



Master Repair Manual

Foreword

This manual is designed primarily for use by snowmobile service technicians in a properly equipped shop. Since a certain knowledge of mechanical theory, tool use, and shop procedures are necessary to perform the servicing work satisfactorily, all operations should be carried out only by qualified service personnel. In order to perform the work efficiently and prevent costly errors, the technician should read the text, thoroughly familiarizing himself with procedures before starting the work. Cleanliness of both the component to be repaired and the work area is of major importance.

This manual includes procedures for maintenance operations, component identification, and unit repair, along with service specifications for the 1972 to current model Polaris snowmobiles. The handy section index tabs will enable the user to quickly locate the component unit section he desires. In addition, a table of contents is placed at the beginning of each section for location of specific page numbers and service information pertinent to that component.

⚠ THIS SYMBOL IS USED THROUGHOUT THE MANUAL TO IDENTIFY SPECIAL INSTRUCTIONS OR PROCEDURES WHICH ARE SAFETY RELATED AND REQUIRE YOUR SPECIAL ATTENTION.

"NOTE:" INDICATES SPECIAL POINTS OF PARTICULAR INTEREST WHICH WILL AID THE SERVICE TECHNICIAN IN WORK QUALITY AND EFFICIENCY.



Polaris E-Z-Go Division of Textron Inc.

*Technical Training Center
Roseau, MN 56751*

SECTION I

MODELS AND SPECIFICATIONS

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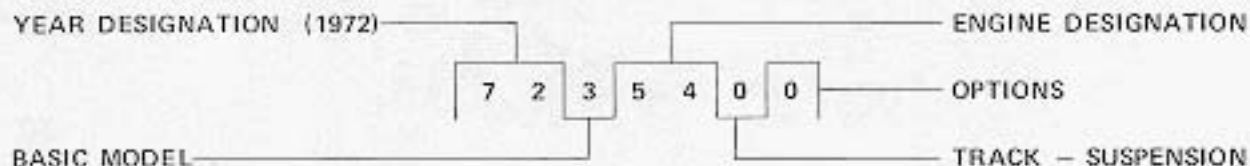
MODELS AND SPECIFICATIONS

Model Identification

The machine serial number may be referred to as an aid in identifying machine model year. Refer to the first digit in the machine serial number for proper identification:

FIRST DIGIT	MODEL YEAR	FIRST DIGIT	MODEL YEAR
2	1967	8	1973
3	1968	9	1974
4	1969	10	1975
5	1970	02	1976
6	1971	03	1977
7	1972	04	1978
		05	1979

1972 MODEL NUMBER IDENTIFICATION



MODEL DESIGNATION

- 1 - Charger
- 3 - Mustang
- 5 - Colt SS
- 7 - Charger SS
- A - Aluminum TX Racer
- C - Colt
- D - TX
- F - Aluminum Colt

ENGINE DESIGNATION

- 17 - 175cc
- 25 - 244cc
- 29 - 294cc
- 34 - 335cc
- 39 - 396cc
- 40 - 398cc
- 43 - 439cc
- 44 - 432cc
- 50 - 488cc
- 51 - 502cc
- 54 - 530cc
- 65 - 648cc
- 79 - 795cc

TRACK - SUSPENSION

- | | |
|--------------------|---------------------------|
| Fan Air | 0 - Cleated, Slide Rail |
| | 1 - Rubber, Driftskipper |
| | 2 - Cleated, Driftskipper |
| Free Air | 9 - Cleated, Slide Rail |
| | A - Rubber, Driftskipper |
| | C - Cleated, Driftskipper |
| Free Air
Racing | G - Cleated, Slide Rail |
| | H - Rubber, Driftskipper |
| | J - Cleated, Driftskipper |

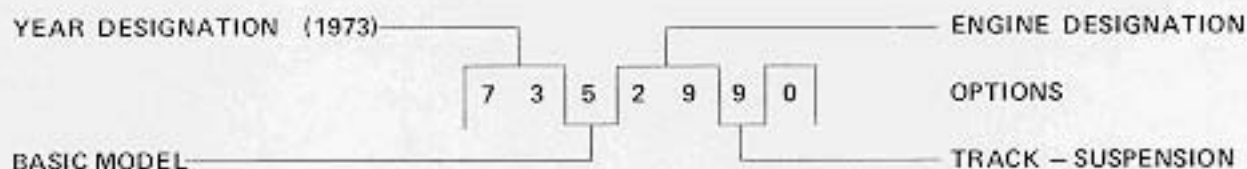
OPTIONS

- 0 - Manual Start
- 1 - Electric Start
- 2 - Manual Start w/Transmission
- 4 - CD Manual Start
- S - Sears

MODELS AND SPECIFICATIONS

Model Identification

1973 MODEL NUMBER IDENTIFICATION



MODEL DESIGNATION

1 — Charger
3 — Mustang
5 — Colt SS
A — ATX Racer
C — Colt
D — ATX Consumer (TX)

ENGINE DESIGNATION

17 — 175cc
25 — 244cc
29 — 294cc
34 — 335cc
39 — 396cc
40 — 398cc
43 — 439cc
44 — 432cc
50 — 488cc
51 — 502cc
54 — 530cc
65 — 648cc
79 — 795cc

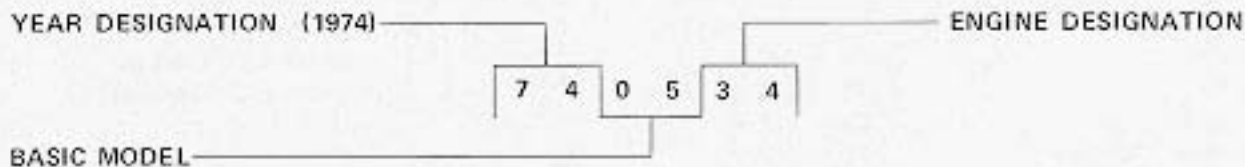
TRACK — SUSPENSION

Fan Air — 0 — Cleated, Slide Rail
Free Air — 9 — Cleated, Slide Rail
Free Air — G — Cleated, Slide Rail
Racing

OPTIONS

0 — Manual Start
4 — CD Ignition

1974 MODEL NUMBER IDENTIFICATION



MODEL DESIGNATION

05 — TX
10 — Colt
11 — Colt SS
25 — Electra
26 — Custom II
35 — TC

ENGINE DESIGNATION

17 — 175cc
18 — 175cc
22 — 250cc
23 — 250cc
24 — 250cc
25 — 250cc
29 — 295cc
34 — 335cc

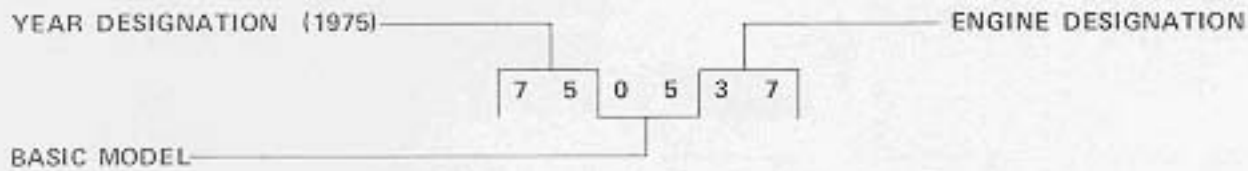
ENGINE DESIGNATION

35 — 335cc
36 — 335cc
40 — 400cc
42 — 440cc
44 — 440cc
52 — 500cc
54 — 530cc

MODELS AND SPECIFICATIONS

Model Identification

1975 MODEL NUMBER IDENTIFICATION



MODEL DESIGNATION

05 — TX
10 — Colt
11 — Colt SS
25 — Electra
36 — TC

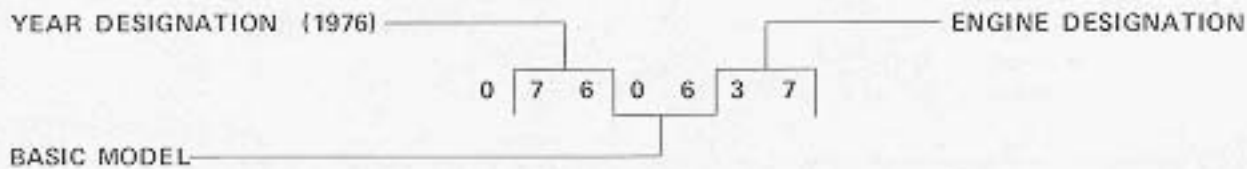
ENGINE DESIGNATION

18 — 175cc
22 — 250cc
23 — 250cc
24 — 250cc
25 — 250cc
35 — 340cc

ENGINE DESIGNATION

36 — 340cc
37 — 340cc
42 — 440cc
45 — 440cc
52 — 500cc

1976 MODEL NUMBER IDENTIFICATION



MODEL DESIGNATION

05 — TX
06 — Starfire
10 — Colt, Standard
11 — Colt SS
25 — Electra

ENGINE DESIGNATION

18 — 175cc
22 — 250cc, single
23 — 250cc, twin
24 — 250cc, twin
25 — 250cc, twin

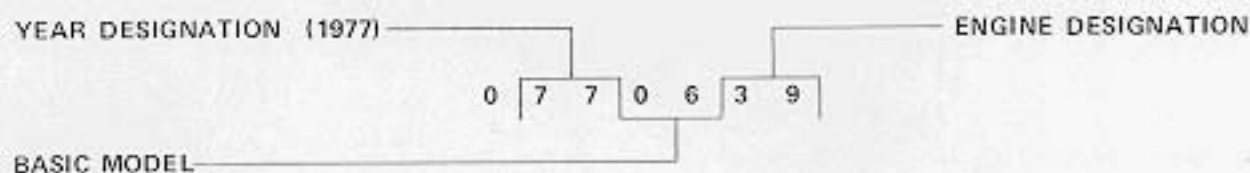
ENGINE DESIGNATION

35 — 340cc
36 — 340cc
37 — 340cc
42 — 440cc
45 — 440cc

MODELS AND SPECIFICATIONS

Model Identification

1977 MODEL NUMBER IDENTIFICATION



MODEL DESIGNATION

05 — TX
06 — TXL
10 — Colt
11 — Colt SS
25 — Electra

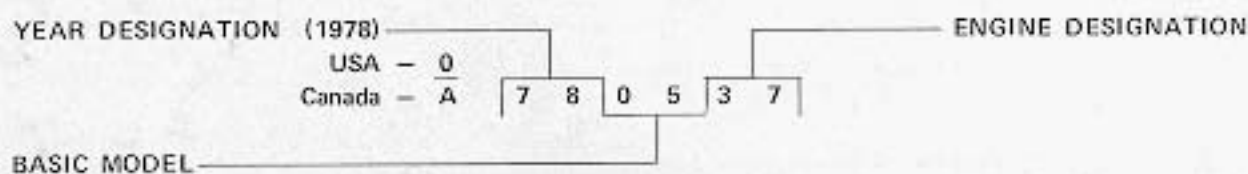
ENGINE DESIGNATION

23 — EC25PT-07 Twin
24 — EC25PC Twin
25 — EC25PS Single
26 — EC25PM-01 Twin
36 — EC34PQ Twin
37 — EC34PT-05 Twin

ENGINE DESIGNATION

38 — EC34PM-03 Twin
39 — EC34PL-01 Twin
42 — EC44PQ Twin
45 — EC44PT-05 Twin
46 — EC44PT-06 Twin

1978 MODEL NUMBER IDENTIFICATION



MODEL DESIGNATION

05 — TX
06 — TX-L
10 — Colt
11 — S/S 340
15 — RXL
18 — Cobra

ENGINE DESIGNATION

23 — EC25PT-07 Twin FA
24 — EC25PC Twin FA
25 — EC25PS Single FC
37 — EC34PT-05 Twin FA

ENGINE DESIGNATION

37 — EC34PL-03 Twin LC
38 — EC34PM-03/04 Twin FA
39 — EC34PL-02 Twin LC
43 — EC44PM-01 Twin FC
45 — EC44PT-05 Twin FA

MODELS AND SPECIFICATIONS

1979 Model Identification

1979 MODEL NUMBER IDENTIFICATION

YEAR DESIGNATION (1979) _____ ENGINE DESIGNATION _____

0 7 9 0 5 3 7

BASIC MODEL _____

MODEL DESIGNATION

05 - TX
06 - TX-L/Centurion
10 - Gemini
11 - Apollo 340
18 - Cobra

ENGINE DESIGNATION

23 - EC25PT-07 Twin FA
25 - EC25PS Single FC
26 - EC25PM-01 Twin FC
37 - EC34PT-05 Twin FA
38 - EC34PM-03/04 Twin FC

ENGINE DESIGNATION

39 - EC34PL-02 Twin LC
43 - EC44PM-01 Twin FC
45 - EC44PT-05 Twin FA
53 - EC51PL-01 Three LC

MODEL NUMBER

0791025
0791026
0791138
0791838
0791843

MACHINE DESCRIPTION

Gemini 244cc Single FC
Gemini 250cc Twin FC
Apollo 340cc Twin FC
Cobra 340cc Twin FC
Cobra 440cc Twin FC

MODEL NUMBER

0790523
0790537
0790545
0790639
0790653

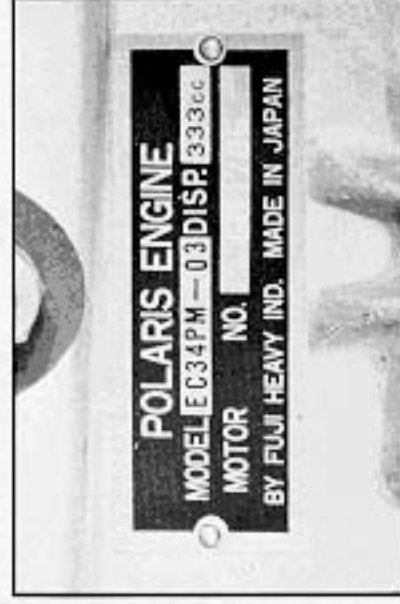
MACHINE DESCRIPTION

TX 250cc Twin FA
TX 340cc Twin FA
TX 440cc Twin FA
TX-L 340cc Twin LC
Centurion 500cc Three LC

These numbers should be referred to in any correspondence regarding warranty, service or replacement parts.

The Machine Model and Serial Number Identification Tag is located on the right front side of the tunnel. The Serial Number is permanently stamped into the tunnel and the Model Number is embossed on the tag.

Whenever corresponding about an engine it is important that the Engine Model and Serial Number be called out. This information is found on the Engine Identification Plate generally located on the crankcase.



MODELS AND SPECIFICATIONS

1979 Gemini



Star Engine Options:

EC25PS — 244cc Single Cylinder Fan Cooled — Model Number 0791025

EC25PM-01 — 244cc Twin Cylinder Fan Cooled — Model Number 0791026

Drive and Brake:

Drive Clutch	Polaris — RPM and torque sensing, 30° sheaves (15° each)
Driven Clutch	Polaris — torque sensing, 30° sheaves (15° each)
Drive Clutch Guard	full coverage steel, hinged
Drive Belt	30° 11.1" C.D., part number 3211021
Brakes	hydraulic disc, automotive brake fluid
Sprocket Ratio	13/35 — 244 single cylinder 15/35 — 250 twin cylinder
Drive Chain	84 pitch 35-2 — 244 single cylinder 86 pitch internal tooth silent — 250 twin cylinder

Track and Suspension:

Track Type	belted rubber with steel cleats and molded-on rubber ice growers
Width	15"
Length	114.44" pitch length, track length on ground — 42"
Suspension Type	slide rail, stamped steel construction
Shock Absorber	accessory
Sprockets	combination sprocket with idler
Rear Idlers	plastic with rubber tire

Steering and Skis:

Skis	width — 5.12"; length — 40"; ski center distance — 24"
Finish	alkyd baked enamel/midnight blue
Springs	2 leaf on 244 single cylinder; 3 leaf on 250 twin cylinder
Shocks	accessory
Rubber Stable Ski Insert	accessory on 244 single cylinder, standard on 250 twin cylinder
Rubber Spring Stop	standard

MODELS AND SPECIFICATIONS

1979 Gemini

Handlebars:

Type Grips	plastic, custom molded
Controls	throttle and brake

Electrical:

Headlight	one adjustable 60 watt hi-lo sealed beam
Taillight	two 2.7 watt lamps
Brake Light	one 12 watt lamp
Instrument Lights	with accessory instrument package
Switches	ignition on console; headlight dimmer and auxiliary safety shut-off on handlebar
Regulated Circuit	standard electronic regulator
Instruments	optional speedometer and tachometer
Reflectors	class A standard

Body and Trim:

Chassis

Type	steel, spot welded
Finish	alkyd baked enamel/midnight blue
Storage Compartment	rear of seat
Gas Tank	polyethylene — 7 U.S. gallons capacity; 5.8 Imperial gallons capacity
Gas Tank Cap	standard without gauge
Foot Rests	standard
Rear Bumper	tubular steel, hitch as accessory
Front Bumper	one-piece steel wraparound
Running Board Pads	formed safety walk
Tunnel Stripe	decal

Hood

Type	chopped fiberglass, resin impregnated
Finish	high gloss gel-coat
Type of Hold Down	front center hinge with two rear spring latches
Hood Trim	Polaris side and deck decals
Windshield Type	formed polycarbonate with trim — high standard
Console Type	stamped steel
Seat Cushion	controlled compression foam with midnight blue vinyl cover
Recoil Handle Location	control console right side of fuel tank
Snow Flap	full coverage rubber

Dimensions and Weights:

Height Less Windshield	31"
Length with Skis	101.75"
Width	31.5"
Approximate Dry Weight	355 pounds — 244 single cylinder 365 pounds — 250 twin cylinder

Tool Kit and Owner's Manual

standard

MODELS AND SPECIFICATIONS

1979 Apollo 340



Star Engine Options:

EC34PM-03 - 333cc Twin Cylinder Fan Cooled - Model Number 0791138

Drive and Brake:

Drive Clutch	Polaris - RPM and torque sensing, 30° sheaves (15° each)
Driven Clutch	Polaris - torque sensing, 30° sheaves (15° each)
Drive Clutch Guard	full coverage steel, hinged
Drive Belt	30° 11.1" C.D., part number 3211021
Brakes	hydraulic disc, automotive brake fluid
Sprocket Ratio	18/35
Drive Chain	88 pitch internal tooth silent

*after #0503733 use #311044
(11.0 inches) belt*

Track and Suspension:

Track Type	all-rubber convolute with molded-on rubber traction bars
Width	15"
Length	114.85" pitch length, track length on ground - 42"
Suspension Type	slide rail, stamped steel construction
Shock Absorber	standard
Sprockets	combination sprocket with idler
Rear Idlers	plastic with rubber tire

Steering and Skis:

Skis	width - 5.12"; length - 40"; ski center distance - 27"
Finish	alkyd baked enamel/midnight blue
Springs	3 leaf
Shocks	standard
Rubber Stable Ski Insert	standard
Rubber Spring Stop	standard

Handlebars:

Adjustments	rotational adjustments
Type Grips	plastic, custom molded
Controls	throttle and brake

Electrical:

Headlight	one adjustable 60 watt hi-lo sealed beam
Taillight	two 2.7 watt lamps
Brake Light	one 12 watt lamp
Instrument Lights	with accessory instrument package
Switches	ignition on console; headlight dimmer and auxiliary safety shut-off on handlebar
Regulated Circuit	standard electronic regulator
Instruments	optional speedometer and tachometer
Reflectors	class A standard

Body and Trim:

Chassis

Type	steel, spot welded
Finish	alkyd baked enamel/midnight blue
Storage Compartment	rear of seat
Gas Tank	polyethylene — 7 U.S. gallons capacity; 5.8 Imperial gallons capacity
Gas Tank Cap	standard without gauge
Foot Rests	standard
Rear Bumper	tubular steel, hitch as accessory
Front Bumper	one-piece steel wraparound
Running Board Pads	formed safety walk
Tunnel Stripe	decal

Hood

Type	chopped fiberglass, resin impregnated
Finish	high gloss gel-coat
Type of Hold Down	front center hinge with two rear spring latches
Hood Trim	Polaris side and deck decals
Windshield Type	formed polycarbonate with trim — high standard
Console Type	stamped steel
Seat Cushion	controlled compression foam with midnight blue vinyl cover
Recoil Handle Location	control console right side of fuel tank
Snow Flap	full coverage rubber

Dimensions and Weight:

Height Less Windshield	31"
Length with Skis	101.75"
Width	31.5"
Approximate Dry Weight	375 pounds

Tool Kit and Owner's Manual

standard

MODELS AND SPECIFICATIONS

1979 Cobra



Star Engine Options:

- EC34PM-04 — 333cc Twin Cylinder Fan Cooled — Model Number 0791838
EC44PM-01 — 432cc Twin Cylinder Fan Cooled — Model Number 0791843

Drive and Brake:

Drive Clutch	Polaris — RPM and torque sensing, 30° sheaves (15° each)
Driven Clutch	Polaris — torque sensing, 30° sheaves (15° each)
Drive Clutch Guard	full coverage steel, hinged
Drive Belt	30° 12.0" C.D., part number 3211042
Brakes	hydraulic disc, automotive brake fluid
Sprocket Ratio	15/35 — 340 twin cylinder 17/33 — 440 twin cylinder
Drive Chain	88 pitch internal tooth silent

Track and Suspension:

Track Type	belted rubber with steel cleats and molded-on rubber ice growlers
Width	15"
Length	119.5" pitch length, track length on ground — 48.75"
Suspension Type	slide rail, stamped steel construction
Shock Absorber	standard
Sprockets	combination sprocket with idler
Rear Idlers	plastic with rubber tire

Steering and Skis:

Skis	width — 5.12"; length — 40"; ski center distance — 28"
Finish	alkyd baked enamel/midnight blue
Springs	3 leaf
Shocks	standard
Rubber Stable Ski Insert	standard
Rubber Spring Stop	standard

MODELS AND SPECIFICATIONS

1979 Cobra

Handlebars:	
Adjustments	rotational adjustments
Type Grips	plastic, custom molded
Controls	throttle and brake
Electrical:	
Headlight	one adjustable 60 watt hi-lo sealed beam
Taillight	two 2.7 watt lamps
Brake Light	one 12 watt lamp
Instrument Lights	with accessory instrument package
Switches	ignition on console; headlight dimmer and auxiliary safety shut-off on handlebar
Regulated Circuit	standard electronic regulator
Instruments	optional speedometer and tachometer
Reflectors	class A standard
Body and Trim:	
Chassis	
Type	steel, spot welded
Finish	alkyd baked enamel/midnight blue
Storage Compartment	storage case with zipper closure attached to chassis under hood
Gas Tank	polyethylene — 7 U.S. gallons capacity; 5.8 Imperial gallons capacity
Gas Tank Cap	standard without gauge
Foot Rests	standard — stirrup type
Rear Bumper	tubular steel, hitch as accessory
Front Bumper	one-piece steel wraparound
Running Board Pads	formed safety walk
Tunnel Stripe	decals
Hood	
Type	chopped fiberglass, resin impregnated
Finish	high gloss gel-coat
Type of Hold Down	front center hinge with two rear spring latches
Hood Trim	Polaris side and deck decals
Windshield Type	formed polycarbonate with trim — high standard
Console Type	stamped steel
Seat Cushion	controlled compression foam with midnight blue vinyl cover
Recoil Handle Location	control console right side of fuel tank
Snow Flap	full coverage rubber
Dimensions and Weight:	
Height Less Windshield	32"
Length with Skis	104"
Width	33.5"
Approximate Dry Weight	396 pounds — 340 twin cylinder 406.5 pounds — 440 twin cylinder
Tool Kit and Owner's Manual	standard

MODELS AND SPECIFICATIONS

1979 TX



SuperStar Engine Options:

- EC25PT-07 - 249cc Twin Cylinder Free Air - Model Number 0790523
- EC34PT-05 - 336cc Twin Cylinder Free Air - Model Number 0790537
- EC44PT-05 - 432cc Twin Cylinder Free Air - Model Number 0790545

Drive and Brake:

- | | |
|--------------------|--|
| Drive Clutch | Polaris - RPM and torque sensing, 30° sheaves (15° each) |
| Driven Clutch | Polaris - torque sensing, 30° sheaves (15° each) |
| Drive Clutch Guard | full coverage, hinged |
| Drive Belt | 30° 12.0" C.D., part number 3211042 |
| Brakes | hydraulic disc, automotive brake fluid |
| Sprocket Ratio | 15/39 - 250 twin cylinder
17/39 - 340 twin cylinder
19/39 - 440 twin cylinder |
| Drive Chain | 64 pitch internal tooth silent - 250 twin cylinder
66 pitch internal tooth silent - 340 and 440 twin cylinder |

Track and Suspension:

- | | |
|-----------------|--|
| Track Type | belted rubber with steel cleats and molded-on rubber ice growers |
| Width | 15" |
| Length | 114.44" pitch length, track length on ground - 44.25" |
| Suspension Type | extruded aluminum slide rail |
| Shock Absorber | standard |
| Sprockets | combination sprocket with idler |
| Rear Idlers | plastic with rubber tire |

Steering and Skis:

- | | |
|--------------------------|--|
| Skis | width - 5.12"; length - 40"; ski center distance - 31" |
| Finish | alkyd baked enamel/midnight blue |
| Springs | monoleaf |
| Shocks | standard |
| Rubber Stable Ski Insert | standard |
| Rubber Spring Stop | standard |

MODELS AND SPECIFICATIONS

1979 TX

Handlebars:

Handlebar Pad
Type Grips
Controls

molded rubber
plastic, custom molded
throttle and brake

Electrical:

Headlight
Taillight
Brake Light
Instrument Lights
Switches

one adjustable 60 watt hi-lo sealed beam
two 2.7 watt lamps
one 12 watt lamp
2 watt

*350 TX. 75 W.
340 & 440 90 W.*

Ignition on console; headlight dimmer and auxiliary safety shut-off on handlebar
standard electronic regulator
speedometer and tachometer with instrument lighting
class A standard

Body and Trim:

Chassis
Type
Finish
Storage Compartment
Gas Tank
Gas Tank Cap
Foot Rests
Rear Bumper
Front Bumper
Tunnel Stripe

lightweight aluminum with ABS nosopan
alkyd baked enamel/midnight blue
rear of seat
polyethylene — 7 U.S. gallons capacity; 5.8 Imperial gallons capacity
standard with gauge
standard
tubular steel, hitch as accessory
one-piece extruded aluminum wraparound
decal

Hood

Type
Finish
Type of Hold Down
Hood Trim
Windshield Type
Console Type
Seat Cushion
Recoil Handle Location
Snow Flap

chopped fiberglass, resin impregnated
high gloss gel-coat
front center hinge with two rear spring latches
Polaris side and deck decals
formed polycarbonate with trim — high standard
stamped steel
controlled compression foam with midnight blue vinyl cover
control console right side of fuel tank
full coverage rubber

Dimensions and Weight:

Height Less Windshield
Length with Skis
Width
Approximate Dry Weight

31.5"
103.75"
38"
370 pounds — 250 twin cylinder
373 pounds — 340 twin cylinder
378 pounds — 440 twin cylinder

Tool Kit and Owner's Manual

standard

MODELS AND SPECIFICATIONS

1979 TX-L



SuperStar Engine Options:

EC34PL-02 — 333cc Twin Cylinder Liquid Cooled — Model Number 0790639

Drive and Brake:

Drive Clutch	Polaris — RPM and torque sensing, 30° sheaves (15° each)
Driven Clutch	Polaris — torque sensing, 30° sheaves (15° each)
Drive Clutch Guard	full coverage, hinged
Drive Belt	30° 12.0" C.D., part number 3211042
Brakes	hydraulic disc, automotive brake fluid
Sprocket Ratio	19/39
Drive Chain	66 pitch internal tooth silent

Track and Suspension:

Track Type	all-rubber involute with molded-on internal drive lugs and rubber traction bars
Width	15"
Length	120.96" pitch length, track length on ground — 47.5"
Suspension Type	extruded aluminum slide rail
Shock Absorbers	standard
Sprockets	polyethylene involute drive
Rear Idlers	plastic with rubber tire

Steering and Skis:

Skis	width — 5.12"; length — 40"; ski center distance — 31"
Finish	alkyd baked enamel/midnight blue
Springs	monoleaf
Shocks	standard
Rubber Stable Ski Insert	standard
Rubber Spring Stop	standard

Handlebars:

Handlebar Pad	molded rubber
Type Grips	plastic, custom molded
Controls	throttle and brake

Electrical:

Headlight	one adjustable 60 watt hi-lo sealed beam
Taillight	two 2.7 watt lamps
Brake Light	one 12 watt lamp
Instrument Lights	2 watt
Switches	ignition on console; headlight dimmer and auxiliary safety shut-off on handlebar
Regulated Circuit	standard electronic regulator
Instruments	speedometer, tachometer, and coolant high temperature warning indicator light with instrument lighting
Reflectors	class A standard

Body and Trim:

Chassis

Type	lightweight aluminum with ABS nosepan
Finish	alkyd baked enamel/midnight blue
Storage Compartment	rear of seat
Gas Tank	polyethylene — 7 U.S. gallons capacity; 5.8 Imperial gallons capacity
Gas Tank Cap	standard with gauge
Foot Rests	standard
Rear Bumper	tubular steel, hitch as accessory
Front Bumper	one-piece extruded aluminum wraparound
Tunnel Stripe	decal

Hood

Type	chopped fiberglass, resin impregnated
Finish	high gloss gel-coat
Type of Hold Down	front center hinge with two rear spring latches
Hood Trim	Polaris side and deck decals
Windshield Type	formed polycarbonate with trim — high standard
Console Type	stamped steel
Seat Cushion	controlled compression foam with midnight blue vinyl cover
Recoil Handle Location	control console right side of fuel tank
Snow Flap	full coverage rubber

Dimensions and Weight:

Height Less Windshield	31.5"
Length with Skis	103.75"
Width	38"
Approximate Dry Weight	400 pounds

Tool Kit and Owner's Manual

standard

MODELS AND SPECIFICATIONS

1979 Centurion



SuperStar Engine Options:

EC51PL-01 — 500cc Three Cylinder Liquid Cooled — Model Number 0790653

Drive and Brake:

Drive Clutch	Polaris — RPM and torque sensing, 30° sheaves (15° each)
Driven Clutch	Polaris — torque sensing, 30° sheaves (15° each)
Drive Clutch Guard	full coverage
Drive Belt	30° 12.0" C.D., part number 3211042
Brakes	hydraulic disc, automotive brake fluid
Sprocket Ratio	19/35
Drive Chain	64 pitch internal tooth silent

Track and Suspension:

Track Type	all-rubber involute with molded-on internal drive lugs and rubber traction bars and steel studs
Width	15"
Length	120.96" pitch length, track length on ground — 47.5"
Suspension Type	extruded aluminum slide rail
Shock Absorbers	standard
Sprockets	polyethylene involute drive
Rear Idlers	plastic with rubber tire

Steering and Skis:

Skis	width — 5.12"; length — 40"; ski center distance — 31"
Finish	alkyd baked enamel/midnight blue
Springs	monoleaf
Shocks	standard
Rubber Stable Ski Insert	standard
Rubber Spring Stop	standard

Handlebars:

Handlebar Pad	molded rubber
Type Grips	plastic, custom molded
Controls	throttle and brake

Electrical:

Headlight	one adjustable 60 watt hi-lo sealed beam
Taillight	two 2.7 watt lamps
Brake Light	one 12 watt lamp
Instrument Lights	2 watt
Switches	ignition on console; headlight dimmer and auxiliary safety shut-off on handlebar
Regulated Circuit	standard electronic regulator
Instruments	speedometer, tachometer, and coolant high temperature warning indicator light with instrument lighting
Reflectors	class A standard

Body and Trim:

Chassis

Type	lightweight aluminum with ABS nosepan
Finish	alkyd baked enamel/midnight blue
Storage Compartment	rear of seat
Gas Tank	polyethylene — 7 U.S. gallons capacity; 5.8 Imperial gallons capacity
Gas Tank Cap	standard with gauge
Foot Rests	standard
Rear Bumper	tubular steel, hitch as accessory
Front Bumper	one-piece extruded aluminum wraparound
Tunnel Stripe	decal

Hood

Type	chopped fiberglass, resin impregnated
Finish	high gloss gel-coat
Type of Hold Down	front center hinge with two rear spring latches
Hood Trim	Polaris side and deck decals
Windshield Type	formed polycarbonate with trim — high standard
Console Type	stamped steel
Seat Cushion	controlled compression foam with midnight blue vinyl cover
Recoil Handle Location	control console right side of fuel tank
Snow Flap	full coverage rubber

Dimensions and Weight:

Height Less Windshield	31.5"
Length with Skis	103.75"
Width	38"
Approximate Dry Weight	420 pounds

Tool Kit and Owner's Manual

standard



The following specifications for the TXC are identical to the TX 340, with the exceptions of:

1. Suspension Type III, aluminum slide rail (same as TX-L/Centurion)
2. Track (same as TX-L)
3. Ski shocks (same as TX-L/Centurion)
4. Front drive shaft and sprockets (same as TX-L/Centurion)
5. High windshield
6. Foot rests (cross-country storage type)
7. Hood hold down (rubber straps)

When performing any other maintenance on the TXC, refer to TX 340 specifications in this manual.

SuperStar Engine Options:

EC34PT-05 — 336cc Twin Cylinder Free Air — Model Number 0790637

Drive and Brake:

Drive Clutch	Polaris — RPM and torque sensing, 30° sheaves (15° each)
Driven Clutch	Polaris — torque sensing, 30° sheaves (15° each)
Drive Clutch Guard	full coverage, hinged
Drive Belt	30° 12.0" C.D., part number 3211042
Brakes	hydraulic disc, automotive brake fluid
Sprocket Ratio	17/39
Drive Chain	66 pitch internal tooth silent

Track and Suspension:

Track Type	all-rubber involute with molded-on internal drive lugs and rubber traction bars
Width	15"
Length	120.96" pitch length, track length on ground — 47.5"
Suspension Type	extruded aluminum slide rail
Shock Absorber	standard
Sprockets	polyethylene involute drive
Rear Idlers	plastic with rubber tire

Steering and Skis:

Skis	width — 5.12"; length — 40"; ski center distance — 31"
Finish	alkyd baked enamel/midnight blue
Springs	monoleaf
Shocks	standard
Rubber Stable Ski Insert	standard
Rubber Spring Stop	standard

MODELS AND SPECIFICATIONS

1979 TXC

Handlebars:

Handlebar Pad	molded rubber
Type Grips	plastic, custom molded
Controls	throttle and brake

Electrical:

Headlight	one adjustable 60 watt hi-lo sealed beam
Taillight	two 2.7 watt lamps
Brake Light	one 12 watt lamp
Instrument Lights	2 watt
Switches	ignition on console; headlight dimmer and auxiliary safety shut-off on handlebar
Regulated Circuit	standard electronic regulator
Instruments	speedometer and tachometer with instrument lighting
Reflectors	class A standard

Body and Trim:

Chassis

Type	lightweight aluminum with ABS nosepan
Finish	alkyd baked enamel/midnight blue
Storage Compartments	rear of seat and foot rests
Gas Tank	polyethylene — 7 U.S. gallons capacity; 5.8 Imperial gallons capacity
Gas Tank Cap	standard with gauge
Foot Rests	cross-country storage type
Rear Bumper	tubular steel, hitch as accessory
Front Bumper	one-piece extruded aluminum wraparound
Tunnel Strips	decal

Hood

Type	chopped fiberglass, resin impregnated
Finish	high gloss gel-coat
Type of Hold Down	rubber straps
Hood Trim	Polaris side and deck decals
Windshield Type	formed polycarbonate with trim — high standard
Console Type	injection molded plastic
Seat Cushion	controlled compression foam with midnight blue vinyl cover
Recoil Handle Location	on right side of console
Snow Flap	full coverage rubber

Dimensions and Weight:

Height Less Windshield	31.5"
Length with Skis	103.75"
Width	38"
Approximate Dry Weight	385 pounds

Tool Kit and Owner's Manual

standard

SECTION II

BODY AND STEERING

Contents of this Section

Summer Storage	1
Torque Specifications	2
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CLEANING AND PRESERVATION OF HOOD, CHASSIS, AND TRIM

Proper storage starts by cleaning, washing, and waxing the hood, chassis, upholstery, and plastic parts. Clean and touch up with paint any rusted or bare metal surfaces. Ensure that all corrosive salt and acids are removed from surfaces before beginning preservation with waxes and rust inhibitors (grease, oil, or paint).

If the machine is equipped with electric start, disconnect the battery cables and clean the cables and battery post. Remove and store the battery in a cool dry place.

The machine should be stored in a dry garage or shed out of the sunlight and covered with a fabric snowmobile cover.

CONTROLS AND LINKAGE

All bushings, spindle shafts, and tie rod ends should be coated with a light coat of oil or grease. Throttle controls and cables should be lubricated with light oil or WD-40, LPS, etc. Force a small amount of lubricant down cable.

ELECTRICAL CONNECTIONS

Separate electrical connector blocks and clean corrosive build-up from connectors. Lubricate or pack connector blocks with petroleum jelly and re-connect. Replace worn or frayed electrical wire and connectors.

CLUTCH AND DRIVE SYSTEM

Remove drive belt and store in cool dry location. Lubricate surface faces, shaft, and ramps of drive and driven clutches with light oil (oil must be cleaned off before installing belt for service). A generous amount of lubrication, such as WD-40, LPS, etc., should be sprayed through the three windows on the drive clutch cover and onto the rollers and weight pins. Replace chaincase lubricant with new oil. Spray lubricant on steel drive shafts, etc., to reduce rusting.

TRACK AND SUSPENSION

Under normal conditions moderate track tension should be maintained during summer storage. Apollo rubber track tension should be maintained at the prescribed normal operating tension specified in this manual. The rear of the machine should be supported off the ground to allow free hanging of track.

ENGINE AND CARBURETOR

There are two methods of properly preparing an engine for storage. The best method is to keep your machine in an area where you can run the engine for about five minutes twice a month. This gives the crankshaft bearings and cylinder walls a fresh coat of oil. Run the engine at about 3,000 RPM and stop it by pulling the choke. This method will prevent rusting of the cylinder walls and prevent the formation of varnish from evaporated fuel in the carburetor.

However, this approach to summer storage is not always feasible, and if not suitable, the following method of engine storage can be used. The fuel tank, fuel lines, and carburetor should be completely drained of gasoline. The engine should be run until it stops to eliminate any gas remaining in the carburetor. Support the front of the snowmobile so that the engine is level or tilted slightly rearward. Remove the spark plug(s). Rotate the piston to B.D.C. (piston in its lowest position) and pour approximately two ounces of Polaris 40:1 petroleum-base oil into the cylinder. NOTE: Allow ample time for the oil to flow from the top of the piston, down the transfer ports and onto the crankshaft bearings before proceeding to the next cylinder. Turn the engine over several times to ensure coverage of piston rings, cylinder walls, and crankshaft bearings.

BODY AND STEERING

Torque Specifications

The following torque specifications are to be used for all applications, except for special cases where the Torque Deviation List will apply.

Standard Torque Specifications

<u>Bolt Size</u>	<u>Threads Per Inch</u>	<u>Torque – Minimum – Maximum</u>
8	18 & 32	18 – 21 in./lbs.
10	24 & 32	20 – 24 in./lbs.
1/4	20 & 28	5 – 6 ft./lbs.
5/16	18 & 24	10 – 12 ft./lbs.
3/8	16	18 – 22 ft./lbs.
3/8	24	20 – 25 ft./lbs.
7/16	14	25 – 30 ft./lbs.
7/16	20	30 – 40 ft./lbs.
1/2	13	50 – 57 ft./lbs.
1/2	20	55 – 65 ft./lbs.

Torque Deviation List

<u>Bolt Size</u>	<u>Description</u>	<u>Torque – Minimum – Maximum</u>
1/4	Handlebar Adjuster Block	11 – 13 ft./lbs.
5/16	175 Drive Clutch Bolt	18 – 20 ft./lbs.
5/16	Skag Bolt	14 – 16 ft./lbs.
3/8	Spring Saddle	36 – 50 ft./lbs.
3/8	Steering Arm	36 – 40 ft./lbs.
3/8	Tie Rod	35 – 40 ft./lbs.
3/8	Suspension Mounting	35 – 40 ft./lbs.
3/8	Nut on Tie Rod	35 – 40 ft./lbs.
3/8	Engine Mounting Bolt	34 – 38 ft./lbs.
3/8	Engine Mounting Bolt	55 – 60 ft./lbs.
7/16	Drive Clutch Bolt	40 – 45 ft./lbs.
7/16	Flywheel Nut – 175cc	30 – 35 ft./lbs.
7/16	Flywheel Nut – All Other	60 – 65 ft./lbs.

Conversions

1 Inch = 25.4mm
 1mm = .0394 Inch
 1 Mile = 1.609 Kilometers
 1 Kilometer = .62 Mile
 1 U.S. Gallon = .8327 Imperial Gallon
 1 Imperial Gallon = 1.2009 U.S. Gallons
 Number of Cubic Centimeters x 0.061 = Cubic Inches
 Number of Cubic Inches x 16.387 = Cubic Centimeters
 Number of Foot Pounds x 0.1383 = Kilogram Meters
 Number of Kilogram Meters x 7.235 = Foot Pounds

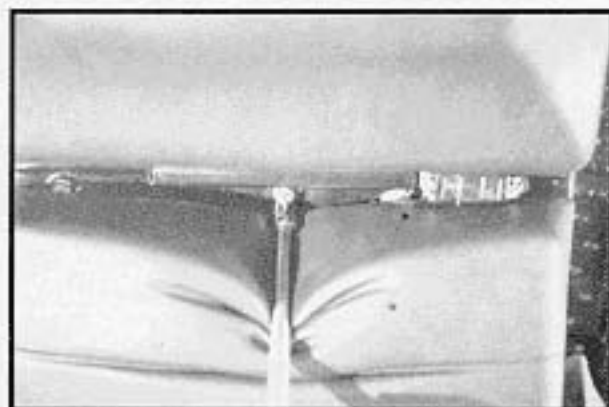
BODY AND STEERING

Gas Tank and Seat Removal

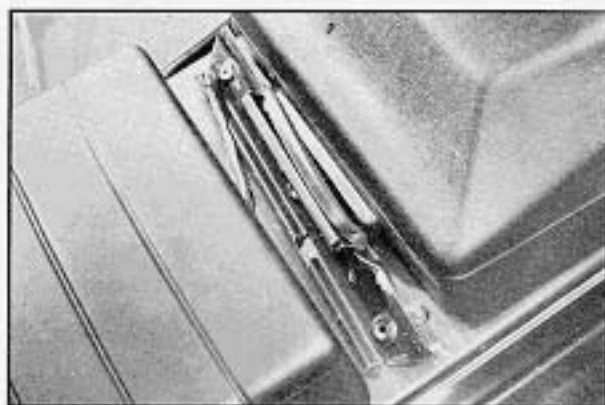
1. Disconnect the gas line from the fuel pump and plug the line to prevent fuel spillage from the tank (A). Roll the front tank hold-down spring (B) forward off the tank saddle.



2. Remove the two bolts holding the rear of the seat to tunnel. Remove the fuel tank and seat hold-down strap by removing the retaining nuts located between the tank and seat.



3. The seat and fuel tank can now be removed from the chassis.

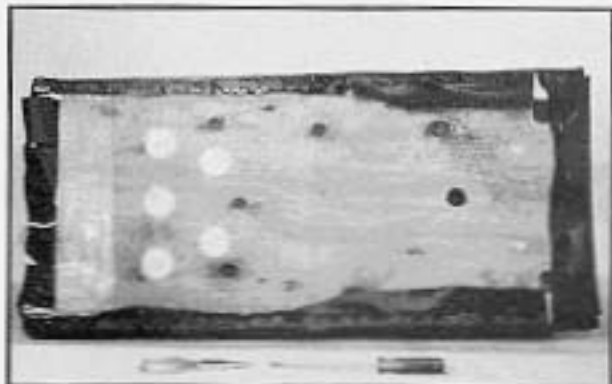


BODY AND STEERING

Seat Cover Replacement

Seat covers on models fitted with loose cover are replaceable by removing existing cover and replacing as outlined below. On models with molded-in cover, the new cover will have to be installed over the top of the existing cover.

1. Remove the seat cushion from snowmobile as outlined on page II - 3.
2. Remove the staples from the seat board.



3. On models equipped with rear storage compartment, the door frame must be removed.
 - A. Remove the taillight lens.
 - B. Slide the taillight housing out and remove the tail and brake light sockets.
 - C. Remove the two screws at the bottom of door frame (A).
 - D. Drill out the seven 1/8" blind rivets (B).
 - E. Remove old cover.



4. Pull cover tightly and evenly and restaple to seat board. Cut and tuck the forward portion under the seat board as shown.



5. Place the door frame into position and install the two screws located at the bottom of door frame. Cut the material in middle of door frame as shown (A). Push the door frame securely into position (corners first). Re-rivet to compartment housing and remove excess material from compartment area. NOTE: If rivet holes were damaged when old rivets were removed, new holes can be drilled between existing holes.
6. Reinstall light socket to taillight housing and install lens. Make a final check for a wrinkle-free finish before reinstalling to snowmobile.



1. Remove old decal. NOTE: Before removing old decal it is important to note its position by marking it in several locations. A small amount of heat will aid in removing the old decal.
2. Thoroughly clean hood in the area in which the new decal will be installed. Apply a solution of mild soap and clean water to this area (approximately four ounces mild soap to one gallon of water).



3. Remove decal backing. With the decal positioned on hood, apply the soap/water solution to the top of decal. Holding decal in position, remove all trapped air and soap/water solution out from under the decal.
IMPORTANT: This must be done with a clean, soft rubber squeegee to prevent scratching of the decal outer surface. Apply heat to the installed decal to ensure it is fastened.



FOR MODELS REQUIRING THE DECAL END TO BE STRETCHED AROUND THE RADIUS AT REAR OF HOOD

1. Fasten a straight edge to the tail end of decal as shown.
2. The mass of the decal which has been secured in the above steps will allow you to pull or stretch the remaining portion around the radius and into position. NOTE: Applying a small amount of heat to the decal will aid in forming it to the radius.
3. Apply soap/water solution to top of decal and remove trapped air. Scribe and remove excess decal material and reinstall hood trim molding.



BODY AND STEERING

ABS Nosepan — Care, Cleaning, and Repair

CARE AND CLEANING

ABS nosepan will retain their original finish with reasonable care and handling. The following suggested care and cleaning tips will help to keep the original luster.

- DO:**
- dust and clean with a soft, damp cloth or chamois, wiping the surfaces gently.
 - use pure soap and lukewarm water — mild detergents or most household cleaners are recommended.
 - dry the surfaces, after washing and rinsing, by blotting with a damp cloth or chamois.
 - wax sparingly the surfaces for protection and the highest degree of polish. Apply household or commercial type wax sparingly in a thin, even film with a soft clean cloth.
 - polish waxed surfaces lightly with a clean cotton flannel or jersey. After polishing, wipe gently with a damp cloth to ground any electrostatic charges which may attract dust particles.
- DO NOT:**
- use cloths containing grit or abrasive particles or kitchen scouring compounds to clean or dust. Light scratches may be rubbed out with wax.
 - use boiling water or strong solvents to clean, as they will soften the plastic.
 - use strong soaps or abrasives.

SPECIAL CLEANING PROBLEMS

Dirt and Grease: Normal liquid cleaners or soap and water may not always remove grimy dirt. Janitor in a Drum and Cascade were found to be the best cleaners to remove ground-in dirty grease.

Stains: Stains such as iodine may be safely removed with 45 percent isopropanol (rubbing alcohol). The higher concentrated, commercial grades will remove the stain but will dull the film surface. The gloss can be returned with Simoniz.

Surface Scratches and Abrasions: Light scratches can be removed by waxing with Simoniz paste wax. Deeper scratches may be removed by lightly buffing with a fine grade of rubbing compound.

REPAIR OF CRACKS AND FRACTURES

Materials Needed:

1. Fiberglass cloth.
2. ABS pipe cement. (Several types of plumbing cement are available. Be sure to use one which is for PVC and ABS material, or ABS material only. Do not use cement labeled "for PVC only.")
3. Polaris blue ABS touch-up paint, PN 2870423. Do not use the standard Polaris touch-up paint, as it is not adaptable to ABS.

Procedure:

1. Clean all dirt, grease, etc., from the area around the crack. The crack itself should be as clean as possible. (Household detergent should work well.) Be sure the pan is dry before proceeding to step 3.
2. Cut a piece of the fiberglass cloth approximately 3" wide and long enough to extend 1" to 2" past the ends of the fracture.
3. Separate the edges of the crack slightly and fill the void with cement. Press the edges together, clamp in place, and wipe the excess cement from the outside of the pan.
4. Liberally coat the inside surface of the pan with cement, covering approximately 1 1/2" on either side of the fracture.
5. Lay the cloth over the fracture.
6. Work the cloth into the pan using a squeegee or your fingers (wear rubber gloves). ABS cement is a "solvent" cement; it actually dissolves the outer surface of the pan. The cement and cloth will take on a slightly bluish tint as this happens.

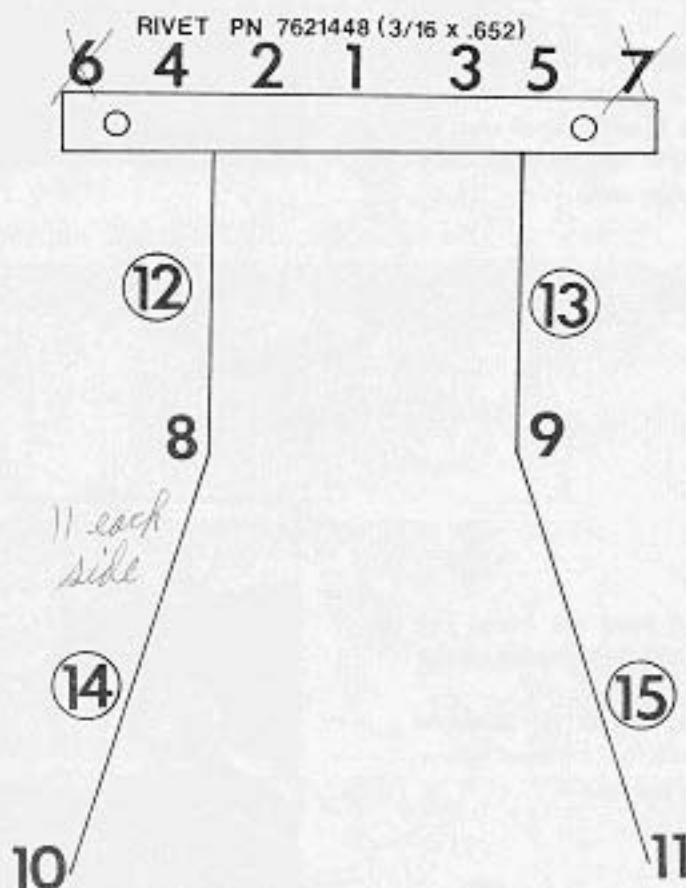
ABS Nosepan — Care, Cleaning, and Repair

- When the cloth is well worked in, wipe off the excess cement and let dry. Drying time will depend on the brand of cement used. Refer to the manufacturer's instructions printed on the can.
- Lightly sand the outside of the pan and paint. A more "finished" job will result if the repaired area on the inside of the pan is also painted.

INSTALLATION OF REPLACEMENT ABS NOSEPAN

When installing a new replacement ABS nosepan, the following procedures must be closely observed to ensure correct fit to the frame and maximum strength. ABS material is not rigid; consequently, it must be installed in such a manner that it can expand or contract with temperature change.

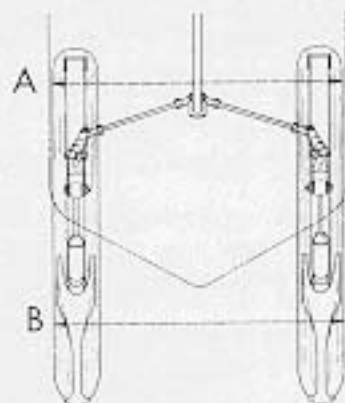
- Remove damaged nosepan by drilling out rivet heads. Engine and other mountings attached to forward part of sled and engine compartment should be removed for easier installation.
- The rivets required for nosepan replacement must be aluminum. Part numbers are:
~~5~~ each — PN 7621448 (3/16 x .652") *22* ~~30~~ each — PN 7621403 (3/16 x .527")
 All holes drilled into the nosepan are to be .220" in diameter. This will be larger than the 3/16 rivet (diameter is .187"). To drill a .220" hole use a 7/32 drill bit (7/32 diameter is .218").
- Position new nosepan in place and attach a bulkhead with the seven 3/16 x .652" rivets, PN 7621448 (top seven only). These rivets should be installed using rivet pattern shown below. All remaining holes use 3/16 x .527" rivets, PN 7621403.
- Maintain 1/4" clearance around exhaust outlet.
- Install tin foil, PN 5810108, in same location as original.



BODY AND STEERING

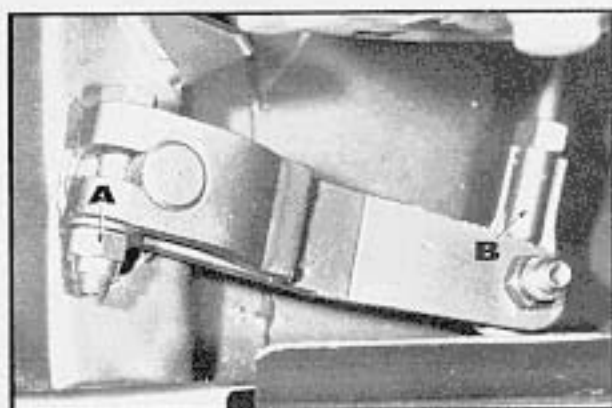
Steering Type I

Skis should be parallel at points A and B, with the handlebars at the straight ahead position. Measure from the straight edge of the ski. Skis must not toe-in.



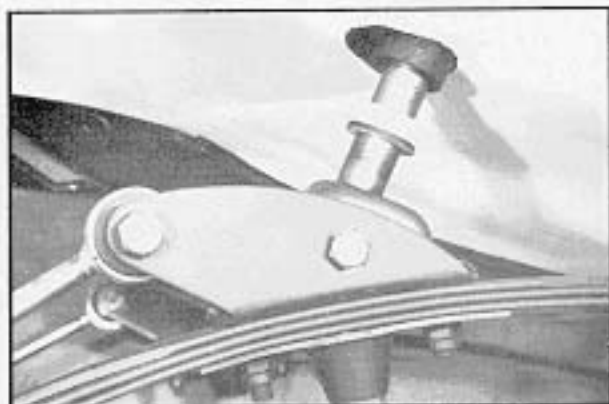
To remove the steering, first remove the steering arm bolt (A). To retain proper ski alignment, the spindle and steering arm should be marked. Adjust the tie rod end for proper ski alignment. Steering skis should be parallel with each other and with vehicle frame when handlebar is in normal straight driving position. Adjustment may be made by turning tie rod end clockwise or counterclockwise, whichever is necessary (B).

⚠ NOTE: The steering assembly of every machine should be checked whenever it comes in for tune-up or repairs. In the event there is evidence of wear or stress on the tie rods or tie rod end bearings, they should be replaced as a complete unit.



Spindle can now be removed from the body. The spindle should be lubricated annually to insure proper steering.

⚠ NOTE: If spindles appear to be damaged (bent or cracked) they should be replaced immediately before further damage results.

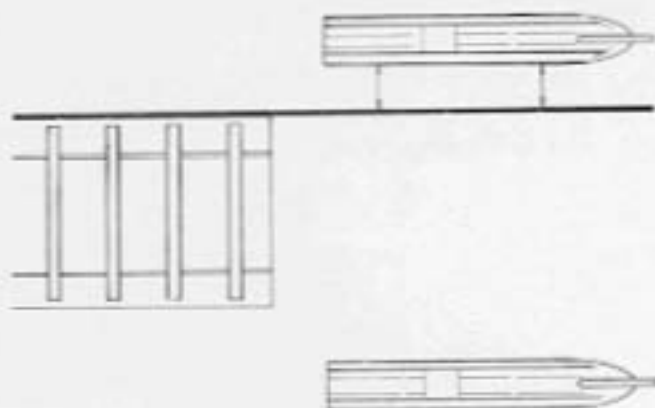


No toe in or out

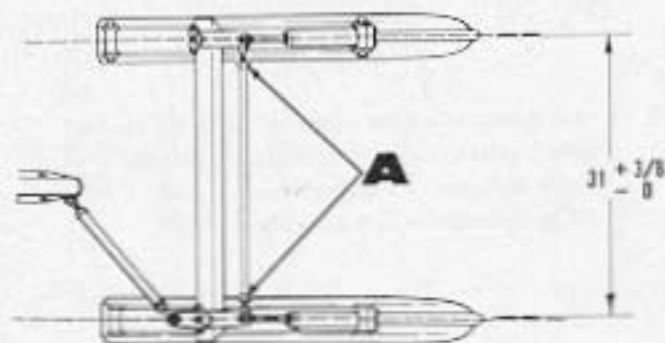
BODY AND STEERING

Steering Type II

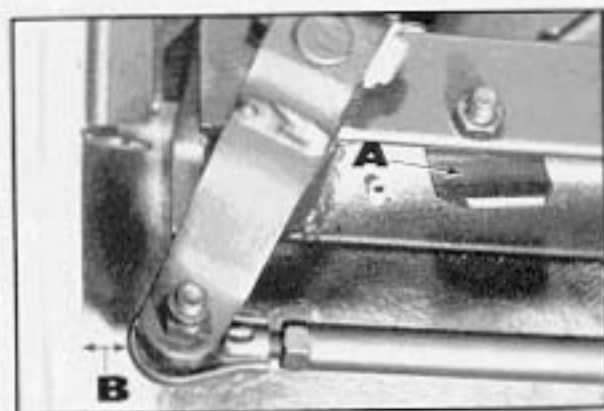
With the handlebars in the straight-ahead position, place a straight edge alongside the track, measure the distance from both ends of one ski. The distance at both the front and back of the ski should be equal. When one ski is parallel with the track, measure across to the opposite ski to ensure that it is also parallel with the track. If adjustment is needed, the tie rod should be adjusted accordingly.



Ski alignment is accomplished by loosening the jam nuts on both tie rod ends (A) and rotating the tie rod in the direction required.



Adjust the steering stop (A) so the left and right steering arms clear the nosepan approximately $\frac{1}{2}$ " (B).



SECTION IV

ENGINE ELECTRICAL

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ENGINE ELECTRICAL

Ignition Data

1974

Engine Model	Ignition Type	Alternator Output	Spark Plug Equivalent	Original Timing*	Recommended Timing*
EC17PM	Mag. Pt.	55 watt	B7ES	.100D	----
EC25PS	Mag. Pt.	75 watt	B7ES	.018S	.014S
EC25PC	Mag. Pt.	75 watt	N-2	.016S	.005S
EC25PT	CDI	75 watt	N-2	.135D	.089D ¹
EC25PF	Mag. Pt.	75 watt	B7ES	.016S	.005S
EC34PC	Mag. Pt.	75 watt	N-2	.016S	.005S
EC34PQ	CDI	140 watt	N-3	.110D	----
EC34PS	CDI	140 watt	N-2	.135D	.120D
EC40PM	Mag. Pt.	140 watt	B7ES	.018S	.016S
EC44PQ	CDI	140 watt	N-3	.110D	----
EC44PT	CDI	140 watt	N-2G	.140D	.095D ²
EC51PT	CDI	140 watt	N-2G	.135D	.095D ²
EC54PM	CDI	140 watt	B8ES	.140D	.130D

1975

Engine Model	Ignition Type	Alternator Output	Spark Plug Equivalent	Original Timing*	Recommended Timing*
EC17PM	Mag. Pt.	55 watt	B7ES	.100D	----
EC25PS	Mag. Pt.	75 watt	B7ES	.018S	.016S
EC25PC	Mag. Pt.	75 watt	N-2	.012S	.005S
EC25PT	CDI	75 watt	N-2	.089D	----
EC34PC	Mag. Pt.	75 watt	N-2	.012S	.005S ³
EC34PQ	CDI	140 watt	B7ES	.089D	----
EC34PT	CDI	75 watt	N-2	.089D	----
EC44PQ	CDI	140 watt	B7ES	.089D	----
EC44PT	CDI	75 watt	N-57	.089D	----
EC91PT	CDI	140 watt	N-2	.089D	----

*D – Dynamic timing/5,000 RPM

S – Static timing

1 – Reference Service Bulletin No. 84

2 – Reference Information Bulletin No. 29

3 – Reference Service Bulletin No. 101

ENGINE ELECTRICAL

Ignition Data

Engine Model	Ignition Type	Alternator Output	Spark Plug Equivalent	Original Timing*	Recommended Timing*
EC17PM	Mag. Pt.	55 watt	B7ES	.113D	----
EC25PS	Mag. Pt.	75 watt	B7ES	.014S	----
EC25PC	Mag. Pt.	75 watt	B8ES	.005S	----
EC25PT-06	CDI	75 watt	N-2	.082D	.053D
EC25PT-05	CDI	75 watt	N-1 or N-57G	.082D	.053D
EC34PC	Mag. Pt.	75 watt	N-3	.005S	----
EC34PQ	CDI	140 watt	B7ES	.083D	----
EC34PT-05	CDI	75 watt	N-2	.082D	.053D
EC34PT-06	CDI	75 watt	B10EV	.082D	.053D
EC44PQ	CDI	140 watt	B7ES	.083D	----
EC44PT-05	CDI	75 watt	B8ES	.083D	.057D

Engine Model	Ignition Type	Alternator Output	Spark Plug Equivalent	Original Timing*	Recommended Timing*
EC25PS <i>Colt</i>	Mag. Pt.	75 watt	N-3	.014S	----
EC25PC <i>Colt</i>	Mag. Pt.	75 watt	N-2	.005S	----
EC25PM-01 <i>Colt SS</i>	Mag. Pt.	75 watt	N-2	.005S	----
EC25PT-07 <i>TX</i>	CDI	75 watt	B9ES	.042-.067D	.053D
EC34PM-03 <i>Colt SS</i>	Mag. Pt.	75 watt	N-3	.005S	----
EC34PQ <i>Electra</i>	Mag. Pt. CDI	75 watt 140 watt	N-3	.006S .088D	----
EC34PT-05 <i>TX</i>	CDI	75 watt	B9ES	.042-.067D	.053D
EC34PL-01 <i>TXL</i>	CDI	75 watt	B9ES	.042-.067D	.053D ⁴
EC44PQ <i>Electra</i>	Mag. Pt. CDI	75 watt 140 watt	N-3	.006S .088D	----
EC44PT-05 <i>TX</i>	CDI	75 watt	B9ES	.050-.072D	.057D
EC44PT-06 <i>TX</i>	CDI	75 watt	B9ES	.050-.072D	.057D

*D - Dynamic timing/5,000 RPM

S - Static timing

4 - Reference Racing Bulletin No. 77-2

ENGINE ELECTRICAL

Ignition Data

Machine Model	Engine Model	Ignition Type	Alternator Output	Spark Plug RFI/NGK
Colt	EC25PS	Mag. Pt.	75 watt	BR8ES
Colt	EC25PC	Mag. Pt.	75 watt	BR9ES
S/S 340	EC34PM-03/04N	Mag. Pt.	75 watt	BR8ES
Cobra	EC34PM-04	Mag. Pt.	75 watt	BR9ES
Cobra	EC44PM-01	Mag. Pt.	75 watt	BR9ES
TX	EC25PT-07	CDI	75 watt	BR9ES
TX	EC34PT-05	CDI	75 watt	BR9ES
TX	EC44PT-05	CDI	90 watt	BR9ES
TX-L	EC34PL-02	CDI	75 watt	BR9ES

Engine Model	Point Gap		Ignition Timing			
			Static		Running	
			MM BTDC	Inches BTDC	MM BTDC	Inches BTDC
	MM	Inches				
EC25PS	.35	.014	.360	.014	2.96	.116
EC25PC	.35	.014	.048	.002	1.69	.067
EC34PM—03/04N	.35	.014	.048	.002	1.69	.067
EC34PM—04	.35	.014	.048	.002	1.69	.067
EC44PM—01	.35	.014	.051	.002	1.83	.072
EC25PT—07	---	---	---	---	4.31*1	.169*1
EC34PT—05	---	---	---	---	4.31*1	.169*1
EC44PT—05	---	---	---	---	4.19*2	.165*2
EC34PL—02	---	---	---	---	5.05*3	.198*3

*Timing specified at 3,000 RPM

1 - EC25PT-07/EC34PT-05
Acceptable Variance
4.02mm - 4.59mm BTDC
.158 in. - .180 in. BTDC
28° - 30° BTDC

2 - EC44PT-05
Acceptable Variance
3.76mm - 4.65mm BTDC
.148 in. - .183 in. BTDC
26° - 29° BTDC

3 - EC34PL-02
Acceptable Variance
4.60mm - 5.52mm BTDC
.181 in. - .217 in. BTDC
30° - 33° BTDC

ENGINE ELECTRICAL

Ignition Data

Machine Model	Engine Model	Ignition Type	Alternator Output	Spark Plug		Plug Gap Inches
				RFI NGK	Champion	
Gemini	EC25PS	Mag. Pt.	75 watt	BR8ES	N-3	.020
Gemini	EC25PM-01	Mag. Pt.	75 watt	BR8ES	N-3	.020
Apollo	EC34PM-03	Mag. Pt.	75 watt	BR8ES	N-3	.020
Cobra	EC34PM-04	Mag. Pt.	75 watt	BR9ES	N-2	.020
Cobra	EC44PM-01	Mag. Pt.	75 watt	BR8ES	N-3	.020
TX	EC25PT-07	CDI	75 watt	BR9ES	N-2	.020
TX	EC34PT-05	CDI	90 watt	BR9ES	N-2	.020
TX	EC44PT-05	CDI	90 watt	BR9ES	N-2	.020
TX-L	EC34PL-02	CDI	90 watt	BR9ES	N-2	.020
Centurion	EC51PL-01	CDI	120 watt	BR9ES	N-2	.020

Engine Model	Point Gap Inches	Ignition Timing					
		Static			Running		
		MM BTDC	Inches BTDC	Degrees BTDC	MM BTDC	Inches BTDC	Degrees BTDC
EC25PS	.014	.3646	.014	8 ± 3	2.958	.116	23 @ 2,000
EC25PM-01	.014	.0476	.002	3 ± 3	1.690	.067	18 @ 2,000
EC34PM-03	.014	.0476	.002	3 ± 3	1.690	.067	18 @ 2,000
EC34PM-04	.014	.0476	.002	3 ± 3	1.690	.067	18 @ 2,000
EC44PM-01	.014	.0513	.002	3 ± 3	1.826	.072	18 @ 2,000
EC25PT-07	----	----	----	----	4.305*1	.169*1	29 @ 3,000*1
EC34PT-05	----	----	----	----	4.305*1	.169*1	29 @ 3,000*1
EC44PT-05	----	----	----	----	4.192*2	.164*2	27.5 @ 3,000*2
EC34PL-02	----	----	----	----	5.050*3	.198*3	31.5 @ 3,000*3
EC51PL-01	----	----	----	----	3.748*4	.147*4	27 @ 3,000*4

*Timing specified at 3,000 RPM

1 – EC25PT-07/EC34PT-05

Acceptable Variance

4.02mm – 4.59mm BTDC

.158 in. – .180 in. BTDC

28° – 30° BTDC

2 – EC44PT-05

Acceptable Variance

3.76mm – 4.65mm BTDC

.148 in. – .183 in. BTDC

26° – 29° BTDC

3 – EC34PL-02

Acceptable Variance

4.60mm – 5.52mm BTDC

.181 in. – .217 in. BTDC

30° – 33° BTDC

4 – EC51PL-01

Acceptable Variance

3.48mm – 4.02mm BTDC

.137 in. – .158 in. BTDC

26° – 28° BTDC

ENGINE ELECTRICAL

Timing Chart

55.6 MM Stroke

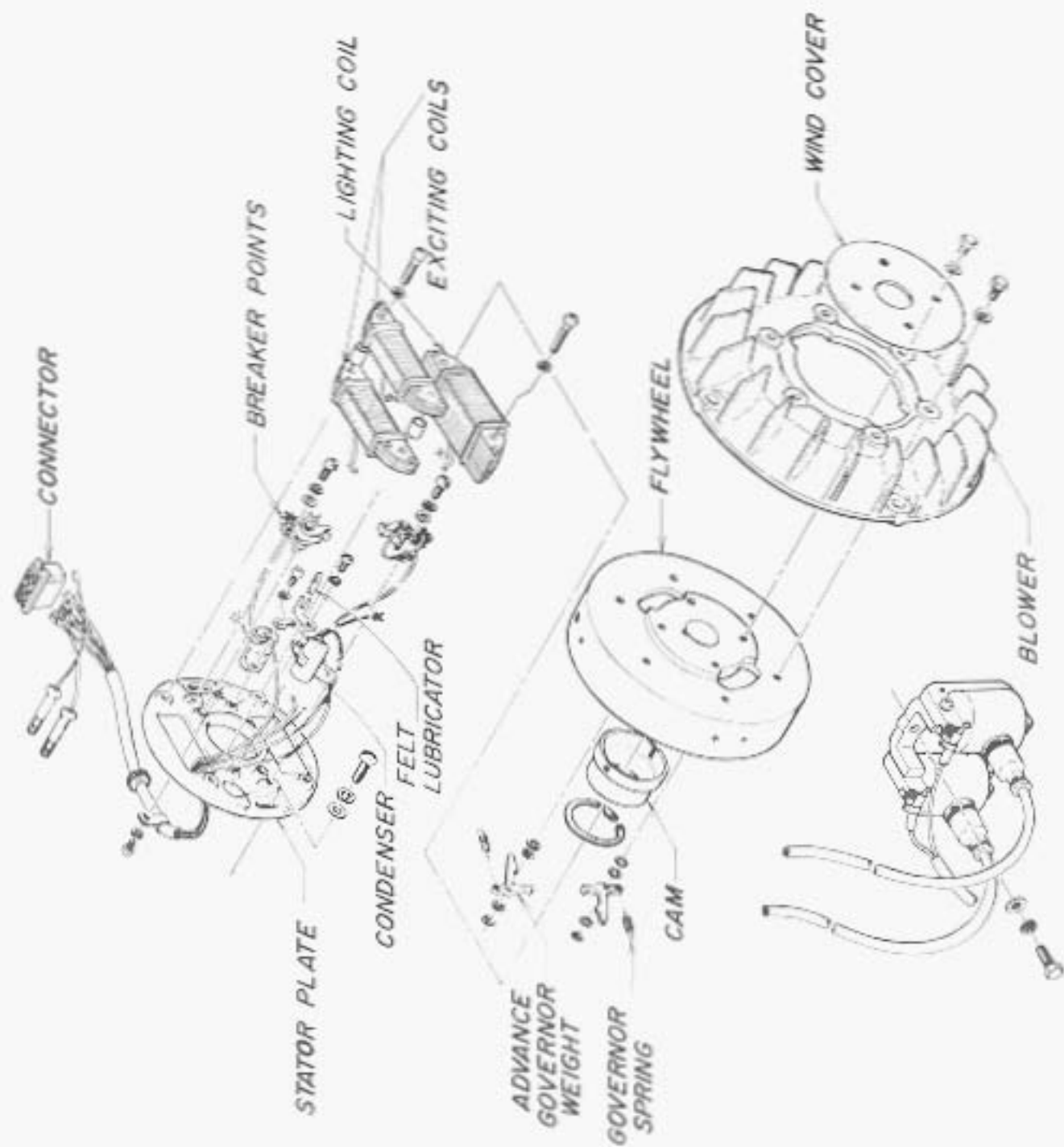
Degrees BTDC	MM	Inches
1	.0052	.0002
2	.0211	.0008
3	.0476	.0018
4	.0846	.0033
5	.1321	.0051
6	.1902	.0074
7	.2588	.0101
8	.3378	.0132
9	.4273	.0167
10	.5271	.0207
11	.6373	.0250
12	.7578	.0297
13	.8884	.0349
14	1.0293	.0404
15	1.1802	.0463
16	1.3412	.0527
17	1.5121	.0594
18	1.6929	.0665
19	1.8835	.0740
20	2.0837	.0818
21	2.2936	.0901
22	2.5130	.0987
23	2.7417	.1077
24	2.9798	.1171
25	3.2270	.1268
26	3.4833	.1368
27	3.7485	.1473
28	4.0226	.1580
29	4.3053	.1692
30	4.5966	.1806
31	4.8963	.1924
32	5.2044	.2045
33	5.5205	.2169
34	5.8447	.2296
35	6.1767	.2427

60 MM Stroke

Degrees BTDC	MM	Inches
1	.0057	.0002
2	.0228	.0008
3	.0513	.0020
4	.0913	.0035
5	.1426	.0056
6	.2053	.0080
7	.2793	.0109
8	.3646	.0143
9	.4611	.0181
10	.5688	.0223
11	.6877	.0270
12	.8177	.0321
13	.9588	.0376
14	1.1108	.0436
15	1.2736	.0500
16	1.4473	.0568
17	1.6318	.0641
18	1.8269	.0717
19	2.0325	.0798
20	2.2486	.0883
21	2.4751	.0972
22	2.7118	.1065
23	2.9587	.1162
24	3.2156	.1263
25	3.4824	.1368
26	3.7589	.1477
27	4.0452	.1589
28	4.3409	.1705
29	4.6460	.1825
30	4.9604	.1949
31	5.2838	.2076
32	5.6162	.2207
33	5.9574	.2341
34	6.3072	.2478
35	6.6655	.2619

Magneto Point Ignition System – Exploded View

TWIN CYLINDER MAGNETO IGNITION SYSTEM



ENGINE ELECTRICAL

Magneto Point Ignition System Timing Procedures

Ignition timing is the proper time to ignite the compressed gas in the combustion chamber, as the piston reaches the top of its stroke. Timing is usually measured in distance from top dead center or in degrees of crankshaft rotation.

Correct timing greatly influences performance. Improper timing causes a decrease in H.P., overheating and increased fuel consumption and can also shorten engine life.

Standard timing for each individual engine can be found in the general specification section of this manual.

Any ignition setting that is less than the standard setting (measured in distance from top dead center, or degrees of crankshaft rotation) is "retarded timing" and any ignition setting that is more than the standard setting is advanced.

STANDARD BREAKER POINT ENERGY TRANSFER SYSTEMS

Contact Breaker — The contact breaker (points) on the magneto stator plate is a kind of switch which cuts the primary current generated in the primary coil by the action of the rotating cam inside the flywheel.

Point Gap — To generate high voltage in the ignition coil, it is necessary to interrupt the flow of current in the primary coil. The current flow is interrupted when the contact points open. If the point gap is too small, the current is not completely interrupted because some current will "jump the gap." If the gap is too large, the quantity of current decreases. In either case performance is influenced because high voltage cannot be produced consistently.

Point Gap should be between .011 and .017 (.014 is a good average).

Point Gap Adjustment — To adjust point gap, rotate the flywheel until the cam opens the points. Stop the flywheel when the point gap is the greatest. Measure the gap with a common feeler type thickness gauge. If the gap must be reset, loosen the point anchor screw and move the point anchor plate in the necessary direction to either increase or decrease the gap as necessary, Fig. 1 (A).

Note: When the flywheel is in the position that opens the point gap to the maximum, this adjustment can be done through the "window" in the flywheel, Fig. 2.

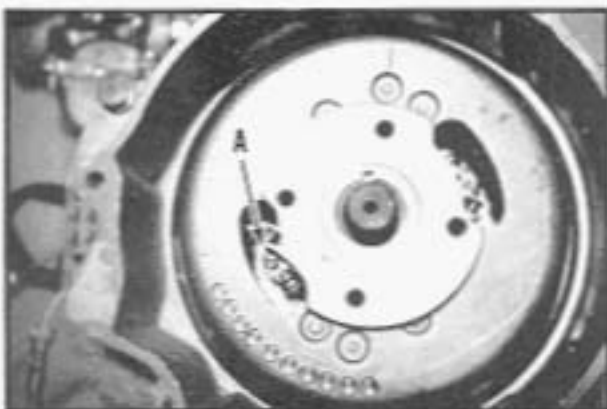


Fig. 1



Fig. 2

Timing Adjustment — To check and/or adjust timing it is necessary to know at what instant the breaker points open and where the piston is in relation to top dead center at the same instant.

The timing kit (PN 2870201) contains a dial indicator, which, when properly installed in the cylinder head, gives an accurate indication of piston position; and a flashlight type indicator that, when properly attached, dims at the instant the points open.

If the points open at the correct crankshaft position the timing is correct. (With the point gap within the correct limitations.)

ENGINE ELECTRICAL

Magneto Point Ignition System Timing Procedures

On all models, the crankshaft should be rotated counterclockwise past the point of correct timing and then rotate the crankshaft clockwise until the light or buzzer changes. This will eliminate slack or free play within the internal workings of the engine.

Static (retarded) Timing vs. Running (advanced) Timing:

1. Static timing is performed without the engine running. At this position, the governor weights in the flywheel are in the retarded position.
2. Running timing is done with the governor weights in the flywheel manually locked open, simulating a top RPM situation. This can be done by locking the weights open by inserting a cap screw through one of the rope starter pulley holes in the flywheel.
3. The 175cc engine is timed in the advanced position as there is no cam advance on the 175cc flywheel. All other engines with magneto ignition can be timed in either the static or running position. Check the Engine Specification section in this manual for correct timing specs.

Dial indicator and timing light properly installed on a twin cylinder engine — The timing light and the dial indicator should be attached to the No. 2 cylinder first, (clutch side).

The No. 2 cylinder should be timed first on twin cylinder engines. The No. 2 cylinder wire in the wire loom is the white wire.

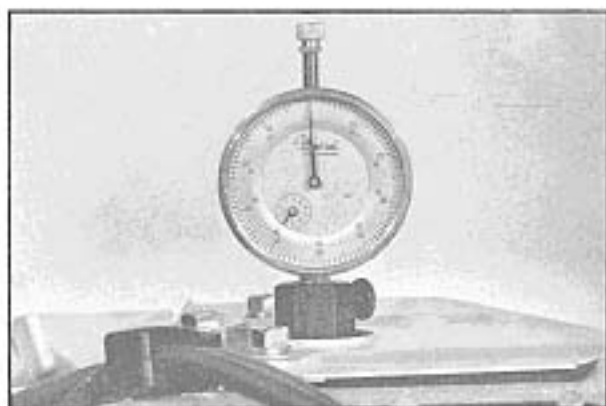
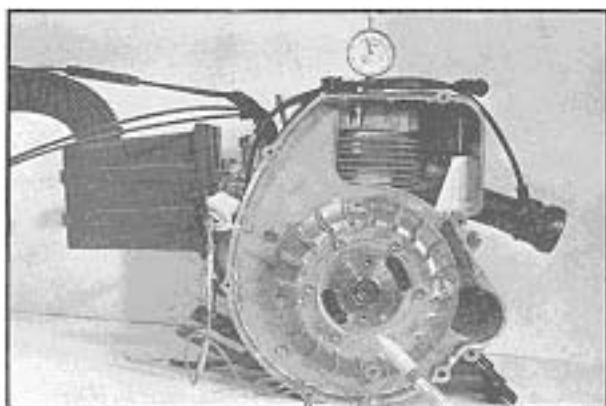
The No. 1 cylinder wire is the red wire.

It is good practice to set the point gap (or gaps) at .014 at the beginning of the timing procedure. (This gap setting is only a good average and can be changed if necessary.)

Installing the Dial Indicator — Shown here installed in the No. 2 cylinder of a twin cylinder engine. Once the indicator is installed, rotate the crankshaft to find top dead center, (TDC).

T.D.C. is the point when the pointer of the gauge just begins to change direction of rotation. Once this point is found, loosen the set screw holding the face of the gauge, and rotate until the "zero" aligns with the pointer, as shown. The piston should then be at T.D.C. of its stroke and the dial indicator pointer at "zero." Any movement of the piston (crankshaft rotation) will then be registered by the pointer in thousandths (.001).

Attaching the Timing Light — One lead of the timing light can be attached to ground anywhere on the engine. The remaining lead must be attached to the wire from the stator plate for the cylinder being timed. On the single cylinder models, the ignition wire is the red wire in the engine wire loom. On twin cylinder models the red wire is the No. 1 cylinder lead and the white wire is the No. 2 cylinder lead.



ENGINE ELECTRICAL

Magneto Point Ignition System Timing Procedures

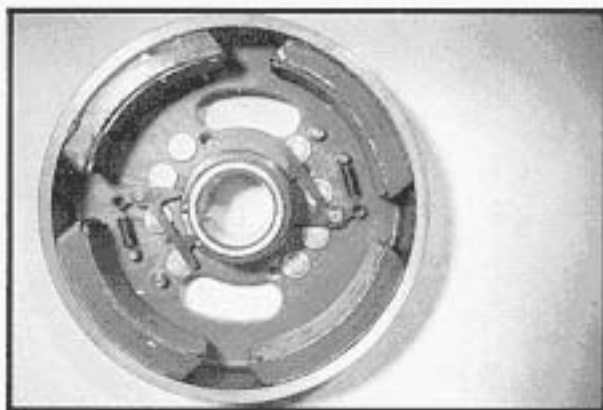
TIMING INSTRUCTIONS

175cc

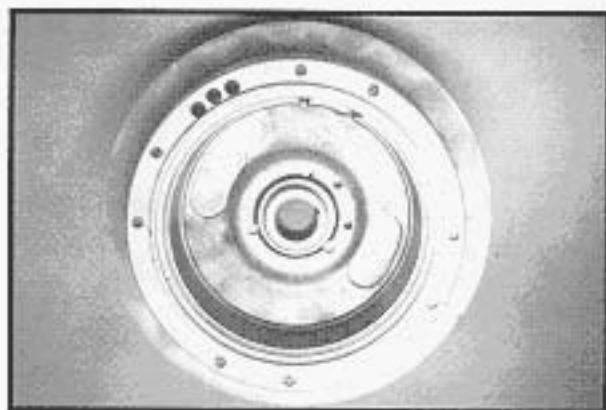
1. Timing checked and set at running specs.
2. No mechanical advance.
3. Cam is on crankshaft (not on flywheel).
4. Timing achieved by setting point gap.
5. Stator plate is not movable.
6. Engine can be timed with flywheel removed.

Procedure:

1. Install dial indicator.
2. Connect one lead of timing light to the red wire and the other wire to ground.
3. Rotate crankshaft to find T.D.C. (top dead center) and zero dial indicator.
4. Rotate crankshaft counterclockwise past the point where the light changes, then rotate clockwise to this point (this will eliminate loose play).
5. If timing is incorrect, adjust point gap.
 - A. If timing is too far advanced, closing the point gap will retard the timing.
 - B. If timing is retarded, opening the point gap will advance timing.
 - C. Point gap should be within .011 — .017.



Twin Cylinder Flywheel
With Automatic Spark Advance



175cc Flywheel Without
Automatic Spark Advance

244cc Single

1. Timed in static position, can be timed in advanced position by locking the cam. See Ignition Data section in this manual for advanced specs.
2. Has mechanical advance on flywheel.
3. Cam is on flywheel.
4. Stator plate is movable.

Procedure:

1. Set point gap at .014 inches at high point of cam.
2. Install dial indicator, rotate crankshaft to find T.D.C., and zero the dial.
3. Connect timing light to red wire and ground.
4. Rotate crankshaft counterclockwise past the place where the light changes, and then rotate clockwise back to the point where the light changed.
5. If timing is incorrect, move the stator plate.
 - A. Rotating the stator plate clockwise will retard the timing.
 - B. Rotating the stator plate counterclockwise will advance the timing.
 - C. Point adjustment can be changed but should remain within .011 — .017.

ENGINE ELECTRICAL

Magneto Point Ignition System Timing Procedures

All Twin Cylinders With Magneto Ignition

1. Timed in static position. Can be timed in advanced position by locking the cam. See Ignition Data charts for the advanced specs.
2. Has mechanical advance.
3. Cam on flywheel.
4. Stator plate is movable.

Procedure:

1. No. 2 cylinder (clutch side of engine).
 - A. Set points at .014 in. (No. 2 identified by white wire coming from points and condenser) on the high point of the cam.
 - B. Hook timing light to white wire coming from engine, and also ground timing light.
 - C. Install dial indicator, find T.D.C. and zero.
 - D. Rotate crankshaft counterclockwise past the point where the light changes, then rotate clockwise back to the point where the light changes.
 - E. If the timing is incorrect, the stator plate can be adjusted.
 1. Moving the plate clockwise will retard the timing.
 2. Moving the plate counterclockwise will advance the timing.

Example: If .018 is the desired static timing and the timing light dims when the pointer is at .008, rotate the stator in the direction shown. (.008 is "retarded" and the stator plate must be advanced until the pointer reads .018 when the light dims.)



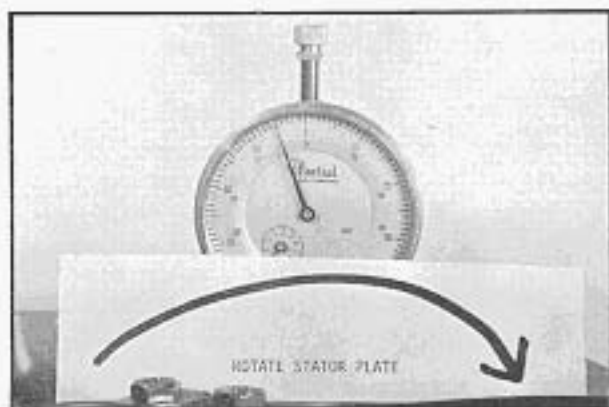
NOTE: Refer to the Ignition Data charts in this section for detailed individual engine timing recommendations.

ENGINE ELECTRICAL

Magneto Point Ignition System Timing Procedures

If the timing light dims when the pointer is past .018, then the timing is too advanced and the stator plate must be rotated in the direction shown to "retard" it to .018.

Remember: Move the stator plate to time only the No. 2 cylinder on twin cylinder models.

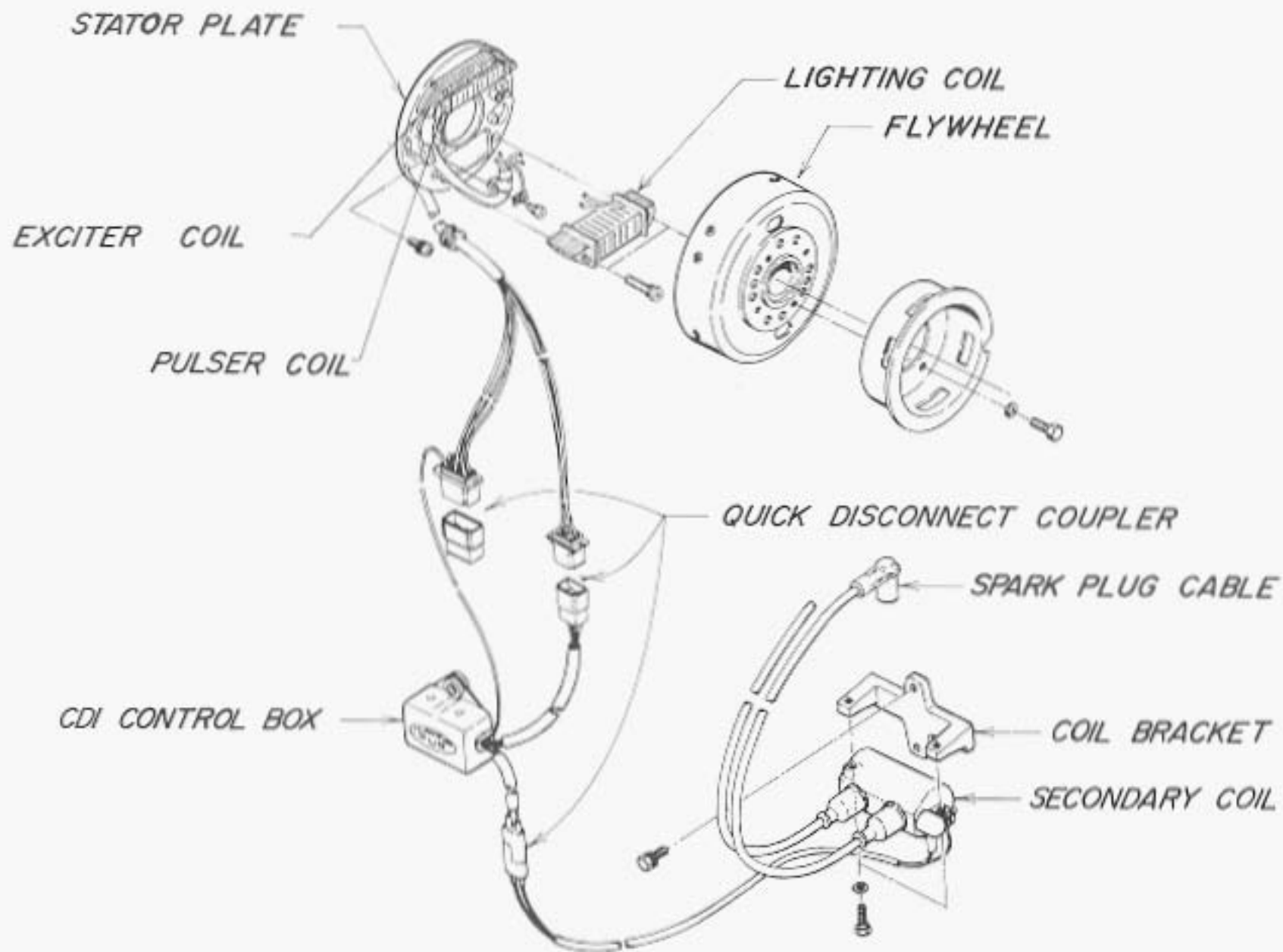


2. No. 1 cylinder (flywheel side of engine).
 - A. Install dial in No. 1 cylinder.
 - B. Find T.D.C. and zero dial.
 - C. Connect timing light to red wire coming from engine.
 - D. Rotate crankshaft counterclockwise past the point where the light changes, then rotate clockwise back to the point of change.
 - E. If the timing is incorrect, the No. 1 set of points must be adjusted.
 1. The No. 1 cylinder points are identified by the red wires connecting the points and condenser.
 2. If the timing is too far advanced, the point gap must be closed.
 3. If the timing is too far retarded, the points must be opened.
 4. After correct timing is achieved, the point gap must be checked to assure that it is within the .011 – .017 range provided.
 5. In the event that the point gap on No. 1 set of points is not within the .011 – .017 range after the correct timing has been achieved, the engine must be retimed using a different point gap on No. 2 cylinder. To correct this should it occur

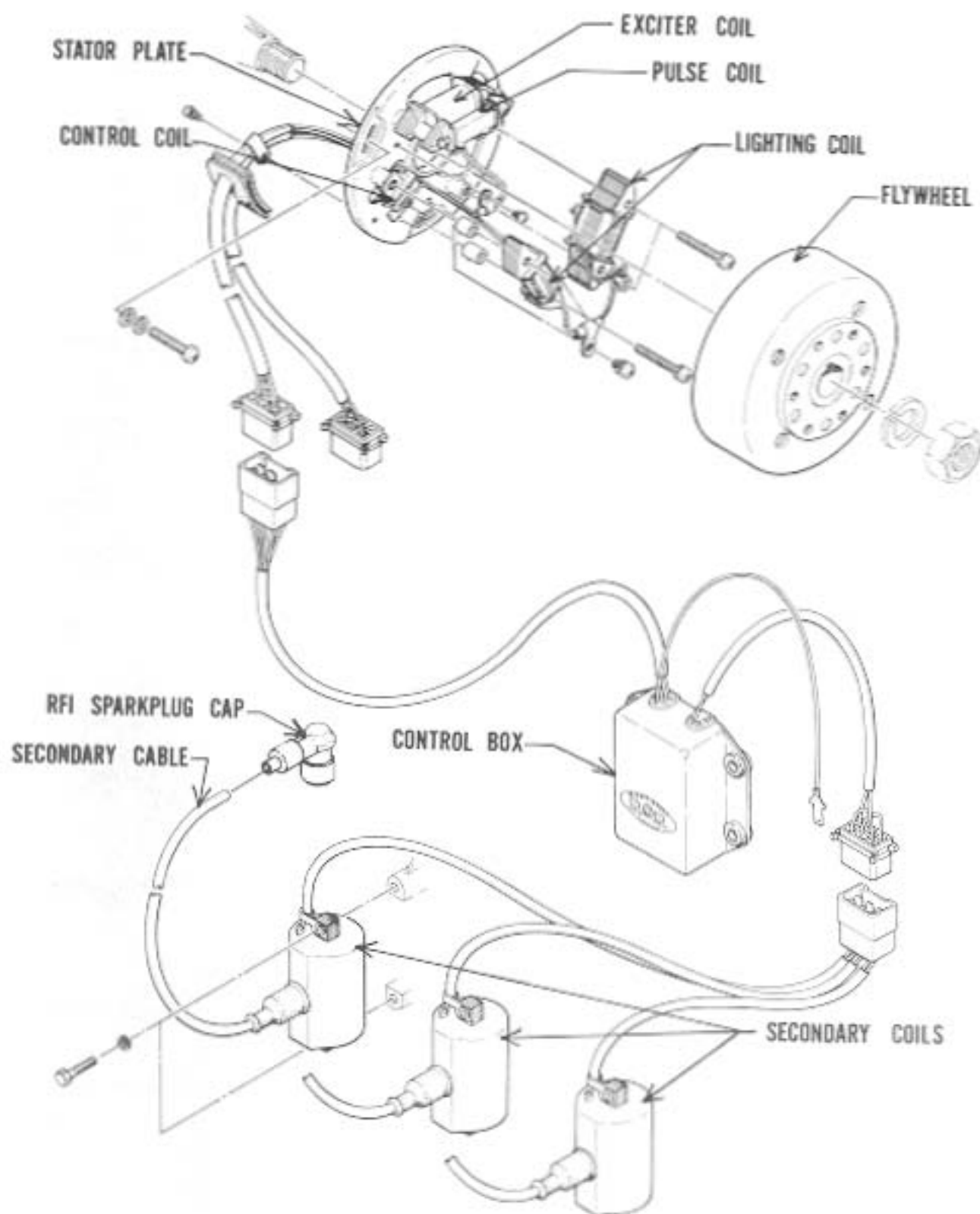
*Point gap too wide (over .017) on No. 1 cylinder. The point gap on No. 2 cylinder should be closed slightly (.001 – .002). Then the stator plate must be advanced (moved counterclockwise) to maintain the correct timing of No. 2 cylinder. Then No. 1 cylinder can be retimed. After achieving correct timing, check the point gap to assure it is within tolerance (.011 – .017).

*If point gap on No. 1 cylinder is too close, (under .012). The point gap on No. 2 cylinder should be opened slightly, then the stator plate must be retarded (moved clockwise) to maintain the correct timing on No. 2 cylinder. Then No. 1 cylinder must be retimed. When the correct timing is reached, the point gap on No. 1 cylinder must be checked. Repeat the above procedure if point gap is still incorrect.

TWIN CYLINDER CAPACITOR DISCHARGE IGNITION SYSTEM

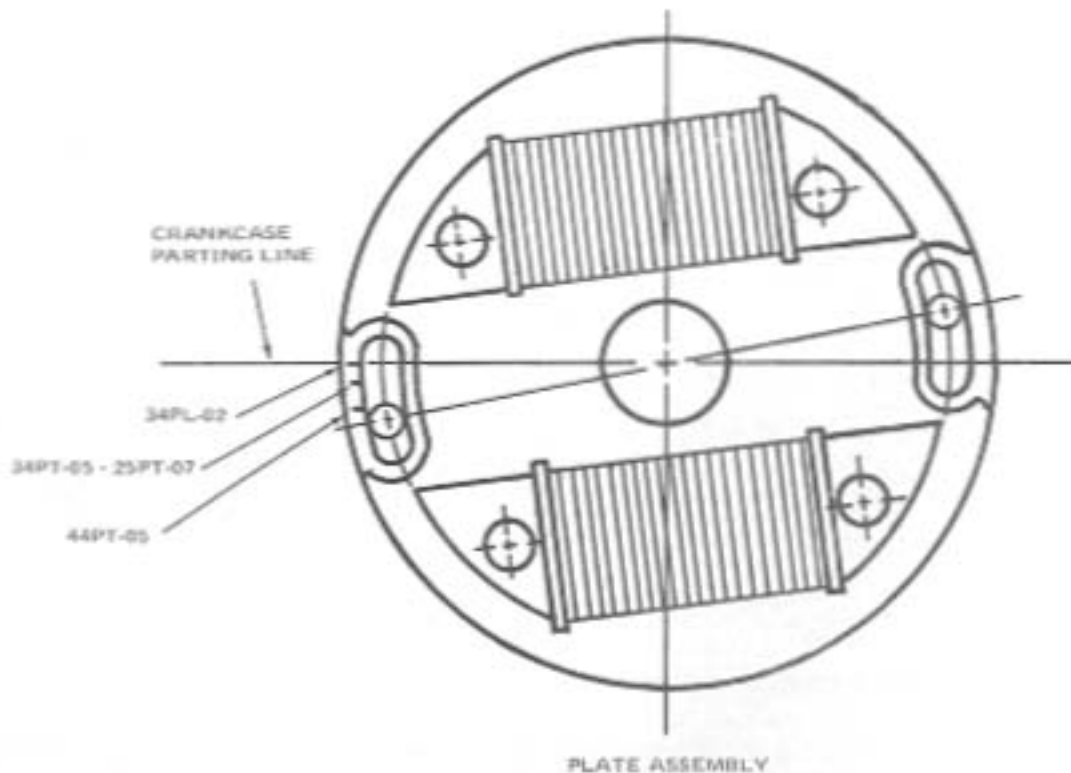


ENGINE ELECTRICAL
Magneto — 500 — Exploded View



EC 51 PL CAPACITOR DISCHARGE IGNITION SYSTEM

ENGINE ELECTRICAL
CDI Stator Plate Installation



The CDI system used on Polaris engines incorporates predetermined static timing settings for three different engine applications. During assembly of the stator plate to engine, observe the following:

1. Identify engine model number from the tag located on the crankcase.
2. Refer to the above drawing to identify the correct stator plate timing mark to coincide with the engine model number.
3. Install the stator plate and mounting screws, aligning the respective mark with the crankcase half parting line.
4. Tighten plate mounting screws.

ENGINE ELECTRICAL

Pre-1978 CDI Dynamic Timing Procedures

CAPACITOR DISCHARGE IGNITION

1. Obtain the proper timing specification from the ignition data section of this manual.
2. Install a dial indicator into one of the cylinder heads.* From top dead center (T.D.C.) rotate the engine backward from the normal engine rotation. When the needle of the indicator corresponds with the recommended timing spec (A), a reference mark should be made on the flywheel and recoil housing (B).



A



B

3. Remove drive belt.
4. Use a strobe light to check for proper alignment of the timing marks.
5. When the engine is run at the recommended RPM for checking ignition timing, the two reference marks should line up.
6. If the timing is retarded too much, the stator plate will have to be turned counterclockwise from normal engine rotation. If advanced too much, rotate the stator plate clockwise to normal engine rotation.
7. Access to the stator plate is achieved by removing the recoil or recoil housing and starter cup.
8. After timing is achieved, reassemble the engine.

*Because the spark plugs fire at the same time it is only necessary to time one of the cylinders and it follows that the remaining cylinder(s) must be the same.

ENGINE ELECTRICAL
CDI Dynamic Timing Procedures – Twin Cylinder

1. On engines with CD ignition, each spark plug fires twice per revolution of the crankshaft.
2. The spark advance mechanism is controlled electrically, therefore, there is no cam on the flywheel, nor any governor weights in the flywheel.
3. Because both spark plugs fire at the same time it is only necessary to time one of the two cylinders and it follows that the remaining one must be the same.
4. A strobe light is needed to time engines with CD ignition. Use a strobe light that can withstand high CD voltage.
5. Engines are timed in full advance position with engines running at specified RPM.

Procedure:

-  1. Remove the drive belt or safely support the rear of machine in a secured area prior to performing any checks.
2. Connect positive and negative leads from timing light to power source and clamp the remaining lead to a spark plug wire. Remove the dust cover grommet from the magneto cover to gain access to the timing marks.
NOTE: EC34PL-02 timing is checked from the engine front side using the machined surface provided after the water pump cover is removed.

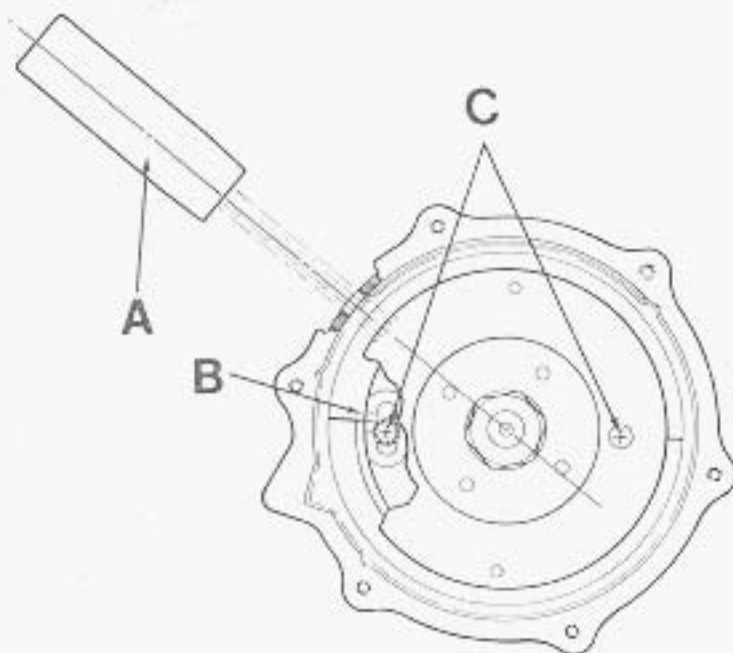


Figure 1

-  3. Start the engine and slowly accelerate to 3,000 RPM. Check the timing by sighting directly above the hole in the magneto cover.
NOTE: On TX engines with the timing access plug provided in the magneto housing, install timing fixture (PN 2870422) to increase timing accuracy.

ENGINE ELECTRICAL

CDI Dynamic Timing Procedures — Twin Cylinder

4. Noting the timing mark position from the dynamic check, refer to the timing mark diagram for proper mark identification and allowable variance range.

NOTE: Identify engine model with respective diagram.

5. If the timing marks are within the variance range shown, engine timing is correct.

6. If the timing needs to be adjusted, proceed as follows:
(Refer to Figure 1 on IV - 17)

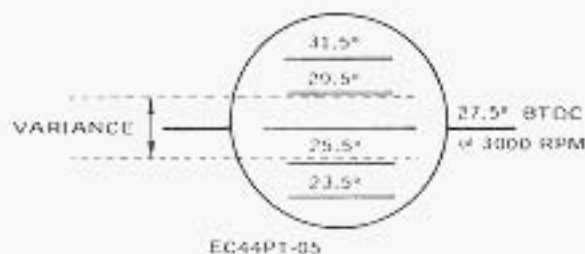
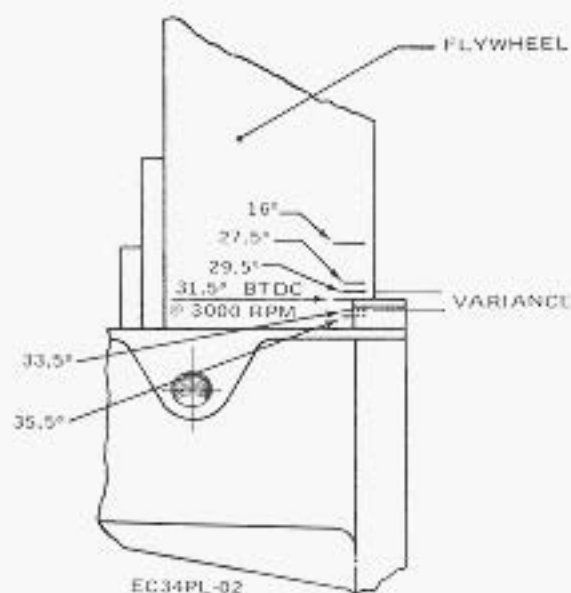
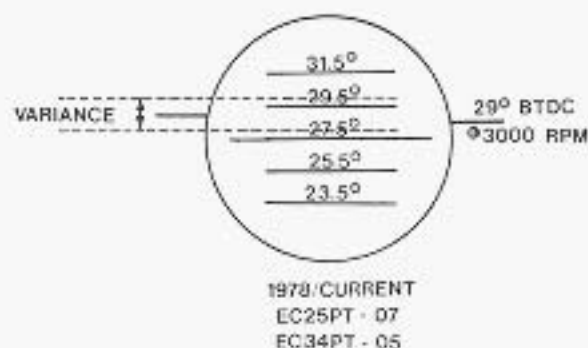
A. Remove the recoil starter and starter cup.

B. Using a flashlight, locate and reference the stator plate index marks. These marks are located on the left side of stator plate (B), Fig. 1.

C. Timing adjustment is accomplished by rotating the stator plate. Loosen the two stator plate fastening screws (C), Fig. 1, and rotate the plate in the direction required. (Counterclockwise advances timing.) Refer to the respective engine timing diagram for mark identification and range.

D. Tighten the two stator plate screws. Install the starter cup and re-check dynamic timing.

E. When timing is properly adjusted, re-check the two stator plate attaching screws for tightness and re-assemble engine.



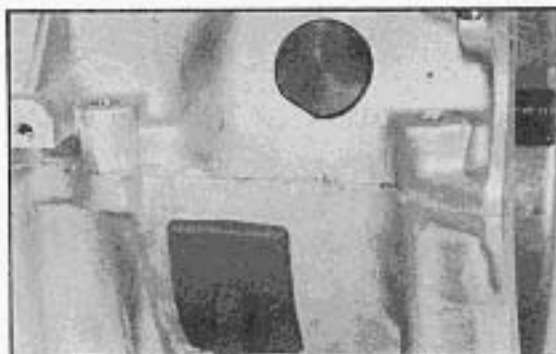
CDI Dynamic Timing Procedures — Three Cylinder

THREE CYLINDER CAPACITOR DISCHARGE IGNITION

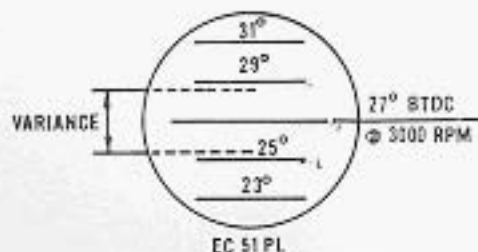
1. The three-cylinder Centurion 500cc engine fires each spark plug three times per revolution, every 120° of rotation.
2. The timing advance mechanism is controlled by the CDI control box.
3. This ignition is designed to gradually retard the spark as engine RPM increases. For example: At 3,000 RPM the timing should be set at 27° or .147". As the RPM increases the ignition will retard automatically to approximately 20° at 7,500 RPM.

Procedure:

1. Remove the drive belt.
2. Using a strobe light capable of high CDI voltage, connect the positive and negative leads to a power source (6 or 12 volt battery) and the remaining lead to one of the three spark plug leads that run to the spark plugs. Remove the rubber dust cover grommet from the magneto housing to gain access to the timing marks on the flywheel.



3. Start the engine and slowly accelerate to 3,000 RPM. Check the timing with the timing light aimed directly at the hole in the magneto cover.
NOTE: Using the timing light, sight perpendicular to the center line of the crankshaft.
4. Note the timing mark position from the dynamic check. Refer to the timing mark diagram for proper mark identification and allowable variance range.



5. If the timing marks are within the variance range shown, engine timing is correct.
6. If the timing needs to be adjusted, proceed as follows:
 - A. Remove the water pump cover, the recoil starter, and the starter cup.
 - B. The timing adjustment is changed by rotating the stator plate counterclockwise to advance and clockwise to retard the timing. Loosen the three stator plate hold-down screws and rotate the stator plate in the direction required.
 - C. Tighten the three stator hold-down screws. Install the starter cup, recoil starter, and water pump cover. Re-check timing.
 - D. When the timing is properly adjusted, re-check the three stator hold-down screws and pump belt tension. Reassemble the engine.

ENGINE ELECTRICAL

Model 1-L Ignition Tester

The model 1-L Ignition Tester provides an inexpensive, simple, rapid, and accurate means of testing CD ignition components and magneto output on conventional magneto point ignitions.



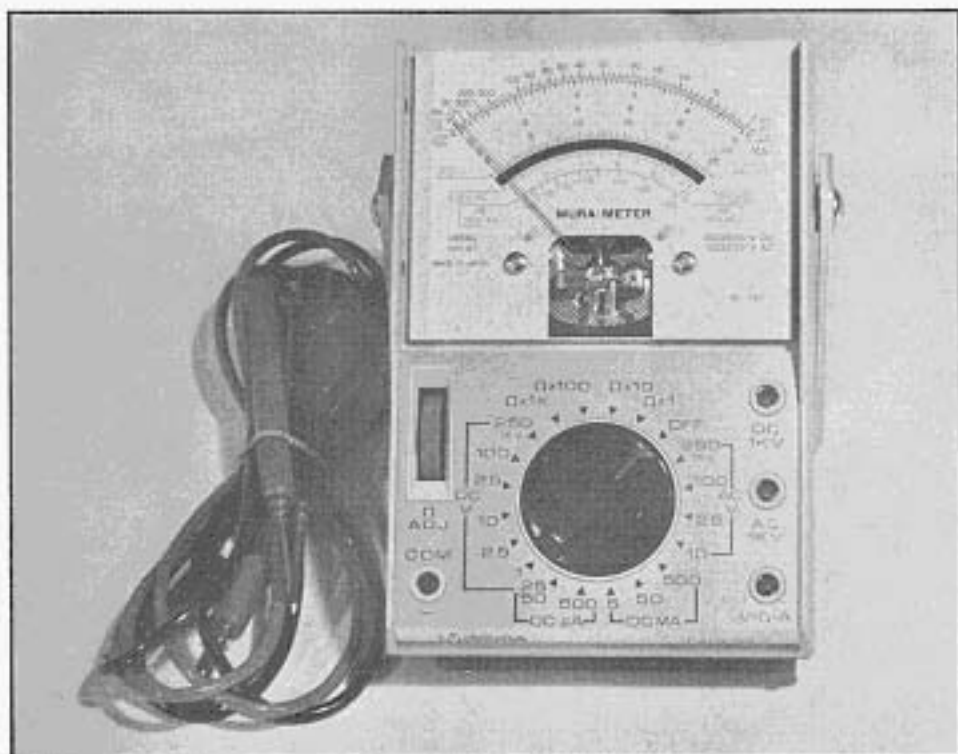
Tester kit includes self-testing device, batteries, and convenient hanger handle. High voltage adapter (MM-1) and wire harness adapters are available.

When ordering, please state make of vehicles to be tested.

FOR FURTHER INFORMATION CONTACT:

Electro-Specialties, Inc.
11225 West Bluemound Road
Wauwatosa, WI 53226

Telephone — 414/475-7550



SPECIFICATIONS:

DC Voltage:	0-25, 1, 2.5, 10, 25, 100, 250, 1000 volts. 20,000 ohms/volt.
AC Voltage:	0-10, 25, 100, 250, 1000 volts. 10,000 ohms/volt.
Decibels:	-20 to +22 dB.
DC Current:	0-50, 500 μ A; 0-5, 50, 500 mA.
Ohmmeter:	0-6 Megohms in 4 ranges.
Power Supply:	One 1.5-volt size "AA" cell for ohmmeter.

Polaris Multitester (Part No. 2870335)

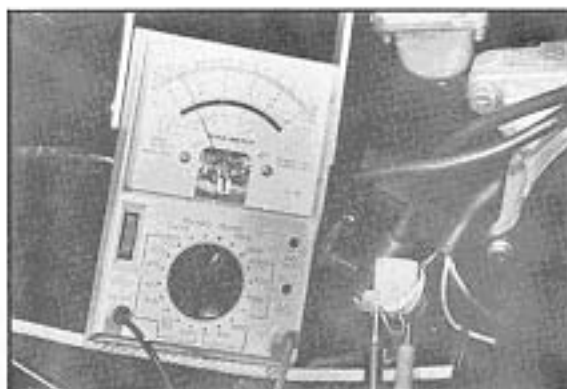
This tester may be used in the following tests on Polaris CD ignition and alternator components.

ENGINE ELECTRICAL

CDI Testing

PROCEDURE

Disconnect the engine primary stator circuit from the CDI control box at the junction block. Adjust the tester in Ohms x 1 position with ohms adjust knob before test by contacting the two test leads together and setting the needle to 0 ohms.



	EXCITER COIL		PULSER COIL	
	Check Position	Resistance Readings	Check Position	Resistance Readings
TWIN CYLINDER MODELS 1978-Current TX, TX-L	Brown/White to White	114 Ohms	Brown/White to Black	63 Ohms
1977 TX-L	Black to White	246 Ohms	Brown/White to Black	61 Ohms
1975-1977 TX	Black to White	246 Ohms	Brown/White to Black	61 Ohms
1976 Starfire	Black to White	246 Ohms	Brown/White to Black	61 Ohms
1972-1977, Except Above Models	Black to White	192 Ohms	Brown/White to Black	24 Ohms
THREE CYLINDER MODELS 1972 TX 500 Limited; 1972 Starfire 439, 650, 795; 1973 Starfire 439, 650	Red to Stator (Engine Ground)	470 Ohms	No. 1 Green to Blue No. 2 Green or Blue to Stator (Engine Ground)	20-22 Ohms Infinity
1973-1975 TX 500	Red to Stator (Engine Ground)	275 Ohms	White to Red	42 Ohms
CONTROL COIL —	Blue to Green	18 Ohms		

NOTE: All readings have a $\pm 10\%$ variance.

NOTE: Readings taken at 68° F (20° C).

EC51PL-01 ENGINE	CHECK POSITION	RESISTANCE READINGS
Exciter Coil	Black to White	261 Ohms
Pulser Coil	Red to White	20 Ohms
Control Coil	Green to Blue	29.4 Ohms
Ignition Coil Primary	Orange to Black	106 Ohms
Ignition Coil Secondary	Black to High Tension Lead	2,016 Ohms

ALTERNATOR OUTPUT TESTS – 75 WATT AND 90 WATT

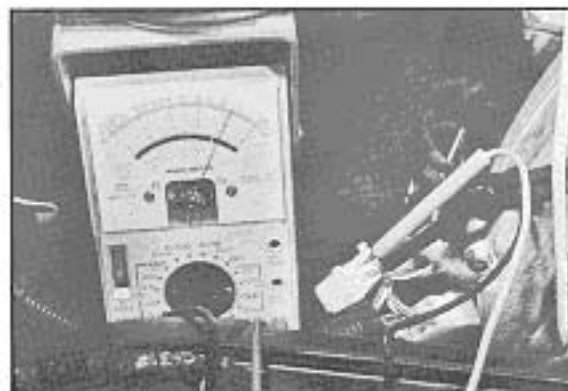
CAUTION: Before performing this test, be sure the Multitester selector is set to the 100 ACV scale to prevent damage to the tester.

1. Disconnect the alternator connector from the engine.
2. Insert red tester lead into one yellow wire coming from the engine alternator.
3. The black tester lead must be grounded to either the engine or the brown wire at connector block.
4. Start engine; observe AC voltage reading on Multitester; slowly increase engine speed to 3,000 RPM. The voltage should read approximately 20 volts. Readings of 15-45 volts are considered normal.

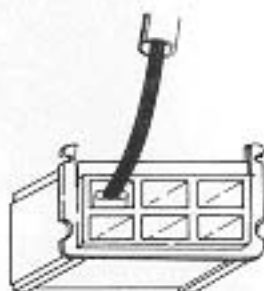


NOTE: On lighting systems with two yellow wires at the connector block, each yellow wire must be checked separately as in steps above. If output on one or both sides is zero or low, the lighting coil must be replaced.

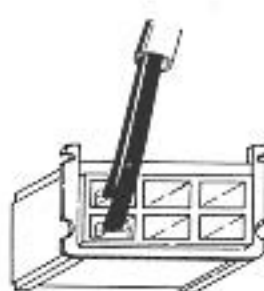
NOTE: On all 140 watt twin cylinder systems alternator output is checked with test leads connected to both yellow wires from the engine.



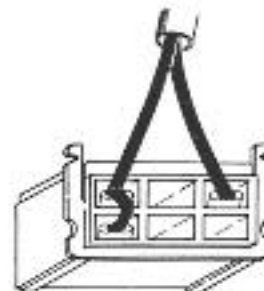
LIGHTING SYSTEM IDENTIFICATION



Yellow Wires
90 Watt
Twin Cylinders



Yellow Wires
75 Watt
Single and Twin Cylinders

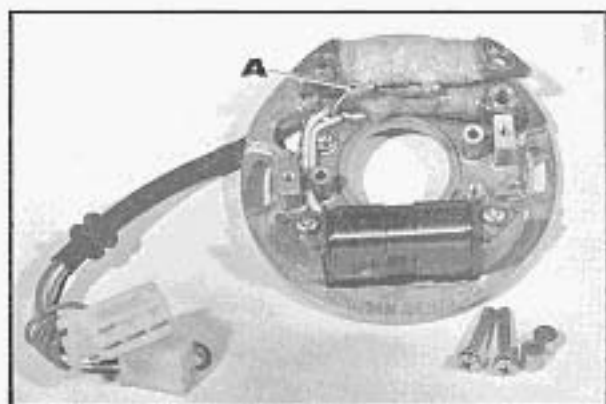


Yellow Wires
140 Watt
Twin Cylinders

ENGINE ELECTRICAL

Twin Cylinder CDI Exciter and Pulser Coil Replacement

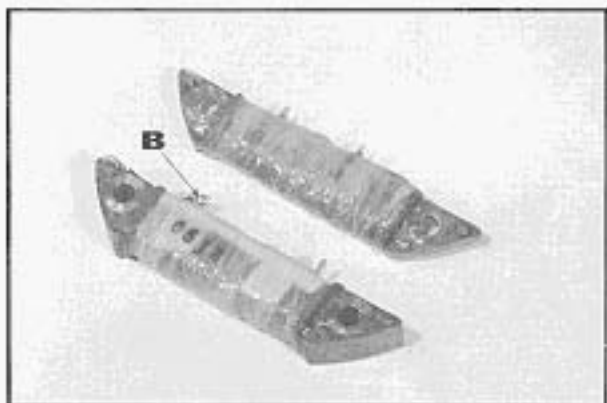
1. Remove the coil retaining screws and spacers. Using a pliers, remove the epoxy from the solder joints (A) on the coil to be replaced.



2. Unsolder the connections from the coil.

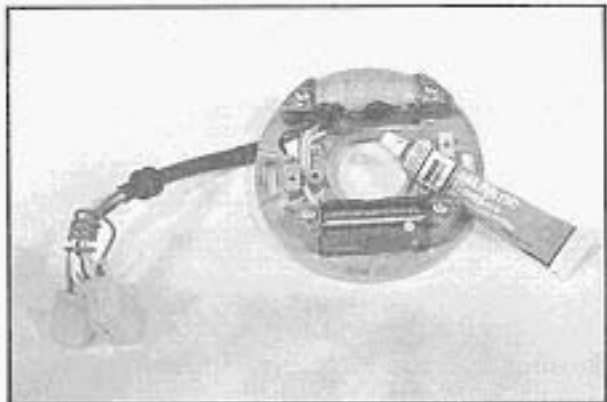


3. Clean the solder terminals (B) on the replacement coil and resolder to their proper wires.



4. Reinstall the retaining screws and spacers. Using a moisture-proof sealant, seal the solder joints as shown. Test resistance of each coil prior to stator plate installation. Lighting and point ignition exciter coils are replaced in a similar manner. All soldering must be done using rosin core solder.

IMPORTANT: After the stator plate is re-installed on the engine check placement of all coil leads to prevent possible contact with the flywheel.



ENGINE ELECTRICAL
Stevens MA-75/MA-80 Coil Test Specifications

TESTING POLARIS COILS ON STEVENS MA-75/MA-80 MAGNETO ANALYZER

The following specifications consist of coil number, "A" or "B" switch setting, index number, adaptor if required, and reference to special notes on making the proper hookups:

3080838	A 28 (Note 1)	3081954	A 20 CD-1 (Note 3)
3081177	A 28 (Note 2)	3081573	A 22
3081272	A 28	3081602	A 24 CD-1
3081303	A 20 CD-1 (Note 3)		
3081389	A 24 CD-1		

NOTE

1. Connect Black Test Clip to coil frame, Red Clip to single red lead. Connect Hi Tension clip to secondary of coil which has red leads. For second test, transfer red test clip and Hi Tension clip to other coil.
2. Connect test clips to coil primary leads. Connect Hi Tension clip to secondary of coil to which Red test clip is connected. Other secondary must be grounded to Black test clip. To test other coil, reverse primary leads and reverse secondary leads.
3. Connect test clips to primary leads. Ground one secondary to black test clip. Test other secondary — if no spark is obtained, interchange secondary leads and retest. To test other secondary, reverse primary leads and reverse secondary leads.

Stevens Model AT-100 Volt-Ohmmeter may be used to check Coil Primary and Secondary Resistance.

ENGINE ELECTRICAL

Ignition Testing – Secondary Coil Part Number Applications

	Cyl. Disp.	Ignition Type	Original Part Number Coil	Superseded by Part Number Coil	Original Part Number Condenser	Superseded by Part Number Condenser
1973						
	175	Magneto	3081573	3081980	3081559	
	244	Magneto	3081272	3081974	3081254	3081970
	294 fan, 398 fan, 294, 335 free	Magneto	3081177		*3081134/3081133	3081970
	TX 294, 335, 398, 432, 530	CDI	3081514	3081954		
	TX 500	CDI	3081602	3081603		
1974						
	175	Magneto	3081980		3081559	
	Single Cylinder 250	Magneto	3081974		3081254	3081970
	250 SS, 295, 295 SS, 340 SS	Magneto	3081958	3081177	*3081254/3081133	3081970
	400	Magneto	3081177		*3081254/3081133	3081970
	TX 250, 340, 440, Custom 530	CDI	3081514	3081954		
	Electra 340, 440	CDI	3081954			
	TX 500	CDI	3081603			
1975						
	175	Magneto	3081980		3081559	
	Single Cylinder 250	Magneto	3081974		3081970	
	250 SS, 340 SS	Magneto	3081177		3081970/3081133	
	TX 250, 340, 440	CDI	3081627	3081954		
	Electra 340, 440	CDI	3081954			
	TX 500	CDI	3081603			
1976						
	175	Magneto	3081980		3081559	
	Single Cylinder 250	Magneto	3081974		3081970	
	250 SS, 340 SS	Magneto	3081177		3081970/3081133	
	TX 250, 340, 440	CDI	3081627	3081954		
	Electra 340, 440	CDI	3081954			
	TX 500	CDI	3081603			
1977						
	175	Magneto	3081980		3081559	
	Single Cylinder 250	Magneto	3081974		3081970	
	250 SS, 340 SS	Magneto	3081177		3081970/3081133	
	TX 250, 340, 440	CDI	3081954			
	Electra 340, 440	CDI	3081954			
1977						
	Single Cylinder 250	Magneto	3081974		3081970	
	Colt Twin Cylinder 250	Magneto	3081177		3081970/3081133	
	250 SS, 340 SS	Magneto	3081177		3081133/3081134	
	Electra 340, 440	CDI	3081954			
	Electra 340, 440	Magneto	3081177		3081133/3081134	
	TX 250, 340, 440	CDI	3081954			
	TXL 340	CDI	3081954			
1978						
	Single Cylinder 250	Magneto	3081974		3081970	
	Colt Twin Cylinder 250	Magneto	3081177		3081133/3081134	
	S/S 340	Magneto	3081177		3081133/3081134	
	Cobra 340, 440	Magneto	3081177		3081133/3081134	
	TX 250, 340, 440	CDI	3081954			
	TX-L 340	CDI	3081954			
1979						
	Gemini Single Cylinder 244	Magneto	3081974		3081970	
	Gemini Twin Cylinder 250	Magneto	3081177		3081133/3081134	
	Apollo 340	Magneto	3081177		3081133/3081134	
	Cobra 340, 440	Magneto	3081177		3081133/3081134	
	TX 250, 340, 440	CDI	3081954			
	TX-L 340	CDI	3081954			
	Centurion 500	CDI				

* Indicates which of the two numbers is superseded.

ENGINE ELECTRICAL
Ignition — Merc-O-Tronic Test Specifications

Polaris Specifications for Merc-O-Tronic Instruments Corp.
Model No. 98, 98A, & 73

POLARIS COIL NO.	MIN. COIL OPERATING AMPERAGE	PRIMARY RESISTANCE		SECONDARY CONTINUITY	
		MIN.	MAX.	MIN.	MAX.
*3080838	1.7	1.4	1.8	40	50
*3081974	1.7	1.4	1.8	40	50
3081573	1.9	.1	.2	45	55
3081980	1.6	.1	.2	45	55
***3081303	2.0	.35	.45	55	65
***3081954	2.0	.35	.5	55	65
*3081177	1.9	1.4	1.8	40	50
**3081389	3.0	.15 or less		20	30
3081603	1.2	.5	.7	60	70
*3081272	1.7	1.4	1.8	40	50

CONDENSER SPECIFICATIONS

CONDENSER NO.	CAPACITY IN MICROFARADS	
	MIN.	MAX.
3081132	.24	.28
3081569	.24	.30
3081133	.22	.27
3081970	.22	.27

*Disconnect internal battery and connect leads from analyzer to a 12 volt storage battery or equal. This test is for COIL POWER TEST ONLY. DO NOT USE THE 12 VOLTS FOR ANY OTHER TESTS AS READING WILL BE INCORRECT.

**To Test this coil, use C.D. Adaptor Part No. 55-980.

***There is no continuity between primary and secondary leads, however, continuity is between secondary leads.

ENGINE ELECTRICAL

Merc-O-Tronic Coil Test Procedures

The following tests were made with a Model 98A Merc-O-Tronic tester, using the self-contained 7-1/2 volt battery, except where noted.

Connect the test leads together and zero the meter as shown.



POINT SYSTEMS SECONDARY COIL TESTS

NOTE: All coils are tested individually.

1. Secondary Continuity — Scale No. 3:
Attach the red test lead to the primary wire on the coil (either red or white). The black test lead is connected to the high tension lead of the coil being tested. Readings are read from the top of scale No. 3 and must be between the two values specified.



2. Primary Resistance — Scale No. 2:
Without connecting the test leads together, zero the meter. Connect the red test lead to the appropriate primary on the coil to be tested and the black test lead to ground. Readings are taken from the red figures on scale No. 2 and must be within the two values specified.



3. Operating Amperage (Coil Power Test) — Scale No. 1:

The two test leads are connected the same as for continuity. The large single red test lead (coming from the rear of the tester) is attached to the high tension lead of the coil to be tested. The control knob on the upper left-hand side of the tester is then slowly turned clockwise until the value specified is reached. The 5mm spark gap (located in the upper right-hand corner of the tester) should then be firing steadily. If a steady spark occurs below this value, the coil is very good.



TWIN CYLINDER CDI COIL

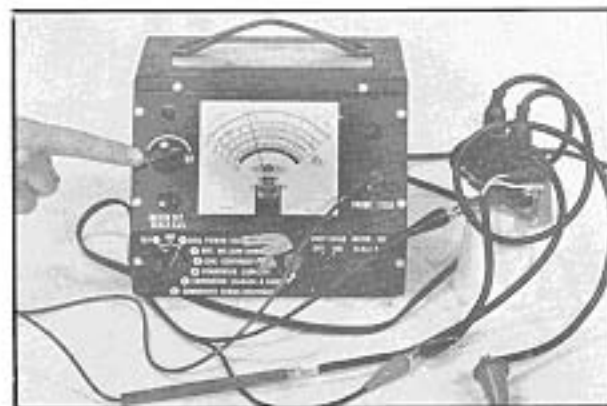
1. Secondary Continuity – Scale No. 3:
Turn the knob to scale No. 3. Connect the two test leads (red and black) together and zero the meter. Connect the red test lead to one high tension lead and the black test lead to the other high tension lead. The readings must be within the values specified. Take the readings from the top of scale No. 3.



2. Primary Resistance – Scale No. 2:
Without connecting the test leads together, turn to scale No. 2 and zero the meter. Attach the red test lead to the orange lead on the coil. The black test lead is connected to the ground on the coil. The readings must fall within the values specified.



3. Operating Amperage (Coil Power Test) – Scale No. 1:
The red test lead is connected to the orange lead on the coil and the black test lead is attached to ground. The large single red test lead (coming from the rear of the tester) is connected to one high tension lead. One end of the extra test probe that comes with the tester is plugged into the other high tension lead and one end is plugged into the tester located above the words "probe test." The knob (located in the upper left-hand corner) is slowly turned clockwise until the meter reaches the value specified. The 5mm spark gap should then be firing steadily. If a steady spark occurs below the specification, the coil is considered very good.

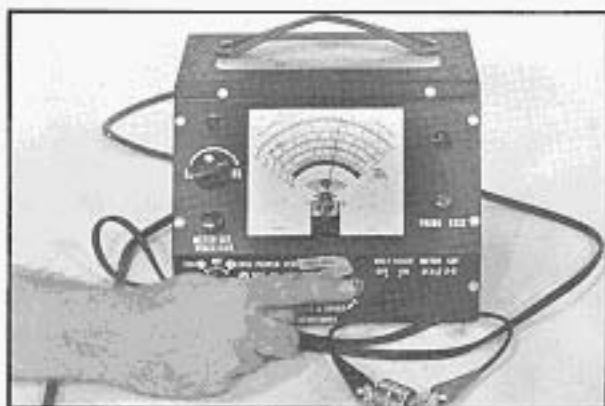


ENGINE ELECTRICAL

Merc-O-Tronic Condenser Test Procedures

The tester must be plugged into a 115 volt AC outlet.

1. **Condenser Capacity – Scale No. 4:**
Turn the meter to scale No. 4. Clip the red and black test leads together and zero the meter. The zero adjustment for scale No. 4 is located just above the selector knob. Attach the red test lead to the condenser terminal and the black test lead to the condenser body. Press the red button and read scale No. 4. The values must be within the specifications.



2. **Condenser Leakage and Short Test – Scale No. 5:**
Connect the red test lead to the condenser terminal and the black test lead to the condenser body. Turn to scale No. 5; depress the red button and hold for a minimum of 15 seconds. The meter pointer will move to the right and must return within the range of the narrow black bar to the left. Readings other than within this narrow range indicate the condenser is leaking or shorted.



3. **Condenser Series Resistance – Scale No. 6:**
Turn the selector to scale No. 6. Clip the test leads together and zero the meter. The zero adjustment for scale No. 6 is located just above the selector switch. Connect the red test lead to the condenser terminal and the black test lead to the condenser body. The meter must be within the "ok green block" on scale No. 6.



ENGINE ELECTRICAL
Ignition — Graham—Lee Test Specifications

Coil No.	Maximum Secondary	Maximum Primary	(Point Test) Maximum Primary DC Ohms	Coil Index	**** Minimum Coil Test ****	Maximum Gap Index
3080270	10,000	5.5	.09	60	25	50
3080838	10,000	9.0	2.0	60	24	50
3081177**	10,000	9.0	2.0	60	24	50
3081303	20,000	1.8	.45	60	18	50*
3081514	20,000	1.0	.45	60	19	50
3081602***	5,000	.4	.09	60	75 AMPLIFIED	50
3081603	20,000	4.5	.9	50	18	50
3081954	15,000	.8	.7	50	16	50
3081974	10,000	9.5	2.0	55	21	55
3081980	10,000	2.0	.25	50	13	50

Condensers — All numbers to date — .22 to .30 Mfd.

*One end of secondary must be grounded to most convenient primary terminal.

**Twin ignition number but each coil is tested separately as a single coil.

***Set of three (3) coils with each coil tested separately as a single coil.

****On this list test limits for "Minimum Coil Test" are given with the secondary cable attached to coil. If secondary cable is removed, reduce test limit two (2) divisions.

For use with all models Graham-Lee Coil and Condenser Testers.

GRAHAM—LEE ELECTRONICS, INC.
4220 Central Avenue Northeast
Minneapolis, Minnesota 55421

ENGINE ELECTRICAL

Graham—Lee Coil-Condenser Test Procedures

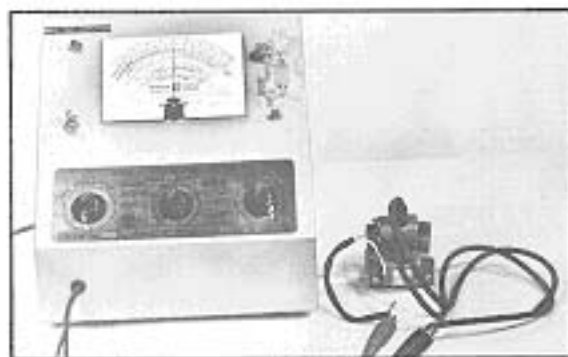
	TUBE LOCATION	TUBE TYPES	
 LEAKAGE	TOP OF CHASSIS OSCILLATOR ☐ COIL ☐ OSCILLATOR ☐	 THYRATRON 2D21 or 2050 OSCILLATOR 6J5 OR 6J5GT CALIBRATE AFTER CHANGING TUBES	 SECONDARY CONTINUITY
 SERIES RESISTANCE	☐	☐	 PRIMARY CONTINUITY
CALIBRATION Set SELECTOR SWITCH to "STAND-BY" Position, Turn LINE SWITCH "ON" and Allow Unit To Warm Up For At Least 10 Minutes. CALIBRATION of CAPACITY, SERIES RESISTANCE, LEAKAGE, SECONDARY CONTINUITY and PRIMARY CONTINUITY— 1. Short PRIMARY TEST LEADS By Clipping Together. 2. Turn SELECTOR SWITCH To "CAPACITY" and Note METER reading. Adjust CAPACITY Control Very Slowly Until the METER Pointer Lines Up With The RIGHT HAND End of The METER Scale. 3. Repeat With Other Tests, Finishing With PRIMARY CONTINUITY. 4. Open (Dis-connect) PRIMARY TEST LEADS. CALIBRATION of COIL INDEX—  CAPACITY COIL INDEX IS PERMANENTLY CALIBRATED. ZERO ADJUSTMENT IS NOT REQUIRED. (SEE BELOW)  COIL INDEX			
SERIAL NO.	117 VOLTS A.C. 60 CYCLE		

With main selector switch in "Coil Index" position, this unit is calibrated so with normal voltage and a good 2D21 tube meter pointer will go off scale to right when coil index knob is turned to right as far as it will go and "coil tests" spring switch is turned "ON." If line voltage is low or tube is weak, meter reading may be below "100." This is OK if a steady meter reading of 90 or more can be obtained on top meter scale. To check "steadiness" of meter reading when pointer goes off scale, turn coil index knob back slightly to a reading between 95 and 100. If pointer is steady tube and circuits are good.

For maximum tube life, allow tester to "warm up" a couple of minutes before operating the spring switch on coil test. Also, do not hold spring switch "ON" for more than a few seconds at a time. A few seconds "ON" and a few seconds "OFF" is best.

There is a definite reason for the sequence or order of the tests. A coil or condenser must pass each test. Failure on any test in the sequence indicates replacement of the affected part.

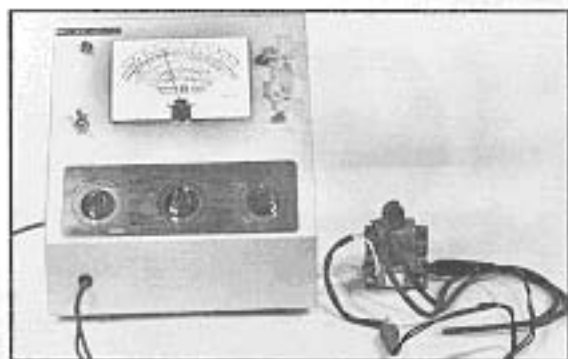
POINT SYSTEMS SECONDARY COIL TESTS



Test No. 1 – Secondary Continuity

Connect the red test to the primary wire (red or white) of the coil to be tested. The black test lead is attached to the high tension lead of the coil to be tested. Refer to the Test Specifications in this manual for Maximum Secondary Ohms. The meter reading must be under maximum specified. No reading or a high reading indicates a defective coil.

NOTE: Test all coils individually and take meter readings from secondary continuity scale.



Test No. 2 – Primary Continuity

Attach the red test lead to the primary wire of the coil to be tested and connect the black test lead to ground. Meter reading must not exceed specifications or coil is not fit for further service.

NOTE: The test circuit is powered by alternating current and resultant meter readings are of primary impedance. Do not confuse with the resistance readings obtained with an Ohmmeter.

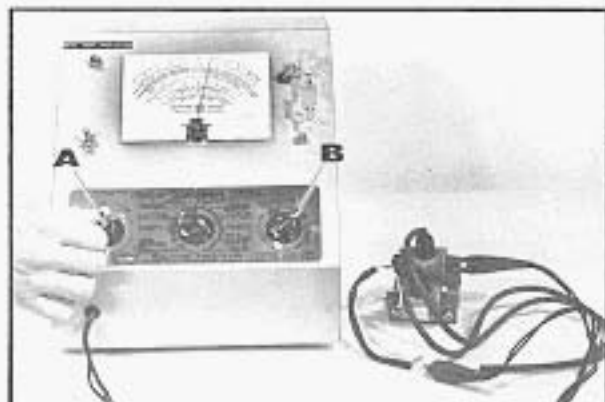


Test No. 3 – Point Test

Maximum primary DC ohms. The test leads are connected the same as for primary continuity. Readings above the maximum render the coil unusable.

ENGINE ELECTRICAL

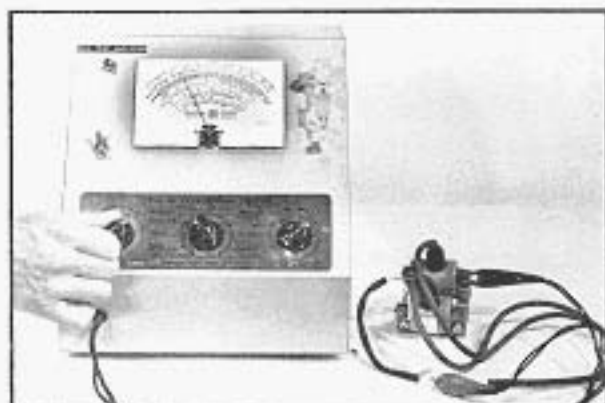
Graham—Lee Coil Test Procedures



Coil Index Adjustment

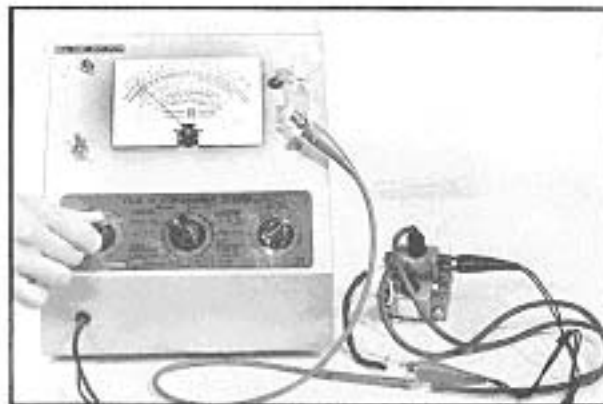
Coil Index Adjustment — Look up the correct coil index setting for coil being tested. Test clips need not be disconnected when setting coil index. Hold the "Coil Tests" knob (A) in the "ON" position and adjust the "Coil Index" knob (B) until the meter reads the selected figure on the "Coil Index" scale. Release the "Coil Tests" knob and do not change index setting during the next test. The coil index setting determines the amount of primary firing power necessary to generate the required secondary open voltage.

CAUTION: Do not exceed the coil index specifications at any time.



Test No. 4 — Minimum Coil Firing Test
(Do not make this test on a metal bench)

Coil index setting must be correct. On this coil test there is nothing connected to the coil secondary terminal. Hold "Coil Test" knob and observe meter reading on "Coil Index" scale. Meter reading must remain steady at or above the figures given in the specifications under "Coil Test." Most good coils will read above the minimum test figures.



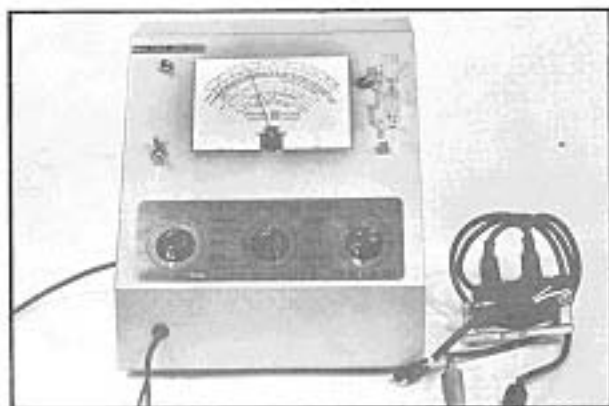
Test No. 5 — Gap Index Test
(Do not make this test on a metal bench)

This test uses practically the same procedure as the regular Coil Firing Test, except that the coil index setting is now called the gap index setting and the coil secondary is connected to and fires across the spark gap on the tester. Connect coil secondary to spark gap, using high tension lead and test probe. Look up the gap index setting and use this figure to set the coil index as described in the coil index adjustment. Fire the coil as described under Coil Firing — Test No. 4. Spark must jump the spark gap regularly. Observe the meter pointer. Regular firing is indicated by a steady pointer. The reading of the meter pointer is not important as long as the pointer remains steady. Missing or failure to jump the gap indicates a defective coil. Before discarding coil, make sure the spark gap points on the tester are clean. If you use a longer test probe lead than the one supplied with the tester, add a few points to the gap index specification (3 to 5) to compensate for the longer lead. Keep the spark gap clean, using a soft brush or cloth. Do not use abrasive materials. The electrodes are made of stainless steel and are factory set to close tolerances.

Test No. 6 — Check for Leaks on Coil Insulation and High Tension Lead:

Leave connected as previous test except the test probe connected to the spark gap. One end of this probe is disconnected from the high tension lead. Hold the "Coil Tests" knob on and run the probe up and down the high tension lead and over the coil. Any time a spark gap is jumped, this indicates a leak.

ENGINE ELECTRICAL
Graham—Lee Coil Test Procedures
TWIN CYLINDER CDI COIL



Test No. 1 – Secondary Continuity

Place the scale selector switch to "Reverse – Secondary." Attach one test lead to each high tension lead on the coil as shown. Readings must be below the maximum specified. No reading or a high reading indicates a defective coil.



Test No. 2 – Primary Continuity

Place the scale selector to "Primary Continuity." Attach the red test lead to the orange primary lead on the coil and connect the black test lead to ground. Readings must not exceed the maximum specified.



Test No. 3 – Point Test

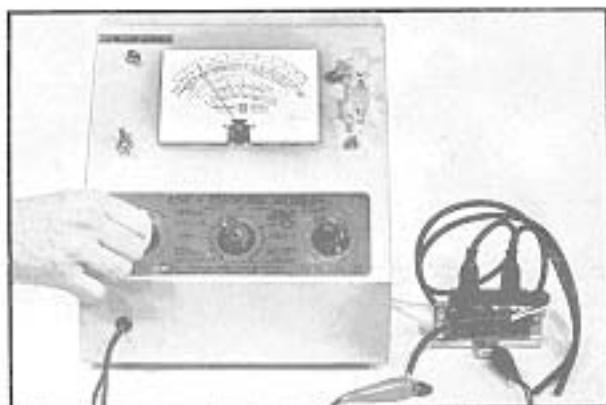
Maximum primary DC ohms. Connect the test leads the same as for primary continuity. Readings must be under the maximum specified.



Coil Index Adjustment

Coil Index Adjustment — Look up the correct coil index setting for coil being tested. Test clips need not be disconnected when setting coil index. Hold the "Coil Tests" knob (A) in the "ON" position and adjust the "Coil Index" knob (B) until the meter reads the selected figure on the "Coil Index" scale. Release the "Coil Tests" knob and do not change index setting during the next test. The coil index setting determines the amount of primary firing power necessary to generate the required secondary open voltage.

CAUTION: Do not exceed the coil index specifications at any time.

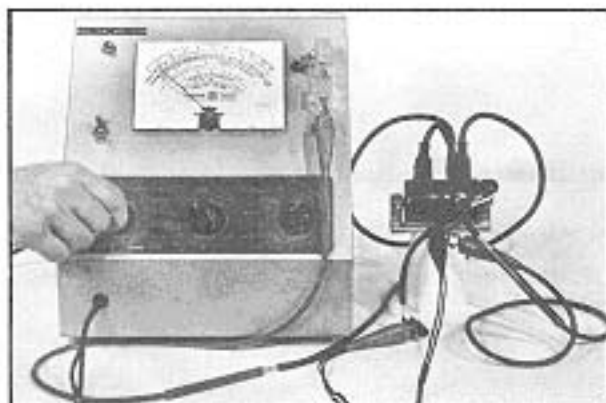


Test No. 4 — Minimum Coil Firing Test
(Do not make this test on a metal bench)

Turn the selector to "Coil Test." Hold "Coil Test" knob on and read meter. Readings should be at or above the minimum specified.

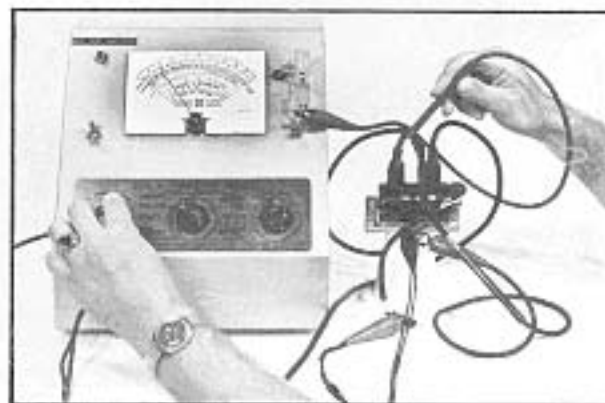
ENGINE ELECTRICAL

Graham—Lee Coil Test Procedures



Test No. 5 — Gap Index Test
(Do not make this test on a metal bench)

Connect the red test lead to the orange primary on coil. Connect black test lead to ground. One test probe is connected to the spark gap and one high tension lead. Another test probe is connected to the other high tension lead and ground as shown. The gap index must be set to the proper specification. Hold the "Coil Tests" knob on and a steady spark must jump in the spark gap. The reading on the meter is not important as long as the pointer remains steady.



Test No. 6 — Check for Leaks on Coil Insulation
and High Tension Lead

Leave connected as above except the test probe is connected to the spark gap. One end of this probe is disconnected from the high tension lead. Hold the "Coil Tests" knob on and run the probe up and down the high tension lead and over the coil. Any time a spark gap is jumped, this indicates a leak.



Test No. 1 — Condenser Capacity

Test No. 1 — Condenser Capacity. Turn scale selector switch to "capacity" position. After this is done, attach one test clip to condenser terminal. Attach the other test clip to bracket on body of condenser. Lay condenser with clips attached on any dry insulated surface. Capacity is read directly in Micro-farads. Nominal capacity is .22 Micro-farads. An open condenser will be indicated by no reading. If condenser passes next two tests of Series Resistance and Condenser Leakage, it may be assumed that its capacity has not changed since manufacture. Sometimes a condenser may be of the capacity specified but the type of service may indicate a condenser of another capacity should be used. For instance, if an automobile is used in taxicab service with continual engine idling time, the capacity of the condenser should be higher than when the same vehicle is used mainly for high speed driving. An examination of the breaker points will indicate when a slightly different capacity condenser should be installed. If the negative breaker point is losing material or has a crater in it, the condenser capacity is too small. If the positive point is the one losing material, the capacity is too great.

Testing Condenser in Distributor or Magneto — Disconnect condenser from primary circuit, either at terminal or ground. If opened at ground, insulate the condenser body from the housing during tests. It is true that condensers may be tested by opening the breaker points alone, but results are not reliable. Attach one test clip to condenser terminal and attach other test clip to condenser case and use regular procedures in testing.

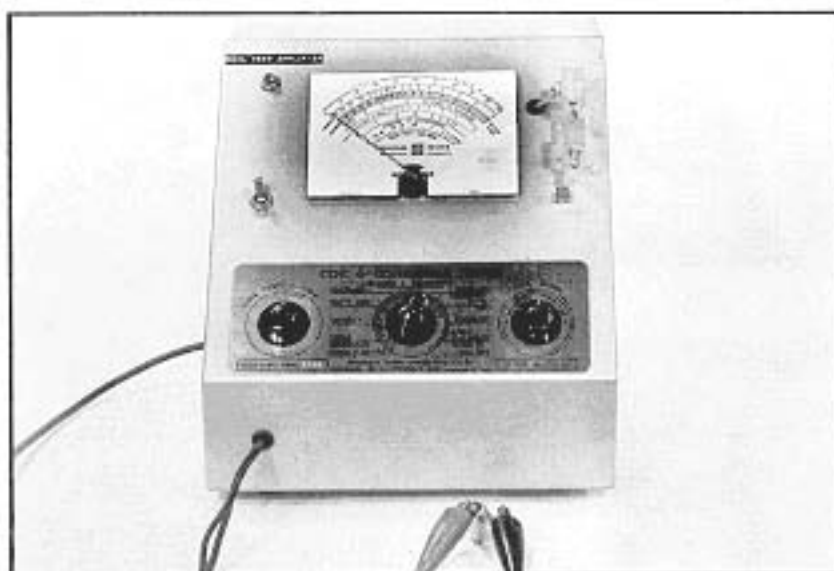
ENGINE ELECTRICAL

Graham—Lee Condenser Test Procedures



Test No. 2 — Condenser Series Resistance

Test No. 2 — Condenser Series Resistance. Without disturbing connections made for Capacity Test, turn selector switch to "Series Resistance." Normal automotive and magneto condensers will show a meter reading of $1/2$ to $3/4$ OHMS. Meter reading over 1 OHM indicates high series resistance and the condenser should be replaced. Series Resistance is an important test and must not be confused with the Condenser Leakage Test where the results are also given in terms of resistance. Measurements in the Condenser Leakage test are made with a high voltage, filtered direct current. Meter readings are in MEGOHMS (millions of ohms) and indicate the amount of resistance in the insulation to the passage of current between the terminal side of the condenser and ground. This insulation consists of the paper between the foil layers, the impregnating compound and the bushing where the terminal comes out. The Series Resistance test uses an oscillating circuit tuned to approximately 1600 Kilocycles. The meter readings indicate any resistance to the flow of current into and out of the condenser. Sometimes a condenser will fail on the first Series Resistance Test and after passing Leakage Test will then pass on a Re-Test of Series Resistance. Do not be confused by this. The condenser should still be discarded. Just be sure the tester itself is properly zeroed in for the first test. Any high Series Resistance indication will then be in the condenser.



Test No. 3 — Condenser Leakage

Test No. 3 — Condenser Leakage. Without disturbing connections after Series Resistance Test, turn selector switch to "Condenser Leakage." Meter will come to rest at some point on the "Leakage in Megohms" scale which will indicate the amount of insulation resistance to leakage. A shorted condenser will cause the meter pointer reading to the extreme right. A good condenser, at room temperature (80° F) is indicated by the meter pointer returning to between 20 megohms and infinity as the condenser becomes fully charged. If the meter shows readings of less than 20 megohms, the condenser should be heated and re-tested. Heat it by the best means available to operating temperature (about 180° F). If it is inconvenient or impossible to heat the condenser, it should be replaced. After heating, the condenser should show resistance equal to or higher than that called for in the specifications. Where no figure is given a minimum resistance of 2 Megohms may be used. Turning selector switch off Condenser Leakage in either direction drains high voltage charge so that condenser will not shock.

ENGINE ELECTRICAL

Graham—Lee Rectifier Test Procedures



Figure 1 — Forward Test

Rectifier Tests (Model 51-R Only)

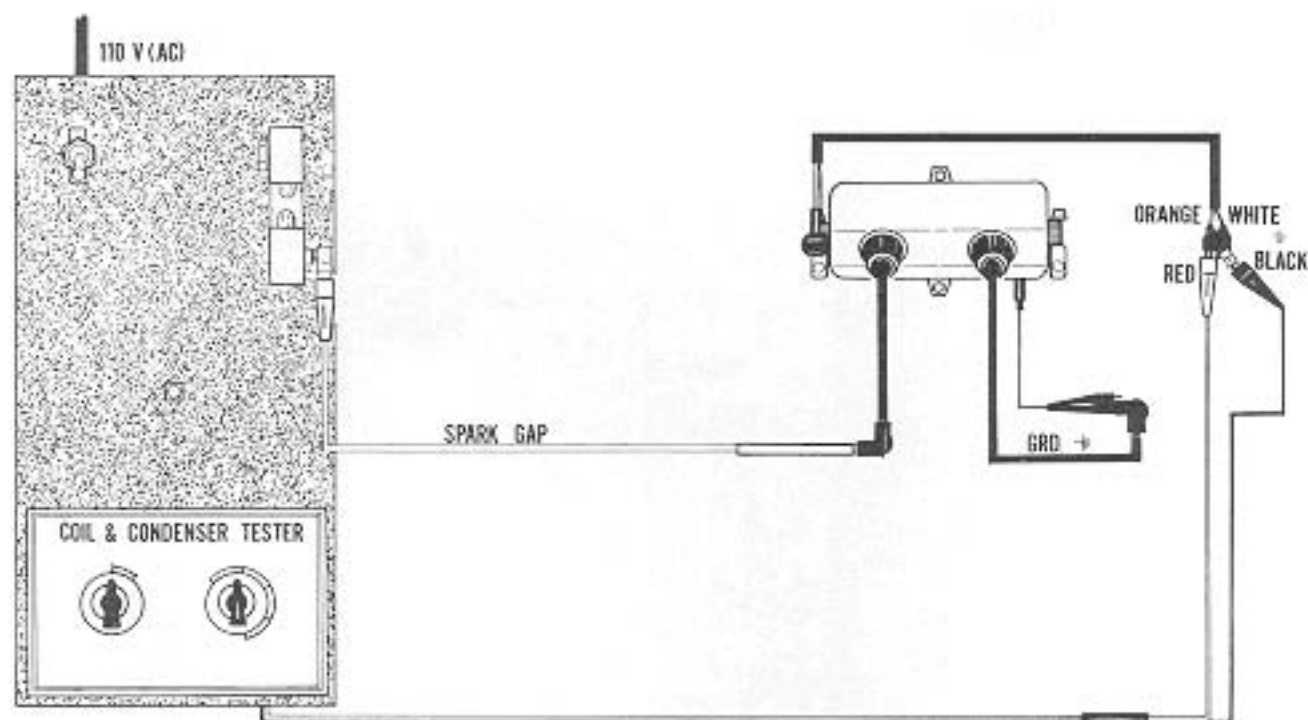
Forward Test — Turn selector switch to "Forward." Connect test clips so meter reads up. The better the rectifier, the higher the reading on top meter scale. Alternating current is applied at the test leads. When testing full wave type rectifiers, test one side at a time. Both sides must test "Good." Suggested minimum on top scale — 85. There is no "zero adjust" for this test.



Figure 2 — Reverse Test

Reverse Test — Without changing connections, turn selector switch to "Reverse." On this test direct current is applied at the test leads. To set "Zero," clip leads together and adjust proper potentiometer at back of tester so meter reads "100." Test clips are connected the same as for Forward Test. Make Forward Test first to determine correct polarity. Suggested maximum on top scale for this test is "85." This is for the larger plate type rectifiers. For the smaller rectifiers and diodes, the maximum will be much lower — in some cases 5 may be the maximum permissible.

ENGINE ELECTRICAL
Graham—Lee Model 31 CDI Coil Test



Testing Connections

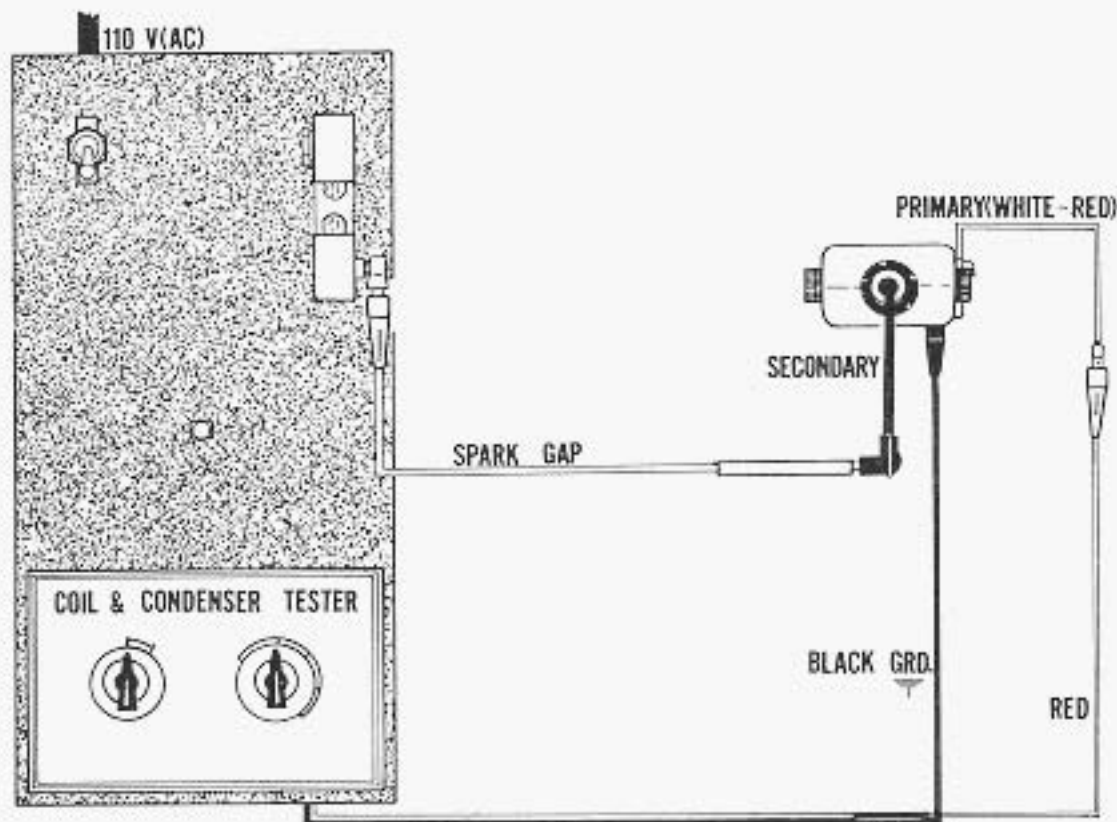
Note: It is not necessary to remove coils from engine for test.

Procedure:

1. Install test leads to coil as shown. Note: It will be necessary to ground one high tension cable to its mounting bracket.
2. Identify coil part number and refer to test specifications for correct tester index setting.
3. Plug tester into 110 V (AC) outlet. (Allow to warm up approximately 30 seconds in "on" position.)
4. Turn tester to "coil tests." Observe the tester spark gap. The coil should fire across the gap regularly at the specified index setting to pass test.

ENGINE ELECTRICAL

Graham—Lee Model 31 Magneto Point Ignition Coil Test



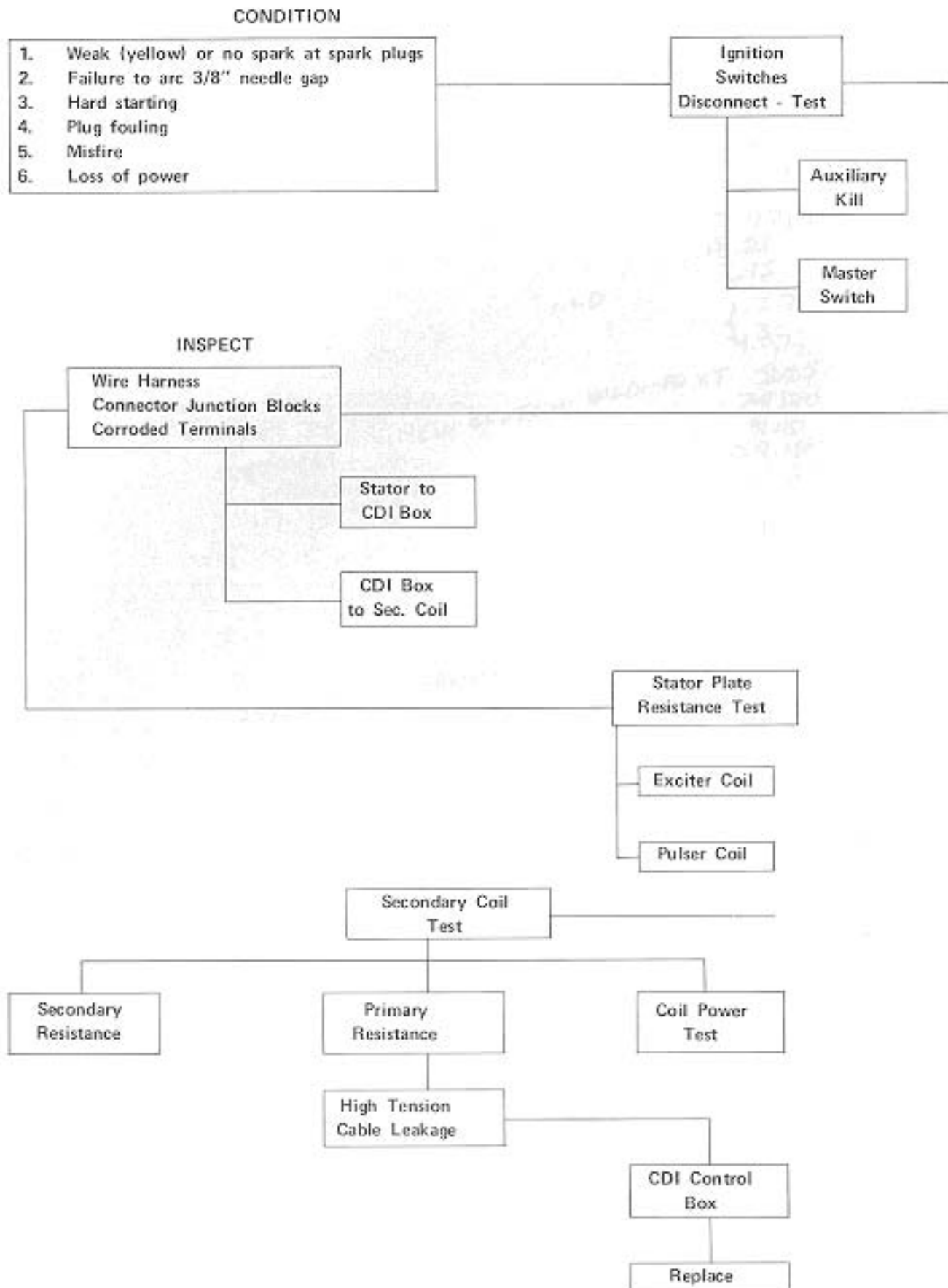
Testing Connections

Note: It is not necessary to remove coils from engine for test.

Procedure:

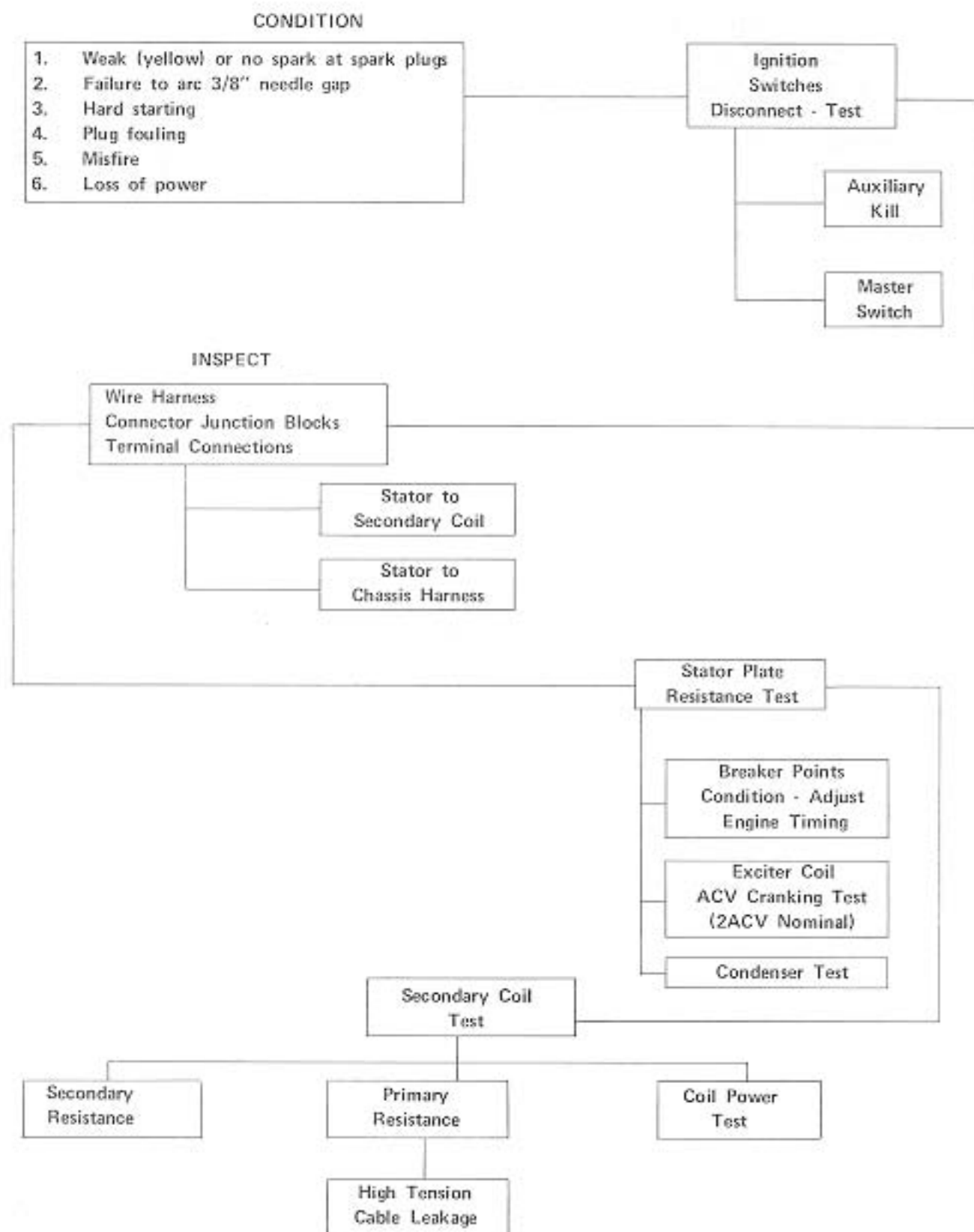
1. Disconnect the coils from the engine using the bullet connectors provided.
2. Install test leads as shown. (Each coil is tested separately.)
3. Identify coil part number and refer to test specifications for correct tester index setting.
4. Plug tester into 110 V (AC) outlet. (Allow to warm up approximately 30 seconds in "on" position.)
5. Turn tester to "coil tests." Observe the tester spark gap. The coil should fire across the gap regularly at the specified index setting to pass test.

ENGINE ELECTRICAL CDI Diagnostic Test Sequence



ENGINE ELECTRICAL

Magneto Point Ignition Diagnostic Test Sequence



SECTION VI

CARBURETION

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CARBURETION

Condensed Data

Engine Model	No. of Cyl.	Carb. Size Type and Number	Original Jetting		Recommended Jetting/0' - 5,000'		Recommended Jetting/5,000' - 10,000'	
			Main	Pilot	Main	Pilot	Main	Pilot
EC17P	1	VM24SH (1)	300H	40	----	35	----	----
EC25P	1	VM30SH (1)	125	40	120	35	115	35
EC29P	2	VM26SH (2)	107.5	40	----	35	105	35
EC29PF	2	VM26SH (2)	107.5	40	----	35	105	35
EC34PS	2	VM26SS (2)	125	40	120	35	105	35
EC40P	2	VM30SH (2)	120	40	----	35	110	35
EC40PF	2	VM30SH (2)	120	40	----	35	110	35
EC51PS	3	VM26SH (3)	125	40	120	35	115	35
EC54P	2	VM32SH (2)	140	40	132.5	35	125	35
EC54PF	2	VM32SH (2)	140	40	132.5	35	125	35

EC17P	1	VM24SH (1)	102.5	40	----	35	----	----
EC25PS	1	VM30SH (1)	125	40	120	35	115	35
EC29PM	2	VM26SH (2)	110	40	----	35	100	35
EC29PF	2	VM26SH (2)	115	40	110	35	100	35
EC29PS	2	VM30SS (2)	127.5	40	120	35	105	35
EC34PF	2	VM26SH (2)	115	40	110	35	107.5	35
EC34PS	2	VM30SS (2)	127.5	40	120	35	110	35
EC40PM	2	VM30SH (2)	120	40	----	35	117.5	35
EC40PS	2	VM32SS (2)	145	40	132.5	35	120	35
EC44PS	2	VM32SS (2)	145	40	137.5	35	120	35
EC51PS	3	VM30SS (3)	127.5	40	120	35	115	35
EC54PM	2	VM32SS (2)	145	40	132.5	35	125	35

CARBURETION
Condensed Data

1974

C - With air silencer installed

1 - Reference Service Bulletin No. 93

4 - Reference Service Bulletin No. 96

5 - Reference Service Bulletin No. 101

Engine Model	No. of Cyl.	Carb. Size Type and Number	Original Jetting		Recommended Jetting/0'-5,000'		Recommended Jetting/5,000'-10,000'	
			Main	Pilot	Main	Pilot	Main	Pilot
EC17PM	1	VM24SH (1)	102.5	35	---	---	---	---
EC25PS	1	VM30SH (1)	125	35	120	---	115	35
EC25PC	2	VM26SS (2)	110	35	---	---	100	35
EC25PT	2	VM30SS (2)	125	35	115	---	105	35
EC29PF	2	VM26SH (2)	115	35	110	---	107.5	35
EC34PC	2	VM26SH (2)	125	35	112.5	---	110	35
EC34PQ	2	VM32SS (1)	125	40	120	35 ^C	107.5	35 ^C
EC34PS	2	VM30SS (2)	127.5	35	120	---	110	35
EC40PM	2	VM30SH (2)	120	40	---	35	115	35
EC44PQ	2	VM38SS (1)	135	40	---	35 ^C	117.5	35 ^C
EC44PT	2	VM38SS (2)	135	35	---	---C ¹	115	35 ^{C1}
EC51PT	3	VM32SS (3)	117.5	35	---	---C	110	35 ^C
EC54PM	2	VM32SS (2)	145	40	130	35 ^C	117.5	35 ^C

1975

EC17PM	1	VM24SH (1)	102.5	35	---	---	---	---
EC25PS	1	VM30SH (1)	125	35	117.5	---C	115	35 ^C
EC25PC	2	VM26SS (2)	105	35	112.5 ⁴	---C	95	35 ^C
EC25PT	2	VM30SS (2)	120	35	---	---C	112.5	35 ^C
EC34PC	2	VM26SS (2)	112.5	35	107.5	---C ⁵	100	35 ^{C5}
EC34PQ	2	VM30SS (2)	122.5	30	117.5	---C	110	30 ^C
EC34PT	2	VM32SS (2)	140	30	130	---C	115	35 ^C
EC44PQ	2	VM30SS (2)	125	25	115	---C	110	25 ^C
EC44PT	2	VM38SS (2)	140	40	132.5	45 ^C	120	40 ^C
EC51PT	3	VM32SS (3)	120	40	---	---C	115	40 ^C

CARBURETION

Condensed Data

Engine Model	No. of Cyl.	Carb. Size Type and Number	Original Jetting		Recommended Jetting/0'-5,000'		Recommended Jetting/5,000'-10,000'	
			Main	Pilot	Main	Pilot	Main	Pilot
EC17PM	1	VM24SH (1)	102.5	35	---	---	---	---
EC25PS	1	VM30SH (1)	125	35	117.5	--- ^C	115	35 ^C
EC25PC	2	VM26SS (2)	112.5	35	---	--- ^C	95	35 ^C
EC25PT-06	2	VM32SS (2)	260H	30	---	35 ^C	190H	30 ^C
EC25PT-05	2	VM32SS (2)	230H	35	---	--- ^C	---	--- ^C
EC34PC	2	VM26SS (2)	107.5	35	---	--- ^C	105	35 ^C
EC34PQ	2	VM30SS (2)	122.5	30	117.5	--- ^C	110	30 ^C
EC34PT-05	2	VM32SS (2)	270H	30	260H ⁶	--- ^C	230	30 ^C
EC34PT-06	2	VM34SS (2)	270H	30	---	--- ^C	---	--- ^C
EC44PQ	2	VM30SS (2)	125	25	115	--- ^C	115	25 ^C
EC44PT-05	2	VM34SS (2)	320H	35	---	--- ^C	270	35 ^C

C - With air silencer installed

H - Hex head

6 - Lower "E" clip to No. 4 position

7 - Lower "E" clip to No. 4 position

EC25PS	1	VM30SH (1)	117.5	35	---	--- ^C	REFER TO THE 1977 SHOP MANUAL FOR SPECIFIC ALTITUDE TEMPERATURE COMPENSATION ADJUSTMENTS
EC25PC	2	VM26SS (2)	112.5	35	---	--- ^C	
EC25PM-01	2	VM26SS (2)	130H	35	---	--- ^C	
EC25PT-07	2	VM30SS (2)	220H	35	---	--- ^C	
EC34PM-03	2	VM26SS (2)	150H	35	130H	--- ^C	
EC34PQ	2	VM30SS (2)	122.5	30	117.5	--- ^C	
EC34PT-05	2	VM32SS (2)	280H	30	270H	--- ^C	
EC34PL-01	2	VM38SS (2)	340H	45	320H ⁷	--- ^C	
EC44PQ	2	VM30SS (2)	115	25	---	--- ^C	
EC44PT-05	2	VM34SS (2)	320H	35	---	--- ^C	
EC44PT-06	2	VM34SS (2)	320H	35	---	--- ^C	

CARBURETION

Condensed Data

Machine Model	Engine Model	Cyl. Disp. CC's	Carburetor Model, Mount Type & No.	Std. Main Jet & Type	Std. Pilot Jet	Air Screw Adjust. (counterclockwise from seat)
Colt	EC25PS	244	VM30SH (1) Flange	117.5 Round	35	1 turn
Colt	EC25PC	250	VM26SS (2) Rubber	112.5 Round	35	1 turn
S/S 340	EC34PM-03 EC34PM-04N	333	VM26SS (2) Rubber	130 Hex	35	1 turn 1/2 turn
Cobra	EC34PM-04	333	VM26SS (2) Rubber	130 Hex	35	1 turn
Cobra	EC44PM-01	432	VM34SS (2) Rubber	200 Hex	35	1 turn
TX	EC25PT-07	249	VM30SS (2) Rubber	220 Hex	35	1 turn
TX	EC34PT-05	336	VM32SS (2) Rubber	280 Hex	30	1 turn
TX	EC44PT-05	432	VM34SS (2) Rubber	370 Hex	45	1 turn
TX-L	EC34PL-02	333	VM38SS (2) Rubber	310 Hex	45	1 turn

Engine Model	Jet Needle No. "E" Clip Position	Needle Jets	Throttle Valve Cutaway	Valve Seat	Fuel Mixture
EC25PS	5DP7 - 4	O-8 (171)	3.0	1.5MM	40:1
EC25PC	5DP7 - 5 or 5DP3 - 3	O-8 (164)	3.0		
EC34PM-03 EC34PM-04N	5DP7 - 2 5EP6 - 3	O-8 (259) P-2 (259)	2.5 3.0		
EC34PM-04	5DP7 - 3	P-2 (259)	3.0		
EC44PM-01	6DP1 - 3	P-6 (166)	2.5		
EC25PT-07	5DP7 - 3	P-2 (171)	2.5		
EC34PT-05	6DH7 - 3	P-4 (159)	2.0		
EC44PT-05	6DH7 - 3	P-6 (166)	2.5		
EC34PL-02	6DH4 - 3	Q-2 (247)	2.5		

CARBURETION

Condensed Data

Machine Model	Engine Model	Cyl. Disp. CC's	Carburetor Model, Mount Type & No.	Std. Main Jet & Type	Std. Pilot Jet	Air Screw Adjust. (counterclockwise from seat)
Gemini	EC25PS	244	VM30SH (1) Flange	117.5 Round	35	1 turn
Gemini	EC25PM-01	244	VM26SS (2) Rubber	120 Hex	35	1 turn
Apollo	EC34PM-03	333	VM26SS (2) Rubber	130 Hex	35	1 turn
Cobra	EC34PM-04	333	VM26SS (2) Rubber	130 Hex	35	1 turn
Cobra	EC44PM-01	432	VM34SS (2) Rubber	200 Hex	35	1 turn
TX	EC25PT-07	249	VM30SS (2) Rubber	220 Hex	35	1 turn
TX	EC34PT-05	336	VM32SS (2) Rubber	290 Hex	30	1 turn
TX	EC44PT-05	432	VM34SS (2) Rubber	320 Hex	30	1 turn
TX-L	EC34PL-02	333	VM38SS (2) Rubber	260 Hex	45	1 turn
Centurion	EC51PL-01	500	VM34SS (3) Rubber	210 Hex	35	1 1/2 turn

Engine Model	Jet Needle No. "E" Clip Position	Needle Jets	Throttle Valve Cutaway	Valve Seat	Fuel Mixture
EC25PS	5DP7 - 4	O-8 (177)	3.0	1.5MM	40:1
EC25PM-01	5DP7 - 2	O-8	2.5		
EC34PM-03	5DP7 - 2	O-8	2.5		
EC34PM-04	5DP7 - 3	P-2 (259)	3.0		
EC44PM-01	6DP1 - 3	P-6 (166)	2.5		
EC25PT-07	5DP7 - 3	P-2 (171)	2.5		
EC34PT-05	6DH7 - 2	P-4 (159)	2.0		
EC44PT-05	6DH7 - 2	Q-0 (166)	2.5		
EC34PL-02	6DH4 - 3	Q-2 (247)	2.5		
EC51PL-01	6DH7 - 2	Q-2 (166)	3.0		

CARBURETION

Systems

FUNCTION OF A CARBURETOR

The function of a carburetor is to produce combustible air-fuel mixture, by breaking fuel into tiny particles (in the form of vapor) and by mixing the fuel with air in a proper ratio, and to deliver the mixture to the engine. A proper ratio (mixture ratio or air-fuel ratio) means an ideal air-fuel mixture that can burn without leaving an excess of fuel or air. Whether the proper mixture ratio is maintained or not holds the key to the efficient engine operation.

FUNCTIONS AND CONSTRUCTION

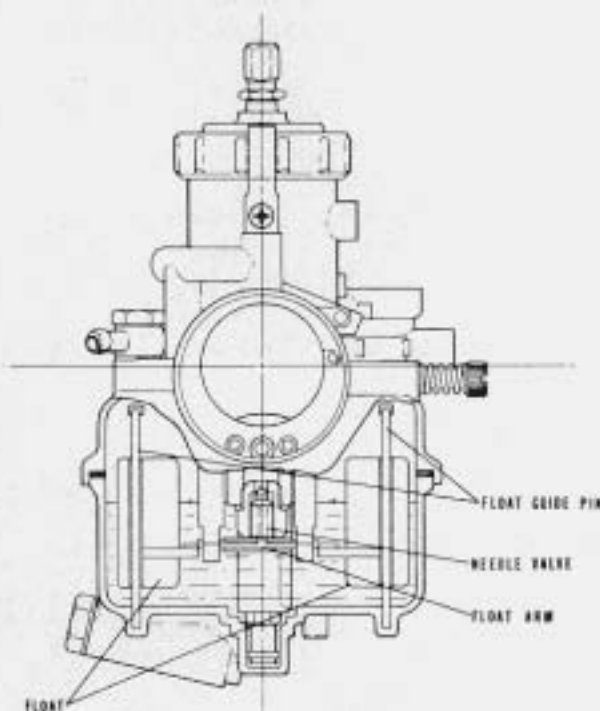
The engine of a vehicle is operated under a wide range of conditions, from idling with the throttle valve remaining almost closed to the full load (the maximum output) with the throttle valve fully opened. In order to meet the requirements for the proper mixture ratio under these varying conditions, a low-speed fuel system (the pilot system) and a main fuel system (the main system) are provided in Mikuni VM-type carburetors.

The Mikuni carburetor has varying operations depending upon varying driving conditions. It is constructed with the float system, the pilot system, the main system, and the starter system (initial starting device).

FLOAT SYSTEM — No. 1

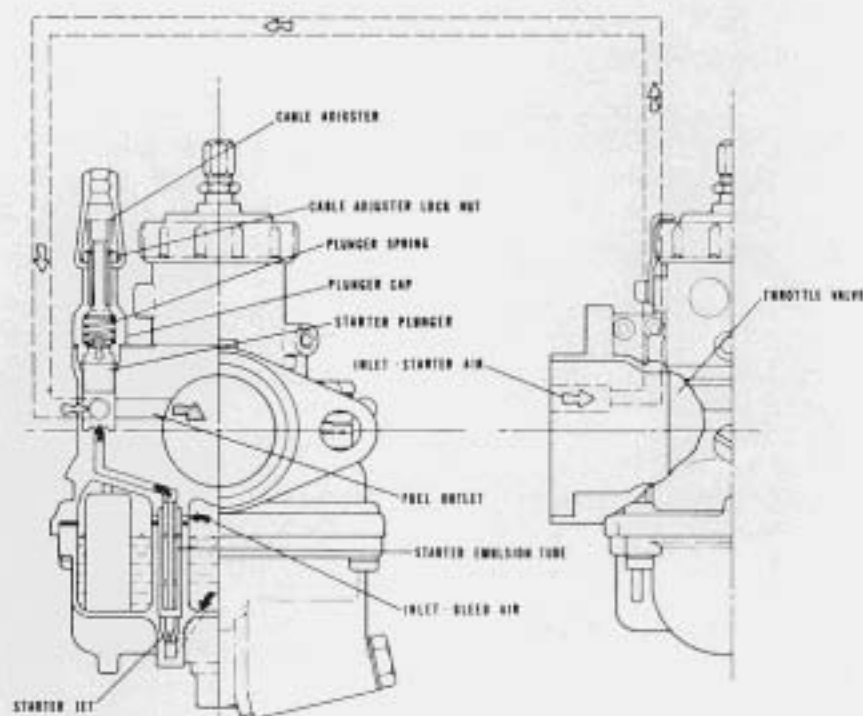
The float system is designed to maintain a constant height of gasoline during operation. When the fuel flowing from the fuel pump into the float chamber through the needle valve reaches the constant fuel level, the floats rise. When the buoyancy of the float and the fuel pressure of the fuel pump balance, the needle valve sticks fast to the needle seat preventing further delivery of gasoline, thereby holding the standard level of gasoline.

The fuel level in the bowl controls the amount of fuel in the fuel mixture. Too high a level allows more fuel than necessary to leave the nozzle, enriching the mixture. Too low a level results in a leaner mixture, as not enough fuel leaves the nozzle. Therefore, the predetermined fuel level should not be changed arbitrarily.



STARTER SYSTEM — No. 2

Starting device (starter system) — In the place of the choke, the starter system is employed for Mikuni carburetors. In the starter type, fuel and air for starting the engine are metered with entirely independent jets. The fuel metered in the starter jet is mixed with air and is broken into tiny particles in the emulsion tube. The mixture then flows into the plunger area, mixes again with air coming from the air intake port for starting and is delivered to the engine in the optimum air-fuel ratio through the fuel discharge nozzle. The starter is opened and closed by means of the starter plunger. Since the starter type is constructed so as to utilize the negative pressure of the inlet pipe, it is important that the throttle valve is closed when starting the engine.



CARBURETION

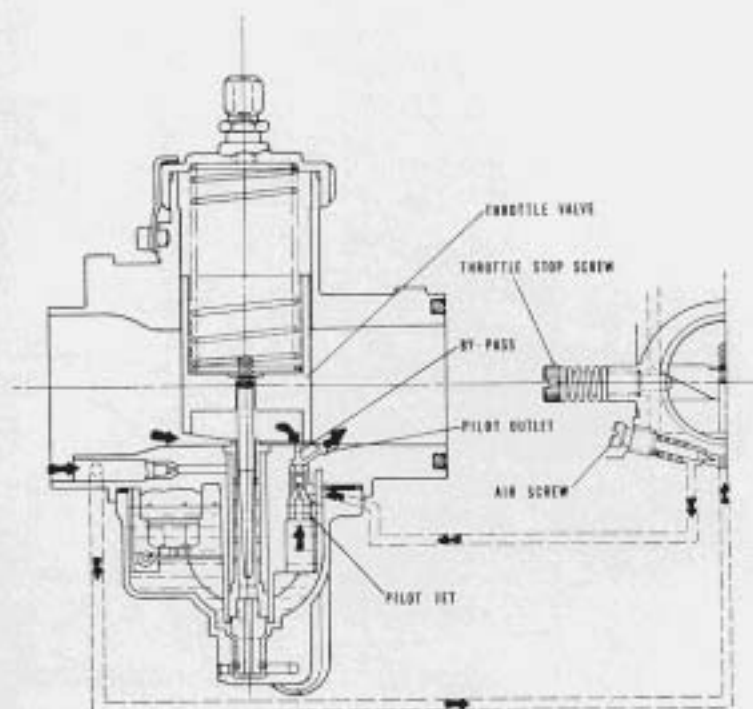
Systems

PILOT SYSTEM — No. 3

The pilot system's main function is that of a low speed jet, to meter fuel at idle and low speed driving. Though its main function is to supply fuel at low speed, it does feed fuel continuously throughout the entire operating range.

Fuel for pilot jet is drawn from the float bowl, mixed with air regulated by the air screw, and delivered to the engine through the pilot outlet.

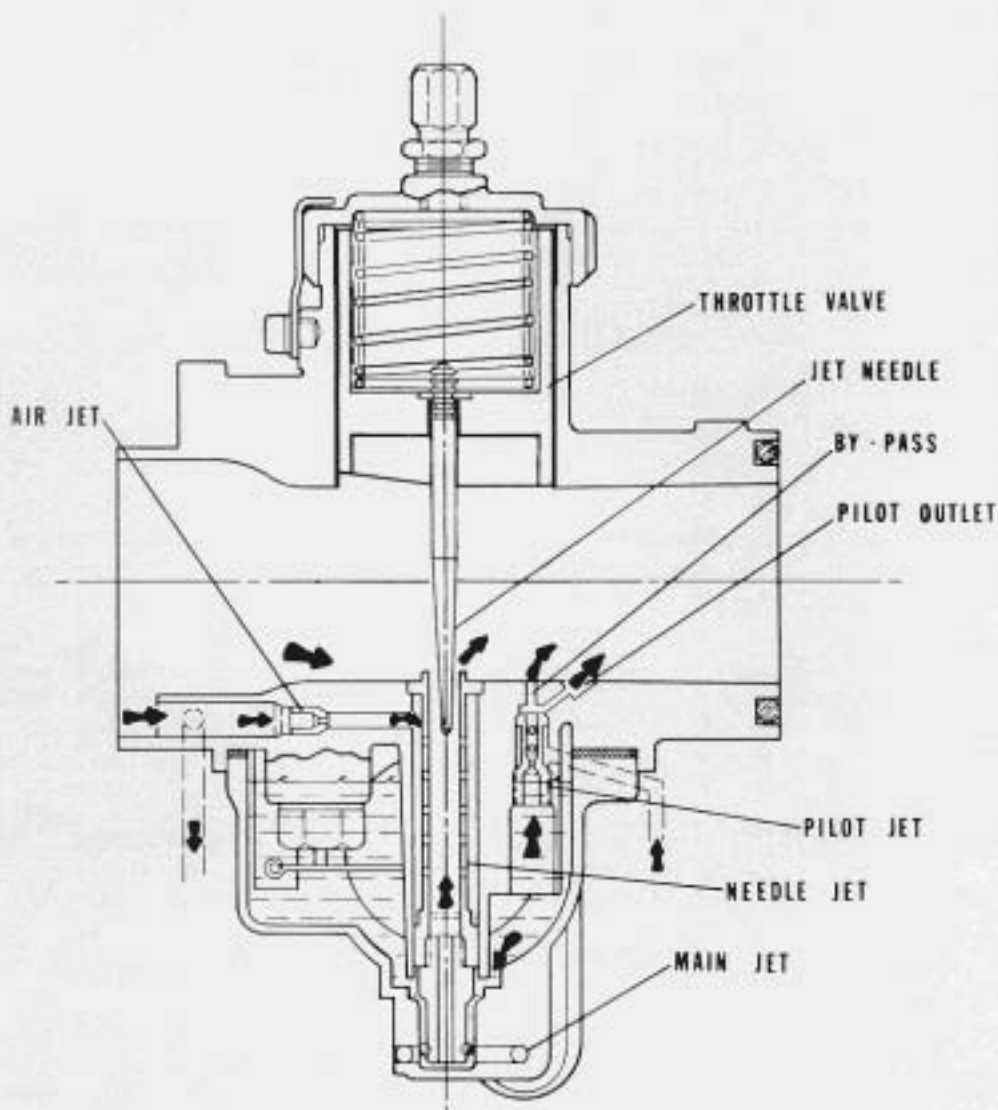
The mixture is regulated to some degree by adjusting the air screw. When the air screw is closed, the fuel mixture is made richer as the amount of air is reduced. When the air screw is opened, the mixture is leaned as the amount of air is increased.



MAIN SYSTEM — No. 4

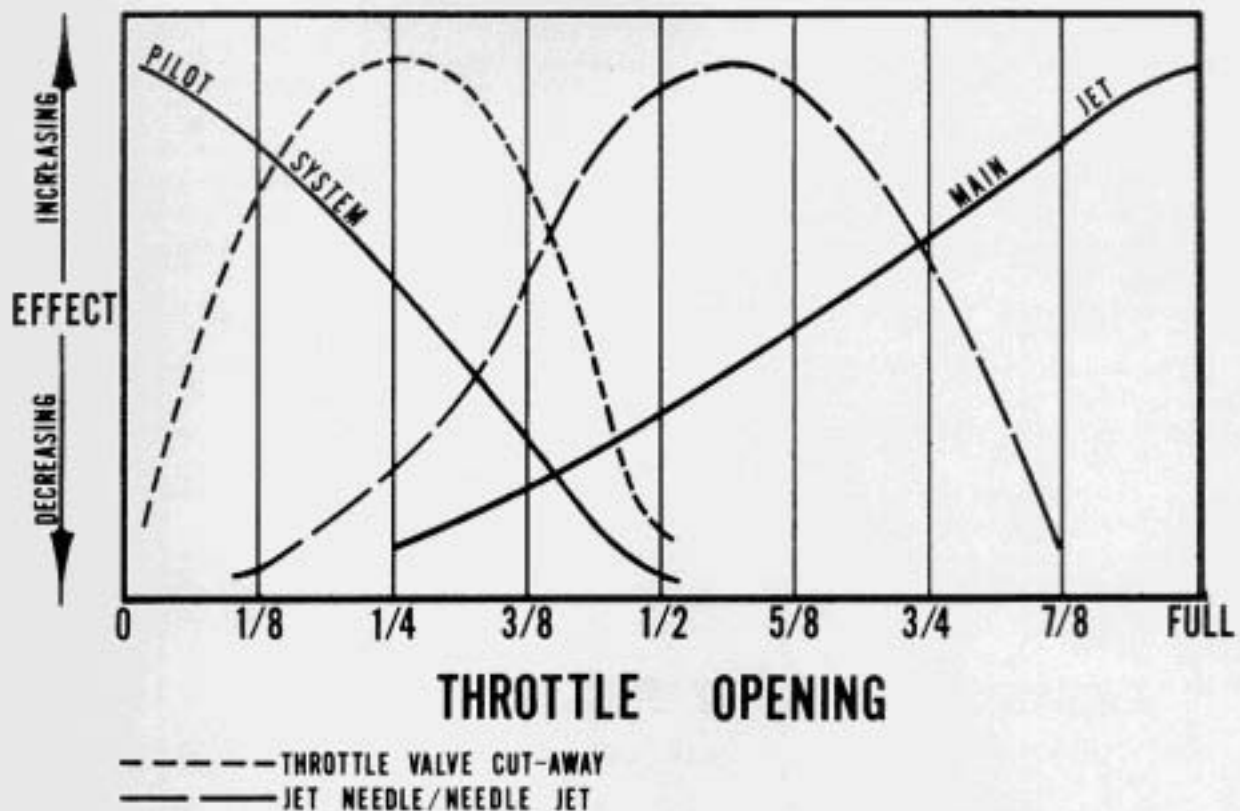
The main system is designed for delivering fuel between low speed and high speed operation. This system is made up of the jet needle, needle jet, and main jet. The main system begins to take effect as soon as there is enough air flow into the carburetor venturi to draw fuel up through the main jet and needle jet assembly.

During low-speed driving there is very little clearance between the jet needle and the needle jet; therefore, very little fuel from the main jet can pass between the jet needle and the needle jet. As the throttle valve opening is increased, the tapered jet needle is raised farther out of the needle jet, allowing greater fuel flow. Under full throttle opening, the cross-sectioned area of clearance between the jet needle and the needle jet becomes greater than the cross-sectioned area of the main jet. Thus the main jet is now controlling the amount of fuel flow.



CARBURETION

Component Effect VS Throttle Opening



The preceding throttle opening chart demonstrates component relationship to fuel flow versus throttle valve opening.

————— Pilot System

The pilot system's main function is that of a low speed jet. Its most effective range of fuel delivery is from idle to approximately 3/8 throttle valve opening.

- - - - - Throttle Valve Cutaway

The throttle valve controls the rate of engine air by its movement up and down in the carburetor venturi. At small throttle openings the air flow is regulated chiefly by the valve cutaway as shown, with its greatest effectiveness at 1/4 throttle opening. Throttle valves are number 1.0, 1.5, 2.0, etc., according to the size of the cutaway. Decreasing the cutaway number will increase the amount of fuel delivered in its effective range.

————— Jet Needle/Needle Jet

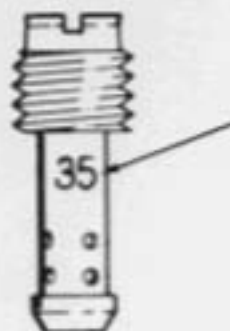
The jet needle and needle jet have an effective operating range from approximately 1/8 to 7/8 throttle opening. The amount of fuel delivered during this range relies upon the jet needle clip position, as well as the needle jet size and other specifications.

————— Main Jet

The main jet affects fuel delivery at 1/4 throttle and consistently increases to full throttle opening.

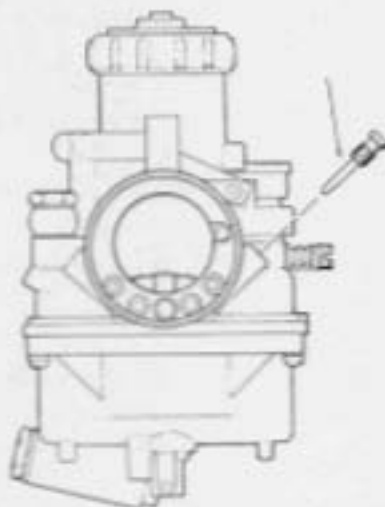
PILOT JET

From idling to low speeds, the fuel supply is measured out chiefly by the pilot jet. In the sides of the pilot jet, there are several air bleed openings which serve the same purpose as the air bleed in the needle jet, that is, to reduce the fuel to mist. The number stamped on the jet is an indication of the amount of fuel in cc's which passes through the jet during a one minute interval under a given set of conditions.



PILOT AIR SCREW

This air screw controls the mixture from idling to low speeds. The tapered tip of the air screw projects into the air passage leading to the pilot jet air bleeds, and by turning the screw in or out, the cross-sectional area of the air passage is varied, in turn varying the pilot jet air supply and changing the mixture ratio.

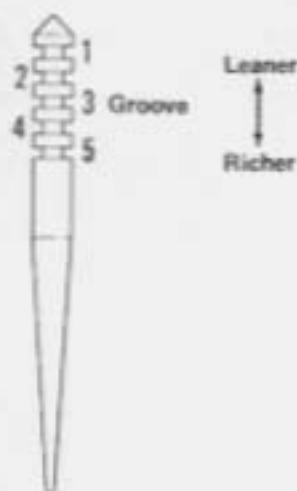


CARBURETION

Component Functions

JET NEEDLE

The jet needle has 5 grooves for adjustment cut in the upper portion, and is tapered from approximately the middle of the needle to the lower end. The top is fixed to the center of the throttle valve by the needle clip, and the tapered end extends into the needle jet. Fuel flows through the space between the needle jet and jet needle, which space is unvarying until the throttle reaches the 1/4 open point. At this time the tapered portion of the needle begins to move out of the jet and affect fuel flow as the opening enlarges. It follows that taper wear, and the position of the needle clip in the grooves also affect fuel flow rate. If the needle clip is changed from the standard position to a lower groove, the needle taper starts coming out of the jet sooner, resulting in a richer mixture; moving the clip higher produces a leaner mixture.



NEEDLE JET

The needle jet works in conjunction with the jet needle to regulate fuel flow rate.

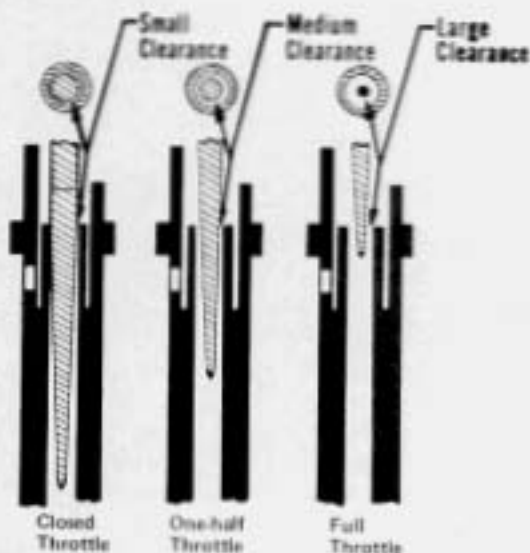
In the side of the needle jet, there is an air bleed opening which brings in air measured by the air jet. This air initiates the mixing and atomizing process inside the needle jet, and mixing is augmented by a projection at the needle jet outlet, called the primary choke.

The letter number code stamped on the jet indicates jet inside diameter.



THROTTLE OPENING VS FUEL FLOW

In the full throttle condition, the cross-sectioned area between the jet needle and the needle jet is larger than the cross-sectioned area of the main jet; therefore, the main jet has greater control over fuel flow.



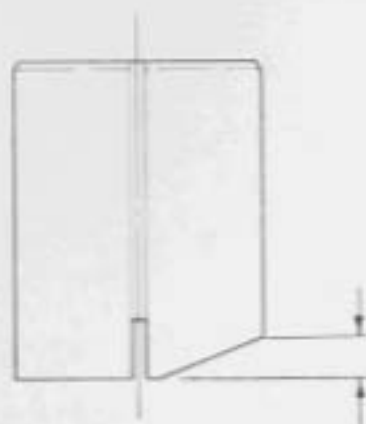
CARBURETION

Component Functions

THROTTLE VALVE

The throttle valve controls the rate of engine air intake by moving up and down inside the main bore. At small throttle openings air flow control is performed chiefly by the cutaway in the valve, and by controlling air flow, the negative pressure over the needle valve is regulated, in turn governing fuel intake.

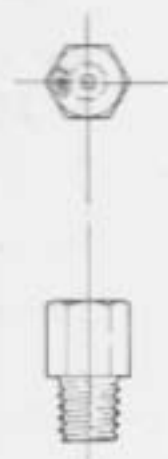
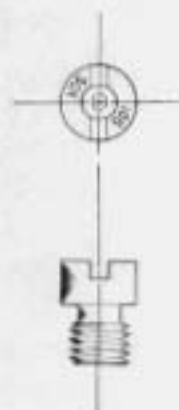
The throttle valves are numbered 1.0, 1.5, 2.0, etc., according to the size of the cutaway; the higher the number, the leaner the gasoline/air mixture.



MAIN JET

When the area between the needle jet and jet needle increases as the throttle opening becomes greater, fuel flow is metered chiefly by the main jet. The number on the jet indicates the approximate amount of fuel in cc's which will pass through it in one minute, with the larger numbers consequently giving a greater flow resulting in a richer mixture.

Main jets are located either in their banjo bolt holders in the carburetor bowl or are screwed directly into the needle jet base.



CARBURETION

1979 Original Equipment Jetting

Engine	EC25PS	EC25PM-01	EC34PM-03	EC34PM-04	EC44PM-01	EC25PT-07	EC34PT-05	EC44PT-05	EC34PL-02	EC51PL-01
Main Jet	117.5*	120	130	130	200	220	280	320	260	210
Pilot Jet	35	35	35	35	35	35	30	30	45	35

* Round Head

The above indicates the main jet and pilot jet that will be installed in each respective new engine. The number of the main jet; i.e., 102.5, 115, etc., is stamped on each jet. The jet size is also stamped on the banjo bolt, but NEVER assume that this is correct, always remove the banjo bolt and check the main jet itself.

The original main jet is not necessarily the correct main jet for that particular engine or altitude.

NOTE: Each engine has slightly different characteristics, therefore, two engines of one particular cc may not necessarily be jetted exactly the same.

Pilot jets are instrumental in low RPM performance. If the fuel flow is too great at low RPM, the excess fuel will build up in the crankcase, and only with increased RPM will the fuel be transferred to the combustion chamber.

CAUTION: TOO SMALL A MAIN JET AND TOO SMALL A PILOT JET CAN CAUSE SERIOUS ENGINE DAMAGE. JET THE CARBURETORS CAREFULLY.

IT IS THE DEALER'S RESPONSIBILITY TO INSURE THAT THE CORRECT JETS ARE INSTALLED IN A MACHINE. BE VERY CAREFUL WHEN JETTING DOWN IN WARM WEATHER; AS THE WEATHER TURNS COLDER IT WILL BE NECESSARY TO REJET UPWARD TO PREVENT ENGINE DAMAGE.

The following chart lists all main and pilot jets and the part number of each that are presently available.

MAIN JET NO.	PART NO.	PILOT JET NO.	PART NO.	HEX HEAD MAIN JET NO.	PART NO.
90	3080992	25	3082253	240	3081666
95	3080993	30	3080631	250	3080698
100	3080862	35	3080632	260	3080714
102.5	3081617	40	3081673	270	3080365
105	3081118	45	3081672	280	3080715
107.5	3081289	50	3081671	290	3080416
110	3080864	HEX HEAD MAIN JET NO.		300	3080612
112.5	3081911	PART NO.		310	3080623
115	3081119	80	3082771	320	3080624
117.5	3081290	85	3082772	330	3082334
120	3080866	90	3082773	340	3082335
122.5	3081908	95	3082774	350	3082336
125	3081319	100	3082775	360	3081769
127.5	3081584	105	3082776	380	3081770
130	3080868	110	3082777	400	3081771
132.5	3081909	120	3082778	420	3081772
135	3081426	130	3082779	430	3082344
137.5	3081910	140	3082780	440	3082345
140	3081291	150	3082577	450	3082343
145	3081120	160	3082578	460	3082346
150	3081616	170	3082579	470	3082347
160	3080697	180	3082580	490	3082398
165	3081401	190	3082581	500	3082401
170	3081402	200	3082573	530	3082400
175	3081403	210	3082582	560	3082593
180	3081404	220	3080171	590	3082594
		230	3081667	620	3082583

CARBURETION

Jetting/Altitude—Temperature Compensation

EC25PS

Outside Air Temperature ° F

	-40	-20	0	+20	+40	+60
1000	122.5	120	117.5	115	112.5	110
3000	120	117.5	115	112.5	110	107.5
5000	115	115	112.5	110	107.5	105
7000	112.5	110	110	107.5	105	102.5
9000	110	107.5	107.5	105	102.5	100

Main Jet Number

Production Setting

Main Jet — 117.5

Cut Away — 3.0

Jet Needle — 5DP7-4

Pilot Jet — 35

Air Screw — 1.0 turn

Maximum engine efficiency and horsepower are directly related to proper carburetion settings. The following charts are established as a guideline for selecting optimum jetting at varying temperature and altitude conditions for the 1979 Polaris.

IMPORTANT: The following guidelines must be followed when establishing a main jet setting:

1. Select the lowest anticipated temperature at which the machine will be operated.
2. Determine the lowest approximate altitude at which the machine will be operated.
3. Tracing down and across on the chart, use the intersecting main jet recommendation.

Altitude — Feet
1000
3000
5000
7000
9000

EC25PM-01

Outside Air Temperature ° F

	-40	-20	0	+20	+40	+60
1000	130	120	120	120	110	110
3000	120	120	110	110	110	100
5000	120	110	110	100	100	90
7000	110	100	100	100	90	90
9000	100	100	90	90	90	80

Main Jet Number

Production Setting

Main Jet — 120

Cut Away — 2.5

Jet Needle — 5DP7-2

Pilot Jet — 35

Air Screw — 1.0 turn

EC34PM-03

Outside Air Temperature ° F

	-40	-20	0	+20	+40	+60
1000	140	140	130	130	120	110
3000	130	130	120	120	110	110
5000	130	120	120	120	110	100
7000	120	120	110	110	100	100
9000	110	110	100	100	90	90

Main Jet Number

Production Setting

Main Jet — 130

Cut Away — 2.5

Jet Needle — 5DP7-2

Pilot Jet — 35

Air Screw — 1.0 turn

CARBURETION

Jetting/Altitude—Temperature Compensation

EC34PM-04
Outside Air Temperature ° F

Altitude — Feet		-40	-20	0	+20	+40	+60
	1000	140	130	120	120	110	110
	3000	130	120	120	110	110	100
	5000	120	110	110	110	100	100
	7000	110	110	100	100	100	90
	9000	110	100	100	90	90	90
		Main Jet Number					

Production Setting

Main Jet — 130

Cut Away — 3.0

Jet Needle — 5DP7-3

Pilot Jet — 35

Air Screw — 1.0 turn

EC44PM-01
Outside Air Temperature ° F

-40	-20	0	+20	+40	+60
210	200	190	180	180	170
200	190	180	170	170	160
190	180	170	160	160	150
170	170	160	150	150	140
160	160	150	140	140	130
Main Jet Number					

Production Setting

Main Jet — 200

Cut Away — 2.5

Jet Needle — 6DP1-3

Pilot Jet — 35

Air Screw — 1.0 turn

EC25PT-07
Outside Air Temperature ° F

Altitude — Feet		-40	-20	0	+20	+40	+60
	1000	230	220	210	200	190	180
	3000	220	210	200	190	180	170
	5000	200	200	190	180	170	160
	7000	190	180	180	170	160	150
	9000	180	170	170	160	150	140
		Main Jet Number					

Production Setting

Main Jet — 220

Cut Away — 2.5

Jet Needle — 5DP7-3

Pilot Jet — 35

Air Screw — 1.0 turn

EC34PT-05
Outside Air Temperature ° F

-40	-20	0	+20	+40	+60
310	300	290	280	270	260
300	290	280	270	260	240
280	270	260	250	240	230
260	250	240	240	230	220
250	240	230	220	210	200
Main Jet Number					

Production Setting

Main Jet — 290

Cut Away — 2.0

Jet Needle — 6DH7-2

Pilot Jet — 30

Air Screw — 1.0 turn

CARBURETION

Jetting/Altitude—Temperature Compensation

EC44PT-05
Outside Air Temperature ° F

Altitude — Feet	—40	—20	0	+20	+40	+60
	340	330	320	310	300	280
	330	310	300	290	280	270
	310	300	290	280	260	250
	290	280	270	260	250	240
	270	260	250	240	230	220

Main Jet Number

Production Setting

Main Jet — 320

Cut Away — 2.5

Jet Needle — 6DH7-2

Pilot Jet — 30

Air Screw — 1.0 turn

EC34PL-02
Outside Air Temperature ° F

—40	—20	0	+20	+40	+60
280	270	260	250	240	230
270	260	250	240	230	220
250	240	230	220	220	200
240	230	220	210	200	190
220	210	200	200	190	180

Main Jet Number

Production Setting

Main Jet — 260

Cut Away — 2.5

Jet Needle — 6DH4-3

Pilot Jet — 45

Air Screw — 1.0 turn

EC51PL-01
Outside Air Temperature ° F

Altitude — Feet	—40	—20	0	+20	+40	+60
	230	220	210	200	190	190
	220	210	200	190	180	180
	200	200	190	180	170	170
	190	180	180	170	160	160
	180	170	170	160	150	150

Main Jet Number

Production Setting

Main Jet — 210

Cut Away — 3.0

Jet Needle — 6DH7-2

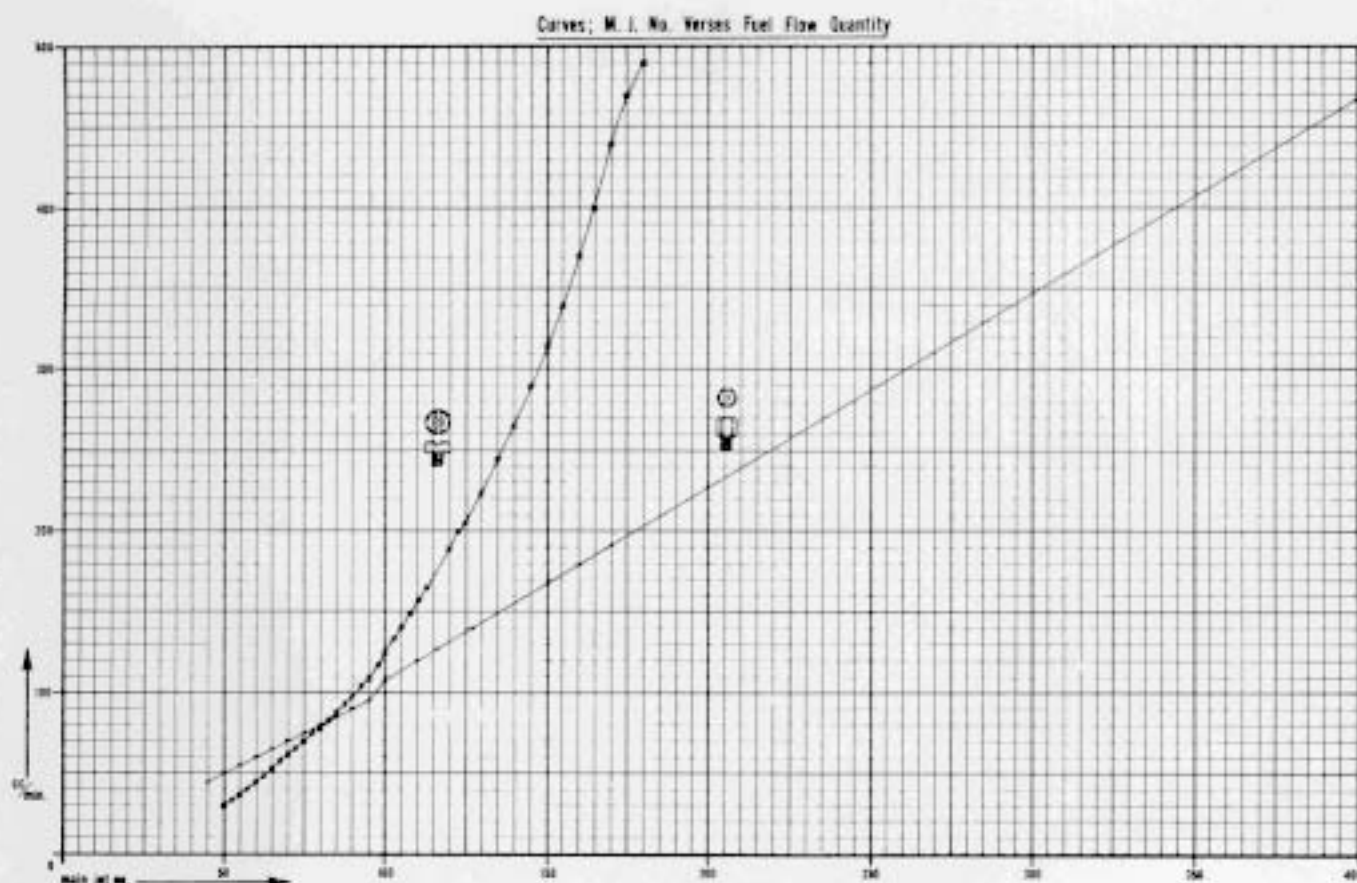
Pilot Jet — 35

Air Screw — 1.5 turn

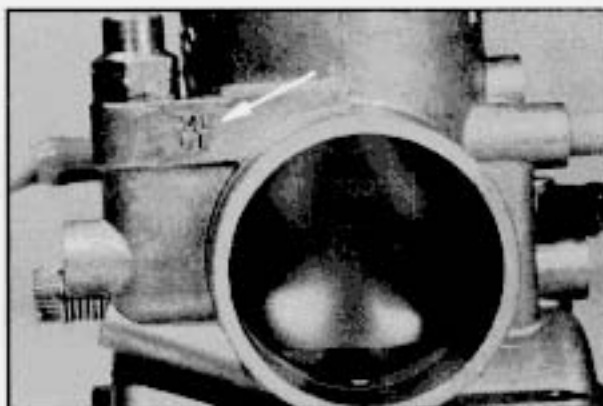
CARBURETION

Main Jet Number VS Fuel Flow and Carburetor Identification

Main Jet Number VS Fuel Flow

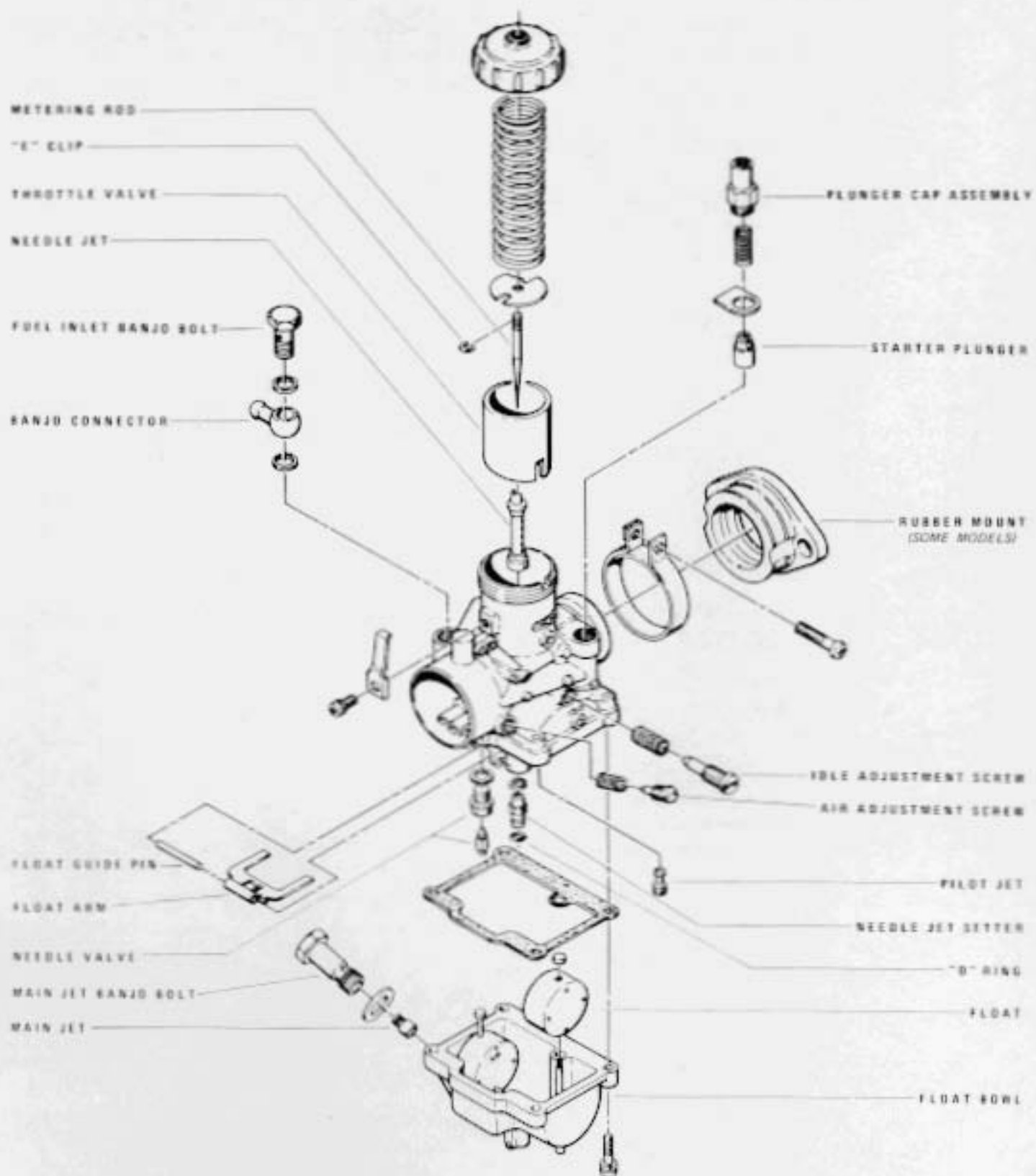


Each Polaris engine has a carburetor that has been calibrated for certain characteristics and model design. The carburetor is stamped with the engine model designation on the carburetor body. Example: EC34PL-02 TX-L engine would have the designation 34L-02. The designation is usually stamped on the front side of the choke housing chamber.



CARBURETION

Exploded View — VM26SS



CARBURETION

Adjustments — Jetting

JETTING IN ACCORDANCE WITH ALTITUDE

The amount of the incoming air in relation to meteorological conditions. The amount of air drawn into the cylinders is influenced by such factors as the altitude, temperature, humidity, etc. Suppose that the amount of air drawn into the cylinders at an elevation of zero is taken as 100 (the temperature and humidity in this case are considered constant). The amount of air in question decreases in proportion to a rise in elevation as shown in Chart A. Reduction in the amount of air drawn into the cylinders changes the air-fuel mixture ratio, with the result that the power output drops markedly. Chart B shows the relations between a rise in temperature and the amount of air drawn into the cylinders. In this case, the atmospheric pressure (elevation) and the humidity are considered unchanged and the amount of air going into the cylinders at 32 degrees F (0 degrees C) is taken as 100.

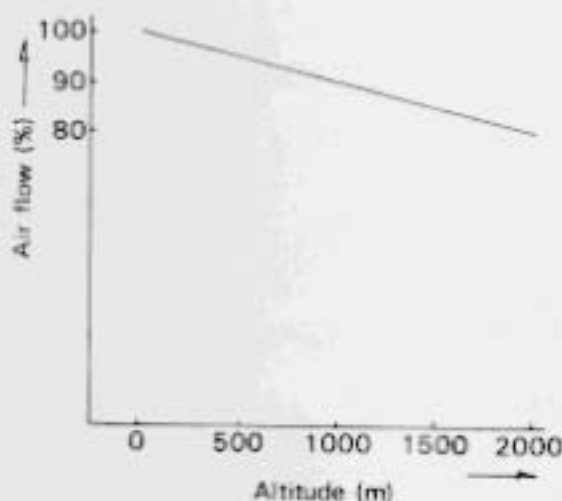


Chart A

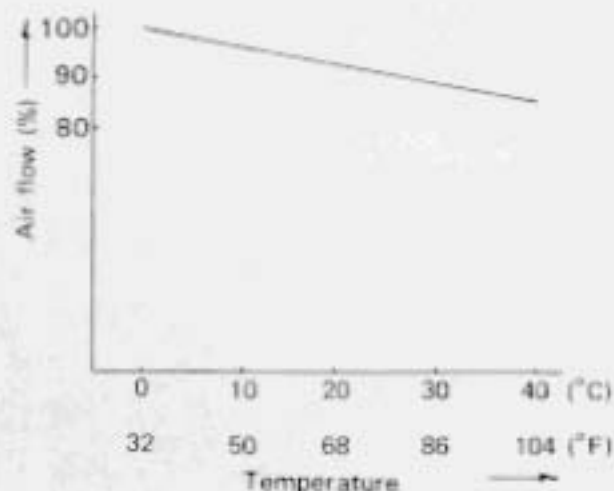


Chart B

On Mikuni VM-type carburetors, the pilot system and the main system are of independent construction. The fuel flow in these two systems is shown on Chart C.

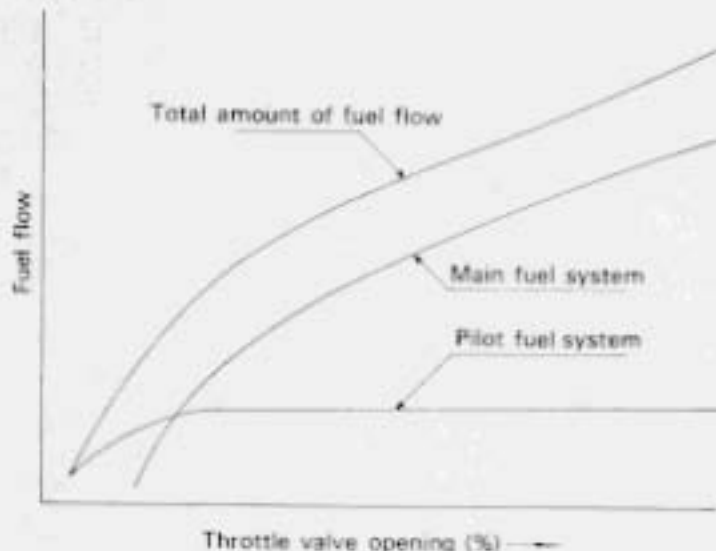


Chart C

CARBURETION

Problem Diagnosis

When the fuel-air mixture is diagnosed as improper due to spark plug readings, possible correction may result if the carburetor is cleaned and its passages blown clear with compressed air.

When the problem exists, further determine whether the mixture is too rich or too lean, again using the spark plug firing end condition as a guide.

Next use the throttle lever to determine at what degree of throttle valve opening the problem exists.

Mixture Too Rich
Black spark plug tip Heavy exhaust smoke Engine runs worse after warm-up Runs better without air silencer Combustion chamber has heavy deposits of carbon

Mixture Too Lean
Spark plug electrodes white Fluctuation in engine speed Power loss Engine overheats Cylinder scoring Back firing – detonation Throttle diagnostic opening check points

0 – 1/4 THROTTLE

Pilot air screw misadjusted

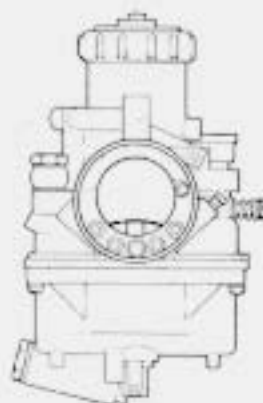
Pilot jet of wrong size

Obstruction of pilot jet

Pilot jet loose

Choke plunger not seating (rich)

Carburetor mounting air leak (lean)

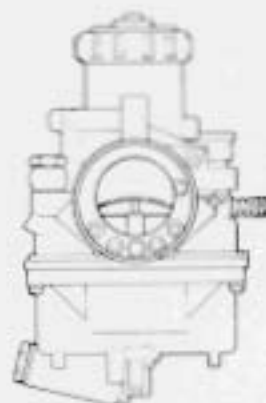


CARBURETION

Problem Diagnosis

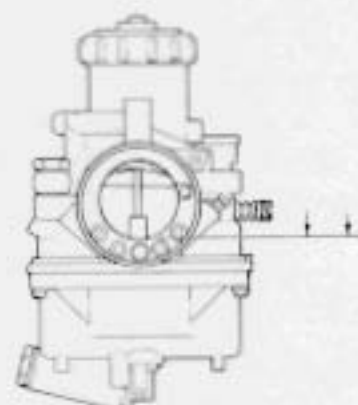
1/4 – 3/8 THROTTLE

Obstruction in main jet or needle jet
Jet needle worn or out of adjustment
Pilot system malfunction



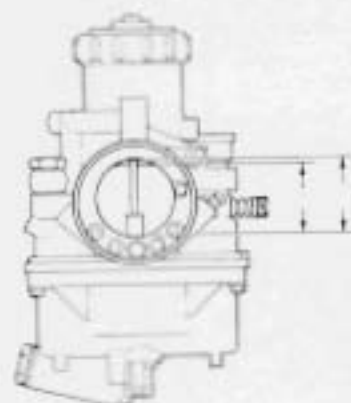
3/8 – 3/4 THROTTLE

Main jet incorrect size – clogged
Needle jet setter O-ring damaged or loose



3/4 – FULL THROTTLE

Main jet size – rich or lean
Fuel filter blocked – lean



When the engine has more than one carburetor, it is very important for full performance to maintain equal operation on all carburetors.

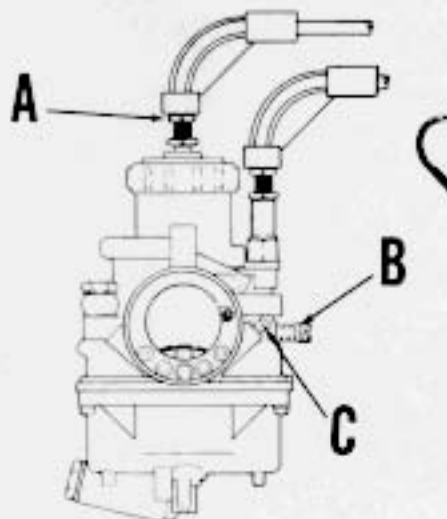
1. Adjustment of throttle valve and cable - It is very important for peak performance that the throttle valves open fully and that they are synchronized.
 - a. The throttle valves should be adjusted so that they are both rising from a closed position at the same time. By using a mirror or your finger, check to see that the throttle valves rise together, if not, adjust the throttle cable (A) accordingly.
 - b. Using a mirror or your finger, check to make sure that the throttle valves are fully open when the throttle control lever is pulled open on the handlebar. The throttle valves should travel up so that they bottom out on the mixing chamber cap. Adjust the cable to allow 1/16" free play at top. This will make sure that when the throttle control handle is pulled fully open, there will be some slack in the throttle cable. This will prevent the cable from being stretched as it would if the throttle valves were bottoming out when the throttle control handle is pulled wide open.

NOTE: Make sure that the back of the throttle valve is clearing the carburetor venturi when the valves are fully raised. The front of the throttle valve (cut out portion) should be well up above the carburetor venturi.

2. Adjustment of idling RPM - The recommended RPM for all models is a minimum of 2,000 RPM to a maximum of 2,500 RPM.

To synchronize the idling speed on a multi-cylinder engine, turn the idle adjusting screw (B) on one carburetor until the desired RPM is reached. Then go to the other carburetor and turn that idle adjusting screw until the engine just starts to pick up RPM. At this point, turn this idle adjusting screw counterclockwise about 1/4 turn and then both carburetors should be synchronized. If the machine has a tachometer, this process is made easier, using tachometer to synchronize the idling RPM.

3. Adjustment of pilot air screw (C) is from 1/4 - 3/4 turn from a fully closed position. With the engine idling, turn the pilot air screw in or out until the smoothest idling is achieved.



CARBURETION

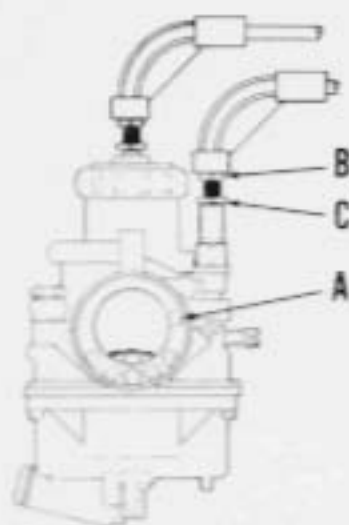
Adjustments — Choke

Choke adjustment — (To be performed with air silencer removed)

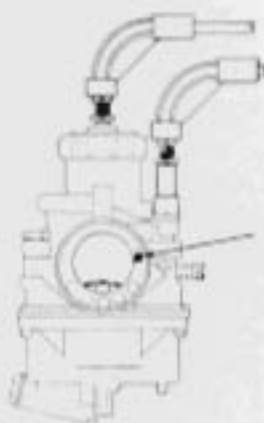
With the dash mounted choke control toggle flipped to full off position, the choke plunger must be seated on fuel passage-way in carburetor. If plunger is not seated on passage-way, the engine will flood or run too rich, causing plug fouling and very poor engine performance.

To inspect choke adjustment, flip choke toggle switch to full off position. By using a flashlight and a mirror, a visual inspection can be made to see if the choke plunger is seated properly (all the way down) in the off position.

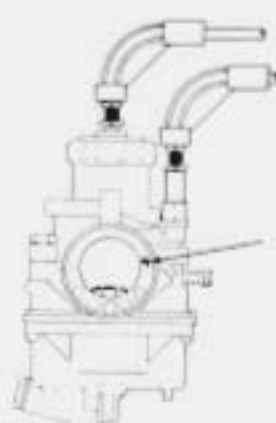
When the choke toggle is in full open position, the choke plunger should be up just far enough so that the choke passage is fully open. This can be determined by inserting a .150" diameter wire into the choke passage (A). NOTE: This wire must have a rounded polished end to prevent damage to the choke plunger and seat. With a slight inward pressure on the wire, turn the choke cable adjustment nut (B) counterclockwise until the gauge wire slips beneath plunger, then secure the lock nut (C). Proper free play of the choke lever after adjustments should be as shown.



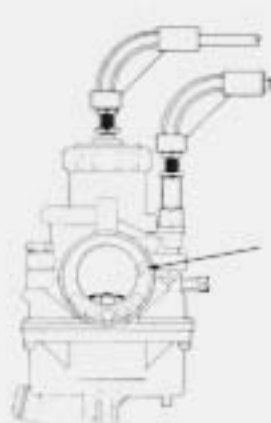
1/8" - 1/4" Freeplay



Off



Half-On

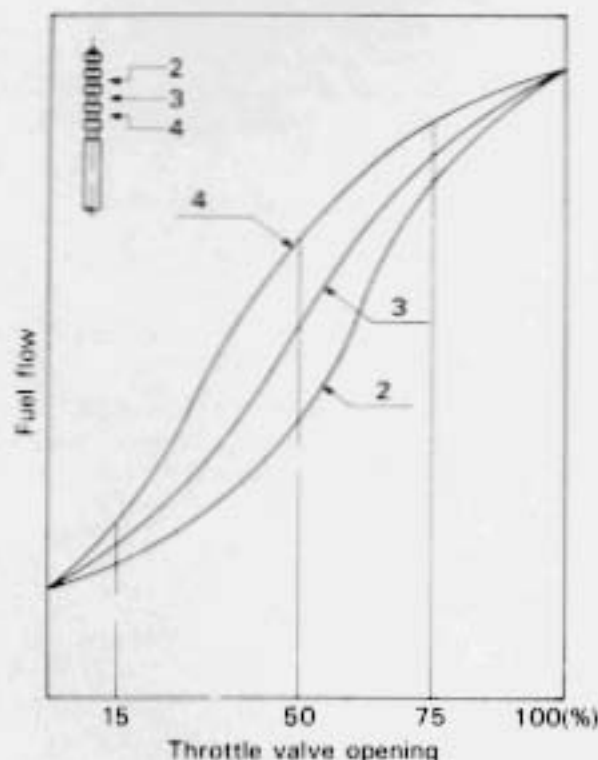


Full-On



FINE TUNING THE MIKUNI CARBURETOR

Selection of the Needle Jet and the Jet Needle - A carburetor with a piston-type throttle valve is also called a variable venturi-type carburetor. In this type of carburetor, the needle jet and the jet needle serve to control a proper air-fuel mixture ratio during the so-called medium throttle valve opening (between 1/4 and 3/4 opening). Whether or not the right size of these parts is used gives a big bearing on the engine performance at partial load. The jet needle tapers off at one end and the clearance between the jet needle and the needle jet increases as the throttle valve opening gets wider. The air-fuel mixture ratio is controlled by the height of "E" ring that is inserted into one of the five slots provided in the head of the jet needle. The variation of fuel flow based on the height of "E" ring is shown on chart to the right.



ADJUSTMENT OF FLOAT LEVEL

To adjust the float level on a Mikuni carburetor, it is necessary to remove the float bowl. With the carburetor in an inverted position the float arm (A) should be parallel with the body (B) on the carburetor as indicated in Figure 1.

NOTE: To adjust the float arm never bend the arm itself, always bend the tang which contacts the inlet needle.

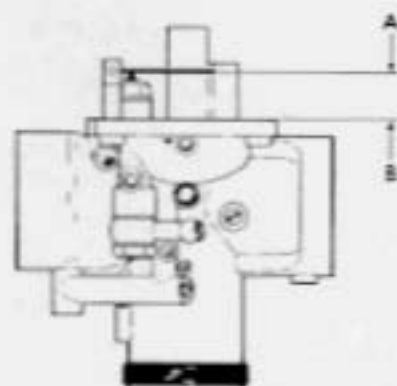


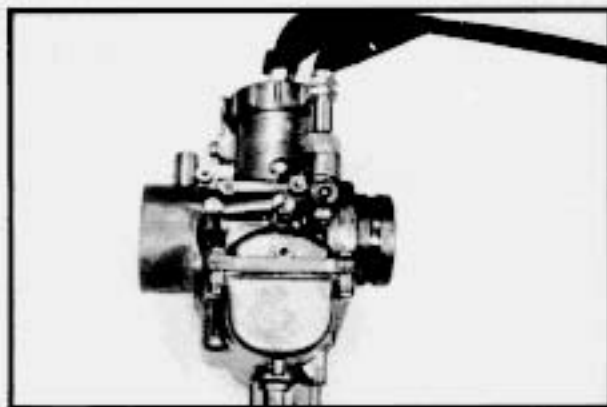
Fig. 1

CARBURETION

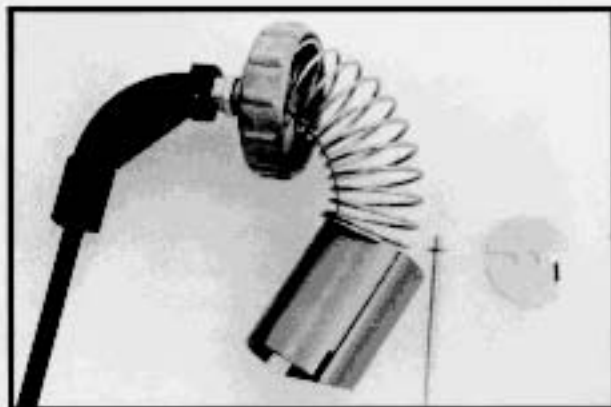
Overhaul Service

The Mikuni carburetor consists of various precision-machined parts. Therefore, care should be exercised when removing jets or disassembling the carburetor for cleaning. With few mechanical functions in this type carburetor, troubles are mostly due to wear of parts and clogging by dirt. In overhauling the carburetor, use a solvent or gasoline to wash all parts and blow dry using compressed air. Observe the following instructions:

1. Remove the carburetor from the engine. Before disassembling, clean the outside of the carburetor thoroughly with solvent.



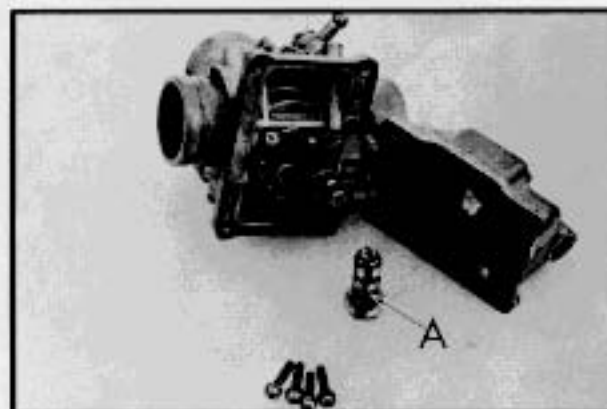
2. Remove the slide valve, inspecting it for nicks or burrs which may cause sticking. Remove the jet needle noting the "E" clip location.



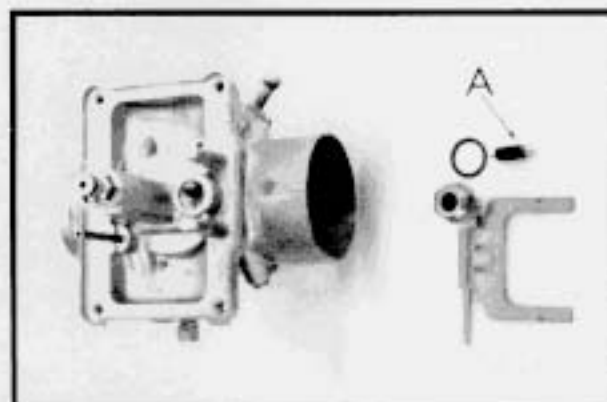
3. Remove the choke plunger, checking the condition of the neoprene seal at its tip. Any nicks or cuts will cause leakage and overfueling of the engine.



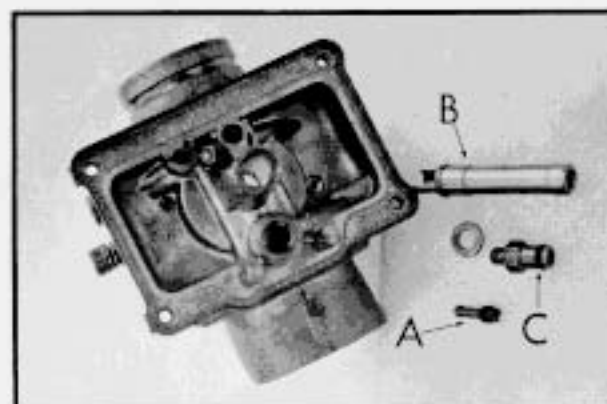
4. Remove the float bowl and main jet banjo bolt (A).



5. Remove the inlet needle and seat assembly inspecting the needle (A) for any wear at its tip.
NOTE: Do not bend the float arm during disassembly.



6. Remove the pilot jet (A) and needle jet (B) by removing the jet setter and pushing the needle jet into the slide valve chamber. Inspect the neoprene "O" ring (C) located on the needle jet setter for nicks or cuts. Wash all parts in solvent and blow all passages and jets with compressed air. Replace gaskets and parts which show wear or damage. Reassemble the carburetor, adjusting the float level before installing the float bowl.
NOTE: Refer to page in this section for correct float level adjustment procedures.



CARBURETION

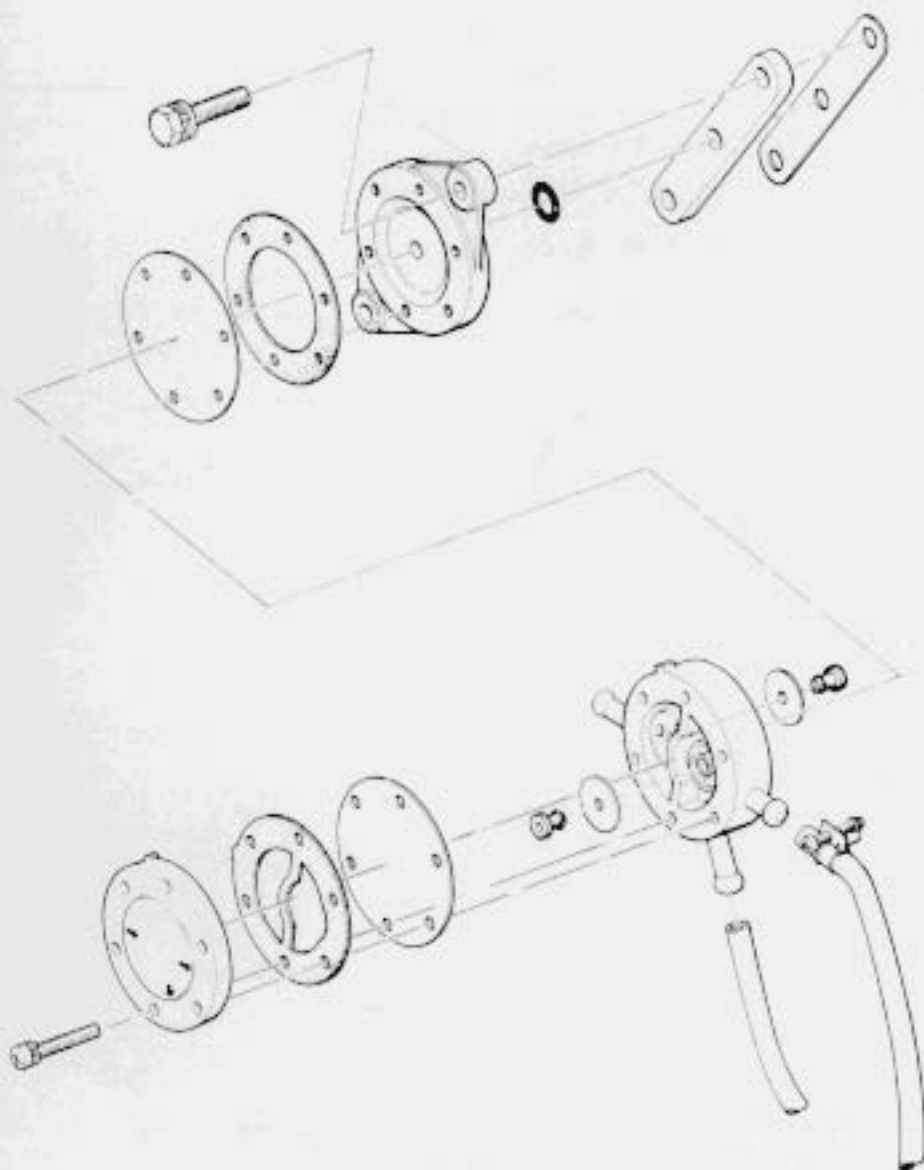
Fuel Pump

The fuel pumps for all Polaris engines are basically the same. The differences are in the size and location of the pumps. Pumps may be mounted on the crankcase or on the machine using an impulse hose.

In the two cycle engine, the pressure in the crankcase changes with the up and down stroke of the piston. The amplitudes of pressure vary according to the RPM and degree of throttle opening. Whether idling or full throttle, the pressure built up in the crankcase has enough amplitude to operate the pump.

When the piston is on the upstroke, crankcase pressure in that cylinder becomes less positive, the diaphragm in the fuel pump moves toward the engine causing a negative pressure or suction in the pump chamber which causes the inlet valve from the fuel supply to open and permits fuel to enter the chamber; this same suction causes the outlet valve (to the carburetor) to close so fuel cannot return from the carburetor.

When the piston begins its downward stroke, the pressure from the crankcase becomes positive, causing the fuel pump diaphragm to move in the opposite direction, reversing the pressure in the fuel pump chamber. This causes the inlet valve in the pump to close and the outlet valve (to the carburetor) to open, filling the float bowl in the carburetor. When the float level in the carburetor reaches its standard level the needle valve will close, preventing more fuel from entering the carburetor, even though the fuel pump continues to try to provide the carburetor with fuel.



SECTION VII

TORQUE-O-MATIC DRIVE

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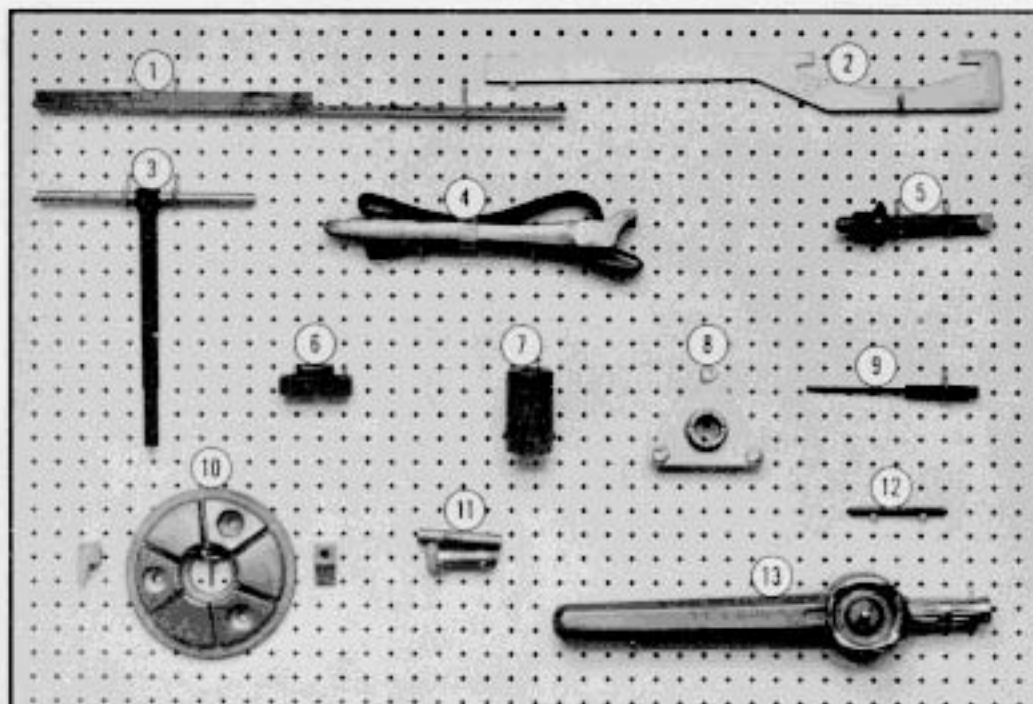
TORQUE-O-MATIC DRIVE

Service Tools

WARNING: ALL DRIVE CLUTCH MAINTENANCE, DISASSEMBLY AND ASSEMBLY MUST BE PERFORMED ONLY BY AN AUTHORIZED POLARIS DEALER WHO HAS ATTENDED CURRENT MODEL DEALER SERVICE SEMINARS, HAS RECEIVED A CERTIFICATE OF COMPLETION AND DISPLAYS THE POLARIS SERVICING DEALER DECAL IN HIS SHOW WINDOW.

Because of the critical nature and precision balance incorporated into the drive clutch, it is absolutely essential that no attempt at clutch disassembly and/or repair be made without factory authorized tools and service procedures.

DRIVE CLUTCH ESSENTIAL TOOLS



Part Number

1. Offset Alignment Tool - 9/16"	2870161
2. Offset Alignment Tool - 5/8"	2870426
3. "T" Handle Clutch Puller	2870353
4. Strap Wrench	2870336
5. Steel Clutch Puller	2870030
6. Roller Pin Gauge Block	2870310
7. Spider Spanner Nut Driver	2870338
8. Spider Torquing Tool	2870341
9. Clutch Pin Punch	2870402
10. Holding Fixture	2870379
11. Aluminum Clutch Puller	2870130
12. Roller Pin Centering Punch	2870401
13. 250 ft./lb. Torque Wrench	Not available through Polaris

TORQUE-O-MATIC DRIVE

Data

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Engine	Clutch Part Number	Weight Letter	Weight Grams	Spring Number	Spring Color	Wire Diameter
Stock:						
175	1321160	A	47.5	7041021	Plain	.157
244	1321186	A	47.5	7041021	Plain	.157
294	1321159	B	43	7041021	Plain	.157
335 S	1321159	B	43	7041021	Plain	.157
335 TX	1321187	B/Mod		7041022	Black	.140
398	1321178	B	43	7041017	Red	.125
432 S	1321178	B	43	7041017	Red	.125
502 TX	1321178	B	43	7041017	Red	.125
530	1321178	B	43	7041017	Red	.125
530 SS	1321204	A	47.5	7041017	Red	.125
Racer:						
294	1322066	L	34.5	7041036	Pink	.170
340	1322066	L	34.5	7041036	Pink	.170
398	1322065	K	40	7041037	Yellow	.192
440	1322065	K	40	7041037	Yellow	.192
650	1322064	J	44	7041036	Pink	.170
795	1322063	H	50	7041036	Pink	.170

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Model	Engine	Clutch Part Number	Weight Letter	Weight Grams	Spring Number	Spring Color	Wire Diameter
Colt	175	1321205	A	47.5	7041022	Black	.140
	250	1321187	B/Mod G	41-42	7041022	Black	.140
	294	1321159	B	43	7041021	Clear	.157
	340	1321159	B	43	7041021	Clear	.157
Charger (Custom)	294	1321159	B	43	7041021	Clear	.157
	398	1321206	A	47.5	7041022	Black	.140
	530	1321207	O/new fry.	50 & 51	7041022	Black	.140
Mustang	398	1321206	A	47.5	7041022	Black	.140
	530	1321207	O/new fry.	50 & 51	7041022	Black	.140
TX	294	1321187	B/Mod G	41-42	7041022	Black	.140
	340	1321187	B/Mod G	41-42	7041022	Black	.140
	398	1321209	B	43	7041022	Black	.140
	440	1321159	B	43	7041021	Clear	.157
	502	1321209	B	43	7041022	Black	.140

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Model	Engine	Sprocket Ratio	Chain Pitch	Center Distance	Clutch Part No.	Weight Letter	Weight Grams	Spring Number	Spring Color & Wire Diameter
Colt	EC17PM	12/35	84	11.1	1321229	A	47.48	7041022	Black/.140
	EC25PS	13/35	84	11.1	1321230	G	41.42	7041022	Black/.140
	EC29PF	13/35	84	11.1	1321231	B	42.5-43.5	7041021	Clear/.157
Colt SS	EC25PC	13/35	84	11.1	1321247	G	41.42	7041021	Clear/.157
	EC29PF	13/35	84	11.1	1321231	B	42.5-43.5	7041021	Clear/.157
	EC34PC	13/35	86	11.1	1321231	B	42.5-43.5	7041021	Clear/.157
Electra	EC34PG	15/39	90	12.15	1321242	B	42.5-43.5	7041022	Black/.140
	EC44PG	15/39	90	12.15	1321238	A	47.48	7041022	Black/.140
Custom	EC25PS	13/39	90	12.15	1321230	G	41.42	7041022	Black/.140
	EC40PM	15/39	90	12.15	1321238	A	47.48	7041022	Black/.140
	EC54PM	17/39	92	12.15	1321239	O	50.51	7041022	Black/.140
TX	EC25PT	13/39	90	13	1321247	G	41.42	7041021	Clear/.157
	EC34PS	15/39	90	13	1321247	G	41.42	7041021	Clear/.157
	EC44PT	17/39	92	13	1321231	B	42.5-43.5	7041021	Clear/.157
	EC51PT	19/39	92	13	1321231	B	42.5-43.5	7041021	Clear/.157

Model	Engine	Sprocket Ratio	Chain Pitch	Center Distance	Clutch Part No.	Weight Letter	Weight Grams	Spring Part No.	Spring Color & Wire Diameter
Colt &	EC25PC	15 - 35	86	11.1	1321260	U	33.5-34.5	7041021	Clear / .157
Colt SS	EC34PC	15 - 35	86	11.1	1321261	W	37 - 38	7041021	Clear / .157
Electra	EC25PS	13 - 39	90	12.1	1321231	B	43	7041021	Clear / .157
Electra	EC34PO	15 - 39	90	12.1	1321231	B	43	7041021	Clear / .157
Electra	EC44PO	17 - 39	92	12.1	1321231	B	43	7041021	Clear / .157
TC	EC17PM	14 - 39	82	9.5	1321229	A	47.5	7041022	Black / .140
TC	EC25PS	14 - 39	82	9.5	1321231	B	43	7041021	Clear / .157
TX	EC25PT	13 - 39	90	13	1321260	U	33.5-34.5	7041021	Clear / .157
TX	EC34PT	15 - 39	90	13	1321261	W	37 - 38	7041021	Clear / .157
TX	EC44PT	17 - 39	92	13	1321289	G (B Mod.)	39.5-40.5	7041021	Purple / .168
TX	EC51PT	19 - 39	92	13	1321231	B	43	7041021	Clear / .157

MODEL	ENGINE	SPROCKET RATIO	CHAIN PITCH	CENTER DISTANCE	CLUTCH PART NO.	WEIGHT LETTER	WEIGHT GRAMS	SPRING PART NO.	SPRING COLOR & WIRE DIAMETER
Colt 175cc	EC17PM	12 - 35	84	11.1	1321229	A	47.5	7041022	Black / .140
Colt 244cc	EC25PS	13 - 35	84	11.1	1321230	G	41 - 42	7041022	Black / .140
Colt 250cc	EC25PC	15 - 35	86	11.1	1321260	U	34	7041021	Clear / .157
Colt 340cc	EC34PC	15 - 35	86	11.1	1321261	W	37.5	7041021	Clear / .157
Electra 244cc	EC25PS	13 - 39	90	12.1	1321231	B	43	7041021	Clear / .157
Electra 339cc	EC34PO	15 - 39	90	12.1	1321231	B	43	7041021	Clear / .157
Electra 433cc	EC44PO	17 - 39	92	12.1	1321231	B	43	7041021	Clear / .157
TX 250cc	EC25PT-06	14 - 39	64	12.0	1321272	G	41 - 42	7041060	Orange / .196
TX 336cc	EC34PT-05	17 - 39	66	12.0	1321273	A	47.5	7041061	Brown / .200
TX 433cc	EC44PT-05	19 - 39	66	12.0	1321274	A	47.5	7041063	Purple / .168
Starfire 250cc	EC25PT-05	14 - 39	64	12.0	1321275	W	37.5	7041062	Silver / .218
Starfire 336cc	EC34PT-06	15 - 39	64	12.0	1321276	Y	35	7041061	Brown / .200

TORQUE—O—MATIC DRIVE

Data

MACHINE MODEL	ENGINE MODEL	SPROCKET RATIO	CHAIN PITCH/TYPE	CENTER DISTANCE		CLUTCH PART NO.	WEIGHT LETTER	WEIGHT GRAMS	SPRING PART NO.	SPRING COLOR & WIRE DIAMETER
				MM	Inches					
Colt 244	EC25PS	13/35	64/35-2	281.94	11.1	1321312	G	41.5	7041063	Purple/.168
Colt 250	EC25PC	15/35	66/35-2	281.94	11.1	1321305	W	37.5	7041063	Purple/.168
Colt SS 250	EC25PM-01	15/35	66/35-2	281.94	11.1	1321298	G	41.5	7041060	Orange/.196
Electra 250	EC25PS	13/39	90/35-2	308.61	12.15	1321311	B	43	7041063	Purple/.168
TX 250	EC25PT-07	15/39	64/Silent	304.8	12.0	1321306	W	37.5	7041062	Silver/.208
Colt SS 340	EC34PM-03	17/35	66/35-2	281.94	11.1	1321299	A	47.5	7041060	Orange/.196
Electra 340	EC34PQ	15/39	90/35-2	308.61	12.15	1321311	B	43	7041063	Purple/.168
TX 340	EC34PT-05	17/39	66/Silent	304.8	12.0	1321307	B	43	7041065	Pink/.177
TXL 340	EC34PL-01	19/39	66/Silent	304.8	12.0	1321313	G	41.5	7041065	Pink/.177
Electra 440	EC44PQ	17/39	92/35-2	308.61	12.15	1321311	B	43	7041063	Purple/.168
TX 440	EC44PT-05/06	19/39	66/Silent	304.8	12.0	1321308	A	47.5	7041060	Orange/.196

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HIGH ELEVATION MODIFICATIONS

The following are weight and spring combinations for elevations above 6,500 feet.

MACHINE MODEL	ENGINE MODEL	DRIVE CLUTCH			
		WEIGHT	WEIGHT KIT PN	SPRING	SPRING PN
Colt 244	EC25PS	G	2200119	Orange	7041060
Colt 250	EC25PC	W	2200108	Purple	7041063
Colt SS 250	EC25PM-01	G	2200119	Silver	7041062
Electra 250	EC25PS	B	2200106	Orange	7041060
TX 250	EC25PT-07	U	2200107	Orange	7041060
Colt SS 340	EC34PM-03	B	2200106	Orange	7041060
Electra 340	EC34PQ	B	2200106	Orange	7041060
TX 340	EC34PT-05	G	2200119	Pink	7041065
TXL 340	EC34PL-01	W	2200108	Pink	7041065
Electra 440	EC44PQ	B	2200106	Orange	7041060
TX 440	EC44PT-05/06	B	2200106	Purple	7041063

NOTE: 6,500 feet is normally the height at which the low altitude to high altitude or the high altitude to low altitude clutch change is made. However, variations in snow conditions, ambient temperature, driver weight, individual machine performance, etc., may make it desirable to change clutching at a slightly lower or higher altitude than 6,500 feet.

TORQUE-O-MATIC DRIVE Data

MACHINE MODEL	ENGINE MODEL	SPROCKET RATIO	CHAIN PITCH/TYPE	CENTER DISTANCE		CLUTCH PART NO.	WEIGHT LETTER	WEIGHT GRAMS	SPRING PART NO.	SPRING COLOR & WIRE DIAMETER
				MM	Inches					
Colt 244	EC25PS	13/35	84/35-2	281.94	11.1	1321312	G	41.5	7041063	Purple/.168
Colt 250	EC25PC	15/35	86/Silent	281.94	11.1	1321305	W	37.5	7041063	Purple/.168
TX 250	EC25PT-07	15/39	84/Silent	304.8	12.0	1321306	W	37.5	7041062	Silver/.208
S/S 340	EC34PM-03/04N	17/35	86/Silent	281.94	11.1	1321299	A	47.5	7041060	Orange/.196
Cobra 340	EC34PM-04	15/35	88/Silent	304.8	12.0	1321318	A	47.5	7041063	Purple/.168
TX 340	EC34PT-05	17/39	86/Silent	304.8	12.0	1321307	B	43	7041065	Pink/.177
TX-L 340	EC34PL-02	19/39	86/Silent	304.8	12.0	1321313	G	41.5	7041083	Red/.192
Cobra 440	EC44PM-01	17/33	88/Silent	304.8	12.0	1321316	@	53	7041022	Black/.140
TX 440	EC44PT-05	19/39	86/Silent	304.8	12.0	1321308	A	47.5	7041060	Orange/.196

HIGH ELEVATION MODIFICATIONS

The following are weight and spring combinations for elevations above 6,500 feet.

MACHINE MODEL	ENGINE MODEL	DRIVE CLUTCH			
		WEIGHT	WEIGHT KIT PN	SPRING	SPRING PN
Colt 244	EC25PS	G	2200119	Orange	7041060
Colt 250	EC25PC	G	2200119	Silver	7041062
TX 250	EC25PT-07	U	2200107	Pink	7041065
S/S 340	EC34PM-03/04N	B	2200106	Orange	7041060
Cobra 340	EC34PM-04	A	2200105	Silver	7041062
TX 340	EC34PT-05	G	2200119	Red	7041083
TX-L 340	EC34PL-02	W	2200108	Red	7041083
Cobra 440	EC44PM-01	@	2200162	Purple	7041063
TX 440	EC44PT-05	A	2200105	Orange	7041060

NOTE: 6,500 feet is normally the height at which the low altitude to high altitude or the high altitude to low altitude clutch change is made. However, variations in snow conditions, ambient temperature, driver weight, individual machine performance, etc., may make it desirable to change clutching at a slightly lower or higher altitude than 6,500 feet.

TORQUE-O-MATIC DRIVE

Data

MACHINE MODEL	ENGINE MODEL	SPROCKET RATIO	CHAIN PITCH/TYPE	CENTER DISTANCE		CLUTCH PART NO.	WEIGHT LETTER	WEIGHT GRAMS	SPRING PART NO.	SPRING COLOR & WIRE DIAMETER
				MM	Inches					
Gemini 244	EC25PS	13/35	84/35-2	281.94	11.1	1321312	G (B Mod.)	41.5	7041063	Purple/.158
Gemini 250	EC25PM-01	15/35	88/Silent	281.94	11.1	1321298	G (B Mod.)	41.5	7041060	Orange/.196
Apollo 340	EC34PM-03	18/35	88/Silent	281.94	11.1	1321299	A	47.5	7041060	Orange/.196
Cobra 340	EC34PM-04	15/35	88/Silent	304.8	12.0	1321318	A	47.5	7041063	Purple/.158
Cobra 440	EC44PM-01	17/33	88/Silent	304.8	12.0	1321316	@	53	7041022	Black/.140
TX 250	EC25PT-07	15/39	64 Silent	304.8	12.0	1321306	W	37.5	7041062	Silver/.208
TX 340	EC34PT-05	17/39	66/Silent	304.8	12.0	1321324	B	43	7041102	Yellow/.192
TX 440	EC44PT-05	19/39	66/Silent	304.8	12.0	1321325	A/P	47.5	7041102	Yellow/.192
TX-L 340	EC34PL-02	19/39	66/Silent	304.8	12.0	1321327	B	43	7041062	Silver/.208
Centurion	EC51PL-01	19/35	64/Silent	304.8	12.0	1321328	A	47.5	7041083	Red/.192

CAUTION: 1979 Apollo models beginning with serial number 0503733 are equipped with drive belt part number 3211044. Due to belt construction and length, it is important not to use substitutes. Failure to comply can result in drive system damage. Correct converter center distance for this belt is 11".

HIGH ELEVATION MODIFICATIONS

The following are weight and spring combinations for elevations above 6,500 feet.

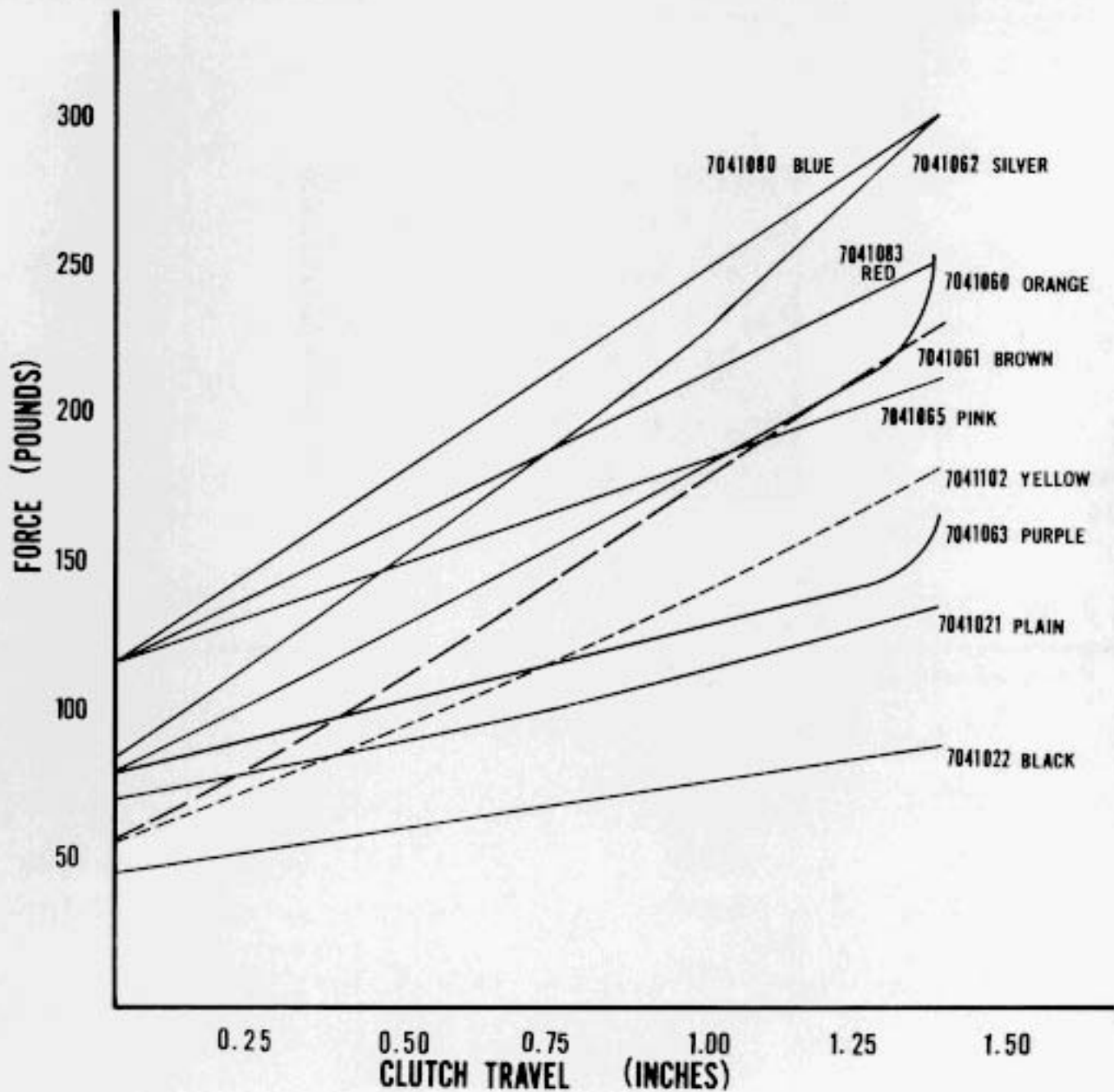
MACHINE MODEL	ENGINE MODEL	DRIVE CLUTCH			
		WEIGHT	WEIGHT KIT PN	SPRING	SPRING PN
Gemini 244	EC25PS	G	2200119	Orange	7041060
Gemini 250	EC25PM-01	W	2200108	Red	7041083
Apollo 340	EC34PM-03	B	2200106	Orange	7041060
Cobra 340	EC34PM-04	A	2200105	Silver	7041062
Cobra 440	EC44PM-01	@	2200162	Purple	7041063
TX 250	EC25PT-07	U	2200107	Pink	7041065
TX 340	EC34PT-05	G	2200119	Red	7041083
TX 440	EC44PT-05	A	2200105	Orange	7041060
TX-L 340	EC34PL-02	W	2200108	Red	7041083
Centurion*	EC51PL-01	B	2200106	Red	7041083

*Above 8,500 feet altitude and +35°F, change to 19-39 gearing and 66 pitch chain for optimum performance.

NOTE: 6,500 feet is normally the height at which the low altitude to high altitude or the high altitude to low altitude clutch change is made. However, variations in snow conditions, ambient temperature, driver weight, individual machine performance, etc., may make it desirable to change clutching at a slightly lower or higher altitude than 6,500 feet.

TORQUE-O-MATIC DRIVE
Drive Clutch Spring Rates

The following drive clutch spring compression rate chart will enable the serviceman to setup and balance engine RPM power curves to meet special converter tuning requirements for maximum machine performance; i.e., high operating altitude, heavy loads, mountainous terrain, etc.

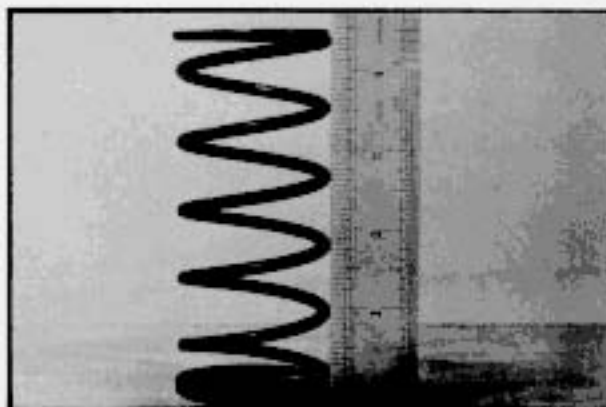


TORQUE-O-MATIC DRIVE

Drive Clutch Spring Data

Maximum efficiency of the variable speed drive system is dependent upon many factors. Included in these are converter alignment, belt tension, and internal condition of the drive and driven clutch components. One of the most critical and easily serviced parts is the drive clutch spring. Due to the severe stress the spring is subject to during operation, it should always be inspected and checked for tolerance limits during any clutch operation diagnosis or repair.

With the spring resting on a flat surface, measure its free length from its outer coil surfaces as indicated. Refer to the spring specification chart for specific free length measurements and tolerances.



In addition to proper free length, the spring coils should be parallel to one another when placed on a flat surface. Distortion of the spring indicates stress fatigue and replacement is required.

TORQUE—O—MATIC DRIVE
Drive Clutch Spring Data

PART NUMBER	COLOR CODE	WIRE DIAMETER	FREE LENGTH
7041021	Clear	.157"	4.38"
7041022	Black	.140"	4.25"
7041063	Purple	.168"	4.37"
7041062	Silver	.208"	3.12"
7041065	Pink	.177"	4.69"
7041060	Orange	.196"	3.37"
7041080	Blue	.207"	3.44"
7041083	Red	.192"	3.77"
7041102	Yellow (1979 production)	.192"	2.92"
7041061	Brown	.200"	3.06"

SPRING MEASUREMENT TOLERANCE

Free Length $\pm$.125"

⚠ CAUTION:

Never shim a drive clutch spring to increase its compression rate. This may result in complete stacking of the coils and subsequent clutch cover failure.

DRIVE BELT PART NUMBERS

- 3211007 - All Models (Except Voyager) - 1969-1971
- 3211003 - Voyager Models - 1969-1971
- 3211021 - Colt, Colt SS, and S/S 340 Models - 1972-1978
All Gemini and Apollo 340 Models
- 3211031 - Charger, Mustang, and Custom Charger Models - 1972-1973
All Customs II Models
All Electra Models
- 3211039 - All TC Models
- 3211041 - TX Models - 1972-1975
- 3211042 - TX, Starfire, TX-L, and Centurion Models - 1976-Current
All Cobra Models

3211044 Apollo

⚠ CAUTION: 1979 Apollo models beginning with serial number 0503733 are equipped with drive belt part number 3211044. Due to belt construction and length, it is important not to use substitutes. Failure to comply can result in drive system damage. Correct converter center distance for this belt is 11".

TORQUE-O-MATIC DRIVE

Drive Clutch Weight Identification - Actual Size



A

Gram weight: 47.5 ± 1
Kit PN 2200105



B

Gram weight: 43 ± 1
Kit PN 2200106



G - (B Modified)

Gram weight: 41.5 ± 1
Kit PN 2200119



O

Gram weight: 51
Kit PN 2200147



Y

Gram weight: 35 ± 1
Kit PN 2200140



A/P

Gram weight: 47.5 ± 1
Kit PN 2200174



W

Gram weight: 37.5 ± 1
Kit PN 2200108



U

Gram weight: 34 ± 1
Kit PN 2200107



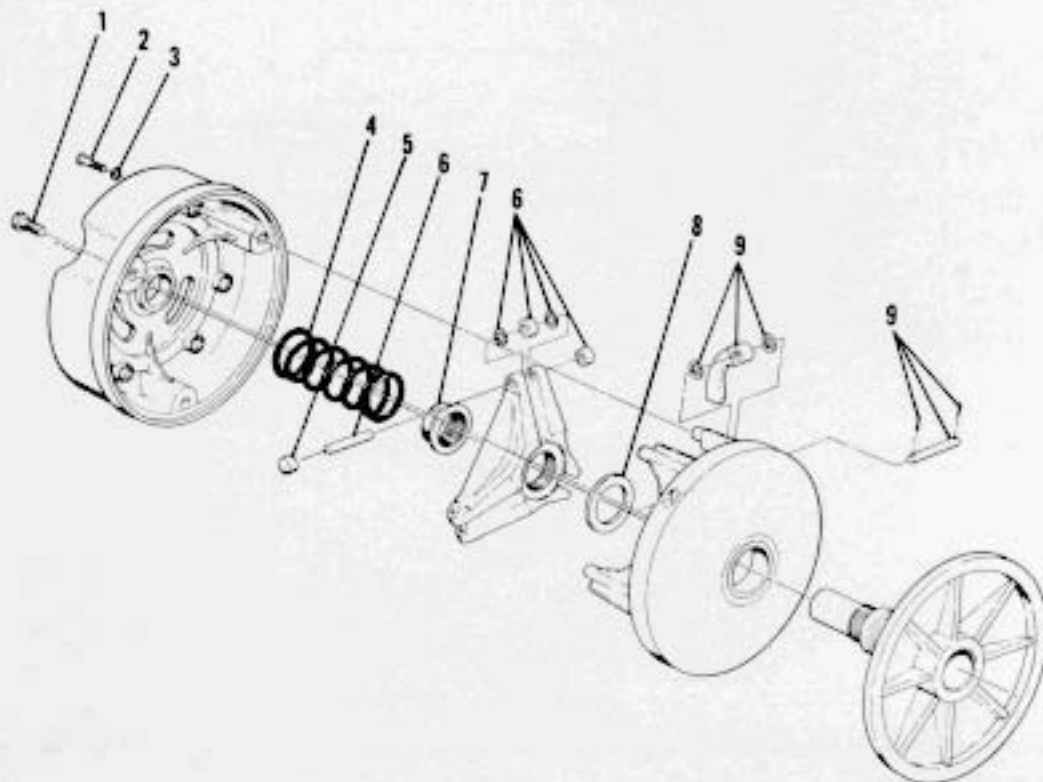
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Gram weight: 53 ± 1
Kit PN 2200162

TORQUE-O-MATIC DRIVE

Drive Clutch Service Parts

ITEM NO.	PART NO.	PART DESCRIPTION	ITEM NO.	PART NO.	PART DESCRIPTION
1	7512182	Screw (3)	6	2200127	Kit Spider Pin — 1975—Current
2	7511978	Screw 10-32 (6)			TX, TX-L, Centurion
3	7574601	Lock Washer	7	5020298	Spider Jam Nut — 1975—Current
4	7041021	Spring (Clear)			TX, TX-L, Centurion
	7041022	Spring (Black)	8		Spider Spacer Washers — TX, TX-L, Centurion
	7041060	Spring (Orange)		5210754	.050"
	7041061	Spring (Brown)		5210753	.032"
	7041062	Spring (Silver)		5210752	.020"
	7041063	Spring (Purple)	9	2200105	Kit—Shift Weight A
	7041080	Spring (Blue)		2200106	Kit—Shift Weight B
	7041083	Spring (Red)		2200107	Kit—Shift Weight U
	7041102	Spring (Yellow)		2200108	Kit—Shift Weight W
5	5430269	Guide Button — Except 1975— Current TX, TX-L, Centurion		2200119	Kit—Shift Weight G
	5430445	Guide Button — 1975—Current TX, TX-L, Centurion		2200140	Kit—Shift Weight Y
				2200147	Kit—Shift Weight O
				2200162	Kit—Shift Weight @
6	2200104	Kit Spider Pin — Except 1975— Current TX, TX-L, Centurion		2200174	Kit—Shift Weight A/P



TORQUE—O—MATIC DRIVE

Operation and Tuning

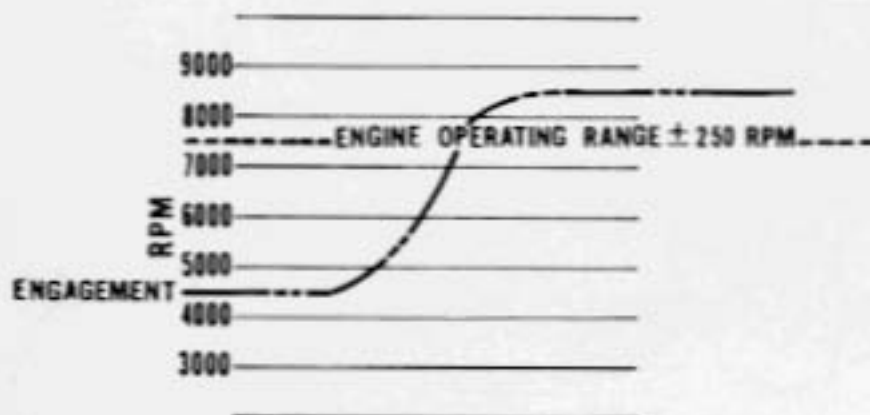
The Polaris torque-o-matic drive system is a centrifugally actuated variable speed belt drive unit. The drive clutch, driven clutch, and belt make up the torque converter system. Each clutch has the proper internal components installed for the specific engine model on which it is installed at the factory. Therefore, modifications or variations of components at random are never recommended. Proper converter setup and adjustments of existing components must be the primary objective in converter operation diagnosis.

⚠ All converter maintenance repairs must be performed only by an authorized Polaris service technician who has attended a Polaris sponsored service training seminar and understands the proper procedures as outlined in this manual. Because of the critical nature and precision balance incorporated into the drive clutch, it is absolutely essential that no attempt at clutch disassembly and/or repair be made without factory authorized special tools and service procedures.

DRIVE CLUTCH WEIGHTS/SPRING RELATIONSHIP TO MAINTAIN OPERATING RPM

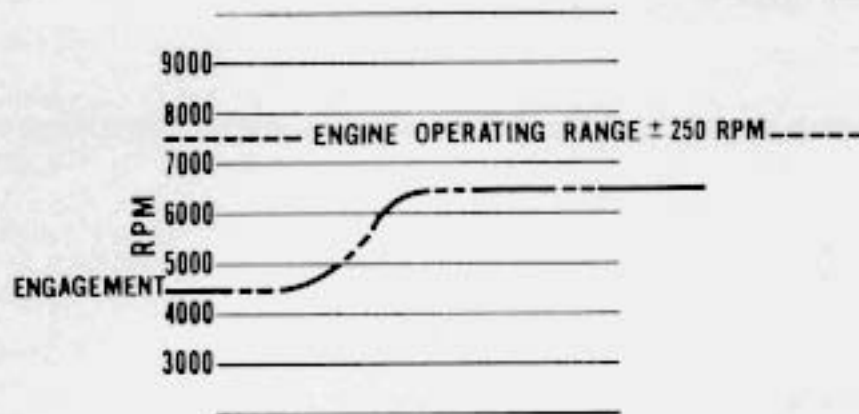
The drive clutch is an RPM and torque sensing unit designed to transfer the maximum amount of horsepower from the engine to the ground. This is accomplished by weights and a spring inside the unit reacting to the centrifugal force applied to it from the engine RPM.

The spring and weights work in combination. In a properly setup clutch, the maximum desired operating RPM will be reached immediately after clutch engagement (full throttle conditions). This RPM should be maintained to gain optimum power. As centrifugal force pushes the weights against the rollers, the movable sheave will force the belt to climb up the drive clutch sheave to increase vehicle speed.

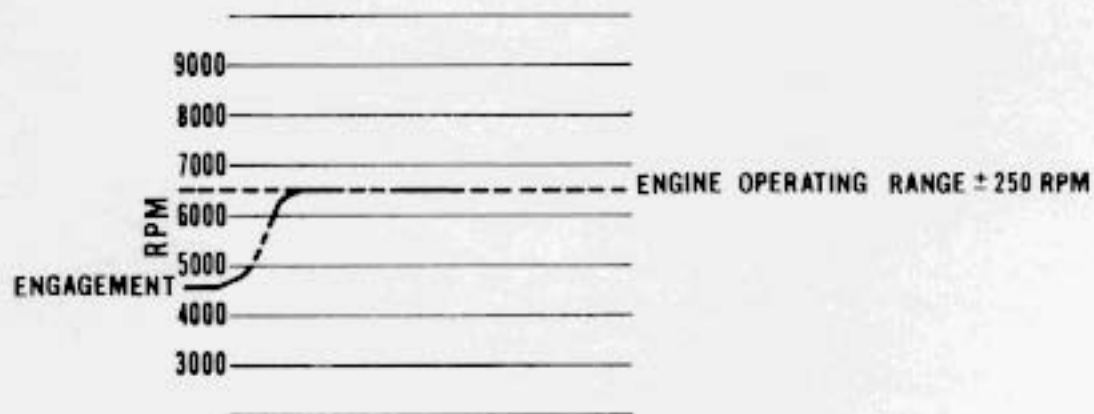


If the weights are too light, or spring rate too high, the maximum RPM will be too great and the drive belt will not go into high gear (top of the clutch).

TORQUE-O-MATIC DRIVE Operation and Tuning



If the weights are too heavy, or spring rate too low, the engine RPM will be low and the drive clutch will upshift too fast, keeping the engine out of its power band.



If the weights and spring are matched properly, the engine RPM will go to the desired range and remain there on both upshift and backshift.

TORQUE-O-MATIC DRIVE

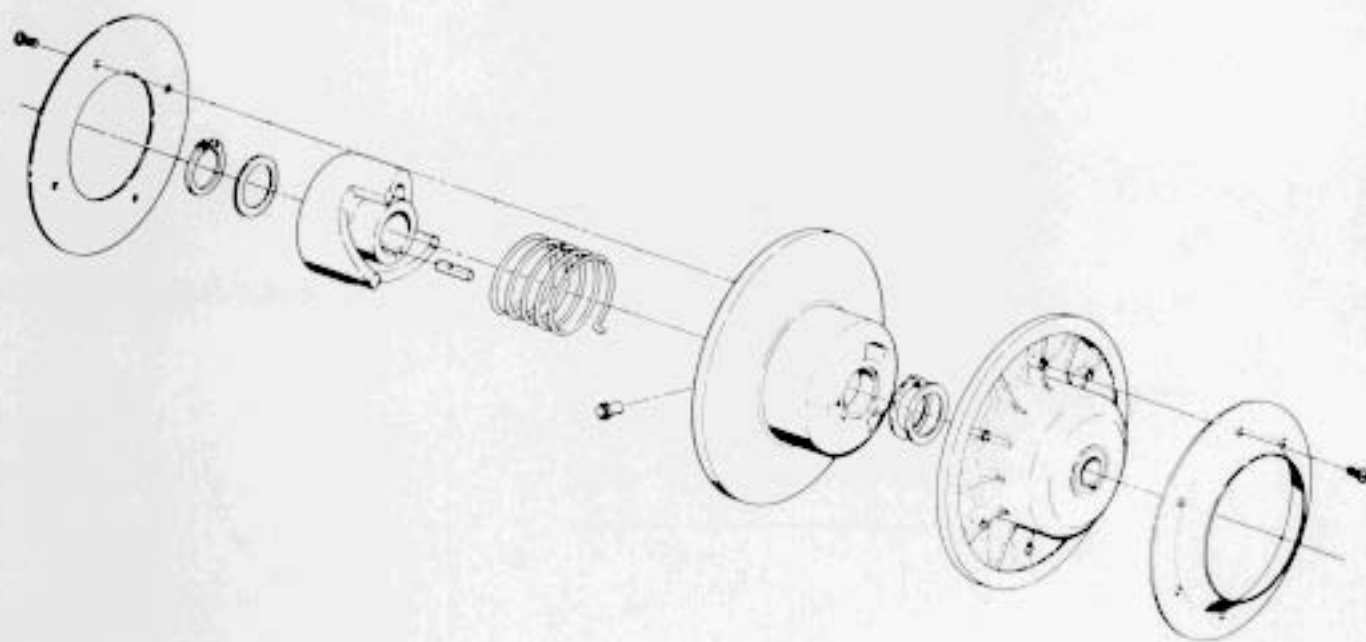
Driven Clutch Operation

The driven clutch operates in conjunction with the drive clutch. Output torque is transmitted through the chaincase jackshaft and chaincase to the front drive shaft and track. Its function is to maintain drive belt tension to prevent slippage and to sense variations in load requirements necessary to maintain optimum engine operating RPM. The driven clutch, unlike the drive clutch, is only torque sensing. This means it will react to both engine torque output and load requirements from the track. When the load on the driven clutch is increased and becomes greater than the torque delivered from the engine, the driven clutch becomes dominant and overrides the drive clutch. The driven clutch "downshifts" into a ratio that will supply the amount of torque needed for the increased load.

Because the driven clutch can sense and shifts into the proper ratio (up or down), engine RPM will remain in the specified range.

DRIVEN CLUTCH ADJUSTMENTS

The aluminum Polaris driven clutch has a provision for varying the torque requirements to change its ratio. This is obtained by relocating the spring in the helix, which in turn will increase or decrease the amount of load required to change its ratio.

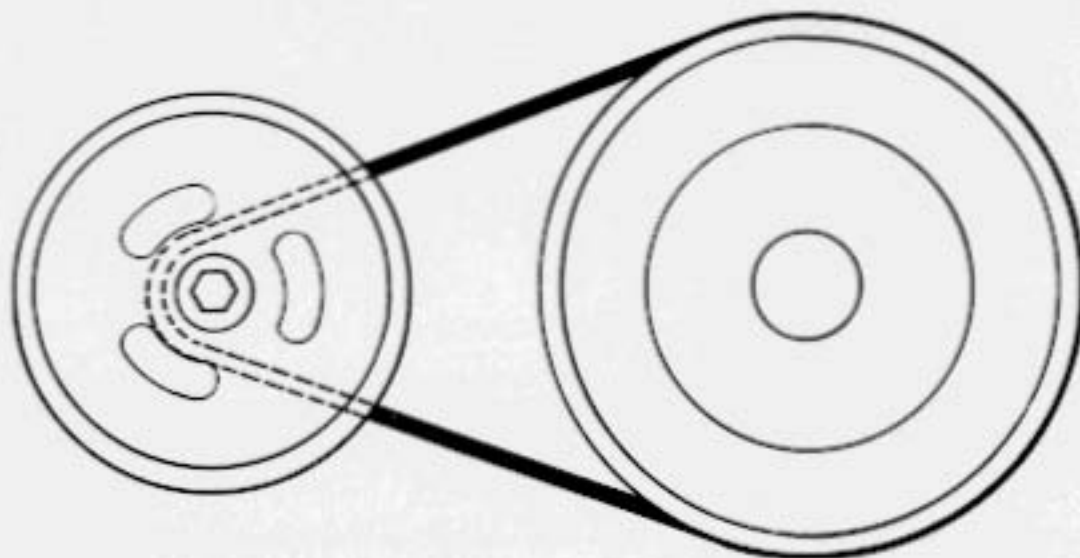


ALUMINUM DRIVEN CLUTCH

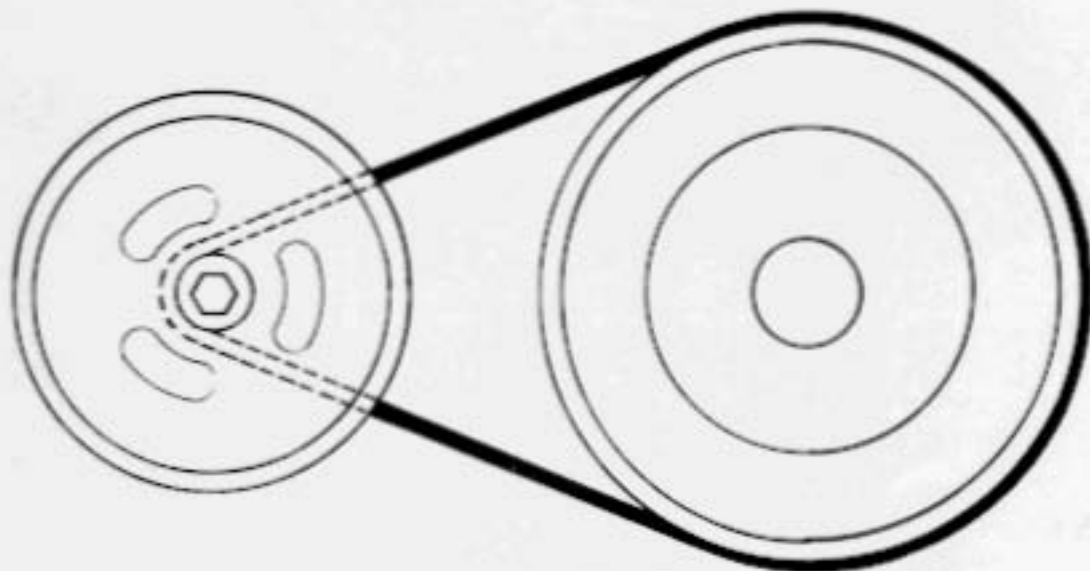
TORQUE-O-MATIC DRIVE

Drive Belt Adjustments

The drive belt is an important component of the converter system. Critical dimensions and construction have been provided for at the time of manufacture. In order to achieve maximum efficiency from the converter, the drive belt must be adjusted properly for tension and clutch offset.



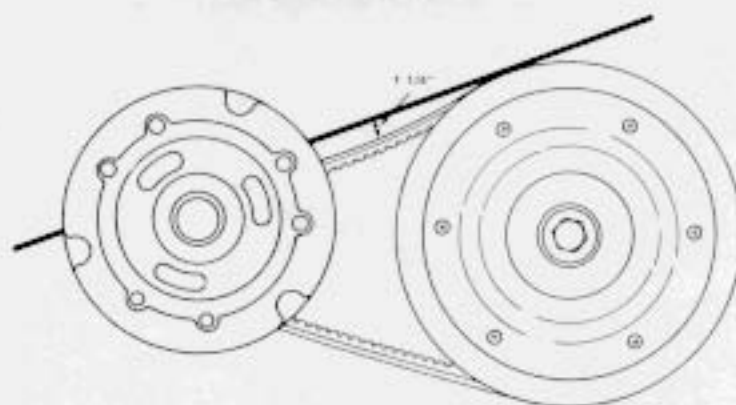
If the belt is too long or center distance too short, the initial starting ratio will be too low resulting in performance loss. This is due to the belt raising too high in the drive clutch sheaves upon engagement.



If the drive belt is too short or center distance too long, the ratio will again be incorrect. In addition, the machine may creep with the engine idling and cause damage to the internal face of the drive belt.

TORQUE-O-MATIC DRIVE

Drive Belt Adjustments

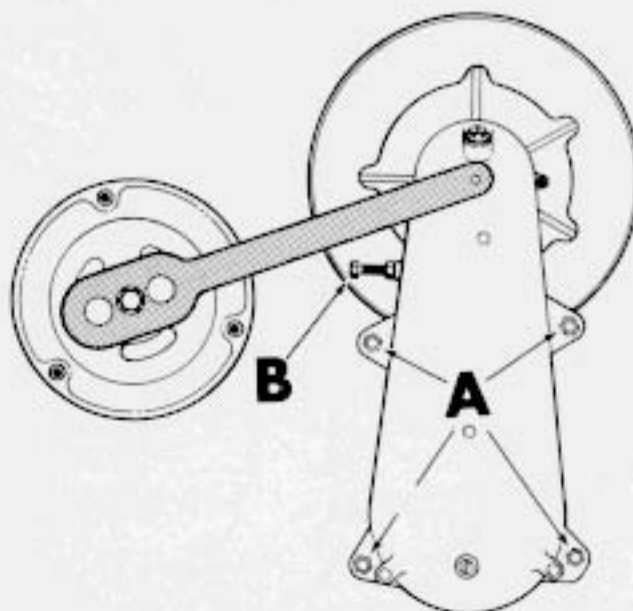


ALUMINUM DRIVEN

The ideal belt deflection is 1 1/4". Measure belt deflection with both clutches at rest and in their full neutral position. Place a straight edge on the belt and apply downward pressure while measuring at the point shown. To change belt deflection, thrust washers in the driven clutch can be added or subtracted.

IMPORTANT: Do not apply excessive pressure so as to force the belt into the driven sheaves which will result in an improper measurement.

NOTE: One thrust washer should always be left between the driven clutch sheaves (aluminum clutch only).



STEEL DRIVEN

On all machines using steel driven clutch, the chaincase can be adjusted either forward or rearward by loosening the four chaincase mounting bolts (A) and setting with the adjusting bolt (B).

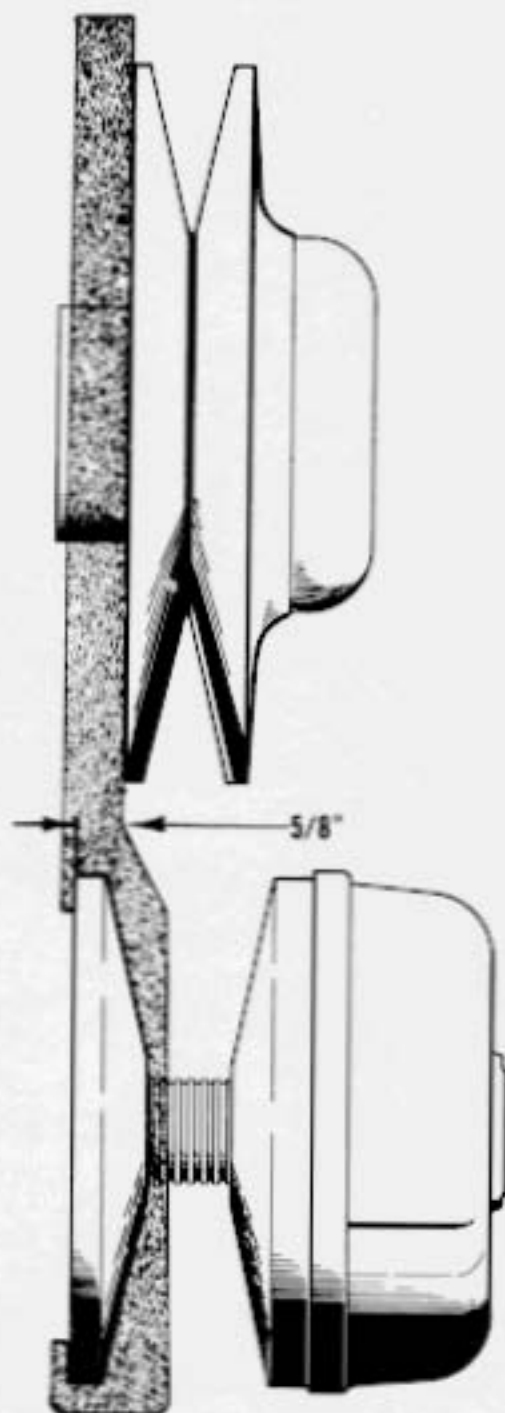
NOTE: On some models, before the above adjustments can be made, the driven clutch must be slid partially inboard on its shaft to provide access to the two 5/16" x 7/8" cap screws which secure the chaincase to its mounting plate.

TORQUE-O-MATIC DRIVE

Clutch Alignment

Use the proper clutch alignment tool to arrive at the correct clutch offset. When the clutches are properly aligned, the tool will contact all sheave surfaces equally. The motor mounts on some models are slotted so the necessary adjustments can be made or one or two washers may also be installed behind the driven clutch on the jackshaft to arrive at correct offset.

NOTE: The drive belt must be removed when this measurement is made.



TORQUE-O-MATIC DRIVE

Drive Clutch Removal, Installation, and Identification

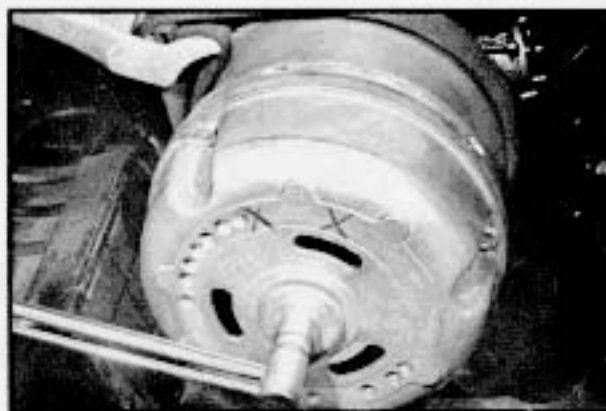
REMOVAL

1. Install the strap wrench (PN 2870336) to the stationary sheave as shown. Remove the drive clutch retaining bolt and install puller (PN 2870130) into the clutch; tighten the puller until the clutch is removed.



INSTALLATION

1. Position the clutch on the engine crankshaft. Install the retaining bushing and bolt. Using the strap wrench (PN 2870336) to hold the clutch, torque the retaining bolt to 40-45 ft./lbs.

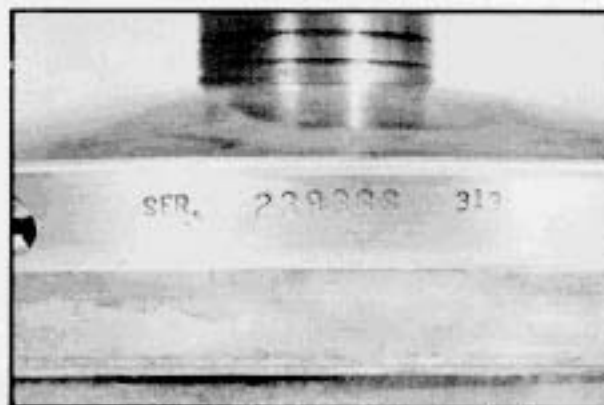


SERVICE TIPS

Never use an air impact wrench for installing a drive clutch as it will loosen the spider torque value.

IDENTIFICATION

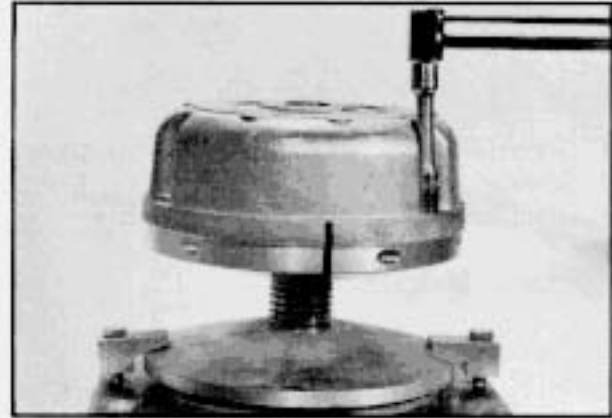
While all drive clutches may look alike, each bears a different part number, which in turn indicates internal clutch component variation for individual engines. For easy identification, refer to the three numbers behind the serial number on the movable sheave. These numbers are the last three digits of that clutch part number.



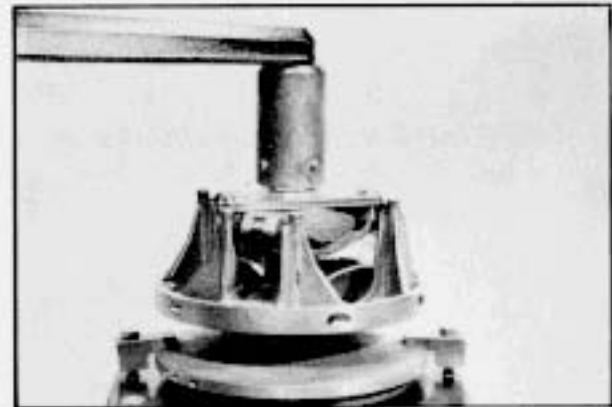
Spider Removal, Lubrication, and Reassembly - Except 1975-Current TX, TX-L, Centurion

1. Remove the clutch from the engine using clutch puller (PN 2870130). Fasten the drive clutch to the clutch holding fixture (PN 2870379). Before disassembling the clutch, it is very important to mark the outside cover and movable face using a marking pen or scribe.

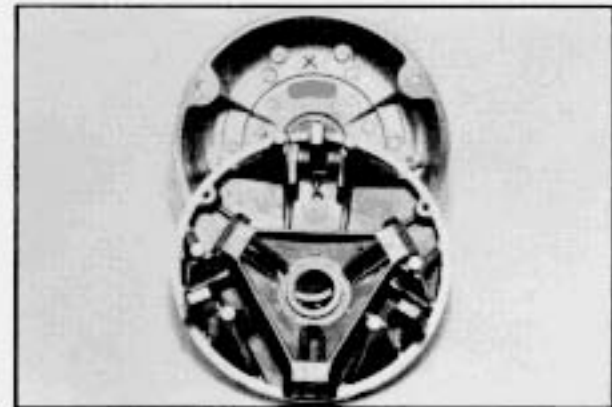
⚠ USING CAUTION, remove the three screws which hold the cover to the movable face. Keep in mind there is spring tension on the cover.



2. Remove the spider using special service tools (PN 2870338 and PN 2870341).



3. With the clutch disassembled, locate the three (3) alignment X's. Upon reassembly, these X's must be aligned for proper clutch balance. Clean and inspect all moving parts, replacing where needed. Refer to pages in this section for replacement of worn parts.



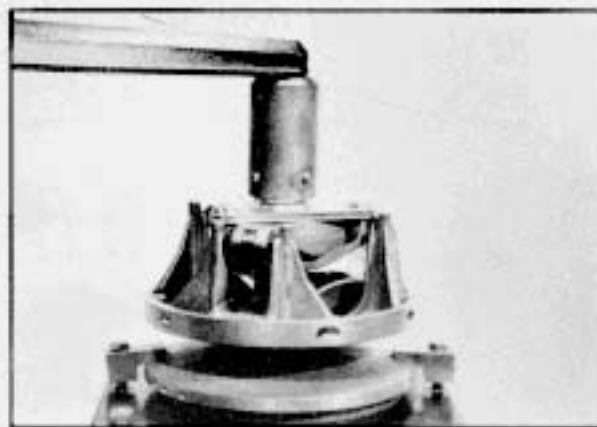
4. **REASSEMBLY:** Lubricate all moving parts; weights and rollers must move freely. Some recommended lubricants are WD-40, CRC 5-56, Kendall CML, LPS-2, or Dri-Slide.



TORQUE-O-MATIC DRIVE

Spider Removal, Lubrication, and Reassembly - Except 1975-Current TX, TX-L, Centurion

5. With the spider and movable sheave X's aligned, torque the spider to 200 ft./lbs. using special service tools (PN 2870338 and PN 2870341).



6.  Install the spring and cover with index marks aligned. Torque the three (3) cover bolts to 6 ft./lbs.

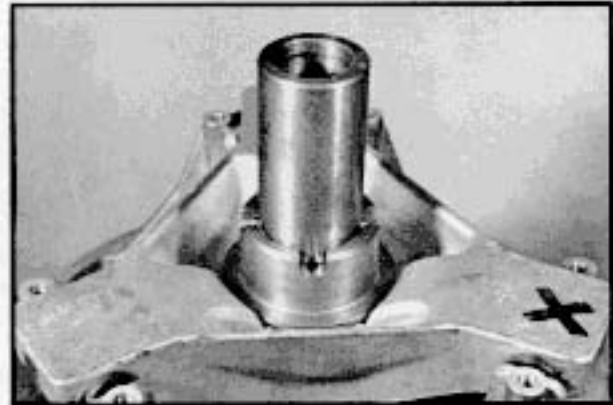


Spider Removal - 1975-Current TX, TX-L, Centurion

1. Remove the drive clutch from the engine using the clutch puller (PN 2870130).
IMPORTANT: Before disassembly of the clutch, it is very important to mark the cover and movable face with a marking pen or scribe. Install the clutch on the disassembly tool (PN 2870239). Remove the six (6) 10-32 screws and the three (3) 1/4 x 20 cover attaching cap screws.
CAUTION: Keep in mind there is spring tension on the cover.



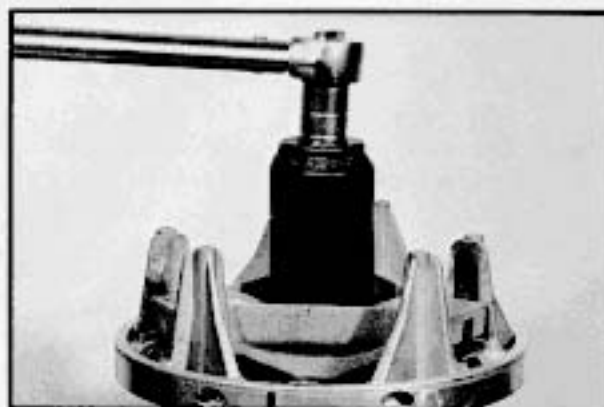
2. With the cover removed, note the (X) balance marks in the cover and under a shift weight. Make a reference (X) directly above the shift weight and a (X) on the spider leg for reassembly, as shown, with scribe or marking pen.



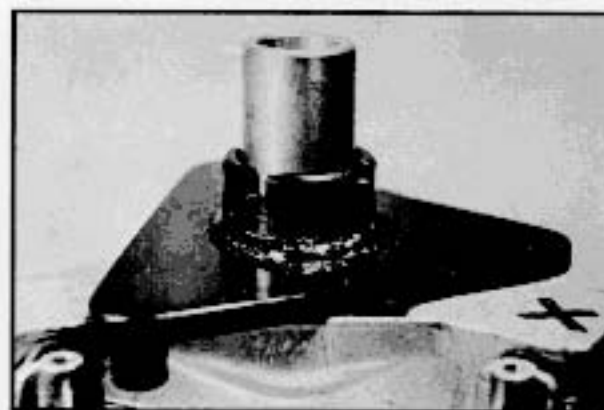
TORQUE—O—MATIC DRIVE

Spider Removal - 1975-Current TX, TX-L, Centurion

3. Remove the spider jam nut using tool (PN 2870338).



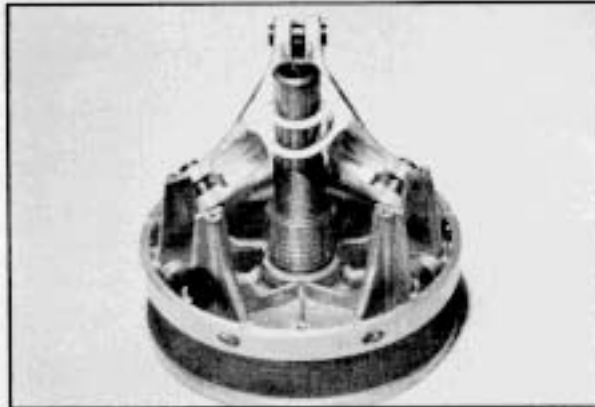
4. Install spider tool (PN 2870341) to the spider.



5. With the spider tool installed, loosen the spider using the jam nut driver as shown.



TORQUE - O - MATIC DRIVE
Belt-Sheave Adjustment - 1975-Current TX, TX-L, Centurion



TX, TX-L, CENTURION

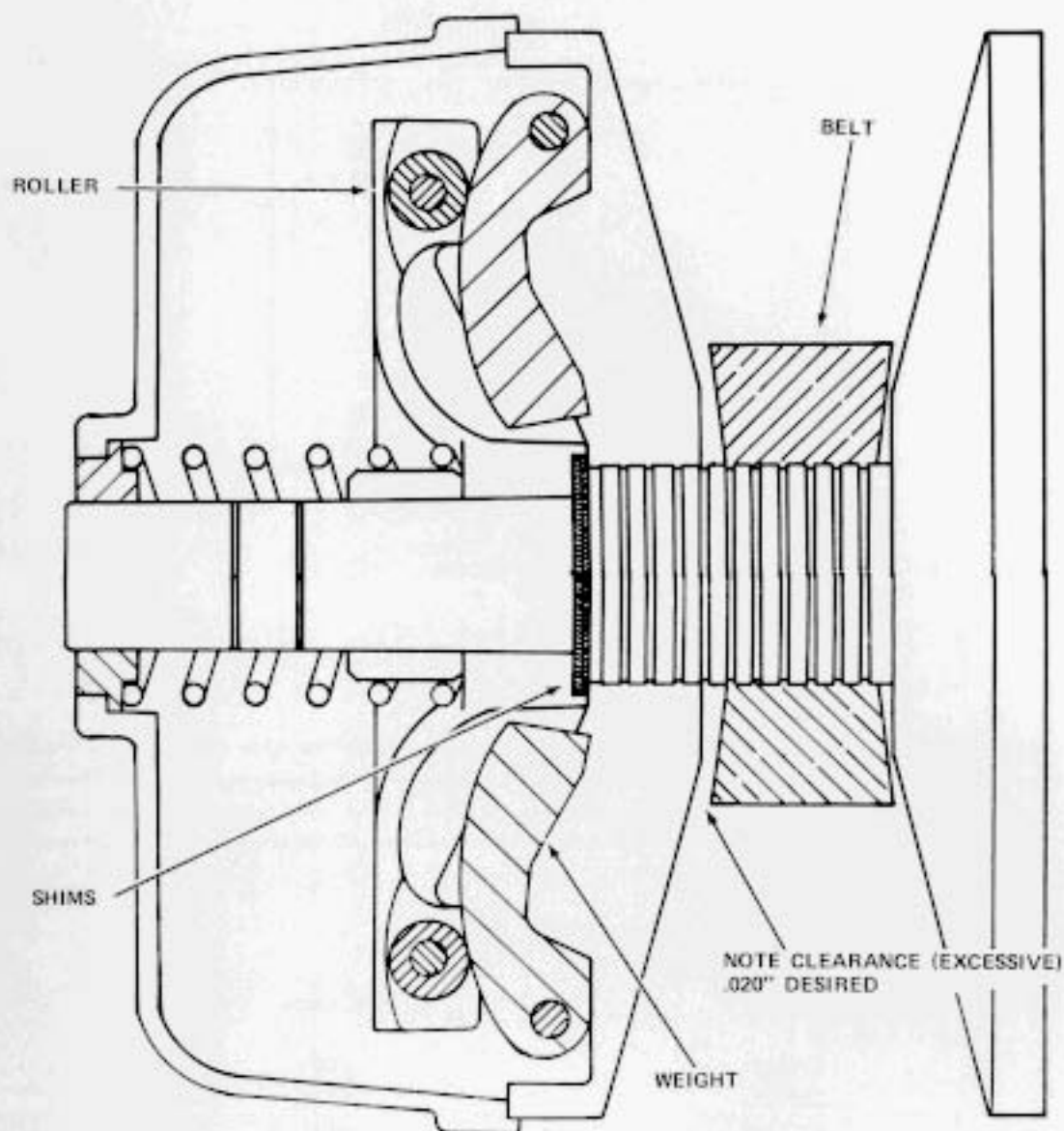
6. **FINE TUNING:** The distance between the belt and the movable sheave on the drive clutch is very important. This distance controls the starting ratio (lowest starting ratio is most preferable) and also controls the position of the clutch weight to engine RPM. The distance between the belt and movable sheave should be .020" or as close as possible without letting the machine creep forward at engine idle. The adjustment for obtaining this distance is controlled by the washers behind the spider.

The following thickness washers are available for fine tuning purposes:

Part No.	Thickness
5210754	.050"
5210753	.032"
5210752	.020"

TORQUE-O-MATIC DRIVE

Belt-Sheave Adjustment - 1975-Current TX, TX-L, Centurion



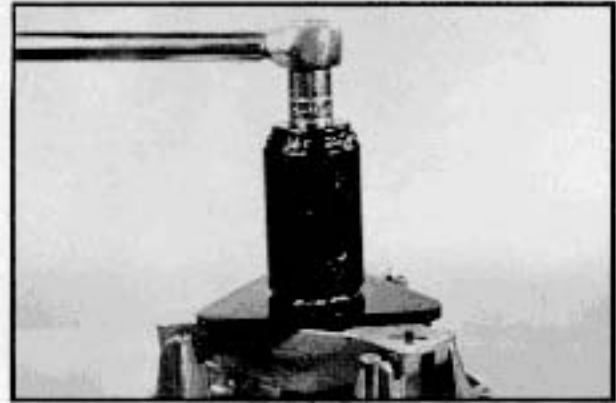
In addition to correct belt tension and alignment, the drive clutch belt-sheave clearance also contributes to maximum efficient converter operation. Whenever the drive clutch is disassembled or fine tuned, the belt-sheave clearance should be adjusted using available shims beneath the spider.

NOTE: Always use a new belt for accuracy and to prevent lack of clearance when a new belt is eventually installed.

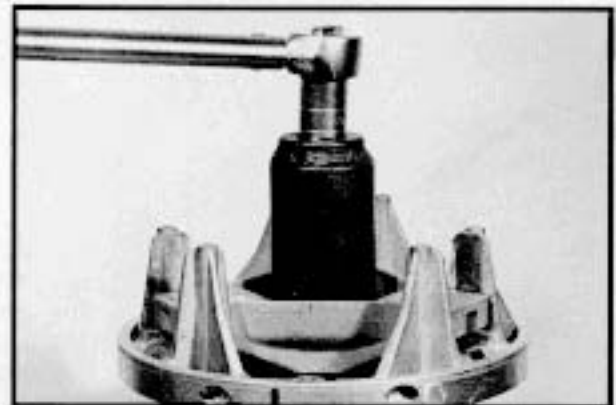
TORQUE-O-MATIC DRIVE
Spider Reassembly - 1975-Current TX, TX-L, Centurion

After cleaning, inspecting, and lubricating the clutch, follow the steps as listed for correct reassembly:

1. Reinstall the spider, taking care to align the (X) balance marks. Torque the spider to 200 ft./lbs. using the spider tool (PN 2870341) and jam nut tool (PN 2870338) as shown.



2. Install and torque the jam nut to 235 ft./lbs.



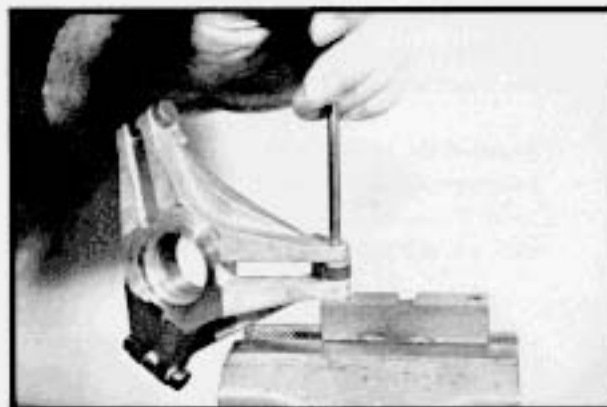
3. Install the spring and cover, torquing the cover screws as follows:
Six (6) 10-32 cover screws - 16 in./lbs.
Three (3) 1/4 x 20 cover bolts - 4 ft./lbs.



TORQUE-O-MATIC DRIVE

Spider Rebuilding Procedures

1. Remove the six (6) guide buttons from the spider and discard. Place the roller pin gauge block (PN 2870310) in a vice and with the pin punch (PN 2870402) drive out and discard the old rollers and pins as shown.

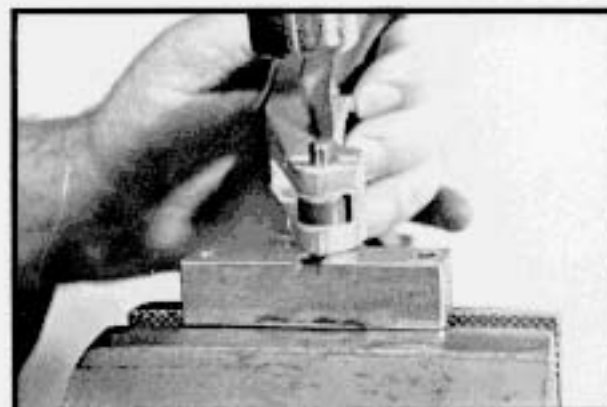


2. Using the vice as a press, start the new pin (smooth end first) into the spider, progressively pressing and installing the new washer, roller, and remaining washer, in that order, on all three legs.

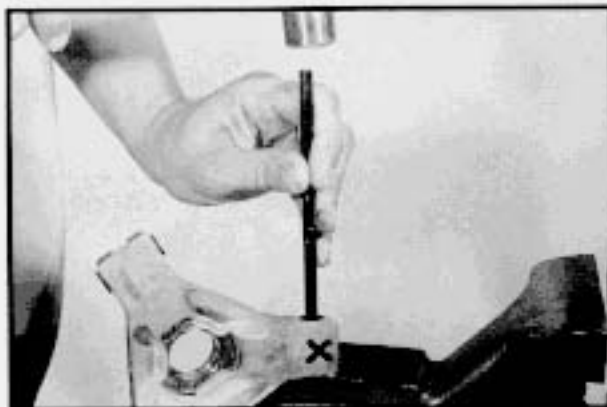


3. With the roller pin gauge block in a vice, center each pin in the spider by locating the spider pin over the gauged keyway of the block and tapping until it bottoms.

IMPORTANT: This operation assures that each pin is centered in the spider to prevent any binding of the buttons to the towers when the clutch is reassembled. Install new buttons to complete spider.



4. **IMPORTANT:** On the TX, TX-L and Centurion spider, it will be necessary to center the roller pin using the special roller pin centering punch (PN 2870401) as shown. This punch assures that each pin is centered in the spider for balance purposes.

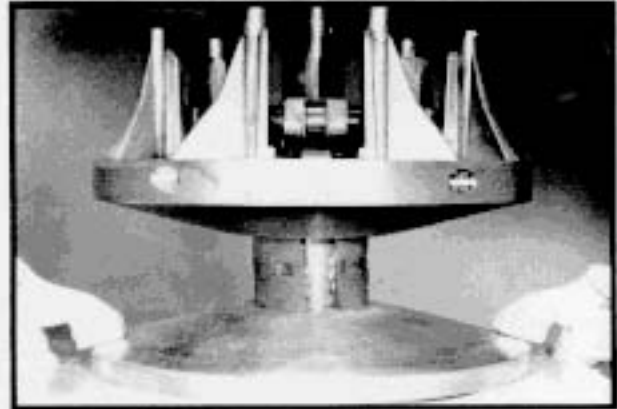


TORQUE-O-MATIC DRIVE

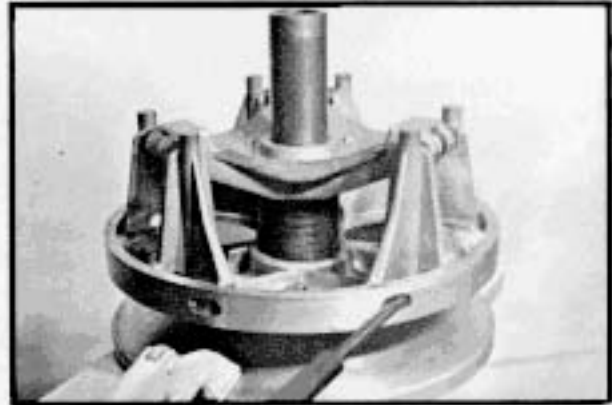
Drive Clutch Weight Kit Installation

IMPORTANT: Select the proper weight kit from the charts before doing anything else.

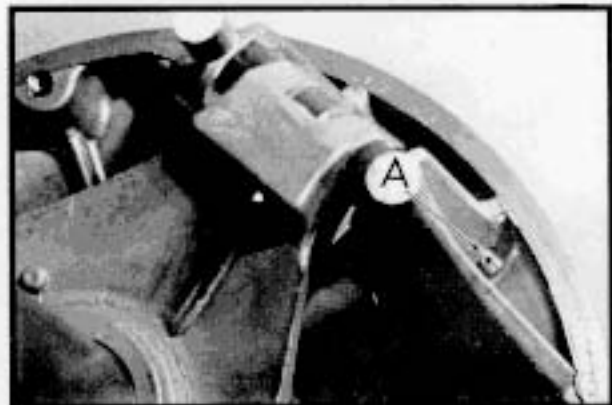
1. Position the clutch as shown. Note that the movable sheave is blocked in its wide open position using a piece of radiator hose. This will prevent any spreading effect on the towers while driving the weight pins.



2. Using the pin punch (PN 2870402), drive the three (3) pins from the weights through the access holes provided.
NOTE: The pins must be driven out from their small hole end only. Discard the old weights and pins.



3. Install the proper new weights and pins into the movable sheave using the pin punch.
NOTE: Before driving the pin, position it so the hole in the small end (A) will be exposed to accept its spring pin.



4. Using the weight pin punch, insert one of the spring pins provided in the kit into its and and tap into the hole of the exposed small end of the pin until the punch bottoms. Install all three (3) pins in this manner.



TORQUE-O-MATIC DRIVE **Aluminum Driven Clutch Service**

1. Remove the snap ring and washer.



2. Inspect the ramp buttons and bushing for wear. Note the condition of the movable sheave fiber bushing. Install the helix into the bushing; it should slide freely without binding. Polish the helix with fine emery cloth to remove any sharp edges which may cause sticking.

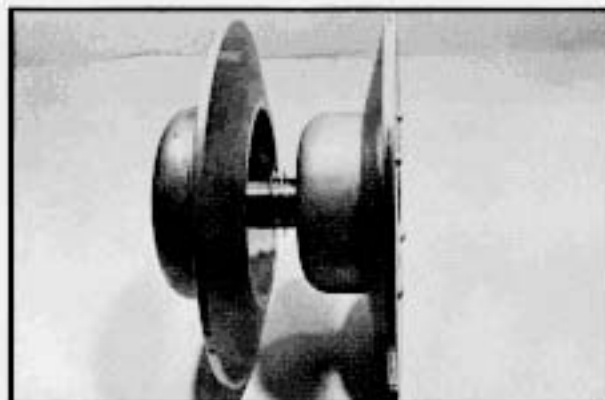


3. In the event the bushing is damaged or excessive clearance is evident, it may be replaced (PN 3569802). Remove the old bushing, cleaning the hub thoroughly using Loctite and primer (PN 2870327). Place a bead of Loctite RC 40 (PN 2870326) in the hub before installation. Again check free movement of the helix after the Loctite has cured.

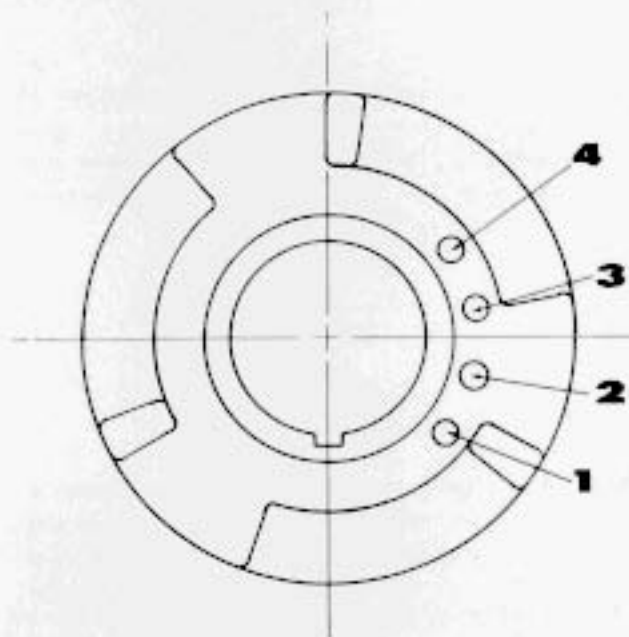


TORQUE-O-MATIC DRIVE **Aluminum Driven Clutch Service**

4. Clean all parts. Reassemble the stationary and movable sheaves. Note the placement of the two thrust washers shown. These washers may be used to adjust effective belt tension measurements as described earlier. Removal of a thrust washer increases neutral belt tension.
NOTE: Re-check alignment offset after adjustments are made.



5. Reassemble the clutch; install the spring into the helix. The correct tension of the spring is 1/3 turn counterclockwise. Refer to the following chart for proper spring location in the helix.



YEAR	MODEL	LOCATION
1977	TX 250, TX 440, TX-L 340	Hole No. 2
1977	TX 340	Hole No. 1
1978	TX 250, TX 440, TX-L 340	Hole No. 2
1978	TX 340	Hole No. 1
1979	TX 250, TX 440, TX-L 340, Centurion	Hole No. 2
1979	TX 340	Hole No. 1

Increasing spring windup tension will produce clutch upshift delay causing the engine to rev more upon acceleration.

TORQUE-O-MATIC DRIVE

Steel Driven Clutch Service

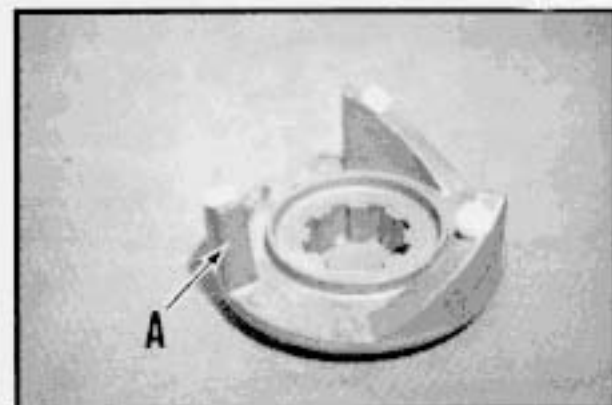
1. Remove the retaining ring as shown. Care should be taken, as snap ring is under spring pressure.



2. Ramp assembly removed. Note position of tension spring when removing the ramp assembly. Inspect the movable sheave and bushing for wear or excessive clearance, replacing as necessary.



3. Apply heat in this area (A) to remove a broken or damaged ramp bushing. Heat will cause the bushing to protrude from the positioning hole. Replace all three ramp bushings when replacement of one is necessary.



4. Reassemble the driven clutch. When installing the ramp and tension spring, preload the tension spring 1/3 turn clockwise while holding the movable face stationary. Assemble the split snap ring as shown. Reinstall the clutch, checking alignment offset.



TORQUE—O—MATIC DRIVE

Troubleshooting

SITUATION	PROBABLE CAUSE	REMEDY
Engine RPM below specified operating range, although engine is in proper state of tune.	1. Wrong or broken drive clutch spring. 2. Drive clutch shift weight too heavy. 3. Driven clutch spring broken or installed in wrong helix location (aluminum clutch). 4. Drive belt too long. 5. Converter sheaves greasy; belt slippage.	Replace with recommended spring. Install correct shift weight kit to match engine application. Replace spring; refer to proper installation location. Clean clutches; install new belt. Install new belt and/or adjust belt tension.
Erratic engine operating RPM during acceleration or load variations.	1. Drive clutch binding. 2. Driven clutch malfunction.	a. Disassemble drive clutch; inspect shift weights for wear and free operation. b. Clean and polish stationary shaft hub; reassemble clutch without spring to determine problem area. a. Replace ramp buttons. b. Inspect movable sheave for excessive bushing clearance/replace.
Engine RPM above specified operating range.	1. Incorrect drive clutch spring (too high spring rate). 2. Drive clutch shift weights incorrect for application (too light). 3. Drive clutch binding. 4. Driven clutch binding.	Install correct recommended spring. Install correct recommended shift weights. Disassemble and clean clutch, inspecting shift weights and buttons. Reassemble without the spring to further determine probable cause. Disassemble, clean, and inspect driven clutch, noting worn sheave bushing and ramp buttons and helix spring location.

CONTINUED

TORQUE—O—MATIC DRIVE

Troubleshooting

SITUATION	PROBABLE CAUSE	REMEDY
Harsh drive clutch engagement.	1. Drive belt worn too narrow. 2. Excessive belt/sheave clearance (TX, TX-L, Centurion) with new belt.	Replace. Perform belt/sheave clearance adjustment with shim washers beneath spider.
Drive belt turns over.	1. Wrong belt for application. 2. Clutch alignment out of spec. 3. Engine mount broken or loose. 4. Driven clutch sheaves have excessive run-out, bent, or damaged.	Replace. Adjust alignment offset. Inspect/adjust or replace. Measurement should be taken 12" in from the outer circumference on the sheave face. Maximum allowable tolerance is .025".
Noise in drive system.	1. Broken drive clutch components. 2. Excessive drive clutch button-tower clearance. 3. Bearing failure/chaincase, jackshaft, or front drive shaft. 4. Drive chain loose or worn, sprocket teeth broken. 5. Driven clutch bushing worn excessively or spring broken. 6. Drive belt surface flat spots.	Inspect/replace. Install new buttons or shim out existing (see Information Bulletin No. 31). Inspect/replace. Inspect/adjust or replace. Inspect/repair. Inspect/replace.

SECTION VIII

CHAINCASE AND BRAKE

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BRAKE SYSTEMS IDENTIFICATION	
CHAINCASE SLAVE CYLINDER	APPLICATION
Type I	All 1972-Current Models, Except 1973 and 1976 Starfire and 1976-Current TX, TX-L, Centurion
Type II	1973 and 1976 Starfire and 1976-1978 TX and TX-L
Type III	1979 TX, TX-L, and Centurion

CHAINCASE AND BRAKE

Chaincase Data

1
9
7
2

Machine Model	Engine Model	Sprocket Ratio	Drive Chain	
			Type	Pitch
Colt	EC17P	12/35	35-2	84
Colt	EC25P	13/35	35-2	84
Colt	EC29P	13/35	35-2	84
Colt SS	EC29PF	13/35	35-2	84
Colt SS	EC34PF	13/35	35-2	84
Charger	EC29P	13/39	35-2	90
Charger	EC40P	15/41	35-2	90
Charger	EC54P	17/41	35-2	92
Charger SS	EC40PF	15/41	35-2	90
Charger SS	EC54PF	17/41	35-2	92
Mustang	EC40P	13/39	35-2	90
Mustang	EC54P	15/39	35-2	90
TX	EC34PS	13/39	35-2	90
TX	EC51PS	17/39	35-2	92

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Machine Model	Engine Model	Sprocket Ratio	Drive Chain	
			Type	Pitch
Colt	EC17P	12/35	35-2	84
Colt	EC25PS	13/35	35-2	84
Colt	EC29PM	13/35	35-2	84
Colt SS	EC29PF	13/35	35-2	84
Colt SS	EC34PF	13/35	35-2	84
Charger	EC29PM	13/39	35-2	90
Charger	EC40PM	15/39	35-2	90
Charger	EC54PM	17/39	35-2	92
Custom	EC40PM	15/39	35-2	90
Custom	EC54PM	17/39	35-2	92
Mustang	EC40PM	13/39	35-2	90
Mustang	EC54PM	15/39	35-2	90
TX	EC29PS	13/39	35-2	90
TX	EC34PS	15/39	35-2	90
TX	EC40PS	15/39	35-2	90
TX	EC44PS	17/39	35-2	92
TX	EC51PS	19/39	35-2	92

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Machine Model	Engine Model	Sprocket Ratio	Drive Chain	
			Type	Pitch
Colt	EC17PM	12/35	35-2	84
Colt	EC25PS	13/35	35-2	84
Colt	EC29PF	13/35	35-2	84
Colt SS	EC25PC	13/35	35-2	84
Colt SS	EC29PF	13/35	35-2	84
Colt SS	EC34PC	15/35	35-2	86
Electra	EC34PQ	15/39	35-2	90
Electra	EC44PQ	15/39	35-2	90
Custom II	EC25PS	13/39	35-2	90
Custom II	EC40PM	15/39	35-2	90
Custom II	EC54PM	17/39	35-2	92
TX	EC25PT	13/39	35-2	90
TX	EC34PS	15/39	35-2	90
TX	EC44PT	17/39	35-2	92
TX	EC51PT	19/39	35-2	92
TC	EC17PM	14/39	35-2	84
TC	EC25PS	14/39	35-2	84

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5

Machine Model	Engine Model	Sprocket Ratio	Drive Chain	
			Type	Pitch
Colt	EC25PC	15/35	35-2	86
Colt	EC34PC	15/35	35-2	86
Colt SS	EC25PC	15/35	35-2	86
Colt SS	EC34PC	15/35	35-2	86
Electra	EC25PS	13/39	35-2	90
Electra	EC34PQ	15/39	35-2	90
Electra	EC44PQ	17/39	35-2	92
TX	EC25PT	13/39	35-2	90
TX	EC34PT	15/39	35-2	90
TX	EC44PT	17/39	35-2	92
TX	EC51PT	19/39	35-2	92
TC	EC17PM	14/39	35-2	84
TC	EC25PS	14/39	35-2	84

CHAINCASE AND BRAKE

Chaincase Data

1
9
7
6

Machine Model	Engine Model	Sprocket Ratio	Drive Chain	
			Type	Pitch
Colt	EC17PM	12/35	35-2	84
Colt	EC25PS	13/35	35-2	84
Colt	EC25PC	15/35	35-2	86
Colt	EC34PC	15/35	35-2	86
Colt SS	EC25PC	15/35	35-2	86
Colt SS	EC34PC	15/35	35-2	86
Electra	EC25PS	13/39	35-2	90
Electra	EC34PQ	15/39	35-2	90
Electra	EC44PQ	17/39	35-2	92
TX	EC25PT-06	14/39	Silent	64
TX	EC34PT-05	17/39	Silent	66
TX	EC44PT-05	19/39	Silent	66
Starfire	EC25PT-05	14/39	Silent	64
Starfire	EC34PT-06	15/39	Silent	64

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Machine Model	Engine Model	Sprocket Ratio	Drive Chain	
			Type	Pitch
Colt	EC25PS	13/35	35-2	84
Colt	EC25PC	15/35	35-2	86
Colt SS	EC25PM-01	15/35	35-2	86
Colt SS	EC34PM-03	17/35	35-2	86
Electra	EC25PS	13/39	35-2	90
Electra	EC34PQ	15/39	35-2	90
Electra	EC44PQ	17/39	35-2	92
TX	EC25PT-07	15/39	Silent	64
TX	EC34PT-05	17/39	Silent	66
TX	EC44PT-05	19/39	Silent	66
TX	EC44PT-06	19/39	Silent	66
TX-L	EC34PL-01	19/39	Silent	66

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Machine Model	Engine Model	Sprocket Ratio	Drive Chain	
			Type	Pitch
Colt	EC25PS	13/35	35-2	84
Colt	EC25PC	15/35	Silent	86
S/S 340	EC34PM-03/04N	17/35	Silent	86
Cobra	EC34PM-04	15/35	Silent	88
Cobra	EC44PM-01	17/33	Silent	88
TX	EC25PT-07	15/39	Silent	64
TX	EC34PT-05	17/39	Silent	66
TX	EC44PT-05	19/39	Silent	66
TX-L	EC34PL-02	19/39	Silent	66

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Machine Model	Engine Model	Sprocket Ratio	Drive Chain	
			Type	Pitch
Gemini	EC25PS	13/35	35-2	84
Gemini	EC25PM-01	15/35	Silent	86
Apollo	EC34PM-03	18/35	Silent	88
Cobra	EC34PM-04	15/35	Silent	88
Cobra	EC44PM-01	17/33	Silent	88
TX	EC25PT-07	15/39	Silent	64
TX	EC34PT-05	17/39	Silent	66
TX	EC44PT-05	19/39	Silent	66
TX-L	EC34PL-02	19/39	Silent	66
Centurion	EC51PL-01	19/35	Silent	64

CHAINCASE AND BRAKE

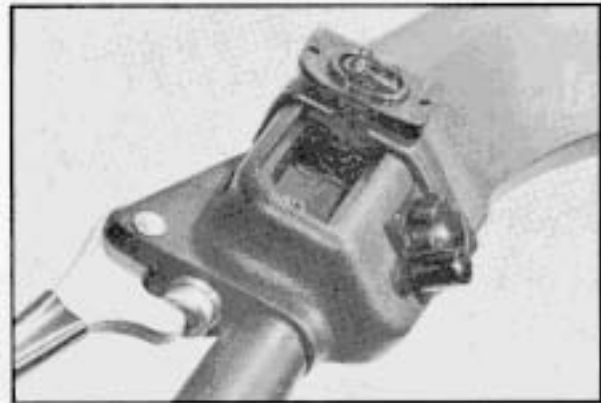
Bleeding Procedures for Polaris Brake Systems

The Polaris hydraulic brake mechanism consists of a handlebar mounted master cylinder, a hydraulically operated plunger assembly (slave cylinder) integrally mounted in the chaincase rear cover, an adjustable brake pad and a self aligning brake disc mounted in the chaincase.

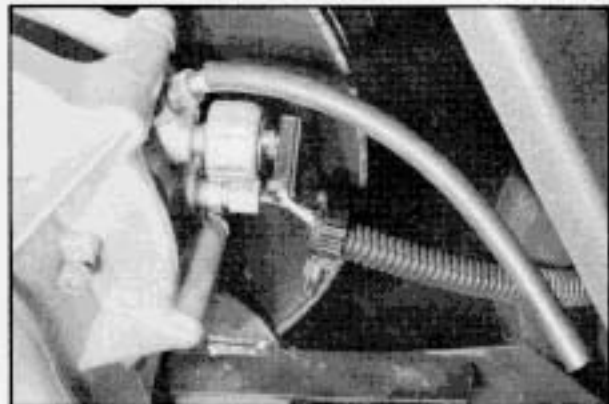
The master cylinder contains a fluid reservoir and a cylindrical pressure chamber in which force applied to the brake lever is transmitted to the fluid which actuates the plunger assembly in the chaincase rear cover. A coil spring, located in the master cylinder, holds the piston assembly against the actuating force of the brake lever. A piston assembly consists of a piston, "U" seal and a rubber "O" ring.

SERVICE

1. Air in the hydraulic system will cause a spring or spongy action of the brake lever. A bleeding operation is necessary to remove air in the system. Fill the master cylinder with standard automotive type brake fluid or Polaris silicone brake fluid (PN 2870251).



2. Slip a rubber tube over the ball of the bleeder valve and direct fluid away from painted areas. NOTE: Care must be taken to wipe any accidentally spilled fluid from painted surfaces.



3. Slowly squeeze brake lever a full stroke and hold. Unscrew bleeder valve 3/4 turn to release air. Close bleeder valve, then release brake lever. Repeat the above procedure until fluid flows from bleeder valve in a solid stream that is free of air. Check master cylinder periodically to make sure that it contains fluid. Fluid should be 1/8" from top of reservoir area. Fill with brake fluid and install new gasket.



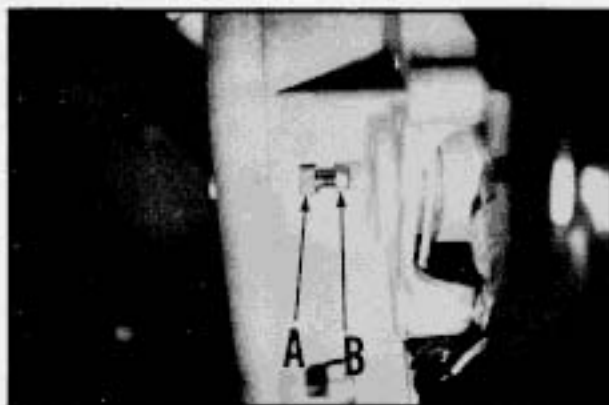
CHAINCASE AND BRAKE

Hydraulic Brake Adjustment and Master Cylinder Overhaul

BRAKE ADJUSTMENT – BRAKE SYSTEM TYPE I

- ⚠** If there is excessive brake pad clearance, turn set screw (A) clockwise until pads are tight against the disc, then back off the screw 1/4 turn counterclockwise. Re-tighten the lock nut (B).

NOTE: When the head of the adjustment screw contacts the locknut, new brake pads should be installed.

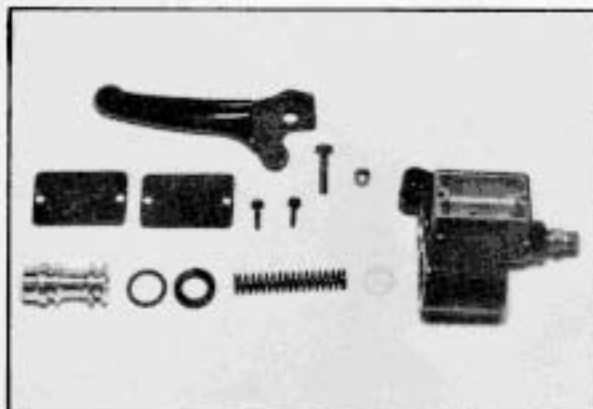
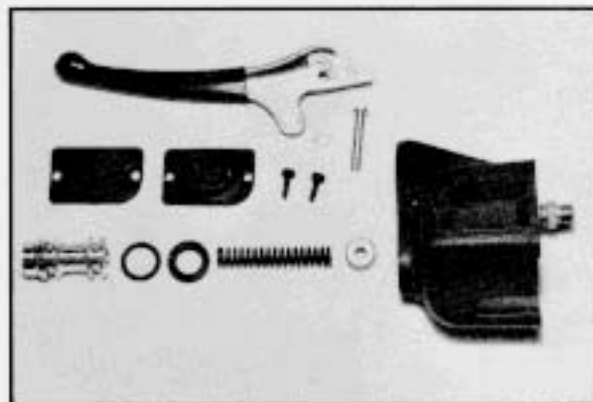


BRAKE SYSTEMS TYPE II AND III

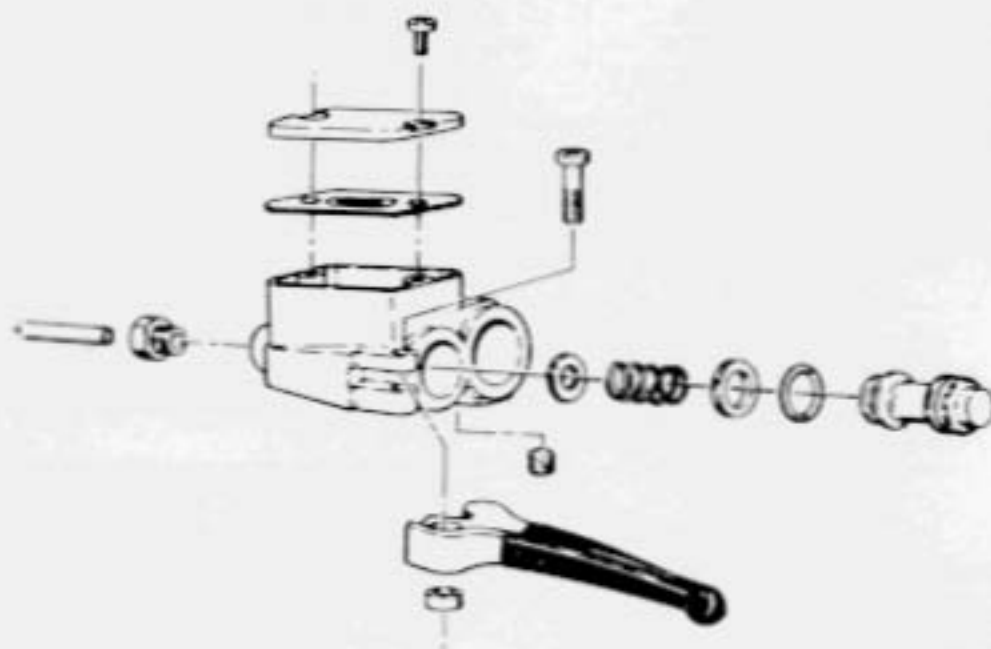
These systems are self adjusting and do not require adjustments.

MASTER CYLINDER OVERHAUL

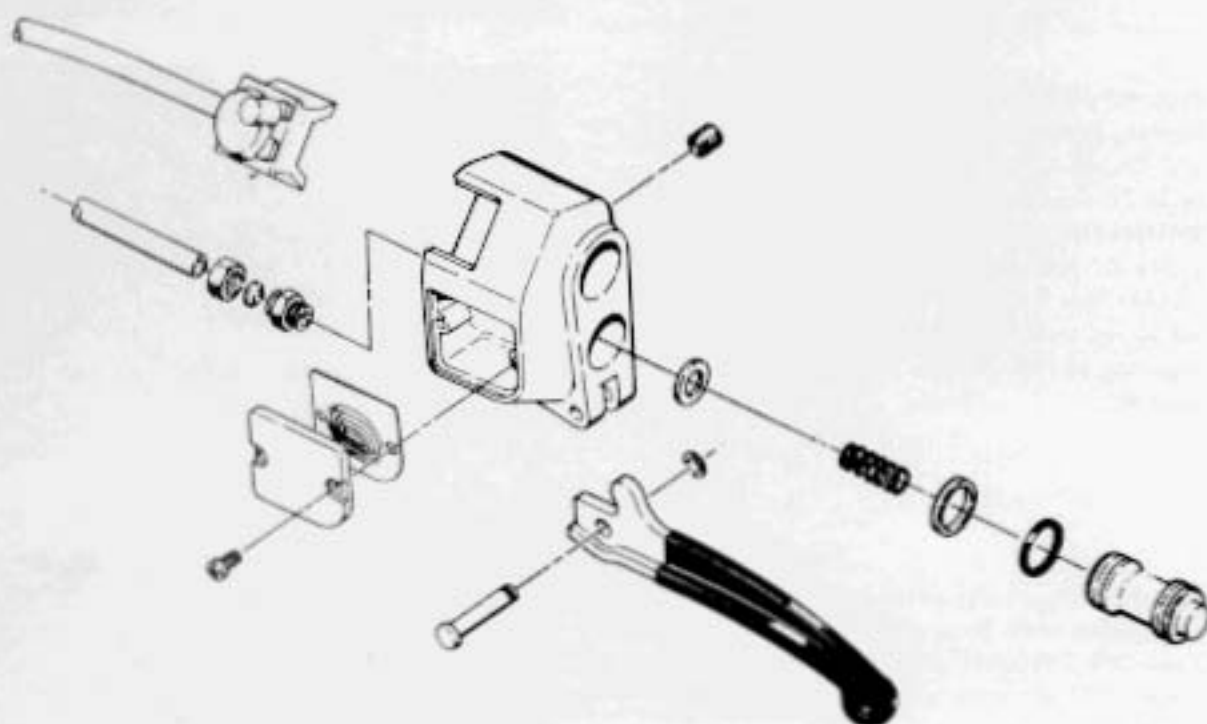
1. Remove the master cylinder assembly from the machine taking care not to spill brake fluid on painted surfaces. On models equipped with molded velox master cylinder, remove existing rivet, as shown. This will have to be replaced with a new pin (PN 7661615) and retaining ring (PN 7710401) upon reassembly.
2. Remove the piston and springs from the master cylinder discarding the rubber "U" cup, "O" ring, and cover gasket. Inspect the cylinder bore for scores, scratches or corrosion. All cylinder parts must be very clean and not be allowed to come in contact with any lubricating oil. When reassembling, dip all internal parts in brake fluid, also wet the cylinder bore. Install new "U" cup and "O" ring to the piston. Next install the springs and piston into the master cylinder bore exercising care to insure the seal is not damaged. Install lever with a new pin and retainer. Assemble the master cylinder to the handlebar, adjusting and bleeding air from system as covered in this section. Use a new cover gasket to prevent leakage.



CHAINCASE AND BRAKE
Master Cylinder Exploded View



CAST ALUMINUM MASTER CYLINDER

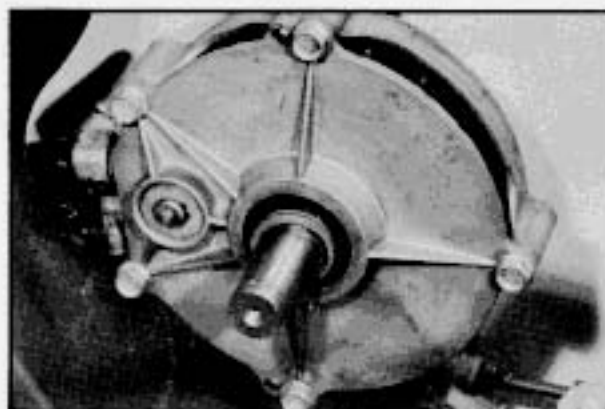


MOLDED VELOX MASTER CYLINDER

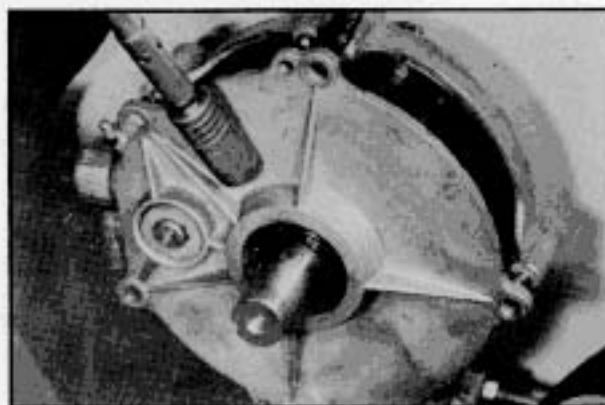
CHAINCASE AND BRAKE

Type I Slave Cylinder Removal and Repair

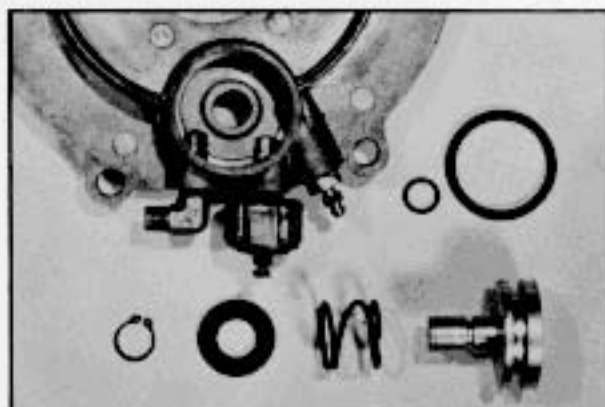
1. Remove the air box, driven clutch, brake line, brake light switch wires, and five cap screws from chaincase rear cover.



2. Apply heat to bearing area and slide rear cover and slave cylinder assembly from the shaft. NOTE: On some models it may be necessary to loosen chaincase to enable the rear cover to clear the chaincase mounting gussets.



3. Remove piston retaining snap ring. Remove washer, spring, and plunger from rear cover and discard. Clean rear cover thoroughly with brake fluid or denatured alcohol. CAUTION: Do not use methanol-base anti-freeze or any other cleaning fluid that may contain even a trace of mineral oil. Inspect bore for scores, scratches, or corrosion. Slight corrosion may be cleaned with fine crocus cloth and alcohol.

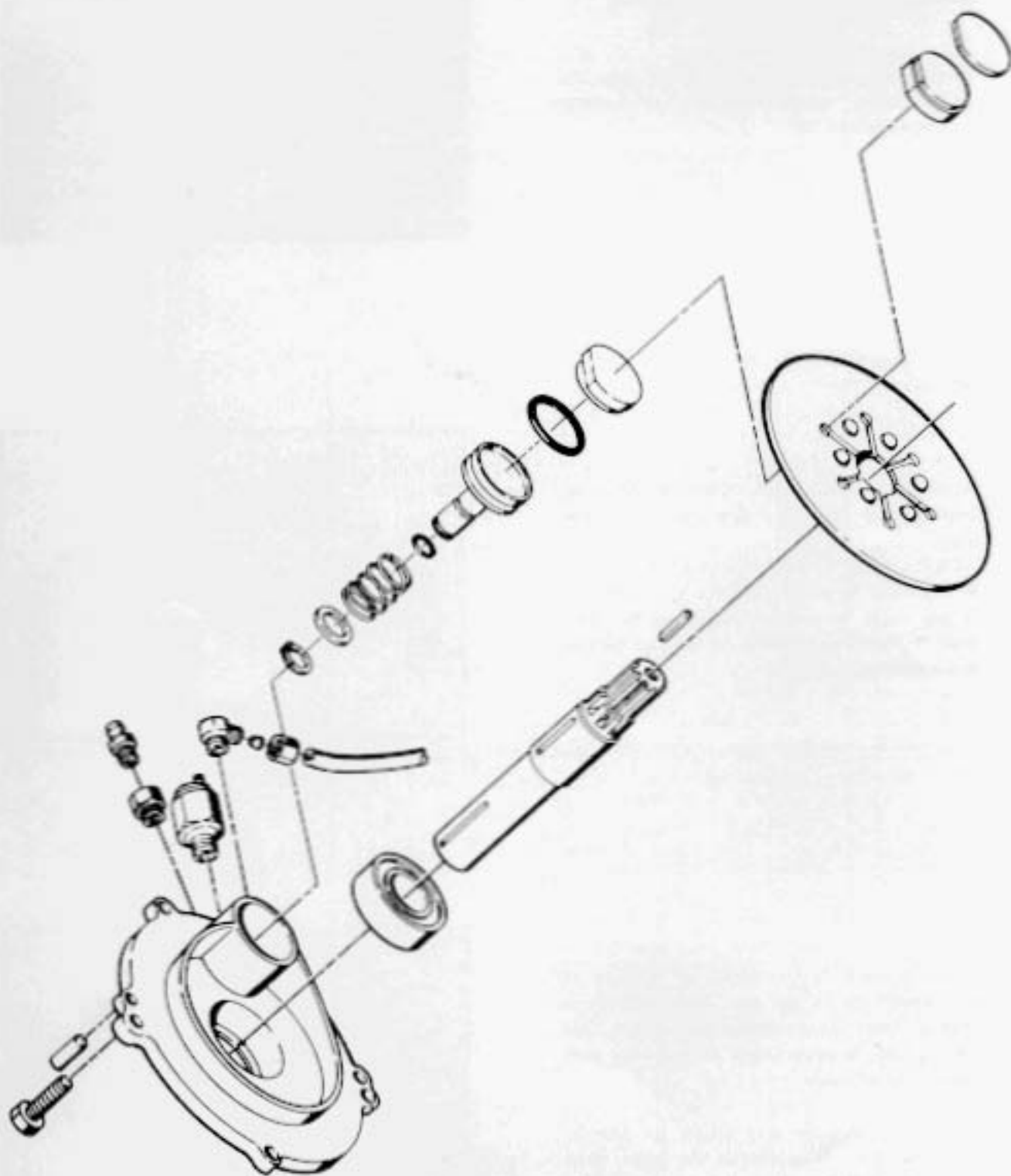


4. Dip all internal parts in clean brake fluid. Use automotive brake fluid or Polaris silicone brake fluid (PN 2870251). Wet cylinder bore and install "O" rings on plunger and insert into rear cover.

 Care must be taken not to damage "O" rings. Torque rear cover bolts evenly as numbered. Bleed system as outlined on page VIII - 3.



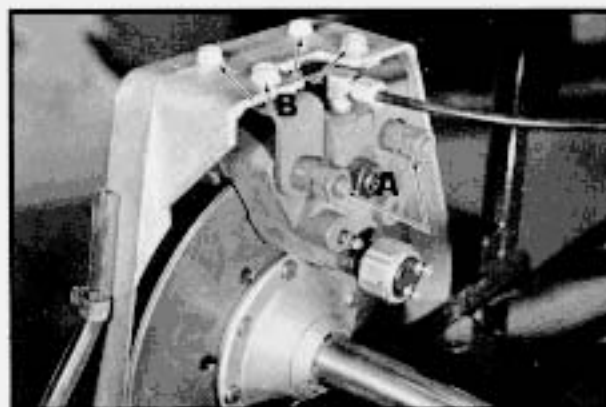
CHAINCASE AND BRAKE
Type I Slave Cylinder Exploded View



CHAINCASE AND BRAKE

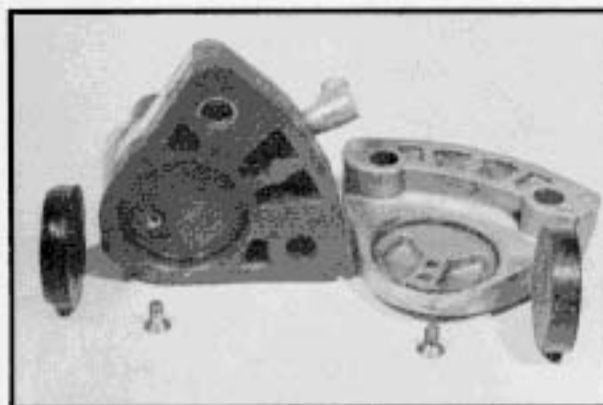
Type II Brake Caliper Removal and Repair

1. Remove the hydraulic line, exercising care to prevent fluid spillage on painted surfaces.
2. Remove the two bolts (A) which hold the caliper halves together and the four bracket mounting screws (B).



3. Remove the friction pads, noting the difference between the stationary side and piston side pads.

NOTE: When replacing friction pads only, it is important to make room for new pads. The piston must be pushed back into the slave cylinder bore. Use Loctite on the two friction pad attaching screws.

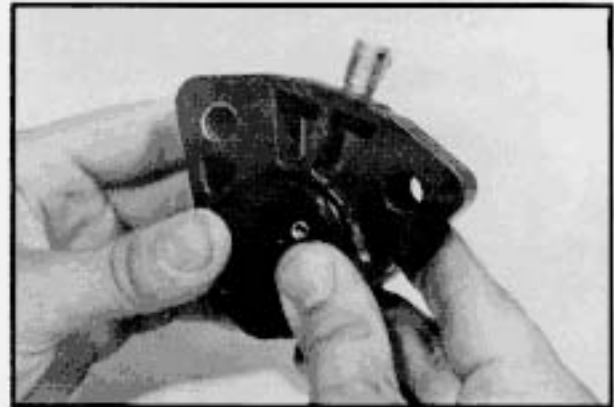


4.  Piston removal is facilitated by the use of compressed air at the inlet fitting. Extreme caution must be exercised to prevent fluid from getting in eyes. Cover the assembly with a shop rag as shown.
5. Inspect the cylinder and piston for scoring. Evidence of severe scoring in the caliper bore will mean replacing the housing and piston to obtain a proper piston seal.



CHAINCASE AND BRAKE
Type II Brake Caliper Repair and Assembly

6. Dip the piston assembly and the "O" ring seal in brake fluid; assemble the seal to the piston. Press the piston into the caliper bore keeping it square to avoid scoring the bore. Push it firmly all the way in.



7. Reassembly is basically the reverse of disassembly procedures. Be sure that all components are clean and serviceable before re-assembling the unit.

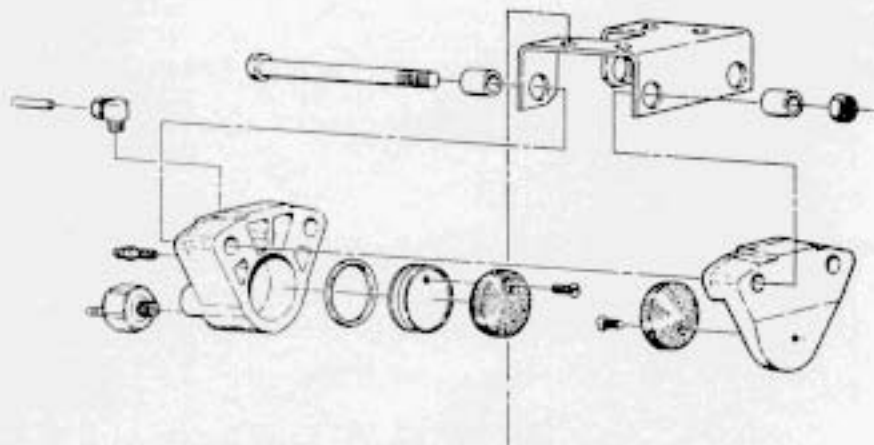
Observe the following:

- A. Apply Loctite (PN 2870326) compound on the two (2) caliper carrier bolts and four (4) bracket attaching cap screws.

Torque Values

Caliper carrier bolts - 25 - 30 ft./lbs.
Caliper attaching bracket cap screws - 8 ft./lbs.

- B. Purge the system of all trapped air by bleeding as outlined on page VIII - 3.
- C. Inspect for system leaks.
- D. Check caliper unit mount for free floating action.



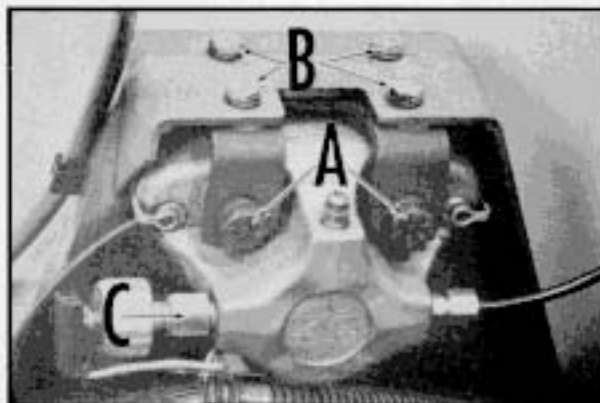
TYPE II SLAVE CYLINDER EXPLODED VIEW

CHAINCASE AND BRAKE

Type III Brake Caliper Removal and Repair

1. Remove the hydraulic line, exercising care to prevent fluid spillage on painted surfaces.
2. Remove spring clips (9), figure 1, which hold the pad retaining pins (10).
3. Remove the two bridge bolts (A) holding the caliper halves together and the four bracket mounting screws (B).

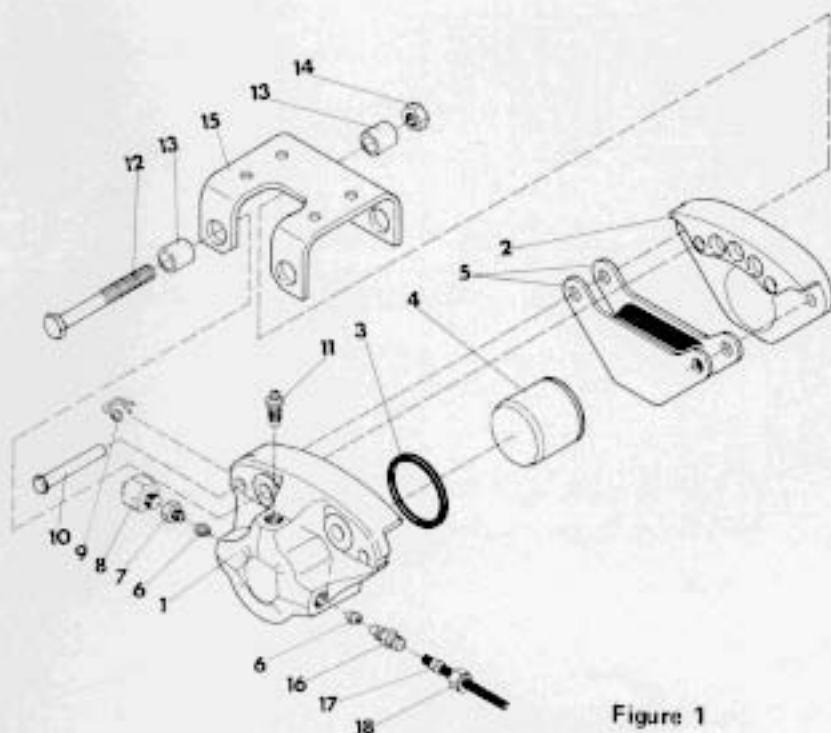
IMPORTANT: Note brake light switch adapter (C) which is used on all Type III brake systems, except Centurion. The Centurion has a special brake light switch which does not require the use of an adapter. All brake light switches, except Centurion, have 1/8" NP thread. The Centurion has a 3/8 x 24 NF thread and a flared end. Therefore, care must be taken when replacing these switches so as not to interchange them and cause possible damage to caliper assemblies.



REPLACING FRICTION PADS

The pad is attached to a pad holder and is replaced as a set.

1. To make room for new pads, the piston must be pushed back into the caliper bore. Loosen the bleeder screw and work the piston back into the bore.
2. Take out pad retaining pins and remove worn friction pads.
3. Install new pad holders. Brake pads should be replaced only as a set.
4. With unit reassembled, apply brakes lightly several times to seat the new pads against the disc.



- 1 — Piston Casting
- 2 — Carrier Casting
- 3 — Piston Seal
- 4 — Piston
- 5 — Pad Assembly (2)
- 6 — Seat Insert (2)
- 7 — Brass Adapter
- 8 — Stop Light Switch
- 9 — Spring Clip (2)
- 10 — Pad Retainer Pin (2)
- 11 — Bleeder Screw
- 12 — Bridge Bolt (2)
- 13 — Spacer Bushing (4)
- 14 — Nut (2)
- 15 — Bracket
- 16 — Male Adapter
- 17 — Ferrule Fitting
- 18 — Female Connector

Figure 1

CHAINCASE AND BRAKE

Type III Brake Caliper Removal and Repair

DISASSEMBLY

Refer to the exploded view while performing steps below. Numbers in parenthesis correspond to callouts in figure 1.

NOTE: Only take apart as far as needed to make repairs.

1. Disconnect hydraulic line.
2. Disassemble on a clean bench.
3. Open bleed screw (11) and drain brake fluid from caliper assembly.
 CAUTION: PROTECT EYES FROM FLUID.
4. Remove the spring clips (9) that hold the pad retainer pins (10) and remove the pins.
5. Remove the two bridge bolts (12).
6. Separate castings (1) and (2).
7. Place caliper with piston down and remove piston (4) from piston casting (1) by applying compressed air to the hydraulic inlet port.
 CAUTION: Use just enough air to do the job. Use extra care not to damage the piston or piston bore.
8. Using a small wood or plastic stick, work out piston seal (3) from its groove in the piston bore. Discard old seal.
 CAUTION: To avoid scratching piston or burring edge of seal groove, do not use a metal tool such as a screwdriver.

CLEANING AND INSPECTING

Check all parts for wear or damage and replace any found defective.

1. Clean all parts with denatured alcohol and wipe dry with a clean, lint-free cloth. Using an air hose, blow out the drilled passages and bores.
2. Inspect casting cylinder bore for scoring, pitting, or corrosion. A corroded or deeply scored casting should be replaced; light scores and stains may be removed.
3. Polish any discolored or stained area with crocus cloth only. Use finger pressure and rotate the crocus cloth in the cylinder bore. Do not slide the cloth in and out of the bore under pressure. Do not use any other kind of abrasive or abrasive cloth. Black stains on the bore walls are caused by the piston seals and do no harm.
4. Check piston to see if it is pitted, scored, or worn. If so, discard and replace the piston. Do not attempt to polish or sand piston.
5. Clean piston with denatured alcohol and wipe dry with a clean, lint-free cloth. Using an air hose, blow dry.
6. Check inlet and bleeder hole threads for damage.
7. Inspect seat insert (6) for damage and replace if necessary.

CHAINCASE AND BRAKE

Type III Brake Caliper Assembly

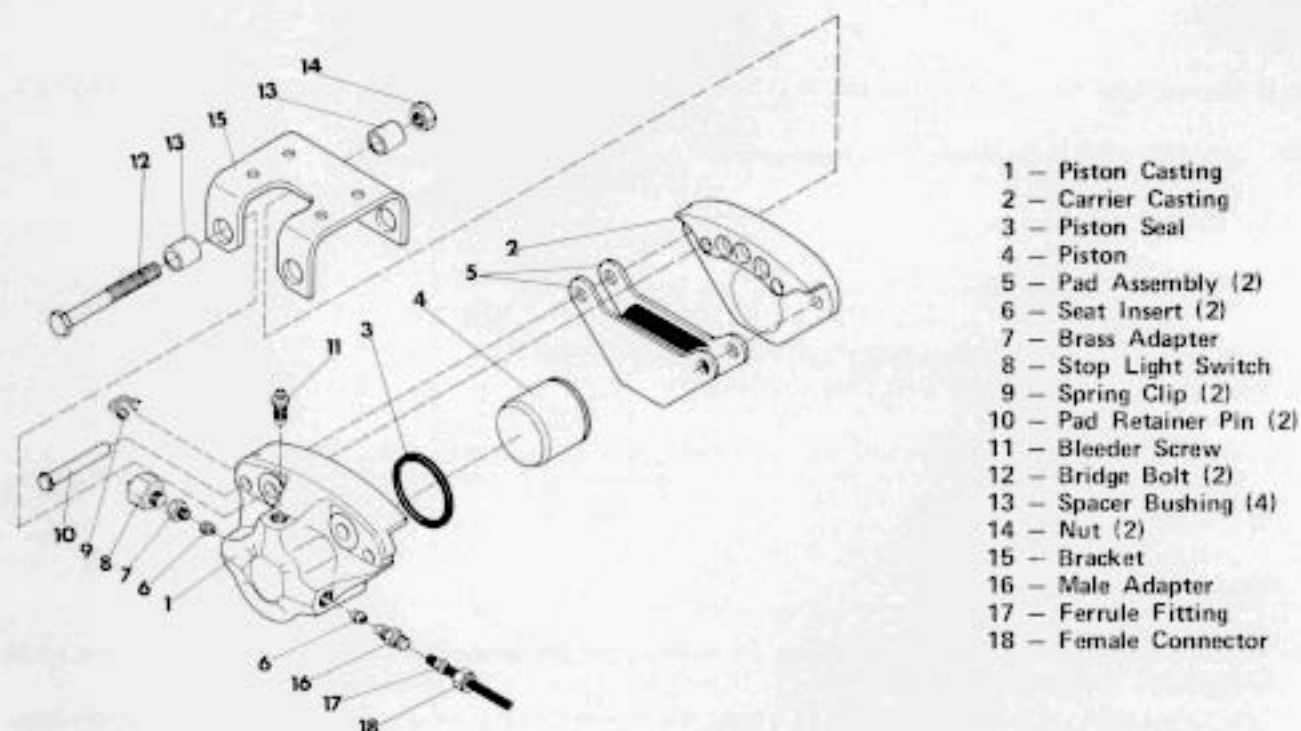


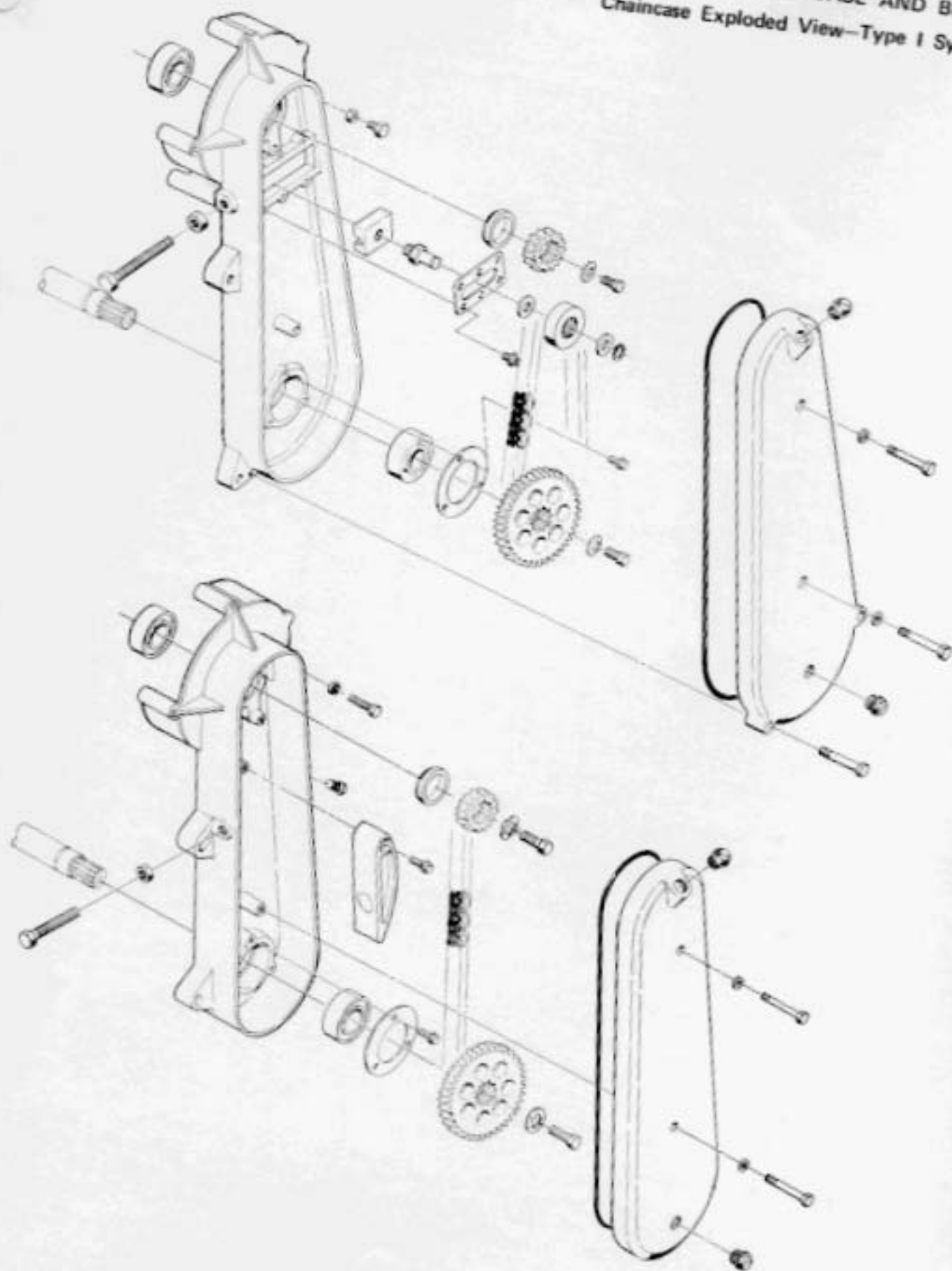
Figure 1

ASSEMBLY

Reassembly is basically the reverse of disassembly. Be sure that all parts are clean and serviceable before reassembling the unit.

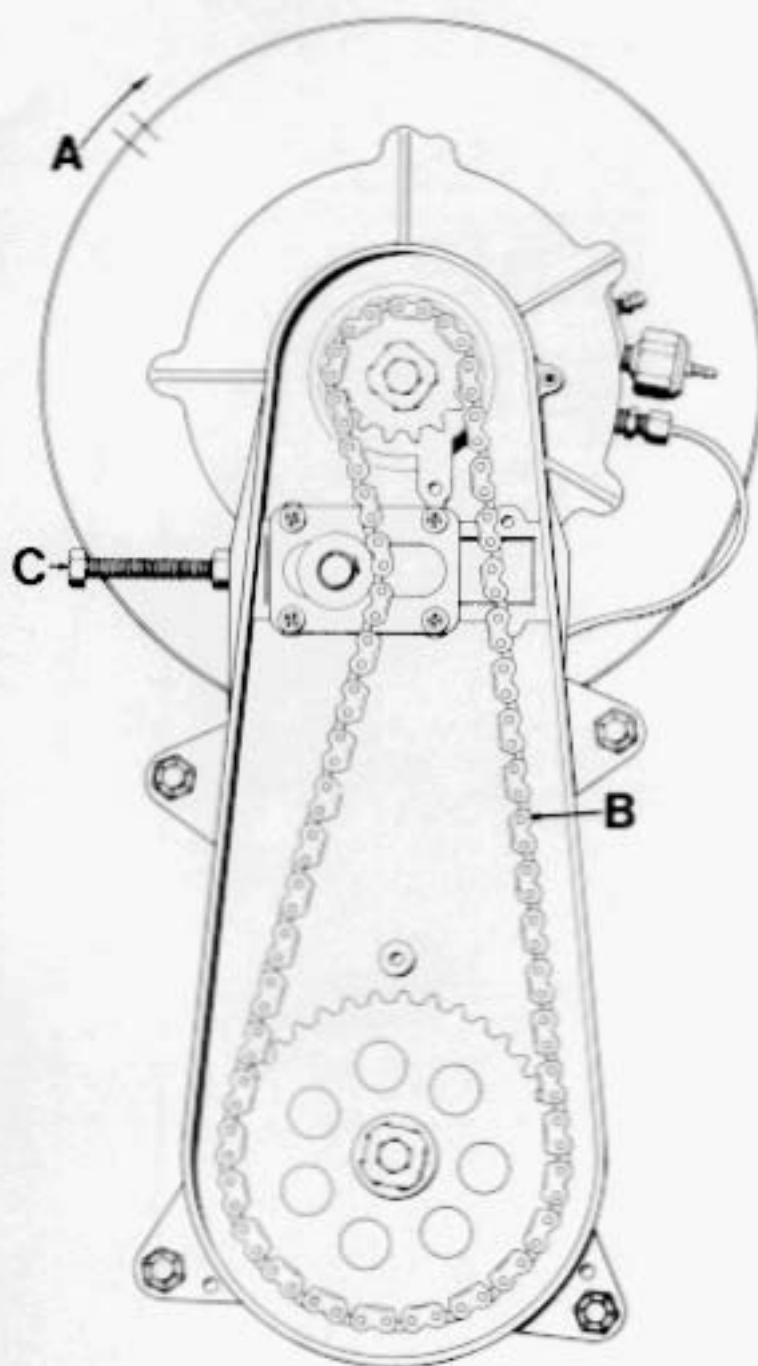
1. Dip a new piston seal (3) in clean brake fluid and place in groove in the cylinder bore. Seal should be positioned at one point in groove and then gently worked around the groove by hand until properly seated. Never use an old seal.
2. Install piston (4) into cylinder bore as follows. Coat piston thoroughly with brake fluid and carefully work piston down the bore until bottomed.
CAUTION: Apply force uniformly to avoid cocking piston in bore.
3. Examine pads for wear or damage. If pads are worn to less than half original thickness, install new pad holder assemblies. If pads are okay, they may be reused. Be sure pads are installed in their original positions. If pads are replaced, replace in sets.
4. Replace pad retainer pins (10) and spring clips (9). Observe the following:
 - A. Be sure bolts and nuts are clean and dry. Apply Loctite (PN 2870326) compound on the two caliper carrier bolts and four bracket attaching cap screws.
Torque Values: Caliper carrier bolts - 30 ft./lbs.
Caliper attaching bracket cap screws - 8 ft./lbs.
 - B. Purge the system of all trapped air by bleeding as outlined on page VIII - 3.
 - C. Inspect for system leaks.
 - D. Check caliper unit mount for free floating action.

CHAINCASE AND BRAKE
Chaincase Exploded View—Type I Systems



CHAINCASE AND BRAKE

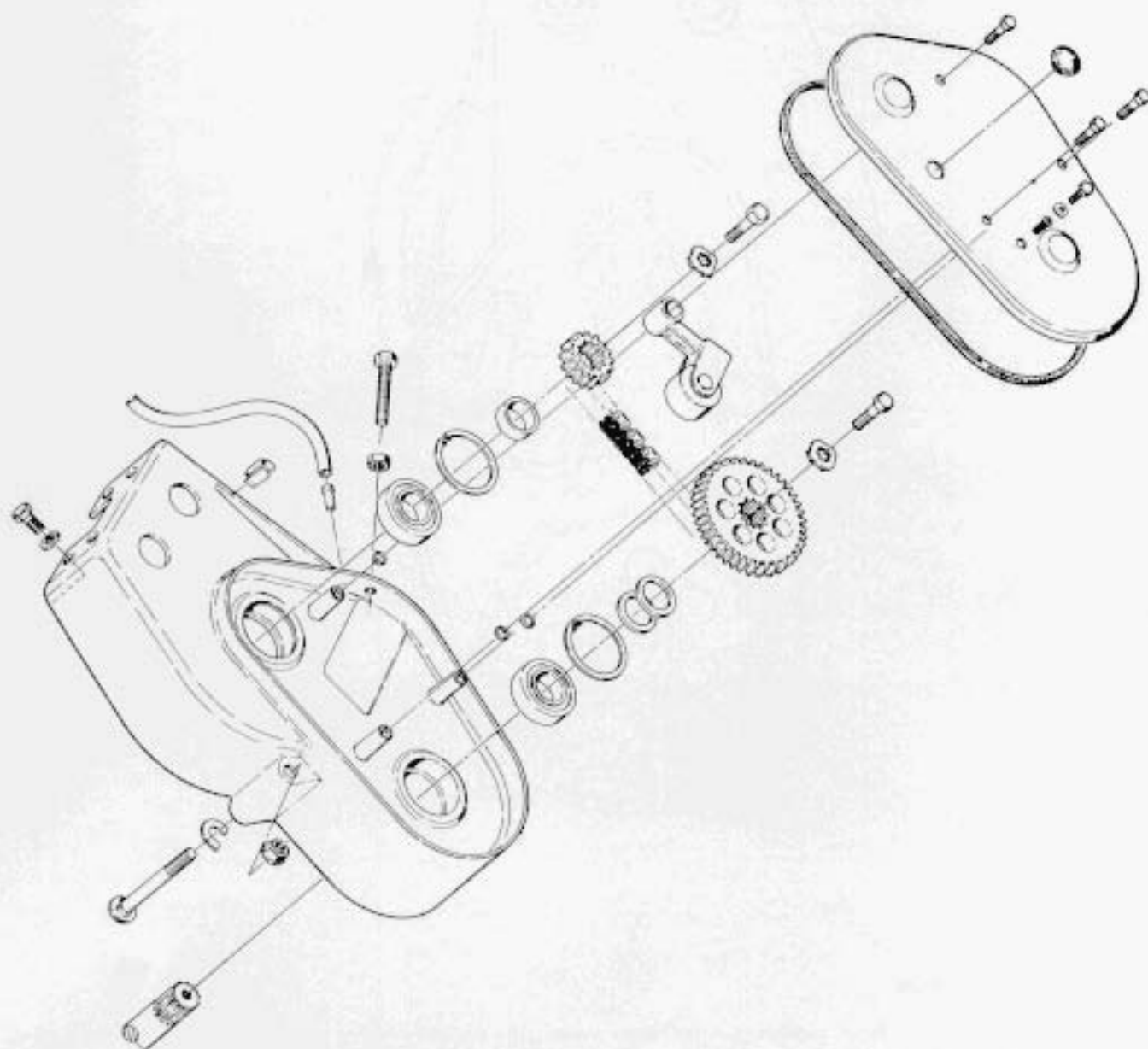
Drive Chain Adjustment and Lubrication—Type I Systems



DRIVE CHAIN TENSION

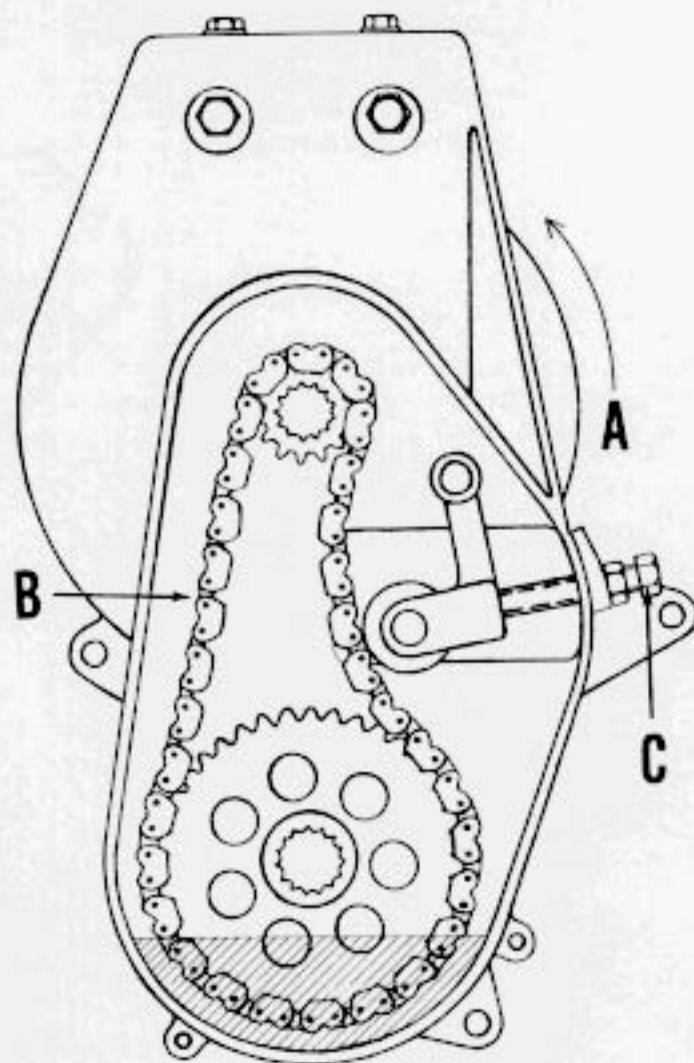
To obtain correct chain tension, remove the chaincase cover. With a slight reverse tension on the chain, turn driven clutch as indicated (A). There should be approximately $\frac{3}{8}$ " deflection on the chain at point (B). Chain adjustment is achieved with the adjusting bolt (C). Install the cover and add chaincase oil to lower plug level; install cover plugs (upper vented).

CHAINCASE AND BRAKE
Chaincase Exploded View—Types II and III Systems



CHAINCASE AND BRAKE

Drive Chain Adjustment and Lubrication—Types II and III Systems



DRIVE CHAIN TENSION

To obtain correct chain tension, remove the chaincase cover with a slight reverse tension on the chain by turning driven clutch as indicated (A). There should be approximately 1/4" – 3/8" free play deflection on the chain at point (B). Chain adjustment is achieved by loosening the adjusting bolt locknut and turning adjusting bolt (C) until correct chain deflection is obtained. Lock the adjusting bolt locknut while holding a wrench on the adjusting bolt at the same time to prevent it from turning and changing your desired chain tension. Install the chaincase cover and add Polaris chaincase lubricant (PN 2870337) through the cover upper plug hole to the lower check plug level.

CHAINCASE AND BRAKE

Drive Chain Sprocket Alignment

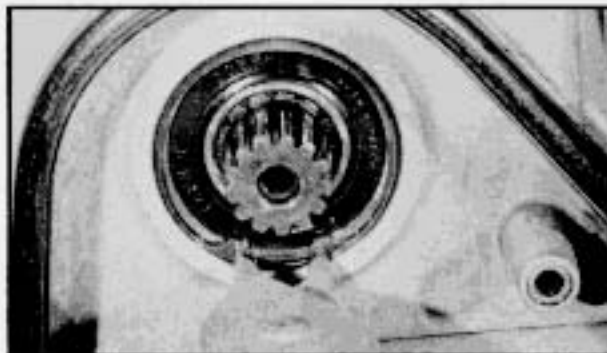


Maximum sprocket and chain life are directly related to proper sprocket alignment. Before installing the drive chain, place a straight edge against the upper and lower installed sprockets. The edge should contact equally on both sprockets. If misalignment is evident, the addition or subtraction of washers (PN 7556509) is necessary behind the bottom sprocket to correct the problem.

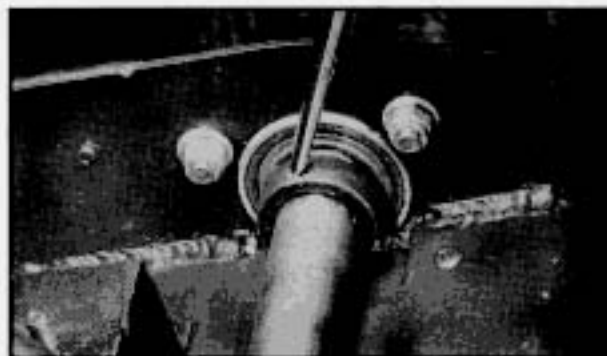
CHAINCASE AND BRAKE

Jackshaft Removal

1. Remove the chaincase cover, sprockets, and retaining snap ring.



2. Remove the drive belt and driven clutch. Loosen the lock collar set screw and rotate the lock collar with a drift punch.



3. Remove the flangette and bearing from left side of machine. NOTE: The suspension may have to be lowered to gain access to the bottom flangette attaching nut.



4. Open the brake disc retaining snap ring and slide it off the bearing and flangette end. The jackshaft may now be removed, sliding it out through chaincase.

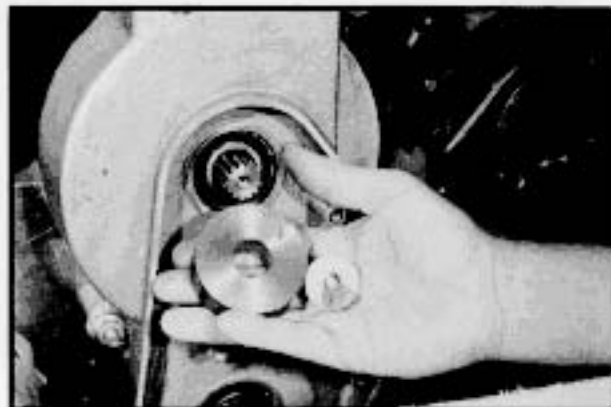


IMPORTANT: Any time the chaincase and/or jackshaft are removed it is necessary that the jackshaft installation procedures are followed to ensure proper alignment into the left side bearing and flangette.

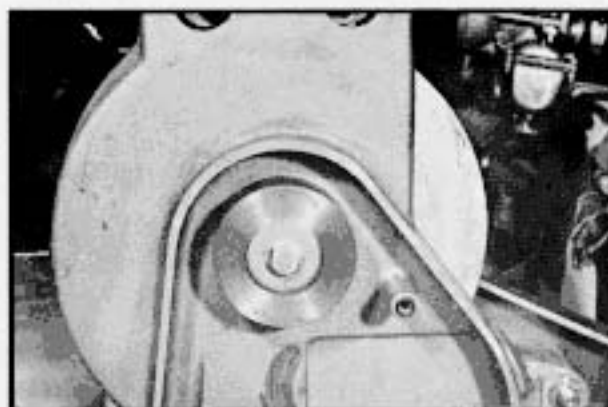
CHAINCASE AND BRAKE

Jackshaft Installation

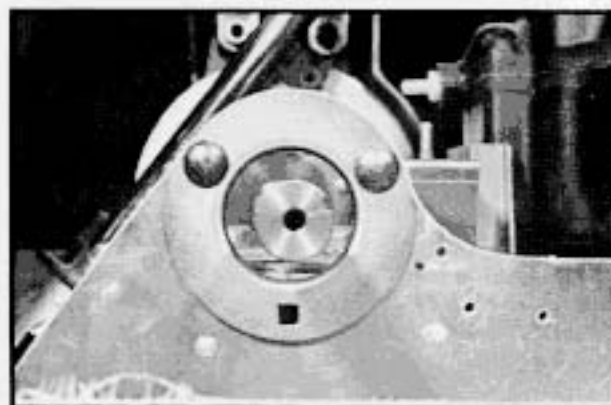
1. Install the chaincase to the chassis with the jackshaft. Do not install the sprockets. Alignment tool (PN 2870399) shown prior to installation.



2. Install the alignment tool to the jackshaft, torquing the cap screw to 5-6 ft./lbs.



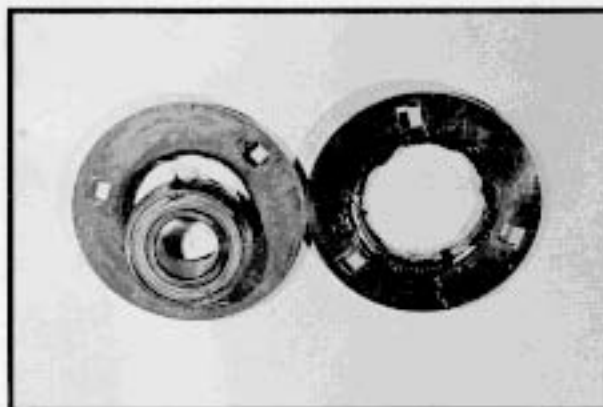
3. Install a flangette into the left bearing support hole. The shaft should center in the flangette. If not, the chaincase will have to be shimmed between the tunnel and case accordingly, using shim kit (PN 2200126) as needed to position the shaft on center.



CHAINCASE AND BRAKE

Jackshaft Installation

4. Following centering of the jackshaft, the left bearing and flangettes must be greased prior to installation.

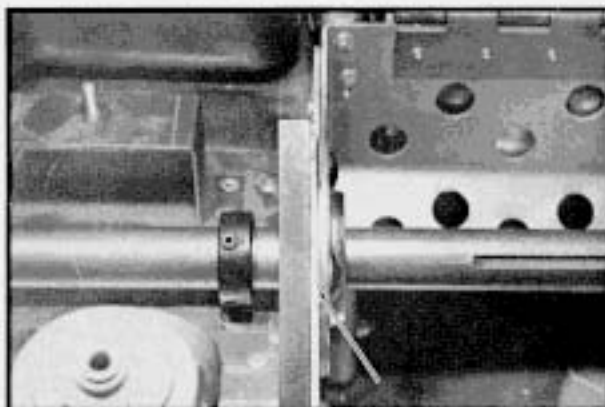


5. Slide the bearing onto the shaft, rotate the flangettes as shown to check for any binding which may cause bearing misalignment upon reassembly.



6. After the flangettes have been tightened, lay a straight edge along the support plate as shown and rotate the shaft, noting any movement of the plate.

IMPORTANT: If the bearing has not centered in the flangettes and movement is evident, it will be necessary to loosen the flange mounting bolts slightly and gently tap the flange while rotating the shaft until no movement exists.



SECTION IX

SUSPENSIONS

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SUSPENSION IDENTIFICATION	
Glass Rail	1972-1973 TX, Charger, Charger SS, Mustang and Custom
Stamped Steel Type I	1972-1978 Colt; 1972-1977 Colt SS Shock Accessory on Some Models
Stamped Steel Type II (E Slot)	1973 TX; 1974 TX, Custom II, and Electra; 1975 TX with Rear Spring Tensioner; 1975-1977 Electra
Stamped Steel Type III (Front Limiter Strap and Rear Spring Tensioner)	1978 S/S 340 and Cobra (Has Pivoting Front Limiter); 1979 Gemini, Apollo, and Cobra
Extruded Aluminum Type I	1976 Starfire; 1976-1979 TX
Extruded Aluminum Type II	1977-1978 TX-L
Extruded Aluminum Type III	1979 TX-L and Centurion

SUSPENSIONS

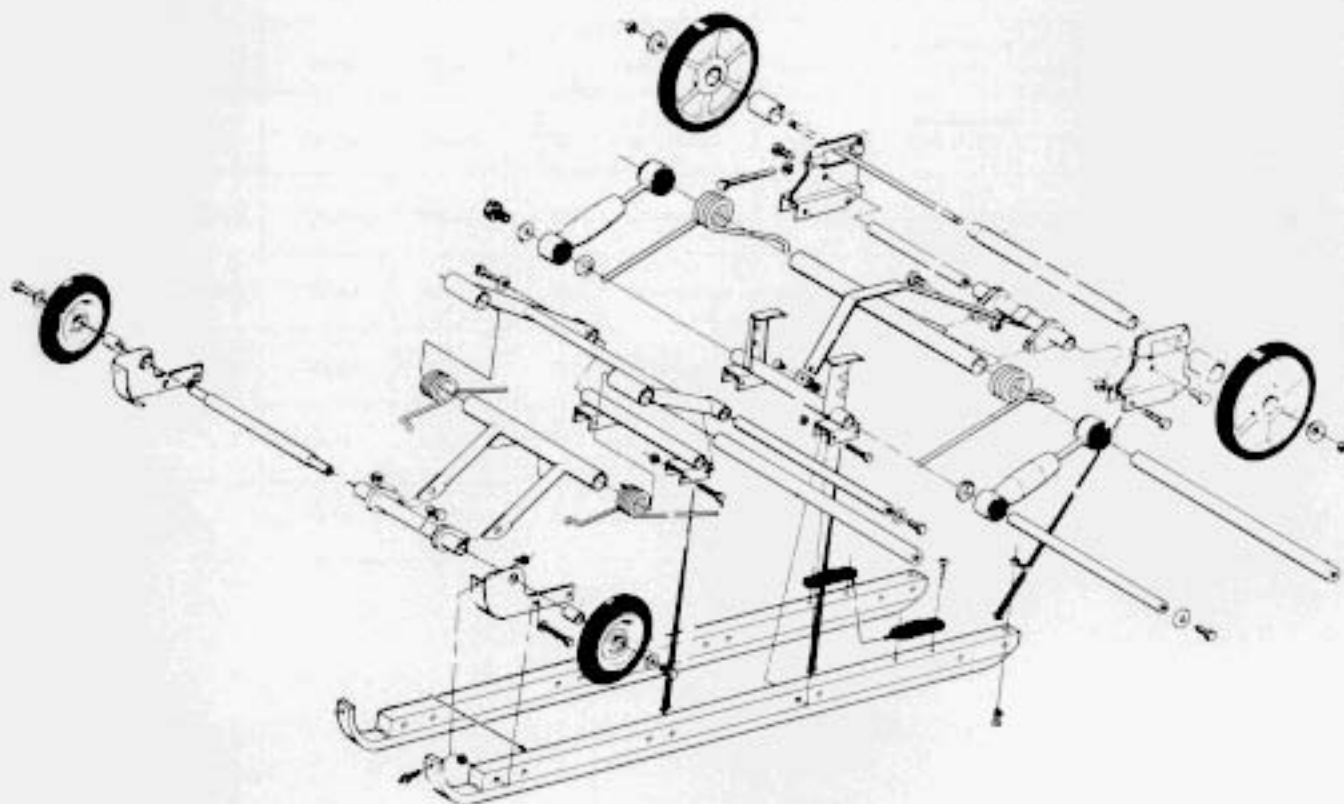
General Specifications

Model	Model Number	Suspension Type	Shock	Track Type	Track Width	Track Length (Overall)	Track Length On Ground	Rivet Type	Ice Growers
Gemini 244	0791025	Stamped Steel Slide Rail	Accessory	Growser Bar	15"	114.44"	42"	Solid	Molded Rubber on Track Belt
Gemini 250	0791026	Stamped Steel Slide Rail	Accessory	Growser Bar	15"	114.44"	42"	Solid	Molded Rubber on Track Belt
Apollo 340	0791138	Stamped Steel Slide Rail	Standard	Molded Rubber	15"	114.85"	42"	—	—
Cobra 340	0791838	Stamped Steel Slide Rail	Standard	Growser Bar	15"	119.5"	48.75"	Solid	Molded Rubber on Track Belt
Cobra 440	0791843	Stamped Steel Slide Rail	Standard	Growser Bar	15"	119.5"	48.75"	Solid	Molded Rubber on Track Belt
TX 250	0790523	Aluminum Extruded Slide Rail	Standard	Growser Bar	15"	114.44"	44.25"	Solid	Molded Rubber on Track Belt
TX 340	0790537	Aluminum Extruded Slide Rail	Standard	Growser Bar	15"	114.44"	44.25"	Solid	Molded Rubber on Track Belt
TX 440	0790545	Aluminum Extruded Slide Rail	Standard	Growser Bar	15"	114.44"	44.25"	Solid	Molded Rubber on Track Belt
TX-L 340	0790639	Aluminum Extruded Slide Rail	Standard	Molded Rubber	15"	120.96"	47.5"	—	—
Centurion	0790653	Aluminum Extruded Slide Rail	Standard	Molded Rubber	15"	120.96"	47.5"	—	Steel Traction Studs

SUSPENSIONS

Slide Rail Assembly — Charger, Charger SS, TX, Mustang, and Custom (Glass Rail)

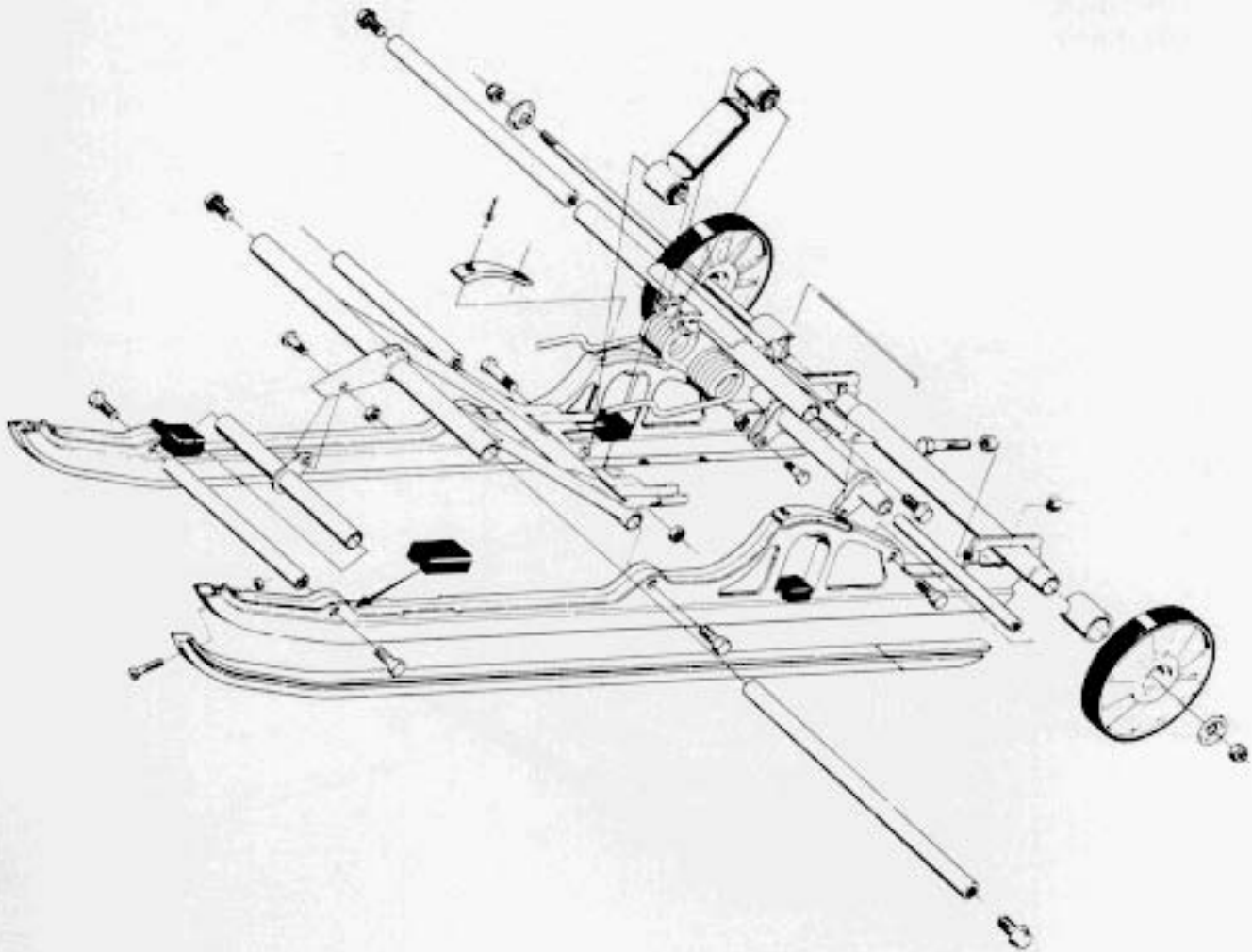
Rear spring adjustment is basically the only adjustment that can be administered to the suspension. This adjustment is for rider weight only. The highest spring position on the suspension would accommodate a heavy rider or when riding double. The lowest spring position would make a softer ride and would accommodate a lighter rider. Hi-fax should be replaced when no less than 1/8" is remaining at any given point. Failure to do so will result in severe damage to the fiberglass rail.



SUSPENSIONS

Type I Stamped Steel Slide Rail Assembly

Stamped steel Type I slide suspension without rider weight adjustments. Shock accessory on some applications.

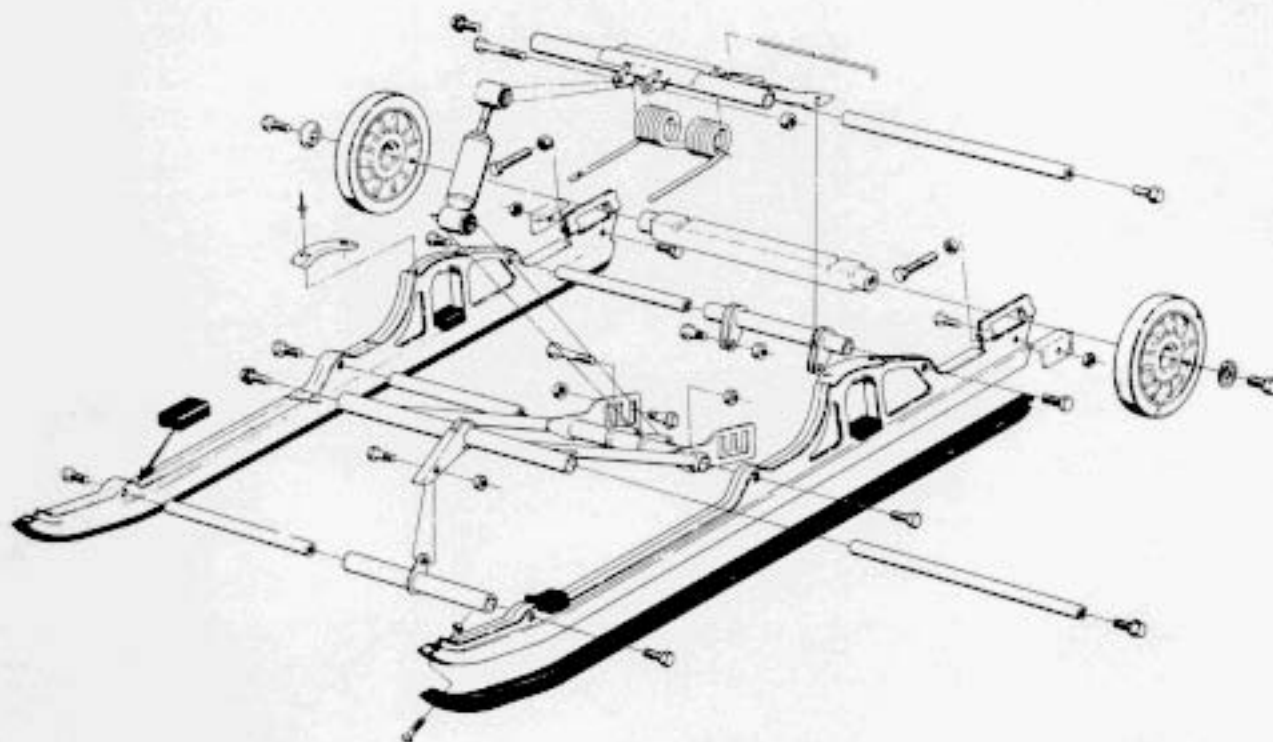


SUSPENSIONS

Type II Stamped Steel Slide Rail Assembly (E Slot)

This type suspension was introduced into the Polaris line in 1973 and was continued in the following models and years:

- 1973 TX
- 1974 Electra, Custom II, TX
- 1975 TX, Electra
- 1976 Electra
- 1977 Electra



Type II Stamped Steel Slide Rail Assembly (E Slot) Adjustments

ADJUSTMENTS

There are compensating spring adjustments for variations in driver weight and variations in machine performance (weight transfer to the track and ski pressure).

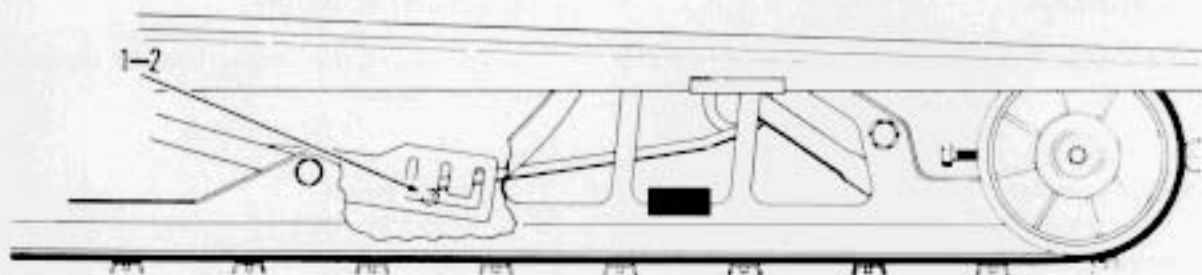
The two basic adjustments are:

1. HORIZONTAL — Variations in weight transfer to track and ski pressure.
2. VERTICAL — Adjustments according to weight of driver.

The farther forward the spring adjusting bolt is placed on the adjusting bracket, the more ski pressure will be obtained. Conversely, the least ski pressure will be obtained by placing the adjuster bolts in the back of the horizontal adjustment.

On the vertical adjustments (driver weight), the heavier a driver is, the higher he will place the adjuster bolts in the vertical adjustments.

Track Tension: Distance between the track and slide rail should be approximately 3/8" to 1/2" in the slack position.



REAR SPRING ADJUSTMENT

1975 TX introduced this adjustment which is included on all Type III suspensions.

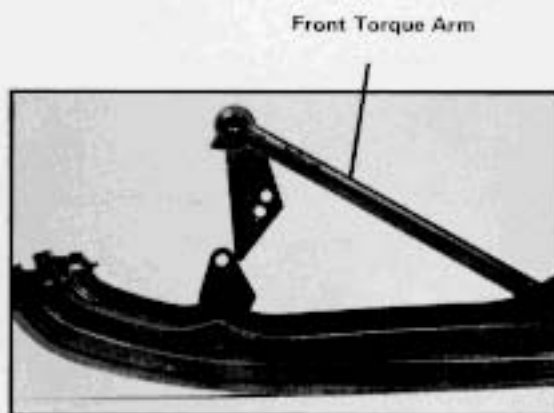
This adjustment is provided to enable the suspension to be adjusted for different passenger and driver weights, which in turn affects ski pressure and handling characteristics. Adjustment is accomplished by turning the cap screw (A). For a firmer ride and less ski to ground pressure, turn the cap screw counterclockwise. For a softer ride resulting in more ski to ground pressure, adjust the cap screw clockwise.



SUSPENSIONS

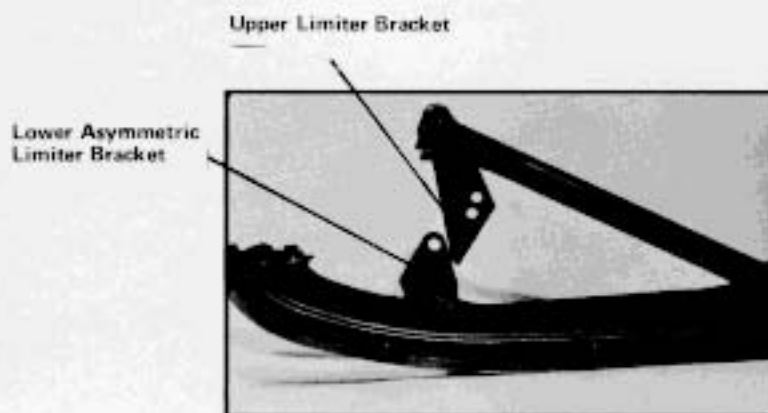
Type III Front Limiter Assembly Adjustments

The torque arm limiter also may be adjusted to work in conjunction with the torque arm to further provide degrees of ski lift and weight transfer. The upper limiter bracket has an upper and a lower hole, while the bottom bracket is asymmetric and may be turned 180° for additional adjustment.



NORMAL POSITION

Lower asymmetric limiter in normal position.



REVERSED POSITION

Lower asymmetric limiter bracket turned 180° to reversed location.

FRONT TORQUE ARM PIVOTING LIMITER ADJUSTMENT COMBINATIONS

The following are adjustment combinations with resulting ski pressure or lift characteristics.

Lower Bracket Position	Upper Limiter Hole Position	Ski – Ground Pressure
Reversed	Lower	Decreasing
Reversed	Upper	↑
Normal	Lower	↓
Normal	Upper	Increasing

FRONT TORQUE ARM STRAP LIMITER ADJUSTMENTS

Ski – Ground Pressure	
Lengthen Strap	Decreasing
	↑
Shorten Strap	Increasing

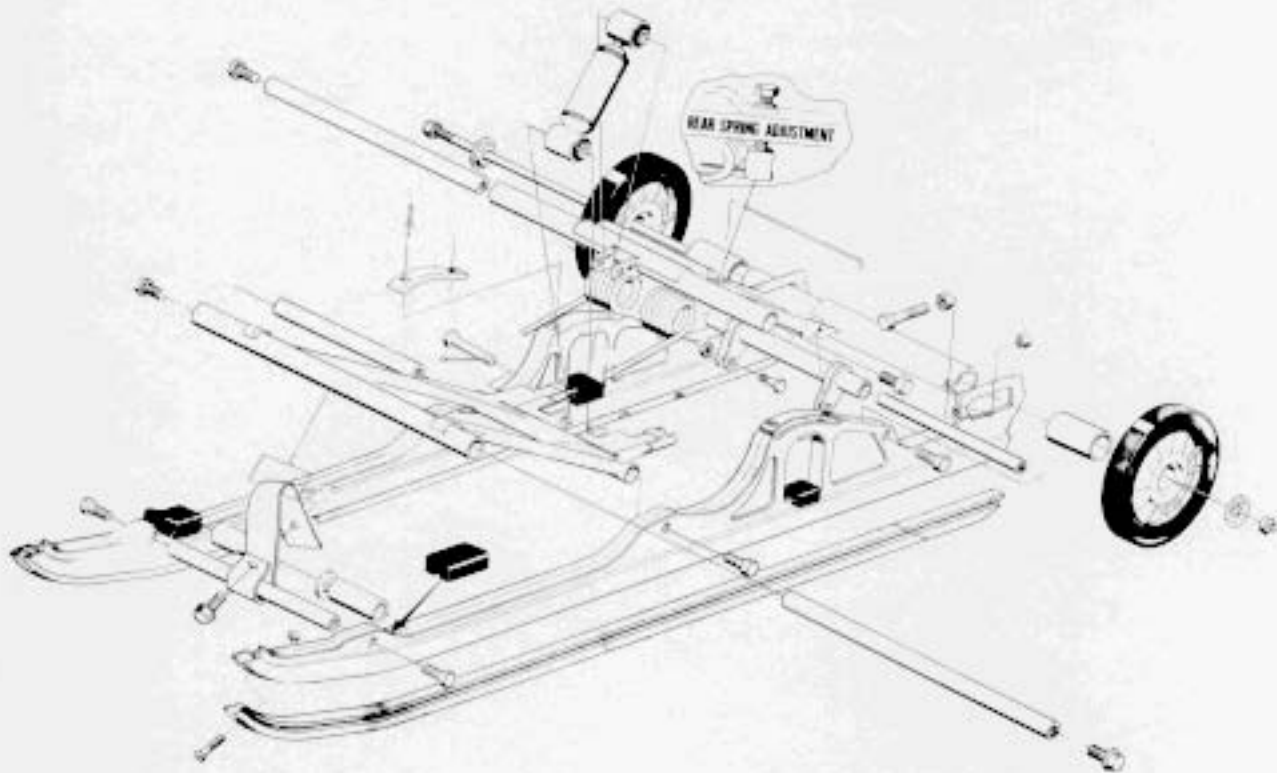
The limiter strap has a series of holes provided to vary its operating length and in turn affect the amount of ski pressure or lift during machine operation.

Setup Tip: In deep snow or hill climbing operation, less ski pressure is desirable.

SUSPENSIONS

Type III Stamped Steel Slide Rail Assembly

NOTE: Front limiter-adjustable belting with rear spring adjustment.



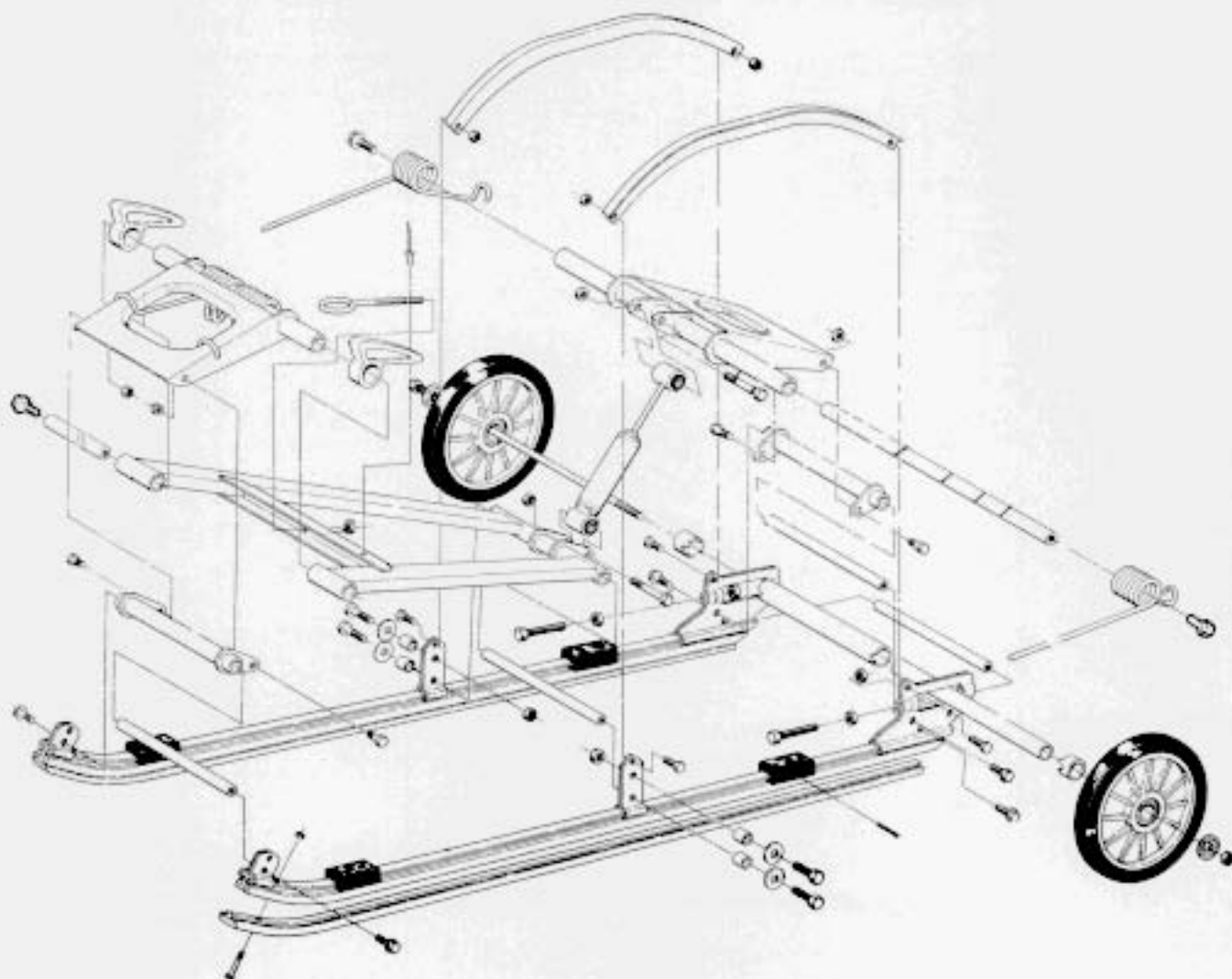
REAR SPRING ADJUSTMENT

This adjustment is provided to enable the suspension to be adjusted for different passenger and driver weights, which in turn affects ski pressure and handling characteristics. Adjustment is accomplished by turning the cap screw (A). For a firmer ride and less ski to ground pressure, turn the cap screw counterclockwise. For a softer ride resulting in more ski to ground pressure, adjust the cap screw clockwise.



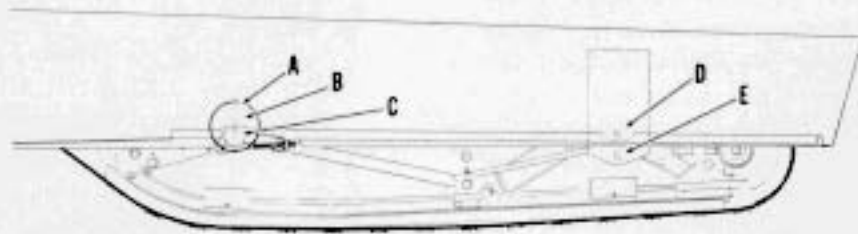
SUSPENSIONS

Type I Extruded Aluminum



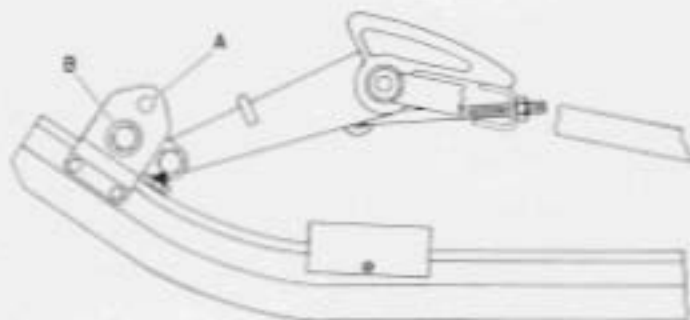
The locations of suspension mountings in the tunnel as shown in figure below are available to owners who wish to tailor their machines for individual riding or handling characteristics.

- A — High ski pressure normally not used.
- B — Less ski pressure than A, but more than C.
- C — Best suited for average conditions.
- D — Most normally used for general riding.
- E — Deep snow running and climbing.



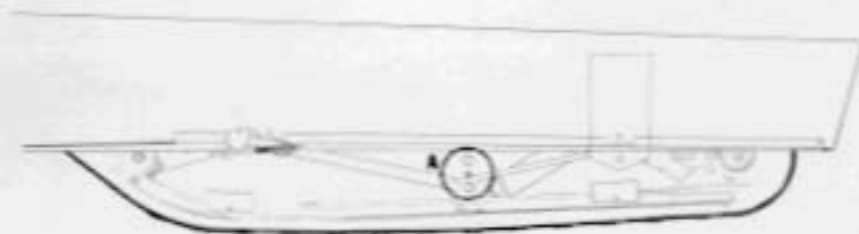
Type I Extruded Aluminum Adjustments

FRONT LIMITER PIVOT ARM



The front limiter pivot arm may be located in either the upper or lower slide rail bracket holes. The upper position (A) provides greater ski lift upon acceleration and is desirable for deep snow running and hill climbing. The lower hole position (B) provides more ski pressure for turning and maneuverability on hard packed surfaces.

REAR SPRING ADJUSTMENTS



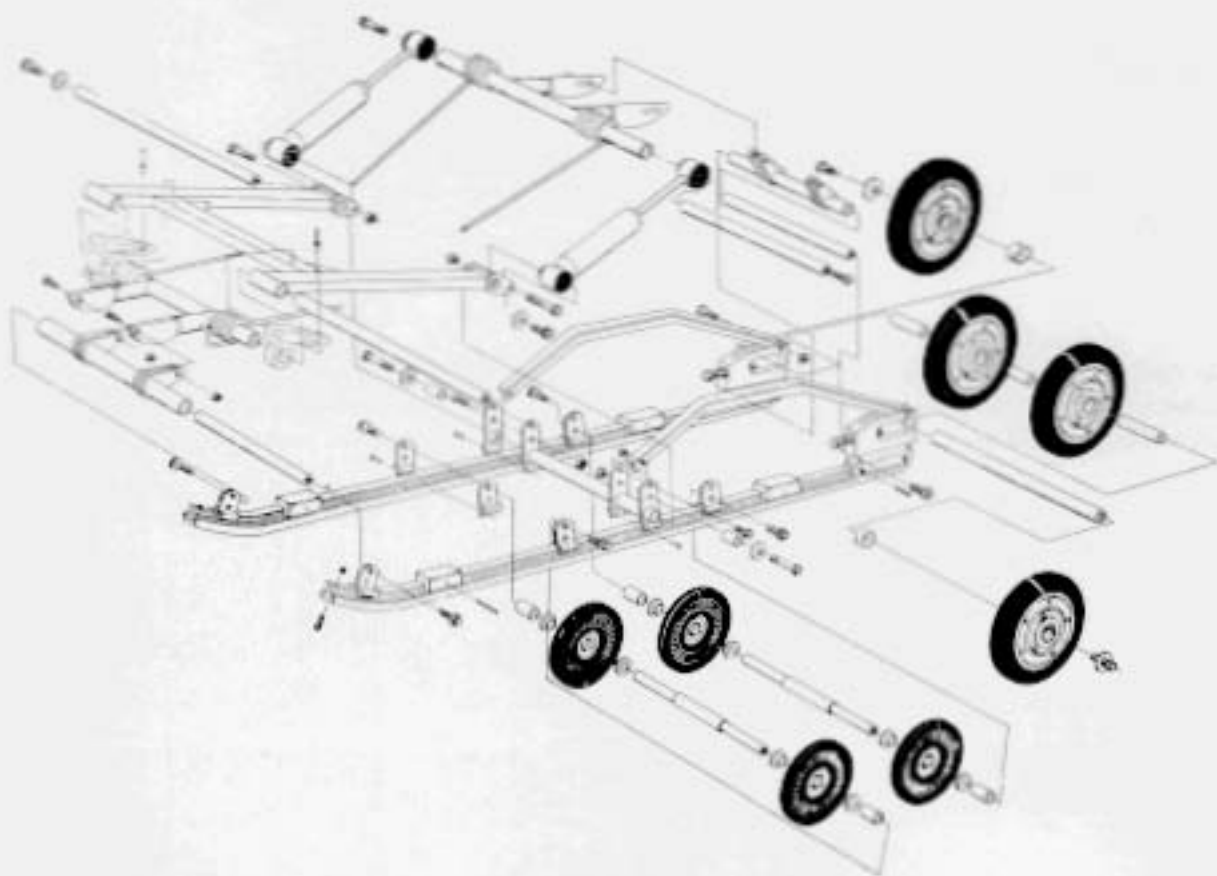
There are two adjustment positions (A) for the rear springs which are located in the center of the suspension on either side. Adjustment is accomplished by moving the spring leg from one shoulder bolt to another. The lower position is for normal riding qualities, while the upper is reserved for loads in excess of 190 pounds.

⚠ Each spring should be located in the same position on either side.

NOTE: Front suspension torque arm spring adjustment is sufficiently adjusted before machine crating at the factory; increasing spring tension is not necessary.

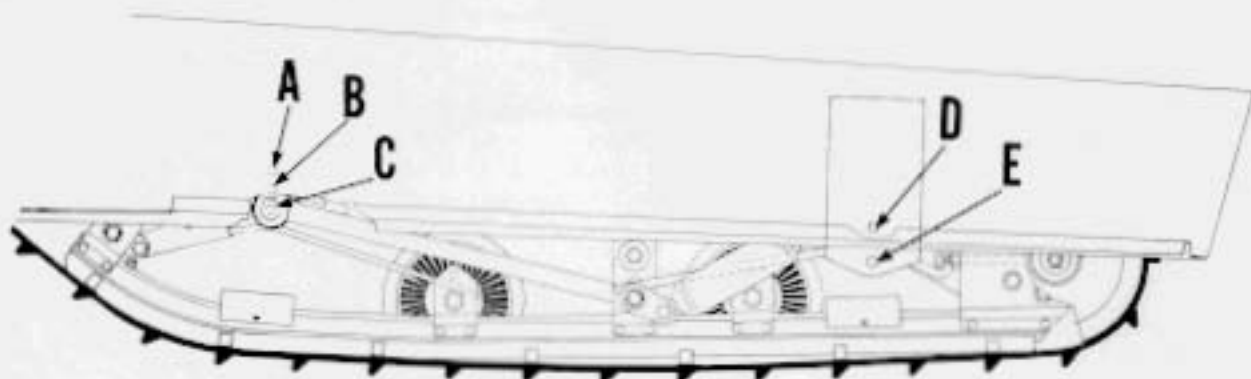
SUSPENSIONS

Type II Extruded Aluminum



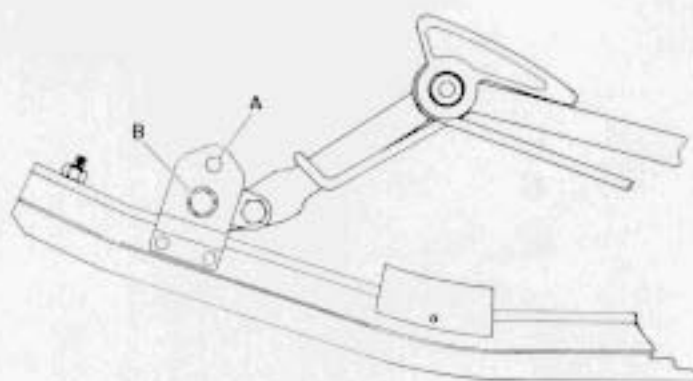
The locations of suspension mountings in the tunnel as shown in figure below are available to owners who wish to tailor their machines for individual riding or handling characteristics.

- A — High ski pressure normally not used.
- B — Less ski pressure than A, but more than C.
- C — Best suited for average conditions.
- D — Most normally used for general riding.
- E — Deep snow running and climbing.



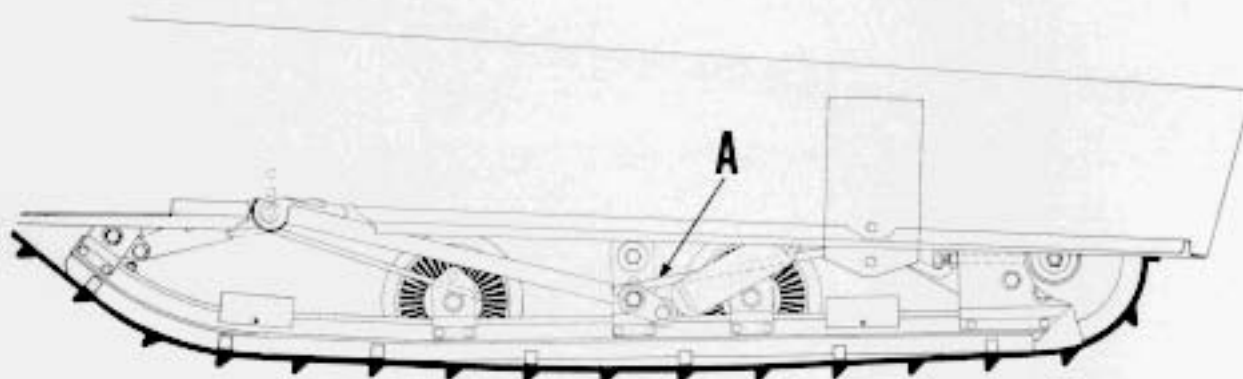
Type II Extruded Aluminum Adjustments

FRONT LIMITER PIVOT ARM



The front limiter pivot arm may be located in either the upper or lower slide rail bracket holes. The upper position (A) provides greater ski lift upon acceleration and is desirable for deep snow running and hill climbing. The lower hole position (B) provides more ski pressure for turning and maneuverability on hard packed surfaces.

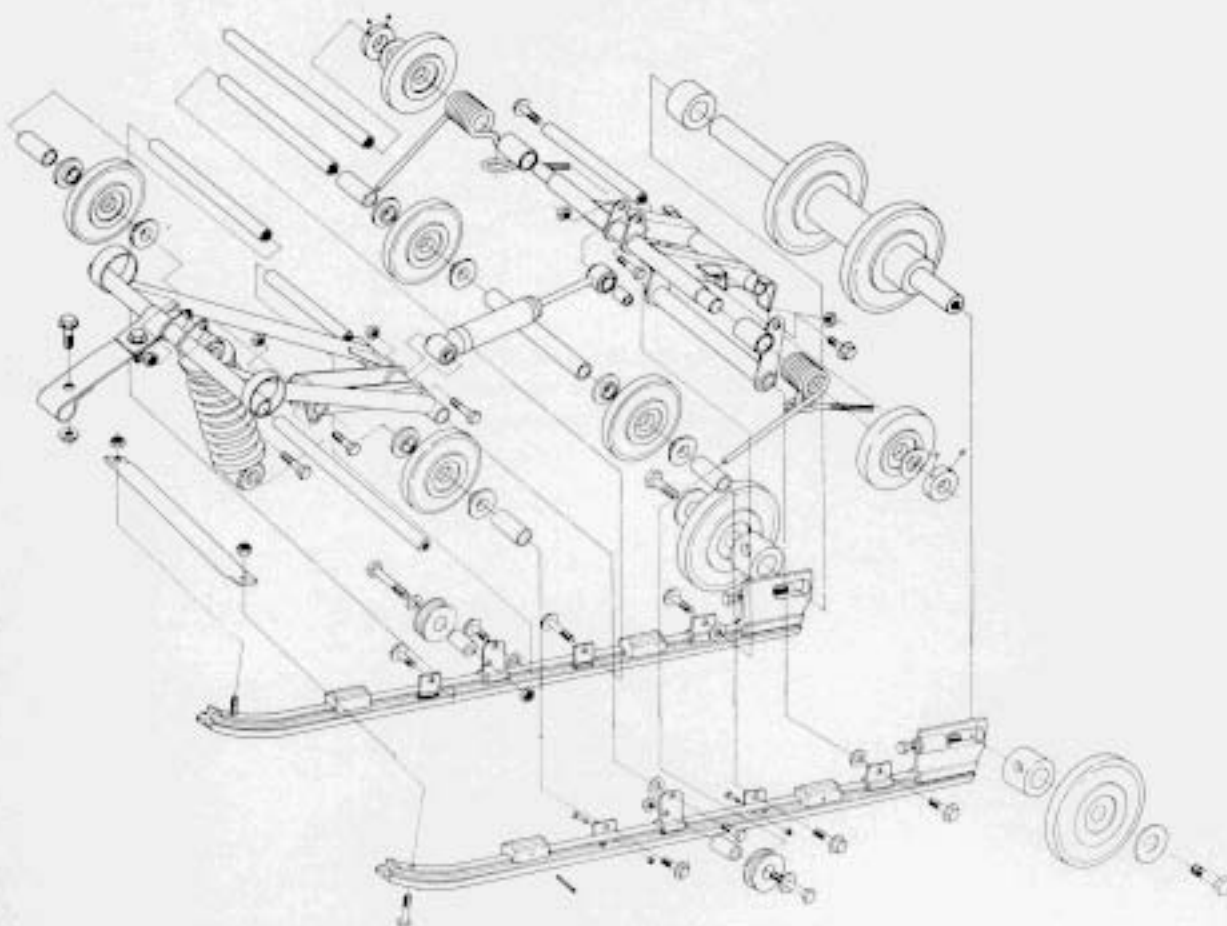
REAR SPRING ADJUSTMENTS



Compensation for rider weight and terrain conditions may be made by moving the rear spring (A) in either the upper position resting on the shoulder bolt or in the lower setting between the shock absorber bracket and mount. The upper position provides a firmer ride and the lower may be used for lighter riders and general conditions.

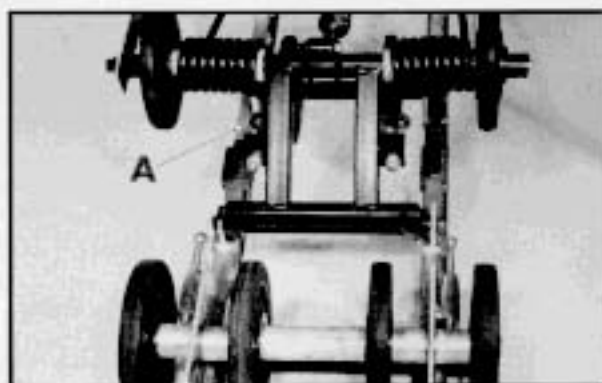
SUSPENSIONS

Type III Extruded Aluminum



REAR SPRING ADJUSTMENT

Rear spring adjustment is primarily a control for rider comfort. A check for correct or recommended settings is as follows. Lift the rear of the machine to release all tolerance in the suspension. Adjust the preload with eyebolts (A) so there is approximately 1/2" - 1" drop from normal raised chassis height with the weight of the rider on the machine.



Type III Extruded Aluminum Adjustments

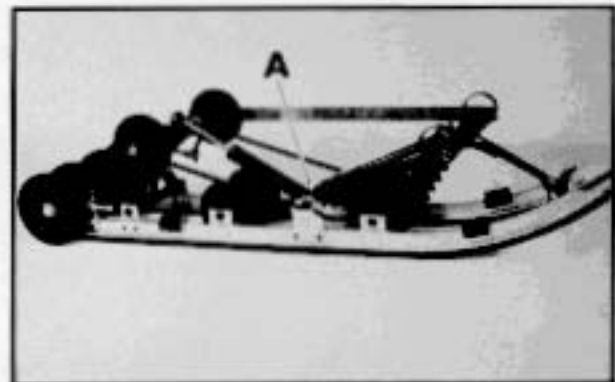
FRONT SPRING AND LIMITER ADJUSTMENT

A high preload tension on the rear spring may cause an increase in ski pressure, especially while trail riding at a low speed. If ski pressure is too severe for this type of riding, increase the preload on the front shock spring by adjusting the cam. To increase ski pressure, limiter adjustment can also be changed. More ski pressure will result by shortening the travel of the limiter belt. Setting of the front limiter belt in the longest position will decrease ski pressure.

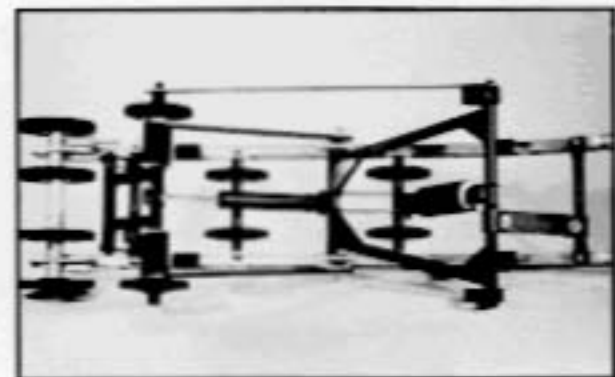


REAR SHOCK POSITION

After all adjustments have been made and the ride seems to be a little firm, it is recommended to reposition the rear shock. To maintain the full travel of the rear suspension, move the shock to the higher mounting position (A). By repositioning the rear shock the usable shock angle is less, resulting in a softer ride.



Because of the long travel incorporated into this suspension, pivot shaft movement is increased. To retard the chances of premature wear, lubrication fittings (5) have been provided. A low temperature high adhesion grease is recommended every 300 miles.



It is necessary to remove the lock collar retainer, wave washer, and idler wheel when replacing the rear suspension springs.

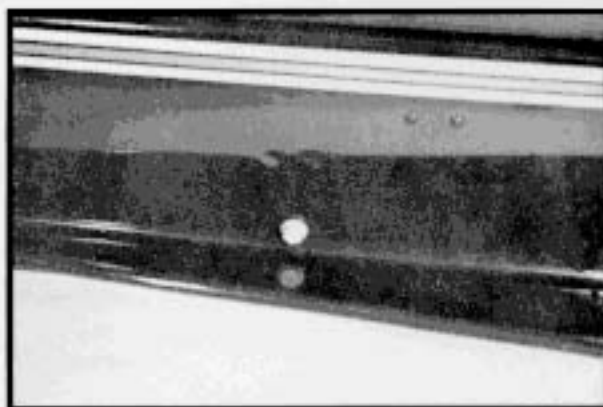
When reassembling, install the spring, idler wheel wave washer, and the lock collar retainer. An inward thrust of approximately 80 pounds must be applied and held on the lock collar when it is tightened. This thrust on the lock collar collapses the wave washer against the inner race of the bearing to keep it from turning.



SUSPENSIONS

Type I Track Removal

1. Remove the front and rear suspension bolts, then turn the machine on its side to remove the suspension.



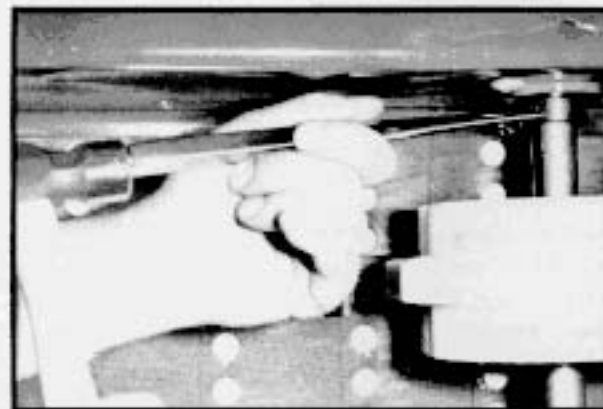
2. Remove muffler. Remove three (3) cap screws that hold flange and bearing in place on the right side of the machine.



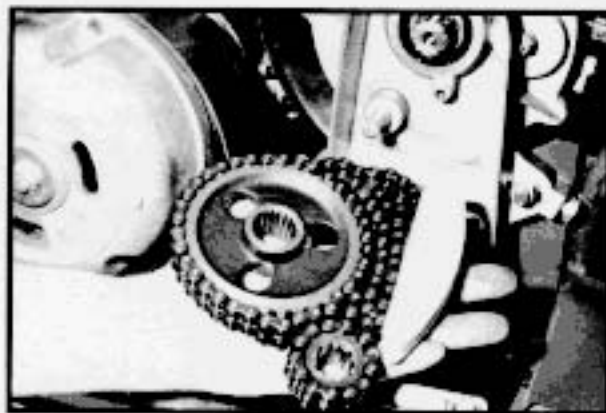
3. With the machine on its side, use an Allen wrench to loosen the set screw on the lock collar.



4. To loosen the lock collar, tap with a hammer and punch. Rotate the lock collar with the normal direction of rotation to loosen and against normal rotation to tighten.

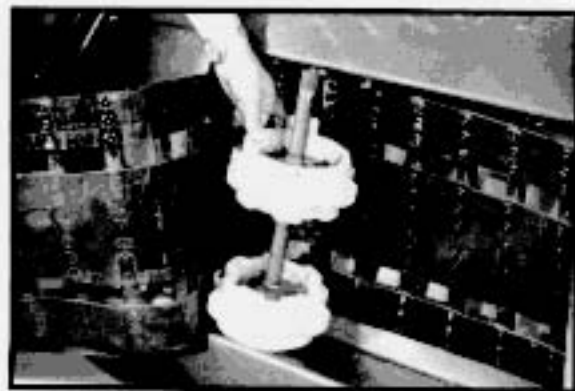


5. Remove the chaincase cover. Remove top and bottom sprockets.

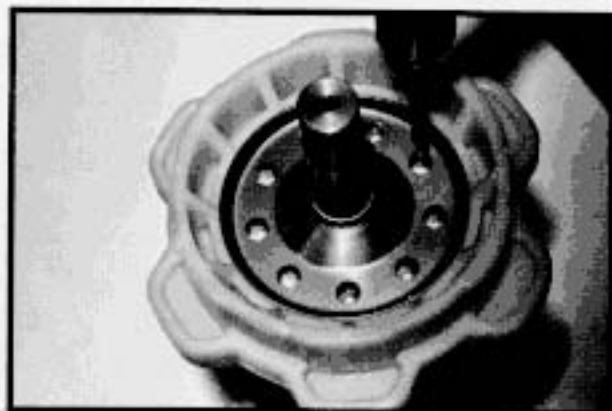


6. The drive shaft can now be removed by first pushing the drive sprocket end from the chaincase, then pull the shaft from the machine.

Reverse procedure for reassembly. When placing suspension into body weldment, bolt front suspension arm to body first, then the rear suspension arm.

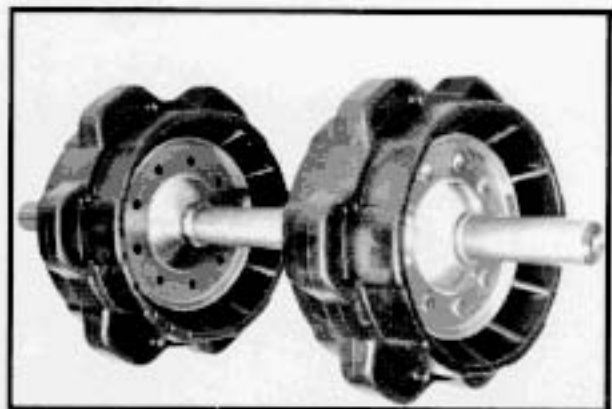


7. Removing sprocket from drive shaft weldment. First use a center punch and center punch rivet head as shown. Then use 1/4" drill and drill to a depth of 1/4". If rivet head does not come off, use hammer and chisel lightly.



8. Replace rivets (9 per sprocket) with bolts (PN 7511967), nuts (PN 7541906) and spacers (PN 5332417).

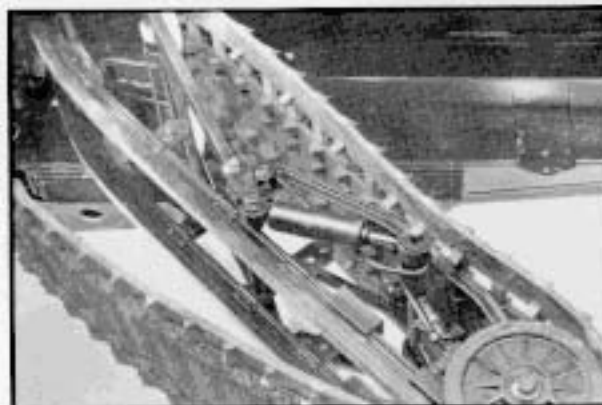
When replacing sprockets on drive shaft weldment, it is very important to index them. On a level surface two of the teeth on each drive sprocket must be resting equally against the surface. Rotate the sprocket assembly, inspecting to insure all teeth are synchronized. If not, it will be necessary to rotate the sprocket in the flanges until tooth alignment is achieved.



SUSPENSIONS

Types II and III Track Removal

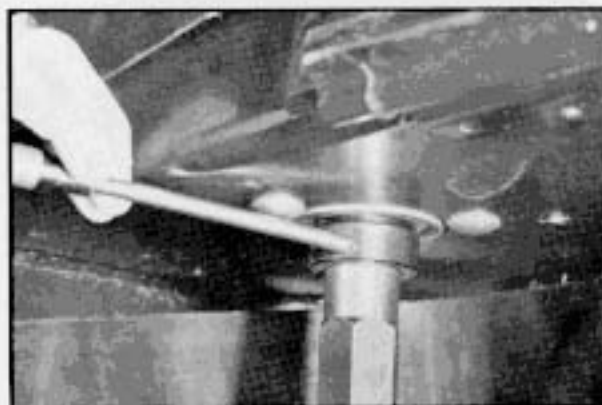
1. Remove the front and rear suspension bolts, then turn the machine on its side to remove the suspension.



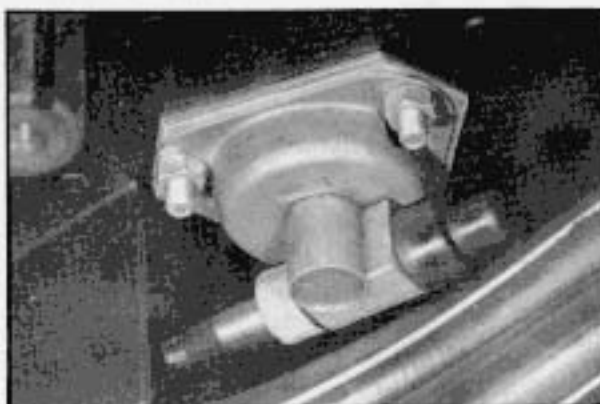
2. Using an Allen wrench, loosen the set screw on the lock collar.



3. Tap the lock collar with a hammer and punch to loosen it. Rotate the lock collar with the normal direction of rotation to loosen and against normal rotation to tighten.



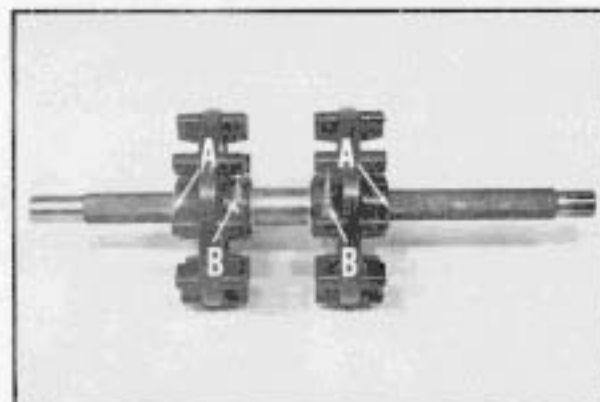
4. Remove the three (3) cap screws that hold the flangette and bearing in place on the left hand side of the machine.



5. Remove the chaincase cover and remove the top and bottom sprockets. The drive shaft can now be removed from the sled by pulling the shaft first from the chaincase and then from the left side of the machine.



To remove the drive sprockets from the drive shaft, remove the outer snap rings (A) and washers. Loosen the spring clamps (B) and pull the sprockets from the shaft. When replacing the sprockets, it is very important to index the sprockets to ensure they are properly synchronized.



SUSPENSION INSTALLATION – ALL MODELS
Install the front suspension bolts. Use the suspension tool (PN 2870354) to compress the rear torque arm to achieve proper alignment.



SUSPENSIONS

Hi-Fax and Rubber Track Clip Replacement

HI-FAX REPLACEMENT

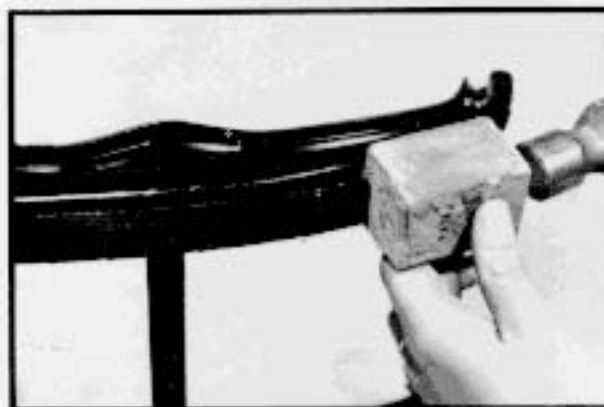
Slide rail material replacement on all Polaris models is similar. When any area of the slide rail material is worn to 1/8", it should be replaced. This will save on other vital components.

NOTE: The slide rail is designed to operate in conditions with adequate snow cover to provide sufficient lubrication. Excessive wear may be due to improper alignment or machine operation on surfaces without snow.

1. Remove the suspension from the machine.
2. Remove the front hi-fax retaining bolt as shown.

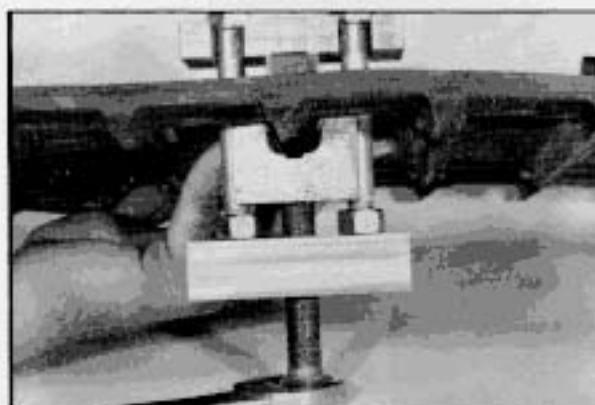


3. Use a block of wood and a hammer to drive the hi-fax rearward from the slide rail.
4. With the hi-fax material at room temperature, reinstall in the reverse procedure.



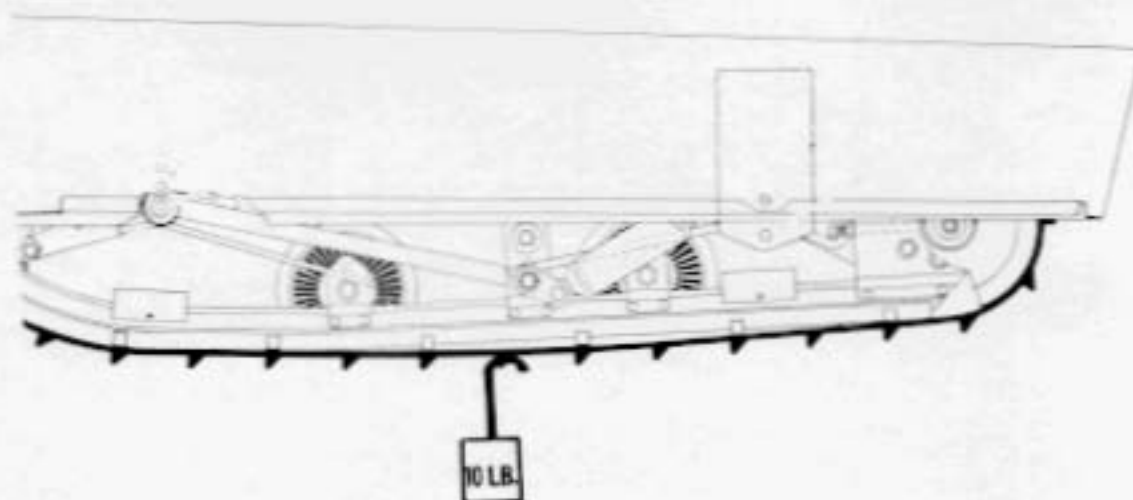
RUBBER TRACK CLIP REPLACEMENT

Install the replacement clip and clipping tool (PN 2870380) as shown. Tighten the drive bolt against the forming die until the clip is formed. The tool may be placed in a vice for ease of operation.



SUSPENSIONS

Track Tension



Track tension on all models and suspension types can be adjusted using the same procedure for all types and models. Check with a 10 pound down load on the track at a point approximately 16" ahead from the center of the rear idler wheel.

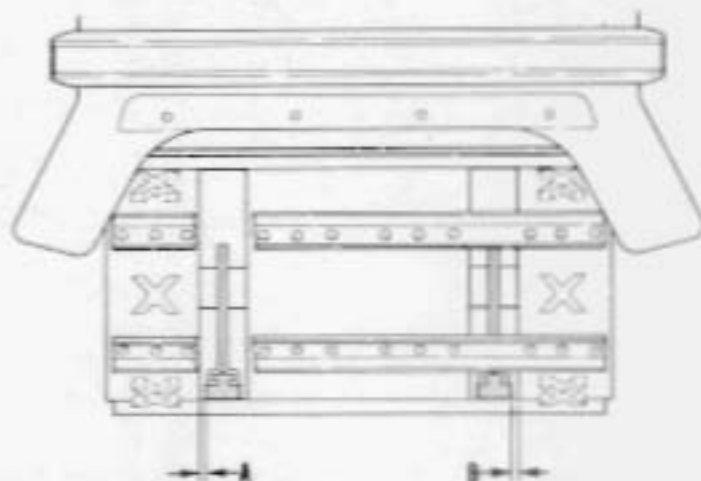
The tolerances are as follows:

<u>TYPE</u>	<u>MODELS</u>	<u>TOLERANCE</u>
Glass Rail	1972-1973 TX, Charger SS, Mustang, Charger, Custom	1/2" between cleat and hi-fax
Stamped Steel Types I, II, and III	All	1/8" - 3/8" between cleat and hi-fax
Extruded Aluminum Type I	1976 Starfire, 1976-1979 TX	1/2" between cleat and hi-fax
Extruded Aluminum Type II	1977-1978 TX-L	1/8" - 1/4" between track clip and hi-fax
Extruded Aluminum Type III	1979 TX-L, Centurion	3/8" - 1/2" between track clip and hi-fax

SUSPENSIONS

Track Alignment — All Models

NOTE: It is necessary to loosen idler shaft nut prior to making adjustments and re-tighten after adjustments are made.



The rear of the machine should be suspended when aligning the track. Track alignment affects track tension. If the track runs to the left and is not properly tensioned, the left side should be tightened. Use the same procedure for the right side until the track is properly aligned and is correctly tensioned. Tolerances at points (A) and (B) should be as close to the same as possible. Refer to Track Tension on page 19 for proper tension specifications.

⚠ CAUTION: WHEN PERFORMING CHECKS OR ADJUSTMENTS, STAY CLEAR OF ALL MOVING PARTS.

5510 107 tunnel stripes

SECTION X

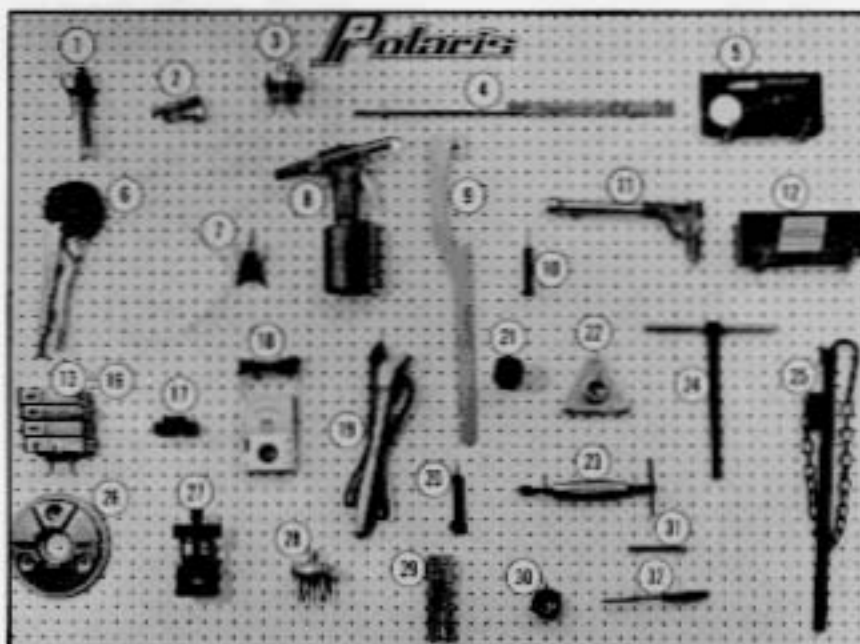
TOOLS/PUBLICATIONS

Contents of this Section

Special Service Tools	1
Publications	2 – 3
Glossary	4 – 7

TOOLS/PUBLICATIONS

Special Service Tools



	Special Service Tools	Part Number
1	Steel Clutch Puller	2870030
2	Aluminum Clutch Puller	2870130
3	Flywheel Puller	2870159
4	Offset Alignment Tool - 9/16"	2870161
5	Timing Kit	2870201
6	Chain Wrench	2870203
7	Piston Ringer	2870205
8	Pneumatic Rivet Gun	2870206
9	Offset Alignment Tool - 5/8"	2870426
10	Feeler Gauge	2870208
11	Pneumatic Rivet Gun Extension	2870262
12	Ammco Cylinder Hone	2870303
13	Cylinder Hone Stone Set Std. Fine (Ammco No. 3952)	2870305
14	Cylinder Hone Stone Set Std. Coarse (Ammco No. 3951)	2870304
15	Cylinder Hone Stone Set O.S. Fine (Ammco No. 3954)	2870307
16	Cylinder Hone Stone Set O.S. Coarse (Ammco No. 3953)	2870306
17	Roller Pin Gauge Block	2870310
18	Multitester	2870335
19	Strap Wrench	2870336
20	CDI Timing Fixture	2870422
21	Clutch Spider Nut Driver	2870338
22	Clutch Spider Tightening Tool	2870341
23	Piston Pin Puller	2870386
24	"T" Handle Clutch Puller	2870353
25	Suspension Compression Tool	2870354
26	Clutch Holding Fixture	2870379
27	IDL Track Clipping Tool	2870380
28	Flywheel Puller - TX-L	2870384
29	Piston Support Block	2870390
30	Jackshaft Alignment Tool	2870399
31	Clutch Roller Pin Centering Punch	2870401
32	Clutch Pin Punch	2870402
33	Replacement Strap for Strap Wrench (Not Pictured)	2870389
34	Replacement Flywheel Puller Bolt (Not Pictured)	3080706

TOOLS/PUBLICATIONS

Publications

SHOP MANUALS

<u>Part Number</u>	<u>Description</u>
9910167	1973 Shop Manual
9910226	1974 Shop Manual
9910262	1974 TX Shop Manual Supplement
9910307	1975 Shop Manual
9910263	1975 TC Shop Manual
9910379	1976 Shop Manual
9910415	1977 Shop Manual
9910513	1978 Shop Manual

OWNERS MANUALS

<u>Part Number</u>	<u>Description</u>
9910130	1972 Owners Manual
9910130	1972 French Owners Manual
9910163	1973 Owners Manual
9910163	1973 French Owners Manual
9910206	1973 TX Starfire Owners Technical Manual
9910224	1974 Owners Manual
9910224	1974 French Owners Manual
9910293	1975 Colt, Colt SS, Electra, TX Owners Manual
9910264	1975 TC Owners Manual
9910344	1975 TX Modification Manual
9910346	1975 French Owners Manual
9910333	1976 Colt, Colt SS, Electra Owners Manual
9910383	1976 TX Owners Manual
9910388	1976 Starfire Technical Owners Manual
9910375	1976 French Owners Manual
9910393	1976 TX French Owners Manual
9910394	1977 Colt, Colt SS, Electra Owners Manual
9910414	1977 TX Owners Manual
9910424	1977 TX-L Owners Manual
9910425	1977 French Owners Manual
9910433	1978 Colt, S/S 340 Owners Manual
9910436	1978 Cobra Owners Manual
9910437	1978 TX Owners Manual
9910438	1978 TX-L Owners Manual
9910442	1978 French Owners Manual
9910547	1979 Gemini, Apollo, Cobra Owners Manual
9910550	1979 TX Owners Manual
9910554	1979 TX-L, Centurion Owners Manual
9910555	1979 French Owners Manual

TECHNICAL SERVICE TRAINING MATERIAL

<u>Part Number</u>	<u>Description</u>
9910431	Polaris Master Service Manual — Contains all Polaris shop manuals from 1974 through 1978 and all effective service and information bulletins
9910432	Service and Information Bulletin Package — Complete set of effective service and information bulletins
9910493	Polaris Master Repair Manual — Includes all 1979 service information and important specifications such as ignition, carburetion, clutch data, etc., from 1972 to present. Its looseleaf design enables additions and updates to be made on a continuing basis
9910514	150-Mile Initial Maintenance Inspection Forms (Package of 25 Forms)
9910515	500-Mile Extended Maintenance Inspection Forms (Package of 25 Forms)
9910516	1200-Mile Extended Maintenance Inspection Forms (Package of 25 Forms)
9910525	1968-78 Revised Specifications Serviceman's Handbook

TOOLS/PUBLICATIONS

Glossary

Air Gap Spark Test:	A good check for ignition voltage and general ignition system condition. Spark should arc 3/8" minimum from end of high tension lead to ground (several testers are available).
Alternator:	Electrical generator producing voltage alternating current.
BTDC:	Before top dead center.
CDI:	Capacitor discharge ignition. Ignition system which stores voltage generated by the stator plate exciter coil in a capacitor or condenser (in CDI box). At the proper moment a voltage, generated by the stator plate pulser coil, closes an electronic switch (thyristor) in the CDI box and allows the voltage in the capacitor to discharge into the primary windings of the ignition coil.
Center Distance:	Distance between center of crankshaft and center of driven clutch shaft.
Chain Pitch:	Distance between chain link pins (No. 35 = 3/8"). Polaris measures chain length in number of pitches; i.e., Colt 250 uses 86 pitch chain.
Clutch Buttons:	Plastic bushings which transmit rotation of the clutch to the movable sheave in the drive and driven clutch.
Clutch Offset:	Drive and driven clutches are offset so that drive belt will stay nearly straight as it moves along the clutch face.
Clutch Weights:	Three levers in the drive clutch which, relative to their weight, profile, and engine RPM, cause the drive clutch to close.
Coil:	A winding of wire around an iron core which has the ability to generate an electrical current when a magnetic current passes through it.
Condenser/Capacitor:	A storage reservoir for electricity, used in both E.T. and CDI systems.
Crankshaft Run-Out:	Run-out or "bend" of crankshaft measured with a dial indicator while crankshaft is supported between centers on V blocks or resting in lower half of crankcase. Measure at various points especially at PTO (.006 maximum run-out is allowable).
Detonation:	The spontaneous ignition of the unburned fuel/air mixture after normal spark ignition. Piston looks "hammered" through, rough appearance around hole. Causes: 1) too high a compression ratio for the fuel octane; 2) low octane fuel; 3) over-advanced ignition timing.
Dial Bore Gauge:	A cylinder measuring instrument which uses a dial indicator. Good for showing taper and out-of-round in the cylinder bore.
E. T. Ignition:	Energy transfer ignition. Magneto type ignition system using an external ignition coil.
Effective Compression Ratio:	Compression ratio measured from after the piston closes the exhaust port.
Electrical Open:	(Open circuit) An electrical circuit which isn't complete. Example: Poor connections or broken wire at hi-lo beam switch. Result: No head lights.

Electrical Short:	(Short circuit) An electrical circuit which is completed before the current reaches the intended component. Example: A bare wire touching the snowmobile chassis under the seat. Result: No taillights or brake lights.
End Seals:	Rubber seals at each end of the crankshaft.
Engagement RPM:	Engine RPM at which the drive clutch engages to make contact with the drive belt.
Foot Pound:	Ft./lb. or lb./ft. A force of one pound at the end of a lever one foot in length, applied in a rotational direction.
g:	Gram. Unit of weight in the metric system.
Head Volume:	Cylinder head capacity in cc, head removed from engine with spark plug installed.
Heat Exchanger:	A device used to transfer heat. The TX-L uses two heat exchangers mounted under the running boards. They, in turn, dissipate engine heat to the atmosphere.
Hi-fax:	The special slide material which fits onto the bottom of the suspension rails.
High Tension Wire:	The heavy insulated wire which carries the high secondary voltage from the coil to the spark plug.
Holed or Vented Piston:	Piston which a hole has formed on the dome. Causes: 1) detonation; 2) pre-ignition.
Ignition Coil:	A type of transformer which increases voltage in the primary windings ($\sim$ 200 V) to a higher voltage in the secondary windings ($\sim$ 14KV - 32KV) through induction. Secondary voltage is high enough to arc the air gap at the spark plug.
Ignition Generating Coil:	(Exciter coil, primary charge coil) Stator plate coil which generates primary ignition voltage. CDI system uses one ignition generating coil. Twin cylinder E.T. ignition systems use two ignition generating coils. Coil is mounted at the top of the stator plate.
Inch Pound:	12 in./lbs. = 1 ft./lb.
Kg/cm ² :	Kilograms per square centimeter.
Keystone Ring:	A piston ring with bevel on upper inside surface.
Kilogram/meter:	A force of one kilogram at the end of a lever one meter in length, applied in a rotational direction.
L Ring:	A wide face piston ring with an "L" shaped cross section. (Leg of "L" goes up when installing on piston.)
Labyrinth Seal:	A pressure-type center seal identified by series of grooves and lands. Polaris engines use this type of seal to separate the cylinders in the crankcase halves.
Lighting Coil:	Large coil mounted at the bottom of the stator plate. Generates voltage for lights, battery charging, etc.
mm:	Millimeter. Unit of length in the metric system. 1mm = .040".

TOOLS/PUBLICATIONS

Glossary

Magnetic Induction:	As a conductor; i.e., coil, is moved through a magnetic field, a voltage will be generated in the windings. This is how mechanical energy in our engines is converted to electrical energy in the lighting coil, ignition generating coils and trigger coil.
No. 1 Cylinder:	Cylinder on flywheel side of engine.
No. 2 Cylinder:	Cylinder on PTO side of engine.
Ohm:	(Ω) The unit of electrical resistance opposing current flow.
Piston Clearance:	Total distance between piston and cylinder wall.
Piston Erosion:	Piston dome melts. Usually occurs at the exhaust port area. Causes: Lean fuel/air mixture, improper spark plug heat range.
Pre-ignition:	A problem in combustion where the fuel/air mixture is ignited before normal spark ignition. Piston looks melted at area of damage. Causes: 1) too hot a spark plug; 2) spark plug not properly torqued; 3) "glowing" piece of head gasket, metal burr, or carbon in the combustion chamber; 4) lean fuel/air mixture.
Primary Circuit:	This circuit is responsible for the voltage build-up in the primary windings of the coil. Parts of this circuit include the exciter coil, points and condenser, wires from the stator plate to the small primary winding in the ignition coil. In the CDI system the parts include the exciter coil, the trigger coil, the wires from stator plate to CDI box and to the low resistance primary windings in the ignition coil.
Primary Clutch:	Drive clutch on engine.
Primary Compression:	Pressure built up in the crankcase of a two stroke engine.
psi.:	Pounds per square inch.
R & R:	Remove and replace.
RFI:	Radio frequency interference. Caused by high voltage from the ignition system. There are special plug caps and spark plugs to help eliminate this problem. (Required in Canada.)
RPM:	Revolutions per minute.
Resistance:	In the mechanical sense, friction or load. In the electrical sense, ohms. Both result in energy conversion to heat.
Right Side & Left Side:	Always referred to based on normal operating position of the driver.
Running Timing:	Ignition timing when fully advanced or at specified RPM.
Secondary Circuit:	This circuit consists of the large secondary coil windings, high tension wire and to ground through the spark plug air gap.
Secondary Clutch:	Driven clutch on chaincase or jackshaft.
Seized Piston:	Galling of the sides of a piston. Usually there is a transfer of aluminum from the piston onto the cylinder wall. Causes: 1) improper lubrication; 2) excessive temperatures; 3) insufficient piston clearance; 4) stuck piston rings.

Spark Plug Reach:	Length of thread portion on spark plug. Polaris uses 3/4" reach plugs.
Static Timing:	Ignition timing when engine is at zero RPM.
Stator Plate:	The plate mounted under the flywheel supporting the primary ignition components and lighting coil.
Surge Tank:	The fill tank in the liquid cooling system.
TDC:	Top dead center. Piston's most outward travel from crankshaft.
Transfer:	The movement of fuel/air from the crankcase to the combustion chamber in a two stroke engine.
Trigger Coil:	(Pulser coil) Generates the voltage for triggering (closing) the thyristor and timing the spark in CDI systems. Small coil mounted at the top of the stator plate next to the ignition generating coil.
ACV:	Alternating current voltage.
DCV:	Direct current voltage.
V Regulator:	Voltage regulator. Maintains maximum lighting coil output @ $\sim$ 14.5 ACV as engine RPM increases.
Venturi:	An area of air constriction. A venturi is used in carburetors to increase velocity pressure (speed up air flow) which decreases static pressure (lowers pressure in venturi to below atmospheric pressure) causing fuel to be pushed through jets, etc., and into the venturi to be mixed with air and form a combustible air/fuel mixture.
Volt:	The unit of measure for electrical pressure or electromotive force. Measured by a Voltmeter in parallel with the circuit.
Watt:	The unit of electrical power. Watts = Amperes x Volts.