mercruiser STERN DRIVES & INBOARDS

service bulletin

TO: SERVICE MANAGER ☐ MECHANICS ☐
PARTS MANAGER ☐

No. 91-6

MCM 7.4L Bravo, MIE 7.4L Inboard GM Generation V Engine Specifications

NOTE: Generation V Engines Have the Fuel Pump Mounted on the Belt Driven Seawater Pump.

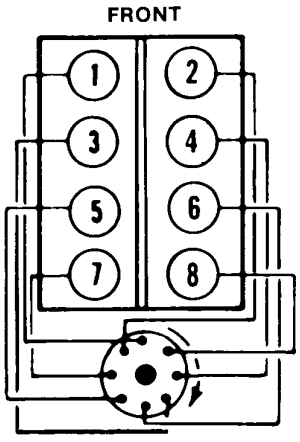
A. Tune-up Specifications
B. Electrical Specifications
C. Carburetor Specifications
D. Internal Engine Specifications
E. Torque Specifications
F. Wiring Diagram (Engine)
G. Water Flow Diagram

A. TUNE-UP SPECIFICATIONS

Model	7.4L Bravo	7.4L Inboard
Propshaft Horsepower (Kilowatts)	300 (224)	310 (231)
Displacement	454 CID (7.4L)	
Engine Type and Number of Cylinders	V8	
Bore	4.25 in. (108mm)	
Stroke	4.00 in. (101.6mm)	
Compression Ratio	8.6:1	
Compression Pressure	150 psi (1035 kPa)	
Ignition	Thunderbolt IV HEI	
Spark Plug Type	AC-MR43T or Champion RV8C	
Spark Plug Gap	.035 in. (0.9mm)	
Timing at Idle RPM	8° BTDC	
Maximum RPM at Wide-Open-Throttle	4200-4600	4000-4400
Idle RPM in Forward Gear	650-700	
Firing Order	1-8-4-3-6-5-7-2	
Fuel Required	87 Octane Minimum (Average Octane Rating)	
Fuel Pump Pressure	3-7 psi (21-48 kPa)	

Model	7.4L Bravo	7.4L Inboard
Electrical System	12V Negative (-) Ground	
Alternator Rating	55 Amps	
Minimum Battery Rating Required	450 CCA or 120 Ah	
Crankcase Oil Capacity with New Filter*	Approx. 7 U.S. Qts. (6.6L)	
Oil Pressure at 2000 RPM	30-70 psi (207-483 kPa)	
Minimum Oil Pressure @ Idle	4 psi (28 kPa)	
Valve Lash	Not Adjustable	
Thermostat	143° F (62° C)	
Cooling System Capacity	20 U.S. Qts. (19.3L)	
*Stern Drive Unit Oil Capacity (Approx.)	Bravo One- 2.8 U.S. Qts.(2.6L)	
	Bravo Two- 3.2 U.S. Qts. (3.0L)	
*Transmission (Borg-Warner) 1:1	2 U.S. Qts. (1.9L)	
*Transmission (Hurth-630A) 8° Down Angle	4.2 U.S. Qts. 4.0L)	
*Transmission (Hurth) V-drive	5.0 U.S. Qts. (4.7L)	

*Approximately, ALWAYS use dipstick to determine exact quantity of oil required.



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

Figure 1. L.H. Rotation

B. ELECTRICAL SPECIFICATIONS

Coil Specifications

Coil	Part No. 392-7803A4
Coil Primary Resistance (Ohms) Minimum	.60
Coil Primary Resistance (Ohms) Maximum	.80
Coil Secondary Resistance (Ohms)	9.400-11.700

Starter Motor Specifications

Part Number (Delco-Remy Number)	No Load Test					Brush Spring Tension
	Volts	Min. Amps	Max. Amps	Min. RPM	Max. RPM	
50-812428A_ (9000762) 50-812604A_ (9000768)	10.6	60	90	3,000	3,300	83-104 oz. (2353-2948 g)

C. CARBURETOR SPECIFICATIONS

All measurements are ± 1/64 in. (0.4mm).

Part Number (Weber)	3310-818659A_ (9772)
Float Drop	2 in. (51mm)
Float Level	1-9/32 in. (33mm)
Pump Rod Hole Location	#3 from End
Accelerator Pump	7/16 in. (11mm) NOTE:1
Choke Pull Off	1/8 in. (3.3mm)
Choke Coil Rod	Top of Rod to be Even with Bottom of Lever Hole (NOTE:2)
Primary Jet Throttle Lever Side Choke Rod Side	 .101 in. .113 in.
Metering Rod (Number)	16-6542
Secondary Jet Throttle Lever Side Choke Rod Side	 .098 in. .077 in.
Idle Mixture Screw (Preliminary)	2 Turns

NOTE 1: Measured from Top of Carburetor to the bottom of “S” link.

NOTE: 2 Remove choke rod from lever hole. Choke held closed and choke rod pushed down next to lever.

D. INTERNAL ENGINE SPECIFICATIONS

UNIT OF MEASUREMENT
in. (mm)

Cylinder Bore:

Model			7.4L Bravo	7.4L Inboard
Diameter			4.2500-4.2507 (107.950-107.967)	
Out of Round	Production		.001 (0.0254) Max.	
	Service		.002 (0.05) Max.	
Taper	Production	Thrust Side	.0005 (0.0127) Max.	
		Relief Side	.001 (0.0254) Max.	
	Service		.001 (0.02)Max.	

Piston:

Clearance	Production	.0030-.0042 (0.0762-0.1066)
	Service	.005 (0.12) Max.

Piston Ring: (1)HI Production Limit

Compression	Groove Side Clearance	Production	Top	.0012-.0029 (0.0304-0.0736)
			2nd	.0012-.0029 (0.0304-0.0736)
		Service		(1) + .001 (0.02)
	Gap	Production	Top	.010-.018 (0.2540-0.4572)
			2nd	.016-.024 (0.4064-0.6096)
		Service		(1) + .010 (0.25)
Oil	Groove Side Clearance	Production		.0050-.0065 (0.1270-0.1651)
		Service		(1) + .001 (0.02)
	Gap	Production		.010-.030 (0.254-0.762)
		Service		(1) + .010 (0.25)

Piston Pin:

Diameter		.98945-.98965 (25.1320-25.1371)
Clearance	Production	.0002-.0007 (0.0050-0.0177)
	Service	.001 (0.02) Max.
Fit in Rod		.0031-.0021 (0.0787-0.0533) Interference

Crankshaft:

Main Journal	Diameter	No. 1,2, 3, 4, 5	2.7482-2.7489 (69.8042-69.8220)
	Taper	Production	.0002 (0.0051) Max.
		Service	.001 (0.02) Max.
	Out of Round	Production	.0002 (0.0051) Max.
		Service	.001 (0.02) Max.
Main Bearing Clearance	Production	No. 1,2, 3, 4,	.0017-.0030 (0.0431-0.0762)
		No. 5	.0025-.0038 (0.0635-0.0965)
	Service	No. 2 3 4	.001-.003 (0.03-0.07)
		No. 5	.0025-.0040 (0.07-0.10)
Crankshaft End Play			.006-.010 (0.15-0.25)
Connecting Rod Journal	Diameter		2.1990-2.1996 (55.8546-55.8698)
	Taper	Production	.0005 (0.0127) Max.
		Service	.001 (0.02) Max.
	Out of Round	Production	.0005 (0.0127) Max.
		Service	.001 (0.02) Max.
Rod Bearing Clearance		Production	.0011-.0029 (0.0279-0.0736)
		Service	.003 (0.07) Max.
Rod Side Clearance			.002-.023 (0.05-0.58)
Crankshaft Runout			.0015 (0.038) Max.

Camshaft and Drive:

Model			7.4L Bravo	7.4L Inboard
Lobe Lift ± .002 (0.051)	Intake		.271 (6.883)	
	Exhaust		.282 (7.163)	
Duration @ .050 in. (1.27mm) Cam Lift	Intake		234°	
	Exhaust		238°	
Journal Diameter			1.9482-1.9492 (49.4842-49.5096)	
Journal Out-of-Round			.001 (0.025) Max.	
Camshaft Run-Out			.002 (0.051) Max.	
Timing Chain Deflection			3/8 (10mm) from Taut Position 3/4 (19mm) Total	

Valve System:

Lifter Type			Hydraulic
Rocker Arm Ratio			1.7:1
Valve Lift	Intake		.461 (11.709)
	Exhaust		.479 (12.167)
Valve Lash (Intake & Exhaust			Fixed Lash
Face Angle (Intake & Exhaust			45°
Seat Angle (Intake & Exhaust			46°
Seat Runout (Intake & Exhaust			.002 (0.05) Max.
Seat Width	Intake		1/32-1/16 (0.8-1.6)
	Exhaust		1/16-3/32 (1.6-2.3)
Stem Clearance	Production	Intake	.0010-.0027 (0.0254-0.0685)
		Exhaust	.0012-.0029 (0.0304-0.0736)
	Service	Intake	.001 (0.02)
		Exhaust	.002 (0.05)

Model			7.4L Bravo	7.4L Inboard
Valve Spring	Free Length		2.12 [2-1/8] (54)	
	Pressure (NOTE 1)	Closed @ 1.88 [1-7/8] (47.8)	74-86 lbs. ft. (100-116) N·m	
		Open @ 1.34 [1-3/8] (35.1)	288-312 lbs. ft. (390-423) N·m	
	Installed Height		1.875 [1-7/8] (47.6)	
Damper	Free Length Approximate		1.86 [1-55/64] (47.2)	
	No. of Coils		4	

NOTE 1: Test spring pressure with inner & outer spring assembled.

Cylinder Head:

Gasket Surface Flatness	.003 (0.07) in 6 (152) - .007 (0.15) Overall Maximum

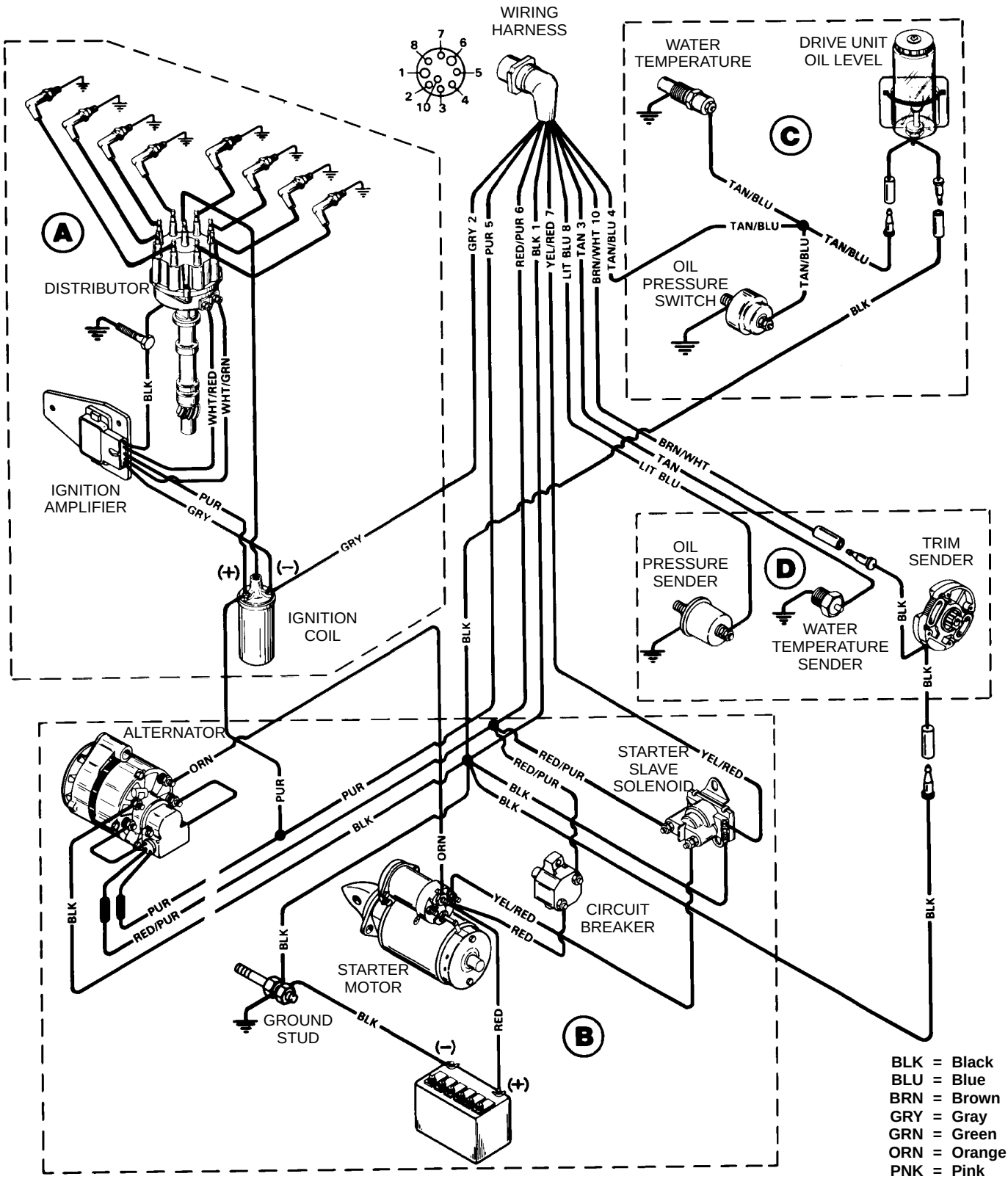
Flywheel:

Runout	.009 (0.22) Max.

E. TORQUE SPECIFICATIONS

Camshaft Sprocket	25 lb.ft. (34 N·m)
Conn. Rod Cap	73 lb. ft. (99 N·m)
Coupler or Drive Plate	35 lb. ft. (48 N·m)
Cylinder Head	85 lb. ft. (115 N·m)
Distributor Clamp	20 lb. ft. (27 N·m)
Exhaust Manifold (Bolts)	35 lb. ft. (48 N·m)
Flywheel	70 lb. ft. (95 N·m)
Flywheel Housing	30 lb. ft. (41 N·m)
Front Cover	120 lb. in. (14 N·m)
Intake Manifold	35 lb. ft. (48 N·m)
Main Bearing Cap	110 lb. ft. (149 N·m)
Oil Filter Adaptor Nut	40 lb. ft. (54 N·m)
Oil Pan to Crankcase	200 lb. in. (23 N·m)
Oil Pan Drain Plug	20 lb. ft. (27 N·m)
Oil Pump	70 lb. ft. (95 N·m)
Oil Pump Cover	80 lb. in. (9 N·m)
Rocker Arm Bolts	45 lb. ft (61 N·m)
Rocker Arm Cover	70 lb. in. (8 N·m)
Spark Plug	22 lb. ft. (30 N·m)
Torsional Damper	90 lb. ft. (122 N·m)
Water Pump	35 lb. ft. (48 N·m)

F. ENGINE WIRING DIAGRAM (7.4L BRAVO)

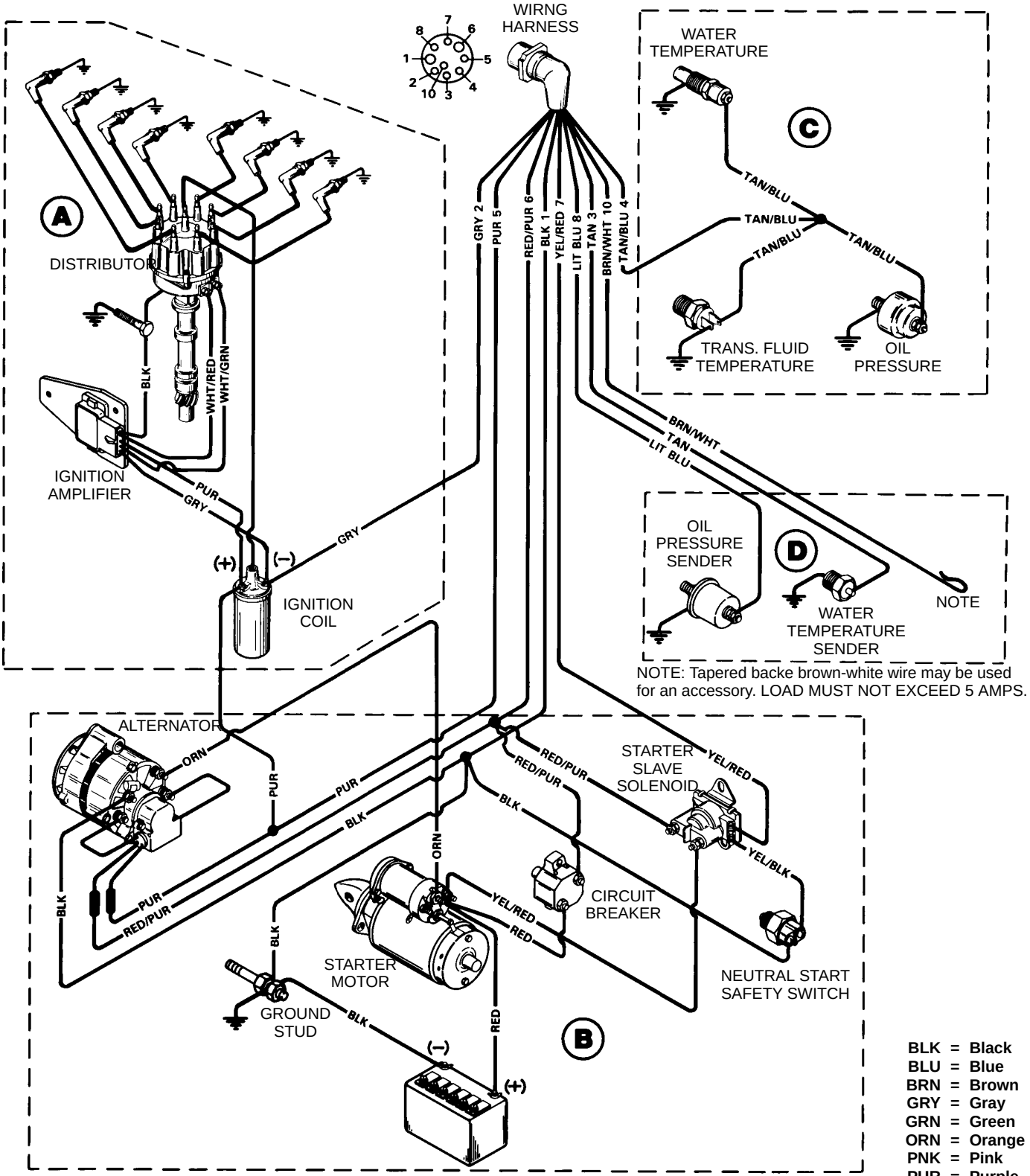


A: Ignition and Choke System
B: Starting and Charging System
C: Audio Warning System
D: Instrumentation System

BLK	=	Black
BLU	=	Blue
BRN	=	Brown
GRY	=	Gray
GRN	=	Green
ORN	=	Orange
PNK	=	Pink
PUR	=	Purple
RED	=	Red
Tan	=	Tan
WHT	=	White
YEL	=	Yellow
LIT	=	Light
DRK	=	Dark

50844

F. ENGINE WIRING DIAGRAM (MIE 7.4L INBOARD)

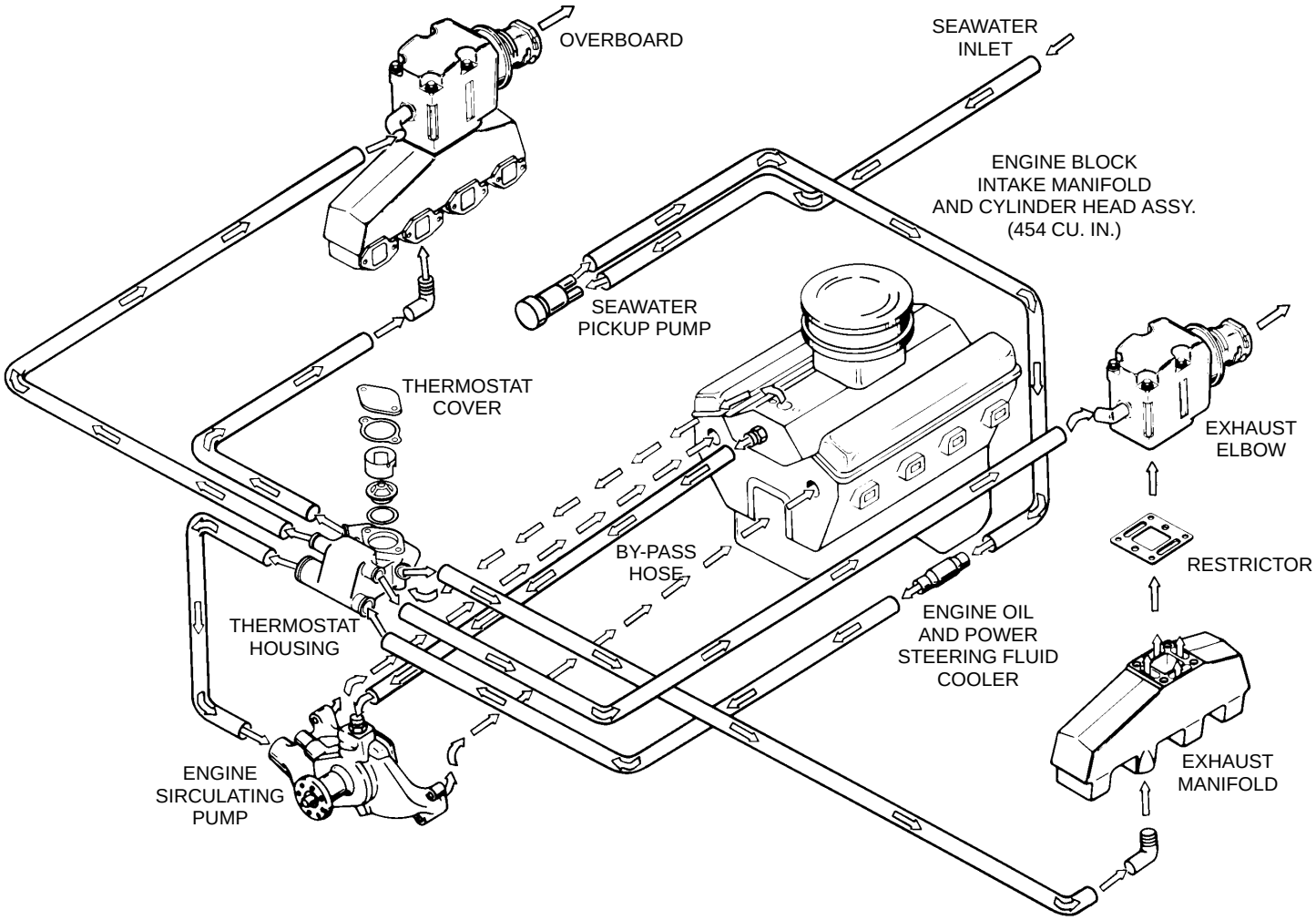


A: Ignition System
B: Starting and Charging System
C: Audio Warning System
D: Instrumentation System

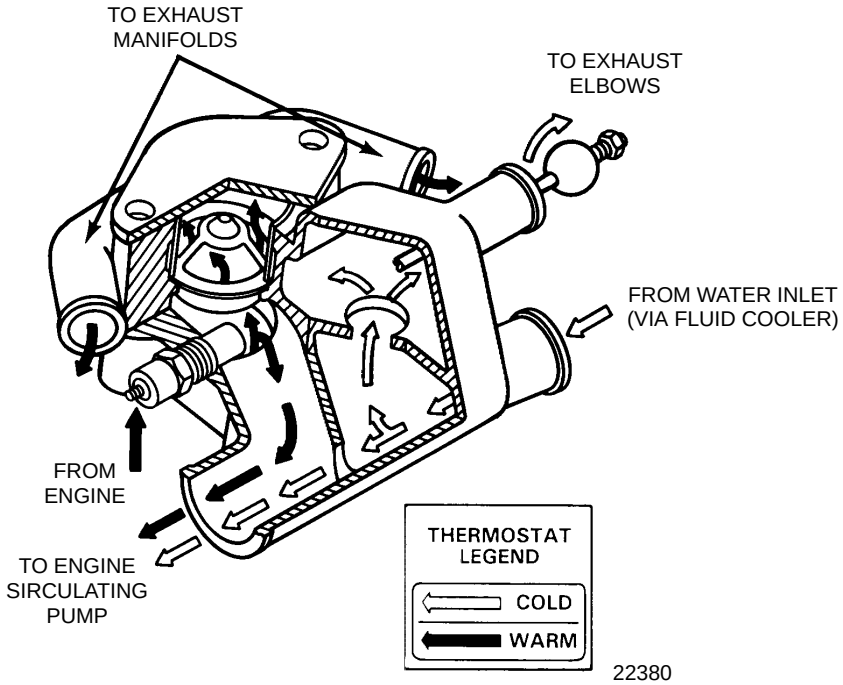
BLK	=	**Black**
BLU	=	**Blue**
BRN	=	**Brown**
GRY	=	**Gray**
GRN	=	**Green**
ORN	=	**Orange**
PNK	=	**Pink**
PUR	=	**Purple**
RED	=	**Red**
Tan	=	**Tan**
WHT	=	**White**
YEL	=	**Yellow**
LIT	=	**Light**
DRK	=	**Dark**

50773

G. WATER FLOW DIAGRAM (7.4L BRAVO) SEAWATER COOLED

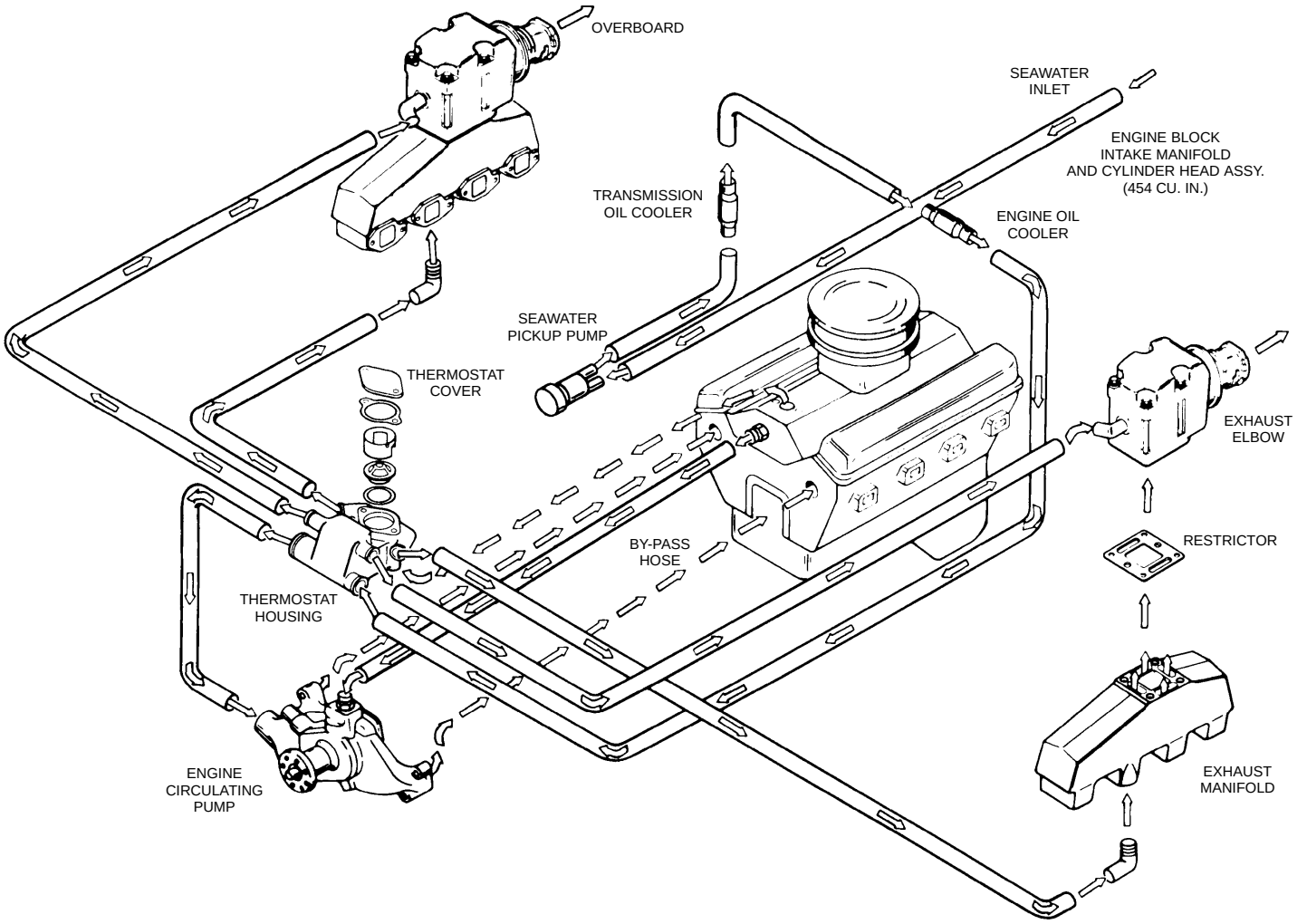


22383

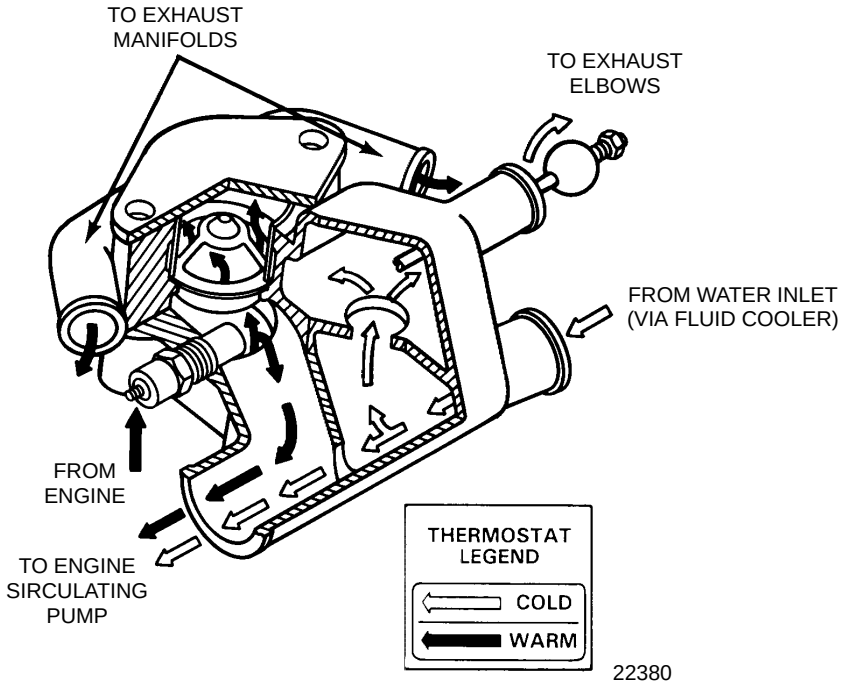


22380

G. WATER FLOW DIAGRAM (7.4L INBOARD) SEAWATER COOLED

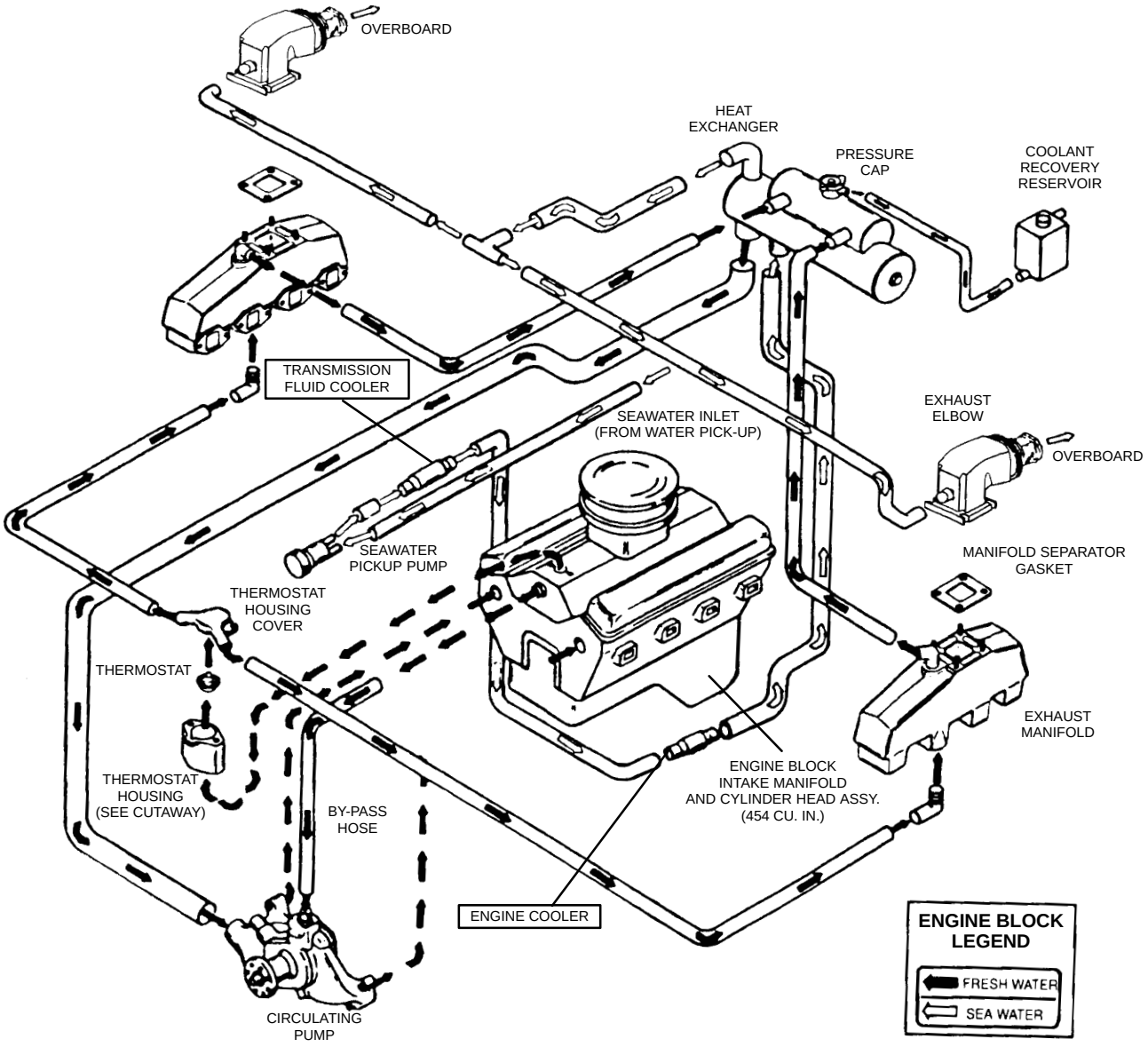


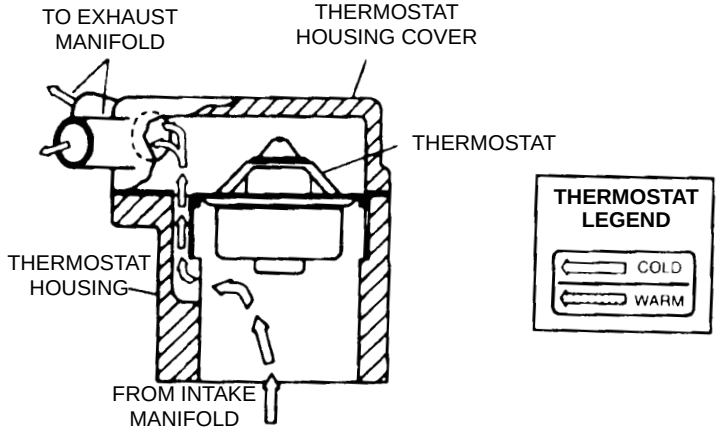
70779



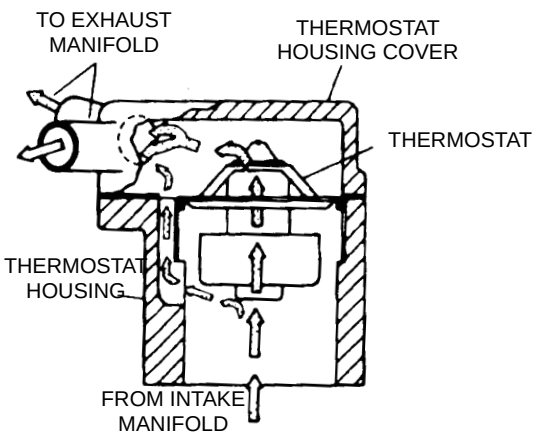
22380

G. WATER FLOW DIAGRAM (7.4L INBOARD) CLOSED COOLED





COOLANT FLOW THROUGH THERMOSTAT HOUSING WITH THERMOSTAT CLOSED (ENGINE COLD)



COOLANT FLOW THROUGH THERMOSTAT HOUSING WITH THERMOSTAT CLOSED (ENGINE COLD)

70780