

TROUBLESHOOTING MANUAL

INDUSTRIAL ENGINES

ELECTRONIC CONTROL

3TNV82A	4TNV84
3TNV82A-B	4TNV84T
3TNV84	4TNV84T-Z
3TNV84T	4TNV88
3TNV84T-B	4TNV88-B
3TNV88	4TNV88-U
3TNV88-B	4TNV94L
3TNV88-U	4TNV98
	4TNV98-Z
	4TNV98-E
	4TNV98T
	4TNV98T-Z
	4TNV106
	4TNV106T

**California
Proposition 65 Warning**

Diesel engine exhaust and some of its constituents are known to the state of California to cause cancer, birth defects, and other reproductive harm.

**California
Proposition 65 Warning**

Battery posts, terminals, and related accessories contain lead and lead compounds, chemicals known to the state of California to cause cancer and reproductive harm.
Wash hands after handling.

Section 1

FAILURE DIAGNOSIS

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Engine warning lamp for Yanmar error codes.

While an error is occurring the error warning lamp on the cluster is flashing with a fixed frequency.

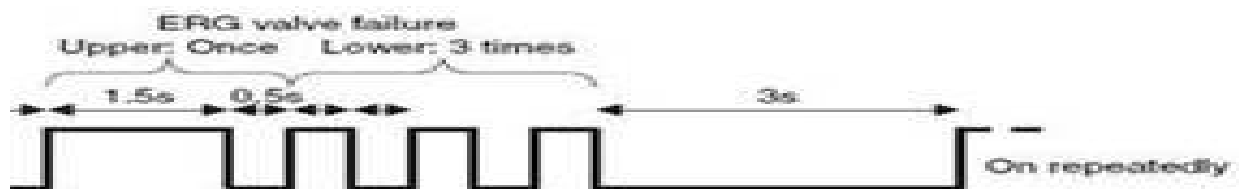
This flashing lamp is to get the attention of the driver, not to give the error code as explained in the manual.

The error code signal which is referring to the code table in the manual is given by a sound of the buzzer.

So to know the right error code you have to listen to the buzzer only.

Remark : Listening to the buzzer and looking at the flashing lamp together gives a very confusing feeling and it is very hard to write down the correct error code.

EGR Code 1-3



Buzzer : ON_____OFF ON/OFF ON/OFF ON/OFF (1 long, 3 short) ↗ correct error.

DTCS (DIAGNOSTIC TROUBLE CODES) GENERAL DESCRIPTION

DTC Code List

Classification	DTC	BUZZER Flashing Patterns	Error Item		Referenced page number	
			Area	Status	Overview	Failure Diagnosis
Analog Input Related Failures	P1202/4	7	Rack position sensor	Error (low voltage)	P.1-8	P.1-136
	P1203/3			Error (high voltage)	P.1-10	
	P0122/4	5	Accelerator sensor	Error (low voltage)	P.1-12	P.1-140
	P1203/3			Error (high voltage)	P.1-14	
	P0124/2			Intermittent failure	P.1-16	
	P1125/1			Error (foot pedal-close position)	P.1-18	P.1-144
	P1126/0			Error (foot pedal-open position)	P.1-20	
	P0222/4	1-8	Spare accelerator sensor	Error (low voltage)	P.1-22	P.1-148
	P0223/3			Error (high voltage)	P.1-24	
	P0224/2			Intermittent failure	P.1-26	
	P1225/1			Error (foot pedal-close position)	P.1-28	P.1-144
	P1226/0			Error (foot pedal-open position)	P.1-30	
	P1227/8			Error (pulse communication)	P.1-32	
	P0222/4	1-9	Atmospheric pressure sensor	Error (low voltage)	P.1-34	P.1-148
	P0223/3			Error (high voltage)	P.1-36	
	P0224/2			Intermittent failure	P.1-38	
	P0668/4	4-1	ECU Temperature Sensor	Error (low voltage)	P.1-40	P.1-154
	P0669/3			Error (high voltage)	P.1-41	
	P1644/2			Intermittent failure	P.1-42	
	P0634/0	2-5	ECU Temperature Rise Alarm		P.1-43	P.1-154
	P0117/4	4	Cooling water temperature sensor	Error (Low Voltage)	P.1-45	P.1-156
	P0118/3			Error (High Voltage)	P.1-47	
	P0119/2			Intermittent failure	P.1-49	
	P0217/0	3-6	Cooling Water Temperature Rise Alarm		P.1-51	P.1-156
	P0642/4	2-4	SENSOR 5V	Error (low voltage)	P.1-53	P.1-160
	P0643/3			Error (High Voltage)	P.1-54	
	P1644/2			Intermittent failure	P.1-55	
P0562/1	2-3	Power supply Voltage	Error (Low Voltage)	P.1-56	P.1-56	
P0563/0			Error (High Voltage)	P.1-58	P.1-58	

Classification	DTC	BUZZER Flashing Patterns	Error Item		Referenced page number	
			Area	Status	Overview	Failure Diagnosis
Pulse Sensors	P0340/4	6	Speed Sensor	Error	P.1-60	P.1-164
	P1340/4	1-1	Spare speed sensor	Error	P.1-62	P.1-167
	P0219/0	9	Overspeed Error		P.1-64	P.1-64
Contact Output Related Failures	P1222/4	1-7	Rack actuator Relay	Error A	P.1-66	P.1-170
	P1223/3			Error B	P.1-68	
	P1224/2			Intermittent failure	P.1-70	
	P1232/4	1-5	Start Assist Relay	Error A	P.1-72	P.1-174
	P1233/3			Error B	P.1-74	
	P1234/2			Intermittent failure	P.1-76	
	P1242/4	1-4	CSD solenoid valve	Error A	P.1-78	P.1-178
	P1243/3			Error B	P.1-80	
	P1244/2			Intermittent failure	P.1-82	
	P1402/4	1-3	EGR valve	Error A (Step Motor A-Phase)	P.1-84	P.1-182
	P1403/3			Error B (Step Motor A-Phase)	P.1-86	
	P1412/4			Error A (Step Motor B-Phase)	P.1-88	
	P1413/3			Error B (Step Motor B-Phase)	P.1-90	
	P1422/4			Error A (Step Motor C-Phase)	P.1-92	
	P1423/3			Error B (Step Motor C-Phase)	P.1-94	
	P1432/4			Error A (Step Motor D-Phase)	P.1-96	
	P1433/3			Error B (Step Motor D-Phase)	P.1-98	
	Contact Input Related Failures	P1192/4	2-1	Oil pressure switch	Error	P.1-100
P1198/1		3-1	Oil Pressure Descend Error		P.1-102	
P1562/4		2-2	Charge switch	Error	P.1-104	
P1568/1		3-2	Charge Alarm		P.1-106	
P1217/0		3-3	Abnormal Water Temperature		P.1-108	
P1101/0		3-4	Air cleaner Clogging Alarm		P.1-110	
P1151/0		3-5	Oil-water separator Alarm		P.1-112	

Classification	DTC	BUZZER Flashing Patterns	Error Item		Referenced page number		
			Area	Status	Overview	Failure Diagnosis	
Actuator Errors	P1212/4	8	Rack actuator	Error (low current)	P.1-114	P.1-193	
	P1213/3			Error (high current)	P.1-116		
	P1211/7			Mechanical failure	P.1-118		
	P1214/2		Engine	Error	P.1-120		
ECU inside and Communication Related Failures	P0605/12	4-1	ECU Internal	Flash ROM	Error (Checksum A)	P.1-122	P.1-197
	P1605/2				Error (Checksum B)		
	P1606/2				Error (Checksum C)		
	P1620/12			Map format	Error		
	P1601/2			EEPROM	Error (Checksum)	P.1-123	
	P0601/12				Error (read/write error)		
	P1610/12			Sub CPU	Error A		
	P1611/12				Error B		
	P1612/12				Error C		
	P0686/4	1-6	Main relay	Error	P.1-124	P.1-199	
	U0001/12	1-2	CAN Communication	Error	P.1-126	P.1-203	
	U0167/12	4-2	Immobilizer	Error (CAN communication)	P.1-128	P.1-205	
	U1167/8			Error (pulse communication)	P.1-130		
U0426/2	Error (System)			P.1-132			

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Description Items

DTC	Code Number	DTC Name
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DTC Detecting Conditions

1 - Precondition; 2 - Detecting condition(s); 3 - Flashing pattern of failure indicator	Check points
1. Precondition for Error detection 2. Error detecting Condition 3. Indicates the pattern in which the failure lamp flashes when the DTC is output. (For detailed information on various flashing patterns, see Annex).	This column shows what parts or items should be checked to identify the cause of the error. For details, see "<Diagnosis Description>."

Movement at Error occurrence

Error Mode	[Operation Continuation] / [Run Under Restrictions] / [Stop Immediately]: The engine operation after detecting the error is described. * [Operation Continuation]:After detecting the error, the system lets the engine continue to run without any restrictions. [Run Under Restrictions]:The system lets the engine continue to run but restricts the High idle speed, engine power, and/or other performance factors as appropriate. [Stop Immediately]: The system stops the engine immediately after detecting the error.When any error is detected before starting the engine, the starter will not rotate.
Run restricted?	Yes/No.: If Yes, this field details how the engine run is restricted when the error has occurred.
Recovery Conditions	Yes/No.: If Yes, this field describes what conditions must be true for the error mode to be reset.
Remarks	This field describes some notes on safety precautions and so on, as appropriate.

Estimation of Failure cause/Error condition

Provides descriptive information on possible points of failure, possible direct causes (such as a disconnected sensor wire), or possible system abnormalities that has indirectly caused the failure (such as abnormally high cooling water temperature), as can be estimated from the output DTC.

Note: Indicates failures that might be related with the output DTC.

Diagnosis Description

Describes methods or procedures of failure diagnosis.

* After successful recovery by the replacement of ECU, sensor or actuator, make sure that installing the previous parts will reproduce the same error.

Analog Input Related Failures

Rack position sensor

(1) P1202/4: Failure with Rack Position Sensor (Low Voltage)

DTC	P1202/4	Rack Position Sensor Error (Low Voltage)
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DTC Detecting Conditions

1 - Precondition; 2 - Detecting condition(s); 3 - Flashing pattern of failure indicator	Check points
1. Key switch ON. 2. The sensor voltage lower limit and below [at E-ECU activation, engine running] 3. Seven flashes.	Connector Harness Rack position sensor E-ECU

Movement at Error occurrence

Error Mode	[Run Under Restrictions]: The engine continues to run in on-error engine control mode. If any error is detected at E-ECU activation, it takes 1 - 10 seconds from the starter begins to rotate until the engine starts.
Run restricted?	Yes: • The High idle speed is restricted to one of the following, whichever smaller: • 80% of the pre-error High idle speed • 150% of the Low idle speed • The fuel injection rate is restricted.
Recovery Conditions	No.
Remarks	The High and Low idle speeds must be equal to those specified in the engine specifications.

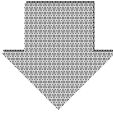
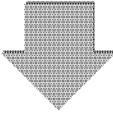
Estimation of Failure cause/Error condition

- The connector may not be properly connected.
 - Wiring defect of the harness
 - The rack position sensor's signal wires may be disconnected or short-circuited with GND.
 - The SENSOR 12V wire may be disconnected or short-circuited with GND (*NOTE).
 - The SENSOR GND wire may be short-circuited with POWER SUPPLY (*NOTE).
- *NOTE) If the SENSOR 12V wire is short-circuited with GND or SENSOR GND wire is short-circuited with POWER SUPPLY, the E-ECU's power supply line fuse 10A might be blown. With this fuse blown, the E-ECU may fail to detect/indicate the error, and to store the error history.**

The rack position sensor may be faulty.

- Output defect of the rack position signal by a disconnection or a short circuit of the inner wiring
- The E-ECU internal circuitry may be faulty.

Diagnosis Description

1) Initial diagnosis with the diagnosis tool	<ul style="list-style-type: none">• Check the fault indication.• Check the sensor voltage (AD value). <p>*For details of the method and the procedure of diagnosis, see P.1-136</p>
	
2) Check of connectors/wiring	<ul style="list-style-type: none">• Before beginning your work, be sure to turn off the key switch.• Check that the connector of the rack actuator is correctly inserted.• Check that the wiring of the rack actuator is not disconnected or the insulation of the wiring is not peeled.
	
3) Failure Diagnostic Work	<ul style="list-style-type: none">• Check the input voltage of the rack position sensor (voltage of the sensor 12V line).• Check the harness for correct continuity. <p>*For details of the method and the procedure of diagnosis, see P.1-136</p>

(2) P1203/3: Failure with Rack Position Sensor (High Voltage)

DTC	P1202/3	Failure with Rack Position Sensor (High Voltage)
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DTC Detecting Conditions

1 - Precondition; 2 - Detecting condition(s); 3 - Flashing pattern of failure indicator	Check points
1. Key switch ON. 2. The sensor voltage upper limit and above [at E-ECU activation, engine running] 3. Seven flashes.	Connector Harness rack position sensor Rack actuator E-ECU

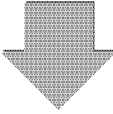
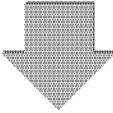
Movement at Error occurrence

	Detection at the engine start	Detection at the engine running
Error Mode	[Run Under Restrictions]: Start the engine in on-error engine control mode. It takes 1 to 10 seconds from the starter's rotation to the engine start.	[Stop Immediately]: The engine stops running.
Run restricted?	Yes: • The High idle is restricted to one of the following, whichever smaller: • 80% of the pre-error High idle speed • 150% of the Low idle speed • The fuel injection rate is restricted.	Yes: The rack actuator relay is turned OFF, and the rack position is forcibly set to the engine stop position.
Recovery Conditions	No.	No.
Remarks	The High and Low idle speeds must be equal to those specified in the engine specifications.	

Estimation of Failure cause/Error condition

- The connector may not be properly connected.
- Wiring defect of the harness
 - The SENSOR GND wire may be disconnected.
 - The rack position sensor signal wire may be short-circuited with POWER SUPPLY.
 - The rack actuator wiring may be short-circuited with GND (with engine running).
- The rack position sensor may be faulty.
 - Output defect of the rack position signal by a disconnection or a short circuit of the inner wiring
- The rack actuator may be faulty.
 - The rack actuator inner wiring may be short-circuited with GND (with engine running).
- The E-ECU internal circuitry may be faulty.

Diagnosis Description

1) Initial diagnosis with the diagnosis tool	<ul style="list-style-type: none">• Check the fault indication.• Check the sensor voltage (AD value). <p>*For details of the method and the procedure of diagnosis, see P.1-136</p>
	
2) Check of connectors/wiring	<ul style="list-style-type: none">• Before beginning your work, be sure to turn off the key switch.• Check that the connector of the rack actuator is correctly inserted.• Check that the wiring of the rack actuator is not disconnected or the insulation of the wiring is not peeled.
	
3) Failure Diagnostic Work	<ul style="list-style-type: none">• Check the input voltage of the rack position sensor (voltage of the sensor 12V line).• Check the harness for correct continuity. <p>*For details of the method and the procedure of diagnosis, see P.1-136</p>

Accelerator sensor

(1) P0122/4: Accelerator Sensor Error (Low Voltage)

DTC	P0122/4	Accelerator Sensor Error (Low Voltage)
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DTC Detecting Conditions

1 - Precondition; 2 - Detecting condition(s); 3 - Flashing pattern of failure indicator	Check points
1. Key switch ON. 2. Sensor voltage 0.2 [V] or lower. 3. Five flashes.	Harness Accelerator sensor

Movement at Error occurrence

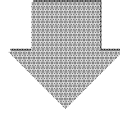
	Spare Accelerator Sensor Function	
	Unavailable	Available
Error Mode	[Run Under Restrictions]: The engine runs at a constant rotational speed.	[Stop Immediately]: The engine continues to run using the spare accelerator sensor instead.
Run restricted?	Yes: The target speed is set to the "on-error target speed (standard value: 1500[min^{-1}])" or "pre-error target speed".	No.
Recovery Conditions	Yes: This error will be automatically reset when a normal voltage (0.2 to 4.6[V]) is input.	Yes: This error will be automatically reset when a normal voltage (0.2 to 4.6[V]) is input.
Remarks		

Estimation of Failure cause/Error condition

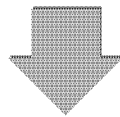
- The connector may not be properly connected.
- Wiring defect of the harness
 - The accelerator sensor's signal wires may be disconnected or short-circuited with GND.
 - The SENSOR 5V wire may be disconnected or short-circuited with GND.
 - The SENSOR GND wire may be short-circuited with POWER SUPPLY (*NOTE).
- ***NOTE) If the SENSOR GND wire is short-circuited with POWER SUPPLY, the E-ECU's power supply line fuse 10A might be blown. With this fuse blown, the E-ECU may fail to detect/indicate the error, and to store the error history.**
- The accelerator sensor may be faulty.
 - Sensor output defect by a disconnection of the accelerator sensor inner wiring or a sliding resistance increase
- The E-ECU internal circuitry may be faulty.

Diagnosis Description

1) Initial diagnosis with the diagnosis tool	<ul style="list-style-type: none">• Check the fault indication.• Check the sensor voltage. <p>*For details of the method and the procedure of diagnosis, see P.1-140</p>
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2) Check of connectors/wiring	<ul style="list-style-type: none">• Before beginning your work, be sure to turn off the key switch.• Check that the connector of the accelerator sensor is correctly inserted.• Check that the wiring of the accelerator sensor is not disconnected or the insulation of the wiring is not peeled.
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3) Failure Diagnostic Work	<ul style="list-style-type: none">• Check the resistance value of the accelerator sensor.• Check the harness for correct continuity.• Check the output voltage of the accelerator sensor. <p>*For details of the method and the procedure of diagnosis, see P.1-140</p>
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(2) P0123/3: Accelerator Sensor Error (High Voltage)

DTC	P0123/3	Accelerator Sensor Error (High Voltage)
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DTC Detecting Conditions

1 - Precondition; 2 - Detecting condition(s); 3 - Flashing pattern of failure indicator	Check points
1. Key switch ON. 2. Sensor voltage 4.6 [V] or higher. 3. Five flashes.	Harness Accelerator sensor

Movement at Error occurrence

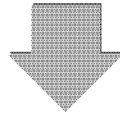
	Spare Accelerator Sensor Function	
	Unavailable	Available
Error Mode	[Run Under Restrictions]: The engine runs at a constant rotational speed.	[Stop Immediately]: The engine continues to run using the spare accelerator sensor instead.
Run restricted?	Yes: The target speed is set to the "on-error target speed (standard value: 1500[min^{-1}])" or "pre-error target speed".	No.
Recovery Conditions	Yes: This error will be automatically reset when a normal voltage (0.2 to 4.6[V]) is input.	Yes: This error will be automatically reset when a normal voltage (0.2 to 4.6[V]) is input.
Remarks		

Estimation of Failure cause/Error condition

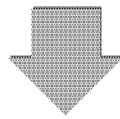
- The connector may not be properly connected.
- Wiring defect of the harness
 - The SENSOR GND wire may be disconnected.
 - The sensor signal wire may be short-circuited with POWER SUPPLY.
- The accelerator sensor may be faulty.
 - Sensor output defect by a short circuit with power supply of the accelerator sensor inner wiring
- The E-ECU internal circuitry may be faulty.

Diagnosis Description

1) Initial diagnosis with the diagnosis tool	<ul style="list-style-type: none">• Check the fault indication.• Check the sensor voltage. <p>*For details of the method and the procedure of diagnosis, see P.1-140</p>
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2) Check of connectors/wiring	<ul style="list-style-type: none">• Before beginning your work, be sure to turn off the key switch.• Check that the connector of the accelerator sensor is correctly inserted.• Check that the wiring of the accelerator sensor is not disconnected or the insulation of the wiring is not peeled.
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3) Failure Diagnostic Work	<ul style="list-style-type: none">• Check the resistance value of the accelerator sensor.• Check the harness for correct continuity.• Check the output voltage of the accelerator sensor. <p>*For details of the method and the procedure of diagnosis, see P.1-140</p>
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(3) P0124/2: Intermittent Failure with Accelerator Sensor

DTC	P0124/2	Intermittent Failure with Accelerator Sensor
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DTC Detecting Conditions

1 - Precondition; 2 - Detecting condition(s); 3 - Flashing pattern of failure indicator	Check points
1. Engine running. 2. Unconfirmed error detected 10 times. 3: Does not flash.	Connector Harness Accelerator sensor

Movement at Error occurrence

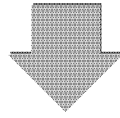
Error Mode	[Run Under Restrictions]: After detecting the error, the system lets the engine continue to run without any restrictions.
Run restricted?	No.
Recovery Conditions	No.
Remarks	

Estimation of Failure cause/Error condition

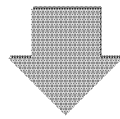
- The connector may not be properly connected.
- Wiring defect of the harness
 - Accelerator sensor signal wire may be disconnected, or short-circuited with GND or power supply.
 - Sensor 5V wire may be disconnected, or short-circuited with GND or power supply.
 - Sensor GND wire may be disconnected.
- The accelerator sensor may be faulty.
 - Inner wiring may be disconnected or short-circuited

Diagnosis Description

1) Initial diagnosis with the diagnosis tool	<ul style="list-style-type: none">• Check the fault indication.• Check the sensor voltage. <p>*For details of the method and the procedure of diagnosis, see P.1-140</p>
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2) Check of connectors/wiring	<ul style="list-style-type: none">• Before beginning your work, be sure to turn off the key switch.• Check that the connector of the accelerator sensor is correctly inserted.• Check that the wiring of the accelerator sensor is not disconnected or the insulation of the wiring is not peeled.
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3) Failure Diagnostic Work	<ul style="list-style-type: none">• Check the resistance value of the accelerator sensor.• Check the harness for correct continuity.• Check the output voltage of the accelerator sensor. <p>*For details of the method and the procedure of diagnosis, see P.1-140</p>
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FAILURE DIAGNOSIS**DTCs (Diagnostic Trouble Codes) General Description****(4) P0123/1: Accelerator Sensor Error (foot pedal-close position)**

DTC	P1125/1	Accelerator Sensor Error (foot pedal-close position)
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DTC Detecting Conditions

1 - Precondition; 2 - Detecting condition(s); 3 - Flashing pattern of failure indicator	Check points
1. Key switch ON. 2. With sensor voltage at or below 0.65[V], foot pedal Normally Open switch detected being ON or foot pedal Normally Closed Switch detected being OFF. 3. Five flashes.	Harness Foot pedal

Movement at Error occurrence

Error Mode	[Run Under Restrictions]: The engine runs at a constant rotational speed.
Run restricted?	Yes: The target speed is set to the "on-error target speed (standard value: 1500[min^{-1}])" or "pre-error target speed".
Recovery Conditions	No.
Remarks	

Estimation of Failure cause/Error condition

- The connector may not be properly connected.
- Wiring defect of the harness
 - The wiring for the foot pedal Normally Closed switch may be disconnected.
 - The wiring for the foot pedal Normally Open switch may be short-circuited with GND.
- The foot pedal may be faulty.
 - The foot pedal inner wiring may be disconnected or short-circuited with GND.
- The E-ECU internal circuitry may be faulty.