Advantage™ Wedge Action Grips

Product Information

10 kN
30 kN
50 kN
100 kN
150 kN
300 kN
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### Trademark information
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### Publication information

<table>
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<tr>
<th>Manual Part Number</th>
<th>Publication Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>152002-01A</td>
<td>July 1997</td>
</tr>
<tr>
<td>152002-02A</td>
<td>July 1998</td>
</tr>
<tr>
<td>015-200-202 B</td>
<td>April 1999</td>
</tr>
<tr>
<td>015-200-202 C</td>
<td>December 2000</td>
</tr>
<tr>
<td>015-200-202 D</td>
<td>August 2001</td>
</tr>
<tr>
<td>015-200-202 E</td>
<td>October 2002</td>
</tr>
<tr>
<td>015-200-202 F</td>
<td>March 2008</td>
</tr>
</tbody>
</table>
Installation  23

About Grip Installation   23
Install the Grips   24

Operation  25

Changing Wedges   25
Installing a Specimen   27

Maintenance  31
Technical Support

How to Get Technical Support

Start with your manuals

The manuals supplied by MTS provide most of the information you need to use and maintain your equipment. If your equipment includes MTS software, look for online help and README files that contain additional product information.

If you cannot find answers to your technical questions from these sources, you can use the internet, e-mail, telephone, or fax to contact MTS for assistance.

Technical support methods

MTS provides a full range of support services after your system is installed. If you have any questions about a system or product, contact MTS in one of the following ways.

MTS web site

The MTS web site gives you access to our technical support staff by means of a Technical Support link:

www.mts.com > Contact Us > Service & Technical Support

E-mail techsupport@mts.com

Telephone MTS Call Center 800-328-2255

Weekdays 7:00 A.M. to 5:00 P.M., Central Time

Fax 952-937-4515

Please include “Technical Support” in the subject line.

Before You Contact MTS

MTS can help you more efficiently if you have the following information available when you contact us for support.

Know your site number and system number

The site number contains your company number and identifies your equipment type (material testing, simulation, and so forth). The number is usually written on a label on your MTS equipment before the system leaves MTS. If you do not have or do not know your MTS site number, contact your MTS sales engineer.

Example site number: 571167
When you have more than one MTS system, the system job number identifies which system you are calling about. You can find your job number in the papers sent to you when you ordered your system.

Example system number: US1.42460

Know information from prior technical assistance

If you have contacted MTS about this problem before, we can recall your file. You will need to tell us the:

- MTS notification number
- Name of the person who helped you

Identify the problem

Describe the problem you are experiencing and know the answers to the following questions:

- How long and how often has the problem been occurring?
- Can you reproduce the problem?
- Were any hardware or software changes made to the system before the problem started?
- What are the model numbers of the suspect equipment?
- What model controller are you using (if applicable)?
- What test configuration are you using?

Know relevant computer information

If you are experiencing a computer problem, have the following information available:

- Manufacturer’s name and model number
- Operating software type and service patch information
- Amount of system memory
- Amount of free space on the hard drive in which the application resides
- Current status of hard-drive fragmentation
- Connection status to a corporate network
Know relevant software information

For software application problems, have the following information available:

- The software application’s name, version number, build number, and if available, software patch number. This information is displayed briefly when you launch the application, and can typically be found in the “About” selection in the “Help” menu.

- It is also helpful if the names of other non-MTS applications that are running on your computer, such as anti-virus software, screen savers, keyboard enhancers, print spoolers, and so forth are known and available.

If You Contact MTS by Phone

Your call will be registered by a Call Center agent if you are calling within the United States or Canada. Before connecting you with a technical support specialist, the agent will ask you for your site number, name, company, company address, and the phone number where you can normally be reached.

If you are calling about an issue that has already been assigned a notification number, please provide that number. You will be assigned a unique notification number about any new issue.

Identify system type

To assist the Call Center agent with connecting you to the most qualified technical support specialist available, identify your system as one of the following types:

- Electromechanical materials test system
- Hydromechanical materials test system
- Vehicle test system
- Vehicle component test system
- Aero test system

Be prepared to troubleshoot

Prepare yourself for troubleshooting while on the phone:

- Call from a telephone when you are close to the system so that you can try implementing suggestions made over the phone.
- Have the original operating and application software media available.
- If you are not familiar with all aspects of the equipment operation, have an experienced user nearby to assist you.
Write down relevant information

Prepare yourself in case we need to call you back:

- Remember to ask for the notification number.
- Record the name of the person who helped you.
- Write down any specific instructions to be followed, such as data recording or performance monitoring.

After you call

MTS logs and tracks all calls to ensure that you receive assistance and that action is taken regarding your problem or request. If you have questions about the status of your problem or have additional information to report, please contact MTS again and provide your original notification number.

Problem Submittal Form in MTS Manuals

Use the Problem Submittal Form to communicate problems you are experiencing with your MTS software, hardware, manuals, or service which have not been resolved to your satisfaction through the technical support process. This form includes check boxes that allow you to indicate the urgency of your problem and your expectation of an acceptable response time. We guarantee a timely response—your feedback is important to us.

The Problem Submittal Form can be accessed:

- In the back of many MTS manuals (postage paid form to be mailed to MTS)
- www.mts.com > Contact Us > Problem Submittal Form (electronic form to be e-mailed to MTS)
Preface

Before You Begin

Safety first! Before you attempt to use your MTS product or system, read and understand the Safety manual and any other safety information provided with your system. Improper installation, operation, or maintenance of MTS equipment in your test facility can result in hazardous conditions that can cause severe personal injury or death and damage to your equipment and specimen. Again, read and understand the safety information provided with your system before you continue. It is very important that you remain aware of hazards that apply to your system.

Other MTS manuals In addition to this manual, you may receive additional MTS manuals in paper or electronic form.

If you have purchased a test system, it may include an MTS System Documentation CD. This CD contains an electronic copy of the MTS manuals that pertain to your test system, including hydraulic and mechanical component manuals, assembly drawings and parts lists, and operation and preventive maintenance manuals. Controller and application software manuals are typically included on the software CD distribution disc(s).
Conventions

Documentation Conventions

The following paragraphs describe some of the conventions that are used in your MTS manuals.

Hazard conventions

As necessary, hazard notices may be embedded in this manual. These notices contain safety information that is specific to the task to be performed. Hazard notices immediately precede the step or procedure that may lead to an associated hazard. Read all hazard notices carefully and follow the directions that are given. Three different levels of hazard notices may appear in your manuals. Following are examples of all three levels.

*Note*  
For *general safety information*, see the *safety information* provided with your system.

⚠️ **DANGER**

Danger notices indicate the presence of a hazard with a high level of risk which, if ignored, *will* result in death, severe personal injury, or substantial property damage.

⚠️ **WARNING**

Warning notices indicate the presence of a hazard with a medium level of risk which, if ignored, *can* result in death, severe personal injury, or substantial property damage.

⚠️ **CAUTION**

Caution notices indicate the presence of a hazard with a low level of risk which, if ignored, *could* cause moderate or minor personal injury, equipment damage, or endanger test integrity.

Notes

Notes provide additional information about operating your system or highlight easily overlooked items. For example:

*Note*  
*Resources that are put back on the hardware lists show up at the end of the list.*

Special terms

The first occurrence of special terms is shown in *italics.*
Illustrations

Illustrations appear in this manual to clarify text. It is important for you to be aware that these illustrations are examples only and do not necessarily represent your actual system configuration, test application, or software.

Electronic manual conventions

This manual is available as an electronic document in the Portable Document File (PDF) format. It can be viewed on any computer that has Adobe Acrobat Reader installed.

Hypertext links

The electronic document has many hypertext links displayed in a blue font. All blue words in the body text, along with all contents entries and index page numbers, are hypertext links. When you click a hypertext link, the application jumps to the corresponding topic.
Conventions
Introduction

The MTS Advantage Wedge Action Grips hold a test specimen in a load unit for static tension testing. The grips can accommodate flat or round specimens.

Contents

- MTS Advantage Wedge Action Grip Functional Description 15
- Grip Environment 16
- MTS Advantage Wedge Action Grips Specifications 17
- MTS Advantage Wedge Action Grips Dimensions 18
- MTS Advantage Wedge Action Grips—Flat Specimen Wedges 19
MTS Advantage Wedge Action Grips—Round Specimen Wedges

What you need to know

MTS Systems Corporation assumes that you know how to use your controller. See the appropriate manual for information about performing any controller-related step in this manual’s procedures. You are expected to know how to:

- Turn on power (electrical or hydraulic) to the load frame (electromechanical) or load unit (servohydraulic).
- Adjust the crosshead and/or actuator position.
MTS Advantage Wedge Action Grip Functional Description

The MTS Advantage Wedge Action Grips are designed for static tension testing. The grips are mounted in a load frame (also called a load unit) by attaching the male mounting pin to a female mounting adapter and securing them with a mounting dowel. A specimen can be installed either from the side of the grip or from the top of the grip.

The grip handles are turned to apply an initial gripping force. The design of the grips holds the wedges stationary while the specimen is being clamped. Once the specimen is secured into both grips, a tensile load is applied to the specimen by the test system. The tensile load pulls the specimen and wedges tighter into the angled grip body, which increases the gripping force to prevent specimen slippage during testing.

Two types of wedges are available for use with these grips: flat wedges for use with flat specimens and vee-notched wedges for use with round specimens. Both flat and vee-notched wedges are finished with a serrated texture to increase gripping force.
Grip Environment

The grips can be used at temperatures from -129 °C to +315 °C (-200 °F to +600 °F). For testing at temperatures other than ambient conditions, the grips can be mounted inside an environmental chamber. When using the grips above ambient temperatures, the maximum tensile load must be reduced according to the figure below. Also, if the grips are being used above +260 °C (+500 °F), the stainless steel springs should be removed or they might have to be replaced periodically.
MTS Advantage Wedge Action Grips Specifications

### Grip Ratings

<table>
<thead>
<tr>
<th>MODEL</th>
<th>MONOTONIC TENSION CAPACITY</th>
<th>WEIGHT (PER GRIP)</th>
<th>MAXIMUM PRELOAD TORQUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 kN</td>
<td>10 kN (2 kip)</td>
<td>4.5 kg (10 lb)</td>
<td>11.3 N·m (100 in·lb)</td>
</tr>
<tr>
<td>30 kN</td>
<td>30 kN (6.7 kip)</td>
<td>5.5 kg (12 lb)</td>
<td>11.3 N·m (100 in·lb)</td>
</tr>
<tr>
<td>50 kN</td>
<td>50 kN (11 kip)</td>
<td>7 kg (15 lb)</td>
<td>15 N·m (130 in·lb)</td>
</tr>
<tr>
<td>100 kN</td>
<td>100 kN (22 kip)</td>
<td>15 kg (33 lb)</td>
<td>45 N·m (450 in·lb)</td>
</tr>
<tr>
<td>150 kN</td>
<td>150 kN (33 kip)</td>
<td>19.6 kg (43 lb)</td>
<td>68 N·m (600 in·lb)</td>
</tr>
<tr>
<td>300 kN</td>
<td>300 kN (67 kip)</td>
<td>53.5 kg (118 lb)</td>
<td>90 N·m (800 in·lb)</td>
</tr>
</tbody>
</table>

### Specimen Installation Access Locations

Some of the grips have a closed back which requires specimens to be installed from the front of the grips. Some grips have an open back which allows specimens to be installed from the front or the back of the grip.

<table>
<thead>
<tr>
<th>MODEL</th>
<th>INSTALLATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 kN</td>
<td>Front and Back</td>
</tr>
<tr>
<td>30 kN</td>
<td>Front Only</td>
</tr>
<tr>
<td>50 kN</td>
<td>Front Only</td>
</tr>
<tr>
<td>100 kN</td>
<td>Front Only</td>
</tr>
<tr>
<td>150 kN</td>
<td>Front Only</td>
</tr>
<tr>
<td>300 kN</td>
<td>Front and Back</td>
</tr>
</tbody>
</table>
MTS Advantage Wedge Action Grips Dimensions

The dimensions shown in the figure correspond with the grip dimensions in the following table.

Grip Dimensions

<table>
<thead>
<tr>
<th>MODEL</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D'</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 kN</td>
<td>172 mm (6.8 in)</td>
<td>132 mm (5.2 in)</td>
<td>62 mm (2.4 in)</td>
<td>1-1/4 in</td>
</tr>
<tr>
<td>30 kN</td>
<td>206 mm (8.1 in)</td>
<td>114 mm (4.4 in)</td>
<td>64 mm (2.5 in)</td>
<td>1-1/4 in</td>
</tr>
<tr>
<td>50 kN</td>
<td>210 mm (8.3 in)</td>
<td>147 mm (5.8 in)</td>
<td>63 mm (2.4 in)</td>
<td>1-1/4 in</td>
</tr>
<tr>
<td>100 kN</td>
<td>215 mm (8.5 in)</td>
<td>192 mm (7.5 in)</td>
<td>93 mm (3.7 in)</td>
<td>1-1/4 in</td>
</tr>
<tr>
<td>150 kN</td>
<td>259 mm (10.2 in)</td>
<td>193 mm (7.6 in)</td>
<td>102 mm (4.0 in)</td>
<td>1-1/4 in</td>
</tr>
<tr>
<td>300 kN</td>
<td>326 mm (12.8 in)</td>
<td>407 mm (16 in)</td>
<td>102 mm (4.0 in)</td>
<td>†</td>
</tr>
</tbody>
</table>

* 30 mm and 45 mm pin sizes are available upon request.
† Threaded stud M36 X 2 mm (1-1/2 in 12 UNC).
MTS Advantage Wedge Action Grips—Flat Specimen Wedges

The flat wedges are available for two force ranges.

---

**10 kN to 50 kN (6 kip to 11 kip) Flat Specimen Wedges**

<table>
<thead>
<tr>
<th>SPECIMEN THICKNESS (T)</th>
<th>WEDGE WIDTH</th>
<th>WEDGE SET</th>
</tr>
</thead>
<tbody>
<tr>
<td>MM IN</td>
<td>MM IN</td>
<td>PART NUMBER*</td>
</tr>
<tr>
<td>0.0 to 7.9</td>
<td>0.00 to 0.31</td>
<td>25.4</td>
</tr>
<tr>
<td>4.06 to 10.92</td>
<td>0.23 to 0.52</td>
<td>25.4</td>
</tr>
</tbody>
</table>

* The wedge set assembly consists of a matched set of four wedges.

---

**100 kN to 300 kN (22 kip to 67 kip) Flat Specimen Wedges**

<table>
<thead>
<tr>
<th>SPECIMEN THICKNESS (T)</th>
<th>WEDGE WIDTH</th>
<th>WEDGE SET</th>
</tr>
</thead>
<tbody>
<tr>
<td>MM IN</td>
<td>MM IN</td>
<td>PART NUMBER*</td>
</tr>
<tr>
<td>0.0 to 9.0</td>
<td>0.00 to 0.35</td>
<td>50.8</td>
</tr>
<tr>
<td>6.4 to 16</td>
<td>0.25 to 0.63</td>
<td>50.8</td>
</tr>
</tbody>
</table>

* The wedge set assembly consists of a matched set of four wedges.
MTS Advantage Wedge Action Grips—Round Specimen Wedges

The vee-notched wedges for round specimens are available for two force ranges.

![Round Specimen Diagram](image)

### 10 kN to 50 kN (6 kip to 11 kip) Vee-Notched Wedges

<table>
<thead>
<tr>
<th>SPECIMEN DIAMETER (D)</th>
<th>WEDGE SET</th>
<th>PART NUMBER*</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>MM</strong></td>
<td><strong>IN</strong></td>
<td><strong>PART NUMBER</strong></td>
</tr>
<tr>
<td>3.0 to 7.9 Side Installation</td>
<td>0.12 to 0.31 Side Installation</td>
<td>053-140-803</td>
</tr>
<tr>
<td>3.0 to 7.9 Top Installation</td>
<td>0.12 to 0.31 Top Installation</td>
<td></td>
</tr>
<tr>
<td>7.0 to 9.5 Side Installation</td>
<td>0.27 to 0.37 Side Installation</td>
<td>053-140-804</td>
</tr>
<tr>
<td>7.0 to 12.7 Top Installation</td>
<td>0.27 to 0.50 Top Installation</td>
<td></td>
</tr>
<tr>
<td>11.5 to 12.7 Side Installation</td>
<td>0.45 to 0.50 Side Installation</td>
<td>053-537-805</td>
</tr>
<tr>
<td>11.5 to 16.0 Top Installation</td>
<td>0.45 to 0.63 Top Installation</td>
<td></td>
</tr>
</tbody>
</table>

* The wedge set assembly consists of a matched set of four wedges.

### 100 kN to 300 kN (22 kip to 67 kip) Vee-Notched Wedges

<table>
<thead>
<tr>
<th>SPECIMEN DIAMETER (D)</th>
<th>WEDGE SET</th>
<th>PART NUMBER*</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>MM</strong></td>
<td><strong>IN</strong></td>
<td><strong>PART NUMBER</strong></td>
</tr>
<tr>
<td>3.2 to 5.8 Side Installation</td>
<td>0.12 to 0.23 Side Installation</td>
<td>053-537-405</td>
</tr>
<tr>
<td>3.2 to 7.6 Top Installation</td>
<td>0.12 to 0.30 Top Installation</td>
<td></td>
</tr>
<tr>
<td>5 to 10.4 Side Installation</td>
<td>0.19 to 0.41 Side Installation</td>
<td>053-537-403</td>
</tr>
<tr>
<td>5 to 12.5 Top Installation</td>
<td>0.19 to 0.49 Top Installation</td>
<td></td>
</tr>
<tr>
<td>12.2 to 15.5 Side Installation</td>
<td>0.48 to 0.61 Side Installation</td>
<td>053-537-404</td>
</tr>
<tr>
<td>12.2 to 19.5 Top Installation</td>
<td>0.48 to 0.76 Top Installation</td>
<td></td>
</tr>
</tbody>
</table>

* The wedge set assembly consists of a matched set of four wedges.
Safety Information

Hazard Placard Placement

Hazard placards contain specific safety information and are affixed directly to the system so they are plainly visible.

Each placard describes a system-related hazard. When possible, international symbols (icons) are used to graphically indicate the type of hazard and the placard label indicates its severity. In some instances, the placard may contain text that describes the hazard, the potential result if the hazard is ignored, and general instructions about how to avoid the hazard.

The following label is typically located on the grip.

<table>
<thead>
<tr>
<th>LABEL</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grip ID Plate.</td>
<td></td>
</tr>
</tbody>
</table>
Contains the following information:
- Model number
- Load rating
- Temperature range
Installation

This section describes how to install the MTS Advantage Wedge Grips in a load frame.

About Grip Installation

**WARNING**

Grip Installation is inherently dangerous because it occurs within the crush zone of the force train. During installation (electrical or servohydraulic) power is applied to the system because crosshead or actuator movement is required.

Serious injury and damage to the equipment can occur.

Take every precaution to avoid unexpected crosshead or actuator movement.
If you are installing the grips on a servohydraulic load unit, you must install a load unit mounting adapter on the actuator and on the force transducer. Servohydraulic installations require the attachment kit (MTS part number 051-880-3xx) for the appropriate parts.

**Install the Grips**

1. Turn on the power to the load frame.
2. Adjust the crosshead position as necessary to allow adequate room to install the grips.
3. Turn the load frame power off.
4. Clean all of the surfaces that will contact each other (such as the mounting pin and the load frame mounting adapter) and lubricate them with Nikal.
5. Install the grips.
   - Install the mounting pin into the load frame mounting adapter. Align the holes of the mounting pin with the load frame mounting adapter and install the mounting dowel to attach the grip assembly to the load frame. Repeat this step for the other grip.
   
   **Note**  *The 300 kN grip does not use a mounting pin or load frame mounting adapter. It is threaded into the load frame.*

6. When both grips are mounted to the load frame, align the upper and lower grips to each other and tighten the locking collars to preload the connection.
7. Install the wedges.
Operation

This section describes how to operate the MTSAdvantage Wedge Action Grips.

Contents

Changing Wedges 25
Installing a Specimen 27

Changing Wedges

Two standard types of wedges are available for the grips: flat wedges for flat specimens and vee-notched wedges for round specimens. Perform the following procedure to replace one type of wedge with the other.

Note  Each wedge is labeled with the wedge part number and manufacturing date code. Be sure that replacement wedges are a matched set before attempting to install the wedges into the grip.

1. Remove any specimen installed in the grips. Position the actuator or crosshead as necessary for convenient access to the grip wedges. If applicable, remove system hydraulic pressure.
The wedge springs can become dislodged and fly out of the grip assembly.

The wedge spring can attain a force that can hurt you.

Ensure that the retaining clip is installed on the spring anchor post.

2. The lower end of the wedge spring is secured to the spring post with a retaining clip (star washer). If the retaining clip is not present, install one before disconnecting the spring from the wedge. Disconnect the springs that are attached to each wedge.

3. Remove the two screws securing the retaining guides and remove the retaining guides.

4. Remove the wedges from the grip body.

5. Remove any debris from the grip body that might have collected during testing.

6. Apply a thin coat of Nikal lubricant to the surfaces of the wedge that contact the grip body.

7. Place the wedges in the grip body.

8. Replace the retaining guides so that the pin on the wedge is in the slot. Secure with two screws.

9. Replace springs on each wedge.
Installing a Specimen

The following procedure describes how to install a specimen in the MTS Advantage Wedge Grips. This procedure assumes a set of wedges has been properly installed.

**CAUTION**

The contact area between the grip face and specimen should be as large as possible.

A small contact area between the grip face and specimen can cause premature wear to the grip face surface.

MTS recommends that specimens should be machined to provide the largest possible surface contact area between the grip face and the specimen.

![Diagram showing contact area and specifications](image.png)

- **Bottom gap specification (3-6 mm)**
- **Large contact area recommended**
- **Small contact area can cause premature wear and damage the grips**

**Figure:**

- Wedge face
- Contact area
- Bottom gap specification (3-6 mm)
- Large contact area recommended
- Small contact area can cause premature wear and damage the grips
**CAUTION**

Improper specimen installation can damage the wedges.

To prevent damage to the grips, follow the installation procedure. Do not install specimens with hardness of Rc 52 or greater.

---

1. Apply power to the load frame or load unit.
2. Open the upper and lower grips.

---

**CAUTION**

**Specimen slippage during the test can damage the grips.**

**Specimen slippage typically occurs when:**

- Insufficient grip pressure is used to securely grip the specimen.
- Grip faces or wedges with rounded or flattened serrations are used.
- The specimen is harder than the wedge or face material.

Do not exceed the maximum pressure rating of the grip. Increasing the pressure setting to hold round specimens can reduce the life of the vee-notched wedges. Do not install specimens with hardness of Rc 52 or greater.

---

3. Place the specimen in the lower grip allowing a space of at least 3 mm (0.12 in), but not greater than 6 mm (0.25 in), between the bottom of the specimen and the bottom inner edges of the lower grip wedges. Turn the grip handles until specimen is firmly secured in place.

4. Lower the crosshead or extend the actuator until the specimen is positioned in the upper grip allowing a space of at least 3 mm (0.12 in) but not greater than 6 mm (0.25 in), between the top of the specimen and the inner top edges of the wedges. Turn the grip handles until the specimen is firmly secured in place.
After approximately 500 uses (or weekly, whichever comes first), the wedges of the grip should be removed and an anti-seizing compound applied to the edges of the wedge which contact the wedge chamber. The grip wedges should also be lubricated if the grips have been in extended storage. Perform the following steps to lubricate the wedges. Material required is Nikal lubricant (MTS part number 011-354-402).

1. Remove the wedges from the grip body.
2. Clean the grip assemblies to remove any dust or particales that might scratch the grip surfaces or wedge faces.
3. Apply a thin layer of Nikal lubricant to the edges of the wedge which contact the wedge chamber and grip piston.
4. Repeat Steps 1 and 2 for the other grip.
5. Place each wedge back into the grip body.

### Service kits

The following table lists the part numbers of the available service kits. The kits include components needed to replace the springs and restore the wedge action.

<table>
<thead>
<tr>
<th>MODEL</th>
<th>PART NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 kN</td>
<td>560116-01</td>
</tr>
<tr>
<td>30 kN</td>
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