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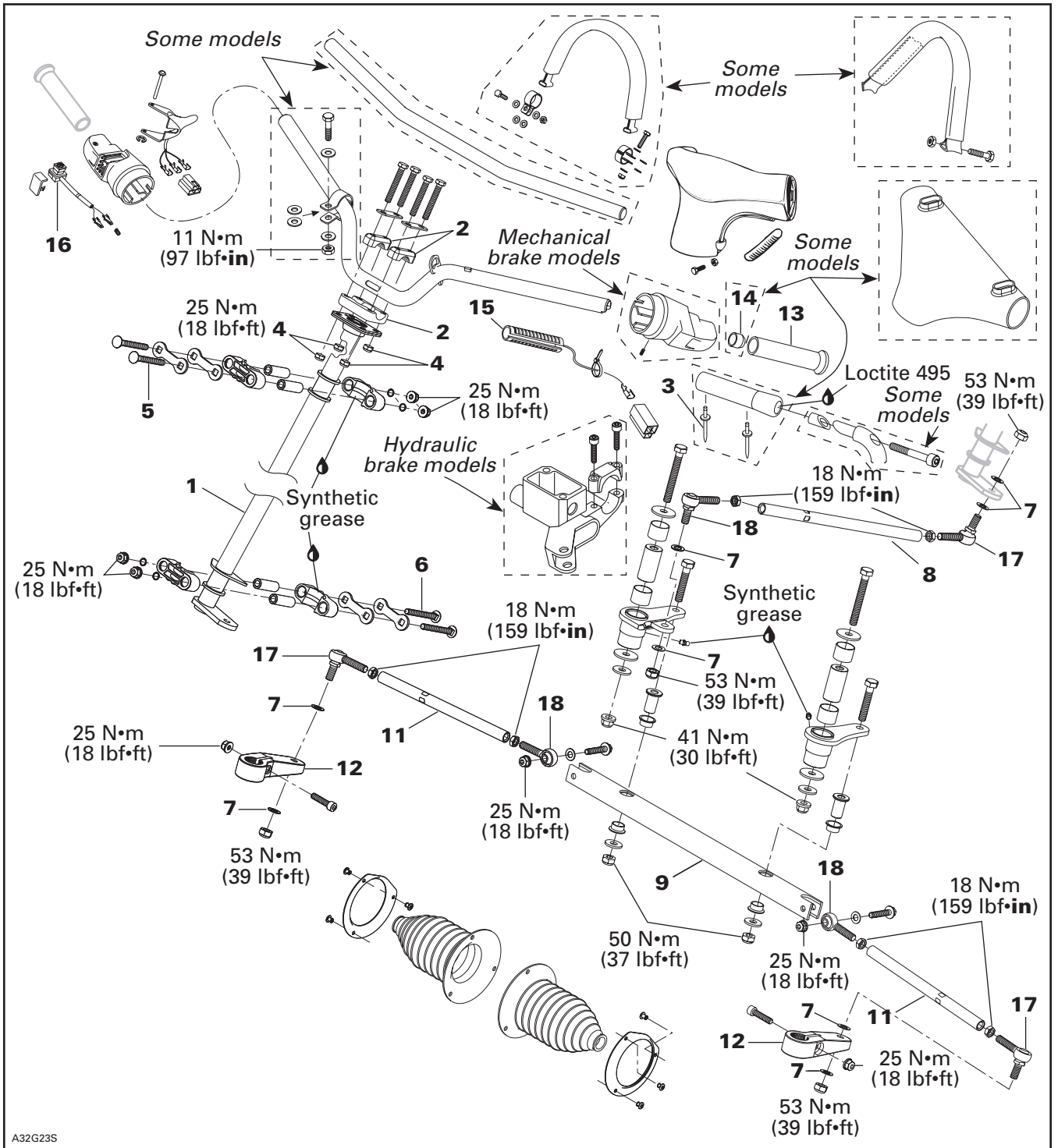
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# Section 08 STEERING/FRONT SUSPENSION

## Subsection 02 (STEERING SYSTEM)

# STEERING SYSTEM

All ZX Series except Summit X/HM X

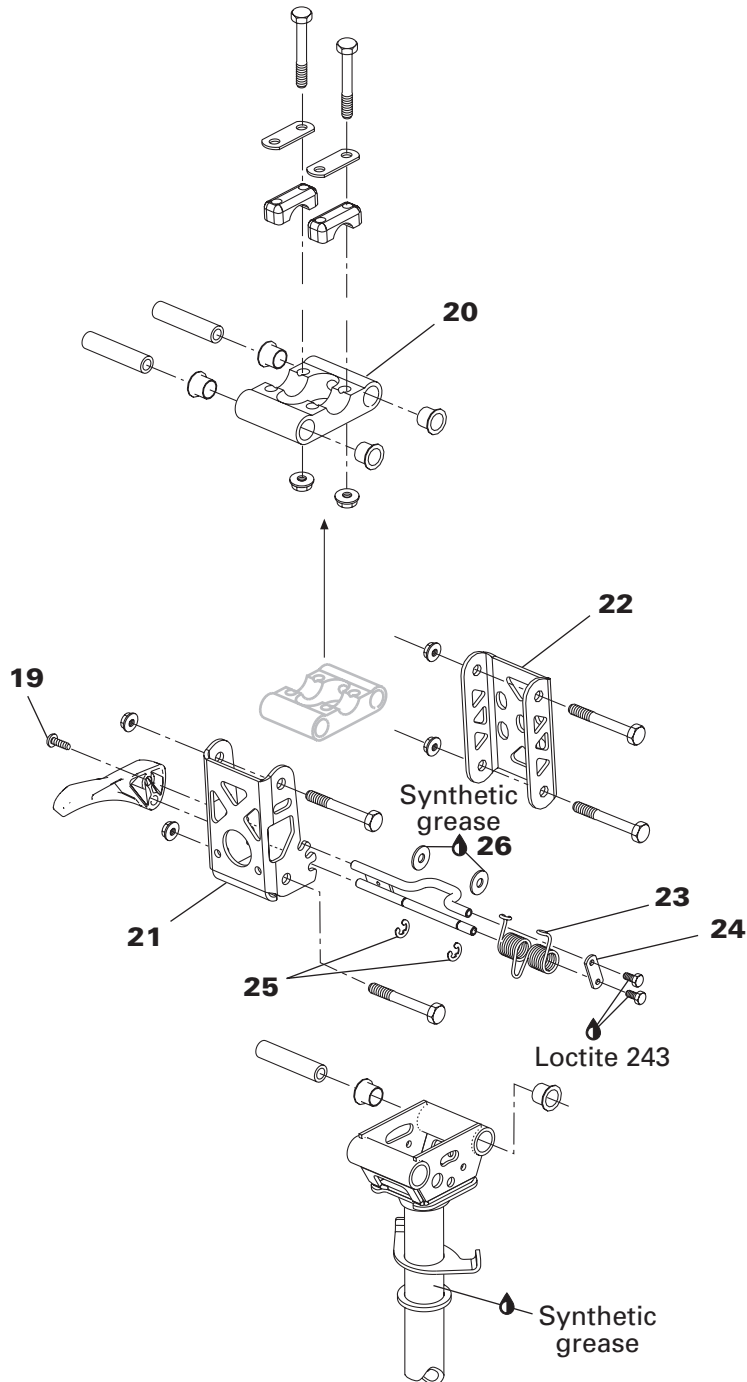


A32G23S

## Section 08 STEERING/FRONT SUSPENSION

### Subsection 02 (STEERING SYSTEM)

#### Tilt Handlebar Mechanism — Grand Touring SE and Legend SE Models

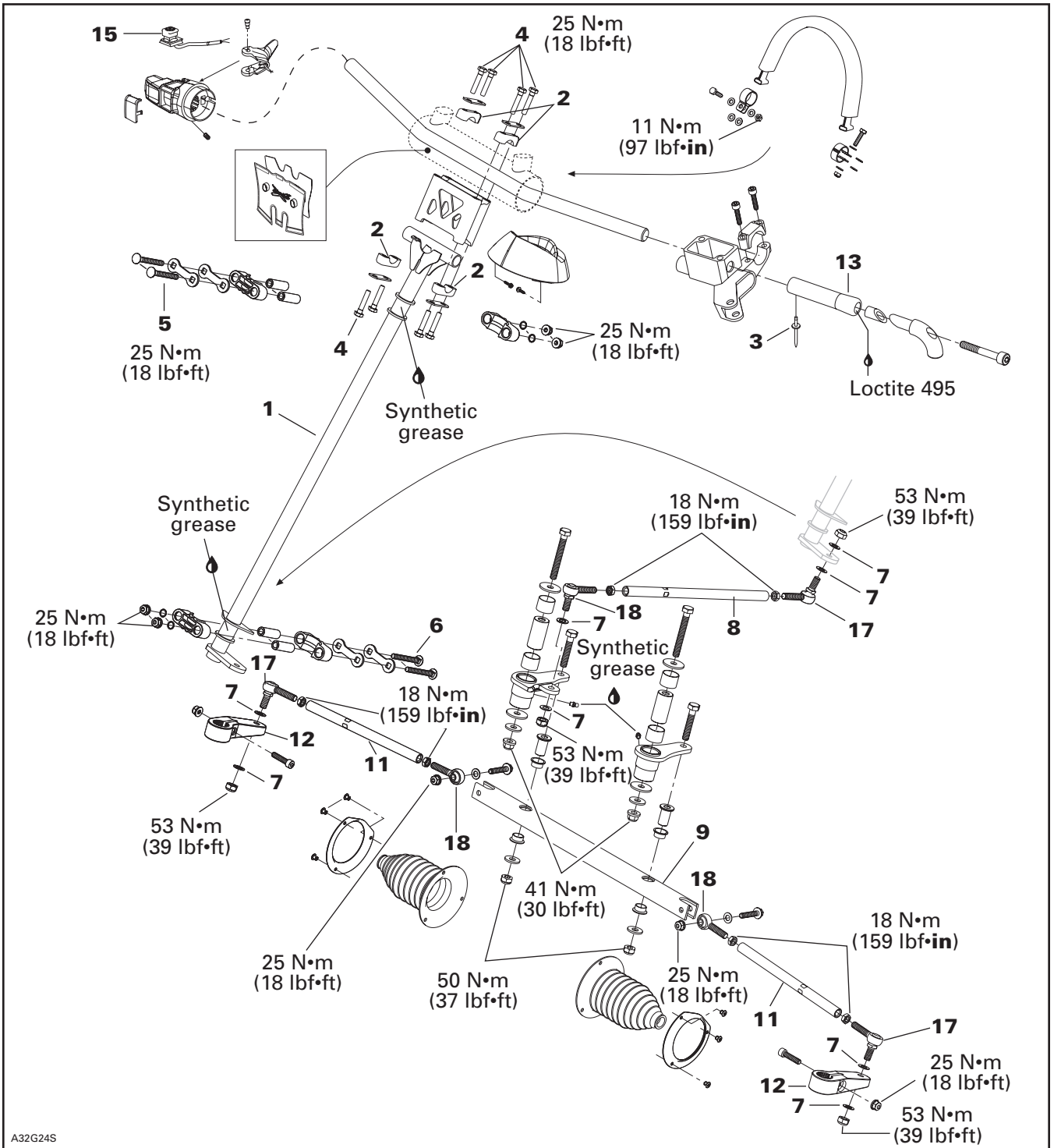


A32G25S

# Section 08 STEERING/FRONT SUSPENSION

## Subsection 02 (STEERING SYSTEM)

### Summit X/HM X Models



## Section 08 STEERING/FRONT SUSPENSION

### Subsection 02 (STEERING SYSTEM)

## DISASSEMBLY AND ASSEMBLY

### 13, Grip

#### **Fan Cooled Models**

Grips must be carefully removed to prevent damaging the heating elements.

Remove rivet no. 3 on so equipped models.

Heat grip with a heat gun.

Apply tape to handlebar near the grip to protect paint.

Inject compressed air into the handlebar and twist grip as pulling it out.

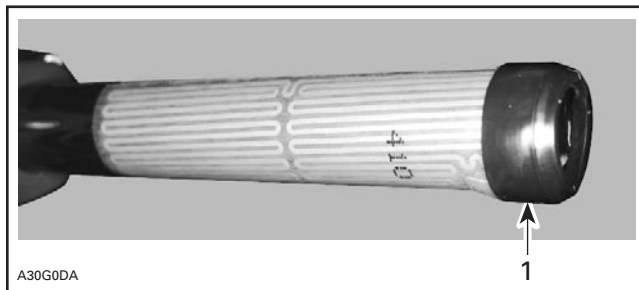
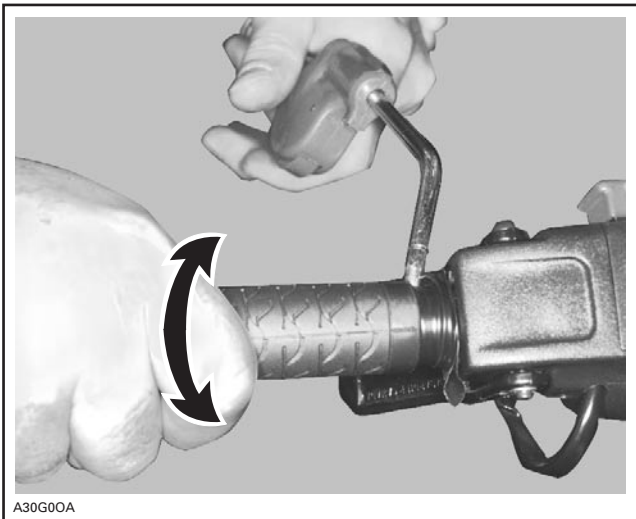
Continue cutting along the gap and remove the grip.

If required, slowly peel heating element no. 15 from handlebar and remove it.

To install, stick the heating element to the handlebar making sure the wires do not interfere with operation of the accelerator or brake handle.

#### **Legend Fan, Grand Touring Fan and Skandic Fan**

Prior to install grips, position heating element protector no. 14.



1. Heating element protector

#### **Fan Cooled Models**

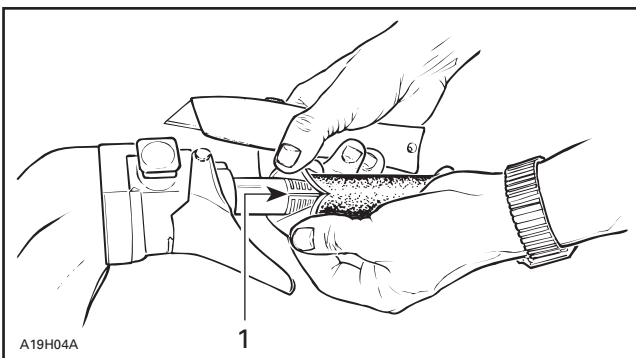
### **⚠ WARNING**

Never use lubricants (e.g. oil, grease, soap etc.) to install the handlebar grip.

The grips might be unremovable as explained above, in this case, carefully proceed as follows to prevent damaging the heating elements.

Locate the element wires inside the handlebar; look through end of grip. Start cutting the grip exactly opposite the element wires and immediately peel it open to locate the gap in the heating element, as shown.

Heat the grip with a heater gun or a spot light to ease installation. Insert new grip with compressed air.



TYPICAL

TYPICAL

1. Gap in the heating element opposite the wires

## Section 08 STEERING/FRONT SUSPENSION

### Subsection 02 (STEERING SYSTEM)

#### **MX Z Fan and Summit Fan**

Locate former rivet holes in handlebar then, drill 4.8 mm (3/16 in) dia. hole through grip in this position. Install 2 rivets no. 3 both sides of handle.

#### **Liquid Cooled Models**

**NOTE:** These models feature an integrated heating element in the plastic sleeve of the grip.

**CAUTION:** Removing grip from handlebar might damage the heating element. Do not remove needlessly.

**NOTE:** If heating grip does not work and needs to be replaced, the grip can be cut with a knife for removal.

Remove lever of tilt handlebar mechanism (if so equipped).

Remove steering padding.

Cut locking tie and unplug heating grip connector.

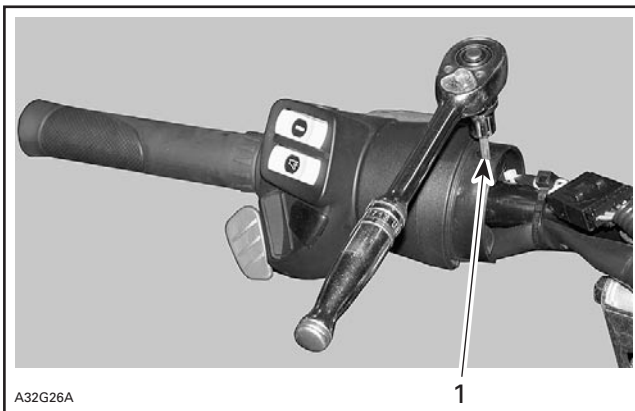
Using the multilock-terminal housing extraction tool AMP (P/N 755430-2), push the 3 wires out of the heating grip connector. Note the position of the wires for reinstallation.

#### **Throttle Side:**

Loosen set screw of throttle lever housing (underneath). Slide housing away of grip.

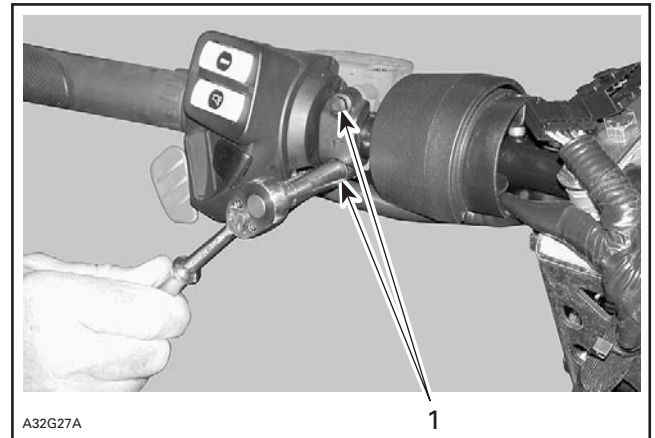
#### **Brake Side:**

Loosen set screw of electrical switch housing. Slide housing inward.



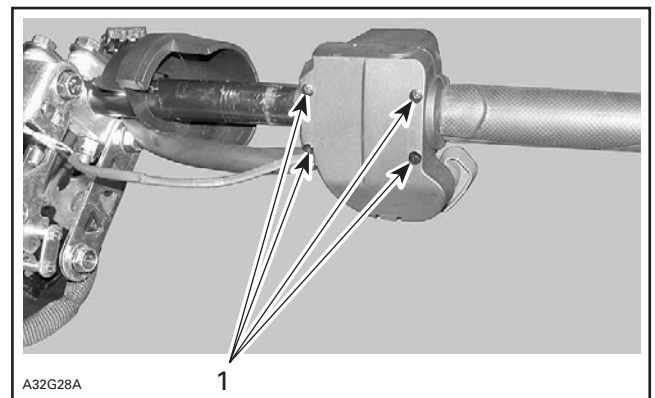
1. Set screw

Remove retaining screws of brake housing. Slide housing away of grip.



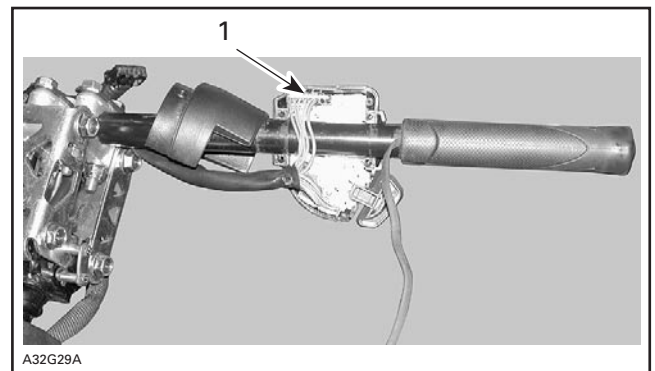
1. Retaining screws

Remove the 4 screws from the electrical control housing.



1. Screws

Disconnect the top connector (heating grip and dimmer switches) and move housing away to make room.



1. Unplug connector

## Section 08 STEERING/FRONT SUSPENSION

### Subsection 02 (STEERING SYSTEM)

#### Both Sides:

Insert the open side of a 23 mm (7/8 in) wrench against the inner end of grip.

**CAUTION:** Pay attention not to damage wires with the wrench.

Using a plastic hammer, tap on the side of the wrench end to make the grip sliding out.



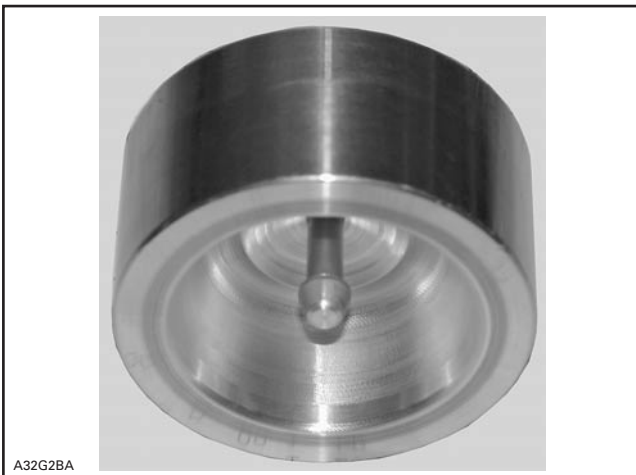
Installation is the opposite procedure of the removal but pay attention to the following.

Clean handlebar ends and inside of heating grip with isopropyl alcohol. Let dry before installation.

#### **⚠ WARNING**

Handlebar end and inside of heating grip must be clean and dry before installing heating grip to ensure proper adhesion.

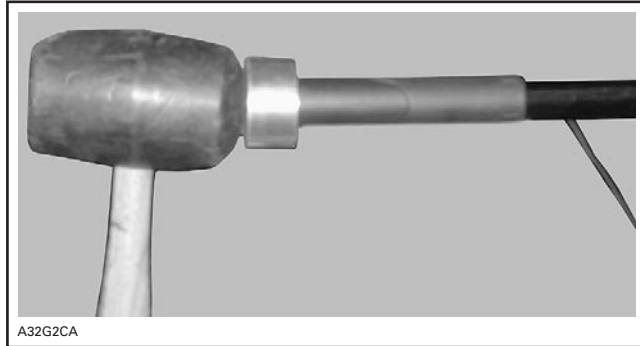
Use the insertion tool (P/N 529 035 897) to properly install grip.



**CAUTION:** Installing grip without the special tool is likely to damage its heating element.

Position the insertion tool at the outside end of grip.

Using a plastic hammer, tap on tool to push grip on. Continue to tap until grip bottoms.



Properly route wires then reposition and tighten throttle and brake housings.

Reinstall terminals and replug connectors. Test grips to ensure they heat properly.

## Tilt Handlebar Mechanism

### **Grand Touring SE and Legend SE**

Move handlebar to its higher position.

Remove Allen screw **no. 19** retaining locking lever. Pull out locking lever.

Remove steering pad. Unhook throttle cable from throttle lever.

Unscrew all 4 nuts and bolts securing handlebar.

**NOTE:** Do not unbolt master cylinder needlessly. Move handlebar apart, keeping master cylinder reservoir in upward position.

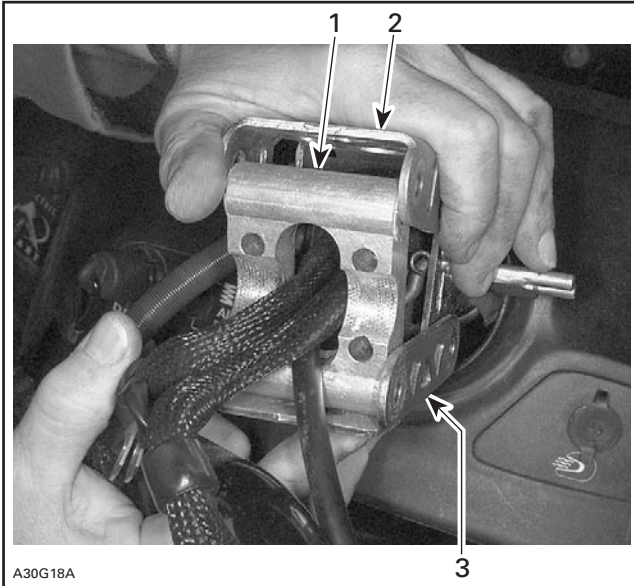


**HANDLEBAR READY TO BE MOVED**

## Section 08 STEERING/FRONT SUSPENSION

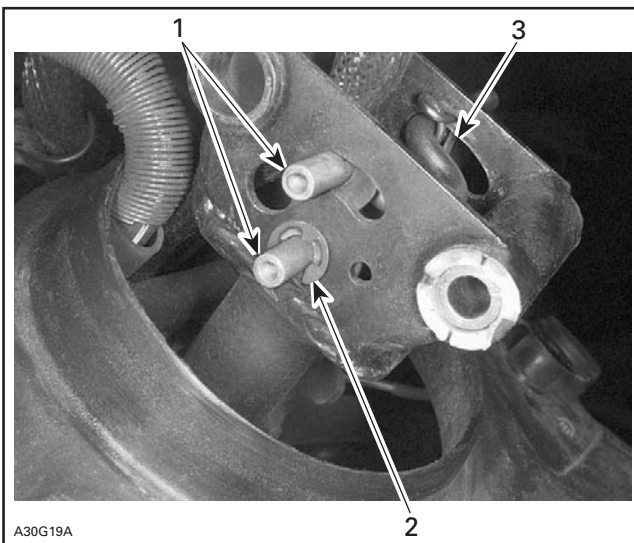
### Subsection 02 (STEERING SYSTEM)

Unbolt 4 nuts and bolts retaining clamp no. 20, front no. 21 and rear no. 22 arms.



1. Clamp
2. Front arm
3. Rear arm

Remove plate no. 24, circlip no. 25 on left side then, plastic washer no. 26 on right side.

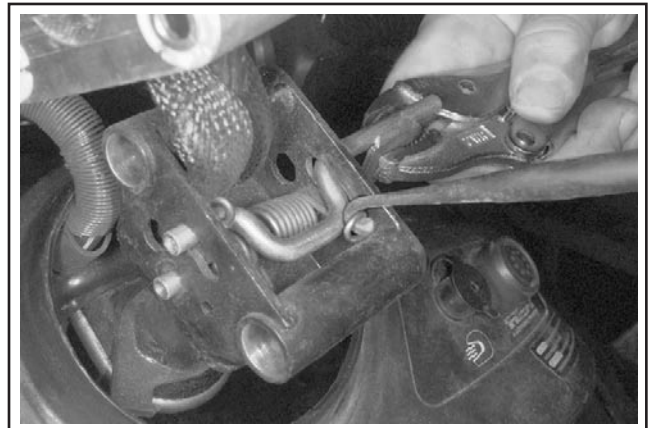


1. Plate removed
2. Circlip to be removed
3. Plastic washer on right side

Using a hook, pull spring no. 23 right side end to allow removing welded lock.

#### **⚠ WARNING**

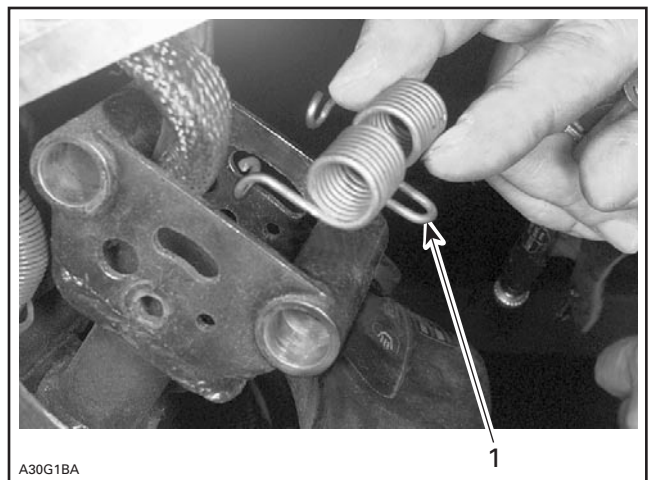
Spring will be ejected upon welded lock removal.



#### WELDED LOCK REMOVAL

To reassemble tilt handlebar mechanism, reverse disassembly procedure. However, pay attention to the following:

Install spring no. 23 with its locking tab facing bottom and rear.



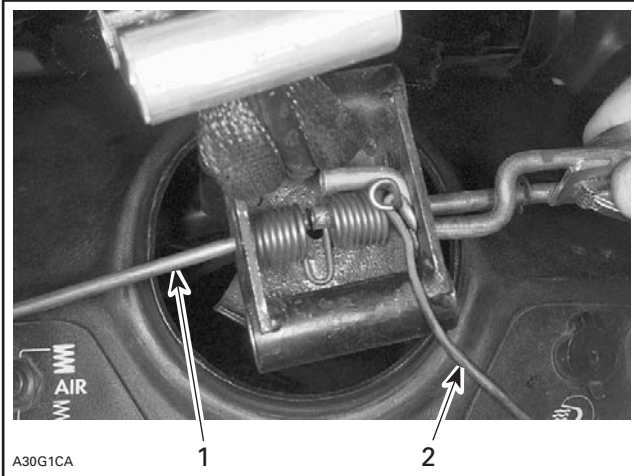
1. Spring tab



## Section 08 STEERING/FRONT SUSPENSION

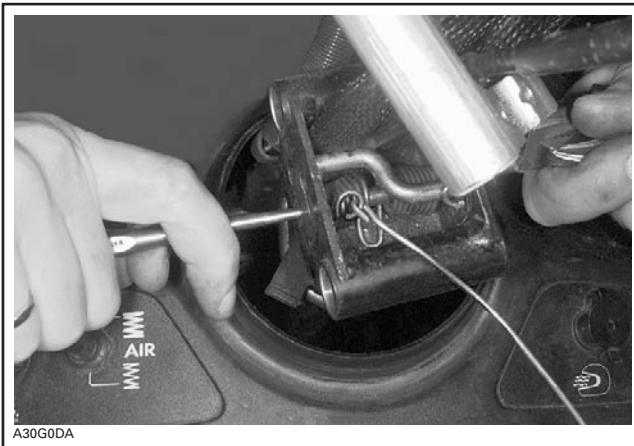
### Subsection 02 (STEERING SYSTEM)

Hold left side portion of spring with a punch inserted in lower bracket. Pull right side spring end with a hook during welded lock insertion.

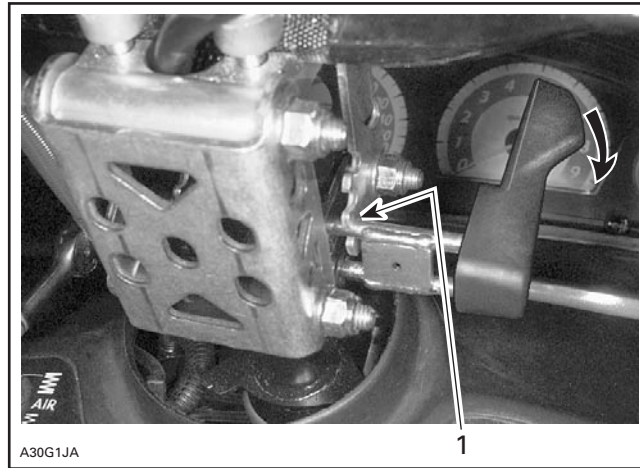


1. Punch
2. Hook to pull spring end

Proceed the same with left side spring end.

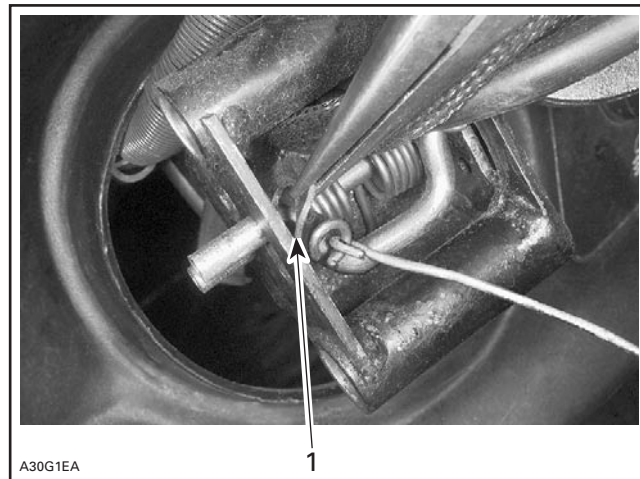


Temporary install locking lever. Push it forward in order to maintain locking rod fully engaged. Tighten screws retaining plate while keeping locking rod fully engaged.

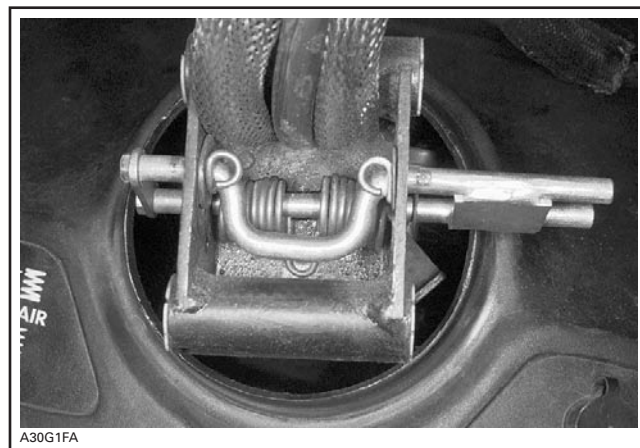


1. Locking rod fully engaged

Install a new plastic washer on each end of spring.



1. Plastic washers



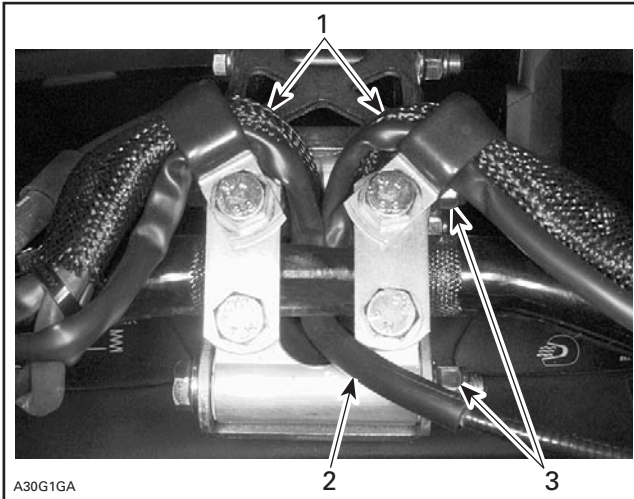
**WELDED LOCK INSTALLED**

Throttle cable must be under handlebar and wiring harnesses above.

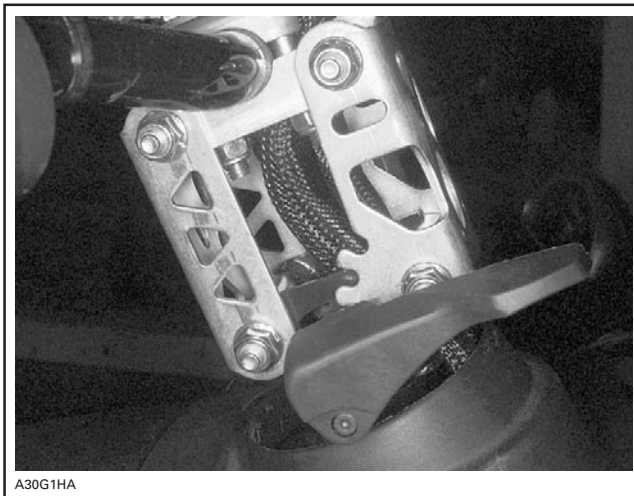
## Section 08 STEERING/FRONT SUSPENSION

### Subsection 02 (STEERING SYSTEM)

All 4 nuts retaining front and rear arms must be on right side.



1. Wiring harnesses
2. Throttle cable
3. Nuts on right side



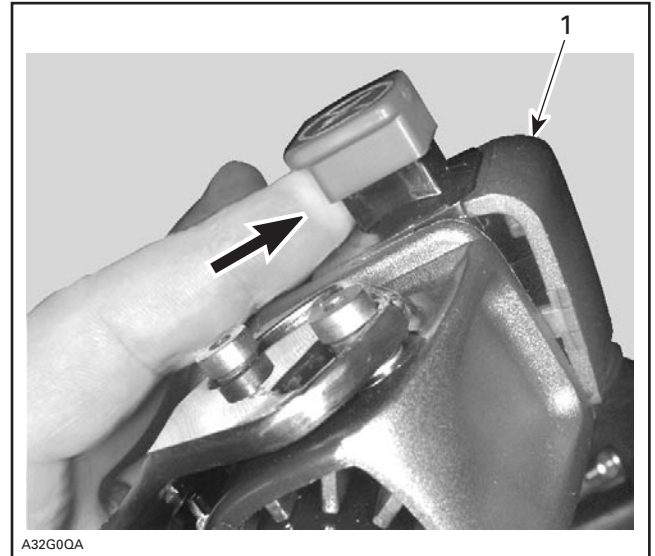
HANDLEBAR IN UPPER POSITION



HANDLEBAR IN LOWER POSITION

## 16, Cut-Out Switch

Push on switch to remove plastic cover.



1. Plastic cover

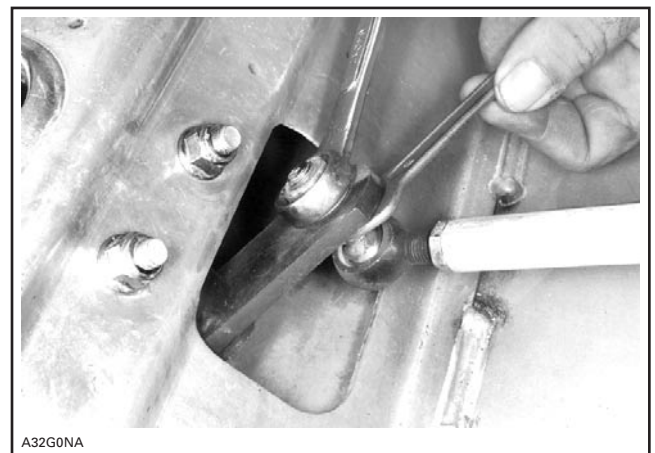
## 1, Steering Column

Remove steering pad, remove master cylinder from handlebar and put it aside. Remove circlip retaining throttle cable to throttle housing. Unplug all connector housings of handlebar switches. Remove handlebar ass'y.

Remove the air intake silencer.

Unbolt console.

Detach the short tie rod **no. 8** (engine has to be removed. Refer to ENGINE section) from the steering column. Note that a hardened flat washer **no. 7** goes on each side of steering column lever.



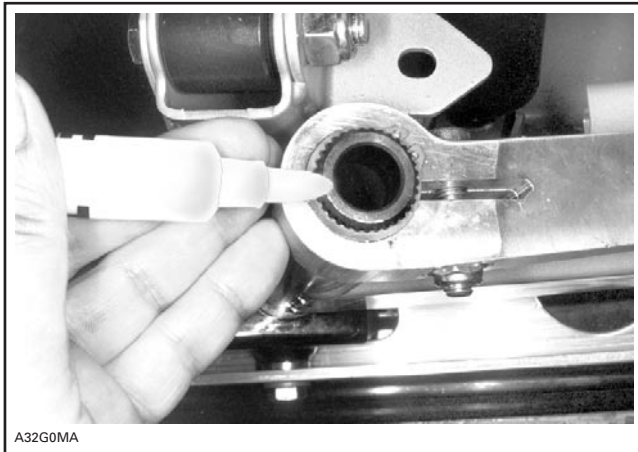
## Section 08 STEERING/FRONT SUSPENSION

### Subsection 02 (STEERING SYSTEM)

Disengage carriage bolts **no. 6** from chassis.  
Disengage carriage bolts **no. 5** from steering support then, pull steering column from top.  
Plastic U-clamps will come out along with steering column.

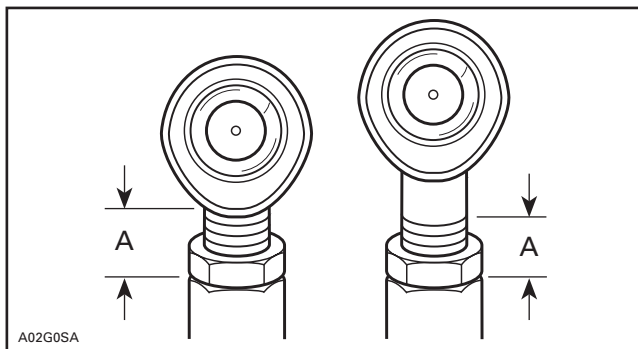
#### 12, Steering Arm

To maintain correct steering geometry for reassembly, scribe a mark on the steering arm and ski leg before disassembly.



#### 17,18, Ball Joint (left hand and right hand threads)

The maximum external threaded length not engaged in the tie rod must not exceed 20 mm (25/32 in).

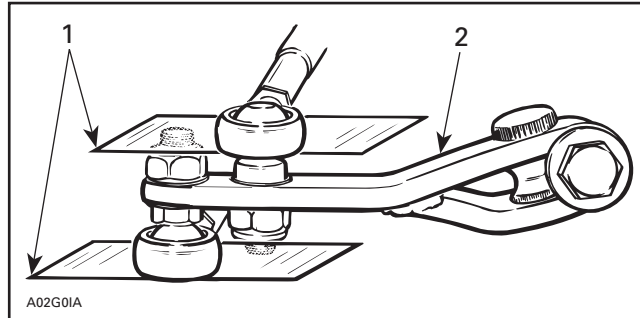


TYPICAL

A. 20 mm (25/32 in) max.

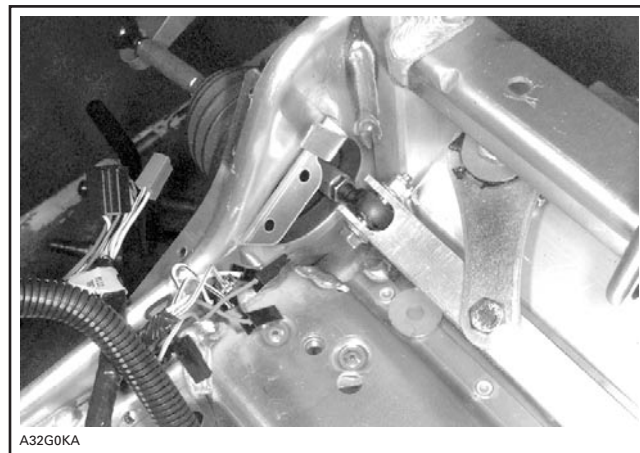
The ball joint should be restrained when tightening the tie rod end lock nut. Align it so the tie rod end is parallel to the steering arm when assembled on the vehicle, refer to the following illustration.

For proper torque specifications refer to the specific exploded view for the vehicle being serviced.



TYPICAL

1. Parallel with steering arm
2. Steering arm



TIE ROD BALL JOINT PARALLEL TO SWIVEL BAR BEFORE TIGHTENING

#### **WARNING**

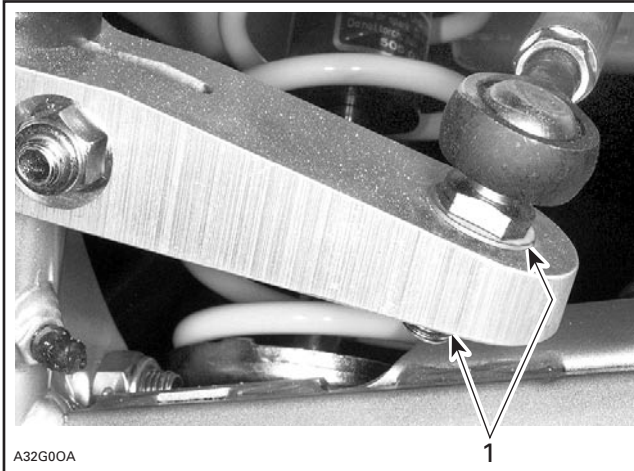
The cut off section of the ball joint must run parallel with the swivel bar **no. 9**. When tightening lock nuts, restrain ball joint with appropriate size wrench. The maximum external threaded length not engaged in the tie rod must not exceed 20 mm (25/32 in).

## Section 08 STEERING/FRONT SUSPENSION

### Subsection 02 (STEERING SYSTEM)

#### 7, Hardened Washer

Install a hardened washer on each side of the arm.



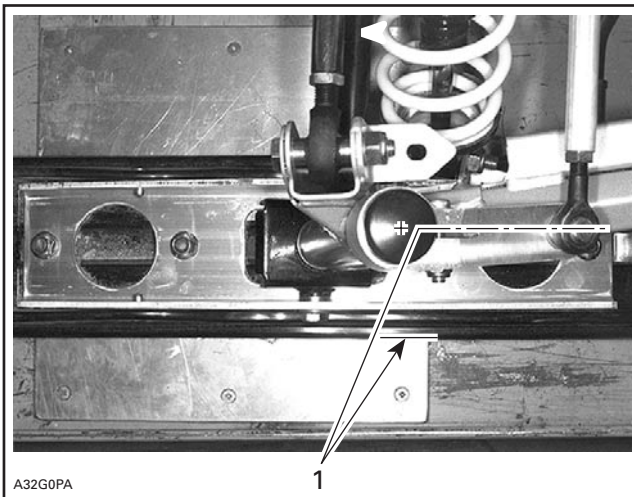
TYPICAL

1. Hardened washers

#### 12, Steering Arm

The steering arm angles should be equal on both sides when skis are parallel with vehicle.

Steering arm axis (from plastic cap center to ball center of ball joint) must run parallel to ski.



TYPICAL

1. Parallel

Tighten the steering arm pinch bolt and nut to the torque specified in the exploded view.

#### INSPECTION

Check skis and runners for wear. Replace as necessary. Refer to FRONT SUSPENSION.

#### 12, Steering Arm

Make sure steering arm and ski leg splines interlock.

#### **WARNING**

Any parts having worn splines have to be replaced with new ones.

Check the general condition of the steering system components for wear. Replace if necessary.

#### 15, Heating Grip Element

Refer to TESTING PROCEDURE.

#### 17,18, Ball Joint (left hand and right hand threads)

Inspect ball joint ends for wear or looseness, if excessive, replace them.

#### HANDLEBAR ADJUSTMENT

##### **All ZX Series except Summit X/HM X**

Loosen all 4 nuts **no. 4** retaining steering clamps **no. 2**.

Adjust the steering handlebar to the desired position.

Lock the handlebar in place by tightening the 4 nuts as specified in the illustrations.

##### **Summit X/HM X Models**

Loosen all 8 bolts **no. 4** from 4 retaining steering clamps **no. 2** at the top and the bottom of handlebar extension.

Adjust the handlebar extension to the desired position.

Lock the handlebar extension in place by tightening the bottom end (handlebar extension) 4 bolts **no. 4** the with bottom clamps **no. 2**.

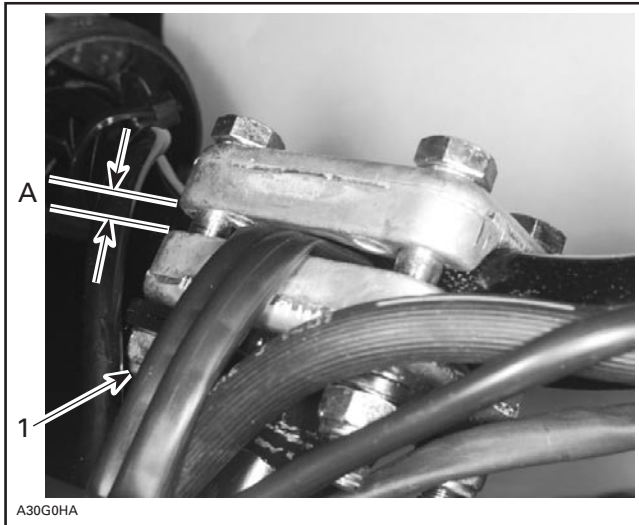
Now adjust the handlebar to the desired position.

Lock the handlebar in place by tightening the top end (handlebar extension) 4 bolts **no. 4** with top clamps **no. 2**.

## Section 08 STEERING/FRONT SUSPENSION

### Subsection 02 (STEERING SYSTEM)

**CAUTION:** Tighten the nuts or bolts equally in a criss-cross sequence and ensure there is an equal gap on each side of the clamps.



TYPICAL

1. Torque to 25 N•m (18 lbf•ft)
- A. Equal gap all around

#### **⚠ WARNING**

Avoid contact between the brake handle and the windshield by NOT adjusting the handlebar too high.

#### **⚠ WARNING**

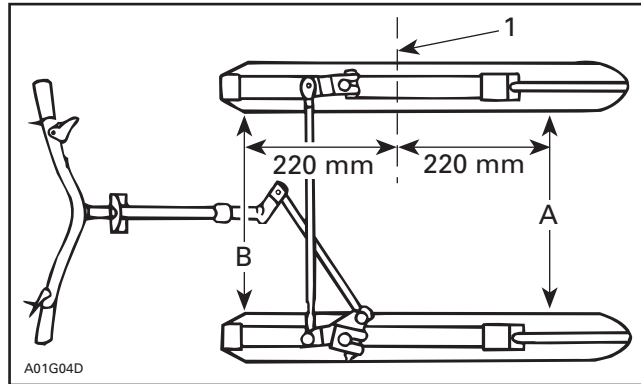
Make sure that the steering pad and all controls are properly fixed to their normal location on the handlebar.

## STEERING ADJUSTMENT (skis)

### Definitions

#### TOE-OUT:

A difference measured between the front edge of the skis "A" and rear edge "B" as viewed from the top. It is adjustable. For all ZX series models, toe-out is measured at 220 mm (8-21/32 in) from ski pivot bolt axis.



TYPICAL

1. Ski pivot bolt axis

### CAMBER:

A specific inward or outward tilt angle of ski leg compared to a vertical line when viewing the vehicle from front.

### Adjustments

Adjustments should be performed following this sequence:

- pivot arm centering
- camber angle
- ski alignment.

### QUICK CHECK

- Position handlebar in a straight ahead position as explained below.
- Verify pivot arm centering as explained below. If it is within 9 - 13 mm (23/64 - 33/64 in), proceed directly with camber adjustment. Otherwise, proceed with handlebar adjustment in PIVOT ARM CENTERING, then perform CAMBER ADJUSTMENT to then finally perform SKI ALIGNMENT.

### PIVOT ARM CENTERING

#### **⚠ WARNING**

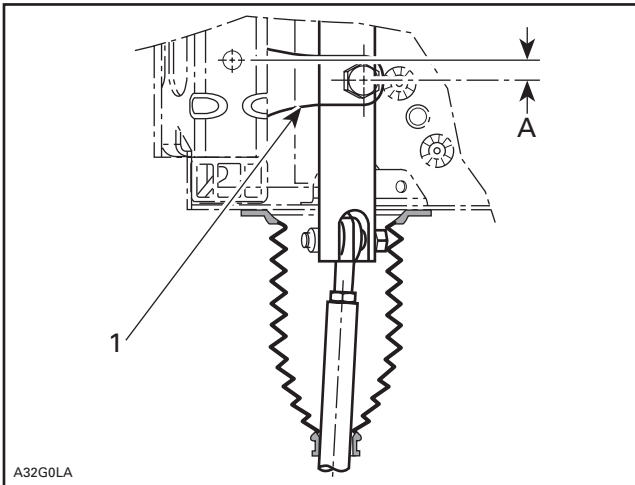
Do not attempt to adjust straight ahead ski position by turning the ball joint on tie rod no. 8.

## Section 08 STEERING/FRONT SUSPENSION

### Subsection 02 (STEERING SYSTEM)

#### 8,17,18, Tie Rod and Ball Joint

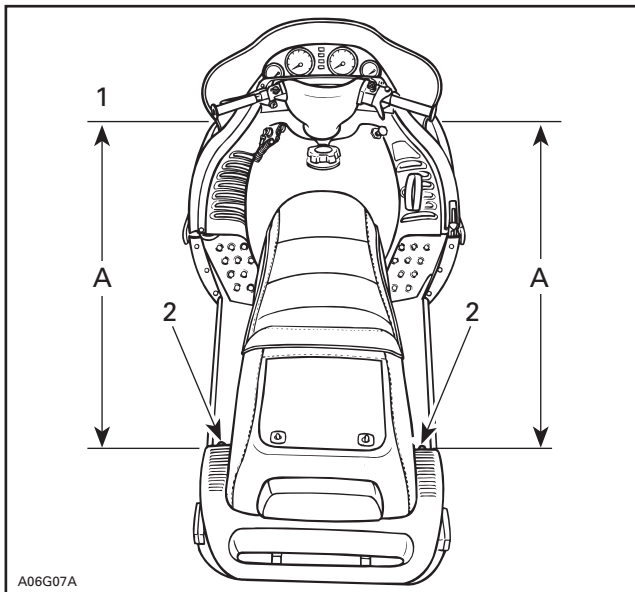
Turn handlebar until bolt center of left side swivel arm is 11 mm (27/64 in) from chassis hole center.



1. Left side swivel arm  
A. 11 mm (.443 in)

Check that handlebar is horizontal by measuring from the extremities of the grips to the rearmost edge of the tunnel, as shown.

**NOTE:** The reference point must be the same relative to each side.



**TYPICAL**  
1. Equal distance "A" on each side  
2. Same reference point

If it is NOT horizontal, remove engine (refer to ENGINE section) and adjust tie rod as explained below. If it is horizontal and does not need adjustment, continue with camber adjustment.

Loosen the jam nuts on tie rod no. 8 (LH threads on steering column end) and turn tie rod accordingly. Retighten the jam nuts to 18 N•m (159 lbf•in).

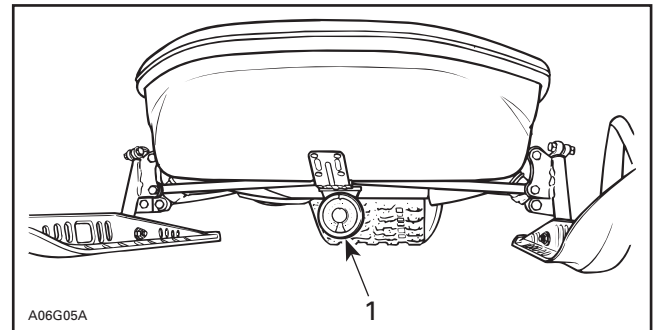
#### **⚠ WARNING**

Never lengthen this tie rod so that the external unengaged threaded portion of ball joint exceeds 20 mm (25/32 in).

#### CAMBER

**NOTE:** Identical adjustments are required on both sides of the vehicle.

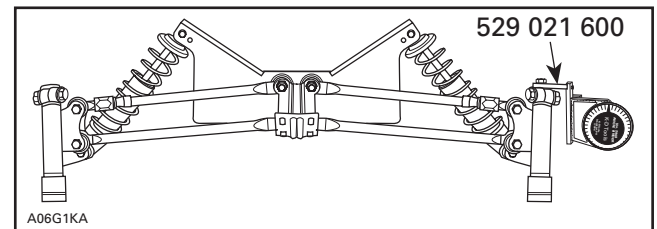
- Make sure the vehicle is leveled by placing an angle finder under the main frame member as shown on the following illustration.
- Vehicle skis must be off the ground.



**TYPICAL**  
1. Angle finder

Using special tool (P/N 529 021 600) mounted to the ski leg, position the angle finder on the tool as shown in the following illustration. An alternate location for the angle finder if the special tool is not available is the outside of the ski leg housing.

**CAUTION:** Angle finder must sit square against swing arm. Positioning angle finder against weld bead or decal may result in false reading.



**TYPICAL — CAMBER ADJUSTMENT SET-UP**

## Section 08 STEERING/FRONT SUSPENSION

### Subsection 02 (STEERING SYSTEM)

#### Adjusting

- Loosen lock nut on both upper control arms.
- Unbolt both upper control arms at ski leg housing. Turn tie rod half turn at a time to obtain the specified value when skis are not touching ground. Bolt upper control arms.

MODEL	CAMBER $\pm 1.0^\circ$
Grand Touring SE/Sport, Legend SE/Sport, MX Z Trail/Adrenaline	- 2

**NOTE:** When adjusted with a negative camber, skis will lean toward center of vehicle.

Tighten lock nut on both upper control arms.

#### SKI ALIGNMENT

Ski alignment is performed by adjusting length of left and right tie rods **no. 11**.

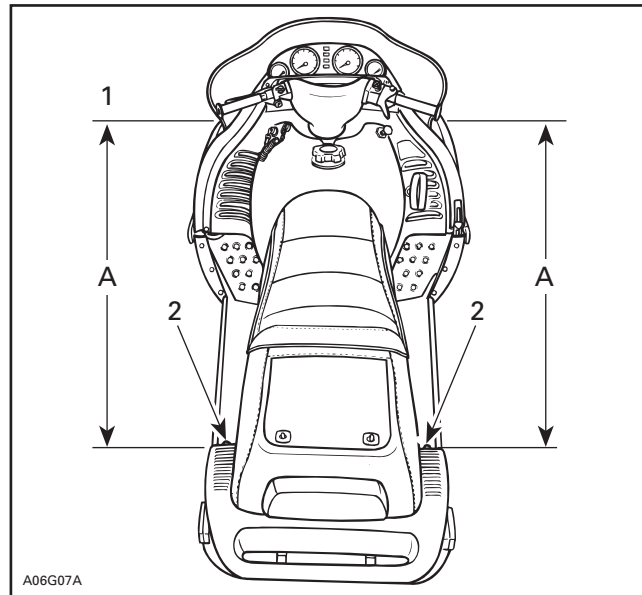
#### WARNING

Do not attempt to adjust skis in a straight ahead position by turning ball joint on tie rod **no. 8**.

#### Procedure:

Position handlebar so that it is horizontal by measuring from the extremities of the grips to the rear most edge of the tunnel, as shown.

**NOTE:** The reference point must be the same relative to each side.

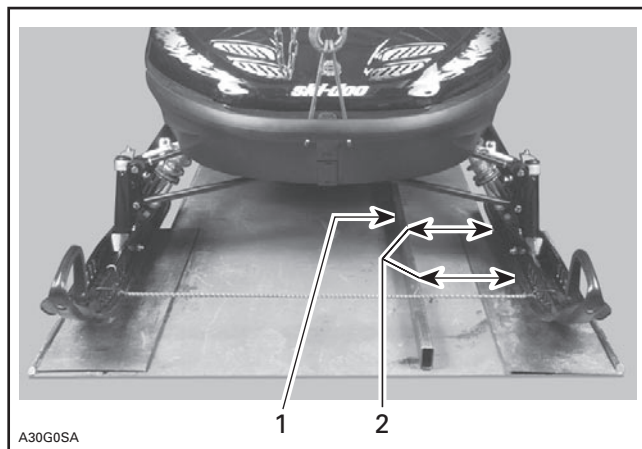


A06G07A

#### TYPICAL

1. Equal distance "A" on each side
2. Same reference point

- A rubber cord must be hooked in front of skis to keep them closed and to take all slack from steering mechanism.
- Lift the front of vehicle off the ground.
- Make sure skis are in a straight-ahead position by placing a straight edge against pre-adjusted track and measure the distance between front and rear of skis and straight edge. Measuring points are 220 mm (8-21/32 in) at front and rear of ski pivot axis.
- To reduce tolerance when measuring, set one ski to proper toe-out (half the total toe-out) then measure from that ski to the opposite ski.



A30G0SA

#### TYPICAL

1. Straight edge
2. Measure at 220 mm (8-21/32 in) from ski pivot axis

## Section 08 STEERING/FRONT SUSPENSION

### Subsection 02 (STEERING SYSTEM)

If adjustment is needed:

- Loosen jam nuts of both tie rods **no. 11**.

Toe-out must be as specified in the following chart.

MODEL	TOTAL TOE-OUT + 3 mm (+ 1/8 in) - 0 mm (- 0 in)
MX Z Renegade/Summit	9.0 (11/32)
MX Z Legend Grand Touring Skandic Fan	3.0 (1/8)

- Turn the tie rod to change its length.

#### **WARNING**

Never lengthen tie rod so that the external un-engaged threaded portion of ball joint exceeds 20 mm (25/32 in).

## LUBRICATION

#### **WARNING**

Do not lubricate throttle cable or housing.

### 26, Grease Fittings

Only use synthetic grease (P/N 413 711 500).

- Grease ski legs.
- Grease LH and RH swivel arms.
- Grease stabilizer blocks in swing arm.

For all others lubrication points use BOMBARDIER LUBE (P/N 293 600 016).

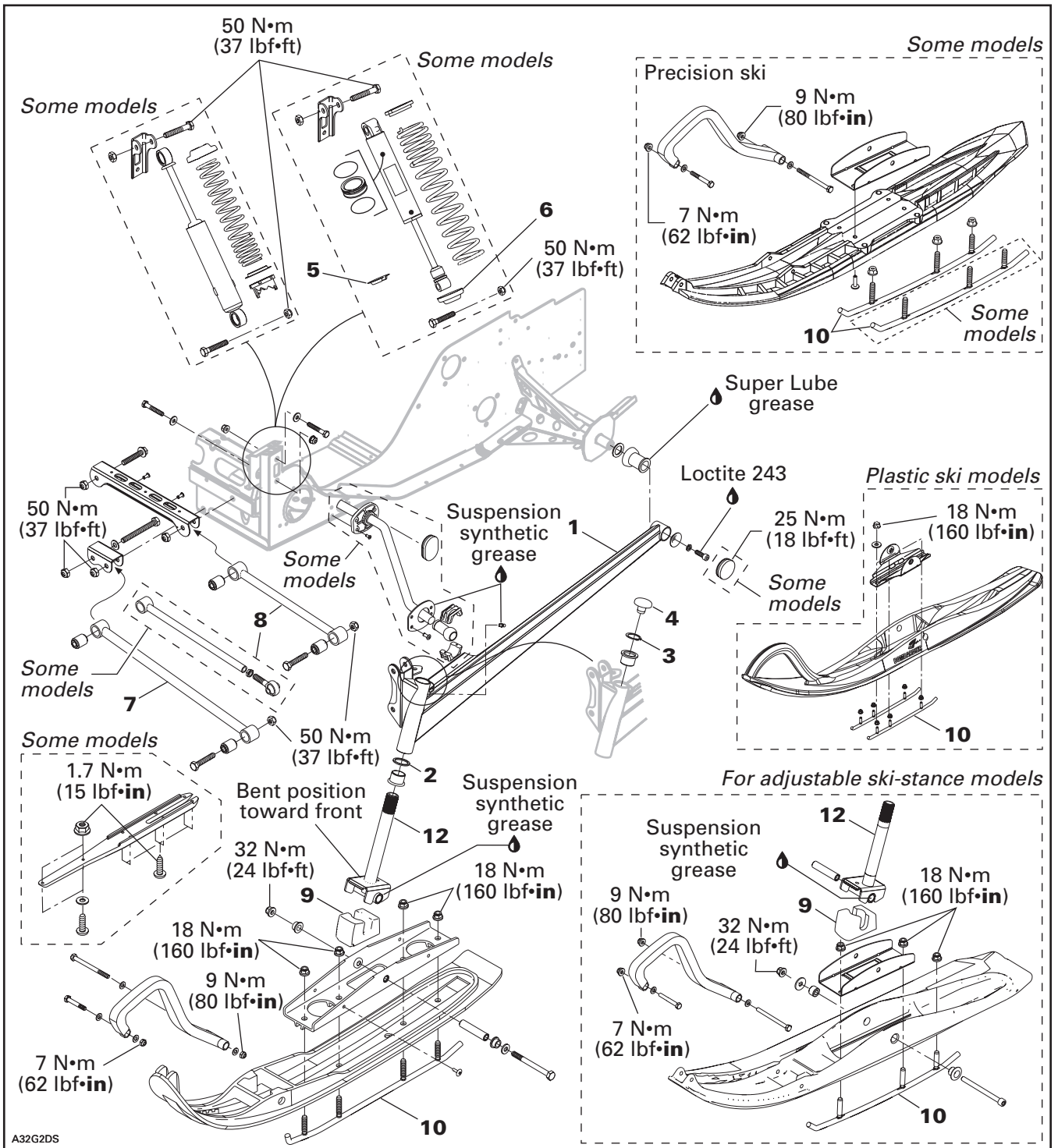
#### Lubricate:

- steering column bushings
- long tie rod ends
- short tie rod ends
- upper arm ball joint on so equipped models.



# SUSPENSION AND SKI SYSTEM

*ZX Series*



## Section 08 STEERING/FRONT SUSPENSION

### Subsection 03 (SUSPENSION AND SKI SYSTEM)

## DISASSEMBLY

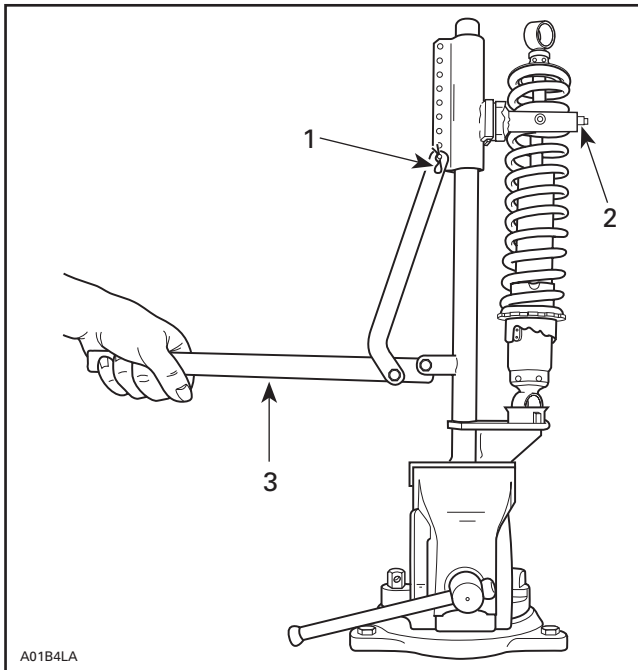
### 5, Shock

Lift front of vehicle and support it off the ground. Reduce spring preload by turning adjusting ring accordingly.

Remove lower bolt then upper bolt of shock.

For shock spring disassembly use shock spring remover (P/N 529 035 504) in a vise. Mount shock in it and turn shock so that spring coils match spring compressor.

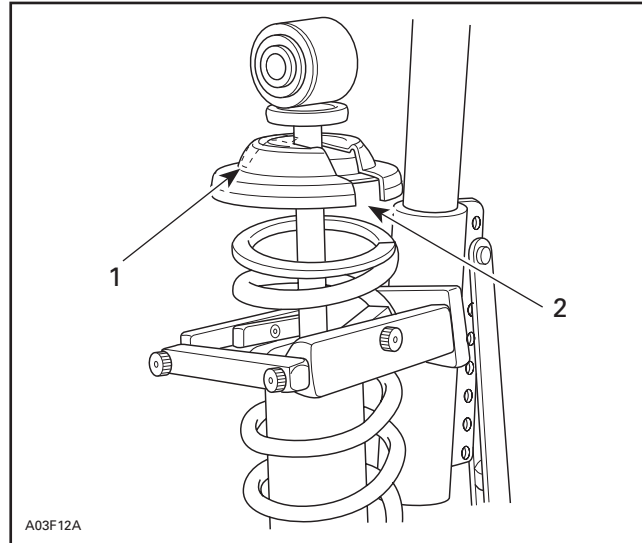
Close and lock the bar. Adjust the handle at horizontal position by changing the position of the clevis pin.



1. Clevis pin
2. Bar
3. Handle horizontal

Push down on the handle until it locks. Remove spring stopper then release handle.

At installation, cap opening **no. 6** must be 180° from spring stopper **no. 5** opening.

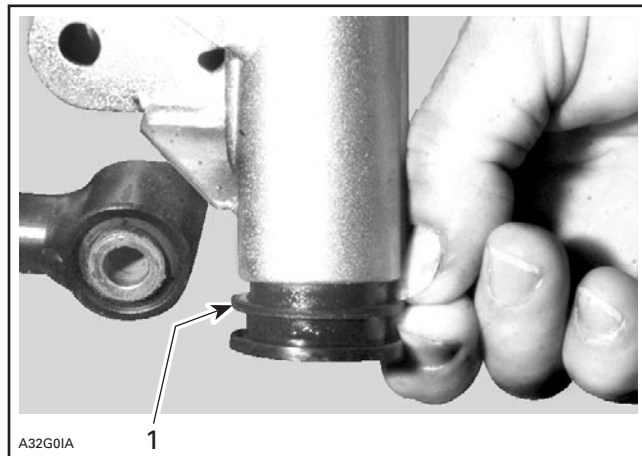


1. Cap opening
2. Spring stopper opening

### 1, Swing Arm

Lift front of vehicle and support it off the ground.

Remove cap **no. 4**, circlip **no. 3** then loosen steering arm bolt and pull up steering arm. Ski leg may fall off from swing arm. Note shim **no. 2** position.



1. Shim **no. 2**

Unbolt upper and lower arms.

Unbolt rear of swing arm from frame.

Pull swing arm off the vehicle.

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## INSPECTION

Check all rubber cushions for crack and wear. Replace as required.

Check straightness of ski leg **no. 12** and make sure that splines are properly interlocking with steering arm. Replace as required.

Check for straightness of swing arm. Replace as required.

Check for clogged grease fittings. Clean or replace as required.

Check skis and runners **no. 10** for wear, replace as necessary.

Check condition of ski stopper **no. 9**. Replace it when deteriorated.

To check condition of shock, refer to SUSPENSION then look for SHOCK ABSORBER INSPECTION.

## INSTALLATION

For assembly, reverse the disassembly procedure. However, pay attention to the following.

Apply suspension synthetic grease (P/N 293 550 033) to ski leg components.

Tighten nuts and screws to proper torque as mentioned in exploded view.

### 7,8, Upper and Lower Arms

Position arms and tie rods horizontally before tightening nuts. Apply the tightening torque to the screw head.

### 8, Adjustable Arm

#### **Some Models Only**

Refer to STEERING SYSTEM for proper camber adjustment on models using these arms.

#### **All Models**

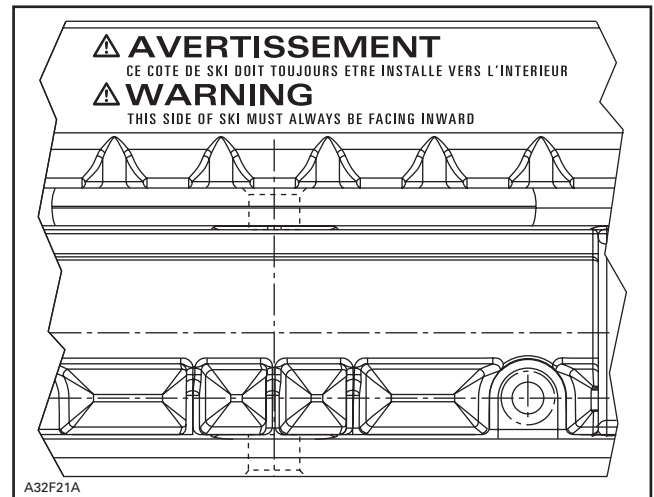
Proceed with ski alignment. Refer to STEERING SYSTEM.

## Ski

### **Summit Models Only**

#### **⚠ WARNING**

Make sure the raised side of ski is always facing inward.



## CONVERTIBLE SKI STANCE

### **Some Models Only**

Convertible models are always fitted with offset ski legs. To change the ski stance from narrow to wide or vice versa follow the procedure as given below.

Remove the connecting bolt of ski and ski leg.

Remove the ski.

Disconnect the steering arm from ski leg.

Rotate ski leg to 180° to change from narrow to wide or wide to narrow.

Connect steering arm to the ski leg. Refer to STEERING SYSTEM for proper tightening torque.

Install ski. Refer to exploded view for proper tightening torque.

Repeat the same procedure on the opposite ski.

#### **⚠ WARNING**

Both ski legs should always be adjusted to narrow or wide position together.

Check ski alignment. Refer to STEERING SYSTEM.