CHAPTER EIGHT

FRONT SUSPENSION AND STEERING

The front suspension and steering consist of spring mounted skis on spindles connected to the steering column by tie rods.

All machines except T'NT R/V models are equipped with multi-leaf springs. T'NT R/V models use a mono-leaf spring.

Ski legs (spindles) are mounted in replaceable bushings. Ski runner shoes are also replaceable.

This chapter includes removal and installation procedures for typical steering and ski components.

SKIS

The following procedures are typical for most models. Special model details, where applicable, are noted. During removal and disassembly always note and record location of bolts of different sizes and lengths as well as shims, spacers, and lockwashers (if any) to aid assembly and installation.

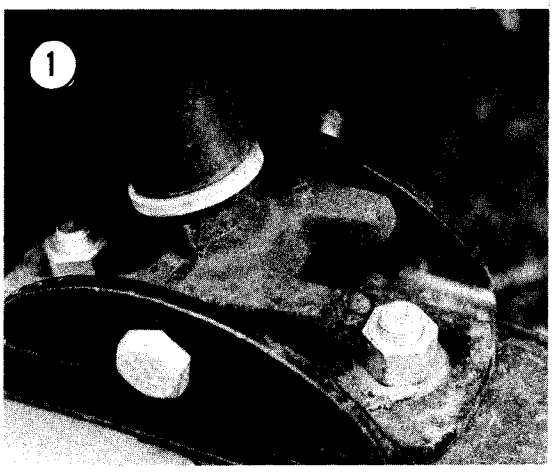
Removal/Installation

1. Raise front of machine off the ground and block up securely.
2. Remove nut from ski spring coupler and unscrew bolt from coupler **(Figure 1)**.

CAUTION

After removing nut do not *attempt to drive bolt from coupler. Bolt must be unscrewed or damage to bolt and/or coupler will occur.*

NOTE: *On models where spring coupler pivots directly on ski leg (spindle), clamp spring leaves together with Vise Grip pliers and remove bolts and nuts securing spring coupler to springs.*



3. Remove ski assembly from machine.
4. Inspect ski runner shoes. Replace runner shoes if worn more than ½ of their thickness.

WARNING

Ski runner shoes are under tension. Remove runner shoes carefully or injury may result.

5. Installation is the reverse of these steps. Keep the following points in mind:

a. When installing spring couplers with threaded holes for coupler bolts, ensure that threaded holes are on the inside of the machine.

b. Torque coupler bolts to 46-50 ft.-lb. (6.4-6.8 mkg), then torque locknut to 44-55 ft.-lb. (6.1-7.6 mkg). See **Table 1.**

Table 1 SKI TORQUE SPECIFICATIONS

Components	Torque Ft.-lb.	Torque Mkg
Spring coupler to leaf spring*	35-40	4.8-5.5
Runner shoe		
Elan 294SS and 300SS	4-5	0.6-0.7
All other models	9-12	1.2-1.7
Ski coupler		
Bolt (all models except T'NT R/V)	46-50	6.4-6.9
Bolt (T'NT R/V)	25	3.5
Nut	44-55	6.1-7.6
Shock absorber	33-35	4.6-4.8

* Tighten to specified torque then loosen and retorque to specified value.

c. Torque bolts securing ski coupler to spring to 35-40 ft.-lb. (4.8-5.5 mkg).

d. Ensure that ski pivots freely on ski leg. Lightly lubricate ski coupler bolt with oil.

e. Perform *Ski Alignment.*

Disassembly/Assembly

1. Release Vise Grip pliers if used during ski removal.

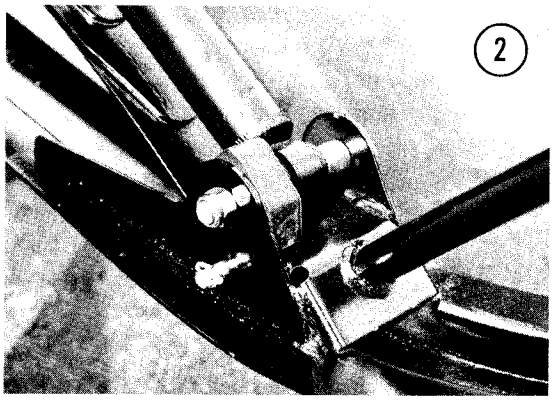
2. On models so equipped, remove bolts securing shock absorber, and remove shock absorber **(Figure 2).**

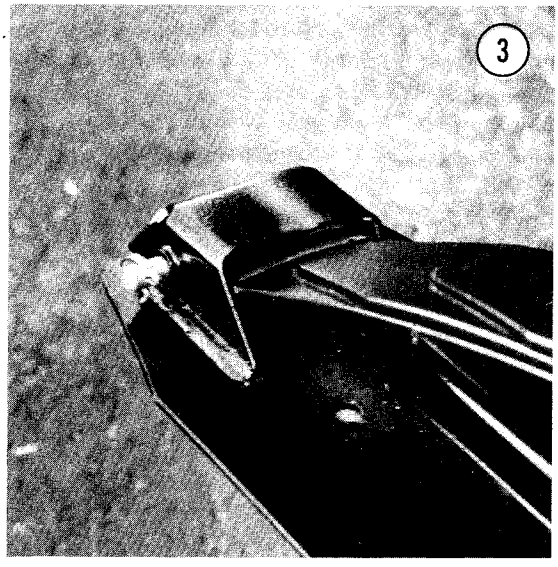
3. Remove cotter pins securing retaining pins on front and rear of main leaf **(Figure 3).**

4. Using a hammer and punch, gently tap spring retaining pins from ski, and remove springs.

5. Remove spring slide cushion from front ski bracket.

6. If further spring disassembly is desired, remove bolts and nuts securing spring coupler to spring and remove coupler.





7. If ski runner shoe is worn to less than ½ its original thickness, remove nuts securing shoe to ski and remove shoe.

WARNING

Ski runner shoes are under tension. Remove runner shoes carefully or injury may result.

8. Assembly is the reverse of these steps. Keep the following points in mind:

a. To aid leaf spring assembly cross leaf springs and temporarily install one bolt and nut to hold leaves together. Align springs parallel to each other and install other bolt and nut. Use *new* elastic locknuts or *new* tab locks on coupler bolts. Torque

bolts securing coupler to spring to 35-40 ft.-lb. (4.8-5.5 mkg).

b. Torque nuts securing runner shoes and shock absorbers as specified in **Table 1**.

c. Insert front and rear spring retaining pins from opposite sides. On left ski insert front pin from left and rear pin from right. On right ski insert front pin from right and rear pin from left. Use *new* cotter pins to secure retaining pins.

STEERING

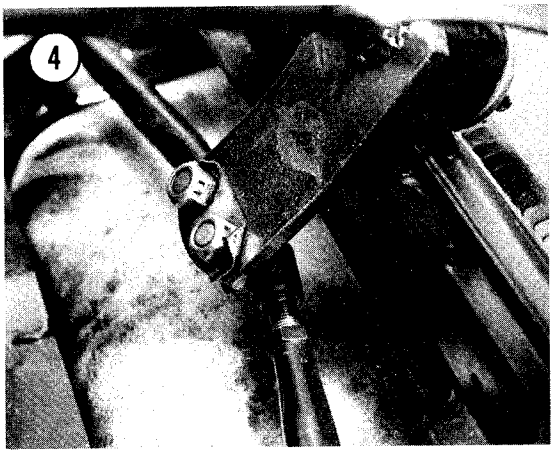
The following procedures are typical for most models. Special model details, where applicable, are noted. During removal always note and record location of bolts of different sizes and lengths as well as shims, spacers, and lockwashers (if any) to aid installation.

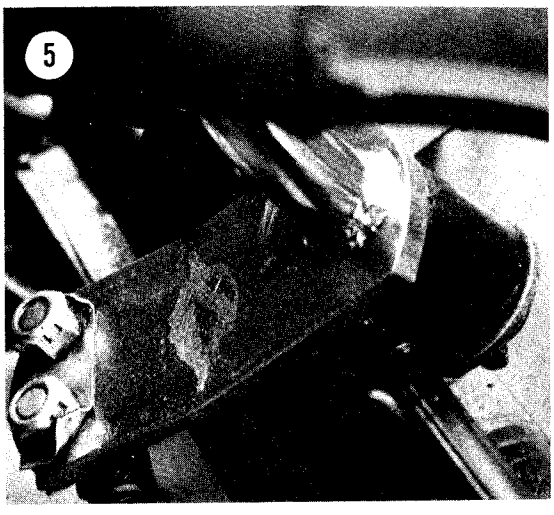
Mid-Engine Model Steering Column Removal/Installation

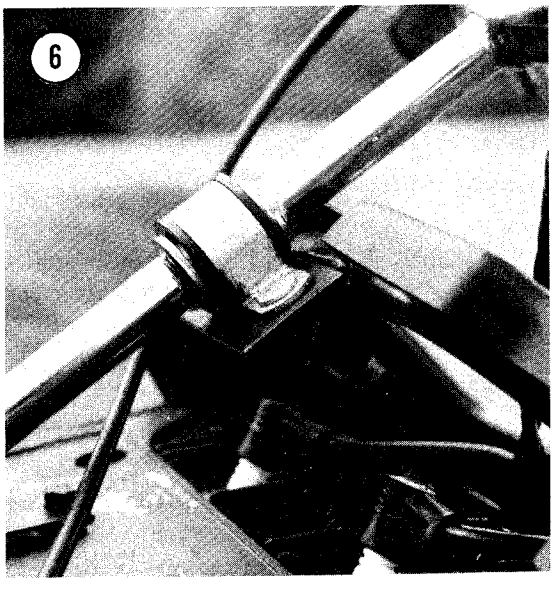
1. Remove console.
2. On Elan models, disconnect throttle and brake cables and remove cable housings from handlebar. On Olympique models, disconnect brake cable and housing at brake assembly brake lever.
3. On models so equipped remove dimmer and cut-out buttons from handlebar.
4. On Elan models remove cotter pin, with washer and spring, securing upper tie rod end to steering column. Disengage tie rod end from steering column.
5. On other models remove nuts securing tie rod ends to steering column and disconnect tie rod ends (**Figure 4**).
6. Using a small punch and hammer, drive out pin securing steering column (**Figure 5**). Remove shims (if any) and washer.
7. Remove U-clamp (**Figure 6**) securing steering column to upper column and remove steering column.

NOTE: *Do not remove steering column bushing unless bushing is to be replaced.*

8. Inspect tie rod ends for excessive wear and replace if necessary. Tie rod ends attached to steering column have left-hand threads.







9. Installation is the reverse of these steps. Keep the following points in mind:
   a. Adjust steering column free play by adding or removing 0.025 in. (0.64mm) shims between steering column bushing and washer before installing pin.
   b. Tighten components to torque values specified in **Table 2**.
   c. Perform *Ski Alignment*.

Table 2 STEERING TORQUE SPECIFICATIONS

Components	Torque Ft.-lb.	Mkg
Steering arm		
1970-1973 models		
Bolt	45-50	6.2-6.9
Nut	55-60	7.6-8.3
1974 and later models	18-23	2.5-3.2
Tie rod end	18-23	2.5-3.2
Handlebar	28-35	3.8-4.8

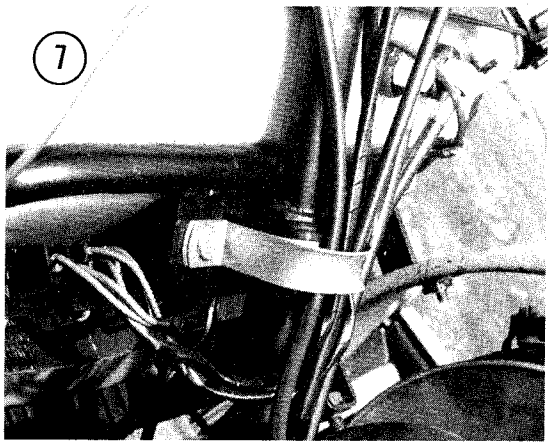
Front-Engine Model Steering Column Removal/Installation

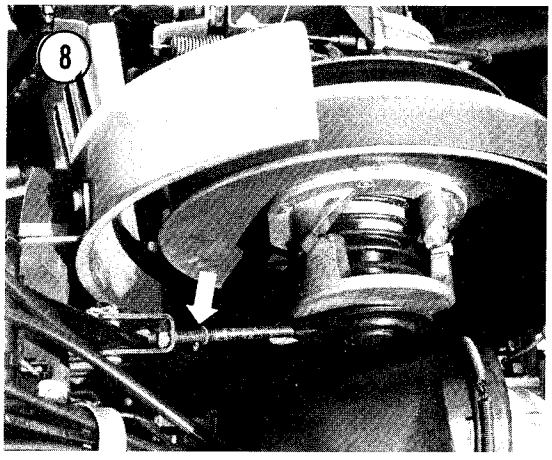
1. Remove console if so equipped.
2. Disconnect throttle cable from lever and remove circlip and throttle lever housing.
3. Remove dimmer and kill button from handlebar.
4. On all but T'NT R/V models remove bolt securing handlebar to steering column and remove handlebar.
5. Remove nuts securing tie rod ends to steering column and disconnect tie rod ends (**Figure 4**).
6. Remove nuts securing steering column to upper column (**Figure 7**).

NOTE: *On some models it may be necessary to remove locking pin and clevis pin and raise driven pulley support (**Figure 8**) to gain access to tie rod ends.*

7. Using a small punch and hammer, drive out pin securing steering column (**Figure 5**). Remove shims (if any) and washer. Remove steering column.

NOTE: *Do not remove steering column bushing unless bushing is to be replaced.*

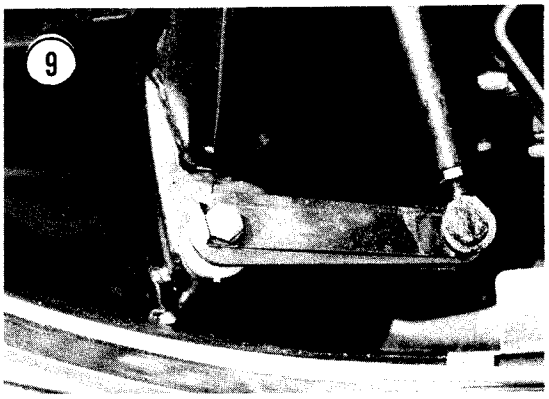


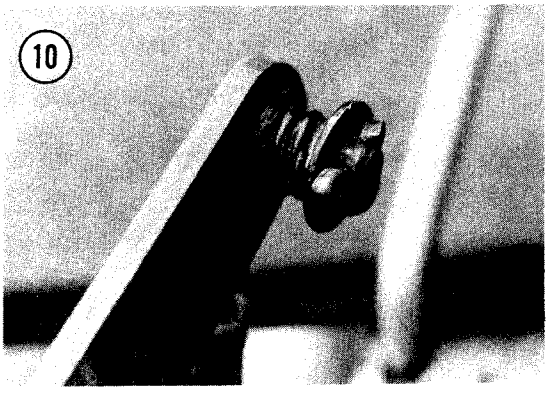


8. Inspect tie rod ends for excessive wear or looseness and replace if necessary.
9. Installation is the reverse of these steps. Keep the following points in mind:
   a. Tie rod ends attached to steering column have left-hand threads. Ensure that tie rod end joint runs parallel to horizontal line of steering arm.
   b. If replacing tie rod end ensure that at least half of threads are screwed into tie rod.
   c. Hold tie rod end with wrench while tightening tie rod locknut.
   d. Tighten components to torque values specified in **Table 2**.
   e. Adjust steering column free play by adding or removing 0.025 in. (0.64mm) shims between steering column bushing and washer before installing pin.
   f. Perform *Ski Alignment*.

Ski Leg and Steering Arm Removal/Installation

1. Perform *Ski Removal.*
2. Remove nuts securing tie rod ends to steering arms and disconnect tie rod ends (**Figure 9**). On Elan models, remove cotter pin and washer and disengage tie rod from steering arm (**Figure 10**).



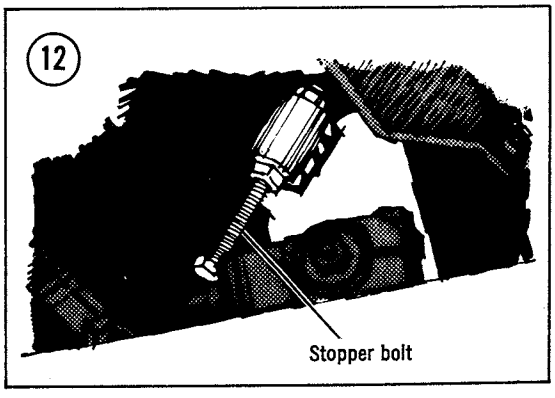


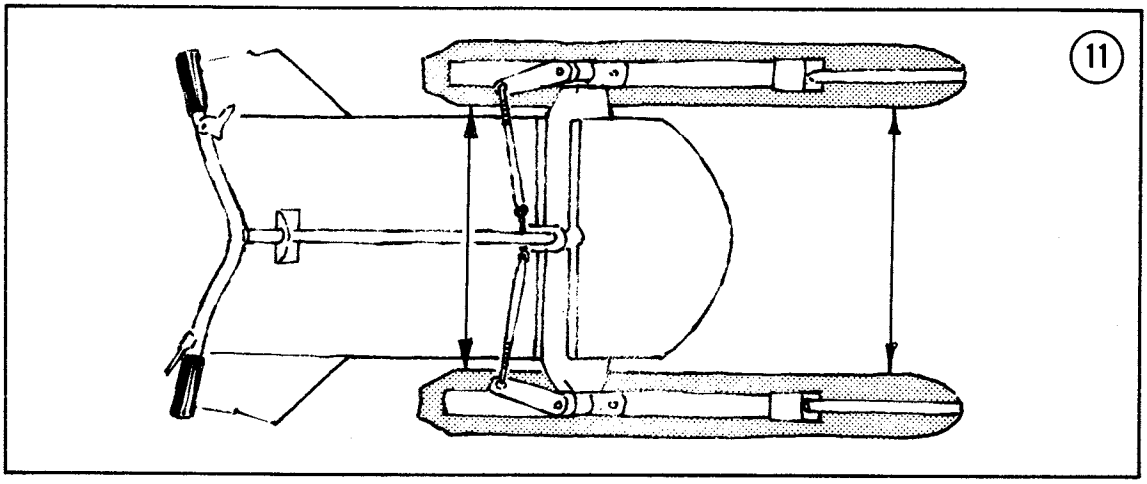
3. Remove bolts or nuts securing steering arms to ski legs. Remove arms with spacers, washers, and springs from ski leg spines. If steering arms are difficult to disengage from ski legs perform the following:
   a. Raise front of machine.
   b. Loosen steering arm bolt 3 or 4 turns or loosen steering arm nut until flush with ski leg.
   c. Gently tap on bolt or ski leg end with a soft faced hammer or a hammer and block of wood to disengage splines.
4. Remove upper ski leg bushing and remove ski leg from machine. Remove lower ski leg bushing if necessary.
5. Installation is the reverse of these steps. Keep the following points in mind:
   a. Ensure that tie rod end joints run parallel to horizontal line of steering arm.
   b. Tighten components to torque values specified in **Table 2.**
   c. Perform *Ski Alignment.*

SKI ALIGNMENT

Ski alignment should be performed whenever steering difficulties are experienced or when repair work has been performed on ski or steering components.

1. Position snowmobile on level ground and measure distance between ski at front and rear leaf springs (**Figure 11**). Front dimension should be ⅛ in. (3.2mm) more than rear on all models except 1973 T'NT F/A which is ¼ in. (6.4mm). Ensure that handlebar is in horizontal position.
2. When measuring ski toe out manually, close front of skis to take up all mechanical slack in steering mechanism.
3. If adjustment is necessary, loosen locknuts on tie rod ends and turn tie rods to increase or decrease ski toe-out.
4. Tighten locknuts, manually close front of skis and recheck measurement. Readjust if necessary.
5. On models equipped with steering travel adjustment (**Figure 12**), turn handlebar fully right until gap of ⅛ in. (3.2mm) exists between lower nut of left tie rod ball joint and bottom plate. Adjust stopper bolt on right side of reinforcing cross member so it just touches right steering arm. Repeat for stopper on left side.





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