

TO: SERVICE MANAGER MECHANICS
PARTS MANAGER

Revised October 1997

No. 97-9

H.P. 377 Scorpion Specifications - Serial No. 0K000656 & Up

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NOTE: Changes to the original 97-9 Service Bulletin are underlined.

TUNE-UP

Horsepower (Kilowatts)	377 (354)
Displacement (Liters)	377 CID (6.2 L)
Engine Type and Number of Cylinders	V8
Bore	4.00 in. (101.6mm)
Stroke	3.75 in. (95.25mm)
Compression Ratio	9.4:1
Compression Pressure	150 psi (1034 kPa)
Ignition Type	MEFI/EST Digital (NOTE 1)
Spark Plug Type-P/N	AC-MR43LTS / Champion RS9YC / <u>NGK BPR5EFS</u> (P/N 33-816336)
Spark Plug Gap	.045 in. (1.1mm)
Timing	8° BTDC (NOTE 2)
Maximum Advance @ 3000 RPM	30° BTDC
Maximum RPM at Wide-Open-Throttle	4800-5200 RPM
Idle RPM in Neutral Gear	600 RPM
Firing Order	1-8-4-3-6-5-7-2
Fuel Required	92 Octane {(R+M)÷2} or 98 RON (NOTE 3)
Fuel Pump Pressure	25-30 psi (172-206 kPa)
Electrical System	12-Volt Negative Ground

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TUNE-UP (CONT.)

Alternator Rating	65 Amperes
Recommended Battery Rating	Min. 550 CCA
Crankcase Oil Capacity with New Filter	Approx. 5 U.S. Qts. (4.7 Liters) (NOTE 4)
Oil Pressure at 2000 RPM	30 - 60 psi (207-414 kPa)
Transmission (Velvet Drive) 1:1	Fluid Type F 2 U.S. Qts. (1.9L) (NOTE 4)
Seawater Cooling System	15 U.S. Qts. (14.1L) (NOTE 5)

NOTE: (1) All (MEFI/EST Digital) stands for: Multi-port, Electronic Fuel Injection / Electronic Spark Timing, Digital.

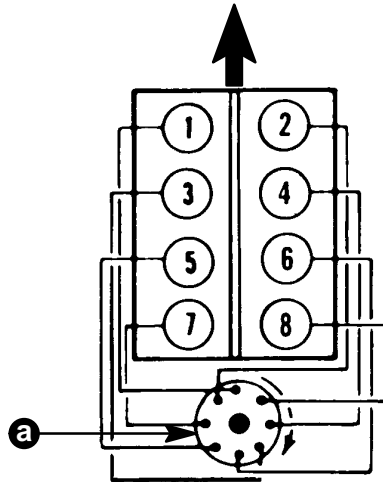
NOTE: (2) Timing on fuel injection engines must be set using a special procedure as outlined in the appropriate Service Manual. Timing cannot be properly set using the conventional method.

NOTE: (3) Without alcohol whenever possible.

NOTE: (4) Approximate, ALWAYS use dipstick to determine exact quantity of oil required.

NOTE: (5) Cooling System Capacity information is for winterization use only.

Figure 1 L.H. Rotation



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

ELECTRICAL SPECIFICATIONS

Ignition Specifications

Coil	Part No. 817378
Coil Primary Resistance (Ohms)	.4
Coil Secondary Resistance (Ohms)	8250

Starter Motor Specifications

Mercury Marine Part No.		50-806962A1		
Delco Remy Part No.		10455603		
No Load Test				
Volts	Amps. (Min.)	Amps. (Max.)	RPM (Min.)	RPM (Max.)
10.6	70	120	5400	10,800

INTERNAL ENGINE SPECIFICATIONS

UNIT OF MEASUREMENT: in. (mm)

Cylinder Bore

Diameter		4.0007-4.0017 (101.618-101.643)	
Out of Round		Production	.0005 (0.12) Max
		Service	.002 (0.05) Max
Taper	Production	Thrust Side	.0005 (0.012) Max
		Relief Side	.001 (0.025) Max
	Service	.001 (0.025) Over Production	

Piston clearance

Piston: See Note

Production	.0025-.004 (0.063-0.101)
Service	.003-.004 (0.076-0.101)

NOTE: Measure piston 2.10 in. (53.34 mm) from top of piston.

Piston Ring:

COMPRESSION RINGS

Groove Side Clearance		
Production	Top & 2nd	.0012-.0032 (0.030-0.081)
Service	Top & 2nd	High Limit Production +.001 (0.025)
End Gap		
Production	Top & 2nd	.016-.026 (0.40-0.66)
Service		High Limit Production ± .010 (.025)

OIL RINGS

Groove Side Clearance	
Production	.002-.007 (0.051-0.71)
Service	High Limit Production ± .001 (0.025)
End Gap	
Production	.010-.050 (0.25-1.27)
Service	High Limit Production ± .001 (.025)

Piston Pin: Free Floating

Diameter		.9270-.9271 (23.545-23.548)
Clearance	Production	.0004-.0008 (0.0120-0.0210)
	Service	.0010 (0.025) Max
Fit to Rod		.0008-.0016 (0.021-0.40) Interference

Crankshaft: Lunati Crank

MAIN JOURNAL

Diameter	No. 1,2,3,4,5	2.4480-2.4490 (62.179-62.204)
Taper & Out of Round	Production	.0002 (0.005) Max
	Service	.001 (0.025) Max

CONNECTING ROD JOURNAL

Diameter		2.0899-2.0998 (53.0834-53.3340)
Taper & Out of Round	Production	.0003 (0.007)
	Service	.001 (0.025) Max.

MAIN BEARING CLEARANCES

Production	No. 1,2,3,4	.0015-.003 (0.038-0.076)
	No. 5	.0025-.0035 (0.0760-0.0380)
Service	No. 1,2,3,4	.0015-.003 (0.038-0.076)
	No. 5	.0025-.0035 (0.0760-0.0380)
Crankshaft End Play		.002-.008 (0.0500-0.2000)

ROD BEARING CLEARANCES

Rod Bearing Clearance	Production	.0015-.003 (0.038-0.076)
	Service	.002-.003 (0.050-0.076)
Rod Side Clearance		.008-.014 (0.20-0.35)

Camshaft and Drive:

Lobe Lift \pm .002 (0.051)	Intake	.340 (8.636)
	Exhaust	.3534 (8.9763)
Duration at .050 In. (1.27mm) Cam Lift	Intake	.222 (5.638)
	Exhaust	.230 (5.842)
Journal Diameter		1.8682-1.8692 (47.440-47.490)
Timing Chain Deflection [LH Rotation]		.375 (9.5) from taut position [total .75 (19)]

Valve System:

Lifter Type		Hydraulic Roller
Rocker Arm Ratio		1.5:1
Valve Lift	Intake	.510 (12.95)
	Exhaust	.5301 (13.464)
Valve Lash (Int. & Exh.)		1 Turn Down from Zero Lash
Face Angle (Int. & Exh.)		45°
Seat Angle (Int. & Exh.)		45°
Seat Run Out (Int. & Exh.)		.002 (0.05) Max
Seat Width	Intake	.040-.065 (1.02-1.65)
	Exhaust	.065-.098 (1.65-2.49)
Stem Clearance		
Production	Intake	.0010-.0027 (0.025-0.069)
	Exhaust	.0010-.0027 (0.025-0.069)
Service	Intake	High Limit Production + .001 (0.025)
	Exhaust	High Limit Production + .0002 (.0050)
Valve Spring		
Free Length		2.02 (51.3)
Valve Spring (Pressure)	Closed @ 1.70 (43.18)	76-84 lb. ft. (338-374 N.m)
	Open @ 1.27 (32.26)	187-203 lb. ft. (832-903 N.m)
Installed Height (Intake)		1.69-1.71 (42.92-43.43)

NOTE: Test springs as a complete assembly with dampener.

Cylinder Head:

Gasket Surface Flatness	.004 (0.10) Overall Maximum
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Flywheel:

Run Out on Face Area	.008 (0.203) Max
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TORQUE SPECIFICATIONS

Camshaft Sprocket/Gear (NOTE 1)	216 lb.in. (24 N·m)
Conn. Rod Cap (NOTE 2)	20 lb. ft. (27 N·m)
Crankcase Front Cover	80 lb. in. (9 N·m)
Cylinder Head Bolt First Sequence	22 lb. ft. (30 N·m)
Angle Torque Second Sequence Short Bolt	55 Degrees
Medium Bolt	65 Degrees
Long Bolt	75 Degrees
Distributor Hold Down	25 lb. ft. (34 N·m)
Exhaust Manifold (Bolts)	20 lb. ft. (27 N·m)

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TORQUE SPECIFICATIONS (CONT.)

Flywheel (Note 1)	75 lb. ft. (100 N·m)
Flywheel Drive Plate (NOTE 1)	35 lb. ft. (48 N·m)
Flywheel Housing To Block	30 lb. in. (41 N·m)
Intake Manifold	18 lb. ft. (24 N·m)
Main Bearing Cap (NOTE 2)	74 lb. ft. (100 N·m)
Oil Pan to Crankcase (5/16-18)	106 lb. in. (12 N·m)
Oil Pan Corner Nut	15 lb. in. (20 N·m)
Oil Pan Drain Plug	15 lb. ft. (20 N·m)
Oil Pump (NOTE 1)	65 lb. ft. (88 N·m)
Oil Pump Cover	80 lb. in. (9 N·m)
Rocker Arm Cover	90 lb. in. (10 N·m)
Spark Plug	15 lb. ft. (20 N·m)
Torsional Damper	40 lb. ft. (54 N·m)
Thermostat Housing	30 lb. ft. (41 N·m)

NOTE: 1 Use Loctite 271 (P/N 92-32609-1) on 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 Teflon pipe thread sealant (like Loctite sealant #592) on threads.

Wiring Diagrams

STARTING AND CHARGING SYSTEM HARNESS

A - Audio Warning Components

- 1 - Oil Pressure Switch
- 2 - Transmission Temperature Switch

B - Instrumentation Components

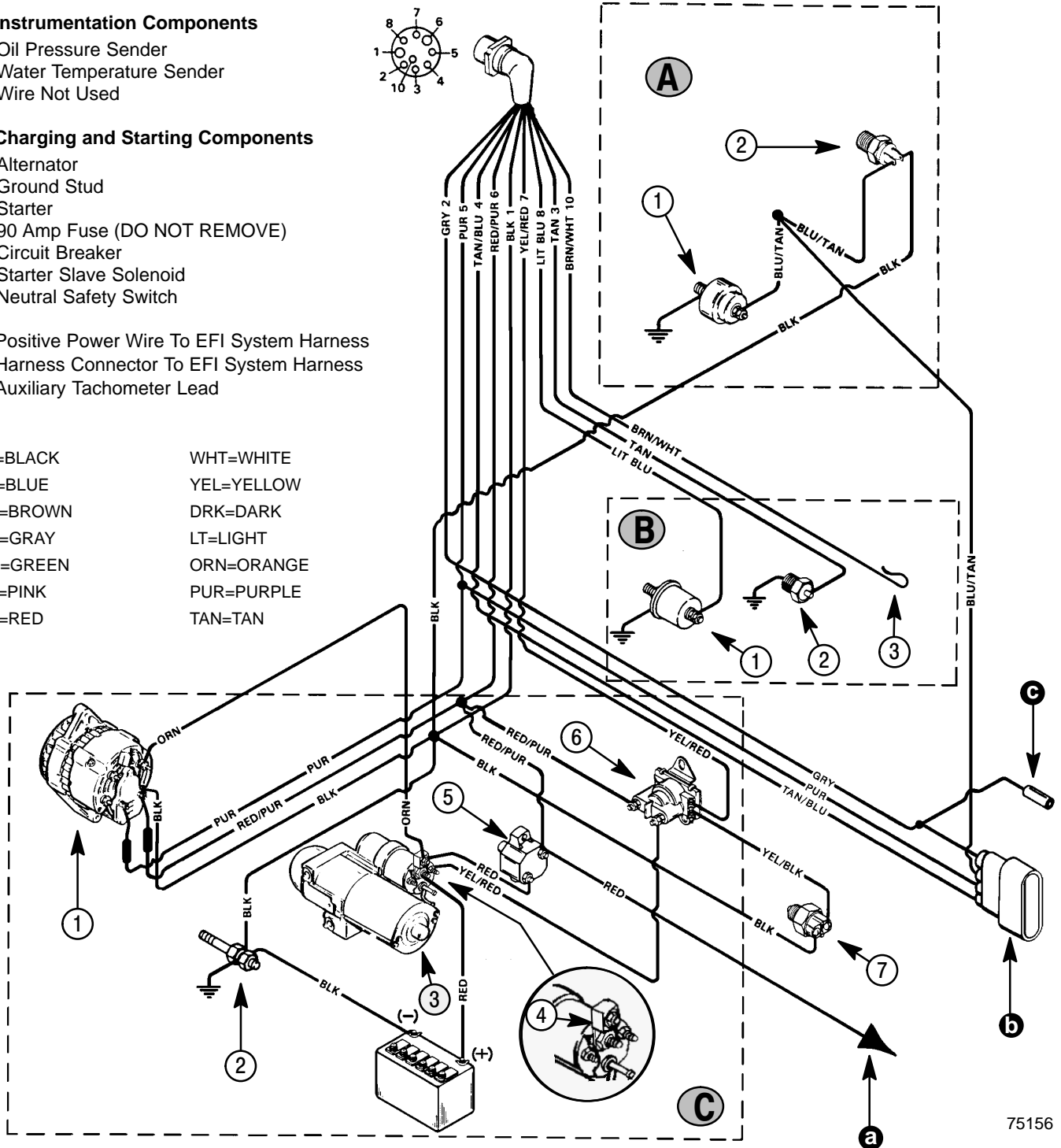
- 1 - Oil Pressure Sender
- 2 - Water Temperature Sender
- 3 - Wire Not Used

C - Charging and Starting Components

- 1 - Alternator
- 2 - Ground Stud
- 3 - Starter
- 4 - 90 Amp Fuse (DO NOT REMOVE)
- 5 - Circuit Breaker
- 6 - Starter Slave Solenoid
- 7 - Neutral Safety Switch

- a - Positive Power Wire To EFI System Harness
- b - Harness Connector To EFI System Harness
- c - Auxiliary Tachometer Lead

- | | |
|-----------|------------|
| BLK=BLACK | WHT=WHITE |
| BLU=BLUE | YEL=YELLOW |
| BRN=BROWN | DRK=DARK |
| GRY=GRAY | LT=LIGHT |
| GRN=GREEN | ORN=ORANGE |
| PNK=PINK | PUR=PURPLE |
| RED=RED | TAN=TAN |



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NOTE: Taped back BROWN-WHITE wire may be used for an Accessory. LOAD MUST NOT EXCEED 5 AMPS.

Wiring Diagrams

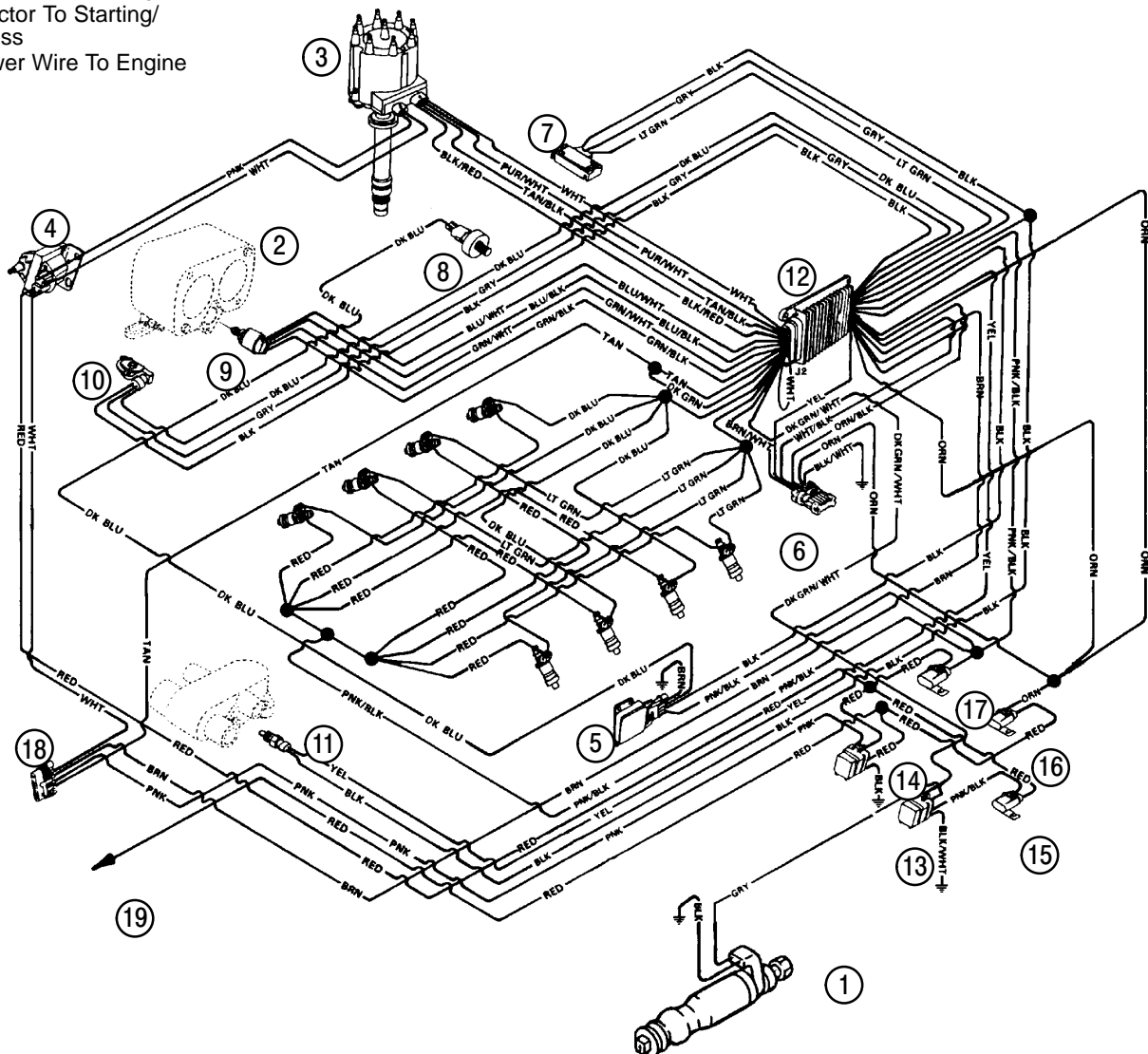
Fuel and Ignition System Harness

NOTE: All BLACK wires with a ground symbol are interconnected within the EFI system harness.

NOTE: Component position and orientation shown is arranged for visual clarity and ease of circuit identification.

- 1 - Fuel Pump
- 2 - Throttle Body
- 3 - Distributor
- 4 - Coil
- 5 - Electronic Spark Control (KS) Module
- 6 - Data Link Connector (DLC)
- 7 - Manifold Absolute Pressure (MAP) Sensor
- 8 - Knock Sensor
- 9 - Idle Air Control (IAC)
- 10- Throttle Position (TP) Sensor
- 11- Engine Coolant Temperature (ECT) Sensor
- 12- Electronic Control Module (ECM)
- 13- Fuel Pump Relay
- 14- Ignition/System Relay
- 15- Fuse (15 Amp) Fuel Pump
- 16- Fuse (15 Amp) ECM/DLC/Battery
- 17- Fuse (10 Amp) ECM/Injector/Ignition/Knock/Module
- 18- Harness Connector To Starting/Charging Harness
- 19- Positive (+) Power Wire To Engine Circuit Breaker

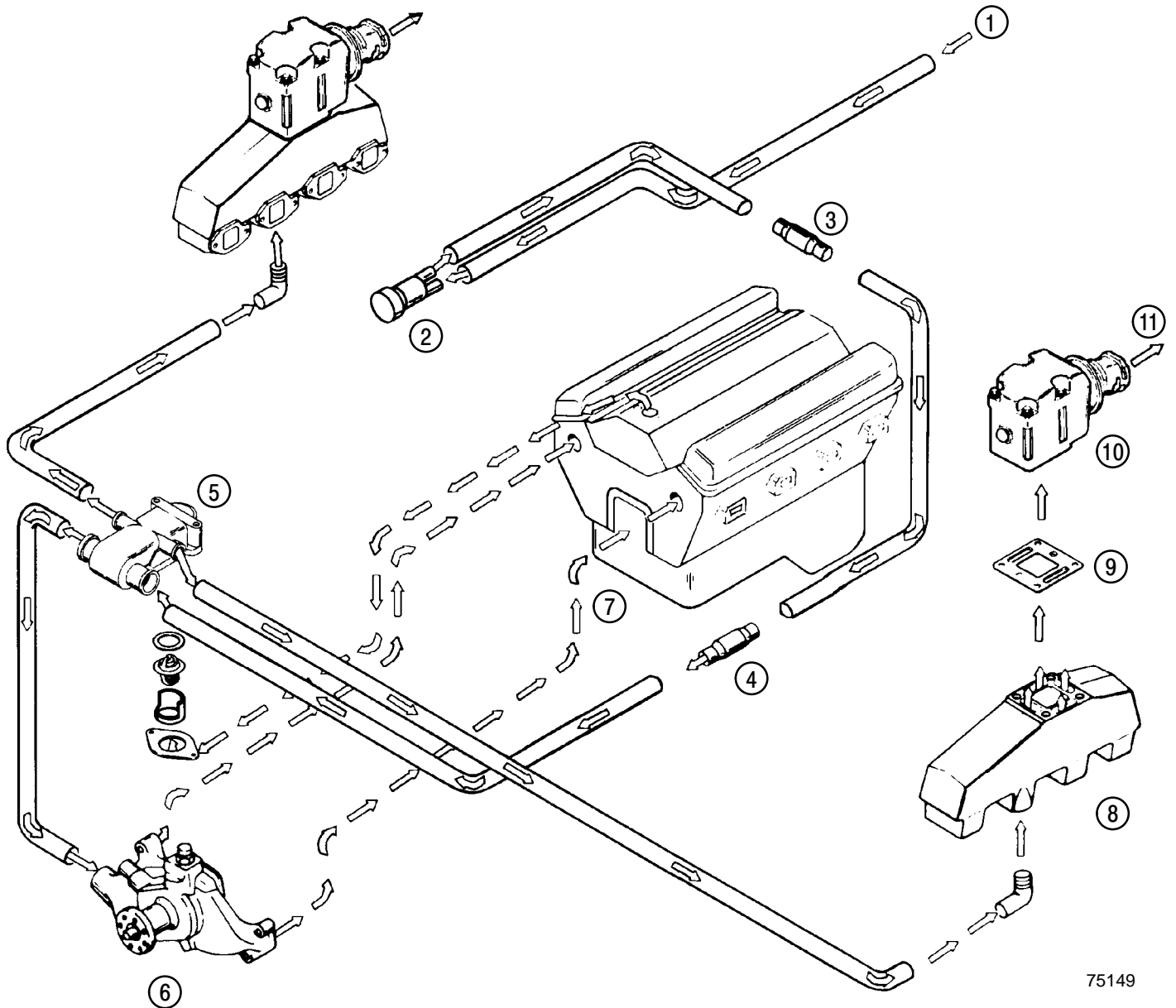
PUR = PURPLE	BLK = BLACK
RED = RED	BLU = BLUE
TAN = TAN	BRN = BROWN
WHT = WHITE	GRY = GRAY
YEL = YELLOW	GRN = GREEN
LIT = LIGHT	ORN = ORANGE
DRK = DARK	PNK = PINK



Water Flow Diagram

NOTE: Certain components in the following diagram may look different than on your particular power package, but the water flow paths remain similar on all engines.

- 1 - Seawater Intake
- 2 - Seawater Pump
- 3 - Transmission Cooler
- 4 - Fuel Cooler
- 5 - Thermostat Housing and Cover Assembly
- 6 - Engine Water Circulating Pump
- 7 - Engine Block and Cylinder Head Assembly
- 8 - Exhaust Manifold, Typical
- 9 - Restrictor Gasket
- 10 - Exhaust Elbow Assembly, Typical
- 11 - Water Flow Overboard



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