Instron Series 2710-11x Screw Action Grips

Reference Manual - Equipment M16-16348-EN Revision C

The difference is measurable®

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

Trademarks

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. 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.

Table of Contents

Chapter 1
Introduction

Description

Instron Series 2710-11x screw action grips are designed for static tensile testing only. For grips with capacities of 1kN or greater, clamping is achieved by tightening the screw knobs using a hex key or torque wrench to provide adequate clamping force. The lower capacity grips (100N and 500N) should only be tightened by hand. The grips are available in the following capacities:

Catalog number	Capacity
2710-111	100 N (22.5 lbf)
2710-112	500 N(112 lbf)
2710-113	1 kN(225 lbf)
2710-114	2 kN(450 lbf)
2710-115	5 kN(1124 lbf)
2710-116	10 kN(2248 lbf)

The grip bodies for the 100N, 500N, 1kN, 2kN and 5kN grips are fabricated in aluminum. The grip bodies for the 10kN grips are fabricated in steel and can be used at higher temperatures (refer to "Grip Specifications" on page 2-1).

The grips can be equipped with a variety of interchangeable grip jaw faces in various sizes and surface types. Refer to Table 2-3 on page 2-4 to find compatible jaw faces for your specific grip model. Contact your Instron sales representative for assistance with selecting jaw faces that are suitable for your testing requirements.

Grip Components

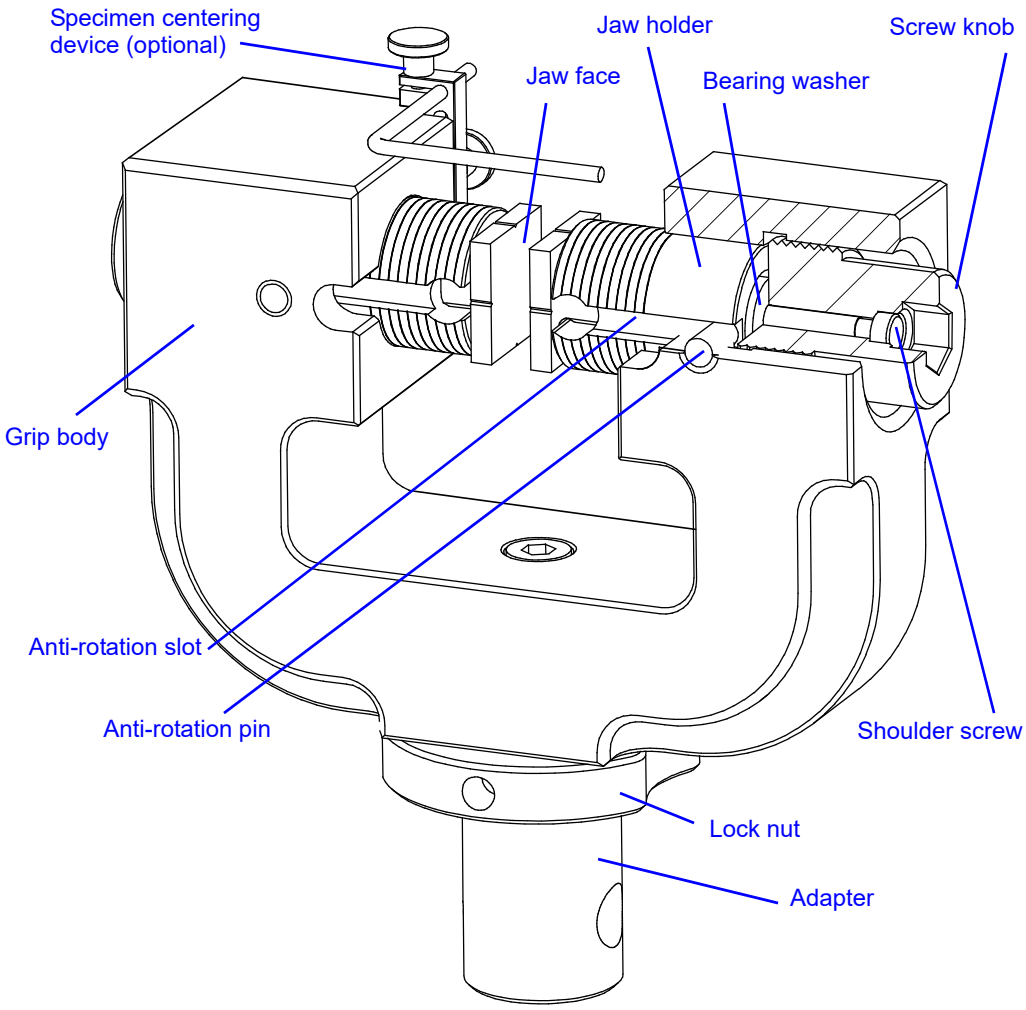

Figure 1-1. Grip Components

Grip Body

The U-shaped grip body is designed to provide compliance in the gripping train. This produces a follow-up action in the gripping train that compensates for any decay in clamping force caused by the thinning of specimens during testing. The front of the body has two mounting holes for attaching the optional specimen centering device.

Adapter

The 100N, 500N, 1kN and 2kN grips connect to the load frame by a type Om adapter with a 6mm (0.25in) clevis pin.

The 5kN and 10kN grips connect to the load frame by a type Dm adapter with a 13mm (0.5in) clevis pin.

Gripping Train

The gripping train consists of the screw knob, bearing washer, shoulder screw and jaw holder. The screw knob provides the clamping force when tightened. The shoulder screw connects the screw knob to the jaw holder and facilitates retraction of the jaw holder when loosening the screw knob. Graduated markings are engraved on the jaw holder to aid in centering specimens. An anti-rotation pin engages the slot in the jaw holder to prevent its rotation when tightening or loosening the screw knobs. The bearing washer, which is sandwiched between the jaw holder and the screw knob, minimizes friction between the screw knob and the jaw holder.

Jaw Faces

The 2710-11x series screw action grips feature a new jaw face attachment mechanism that greatly simplifies the task of changing jaw faces. Refer to “Installing and Removing Jaw Faces” on page 3-2.

Specimen Centering Device

The optional specimen centering device is a small metal clamp with two thumbscrews that attach to the front of the grip body. A knurled thumbscrew secures the specimen stop. The specimen stop is a thin L-shaped arm, which extends outward across the jaw faces. The extension of the specimen stop adjusts to accommodate different specimen widths.

The specimen stop lets you set the forward-to-back position of a specimen in the grips. The forward-to-back position of same-sized specimens in the grips can then be repeated to ensure consistent results.

Chapter 2
Specifications

Grip Specifications

Table 2-1. Grip Specifications

	2710-111	2710-112	2710-113	2710-114	2710-115	2710-116
Load capacity	100 N (22.5 lbf)	500 N (112 lbf)	1 kN (225 lbf)	2 kN (450 lbf)	5 kN (1124 lbf)	10 kN (2248 lbf)
Test Application	Tensile					
Mechanical connection (upper and lower)	Type Om 6 mm (0.24 in) clevis pin				Type Dm 12.7 mm (0.5 in) clevis pin	
Maximum specimen thickness	Varies according to jaw face, refer to Table 2-3 on page 2-4					
Maximum torque that can be applied to the screw knobs	0.4 Nm (hand-tighten only)	2 Nm (hand-tighten only)	8 Nm (5.9 lbft)	16 Nm (11.8 lbft)	40 Nm (29.5 lbft)	80 Nm (59.0 lbft)
Grip body material	Aluminum					Steel
Temperature range	-70°C to +125°C (-94°F to +257°F)					-70°C to +200°C (-94°F to +392°F)
Weight (each grip, excluding jaw faces)	0.45 kg (1.0 lb)	0.55 kg (1.2 lb)	1.15 kg (2.54 lb)	1.15 kg (2.54 lb)	2.68 kg (5.91 lb)	4.91 kg (10.82 lb)

Grip Dimensions

Table 2-2. Grip Dimensions - mm (in)

Dimension - mm (in)	Label on Figure 2-1	2710-111	2710-112	2710-113 and 2710-114	2710-115 and 2710-116
Effective height	A	94 (3.68)	98.6 (3.86)	116.5 (4.59)	155.5 (6.12)
Maximum overall width (with jaw face fully retracted)	B	173 (6.81)		196 (7.71)	225 (8.86)
Throat depth	C	37.5 (1.48)		42.5 (1.67)	55.0 (2.17)
Throat depth	D	12.5 (0.49)		17.5 (0.69)	25.0 (0.98)
Depth	E	25 (0.98)		35.0 (1.38)	50.0 (1.97)
Hex socket size (across flats)	F	n/a		10	12
Maximum jaw face opening with serrated faces (basic opening)[a]	G	35 (1.42)		36 (1.42)	44 (1.73)

a. Opening depends on the type of jaw face used. Refer to Table 2-3 on page 2-4 for maximum specimen thicknesses.

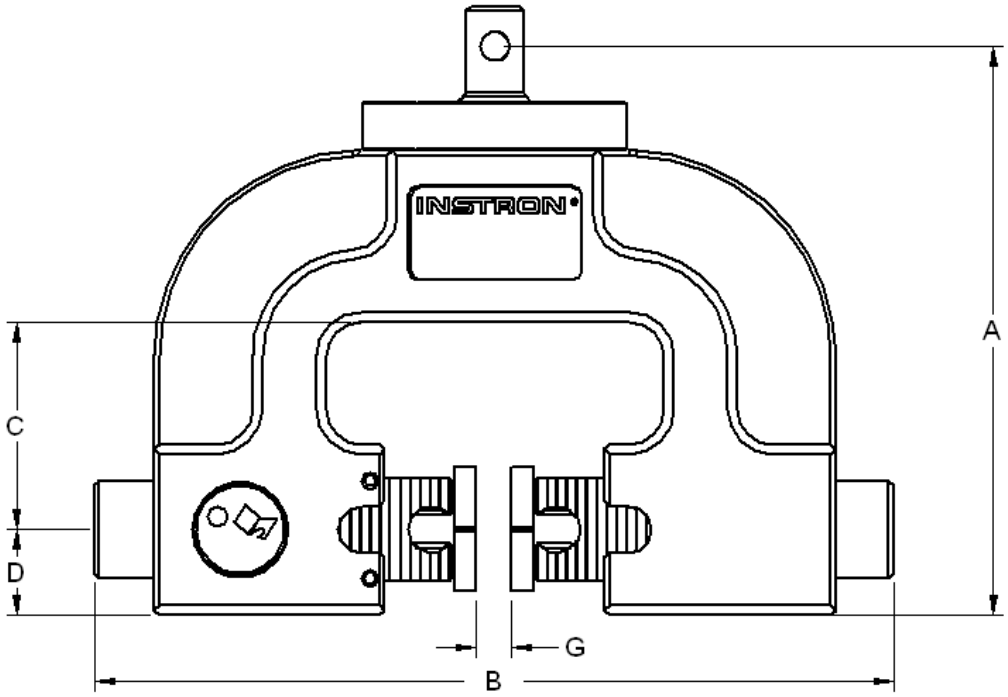

Figure 2-1. Grip Dimensions

Compatible Jaw Faces

Table 2-3. Compatible Jaw Faces for 1kN, 2kN, 5kN and 10kN Grips

Catalog No.	Surface	Width - mm (in)	Height - mm (in)	Maximum Specimen Thickness - mm (in)	
				2710-113 and 2710-114	2710-115 and 2710-116
2702-300	Rubber	25 (1.0)	25 (1.0)	34 (1.34)	44 (1.73)
2702-301	Rubber	25 (1.0)	38 (1.5)	34 (1.34)	44 (1.73)
2702-302	Rubber	25 (1.0)	51 (2.0)	34 (1.34)	44 (1.73)
2702-303	Rubber	38 (1.5)	13 (0.5)	34 (1.34)	44 (1.73)
2702-304	Rubber	38 (1.5)	25 (1.0)	34 (1.34)	44 (1.73)
2702-305	Rubber	38 (1.5)	51 (2.0)	34 (1.34)	44 (1.73)
2702-306	Rubber	51 (2.0)	25 (1.0)	34 (1.34)	44 (1.73)
2702-307	Rubber	51 (2.0)	38 (1.5)	34 (1.34)	44 (1.73)
2702-308	Rubber	51 (2.0)	51 (2.0)	34 (1.34)	44 (1.73)
2702-309	Rubber	76 (3.0)	25 (1.0)	34 (1.34)	44 (1.73)
2702-310	Rubber	76 (3.0)	51 (2.0)	29 (1.41)	39 (1.54)
2702-311	Rubber	152 (6.0)	51 (2.0)	29 (1.41)	39 (1.54)
2702-315	Serrated	25 (1.0)	25 (1.0)	36 (1.42)	46 (1.81)
2702-316	Serrated	25 (1.0)	38 (1.5)	36 (1.42)	46 (1.81)
2702-357	Serrated	25 (1.0)	51 (2.0)	31 (1.22)	41 (1.61)
2702-318	Serrated	38 (1.5)	13 (0.5)	36 (1.42)	46 (1.81)
2702-319	Serrated	38 (1.5)	25 (1.0)	36 (1.42)	46 (1.81)
2702-320	Serrated	38 (1.5)	51 (2.0)	36 (1.42)	46 (1.81)
2702-321	Serrated	51 (2.0)	25 (1.0)	36 (1.42)	46 (1.81)
2702-322	Serrated	51 (2.0)	38 (1.5)	36 (1.42)	46 (1.81)
2702-323	Serrated	51 (2.0)	51 (2.0)	36 (1.42)	46 (1.81)

Table 2-3. Compatible Jaw Faces for 1kN, 2kN, 5kN and 10kN Grips

Catalog No.	Surface	Width - mm (in)	Height - mm (in)	Maximum Specimen Thickness - mm (in)	
				2710-113 and 2710-114	2710-115 and 2710-116
2702-324	Serrated	76 (3.0)	25 (1.0)	36 (1.42)	46 (1.81)
2702-325	Serrated	76 (3.0)	51 (2.0)	31 (1.22)	41 (1.61)
2702-326	Serrated	152 (6.0)	51 (2.0)	31 (1.22)	41 (1.61)
2702-330	Smooth	25 (1.0)	25 (1.0)	36 (1.42)	46 (1.81)
2702-331	Smooth	25 (1.0)	38 (1.5)	36 (1.42)	46 (1.81)
2702-332	Smooth	25 (1.0)	51 (2.0)	36 (1.42)	46 (1.81)
2702-333	Smooth	38 (1.5)	13 (0.5)	36 (1.42)	46 (1.81)
2702-334	Smooth	38 (1.5)	25 (1.0)	36 (1.42)	46 (1.81)
2702-335	Smooth	38 (1.5)	51 (2.0)	36 (1.42)	46 (1.81)
2702-336	Smooth	51 (2.0)	25 (1.0)	36 (1.42)	46 (1.81)
2702-337	Smooth	51 (2.0)	38 (1.5)	36 (1.42)	46 (1.81)
2702-338	Smooth	51 (2.0)	51 (2.0)	36 (1.42)	46 (1.81)
2702-339	Smooth	76 (3.0)	25 (1.0)	36 (1.42)	46 (1.81)
2702-340	Smooth	76 (3.0)	51 (2.0)	31 (1.22)	41 (1.61)
2702-341	Smooth	152 (6.0)	51 (2.0)	31 (1.22)	41 (1.61)
2702-345	Brake Lining (HFC)	25 (1.0)	38 (1.5)	33 (1.30)	43 (1.69)
2702-346	Brake Lining (HFC)	38 (1.5)	25 (1.0)	33 (1.30)	43 (1.69)
2702-347	Brake Lining (HFC)	51 (2.0)	38 (1.5)	33 (1.30)	43 (1.69)
2702-350	Line	25 (1.0)	n/a	36 (1.42)	46 (1.81)
2702-351	Line	76 (3.0)	n/a	14 (0.55)	24 (0.94)

Table 2-3. Compatible Jaw Faces for 1kN, 2kN, 5kN and 10kN Grips

Catalog No.	Surface	Width - mm (in)	Height - mm (in)	Maximum Specimen Thickness - mm (in)	
				2710-113 and 2710-114	2710-115 and 2710-116
2702-352	Wave	51 (2.0)	51 (2.0)	22.5 (0.67)	32.5 (1.28)
2702-353	Wave	76 (3.0)	51 (2.0)	n/a	5.0 (0.20)
2702-354	Vee-serrated	3 - 6.5 (0.12 - 0.25)	25 (1.0)	6.5 (0.25)	6.5 (0.25)
2702-355	Vee-serrated	6 - 18.5 (0.24 - 0.73)	25 (1.0)	18.5 (0.73)	18.5 (0.73)

Table 2-4. Compatible Jaw Faces for 100N and 500N Grips

Catalog No.	Surface	Width - mm (in)	Height - mm (in)	Maximum Specimen Thickness - mm (in)
2702-360	Rubber	10 (0.4)	10 (0.4)	34 (1.34)
2702-361	Rubber	12 (0.5)	25 (1.0	34 (1.34)
2702-362	Rubber	25 (1.0)	25 (1.0	34 (1.34)
2702-363	Rubber	50 (2.0)	25 (1.0	34 (1.34)
2702-364	Rubber	100 (4.0)	25 (1.0	34 (1.34)
2702-365	Serrated	10 (0.4)	10 (0.4)	35 (1.38)
2702-366	Serrated	12 (0.5)	25 (1.0	35 (1.38)
2702-367	Serrated	25 (1.0	25 (1.0	35 (1.38)
2702-368	Serrated	50 (2.0)	25 (1.0	35 (1.38)
2702-369	Serrated	100 (4.0)	25 (1.0	35 (1.38)
2702-370	Smooth	10 (0.4)	10 (0.4)	35 (1.38)
2702-371	Smooth	12 (0.5)	25 (1.0	35 (1.38)

Table 2-4. Compatible Jaw Faces for 100N and 500N Grips

Catalog No.	Surface	Width - mm (in)	Height - mm (in)	Maximum Specimen Thickness - mm (in)
2702-372	Smooth	25 (1.0	25 (1.0	35 (1.38)
2702-373	Smooth	50 (2.0)	25 (1.0	35 (1.38)
2702-374	Smooth	100 (4.0)	25 (1.0	35 (1.38)
2702-375	Brake Lining (HFC)	25 (1.0	25 (1.0	34 (1.34)
2702-376	Brake Lining (HFC)	50 (2.0)	25 (1.0	34 (1.34)
2702-377	Line Contact	25 (1.0	n/a	35 (1.38)

Chapter 3
Installation

This chapter contains procedures for installing the grips. It includes the following sections:

Installing onto a Load Frame

Checklist

Before you begin, check the following:

- ❑ There is sufficient space between the load cell and the load frame base to install the grips.
- ❑ The testing system is in standby mode and other personnel cannot operate any of the system controls.
- ❑ The limit stops on the load frame are set to prevent the upper and lower grips from colliding with each other.
- ❑ The mating surfaces of the grips, load cell and load frame base are free of dirt and debris.

Procedure

1. Insert the adapter on the grip into the female clevis socket on the load frame base or load cell as shown in Figure 3-1 on page 3-2.
2. Align the clevis holes and insert the clevis pin through the holes.
3. Secure the clevis pin in position with the clevis pin clip.
4. Tighten the lock nut by hand at this stage, when you have installed all the grip components, refer to “Preload the Load String” on page 3-5.

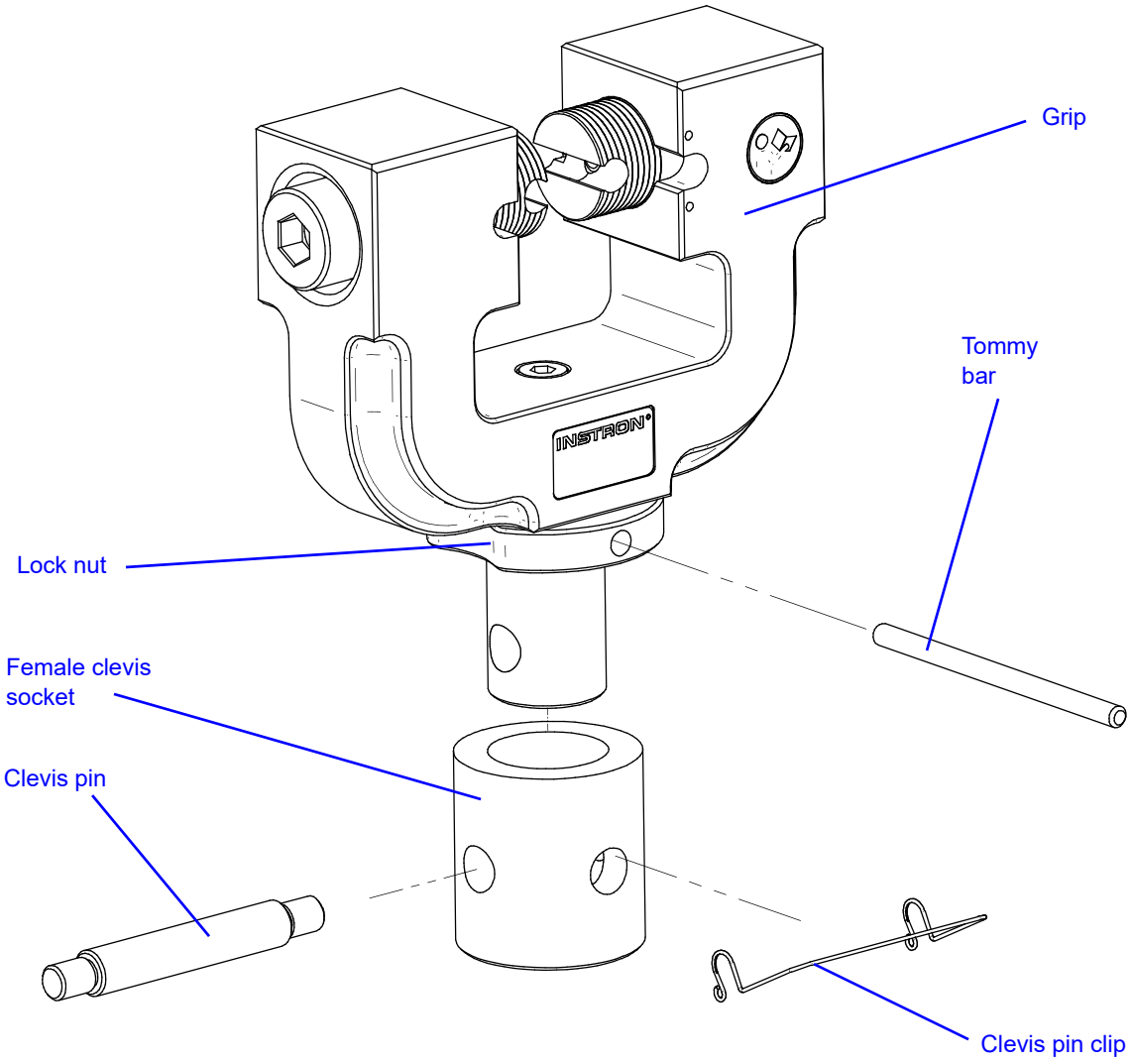

Figure 3-1. Installing Grip onto Load Frame

Installing and Removing Jaw Faces

Install Jaw Faces

1. Push the jaw face into the grip body as shown in Figure 3-2 on page 3-3 until you feel it locate in the socket.
2. Grasp the top and bottom edges of the jaw face between finger and thumb and rock it up and down to ensure that it is fully located in the socket.

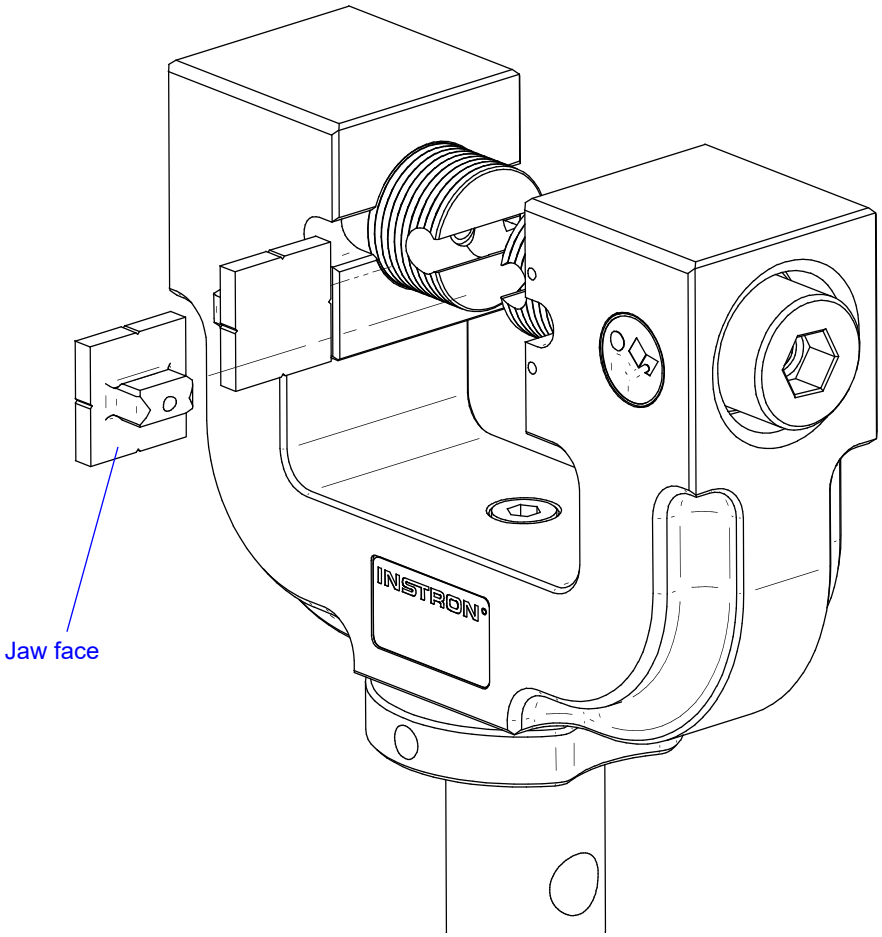

Figure 3-2. Installing Jaw Faces

Remove Jaw Faces

Simply push the jaw face out of the grip body.

Installing the Specimen Centering Device

The specimen centering device is an optional feature that attaches to the grip and lets you center a specimen in the jaw faces. The specimen stop adjusts to accommodate different specimen widths.

To attach the specimen centering device:

1. Attach the specimen centering device loosely onto the grip body by fastening the two thumbscrews, as shown in Figure 3-3 on page 3-4.
2. Move the specimen centering device vertically to the desired position and secure in place by tightening the two thumbscrews.

For proper specimen installation, refer to"Installing a Specimen" on page 4-1.

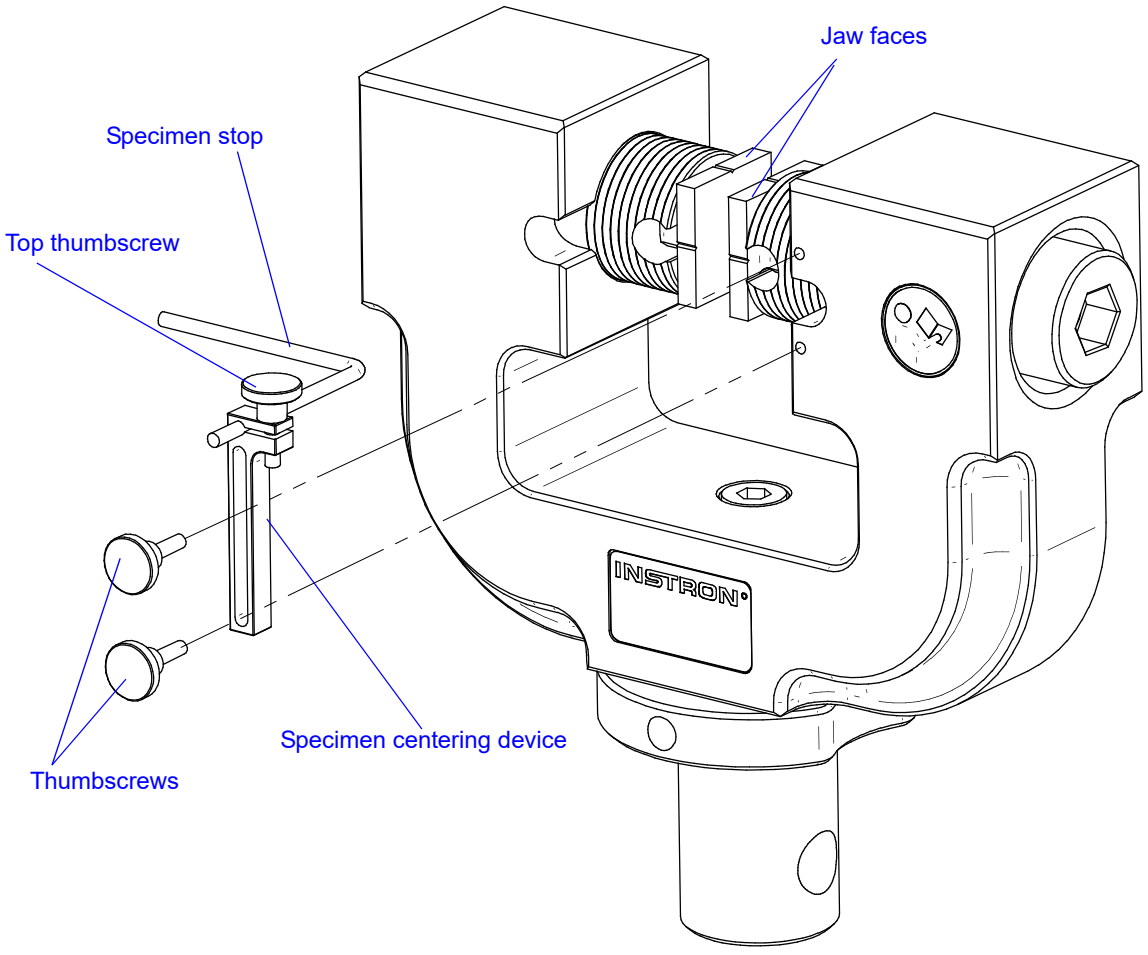

Figure 3-3. Installing the Specimen Centering Device

Preload the Load String

The purpose of this procedure is to eliminate backlash and deflections within the load string which can degrade the integrity of test results, especially when testing at high loads. The procedure involves preloading the entire load string and then hand-tightening all the locknuts on all the grips and couplings. Even when using self-aligning couplings on the upper grip, it is good practice to preload the lower grip.

You will need a rigid specimen that is strong enough to sustain the preload value without breaking. This means a specimen that can sustain a load that is:

- 10% above the expected test load, or
- the maximum load rating of the weakest component of the load string (grips or load cell)

whichever is less. For example, if your grips are rated at 1kN, the load cell at 2kN and your expected test load is 500N then you should preload to at least 550N but not more than 1kN.

Before inserting the specimen ensure that:

- ❑ The grips and couplings are installed but the locknuts are not tightened.
- ❑ Crosshead travel limits are set.
- ❑ The value of load in the live display is near zero. If it is not, balance the load.
- ❑ The load limits are set in the software to a value that matches the maximum load capacity of the weakest component in the load string.

To preload the load string:

1. Install the strong specimen.
2. Increase the load on the load string to the chosen preload value.
3. Hand tighten all the locknuts on the grips and any intermediate couplings.
4. Reduce the load to zero.
5. Remove the specimen.

The load string is now preloaded and all the locknuts are tight and should not move during subsequent testing. The system is now ready to test.

When you next need to change grips or any other part of the loadstring, the locknuts will be too tight to loosen by hand. Follow the unload procedure ("To unload the load string:" on page 3-6).

To unload the load string:

1. Install the strong specimen.
2. Increase the load on the load string to the chosen preload value.
3. Loosen all the locknuts on the grips and any intermediate couplings.
4. Reduce the load to zero.
5. Remove the specimen.

The load string is now unloaded and all the locknuts are loose so that you can change any component.

Chapter 4
Operation

Materials testing systems are inherently hazardous. The following two statements warn of behavior that offers the highest probability of personal injury from using the system.

Warnings

Hazard - do not allow more than one person to operate a testing machine.

Operator injury may result if more than one person operates the testing machine. For example, injury can occur if one person moves the crosshead or actuator while the other is working inside the hazard area between the grips or fixtures.

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.

Installing a Specimen

Checklist

Check for the following conditions before you install a specimen:

- The grip coupling pins are secure.
- The jaw faces are the appropriate size and type for the test specimen.
- The crosshead is set to the test gauge length.

- The load frame's limit stops are set to prevent the grips from colliding with each other or other fixtures.

If your testing system has a Specimen Protect function, use it when installing a specimen. Refer to the testing system documentation for operating details.

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.

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.

Procedure

1. Open the upper and lower grips by unscrewing the screw knobs far enough to accommodate the thickness (or diameter) of the specimen.
2. Position the specimen in the grips so it engages the entire length of the jaw faces (100% insertion depth), as shown in Figure 4-1 on page 4-3. Ensure that the specimen is centered forward-to-back. Hand tighten the screw knobs only enough to prevent the specimen from falling out.
3. Center the specimen in the grips. Make sure the specimen is perpendicular and contacts the entire length of the grip faces as shown in Figure 4-1 on page 4-3.
4. If you are using the specimen centering device, loosen the top thumbscrew and position the specimen stop (L-shaped arm) against the specimen, then retighten the top

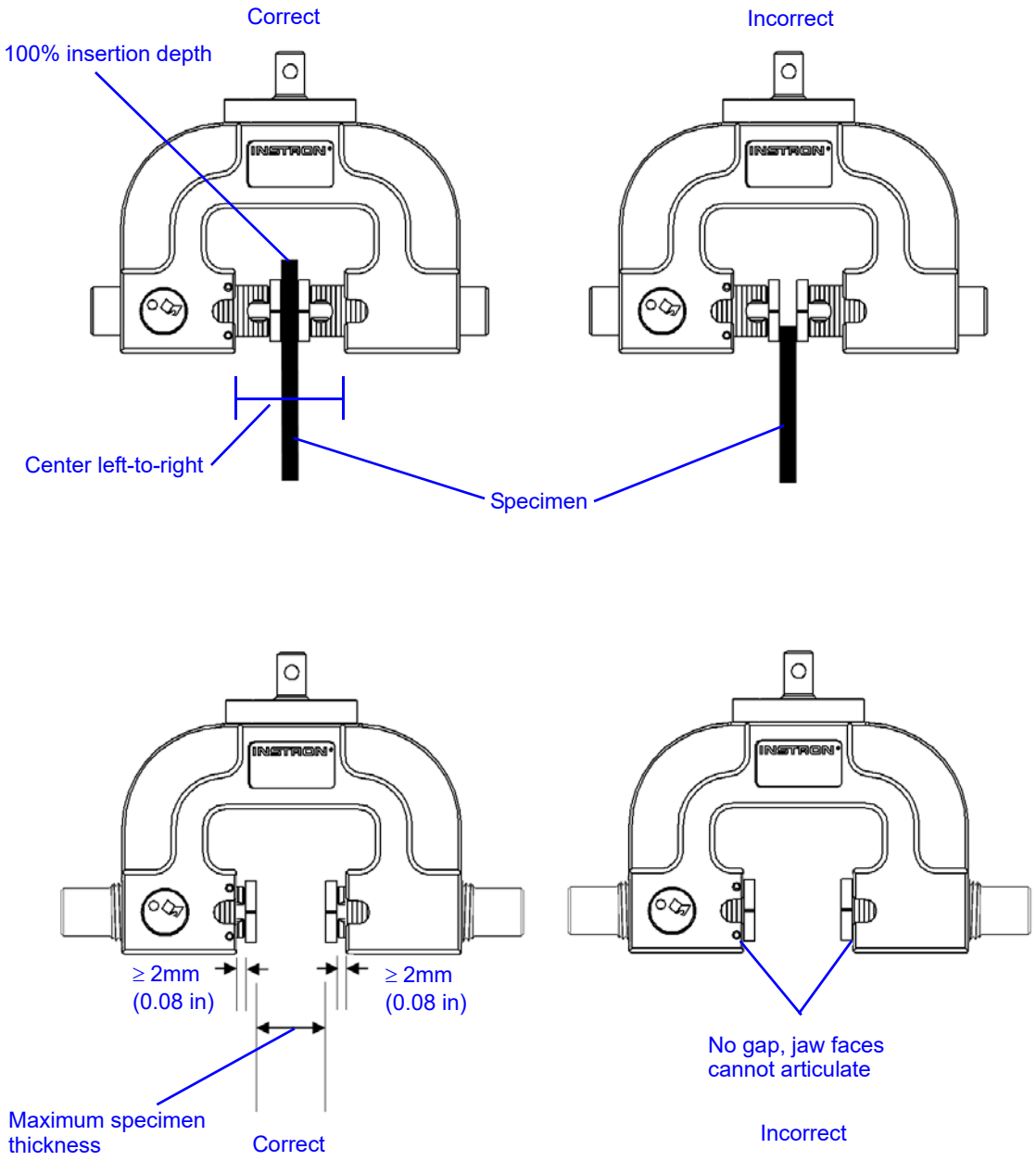

Figure 4-1. Proper Specimen Placement

Ensure that there is a gap of at least 2.5mm between the jaw faces and the grip body, as shown in Figure 4-1 on page 4-3. This provides sufficient clearance for the jaw faces to articulate.

thumbscrew. See Figure 4-2 on page 4-4. When testing subsequent same-sized specimens, position them against the specimen stop to ensure the forward-to-back position of all specimens is consistent.

5. Starting with the upper grip, adjust the screw knobs so that the specimen is centered left-to-right, as shown in Figure 4-1 on page 4-3. Use the engraved scale on the jaw holder to aid in doing this.
6. Repeat steps for the lower grip.
7. Once the specimen is centered left-to-right in both grips, tighten the screw knobs to the appropriate torque to achieve the desired clamping force. Do not exceed the maximum torque rating of the grips, as follows:

Grip	Maximum Torque Nm (lbft)
2710-111	0.4 (0.3)
2710-112	2 (1.48)
2710-113	8 (5.9)
2710-114	16 (11.8)
2710-115	40 (29.5)
2710-116	80 (59.0)

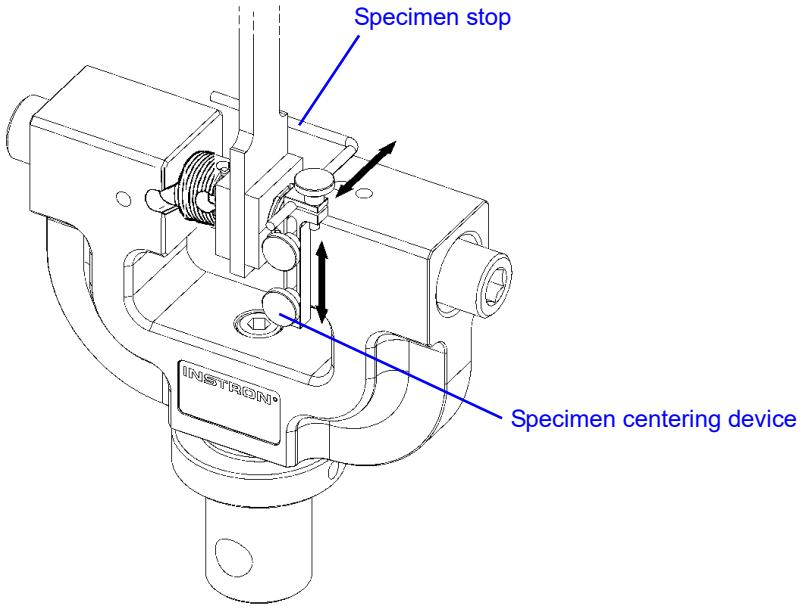

Figure 4-2. Using the Specimen Centering Device

Removing a Specimen

Warning

Hazard - Do not release a specimen from the grips while the specimen is under a load or if the system is in LOAD or STRAIN control.

Checklist

Check for the following conditions before you remove a specimen:

- The test is complete and there is no significant load on the specimen.
- There is no measuring device, such as an extensometer or LVDT, on the specimen.

Warning

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.

Procedure

1. Unscrew the screw knob on the upper grip, using a hex wrench if necessary, until the jaw faces disengage from the specimen.

Caution

Secure fragile specimens before opening the lower grip.

2. Unscrew the screw knob on the lower grip, using a hex wrench if necessary, until the jaw faces disengage from the specimen.
3. Remove the specimen.

Chapter 5
Maintenance

This chapter contains instructions for maintaining and troubleshooting your grips. It includes the following sections:

General Maintenance Checklist

Perform the items in the following checklist every 4 to 6 weeks:

- Clean the grip body, jaw holder and screw threads with a soft cloth.
- Lubricate the jaw holder and screw threads on both the grip body and the screw knobs. Refer to “Lubrication” on page 5-3.
- Check the grip faces for excessive wear. Replace if necessary.
- Use a wire brush to remove any residual specimen material or corrosion from the jaw face serrations.

Do not lubricate the gripping area of the jaw faces. Oil or grease decreases the effective gripping force and clogs the jaw face serrations.

Troubleshooting

Improper adjustments or the lack of maintenance cause most grip operating problems. When a problem develops, Table 5-1 suggests a probable cause and recommends a remedy. If you are unable to solve a problem, contact Instron Service.

Before you contact Instron Service, note the model and serial numbers of the test system and make sure there is a telephone at the test site.

Table 5-1. Troubleshooting

Problem	Cause	Remedy
Excessive backlash in gripping train	Shoulder screw loosened	Tighten shoulder screw in screw knob (see Figure 5-1 on page 5-4)
	Bearing washers worn or damaged	Replace bearing washers (refer to "Replacing the Bearing Washers" on page 5-3)
Difficulty retracting grip faces from the specimen.	Grip face bound to the specimen.	Lightly tap the grip face to release the bond.
	Grip requires lubrication.	Lubricate the grip. Refer to "Lubrication" on page 5-3.
Specimen slips while under load.	Wrong size or type of grip face.	Install appropriate grip faces for specimen size and type.
	Not enough gripping area.	Install specimen for complete engagement with grip faces.
	Not enough gripping force.	Lubricate screw knobs (refer to "Lubrication" on page 5-3) and tighten screw knobs.
	Worn grip faces.	Replace with new grip faces.
	Bearing washers worn or damaged.	Replace bearing washers (refer to "Replacing the Bearing Washers" on page 5-3)
Specimen breaks at grip face	Initial gripping force is too great for specimen.	Do not overtighten screw knobs when gripping a specimen
	Wrong size or type of grip face.	Install appropriate grip face for specimen size and type.
	Load string component is out of alignment.	Verify the alignment of the load string and specimen.

Maintenance Procedures

Lubrication

You must lubricate the screw threads and the jaw holder in the screw action grip in order for the grips to operate smoothly and produce consistent clamping forces.

To lubricate the grip:

1. Remove the jaw faces (refer to "Installing and Removing Jaw Faces" on page 3-2).
2. Remove the gripping train from the body (refer to Figure 5-1 on page 5-4).
3. Clean the jaw holder and the screw threads on both the grip body and on the screw knobs with a soft cloth.
4. Refer to the following operating temperature and lubrication guidelines:

Operating Temperature	Lubrication	Frequency
-70 °C to 200 °C (-94 °F to 392 °F)	Molykote 33 grease	Every four to six weeks

5. Lubricate the screw threads on the screw knobs. Do not use excessive amounts of grease.
6. Lubricate the jaw holder.
7. Using a cotton swab, smear a light coating of grease on the two main bores.
8. Reinstall the gripping train in the grip body. Ensure that the anti-rotation pin in the grip body is aligned with the anti-rotation slot in the jaw holder.

Replacing the Bearing Washers

Replace the bearing washers when necessary according to the following procedure:

1. Remove the grip faces (refer to "Installing and Removing Jaw Faces" on page 3-2).
2. Unscrew the shoulder screw completely, as shown in Figure 5-1 on page 5-4.
3. Remove the screw knob and jaw holder from the grip body. Replace the old bearing washer with a new one.
4. Lubricate the flat surfaces of the bearing washer with Molykote 33 grease. Do not use excessive amounts of grease.
5. Reassemble the gripping train, as shown in Figure 5-1 on page 5-4. Ensure that the shoulder screw is secured tightly.

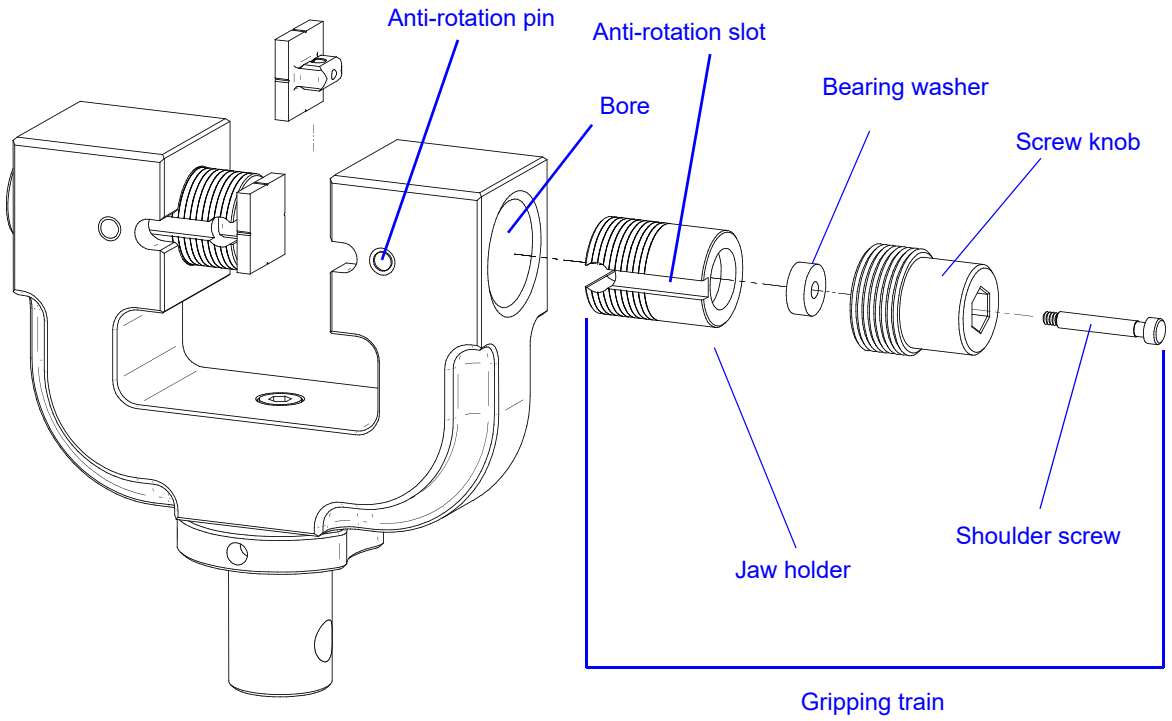

Figure 5-1. Lubricating the Screw Knobs and Replacing the Bearing Washers

6. Reinstall the gripping train in the grip body. Ensure that the anti-rotation pin in the grip body is aligned with the anti-rotation slot in the jaw holder, as shown in Figure 5-1 on page 5-4.

Chapter 6
Illustrated Parts

Replaceable Parts List

Figure 6-1 on page 6-2 shows an exploded view of the 2710-115 (5kN) screw action grip. The components of the other 2710-11x grips are similar except in size.

To identify a part:

1. Locate the part on the illustration.
2. Refer to the item number on the illustration.
3. Refer to the item number in the corresponding parts list (Table 6-1 on page 6-3).

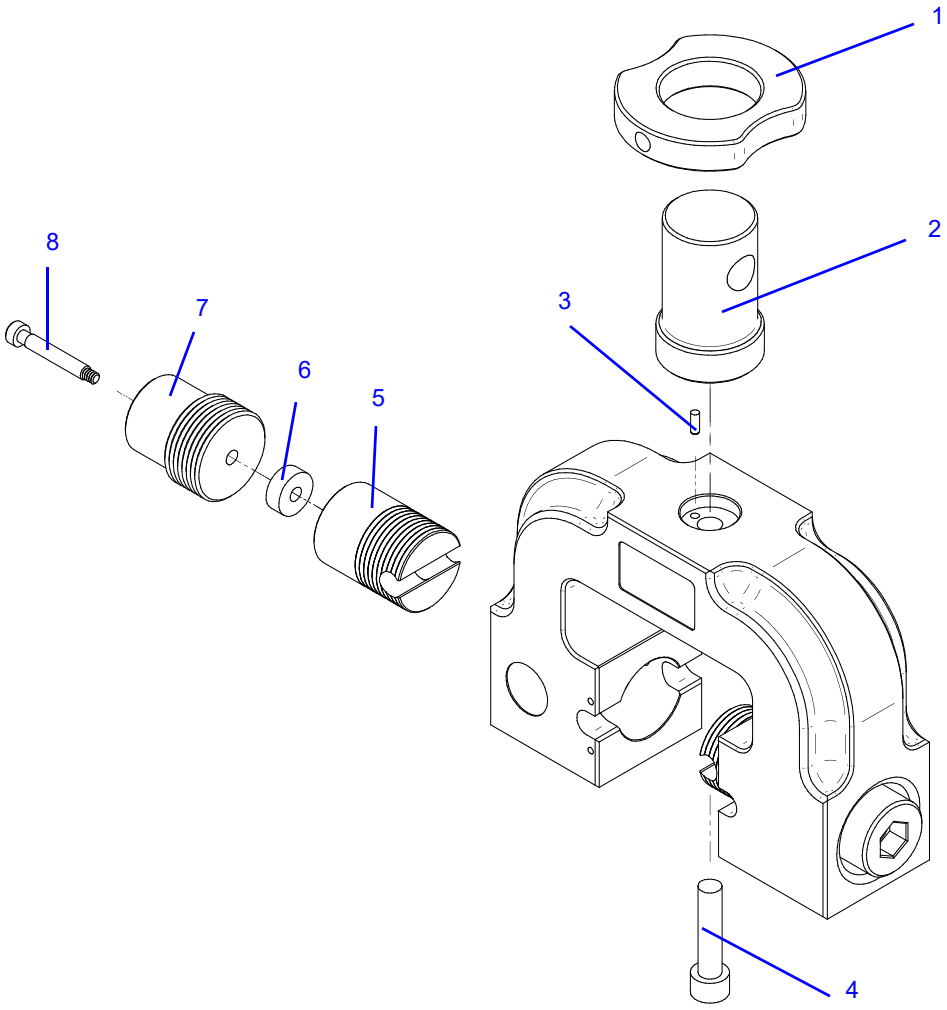

Figure 6-1. Exploded View of 2710-115 (5kN) Screw Action Grip

Table 6-1. Replaceable Parts List

Item	Description	Part Number						Quantity per grip
		2710-111	2710-112	2710-113	2710-114	2710-115	2710-116	
1	Lock nut (Type O adapter)	T621-104				n/a		1
2	Adapter (Type O adapter)	T621-153				n/a		1
1	Lock nut (Type D adapter)	n/a				T621-269		1
2	Adapter (Type D adapter)	n/a				T612-126		1
3	Dowel pin	705J83						1
4	Socket head cap screw	201V46						1
5	Jaw holder	T612-111		T612-168		T612-228		2
6	Bearing washer	T612-103				T612-223		2
7	Screw knob	T612-108	T612-138	T612-162		T612-222		2
8	Shoulder screw	9-6-21						2

Table 6-2. Ancillary Parts - supplied with Grips

Description	Grip Part Number						Quantity per grip set
	2710-111	2710-112	2710-113	2710-114	2710-115	2710-116	
Molykote 33 grease	105-1-4						1
Tommy bar	T1080-23						1
Hex key	n/a	n/a	80-1-1033 (10mm)		80-1-1032 (12mm)		1

Assemblies and Accessories

Table 6-3. Available Assemblies and Accessories

Part number	Description	Applicability			
		2710-111 2710-112	2710-113 2710-114	2710-115	2710-116
2501-254	Type O adapter assembly (lock nut, adapter and dowel pin)	Replaces standard adapter assembly		Can be used to convert from standard Type D to Type O adapter	
2501-255	Type D adapter assembly (lock nut, adapter and dowel pin)	Can be used to convert from standard Type O to Type D adapter		Replaces standard adapter assembly	
2710-109	Specimen centering device	All			

Table 6-4. Replacement Grips

Part number	Description	Notes
2710-111U	Assembled 100N grip (complete single upper grip with appropriate grip interface adapter)	These upper grips can be used to replace a lower grip, although the labels will be upside down.
2710-112U	Assembled 500N grip (complete single upper grip with appropriate grip interface adapter)	
2710-113U	Assembled 1kN grip (complete single upper grip with appropriate grip interface adapter)	
2710-114U	Assembled 2kN grip (complete single upper grip with appropriate grip interface adapter)	
2710-115U	Assembled 5kN grip (complete single upper grip with appropriate grip interface adapter)	
2710-116U	Assembled 10kN grip (complete single upper grip with appropriate grip interface adapter)	