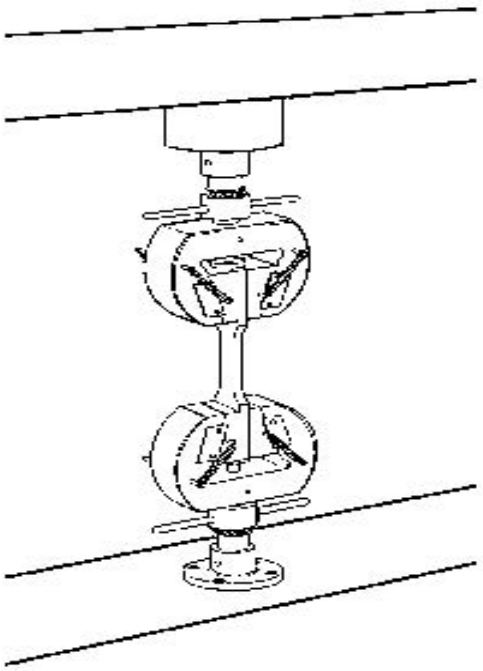
INSTRON®

5kN, 30kN and 50kN Wedge Grips



Reference Manual - Equipment M10-14052-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

Original instructions

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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 in the testing system that are potentially hazardous, particularly force actuators or a moving crosshead.

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

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

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

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

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

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

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

Warnings

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

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

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

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

Hazard - Protect electrical cables from damage and inadvertent disconnection.

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

Warnings

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.

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

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

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

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

Warnings

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

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

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

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

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

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

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

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

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

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

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.

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

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

Table of Contents

Chapter 1
Introduction

This chapter describes the 5 kN, 30 kN, and 50 kN wedge action grips and their grip components.

General

This manual describes the 5 kN wedge action grips, two versions of the 30 kN wedge action grips, and the 50 kN wedge action grips. These are:

- Catalog number 2716-010 - 5 kN wedge action grips
- Catalog number 2716-015 - 30 kN wedge action grips
- Catalog number 2736-015 - High Temperature 30 kN wedge action grips
- Catalog number 2716-020 - 50 kN wedge action grips

Purpose

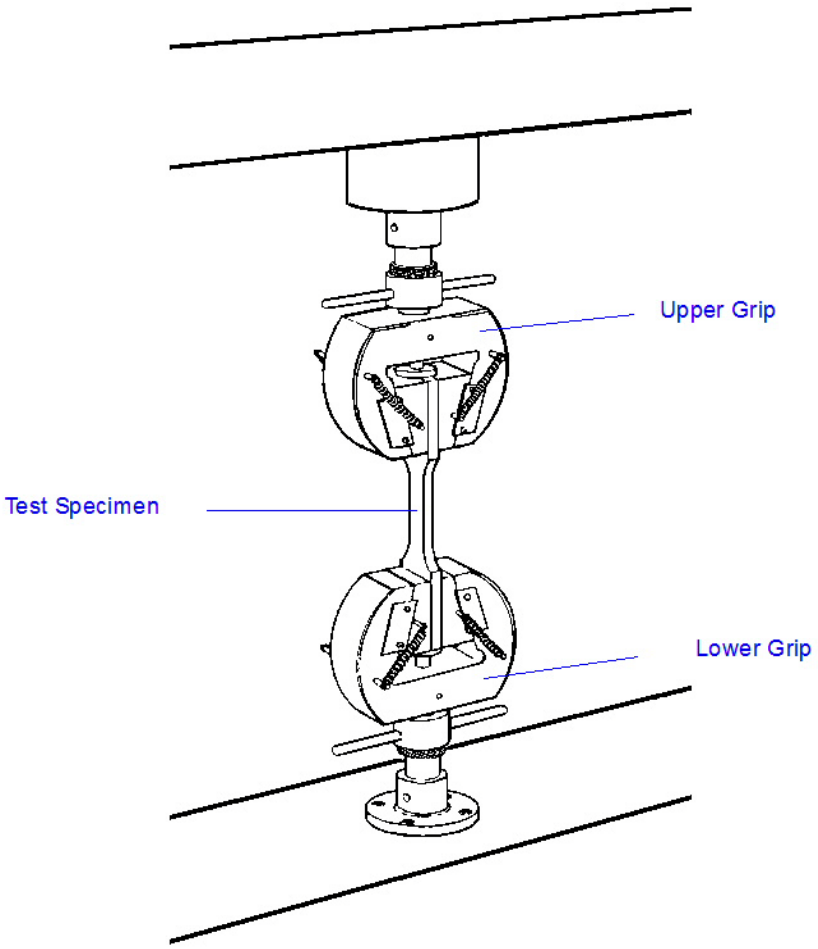

Figure 1. 30 kN Wedge Grip (2716-015)

The Instron wedge action grips hold a test specimen between a stationary load frame member and force producing crosshead or actuator.

Figure 1 shows the 2716-015 (30 kN) version of the grips. The 2716-010 (5 kN) version looks exactly the same. The high temperature version (2736-015) is similar except that there are four handles on each grip to facilitate tightening the grips in the confined space of a temperature chamber. The 2716-020 (50 kN) version looks exactly the same.

The grips are for static tensile testing only. The wedge action design allows the jaw faces to tighten onto a specimen without altering the vertical position of the faces in relation to the specimen. This allows you to install a test specimen without exerting a tensile

preload on it. A compressive test load eliminates any gripping force and causes the specimen to slip from the grips.

The open front design of the grips lets you change jaw faces to accommodate flat, round or different size specimens.

Description

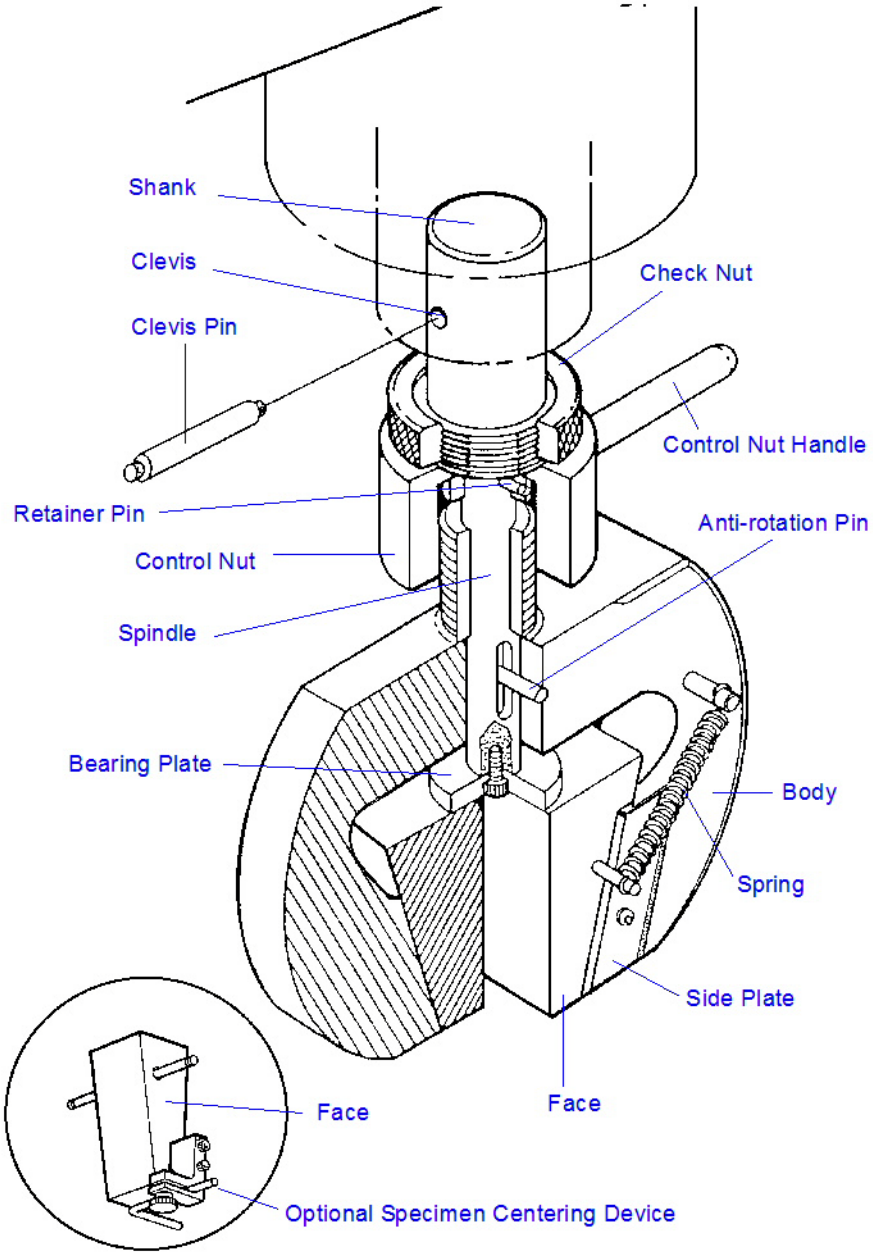

Figure 2. Grip Components (2716-015)

Components

The major grip components are the body, control mechanism, faces and optional specimen centering device. Figure 2 illustrates the grip components.

Body

The front of the alloy steel U-shaped body has a center cavity with integral wedges which taper toward the open end. The back of the body has two angled slots.

Two screws hold a recessed side plate which overlaps each body wedge and jaw face. Two steel pins hold the face retainer springs on the front and back of the body.

The closed end of the body has a threaded stud with a machined bore. A control nut threads on the stud and a spindle passes through the bore. An anti-rotation pin passes through the body and sits in the control mechanism spindle slot.

Control Mechanism

The control mechanism consists of a control nut and a spindle. The control nut threads onto the body stud and has two horizontal handles. The thin spindle end passes through the control nut to the body cavity. A screw attaches a bearing plate to the spindle end. An anti-rotation pin passes through a vertical slot in the spindle shaft. The spindle shank has a horizontal bore through which a clevis pin passes. A control nut retainer pin passes through a smaller horizontal bore at the spindle center. A check nut attaches to the external threads between the two horizontal bores.

Faces

A pair of tool steel, wedge-shaped jaw faces rest on the body's integral wedges. Two posts on each face attach springs to the body. There is a series of serrations cut into the side of the face which contacts the specimen. Faces may be flat, for flat specimens, or vee-shaped, for round specimens, with different grades of serrations. Faces with other contact surfaces are also available, including rubber coated and surfalloy. An optional specimen centering device attaches to one of the jaw faces.

Specimen Centering Device

The optional specimen centering device is a small metal block which two screws attach to the outside of a jaw face. A knurled thumb screw secures a thin L-shaped arm which extends outward across the face.

Functional

Figure 3 illustrates the grip in the closed and open positions.

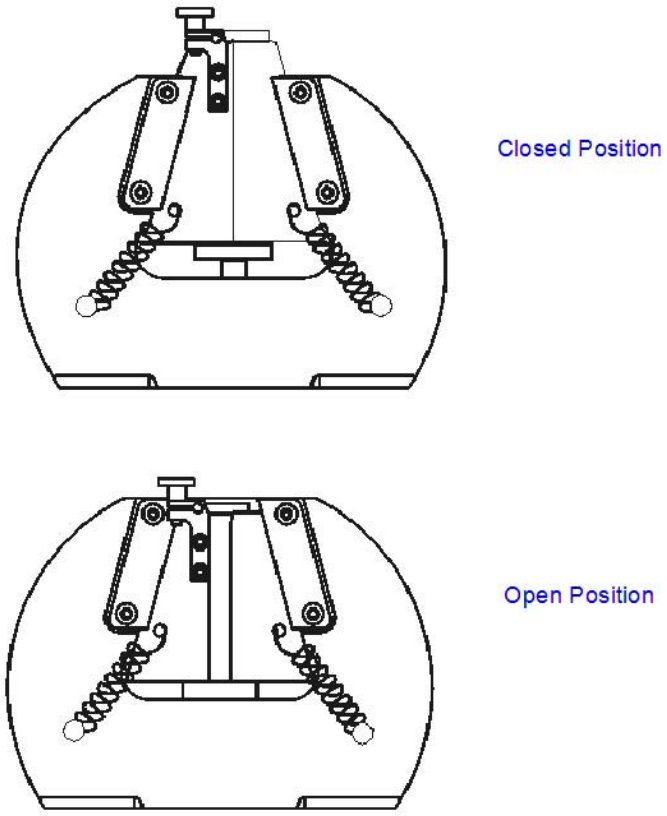

Figure 3. Grips in the Closed and Open Positions

Closed

Adjust the specimen centering device before you place a test specimen between the open jaw faces. When you turn the handles to close the grip on a specimen, the screw action of the control nut and body threads move the body away from the test specimen and push the bearing plate against the jaw faces. The position of the faces remain vertically fixed, relative to the specimen, because the body is moving away from the specimen. The anti-rotation pin prevents the grip from rotating as you tighten the control nut.

The angle of the jaw faces and the body wedges force the faces inward on the specimen until the face serrations bite into the specimen. The gripping force increases during a test as the system applies more tensile force to the specimen.

Open

When you turn the control handles to open the grip, the screw action of the control nut and body threads move the body toward the test specimen. The movement eliminates the gripping force on the specimen and allows the four springs to retract the jaw faces away from the specimen.

Chapter 2
Specifications

This chapter details the grip specifications and includes a dimensional drawing of the grips. The chapter also includes the specifications for flat and vee jaw faces.

Dimensions

Figure 4 illustrates the grip dimensions.

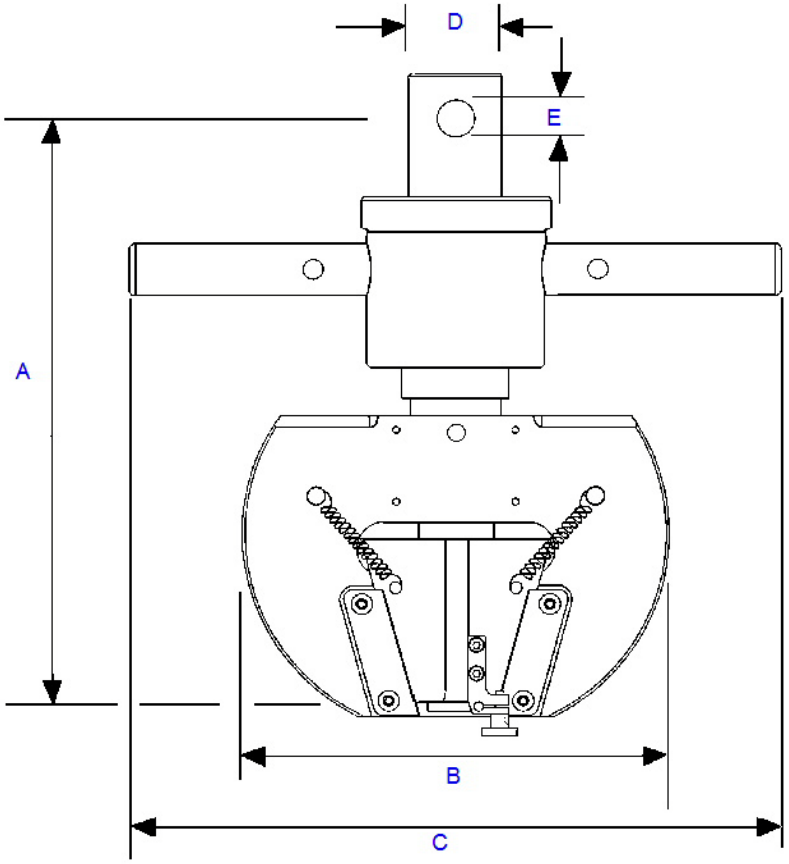

Figure 4. Dimensions

Table 1. Dimensions

Designation	Measurement	2716-010 (5 kN) Value mm (in)	2716-015 & 2736-015 (30 kN) Value mm (in)	2716-020 (50 kN) Value mm (in)
A	Effective length	191 (7.50)	203 (8.00)	208.5 (8.22)
B	Body width	144 (5.67)	144 (5.67)	160 (6.3)
C	Overall width	178 (7.00)	220 (8.66)	220 (8.66)
D	Shank diameter	31.75 (1.25)	31.75 (1.25)	31.75 (1.25)
E	Shank coupling	12.7 (0.5)	12.7 (0.5)	12.7 (0.5)

Grips

Table 2. Grip Specifications

Parameter	2716-010 (5 kN)	2716-015 & 2736-015 (30 kN)	2716-020 (50 kN)
Load Capacity	5 kN 510 kgf 1125 lbf	30 kN 3060 kgf 6744 lbf	50 kN 5100 kgf 11240 lbf
Test Application	Tensile	Tensile	Tensile
Weight (each grip)	3.25 kg (7.2 lb)	Ambient temp. grip 5.25 kg (11.5 lb) High temp. grip 5.9 kg (13 lbs)	7 kg (15.5 lb)
Weight (2 faces)	450 g (1 lb) approx.	450 g (1 lb) approx.	450 g (1 lb) approx.
Construction	Alloy steel	Alloy steel	Alloy steel
Finish	Nickel	Nickel	Nickel
Temperature Range (Ambient temp. grips)	-73 to 250°C (-100 to 480°F)	-73 to 250°C (-100 to 480°F)	-73 to 250° C (-100 to 480° F)
Temperature Range (High temp. grips)	Not applicable	-73 to 350°C (-100 to 660°F)	Not applicable
Instron Interface	0.5 in. clevis pin (Type Dm)	0.5 in. clevis pin (Type Dm)	0.5 in. clevis pin (Type Dm)

Jaw Faces

Jaw faces are available for testing flat or round specimens. Use flat faces for flat specimens and vee faces for round specimens. Table 3 details the specific jaw face specifications and specimen thicknesses. The specimen thicknesses shown in Table 3 apply to the 50 kN grips only when used with the spacers that are included with these grips. Each catalog number provides 4 faces (2 for each grip).

The 2716-020 (50 kN) wedge action grips have a wider opening that enables you to test a larger range of specimen thicknesses. These grips come with a spacer that must be used when testing thinner specimens to ensure a tight grip. Refer to Table 4 on page 22 for additional information on specimen thicknesses for the 50 kN grips.

Table 3. Jaw Face Specifications

Catalog Number	Specimen Type	Specimen Thickness mm (in)	Surface
2703-151	Flat	0 to 6.4 (0 to 0.25)	1.5mm pitch (16 teeth per in.)
2703-152	Flat	6.4 to 12.6 (0.25 to 0.50)	1.5mm pitch (16 teeth per in.)
2703-155	Flat	0 to 6.4 (0 to 0.25)	1mm pitch (25 teeth per in.)
2703-156	Flat	6.4 to 12.6 (0.25 to 0.50)	1mm pitch (25 teeth per in.)
2703-157	Flat	0 to 6.4 (0 to 0.25)	Surfalloy coated (emery grit of 100)
2703-158	Flat	6.4 to 12.6 (0.25 to 0.50)	Surfalloy coated (emery grit of 100)
2703-160	Flat	0 to 6.4 (0 to 0.25)	Rubber coated (emery grit of 100)
2703-153	Round	3.2 to 7.8 (0.12 to 0.31) Diameter	1mm pitch (25 teeth per in.)
2703-154	Round	7.1 to 12.6 (0.28 to 0.50) Diameter	1mm pitch (25 teeth per in.)

Table 4. 2716-020 (50 kN) Ranges for Specimen Thickness

Catalog Number	Specimen Type	Specimen Thickness		Surface
		With Spacers mm (in)	Without Spacers mm (in)	
2703-151	Flat	0 to 6.4 (0 to 0.25)	5 to 11.4 (0.20 to 0.45)	1.5mm pitch (16 teeth per in.)
2703-152	Flat	6.4 to 12.6 (0.25 to 0.50)	11.4 to 17.6 (0.45 to 0.70)	1.5mm pitch (16 teeth per in.)
2703-155	Flat	0 to 6.4 (0 to 0.25)	5 to 11.4 (0.20 to 0.45)	1mm pitch (25 teeth per in.)

Table 4. 2716-020 (50 kN) Ranges for Specimen Thickness (Continued)

Catalog Number	Specimen Type	Specimen Thickness		Surface
		With Spacers mm (in)	Without Spacers mm (in)	
2703-156	Flat	6.4 to 12.6 (0.25 to 0.50)	11.4 to 17.6 (0.45 to 0.70)	1mm pitch (25 teeth per in.)
2703-157	Flat	0 to 6.4 (0 to 0.25)	5 to 11.4 (0.20 to 0.45)	Surfalloy coated (emery grit of 100)
2703-158	Flat	6.4 to 12.6 (0.25 to 0.50)	11.4 to 17.6 (0.45 to 0.70)	Surfalloy coated (emery grit of 100)
2703-160	Flat	0 to 6.4 (0 to 0.25)	5 to 11.4 (0.20 to 0.45)	Rubber coated (emery grit of 100)
2703-153	Round	3.2 to 7.8 (0.12 to 0.31) Diameter	8.2 to 12.8 (0.32 to 0.50) Diameter	1mm pitch (25 teeth per in.)
2703-154	Round	7.1 to 12.6 (0.28 to 0.50) Diameter	12.1 to 17.6 (0.48 to 0.70) Diameter	1mm pitch (25 teeth per in.)

Caution

Do not use serrated jaw faces to test specimens with a hardness greater than 50 Rockwell C. The serrations may not penetrate extremely hard specimens; also, hard specimens will cause excessive serration wear.

The following are common jaw face specifications:

Parameter	Specification
Construction	Tool steel
Height	57 mm (2.2 in.)
Width	25 mm (1 in.)

Chapter 3
Installation

This chapter describes electromechanical and servohydraulic load string attachment methods and grip installation procedures. Each procedure contains an equipment list, a checklist and a set of instructions.

General

Load String

The load string is all of the components you install between a force producing load frame component (actuator or moving crosshead) and a stationary rigid member (baseplate or fixed crosshead). This includes the grips, attachment kits and the specimen. A tight connection between each component is essential for accurate test data. Any backlash in the load string components will degrade the integrity of the test results.

Each grip requires an attachment kit to connect the grip to either the load cell, actuator or crosshead. The type of attachment kit will depend on the type of test system, either servohydraulic or electromechanical, and the size of the load cell, actuator or crosshead. In either case, you must preload the load string with a tensile force 10 to 15% greater than the highest load your test will reach.

Clevis Pin Couplings

A clevis pin coupling is typically used for attaching the grips to an electromechanical test system. Figure 5 on page 26 illustrates the clevis pin coupling. A male shank connects to a female clevis socket, which connects to either the load cell or to the baseplate. A

clevis pin couples the shank and socket together. A locknut assures that no end play exists in the grip to load frame connection.

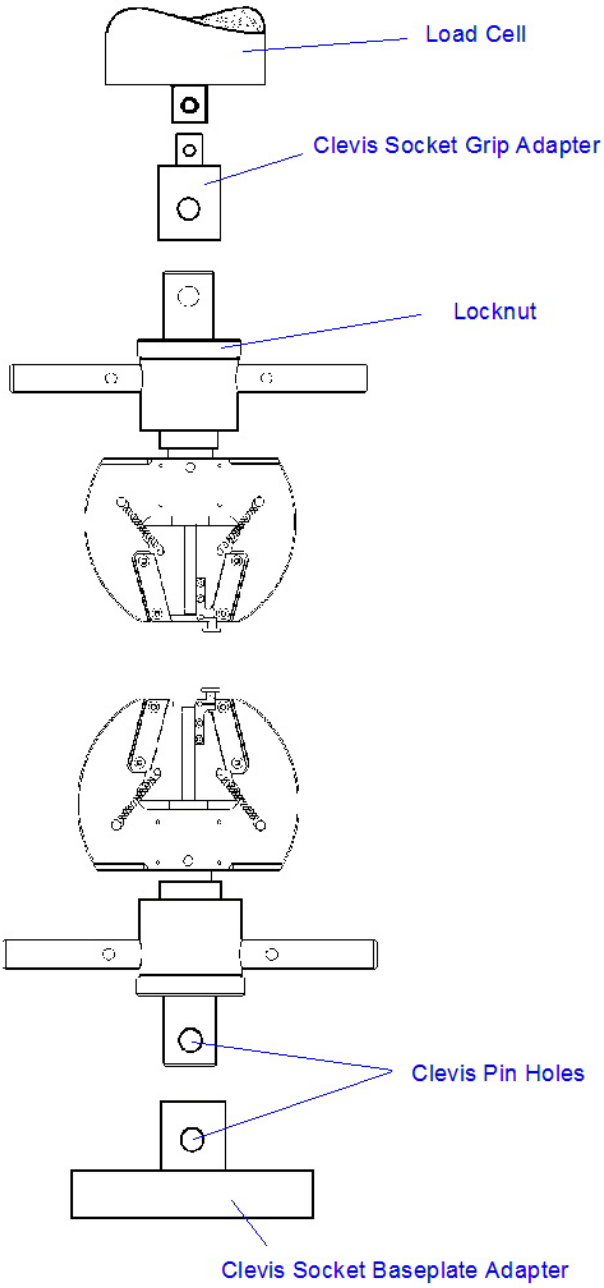

Figure 5. Clevis Pin Couplings

Threaded Couplings

A threaded coupling is typically used for attaching the grips to a servohydraulic test system. Figure 6 on page 27 illustrates a threaded coupling. A servohydraulic attachment kit uses a female clevis socket which threads into the actuator or load cell. You eliminate any end play by tightening a locknut against the actuator piston rod or load cell and the grip locknut against the grip adapter.

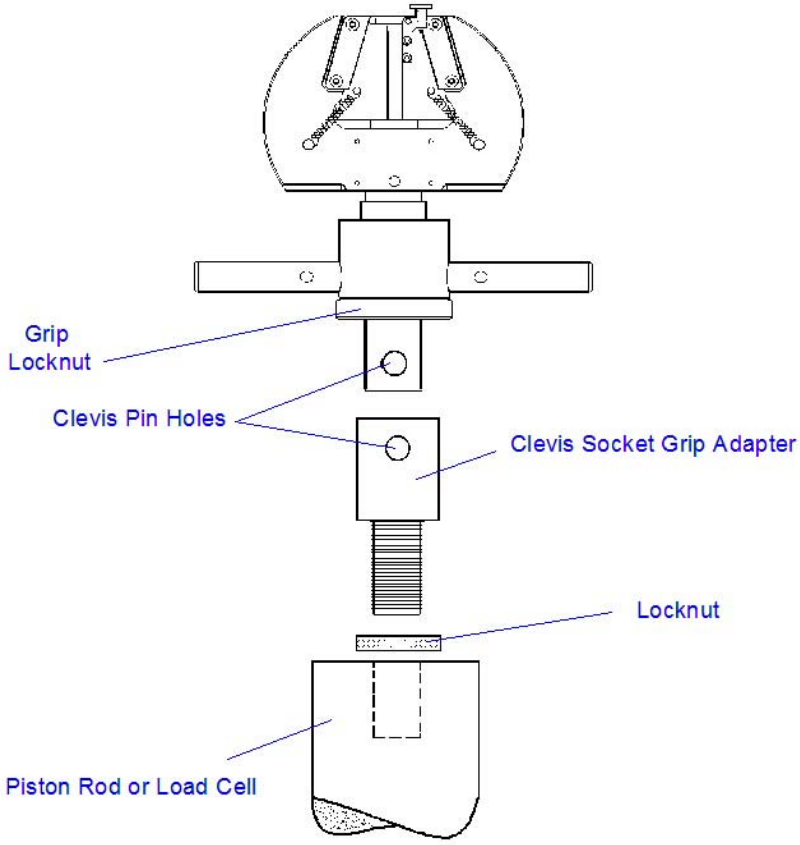

Figure 6. Threaded Coupling

Installing the Jaw Faces

Equipment

You need a dispenser of Molykite g-N paste.

Checklist

Before you install the faces, check for the following:

- The grips are in the open position.
- The jaw faces are the correct size for the test specimen.
- There are no jaw faces or specimen in the grips.

Procedure

Warning

Hazard - Do not perform any testing if the side plates are not in place.

The side plates secure the jaw faces and prevent the jaw faces from moving side to side. This type of motion can create a hazardous condition for both the system and operator.

On the 50 kN grips, there is an available spacer, which performs the same safety function as the side plates but also reduces the space between the jaw faces. The spacer is necessary when testing thinner specimens. When using the 50 kN grips, either the side plates or the spacers must be in place before you perform any testing. Refer to "Installing the Spacers and Side Plates" on page 29 for installation instructions.

To install the jaw faces:

1. Coat the back and base of the jaw face with Molykote g-N paste. Do not remove the side plates located on the grips.

   If you are using a 2716-020 (50 kN) wedge grip, you may need to remove the side plates in order to install the spacers. Before operating the system, ensure that either the spacers or side plates are securely fitted to the grips. Refer to "Installing the Spacers and Side Plates" on page 29 for additional information.

2. Place the jaw face, with the taper facing the head wedge, in the center of the head slot and slide it towards the wedge. Figure 7 on page 29 illustrates the jaw face installation.

3. Ensure that the side plates are secure and that the jaw face has no sideways movement. If a side plate is loose, tighten it using a hex wrench.

4. Attach the springs from the spring retainer pins to the post on each side of the jaw face.

5. Repeat Step 1 through Step 3 for the remaining three jaw faces.

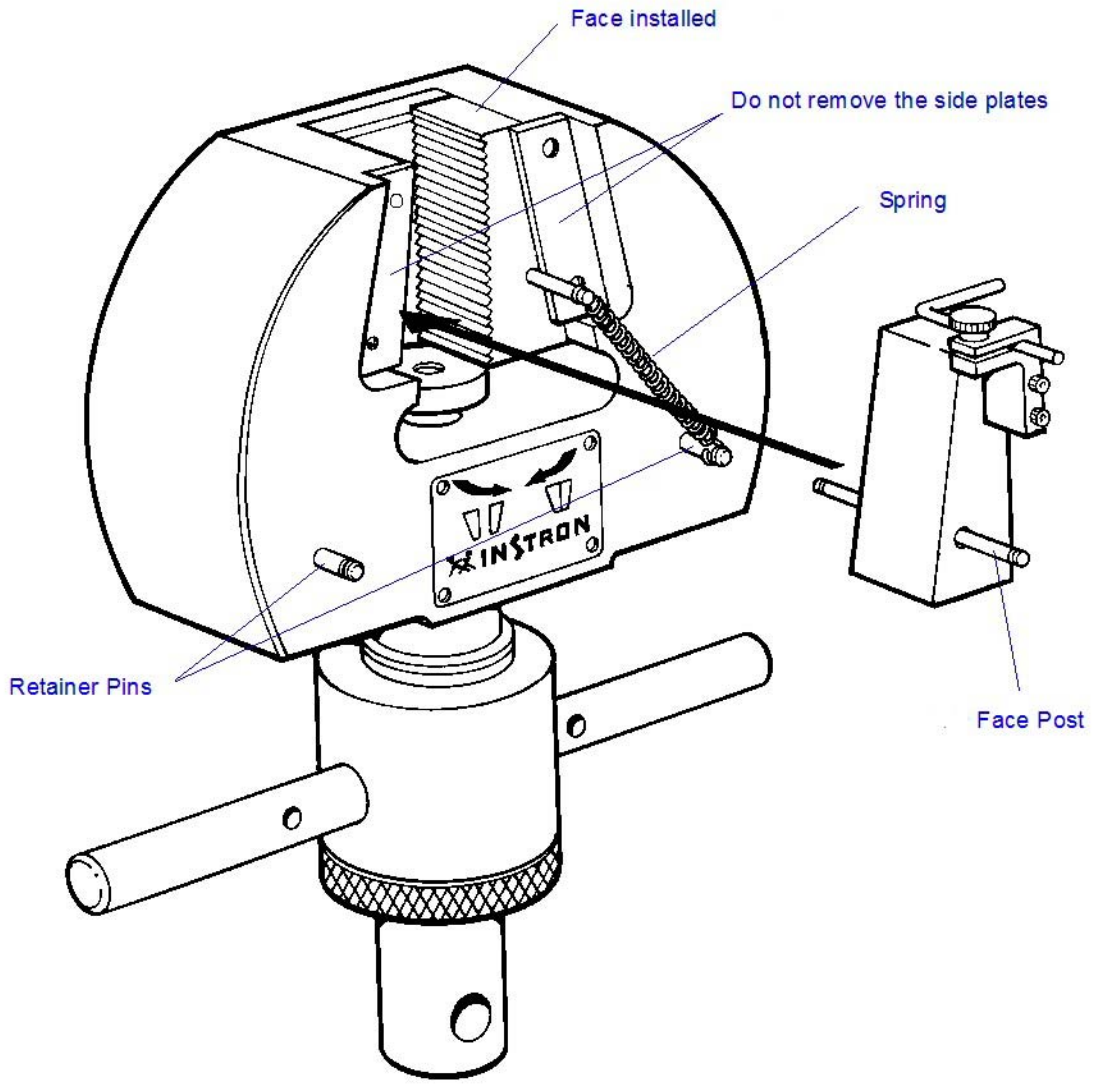

Figure 7. Installing a Jaw Face

Installing the Spacers and Side Plates

The 2716-020 (50 kN) wedge grips come with a spacer that enables you to use a greater variety of specimen thicknesses. The grips can be used either with the spacer for thinner specimens, or without the spacer for thicker specimens.Table 4 on page 22 summarizes the ranges of specimen thickness available with and without the spacer.

The spacers replace the side plates when testing thinner specimens. Both the spacers and side plates perform an important safety function preventing the jaw faces from moving side to side. You must have either the spacers or the side plates in place before testing begins. When you are setting up the grips, determine the thickness of your specimens and install either the spacers or the side plates as appropriate for your specimens.

Equipment

You need a 2.5 mm hex wrench.

Checklist

Before you install the spacers, check for the following:

- The grips are in the open position.
- The thickness of the specimen.
- There are no jaw faces or specimen in the grips.

Procedure

Warning

Hazard - Do not perform any testing if either the spacers or side plates are not in place.

The spacers (or side plates) secure the jaw faces and prevent the jaw faces from moving side to side. This type of motion can create a hazardous condition for both the system and operator. Verify the thickness of your specimens and install either the spacers or side plates, whichever is appropriate for your specimen.

Installing the Spacers

To install the spacers:

1. If necessary, remove the side plates. Using a 2.5 mm hex wrench, loosen and remove the two M4 x 8 screws and then remove the side plate.
2. Orient the spacer so that the spacer section fits on top of the flat section of the grip and the two screw holes on the side plate section fit over the two mounting holes in the grip. See Figure 8 and Figure 9 on page 32.

3. Using a 2.5 mm hex wrench, secure the spacer using two M4 x 8 screws (same screws removed in Step 1).
4. Repeat Step 1 through Step 3 for the remaining three spacers.
5. Proceed with installing the jaw faces. Refer to “Installing the Jaw Faces” on page 27.

Installing the Side Plates

To install the side plates:

1. If necessary, remove the spacers. Using a 2.5 mm hex wrench, loosen and remove the two M4 x 8 screws and then remove the spacer.
2. Orient the side plate so that the two screw holes on the side plate fit over the two mounting holes in the grip. See Figure 9 on page 32.
3. Using a 2.5 mm hex wrench, secure the side plate using two M4 x 8 screws (same screws removed in Step 1).
4. Repeat Step 1 through Step 3 for the remaining three side plates.
5. Proceed with installing the jaw faces. Refer to “Installing the Jaw Faces” on page 27.

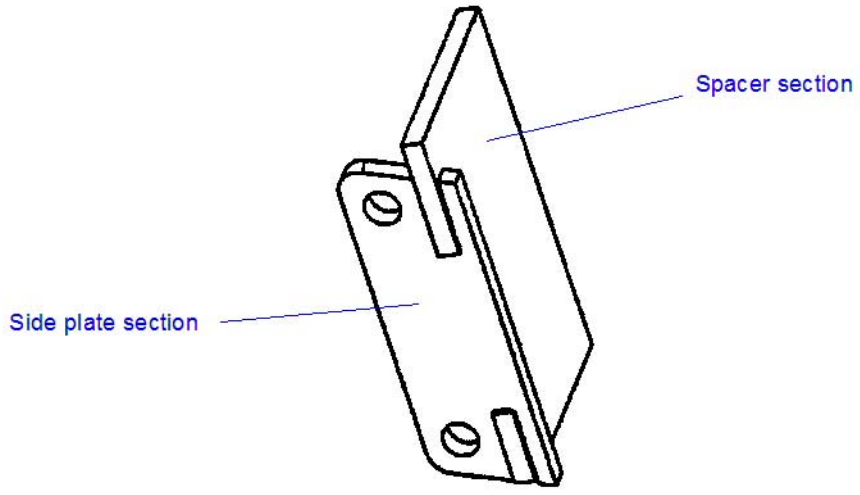

Figure 8. Spacer in Detail

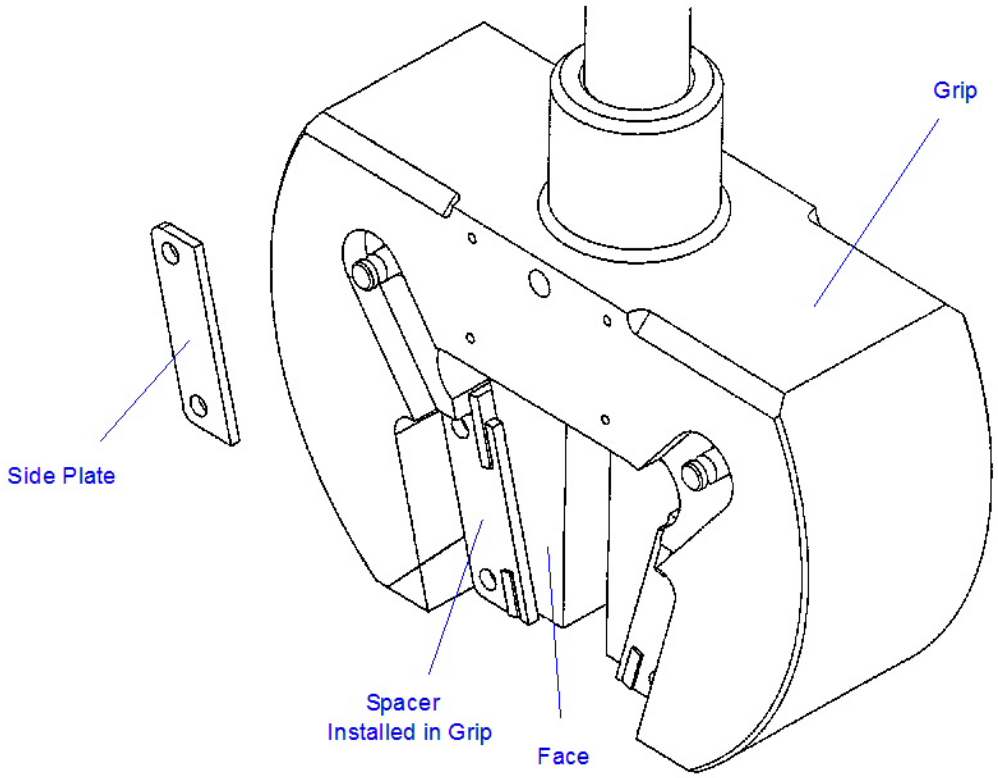

Figure 9. Installing Side Plate and Spacer

Preloading the Load String

All load string components must be rigid and not allow any backlash which could degrade the integrity of the test results. You must preload the load string attachment kits to eliminate backlash.

To preload the load string, you must install a specimen capable of withstanding a tensile load 10 to 15% greater than the highest load you will be applying during your test.

Equipment

You need the following items:

- a specimen capable of withstanding a tensile load 10 to 15% greater than the highest test load

- spanner wrench (1/4 in.) - Instron part #80-4-4

Checklist

Check for the following conditions before you preload the grips:

- The jaw faces are installed.
- The side plates are secure. If you are using a 50 kN wedge grip, ensure that either the spacers or side plates are fitted on the grip and are secure.
- If using a 50 kN grip, check the thickness of your specimen and ensure that the appropriate spacers or side plates are installed. Refer to "Installing the Spacers and Side Plates" on page 29 for additional information.
- The attachment kits are installed but loose.
- The Load channel indicates a zero load.
- The electronic load limits are set to protect the weakest load string component.

Procedure

1. Install a specimen according to section "Installing a specimen" on page 35.
2. Set the control electronics for a tensile load 10 to 15% greater than the highest load you will be applying during your test.
3. Using the spanner wrench, turn each locknut against the mounting device (load cell, baseplate clevis, or actuator).
4. Repeat Step 1 through Step 3 for the other grip.
5. Set the electronic controls for a zero load.
6. Refer to section "Removing a Specimen" on page 37 for instructions on removing the specimen.

Removing Preload

You must remove the load string preload before removing the grips from the system. To remove the load string preload, you must install a specimen capable of withstanding a tensile load equal to the current load string preload.

Equipment

You need the following items:

- a specimen capable of withstanding a tensile load equal to the current load string preload
- spanner wrench (1/4 in.)

Checklist

Check for the following conditions before you preload the grips:

- The jaw faces are installed.
- The side plates are secure. If you are using a 50 kN wedge grip, ensure that either the spacers or side plates are fitted on the grip and are secure.
- If using a 50 kN grip, check the thickness of your specimen and ensure that the appropriate spacers or side plates are installed. Refer to “Installing the Spacers and Side Plates” on page 29 for additional information.
- The Load channel indicates a zero load.
- The electronic load limits are set to protect the weakest load string component.

Procedure

1. Install a specimen. Refer to section “Installing a specimen” on page 35.
2. Set the control electronics for a tensile load equal to the amount of the current load string preload.
3. Using the spanner wrench, turn each locknut away from the mounting device (load cell, baseplate clevis, or actuator).
4. Repeat Step 1 through Step 3 for the other grip.
5. Refer to section “Removing a Specimen” on page 37 to remove the specimen.

Chapter 4
Operation

This chapter contains procedures for installing and removing specimens. Each procedure contains an equipment list, a checklist and a set of instructions.

Installing a specimen

The force you use to turn the control nut handle determines the initial gripping pressure on the specimen. However, the tensile load on the specimen determines the gripping force during the test.

Caution

Do not exceed 35 kN (55 kN for the 50 kN grips) or the maximum load rating of any load string component. Exceeding the maximum load rating of a component will damage it.

Caution

Do not load the grips with compressive forces. Compressive loading removes the gripping force from the specimen.

Checklist

Check for the following conditions before installing a specimen:

- The attachment kits are preloaded (unless you are installing a preload specimen).
- The size and type of jaw faces are appropriate for the test specimen.
- The side plates are secure. If you are using a 50 kN wedge grip, ensure that either the spacers or side plates are fitted on the grip and are secure.

- If using 50 kN grips, either the side plates or spacers are installed, whichever is appropriate for the thickness of the test specimen.
- There is enough space between the upper and lower grip to install the specimen.
- The load frame extension limits are set to prevent the grips from colliding.

Procedure

If your control system has a Specimen Protect or Load Protect function, use it when you install a specimen. Refer to the control system documentation for details.

1. Separate the jaw faces by rotating the grip control nut on both grips.
2. If you are using the specimen centering device, loosen the thumbscrew and adjust the L-shaped arm so it centers the specimen.

Warning

Hazard - Keep your fingers clear of the area between the jaw faces.

Caution

Align the specimen correctly to prevent equipment damage and specimen slippage.

3. Position the specimen in the grips so it engages the entire length of the jaw faces. Figure 10 on page 37 illustrates proper specimen placement.
4. Adjust the centering device until it just touches the specimen edge. If you are not using a specimen centering device, align the specimen visually.

Caution

Do not over tighten the control nut. Excessive tightening can damage the grip and exert unwanted preload on the specimen.

5. Hand-tighten the lower grip's control nut until the jaw faces engage the specimen.
6. Hand-tighten the upper grip's control nut until the jaw faces engage the specimen.

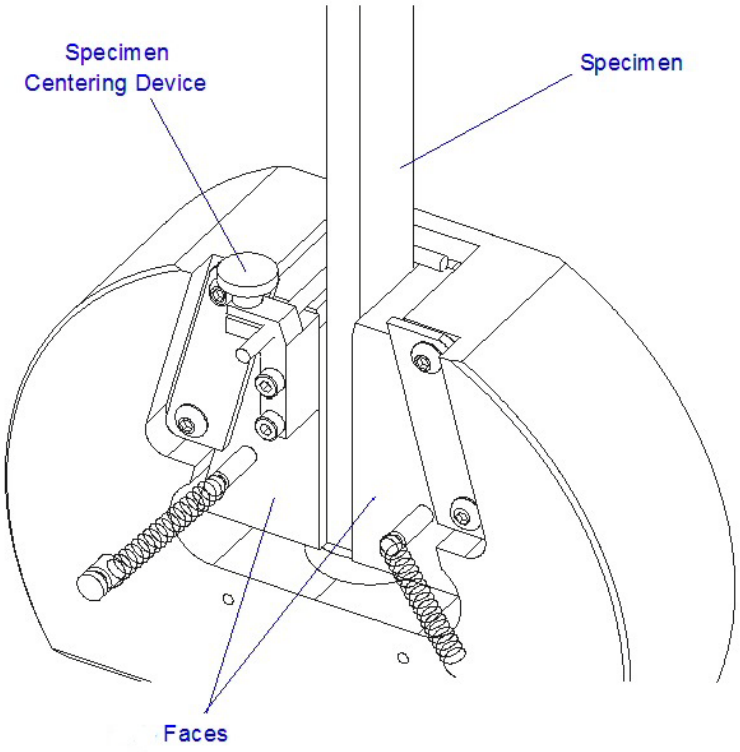

Figure 10. Specimen Placement

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 system is not exerting a load on the specimen.
- There is no measuring device, such as an extensometer or LVDT, on the specimen.

Procedure

1. Turn the upper grip control nut, according to the grip label icon, until the jaw faces no longer engage the specimen.

Caution

Secure fragile specimens by some means before you open the lower grip.

2. Turn the lower grip control nut, according to the grip label icon, until the jaw faces no longer engage the specimen.
3. Remove the specimen.

Chapter 5
Maintenance

This chapter includes a maintenance checklist and a troubleshooting table to help maintain your grips.

Checklist

Warning

Hazard - Turn the system's main power switch off before you perform any maintenance procedure.

Perform the items in the following checklist after approximately 100 cycles of opening and closing the jaw faces:

- Clean the grip body and control mechanism with a soft, lightly oiled cloth.
- Lubricate the back of the jaw faces with a thin film of Molykote g-N paste.
- Inspect the jaw face serrations for excessive wear. Replace any worn faces.
- Use a wire brush to remove any residual specimen material or corrosion from the jaw face serrations.
- Lubricate the attachment kits with a light oil to prevent corrosion.

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 a lack of maintenance is the cause of most grip operating problems. To help you when a problem develops, Table 5 suggests a probable cause and recommends a solution.

Table 5. Troubleshooting

Problem	Cause	Remedy
Specimen slips while under load	Wrong size or type of jaw face	Install appropriate jaw face for specimen size and type
	Cyclic or compressive loads	Do not use wedge action grip for cyclic or compressive testing
	Not enough gripping area	Install specimen for complete engagement with jaw faces
	Not enough preload	Tighten the grip handles
	Not enough lubricant on jaw faces	Lubricate the back of the jaw faces
Specimen breaks at jaw face	Initial gripping force is too great for specimen	Do not over-tighten control nut
	Misalignment of a load string component	Verify alignment of load frame and specimen
	Dirt, corrosion, specimen debris or other contaminants are obstructing face clearance	Remove jaw faces, clean the head tapers, apply Molykote g-N paste and install jaw faces
Jaw faces will not release or do not completely retract	Jaw face serrations are bound to specimen	Lightly tap specimen to release bond
	Dirt, corrosion, specimen debris or other contaminants are obstructing face clearance	Remove jaw faces, clean the head tapers, apply Molykote g-N paste and install jaw faces
	Tensile load on specimen	Remove tensile load
	Not enough lubricant on jaw faces	Lubricate the back of the jaw faces

Chapter 6
Illustrated Parts

This chapter contains instructions to help you identify the grip parts from an exploded-view illustration. A list, corresponding to the grip illustration, contains the component description, part number and quantity. There is also an ancillary parts list.

Finding a Part

Grip Illustration

Figure 11 on page 43 shows an exploded view of the 2716-015 version of the 30 kN wedge grips. The only visual difference between this version and the 2736-015 (High Temperature) version is that there are four handles on the high temperature version.

The 2716-015 (30 kN) wedge grip is visually similar to both the 2716-010 (5 kN) and 2716-020 (50 kN) wedge grips, so the same graphic is used to identify parts for all three grips.

To identify a part from the grip illustration:

1. Locate the part on the illustration.
2. Refer to the item number on the illustration.
3. Refer to the item number on the corresponding parts list.

Each item number has a part description, an Instron part number and a quantity. The quantity represents the number of parts for one grip. For the jaw faces, each catalog number provides 4 faces (2 for each grip).

Ancillary Parts

The Ancillary Parts list contains additional items for installing and maintaining the grips. There is a description and Instron part number for each item.

Parts Lists

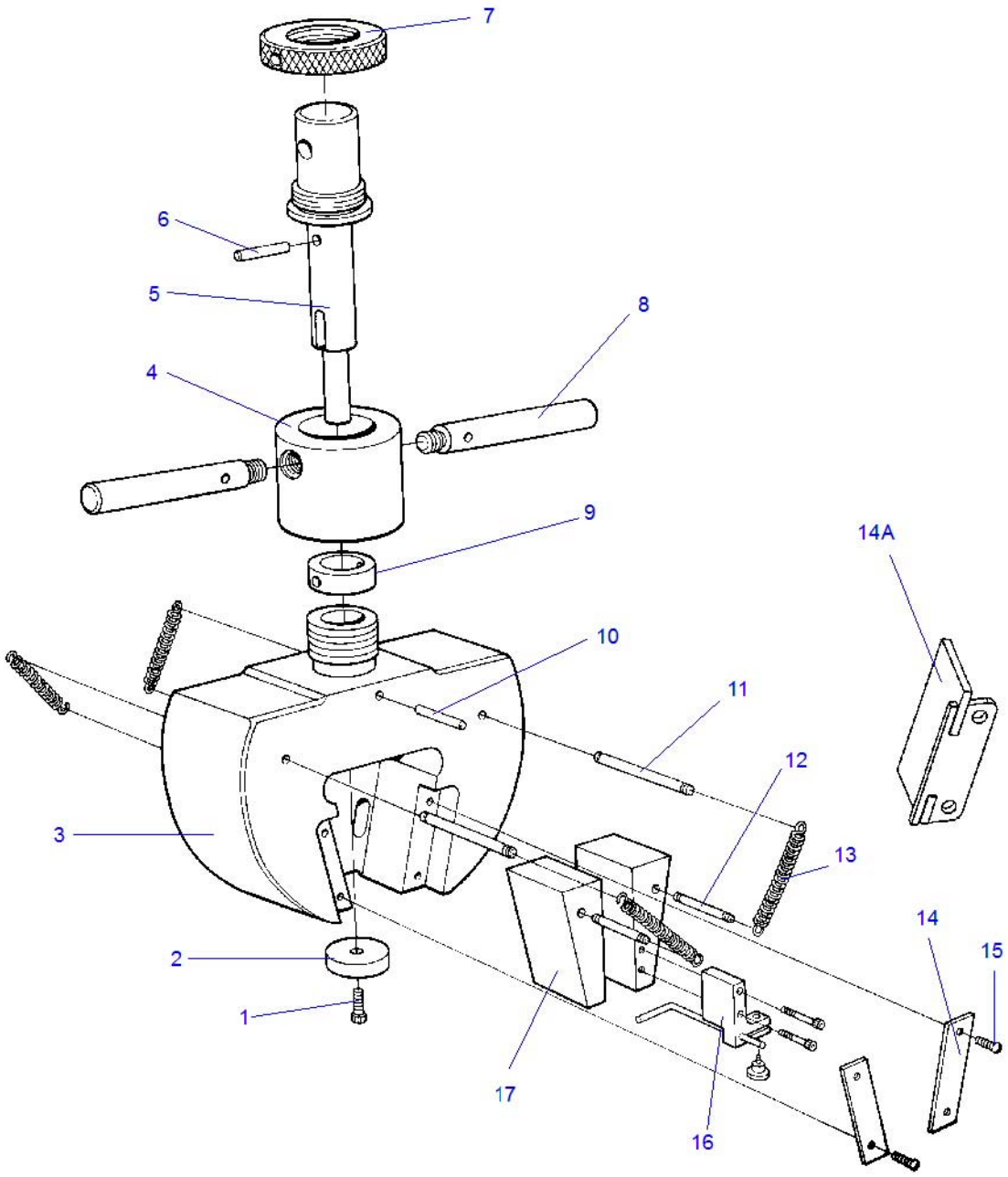

Figure 11. Illustrated Parts

Table 6. 2716-010 (5 kN) Wedge Grip - Parts List

Item	Description	Part Number	Quantity
1	Screw M4 x 8	201S87	1
2	Bearing Pad	T566-5	1
3	Body	T566-4	1
4	Control Nut	T566-2	1
5	Spindle	T566-1	1
6	Pin, 10 x 35	54-53-1054	1
7	Check Nut	T2-309	1
8	Handle	T566-7	2
9	Bearing Washer	T566-3	1
10	Pin, 6 x 14	54-53-1053	1
11	Pin, 1/4 x 1 in.	54-5-11	4
12	Pin, 5/32 x 1 in.	26-6-2	4
13	Spring Extension	66-1-1069	4
14	Side Plate	T566-6	2
15	Screw M4 x 8	204F123	4
16	Specimen Centering Device Including: Bracket Thumbscrew Stop Screws	2716-011 T566-14 71-2-55 T566-115 201T98	1 1 1 1 2
17	Faces	Refer to Table 3 on page 22	2 pair

Table 7. 2716-015 (30 kN) Wedge Grip - Parts List

Item	Description	Part Number	Quantity
1	Screw M4 x 8	201S87	1
2	Bearing Pad	T566-5	1
3	Body	T566-22	1
4	Control Nut	T566-18	1
5	Spindle	T566-21	1
6	Pin, 10 x 35	705J206	1
7	Check Nut	T2-309	1
8	Handle	T566-16	2
9	Bearing Washer	T566-17	1
10	Pin, 6 x 14	705J149	1
11	Pin, 1/4 x 1 in.	54-5-11	4
12	Pin, 5/32 x 1 in.	26-6-2	4
13	Spring Extension	66-1-1069	4
14	Side Plate	T566-6	2
15	Screw M4 x 8	204F123	4
16	Specimen Centering Device Including: Bracket Thumbscrew Stop Screws	2716-011 T566-14 71-2-55 T566-115 201T98	1 1 1 1 2
17	Faces	Refer to Table 3 on page 22	2 pair

Table 8. 2736-015 (30 kN) High Temp. Wedge Grip - Parts List

Item	Description	Part Number	Quantity
1	Screw M4 x 8	201S87	1
2	Bearing Pad	T566-5	1
3	Body	T566-54	1
4	Control Nut	T566-51	1
5	Spindle	T566-52	1
6	Pin, 10 x 35	54-53-1056	1
7	Check Nut	T2-309	1
8	Handle	T566-50	4
9	Bearing Washer	T566-53	1
10	Pin, 6 x 14	705J149	1
11	Pin, 1/4 x 1 in.	54-5-11	4
12	Pin, 5/32 x 1 in.	304C1	4
13	Spring Extension	66-2-1020	4
14	Side Plate	T566-56	2
15	Screw M4 x 8	204F123	4
16	Specimen Centering Device Including: Bracket Thumbscrew Stop Screws	2716-011 T566-14 71-2-55 T566-115 201T98	1 1 1 1 2
17	Faces	Refer to Table 3 on page 22	2 pair

Table 9. 2716-020 (50 kN) Wedge Grip - Parts List

Item	Description	Part Number	Quantity
1	Screw M4 x 8	201T123	1
2	Bearing Pad	T566-132	1
3	Body	T566-143	1
4	Control Nut	T566-18	1
5	Spindle	T566-133	1
6	Pin, 10 x 35	705J206	1
7	Check Nut	T2-309	1
8	Handle	T566-16	2
9	Bearing Washer	T566-136	1
10	Pin, 6 x 14	705J149	1
11	Pin, 1/4 x 1 in.	54-5-11	4
12	Pin, 5/32 x 1 in.	54-5-10	4
13	Spring Extension	66-1-1069	4
14	Side Plate	T566-6	2
14A	Spacer	T566-135	2
15	Screw M4 x 8	204F123	4
16	Specimen Centering Device Including: Bracket Thumbscrew Stop Screws	2716-011 T566-14 71-2-55 T566-115 201T98	1 1 1 1 2
17	Faces	Refer to Table 3 on page 22	2 pair

Ancillary Parts

Table 10. Ancillary Parts List

Description	Part No.
Spanner Wrench	80-4-4
Molykote g-N Paste	105-1-28

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