

**SUPPLEMENT
TO
CUSHMAN SERVICE MANUAL #826767**

**for 22 HP HAULSTER[®] AND TURF-TRUCKSTER[™]
BEGINNING WITH 8510
models**

898450	898457
898451	898458
898452	898459
898454	898461
898455	898530
898456	898531
	898532

This supplement contains the following information for the above vehicles.

ENGINE TUNE-UP	2
WIRING DIAGRAMS	8
SPECIFICATIONS	10

Engine Tune-up

We recommend that the following services be performed as part of your regular tune-up procedure:

- A. Thoroughly clean the engine compartment, engine and drivetrain. Remove any debris from around the cylinder fins. Visually inspect all parts for signs of damage, leakage, etc.
- B. Check valve lash and adjust if necessary.
- C. Perform compression test.
- D. Install new spark plugs.
- E. Install and adjust new contact points. Install new condenser.
- F. Adjust ignition timing and test spark advance mechanism.
- G. Check governor adjustment and correct if necessary.
- H. Install a new fuel filter.
- I. Inspect and clean the air filter. Install new filter element if necessary.
- J. Check carburetor performance and correct if necessary.
- K. Check engine overheat warning system.

Step-by-step instructions for these procedures follow, beginning with item B:

Valve Lash Adjustment Procedure

NOTE

- This procedure must be done with engine "cold".

Step #1

Remove both valve covers.

Step #2

Align the timing marks on the flywheel and fan housing (see Fig. 1). This will close the valves on one cylinder.

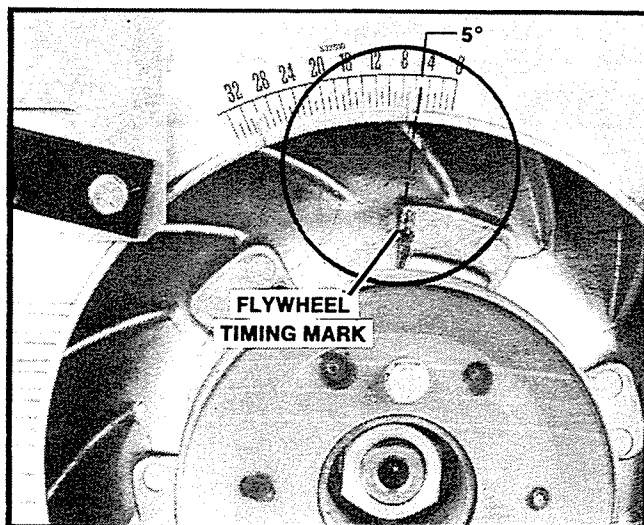


Figure 1 Timing Mark Alignment

Step #3

Locate the cylinder with the valves closed and loosen one of the locking nuts, using a 7/16" boxend wrench or socket.

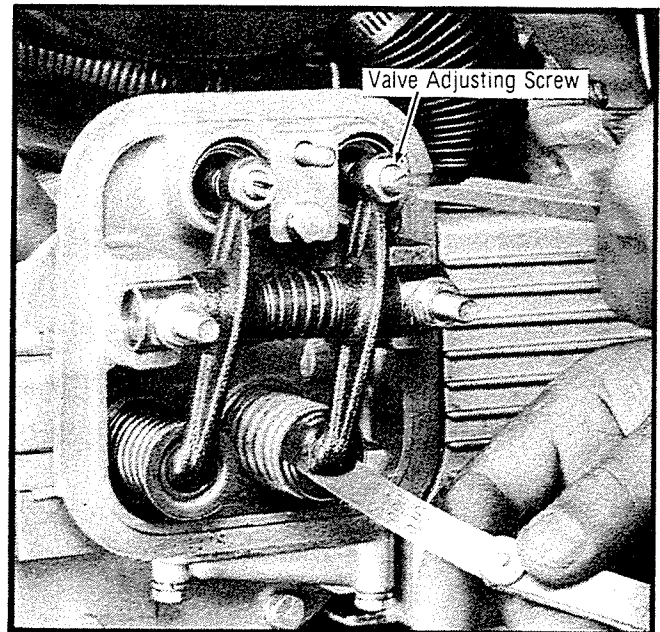


Figure 2 Valve Lash Adjustment

Step #4

Turn the valve adjusting screw to provide .003"-.004" (0.08-0.10 mm) clearance between the rocker arm pad and the end of the valve stem.

Step #5

Tighten the lock nut, then recheck clearance. Adjust the remaining valve on that cylinder in the same manner.

Step #6

Turn the engine one full revolution, until the timing marks align once again. Repeat the adjustments on the remaining cylinder.

Step #7

Replace the valve covers using new valve cover gaskets. An aluminum washer serves as a gasket under each acorn nut. Be sure these washers are in place. Tighten acorn nuts to 5-7 lbs. ft. (7-9 N·m).

Compression Test

Battery should be fully charged prior to conducting this test.

Step #1

Start and run the engine until warmed to normal operating temperature. Stop the engine, allow it to cool enough to work on safely, then remove both spark plugs.

Step #2

Hold the throttle in the wide open position and make sure the choke is fully open.

Step #3

Connect an automotive-type compression gauge to one spark plug hole and operate the starter, spinning the engine until the gauge indicator no longer advances. Check the reading. If the compression on either or both cylinders is less than 130 PSI, a problem is indicated. At no time should the compression vary more than 10 PSI between the two cylinders. Low compression or excessive variance indicates possible problems with rings or valves.

Spark Plug Replacement**Step #1**

Disconnect spark plug wires. Remove and discard existing spark plugs.

Step #2

Replace with new plugs that have been gapped with a wire gauge to .025" (0.6 mm). Use Champion RV15 YC (or equivalent) spark plugs.

Step #3

Tighten to 22 - 25 lbs. ft. torque.

Plugs can be easily started by using a length of rubber hose over the tip of the plug, then turning the hose to start the plug.

Contact Point Adjustment**Step #1**

Remove the timer cover. Rotate the engine until the contact points are fully opened. Inspect the contact points. If pitting or other damage is noted, replace the points and condenser.

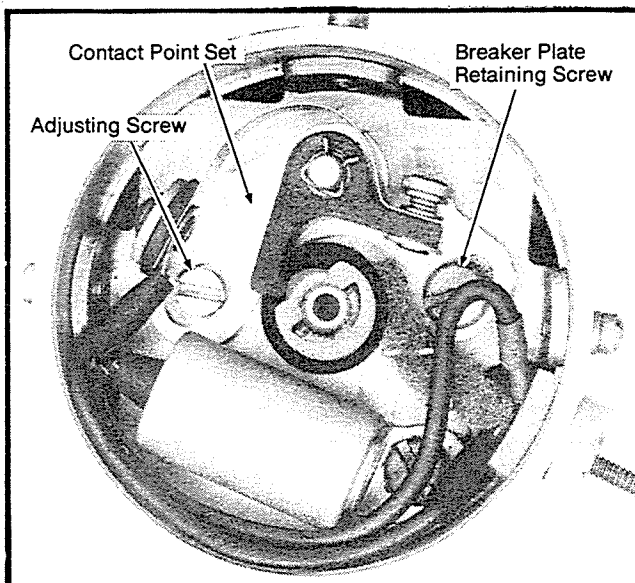


Figure 3 Contact Points

Step #2

Loosen the breaker plate retaining screw and turn the adjusting screw until the point gap measures .020" (0.5 mm). Tighten the retaining screw, then recheck the gap measurement.

Step #3

Once the gap is correctly adjusted, replace the timer cover.

Ignition Timing Adjustment and Spark Advance Mechanism Test

This procedure requires a tachometer and an automotive-type timing light.

Step #1

Connect a tachometer and timing light to the engine per the tool manufacturer's directions.

Step #2

Start the engine and adjust the idle speed screw on the carburetor to bring engine speed below 700 RPM.

Step #3

Use the timing light to set the timing at 5° B.T.D.C. as indicated on the decal attached to the fan housing (Figure 1). Loosen the timer hold-down clamps and turn the timer as necessary to bring the marks into alignment.

Step #4

Tighten the timer hold-down clamps and reset engine idle speed to 750-1000 RPM.

Step #5

Advance the throttle to full governed speed. Flywheel timing mark should move counter clockwise and stop between the 28° and 31° marks (Figure 4). If it does not, the advance mechanism is not operating properly. Refer to Timer/Governor Repair section in manual 826767.

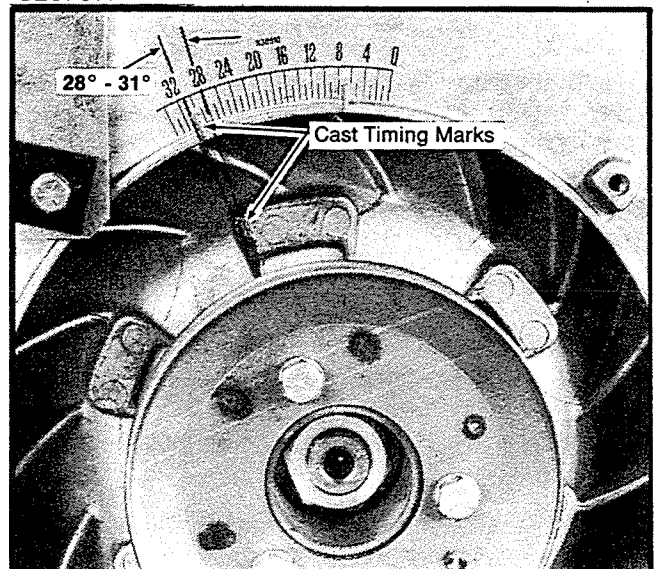


Figure 4 Timing and Test Marks

Governor Adjustment

This procedure requires a tachometer.



SAFETY WARNING

- To avoid unexpected vehicle movement, always chock the drive wheels before working on vehicle with engine running.

When engine is running, always keep hands, hair and clothing away from flywheel, belts and pulleys.

Step #1

Connect a tachometer to the engine per the tool manufacturer's directions.

- a. Loosen the adjusting screw on governor adjusting bracket assembly. See Fig. 5
- b. Start the engine and advance throttle to full speed.

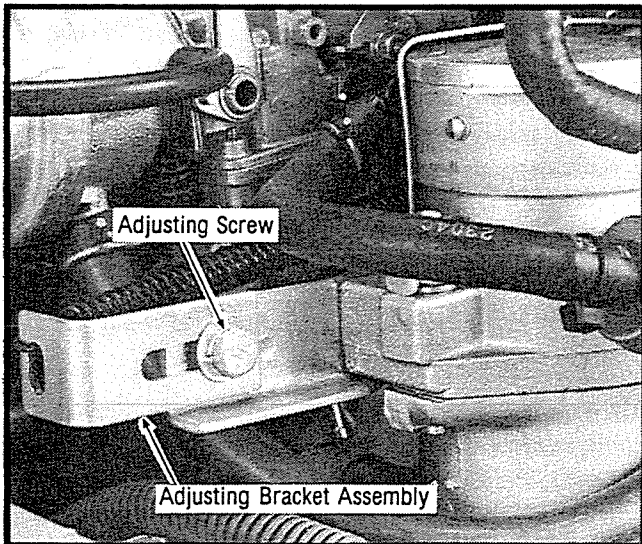


Figure Governor Adjustment

- c. Move governor adjusting bracket until tachometer shows 3750 RPM, then tighten the adjusting screw to 6-10 lbs. ft. (8-13 N·m).

Fuel Filters

An in-line fuel filter, located under the vehicle seat, removes foreign particles from the fuel. It should be replaced every 600 hours or 6000 miles. To replace, unclamp and remove hoses from filter. Install new filter with "IN" facing toward fuel pump.

A fuel filter is screwed into the rear of the fuel pump. It should be replaced every 600 hours or 6000 miles or yearly.

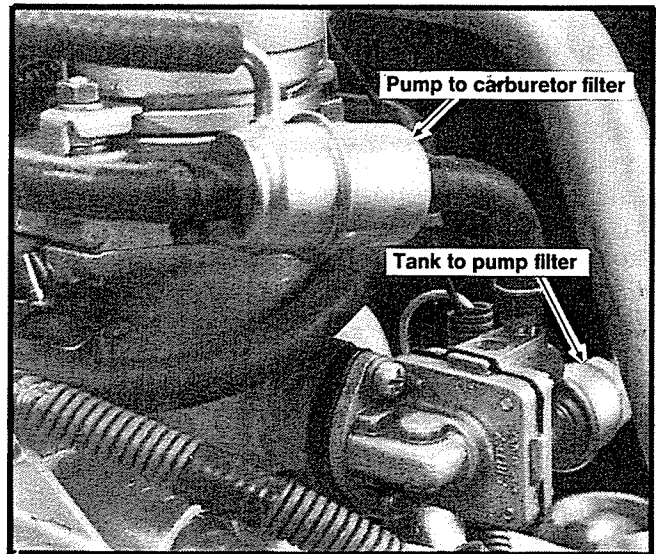


Figure 6

IMPORTANT

CARBURETOR FILTER

A filter is located in the carburetor inlet elbow.

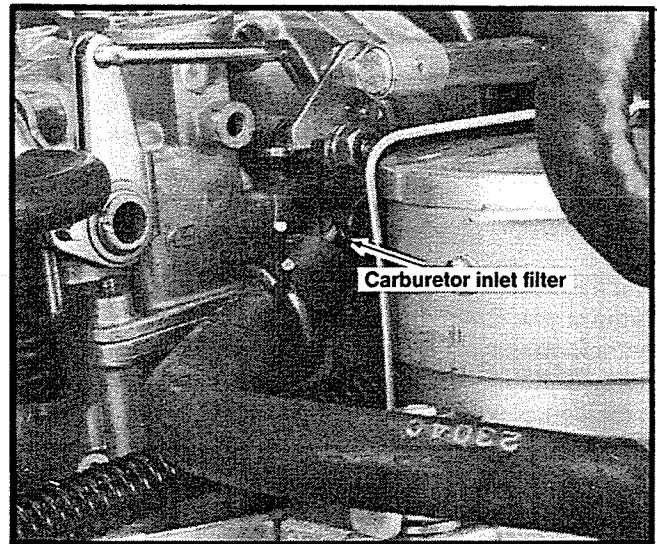


Figure 7

Air Cleaner Service

Combustion Air

Step #1

Remove the cover and remove filter element.

Step #2

Visually inspect the paper element. Surface dirt may be removed by tapping the element lightly against the heel of your hand, etc. Hold the element over a light bulb and note the amount of light showing through. If very little or no light penetrates, or if pin holes are noticed the element should be discarded and replaced with a new part.

Clean any debris from inside the cover assembly. Check the rubber seals and replace any that show damage or appear to be badly weathered, etc.

Step #3

Replace and secure all parts, making sure all seals are intact.

NOTE

- It is very important that all seals are installed correctly and are in good condition to insure that all air entering the engine passes through the filter element.

Engine Cooling Air

Engine cooling air is drawn into the left side of the engine cover and through the air intake ducts to the flywheel. Engine operating temperature is controlled by doors inside the fan housing that control the amount of air flowing over the cylinders. Each door is controlled by a temperature compensating bellows mounted on the bottom side of the cylinder and connected to the door by an adjustable rod.

When performing a tune-up, be sure the doors are operating properly. Both doors should be closed when the engine is cold and should open as the engine warms up. If the door fails to open, do not operate engine until problem is corrected. Disconnect linkage to bellows and check for binding in door hinge.

The opening in the left side of the engine cover has

a screen to prevent debris from entering the air duct. Clean away all accumulated debris to assure good air flow.

CARBURETOR

Adjust throttle stop screw to provide an idle speed of 900 RPM. See Fig. 8

Adjust fast idle speed to provide 1800 - 2000 RPM during engine warm-up. Bend fast idle tang as shown in Fig. 8. Pull choke on to check fast idle RPM.

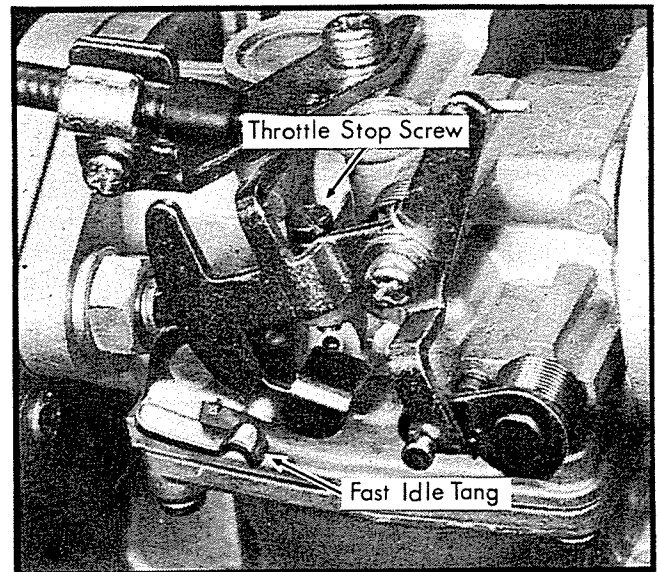
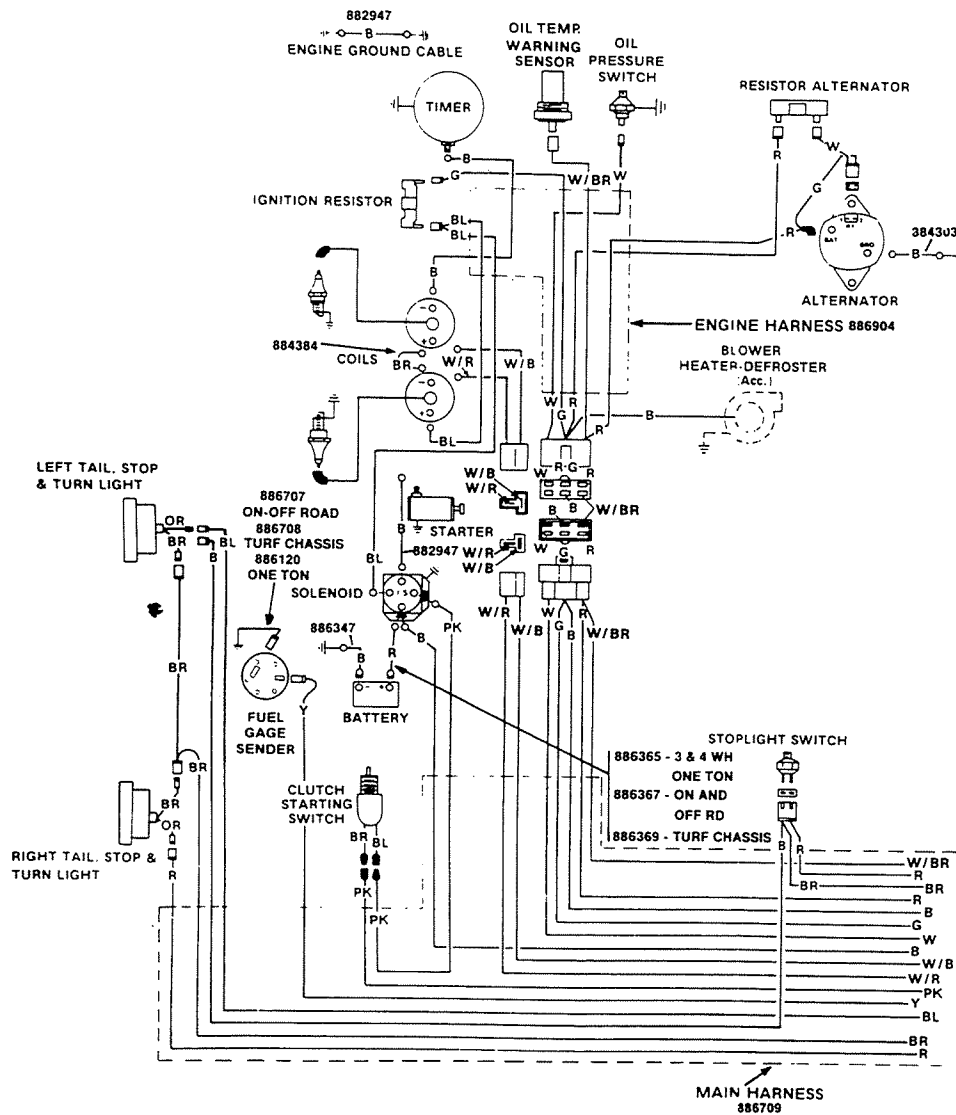


Figure 8

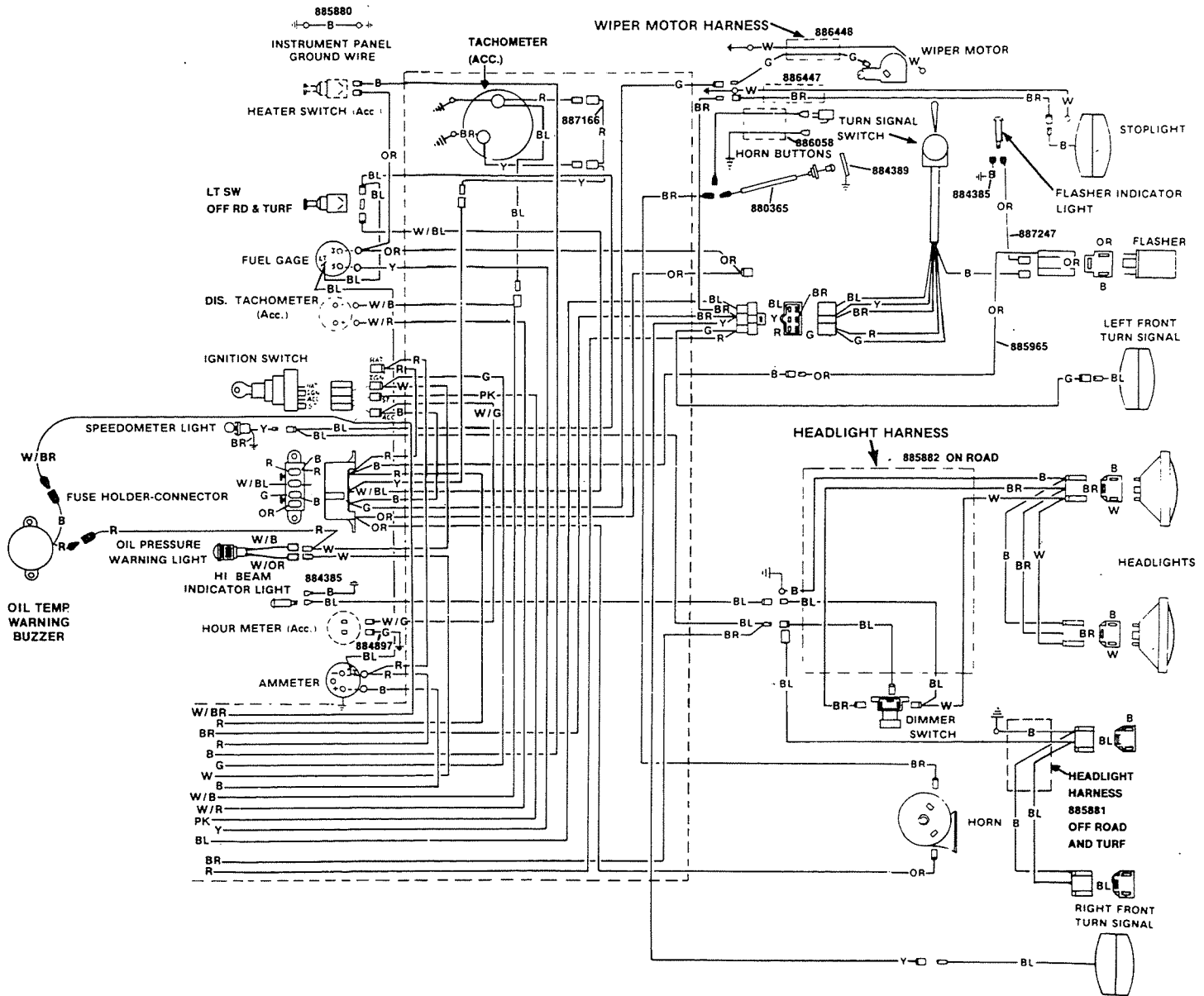
WIRING DIAGRAM for models with hazard warning switch in turn signal switch



COLOR CODE

B	BLACK	OR	ORANGE
G	GREEN	PK	PINK
R	RED	W/B	WHITE W/ BLACK STRIPE
W	WHITE	W/G	WHITE W/ GREEN STRIPE
Y	YELLOW	W/R	WHITE W/ RED STRIPE
BL	BLUE	W/BL	WHITE W/ BLUE STRIPE
BR	BROWN	W/OR	WHITE W/ ORANGE STRIPE

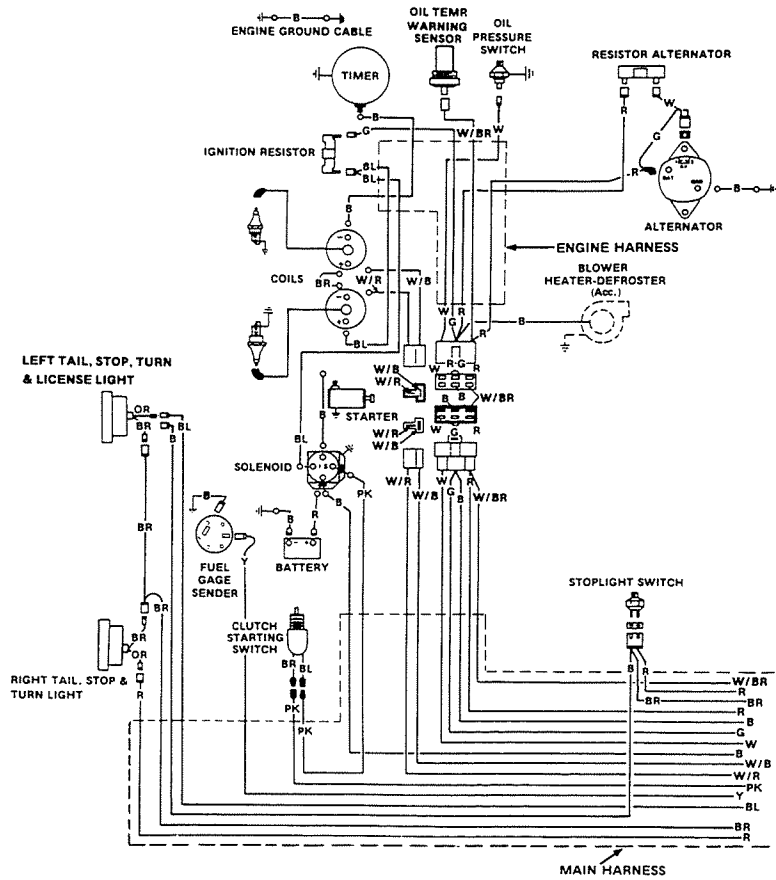
WIRING DIAGRAM for models with hazard warning switch in turn signal switch



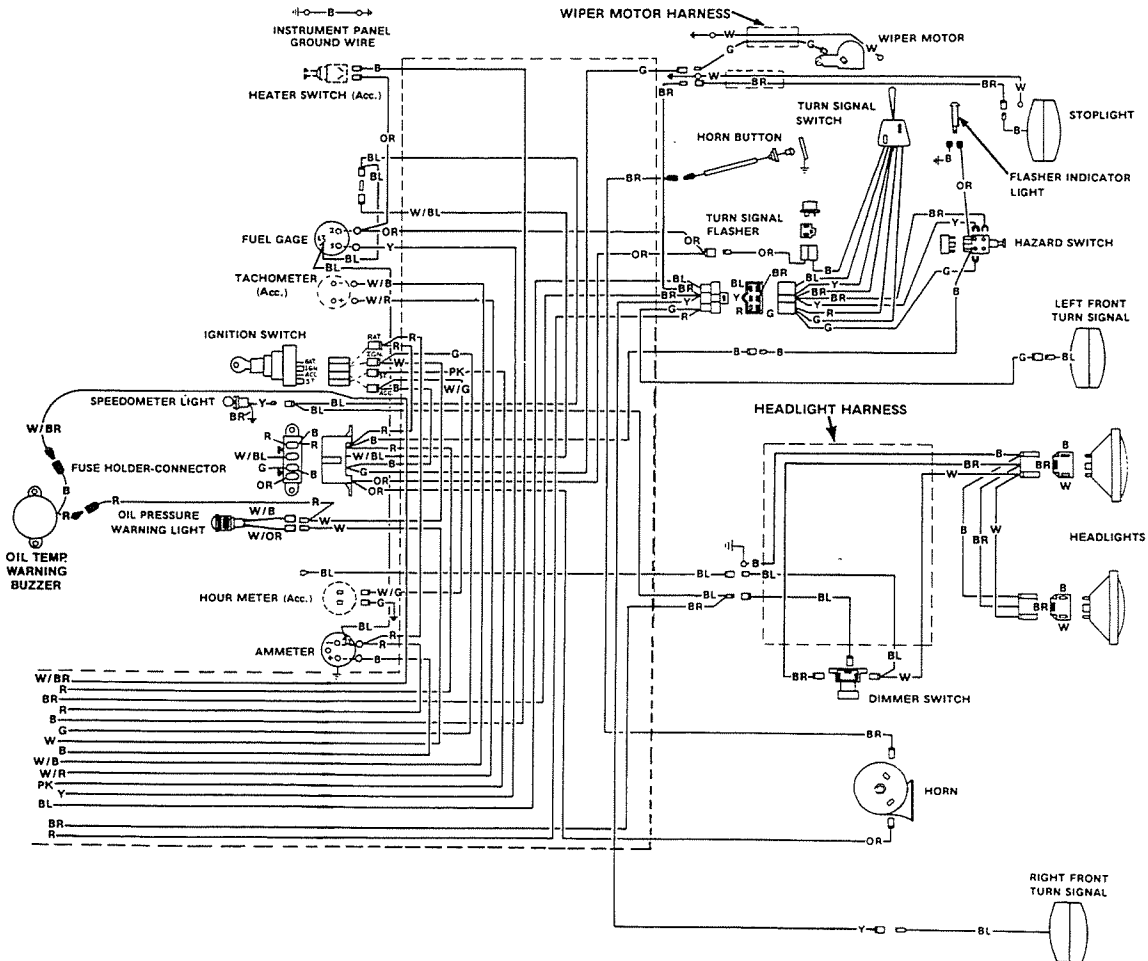
WIRING DIAGRAM for models with hazard warning switch on dash

COLOR CODE

B	BLACK
BL	BLUE
BR	BROWN
G	GREEN
OR	ORANGE
PK	PINK
R	RED
W	WHITE
Y	YELLOW
W/B	WHITE WITH BLACK STRIPE
W/BL	WHITE WITH BLUE STRIPE
W/G	WHITE WITH GREEN STRIPE
W/R	WHITE WITH RED STRIPE
W/BR	WHITE WITH BROWN STRIPE



WIRING DIAGRAM for models with hazard warning switch on dash



ENGINE SPECIFICATIONS

Brake Horsepower	22
Bore	3.50" (88.90mm)
Stroke	2.500 (63.50mm)
Displacement	48.1 (789cm ³)
Compression Ratio	8.0:1
Cranking Compression	130 PSI (896 kPa)
Governor Type	Flyball Type
Rotation (Viewed from fly-wheel)	CW
Spark Plug	Champion RV15YC
Air Cleaner	Paper Cartridge
Spark Plug Size	14mm
Breaker Point Gap020" (0.5mm)
Spark Plug Gap025" (0.6mm)
Spark Run	28°-31° BTDC
Spark Retard (Static timing)	5° BTDC
Oil Filter	Full Flow
Valve Seat Angle	44° 33'
Valve Face Angle	45°
Valve Timing for .040" (1.0mm)	
Lash at Valve	Intake Opens 4 degrees 42' B.T.D.C. Intake Closes 39 degrees 40' A.B.D.C. Exhaust Opens 39 degrees 42' B.B.D.C. Exhaust Closed 4 degrees 40' A.T.D.C.

MAXIMUM VEHICLE AND ENGINE SPEED

22 HP ENGINE (SAE hp)

Axle Ratio	Maximum** Vehicle Speed*	Maximum** Engine RPM
4.71:1	39.0 M.P.H. (63.4 km/h)	3750
6.5:1	29.0 M.P.H. (47 km/h)	3750
*8.2:1	22.5 M.P.H. (36 km/h)	3750
10.25:1 ...	18.0 M.P.H. (29 km/h)	3750

*Auxiliary transmission halves speed.

**The engine governor controls are preset to control engine and ground speeds to design limits.



SAFETY WARNING

- To prevent speeds greater than design limits, **NEVER** alter the governor controls in any manner to increase engine speed beyond 3750 R.P.M.

BATTERY

Volts	12
Ampere Hour Rating	70
Ground Terminal Polarity	Negative

FUEL AND OILS

Gasoline good grade of leaded or non-leaded regular not lower than 87 octane

NOTE

- The engine may last longer if leaded fuel is used.

GASOLINE CONTAINING METHANOL

We do NOT recommend the use of METHANOL bearing fuels in any of our products. The use of these fuels may create a potential safety hazard.

LUBRICANTS

Engine oil	use only oils recommended for service SE or SF SAE 30 above 32° F. (0°C) SAE 10W below 32° F. (0°C)
Transmission oil	SAE 80 above 32° F. (0°C) SAE 20W below 32° F. (0°C)
Differential oil	EP 80-90 Multigrade Lubricant
Pressure gun grease	Lithium base
Hydraulic Lift System	Type A or F Transmission Fluid

GEAR RATIOS

Transmission:

High gear	1:1
Second gear	1.6:1
Low gear	2.6:1
Reverse gear	3.5:1

CAPACITIES

Gasoline tank (models 530 & 532)	6.5 gal. (23.6 L)
all other models	6.0 gal. (22.7 L)
Crankcase	2 qt. (1.9 L)
(if filter is replaced 2 1/2 qt.)	(2.4 L)

NOTE

- The oil level must be kept between the two marks on the dipstick.

Do NOT overfill. Engine overheating and damage may result.

Transmission	1½ pt. (0.7 L)
Differential	12 oz. (0.4 L)
Auxiliary Transmission	22 oz. (0.7 L)
Hydraulic System	112 oz. (3.34 L)



