

TestStation SE™ Site Preparation Guide



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CMU™	GR-X1550™	MultiScan™	Spectrum™	Z1800-Series™
Cshell™	GR-X4005™	MultiScan II™	Spectrum 8800-Series™	Z1820VP™
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D2B™	GR-X7005™	NXR™	Stronghold™	Z1880VP™
Design-to-Build™	GR-X7010™	Opens Xpress™	Synclod™	Z1890VP™
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D2B DesignView™	GR4000™	Optima 7200™	Knowledge®	
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D2B Strategist™	GR 228X™	Optima 7200 OPT™	Teradyne®	
D2B DFx™	GR & Des.™	Optima 7210 OPT™	TeraNet	
D-TRACKER™	GR AccelerATE®	Optima 7300™	Teradyne & Des.	
DBIU™	GR Advise™	Optima 7350™	TestAdvisor	
Defect Display Station	GR Navigate™	Orient Xpress™	TestStudio™	
(DDS)™	GRNet™	Panel-Test™	Test Toolbox™	


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WARNINGS

- Do not remove covers. Potentially lethal voltages are present inside the system. Observe all WARNING markings on the equipment and WARNING notices in the manual. If servicing is necessary, it should be performed only by a qualified person familiar with the electrical shock hazards present inside the system.
- Grounding circuit continuity is vital for safe operation of the equipment. Never operate equipment with grounding conductor disconnected.
- Safeguard your hands and fingers while handling any fixture or other accessory. Be sure it is securely supported if you reach under it. If it is heavy, you must have another person help to move it.
- The symbol  IEC417 on equipment signifies that the manual contains information to prevent injury or equipment damage. Observe and heed all WARNING notices in the manuals and the equipment. WARNINGS call attention to personnel safety information.
- Replace any fuse only with the same type and ratings as labeled on the equipment and/or listed in the manual.


MISES EN GARDE

- Ne pas enlever les couvercles. Les niveaux de tension se trouvant dans le système sont extrêmement dangereux. Respectez toutes les consignes de sécurité figurant sur l'équipement et les MISES EN GARDE données dans ce manuel. Seule une personne qualifiée, connaissant les risques de décharge électrique du système, est autorisée à effectuer les opérations de nettoyage ou de réparation du système.
- Le circuit doit être mis à la terre sans discontinuation pour garantir un fonctionnement sans danger de l'équipement. Ne jamais faire fonctionner l'équipement pendant que le raccord à la terre est déconnecté.
- Protégez-vous les mains et les doigts pendant le maniement de tout dispositif de serrage ou autre accessoire. Assurez-vous que ceux-ci soient bien solidement fixés en place, avant de vous pencher sous eux. Si l'accessoire en question est trop lourd, faites-vous aider pour le déplacer.
- Le symbole  IEC417 figurant sur l'équipement signifie que le manuel contient des informations permettant d'empêcher les accidents ou l'endommagement de l'équipement. Respectez toutes les consignes de MISES EN GARDE données dans le manuel et figurant sur l'équipement. Les MISES EN GARDE attirent l'attention sur la nécessité de se protéger.
- Ne remplacez les fusibles qu'avec des fusibles du même type et de la même valeur que ceux mentionnés sur l'équipement et figurant dans le manuel.


WARNHINWEISE

- Abdeckungen nicht entfernen. Potentiell lebensgefährliche Spannungsbedingungen innerhalb des Systems vorhanden. Alle auf der Einrichtung befindlichen WARNMARKIERUNGEN und im Handbuch enthaltenen WARNHINWEISE beachten. Wartungsarbeiten dem qualifizierten Personal überlassen, das mit den innerhalb des Systems vorhandenen Gefahren eines elektrischen Schlags vertraut ist.
- Die Erdung des Schaltungsdurchgangs ist eine Grundvoraussetzung für den sicheren Betrieb der Einrichtung. Einrichtung niemals ohne Erdleiter betreiben.
- Hände und Finger bei der Handhabung einer Spannvorrichtung oder eines anderen Zubehörschutzes. Sich vor der Platzierung der Hände unterhalb der Einrichtung vergewissern, daß die Einrichtung über ausreichenden Halt verfügt. Falls die Einrichtung schwer ist, sich von einer anderen Person beim Tragen helfen lassen.
- Das auf der Einrichtung befindliche Symbol  IEC417 bedeutet, daß das Handbuch Informationen zur Verhinderung von Körperverletzungen oder Sachschäden enthält. Alle in den Handbüchern enthaltenen und auf der Einrichtung befindlichen WARNHINWEISE beachten und befolgen. WARNHINWEISE sollen auf Informationen zur persönlichen Sicherheit aufmerksam machen.
- Sicherungen nur durch Sicherungen des gleichen Typs und der gleichen Nennleistung ersetzen. Auf der Einrichtung befindliche Etiketten und im Handbuch enthaltene Informationen zu Rate ziehen.

AVISOS

- Não remova as tampas. Há voltagens potencialmente fatais presentes na parte interna do sistema. Observe todas as marcações de AVISOS no equipamento e descrições de AVISOS no manual. Se for necessário fazer manutenção, esta deve ser feita somente por uma pessoa qualificada familiarizada com os perigos de choques elétricos presentes na parte interna do sistema.
- A continuidade do circuito de aterramento é vital para a operação segura do equipamento. Nunca opere o equipamento com o cabo de aterramento desligado.
- Proteja as suas mãos e dedos ao operar qualquer dispositivo ou outro acessório. Certifique-se que ele esteja suportado com segurança se você tiver que alcançar algo debaixo dele. Se for pesado, você deve ter a ajuda de uma outra pessoa para movê-lo.
- O símbolo  IEC417 no equipamento significa que o manual contém informações para prevenir ferimentos ou danos ao equipamento. Observe e preste atenção a todos os AVISOS nos manuais e no equipamento. Os AVISOS chamam a atenção a informações sobre a segurança pessoal.
- Substitua qualquer fusível somente com um do mesmo tipo e da mesma capacidade nominal como marcado no equipamento e listado no manual.

ADVERTENCIAS

- No quitar las tapas. En el interno del sistema hay voltajes potencialmente mortales. Obsérvense todos los rótulos de ADVERTENCIA presentes en el equipo, así como la descripción de las notas de ADVERTENCIA presentadas en el manual. De ser necesario, el servicio de mantenimiento deberá ser efectuado únicamente por personal calificado que esté familiarizado con los peligros de choque eléctrico presentes en el sistema.
- La continuidad del circuito de puesta a tierra es de vital importancia para el funcionamiento seguro del equipo. Nunca se debe usar el equipo con el conductor de puesta a tierra desconectado.
- Protéjense las manos y los dedos toda vez que sea necesario manipular un dispositivo u accesorio. Cerciorarse de que el mismo esté firmemente sujetado antes de proceder a trabajar debajo de él. Si el aparato u accesorio fuera pesado, pedir la ayuda de otra persona para moverlo.
- El símbolo  IEC417 que aparece en el equipo significa que el manual contiene informaciones para evitar lesiones personales o daños al equipo. Obsérvense y préstese atención a toda las notas de ADVERTENCIA presentes en los manuales y en el equipo. Las ADVERTENCIAS sirven para llamar la atención sobre informaciones de seguridad para el personal.
- Reemplazar los fusibles únicamente con otros del mismo tipo y capacidad, según lo indique el rótulo en el equipo y la descripción en el manual.

CAUTIONS

- Observe and heed all CAUTION notices in the manuals and on the equipment. CAUTIONS call attention to information about safeguarding *equipment* from damage.



HANDLING PRECAUTIONS FOR ELECTRONIC DEVICES SUBJECT TO DAMAGE BY STATIC ELECTRICITY

Place instrument or module to be serviced, spare parts in conductive (anti-static) envelopes or carriers, hand tools etc. on a work surface defined as follows. The work surface must be conductive and reliably connected to earth ground through a safety resistance of approximately 250 kilohms. The surface must **NOT** be metal. (A resistivity of 30 to 300 kilohms per square inch is suggested.) Avoid placing tools or electrical parts on insulators.

Ground the frame of any line-powered equipment, test instruments, lamps, soldering irons, etc., directly to earth ground. To avoid shorting out the safety resistance, be sure that grounded equipment has rubber feet or other means of insulation from the work surface. The module being serviced should be insulated while grounded through the power-cord ground wire, but must be connected to the work surface before, during and after any disassembly or other procedure in which the line cord is disconnected.

Exclude any hand tools (such as non-conductive plunger-type solder suckers) that can generate a static charge.

Ground yourself reliably, through a resistance, to the work surface; use, for example, a conductive strap or cable with a wrist cuff. The cuff must make electrical contact directly with your skin; do **NOT** wear it over clothing. (Resistance between skin contact and work surface through a commercially available personnel grounding device is typically 250 kilohms to 1 megohm.)

If any circuit or IC packages are to be stored or transported, enclose them in conductive envelopes or carriers. Remove them only with the above precautions; handle IC packages without touching the contact pins.

Avoid circumstances that are likely to produce static charges, such as wearing clothes of synthetic material, sitting on a plastic-covered stool (particularly while wearing wool), combing your hair, or making extensive erasures. *These circumstances are most significant when the air is dry.*

When testing static sensitive devices, be sure DC power is on before, during, and after application of test signals. Be sure all pertinent voltages have been switched off while boards or components are removed or inserted.

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Site Preparation Checklist

Using This Manual

Purpose

This document describes the information to consider before installing or moving a TestStation SE™ system, or before adding optional equipment to the system. Safety and efficiency considerations related to site selection, preparation and management are also described.

This guide enables you to prepare a site for your system that will permit the system to function in a safe, reliable and efficient manner, while enabling personnel to work in a comfortable and safe environment.






After installation, keep this guide with other system documentation. See this guide when any changes to the configuration or site are contemplated. This user's guide provides information you need to effectively use your TestStation SE system to perform production testing.

Audience

This document should be read by all personnel with responsibility for site selection, preparation, and management of the system.

Document Conventions

The following document conventions are used throughout the documentation set.

Convention	Indicates
Bold monospace text	command text that you enter
Bold text	commands, keys, buttons, prompts, menu options, icons, and literals within text
Courier text	command, syntax, or error message
<i>Italic monospace text</i>	replace the <i>term</i> with a valid entry
<i>Italic text</i>	manual title, chapter title, or section title
P/N or PN	part number
[<i>text</i> , <i>text</i>]	field within the brackets is optional
{ <i>text</i> , <i>text</i> }	select one or more choices within the braces
CAUTION	potential harm to the system or equipment as a result of this action
 Example	the beginning of an example
 End Example	the end of an example
 NOTE	specialized information that may benefit you
 NEXT	informational options that direct you to the next chapter or step
 WARNING	potential harm to you as a result of this action
... and :	the omission of undetermined information

Technical Support Center

You can contact the Technical Support Center for assistance at any time if you are unable to solve a problem through the use of online Help or product documentation.

Before contacting the Technical Support Center, please have the following information available:

- Your customer number
- Hardware system type
- System serial number
- Software version number

You can contact the Technical Support Center using the information below.

Phone	Worldwide Support Line 1-800-TERADYNE (1-800-837-2396)
Fax	(978) 370-6260
E-mail	cs1@teradyne.com
Mail	Teradyne, Inc. Assembly Test Division 500 Riverpark Drive, MS NR5001-5 North Reading, MA 01864
World Wide Web	http://www.teradyne.com Click the <i>Circuit Board Test & Inspection</i> link on the webpage.

Internet Information

Access to up-to-date information on products, technologies and programs is available on the Teradyne World Wide Web Site, www.teradyne.com.

How To Order Additional Documentation

To reorder this manual or any others, contact Customer Support.

Worldwide Support Line
1-800-TERADYNE (1-800-837-2396)

Part Number
034-154-00

Chapter 1

Site Preparation Overview

Site Planning Before System Delivery

Proper site planning before receiving your system is the key to a smooth installation as well as efficient production flow during operation. Major considerations include space, weight, environmental, power, vacuum, and cooling requirements, as well as delivery routing. Figure 1-1 shows a typical system. If you require site planning assistance, contact the Teradyne Technical Support Center using the information in the *Technical Support Center* of *Using This Manual*.

Figure 1-1 TestStation SE



Site Planning Requirements

The following sections provide an overview of the requirements related to the site planning process.

Location

In a busy production environment, place the tester near the main flow of boards in the assembly line. Also, locate the board repair and fixture storage areas nearby. In a low-to-medium production environment, provide ample room for carts containing board boxes.

Locate your tester within 10 feet of a source of AC power. AC power cords for all testers are 15 feet long and are provided with power source connectors.



Note: European power source connectors are not provided for European installations. Make connections according to country and local electrical codes.

Space Requirements

Provide adequate space for the placement and servicing of the system and peripherals. In addition, consider space requirements for operating personnel, tables, chairs, and storage areas (for such things as test fixtures and paper) and sufficient space for adequate ventilation of the system components. See Chapter 2.

Weight Requirements

System weight, as well as the weight of peripheral equipment and other items positioned in the same general area, must be considered. The floor loading capacity must be sufficient to support the weight involved. Most industrial plant floors support weights of 50 psf (2.4 kPa) or more, which is normally adequate for this type of equipment. If you have a question as to whether the floor loading capacity or structural considerations are adequate, consult a qualified structural engineer before delivery. See Chapter 2.

Environmental Requirements

A room with an air distribution system that provides cool, well-filtered humidified air is ideal for this system. Air pressure within the room should be maintained at a higher level than the air pressure of adjacent areas to prevent dust infiltration. While this system does not require an absolute clean-room environment, cleanliness and freedom from excessive heat and dust should always be a prime consideration to reduce the possibility of equipment failure caused by heat and dust build-up. Maintain the temperature and humidity specifications for the system and its peripheral equipment within safe operating levels at all times. See Chapter 2, *System Requirements*.

Power Requirements

Provide input power and grounding requirements before system installation. Sufficient AC power must be available for all equipment. A separate earth safety ground connection is also required for this system. Electrical conduit is not considered an acceptable separate earth ground path; however, water pipes or other known good earth ground paths may sometimes be used. Locate fuse or circuit-breaker-protected AC outlets and safety ground connections as close to the system as possible in order to keep cable runs short. See Chapter 2, *System Requirements*.



Note: In locations outside of the United States, you must adjust the line conditioner transformer to the local AC line voltage. The transformer has taps to accommodate incoming voltages between 100 and 240 VAC for TestStation SE.

Vacuum Requirements

Vacuum is required for system operation. Vacuum serves two functions: it mates the test fixture with the system's receiver and mates the unit under test to the test fixture. The customer is responsible for providing and connecting AC input power to the vacuum pump motor and connecting the vacuum fittings from the pump to the system's vacuum port on the rear of the power bay. See Chapter 2, *System Requirements* and Chapter 4, *Additional Site Requirements*.

Cooling Requirements

The site cooling plant must be able to compensate for the heat produced when the system is in operation. The heat produced by the system, and any attached peripherals, is computed based upon the amount of current required by the system and its peripherals. See Chapter 2, *System Requirements*.

Delivery Routing

Before the system is delivered, determine the route that the system crates will travel from the receiving area to the installation site. Develop a routing plan to cope with such problems as bends or obstructions in hallways, elevator size, and weight limitations. Advance planning to eliminate obstructions along the delivery route can save valuable time during installation.

Teradyne recommends that the crated system be moved from your receiving area to the system's installation site (see Table 2-1 on page 2-1 for dimensions). Standard practice is that Teradyne's installer uncrates the system at its installation site. You must provide a minimum distance of 12 ft (3.66 m) to the right side of the fork lift entry for uncrating space at the installation site.

Board Assignment

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

Required Equipment, Tools, and Personnel

The following personnel, equipment, tools, and other items are required for uncrating and installation procedures:



Note: Do not uncrate any tester component or unpack any cartons without the Teradyne field service engineer present.

- Four people - A minimum of four persons are required to remove the uncrated tester from its pallet-skid
- Fork lift
- Ratchet socket wrench set
- Phillips head #2 screwdriver
- Allen wrench set
- $\frac{3}{8}$ -inch blade knife to cut cardboard crate
- Nail puller or claw hammer
- Heavy wire cutter or other cutting tool to cut straps
- Digital voltmeter
- Bubble-type level
- Safety goggles
- Non-detergent SAE (Society of Automotive Engineers) 30W motor oil (0.95 liter; 1 quart), if the optional vacuum pump is being installed

Chapter 2

System Requirements

This chapter describes the space and weight; environmental; input power; and cooling requirements in addition to site considerations for peripheral equipment and test fixture procurement.

Space and Weight Requirements

The shipping information in Table 2-1 is for the crated system and optional equipment. For space planning purposes, Table 2-2 on page 2-2 lists the uncrated dimensions and weight for the system and optional peripheral equipment. Figure 2-1 shows system space requirements. When planning space requirements for the system and its optional peripherals:

- Allow sufficient room around the system and its peripherals for access by operation and service personnel. Sufficient room is considered 40 in. (101.6 cm) between each side of the system and the nearest wall or any other obstacle.
- If systems are located adjacent to each other, make certain that proper air space separates them to prevent the exhaust air of one system from being drawn into the other system.
- Do not block the air vents that are located on all four corners of the system.

Crated System Dimensions and Weight

Table 2-1 contains the dimensions and weight of a crated system without its peripherals and various cartons.

Table 2-1 Crated Dimensions and Weight

Dimensions (width x height x length)	42" x 62" x 53" (106.68 x 157.48 x 134.62 cm)
Weight in kg	410.51 kg
Weight in lb	905 lb

Uncrated System Dimensions and Weight

Table 2-2 contains the dimensions and weight of a crated system without its peripherals and various cartons.

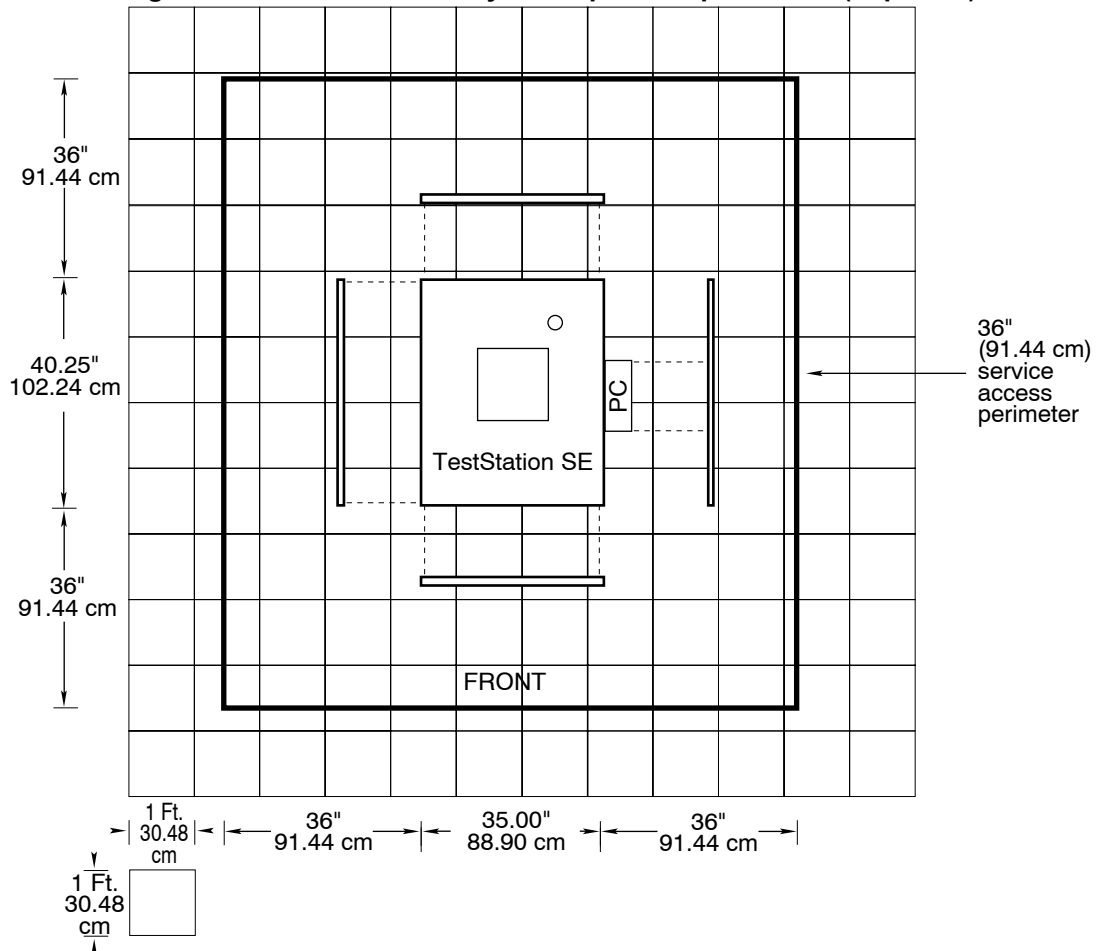
Table 2-2 Uncrated System Dimensions and Weight

Dimensions (width x height x length)	40.25" x 32.50" x 36" 102.2 cm x 82.55 cm x 91.44 cm
Weight in kg	297.11kg
Weight in lb	655 lb (approximate)

Space Requirements

Figure 2-1 shows the space requirements for TestStation SE.

Figure 2-1 TestStation SE System Space Requirements (Top View)



Power Requirements

Nominal Power Requirements	100, 110, 120, 127, 200, 210, 220, 230, 240VAC (+6%, -13%) 2.3 kVA, 3-wire, 50–60 Hz single-phase
Power Connector provided	NEMA L5-30P
Recommended European installation	IEC 320-16A (not supplied)
Breaker Service	@ 200V or less: 25 Amps @ 201V or more: 13 Amps

In all cases, adhere to country and local electrical codes.

Vacuum Requirements

Vacuum Pump Capacity	41 CFM
Vacuum (Minimum)	20" Hg

Vacuum Pump Location

Install the Busch pump in a horizontal position on a level surface so that it is evenly supported on its feet. Allow at least 1 ft (30.5 cm) of air space between the pump and any walls or other obstructions for the flow of cooling air.

Also, provide access space for:

- Viewing the oil-sight glass (located on the lower side of the pump).
- Maintaining the vacuum pump (adding/changing oil and filter replacement). It is recommended that the pump's exhaust be vented outside of the building.

Environmental Requirements

These operating and storage environmental limits apply to the entire system including its equipment options when they operate as part of the system. Manufacturers of peripheral equipment may list operational temperature and humidity ranges that exceed the system limits shown in the following sections.

System

The system operating and storage environmental limits are:

Limit	Operating Environment
Relative Humidity	20 to 70% non-condensing
Ambient Temperature	15°–35°C 59°–95°F

Chapter 3

Safety Considerations in Site Planning

This chapter contains considerations in site planning relating to the safety of both personnel and the equipment.

System Grounding

A separate (10 ft [3 m]) safety-ground wire is supplied with the system and must be connected from the system's ground lug to a known earth ground.

Methods of grounding the system are:

- Connection to a water pipe or known earth ground.
- Connection to a ground stake, which is a long steel rod is placed in a hole drilled through the floor into the ground below. Install according to country and local electrical codes. Do not block the air vents that are located on all four corners of the system.

Fire Precautions

Take all necessary precautions against fire. Store permanent documents, tape cartridges, and spare parts, etc in a fire-proof area. Overhead sprinklers can be used if the water heads are not directed at the equipment. Additionally, sprinkler heads should not be located directly over the system or its fan intake/exhaust path. Locate wall-mounted CO₂ (carbon dioxide) fire extinguishers within easy reach of the system.

Personnel Safety Considerations

Facility personnel (especially operators) should be familiar with the emergency power shut-down procedure and with how to notify the fire department. Preparedness might well result in saving expensive equipment.

An operator is adequately protected from electrical shock. Nevertheless, personnel trained in first aid for electrical shock and burns should be always available.

Unauthorized personnel should not remove any of the system's panels, which are provided for system cooling and protection of the electronics. Review the instruction manuals for precautions needed to assure safe operation.

Chapter 4

Additional Site Requirements

Vacuum System Design

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

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

Planning the design can make the difference between an efficient vacuum system which is easy to maintain and a marginally serviceable one. Review this section to understand the full scope of incorporating a vacuum supply system into your factory environment.

Environmental Requirements

If you are using Teradyne-supplied portable pumps, plan the location of your pumps carefully to make sure that the following requirements are met:

- 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: 0° – 50° C (32°-122° F).
- Relative Humidity: 20% – 70%, non-condensing.

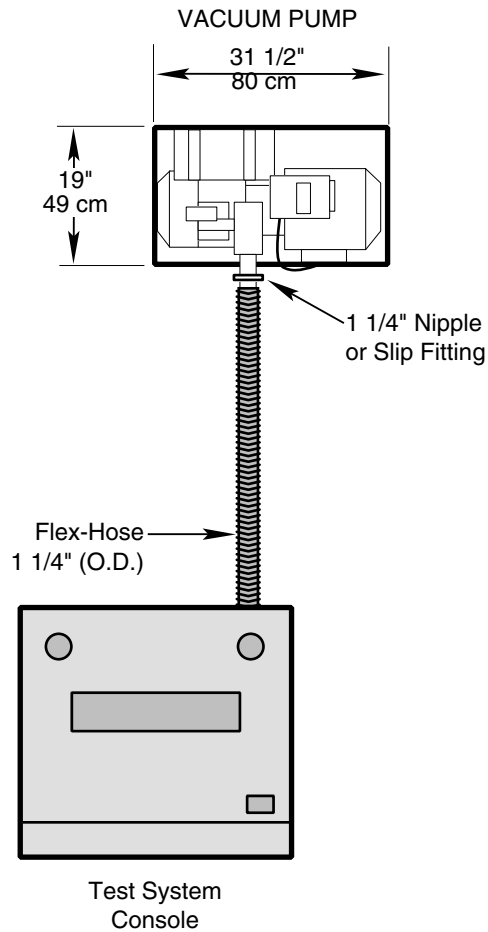
Vacuum System Sources

Your vacuum source defines the type of installation necessary for your tester. There are three types of vacuum sources: local, remote, and central. When instating, allow free access for maintenance, as well as adequate ventilation.

Local

If only limited space is available at the site (single-system site) or if the site is temporary, use a local source close to your tester. Figure 4-1 shows how to connect vacuum from a local location to your tester.

Figure 4-1 Local Vacuum Installation

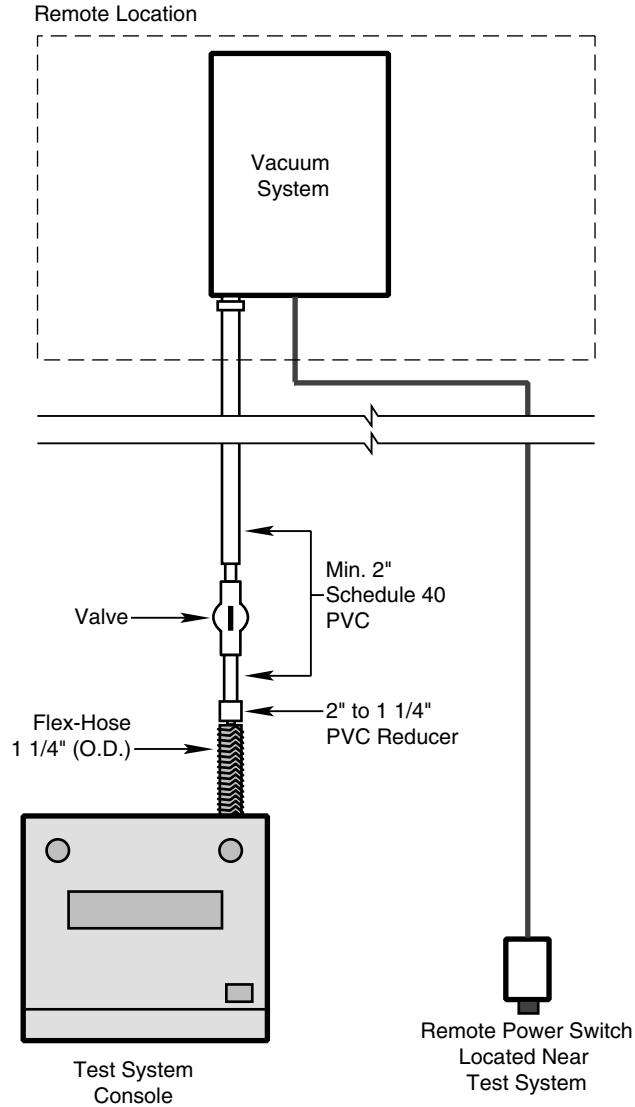


* Dimensions apply to pumps supplied by Teradyne

Remote

A remote vacuum source is located away from the tester in an equipment room. Such a source reduces noise and clutter, keeps the air clean, and minimizes power outlet requirements near the tester. Figure 4-2 shows how to connect vacuum from a remote location to your tester.

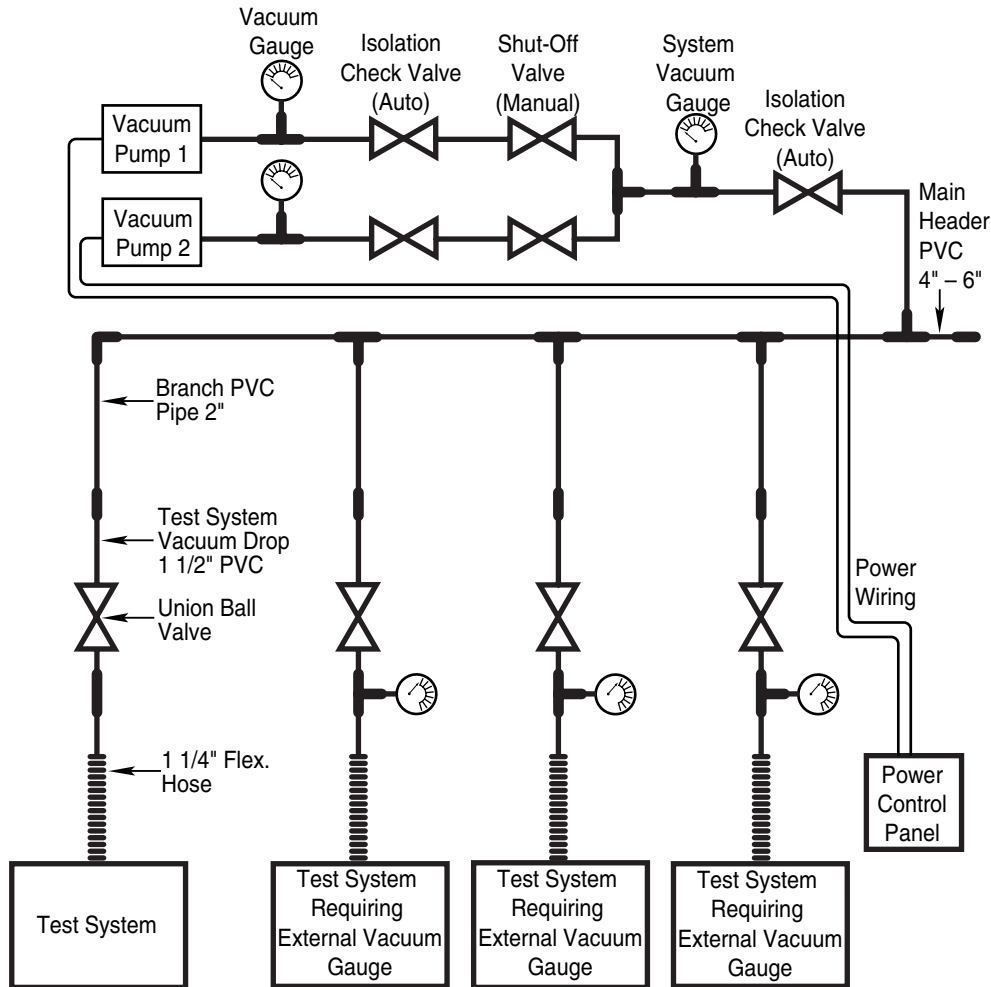
Figure 4-2 Remote Location



Central

A central vacuum source, located away from the tester, supplies vacuum to more than one piece of equipment. The central source is appropriate if you plan to install other systems or equipment requiring vacuum, or if the size of your facility requires more than one pump. Situating all the pumps in one area adds to the ease of maintenance. Figure 4-3 shows how to connect vacuum from a central location to your tester.

Figure 4-3 Central Location



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.

For remote and central vacuum (multiple-outlet) systems, use the minimum pipe diameters recommended in Table 4-1.

Table 4-1 Minimum Pipe Diameter for Remote/Central Systems

Total Capacity of Vacuum System	Minimum Recommended 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 can install pipes with diameters which exceed the minimum standards presented in Table 4-1. By choosing a large pipe diameter, you 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, consider having a vacuum reservoir at your facility.

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



Note: 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.

The low cost-per-linear-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.

Valve Selection and Placement

Valve selection and placement determine the versatility of a system and the ease with 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 for the acquisition and placement of the following:

- Valves with ports approximately equal to line size
- Isolation and control valves

The valves should have ports approximately equal to the size of the line 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. They are available through local plastic pipe and supply houses.

Isolation and Control Valves

Working from the pump end of the system, 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, because they make sure 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.

Gauges

Vacuum gauges help ensure optimal system performance.

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 allow reasonably good control of the system. One gauge of higher accuracy (a capsule or Bourdon type) should serve as a standard to check other gauges.

Gauge layout in a remote or central 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 ports, usually placed on either side of a control valve, enable you to use a minimum number of gauges to take readings at various points and then move them to other ports in the system.

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 equipment to ensure proper vacuum operating levels.

Modem Requirements

A telephone line must be available if you purchased a modem. Teradyne recommends a standard direct line in and out of the building. If a direct line is not available, certain conditions must be considered. If a PBX system is used, the PBX must be programmed for both data and voice if a phone is to be used with both.

A telephone jack needs to be installed on the phone line. A standard RJ11C modular telephone jack (normally used for office and residential phones) is recommended. Teradyne recommends that you have one phone line for each system. Cable routing must take into consideration in an environment that provides the best possible clean and noise-free atmosphere; for example, do not route a cable near a 3-phase, 400-V power cable.

Fixture Storage

CAUTION

Store test fixtures carefully to prevent possible damage or corrosion to their electrical contacts.

Place a fixture storage rack (on wheels) near the system for fast and easy access to system test fixtures.

Circuit-board Storage Racks

Circuit-board storage racks (on wheels) facilitate test system throughput. Placing a rack of untested boards on one side of the operator and a rack of tested boards on the other side of the operator provides an efficient manner of handling circuit boards. An additional rack for defective boards can also be useful. In addition, the racks permit easy movement of circuit boards to and from the system within the production area.

CAUTION

Never place circuit boards on the surface of the test system. If you desire, place an ESD mat on the surface.

Telephone Installation

It is suggested that a telephone for in-plant use be available on or near the system. This enables the operator to contact supervisory personnel in production, test engineering, and application engineering when necessary.

Recommended Supplies

Teradyne recommends that you have the following supplies on-site.

Printer Paper

Purchase from a computer-related printer paper supplier.

PC Floppy Drive Diskette

The high-density, preformatted 3 1/2-inch diskette for the PC's floppy drive is available as Teradyne PN 9021-0025 (one diskette). Diskettes can also be ordered from most computer accessory suppliers.

CD ROM Drive CDs

Purchase from a computer parts supplier.

Additional Suggested Site Considerations

You may want to implement some of these suggestions at your site.

- Install a bulletin board near the system for posting messages.
- Obtain static-avoidance equipment.
- Keep spare nails available for test fixtures.
- Provide space in your facility for storing printer-paper.
- Provide a portable vacuum cleaner (with non-metallic bristle-brush fitting on end of hose) for cleaning the top of the fixture before the start of board testing.
- Keep a maintenance log, particularly for preventive maintenance. Secure all maintenance documentation, including the documentation for peripheral items, so that certain supply items and options can be obtained and preventive maintenance schedules are available when needed. The Maintenance Manual contains a series of blank site-status logging forms.
- Consult Teradyne about a maintenance contract and other services.

Appendix A

Site Preparation Checklist

The following activities are part of the site preparation planning and initiated after they are resolved. If you require site planning assistance, contact the Teradyne Technical Support Center. See *Using This Manual* for more information about contacting the Teradyne Technical Support Center.

Company Name/Location: _____

Customer Number: _____

Primary Customer

Contact: _____ (W) _____ (FAX) _____

Secondary Customer

Contact: _____ (W) _____ (FAX) _____

Customer Expected Date of Installation: _____

System Type/Options: _____

In the following steps, the * denotes critical items. The system cannot be installed without these requirements being met.

- ▶ To confirm the site preparation activities:
 - 1 *Identify the desired location for installation of the:
 - System
 - Vacuum pump, if applicable
 - 2 *Verify that all environment requirements are met:
 - Ambient Temperature 15°–35°C
 - Relative Humidity: 20%–70% non-condensing
 - Optional Vacuum Pump Temperature: 32°–122°F (0°–50°C)
 - Cleanliness
 - Free of airborne contaminants
 - 3 Plan the delivery route to the installation site.
 - 4 *Obtain required, stable input power for the site.

- System power available at the system location
100, 110, 120, 127, 200, 210, 220, 230, 240VAC @ 2.3 kVA, NEMA L5-30P



Note: System installation requires a power receptacle compatible with the National Electrical Manufacturer's Association (NEMA) standards as well as local electrical codes. Make certain, when ordering the power receptacle from your vendor, that the lead time for the receptacle's delivery allows for installation before the planned system delivery date.

- Date that the power receptacle was ordered
 - Power receptacle part number
 - Peripheral Equipment:
120 VAC @ 15 A one-phase duplex
 - Optional Vacuum Pump: 208 VAC @ 20A three-phase NEMA L15-20P
- 5** *Install a safety earth ground according to specifications.
- 6** Determine/install the type of flooring (unless cabling is to be installed under a raised floor).
- 7** Design the equipment, furniture, and storage layout for the site.
- *Leave a minimum of 40 in. (101.6 cm) from any side of the system and the nearest wall, or any other obstacles that could restrict system access or air flow.
 - *Leave a minimum of 12 in. (30.5 cm) between the sides of the system and the nearest peripheral.
 - Consider future expansion.
 - Consider safety and comfort of personnel.
 - Consider any required cabling to local and remote peripherals.
- 8** Allow for the following items in the site preparation plan:
- *Length of the vacuum line to the system.
 - *Length of the compressed air line and connection to the system.
 - *Obtain a compressed air fitting to attach supplied hose to air source.
 - Telephone and modem lines (analog line is required for the modem).
 - Fire extinguisher.
 - Sufficient space for other equipment, such as board carts or racks, to be moved around the system.
 - Storage equipment for fixtures.
 - Storage for additional supplies such as printer paper and ribbons, tape cartridges, PC diskettes, system air filter kit, and the filter kit for the Busch vacuum pump.
 - Facilities Vacuum, Busch Pump Option purchased from Teradyne or other vacuum system supplied by customer.
 - Vacuum of 20" of mercury at the system with 28–41 CFM capacity (41 CFM recommended); 1 1/4" NPT male thread within 10 ft. of system.
- 9** Crate Information:
- 10 ft. clearance from the end of the crate marked "Ramp End".

- Discuss crated dimensions for system.
 - Leave strapping and ramp in place.
 - Teradyne should uncrate.
- 10** Floor Space: Discuss uncrated dimension, floor space, and clearance requirements for the system ordered.
- 11** Provide for air conditioning (if applicable).
- 12** Static avoidance equipment.
- 13** Determine if the following items will be present or incorporated at the site:
- If any layered software is to be purchased, identify the loading, testing, and acceptance criteria.
 - Teradyne's Access (remote support) requirements.
 - Determine Ethernet or other networking requirements for the site.
 - Ensure that the system's configuration matches the site requirements.
 - Verify the network host system protocol.
 - Confirm that the Ethernet node is functional before the system's delivery.

