

# INSTRUMENT PANEL

1993 Mitsubishi Montero

1993 ACCESSORIES & EQUIPMENT  
Mitsubishi Instrument Panels

Montero

## DESCRIPTION & OPERATION

Instrument cluster includes speedometer, fuel gauge and temperature gauge. Fuel gauge has a built-in voltage limiter to keep voltage supply to gauges at 7 volts. Some models may also have a shunt-type ammeter, oil pressure gauge, tachometer, voltmeter and/or turbo boost pressure gauge. Oil pressure gauge uses full battery voltage. The tachometer operates by pulse feed.

## TROUBLE SHOOTING

### FUEL/TEMPERATURE GAUGE NOT WORKING

Check for blown fuse, faulty voltage limiter and faulty relay. Ensure sending unit connections are clean and tight. Test sending unit for correct operation. Tighten connections in instrument cluster.

### SPEEDOMETER NOT WORKING

Ensure speedometer cable is properly connected and correctly routed. If speedometer pointer and/or odometer still do not work, replace speedometer as an assembly.

### TACHOMETER NOT WORKING

Tachometer is serviced as an assembly. If wiring harness is okay, replace tachometer assembly.

### WARNING LIGHTS NOT WORKING

Test for defective sending unit, burned-out bulb and broken printed circuit. Ensure all connections are clean and tight.

## TESTING

### FUEL TANK SENDING UNIT

Resistance Test

Remove fuel tank sending unit from fuel tank. Measure resistance between appropriate terminals with fuel float in FULL and EMPTY positions. See Fig. 1. Compare resistance reading to FUEL TANK SENDING UNIT RESISTANCE SPECIFICATIONS table. If resistance is not to specification, replace fuel tank sending unit.

FUEL TANK SENDING UNIT RESISTANCE SPECIFICATIONS TABLE

Application	Specification
Empty .....	103.0-117.0
Full .....	1.0-5.0

## FUEL GAUGE

CAUTION: Gauge coils can be damaged if wire is grounded too long. Perform test as quickly as possible.

### Simple Test

1) Disconnect fuel gauge sending unit connector wire in luggage compartment, in cargo space or at tank unit. Connect a 12-volt, 3.4-watt bulb to harness side of connector, between appropriate terminals. See Fig. 1.

2) Turn ignition switch to ON position. Ensure test bulb flashes, or stays on, and fuel gauge needle moves. If bulb or gauge needle does not function as described, check and repair fuel gauge circuit.

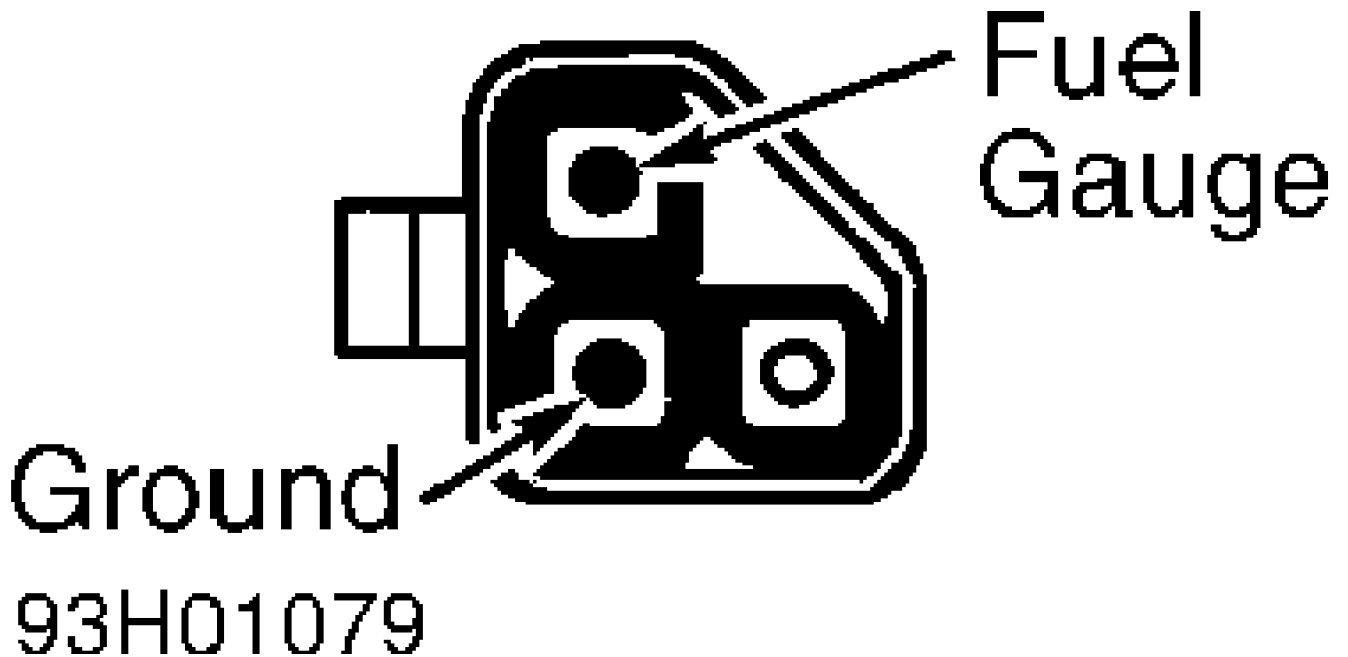


Fig. 1: Fuel Gauge Test Connection ID  
Courtesy of Mitsubishi Motor Sales of America.

NOTE: Fuel gauge resistance test must be completed with instrument panel cluster removed. Use ohmmeter for all measurements. If resistance is extremely low, a short may exist in coil. If resistance is extremely high, a broken wire or similar problem may exist in gauge.

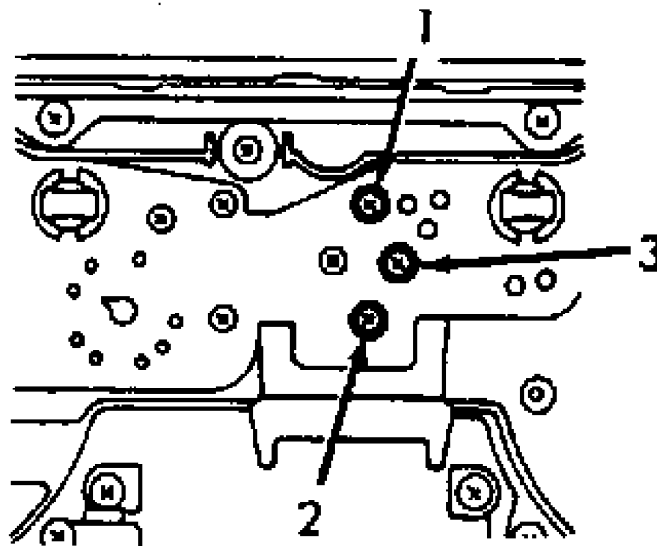
### Resistance Test

1) Remove instrument cluster. See INSTRUMENT CLUSTER under REMOVAL & INSTALLATION.

2) Measure resistance between appropriate terminals of instrument cluster. See Fig. 2. See FUEL GAUGE RESISTANCE SPECIFICATIONS table. If resistance readings are not to specification, replace fuel gauge.

### FUEL GAUGE RESISTANCE SPECIFICATIONS TABLE

Terminals	Ohms
No. 2 & 3 .....	209.7-256.3
No. 1 & 2 .....	77.4-94.6



## MONTERO

Fig. 2: Instrument Panel Fuel Gauge Resistance Check Terminal ID  
 Courtesy of Mitsubishi Motor Sales of America.

### OIL PRESSURE GAUGE

#### Circuit Test

1) Disconnect oil pressure gauge wiring connector from sending unit inside engine compartment. Connect a 12-volt test light between harness connector terminal and ground. Turn ignition on, but DO NOT start engine.

2) If test light comes on and gauge needle moves, go to GAUGE RESISTANCE TEST. If test light does not come on and gauge needle does not move, repair wiring to sending unit.

#### Gauge Resistance Test

1) Remove instrument cluster from instrument panel. See INSTRUMENT CLUSTER under REMOVAL & INSTALLATION.

2) Check continuity between oil pressure gauge terminals. See Fig. 3. See OIL PRESSURE GAUGE RESISTANCE SPECIFICATIONS table. If resistance is not within specification, replace oil pressure gauge.

#### OIL PRESSURE GAUGE RESISTANCE SPECIFICATIONS TABLE

Application	Ohms
Montero .....	50

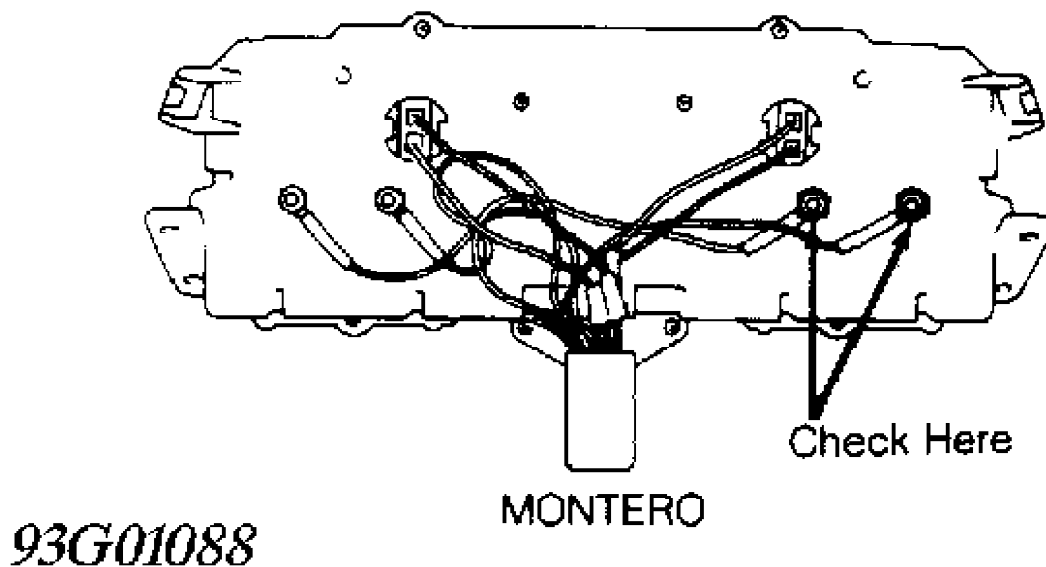


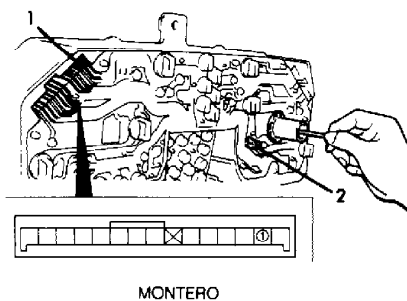
Fig. 3: Oil Pressure Gauge Resistance Test Terminal ID  
 Courtesy of Mitsubishi Motor Sales of America.

### REED SWITCH

#### Continuity Check

1) Remove instrument cluster. See INSTRUMENT CLUSTER under REMOVAL & INSTALLATION. Check continuity between reed switch terminals no. 1 and 2. See Fig. 4.

2) Ensure continuity pulses on and off 4 times per revolution of speedometer shaft connection. If continuity is not as specified, replace reed switch.



**93A01090**

Fig. 4: Reed Switch Test Terminal ID  
 Courtesy of Mitsubishi Motor Sales of America.

### SPEEDOMETER

#### Calibration Test

Adjust tire pressure to standard value. Using a calibrated, reliable speedometer tester, compare reading of vehicle speedometer to speedometer tester. See SPEEDOMETER ALLOWABLE VARIATION table. Replace speedometer if necessary.

SPEEDOMETER ALLOWABLE VARIATION TABLE

MPH (km/h)	Allowable Variation MPH (km/h)
20 (32)	19-22 (31-35)
40 (64)	38-44 (61-71)
60 (97)	57-66 (92-106)
80 (129)	76-88 (122-142)
100 (161)	94-110 (151-177)

### TACHOMETER

NOTE: DO NOT reverse polarity when installing tachometer; diode and transistor may be damaged.

#### Calibration Test

Connect a calibrated, reliable tach-dwell meter to vehicle ignition system. Operate engine at various speeds (RPM). See TACHOMETER ALLOWABLE VARIATION table. If comparison between tach-dwell meter and vehicle tachometer readings are not within permissible variation, replace vehicle tachometer.

TACHOMETER ALLOWABLE VARIATION TABLE

Engine Speed (RPM)	Allowable Variation (RPM)
1000	900-1100
3000	2850-3150
5000	4750-5250
6000	5700-6300

### TEMPERATURE GAUGE

CAUTION: DO NOT connect sender wire directly to ground during test.

#### Circuit Test

1) Disconnect temperature sender wire from sending unit. Connect a 12-volt, 3.4-watt test light between connector terminal and ground. Turn ignition switch to ON position.

2) If test light flashes and temperature gauge needle moves, go to SENSOR RESISTANCE TEST. If test light does not flash or gauge needle does not move, repair wiring to sending unit.

#### Sensor Resistance Test

1) Remove Coolant Temperature Sensor (CTS) from engine. Sensor is located on intake manifold. Place sending unit in 158°F (70°C) water. Check sensor resistance using ohmmeter.

2) CTS resistance should be 90-117 ohms. If CTS resistance is okay, go to GAUGE RESISTANCE TEST. Replace CTS if resistance is not as specified.

#### Gauge Resistance Test

1) Remove instrument cluster from instrument panel. See INSTRUMENT CLUSTER under REMOVAL & INSTALLATION.

2) Measure resistance between temperature gauge terminals at

rear of cluster. See TEMPERATURE GAUGE RESISTANCE SPECIFICATIONS table. See Fig. 5.

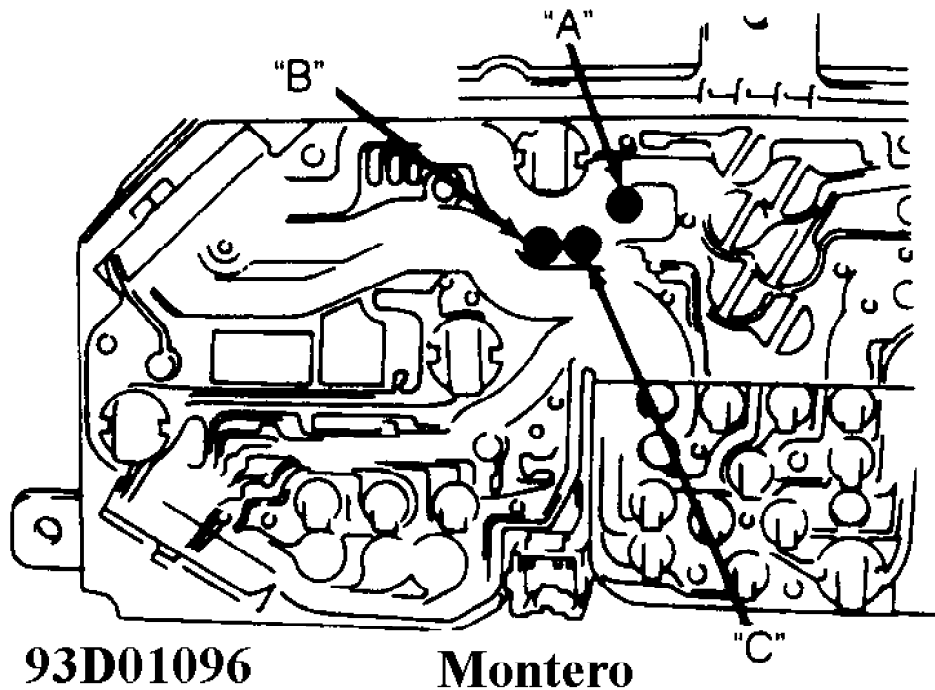


Fig. 5: Temperature Gauge Resistance Test Terminal ID  
 Courtesy of Mitsubishi Motor Sales of America.

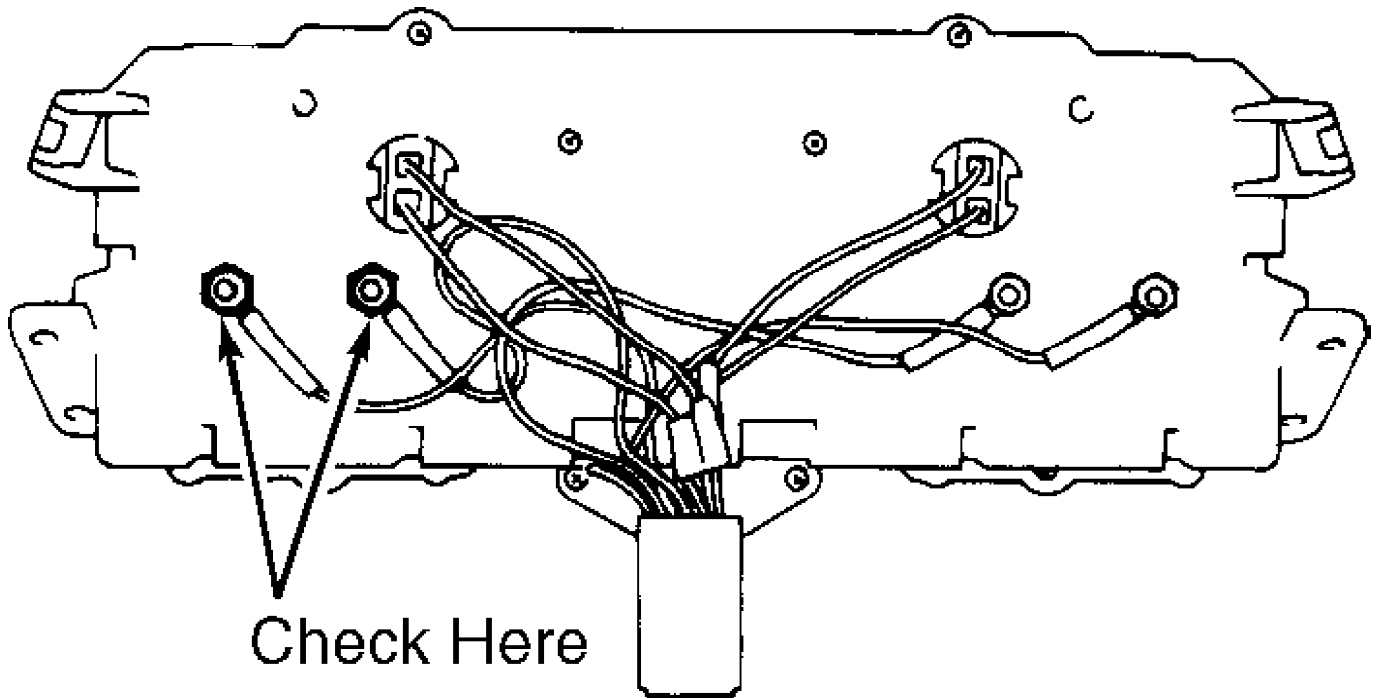
TEMPERATURE GAUGE RESISTANCE SPECIFICATIONS TABLE

Terminals	Ohms
"A" & "B" .....	67.5-82.5
"A" & "C" .....	132.3-161.7
"B" & "C" .....	199.8-244.2

VOLTMETER

Resistance Test

Using an ohmmeter, measure resistance between voltmeter terminals. See Fig. 6. Resistance should be 380-460 ohms.



93D01100

Fig. 6: Voltmeter Resistance Test Terminal ID  
 Courtesy of Mitsubishi Motor Sales of America.

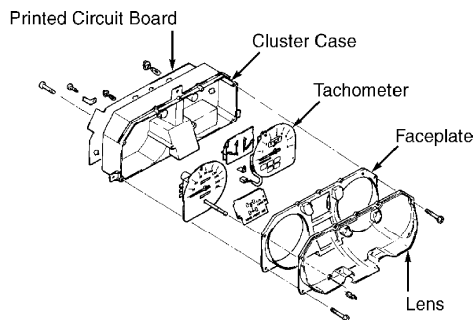
## REMOVAL & INSTALLATION

### INSTRUMENT CLUSTER

#### Removal & Installation

1) Disconnect negative battery cable. Remove instrument cluster cover plug. Remove cluster cover. Remove screws from instrument cluster.

2) Disconnect speedometer cable from back of instrument cluster. Disconnect all connectors attaching cluster. Remove cluster. To install, reverse removal procedure. See Fig. 7.



93J01099  
 Fig. 7: Instrument Cluster Components  
 Courtesy of Mitsubishi Motor Sales of America.

### SPEEDOMETER CABLE

NOTE: When routing speedometer cable, DO NOT bend cable sharply. Minimum bending radius is 6" (150 mm). Speedometer cable length varies with transmission type.

#### Removal

Disconnect speedometer cable from transmission or transaxle. Remove instrument cluster from instrument panel. See INSTRUMENT CLUSTER. Disconnect speedometer cable from instrument cluster and/or adapter (if equipped). Remove speedometer cable from firewall grommet.

#### Installation

1) Install new cable. Insert cable until stopper seats properly in groove on rear of speedometer housing. Pull speedometer cable through firewall grommet until cable marking is visible from engine compartment.

NOTE: An improperly installed cable can cause fluctuating meter, noise or damaged harness inside instrument panel.

2) Install adapter onto speedometer cable (if equipped). Install instrument cluster. See INSTRUMENT CLUSTER. Install cable onto transmission or transaxle. Check for proper operation.

## WIRING DIAGRAMS

See appropriate chassis wiring diagram in the WIRING DIAGRAMS section.