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M10-2MN44-1
Issue A August 1994

Instron
Mini 44 and Mini 55
Load Frames

Operator's Guide

INSTRON

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Amendment Incorporation Record

Amendment No.	Brief Description of Content	ECR No.	Person Incorporating Amendment
1	Change part number for power amplifier on Page 8-4	Identified on product release	R Tunsley
2			
3			
4			
5			
6			
7			
8			
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10			

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Amendment Incorporation Record

Amendment No.	Brief Description Of Content	ECR No.	Person Incorporating Amendment
11			
12			
13			
14			
15			

Revision Record

Revision	ECR No.
A to B	B2422

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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 which are potentially hazardous, particularly the actuator in a servo-hydraulic testing system or the moving crosshead in an electromechanical testing system.

Whenever you consider that safety is compromised, press the Emergency Stop button to stop the test and isolate the testing system from hydraulic or electrical power.

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.

Ensure that the test set-up and the actual test you will be using on materials, assemblies or structures constitutes no hazard to yourself or others. Make full use of all mechanical and electronic limits features. These are supplied for your safety to enable you to prevent movement of the actuator piston or the moving crosshead beyond desired regions of operation.

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.

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Warning

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.

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.

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.

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Warning

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.

Use protective shields or screens if any possibility exists of a hazard from the failure of a specimen, assembly or structure under test.

Use protective shields 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.

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 which 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.

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Warning

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.

Take care when installing or removing a specimen, assembly or structure.

Installation or removal of a specimen, assembly or structure involves working inside the hazard area between the grips or fixtures. 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.

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Warning

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.

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. Deactivate the robot before entering the envelope for any purpose, such as reloading the specimen magazine.

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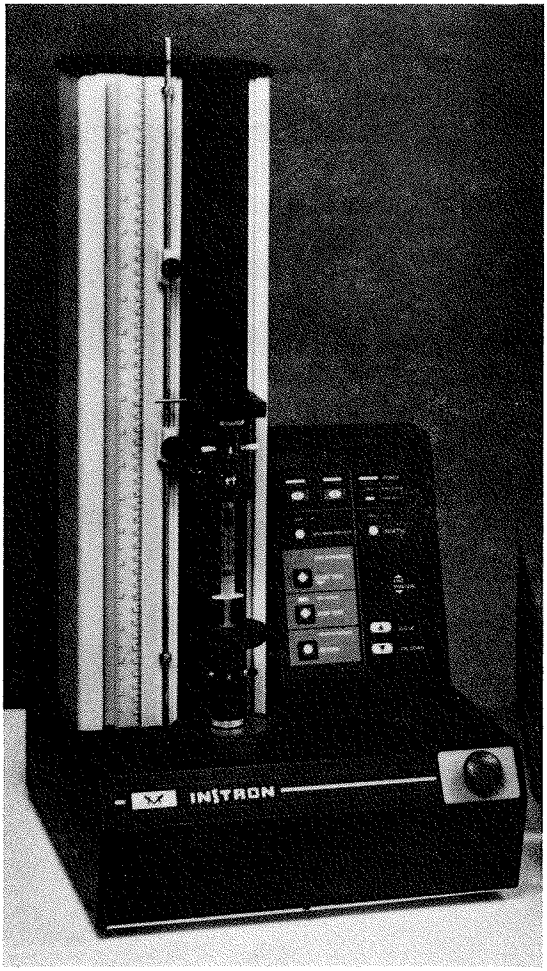
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Frontispiece. Mini 55 Testing System

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Chapter 1
Introduction

Outline

- Purpose. . . . . Page 1-2
- Description. . . . . Page 1-3

This chapter introduces the Instron Mini 44 and Mini 55 load frames. It explains the purpose of the load frames and describes its components and their functions.

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Purpose

The Instron Mini 44 and Mini 55 load frames are designed to let you test a wide range of materials at loads of up to 500 N (112 lb.) and speeds up to 1000 mm/min (39.4 in./min). They are compact load frames with a small footprint and sit easily on a table or workbench. The total vertical travel of the crosshead is 355 mm (14 in.) and the vertical test space is 430 mm (17 in.). You can install an optional crosshead extender to increase the vertical test space to 660 mm (26 in.).

The Mini 44 load frame uses the Instron Series 4400 control panel as its means of controlling materials tests. The Mini 55 load frame uses the Instron Merlin test control software.

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Description

Figure 1-1 shows a ghosted view of the frame.

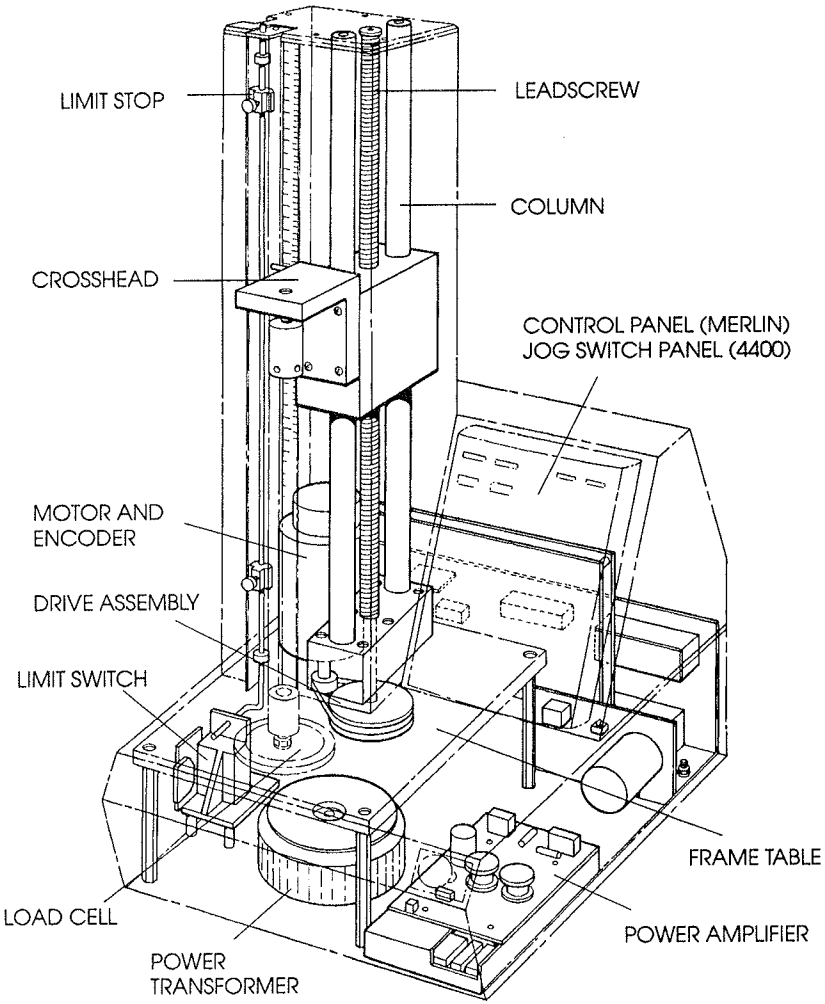


Figure 1-1. Ghosted View of the Frame

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The load frame consists of a load frame table that supports a load cell, a drive motor, two columns and a leadscrew. A crosshead is mounted on the columns and leadscrew. A drive assembly links the motor to the lower end of the leadscrew. Rotation of the drive motor is transmitted to the leadscrew which, in turn, drives the crosshead up or down the columns.

The whole assembly forms a rigid structure into which you mount a specimen of material for testing. You attach the specimen, using grips or specially designed fixtures, between the load cell and the crosshead. As the motor drives under the command of the control system, the crosshead moves up or down transmitting the load directly to the specimen. The load cell measures the load on the specimen.

The complete assembly is mounted on to a load frame base and is enclosed by a frame casing and a column cover that imparts further structural support to the load frame columns and leadscrew. The column cover has a T-slot in the side to enable you to mount various accessries such as a lamp or extensometer support. A limit rod extends up the front of the column cover and carries two limit stops. When the crosshead contacts either limit stop, the limit switch in the casing is activated and further travel in that direction is inhibited.

The casing also encloses the load frame power amplifier, power transformer, and the load frame electronic circuit boards. Mounted on the casing is the Merlin control panel for the Mini 55 testing system, or the jog switch panel for the Mini 44 testing system. An Emergency Stop button mounted on the front of the casing enables you to stop the load frame at any time when safety may be compromised.

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Chapter 2
Specifications

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- Dimensions . . . . . Page 2-2
- Specifications. . . . . Page 2-3

This chapter details the dimensions and specifications for the Instron Mini 44 and Mini 55 load frames.

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Dimensions

Load Frame

Height	635 mm (25 in.)
Width	330 mm (13 in.)
Depth	400 mm (15.75 in.)
Clearance (specimen center line to screw cover)	72 mm (2.8 in.)
Weight	29.5 kg (65 lb)

Merlin Interface Box

Height	300 mm (11.8 in.)
Width	205 mm (8 in.)
Depth	380 mm (15 in.)
Weight	8 kg (18 lb)

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Specifications

Maximum force	500 N (100 lb)
Maximum speed	1000 mm/min (39.4 in./min)
Speed at maximum force	1000 mm/min (39.4 in./min)
Minimum speed	0.05 mm/min (0.002 in./min)
Speed accuracy	+/- 0.2 % of set speed
Extension accuracy	The greater of 0.05 mm (0.002 in.) or 0.15 %
Vertical test space	430 mm (17 in.) (710 mm (28 in.) with optional extender)
Crosshead travel	355 mm (14 in.)

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Chapter 3
Function of Controls

Outline

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This chapter describes the functions of the controls on the Instron MN44 and MN55 load frames. For more complete details about using the many functions of the testing systems, refer to the relevant Operator's Guide for the system.

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Common Controls

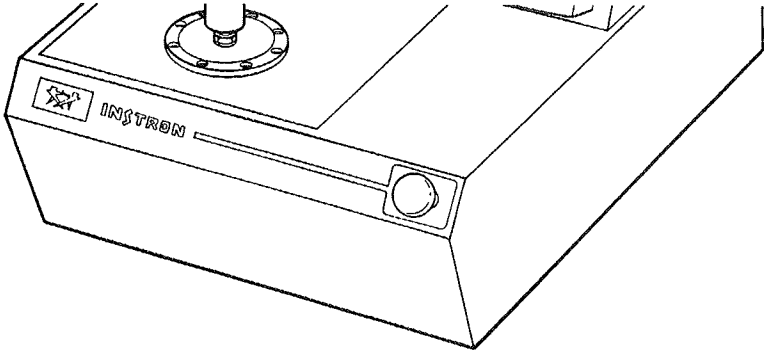


Figure 3-1. Emergency Stop Switch

Emergency Stop Switch

The Emergency Stop switch is located on the front right-hand side of the load frame, as shown in Figure 3-1. Press the Emergency Stop switch whenever you consider that safety is compromised and you need to stop the test quickly. The Emergency Stop switch latches in when it is pressed and you must pull the switch out to reset the load frame. If you are using the Merlin software to control the system, you will need also to reset the load frame in the software. Refer to the online help system for details.

Load Frame Rear Panel

Main Power Switch

The Main Power switch is in the Power Connector assembly. Place the switch in the | (On) position to apply

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power to the load frame or in the 0 (Off) position to isolate the load frame from the power supply.

The connector also serves as the main voltage selector and the main power fuse holder.

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Mini 55 Load Frame Controls

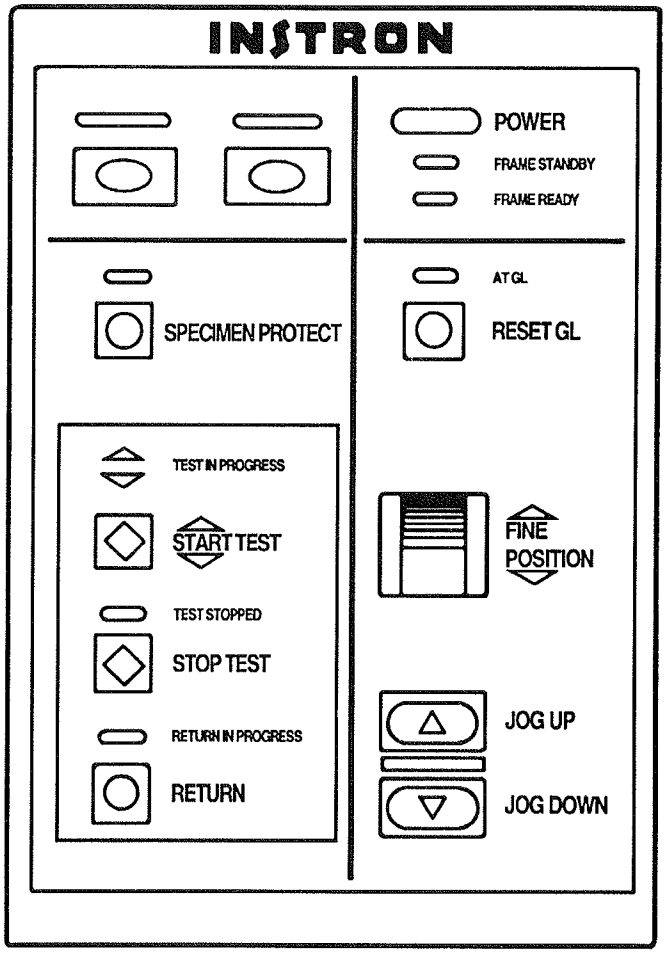


Figure 3-2. Mini 55 Control Panel

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Jog Controls

Press the **JOG UP** button or the **JOG DOWN** button to move the crosshead up or down. If you press and hold the button, The crosshead stats to move slowly , then increases to a maximum until you release the button.

FINE POSITION Thumbwheel

The thumbwheel control lets you position the crosshead slowly and accurately. Rotating the thumbwheel up moves the crosshead up, while rotating the thumbwheel down moves the crosshead down.

RESET G.L. Button

Press this button to set the current position of the crosshead as the gauge length position. Once the gauge length is set, the crosshead always returns to this position when you press the **RETURN** button or set a limit or event action of **RETURN**.

AT G.L. Indicator

Illuminates to indicate that the crosshead is at the gauge length position as set using the **RESET G.L.** button.

POWER Indicator

Illuminates to indicate that power is applied to the load frame.

FRAME STANDBY Indicator

Illuminates when the load frame is in Standby mode. In this mode, power is applied to the load cell and the load

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cell conditioner card, but other load frame and transducer circuits remain inactive.

FRAME READY Indicator

Illuminates to indicate that all load frame and transducer components are active and ready for use.

SPECIMEN PROTECT Button

Press this button to arm the Specimen Protect function, provided that you have enabled the function in the Merlin software.

SPECIMEN PROTECT ON Indicator

Illuminates to indicate that the Specimen Protect function is actively monitoring the specimen for an overload condition as set up in the Merlin software.

START TEST button

Press to start a test running. The indicators on either side of the **START TEST** label indicate the direction that the crosshead will move once a test starts.

TEST IN PROGRESS indicators

Illuminate to indicate the current direction of crosshead travel.

STOP TEST Button

Press to stop crosshead motion during or at the end of a test.

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TEST STOPPED Indicator

Illuminates to indicate that the test is stopped, but that the crosshead has not returned to the gauge length position.

RETURN Button

Press to move the crosshead back to the gauge length position after a test.

RETURN IN PROGRESS Indicator

Illuminates to indicate that the crosshead is moving back to the gauge length position.

Soft Key 1 and 2 Buttons

Press either of these buttons to carry out a function that you have previously programmed into each button in the Merlin software. The function of each button is as labeled on the Soft Keys on the Merlin screen.

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Mini 44 Load Frame Controls

JOG Switch

A three-position rocker switch spring-loaded to the center position. Press the top of the switch, labeled **JOG UP**, to move the crosshead up, or press the bottom of the switch, labeled **JOG DOWN**, to move the crosshead down

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Chapter 4
Installation

Outline

- Unpacking and Handling . . . . . Page 4-2
- Interconnecting System Components . . . Page 4-4
- Input Voltage Selection . . . . . Page 4-6
- Main Power Connection . . . . . Page 4-11

This chapter describes how you install your Mini 44 or Mini 55 load frame. It details how to unpack and set up the frame, how to connect the various parts of your testing system, how to set the correct operating voltage, and connect the load frame to the main power supply.

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Unpacking and Handling

The load frame is packed in a strong cardboard carton strapped to a wooden pallet. Accompanying components are also packed in cardboard cartons. You need to set up your testing system on a strong table or work bench at a convenient operating height and within easy reach of electrical power outlets. The load frame weighs around 29.5 kg (65 lb); an adult of normal strength should have no difficulty in lifting the frame.

To unpack the load frame, use the following procedure:

(a) Place the load frame carton near to the final working area for the testing system.

(b) Cut the strapping securing the load frame carton to the wooden pallet.

(c) Open the top of the load frame carton and remove the packing material.

(d) Using a sharp knife, carefully cut down one corner of the carton and along the base, then fold the cut portion of the carton to one side.

Caution

Do not put any strain on the Emergency Stop switch, the limit stops, or the load frame grip adapters while lifting the load frame.

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(e) Firmly grasp the load frame base, lift the frame out of the carton, and set it into place in its working position.

(f) Unpack any accompanying components and set them into place adjacent to the load frame.

(g) Check off the components against the packing list to ensure that you have all relevant items.

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Interconnecting System Components

Merlin System

See Figures 4-1 and 4-2 and use the following procedure to interconnect the components for a Merlin testing system:

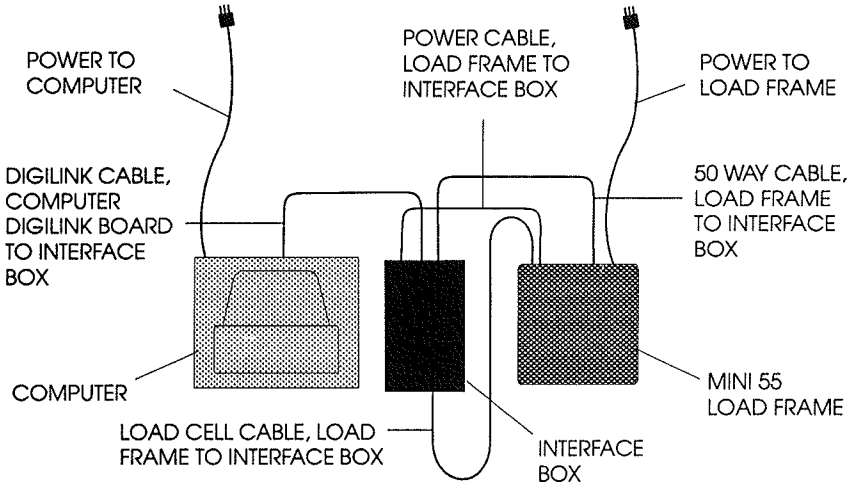


Figure 4-1. Merlin System Interconnection

(a) Connect the 50-way cable between the 50-way connector on the rear of the load frame and the 50-way connector on the rear of the interface box.

(b) Connect the power cable between the **5500 POWER** connector on the rear of the load frame and the **POWER IN** connector on the rear of the interface box.

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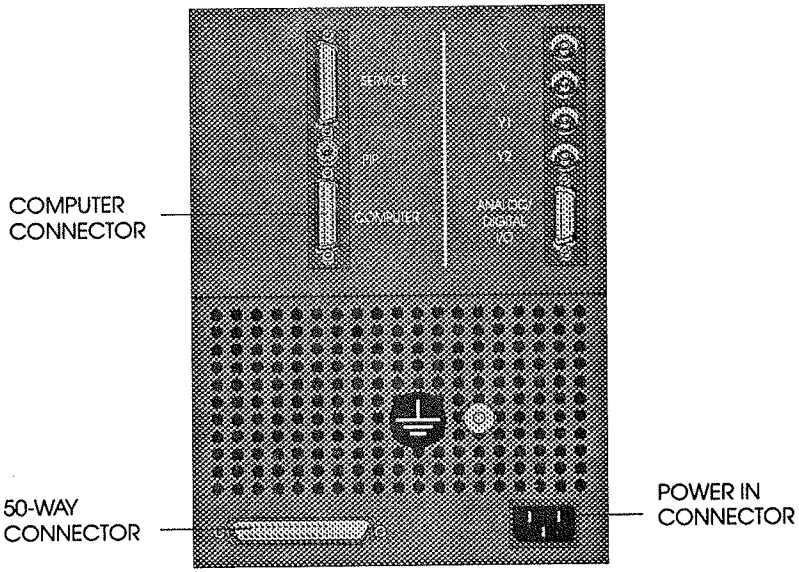


Figure 4-2. Merlin Interface Box Connectors

(c) Connect the load cell cable on the load frame to the **LOAD** connector on the front of the interface box.

(d) Connect the Digilink cable between the **COMPUTER** connector on the interface box and the digilink board connector on the computer.

(e) Refer to the Operator's Guide for the computer to connect the main power supply to the computer.

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4400 System

See Figures 4-3 and 4-4 and use the following procedure to interconnect the components for a 4400 testing system:

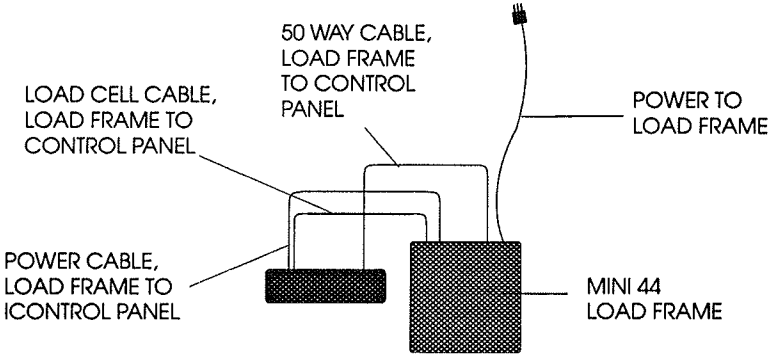


Figure 4-3. 4400 System Interconnection

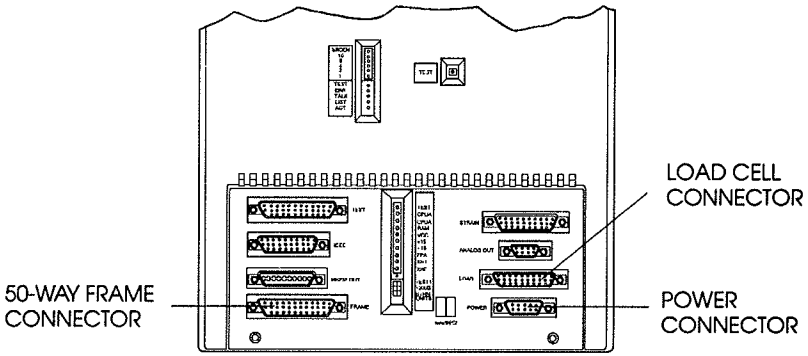


Figure 4-4. 4400 System Rear Panel Connectors

(a) Connect the 50-way cable between the 50-way connector on the rear of the load frame and the **FRAME** connector on the rear of the control panel.

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(b) Connect the power cable between the **4400 POWER** connector on the rear of the load frame and the **POWER** connector on the rear of the control panel.

(c) Connect the load cell cable on the load frame to the **LOAD** connector on the rear of the control panel.

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Input Voltage Selection

The load frame is set at the factory to accept the main power input voltage specified on your order; a 10-foot, 3-wire power cable for this voltage is included. If your power source is not at the voltage originally specified, follow the instructions below

The power input connector on right side of the load frame base can be altered to accept other line voltages in the range of 100 to 240 Va.c., 47 to 63 Hz.

Caution

Use a 3-wire, grounded main power cable for the load frame.

This system operates from a single phase, two-wire grounded power source that does not apply more than 250 volts rms between the supply conductors or between the ungrounded supply conductor and earth ground.

To adapt the load frame for a different main power voltage, change the voltage selector on the load frame as follows:

Warning

Switch off and disconnect the electrical power supply before changing the line voltage selector or the fuse.

(a) Switch off and disconnect the main power supply.

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(b) Inspect the line input connector. There are four holes in a vertical line at the right side of the connector, each corresponding to a different line voltage. The current voltage setting is indicated by a white plastic pin visible in one of the holes. See Figure 4-5.

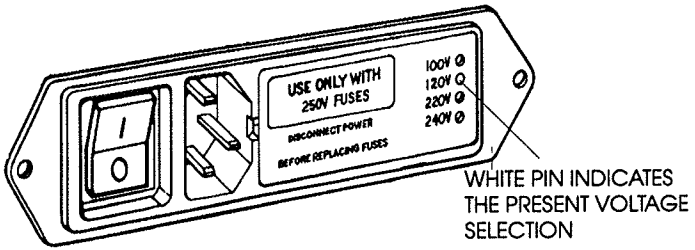


Figure 4-5. Input Voltage Selector

(c) Insert a small screwdriver into the middle of the connector and pry out the fuse holder, as shown in Figure 4-6. Remove the fuse holder from the line input connector, as shown in Figure 4-7.

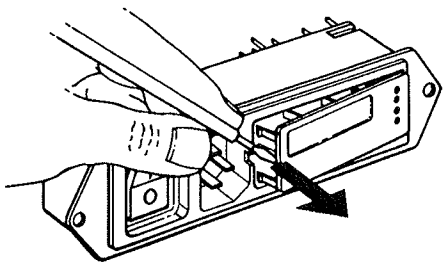


Figure 4-6. Prying Out the Fuse Holder

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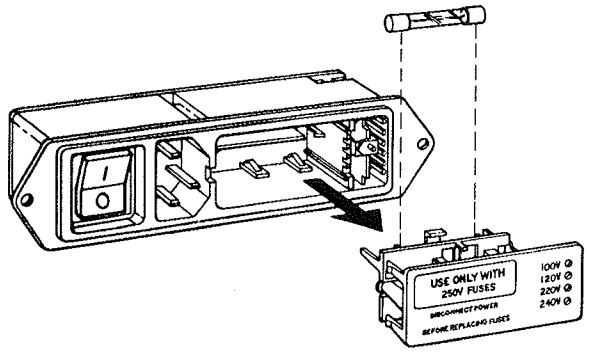


Figure 4-7. Removing the Fuse Holder

NOTE If you simply wish to replace the input line fuse, replace the fuse at this stage then go to Step (g) to reassemble the fuse holder.

(d) Remove the voltage selector card using long nose pliers as shown in Figure 4-8.

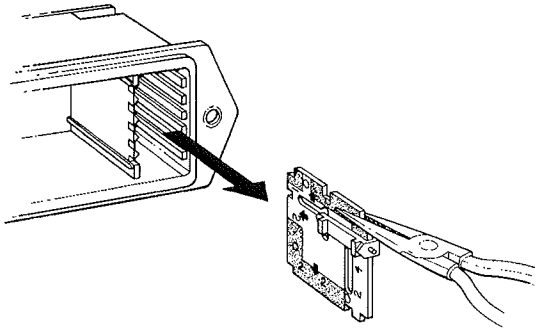


Figure 4-8. Removing the Voltage Selector Card

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(e) Align the voltage selector card so that the indicator pin is pointing upwards. Holding the pin in this position, rotate the card until the required voltage setting, determined from Table 4-1 is shown at the bottom of the card, as shown in Figure 4-9.

Table 4-1. Input Voltage Selection

If the main power voltage is:	Set the voltage selector to:
100 +/- 10 V a.c.	100 V
120 +/- 10 V a.c.	120 V
220 +/- 10 V a.c.	220 V
240 +/- 10 V a.c.	240 V

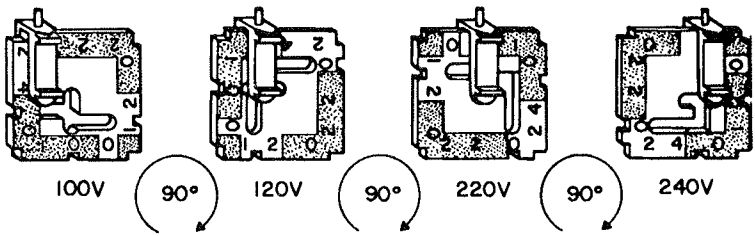


Figure 4-9. Selecting the Line Voltage

(f) Reinsert the card into the connector, with the edge showing the selected voltage leading and the printed numbers toward the center of the connector (see Figure 4-6. Ensure the card is fully seated.

(g) Install the fuse housing into the connector. Check that the indicator pin indicates the correct input voltage.

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Note *For 100-120 Va.c. operation, use a 6 amp, 3 AB type fuse (Instron Part No. 27-2-46). For 200-240 V.a.c. operation, use a 3 amp, 3 AB type (Instron Part No. 27-2-40) fuse. Both types of fuse are supplied with the system.*

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Main Power Connection

Check that the main power switch on the right side of the load frame is in position 0 (Off). Connect the input power cable to a convenient wall outlet of the correct voltage.

Warning

Ensure that the power cable grounding conductor is properly connected to earth ground to avoid electrical shock.

The installation procedure for your testing system is complete at this point. Become familiar with the testing instrument and its controls and operating procedures before you operate it.

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Chapter 5
Preparation for Use

Outline

- Applying Power . . . . . Page 5-2
- Setting the Load Frame Limits . . . . . Page 5-3

This chapter describes how to apply power to the testing system and how to set the physical crosshead travel limit stops.

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Applying Power

Caution

Make sure that the voltage selector is correctly set for your power supply.

The testing system is set at the factory to accept the main power supply voltage as specified on your order; a three-wire power cable for this voltage is included. If your power source is not at the voltage specified, you can change the voltage setting. Refer to Page 4-5 for details on selecting the correct voltage setting.

To apply power to the testing system, use the following procedure:

(a) Ensure that the voltage selector is correctly set. Refer to Page 4-5.

(b) Ensure that all necessary interconnecting cables between the load frame and the control panel (4400 systems) or the load frame, the interface box, and the computer (Merlin systems) are correctly and securely connected.

(c) Connect the main power supply cable between the connector on the rear of the frame base and to a convenient power supply outlet.

(d) Turn on the system by setting the main power supply switch at the rear of the frame base to **ON**.

(e) Monitor the self-test sequence as detailed in the relevant system operator's guide.

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Setting the Load Frame Limits

The crosshead travel limit stops are a safety feature that you should set every time that you use the testing system. Set the limits after you establish the test gauge length, but before you start the test.

The crosshead limits are two adjustable stops mounted on a limits rod on the left-hand front side of the column cover, as shown in Figure 5-1

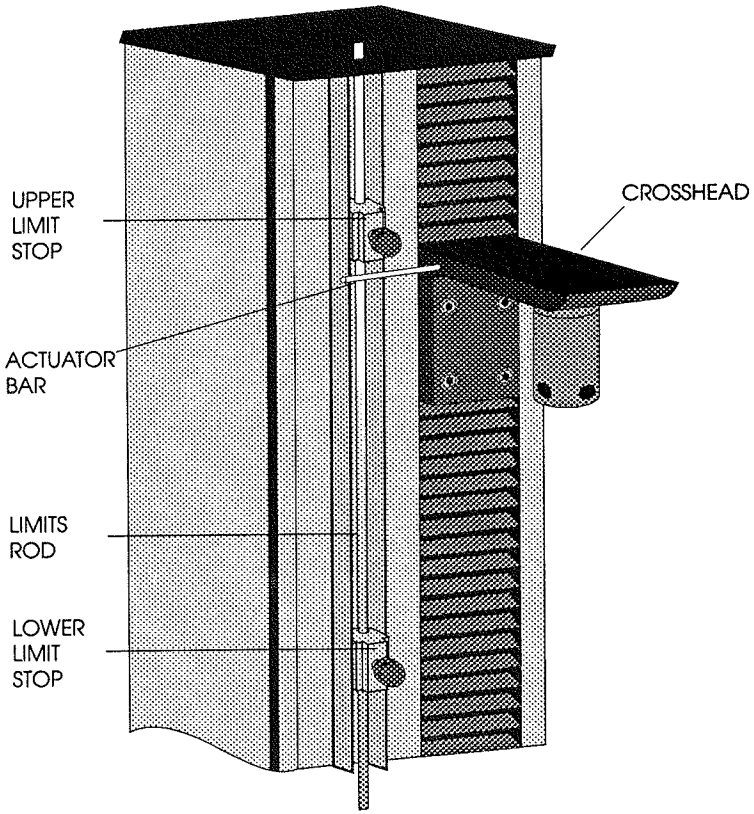


Figure 5-1. Limit Stops

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The stops have thumbscrews that you can tighten or release by hand; you can move the stops to any position on the actuating rod. An actuator bar on the crosshead contacts one of the stops when the crosshead reaches the limit of travel as set by the stops. The bar moves the stop and the rod, which operates a microswitch to stop crosshead motion.

Warning

Set the crosshead travel limit stops before you start a test.

To set the crosshead travel limit stops, use the following procedure:

(a) Set the upper limit stop to a position just above the expected maximum travel in the upward direction when tensile testing or just above the test starting point when compression testing. Tighten the stop on to the limits rod.

(b) Set the lower limit stop to a position just below the expected maximum travel in the downward direction when tensile testing or just below the test starting point when compression testing. Tighten the stop on to the limits rod.

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Chapter 6
Operation

Outline

- Emergency Stop Button . . . . . Page 6-2
- Moving the Crosshead Off a Limit . . . . . Page 6-3

Operation of the testing system under Merlin or 4400 control is detailed in the relevant system Operator's Guide. This chapter describes how to use the Emergency Stop button to stop a test when safety is compromised and how to move the crosshead off a limit that has disabled the load frame drive.

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Emergency Stop Button

The Emergency Stop button is a large, round, red button on the front of the load frame. You use it to stop crosshead movement whenever a condition develops that could effect the safety of persons operating the system or could result in damage to the specimen or test fixtures. Press the Emergency Stop button to disable the power supply to the drive motor.

The Emergency Stop button latches into the Stop position when it is pressed. After you clear the problem that caused the button to be pressed, pull the button out to unlatch it.

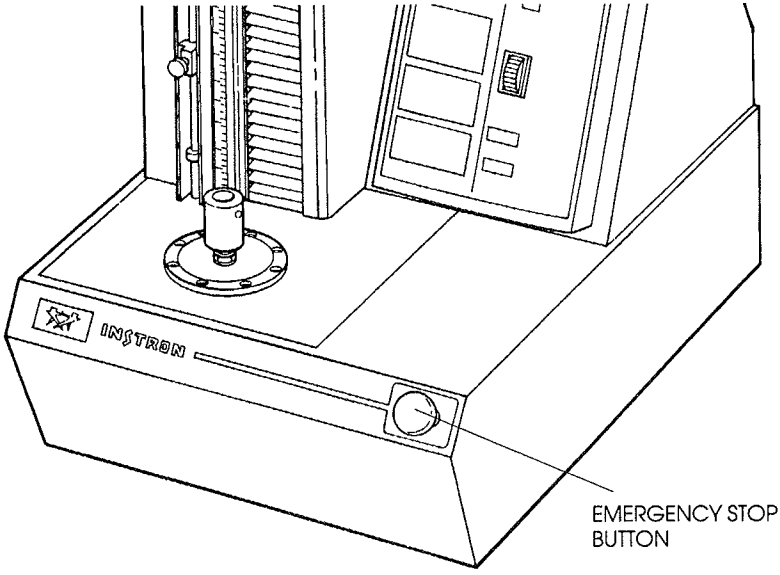


Figure 6-1. Emergency Stop Button

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Moving the Crosshead Off a Limit

When the crosshead activates a software limit or a first level crosshead travel limit, the system inhibits travel in the limited direction. You can move the crosshead in the direction away from the limit using the JOG keys and thumbwheel (Merlin systems) or the JOG switch (4400 systems).

However, if the crosshead operates a second-level crosshead travel limit, the load frame drive is disabled and you cannot drive the crosshead away from the limit. In this situation, you may be able to unscrew the limit stop to release the limit. If this is not possible, you must physically drive the crosshead away from the limit using the drive screw at the top of the column. Insert a 2.5 mm hex wrench into the screw and turn the wrench clockwise to drive the crosshead up or counter-clockwise to drive the crosshead down.

Operation of a second-level limit indicates a problem in the load frame. Do not use the frame again until you have contacted the Instron service department for advice.

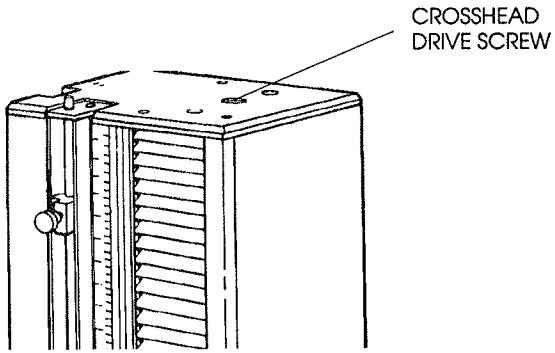


Figure 6-2. Crosshead Drive Screw

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Chapter 7
Maintenance

Outline

- Access to Components. . . . . Page 7-2
- Preventive Maintenance . . . . . Page 7-7
- Corrective Maintenance. . . . . Page 7-9

This chapter describes what you can do to maintain your Mini 44 or Mini 55 load frame. It describes the actions necessary to ensure that your load frame remains at peak efficiency, and how to replace and adjust various components.

By the end of this chapter, you will know how to:

- Clean and lubricate the load frame
- Remove and refit the frame casing and column cover
- Remove and refit the load cell
- Remove and refit the power amplifier
- Remove and refit the drive belt
- Adjust the drive belt tightness
- Remove and refit a controller board (Merlin systems only)

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Access to Components

Removing the Frame Casing

Warning

Switch off and disconnect the main power supply before you remove the load frame casing.

To remove the frame casing, see Figures 7-1 and 7-2 and use the following procedure:

(a) Swich off and disconnect the main power supply.

(b) Remove all accessories from the column T-slot.

(c) Unclip the load transducer cable from the clips on the casing. Coil the cable up around the load cell.

(d) Remove the four screws securing the casing rear access panel and remove the panel. For 4400 systems only, unplug the power supply cable from the power supply mounted on the rear panel.

(e) Remove the lead for the Emergency Stop switch.

(f) For 4400 systems only, remove the jog control lead from the printed circuit board.

(g) For Merlin systems only, remove the control panel cable from the printed circuit card.

(h) Remove the six screws from the sides and rear of the casing, and lift the casing over the column.

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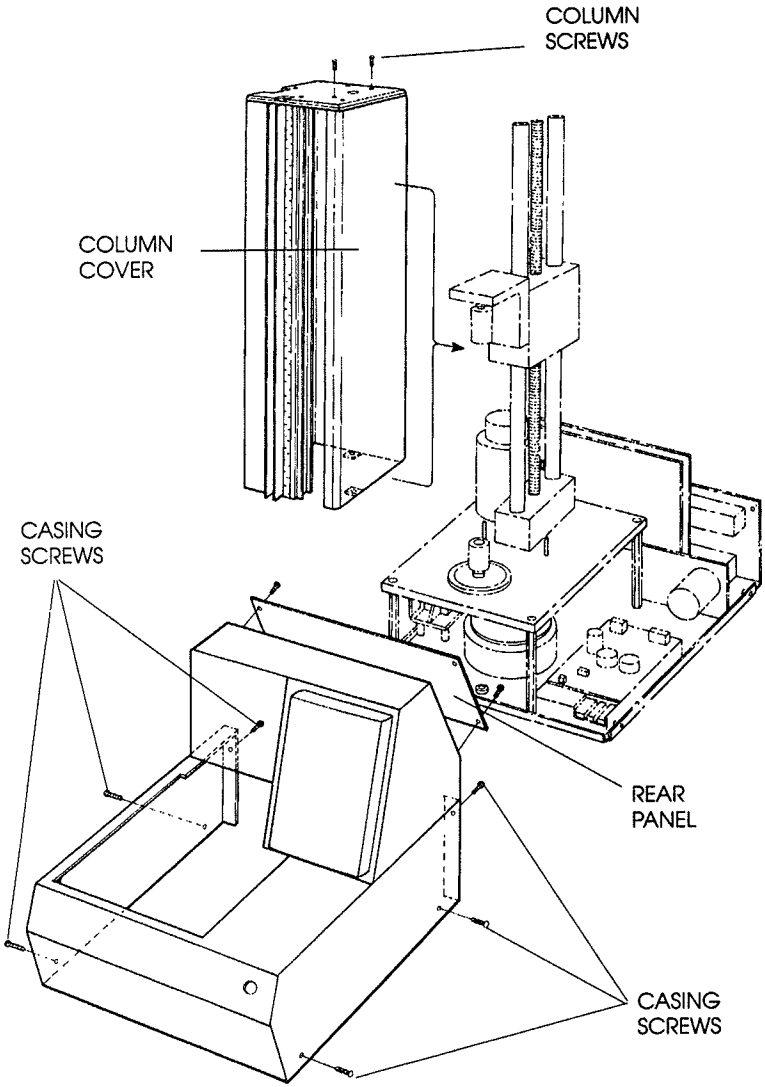


Figure 7-1. Frame Casing and Column Cover Installation

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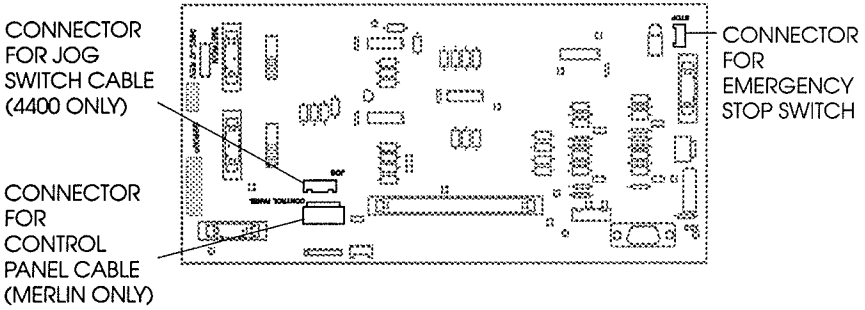


Figure 7-2. Rear Printed Circuit Board Connections

Refitting the Frame Casing

Warning

Test the function of the Emergency Stop button after replacing the casing and before you do any testing.

Casing removal involves disconnecting the Emergency Stop button. To ensure that the button operates correctly after refitting the casing, you must do a functional check of the button before you do any further testing.

To refit the casing, see Figures 7-1 and 7-2 and use the following procedure:

(a) Guide the casing over the column cover and locate it onto the frame base, taking care not to trap any cables between the casing and the base or the table.

(b) Reconnect the Emergency Stop button cable to its connector on the rear printed circuit board.

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(c) On Mini 44 frames only, reconnect the jog control cable to its connector on the rear printed circuit board.

(d) On Mini 55 frames only, reconnect the control panel cable to its connector on the rear printed circuit board.

(e) Replace and tighten the six screws securing the casing to the frame base.

(f) On Mini 44 frames only, reconnect the power supply cable to the power supply on the rear panel.

(g) Refit the rear panel to the casing using the four securing screws.

(h) Route the load cell cable across the table and along the side of the frame casing. Clip the cable into the clips on the side of the casing.

(i) Check the correct functioning of the Emergency Stop button and the crosshead travel limit stops before you do any testing.

Removing the Column Cover

To remove the column cover, see Figure 7-1 and use the following procedure:

(a) Pry apart the Velcro® securing the column cover blinds to the cover and remove the blinds.

(b) Remove the two M6 screws securing the column cover top plate to the columns.

(c) Carefully lift the column cover over the columns.

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(d) Secure the crosshead travel limits rod to the column while the column cover is removed to avoid damage to the rod.

Refitting the Column Cover

To refit the column cover, see Figure 7-1 and use the following procedure:

(a) Place the column cover over the columns and lower it into place on the locating dowels on the frame base. Ensure that you guide the crosshead travel limits rod into place and the top of the ballscrew into its bearing in the column cover top plate.

(b) Refit the two M6 screws securing the column cover top plate to the columns. Tighten the two screws down in equal increments until the top plate is flush with the top of the columns.

(c) Refit the column cover blinds.

(d) Check the correct functioning of the crosshead travel limit stops before you do any testing.

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Preventive Maintenance

The load frame is designed to ensure a long and trouble-free servicelife. You need only to ensure that the frame remains clean and free of debris, and to lubricate the frame at regular intervals.

Cleaning

To clean the load frame, wipe the exterior surfaces with a moistened cloth and blow or vacuum any dust accumulations from components and printed citcuit cards. When you do these tasks, remember the following points:

- Do not use solvents for cleaning. Avoid harsh or abrasive cleaners and be aware that some household or commercial cleaners can react with painted surfaces and panel markings. If in doubt, test the cleaner on an unobtrusive or interior surface before you use it for general cleaning.
- Use only low pressure air for blowing out dust and do not direct the air strean directly at sensitive components.

Lubrication

As a guide to how often you may need to lubricate, we recommend that you lubricate the frame every two months if the frame is in contiuous use. Thus if you use the frame less frequently than this you can increase the time interval between lubrications accordingly. Remember that you need to clean and lubricate the frame more often if it is operated in a dirty or dusty environment.

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To lubricate the frame, use the following procedure:

(a) Remove the column cover. Refer to Page 7-5

(b) Clean the surfaces of the ball-screw, columns, crosshead, and lower bearing block with a clean lint-free cloth. Also clean the inside of the column cover.

(c) Apply a thin coating of Molykote 33 grease or equivalent to the columns.

(d) Apply a thin coating of Lubriko grease to the ball-screw.

(e) Apply one or two drops of light oil to the upper screw bush.

NOTE *Do not lubricate the screw lower bearing. It is lubricated for life during manufacture.*

(f) Refit the column cover. Refer to Page 7-5.

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Corrective Maintenance

Fuse Replacement

Warning

Switch off and disconnect the main power supply before you replace the system fuse.

A fuse mounted in the input power cord connector protects the input power line. Refer to Chapter 3, Installation, for details on how to change the fuse and for the fuse rating.

Removing the Load Cell

(a) Unclip the load cell cable from the clips on the side of the frame casing.

(b) Remove the M4 screws securing the load cell to the load frame table.

Refitting the Load Cell

(a) Locate the load cell into the mounting hole, locating the load cell cable into its machined recess.

(b) Fit the M4 screws securing the load cell to the load frame table. Tighten the screws enough to seat the cell but to still allow lateral movement of the cell.

(c) Locate the alignment bar into the upper grip coupling on the crosshead.

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(d) Using the jog keys, move the crosshead down until the lower end of the alignment bar locates into the load cell coupling. Move the load cell laterally on the table until you can rotate the bar inside the couplings.

(e) Tighten two opposed M4 screws securing the load cell to the table. Ensure that you can still rotate the alignment bar inside the couplings.

(f) Tighten all the M4 screws securing the load cell to the table.

(g) Route the load cell cable across the table and along the side of the frame casing. Clip the cable into the clips on the side of the casing.

Removing the Drive Belt

(a) Remove the column cover and the frame casing. Refer to Pages 7-2 and 7-5.

(b) Disconnect the motor power and the encoder leads from the printed circuit board. See Figure 7-2

(c) Loosen the two M6 screws securing the motor mounting plate to the load frame table.

(d) Swivel the motor toward the center of the frame and remove the motor drive belt.

Refitting the Drive Belt

(a) While the motor mounting plate is loosened, locate the belt over the motor and the ballscrew pulleys.

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(b) Using hand pressure, move the motor toward the outer edge of the frame base and hand tighten the two M6 screws securing the motor mounting plate to the load frame table.

(c) Rotate the drive to ensure that the belt drive teeth are located over the pully teeth.

(d) Using hand pressure, move the motor until firm finger pressure on either side of the drive belt results in not more than 3 mm (0.125 in.) movement as shown in Figure 7-3.

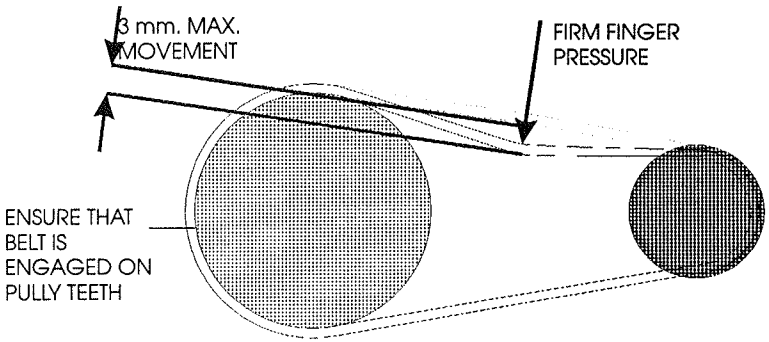


Figure 7-3. Belt Tension

(e) Holding the motor in the final position, tighten the two M6 screws securing the motor mounting plate to the load frame table.

(f) Refit the frame casing and the column cover. Refer to Pages 7-3 and 7-5.

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(g) Check the correct functioning of the Emergency Stop button and the crosshead travel limit stops before you do any testing.

Removing the Power Amplifier

To remove the power amplifier, see Figure 7-4 and use the following procedure:

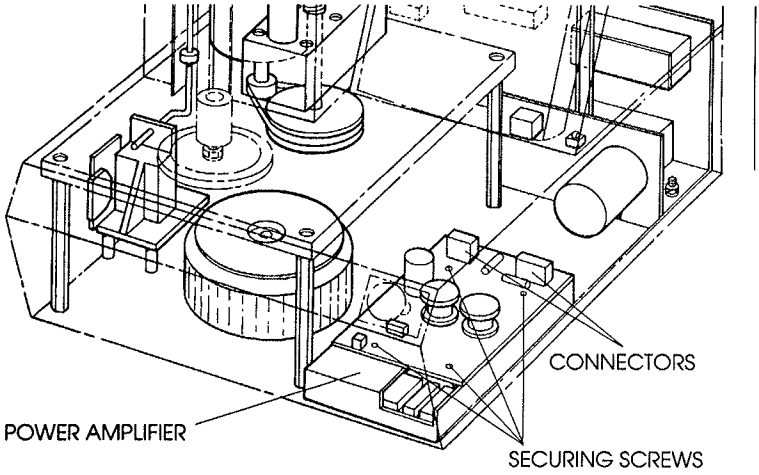


Figure 7-4. Replacing the Power Amplifier

(a) Remove the frame casing. Refer to Page 7-2.

(b) Remove the two power amplifier leads from their connectors.

(c) Remove the four screws securing the power amplifier to the frame base

(d) Lift out the power amplifier.

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Refitting the Power Amplifier

To refit the power amplifier, see Figure 7-4 and use the following procedure:

(a) Locate the power amplifier in the frame base, and replace and tighten the four power amplifier securing screws.

(b) Reconnect the two power amplifier leads to their connectors.

(c) Refit the frame casing. Refer to Page 7-3.

(d) Check the correct functioning of the Emergency Stop button before you do any testing.

Removing an Electronic Accessory Board (Merlin Testing Systems Only)

Merlin testing systems use a frame interface box between the load frame and the computer. The box contains the main controller board, one or more transducer conditioner boards, and an optional digital input/output board. You can replace or add any of the transducer boards or the input/output board.

Warning

Switch off and disconnect the main power supply before you remove the interface box casing.

To remove an electronic accessory board, use the following procedure:

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(a) Switch off and disconnect the main power supply.

(b) Remove all connecting cables and leads from the interface box, noting their position for later reconnection.

(c) Remove the four screws securing the interface box casing and lift the casing clear.

(d) Loosen the two shield flange screws securing the relevant accessory board and lift the board out from the card cage.

Refitting an Electronic Accessory Board (Merlin Systems Only)

To refit an electronic accessory board, use the following procedure:

(a) Locate the board into an empty slot in the card cage. You can fit a transducer card to any of the center slots in the cage, but you can fit a digital input/output card only into the outer slot.

(b) Push the card down into place, ensuring that the card edge connector engages in the cage connector.

(c) Secure the two shield flange screws.

(d) Replace the interface box casing and secure it into place using the four securing screws.

(e) Replace all cables and leads into their original connectors.

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(f) Connect and switch on the main power supply.

(g) Thoroughly test the system functions before you start testing.

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Chapter 8
Replaceable Parts

Outline

- Purpose. . . . . Page 8-2
- Description. . . . . Page 8-3

This chapter details the replaceable spare parts for the Mini 44 and Mini 55 load frames. It also details the connecting cables, the accompanying spare parts kit, and optional accessories available for the load frame.

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Load Frame

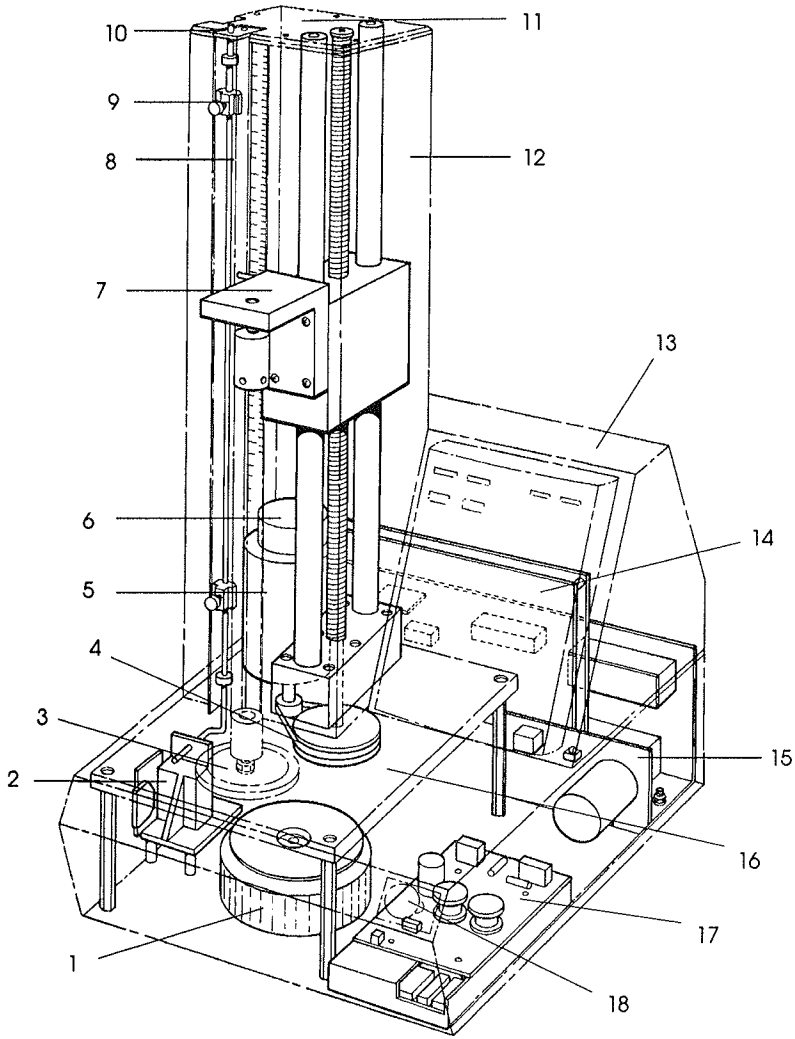


Figure 8-1. Exploded View of the Mini-Tester

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Item	Description	No.	Qty	Mini 44	Mini 55
Refer to Figure 8-1					
	Load frame assembly	A563-229	1	Yes	No
		or			
		A563-226	1	No	Yes
	including				
1	Transformer	73-1-1123	1	Yes	Yes
2	Limit switch	A563-222	1	Yes	Yes
3	Load cell 500 N	2550-416	1	Yes	Yes
	or				
	Load cell 50 N	2550-417	1	Yes	Yes
	or				
	Load cell 5 N	2550-418	1	Yes	Yes
4	Timing belt	15-5-126	1	Yes	Yes
5	Motor	48-1-25	1	Yes	Yes
6	Encoder	94-1-55	1	Yes	Yes
7	Crosshead	T563-265	1	Yes	Yes
8	Limit rod	T563-302	1	Yes	Yes
9	Limit stop	T563-21	2	Yes	Yes
	including				
	Screw	201U24	2	Yes	Yes
	and				
	Knob	39-1-1004	2	Yes	Yes
10	Limit rod bracket	T563-305	1	Yes	Yes
11	Top Plate	T563-268	1	Yes	Yes

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Item	Description	No.	Qty	Mini 44	Mini 55
12	Column cover	T563-226	1	Yes	Yes
	including				
	Blinds	T563-303	2	Yes	Yes
	and				
	Measurement strip	T563-27	1	Yes	Yes
13	Frame casing assembly	A563-223	1	No	Yes
		or			
		A563-228	1	Yes	No
		including			
	Power Supply	111-1-65	1	Yes	No
14	Frame interface PC board	A563-47	1	Yes	Yes
15	Relay PC board assembly	A563-244	1	Yes	Yes
16	Mat	T563-304	1	Yes	Yes
17	Power amplifier	125-1-61	1	Yes	Yes
18	Emergency Stop button	65-3-162	1	Yes	Yes

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Connecting Cables

Description	No.	Qty	Mini 44	Mini 55
50-way cable	A570-5	1	Yes	Yes
Load frame power cable	16-2-16	1	Yes	Yes
Load frame to frame interface box power cable	504-88	1	No	Yes
Load frame to 4400 control panel power cable	A570-6	1	Yes	No

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Spares and Accessories

Description	No.	Qty	Mini 44	Mini 55
Clevis pin	T1223-1034	2	Yes	Yes
Clevis pin clip	T1223-1031	2	Yes	Yes
T-nut	T1697-1307	3	Yes	Yes
Hex key set	80-1-1011	1	Yes	Yes
Fuse, 3A, slo-blo	27-2-40	3	Yes	Yes
Alignment bar	T563-356	1	Yes	Yes

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Optional Equipment

Description	No.	Qty	Mini 44	Mini 55
Crosshead extender	2501-345	1	Yes	Yes
Adapter, load cell on crosshead	2501-231	1	Yes	Yes
Grip, 5 N pneumatic	2712-013	2	Yes	Yes
Grip, 250 N pneumatic	2712-014	2	Yes	Yes
Grip, 20 N pneumatic cord and yarn	2714-031	2	Yes	Yes
Compression anvils, 50N, 1.6 in.	2501-107	2	Yes	Yes
Compression anvils, 50N, 2.5 in.	2501-108	2	Yes	Yes
Grip, fiber 70g, O-ring type	2711-007	2	Yes	Yes
Grip, fiber 50g	2711-006	2	Yes	Yes
Grip, 500N screw action	2710-004	2	Yes	Yes
Grip, 500N wedge action	2716-009	2	Yes	Yes
500N 3-jaw chuck	2830-001	2	Yes	Yes

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