

# Z1800-Series

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## Site Preparation Guide



Teradyne, Inc.  
Assembly Test/Walnut Creek  
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# Z1800-SERIES SITE PREPARATION GUIDE

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## Manual History

### **Fourth Edition, September 1998**

Z1888 and Z1803 information added

### **Third Edition, January 1997**

Change to vacuum requirement

### **Second Edition, May 1996**

Changes to tester power requirements in the "Plan the Tester Site" and "Z1800-Series Site Preparation Checklist" sections

### **First Edition, April 1996**

Additional copies of this manual may be obtained from Teradyne.

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## **Z1800-Series Site Preparation Checklist**

# Z1800-SERIES SITE PREPARATION GUIDE

The **Z1800-Series Site Preparation Guide** contains site requirements and system specifications for the Z1800-Series test systems and vacuum pump options. It also provides details for the installation of vacuum systems for one or many test systems.

The last page is a checklist for Teradyne customers and field personnel to help determine if the location is ready for a new tester installation.

Note: **Systems Currently in Production** Z1888, Z1884, Z1860-NB, and Z1803 Plus.

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## Planning the Tester Site

In a busy production environment, place the tester near the main flow of boards in the assembly line. The board repair and fixture storage areas should be located nearby. In low-to-medium production rate areas, provide ample room for carts containing board boxes and movement of product to and from the tester.

AC power cords for all testers are 15 feet long with an NEMA L5-30P connector. Locate your tester within 10 feet of a source of 47–63 Hz, single-phase AC power. In locations outside of the United States, adjust the line conditioner transformer to the local AC line voltage. The transformer has taps to accommodate incoming voltages between 100 and 240 VAC. Refer to your tester-specific system reference for information on adjusting the line conditioner taps.

Position your printer and computer close to the tester. The following is a list of Bosch Frame accessories/options for mounting the printer, the computer, the mouse or track ball, and other items. Dimensions shown will add to the overall system footprint. All options will fit within the specified Service Access boundary.

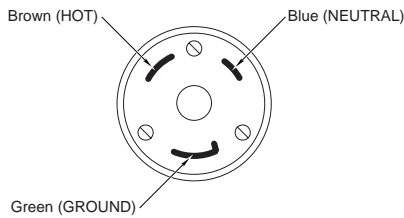
- Bosch Frame Tilt Option, PN 046-932-01
- Tabletop Extension (9 in. x 48 in., non-tilted), PN 046-937-01
- Tabletop Extension (9 in. x 48 in., 15-degree tilt), PN 046-937-02
- Tabletop Extension for Optional Bays (9 in. x 38 in.), PN 046-940-00
- Tabletop Extension for Mouse or Track Ball (9 in. x 15 in., non-tilted), PN 046-943-01
- Tabletop Extension for Mouse or Track Ball (9 in. x 15 in., tilted), PN 046-943-01
- Printer Shelf (8 in. x 14 in., tilted)
- Computer Mounting Frame
- Rear Shelf (9 in. x 48 in.)

If your plant has a central vacuum supply, locate your tester within 10 feet of a vacuum outlet. If your plant does not have a central vacuum supply, Teradyne's 41 CFM vacuum pump is available as an option.

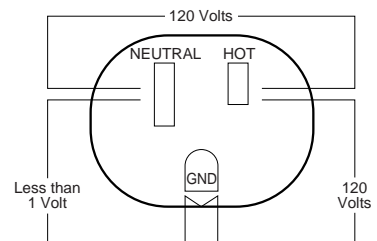
**General Specifications**

	Testers	Item Specified	Teradyne Provides
<b>AC MAINS</b>	<b>Z1860-NB, Z1880, Z1884, Z1888, Z1890</b>	100–240 VAC, 3.0 kVA, 3-wire, 50–60Hz (range of 47–63Hz), single-phase	<b>X</b>
	<b>Z1800, Z1803, Z1805, Z1808, Z1820, Z1840, Z1850, Z1860, Z1860 LCT, Z1866</b>	100–240 VAC, 1.8 kVA, 3-wire, 50–60Hz (range of 47–63Hz), single-phase	<b>X</b>
<b>AC MAINS Circuit Breaker</b>	<b>Z1860-NB, Z1880, Z1884, Z1888, Z1890</b>	<ul style="list-style-type: none"> <li>• 100–130 VAC requires minimum of 25A breaker</li> <li>• 200–240 VAC requires minimum of 13A breaker</li> </ul>	
	<b>Z1800, Z1803, Z1805, Z1808, Z1820, Z1840, Z1850, Z1860, Z1860 LCT, Z1866</b>	<ul style="list-style-type: none"> <li>• 100–130 VAC requires minimum of 15A breaker</li> <li>• 200–240 VAC requires minimum of 7.5A breaker</li> </ul>	
<b>AC MAINS Receptacle</b>	<b>All models</b>	NEMA L5-30R	
<b>AC MAINS Cord Connector</b>	<b>All models</b>	NEMA L5-30P	<b>X</b>
<b>Main AC Input Breaker</b>	<b>Z1803, Z1805, Z1808, Z1860-NB, Z1880, Z1884, Z1888, Z1890</b>	<ul style="list-style-type: none"> <li>• 100–130 VAC requires 25A breaker PN 090-156-00</li> <li>• 200–240 VAC requires 13A breaker PN 090-186-00</li> </ul>	<b>X</b>
	<b>Z1800, Z1820, Z1840, Z1850, Z1860, Z1866, Z1860 LCT</b>	<ul style="list-style-type: none"> <li>• 100–130 VAC requires 15A breaker PN 087-11X-00</li> <li>• 200–240 VAC requires 7.5A breaker PN 087-12X-00</li> </ul>	<b>X</b>
<b>Vacuum Supply</b>	<b>All models</b>	41 CFM pump capacity recommended. 1 in. NPT male thread within 10 ft. of system. Minimum vacuum level of 20 in. of mercury available to the system at all times.	
<b>Vacuum Pump Power</b>	<b>All models using Teradyne's 41 CFM vacuum pump</b>	Line voltage of 190–460 VAC, 2.2 kVA, 30 Amp, 4-wire, 50 or 60Hz, 3-phase.	
<b>Vacuum Power Connectors</b>	<b>All models</b>	<ul style="list-style-type: none"> <li>• Low Voltage 190–230 VAC uses 250 VAC, 20 Amp, 4-wire, NEMA L15-20P</li> <li>• High Voltage 380–460 VAC uses 480 VAC, 20 Amp, 4-wire, NEMA L16-20P</li> </ul>	<b>X</b>
<b>Environmental Requirements</b>	<b>All models</b>	Ambient temperature: 64°–89°F (18°–32°C) Relative humidity: 20–70% non-condensing Vacuum pump operating temperature range: 32°–122°F (0°–50°C)	

**AC MAINS Wiring Color Codes**



**AC Outlets on Tester**



**Z1890**

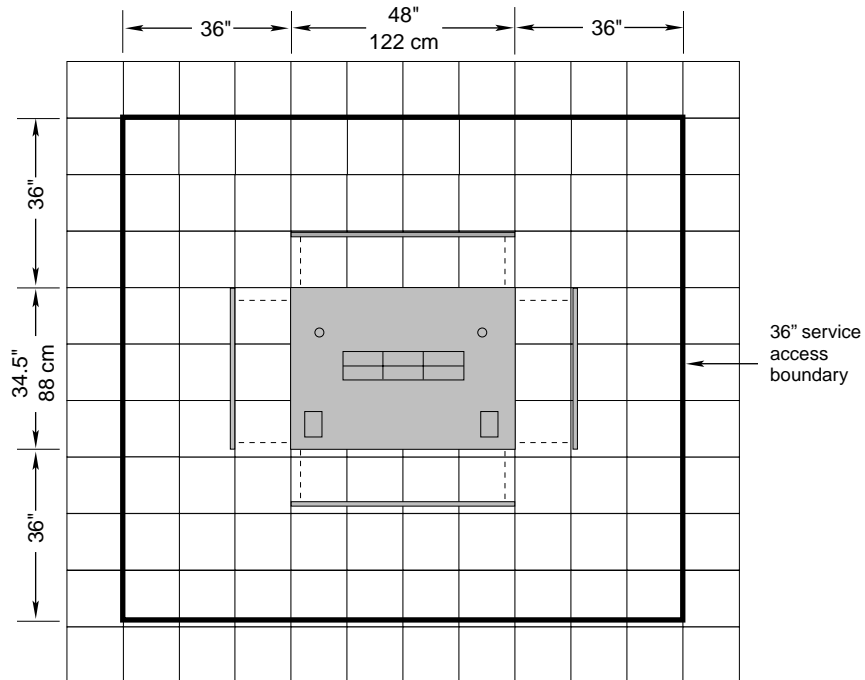
**Note:** Also see “PRISM-Z Option” on page 17 if applicable.

<b>Uncrated Dimensions</b>	32.5 in. (83 cm) H x 34.5 in. (88 cm) D x 48 in. (122 cm) L
<b>Crate Dimensions</b>	62 in. (158 cm) H x 45 in. (114 cm) D x 59 in. (150 cm) L
<b>Weight Crated</b> (approximate)	1225 lb (556 kg)
<b>Weight</b> (approximate)	1000 lb (454 kg)

Teradyne Provides

<b>AC MAINS</b>	100–240 VAC, 3.0 kVA, 3-wire, 50–60Hz (range of 47–63Hz), single-phase	<b>X</b>
<b>AC MAINS Circuit Breaker</b>	<ul style="list-style-type: none"> <li>• 100–130 VAC requires minimum of 25A breaker</li> <li>• 200–240 VAC requires minimum of 13A breaker</li> </ul>	
<b>AC MAINS Receptacle</b>	NEMA L5-30R	
<b>AC MAINS Cord Connector</b>	NEMA L5-30P	<b>X</b>
<b>Main AC Input Breaker</b>	<ul style="list-style-type: none"> <li>• 100–130 VAC requires 25A breaker PN 090-156-00</li> <li>• 200–240 VAC requires 13A breaker PN 090-186-00</li> </ul>	<b>X</b>
<b>Vacuum Supply</b>	41 CFM pump capacity recommended. 1 in. NPT male thread within 10 ft. of system. Minimum vacuum level of 20 in. of mercury available to the system at all times.	
<b>Vacuum Pump Power</b>	Line voltage of 190–460 VAC, 2.2 kVA, 30 Amp, 4-wire, 50 or 60Hz, 3-phase.	
<b>Vacuum Power Connectors</b>	<ul style="list-style-type: none"> <li>• Low Voltage 190–230 VAC uses 250 VAC, 20 Amp, 4-wire, NEMA L15-20P</li> <li>• High Voltage 380–460 VAC uses 480 VAC, 20 Amp, 4-wire, NEMA L16-20P</li> </ul>	<b>X</b>
<b>Environmental Requirements</b>	Ambient temperature: 64°–89°F (18°–32°C) Relative humidity: 20–70% non-condensing Vacuum pump operating temperature range: 32°–122°F (0°–50°C)	

**Floor Space Required**



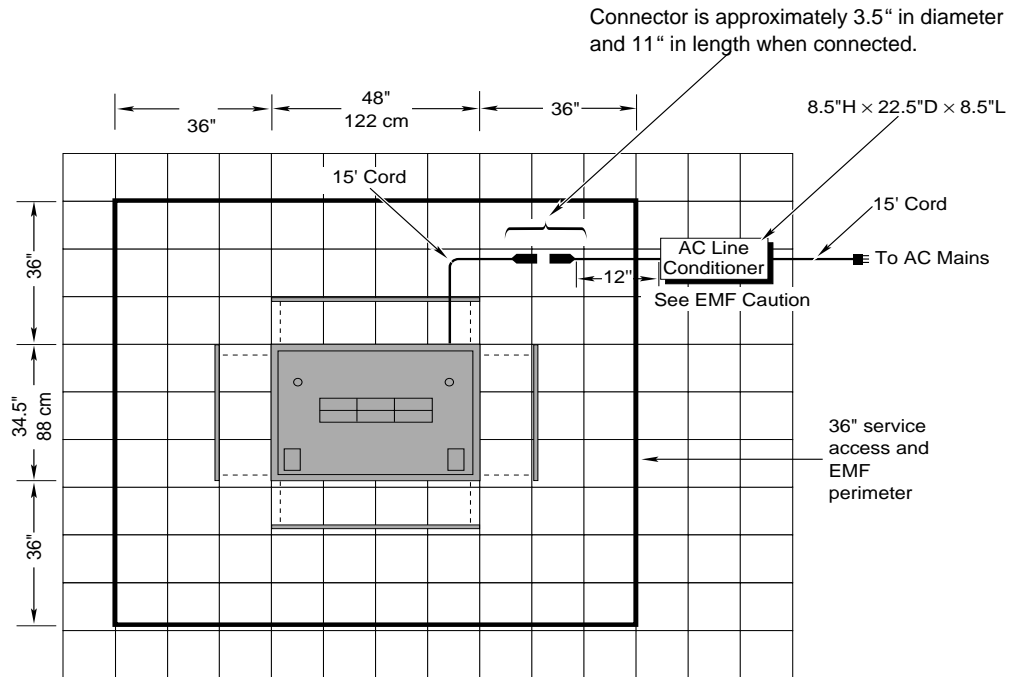
**Z1888**

<b>Uncrated Dimensions</b>	32.5 in. (83 cm) H x 34.5 in. (88 cm) D x 48 in. (122 cm) L
<b>Crate Dimensions</b>	62 in. (158 cm) H x 45 in. (114 cm) D x 59 in. (150 cm) L
<b>Weight Crated</b> (approximate)	1225 lb (556 kg)
<b>Weight</b> (approximate)	1000 lb (454 kg)

Teradyne Provides

<b>External AC Power Line Conditioner</b>	8.5 in. (21 cm) H x 22.5 in. (57 cm) D x 8.5 in. (21 cm) L	<b>X</b>
<b>AC MAINS</b>	100–240 VAC, 3.0 kVA, 3-wire, 50–60 Hz (range of 47–63 Hz), single-phase	<b>X</b>
<b>AC MAINS Circuit Breaker</b>	<ul style="list-style-type: none"> <li>• 100–130 VAC requires minimum of 25 A breaker</li> <li>• 200–240 VAC requires minimum of 13 A breaker</li> </ul>	
<b>AC MAINS Receptacle</b>	NEMA L5-30R	
<b>AC MAINS Cord Connector</b>	NEMA L5-30P	<b>X</b>
<b>Main AC Input Breaker</b>	<ul style="list-style-type: none"> <li>• 100–130 VAC requires 25 A breaker PN 090-156-00</li> <li>• 200–240 VAC requires 13 A breaker PN 090-186-00</li> </ul>	<b>X</b>
<b>Vacuum Supply</b>	41 CFM pump capacity recommended. 1 in. NPT male thread within 10 ft. of system. Minimum vacuum level of 20 in. of mercury available to the system at all times.	
<b>Vacuum Pump Power</b>	Line voltage of 190–460 VAC, 2.2 kVA, 30 Amp, 4-wire, 50 or 60 Hz, 3-phase.	
<b>Vacuum Power Connectors</b>	<ul style="list-style-type: none"> <li>• Low Voltage 190–230 VAC uses 250 VAC, 20 Amp, 4-wire, NEMA L15-20P</li> <li>• High Voltage 380–460 VAC uses 480 VAC, 20 Amp, 4-wire, NEMA L16-20P</li> </ul>	<b>X</b>
<b>Environmental Requirements</b>	Ambient temperature: 64°–89°F (18°–32°C) Relative humidity: 20–70% non-condensing Vacuum pump operating temperature range: 32°–122°F (0°–50°C)	

**Floor Space Required**



**Important:** The AC line conditioner must be a minimum of 36" from the system console. If it is within the 36" EMF service perimeter, degradation of analog (PRISM-Z) measurements may occur.



**Z1884**

**Important:** The Z1884 requires a forklift to remove it from the crate.

**Uncrated Dimensions**

**Test Head Bay:** 46.5 in. (118 cm) H x 49.5 in. (125 cm) D x 54.25 in. (138 cm) L

**Power Bay:** 35 in. (89 cm) H x 39.25 in. (99 cm) D x 24 in. (61 cm) L

**Crate Dimensions**

**Test Head Bay:** 60 in. (152 cm) H x 64 in. (163 cm) D x 68 in. (173 cm) L

**Power Bay:** 46 in. (117 cm) H x 31 in. (79 cm) D x 46 in. (117 cm) L

**Weight Crated** (approximate)

1800 lb (817 kg)

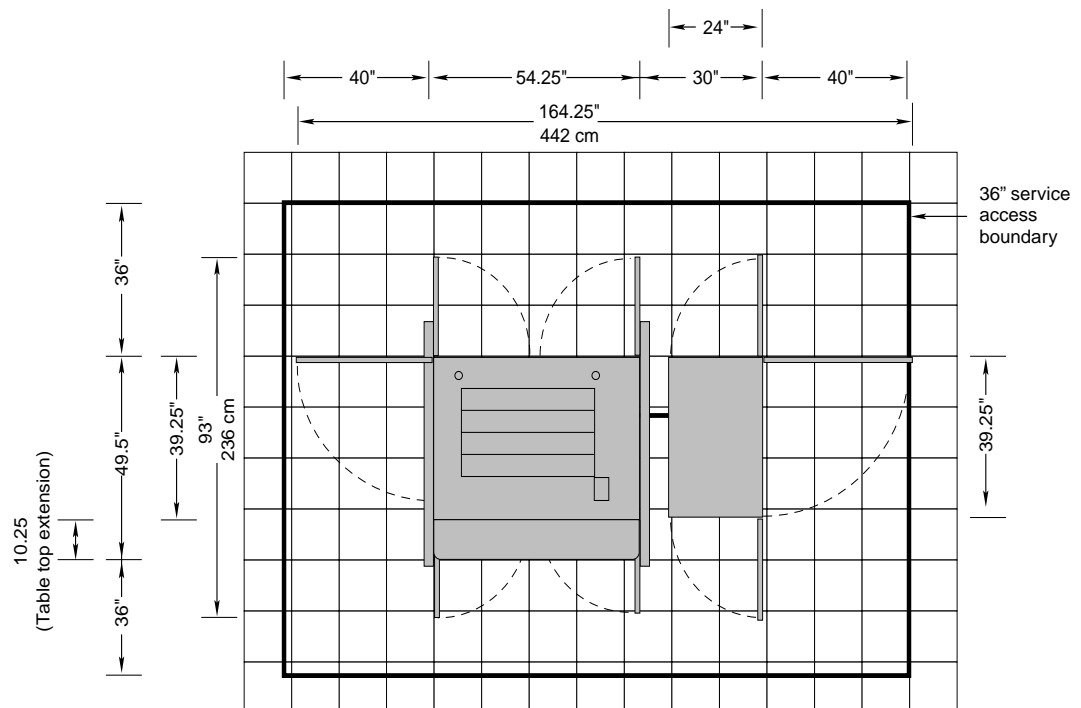
**Weight** (approximate)

1400 lb (635 kg)

Teradyne Provides

<b>AC MAINS</b>	100–240 VAC, 3.0 kVA, 3-wire, 50–60Hz (range of 47–63Hz), single-phase	<b>X</b>
<b>AC MAINS Circuit Breaker</b>	<ul style="list-style-type: none"> <li>• 100–130 VAC requires minimum of 25A breaker</li> <li>• 200–240 VAC requires minimum of 13A breaker</li> </ul>	
<b>AC MAINS Receptacle</b>	NEMA L5-30R	
<b>AC MAINS Cord Connector</b>	NEMA L5-30P	<b>X</b>
<b>Main AC Input Breaker</b>	<ul style="list-style-type: none"> <li>• 100–130 VAC requires 25A breaker PN 090-156-00</li> <li>• 200–240 VAC requires 13A breaker PN 090-186-00</li> </ul>	<b>X</b>
<b>Vacuum Supply</b>	41 CFM pump capacity recommended. 1 in. NPT male thread within 10 ft. of system. Minimum vacuum level of 20 in. of mercury available to the system at all times.	
<b>Vacuum Pump Power</b>	Line voltage of 190–460 VAC, 2.2 kVA, 30 Amp, 4-wire, 50 or 60Hz, 3-phase.	
<b>Vacuum Power Connectors</b>	<ul style="list-style-type: none"> <li>• Low Voltage 190–230 VAC uses 250 VAC, 20 Amp, 4-wire, NEMA L15-20P</li> <li>• High Voltage 380–460 VAC uses 480 VAC, 20 Amp, 4-wire, NEMA L16-20P</li> </ul>	<b>X</b>
<b>Environmental Requirements</b>	Ambient temperature: 64°–89°F (18°–32°C) Relative humidity: 20–70% non-condensing Vacuum pump operating temperature range: 32°–122°F (0°–50°C)	

**Floor Space Required**



**Z1880 Plus: Z1880-1 and Z1880-2**

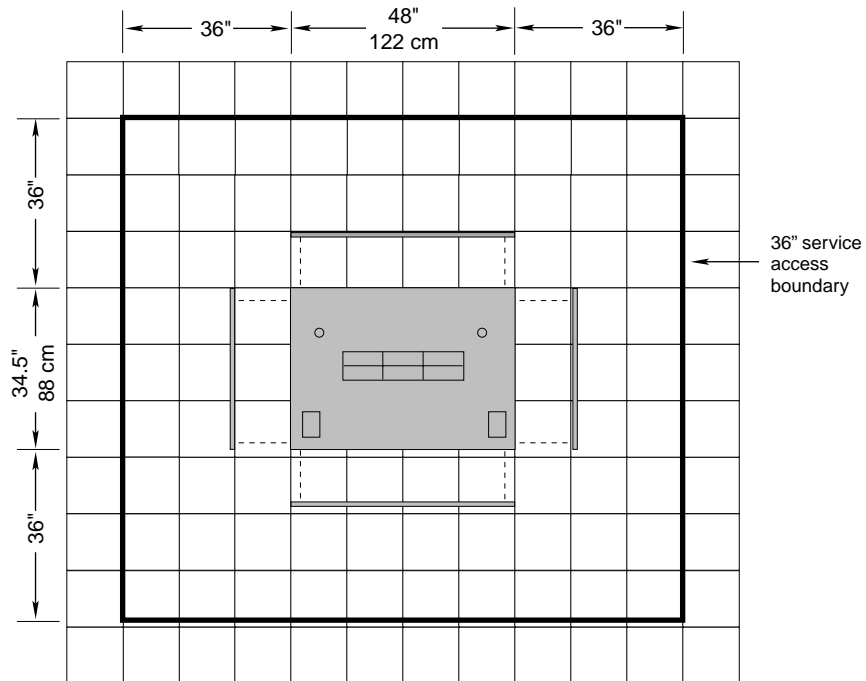
**Note:** Also see “PRISM-Z Option” on page 17 if applicable.

<b>Uncrated Dimensions</b>	32.5 in. (83 cm) H x 34.5 in. (88 cm) D x 48 in. (122 cm) L
<b>Crate Dimensions</b>	62 in. (158 cm) H x 45 in. (114 cm) D x 59 in. (150 cm) L
<b>Weight Crated</b> (approximate)	<b>Z1880-1:</b> 800 lb (364 kg) <b>Z1880-2:</b> 1225 lb (556 kg)
<b>Weight</b> (approximate)	<b>Z1880-1:</b> 600 lb (273 kg) <b>Z1880-2:</b> 1000 lb (454 kg)

Teradyne Provides

<b>AC MAINS</b>	100–240 VAC, 3.0 kVA, 3-wire, 50–60Hz (range of 47–63Hz), single-phase	<b>X</b>
<b>AC MAINS Circuit Breaker</b>	<ul style="list-style-type: none"> <li>• 100–130 VAC requires minimum of 25A breaker</li> <li>• 200–240 VAC requires minimum of 13A breaker</li> </ul>	
<b>AC MAINS Receptacle</b>	NEMA L5-30R	
<b>AC MAINS Cord Connector</b>	NEMA L5-30P	<b>X</b>
<b>Main AC Input Breaker</b>	<ul style="list-style-type: none"> <li>• 100–130 VAC requires 25A breaker PN 090-156-00</li> <li>• 200–240 VAC requires 13A breaker PN 090-186-00</li> </ul>	<b>X</b>
<b>Vacuum Supply</b>	41 CFM pump capacity recommended. 1 in. NPT male thread within 10 ft. of system. Minimum vacuum level of 20 in. of mercury available to the system at all times.	
<b>Vacuum Pump Power</b>	Line voltage of 190–460 VAC, 2.2 kVA, 30 Amp, 4-wire, 50 or 60Hz, 3-phase.	
<b>Vacuum Power Connectors</b>	<ul style="list-style-type: none"> <li>• Low Voltage 190–230 VAC uses 250 VAC, 20 Amp, 4-wire, NEMA L15-20P</li> <li>• High Voltage 380–460 VAC uses 480 VAC, 20 Amp, 4-wire, NEMA L16-20P</li> </ul>	<b>X</b>
<b>Environmental Requirements</b>	Ambient temperature: 64°–89°F (18°–32°C) Relative humidity: 20–70% non-condensing Vacuum pump operating temperature range: 32°–122°F (0°–50°C)	

**Floor Space Required**

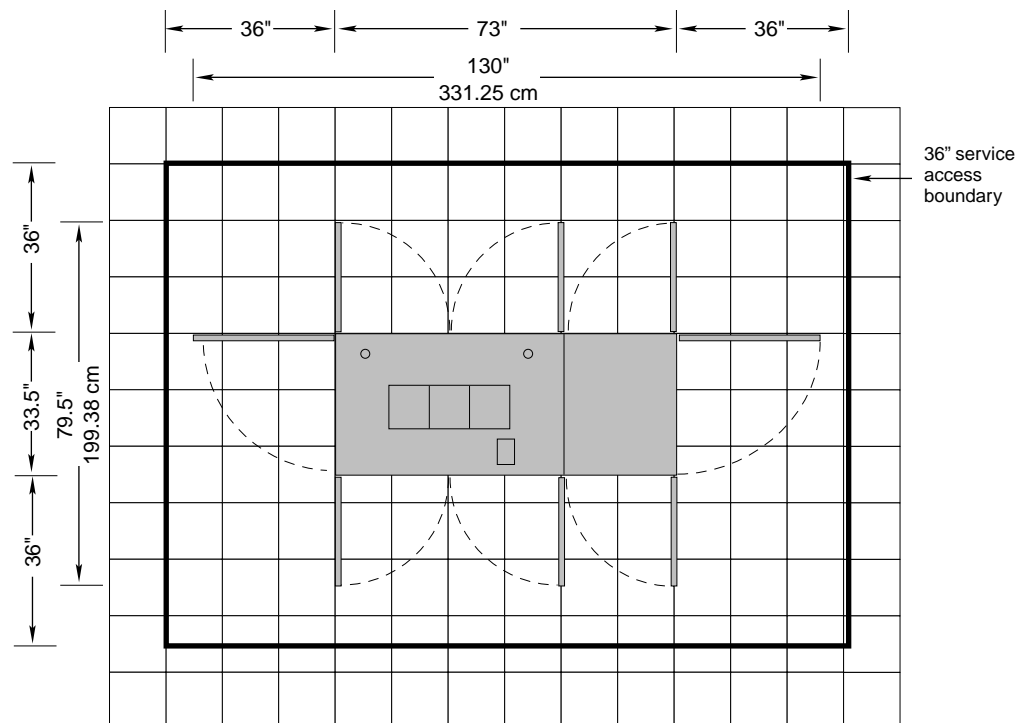


**Z1866**

<b>Uncrated Dimensions</b>	28 in. (71 cm) H x 33.5 in. (85 cm) D x 73 in. (186 cm) L
<b>Crate Dimensions</b>	50 in. (127 cm) H x 43 in. (110 cm) D x 83 in. (211 cm) L
<b>Weight Crated</b> (approximate)	1250 lb (567 kg)
<b>Weight</b> (approximate)	1000 lb (454 kg)
<b>Power Requirements</b>	Two AC service supply outlets

Teradyne Provides

<b>AC MAINS</b>	100–240VAC, 1.8 kVA, 3-wire, 50–60Hz (range of 47–63Hz), single-phase	<b>X</b>
<b>AC MAINS Circuit Breaker</b>	<ul style="list-style-type: none"> <li>• 100–130VAC requires minimum of 15A breaker</li> <li>• 200–240VAC requires minimum of 7.5A breaker</li> </ul>	
<b>AC MAINS Receptacle</b>	NEMA L5-30R	
<b>AC MAINS Cord Connector</b>	NEMA L5-30P	<b>X</b>
<b>Main AC Input Breaker</b>	<ul style="list-style-type: none"> <li>• 100–130 VAC requires 15A breaker PN 087-11x-00</li> <li>• 200–240 VAC requires 7.5A breaker PN 087-12x-00</li> </ul>	<b>X</b>
<b>Vacuum Supply</b>	41 CFM pump capacity recommended. 1 in. NPT male thread within 10 ft. of system. Minimum vacuum level of 20 in. of mercury available to the system at all times.	
<b>Vacuum Pump Power</b>	Line voltage of 190–460 VAC, 2.2 kVA, 30 Amp, 4-wire, 50 or 60Hz, 3-phase.	
<b>Vacuum Power Connectors</b>	<ul style="list-style-type: none"> <li>• Low Voltage 190–230 VAC uses 250 VAC, 20 Amp, 4-wire, NEMA L15-20P</li> <li>• High Voltage 380–460 VAC uses 480 VAC, 20 Amp, 4-wire, NEMA L16-20P</li> </ul>	<b>X</b>
<b>Environmental Requirements</b>	Ambient temperature: 64°–89°F (18°–32°C) Relative humidity: 20–70% non-condensing Vacuum pump operating temperature range: 32°–122°F (0°–50°C)	

**Floor Space Required**

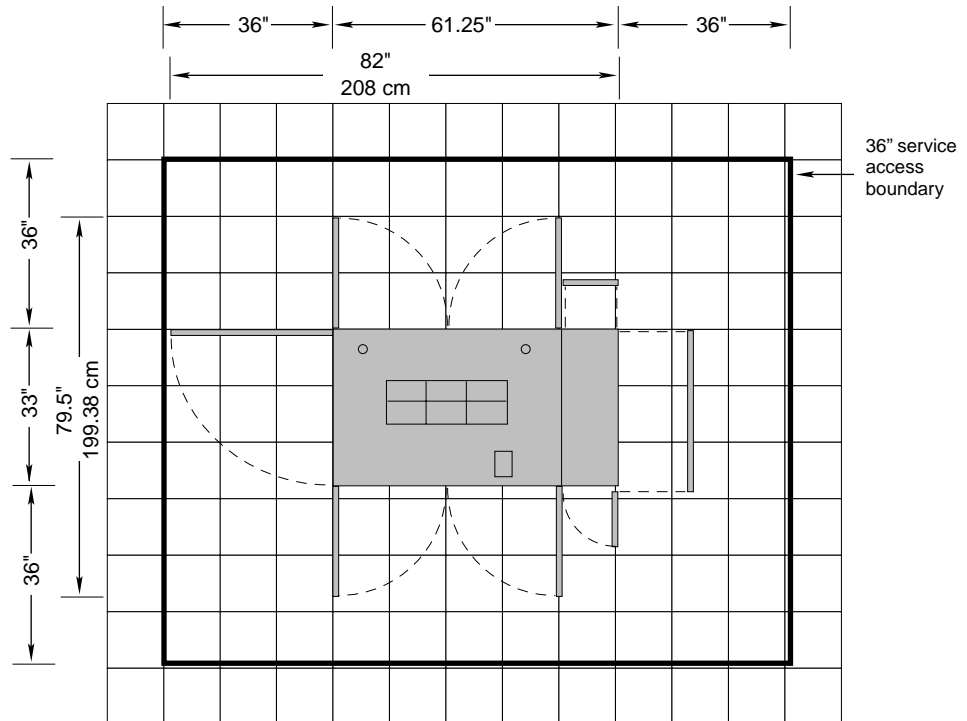
**Z1860-NB**

<b>Uncrated Dimensions</b>	28 in. (71 cm) H x 33 in. (84 cm) D x 61.25 in. (156 cm) L
<b>Crate Dimensions</b>	50 in. (127 cm) H x 43 in. (110 cm) D x 82 in. (208 cm) L
<b>Weight Crated</b> (approximate)	1250 lb (567 kg)
<b>Weight</b> (approximate)	1000 lb (454 kg)

Teradyne Provides

<b>AC MAINS</b>	100–240 VAC, 3.0 kVA, 3-wire, 50–60 Hz (range of 47–63 Hz), single-phase	<b>X</b>
<b>AC MAINS Circuit Breaker</b>	<ul style="list-style-type: none"> <li>• 100–130 VAC requires minimum of 25A breaker</li> <li>• 200–240 VAC requires minimum of 13A breaker</li> </ul>	
<b>AC MAINS Receptacle</b>	NEMA L5-30R	
<b>AC MAINS Cord Connector</b>	NEMA L5-30P	<b>X</b>
<b>Main AC Input Breaker</b>	<ul style="list-style-type: none"> <li>• 100–130 VAC requires 25A breaker PN 090-156-00</li> <li>• 200–240 VAC requires 13A breaker PN 090-186-00</li> </ul>	<b>X</b>
<b>Vacuum Supply</b>	41 CFM pump capacity recommended. 1 in. NPT male thread within 10 ft. of system. Minimum vacuum level of 20 in. of mercury available to the system at all times.	
<b>Vacuum Pump Power</b>	Line voltage of 190–460 VAC, 2.2 kVA, 30 Amp, 4-wire, 50 or 60 Hz, 3-phase.	
<b>Vacuum Power Connectors</b>	<ul style="list-style-type: none"> <li>• Low Voltage 190–230 VAC uses 250 VAC, 20 Amp, 4-wire, NEMA L15-20P</li> <li>• High Voltage 380–460 VAC uses 480 VAC, 20 Amp, 4-wire, NEMA L16-20P</li> </ul>	<b>X</b>
<b>Environmental Requirements</b>	Ambient temperature: 64°–89°F (18°–32°C) Relative humidity: 20–70% non-condensing Vacuum pump operating temperature range: 32°–122°F (0°–50°C)	

**Floor Space Required**



**Z1860 LCT**

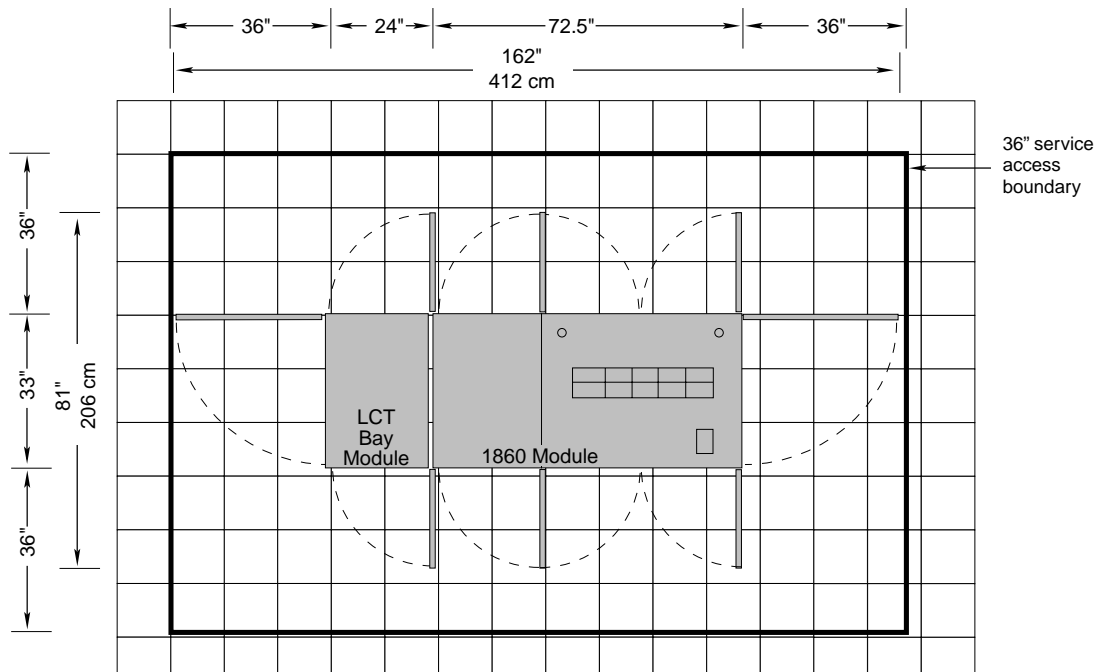
The Z1860 LCT consists of the Line Card Tester (LCT) bay attached to a Z1860 system.

<b>Uncrated Dimensions</b>	<b>Z1860:</b> 28 in. (71 cm) H x 33 in. (84 cm) D x 72.5 in. (185 cm) L <b>LCT:</b> 28 in. (71 cm) H x 33 in. (84 cm) D x 24 in. (61 cm) L
<b>Crate Dimensions</b>	<b>Z1860:</b> 50 in. (127 cm) H x 43 in. (109 cm) D x 83 in. (211 cm) L <b>LCT:</b> 39 in. (99 cm) H x 40 in. (102 cm) D x 30 in. (76 cm) L
<b>Weight Crated</b> (approximate)	<b>Z1860:</b> 1250 lb (556 kg) <b>LCT:</b> 450 lb (204 kg)
<b>Weight</b> (approximate)	<b>Z1860:</b> 1000 lb (454 kg) <b>LCT:</b> 350 lb (159 kg)
<b>Power Requirements</b>	Two AC service supply outlets

Teradyne Provides

<b>AC MAINS</b>	100–240VAC, 1.8 kVA, 3-wire, 50–60Hz (range of 47–63Hz), single-phase	<b>X</b>
<b>AC MAINS Circuit Breaker</b>	<ul style="list-style-type: none"> <li>• 100–130 VAC requires minimum of 15A breaker</li> <li>• 200–240 VAC requires minimum of 7.5A breaker</li> </ul>	
<b>AC MAINS Receptacle</b>	NEMA L5-30R	
<b>AC MAINS Cord Connector</b>	NEMA L5-30P	<b>X</b>
<b>Main AC Input Breaker</b>	<ul style="list-style-type: none"> <li>• 100–130 VAC requires 15A breaker PN 087-11x-00</li> <li>• 200–240 VAC requires 7.5A breaker PN 087-12x-00</li> </ul>	<b>X</b>
<b>Vacuum Supply</b>	41 CFM pump capacity recommended. 1 in. NPT male thread within 10 ft. of system. Minimum vacuum level of 20 in. of mercury available to the system at all times.	
<b>Vacuum Pump Power</b>	Line voltage of 190–460 VAC, 2.2 kVA, 30 Amp, 4-wire, 50 or 60Hz, 3-phase.	
<b>Vacuum Power Connectors</b>	<ul style="list-style-type: none"> <li>• Low Voltage 190–230 VAC uses 250 VAC, 20 Amp, 4-wire, NEMA L15-20P</li> <li>• High Voltage 380–460 VAC uses 480 VAC, 20 Amp, 4-wire, NEMA L16-20P</li> </ul>	<b>X</b>
<b>Environmental Requirements</b>	Ambient temperature: 64°–89°F (18°–32°C) Relative humidity: 20–70% non-condensing Vacuum pump operating temperature range: 32°–122°F (0°–50°C)	

**Floor Space Required**



**Z1860**

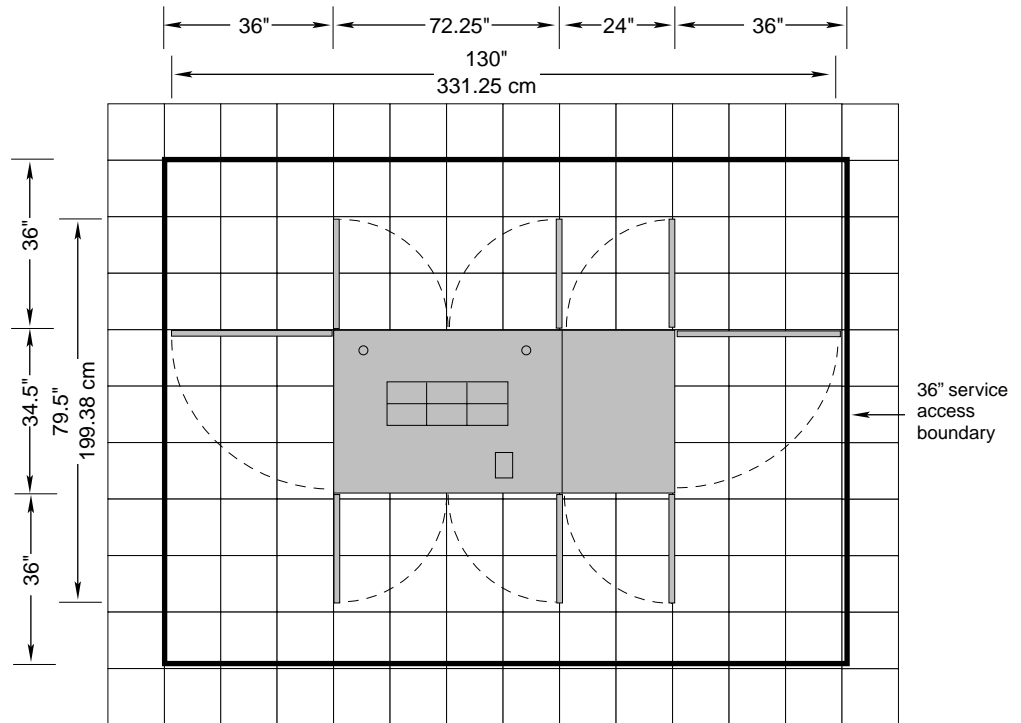
**Note:** Also see “PRISM-Z Option” on page 17 if applicable.

<b>Uncrated Dimensions</b>	28 in. (71 cm) H x 34.5 in. (88 cm) D x 72.25 in. (185 cm) L
<b>Crate Dimensions</b>	50 in. (127 cm) H x 43 in. (109 cm) D x 83 in. (211 cm) L
<b>Weight Crated</b> (approximate)	1250 lb (556 kg)
<b>Weight</b> (approximate)	1000 lb (454 kg)

Teradyne Provides

<b>AC MAINS</b>	100–240 VAC, 1.8 kVA, 3-wire, 50–60Hz (range of 47–63Hz), single-phase	<b>X</b>
<b>AC MAINS Circuit Breaker</b>	<ul style="list-style-type: none"> <li>• 100–130 VAC requires minimum of 15A breaker</li> <li>• 200–240 VAC requires minimum of 7.5A breaker</li> </ul>	
<b>AC MAINS Receptacle</b>	NEMA L5-30R	
<b>AC MAINS Cord Connector</b>	NEMA L5-30P	<b>X</b>
<b>Main AC Input Breaker</b>	<ul style="list-style-type: none"> <li>• 100–130 VAC requires 15A breaker PN 087-11x-00</li> <li>• 200–240 VAC requires 7.5A breaker PN 087-12x-00</li> </ul>	<b>X</b>
<b>Vacuum Supply</b>	41 CFM pump capacity recommended. 1 in. NPT male thread within 10 ft. of system. Minimum vacuum level of 20 in. of mercury available to the system at all times.	
<b>Vacuum Pump Power</b>	Line voltage of 190–460 VAC, 2.2 kVA, 30 Amp, 4-wire, 50 or 60Hz, 3-phase.	
<b>Vacuum Power Connectors</b>	<ul style="list-style-type: none"> <li>• Low Voltage 190–230 VAC uses 250 VAC, 20 Amp, 4-wire, NEMA L15-20P</li> <li>• High Voltage 380–460 VAC uses 480 VAC, 20 Amp, 4-wire, NEMA L16-20P</li> </ul>	<b>X</b>
<b>Environmental Requirements</b>	Ambient temperature: 64°–89°F (18°–32°C) Relative humidity: 20–70% non-condensing Vacuum pump operating temperature range: 32°–122°F (0°–50°C)	

**Floor Space Required**



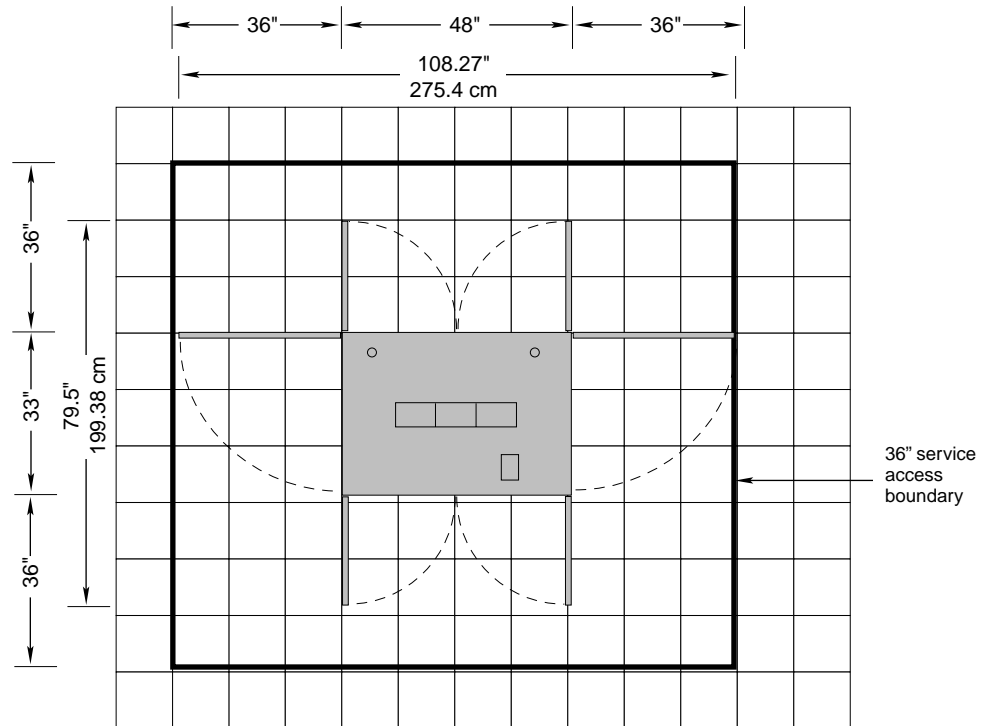
**Z1850**

<b>Uncrated Dimensions</b>	28 in. (71 cm) H x 33 in. (84 cm) D x 48 in. (122 cm) L
<b>Crate Dimensions</b>	50 in. (127 cm) H x 44 in. (112 cm) D x 58 in. (147 cm) L
<b>Weight Crated</b> (approximate)	850 lb (386 kg)
<b>Weight</b> (approximate)	700 lb (318 kg)

Teradyne Provides

<b>AC MAINS</b>	100–240 VAC, 1.8 kVA, 3-wire, 50–60Hz (range of 47–63Hz), single-phase	<b>X</b>
<b>AC MAINS Circuit Breaker</b>	<ul style="list-style-type: none"> <li>• 100–130 VAC requires minimum of 15A breaker</li> <li>• 200–240 VAC requires minimum of 7.5A breaker</li> </ul>	
<b>AC MAINS Receptacle</b>	NEMA L5-30R	
<b>AC MAINS Cord Connector</b>	NEMA L5-30P	<b>X</b>
<b>Main AC Input Breaker</b>	<ul style="list-style-type: none"> <li>• 100–130 VAC requires 15A breaker PN 087-11x-00</li> <li>• 200–240 VAC requires 7.5A breaker PN 087-12x-00</li> </ul>	<b>X</b>
<b>Vacuum Supply</b>	41 CFM pump capacity recommended. 1 in. NPT male thread within 10 ft. of system. Minimum vacuum level of 20 in. of mercury available to the system at all times.	
<b>Vacuum Pump Power</b>	Line voltage of 190–460 VAC, 2.2 kVA, 30 Amp, 4-wire, 50 or 60Hz, 3-phase.	
<b>Vacuum Power Connectors</b>	<ul style="list-style-type: none"> <li>• Low Voltage 190–230 VAC uses 250 VAC, 20 Amp, 4-wire, NEMA L15-20P</li> <li>• High Voltage 380–460 VAC uses 480 VAC, 20 Amp, 4-wire, NEMA L16-20P</li> </ul>	<b>X</b>
<b>Environmental Requirements</b>	Ambient temperature: 64°–89°F (18°–32°C) Relative humidity: 20–70% non-condensing Vacuum pump operating temperature range: 32°–122°F (0°–50°C)	

**Floor Space Required**



**Z1840**

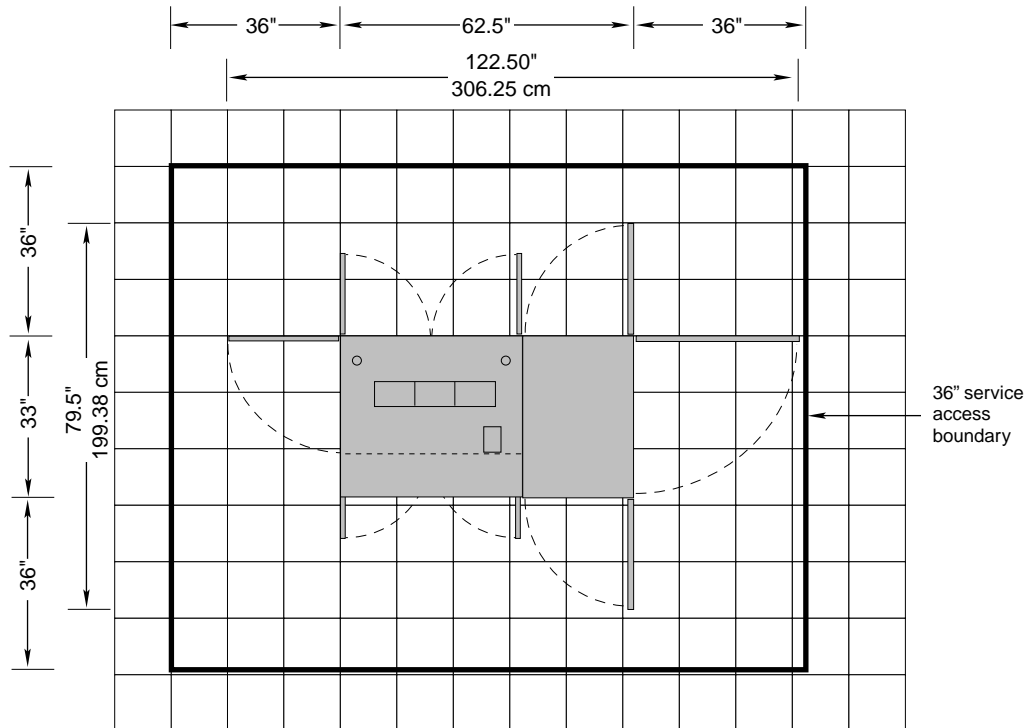
**Note:** Also see “PRISM-Z Option” on page 17 if applicable.

<b>Uncrated Dimensions</b>	28 in. (71 cm) H x 33 in. (84 cm) D x 62.5 in. (159 cm) L
<b>Crate Dimensions</b>	50 in. (127 cm) H x 43 in. (110 cm) D x 73 in. (185 cm) L
<b>Weight Crated</b> (approximate)	800 lb (363 kg)
<b>Weight</b> (approximate)	625 lb (284 kg)

Teradyne Provides

<b>AC MAINS</b>	100–240 VAC, 1.8 kVA, 3-wire, 50–60Hz (range of 47–63Hz), single-phase	<b>X</b>
<b>AC MAINS Circuit Breaker</b>	<ul style="list-style-type: none"> <li>• 100–130 VAC requires minimum of 15A breaker</li> <li>• 200–240 VAC requires minimum of 7.5A breaker</li> </ul>	
<b>AC MAINS Receptacle</b>	NEMA L5-30R	
<b>AC MAINS Cord Connector</b>	NEMA L5-30P	<b>X</b>
<b>Main AC Input Breaker</b>	<ul style="list-style-type: none"> <li>• 100–130 VAC requires 15A breaker PN 087-11x-00</li> <li>• 200–240 VAC requires 7.5A breaker PN 087-12x-00</li> </ul>	<b>X</b>
<b>Vacuum Supply</b>	41 CFM pump capacity recommended. 1 in. NPT male thread within 10 ft. of system. Minimum vacuum level of 20 in. of mercury available to the system at all times.	
<b>Vacuum Pump Power</b>	Line voltage of 190–460 VAC, 2.2 kVA, 30 Amp, 4-wire, 50 or 60Hz, 3-phase.	
<b>Vacuum Power Connectors</b>	<ul style="list-style-type: none"> <li>• Low Voltage 190–230 VAC uses 250 VAC, 20 Amp, 4-wire, NEMA L15-20P</li> <li>• High Voltage 380–460 VAC uses 480 VAC, 20 Amp, 4-wire, NEMA L16-20P</li> </ul>	<b>X</b>
<b>Environmental Requirements</b>	Ambient temperature: 64°–89°F (18°–32°C) Relative humidity: 20–70% non-condensing Vacuum pump operating temperature range: 32°–122°F (0°–50°C)	

**Floor Space Required**





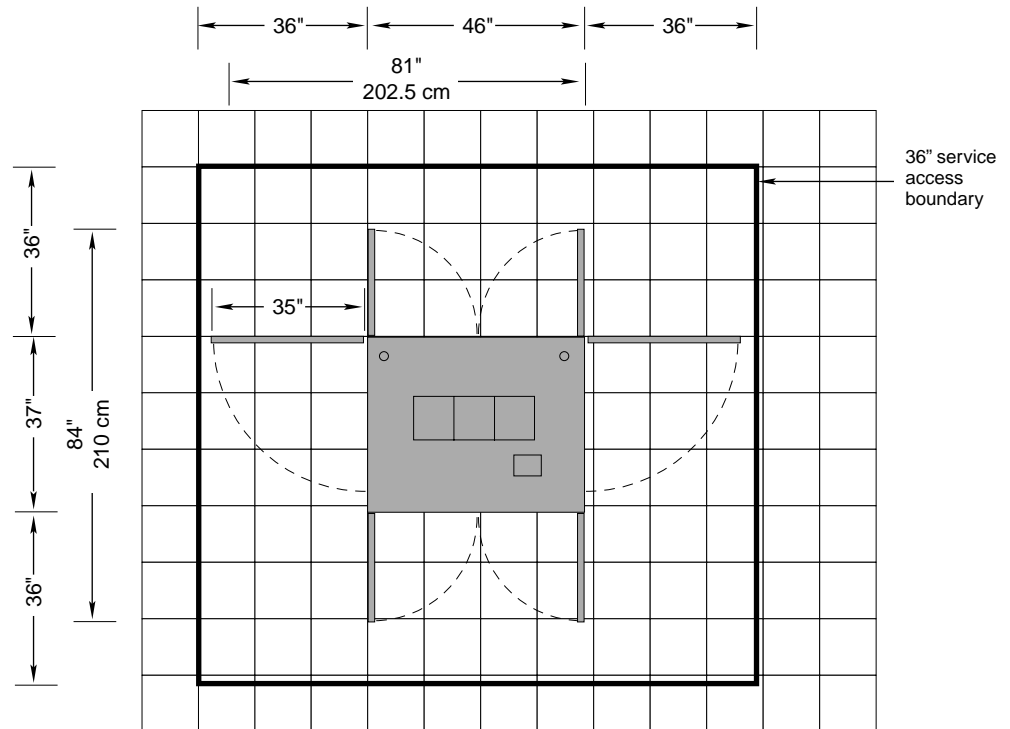
**Z1820**

<b>Uncrated Dimensions</b>	37 in. (84 cm) H x 37 in. (84 cm) D x 46 in. (117 cm) L
<b>Crate Dimensions</b>	52.5 in. (133 cm) H x 43.75 in. (112 cm) D x 58 in. (136 cm) L
<b>Weight Crated</b> (approximate)	1000 lb (454 kg)
<b>Weight</b> (approximate)	750 lb (340 kg)

Teradyne Provides

<b>AC MAINS</b>	100–240 VAC, 1.8 kVA, 3-wire, 50–60Hz (range of 47–63Hz), single-phase	<b>X</b>
<b>AC MAINS Circuit Breaker</b>	<ul style="list-style-type: none"> <li>• 100–130 VAC requires minimum of 15A breaker</li> <li>• 200–240 VAC requires minimum of 7.5A breaker</li> </ul>	
<b>AC MAINS Receptacle</b>	NEMA L5-30R	
<b>AC MAINS Cord Connector</b>	NEMA L5-30P	<b>X</b>
<b>Main AC Input Breaker</b>	<ul style="list-style-type: none"> <li>• 100–130 VAC requires 15A breaker PN 087-11x-00</li> <li>• 200–240 VAC requires 7.5A breaker PN 087-12x-00</li> </ul>	<b>X</b>
<b>Vacuum Supply</b>	41 CFM pump capacity recommended. 1 in. NPT male thread within 10 ft. of system. Minimum vacuum level of 20 in. of mercury available to the system at all times.	
<b>Vacuum Pump Power</b>	Line voltage of 190–460 VAC, 2.2 kVA, 30 Amp, 4-wire, 50 or 60Hz, 3-phase.	
<b>Vacuum Power Connectors</b>	<ul style="list-style-type: none"> <li>• Low Voltage 190–230 VAC uses 250 VAC, 20 Amp, 4-wire, NEMA L15-20P</li> <li>• High Voltage 380–460 VAC uses 480 VAC, 20 Amp, 4-wire, NEMA L16-20P</li> </ul>	<b>X</b>
<b>Environmental Requirements</b>	Ambient temperature: 64°–89°F (18°–32°C) Relative humidity: 20–70% non-condensing Vacuum pump operating temperature range: 32°–122°F (0°–50°C)	

**Floor Space Required**



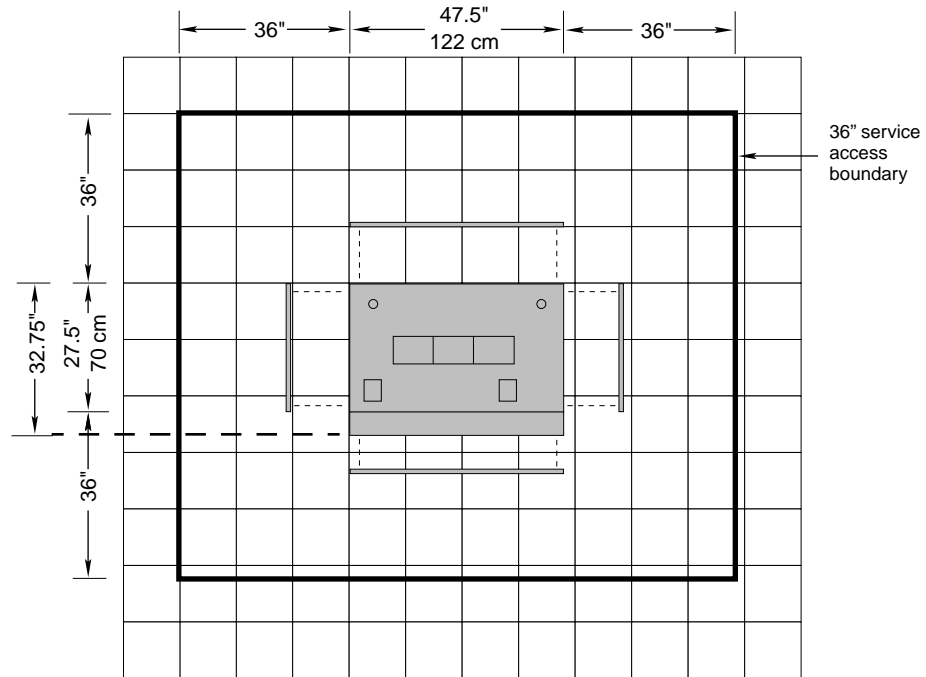
**Z1805 and Z1808**

<b>Uncrated Dimensions</b>	32.5 in. (83 cm) H x 32.75 in. (83 cm) D x 47.5 in. (121 cm) L
<b>Crate Dimensions</b>	62 in. (158 cm) H x 45 in. (114 cm) D x 59 in. (150 cm) L
<b>Weight Crated</b> (approximate)	1225 lb (556 kg)
<b>Weight</b> (approximate)	1000 lb (454 kg)

Teradyne Provides

<b>AC MAINS</b>	100–240 VAC, 1.8 kVA, 3-wire, 50–60Hz (range of 47–63Hz), single-phase	<b>X</b>
<b>AC MAINS Circuit Breaker</b>	<ul style="list-style-type: none"> <li>• 100–130 VAC requires minimum of 15A breaker</li> <li>• 200–240 VAC requires minimum of 7.5A breaker</li> </ul>	
<b>AC MAINS Receptacle</b>	NEMA L5-30R	
<b>AC MAINS Cord Connector</b>	NEMA L5-30P	<b>X</b>
<b>Main AC Input Breaker</b>	<ul style="list-style-type: none"> <li>• 100–130 VAC requires 15A breaker PN 087-11x-00</li> <li>• 200–240 VAC requires 7.5A breaker PN 087-12x-00</li> </ul>	<b>X</b>
<b>Vacuum Supply</b>	41 CFM pump capacity recommended. 1 in. NPT male thread within 10 ft. of system. Minimum vacuum level of 20 in. of mercury available to the system at all times.	
<b>Vacuum Pump Power</b>	Line voltage of 190–460 VAC, 2.2 kVA, 30 Amp, 4-wire, 50 or 60Hz, 3-phase.	
<b>Vacuum Power Connectors</b>	<ul style="list-style-type: none"> <li>• Low Voltage 190–230 VAC uses 250 VAC, 20 Amp, 4-wire, NEMA L15-20P</li> <li>• High Voltage 380–460 VAC uses 480 VAC, 20 Amp, 4-wire, NEMA L16-20P</li> </ul>	<b>X</b>
<b>Environmental Requirements</b>	Ambient temperature: 64°–89°F (18°–32°C) Relative humidity: 20–70% non-condensing Vacuum pump operating temperature range: 32°–122°F (0°–50°C)	

**Floor Space Required**



**Z1803 Plus: Z1803-1 and Z1803-2**

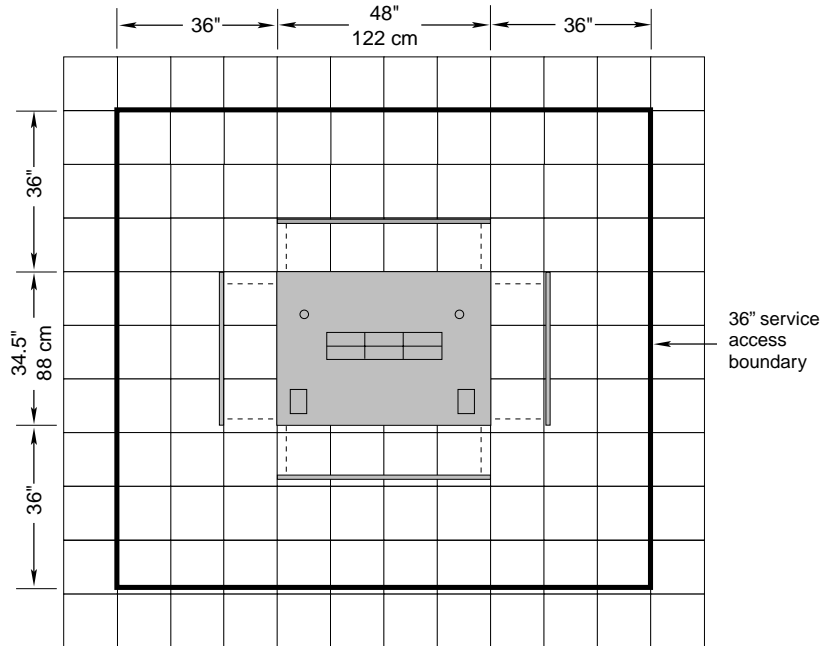
**Note:** Also see “PRISM-Z Option” on page 17 if applicable.

<b>Uncrated Dimensions</b>	32.5 in. (83 cm) H x 34.5 in. (88 cm) D x 48 in. (122 cm) L
<b>Crate Dimensions</b>	62 in. (158 cm) H x 45 in. (114 cm) D x 59 in. (150 cm) L
<b>Weight Crated</b> (approximate)	Z1803-1: 600 lb (267 kg) Z1803-2: 800 lb (363 kg)
<b>Weight</b> (approximate)	Z1803-1: 525 lb (238 kg) Z1803-2: 725 lb (329 kg)

Teradyne Provides

<b>AC MAINS</b>	100–240 VAC, 1.8 kVA, 3-wire, 50–60Hz (range of 47–63Hz), single-phase	<b>X</b>
<b>AC MAINS Circuit Breaker</b>	<ul style="list-style-type: none"> <li>• 100–130 VAC requires minimum of 15A breaker</li> <li>• 200–240 VAC requires minimum of 7.5A breaker</li> </ul>	
<b>AC MAINS Receptacle</b>	NEMA L5-30R	
<b>AC MAINS Cord Connector</b>	NEMA L5-30P	<b>X</b>
<b>Main AC Input Breaker</b>	<ul style="list-style-type: none"> <li>• 100–130 VAC requires 15A breaker PN 087-11x-00</li> <li>• 200–240 VAC requires 7.5A breaker PN 087-12x-00</li> </ul>	<b>X</b>
<b>Vacuum Supply</b>	41 CFM pump capacity recommended. 1 in. NPT male thread within 10 ft. of system. Minimum vacuum level of 20 in. of mercury available to the system at all times.	
<b>Vacuum Pump Power</b>	Line voltage of 190–460 VAC, 2.2 kVA, 30 Amp, 4-wire, 50 or 60Hz, 3-phase.	
<b>Vacuum Power Connectors</b>	<ul style="list-style-type: none"> <li>• Low Voltage 190–230 VAC uses 250 VAC, 20 Amp, 4-wire, NEMA L15-20P</li> <li>• High Voltage 380–460 VAC uses 480 VAC, 20 Amp, 4-wire, NEMA L16-20P</li> </ul>	<b>X</b>
<b>Environmental Requirements</b>	Ambient temperature: 64°–89°F (18°–32°C) Relative humidity: 20–70% non-condensing Vacuum pump operating temperature range: 32°–122°F (0°–50°C)	

**Floor Space Required**



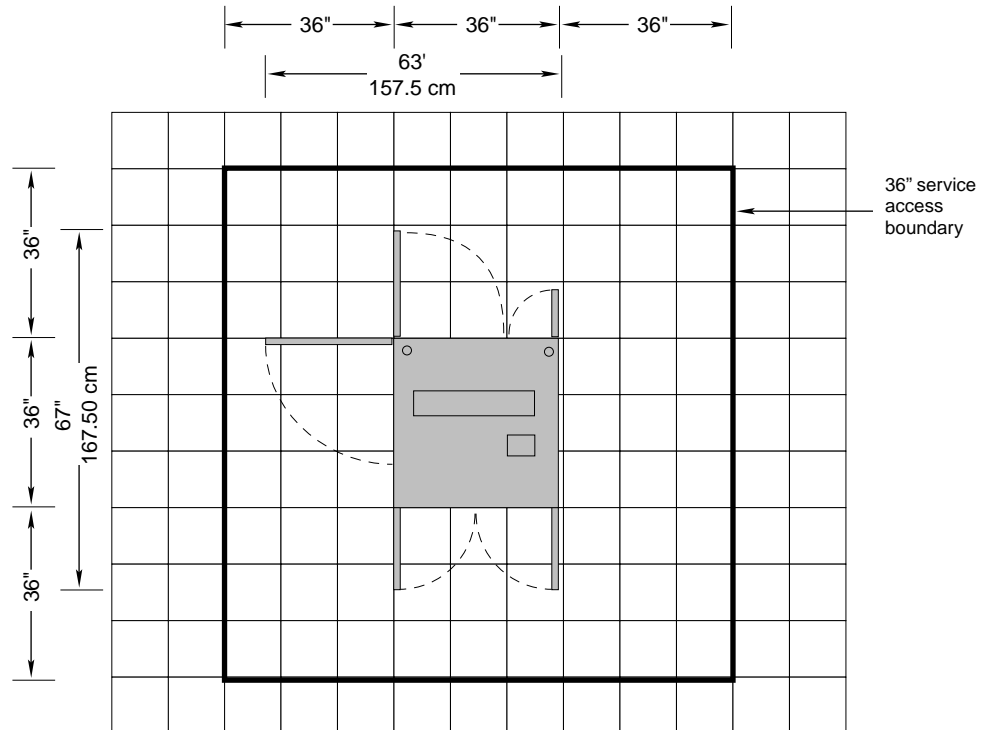
**Z1800**

<b>Uncrated Dimensions</b>	37 in. (94 cm) H x 36 in. (92 cm) D x 36 in. (92 cm) L
<b>Crate Dimensions</b>	52.5 in. (133 cm) H x 39.5 in. (100 cm) D x 41.25 in. (105 cm) L
<b>Weight Crated</b> (approximate)	600 lb (267 kg)
<b>Weight</b> (approximate)	500 lb (227 kg)

Teradyne Provides

<b>AC MAINS</b>	100–240 VAC, 1.8 kVA, 3-wire, 50–60Hz (range of 47–63Hz), single-phase	<b>X</b>
<b>AC MAINS Circuit Breaker</b>	<ul style="list-style-type: none"> <li>• 100–130 VAC requires minimum of 15A breaker</li> <li>• 200–240 VAC requires minimum of 7.5A breaker</li> </ul>	
<b>AC MAINS Receptacle</b>	NEMA L5-30R	
<b>AC MAINS Cord Connector</b>	NEMA L5-30P	<b>X</b>
<b>Main AC Input Breaker</b>	<ul style="list-style-type: none"> <li>• 100–130 VAC requires 15A breaker PN 087-11x-00</li> <li>• 200–240 VAC requires 7.5A breaker PN 087-12x-00</li> </ul>	<b>X</b>
<b>Vacuum Supply</b>	41 CFM pump capacity recommended. 1 in. NPT male thread within 10 ft. of system. Minimum vacuum level of 20 in. of mercury available to the system at all times.	
<b>Vacuum Pump Power</b>	Line voltage of 190–460 VAC, 2.2 kVA, 30 Amp, 4-wire, 50 or 60Hz, 3-phase.	
<b>Vacuum Power Connectors</b>	<ul style="list-style-type: none"> <li>• Low Voltage 190–230 VAC uses 250 VAC, 20 Amp, 4-wire, NEMA L15-20P</li> <li>• High Voltage 380–460 VAC uses 480 VAC, 20 Amp, 4-wire, NEMA L16-20P</li> </ul>	<b>X</b>
<b>Environmental Requirements</b>	Ambient temperature: 64°–89°F (18°–32°C) Relative humidity: 20–70% non-condensing Vacuum pump operating temperature range: 32°–122°F (0°–50°C)	

**Floor Space Required**

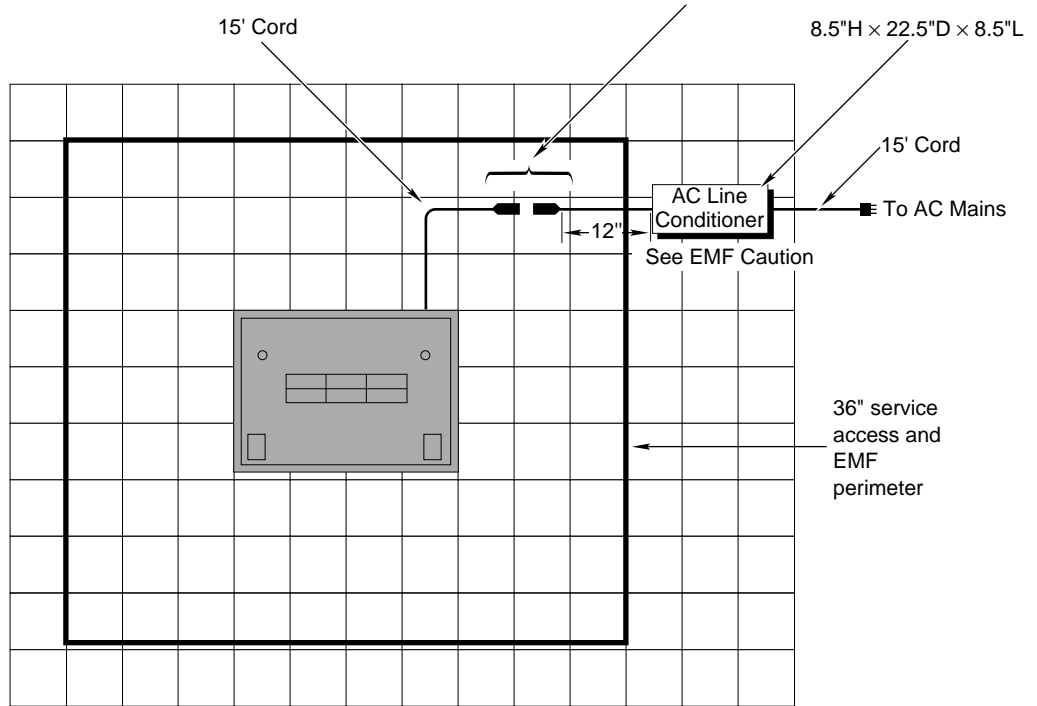


**PRISM-Z Option**

The Z1890, Z1880, Z1860, Z1840, and 1803 Plus can be equipped with the optional PRISM-Z. When PRISM-Z is installed, the system uses an external line conditioner. The external line conditioner must be positioned at least three feet away from the tester.

**Position of external line conditioner for systems with PRISM-Z installed:**

Bosch-frame systems use a connector approximately 3.5" in diameter and 11" in length when connected. Z1860 and Z1840 use a different connector for PRISM-Z installations.



**Important:** The AC line conditioner must be a minimum of 36" from the system console. If it is within the 36" EMF service perimeter, degradation of analog (PRISM-Z) measurements may occur.

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## Uncrating and Positioning the Tester

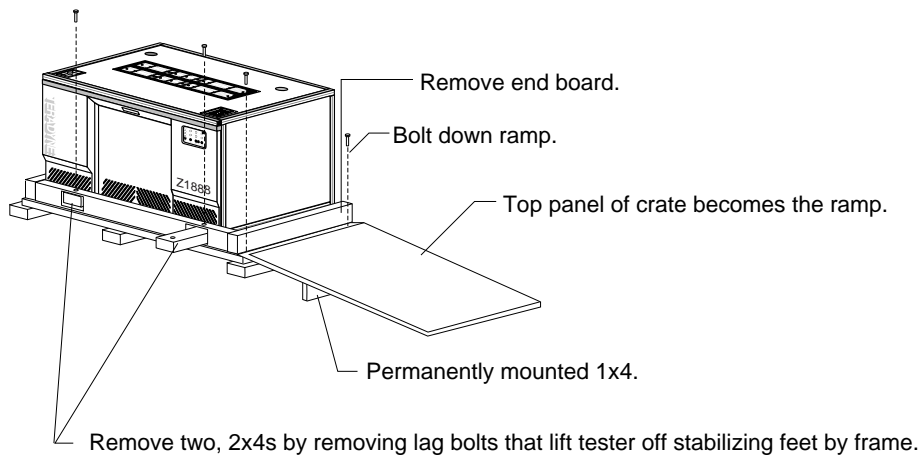
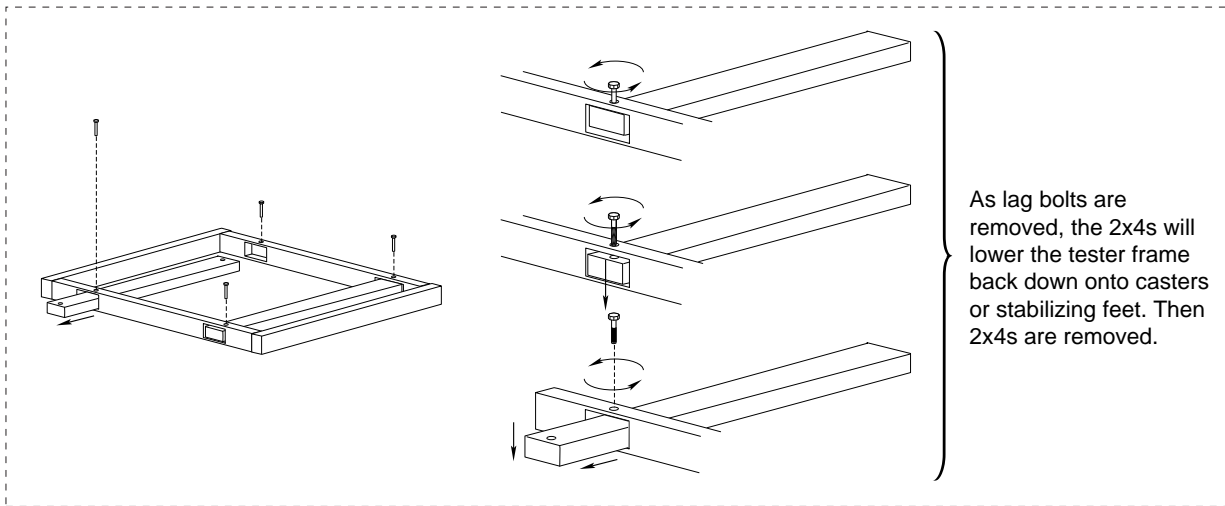
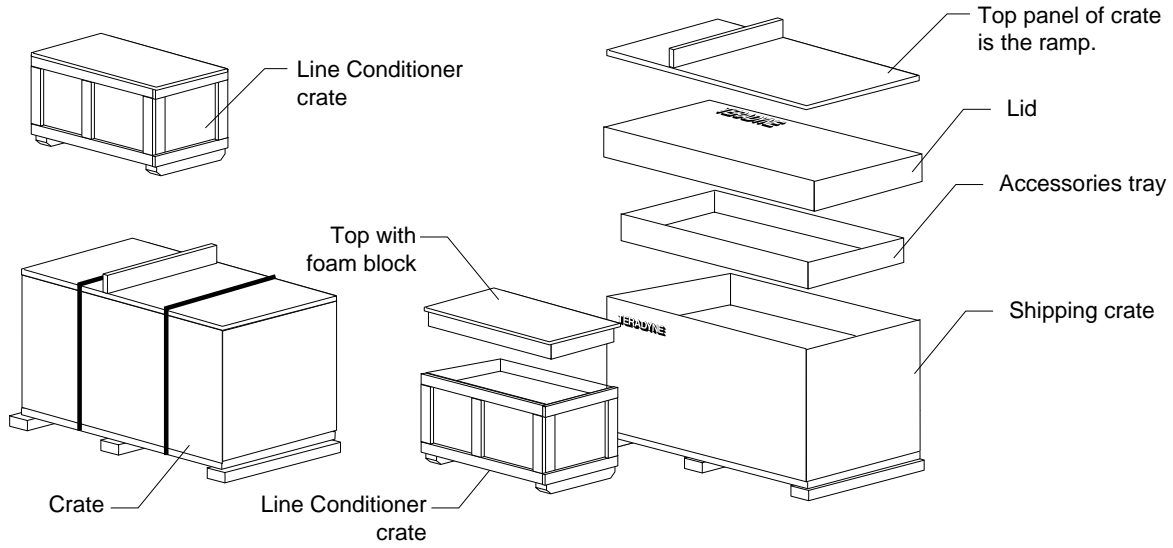
### **Z1890, Z1888, Z1880, Z1808, Z1805 and Z1803 Plus with the PRISM-Z Option**

**Important:**

The procedures below explain how to uncrate and position your tester. Refer to the procedure for your specific tester.

Follow the steps listed below to uncrate the Z1890, Z1888, Z1880, Z1808, Z1805, and Z1803 Plus testers. The following illustration shows the steps for uncrating the Z1888.

- 1** Cut the steel bands.  
Use caution when cutting steel bands.
- 2** Remove lid, ramp, and all packing.
- 3** Remove all accessories from the lid tray.
- 4** Remove the additional packing from around the tester.
- 5** Remove the four 9/16-inch bolts on the base of the crate.
- 6** Slide the elevator boards out.
- 7** Remove the two end bolts, saving them for Step 9.
- 8** Lift off the end cap.
- 9** Secure the ramp on the beveled edge of the crate using the two end bolts as retaining pins.
- 10** Roll the unit on to the floor.
- 11** Connect the optional external line conditioner by plugging the line conditioner cable to the cable from the AC controller.
- 12** Remove the desiccant from inside the tester.



**Z1890, Z1880, Z1808,  
and Z1805**

Follow the steps listed below to uncrate the Z1890, Z1880, Z1808, and Z1805 testers.

**Important:**

- 1** Cut the steel bands.  
Use caution when cutting steel bands.
- 2** Remove lid, ramp, and all packing.
- 3** Remove all accessories from the lid tray.
- 4** Remove the additional packing from around the tester.
- 5** Remove the four 9/16-inch bolts on the base of the crate.
- 6** Slide the elevator boards out.
- 7** Remove the two end bolts, saving them for Step 9.
- 8** Lift off the end cap.
- 9** Secure the ramp on the beveled edge of the crate using the two end bolts as retaining pins.
- 10** Roll the unit on to the floor and position it.
- 11** Remove the desiccant from inside the tester.

**Z1884**

Follow the steps listed below to uncrate the Z1884 tester.

**Important:**

A forklift capable of lifting 2500 pounds at a 24-inch center load is required.

- 1** Remove climp clamps from the crate.  
The climp clamps hold the front wall of the crate.
- 2** Remove the climp clamps from the base of the crate.
- 3** Pull the walls away.
- 4** Locate and remove the four lag bolts at the base of the pallet.  
Remove the bolts with a 9/16-inch socket or wrench.
- 5** Align forklift tines with the stickers which indicate where to place the forklift tines under the tester.  
**Important:** Ensure that the forklift tines are positioned correctly.
- 6** Lift the tester, place it on the floor, and position it.
- 7** Remove the desiccant from inside the tester.



**Z1860, Z1860-NB,  
Z1850, Z1840, Z1820,  
and Z1800**

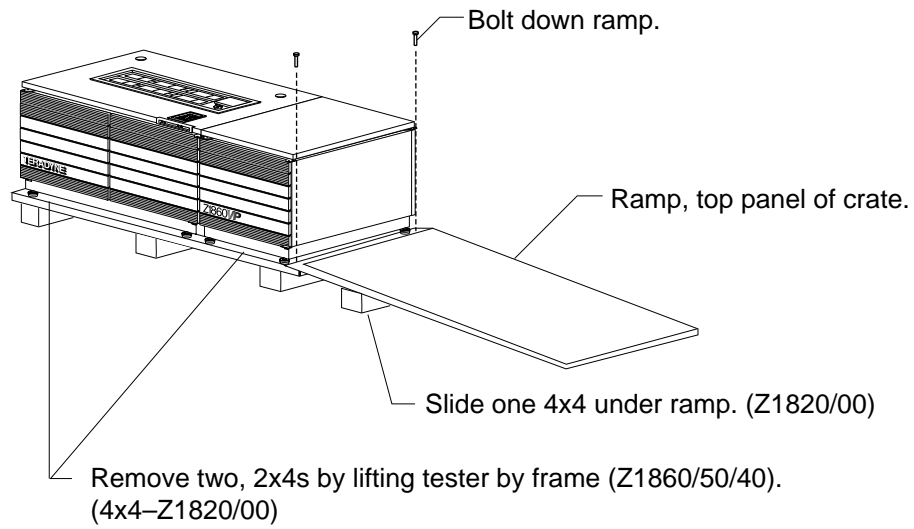
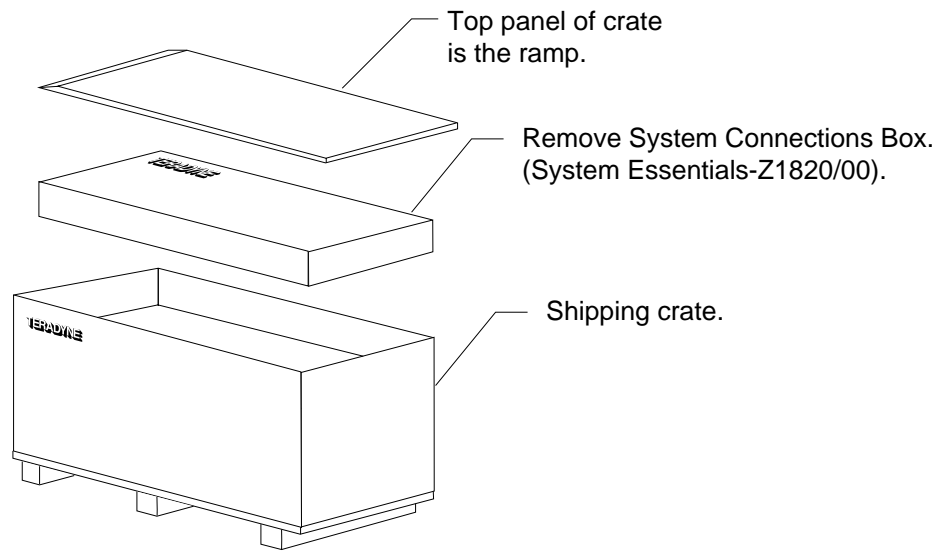
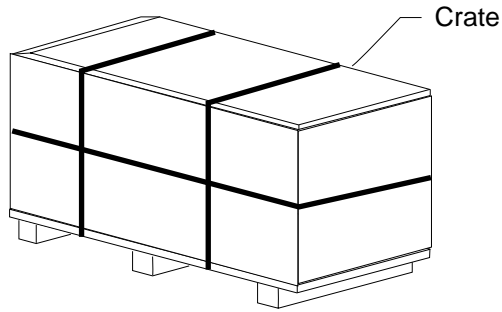
Follow the steps listed below to uncrate the Z1860, Z1860-NB, Z1850, Z1840, Z1820, and Z1800 testers. See the illustration that follows the instructions.

- 1** Carefully remove the bindings, shipping crate, and wrappings.
- 2** Open the box marked “System Accessories” and remove the keys for the tester.
- 3** Unlock the tester doors and remove the bags of drying agent.
- 4** Remove and retain the two  $\frac{9}{16}$  in. bolts on the bottom of the base and remove the side rail.
- 5** Place the ramp supplied as the top of the shipping carton on the beveled edge of the wooden base.
- 6** Align the predrilled holes in the ramp with the holes in the base and insert the bolts.
- 7** Gripping the frame on one side, lift the tester high enough to slide out the board that is underneath the tester.  

**Important:** Do not lift the tester by the tabletop.  
Removing the boards lowers the tester casters to the floor of the shipping crate.
- 8** Repeat on the opposite side.
- 9** Adjust the stabilizing feet to their highest position to provide clearance for rolling the tester from the ramp to the floor.
- 10** Roll the unit on to the floor.  

For the Z1820/00, place one board under the ramp for support and then roll the unit on to the floor.
- 11** Position the tester.
- 12** Lower the stabilizing feet with an adjustable wrench to prevent the tester from moving.  

**Important:** The stabilizing feet are not designed to hold the weight of the tester. Do not extend them so far that they prevent the casters from touching the floor.
- 13** If you have a Z1860 or Z1840 with the optional PRISM-Z, connect the external line conditioner power cable to the AC controller input.



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## Vacuum System Design

Review this section to understand the full scope of incorporating a vacuum supply system into your factory environment.

When designing a vacuum system, you must consider the following factors:

- Environmental requirements
- Type of installation appropriate to your system
- Pipe size for your system
- Type of valves and valve placement
- Gauge placement

Note: If the same pump supplies vacuum to more than one tester or other equipment, you should have a vacuum reservoir at your facility.

## Environmental Requirements

If you are using Teradyne-supplied portable pumps, plan the location of your pumps to meet the following requirements:

- One foot of air space in all directions from walls or any obstructions to allow cool air to flow.
- A level surface for pump to rest on rubber feet or wheels
- Operating temperature range: 0-50 degrees C (32-122 degrees F).
- Relative humidity: 20-70%, non-condensing.

## Vacuum System Installation Types

The three basic types of vacuum system installations define where and how you would install your vacuum pump. Illustrations for the vacuum system installation types will follow the descriptions. Procedures for each type of installation are discussed later.

### Local

The pump or vacuum source is located in close proximity to your tester. A user would typically choose a local installation if limited space is available at the site (single system site) or if the site is temporary.

### Remote

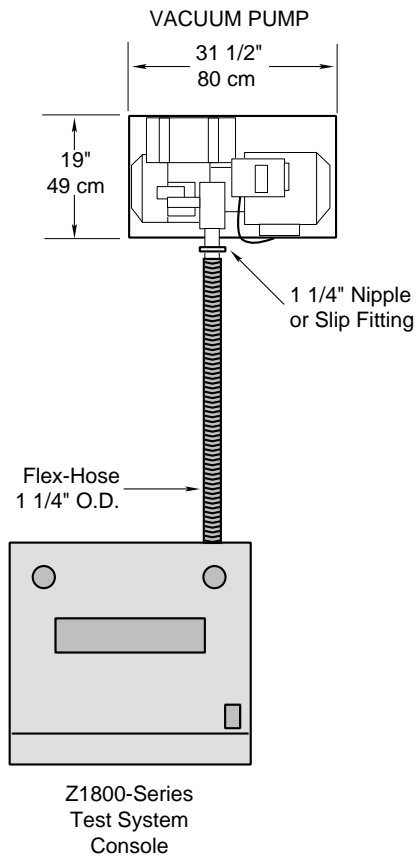
The pump or vacuum source is located away from the tester in an equipment room. A user would typically choose remote installation for a single system site in order to reduce noise and clutter, keep the air clean, and minimize power outlet requirements near the tester.

### Central

The pump or vacuum source is located away from the tester and is supplying vacuum to more than one piece of plant equipment. For example, one pump may supply vacuum to more than one tester. A user would typically choose central installation if he is planning to install other systems or equipment which require the use of vacuum, or the size of the facility requires more than one pump. Situating all the pumps in one area adds to the ease of maintenance.

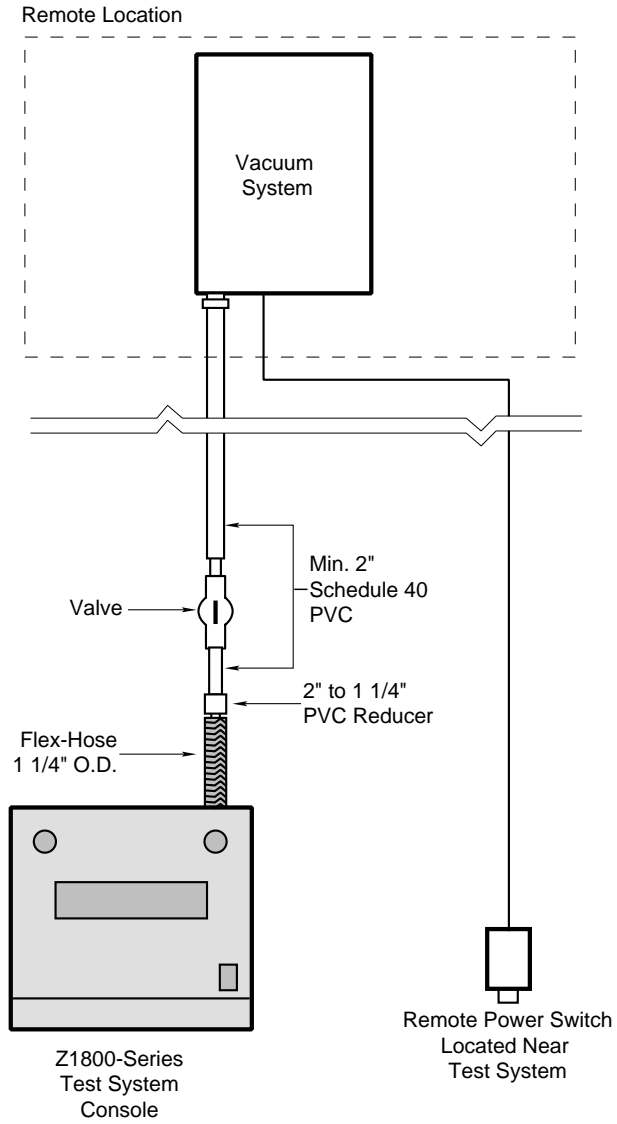
Installation should permit free access for maintenance, as well as adequate ventilation.

### Local Vacuum Installation

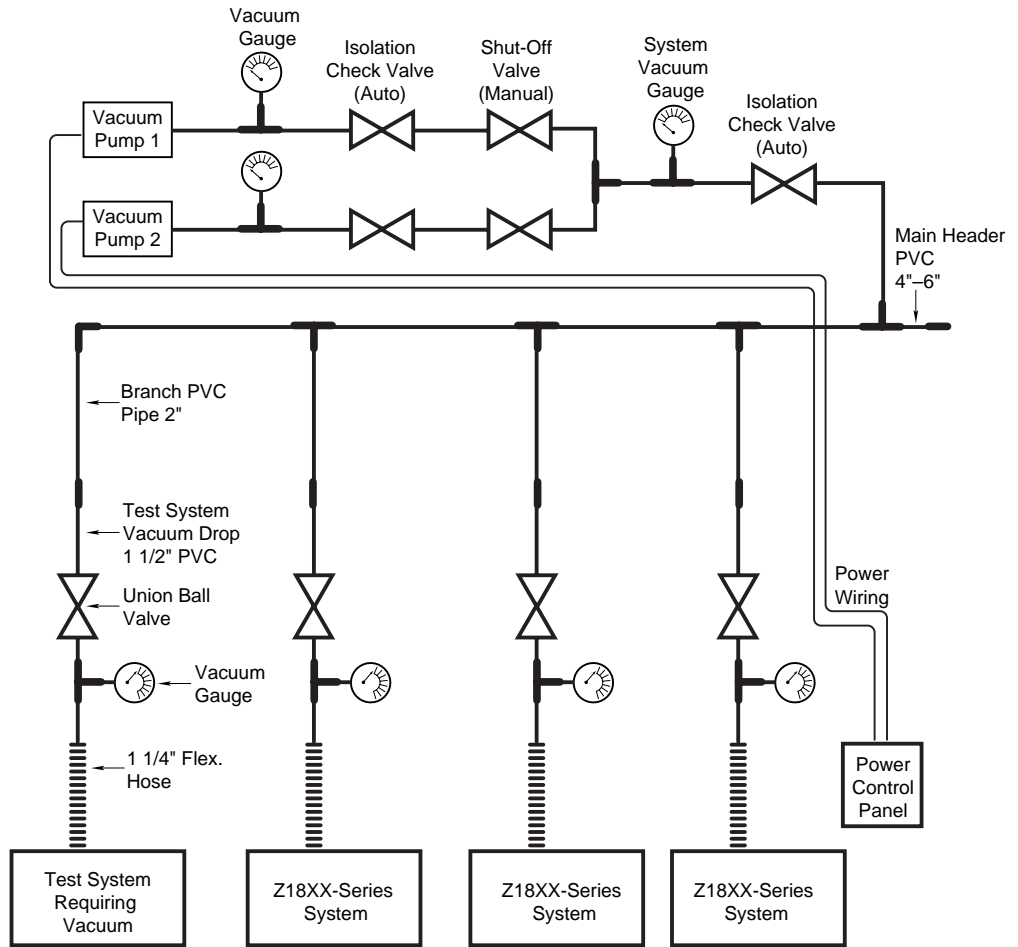


\* Dimensions apply to pumps supplied by Teradyne

### Remote Vacuum Installation



### Central Vacuum Installation



## Pipe Selection

The size of the pipe is critical in the design of a good remote or central vacuum system. When the overall length of piping is too long and the diameter of the pipe is too small relative to the whole vacuum system, the conductance of a pipe (its resistance to flow) is affected. The piping throttles the flow, restricting the pump so that its full capacity cannot be delivered to each test station.

**Remote/Central Systems** For remote and central vacuum (multiple-outlet) systems, use the minimum pipe diameters recommended.

Total Capacity of Vacuum System	Minimum Diameter of Main Header Pipe	
	Pipe runs < 500 ft.	Pipe runs 500-1,000 ft.
< 100 CFM*	1 1/2-in.	n/a
100-200 CFM	2-in.	3-in.
250-500 CFM	3-in.	4-in.
500-1,000 CFM	4-in.	5-in.

\*CFM= cubic feet per minute

You may install pipes with diameters which exceed the minimum standards. By choosing a large pipe diameter, you will increase the total volume of the system to be pumped down; the piping system thereby becomes a vacuum reservoir, which stabilizes the vacuum pump and improves the response at each station. If the same pump supplies vacuum to more than one tester or to other equipment, you should have a vacuum reservoir at your facility.

The low cost-per-lineal-foot of PVC pipe in large diameters, combined with its ease of installation and proper sealing of joints, makes it ideal for most systems. Tees, ball valves, elbows, pipe plugs and other fittings are readily available in PVC piping, and they add to the ease of assembling the vacuum system.

Schedule 40 PVC (polyvinyl chloride) pipe is recommended for almost every vacuum application.

**Important:** Schedule 80 pipe may be required for:

- Exposed lines at floor level
- Lines of 6-inches in diameter or greater, or
- Applications with ambient temperatures greater than 120 °F

## Valve Selection and Placement

Valve selection and placement are important factors which determine the versatility of a system and the ease in which you can maintain, troubleshoot, and service equipment on the system. Ball valves and globe valves provide the best control since they are essentially leak-tight in a vacuum plumbing system.

Plan the purchasing and placement of:

- valves with ports approximately equal to line size
- isolation and control valves

### Ports Equal to Line Size

Ensure that the valves have ports approximately equal to the line size in which they are installed so that no significant pressure drop occurs across the valve. PVC true union-type ball valves meet the above requirements and come in sizes up to 6-inches in diameter and are available through local plastic pipe and supply houses.

### Isolation and Control Valves

Working from the pump end of the system, you should insert a pneumatic or electrically-operated PVC ball valve in the line to isolate the individual pumps from each other and the main header or common manifold.

In multiple pump systems, each pump should have an automatic ball valve to isolate it from the main line or common manifold so that these valves can automatically close to isolate the pump if the pump should fail while the rest of the system is still in operation and under vacuum.

A manual ball valve should be inserted in line between the pumping system and the main header.

Most supply houses offer pneumatic or electrically-operated PVC ball valves. These positive-acting valves are recommended over the standard spring-actuated or flapper-check valve since they ensure that fluid in the pumping system is not drawn into the vacuum pump and that the vacuum pump is not throttled by the smaller orifices usually found in check valves.

Using individual ball valves at each remote vacuum station permits isolation of a particular station from the total system. When a problem develops, these valves allow you to disconnect the station from the central system. An additional advantage of having a ball or globe valve at each station is its ability to provide vacuum control for each operating unit.

## Gauge Placement

Gauges to monitor the performance of the system complement close control of the system. In the ATE industry, vacuum levels rarely exceed 28 in. Hg, and many units can operate in such ranges as 15-20 in. Hg. In the latter case, the simplest vacuum gauges will allow reasonably good control of the system. One gauge of higher accuracy (capsule or Bourdon type) should serve as a standard to check other gauges.

Gauge layout in the system can take the form of a series of 1/2-in. or 1/4-in. NPT pipe plugs placed at strategic locations throughout the system for use as gauge ports. These gauge ports are usually placed on each side of any control valve, which facilitates troubleshooting by the ability to take vacuum readings at the various points without investing in excessive number of vacuum gauges. Gauge ports should also be installed at the vacuum source for troubleshooting purposes and at any test station that does not have a built-in gauge on the ATE to assure proper vacuum operating levels.



## Vacuum System Installation

Once you have designed your vacuum system, install the vacuum pump and leak test the system. Refer to the vacuum installation illustrations in “Vacuum System Installation Types” on page 23.

### Local Vacuum Installation

**Requirement** 1-1/4 in. flexible hose between pump and ATE for installation.

- 1 Locate your pump within 10 feet of the tester.
- 2 Verify that the AC power source is supplying the correct voltage for your pump.
- 3 Connect the vacuum pump to the AC power source.
- 4 Connect the vacuum hose between the pump and the tester’s vacuum inlet.
- 5 Make sure the tester VAC controls are off or closed.
- 6 Turn on the vacuum pump.

### Remote Vacuum Installation

#### Requirements

- 1 shut off valve needed near system
- 1 remote power switch with on/off indicator light needed near system.
- 2 in. schedule 40 PVC for piping from pump to ATE with required reducers (2 in. to 1-1/4 in.) at the test system.

- 1 Locate your pump in the remote location.
- 2 Verify that the AC power source is supplying the correct voltage for your pump.
- 3 Connect the vacuum pump to the AC power source and piping which supplies vacuum to the ATE.
- 4 Connect the vacuum hose between the vacuum supply line and the tester vacuum inlet.
- 5 Make sure the tester VAC controls are off or closed.
- 6 Turn on the vacuum pump.
- 7 Open the shut off valve to the ATE.

### Central Vacuum Installation

Connect the vacuum hose between the vacuum supply line and the vacuum inlet of the test system.

#### Requirements

- 3 in. to 4 in. PVC main header pipe
- 1 isolation/check valve and 1 shut off valve per pump
- 1 shut off valve per test system (test system isolation valve)
- 1 flexible hose per system
- 1 vacuum gauge per pump
- 1 vacuum gauge for entire vacuum system
- 2 in. PVC for branch lines to tester(s)
- 1-1/2 in. PVC drop to test systems with 1-1/4 in. reducer at the test system

## Leak Testing

The Rate of Rise test verifies that the vacuum system leakage is within acceptable limits. To leak test the vacuum system plumbing, first determine its “rate of rise,” which entails valving the system off from the vacuum source and the individual test stations and then pumping the system down to 28 in. or 29 in. Hg.

To observe the vacuum tightness of the system, measure the time it takes for the vacuum level to rise to a higher pressure (worse vacuum) as indicated by a change on the system vacuum gauge from 28 in. Hg. to 23 in. Hg.

**Maximum Values for Acceptable Rates of Rise** Refer to Table 1.2 which provides the maximum values for acceptable rates of rise in various sizes of systems.

Total Volume of System Piping	Maximum Acceptable Time for Pressure to Rise 5 in.-Hg*
10-ft. <sup>3</sup>	45 sec
50-ft. <sup>3</sup>	3 min, 45 sec
100-ft. <sup>3</sup>	7 min, 30 sec
200-ft. <sup>3</sup>	15 min
* From 28-in. to 23-in. Hg	

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## Computer Requirements

In order for your tester software to run smoothly and efficiently, the computer should meet the following minimum requirements.

- 80486DX/66 MHz CPU
- 8 Mb RAM memory
- 500 Mb hard disk (IDE) or larger with 15mS maximum access time
- CD-ROM drive, double speed (quad speed preferred), IDE interface
- 1.44 Mb 3.5 in. diskette drive
- Minimum of one available unused 16-bit AT bus hardware adapter slot (for system I/O board). A second slot is needed if IEEE or VXI is required.
- Two RS232 serial ports; one parallel port
- VGA adapter card with 2 Mb video memory (e.g. Diamond Stealth 32 or equivalent)
- VGA display monitor
- MS DOS 6.2 or later; MS DOS 7.0 for Windows 95
- Memory manager: EMM386 (part of MS DOS) or QEMM version 7.0 or later
- A mouse, either bus or serial, depending on your need for serial ports and the availability of interrupts.

If you are using Windows 95, your computer should meet the following requirements for optimal performance:

- 80486DX/66 MHz CPU
- 16 Mb RAM

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## Board Assignment Recommendations

If you are planning to use a fixture on several test systems, you should plan a standard hardware configuration for all testers so that fixtures and programs will be compatible when transported from location to location. In particular, you should standardize the locations you choose for the various boards which are installed in the test head cage.

Board types include driver/receiver boards of various capability (such as the DRI, DR2, DR2P, and DR2D), FIBs (Function Interface Boards), DeltaScan, and others.

**Board Configuration Example** One recommended configuration is shown in the following table.

This configuration is for any 1024 node system.

Slot	Board Type
<b>Spare</b>	DeltaScan board. If your tester does not have a spare slot, place the Dscan board in slot 31.
<b>0</b>	Driver/Receiver (D/RI or D/RII or D/R2D as equipped).
<b>6</b>	DR2P (optional board. Driver/Receiver if DR2P not present)
<b>7</b>	DR2P (optional board. Driver/Receiver if DR2P not present)
<b>8</b>	DR2P (optional board. Driver/Receiver if DR2P not present)
<b>9</b>	DR2P (optional board. Driver/Receiver if DR2P not present)
<b>12</b>	FIB (optional board. Driver/Receiver if FIB not present. Check interconnects and SOP for FIB location—last empty card slot in system.)
<b>13–28</b>	Driver/Receiver boards
<b>29</b>	PRISM-Z
<b>30</b>	PRISM-Z
<b>31</b>	DeltaScan



## Z1800-SERIES SITE PREPARATION CHECKLIST

**Important:** Fax a copy of this checklist for the appropriate test system to the customer contact prior to site prep review.

Company Name / Location: \_\_\_\_\_

Customer Number: \_\_\_\_\_

Primary Customer Contact: \_\_\_\_\_ (W) \_\_\_\_\_ (FAX) \_\_\_\_\_

Secondary Customer Contact: \_\_\_\_\_ (W) \_\_\_\_\_ (FAX) \_\_\_\_\_

Customer Expected Date of Installation: \_\_\_\_\_

System Type / Options: \_\_\_\_\_

- |                          |                          |  |
|--------------------------|--------------------------|--|
| <b>Environmental</b>     | <input type="checkbox"/> | Ambient Temperature 64°–89°F (18°–32°C)  |
|                          | <input type="checkbox"/> | Relative Humidity: 20%–70% non-condensing  |
|                          | <input type="checkbox"/> | Optional Vacuum Pump Temperature: 32°–122°F (0°–50°C)  |
| <b>Power</b>             | <input type="checkbox"/> | Verify tester-specific power requirements previously cited in this guide   |
|                          | <input type="checkbox"/> | Peripheral Equipment: 120 VAC @ 15 A single-phase duplex   |
|                          | <input type="checkbox"/> | Optional Vacuum Pump: 208 VAC @ 30 A 3-phase NEMA L15-20P  |
| <b>Vacuum</b>            | <input type="checkbox"/> | Facilities Vacuum, Busch Pump Option purchased from Teradyne   |
|                          | <input type="checkbox"/> | Other vacuum system supplied by customer   |
|                          | <input type="checkbox"/> | 20 in. of mercury at the system with 28-41 CFM capacity (41 CFM recommended); 1 in. NPT male thread within 10 ft. of system          |
| <b>PC (Min. Req.)</b>    | <input type="checkbox"/> | 486DX2/66 • 8Mb RAM • 500Mb HD with 15 ms max access time  |
|                          |                          | • double speed CD ROM with IDE interface   |
|                          |                          | • 1.44 Mb 3.5 in. diskette drive   |
|                          |                          | • VGA adapter card with 2Mb video memory   |
|                          | <input type="checkbox"/> | MS DOS 6.2 or later loaded; MS DOS 7.0 for Windows 95  |
|                          | <input type="checkbox"/> | Memory Manager loaded: QEMM 7.0 or later or EMM386 part of MS DOS  |
|                          | <input type="checkbox"/> | Two RS-232 serial ports; one parallel port   |
|                          | <input type="checkbox"/> | Minimum of one available unused 16-bit ISA slot for PC I/O. Reserve the second slot if IEEE or VXI is required now or in the future. |
|                          | <input type="checkbox"/> | VGA display monitor  |
|                          | <input type="checkbox"/> | Mouse, either bus or serial depending on your application's need for serial ports and the availability of interrupts                 |
| <b>Crate Information</b> | <input type="checkbox"/> | 10 ft. clearance from crate box end marked "Ramp End"  |
|                          | <input type="checkbox"/> | Discuss crated dimensions for system   |
|                          | <input type="checkbox"/> | Leave strapping and ramp in place  |
|                          | <input type="checkbox"/> | Teradyne should uncrate. If Teradyne does not uncrate the tester, use the uncrating instructions in this manual.                     |
| <b>Floor Space</b>       | <input type="checkbox"/> | Forklift is required for uncrating 1884 system   |
|                          | <input type="checkbox"/> | Discuss uncrated dimension, floor space, and clearance requirements for the system ordered   |

