



### **ELECTRICAL**

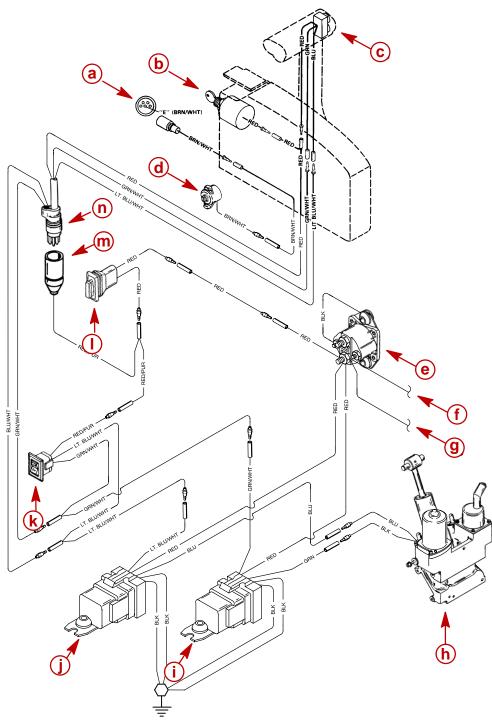
### **Section 2D – Wiring Diagrams**

### **Table of Contents**

Power Trim Wiring Diagram	Outboard Multi-Function Gauge Setting 2D Water Pressure Gauge Hose Connection 2D Model 200/225 2D Warning System 2D Warning System Signals 2D Warning System Operation 2D Guardian Protection System 2D Guardian System Operation with Gauges 2D Guardian System Activation 2D 2000 (Analog) 200/225 DFI Wiring Diagram 2D	)-18 )-18 )-19 )-20 )-20 )-22 )-28 )-28 )-28
		)-27 )-28



### **Power Trim Wiring Diagram**



- a Tach. Connector
- **b** Key Switch Assembly
- c Trim Switch
- d Trim Sender
- e Start Solenoid
- f To Battery
- g To Alternator

- h Trim Pump and Motor
- i DOWN Solenoid
- j UP Solenoid
- k Bottom Cowl Switch
- I 20 Ampere Fuse
- m Engine Harness
- n Remote Control Harness



### **Instrument Wiring Connections**

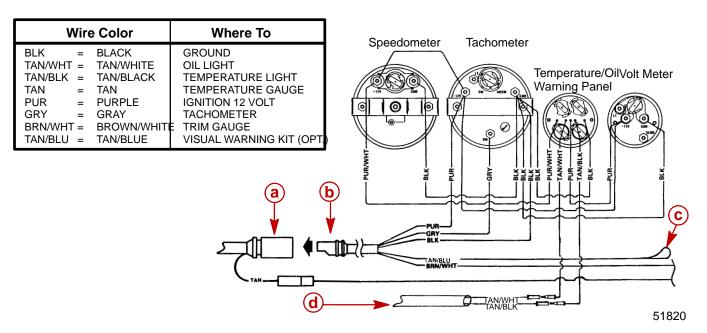


Figure 1 - Without Light Switch

**NOTE:** ANY INSTRUMENT WIRING HARNESS LEADS NOT USED MUST BE TAPED BACK TO THE HARNESS.

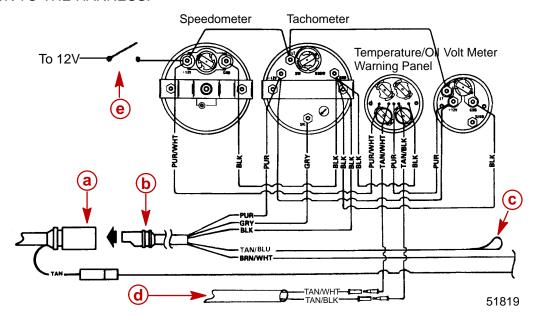


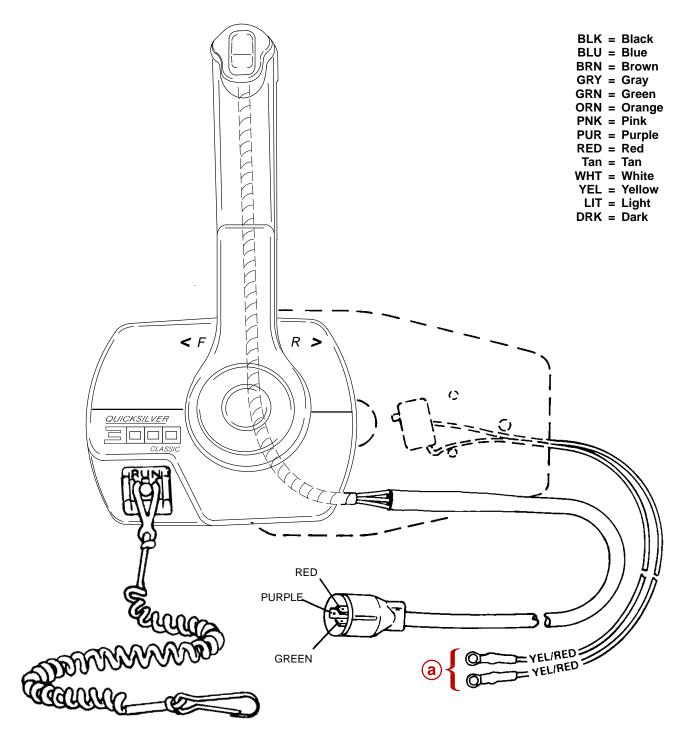
Figure 2 - With Light Switch

- a Tachometer Receptacle From Control Box or Ignition/Choke Switch
- **b** Tachometer Wiring Harness
- **c** Lead to Optional Visual Warning Kit (Taped Back to Harness)
- **d** Cable Extension (For Two Function Warning Panel)
- e Light Switch

90-859769R1 DECEMBER 2000



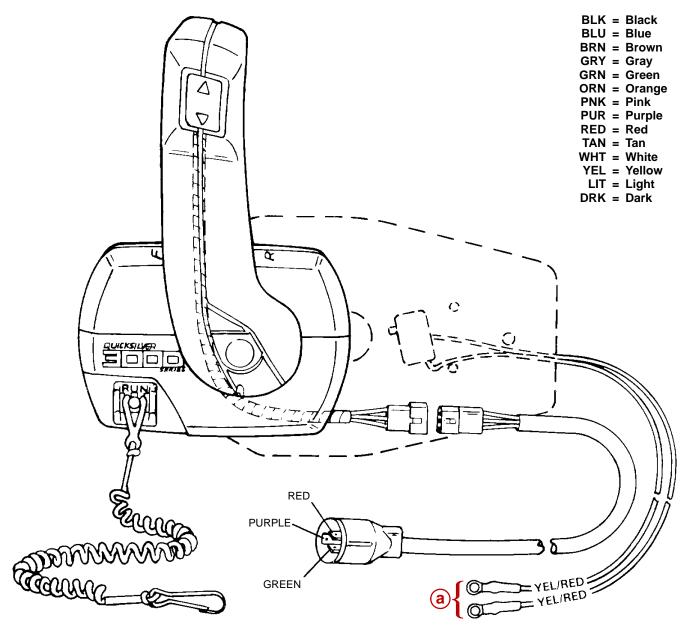
### **Commander 3000 Classic Panel Remote Control**



a - Neutral Interlock Switch



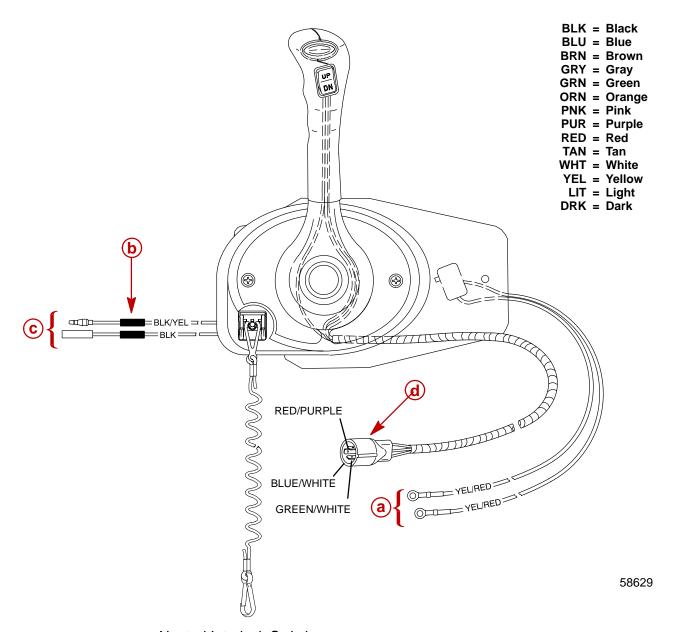
### **Commander 3000 Panel Remote Control**



a - Neutral Interlock Switch



### **MPC 4000 Mechanical Panel Control**

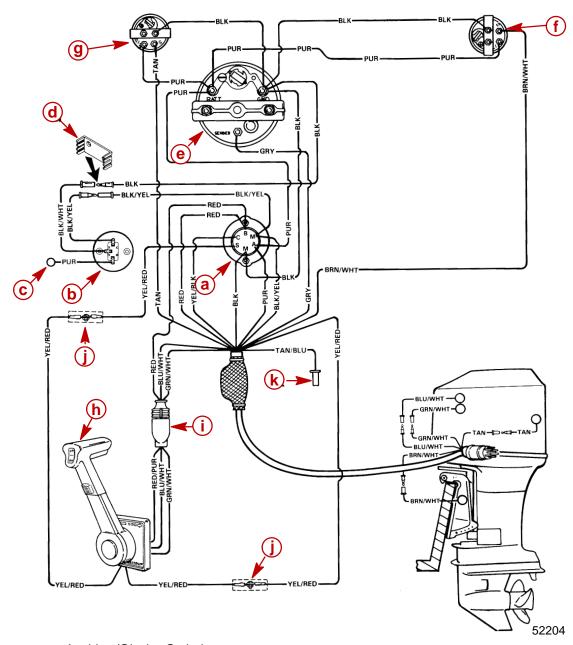


- a Neutral Interlock Switch
- **b** Solder Connections covered with shrink tube
- c Emergency Stop Switch Harness
- d Trim Harness



### Instrument/Lanyard Stop Switch Wiring Diagram

BLK=BLACK BLU=BLUE BRN=BROWN GRN=GREEN GRY=GRAY PUR=PURPLE RED=RED TAN=TAN WHT=WHITE YEL=YELLOW

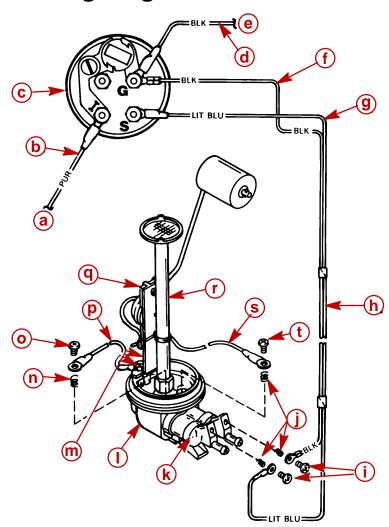


- a Ignition/Choke Switch
- **b** Lanyard Stop Switch
- c Lead Not Used on Outboard Installations
- d Retainer
- e Tachometer
- f Trim Indicator Gauge (Optional)
- g Temperature Gauge
- h Remote Control
- Power Trim Harness Connector
- j Connect Wires Together w/Screw and Nut (2 Places); Apply Liquid Neoprene to Connections and Slide Rubber Sleeve over each Connection.
- k Lead to Optional Visual Warning Kit

IMPORTANT: On installations where gauge options will not be used, tape back any unused wiring harness leads.



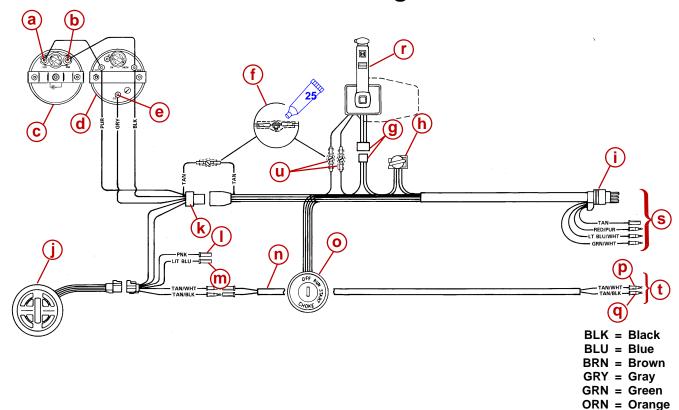
### Oil Level Gauge Wiring Diagram



- a To 12 Volt Source
- **b** PURPLE Wire (Connect to Trim Indicator Gauge "I" [or POSITIVE (+) 12 Volt Source that is Turned "ON" and "OFF" with Ignition Switch])
- c Oil Level Gauge
- **d** BLACK Wire (Connects to NEGATIVE Ground)
- e To Ground
- f BLACK Wire (From Gauge to Oil Clip Connector)
- g LIGHT BLUE Sender Lead to Gauge
- h Wiring Harness (LT. BLU. and BLACK)
- i Screw (10-16 x 5/8 in.)
- j Spring
- k Oil Clip Connector
- I Adaptor Housing
- m Screw (10-16 x 1/4 in.)
- n Spring
- o Screw (10-16 x 5/8 in.)
- p BLACK Wire
- q Oil Level Sender Unit
- r Oil Pick-Up Tube
- s WHITE Lead (from Oil Level Sender)
- **t** Screw (10-16 x 5/8 in.)



### **Panel Mount Remote Control Wiring Installation**



- Liquid Neoprene (92-25711--2)
- a (+) 12 Volt Terminal
- **b** (-) Ground Terminal
- **c** Speedometer
- d Tachometer
- e Tachometer Signal Terminal
- f Connect Wires Together with Screw and Hex Nut (3 Places); Apply Quicksilver Liquid Neoprene to Connections and Slide Rubber Sleeve Over Each Connection.
- **g** Power Trim Connector
- h Horn
- i 8 Pin Harness Connector

- j Multi-Function Gauge
- k Multi-Function Adapter Harness

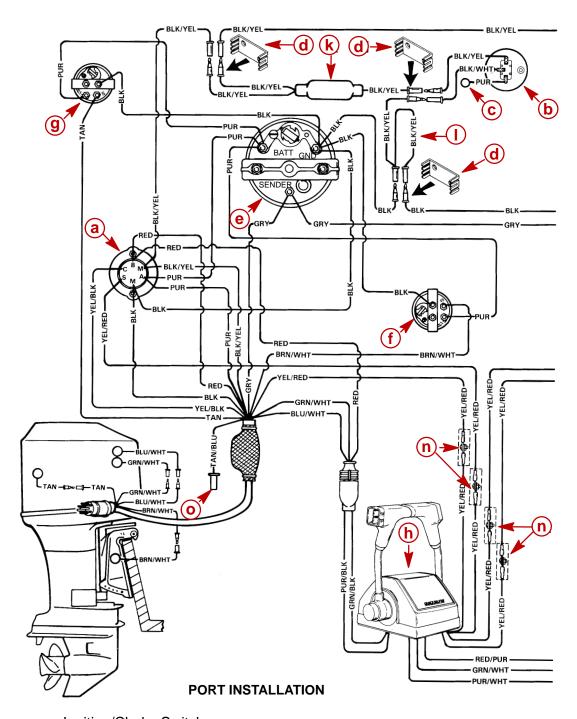
PNK = Pink
PUR = Purple
RED = Red
TAN = Tan
WHT = White
YEL = Yellow
LIT = Light
DRK = Dark

- I To Fuel Sender (Optional)
- m To Oil Sender (Optional)
- n Two Wire Harness
- o Ignition/Choke Switch
- p Low Oil Sender Lead
- **q** Over Temperature Switch
- r Panel Mount Remote Control
- s To Engine
- t To Engine
- u Neutral Safety Switch Lead



# Instrument/Lanyard Stop Switch Wiring Diagram (Dual Outboard)

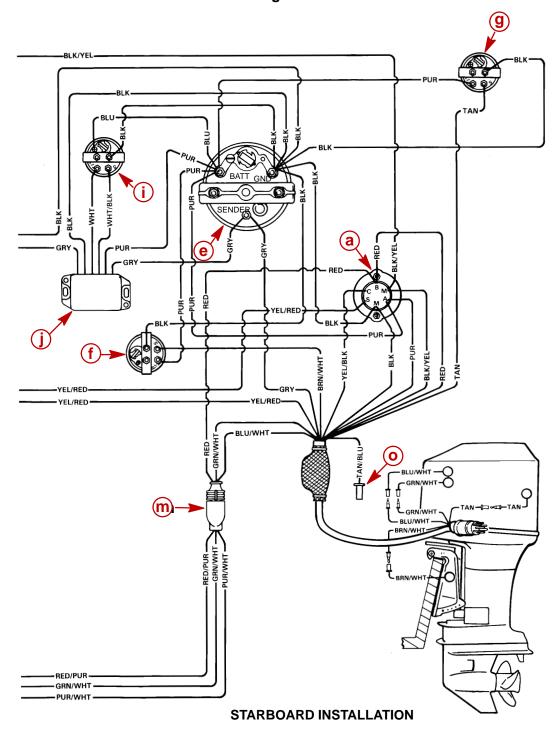
BLK=BLACK BLU=BLUE BRN=BROWN GRN=GREEN GRY=GRAY PUR=PURPLE RED=RED TAN=TAN WHT=WHITE YEL=YELLOW



- a Ignition/Choke Switch
- **b** Lanyard Stop Switch
- c Lead not used on Outboard Installations
- d Retainer
- e Tachometer
- f Trim Indicator Gauge
- g Temperature Gauge
- h Remote Control



## IMPORTANT: On installations where gauge options will not be used, tape back and isolate unused wiring harness leads



- i Synchronizer Gauge
- j Synchronizer Module
- k Lanyard Switch (Isolation) Diode
- I Y Harness
- m Power Trim Harness Connector
- n Connect Wires together with Screw and Nut (4 Places); Apply Liquid Neoprene to Connections and slide Rubber Sleeve over each Connection.
- o Lead to Visual Warning Kit



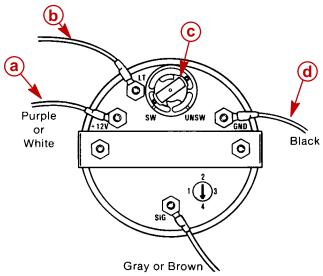
### **QSI Gauge Wiring Diagrams**

#### **Tachometer Wiring Diagram**

Tachometer dial on back side of case must be set to position number 4.

#### **WIRING DIAGRAM A**

Use this wiring diagram when using a separate light switch for instrument lighting.

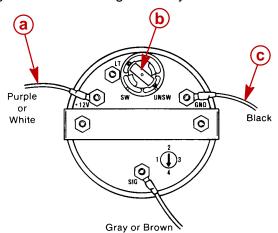


51106

- a Connect to + 12 Volt
- b +12 Volt Light Switch Wire
- c Position Light Bulb to the Switched Position
- d Connect to NEGATIVE (-) Ground

#### **WIRING DIAGRAM B**

Use this wiring diagram when instrument lighting is wired directly to the ignition key switch. (Instrument lights are on when ignition key switch is turned on.)



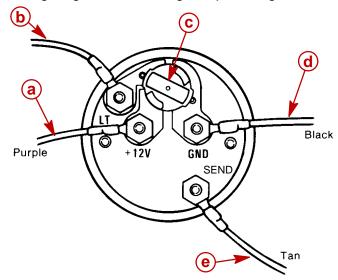
- a Connect to +12 Volt
- **b** Position Light Bulb to the Unswitched Position
- c Connect to NEGATIVE (-) Ground



#### **Water Temperature Gauge**

#### **WIRING DIAGRAM A**

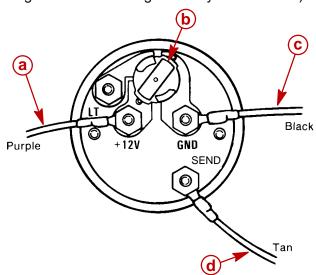
Use this wiring diagram when using a separate light switch for instrument lighting.



- a Connect to + 12 Volt
- b +12 Volt Light Switch Wire
- c Position Light Bulb to the Switched Position
- d Connect to NEGATIVE (-) Ground
- Connect to TAN Lead located at the Tachometer Receptacle on Commander Side Mount Remote Control or TAN Lead coming from Accessory Ignition/ Choke Assembly.

#### **WIRING DIAGRAM B**

Use this wiring diagram when instrument lighting is wired directly to the ignition key switch. (Instrument lights are on when ignition key is turned on.)

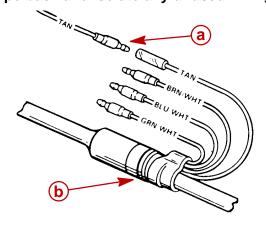


- a Connect to +12 Volt
- **b** Position Light Bulb to the Unswitched Position
- c Connect to NEGATIVE (-) Ground
- Connect to TAN Lead located at the Tachometer Receptacle on Commander Side Mount Remote Control or TAN Lead coming from Accessory Ignition/ Choke Assembly



Route TAN lead on starboard side of engine to engine/remote control harness. Connect as shown.

#### IMPORTANT: Tape back and isolate any unused wiring harness leads.

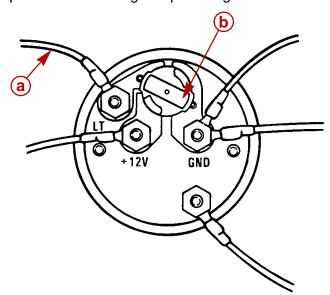


28086

- **a** Lead from Temperature Sender
- **b** Engine/Remote Control Harness

# Oil Level Gauge Wiring LIGHT BULB POSITION A

Use this position when using a separate light switch for instrument lighting.



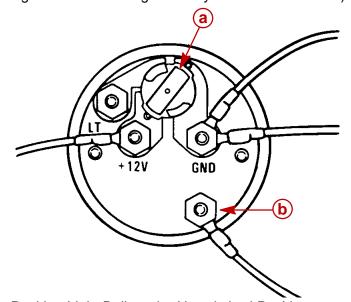
- a +12 Volt Light Switch Wire
- **b** Position Light Bulb to the Switched Position

51112



#### **LIGHT BULB POSITION B**

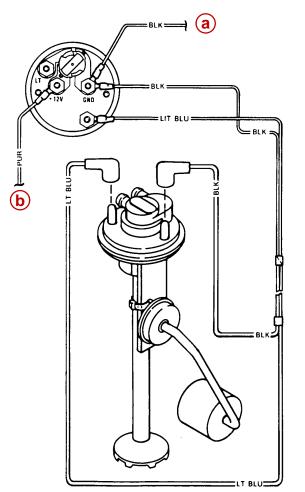
Use this position when instrument lighting is wired directly to the ignition key switch. (Instrument lights are on when ignition key switch is turned on.)



a - Position Light Bulb to the Unswitched Position

**b** - Sender

#### **SENDER WIRING**



a - Connect to +12 Volt

**b** - Connect to NEGATIVE (-) Ground

51108

90-859769R1 DECEMBER 2000

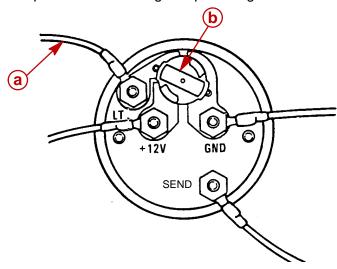
Page 2D-15



### **Engine Synchronizer Wiring Diagram**

#### **LIGHT BULB POSITION A**

Use this position when using a separate light switch for instrument lighting.

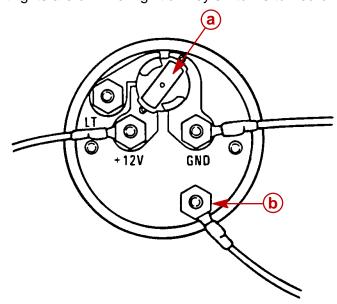


51105

- a +12 Volt Light Switch Wire
- **b** Position Light Bulb to the Unswitched Position

#### LIGHT BULB POSITION B

Use this position when instrument lighting is wired directly to the ignition key switch. (Instrument lights are on when ignition key switch is turned on.)



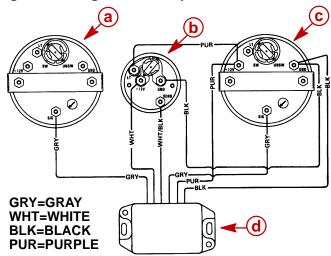
51106

- a Position Light Bulb to the Switched Position
- **b** Sender

Synchronizer wiring can be accomplished two different ways as an option to the user.



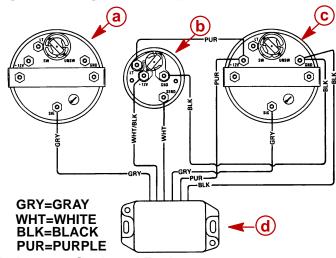
#### Wiring Diagram - Gauge needle to point toward slow running engine



51107

- a Tachometer Starboard Engine
- **b** Synchronizer Gauge
- c Tachometer Port Engine
- d Synchronizer Module

#### Wiring Diagram - Gauge needle to point toward fast running engine



51107

- a Tachometer Starboard Engine
- **b** Synchronizer Gauge
- c Tachometer Port Engine
- d Synchronizer Module

#### **Maintenance**

Clean gauge by washing with fresh water to remove sand and salt deposits. Wipe off with a soft cloth moistened with water. The gauge may be scored or damaged if wiped with abrasive material (sand, saline or detergent compounds, etc.) or washed with solvents such as trichloroethylene, turpentine, etc.

90-859769R1 DECEMBER 2000



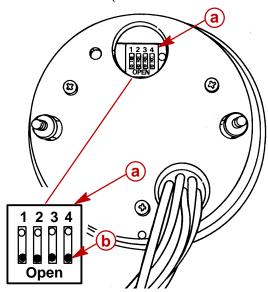
### **Multi-Function Gauge**

#### **Dip Switch Setting/Testing**

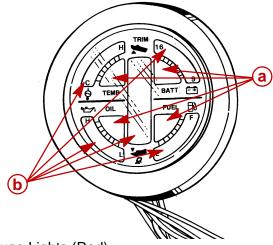
**NOTE:** The multi-function gauge "Dip Switch" must be set on the back of gauge prior to operation. Turn the ignition switch to the "OFF" position before setting dip switch. The gauge will reset to selected settings when the ignition is turned "On".

IMPORTANT: Test the gauge and related wiring BEFORE making final "Dip Switch" settings and BEFORE securing the gauge to dashboard of boat.

1. With the ignition switch in the "Off" position, set the multi-function gauge "Dip Switch" in (test) position as shown. (BLACK dot indicates switch position).



- a "Dip Switch" (shown in test position)
- **b** Black Dot Switch in "Open" Position
- 2. Turn ignition switch to the "Run" position. The multi-function gauge now is in the display test mode. The gauge Temp, Batt, Oil, and Fuel red warning lights should be alternately flashing "On" and "Off"; the BLACK L.C.D. bar graphs should be cycling. (This indicates that all gauge functions are operational).
- 3. Turn ignition switch to the "Off" position. Reset the gauge "Dip Switch" to the correct operating position for the outboard application.



- a Gauge Lights (Red)
- b Gauge L.C.D. Bar Graph (Black)



### **Outboard Multi-Function Gauge Setting**

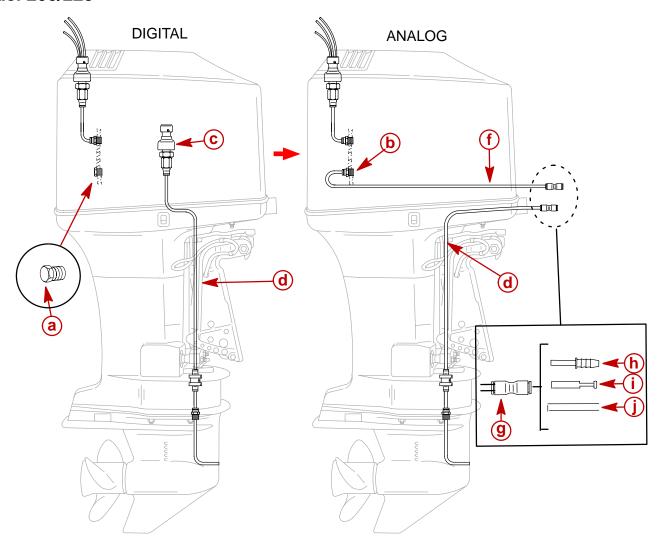
Model	Dip Switch Setting
Test Display (All)	1 2 3 4  O O O  Open
275 hp (3.4 Litre) Outboards (single engine)	1 2 3 4  Open
135-250 hp Outboards (single engine)	1 2 3 4
"Note" On Dual Engine/Single Fuel Tank Applications: Position Dip Switch 4 "Open" *	1 2 3 4

<sup>\*</sup> Dip Switch (4) in "Open Position" For Dual Engine Single Fuel Tank Applications. Switches 1,2,3 Must Be In Specified Model Position.



### **Water Pressure Gauge Hose Connection**

#### Model 200/225



#### **ENGINE WATER PRESSURE TUBE**

- 1. Remove and discard plug (a). from the lower corner on back of cylinder block.
- 2. Install fitting (b) into hole where plug (a) was removed from.
- 3. Connect the 44 in. long gray tubing (f) to fitting (b). Route the tubing out through the front of the outboard.
- 4. Install coupler (g) onto end of tube. Insert the plug (i), barb fitting (h), or gauge tubing (j) into the coupler. *NOTE: Barb fitting (h) is used for hose connection.*

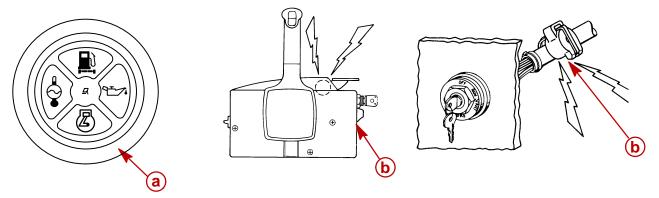
**NOTE:** An after market water pressure gauge may be connected to the engine, if existing hosing is not appropriate, by removing plug (a) or fitting (b) and installing a suitable barb fitting.

**NOTE:** Digital gauge speedometers use water pressure sensor (c) wired to the ECM. Analog gauge speedometers use BLACK Tubing (d) connected through adaptor fitting to speedometer gauge tubing.



### **Warning System**

The outboard warning system incorporates warning light gauge and warning horn. The warning horn is located inside the remote control or is part of the ignition key switch wiring harness.



- a Warning Light Gauge (Analog Models Only) 2000 Model Year
- **b** Warning Horn

When the key switch is turned to the ON position, the warning lights and horn will turn on for a moment as a test to tell you the system is working.

#### **Warning System Signals**

**NOTE:** The warning system signals which includes audible and visual indicator involving the horn and lights will identify the potential problems listed in the chart

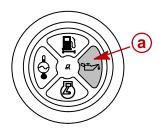
Problem	Horn	Check Engine Light	Low Oil Light	Over Heat Light	Water In Fuel Light	Engine Speed Reduction Activated
Power Up/System Check	Single Beep	Yes	Yes	Yes	Yes	No
Low Oil	4 Beep 2 Minutes Off		Yes			No
Oil Pump Electrical Failure		Yes	Yes			Yes
Over Heat	Continuous Beep			Yes		Yes
Water In Fuel	4 Beep 2 Minutes Off				Yes	No
Over Speed	Continuous Beep					Yes (Activated at 5800 RPM)
Coolant Sensor Failure	No	Yes				No
MAP Sensor Failure	No	Yes				No
Air Temperature Sensor Failure	No	Yes				No
Ignition Coil Failure	No	Yes				No
Injector Failure	No	Yes				No
Horn Failure	N/A	Yes				No

90-859769R1 DECEMBER 2000



Problem	Horn	Check Engine Light	Low Oil Light	Over Heat Light	Water In Fuel Light	Engine Speed Reduction Activated
Battery Voltage too high (16V) or too low (11V) or very low (9.5V)	No	Yes				Yes – If battery voltage is less than 10.4 V – RPM is reduced.
Over Heat Cyl. Head/Compressor	Continuous Beep			Yes		Yes
Throttle Sensor Failure	Continuous Intermittant Beeping	Yes				RPM reduced, ECM then refers to MAP Sensor for throttle position
Block Water Pressure	Yes	Yes		Yes		Yes

## Warning System Operation (Model Year 2000) LOW OIL LEVEL

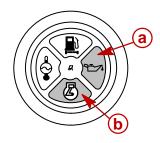


The system is activated when the oil in the engine mounted oil reservoir tank drops below 50 fl. oz. (148 ml) You still have an oil reserve remaining for 30 minutes of full speed operation.

**NOTE:** The engine mounted oil reservoir tank (located beneath the top cowl) along with the remote oil tank will have to be refilled.

The OIL light (a) will come on and the warning horn sounds a series of four short tones. If you continue to operate the outboard, the light will stay on and the horn will sound four short tones every two minutes. The engine has to be shut off to reset the warning system.

#### NO OIL FLOW TO THE ELECTRIC OIL PUMP

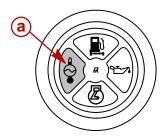


The system is activated when there is an electrical failure of the oil pump or the oil pump circuit. Stop the engine as soon as possible. Continuing to operate the engine can result in severe engine damage.

The OIL light (a) and CHECK ENGINE light (b) will come on and the warning horn will begin sounding. The warning system will automatically reduce and limit the engine speed. The engine has to be shut off to reset the warning system.



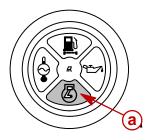
#### **ENGINE OVERHEAT**



The system is activated when the engine temperature is too hot.

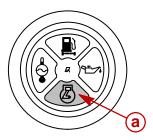
The TEMP light (a) will come on and the warning horn begins sounding. The warning system will automatically limit the engine speed to 3000 RPM. After the engine has cooled, shift the outboard into neutral to reset the overheat circuit.

#### IGNITION COIL, SENSOR, OR INJECTOR NOT FUNCTIONING



The system is activated if an ignition coil, sensor or injector is not functioning correctly. The CHECK ENGINE light (a) will turn on.

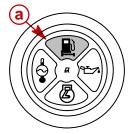
#### THROTTLE SENSOR NOT FUNCTIONING



The system is activated if the throttle sensor is not functioning correctly.

The CHECK ENGINE light (a) will turn on and the warning horn will begin sounding.

#### WATER SEPARATING FUEL FILTER IS FULL OF WATER



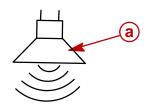
The water level detection warning is activated when water in the water separating fuel filter reaches the full level. The water can be removed from the filter.

The WATER DETECTION light (a) will come on and the warning horn will begin sounding a series of four beeps. If you continue to operate the outboard, the light will stay on and the horn will sound every two minutes.

90-859769R1 DECEMBER 2000



#### **ENGINE OVER-SPEED PROTECTION SYSTEM**



The system is activated when the engine speed exceeds the maximum allowable RPM.

Anytime the engine over-speed system is activated, the warning horn (a) begins to sound continuously. The system will automatically reduce the engine speed to within the allowable limit.

**NOTE:** Engine speed should never reach the maximum limit to activate the system unless the propeller is ventilating, an incorrect propeller is being used, or the propeller is faulty.



### **Guardian Protection System**

The guardian protection system monitors critical engine functions and will reduce engine power accordingly in an attempt to keep the engine running within safe operating parameters.

IMPORTANT: The Guardian System cannot guarantee that powerhead damage will not occur when adverse operating conditions are encountered. The Guardian System is designed to (1) warn the boat operator that the engine is operating under adverse conditions and (2) reduce power by limiting maximum rpm in an attempt to avoid or reduce the possibility of engine damage. The boat operator is ultimately responsible for proper engine operation.

#### **Guardian System Operation with Gauges**

	System will sound warning horn and illuminate appropriate light on gauge.
SmartCraft Gauge	System will sound warning horn and display the warning message.

#### **Guardian System Activation**

Condition	Result
Engine Overheat	Engine power level can be reduced to any percentage down to an idle speed, if overheat condition persists.
Air Compressor Overheat	2000 Model – engine power level can be reduced to any percentage down to an idle speed, if overheat condition persists.  2001 Model – no power reduced.
Block Water Pressure Low	Engine power level can be reduced to any percentage down to a fast idle, if condition persists.
Throttle Position Sensor Failure	If the throttle position sensor fails or becomes disconnected, power will be limited to a maximum of approximately 4500 rpm. When the TPS is in the fail mode, the ECM will use the MAP sensor for a reference to determine fuel calibration.
Temperature Sensor (cylinder head and air compressor) Failure	If a temperature sensor should fail or become disconnected, power will be reduced by 25%.
Battery Voltage (too high or too low)	Battery voltage greater than 16.5 volts or less than 10.5 volts will result in engine output power being reduced. The higher or lower the voltage is outside of these parameters, the greater the percentage of power reduction. In an extreme case, power could be reduced to idle speed.
Oil Pump Failure	If the oil pump fails or an open circuit occurs between the pump and the ECM, engine power will be reduced to idle.

90-859769R1 DECEMBER 2000



### **Notes:**

#### 2000 (Analog) Model 200/225 DFI Wiring Diagram 1 - Direct Injector #1 2 - Direct Injector #2 3 - Direct Injector #3 4 - Direct Injector #4 5 - Direct Injector #5 (8) 6 - Direct Injector #6 АВС BRN—B АВС ΑВ 7 - Oil Pump ΑË 8 - Map Sensor 18WHT 9 - Block Pressure Sensor 10 - Smartcraft Gauge Harness 11 - Throttle Position Sensor (TPS) 12 - Crank Position Sensor 13 - Low Oil Switch 14 - Shift Switch 15 - Air Temperature Sensor 16 - Water Sensor 17 - Starboard Head Temperature Switch 18 - Digital Diagnostic Terminal Connector 19 - Port Head Temperature Switch 20 - Compressor Temperature Switch 21 - Starter 22 - To 12 Volt Battery 23 - 60 Ampere Alternator 24 - Starter Solenoid 25 - Main Power Relay 26 - ECM Driver/Oil Pump Circuit 20 Ampere Fuse 27 - Accessories 20 Ampere Fuse 28 - Ignition Coil 20 Ampere Fuse

29 - Electric Fuel Pump 20 Ampere Fuse

37 - Fuel Pump #2 (Outside Vapor Separator)

**38** - Fuel Pump #1 (Inside Vapor Separator)

30 - Accessory Power 31 - Check Engine Light

33 - Water In Fuel Light 34 - Over-Heat Light

**36** - Remote Control

42 - Trim Pump

43 - Trim Down Relay 44 - Trim Up Relay

45 - Ignition Coil #6

46 - Ignition Coil #5

47 - Ignition Coil #4 48 - Ignition Coil #3

49 - Ignition Coil #2

50 - Ignition Coil #1 51 - Fuel Injector #6 **52** - Fuel Injector #5 53 - Fuel Injector #4 **54** - Fuel Injector #3 55 - Fuel Injector #2 56 - Fuel Injector #1

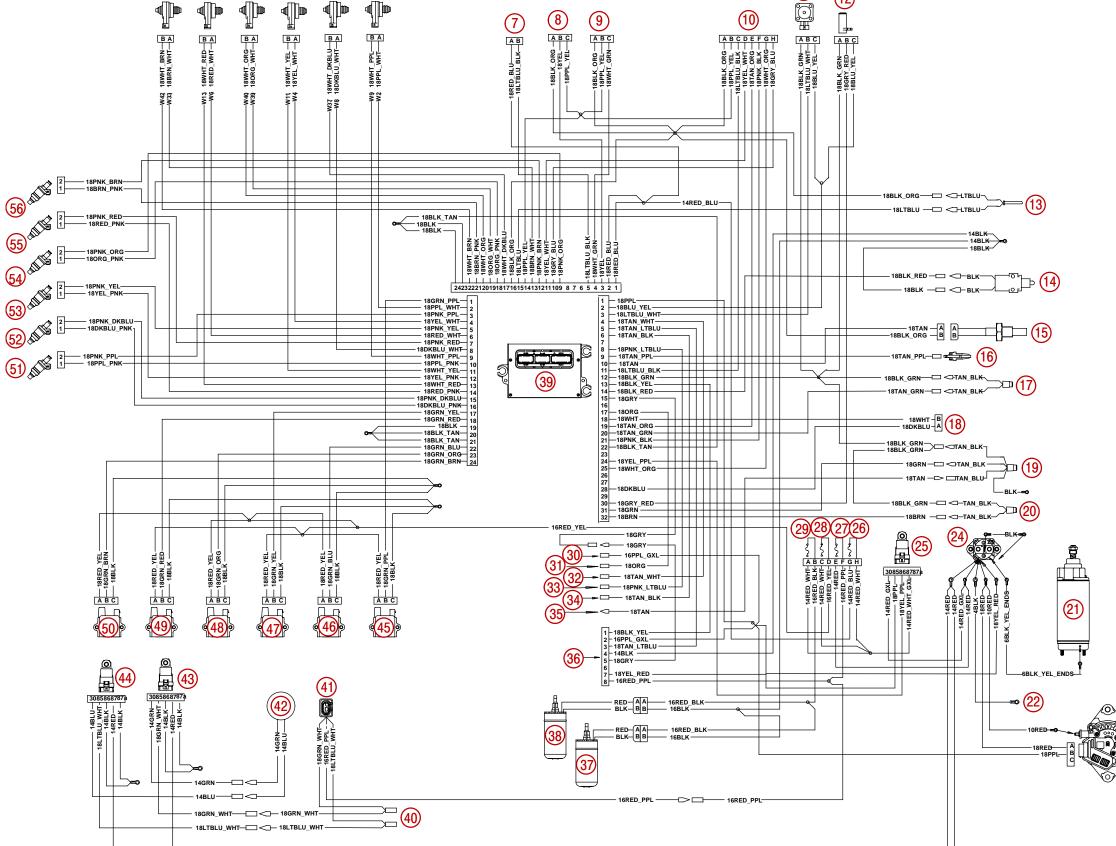
35 - To Temperature Gauge

39 - Electronic Control Module

41 - Cowl Mounted Trim Switch

40 - To Remote Control Trim Switch

32 - Low Oil Light



Page 2D-27 90-859769R1 DECEMBER 2000

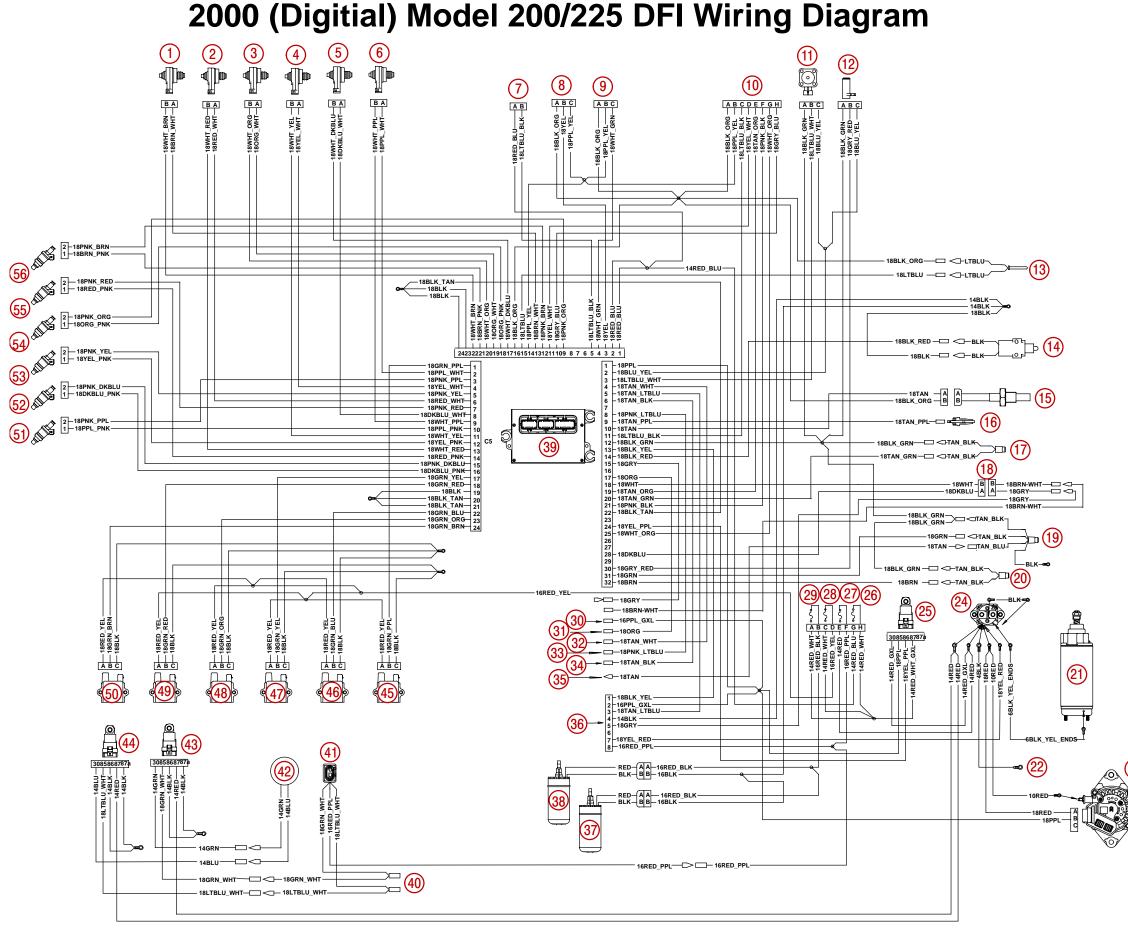


#### 1 - Direct Injector #1 2 - Direct Injector #2 3 - Direct Injector #3 4 - Direct Injector #4 5 - Direct Injector #5 6 - Direct Injector #6 7 - Oil Pump 8 - Map Sensor 9 - Block Pressure Sensor 10 - Smartcraft Gauge Harness 11 - Throttle Position Sensor (TPS) 12 - Crank Position Sensor 13 - Low Oil Switch 14 - Shift Switch 15 - Air Temperature Sensor 16 - Water Sensor 17 - Starboard Head Temperature Switch 18 - Digital Diagnostic Terminal Connector 19 - Port Head Temperature Switch 20 - Compressor Temperature Switch 21 - Starter 22 - To 12 Volt Battery 23 - 60 Ampere Alternator 24 - Starter Solenoid 25 - Main Power Relay 26 - ECM Driver/Oil Pump Circuit 20 Ampere Fuse 27 - Accessories 20 Ampere Fuse 28 - Ignition Coil 20 Ampere Fuse 29 - Electric Fuel Pump 20 Ampere Fuse 30 - Accessory Power 31 - Check Engine Light 32 - Low Oil Light 33 - Water In Fuel Light 34 - Over-Heat Light 35 - To Temperature Gauge 36 - Remote Control 37 - Fuel Pump #2 (Outside Vapor Separator) 38 - Fuel Pump #1 (Inside Vapor Separator) 39 - Electronic Control Module 40 - To Remote Control Trim Switch 41 - Cowl Mounted Trim Switch 42 - Trim Pump 43 - Trim Down Relay 44 - Trim Up Relay 45 - Ignition Coil #6 46 - Ignition Coil #5 47 - Ignition Coil #4 48 - Ignition Coil #3 49 - Ignition Coil #2 50 - Ignition Coil #1 51 - Fuel Injector #6 52 - Fuel Injector #5

53 - Fuel Injector #4

**54** - Fuel Injector #3

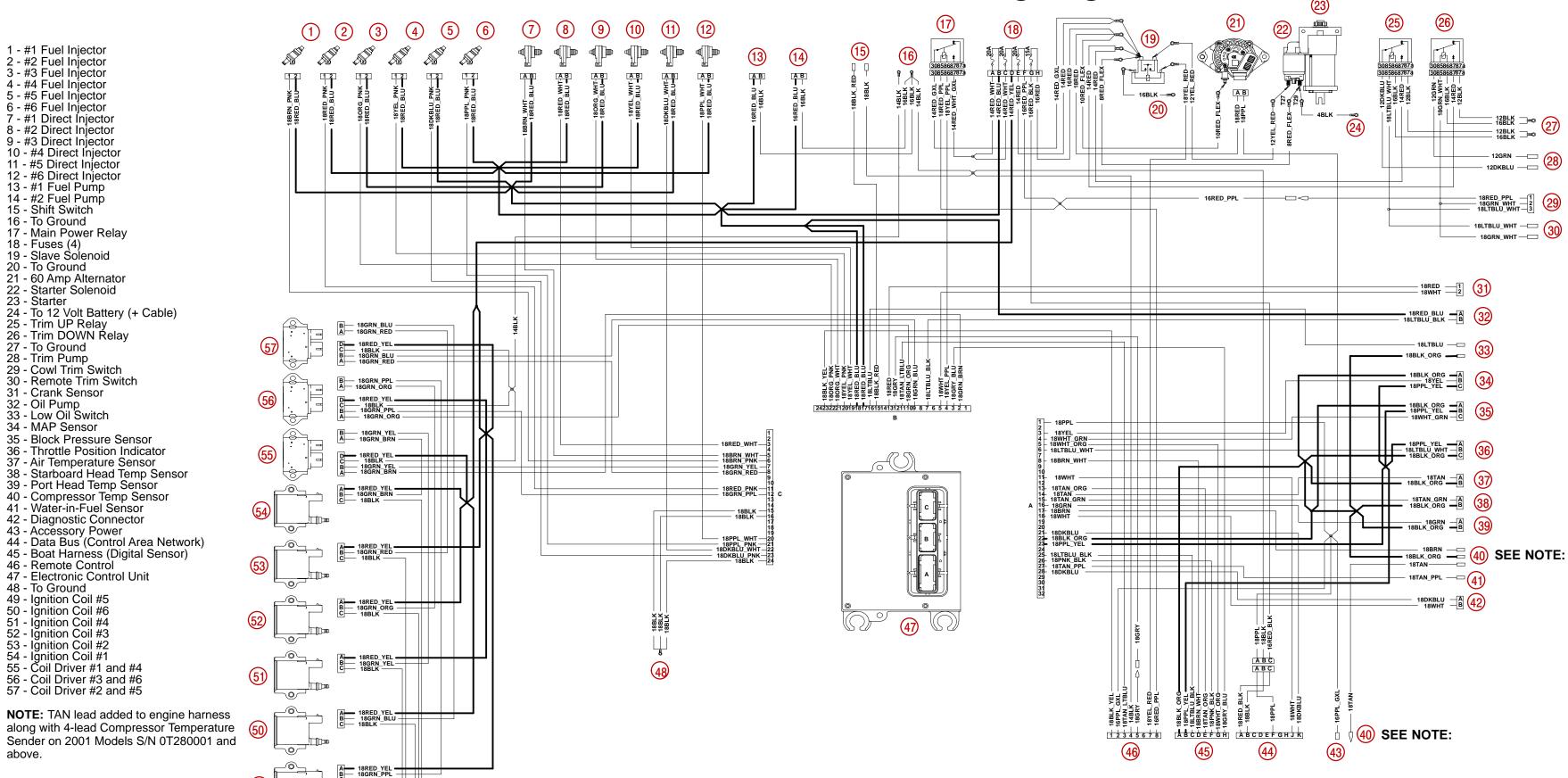
55 - Fuel Injector #256 - Fuel Injector #1



Page 2D-28 90-859769R1 DECEMBER 2000



## 2001 Model 200/225 DFI Wiring Diagram



90-859769R1 DECEMBER 2000 Page 2D-29