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# Marine Engine Warranty

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**THIS LIMITED WARRANTY IS IN LIEU OF AND EXCLUDES ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.**

## **COMPLETE ASSEMBLY/LONG BLOCK**

**NEW AND REMANUFACTURED MARINE ENGINES** are warranted for a period of twelve [12] months from the date of invoice with unlimited hours for pleasure craft, and six [6] months or 500 hours for commercial use.

**NEW AND REMANUFACTURED MARINE PERFORMANCE ENGINES** are warranted on a start-up basis only against manufactured defects.

**RACE AND/OR HOT ROD APPLICATIONS** are excluded from any and all warranty coverage regardless of cause.

- (A) Warranty service is available by calling 1-800-811-9328 Monday through Friday during the hours of 7:00 a.m. to 5:00 p.m. Central Standard Time. No repair of the product will be covered by this warranty without the specific prior knowledge and consent of Eagle Engine. Return of defect shall be made to Eagle within thirty (30) days of discovery and prior to the expiration of the warranty.
- (B) Eagle will, at its option, repair, replace or refund any Eagle product which is determined to be defective in material or workmanship, upon receipt of product, via pre-paid shipment to: Eagle Engine Sales, Inc.
- (C) Eagle's liability under this limited warranty, for the cost of labor for removal and reinstallation of any engine which is found to be defective in material or workmanship and which is repaired or replaced is limited to the labor expense determined from hours at flat rate of \$50.00 per hour. Eagle's liability for parts replacement is limited to only jobber cost of parts (i.e. gasket kit, oil pump, etc.). In no event shall the total amount of labor cost exceed \$500.00. A \$100.00 crane allowance will be allowed on cabin cruisers 24 feet or longer, in addition to the limitation of labor costs.
- (D) This warranty is also expressly in lieu of all other obligations or liabilities, including liability for indirect incidental, consequential or special damages or any other economic loss with respect to the sale or use of the items warranted. Some states do not allow limitations on how long an implied warranty lasts or the exclusion or limitation of incidental or exclusions may not apply to you.
- (E) This warranty does not apply to normal maintenance or adjustments, normal wear due to working conditions, failure of associated parts, components and assemblies not included in the sale of the product, products which have been damaged by improper installation, accident, misuse, or neglect or which have been repaired or altered by someone other than Eagle Engine or its authorized representative, or to products used outside specified application including marine, stationary uses, propane conversion, or to products which are not operated in accordance with the printed instructions of seller or which have been operated beyond the rated capacity of the product; or to products damaged by overheating and/or improper lubrication.

(F) This warranty is a fully integrated document consisting of the entire scope of the warranty to original purchaser and no agent, employee or representative of seller has any authority to bind seller to any affirmation, representation or warranty concerning the products unless said affirmation, representation or warranty is specifically included within this document. There shall be no oral modifications to this warranty and any legal rights, and you may also have other rights which may vary from state to state.

## **WHAT IS NOT COVERED BY WARRANTY**

1. Shop supplies used in performing warranty work (i.e. rags, sealants, lubricants, etc.).
2. Incidental and consequential damages (storage charges, telephone or rental charges of any type, inconvenience or loss of time or income).
3. Minor adjustments and tune-ups; including checking, cleaning or adjusting spark plugs, carburetor setting, filters, belts, controls and checking lubrication.
4. Failure caused by neglect, lack of maintenance, accident, abnormal operation, improper installation, improper preparation, improper winterization, improper dealer set-up or improper service or normal wear and tear.
5. Haul-out, launch, towing charges; removal and/or replacement of boat partitions or material because of boat design for necessary access to the product.
6. Transportation charges and/or travel time.
7. Service requested by customer other than that necessary to satisfy the warranty obligation.
8. Use of other than Eagle Engine Sales, Inc. authorized replacement parts and labor to install these parts when making warranty repairs.
9. Oil, lubricants or fluids used in normal maintenance.
10. Participation in or preparing for racing or other competitive activity.
11. Starter motors and/or armatures or field coil assembly, which are damaged from excessive cranking, condensation, or submersion.
12. Water entering the engine via the intake or exhaust system or submersion.
13. Use of fuels and lubricants that are not suitable for use with or on the product.
14. Failure of any parts caused by lack of cooling water, which results from starting motor out of water or foreign materials blocking intake passages.
15. Air freight, next-day or second-day air, or any special delivery fees, unless authorized by Eagle Engine Sales, Inc. prior to ordering of parts.
16. Certain parts may be tested on receipt by Eagle Engine Sales, Inc. Parts found to be free of defects will be returned to the dealer and no credit will be issued. If the part has already been credited, the dealer account will be debited.

## **ENGINE OIL REQUIREMENTS**

Eagle Engine Sales, Inc. recommends Pennzoil Marine 15W-40 Marine Oil. If Pennzoil is not available, any 15W40 oil meeting the API specifications of SJ/CH4/CG4 is acceptable. If engine is to be used in conditions below 20°F (-7°C) use 10W30 API SJ/CD motor oil.

## **SYNTHETIC OIL**

Synthetic oil that meets our requirements of 15W40 SJ/CH4/CG4 is acceptable to use after 100 hours of operation with the recommended conventional oil. The use of synthetic oil does not change the requirement of 50 hour oil change intervals.



## RECOMMENDED INITIAL START-UP AND BREAK IN PROCEDURES

### ***Before Initial Start-up***

1. Prime Oil Pump (see enclosed).
2. Check Oil level.
3. Check Fuel quality and prime the system to avoid unnecessary cranking.
4. Be sure the distributor is properly installed and the timing has been statically set to minimize cranking during initial start-up.

### ***Initial start-up (prior to installation in the boat)***

1. Verify proper oil pressure.
2. Verify proper cooling/water flow. Cooling system must be bled of all air prior to operation.
3. Check ignition timing. Set engine speed to 1,500 r.p.m. for a period of 15 minutes, to insure proper break-in of the camshaft and valve train.
4. Check for possible water, oil or fuel leaks (prior to installation in boat).

### ***Engine break-in period***

The break-in period of your Eagle Engine Sales, Inc. engine is the first 25 hours of operation. Proper engine break-in is essential to achieve maximum performance and longevity. During the break-in period, the following guidelines must be followed.

1. Do not operate the engine below 1,500 r.p.m. for extended periods of time for the first 10 hours of operation.
2. Do not operate the engine at any one speed for extended periods of time.
3. Do not exceed 3/4 throttle during the first 10 hours of operation. During the next 15 hours, intermittent periods of no more than 5 minutes maximum of wide-open throttle are acceptable.
4. Avoid full throttle acceleration from idle speed.
5. Allow engine to come to full operating temperature before operating at full throttle.
6. Be sure the engine is able to obtain the rated r.p.m. at wide open throttle. Over or under propping will cause severe damage and shorten engine life. Check the manufacture recommendation for this specification.

### ***Recommended 25-Hour Inspection***

After the first 25 hours of operation, it is recommended that your Eagle Engine Sales, Inc. marine engine be given an inspection. You should make an appointment with your dealer to perform the necessary checks and adjustments to ensure proper engine performance. The following maintenance should be performed.

1. Change oil and filter.
2. Ignition Systems inspected adjust timing and verify ignition advance at wide open throttle.
3. Check carburetor adjustments.
4. Check engine alignment.
5. Inspect accessory drive belts and tension.

6. Check all fluids.
7. Check throttle and shift cable adjustments and check the ease of movement.
8. Inspect the cooling system; check all hoses and hose clamps.
9. Inspect the entire Exhaust System for leaks, damage, deterioration, or restrictions.
10. Inspect the entire engine for loose, missing, or damaged parts. Pay close attention to the engine mounts, alternator, and mounting fasteners.

**Note:** Eagle Engine Sales, Inc. assumes no responsibility for the costs related to the 25-hour inspection. This is the customer's responsibility.

**REMANUFACTURER'S RESPONSIBILITIES AND LIABILITY:**

The liability of re-manufacturer under this warranty is limited solely to the repair or replacement of defective parts or workmanship, except as otherwise may be provided by applicable state law, re-manufacturer shall not be liable for any incidental, special, consequential or exemplary damages, or for any service not expressly provided for herein, relating to or arising from failure of the engine or its internal parts.

**PURCHASER'S RESPONSIBILITIES IN THE EVENT OF ANY ENGINE PROBLEM WITHIN THE WARRANTY PERIOD:**

**(A) WHO TO CONTACT:** Contact the seller of the engine. The seller is the administrator of the warranty and will contact the re-manufacturer. You will be referred back to your installer or to a repair facility. (The seller is the business from which the engine was purchased.)

If you are in another town or state, likewise contact the seller. You will be directed to an approved repair facility near you.

**(B) PRIOR APPROVAL:** All warranty repairs, including any replacement parts or labor charges, must have prior approval of remanufacture. It is the seller's responsibility to contact the remanufacture in event of a warranty problem. Your failure to contact the seller to obtain prior approval for any warranty repair will void the owner's warranty.

**(C) RETURN OF PARTS:** Claims for repair work must be substantiated with defective parts and work order. Upon arrival at re-manufacturer's factory, all claimed defective merchandise is inspected. Credit will be allowed providing that the engine or part is defective in material and/or workmanship—and is within the warranty period.

**(D) AUTHORIZED REPAIRS:** Any repair that has been authorized by remanufacture must be guaranteed by the dealer making the repair. Repairs or replacement do not extend the warranty period beyond the time period of the original purchase.



# General Information

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## HYDRO-LOCK

Water can enter the engine cylinders through the exhaust system. Beware of these situations:

1. **Following Wakes:** Sudden slow-downs may cause the boat wake to flow over the transom of your boat.
2. **Engine Shutdown:** Sudden engine shutdown while the boat is moving may force water into the exhaust system.
3. **Improper Installation:** Refer to exhaust pipe section. An exhaust system without flappers and the specified incline increases the likelihood of water entering the engine.
4. **Improper Hoisting:** Operators are sometimes tempted to reduce hoisting time for propeller changes by hoisting only the boat stern. Such hoisting can cause residual water in the exhaust system to enter engine cylinders.

Water entering engine cylinders will cause the engine to lock because water does not compress. To remedy this situation, take the following steps:

1. Change engine oil & filters.
2. Remove all spark plugs.
3. Remove coil wire.
4. Crank engine for 15 seconds.
5. Replace spark plugs and reattach coil wire.
6. Start engine - if there are any abnormal sounds **STOP ENGINE** immediately and contact your dealer.

## WATER INVERSION

Water inversion is water that is pulled back into the exhaust and usually ends up in the piston cylinder. Most of the time this happens under the following conditions:

- Shutting off engine at high RPM's
- Water comes up the exhaust after a quick slowdown
- Long periods of idling
- Exhaust drop not sufficient

Usually the water is not found until the next time the boat is used. In some cases this may not be for weeks. In the case of a salt water environment this is catastrophic due to the rusting. To minimize this problem Eagle Engine requires the installation of flappers at the transom and in the exhaust hose just after the exhaust riser or elbow.

## DETONATION AND / OR PRE-IGNITION

Detonation is most commonly known as “pinging”, “spark knock” or “fuel knock”. It is the abnormal combustion of the fuel which causes the fuel to explode severely within the combustion chamber.

In a four-cycle engine, normal combustion or burning starts at the spark plug and a wave of flames move across the combustion chamber. This results in an even pressure rise in the combustion chamber which pushes the piston downward.

Detonation begins as normal combustion with the spark-ignited flame progressing across the combustion chamber while applying the heat and pressure to the unburned portion of

fuel. Instead of continuing to burn evenly, the last portion of the fuel explodes violently which in turn causes overheating of the pistons, valves and spark plugs.

This may occur at any speed and is not often detected, serious and tragic engine damage may occur.

There are many causes of detonation, with the most common being the use of a low-octane gasoline. Detonation may also occur when using the proper octane gasoline if engine maintenance has been neglected.

- Poor or improper fuel quality/octane
- Improper initial ignition timing setting
- Improper propeller selection
- Engine overload, such as operating twin-engine boat with only one engine
- Improper cooling operation resulting in engine overheating
- Fuel starvation or vapor lock resulting from poor fuel quality / lean out
- Malfunctioning carburetor causing lean mixture
- Operating engine that is out of proper tune, dead cylinder, defective distributor cap
- Excessive exhaust back pressure caused by restricted exhaust mufflers or outlets

### ENGINE ROTATION

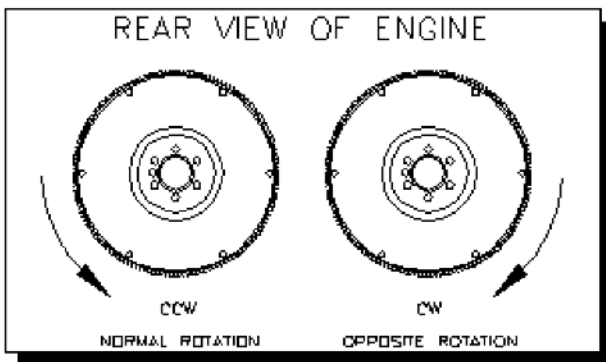
Directional references used in this section are given as if standing behind the boat, looking forward:

- front of boat is bow
- rear of boat is stern
- right side is starboard
- left side is port

The raw water (or seawater) pump is located at the front of the engine on the crankshaft pulley. Engine rotation can be determined by looking at the stern end of the engine and observing the flywheel rotation. Do not assume engine rotation by looking at the propeller rotation; it may not be the same. This information is critical when ordering parts for your engine.

Left Hand Engines: CCW or Normal Rotation

Right Hand Engines: CW or Opposite Rotation



## PROPELLER WARNING

The propeller selected should allow the engine to operate at or near the recommended wide open throttle RPM range with a normal load. Wide Open Throttle RPM range is listed in *Engine Specification Section*.

**WARNING!** Using a propeller too large will not allow the engine to reach its rated RPM range which will create an overloaded condition and possible destructive detonation that can be harmful to the engine's performance and life.

## PROPELLER INFORMATION

Diameter, pitch or coupling of a propeller will affect engine rpm and boat performance. Configuration of the blade also affects performance. Even propeller from different manufacturers with the same pitch and diameter will perform differently.

Testing for a correct propeller is accomplished by operating the boat (with an average load) at Wide Open Throttle (WOT) rpm's should be at the high end of the specified range and checked with an accurate tachometer. This will allow the engine not to fall below the rpm specified range under a heavy load condition. If the engine rpm is above or below the specified range, a change in the diameter and/or pitch of the propeller is required. Newly installed engines operating 100 - 300 RPM below wide open throttle is usually a propeller problem.

# Scheduled Maintenance by Owner

SERVICE:	ENGINE STARTUP EACH DAY	AFTER FIRST 10 HOURS OF OPERATION	EVERY 50 HOURS OF OPERATION	EVERY 100 HOURS OF OPERATION
CHECK ENGINE OIL LEVEL*	✗			✗
INSPECT FUEL LINES AND CONNECTIONS FOR LEAKS	✗			✗
CHECK COOLANT LEVEL IN TANK (IF EQUIPPED WITH CLOSED COOLING)	✗			✗
INSPECT AND CLEAN SEA STRAINER (IF EQUIPPED)	✗			✗
INSPECT ENTIRE POWER PACKAGE FOR LEAKS (WATER, FUEL, OIL, EXHAUST, ETC.)		✗	✗	✗
INSPECT BELTS FOR TENSION AND WEAR		✗	✗	✗
INSPECT BATTERY (TERMINALS AND FLUID LEVELS)		✗	✗	✗
CHECK BATTERY CONNECTION TO ENGINE		✗	✗	✗
TOUCH UP EXTERIOR SURFACE WITH MARINE POWER PAINT		✗	✗	✗
INSPECT ZINC ANODES IN HEAT EXCHANGER FOR DETERIORATION (IF EQUIPPED WITH CLOSED COOLING)		✗	✗	✗
CHECK POWER STEERING FLUID (IF EQUIPPED)				✗
CHECK TRANSMISSION FLUID LEVEL	✗		✗	✗
LUBRICATE STARTER PINION AND SHAFT			✗	✗

\* ENGINE START-UP EACH DAY AND ONCE EVERY EIGHT (8) HOURS OF OPERATION



# Scheduled Maintenance by Qualified Technician

SERVICE:	ENGINE STARTUP EACH DAY	AFTER FIRST 10 HOURS OF OPERATION	EVERY 50 HOURS OF OPERATION	EVERY 100 HOURS OF OPERATION
CHANGE ENGINE OIL AND FILTERS	×	×		×
CHANGE FILTER ON FUEL/WATER SEPARATOR		×		×
CHECK ENGINE MOUNTS (TIGHTNESS)	×		×	×
CHECK RISER AND MANIFOLD BOLTS FOR TIGHTNESS	×	×	×	×
CHECK FOR LOOSE, DAMAGED OR MISSING ENGINE PARTS			×	×
CHECK WIRE HARNESS PLUGS FOR CORROSION AND CONNECTIONS			×	×
INSPECT DISTRIBUTOR FOR CRACKS OR DETERIORATION			×	×
CHECK CONDITION OF SPARK PLUGS (REPLACE IF NECESSARY)			×	×
INSPECT HOSES FOR DETERIORATION			×	×
REPLACE IMPELLER IN SEAWATER PUMP			×	×
CHECK PROPELLER AND SHAFT ALIGNMENT				×
CHECK AND ADJUST IGNITION TIMING (Carbureted Engine Only)				×
CHECK AND ADJUST CARBURETOR				×
CLEAN AND INSPECT FLAME ARRESTOR AND CRANK CASE VENT HOSE			×	×
CLEAN AND INSPECT CARBURETOR FILTER			×	×
CHANGE TRANSMISSION FLUID				×
CHANGE COOLANT (IF EQUIPPED WITH CLOSED COOLING)				×
CLEAN SEAWATER SECTION OF HEAT EXCHANGER				×



# Technician/Installer Information

## DELCO EST IGNITION

### USING THE TIMING TOOL: Carbureted Engine

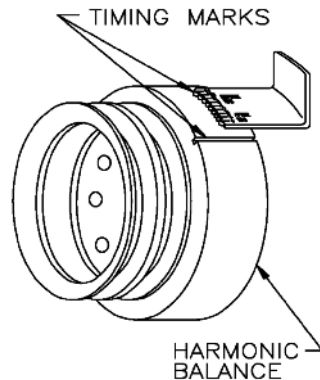
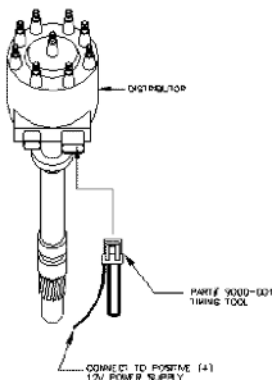
The timing tool is used in setting the initial engine timing on MARINE POWER carbureted engines. This connector by-passes the electronic spark timing of the engine and allows the initial timing to be adjusted by rotating the distributor. Use the following procedure (become familiar with entire procedure before beginning):

The ignition timing marks are located on the engine's front cover. A saw slot on the balancer indicates engine at (TDC) Top Dead Center. Adjust ignition timing as follows:

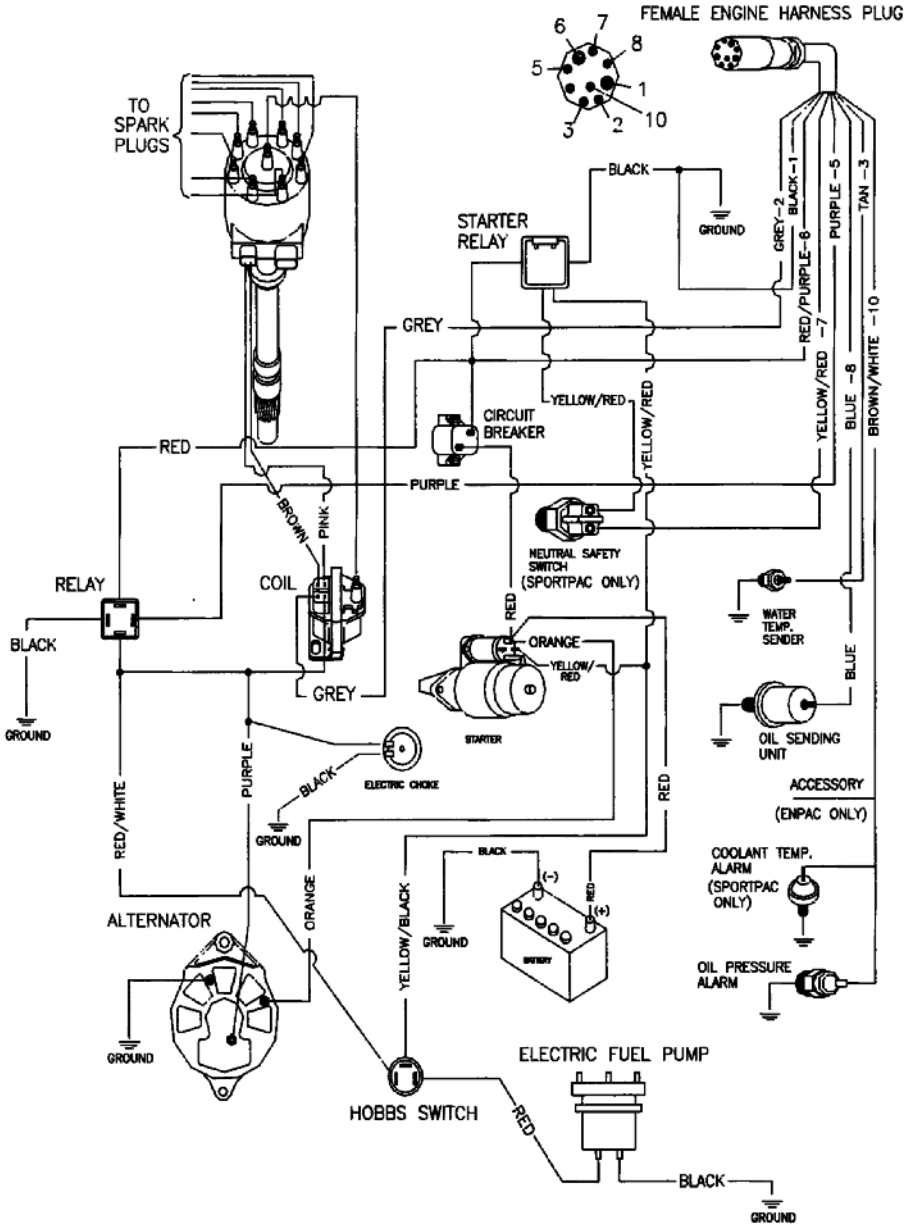
1. Connect a timing light to the number one (1) spark plug wire. Connect the timing light power lead to a 12 volt power source. **DO NOT CONNECT TO 12 VOLTS ON ALTERNATOR.**
2. Start engine and allow to warm to operating temperature. Bring engine to idle (650-800 RPM).
3. **WHILE ENGINE IS RUNNING**, install the timing tool supplied with your engine into the terminal connector on the distributor.
4. Loosen distributor clamp just enough to rotate distributor in place.

**Note: An adjustable timing light is required to set initial and total timing.**

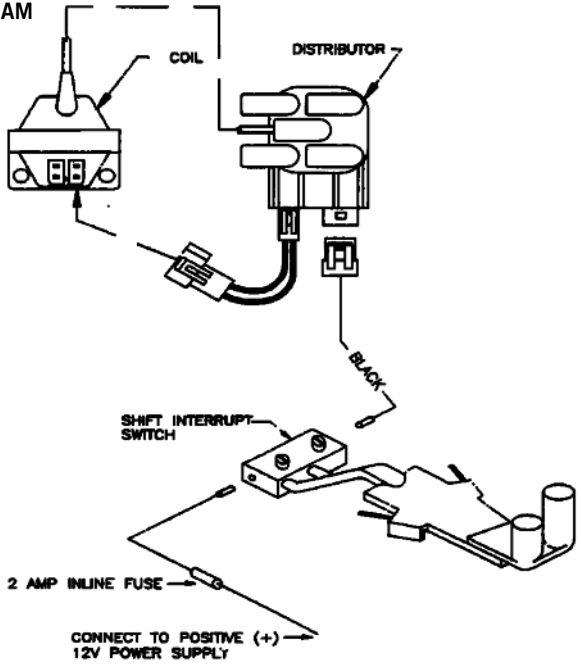
5. Secure the bare wire end of the timing tool to battery positive (+) voltage. (the most convenient location of this voltage is on the cranking motor solenoid.) If desired, a suitable clip, such as an alligator clip may be permanently attached to the bare wire end of the timing tool to hold it in place.
6. Rotate distributor to set mechanical timing. **REFER TO THE APPROPRIATE "ENGINE SPECIFICATIONS" SECTION OF THIS MANUAL FOR CORRECT TOTAL AND INITIAL TIMING FOR YOUR ENGINE.**
7. Tighten distributor clamp to hold in position when initial timing is obtained.
8. Recheck timing.
9. Remove the timing tool from distributor.
10. Check total timing at 4000 RPM. (See Engine Specifications Section.)
11. Disconnect and remove the timing light.



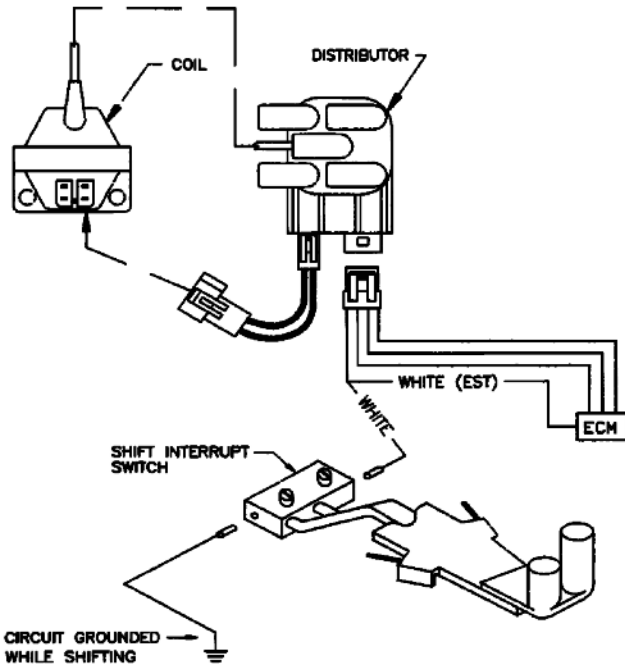
**PRIMARY ENGINE WIRING HARNESS 3.0L, 4.3L, 5.7L, 454, 502  
CARBURETED / ELECTRIC FUEL PUMP**



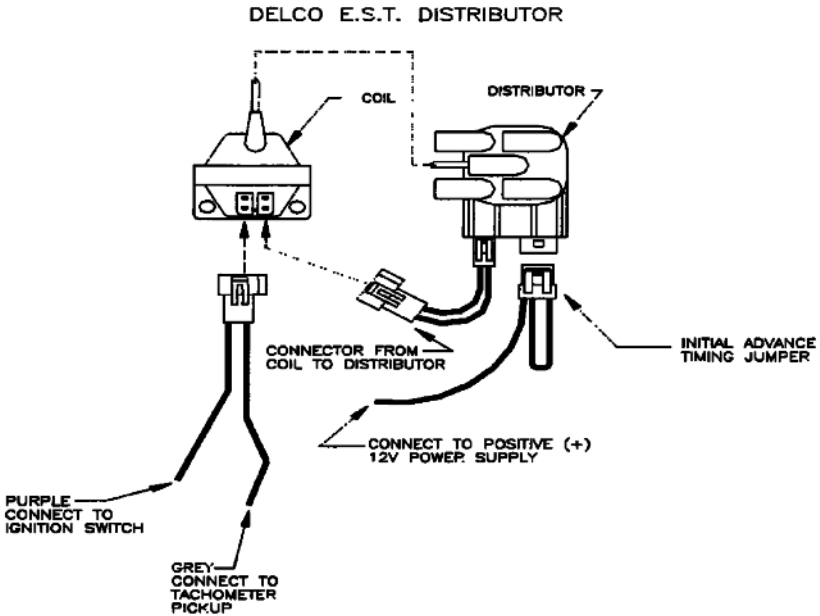
**SHIFT ASSIST WIRING DIAGRAM**  
 Carbureted Mercruiser  
 & Early OMC Applications



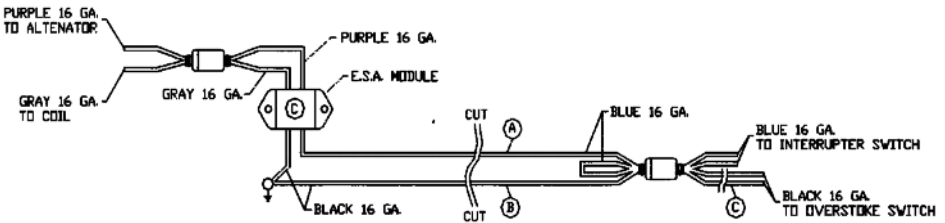
**TBI SHIFT INTERRUPT WIRING DIAGRAM**



## INITIAL TIMING JUMPER WIRING DIAGRAM



## SHIFT INTERRUPT OMC

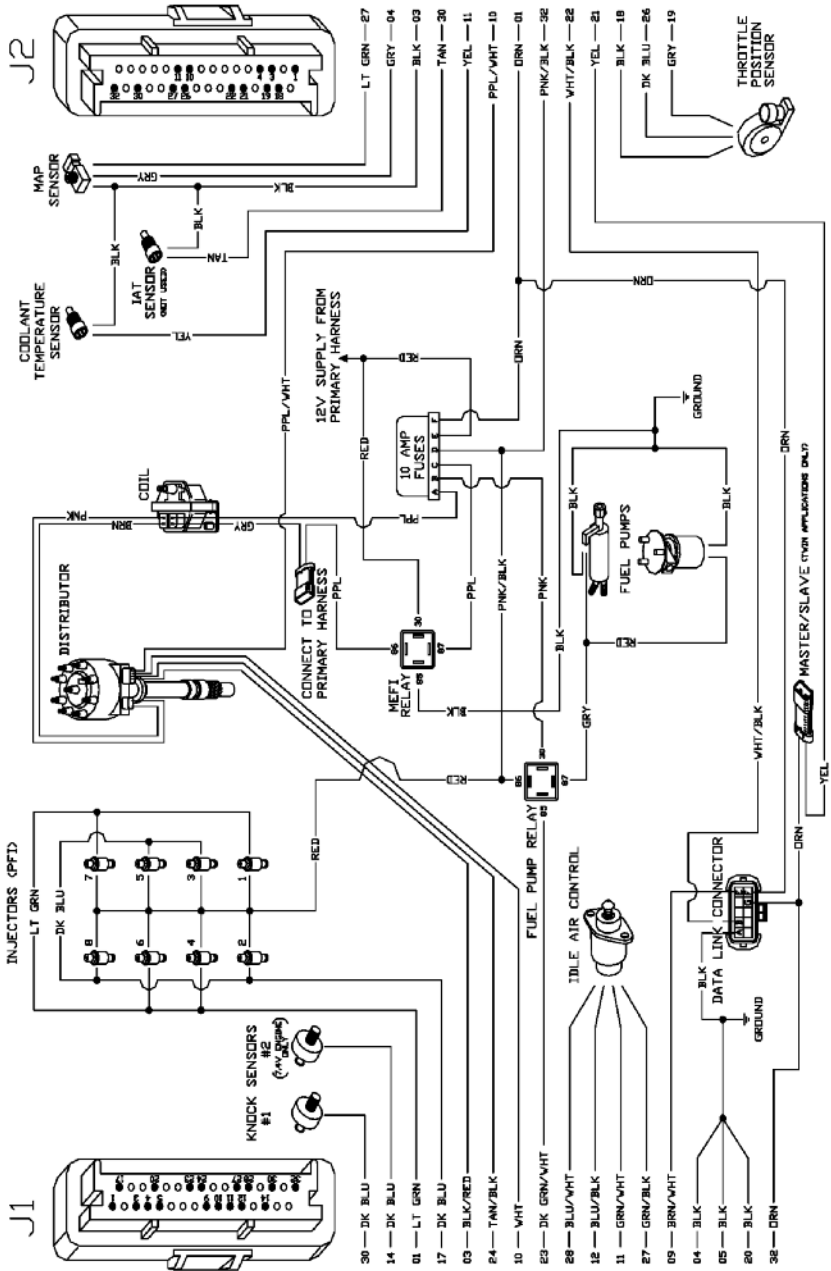


### Installation Instructions

1. Cut the blue 16 gauge wire (A) and connect to 12V positive supply when ignition switch is in the "ON" position with 2 amp in-line fuse
2. Cut the black 16 gauge wire (B) and connect the shift interrupt wire on the engine. (Refer to shift cutout wiring diagram.)
2. Cut the black 16 gauge wire (C). The over stroke switch and the E.S.A. module are no longer used.



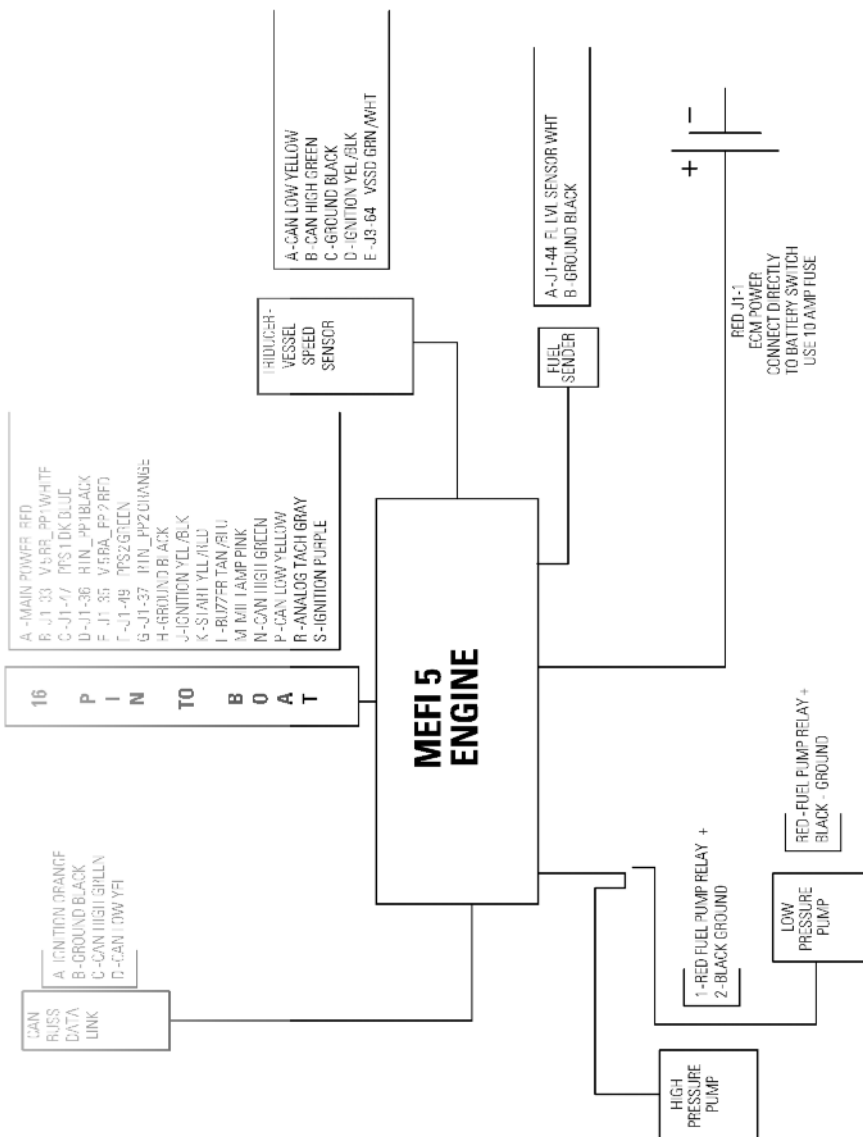
# EFI SECONDARY WIRING HARNESS



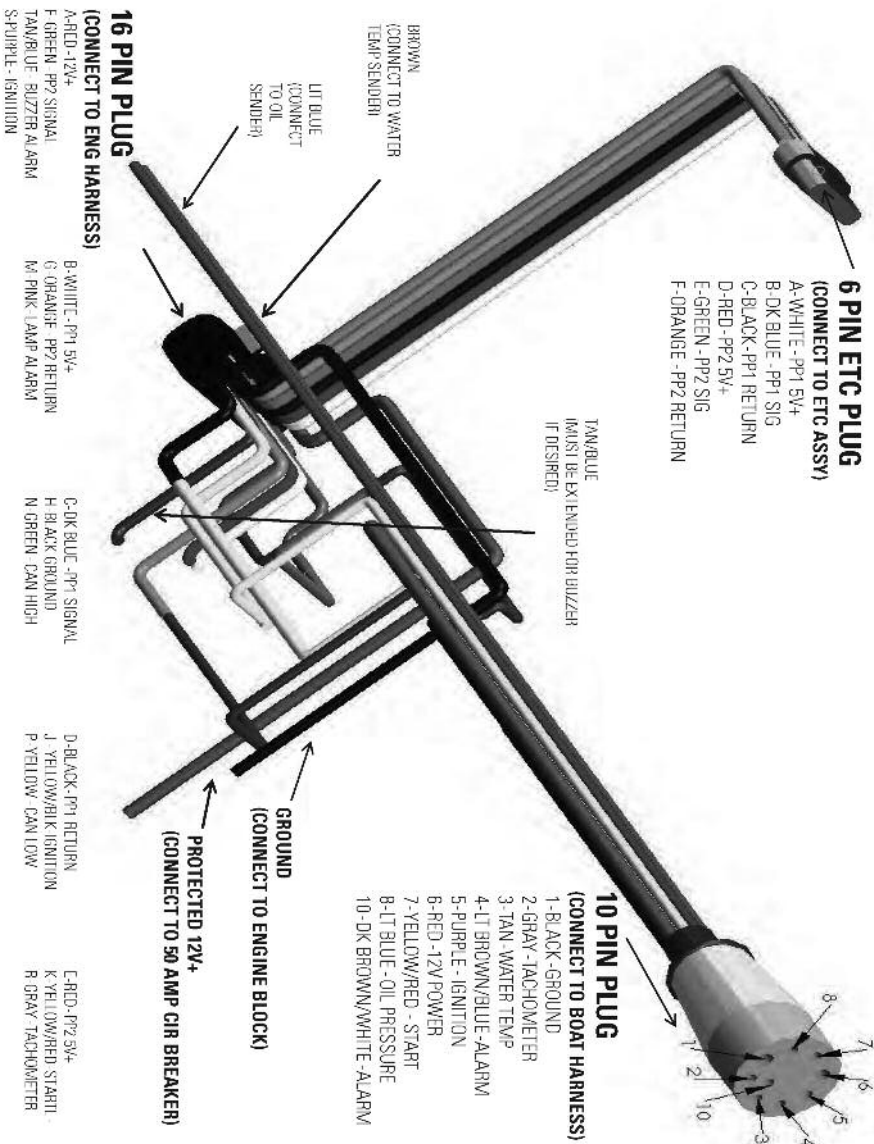
Questions? 800.811.9328 | [www.eagleenginesales.com](http://www.eagleenginesales.com)

275 Commonwealth Drive • Carol Stream, Illinois 60188









# Troubleshooting Guide

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The following troubleshooting hints are not all inclusive but are the most common found. In all cases, if the cause of the problem is outside your capability to repair or correct contact your dealer.

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## Engine Will Not Turn Over

POSSIBLE CAUSE	REMEDY
<input type="checkbox"/> Low Battery or Bad Connection	Check / Charge / Replace. Requires 12 -14 Volts
<input type="checkbox"/> Faulty Battery Cable	
<input type="checkbox"/> Trip Circuit Breaker	
<input type="checkbox"/> Faulty Neutral Switch	
<input type="checkbox"/> Bad Starter Solenoid or Motor	
<input type="checkbox"/> Faulty Fuel Pump	
<input type="checkbox"/> Shift control in Gear	
<input type="checkbox"/> Faulty Relay Solenoid	
<input type="checkbox"/> Hydro Lock	
	Remove spark plug look for water in the cylinder

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## Engine Cranks But Will Not Start

POSSIBLE CAUSE	REMEDY
<input type="checkbox"/> Faulty Fuel Pump	Check / Charge / Replace. Requires 12 -14 Volts
<input type="checkbox"/> Blown Fuel Pump Fuse	
<input type="checkbox"/> Faulty Oil Pressure Switch	Replace
<input type="checkbox"/> Insufficient Fuel Supply	Check Fuel Supply Shut Off Valve, Check Fuel Filter
<input type="checkbox"/> Insufficient Cranking RPM's	Check Battery Voltage
<input type="checkbox"/> Check Distributor Cap & Rotor	Replace
<input type="checkbox"/> Fouled Plugs	Replace
<input type="checkbox"/> Engine Timing	Re-time
<input type="checkbox"/> Correct Firing Order	Check / Correct
<input type="checkbox"/> Low Compression	
<input type="checkbox"/> Bad / Old Fuel	
<input type="checkbox"/> Fouled Carburetor	

*ENSURE A TUNE UP IS DONE EVERY 100 HOURS OR EVERY SEASON*

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## Engine Starts and Stops (Carbureted)

POSSIBLE CAUSE	REMEDY
<input type="checkbox"/> Cold Engine	When engine starts, move throttle to a higher rpm (Carburetor Only)
<input type="checkbox"/> Engine Idle Too Slow	Adjust Choke (Carbureted Engine Only)
<input type="checkbox"/> Faulty Key Switch	
<input type="checkbox"/> Faulty Carburetor	Check in line filter. Check carburetor filter
<input type="checkbox"/> Internal Failure	
<input type="checkbox"/> Compression	

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## Engine Starts and Stops (EFI)

POSSIBLE CAUSE	REMEDY
<input type="checkbox"/> Faulty Fuel Pump Operation	Verify fuel supply and return not reversed.
<input type="checkbox"/> Vapor Lock	Verify fuel supply and pickup not sucking air.
<input type="checkbox"/> Insufficient Fuel Supply	

---

## Engine Runs Poorly At Idle and Acceleration

### POSSIBLE CAUSE

- Incorrect Firing Order
- Incorrect Ignition Timing
- Choke Adjustment
- Faulty Spark Plug
- Contaminated Carburetor
  
- Internal Cylinder Head Problem
- Engine Surge, Stall, Lack Power

### REMEDY

Check / Adjust / Replace

Check for sticking or burnt valve or broken valve spring.

Carburetor float adjustment, Power Piston, Leaking Gaskets

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## Engine Runs Poorly At High RPM

### POSSIBLE CAUSE

- Low Grade or Old Fuel
- Ignition Timing
- In Need of a Tune-UP
- Ignition Coil
- Engine Overheating
- Restricted Exhaust
- Overfilled Crankcase
- Plugged Fuel Tank Vent
- Restricted Anti-Siphon Valve
- Restricted Exhaust
- Low Compression

### REMEDY

Check / Clean / Replace

*ENGINE PERFORMANCE CAN BE GREATLY AFFECTED BY BOAT HULL AND PROP CONDITION*

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## High Speed Miss

### POSSIBLE CAUSE

- Water in fuel
- Clogged fuel filter
- Insufficient fuel supply
- Spark plug or wires
- Faulty distributor Module
- Loose ignition connection
- Ignition coil
- Ignition timing. Total advance incorrect
- Faulty tachometer
- Faulty fuel pump
- Loose electrical connection at fuel pump
- Detonation

### REMEDY

Inspect / Clean / Replace

---

## Fuel System - Rich

### POSSIBLE CAUSE

- Dirty / Clogged Flame Arrester
- Carburetor Float Adjustment
- Carburetor Gasket Leaking
- Return Line Not Directed Back To Tank

### REMEDY

Check / Clean / Replace



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## Fuel System - Lean

### POSSIBLE CAUSE

- Empty Fuel Tank
- Vapor Lock
- Automatic choke

### REMEDY

Stuck open, adjust

---

## Poor Fuel Economy

### POSSIBLE CAUSE

- Boat Hull Dirty
- Incorrect Prop Size or Damage
- Clogged Flame Arrester
- Tune -up
- Low Engine Compression
- Engine Running Too Hot or Cold
- Incorrect Fuel Grade
- Boat Overload
- Weight Distribution
- Carburetor Settings
- Incorrect Spark Plug or Gap
- Initial or Advanced Timing Wrong
- Plugged or Restricted Exhaust
- Clean / Check / Adjust

### REMEDY

Check / Clean / Adjust

---

## Oil Pressure - Low

### POSSIBLE CAUSE

- Low oil level in crankcase
- Excessive oil in crankcase
  
- Erroneous oil gauge readings
  
- Incorrect Dipstick
- Oil line position and routing
- Incorrect oil viscosity or diluted
- Oil Pump malfunctioning
- Oil leak
- Excessive Bearing Clearance

### REMEDY

Refer to owner manual for correct oil levels  
Remove excess oil. Refer to owner manual  
for correct oil levels

Contact dealer to perform a mechanical  
oil pressure check

Rod, Cam or Main Bearings

Engine oil pressure as low as of 5 pounds at idle is acceptable. At 2000 rpm 30 pounds is acceptable

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## Oil Pressure - High

### POSSIBLE CAUSE

- Oil too thick - Wrong Viscosity
- Erroneous oil gauge readings
  
- Clogged or restricted oil passage
- Oil valve relief valve stuck closed

### REMEDY

Change oil

Contact dealer to perform a mechanical  
oil pressure check

Contact dealer

Contact dealer

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## Excessive Oil Consumption

### POSSIBLE CAUSE

- External Leak
- Excessive oil in crankcase
- Oil / Fuel dilution
- Extended excessive RPM's
- Incorrect oil viscosity
- Incorrect dipstick
- Excessive oil temperature
- Defective oil cooler
- Remote oil lines installed wrong
- Engine breather tubes blocked
- Defective piston rings
- Defective Cylinders
- Excessive bearing Clearance

### REMEDY

Clean / Check / Adjust

The amount of oil used is greatly dependent upon engine speed. Oil usage will be greater at higher rpm's

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## Engine Overheating

VERIFY IF ENGINE IS ACTUALLY OVERHEATING.

### POSSIBLE CAUSE

- Clogged seawater intake
- Clogged seawater strainer
- Improperly installed strainer
- Loose hose connections
- Seawater hose kinked or collapsed
- Water turbulence under boat
- Defective thermostat
- Seawater pump impeller worn
- Obstruction in cooling system
- Engine circulating pump defective
- Low coolant level
- Antifreeze not properly mixed
- Heat exchanger core plugged.
- Water hoses reversed
- Exhaust riser obstruction
- Transmission cooler blocked
- Air leak in hose
- Slipping circulating pump belt
- Head gasket failure

### REMEDY

Clear intake. Ensure that all hoses after the intake are clear.

Tighten hose connections

Replace seasonally

Mix to a 50 /50 ratio

Mix to a 50 /50 ratio

Riser should be changed every three to four years.

See dealer



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## Water In Engine Cylinder or Base

### POSSIBLE CAUSE

- Operator error
- Exhaust restricted or blocked
- Engine and exhaust too low in boat
- Defective exhaust riser gasket
- Defective exhaust manifold or riser
- Cylinder head gasket leak
- Cracked block or cylinder head
- Intake manifold gasket
- Incorrect engine rotation

### REMEDY

See Boater's Beware.  
REMOVE water from engine immediately  
Repair or Replace.  
REMOVE water from engine immediately  
Redesign add riser spacers.  
REMOVE water from engine immediately  
Contact dealer.  
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Remove water by removing spark plugs and turning the engine over by hand. Once water is removed spray cylinder with Marvel Mystery Oil or two cycle engine oil. Drain all the oil and change the oil filter(s). Again, turn the engine over by hand to circulate the oil. Contact your dealer immediately to make the required repairs. Upon completion of repairs, run the engine and again change the oil.

# Terms and Conditions of Sale

**1. EFFECT OF THESE TERMS AND CONDITIONS OF SALE.** The following terms and conditions shall apply to all quotations, purchase orders, order acknowledgments and other documents, dealings and transactions relating to the sale of Seller's goods. Buyer's ordering, acceptance or use of any goods of Seller shall constitute an acceptance of the following terms and conditions. Seller shall not be deemed to have waived any of the following terms or conditions, even if Seller fails to object to any contrary or inconsistent provision appearing on, attached to, or incorporated by reference in any purchase order or other document issued by Buyer. Seller's acceptance of any such purchase order or other document of Buyer shall be conditioned upon the understanding that these terms and conditions shall control, notwithstanding any such contrary or inconsistent term or condition of Buyer.

**2. PRICES.** Unless otherwise agreed upon in writing by Seller, all prices, payments and references thereto shall be in U.S. dollars. Prices do not include freight charges. All goods are shipped F.O.B., Carol Stream, Illinois, or Lakeland, Florida U.S.A. Additionally, prices do not include sales taxes, use or excise taxes, import or export duties, special financing fees, value added taxes, income or royalty taxes, special permits or licenses, or similar charges. Buyer shall either pay such charges or provide Seller with acceptable exemption certificates.

**3. PAYMENT.** All orders are subject to Seller's approval. If Seller deems Buyer's financial condition or payment practices to be unsatisfactory, cash payment or other security may be required. If Buyer fails to meet such requirements, Seller may discontinue the delivery of goods to Buyer and treat such failure at any time thereafter as reasonable grounds for the lawful termination of any pending order. Seller shall have the right to issue invoices to Buyer upon readiness of goods for delivery, unless otherwise agreed upon in writing by Seller. Unless otherwise specified by Seller, invoices shall be due and payable NET 30 DAYS following date of invoice without regard to delays of transportation or inspection. Interest shall accrue on any overdue payment at the rate of 1.5% per month, or at the maximum lawful rate of interest, whichever is less. Buyer hereby grants Seller, and Seller shall retain, a security interest in all goods shipped or delivered to Buyer until payment of the total purchase price is received. Seller shall have the right to take all lawful measures to protect and preserve Seller's security interest in the goods, including, but not limited to, the filing of Uniform Commercial Code financing statements.

**4. TITLE AND RISK OF LOSS.** All goods supplied to Buyer shall have marketable title, free and clear of any security interest, lien or encumbrance of any third party. Title to, and risk of loss, shall pass to Buyer upon notice to Buyer of readiness of the goods for shipment. Freight and shipping obligations shall have no bearing on transfer of title or risk of loss. Claims for damages or shortages attributable to Seller must be filed with Seller within 10 days following receipt of goods or notice of loss, whichever occurs first, and must be accompanied by Seller's packing slip and a detailed description of any such claim.

**5. LIMITED WARRANTY.** Except as otherwise specifically set forth herein, Seller warrants only that the goods supplied to Buyer shall be free from defects in materials and workmanship when properly installed and operated under normal conditions and in accordance with all applicable instruction manuals, recommendations and specifications. This limited warranty shall begin on the original invoice date, specific to the terms described in this Manual / Warranty listed on pages 2-3. To obtain consideration under this limited warranty, Buyer must first send written notice to Seller in Carol Stream, Illinois, U.S.A., stating in what respects the goods are believed by Buyer to be defective. Failure to give notice within the warranty period shall be a waiver of this limited warranty and no assistance or other action thereafter taken by Seller shall be deemed to extend or revive the warranty period. Any goods believed by Buyer to be defective shall be returned by Buyer to Seller's facility in Carol Stream, Illinois, U.S.A., transportation prepaid, for examination by Seller. No goods shall be returned to Seller unless Buyer first obtains a return authorization from Seller. If, in Seller's sole judgment, the goods returned by Buyer are not defective or for some other reason are not covered under this limited warranty, Buyer shall pay Seller's applicable service time charges for said examination. If, in Seller's sole judgment, the goods returned by Buyer are defective and covered under this limited warranty, Seller shall have the option of repairing, rebuilding or replacing such goods, at its charge, provided that such goods are returned to Seller's facility in Carol Stream, Illinois, U.S.A., transportation prepaid. This limited warranty shall not apply to products which, in Seller's sole judgment, have been the subject of negligence, abuse, accident, misapplication, tampering or alteration; nor shall it apply to products damaged by acts of God, war or civil insurrection, acts of terrorism, improper installation, operation, maintenance or storage, or other than normal application, use or service, including, without limitation, operational failures caused by corrosion, erosion, wear and tear, rust or other foreign materials in the system in which they are utilized. Further, this limited warranty shall not apply to any products, parts, accessories or other goods not manufactured by Seller, provided that Seller, upon request by Buyer, shall advise Buyer of any warranties known to Seller that may be offered by the manufacturer of such goods. This limited warranty shall not cover, and Seller shall not under any circumstances be liable for, damages for injuries to persons or property; loss of product; loss of profits; loss of use; expenses of labor, travel or other items relating to the removal or replacement of defective goods; damages resulting from the removal of defective goods or the installation of repaired, rebuilt or replaced goods; expenses relating to the transportation of goods to and from Seller's facility; any consequential, incidental, contingent or special damages, whether arising in contract, in tort or under statute; or any other damages or expenses not agreed upon in writing by Seller, even if Seller has been advised of the potential for any such damages or expenses. THIS LIMITED WARRANTY IS IN LIEU OF ALL WARRANTIES, EXPRESS OR IMPLIED, INCLUDING, WITHOUT LIMITATION, ALL WARRANTIES OF MERCHANT-ABILITY AND



FITNESS FOR A PARTICULAR PURPOSE OR USE. No person is authorized to give any other warranty or to assume any other liability on Seller's behalf.

**6. FORCE MAJEURE.** In no event shall Seller be liable for any non-performance, delay in performance, or any other variation from Seller's performance obligations, nor for any loss or damage to any goods supplied to Buyer, when occasioned directly or indirectly by any cause beyond the reasonable control of Seller or its suppliers, vendors, subcontractors, or other representatives or agents, including, but not limited to, communication line failures; power failures; natural disasters or acts of God; acts of criminals or a public enemy; war; riot; acts of terrorism; official or unofficial acts, contracts, regulations or restrictions of any foreign or domestic governmental agency; acts of Buyer or its employees, representatives or agents; strikes or labor difficulties; or failures, shortages or delays in Seller's usual sources of labor or materials. Seller shall automatically be entitled to a reasonable extension of all periods of performance when delayed by any such cause.

**7. MODIFICATION OR SUSPENSION OF ORDERS.** Requests by Buyer for any modification or change of any order, including, but not limited to, any change in specifications, quantities or delivery obligations, shall be subject to Seller's written consent, and may result in adjustments to prices and delivery schedules. Any request by Buyer for a suspension of any order or a delay in any delivery shall be in writing, and shall be subject to the written consent of Seller. Such suspensions or delays may result in adjustments to prices, payments and delivery schedules. The time required for the subsequent fulfillment of any order may exceed the period of suspension or delay due to Seller's scheduling constraints or other reasons.

**8. ASSIGNMENT/SUBCONTRACTING.** Seller shall have the right to assign any of its rights or obligations under any order, and shall be entitled to subcontract the performance of any of its obligations under any order. Any attempted assignment by Buyer of any of its rights or obligations under any order shall be null and void in the absence of Seller's prior written consent.

**9. INDEPENDENT CONTRACTOR.** At all times, Seller shall be deemed an independent contractor of Buyer, and not a partner, joint venturer, employee or agent of Buyer.

**10. LIMITATION OF LIABILITY.** To the full extent permitted by laws, Buyer waives all rights against Seller for any damage to its property or that of third parties, or for injury to any person, however caused. In no event shall Seller's total liability exceed the specified purchase price of the goods covered by the applicable order.

**11. REGULATORY COMPLIANCE.** Buyer shall comply with all applicable laws, regulations and rules governing goods supplied by Seller, including, but not limited to, safety and health standards, environmental regulations, technical standards, and export controls.

**12. SELLER'S OPPORTUNITY TO CURE.** In the event that Buyer believes that Seller is not in full compliance with its obligations hereunder, Buyer shall notify Seller in writing and Seller shall have the right to remedy the alleged non-compliance within 30 days following its receipt of said notice.

**13. VENUE; WAIVER OF JURY TRIAL.** BUYER HEREBY IRREVOCABLY SUBMITS TO THE JURISDICTION OF ANY STATE OR FEDERAL COURT SITTING IN CHICAGO, ILLINOIS, OVER ANY ACTION OR PROCEEDING BASED HEREON, AND BUYER HEREBY IRREVOCABLY AGREES THAT ALL CLAIMS IN RESPECT OF SUCH ACTION OR PROCEEDING SHALL BE HEARD AND DETERMINED IN SUCH STATE OR FEDERAL COURT. BUYER HEREBY IRREVOCABLY WAIVES, TO THE FULLEST EXTENT IT MAY EFFECTIVELY DO SO, THE DEFENSE OF AN INCONVENIENT FORUM TO THE MAINTENANCE OF SUCH ACTION OR PROCEEDING. BUYER IRREVOCABLY CONSENTS TO THE SERVICE OF ANY AND ALL PROCESS IN ANY SUCH ACTION OR PROCEEDING BY THE MAILING OF COPIES OF SUCH PROCESS TO BUYER AT ITS ADDRESS AS SPECIFIED IN THE RECORDS OF SELLER. BUYER AGREES THAT A FINAL JUDGMENT IN ANY SUCH ACTION OR PROCEEDING SHALL BE CONCLUSIVE AND MAY BE ENFORCED IN ANY OTHER JURISDICTION BY SUIT ON THE JUDGMENT OR IN ANY OTHER MANNER PROVIDED BY LAW. BUYER KNOWINGLY, VOLUNTARILY AND INTENTIONALLY WAIVES IRREVOCABLY THE RIGHT IT MAY HAVE TO TRIAL BY JURY WITH RESPECT TO ANY LEGAL PROCEEDING BASED HEREON, OR ARISING OUT OF, UNDER OR IN CONNECTION WITH ANY ORDER. BUYER SHALL REIMBURSE SELLER, UPON DEMAND, FOR ALL COSTS AND EXPENSES (INCLUDING REASONABLE ATTORNEYS' FEES AND COURT COSTS) INCURRED BY SELLER IN ANY ACTION OR PROCEEDING.

**14. INTERPRETATION.** These terms and conditions shall be governed by and construed in accordance with the laws of the State of Illinois, including such State's Uniform Commercial Code, without giving effect to principles of conflict of laws. Whenever any conflict exists between these terms and conditions and any provision of such Uniform Commercial Code, these terms and conditions shall govern. The section headings contained herein have been inserted for convenience only, and shall not be considered in interpreting any term or condition hereof. If any term or condition contained herein is found to be invalid or unenforceable, it shall be deemed stricken herefrom without affecting the remaining terms or conditions hereof.

**15. NOTICE.** All notices required hereunder shall be in writing and delivered by overnight delivery or certified or registered mail, postage prepaid, return receipt requested. Any such notice shall be deemed to have been given on the date it is received, even if refused, during regular office hours at the address listed on the applicable order or at such other address as the affected party may have previously designated for notices.