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Millimeter/Decimal/Inch Conversion Table

MM	Decimal Equiv.	Inches	+ or −	MM	Decimal Equiv.	Inches	+ or −
1	0.0394	1/32	+	53	2.0866	2 3/32	−
2	0.0787	3/32	−	54	2.1260	2 1/8	+
3	0.1181	1/8	−	55	2.1654	2 5/32	+
4	0.1575	5/32	+	56	2.2047	2 7/32	−
5	0.1969	3/16	+	57	2.2441	2 1/4	−
6	0.2362	1/4	−	58	2.2835	2 9/32	+
7	0.2756	9/32	−	59	2.3228	2 5/16	+
8	0.3150	5/16	+	60	2.3622	2 3/8	−
9	0.3543	11/32	+	61	2.4016	2 13/32	−
10	0.3937	13/32	−	62	2.4409	2 7/16	+
11	0.4331	7/16	−	63	2.4803	2 15/32	+
12	0.4724	15/32	+	64	2.5197	2 17/32	−
13	0.5118	1/2	+	65	2.5591	2 9/16	−
14	0.5512	9/16	−	66	2.5984	2 19/32	+
15	0.5906	19/32	−	67	2.6378	2 5/8	+
16	0.6299	5/8	+	68	2.6772	2 11/16	−
17	0.6693	21/32	+	69	2.7165	2 23/32	−
18	0.7087	23/32	−	70	2.7559	2 3/4	+
19	0.7480	3/4	−	71	2.7953	2 25/32	+
20	0.7874	25/32	+	72	2.8346	2 27/32	−
21	0.8268	13/16	+	73	2.8740	2 7/8	−
22	0.8661	7/8	−	74	2.9134	2 29/32	+
23	0.9055	29/32	−	75	2.9528	2 15/16	+
24	0.9449	15/16	+	76	2.9921	3.0	−
25	0.9843	31/32	+	77	3.0315	3 1/32	+
26	1.0236	1 1/32	−	78	3.0709	3 1/16	+
27	1.0630	1 1/16	+	79	3.1102	3 1/8	−
28	1.1024	1 3/32	+	80	3.1496	3 5/32	−
29	1.1417	1 5/32	−	81	3.1890	3 3/16	+
30	1.1811	1 3/16	−	82	3.2283	3 7/32	+
31	1.2205	1 7/32	+	83	3.2677	3 9/32	−
32	1.2598	1 1/4	+	84	3.3071	3 5/16	−
33	1.2992	1 5/16	−	85	3.3465	3 11/32	+
34	1.3386	1 11/32	−	86	3.3858	3 3/8	+
35	1.3780	1 3/8	+	87	3.4252	3 7/16	−
36	1.4173	1 13/32	+	88	3.4646	3 15/32	−
37	1.4567	1 15/32	−	89	3.5039	3 1/2	+
38	1.4961	1 1/2	−	90	3.5433	3 17/32	+
39	1.5354	1 17/32	+	91	3.5827	3 19/32	−
40	1.5748	1 9/16	+	92	3.6220	3 5/8	−
41	1.6142	1 5/8	−	93	3.6614	3 21/32	+
42	1.6535	1 21/32	−	94	3.7008	3 11/16	+
43	1.6929	1 11/16	+	95	3.7402	3 3/4	−
44	1.7323	1 23/32	+	96	3.7795	3 25/32	−
45	1.7717	1 25/32	−	97	3.8189	3 13/16	+
46	1.8110	1 13/16	−	98	3.8583	3 27/32	+
47	1.8504	1 27/32	+	99	3.8976	3 29/32	−
48	1.8898	1 7/8	+	100	3.9370	3 15/16	−
49	1.9291	1 15/16	−	101	3.9764	3 31/32	+
50	1.9685	1 31/32	−	102	4.0157	4 1/32	−
51	2.0079	2.0	+	103	4.0551	4 1/16	−
52	2.0472	2 1/16	−	104	4.0945	4 3/32	+

+ = Decimal equivalent is greater than the fraction.
− = Decimal equivalent is less than the fraction.

Millimeter/Decimal/Inch Conversion Table

MM	Decimal Equiv.	Inches	+ or −	MM	Decimal Equiv.	Inches	+ or −
105	4.1339	4 1/8	+	157	6.1811	6 3/16	−
106	4.1732	4 3/16	−	158	6.2205	6 7/32	+
107	4.2126	4 7/32	−	159	6.2598	6 1/4	+
108	4.2520	4 1/4	+	160	6.2992	6 5/16	−
109	4.2913	4 9/32	+	161	6.3386	6 11/32	−
110	4.3307	4 11/32	−	162	6.3779	6 3/8	+
111	4.3701	4 3/8	−	163	6.4173	6 13/32	+
112	4.4094	4 13/32	+	164	6.4567	6 15/32	−
113	4.4488	4 7/16	+	165	6.4961	6 1/2	−
114	4.4882	4 1/2	−	166	6.5354	6 17/32	+
115	4.5276	4 17/32	−	167	6.5748	6 9/16	+
116	4.5669	4 9/16	+	168	6.6142	6 5/8	−
117	4.6063	4 19/32	+	169	6.6535	6 21/32	−
118	4.6457	4 21/32	−	170	6.6929	6 11/16	+
119	4.6850	4 11/16	−	171	6.7323	6 23/32	+
120	4.7244	4 23/32	+	172	6.7716	6 25/32	−
121	4.7638	4 3/4	+	173	6.8110	6 13/16	−
122	4.8031	4 13/16	−	174	6.8504	6 27/32	+
123	4.8425	4 27/32	−	175	6.8898	6 7/8	+
124	4.8819	4 7/8	+	176	6.9291	6 15/16	−
125	4.9213	4 29/32	+	177	6.9685	6 31/32	−
126	4.9606	4 31/32	−	178	7.0079	7.0	+
127	5.0000	5.0		179	7.0472	7 1/16	−
128	5.0394	5 1/32	+	180	7.0866	7 3/32	−
129	5.0787	5 3/32	−	181	7.1260	7 1/8	+
130	5.1181	5 1/8	−	182	7.1653	7 5/32	+
131	5.1575	5 5/32	+	183	7.2047	7 7/32	−
132	5.1968	5 3/16	+	184	7.2441	7 1/4	−
133	5.2362	5 1/4	−	185	7.2835	7 9/32	+
134	5.2756	5 9/32	−	186	7.3228	7 5/16	+
135	5.3150	5 5/16	+	187	7.3622	7 3/8	−
136	5.3543	5 11/32	+	188	7.4016	7 13/32	−
137	5.3937	5 13/32	−	189	7.4409	7 7/16	+
138	5.4331	5 7/16	−	190	7.4803	7 15/32	+
139	5.4724	5 15/32	+	191	7.5197	7 17/32	−
140	5.5118	5 1/2	+	192	7.5590	7 9/16	−
141	5.5512	5 9/16	−	193	7.5984	7 19/32	+
142	5.5905	5 19/32	−	194	7.6378	7 5/8	+
143	5.6299	5 5/8	+	195	7.6772	7 11/16	−
144	5.6693	5 21/32	+	196	7.7165	7 23/32	−
145	5.7087	5 23/32	−	197	7.7559	7 3/4	+
146	5.7480	5 3/4	−	198	7.7953	7 25/32	+
147	5.7874	5 25/32	+	199	7.8346	7 27/32	−
148	5.8268	5 13/16	+	200	7.8740	7 7/8	−
149	5.8661	5 7/8	−	201	7.9134	7 29/32	+
150	5.9055	5 29/32	−	202	7.9527	7 15/16	+
151	5.9449	5 15/16	+	203	7.9921	8.0	−
152	5.9842	5 31/32	+	204	8.0315	8 1/32	+
153	6.0236	6 1/32	−	205	8.0709	8 1/16	+
154	6.0630	6 1/16	+	206	8.1102	8 1/8	−
155	6.1024	6 3/32	+	207	8.1496	8 5/32	−
156	6.1417	6 5/32	−	208	8.1890	8 3/16	+

+ = Decimal equivalent is greater than the fraction.
− = Decimal equivalent is less than the fraction.

Millimeter/Decimal/Inch Conversion Table

MM	Decimal Equiv.	Inches	+ or −	MM	Decimal Equiv.	Inches	+ or −
209	8.2283	8 7/32	+	255	10.0393	10 1/32	+
210	8.2677	8 9/32	−	256	10.0787	10 3/32	−
211	8.3071	8 5/16	−	257	10.1181	10 1/8	−
212	8.3464	8 11/32	+	258	10.1575	10 5/32	+
213	8.3858	8 3/8	+	259	10.1968	10 3/16	+
214	8.4252	8 7/16	−	260	10.2362	10 1/4	−
215	8.4646	8 15/32	−	261	10.2756	10 9/32	−
216	8.5039	8 1/2	+	262	10.3149	10 5/16	+
217	8.5433	8 17/32	+	263	10.3543	10 11/32	+
218	8.5827	8 19/32	−	264	10.3937	10 13/32	−
219	8.6220	8 5/8	−	265	10.4330	10 7/16	−
220	8.6614	8 21/32	+	266	10.4724	10 15/32	+
221	8.7008	8 11/16	+	267	10.5118	10 1/2	+
222	8.7401	8 3/4	−	268	10.5512	10 9/16	−
223	8.7795	8 25/32	−	269	10.5905	10 19/32	−
224	8.8189	8 13/16	+	270	10.6299	10 5/8	+
225	8.8583	8 27/32	+	271	10.6693	10 21/32	+
226	8.8976	8 29/32	−	272	10.7086	10 23/32	−
227	8.9370	8 15/16	−	273	10.7480	10 3/4	−
228	8.9764	8 31/32	+	274	10.7874	10 25/32	+
229	9.0157	9 1/32	−	275	10.8268	10 13/16	+
230	9.0551	9 1/16	−	276	10.8661	10 7/8	−
231	9.0945	9 3/32	+	277	10.9055	10 29/32	−
232	9.1338	9 1/8	+	278	10.9449	10 15/16	+
233	9.1732	9 3/16	−	279	10.9842	10 31/32	+
234	9.2126	9 7/32	−	280	11.0236	11 1/32	−
235	9.2520	9 1/4	+	281	11.0630	11 1/16	+
236	9.2913	9 9/32	+	282	11.1023	11 3/32	+
237	9.3307	9 11/32	−	283	11.1417	11 5/32	−
238	9.3701	9 3/8	−	284	11.1811	11 3/16	−
239	9.4094	9 13/32	+	285	11.2204	11 7/32	+
240	9.4488	9 7/16	+	286	11.2598	11 1/4	+
241	9.4882	9 1/2	−	287	11.2992	11 5/16	−
242	9.5275	9 17/32	−	288	11.3386	11 11/32	−
243	9.5669	9 9/16	+	289	11.3779	11 3/8	+
244	9.6063	9 19/32	+	290	11.4173	11 13/32	+
245	9.6457	9 21/32	−	291	11.4567	11 15/32	−
246	9.6850	9 11/16	−	292	11.4960	11 1/2	−
247	9.7244	9 23/32	+	293	11.5354	11 17/32	+
248	9.7638	9 3/4	+	294	11.5748	11 9/16	+
249	9.8031	9 13/16	−	295	11.6142	11 5/8	−
250	9.8425	9 27/32	−	296	11.6535	11 21/32	−
251	9.8819	9 7/8	+	297	11.6929	11 11/16	+
252	9.9212	9 29/32	+	298	11.7323	11 23/32	+
253	9.9606	9 31/32	−	299	11.7716	11 25/32	−
254	10.0000	10.0		300	11.8110	11 13/16	−

+ = Decimal equivalent is greater than the fraction.
− = Decimal equivalent is less than the fraction.

Conversions

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 = Kilograms in Meters
Number of Kilogram Meters x 7.235 = Foot Pounds

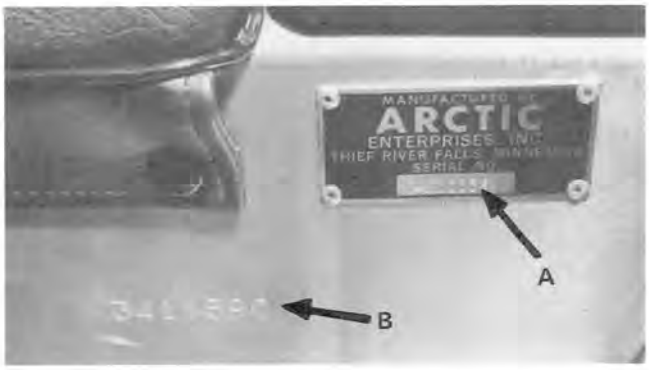
IDENTIFICATION

The 1974 Arctic Cat Panther has 3 identifying numbers; chassis model and serial number, a body serial number, and an engine model and serial number.

Chassis Model and Serial Number — The identification plate, Fig. I-1 (A), is located on the right front side of the body tunnel. All internal records are maintained by the chassis serial number.

Body Serial Number — The number is stamped into the body tunnel, Fig. I-1 (B), near the chassis serial number plate. This number is of great importance because it can be used to trace and identify a stolen snowmobile.

Fig. I-1

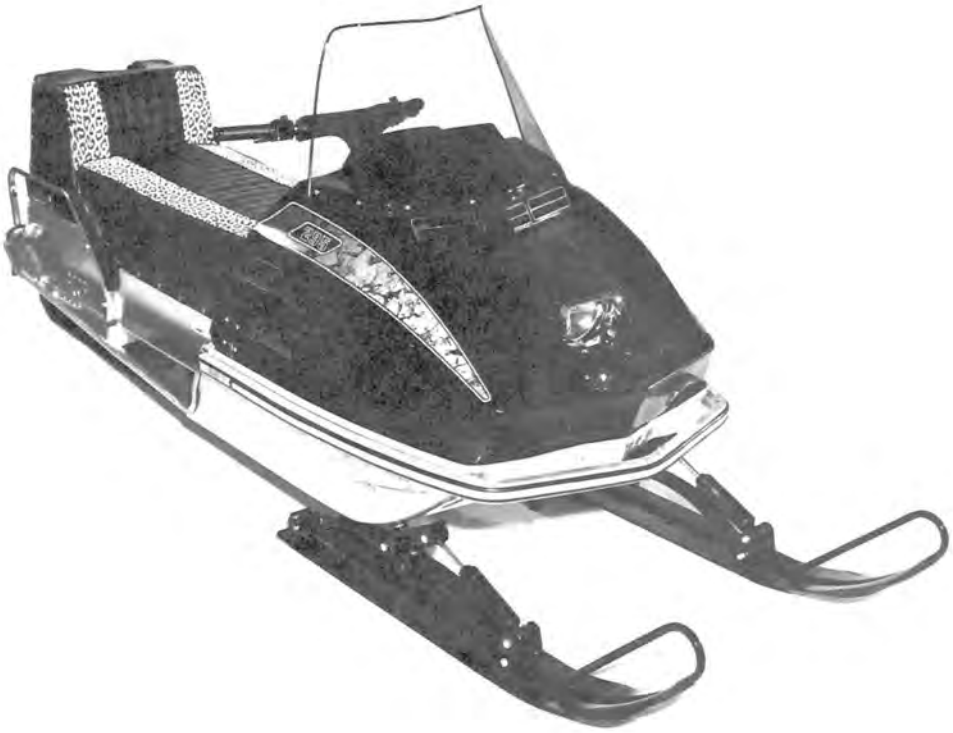


Engine Model and Serial Number — The engine model and serial numbers are stamped into the engine name plate, which is located to the left of the engine wiring connector.

Fig. I-2

The chassis, body and engine numbers are required to properly complete warranty claims and to ensure that correct replacement parts are obtained. Under no circumstances is warranty to be allowed if the chassis model and serial number plate has been tampered with or removed. When a new engine is installed, notify the distributor and the factory of the new engine model and serial number.

Fig. I-3



SPECIFICATIONS

Engine:

Engine (Sachs Wankel)	KM 24
Rotor Chamber Volume	294cc/17.940 Cu. In.
Compression Ratio	8.5:1
Horsepower @ 6000 RPM	23 (DIN)
Cooling	Air Cooled by Fan
Ignition	Bosch Magneto Generator
Pole Shoe Gap	0.315 - 0.472 In.
*Timing (Align Timing Marks)	16° BTDC
Voltage/Wattage	12 Volt 100 Watt
Point Gap	0.014 - 0.018 In.
Spark Plug	Bosch W240T1
Plug Gap	0.020 In.
Carburetor	Walbro WRC1
Carburetor Type	Diaphram w/Throttle, Choke Butterfly
Low Speed Mixture Needle	1 Turn Open
High Speed Mixture Needle	1-1/8 Turns Open
Fuel Pump Suction Height	19.6 In. (Approximate)
Fuel Mixture Ratio	25:1

*Align scribe mark on the inside sheave of auxiliary rope pulley with the "M" mark in the fan housing.

Drive Clutch:

Model (0225-014)	Arctic
Spring Color	White
Spring Tension	25 Lbs. Per Inch
Engagement Speed	2700 RPM (Approximate)
Drive Belt Width	1-1/4 In. $\pm$ 1/16 In.
Outside Drive Belt Circumference	43-1/4 In. $\pm$ 1/4 In.

Driven Pulley:

Model (0226-004)	Arctic
Spring Color	Black
Cam Angle	30°

Drive/Driven Pulley:

Center to Center Distance	10.866 In.
Offset	0.320 In.

Chassis:

Chassis Material	Aluminum
Belly Pan Material	Aluminum
Hood Material	Fiberglass
Console Material	Polycarbonate (Lexan)
Length w/Skis	104 In.
Height w/Windshield	43 In.
Width Overall	34 In.
Track Width	17 In.
Track Length on Ground	36 In.
Fuel Tank Capacity	6-1/4 U.S. Gallons
Chaincase Capacity	8 Ounces
Curb Weight - Approximate	425 Pounds
Dry Weight - Approximate	380 Pounds

BOLT TORQUE CHART

Bolt Grade		SAE-2	SAE-5	SAE-8	Socket or Wrench	
Minimum Tensile Strength		64,000 PSI	105,000 PSI	150,000 PSI		
Grade Marking on Bolt						
U.S. Standard						
Bolt Diameter	U.S. Dec. Equiv.	Ft./Lbs. Torque ± 10%			Bolt Head	Nut
1/4	0.250	6	10	14	7/16	7/16
5/16	0.3125	13	20	30	1/2	1/2
3/8	0.375	23	35	50	9/16	9/16
7/16	0.4375	35	55	80	5/8	11/16
1/2	0.500	55	85	120	3/4	3/4
9/16	0.5625	75	130	175	13/16	7/8
5/8	0.625	105	170	240	15/16	15/16
3/4	0.750	185	300	425	1-1/8	1-1/8
7/8	0.875	160	445	685	1-5/16	1-5/16
1	1.000	250	670	1030	1-1/2	1-1/2

Note: Multiply foot pound value by 12 to obtain inch pound torque value.

CHAINCASE LUBRICANT

The lubricant used in the chaincase is to be Arctic Chainlube. Lubricant level must be at the point of overflowing in the check plug hole, Fig. I-4. Capacity of the chaincase is 8 ounces.

To drain the lubricant from the chaincase, place rags in the belly pan, remove chaincase cover and allow lubricant to drain into the rags. Lubricant is to be changed at the end of every snow season or after 100 hours of operation.

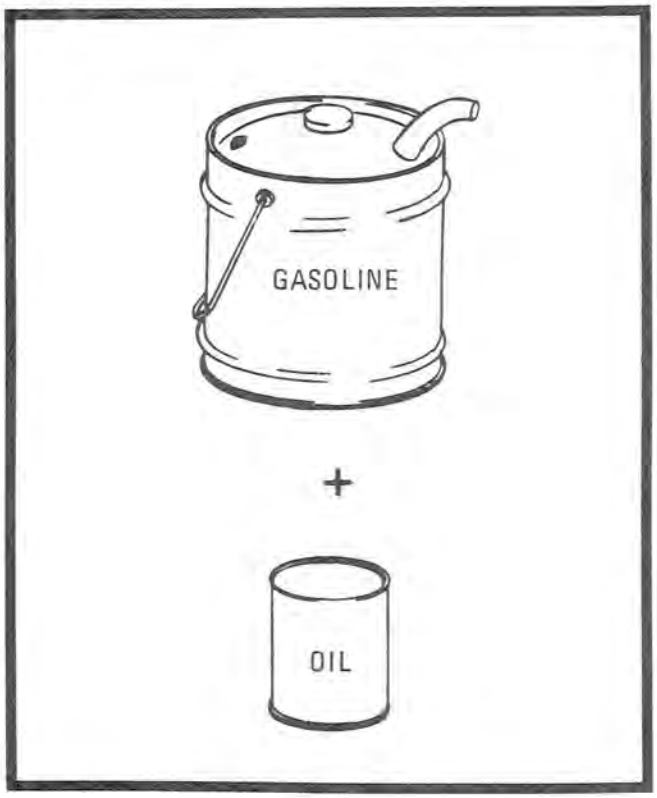
Fig. I-4

FUEL MIXING

Equipment Necessary: Gas Can, Arctic Cat Rotolube - Improved Formula or SAE 30 HD Shell Rotella T and Gasoline (90 Octane Minimum)

The correct fuel mixture ratio is 6 U.S. gallons of regular gasoline (90 octane minimum) plus 1 U.S. quart of Arctic Cat Rotolube - Improved Formula or equivalent (SAE 30 HD Shell Rotella T), Fig. I-5. This mixture is equivalent to a 25:1 ratio.

Fig. I-5



WARNING

When mixing gas/oil or when the snowmobile fuel tank is filled, do so outdoors. Do not smoke; keep away from camp fires if fueling in a camping or rest area. The engine must not be running when fueling to prevent the possibility of a fire or an explosion, Fig. I-6.

Instruct the customer that the Wankel engine requires the lubricating oil to be mixed with gasoline for lubrication and internal engine cooling. Do not use outboard motor oil, non-detergent oil or standard two-cycle oil in the Wankel engine.

Fig. I-6

Note: Gasoline and oil must be premixed in a clean container. Impress upon the customer that no attempt should be made to mix gasoline and oil in the snowmobile fuel tank. Gasoline and oil will not mix well in extremely cold temperatures. Therefore, it is recommended that the oil be at room temperature (+70°F.) when mixing.

1. Fill a clean container (gas can) with 3 U.S. gallons of gasoline (90 octane minimum). Add the recommended amount of oil (1 U.S. quart of Arctic Cat Rotolube - Improved Formula) and shake the mixture vigorously.

2. Add the remainder of gasoline (3 U.S. gallons) and again, shake the mixture vigorously.

3. Using a funnel with a fine mesh screen to prevent the entry of dirt or other foreign particles, fill the snowmobile fuel tank. Wipe up any fuel that may have spilled. DO NOT fill when the engine is hot.

Note: When using a gasoline/oil mixture that has been setting for some time (settling of oil may have occurred), the mixture is to be shaken vigorously before the snowmobile fuel tank is filled.

KNOW THE CONTROLS

Prior to starting the engine, the operation and function of every control, Figs. I-7 and I-8, must be understood. Even if you have driven and serviced an Arctic Cat before, read this material to familiarize yourself with the location of controls and operational characteristics so that you can better explain them to the customer. KNOW THE CONTROLS.

1. Headlight Dimmer Switch (A) – Depress the headlight dimmer switch to obtain the desired low or high beam position. When the switch is in a depressed position, headlight is at low beam. When switch is in a released position, headlight is at high beam.

2. Brake Control (B) – When depressed, braking action will retard or stop the forward movement.

3. Ignition Switch (C) – Three positions (OFF, ON and START). OFF position used to shut engine off. Rotate key to ON position to start recoil equipped engine. START position used to crank engine equipped with an electric starter.

Note: Ignition key must be in the OFF position before it can be rotated to the ON or START position. Key will not rotate from ON to START.

4. Light Switch (D) – Move switch to ON position to activate headlight and taillights. Lights work only while engine is running.

5. Recoil Starter Handle (E) – After ignition key is rotated to the ON position, pull recoil starter handle to start the engine.

6. Choke (F) – To start a cold engine, close choke by pulling fully outward. When engine starts, regulate choke as necessary. A warm engine will require little or no choking.

7. Throttle Control (G) – Used to operate engine at various speeds. Speed is directly proportionate to throttle lever movement. When throttle is released, it automatically returns carburetor throttle arm to idle position. If carburetor throttle or throttle linkage freezes or jams in an open position, throttle safety switch will automatically shut engine off when handle-mounted throttle control is released.

8. Emergency Shut-Off Switch (H) – To be used if an emergency occurs and the engine must be shut off quickly. Depress the emergency shut-off switch to obtain the ON or OFF position. When the switch is in a depressed position, the engine will shut off and will not start. When the switch is in a released position, the engine can be started. The emergency shut-off switch works independently of the ignition switch.

Fig. I-7

9. Full Tank Gauge Cap (I) – Indicates full level. Keep vent hole in the top of the cap unobstructed.

Fig. I-8

Note: Tachometer, speedometer, heat gauges and an electric starter are optional equipment for the 1974 Wankel Panther. Additional accessories are listed in the 1974 Arctic Cat Snowmobile Accessory Brochure.

SAFETY CHECKS

Before the snowmobile is test driven and returned to the customer after service work is completed, the following critical items are to be checked so that the operating systems are working properly.

1. Check the cooling system. Cooling fan must not have damaged blades and the finned parts of the engine must not be obstructed.

2. Ensure the carburetor and exhaust systems are securely fastened.

3. Check the operation of the throttle control. The throttle control is to depress without excessive effort and return freely to the idle position.

4. Check the brake control. Brake is to fully engage when brake control is depressed approximately 3/4-inch and disengage freely when released. If more than 3/4-inch brake control travel is necessary to fully engage the brake, an adjustment of the brake is necessary.

5. Check the steering; skis must turn freely. If difficulty is encountered, repair before operating. Check the ski alignment; skis must be parallel or have 1/4-inch (max.) "toe in".

6. Ensure the headlight, brakelight and taillights are working properly.

7. Check the operation of the throttle safety switch. Prop the back end of the snowmobile up on a Quik Jack and start the engine. Check the operation of the throttle safety switch by opening the carburetor throttle approximately 1/8-inch. DO NOT compress throttle control on the steering handle. When engine starts to cut out, release the carburetor throttle. Engine cutout indicates throttle safety switch is operating properly. If cutout does not occur, an adjustment is necessary.

STARTING/STOPPING INSTRUCTIONS

WARNING

Never allow anyone to stand in front of the snowmobile at any time, especially when starting.

1. Ensure all Safety Checks are carried out.

2. Depress the emergency shut-off switch so that it is in a released position. This released position allows the engine to be started.

3. Pull the choke fully outward and hold the throttle control approximately 1/4-inch open. If the carburetor is equipped with a primer, pull once or twice to prime the engine.

Note: If the engine is warm, choking and priming is not normally necessary.

4. Rotate the ignition key to the ON position.

5. Pull recoil starter handle until pawls engage; then give a short quick pull.

CAUTION

DO NOT pull the recoil rope to its limit or drop the rope from an extended recoil position. Failure to comply may result in damage to the recoil starter.

6. When the engine starts, regulate the choke as necessary. Allow a cold engine to idle for approximately 2 minutes before operating.

7. Stopping – To stop (shut-off) the engine under normal conditions, rotate the ignition key to the OFF position after coming to a complete stop.

8. Emergency Stopping – If the engine must be shut off quickly because of an emergency, depress the emergency shut-off switch. Engine will shut off.

NOTES

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SETTING UP INSTRUCTIONS

Install Skid Frame

Equipment Necessary: 1/2-Inch Wrench, 1/2-Inch Socket, Cardboard, Four 3/8 x 1-1/4-Inch Bolts, Four 3/8-Inch Lockwashers, 9/16-Inch Socket and Torque Wrench

1. Remove all mounting hardware that secures the snowmobile to the pallet, using a 1/2-inch wrench and socket. Lift the snowmobile off the pallet and set on the floor.

2. Tip the snowmobile onto its side and use a piece of cardboard to protect against scratching.

3. Move the front mounting arm of the skid frame into position with the front mounting holes in the tunnel. Slide lockwasher onto bolt and secure skid frame to tunnel, using a 9/16-inch socket. DO NOT TIGHTEN BOLT – THREAD IN ONLY HALF WAY, Fig. IA-1.

Note: To aid in centering the front arm with the mounting holes in the tunnel, position the skid frame at a 45° angle to the bottom of the tunnel.

Fig. IA-1

4. Push skid frame, track and tunnel together and tip over on opposite side. Use a piece of cardboard to protect against scratching.

5. Secure the front mounting arm, following the directions given in step 3.

6. Move the rear mounting arm of the skid frame into position with the rear mounting holes in the tunnel. Slide lockwasher onto bolt and secure skid frame to tunnel, using a 9/16-inch socket. DO NOT TIGHTEN BOLT – THREAD IN ONLY HALF WAY, Fig. IA-2.

Note: The rear mounting arm of the skid frame may not line up with the holes in the tunnel. To obtain mounting arm and mounting hole alignment, drive the rear mounting arm in the proper direction until alignment is obtained; a rubber hammer is to be used.

Fig. IA-2

7. Tip snowmobile over on opposite side and use a piece of cardboard to protect against scratching.

8. Secure the rear mounting arm to the tunnel with a bolt and lockwasher, using a 9/16-inch socket. Tip snowmobile upright.

9. Tighten all skid frame mounting bolts to 35 ft. lbs. torque, using a 9/16-inch socket and torque wrench.

Install Skis

Equipment Necessary: Shock Absorbers, Long Sleeves, Plastic Bushings, Two 7/16 x 3-1/4-Inch Bolts, Four 7/16-Inch Locknuts, Low-Temperature Grease, 5/8-Inch Wrench, 5/8-Inch Socket, Torque Wrench, Cardboard, Two 3/8 x 4-1/4-Inch Bolts, Two 3/8-Inch Locknuts, 9/16-Inch Socket, Short Sleeves and Two 7/16 x 2-1/4-Inch Bolts

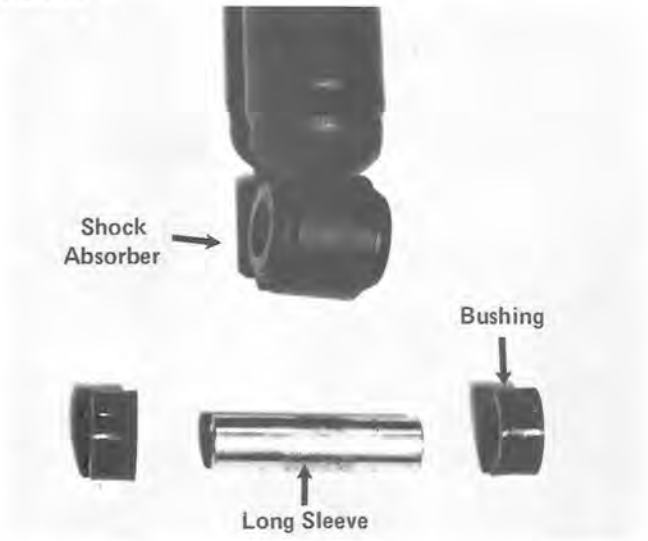
1. Locate the 2 skis and shock absorbers.

SETTING UP INSTRUCTIONS

2. Slide a long sleeve through the stationary end of the shock absorber and place a plastic bushing on each end of the long sleeve, Fig. IA-3.

Note: Flat end surface of the plastic bushing is to contact the shock absorber and radiused end surface to contact the shock mounting bracket.

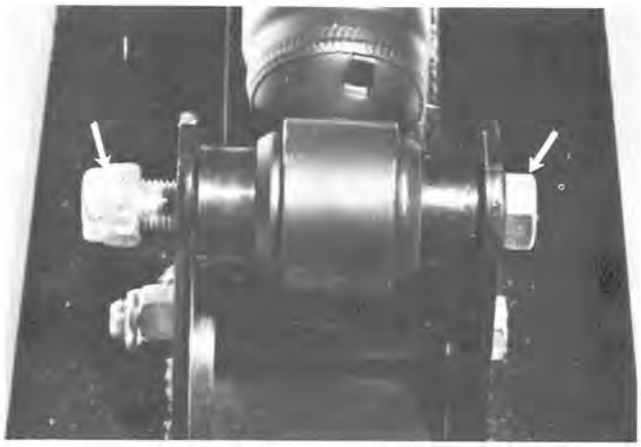
Fig. IA-3



3. Place shock assembly into position between the shock mounting bracket and secure in place with bolt and locknut, Fig. IA-4. Bolt is to be started from the outside. Tighten the bolt to 50 ft. lbs. torque, using a 5/8-inch wrench, 5/8-inch socket and torque wrench.

Note: Apply low-temperature grease (Texaco 2346 EP) on the non-threaded portion of the bolt to prevent the possibility of binding or corrosion.

Fig. IA-4



4. Install remaining shock absorber on ski, following the directions given in steps 2 and 3.

5. Tip the snowmobile onto its side and use a piece of cardboard to protect against scratching.

6. Place ski assembly into position on spindle and secure in place with a bolt, Fig. IA-5. Threaded hole in the ski saddle is to be to the inside, and therefore, the bolt, Fig. IA-5, must be started from the outside. Tighten the bolt to 30 ft. lbs. torque, using a 9/16-inch socket and torque wrench. Thread locknut onto bolt and tighten to 30 ft. lbs. torque, using a 9/16-inch socket and torque wrench.

Note: Apply low-temperature grease (Texaco 2346 EP) on the non-threaded portion of the bolt to prevent the possibility of binding or corrosion.

7. Slide a short sleeve through the movable end of the shock absorber and position the end between the spindle mounting bracket. Secure in place with bolt and locknut, making sure the bolt is started from the outside, Fig. IA-5. Tighten the bolt to 50 ft. lbs. torque, using a 9/16-inch socket and torque wrench.

Note: Apply low-temperature grease (Texaco 2346 EP) on the non-threaded portion of the bolt to prevent the possibility of binding or corrosion.

Fig. IA-5

8. Tip the snowmobile on the opposite side, using a piece of cardboard to protect against scratching. Install remaining ski assembly to the ski spindle, following the directions given in steps 6 and 7.

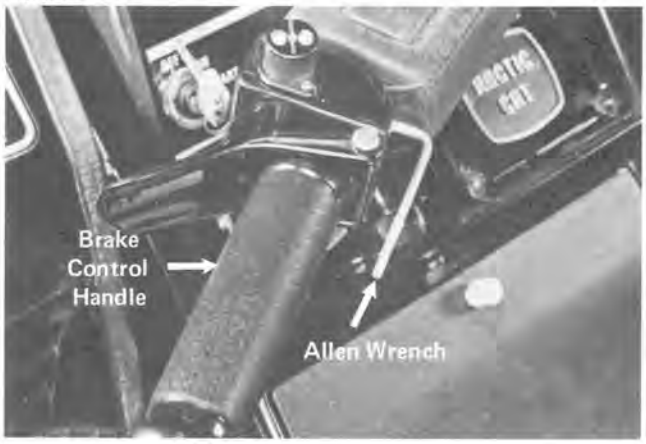
9. Position the snowmobile upright.

Align Skis

Equipment Necessary: Allen Wrench (As Supplied), 9/16-Inch Wrench, 9/16-Inch Socket, 8-Inch Extension, Tape Measure and Torque Wrench

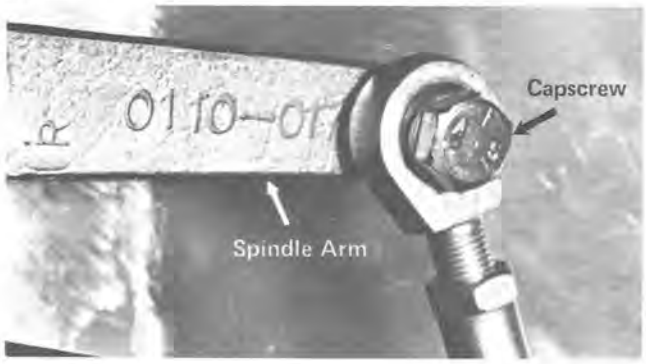
1. Position the brake control handle properly and secure in place with the Allen wrench supplied with each snowmobile, Fig. IA-6.

Fig. IA-6



2. Open the hood and remove the capscrew and locknut that secures the tie rod end to the spindle arm, using a 9/16-inch wrench, 9/16-inch socket and an 8-inch extension, Fig. IA-7. Separate tie rod end from the spindle arm. Perform this step on opposite tie rod.

Fig. IA-7

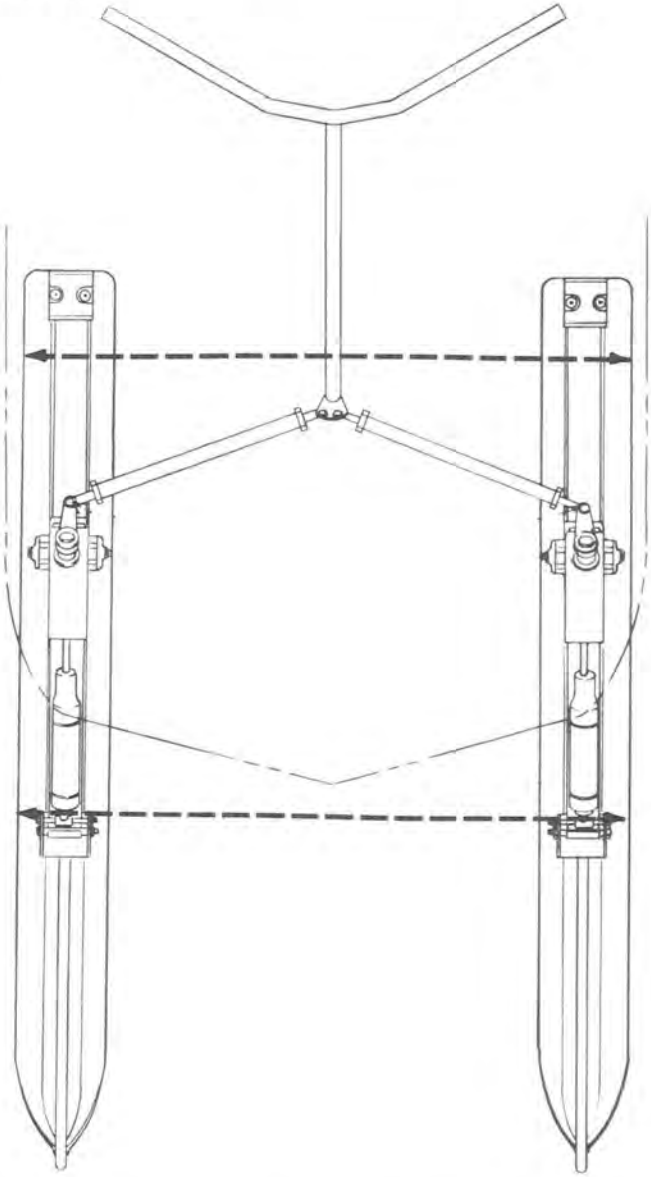


3. Position the skis straight forward and establish a parallel relationship, Fig. IA-8.

4. Measure the distance between the skis from the outside edge of the ski itself, making sure the measurement is taken behind the front spring mount and ahead of the rear spring mount. Skis are to be parallel or have a slight "toe-in" (0.25 inch maximum), Fig. IA-8.

5. Position the handlebars straight forward in relation to the skis.

Fig. IA-8



6. Rotate the tie rod end until the mounting hole lines up with the hole in the spindle arm. Secure the tie rod end to the spindle arm with

a capscrew and locknut, using a 9/16-inch wrench, 9/16-inch socket, 8-inch extension and torque wrench. Tighten capscrew and locknut to 35 ft. lbs. torque.

WARNING

To ensure the utmost safety of the operator, all nuts, bolts and tie rod ends must be tightened securely and without noticeable damage. If bolts and nuts are not tight or if a component is damaged, serious injury to the operator and/or passenger may occur.

7. Perform step 6 on remaining tie rod end and spindle arm.

Install Windshield

Equipment Necessary: 8 Rubber Well-Nuts, Windshield, Trim, 8 Phillips Screws and Phillips Screwdriver

1. Remove the protective covering and plastic bag from the windshield. Properly dispose of the protective covering and plastic bag.

2. Separate the windshield and trim by removing the 2 twist-lock ties.

3. Push the rubber well-nuts into the mounting holes in the hood.

Fig. IA-9

4. Position the windshield and trim in place and retain with 2 phillips screws on each side of center, Fig. IA-9. Thread the screws 3/4 of the way in, using a phillips screwdriver. DO NOT TIGHTEN SCREWS.

5. Work from side to side and install the remaining phillips screws, which will position the windshield and trim on the hood. DO NOT TIGHTEN SCREWS.

6. When all screws are installed and the windshield is in place, tighten all screws, working from the center to the outside, Fig. IA-9.

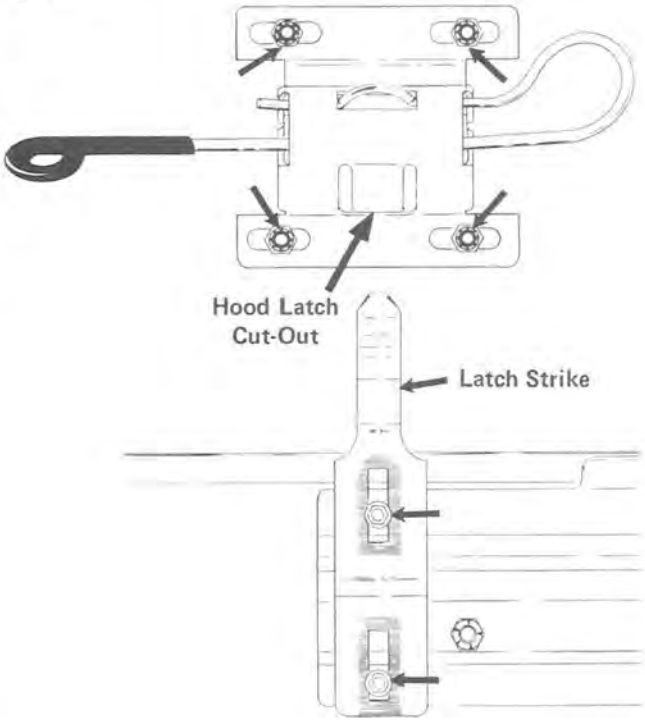
Check Hood Latches

Equipment Necessary: Phillips Screwdriver, 11/32-Inch Wrench and 3/8-Inch Wrench

1. Open the hood and allow the hood to rest on the latch strike.

2. Examine the alignment between the latch strike and the cut-out in the bottom of the hood latch. The latch strike is to be positioned directly over the cut-out in the bottom of the hood latch, Fig. IA-10. If proper alignment is evident, proceed to step 4. If proper alignment is not evident, proceed to step 3.

Fig. IA-10



3. Loosen the 4 locknuts and phillips machine screws that secure the hood latch, using a phillips screwdriver and 11/32-inch wrench, Fig. IA-10. Taking into consideration the alignment obtained in step 2, slide the hood latch into proper position as described in step 2. When proper alignment is obtained, tighten the phillips machine screws and locknuts, using a phillips screwdriver and 11/32-inch wrench. Proceed to step 4.

4. Close the hood. Push down on each side and determine how much "free-play" exists between the hood latch and latch strike. Virtually no "free-play" is to be evident. If "free-play" is evident, proceed to step 5. If "free-play" is not evident, proceed to step 6.

5. Loosen the 2 carriage bolts and locknuts that secure the latch strike, using a 3/8-inch wrench, Fig. IA-10. If the hood had "free-play" when checked as described in step 4, move the latch strike down. If hood was too tight and was difficult to open, move the latch strike up. The most advantageous adjustment is when the hood is tightly secured (no "free-play") and opening/closing can be performed without undue binding of the hood latch and latch strike. When proper adjustment is obtained, tighten the 2 carriage bolts and locknuts, using a 3/8-inch wrench, Fig. IA-10.

6. Close the hood and check again for proper operation.

Check Chain Alignment, Tension and Lubricate

Equipment Necessary: Straight Edge, Screwdriver, Arctic Chainlube and Low-Temperature Grease (Texaco 2346 EP)

1. Open the hood and remove the 3 thumb screws and washers that secure the chaincase cover. Remove the chaincase cover and gasket from the backing plate.

Note: Exercise care when removing the chaincase cover so as not to damage the gasket.

2. Check the chain alignment in relation to the sprockets by placing a 12-inch straight edge on the bottom and top sprocket. No visible gap is to exist between the surface of the straight edge and face of the sprockets. If alignment is correct, proceed to step 3. If alignment is not correct, adjust sprockets accordingly (see Section V, Drive System).

Fig. IA-11

3. Check the chain tension (see Section V – Drive System, Chain Tension).

4. If chain tension is correct, proceed to step 6. If tension is not correct, proceed to step 5.

5. Adjust chain tension (see Section V – Drive System, Chain Tension Adjustment).

6. Remove the rubber filler plug and the check plug from the chaincase cover, using a screwdriver.

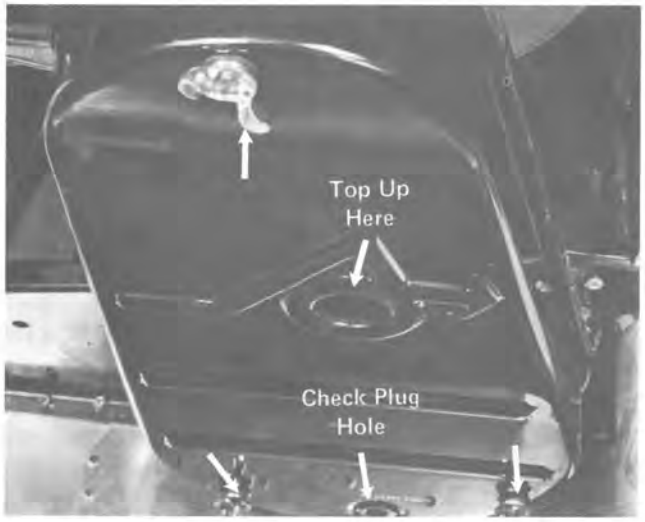
7. Install the chaincase gasket and cover to the chaincase backing plate. Secure in place with the 3 thumb screws and washers, Fig. IA-12.

CAUTION

Make sure the chaincase gasket is installed evenly so that a good seal exists between the chaincase cover and backing plate. If after being filled with chainlube and a leak develops, mechanical damage will occur resulting in component failure when operated.

8. Using a funnel, fill the chaincase with 8 ounces of Arctic Chainlube, which is located in the toolbox. Lubricant level is to be at the point of overflowing in the check plug hole, Fig. IA-12. If not at the point of overflowing, carefully top up with Arctic Chainlube. Wipe any chainlube that may have spilled.

Fig. IA-12



CAUTION

Make sure the chaincase cover and gasket are sealing properly against the chaincase backing plate. Chainlube will leak if an improper seal exists and damage will occur resulting in component failure when operated.

9. Install the rubber filler plug and the check plug with a short screwdriver. Check plug must be adequately tightened to prevent chainlube leakage. Lubricate the eccentric bearing with low-temperature grease (Texaco 2346 EP or equivalent).

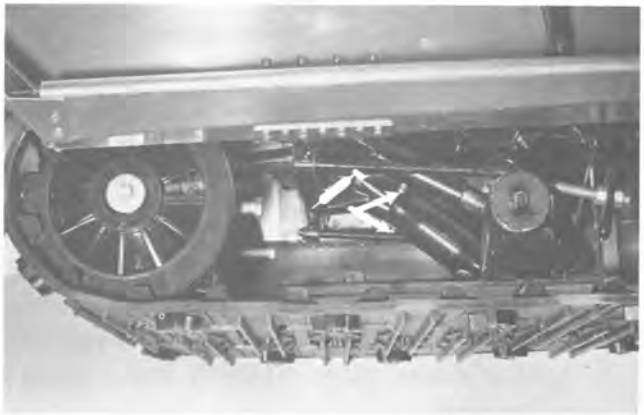
Adjust Suspension and Track

Equipment Necessary: Low-Temperature Grease (Texaco 2346 EP) and Grease Gun

1. Lubricate the rear suspension arms with low-temperature grease (Texaco 2346 EP or equivalent), Fig. IA-13.

Note: Due to the grease fitting position, a flexible hose grease gun must be used.

Fig. IA-13



2. Adjust the suspension (see Section VI – Suspension, Suspension Adjustment), Fig. IA-14.

Fig. IA-14

3. Adjust the track tension (see Section VI – Suspension, Track Tension), Fig. IA-15.

Fig. IA-15

4. Adjust the track alignment (see Section VI – Suspension, Track Alignment), Fig. IA-16.

Fig. IA-16

SETTING UP INSTRUCTIONS

Adjust Choke, Brake and Throttle Controls

Equipment Necessary: Screwdriver, 1/2-Inch Socket, 1/2-Inch Wrench and Pliers

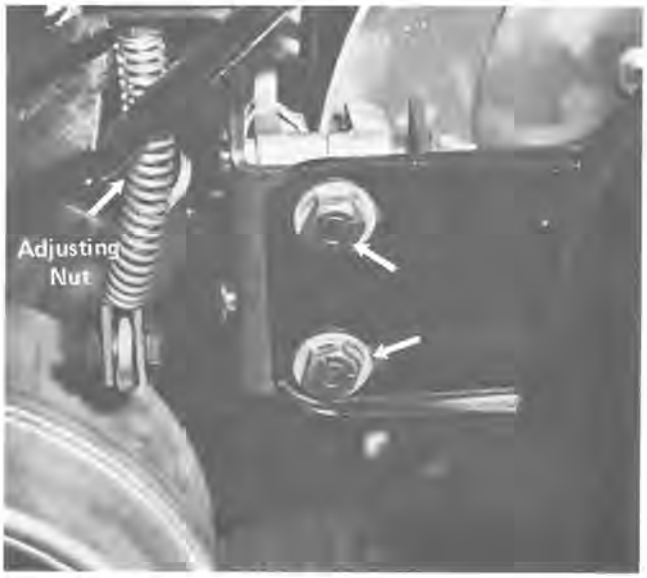
1. Loosen the choke cable retaining screw, using a screwdriver. Move carburetor-mounted choke arm fully forward (toward engine) and hold in this position.

2. Position the front edge of the console-mounted choke knob 1/8-inch from the console. When knob is in proper position, tighten choke cable retaining screw, using a screwdriver.

Note: The choke cable is adjusted with 1/8-inch between the front edge of the choke knob and console to ensure carburetor choke is fully forward when choke is not used (pushed in).

3. Loosen the 2 brake mounting bolts, using a 1/2-inch socket, Fig. IA-17. Squeeze the handle-mounted brake lever, which will center the brake on the driven pulley contact surface; tighten the 2 brake mounting bolts, using a 1/2-inch socket.

Fig. IA-17



4. Squeeze the brake lever. When brake is fully engaged, there is to be from 1/4 – 1/2-inch between the front of the brake lever and the brake lever stop. If specification (1/4 – 1/2-inch) is not obtained, rotate the brake adjusting nut, Fig. IA-17, clockwise or counterclockwise, using a 1/2-inch wrench, until the specified adjustment is obtained.

5. Loosen the throttle cable retaining screw, using a screwdriver, which will allow the carburetor throttle arm to contact the idle screw. Pull all slack from the throttle cable plus an additional 1/16-inch to preload the throttle safety switch spring, using a pliers.

6. Hold throttle cable in place and tighten the throttle cable retaining screw, using a screwdriver.

Note: The desired adjustment is when the handle-mounted throttle lever lightly contacts the handle grip and the carburetor throttle plate is fully open.

Time the Engine (Ignition)

Equipment Necessary: 13/16-Inch Spark Plug Socket, Feeler Gauge and 13 mm Wrench

It is recommended that the ignition timing be checked at time of "Set-Up" and each time the engine is serviced. Incorrect ignition timing has a negative effect on engine performance and can be accountable for lighting problems.

1. Disconnect the high tension wire from the spark plug. Remove the spark plug and washer, using a 13/16-inch spark plug socket and check for proper type and heat range (Bosch W260 T1). Set the air gap at 0.020 inch, using a feeler gauge.

2. Install the spark plug and washer. Tighten to 16-18 ft. lbs. torque, using a 13/16-inch spark plug socket and torque wrench. Connect the high tension wire to the spark plug.

3. Remove the 2 bolts, lockwashers and flat washers that secure the fuel pump to the recoil housing, using a 13 mm wrench, Fig. IA-18. Remove fuel pump and lay in bottom of belly pan.

4. Remove the 4 screws and lockwashers that secure the recoil assembly to the fan housing, using a short screwdriver. Just before the last screw is removed, grasp the recoil assembly with hand, remove the screw and allow recoil to retract against the recoil handle mounting bracket.

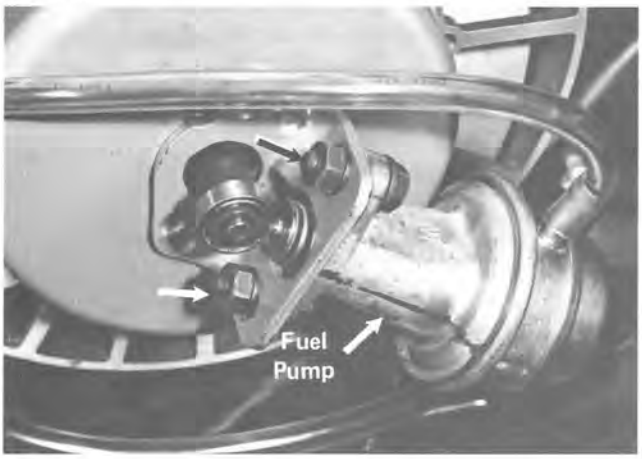
5. Check the timing, using a timing buzzer (see Section IV – Electrical System, Ignition Timing).

SETTING UP INSTRUCTIONS

6. When timing is correct, secure the recoil assembly to the fan housing with 4 screws, using a screwdriver socket and torque wrench. Tighten the screws to 4.3-5.8 ft. lbs. torque.

7. Install the fuel pump on the recoil housing and secure with 2 bolts, lockwashers and flat washers, using a 13 mm wrench, Fig. IA-18.

Fig. IA-18



Adjust Carburetor

Equipment Necessary: Fuel Mixture (25:1) and 1/4-Inch Wrench

1. Check the fuel and impulse lines to ensure that the lines are properly fitted.

2. Rotate the low speed mixture needle clockwise until it just closes, Fig. IA-19. DO NOT USE SCREWDRIVER.

CAUTION

Close the low speed mixture needle finger tight only; forcing may cause damage to the needle and seat.

3. Rotate the low speed mixture needle 1 turn counterclockwise, Fig. IA-19.

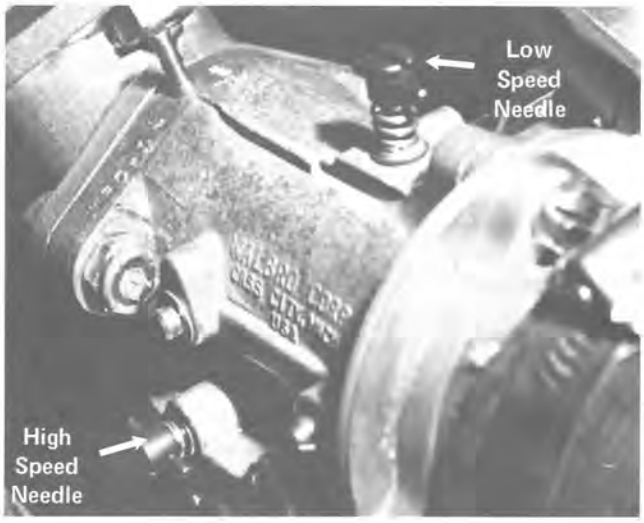
4. Rotate the high speed mixture needle clockwise until it just closes, Fig. IA-19. DO NOT USE SCREWDRIVER.

CAUTION

Close the high speed mixture needle finger tight only; forcing may cause damage to the needle and seat.

5. Rotate the high speed mixture needle 1-1/8 turn counterclockwise, Fig. IA-19.

Fig. IA-19



6. Fill fuel tank with gasoline and oil mixture and start the engine. Rotate the idle speed screw clockwise to increase idle RPM and counterclockwise to decrease idle RPM, using a 1/4-inch wrench, Fig. IA-20. Set idle at a speed just prior to drive clutch engagement.

Note: There is a definite relationship between the low speed mixture and idle adjustment; neither is to be changed without checking the other for proper operation.

Fig. IA-20

7. Shut the engine off.

8. When the idle speed is changed, the operation of the throttle safety switch is influenced. Adjust the throttle safety switch (see Section IA — General, Adjust Choke, Brake and Throttle Controls, steps 5 and 6, page IA-8).

SETTING UP INSTRUCTIONS

Check Switch Operation

Equipment Necessary: No Special Requirement

1. Turn ignition switch ON and start the engine.

2. Move light switch to the ON position — headlight and taillight is to illuminate. Squeeze the brake lever — brakelight is to illuminate.

3. Depress the headlight dimmer switch — light is to be on low beam when switch is in depressed position and high beam when in a released position.

4. Depress the emergency shut-off switch. Engine is to stop if switch is operating properly. Depress switch and restart the engine.

5. With the engine running, rotate the ignition key to OFF to ensure the ignition switch will shut engine off.

Adjust Headlight

Equipment Necessary: See Section IV — Electrical System, Headlight Adjustment

1. The headlight is to be adjusted for vertical and horizontal aim of the high/low beam (see Section IV — Electrical System, Headlight Adjustment).

BREAK-IN

Strict adherence to the following break-in procedure will contribute to optimum performance and the longevity of the Wankel engine.

Inform the customer that for the first 5 operating hours (approximately 1 tank of fuel) the engine is not to be subjected to heavy load conditions or full throttle operation. During initial break-in or after the engine is overhauled, a maximum of 1/2 throttle is recommended. Operating speeds are to be varied, not constantly maintained for a prolonged time.

Note: During break-in or after the engine is overhauled, the only fuel mixture to use and recommend to the customer is a 25:1 ratio.

After the customer operates the snowmobile for 5 hours (break-in), ask that the snowmobile be returned to the dealership for a 5 hour maintenance checkup. The cost of the checkup is to be assumed by the customer. The checkup will allow you, the Arctic dealer, to talk with the customer and determine if a serious problem exists. If the customer is dissatisfied, the problem may be easier to remedy at this time rather than to allow the snowmobile to be operated until a possible failure occurs. If a defective part is found at the 5 hour checkup and it is a warrantable component, submit a warranty claim form through normal Arctic channels (refer to the Warranty Policy and Procedure Booklet). The customer is not to pay for a warrantable component.

Arctic recommends that specific items be checked at the 5 hour checkup. The specific items are critical adjustments, operating characteristics, and safety features (see 5 Hour Checkup, page IA-11).

FIVE HOUR CHECK UP

Arctic recommends that specific items be checked after the customer operates the snowmobile in accordance with the break-in procedure described in the Operator's Manual. The cost of the checkup is to be assumed by the customer. This 5 hour checkup will allow you, the Arctic dealer, to talk with the customer and determine if a problem exists. If the customer is dissatisfied, the problem may be easier to remedy at this time rather than to allow the snowmobile to be operated until a possible failure occurs. If a defective part is found and it is a warrantable component, submit a warranty claim form through normal Arctic channels (refer to the Warranty Policy and Procedure Booklet). The customer is not to pay for a warrantable component.

The following items are to be checked:

1. Ask the customer if he is satisfied with the performance and general operating characteristics of the snowmobile.

2. Check the operation of the ignition switch, headlight and taillight switch, brakelight switch, and the emergency shut-off switch. Make sure the headlight dimmer switch will move the beam of light from high to low beam.

3. Test drive the snowmobile so that you can be certain all systems are operating properly. Test the brake for proper braking characteristics.

4. Remove the spark plug and examine the center electrode and air gap. Determine the operating temperature of the engine by the color of the center electrode.

5. Check the fuel line, return line, the inline fuel filter and the fuel tank filter.

6. Check the carburetor for proper adjustment.

7. Check the choke and throttle control. Cables must not be bent, frayed or kinked.

8. Check the ski alignment and examine the skags for excessive wear.

9. Check the drive chain tension.

10. Check the condition of the drive belt.

11. Check the drive clutch; rollers must be free to rotate.

12. Check center to center distance between the drive clutch and driven pulley.

13. Check the offset between the drive clutch and the driven pulley.

14. Check lubricant level in the chaincase.

15. Lubricate the eccentric bearing.

16. Check track tension and alignment.

17. Lubricate rear suspension arms.

18. Check ignition timing.

19. Tighten all nuts and bolts.

20. Tighten the intake, exhaust and recoil hardware to the proper torque value.

21. Make sure all safety decals are in place.

22. Test drive the snowmobile to ensure proper operation.

23. Clean the snowmobile prior to customer pick-up or delivery.

NOTES

TABLE OF CONTENTS

THEORY OF OPERATION

The snowmobile is equipped with a Sachs Wankel rotary engine, manufactured for Arctic Enterprises, Inc. by Fichtel and Sachs AG, Schweinfurt, West Germany.

The engine is built with a fan to provide cool air currents to the external housings. Internal cooling and lubrication is accomplished by means of the premixed gasoline and oil. The fuel mixture combined with air at the carburetor is routed through the rotor for internal cooling and lubrication.

Basic components of the rotary engine are the rotor with apex and side seals, rotor housing, mainshaft and end covers. The rotor is mounted on the mainshaft and is precisely timed by the rotor gear and the pinion on the Magneto end cover. This gearing accounts for the 3:1 ratio from the mainshaft to the rotor; rotor speed is 1/3 that of the mainshaft.

While the rotor turns on the mainshaft, three rotor chamber areas are constantly being increased and decreased in volume. The apex seals of the rotor are always in slight contact with the inside surface of the rotor housing. As the rotor turns, five phases of operation are always occurring simultaneously; the phases are intake, compression, ignition, expansion (power) and exhaust.

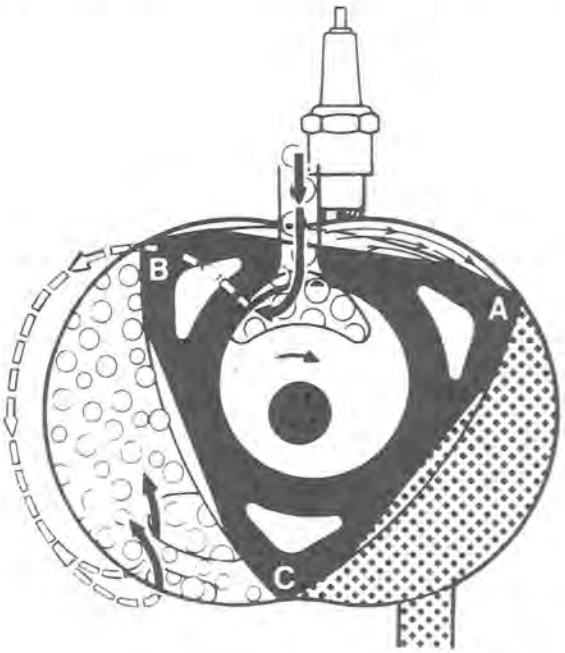
Even though gasoline and oil must be mixed together, the Wankel rotary engine has the operating characteristics of the conventional four-stroke cycle reciprocating piston engine. The four-stroke cycle operating phases are intake, compression, expansion (power) and exhaust and also are an occurrence of the rotary engine. Three firing impulses occur during one revolution of the rotor, but since the mainshaft rotates three times faster than the rotor, one power impulse results for every rotation of the mainshaft.

To compensate for any uneven centrifugal forces caused by the rotor and mainshaft, a counterweight is installed on the Magneto and PTO end of the mainshaft. These counterweights allow the engine to be balanced, permitting high mainshaft RPM and vibration-free operation.

Operating Phases

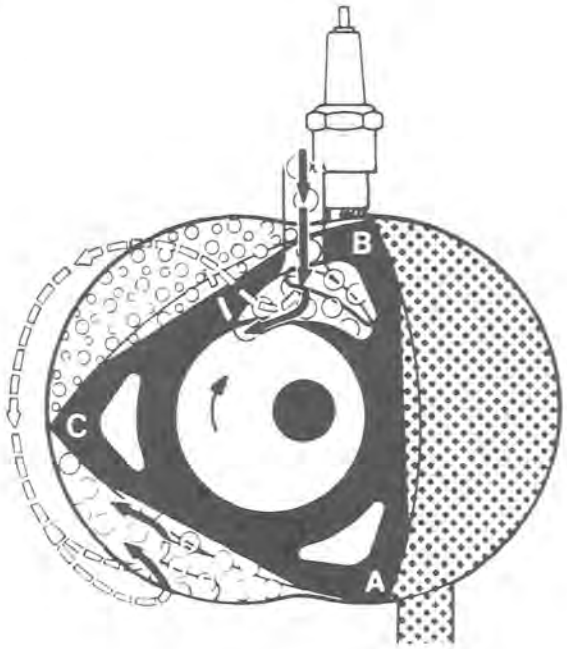
Intake (Fig. II-1) — When the rotor is positioned as illustrated, the chamber between points "B" and "C" is completing maximum intake of fuel. Ignition has taken place between points "A" and "B".

Fig. II-1



Compression (Fig. II-2) — As the fuel is compressed in the chamber between points "B" and "C", the chamber between "A" and "B" starts the exhaust phase.

Fig. II-2

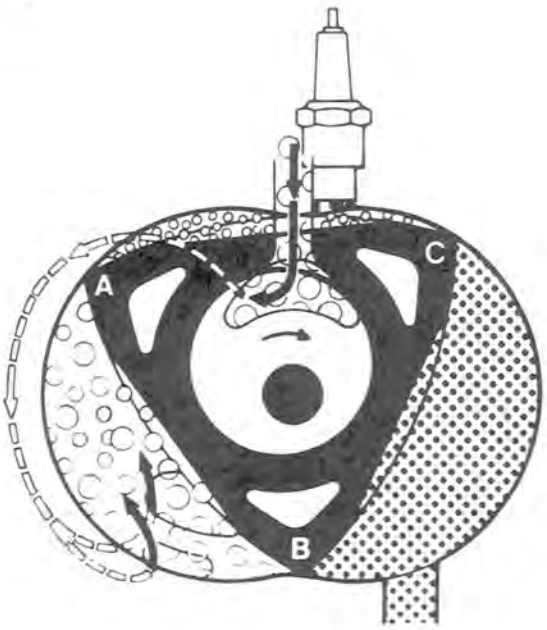


Ignition (Fig. II-3) — When the rotor is positioned 10° BTDC, which is the firing moment (ignition),

THEORY OF OPERATION

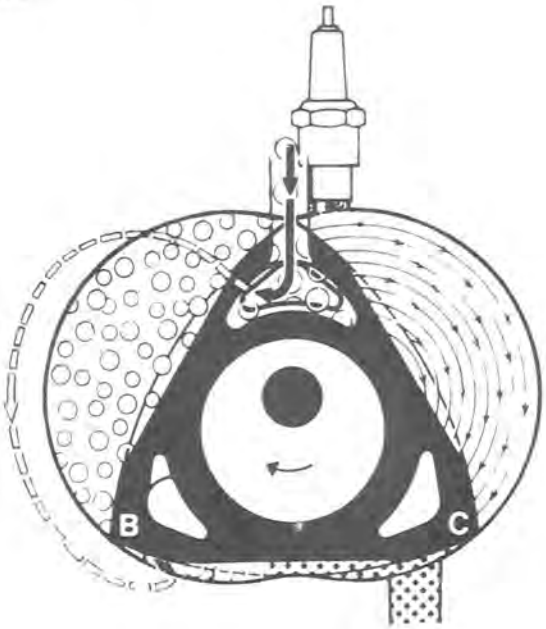
intake of the fuel mixture is occurring through the ports between points "A" and "B". The chamber volume between points "A" and "C" is at minimum capacity. The chamber between points "B" and "C" is just starting to form the exhaust phase.

Fig. II-3



Exhaust (Fig. II-4) – The rotor side between points "B" and "C" is just completing the exhaust phase; exhaust and intake ports are both open. A new intake phase is also commensing.

Fig. II-4



The combination of four-stroke cycle operation, a power impulse every revolution of the mainshaft and high mainshaft RPM results in maximum power delivery. Properly serviced and adjusted, the Wankel rotary engine will be smooth running and virtually vibration free.

BEFORE TROUBLE SHOOTING THE ENGINE

Check Spark Plug

Equipment Necessary: 13/16-Inch Spark Plug Socket and Torque Wrench

1. Disconnect the high tension wire from the spark plug and remove the spark plug, using a 13/16-inch spark plug socket.

2. Examine the condition of the spark plug insulator, center electrode and side electrode. Set the air gap at 0.020 inch. If the spark plug is fouled, install a new plug.

3. Connect the high tension wire to the spark plug and hold the spark plug base on the rotor housing. Pull the recoil starter . . . spark is to jump the air gap (0.020 inch) with a bright blue flame front, Fig. II-5.

Fig. II-5

4. Install the spark plug, using a 13/16-inch spark plug socket and torque wrench. Tighten the spark plug to 16 - 18 ft. lbs. torque, using a torque wrench.

5. If bright blue flame front is not evident even after a new plug is used, continue testing the electrical system (see Check Breaker Points, page II-4).

Check Breaker Points

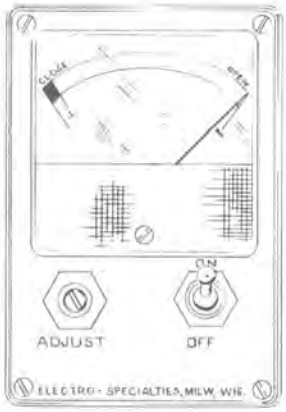
Equipment Necessary: Point Tester Ohm Meter

1. Disconnect the 2 blue wires from the external ignition coil connector.

2. Move the ohm meter switch to the ON position, Fig. II-6.

3. Hold ohm meter connecting clips apart (must not touch) and rotate the adjusting knob until the indicator needle is positioned precisely at the OPEN end of the scale, Fig. II-6.

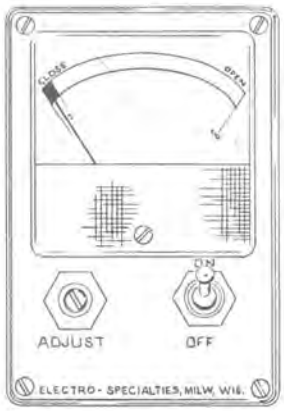
Fig. II-6



4. Ground one of the ohm meter connecting clips to the engine. Attach the other ohm meter connecting clip to the clip that joins the 2 blue wires coming from the engine. Clip was removed in step 1.

5. Rotate the mainshaft until the indicator needle moves to the CLOSED end of the scale (points closed). Indicator needle is to read no more than 0.1 ohm resistance, Fig. II-7. If resistance is 0.1 ohm or less, breaker points are acceptable. If resistance is greater than 0.1 ohm resistance, replace the breaker points.

Fig. II-7



6. Disconnect the ohm meter connecting clips and move switch to the OFF position. Connect 2 blue wires to the external coil.

BEFORE TROUBLE SHOOTING THE ENGINE

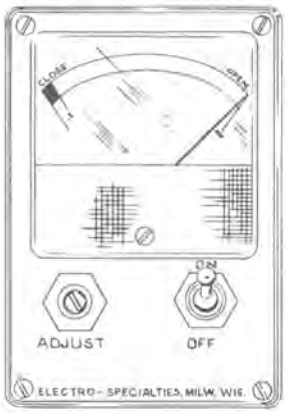
Check Primary

Equipment Necessary: Point Tester Ohm Meter

1. Move the ohm meter switch to the ON position, Fig. II-8.

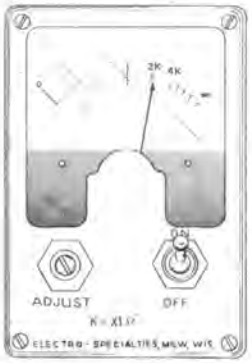
2. Hold ohm meter connecting clips apart (must not touch) and rotate the adjusting knob until the indicator needle is positioned precisely at the OPEN end of the scale, Fig. II-8.

Fig. II-8



3. Ground one of the ohm meter connecting clips to the engine. Attach the other ohm meter connecting clip to the primary (plug wire) terminal on the external ignition coil. Indicator needle is to read 2 - 2.7 ohms resistance, Fig. II-9. If resistance is 2 - 2.7 ohms, primary is acceptable. If resistance is not 2 - 2.7 ohms, replace the external ignition coil.

Fig. II-9



4. Disconnect the ohm meter connecting clips and move the switch to the OFF position.

5. Connect the 2 blue wires coming from the engine to the primary terminal on the external ignition coil. Connect high tension wire (plug wire) to the external coil.

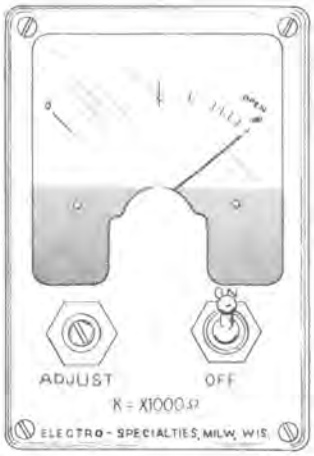
Check Secondary

Equipment Necessary: Mini Ohm Meter

1. Move the ohm meter switch to the ON position, Fig. II-10.

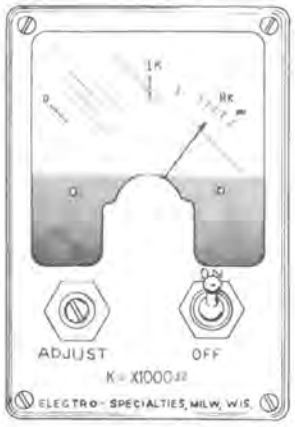
2. Hold ohm meter connecting clips apart (must not touch) and rotate the adjusting knob until the indicator needle is positioned precisely at the OPEN end of the scale, Fig. II-10.

Fig. II-10



3. Pull gold wire (ground) off the secondary terminal of the external ignition coil. Ground one of the ohm meter connecting clips to the engine. Attach the other ohm meter connecting clip to the secondary terminal. Indicator needle is to read 8000 ohms resistance, Fig. II-11. If resistance is 8000 ohms, secondary is acceptable. If resistance is not 8000 ohms, replace the external ignition coil.

Fig. II-11



4. Disconnect the ohm meter connecting clips and move the switch to the OFF position. Connect gold wire to the secondary terminal.

BEFORE TROUBLE SHOOTING THE ENGINE

Check Fuel Tank Filter

Equipment Necessary: 12-Inch Stiff Wire and Gasoline

Inside the fuel tank on the end of the fuel line is a brass screened fuel filter. The filter must be clean to allow the fuel line to transmit the maximum volume of fuel. If fuel filter is obstructed, fuel flow will be restricted – cleaning is required.

1. Form a hook on the end of a piece of stiff wire.

2. Remove the fuel tank cap, insert hook through the filler hole and pull fuel line and filter from within the fuel tank.

3. Examine the condition of the fuel filter. If filter is obstructed, wash in a container of clean gasoline. If brass screen or spring is damaged, filter is to be replaced.

CAUTION

DO NOT clean the fuel filter by scraping with a wire brush or similar tool, as this may damage the screen, allowing foreign particles to enter the fuel line. As a result, carburetor malfunctions may occur. Always replace a damaged fuel filter.

4. When the fuel filter is clean, install in the end of the fuel line. Insert fuel line and filter into the fuel tank, making sure that the filter touches the bottom of the fuel tank.

5. Install the fuel level gauge cap.

Check In-Line Fuel Filter

Equipment Necessary: Gasoline

The fuel line also incorporates an in-line fuel filter, just before the engine mounted fuel pump. The filter must be clean to allow the fuel line to transmit the maximum volume of fuel. If fuel filter is obstructed, fuel flow will be restricted – cleaning is required.

1. Remove the fuel filter from the fuel line. After filter is removed, position the fuel line higher than the fuel level in the fuel tank so that drainage does not occur.

2. The in-line fuel filter is a unitized component and does not have a replaceable filtering element. Therefore, the only cleaning that is to be performed is a back-flush of the filter, using gasoline.

3. When the fuel filter is clean, install in the fuel line.

4. Check fuel line, return line and impulse line for proper connection on the fittings. If lines are cracked or deteriorated, replacement is necessary.

Check Fuel Pump Filter

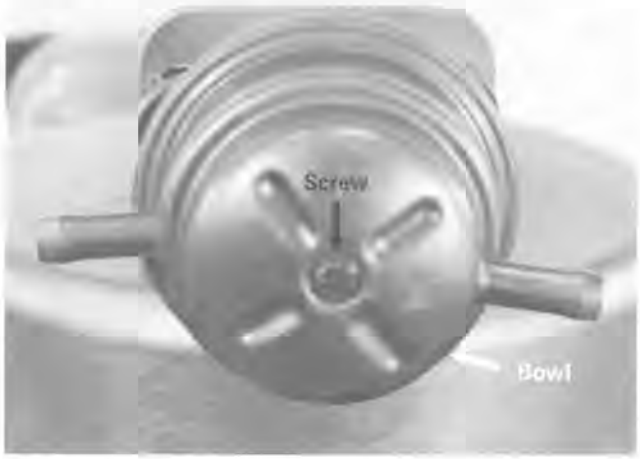
Equipment Necessary: Screwdriver and Kerosene

The screened filter in the fuel pump bowl is to be clean to allow the maximum volume of fuel to be pumped to the carburetor. If screened filter is obstructed, fuel flow will be restricted – cleaning is necessary.

1. Remove the fuel line running from the fuel tank to the fuel pump fitting. Place the fuel line higher than the fuel level in the fuel tank to prevent drainage.

2. Remove the screw and lockwasher that secures the fuel pump bowl, using a screwdriver, Fig. II-12.

Fig. II-12



3. Unscrew the cover and remove the screened filter and gasket.

4. If the screen is obstructed or dirty, flush with kerosene and dry thoroughly before installing.

BEFORE TROUBLE SHOOTING THE ENGINE

CAUTION

DO NOT clean the fuel pump filter by scraping with any type instrument as this may damage the screen, allowing foreign particles to pass through the fuel pump and into the carburetor. If allowed to pass through the carburetor, the foreign matter or dirt may cause engine damage. If the screened filter or gasket is damaged, replacement is necessary.

5. After cleaning or replacing the screened filter, install the gasket, screened filter, and fuel pump bowl. Secure components to fuel pump with a screw and lockwasher, using a screwdriver, Fig. II-12.

TROUBLE SHOOTING

Problem	Condition	Remedy
Engine will not start due to absence of spark.	1. Ignition switch not ON or malfunctioning.	1. Turn switch ON or replace ignition switch.
	2. Emergency shut-off switch in depressed (OFF) position or malfunctioning.	2. Depress switch so that button is released (ON) or replace the emergency shut-off switch.
	3. Throttle safety switch improperly adjusted.	3. Adjust throttle safety switch.
	4. High tension wire to the spark plug loose, grounded or shorted.	4. Tighten, service or replace the high tension wire.
	5. Spark plug fouled, oiled or damaged.	5. Replace the spark plug.
	6. Breaker points improperly adjusted or stuck (Open/ Closed).	6. Adjust breaker points to proper specification.
	7. Breaker points oily, wet or burned.	7. Clean or replace breaker points.
	8. Ignition coil damaged, burned out or shorted.	8. Replace the ignition coil.
	9. Condenser burned out or damaged.	9. Replace the condenser.
Engine will not start due to lack of fuel.	1. Fuel tank empty.	1. Fill fuel tank with fuel.
	2. Cracked, broken or pinched fuel line.	2. Replace or service fuel line.
	3. Obstructed or damaged fuel filters (In-Line, Fuel Tank and Fuel Pump).	3. Clean or replace fuel filter (see Before Trouble Shooting the Engine, pages II-6 and 7).
	4. Fuel pump dirty or damaged.	4. Clean or replace fuel pump.
	5. Carburetor malfunctioning.	5. Perform carburetor service.
Engine will not start because fuel will not ignite.	1. Air leak between carburetor and intake manifold.	1. Tighten mounting bolts and nuts or replace the gasket.

TROUBLE SHOOTING

Problem	Condition	Remedy
Engine will not start because fuel will not ignite.	2. Air leak between intake elbow and engine. 3. Low speed and/or high speed mixture needles adjusted improperly. 4. Insulating block between intake elbow and engine is warped. 5. Water in carburetor. 6. Engine flooded.	2. Tighten mounting nuts or replace gasket. 3. Adjust carburetor. 4. "True up" or replace intake insulating block. 5. Perform carburetor service. 6. Turn ignition switch OFF, remove spark plug and dry — crank engine over 5 - 10 times. Install spark plug and start engine. If engine continues to flood, service the carburetor.
Engine will not idle.	1. Adjustment of idle speed screw improperly set. 2. Low speed mixture screw improperly adjusted. 3. Obstructed, dirty or malfunctioning carburetor.	1. Adjust idle speed screw. 2. Adjust low speed mixture screw. 3. Clean and service the carburetor.
Engine develops power loss or accelerates poorly.	1. Vent hole in fuel tank cap obstructed. 2. Fouled or defective spark plug. 3. Seal in end cover leaking. 4. Choke butterfly accidentally closing. 5. Rotor face washed clean (absence of carbon) near the sealing pin and side seal.	1. Remove obstruction from vent hole. 2. Replace spark plug. 3. Replace end cover seal. 4. Service the carburetor. 5. A) Remove apex seals and springs, sealing pins, sealing pin springs, side seals and side seal springs. Decarbonize the side seals, springs, grooves and sealing pin bore in the rotor. B) Place the wearing surface of the side seals together, press together on each end and hold up to the light. No light is to be evident between the seals. Measure the side seals (see II Engine Servicing, Inspect Apex Seals, Sealing Pins and Side Seals, page II-21).

TROUBLE SHOOTING

Problem	Condition	Remedy
		C) Check the sealing pin springs and side seal springs. Replace if damaged or deteriorated (see II Engine Servicing, Inspect Rotor Sealing Component Springs, page II-22). D) Install all components in rotor. Check side seal end play by pushing seal against sealing pin. End play is to be 0.010 inch. E) Using a blunt instrument, depress the sealing pin. Top of sealing pin must fall below the top surface of the rotor. When released, top of sealing pin is to extend above the surface of the rotor.
	6. Leading edge of the rotor washed clean (absence of carbon) along either side of the apex seal.	6. A) Remove apex seals and springs. Decarbonize apex seal, spring and groove. B) Place wearing surface of the apex seals together, press together on each end and hold up to the light. No light is to be evident between the wearing surfaces. C) Measure the apex seals (see II Engine Servicing, Inspect Apex Seals, Sealing Pins and Side Seals, page II-21). D) Check the apex seal spring. Replace if damaged or deteriorated. E) Install apex seal spring and apex seal in the rotor. Seal must not bind or stick in the groove. Check apex seal side play with feeler gauge. Side play to be 0.0098.
	7. Low speed mixture screw set too lean.	7. Adjust the carburetor.

TROUBLE SHOOTING

Problem	Condition	Remedy
	8. Main fuel orifice obstructed. 9. Diaphram lever, plate or gasket malfunctioning.	8. Service the carburetor. 9. Service the carburetor.
Engine backfires or has irregular running condition.	1. Throttle safety switch adjusted improperly. 2. High tension wire deteriorated, broken or damaged. 3. Fouled or incorrect spark plug (heat range). 4. Breaker points adjusted improperly. 5. Air leak between carburetor and intake manifold. 6. Air leak between intake elbow and engine. 7. Insulating block between intake elbow and engine is warped.	1. Adjust throttle safety switch. 2. Replace high tension wire. 3. Replace spark plug. 4. Adjust breaker points and time the engine. 5. Tighten mounting bolts and nuts or replace the gasket. 6. Tighten mounting nuts or replace gasket. 7. "True up" or replace intake insulating block.
Engine four-cycles.	1. Carburetor adjusted too rich. 2. Carburetor inlet needle and seat worn or damaged.	1. Adjust the carburetor. 2. Service the carburetor and replace inlet needle and seat.
Engine pings at full throttle (overheating).	1. Cooling fins obstructed or damaged. 2. Cooling fan damaged. 3. Excessive carbon buildup in the combustion chamber.	1. Clean cooling fins or replace the end cover. 2. Replace the cooling fan. 3. Decarbonize the affected area and related components.

ENGINE REMOVAL

General

For photography purposes and to improve clarity, the engine is shown removed from the snowmobile, even though many of the service procedures may be performed with the engine mounted in the snowmobile. More often than not, a major service procedure can be accomplished more efficiently if the engine is removed from the snowmobile.

Note: When the engine is being removed from the snowmobile, all mounting hardware is to be kept with respective components.

Remove Engine from Snowmobile

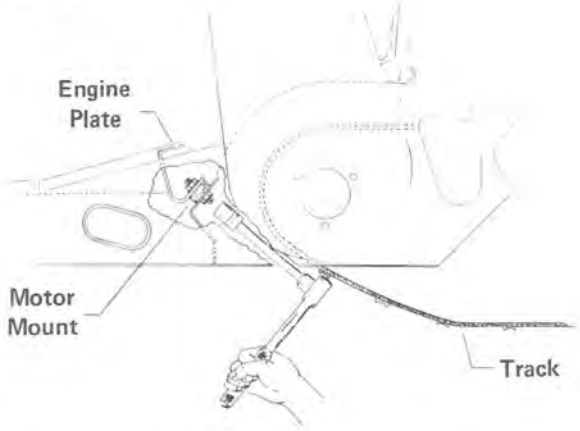
Equipment Necessary: Pliers, Cardboard, 9/16-Inch Socket, 8-Inch Extension, Short Screwdriver, 13 mm Socket, 13 mm Wrench, and Two 9/16-Inch Wrenches

1. Remove the hood cable, using a phillips screwdriver and 1/2-inch wrench. Remove the push nuts and pins that secure the hood to the hinge support, using a pliers. Remove the hood from the hinge support.

2. Tip the snowmobile on its side and use a piece of cardboard or similar material to prevent scratching.

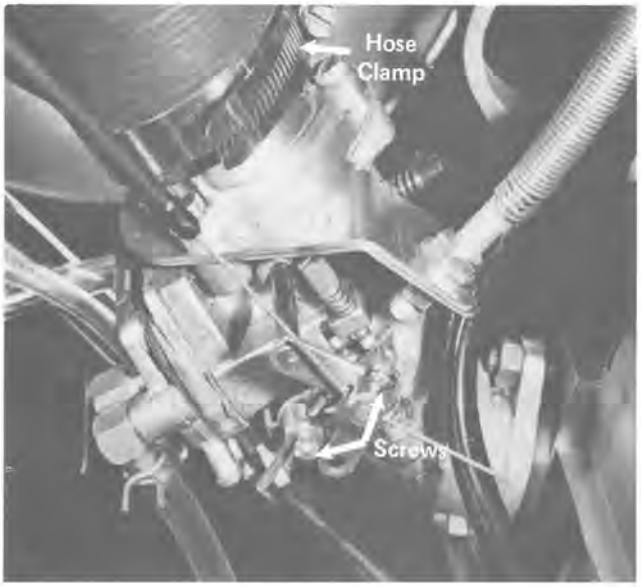
3. Remove the 2 locknuts that secure the motor mounts to the belly pan, using a 9/16-inch socket and an 8-inch extension, Fig. II-13. Tip the snowmobile right side up.

Fig. II-13



4. Loosen the 2 screws that secure the throttle wire and the choke wire to carburetor mounted throttle and choke arms, Fig. II-14. Pull wires from the throttle and choke arms.

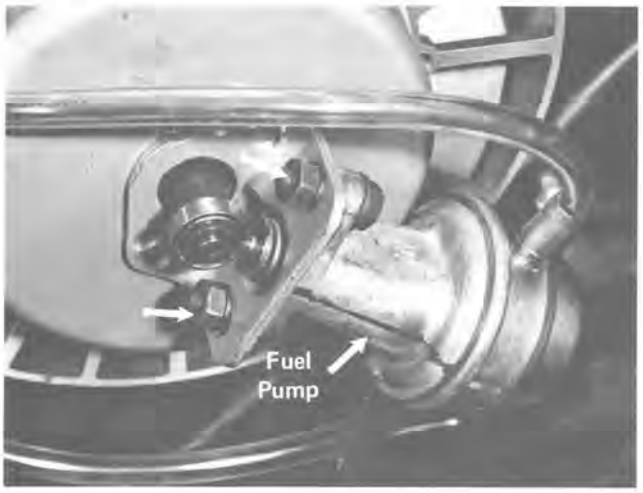
Fig. II-14



5. Loosen the carburetor intake hose clamp, using a screwdriver, Fig. II-14. Pull intake hose off carburetor intake adaptor.

6. Remove the 2 bolts, lockwashers, flat washers and nuts that secure the fuel pump to the recoil housing, using a 13 mm socket and wrench, Fig. II-15. Lay fuel pump in the belly pan.

Fig. II-15



7. Pull the fuel line off the carburetor inlet fuel fitting and the return line off the carburetor return line fitting, Fig. II-15. Position the fuel line and return line higher than the fuel level in the fuel tank to prevent fuel flow from the fuel tank.

ENGINE REMOVAL

8. Remove the 4 screws and lockwashers that secure the recoil starter assembly to the fan housing, using a short screwdriver. Remove the recoil starter assembly and carefully allow to retract against the console-mounted recoil cable bracket.

9. Remove the belt and pull the drive clutch off the mainshaft of the engine, Fig. II-16, (see Section V – Drive System, Drive Clutch Removal).

Fig. II-16

10. Remove outside 2 capscrews, flat washers and locknuts that secure the front of the engine plate to front end, using two 9/16-inch wrenches.

11. Grasp engine on both sides, pivot engine rearward until muffler tailpipe pulls through the hole in the belly pan and pull engine out of the snowmobile.

12. Set engine on a clean work bench.

13. Account for the 2 solid aluminum motor mounts that may fall into the belly pan when the engine is pulled.

14. Before disassembling the engine, clean the exterior surfaces of all foreign matter.

ENGINE SERVICING (DISASSEMBLY)

Remove External Components

Equipment Necessary: 13 mm Open End Wrench and Socket, 7/16-Inch Socket and Wrench, Screwdriver, 11/16-Inch Socket and 11/16-Inch Wrench

1. Remove the 2 nuts that secure the carburetor elbow to the engine, using a 13 mm open end wrench. Slide carburetor with elbow, gaskets and insulator block from the engine and set aside in a clean dry area.

2. Loosen the capscrew and locknut that secures the muffler strap and asbestos strip, using a 7/16-inch socket and wrench. When strap is sufficiently released, slide strap and asbestos strip off the backing bracket.

3. Remove the 2 nuts that secure the tailpipe clamp, using a 13 mm socket. Remove clamp assembly from around the tailpipe.

4. Drive the muffler off the exhaust pipe, using a rubber hammer.

5. When muffler is removed, use a 13 mm wrench and remove the nuts and flat washers that secure the exhaust pipe to the engine. Slide the exhaust pipe and exhaust gasket off the mounting studs.

Note: Examine the 2 muffler backing brackets that are secured to the engine plate. If damage is not evident, removal of brackets is not necessary.

6. Pull the high tension wire off the spark plug, Fig. II-17. Pull blue wire connector off the external ignition coil.

7. Remove the 3 screws and lockwashers that secure the external ignition coil to the fan housing, using a screwdriver, Fig. II-17. Pull external coil from fan housing.

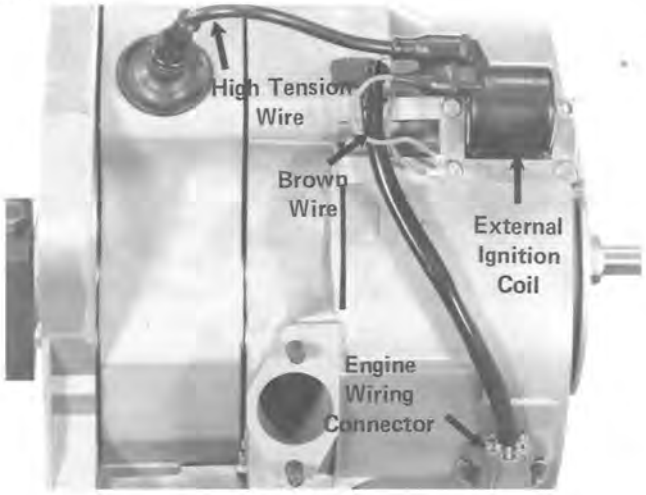
Note: The high tension wire and the brown ground wire are to remain connected to the external ignition coil.

ENGINE SERVICING (DISASSEMBLY)

8. Remove the engine wiring connector from the fan housing by removing the 2 screws, using a screwdriver, Fig. II-17.

Note: Allow the engine wiring connector to hang loose.

Fig. II-17



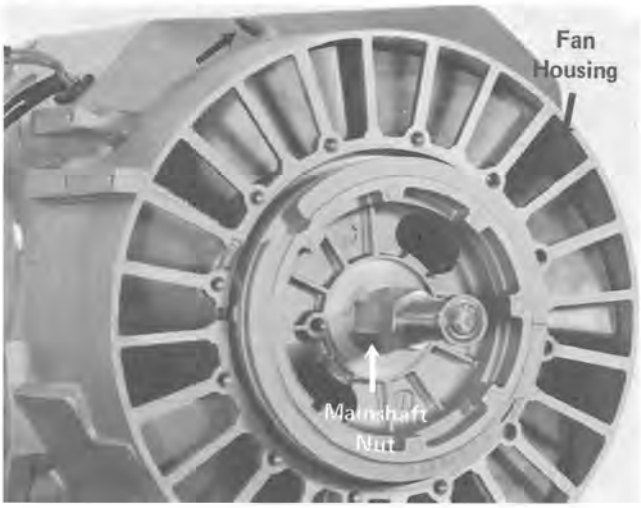
9. Remove the 4 bolts and lockwashers that secure the engine plate to the engine, using a 11/16-inch wrench and socket. Set engine plate aside.

Remove Starter Drum and Fan

Equipment Necessary: 5 mm Allen Wrench, 15/16-Inch Wrench, Vise, Puller and Small Side Cutter

1. Remove the 3 Allen head bolts that secure the fan housing to the end cover, Fig. II-18. Slide fan housing off the mainshaft.

Fig. II-18



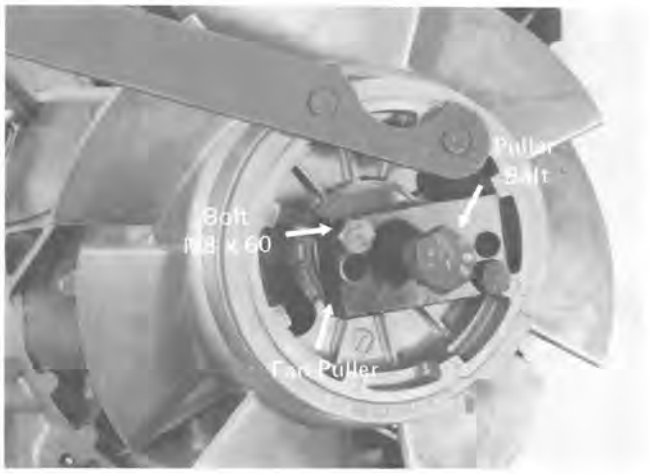
2. Place the PTO end counterweight of the engine in a vise and tighten securely to hold in place.

3. Remove the mainshaft nut, using a 15/16-inch wrench, Fig. II-18.

4. Slide a protective cap on the mainshaft and install the fan puller, using two M8 x 60 bolts, Fig. II-19. The holding tool shown is not necessary if the counterweight is in a rise. Arctic does not sell the holding tool.

> **CAUTION**
> **The two M8 x 60 bolts are to be threaded into the fan only 1/2 inch. If exceeded, damage to the main lighting and/or booster lighting coil may occur because the two M8 x 60 bolts can contact the lighting coils if threaded in too far.**

Fig. II-19



5. Pull the fan from the mainshaft by rotating the center puller bolt clockwise until the fan releases from the mainshaft taper, using a 15/16-inch wrench, Fig. II-19. Separate the puller from the fan.

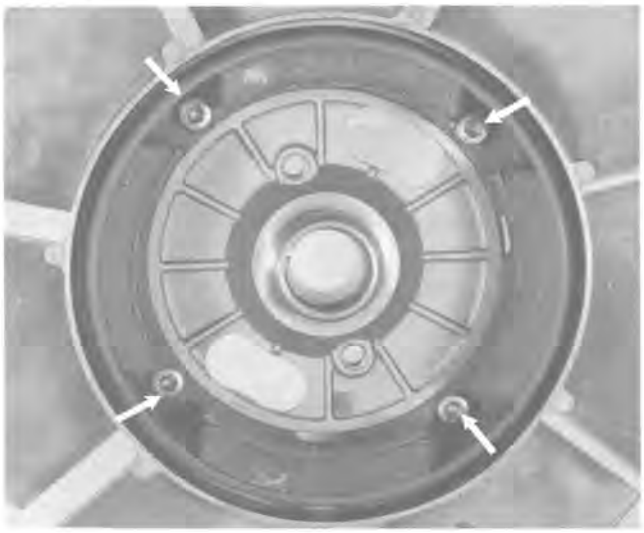
> **CAUTION**
> **Position the fan on a clean dry area with the magnets up. Damage may result if dirt and other foreign particles come in contact with the magnets.**

6. Remove the key from the mainshaft, using a side cutter. Keep key with fan. Remove PTO end counterweight from the rise.

7. If the starter drum, fan or flywheel is not to be serviced, remove the magneto assembly (see Remove Magneto Assembly and Counterweights, page II-14). If the starter drum, fan or flywheel is to be serviced, proceed to step 8.

8. Using a 5 mm Allen wrench, remove the 4 Allen head bolts and lockwashers that secure the starter drum, fan and flywheel, Fig. II-20. Separate components and replace as conditions dictate.

Fig. II-20



Note: The 4 Allen head bolts are sealed with locktite. It is recommended that an impact driver be used to break the bolts loose. If an impact driver is not used, there is a possibility that the bolt head may deform when removed with a conventional Allen wrench, making removal extremely difficult.

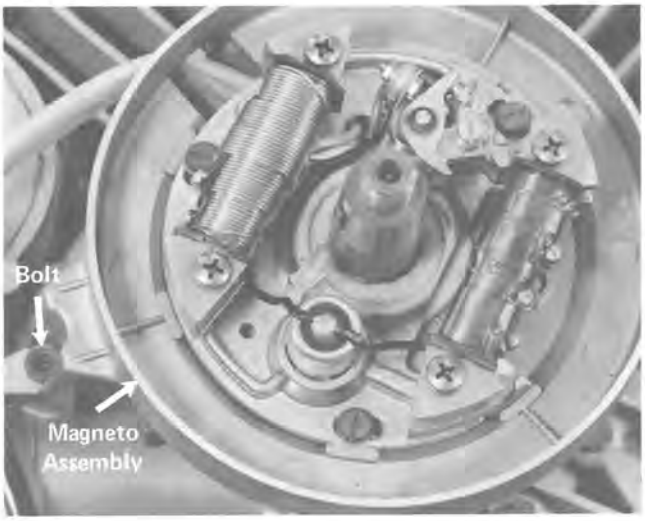
Remove Magneto Assembly and Counterweights

Equipment Necessary: 10 mm Wrench, 5 mm Allen Wrench, 13 mm Socket and Rubber Hammer

1. Remove the 4 bolts, flat washers and nuts that secure the magneto mounting plate to the end cover, using a 5 mm Allen wrench, Fig. II-21. Remove magneto mounting plate and ensure that the 2 dowel pins are accounted for. Set magneto mounting plate on a clean area where it will not be subjected to dirt or accidental damage.

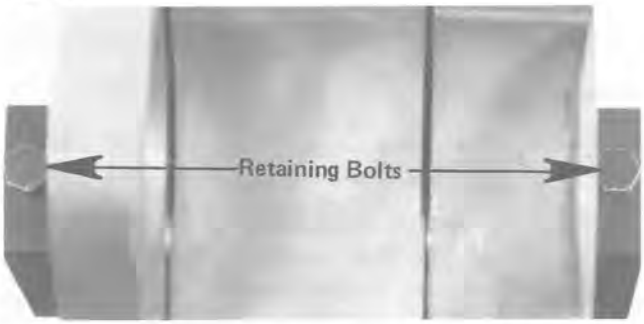
2. Loosen the counterweight retaining bolt, using a 13 mm wrench, Fig. II-22. Use a rubber hammer to drive counterweight free of the mainshaft. Perform this step on both the Magneto end and PTO end counterweights.

Fig. II-21



Note: It is recommended that the area around the counterweight bolt be heated before attempting to remove. Heating makes bolt removal easier.

Fig. II-22



3. If the coils, breaker points or condenser will not be serviced, remove the PTO end cover (see Remove PTO End Cover, page II-14). If the coils, breaker points or condenser are to be serviced, proceed to Section IV, Electrical System.

Remove PTO End Cover

Equipment Necessary: 10 mm Socket and Wrench

1. Remove the 10 bolts, washers and nuts that secure the PTO end cover, rotor housing and Magneto end cover, Fig. II-23. Each bolt is fitted with 2 washers, one with the bolt head, the other with the nut.

Fig. II-23

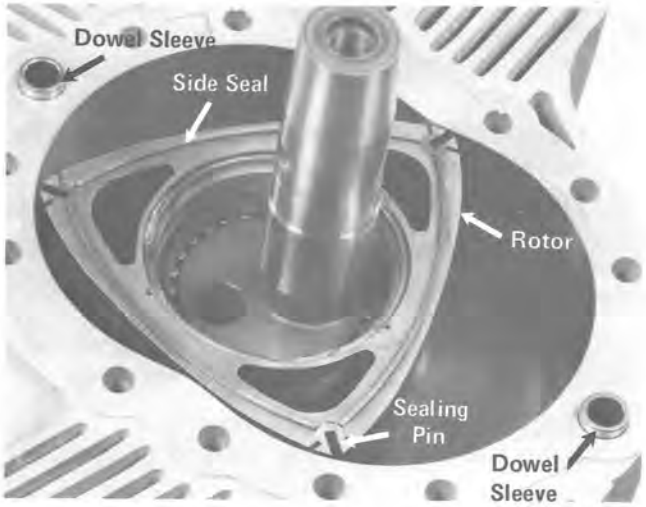
2. Carefully lift the PTO end cover off the rotor housing and mainshaft.

Note: As the end cover is removed, the dowel sleeves, rotor sealing pins, sealing pin springs, side seals and side seal springs, Fig. II-24, may stick to the end cover. Exercise care so that these components do not accidentally fall, and as a result, become lost.

CAUTION

Protect the end cover sliding surface and the bearing contained within the end cover from dirt and accidental damage.

Fig. II-24



Remove Rotor and Rotor Housing

Equipment Necessary: No Special Tools Required

1. Remove the rotor from the rotor housing and mainshaft, exercising care so that the rotor is not accidentally dropped and damaged, Fig. II-24. The apex seals, apex seal springs, side seals, side seal springs, sealing pins and sealing pin springs may stick to the PTO end cover when the rotor is removed. Parts to be accounted for are 3 apex seals and springs, 6 side seals and springs, 6 sealing pins and 12 sealing pin springs.

Note: Place rotor and sealing components on a clean area where accidental damage will not occur.

2. Lift the rotor housing off the magneto end cover. Account for the 2 dowel pins.

CAUTION

Protect both PTO and magneto end covers and the rotor housing from damage. Accidental damage will require replacement of component prior to assembly.

Remove Mainshaft

Equipment Necessary: Center Punch, Conventional Hammer, Self-Tapping Screw, Wire Pinchers, Snap Ring Pliers and Rubber Hammer

The mainshaft is not to be removed from the magneto end cover unless repair of the mainshaft, pinion gear, end cover, bearing or rotor is necessary.

1. Punch a hole into the magneto end cover seal and thread a self-tapping screw into the hole. Pull out oil seal by grasping the screw, using a pinchers, Fig. II-25.

Fig. II-25

Note: The oil seal WILL be damaged when removed; this is an accepted practice. Replacement of the seal is necessary when seal is pulled.

2. Remove the snap ring, Fig. II-26, that retains the mainshaft in the end cover, using a snap ring pliers.

Fig. II-26

3. Place protective cap over the magneto end of the mainshaft and drive out of the end cover, using a rubber hammer.

Note: There are 2 spacer thrust rings on every mainshaft. Ensure they are accounted for. Some mainshafts may have a shim(s) — make sure shim(s) is also accounted for. Spacer thrust rings and shim(s) are used to obtain proper crankshaft end play.

CAUTION

Make sure that damage to the sealing surface or rotor sliding surface of the end cover is not sustained. If damaged, replacement is necessary.

Remove Bearing from PTO End Cover

Equipment Necessary: Flat End Punch, Hammer, Two 2 x 4 Wooden Blocks, Clean Soft Rags and Lacquer Thinner

The only time the bearing is to be removed is when it is damaged or if the magneto end cover bearing is replaced. Always replace both bearings even if only one is defective.

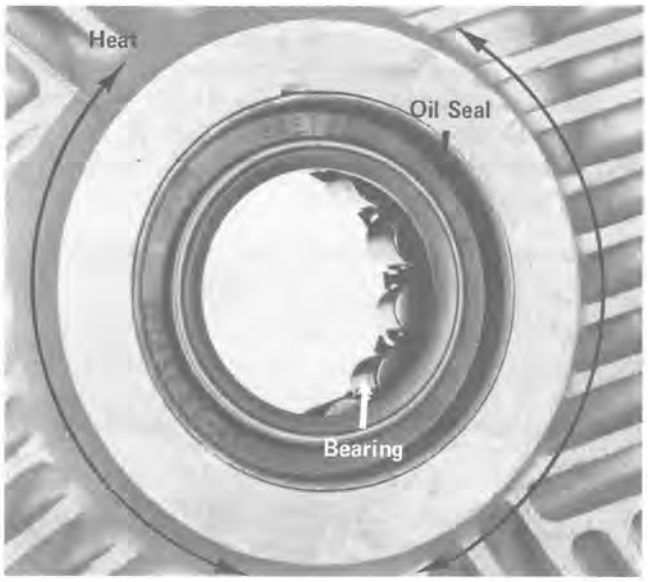
1. Set the PTO end cover on rag-covered wooden blocks with the rotor sliding surface facing upward.

2. Using a flat end punch and hammer, drive the oil seal out of the end cover.

3. Turn the end cover over so that the rotor sliding surface is positioned on the rag-covered wooden blocks.

4. Heat the end cover bearing area on the exterior casting surface to +392°F. When temperature is obtained, use a flat end punch and hammer and drive the bearing out of the end cover, Fig. II-27. Make sure that the end of the punch is positioned on the bearing race when driving bearing out.

Fig. II-27



5. Remove the locktite deposits from the bearing and oil seal area of the end cover, using lacquer thinner.

Remove Bearing from Magneto End Cover

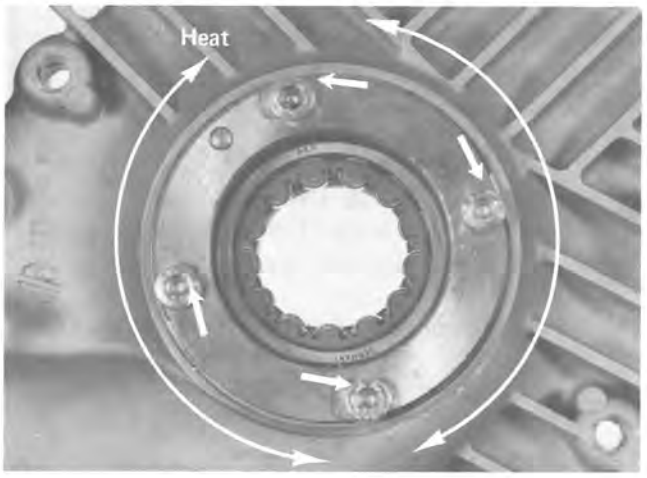
Equipment Necessary: Flat End Punch, Hammer, Two 2 x 4 Wooden Blocks and Clean Soft Rags

1. Heat the end cover bearing area on the exterior casting surface to +300°F., Fig. II-28.

2. When temperature is obtained, set the magneto end cover on rag-covered wooden blocks with the gear facing upward.

3. Use a flat end punch and hammer and drive the bearing out of the pinion gear. Make sure that end of the punch is positioned against the bearing race when driving the bearing out.

Fig. II-28



I

Remove Pinion Gear

Equipment Necessary: 5 mm Allen Wrench and Impact Driver

1. Remove the 4 Allen head bolts, Fig. II-28, using an impact driver and 5 mm Allen wrench . . . reason — bolts are sealed with locktite.

2. Heat the end cover pinion area on the exterior casting surface to +300°F., Fig. II-28. When temperature is obtained, press the pinion gear out of the end cover. Also remove the paper gasket that fits between the pinion collar and end cover.

Remove Apex and Side Seal Components

Equipment Necessary: Decarbonizing Tool

Fig. II-29

1. Position the tipped end of the decarbonizing tool against the end of the apex seal, Fig. II-29. Push or tap lightly against the tool until the apex seal and spring can be removed.

2. Loosen the sealing pin by turning with the tipped end of the decarbonizing tool, Fig. II-30. Lift the sealing pin and the 2 horseshoe-shaped springs out of the sealing pin bore.

Fig. II-30

3. Position the tipped end of the decarbonizing tool against the end of the side seal. Push or tap lightly against the tool until the side seal and spring can be removed, Fig. II-31.

Fig. II-31

4. Perform steps 1 - 3 on all seal areas until all sealing components are removed, Fig. II-32.

Fig. II-32

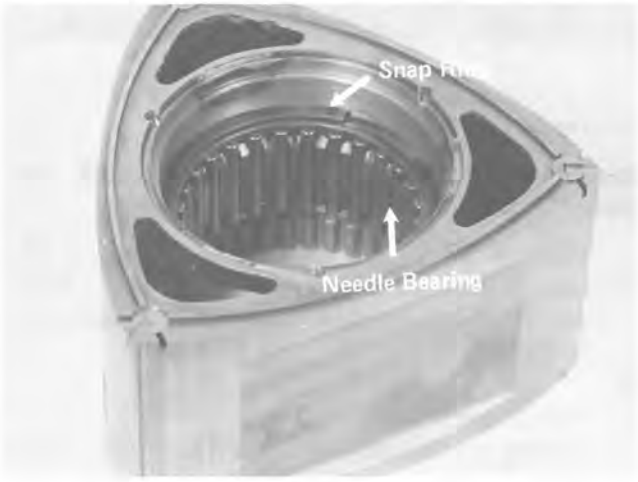
CAUTION

Before the needle bearing is removed from the rotor, make sure that all sealing components are removed from both sides of the rotor, Fig. II-32. If seals are not removed, damage may occur when the bearing is being removed from the rotor.

1. Remove the snap ring, Fig. II-33, that secures the needle bearing, using a snap ring pliers. There is also a snap ring on the gear side of the needle bearing that is to be removed.

2. Slide the needle bearing from within the rotor.

Fig. II-33



Remove Rotor Needle Bearing

Equipment Necessary: Snap Ring Pliers

Note: If the rotor needle bearing is to be reused, mark the bearing and the rotor so that the bearing will be installed in exactly the same position when reassembling. A definite wear pattern develops between the bearing and the eccentric on the mainshaft. For this reason the bearing must be installed in the same position. The bearing will deteriorate rapidly if not installed in this manner.

ENGINE SERVICING (DECARBONIZING)

Decarbonize Rotor and Sealing Components

Equipment Necessary: Decarbonizing Tool

1. Remove major carbon buildup from the rotor sealing components and the respective seal grooves and sealing pin bores in the rotor, using the decarbonizing tool, Fig. II-34. DO NOT scrape down to the bare metal.

Fig. II-34

2. Remove major carbon buildup from the rotor faces (3 sides), using the decarbonizing tool. It is not necessary to scrape so clean as to expose bare metal.

3. If the top or bottom (end cover sealing sides) of the rotor have EXCESSIVE carbon buildup, scrape off only the carbon flakes, using the decarbonizing tool.

4. Observe the condition of the 3 fuel flow passages near the rotor apexes, Fig. II-34. The fuel flow passages must be unobstructed. Decarbonize the passages if necessary.

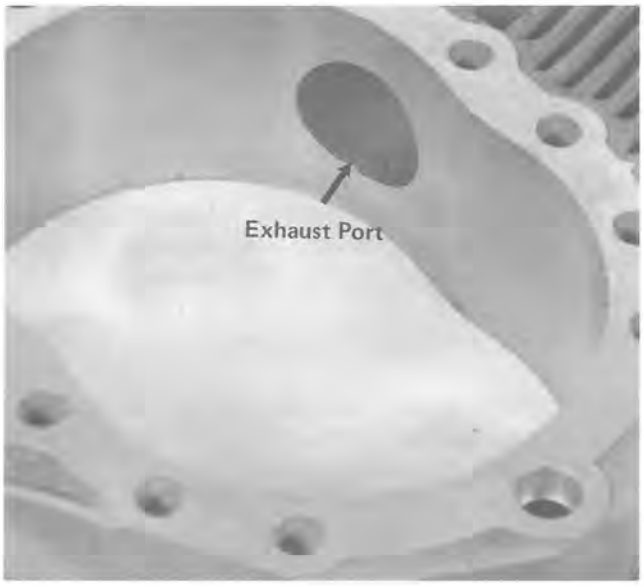
Decarbonize Rotor Housing

Equipment Necessary: Decarbonizing Tool, Cleaning Solvent and 13/16-Inch Spark Plug Socket

1. Remove the spark plug from the rotor housing, using a 13/16-inch spark plug socket.

2. Carefully remove major carbon buildup from the exhaust port and spark plug bore, using the decarbonizing tool or triangular scraper, Fig. II-35. DO NOT SCRAPE OFF ANY METAL.

Fig. II-35



3. Clean the inside of the rotor housing very well, using cleaning solvent. Dry the rotor housing thoroughly.

Decarbonize End Covers

Equipment Necessary: Cleaning Solvent

1. Remove major carbon buildup from the rotor sliding surface of both end covers, using cleaning solvent. Dry the end covers thoroughly.

Note: If only minor carbon deposits are present on the rotor sliding surface of the end covers, DO NOT attempt to remove such deposits.

CAUTION

DO NOT scrape or accidentally damage the rotor sliding surface of the end covers. Most any damage may contribute to leakage, power loss or engine seizure.

ENGINE SERVICING (INSPECTING)

Inspect End Covers

Equipment Necessary: Surface Plate

Note: End covers cannot be remachined; total replacement of the affected end cover is to be made if damage is incurred.

1. Inspect the end covers for scratches, scoring, cracks (other than hairline), breakage and any other noticeable imperfection that may affect operation. If any of these conditions exist, replacement is necessary.

2. Inspect end cover bearings for rough rotation and the absence of a bearing element. If these conditions exist, replace the bearing.

3. Inspect port areas for damage.

4. Carefully place the end covers on a clean surface plate. There is not to be any distortion between the rotor sliding surface of the end cover and the surface plate. If distortion is evident, replace the end covers.

CAUTION

Be extremely careful when the end cover is placed on the surface plate to check distortion. If the end cover is scraped across the surface plate, the possibility of end cover sliding surface damage does exist. If accidentally damaged, end cover must be replaced. Remachining cannot be performed on the end covers.

Inspect Rotor Housing

Equipment Necessary: No Special Tools Required

Note: The sliding surface of the rotor housing is not to be remachined; total replacement of the rotor housing must be made if damage is incurred.

If a new rotor housing is to be installed, new apex seals must be used in conjunction with the new rotor housing. DO NOT USE APEX SEALS THAT WERE REMOVED, EVEN IF THE SEAL IS NOT WORN. Whenever a rotor housing is replaced, the hole for the spark plug should be checked for length so that a spark plug with the appropriate reach is used.

1. Inspect the rotor housing sliding surface for deep scratches, scoring, cracks (other than hairline), breakage and any noticeable imperfection that may affect engine operation. If any of these conditions exist, replace the rotor housing.

2. Inspect the exhaust port and spark plug hole for damage and raised surfaces. Replace the rotor housing if these conditions exist.

3. Check both sides of the rotor housing sealing surface by placing the rotor housing on a surface plate. There is not to be any distortion between the rotor housing and the surface plate. No coarse or raised edges are to be evident on the sealing surfaces. If any of these conditions exist, replace the rotor housing.

Inspect Fan and Starter Drum

Equipment Necessary: Metal File (If Necessary)

1. Inspect the fan for cracks, nicks, or broken blades. If fan blades are cracked or broken, replace the fan.

Note: If the fan blade is nicked, use a metal file and carefully smooth out the affected area.

2. Inspect the keyway on the inside diameter of the fan for damage. If damage is evident, replace the fan.

3. Inspect the starter drum for damage, cracks, nicks, and imperfections in the casting. Smooth out nicked areas with a metal file. If damaged or cracked, the starter drum is to be replaced.

Check Magnet Strength (Flywheel)

Equipment Necessary: Screwdriver

1. Set the fan with flywheel on a wooden surface so that the magnets face upward.

2. Hold a screwdriver on the extreme end of the handle with the blade end pointing down toward the center of the flywheel.

3. Slowly lower the blade end of the screwdriver toward the center of the flywheel. When blade gets close to the magnet force, the blade is to attract against a magnet with considerable force. If attraction is not evident or very weak, the flywheel is to be replaced.

CAUTION

DO NOT stack flywheels on top of each other for storage purposes. The strength of the magnets may deteriorate if flywheels are stacked on top of each other. If magnet qualities deteriorate, a conventional charger cannot be used for recharging purposes.

Inspect Mainshaft

Equipment Necessary: No Special Tools Required

1. Inspect the keyway and examine the external and internal threads for wear, scoring, or damaged threads. Replace as conditions dictate.

2. Inspect the graduated tapers for scratches, wear, or scoring. Replace as conditions dictate.

3. Inspect the mainshaft eccentric for scratches, wear, or scoring. Replace as conditions dictate.

Inspect Rotor

Equipment Necessary: Feeler Gauge

1. Inspect the rotor for cracks, chips and deep scratches. If these conditions exist, replace the rotor.

2. Check the rotor ring gear for cracks and damaged teeth. If damaged teeth or cracks are evident, the rotor is to be replaced. Ring gears cannot be replaced individually. If the rotor is replaced, the pinion gear (PTO end cover) must also be replaced. If one component is replaced and not the other, accelerated gear wearing of the new component will occur. This in itself will negate the replacement of the component.

3. Check the apex seal grooves for pitted edges and raised metal surfaces. If excessively damaged, replace the rotor.

4. Insert apex seals into the rotor and check the apex seal side play, using a feeler gauge. Maximum permissible apex seal side play is 0.0098 inch.

Note: As the engine is used, the apex seal grooves in the rotor become increasingly conical shaped. Because this condition exists, the feeler gauge is not to be inserted more than 0.078 inch into the apex seal groove when measuring side play.

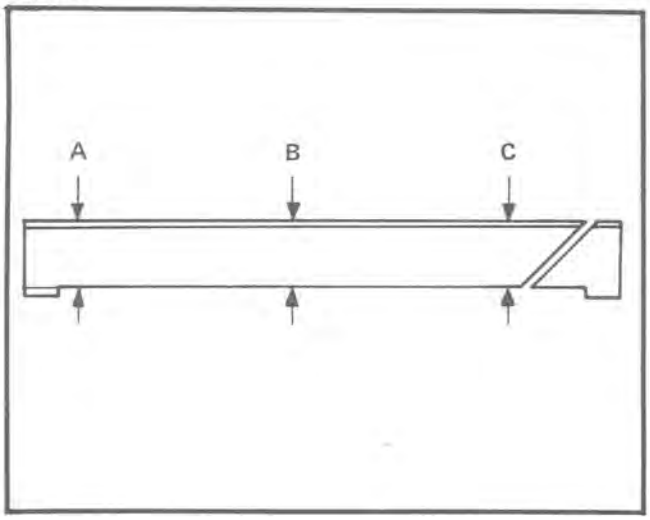
Fig. II-36

Inspect Apex Seals, Sealing Pins and Side Seals

Equipment Necessary: 1-Inch Micrometer

1. Using new or decarbonized apex seals, measure the seals at positions A, B and C, using a micrometer, Fig. II-37. Measurement is to range from 0.2793 - 0.2953 inch. If measure-

Fig. II-37



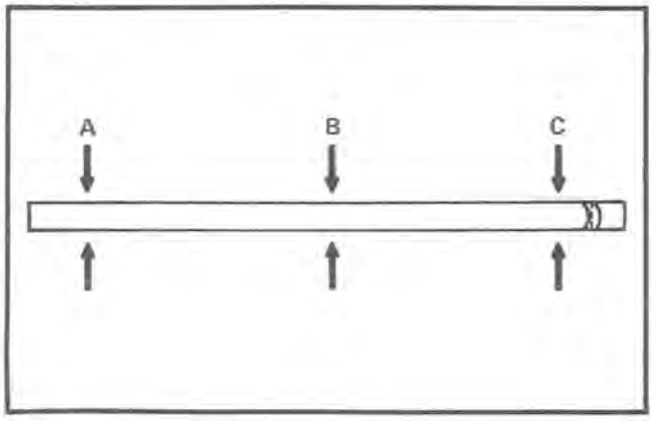
ment is not within tolerance, replace the apex seal. If there is more than 0.0079 inch deviance between positions A, B and C, replace the apex seal.

Note: All apex seals are to be replaced even if only one seal is not within tolerance.

2. Measure the thickness of the apex seal at positions A, B and C, Fig. II-38. Measurement is to range from 0.1173 - 0.1181 inch. If measurement is not within tolerance, replace the apex seal. If there is more than 0.00079 inch deviance between positions A, B and C, replace the apex seal.

Note: All apex seals are to be replaced even if only 1 seal is not within tolerance.

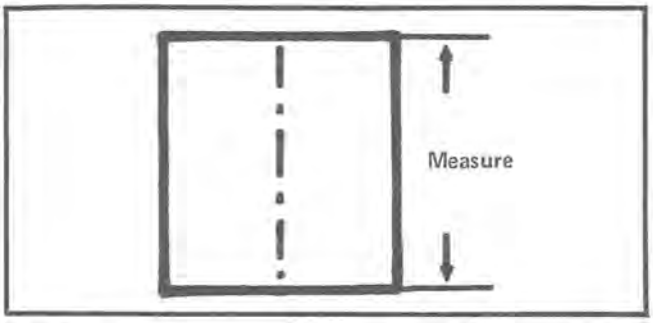
Fig. II-38



3. Measure the length of the sealing pins, using a micrometer, Fig. II-39. Measurement is to range from 0.2086 - 0.2204 inch. Replace the sealing pin if not within tolerance. If the measurement between any 2 seals deviates by more than 0.00196 inch, the sealing pin is to be replaced.

Note: All sealing pins are to be replaced even if only 1 seal is not within tolerance.

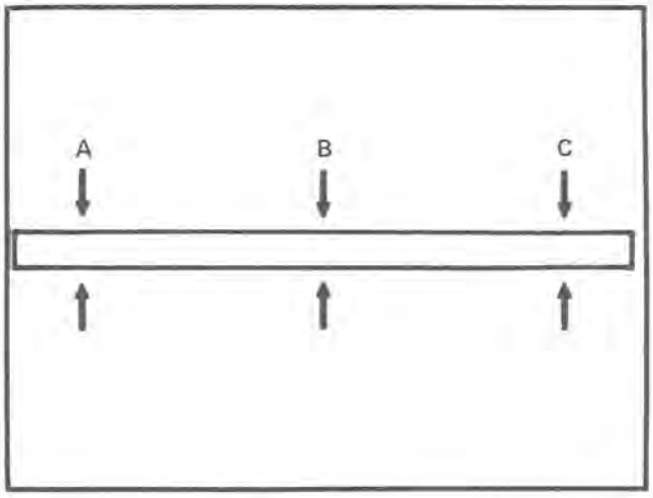
Fig. II-39



4. Measure the depth of the side seals at positions A, B and C, using a micrometer, Fig. II-40. Measurement is to range from 0.0865 - 0.0945 inch. Replace side seal if not within tolerance. The extreme ends of the side seals (A and C) cannot be worn more than 0.0039 inch as compared with the center (B) of the side seal. If this condition exists, replace the side seal.

Note: All side seals are to be replaced even if only 1 seal is not within tolerance.

Fig. II-40



Inspect Rotor Sealing Component Springs

Equipment Necessary: No Special Tools Required

1. Check the apex seal springs, side seal springs and the sealing pin springs for compression characteristics. If condition of a spring is doubtful, replacement is necessary.

Note: All related component springs are to be replaced even if only 1 spring is not within tolerance. For example – if 1 apex seal spring is to be replaced, replace all apex seal springs. The same holds true for side seal springs and sealing pin springs.

ENGINE SERVICING (ASSEMBLY)

Install Bearing and Pinion (Magneto End Cover)

Equipment Necessary: Two 2 x 4 Wooden Blocks, Clean Rags, Four M6 x 70 Bolts, 5 mm Allen Wrench, Locktite 40 and Torque Wrench

Note: If the gear teeth inside the rotor are damaged, which constitutes replacement, the pinion gear must also be replaced. Likewise, if the pinion gear is damaged, which constitutes replacement, the rotor must also be replaced.

1. Position the pinion gear with the gear resting on the working surface. Heat the bearing race contact area of the pinion gear to +266°F. and press the bearing into the pinion gear, Fig. II-41. Allow the pinion gear with bearing to cool.

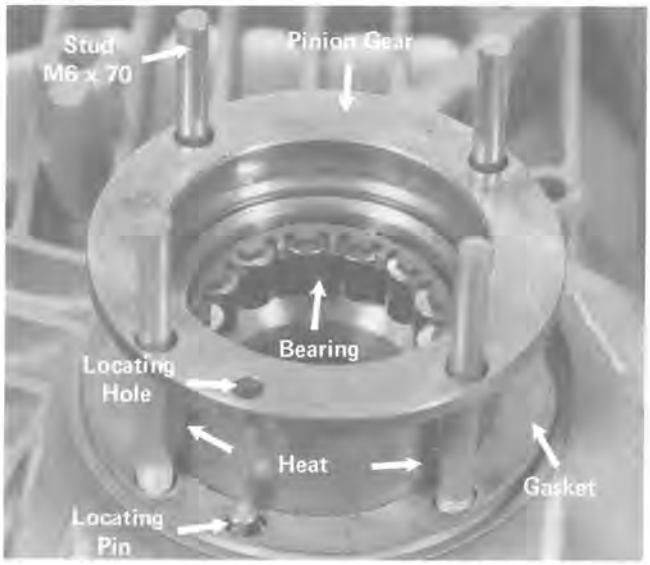
Note: Ensure that the bearing race is fully seated against the bearing seat stop in the pinion gear.

2. Set the Magneto end cover on rag-covered wooden blocks with the rotor sliding surface against the rags. Place paper gasket on the end cover, making sure that the gasket holes line up with those in the end cover, Fig. II-41.

3. Position the pinion gear in the end cover, making sure that the pinion gear locating hole and the end cover locating pin line up, Fig. II-42.

4. Center the pinion gear in relation to the mounting holes, using four M6 x 70 bolts or studs, Fig. II-41.

Fig. II-41



5. Press the pinion gear into the end cover and remove the four M6 x 70 bolts or studs that were used for centering purposes.

6. Secure the pinion gear to the end cover with 4 Allen head bolts, Fig. II-42, using a 5 mm Allen wrench. Tighten bolts to 6 ft. lbs. torque, using a torque wrench. Locktite 40 can be used on the bolt threads.

Fig. II-42

Install Bearing and Seal (PTO End Cover)

Equipment Necessary: Locktite 40, High-Temperature Grease (Bosch Ft1v4 or Ft1v8)

1. Heat the end cover bearing area (opposite side of rotor sliding surface) to +300°F., Fig. II-43.

2. Lightly coat the outside surface of the bearing race with Locktite 40 and press the bearing into the end cover from the rotor sliding surface side, Fig. II-43.

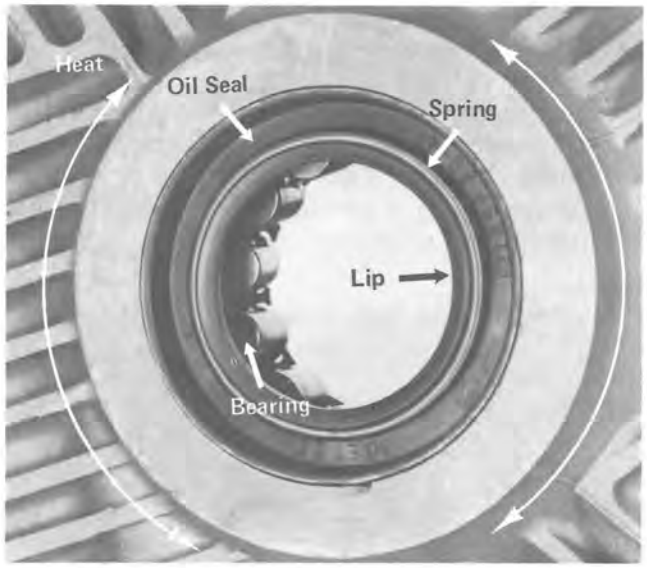
Note: Ensure that the bearing race seats against the bearing stop in the end cover.

3. Lightly coat the outer diameter surface of the oil seal with Locktite 40 and press the seal into the end cover from the outside. Oil spring to face outward, Fig. II-43.

4. Apply high-temperature grease (Bosch Ft1v4 or Ft1v8) on the sealing lip of the oil seal, Fig. II-43.

5. Set the end cover aside where it will not be damaged.

Fig. II-43



Install Mainshaft and Check End Play

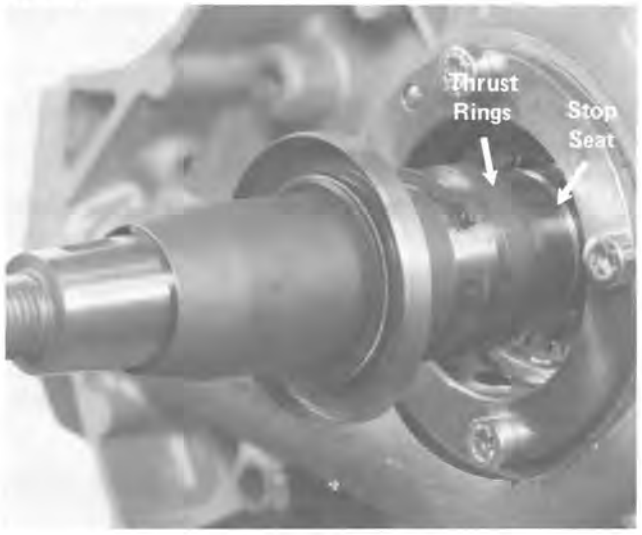
Equipment Necessary: Oil, Snap Ring Pliers and Feeler Gauge

1. Lubricate the Magneto end cover bearing with oil.

2. Slide the mainshaft threaded end through the end cover starting from the inside (rotor sliding surface).

3. Heat the spacer thrust ring(s) in hot oil. Slide spacer thrust ring(s), Fig. II-44, on the mainshaft and press into position. Ensure the spacer thrust ring(s) fully seat against the stop seat on the mainshaft, Fig. II-44.

Fig. II-44



Note: If shims were removed during disassembly, same quantity must always be installed during assembly. These shims are necessary to maintain correct mainshaft end play.

4. Secure mainshaft in the end cover with the snap ring, using a snap ring pliers, Fig. II-45.

Fig. II-45

5. Insert a feeler gauge or wire gauge to the inside of the snap ring, Fig. II-46. Measurement is to be from 0.000 - 0.001 inch. Shim as required to obtain the correct measurement.

Note: It may be necessary to bend the feeler gauge or wire gauge at the end to gain access between the snap ring and shim(s) for checking end play.

Fig. II-46

6. Apply high-temperature grease (Bosch Ft1v4 or Ft1v8) on the sealing lip of the oil seal.

7. Lightly coat the outer diameter surface of the oil seal with Locktite 40 and press the seal into the end cover from the outside, Fig. II-47. The oil seal spring is to face outward.

Fig. II-47

Install Rotor Housing and Assemble Rotor

Equipment Necessary: Oil, Snap Ring Pliers, Clean Rag and High-Temperature Grease (Bosch Ft1v4 or Ft1v8)

1. Place 2 dowel pins in the Magneto end cover. Lubricate the Magneto end cover sliding surface with oil.

2. Lubricate the rotor housing sliding surface with oil and place on the Magneto end cover. Ensure that the dowel pins in the Magneto end cover fully seat in the locating holes of the rotor housing.

3. Place 2 dowel pins in the rotor housing locating holes.

4. Slide the unassembled rotor onto the mainshaft and pinion gear. Observe the position of the rotor so that when seals are installed on the gear side of the rotor, the rotor can be placed into the rotor housing without unnecessary movement. This prevents the sealing components from accidentally falling out of the rotor.

5. Remove the rotor from the rotor housing.

6. Install a snap ring in the groove nearest the rotor gear, using a snap ring pliers.

7. Slide the needle bearing into the rotor. The marks made on the needle bearing (if reused) and rotor are to be lined up so that the needle bearing is installed in the same place as prior to disassembly.

8. Secure the needle bearing in the rotor with a snap ring, using a snap ring pliers, Fig. II-48. Lubricate the needle bearing with oil.

Note: Snap rings must be seated in the rotor grooves to properly retain the needle bearing in place.

Fig. II-48

9. Place the rotor on a clean rag with the gear side facing up.

10. Insert high-temperature grease (Bosch Ft1v4 or Ft1v8) in the sealing pin bores and the side seal grooves.

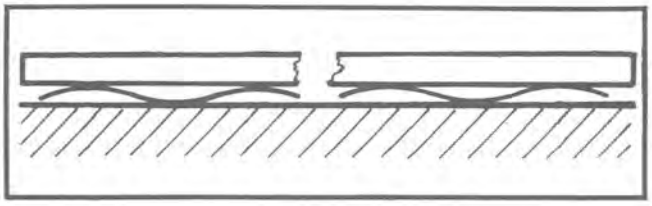
11. Insert the 2 sealing pin springs into each sealing pin bore. Perform this step on remaining sealing components on gear side of rotor.

Note: Sealing pin springs must have the convex sides touch each other to ensure maximum spring compression. Open end of the sealing pin springs must line up with apex seal groove.

12. Insert the sealing pin into the sealing pin bore. Line up sealing pin by running an apex seal through the groove. Perform this step on remaining sealing components on gear side of rotor.

13. Install the side seal springs into the groove; spring ends are to point toward the rotor. Install side seal in grooves, Fig. II-49.

Fig. II-49



Install Rotor in Rotor Housing

Equipment Necessary: High-Temperature Grease (Bosch Ft1v4 or Ft1v8)

1. Carefully slide the rotor (gear side down) onto the mainshaft and pinion gear.

> **CAUTION**
> **Make sure that sealing components do not accidentally fall out of the rotor when installing rotor in rotor housing. Damage to the end cover(s) and/or rotor housing will occur if components were allowed to fall out of the rotor and complete engine assembly performed.**

2. Insert high-temperature grease (Bosch Ft1v4 or Ft1v8) into the sealing pin bores and side seal grooves.

3. Insert 2 sealing pin springs into each sealing pin bore. Perform this step on all sealing components.

Note: Sealing pin springs must have the convex sides touching to ensure maximum spring compression. Open end of the sealing pin springs must line up with the apex seal groove.

4. Insert the sealing pin into the sealing pin bore. Line up sealing pin by running an apex seal through the groove. Perform this step on all sealing components.

5. Install the side seal springs into the grooves; spring ends are to point toward the rotor. Install side seals in grooves, Fig. II-49. Perform this step on sealing components.

6. Lubricate the apex seal end piece with high-temperature grease (Bosch Ft1v4 or Ft1v8) and slide the end piece into the apex seal groove.

7. Place the apex seal with spring on the apex seal end piece and slowly push all components down the groove, Fig. II-50. Install remaining apex seal end pieces, apex seal springs and apex seals in the same manner.

Fig. II-50

Install PTO End Cover and Counterweights

Equipment Necessary: Oil, Mounting Sleeve, 10 mm Socket, 11 mm Wrench and Torque Wrench

1. Lubricate the PTO end cover sliding surface and bearing with oil.

2. Place the mounting sleeve on the mainshaft and slide the PTO end cover over the mainshaft. Ensure the PTO end cover slides onto the rotor housing dowel pins, Fig. II-50, and is firmly sealed around the rotor housing sealing surface.

3. Secure the PTO end cover, rotor housing and Magneto end cover together with 10 bolts, flat washers and nuts, using a 10 mm socket and wrench, Fig. II-51. Tighten the nuts to 5.8 - 8.0 ft. lbs. torque, using a torque wrench.

Fig. II-51

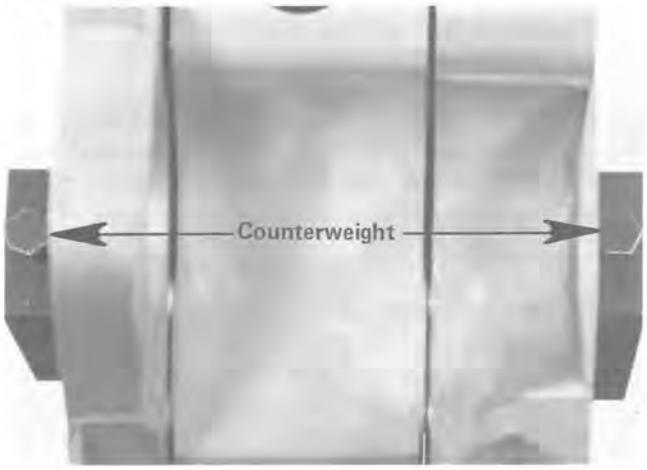
Note: Each bolt is to be equipped with 2 flat washers; one under the bolt head and the other between the PTO end cover and nut. When tightening the nuts, use a crisscross pattern and tighten the nuts in three graduated torque increments.

4. Remove the mounting sleeve from the mainshaft.

5. Clean Locktite deposits from counterweight bolts and inner threads of the counterweights with lacquer thinner. Apply Locktite TL 270 on the bolt threads.

6. Thread bolts into counterweights. Slide a counterweight, Fig. II-52, onto each end of the mainshaft and align bolt with the balancing detent in the mainshaft. Tighten the counterweight bolt to 21.7 ft. lbs. torque, using a 13 mm socket and torque wrench.

Fig. II-52



Install Magneto and Fan Assembly

Equipment Necessary: 5 mm Allen Wrench, 10 mm Socket, Torque Wrench, 15/16-Inch Wrench and Locktite TL 270

1. Position the magneto plate in place on the Magneto end cover mounting studs. Secure magneto plate, Fig. II-53, in place with 4 bolts, flat washers and nuts, using a 5 mm Allen wrench, 10 mm socket and torque wrench, Fig. II-53. Tighten the nuts to 5.8 - 8.0 ft. lbs. torque.

Note: If electrical components were not removed from the magneto plate, install the complete magneto assembly.

Fig. II-53

2. Insert the woodruff key into the keyway in the mainshaft, Fig. II-54.

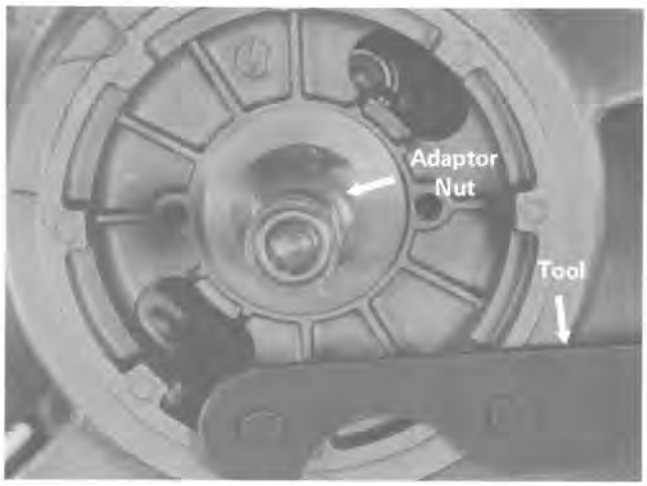
Fig. II-54

3. Slide the fan assembly onto the mainshaft, making sure that the woodruff key seats into the keyway in the fan.

4. Place the PTO end counterweight into a vise and tighten securely to hold engine in place and to prevent the mainshaft from rotating. Secure the fan assembly to the mainshaft with the mainshaft adaptor nut, using a 15/16-inch wrench, Fig. II-55. Tighten the adaptor nut to approximately 57.8 ft. lbs. torque, using an end wrench. Torque wrench cannot be used for tightening due to the adaptor nut configuration. Holding tool in Fig. II-55 is not necessary.

Note: Internal threads of the adaptor nut can be lightly coated with Locktite TL 270.

Fig. II-55



Install Fan Housing

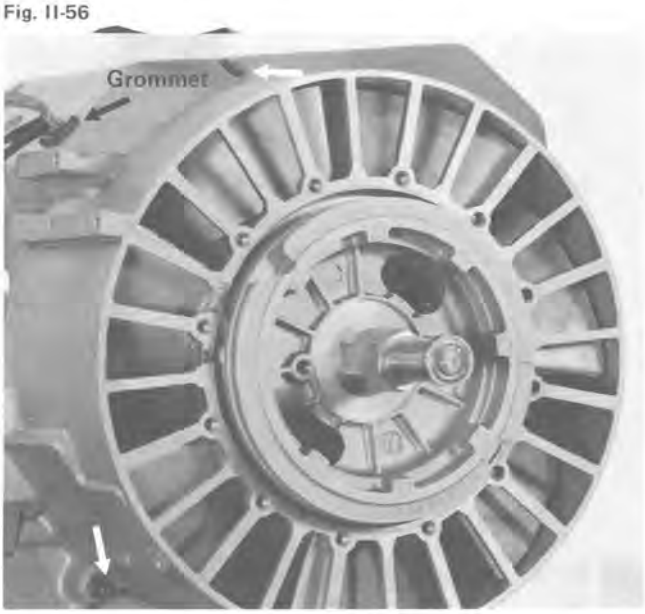
Equipment Necessary: 5 mm Allen Wrench and Torque Wrench

1. Insert and seat 2 dowel pins in the top and exhaust side mounting holes of the magneto end cover.

2. Slide the fan housing into position and insert the rubber grommet into the cut-out in the fan housing. Curved end of grommet to be inserted into the fan housing, Fig. II-56.

3. Secure the fan housing to the end cover with 3 Allen head screws, using a 5 mm Allen wrench, Fig. II-55. Tighten the screws to 5.5 ft. lbs. torque, using a torque wrench.

Fig. II-56



Note: Use the shortest allen head screw to secure the fan housing nearest the intake of the engine.

Install External Components

Equipment Necessary: 11/16-Inch Socket, 11/16-Inch Wrench, Torque Wrench, Screwdriver, 13/16-Inch Spark Plug Socket, 13 mm Wrench, 7/16-Inch Socket and 7/16-Inch Wrench

1. Install the engine plate to the engine with 4 bolts and lockwashers, using a 11/16-inch socket and wrench. Tighten the bolts to 30 ft. lbs. torque, using a torque wrench.

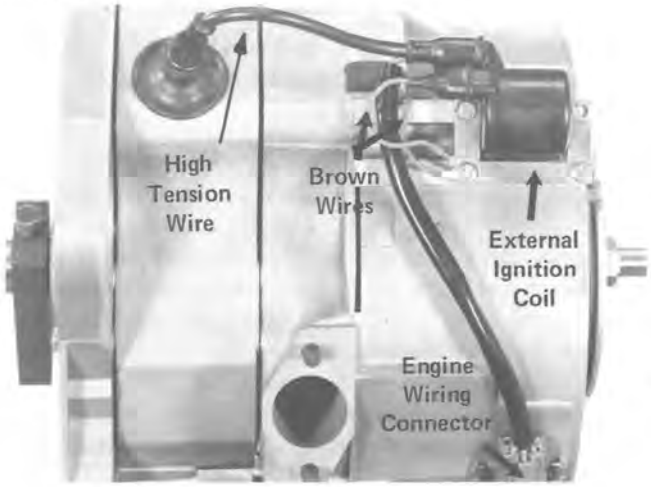
2. Secure the engine wiring connector to the fan housing with 2 screws, using a screwdriver. The short ground wire extending from the wiring connector is to be grounded to the outside screw, Fig. II-57.

3. Install the external ignition coil to the fan housing with 3 screws and lockwashers, using a screwdriver, Fig. II-57.

Note: The 2 brown wires (one from external coil and one from engine wiring harness) are to be grounded to the bottom left screw that secures the external coil to the fan housing, Fig. II-57.

4. Install the spark plug, using a 13/16-inch spark plug socket, and tighten to 16 - 18 ft. lbs. torque. Connect the high tension wire to the spark plug. Connect the 2 blue wires to the secondary terminal on the external ignition coil, Fig. II-57.

Fig. II-57



ENGINE SERVICING (ASSEMBLY)

5. Secure the exhaust pipe and gasket to the exhaust manifold with the 2 nuts and flat washers, using a 13 mm wrench. Tighten nuts to 9.4 - 11.5 ft. lbs. torque, using a torque wrench.

6. Slide the muffler partially onto the exhaust pipe, position the tailpipe clamp around the tailpipe and secure to the muffler backing bracket with 2 bolts, using a 1/2-inch wrench.

7. Slide the asbestos muffler strip between the muffler and backing bracket. When asbestos strip is in position, slide the muffler strap over the muffler backing bracket and tighten the capscrew and locknut, using a 7/16-inch socket and wrench.

8. Secure the carburetor with elbow, gaskets and insulator block to the intake manifold, using 1/2-inch open end wrench. Tighten to 9.4 - 11.5 ft. lbs. torque, using a torque wrench.

CAUTION

Nuts that secure carburetor to the intake manifold must be tight to ensure a good seal between the components. If not tight, sucking of air will occur, resulting in hard starting characteristics and a lean condition while operating; severe engine damage may occur.

ENGINE INSTALLATION

Install Engine in Snowmobile

Equipment Necessary: Two 9/16-Inch Wrenches, Pliers, Cardboard, 9/16-Inch Socket, 8-Inch Extension, Torque Wrench, Phillips Screwdriver and 1/2-Inch Wrench

1. Set the 2 solid aluminum front mounts on the front end assembly.

2. Carefully place the engine on the front end assembly and aluminum mounts. Slowly move the engine rearward to allow the rear motor mounts to push through the holes in the curved section of the belly pan.

3. Secure the engine plate and solid aluminum mounts to the front end assembly with 2 capscrews, flat washers and locknuts, using two 9/16-inch wrenches.

Note: The locknut and flat washer are to be positioned on top of the engine plate for proper installation.

4. Push the vapor return line onto the carburetor vapor return fitting (inside fitting), Fig. II-58.

5. Push the fuel line onto the carburetor fuel inlet fitting (outside fitting), Fig. II-58, and secure in place with the clamp, using a pliers.

Fig. II-58

6. Install the recoil starter and fuel pump (see Install Recoil Starter, steps 1 and 2, page II-35).

7. Plug the ignition connector into the engine connector block.

8. Install the drive clutch (see Section V — Drive System, Install Drive Clutch).

9. Install the intake hose, throttle and choke wires (see Section III — Fuel System, Install Carburetor, steps 2 - 5).

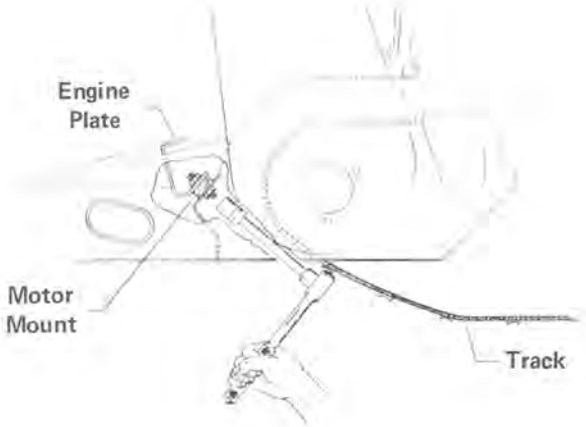
ENGINE INSTALLATION

10. Adjust the throttle control (see Section III — Fuel System, Throttle Adjustment).

11. Tip the snowmobile on its side and use a piece of cardboard or similar material to prevent scratching.

12. Secure the motor mounts to the belly pan with 2 locknuts, using a 9/16-inch socket and an 8-inch extension. Tighten the locknuts to 35 ft. lbs. torque, using a torque wrench. Tip the snowmobile right side up.

Fig. II-59



13. Install the hood with 2 pins and retain in place with 2 push nuts.

14. Push the headlight harness connector into the headlight connector block.

15. Secure the hood cable to the inside of the front end assembly and belly pan with a phillips screw, flat washer and locknut, using a phillips screwdriver and 1/2-inch wrench.

16. Check the center to center distance between the drive clutch and driven pulley (see Section V — Drive System, Center to Center Distance).

17. Check the offset between the drive clutch and driven pulley (see Section V — Drive System, Offset).

18. Install the drive belt (see Section V — Drive System, Install Drive Belt).

ENGINE SERVICING (RECOIL STARTER)

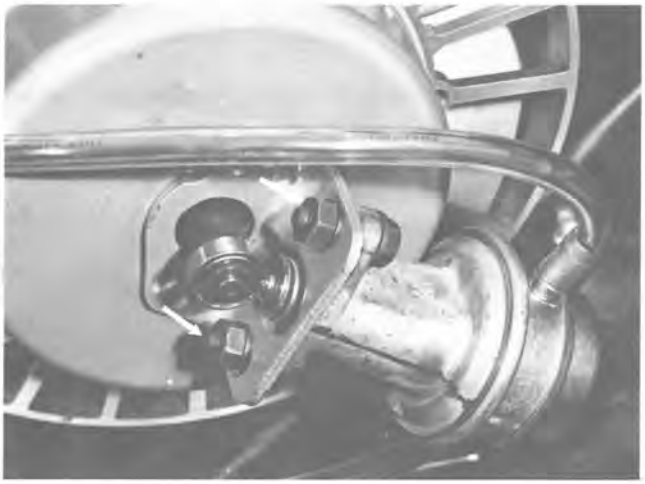
Remove Recoil Starter

Equipment Necessary: 7/16-Inch Wrench, Large Screwdriver, 13 mm Socket, 13 mm Wrench and Short Screwdriver

1. Remove the console-mounted recoil cable bracket, using a large screwdriver and 7/16-inch wrench. Just prior to complete removal of the last screw, grasp the recoil handle so it does not forcefully retract toward the main recoil assembly.

2. Remove the 2 bolts, lockwashers, flat washers and nuts that secure the fuel pump to the recoil housing, using a 13 mm socket and wrench, Fig. II-60.

Fig. II-60

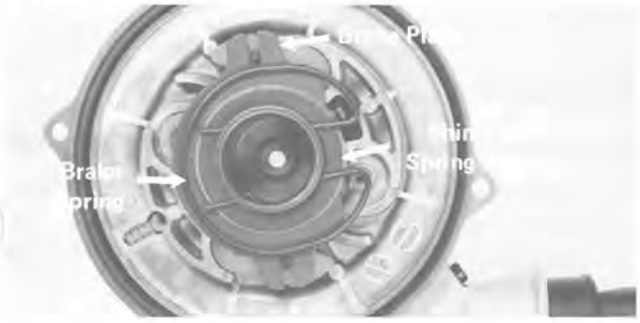


3. Remove the 4 screws and lockwashers that secure the recoil starter assembly to the fan housing, using a short screwdriver. Place recoil assembly on a clean work area and disassemble.

Disassemble Recoil Starter

Equipment Necessary: Vise Grip and Hammer

Fig. II-61

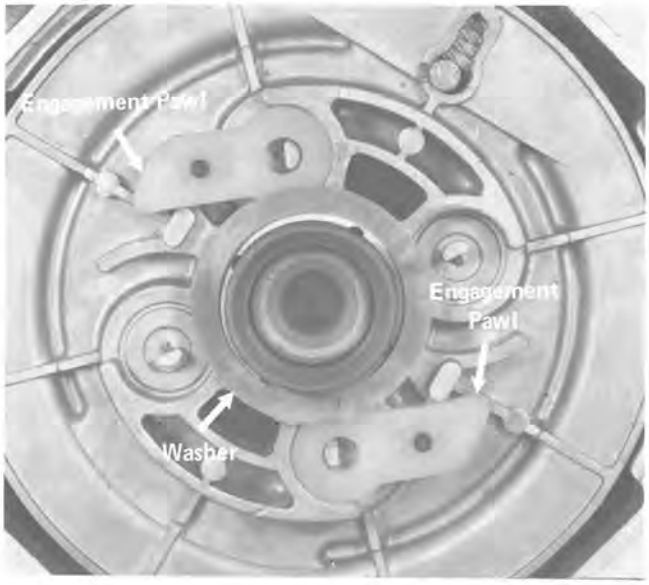


1. Grasp the brake spring at its arched point and lift up to clear center hub. Slide the brake spring off the center hub, Fig. II-61.

2. Remove the 2 shims, spring washer and brake plate from the center hub, Fig. II-61.

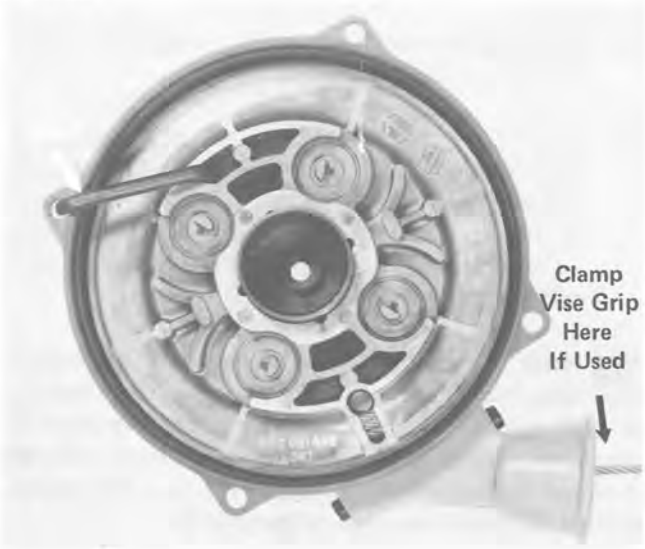
3. Remove washer and engagement pawls from the pulley, Fig. II-62.

Fig. II-62



4. Pull the starter cable out approximately 20 inches and lock the cable pulley in place with a home-made tool. A vise grip may also be used to retain the starter cable in place but caution is to be exercised so that the cable is not accidentally damaged, Fig. II-63.

Fig. II-63



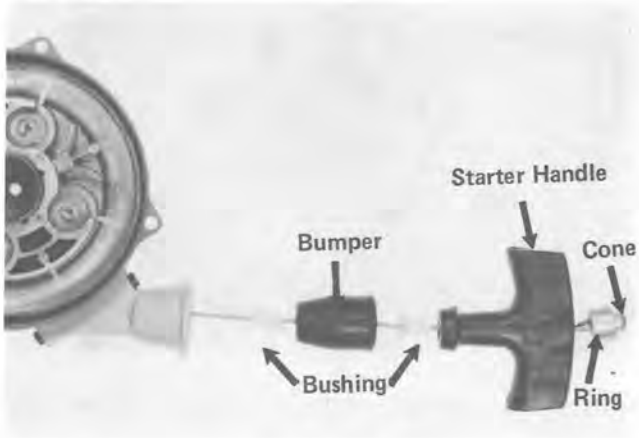
5. Pull the rubber bumper from the starter handle. Grasp starter cable and push toward the starter handle so that the clamping ring and retaining cone are pushed out of the starter handle, Fig. II-64.

6. Tap lightly on the retaining cone to remove from the clamping ring, using a hammer. Separate starter cable, retaining cone and clamping ring, Fig. II-64.

7. Slide all components off the starter cable.

Note: There is a bushing in the end of the rubber bumper and starter handle. Removal is not necessary unless damage is evident.

Fig. II-64



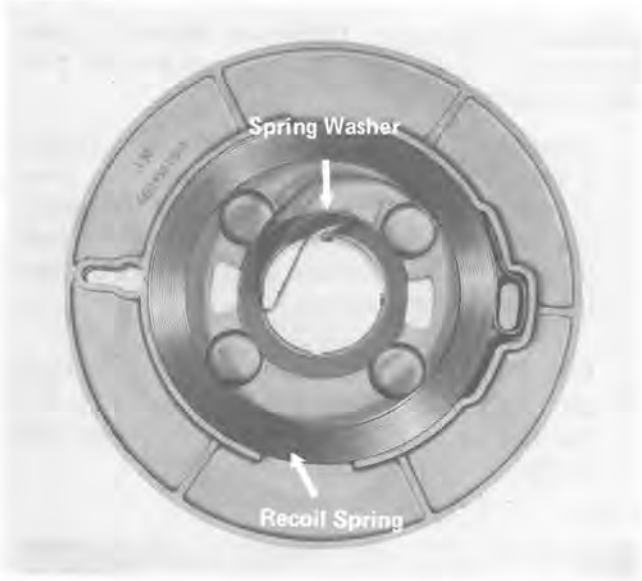
8. Grasp the cable pulley with one hand so that a sudden retraction of the cable cannot occur and with the other, release the vise grip or tool from the cable. Slowly allow the cable to retract onto the cable pulley.

9. Remove the cable guide that is secured to the recoil housing, using a screwdriver.

10. Carefully lift the cable pulley off the center hub, making sure that the recoil spring does not accidentally disengage from the back side of the cable pulley. Account for the spring washer located between the recoil spring and cable pulley, Fig. II-65.

Note: If recoil spring damage is suspected, proceed to step 11. If damage is not evident, do not remove the recoil spring from the back of the cable pulley. No further disassembly is required if recoil spring is not removed. Proceed to Inspection of Recoil Components, page II-32).

Fig. II-65



11. Remove the recoil spring from the cable pulley by lifting the spring end up and out. Hold remainder of recoil spring in the cable pulley with thumbs and alternately lift each thumb to allow the recoil spring to gradually release from the cable pulley, Fig. II-66.

Fig. II-66

Inspection of Recoil Components

Equipment Necessary: No Special Tools Required

1. Inspect the brake spring, shims, washers, brake plate and engagement pawls for excessive wear and damage. Replace affected components if damage is evident.

2. Inspect the cable pulley and recoil housing for excessive wear, cracks or damage. Also check the center hub and nylon centering piece, Fig. II-69, for cracks and excessive wear. Replace components if wear or damage is evident.

3. Check the cable for cracks, fraying and breaks. If any of these conditions exist, replacement is necessary.

4. Inspect the spring for cracks, crystalization and abnormal bends. If damage is evident, replace the recoil spring.

5. Inspect the starter handle, rubber bumper, clamping ring, retaining cone and the nylon bushings in the end of the rubber bumper and starter handle for damage, cracks or deterioration. Replace components as conditions dictate.

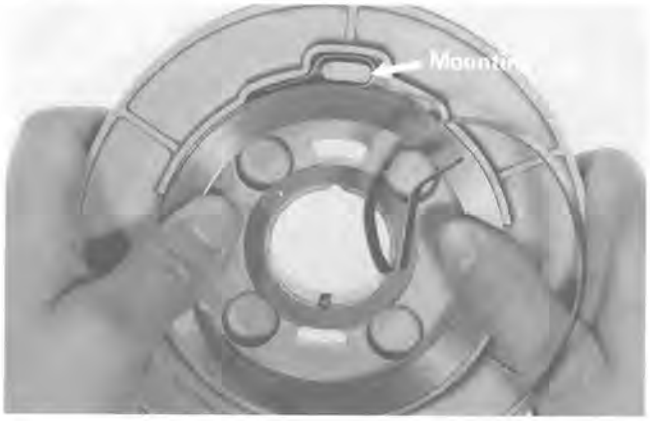
Assemble Recoil Starter

Equipment Necessary: Low-Temperature Grease (Texaco 2346EP), Light Oil, Vise Grip, Screwdriver, Flat End Punch and Hammer

1. Position the rectangular-shaped hooked end of the recoil spring around the mounting lug in the cable pulley, Fig. II-67.

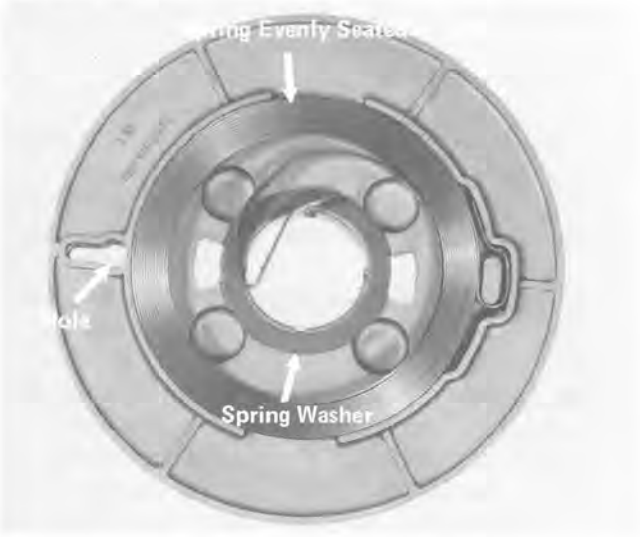
2. Continue to insert the recoil spring, winding in a clockwise direction, Fig. II-67. Insert windings one at a time until the complete recoil spring is installed.

Fig. II-67



Note: Recoil spring must seat evenly on the cable pulley to ensure correct installation, Fig. II-68.

Fig. II-68



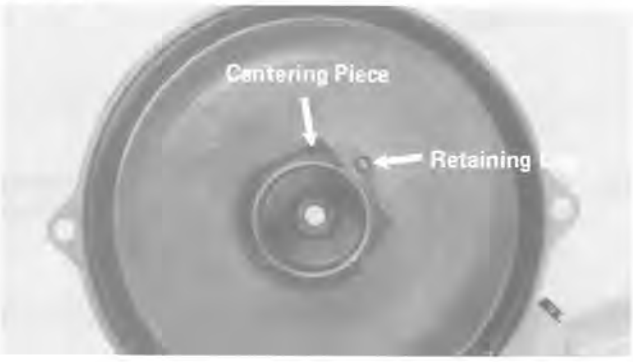
3. If a new cable is to be installed, slide the end through the hole, Fig. II-68, in the pulley and seat the cable retaining pin in the hole. Place spring side of the cable pulley down and wind the cable around the pulley in a counterclockwise direction.

4. Apply a light coat of low-temperature grease (Texaco 2346EP) on the spring washer and slide into the recess of the cable pulley, Fig. II-68.

5. Apply a few drops of light oil on the recoil spring. Wipe off any excess oil that may remain on the spring or cable pulley, Fig. II-68.

6. If the centering piece, Fig. II-69, was defective, slide a new centering piece on the center hub of the recoil housing. Make sure that the ends of the centering piece are positioned on each side of the recoil spring retaining lug, Fig. II-69.

Fig. II-69



7. Slide the cable pulley onto the center hub of the recoil housing, and simultaneously, hook the spring end around the recoil spring retaining lug.

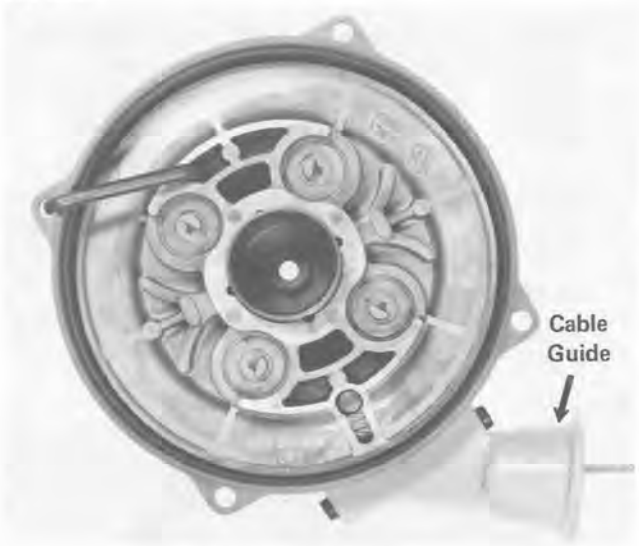
8. Preload the recoil spring by rotating the cable pulley 1/2 - 1 turn counterclockwise until the cable mounting hole in pulley lines up with the cable port (opening) in the recoil housing.

9. Hold pulley in place to prevent retraction and pull cable through the cable port in the recoil housing. Cable to be pulled out approximately 20 inches. With cable pulled out, lock the cable pulley in place with a home-made tool. A vise grip may be used to retain starter cable in place but caution is to be exercised so that the cable is not accidentally damaged.

10. Slide the cable guide onto the starter cable, hold end of cable, remove vise grip and clamp at back side of cable guide.

11. Position the cable guide so that the bell end faces toward the oiler fitting on the recoil housing. Secure cable guide to recoil housing with 2 screws and lockwashers, using a screwdriver, Fig. II-70.

Fig. II-70

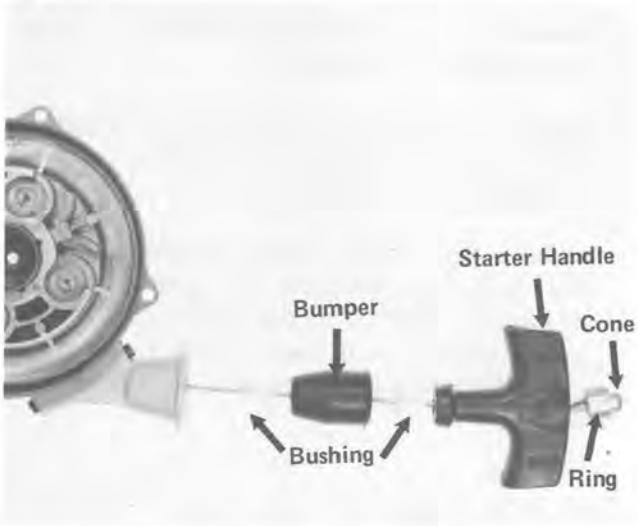


12. Slide the rubber bumper with bushing, starter handle with bushing and clamping ring (small diameter first) onto the starter cable.

13. Wind the starter cable around the retaining cone and seat the cable with cone into the clamping ring. Seat the retaining cone, using a flat end punch and hammer.

14. Pull the clamping ring with retaining cone and cable into the starter handle seat. Push end of starter handle into the rubber bumper.

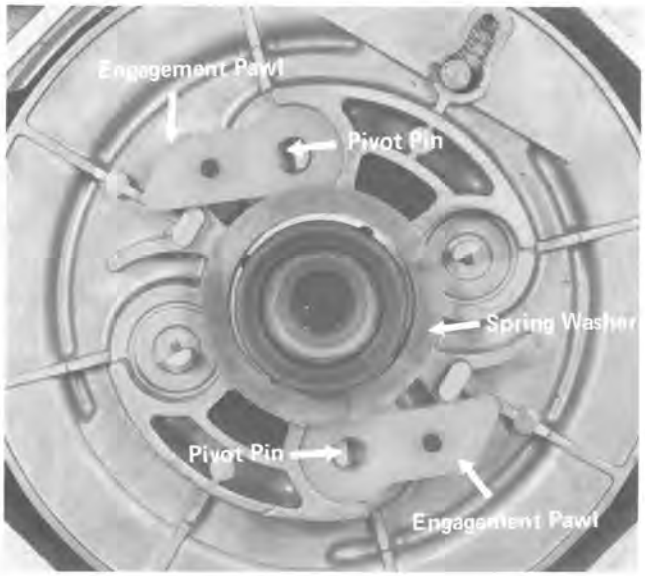
Fig. II-71



15. Remove the vise grip and allow the starter cable to slowly retract onto the cable pulley. Care must be exercised so that the cable does not suddenly retract and cause possible damage.

16. Lubricate the engagement pawl pivot pins in the cable pulley with light oil. Place engagement pawls into position and slide shim washer over the center hub, Fig. II-72.

Fig. II-72



ENGINE SERVICING (RECOIL STARTER)

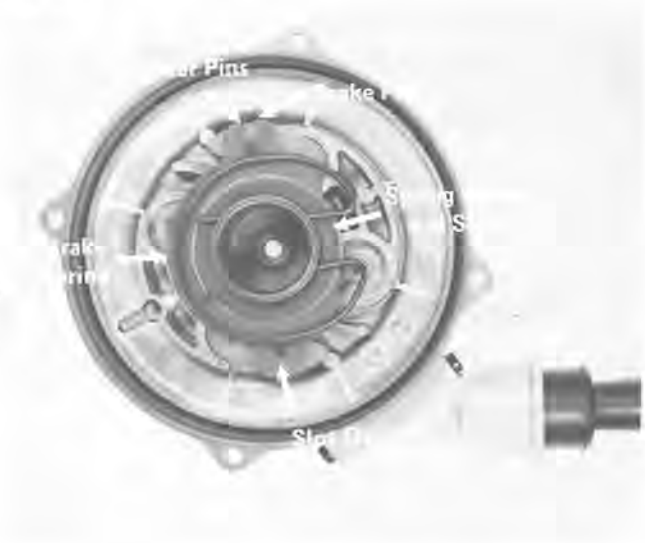
17. Slide the brake plate, spring washer and shims onto the center hub, Fig. II-73.

Note: Slots in the brake plate are to be positioned over the engagement pawl pins, Fig. II-73, so that proper operation will result.

18. Secure the recoil assembly with the brake spring.

Note: The two center ends of the brake spring must be positioned on the inside of the brake plate retaining flanges, Fig. II-73. Brake plate is to have from 0.0039 - 0.0079 inch axial play.

Fig. II-73



Install Recoil Starter

Equipment Necessary: Short Screwdriver, Torque Wrench, 13 mm Socket, Large Screwdriver and 7/16-Inch Wrench

1. Install the recoil starter assembly with the 4 screws and lockwashers, using a short screwdriver. Tighten the screws to a point just before binding of the recoil assembly occurs. Pull starter cable out approximately 6 - 10 inches or until the pawls engage, which will center the recoil assembly. Tighten the screws to 4.3 - 5.8 ft. lbs. torque, using a torque wrench.

2. Install the fuel pump (fuel pump bowl toward exhaust side of engine) on the recoil housing bracket with 2 bolts, lockwashers and flat washers, using a 13 mm socket and wrench. Tighten bolts and nuts securely.

3. Slide the recoil cable bracket on the cable and pull cable out to the console. Secure the cable bracket with cable to the console with 2 screws and locknuts, using a large screwdriver and 7/16-inch wrench.

Note: The toolbox must be opened to install the locknuts on the screws that secure the cable bracket in place.

ENGINE SERVICING (STORAGE)

Storage

If a consumer brings the Wankel Panther in for servicing at the end of the snow season, the following instructions are to be performed to protect the engine and mechanical components from rust, undue tension, etc.

1. Disconnect the fuel line running from the fuel tank at the fuel pump. Allow the fuel from the fuel tank to drain completely. Connect fuel line to fuel pump.

2. Start the engine and run at idle until the engine stops from fuel exhaustion. Fuel tank, fuel line, fuel pump, carburetor and engine are free of fuel.

Note: If fuel is allowed to remain in the fuel tank and fuel system, varnish and gum deposits may very well occur, resulting in improper operation of the fuel system and engine.

3. Blow out the fuel and vapor return lines.

4. Remove the fuel tank and wash the inside with cleaning solvent. Dump out solvent and pour a pint of fuel (25:1 mixture) into the fuel tank and install the fuel tank cap. Shake the mixture vigorously and dump out when fuel tank sides have been coated. Install fuel tank and connect fuel line to the fuel tank fitting.

ENGINE SERVICING (STORAGE)

5. Check the fuel tank fuel filter, in-line fuel filter and the fuel pump filter.

6. Loosen the carburetor intake hose clamp, using a screwdriver. Pull the intake hose off the carburetor intake adaptor. Squirt 1 ounce of Arctic Cat Engine Preservative, Shell ENSIS Fluid 260, ESSO RUST BAN 395 or MOBIL OIL MIL-L-644B into the intake with the choke and throttle valve open. Pull the recoil starter 5 to 6 times to allow the rotor to coat the internal engine parts with preservative, which will prevent rusting due to condensation during storage.

7. Remove the spark plug and install an old plug, which prevents fouling the existing plug or a new plug with the preservative used to coat the internal engine components. Close the choke and plug the carburetor intake hose and muffler tailpipe.

8. Remove the chaincase cover and drain the chaincase lubricant. Install chaincase cover and fill with 8 ounces of Arctic Chainlube, or even with the bottom of the check plug hole.

9. Thoroughly clean the snowmobile by hosing off dirt accumulations and grime from the skid frame and engine compartment; dry components thoroughly.

Note: Use special care so as not to get an undue amount of water on the engine and carburetor.

10. Remove the drive belt from the driven pulley and drive clutch. To prevent warping or distortion, lay the belt flat or place in a cardboard sleeve to retain belt configuration.

11. Check the drive chain tension.

12. Clean the faces of the driven pulley. Apply low-temperature grease (Texaco 2346EP) on the pulley hub, fixed and moveable face to prevent rusting. Wipe off excess grease.

13. Loosen the track tension adjusting bolts to prevent stretching and warping of the track. If the snowmobile is to be stored for the consumer, rotate the track several revolutions each month.

14. Apply light oil (anti-corrosion) to the steering post bushings, spindle arms and skid frame pivot points.

15. Lubricate the rear suspension arms with low-temperature grease (Texaco 2346EP).

Note: The position of the grease fitting makes it necessary to use a flexible hose grease gun for this lubricating purpose.

16. Tighten all nuts and bolts. Ensure that all rivets and connections are securely fastened.

17. Touch up all rusted or chipped paint surfaces; sand lightly before painting.

18. Clean and polish the hood with an automotive cleaner wax.

19. Clean the console and toolbox with water. DO NOT USE SOAP OR SPRAY CLEANERS. DAMAGE TO THE LEXAN CONSOLE AND TOOLBOX WILL RESULT.

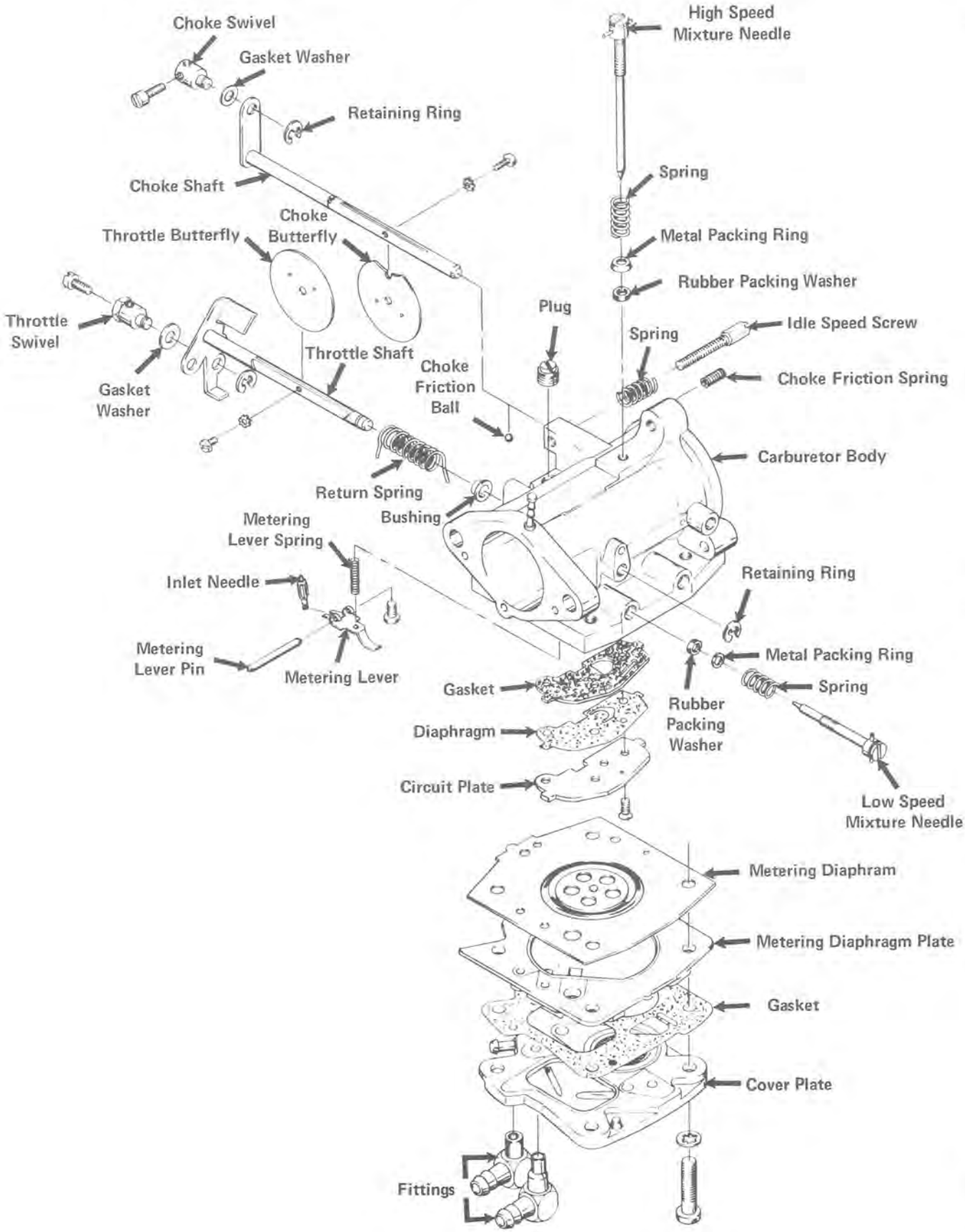
20. If the snowmobile is to be stored for the consumer inside a storage building, suspend the entire track off the floor by blocking up the rear end. Cover the snowmobile with a snowmobile cover or heavy tarpaulin.

ALTERNATE OILS FOR FUEL MIXING

1. BP-Super Outboard Motor Oil
2. Essolub HD30
3. Mobilmix TT
4. Mobiloil TT
5. Shell Rotella SAE 30 HD
6. Fina Poly 8

TABLE OF CONTENTS

WALBRO WRC-I CARBURETOR



FUEL SYSTEM

General (Fig. III-1)

The fuel system utilized in the Arctic Cat Wankel Panther snowmobile consists of a fuel tank, fuel line, vapor return line, carburetor and an externally mounted fuel pump. The fuel pump is mounted on the recoil housing and actuated by a cam that works integrally with the number of mainshaft revolutions.

The only source of lubrication for the Wankel engine is the fuel mixture that is used during the combustion process and for this reason, significant importance is placed on fuel mixing. The correct ratio of gasoline to oil is 25:1. If the fuel mixture contains too much oil, the spark plug will eventually foul and the rotor faces will become excessively carboned because of incomplete combustion.

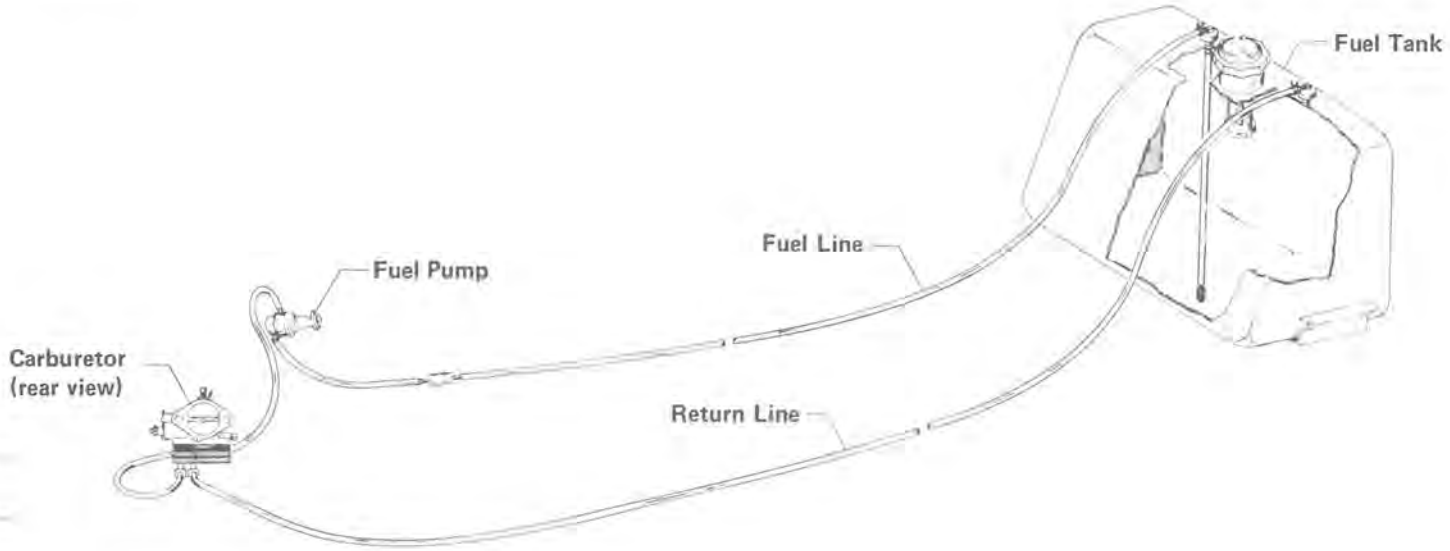
The fuel tank, Fig. III-1, is made of 20 gauge cold rolled steel and has an approximate capacity of 6.25 U.S. gallons. The outside of the fuel tank is specially cleaned and coated with a gasoline/oil resistant paint. The tank is equipped with a vented fuel level gauge cap, Fig. III-1, that allows vapor gasses to be released to the atmosphere and also aids in allowing fuel to flow to the fuel pump and carburetor. If a vent hole would not be provided in the fuel level gauge cap or if the vent hole becomes obstructed, fuel will not flow to the fuel pump and carburetor.

The fuel tank is also equipped with 2 fittings to accommodate the fuel line (pick-up with filter and check valve to prevent back flow of fuel when engine is off) and the vapor return line, Fig. III-1. The section of fuel line that extends down to the bottom of the fuel tank has a screened filter at the end that filters out impurities in the gasoline, which would otherwise make their way to the fuel pump and to the carburetor. As an added precaution, an in-line filter is also placed in the fuel line, just before the fuel pump. In addition to the afore mentioned filters, there is also a filter in the fuel pump and in the carburetor to ensure that foreign matter does not pass into the engine and cause severe damage.

To transmit fuel from the fuel tank to the carburetor, a fuel pump is mounted on the recoil housing and works in conjunction with mainshaft revolutions. The primary function of the carburetor is to meter a precise volume of fuel and at a specific time, change liquid fuel to a vapor that is mixed with air, resulting in a volatile gas. This volatile gas is ignited by the spark plug, resulting in combustion.

The Walbro WRC carburetor is a diaphragm-type with an externally mounted fuel pump that operates off mainshaft revolutions. To retard vapor locking, the carburetor employs a recirculation system that returns vapor and excess fuel not used by the carburetor to the fuel tank. The carburetor intake hose quiets intake air and catches fuel spit-back from the carburetor, Fig. III-1.

Fig. III-1



THEORY OF OPERATION

Choke/Starting Operation

The fuel pump transmits fuel from the fuel tank to the carburetor. To enter the carburetor, fuel passes through the inlet fitting and filter screen. Once screened, the fuel is governed by the metering diaphragm, then passes around the inlet needle and into the bore of the carburetor via the idle port, secondary idle ports and the main nozzle. This rich fuel mixture is obtained when the choke butterfly is closed and the throttle butterfly is slightly open (approximately 1/4). Excess fuel and if any vapor exists, bypasses the inlet needle, flows out of the carburetor and back to the fuel tank via the vapor return line.

Idle Operation

When a warm engine is idling, the choke butterfly is completely open and the throttle butterfly is slightly open. During the idling process, the carburetor is under atmospheric pressure. Fuel flows through the idle take-off and into the idle fuel well where air and fuel are mixed. The air enters the idle fuel well through the secondary idle ports. The fuel finally passes by the idle needle and is introduced into the carburetor bore through the idle discharge port.

Part Throttle Operation

Fuel is introduced and passes through the carburetor as during idle operation. As the throttle butterfly is opened and the engine speed increases, more fuel is demanded from the carburetor. When the throttle butterfly is partially open, the secondary idle ports are exposed to air velocity. Fuel flows into the idle fuel well and is discharged through the idle port and secondary idle ports. Mixing of fuel and air occurs in the carburetor bore.

Full Throttle Operation

As the throttle butterfly opens progressively further from part throttle operation, the air velocity through the carburetor venturi increases. Both the choke and throttle butterfly are now fully open. The greatest volume of fuel flows around the high speed mixture needle and is discharged into the carburetor bore through the main nozzle. Additional fuel also flows into the idle fuel well and is discharged into the carburetor bore through the idle port and secondary idle ports. Mixing of fuel and air occurs in the carburetor bore.

Fuel and Vapor Return System

During engine operation at high elevation or high temperatures, fuel may vaporize. Vapor and excess fuel collects above the inlet needle and is allowed to escape through the inlet needle bypass. Vapor and excess fuel then flows out of the carburetor and back to the fuel tank via the vapor return line. The vapor then passes through the vented fuel level gauge cap and escapes into the atmosphere.

BEFORE TROUBLE SHOOTING THE CARB.

Check Fuel Tank Filter

Equipment Necessary: 12-Inch Stiff Wire and Gasoline

Inside the fuel tank on the end of the fuel line is a brass screened fuel filter. The filter must be clean to allow the fuel line to transmit the maximum volume of fuel. If the fuel filter or the vent hole in the fuel level gauge cap is obstructed, fuel flow will be restricted – cleaning is required.

1. If the fuel level gauge cap vent hole is plugged, remove the obstruction by washing in gasoline and drying with compressed air.
2. Form a hook on the end of a piece of stiff wire.
3. Insert the hook through the filter hole and pull the fuel line with filter from within the fuel tank.
4. Examine the condition of the fuel filter. If filter is obstructed, wash in a container of clean gasoline. If brass screen or spring is damaged, filter is to be replaced.

BEFORE TROUBLE SHOOTING THE CARB.

5. When the fuel filter is clean, install the filter in the end of the fuel line. Insert the fuel line with filter into the fuel tank, making sure the filter reaches the bottom of the fuel tank.

6. Install the fuel level gauge cap.

Check In-Line Fuel Filter

Equipment Necessary: Gasoline

The fuel line incorporates an in-line fuel filter, just before the engine mounted fuel pump. The filter must be clean to allow the fuel line to transmit the maximum volume of fuel. If fuel filter is obstructed, fuel flow will be restricted — cleaning is required.

1. Remove the fuel filter from the fuel line. After filter is removed, position the fuel line higher than the fuel level in the fuel tank so that drainage does not occur.

2. The in-line fuel filter is a unitized component and does not have a replaceable filtering element. Therefore, the only cleaning that is to be performed is a back-flush of the filter, using gasoline.

3. When the fuel filter is clean, install in the fuel line.

4. Check fuel line and vapor return line for proper connection on the fittings. If lines are cracked or deteriorated, replacement is necessary.

Check Fuel Pump Filter

Equipment Necessary: Screwdriver and Kerosene

The screened filter in the fuel pump bowl is to be clean to allow the maximum volume of fuel to be pumped to the carburetor. If screened filter is obstructed, fuel flow will be restricted — cleaning is necessary.

1. Remove the fuel line running from the fuel tank to the fuel pump fitting. Place the fuel line higher than the fuel level in the fuel tank to prevent drainage.

2. Remove the screw and lockwasher that secures the fuel pump cover, using a screwdriver.

3. Remove the cover by rotating counterclockwise and lift out the screened filter and gasket.

4. If the screen is obstructed or dirty, flush with kerosene and dry thoroughly with compressed air before installing.

5. After cleaning or replacing the screened filter, install the gasket, screened filter and fuel pump bowl. Secure the components to the fuel pump with a screw and lockwasher, using a screwdriver.

Starting a Flooded Engine

Equipment Necessary: 13/16-Inch Spark Plug Socket and Torque Wrench

1. Rotate the ignition key to the OFF position.

2. Disconnect the high tension wire from the spark plug and remove the spark plug, using a 13/16-inch spark plug socket.

3. Dry the spark plug and crank engine over 5-10 times.

4. Install the spark plug and tighten to 16-18 ft. lbs. torque, using a torque wrench. Connect the high tension wire to the spark plug.

5. Start the engine (see Section I — General, Starting/Stopping Instructions, page I-10).

Note: If the engine continues to flood, trouble shoot the carburetor (see Trouble Shooting, page III-6).

CHECK FUEL PUMP PRESSURE

(See Addendum 1 at end of this section.)

TROUBLE SHOOTING

Problem	Condition	Remedy
Rich condition — engine will not idle, accelerate or reach top speed.	1. Low speed mixture needle improperly adjusted. 2. High speed mixture needle improperly adjusted. 3. Metering lever set too high. 4. Dirt or foreign matter lodged under the inlet needle.	1. Adjust carburetor. (Fine Tuning) 2. Adjust carburetor. (Fine Tuning) 3. Adjust metering lever. 4. Disassemble carburetor, clean, assemble, install and adjust. (Fine Tuning)
Lean condition — spark plug insulator tip light gray or white, engine running hot or acceleration occurs when choke is activated at full throttle.	1. High speed mixture needle improperly adjusted. 2. Dirt or foreign matter. 3. Metering lever set too low. 4. Hole in metering diaphragm. 5. Warped insulator block. 6. Manifold gasket(s) leaking. 7. Carburetor or intake elbow loose. 8. Dirty fuel inlet screen. 9. Air leak between the choke shaft and carburetor mounting hole. 10. Air leak between the throttle shaft and carburetor mounting hole. 11. Carburetor cover plate and diaphragm plate loose.	1. Adjust carburetor. (Fine Tuning) 2. Disassemble, clean, assemble and adjust the carburetor. 3. Adjust metering lever. 4. Replace metering diaphragm. 5. Sand or replace insulator block. 6. Replace gasket(s). 7. Tighten bolts and nuts securing carburetor or intake elbow. 8. Clean fuel inlet screen and check complete fuel delivery system. 9. Replace the choke shaft and components or main carburetor body. 10. Replace the throttle shaft and components or main carburetor body. 11. Tighten 4 screws securely.

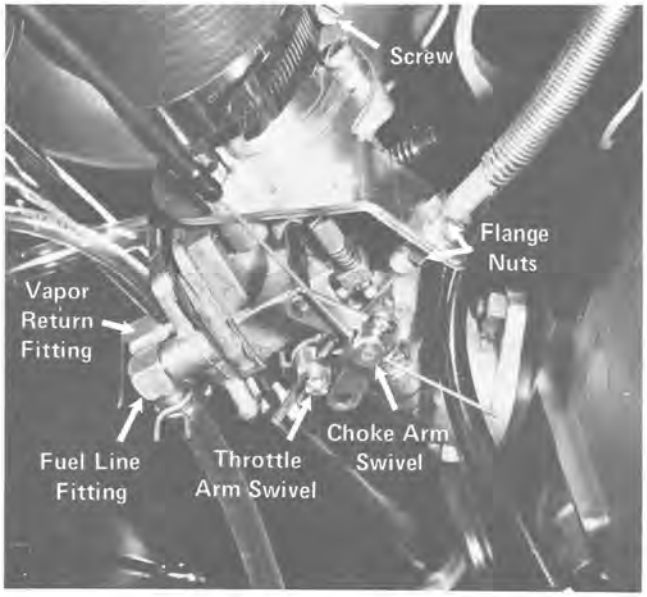
CARBURETOR REMOVAL

Carburetor Removal

Equipment Necessary: Screwdriver and Two 1/2-Inch Wrenches

1. Open the hood.
2. Remove the fuel line and vapor return line from the carburetor fittings, Fig. III-2. Position the fuel line so that gasoline does not flow.
3. Remove the carburetor intake hose from the intake adaptor by loosening the hose clamp screw, using a screwdriver, Fig. III-2. Pull the intake hose off the intake adaptor.
4. Remove the choke wire from the carburetor choke arm swivel, using a screwdriver, Fig. III-2.
5. Remove the throttle wire from the carburetor throttle arm swivel, using a screwdriver, Fig. III-2.
6. Loosen the 2 flange nuts that secure the throttle cable to the carburetor mounting bracket, using two 1/2-inch wrenches, Fig. III-2.
7. Remove the 2 bolts and locknuts that secure the carburetor to the intake elbow, using two 1/2-inch wrenches.

Fig. III-2



CARBURETOR SERVICING (DISASSEMBLY)

Disassemble Carburetor

Equipment Necessary: Medium Screwdriver

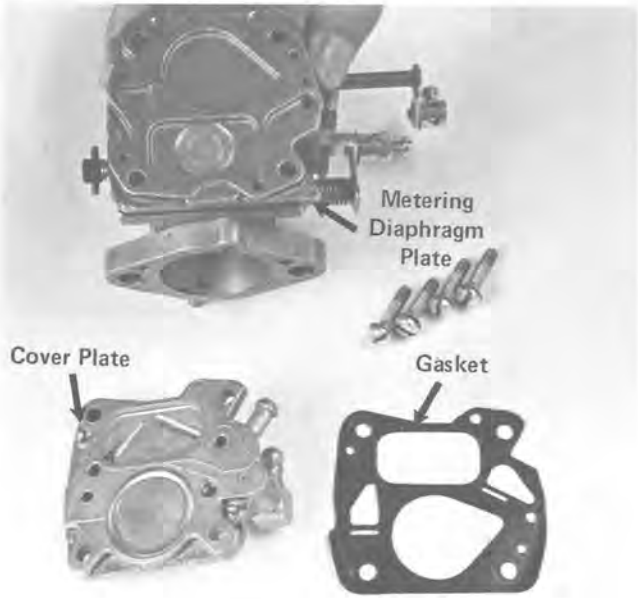
Prior to disassembling and servicing the carburetor, carefully clean the exterior of the carburetor, using carburetor cleaner.

CAUTION

DO NOT use compressed air to clean and blow out an assembled carburetor because damage to the diaphragm may result.

1. Disassemble the intake adaptor and throttle cable mounting bracket from the carburetor intake by removing the 3 screws and lockwashers, using a screwdriver.
2. Remove the 4 screws and lockwashers that secure the cover plate and metering diaphragm plate to the carburetor body, using a screwdriver.
3. Remove the cover plate and gasket, which will expose the metering diaphragm plate, Fig. III-3.

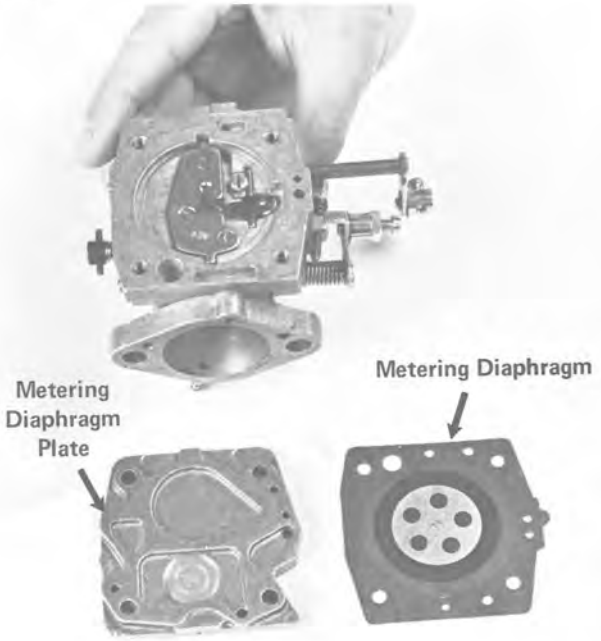
Fig. III-3



CARBURETOR SERVICING (DISASSEMBLY)

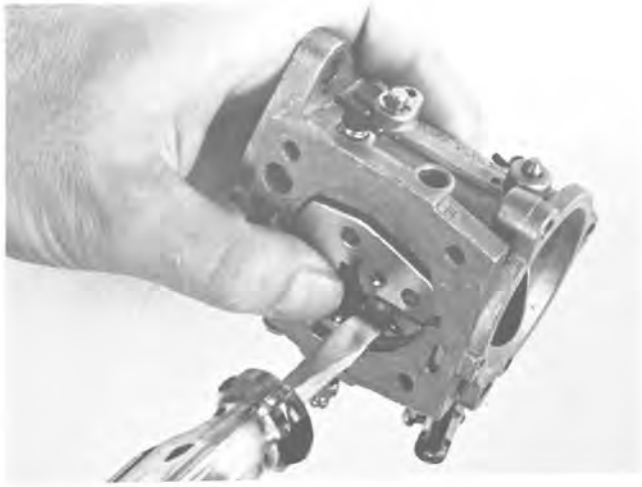
4. Remove the metering diaphragm plate and the metering diaphragm, which will expose the underside the carburetor body, Fig. III-4.

Fig. III-4



5. Grasp the carburetor and place thumb over the metering lever and metering lever spring. Remove the metering lever pin screw, using a screwdriver, Fig. III-5. Slowly release thumb and allow the metering lever, metering lever spring, metering lever pin and the inlet needle valve to push away from the carburetor body.

Fig. III-5



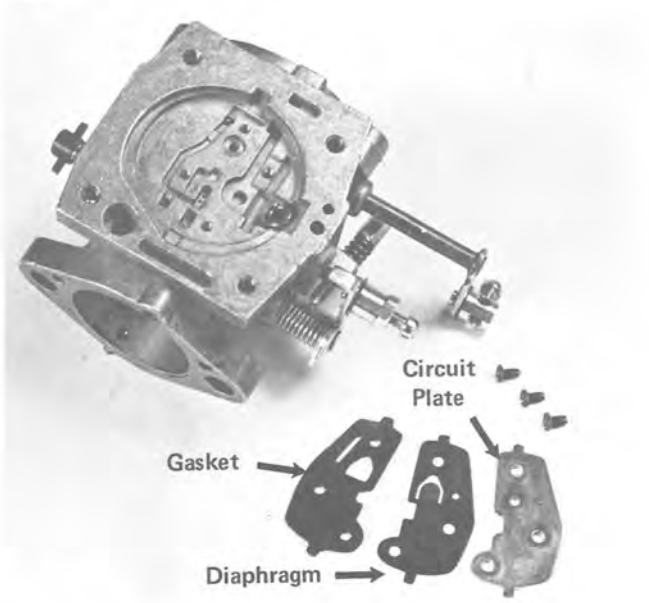
Note: Metering lever spring may "fly out" if care is not exercised when metering components are being removed.

6. Remove the 3 screws that secure the circuit plate to the carburetor body, using a screwdriver, Fig. III-6.

Fig. III-6

7. Carefully separate the circuit plate, circuit plate diaphragm and the circuit plate gasket, Fig. III-7.

Fig. III-7



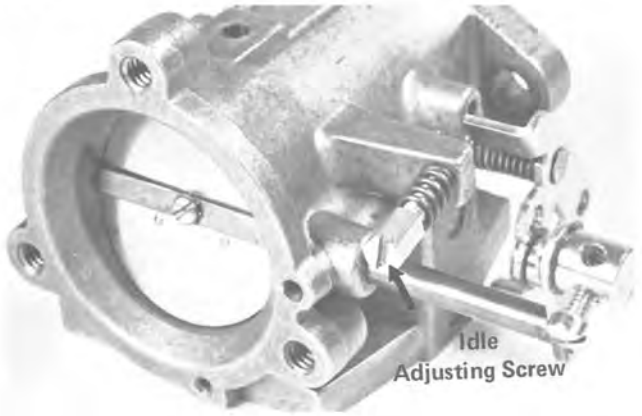
8. Remove the high and low speed mixture needles from the carburetor body and slide the packing rings, washers and springs off the needles, Fig. III-8.

CARBURETOR SERVICING (DISASSEMBLY)

Fig. III-8

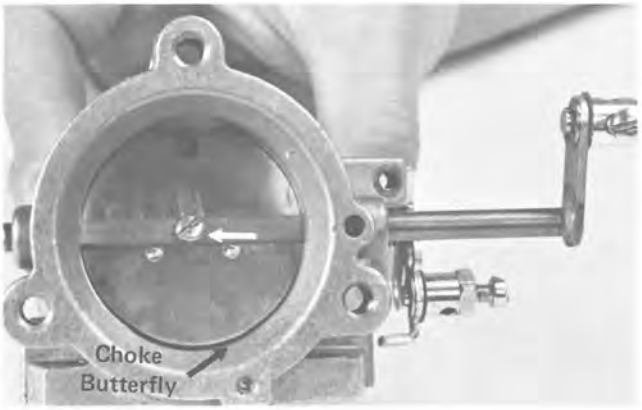
9. Remove the idle adjusting screw and spring, using a screwdriver, Fig. III-9. Separate idle adjusting screw and spring.

Fig. III-9



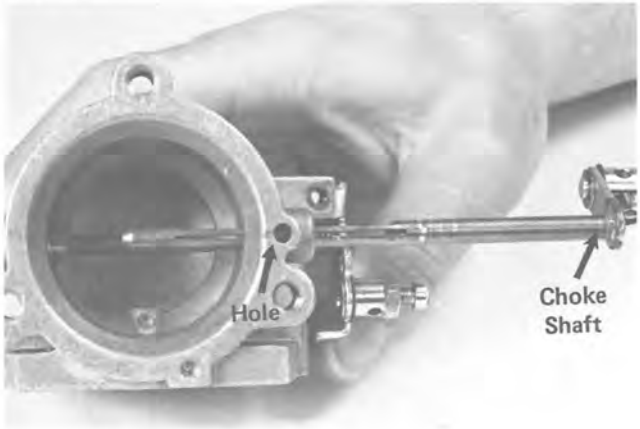
10. Remove the screw and star washer, Fig. III-10, that secures the choke butterfly to the choke shaft, using a screwdriver. Pull choke butterfly, Fig. III-10, from between the split section of the choke shaft.

Fig. III-10



11. Hold intake side of carburetor upward and pull the choke shaft from within the carburetor body, Fig. III-11. Carefully tip carburetor over and allow the choke shaft friction ball and spring to fall from the hole, Fig. III-11, in the carburetor body into a cupped hand.

Fig. III-11



12. Remove the screw and star washer, Fig. III-12, that secures throttle butterfly to the throttle shaft, using a screwdriver. Pull throttle butterfly, Fig. III-12, from between the split section of the throttle shaft.

Fig. III-12

13. Push the retaining ring, Fig. III-13, off the end of the throttle shaft, using a screwdriver.

14. Slowly allow the throttle return spring to release all tension and pull the throttle shaft and spring from within the carburetor body.

Note: DO NOT lose the nylon bushing located on the spring end of the throttle shaft.

CARBURETOR SERVICING (DISASSEMBLY)

Fig. III-13

15. Remove the plug, Fig. III-14, on the control side of the carburetor, using a large screwdriver.

Fig. III-14

CARBURETOR SERVICING (CLEANING)

Cleaning

Equipment Necessary: Carburetor Cleaner, Basket (for Soaking)and Compressed Air

1. Carefully wash all metallic carburetor components with a good quality carburetor cleaner. DO NOT place any of the nonferous components in the carburetor cleaner because damage or deterioration will likely occur.

CAUTION

DO NOT clean carburetor orifices, holes or channels with wire or small drill bits because orifices, holes or channels can be enlarged or nicked, resulting in poor carburetor operation. Therefore, the carburetor is to be cleaned with carburetor cleaner only.

2. After carburetor components have been washed, place all components in a basket and submerse the components in carburetor cleaner.

3. Allow the components to remain in the carburetor cleaner solution for approximately 1-1/2 hours. After the 1-1/2 hour soak period, remove components and rinse with fresh carburetor cleaner.

4. Dry the components with compressed air, making sure all holes, orifices and channels are unobstructed.

CAUTION

DO NOT use rags or paper towels to dry carburetor components. Lint and coarse paper particles can plug orifices, holes, channels and jet openings, causing a negative operating characteristic.

CARBURETOR SERVICING (INSPECTING)

Inspecting Components

Equipment Necessary: No Special Tools Required

1. Inspect the inlet seat screen. Blow compressed air through the inlet seat from the bottom side of the carburetor. If the screen will not free itself of an obstruction when blown with compressed air, the screen is to be removed with a wooden match stick. Push the match stick into the inlet seat from the bottom side of the carburetor until the screen is removed.

Note: If the screen is removed, install an in-line fuel filter in the fuel line, just before the external fuel pump.

2. Examine the carburetor body, metering diaphragm plate and cover plate for cracks, nicks, stripped threads and any other imperfection in the casting. If any of these conditions exist, replacement is necessary.

3. Check the condition of the throttle return spring and the metering lever spring. If damaged or condition is doubtful, replacement is necessary.

4. Examine the throttle and choke shafts and their respective carburetor mounting holes for wear. Excessive wear between the shafts and mounting holes will contribute to a lean carburetor condition, the result of air entering between the shaft and mounting hole. If shafts and/or carburetor mounting holes are worn, replace the appropriate component(s).

5. Inspect all diaphragms and gaskets for distortion, tears and noticeable damage. If conditions dictate, replacement is necessary.

CAUTION

The carburetor insulator block is to be checked for distortion by placing on a surface plate. If insulator block is only slightly distorted, sand down insulator block accordingly. If insulator block is excessively warped, replacement is necessary. An air leak between the carburetor and engine will cause severe engine damage, the result of a lean fuel-air mixture.

6. Inspect the high speed mixture needle, low speed mixture needle and the inlet needle valve seating surface for wear, broken tips and pitting. If conditions dictate, replacement is necessary.

7. Inspect the throttle and choke butterfly for damage. Make sure the screw and star washer retain the butterfly to the choke shaft.

8. Inspect the throttle and choke wire mounting swivels on the end of the respective shafts. If swivel is worn, has stripped threads or a broken retaining screw, replacement is necessary.

CARBURETOR SERVICING (ASSEMBLY)

Assemble Carburetor

Equipment Necessary: Small Screwdriver, Straight Edge and Large Screwdriver

Note: Whenever a WRC-1 carburetor is to be rebuilt, use a carburetor repair kit (Arctic Part No. 0170-041) for complete servicing.

1. Install a new throttle wire mounting swivel on the throttle shaft if replacement was necessary.

2. Slide the throttle shaft with return spring and bushing through the carburetor body and pre-load the return spring by rotating the throttle shaft one revolution clockwise. Hold throttle shaft in the carburetor and prevent the return spring from uncoiling. Secure the throttle shaft in place with the retaining ring, Fig. III-15.

Fig. III-15

3. Install the idle adjusting screw and spring until contact is made with the throttle arm; then rotate 1 additional turn, using a screwdriver.

4. Rotate the throtle shaft and slide the throttle butterfly between the split section of the throttle shaft. Allow the throttle to close, which will center the throttle butterfly in the carburetor bore. When properly centered, secure the butterfly to the throttle shaft with a star washer and screw, using a screwdriver, Fig. III-16.

Note: The throttle butterfly has a number stamped into it . . . the number must face outward and be positioned below the throttle shaft to be installed properly.

Fig. III-16

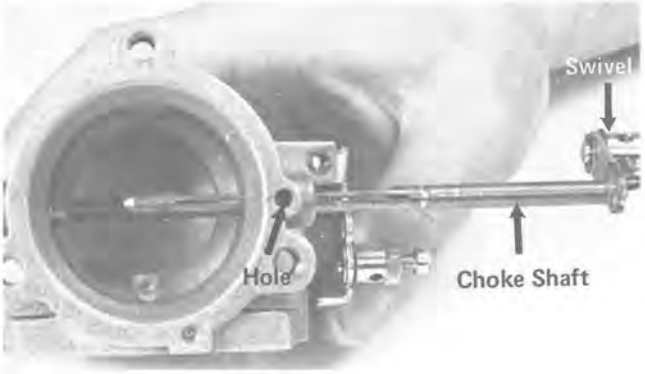
5. Install a new choke wire mounting swivel, Fig. III-17, on the choke shaft if replacement was necessary.

6. Position the carburetor so the choke side faces upward.

7. Insert the choke shaft friction spring and ball into the small hole, Fig. III-17, located over the choke shaft mounting hole.

8. Slide the choke shaft through the mounting hole and over the ball and friction spring. Continue to push the choke shaft through the carburetor body and into position.

Fig. III-17

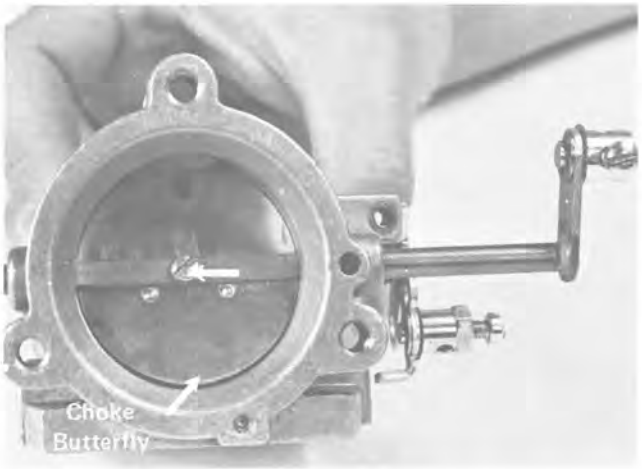


9. Rotate the choke shaft and slide the choke butterfly between the split section of the choke shaft. When properly positioned, secure the butterfly to the choke shaft with a star washer and screw, using a screwdriver, Fig. III-18.

Note: The cut-out in the choke butterfly is to face to the top of the carburetor bore.

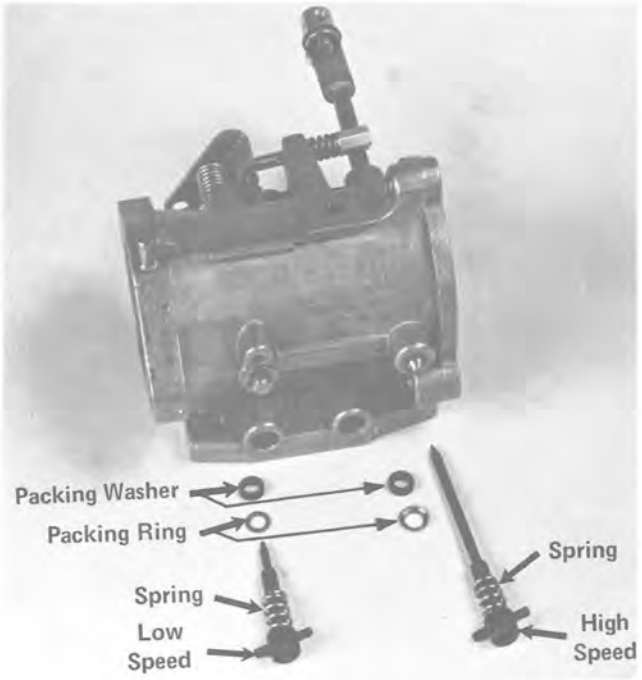
CARBURETOR SERVICING (ASSEMBLY)

Fig. III-18



10. Slide the spring, metal packing ring and rubber packing washer on the low speed mixture needle, Fig. III-19.

Fig. III-19

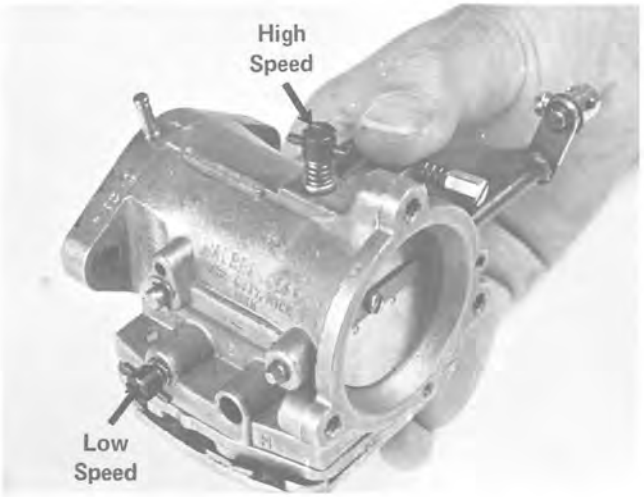


11. Install the low speed mixture needle into the hole in the side of the carburetor body, Fig. III-20. Seat the low speed mixture needle.

CAUTION

The low speed mixture needle is to be seated (closed) finger tight only – DO NOT USE A SCREWDRIVER. Forcing the needle will cause damage to the needle and seat.

Fig. III-20



12. Slide the spring, metal packing ring and rubber packing washer on the high speed mixture needle, Fig. III-19.

Note: Dished side of metal packing ring is to face toward the rubber packing washer and the carburetor body.

13. Install the high speed mixture needle into the hole in the top of the carburetor body, Fig. III-20. Seat the high speed mixture needle.

CAUTION

The high speed mixture needle is to be seated (closed) finger tight only – DO NOT USE A SCREWDRIVER. Forcing the needle will cause damage to the needle and seat.

14. From the seated position, rotate the low speed mixture needle 1 turn counterclockwise to open.

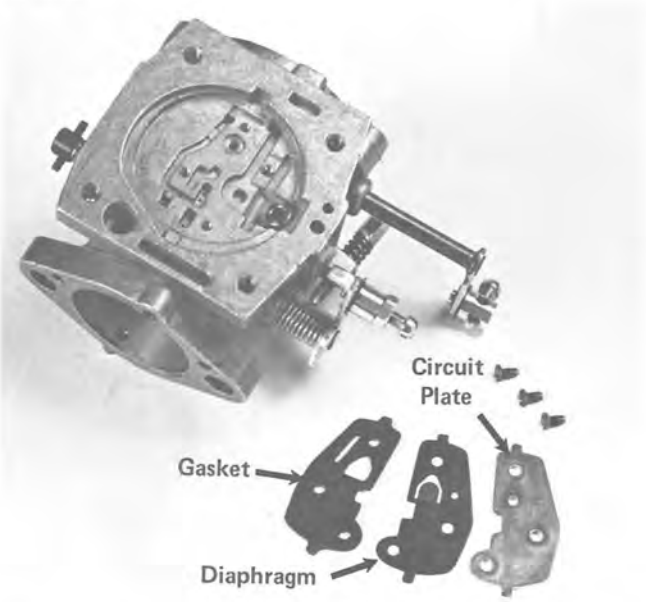
15. From a seated position, rotate the high speed mixture needle 1-1/4 turns counterclockwise to open.

Note: The mixture needle settings established in steps 14 and 15 are only preliminary settings and are to be used to initially start the engine after carburetor overhaul is performed. The carburetor is to be fine tuned under actual running conditions to ensure optimum performance.

CARBURETOR SERVICING (ASSEMBLY)

16. Place the circuit plate gasket, circuit diaphragm and the circuit plate in position on the bottom of the carburetor body, Fig. III-21. Secure components in place with 3 screws, using a screwdriver.

Fig. III-21

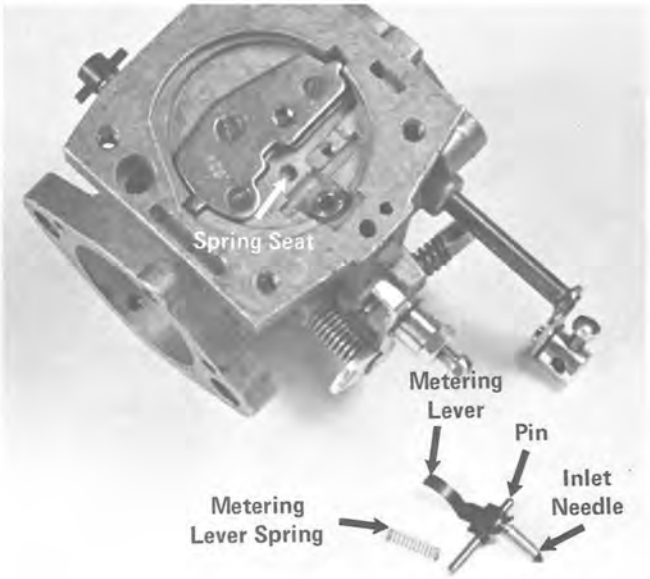


17. Insert the metering lever spring into the spring seat, Fig. III-22.

18. Slide the metering lever pin, Fig. III-22, through the holes in the metering lever.

19. Position the inlet needle, Fig. III-22, on the end of the metering lever.

Fig. III-22



20. Place dimple in metering lever over the metering lever spring and ensure the inlet needle slides down into the inlet needle seat. Hold components in place and secure to the carburetor body with the retaining screw, Fig. III-23.

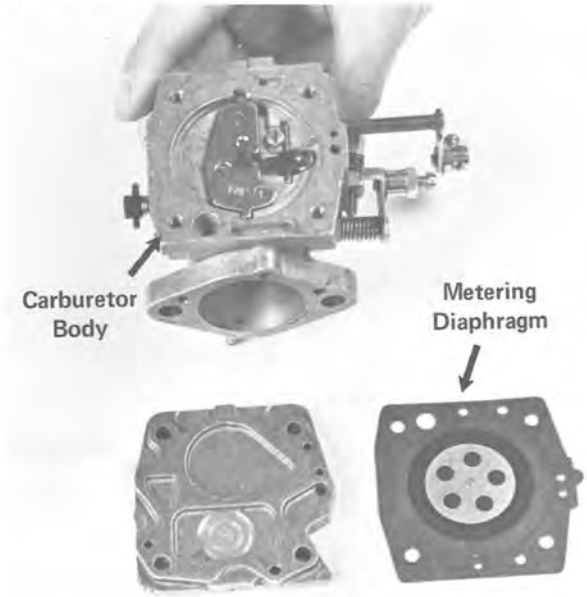
Fig. III-23

21. Set the metering lever to 0.005 - 0.020 inch above the sides of the carburetor body (see Adjust Metering Lever, steps 3, 4, 5 and 6, page III-15).

22. Place the metering diaphragm on the carburetor body, Fig. III-24.

Note: The half dollar sized metal washer in the metering diaphragm is to be positioned against the carburetor body.

Fig. III-24



CARBURETOR SERVICING (ASSEMBLY)

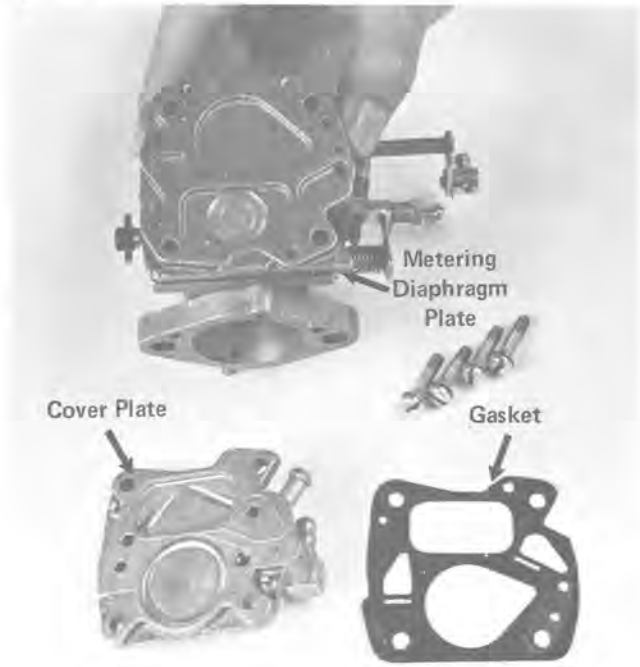
23. Position the metering diaphragm plate against the metering diaphragm, Fig. III-25.

24. Position the cover plate gasket and cover plate against the metering diaphragm plate, Fig. III-25.

25. Secure all components to the carburetor body with 4 screws and washers, using a screwdriver.

26. Secure the throttle cable mounting bracket and intake adaptor to the carburetor with 3 screws and lockwashers, using a screwdriver.

Fig. III-25



METERING LEVER ADJUSTMENT

Adjust Metering Lever

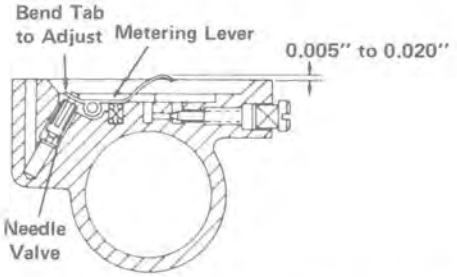
Equipment Necessary: Screwdriver, Straight Edge and Feeler Gauge

1. Remove the carburetor if not already removed (see Carburetor Removal, page III-7).

2. Using a screwdriver, remove the 4 screws and washers that secure the cover plate, gasket, diaphragm plate and the metering diaphragm to the carburetor body if these components have not been removed.

3. Invert the carburetor and place a straight edge across the carburetor body, adjacent to the metering lever. The metering lever is to be from 0.005-0.020 inch above the carburetor body, Fig. III-26. The check can be made by placing two appropriate feeler gauges between the carburetor body and at both ends of the straight edge.

Fig. III-26



4. If an adjustment is necessary, bend the metering lever tab. BEND ONLY THE METERING LEVER TAB, NOT THE LONG EXTENSION OF THE METERING LEVER.

5. Install the metering diaphragm, diaphragm plate, gasket and cover plate on the carburetor body with 4 screws and washers, using a screwdriver (see Assemble Carburetor, steps 22-26, page III-14)

6. Install the carburetor on the engine (see Install Carburetor on Engine, page III-16).

CARB. INSTALLATION/ADJUSTMENT

Install Carburetor on Engine

Equipment Necessary: Two 1/2-Inch Wrenches and Screwdriver

1. Install the carburetor and new intake gasket to the intake elbow with 2 bolts and locknuts, using two 1/2-inch wrenches.

> **CAUTION**
> **Make sure the 2 bolts and locknuts that secure the carburetor to the intake elbow are tight. If there is an air leak, a lean carburetor condition will exist, which may cause severe engine damage.**

2. Slide the throttle wire through the hole in the carburetor throttle arm swivel. Secure throttle wire with the retaining screw, using a screwdriver, Fig. III-27.

3. Install the 2 throttle cable flange nuts on both sides of the throttle cable mounting bracket, Fig. III-27. Tighten the flange nuts, using two 1/2-inch wrenches.

4. Slide the choke wire through the hole in the choke arm swivel, making sure the choke butterfly is open. Pull the console mounted choke control out 1/16-inch. Secure the choke wire with the retaining screw, using a screwdriver, Fig. III-27.

Note: The reason for pulling the choke away from the dash 1/16-inch is to make sure the choke butterfly is completely open when the choke control is pushed in.

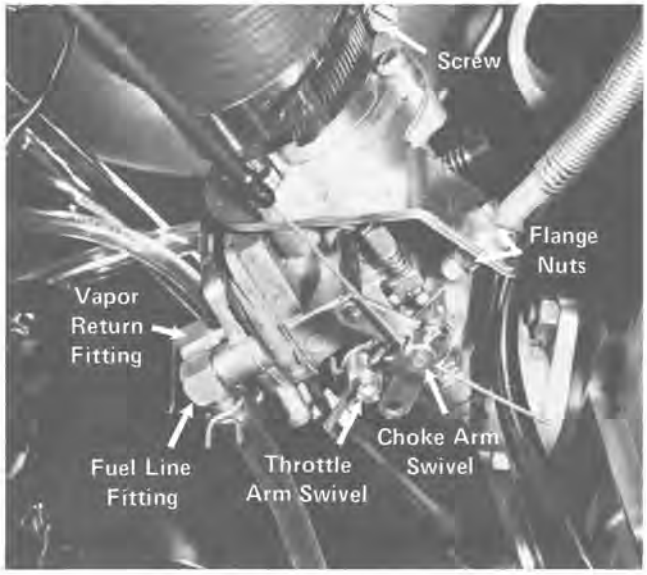
5. Slide the intake hose over the carburetor intake adaptor and secure in place with the hose clamp by tightening the screw, using a screwdriver, Fig. III-27.

6. Connect the vapor return line to the inside fitting on the carburetor, Fig. III-27.

7. Connect the fuel line to the outside fitting on the carburetor, Fig. III-27.

Note: Make sure the fuel and vapor return lines are securely connected to the respective fittings, so as to ensure efficient carburetor operation.

Fig. III-27



8. Adjust the throttle control (see Throttle Adjustment, page III-16).

9. Close the hood.

Throttle Adjustment

Equipment Necessary: Screwdriver and Pliers

> **WARNING**
> **Frequently observe the condition of the throttle cable, wire and housing. Any cable that is kinked, stretched, frayed or does not operate smoothly is to be replaced. A defective throttle cable or housing may contribute to a serious injury or damage to the snowmobile.**

The correct adjustment is when the carburetor throttle butterfly is completely open while the hand throttle lever lightly contacts the handle grip.

1. Make sure the engine is not running and open the hood.

2. Loosen the throttle wire retaining screw, Fig. III-27, located on the carburetor throttle arm, using a screwdriver.

3. Pull all slack from the throttle cable plus 1/16-inch of spring tension, using a screwdriver. Tighten the throttle wire retaining screw.

CARB. INSTALLATION / ADJUSTMENT

Note: If the engine fails to start within a reasonable length of time, repeat steps 2 and 3. The throttle safety switch spring must be tensioned to activate the throttle safety switch mechanism.

Adjust Carburetor

Equipment Necessary: Screwdriver and 1/4-inch Wrench

The Walbro WRC-1 carburetor is a diaphragm-type used in conjunction with an external fuel pump. To obtain optimum performance and assure longevity, proper adjustment of the carburetor is critical. Altitude and temperature variations may necessitate carburetor adjustments.

1. Make sure the engine is not running and open the hood.

2. Close the low speed mixture needle, Fig. III-28, by turning clockwise – finger tight only. DO NOT USE A SCREWDRIVER.

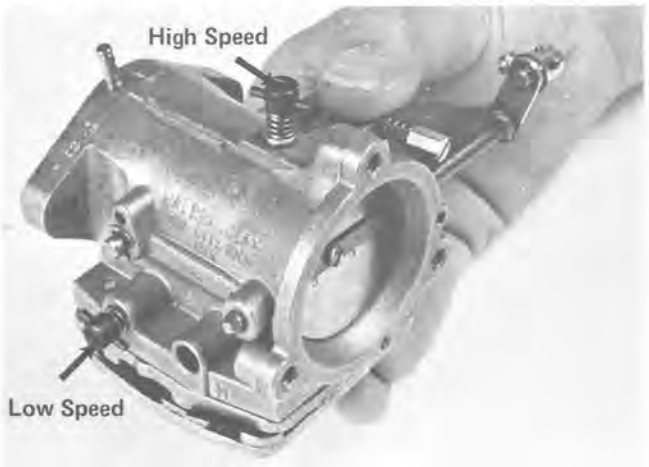
CAUTION

Close the low speed mixture needle finger tight only – forcing will cause damage to the needle and seat.

3. Rotate the low speed mixture needle, Fig. III-28, 1 turn counterclockwise.

4. Close the high speed mixture needle, Fig. III-29, by turning clockwise – finger tight only. DO NOT USE A SCREWDRIVER.

Fig. III-28

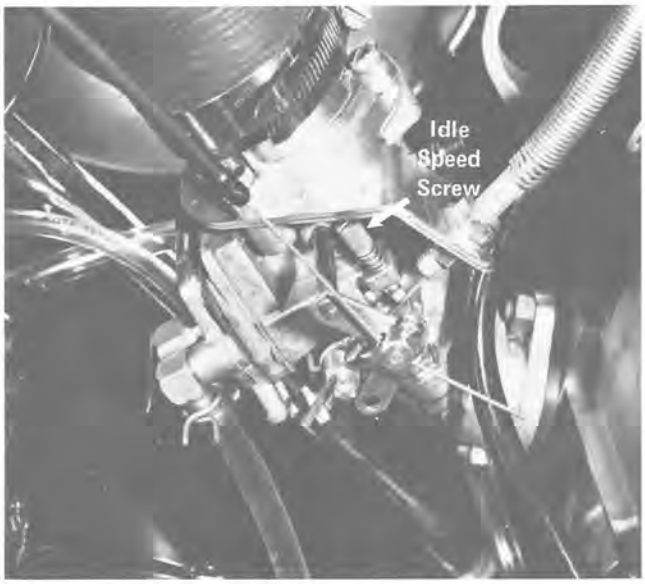


CAUTION

Close the high speed mixture needle finger tight only – forcing will cause damage to the needle and seat.

5. Rotate the high speed mixture needle, Fig. III-29, 1-1/4 turns counterclockwise.

Fig. III-29



6. Rotate the idle speed screw, Fig. III-29, counterclockwise until it releases from the throttle arm, using a 1/4-inch wrench.

7. Rotate the idle speed screw, Fig. III-29, clockwise until it just contacts the throttle arm; then rotate the idle speed screw 1 additional turn clockwise, using a 1/4-inch wrench.

Note: The idle speed screw is to be adjusted after the low speed mixture needle is set. Because there is a definite relationship between the idle speed and low speed mixture adjustment, neither is to be changed without checking the other. Whenever the idle speed is changed, the throttle (safety switch) is to be adjusted (see Throttle Adjustment, page III-16).

8. The settings of the high and low speed mixture needles are only approximate. For break-in the settings are to be as indicated in steps 3 and 5. After break-in, the carburetor is to be fine tuned (see Fine Tune the Carburetor, Page III-18).

CARB. INSTALLATION/ADJUSTMENT

Fine Tune the Carburetor

Equipment Necessary: Screwdriver, 13/16-inch Spark Plug Socket and 1/4-Inch Wrench

1. Start the engine and allow the engine to warm up for approximately 1 minute.

2. Rotate the low speed mixture needle, Fig. III-30, 1/8-turn at a time clockwise or counterclockwise, whichever will enable the engine to run smoothly. Allow 15 - 20 seconds between each adjustment, which will allow the carburetor to adjust to the new setting. DO NOT USE A SCREWDRIVER.

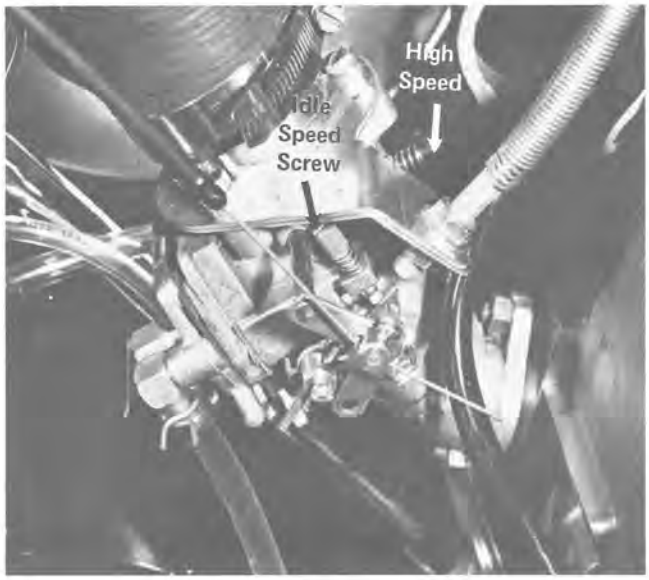
Note: To richen the mixture, rotate the low speed mixture needle counterclockwise. To lean out the mixture, rotate the low speed mixture needle clockwise.

Fig. III-30

3. Using a 1/4-inch wrench, rotate the idle speed screw, Fig. III-31, until the engine idles at approximately 2200 RPM, which is just below drive clutch engagement.

4. With the high speed mixture needle, Fig. III-31, set at 1-1/4 turns from the seated position, run the snowmobile on a flat hard-packed area at full throttle for approximately 1/4 mile. Coast to a stop, shut the engine off, remove the high tension wire from the spark plug and remove the spark plug, using a 13/16-inch spark plug socket. Examine the condition of the spark plug insulator tip.

Fig. III-31



   A. Tan or Light Brown — Indicates correct carburetor setting.

   B. Light Gray or White — Indicates a lean carburetor setting.

   C. Black — Indicates a rich carburetor setting.

5. Install the spark plug, using a 13/16-inch spark plug socket. Connect the high tension wire to the spark plug and close the hood.

6. Start the engine and repeat steps 4 and 5 as often as necessary to obtain the proper colored spark plug insulator tip. Remember that the high speed mixture needle, Fig. III-31, is to be rotated 1/8-turn at a time — NEVER MORE. When the spark plug insulator tip is tan or light brown, the carburetor is fine tuned (adjusted properly).

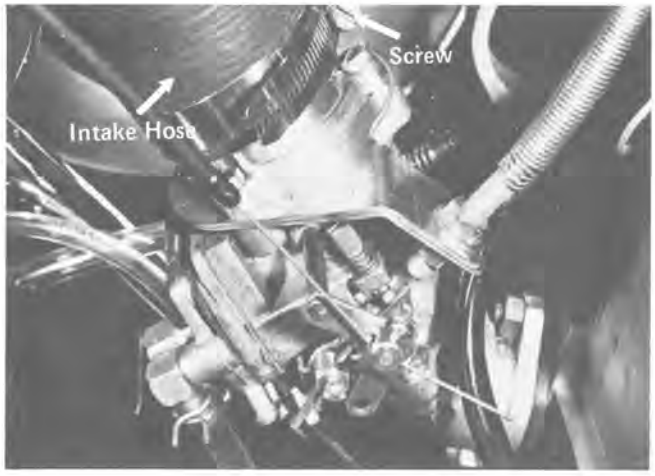
Note: Rotate high speed mixture needle counterclockwise to richen the mixture and clockwise to lean out the mixture.

INTAKE HOSE SERVICING

Intake Hose

Used in conjunction with the carburetor is an intake hose, Fig. III-32. The function of the intake hose is to quiet the intake of fresh air used in carburetion and to catch fuel that spits back out of the carburetor.

Fig. III-32



CAUTION

The intake hose is to be secured to the carburetor when operating the engine and when adjusting the carburetor. If the intake hose is removed, the engine is not to be run because possible engine damage may occur. Make sure the inside of the intake hose is clean and free of obstructions.

Intake Hose Removal

Equipment Necessary: Screwdriver

1. Open the hood.
2. Remove the carburetor intake hose from the intake adaptor by loosening the hose clamp screw, using a screwdriver, Fig. III-32.
3. Pull the intake hose off the carburetor intake adaptor, slide the clamp off the hose and pull the hose from within the strap that is secured to the side of the console.
4. Clean the inside of the intake hose and make sure the hose is free of obstructions.

Note: If the intake hose is damaged or deteriorated, replacement is necessary.

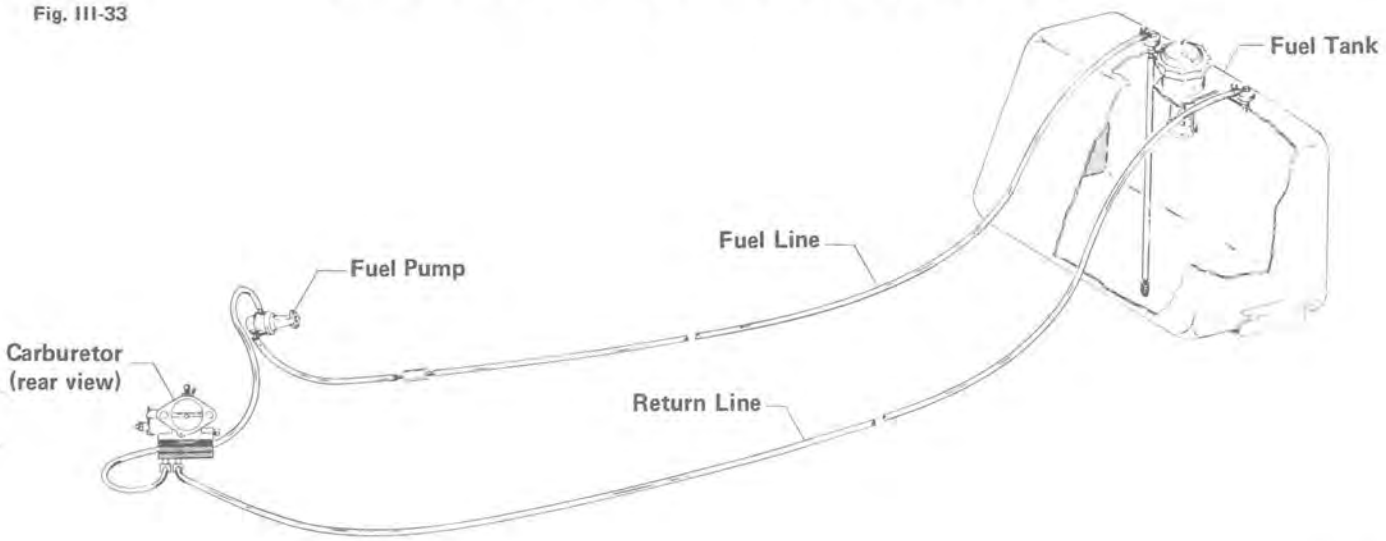
Intake Hose Installation

Equipment Necessary: Screwdriver

1. Push the intake hose through the strap mounted at the side of the console and slide the carburetor mounting strap on the hose.
2. Push the hose over the carburetor intake adaptor and secure in place with the strap by tightening the screw, using a screwdriver, Fig. III-32.

FUEL TANK SERVICING

Fig. III-33



FUEL TANK SERVICING

General

The fuel tank is made of 20 gauge cold rolled steel and has an approximate capacity of 6.25 U.S. gallons. The fuel tank exterior is specially cleaned and coated with a gasoline/oil resistant paint. The tank is equipped with a vented fuel level gauge cap that allows vapor gasses to be released to the atmosphere and also aids in allowing fuel to flow to the fuel pump and carburetor. If a vent hole would not be provided in the fuel level gauge cap or if the vent hole becomes obstructed, fuel will not flow from the fuel tank to the fuel pump or to the carburetor.

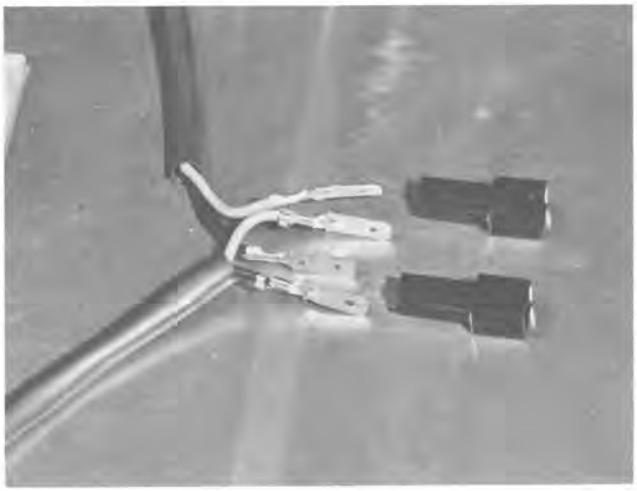
The fuel tank is also equipped with 2 fittings to accommodate the fuel line and vapor return line. The section of fuel line that extends down to the bottom of the fuel tank has a screened filter with an integral ball check valve, which filters out gasoline impurities and prevents fuel back flow when the engine is off.

Fuel Tank Removal

Equipment Necessary: Cardboard, 1/2-Inch Metal Chisel, Hammer, 9/16-Inch Socket, 3-Inch Extension, Quik Jack, Large Screwdriver and 7/16-Inch Wrench.

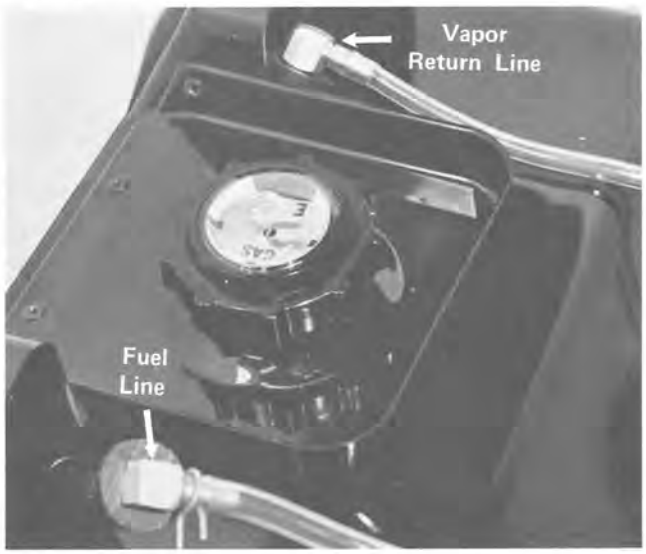
1. Remove the seat cushion and backrest. Pull the taillight connector blocks apart and slide the wires that run to the taillights out of the 2 connector blocks, Fig. III-34.

Fig. III-34



2. Remove the fuel tank gauge cap. Pull the fuel line and vapor return line with fittings from within the fuel tank, Fig. III-35.

Fig. III-35



3. Tip the snowmobile onto its side and allow to rest on a piece of cardboard to protect against scratching.

4. Remove the 3 rivets that secure the rear bumper to the wear plate at the end of the running board, using a 1/2-inch chisel and hammer, Fig. III-36.

5. Tip the snowmobile onto its opposite side and allow to rest on a piece of cardboard to protect against scratching.

6. Remove the 3 rivets that secure the rear bumper to the wear plate at the end of the running board, using a 1/2-inch chisel and hammer, Fig. III-36.

Fig. III-36

FUEL TANK SERVICING

Note: Both bottom end sides of the rear bumper should now be free of the wear plate. This is necessary because the entire rear bumper must be removed to accomplish fuel tank removal.

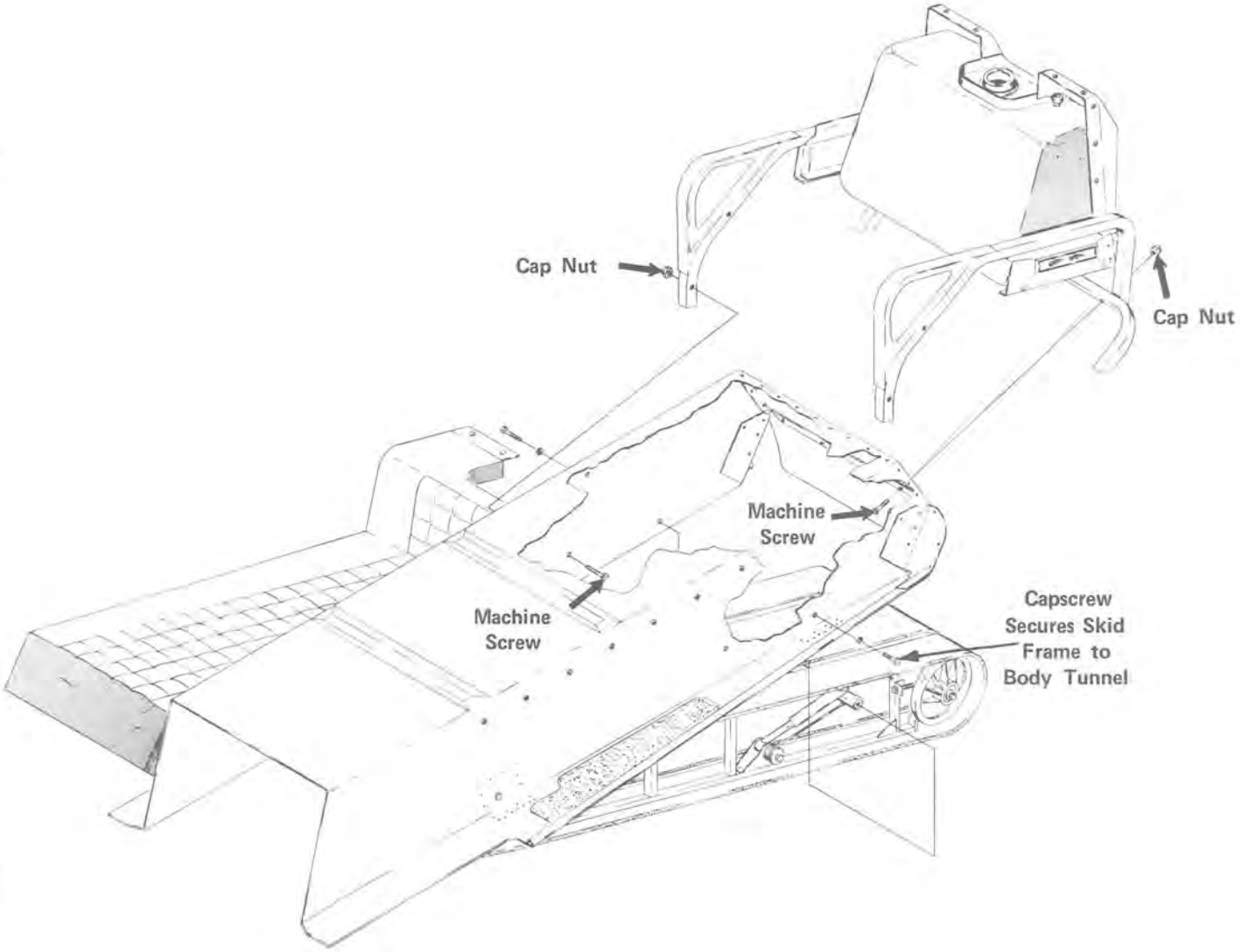
7. Tip the snowmobile upright. Remove the rear capscrews and lockwashers that secure the skid frame to the body tunnel, using a 9/16-inch socket and 3-inch extension, Fig. III-37. Suspend the rear of the snowmobile up on a Quik Jack. The entire rear section of the skid frame and track is to remain on the shop floor.

8. Remove the 8 slotted machine screws and cap nuts that secure the back and sides of the rear bumper to the body tunnel, using a large screwdriver and 7/16-inch wrench, Fig. III-37.

Note: When the slotted machine screws that secure the back of the rear bumper are removed, the snow flap and backing plate will be free.

9. Slightly raise the rear bumper and slide entire rear bumper with fuel tank off the body tunnel. Fuel tank can now be removed from the rear bumper.

Fig. III-37

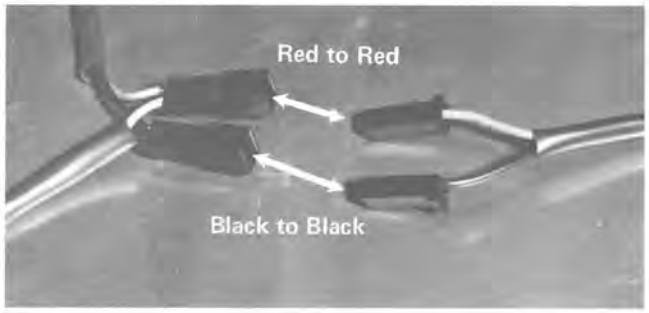


9. Lower the rear of the snowmobile to the floor and remove the Quik Jack.

10. Connect the red taillight wire connector block to the red wire connector block (main harness), Fig. III-41.

11. Connect the black taillight wire connector block to the black wire connector block (main harness), Fig. III-41.

Fig. III-41

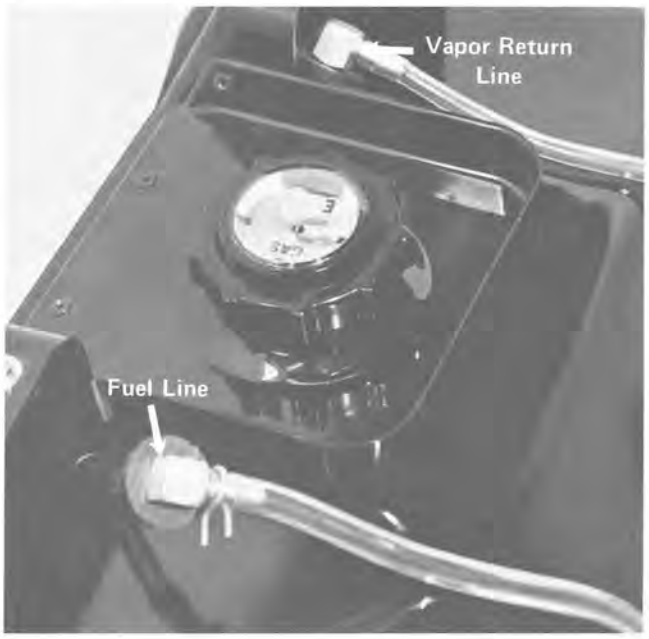


12. Insert the fitting and fuel line with fuel filter into the fuel tank. Make sure the rubber around the fitting seats in the mounting hole, Fig. III-42.

13. Insert the vapor return line with fitting into the fuel tank. Make sure the rubber around the fitting seats in the mounting hole, Fig. III-42.

14. Install the fuel level gauge cap, Fig. III-42.

Fig. III-42



15. Tip the snowmobile onto its side and allow to rest on a piece of cardboard to protect against scratching.

16. Align the hole in the skid frame rear axle with the body tunnel mounting hole and secure in place with a lockwasher and cap screw, using a 9/16-inch socket and 3-inch extension.

17. Tip snowmobile onto the opposite side and allow to rest on a piece of cardboard to protect against scratching. Repeat step 16 on the rear axle. Tighten the cap screws to 35 ft. lbs. torque, using a torque wrench.

18. Set the snowmobile upright and install the seat cushion and backrest.

19. Suspend the rear of the snowmobile up on a Quik Jack.

20. Secure the rear bumper to the wear plate at the end of the running board with 3 pop rivets, using a pop rivet tool, Fig. III-43. Perform this step on opposite side.

Fig. III-43

21. Lower the rear of the snowmobile to the floor and remove the Quik Jack.

22. Check the track tension (see Section V – Drive System, Track Tension).

23. Check the track alignment (see Section V – Drive System, Track Alignment).

ADDENDUM NO. 1

Fuel Pump Pumping Pressure

Equipment Necessary: Plastic "T" Fitting and Pressure Gauge

1. Install the plastic "T" fitting and pressure gauge in the fuel line that feeds the carburetor, Fig. III-44.

2. Raise the rear of the snowmobile off the shop floor, using a Quik Jack. Make sure the track is free to rotate.

3. Start the engine. Between 2000-6000 RPM, pumping pressure is to remain at approximately 3.5 lbs. If pressure is not 3.5 lbs., but is greater (approximately 10-15 lbs.), the fuel pump is defective and is to be replaced.

Fig. III-44

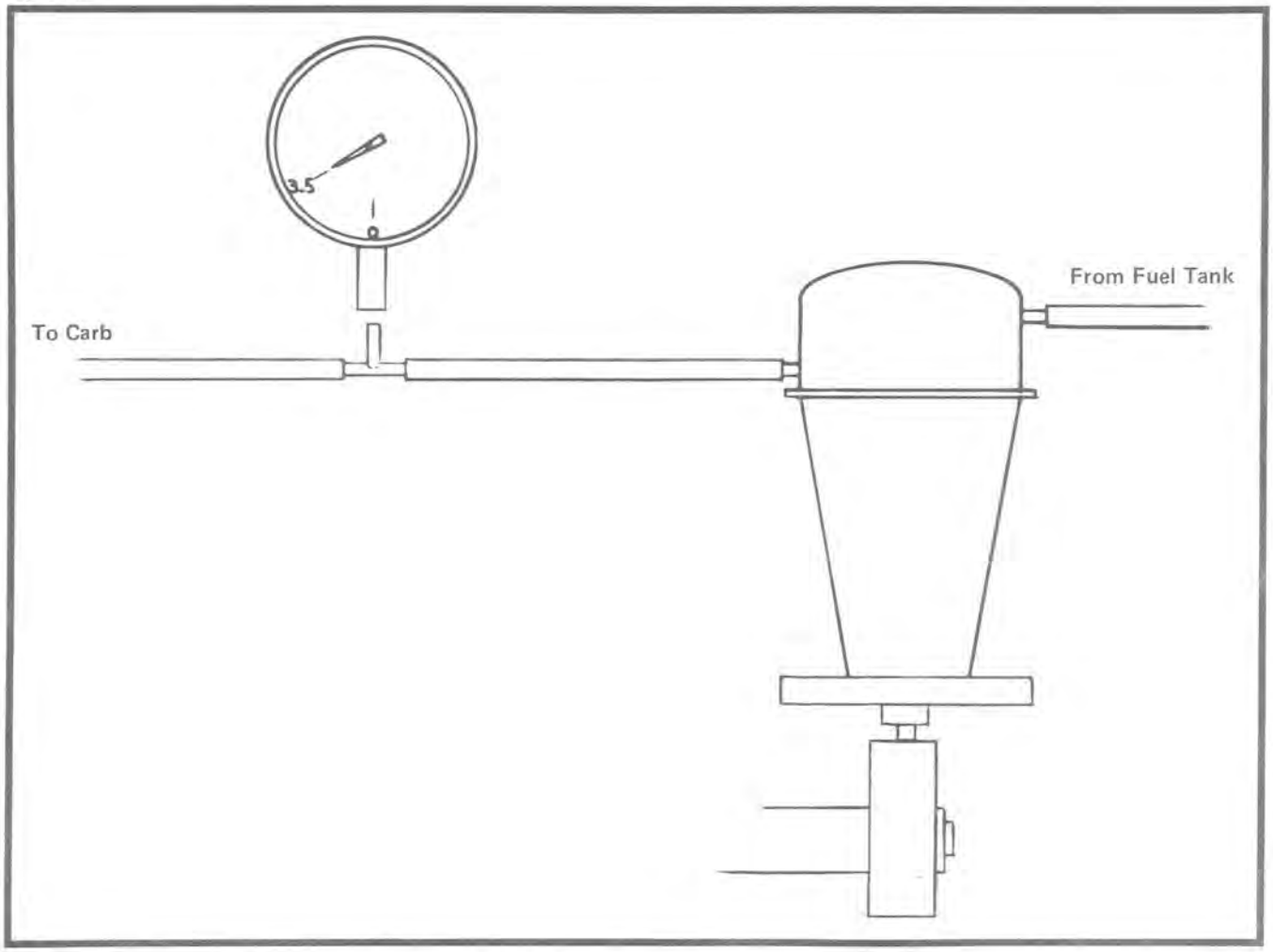


TABLE OF CONTENTS

ELECTRICAL SPECIFICATIONS

Description	Arctic Part No.	Test Value	Resistance in Ohms	Air Gap	Mfg. No.
High Voltage Output	———	70	———	———	———
Exciting Coil	6000-692	55	3.5-3.7	———	———
Lighting Coils	———	———	———	———	———
100 Watt	6000-839	———	0.28-0.31	———	———
23 Watt	6000-693	———	1.70-1.85	———	———
External Coil	6000-654	———	———	———	———
Primary	———	———	1.65-1.85	———	———
Secondary	———	———	+6700-7100	———	———
Spark Plug Cap	*6000-218	———	900-1000	———	———
Breaker Points	6000-661	———	0-0.1	———	———
Condenser	6000-658	0.26-0.30 Micro-Farad	———	———	———
Bosch Spark Plug W260T1	**0217-428	———	———	0.020 In.	———
Bosch Spark Plug W240T2	++0217-428	———	———	0.020 In.	———
Headlight	0109-179	———	———	———	G.E. 4454
Brakelight Bulb	0109-288	———	———	———	G.E. 1003
Taillight Bulb	0109-402	———	———	———	G.E. 1889
Speedometer Bulb	0109-453	———	———	———	G.E. 53X
Tachometer Bulb	———	———	———	———	WI893
Heat Gauge Bulb	———	———	———	———	W53

Note: High Voltage output test value and exciting coil output is measured by using the Electro-Specialties CD Ignition Tester Model No. 1.

+Spark plug cap removed from high tension wire.

*After KM24 engine serial number 7565742, use spark plug cap and wire assembly, part number 6000-899.

**Use Bosch spark plug W260T1 on all KM24 engines preceding serial number 7565102.

++Use Bosch spark plug W240T2 on all KM24 engines having serial number 7565102 and after.

WIRING - RECOIL AND ACCESSORIES

Fig. IV-1

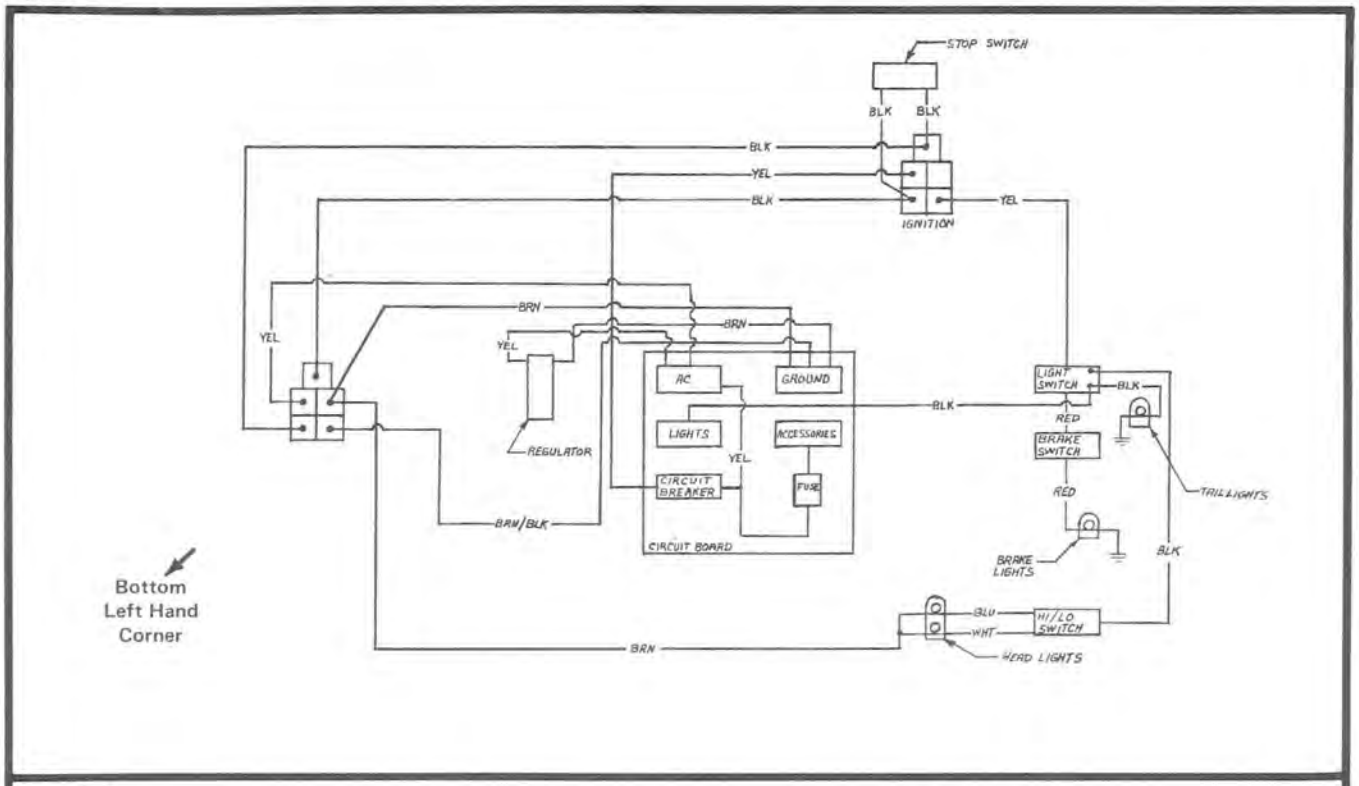
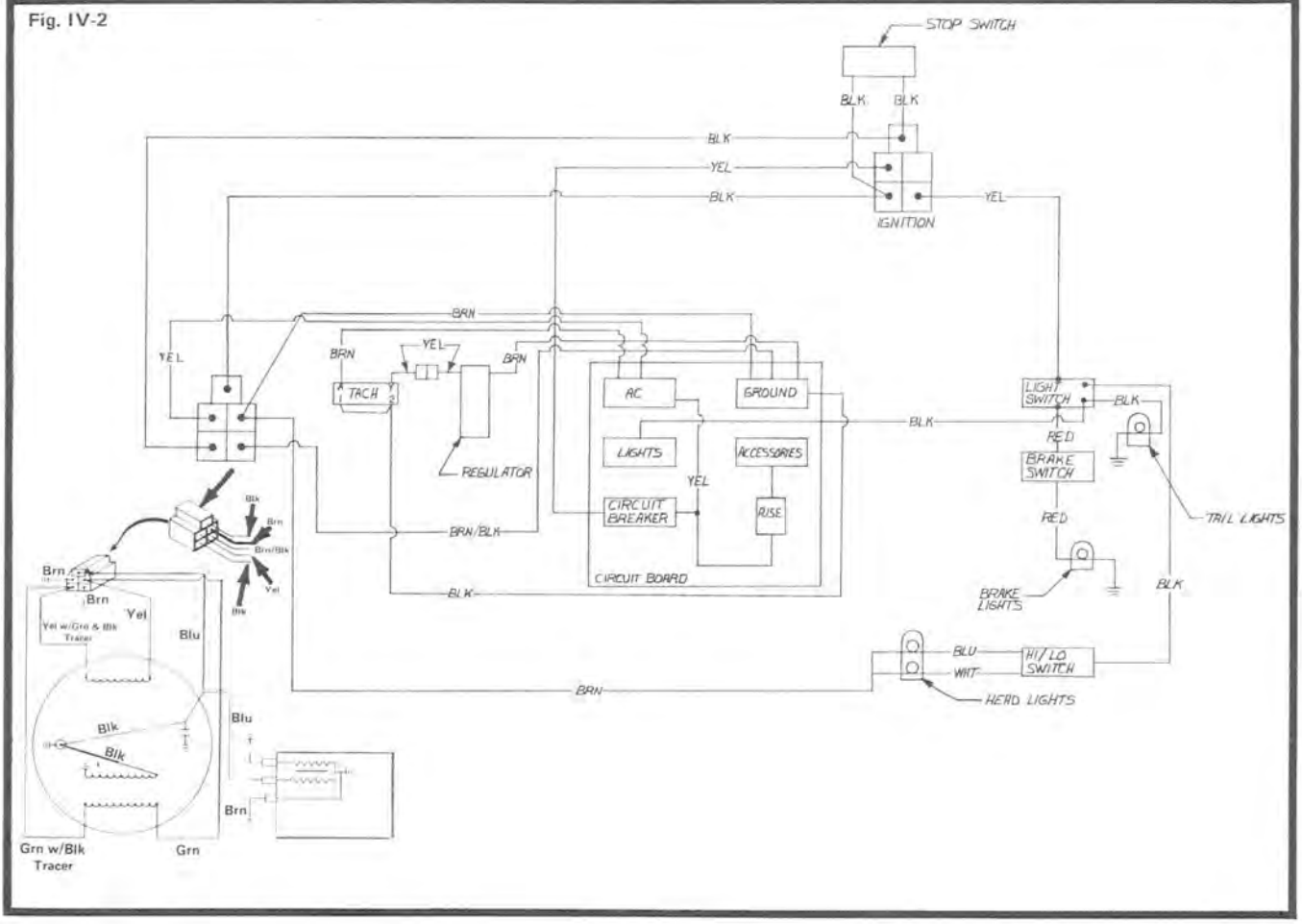


Fig. IV-2



WIRING - ELECTRIC AND ACCESSORIES

Fig. IV-3

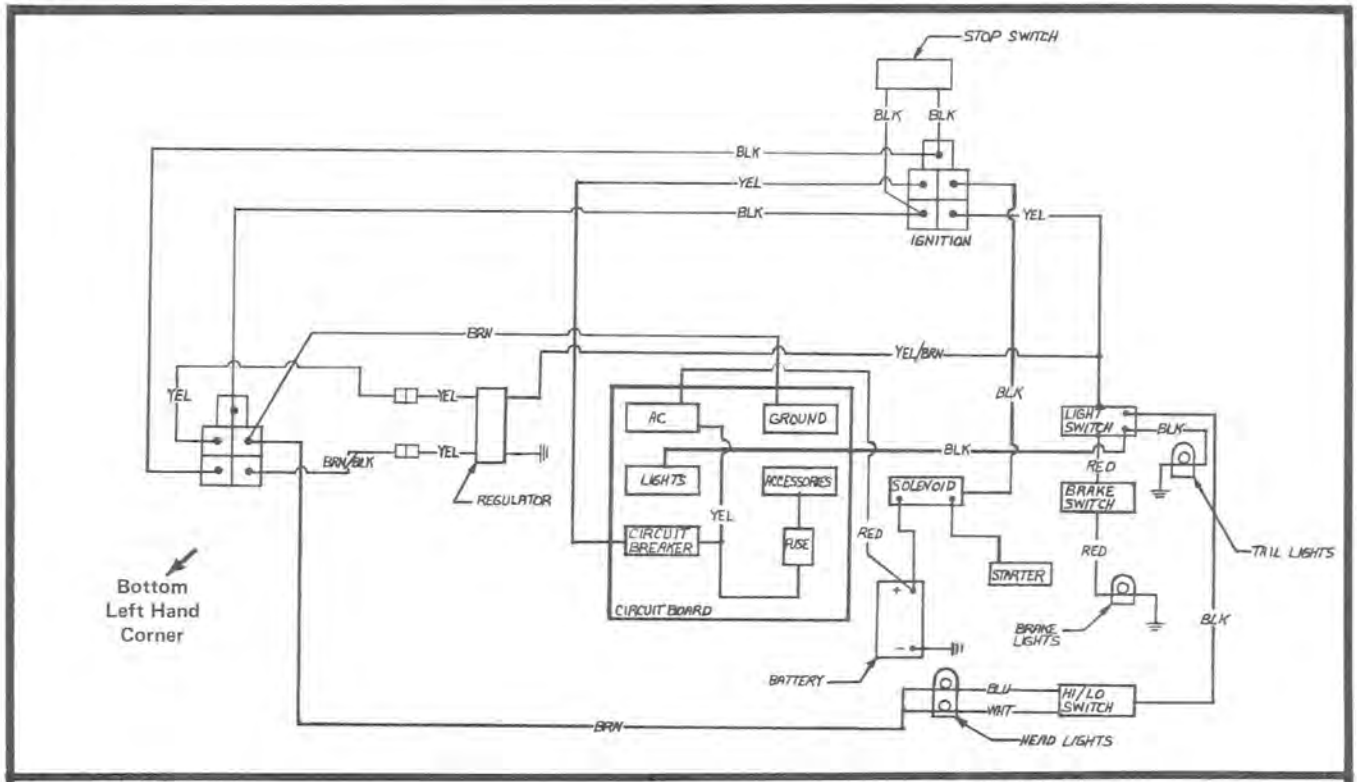
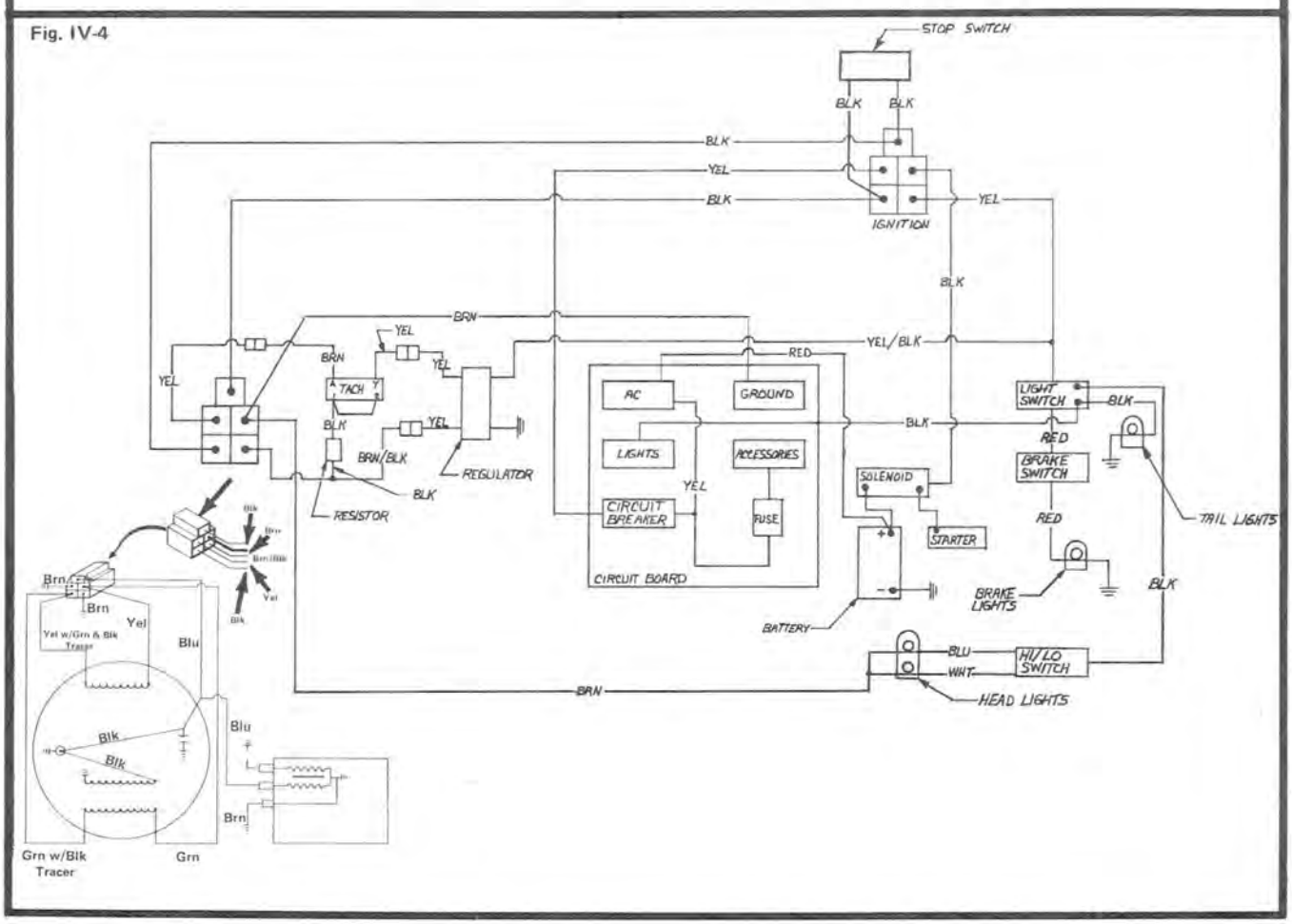


Fig. IV-4



SWITCHES AND CONNECTORS

Fig. IV-5

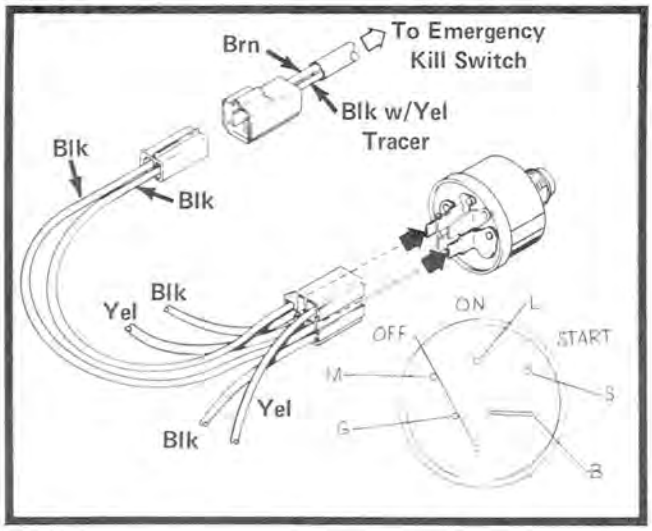


Fig. IV-8

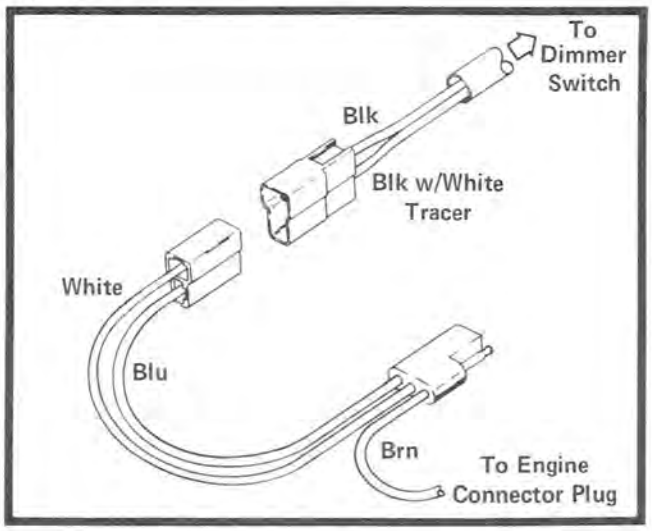


Fig. IV-6

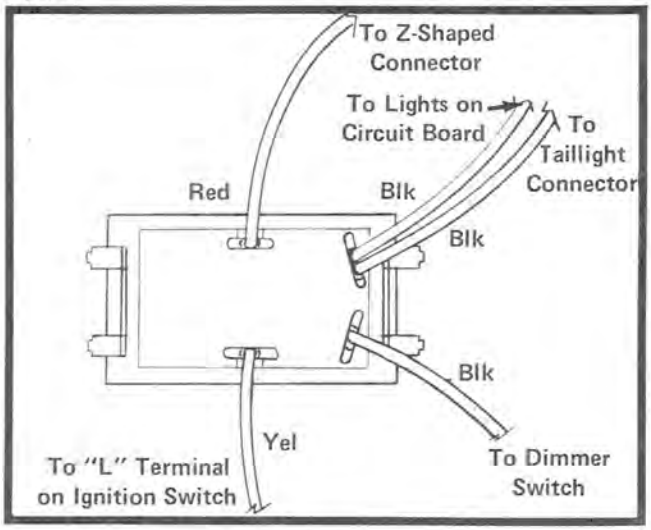


Fig. IV-9

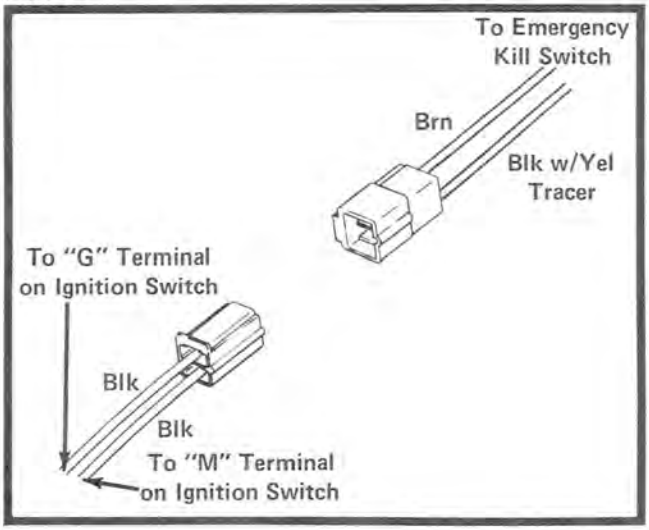


Fig. IV-7

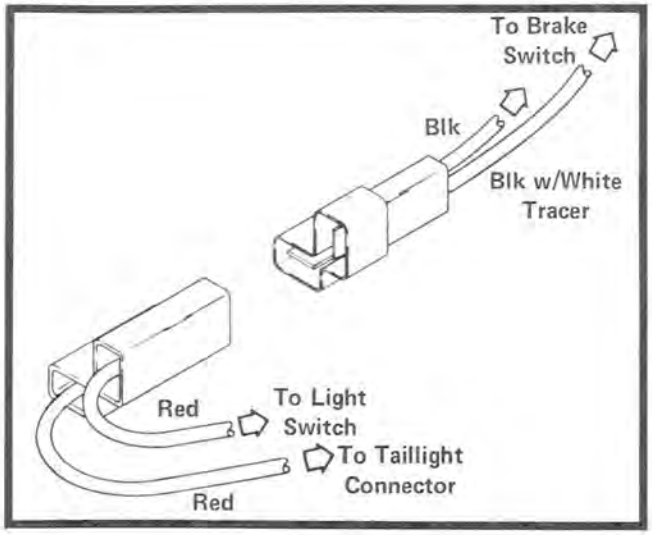
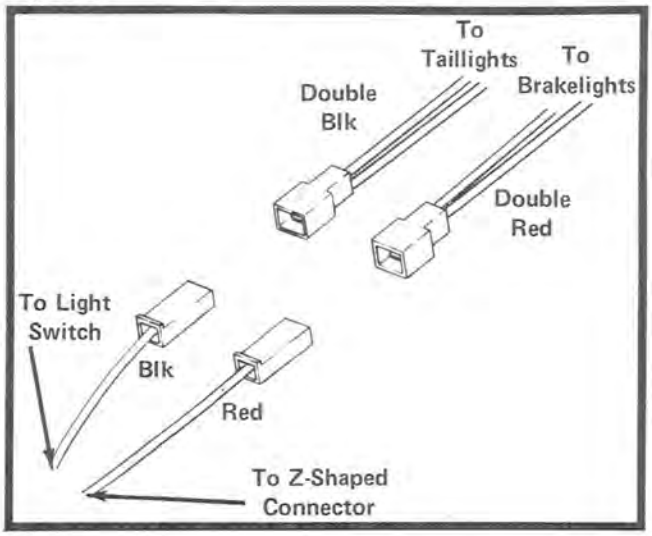


Fig. IV-10



THEORY OF OPERATION

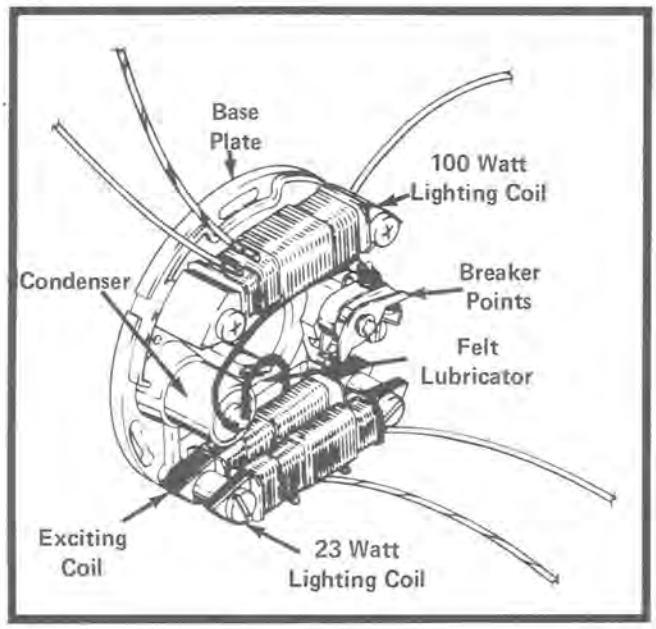
General

The Wankel Panther snowmobile electrical system consists of two, somewhat separate, systems; the ignition system and the magneto alternator system. Electrical current for both systems is produced by the flywheel magneto generator assembly (12 volt, 123 watts).

The flywheel magneto generator assembly, Fig. IV-11, consists of the components listed below.

1. Flywheel w/Magnets
2. Base Plate
3. 100 Watt Lighting Coil
4. 23 Watt Lighting Coil
5. Exciting Coil
6. Breaker Points
7. Condenser
8. Felt Lubricator
9. External Coil } Mounted Externally on Engine
10. Spark Plug } Mounted Externally on Engine

Fig. IV-11



The remaining components that comprise the ignition system are: the ignition switch, emergency shut-off switch and throttle safety switch.

The magneto alternator system produces 123 watts and is regulated at 12 volts. The generated electric current provides the spark that is necessary to ignite the fuel air mixture in the combustion chamber and also, by passing through the wiring harness and switches, allows for operation of the lights and electrical accessories.

In summary, a flywheel magneto generator assembly that produces maximum output will allow the engine to run smoothly, and all other electrical systems will operate properly. Conversely, without maximum output from the flywheel magneto generator assembly, the engine and other electrical systems will not operate properly.

Ignition System

The function of the ignition system is to ignite the fuel/air mixture contained within the combustion chamber at a moment of compression (firing moment) that produces the strongest power phase (see Section II, Engine Servicing, Operating Phases, page II-2).

Igniting of the fuel/air mixture in the combustion chamber is produced by a generated electrical arc across the center and side electrode (air gap) of the spark plug. If the arc is not of sufficient voltage, ignition will be poor and result in less than optimum performance. To produce and control the necessary voltage required for ignition, a number of electrical components are used in conjunction with each other.

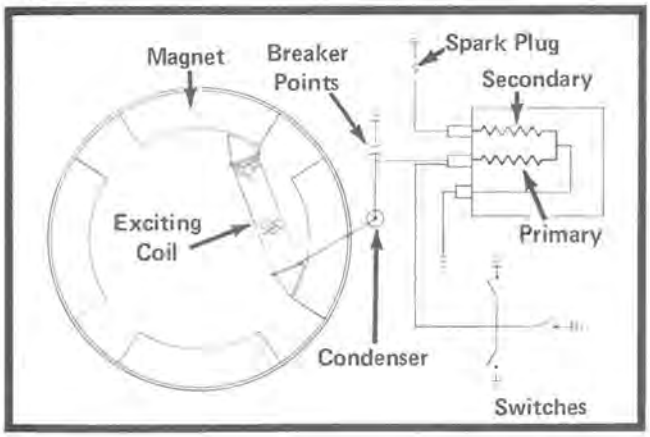
1. FLYWHEEL-MOUNTED PERMANENT MAGNETS – Provide a moving magnetic field when the flywheel is rotating around the coils.

2. EXCITING COIL – Mounted on the base plate, just below the 23 watt lighting coil. One lead of the exciting coil is grounded to the engine, through the coil attaching screws, and the other lead is connected to the condenser with a parallel connection with the breaker points and external ignition coil primary.

As stated in the previous paragraph, high voltage current is required to jump the spark plug air gap, which will result in ignition of the fuel/air mixture in the combustion chamber. To accomplish this, current is induced in the exciting coil, Fig. IV-12, by the rotation of the four magnets. When the

breaker points are closed, the induced voltage flows through the points and to engine ground. Since the magnets are alternately mounted, and also, alternately pass the exciting coil, the magnetic forces change direction of travel. Because the magnetic forces travel from north to south (positive to negative), the direction of flow changes every 90 degrees of flywheel rotation. Therefore, the electricity induced in the exciting coil winding will also alternate in direction of flow. The term for this type of flow is "alternating current".

Fig. IV-12



After current is induced in the exciting coil, the current flows to the external ignition coil "primary", resulting in a magnetic induction with the high voltage "secondary". To allow current flow from the exciting coil to the low voltage external ignition coil primary, the breaker points and condenser must operate at a particular time and sequence. As the crankshaft is rotating, the breaker points open and close by means of an activating cam that is attached to the breaker point arm. When an engine is timed properly (16° BTDC), the breaker points are in an open position, and this coincides with the maximum positive amplitude of the voltage (current) flowing from the exciting coil. The current flows to the external ignition coil primary when the breaker points open, Fig. IV-12, and in turn, breaks the exciting coil circuit to ground, which is on the base plate. As a result, the current flows through the external ignition coil "primary", Fig. IV-12.

Like a transformer, the external ignition coil consists of two separate windings; a low voltage "primary" and high voltage "secondary", Fig. IV-12. As current flows through the "primary", the magnetic field builds up, resulting in induction of the "secondary". Because of the required high voltage current that is needed to jump the air gap between the spark plugs center and side electrode, a considerable increase in voltage must take place.

And how is this increase in voltage accomplished? The wire turn ratio of the secondary is considerably more than that of the primary, which accounts for the increased secondary output. Because the secondary has a high voltage output, it is wound above the primary, which prevents a short circuit of the coil. Being that the secondary is wound above the primary, the magnetic force lines of the primary are broken, resulting in the induction of an EMF (electromotive force) in the secondary. Therefore, the secondary allows high voltage current to flow to the spark plug and jump the air gap between the center and side electrode, Fig. IV-12. At the moment of spark, the compressed fuel/air mixture in the combustion chamber is ignited, causing expansion and a single power impulse (see Section II, Engine Servicing, Theory of Operation, pages II-2 and 3).

The condenser is made of foil sheets with high-quality insulation between them. It is connected in parallel between the exciting coil and breaker points, Fig. IV-12, and its function is to absorb excess (unwanted) voltage when the points open. This decreases the arc that would normally occur between the points if there would not be a condenser in the circuit. Without the condenser, the breaker points would burn in a short time.

Other components that function in the ignition system, but are not mounted on the engine, are: the ignition switch, throttle safety switch, and the emergency kill switch, Fig. IV-12. The switches are all connected in parallel with the external ignition coil primary and the engine frame, which also serves as a common ground. If any one of the switches is closed (OFF), the induced exciting coil current is routed to ground, rather than allowing the current to flow to the external ignition coil and spark plug. Therefore, a closed ignition switch, emergency shut-off switch, or throttle safety switch will not allow the engine to start due to the absence of ignition spark.

Working between the throttle lever and carburetor-mounted throttle, with the ability to sense a frozen or jammed throttle, is the spring-actuated throttle safety switch. When throttle cable is tensioned properly at the carburetor-mounted throttle arm, the switch is

constantly open, Fig. IV-12, thereby allowing current to flow to the spark plug for ignition. Conversely, if the throttle cable is not tensioned properly at the carburetor-mounted throttle arm, the switch is closed, forcing the induced current in the exciting coil to flow to ground. And consequently the engine will not start because there is no high voltage current to the spark plug.

Note: To make sure the throttle safety switch operates properly, proper adjustment is critical (see Section III, Fuel System, Throttle Adjustment, page III-16).

Magneto Alternator System

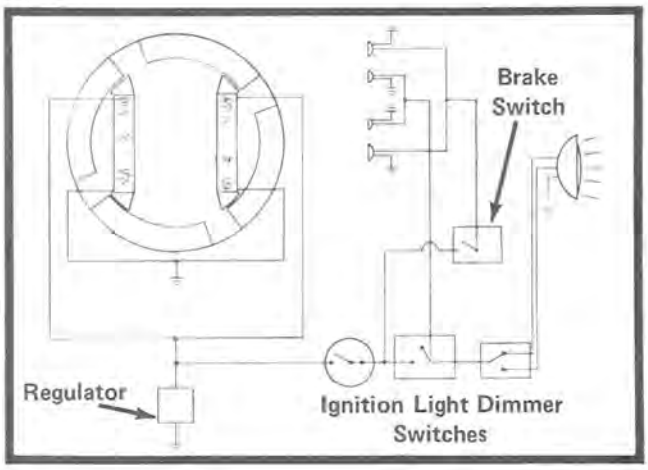
The function of the magneto alternator system is to produce the electrical current required by the headlight, taillights and brakelights. Accessories, such as a speedometer, tachometer, heat gauges and an electric starter, also draw upon the output of magneto alternator for proper operation. To produce and control the current necessary for the lighting system, a number of electrical components are used in conjunction with each other.

1. FLYWHEEL-MOUNTED PERMANENT MAGNETS – Provide a moving magnetic field when the flywheel is rotating around the coils.

2. LIGHTING COILS – Mounted on the base plate, just above the ignition system exciting coil, is the 23 watt lighting coil. Mounted opposite the 23 watt lighting coil is the large 100 watt lighting coil. The four leads of the coils are connected in parallel at the engine connector by two common end pieces. To make sure there will be maximum output, the yellow wire having a black and green tracer must be connected with the green wire having a black tracer. Additionally, the solid green wire must be connected with the yellow wire.

As stated in the previous paragraph, electrical current is required to operate the headlight, taillights, brakelights and accessories that require output from the lighting coils. To accomplish this, current is induced in the two lighting coils by the rotation of the four magnets, Fig. IV-13. Since the magnets are alternately mounted and, also, alternately pass the two lighting coils, the magnetic forces change direction of travel. Because the magnetic forces travel from north to south (maximum positive to maximum negative), the direction of flow changes every 90 degrees of flywheel rotation. The lighting system uses every positive and negative current impulse to supply electricity to the lighting system. And why don't the lights blink, being that both the positive and negative electrical impulses are used? For every mainshaft rotation, four electrical impulses take place. When the engine is at idle (2400 RPM), the output of the lighting coils is 9600 electrical impulses per minute. Therefore, the electrical impulses take place so fast that the decrease in output, which occurs just after maximum positive and just before maximum negative, cannot be detected.

Fig. IV-13



After current is induced in the two lighting coils, the current flows to the lights and other accessories by way of wiring harnesses and switches, Fig. IV-13. Current flow to the headlight, taillights and brakelights will occur only when the light switch is ON (closed circuit). Conversely, if the light switch is OFF (open circuit), the induced current in the lighting coils is routed through the voltage regulator and to ground, Fig. IV-13. Therefore, the voltage regulator shunts of any unwanted or excess voltage that is not used by the lighting system.

Another component that is a part of the lighting system is the headlight dimmer switch. When the light switch is ON (closed circuit), current flows to the dimmer switch. By moving the switch to high beam, the low beam circuit is opened, thereby, diverting current to the headlight high beam filament, Fig. IV-13. The exact opposite takes place when the dimmer switch is moved to low beam: the high beam circuit is opened, thereby,

diverting current to the headlight low beam filament.

Electric Start System

The function of the electric start system is to crank the engine, by means of an electric motor, for starting purposes. To produce and store the current necessary for the electric start system, a number of components are used in conjunction with each other.

1. FLYWHEEL-MOUNTED PERMANENT MAGNETS – Provide a moving magnetic field when the flywheel is rotating around the coils.

2. LIGHTING COILS – Mounted on the base plate, just above the ignition system exciting coil is the 23 watt lighting coil. Mounted opposite the 23 watt lighting coil is the large 100 watt lighting coil. The four leads of the coils are connected in parallel at the engine connector by two common end pieces. To make sure there will be maximum output, the yellow wire having a black and green tracer must be connected with the green wire having a black tracer. Additionally, the solid green wire must be connected with the yellow wire.

3. REGULATOR RECTIFIER – Diverts to ground any unwanted or excess voltage that is not used by the electric start system or the lighting system. It also converts alternating current (AC) to direct (DC), which is required to charge the battery.

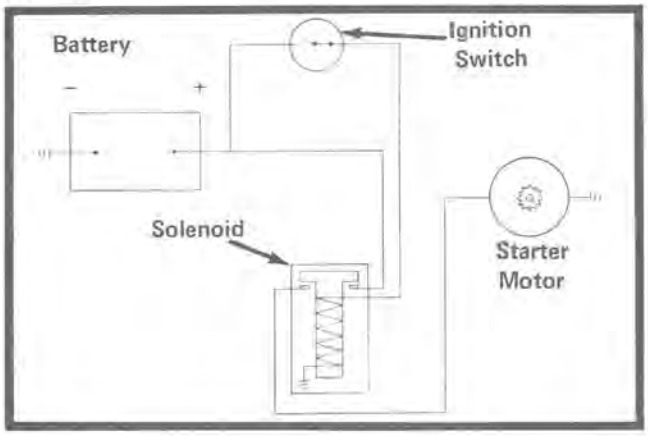
4. STARTER MOTOR AND RING GEAR – Used to crank engine over.

5. BATTERY – Stores the electrical energy that is supplied to the electric starter motor during cranking.

6. SOLENOID – Acts as a switch to allow current to pass from the battery, through the heavy cables and to the starter motor.

To start the engine, using the electric start motor, direct current flows from the battery, through the heavy cables and, as a result, activates the electric starter motor. Since the starter motor requires a substantial amount of current for operation, heavy gauge battery cables and ground cable is used for direct current transmission. To keep the heavy battery cables as short as possible, a solenoid is used. The solenoid acts as a switch between the battery and starter motor, Fig. IV-14. Starter motor engagement with the ring gear takes place when the ignition switch is in the START position. At this time, the heavy cable circuit to the battery is closed, resulting in direct current flow to the starter motor and subsequent starter gear engagement with the ring gear, Fig. IV-14.

Fig. IV-14



The battery is used as a storage center and power source for the electric start motor. And to operate the starter motor, the battery must be fully charged, which will result in maximum output from the battery. Current for the battery charge system is supplied by the magneto alternator system. The generated current, which is induced in the lighting coils by the rotating magnets, is routed to the regulator/rectifier. As current goes into the regulator/rectifier, it is alternating current; this type of current will not charge the battery. Therefore, alternating current must be changed to direct current for battery charging purposes. Because a change from alternating current to direct current is made within the regulator/rectifier, the battery receives only positive charges, resulting in a fully-charged battery. When the battery is fully charged, the regulator/rectifier routes the excess current to ground, which prevents damage to the charging and lighting system.

Tachometer

The function of the engine tachometer is to register the engine mainshaft revolutions per minute. To accomplish this, the positive (+) and

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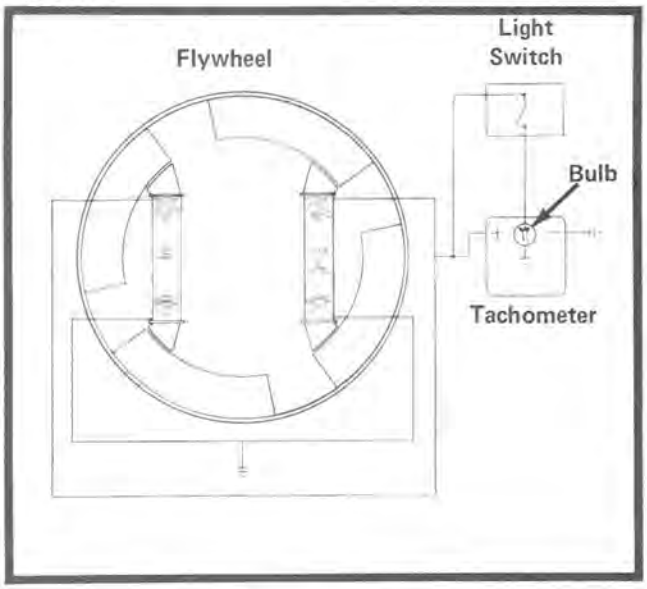
negative (–) terminals on the back of the tachometer are connected in parallel with the magneto alternator, Fig. IV-15, which sends positive pulses to the tachometer. These positive pulses flow through a coil in the tachometer and create an electromagnetic force, resulting in tachometer needle movement against a spring. Therefore, as the pulse rate of the magneto generator increases, so also does the tachometer needle movement. Conversely, as the pulse rate decreases, so also does the electromagnetic force, which allows the indicator needle spring force to become dominant and indicate a reduction in RPM.

Mounted in the tachometer and connected in parallel with the instrument lighting circuit is the tachometer light bulb, Fig. IV-15. The bulb's only function is to illuminate the tachometer dial and does not affect any mechanical function.

Fig. IV-15



BEFORE TROUBLE SHOOTING IGN. SYSTEM

Check Fuel Delivery to Engine

Oftentimes the fuel system will not be functioning properly and, as a result, may lead the service technician to believe there is a problem in the ignition electrical system. Therefore, before the ignition system is considered to be malfunctioning, check the fuel system to make sure the engine is getting fuel.

1. Check fuel tank filter (see Section III, Fuel System, Check Fuel Tank Filter, page III-4).
2. Check in-line fuel filter (see Section III, Fuel System, Check In-Line Fuel Filter, page III-5).
3. Check engine-mounted fuel pump filter (see Section III, Fuel System, Check Fuel Pump Filter, page III-5).
4. Make sure the carburetor is adjusted properly and delivering fuel to the engine.

IGNITION SYSTEM TESTING

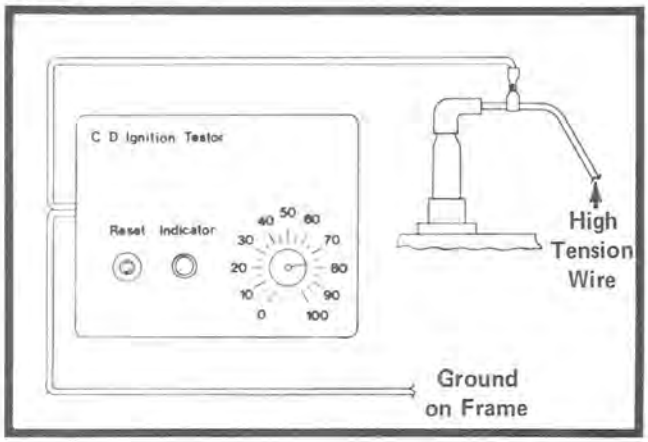
High Voltage Output and Spark Plug Test

Equipment Necessary: Electro-Specialties CD Ignition Tester Model No. 1, New Spark Plug and 13/16-Inch Spark Plug Socket

Note: KM-24 engines having serial number 7565-102 and before, use Bosch Spark Plug W240T1. After serial number 7565-102, use Bosch Spark Plug W240T2. Air gap for both plugs is 0.020 inch.

1. Connect one lead of the tester to ground and the other lead on the high tension wire, Fig. IV-16. Set tester dial on 70.

Fig. IV-16



IGNITION SYSTEM TESTING

2. Grasp the recoil handle, then crank the engine over quickly.

3. If red light on tester illuminates, spark plug and high voltage output is satisfactory. If red light did not illuminate, proceed to step 4.

Note: Remember to press the RESET button after the red light illuminates.

4. Remove customer's old spark plug and install new plug, using a 13/16-inch spark plug socket. Connect high tension wire to spark plug.

5. Connect one lead of tester to ground and the other lead on the high tension wire, Fig. IV-16. Set tester dial on 70.

6. Grasp recoil handle, then crank engine over quickly.

7. If red light on tester illuminates, high voltage output is satisfactory and customer's old spark plug is defective. If red light on tester did not illuminate, the ignition system or the wiring harness may be defective. Check both the ignition system and wiring harness to isolate the problem (see Ignition System and Main Wiring Harness Check, page IV-11).

Ignition System and Main Wiring Harness Check

Equipment Necessary: Electro-Specialties CD Ignition Tester Model No. 1

1. Disconnect the main wiring harness from the engine connector plug.

2. Connect one lead of the tester to ground and the other lead on the high tension wire, Fig. IV-16. Set tester dial on 70.

3. Grasp the recoil handle, then crank the engine over quickly.

4. If red light illuminates, high voltage output is satisfactory and indicates there is a problem in the main wiring harness or related switches. Check all the switches to find the problem area (see Check Main Wiring Harness and Related Switches, page IV-11). If red light did not illuminate, high voltage is not satisfactory and indicates there is a problem in the ignition system, not in the main wiring harness or switches. Check ignition system components to find the problem area (see Check Ignition-Related Components, page IV-12).

Check Main Wiring Harness and Related Switches

Equipment Necessary: Electro-Specialties Ohmmeter Model No. PC2

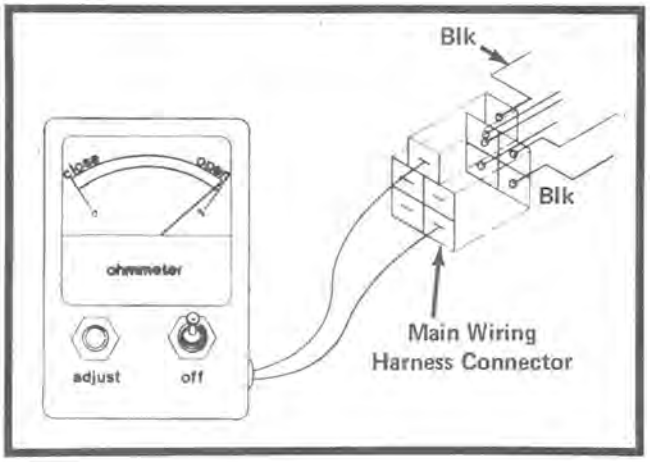
Note: Before checking harness and switches, loosen screw holding throttle wire to carburetor-mounted throttle arm, using screwdriver having 1/4-inch blade. Pull all slack out of throttle wire, plus an additional 1/16-inch, which will tension the throttle safety switch properly; then tighten screw.

1. Make sure the main wiring harness is disconnected from the engine connector plug.

2. Rotate the ignition switch to the ON position.

3. Connect one lead of the ohmmeter to a black wire in the wiring harness connector plug and the other lead to the remaining black wire in the connector plug, Fig. IV-17.

Fig. IV-17



4. If the ohmmeter reads infinity (OPEN), Fig. IV-17, an open circuit exists and the switches are satisfactory. If the ohmmeter reads 0 or very low resistance, a short circuit exists and a switch may not be operating properly. To determine if a switch or the wiring harness is defective, proceed to step 5 and 6.

5. Disconnect the main wiring harness connector plug from the ignition switch, Fig. IV-5. Also,

disconnect emergency kill switch plug, Fig. IV-9, holding a brown wire, and black wire having a yellow tracer from the plug holding two black wires running to the connector that is disconnected from the ignition switch.

6. If the ohmmeter now registers infinity (OPEN), a switch is defective and it is to be replaced (see Ignition and Throttle Safety/Kill Switch Check, page IV-12). If the ohmmeter continues to register 0, the main wiring harness is defective and is to be replaced.

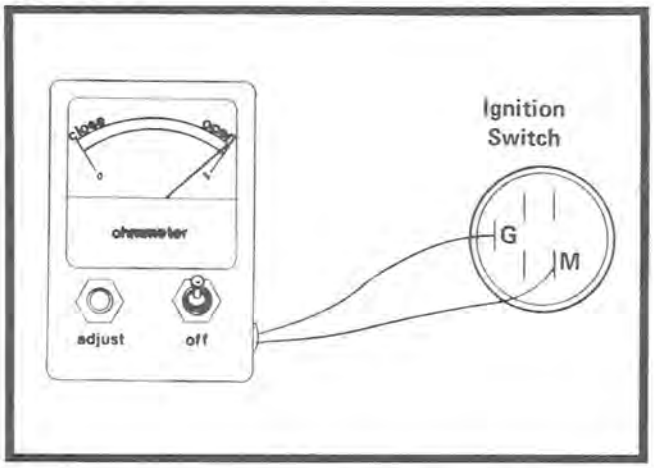
Ignition and Throttle Safety/Kill Switch Check

Equipment Necessary: Electro-Specialties Ohmmeter Model No. PC2

1. Rotate ignition switch to the ON position.

2. Connect one lead of the ohmmeter to the G terminal on ignition switch and the other lead to the M terminal, Fig. IV-18.

Fig. IV-18

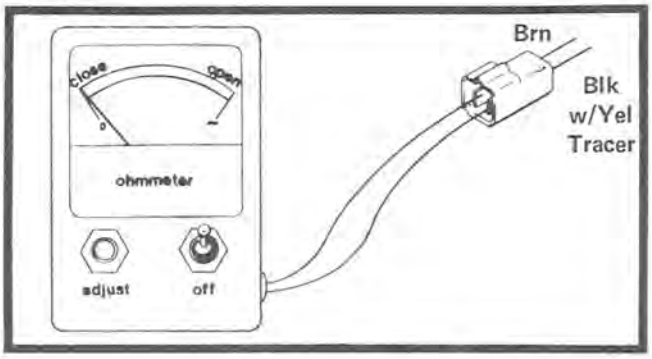


3. If ohmmeter registers infinity (OPEN), Fig. IV-18, the ignition switch is satisfactory; proceed to step 4. If ohmmeter registers 0, the ignition switch is defective and is to be replaced.

Note: Before performing steps 4, 5 and 6, loosen screw holding throttle wire to carburetor-mounted throttle arm, using a screwdriver having a 1/4-inch blade. Pull all slack out of throttle wire, plus an additional 1/16-inch, which will tension the throttle safety switch properly; then tighten screw.

4. Connect one lead of the ohmmeter to the brown wire running to the throttle safety/kill switch and the other lead to the black wire having a yellow tracer, Fig. IV-19. This wire also runs to the throttle safety/kill switch.

Fig. IV-19



5. Depress the emergency shut-off switch button and make sure it is in a released (fully up) position.

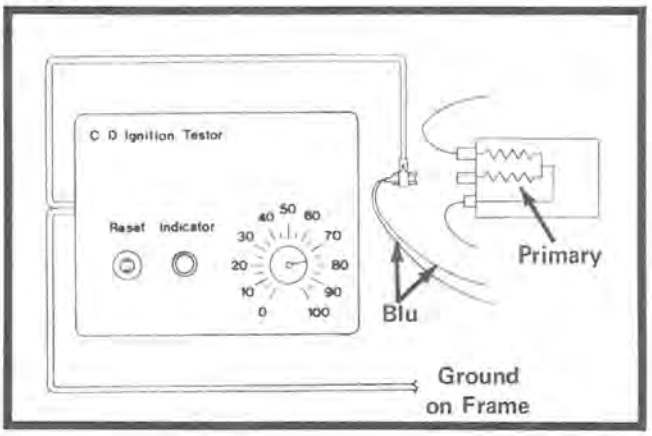
6. If ohmmeter registers 0, the throttle safety/kill switch is defective and is to be replaced. If ohmmeter registers infinity (OPEN), the switch is satisfactory.

Check Ignition-Related Components

Equipment Necessary: Electro-Specialties CD Ignition Tester Model No. 1

1. Remove the blue wires from the external coil primary, Fig. IV-20. Connect one lead of the CD ignition tester to the blue wire terminal of the external coil and the other tester lead to ground on the frame, Fig. IV-20. Set tester dial at 55.

Fig. IV-20



2. Grasp the recoil handle, then crank the engine over quickly.

3. If the red light on tester illuminates, exciting coil high voltage output is satisfactory and indicates there is a problem in the external ignition coil (see Check External Ignition Coil Primary and Secondary, page IV-13). If the red light on tester does not illuminate, exciting coil high voltage output is not satisfactory and indicates there is a problem in the magneto generator (exciting coil, breaker points, or condenser). Resistance values of magneto generator components are to be checked (see Check Breaker Points, Exciting Coil and Condenser, pages IV-13 and 14).

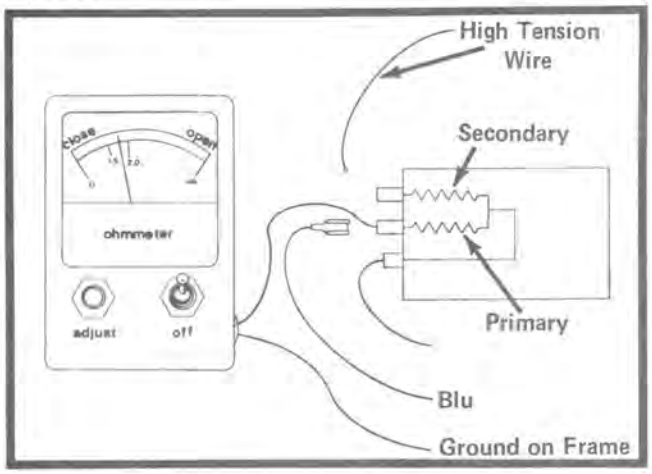
Check External Ignition Coil Primary and Secondary

Equipment Necessary: Electro-Specialties Ohmmeter Model No. PC2 and Arctic Multi-Tester

Note: Resistance readings (ohms) are acceptable within ± 10%.

1. Disconnect the blue wire from the primary and high tension wire from the external ignition coil secondary, Fig. IV-21. Make sure brown wire is connected to external coil ground.

Fig. IV-21



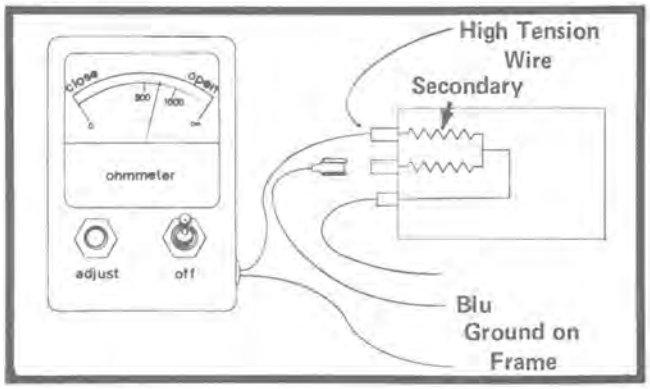
2. Connect one lead of the ohmmeter to the external coil primary terminal, and the other lead to ground, Fig. IV-21.

3. Ohmmeter is to show resistance reading of 1.65-1.85.

4. If resistance is 1.65-1.85, check the external ignition coil secondary (steps 5 and 6). If resistance reading is not 1.65-1.85, replace the external ignition coil because the primary circuit is defective.

5. Connect one lead of the Arctic multi-tester to ground and the other lead to the secondary terminal (where high tension wire connects), Fig. IV-22. Ohmmeter is to show resistance reading of 6700-7100.

Fig. IV-22



6. If resistance reading is 6700-7100, external ignition coil is satisfactory and indicates a problem in the magneto generator. If resistance reading is not 6700-7100, the external ignition coil is to be replaced because the secondary circuit is defective.

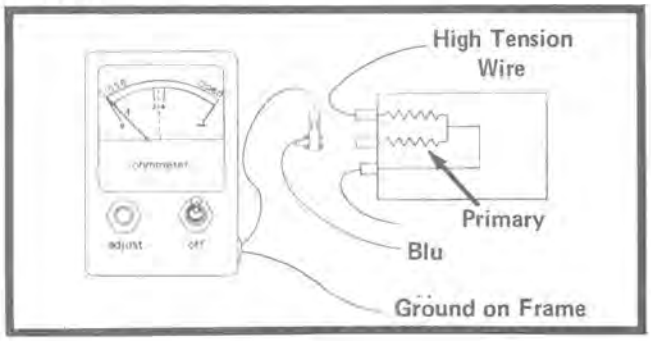
Check Breaker Points and Exciting Coil

Equipment Necessary: Electro-Specialties Ohmmeter Model No. PC2

Note: Resistance reading (ohms) are acceptable within ± 10%.

1. Disconnect the blue wire from the external ignition coil primary, Fig. IV-23.

Fig. IV-23



IGNITION SYSTEM TESTING

2. Connect one lead of the ohmmeter to engine ground and the other lead to the blue wire, Fig. IV-23.

3. Slowly pull recoil handle until ohmmeter needle moves to the CLOSED end of the scale (points closed). Ohmmeter needle is to read no more than 0.1 ohms, Fig. IV-23. If resistance reading is 0.1 or less, the breaker points are satisfactory. If resistance is more than 0.1, replace the breaker points because they are defective.

4. Continue to pull the recoil handle slowly until the ohmmeter needle moves toward the OPEN end of the scale (points open). Ohmmeter needle is to read 3.5-3.7 ohms, Fig. IV-23. If resistance reading is 3.5-3.7, exciting coil is acceptable. If resistance reading is not 3.5-3.7, the exciting coil is defective and is to be replaced.

5. Check the condenser for capacity, leaks and shorts (see Condenser Check, page IV-14).

Note: If the exciting coil, breaker points, condenser and external ignition coil all tested satisfactory (within specifications), the only remaining component that could be defective is the flywheel. The strength of the flywheel magnets may be low and, as a result, minimal current induction into the exciting coil will be produced.

Condenser Check

Equipment Necessary: Merc-O-Tronic Analyzer Model No. 98

1. Perform condenser capacity test, and leakage and short test, using a Merc-O-Tronic Analyzer.

2. Connect the analyzer leads as recommended in the Merc-O-Tronic Operating and Test Manual.

3. When performing the capacity test, condenser must be within specification (0.26-0.30 Microfarads.

4. If capacity is not within specifications, is leaking or is shorted, replace the condenser.

Note: A good indication of a defective condenser is when breaker points burn out very quickly.

LIGHTING SYSTEM TESTING

Check Headlight, Taillights and Brakelights

Oftentimes the light bulbs will not be functioning properly (burned out or loose in socket) and, as a result, may lead the service technician to believe there is a problem in the magneto alternator or other areas of the lighting system. Therefore, before the magneto alternator or lighting system is considered to be malfunctioning, check the light bulbs for broken filaments, etc.

1. Check headlight bulb (see Check Headlight, page IV-15).

2. Check taillight and brakelight bulbs (see Check Taillights and Brakelights, page IV-14).

Check Taillights and Brakelights

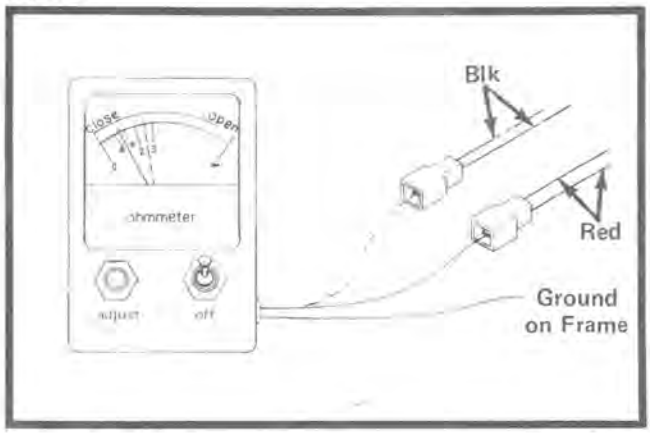
Equipment Necessary: Electro-Specialties Ohmmeter Model No. PC2

1. Remove the seat from the tunnel.

2. Disconnect the taillight and brakelight connectors, Fig. IV-10.

3. Connect one lead of the ohmmeter to the two red wires running to the brakelights, and the other lead to a suitable ground, Fig. IV-24. Ohmmeter is to register approximately 0.6-0.8 ohms (low resistance).

Fig. IV-24



4. If the ohmmeter registers low resistance (approximately 0.6-0.8), the brakelights are acceptable. If ohmmeter registers slightly higher resistance (approximately 1.2-1.6), one of the brakelight bulbs is not making contact in the socket, or is burned out. If the ohmmeter registers infinity (OPEN), there is a bad ground, broken red wire or both brakelight bulbs are burned out.

5. Connect one lead of the ohmmeter to the two black wires running to the taillights, and the other lead to a suitable ground, Fig. IV-24.

6. If the ohmmeter registers low resistance (approximately 2-3), the taillights are acceptable. If ohmmeter registers slightly higher resistance (approximately 4-6), one of the taillight bulbs is not making contact in the socket, or is burned out. If the ohmmeter registers infinity (OPEN), there is a bad ground, broken black wire or both taillight bulbs are burned out.

Note: The taillights, brakelights and wires have now been checked. If all the components checked out to be acceptable and a malfunction still exists in the brakelights and taillights, the problem area must be isolated (see Isolate Problem to Magneto Alternator or Wiring Circuit, page IV-15).

Check Headlight

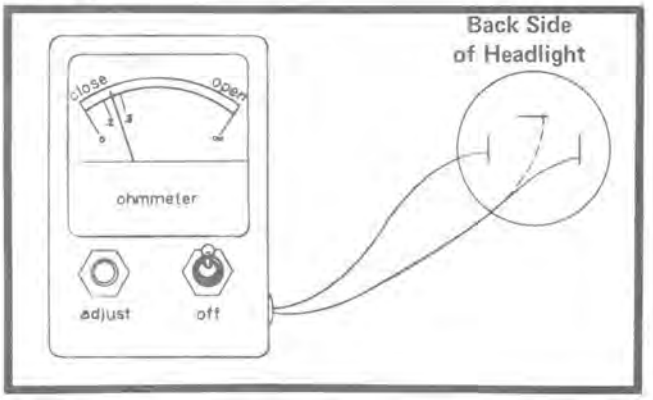
Equipment Necessary: Electro-Specialties Ohmmeter Model No. PC2

1. Disconnect the headlight connector from the headlight terminals.

2. Connect one lead of the ohmmeter to ground terminal on headlight (where brown wire connects), and the other lead to the high beam headlight terminal (where blue wire connects), Fig. IV-25.

3. If the ohmmeter registers low resistance (0.2-0.3), the high beam filament is acceptable. Check low beam if headlight malfunction still exists (see step 4). If the ohmmeter registers high resistance or infinity (OPEN), the high beam filament is burned out and is to be replaced.

Fig. IV-25



4. Connect one lead of the ohmmeter to ground terminal on headlight (where brown wire connects), and the other lead to the low beam headlight terminal (where white wire connects), Fig. IV-25.

5. If the ohmmeter registers low resistance (0.2-0.3), the low beam filament is acceptable. If the ohmmeter registers high resistance or infinity (OPEN), the low beam filament is burned out and is to be replaced.

Note: The headlight has now been checked. If it checked out to be acceptable and a malfunction still exists at the headlight, the problem area must be isolated (see Isolate Problem to Magneto Alternator or Wiring Circuit, page IV-15).

Isolate Problem to Magneto Alternator or Wiring Circuit

Equipment Necessary: Electro-Specialties Voltmeter Model No. MS-10 and Quik Jack

Note: Use either a voltmeter or ohmmeter to isolate the lighting problem to the magneto alternator or wiring harness. If a voltmeter is used, proceed by using steps 1-5. If ohmmeter is used, check resistance of lighting coils (see step 6 only).

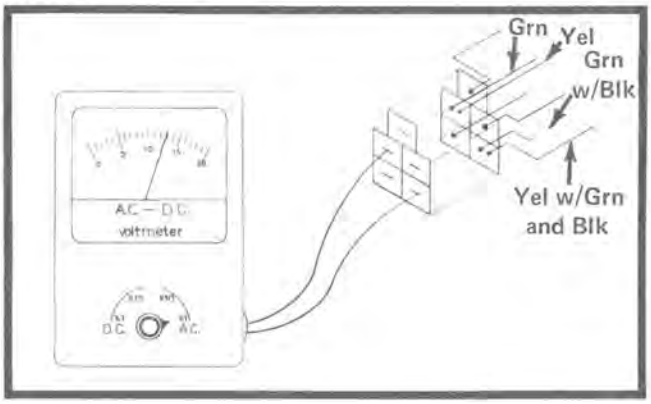
1. Raise the rear of the snowmobile off the shop floor, using a Quik Jack. Make sure the track is free to rotate.

2. Disconnect the main wiring harness from the engine connector plug.

LIGHTING SYSTEM TESTING

3. In the engine connector plug, connect one lead of the voltmeter to the common green wire and yellow wire terminal, and the other lead to the common green wire terminal having a black tracer and yellow wire having a green and black tracer, Fig. IV-26.

Fig. IV-26



4. Start the engine and allow it to idle. The voltmeter is to register some degree of AC voltage (approximately 10-15 volts), Fig. IV-26. Grasp the throttle and accelerate slightly. As the engine RPM increases, the voltmeter is to register 20-30 AC volts.

CAUTION

Make sure AC voltmeter has the capacity to test in excess of 30 AC volts. High engine RPM can cause high voltage and, as a result, damage on-line components (AC voltmeter, etc.).

5. If the AC voltage output is 10-15 volts at idle and, also, raises to 20-30 volts when slight acceleration takes place, the magneto alternator (lighting coils) is satisfactory and indicates a wiring circuit problem. If the output is not satisfactory, the magneto alternator is malfunctioning and must be checked further (see Check Magneto Alternator, page IV-21). Shut engine off and remove the Quik Jack.

6. An alternate method of testing the magneto alternator (lighting coils) is with the use of an ohmmeter (see Check Resistance of Lighting Coils, page IV-16).

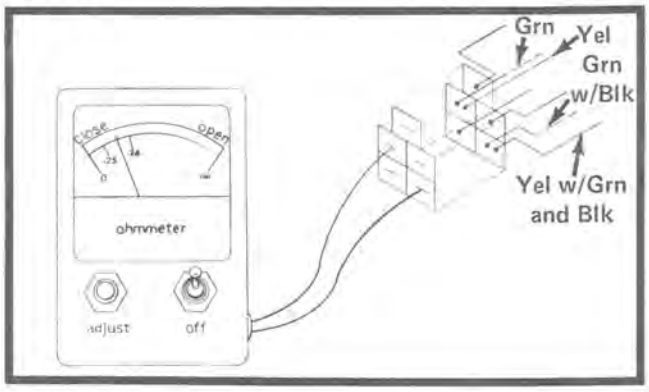
Check Resistance of Lighting Coils

Equipment Necessary: Electro-Specialties Ohmmeter Model No. PC2

1. Disconnect the main wiring harness from the engine connector block.

2. In the engine connector plug, connect one lead of the ohmmeter to the common green wire and yellow wire terminal, and the other lead to the common green wire terminal having a black tracer and yellow wire terminal having a green and black tracer, Fig. IV-27.

Fig. IV-27



3. The ohmmeter is to register a resistance value of 0.25-0.28, which is actually a parallel reading of the 100 watt and 23 watt lighting coils.

4. If the ohmmeter registers resistance value of 0.25-0.28, the magneto alternator (lighting coils) is satisfactory and indicates a wiring circuit problem (see Check Voltage Regulator, page IV-17). If the ohmmeter does not register a resistance value of 0.25-0.28, the magneto alternator is malfunctioning and must be checked further (see Check Magneto Alternator, page IV-21).

WIRING CIRCUIT TESTING

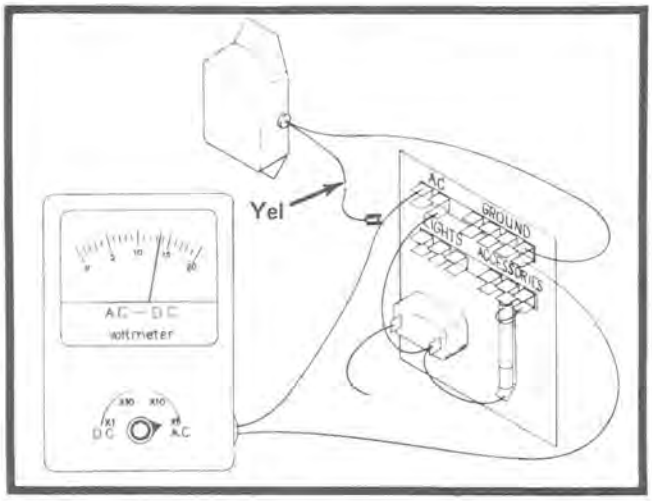
Check Voltage Regulator

Equipment Necessary: Electro-Specialties Voltmeter Model No. MS-10 and Quik Jack

1. Connect the main wiring harness connector to the engine connector plug.

2. Disconnect the voltage regulator yellow wire from the AC terminal on the circuit board, Fig. IV-28.

Fig. IV-28



3. Raise the rear of the snowmobile off the shop floor, using a Quik Jack. Make sure the track is free to rotate.

4. Connect one lead of the AC voltmeter to an empty AC terminal on the circuit board, and the other lead to a GROUND terminal on the circuit board, Fig. IV-28.

5. Start the engine and allow it to idle rapidly. The voltmeter is to register approximately 12-15 AC volts. Grasp the throttle and accelerate slightly. As the engine RPM increase, the voltmeter is to register 20-30 AC volts.

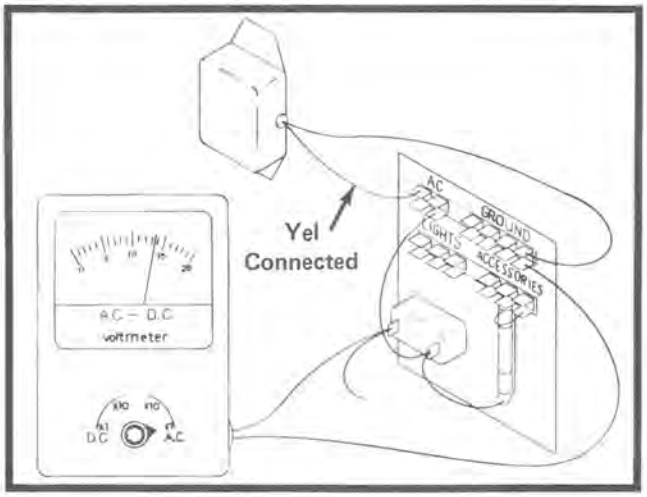
CAUTION

Make sure the AC voltmeter has the capacity to test in excess of 30 AC volts. High engine RPM can cause high voltage and, as a result, damage on-line components (AC voltmeter, etc.).

6. If the voltmeter registers 12-15 AC volts at engine idle and 20-30 AC volts when engine is accelerated slightly, adequate power is getting to the circuit board. Proceed to step 7. If the voltmeter does not register 12-15 AC volts at engine idle and 20-30 AC volts when engine is accelerated, there is a problem in the two magneto alternator wiring circuit wires, between the engine connector block and circuit board.

7. With the engine at idle and the AC voltmeter leads connected to AC and GROUND on circuit board (see step 4), connect the voltage regulator yellow wire to AC terminal on circuit board. Voltmeter is to register 12-15 AC volts at idle and when engine is accelerated.

Fig. IV-29



8. If voltmeter registers 12-15 AC volts, the voltage regulator is operating properly and indicates there may be a problem in the circuit breaker (see step 9). If voltmeter does not register 12-15 AC volts, the voltage regulator is defective and is to be replaced.

9. Connect one lead of the voltmeter to GROUND on the circuit board and the other lead to circuit breaker terminal, Fig. IV-29. Voltmeter is to register 12-15 AC volts. If voltmeter registers 12-15 volts, check the opposite circuit breaker terminal; it also is to have 12-15 AC volts. If either circuit breaker terminal does not have 12-15 volts, the circuit breaker is defective and constitutes circuit board replacement.

10. Check voltage at ignition switch (see Check Ignition Switch and Wiring Harness for Voltage, page IV-18).

Check Ignition Switch/Wiring Harness for Voltage

Equipment Necessary: Electro-Specialties Voltmeter Model No. MS-10 and Quik Jack

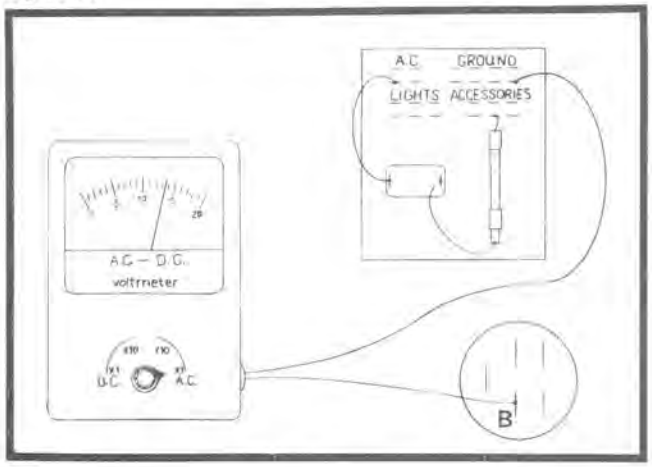
1. Connect the main wiring harness connector to the engine connector plug.

2. Raise the rear of the snowmobile off the shop floor, using a Quik Jack. Make sure the track is free to rotate.

3. Start the engine and allow it to idle.

4. Connect one lead of the AC voltmeter to GROUND on the circuit board, and the other lead to the B terminal on the ignition switch, Fig. IV-30. Voltmeter is to register 12-15 AC volts. DO NOT REMOVE CONNECTOR FROM SWITCH.

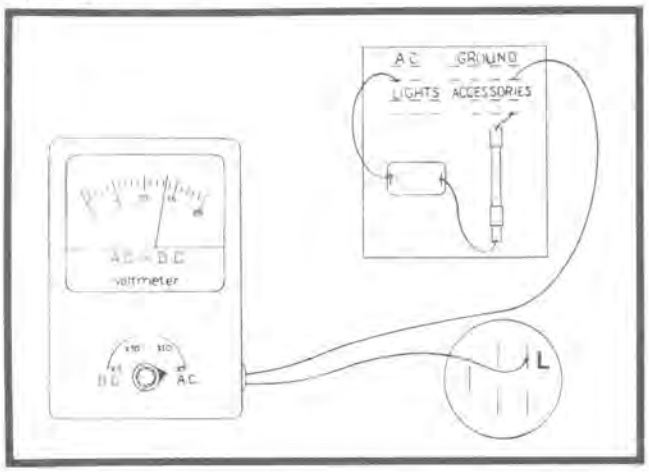
Fig. IV-30



5. If voltmeter does not register 12-15 AC volts at the B terminal, the ignition switch or yellow wire running from the B terminal to the circuit breaker is defective (see Check Ignition Switch, page IV-18). If voltmeter registers 12-15 AC volts, check voltage at L terminal (see step 6).

6. Connect one lead of the AC voltmeter to GROUND on the circuit board, and the other lead to the L terminal on the ignition switch, Fig. IV-31. Voltmeter is to register 12-15 AC volts. DO NOT REMOVE CONNECTOR FROM SWITCH.

Fig. IV-31



7. If voltmeter registers 12-15 AC volts, the switch is acceptable (see step 8). If the voltmeter does not register 12-15 AC volts, the ignition switch is defective and is to be replaced.

8. As a final test, check the ignition switch (see Check Ignition Switch, page IV-18).

Check Ignition Switch

Equipment Necessary: Electro-Specialties Ohmmeter Model No. PC-2

1. Shut the engine off.

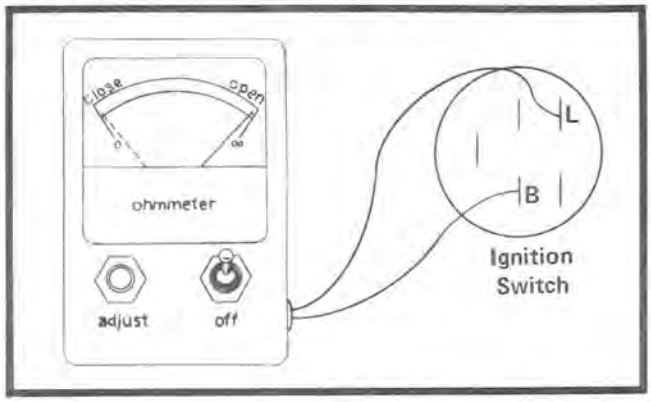
2. Remove the locking ring from the ignition switch. Slide ignition switch through instrument panel and remove ignition connector plug from switch.

3. Connect one lead of the ohmmeter to the L terminal on the ignition switch, and the other lead to the B terminal, Fig. IV-32. Ohmmeter is to register OPEN with switch in the OFF position, CLOSED with switch in ON position and OPEN with switch in the START position.

4. If ohmmeter does not register as explained in step 3, the ignition switch is defective and is to be replaced. If ohmmeter registers as explained in step 3, the ignition switch is acceptable and indicates there may be a problem in the yellow wire running from the B terminal of the ignition switch to the circuit breaker terminal. The yellow wire will probably be defective.

WIRING CIRCUIT TESTING

Fig. IV-32



5. At this point, the light switch is to be checked for voltage if a lighting problem still exists (see Check Light Switch for Voltage, page IV-19).

Check Light Switch for Voltage

Equipment Necessary: Electro-Specialties Voltmeter Model No. MS-10 and Quik Jack

1. Connect the main wiring harness connector to the engine connector plug.

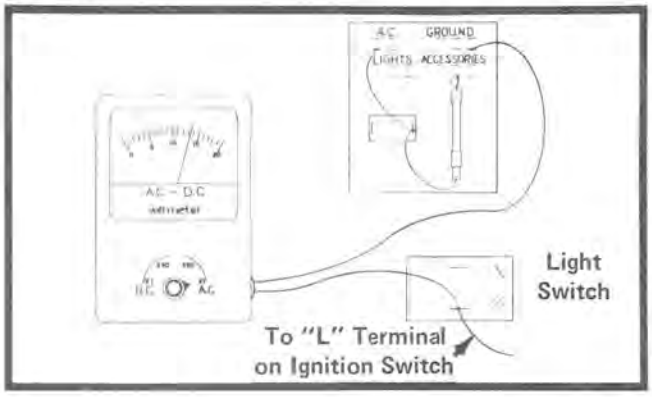
2. Raise the rear of the snowmobile off the shop floor, using a Quik Jack. Make sure the track is free to rotate.

3. Start the engine and allow it to idle.

4. Move light switch to OFF position.

5. Connect one lead of the voltmeter to GROUND on the circuit board and the other lead to the horizontally-oriented terminal holding a yellow wire, Fig. IV-33. Voltmeter is to register 12-15 AC volts. DO NOT REMOVE WIRES FROM SWITCH.

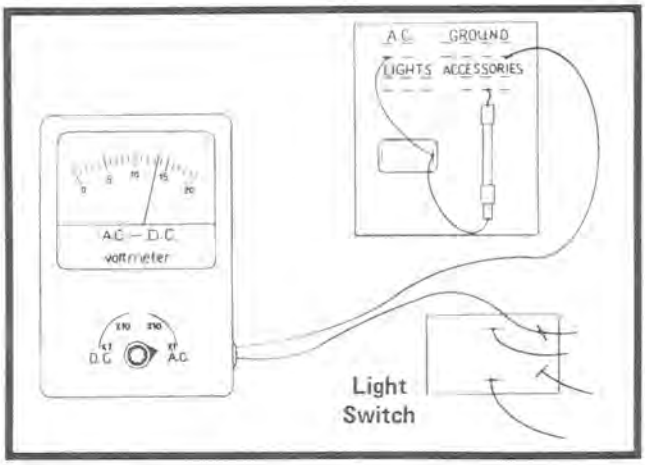
Fig. IV-33



6. If voltmeter registers 12-15 AC volts, check the two vertically-oriented terminals (see step 7). If voltmeter does not register 12-15 AC volts, there is a problem in the yellow wire running from the ignition switch L terminal to the horizontally-oriented light switch terminal.

7. Connect one lead of the voltmeter to GROUND on the circuit board and the other lead to a vertically-oriented light switch terminal, Fig. IV-34. Move light switch to ON position. Voltmeter is to register 14-15 AC volts. DO NOT REMOVE WIRES FROM SWITCH.

Fig. IV-34



8. If the voltmeter registers 12-15 AC volts, the light switch is acceptable and indicates a problem in the brake switch, dimmer switch or related wires (see Check Brake Switch and Dimmer Switch, page IV-20). If the voltmeter does not register 12-15 AC volts, the light switch is defective and is to be replaced. To positively verify a defective switch, check it with an ohmmeter (see Check Light Switch Resistance, page IV-19).

Check Light Switch Resistance

Equipment Necessary: Electro-Specialties Ohmmeter Model No. PC-2

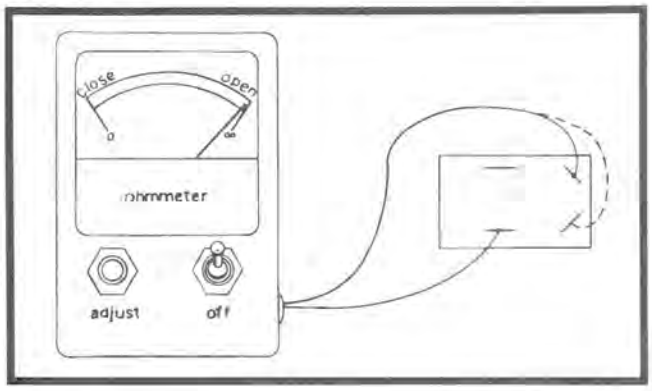
1. Shut the engine off.

2. Remove the wires from the light switch terminals.

3. Move the light switch to the OFF position.

4. Connect one lead of the ohmmeter to a horizontally-oriented terminal on the light switch and the other lead to a vertically-oriented terminal, Fig. IV-35. Ohmmeter is to register open. Check remaining vertically-oriented terminal in same manner, Fig. IV-35.

Fig. IV-35



5. If ohmmeter does not register OPEN, the light switch is defective and is to be replaced. If the ohmmeter registers OPEN, proceed to step 6.

6. Move the light switch to the ON position. Ohmmeter is to register CLOSED.

7. If ohmmeter registers CLOSED, the light switch is acceptable. If the ohmmeter does not register CLOSED, the light switch is defective and is to be replaced.

8. Check the brake switch and dimmer switch (see Check Brake Switch and Dimmer Switch, page IV-20).

Check Brake Switch and Dimmer Switch

Equipment Necessary: Electro-Specialties Ohmmeter Model No. PC-2

1. Shut engine off.

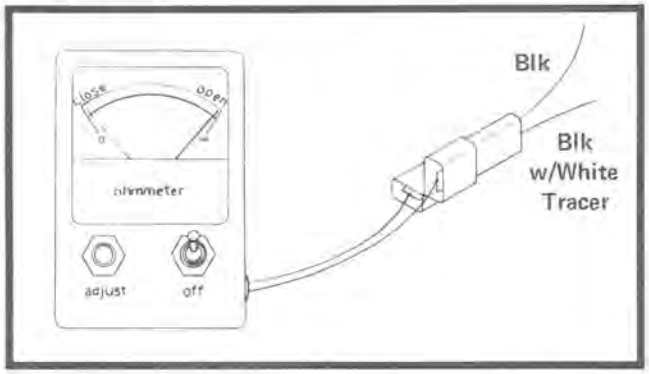
2. Disconnect the single black wire that runs to dimmer switch from the light switch, Fig. IV-6.

3. Disconnect the T-shaped connectors that hold the two wires running to the dimmer switch, Fig. IV-8.

4. Disconnect the Z-shaped connectors that hold two wires running to the brake switch, Fig. IV-7.

5. Connect one lead of the ohmmeter to a terminal in the Z-shaped connector, and the other lead to the remaining terminal in the Z-shaped connector holding the two wires running to the brake switch, Fig. IV-36. Ohmmeter is to register OPEN.

Fig. IV-36



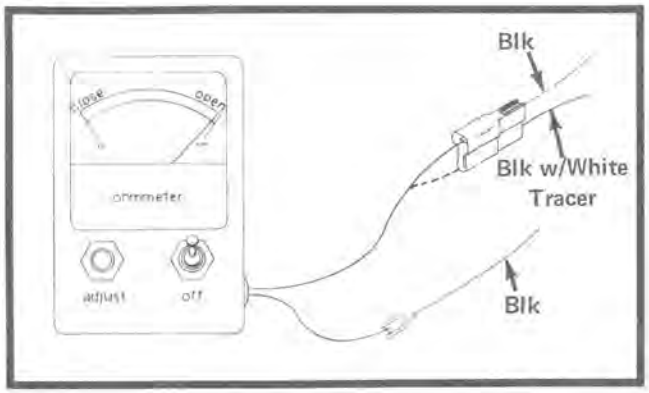
6. If ohmmeter does not register OPEN, the switch is defective and is to be replaced. If the ohmmeter registers OPEN, proceed to step 7.

7. Squeeze the brake lever. Ohmmeter is to register CLOSED, Fig. IV-36.

8. If ohmmeter registers CLOSED, the brake switch is acceptable and indicates a possible dimmer switch problem (see step 9). If the ohmmeter does not register CLOSED, the brake switch is defective and is to be replaced.

9. Connect one lead of the ohmmeter to the long black wire that was disconnected from the light switch, and the other lead to the black wire terminal in the T-shaped connector holding the two wires running to the dimmer switch, Fig. IV-37. Move the dimmer switch to low beam. Ohmmeter is to register OPEN.

Fig. IV-37



WIRING CIRCUIT TESTING

10. Now, remove the ohmmeter lead from the black wire terminal and connect it to the black wire having a white tracer, Fig. IV-37. Move dimmer switch to high beam. Ohmmeter is to register OPEN.

11. If the ohmmeter registers as explained in steps 9 and 10, the dimmer switch is acceptable. If ohmmeter does not register as explained in steps 9 and 10, the dimmer switch is defective and is to be replaced.

Note: The switches have all been checked at this time. If a lighting problem still exists, the only possible defect is in the wiring circuit harness having a lighting problem. Replace the appropriate wiring harness to remedy the lighting problem.

Check Magneto Alternator

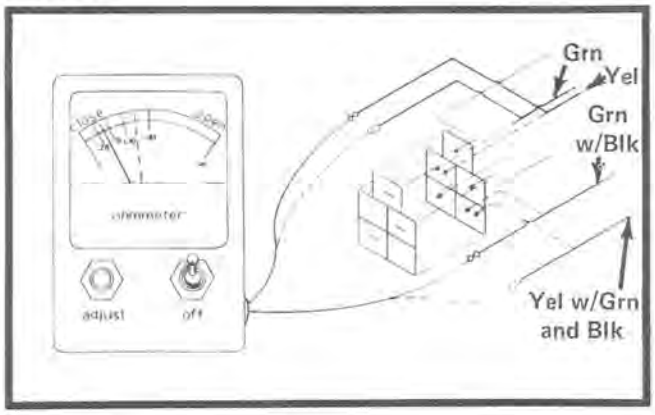
Equipment Necessary: Screwdriver Having a 3/16-Inch Blade and Electro-Specialties Ohmmeter Model No. PC-2

1. Shut the engine off.

2. Disconnect the main wiring harness from the engine connector plug.

3. Remove the green wire and yellow wire from the engine connector plug, Fig. IV-38, using a screwdriver having a 3/16-inch blade. Also, remove the yellow wire having a black and green tracer, and the green wire having a black tracer from the engine connector plug, using a screwdriver having a 3/16-inch blade.

Fig. IV-38



4. Separate the wires from the terminal end pieces.

5. Connect one lead of the ohmmeter to the yellow wire, and the other lead to the yellow wire having a black and green tracer. Ohmmeter is to register 0.28-0.31 ohms.

6. If the ohmmeter registers 0.28-0.31 ohms, the 100 watt lighting coil is acceptable (proceed to step 7). If the ohmmeter does not register 0.28-0.31 ohms, the 100 watt lighting coil is defective and is to be replaced (see Magneto Generator Disassembly, page IV-26).

7. Connect one lead of the ohmmeter to the green wire, and the other lead to the green wire having a black tracer. Ohmmeter is to register 1.70-1.85 ohms.

8. If the ohmmeter registers 1.70-1.85 ohms, the 23 watt lighting coil is acceptable (proceed to step 9). If the ohmmeter does not register 1.70-1.85 ohms, the 23 watt lighting coil is defective and is to be replaced (see Magneto Alternator Disassembly, page IV-26).

9. The lighting coils have now been checked for proper resistance. If the resistance values were as specified, the air gap between the flywheel magnets and coil pole shoes is contributing to the low voltage output of the magneto alternator (see Set Induction Coil Air Gap, page IV-28).

Note: If voltage output of the magneto alternator does not improve, even after all the preceding tests are taken, the flywheel magnets may be weak. Compare the magnetic attraction of the old flywheel against the attraction of a new flywheel. Install a new flywheel if old flywheel magnets do not seem to be strong enough.

ELECTRIC START TESTING

General Battery Care

The battery is perishable and, therefore, must be maintained properly to ensure peak output. When a battery requires charging, a slow charge is to be used. The following items will ensure peak battery output.

1. Check the electrolyte level in the battery every week. If electrolyte is low, add pure distilled water until proper level is obtained. DO NOT OVERFILL BATTERY.

CAUTION

Overfilling the battery will cause the electrolyte to be forced out through the vent hole in the battery cell caps, resulting in a diluted solution strength. And when the discharged solution contacts the battery terminals, cables and other snowmobile parts, corrosion will occur and cause damage.

2. Make sure the battery base and hold down clamp is free of corrosion and other foreign matter.

3. Adjust the hold down clamp properly to keep the battery from shaking, but not so tight that a strain is exerted on the battery case.

4. Before connecting the battery cables to the battery terminals, clean both of the battery terminals and cable connectors to ensure good contact.

5. Coat the battery terminals and cables with petroleum jelly after the battery cables are connected to the terminals.

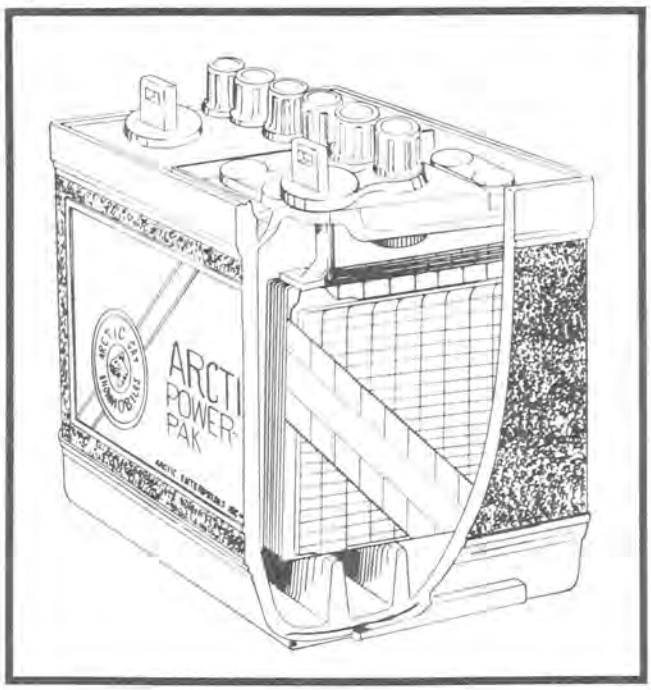
Note: When connecting the battery cables to the terminals, install the positive (+) cable first, then the negative (–) cable.

Check Battery Charge

Equipment Necessary: Hydrometer and Electro-Specialties Voltmeter Model No. MS-10

The electrolyte solution in the battery is to be checked frequently to make sure the battery is fully charged. The electrolyte solution consists of sulfuric acid and distilled water that varies in weight in relation to battery charge. When the battery charge decreases, acid is released from the solution and transposed to the battery plates, Fig. IV-39, resulting in a decrease in electrolyte weight.

Fig. IV-39



1. Remove the battery cell caps and withdraw a sample of electrolyte solution from one of the cells.

2. Check the hydrometer reading to see what the charge of the battery is (see Battery Charge Table below).

BATTERY CHARGE TABLE

Specific Gravity	State of Charge	Battery Freeze Point
1.260	Fully Charged	-74°F
1.230	3/4 Charged	-42°F
1.200	1/2 Charged	-16°F
1.170	1/4 Charged	0°F
1.110	DISCHARGED	+19°F

3. If the battery charge is low, install battery cell caps and charge the battery, using a 12 volt "slow charge" battery charger. Remove battery from snowmobile chassis when charging the battery.

A. Above +60°F – 3 Amperes for four hrs.

B. Below +60°F – 3 Amperes for six hrs.

WARNING

The hydrogen gas formed while the battery is being charged is extremely explosive. Keep open flame, electrical spark, cigars and cigarettes away from the battery to prevent an explosion.

4. Connect one lead of the DC voltmeter to the positive (+) battery terminal, and the other lead to the negative (–) terminal. Voltmeter is to register 12 DC volts.

5. If the voltmeter registers 12 DC volts, the battery is acceptable (proceed to step 6). If voltmeter does not register 12 DC volts, the battery is defective and is to be replaced.

6. After the battery is fully charged, install it in the snowmobile chassis; then connect positive (+) and negative (–) cable to the corresponding battery terminal.

Changing Battery Electrolyte

Under normal conditions, the battery electrolyte should not have to be changed. However, the solution can be changed if it is accidentally neutralized by adding an alkaline substance, or if the solution is spilled. DO NOT CHANGE ELECTROLYTE IN AN OLD BATTERY.

When electrolyte is drained from the battery, waste materials, the result of repetitive charging and discharging, may release from the sediment chambers and become lodged in the separators. If this situation occurs, a battery short circuit may result, causing damage to the electrical system.

1. Charge the battery until "gassing" in all cells is clearly evident.

Note: Gassing is the bubbling action of the electrolyte. If one or more cells fail to gas, do not proceed to the next step. There is a structural defect in the battery and it is to be replaced.

2. Check the specific gravity of the electrolyte solution at three consecutive hourly intervals, using a hydrometer. Hydrometer reading is to be the same at each check.

3. Drain the electrolyte solution from the charged battery and refill with distilled water.

4. Charge the battery until it is fully charged (see Battery Charge Table, page IV-22).

5. Drain the solution from the battery; then add prepared electrolyte to the battery cells. FILL TO PROPER LEVEL.

6. Charge the battery until it is fully charged (see Check Battery Charge, page IV-22).

Note: If the specific gravity accidentally gets too high, add pure distilled water to the solution in each cell until the specific gravity reading is as specified (see Battery Charge Table, page IV-22).

7. After the battery is fully charged, install it in the snowmobile chassis; then connect positive (+) and negative (–) cable to corresponding battery terminal.

Check Solenoid

Equipment Necessary: Electro-Specialties Voltmeter Model No. MS-10 and Quik Jack

Note: Rotate the ignition key to the START position. If the solenoid emits an audible click, the solenoid is acceptable. If a click is not evident, the solenoid is defective and is to be replaced.

1. Check the battery charge rate and voltage output (see Check Battery Charge, page IV-22).

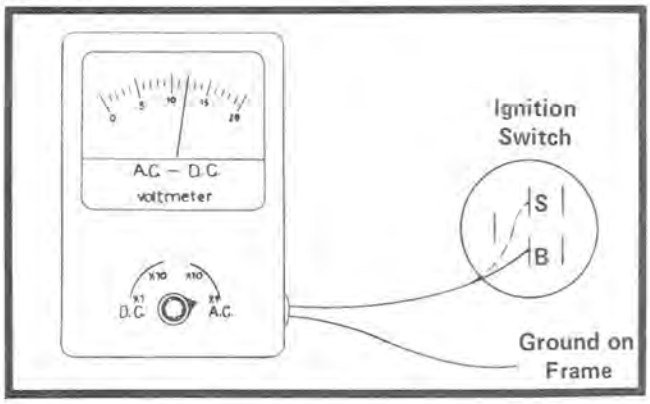
2. Raise the rear of the snowmobile off the shop floor, using a Quik Jack. Make sure the track is free to rotate.

3. Rotate the ignition switch to the OFF position.

4. Connect one lead of the DC voltmeter to ground, and the other lead to the B terminal on the ignition switch, Fig. IV-40. Voltmeter is to register 12 DC volts. DO NOT REMOVE IGNITION CONNECTOR FROM IGNITION SWITCH.

ELECTRIC START TESTING

Fig. IV-40



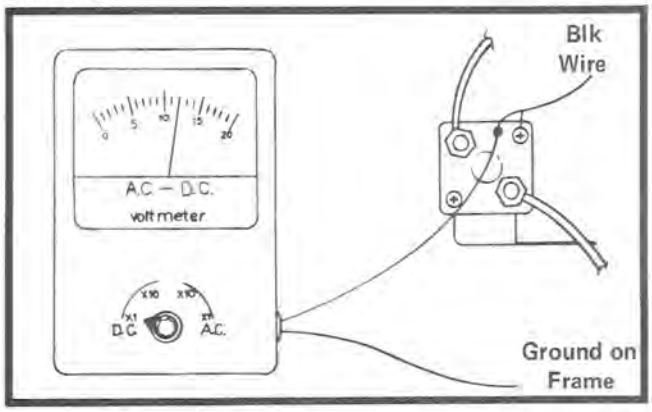
5. If voltmeter does not register 12 DC volts, there is a problem in the red wire running from the battery to the ignition switch. If voltmeter registers 12 DC volts, voltage is getting to the ignition switch (proceed to step 6).

6. Connect one lead of the voltmeter to ground and the other lead to the S terminal on the ignition switch, Fig. IV-40. Rotate the ignition switch to the START position. Voltmeter is to register 12 DC volts. DO NOT REMOVE IGNITION CONNECTOR FROM IGNITION SWITCH.

7. If voltmeter does not register 12 DC volts, the ignition switch is defective and is to be replaced. If voltmeter registers 12 DC volts, the ignition switch is acceptable (proceed to step 8).

8. Connect one lead of the voltmeter to ground and the other lead to the small terminal on the solenoid, Fig. IV-41. Rotate ignition key to START. Voltmeter is to register 12 DC volts.

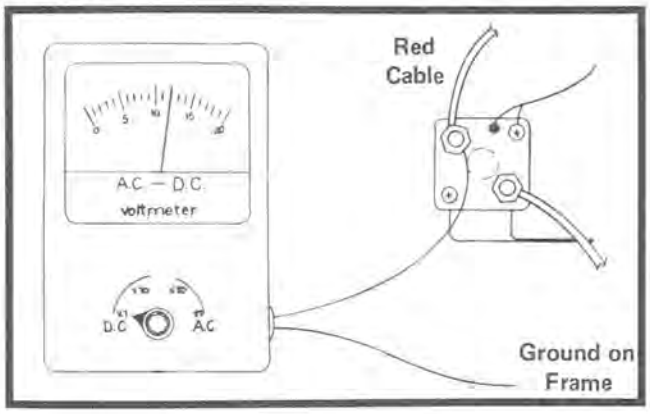
Fig. IV-41



9. If the voltmeter does not register 12 DC volts, there is a problem in the black wire running from the solenoid to the ignition switch. If the voltmeter registers 12 DC volts, proceed to step 10.

10. Connect one lead of the voltmeter to ground and the other lead to the red cable terminal on the solenoid, Fig. IV-42. Voltmeter is to register 12 DC volts.

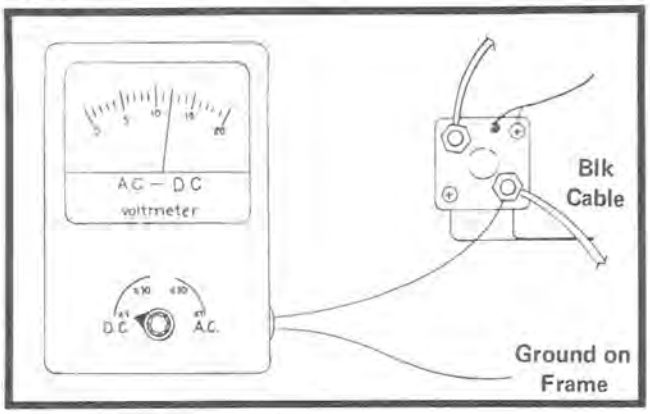
Fig. IV-42



11. If voltmeter registers 12 DC volts, proceed to step 12. If voltmeter does not register 12 DC volts, the red cable is defective and is to be replaced.

12. Connect one lead of the voltmeter to the black cable terminal on the solenoid, and the other lead to ground, Fig. IV-43. Rotate ignition switch to the START position. Voltmeter is to register 12 DC volts.

Fig. IV-43

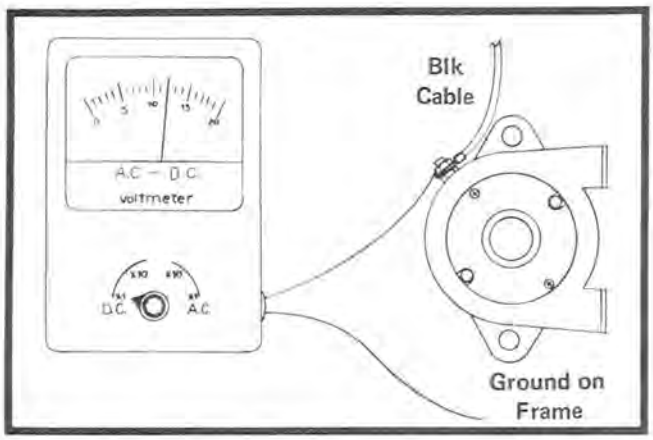


13. If voltmeter registers 12 DC volts, proceed to step 14. If voltmeter does not register 12 DC

volts, the solenoid is defective and is to be replaced.

14. Connect one lead of the voltmeter to ground, and the other lead to the black cable terminal on the starter motor, Fig. IV-44. Rotate ignition switch to the START position. Voltmeter is to register 12 DC volts.

Fig. IV-44



15. If voltmeter registers 12 DC volts, the starter motor is defective and is to be repaired. If voltmeter does not register 12 DC volts, the black cable running from the solenoid to the starter motor is defective.

Check Starter Motor

Equipment Necessary: Electro-Specialties Voltmeter Model No. MS-10 and Quik Jack

1. Raise the rear of the snowmobile off the shop floor, using a Quik Jack. Make sure the track is free to rotate.

2. Make sure battery output is acceptable (see Check Battery Charge, page IV-22).

3. Make sure the solenoid is operating (see Check Solenoid, page IV-23).

4. Connect one lead of the voltmeter to ground and the other lead to the starter motor terminal, Fig. IV-44. Rotate ignition switch to the START position. Voltmeter is to register approximately 12 DC volts.

Note: A slight drop in voltage may take place due to the cranking load on the starter motor. This condition is acceptable.

5. If the voltmeter registers approximately 12 DC volts, but the starter motor doesn't crank or cranks slowly, the battery ground and starter motor ground is to be checked (proceed to step 6). If a large drop in voltage takes place, a component in the starter motor is defective (see Check Starter Motor Components, page IV-25).

6. Check the battery and starter motor ground connections. If the ground connections are satisfactory, a component in the starter motor is defective (see Check Starter Motor Components, page IV-25).

Check Starter Motor Components

Equipment Necessary: Ohmmeter and Fiber Glass Paper

1. Check the surface of the commutator and if it is rough, polish the commutator, using fiber glass paper.

2. Measure the depth of the commutator, and distance between segments. Commutator depth is 0.008 of an inch, and distance between segments is 0.019-0.031 of an inch.

3. Check the winding insulation between the commutator and armature core or shaft. If the ohmmeter registers OPEN, the armature is acceptable. If any other reading is obtained, the armature is to be replaced.

4. Check the armature coil for a short circuit, using a growler. With armature installed in growler, place thin strip of steel on armature surface and rotate armature. If the steel strip does not vibrate, the armature is acceptable. If the steel strip does vibrate, the armature has a short circuit and is to be replaced.

5. Check the field coil for open circuits, using an ohmmeter. With ohmmeter leads connected to field coil brushes, the ohmmeter is to register CLOSED. If ohmmeter does not register CLOSED, but registers OPEN, a wire is disconnected and must be replaced. Also check the field coil and yoke. If ohmmeter registers CLOSED, replace the defective part.

6. Check the brush box for insulating defects, using an ohmmeter. Make sure brush holder is

ELECTRIC START TESTING

straight (not bent), and sliding part of brush is clean (not dirty). Connect one lead of the ohmmeter to positive (+) side brush box, and the other lead to negative (–) side base plate. Ohmmeter is to register OPEN. Any other reading indicates faulty insulation and replacement of the brush box is required.

TACHOMETER TESTING

Check Tachometer

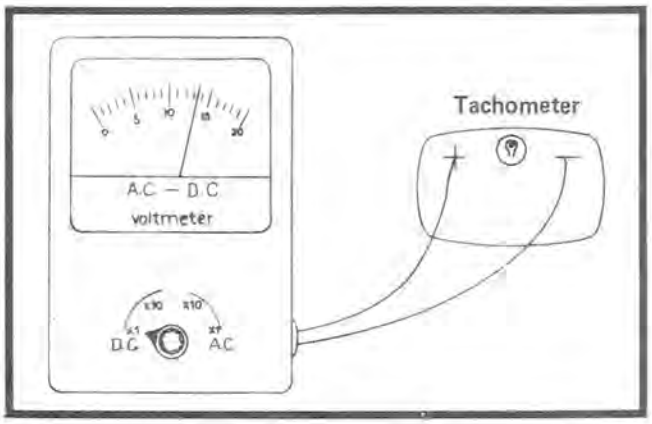
Equipment Necessary: Electro-Specialties Voltmeter Model No. MS-10 and Quik Jack

1. Raise the rear of the snowmobile off the shop floor, using a Quik Jack. Make sure the track is free to rotate.

2. Start the engine and allow it to idle.

3. Connect one lead of the voltmeter to the positive (+) terminal on the tachometer, and the other lead to the negative (–) terminal, Fig. IV-45. Voltmeter is to register 12-15 AC volts.

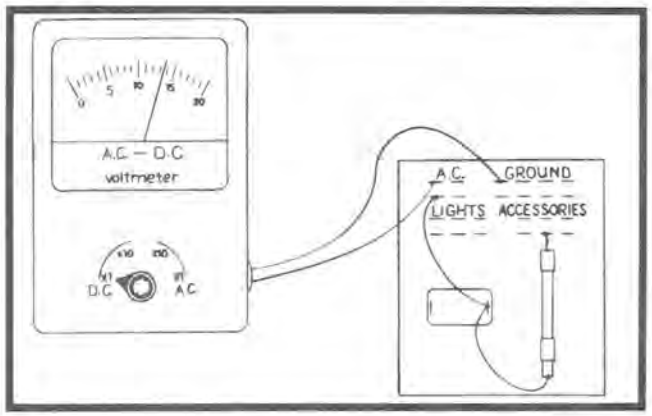
Fig. IV-45



4. If the voltmeter registers 12-15 AC volts, but the tachometer does not function, the tachometer is to be replaced because it is defective. If the voltmeter does not register 12-15 AC volts, there is a problem in another area (proceed to step 5).

5. Connect one lead of the voltmeter to an AC terminal on the circuit board and the other lead to GROUND on the circuit board, Fig. IV-46. Voltmeter is to register 12-15 AC volts.

Fig. IV-46



6. If voltmeter registers 12-15 AC volts and the tachometer does not operate, the wires running from the tachometer to the circuit board are defective. If voltmeter does not register 12-15 AC volts, the magneto alternator may be defective (see Check Magneto Alternator, page IV-21).

MAGNETO GENERATOR DISASSEMBLY

Remove Recoil Assembly and Fan

Equipment Necessary: Screwdriver Having a 5/16-Inch Blade

1. Remove the four screws and lock washers that hold recoil assembly on fan housing, using a screwdriver having a 5/16-inch blade. Slide recoil starter assembly away from fan housing and carefully allow it to retract against console-mounted recoil cable bracket.

2. Remove externally-mounted wiring components (see Section II, Engine Servicing, Remove External Components, steps 6-8, page II-12).

MAGNETO GENERATOR DISASSEMBLY

3. Remove the fan housing and fan (see Section II, Engine Servicing, Remove Starter Drum and Fan, page II-13).

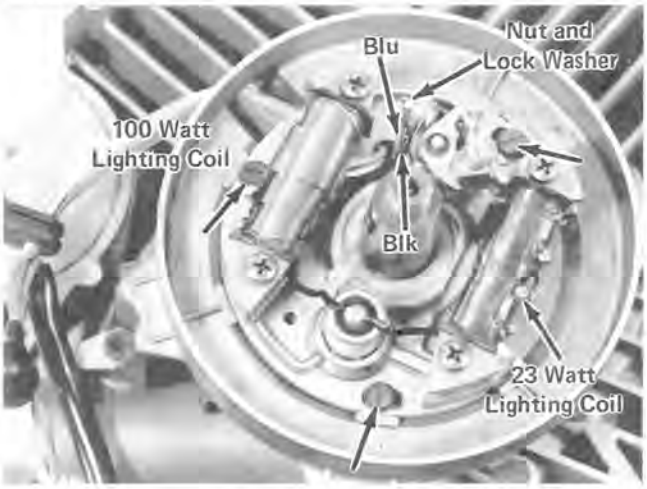
Remove and Disassemble Magneto Generator Assembly

Equipment Necessary: 7/32-Inch Ignition Wrench, Screwdriver Having a 1/4-Inch Blade, Phillips Screwdriver Having a No. 2 Blade, Screwdriver Having a 5/16-Inch Blade, Soldering Iron, Scribe, 11/16-Inch Bushing Driver and Hammer

Note: The exciting coils, lighting coils and breaker points can be disassembled from the magneto base plate without removing base plate. The only time the magneto base plate must be removed is when condenser or base plate replacement is required (see steps 7-9).

1. Remove the small nut and lock washer from the bolt that holds black wire and blue wire to breaker points, Fig. IV-47, using a 7/32-inch ignition wrench.

Fig. IV-47



2. Remove the E-ring from the breaker point pivot pin, Fig. IV-47, using a screwdriver having a 1/4-inch blade.

3. Remove the screw, lock washer and flat washer that hold breaker points to magneto base plate, Fig. IV-47, using a screwdriver having a 1/4-inch blade.

4. Remove the two screws and lock washers holding large 100 watt lighting coil to base plate, Fig. IV-47, using a phillips screwdriver having a no. 2 blade.

5. Remove the two screws, lock washers and bushings holding the small 23 watt lighting coil and exciting coil to the magneto base plate, Fig. IV-47, using a screwdriver having a 5/16-inch blade.

Note: If the exciting coil or condenser is to be removed, heat the top of the condenser until the two black wires are free, Fig. IV-47, using a soldering iron.

6. Remove wires from the engine connector block or external coil, whichever coincides with the magneto components being removed.

7. Mark the magneto base plate in relation to the base plate mount, Fig. IV-47, using a scribe. This is necessary to ensure proper installation of magneto base plate.

8. Remove the three screws and lock washers holding magneto base plate to base plate mount, Fig. IV-47, using a screwdriver having a 5/16-inch blade. Slide magneto base plate off mainshaft.

9. Remove the condenser from the magneto base plate by driving it out from the back side, using a 11/16-inch bushing driver and hammer.

MAGNETO GENERATOR ASSEMBLY

Assemble and Install Magneto Generator Assembly (See Fig. IV-47)

Equipment Necessary: Condenser Seating Tool, 7/32-Inch Ignition Wrench, Screwdriver Having a 1/4-Inch Blade, Screwdriver Having a 5/16-Inch Blade, Phillips Screwdriver Having a No. 2 Blade, Soldering Iron and Solder

1. Press the condenser into the magneto base plate until it is fully seated. Make sure there is a tight fit between the condenser and mounting boss. If the fit is not tight, crimp the boss against the condenser, using a condenser seating tool.

2. Install the breaker points with E-ring, screw, lock washer and flat washer, using a screwdriver having a 1/4-inch blade. DO NOT TIGHTEN SCREW.

3. Connect the blue wire and black condenser wire to the breaker points, using a 7/32-inch ignition wrench.

4. Assemble in sequence on the open end of the magneto base plate, the exciting coil with black wire, bushings, and 23 watt lighting coil. Secure components in place with two screws and lock washers, using a screwdriver having a 5/16-inch blade.

5. Install the 100 watt lighting coil on the magneto base plate with two screws and lock washers, using a phillips screwdriver having a no. 2 blade.

6. Solder the black wire from the exciting coil and black wire from the breaker points to the top of the condenser, using a soldering iron and solder.

7. If the magneto base plate was removed from the base plate mount, install the assembled magneto generator with three screws and lock washers, using a screwdriver having a 5/16-inch blade. Make sure the scribe marks made on base plate and base plate mount are lined up.

Install Fan and Fan Housing

Equipment Necessary: 15/16-Inch Wrench

1. Insert the woodruff key in the keyway in the mainshaft.

2. Slide the fan onto the mainshaft, making sure the key seats into the keyway in the fan.

3. Secure the fan to the mainshaft with the adaptor nut, using a 15/16-inch wrench. Tighten the adaptor nut to approximately 57.8 ft. lbs.

Note: Internal threads of the adaptor nut can be lightly coated with Locktite TL270.

4. Install fan housing (see Section II, Engine Servicing, Install Fan Housing, page II-28).

5. Set air gap between the coils and flywheel magnets (see Set Induction Coil Air Gap, page IV-28).

ELECTRICAL ADJUSTMENTS

Set Induction Coil Air Gap

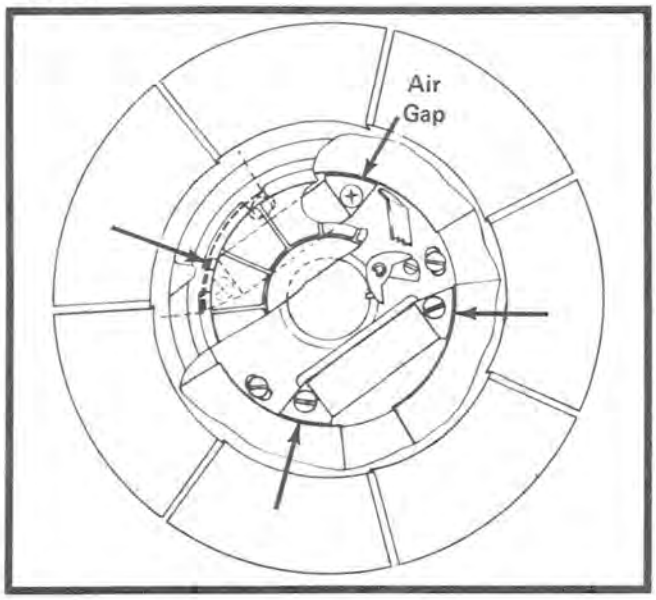
Equipment Necessary: Feeler Gauge, Screwdriver Having a 5/16-Inch Blade and Phillips Screwdriver Having a No. 2 Blade

After the magneto assembly and flywheel have been installed, the air gap between the pole shoes of the induction coils must be established. The specified air gap to be maintained is 0.009-0.013 inch. This will ensure maximum ignition and lighting output.

1. CHECK AIR GAP — Check the air gap between the coil pole shoes and flywheel magnets, Fig. IV-48, by inserting a feeler gauge through the opening in the flywheel. Specified air gap is to be 0.009-0.013 inch.

2. If air gap is as specified, adjust the breaker point gap (see Set Breaker Point Gap, page IV-29). If air gap is not as specified, an adjustment is necessary (see step 3 and 4).

Fig. IV-48



3. ADJUST AIR GAP — Loosen the screws holding coil(s) to base plate, Fig. IV-48, using a screwdriver having a 5/16-inch blade for slotted screws and phillips screwdriver having a no. 2 blade for phillips head screws.

4. Move the coil pole shoes until specified air gap (0.009-0.013 inch) is obtained; then tighten screws.

5. Adjust the breaker point gap (see Set Breaker Point Gap, page IV-29).

Set Breaker Point Gap

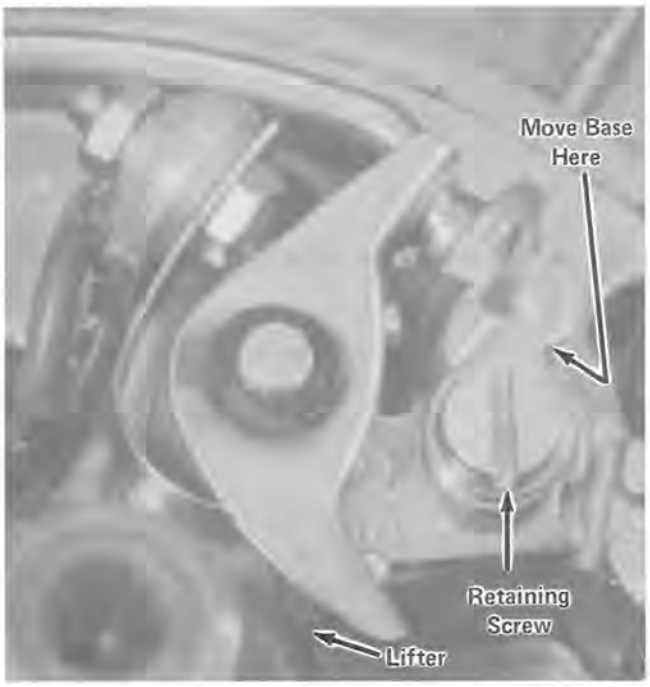
Equipment Necessary: Screwdriver Having a 5/16-Inch Blade and Feeler Gauge

1. Rotate the flywheel clockwise until the timing mark on the inner sheave of the rope pulley lines up with the T mark on the fan housing.

2. Adjust the breaker point gap to 0.014-0.018 inch, using a feeler gauge and screwdriver having a 5/16-inch blade. Feeler gauge and screwdriver can be inserted through the holes in the flywheel.

3. If the breaker point gap is to be adjusted, loosen the breaker point base retaining screw and move base until specified adjustment (0.014-0.018 inch) is obtained; then tighten screw, Fig. IV-49.

Fig. IV-49



4. Recheck the breaker point gap and adjust if it is necessary.

Note: Due to the wear-in characteristic of the breaker point "lifter", Fig. IV-49, the points are to be adjusted nearer 0.018 inch, rather than 0.014 inch.

Note: Breaker point gap will have an effect on ignition timing. Opening the breaker point gap advances the firing moment, and closing the gap retards the firing moment. Check ignition timing whenever breaker point gap is adjusted.

5. Adjust the ignition timing (see Set Ignition Timing, page IV-29).

Set Ignition Timing

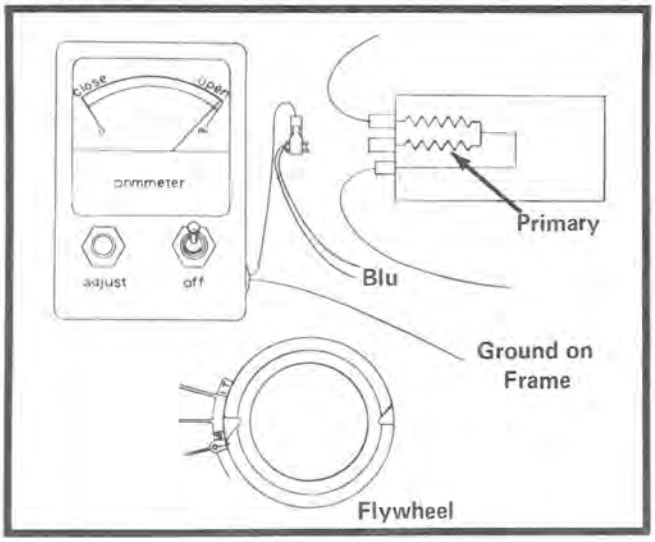
Equipment Necessary: Electro-Specialties Ohmmeter Model No. PC-2 or Arctic Timing Buzzer, Screwdriver Having a 5/16-Inch Blade, Screwdriver Socket Having a 5/16-Inch Blade and Torque Wrench

1. If externally-mounted wiring components are not installed on the engine, do so at this time (see Section II, Engine Servicing, Install External Components, steps 2-4, page II-28).

2. Disconnect the two blue wires from the external ignition coil primary.

3. Connect one lead of the ohmmeter or timing buzzer to engine ground, and the other lead to the end piece holding the two blue wires, Fig. IV-50.

Fig. IV-50



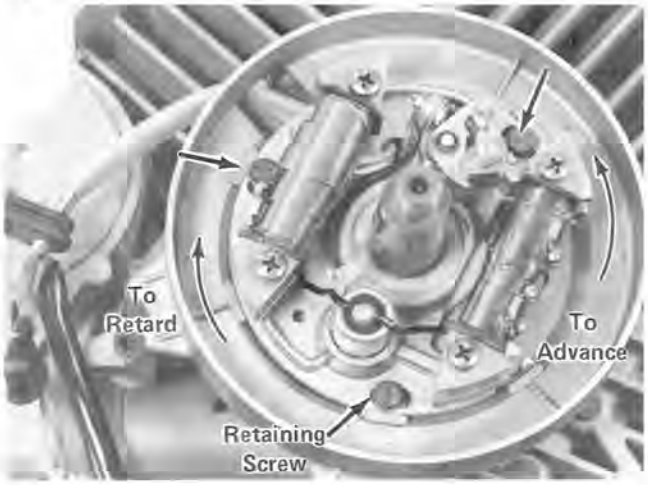
4. Rotate the flywheel clockwise until the timing mark on the inner sheave of the rope pulley lines up with the M mark on the fan housing, Fig. IV-50.

5. When the timing marks line up, the ohmmeter is to show a positive deflection toward the OPEN end of the scale, Fig. IV-50, or the timing buzzer should shut off if it is being used.

6. If timing marks line up, ignition timing is correct (proceed to step 11). If the ohmmeter needle showed a positive deflection toward the OPEN end of the scale, or the buzzer shut off before the timing marks lined up, the timing is advanced and must be retarded to correct the problem (see step 7 and 8). If the ohmmeter needle showed a positive deflection toward the OPEN end of the scale, or the buzzer shut off after the timing marks lined up, the timing is retarded and must be advanced to correct the problem (see step 9 and 10).

7. RETARD TIMING – Loosen the three magneto base plate retaining screws, Fig. IV-51, using a screwdriver having a 5/16-inch blade. Move the magneto base plate clockwise to retard the timing, Fig. IV-51; then tighten the three retaining screws. FLYWHEEL HAS BEEN REMOVED FOR CLARITY PURPOSES ONLY, BUT IT IS NOT NECESSARY TO REMOVE THE FLYWHEEL WHEN ADJUSTING THE BASE PLATE.

Fig. IV-51



8. Repeat steps 4-6 and recheck breaker point gap until timing is correct.

Note: Breaker point gap will have an effect on ignition timing. Opening the breaker point gap advances the firing moment, and closing the gap retards the firing moment. Check ignition timing whenever breaker point gap is adjusted.

9. ADVANCE TIMING – Loosen the three magneto base plate retaining screws, Fig. IV-51, using a screwdriver having a 5/16-inch blade. Move the magneto base plate counterclockwise to advance the timing, Fig. IV-51; then tighten the three retaining screws. FLYWHEEL HAS BEEN REMOVED FOR CLARITY PURPOSES ONLY, BUT IT IS NOT NECESSARY TO REMOVE THE FLYWHEEL WHEN ADJUSTING THE BASE PLATE.

10. Repeat steps 4-6 and recheck breaker point gap until timing is correct.

Note: Breaker point gap will have an effect on ignition timing. Opening the breaker point gap advances the firing moment and closing the gap retards the firing moment. Check ignition timing whenever breaker point gap is adjusted.

ELECTRICAL ADJUSTMENTS

11. Install the recoil assembly on the fan housing with four screws and lock washers, using a screwdriver socket having a 5/16-inch blade; then tighten screws to 4.3-5.8 ft. lbs., using a torque wrench.

Headlight Aiming Adjustment

Equipment Necessary: Tape Measure and Phillips Screwdriver Having a No. 1 Blade

The headlight can be adjusted for vertical and horizontal aim of the high/low beam. The geometric center of the high beam light zone is to be used for vertical and horizontal service aiming.

1. Make sure suspension is adjusted properly.

2. Position the snowmobile on a level floor so the headlight is approximately 25 feet away from a wall or similar aiming surface.

3. Measure the distance from the floor to midpoint of headlight, using a tape measure. REMEMBER THIS DISTANCE.

4. Using distance obtained in step 3, place an appropriate mark on the wall or similar headlight aiming surface.

5. Activate the headlight and make sure high beam is on. DO NOT USE LOW BEAM – IMPROPER HEADLIGHT AIM WILL RESULT.

6. Observe the headlight beam aim. Proper aim is when the most intense beam is focused and centered 2 inches below the mark made on the wall or similar aiming surface. If headlight aim is not as specified, a vertical and/or horizontal adjustment of the headlight is necessary (see step 7).

7. If an adjustment is necessary, proceed as follows:

   A. VERTICAL ADJUSTMENT – The vertical adjusting screw is located at the bottom center of the headlight housing. To lower the vertical aim of the high beam, rotate vertical adjusting screw clockwise, using a phillips screwdriver having a no. 1 blade. To raise the vertical aim of the high beam, rotate vertical adjusting screw counterclockwise, using a phillips screwdriver having a no. 1 blade. Recheck headlight aim, using steps 2-6.

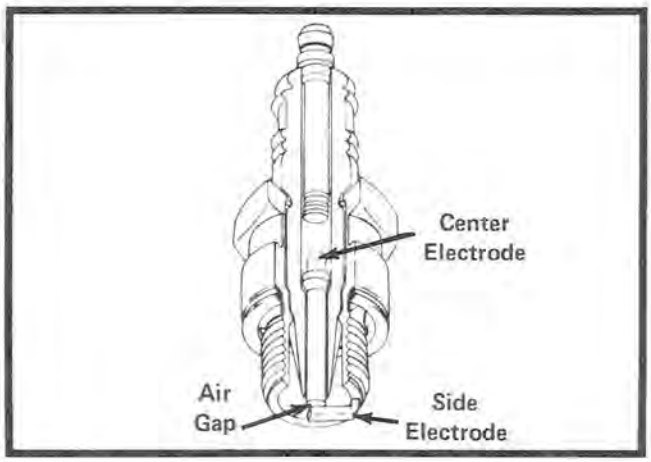
   B. HORIZONTAL ADJUSTMENT – The two horizontal adjusting screws are located at side center of headlight housing. Rotate horizontal adjusting screw clockwise to move headlight to the right and counterclockwise to move headlight to the left, using a phillips screwdriver having a no. 1 blade. Recheck headlight aim, using steps 2-6.

SPARK PLUG INFORMATION

Spark Plug Structure

The Bosch spark plug used in the Wankel engine consists of two electrodes, both of which are separated by an air gap. Completely insulated in the core of the spark plug is the "center electrode", Fig. IV-52. The "side electrode" is connected to the outer shell of the spark plug base, Fig. IV-52. When high voltage flows from the external ignition coil "secondary", it flows through the center electrode and jumps the air gap to side electrode, Fig. IV-52. This spark that is generated between the two electrodes ignites the fuel mixture in the rotor housing.

Fig. IV-52



SPARK PLUG INFORMATION

Heat Range

Proper spark plug heat range selection is very important to the operation of the engine. When the snowmobile is to be operated relatively slow, as for trail riding, use a spark plug having a high heat range to prevent spark plug fouling. And for high speed operation, use a spark plug having a low heat range.

HEAT RANGE — The ability of the spark plug to dissipate heat away from its center electrode and insulating material. This ability to dissipate heat is controlled by the design of the spark plug insulator and shell structure. The heat escape route followed is:

1. Spark Plug Shell
2. Metal Washer (Gasket)
3. Rotor Housing Spark Plug Threads
4. Cool Air from Fan

A spark plug having a high heat range has a long center electrode extension, which permits heat transfer less rapidly. By comparison, a spark plug having a low heat range has a shorter center electrode extension, which permits rapid heat transfer.

The remaining component affecting heat transfer is the metal washer. To make sure the seal between the spark plug and rotor housing is adequate, the spark plug is to be tightened to 16-18 ft. lbs. torque. If the spark plug is tightened excessively, causing the metal washer to be flattened completely, the spark plug will burn colder than expected because heat will be conducted too rapidly. Conversely, a spark plug tightened insufficiently will not crush the metal washer enough, resulting in compression leakage, overheating and possible rotor, rotor housing, and end cover damage.

The correct spark plug to use in the Wankel engine is a Bosch W240T1 or W240T2, depending on engine serial number (see Caution). Set the air gap at 0.020 inch.

CAUTION

All KM-24 Wankel engines preceding engine serial number 7565102 use a 1/2-inch reach spark plug (Bosch W240T1). After engine serial number 7565102, use a 3/4-inch reach spark plug (Bosch W240T2). DO NOT USE A 3/4-INCH REACH SPARK PLUG IN ENGINES PRECEDING ENGINE SERIAL NUMBER 7565102 BECAUSE THE ENGINE WILL BE DAMAGED IF OPERATED.

Spark Plug Operating Conditions

Disconnect the high tension wire from the spark plug; then remove the plug from the rotor housing, using a 13/16-inch spark plug socket. Examine the condition of the spark plug insulator to determine the operating temperature of the engine.

1. A tan or light brown insulator tip indicates the correct spark plug and proper heat range.
2. A light gray or white insulator tip indicates overheating caused by a lean carburetor setting, loose carburetor, constant overloading of the engine and an incorrect spark plug (heat range too high).
3. A black or oily insulator tip indicates fouling caused by incorrect fuel/air mixture ratio, a rich carburetor setting or incorrect spark plug (heat range too low).

CAUTION

A cracked, fouled or dirty spark plug is to be replaced. DO NOT clean and reuse a fouled or dirty spark plug; grit may be released into the rotor chamber, causing engine damage.

Spark Plug Installation

Equipment Necessary: Graphite Grease, Torque Wrench and 13/16-Inch Spark Plug Socket

1. Apply a light film of graphite grease on the spark plug threads.
2. Install the spark plug in the rotor housing and tighten to 16-18 ft. lbs., using a 13/16-inch spark plug socket and torque wrench.
3. Connect the high tension wire to the spark plug.

TABLE OF CONTENTS

DRIVE CLUTCH SPECIFICATIONS

Description	Specifications	
	Low Altitude	High Altitude
+Arctic Drive Clutch Model	0225-046 and 0225-050	0225-046 and 0225-050
Clutch Engagement Speed - Approximate	2400 RPM	2700 RPM
Maximum Drive Clutch RPM	6000 RPM	6000 RPM
Spring Part Number	0146-065	0146-065
Spring Color	White	White
*Spring Length - New W/No Load	4.35 In. ± 0.25	4.35 In. ± 0.25
Spring Wire Diameter	0.156 In.	0.156 In.
Spring Pressure at 1.25 In. Compression	67.5 - 87.5 Lbs.	67.5 - 87.5 Lbs.
Weight Part Number	0146-106	0146-175
Weight Color	Red	Red
Weight Outside Diameter	0.530 In. ± 0.002	0.437 In. ± 0.002
Weight Thickness	0.2500 In. ± 0.0015	0.2500 In. ± 0.0015
Weight - Gram Weight	5.958 Grams ± 0.20	3.725 Grams ± 0.20
Ramp Part Number	0146-143	0146-143
Clutch/Pulley "Center to Center Distance"	10.875 (10-7/8) In.	10.875 (10-7/8) In.
Clutch/Pulley "Offset"	0.320 (5/16) In.	0.320 (5/16) In.
Moveable Sheave "Travel Distance on Shaft"	1.125 (1-1/8) In.	1.125 (1-1/8) In.

+Drive clutch model 0225-046 has hex shaft; used on 295cc Wankel Panther having S.N. 4011088 and higher. Drive clutch model 0225-050 has round shaft; used on 295cc Wankel Panther having S.N. 4000001-4001500.

***After approximately 50 miles the spring will take a set and loose 0.25 (1/4) inch of its total length. No significant spring pressure loss will occur as a result of the decreased spring length.**

DRIVEN PULLEY SPECIFICATIONS

Description	Specifications	
	Low Altitude	High Altitude
Arctic Driven Pulley Model	0226-004	0226-004
Driven Pulley Diameter	9.687 (9-11/16) In.	9.687 (9-11/16) In.
Cam Angle	30°	30°
Spring Part Number	0148-004	0148-004
Spring Color	Black	Black
Spring Length - New W/No Load	4.1 In.	4.1 In.
Spring Diameter	2.880 In.	2.880 In.
Spring Wire Diameter	0.156 In.	0.156 In.
Spring Preload - Counterclockwise	1st Hole - 1/3 Turn	1st Hole - 1/3 Turn
Clutch/Pulley "Center to Center Distance"	10.875 (10-7/8) In.	10.875 (10-7/8) In.
Clutch/Pulley "Offset"	0.320 (5/16) In.	0.320 (5/16) In.
Stationary/Moveable Sheave Distance - Closed	2.938 (2-15/16) In.	2.938 (2-15/16) In.
Stationary/Moveable Sheave Distance - Fully Open	3.818 (3-13/16) In.	3.818 (3-13/16) In.
Moveable Sheave "Travel Distance on Shaft"	0.88 (7/8) In.	0.88 (7/8) In.

DRIVE BELT SPECIFICATIONS

Description	Specifications	
	Low Altitude	High Altitude
Belt Part Number	0227-007	0227-007
Outside Circumference	43-1/4 In. ± 3/16 In.	43-1/4 In. ± 3/16 In.
Diameter - Top Surface	1-1/4 In. ± 1/32 In.	1-1/4 In. ± 1/32 In.
Thickness - Top of Belt to Bottom of Lug	17/32 In. ± 1/32 In.	17/32 In. ± 1/32 In.
Belt Taper Angle	28°	28°

SPROCKET/CHAIN SPECIFICATIONS

Description	Specifications	
	Low Altitude	High Altitude
Sprocket Ratio	17/39 In.	17/39 In.
Chain Pitch	90	90
Chain Type	Roller	Roller

TRACK SPECIFICATIONS

Description	Specifications	
	Low Altitude	High Altitude
Track Part Number	0110-790	0110-790
Track Width	17 In.	17 In.
Track Length on Ground	36 In.	36 In.
Type of Drive	Internal Drive Lug	Internal Drive Lug
Cleat Part Number	0102-086	0102-086
Cleat Type	2/3 w/Solid Rivet	2/3 w/Solid Rivet

THEORY OF OPERATION

General

The Drive System, as it will be referred to in this section, is composed of a drive clutch, drive belt, driven pulley, sprockets, chain, track drive and track. Operating as a complete system, the components will deliver optimum power to the track under varying snow conditions and load factors (resistance on the track).

The Arctic Cat Snowmobile uses a torque sensing, sheave-type, variable ratio (3.79:1) drive clutch and driven pulley. This method of transmitting power from the drive clutch by means of a belt to the driven pulley is used to multiply engine torque that is needed by the track to pull the snowmobile through varying snow depths, up and down steep hills and mountains, and across open hard-packed areas at high speeds. The Arctic drive clutch and driven pulley automatically determines the proper ratio that will enable the snowmobile to move without hesitation from drive clutch engagement speed to high speed operation, no matter what the snow conditions are.

Resistance (load on the track) has an effect on the ratio that the drive clutch and driven pulley automatically "seeks out". As resistance increases and when more torque is needed, the belt will "down shift" to a larger radius on the driven pulley. If track resistance decreases, the belt will "up shift" to a 1:1 ratio between the drive clutch and driven pulley. The engine RPM is maintained at somewhat of a constant throughout the "down shift" and "up shift" pattern.

Snowmobile speed is then governed by the "ratio" the belt seeks between the drive clutch and driven pulley. If the clutch/pulley ratio is 3.79:1 and engine RPM is 6,000, the snowmobile should travel at the slowest designed speed possible. If the ratio changes to 1:1 and engine RPM is 6,000, speed should increase to fastest designed speed possible. This characteristic evolves because at a 3.79:1 ratio, the drive clutch must turn 3.79 revolutions before the driven pulley can turn 1 revolution. When a 1:1 ratio exists, the drive clutch turns 1 revolution as does the driven pulley.

Note: Minimum and maximum MPH are affected by the sprocket ratio used (see Sprocket/Chain Specifications, Sprocket Ratio, page V-4).

In the paragraphs that follow, elements of the drive clutch and driven pulley will be examined. Knowing what influence the various elements have on the drive clutch/driven pulley will help you to better understand the operating characteristics.

Spring (Drive Clutch)

The drive clutch spring is manufactured from straight, high quality spring steel wire that has excellent spring rate retention qualities. The wire is wound with a definite number of windings and to a predetermined length that will provide the desired spring rate. Once the spring rate is established, the spring is color coded for identification purposes (see Drive Clutch Specifications, Spring Color Code, page V-2).

Note: In comparing spring rates, four factors will affect the rate characteristic:

1. **Wire Diameter**
2. **Number of Coils**
3. **Total Spring Diameter**
4. **Total Spring Length**

Comparison – Spring will be weaker if the wire diameter is smaller, there are more coils, larger spring diameter or longer spring length. A stronger spring will have larger diameter wire and less number of coils in relation to a spring of the same length.

The spring's primary function is to control initial moveable sheave engagement with the drive belt and stationary sheave. At idle speed there is no applied belt force because the spring keeps the stationary and moveable sheaves apart. The drive clutch is designed so that when the sheaves are fully apart, stationary and moveable sheaves are slightly wider apart than the top thickness of the belt. As engine RPM increases to a predetermined point established by the factory (see Specifications, Engagement Speed, page V-2), centrifugal weights and rollers roll outward on ramps, Fig. V-1, with enough force to overcome the spring pressure. Therefore, engagement speed can be increased or decreased by using springs with different spring rates (see Specifications, Spring Rate, page V-2).

Note: Desired engagement speed is when the engine delivers sufficient horsepower RPM to pull the snowmobile from a stop without a "flat spot" or undue hesitation.

THEORY OF OPERATION

Weights, Rollers and Ramps

The weights and rollers are bolted to arms that are pinned to the spider, Fig. V-1. The spider is equipped with 3 arms, each arm having 2 weights and a roller with bushing that are retained to the arm by a small bolt and locknut, Fig. V-1. The complete spider assembly (includes arms, weights and rollers) is fastened to the stationary sheave shaft by means of 3 set screws and a split ring.

The function of the weights is to provide an outward force against the spring while the rollers roll on 3 ramps. The 3 ramps are so designed that clutch engagement will be smooth and the total shift pattern be responsive to various load factors. When the engine is at idle (less than clutch engagement RPM), the force produced against the ramp by the rollers and weights is not enough to overcome the spring's preload. As engine RPM increases and predetermined clutch engagement speed is achieved, the weights are thrown outward by centrifugal force caused by increased crankshaft RPM. At this time, belt engagement occurs because the moveable sheave moves toward the stationary sheave causing side pressure on the belt, resulting in power transmission.

As engine speed gradually increases to peak horsepower RPM, centrifugal force throws the weights with rollers progressively outward along the angle of the 3 ramps, Fig. V-1. A ramp that has a steep angle, Fig. V-1A, will take more time and engine RPM to shift from engagement speed through the complete shift pattern. Conversely, if the ramp angle is decreased, Fig. V-1A, it will take less time and engine RPM to shift from engagement speed through the complete shift pattern. When maximum RPM are reached and if the track has only a slight load, the weights will spin fast enough to move the belt out to the maximum radius between the drive clutch sheaves. When the belt is at the maximum radius, there will be a 1:1 ratio between the drive clutch and driven pulley. Top speed will now be achieved, provided all other systems are operating properly.

Note: A light weight will increase clutch engagement RPM and take longer to complete the total shift pattern. Conversely, a heavy weight will decrease clutch engagemenet RPM and take less time to complete the total shift pattern.

Fig. V-1

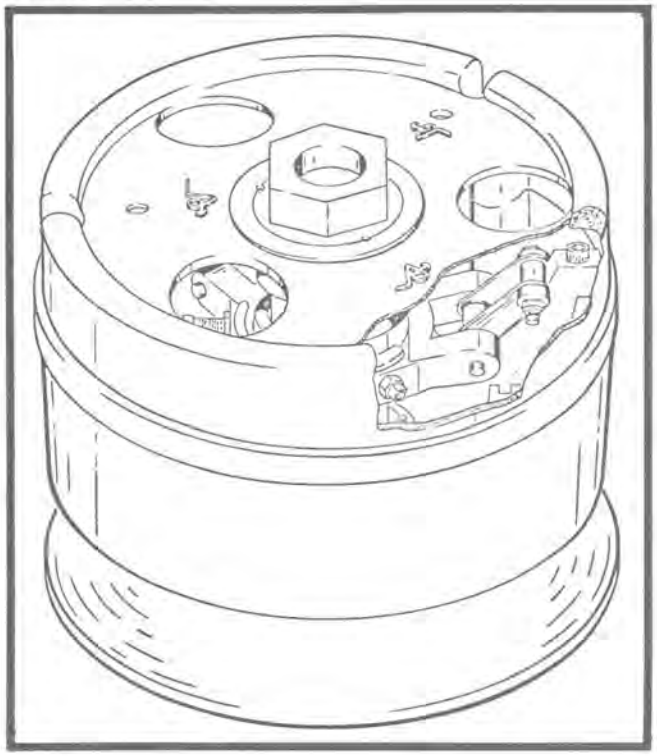
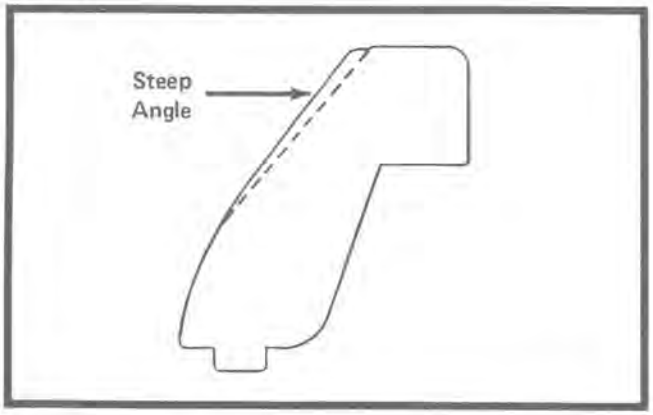


Fig. V-1A



CUSTOMIZING DRIVE CLUTCH

Engine RPM can be increased or decreased by changing the weights in the drive clutch. If a light weight is used, engine RPM will be higher throughout the entire shift pattern. A lighter weight will also produce a slightly higher clutch engagement speed. Conversely, if a heavy weight is used, engine RPM will be lower throughout the entire shift pattern. A heavy weight will also produce a slightly lower clutch engagement speed.

The spring is another variable that primarily affects clutch engagement speed, but also has a definite influence on engine RPM maintained throughout the shift pattern. A light spring will decrease both engagement speed and maximum engine RPM, the result being a slower shift pattern. Conversely, a heavy spring will increase both engagement speed and maximum engine RPM, the result being a quicker shift pattern.

The ramp is the remaining variable affecting patterns of "upshift" and "downshift". The ramp is designed to provide the proper shift pattern within the peak torque curve of the engine; deviation from peak torque curve will adversely affect the shift pattern, resulting in poor performance.

In conclusion, the weights, spring, and ramp profile all have a combined effect on total drive clutch operation. As produced, the snowmobile is clutched for average customer usage. By understanding the clutching variables (weights, spring and ramps), a customer's clutching requirements can be customized. The weight and spring chart is to be used as a guide to satisfy clutching requests that may be made by customers (see Weight Chart and Spring Chart, page V-8).

WEIGHT CHART

	Part No.	Gram Weight	Outside Diameter	Inside Diameter	Thickness	Color Code
Light	0146-159	2.500	0.377	0.205	0.250	White
	0146-108	3.058	0.406	0.205	0.250	Yellow
	0146-175	3.725	0.437	0.205	0.250	Red
	0146-135	4.479	0.471	0.205	0.250	Black
	0146-176	4.675	0.500	0.205	0.228	Green
	0146-107	4.958	0.491	0.205	0.250	White
	0146-106	5.958	0.530	0.205	0.250	Red
	0146-123	6.992	0.568	0.205	0.250	Yellow
	0146-105	7.858	0.598	0.205	0.250	Black
	0146-136	9.279	0.644	0.205	0.250	Green
	0146-104	9.750	0.665	0.205	0.250	White
Heavy	0146-166	-----	0.684	0.205	0.250	Red

SPRING CHART

	Part No.	Spr. Rate Lbs./Inch	Spr. Comp. @ 1.25 Inches	Spring Length No. Load	No. Coils	Color Code
Light	0146-065	22.5 - 27.5	67.5 - 87.5 Lbs.	4.35 In. ± 0.25	5.1	White
	0146-066	39 - 45	120 - 140 Lbs.	4.35 In. ± 0.234	5.15	Red
	0146-067	45 - 53	145 - 165 Lbs.	4.35 In. ± 0.187	5.35	Yellow
Heavy	0146-068	60 - 66	192 - 212 Lbs.	4.35 In. ± 0.156	5.0	Green

DRIVE CLUTCH TROUBLE SHOOTING

Problem	Condition	Remedy
Drive clutch engages before specified RPM.	1. Incorrect spring. 2. Weak spring. 3. Incorrect weights.	1. Check specifications for correct spring. 2. Check spring pressure. 3. Check specifications for correct weights.
Drive clutch engages after specified RPM.	1. Incorrect spring. 2. Incorrect weights. 3. Dirty clutch. 4. Worn (flat spots) rollers and ramps. 5. Bushing in cover housing and moveable sheave worn excessively on inside diameter.	1. Check specifications for correct spring. 2. Check specifications for correct weights. 3. Clean clutch. 4. Replace rollers and ramps. 5. Replace appropriate component(s) — see Parts Manual.
Maximum drive clutch RPM too high.	1. Weights too light. 2. Incorrect ramps (ramp angle too steep at top).	1. Check specifications for correct weights. 2. Check specifications for correct ramps.
Maximum drive clutch RPM too low.	1. Weights too heavy. 2. Incorrect ramps (ramp angle too flat at top).	1. Check specifications for correct weights. 2. Check specifications for correct ramps.
Shift up through midrange takes place too quickly.	1. Weights too heavy. 2. Incorrect ramps (ramp angle too steep). 3. Drive clutch spring too weak. 4. Driven pulley spring preload too loose. 5. Driven pulley spring too weak.	1. Check specifications for correct weights. 2. Check specifications for correct ramps. 3. Check spring pressure. 4. Increase driven pulley spring preload. 5. Replace driven pulley spring.
Shift up through midrange takes place too slowly.	1. Weights too light. 2. Incorrect ramps (ramp angle too flat). 3. Drive clutch spring too strong.	1. Check specifications for correct weights. 2. Check specifications for correct ramps. 3. Check spring pressure.

DRIVE CLUTCH TROUBLE SHOOTING

Problem	Condition	Remedy
	4. Driven pulley spring preload too tight. 5. Driven pulley spring too strong.	4. Decrease driven pulley spring preload. 5. Replace driven pulley spring.
Belt deposits on drive clutch face and/or hex shaft.	1. Incorrect "offset". 2. Belt worn because of hourly usage.	1. Remove belt deposits and establish correct "offset" — see specifications. 2. Install new belt and check "center to center distance" and "offset" — see specifications.
Drive clutch does not disengage at idle — engine has tendency to stall and hard starting will be evident because of belt drag.	1. Moveable sheave Duralon bearing set screws backed out. 2. Drive belt outside circumference below specifications. 3. Thickness of belt on inside diameter exceeds specifications.	1. Stake moveable sheave Duralon bearing set screws. 2. Check drive belt specifications (outside circumference). 3. Check drive belt specifications (belt thickness on inside diameter).

BELT TROUBLE SHOOTING

Problem	Condition	Remedy
1. Normal belt side wear.	1. Normal and minimal side pressure applied to belt.	1. Install new belt – cause is normal.
2. Belt will not shift to top of drive clutch (1:1 ratio).	2. Belt worn across top surface (less than 1-1/16") after many hours of use.	2. Install new belt – cause is normal.
3. Cracks between belt lugs when flexed.	3. Occurs after many hours of use.	3. Install new belt – cause is normal.
Glazed or baked belt side – not normal and is caused by heat buildup.	1. Incorrect belt – excessive slippage.	1. Install correct drive belt – see Parts Manual.
	2. Driver applied too much throttle under heavy load – excessive slippage.	2. Instruct driver to decrease throttle under heavy load condition: install new belt.
	3. Drive clutch spring too weak.	3. Perform spring pressure test; install new spring if spring is too weak.
	4. Engagement RPM too low.	4. Adjust engagement RPM – see specifications.
	5. Improper drive clutch operation (sticking, etc.).	5. Remove and service drive clutch; install new belt if required.
	6. Drive clutch and driven pulley "offset/parallelism" is incorrect.	6. Check and adjust "offset/parallelism"; install new belt if required.
	7. Grease on drive clutch or driven pulley sheave surface.	7. Clean sheaves; install new belt if required.
1. Belt disintegrates.	1. Drive clutch and driven pulley "offset/parallelism" is incorrect.	1. Check and adjust "offset/parallelism"; install new belt after correct adjustment is obtained.
2. Frayed or broken cord at side of belt.	2. Drive clutch and driven pulley "offset/parallelism" is incorrect.	2. Check and adjust "offset/parallelism; install new belt after correct adjustment is obtained.
3. Belt turns over at high speeds.	3. Drive clutch and driven pulley "offset/parallelism" is incorrect.	3. Check and adjust "offset/parallelism"; install new belt after correct adjustment is obtained.
4. Belt side wear usually occurs after belt is glazed or baked because of slippage.	4. Drive clutch and driven pulley "offset/parallelism" is incorrect.	4. Check and adjust "offset/parallelism"; install new belt after correct adjustment is obtained.
Lugs torn off inside of belt.	Drive clutch engages suddenly (too high).	Remove and service drive clutch; install new belt.

BELT TROUBLE SHOOTING

Problem	Condition	Remedy
Belt worn in one spot.	1. Track frozen to skid frame or front drive. 2. Track tension too tight. 3. Idle speed too high. 4. Improper operation of drive clutch.	1. Free the track and install new belt. 2. Adjust track tension and install new belt. 3. Reduce idle RPM and install new belt. 4. Repair or replace drive clutch and install new belt.
Cracks at base of belt lug.	Continuous over revving.	Decrease RPM and install new belt.

DRIVEN PULLEY TROUBLE SHOOTING

Problem	Condition	Remedy
Engine RPM low and belt shifted completely through driven pulley.	1. Weak spring. 2. Broken spring.	1. Check and replace driven pulley spring. 2. Install new spring.
Engine RPM high and belt takes too long to shift through driven pulley.	1. Incorrect spring – too heavy. 2. Sliding shoes worn excessively. 3. Dirty driven pulley hub. 4. Worn driven pulley sheave.	1. Install correct spring. 2. Install new sliding shoes. 3. Clean driven pulley. 4. Install new sheave.

CHAIN/SPROCKET TROUBLE SHOOTING

Problem	Condition	Remedy
Chain rattles in chain case.	1. Chain tension improperly adjusted – too loose. 2. Chain stretched beyond adjustable limit.	1. Adjust chain tension. 2. Install new chain and sprockets.
Chain slips on sprockets.	1. Chain too loose – tension improperly adjusted. 2. Chain stretched beyond adjustable limit. 3. Sprocket teeth worn.	1. Adjust chain tension. 2. Install new chain and sprockets. 3. Install new sprockets and chain.
Chain slips off sprockets.	1. Chain tension improperly adjusted – too loose. 2. Sprocket teeth worn. 3. Sprockets misaligned.	1. Adjust chain tension. 2. Install new sprockets and chain. 3. Align top sprocket with bottom sprocket.

TRACK TROUBLE SHOOTING

Problem	Condition	Remedy
Edge of track is frayed.	1. Track is misaligned. 2. Outer belts worn out because of hourly usage. 3. Track strikes rivets in tunnel, even though alignment is correct.	1. Set track tension and alignment. 2. Install new outer belt(s). 3. Remove affected rivets that are too long and install correct type rivet.
Track is grooved (worn) or burnt on inside surface of outer belt(s).	1. Track tension is too tight. 2. Rear idler wheels do not turn or otherwise damaged.	1. Set track tension and alignment. 2. Install new rear idler wheels and set track tension and alignment.
Track is grooved or gouged on center belt.	1. Center brace(s) of skid frame hanging down and contacting inside surface of center belt.	1. Repair skid frame center brace and install new center belt if damage is excessive.
Internal drive lugs worn on inside surface.	1. Track is misaligned.	1. Set track tension and alignment. If lugs are worn excessively, install new outer belt(s).
Track ratchets or hits on body tunnel (top).	1. Track tension is too loose. 2. Track drive sprockets not timed in relation to drive lugs. 3. Track drive sprockets turn on shaft. 4. Internal drive lugs worn because of hourly usage.	1. Set track tension and alignment. 2. Install new track drive and replace outer belt(s) if drive lugs are worn excessively. 3. Install new track drive and replace outer belt(s) if drive lugs are worn excessively. 4. Install new outer belt(s).
Accelerated hi-fax wear.	1. Slide rail(s) is bent. 2. Badly worn cleat on surface that contacts hi-fax. 3. Track is misaligned.	1. Straighten slide rail(s) or install new skid frame. 2. Install new hi-fax and/or cleats. 3. Set track tension and alignment.

DRIVE CLUTCH BEARING TOLERANCE

Inspect and Measure Bearing For Wear

Equipment Necessary: Flashlight, Tri-Square, Scribe and Calipers or Scale

The maximum allowable bearing wear or clearance between the hex shaft and bearing is critical to drive clutch function. The flats on the drive clutch are directly associated with the large bearing area. This bearing area, added to the high bearing load capacity and low coefficient of friction, result in improved life expectancy of the clutch.

For assembly purposes, radial clearance between the hex shaft and bearing is necessary, and a slightly greater clearance does not adversely affect clutch operation. However, the maximum allowable bearing wear tolerance is limited by the clearance between the ramp and inside surface of the roller arm.

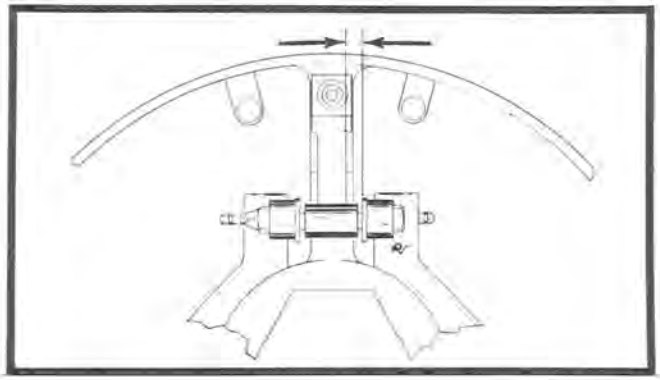
If the bearing is considered to be worn, roller arm and ramp clearance can be visually inspected by looking into the clutch, or the clutch can be removed from the crankshaft and measured. The visual inspection method and measurement method are explained below. Use the method that best suits the situation at the time of inspection.

Visual Inspection Method

1. Look into the clutch and rotate it clockwise and counterclockwise; a flashlight may be necessary to see the inside of the clutch. Look at the inside surface of the roller arm; there must not be any contact between the roller arm and ramp, Fig. V-2.

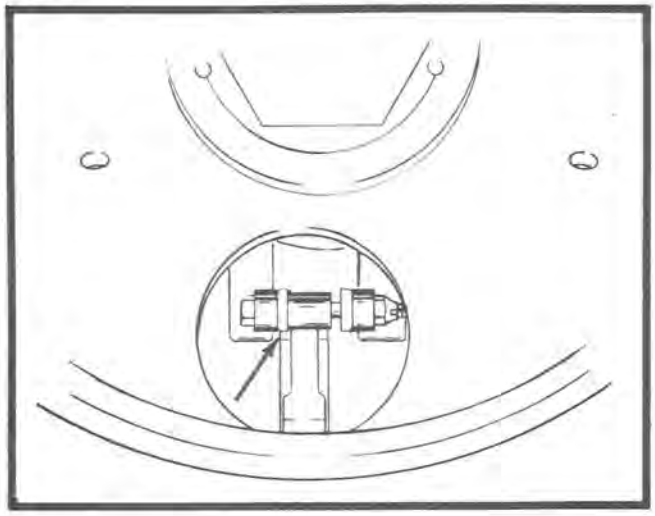
2. If there is no contact between the roller arm and ramp, Fig. V-2, the maximum allowable drive clutch bearing wear is within tolerance. Drive clutch is acceptable.

Fig. V-2



3. If there is contact between the roller arm and ramp, Fig. V-3, the maximum allowable drive clutch bearing wear is not within tolerance. Drive clutch moveable sheave and cover housing needs to be replaced.

Fig. V-3



Measurement Method

1. Remove the drive clutch from the crankshaft (see Remove Drive Clutch, page V-17).

2. Remove cover housing and spring (see Disassemble Drive Clutch, steps 1-3, page V-17).

3. Install cover housing with 3 socket head capscrews, using a 1/4-inch Allen wrench.

4. Keeping the stationary sheave fixed, rotate the moveable sheave counterclockwise until all clearance is taken up, Fig. V-4. Scribe a line on the moveable sheave, using a tri-square and scribe, Fig. V-4.

DRIVE CLUTCH BEARING TOLERANCE

Fig. V-4

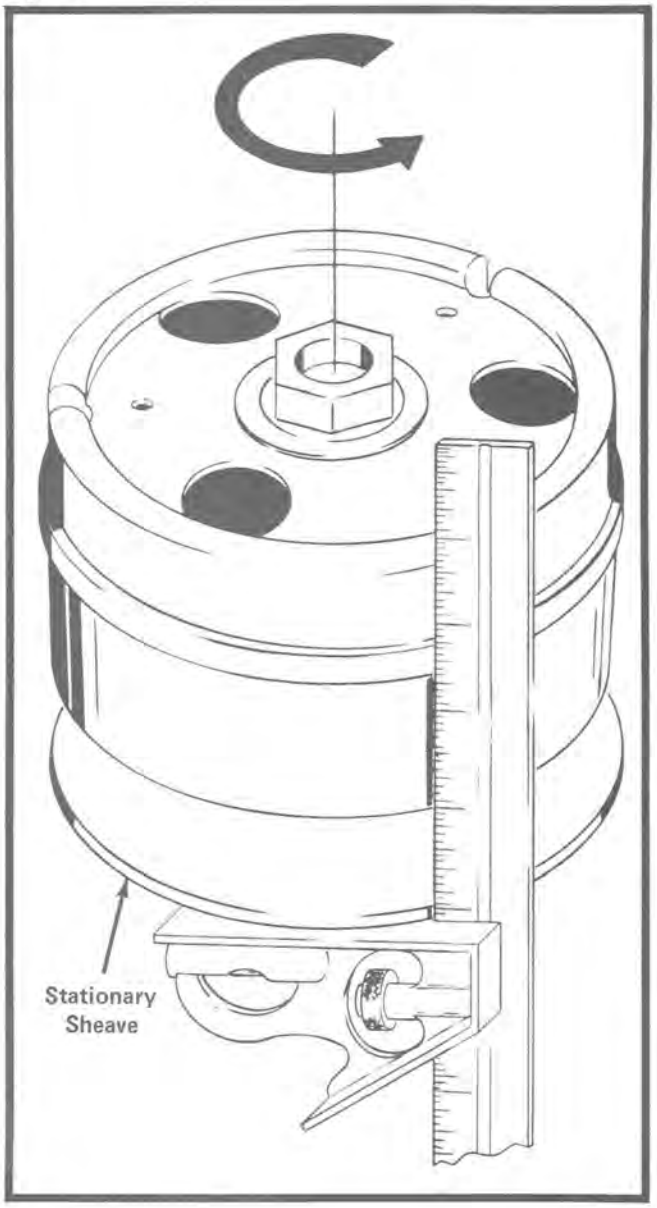
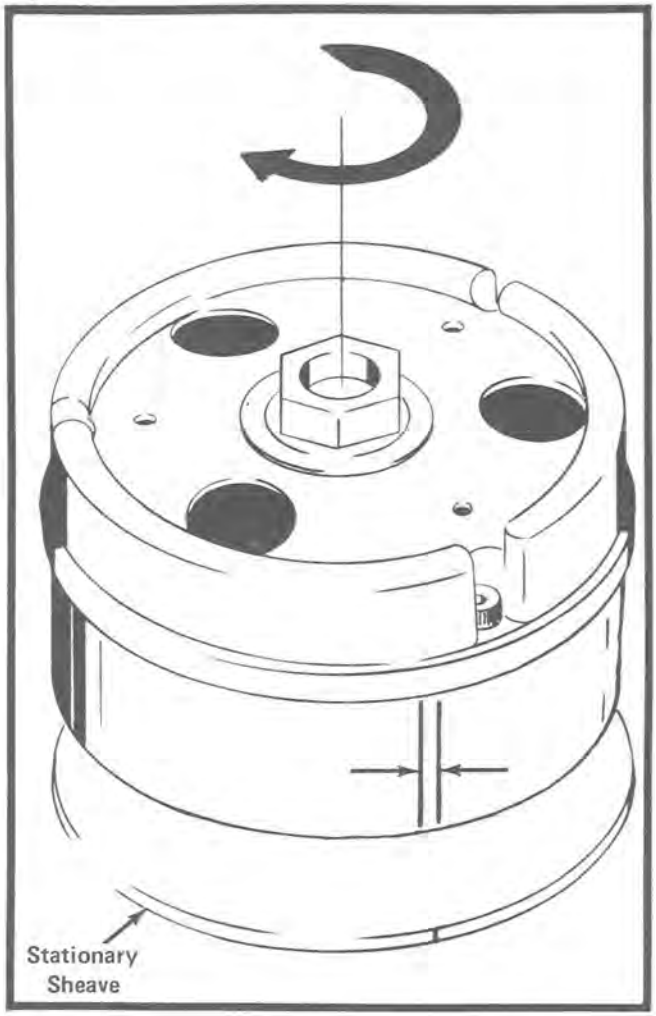


Fig. V-5



5. Keeping the stationary sheave fixed, rotate the moveable sheave clockwise until all clearance is taken up, Fig. V-5. Scribe another line on the moveable sheave, using a tri-square and scribe, Fig. V-5.

6. Measure distance between the two scribe marks, Fig. V-5, using a caliper or scale.

7. If distance between the two scribed lines is less than 5/32-inch (0.156), the maximum allowable drive clutch bearing wear is within tolerance. Drive clutch is acceptable.

8. If distance between the two scribed lines is more than 5/32-inch (0.156), the maximum allowable drive clutch bearing wear is not within tolerance. Drive clutch moveable sheave and cover housing needs to be replaced.

DRIVE CLUTCH REMOVAL

Remove Drive Clutch

Equipment Necessary: 3/4-Inch Socket, Air Impact Tool and Clutch Puller

1. With the hood open, remove drive belt.

2. Remove the capscrew and lock washer that secures the drive clutch to the crankshaft, using a 3/4-inch socket and air impact tool.

3. Slide the puller bolt (see Section VIII, Tools) through the center hub of the clutch; thread puller bolt into crankshaft. Back puller bolt out 1/2 turn after it is "bottomed out" on crankshaft.

4. Pull the drive clutch off the crankshaft, using a 3/4-inch socket and air impact tool.

DRIVE CLUTCH DISASSEMBLY

Disassemble Drive Clutch

Equipment Necessary: 1/4-Inch Allen Wrench, 1/4-Inch Wrench, 3/16-Inch Wrench, 3/8-Inch Wrench and 9/64-Inch Allen Wrench

1. Place a large flat washer on puller bolt, then thread puller bolt into the center of the hex shaft, starting on the cover housing side. Continue to thread puller bolt in until contact with cover housing is made.

2. Remove the 3 socket head capscrews, Fig. V-6, that secure the cover housing to the moveable sheave, using a 1/4-inch Allen wrench. After socket head capscrews are removed, remove the puller bolt from the center of the hex shaft.

Fig. V-6

3. Remove cover housing and slide spring off stationary sheave center hub, Fig. V-7.

Fig. V-7

4. Loosen the 3 jamnuts, using a 1/4-inch wrench, and the 3 set screws, Fig. V-8, until the spider assembly is free on the hex shaft, using a 3/16-inch wrench.

Fig. V-8

DRIVE CLUTCH DISASSEMBLY

5. Push the spider assembly down against the moveable sheave, Fig. V-9.

Note: The spider assembly may tend to stick on the hex shaft even after the set screws are loosened and downward pressure is exerted. If this situation occurs, the spider assembly is to be forced down on the hex shaft.

Fig. V-9

6. Slide the split ring halves out of the groove in the hex shaft, Fig. V-10.

Fig. V-10

7. Mark the spider assembly in relation to the hex shaft so that it can be installed in the same position. Slide spider assembly off hex shaft, Fig. V-11.

Fig. V-11

8. Slide moveable sheave off hex shaft, Fig. V-12.

Fig. V-12

9. If the spider, rollers and/or weights are to be serviced, use the following instructions:

   A. Remove locknut and capscrew that secures weights and roller with bushing to the roller arm, using a 3/8-inch wrench, Fig. V-13.

   B. Slide roller with bushing from between roller arm, Fig. V-13.

Note: There are 2 small "ears" that protrude on the inside of the roller arm. These ears must be taken into consideration when roller with bushing is being removed.

   C. Perform steps A and B on remaining roller arms.

DRIVE CLUTCH DISASSEMBLY

Note: A complete roller kit with bushings is to be installed, even if only 1 roller with bushing is worn or damaged. New rollers with bushings will have a definite "wear-in" pattern. If rollers with bushings are to be replaced, new ramps are to be installed (see step 10).

10. Remove the capscrews that secure the ramps to the moveable sheave, using a 9/64-inch Allen wrench. Slide ramp out of "ramp setting" in moveable sheave.

Note: A complete ramp kit is to be installed, even if only 1 ramp is worn or damaged. If ramps are to be replaced, new rollers with bushings are to be installed.

Fig. V-13

CLEANING INDIVIDUAL COMPONENTS

Cleaning

Equipment Necessary: Cleaning Solvent and Compressed Air

1. Wash grease, dirt and foreign matter off all components, using cleaning solvent. Dry components with compressed air.

2. If drive belt accumulations are on the stationary sheave, moveable sheave or the moveable sheave Duralon bushing, the accumulations are to be removed, using cleaning solvent ONLY. Dry components with compressed air.

CAUTION

DO NOT use steel wool or a wire brush on components that have a Duralon bushing; damage will result if contacted.

INSPECTING INDIVIDUAL COMPONENTS

Inspecting

Equipment Necessary: Cleaning Solvent and Compressed Air

1. Inspect the stationary sheave, moveable sheave and cover housing for cracks and imperfections in the castings. Replace component(s) as conditions dictate.

2. Inspect the spider for cracks and imperfections in the casting. Arms, weights and rollers with bushings are to be without damage or wear. Replace component(s) as conditions dictate.

3. Inspect the ramp "settings" on the inside of the moveable sheave for wear and cracks. Replace the moveable sheave if ramp "setting" is badly worn or damaged.

4. Inspect the spring for proper compression qualities (see Spring Compression Test, page V-20). If spring compression is not as specified or damage is evident, replacement is necessary.

5. Inspect the ramps for wavy pattern that may develop after usage. If ramp(s) is wavy, replace as a complete set.

6. Inspect all threaded components for stripped or otherwise damaged threads. Replace any component(s) that is damaged.

INSPECTING INDIVIDUAL COMPONENTS

7. Inspect the hex shaft; no burrs or rough edges are to be evident. Use a fine file to remove burrs and rough edges. If filing was necessary, the stationary sheave and hex shaft is to be washed in cleaning solvent to remove metal filings. Dry with compressed air.

8. Inspect the set screws that retain the Duralon bearing in the moveable sheave. Set screws are to be 1/16-inch below the casting on the inside surface of the moveable sheave. Set screws are to be staked on inside of moveable sheave. If set screws are not staked, do so (see Stake Moveable Sheave Duralon Bearing Set Screws, page V-20).

SPRING COMPRESSION SPECIFICATION

Spring Compression Test

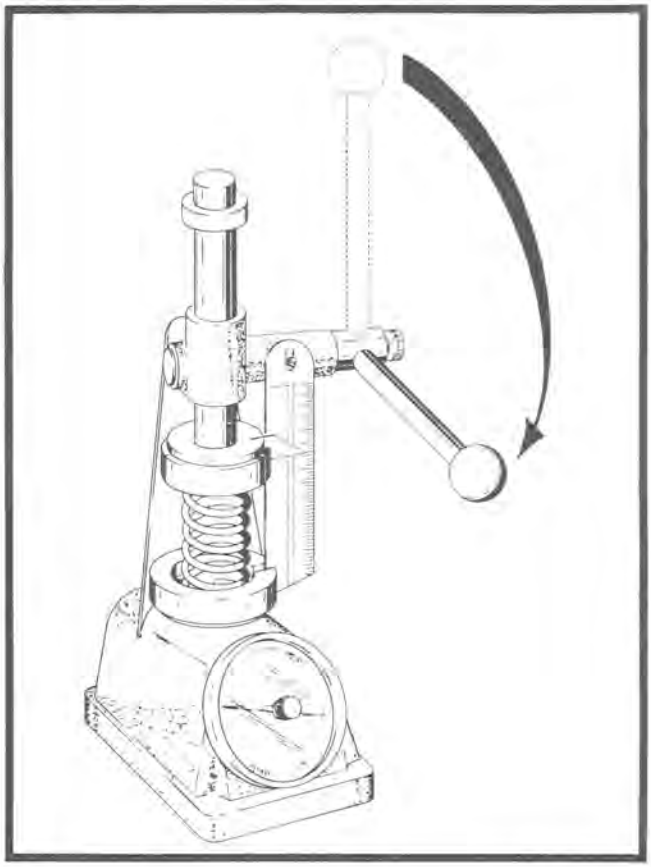
Equipment Necessary: Spring Pressure Tester

The spring is to be a specific length and have definite pressure characteristics to ensure proper drive clutch engagement (see Drive Clutch Specifications, page V-2). Spring pressure reading must be as specified when checked with a spring pressure tester (see Drive Clutch Specifications, page V-2). If the spring pressure is within tolerance and an engagement problem is still experienced, another drive clutch component is affecting engagement RPM.

1. Place spring between compression pad and scale contact surface, Fig. V-14.

2. Push compression arm down 1-1/4—inches and read the total number of pounds registered on the indicator, Fig. V-14. Indicator reading is to be as specified (see Drive Clutch Specifications, page V-2). If indicator reading is less than specified spring pressure, install a new spring.

Fig. V-14



MOVEABLE SHEAVE SET SCREW STAKING

Stake Moveable Sheave Duralon Bearing Set Screws

Equipment Necessary: 3/32-Inch Allen Wrench, 1/8-Inch Diameter Flat End Punch and Hammer

The 3 set screws that secure the Duralon bearing in the moveable sheave have a tendency to back out. When this occurs, the drive clutch will not disengage at idle speed and have a tendency to creep. Hard starting may be evident and the snowmobile may "lurch" forward when the recoil rope is pulled. To correct the situation, the set screws are to be staked.

1. Examine the set screws that secure the Duralon bearing to the moveable sheave. The head of the set screws is to be 1/16-inch below the surface of the casting as viewed from the inside of the moveable sheave.

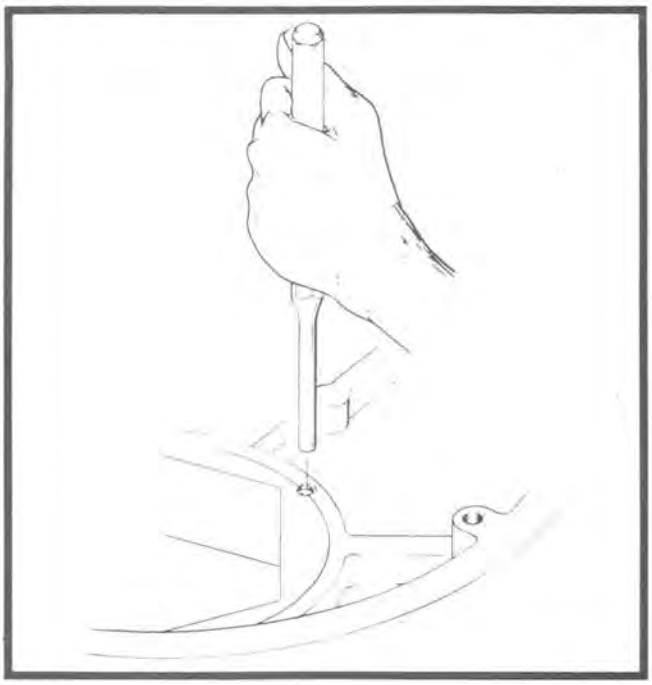
MOVEABLE SHEAVE STAKING

2. If set screws are not 1/16-inch below casting surface, tighten set screws until proper measurement is evident, using a 3/32-inch Allen wrench.

3. After set screws are tightened, the casting is to be staked on the outside edge of each set screw, using a 1/8-inch flat end punch and hammer, Fig. V-15.

Note: When staking is performed, strike the punch with the hammer, using sufficient force to deform the threads but not so hard as to break off a part of the casting. This procedure will keep the set screws in place and prevent them from backing out.

Fig. V-15



DRIVE CLUTCH ASSEMBLY

Assemble Drive Clutch

Equipment Necessary: 9/64-Inch Allen Wrench, Torque Wrench, 3/8-Inch Socket, 3/8-Inch Wrench, 3/16-Inch Socket and 1/4-Inch Allen Wrench

1. Ensure all clutch components have been cleaned, repaired or replaced.

2. Install ramp in moveable sheave and secure in place with socket head capscrew, using a 9/64-inch Allen wrench. Tighten socket head capscrew to 2-2.5 ft. lbs. torque, using a torque wrench. Install remaining ramps.

Note: A complete ramp kit is to be installed, not an individual ramp. If new ramps are being installed, new roller kit with bushings is to be installed.

3. Slide the moveable sheave on the stationary sheave hex shaft, Fig. V-16. The alignment marks on both sheaves MUST line up to keep the clutch balanced.

4. If the spider, rollers and/or weights were serviced, use the following procedure:

Note: A complete roller kit is to be installed, not individual rollers. If new rollers are being installed, a new ramp kit should have already been installed (see Step 2).

Fig. V-16

DRIVE CLUTCH ASSEMBLY

A. Slide bushing into roller and install both components between the roller arm, Fig. V-17, making sure the bushing "cut outs" slide over the 2 small "ears" on the inside surface of the roller arm.

B. Slide a weight onto the capscrew and push capscrew through roller arm, roller and bushing.

Note: Head of capscrew is to be positioned on side of roller arm having the 2 small "ears".

C. Slide another weight onto opposite end of capscrew and secure with locknut. Tighten locknut to 3-4 ft. lbs. torque, using a 3/8-inch socket, 3/8-inch wrench and a torque wrench.

D. Perform steps A, B and C on remaining rollers, bushings and weights, Fig. V-17.

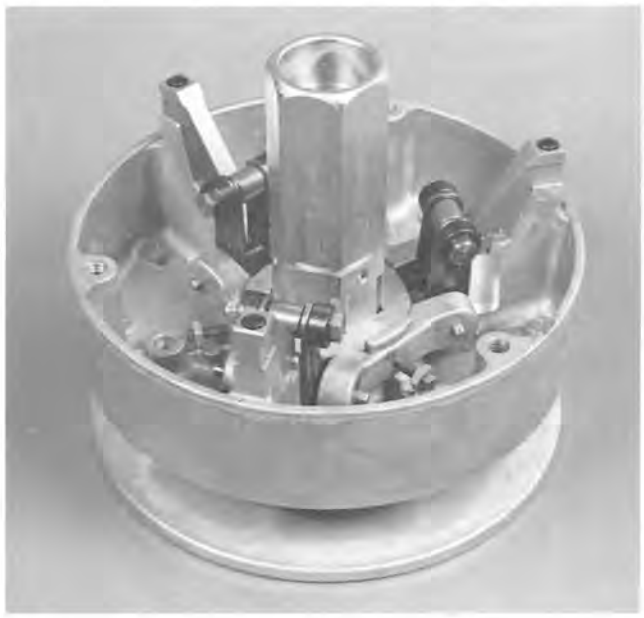
Fig. V-17

E. Install the 3 set screws with locknuts in the spider assembly. End of set screws is not to extend into center area of spider.

5. Slide the complete spider assembly onto the hex shaft in the same position occupied before disassembly, Fig. V-18. Side of spider with stamped part number is to face up.

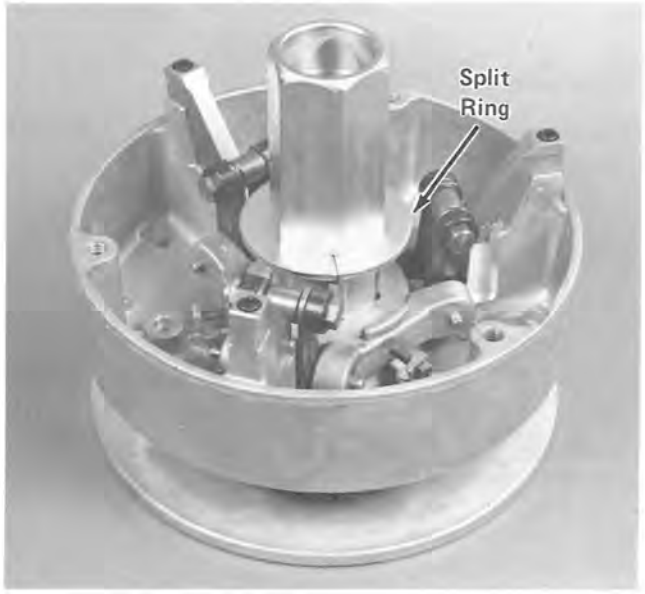
Note: During disassembly the spider was to have been marked in relation to the hex shaft. This marking enables same position installation.

Fig. V-18



6. Install the split ring halves in the hex shaft groove, Fig. V-19.

Fig. V-19

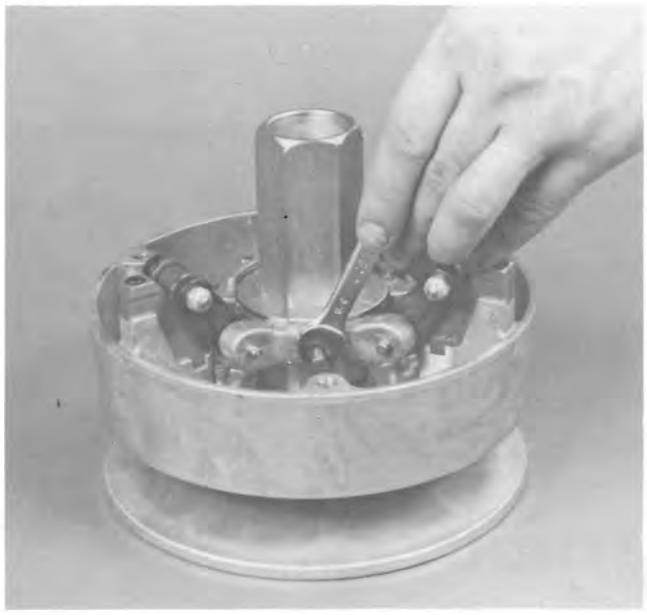


7. Pull the spider assembly up against the split ring halves. Tighten set screws to 3-4 ft. lbs. torque, using a 3/16-inch socket and torque wrench. Bottom the locknuts against the spider, Fig. V-20, to lock the set screws in place, using a 3/8-inch wrench.

Note: End of set screws is to slide into the recess in the hex shaft to ensure proper spider retention.

DRIVE CLUTCH ASSEMBLY

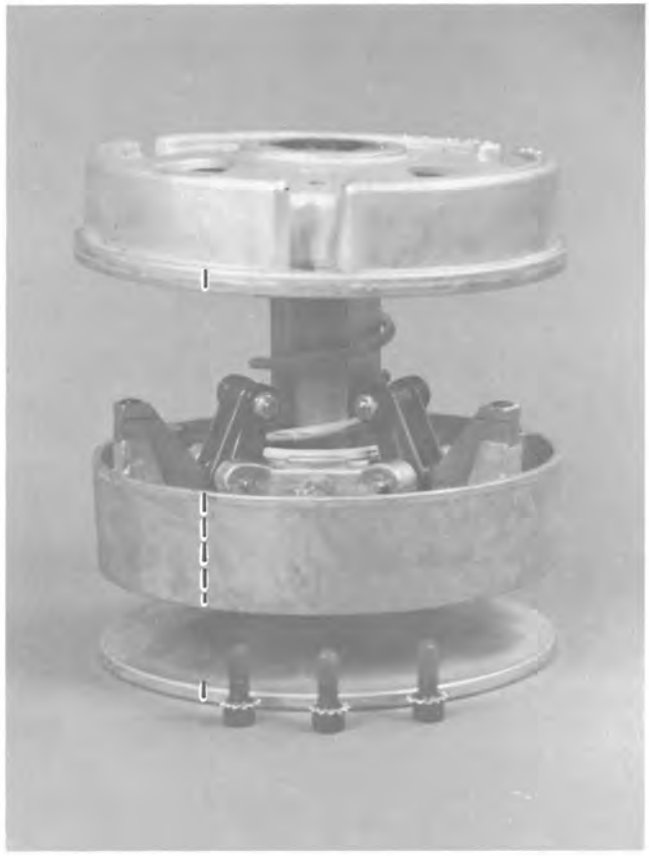
Fig. V-20



8. Slide the spring over the hex shaft, Fig. V-21.

9. Place the cover housing on the spring and line up the alignment mark with those in the moveable and stationary sheave, Fig. V-21.

Fig. V-21



10. Compress (push down) the cover housing on the hex shaft and lift up on the moveable sheave until both components contact each other, using the clutch puller bolt and large flat washer. Secure the cover housing to the moveable sheave, Fig. V-22, with 3 socket head capscrews, using a 1/4-inch Allen wrench. Tighten the capscrews to 15-17 ft. lbs. torque, using a 1/4-inch Allen wrench and torque wrench.

Fig. V-22

DRIVE CLUTCH INSTALLATION

Install Drive Clutch

Equipment Necessary: 3/4-Inch Socket, Air Impact Tool and Torque Wrench

1. Place the drive belt on the driven pulley.

2. Move the drive clutch into position near the crankshaft and loop drive belt onto the clutch.

3. Secure drive clutch to crankshaft with capscrew and lock washer, using a 3/4-inch socket and air impact tool. Tighten the capscrew to 75 ft. lbs. torque, using a 3/4-inch socket and torque wrench.

4. Check alignment between drive clutch and driven pulley (see Drive Clutch/Driven Pulley Alignment, page V-24).

CAUTION

If service was performed on the drive clutch or a new drive clutch is installed, alignment is to be checked between the drive clutch and driven pulley. When alignment is not as specified, accelerated belt wear, poor performance and component failure may occur.

ALIGNMENT INSTRUCTIONS

Drive Clutch/Driven Pulley Alignment

Equipment Necessary: Clutch Alignment Bar, 1/4-Inch Block

Note: Two items that must be checked when aligning the drive clutch and driven pulley are PARALLELISM and OFFSET. The first item to check and adjust, if required, is parallelism, then offset.

1. Parallelism Adjustment – Remove the brake cable, clutch shield and drive belt (see Remove Brake Cable, Clutch Shield and Drive Belt, page V-26).

2. Install the clutch alignment bar between the sheaves of the driven pulley, making sure that bar is as far down between sheaves as possible. Allow sheaves to release and hold alignment bar in position, Fig. V-23.

Note: Alignment bar must extend beyond the front edge of the drive clutch.

3. Place a 1/4-inch block on the drive clutch hex shaft and allow alignment bar to lay on the block. All measurements must be taken with the alignment bar laying on the block.

4. Measure dimension X and Y, Fig. V-23, at front and rear edge of the drive clutch, using a scale or calipers. Write the two dimensions on a piece of paper for reference. Compare dimension X and Y against Rule A and B.

   Rule A – Dimension Y must be more than dimension X.

   Rule B – Dimension Y must never exceed dimension X by more than 1/16-inch (0.0625).

Note: Manufacturing tolerances for both dimensions (X and Y) are ± 1/16-inch (0.0625). For service recommendations, conform to Rule A and B as stated above.

5. If dimension Y is less than dimension X, parallelism between engine mainshaft and driven pulley shaft is not correct. If dimension Y is more than dimension X (see Rules A and B), the offset can be adjusted (see Offset Adjustment, steps 6-8, page V-24).

6. Offset Adjustment – Install clutch alignment bar between the sheaves of the driven pulley, making sure that bar is as far down between sheaves as possible. Allow sheaves to release and hold alignment bar in position.

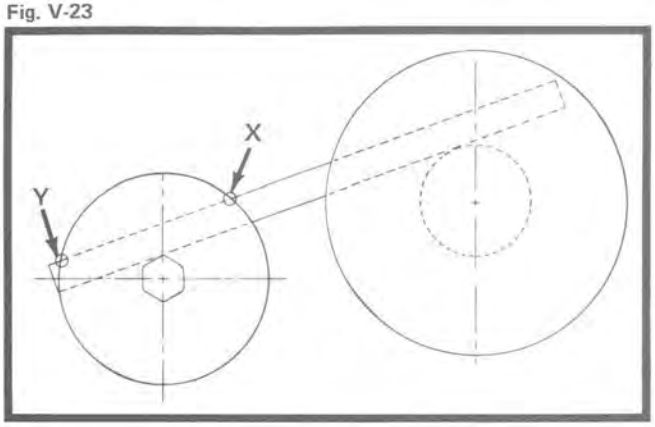
Note: Alignment bar must extend beyond the front edge of the drive clutch.

7. Place a 1/4-inch block on the drive clutch hex shaft and allow alignment bar to lay on the block. All measurements must be taken with the alignment bar laying on the block.

8. Measure dimension X and Y, Fig. V-23, at the front and rear edge of the drive clutch, using a

scale or calipers. Both dimensions must fall between 1-1/4–inches (1.25) and 1-5/16–inches (1.3125). If dimensions fall within specified values, offset is correct; proceed to step 10. If dimensions do not fall within specified values, proceed to step 9.

Fig. V-23



9. Offset Correction

   A. Remove capscrew and washers holding driven pulley on driven pulley shaft, using a 1/2-inch socket, Fig. V-24.

Fig. V-24

   B. Loosen socket head set screw holding offset adjusting collar in place, using a 3/32-inch Allen wrench, Fig. V-25.

Fig. V-25

   C. Move driven pulley and rotate offset adjusting collar until dimensions X and Y fall within 1-1/4–inches (1.25) and 1-5/16–inches (1.3125). When dimensions fall within specified values, lock offset adjusting collar against driven pulley by tightening the socket head capscrew, using a 3/32-inch Allen wrench. Install capscrew and washers that hold driven pulley on driven shaft, using a 1/2-inch socket. Proceed to step 10.

10. Install the drive belt, clutch shield and brake cable (see Install Drive Belt, Clutch Shield and Brake Cable, page V-42).

CLUTCH/PULLEY PARALLELISM ADJ.

Parallelism Adjustment

Equipment Necessary: 9/16-Inch Socket, 12-Inch Extension and 3-Inch Extension

1. Remove the locknut that holds left rear motor mount as viewed from the operator's position, using a 9/16-inch socket and 3-inch extension. Also loosen the locknut that holds the right rear motor mount.

2. Loosen the locknuts holding front of motor plate, using 9/16-inch socket and 12-inch extension.

3. Insert a shim between the bottom of the left rear motor mount and the curved section of the front end assembly.

4. Tighten all locknuts and check parallelism and offset (see Drive Clutch/Driven Pulley Alignment, page V-24).

Note: Continue to add shims until parallelism is obtained.

DRIVEN PULLEY REMOVAL

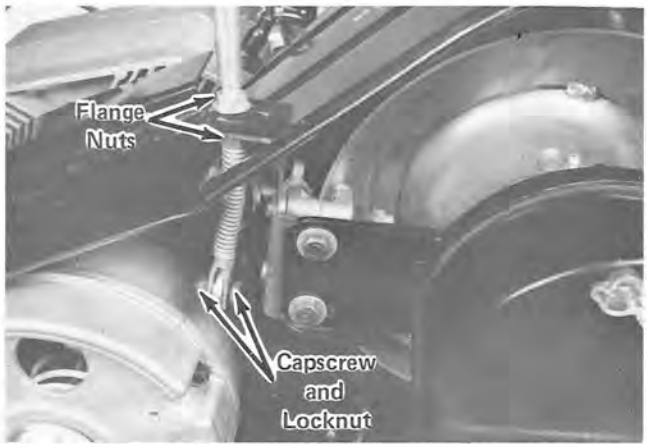
Remove Brake Cable, Clutch Shield and Drive Belt

Equipment Necessary: 1/2-Inch Open End Wrench, 7/16-Inch Open End Wrench and 7/16-Inch Socket

1. Loosen brake cable flange nuts, Fig. V-26, using a 1/2-inch wrench.

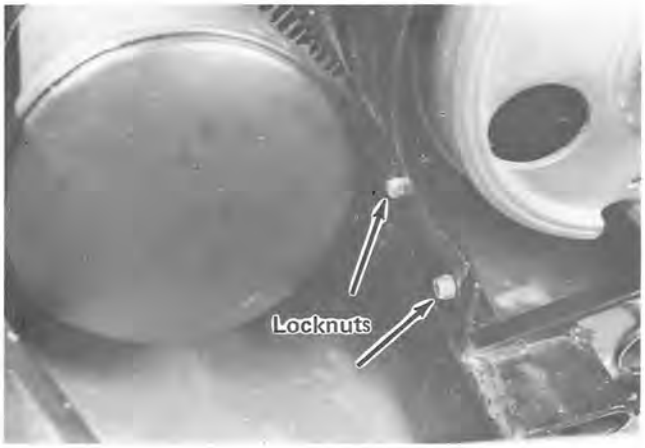
2. Remove capscrew and locknut that holds end of brake cable to brake arm, Fig. V-26, using a 7/16-inch wrench and socket. Pull brake cable through clutch shield and move cable to the side.

Fig. V-26



3. Remove two front locknuts, Fig. V-27, that hold clutch shield to weld studs, using a 7/16-inch socket.

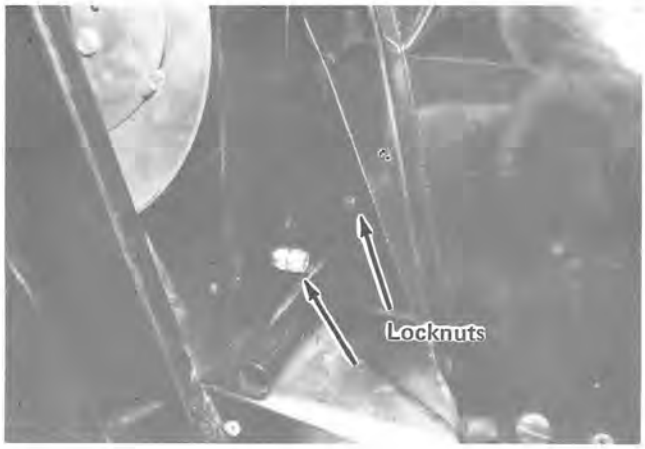
Fig. V-27



4. Remove two rear locknuts, Fig. V-28, that hold clutch shield to weld studs, using a 7/16-inch open end wrench.

5. Remove clutch shield and set aside.

Fig. V-28



DRIVEN PULLEY REMOVAL

6. Remove drive belt, Fig. V-29.

Fig. V-29

Remove Driven Pulley

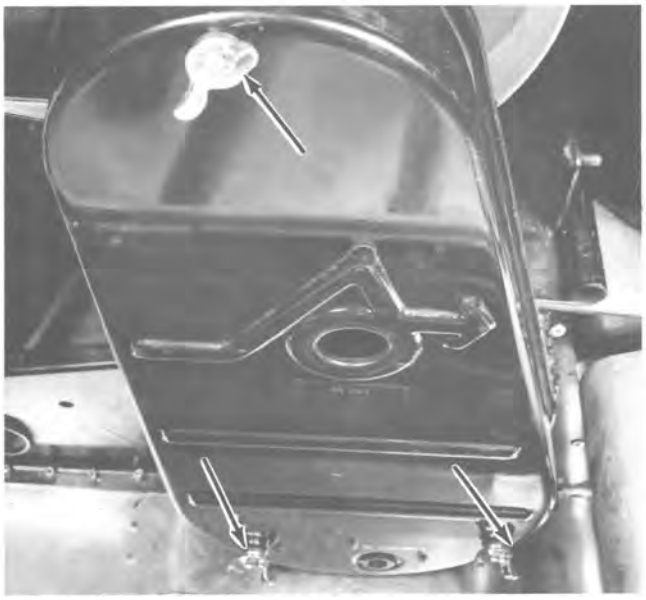
Equipment Necessary: Rags, 1/2-Inch Socket, 9/16-Inch Socket and Two-Pronged Puller

1. Place rags under chaincase cover to absorb chain lube that will flow when dropcase cover is removed.

2. Remove 3 thumb screws and washers that hold chaincase cover to backing plate, Fig. V-30. Pull chaincase cover and gasket away from backing plate; chain lube will flow onto rags.

Note: If chain lube spills into belly pan or onto other components, wipe clean using a dry rag.

Fig. V-30



3. Remove capscrew and flat washer, Fig. V-31, that holds driven pulley on eccentric shaft, using a 1/2-inch socket.

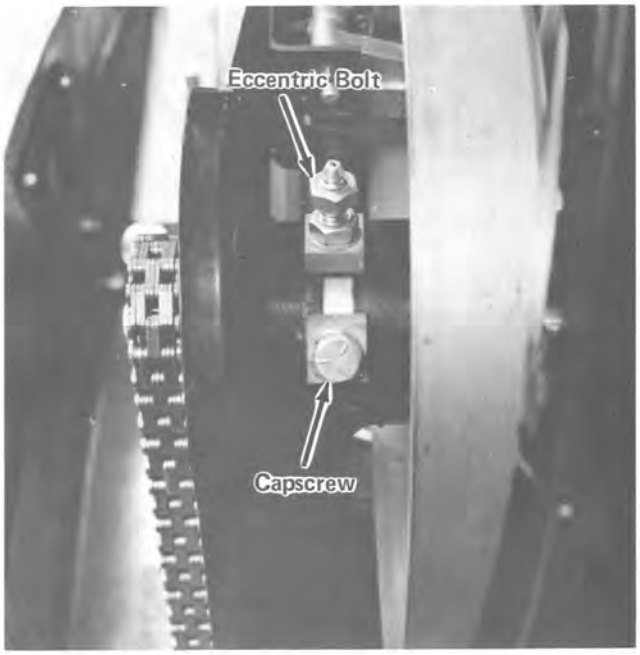
Note: There may be a shim with the flat washer and capscrew that is used to hold driven pulley on eccentric shaft. Shim is used to keep driven pulley from sliding laterally on eccentric shaft.

Fig. V-31

4. Remove capscrew, lock washer and eccentric washer from eccentric bearing, Fig. V-32, using a 9/16-inch socket.

5. Loosen eccentric bolt w/grease fitting, jam nut, lock washer and eccentric washer, Fig. V-32, using a 9/16-inch socket.

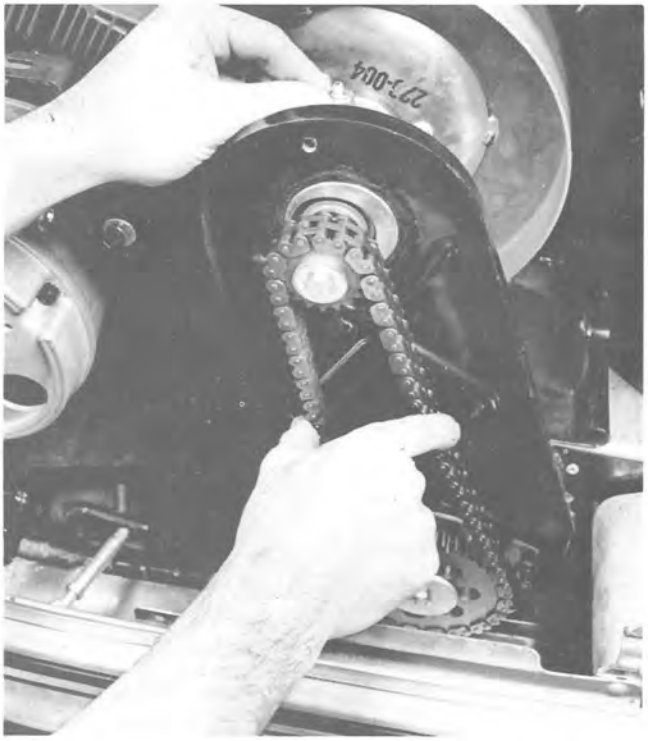
Fig. V-32



DRIVEN PULLEY REMOVAL

6. Push eccentric bolt in proper direction to get maximum slack in drive chain, Fig. V-33. Remove eccentric bolt w/grease fitting, jam nut, lock washer and eccentric washer.

Fig. V-33

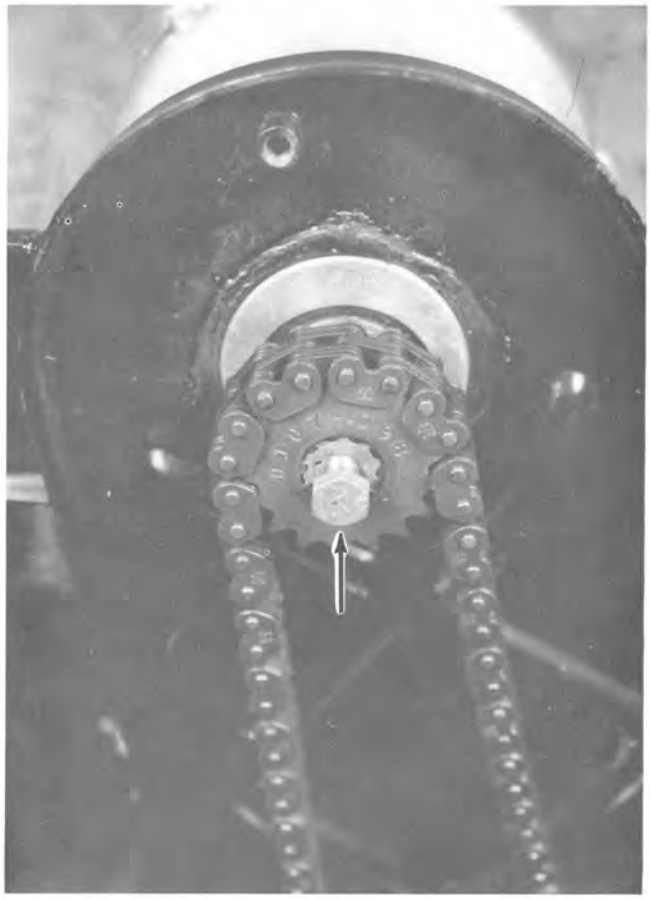


7. Remove capscrew and flat washer that holds upper sprocket to eccentric shaft, Fig. V-34, using a 1/2-inch socket.

Fig. V-34

8. Thread capscrew into eccentric shaft approximately half way, Fig. V-35. Capscrew is used for bottoming puller bolt when sprocket is to be pulled off eccentric shaft.

Fig. V-35



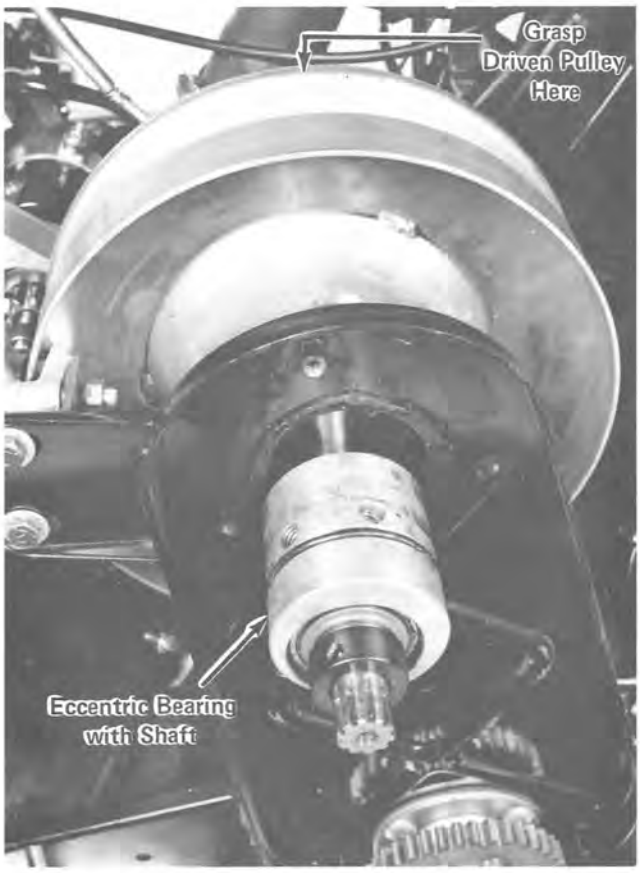
9. Pull upper sprocket and chain off eccentric shaft, using a two-pronged puller. After sprocket is pulled, remove capscrew from eccentric shaft.

DRIVEN PULLEY REMOVAL

10. Grasp driven pulley and pull out eccentric bearing w/shaft, Fig. V-36. Driven pulley and eccentric shaft are to be apart at this time. Lay driven pulley and eccentric assembly aside.

Note: If eccentric bearing and/or shaft is to be serviced, disassemble eccentric bearing from shaft (see Disassemble Eccentric Bearing and Shaft, page V-30). If driven pulley is to be serviced, disassemble the driven pulley (see Disassemble Driven Pulley, page V-29). It is not necessary to disassemble the eccentric bearing and shaft if only the driven pulley is to be serviced.

Fig. V-36



DRIVEN PULLEY DISASSEMBLY

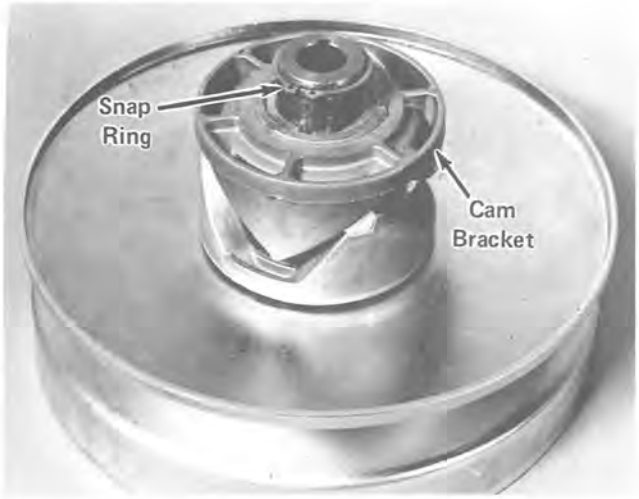
Disassemble Driven Pulley

Equipment Necessary: Screwdriver, Rubber Mallet, Snap Ring Pliers and Side Cutter

1. Slide screwdriver between cam bracket and spring. Pry spring until all spring preload is released.

2. Drive cam bracket toward moveable sheave until side pressure is removed from snap ring, Fig. V-37, using a rubber mallet.

Fig. V-37



3. Remove snap ring from groove at end of stationary sheave hub, Fig. V-38, using a snap ring pliers.

DRIVEN PULLEY DISASSEMBLY

Fig. V-38

4. Slide cam bracket and spring off stationary sheave hub, Fig. V-39. Remove cam bracket sliding shoes, Fig. V-39, if servicing is required, using a pliers.

Note: If cam bracket is hard to remove, a three-pronged puller can be used to pull cam bracket off hub.

Fig. V-39

5. Remove woodruff key from keyway, using a side cutter or pliers, Fig. V-40.

Fig. V-40

6. Slide moveable sheave off stationary sheave hub, Fig. V-41. Driven pulley is completely disassembled at this time.

Fig. V-41

7. Clean and inspect driven pulley (see Cleaning and Inspecting, page V-33).

Disassemble Eccentric Bearing and Shaft — If Required

Equipment Necessary: 1/8-Inch Allen Wrench, Rag, 5/16 x 1/8-Inch Flat End Punch, 3/32-Inch Allen Wrench, Hammer, Propane Torch and Two 1-Inch Thick Wooden Blocks

1. Loosen lock collar set screw, using a 1/8-inch Allen wrench, Fig. V-42.

Fig. V-42

DRIVEN PULLEY DISASSEMBLY

2. Hold eccentric assembly in a vise, using a rag on the long end of shaft to protect from possible damage. Drive lock collar in opposite direction of normal shaft rotation, using a 5/16 x 1/8-inch flat end punch and hammer, Fig. V-43.

Note: The lock collar has a detent that is to be used in conjunction with the punch.

Fig. V-43

3. Slide lock collar off eccentric shaft.

4. If eccentric shaft is to be serviced or replaced, proceed to step 5. If only eccentric bearing is to be serviced, proceed to step 6.

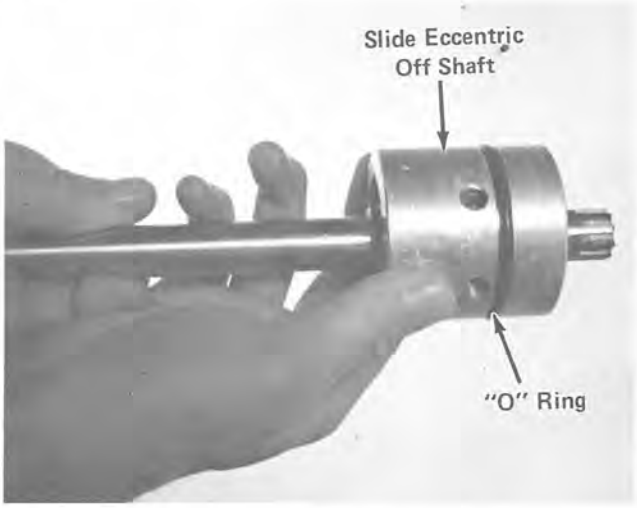
5. Loosen set screw that holds offset adjusting collars on eccentric shaft, Fig. V-44, using a 3/32-inch Allen wrench. Slide offset adjusting collars and the eccentric bearing off shaft. New shaft can now be installed; no need to perform remaining disassembly instructions.

Fig. V-44

6. Pull eccentric bearing off shaft, Fig. V-45. Offset adjusting collars are to remain on eccentric shaft.

Note: If it is difficult to slide eccentric bearing off shaft, a two-pronged puller may be used.

Fig. V-45



7. Remove "O" ring from the eccentric bearing if servicing is required. Eccentric shaft is completely disassembled from eccentric bearing at this time.

8. Place the eccentric housing on two 1-inch thick wooden blocks ("O" ring groove side up). Heat the area of the eccentric bearing below the "O" ring groove, using a propane torch.

9. Drive the bearing out of the eccentric housing, using a 5/16 x 1/8-inch flat end punch and hammer, Fig. V-46.

DRIVEN PULLEY DISASSEMBLY

Fig. V-46

10. After bearing is removed, inspect the inside of the eccentric housing and the bearing for wear and damage. Bearing is to have generous supply of grease, Fig. V-47.

Fig. V-47

11. Place the eccentric housing on two 1-inch thick wooden blocks ("O" ring groove side down). Heat the area from the "O" ring groove down, using a propane torch.

12. Drive the bearing out of the eccentric housing, using a 5/16 x 1/8-inch flat end punch and hammer, Fig. V-48.

Fig. V-48

13. After the bearing is removed, inspect the inside of the eccentric housing and bearing for wear and damage.

CLEANING INDIVIDUAL COMPONENTS

Cleaning

Equipment Necessary: Cleaning Solvent, Compressed Air

1. Wash grease, drive belt accumulations and foreign matter off all components, using cleaning solvent. Dry components with compressed air.

2. If drive belt accumulations are on stationary sheave, stationary sheave hub or moveable sheave, the accumulations are to be removed, using cleaning solvent ONLY. Dry with compressed air.

CAUTION

DO NOT use steel wool or wire brush to clean any of driven pulley components. If sheaves are gouged, the result of using steel wool or wire brush, drive belt may not slide properly between sheaves; result will be decreased performance and possible accelerated belt wear.

INSPECTING INDIVIDUAL COMPONENTS

Inspecting

Equipment Necessary: Fine Emery Cloth

1. Inspect sliding shoes for wear and damage. Replace sliding shoes if conditions dictate.

2. Inspect rivet and weld areas for looseness and cracks. Replace component(s) if repair is not practical.

3. Inspect cam brackets for cracks, wear and other noticeable damage. Replace if conditions dictate.

4. Inspect stationary and moveable sheave for rough surfaces, grooves and scratches. Use fine emery cloth to repair minor damage. If sheave has extensive damage, replacement is necessary.

5. Inspect spring for distortion, crystallization or breaks. If spring condition is doubtful, spring replacement is necessary.

DRIVEN PULLEY ASSEMBLY

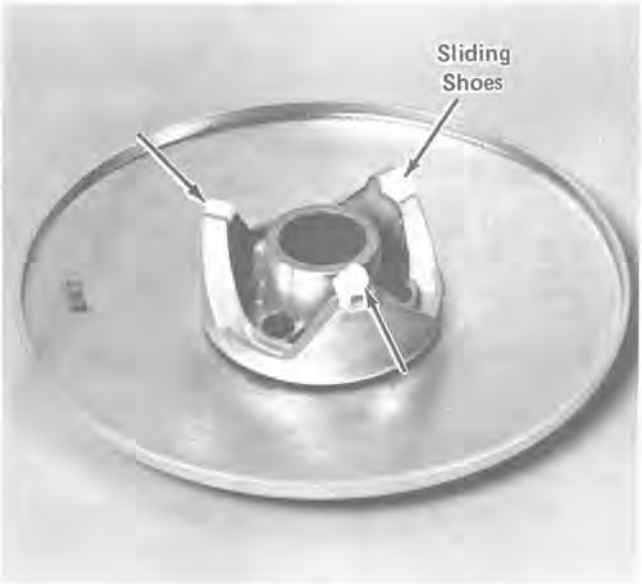
Assemble Driven Pulley

Equipment Necessary: Rubber Mallet and Snap Ring Pliers

1. Be sure all components are clean and have been inspected for possible defects.

2. Place cam bracket sliding shoes into position, Fig. V-49, then seat into casting, using a rubber mallet.

Fig. V-49



DRIVEN PULLEY ASSEMBLY

3. Slide moveable sheave onto stationary sheave hub, Fig. V-50.

Fig. V-50

4. Install woodruff key in keyway. Seat key in keyway, using a rubber mallet.

5. Slide spring on stationary sheave hub, Fig. V-51, then hook spring end against casting knurl.

6. Place cam bracket on spring, Fig. V-51, at a point where cam bracket keyway and woodruff key are somewhat aligned.

Fig. V-51

7. Push cam bracket onto hub, making sure that woodruff key slides into cam bracket keyway. Continue to push cam bracket down until tips are just above the sliding shoes. A rubber mallet may be used to drive cam bracket down.

8. Rotate moveable sheave counterclockwise until slight spring resistance is felt, then rotate moveable sheave an additional 1/3 turn.

9. Maintaining spring preload, push cam bracket down and lock it under the woodruff key, Fig. V-52.

10. Install snap ring in groove of stationary sheave hub, Fig. V-52, using a snap ring pliers.

11. Rotate cam bracket until keyway and woodruff key alignment is gained, then allow cam bracket to release upward against the snap ring, Fig. V-52.

Fig. V-52

DRIVEN PULLEY INSTALLATION

Install Driven Pulley – Eccentric Disassembled

Note: Use this set of instructions ONLY if eccentric bearing and shaft WAS disassembled. If eccentric bearing and shaft WAS NOT disassembled, use next set of instructions (see Install Driven Pulley – Eccentric Assembled, page V-39).

Equipment Necessary: Press or Vise, Flat End Punch, Hammer, 3/32-Inch Allen Wrench and Arctic Chain Lube

1. Install greased bearing in eccentric housing, Fig. V-53, using a press or vise. Bearings are to be pressed into eccentric housing until they bottom out on the bearing "stop".

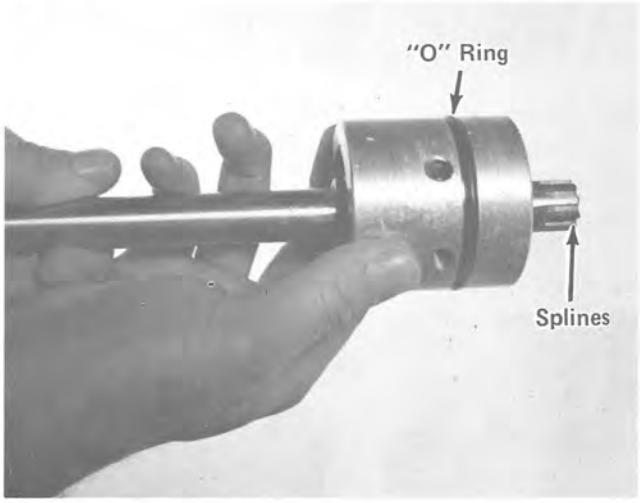
DRIVEN PULLEY INSTALLATION

Fig. V-53

2. Slide "O" ring, Fig. V-54, into groove on outside of eccentric bearing.

3. Push eccentric bearing onto eccentric shaft; "O" ring end of eccentric bearing is to be toward splined end of shaft, Fig. V-54.

Fig. V-54



4. Slide offset adjusting collars onto keyed end of eccentric shaft, Fig. V-55. Slide single lock collar onto splined end, Fig. V-55.

Fig. V-55

5. Hold driven pulley on inside of eccentric mount, then slide eccentric shaft (keyway end) into the mount and through driven pulley, Fig. V-56.

Note: Threaded holes in eccentric bearing are to be exposed in the eccentric mount slide area.

Fig. V-56

DRIVEN PULLEY INSTALLATION

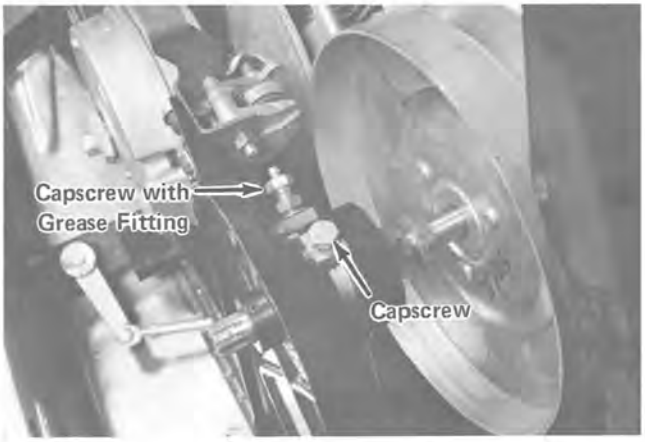
6. Install capscrew, flat washer and eccentric washer in eccentric bearing, Fig. V-57. DO NOT tighten.

Note: The eccentric washer has a "stop" on side that contacts eccentric slide area. The eccentric washer is to be positioned so that the stop contacts end of eccentric slide area before the capscrew does.

7. Install capscrew w/grease fitting, jam nut, flat washer and eccentric washer in eccentric bearing, Fig. V-57. DO NOT tighten.

Note: The eccentric washer has a "stop" on side that contacts eccentric slide area. The eccentric washer is to be positioned so that the "stop" contacts end of eccentric slide area before the capscrew does.

Fig. V-57



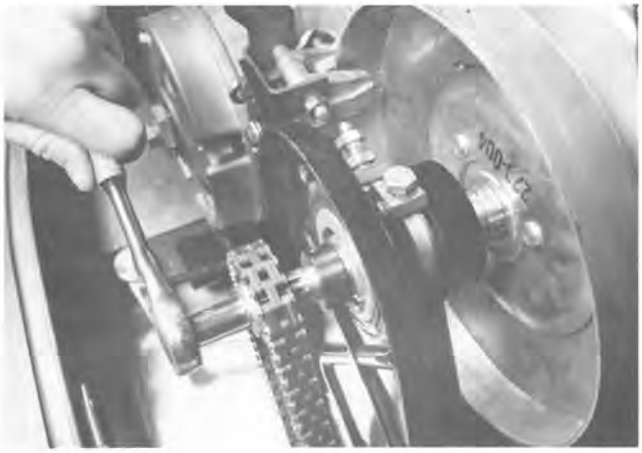
8. Line up keyway in eccentric shaft and driven pulley. Install long key, Fig. V-58, to hold driven pulley in place. It may be necessary to use a long flat end punch and hammer when key is being installed.

Fig. V-58

9. Assemble drive chain on large bottom sprocket and small top sprocket, then start small sprocket on splined end of eccentric shaft. Pull sprocket against shaft with capscrew and flat washer, using a 1/2-inch socket, Fig. V-59. Tighten capscrew to 17 ft. lbs. torque, using a torque wrench and 1/2-inch socket.

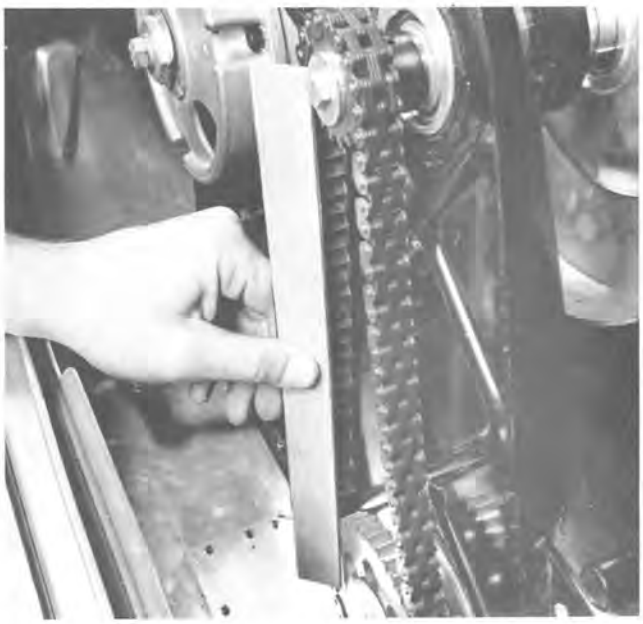
Note: When capscrew is tightened, sprocket will draw onto eccentric shaft splines properly.

Fig. V-59



10. Check Sprocket Alignment — Lay a twelve inch straight edge on face of top and bottom sprocket, Fig. V-60. No visible gap is to be evident between straight edge contact surface and sprocket face.

Fig. V-60

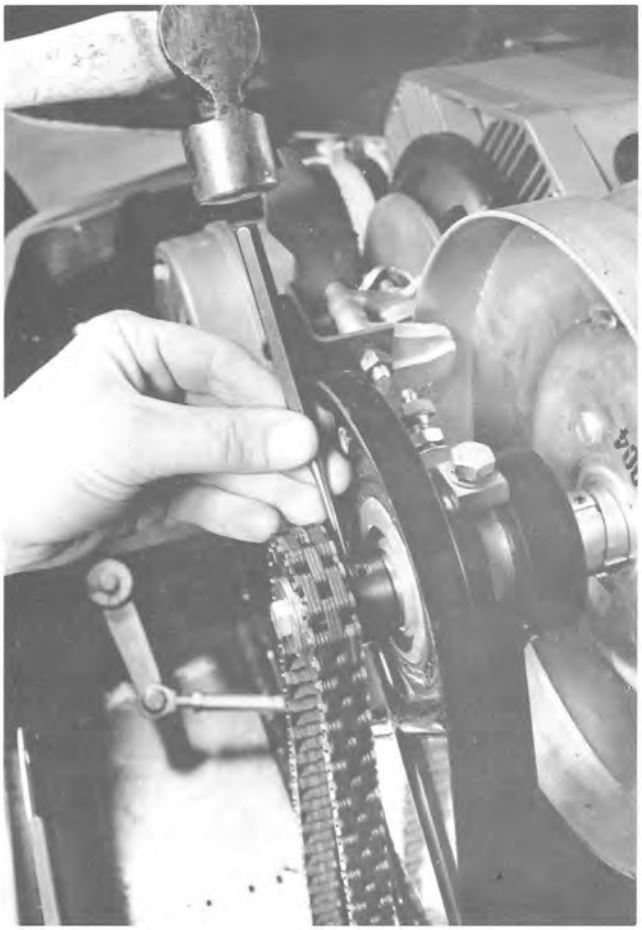


DRIVEN PULLEY INSTALLATION

11. Slide eccentric shaft and sprocket in or out until alignment is correct, then drive lock collar forward, Fig. V-61, which will lock adjustment in place. A 5/16 x 1/8-inch flat end punch and hammer is to be used to drive the lock collar. Recheck alignment and adjust if necessary.

Note: Lock collar is locked tightly when bearing begins to turn with the collar.

Fig. V-61

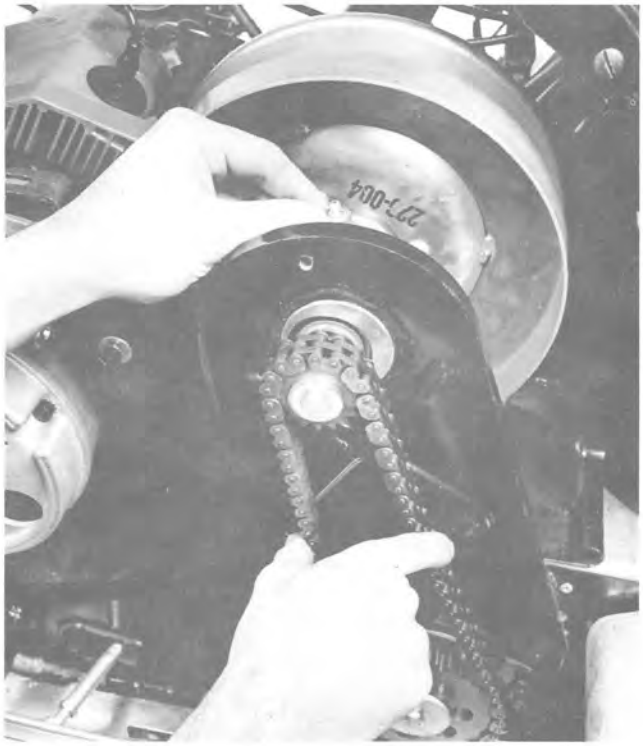


12. Tighten lock collar set screw, using a 1/8-inch Allen wrench, Fig. V-62.

Fig. V-62

13. Push against capscrew w/grease fitting until chain tightens. Chain is to have approximately 1/4-inch deflection at midspan when squeezed together using thumb and forefinger, Fig. V-63.

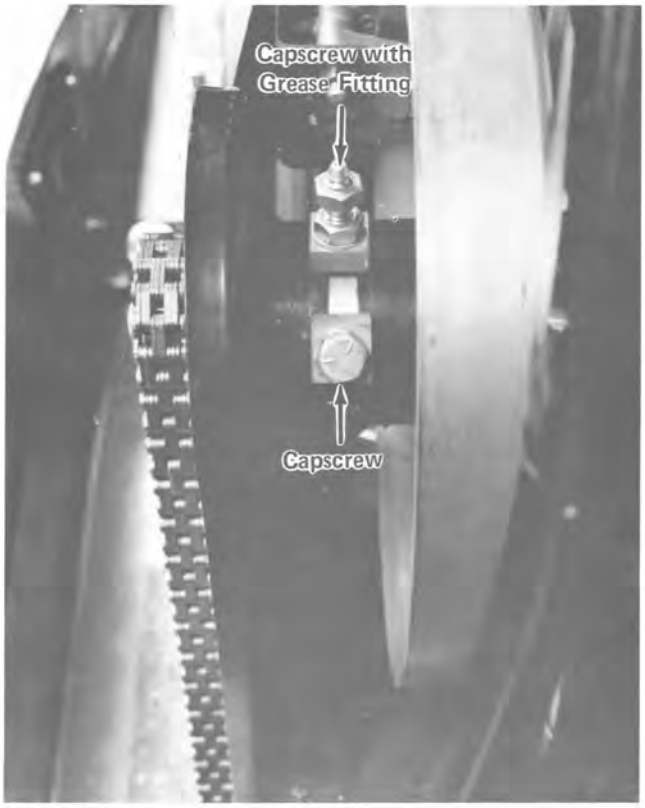
Fig. V-63



DRIVEN PULLEY INSTALLATION

14. When proper adjustment is obtained, tighten capscrew w/grease fitting and any remaining lock capscrew(s), Fig. V-64, using a 9/16-inch socket. Recheck chain tension and adjust if necessary.

Fig. V-64



15. Push offset adjusting collar against eccentric bearing, then drive collar forward. A 5/16 x 1/8-inch flat end punch and hammer is to be used to drive the collar. Tighten adjusting collar set screw, using a 3/32-inch Allen wrench, Fig. V-65.

Fig. V-65

16. Align the drive clutch and driven pulley, using the alignment bar, Fig. V-66, (see Drive Clutch/Driven Pulley Alignment, page V-24).

Fig. V-66

Note: Be sure "offset" is not accidentally changed when lock collar half is moved against driven pulley.

Fig. V-67

18. Secure driven pulley to eccentric shaft with capscrew and flat washer, Fig. V-68, using a 1/2-inch socket. Pull driven pulley against flat washer, then push toward eccentric bearing. No movement is to be evident. If movement occurred, remove capscrew and flat washer; add shim(s) until movement is eliminated. Install capscrew, flat washer and shim(s). Tighten capscrew to 20 ft. lbs. torque, using a torque wrench and 1/2-inch socket.

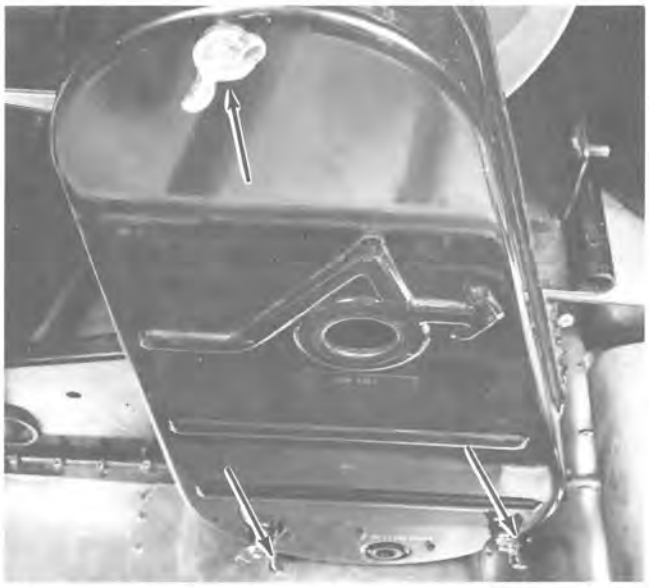
DRIVEN PULLEY INSTALLATION

Fig. V-68

19. Remove rubber filler plug and check plug from chaincase cover. Install chaincase cover and gasket to backing plate with 3 thumb screws and washers, Fig. V-69.

20. Fill chaincase with 8 ounces of Arctic chain lube, Fig. V-69. Chain lube is to be at point of overflowing in check plug hole, Fig. V-69. install rubber filler plug and check plug.

Fig. V-69



CAUTION

Be sure chaincase cover and gasket is installed evenly and a good seal exists between chaincase cover and backing plate. If, after filling dropcase with chain lube and a leak develops due to an improper seal, mechanical damage will occur because of improper chain and sprocket lubrication.

21. Install drive belt, clutch shield and brake cable (see Install Drive Belt, Clutch Shield and Brake Cable, page V-42).

Install Driven Pulley — Eccentric Assembled W/Lock Collars

Note: Use this set of instructions ONLY if eccentric bearing and shaft WAS NOT disassembled. If eccentric bearing and shaft WAS disassembled, use preceding set of instructions (see Install Driven Pulley — Eccentric Disassembled, page V-34).

Equipment Necessary: 5/16 x 1/8-Inch Flat End Punch, Hammer, 1/2-Inch Socket, Torque Wrench, 12-Inch Straight Edge, Steel Ruler and Arctic Chain Lube

1. Hold driven pulley on inside of eccentric mount, then slide eccentric shaft (keyway end) into mount and through driven pulley, Fig. V-70.

Note: Threaded holes in eccentric bearing are to be exposed in eccentric mount slide area.

Fig. V-70

DRIVEN PULLEY INSTALLATION

2. Install capscrew, flat washer and eccentric washer in eccentric bearing, Fig. V-71. DO NOT tighten.

Note: The eccentric washer has a "stop" on side that is to contact eccentric slide area. The eccentric washer is to be positioned so that the "stop" contacts end of eccentric slide area before the capscrew does.

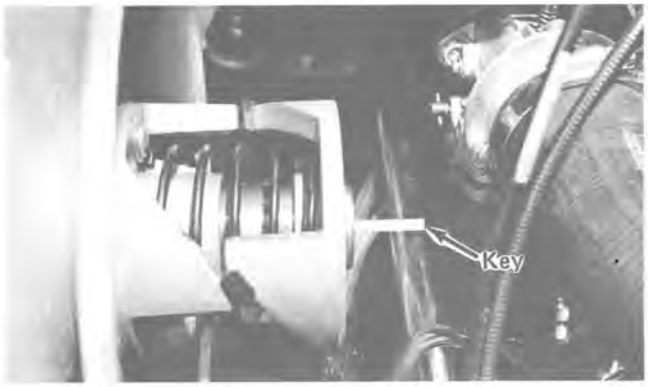
3. Install capscrew w/grease fitting, jam nut, flat washer and eccentric washer in eccentric bearing, Fig. V-71. DO NOT tighten.

Note: The eccentric washer has a "stop" on side that is to contact eccentric slide area. The eccentric washer is to be positioned so that the "stop" contacts end of eccentric slide area before the capscrew does.

Fig. V-71

4. Line up keyway in eccentric shaft and driven pulley. Install long key to hold driven pulley in place, Fig. V-72. It may be necessary to use a flat end punch and hammer when key is being installed.

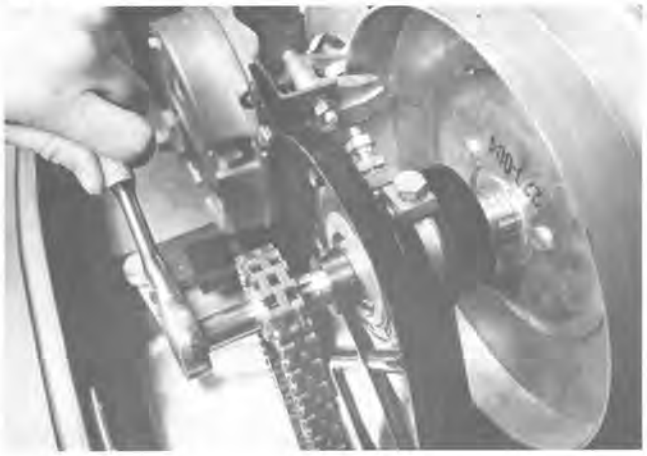
Fig. V-72



5. Assemble drive chain on large bottom sprocket and small top sprocket, then start small sprocket on splined end of eccentric shaft. Pull sprocket on eccentric shaft with capscrew and flat washer, using a 1/2-inch socket, Fig. V-73. Tighten capscrew to 17 ft. lbs. torque, using a 1/2-inch socket and torque wrench.

Note: When capscrew is tightened, sprocket will draw onto eccentric shaft splines properly.

Fig. V-73



6. Check Sprocket Alignment – Lay a twelve inch straight edge on face of top and bottom sprocket. No visible gap is to be evident between straight edge contact surface and sprocket face. If alignment is correct, proceed to step 7. If there is a gap between straight edge contact surface and sprocket face, an adjustment is necessary (see Sprocket Alignment Adjustment, page V-43).

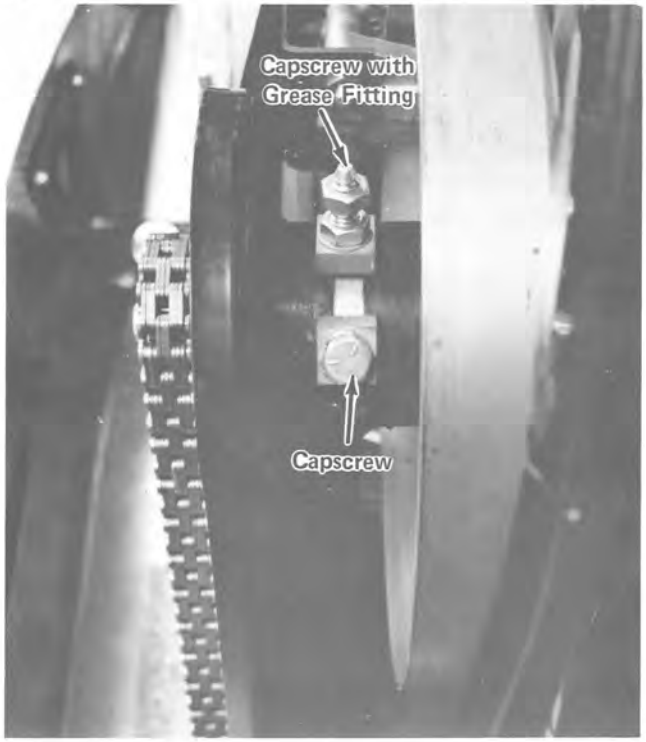
7. Push against capscrew w/grease fitting until chain tightens. Chain is to have approximately 1/4-inch deflection at midspan, when squeezed together using thumb and forefinger, Fig. V-74.

DRIVEN PULLEY INSTALLATION

Fig. V-74

8. When proper adjustment is obtained, tighten capscrew w/grease fitting and any remaining lock capscrew(s), Fig. V-75, using a 9/16-inch socket. Recheck chain tension and adjust if necessary.

Fig. V-75



9. Align the drive clutch and driven pulley, using the clutch alignment bar, Fig. V-76, (see Drive Clutch/Driven Pulley Alignment, page V-24).

Fig. V-76

10. Secure driven pulley to eccentric shaft with capscrew and flat washer, Fig. V-77, using 1/2-inch socket. Pull driven pulley against flat washer, then push toward eccentric bearing. No movement is to be evident. If movement occurred, remove capscrew and flat washer and add shim(s) at end of shaft until movement is removed. Install capscrew, flat washer and shim(s). Tighten capscrew to 20 ft. lbs. torque, using a torque wrench and 1/2-inch socket.

Fig. V-77

11. Remove rubber filler plug and check plug from chaincase cover. Install chaincase cover and gasket to backing plate with 3 thumb screws and washers, Fig. V-78.

DRIVEN PULLEY INSTALLATION

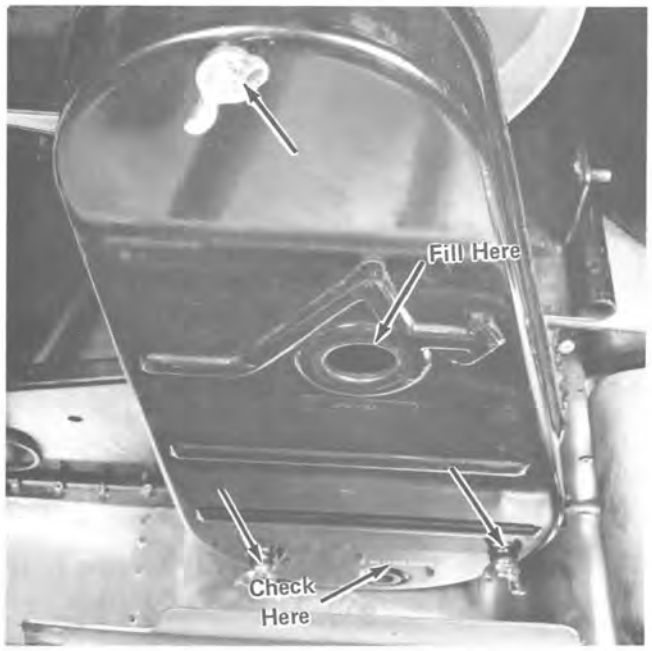
CAUTION

Be sure chaincase cover and gasket are installed evenly and a good seal exists between chaincase cover and backing plate. If, after filling chaincase with chain lube and a leak develops due to an improper seal, mechanical damage will occur because of improper chain and sprocket lubrication.

12. Fill chaincase with 8 ounces of Arctic chain lube, Fig. V-78. Chain lube is to be at the point of overflowing in check plug hole, Fig. V-78. Install rubber filler plug and check plug.

13. Install drive belt, clutch shield and brake cable (see Install Drive Belt, Clutch Shield and Brake Cable, page V-42).

Fig. V-78



Install Drive Belt, Clutch Shield and Brake Cable

Equipment Necessary: 7/16-Inch Socket, 7/16-Inch Open End Wrench and 1/2-Inch Open End Wrench

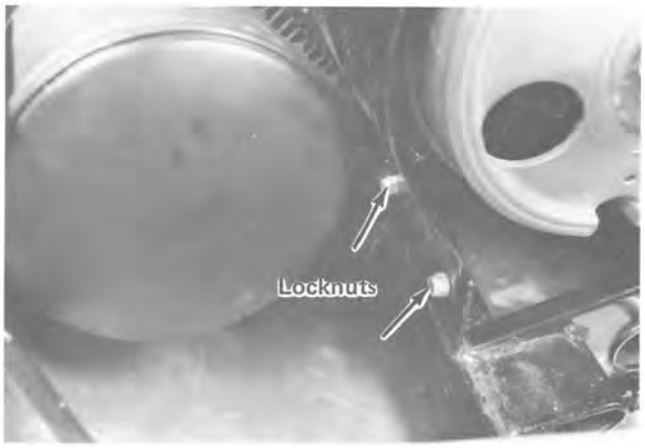
1. Install drive belt, Fig. V-79.

2. Place clutch shield in position on front and rear weld studs.

Fig. V-79

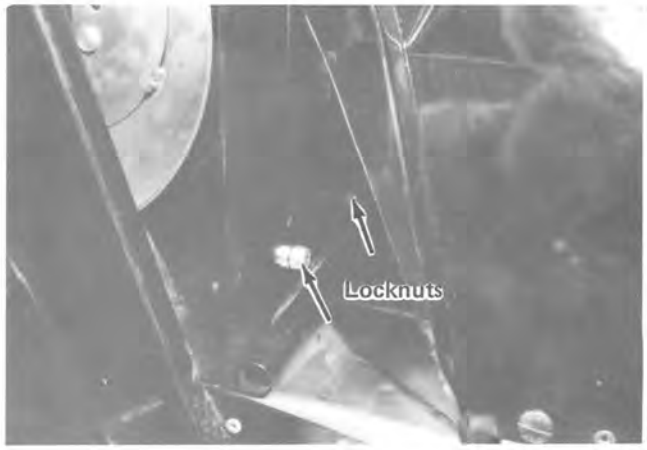
3. Retain front of clutch shield to weld studs with 2 locknuts, Fig. V-80, using a 7/16-inch socket.

Fig. V-80



4. Retain rear of clutch shield to weld studs with 2 locknuts, Fig. V-81, using a 7/16-inch open end wrench.

Fig. V-81



DRIVEN PULLEY INSTALLATION

5. Slide end of brake cable through cut-out in clutch shield. Connect end of brake cable to brake arm with capscrew and locknut, Fig. V-82, using a 7/16-inch socket and wrench.

6. Push brake cable into slide cut-out in clutch shield cable mount. Tighten flange nuts against cable mount, Fig. V-82, using a 1/2-inch open end wrench.

Note: Squeeze brake lever. When brake is fully engaged, there is to be from 1/4 - 1/2-inch between front of brake lever and brake lever "stop". If setting is not as specified, adjust brake cable flange nuts.

Fig. V-82

CHAIN AND SPROCKET ADJUSTMENTS

Adjust Chain Tension

Equipment Necessary: 9/16-Inch Socket

1. Loosen eccentric capscrew w/grease fitting and locking capscrew(s), using a 9/16-inch socket.

2. Push against capscrew w/grease fitting until chain tightens. Chain is to have approximately 1/4-inch deflection at midspan when squeezed together using thumb and forefinger. When proper adjustment is obtained, tighten capscrew w/grease fitting and any remaining lock capscrews, using a 9/16-inch socket. Recheck chain tension and adjust if necessary.

Sprocket Alignment Adjustment

Equipment Necessary: Rags, 1/2-Inch Socket, 1/8-Inch Allen Wrench, 5/16 x 1/8-Inch Flat End Punch, Hammer, 3/32-Inch Allen Wrench and Arctic Chain Lube

1. Remove brake cable, clutch shield and drive belt (see Remove Brake Cable, Clutch Shield and Drive Belt, page V-26).

2. Place rags under chaincase cover to absorb chain lube that will flow when chaincase cover is removed.

3. Remove 3 thumb screws and washers that hold chaincase cover to backing plate. Pull chaincase cover and gasket away from backing plate; chain lube will flow onto rags.

Note: If chain lube spills into belly pan or onto other components, wipe clean using a dry rag.

4. Remove capscrew and flat washer, Fig. V-83, that holds driven pulley on eccentric shaft, using a 1/2-inch socket.

Note: There may be a shim with the capscrew and flatwasher that holds driven pulley on eccentric shaft. KEEP THE SHIM.

Fig. V-83

5. Loosen lock collar set screw, using a 1/8-inch Allen wrench, Fig. V-84.

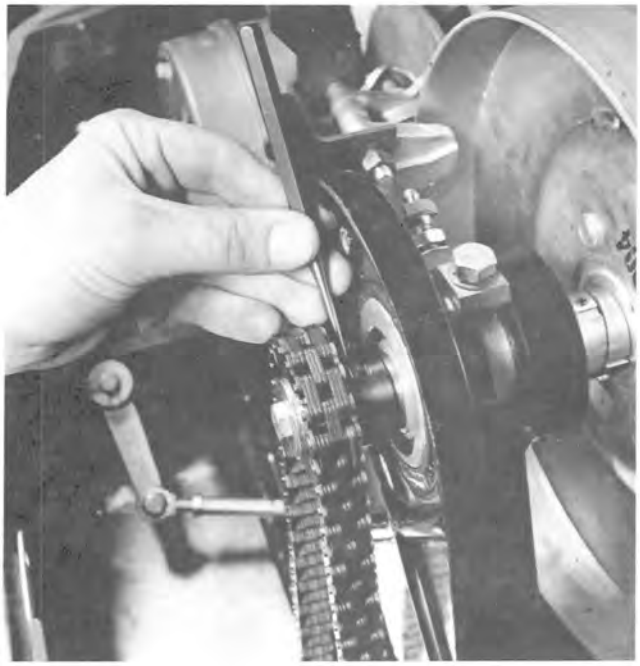
CHAIN AND SPROCKET ADJUSTMENTS

Fig. V-84

6. Loosen the lock collar by driving in opposite direction of normal eccentric shaft rotation, using a 5/16 x 1/8-inch flat end punch and hammer, Fig. V-85.

Note: The lock collar has a detent that is to be used in conjunction with the flat end punch.

Fig. V-85

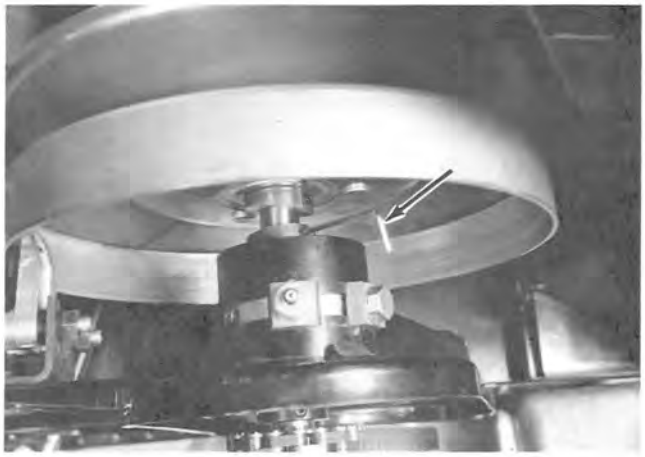


7. Loosen set screw that holds offset adjusting collar against driven pulley, using a 3/32-inch Allen wrench, Fig. V-86.

Fig. V-86

8. Loosen set screw that holds offset adjusting collar against eccentric bearing, using a 3/32-inch Allen wrench, Fig. V-87.

Fig. V-87



9. Loosen offset adjusting collar nearest eccentric bearing by driving in opposite direction of normal eccentric shaft rotation, using a 5/16 x 1/8-inch flat end punch and hammer.

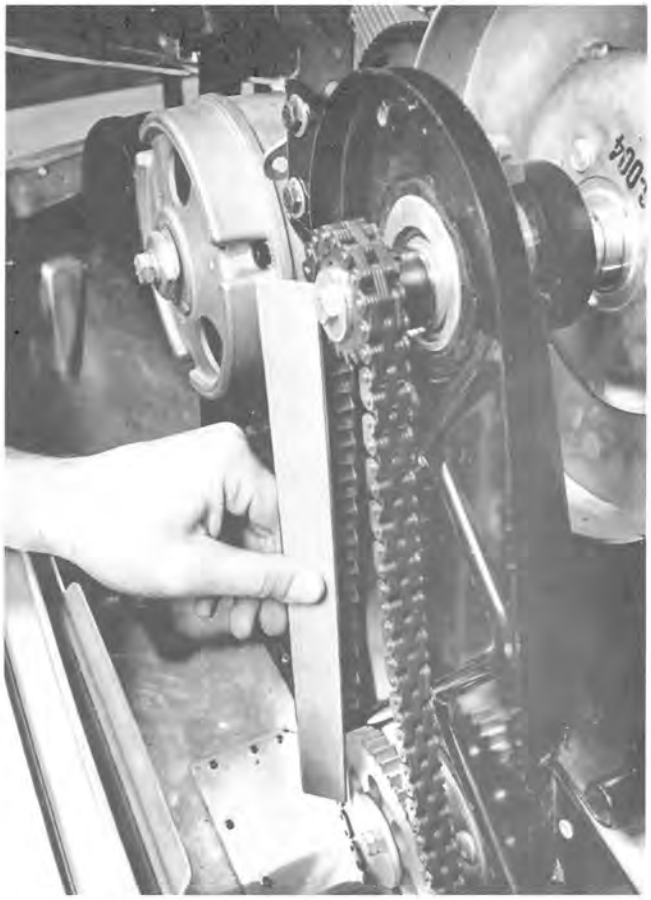
Note: The offset adjusting collar has a detent that is to be used in conjunction with the flat end punch.

10. Move the eccentric shaft in or out, whichever will provide proper sprocket alignment, Fig. V-88.

CHAIN AND SPROCKET ADJUSTMENTS

Note: To check sprocket alignment, lay a twelve inch straight edge on face of top and bottom sprocket, Fig. V-88. No visible gap is to be evident between straight edge contact surface and sprocket face.

Fig. V-88



11. When proper sprocket alignment is established, drive offset adjusting collar nearest eccentric bearing in direction of normal eccentric shaft rotation, using a 5/16 x 1/8-inch flat end punch and hammer. Lock collar and bearing are locked tightly when bearing begins to turn with the lock collar. Recheck sprocket alignment and adjust if necessary.

12. Tighten lock collar set screw, using a 3/32-inch Allen wrench, Fig. V-89.

13. Push offset adjusting collar against eccentric bearing, Fig. V-90, while pushing in on the top sprocket. Drive lock collar half in direction of normal eccentric shaft rotation, using a 5/16 x 1/8-inch flat end punch and hammer. collar half and bearing are locked tightly when bearing begins to turn with lock collar half.

Fig. V-89

14. Tighten offset adjusting collar half set screw, using a 3/32-inch Allen wrench, Fig. V-90.

Fig. V-90

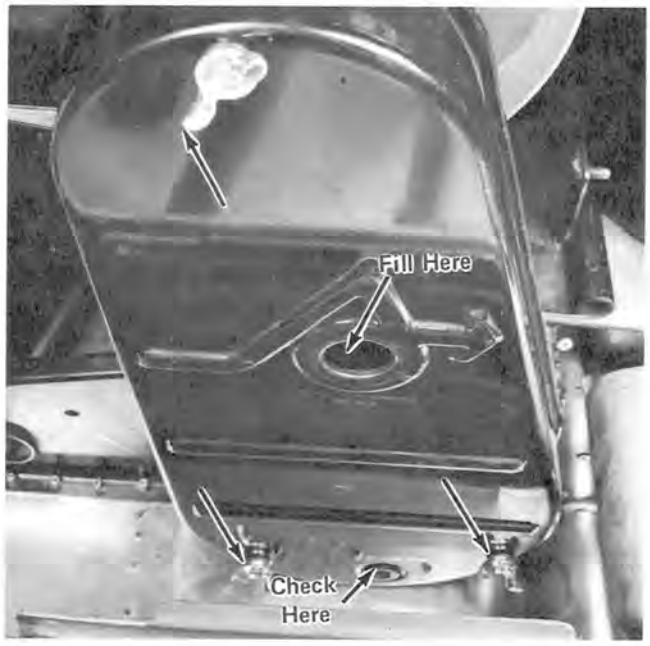
15. Adjust driven pulley/drive clutch "offset" (see Drive Clutch/Driven Pulley Alignment, page V-24).

16. Remove rubber filler plug and check plug from chaincase cover. Install chaincase cover and gasket to backing plate with 3 thumb screws and washers, Fig. V-91.

CHAIN AND SPROCKET ADJUSTMENTS

17. Fill chaincase with 8 ounces of Arctic chain lube, Fig. V-91. Chain lube is to be at the point of overflowing in the check plug hole, Fig. V-91. Install rubber filler plug and check plug.

Fig. V-91



CAUTION

Be sure chaincase cover and gasket is installed evenly and a good seal exists between chaincase cover and backing plate. If, after filling chaincase with chain lube and a leak develops due to improper seal between chaincase cover and backing plate, mechanical damage will occur because drive chain and sprockets will not be lubricated properly.

18. Install drive belt, clutch shield and brake cable (see Install Drive Belt, Clutch Shield and Brake Cable, page V-42).

TRACK DRIVE REMOVAL

Remove Chaincase Cover and Bottom Sprocket

Equipment Necessary: Two 10 mm Wrenches, Rags, 9/16-Inch Socket, Short Two-Pronged Puller

Note: If snowmobile is equipped with an electric starter, remove the battery from chassis, Fig. V-92, using two 10 mm wrenches.

Fig. V-92

1. Place rags under chaincase cover to absorb chain lube that will flow when chaincase cover is removed.

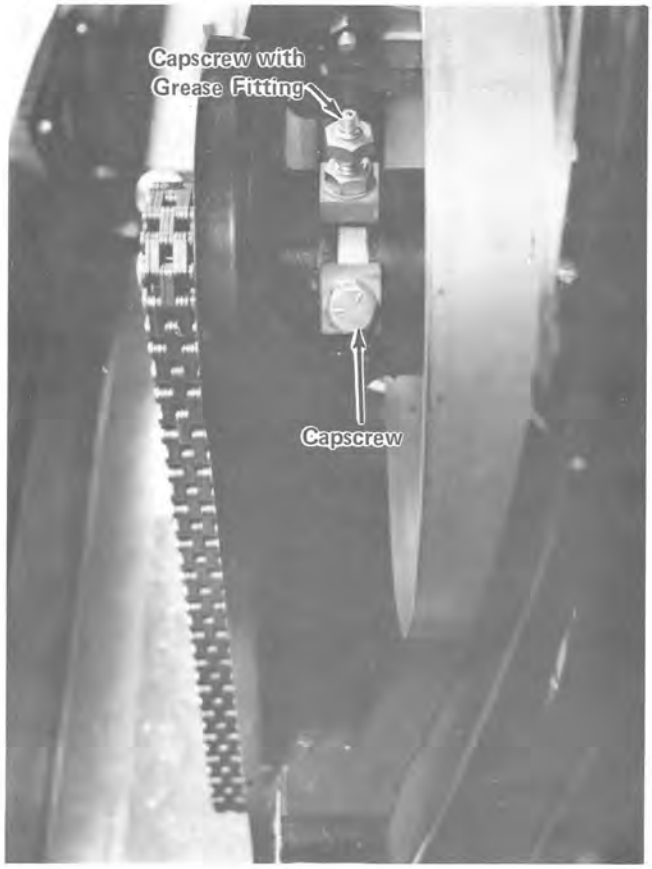
2. Remove 3 thumb screws and washers that hold chaincase cover to backing plate. Pull chaincase cover and gasket away from backing plate while tapping under right corner of chaincase cover; chain lube will flow onto rags.

Note: If chain lube spills into belly pan or onto other components, wipe clean using a dry rag.

3. Loosen eccentric bearing capscrew(s) and capscrew w/grease fitting, Fig. V-93, using a 9/16-inch socket.

TRACK DRIVE REMOVAL

Fig. V-93



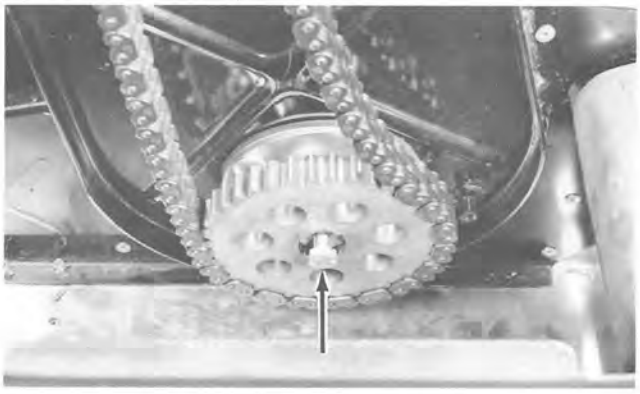
4. Push capscrew w/grease fitting in proper direction to get maximum slack in drive chain, Fig. V-94.

Fig. V-94

5. Remove capscrew and flat washer that holds bottom sprocket on track drive shaft, using a 1/2-inch socket. Thread capscrew approximately half way into the track drive shaft, Fig. V-95. Capscrew is used for bottoming puller bolt when sprocket is to be pulled off track drive shaft.

6. Pull bottom sprocket and chain off track drive shaft, using a short two-pronged puller. After sprocket is pulled, remove capscrew from track drive shaft.

Fig. V-95



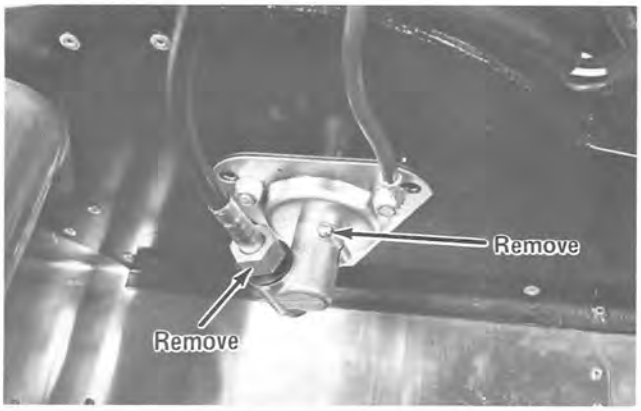
Remove Skid Frame and Track Drive Shaft

Equipment Necessary: Cardboard, Screwdriver Having 1/4-Inch Blade, 3/4-Inch Open End Wrench, 1/8-Inch Allen Wrench, 5/16 x 1/8-Inch Allen Wrench, Hammer, Hoist and 1/2-Inch Socket

1. Remove skid frame from tunnel (see Skid Frame Removal, Section VI, page VI-3).

2. If the snowmobile is equipped with a speedometer, remove the drive head and disconnect cable coupling from track drive shaft, Fig. V-96, using a screwdriver and 3/4-inch open end wrench.

Fig. V-96

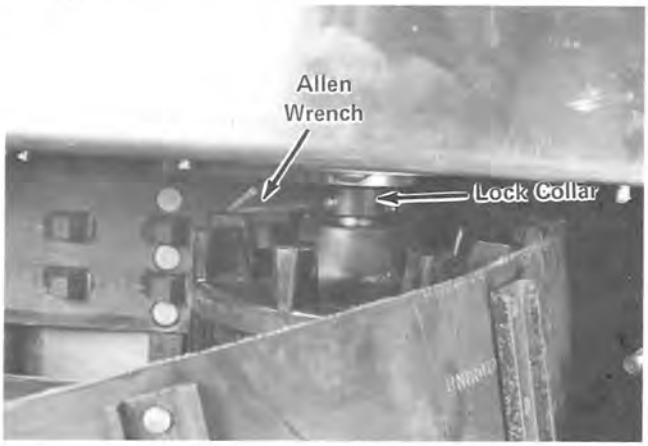


TRACK DRIVE REMOVAL

3. Tip snowmobile onto recoil side and use a piece of cardboard to protect against scratching.

4. Loosen set screw that holds bearing lock collar on recoil end of track drive shaft, using a 1/8-inch Allen wrench, Fig. V-97.

Fig. V-97

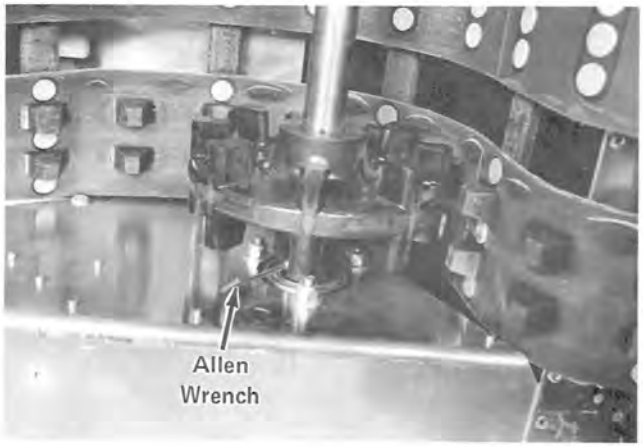


5. Drive lock collar in opposite direction of normal shaft rotation, using a 5/16 x 1/8-inch flat end punch and hammer, Fig. V-98.

Fig. V-98

6. Loosen set screw that holds bearing lock collar on sprocket end of track drive shaft, using a 1/8-inch Allen wrench, Fig. V-99.

Fig. V-99



7. Drive lock collar in opposite direction of normal shaft rotation, using a 5/16 x 1/8-inch flat end punch and hammer, Fig. V-100.

Fig. V-100

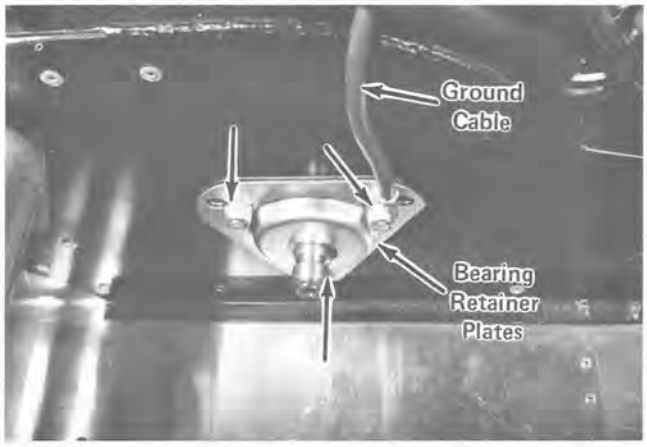
8. Tip snowmobile upright, then raise back end off shop floor approximately 3 feet, using a hoist.

9. Remove 3 locknuts and carriage bolts that hold bearing retainer plates to recoil side of front end, Fig. V-101, using a 1/2-inch socket. Set locknuts and carriage bolts aside.

Note: If snowmobile is equipped with an electric starter, the ground cable is to be removed, Fig. V-101.

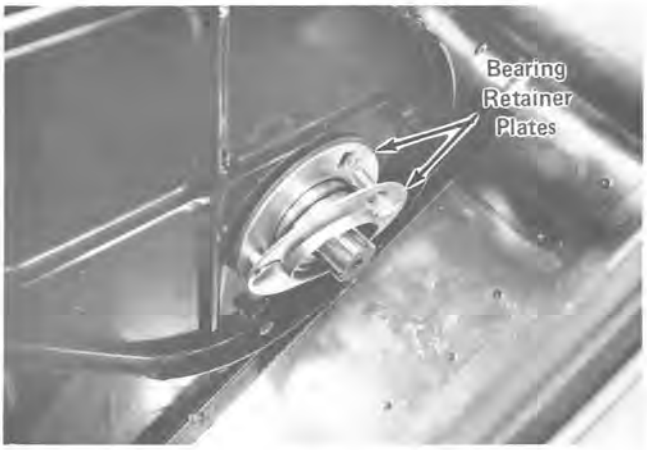
TRACK DRIVE REMOVAL

Fig. V-101



10. Remove 3 locknuts and carriage bolts that hold bearing retainer plates to sprocket side of front end assembly, Fig. V-102, using a 1/2-inch socket. Set locknuts, carriage bolts, "O" ring, bearing, lock collar, bearing retainer plates and gasket where accidental damage cannot take place.

Fig. V-102

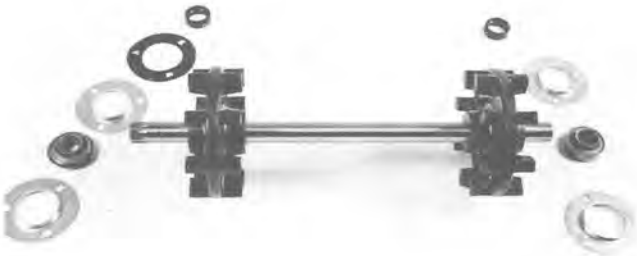


11. Slide track drive shaft toward sprocket side until recoil end is out of the mounting hole in front end assembly, then remove opposite end of shaft. Account for the retainer plates and bearing on recoil end of track drive shaft.

Note: At this time the track drive shaft and track are removed from between the tunnel.

12. Track drive shaft is now removed and completely disassembled, Fig. 103.

Fig. V-103



TRACK DRIVE INSTALLATION

Install Track Drive Shaft and Skid Frame

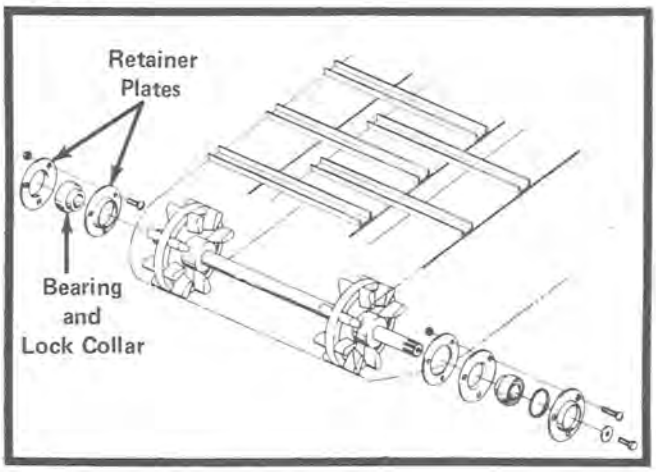
Equipment Necessary: 1/2-Inch Socket, Torque Wrench, 5/16 x 1/8-Inch Flat End Punch, Hammer, 1/8-Inch Allen Wrench, Steel Tape Measure, 3/4-Inch Open End Wrench and Screwdriver Having 1/4-Inch Blade

1. Position track drive shaft between track so that splined end is on clutch side.

2. Slide lock collar (large I.D. toward end of shaft), retainer plate (flange toward lock collar), bearing (race toward lock collar) and retainer plate (flange toward end of shaft) on the nonsplined end of track drive shaft, Fig. V-104.

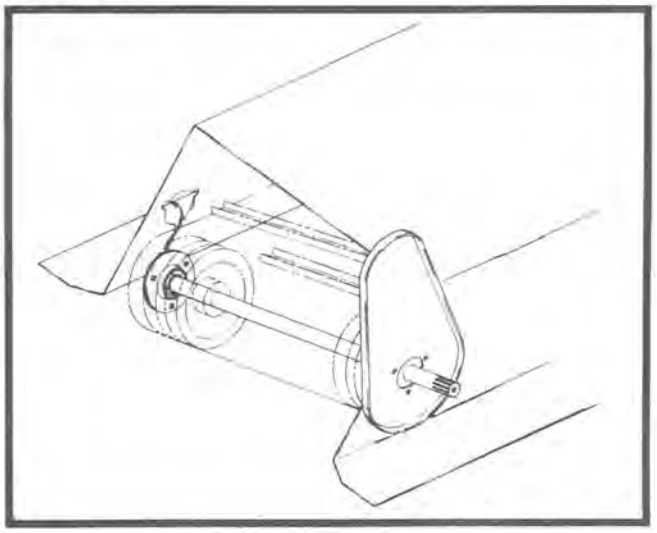
TRACK DRIVE INSTALLATION

Fig. V-104



3. Lift track drive shaft and track into position between front end assembly, then push splined end of track drive shaft through hole in chaincase backing plate and front end. Continue to push through hole until opposite end of shaft can be pushed through hole in recoil side of front end. Allow track drive shaft to hang loosely in position, Fig. V-105.

Fig. V-105



4. Slide lock collar (large I.D. toward splines) on shaft, Fig. V-106.

5. Slide gasket, retainer plate (flange toward chaincase backing plate), bearing w/"O" ring (race toward chaincase backing plate) and retainer plate (flange toward splined end of shaft) on the splined end of track drive shaft, Fig. V-106.

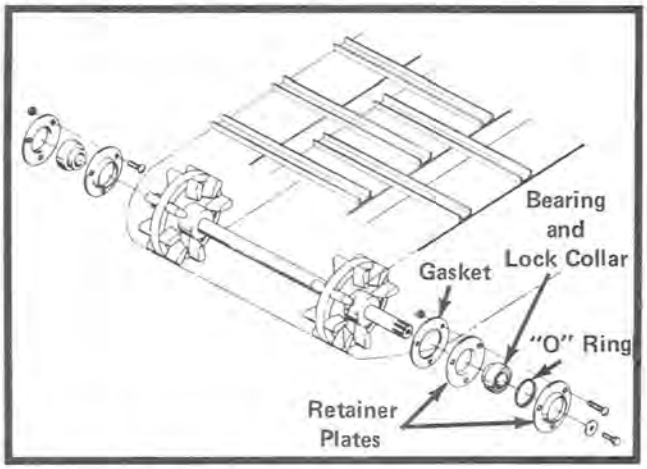
6. Align holes in retainer plates and gasket with holes in chaincase backing plate and front end assembly. Hold all components in place with 3 carriage bolts, flat washers and locknuts, Fig. V-106, using a 1/2-inch socket. Tighten locknuts to 20 ft. lbs. torque, using torque wrench and 1/2-inch socket.

Note: Locknuts and flat washers are to be positioned on inside tunnel, not against chaincase backing plate.

7. Align holes in retainer plates with holes in tunnel and front end assembly on recoil side. Hold all components in place with 3 carriage bolts and locknuts, using a 1/2-inch socket. If snowmobile is equipped with an electric starter, the green cable is to be grounded on one of the carriage bolts. Tighten locknuts to 20 ft. lbs. torque, using a torque wrench and 1/2-inch socket.

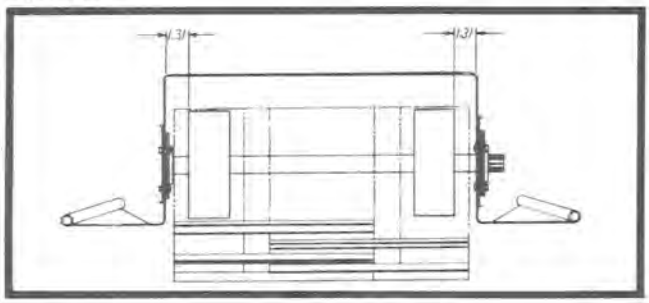
Note: Head of carriage bolt is to be positioned on inside of tunnel.

Fig. V-106



8. Line up track drive shaft sprockets so that sprocket edge is equidistant from inside edge of tunnel, using a steel tape measure, Fig. V-107.

Fig. V-107



TRACK DRIVE INSTALLATION

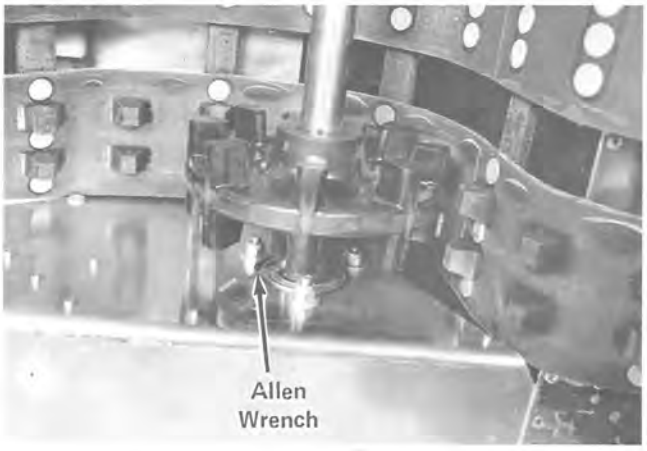
9. Tip snowmobile onto clutch side and use a piece of cardboard to protect against scratching.

10. When correct alignment is established, slide lock collar against bearing. Drive lock collar in direction of normal shaft rotation, using a 5/16 x 1/8-inch flat end punch and hammer, Fig. V-108. Lock collar and bearing are locked when bearing begins to turn with lock collar.

Fig. V-108

11. Tighten lock collar set screw, using a 1/8-inch Allen wrench, Fig. V-109.

Fig. V-109

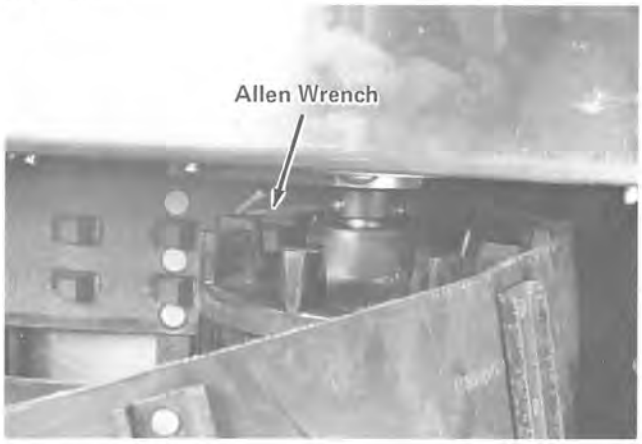


12. Move to opposite end of track drive shaft and slide lock collar against bearing. Drive lock collar in direction of normal shaft rotation, using a 5/16 x 1/8-inch flat end punch and hammer, Fig. V-110. Lock collar and bearing are locked when bearing begins to turn with lock collar.

Fig. V-110

13. Tighten lock collar set screw, using a 1/8-inch Allen wrench, Fig. V-111.

Fig. V-111



14. Install the skid frame (see Section VI, Skid Frame Installation, page VI-14).

Install Sprocket and Chaincase Cover

Equipment Necessary: 1/2-Inch Socket, Torque Wrench, Twelve Inch Straight Edge, 9/16-Inch Socket, Arctic Chain Lube (8 Ounces) and Funnel

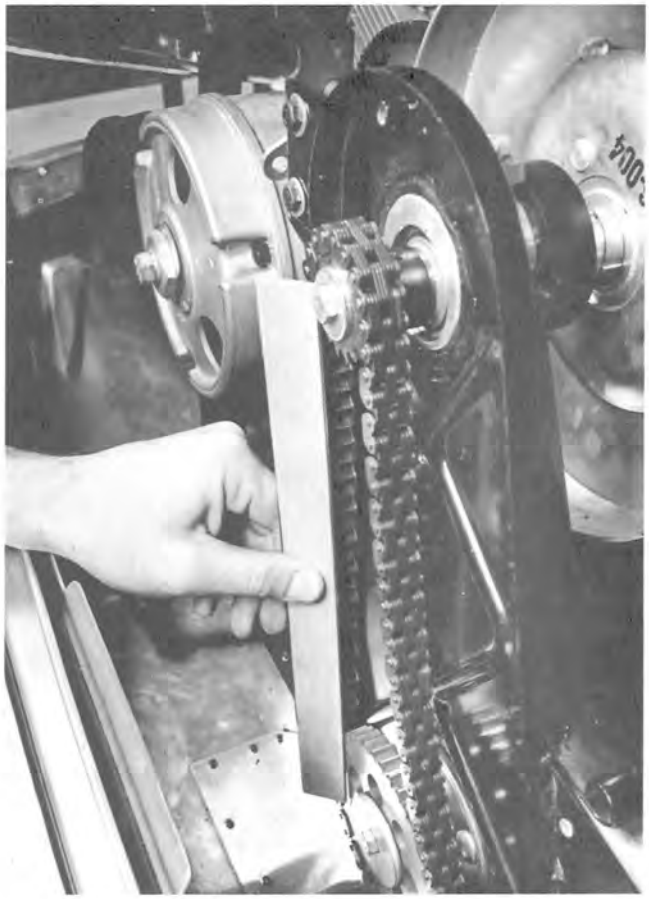
1. Assemble drive chain on top sprocket and large bottom sprocket, then start large sprocket on track drive shaft splines. Pull sprocket on track drive shaft with capscrew and flat washer, using a 1/2-inch socket. Tighten capscrew to 17 ft. lbs. torque, using a torque wrench and 1/2-inch socket.

Note: When capscrew is tightened, sprocket will draw onto track drive shaft splines properly.

TRACK DRIVE INSTALLATION

2. Check Sprocket Alignment – Lay a twelve inch straight edge on face of top and bottom sprocket, Fig. V-112. No visible gap is to be evident between straight edge contact surface and sprocket face. If alignment is correct, proceed to step 3. If there is a gap between straight edge contact surface and sprocket face, an adjustment is necessary (see Sprocket Alignment Adjustment, page V-43).

Fig. V-112

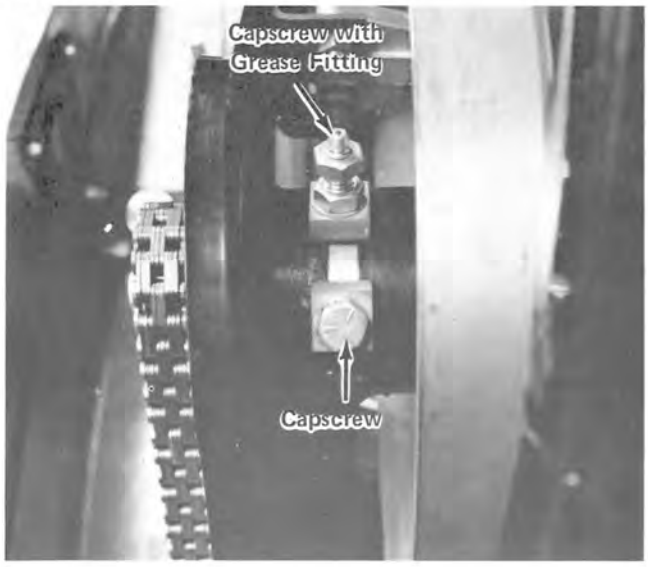


3. Push against capscrew w/grease fitting until chain tightens. Chain is to have approximately 1/4-inch deflection at midspan, when squeezed together using thumb and forefinger, Fig. V-113.

Fig. V-113

4. When proper adjustment is obtained, tighten capscrew with grease fitting and any remaining lock capscrew(s), Fig. V-114, using a 9/16-inch socket. Recheck chain tension and adjust if necessary.

Fig. V-114



TRACK DRIVE INSTALLATION

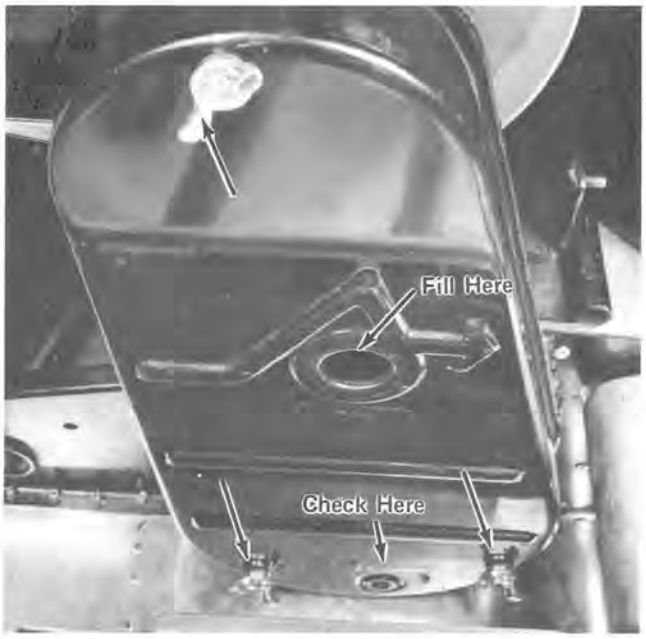
5. Remove rubber filler plug and check plug from chaincase cover. Install chaincase cover and gasket to backing plate with 3 thumb screws and washers, Fig. V-115.

6. Fill chaincase with 8 ounces of Arctic chain lube, Fig. V-115, using a funnel. Chain lube is to be at the point of overflowing in check plug hole, Fig. V-115. Install rubber filler plug and check plug.

CAUTION

Be sure chaincase cover and gasket are installed evenly and a good seal exists between chaincase cover and backing plate. If, after filling crankcase with chain lube and a leak develops due to an improper seal, mechanical damage will occur because of improper chain and sprocket lubrication.

Fig. V-115



TRACK SERVICING

General

The track is composed of three belts, held together by three-quarter-length cleats which are riveted to the track belts. Both outer belts have molded internal drive lugs on the inside surface. These drive lugs engage with the track drive shaft sprockets to provide efficient, smooth power transfer. The track not only drives the snowmobile but acts as a cushion to absorb minor impacts, and working in conjunction with the brake, exerts a drag on the snow surface to aid in slowing down or stopping.

Note: When the molded internal drive lugs become worn on one side because of hourly usage, the track can be reversed to get maximum track life.

TRACK REMOVAL

Remove Track

Equipment Necessary: Cardboard, 1/8-Inch Allen Wrench, 5/16 x 1/8-Inch Flat End Punch, Hammer, Hoist, 1/2-Inch Socket, Screwdriver Having 1/4-Inch Blade and 3/4-Inch Open End Wrench

1. Remove chaincase cover and bottom sprocket (see Remove Chaincase Cover and Bottom Sprocket, page V-46).

2. Remove skid frame and track drive shaft (see Remove Skid Frame and Track Drive Shaft, page V-47).

Note: At this time the track drive shaft and track are removed from between the tunnel.

TRACK INSTALLATION

Install Track

Equipment Necessary: 1/2-Inch Socket, Torque Wrench, 5/16 x 1/8-Inch Flat End Punch, Hammer, 1/8-Inch Allen Wrench and 3/4-Inch Open End Wrench

1. Install track drive shaft and skid frame (see Install Track Drive Shaft and Skid Frame, page V-49).

2. Install sprocket and chaincase cover (see Install Sprocket and Chaincase Cover, page V-51).

NOTES

NOTES

TABLE OF CONTENTS

TROUBLE SHOOTING

Problem	Condition	Remedy
Edge of track is frayed.	1. Track is misaligned. 2. Outer belts worn out because of hourly usage. 3. Track strikes rivets in tunnel, even though alignment is correct.	1. Set track tension and alignment. 2. Install new outer belt(s). 3. Remove affected rivets that are too long and install correct type rivet.
Track is grooved (worn) or burnt on inside surface of outer belt(s).	1. Track tension is too tight. 2. Rear idler wheels do not turn or otherwise damaged.	1. Set track tension and alignment. 2. Install new rear idler wheels and set track tension and alignment.
Track is grooved or gouged on center belt.	1. Center brace(s) of skid frame hanging down and contacting inside surface of center belt.	1. Repair skid frame center brace and install new center belt if damage is excessive.
Internal drive lugs worn on inside surface.	1. Track is misaligned.	1. Set track tension and alignment. If lugs are worn excessively, install new outer belt(s).
Track ratchets or hits on body tunnel (top).	1. Track tension is too loose. 2. Track drive sprockets not timed in relation to drive lugs. 3. Track drive sprockets turn on shaft. 4. Internal drive lugs worn because of hourly usage.	1. Set track tension and alignment. 2. Install new track drive and replace outer belt(s) if drive lugs are worn excessively. 3. Install new track drive and replace outer belt(s) if drive lugs are worn excessively. 4. Install new outer belt(s).
Accelerated Hi-Fax Wear	1. Slide rail(s) is bent. 2. Badly worn cleat on surface that contacts hi-fax. 3. Track is misaligned.	1. Straighten slide rail(s) or install new skid frame. 2. Install new hi-fax and/or cleats. 3. Set track tension and alignment.

SKID FRAME REMOVAL

General

The specially-designed slide rail and torsion spring suspension system allows the Arctic Cat Snowmobile to maneuver and negotiate in most snow conditions. The slide rail operating principle is to create maximum track pressure on the snow surface. Proper adjustment, lubrication and overhaul will ensure proper operation, thereby contributing to total snowmobile performance.

Skid Frame

Equipment Necessary: 9/16-Inch Socket, 3-Inch Extension and Quik Jack (Hoist)

1. Position the snowmobile in its normal upright position.

2. Remove 4 capscrews and lockwashers, Fig. VI-1, that secure front and rear skid frame mounting axles to the body tunnel, using a 9/16-inch socket and 3-inch extension.

Fig. VI-1

3. Raise rear of snowmobile off the floor approximately 2 feet, using a Quik Jack or similar type hoist.

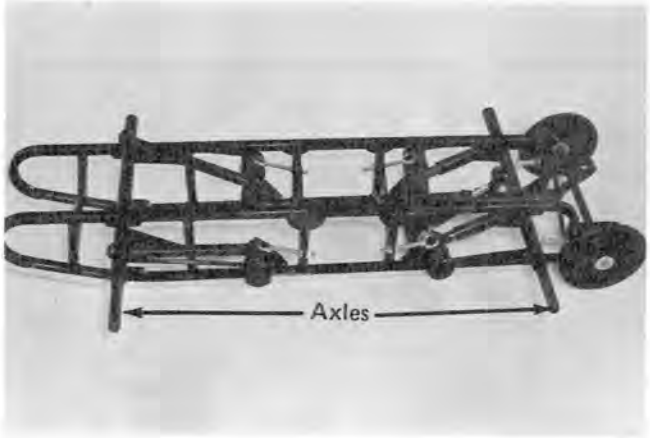
Note: As rear is being raised, track and skid frame is to remain on floor.

4. Grasp skid frame and pull from within track sections, Fig. VI-2.

Fig. VI-2

5. Slide the axles out of front and rear arms, Fig. VI-3.

Fig. VI-3



SKID FRAME DISASSEMBLY

Remove Hi-Fax Slides

Equipment Necessary: 1/2-Inch Chisel, Hammer and 5/16 x 1/8-Inch Punch

Note: Examine hi-fax slides for wear, cracks and deterioration. If conditions dictate, replace the hi-fax slides. A good indication of excessive hi-fax wear is when rivet heads are flush with top surface of hi-fax slide. If hi-fax slides will not be serviced, remove the front arm (see Remove Front Arm, page VI-4).

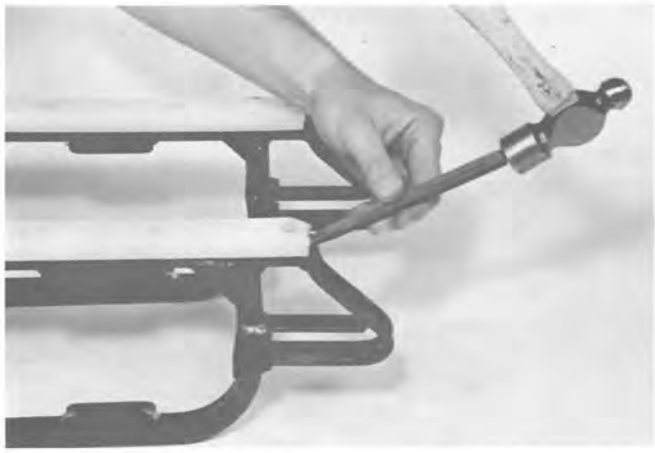
1. Set skid frame on a clean working surface; hi-fax slides to face upward.

2. Remove rivets that secure hi-fax slides to skid frame rail, using an air tool with 1/2-inch chisel. As an alternative, use hammer and a 1/2-inch chisel, Fig. VI-4.

Note: When removing rivets that secure hi-fax slides to skid frame, start at back of skid frame and work forward.

SKID FRAME DISASSEMBLY

Fig. VI-4



3. Remove all rivet ends from skid frame, using a 5/16 x 1/8-inch punch. DO NOT ELONGATE HOLES IN SKID FRAME.

Remove Front Arm

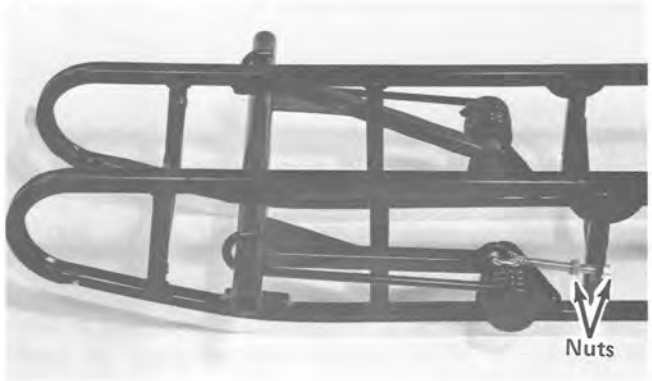
Equipment Necessary: 9/16-Inch Deep-Well Socket and 9/16-Inch Combination Wrench

1. Set the skid frame on a clean working surface; hi-fax side to contact working surface.

> **CAUTION**
>
> **Do not accidentally damage hi-fax slides when servicing skid frame. Accidental damage that is undetected will cause accelerated hi-fax wear and possible track deterioration.**

2. Loosen and remove nuts, Fig. VI-5, that secure eye bolt to skid frame mounting flange, using a 9/16-inch deep-well socket and open end wrench. Repeat this step on opposite side eye bolt.

Fig. VI-5

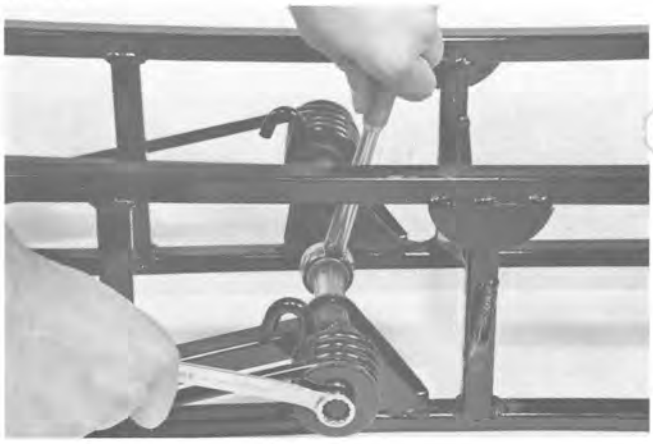


3. Remove eye bolts from front springs, Fig. VI-6.

Fig. VI-6

4. Remove capscrew, large flat washer and locknut that secures front arm and springs to skid frame pivot mount, using a 9/16-inch socket and wrench, Fig. VI-7. Repeat this step on opposite side.

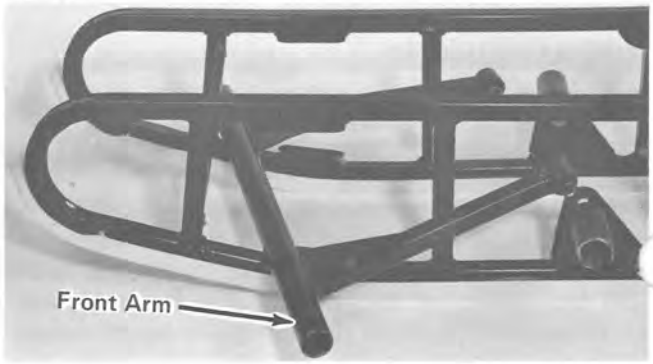
Fig. VI-7



5. Slide springs off front arm and skid frame pivot mounts.

6. Rotate front arm to the side and remove from within inside of skid frame, Fig. VI-8.

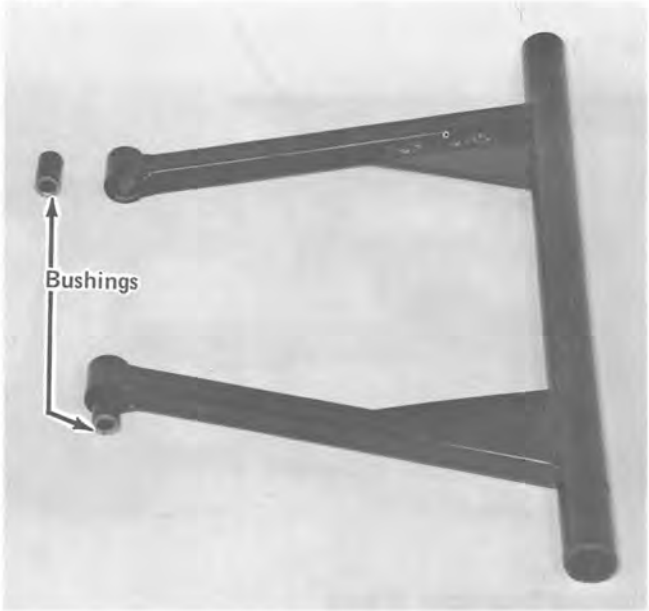
Fig. VI-8



SKID FRAME DISASSEMBLY

Note: Account for 2 bushings located in front arm pivot points, Fig. VI-9.

Fig. VI-9

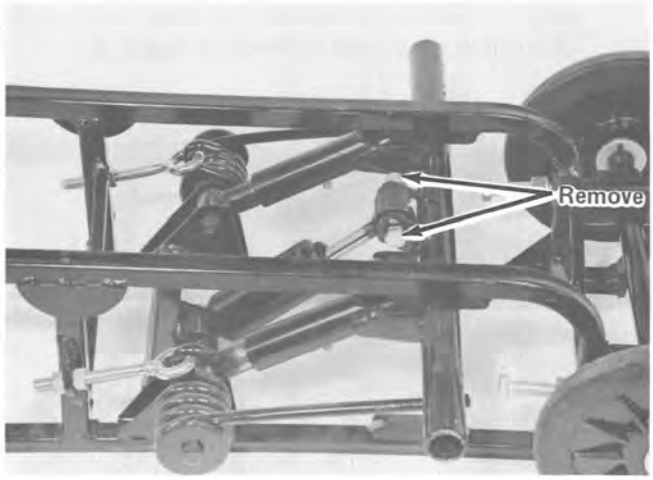


Remove Rear Arm

Equipment Necessary: 5/8-Inch Short Socket, 5/8-Inch Wrench, 9/16-Inch Deep-Well Socket and 9/16-Inch Combination Wrench

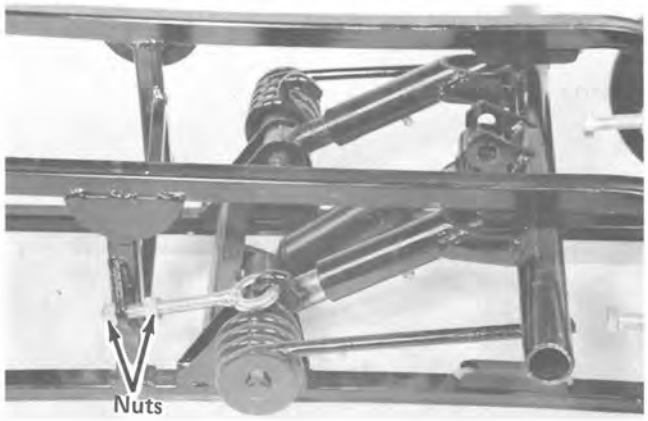
1. Remove locknut and capscrew, Fig. VI-9, that secures shock absorber to rear arm, using a 5/8-inch short socket and wrench.

Fig. VI-9



2. Loosen and remove nuts, Fig. VI-10, that secure eye bolt to eye bolt mounting flange, using a 9/16-inch deep-well socket and wrench. Repeat this step on opposite side eye bolt.

Fig. VI-10



3. Remove eye bolts from rear springs, Fig. VI-11.

Fig. VI-11

4. Remove capscrew, large flat washer and locknut that secures rear arm and springs to rear arm mount, using a 9/16-inch socket and wrench, Fig. VI-12.

Fig. VI-12

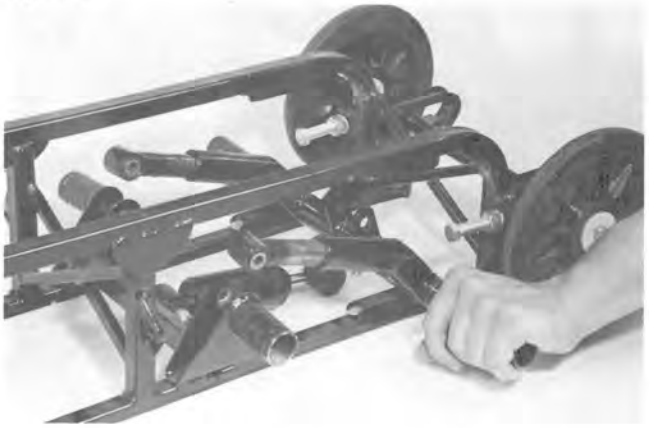
SKID FRAME DISASSEMBLY

5. Pull rear arm backward until spring ends slide out of mounting holes, Fig. VI-13; then slide springs off spring pivot mounts.

Fig. VI-13

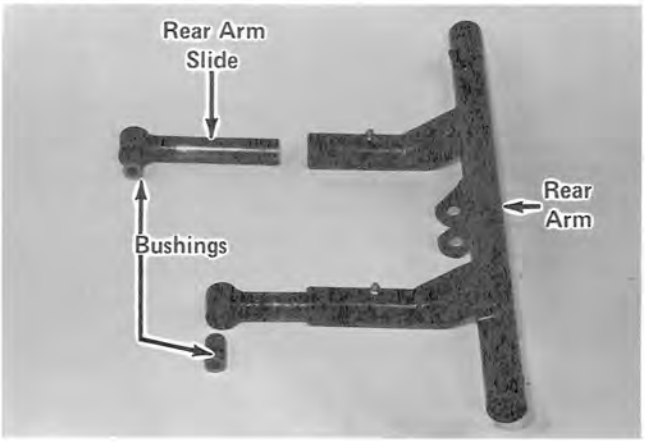
6. Slide rear arm from within inside of skid frame, Fig. VI-14.

Fig. VI-14



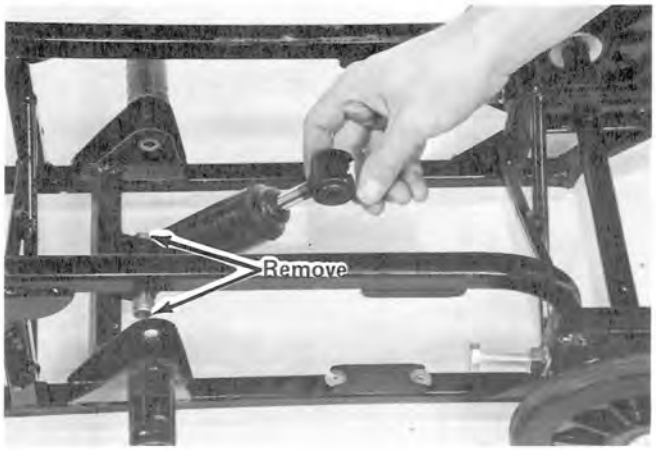
Note: Account for 2 bushings located in rear arm pivot points and separate rear arm slides from rear arm, Fig. VI-15.

Fig. VI-15



7. Remove locknut and capscrew, Fig. VI-16, that secures shock absorber to skid frame cross member mount, using a 5/8-inch short socket and wrench.

Fig. VI-16



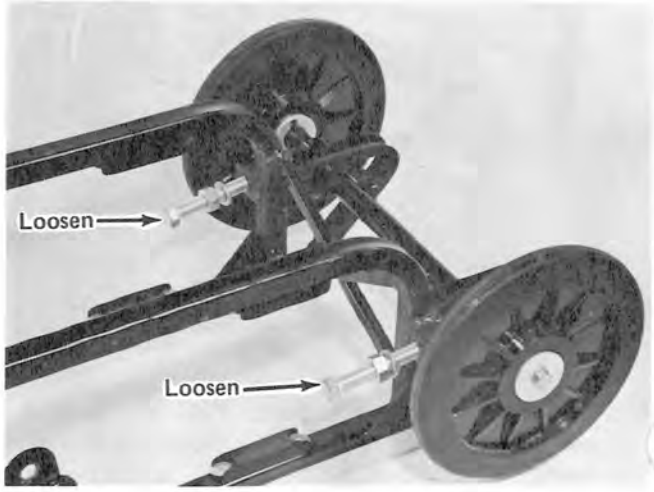
Remove Rear Idler Wheels

Equipment Necessary: 5/8-Inch Socket, 11/16-Inch Open End Wrench, 1/2-Inch Socket, Hammer, 5/16 x 1/8-Inch Punch, 3/16-Inch Allen Wrench and 1/2-Inch Nonferous Dowel

Note: If rear idler wheel is damaged and must be replaced, install 2 new rear idler wheels. A worn and a new rear idler wheel may cause track drive problems.

1. Loosen idler wheel adjusting bolts, Fig. VI-17, using a 5/8-inch socket on the bolt and 11/16-inch open end wrench on the nut.

Fig. VI-17



SKID FRAME DISASSEMBLY

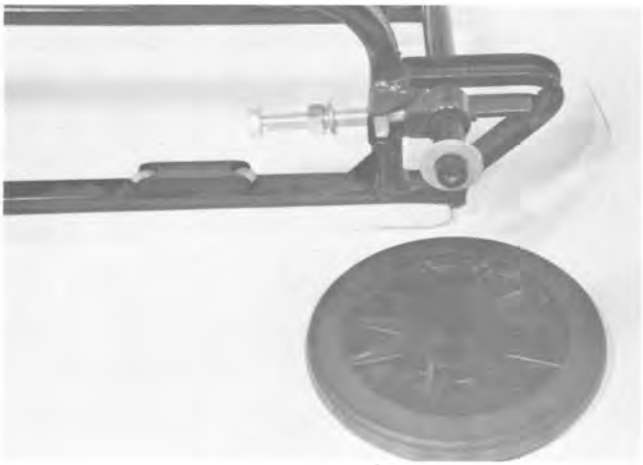
Note: If skid frame is damaged and replacement is necessary, remove the 2 idler wheel adjusting bolts, hex nuts, lockwashers and square nuts.

2. Remove capscrew and flat washer, Fig. VI-18, that secures idler wheel to idler wheel axle, using a 1/2-inch socket. Repeat this step on opposite side.

Fig. VI-18

3. Slide rear idler wheel and large flat washer off axle, Fig. VI-19.

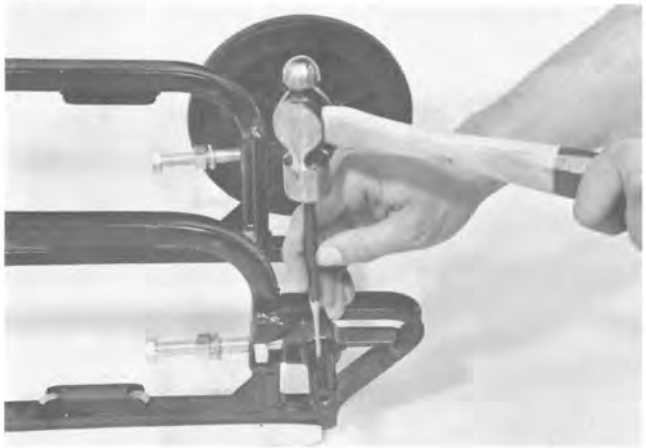
Fig. VI-19



Note: It may be necessary to tap lightly near center hub before rear idler wheel will slide off axle.

4. Remove drive pin from axle, using a hammer and 5/16 x 1/8-inch punch, Fig. VI-20.

Fig. VI-20

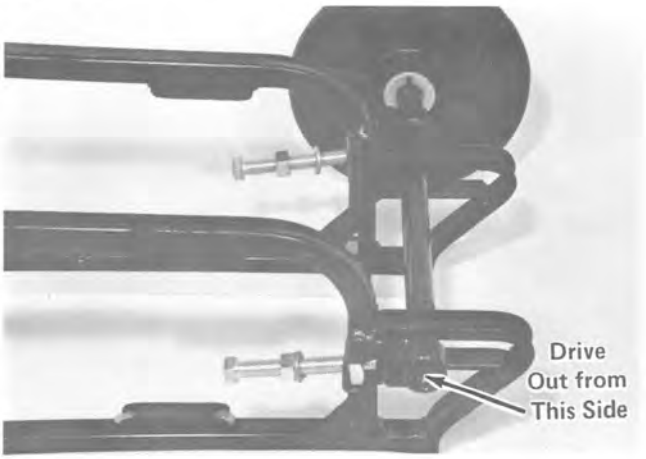


5. Remove set screw from spacer, using a 3/16-inch Allen wrench, Fig. VI-21. Remove set screw from opposite side spacer.

Fig. VI-21

6. Drive out rear axle, using a 1/2-inch nonferous dowel and hammer, Fig. VI-22.

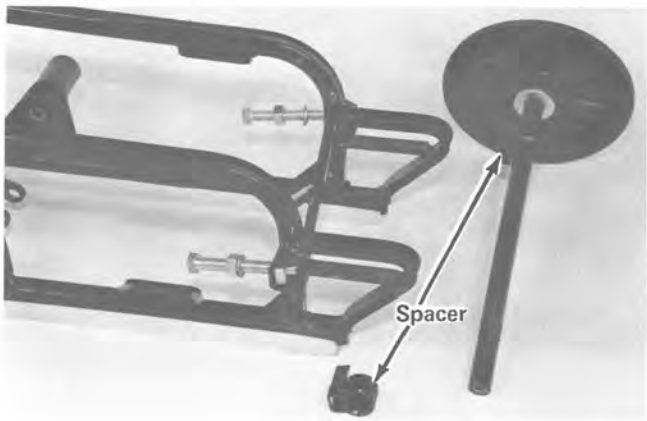
Fig. VI-22



SKID FRAME DISASSEMBLY

7. When axle is removed from within the skid frame, account for the 2 spacers, Fig. VI-23.

Fig. VI-23



8. Remove rear idler wheel and related components from opposite end of axle.

CLEANING

Cleaning

Equipment Necessary: Soap, Water, Clean Rag, Degreaser Solution, Compressed Air and Kerosene

1. Wash entire skid frame with soap and water; dry thoroughly with clean rag.

2. Touch up all rusted and chipped paint surfaces; sand affected skid frame area lightly before painting.

3. Remove bushings from front arm; clean arm and bushings with degreaser. Dry components thoroughly with compressed air.

4. Remove bushings from rear arm and separate rear arm from its sliding ends. Clean arm, sliding ends and bushings with degreaser. Also check rear arm spring bushings for wear and deterioration. Dry components thoroughly with compressed air.

5. Wash the rear idler wheels with soap and water; dry thoroughly with clean rag.

6. Wash remaining components in kerosene; dry thoroughly with compressed air.

INSPECTING COMPONENTS

Inspecting

Equipment Necessary: No Special Tools Required

1. Inspect all threaded components for stripped threads. Replace component(s) if damaged.

2. Inspect all bushings and corresponding pivot areas for damage, cracks and excessive wear. Replace component(s) if conditions dictate.

3. Inspect rear idler wheels for cracks, center hub wear and rubber deterioration. Replace both rear idler wheels if damage or wear is evident. Bearing must rotate freely.

Note: Rear idler wheels are to be replaced as a set, not as individual components.

4. Make sure that axles are not bent. Replace axle(s) if conditions dictate.

5. Inspect all springs for abnormal bends and cracks. Replace spring(s) if conditions dictate.

6. Inspect the eye bolts for separation of eye and abnormal bend. Replace component(s) if conditions dictate.

7. Inspect front and rear arm pivot points on skid frame. Repair any damage that exists.

8. Inspect eye bolt mounting flanges at center of skid frame. Repair any damage that exists.

9. Inspect the entire skid frame. No unusual bend is to be evident in the skid frame. Replace skid frame if conditions dictate.

SKID FRAME ASSEMBLY

Install Hi-Fax Slides

Equipment Necessary: Pop Rivets, Rivet Tool and Propane Torch

Note: Make sure skid frame and related components are clean (see Cleaning, page VI-9) and have been inspected for wear, defects and damage (see Inspecting, page VI-9).

1. Before attempting to install hi-fax slides on skid frame rail, make sure hi-fax is at room temperature (+70°F.).

2. Install a new hi-fax slide in first hole at curved end of skid frame rail, using a pop rivet and rivet tool.

3. With front of hi-fax slide secured to curved end of skid frame, carefully heat the hi-fax, using a propane torch. Immediately bend hi-fax slide into position on skid frame rail and continue to secure hi-fax slide, using rivets and rivet tool.

Note: Hi-fax slide is to be heated so as to conform with curved end of skid frame rail. If hi-fax slide is not heated, breakage may occur when riveting to curved section of skid frame rail.

4. Continue to secure hi-fax slide to remainder of skid frame rail.

5. Repeat steps 2 - 4 on opposite side skid frame rail.

Install Rear Idler Wheels

Equipment Necessary: Tape Measure, 3/16-Inch Allen Wrench, Hammer, 1/2-Inch Socket and Torque Wrench

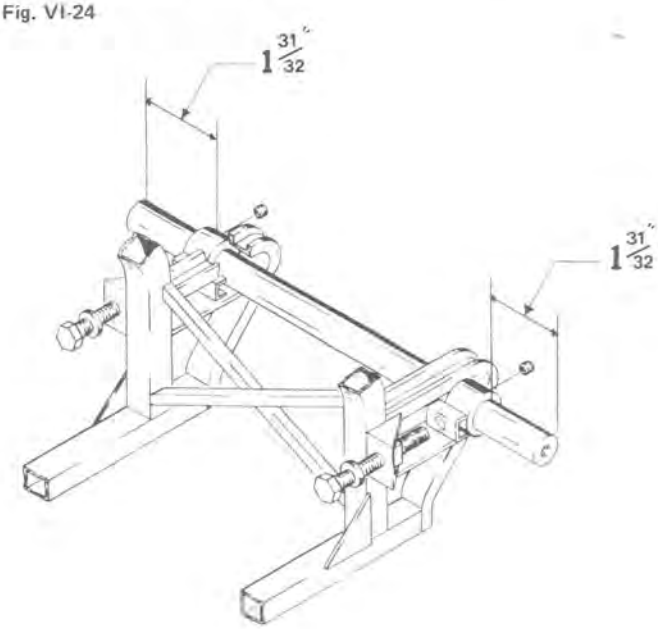
Note: Make sure skid frame and related components are clean (see Cleaning, page VI-9) and have been inspected for wear, defects and damage (see Inspecting, page VI-9).

1. If removed during disassembly, install idler wheel adjusting bolts, hex nuts, lockwashers and square nuts to the skid frame mounting flange.

Note: Adjusting bolts are to extend through square nuts only 1/4-inch.

2. Slide idler wheel axle between skid frame axle slide, Fig. VI-24.

Fig. VI-24

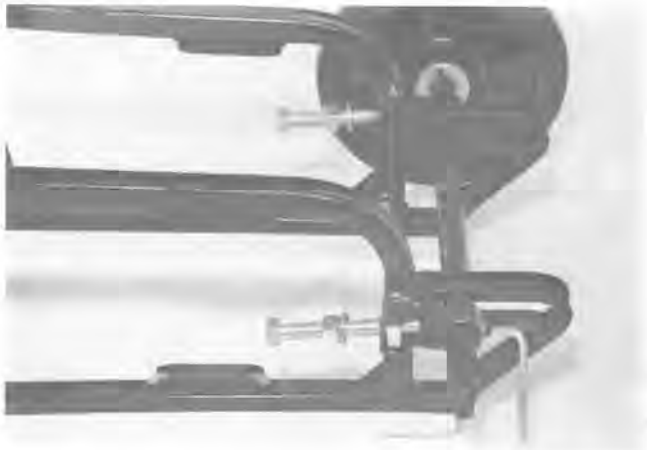


3. Slide spacers onto idler wheel axle, making sure that spacer extension is positioned to the inside (between skid frame axle slide).

4. Seat the spacers against the axle slides. Measure distance from outside edge of spacers to end of idler wheel axle, using a tape measure, Fig. VI-24. Correct measurement is when spacers are equidistant from axle ends.

5. When correct measurement is obtained, tighten both spacer set screws, using a 3/16-inch Allen wrench, Fig. VI-25. Tighten set screws securely.

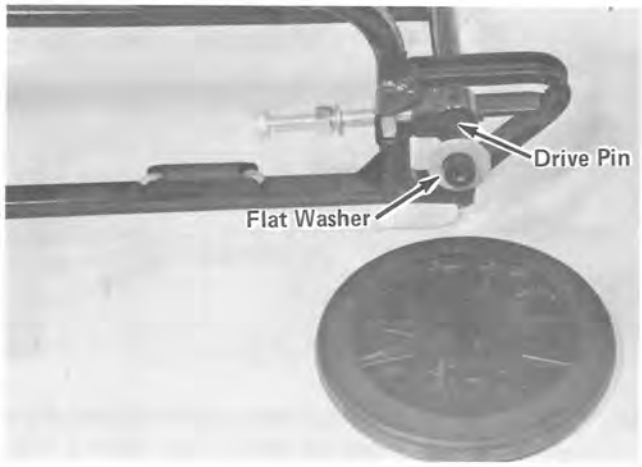
Fig. VI-25



SKID FRAME ASSEMBLY

6. Install drive pin, Fig. VI-26, in each end of idler wheel axle, using a hammer. Drive pin is to extend equally on both sides of axle.

Fig. VI-26



7. Place a large flat washer on the idler wheel axle, Fig. VI-26.

8. Hold rear idler wheel in position and secure to axle with capscrew and flat washer, Fig. VI-27, using a 1/2-inch socket. Tighten capscrew to 14 - 19 ft. lbs. torque, using a torque wrench.

Fig. VI-27

Note: Largest diameter recess at center of idler wheel is to fit against the large flat washer that contacts the drive pin, Fig. VI-26.

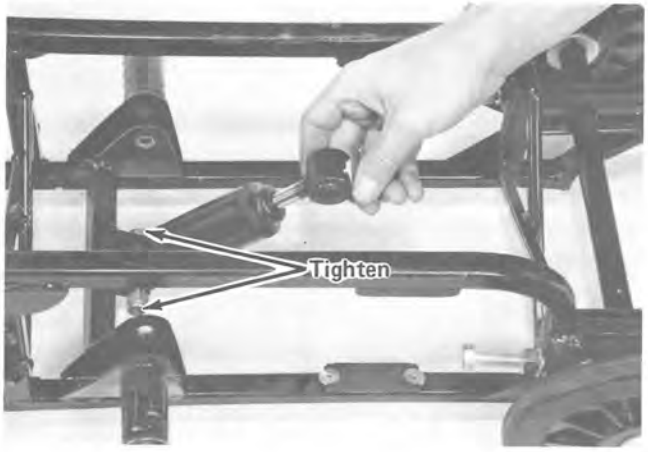
9. Repeat steps 7 and 8 on opposite side of idler wheel axle.

Install Rear Arm

Equipment Necessary: 5/8-Inch Short Socket, 5/8-Inch Wrench, 9/16-Inch Deep-Well Socket, 9/16-Inch Open End Wrench, Torque Wrench, Grease Gun and Low-Temperature Grease (Texaco 2346EP or Equivalent)

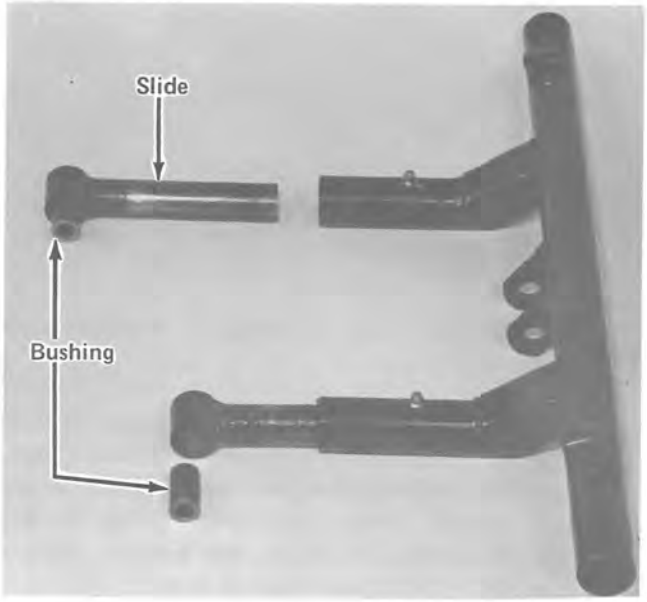
1. Install stationary end of shock absorber between the skid frame cross member mount and secure in place with capscrew and locknut, Fig. VI-28, using a 5/8-inch short socket and wrench. Tighten locknut to 45 - 55 ft. lbs. torque, using a 5/8-inch short socket and torque wrench.

Fig. VI-28



2. Install rear arm slides into rear arm and insert bushing into both rear arm slide pivot points, Fig. VI-29.

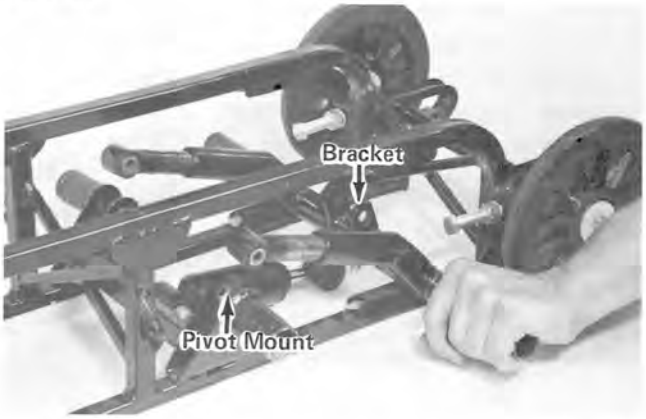
Fig. VI-29



SKID FRAME ASSEMBLY

3. Position rear arm assembly on inside of skid frame and allow rear arm pivot points to slide between rear arm pivot mounts on the skid frame, Fig. VI-30.

Fig. VI-30



Note: Ensure rear arm shock mounting bracket faces upward, Fig. VI-30. Upward position of shock mounting bracket is necessary for correct shock absorber installation.

4. Slide rear arm springs onto the spring pivot mounts, Fig. VI-31. Pull rear arm backward until spring ends can be slid into the rear arm mounting holes, Fig. VI-31. Push rear arm forward.

Fig. VI-31

Note: Hooked end of spring for eye bolt is to face inward.

5. Slide large flat washer onto capscrew. Secure the spring and rear arm to the skid frame with capscrew, large flat washer and locknut, using a 9/16-inch socket and wrench, Fig. VI-32. Tighten locknut to 35 ft. lbs. torque, using a 9/16-inch socket and torque wrench. Perform this step on opposite side of skid frame.

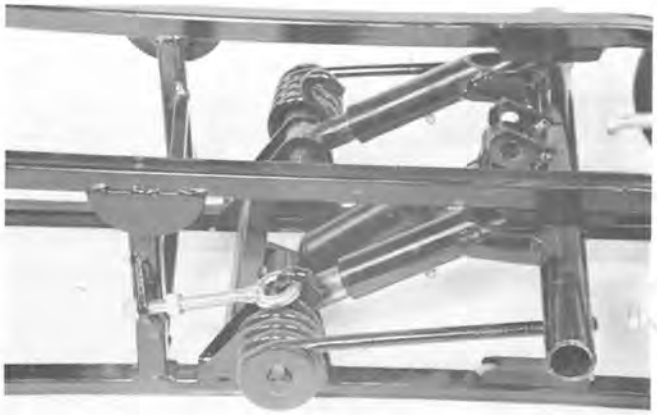
Fig. VI-32

6. Thread a nut halfway onto eye bolt and slide eye bolt onto hooked end of rear spring, Fig. VI-33. Perform this step on remaining eye bolt.

Fig. VI-33

7. Slide both eye bolt ends through the respective eye bolt mounting flanges on the skid frame. Hold components in place and install nuts on both eye bolts, Fig. VI-34.

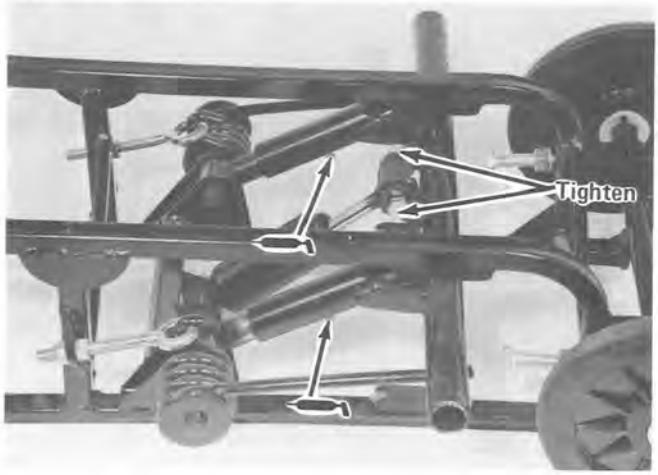
Fig. VI-34



SKID FRAME ASSEMBLY

8. Secure shock absorber to rear arm with a capscrew and locknut, Fig. VI-35, using a 5/8-inch short socket and wrench. Tighten locknut to 45 - 55 ft. lbs. torque, using a 5/8-inch short socket and torque wrench.

Fig. VI-35



9. Tighten eye bolt adjusting nut so approximately 5/8-inch of eye bolt extends through the nut, Fig. VI-35, using a 9/16-inch deep-well socket. Lock adjustment in place by "bottoming" jam nut against eye bolt mounting flange, Fig. VI-35, using a 9/16-inch open end wrench. Perform this step on opposite side eye bolt.

Note: Make sure both eye bolts are adjusted equally.

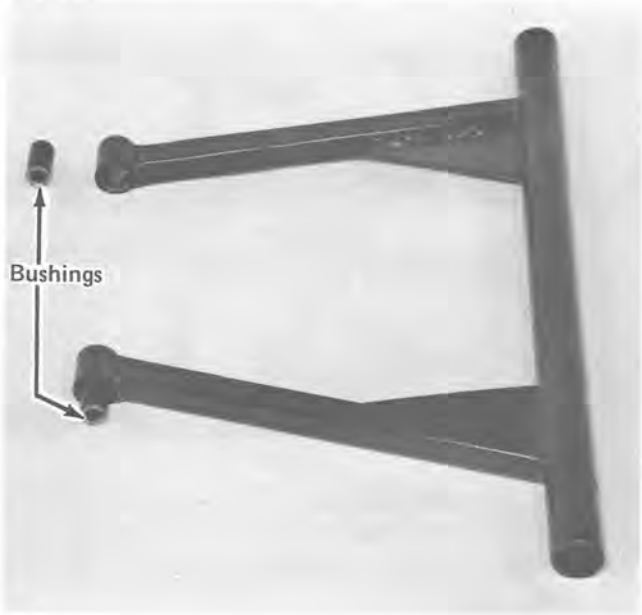
10. Lubricate the rear arms with low-temperature grease (Texaco 2346EP or equivalent), Fig. VI-35, using a hand grease gun. Two or three pumps on the grease gun handle will provide enough grease for proper lubrication.

Install Front Arm

Equipment Necessary: 9/16-Inch Deep-Well Socket, 9/16-Inch Open End Wrench and Torque Wrench

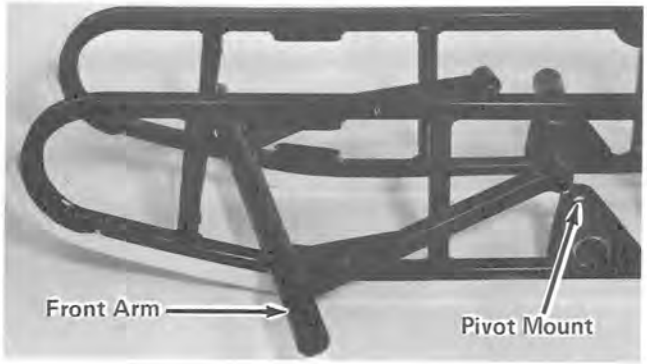
1. Insert bushing into front arm pivot points, Fig. VI-36.

Fig. VI-36



2. Position front arm on inside of skid frame, Fig. VI-37, and allow front arm pivot points to slide between front arm pivot mounts on the skid frame.

Fig. VI-37



3. Slide front arm springs onto front arms and spring pivot mount on the skid frame.

Note: Hooked end of spring for eye bolt is to face inward.

4. Slide large flat washer onto capscrew. Secure spring and front arm to the skid frame with capscrew, large flat washer and locknut, using a 9/16-inch socket and wrench, Fig. VI-38. Tighten locknut to 45 - 55 ft. lbs. torque, using a 9/16-inch socket and torque wrench. Perform this step on opposite side of skid frame.

SKID FRAME ASSEMBLY

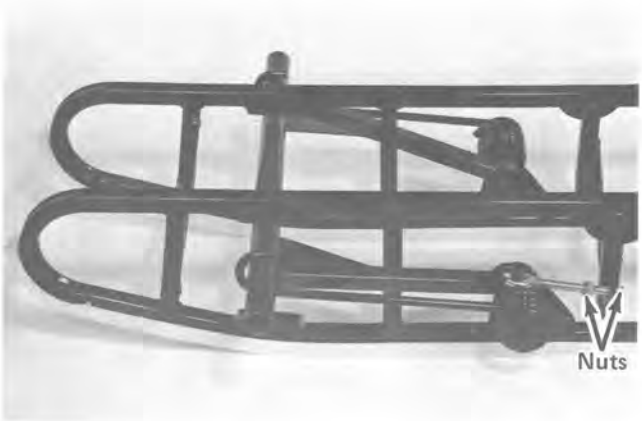
Fig. VI-38

5. Thread a nut halfway onto eye bolt and slide eye bolt onto hooked end of front spring, Fig. VI-39. Perform this step on remaining eye bolt.

Fig. VI-39

6. Slide both eye bolt ends through the respective eye bolt mounting flanges on the skid frame. Hold components in place and install nuts on both eye bolts, Fig. VI-40.

Fig. VI-40



7. Tighten eye bolt adjusting nut so that approximately 1/2-inch of eye bolt extends through the nut, using a 9/16-inch deep-well socket. Lock adjustment in place by "bottoming" jam nut against eye bolt mounting flange, using a 9/16-inch open end wrench. Perform this step on opposite side eye bolt.

Note: Make sure both eye bolts are adjusted equally.

SKID FRAME INSTALLATION

Install Skid Frame

Equipment Necessary: Low-Temperature Grease (Texaco 2346EP or Equivalent), Cardboard, 9/16-Inch Socket, 3-Inch Extension and Torque Wrench

1. Spread a light film of low-temperature grease (Texaco 2346EP or equivalent) on the front and rear skid frame mounting axles.

2. Tip snowmobile onto its side and use a piece of cardboard to protect against scratching.

3. Pull track away from body tunnel and install skid frame within the confines of the track. Slide axles through front and rear arms of the skid frame.

4. Move front arm of skid frame into position with front mounting hole in the body tunnel. Slide lockwasher onto capscrew and secure front arm to tunnel, using a 9/16-inch socket. DO NOT TIGHTEN CAPSCREW – THREAD IN ONLY HALFWAY, Fig. VI-41.

Fig. VI-41

SKID FRAME INSTALLATION

Note: To aid in centering front arm of skid frame with holes in tunnel, position skid frame and track at a 45° angle to bottom of tunnel.

5. Push skid frame and track up into the tunnel. Tip snowmobile onto its opposite side and use a piece of cardboard to protect against scratching.

6. Secure front arm to tunnel following directions given in step 4.

7. Move rear arm of skid frame into position with rear mounting holes in body tunnel. Slide lockwasher onto capscrew and secure rear arm to tunnel, using a 9/16-inch socket and 3-inch extension. DO NOT TIGHTEN CAPSCREW – THREAD IN ONLY HALFWAY, Fig. VI-42.

Fig. VI-42

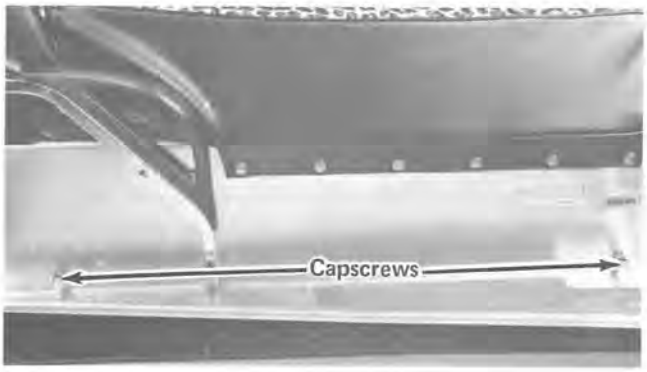
Note: Rear arm of skid frame may not line up with mounting holes in tunnel. To obtain proper alignment of rear arm and mounting holes, drive rear arm in proper direction until alignment is obtained; a rubber hammer is to be used.

8. Tip snowmobile on opposite side and use a piece of cardboard to protect against scratching.

9. Slide lockwasher onto capscrew and secure rear arm to tunnel, using a 9/16-inch socket and 3-inch extension. Tip snowmobile upright.

10. Tighten front and rear arm mounting capscrews, Fig. VI-43, to 35 ft. lbs. torque, using a torque wrench.

Fig. VI-43



ADJUSTMENTS

Track Tension

Equipment Necessary: Quik Jack, 11/16-Inch Open End Wrench, 5/8-Inch Socket and Tape Measure

WARNING

Shut engine off and make sure ignition switch is in the OFF position. Personal injury may result if this warning is not complied with.

1. Make sure both rear idler wheels are positioned between the internal drive lugs.

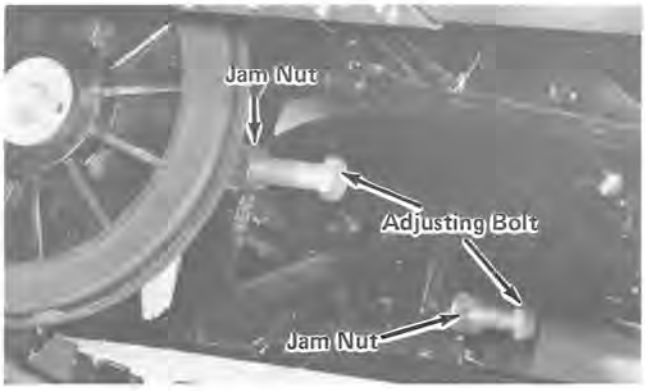
2. Using a Quik Jack, raise rear of snowmobile until track is completely off the shop floor.

3. Press down on track at midspan and measure distance between bottom of hi-fax slides and inside surface of track, using a tape measure. Desired distance is to be 1-1/4 - 1-1/2 inches.

4. If measurement is not 1-1/4 - 1-1/2 inches, loosen idler wheel adjusting bolt jam nut, Fig. VI-44, using an 11/16-inch open end wrench. Back jam nut off until it is approximately 1/2-inch away from the adjusting bolt head. Perform this step on opposite side idler wheel adjusting bolt jam nut.

5. If measurement obtained in step 3 is more than 1-1/2 inches, tighten adjusting bolts, Fig. VI-44. If measurement obtained in step 3 is less than 1-1/4 inches, loosen adjusting bolts, Fig. VI-44. When specified measurement (1-1/4 - 1-1/2 inches) is obtained, lock adjustment in place by bottoming jam nuts against skid frame, using an 11/16-inch open end wrench.

Fig. VI-44



Note: An excellent check at this time would be to slide your hand along the inside of the tunnel and vigorously push underside of track up and down. Track must not hit top of tunnel or slap on the skid frame.

6. After correct track tension is obtained, check track alignment (see Track Alignment, page VI-16).

Note: Track tension and track alignment are both interrelated; always perform both adjustments, even if only one particular adjustment seems necessary. Always establish correct track tension before checking and/or adjusting track alignment.

Track Alignment

Equipment Necessary: Quik Jack, 5/8-Inch Socket and 11/16-Inch Open End Wrench

Proper track alignment is obtained when rear idler wheels are equidistant from inside edges of internal drive lugs.

WARNING

Shut engine off and make sure ignition switch is in the OFF position. DO NOT allow anyone to stand in front or to the rear of the snowmobile when checking track alignment. Personal injury or bystander injury may result if this warning is not complied with.

1. Make sure both rear idler wheels are positioned between the internal drive lugs.

2. Using a Quik Jack, raise rear of snowmobile until track is completely off the shop floor and free to rotate. Skis are to be placed against a wall or another stationary object.

3. Start engine, accelerate slightly to turn the track several revolutions and SHUT ENGINE OFF (ignition switch in OFF position). Note to which side the track has run.

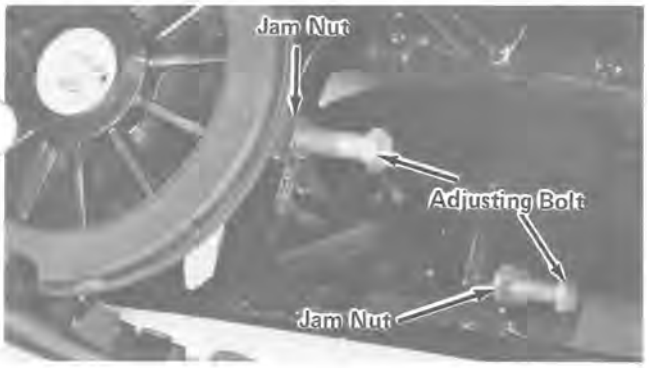
Note: Allow track to coast to a stop when checking track alignment. DO NOT apply brake as this may produce an inaccurate alignment condition.

4. If track ran to the left or right and is rubbing against inside surface of internal drive lugs, loosen idler wheel adjusting bolt jam nut, Fig. VI-45, using an 11/16-inch open end wrench. Back jam nut off until it is approximately 1/2-inch away from the adjusting bolt head. Perform this step on opposite side idler wheel adjusting bolt jam nut.

5. Rotate adjusting bolts, Fig. VI-45, clockwise or counterclockwise until proper alignment is established, using a 5/8-inch socket. Bottom jam nuts against skid frame, using an 11/16-inch open end wrench.

Note: After the jam nuts are bottomed against the skid frame, an equal length of bolt is to extend back from the jam nut to the bolt head. This relationship in itself will ensure proper track alignment.

Fig. VI-45



6. When adjustment is completed, lower rear of snowmobile, start engine and test run the track under actual operating conditions.

7. After test run is completed, recheck track alignment and adjust if necessary.

Note: Make sure correct track tension is maintained when alignment is adjusted.

Suspension Adjustment

Equipment Necessary: 9/16-Inch Open End Wrench

The suspension is to be set up for either the operator only or the operator and passenger combined. Total operator and passenger weight have a direct influence on the rear adjustment. The front adjustment is to be made for snow conditions.

Hard Packed Snow — Front spring, Fig. VI-46, adjustment is to be increased (tighten adjusting nuts) to allow track to remain on top of the snow.

Trail Riding — If constant trail riding is anticipated, front spring, Fig. VI-46, adjustment is to be increased (tighten adjusting nuts), which will allow skis to be turned easier than when adjustment is loose. Tightening front adjusting nuts increases spring tension and as a result, decreases downward pressure on the skis; decreased pressure on skis accounts for easier turning effort characteristics. Loosening front adjusting nuts decreases spring tension and as a result, increases downward pressure on the skis; increased pressure on skis makes turning more difficult for the operator but the compensation is more positive turning characteristics.

To obtain the best ride, the suspension (front and rear springs) must be tensioned properly. The tension can be changed by adjusting the eye bolt pull against the springs.

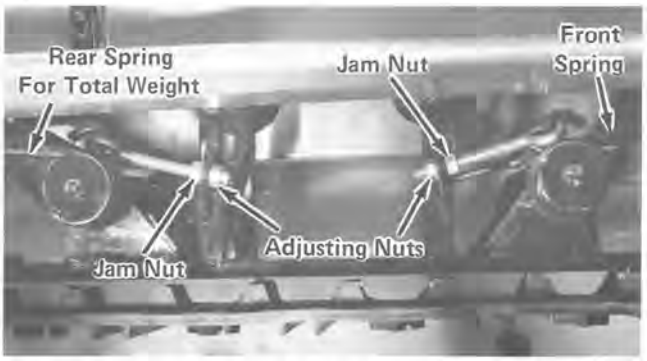
1. Back jam nut, Fig. VI-46, away from front or rear eye bolt mounting flange, using a 9/16-inch open end wrench. Perform this step on opposite side.

2. Tighten or loosen adjusting nut, Fig. VI-46, to obtain desired suspension adjustment, using a 9/16-inch open end wrench. Perform this step on opposite side.

3. When desired tension is obtained, lock adjustment in place by bottoming jam nut, Fig. VI-46, against eye bolt mounting flange, using a 9/16-inch open end wrench. Perform this step on opposite side.

Note: Maintain equal suspension adjustment on both sides of the skid frame.

Fig. VI-46



NOTES

NOTES

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STEERING SERVICING

Remove Throttle Control Handle

Equipment Necessary: Screwdriver Having a 1/4-Inch Blade, Screwdriver Having a 3/16-Inch Blade, 1/4 x 3/32-Inch Flat End Punch, Hammer, 5/16 x 1/8-Inch Flat End Punch and 1/8-Inch Allen Wrench

1. Remove the protective pad from the handlebar.

2. Loosen the screw holding throttle cable to carburetor-mounted throttle arm, using a screwdriver having a 1/4-inch blade.

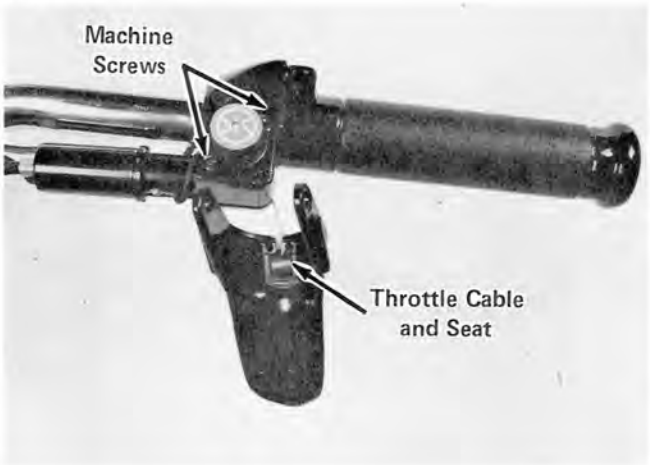
3. Remove the retaining ring from the pin, Fig. VII-1, that holds throttle lever to throttle handle, using a screwdriver having a 1/4-inch blade.

Fig. VII-1

4. Remove the pin that holds throttle lever to throttle handle; then disconnect end of throttle cable from "seat" in throttle lever, Fig. VII-2.

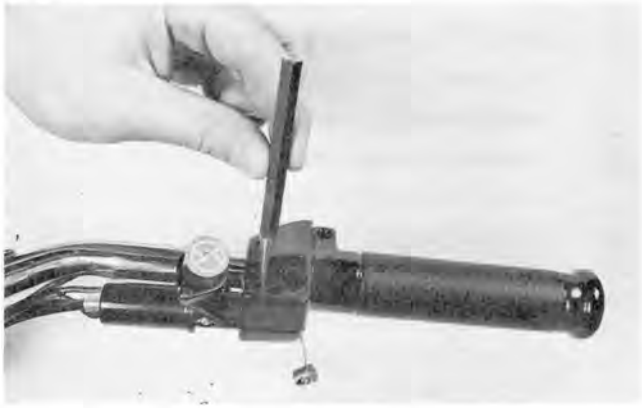
5. Remove the two machine screws, Fig. VII-2, that hold emergency kill switch in the throttle handle mounting socket, using a screwdriver having a 3/16-inch blade.

Fig. VII-2



6. Remove spring pin, Fig. VII-3, that holds the throttle safety switch in the throttle handle, using a 1/4 x 3/32-inch flat end punch and hammer.

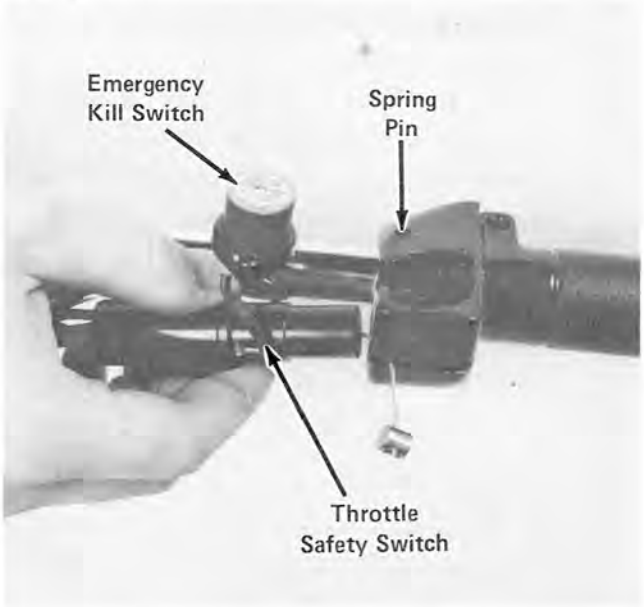
Fig. VII-3



7. Pull throttle safety switch out of throttle handle, Fig. VII-4. Emergency kill switch and throttle safety switch should now be free of the throttle handle. MAKE SURE THAT THROTTLE SAFETY SWITCH CASINGS DO NOT PULL APART.

8. Remove the spring pin, Fig. VII-4, that holds throttle handle on handlebar, using a 5/16 x 1/8-inch flat end punch and hammer.

Fig. VII-4



9. Remove the set screw that holds throttle handle on handlebar, using a 1/8-inch allen wrench. Pull throttle handle off handlebar.

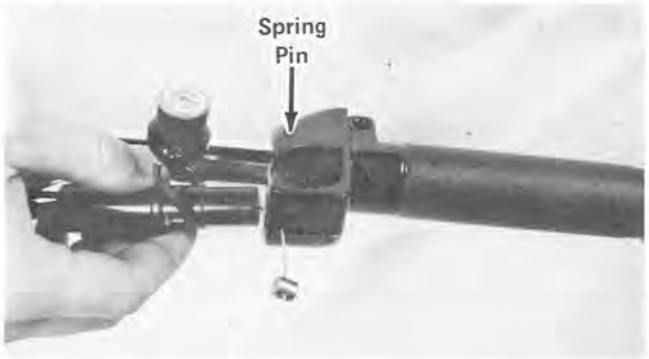
STEERING SERVICING

Install Throttle Control Handle

Equipment Necessary: Hammer, 1/8-Inch Allen Wrench, 1/4 x 3/32-Inch Flat End Punch, Hammer, Screwdriver Having a 3/16-Inch Blade and Screwdriver Having a 1/4-Inch Blade

1. Slide the throttle handle on the handlebar, making sure that socket for emergency kill switch is toward the rear of the snowmobile. Move throttle handle into position desired, then secure in place with spring pin, Fig. VII-5, using a hammer. Tighten set screw, using a 1/8-inch allen wrench.

Fig. VII-5



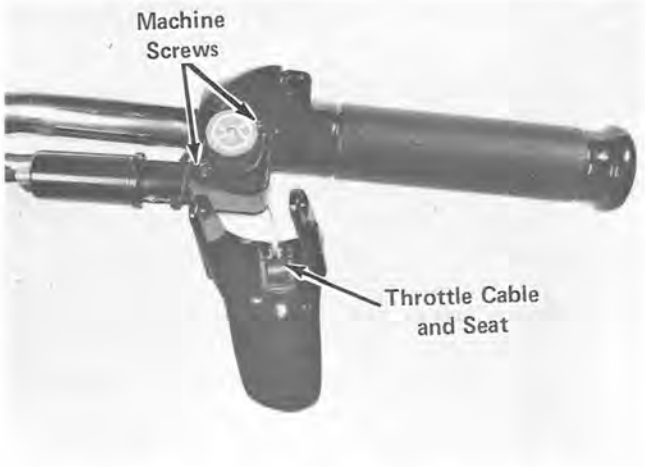
2. Move throttle safety switch and throttle cable into position on the throttle handle. Secure switch to throttle handle with spring pin, using a 1/4 x 3/32-inch flat end punch and hammer, Fig. VII-6.

Fig. VII-6

3. Move the emergency kill switch into position in the throttle handle switch socket and secure it in place with two machine screws, Fig. VII-7, using a screwdriver having a 3/16-inch blade. DO NOT TIGHTEN MACHINE SCREWS EXCESSIVELY.

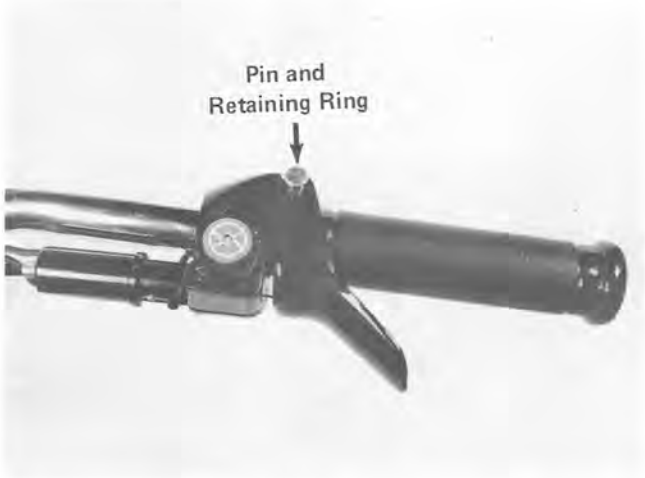
4. Hook end of throttle cable into throttle lever seat, Fig. VII-7.

Fig. VII-7



5. Install throttle lever and "seated" throttle cable on the throttle handle with pin and retaining ring, Fig. VII-8.

Fig. VII-8



6. Install end of throttle cable in the carburetor-mounted throttle arm. Pull end of throttle cable until slack is removed; then pull cable an additional 1/16-inch to preload the throttle safety switch spring. Tighten retaining screw, using a screwdriver having a 1/4-inch blade.

Note: The desired adjustment is when the handle-mounted throttle lever lightly contacts the throttle handle and the carburetor throttle plate is fully open.

7. Install protective pad on the handlebar.

STEERING SERVICING

Remove Throttle Safety/Kill Switch

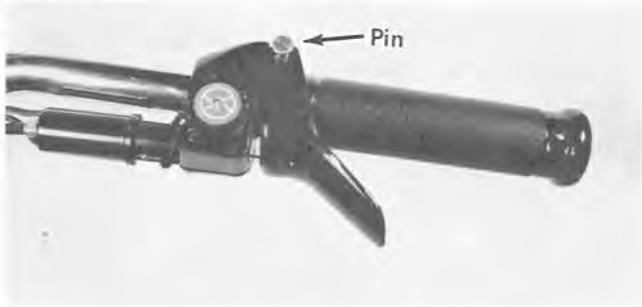
Equipment Necessary: Screwdriver Having a 1/4-Inch Blade, Screwdriver Having a 3/16-Inch Blade, 1/4 x 3/32-Inch Flat End Punch and Hammer

1. Remove the protective pad from the handlebar.

2. Loosen the screw holding throttle cable to carburetor-mounted throttle arm, using a screwdriver having a 1/4-inch blade.

3. Remove the retaining ring from the pin, Fig. VII-9, that holds throttle lever to throttle handle, using a screwdriver having a 1/4-inch blade.

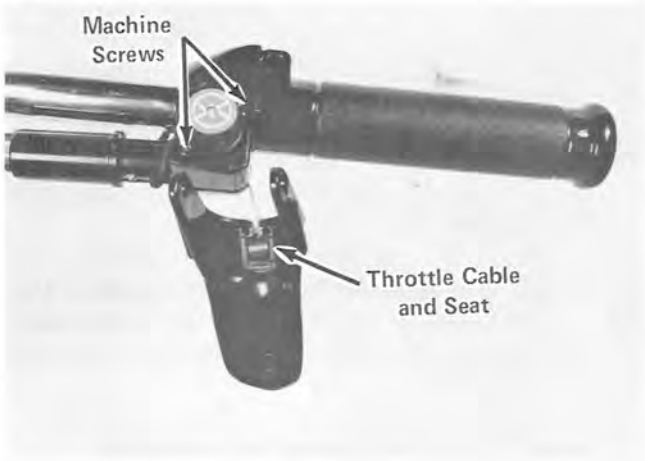
Fig. VII-9



4. Pull out pin that holds throttle lever to throttle handle; then disconnect end of throttle cable from "seat" in throttle lever, Fig. VII-10.

5. Remove the two machine screws, Fig. VII-10, that hold emergency kill switch in throttle handle mounting socket, using a screwdriver having a 3/16-inch blade.

Fig. VII-10

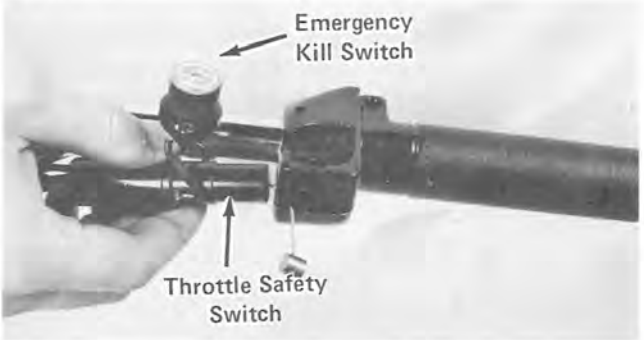


6. Remove spring pin, Fig. VII-11, that holds throttle safety switch in the throttle handle, using a 1/4 x 3/32-inch flat end punch and hammer.

Fig. VII-11

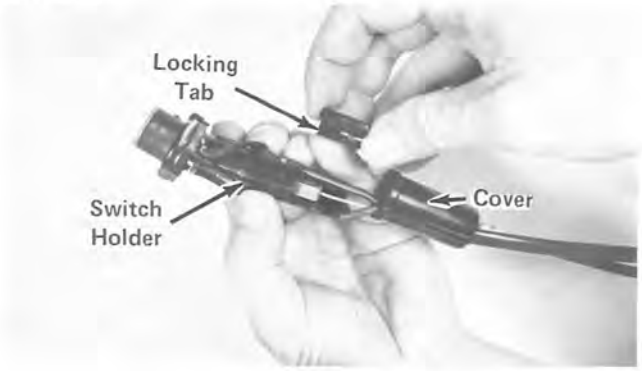
7. Pull throttle safety switch out of throttle handle, Fig. VII-12. Emergency kill switch and throttle safety switch should now be free of the throttle handle.

Fig. VII-12



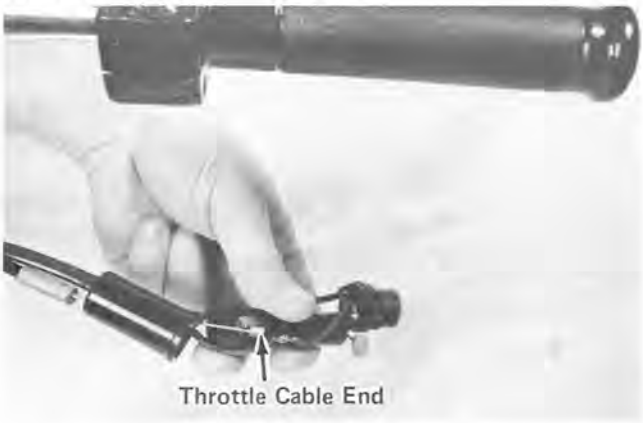
8. Slide the throttle safety switch cover off the switch holder and account for the locking tab, Fig. VII-13.

Fig. VII-13



9. Disengage end of throttle cable from the throttle cable switch block, Fig. VII-14. Pull throttle cable out of the throttle safety switch cover.

Fig. VII-14



10. Disconnect the square connector at end of kill switch harness from connector that holds the two black wires running to the "G" and "M" terminals on the ignition switch, Fig. VII-15.

11. Remove the kill switch wires from the connector, using a screwdriver having a 1/4-inch blade.

Note: Connector is removed from end of kill switch harness so that complete harness can be pulled through upper steering post bracket and clamp. If connector is allowed to remain on harness, you will not be able to pull the harness through upper steering post bracket and clamp.

12. Pull throttle safety/kill switch harness through upper steering post bracket, clamp and instrument panel.

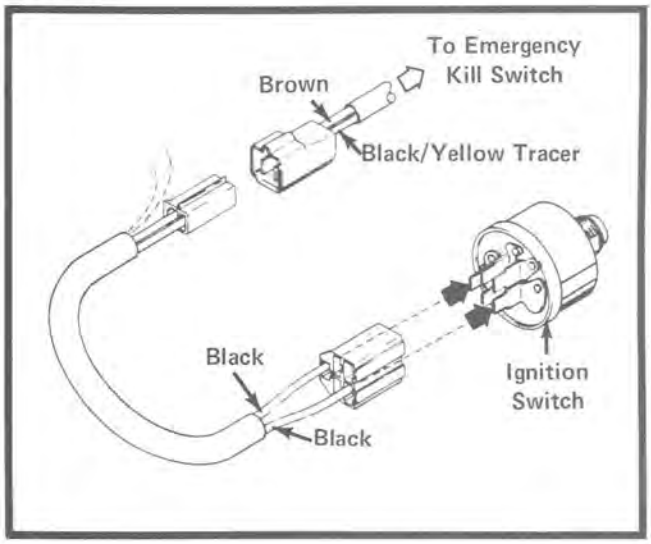
Install Throttle Safety/Kill Switch

Equipment Necessary: 1/4 x 3/32-Inch Flat End Punch, Hammer, Screwdriver Having a 3/16-Inch Blade and Screwdriver Having a 1/4-Inch Blade

1. Slide end of kill switch harness through instrument panel, upper steering post bracket and clamp.

2. Install the kill switch wires in the square connector, Fig. VII-15. Push together the kill switch wire connector and connector that holds the two black wires running to the "G" and "M" terminals on the ignition switch, Fig. VII-15.

Fig. VII-15

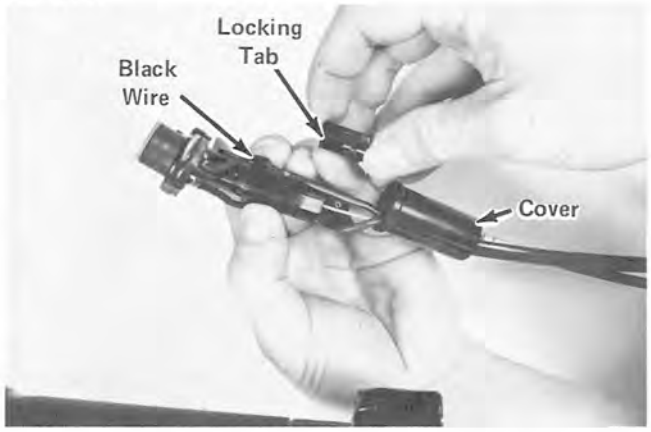


3. Slide throttle cable through throttle safety switch cover. Install end of throttle cable in the switch block, Fig. VII-16.

Fig. VII-16

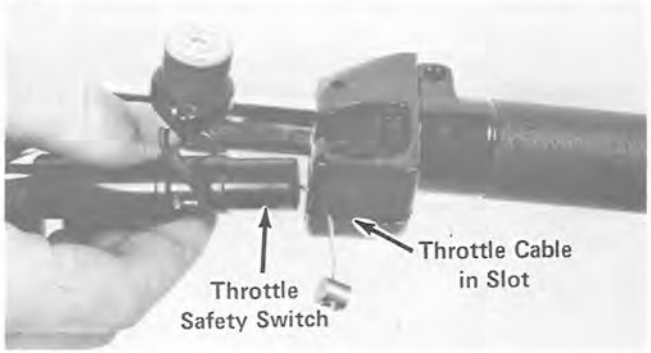
4. Move black wire against switch casing; then place locking tab (recess in tab over black wire) in switch casing, Fig. VII-17. Push throttle safety switch cover onto switch. Make sure all components remain seated and in place.

Fig. VII-17



5. Push end of throttle safety switch into socket in throttle handle and throttle cable into slot, Fig. VII-18.

Fig. VII-18



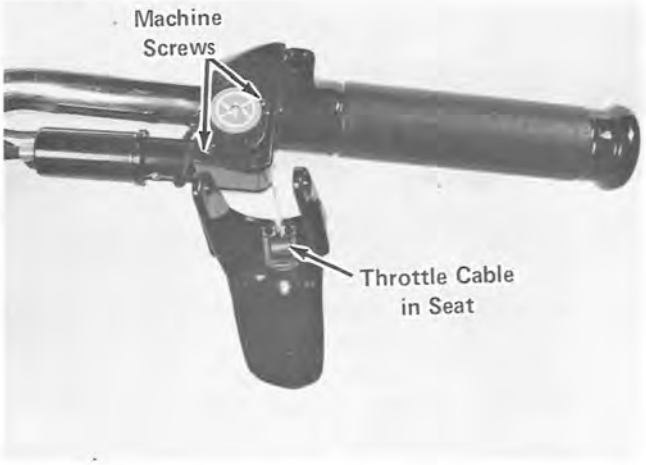
6. Secure throttle safety switch in place with spring pin, using a 1/4 x 3/32-inch flat end punch and hammer, Fig. VII-19.

Fig. VII-19

7. Move the emergency kill switch into position in the throttle handle switch socket, Fig. VII-20, and secure it in place with two machine screws, using a screwdriver having a 3/16-inch blade. DO NOT TIGHTEN MACHINE SCREWS EXCESSIVELY.

8. Hook end of throttle cable into "seat" in throttle lever, Fig. VII-20.

Fig. VII-20



9. Install throttle lever and "seated" throttle cable on throttle handle with pin and retaining ring, Fig. VII-21.

Fig. VII-21

10. Install end of throttle cable in the carburetor-mounted throttle arm. Pull end of throttle cable until slack is removed; then pull cable an additional 1/16-inch to preload the throttle safety switch spring. Tighten retaining screw, using a screwdriver having a 1/4-inch blade.

Note: The desired adjustment is when the handle-mounted throttle lever lightly contacts the throttle handle and the carburetor throttle plate is fully open.

11. Install protective pad on the handlebar.

STEERING SERVICING

Remove Brake Control Handle

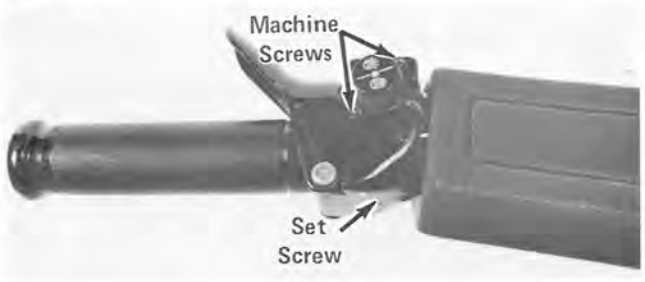
Equipment Necessary: Screwdriver Having a 3/16-Inch Blade, 1/8-Inch Allen Wrench, 1/4 x 3/32-Inch Flat End Punch and Hammer

1. Remove the protective pad from the handlebar.

2. Remove the two machine screws that hold dimmer switch in the brake handle mounting socket, Fig. VII-22, using a screwdriver having a 3/16-inch blade.

3. Loosen the set screw that holds brake handle, Fig. VII-22, using a 1/8-inch allen wrench.

Fig. VII-22



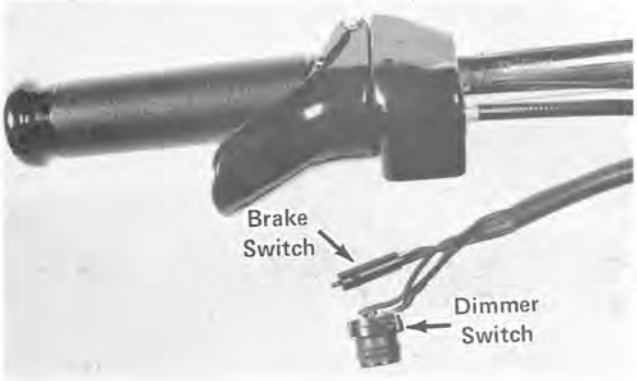
4. Rotate brake handle until brake lever faces toward the rear of the machine; then tighten the set screw, using a 1/8-inch allen wrench.

5. Drive the spring pin that holds brake switch inward approximately 1/2-inch, using 1/4 x 3/32-inch flat end punch and hammer, Fig. VII-23.

Fig. VII-23

6. Pull brake switch out of brake handle. Dimmer switch and brake switch should now be free of the brake handle, Fig. VII-24.

Fig. VII-24



7. Remove the retaining ring, Fig. VII-25, from the pin that holds brake lever to brake handle, using a screwdriver having a 3/16-inch blade. Remove the pin that holds brake lever to brake handle; then disconnect end of brake cable from "seat" in brake lever. Pull brake cable out of brake handle.

Fig. VII-25

8. Loosen the set screw that holds brake handle on handlebar, using a 1/8-inch allen wrench. Pull brake handle off handlebar.

Install Brake Control Handle

Equipment Necessary: 1/8-Inch Allen Wrench, 1/4 x 3/32-Inch Flat End Punch, Hammer and Screwdriver Having a 3/16-Inch Blade

1. Slide the brake handle on the handlebar, making sure that socket for dimmer switch is toward the front of the snowmobile. Move brake handle into position desired, then secure in place with set screw, Fig. VII-26, using a 1/8-inch allen wrench.

2. Slide brake cable into position in brake handle and hook end of brake cable into the brake lever.

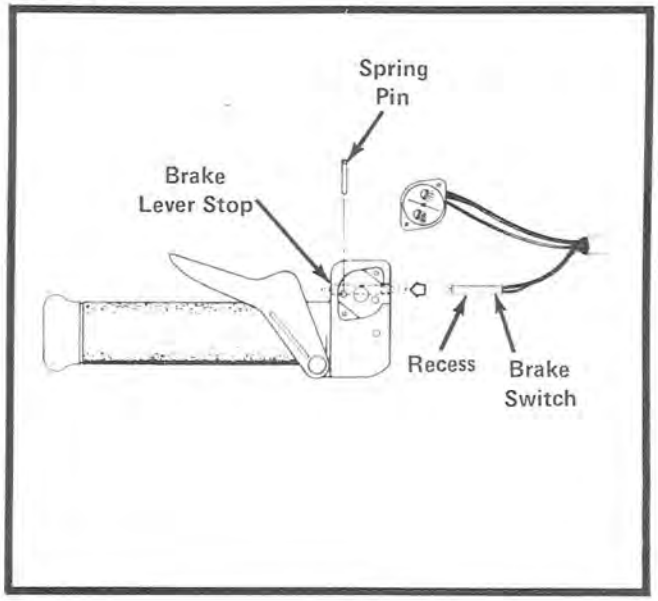
3. Install brake lever and seated brake cable on the brake handle with the pin and retaining ring, Fig. VII-26.

Fig. VII-26

4. Slide the brake switch into the brake handle making sure that recess in side of switch will match with the spring pin.

5. Squeeze the brake lever fully and move switch so that flat end of switch casing is flush with the brake lever stop. Drive spring pin downward until the end is flush with dimmer switch socket, Fig. VII-27, using 1/4 x 3/32-inch flat end punch and hammer. Brake switch should now be retained in the brake handle.

Fig. VII-27



6. Move the dimmer switch into position in the brake handle switch socket and secure in place with two machine screws, Fig. VII-28, using a screwdriver having a 3/16-inch blade. DO NOT TIGHTEN MACHINE SCREWS EXCESSIVELY.

7. Install protective pad on handlebar.

Fig. VII-28

Remove Brake/Dimmer Switch

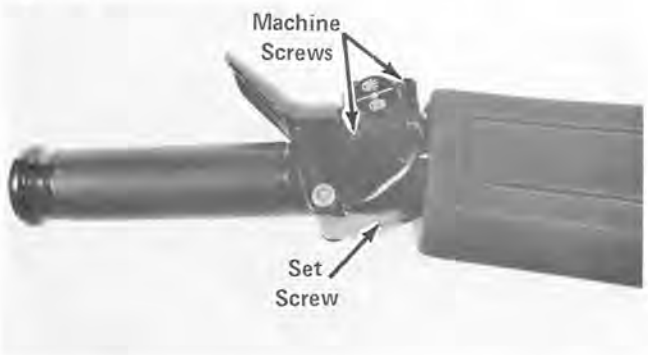
Equipment Necessary: Screwdriver Having a 3/16-Inch Blade, 1/8-Inch Allen Wrench, 1/4 x 3/32-Inch Flat End Punch and Hammer

1. Remove the protective pad from the handlebar.

2. Remove the two machine screws, Fig. VII-29, that hold dimmer switch in the brake handle mounting socket, using a screwdriver having a 3/16-inch blade.

3. Loosen the set screw, Fig. VII-29, that holds brake handle, using a 1/8-inch allen wrench.

Fig. VII-29



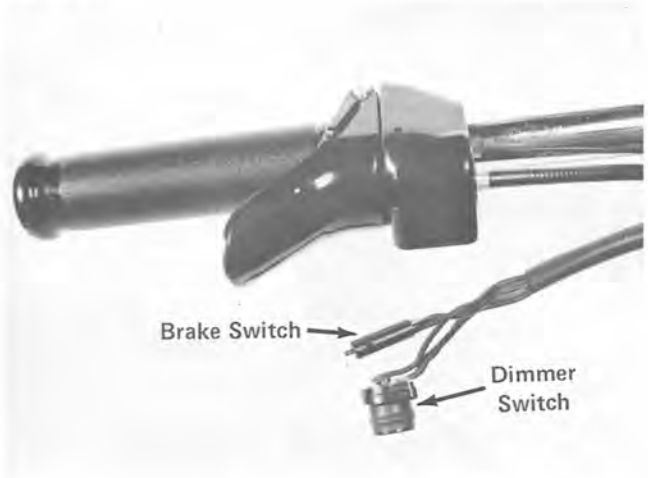
4. Rotate brake handle until brake lever faces toward rear of the machine; then tighten the set screw, using a 1/8-inch allen wrench.

5. Drive the spring pin that holds brake switch inward approximately 1/2-inch, using a 1/4 x 3/32-inch flat end punch and hammer, Fig. VII-30.

Fig. VII-30

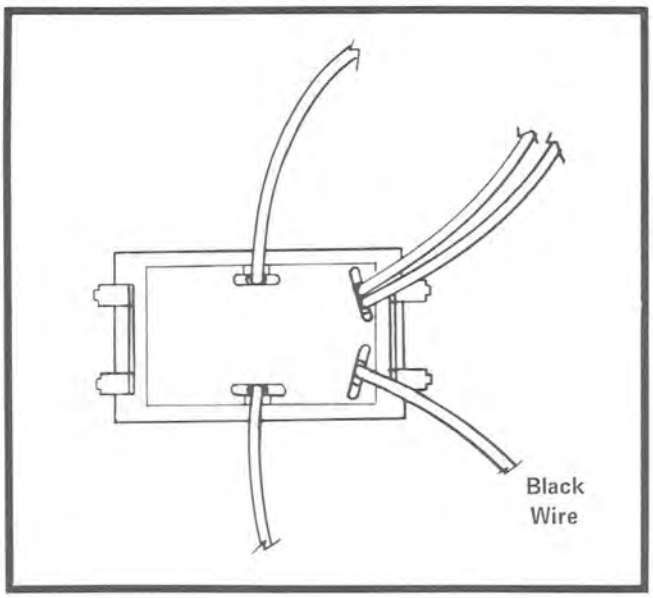
6. Pull brake switch out of brake handle. Dimmer switch and brake switch should now be free of the brake handle, Fig. VII-31.

Fig. VII-31



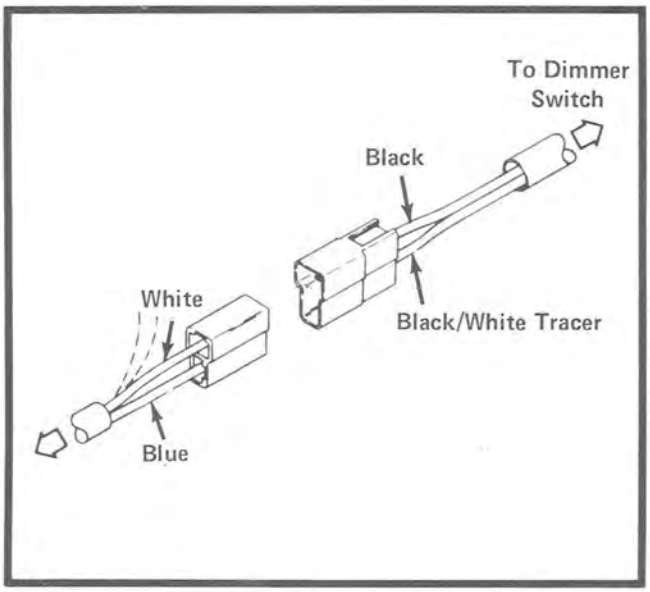
7. Disconnect the connector that holds the single black wire running to the dimmer switch from the light switch, Fig. VII-32.

Fig. VII-32



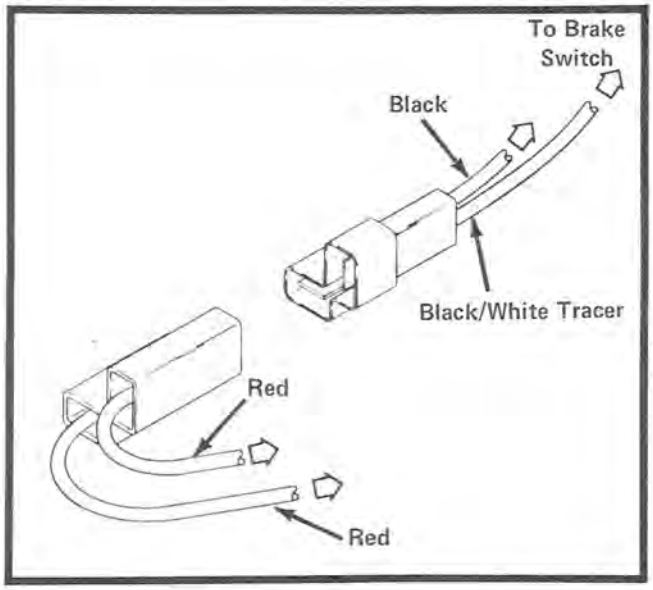
8. Disconnect T-shaped connectors that hold two wires running to dimmer switch, Fig. VII-33.

Fig. VII-33



9. Disconnect Z-shaped connectors that hold two wires running to the brake switch, Fig. VII-34.

Fig. VII-34



10. Remove the brake/dimmer switch wires from the connectors, using a screwdriver having a 3/16-inch blade.

Note: Connectors are removed from brake and dimmer switch wires so that complete harness can be pulled through upper steering post bracket and clamp. If connectors are allowed to remain on harness, you will not be able to pull the harness through upper steering post bracket and clamp.

11. Pull brake/dimmer switch harness through upper steering post bracket, clamp and instrument panel.

Install Brake/Dimmer Switch

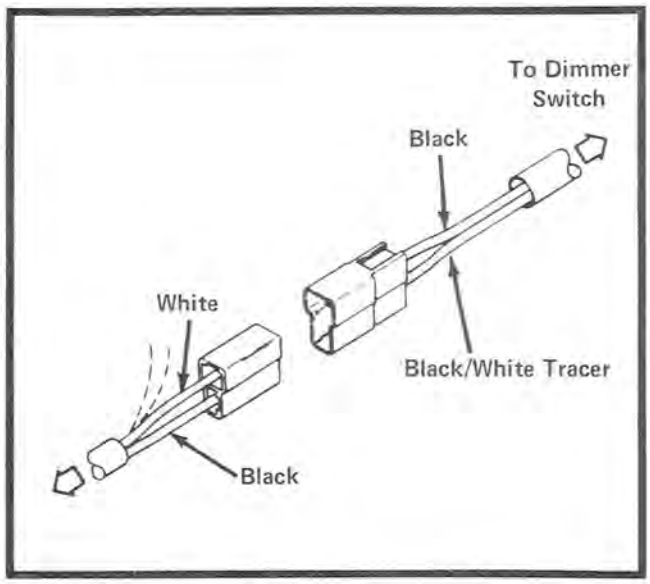
Equipment Necessary: 1/8-Inch Allen Wrench, 1/4 x 3/32-Inch Flat End Punch, Hammer and Screwdriver Having a 3/16-Inch Blade

1. Slide end of brake/dimmer switch harness through instrument panel, upper steering post bracket and clamp.

2. Install connector on end of long single black wire that runs to the dimmer switch.

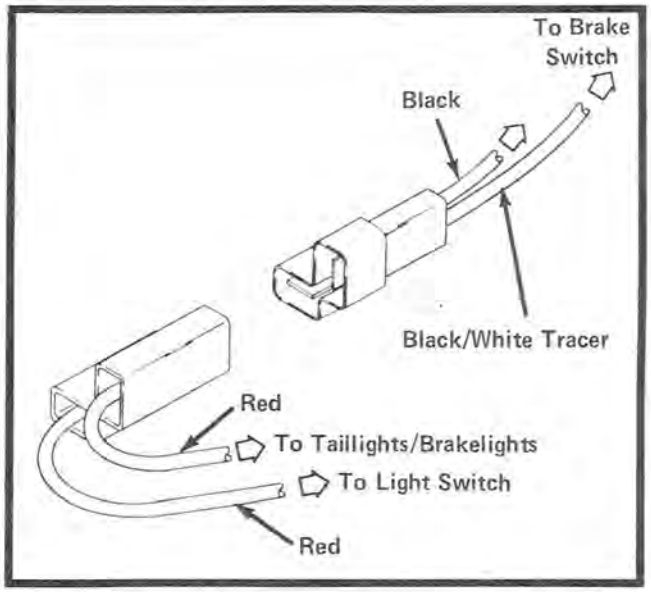
3. Install T-shaped connector on end of black wire and black wire with white tracer that runs to the dimmer switch, Fig. VII-35.

Fig. VII-35



4. Install Z-shaped connector on end of black wire and black wire with white tracer that runs to the brake switch, Fig. VII-36.

Fig. VII-36



5. Connect the single black wire that runs from the dimmer switch to the lower right vertically-oriented terminal on the light switch, Fig. VII-37.

Fig. VII-37

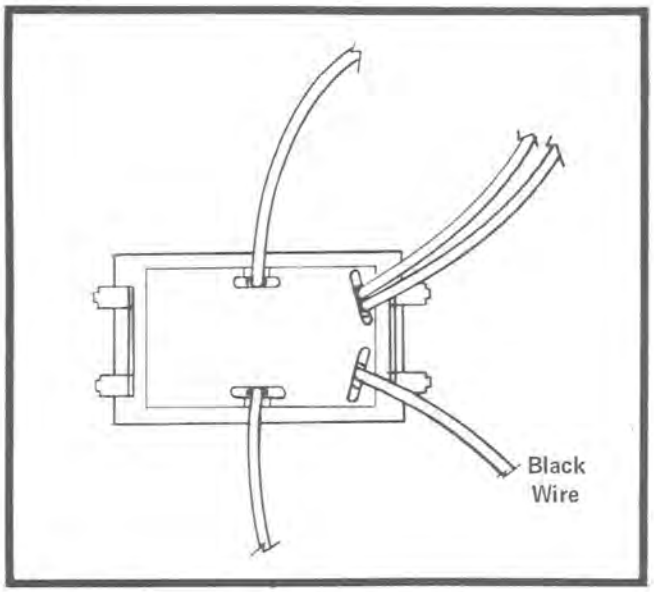
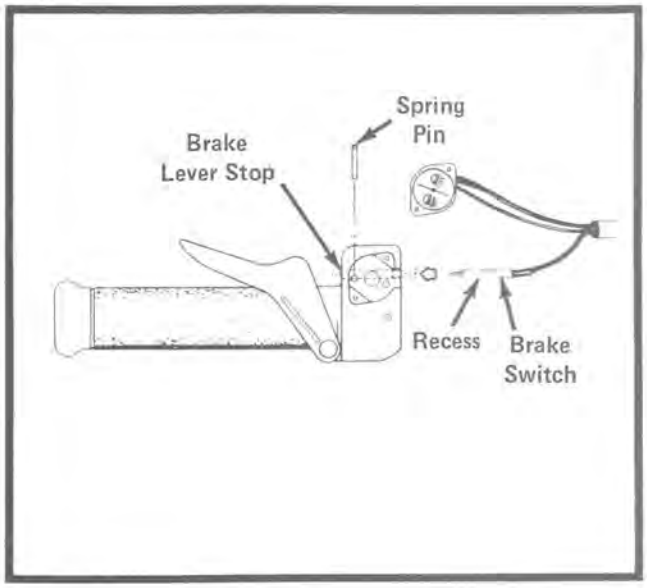


Fig. VII-38



6. Push the T-shaped connector holding black wire and black wire with white tracer over the T-shaped connector holding black wire that runs to ignition switch and white wire that runs to headlight, Fig. VII-35.

7. Push the Z-shaped connector holding black wire and black wire with white tracer over the Z-shaped connector holding red wire that runs to taillights/brakelights and red wire that runs to the top left horizontally-oriented terminal on the light switch, Fig. VII-36.

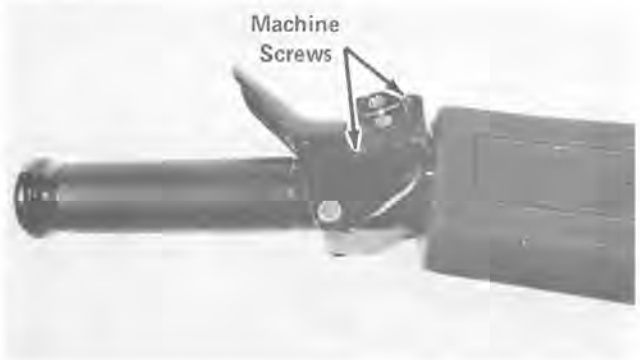
8. Loosen the set screw that holds brake handle, using a 1/8-inch allen wrench. Rotate brake handle back to its normal position (lever forward); then tighten set screw, using a 1/8-inch allen wrench.

9. Slide brake switch into the brake handle making sure that recess in side of switch will match with spring pin, Fig. VII-38.

10. Squeeze brake lever fully and move switch so that switch casing is flush with the brake lever stop, Fig. VII-38. Drive spring pin downward until the end is flush with dimmer switch socket in brake handle, using 1/4 x 3/32-inch flat end punch and hammer. Brake switch should now be retained in brake handle, Fig. VII-38.

11. Move dimmer switch into position in the brake handle switch socket and secure in place with two machine screws, Fig. VII-39, using a screwdriver having a 3/16-inch blade. DO NOT TIGHTEN MACHINE SCREWS EXCESSIVELY.

Fig. VII-39



12. Install protective pad on handlebar.

Remove Steering Post and Tie Rod Ends

Equipment Necessary: Screwdriver Having 1/4-Inch Blade, 7/16-Inch Wrench, Screwdriver Having 5/16-Inch Blade, Screwdriver Having 7/16-Inch Blade, 9/16-Inch Socket, 3-Inch Extension, 9/16-Inch Wrench, 7/16-Inch Socket, 7/16-Inch Wrench, 1/8-Inch Allen Wrench, 5/16 x 1/8-Inch Flat End Punch and Hammer

STEERING SERVICING

1. Remove outside tie rod ends and tie rods (see Remove Outside Tie Rod Ends and Tie Rods, steps 1-4, page VII-16).

2. Remove the ring nut, Fig. VII-40, holding ignition switch in instrument panel; slide switch through instrument panel. DO NOT REMOVE WIRE CONNECTOR FROM IGNITION SWITCH.

Fig. VII-40

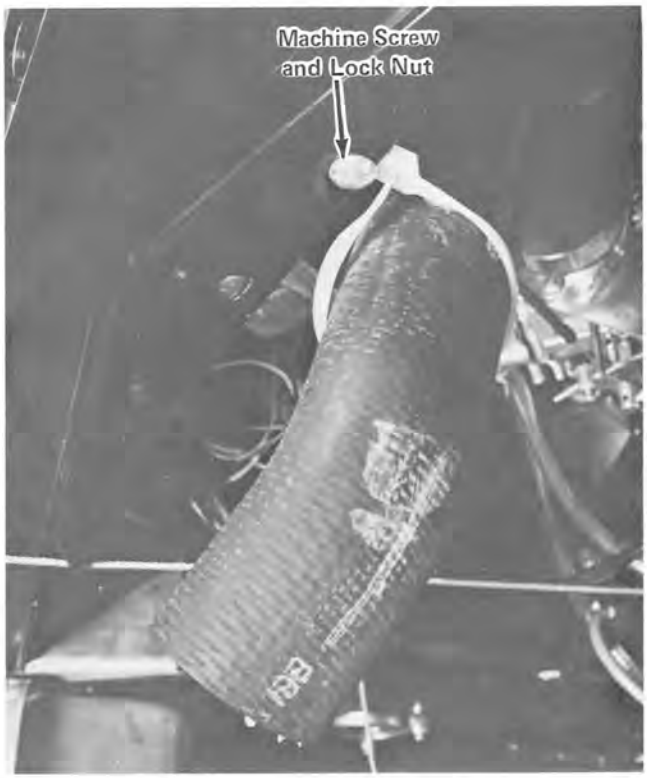
3. Pull wires off light switch terminals.

4. Loosen screw holding choke wire to choke arm on the carburetor, Fig. VII-41, using a screwdriver having a 1/4-inch blade. Remove wire from choke arm.

Fig. VII-41

5. USE THIS STEP ONLY IF ENGINE IS EQUIPPED WITH A DIAPHRAGM-TYPE CARBURETOR – Remove the machine screw and lock nut, Fig. VII-42, that holds air intake hose strap to instrument panel, using a 7/16-inch wrench and screwdriver having a 5/16-inch blade.

Fig. VII-42



6. If snowmobile is equipped with a tachometer, speedometer or heat gauge, all wires and drive cables are to be disconnected so that instrument panel can be removed.

7. Remove protective pad from handlebar.

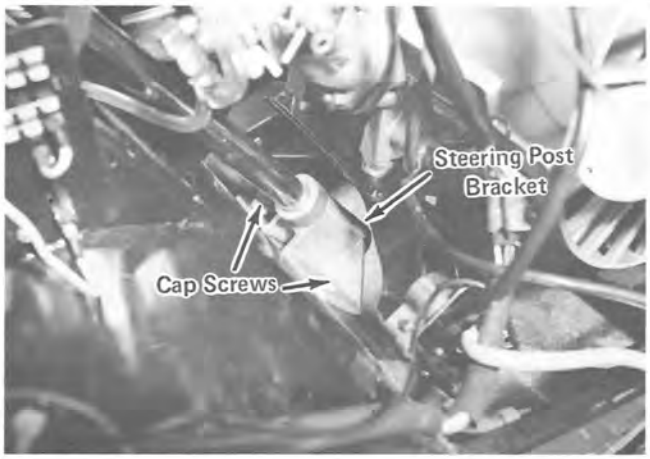
8. Loosen the three-quarter-turn studs holding instrument panel to lower shroud, using a screwdriver having a 7/16-inch blade.

9. Pull sides of instrument panel outward and remove it from the lower shroud.

10. Remove the two cap screws and lock nuts that hold lower steering post bracket to curved section of front end assembly, Fig. VII-43, using a 9/16-inch socket, 3-inch extension and 9/16-inch wrench.

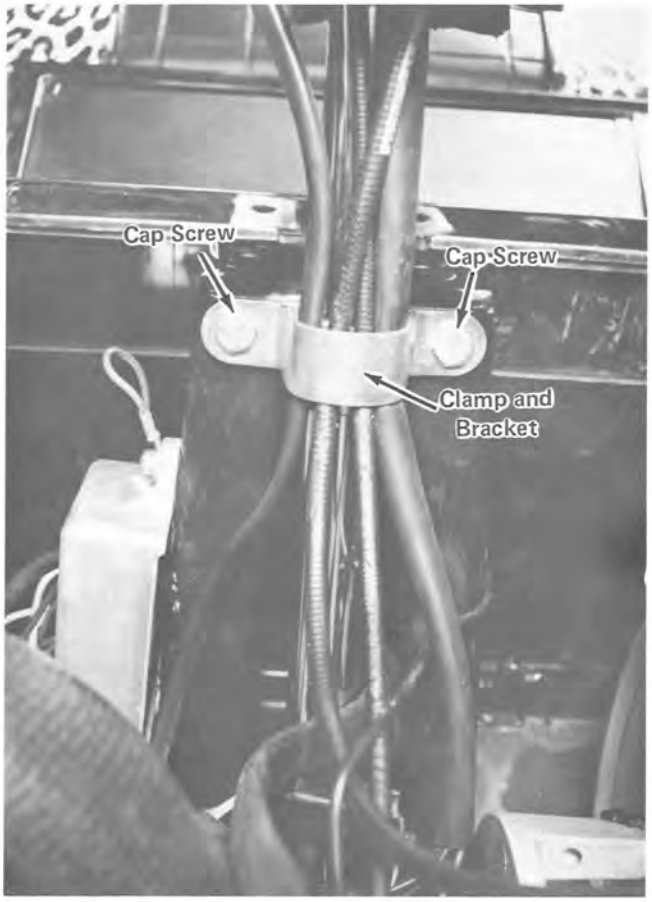
STEERING SERVICING

Fig. VII-43



11. Remove the two cap screws and lock nuts that hold steering post clamp and bracket to the steering tower, Fig. VII-44, using a 7/16-inch socket and wrench. Set steering post clamp aside.

Fig. VII-44



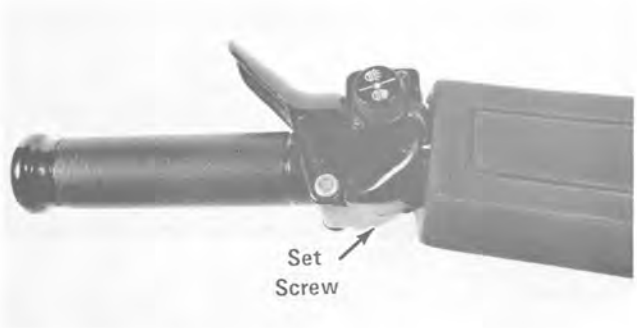
12. If only the tie rod ends are to be replaced, proceed to step 13. If the complete steering post is to be replaced, proceed to step 14.

13. Pivot steering post toward drive clutch. Remove the cap screw and lock nut that holds tie rod end to the bottom of the steering post, Fig. VII-45, using a 9/16-inch socket and wrench.

Fig. VII-45

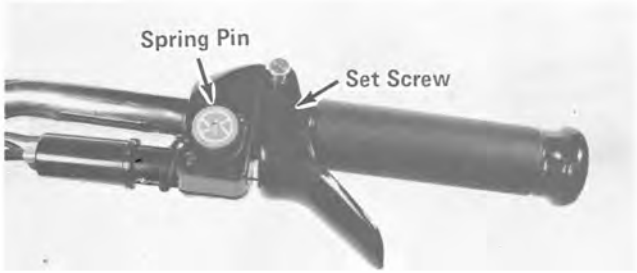
14. Loosen the set screw, Fig. VII-46, that holds brake handle to handlebar, using a 1/8-inch allen wrench. Pull brake handle off handlebar.

Fig. VII-46



15. Drive spring pin, Fig. VII-47, out of throttle handle and handlebar, using a 5/16 x 1/8-inch flat end punch and hammer. Loosen set screw, Fig. VII-47, using 1/8-inch allen wrench. Pull throttle handle off handlebar.

Fig. VII-47



16. Slide steering post up and away from the steering tower.

17. Remove the cap screw and lock nut that holds tie rod end to steering post, using a 9/16-inch socket and wrench.

Install Steering Post and Tie Rod Ends

Equipment Necessary: 9/16-Inch Socket, 9/16-Inch Wrench, Torque Wrench, Hammer, 1/8-Inch Allen Wrench, 7/16-Inch Socket, 7/16-Inch Wrench, Screwdriver Having a 7/16-Inch Blade, Screwdriver Having a 5/16-Inch Blade and Screwdriver Having a 1/4-Inch Blade

1. Install tie rod ends on bottom of steering post with two cap screws and lock nuts, using a 9/16-inch socket and wrench. Tighten lock nuts to 35 ft. lbs. torque, using a 9/16-inch socket and torque wrench.

Note: Bronze-colored tie rod ends are left hand thread and must be installed only on the steering post.

2. Slide the steering post into position.

CAUTION

Make sure that control cables and electrical wires are not pinched when the steering post is installed.

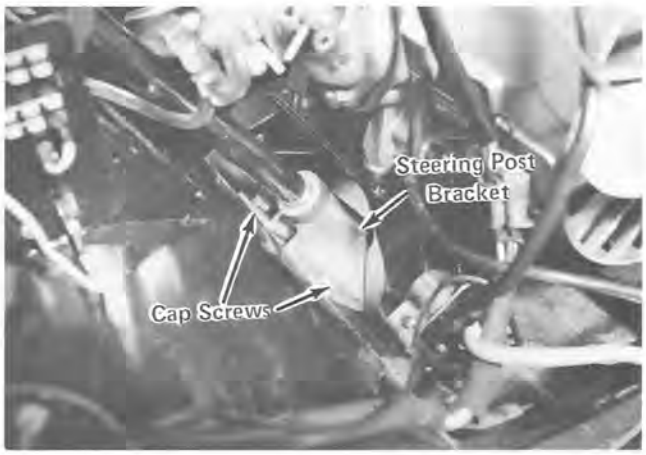
3. Slide throttle handle on right side of handlebar. Align holes in handle control and handlebar; then secure in place with spring pin, Fig. VII-48, using a hammer. Tighten the set screw, Fig. VII-48, using a 1/8-inch allen wrench.

Fig. VII-48

4. Slide brake handle on left side of handlebar. Secure brake handle in place with set screw, using a 1/8-inch allen wrench.

5. Install lower steering post bracket, Fig. VII-49, to curved section of front end with two cap screws and lock nuts, using a 9/16-inch socket, 3-inch extension and 9/16-inch wrench. Tighten lock nut to 35 ft. lbs. torque, using a 9/16-inch socket, 3-inch extension and a torque wrench.

Fig. VII-49

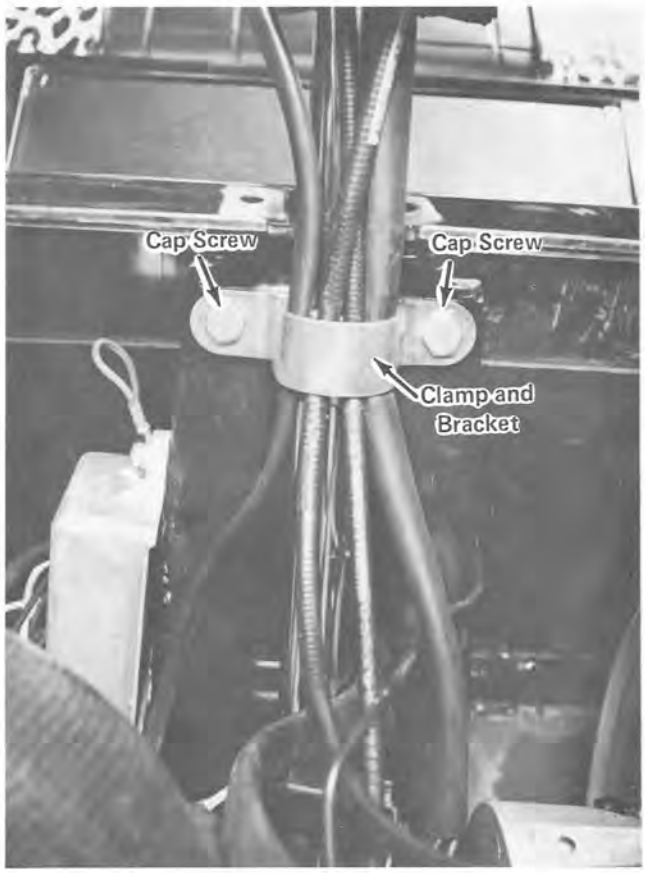


6. Slide the upper steering post bracket and clamp into position on the steering support tower. Place the throttle cable, brake cable, kill switch harness and the dimmer switch harness between the upper steering post bracket and clamp, Fig. VII-50. Retain upper steering post bracket and clamp to the steering support tower with two cap screws and lock nuts, Fig. VII-50, using a 7/16-inch socket and wrench. Tighten cap screw to 10 ft. lbs. torque, using a 7/16-inch socket and torque wrench.

WARNING

Make sure that control cables and electrical wiring harnesses are not pinched between the upper steering post bracket and clamp. If a cable or harness is pinched, mechanical or electrical failure may occur, resulting in possible injury to the operator or damage to the snowmobile.

Fig. VII-50



7. Install the instrument panel on the lower shroud with the three-quarter-turn studs, using a screwdriver having a 7/16-inch blade.

8. Connect the wires to the light switch terminals. Make sure that vertically-oriented terminals are nearest to the steering post. If terminals are not in this position, remove the light switch and install properly.

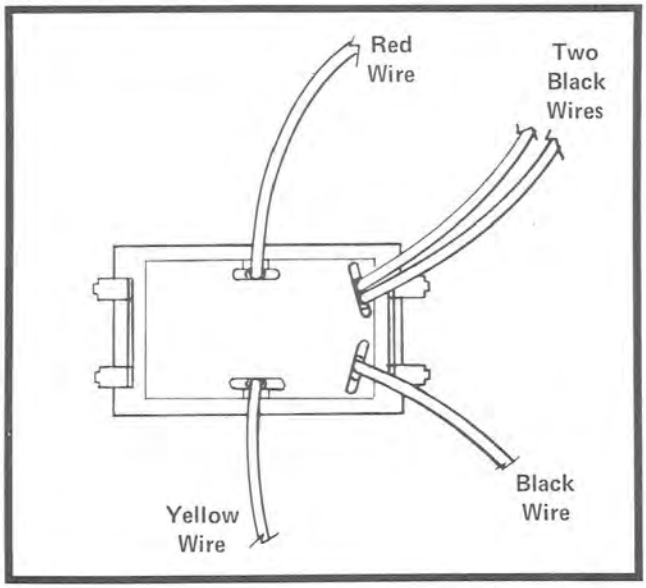
   A. Connect the TWO BLACK wires that are contained in one plug to the upper right vertically-oriented terminal, Fig. VII-53. One of the black wires runs to the taillights, the other to the circuit board "LIGHTS".

   B. Connect the long BLACK wire that runs from the dimmer switch to the lower right vertically-oriented terminal, Fig. VII-53.

   C. Connect the RED wire that runs from the brake switch to the top left horizontally-oriented terminal, Fig. VII-53.

   D. Connect the YELLOW wire that runs from the ignition switch to the lower left horizontally-oriented terminal, Fig. VII-53.

Fig. VII-53



9. Slide the ignition switch through the instrument panel; then secure in place with the ring nut, Fig. VII-54. DO NOT OVER-TIGHTEN RING NUT.

Note: It is possible to install the ignition switch upside down. Make sure single prong terminal on ignition switch is toward the steering post.

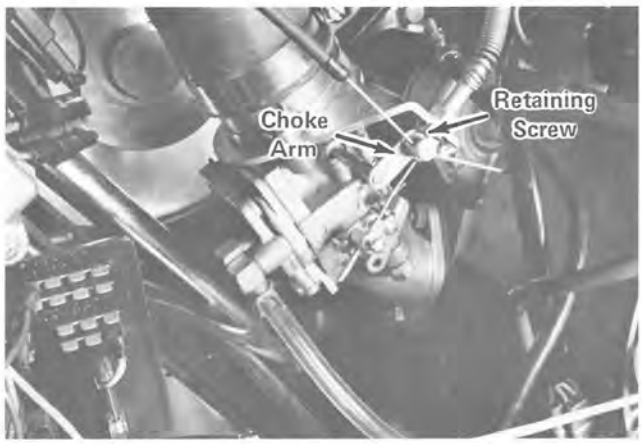
Fig. VII-54

10. USE THIS STEP ONLY IF ENGINE IS EQUIPPED WITH A DIAPHRAGM-TYPE CARBURETOR — Install air intake hose to the right side of the instrument panel with the nylon strap, machine screw and lock nut, Fig. VII-51, using a 7/16-inch wrench and a screwdriver having a 5/16-inch blade.

Fig. VII-51

11. Move the carburetor-mounted choke arm fully forward (toward engine) and install choke wire, Fig. VII-52. Position the front edge of the console-mounted choke knob 1/8-inch away from the choke "stop". When knob is in proper position, tighten choke wire retaining screw, Fig. VII-52, using a screwdriver having a 1/4-inch blade.

Fig. VII-52



12. Connect electrical wires and cables for speedometer, tachometer and heat gauges, if the snowmobile is so equipped.

13. Install protective pad on handlebar.

14. Install tie rods (see Install Tie Rod and Outside Tie Rod Ends, page VII-17).

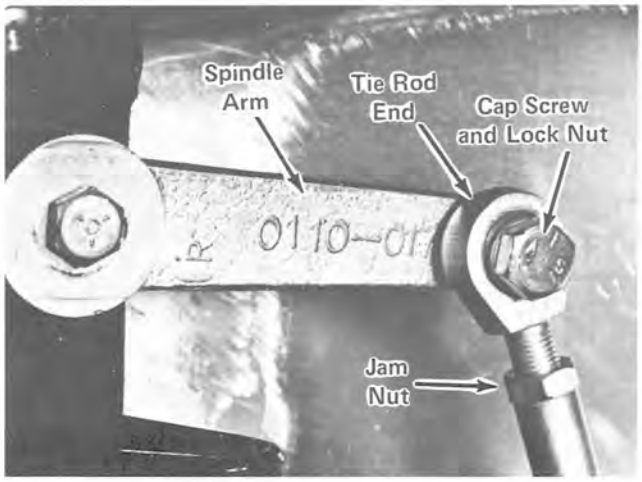
Remove Outside Tie Rod End and Tie Rod

Equipment Necessary: 9/16-Inch Open End Wrench and 9/16-Inch Socket

1. Loosen the jam nut that locks tie rod end in place, Fig. VII-55, using a 9/16-inch open end wrench.

2. Remove the cap screw and lock nut, Fig. VII-55, that holds tie rod end to spindle arm, using a 9/16-inch socket and open end wrench.

Fig. VII-55



3. Unscrew tie rod end from tie rod, Fig. VII-55.

Fig. VII-56

4. Rotate tie rod clockwise which will remove tie rod from steering post tie rod end, using a 9/16-inch open end wrench, Fig. VII-57.

5. If tie rod end on steering post is to be replaced, proceed to Remove Steering Post and Tie Rod Ends (steps 2-13, page VII-11).

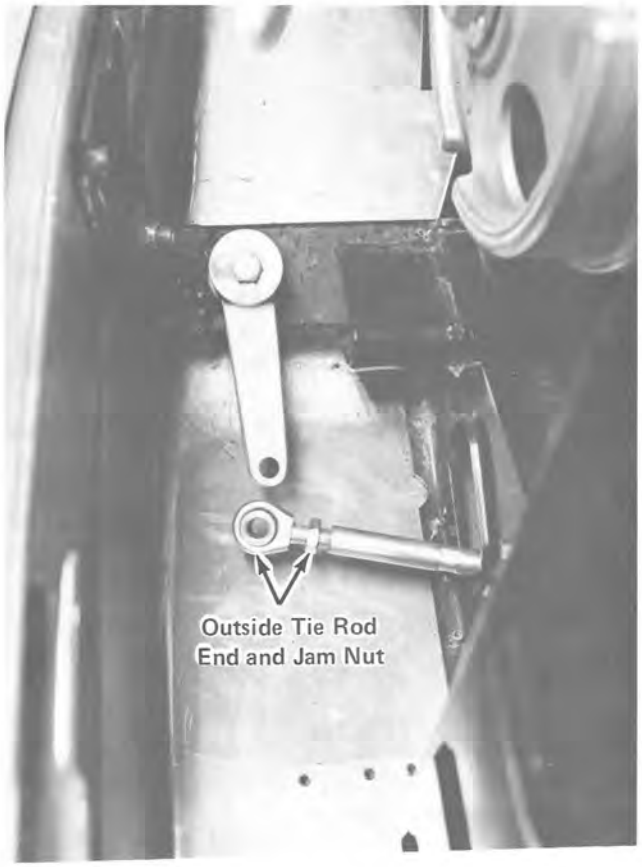
Install Tie Rod and Outside Tie Rod End

Equipment Necessary: 9/16-Inch Open End Wrench and 9/16-Inch Socket

1. Check the jam nut on STEERING POST tie rod end. Jam nut is to be threaded on approximately half way.

2. Thread tie rod (counterclockwise) onto steering post tie rod end until it solidly bottoms against the tie rod end jam nut, using a 9/16-inch open end wrench, Fig. VII-56. It may be necessary to turn steering post tie rod end toward the side that tie rod will be installed.

Fig. VII-57



3. Thread outside tie rod end approximately half way into the tie rod, Fig. VII-57.

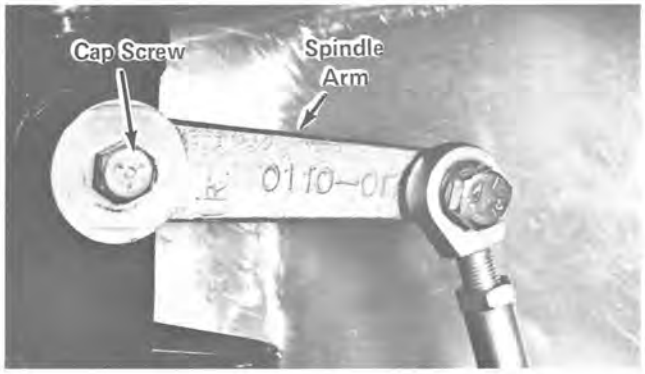
4. Align the skis (see Ski Alignment, page VII-23).

Remove Ski Spindle

Equipment Necessary: 1/2-Inch Socket, 1/2-Inch Diameter Brass Punch, Hammer, 5/8-Inch Socket and 5/8-Inch Wrench

1. Remove the cap screw and flat washer, Fig. VII-58, that holds the spindle arm to the spindle, using a 1/2-inch socket. Pull spindle arm off spindle shaft.

Fig. VII-58



2. Slide U-bend washers and flat washer off the spindle shaft.

3. Block the front end up until the entire ski (spindle shaft) can be removed from the spindle mount. Account for the flat washer that is on the spindle shaft after the spindle shaft is removed from the spindle mount.

Note: The spindle shaft may stick in the spindle mount. If this occurs, use a 1/2-inch diameter brass punch and drive the spindle shaft out of the spindle mount.

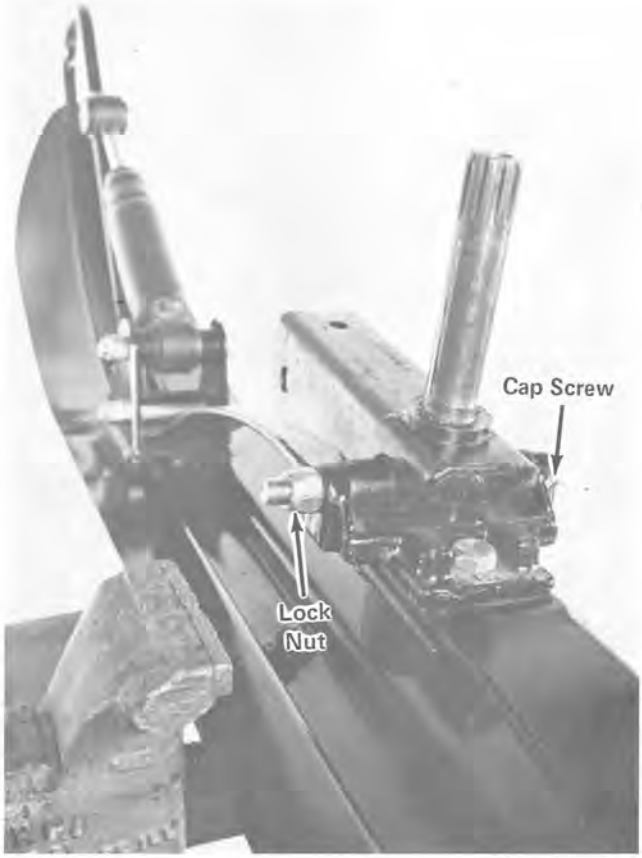
4. Remove the cap screw and lock nut that holds top of shock absorber (moveable end) to the spindle, using a 5/8-inch socket and wrench, Fig. VII-59. Account for the short sleeve positioned inside of shock absorber moveable end.

Fig. VII-59

5. Remove the lock nut and cap screw, Fig. VII-60, that holds spindle to ski saddle, using a 9/16-inch socket.

Note: The lock nut must first be removed from the cap screw; then the cap screw can be removed. The reason for this is that the cap screw is threaded through the ski saddle.

Fig. VII-60



Install Ski Spindle

Equipment Necessary: 9/16-Inch Socket, Torque Wrench, 5/8-Inch Socket, 5/8-Inch Wrench and 1/2-Inch Socket

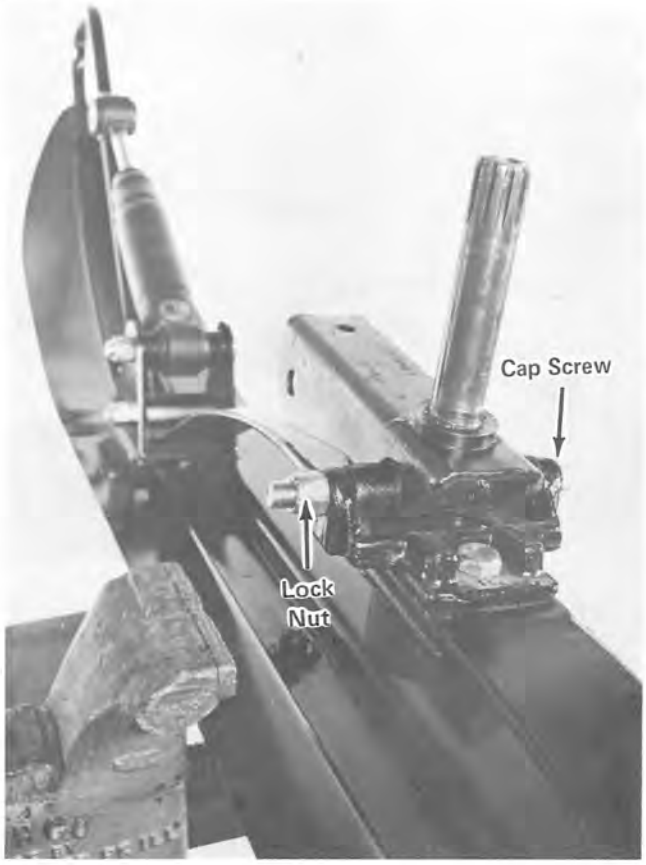
1. Apply low-temperature grease (Texaco 2346 EP or equivalent) on the unthreaded portion of the cap screw that holds spindle to ski saddle.

2. Position the spindle on the ski saddle and secure in place with a cap screw, Fig. VII-61, using a 9/16-inch socket. Tighten cap screw to 30 ft. lbs. torque, using a 9/16-inch socket and torque wrench.

Note: Head of cap screw is to be on opposite side of threaded hole in ski saddle.

3. Thread lock nut, Fig. VII-61, onto cap screw and tighten to 30 ft. lbs. torque, using a 9/16-inch socket and torque wrench.

Fig. VII-61

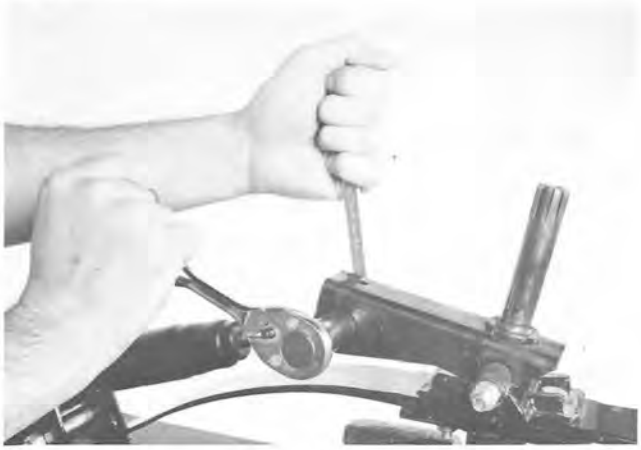


4. Slide the short sleeve through moveable end of shock absorber.

5. Apply low-temperature grease (Texaco 2346 EP or equivalent) on the unthreaded portion of the cap screw that holds moveable end of shock absorber to spindle.

6. Position the moveable end between the spindle bracket and secure in place with cap screw and lock nut, using a 5/8-inch socket and wrench, Fig. VII-62. Tighten lock nut to 50 ft. lbs. torque, using a 5/8-inch socket and torque wrench.

Fig. VII-62

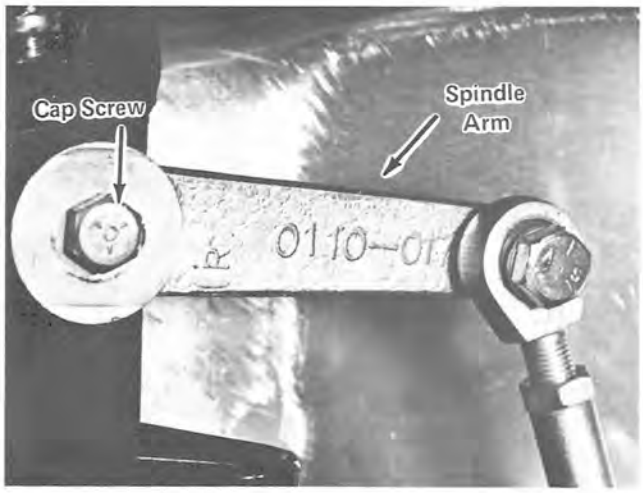


7. Place flat washer on spindle shaft; then slide shaft through the spindle mount.

8. Place flat washer and U-bend washer on spindle shaft.

9. Align the skis (see Ski Alignment, page VII-23). When correct alignment is obtained, secure spindle arm to spindle with cap screw and flat washer, Fig. VII-63, using a 1/2-inch socket. Tighten cap screw to 20 ft. lbs. torque, using a 1/2-inch socket and torque wrench.

Fig. VII-63

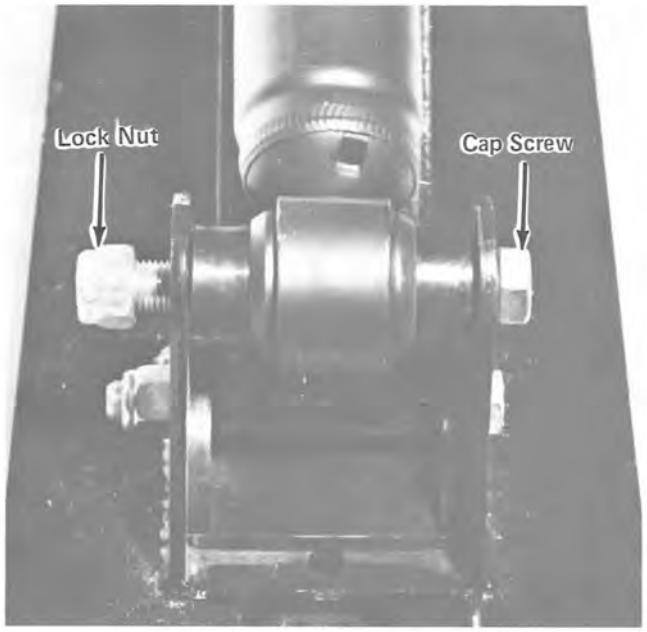


Remove Ski Spring

Equipment Necessary: 5/8-Inch Socket, 5/8-Inch Wrench, 1/2-Inch Socket, 1/2-Inch Wrench and a Vise

1. Remove lock nut and cap screw that holds bottom end of shock absorber (stationary end) to mount bracket, Fig. VII-64, using a 5/8-inch socket and wrench. Account for the long sleeve and two plastic bushings.

Fig. VII-64



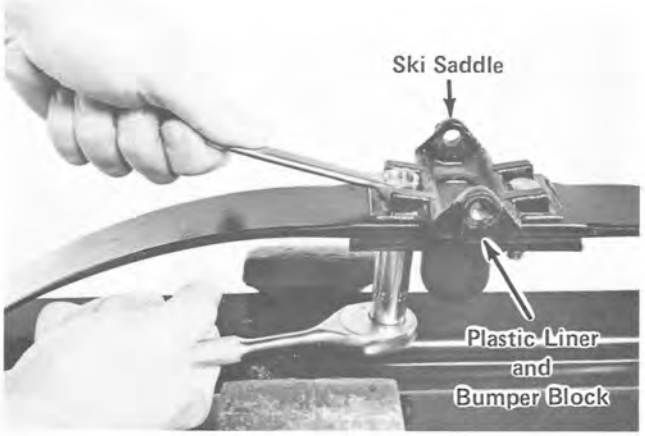
2. Remove the lock nut from the cap screw that holds ski saddle to spindle, using a 9/16-inch socket; then remove the cap screw, Fig. VII-65.

Fig. VII-65

Note: The lock nut must first be removed from the cap screw, then the cap screw can be removed. The reason for this is that the cap screw is threaded through the ski saddle.

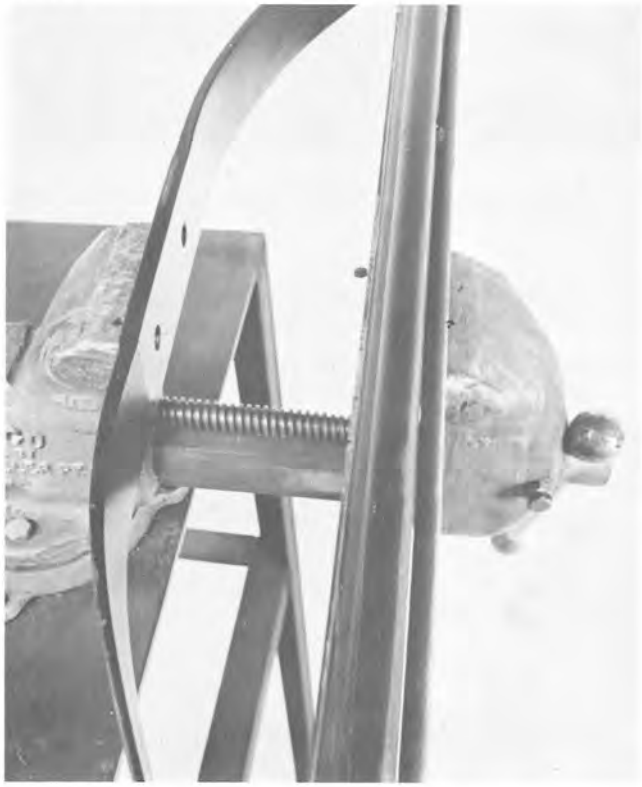
3. Remove the two cap screws and lock nuts that hold ski saddle, plastic liner and bumper block to the ski spring, using a 9/16-inch socket and wrench, Fig. VII-66. Set components aside.

Fig. VII-66



4. Place ski in a vise and compress spring approximately 1 inch, Fig. VII-67.

Fig. VII-67

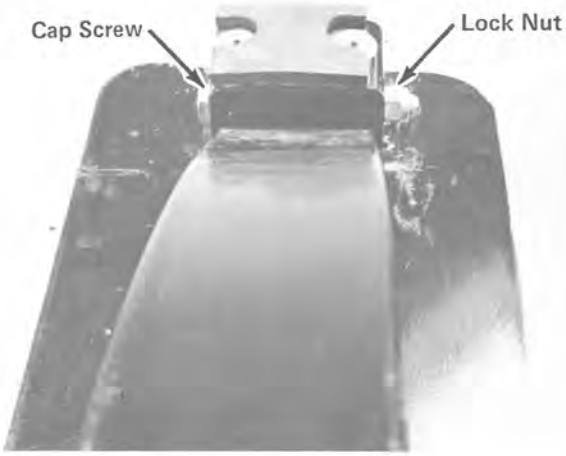


5. Remove the cap screw and lock nut that holds front of spring and spring slide saddle between the mount bracket, using a 9/16-inch socket and wrench, Fig. VII-68. After components are disassembled, slowly release the vise pressure against the spring.

Fig. VII-68

6. Remove cap screw and lock nut, Fig. VII-69, that holds spring to mount bracket at rear of ski, using a 1/2-inch socket and wrench. Ski spring can now be replaced.

Fig. VII-69



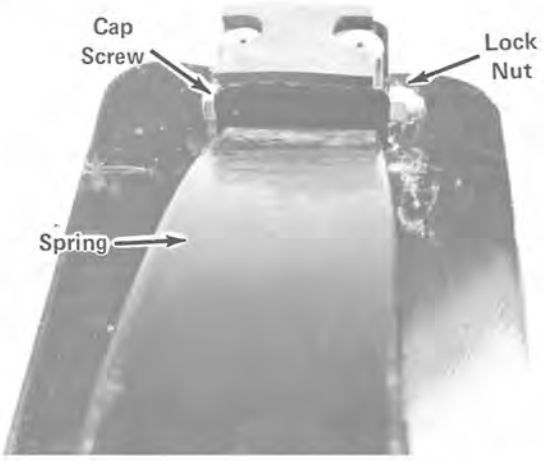
Install Ski Spring

Equipment Necessary: 1/2-Inch Socket, 1/2-Inch Wrench, Torque Wrench, 5/8-Inch Socket and 5/8-Inch Wrench

1. Install end of spring between mount bracket at rear of ski, Fig. VII-70. Secure spring in place with cap screw and lock nut, Fig. VII-70, using a 1/2-inch socket and wrench. Tighten lock nut to 20 ft. lbs. torque, using a 1/2-inch socket and torque wrench.

Note: Lock nut is to be positioned on the inside of the ski.

Fig. VII-70

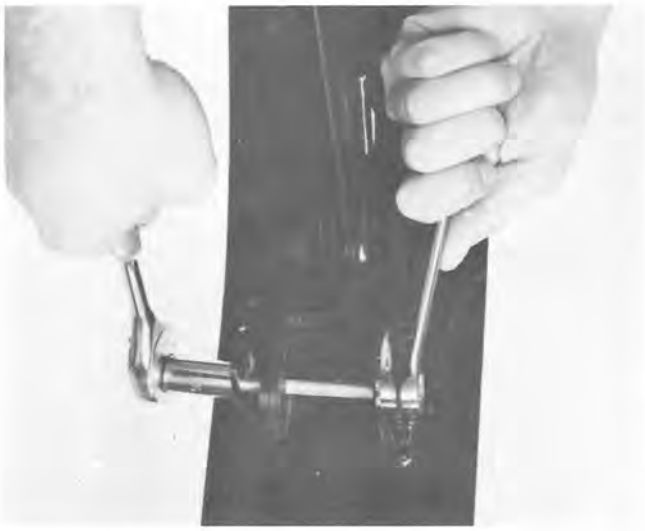


2. Place spring slide saddle and spring between the front mount bracket, Fig. VII-71.

Fig. VII-71

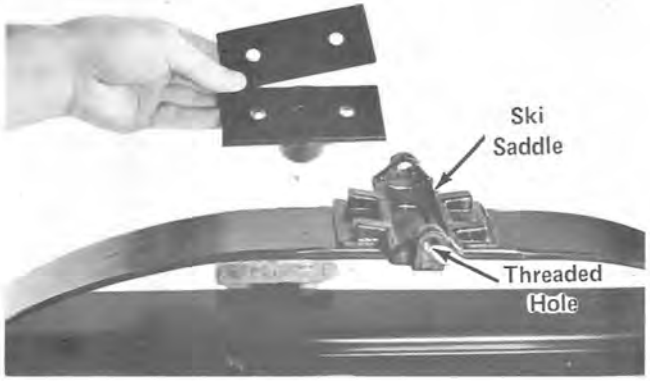
3. Place ski in a vise and compress spring until cap screw and lock nut can be installed, Fig. VII-72. Spring should be retained in place at this time. Tighten lock nut to 35 ft. lbs. torque, using a 9/16-inch socket, 9/16-inch wrench and a torque wrench. After components are assembled, slowly release the vise pressure against the spring.

Fig. VII-72



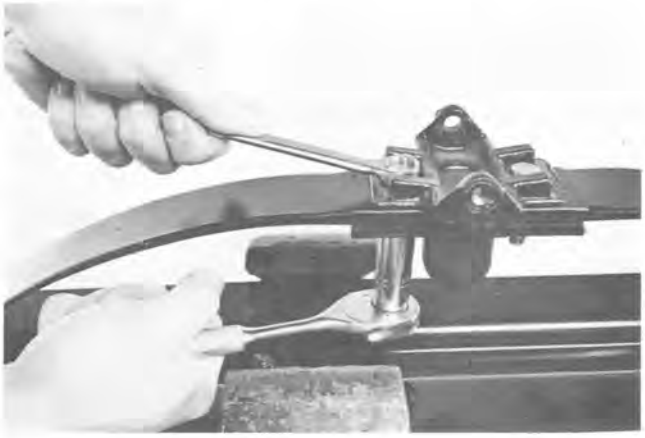
4. Place the ski saddle on top of the spring, Fig. VII-73. Threaded hole in saddle must be positioned toward the inside of the ski. Place plastic liner and bumper block under the saddle and spring, Fig. VII-73.

Fig. VII-73



5. Secure components in place with two cap screws and lock nuts, using 9/16-inch socket and wrench, Fig. VII-74. Tighten lock nuts to 35 ft. lbs. torque, using a 9/16-inch socket, 9/16-inch wrench and a torque wrench.

Fig. VII-74



6. Place ski saddle into position on spindle and secure in place with cap screw, Fig. VII-75, using a 9/16-inch socket. Tighten cap screw to 30 ft. lbs. torque, using a 9/16-inch socket and torque wrench.

Note: Head of cap screw is to be on opposite side of threaded hole in ski saddle.

Fig. VII-75

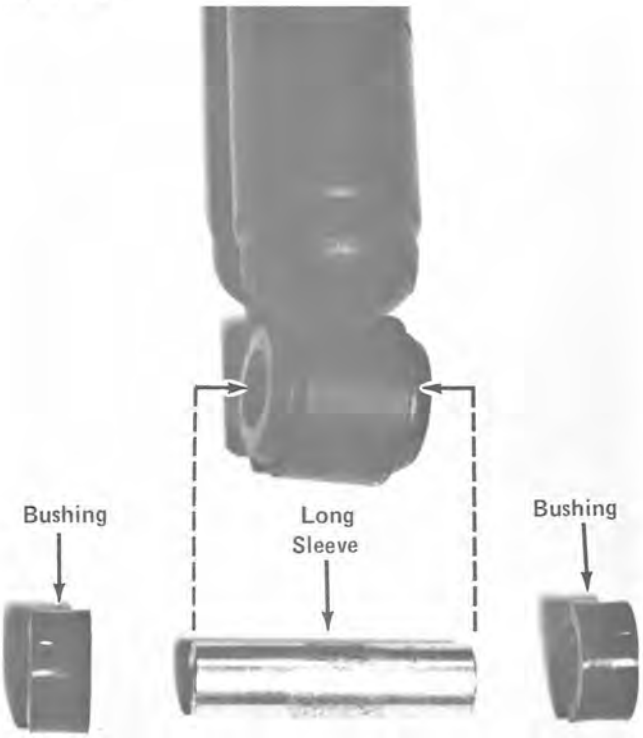
7. Thread lock nut onto cap screw and tighten to 30 ft. lbs. torque, using a 9/16-inch socket and torque wrench.

8. Slide long sleeve through stationary end of shock absorber, Fig. VII-76; then place a plastic bushing on each end of the long sleeve, Fig. VII-76.

Note: Flat end surface of the plastic bushing is to contact the shock absorber and radiused end surface is to contact mount bracket on ski.

STEERING SERVICING

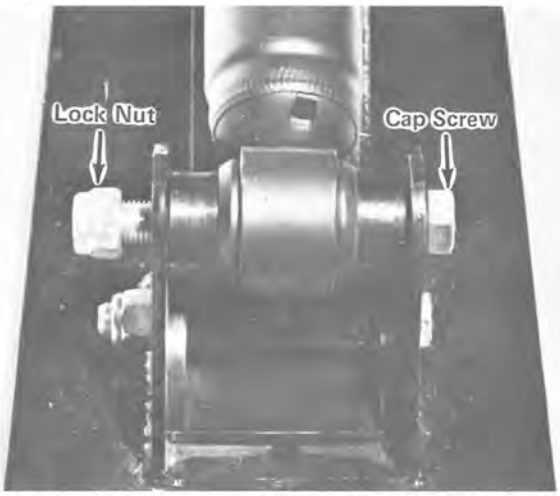
Fig. VII-76



9. Apply low-temperature grease (Texaco 2346 EP or equivalent) on the unthreaded portion of the cap screw that holds stationary end of shock absorber to mount bracket.

10. Place stationary end of shock absorber between the mount bracket; then secure in place with cap screw and lock nut, Fig. VII-77, using a 5/8-inch socket and wrench. Tighten lock nut to 50 ft. lbs. torque, using a 5/8-inch socket, 5/8-inch wrench and a torque wrench.

Fig. VII-77

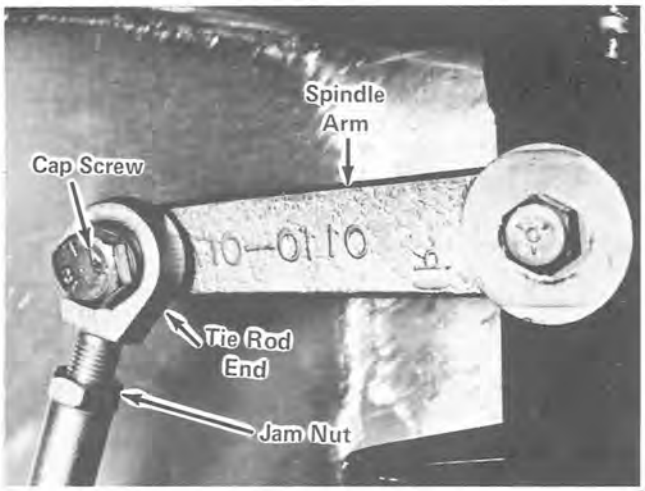


Ski Alignment

Equipment Necessary: 9/16-Inch Socket, 9/16-Inch Open End Wrench, Tape Measure and Torque Wrench

1. Remove the cap screw and lock nut that holds the tie rod end to the spindle arm, Fig. VII-78, using a 9/16-inch socket and open end wrench. Separate tie rod end from the spindle arm. Perform this step on opposite tie rod end.

Fig. VII-78



2. Position the skis straight forward and establish a parallel relationship.

3. Measure the distance to the outside edge of both skis, using a tape measure, Fig. VII-79. Make sure measurement is taken behind the front spring mount bracket and ahead of the rear spring mount bracket. Skis are to be parallel (same measurement at front and rear) or have a maximum of 1/4-inch "toe in" (front measurement 1/4-inch less than at rear).

Fig. VII-79

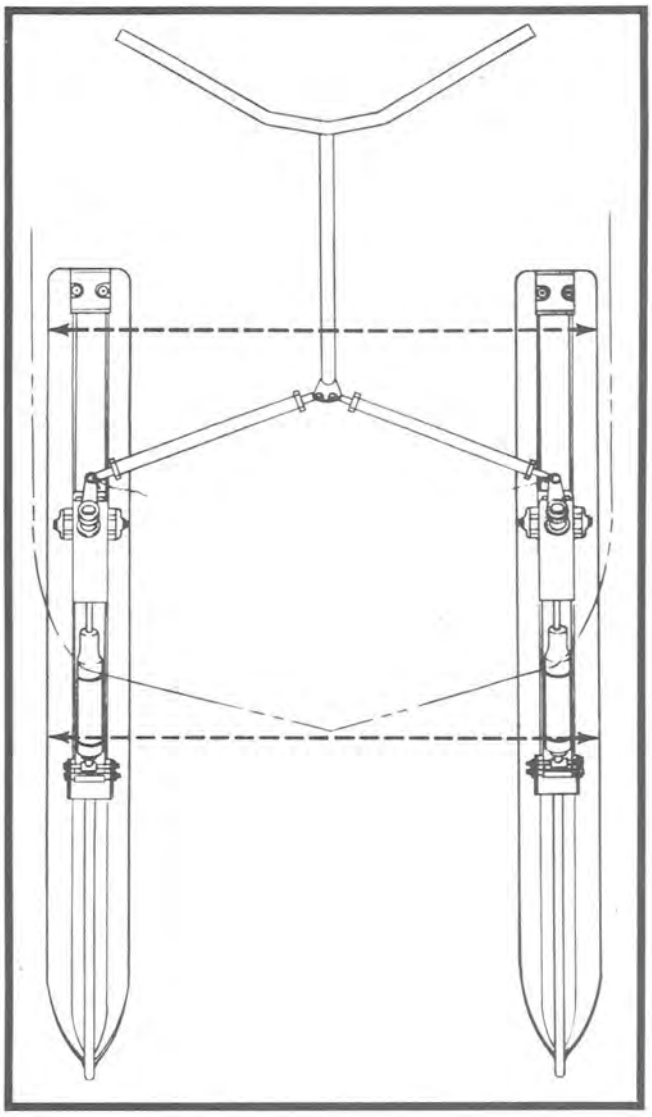
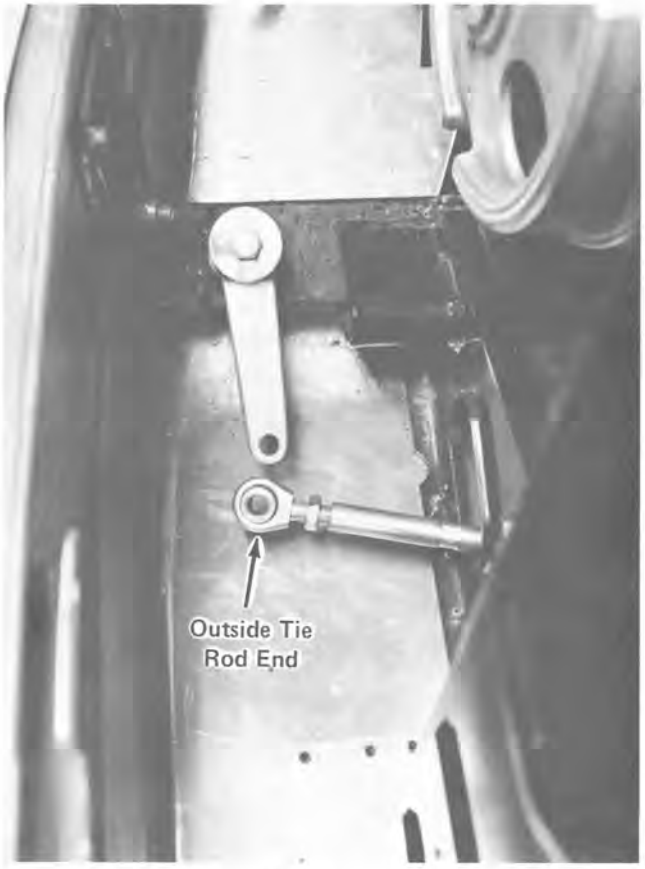


Fig. VII-79A



4. Position the handlebars straight forward in relation to the skis.

5. Rotate the outside tie rod end until the mounting hole lines up with the hole in the spindle arm, Fig. VII-79A. Secure tie rod end to spindle arm with a cap screw and lock nut, Fig. VII-78, using a 9/16-inch socket and open end wrench. Tighten cap screw to 35 ft. lbs. torque, using a 9/16-inch socket and torque wrench.

6. Bottom the jam nut against the tie rod, Fig. VII-78, using a 9/16-inch open end wrench.

7. Perform steps 5 and 6 on remaining tie rod end.

WARNING

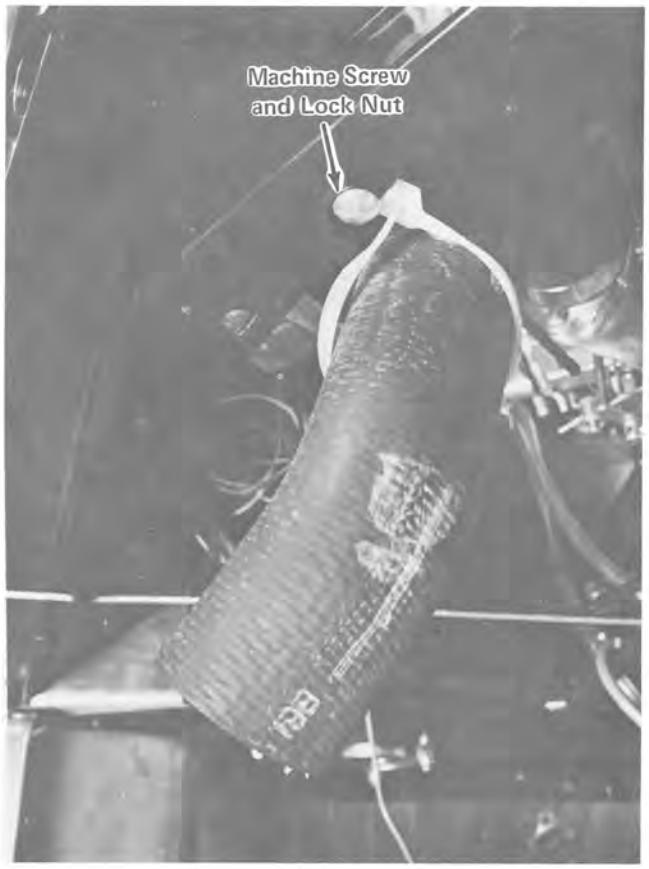
To ensure the utmost safety of the operator, all cap screws, lock nuts, jam nuts, tie rods and tie rod ends must be tightened properly and be without noticeable damage. Tie rod ends must be threaded halfway into tie rod to assure maximum steering linkage strength. If any of these conditions are neglected, damaged or not assembled properly, serious injury to the operator or passenger may occur.

Remove Instrument Panel

Equipment Necessary: Screwdriver Having 5/16-Inch Blade, 7/16-Inch Wrench, Screwdriver Having a 1/4-Inch Blade and Screwdriver Having a 7/16-Inch Blade

1. USE THIS STEP ONLY IF ENGINE IS EQUIPPED WITH A DIAPHRAGM-TYPE CARBURETOR – Remove the machine screw and lock nut that holds the nylon strap and air intake hose to the right side of the instrument panel, Fig. VII-80, using a 7/16-inch wrench and screwdriver having a 5/16-inch blade.

Fig. VII-80



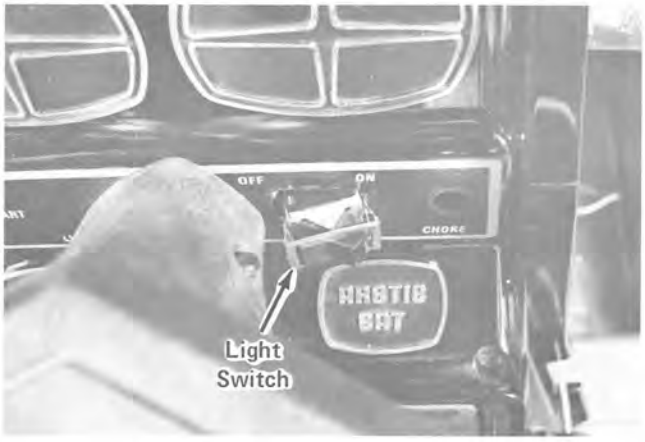
2. If snowmobile is equipped with a tachometer, speedometer or heat gauge, all wires and drive cables are to be disconnected so that the instrument panel can be removed.

3. Remove the ring nut holding ignition switch in the instrument panel, Fig. VII-81; slide switch through the instrument panel. DO NOT REMOVE WIRE CONNECTOR FROM IGNITION SWITCH.

Fig. VII-81

4. Pull wires off light switch terminals. Compress locking tabs on back of light switch, using thumb and forefinger. Remove switch from instrument panel, Fig. VII-82.

Fig. VII-82



5. Loosen screw holding choke wire to choke arm on carburetor, using a screwdriver having a 1/4-inch blade. Remove wire from choke arm and pull complete choke control from the instrument panel, Fig. VII-83.

6. Loosen the three-quarter-turn studs holding instrument panel to lower shroud, using a screwdriver having a 7/16-inch blade.

7. Pull sides of instrument panel outward and remove it from the lower shroud.

Fig. VII-83

Install Instrument Panel

Equipment Necessary: Screwdriver Having 5/16-Inch Blade, 7/16-Inch Wrench, Screwdriver Having 1/4-Inch Blade and Screwdriver Having a 7/16-Inch Blade

1. Install the instrument panel on the lower shroud with the three-quarter-turn studs, using a screwdriver having a 7/16-inch blade.

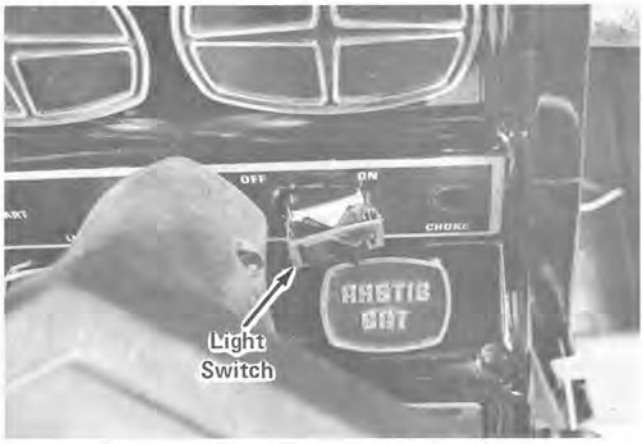
2. Slide the ignition switch through the instrument panel, then secure in place with the ring nut, Fig. VII-84. DO NOT OVER-TIGHTEN RING NUT.

Note: It is possible to install the ignition switch upside down. Make sure single prong terminal on ignition switch is toward the steering post.

Fig. VII-84

3. Install light switch in the instrument panel, Fig. VII-85. Make sure that vertically-oriented terminals are nearest to the steering post.

Fig. VII-85



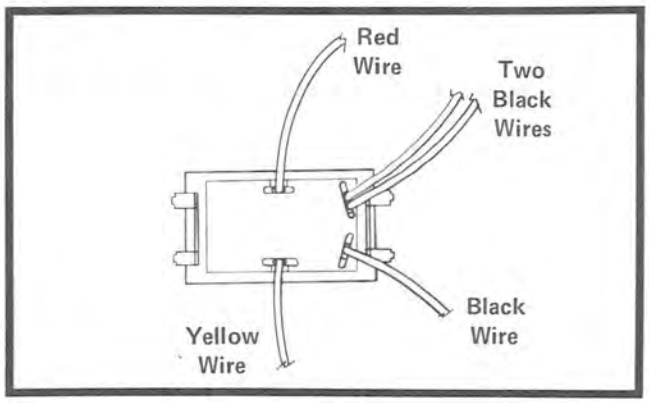
A. Connect the TWO BLACK wires that are contained in one plug to the upper right vertically-oriented terminal on the light switch, Fig. VII-86. One of the black wires runs to the taillights, the other to the circuit board "LIGHTS".

B. Connect the long BLACK wire that runs from the dimmer switch to the lower right vertically-oriented terminal on the light switch, Fig. VII-86.

C. Connect the RED wire that runs from the brake switch to the top left horizontally-oriented terminal on the light switch, Fig. VII-86.

D. Connect the YELLOW wire that runs from the ignition switch to the lower left horizontally-oriented terminal on the light switch, Fig. VII-86.

Fig. VII-86



4. Slide the complete choke control assembly through the instrument panel and lock it in place, Fig. VII-87. Move the carburetor-mounted choke arm fully forward (toward engine) and install choke wire. Position the front edge of the console-mounted choke knob 1/8-inch away from the choke "stop". When knob is in proper position, tighten choke wire retaining screw, using a screwdriver having a 1/4-inch blade.

Fig. VII-87

5. USE THIS STEP ONLY IF ENGINE IS EQUIPPED WITH A DIAPHRAGM-TYPE CARBURETOR — Install air intake hose to the right side of the instrument panel with the nylon strap, machine screw and lock nut, Fig. VII-88, using a 7/16-inch wrench and a screwdriver having a 5/16-inch blade.

Fig. VII-88

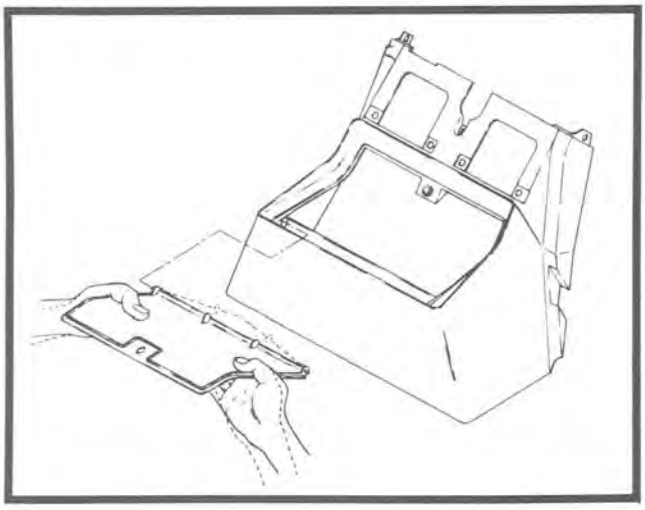
6. Connect electrical wires and cables for speedometer, tachometer and heat gauges, if the snowmobile is so equipped.

Remove Lower Shroud (Toolbox)

Equipment Necessary: 7/16-Inch Wrench, Screwdriver Having a 7/16-Inch Blade, Air-Powered Drill and 5/32-Inch Bit

1. Open the toolbox door completely. Place both hands behind the door and thumbs around the sides. Exert pressure toward center of door and pull upward when door is bowed far enough to release it from mounting curve in lower shroud, Fig. VII-89.

Fig. VII-89



2. Remove the instrument panel (see Remove Instrument Panel, page VII-25).

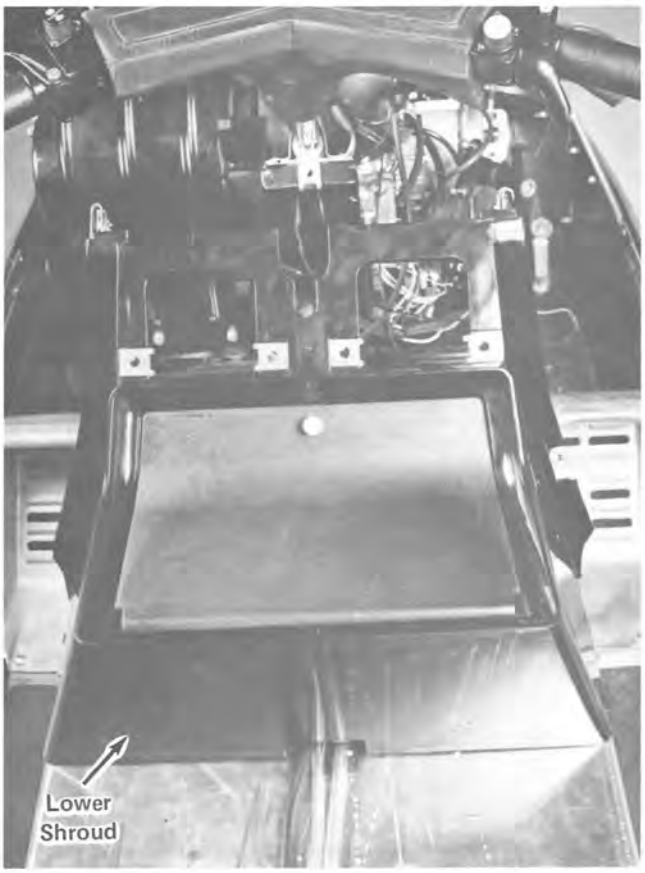
Note: It is not necessary to remove the light switch and complete choke assembly from the instrument panel when lower shroud is to be removed.

3. Remove the two machine screws, flat washers and lock nuts that hold the recoil bracket to the side of the lower shroud, using a 7/16-inch wrench and a screwdriver having a 7/16-inch blade. Before the machine screws are removed, grasp recoil handle to prevent a sudden rewind; then pull out machine screws and allow the recoil handle to rewind against the recoil housing.

4. Remove the seat from the tunnel.

5. Loosen the three-quarter-turn studs that hold lower shroud to brackets on steering support tower, left side of tunnel and right side of tunnel, Fig. VII-90, using a screwdriver having a 7/16-inch blade.

Fig. VII-90



6. Slide the lower shroud away from the steering post.

7. Drill out the pop rivets that hold toolbox bottom to lower shroud, using a 5/32-inch bit and air-powered drill.

Note: The toolbox pad is to be considered as a separate part if the lower shroud is being replaced.

Install Lower Shroud (Toolbox)

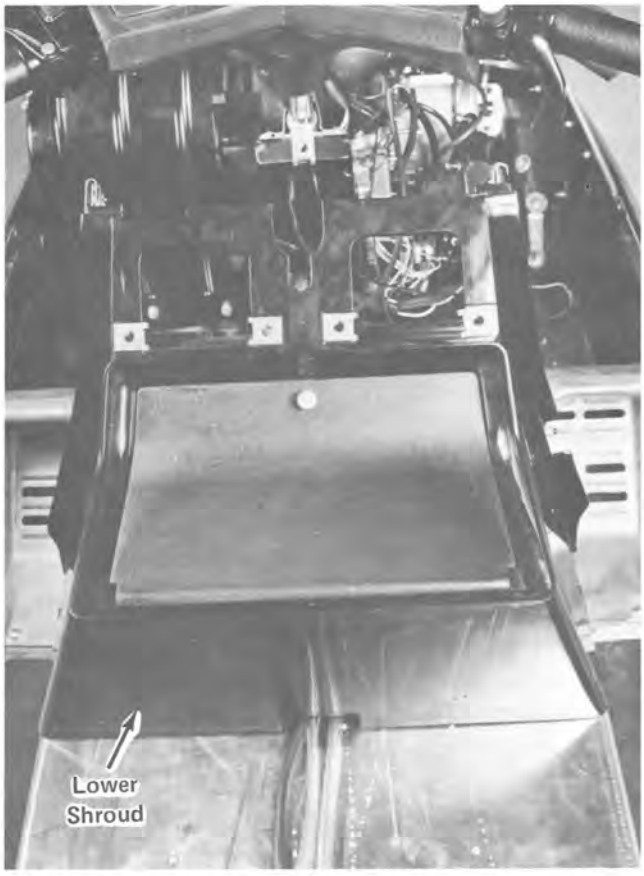
Equipment Necessary: Air-Operated Pop Rivet Tool, Screwdriver Having a 7/16-Inch Blade and 7/16-Inch Wrench

1. Assemble the toolbox bottom and lower shroud with pop rivets and washers, using an air-operated pop rivet tool.

2. Install toolbox pad on toolbox bottom.

3. Slide lower shroud into position against the steering support tower. Secure the lower shroud in place with three-quarter-turn studs, washers and receptacles, Fig. VII-91, using a screwdriver having a 7/16-inch blade.

Fig. VII-91



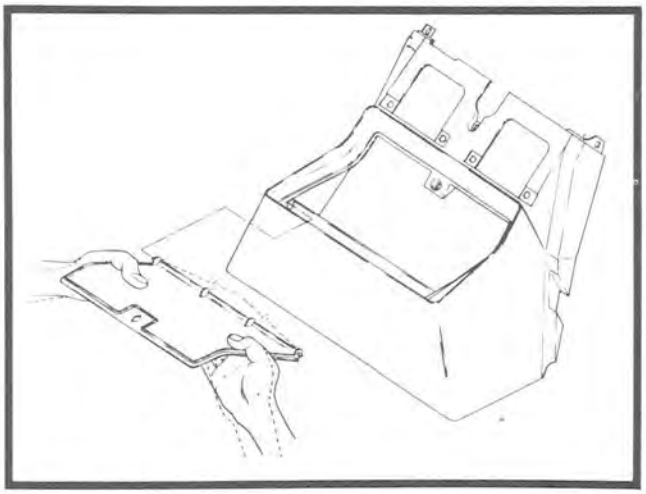
4. Install the seat on the tunnel, Fig. VII-92.

Fig. VII-92

5. Pull the recoil handle and bracket into position on the side of the lower shroud. Secure recoil bracket to lower shroud with two machine screws, flat washers and lock nuts, using a 7/16-inch wrench and a screwdriver having a 7/16-inch blade.

6. Install the toolbox door by placing both hands behind the door and thumbs around the sides. Exert pressure toward center of door and push it downward into the lower shroud mounting curve when door is bowed far enough, Fig. VII-93.

Fig. VII-93



7. Install the instrument panel (see Install Instrument Panel, page VII-26).

Remove Hood, Headlight, Hinge Bracket and Hinge Support

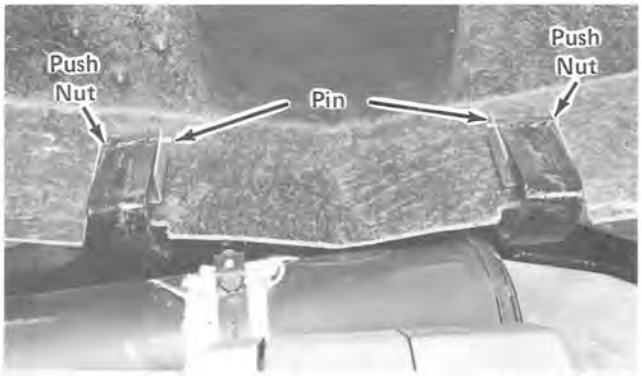
Equipment Necessary: Screwdriver Having a 1/4-Inch Blade, Pliers, 7/16-Inch Socket, Screwdriver Having a 7/16-Inch Blade, 1/4-Inch Wrench, Phillips Screwdriver Having a No. 1 Blade and Phillips Screwdriver Having a No. 3 Blade

1. Remove the hood cable from the hood by prying looped end over rivet, using a screwdriver having a 1/4-inch blade.

2. Disconnect the headlight harness from the main wiring harness.

3. Remove the push nut, Fig. VII-94, from the pins that hold hood to hinge support, using a pliers. After push nuts are removed, pull pins out of hood hinge and hinge support, Fig. VII-94, using a pliers.

Fig. VII-94



4. If the hood hinge bracket needs to be removed, proceed to step 5. If the headlight and/or headlight housing needs to be replaced, proceed to steps 6-8. If the belly pan-mounted hinge support needs to be replaced, proceed to steps 9-11.

5. Remove the two slotted machine screws, rubber washers and lock nuts that hold the hinge bracket to the hood, Fig. VII-95, using a 7/16-inch socket and screwdriver having a 7/16-inch blade. Repeat this step on opposite hinge bracket.

Fig. VII-95

6. Disconnect the headlight harness from the headlight; then remove headlight harness from hood.

7. Press ends of headlight retaining wire together until it disengages from the keepers. Remove headlight from housing.

8. Remove the four machine screws, washers and lock nuts that hold headlight housing in the hood, using a 1/4-inch wrench and a phillips screwdriver having a no. 1 blade. Slide headlight housing out of hood.

9. Remove reflector, reflectorized strip and vinyl strip from the bumper (see Remove Reflector, Reflectorized Strip and Vinyl Strip, page VII-32).

10. Remove the two machine screws and lock nuts that hold the hinge support to the sides of the belly pan and bumper, using a 7/16-inch socket and phillips screwdriver having a no. 3 blade.

11. Remove the four machine screws and lock nuts that hold the hinge support to the front of the belly pan, using a 7/16-inch socket and screwdriver having a 7/16-inch blade. Hinge support should now be free of the belly pan.

Install Hood, Headlight, Hinge Bracket and Hinge Support

Equipment Necessary: 7/16-Inch Socket, Screwdriver Having a 7/16-Inch Blade, Phillips Screwdriver Having a No. 3 Blade, 1/4-Inch Wrench, Phillips Screwdriver Having a No. 1 Blade and Screwdriver Having a 1/4-Inch Blade

1. If the belly pan-mounted hinge support was removed, proceed to steps 2-4. If the headlight housing was removed, proceed to steps 5-7. If the hood hinge bracket was removed, proceed to step 8.

2. Place hinge support into position in front of belly pan. Retain center of hinge support to front of belly pan with four machine screws and lock nuts, using a 7/16-inch socket and screwdriver having a 7/16-inch blade. DO NOT TIGHTEN MACHINE SCREWS AT THIS TIME.

3. Retain ends of hinge support to sides of belly pan and bumper with two machine screws and lock nuts, using a 7/16-inch socket and phillips screwdriver having a no. 3 blade.

4. Install vinyl strip, reflectorized strip and reflector (see Install Vinyl Strip, Reflectorized Strip and Reflector, page VII-33).

5. Install headlight housing in hood with four machine screws, washers and lock nuts, using a 1/4-inch wrench and a phillips screwdriver having a no. 1 blade.

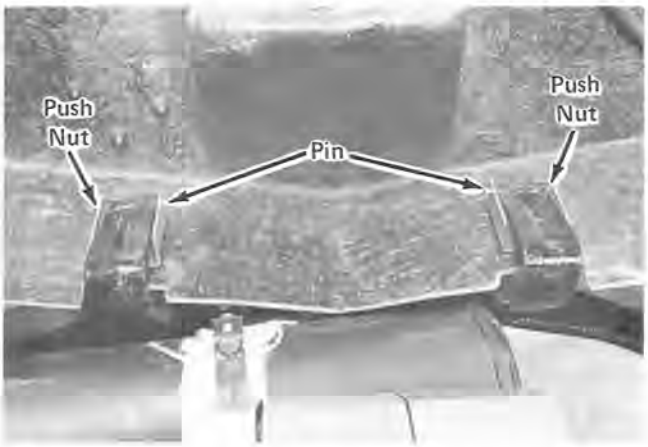
6. Install headlight on back of headlight housing with retaining wire.

7. Install headlight harness on inside of hood; then push connector over headlight terminals.

8. Install hinge bracket on inside of hood with two slotted machine screws, rubber washers and lock nuts, using a 7/16-inch socket and screwdriver having a 7/16-inch blade. Repeat this step on remaining hinge bracket.

9. Place hood into position on hinge support. Retain hood in place with pins and push nuts, Fig. VII-96. Pins are to be installed from inside to outside of bracket.

Fig. VII-96



10. Install looped ends of hood cable over rivet on hood, using a screwdriver having a 1/4-inch blade.

11. Connect the headlight harness to the main wiring harness.

12. If headlight and/or headlight housing was removed, adjust the headlight (see Headlight Aiming, page VII-31).

Headlight Aiming

Equipment Necessary: Tape Measure and Phillips Screwdriver Having a No. 1 Blade

The headlight can be adjusted for vertical and horizontal aim of the high/low beam. The geometric center of the high beam light zone is to be used for vertical and horizontal service aiming.

1. Make sure suspension is adjusted properly.

2. Position the snowmobile on a level floor so that the headlight is approximately 25 feet away from a wall or similar aiming surface.

3. Measure the distance from the floor to midpoint of headlight, using a tape measure. REMEMBER THIS DISTANCE.

4. Using distance obtained in step 3, place an appropriate mark on the wall or similar headlight aiming surface.

5. Activate the headlight and make sure high beam is on. DO NOT USE LOW BEAM – IMPROPER HEADLIGHT AIM WILL RESULT.

6. Observe the headlight beam aim. Proper aim is when the most intense beam is focused and centered 2 inches below the mark made on the wall or similar aiming surface. If headlight aim is not as specified, a vertical and/or horizontal adjustment of the headlight is necessary (see step 7).

7. If an adjustment is necessary, proceed as follows:

   A. VERTICAL ADJUSTMENT – The vertical adjusting screw is located at the bottom center of the headlight housing. To lower the vertical aim of the high beam, rotate vertical adjusting screw clockwise, using a phillips screwdriver having a no. 1 blade. To raise the vertical aim of the high beam, rotate vertical adjusting screw counterclockwise, using a phillips screwdriver having a no. 1 blade. Recheck headlight aim using steps 2-6.

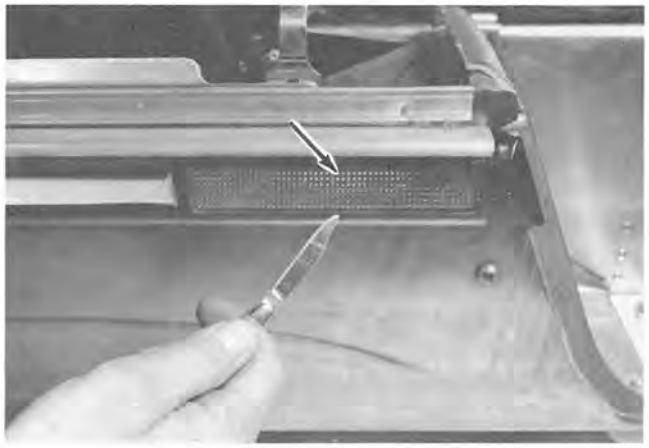
   B. HORIZONTAL ADJUSTMENT – The two horizontal adjusting screws are located at side center of headlight housing. Rotate horizontal adjusting screw clockwise to move headlight to the right and counterclockwise to move headlight to the left, using a phillips screwdriver having a no. 1 blade. Recheck headlight aim using steps 2-6.

Remove Reflector, Reflectorized Strip and Vinyl Strip

Equipment Necessary: Jackknife, Screwdriver Having a 1/4-Inch Blade and Phillips Screwdriver Having a No. 3 Blade

1. Insert jackknife tip between TOP AND BOTTOM of reflector housing and reflector, Fig. VII-97. Pry reflector away from the reflector housing.

Fig. VII-97



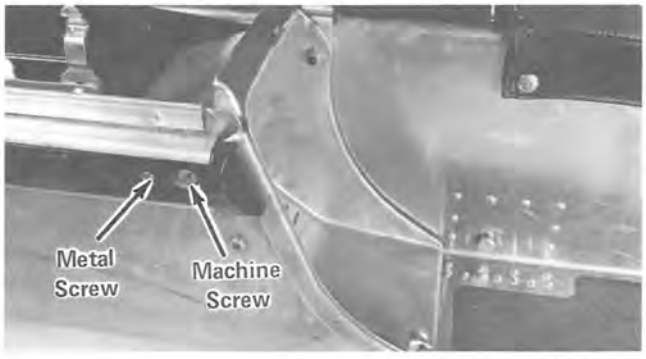
CAUTION

Do not try to remove reflector when it is cold. If an attempt is made to remove the reflector when it is cold, the reflector may break.

2. Remove the metal screw that holds reflector housing to the bumper, Fig. VII-98, using a screwdriver having a 1/4-inch blade.

3. Remove the machine screw that holds end of bumper to the footrest, Fig. VII-98, using a phillips screwdriver having a no. 3 blade.

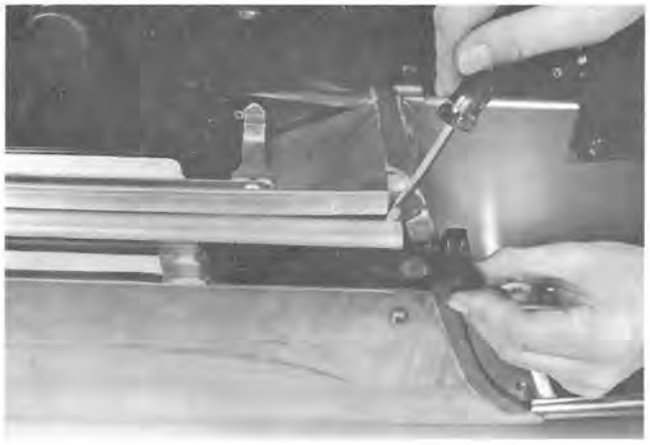
Fig. VII-98



4. Insert screwdriver blade between end of bumper and belly pan. Pry bumper away from belly pan and slide reflector housing out of the bumper track, Fig. VII-99.

Note: The bumper must be pried away from the belly pan so that clearance can be obtained between the lapped-side of the footrest and the end of the reflector housing. If bumper is not pried away from belly pan, there will not be enough clearance to allow the reflector housing to slide by the lapped-side of the footrest.

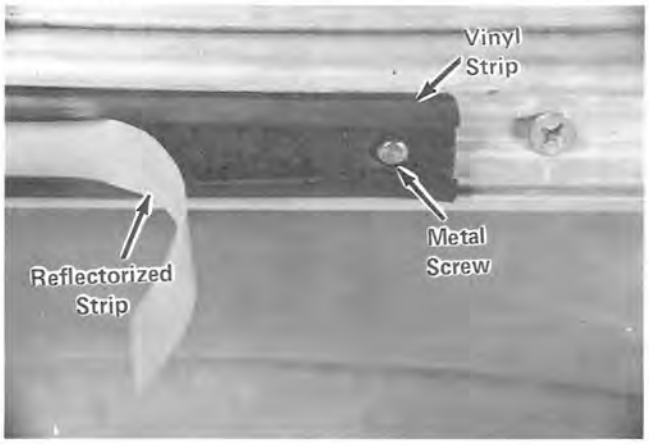
Fig. VII-99



5. Perform steps 1-4 on opposite side of reflector housing.

6. Grasp end of reflectorized strip, Fig. VII-100, and pull it out of the track in the vinyl strip. Remove the metal screw that holds vinyl strip to bumper, Fig. VII-100, using a screwdriver having a 1/4-inch blade.

Fig. VII-100



7. Grasp vinyl strip and pull it out of the bumper track.

Install Vinyl Strip, Reflectorized Strip and Reflector

Equipment Necessary: Pliers, Screwdriver Having a 1/4-Inch Blade and Phillips Screwdriver Having a No. 3 Blade

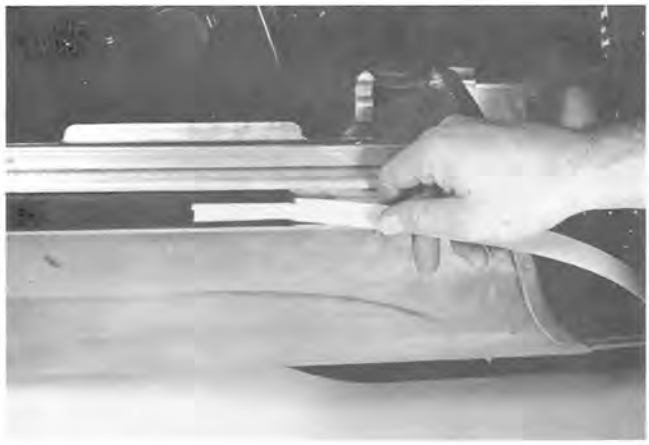
1. Apply liquid detergent on backside of vinyl strip. Insert end of vinyl strip into track in bumper, Fig. VII-101. Grasp end of vinyl strip and pull completely around bumper, using a pliers.

Fig. VII-101

2. Secure the vinyl strip to the bumper with two metal screws, using a screwdriver having a 1/4-inch blade.

3. Apply liquid detergent on backside of reflectorized strip. Insert end of reflectorized strip into track in vinyl strip, Fig. VII-102. Grasp end of reflectorized strip and pull completely around the vinyl strip, using a pliers.

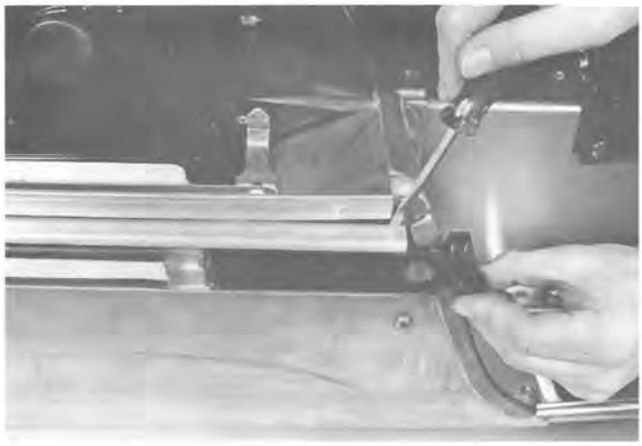
Fig. VII-102



4. Insert screwdriver blade between end of bumper and belly pan. Pry bumper away from belly pan and slide reflector housing into bumper track, Fig. VII-103.

Note: The bumper must be pried away from the belly pan so that clearance can be obtained between the lapped-side of the footrest and the end of the reflector housing. If bumper is not pried away from belly pan, there will not be enough clearance to allow the reflector housing to slide the lapped-side of the footrest.

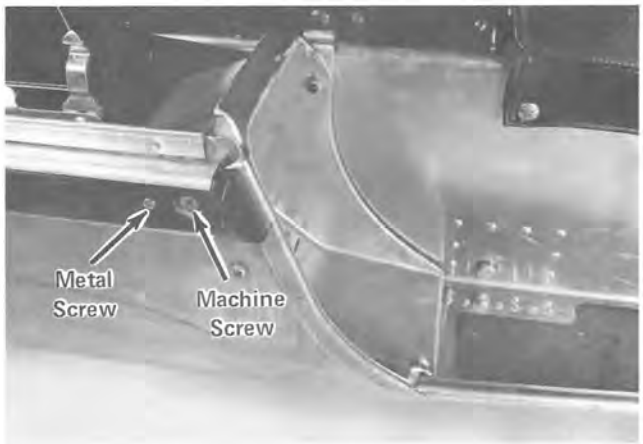
Fig. VII-103



5. Install the metal screw that holds the reflector housing to the bumper, Fig. VII-104, using a screwdriver having a 1/4-inch blade.

6. Install machine screw that holds end of bumper to footrest, Fig. VII-104, using a phillips screwdriver having a no. 3 blade.

Fig. VII-104



7. Snap the reflector into the reflector housing.

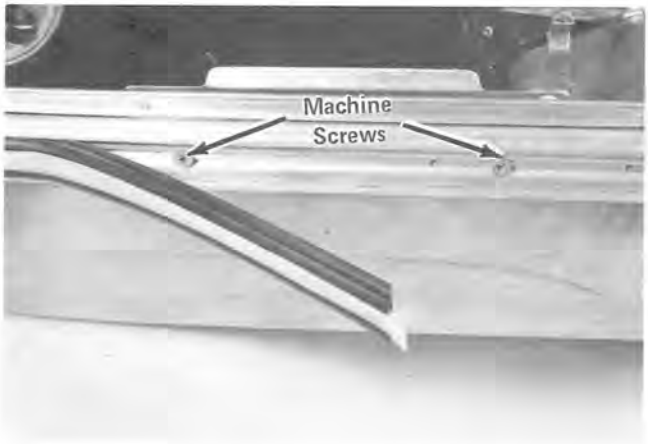
Remove Bumper, Hood Channels and Hood Cushions

Equipment Necessary: 7/16-Inch Socket and Phillips Screwdriver Having a No. 3 Blade

1. Remove the reflector, reflectorized strip and vinyl strip (see Remove Reflector, Reflectorized Strip and Vinyl Strip, page VII-32).

2. Remove the remaining 5 machine screws and lock nuts that hold both sides of the bumper to the belly pan and front end, Fig. VII-105, using a 7/16-inch socket and a phillips screwdriver having a no. 3 blade.

Fig. VII-105



3. At this time the bumper, hood channels and hood cushions are now disassembled completely from the belly pan.

Install Bumper, Hood Channels and Hood Cushions

Equipment Necessary: 7/16-Inch Socket and Phillips Screwdriver Having a No. 3 Blade

1. Install the bumper, hood channels and hood cushions to the belly pan and front end with 5 machine screws and lock nuts, using a 7/16-inch socket and phillips screwdriver having a no. 3 blade. DO NOT INSTALL REMAINING TWO MACHINE SCREWS THAT HOLD ENDS OF BUMPER TO FOOTREST.

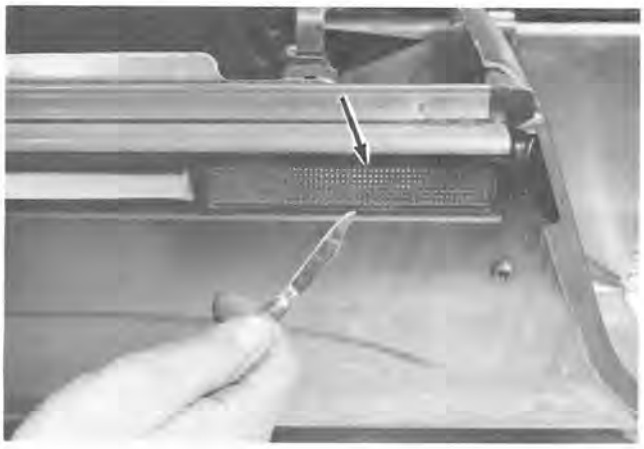
2. Install the vinyl strip, reflectorized strip and reflector (see Install Vinyl Strip, Reflectorized Strip and Reflector, page VII-33).

Remove Footrest

Equipment Necessary: Jackknife, Phillips Screwdriver Having a No. 3 Blade, 7/16-Inch Box-End Wrench and Screwdriver Having a 7/16-Inch Blade

1. Insert jackknife tip between TOP AND BOTTOM of reflector housing and reflector, Fig. VII-105A. Pry reflector away from the reflector housing.

Fig. VII-105A



CAUTION

Do not try to remove reflector when it is cold. If an attempt is made to remove the reflector when it is cold, the reflector may break.

2. Remove the two machine screws that hold the footrest to end of bumper and belly pan, Fig. VII-106, using a phillips screwdriver having a no. 3 blade.

3. Remove the machine screw and lock nut that holds bottom of footrest to tunnel (running board), Fig. VII-106, using a 7/16-inch box-end wrench and screwdriver having a 7/16-inch blade.

4. Remove the skid frame from the tunnel (see Section VI, Skid Frame Removal, page VI-3).

5. Remove the two machine screws and nylon cap nuts that hold inside of footrest to bracket at front side of tunnel, Fig. VII-106, using a 7/16-inch box-end wrench and screwdriver having a 7/16-inch blade. Slide

footrest from between the belly pan and side of tunnel.

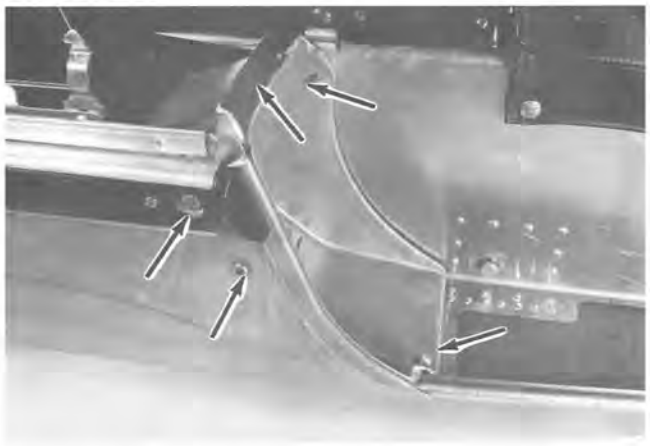
Install Footrest

Equipment Necessary: 7/16-Inch Box-End Wrench, Screwdriver Having a 7/16-Inch Blade and Phillips Screwdriver Having a No. 3 Blade

1. Slide the footrest into position between the belly pan and tunnel. Line up holes in tunnel, bracket and footrest; then secure footrest to tunnel with two machine screws and nylon cap nuts, Fig. VII-106, using a 7/16-inch box-end wrench and screwdriver having a 7/16-inch blade.

2. Secure bottom of footrest to tunnel (running board) with machine screw and lock nut, Fig. VII-106, using a 7/16-inch box-end wrench and screwdriver having a 7/16-inch blade.

Fig. VII-106



3. Drain gasoline from fuel tank. Install the skid frame (see Section VI, Skid Frame Installation, page VI-14 and VI-15).

4. Retain the side of the footrest to end of bumper and belly pan with two machine screws, using a phillips screwdriver having a no. 3 blade.

5. Snap the reflector into the reflector housing.

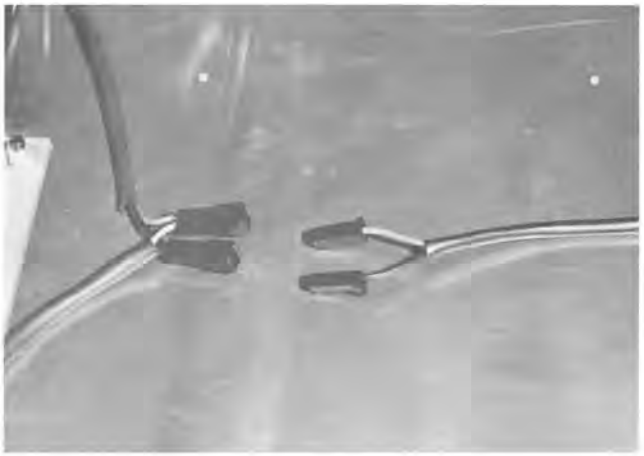
Remove Fuel Tank and Rear Shroud

Equipment Necessary: Screwdriver Having a 3/16-Inch Blade, Cardboard, 7/16-Inch Cold Chisel, Hammer, 9/16-Inch Socket and Screwdriver Having a 7/16-Inch Blade

1. Drain fuel from fuel tank.

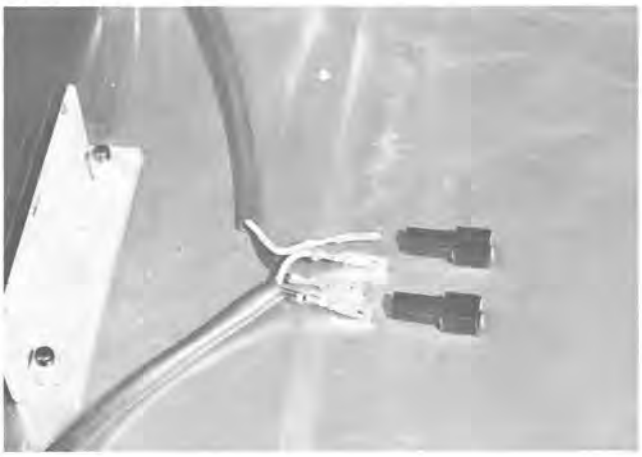
2. Remove the seat cushion and backrest. Pull taillight connectors apart, Fig. VII-107.

Fig. VII-107



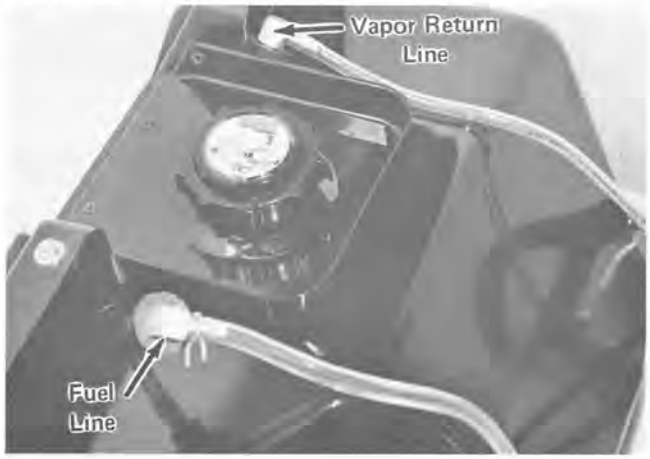
3. Slide the wires that run to the taillights out of the connectors, Fig. VII-108, using a screwdriver having a 3/16-inch blade.

Fig. VII-108



4. Remove the fuel tank gauge cap, Fig. VII-109. Pull the fuel line and vapor return line with fittings from within the fuel tank, Fig. VII-109.

Fig. VII-109



5. Tip the snowmobile onto its side, using a piece of cardboard to protect against scratching.

6. Remove the three rivets that hold the rear bumper to the wear plate at end of running board, Fig. VII-110, using a 7/16-inch cold chisel and hammer.

7. Tip the snowmobile onto its opposite side, using a piece of cardboard to protect against scratching.

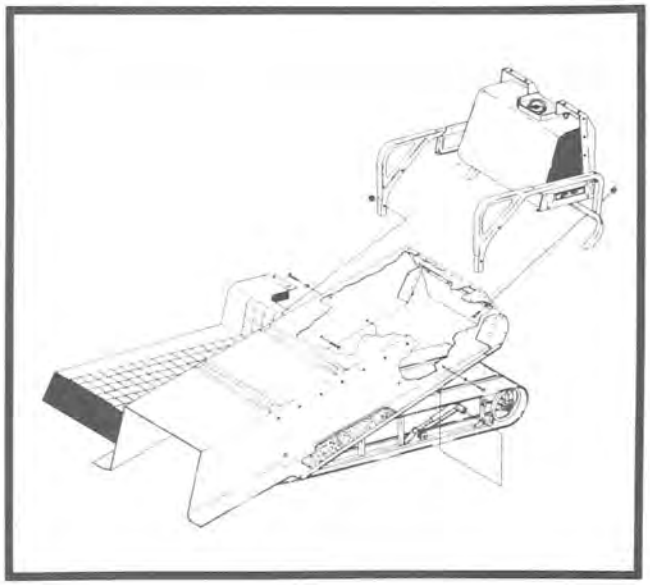
8. Remove the three rivets that hold the rear bumper to the wear plate at end of running board, Fig. VII-110, using a 7/16-inch cold chisel and hammer.

Fig. VII-110

9. Tip the snowmobile upright; then remove the cap screws and lock washers that hold rear of skid frame on inside of tunnel, Fig. VII-111, using a 9/16-inch socket and three inch extension. Raise the rear of the snowmobile off the shop floor, using a Quik Jack. The entire rear section of the skid frame and track is to remain on the floor.

10. Remove the eight slotted machine screws and nylon cap nuts that hold back and sides of bumper to tunnel, Fig. VII-111, using a 7/16-inch socket and screwdriver having a 7/16-inch blade.

Fig. VII-111



11. Raise the rear bumper and fuel tank slightly and slide components off the tunnel. Slide fuel tank out of the track in the left and right shroud, Fig. VII-112. Fuel tank and rear shroud can now be serviced.

Install Fuel Tank and Rear Shroud

Equipment Necessary: 7/16-Inch Socket, Screwdriver Having a 7/16-Inch Blade, Quik Jack, Cardboard, 9/16-Inch Socket, 3-Inch Extension and Torque Wrench

1. Move the fuel tank between the rear bumper; then slide taillight wires through channels located on both sides of the fuel tank.

2. Fit the fuel tank and rear shroud together, Fig. VII-112. End of fuel tank channels must seat between the retaining brackets on inside surface of left and right side shroud panels.

Fig. VII-112

WARNING

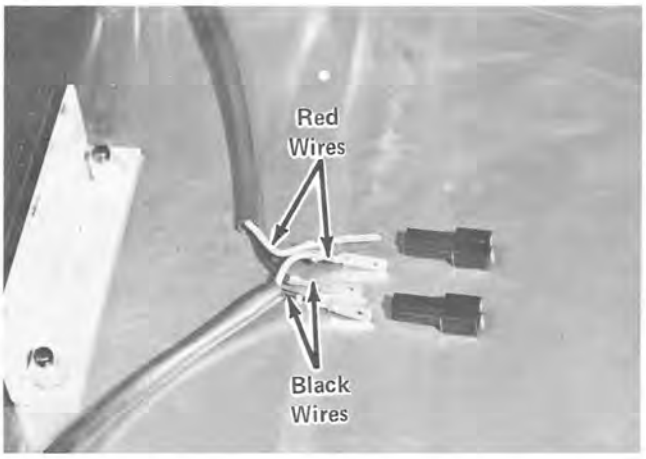
Make sure the taillight wires do not bind or get pinched between the fuel tank and rear shroud. If the wires get pinched, a short circuit may develop and cause a lighting malfunction. A no-light condition during limited visibility could contribute to an accident.

3. Set the assembled fuel tank and rear shroud in position on the tunnel, Fig. VII-111.

4. Slide the two red taillight wire end pieces into a connector, Fig. VII-113.

5. Slide the two black taillight wire end pieces into a connector, Fig. VII-113.

Fig. VII-113



6. Align the holes in the rear bumper (near passenger handle grips) and tunnel. Secure sides of rear bumper to tunnel with four machine screws and nylon cap nuts, Fig. VII-111, using a 7/16-inch blade.

Note: Nylon cap nuts are to be positioned on the outside of the rear bumper.

7. Secure the end plate, snow flap and back of rear bumper to end of tunnel with four machine screws and nylon cap nuts, Fig. VII-111, using a 7/16-inch blade.

Note: Nylon cap nuts are to be positioned on the outside of the rear bumper.

8. Lower the rear of the snowmobile and remove the Quik Jack.

9. Connect the taillight connector that holds two red wires to the taillight harness red wire connector, Fig. VII-114.

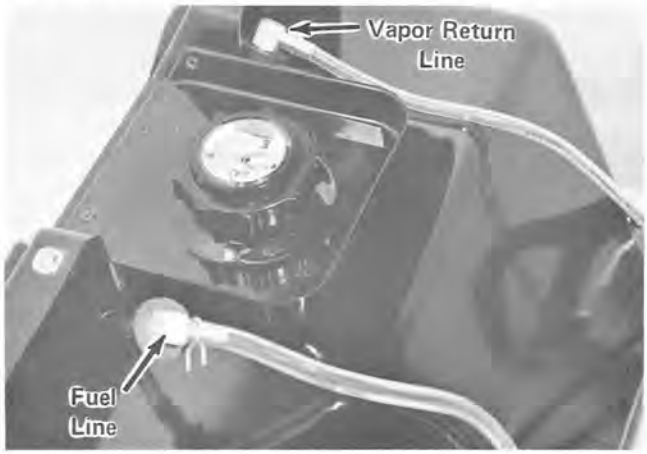
10. Connect the taillight connector that holds two black wires to the taillight harness black wire connector, Fig. VII-114.

Fig. VII-114

11. Install the fuel line and filter, rubber plug and elbow in hole at right side of fuel tank, as viewed from behind the snowmobile, Fig. VII-115.

12. Install the vapor return line (if carburetor is so equipped), rubber plug and elbow in hole at left side of fuel tank, as viewed from behind the snowmobile, Fig. VII-115. Install fuel tank gauge cap, Fig. VII-115.

Fig. VII-115



13. Tip the snowmobile onto its side, using a piece of cardboard to protect against scratching.

14. Move rear arm of skid frame into alignment with hole in tunnel. Slide lock washer onto cap screw and secure the rear arm to the tunnel, Fig. VII-116, using a 9/16-inch socket and 3-inch extension. DO NOT TIGHTEN CAP SCREW – THREAD IN ONLY HALF WAY.

Note: Rear arm of skid frame may not line up with hole in tunnel. To obtain proper alignment of the rear arm and hole in tunnel, release rear idler wheel tension; then drive rear arm in proper direction until alignment is obtained, using a hammer.

15. Tip snowmobile on opposite side, using a piece of cardboard to protect against scratching.

16. Slide lock washer onto cap screw and secure rear arm to the tunnel, Fig. VII-116, using a 9/16-inch socket and 3-inch extension. Tip snowmobile upright.

17. Tighten rear arm mounting cap screws to 35 ft. lbs. torque, using a 9/16-inch socket and torque wrench.

Fig. VII-116

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SPECIAL TOOLS-ENGINE, SACHS

Description: Flywheel Puller

Part Number: 6000-684

Usage: KM24, KM3, KM914 and RC18.5

How Used: To pull flywheel of mainshaft.

Description: Oil Seal Extractor — Includes hook, part number 0144-091 (3MM).

Part Number: 6000-674

Usage: KM3

Description: Hook, 3mm

Part Number: 0144-091

Usage: KM3

How Used: Remove seal from mag side.

Description: Hook, 4mm

Part Number: 0144-090

Usage: KM3

How Used: Remove seal from PTO side.

Description: Decarbonizing Tool

Part Number: 6000-528

Usage: All Sachs Rotary Engines

How Used: Remove carbon from rotor seal grooves.

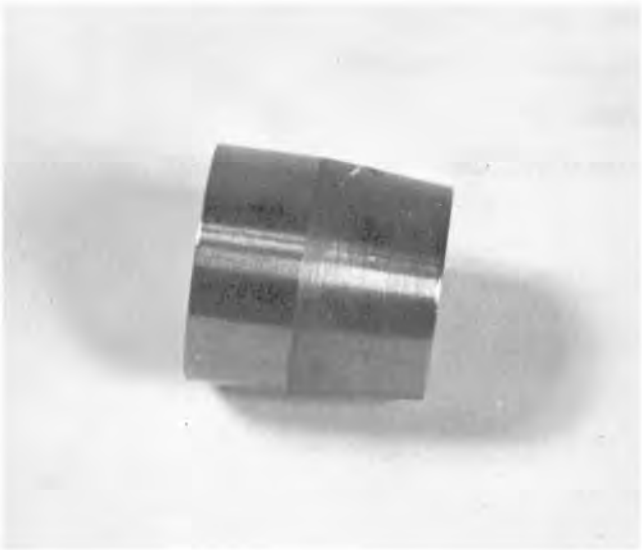
SPECIAL TOOLS-ENGINE, SACHS

Description: Oil Seal Mounting Sleeve

Part Number: 0144-088

Usage: KM3

How Used: Install oil seal in PTO end cover.



Description: Oil Seal Mounting Sleeve

Part Number: 0144-089

Usage: KM3

How Used: Install oil seal in magneto end cover.

Description: Bearing Puller Kit

Part Number: 0144-080

Usage: KM914, RC18.5, SB93, 50AMAX

How Used: Remove bearings from crankshaft.

Note: SB93 puller shells used to pull flywheel off crankshaft.

SPECIAL TOOLS-ENGINE, SACHS

Description: Protective Cap

Part Number: 6000-683

Usage: KM24, KM3, KM914 and RC18.5

How Used: Use with flywheel puller (6000-684) to protect mainshaft.

Part No. 2214-000
Sachs Mini-Bike Tool Kit

Description: Tool Kit

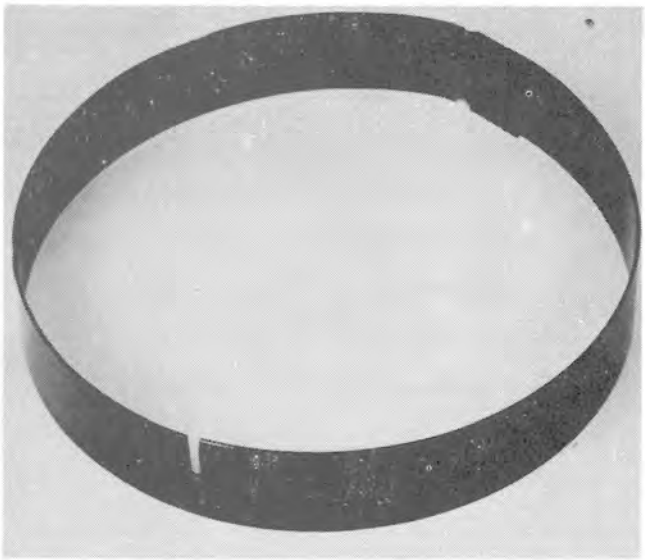
Part Number: 2214-000

Usage: 50AMAX

How Used: Used to pull flywheel, sprockets, piston pin and hold flywheel.

NOTES

SPECIAL TOOLS-ENGINE, ARCTIC CAT

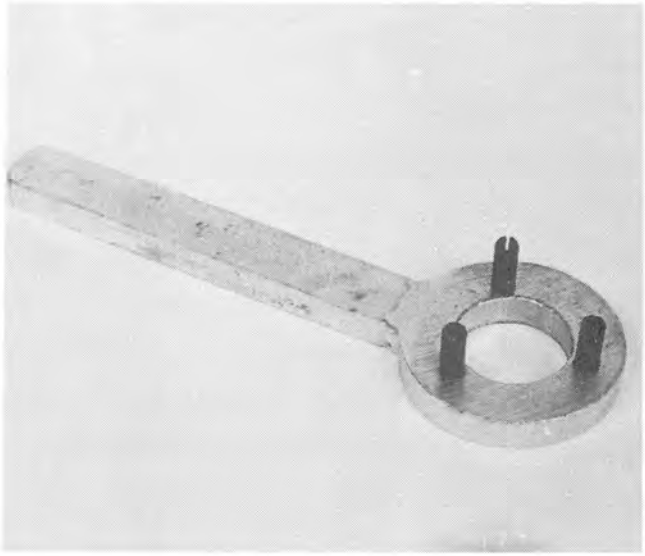


Description: Recoil Spring Retainer

Part Number: 0144-005

Usage: All Arctic Cat Engines Except T6A, T6B, T5A and T5B.

How Used: Used to wind and install recoil spring in recoil case.



Description: Fan Holder

Part Number: 0144-004

Usage: All "T" Series Axial Flow Engines

How Used: Used to hold axial fan pulley.

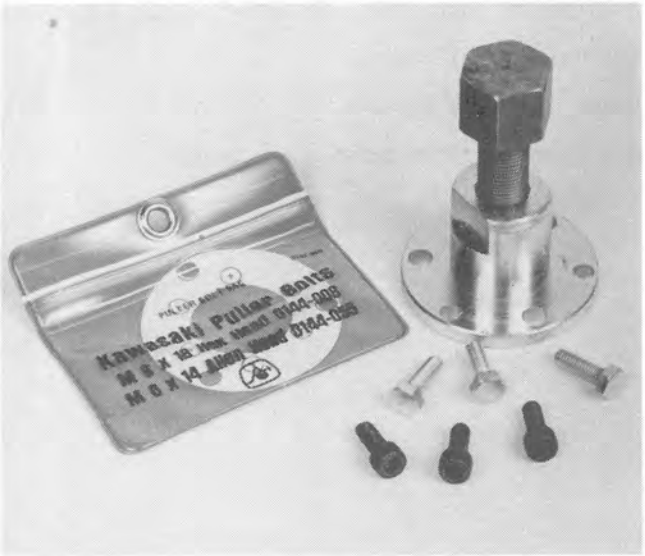
Description: Spanner Wrench, Flywheel

Part Number: 0144-007

Usage: All Arctic Cat Engines

How Used: Used to hold flywheel while removing flywheel nut.

SPECIAL TOOLS-ENGINE, ARCTIC CAT



Description: Flywheel Puller Kit

Part Number: 0144-064

Usage: All Arctic Cat Engines

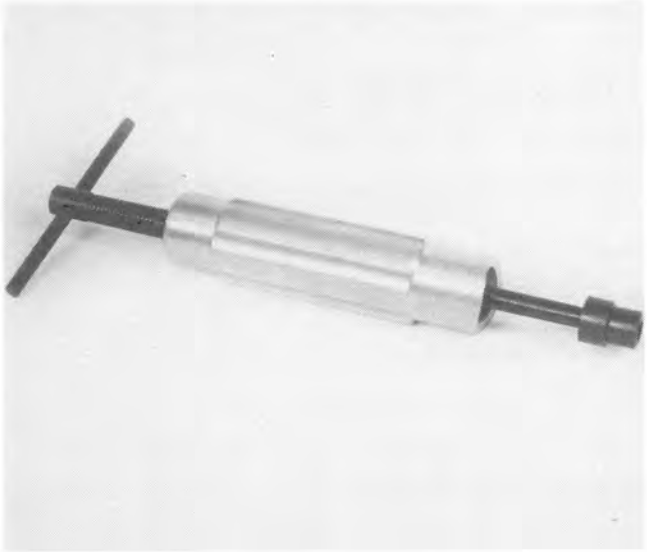
How Used: Used to pull flywheel off crankshaft.

Description: Flywheel Puller Bolt Kit

Part Number: 0144-063

Usage: Use with Flywheel Puller (0144-064)

How Used: For replacement purposes.



Description: Piston Pin Extractor

Part Number: 0144-003

Usage: All Arctic Cat Engines Except T5A and T6A

How Used: Used to remove piston pin.

SPECIAL TOOLS-ENGINE, ARCTIC CAT

Description: Piston Pin Extractor

Part Number: 0144-066

Usage: T5A and T6A

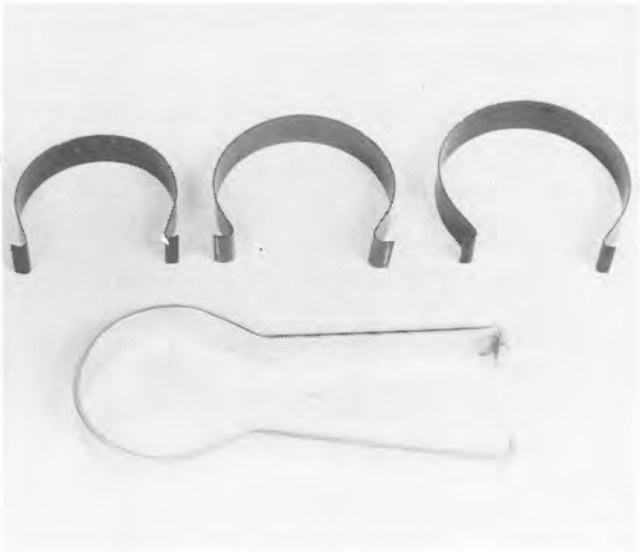
How Used: Used to remove piston pin.

Description: Bearing Puller Kit

Part Number: 0144-080

Usage: All Arctic Cat Engines

How Used: Remove bearings from crankshaft.



Description: Piston Ring Clamp with Compression Bands

Part Number: 0144-001

Usage: All Arctic Cat Engines

How Used: Used to compress piston ring.

Small – 250 & 295 cc engines

Medium – 340, 400, 440 cc engines

Large – 292 single

SPECIAL TOOLS-ENGINE, ARCTIC CAT

Description: Belt Tension Gauge

Part Number: 0144-012

Usage: All Arctic Cat Axial Flow Engines

How Used: Used to tension axial fan belt.

Description: Magneto Gauge

Part Number: 0144-011

Usage: T1A F Series Arctic Cat Engines

How Used: Used to install new excitor, pulser or lighting coil to base plate.

Description: CDI Gauge

Part Number: 0144-056

Usage: T3A and T8A Arctic Cat Engines

How Used: Used to install new excitor, pulser or lighting coil to base plate.

NOTES

SPECIAL TOOLS-ELECTRICAL

Description: Ohm Meter

Note: Order from
Electro Specialties, Inc.
4195 Southport Wash. Ave.
Milwaukee, Wisconsin 53208

Description: Amp Meter

Note: Order from
Electro Specialties, Inc.
4195 Southport Wash. Ave.
Milwaukee, Wisconsin 53208

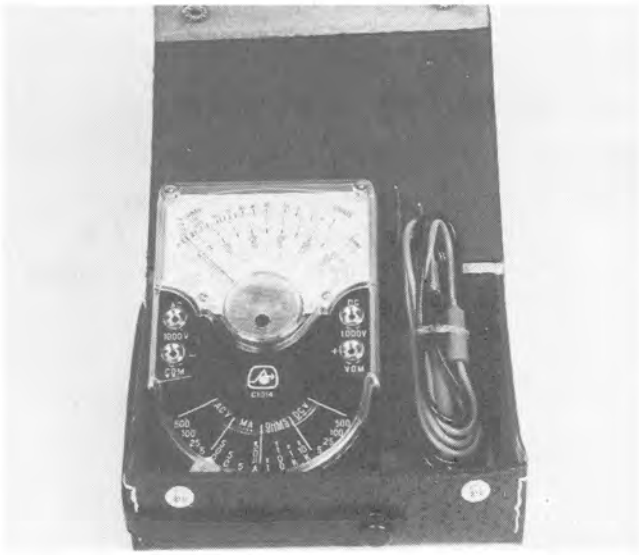
Description: Volt Meter

Note: Order from
Electro Specialties, Inc.
4195 Southport Wash. Ave.
Milwaukee, Wisconsin 53208

SPECIAL TOOLS-ELECTRICAL

Description: CD Ignition Tester

Note: Order from
Electro Specialties, Inc.
4195 Southport Wash. Ave.
Milwaukee, Wisconsin 53208

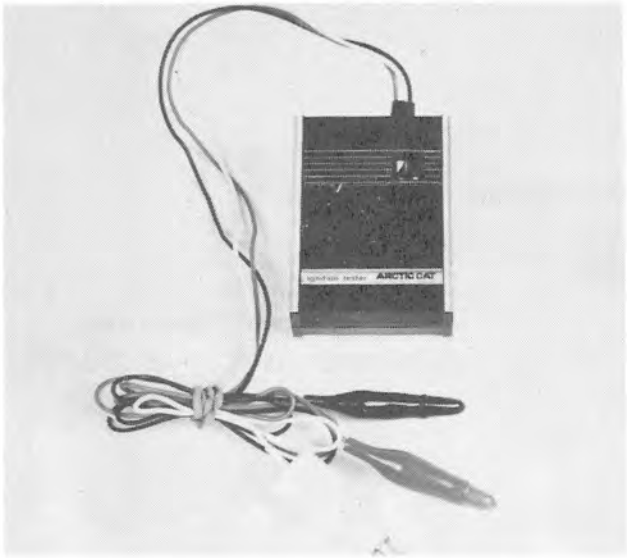


Description: Multitester

Part Number: 0144-053

Usage: All Arctic Cat Snowmobile Electrical Systems

How Used: Ability to read AC volts, DC volts and Ohms



Description: Timing Buzzer

Part Number: 0144-010

Usage: All Arctic Cat Engines

How Used: Used to time engines.

SPECIAL TOOLS-ELECTRICAL

Description: Engine Timing Gauge

Part Number: 0144-009

Usage: All Arctic Cat Engines Except Those Equipped with CDI

How Used: Used to time engines.

Description: Amp Terminal Extractor

Part Number: 0144-100

Usage: All 1974 Arctic Cat Snowmobiles Except Lynx I and Wankel Panther

How Used: Used to remove wire terminal from engine connector block.

NOTES

SPECIAL TOOLS-DRIVE SYSTEM

Description: Arctic Drive Clutch Puller

Part Number: 0144-104

Usage: All 1974 Arctic Cat Snowmobiles Except Wankel Panther Equipped with Arctic Clutch (0225-050 & 0225-010)

How Used: Used to pull drive clutch off crankshaft.

Description: Arctic Drive Clutch Puller

Part Number: 0144-054

Usage: 1974 Wankel Panther Equipped with Arctic Clutch (0225-050 & 0225-014) and 1973 Cheetah/Panther

How Used: Used to pull drive clutch off crankshaft.

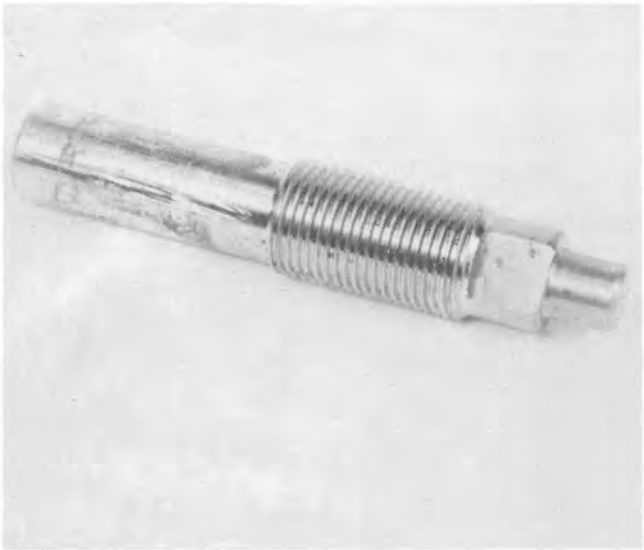
Description: Arctic Drive Clutch Puller

Part Number: 0144-068

Usage: All 1973 Arctic Cat El Tigre's

How Used: Used to pull drive clutch off crankshaft.

SPECIAL TOOLS-DRIVE SYSTEM



Description: Salsbury Drive Clutch Puller

Part Number: 0144-031

Usage: All 700 Series Salsbury Drive Clutches

How Used: Used to pull drive clutch off crankshaft.

Description: Salsbury Drive Clutch Puller

Part Number: 0144-029

Usage: All Salsbury 910 Drive Clutches

How Used: Used to pull drive clutch off crankshaft.

Description: Spring Seating Tool

Part Number: 0144-014

Usage: All Salsbury Drive Clutches

How Used: Used to seat spring behind roller arm tab.

SPECIAL TOOLS-DRIVE SYSTEM

Description: St. Lawrence Drive Clutch Puller

Part Number: 0144-052

Usage: All St. Lawrence Clutches

How Used: Used to pull drive clutch off crankshaft.

Description: Salsbury Drive Clutch Puller

Part Number: 0144-026

Usage: Salsbury 9R & 11R Drive Clutch

How Used: Used to pull drive clutch off crankshaft.

Description: Salsbury Drive Clutch Roller

Part Number: 0144-025

Usage: Salsbury 7R

How Used: Used to pull drive clutch off crankshaft.

SPECIAL TOOLS-DRIVE SYSTEM

Description: Solid Rivet Tool

Part Number: 0144-067

Usage: All Tracks Manufactured with Solid Rivets and Internal Drive Lugs

How Used: Used to rivet cleats and ice studs to track – TRACK REBUILDING.

Description: Solid Rivet Tool

Part Number: 0144-062

Usage: All Tracks Manufactured with Solid Rivets and Cleat Drive

How Used: Used to rivet cleats, track guides and ice studs to track – TRACK REBUILDING.

Description: Snowmobile Stand

Part Number: 0144-082

Usage: All Arctic Cat Snowmobiles

How Used: Used to hold snowmobile on its side while using solid rivet tools.

SPECIAL TOOLS-DRIVE SYSTEM

Description: Air Operated Solid Rivet Tool

Part Number: 0144-094

Usage: All Arctic Cat Snowmobile Tracks

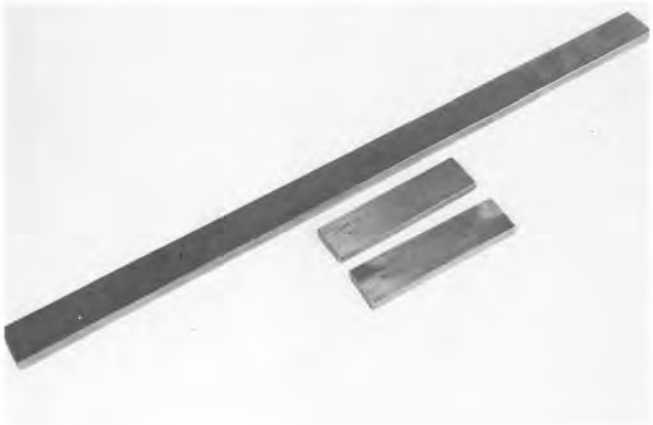
How Used: Used to rivet cleats and ice studs to track.

Description: Drive Clutch Spanner Wrench

Part Number: 0144-069

Usage: 1973 El Tigre'

How Used: Used to hold drive clutch for removal purposes.



Description: Clutch Alignment Kit

Part Number: 0144-097 Spacer (.305)
0144-098 Spacer (.365)
0144-099 Bar

Usage: All Arctic Cat Snowmobiles

How Used: Used to establish "parallelism" and "offset" between drive clutch and driven pulley.

KM-24 SACHS WANKEL

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