

**Models MT1 and MT2
MicroTorsion Testing System**



Pre-Installation Manual
M47-16625-EN Revision C

Electromagnetic Compatibility

Where applicable, this equipment is designed to comply with International Electromagnetic Compatibility (EMC) standards.

To ensure reproduction of this EMC performance, connect this equipment to a low impedance ground connection. Typical suitable connections are a ground spike or the steel frame of a building.

Proprietary Rights Notice

This document and the information that it contains are the property of Illinois Tool Works Inc. (ITW). Rights to duplicate or otherwise copy this document and rights to disclose the document and the information that it contains to others and the right to use the information contained therein may be acquired only by written permission signed by a duly authorized officer of ITW.

Trademarks

Instron[®] is a registered trademark of Illinois Tool Works Inc. (ITW). Other names, logos, icons and marks identifying Instron products and services referenced herein are trademarks of ITW and may not be used without the prior written permission of ITW.

Other product and company names listed are trademarks or trade names of their respective companies.

Original Instructions

Copyright © 2015 Illinois Tool Works Inc. All rights reserved. All of the specifications shown in this document are subject to change without notice.

Corporate Headquarters

Instron
825 University Avenue
Norwood, MA 02062-2643
United States of America

European Headquarters

Instron
Coronation Road
High Wycombe, Bucks HP12 3SY
United Kingdom

Industrial Products Group

Instron
900 Liberty Street
Grove City, PA 16127
United States of America

General Safety Precautions



Materials testing systems are potentially hazardous.

Materials testing involves inherent hazards from high forces, rapid motions, and stored energy. You must be aware of all moving and operating components in the testing system that are potentially hazardous, particularly force actuators or a moving crosshead.

Carefully read all relevant manuals and observe all Warnings and Cautions. The term Warning is used where a hazard may lead to injury or death. The term Caution is used where a hazard may lead to damage to equipment or to loss of data.

Instron products, to the best of its knowledge, comply with various national and international safety standards, in as much as they apply to materials and structural testing. We certify that our products comply with all relevant EU directives (CE mark).

Because of the wide range of applications with which our instruments are used, and over which we have no control, additional protection devices and operating procedures may be necessary due to specific accident prevention regulations, safety regulations, further EEA directives or locally valid regulations. The extent of our delivery regarding protective devices is defined in your initial sales quotation. We are thus free of liability in this respect.

At your request, we will gladly provide advice and quotations for additional safety devices such as protective shielding, warning signs or methods of restricting access to the equipment.

The following pages detail various general warnings that you must heed at all times while using materials testing equipment. You will find more specific Warnings and Cautions in the text whenever a potential hazard exists.

Your best safety precautions are to gain a thorough understanding of the equipment by reading your instruction manuals and to always use good judgement.

It is our strong recommendation that you should carry out your own product safety risk assessment.

Warnings



Hazard - Press the Emergency Stop button whenever you consider that an unsafe condition exists.

The Emergency Stop button removes hydraulic power or electrical drive from the testing system and brings the hazardous elements of the system to a stop as quickly as possible. It does not isolate the system from electrical power, other means are provided to disconnect the electrical supply. Whenever you consider that safety may be compromised, stop the test using the Emergency Stop button. Investigate and resolve the situation that caused the use of the Emergency Stop button before you reset it.



Flying Debris Hazard - Make sure that test specimens are installed correctly in grips or fixtures in order to eliminate stresses that can cause breakage of grip jaws or fixture components.



Incorrect installation of test specimens creates stresses in grip jaws or fixture components that can result in breakage of these components. The high energies involved can cause the broken parts to be projected forcefully some distance from the test area. Install specimens in the center of the grip jaws in line with the load path. Insert specimens into the jaws by at least the amount recommended in your grip documentation. This amount can vary between 66% to 100% insertion depth; refer to supplied instructions for your specific grips. Use any centering and alignment devices provided.



Hazard - Protect electrical cables from damage and inadvertent disconnection.

The loss of controlling and feedback signals that can result from a disconnected or damaged cable causes an open loop condition that may drive the actuator or crosshead rapidly to its extremes of motion. Protect all electrical cables, particularly transducer cables, from damage. Never route cables across the floor without protection, nor suspend cables overhead under excessive strain. Use padding to avoid chafing where cables are routed around corners or through wall openings.



High/Low Temperature Hazard - Wear protective clothing when handling equipment at extremes of temperature.



Materials testing is often carried out at non-ambient temperatures using ovens, furnaces or cryogenic chambers. Extreme temperature means an operating temperature exceeding 60 °C (140 °F) or below 0 °C (32 °F). You must use protective clothing, such as gloves, when handling equipment at these temperatures. Display a warning notice concerning low or high temperature operation whenever temperature control equipment is in use. You should note that the hazard from extreme temperature can extend beyond the immediate area of the test.

Warnings



Crush Hazard - Take care when installing or removing a specimen, assembly, structure, or load string component.

Installation or removal of a specimen, assembly, structure, or load string component involves working inside the hazard area between the grips or fixtures. When working in this area, ensure that other personnel cannot operate any of the system controls. Keep clear of the jaws of a grip or fixture at all times. Keep clear of the hazard area between the grips or fixtures during actuator or crosshead movement. Ensure that all actuator or crosshead movements necessary for installation or removal are slow and, where possible, at a low force setting.



Hazard - Do not place a testing system off-line from computer control without first ensuring that no actuator or crosshead movement will occur upon transfer to manual control.

The actuator or crosshead will immediately respond to manual control settings when the system is placed off-line from computer control. Before transferring to manual control, make sure that the control settings are such that unexpected actuator or crosshead movement cannot occur.



Robotic Motion Hazard - Keep clear of the operating envelope of a robotic device unless the device is de-activated.

The robot in an automated testing system presents a hazard because its movements are hard to predict. The robot can go instantly from a waiting state to high speed operation in several axes of motion. During system operation, keep away from the operating envelope of the robot. De-activate the robot before entering the envelope for any purpose, such as reloading the specimen magazine.



Hazard - Set the appropriate limits before performing loop tuning or running waveforms or tests.

Operational limits are included within your testing system to suspend motion or shut off the system when upper and/or lower bounds of actuator or crosshead travel, or force or strain, are reached during testing. Correct setting of operational limits by the operator, prior to testing, will reduce the risk of damage to test article and system and associated hazard to the operator.



Electrical Hazard - Disconnect the electrical power supply before removing the covers to electrical equipment.

Disconnect equipment from the electrical power supply before removing any electrical safety covers or replacing fuses. Do not reconnect the power source while the covers are removed. Refit covers as soon as possible.

Warnings



Rotating Machinery Hazard - Disconnect power supplies before removing the covers to rotating machinery.

Disconnect equipment from all power supplies before removing any cover which gives access to rotating machinery. Do not reconnect any power supply while the covers are removed unless you are specifically instructed to do so in the manual. If the equipment needs to be operated to perform maintenance tasks with the covers removed, ensure that all loose clothing, long hair, etc. is tied back. Refit covers as soon as possible.



Hazard - Shut down the hydraulic power supply and discharge hydraulic pressure before disconnection of any hydraulic fluid coupling.

Do not disconnect any hydraulic coupling without first shutting down the hydraulic power supply and discharging stored pressure to zero. Tie down or otherwise secure all pressurized hoses to prevent movement during system operation and to prevent the hose from whipping about in the event of a rupture.



Hazard - Shut off the supply of compressed gas and discharge residual gas pressure before you disconnect any compressed gas coupling.

Do not release gas connections without first disconnecting the gas supply and discharging any residual pressure to zero.



Explosion Hazard - Wear eye protection and use protective shields or screens whenever any possibility exists of a hazard from the failure of a specimen, assembly or structure under test.



Wear eye protection and use protective shields or screens whenever a risk of injury to operators and observers exists from the failure of a test specimen, assembly or structure, particularly where explosive disintegration may occur. Due to the wide range of specimen materials, assemblies or structures that may be tested, any hazard resulting from the failure of a test specimen, assembly or structure is entirely the responsibility of the owner and the user of the equipment.



Hazard - Ensure components of the load string are correctly pre-loaded to minimize the risk of fatigue failure.

Dynamic systems, especially where load reversals through zero are occurring, are at risk of fatigue cracks developing if components of the load string are not correctly pre-loaded to one another. Apply the specified torque to all load string fasteners and the correct setting to wedge washers or spiral washers. Visually inspect highly stressed components such as grips and threaded adapters prior to every fatigue test for signs of wear or fatigue damage.

Table of Contents

Chapter 1	Introduction	1-1
	About these instructions	1-3
	System overview	1-4
	Purpose	1-4
	System components	1-4
	Frame configuration options	1-5
	Torque cell options	1-5
	Testing accessories	1-5
	System identification	1-6
	System safety and information labeling	1-7
	Product support	1-8
	Product documentation	1-8
	Calibration upon installation	1-9
	Training	1-9
	Delivery time	1-9
	Customer's responsibilities	1-10
	Site preparation	1-10
	Handling and transporting	1-10
	Insurance and safety	1-10
	Materials disposal	1-10
	Instron's responsibilities	1-11
	Insurance	1-11
	Installation	1-11
	Initial operation	1-11
	Documentation	1-11
Chapter 2	Specifications	2-1
	Environmental conditions	2-2
	Noise level	2-2
	Physical dimensions of components	2-3
	Frame	2-3
	59 Series control unit	2-3
	Crate dimensions	2-4

Chapter 3	Site Preparation	3-1
	Requirement checklist	3-2
	Determine component placement	3-3
	Prepare foundation	3-3
	Prepare electrical power supply	3-4
	MT1 frames	3-4
	MT2 frames	3-6
	59 Series control unit	3-7
	Computer system	3-7
	Provide telephone line and network connection	3-7
	Provide additional utilities	3-8
	Check ceiling clearance	3-8
	Check environmental conditions	3-8
	Prepare for shipment arrival	3-8
Chapter 4	Shipment Arrival	4-1
	Requirement checklist	4-2
	Receive the system	4-3
	Uncrate the system	4-3
	Move system components to installation area	4-4
	Before you begin	4-4
	Equipment required	4-4
	Recommended procedure	4-4
	Prepare the system	4-6
	Install the user control panel	4-6
	Computer system - network connection	4-6
	Prepare for installation service visit	4-7

Chapter 1

Introduction

- About these instructions 1-3
- System overview 1-4
- System safety and information labeling 1-7
- Product support 1-8
- Product documentation 1-8
- Calibration upon installation 1-9
- Training 1-9
- Delivery time. 1-9
- Customer's responsibilities 1-10
- Instron's responsibilities 1-11

This page is intentionally blank.

About these instructions

These instructions describe the site preparation, unpacking, lifting and installation of Instron Model MT MicroTorsion Testing Systems.

These instructions assume the following:

- Your system consists of a frame, a control unit, a user control panel, a torque cell, a computer system with an Instron materials testing software package, and any testing accessories necessary to secure the specimen in the test space.

It is important that the site be adequately prepared in order to avoid unnecessary delays in the installation process and to ensure that the MT testing system operates without interference from various environmental conditions (i.e. excess building vibrations or extreme temperature and humidity levels).

Throughout these instructions are NOTE, CAUTION, and WARNING statements that alert you to important information. They appear as follows:



Notes provide further clarification on particular issues.

Caution

Cautions alert the user to situations that may cause equipment damage.

Warning



Warnings alert the user to situations that may cause serious personal injury or death.

Please read these instructions, and any other documents provided, thoroughly and carefully. Be sure to understand all Warnings and Cautions before attempting to operate any of the MT system in whole or in part.

System overview

Purpose

Warning



If the equipment is used in a manner not specified by Instron, the protection provided by the equipment may be impaired. Injury to personnel or damage to the system may result. Be sure to read and understand the material presented in these instructions and in any other accompanying instructions.

The Instron Model MT1 and MT2 MicroTorsion Testing Systems are designed specifically for applying a measured torsional force to a specimen. A variety of specimen materials and geometries can be tested.

System components

Model MT1 and MT2 systems consist of:

- Frame (see [Figure 1-1](#))
- 59 Series control unit and other system controls and electronics
- Instron approved computer system with Instron Partner[®] software

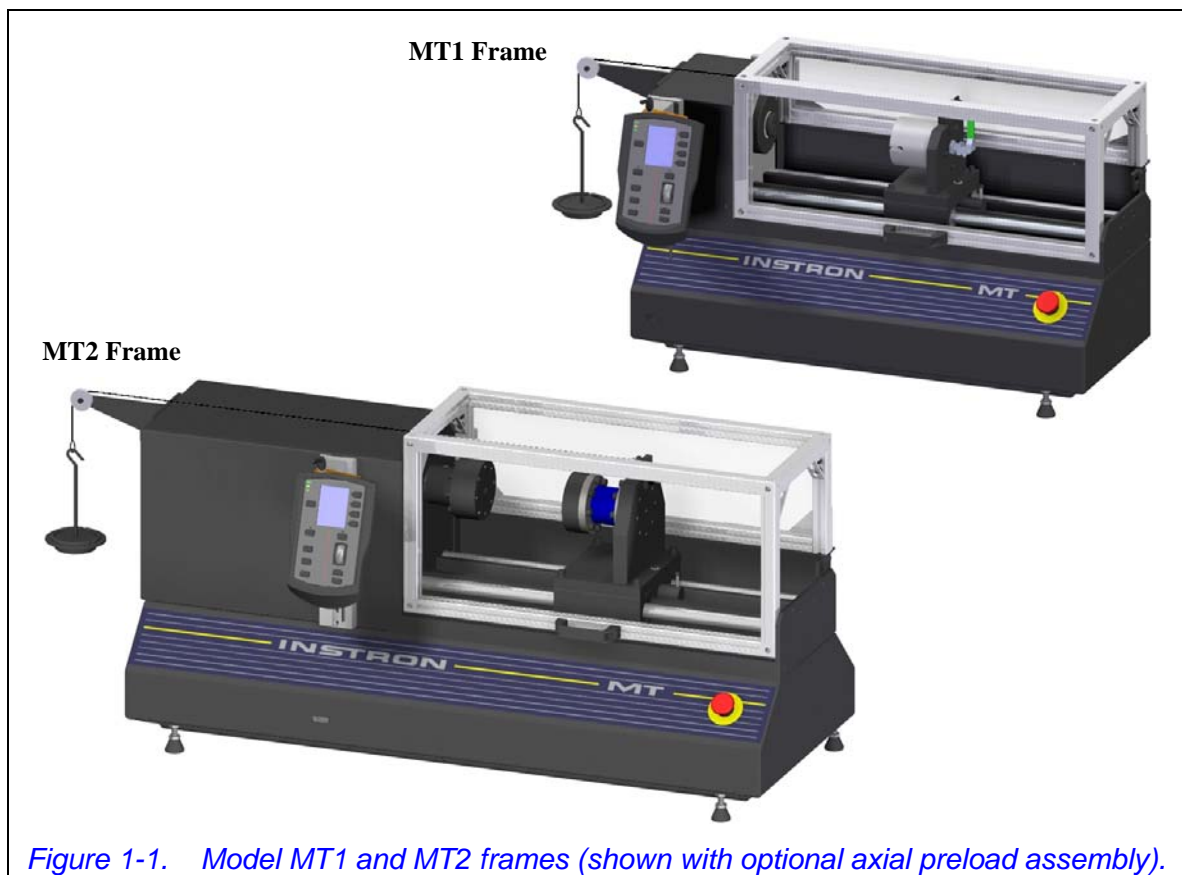


Figure 1-1. Model MT1 and MT2 frames (shown with optional axial preload assembly).

Frame configuration options

Frames can be configured with a variety of options. These options include:

- Test opening variations:
 - E1 - Standard test opening
 - E3 - Increase test opening by 305 mm (12 in)
- Linear guide cover variations:
 - H1 - No linear guide covers
 - H2A - Linear guide covers for E1 test opening
 - H2C - Linear guide covers for E3 test opening

It is very important to be aware of and understand the configuration of your frame as you perform various operations and procedures so that they can be performed correctly. Refer to “[System identification](#)” on page 1-6 for ways to identify your frame’s configuration.

Torque cell options

The torsional force applied by the frame is measured by a torque cell. Torque cells are available in a variety of capacities and are interchangeable to provide a range of load measurement capabilities. Torque cells must be selected and purchased in addition to the system. The available torque cells are:

- W-5510-T1 - 225 N-m (2,000 lbf-in)
- W-5510-T2 - 22.5 N-m (200 lbf-in)
- W-5510-T3 - 2.25 N-m (20 lbf-in)
- W-5510-T4 - 0.225 N-m (2 lbf-in)



The torque cell is not included with the system; it must be selected and purchased separately. The capacity of the torque cell used could limit system capacity.

Testing accessories

Testing accessories are purchased separately from the frame. Testing accessories either provide a means to secure the specimen in the test space or provide additional functionality to the frame. Instructions on the installation, use and maintenance of Instron testing accessories are provided separately with each testing accessory. A variety of testing accessories are available:

- Axial alignment fixture (MT1 systems only)
- Torque cell protection device (MT2 systems only)
- Axial preload assembly
- Keyless or keyed drill-type chuck assemblies
- Collet grip assemblies
- Socket drive sets

System identification










Your system has been given a unique serial number for system identification. This serial number can be found on the serial tag located on the rear of the frame. In addition, the 59 Series control unit is also given a unique serial number that can be found on the rear of the control unit.

The frame serial tag includes other important system information, including information on your frame's configuration. Frame configuration information can also be found on customer copies of the Instron quote.

System safety and information labeling

Table 1-1 explains the meanings of any safety and information labels that may be attached to any part of the testing system.

Table 1-1. Descriptions of safety and information labeling.

Label	Meaning	Purpose
	Rotating machinery hazard - read manual	Indicates that a rotating hazard exists. Be sure to read and understand the operator's manual before using the system.
	Electrical hazard - do not remove covers	Indicates that a hazard exists from high voltage or electrical current - do not operate the system with covers removed. Be sure to read and understand the operator's manual before using the system. Only authorized personnel should service the equipment.
	Electrical hazard - fuse warning	Indicates that an electrical hazard exists. Advises about disconnecting power mains before changing fuses and using only specified fuses.
	Electrical hazard - high leakage current	Indicates that a hazard exists from leakage current and that the equipment must be connected to a mains ground point.
	Fragile - read manual	Indicates that equipment is fragile and can be easily damaged. Be sure to read and understand the operator's manual before using the system.
	Ground stud	Indicates a ground stud. Connect to an appropriate ground/earth system.
	Protective earth	Indicates the protective earth terminal for the main power supply.
	Single-phase power supply	Indicates that the equipment requires a single-phase power supply.
	Three-phase power supply	Indicates that the equipment requires a three-phase power supply.

Product support

Instron provides documentation, including manuals and online help, that can answer many of the questions you may have. It is recommended that you review the documentation sent with the system you purchased for possible solutions to your questions.

If you cannot find answers in these sources, contact Instron's Services department directly. A list of Instron offices is available on our website at www.instron.com. In the US and Canada, you can call directly at 1-800-473-7838.

Product documentation

Instron offers a comprehensive range of documentation to help you get the most out of your Instron products. Depending on what you have purchased, your documentation may include some or all of the following:

Pre-Installation Manual	Information about preparing your site for installation of the system, receiving the system, and lifting and handling of the system.
Operating Instructions	How to use your system components and controls, and other frequently performed operating tasks.
System Concepts	Additional information about your system.
Online Help	Software products come complete with context sensitive help, which provides detailed information on how to use all software features.
Accessory Equipment Reference	How to set up and use any accessories you have purchased, for example grips, fixtures, extensometers, transducers, hydraulic power units, non-standard actuators, and environmental chambers.

We welcome your feedback on any aspect of the product documentation. Please email info_dev@instron.com with your comments.

Calibration upon installation

ASTM, ISO, and EN standards require the system be calibrated when it is installed or when it is moved or relocated. Instron calibrates the system at the factory, and provides a record of readings for the load cell. This machine may be verified on-site to ASTM E-4, BS 1610, DIN 51221, ISO 7500/1, EN 10002-2, JIS B7721, JIS B773 or AFNOR A03-501 standards. The factory calibration is not a complete verification to any current version of any of the above standards. Installation and Basic Software training are included with the purchase of your system. Verification services are available at a reduced rate if performed as part of the installation, but must be purchased separately. Contact your local Instron office for more information about our on-site verification services. Refer to “Product support” on page 1-8 for Instron’s contact information.

Training

During installation, the service engineer provides basic familiarization training on your testing system. However, attending a training class specifically designed for your system helps you to realize the full potential and flexibility of Instron’s testing systems. It is recommended that anyone who will regularly use the testing system attend a training class. This may include daily operators of the system, lab supervisors or product engineers.

Detailed training on the operation of your testing system is available through Instron’s training center. Classes are offered at several Instron locations and can also be scheduled on-site at your location. For a detailed description of available classes, refer to Instron’s web site at www.instron.com or contact your local Instron office.

Delivery time

The estimated delivery time for an Instron testing system varies from system to system. No models are kept in inventory, so every testing system is custom configured to the specifications outlined in your order. In addition to building your system, it must also be thoroughly tested and inspected to ensure that it meets various national and international testing standards. This process can range from a few days to several months, depending upon the type of system purchased and the level of customizing involved.

This time period provides you adequate time to prepare your testing location for the installation.

Contact your local Instron sales representative to obtain information on the status of your system and an estimated delivery date.

Customer's responsibilities

It is the customer's responsibility to ensure that all required support services (i.e. power, air, and/or water supplies, telephone line, etc.) are available, and that all necessary checks are made prior to installing the testing system. These services and checks are described below.

Site preparation

Proper site preparation is imperative so that the testing system operates in accordance with its specifications and provides accurate test results. The customer must ensure that the site requirements are satisfied prior to scheduling an installation appointment with Instron Service. These site requirements are described in this manual under [Chapter 3](#) and [Chapter 4](#). Always verify your equipment's specific model when referencing any information in this manual; refer "[System identification](#)" on page 1-6.

Handling and transporting

Unless specifically arranged otherwise, it is the customer's responsibility to arrange the off-loading, unpacking and moving of the testing system to the final installation location. Refer to "[Move system components to installation area](#)" on page 4-4 for details on handling and transporting your system to its final location.

Upon special arrangements, an Instron service engineer can supervise the off-loading and transportation of the frame to its final installation location. Contact Instron's service department or your local Instron office for additional information on this service. Refer to "[Product support](#)" on page 1-8 for Instron's contact information.

Insurance and safety

Under Instron's standard contract, the shipping terms are Ex-Works (or FOB Factory), meaning ownership and liability for the testing system transfers to the customer at Instron's loading dock. Unless other shipping terms are specified in a purchase order, which Instron does not dispute, the Ex-Works shipping terms apply. Under these terms, the customer is responsible for securing the applicable transit insurance on the shipment and arranging safe transport to the final destination. Arrangements can be made through Instron to secure insurance cover and shipping, at the customer's expense.

When transporting a frame within your own premises, you are responsible for its safe transport. As stated under "[Handling and Transporting](#)" above, you can arrange for an Instron service engineer to supervise the off-loading and transportation of the frame to its final installation location.

Materials disposal

It is the customer's responsibility to properly dispose of any waste materials generated from the installation of the system and its accessories, or from the general operation of the system. This includes packing materials, hydraulic fluid, and waste materials contaminated with hydraulic fluid. Hydraulic fluid is generally considered a hazardous material so proper disposal of this substance, or anything contaminated with it, must comply with local, state, and federal regulations.

Instron's responsibilities

Instron's standard contract requires Instron to provide the necessary services to ensure that your testing system operates accurately. These services are described below.

Additional services and equipment may be negotiated with Instron, but these additional services must be mutually agreed upon and specifically described in your purchase order.

Insurance

Under Instron's standard contract, the shipping terms are Ex-Works (or FOB Factory), meaning ownership and liability for the testing system transfers to the customer at Instron's loading dock. Unless other shipping terms are specified in a purchase order, which Instron does not dispute, the Ex-Works shipping terms apply. Under these terms, Instron is responsible for insurance cover while the testing system is in the factory up until it reaches the loading dock for shipping.

Installation

Installation is included with the purchase of the system. When the site location is prepared and the frame and its components have been moved to the final operating location (refer to "[Move system components to installation area](#)" on page 4-4), Instron is responsible for the complete installation of the frame, its components and any additional accessories that may have been purchased.

The customer must not make any attempt to install the system without an Instron service representative present.

Initial operation

Once the installation is complete, Instron performs an initial operation of the frame and a calibration check to ensure that it is working properly and measuring accurately.

The service representative also performs a required on-site training program. The required on-site training takes approximately one day to complete, and is designed to accommodate up to three individuals.

Contact Instron's Professional Services department for more information on this training (refer to "[Product support](#)" on page 1-8). Additional training is available through Instron's training center.

Documentation

Instron provides all documentation required to operate the system, including manuals for the frame and any required software applications.

Additional copies are available and can be ordered through any Instron sales office.

This page is intentionally blank.

Chapter 2

Specifications

- Environmental conditions 2-2
- Physical dimensions of components 2-3
- 59 Series control unit 2-3
- Crate dimensions 2-4
- Noise level 2-2

Environmental conditions

Table 2-1 lists the recommended environmental conditions in which the system should be operated and stored.

Table 2-1. Recommended environmental conditions.

Operating Temperature:	+10 to +38 deg C (+50 to +100 deg F)
Storage Temperature:	-40 to +66 deg C (-40 to +150 deg F)
Humidity:	10% to 90% (non-condensing)
Atmosphere:	Designed for use under normal laboratory conditions. Protective measures may be required if excessive dust, corrosive fumes, electromagnetic fields, or hazardous conditions are encountered.

Noise level

The A-weighted emission sound pressure level generated by the testing system under normal operating conditions does not exceed 70 dBA. The peak C-weighted instantaneous sound pressure value does not exceed 63 Pa.

Since many variables (such as room layout) affect noise levels, it can not be assumed that these readings will be equal to those in the field. The readings were taken at a location in front of the system as shown in Figure 2-1. This is the typical location for an operator to stand when operating the system.

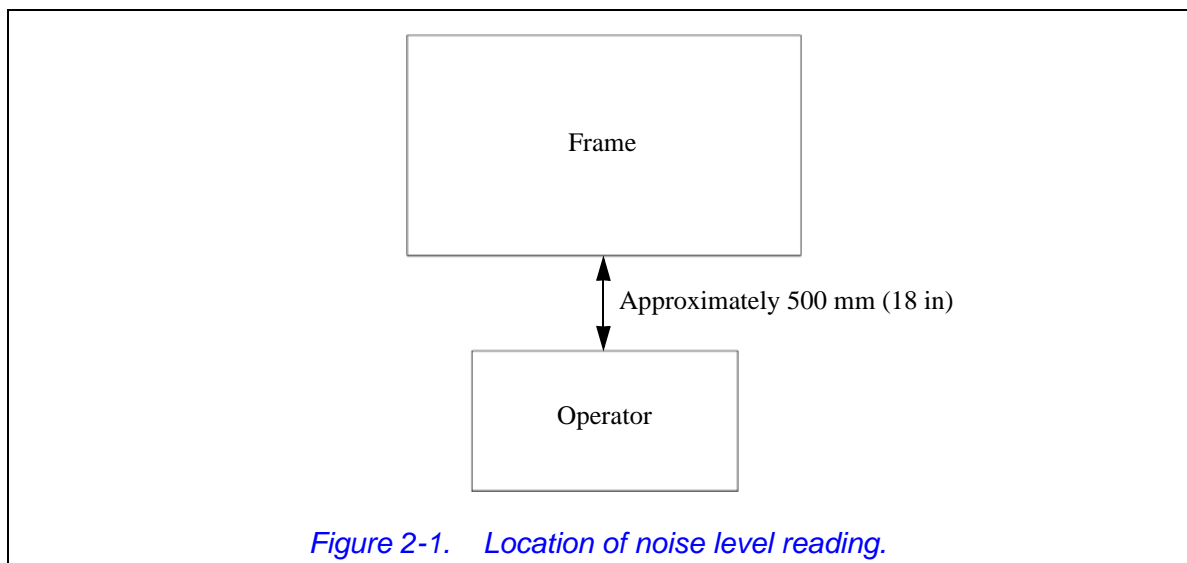


Figure 2-1. Location of noise level reading.

Physical dimensions of components

Frame

Table 2-2 lists the various standard configurations of MT1 and MT2 frame models and their physical dimensions.

Table 2-2. Dimensions of standard MT1 and MT2 frames.

Frame Model ^{1, 2}	Height ³	Overall Area ⁴ (W x D)	Approx. Weight
MT1-E1	653 mm (25.7 in)	820 x 650 mm (32.25 x 25.6 in)	90 kgs (198 lbs)
MT1-E3	653 mm (25.7 in)	1124 x 650 mm (44.25 x 25.6 in)	110 kgs (243 lbs)
MT2-E1	711 mm (28 in)	1130 x 764 mm (44.5 x 30.1 in)	180 kgs (397 lbs)
MT2-E3	711 mm (28 in)	1435 x 764 mm (56.5 x 30.1 in)	220 kgs (485 lbs)

1. As designated on frame serial number tag
2. E1 = Standard test opening
E3 = Increase test opening by 305 mm (12 in)
3. Includes clearance to open the enclosure door and includes 51 mm (2 in) for height of the leveling feet.
4. Dimensions are of the widest and deepest portion(s) of the frame. Includes clearance behind frame to open the enclosure door. Does not include clearance to mount optional axial preload assembly (requires clearance of 230 mm (9 in) on **each** side of frame).

59 Series control unit

Table 2-3. Dimensions of 59 Series control unit.

Size (W x D x H):	312 x 392 x 183 mm (12.3 x 15.4 x 7.2 in)
Weight:	13 kgs (28.6 lbs)

Crate dimensions

Table 2-4 lists the crate dimensions for your specific frame model.

Table 2-4. Typical shipping dimensions of MT1 and MT2 frames.

Frame Model^{1, 2}	Approximate Crate Dimensions (L x W x H)	Approx. Weight of Crated Frame³
MT1-E1	1015 x 1145 x 890 mm (40 x 45 x 35 in)	255 kgs (560 lbs)
MT1-E3	1320 x 1145 x 890 mm (52 x 45 x 35 in)	268 kgs (590 lbs)
MT2-E1	1320 x 1170 x 940 mm (54 x 46 x 37 in)	375 kgs (825 lbs)
MT2-E3	1625 x 1170 x 940 mm (64 x 46 x 37 in)	517 kgs (1,140 lbs)

1. As designated on frame serial number tag
2. E1 = Standard test opening
E3 = Increase test opening by 305 mm (12 in)
3. This weight includes 68 kgs (150 lbs) for accessories. This is only an estimation; the actual weight for accessories could be higher or lower depending on accessories purchased.

Chapter 3

Site Preparation

- Requirement checklist 3-2
- Determine component placement 3-3
- Prepare foundation 3-3
- Prepare electrical power supply 3-4
- Provide telephone line and network connection 3-7
- Provide additional utilities 3-8
- Check ceiling clearance 3-8
- Check environmental conditions 3-8
- Prepare for shipment arrival 3-8

Requirement checklist

Before the system arrives at your facility, it is important that the site be adequately prepared in order to avoid unnecessary delays in frame placement and installation. Also to ensure that the system operates without interference from various environmental conditions (i.e. excess building vibrations or extreme temperature and humidity levels).

Below is a reference checklist designed to aid the customer in preparing the testing system(s) installation site. Each item of the checklist is discussed in more detail in the following sections. Please use and refer to this checklist to complete each item.

- Determine component placement, see page 3-3.
- Prepare foundation, see page 3-3.*
- Prepare electrical power supply, see page 3-4.
- Provide telephone line and network connection, see page 3-7.
- Provide additional utilities, see page 3-8.
- Check ceiling clearance, see page 3-8.
- Check environmental conditions, see page 3-8.
- Prepare for shipment arrival, see page 3-8.

* Instron is not responsible for foundation recommendations. This should be reviewed with a certified civil engineer.

Determine component placement

All system components must be placed so that they can be easily accessed for service, maintenance and calibration. A perimeter of 1 m (3 ft) is recommended around the system. These systems are generally verified using a torque arm and dead weights. The system must be able to be positioned at the edge of the table, both to the front and the rear, so the weights can hang below the table. A distance of 760 mm (30 in) from the center of the torque cell to any wall is needed.

Generally the 59 Series control unit and computer system are located to the right side of the frame and may or may not be placed on the same surface. Also keep in mind that the electrical power source must be within a certain distance of the system; refer to “[Prepare electrical power supply](#)” on page 3-4. Do not place the 59 Series control unit near any equipment that emits an extreme static discharge.

The distance between system components is limited by the length of the supplied interconnecting electrical cables. The standard length for most electrical cables is 3 m (10 ft).

Prepare foundation

The system is designed for placement on a mounting surface such as a table, desk or workbench. All system components can be placed on one mounting surface, or the frame can be placed on a separate mounting surface from the 59 Series control unit and computer system. Instron offers a table and a computer stand that can be purchased with the system. If the mounting surface(s) will be supplied by the customer, the following must be taken into consideration when selecting the mounting surface(s):

- The mounting surface(s) must be rated to support the weight of the components that will be placed on it. If all system components will be put on the same mounting surface, be sure the mounting surface can support the combined weight of all components. Refer to [Chapter 2](#) for frame and 59 Series control unit weight specifications and refer to documentation that accompanied the computer system for its weight information.
- The mounting surface(s) must be large enough to fit all components that will be placed on it. Also consider how and where any testing fixtures or accessories will be stored. It may be desired that the mounting surface(s) include drawers or shelves for these items.
- The mounting surface(s) should be as level as possible. The frame is equipped with adjustable mounting feet (typically either four or six depending on frame length) and a bubble level to permit some leveling of the frame.
- The mounting surface(s) should put system components at a comfortable working height.

Prepare electrical power supply

The customer must supply all electrical power to operate the MT testing system. The system typically requires electrical power from three different sources, one for the frame, one for the 59 Series control unit and one for the computer system. The frame requires either single phase or three phase power, depending on the model, while the control unit and computer system typically require power from a single phase source.

Caution

Please check equipment's electrical nameplate for its proper power rating information.

Caution

Be sure all power supplies are properly grounded.

MT1 frames




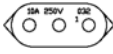


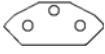
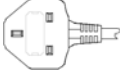

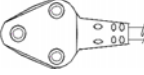
MT1 frames require a single phase power source. The specific electrical requirements for the frame are dependent on the power option selected by the customer. Two standard power options are available. Methods to determine the power option selected for your frame can be found in “[System identification](#)” on page 1-6. The standard power options and their associated power requirements are:

- **MT1-D1:** 100-120 VAC, 1 Ph, 50/60 Hz, 10 A
- **MT1-D2:** 200-240 VAC, 1 Ph, 50/60 Hz, 10 A

In addition to providing the incoming power for the frame, the following items must be supplied and/or considered:

- The customer's power supply should be fused, properly grounded, and equipped with a disconnect switch.
- The customer must supply an appropriately rated outlet in the vicinity of the frame's installation location.
 - The frame is supplied with a 3-wire power cable with connector that can be plugged directly into the customer's outlet.
 - This power cable is 3 m (10 ft) long. Keep this in mind when determining the relative location of the customer's outlet to the frame's installation location.
 - Do not change plugs on the power cable; the plug is appropriately sized for the current rating of the system. Several power cable options are available that allow the customer to choose the plug type that best suits their needs. Methods to determine the power cable option selected for your frame can be found in “[System identification](#)” on page 1-6. Refer to [Table 3-1](#) for descriptions of each power cable option.
- If local codes require a residual current device (i.e. GCFI, GFI, RCCB, RCD, etc.), then it should be rated for less than 1 mA of current leakage.
- Do not connect the frame to its power supply at this time.

Table 3-1. Power cable options.

Power Cable Option Catalog Number	Country	Plug Type (for connection to customer's outlet)
IP-MT1-P1 ¹ IP-MT2-P1 ²	USA/Canada	NEMA 5-15P 
IP-MT1-P2 ¹ IP-MT2-P2 ²	Denmark	AFSNIT 107-2-D1 
IP-MT1-P3 ¹ IP-MT2-P3 ²	Europe	CEE 7/7 (SCHUKO) 
IP-MT1-P4 ¹ IP-MT2-P4 ²	Italy	CEI 23-16/VII 
IP-MT1-P5 IP-MT2-P5 ²	China	GB 2099.1-1996 
IP-MT1-P6 ¹ IP-MT2-P6 ²	Australia/New Zealand	AS 3112 
IP-MT1-P7 ¹ IP-MT2-P7 ²	Switzerland	SEV 1011 
IP-MT1-P8 ¹ IP-MT2-P8 ²	United Kingdom	BS 1363 
IP-MT1-P9 ¹ IP-MT2-P9 ²	Other (three cables supplied: P1, P3, and a cable with no plug)	NEMA 5-15P and CEE 7/7 (SCHUKO)  If the cable with no plug is used, it can be connected directly to the customer's disconnect switch OR if the customer desires to use an outlet, then the customer must supply an appropriate connection plug for the end of the power cable.
IP-MT1-PA ¹ IP-MT2-PA ²	India/South Africa	BS 546 

1. For MT1 systems, the power cable option determines the type of plug that is supplied for both the frame's power cable and the control unit's power cable.
2. For MT2 systems, the power cable option determines the type of plug that is supplied for the control unit's power cable.

MT2 frames

MT2 frames require a three phase power source. The specific electrical requirements for the frame are dependent on the power option selected by the customer. Two standard power options are available. Methods to determine the power option selected for your frame can be found in “[System identification](#)” on page 1-6. The standard power options and their associated power requirements are:

- **MT2-D1:** 200/230 VAC, 3 Ph, 50/60 Hz, 20 A
- **MT2-D4:** 380/400/415/460 VAC, 3 Ph, 50/60 Hz, 15 A

In addition to providing incoming power for the frame, the following items must be supplied and/or considered:

- The customer’s power supply should be fused, properly grounded, and equipped with a disconnect switch.
- The frame is supplied with a 4-conductor 4 mm² (12 AWG) power cable that is 3 m (10 ft) long. Keep this in mind when determining the relative location of the frame’s power connection to the frame’s installation location.
- The supplied power cable can be connected directly to the customer’s disconnect switch OR if the customer desires to use an outlet, then the customer must supply an appropriate connection plug for the end of the power cable.
- The frame is also supplied with a 6.7 mm² earth ground cable that must be connected to a customer supplied mains ground point. This ground cable is 3 m (10 ft) long.
- If local codes require a residual current device (i.e. GCFI, GFI, RCCB, RCD, etc.), then it should be rated for the following current leakage (depending on the power option):
 - **MT2-D1:** 125 mA
 - **MT2-D4:** 240 mA
- Do not connect the frame to its power supply at this time.

59 Series control unit

The 59 Series control unit requires a separate, single phase power source. Power requirements are 100-240 VAC, 1 Phase, 50/60 Hz. The control unit has an on/off switch on the rear of the unit. The necessary power cable is supplied. Several power cable options are available that allow the customer to choose the plug type that best suits their needs. Methods to determine the power cable option selected for the control unit can be found in “System identification” on page 1-6. Refer to Table 3-1 for descriptions of each power cable option.

If local codes require a residual current device (i.e. GCFI, GFI, RCCB, RCD, etc.), then it should be rated for less than 1 mA of current leakage.

Computer system

The computer system requires a separate, single phase power source. The power source requirements are typically:

- Computer tower (CPU):
 - Either a low supply voltage of 100-120 VAC or a high supply voltage of 220-240 VAC. The incoming power supply setting on the tower must match the supply voltage or damage will occur.
 - Supply frequency of 50/60 Hz (no adjustment required).
- Monitor:
 - Supply voltage of 100-240 VAC (no adjustment required).
 - Supply frequency of 50/60 Hz (no adjustment required).
- Printer: Printers must be purchased for a specific supply voltage and frequency and must be run on that voltage and frequency, no adjustment is possible. Check your printer for exact power requirements.

Provide telephone line and network connection

Ensure that a telephone line is located within the general testing area. This enables the user to contact Instron’s service department directly from the testing area so the user can perform the instructions provided and resolve the situation while on the telephone with the service representative. This facilitates resolving issues in a timely manner and reduces the number of repeated phone calls on the same problem.

It is also suggested that network drops, or digital phone lines, be within the general testing area. Instron’s goal is to provide remote diagnostics in order to resolve system issues. Having a network drop or digital phone line available will enable an Instron service representative to dial into the testing system’s computer to diagnose and resolve problems more efficiently. Including the network or digital lines in your initial site preparation will facilitate adding this function if it becomes necessary in the future. Do not connect the computer to the network until instructed to do so by Instron Service personnel.

Provide additional utilities

Depending on the system purchased and the customer's requirements, the customer may need to provide other utilities to the installation site; in addition to the main electrical power supply.

These additional utilities may include: an air supply for optional pneumatic grips/fixtures; cables for network connections; and/or direct phone line for modem connection (Internet access and phone support).

If any grips or fixtures being used with the system are pneumatically operated, the customer must supply an appropriate air supply to the installation site (unless the air supply is part of the customer order).

Check ceiling clearance

Ensure that there is adequate ceiling clearance so that the frame can be easily placed in its testing location. Take into consideration how you will be transporting the frame (by forklift or crane, for instance) and ensure that the ceiling height can accommodate your mode of transportation.

Check environmental conditions

Ensure that the testing site meets the standards described under "[Environmental conditions](#)" on page 2-2.

Prepare for shipment arrival

Before your shipment arrives, be sure that you review the requirements outlined in [Chapter 4](#), "[Shipment Arrival](#)" so that you are prepared to handle the system and can successfully have everything in place before the arrival of the service engineer. Especially be sure to review the information provided in "[Move system components to installation area](#)" on page 4-4 and that you have appropriate lifting equipment.

Chapter 4

Shipment Arrival

- Requirement checklist..... 4-2
 - Receive the system 4-3
 - Uncrate the system 4-3
 - Move system components to installation area 4-4
 - Prepare the system..... 4-6
 - Prepare for installation service visit 4-7
-

Requirement checklist

Once the testing system arrives at the customer's site, the customer must also complete the following before arrival of the Instron service engineer:

- ❑ Receive the system, see page 4-3.
- ❑ Uncrate the system, see page 4-3.
- ❑ Move system components to installation area, see page 4-4.
- ❑ Prepare the system, see page 4-6.
- ❑ Prepare for installation service visit, see page 4-7.

Receive the system

The system should arrive at the customer's site in one crate. A packing list is typically attached to the crate and is enclosed in an adhesive backed package labeled "Packing List Enclosed". Refer to [Table 2-4](#) on page [2-4](#) for typical crate dimensions and weights.

When the system is received visually check for damage to crating that may have occurred during shipment. If damage is visible, check the contents of the crate for damage to system parts. Notify both the common carrier and Instron immediately to report any damage. Take pictures of the system as received, if possible, to document damage.

Uncrate the system

Perform the following to uncrate the system. Be sure to avoid damaging the system while uncrating.

- Remove the crating and packing material from the frame and its components.
- Verify the content of your shipment against the packing list provided. **Retain all packing materials until the system is satisfactorily installed and all parts, assemblies and accessories have been located.**
- Notify Instron and the common carrier immediately if there are any discrepancies.

Move system components to installation area

Before you begin

Before moving any part of the system ensure that:

- The final operating site is properly set up. Review all information in [Chapter 3](#), in particular “[Prepare foundation](#)” on page 3-3 and “[Prepare electrical power supply](#)” on page 3-4.
- You have all the necessary lifting equipment as outlined under the “Equipment Required” section and that all equipment is appropriately rated to lift the frame and other components.
- Your equipment operators have the appropriate licenses and have complied with your local safety standards (i.e. the appropriate training required by OSHA in the U.S.).
- At the final site location, there is adequate clearance between the ceiling and the top of the frame, including clearance for lifting the frame via a forklift or crane.
- There are no loose accessories on any skid, crate or component that is being moved.
- The frame and the lifting equipment can fit through all doorways, halls, elevators or stairs from the shipping dock to the final site location. Also that the floors from the shipping dock to the final site location have sufficient support for the weight of the frame and lifting equipment combined. If you move the frame while it is still crated, refer to the crated dimensions listed in [Table 2-4](#) on page 2-4. If you move the frame without its crating, refer to the frame dimensions in [Table 2-2](#) on page 2-3.

Equipment required

You will need the following equipment:

- Fork truck or equivalent lifting equipment
- Protective material (such as leather or heavy cardboard) to put between the lifting equipment and frame
- An adjustable wrench

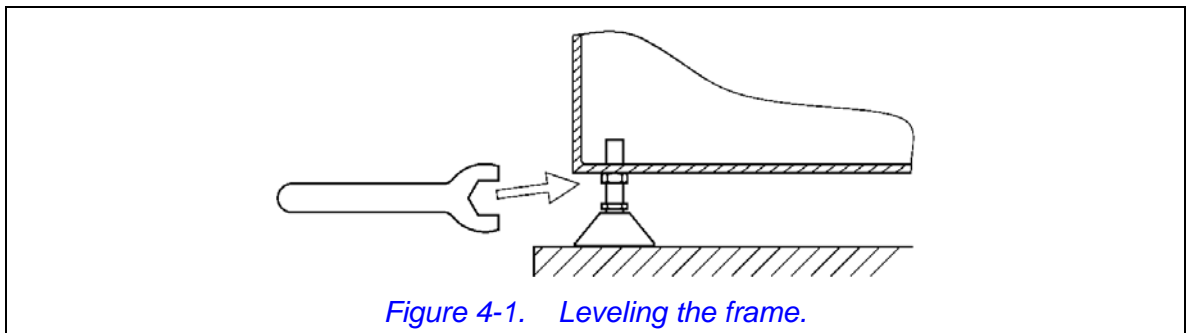
Recommended procedure

Following are instructions to remove the frame from its skid, move it to the installation area, and place it on its mounting surface. It is recommended that at least two qualified personnel be present when moving the frame.

1. Be sure that all crating has been removed from around the frame.
2. Remove all other boxes and equipment that are packed around the frame. These items can be taken to the installation location.
3. Cut and remove all metal banding that secures the frame to the wooden skid. Remove any blocking from around the frame. Be sure that the frame is not secured to the skid in any way.
4. Place protective material on the forks of the fork truck to protect the frame from damage.
5. Place the forks under the base of the frame - it may be necessary to lift the frame slightly so that the forks will fit under the base. Make certain that the forks extend to the rear of the frame and

that they are adequately spaced to balance the frame. Note that the frame is not equally balanced from left to right. The left side (motor side) of the frame is heavier than the right side.

6. Carefully lift the frame.
7. Carefully move the frame to the installation location.
8. Place the frame in its operating position on the selected mounting surface.
9. Level the frame:
 - a. Locate the bubble level on the frame base.
 - b. Adjust the leveling feet until the bubble level indicates that the frame is level in both the side-to-side and front-to-back directions. To adjust a leveling foot, use an adjustable wrench to loosen the jam nut (see [Figure 4-1](#)), adjust the height of the foot as necessary and then tighten the jam nut against the bottom of the frame.



Prepare the system

Once the frame is in place on its mounting surface, the following preparations are necessary.

Install the user control panel

The user control panel is typically removed from its mounting bracket on the front of the frame for shipment of the system (see [Figure 4-2](#)). Install the user control panel on its mounting bracket.

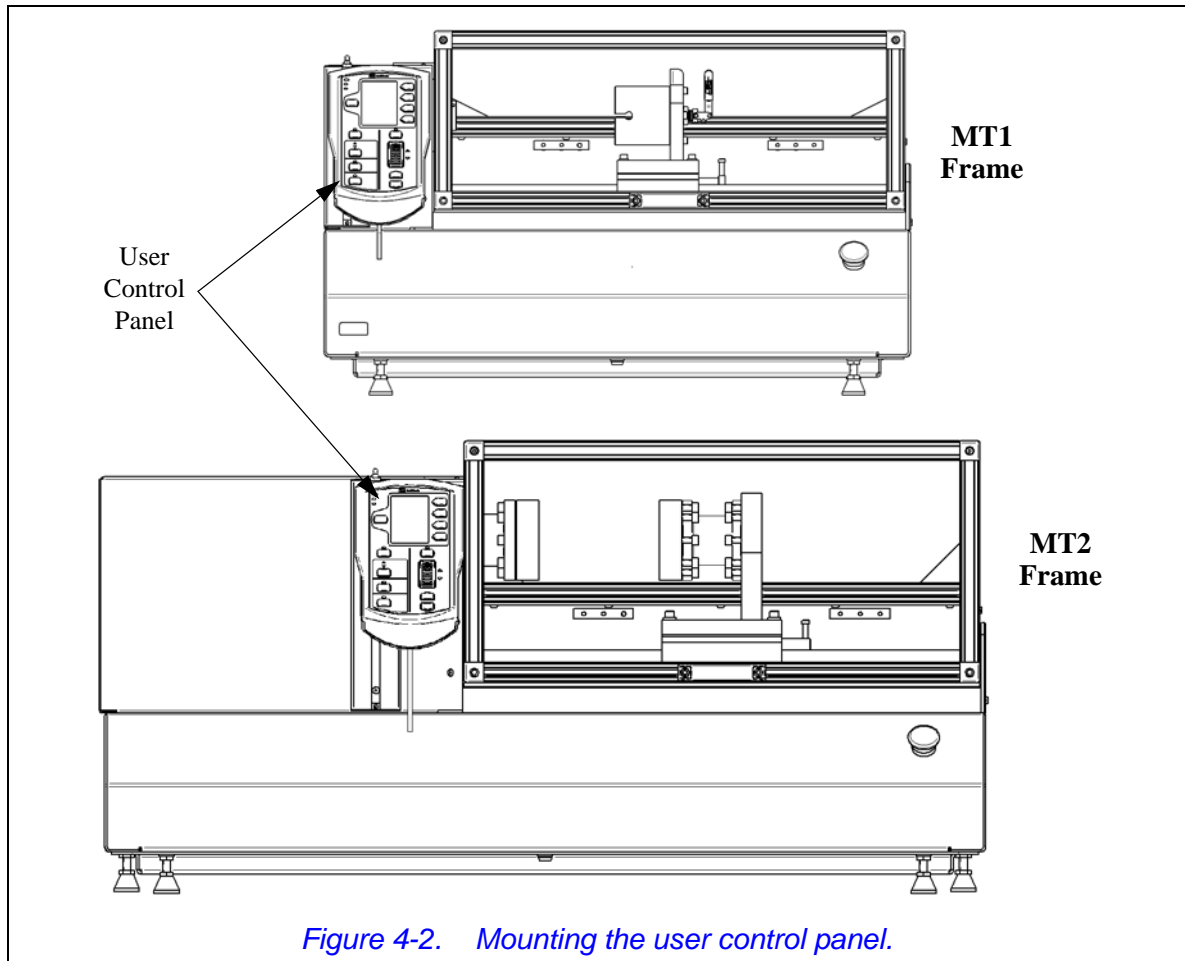


Figure 4-2. Mounting the user control panel.

Computer system - network connection

If the computer system will be connected to a corporate network, Instron highly recommends that it not be connected until after installation is complete. Most Instron software requires an Administrator level password in order to install the software correctly. Connecting the computer to the network before the arrival of the Instron service engineer usually delays the installation until the required password is obtained and may cause conflicts with the control system until it is fully operational. After installation, the computer can be connected to the network without interfering with the control system.

Prepare for installation service visit

System installation is included with the purchase of the system. Instron service will schedule an installation appointment to take place after delivery of the testing system to the customer's site. An Instron field service engineer will arrive at the customer site for connecting system components, system checkout, verification of system calibration, and customer training.

Before the service engineer arrives for installation, the customer must prepare the installation site as described under the “[Requirement checklist](#)” on page 3-2 and page 4-2. In particular, be sure that the following items have been completed:

- All system components are at or near their final location.
- Adequate power source(s) are available for the frame, 59 Series control unit, and computer system.
- Network and phone connections are available. Do not connect the computer system to the network.
- All preparations discussed under “[Prepare the system](#)” on page 4-6 have been completed.
- Adequate work area is available to allow interconnection and final installation.

The following list is an overview of what the field service engineer will complete at the time of installation:

- Review the customer's order against the goods that were actually received.
- Electrical hook-up of test system.
- Unpack and set up the computer system and interconnect system components.
- Bring test system to operational/functional state.
- Install grips/fixtures for training.
- Provide basic software training for a basic system. This may be extended depending on software options purchased.

This page is intentionally blank.

The background of the page is a light gray color with a subtle, abstract design. It features several curved, overlapping lines in shades of gray, creating a sense of motion and depth. A prominent feature is a circular area on the left side, filled with a fine grid of small, light gray dots. The overall aesthetic is clean, modern, and technical.

Product Support: www.instron.com