mercruiser STERN DRIVES & INBOARDS

service bulletin

TO: SERVICE MANAGER ☐ MECHANICS ☐
PARTS MANAGER ☐

No. 91-3

MCM 502 Magnum MIE 8.2L Inboard GM MK IV Engine Specifications

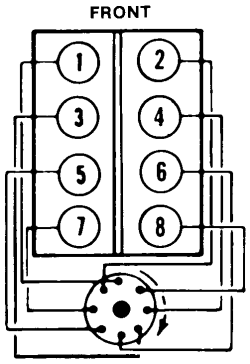
A. Tune-up Specifications
B. Electrical Specifications
C. Carburetor Specifications
D. Internal Engine Specifications
E. Torque Specifications
F. Wiring Diagram (Engine)
G. Water Flow Diagram

A. TUNE-UP SPECIFICATIONS

Model	502 Magnum	8.2L
Propshaft Horsepower (Kilowatts)	390 (292)	400 (298)
Displacement	502 CID (8.2L)	
Engine Type and Number of Cylinders	V8	
Bore	4.47 in. (113.5mm)	
Stroke	4.00 in. (101.6mm)	
Compression Ratio	8.75:1	
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	4600-5000	4400-4800
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	502 Magnum	8.2L
Electrical System	12V Negative (-) Ground	
Alternator Rating	55 Amps	
Minimum Battery Rating Required	550 CCA or 120 Ah	
Crankcase Oil Capacity with New Filter*	Approx. 8 U.S. Qts. (7.5L)	
Oil Pressure at 2000 RPM	30-70 psi (207-483 kPa)	
Minimum Oil Pressure @ Idle	4 psi (28 kPa)	
Valve Lash	3/4 Turn Down from Zero Lash	
Thermostat	143° F (62° C)	
Cooling System Capacity	20 U.S. Qts. (19.3L)	
Closed Cooling System Capacity	28 U.S. Qts. (26.5L)	
*Stern Drive Unit Oil Capacity (Approx.)	2.8 U.S. Qts. (2.6L)	
Transmission* (Hurth-630A) 8° Down Angle	4.2 U.S. Qts. (4.0L)	
Transmission* (Hurth-800AM) 8° Down Angle	4.4 U.S. Qts. (4.1L)	
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	
502 Magnum 50-812428A_ (9000762) 50-812604A_ (9000768)	10.6	60	90	3,000	3,300	83-104 oz. (2353-2948 g)
8.2L Inboard 50-17251A_ 50-76965A_ (10455602)	10.6	70	120	5,400	10,800	118-172 oz. (3345-4876 g)

C. CARBURETOR SPECIFICATIONS

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

Model: 502 Magnum

Part Number (4 MV Rochester)	1347-814623A_ (17089112)
Float Level	1/4 in. (6.5mm)
Pump Rod Hole Location	Inner
Accelerator Pump (NOTE 1)	23/64 in. (9mm)
Air Valve Dash Pot (Air Valve Rod)	.025 in. (0.64mm)
Vacuum Break	.080 in. [5/64 in. (2mm)]
Air Valve Spring (Wind-Up Force)	1/2 Turn 80 Grams
Choke Coil Rod (NOTE 2)	Top of Rod Even with Bottom of Hole
Float Weight (Max.)	9.8 Grams
Primary Jet —Throttle Lever Side —Choke Rod Side	.070 in. .076 in.
Metering Rod (Primary)	.044 in.
Metering Rod (Secondary)	DC
Idle Mixture Screw (Preliminary)	3 Turns

NOTE 1: Accelerator pump measurement taken from flame arrestor surface to pump stem with throttle plate closed.

NOTE 2: Choke valve must be closed, shoke rod in bottom of shoke lever slot, and choke coil rod pushed down to end of travel.

Model 8.2L Inboard

Part Number (Weber)	3310-817693A_ (9774)
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	 .104 in. .107 in.
Metering Rod (Number)	16-6542
Secondary Jet	.098 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			502 Magnum	8.2L Inboard
Diameter			4.4650-4.4725 (113.411-113.601)	
Out of Round	Production		.001 (0.025) Max.	
	Service		.002 (0.05) Max.	
Taper	Production	Thrust Side	.005 (0.0127) Max.	
		Relief Side	.001 (0.025) Max.	
	Service		.001 (0.02)Max.	
Clearance	Production		.0040-.0057 (0.1016-0.1447)	
	Service		.0065 (0.16) Max.	

Piston Ring: (1)HI Production Limit

Compression	Groove Side Clearance	Production	Top	.0017-.0032 (0.0432-0.0812)
			2nd	.0017-.0032 (0.0432-0.0812)
		Service		(1) + .001 (0.02)
	Gap	Production	Top	.010-.020 (0.254-0.508)
			2nd	.010-.020 (0.254-0.508)
		Service		(1) + .010 (0.25)
Oil	Groove Side Clearance	Production		.005-.0065 (0.127-0.165)
		Service		(1) + .001 (0.02)
	Gap	Production		.020-.035 (0.508-0.889)
		Service		(1) + .010 (0.25)

Piston Pin:

Diameter		.9895-.9898 (25.1333-25.1409)
Clearance	Production	.00025-.00035 (0.00635-0.00889)
	Service	.001 (0.02) Max.
Fit in Rod		.0008-.0016 (0.0203-0.0406) Interference

Crankshaft:

Main Journal	Diameter	No. 1	2.7485-2.7494 (69.8119-69.8348)
		No. 2 3 4	2.7481-2.7490 (69.8017-69.8246)
		No. 5	2.7478-2.7488 (69.7941-69.8195)
	Taper	Production	.0002 (0.005) Max.
		Service	.001 (0.02) Max.
	Out of Round	Production	.0002 (0.005) Max.
		Service	.001 (0.02) Max.
Main Bearing Clearance	Production	No. 1	.0013-.0025 (0.0330-0.0635)
		No. 2 3 4	
		No. 5	.0024-.0040 (0.0610-0.1016)
	Service	No. 1	.001-.0015 (0.03)
		No. 2 3 4	.001-.0025 (0.03-0.06)
		No. 5	.0025-.0035 (0.07-0.08)
Crankshaft End Play			.006-.010 (0.15-0.25)
Connecting Rod Journal	Diameter		2.1985-2.1995 (55.8419-55.8673)
	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	.0009-.0025 (0.0229-0.0635)
		Service	.003 (0.07) Max.
Rod Side Clearance			.013-.023 (0.35-0.55)
Crankshaft Runout			.0015 (0.0381) Max.

Camshaft and Drive:

Model		502 Magnum	8.2L Inboard
Lobe Lift ± .002 (0.051)	Intake	.300 (7.62)	
	Exhaust	.300 (7.62)	
Duration @ .050 in. (1.27mm) Cam Lift	Intake	224°	
	Exhaust	224°	
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 Lash (Intake & Exhaust			3/4 Turn Down from Zero Lash
Face Angle (Intake & Exhaust			45°
Seat Angle (Intake & Exhaust			46°
Seat Runout (Intake & Exhaust			.002 (0.051) 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	.001-.0027 (0.0254-0.0686)
		Exhaust	.0012-.0029 (0.0305-0.0737)
	Service	Intake	.0037 (0.09)
		Exhaust	.0049 (0.12)

	Free Length		Outer-2.38 [2-3/8] (60.5) Inner-2.23 [2-15/64] (56.6)
Valve Spring	Pressure (NOTE 1)	Closed @ 1.875 [1-7/8] (47.6)	60-70 lbs. ft. (81-95) N.m
		Open @ 1.365 [1-23/64] (34.7)	220-230 lbs. ft. (298-312) N.m
	Installed Height		1.875 [1-7/8] (47.6)

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

Cylinder Head:

Gasket Surface Flatness	.003 (0.07) in 6 (152) area .007 (0.17) Overall Maximum

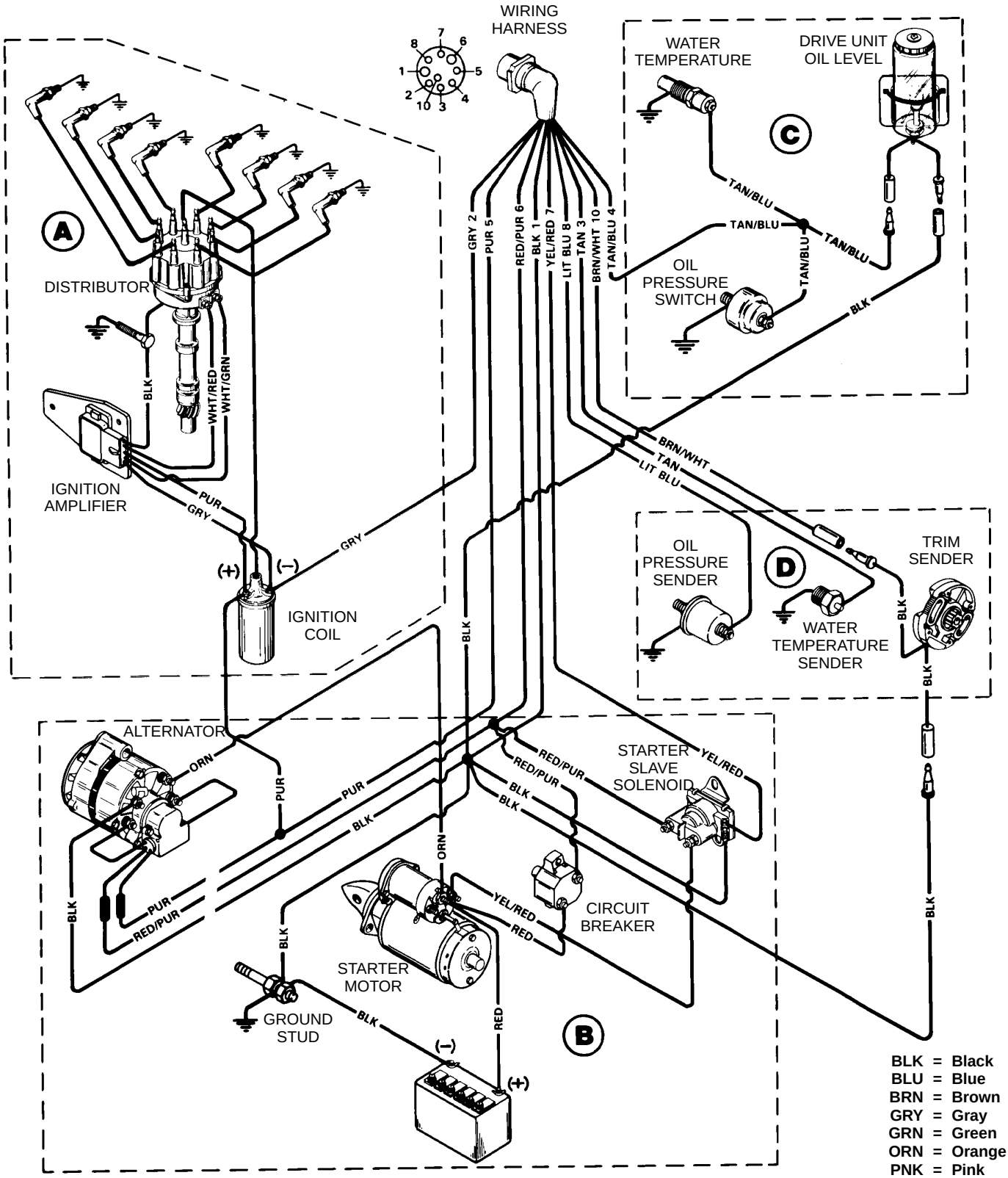
Flywheel:

Runout	.008 (0.203) Max.

E. TORQUE SPECIFICATIONS

Camshaft Sprocket	25 lb.ft. (34 N.m)
Conn. Rod Cap	50 lb. ft. (68 N.m)
Crankcase Front Cover	120 lb. in. (14 N.m)
Cylinder Head	85 lb. ft. (115 N.m)
Distributor Clamp	25 lb. ft. (34 N.m)
Exhaust Manifold (Bolts)	35 lb. ft. (48 N.m)
Exhaust Manifold (Nuts)	25 lb. ft. (34 N.m)
Flywheel	65 lb. ft. (88 N.m)
Coupler or Drive Plate	35 lb. ft. (48 N.m)
Flywheel Housing	30 lb. ft. (41 N.m)
Intake Manifold	30 lb. ft. (41 N.m)
Main Bearing Cap	110 lb. ft. (149 N.m)
Oil Filter	25 lb. ft (34 N.m)
Oil Filter By-Pass Valve	80 lb. in. (9 N.m)
Oil Pan to Crankcase (5/16-18)	200 lb. in. (22 N.m)
Oil Pan to Crankcase (1/4-20)	80 lb. in. (9 N.m)
Oil Pan Drain Plug	20 lb. ft. (27 N.m)
Oil Pump	65 lb. ft. (88 N.m)
Oil Pump Cover	80 lb. in. (9 N.m)
Rocker Arm Cover	70 lb. in. (7.9 N.m)
Spark Plug	180 lb. in. (20 N.m)
Torsional Damper	85 lb. ft. (115 N.m)
Water Pump	30 lb. ft. (41 N.m)

F. ENGINE WIRING DIAGRAM (502 MAGNUM)



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	=	Daek

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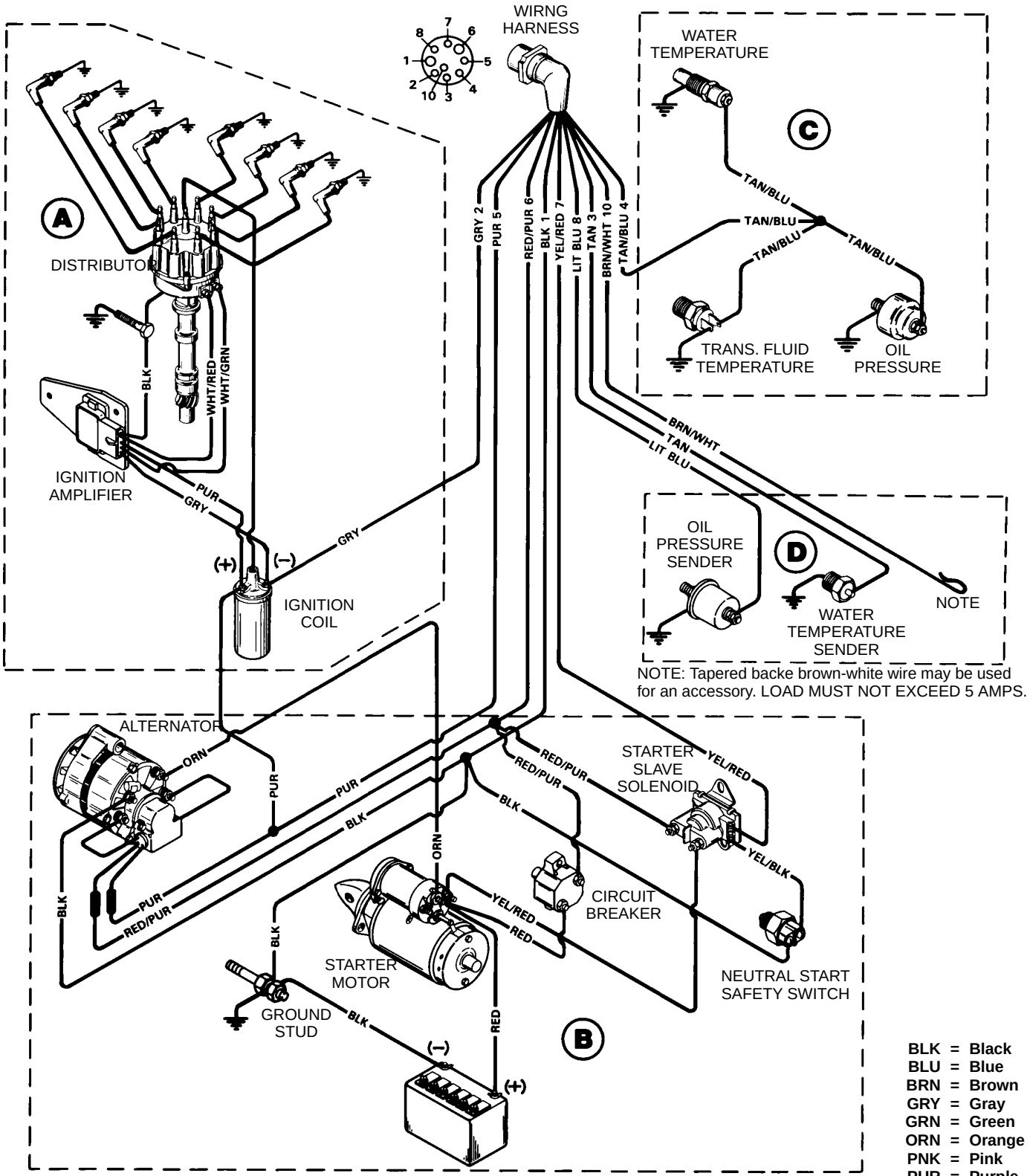
F. ENGINE WIRING DIAGRAM (8.2L INBOARD)



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	=	**Daek**

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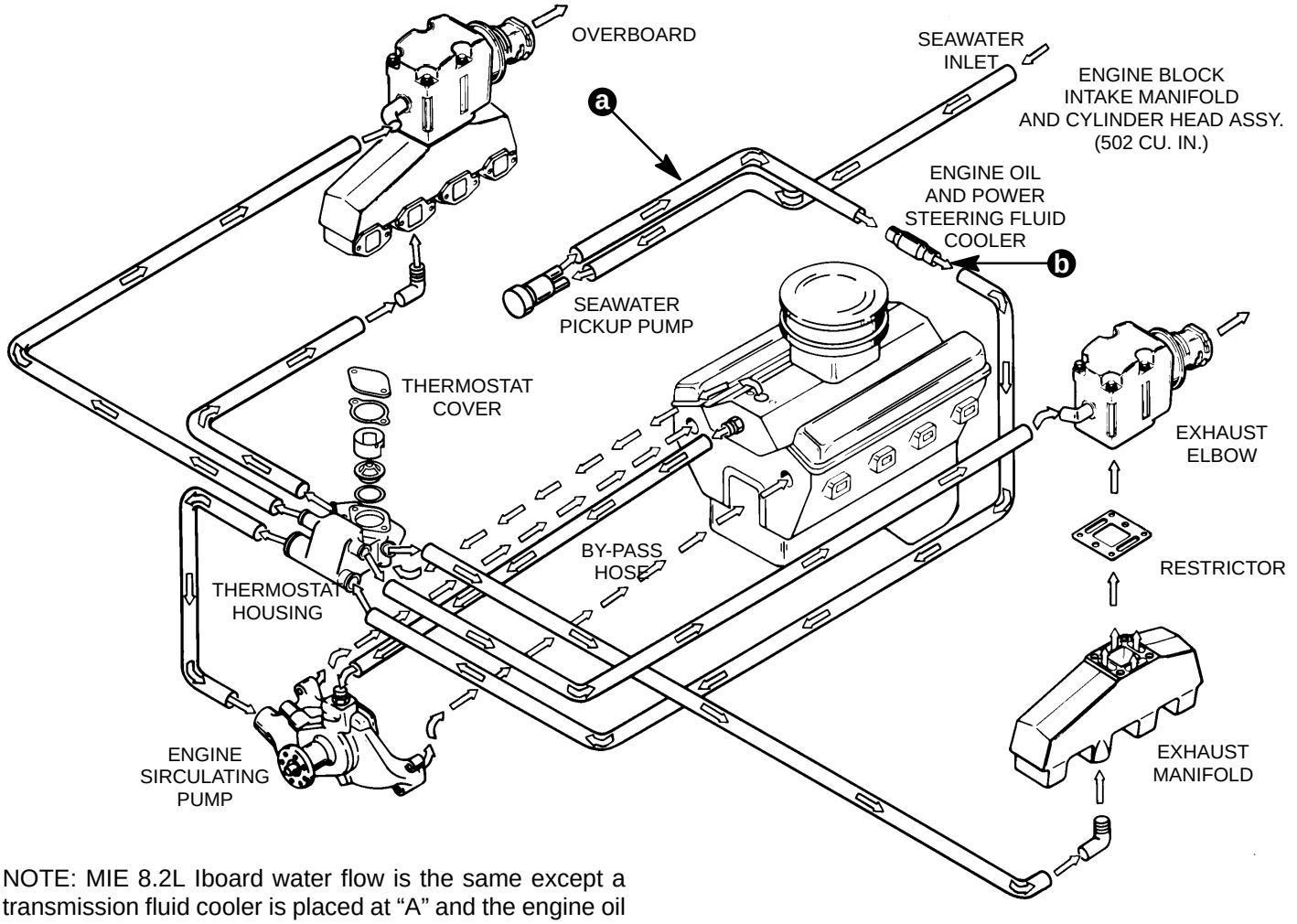
G. WATER FLOW DIAGRAM (502 MAGNUM AND 8.2L INBOARD)



NOTE: MIE 8.2L Iboard water flow is the same except a transmission fluid cooler is placed at “A” and the engine oil cooler is placed at “B”.

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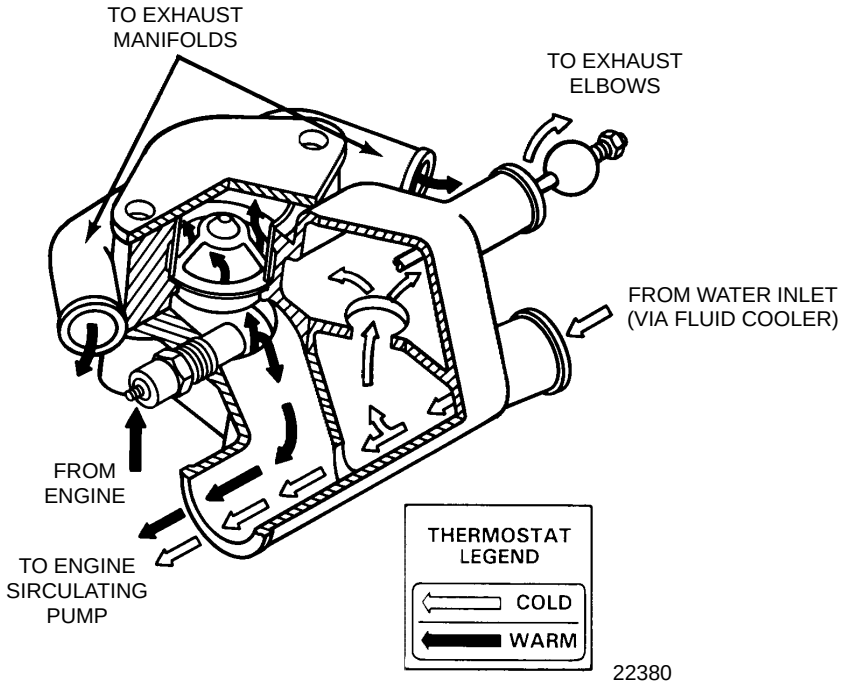

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