



POWERHEAD

Section 4B - Cooling

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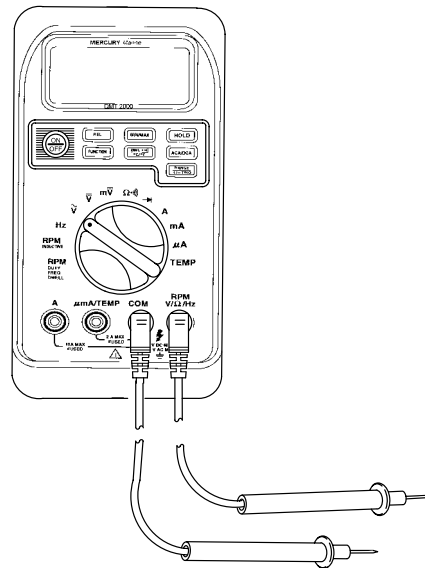
Specifications

Water Pressure

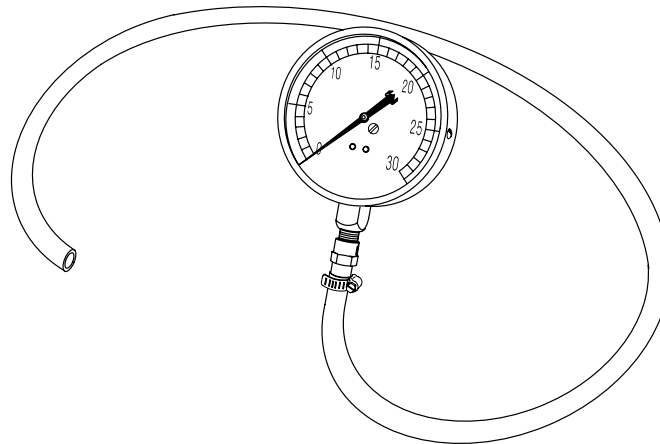
1000 – 1100 (in Neutral)	1/2 – 1-1/2 PSI (3.4 – 10 kPa)
5500 (Boat on Plane)	10 – 15 PSI (69 – 103 kPa)
5800 (Boat on Plane)	13 – 17 PSI (90 – 117 kPa)

Special Tools

1. DMT 2000 Digital Tachometer Multi-meter P/N 91-854009A1



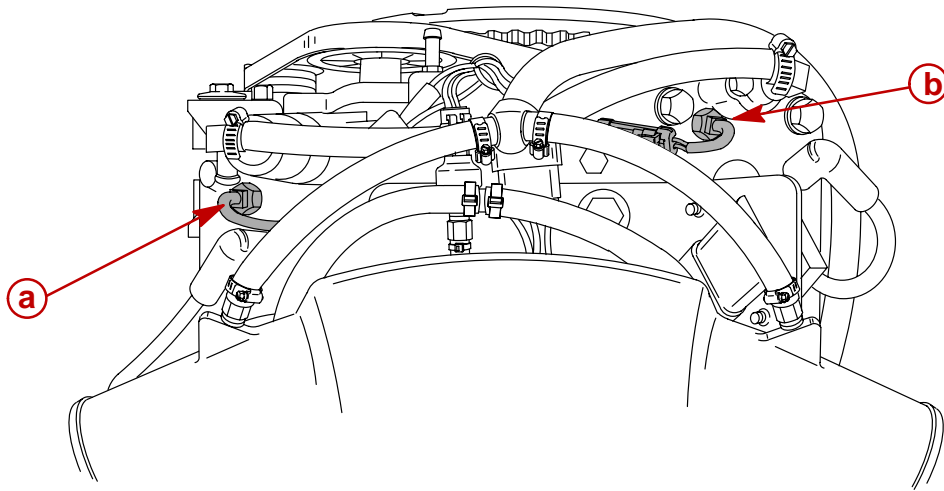
2. Water Pressure Gauge 91-79250A2



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Temperature Sensor Location



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- a** - Port Head
- b** - Starboard Head



Digital (Port and Starboard) Temperature Sensor

An ohms test of the temperature sensors would be as follows:

Disconnect temperature sensor harness and check continuity with digital or analog ohm-meter test leads between both connector pins. With engine at temperature (F°) indicated, ohm readings should be as indicated $\pm 10\%$. There should be no continuity between each connector pin and ground.

Temperature Sensor Specifications		
Fahrenheit	Centigrade	OHMS
257	125	340
248	120	390
239	115	450
230	110	517
221	105	592
212	100	680
203	95	787
194	90	915
185	85	1070
176	80	1255
167	75	1480
158	70	1752
149	65	2083
140	60	2488
131	55	2986
122	50	3603
113	45	4370
104	40	5327
95	35	6530
86	30	8056
77	25	10000
68	20	12493
59	15	15714
50	10	19903
41	5	25396
32	0	32654
14	-10	55319
5	-15	72940

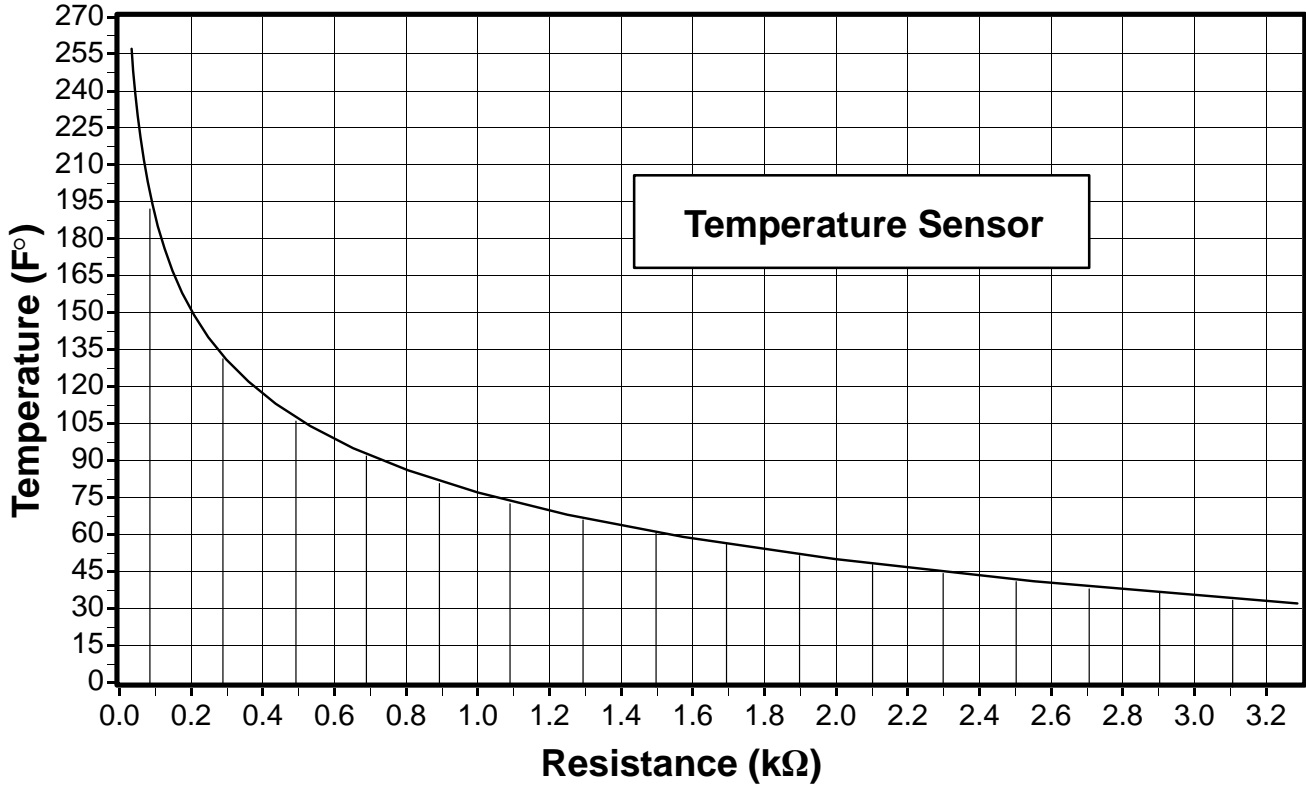


Analog Temperature Sensor

TAN/BLACK sensor lead (in port analog temperature sensor) provides signal for optional temperature gauge.

An ohms test of the analog temperature sensor (in port cylinder head) would be as follows:

Insert digital or analog ohmmeter test leads into both TAN/BLACK sensor leads. With engine at temperature (F°) indicated, ohm readings should be as indicated ±10%.



Temperature Sensor	
Between Black and each TAN/BLK wire.	No Continuity
Between each lead and ground	No Continuity
Between each TAN/BLK wire	Resistance will vary with temperature



Water Flow

Description

Water is pumped up through the adaptor plate and into the powerhead by the jet pump impeller which is constantly turning whenever the engine is running. Water flows through the center of the block, around the cylinder sleeves and through the cylinder heads.

Water exits from the bottom of the block and into the adaptor plate flowing past the exhaust runners and into the expansion chamber. The water fills the expansion chamber and exits out the top of the chamber via a hose and back into the adaptor plate where is drawn out by the impeller.

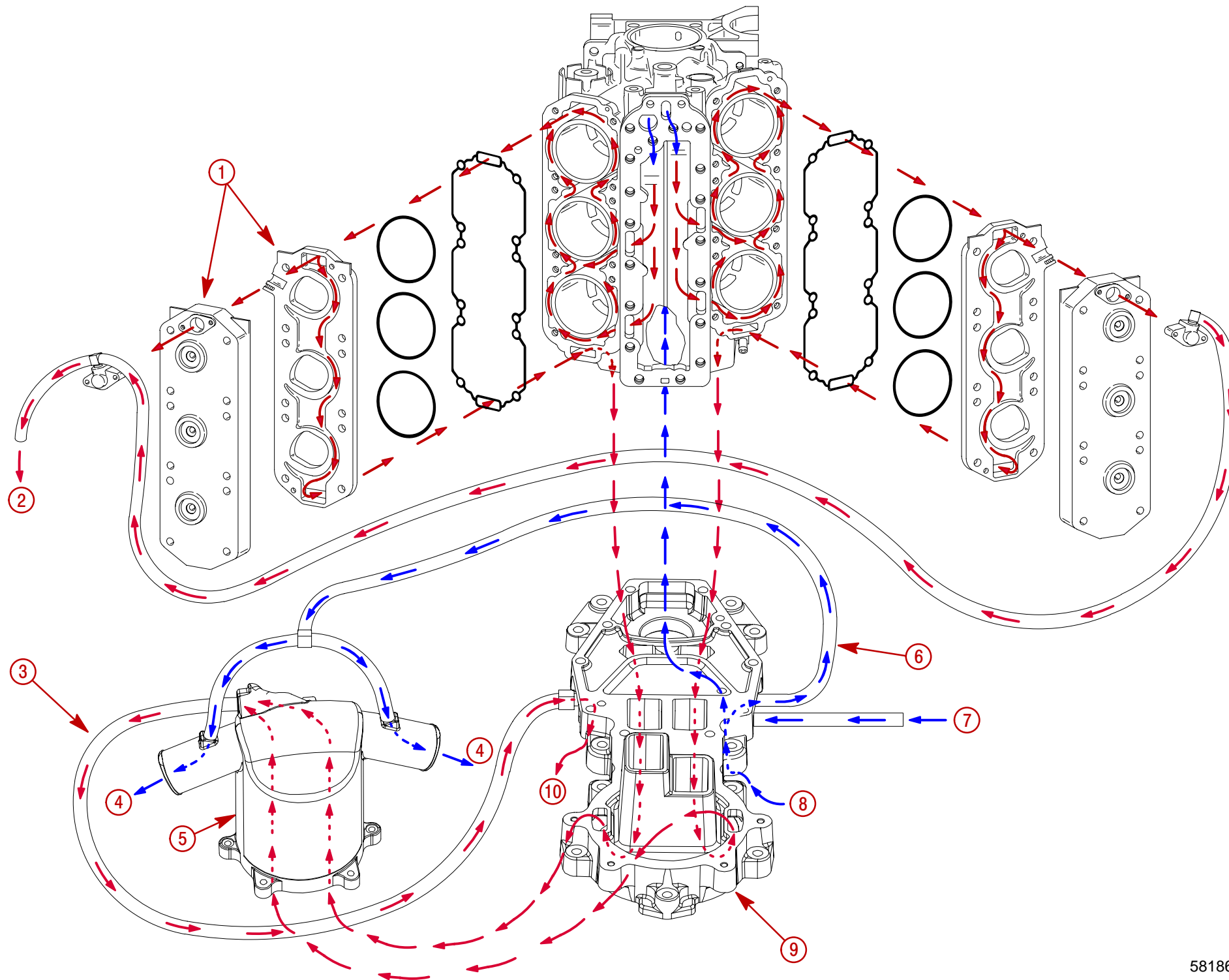
Water is also pumped from the starboard side of the adaptor plate via a hose to a t-fitting over the expansion chamber. The water is then sprayed into each exhaust pipe for cooling purposes.

To allow complete passage filling and to prevent steam pockets, all cooling passages are interconnected. Small passages are incorporated to allow the cooling system to drain.



Water Flow Diagram

Cylinder Block, Expansion Chamber and Adaptor Plate



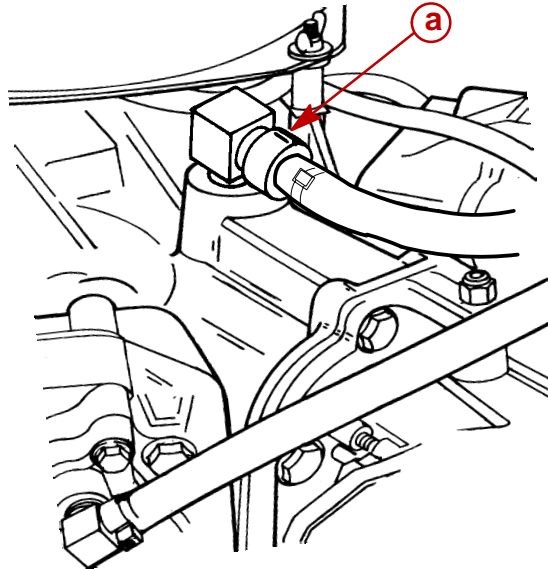
- 1 - Cylinder Head Cover – removed from head for illustration, normally part of head casting.
- 2 - Water Bypass – discharged outside of boat.
- 3 - Cooling water from expansion chamber is emptied back into adaptor plate.
- 4 - Cooling water for exhaust tubes is discharged with exhaust.
- 5 - Expansion Chamber Water Jacket
- 6 - Incoming cooling water is directed to expansion chamber exhaust pipes.
- 7 - Water inlet to flush powerhead.
- 8 - Inlet cooling water from jet pump for powerhead.
- 9 - Exhaust Adaptor Plate
- 10 - Cooling water from expansion chamber is emptied into adaptor plate and through the jet tunnel.

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Water Pressure Check

NOTE: To perform these checks, a Water Pressure Gauge Kit P/N 91-79250A2 is recommended. Water pressure is taken at the top of the powerhead.



a - Water Pressure Taken At This Location

RPM	Water Pressure PSI (kPa)
1,000 - 1,100 (in Neutral)	1/2 - 1-1/2 (3.4 - 10)
5500 (Boat on Plane)	10 - 15 (69 - 103)
5800 (Boat on Plane)	13 - 17 (90 - 117)

Problem Diagnosis

Condition	Recommended Range	Possible Cause
Pressure below specification @ idle	1/2 - 1-1/2 psi (3.4 - 10kPa)	<ul style="list-style-type: none"> •Severe internal leak •Inlet restriction
Pressure above 5 psi (34.2kPa) @ idle	1/2 - 1-1/2 psi (3.4 - 10 kPa)	<ul style="list-style-type: none"> •Plugged tell-tale
Pressure is below minimum specification @ W.O.T. 5500 (Boat on Plane) 5800 (Boat on Plane)	10 psi (103 kPa) 13 psi (117 kPa)	<ul style="list-style-type: none"> •Inlet restriction •Configuration of boat bottom interfering with adequate flow of water to coolant inlets •Severe internal leak
Pressure higher than normal @ W.O.T., but engine still indicates overheat condition 5300 (Boat on Plane) 6000 (Boat on Plane)	Maximum pressure 15 (69 - 103) 17 (90 - 117)	<ul style="list-style-type: none"> •Outlet water passages restricted. •Steam pocket has formed at top of powerhead due to lack of cooling water