MERCURY Racing service bulletin

TO: SERVICE MANAGER ☐ MECHANICS ☐
PARTS MANAGER ☐

No. 2000-1

# H.P. 575 SCi Specifications

## Models Affected

Engine Serial Number 0L601000 & Up.

## Octane Requirements

| FUEL TYPE | MINIMUM POSTED OCTANE |
|---|---|
| Unleaded premium **(Note)** | (R+M)÷2=92 or RON=98 |

***NOTE:*** *Without alcohol whenever possible.*

## Starting Procedure

### COLD OR WARM ENGINE

- **No throttle advance.** Any throttle advance up to half throttle will flood the engine.
- Turn ignition key to start position and hold until engine starts. Supercharged engines usually require longer cranking times to start than normally aspirated models. **Do not operate the starter motor continuously for more than 30 seconds.**

### FLOODED ENGINE

- Move throttle lever to just past half throttle and engage the starter.
- Be prepared to return engine speed to 1000-1500 RPM when engine starts.

## Crankcase Oil Recommendations/Capacity

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

| | |
|---|---|
| Crankcase Oil Capacity with New Filter | 8 US qts (7.6 L) **(NOTE)** |
| Oil Filter Part No. | 35-16595 |

***NOTE:*** *Approximate, ALWAYS use dipstick to determine exact quantity of oil required.*


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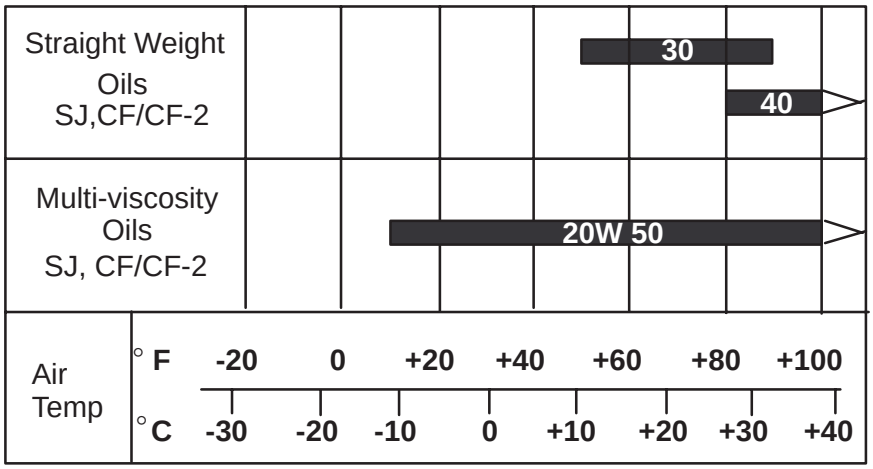
## TEMPERATURE/OIL VISCOSITY CHART




## 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. |

# General

| | |
|---|---|
| Propshaft Horsepower (Kilowatts) | 550 (410 kw) |
| Displacement cid/L | 502 cid / 8.2L |
| Bore | 4.47 in. (113 mm) |
| Stroke | 4.00 in. (102 mm) |
| Compression Ratio | 7.5 :1 |
| Maximum RPM at Wide-Open-Throttle | 5200 |
| RPM Rev Limit | 5400 |
| Type of Ignition System | Inductive – Digital Control |
| Oil Pressure @ Idle (HOT) | Min. 30 psi (207 kPa) |
| Oil Pressure @ WOT (HOT) | Min. 45 psi (310 kPa) |
| Engine Oil Temperature @ WOT | 170-180° F (77-82° C) |
| Thermostat | 143°F (62°C) |
| Electrical System | 12-Volt Negative (–) Ground |
| Alternator Rating | 60 Amperes |
| Recommended Battery Rating | Minimum 550 CCA, 700 MCA or 120 Amp/Hrs |

## Dimension/Weight

| | |
|---|---|
| Length - C/L of flywheel housing mounts to the front pulley | 34.5 in. (876 mm) |
| Width - Outside of headers | 33.75 in. (857 mm) |
| Height - Crankshaft C/L to top of flame arrester stud | 28.25 in. (718 mm) |
| Weight | 955 lb (433 kg) |

## Tune-Up

| | |
|---|---|
| Idle RPM in or out of Gear | 750 RPM – ECM controlled |
| Timing @ Idle RPM | 8° BTDC **(Note 1)** |
| Timing @ 4000 RPM | 35° BTDC |
| Spark Plug Type-P/N | NGK R5673-8 (33-813421), AC-MR41T, or Champion V4C |
| Spark Plug Gap | .035 in. (0.9 mm) |
| Valve Lash | 5/8 turn down from zero lash |
| Supercharger Boost @ WOT | 4.3 psi (30 kPa) |
| Fuel Rail Pressure | Idle 28 PSI. (193 kPa)<br>WOT 26 PSI. (179 kPa) |
| Compression Pressure | 145 Psi ( 999 kPa) |
| Serpentine Belt Tension **(Note 2)** | New 120 lbs (530 N)<br>Used 80 lbs (350 N) |

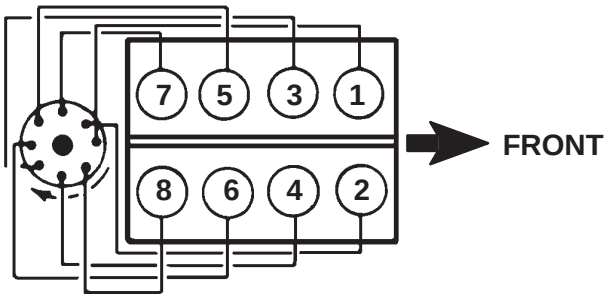
***NOTE: (1)*** *A special procedure must be followed to check or adjust timing.*

***NOTE: (2)*** *Special belt tension tool required.*

## Firing Order

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

**Figure 1 L.H. Rotation**

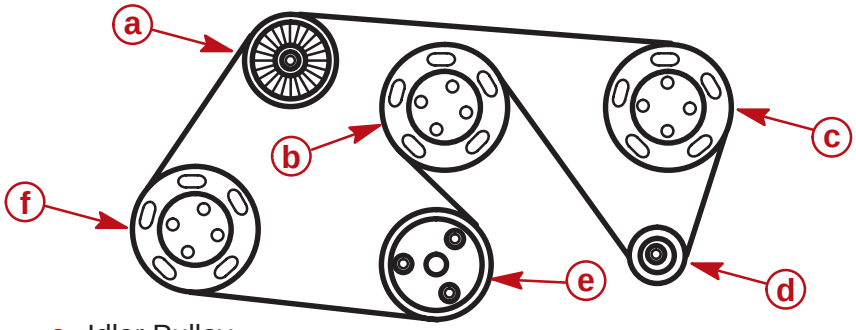



## Cooling System

| | |
|---|---|
| Seawater Cooling System | 20 U.S. Qts. (19 L) **(NOTE)** |
| Max. Allowable Block Pres. @ WOT | 35 psi (241 kPa) |
| Min. Allowable Block Pres. @ WOT | 20 psi (138 kPa) |
| Desired Block Pres. @ WOT | 25 psi (172 kPa) |

***NOTE:*** *Cooling System Capacity information is for winterization use only.*

## Serpentine Belt Routing



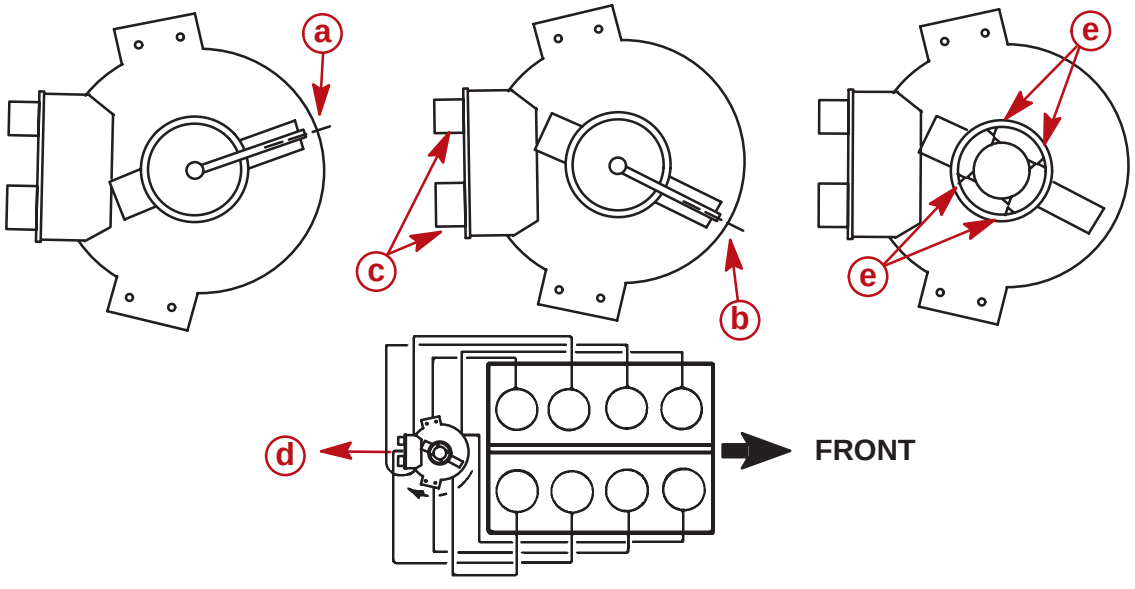

**a** - Idler Pulley
**b** - Circulating Pump Pulley
**c** - Power Steering Pulley (Non Power Steering Models Will Have an Idler Pulley)
**d** - Alternator Pulley
**e** - Crankshaft Pulley
**f** - Seawater Pump Pulley

## Timing

### INITIAL (NON RUNNING) SET-UP

***NOTE:*** *Initial setup must be confirmed by checking timing in the running mode after set-up.*

1. Rotate engine to have #1 Cyl at top firing position and Torsional Damper at 13° BTDC (13° for non-running set-up only).
2. For initial installation into engine, pickup will be approx. at point (a), then will rotate to (b) (#1 spark plug wire of cap) when seated, with the base plate connections (c) pointing straight back from engine (d).
3. Align four pointers of distributor with four pickups of outer ring (e), secure distributor shaft hold down and install cap.

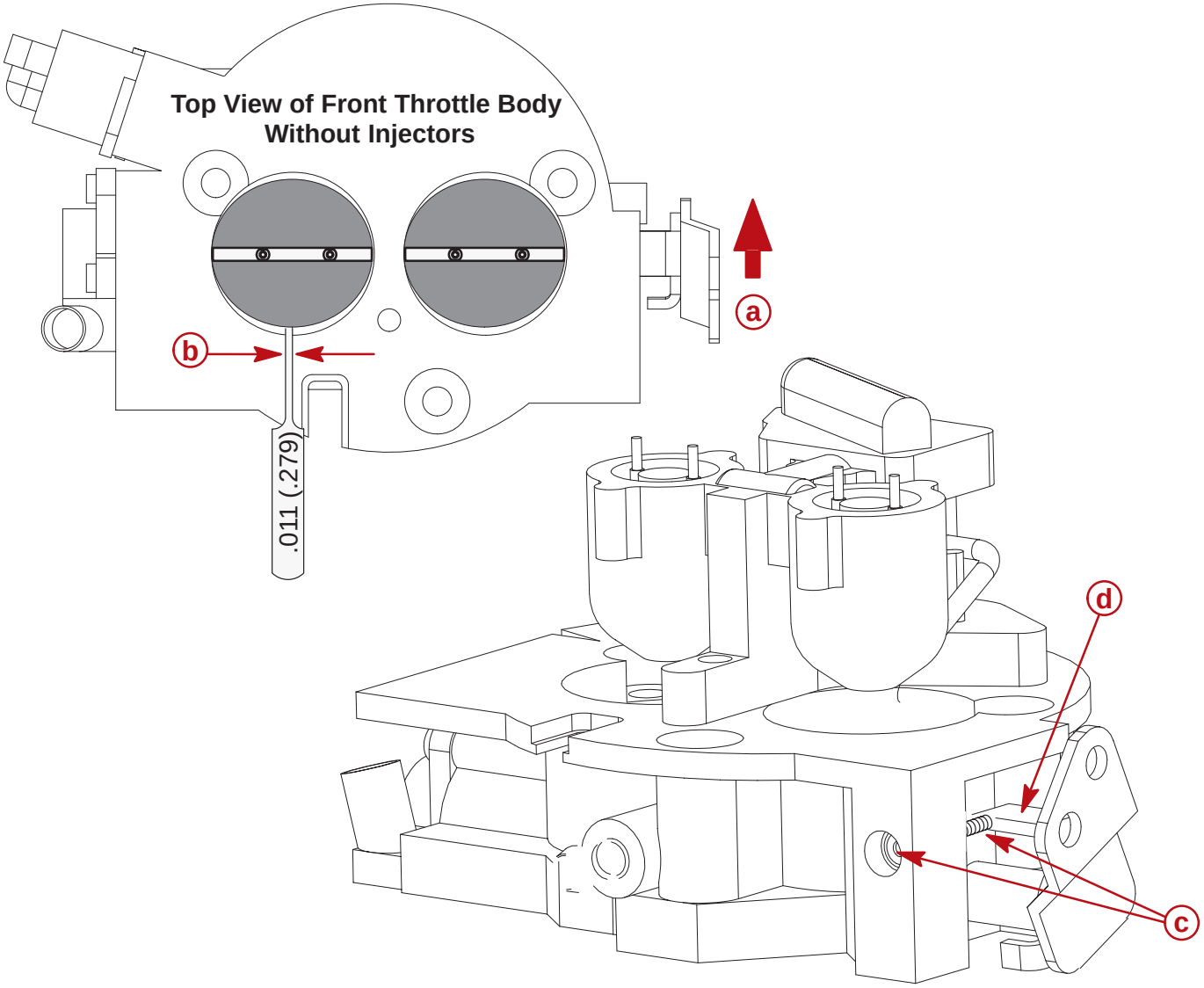



### RUNNING MODE SET-UP

1. Connect Digital Diagnostic Terminal (DDT) tester to the Data Link engine connection and set to **SERVICE MODE**.
2. Start engine and check timing at torsional damper with a timing light.
3. Timing should be 8°. If required loosen distributor hold down and rotate distributor to achieve correct timing, then retighten hold down.

## Procedures For Setting Throttle Stop Screw If Disturbed:

1. Disconnect throttle cable from cable end guide.
2. Remove flame arrestor.
3. Use a modified 0.011 in. (0.279 mm) feeler gauge with a blade not wider than 1/8” (0.125 mm) to set the throttle plate opening on the FRONT THROTTLE BODY ONLY. There should be drag on the feeler gauge for correct setting.
4. If adjustment is required, remove sealer covering access to the throttle stop screw and adjust screw to set gap at 0.011 in. (0.279 mm). Ensure that throttle lever contacts throttle stop screw while making this adjustment.
5. With gap set and screw adjusted, fill in access to the throttle stop screw with silicone sealant. **This screw should never be used to adjust engine idle speed.**




**a** - Throttle Opening Direction
**b** - Maximum Blade Width 1/8” (0.125mm)
**c** - Throttle Stop Screw (Adjust Front Throttle Body Only)
**d** - Throttle Lever (Should Make Contact with Throttle Stop Screw)

## Throttle Cable Installation & Adjustment

1. Re-install throttle cable (refer to installation manual 90-849873010 for installation).
2. Connect Digital Diagnostic Tester (DDT) (91-823686A2) with version 2.0 cartridge (91-803999) to engine.
3. Start engine and run until normal operating temperature is attained.
4. With the engine idling, ensure that throttle lever contacts throttle stop screw. The IAC reading should be greater than 0 counts. Normal IAC readings are between 5 to 20 counts at idle.
5. Turn off ignition.
6. Re-install flame arrestor.

### IF IAC READING IS ZERO (0) COUNTS

7. If the IAC reading is zero (0), then the throttle setting is probably beyond the 2.5% throttle opening that the IAC valve controls. To verify this condition, monitor the Throttle Position Sensor reading. Reading should be below 2.5%.
8. Repeat steps one through six for setting throttle opening if the throttle position sensor reading at idle is too high.

## Electrical Specifications

### IGNITION SPECIFICATIONS

| | |
|---|---|
| Coil Part No. | 817378 |
| Coil Primary Resistance (Ohms) Minimum | .60 |
| Coil Primary Resistance (Ohms) Maximum | .80 |
| Coil Secondary Resistance (Ohms) | 9.4-11.7 |

### STARTER MOTOR SPECIFICATIONS

| **Part No.** | Mercury Marine 50-806964A-1 Delco 9000821 | | | |
|---|---|---|---|---|
| **No Load Test** | | | | |
| **Volts** | **Amps. (Min.)** | **Amps. (Max.)** | **RPM (Min.)** | **RPM (Max.)** |
| 10.6 | 70 | 120 | 5400 | 10,800 |

## Fuel System Specifications

| | |
|---|---|
| Type of System | Throttle Body Injection (Duel) |
| Max. Flow of Injector | 16 GPH (60.5 Liter/Hr) |
| Voltage to Injector | 6 |
| Max. Air Flow of Throttle Body (each) | 685 CFM (19.4 $m^3$/minute) |
| Fuel Pressure Regulator Setting | 30 psi (207 kPa) |

### ECM

| | |
|---|---|
| ECM Type | Marine Electronic Fuel Injection - MEFI 3 |
| Prom ID | 255 |
| Calibration Check Sum | BFDF |

# Internal Engine Specifications

| UNIT OF MEASUREMENT: in. (mm) |
|---|

## CYLINDER BORE

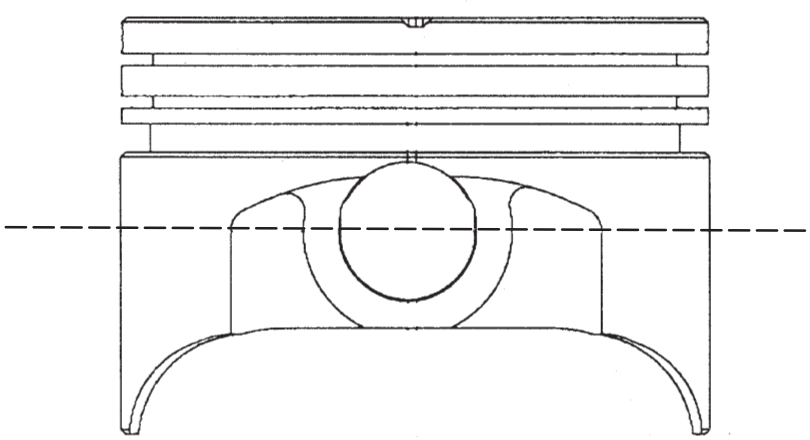
| | | |
|---|---|---|
| Diameter | 4.4662 - 4.4655 (113.442 - 113.424) | |
| Out of Round | Production | 0.001 (0.0254) |
| | Service | 0.002 (0.051) |
| Taper | Production | 0.0005 (0.0127) |
| | Service | 0.001 (0.025) |

## PISTON

| | | |
|---|---|---|
| Clearance | Production & Service | 0.005 - 0.007 (0.127 - 0.178) |

MEASURING PISTON

Measure piston 90° to the wrist pin and at the center line of the wrist pin bore



## PISTON RING

COMPRESSION RINGS

| Groove Side Clearance | | |
|---|---|---|
| Production | Top & 2nd | 0.0017 - 0.0032 (0.044 - 0.0814) |
| Service | Top & 2nd | 0.0027 - 0.0042 (0.0687 - 0.1068) |
| End Gap | | |
| Service | Top | 0.028 - 0.030 (0.711 - 0.762) |
| | 2nd | 0.028 - 0.030 (0.711 - 0.762) |

OIL RINGS

| Groove Side Clearance | |
|---|---|
| Production | 0.0025 - 0.0045 (0.0635 - 0.1143) |
| Service | 0.006 (0.152) |

OIL RINGS (CONT.)

| End Gap | |
|---|---|
| Production | 0.015 - 0.055 (0.381 - 1.397) |
| Service | 0.015 - 0.055 (0.381 - 1.397) |

## PISTON PIN

| Piston Pin Style | | Press Fit |
|---|---|---|
| Diameter | | 0.9895 (25.133) |
| Piston/Pin **Clearance** | Production | 0.0011 (0.0279) |
| | Service | 0.0015 (0.0381) |
| Fit to Rod **(Interference)** | Production | 0.0015 (0.0381) |
| | Service | 0.0011 (0.0279) |

## CRANKSHAFT

MAIN JOURNAL

| Diameter | No. 1,2,3,4,5 | 2.748 - 2.749 (69.8195 - 69.8246) |
|---|---|---|
| Taper & Out of Round | Production | 0.0005 (0.0127) |
| | Service | 0.001 (0.0254) |

CONNECTING ROD JOURNAL

| Diameter | | 2.1990 - 2.2000 (55.855 - 55.880) |
|---|---|---|
| Taper & Out of Round | Production | 0.0005 (0.0127) |
| | Service | 0.001 (0.0254) max. |

MAIN BEARING CLEARANCES

| Production & Service | No. 1,2,3,4 | 0.0024 - 0.0032 (0.0610 - 0.0813) |
|---|---|---|
| | No. 5 | 0.0032 - 0.0042 (0.0813 - 0.1067) |
| Crankshaft End Play | | 0.006 - 0.010 (0.152 - 0.254) |
| Crankshaft Run Out | | 0.0002 - 0.0015 (0.0051 - 0.0381) |

ROD BEARING CLEARANCES

| Rod Bearing Clearance Production & Service | 0.0024 - 0.0035 (0.0610 - .0889) |
|---|---|
| Rod Side Clearance | 0.020 - .028 (0.508 - 0.711) |

## CAMSHAFT AND DRIVE

| | | |
|---|---|---|
| Lobe Lift ± .002 (0.051) | Intake & Exhaust | 0.329 (8.36) |
| Journal Diameter | | 1.948 - 1.949 (49.48 - 49.51) |
| Journal Out-of-Round | | 0.001 (0.0254) |
| Camshaft Run-Out | | 0.0015 (0.0381) |
| Timing Chain Deflection | | 0.500 (13) |

## VALVE SYSTEM

| | | |
|---|---|---|
| Lifter Type | | Flat Tappet / Hydraulic |
| Rocker Arm Ratio | | 1.7 to 1 |
| Valve Lash (Int. & Exh.) | | 5/8 Turn Down From Zero Lash |
| Face Angle (Int. & Exh.) | | 45° |
| Seat Angle (Int. & Exh.) | | 45° |
| Seat Run Out (Int. & Exh.) | | 0.002 (0.0508) |
| Seat Width | Intake | 0.080 (2.03) |
| | Exhaust | 0.080 (2.03) |
| Stem Clearance | | |
| Production | Intake | 0.0010 - 0.0025 (0.025 - 0.064) |
| | Exhaust | 0.0012 - 0.0025 (0.038 - 0.064) |
| Service | Intake | 0.0010 - 0.003 (0.025 - 0.076) |
| | Exhaust | 0.0010 - 0.003 (0.025 - 0.076) |
| Valve Spring | | |
| Free Length | | 2.20 (55.88) |
| Pressure<br>Lbs. @ Inches (mm) | Closed @ 1.875 (47.6) | 130 lbs. (578 N) |
| Pressure<br>Lbs. @ Inches (mm) | Open @ 1.316 (33.4) | 360 lbs. (1601 N) |
| Installed Height | | 1.875 (47.6) |

## CYLINDER HEAD

| | |
|---|---|
| Gasket Surface Flatness | 0.006 (0.152) Overall Max.<br>0.003” (0.076) Within a 6 in. (152mm) Span |

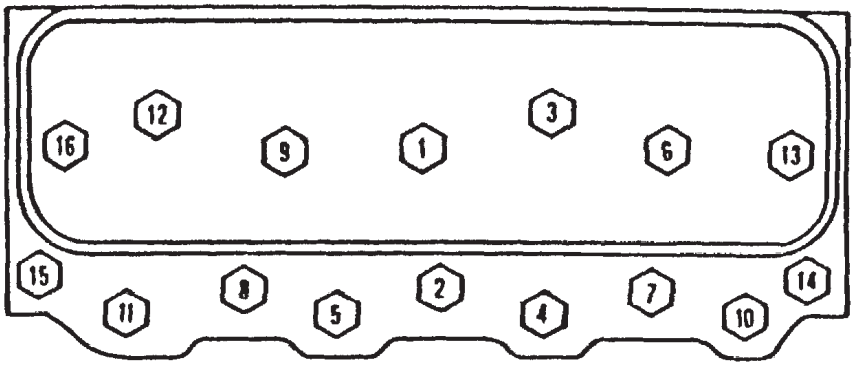
## FLYWHEEL

| | |
|---|---|
| Run Out on Face Area | 0.008 (0.203) Max (Face Area) |

## TORQUE SPECIFICATIONS

| Component | Torque | | | Sealants/ Lubricants |
|---|---|---|---|---|
| | lb-in. | lb-ft | Nm | |
| Camshaft Sprocket/Gear | | 25 | 34 | Loctite 271 (Red) |
| Cam Thrust Plate | | 8 | 11 | |
| Valve Lifter Hold Down | | 15 | 20 | Loctite 271 (Red) |
| Conn. Rod Cap | | 65 | 88 | Moly lube on threads, under bolt head and on washer |
| Main Bearing Cap | | 110 | 149 | |
| Crankcase Front Cover | | 10 | 14 | |
| Cylinder Head (Torque Sequence on Following Page) | Step #1<br>Step #2<br>Step #3 | 50<br>65<br>80 | 68<br>88<br>108 | Perfect Seal under bolt head, Pipe sealant on threads |
| Distributor Clamp | | 5 | 7 | |
| Flywheel | | 70 | 95 | Loctite 271 (Red) |
| Flywheel Drive Plate | | 35 | 48 | |
| Flywheel Housing | | 30 | 41 | |
| Intake Manifold (Torque Sequence on Following Page) | Step #1<br>Step #2 | 20<br>30 | 27<br>41 | Perfect Seal on threads and under head of bolt |
| Supercharger to Intake Manifold | | 10 | 14 | |
| Throttle Body Adapter to Supercharger | | 25 | 34 | Loctite 271 (Red) |
| Throttle Body to Adapter | | 20 | 27 | |
| Oil Pan to Crankcase (5/16-18) | | 15 | 20 | |
| Oil Pan Drain Plug | | 20 | 27 | |
| Oil Pump | | 70 | 95 | Loctite 271 (Red) |
| Oil Pump Cover | | 8 | 11 | |
| Lower Oil Adapter | | 25 | 34 | Oil |
| Rocker Arm Stud | | 45 | 61 | Loctite 680 (Green) |
| Rocker Arm Allen Locking Nut | | 25 | 34 | |
| Rocker Arm Cover | | 8 | 11 | |
| Exhaust Manifold | | 30 | 41 | |
| Spark Plug | | 15 | 20 | |
| Torsional Damper | | 80 | 108 | Loctite 271 (Red) |
| Recirculating Water Pump | | 30 | 41 | |
| Front Engine Mount to Engine Block | | 30 | 41 | Loctite 271 (Red) |
| Driveline Model Housing to Flywheel Housing | | 45 | 61 | |
| Transmission to Flywheel Housing | | 50 | 68 | |

## Cylinder Head Torque Sequence

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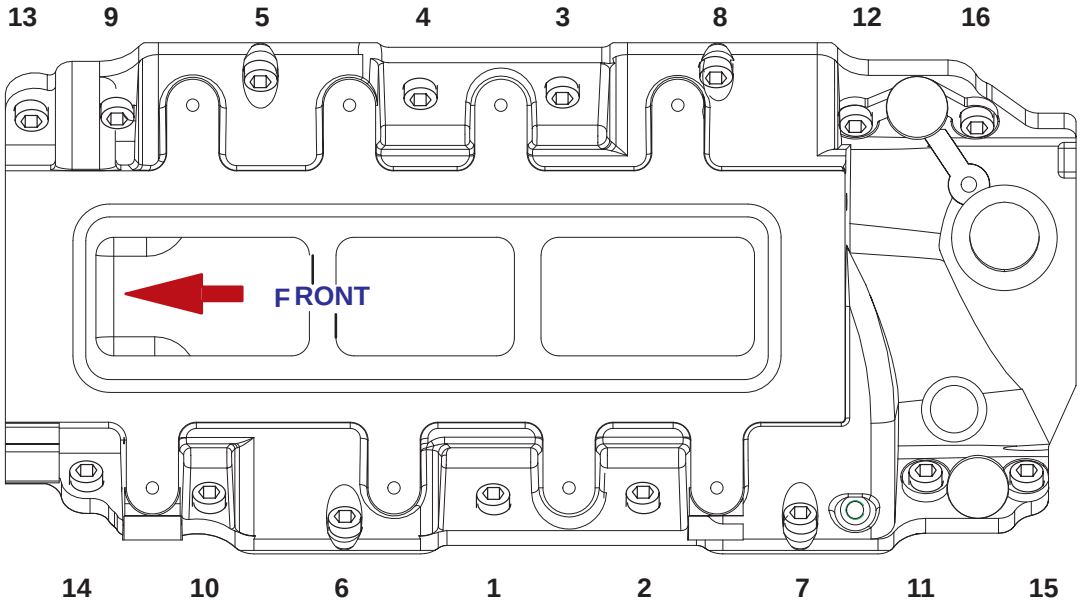
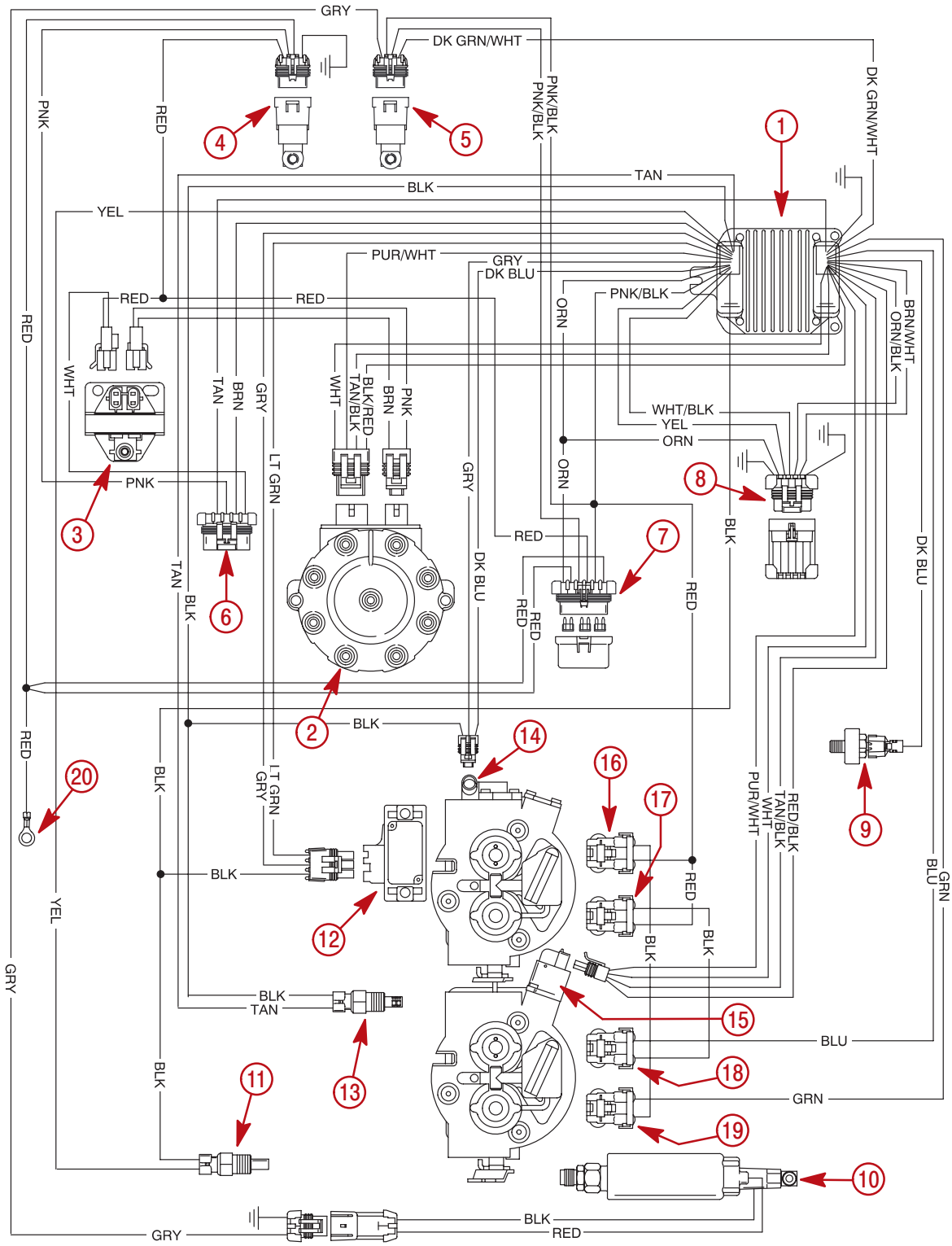
## Intake Manifold Torque Sequence



# Wiring Diagrams

## ENGINE WIRING DIAGRAM




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

# Wiring Diagrams (cont.)

## ENGINE WIRING DIAGRAM COMPONENT LIST

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

**1** - ECM
**2** - Distributor
**3** - Coil
**4** - Ignition Relay
**5** - Fuel Pump Relay
**6** - Engine Harness Connector
**7** - Fuses
**8** - Data Link Connector (DLC)
**9** - Knock Sensor
**10** - Fuel Pump
**11** - Engine Coolant Temperature (ECT) Sensor
**12** - Manifold Absolute Pressure (MAP) Sensor
**13** - Intake Air Temperature (IAT) Sensor
**14** - Throttle Position Sensor (TPS)
**15** - Idle Air Control (IAC) Sensor
**16** - Injector
**17** - Injector
**18** - Injector
**19** - Injector
**20** - Positive (+) 12V Power Supply To Engine Circuit Breaker

# Wiring Diagrams (cont.)

## AUDIO WARNING/INSTRUMENT SENDERS/CHARGING AND STARTING SYSTEM

### A - Audio Warning System

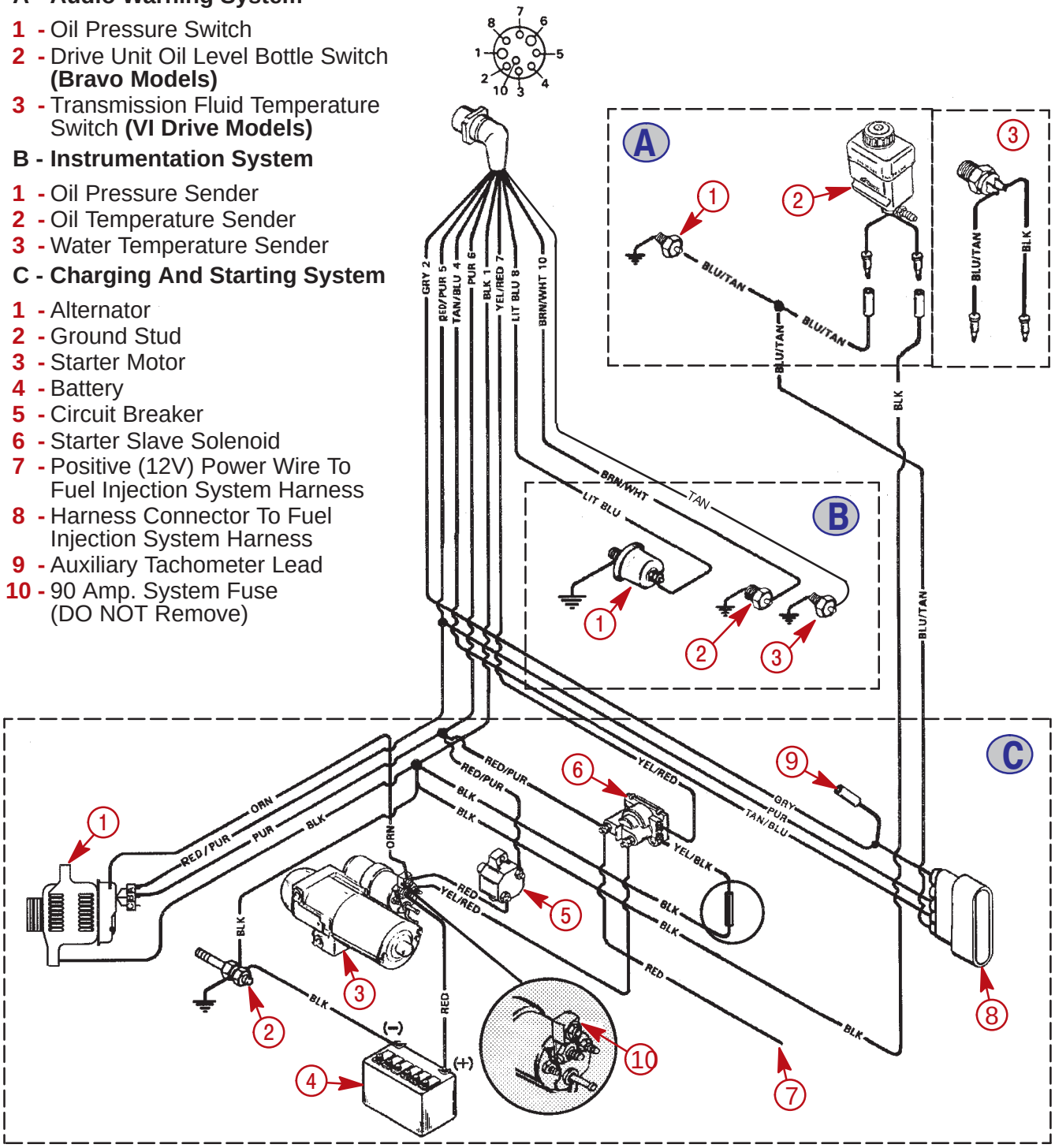
1 - Oil Pressure Switch
2 - Drive Unit Oil Level Bottle Switch **(Bravo Models)**
3 - Transmission Fluid Temperature Switch **(VI Drive Models)**

### B - Instrumentation System

1 - Oil Pressure Sender
2 - Oil Temperature Sender
3 - Water Temperature Sender

### C - Charging And Starting System

1 - Alternator
2 - Ground Stud
3 - Starter Motor
4 - Battery
5 - Circuit Breaker
6 - Starter Slave Solenoid
7 - Positive (12V) Power Wire To Fuel Injection System Harness
8 - Harness Connector To Fuel Injection System Harness
9 - Auxiliary Tachometer Lead
10 - 90 Amp. System Fuse (DO NOT Remove)

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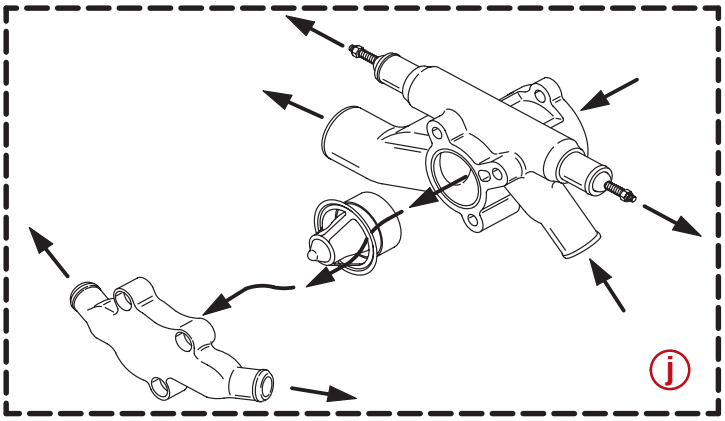
| | | | | | |
|---|---|---|---|---|---|
| BLK | = | Black | PUR | = | Purple |
| BLU | = | Blue | RED | = | Red |
| BRN | = | Brown | TAN | = | Tan |
| GRY | = | Gray | WHT | = | White |
| GRN | = | Green | YEL | = | Yellow |
| ORN | = | Orange | LIT | = | Light |
| PNK | = | Pink | DRK | = | Dark |

# Engine Water Flow Diagram




**a** - Seawater Inlet
**b** - Seawater Pickup Pump
**c** - Fuel Cooler
**d** - Transmission Cooler (Not Used on Bravo Models)
**e** - Engine Oil Cooler
**f** - Power Steering Cooler
**g** - Thermostat Housing
**h** - Water flow Overboard
**i** - Water Circulating Pump
**j** - Water Flow Thru Open Thermostat