

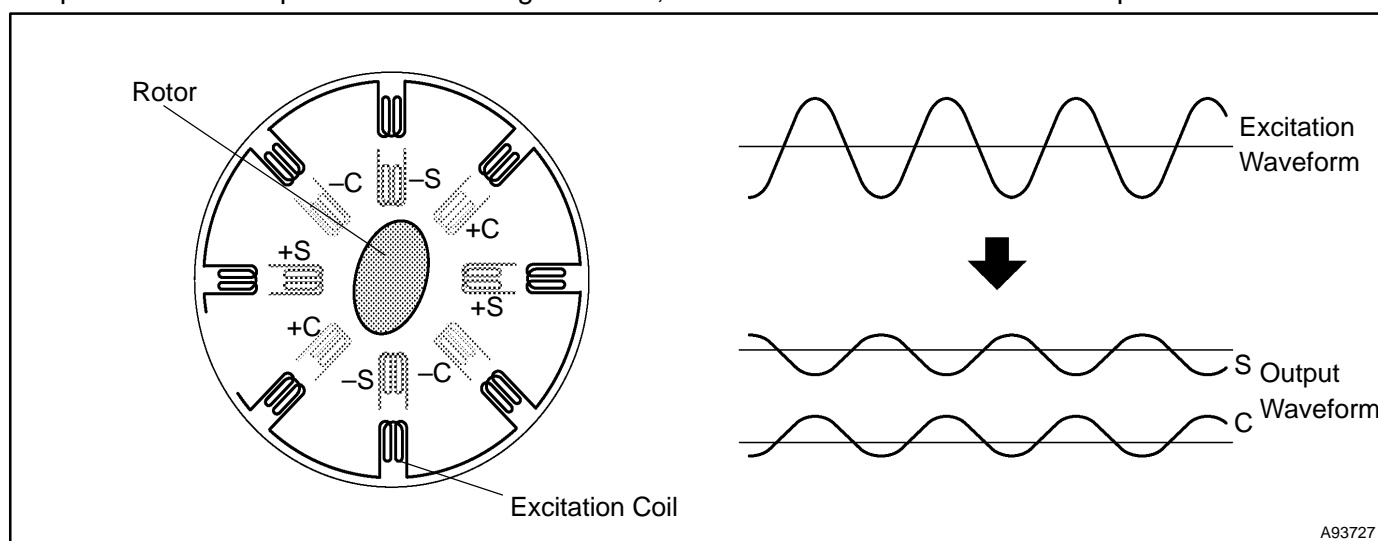
| | | |
|------------|------------------|--|
| DTC | P0A3F/243 | DRIVE MOTOR "A" POSITION SENSOR CIRCUIT |
| DTC | P0A40/500 | DRIVE MOTOR "A" POSITION SENSOR CIRCUIT RANGE/PERFORMANCE |
| DTC | P0A41/245 | DRIVE MOTOR "A" POSITION SENSOR CIRCUIT LOW |

CIRCUIT DESCRIPTION

The motor resolver is a type of sensor that detects the position of the magnetic poles, which are indispensable for ensuring the highly efficient control of the MG1 and MG2.

The stator of the resolver contains an excitation coil and two detection coils. Because the rotor has an oval shape, the gap between the stator and the rotor changes as the rotor turns. An alternating current with a predetermined frequency flows through the excitation coil, and detection coils S and C output alternating currents in accordance with the position of the sensor rotor.

The HV control ECU detects the absolute position of the rotor in accordance with the phases of detection coils S and C and the height of their waveform. Furthermore, the CPU calculates the amount of change in the position within a predetermined length of time, in order to use the resolver as a speed sensor.



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The HV control ECU monitors the output signals of the motor resolver and detects malfunction.

| DTC No. | INF Code | DTC Detection Condition | Trouble Area |
|---------|----------|--|---|
| P0A3F | 243 | Interphase short in motor resolver circuit | <ul style="list-style-type: none"> • Wire harness or connector • Hybrid vehicle motor • HV control ECU |
| P0A40 | 500 | Motor resolver output is out of normal range | <ul style="list-style-type: none"> • Wire harness or connector • Hybrid vehicle motor • HV control ECU |
| P0A41 | 245 | Open or short in motor resolver circuit | <ul style="list-style-type: none"> • Wire harness or connector • Hybrid vehicle motor • HV control ECU |

MONITOR DESCRIPTION

The HV control ECU monitors the motor resolver output signal. If the HV control ECU detects output signals that are out of the normal range or specification, it will conclude that there is a malfunction of the motor resolver. The HV control ECU will illuminate the MIL and set a DTC.

MONITOR STRATEGY

| | |
|----------------------------|---|
| Related DTCs | P0A3F (INF 243): Drive motor "A" position sensor circuit malfunction / Short circuit between phases P0A40 (INF 500): Drive motor "A" position sensor circuit malfunction / Range check P0A41 (INF 245): Drive motor "A" position sensor circuit malfunction / Circuit discontinuity or short circuit |
| Required sensor/components | Motor resolver |
| Frequency of operation | Continuous |
| Duration | TOYOTA's intellectual property |
| MIL operation | Immediately |
| Sequence of operation | None |

TYPICAL ENABLING CONDITIONS

| | |
|--|--------------------------------|
| The monitor will run whenever the following DTCs are not present | TOYOTA's intellectual property |
| No other condition | – |

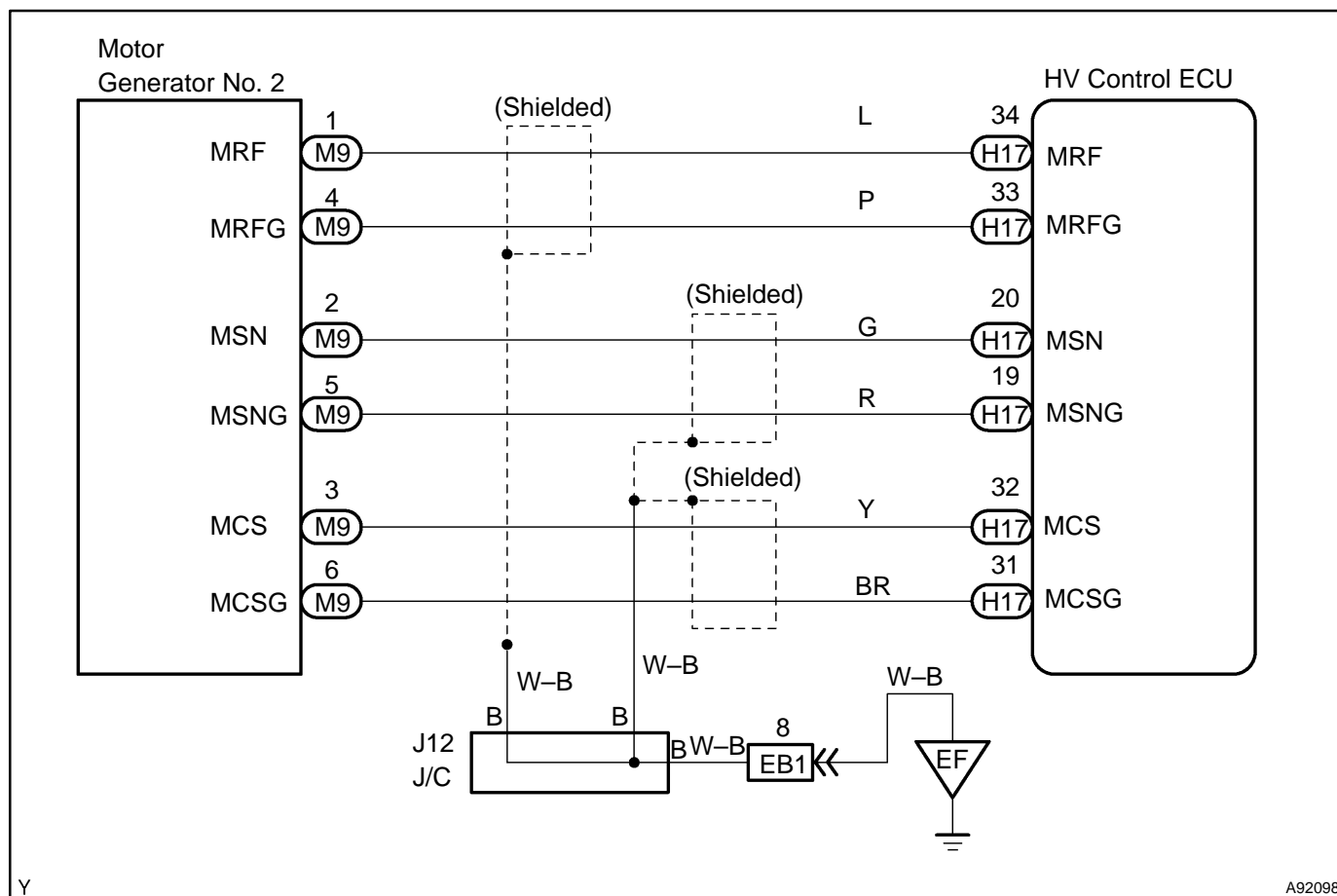
TYPICAL MALFUNCTION THRESHOLDS

| | |
|----------------|--|
| Motor resolver | Circuit malfunction (interphase shot, open or short), or abnormal output |
|----------------|--|

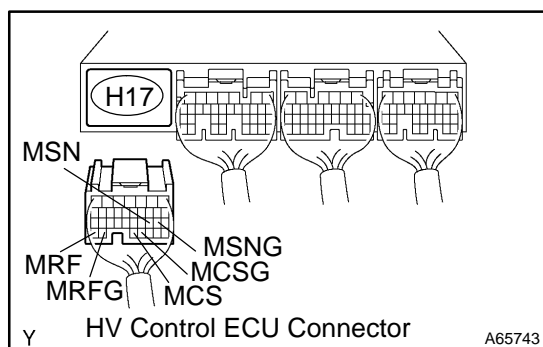
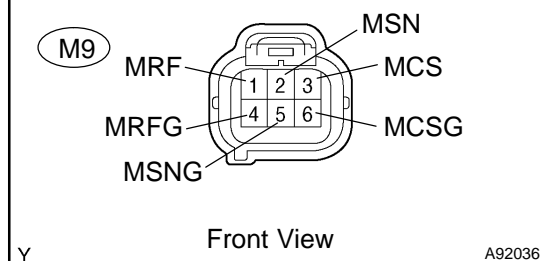
COMPONENT OPERATING RANGE

| | |
|----------------|--|
| Motor resolver | DTCs P0A3F (INF 243), P0A40 (INF 500) and P0A41 (INF 245) are not detected |
|----------------|--|

WIRING DIAGRAM



INSPECTION PROCEDURE

1 CHECK HARNESS AND CONNECTOR(HYBRID VEHICLE CONTROL ECU – MOTOR RESOLVER)
**Wire Harness Side:****Motor Resolver Connector**

- (a) Disconnect the H17 HV control ECU connector.
- (b) Disconnect the M9 motor resolver connector.
- (c) Turn the power switch ON (IG).
- (d) Measure the voltage between the terminals of the HV control ECU connector and body ground.

Standard:

| Tester Connection | Specified Condition |
|-----------------------------|---------------------|
| MRF (H17-34) – Body ground | Below 1 V |
| MRFG (H17-33) – Body ground | Below 1 V |
| MSN (H17-20) – Body ground | Below 1 V |
| MSNG (H17-19) – Body ground | Below 1 V |
| MCS (H17-32) – Body ground | Below 1 V |
| MCSG (H17-31) – Body ground | Below 1 V |

- (e) Turn the power switch OFF.
- (f) Check the resistance between the wire harness side connectors.

Standard (Check for open):

| Tester Connection | Specified Condition |
|-----------------------------|---------------------|
| MRF (H17-34) – MRF (M9-1) | Below 1 Ω |
| MRFG (H17-33) – MRFG (M9-4) | Below 1 Ω |
| MSN (H17-20) – MSN (M9-2) | Below 1 Ω |
| MSNG (H17-19) – MSNG (M9-5) | Below 1 Ω |
| MCS (H17-32) – MCS (M9-3) | Below 1 Ω |
| MCSG (H17-31) – MCSG (M9-6) | Below 1 Ω |

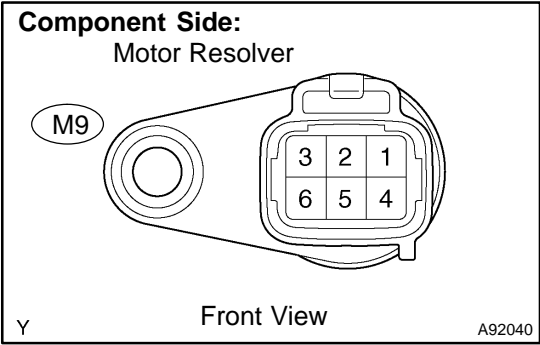
Standard (Check for short):

| Tester Connection | Specified Condition |
|--|-------------------------|
| MRF (H17-34) or MRF (M9-1) – Body ground | 10 k Ω or higher |
| MRFG (H17-33) or MRFG (M9-4) – Body ground | 10 k Ω or higher |
| MSN (H17-20) or MSN (M9-2) – Body ground | 10 k Ω or higher |
| MSNG (H17-19) or MSNG (M9-5) – Body ground | 10 k Ω or higher |
| MCS (H17-32) or MCS (M9-3) – Body ground | 10 k Ω or higher |
| MCSG (H17-31) or MCSG (M9-6) – Body ground | 10 k Ω or higher |

- (g) Reconnect the motor resolver connector.
- (h) Reconnect the HV control ECU connector.

NG**REPAIR OR REPLACE HARNESS OR CONNECTOR****OK**

2INSPECT MOTOR RESOLVER



- (a) Measure the resistance between the terminals of the motor resolver.

Standard:

| Tester Connection | Specified Condition |
|--|---------------------|
| MRF (M9-1) – MRFG (M9-4) | 7.65 to 10.2 Ω |
| MSN (M9-2) – MSNG (M9-5) | 12.6 to 16.8 Ω |
| MCS (M9-3) – MCSG (M9-6) | 12.6 to 16.8 Ω |
| Each terminal listed above – Transaxle housing | 10 kΩ or higher |

NG

REPLACE HYBRID VEHICLE MOTOR ASSY

OK

REPLACE HYBRID VEHICLE CONTROL ECU (See page 21-124)