

WARRANTY INFORMATION SERVICE INFORMATION

HP 900 SC Dry Sump Engine

NOTE: The 900 SC can be returned to Mercury Racing for a factory rebuild if a MerCruiser Dealership decides that they are not-equipped to perform this service. Contact Mercury Racing Sales at 920-921-5330 (Fax: 920-921-6533) for pricing and scheduling.

Tune-Up

Propshaft Horsepower (Kilowatts)	850 (634)
Displacement (Liters)	540 CID (8.9 L)
Bore	4.44 in. (114.4 mm)
Stroke	4.375 in. (114.4 mm)
Compression Ratio	8.0:1
Compression Pressure	125 130 psi (862-896 kPa)
Spark Plug Type-P/N & Gap	Champion N63YD .025 in. (0.6 mm)
Maximum Advance @ 5000 rpm	32° BTDC
Maximum rpm at Wide-Open-Throttle	5600-6000 rpm
Rev. Limiter rpm Setting	6150 rpm
Idle rpm in Forward Gear	1300 rpm (minimum)
Valve Lash (Intake & Exhaust)	Cold: 0.016 (0.4 mm) Hot: 0.020 (0.5 mm)
Fuel Required (NOTE 1)	92 Octane {(R+M)÷2} or 98 RON
Fuel Pump Pressure	4-8 psi (28-55 kPa)
Electrical System	12-Volt Negative Ground
Alternator Rating	55 Amperes
Supercharger Boost	8-9 psi (55-62 kPa)
Recommended Battery Rating	Min. 550 CCA
Oil System with New Filter (NOTES 2&3)	16 Qts. (15.2 L)
Oil Pressure at 1300 rpm	Minimum 30 psi (207 kPa)
Oil Pressure at 6000 rpm	Minimum 45 psi (310 kPa)

NOTE: (1) Without alcohol whenever possible.

NOTE: (2) Approximate, refer to reservoir sight tube to determine exact quantity of oil.

NOTE: (3) Length of oil lines will effect oil capacity.

NOTE: (4) Cooling System Capacity information is for winterization use only.

NOTE: (5) Approximate, Use dipstick to determine exact level.

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Tune-Up (Continued)

Oil Reservoir W/New Filter (NOTE 3)	14-16 US qts (13.2-15.2 L)
Seawater Cooling System (NOTE 4)	20 U.S. Qts. (19 L)
Stern Drive Unit Oil (VI Drive, Dry Sump)	4.25 U.S. Qts. (4 L)
Transom Bearing Cavity (Close Couple Models)	0.5 U.S. Qts. (.47 L)
Transmission Fluid Type F (NOTE 5)	2.0 U.S. Qts. (1.9 L)

NOTE: (1) Without alcohol whenever possible.

NOTE: (2) Approximate, refer to reservoir sight tube to determine exact quantity of oil.

NOTE: (3) Length of oil lines will effect oil capacity.

NOTE: (4) Cooling System Capacity information is for winterization use only.

NOTE: (5) Approximate, Use dipstick to determine exact level.

Priming the Oil System

IMPORTANT: Check oil reservoir sight tube to ensure that an adequate oil supply is in the engine oil reservoir prior to engine operation. (Some oil must be visible in sight tube). Turn engine over with the starter several times (**DO NOT** allow engine to start) until 40 psi. of oil pressure is seen at the instrument panel.

MANUAL OIL SYSTEM PRIMING

NOTE: Manually priming the oiling system must be done if:

- If no oil is visible in reservoir sight tube.
- The oil is drained from the system for any reason (such as engine repairs or oil change).

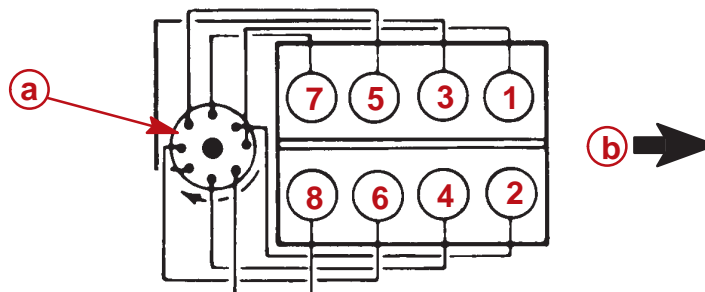
CAUTION

Failure to prime the oiling system prior to engine operation will result in severe engine damage.

1. Remove the oil pump drive belt from the pump and manually turn the oil pump (with an electric drill or by hand) to prime the oil system until 40 psi. of oil pressure is seen at the instrument panel.
2. Stop engine after 40 psi. is achieved and reinstall belt.

ENGINE FIRING ORDER

NOTE: 900SC is a Left Hand Rotation Engine



a - Firing Order: 1-8-4-3-6-5-7-2

b - Front of Engine and Boat

Electrical Specifications

IGNITION SPECIFICATIONS

Timing	32° BTDC @ 5000 rpm
Coil	Part No. 332-4895A8
Coil Primary Resistance (Ohms) Minimum	.010 (Ohms)
Coil Primary Resistance (Ohms) Maximum	.015 (Ohms)
Coil Secondary Resistance (Ohms)	575-725 (Ohms)

STARTER MOTOR SPECIFICATIONS

Mercury Marine Part No.	50-808011A3
Delco Remy Part No.	19010615

No Load Test				
Volts	Amps. (Min.)	Amps. (Max.)	RPM (Min.)	RPM (Max.)
10.6	60	100	6000	9200

Carburetor Specifications

Make (Model)	Holley (4500)
Mercury Part No.	12377A8
Float Adjustment	Bottom of Sight Plug Hole ± 1/32 (.8 mm)
Front Carburetor, Primary and Secondary Jets	No. 98
Rear Carburetor, Primary and Secondary Jets	No. 96
Accelerator Pump	.015 (.4 mm)
Idle Mixture Screw Preliminary Setting	1-turn out

Internal Engine Specifications

UNIT OF MEASUREMENT: in. (mm)

CYLINDER BORE

Diameter	4.440 - 4.442 (112.776 - 112.826)	
Out of Round	Production	.001 (0.0254)
	Service	.002 (0.051)
Taper	Production	.0005 (0.0127)
	Service	.001 (0.025)

PISTON

NOTE: Measure piston 1.300 in. (33.02 mm) down from lower oil ring groove and 90° from piston pin bore.

Clearance	Production & Service	.0050 - .0085 (0.1397 - 0.2159)
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Piston Ring

COMPRESSION RINGS

Groove Side Clearance		
Production	Top & 2nd	.0017 - .0032 (0.044 - 0.0814)
Service	Top & 2nd	.0027 - .0042 (0.0687 - 0.1068)
End Gap		
Service	Top	.033 - .035 (0.838 - 0.889)
	2nd	.029 - .031 (0.737 - 0.787)

OIL RINGS

Groove Side Clearance	
Production	.0005 - .0065 (0.0127 - 0.1651)
Service	.0015 - .0075 (0.0381 - 0.191)
End Gap	
Production	.015 - .055 (0.381 - 1.397)
Service	.025 - .065 (0.635 - 1.651)

PISTON PIN: FREE FLOATING

Diameter	.990 (25.146)	
Clearance	Production	.0010 - .0012 (0.0203 - 0.0254)
	Service	.0012 - .0018 (0.0254 - 0.0305)
Fit to Rod	.0010 - .0012 (0.0203 - 0.0305)	

Crankshaft: Kryptinite Crank

MAIN JOURNAL

Diameter	No. 1,2,3,4	2.748 - 2.749 (69.8195 - 69.8246)
	No. 5	2.745 - 2.748 (69.723 - 69.799)
Taper & Out of Round	Production	.0005 (0.0127)
	Service	.001 (0.0254)

CONNECTING ROD JOURNAL

Diameter		2.1980 - 2.1990 (55.8292 - 55.8546)
Taper & Out of Round	Production	.0005 (0.0127)
	Service	.001 (0.0254) max.

MAIN BEARING CLEARANCES

Production	No. 1,2,3,4	.0025 - .003 (0.0635 - 0.0762)
	No. 5	.0035 - .004 (0.0889 - 0.1016)
Service	No. 1,2,3,4	.0025 - .0035 (0.0635 - 0.0889)
	No. 5	.0035 - .0045 (0.0889 - 0.1143)
Crankshaft End Play		.007 - .013 (0.1778 - 0.2540)
Crankshaft Run Out		.0005 - .0015 (0.0127 - 0.0381)

ROD BEARING CLEARANCES

Rod Bearing Clearance	.0025 - .0035 (0.0635 - .0889)
Rod Side Clearance	.018 - .025 (.46 - .64)

CAMSHAFT AND DRIVE

Lobe Lift \pm .002 (0.051)	Intake	.395 (10.033)
	Exhaust	.395 (10.033)
Journal Diameter		1.948 - 1.949 (49.48 - 49.51)
Journal Out-of-Round		.001 (0.0254)
Camshaft Run-Out		.0015 (0.0381)
Camshaft End Play		.010 - .015 (0.254 - 0.381)
Timing Belt (NOTE 1)		Non Adjustable

NOTE: (1) Timing belt gear retaining bolt is left hand thread.

VALVE SYSTEM

Lifter Type		Solid Roller
Rocker Arm Ratio		1.7:1
Valve Lash (Intake & Exhaust)		Cold: .016 (0.4) Hot: .020 (0.5)
Face Angle (Int. & Exh.)		45°
Seat Angle (Int. & Exh.)		45°
Seat Run Out (Int. & Exh.)		.002 (0.0508)
Seat Width	Intake	.080 (2.03)
	Exhaust	.080 (2.03)
Stem Clearance		
Production	Intake	.001 (0.0254)
	Exhaust	.0015 (0.0381)
Service	Intake	.002 (0.0508)
	Exhaust	.0025 (0.0635)
Valve Spring		
Free Length		2.440 (61.976)
Pressure Lbs. @ Inches (mm) (NOTE 1)	Closed @ 2.050 (52.07)	150 lbs. (203 Nm)
	Open @ 1.370 (34.7)	470 lbs. (637 Nm)
Installed Height		2.050 (52.07)

NOTE: (1) Test springs as a complete assembly with dampener.

CYLINDER HEAD

Gasket Surface Flatness	.002 (.050) within 6 in. (152) .005 in. (.127) Overall
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FLYWHEEL

Run Out on Face Area	.008 (.20)
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Torque Specifications

Alternator Bracket 7/16 in. Nut	45 lb. ft. (61Nm)
Alternator Bracket 3/8-1/2 in. Nut	15 lb. ft. (20 Nm)
Camshaft Timing Gear Hub (NOTE 1, 4 & 5)	25-30 lb. ft. (34-41 Nm)
Camshaft Timing Gear (NOTE 1) Bolt Is Left Hand Thread	70 lb. ft. (95 Nm)

NOTE: (1) Apply Loctite 271 (P/N 92-32609-1) on bolt threads.

NOTE: (2) Apply moly lube on washer and under bolt head as well as on the threads.

NOTE: (3) Apply oil under bolt head, and Loctite Teflon pipe thread sealant #592 on threads.

NOTE: (4) Apply RTV on back of hub at cam contact area.

NOTE: (5) Apply Loctite 515 under bolt heads.

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Torque Specifications (Continued)

Carburetors	15 lb. ft. (20 Nm)
Carburetor Adapter	35 lb. ft. (47 Nm)
Connecting Rod Cap (NOTE 2)	90 lb. ft. (109 Nm)
Crankcase Front Cover	10 lb. ft. (14 Nm)
Crankshaft Damper	110 lb. ft. (149 Nm)
Crankshaft Pulley	35 lb. ft. (47 Nm)
Cylinder Head (In Three Increments) (NOTE 3)	80 lb. ft. (109 Nm)
Drive Plate (NOTE 1)	45 lb. ft. (61 Nm)
Flywheel (NOTE 1)	90 lb. ft. (122 Nm)
Flywheel Housing To Block	35 lb. ft. (47 Nm)
Front Mount	35 lb. ft. (47 Nm)
Fuel Pump	30 lb. ft. (41 Nm)
Idler Pulley	90 lb. ft. (122 Nm)
Intake Manifold (In Three Increments)	30 lb. ft. (41 Nm)
Main Bearing Cap Nuts (NOTE 2)	110 lb. ft. (149 Nm)
Oil Cooler To Housing	20 lb. ft. (27 Nm)
Oil Filter Adapter	20 lb. ft. (27 Nm)
Oil Pan to Crankcase (5/16-18)	180 lb. in. (20 Nm)
Oil Pan to Crankcase (1/4-20)	72 lb. in. (8 Nm)
Oil Pump to Block	45 lb. ft. (61 Nm)
Rocker Arm Cover	4 lb. ft. (5 Nm)
Rocker Arm Lock Set Screw	23 lb. ft. (31 Nm)
Rocker Arm Stud (NOTE 1)	70 lb. ft. (95 Nm)
Rocker Arm Stud Girdle	15 lb. ft. (20 Nm)
Starter Motor	45 lb. ft. (61 Nm)
Supercharger (In Three Increments)	25 lb. ft. (34 Nm)
Supercharger Front Gear Cover (NOTE 1 & 5)	20 lb. ft. (27 Nm)
Supercharger Front Snout	20 lb. ft. (27 Nm)
Supercharger Gear Bolts	120 lb. ft. (163 Nm)
Supercharger Pulley	35 lb. ft. (47 Nm)
Timing Chain Cover	10 lb. ft. (14 Nm)
Transmission To Housing	45 lb. ft. (61 Nm)
Water Inlet Housing	30 lb. ft. (41 Nm)

NOTE: (1) Apply Loctite 271 (P/N 92-32609-1) on bolt threads.

NOTE: (2) Apply moly lube on washer and under bolt head as well as on the threads.

NOTE: (3) Apply oil under bolt head, and Loctite Teflon pipe thread sealant #592 on threads.

NOTE: (4) Apply RTV on back of hub at cam contact area.

NOTE: (5) Apply Loctite 515 under bolt heads.

Intercooler

INTERCOOLER MAINTENANCE		
FLUSHING	BACK-FLUSHING	DISASSEMBLE, CLEAN & PRESSURE CHECK
After every engine operation and prior to any winter storage	After every 15 hours of operation	Every 50 hours of operation (By an authorized dealer)

CAUTION

The intercooler must have all of the water removed and be flushed with antifreeze as part of any winter storage or damage to the intercooler could result.

IMPORTANT: The intercooler is very sensitive to accumulation of internal debris and corrosion and must be kept as clean as possible. Waterflow blockage could cause excessive internal water pressures resulting in overheating and or leaking.

1. Remove the lines from the front and back fittings of the intercooler.

IMPORTANT: Flush the intercooler in the opposite water flow direction as normal flow.

CAUTION

The front fitting of the intercooler is threaded into the cooler core and extreme care must be taken not to damage the core while removing or reinstalling the front water line or the fitting. Hold the cooler fitting with a wrench while tightening the line.

2. Connect a hose from a water source to the front fitting of the intercooler.
3. Connect a line to the rear fitting of the intercooler to route the flushing water overboard or into a container.
4. Thoroughly flush the intercooler until water flow is clear and free of debris.

Fuel Requirements

WARNING

FIRE AND EXPLOSION HAZARD: Fuel leakage from any part of fuel system can be a fire and explosion hazard which can cause serious bodily injury or death. Careful periodic inspection of entire fuel system is mandatory, particularly after storage. All fuel components including fuel tanks, whether plastic metal or fiberglass, fuel lines, fittings, fuel filters and carburetors/fuel injection components should be inspected for leakage, softening, hardening, swelling or corrosion. Any sign of leakage or deterioration requires replacement before further engine operation.

CAUTION

Use of improper gasoline can damage your engine seriously and is considered misuse of your engine. Damage resulting from use of improper gasoline will not be covered under the limited warranty.

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OCTANE REQUIREMENTS FOR YOUR ENGINE

FUEL TYPE	MINIMUM POSTED OCTANE
Unleaded premium	$(R+M)\div 2=92$ or $RON^*=98$

**Research Octane Number*

USING REFORMULATED (OXYGENATED) GASOLINES (USA ONLY)

These “Reformulated Gasolines” are acceptable for use in your MerCruiser engine.

This type of gasoline is required in certain areas of the US. The two types of “oxygenates” used in these fuels are alcohol (Ethanol) or Ether (MTBE or ETBE). If Ethanol is the “oxygenate” that is used in the gasoline in your area, refer to “Gasolines Containing Alcohol” which follows.

GASOLINES CONTAINING ALCOHOL

If the gasoline in your area contains either “methanol” (methyl alcohol) or “ethanol” (ethyl alcohol), you should be aware of certain adverse effects that can occur. These adverse effects are more severe with “methanol”. Increasing the percentage of alcohol in the fuel can also worsen these adverse effects.

Because of possible adverse effects of alcohol in gasoline, it is recommended that only alcohol-free gasoline be used where possible. If only fuel containing alcohol is available, or if the presence of alcohol is unknown, increased inspection frequency for leaks and abnormalities is required.

Some of these adverse effects are caused because the alcohol in the gasoline can absorb moisture from the air, resulting in a separation of the water/alcohol from the gasoline in the fuel tank.

MerCruiser engine fuel system components will withstand up to 10% alcohol content in the gasoline. We do not know what percentage your boat’s fuel system will withstand. Contact your boat manufacturer for specific recommendations on the boats fuel system components (fuel tanks, fuel lines, and fittings).

GASOLINE CONTAINING ALCOHOL MAY INCREASE:

- Corrosion of metal parts.
- Deterioration of rubber or plastic parts.
- Fuel permeation through rubber fuel lines.
- Starting and operating difficulties and decrease in performance.

IMPORTANT: When operating a MerCruiser engine on gasoline containing alcohol, storage of gasoline in the fuel tank for long periods should be avoided. Long periods of storage, common to boats, create unique problems. In cars alcohol-blend fuels normally are consumed before they can absorb enough moisture to cause trouble, but boats often sit idle long enough for phase separation to take place. In addition, internal corrosion may take place during storage if alcohol has washed protective oil films from internal components.

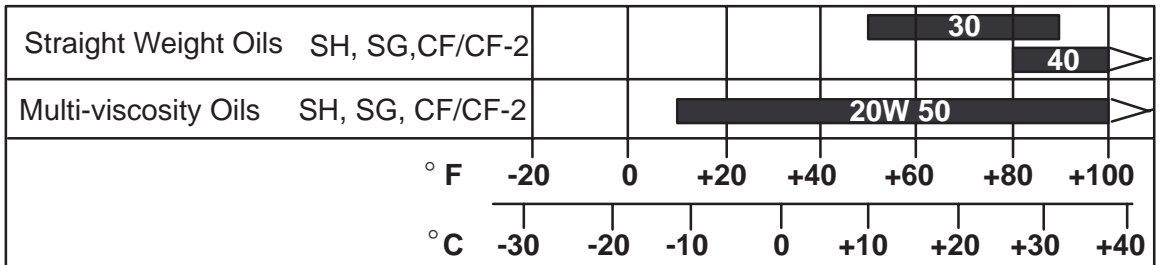
OIL RECOMMENDATIONS

PREFERRED OILS Oil filter should always be changed with oil	API CLASSIFICATION
Premium grade multi-viscosity 20W-50 automotive oil	SH, SG, CF/CF-2
OTHER RECOMMENDATIONS IF PREFERRED OILS ARE NOT AVAILABLE	
Premium multi-viscosity 20W-40 automotive oil	SH, SG, CF/CF-2
Straight weight detergent automotive oil of correct viscosity (See Chart Below)	SH, SG, CF/CF-2

IMPORTANT OIL PRACTICES

Do Not Use	• Non-detergent oils
	• Oils containing solid additives
	• Multi-viscosity oils other than the ones recommended
	• Low quality oils
Do Not Mix	• Straight weight and multi-viscosity oils
	• Different brands of oils, straight weight or multi-viscosity
	• Different weights of straight weight or different weights of multi-viscosity oils.

OIL TEMPERATURE/OIL VISCOSITY CHART



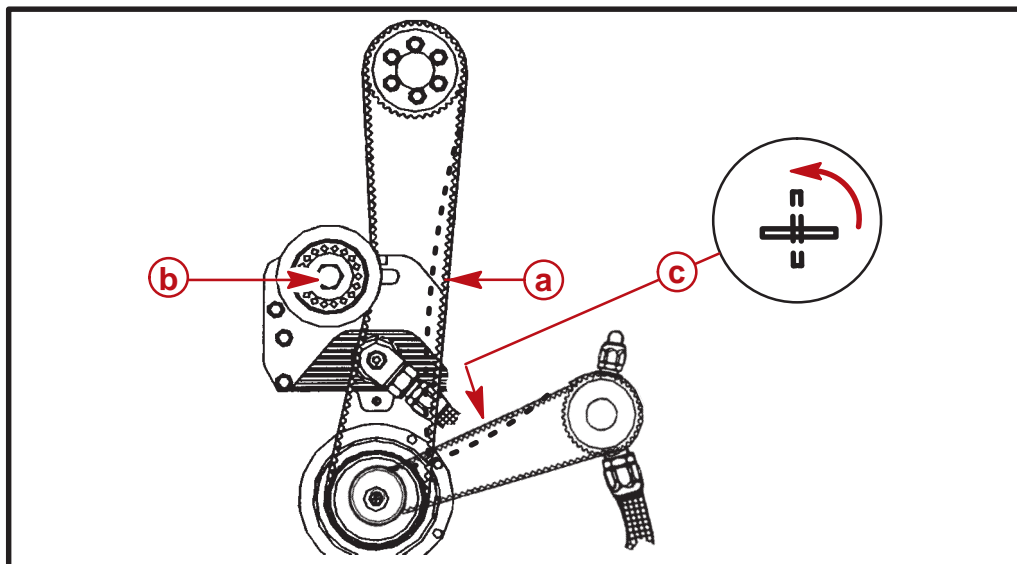
SUPERCHARGER AND OIL PUMP BELT TENSION

⚠ CAUTION

Over-tightening of the supercharger or oil pump belt can cause damage to the seals and oil leakage. The belt should be able to be deflected as specified between crankshaft and supercharger or oil pump pulleys.

The supercharger and oil pump belt tension must be manually adjusted. Check belt deflection half way between the crankshaft and supercharger or oil pump pulleys.

- Adjust supercharger belt to have 1 in. (25.4 mm) to 1-1/4 in. (32 mm) deflection (a).
- Adjust the oil pump belt to have 1/4 in. (6mm) to 3/8 in. (9mm) deflection or to be twistable to 90° at midpoint of the belt (c).



- a** - Check Belt Deflection at This Point
- b** - Adjustment Bolt
- c** - Oil Pump belt deflection should be 1/4 in.(6mm) to 3/8 in. (9mm) or twistable by 90° at mid point of the belt

OIL SYSTEM CLEANING

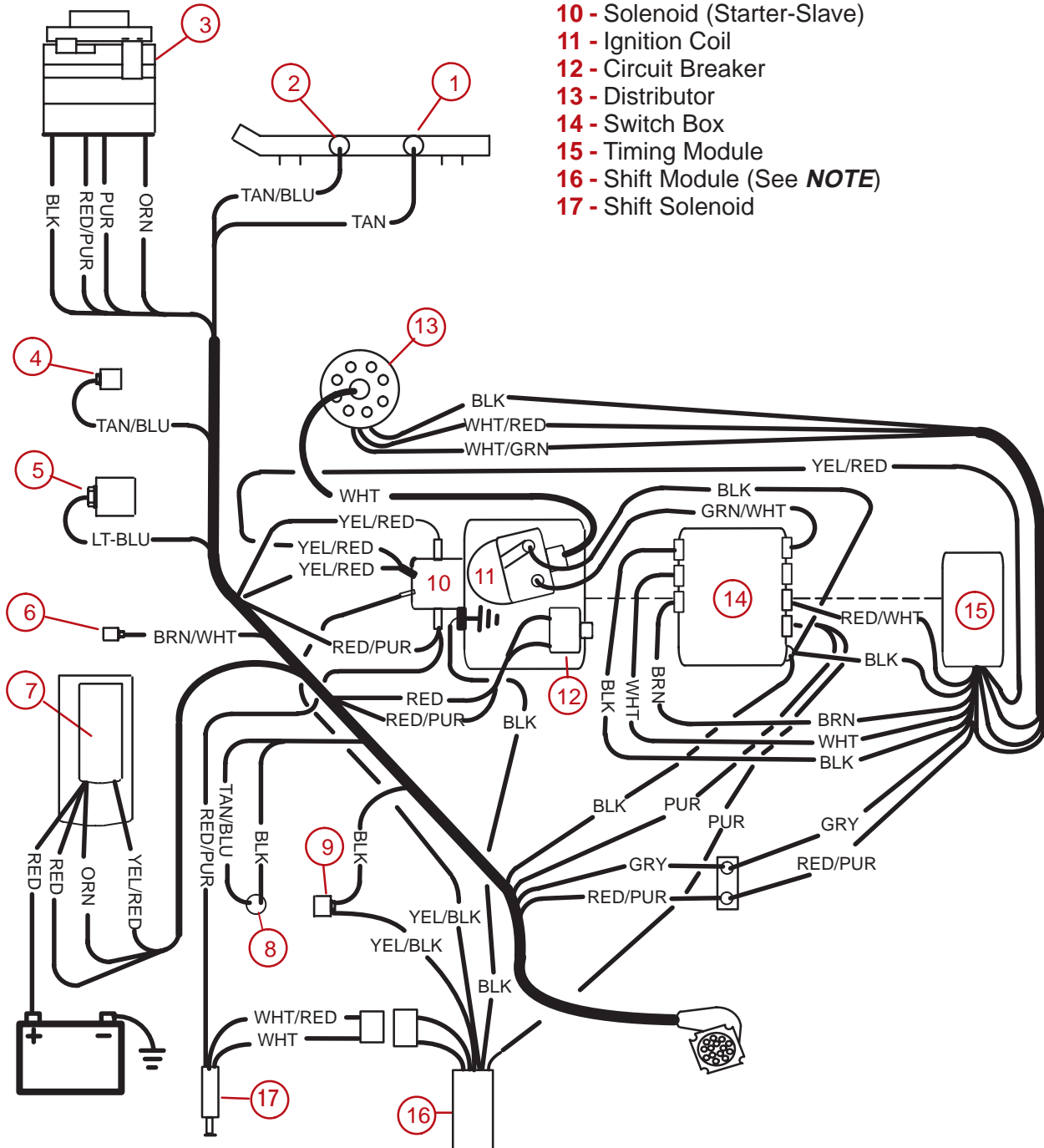
IMPORTANT: In the event that an engine failure occurs, debris may be present in the oil system, engine oil pump, oil system reservoir, oil lines and oil filter.

- Further engine damage could result from debris left in the oil system.
- The oil pump, reservoir, overflow reservoir and oil lines must be disassembled and thoroughly cleaned at the time of the engine repairs and before engine operation.
- Each oil pan pickup line has a screen in the pan fitting which must be cleaned.
- Oil filter must be replaced.

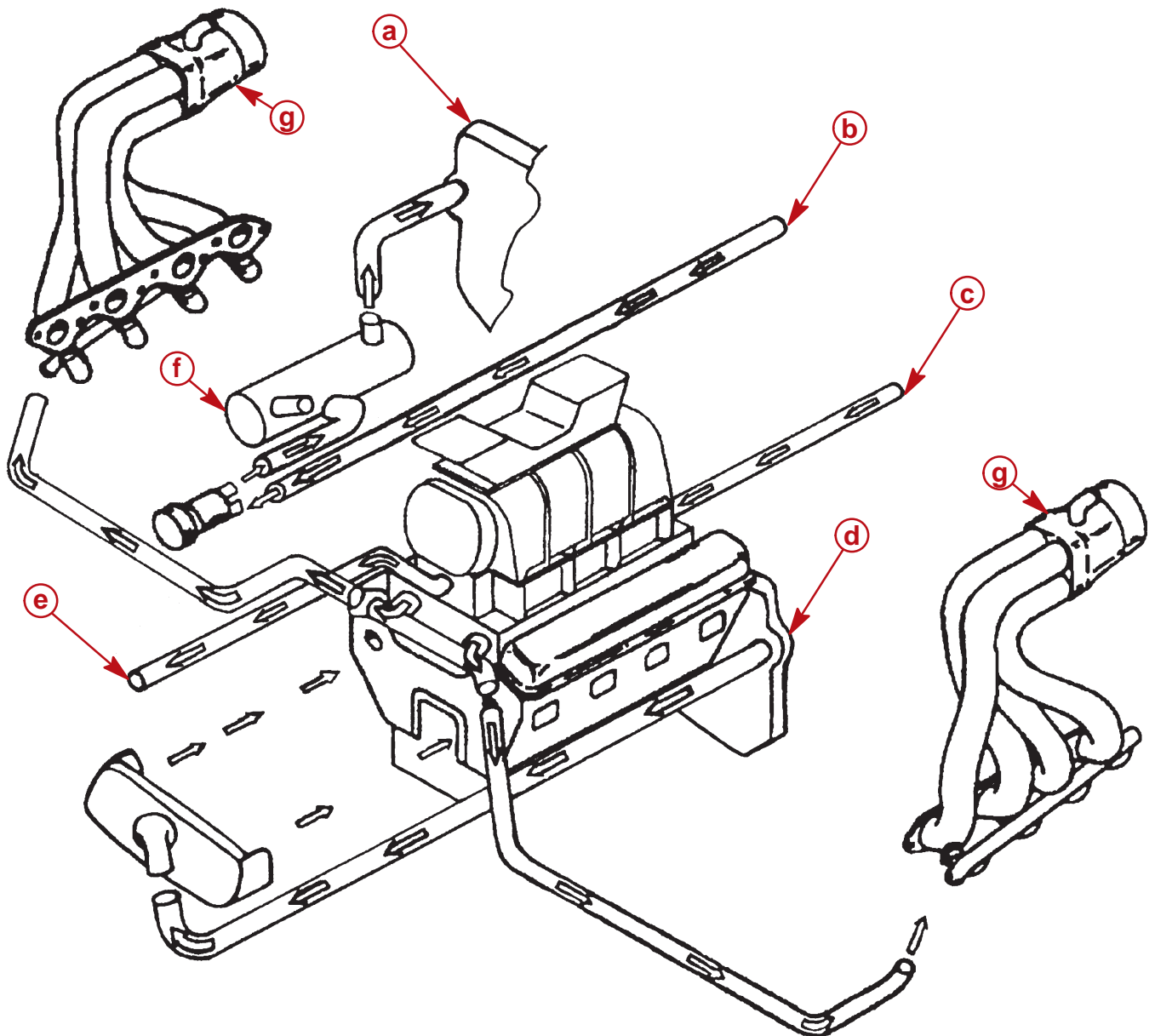
Wiring Diagram 900SC Dry Sump

NOTE: Connect the LONG YEL/BLK wire from the shift module #16 to the Neutral Safety Switch #9 and the SHORT YEL/BLK to the Starter Slave Solenoid #10.

- 1 - Water Temperature Sender
- 2 - Audio Warning Sender (Water)
- 3 - Alternator
- 4 - Low Oil Pressure Audio Warning Sender
- 5 - Oil Pressure Sender
- 6 - Oil Temperature Sender
- 7 - Starter Solenoid
- 8 - Transmission Temperature Audio Warning
- 9 - Neutral Safety Switch
- 10 - Solenoid (Starter-Slave)
- 11 - Ignition Coil
- 12 - Circuit Breaker
- 13 - Distributor
- 14 - Switch Box
- 15 - Timing Module
- 16 - Shift Module (See **NOTE**)
- 17 - Shift Solenoid



Cooling System Water Flow Diagram 900SC Dry Sump



- a** - Bell Housing Oil Cooler (Starboard)
- b** - Inlet Water (From Seawater Pickup) To Engine)
- c** - Inlet Water (From Seawater Pickup to Intercooler)
- d** - Bell Housing Oil Cooler (Port)
- e** - Outlet Water From Intercooler (Overboard)
- f** - Transmission/Power Steering Cooler
- g** - Exhaust Headers (Not Included With Engine, Must Be Purchased Separately)