

Series 2714 and 2734 Cord and Yarn Grips



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.

Copyright © 2013 Illinois Tool Works Inc. All rights reserved. All of the specifications shown in this document are subject to change without notice.

Worldwide 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. Our products are designed to the Instron Safety Standard (ICP-CS503), which is available on request. This standard is derived from various national and international standards. 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



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.



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.



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.

Warnings



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.



Crush hazard - disconnect the pneumatic supply to the grips before installing or removing jaw faces.

Installing and removing jaw faces involves working very close to the hazard area between the grips. Disconnect the pneumatic supply to the grips to remove the risk of accidental operation of the toggle switch or foot switch.

Table of Contents

Chapter 1	Introduction	1-1
	Description	1-1
	Grip Components	1-2
	Pneumatic Foot Switch	1-2
	Product Support	1-3
	Product Documentation	1-3
Chapter 2	Specifications	2-1
	Specifications	2-1
Chapter 3	Installing and Preparing for Use	3-1
	Installing the Grips	3-1
	Clevis Pin Coupling	3-2
	Threaded Coupling	3-2
	Installing 2734-007 High Temperature Grips	3-3
	Foot Switch and Air Connections	3-4
	Preparing for Use	3-4
	General Considerations	3-4
	Extreme Temperature Considerations	3-4
	Setting Gauge Length	3-4
	Installing a Specimen	3-6
Chapter 4	Maintenance and Replaceable Parts	4-1
	Maintenance	4-1
	Checklist	4-1
	Lubrication	4-1
	Replaceable Parts	4-3

Chapter 1

Introduction

- Description 1-1
 - Grip Components 1-2
 - Pneumatic Foot Switch. 1-2
 - Product Support 1-3
 - Product Documentation 1-3
-

Description

Instron pneumatic cord and yarn grips hold a fiber specimen between a stationary load frame member and a moving crosshead or actuator.

The grips are pneumatic action grips that provide a convenient method for clamping fiber and cord specimens. The grip is actuated by a pneumatic footswitch. Specimen loading is made easier by the guide horn.

Cord and yarn specimens have a small gripping area in relation to their strength, and tend to break in the grip with normal gripping techniques. This problem is solved in the cord and yarn grips by distributing the gripping force along the section of the specimen within the contoured face.

The pneumatic action of the grips lets you adjust the gripping force to accommodate the differences in mechanical properties and surface finishes of cord and yarn specimens. During a test, this pneumatic action also compensates for gripping force decay due to changes in the specimen's cross-sectional area.

The grips require an air supply to provide the gripping force on the specimen. A control device, for opening and closing the grips, connects between the grip and the pneumatic supply. The control device can be a simple valve or an automatic grip control unit integrated with the electronic control system.

Grip Components

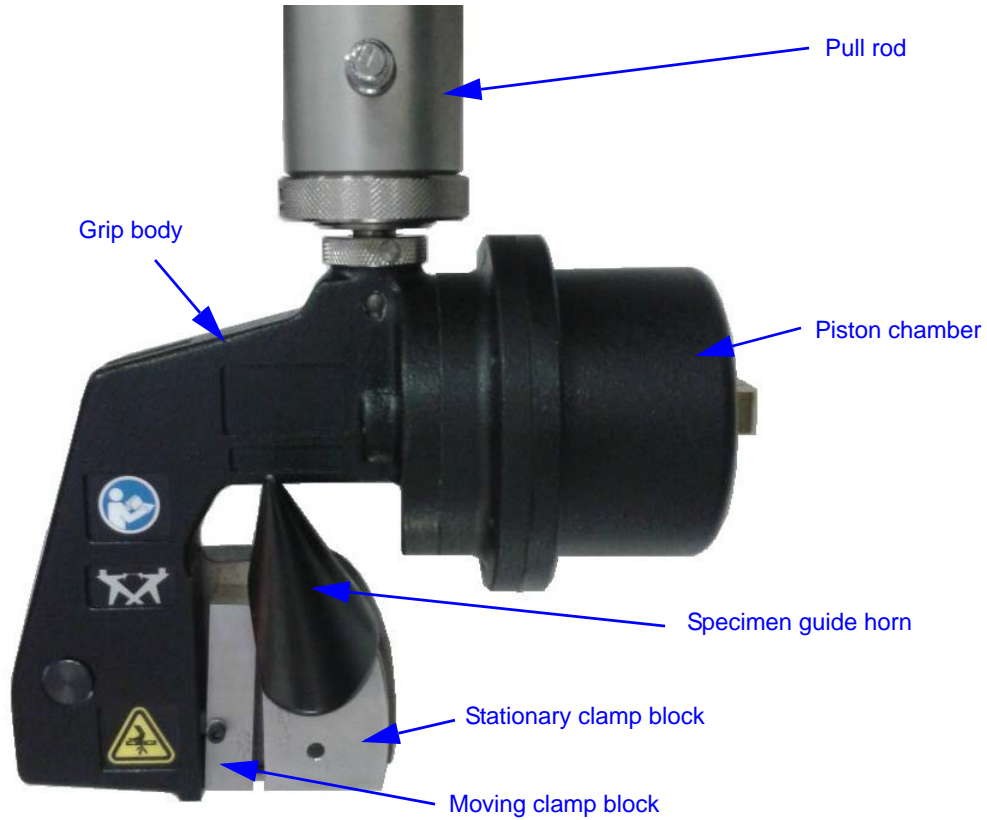
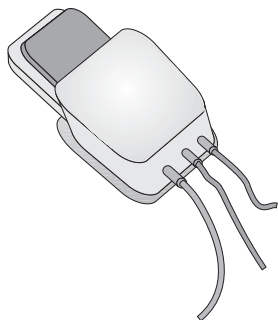


Figure 1-1. Grip Components

Pneumatic Foot Switch



The foot switch lets you operate the grips while using both hands to manipulate the specimen.

To operate the grips, you push down the foot switch to the first position to close the upper grip, then to the second position to close the lower grip. To open the grips, move your toes forward to release the switch and open the grips.

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 Service 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:

Operator's Guide	How to use your system components and controls, procedures for setting limits, calibration and other frequently performed operating tasks.
System Support	Information about system installation, set up and configuration, transducer connection and calibration.
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, and environmental chambers.

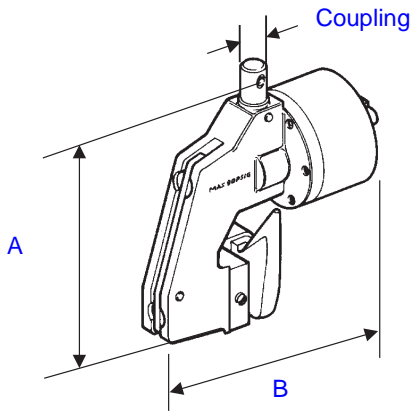
We welcome your feedback on any aspect of the product documentation. Please email info_dev@instron.com with your comments.

Chapter 2 Specifications

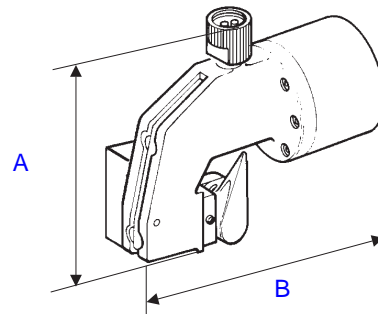
- Specifications 2-1

Specifications

Figure 2-1 on page 2-1 shows the dimensions of the 2714 and 2734 Series grips. Table 2-1 on page 2-2 lists the grip specifications for each grip in t.



Typical 2714 Cord and Yarn Grip



Typical 2734 High Temperature Cord and Yarn Grip

Figure 2-1. Grip Dimensions

Table 2-1. Grip Specifications

Catalog number	2714-031	2714-005	2734-007 (High temp)	2714-040
Maximum capacity	50 N (11 lbf)	1 kN (225 lbf)	1 kN (225 lbf)	2 kN (450 lbf)
Maximum specimen diameter	2.4 mm (0.093 in)	3.2 mm (0.125 in)	3.2 mm (0.125 in)	4.8 mm (0.190 in)
Minimum specimen gauge length	54 mm (2.1 in)	95 mm (3.75 in)	95 mm (3.75 in)	185 mm (7.3 in)
Effective height (A)	90 mm (3.5 in) upper and lower	148 mm (5.8 in) upper and lower	154 mm (6.1 in) upper and lower	210 mm (8.3 in) upper and lower
Overall length (B)	78 mm (3.1 in)	146 mm (5.75 in)	162 mm (6.4 in)	235 mm (9.25 in)
Connection fitting	6 mm clevis Type Om upper and lower	6 mm clevis Type Om upper and lower	Pneumatic connection upper and lower	1/2 in clevis Type Dm upper and lower
Weight (upper grip)	236 g (0.52 lb)	1.14 kg (2.2 lb)	2.8 kg (6.2 lb)	2.5 kg (5.5 lb)
Temperature range	-10 to 80°C (14 to 176°F)	-10 to 80°C (14 to 176°F)	-73 to 260°C (-100 to 500°F)	-10 to 80°C (14 to 176°F)
Maximum air pressure	5.2 bar (75 psi)	6.2 bar (90 psi)	6.2 bar (90 psi)	6.2 bar (90 psi)
Gripping force at maximum air pressure	258 N (58 lbf)	5.0 kN (1124 lbf)	6.2 kN (1394 lbf)	7.1 kN (1596 lbf)

Chapter 3

Installing and Preparing for Use

- Installing the Grips 3-1
 - Installing 2734-007 High Temperature Grips. 3-3
 - Foot Switch and Air Connections. 3-4
 - Preparing for Use 3-4
-

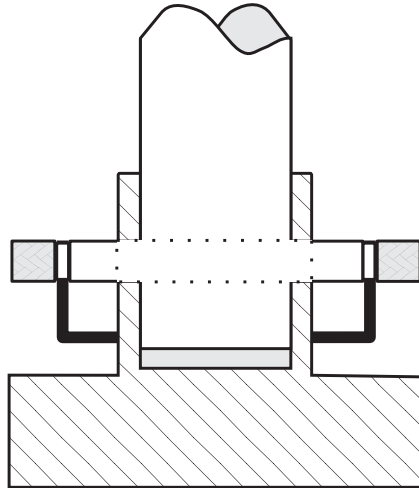
Installing the Grips

The load string is all of the components you install between the actuator or moving crosshead and the frame table, including grips, attachment kits and the specimen. A tight connection between components is essential for accurate test data.

If your test has a temperature range from -73 to 175°C (-100 to 350°F), lubricate the grip couplings with Dow Corning 33 before you install the grips.

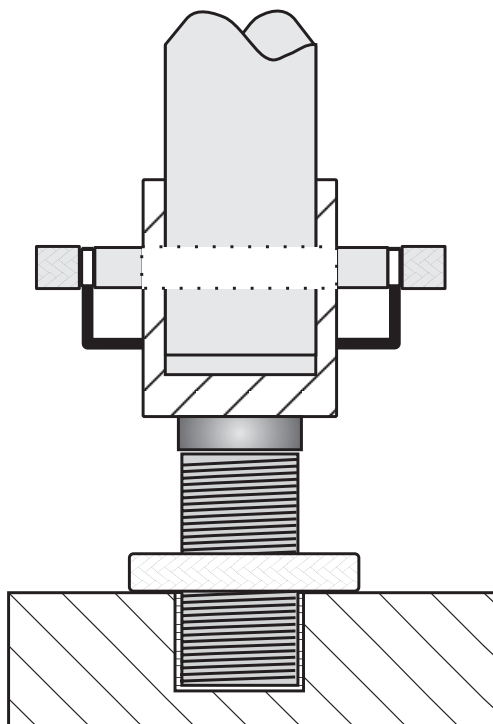
If your test has a temperature range from above 175°C (350°F), lubricate the grip couplings with Molycote GN paste before you install the grips.

Clevis Pin Coupling



A clevis pin coupling normally attaches the grips to an electromechanical test system. A male shank connects to a female clevis socket, which connects to either the load cell or to the frame table. A clevis pin and locking clip couples the shank and socket. A locknut assures that no end play exists in the grip to load frame connection.

Threaded Coupling



A threaded coupling uses a male threaded stud which threads into the frame table, load cell or actuator. You eliminate end play by tightening a locknut against the connecting surface at either end.

Installing 2734-007 High Temperature Grips

These grips are designed for use inside a temperature chamber. Extension rods provide the grips with the maximum amount of travel within the chamber and carry the air pressure to the grip. The specific extension rod configuration depends on the size of the chamber, specimen length and the amount of crosshead travel during the test.

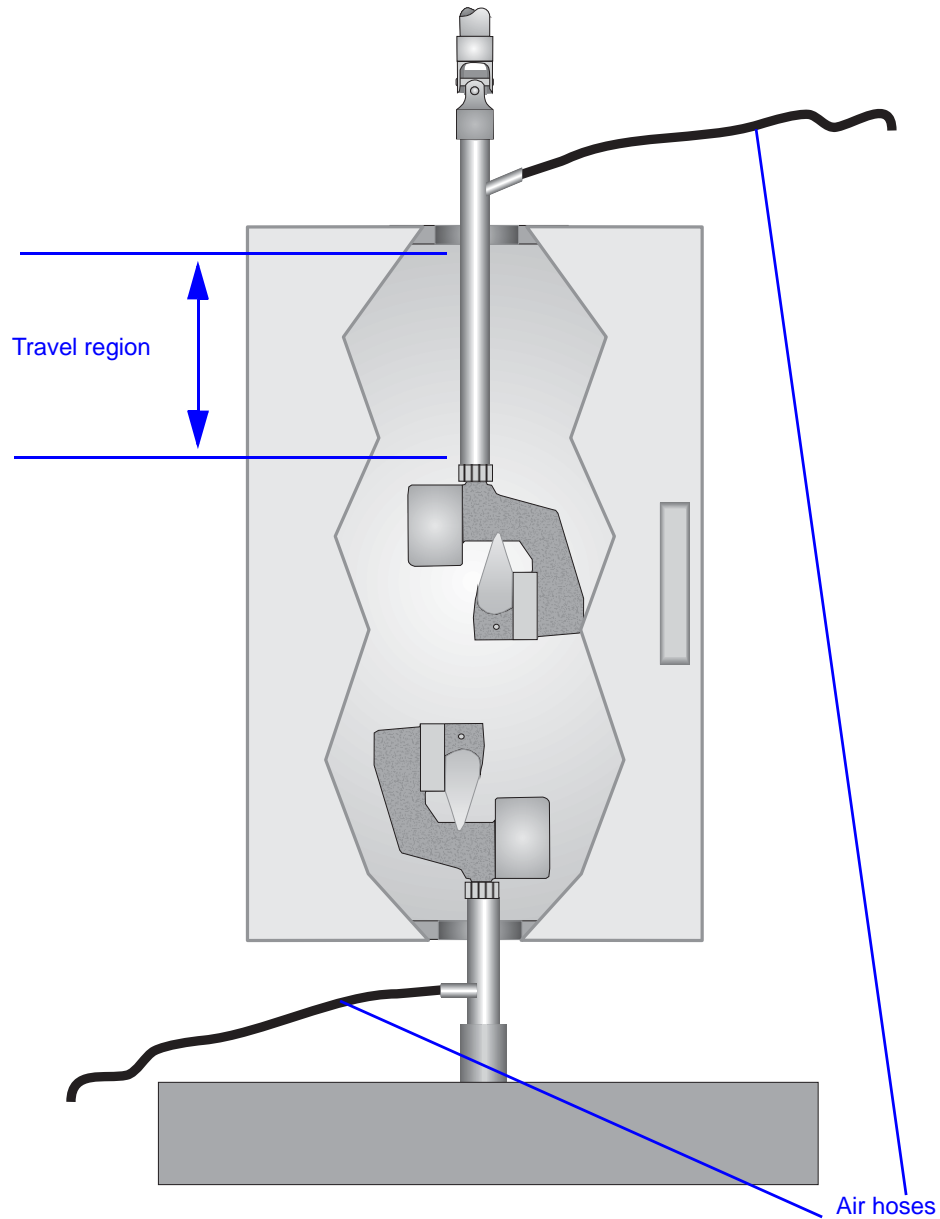


Figure 3-1. High Temperature Grips

Foot Switch and Air Connections

A pneumatic foot switch or an automatic air kit lets you operate the grips while keeping your hands free for aligning the specimen. The foot switch system consists of the switch assembly and three air lines. Two air lines, marked upper and lower grip, are attached to the switch assembly at the factory. The other end of the hoses have quick disconnect fittings for connecting to the grips. The third air line has a female threaded fitting on both ends for connecting to the air supply.

An automatic grip control integrates the grips with the load frame's control system. Refer to the automatic grip control unit manual for specific installation details.

Preparing for Use

General Considerations

- The grips are installed and the coupling pins are secure.
- The air supply is on and the air hoses are connected and free of kinks.
- There is adequate slack in the air hoses to allow for the crosshead travel you anticipate during the test.
- The gauge length your test requires is set between the ends of the upper and lower grip faces.

Extreme Temperature Considerations

- Standard compressed air is used for ambient temperature testing. For temperatures below ambient, use dry air or dry nitrogen.
- If your test requires an operating temperature range from 73 to 175°C (-100 to 350°F), lubricate the grip couplings with Dow Corning 33 before you install the grips. If your test requires an operating temperature above 175°C (350°F), lubricate the grip couplings with Molycote GN paste before you install the grips.

Setting Gauge Length

Gauge length is the actual length of specimen which is held between the nip points of the upper and lower grips. The nip point is located where the groove in the contoured section ends at the flat clamping surface.

Table 3-1. Approximate Gauge Lengths

Model Number	Approximate Gauge Length at Zero Grip Separation
2714-031	54 mm (2.1 in)
2714-005, 2734-007	95 mm (3.8 in)
2714-040	185 mm (7.3 in)

Warning



Crush hazard - Remain clear of the test area between the load frame base and the crosshead, and from the area inside the gripping jaws or grips or fixtures.

Equipment

You need the following items:

- carbon paper or chalk
- length of cord or yarn of the same material to be tested
- tape measure or ruler

Procedure

1. Place a piece of carbon paper against the moving face of each grip so that it will mark the specimen at the nip point when it is installed.
2. Move the crosshead to position the grips at the approximate gauge length position (grip separation) according to [Table 3-1](#) on page 3-5.



Made sure you allow additional specimen length for clamping in the grips.

3. Place a length of the specimen to be tested in the grips.
4. Apply the correct pretension.
5. Without moving the crosshead position, close the grips.
6. Open the grips to remove the specimen and measure the distance between the carbon paper marks.

7. If necessary, position the crosshead and repeat the procedure until the distance between the carbon marks (nip to nip) is the gauge length you desire.

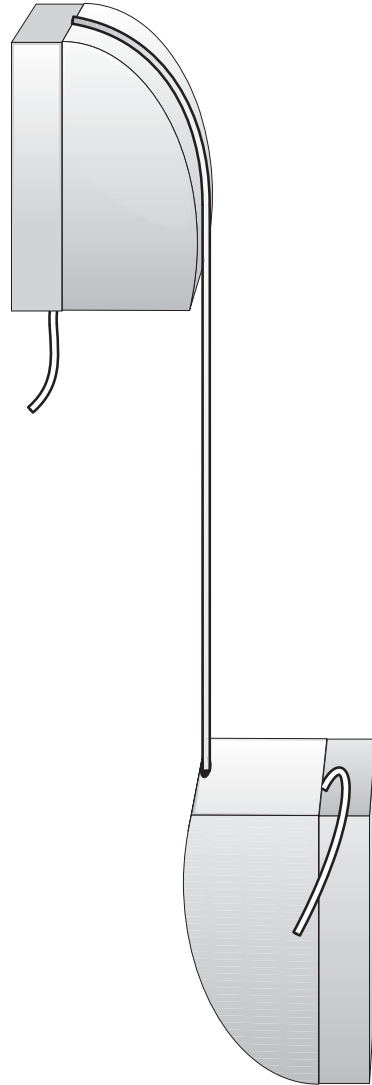
Installing a Specimen

Check for the following items before you install a specimen:

- You have determined the gauge length of your specimen.
- Both grips are in the open position (no air pressure at the grips).
- The crosshead direction and travel limits are set to prevent the grips from colliding. Refer to the load frame and control system manuals for details.

To install the specimen:

1. Pass one end of the specimen between the upper grip face and the flat side of the specimen guide. Make sure the specimen is located in the center of the grip face.
2. Close the upper grip.
3. Position the long end of the specimen so it sits in the specimen guide groove and extends down to the lower grip.
4. Lead the specimen around the lower grip guide horn and through the grip face. Do not pull the specimen too taut.
5. Close the lower grip.



Chapter 4

Maintenance and Replaceable Parts

• Maintenance	4-1
• Replaceable Parts	4-3

Maintenance

Checklist

- Apply a lubricant to the grips according to details below.
- Check the air supply for correct pressure.
- Check the air hoses for damage or excessive wear; replace if necessary.
- Periodically check the air supply filter and lubricant.

Lubrication

Review the following list before you service a grip:

- Contact Instron Service regarding warranty and repair services.
- Remove the grip from the load frame and turn it to allow lubricant to coat the bearing surfaces.
- Lubricate only from the lever side of the grip. Do not lubricate the grip faces.
- Refer to [Figure 4-1](#) on page [4-2](#) for the lubrication points.

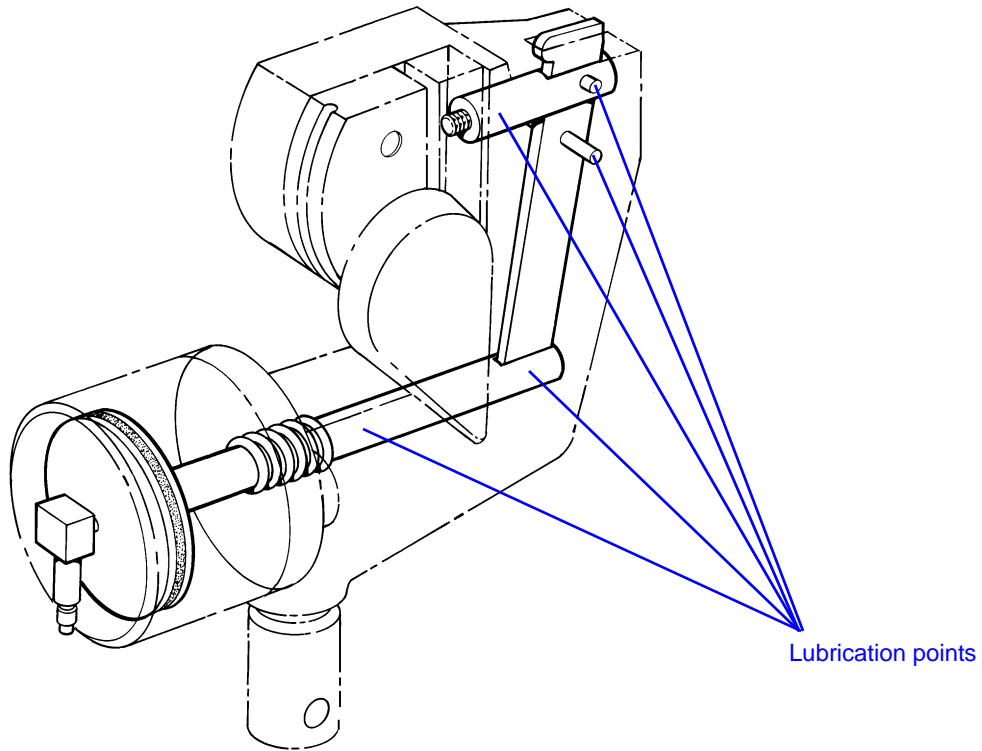


Figure 4-1. Lubrication Points

Replaceable Parts

Table 4-1. Replaceable Parts for all Grips

Part or Catalog Number	Description
T353-8	Moving clamp block for 2714-031
T353-2	Stationary clamp block for 2714-031
T353-10	Specimen guide horn for 2714-031
T2-222	Moving clamp block for 2714-005
T2-383	Specimen guide horn for 2714-005
2714-042	Moving and stationary clamp block for general purpose cord and yarn testing for 2714-040
2714-043	Moving and stationary clamp block for Aramid type cord and yarn testing for 2714-040
2714-044	Moving and stationary clamp block for UHMWPE (Ultra High Molecular Weight Polyethylene) fiber type cord and yarn testing for 2714-040
2714-045	Moving and stationary clamp block for High Denier Aramid type cord and yarn testing for 2714-040
2810-018	Air compressor, portable 115V a.c.
2810-060	Air compressor, portable 230V a.c.
2701-004	Pneumatic foot switch
2701-065	Automatic air control kit for 3300, 4400, 5500, 5800 and 5900
2701-067	Automatic air control kit for 441

Table 4-2. Pull Rods for High Temperature Grips 2734-007

Catalog Number	Description
3119-305 ^a	Lower pull rod Type Dm, rated capacity 10 kN Mechanical fitting: 1.25 in connection with 1/2 in clevis pin Effective length: 81 mm (3.2 in)
3119-306	Lower pull rod Type Dm, rated capacity 10 kN Mechanical fitting: 1.25 in connection with 1/2 in clevis pin Effective length: 118 mm (4.6 in)
3119-311	Lower pull rod Type Dm, rated capacity 10 kN Mechanical fitting: 1.25 in connection with 1/2 in clevis pin Effective length: 160 mm (6.3 in)
3119-318	Upper pull rod Type Om, rated capacity 2kN Mechanical fitting: 12 mm connection with 6 mm clevis pin Effective length: 316 mm (12.4 in)
3119-319	Upper pull rod Type Om, rated capacity 2kN Mechanical fitting: 12 mm connection with 6 mm clevis pin Effective length: 380 mm (15 in)

- a. If you want to use the grips at ambient temperature outside of a temperature chamber, use two 3119-305 pull rods with the appropriate couplings at the test machine and load cell interfaces.

The background of the page is a light gray color with abstract, flowing, curved lines in a slightly darker shade of gray. There are also sections with a fine, repeating dot pattern, similar to a halftone or perforated metal texture, located on the left and bottom right sides. At the bottom of the page, there is a solid red horizontal bar.

Product Support: www.instron.com