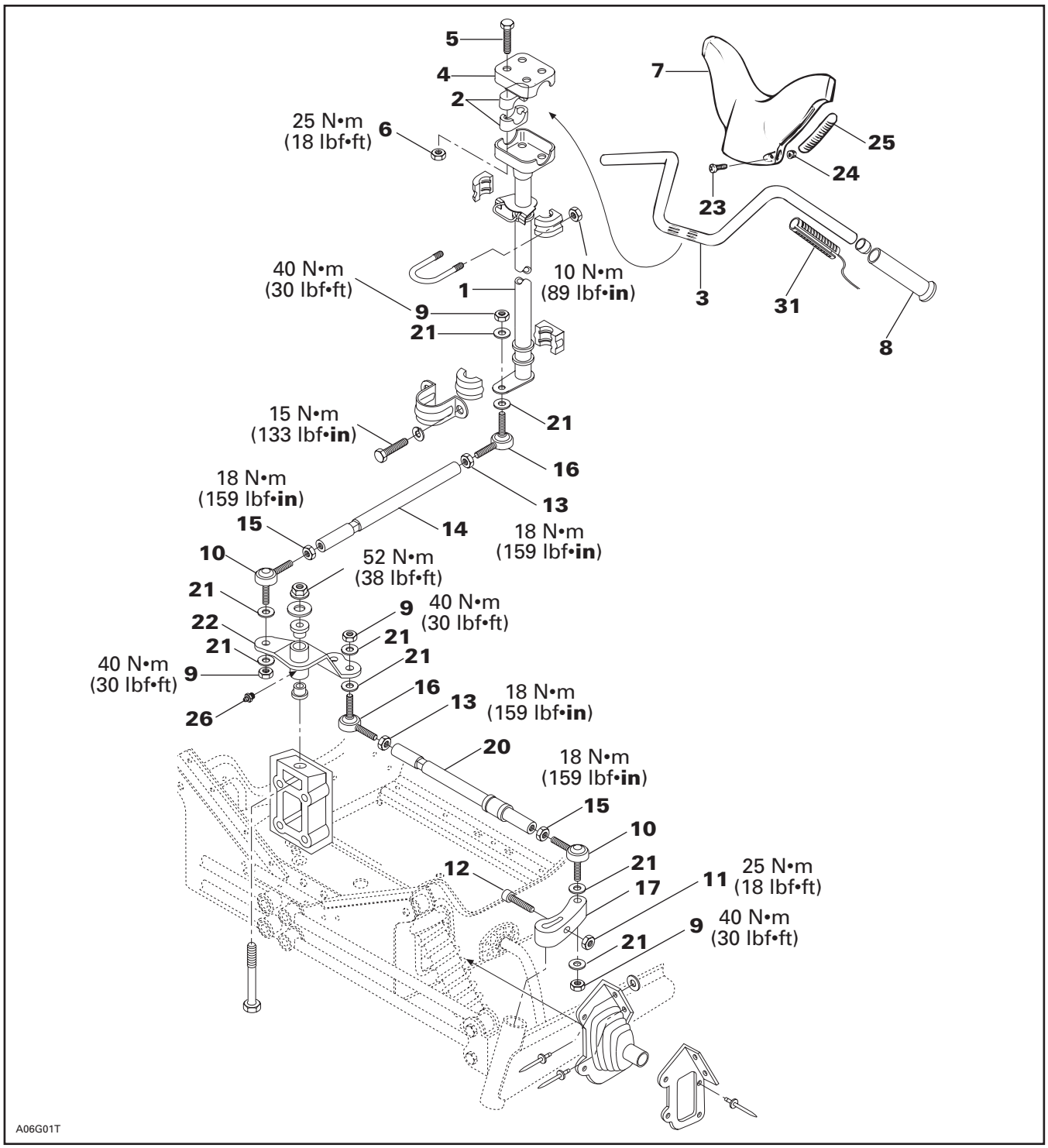
TABLE OF CONTENTS

STEERING SYSTEM 08-02-1
INSPECTION 08-02-4
DISASSEMBLY AND ASSEMBLY 08-02-4
INSPECTION 08-02-5
ADJUSTABLE HANDLEBAR 08-02-7
STEERING ADJUSTMENT (SKIS) 08-02-8
LUBRICATION 08-02-10

SUSPENSION AND SKI SYSTEM 08-03-1
DISASSEMBLY 08-03-2
INSPECTION 08-03-3
INSTALLATION 08-03-3
ON-VEHICLE COMPONENT VERIFICATION 08-03-5
DISASSEMBLY 08-03-6
INSPECTION 08-03-7
INSTALLATION 08-03-7

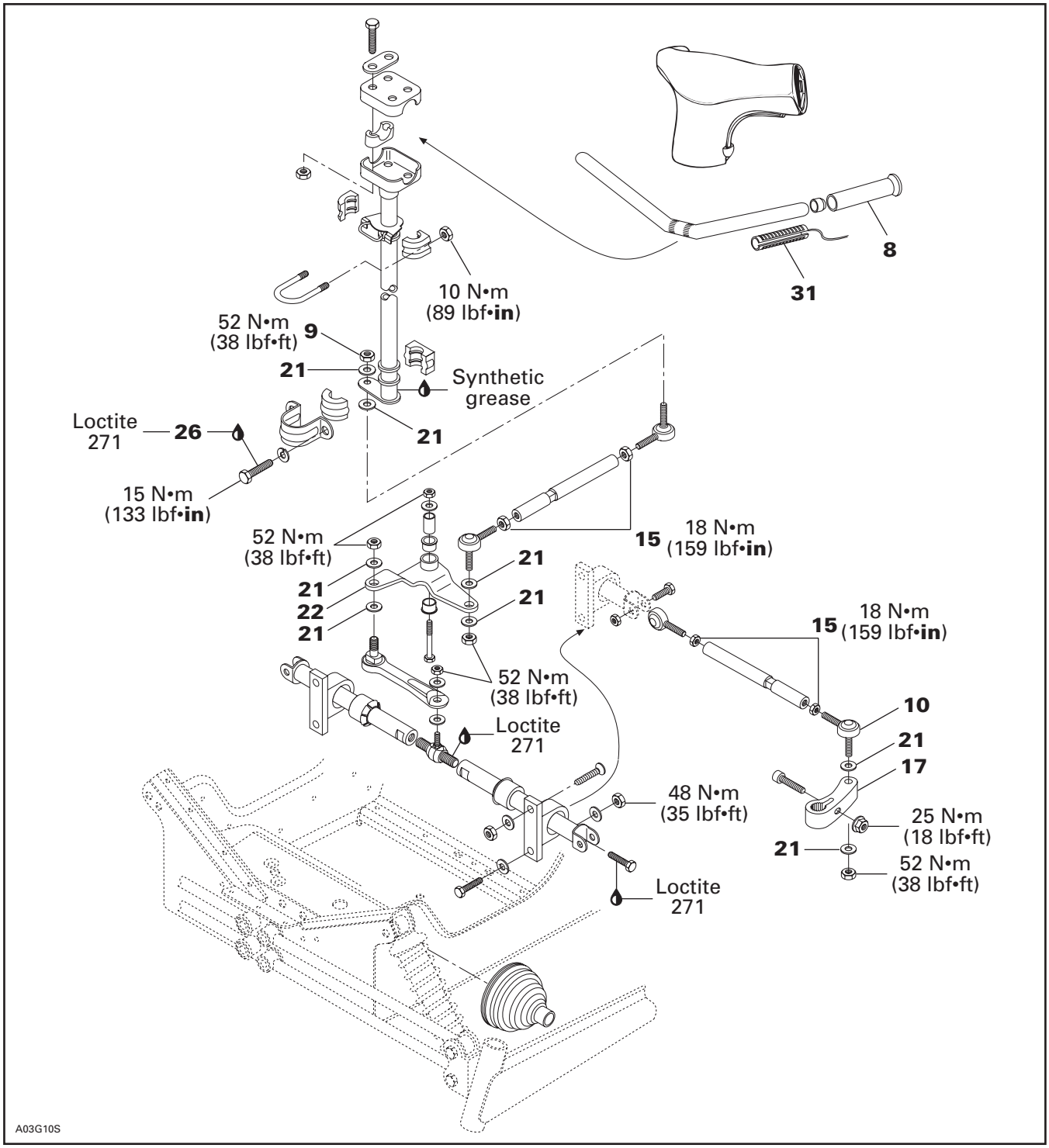
STEERING SYSTEM

Formula DLX 500/583/670, MX Z 440, Grand Touring 500/583 and Summit 500/X 670



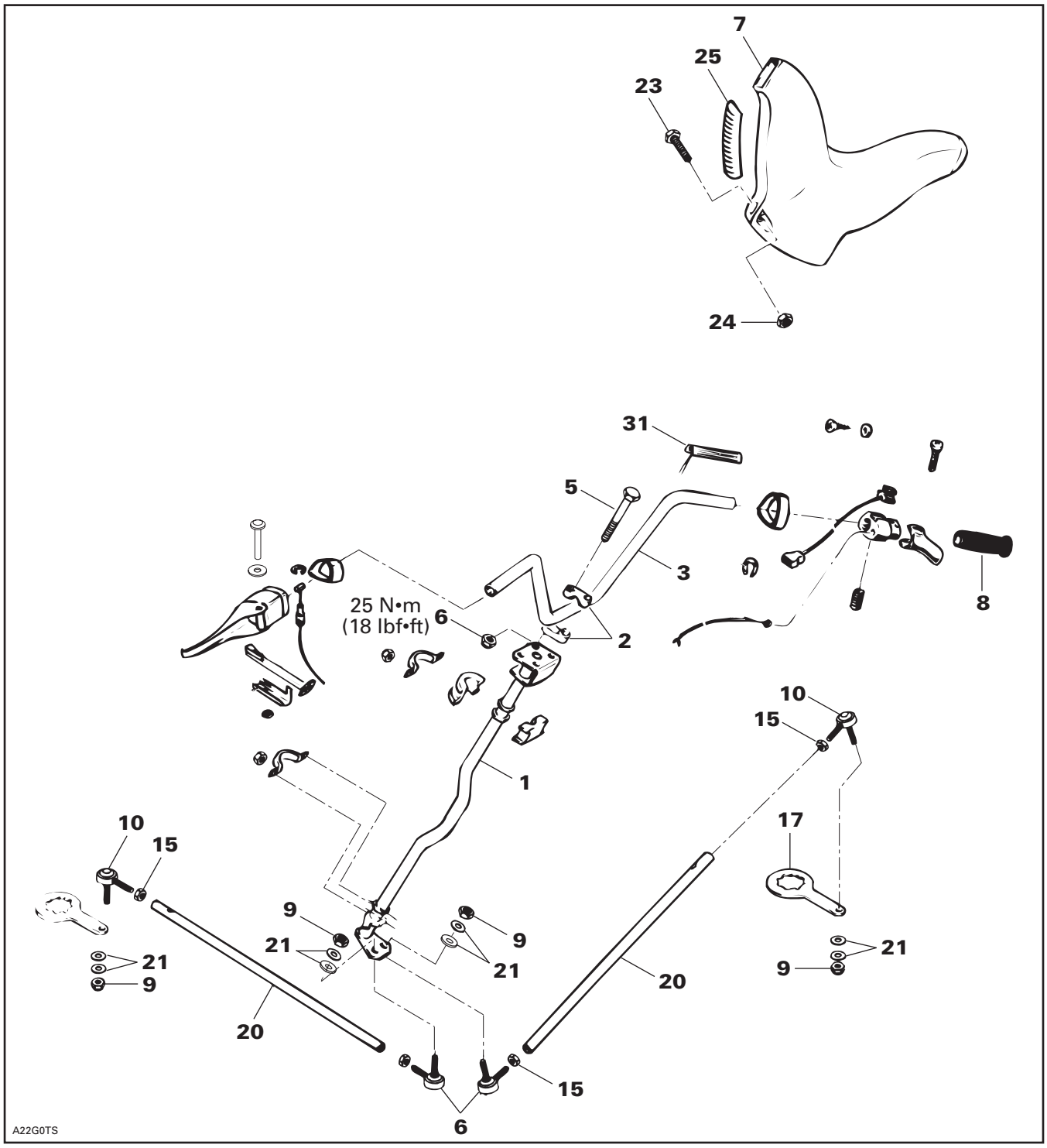
PARTS

MX Z 500/670 HO and Formula 500/583/670



PARTS

Skandic WT/SWT/WT LC



TYPICAL

INSPECTION

Check skis and runner shoes for wear, replace as necessary. (See section 08-03).

17, Steering Arm and Ski Leg

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.

DISASSEMBLY AND ASSEMBLY

8, Grip

Grips can be removed and installed without any damage by injecting compressed air into the handlebar or by heating them with a heat gun.

1, Steering Column

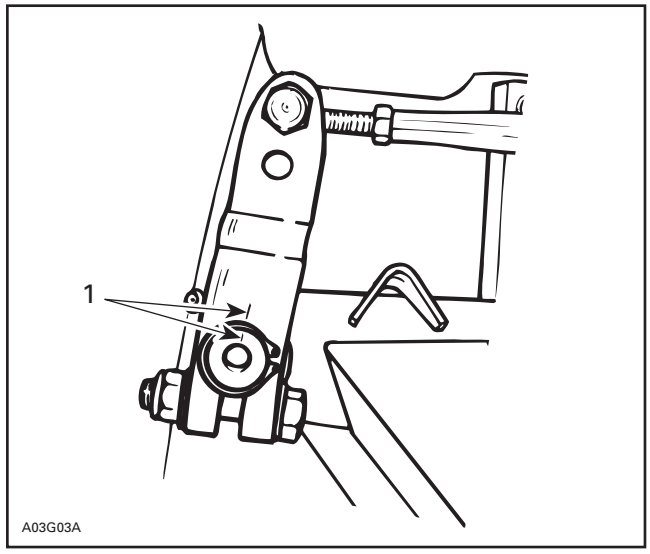
Remove steering pad then handlebar ass'y.

To gain access remove the air intake silencer and carburetor(s).

Detach the short tie rod (under the engine) from the steering column.

17, Steering Arm

To maintain correct steering geometry for reassembling, punch mark the steering arm and ski leg before disassembly.

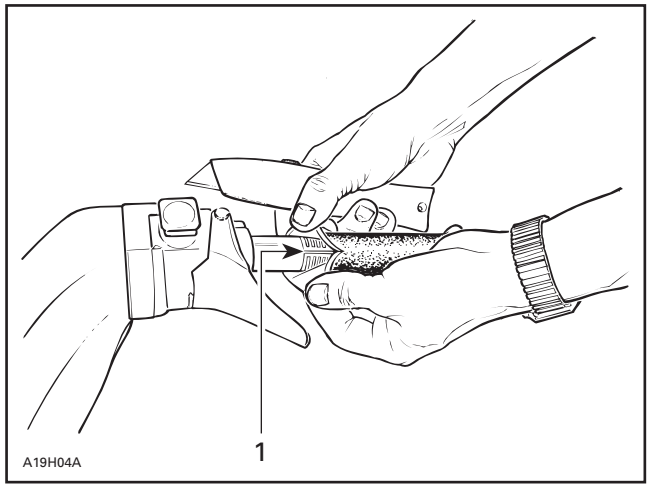


TYPICAL
1. Punch marks

31, Heating Grip Element

On vehicles equipped with heating, 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.



1. Gap in the heating element opposite the wires

Continue cutting along the gap and remove the grip. If required, slowly peel heating element 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.

◆ WARNING

Never use lubricants (e.g. soap, grease, etc.) to install the handlebar grip, use a mix of soap and water. Mix 40 parts of water with one part of dish washing soap (recommended: Ultra Joy, Sunlight or Palmolive).

Heat the grip with a heater gun or a spotlight to ease installation. Insert new grip with a rubber mallet.

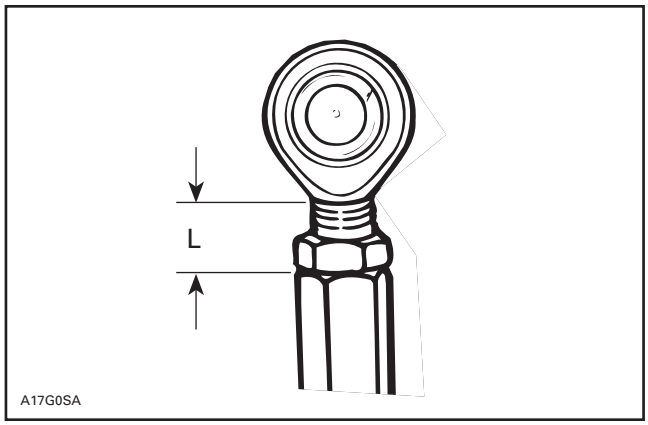
INSPECTION

Refer to TESTING PROCEDURE 06-06.

10,16, Ball Joint (left hand and right hand threads)

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

Screw threaded end of the ball joint into the tie rod. The maximum external threaded length not engaged in the tie rod must not exceed the value L in the following thread length chart:

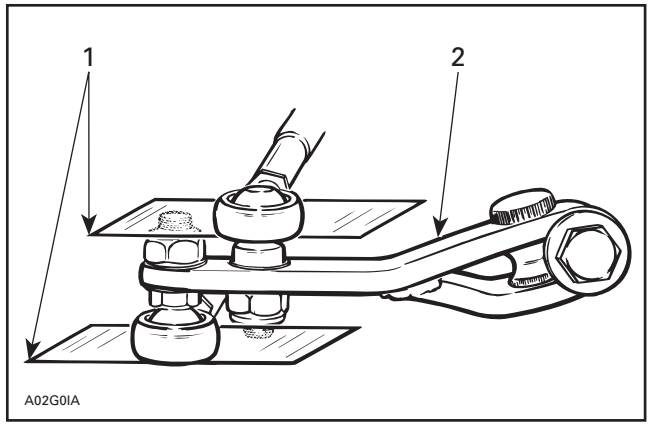


TYPICAL

MODEL	L	
	mm	(in)
All	20	(25/32)

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*

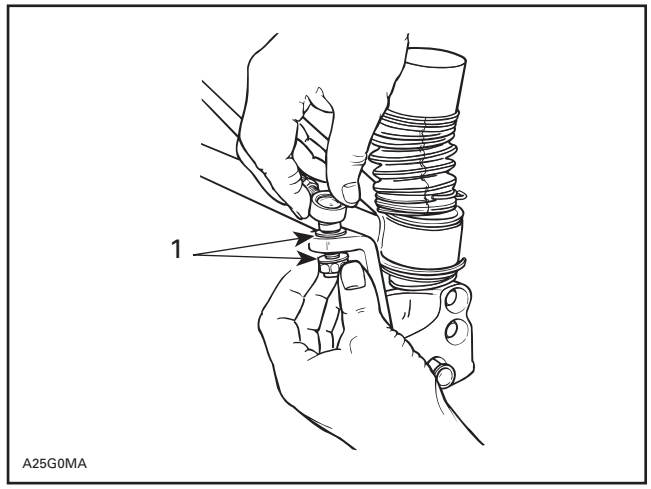
◆ WARNING

The cut off section of the ball joint must run parallel with the steering arm. When tightening lock nuts, restrain ball joint with appropriate size wrench. Ensure not too many threads are kept outside of the tie rod according to the thread length chart.

21, Hardened Washer

All Models Except Skandic WT/SWT/WT LC

Install a hardened washer on each side of the arm.

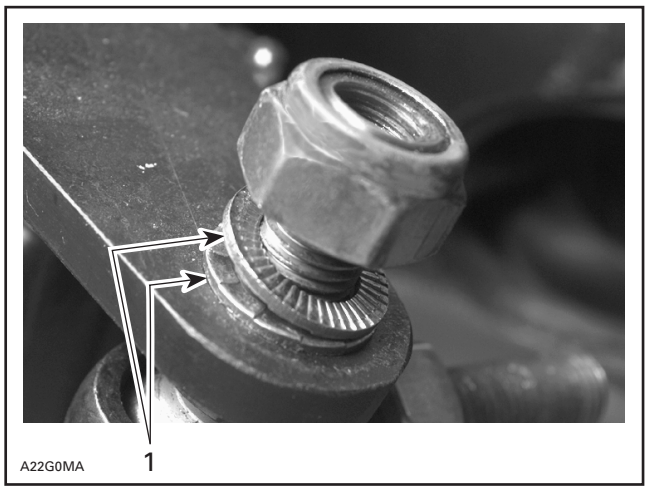


TYPICAL

1. *Hardened washers*

Skandic WT/SWT/WT LC Only

Install special washers (locking disks) with teeth facing each others.



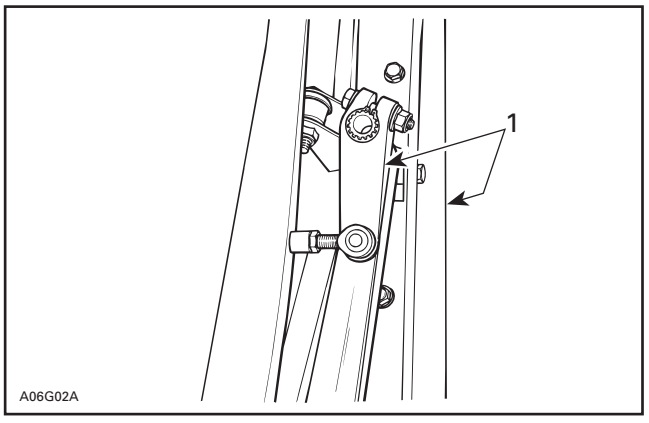
1. Large teeth

All Models Except Skandic WT/SWT/WT LC

17, Steering Arm

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

Steering arm must run parallel to ski.



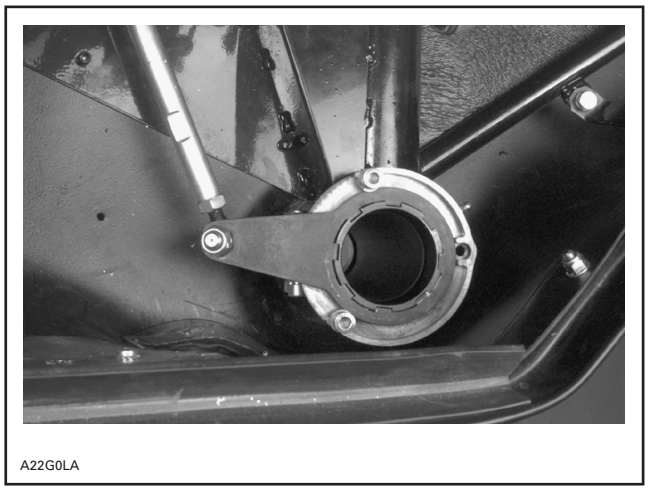
TYPICAL

1. Parallel

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

Skandic WT/SWT/WT LC Only

Install steering arm at mid-travel position when handlebar is facing straight ahead.



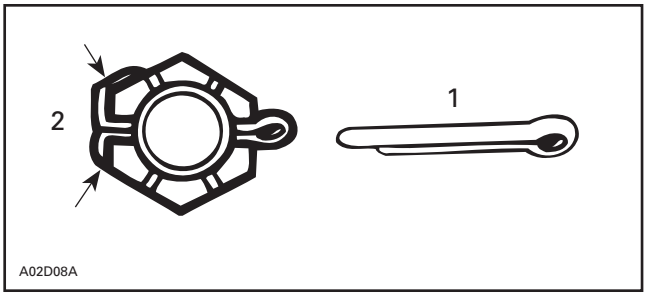
TYPICAL

9,13,15, Ball Joint Nut and Jam Nut

Tighten ball joint, nuts and jam nuts to specified torque (see exploded view).

9, Vehicles with a Castle Nut

After proper torque has been applied to the ball joint nut, insert a cotter pin through the hole in the tie rod end bending the ends around the nut as shown in the following illustration.



1. New
2. Fold cotter pin over castellated nut flats only

11,12, Steering Arm Nut and Bolt

Tighten steering arm nuts to specified torque (see exploded view).

ADJUSTABLE HANDLEBAR

1,3, Steering Column and Handlebar

If applicable, remove the steering clamp and nuts holding the handlebar to the steering column.

2,4,5,6, Handlebar Support, Steering Clamp, Bolt and Nut

Install the handlebar support, steering clamp, the 4 screws and nuts to the column, as illustrated.

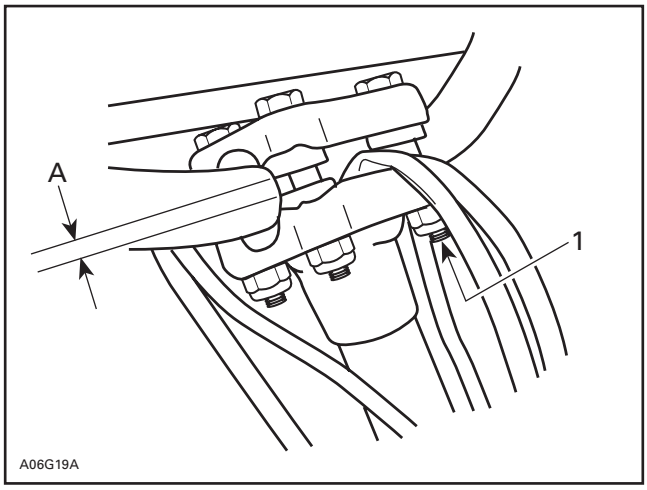
See applicable exploded view for each model.

Adjust the steering handlebar to the desired position.

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

▼ CAUTION

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



TYPICAL

1. Torque to 26 N•m (19 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.

7,23,24,25, Steering Pad, Bolt, Nut and Rubber Attachment

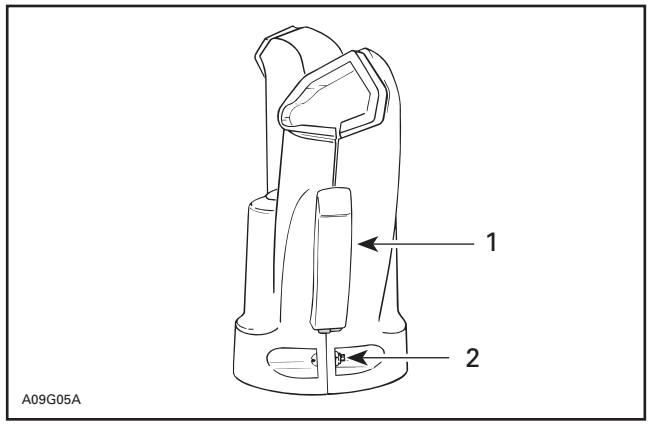
▼ CAUTION

Prior to installation, perform handlebar adjustment.

Properly fit the steering pad to the handlebar. Assemble using the 2 rubber attachments, nuts and bolts where applicable.

◆ WARNING

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



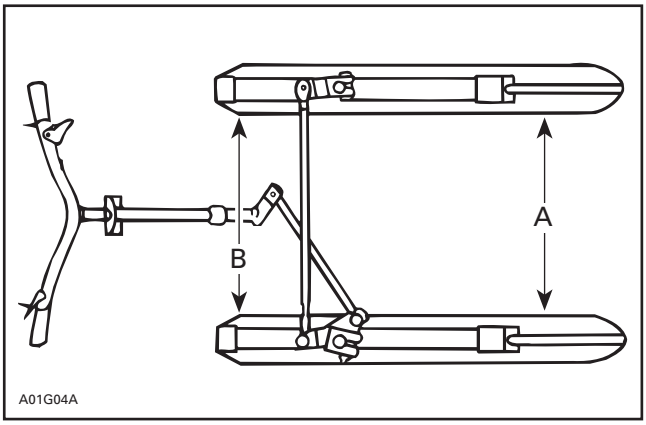
1. Rubber attachment
2. Nut and bolt (where applicable)

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.



CAMBER:

A specific inward or outward tilt angle of ski leg compared to a vertical line when viewing the vehicle from front. **This angle is adjustable on some models only.**

Adjustments

S-Series

Adjustments should be performed following this sequence:

– Pivot arm centering.
– Set camber angle (some models).
– Check for an horizontal handlebar.
– Set toe-out.

DSA System

PIVOT ARM CENTERING

◆ WARNING

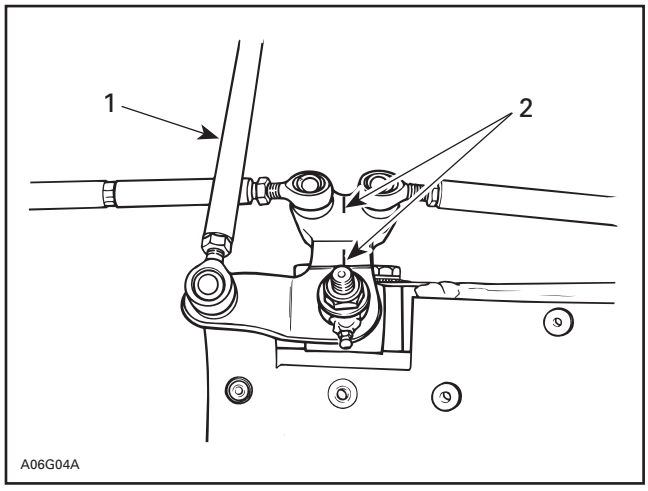
Do not attempt to adjust straight-ahead ski position by turning the ball joint on tie rod no. 14.

13,14,15,22, Jam Nut, Tie Rod and Pivot Arm

With handlebar in straight-ahead position, the center of the pivot arm must be in line with the end of the bolt. Loosen the jam nuts on tie rod no. 14 (LH threads on steering column end) and turn tie rod accordingly. Align and retighten the jam nuts to 18 N•m (159 lbf•**in**).

◆ WARNING

Never lengthen tie rod making threaded portion of ball joint exceed 20 mm (25/32 in).



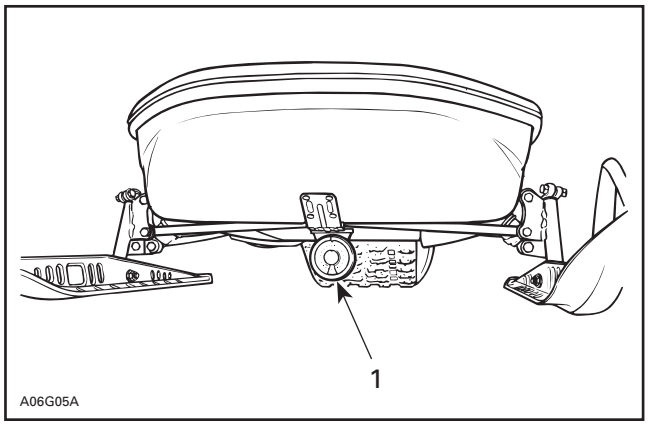
*1. Tie rod **no. 14***
2. Center of pivot arm in line with bolt end

CAMBER

NOTE: On vehicles without adjustable radius arms (no. 7) the camber is not adjustable.

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.



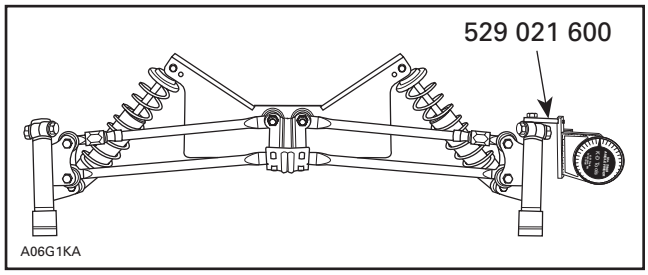
1. Angle finder

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 alternative location for the angle finder, if the special tool is not available, is the outside of the ski leg housing.

Adjust the camber to 0° ± 0.5°.

▼ CAUTION

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



TYPICAL — DSA CAMBER ADJUSTMENT SET-UP

Adjusting

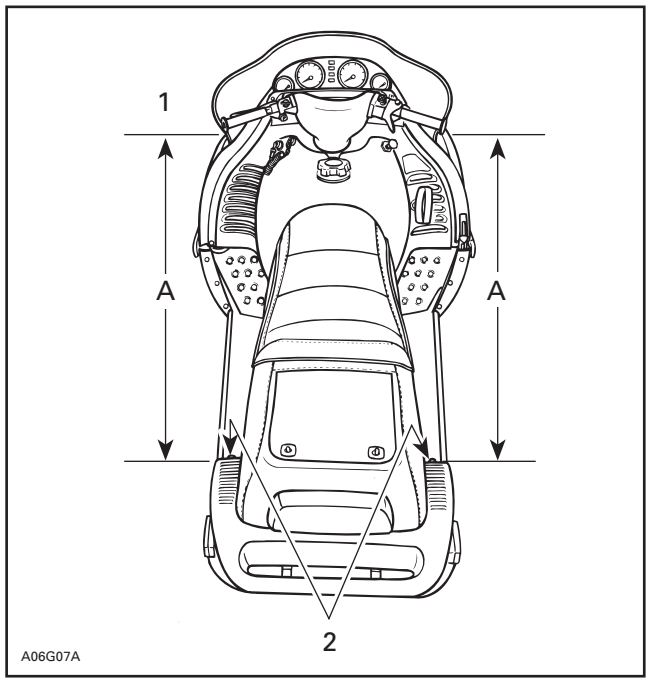
– Loosen lock nut on both lower control arms.

– Unbolt both upper control arms at ski leg housing. Turn tie rod half a turn at a time to obtain a vertical ski leg (0° ± 0.5°). Bolt upper control arms.

HANDLEBAR AND SKI TOE-OUT

Check that handlebar is horizontal when skis are in straight-ahead position 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 (rivet)

Adjustment is performed by adjusting length of left and right tie rods **no. 20**.

◆ WARNING

Do not attempt to adjust skis straight-ahead position by turning ball joint on tie rod no. 14.

Procedure:

– Loosen jam nuts **no. 13** and **no. 15** of both tie rods **no. 20**.

– Turn the tie rod on one side to shorten its length.

– Lengthen the other one by turning it exactly the same amount, so that toe-out is not changed.

◆ WARNING

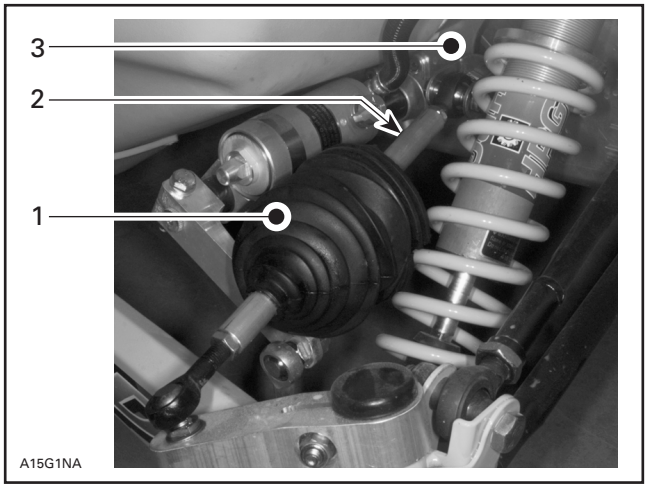
Never lengthen tie rod making threaded portion of ball joint exceed 20 mm (25/32 in).

– Close front of skis manually to take all slack from steering mechanism.

NOTE: A rubber cord must be hooked in front of skis to keep them closed.

Some Models Only

In order to ease steering tie rod loosening, detach rubber boot from snowmobile frame. Refer to the following photo.



TYPICAL

1. *Rubber boot*
2. *Steering tie rod*
3. *Snowmobile frame*

Skandic WT/SWT/WT LC Only

– Skis should have a toe-out of 10 mm (3/8 in) when they are in a straight-ahead position and the vehicle is resting on the ground.

NOTE: To make sure skis are in a straight-ahead position, place a straight edge against pre-adjusted track and measure the distance between front and rear of skis and straight edge. Distances should be equal. After the ski toe-out adjustment, distance at front of ski must be 5 mm (3/16 in) more than at rear on both sides for a total toe-out of 10 mm (3/8 in).

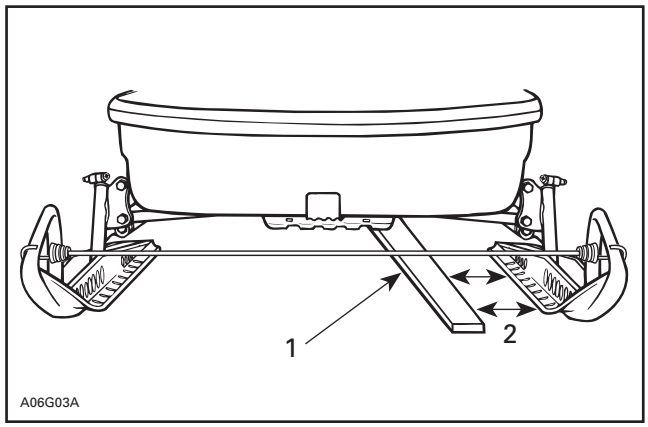
S-Series

Toe-out is 0 mm (0 in) when skis are in a straight-ahead position and the front of vehicle is lifted off the ground.

NOTE: To make sure skis are in a straight-ahead position, place a straight edge against pre-adjusted track and measure the distance between front and rear of skis and straight edge. Distances should be equal. After the ski toe-out adjustment, distance must be equal.

All Models

To reduce tolerance when measuring, set one ski to proper toe-out then measure from that ski to the opposite ski.



TYPICAL

1. *Straight edge*
2. *Measure here*

LUBRICATION

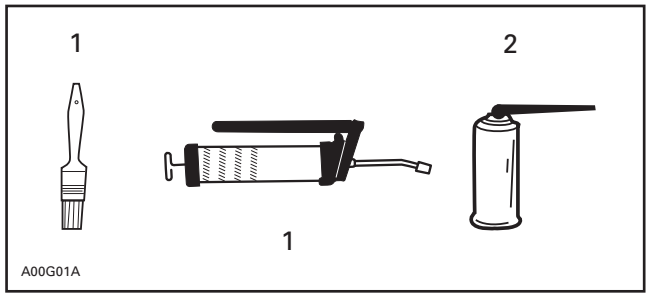
◆ WARNING

Do not lubricate throttle and/or brake cable nor their housing.

26, Grease Fittings

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

The following symbols will be used to show what type of lubricant should be used at the suitable locations.



1. *Synthetic grease*
2. *Penetrating lubricant (P/N 293 600 016)*

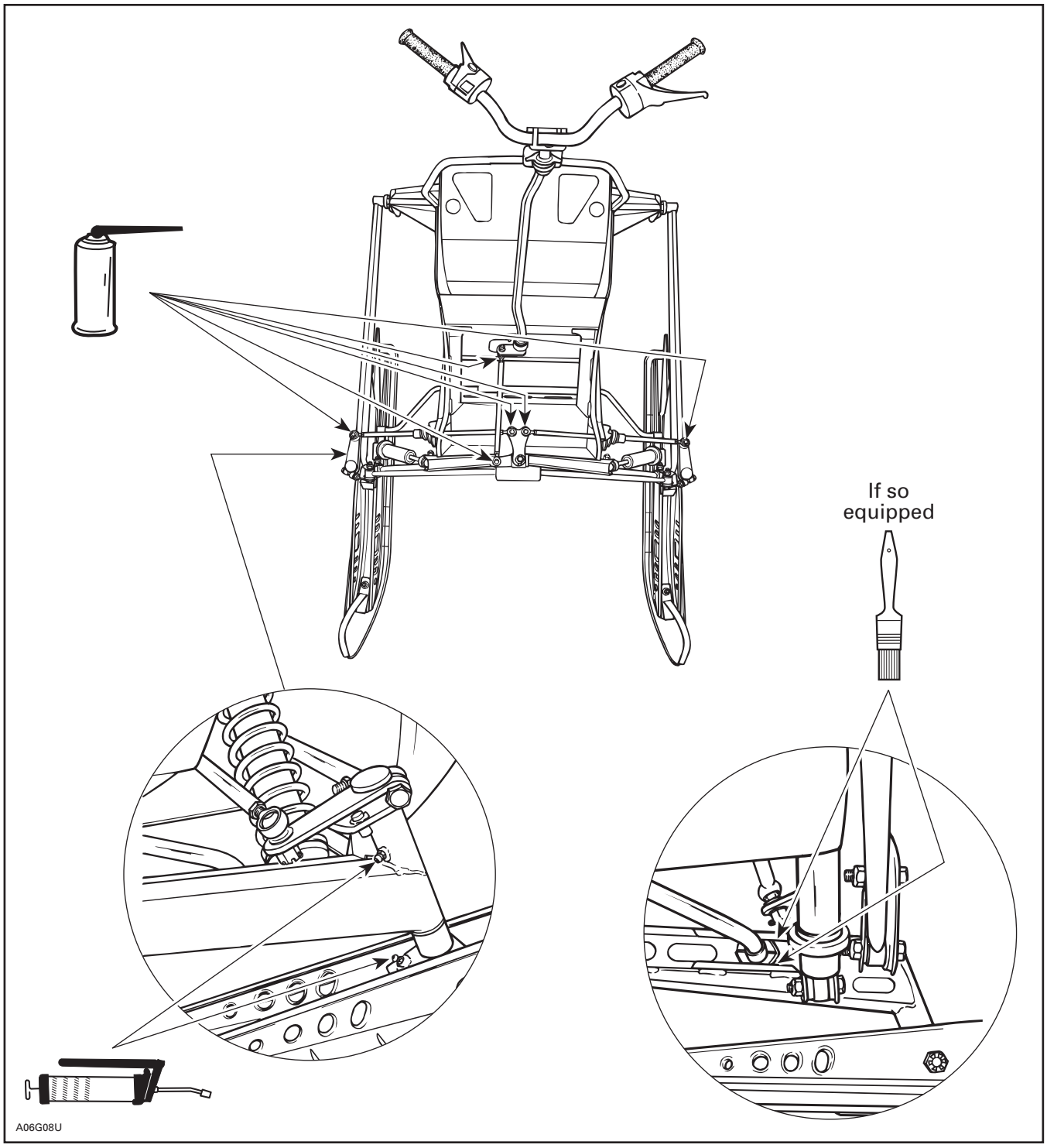
Lubricate:

– Steering column.

– Grease ski legs, ski pivots and idler arm.

– Coat stabilizer sliders with grease, and oil their ball joints if so equipped.

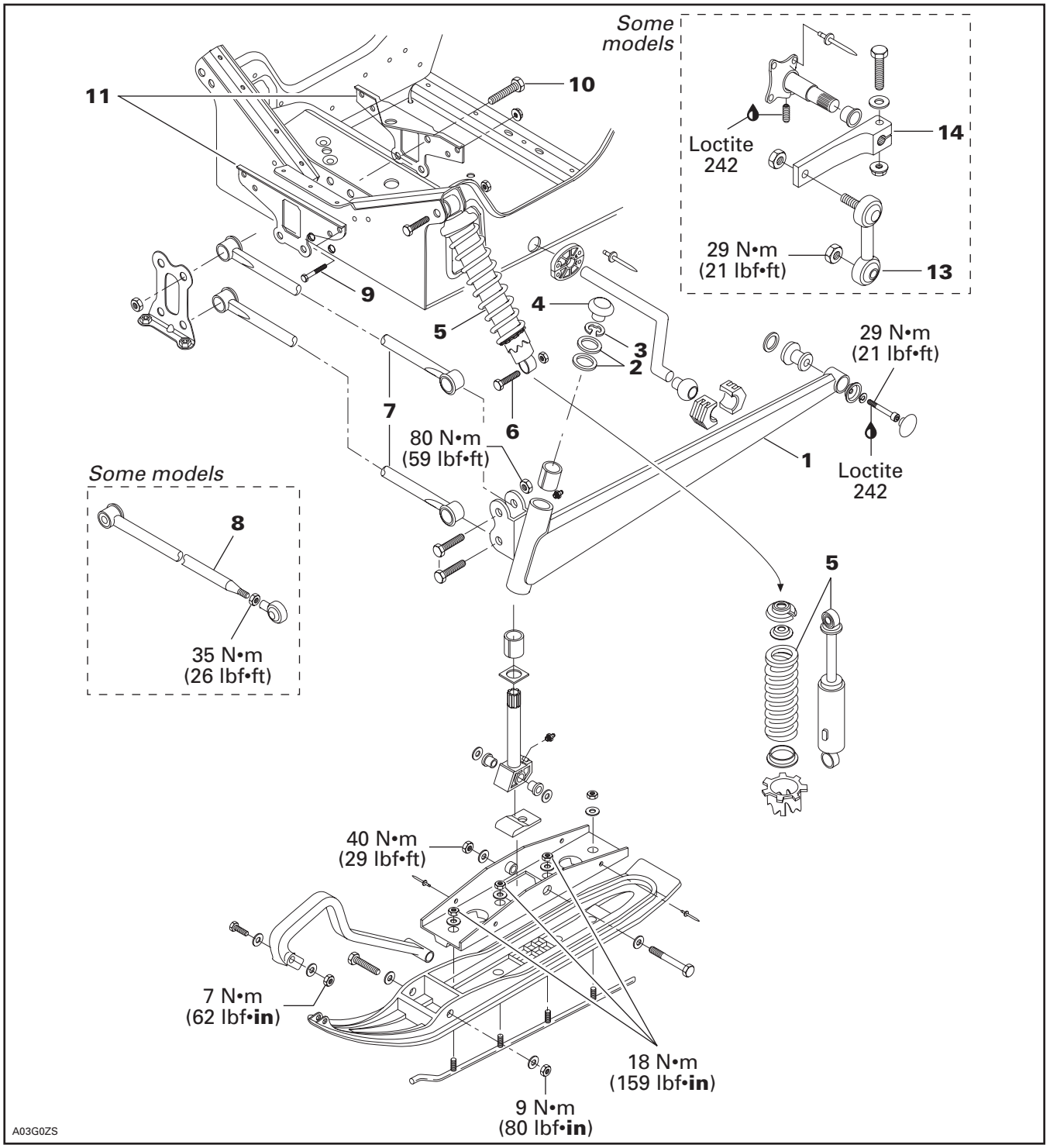
S-Series



TYPICAL

SUSPENSION AND SKI SYSTEM

S-Series

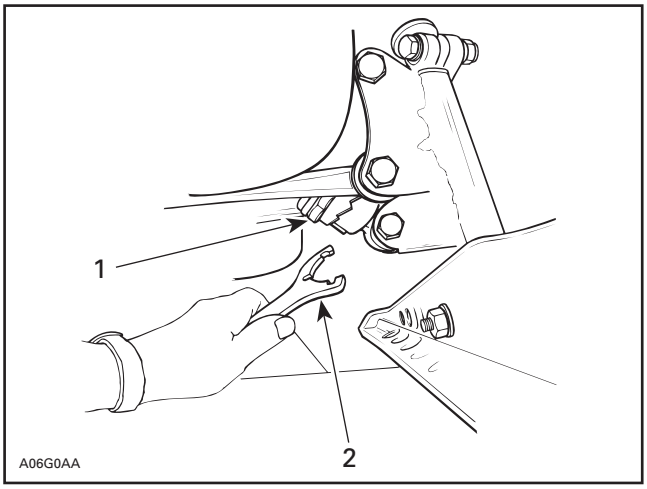


DISASSEMBLY

5, Shock

Lift front of vehicle and support it off the ground.

Reduce spring preload by turning adjusting ring accordingly with the adjustment wrench in vehicle tool box.



1. Shock cam
2. Adjustment wrench

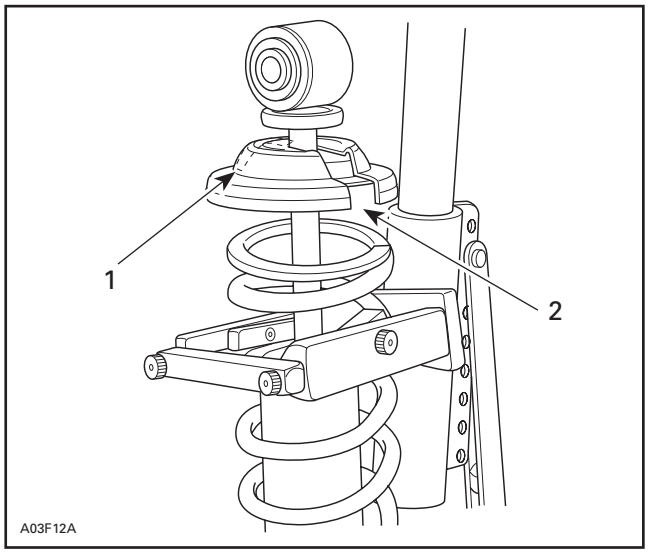
Remove lower bolt then upper bolt of shock.

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 horizontal position by changing the position of the clevis pin.

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

When installing the cap opening must be 180° from the spring stopper opening.



1. Cap opening
2. Spring stopper opening

MX Z 500/670 HO

On these models, install shocks on vehicle with their adjusting ring at top.

1, Swing Arm

All Models

Lift front of vehicle and support it off the ground.

Remove cap, circlip then loosen steering arm bolt and pull up steering arm. Note shim positions. Ski leg may fall off from swing arm.

Unbolt lower end of shock from swing arm.

Unbolt radius rod.

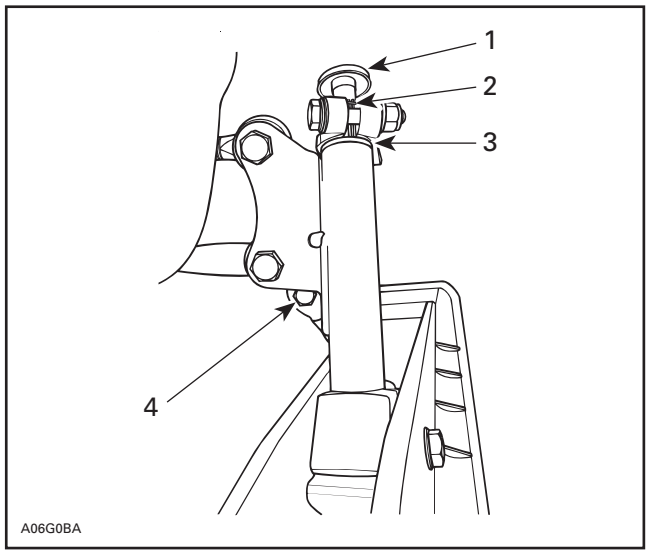
14, Lever

Models with Adjustable Stabilizer Bar

Unbolt tie rod no. 13 ball joint from swing arm, do not change stabilizer adjustments at this time.

Unbolt rear of swing arm from frame.

Pull swing arm off the vehicle. Stabilizer bar will disengage ball joint at swing arm inside rails.



1. *Cap* ***no. 4***
2. *Circlip* ***no. 3***
3. *Shims* ***no. 2***
4. *Bolt retaining lower end of shock* ***no. 6***

INSPECTION

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

Check straightness of splines and proper 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 for proper action of sliding blocks in swing arm.

Check skis and runners for wear, replace as necessary.

Check condition of ski stopper. Replace it when deteriorated.

To check condition of shock, refer to SC-10 SUSPENSION 07-02 then look for **Shock Absorber Inspection**.

INSTALLATION

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

Apply synthetic grease (P/N 413 711 500) to ski leg components.

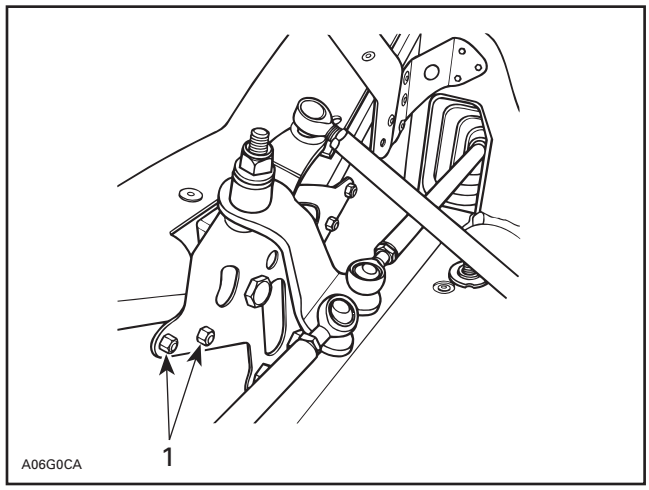
Tighten nuts and screws to proper torque as mentioned in exploded view.

7,8, Upper and Lower Half Arms

Position half arms and tie rods horizontally before tightening nuts.

9,10,11, Bolt, Nut and Link Plate

Attach link plate to frame with additional nuts and bolts, if applicable.

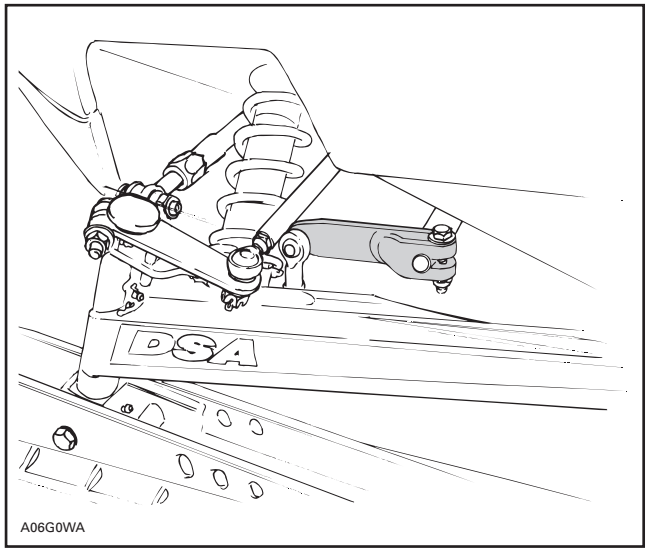


SOME MODELS

1. *Nuts and bolts*

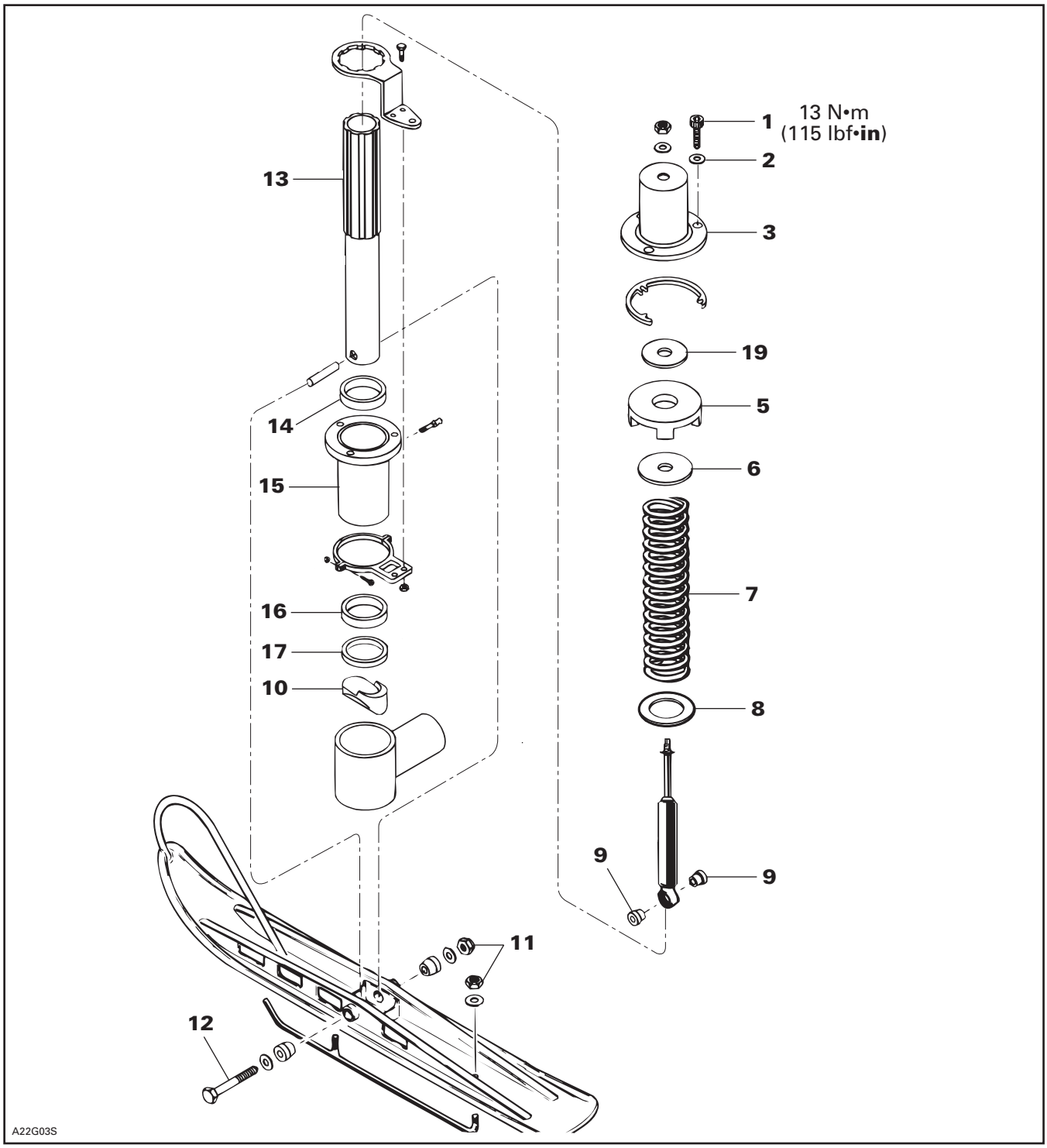
13,14, Tie Rod and Lever

Install levers on both sides at same angle (about horizontal).



TYPICAL

Skandic WT/SWT/WT LC



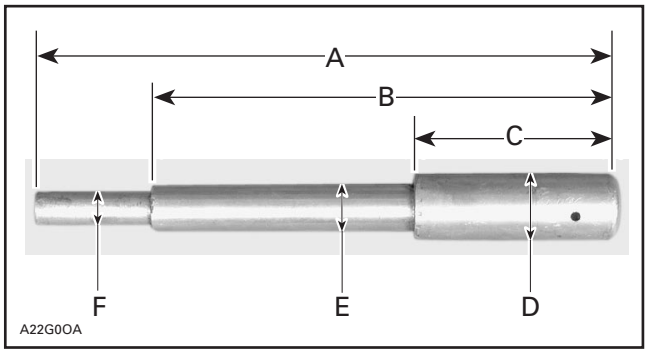
ON-VEHICLE COMPONENT VERIFICATION

8, Shock

Lift front of vehicle and support off the ground.

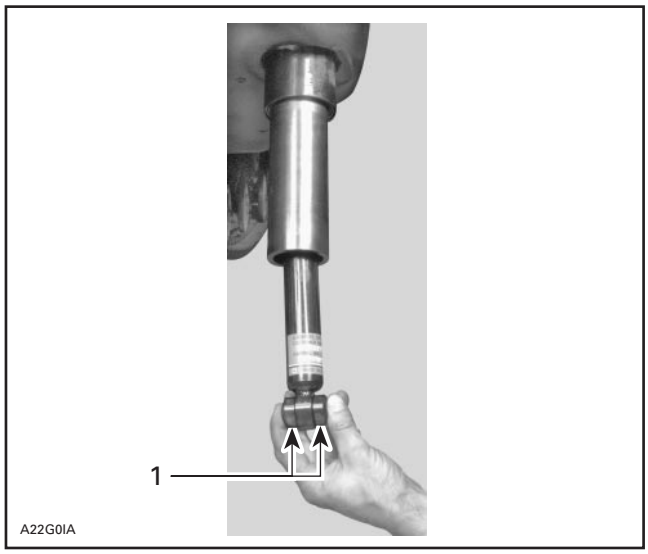
Remove ski bolt and nut.

Remove steel bushing from ski using a pusher. See pusher dimensions below.



A. 220 mm (8.66 in)
B. 180 mm (7.09 in)
C. 70 mm (2.75 in)
D. 25 mm (1.0 in)
E. 15 mm (.59 in)
F. 9 mm (.35 in)

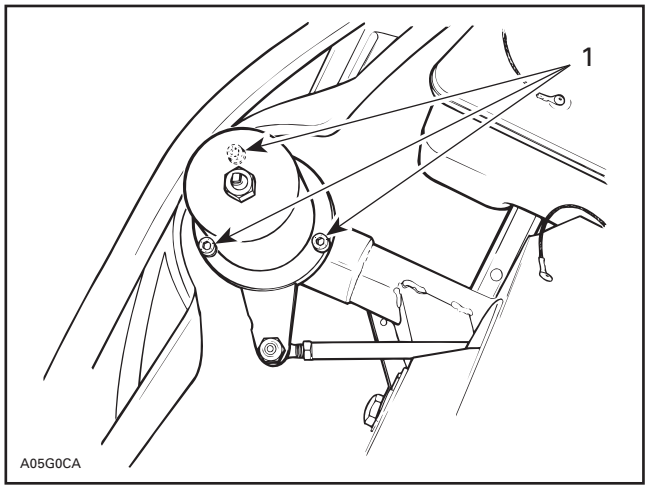
Unfasten rod nut then pull out shock from bottom. Check shock as described below in INSPECTION. At installation, make sure bushings are in place.



1. Bushings

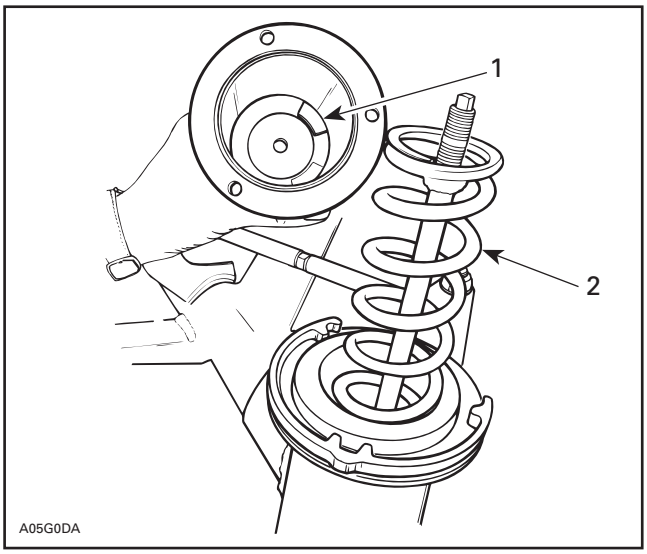
7, Spring

Unscrew shock piston pin nut then remove washer. Unscrew 3 Allen screws retaining cover **no. 3**, then remove stopper **no. 5**, washers **no. 6**, washer **no. 19**.



1. Allen screws

NOTE: These washers and stopper can be wedged in cover.



1. Washers and stopper wedged in cover
2. Spring

Pull out spring.

Suspension Free Operation

Remove cover and check for free movement of ski leg by lifting end of ski.

DISASSEMBLY

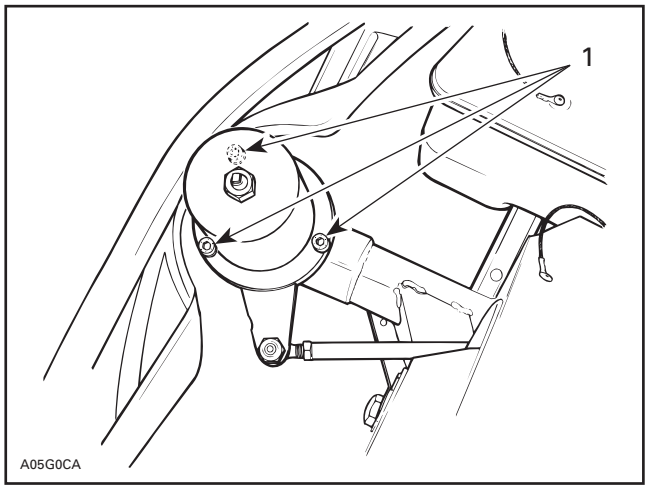
Lift front of vehicle and support off the ground.

1,2,3,5,6,9,11,12, Bolt, Lock Washer, Cover, Stopper, Bushing and Nut

Remove ski bolt, nut, bushings and ski.

Unscrew shock piston pin nut then remove washer. Shock will fall off the ski leg.

Unscrew 3 Allen screws retaining cover, then remove stopper and washers.

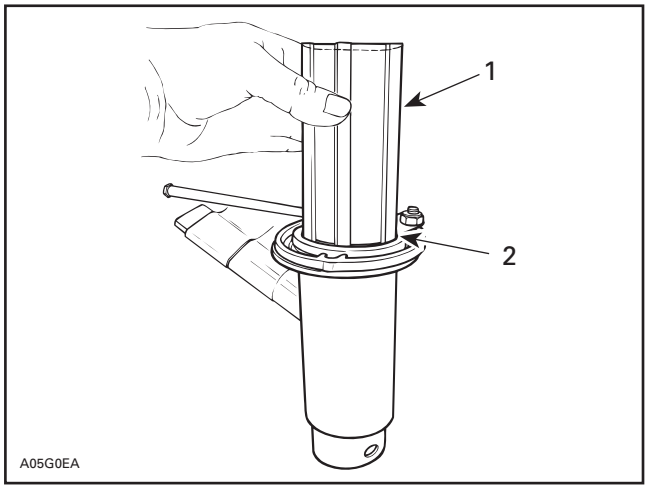


1. Allen screws

NOTE: These washers and stopper can be wedged in cap.

13,14,16,17, Ski Leg, Bushing and Seal

Pull up ski leg. Steering arm will not interfere.



1. Pull up ski leg
2. Steering arm in place

Remove seal. Drive out bushing if worn out.

INSPECTION

All Models

13, Ski Leg

Check straightness of ski leg. Check for scored or scratched surface. Replace as required.

Check that splines on ski leg and steering arm interlock properly with no excessive free play. Renew as necessary.

5, Stopper

Check condition of stopper. Replace it when deteriorated.

Grease Fitting

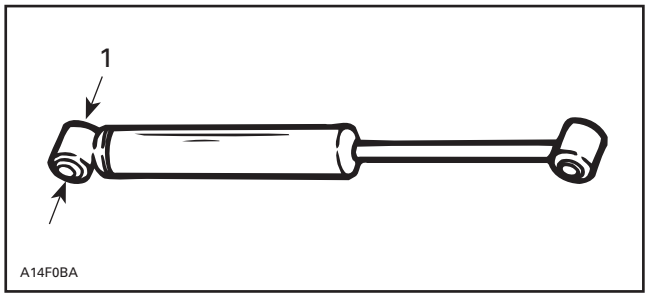
Ensure that grease fittings are not clogged.

10, Stopper

Check stopper for crack or deterioration. Replace as required.

8, Shock Absorber

Secure the shock body end in a vise with its rod upward.



1. Clamp

▼ CAUTION

Do not clamp directly on shock body.

Examine each shock for leaks. Extend and compress the piston several times over its entire stroke with its rod upward. Check that it moves smoothly and with uniform resistance.

Pay attention to the following conditions that will denote a defective shock:

– A skip or a hang back when reversing stroke at mid travel.
– Seizing or binding condition except at extreme end of either stroke.
– Oil leakage.
– A gurgling noise, after completing one full compression and extension stroke.

Renew if any faults are present.

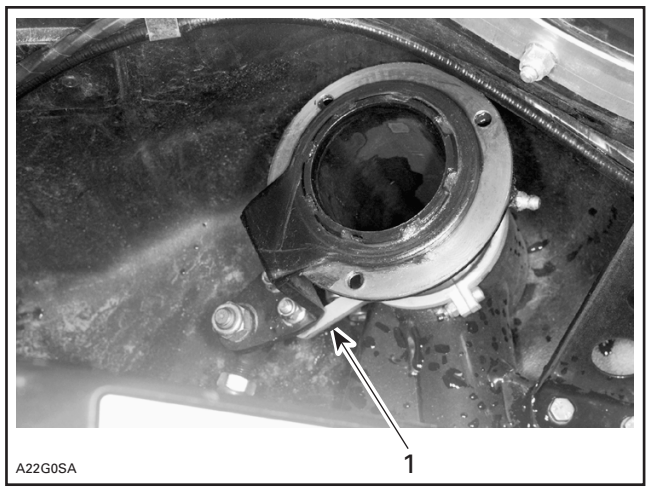
INSTALLATION

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

Apply synthetic grease (P/N 413 711 500) as illustrated in exploded view above.

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

Reinstall steering arm reinforcement.



1. Reinforcement

16,17, Seal

Install seal before reinstalling ski leg.