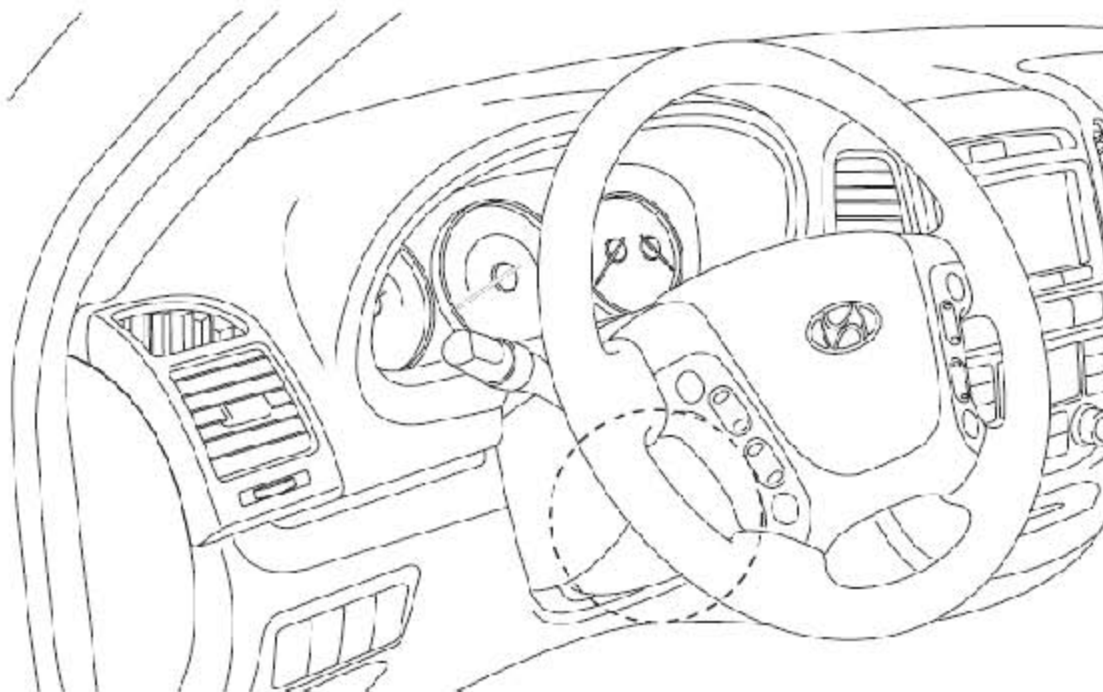


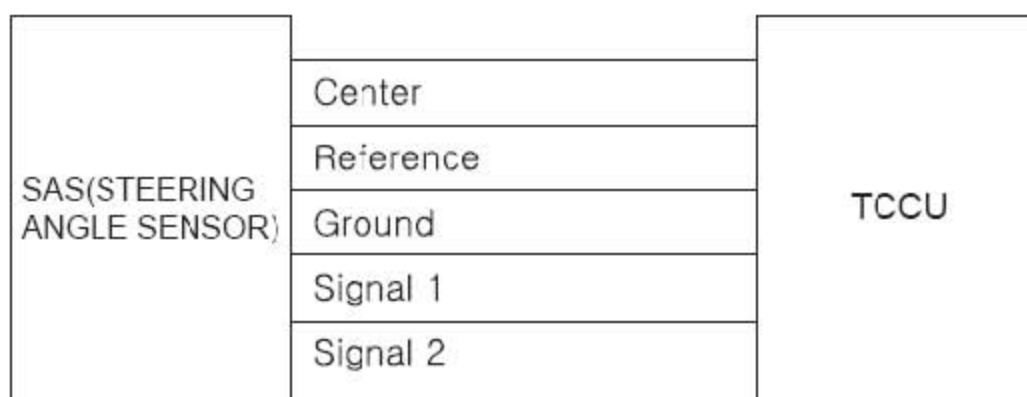
P1717 STEER 1 INPUT SIGNAL

COMPONENT LOCATION



GENERAL DESCRIPTION

Steering Wheel Angle Sensor installed in steering wheel prevents a state of TCB(Tight Corner Braking) by sensing the rotating direction & straight driving of vehicle and is used for EMC duty control. In case of ESP system applied, 4WD ECU receives this signal through CAN line. If it is not the case, 4WD ECU receives this signal from Steering Wheel Angle Sensor directly. TCB (Tight Corner Braking) : TCB is that the vehicle makes an abnormal noise and hesitation when the vehicle turns left / right fully with low speed at a paved road.



DTC DESCRIPTION

This code related to Steering Angle Sensor Signal(#1) is set when voltage of signal is above 4.5V or loss of signal is occurred for more than 1sec. In case of ESP system applied, this code is set when can bus off or ecu external error is occurred. If failure is detected TCCU prohibits the ITM control and cuts the current to control coil.

DTC DETECTING CONDITION

Item	Detecting Condition	Possible Cause
DTC Strategy	Loss of signal out of range	<ul style="list-style-type: none"> • Steering angle sensor,TCCU connector looseness and poor terminal to wire connection. • Steering angle sensor circuit open/short • Faulty Steering angle sensor • Faulty TCCU
Enable Conditions	V < 4.5 for 1.0 sec self clearing	
Threshold Value	Out of Range signal: Voltage >= 4.5vdc for greater than one (1) second	
Diagnostic Time	1 sec	
MIL on condition	0.5 Sec	
Fail Safe	Steering Wheel Sensor input=0. The ECU will not send current to the clutch coil	

SIGNAL WAVEFORM & DATA

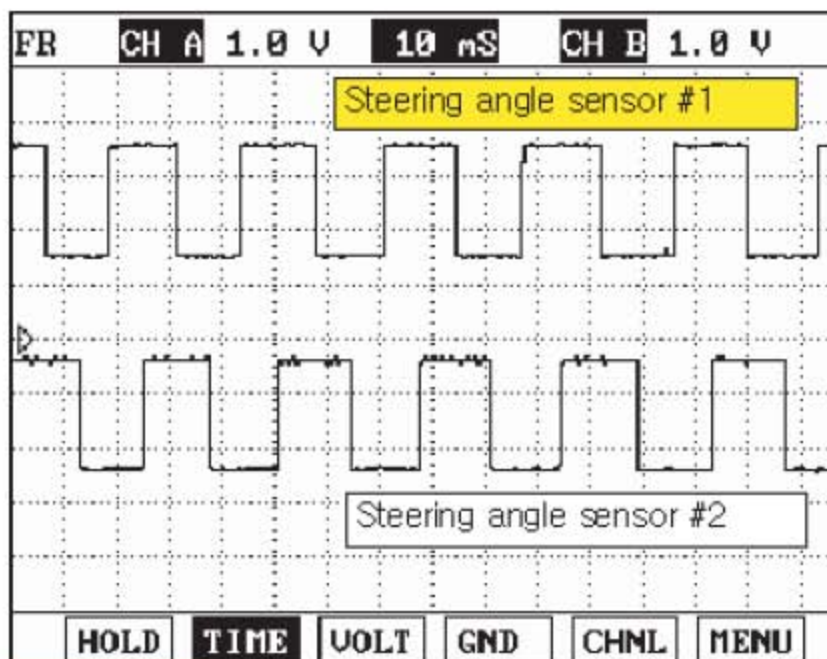


FIG.1)

FIG.1) Steering Wheel Angle Sensor #1,#2

TERMINAL AND CONNECTOR INSPECTION

- 1). Many malfunctions in the electrical system are caused by poor harness and terminals. Faults can also be caused by interference from other electrical systems, and mechanical or chemical damage.
- 2). Thoroughly check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration, or damage.
- 3). Has a problem been found?

YES

- ▶ Repair as necessary and go to "Verification of Vehicle Repair" procedure.

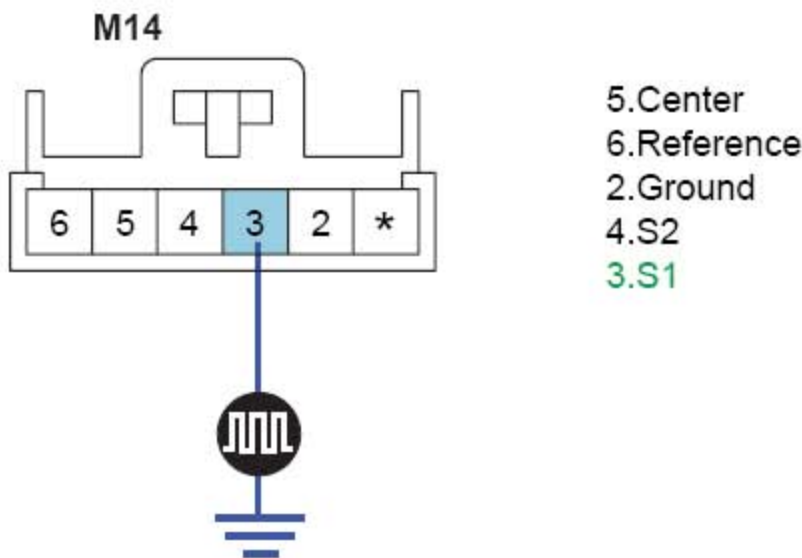
NO

- ▶ Go to "Steering angle sensor #1 Signal Inspection" procedure.

STEERING ANGLE SENSOR #1 SIGNAL INSPECTION

- 1). Ignition ON, Engine : ON.
- 2). Connect TCCU, Steering angle sensor connector.
- 3). Monitor signal waveform between terminal 3 of Steering angle sensor harness connector and chassis ground.
- 4). Turn steering Wheel to the right or left.

Specification : Signal Waveform & Data



CAUTION

The above value is only for reference.
The actual value may differ from it according to various engine condition.

5). Is Steering angle sensor #1 Signal display near the specified value?

YES

► Fault is intermittent caused by poor contact in the sensor's and/or TCCU's connector or was repaired and TCCU memory was not cleared. Thoroughly check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration, or damage. Repair or replace as necessary and then go to "Verification of Vehicle Repair" procedure.

NO

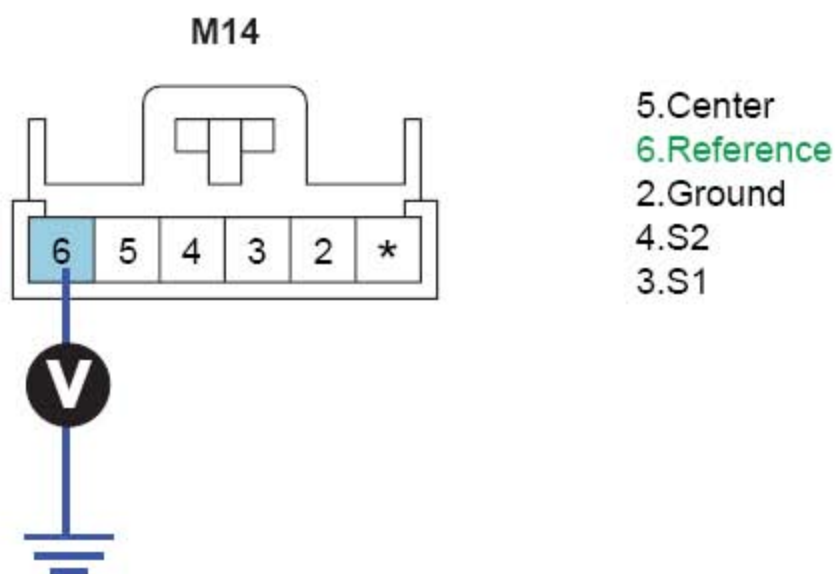
► Go to " Steering angle sensor Reference voltage inspection " procedure.

STEERING ANGLE SENSOR REFERENCE VOLTAGE

INSPECTION

- 1). Ignition "ON", Engine "OFF".
- 2). TCCU, Steering angle sensor connector : Connect.
- 3). Measure voltage between terminal 6 of Steering angle sensor harness connector and chassis ground.

Specification : Approx. 5V



CAUTION

The above value is only for reference.
The actual value may differ from it according to various engine condition.

- 4). Is voltage display near the specified value?

YES

- ▶ Go to " Steering angle sensor ground harness open circuit inspection " procedure.

NO

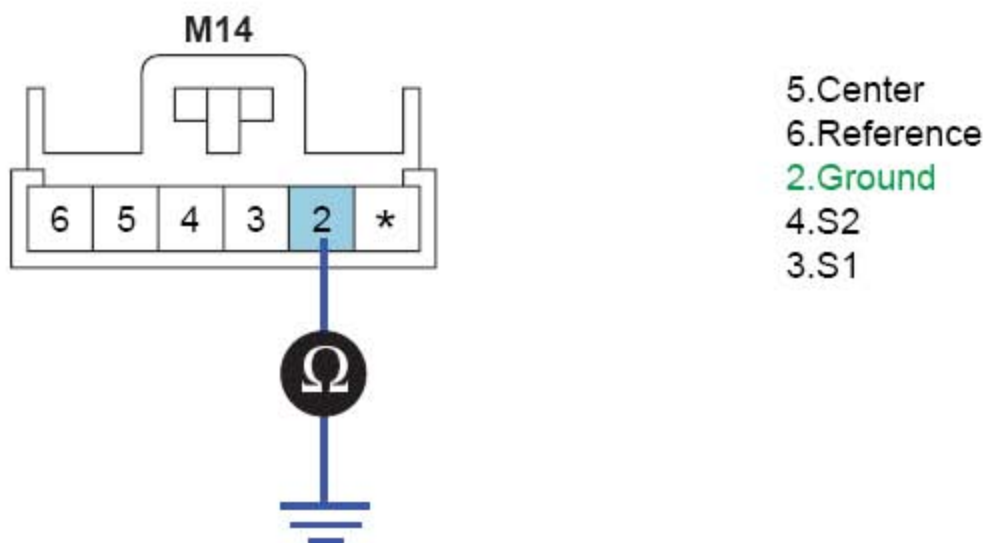
- ▶ Check for Steering angle sensor Reference harness.
- ▶ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

STEERING ANGLE SENSOR GROUND HARNESS

OPEN CIRCUIT INSPECTION

- 1). Ignition OFF, Engine "OFF".
2. TCCU, Steering angle sensor connector : Connect.
3. Measure resistance between terminal 2 of Steering angle sensor harness connector and chassis ground.

Specification : 1Ω below



CAUTION

The above value is only for reference.
The actual value may differ from it according to various engine condition.

- 4). Is resistance display near the specified value?

YES

- ▶ Go to " Steering angle sensor #1 ,short to signal line ground Inspection " procedure.

NO

- ▶ Check for open circuit of Steering angle sensor ground harness.
- ▶ Repair as necessary and then go to "Verification of Vehicle Repair" procedure

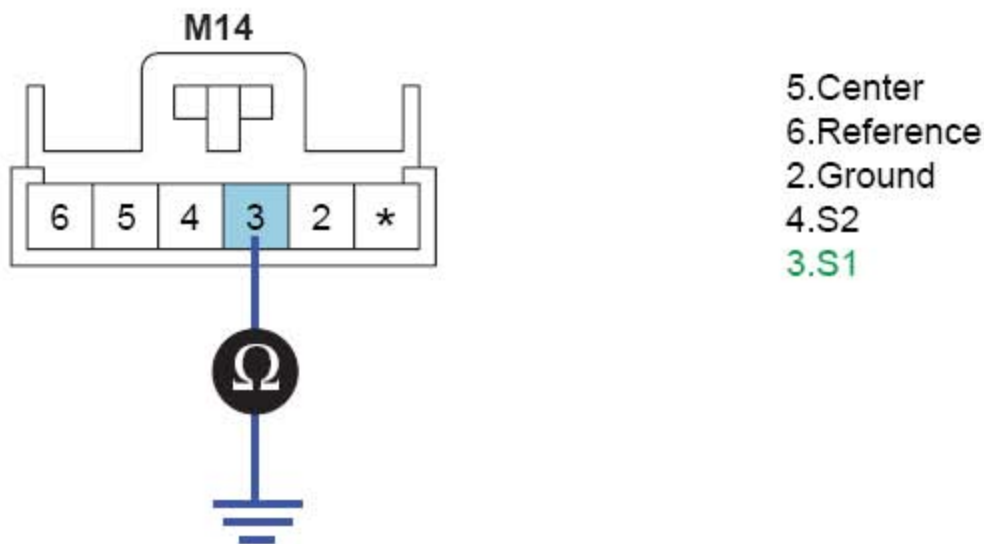
SIGNAL CIRCUIT INSPECTION

STEERING ANGLE SENSOR #1 , SHORT TO SIGNAL

LINE GROUND INSPECTION

- 1). Ignition OFF, Engine "OFF".
- 2). TCCU, Steering angle sensor connector : Disconnect.
- 3). Measure resistance between terminal 3 of Steering angle sensor harness connector and chassis ground.

Specification : $\infty \Omega$



CAUTION

The above value is only for reference.

The actual value may differ from it according to various engine condition.

- 4). Is resistance display near the specified value?

YES

- ▶ Go to " Steering angle sensor #1 signal line open Inspection " procedure.

NO

- ▶ Check for short to ground circuit of Steering angle sensor #1Signal circuit.
- ▶ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

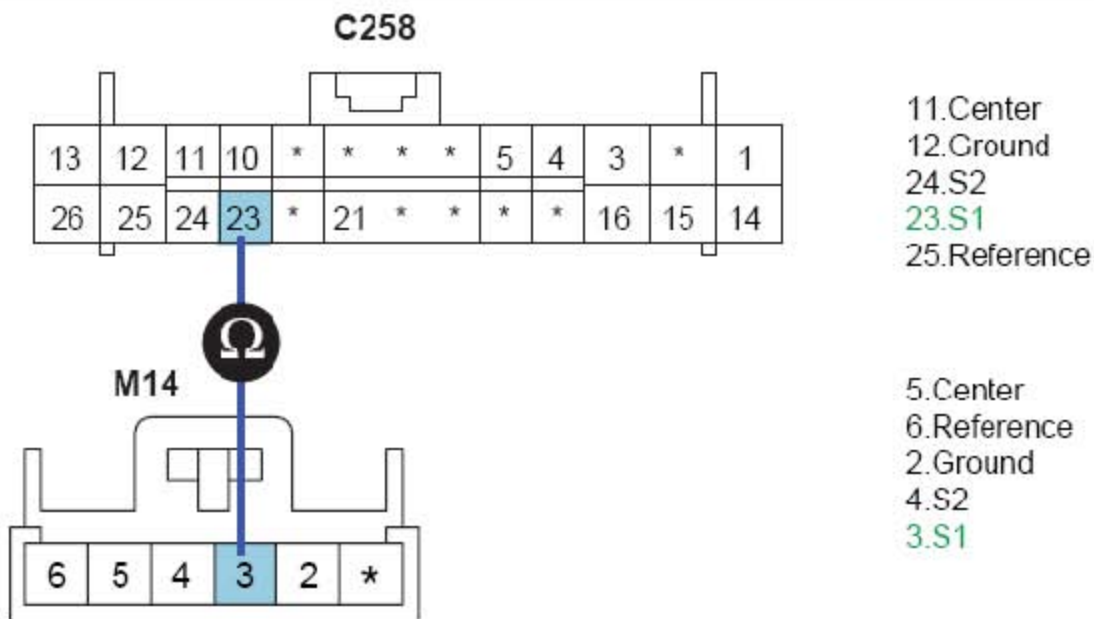
SIGNAL CIRCUIT INSPECTION

STEERING ANGLE SENSOR #1 , SHORT TO SIGNAL

LINE GROUND INSPECTION

- 1). Ignition OFF, Engine "OFF".
- 2). TCCU, Steering angle sensor connector : Disconnect.
- 3). Measure resistance between terminal 3 of Steering angle sensor harness connector and terminal 23 of TCCU harness connector.

Specification : 1Ω



CAUTION

The above value is only for reference.
The actual value may differ from it according to various engine condition.

- 4). Is resistance display near the specified value?

YES

- ▶ Substitute with a known-good TCCU or Steering angle sensor and check for proper operation.
- ▶ If the problem is corrected, replace TCCU and then go to "Verification of Vehicle Repair" procedure.

NO

- ▶ Check for open circuit of Steering angle sensor #1 Signal circuit.
- ▶ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

VERIFICATION OF VEHICLE REPAIR

- 1). Connect scan tool and select "Diagnostic Trouble Codes(DTCs)" mode.
- 2). Using scantool, Clear DTC.
- 3). Operate the vehicle within DTC Enable conditions in General information.
- 4). Are any DTCs present ?

YES

- ▶ Go to the applicable troubleshooting procedure.

NO

- ▶ System is performing to specification at this time.