J18	E5011-65721
P12	J12	E5011-65722
P16	J16	E5011-65722
P22	J22	E5011-65723
P20	J20	E5011-65724
P9	J9	E5011-65725
P1	J1	E5011-65726
P38	J38	E5011-65727
P30	J30	E5011-65730
-	J26*1	

*1. External Emergency Switch Connector

Removing the Air Bearing Securing Screws

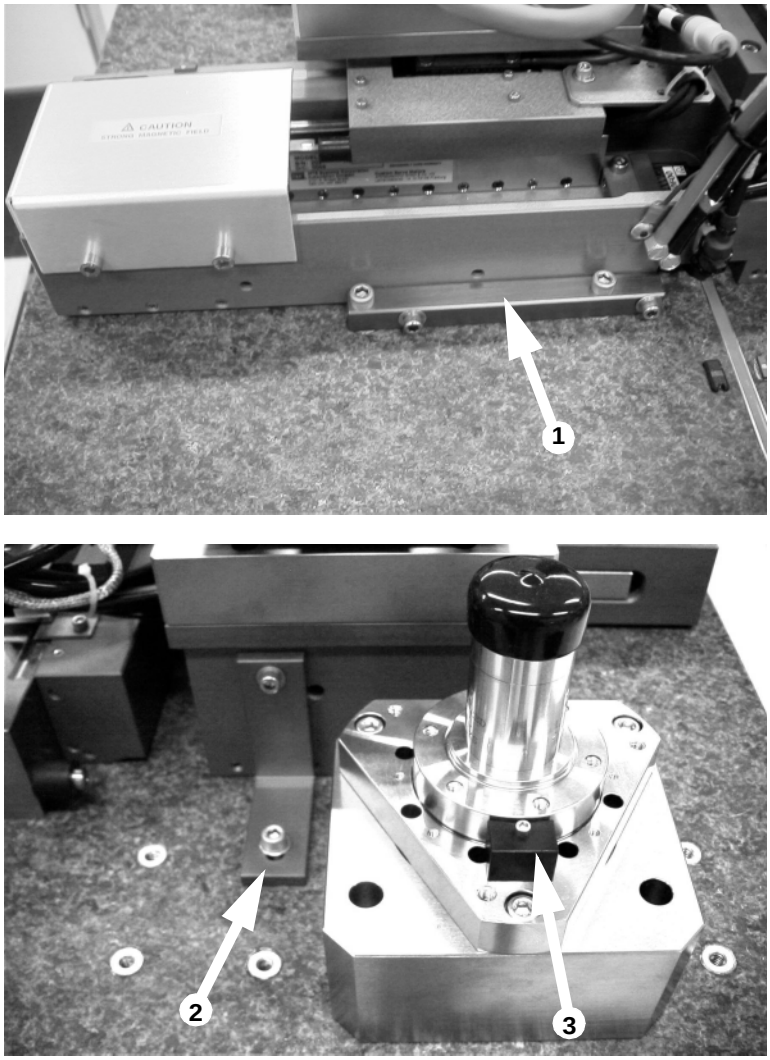
Tools Required

- 5/32” hex key
- 3/16” hex key
- 3/32” hex key

Step 1. Referring to Figure 3-25, remove two shipping brackets 1 and 2 with 3/16” and 5/32” hex keys.

Step 2. Remove a air spindle shipping brackets 3 with 3/32” hex key.

Figure 3-25 Locations of the Shipping Brackets



CAUTION Do not rotate the spindle without providing compressed air to the spinstand. Doing so may cause fatal damage of the spindle assembly.

CAUTION Do not provide compressed air until removing shipping brackets.

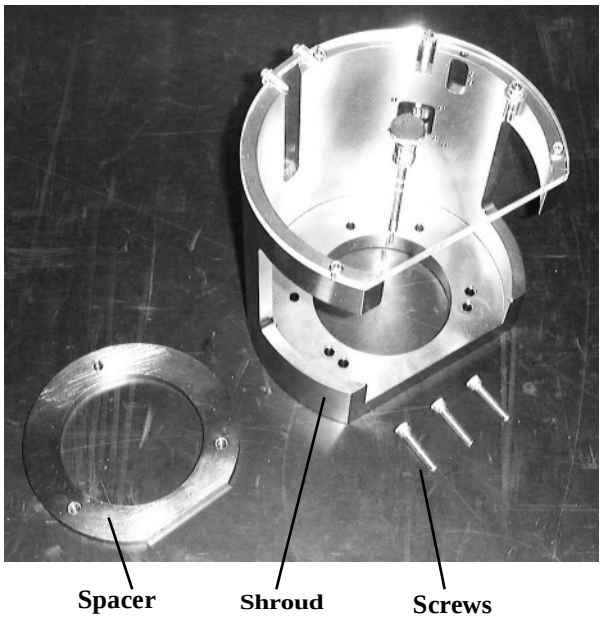
NOTE Store the shipping brackets and screws in a safe place. They will be used to secure the air stages again when you send back it for repairing or relocate the system.

Attaching the Shroud Assembly

Tools Required

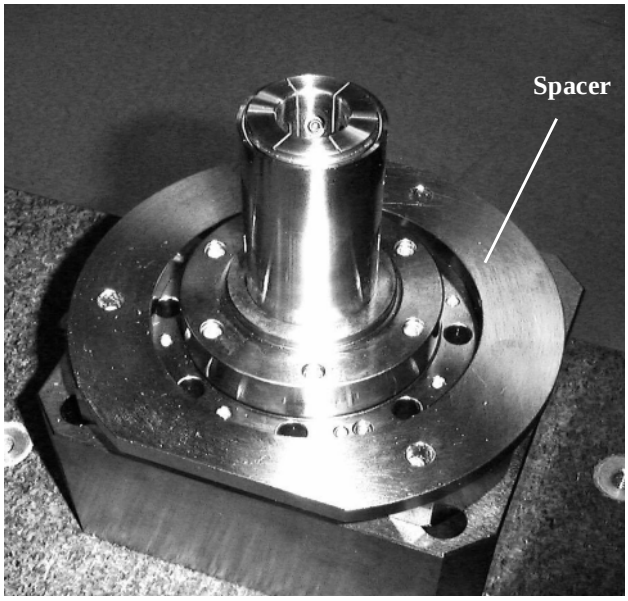
- 5/32” hex key
- T10 TORX® screwdriver

Figure 3-26 Shroud Assembly



Step 1. Put a spacer on the spindle assembly as shown in Figure 3-27.

Figure 3-27 **Shroud Spacer**



Step 2. Attach the shroud assembly with three screws furnished to the spinstand using a 5/32” hex key.

Figure 3-28 **Locations of the Screws**

Step 3. Attach the shroud switch to the shroud with two screws furnished to the spinstand using a T10 TORX® screwdriver.

Step 4. Fix the shroud switch cable to a cable tie mount on the shroud with a cable tie.

Providing Air Connection

The spinstand requires two kinds of air lines: compressed air and drawing air (vacuum). The compressed air is used for air bearing of the air spindle, floating air stages, and loading/unloading head. The vacuum air is used to lock down the air stages, and to clamp medium.

NOTE Procedures for connecting air lines described in this document assumes that all the facilities required for the lines are prepared at the installation site. For details on air equipment, refer to Chapter 2, “Site Preparation.”

NOTE Make sure that air is operated within the limits of system use. Failure to do so could result system malfunction and unwanted accident.

Specification of Compressed Air

Use compressed air that meets the following specification.

Table 3-20 Specification of Compressed Air

Air Pressure Range	620 kPa (90 psi) minimum
Temperature Range	Room Temperature ±2.8 °C (Room Temperature ±5 °F)
Minimum Flow Rate	0.75×10^{-3} m^3/s (2.72 m^3/h, 1.6 scfm)
Tube Diameter	9.5 mm (3/8”)*1

*1. Use an adapter tube (Agilent p/n E5010-60004) furnished with the system to connect a 10-mm tube.

Specification of Vacuum

Use vacuum that meets the following specification.

Table 3-21 Specification of Vacuum

Minimum Air Pressure	–70 kPa (–20.5 inHg, –521 mmHg)
Minimum Flow Rate	0.22×10^{-3} m^3/s (0.79 m^3/h, 0.47 scfm)
Tube Diameter	9.5 mm (3/8”)*1

*1. Use an adapter tube (Agilent p/n E5010-60004) furnished with the system to connect a 10-mm tube.

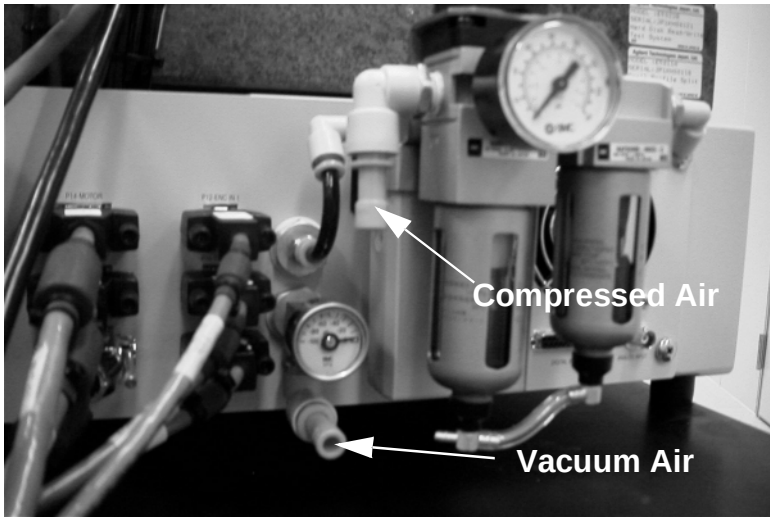
Connecting Air Tubes

Follow these steps to connect the air tubes.

Step 1. Connect the compressed air tube to the air connector on the rear panel of the spinstand as shown in Figure 3-29.

Step 2. Connect the vacuum air tube to the air connector on the rear panel of the spinstand as shown in Figure 3-29.

Figure 3-29 **Air Tube Connection**



NOTE The spinstand air connectors fit 9.5 mm (3/8”) air tubes. Using the adapter tube furnished with the system (Agilent p/n E5010-60004) allows you to connect them 10-mm air tubes.

CAUTION Do not apply compressed air to the vacuum air inlet. Doing so may cause damage to the vacuum indicator.

Step 3. Confirm the reading of the main air gauge which is on the front panel is within the range shown in Table 3-20.

Step 4. Confirm the reading of the vacuum gauge on the front panel is within the range shown in Table 3-21.

Connecting Spinstand (E5011A)

Figure 3-30 Cable Connection (E5011A Spinstand)

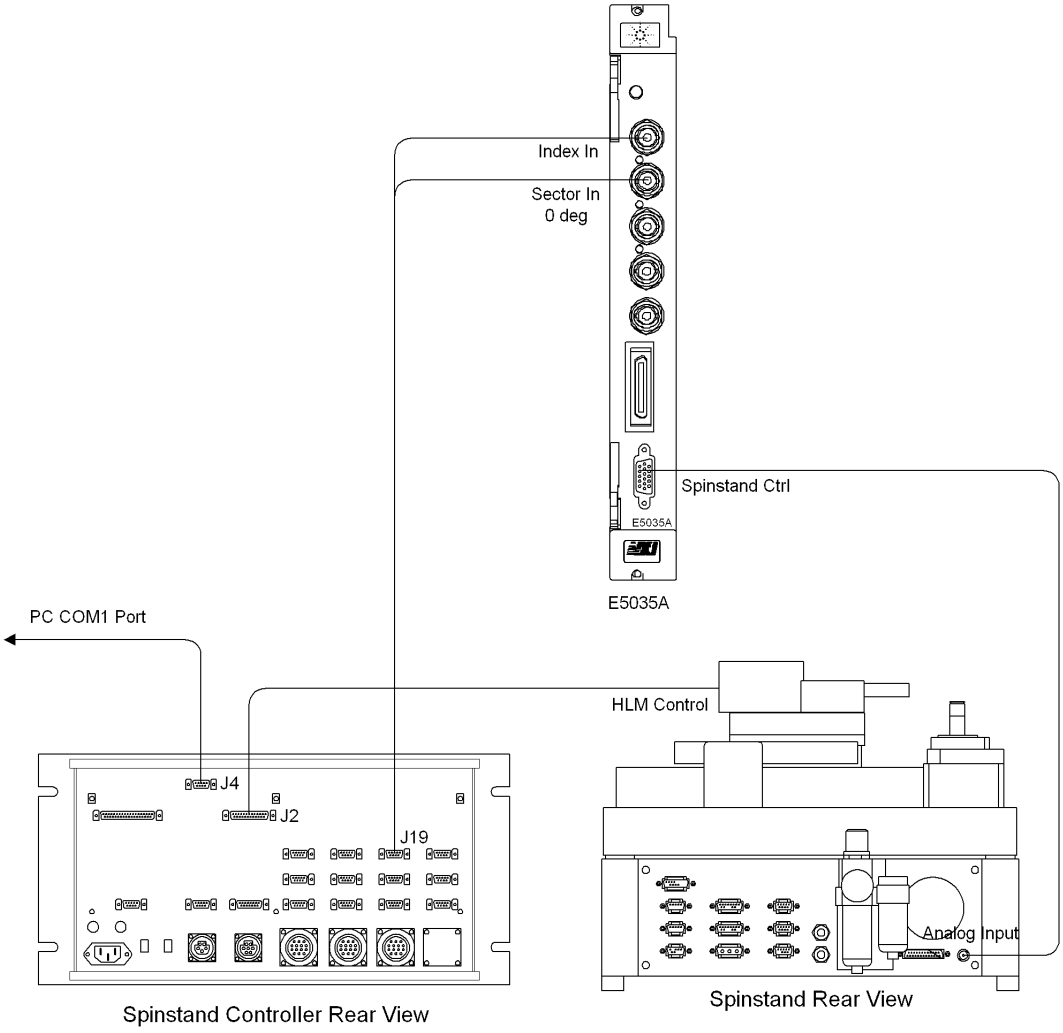


Table 3-22 Cable Connection (E5011A Spinstand)

No.	Description	Connection		Part Number
8	Spinstand-HLM Interconnection Cable*1	E5035A “Spinstand Ctrl”	Spinstand Rear Panel (already connected inside)	E5022-61601
		HLM Control		
10	BNC(m)-BNC(m) Cable	E5035A “Index In”	Spinstand “Index Out”	E5022-61608
11	BNC(m)-BNC(m) Cable	E5035A “Sector In”	Spinstand “Sector 0°”	E5022-61609
14	Serial Cable	Spinstand Serial Port	PC COM1 Port	E5022-61628

*1.This cable is already connected to the piezo control unit and the piezo power supply unit inside of the spinstand.

Figure 3-31 Cable Connection (Head Amplifier Cables)

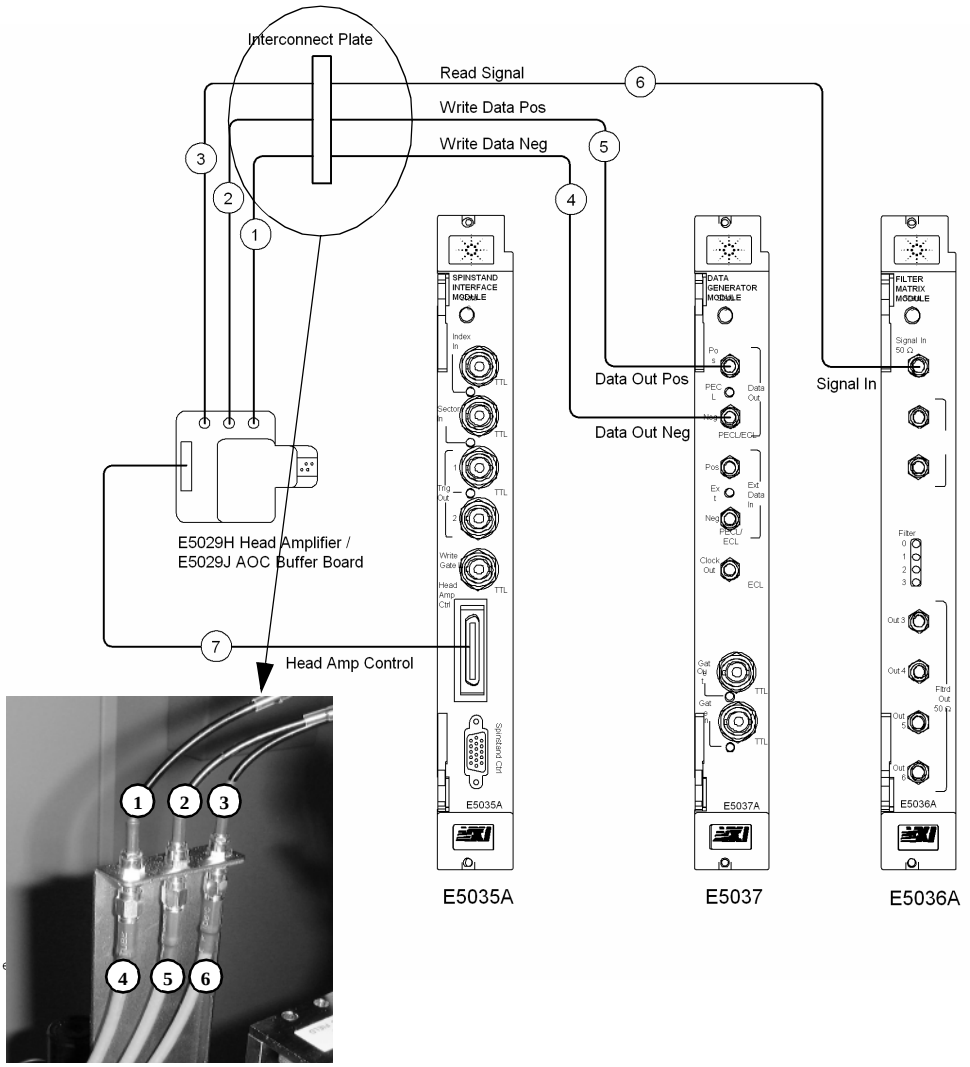


Table 3-23 Cable Connection (Head Amplifier Cables)

No.	Description	Connection		Part Number
1	SMA(m)-SMA(m) Cable*1	Head Amp “Write Data Neg”	Interconnect Plate	E5022-61639
2	SMA(m)-SMA(m) Cable*1	Head Amp “Write Data Pos”	Interconnect Plate	E5022-61638
3	SMA(m)-SMA(m) Cable*1	Head Amp “Read Signal”	Interconnect Plate	E5022-61637
4	SMC(f)-SMC(f) Cable	Interconnect Plate*2	E5037A “Data Out Neg”	E5022-61622
5	SMC(f)-SMC(f) Cable	Interconnect Plate*2	E5037A “Data Out Pos”	E5022-61620
6	SMC(f)-SMC(f) Cable	Interconnect Plate*2	E5036A “Signal In”	E5022-61618
7	Head Amp Control Cable	Head Amp “Control”	E5035A “Head Amp Ctrl”	E5022-61643

*1. These cables are already connected to the interconnect plate on the spinstand.
*2. Connect to the appropriate connectors with referring to the cable markers on the SMA(m)-SMA(m) cables.

Connecting Power Cables

In this step, you connect power cables of the spinstand and those of the instruments.

CAUTION Before you turn on the E5022A/B, make sure that the line voltage for each instrument is set correctly. See “Setting Line Voltage” on page 33 for each instrument for instructions on how to set the line voltage.

NOTE Procedures for connecting the power cable described in this document assumes that all the facilities required for the power are prepared at the installation site. For details on power equipment, refer to “Power Supply Requirements” on page 23.

Connecting the Instruments to Power Source

When Using the System Rack

Connect all the instrument power cables to the PDU (Power Distribution Unit) inside the system rack, and then connect the system rack power cable to the power source.

When Not Using the System Rack

Connect each instrument power cable to the power source at your site individually.

NOTE If you want to use the system out of the original specification at your purchase, refer to the “Setting Line Voltage” on page 33.

Connecting the Spinstand to Power Source

Connect the spinstand to the power source at your site using the furnished power cable.

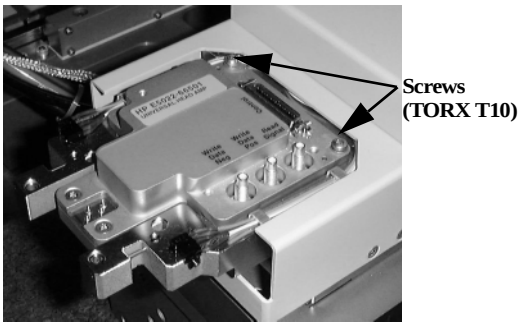
Attaching and Connecting the Head Amplifier

Tools Required

- T10 TORX® screwdriver
- Torque wrench, 6mm / 3.5 kg·m (Agilent P/N E5010-65208)

Step 1. Attach the Head Amplifier E5029H on the HLM with two screws using a T10 TORX® screwdriver.

Figure 3-32 **Attaching Head Amplifier**

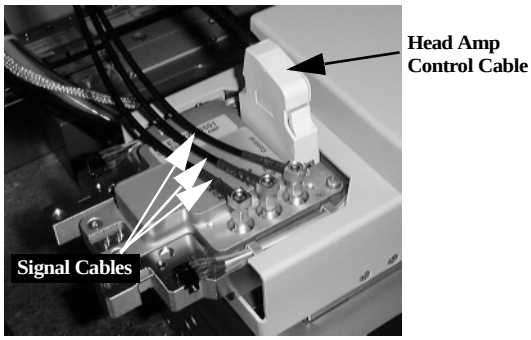


Step 2. Connect three SMA signal cables using the torque wrench.

CAUTION Do not overtighten the SMA connector. The SMA connector is easy to break.

NOTE The locations of connectors on the head amplifier may differ from the figure above depending on the amplifier that you use. Check the connector names printed on the head amplifier when connecting the cables.

Figure 3-33 **Connecting Head Amplifier**



Step 3. Connect the head amp control cable to the head amplifier.

CAUTION Turn off the VXI mainframe power when you connect or disconnect the head amplifier control cable. Connecting or disconnecting the cable while the VXI mainframe power is on may damage to the head amplifier.