

GROUP 4 MECHATRONICS SYSTEM

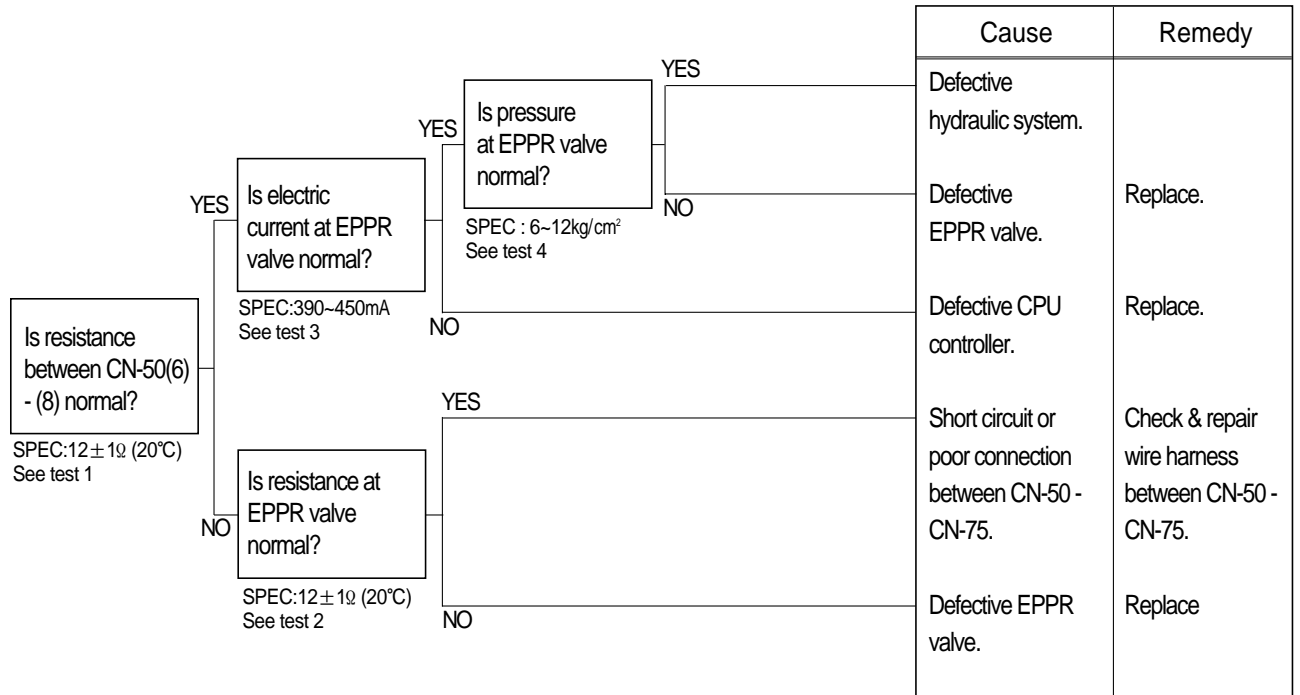
1. ALL ACTUATORS SPEED ARE SLOW

※ Boom, arm, bucket, swing and travel speed are slow, but engine speed is good.

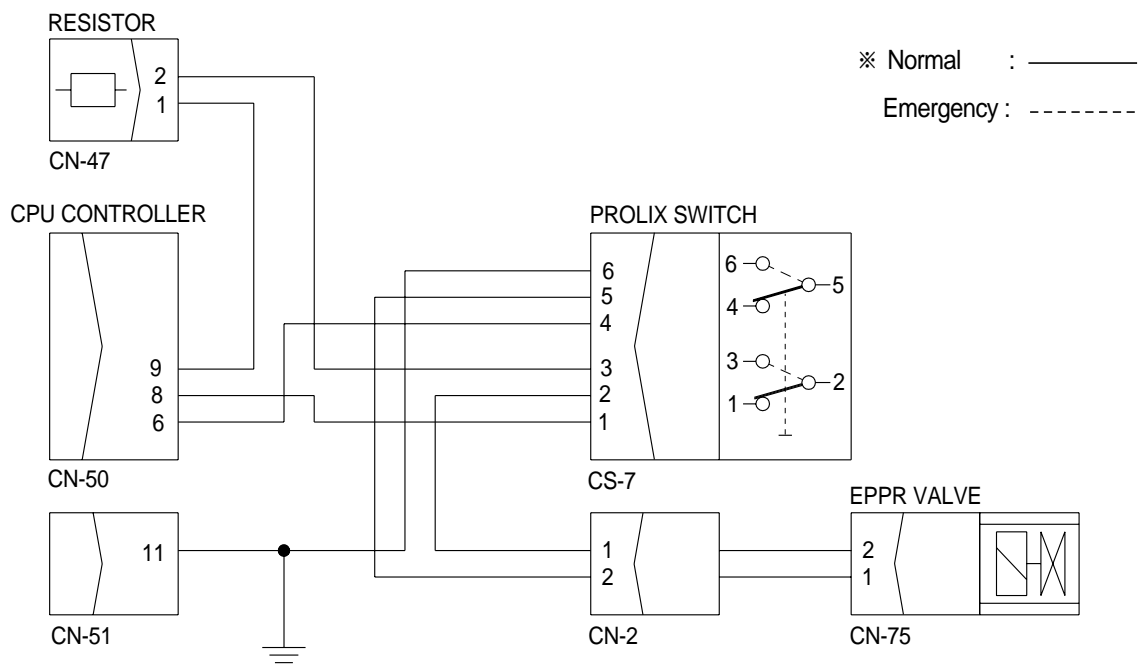
※ Spec : H-mode 2250 +50rpm S-mode 2250 +50rpm
L-mode 2000 +50rpm F-mode 1650 +50rpm

※ Before carrying out below procedure, check all the related connectors are properly inserted.

1) INSPECTION PROCEDURE



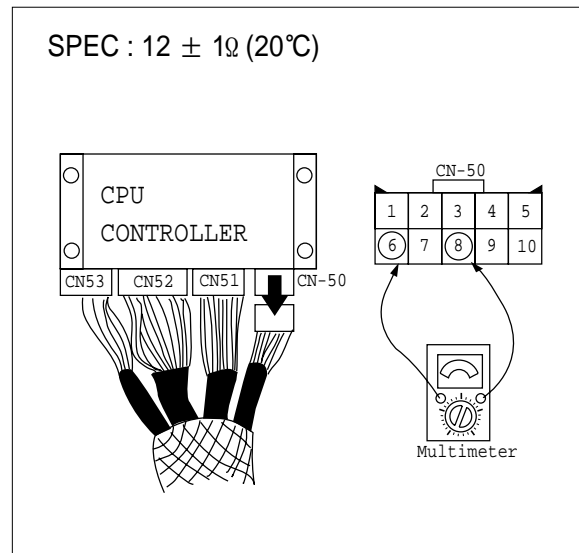
Wiring diagram



2) TEST PROCEDURE

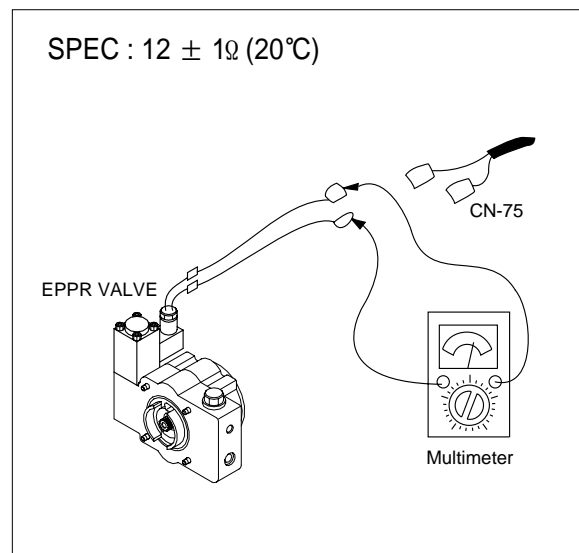
(1) **Test 1** : Check resistance (6)-(8) at connector CN-50.

- ① Starting key OFF.
- ② Remove CPU controller and disconnect connector CN-50.
- ③ Check resistance between pin No. 6 and No. 8 at connector CN-50.



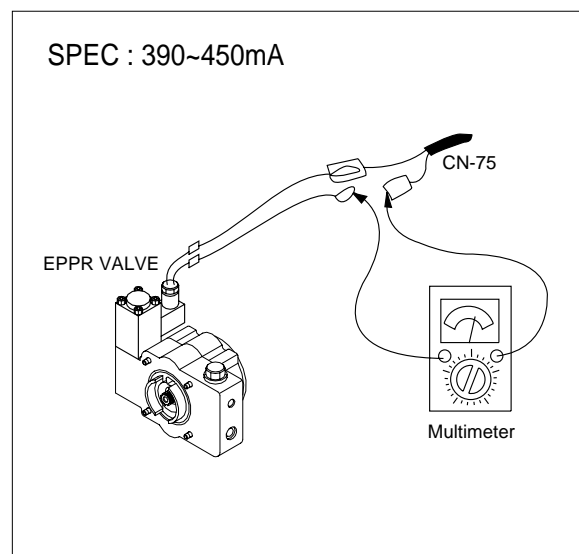
(2) **Test 2** : Check resistance at connector CN-75.

- ① Starting key OFF.
- ② Disconnect connector CN-75 from EPPR valve at main hydraulic pump.
- ③ Check resistance between 2 lines as figure.



(3) **Test 3** : Check electric current at EPPR valve.

- ① Start engine.
- ② Set S-mode and cancel auto decel mode.
- ③ If tachometer show approx 2250+50rpm, disconnect one wire harness from EPPR valve.
- ④ Install multimeter as figure.
- ⑤ Check electric current at bucket circuit relief position.

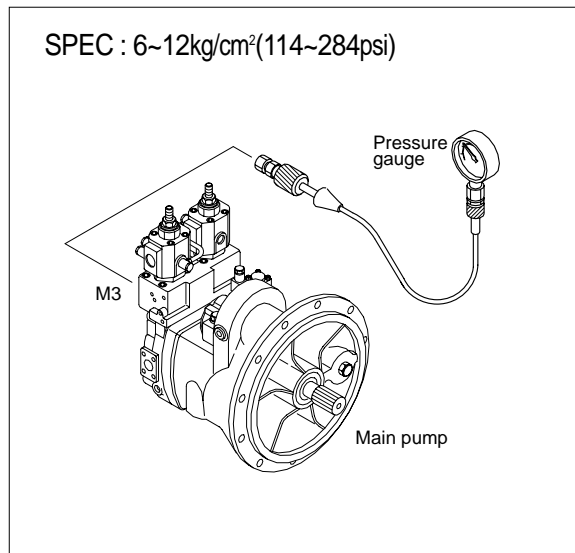


(2) **Test 4** : Check pressure at EPPR valve.

- ① Remove plug and connect pressure gauge as figure.

Gauge capacity : 0 to 40~50kg/cm²
(0 to 570~710psi)

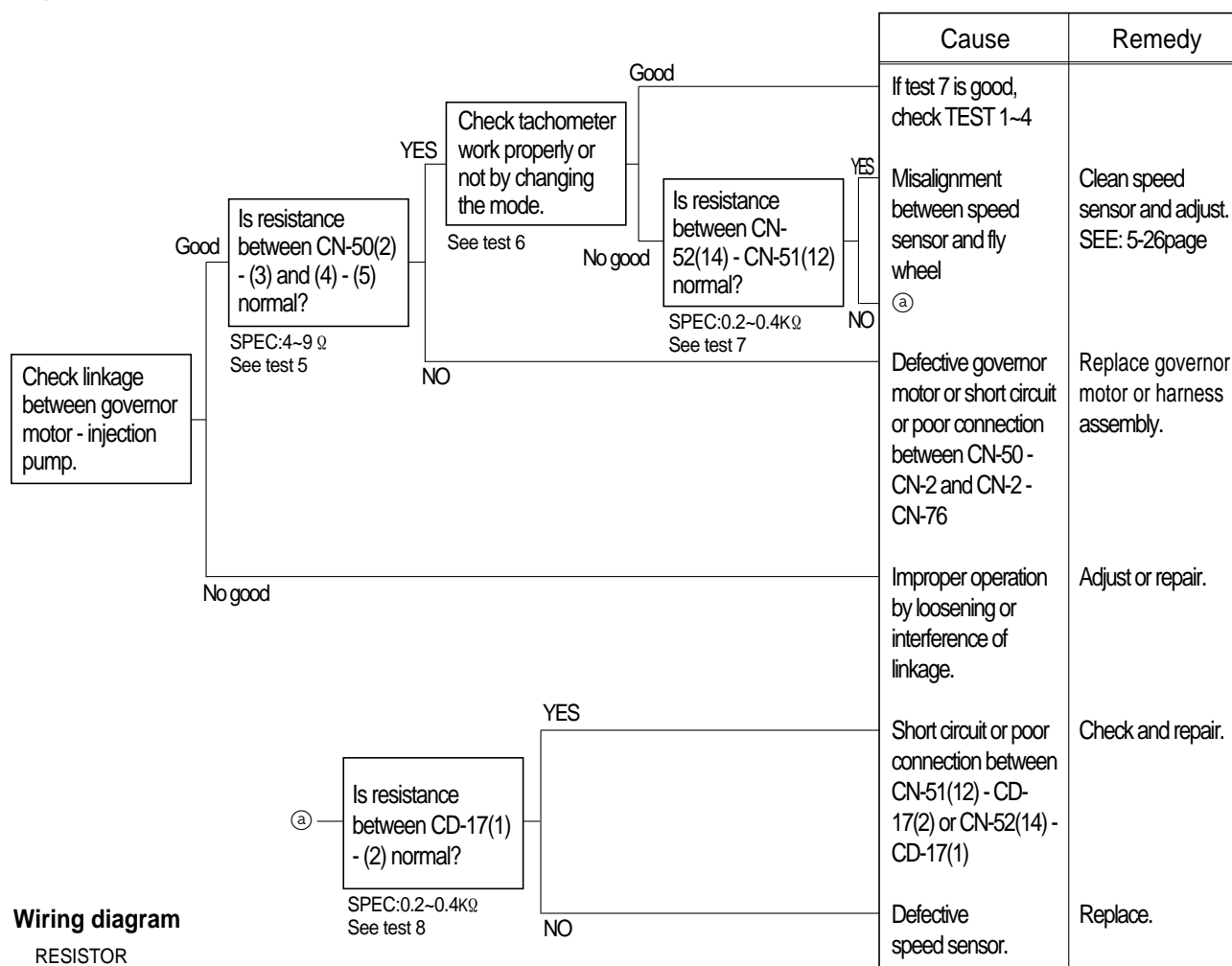
- ② Start engine.
③ Set S-mode and cancel auto decel mode.
④ If tachometer show approx. 2250+50rpm, check pressure at relief position of bucket circuit by operating bucket control lever.
⑤ If pressure is not correct, adjust it.
⑥ After adjust, test the machine.



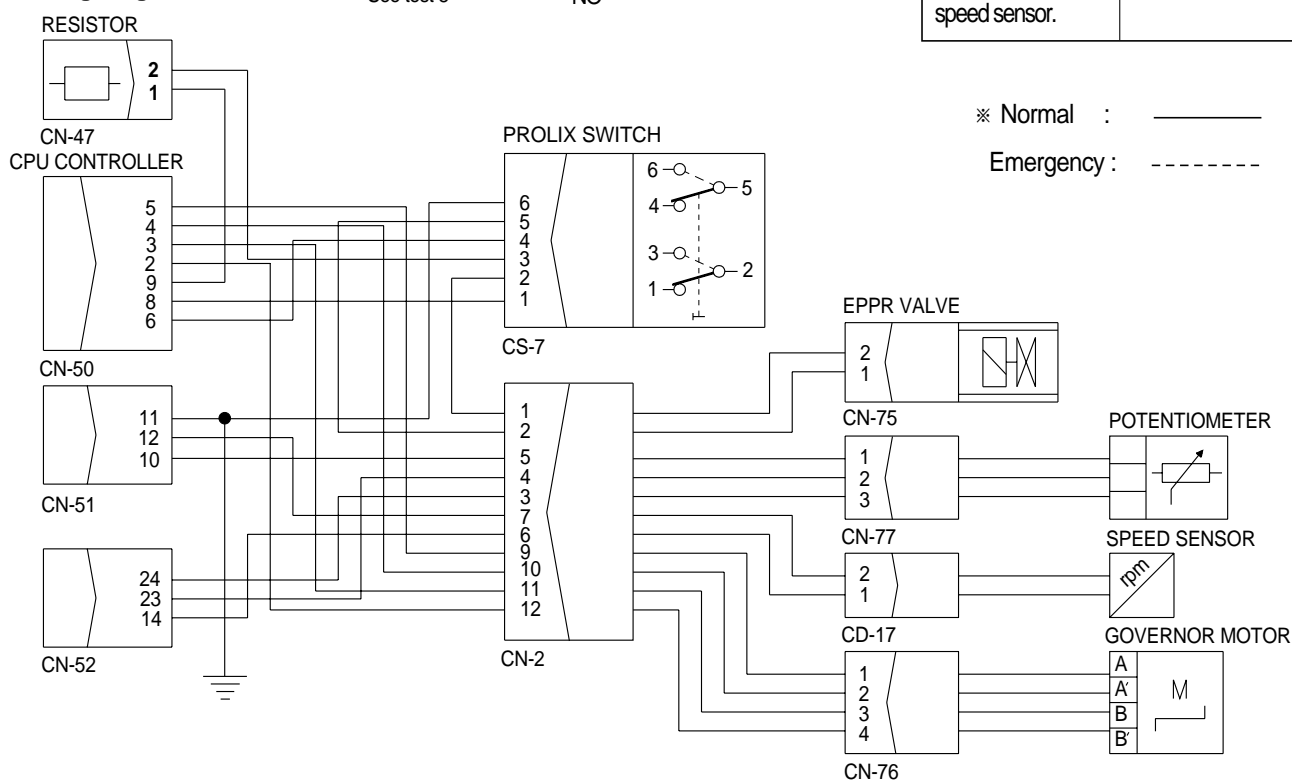
2. ENGINE SPEED IS SLOW AT ALL MODE

※ Before carrying out below procedure, check all the related connectors are properly inserted.

1) INSPECTION PROCEDURE



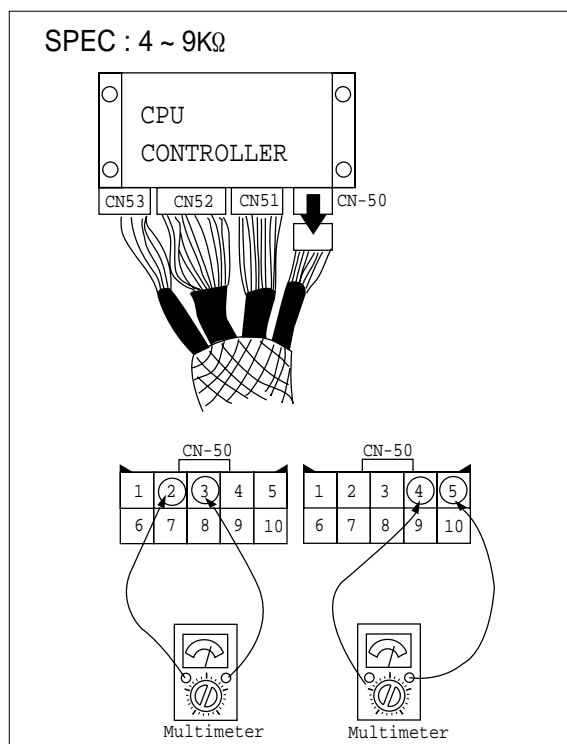
Wiring diagram



2) TEST PROCEDURE

(1) **Test 5** : Check resistance between (2)-(3) and (4)-(5) at connector CN-50.

- ① Starting key OFF.
- ② Remove CPU controller and disconnect connector CN-50 from CPU controller.
- ③ Check resistance as figure.



(2) **Test 6** : Check tachometer
(Work properly or not.)

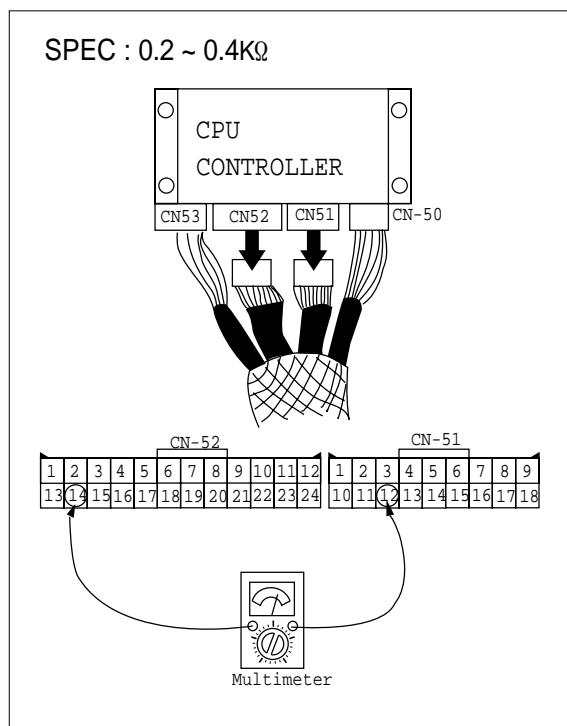
- ① Start engine.
- ② Check tachometer reading.

unit : rpm

Spec		Remark
H-mode	2250+50rpm	Check rpm after cancel the Auto decel mode.
S-mode	2250+50rpm	
L-mode	2000+50rpm	
F-mode	1650+50rpm	

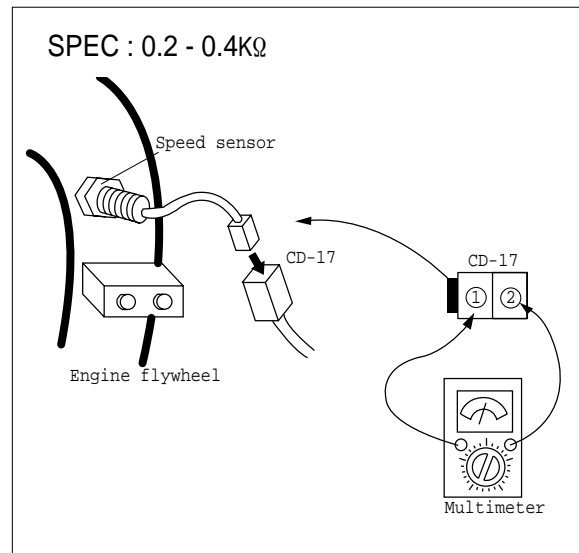
(2) **Test 7** : Check resistance between (14) of CN-52 and (12) of CN-51.

- ① Starting key OFF.
- ② Remove CPU controller and disconnect connector CN-51 and CN-52 from CPU controller.
- ③ Check resistance as figure.



(4) **Test 8** : Check resistance at speed sensor.

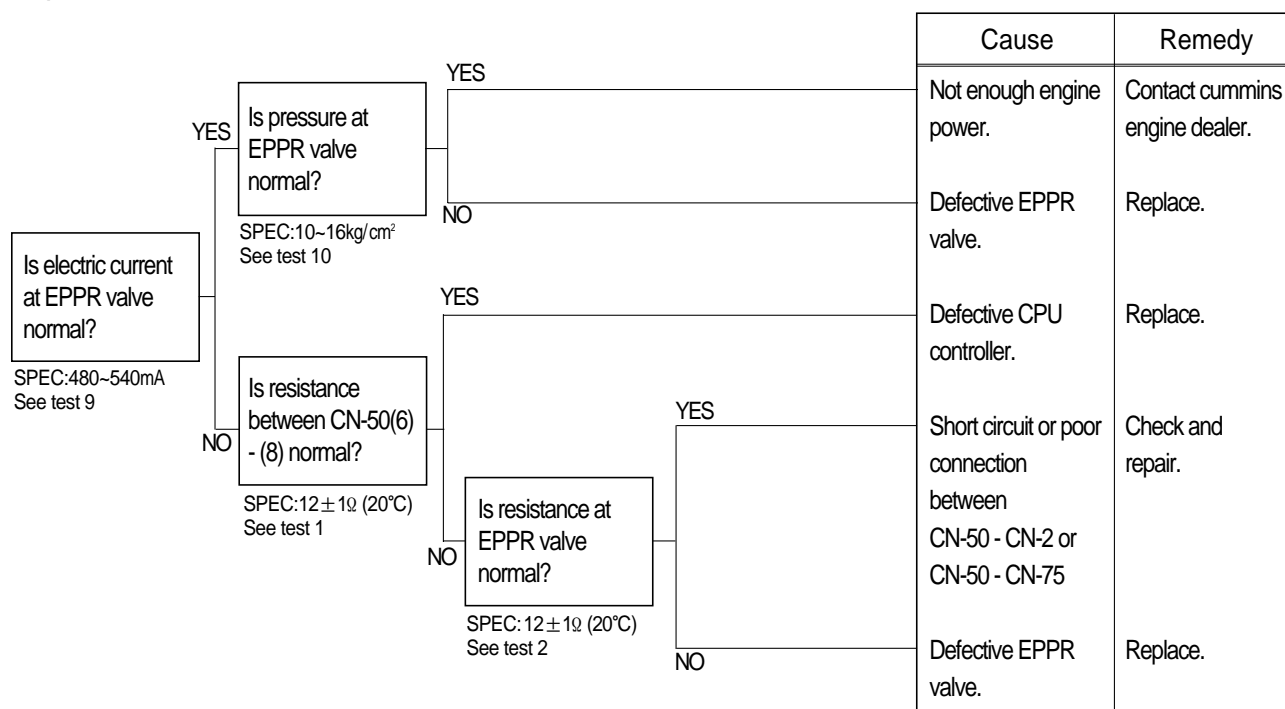
- ① Starting key OFF.
- ② Disconnect connector CD-17 of speed sensor at engine flywheel housing.
- ③ Check resistance as figure.



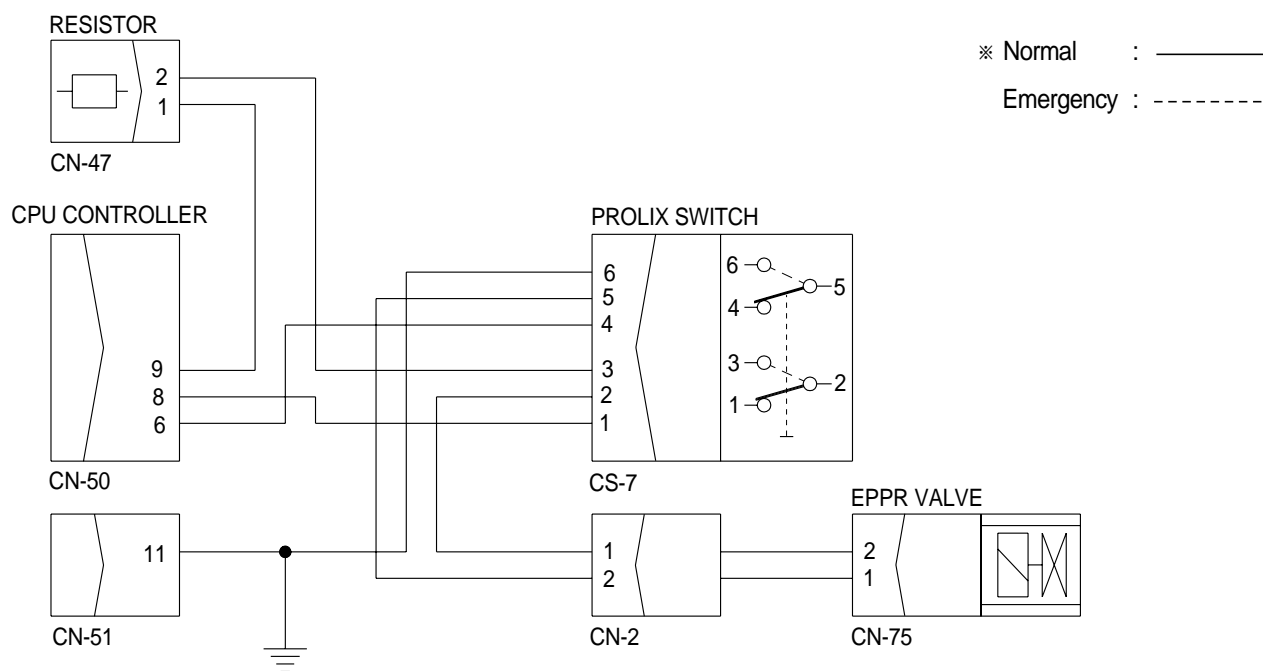
3. ENGINE STALL

※ Before carrying out below procedure, check all the related connectors are properly inserted.

1) INSPECTION PROCEDURE



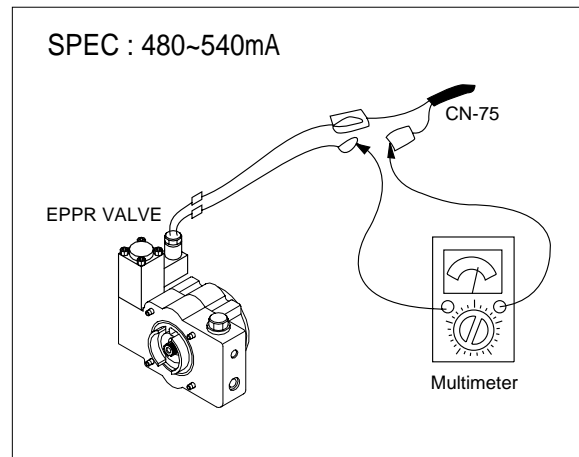
Wiring diagram



2) TEST PROCEDURE

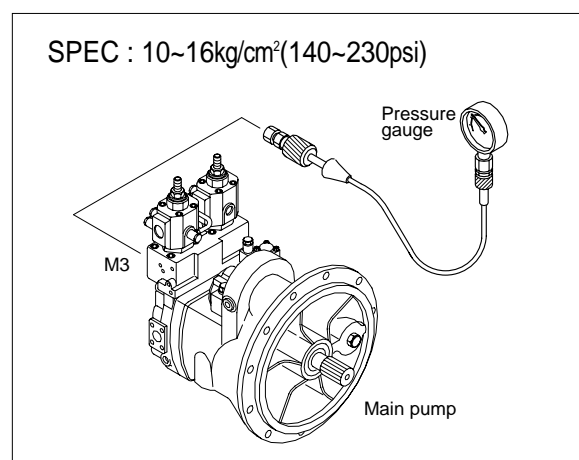
(1) **Test 9** : Check electric current at EPPR valve at F-mode

- ① Start engine.
- ② Set F-mode with 1650 +50rpm
- ③ Install multimeter as figure.
- ④ Operate bucket lever completely push or pull and hold arm lever at the end of stroke.
- ⑤ Check electric current at engine stall state.



(2) **Test 10** : Check pressure at EPPR valve at F-mode

- ① Connect pressure gauge at EPPR valve.
- ② Start engine.
- ③ Set F-mode with 1650 +50rpm
- ④ Operate bucket lever completely push or pull and hold arm lever at the end of stroke.
- ⑤ Check pressure at relief position.

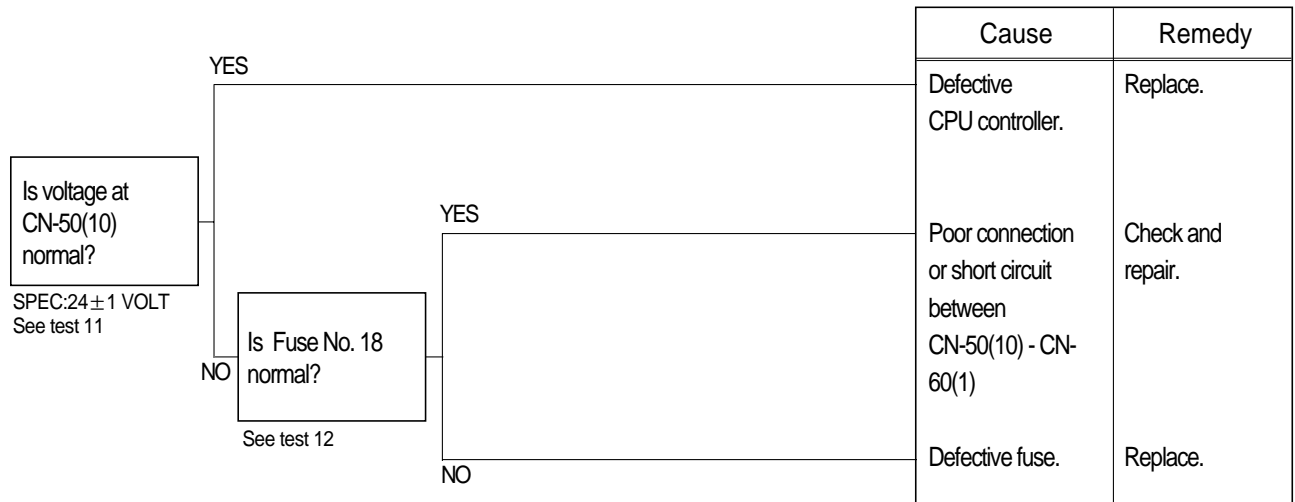


4. CLUSTER LAMPS ARE OFF IMMEDIATELY AFTER KEY SWITCH OFF

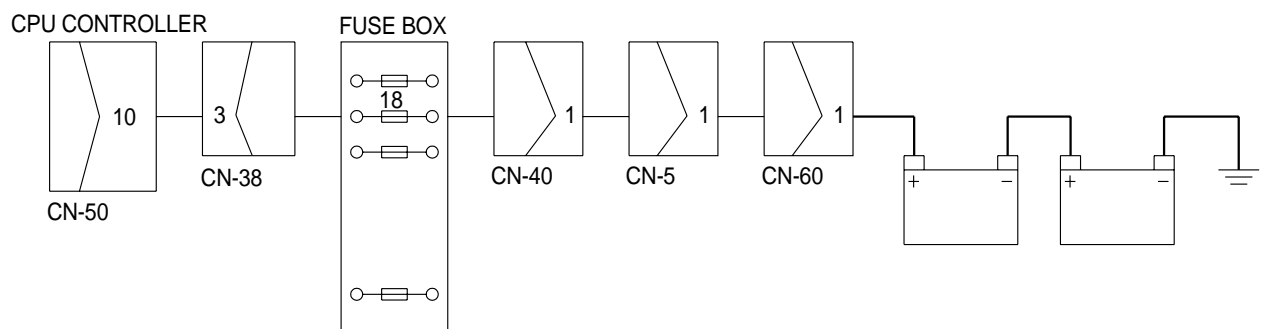
※ Before carrying out below procedure, check all the related connector are properly inserted.

Normal condition : Lamps ON approx. 3~7 seconds after key switch OFF.

1) INSPECTION PROCEDURE



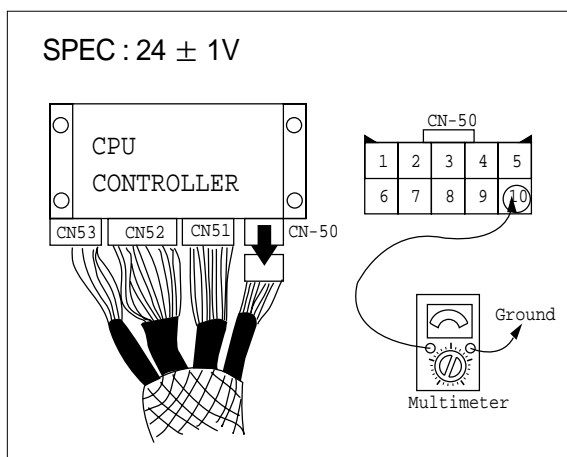
Wiring diagram



2) TEST PROCEDURE

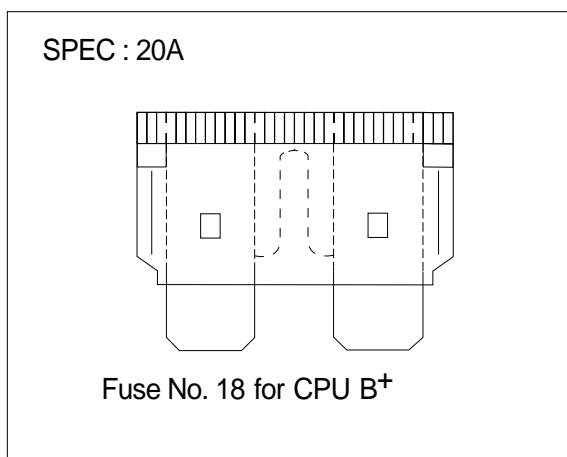
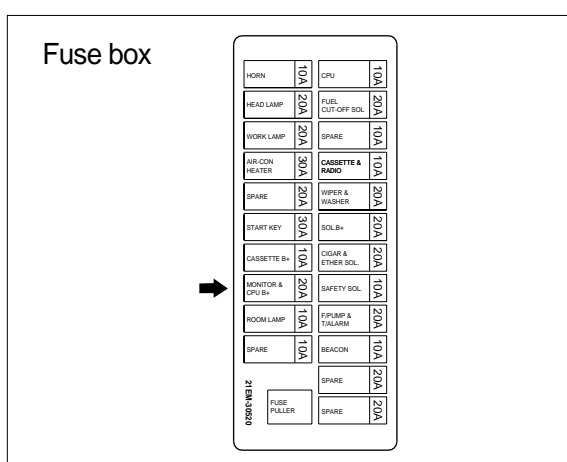
(1) **Test 11** : Check voltage at (10) of CN-50.

- ① Starting key OFF.
- ② Disconnect connector CN-50 from CPU controller.



(2) **Test 12** : Check fuse at (18) of fuse box.

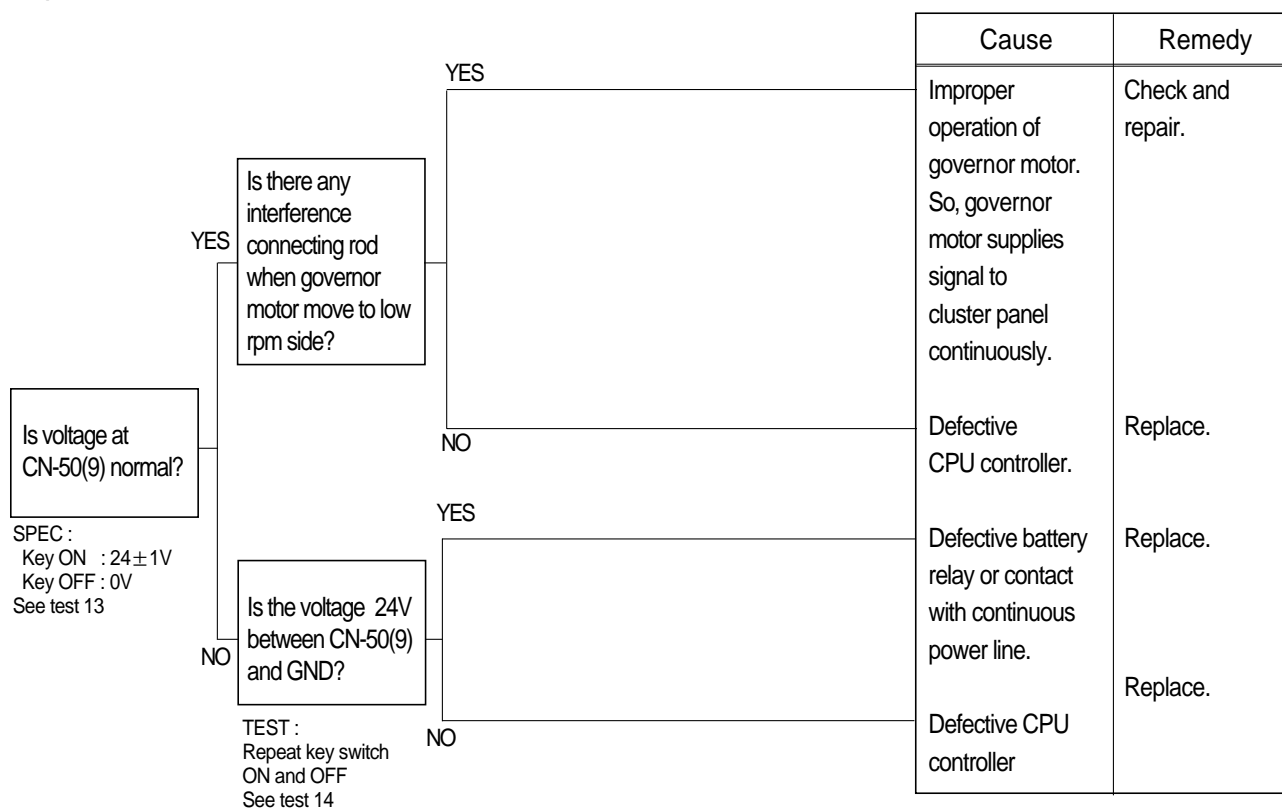
- ① Starting key OFF.
- ② Selecting the fuse at (18) of fuse box.
- ③ Check if the fuse is defective or not.



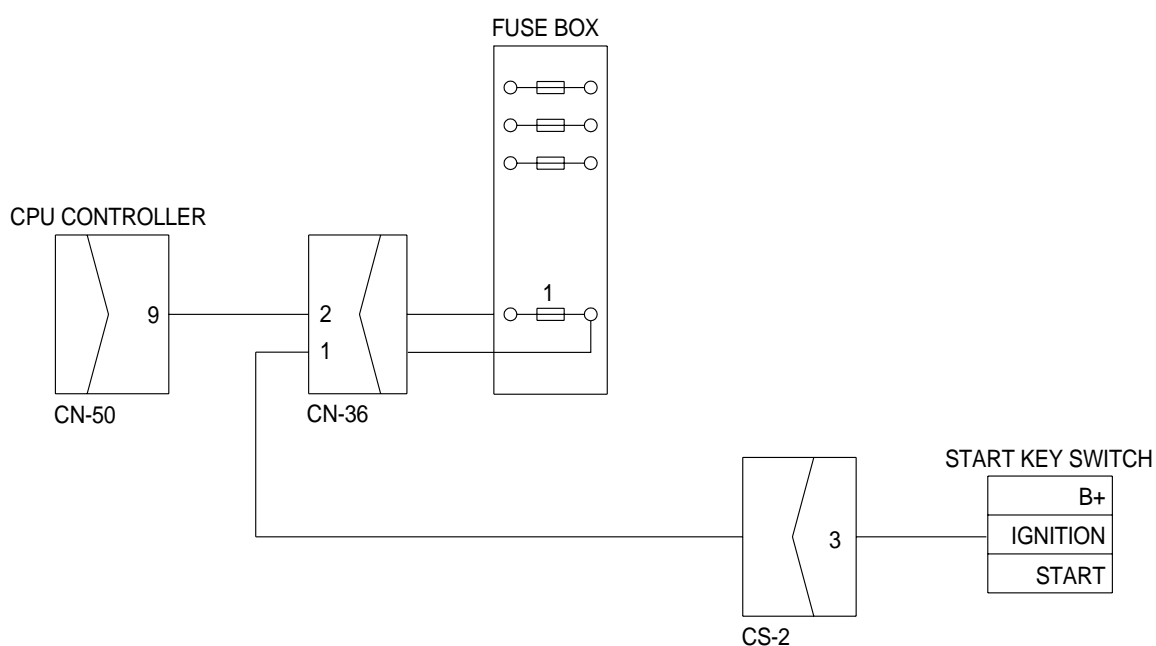
5. CLUSTER LAMPS ARE STILL ON AFTER STARTING KEY OFF

※ Before carrying out below procedure, check all the related connectors are properly inserted.

1) INSPECTION PROCEDURE



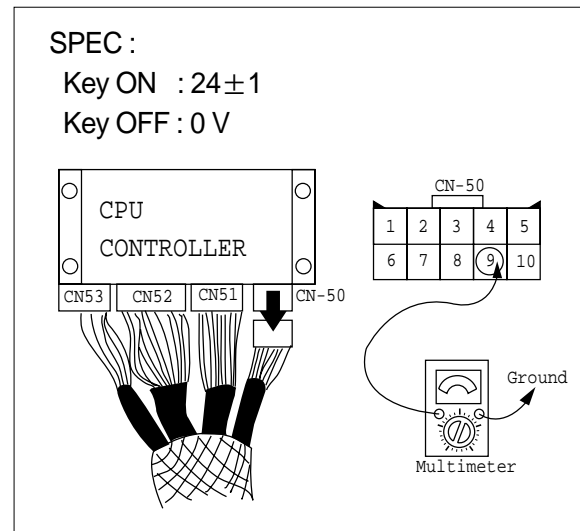
Wiring diagram



2) TEST PROCEDURE

(1) **Test 13** : Check voltage at (9) of CN-50.

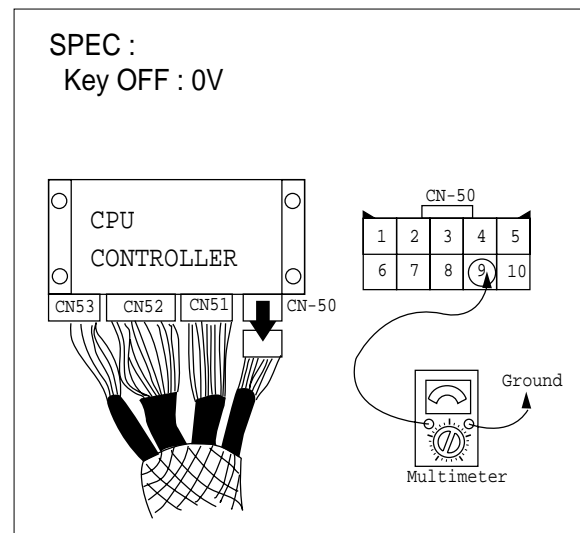
- ① Starting key ON.
- ② Disconnect connector CN-50 from CPU controller.
- ③ Check voltage as figure.



(2) **Test 14** : Check operating status of main power supply at (9) of CN-50.

- ① Starting key ON and OFF.
- ② Disconnect CN-50 from CPU controller.
- ③ Check if the voltage remains at 24 ± 1 volt in spite of operating key switch ON and OFF.

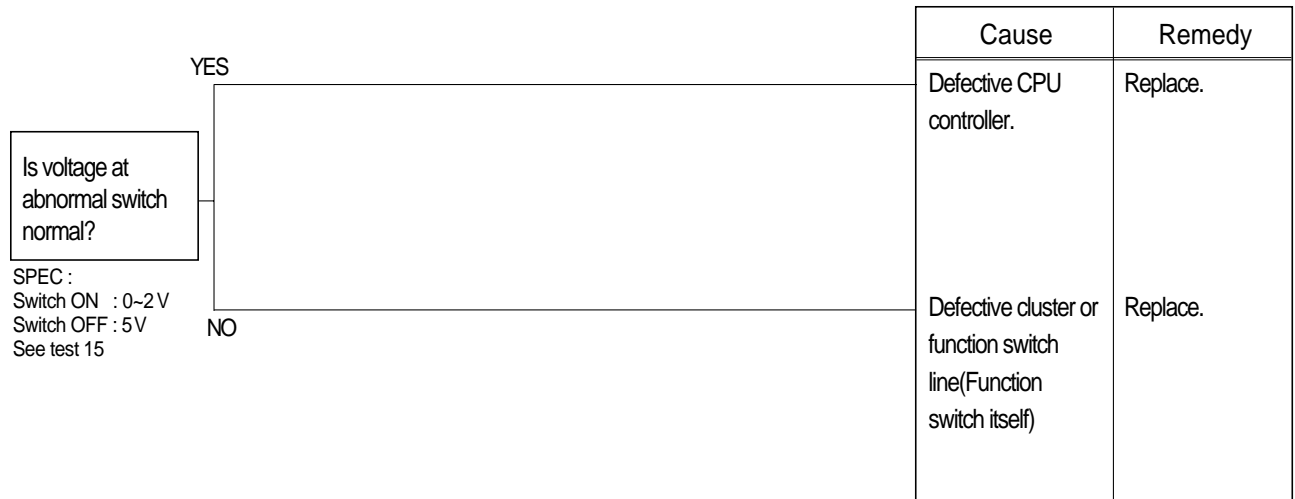
※ If there is certain amount of voltage, replace CPU controller.



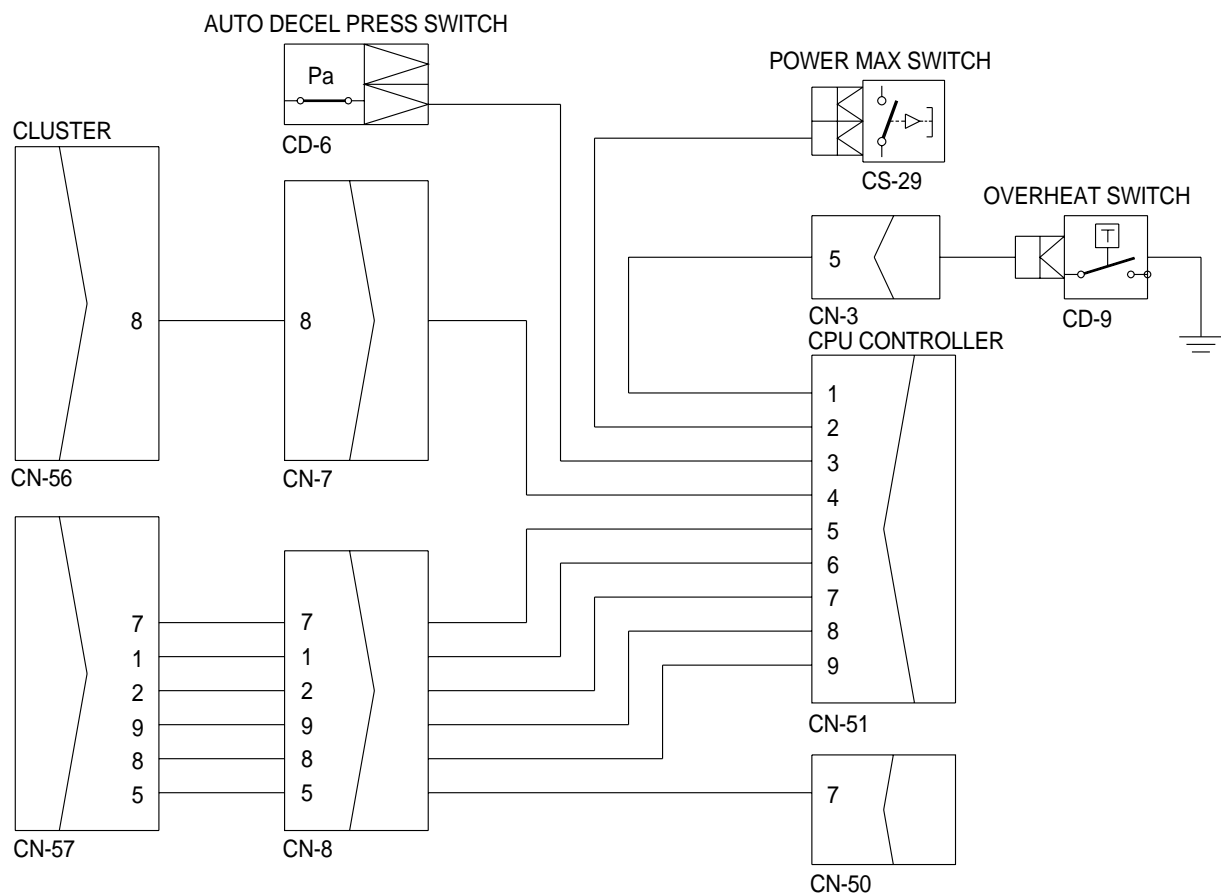
6. CLUSTER LAMPS ARE NOT CHANGING OR FUNCTION IS ABNORMAL WHEN THE RELATED SWITCH ARE PUSHED.

※ Before carrying out below procedure, check all the related connectors are properly inserted.

1) INSPECTION PROCEDURE

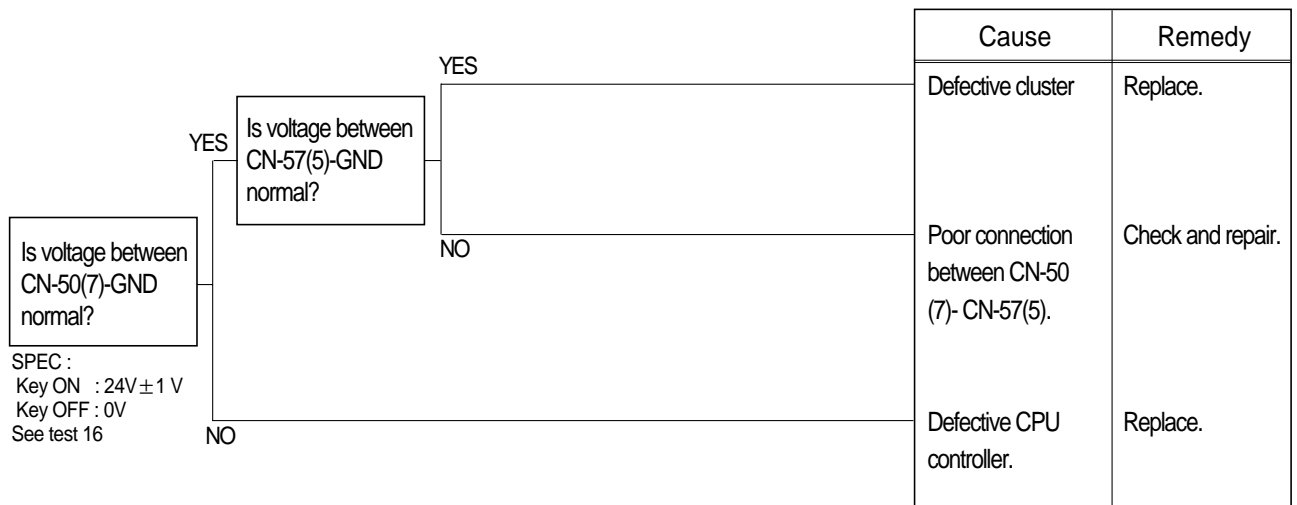


Wiring diagram

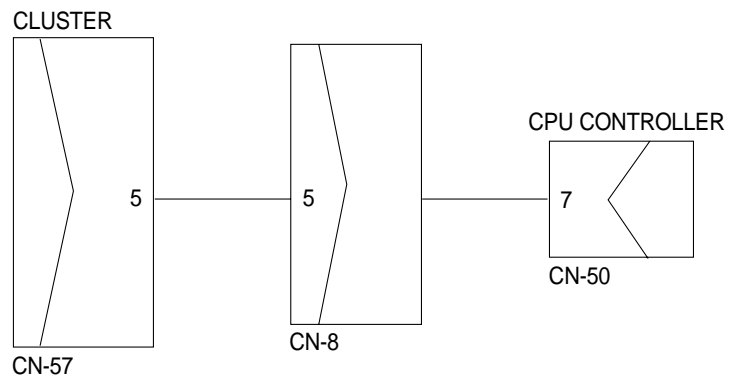


6-1. ALL CLUSTER LAMPS ARE OFF WHEN START KEY SWITCH IS ON POSITION.

※ Before carrying out below procedure, check all the related connectors are properly inserted.



Wiring diagram



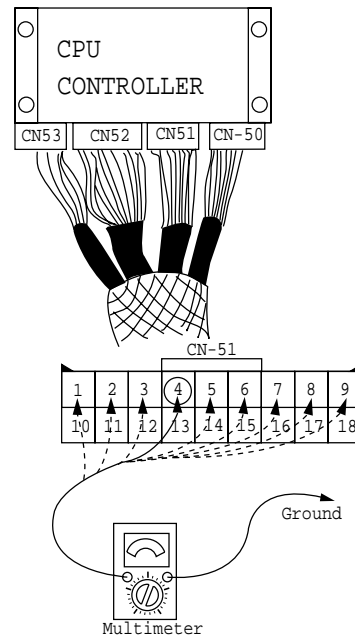
2) TEST PROCEDURE

(1) **Test 15** : Check voltage for malfunction switches.

- ① Starting key ON.
- ② Check voltage as figure.

SPEC : Switch push once : 0~2 V

Switch push once more : 4.5~5.5 V

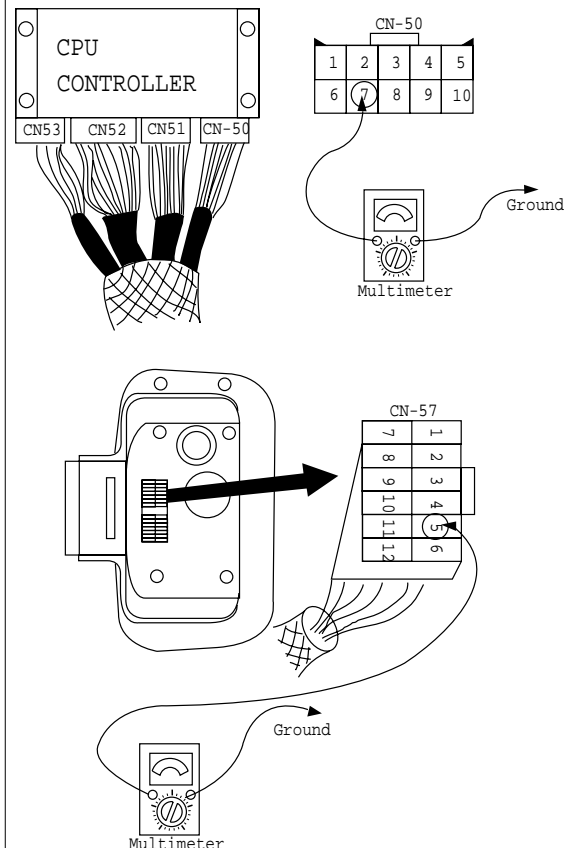


(2) **Test 16** : Check voltage for CN-50, CN-57

- CN-50 : output power($24 \pm 1V$)
- CN-57 : input power($24 \pm 1V$)

- ① Starting key ON.
- ② Remove cluster from panel.
- ※ Don't disconnect connector CN-50 from CPU controller.
- ③ Disconnect connector CN-57 from cluster.
- ④ Check voltage CN-50, CN-57 with ground as figure.

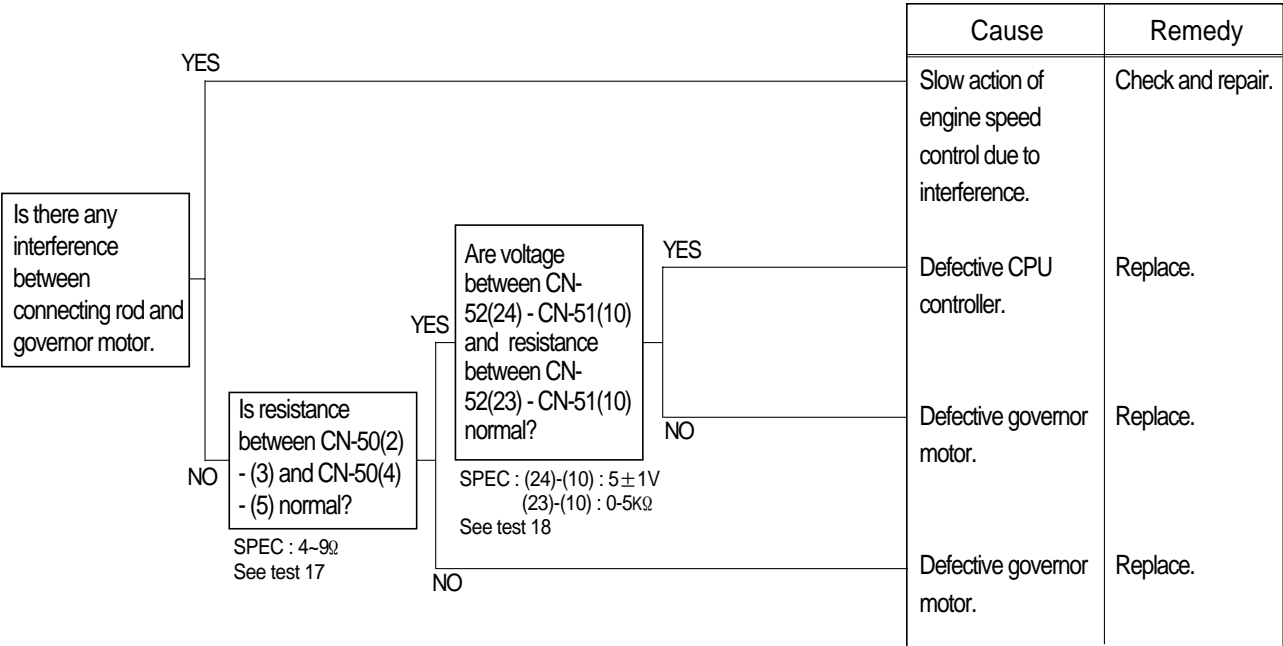
SPEC : $24 \pm 1V$



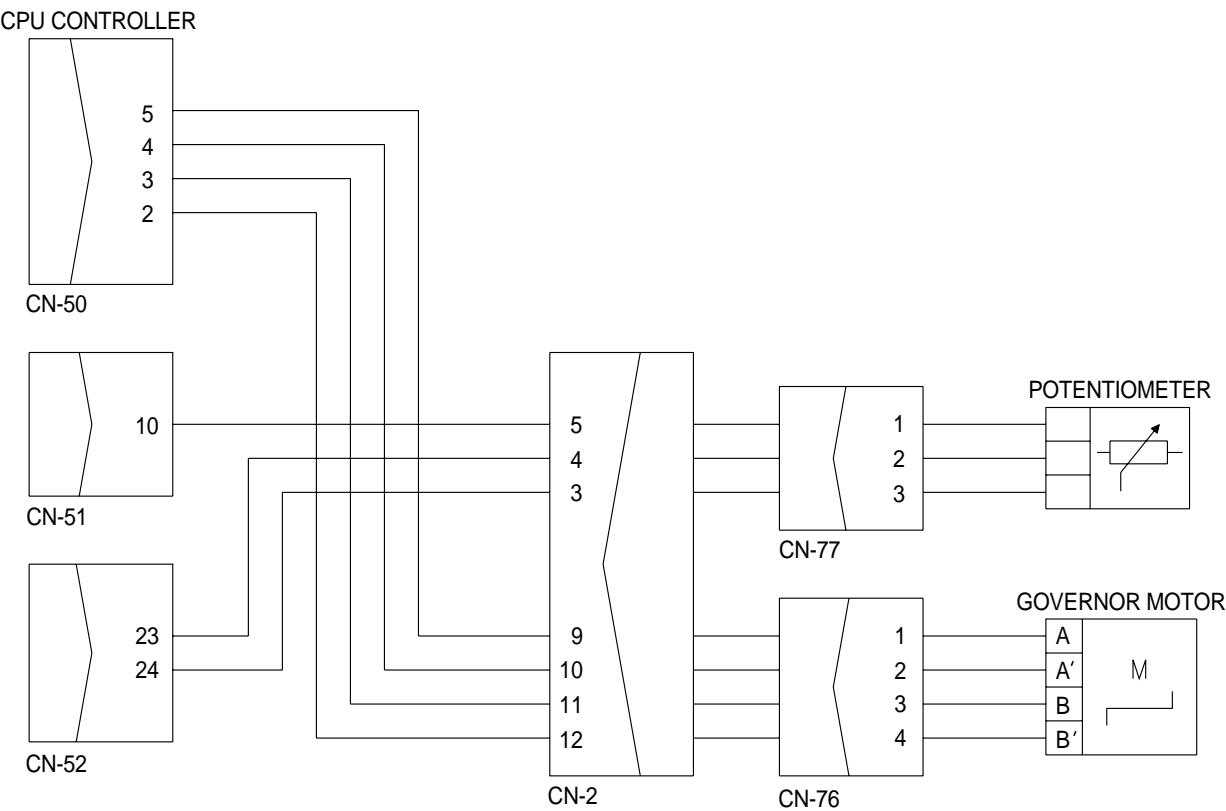
7. SLOW ACTION OF ENGINE SPEED CHANGE WHEN CHANGE THE MODE

※ Before carrying out below procedure, check all the related connectors are properly inserted.

1) INSPECTION PROCEDURE



Wiring diagram

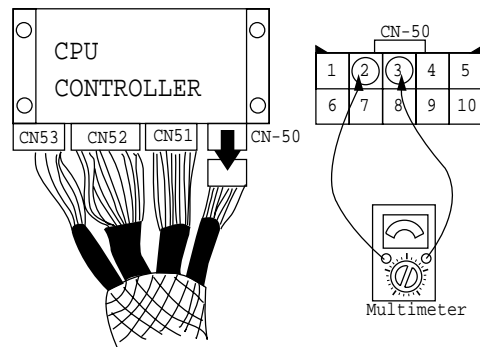


2) TEST PROCEDURE

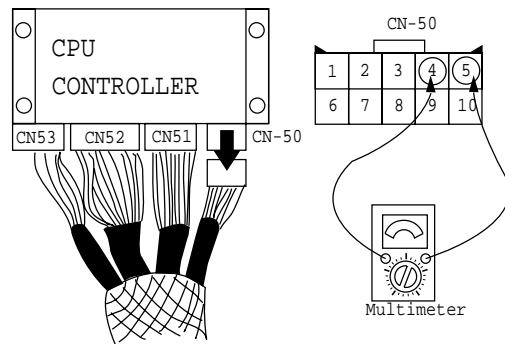
(1) **Test 17** : Check resistance

- ① Starting key OFF.
- ② Disconnect connector CN-50 from CPU controller.
- ③ Check resistance between (2) and (3), (4) and (5) of CN-50 as figure.

Test - a



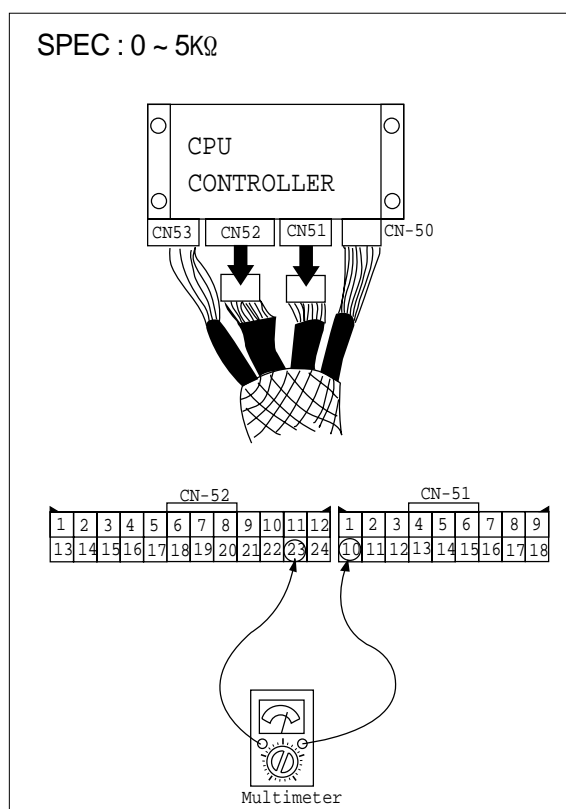
Test - b



(2) **Test 18** : Check voltage and resistance.

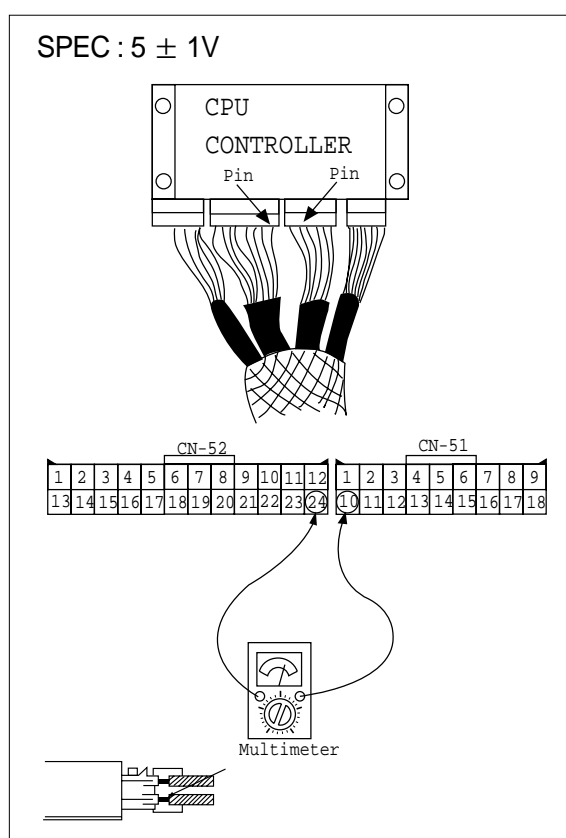
① Check resistance between (23) of CN-52 and (10) of CN-51.

- Starting key OFF.
- Disconnect connector CN-52 and CN-51 from CPU controller.
- Check resistance with multimeter as figure.



② Check voltage between (24) of CN-52 and (10) of CN-51.

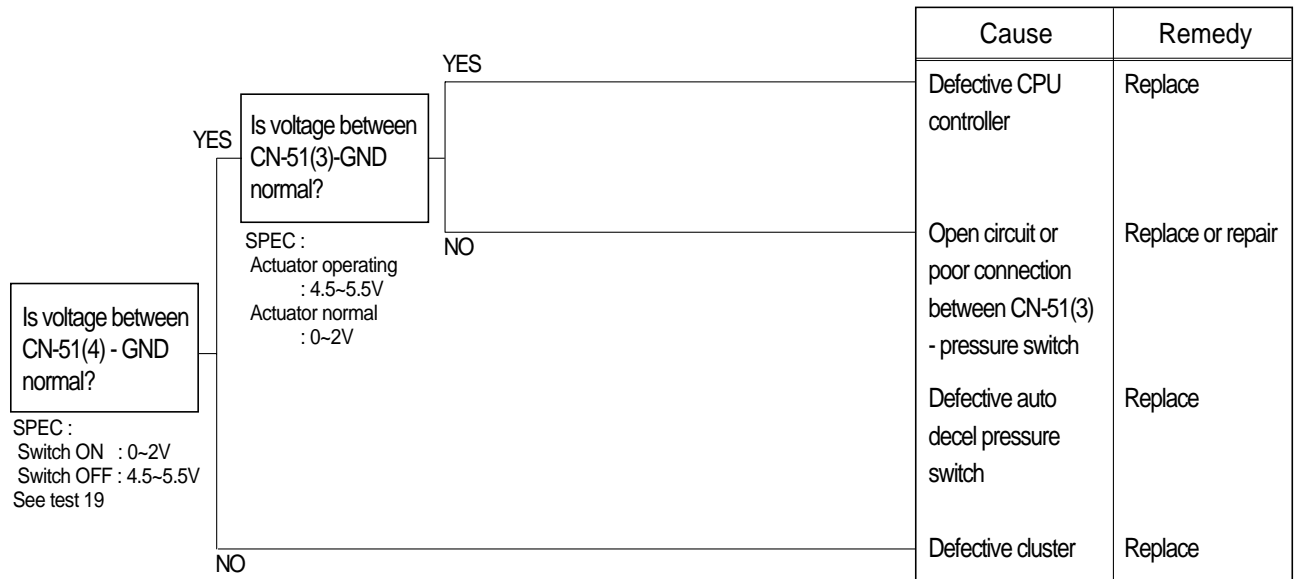
- Prepare 2 pieces of thin sharp pin, steel or copper.
- Starting key ON.
- Insert prepared pins to rear side of connectors :
 - One pin to (24) of CN-52
 - Other pin to (10) of CN-51
- Check voltage.



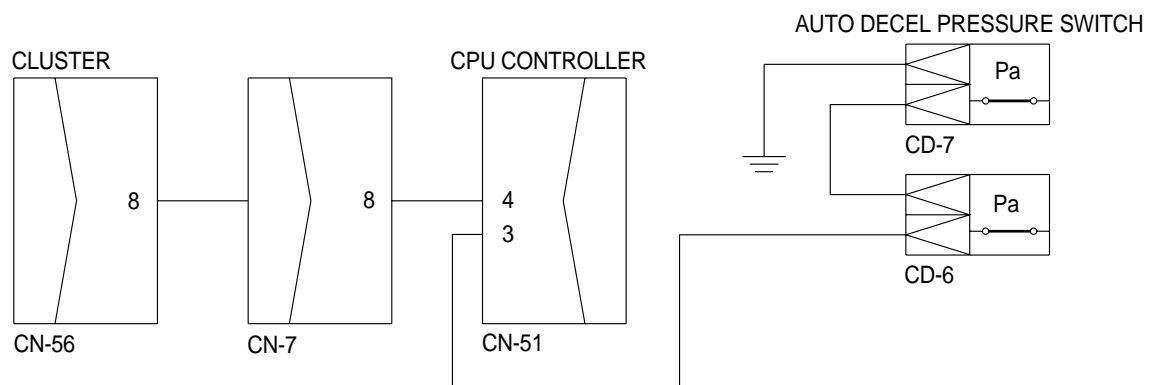
8. AUTO DECEL SYSTEM DOES NOT WORK

※ Before carrying out below procedure, check all the related connectors are properly inserted.

1) INSPECTION PROCEDURE



Wiring diagram



2) TEST PROCEDURE

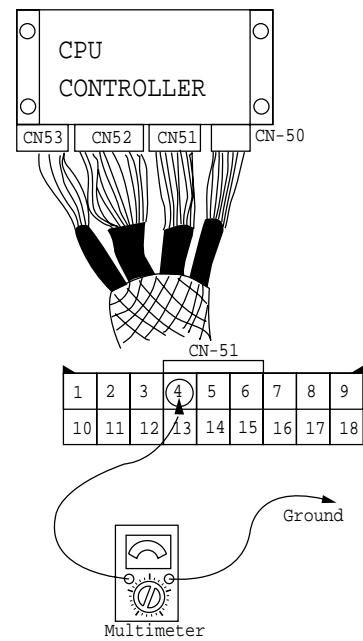
(1) **Test 19** : Check voltage at CN-51(4) and ground.

- ① Starting key OFF.
- ② Turn start key ON.
Check voltage as figure.

SPEC :

Auto decel switch ON(Light ON) : 0~2V

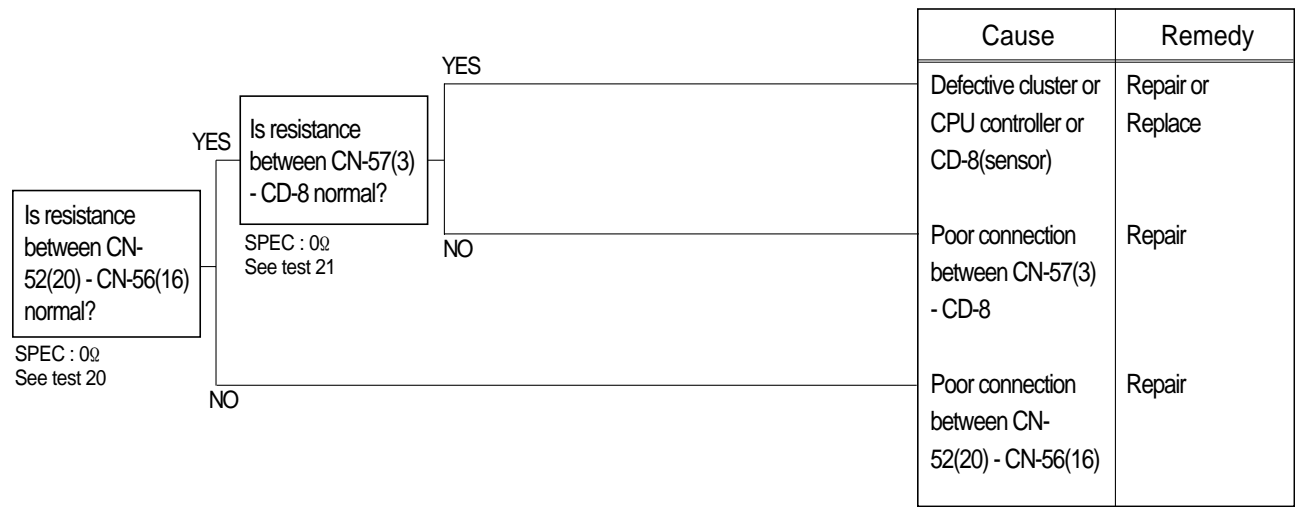
Auto decel switch OFF(Light OFF) : 4.5~5.5V



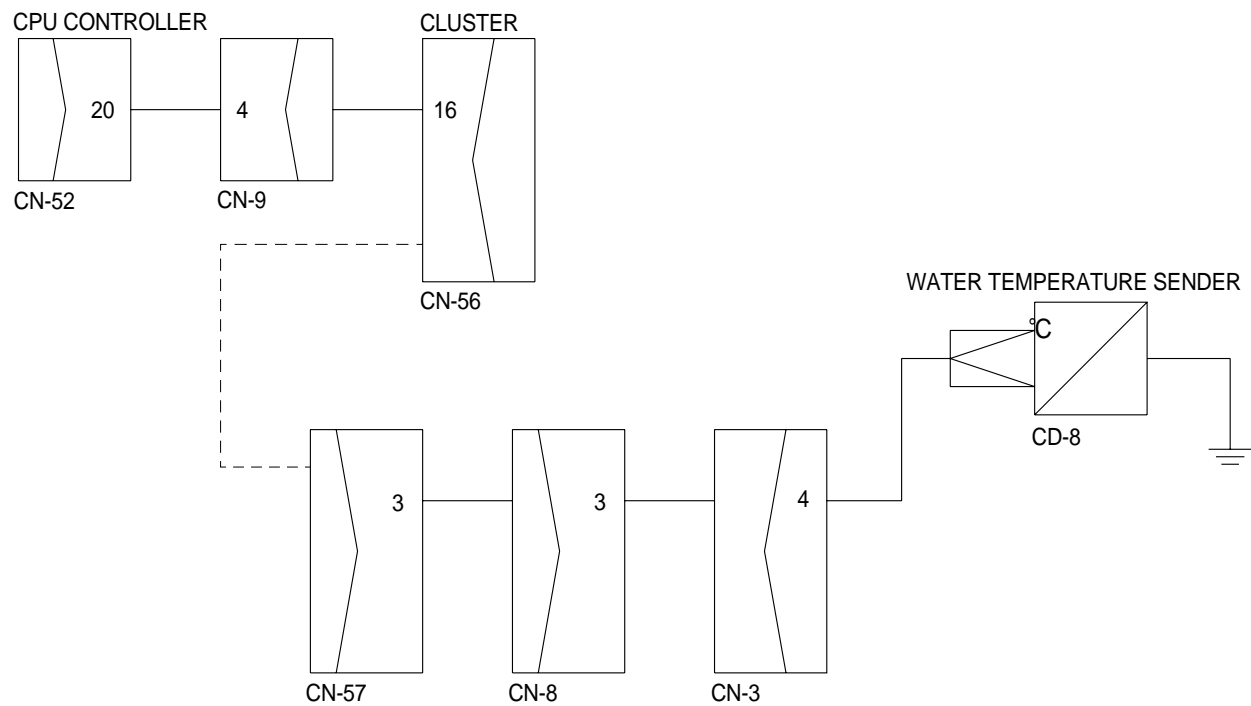
9. MALFUNCTION OF WARMING UP

※ Before carrying out below procedure, check all the related connectors are properly inserted.

1) INSPECTION PROCEDURE

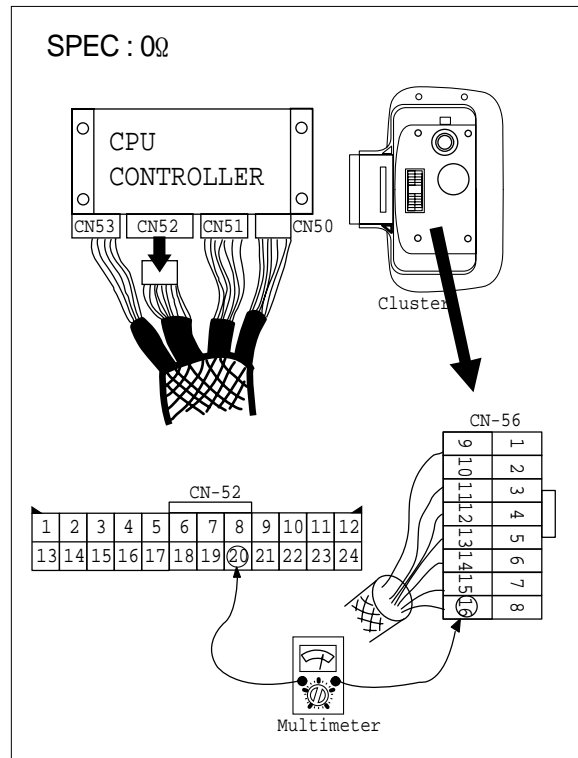


Wiring diagram

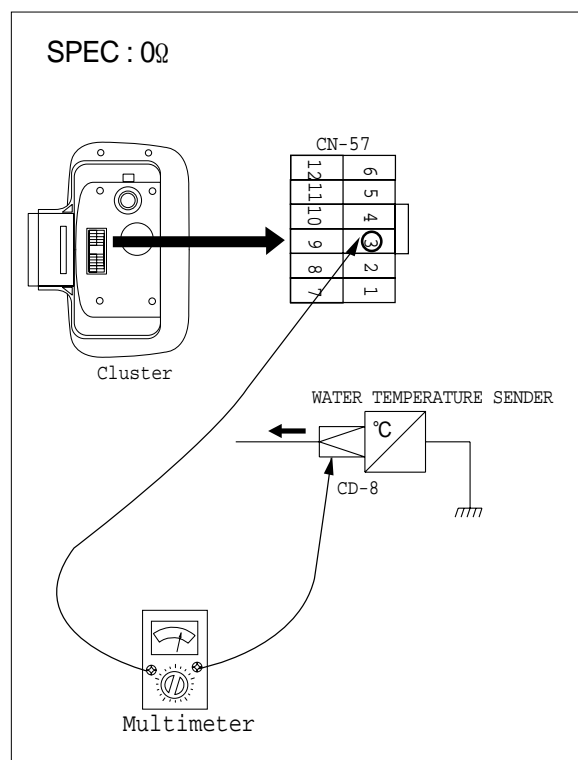


2) TEST PROCEDURE

- (1) **Test 20** : Check resistance between connector (20) of CN-52 and (16) of CN-56.
- ① Starting key OFF.
 - ② Remove CPU controller and disconnect CN-52 from CPU controller.
 - ③ Remove cluster and disconnect CN-56 from cluster.
 - ④ Check resistance as figure.



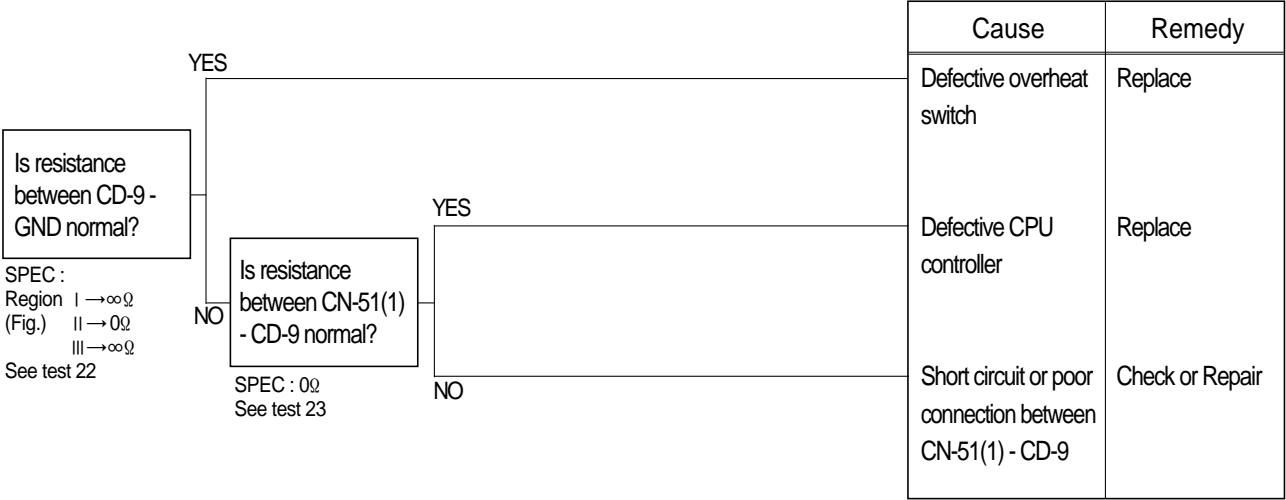
- (2) **Test 21** : Check resistance between connector (3) of CN-57 - CD-8.
- ① Starting key OFF.
 - ② Remove cluster and disconnect CN-57 from cluster.
 - ③ Disconnect connector CD-8 of water temp sensor at engine head.
 - ④ Check resistance as figure.



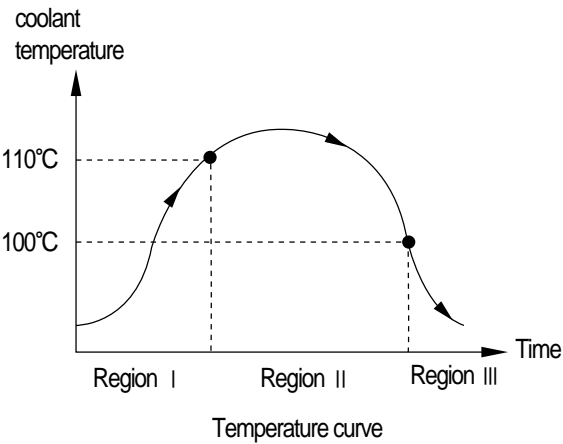
10. MALFUNCTION OF OVERHEAT

※ Before carrying out below procedure, check all the related connectors are properly inserted.

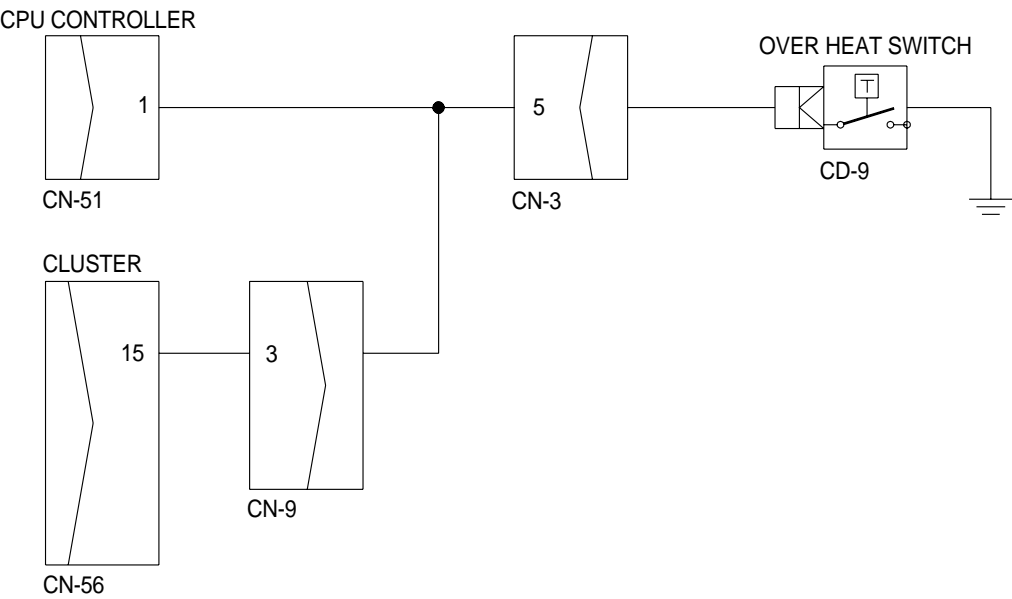
1) INSPECTION PROCEDURE



- ※ Overheat switch ON : coolant temperature 110°C
- ※ Overheat switch OFF : coolant temperature 100°C



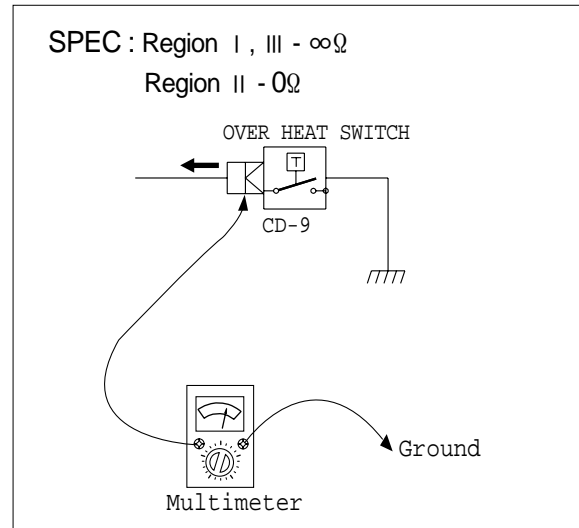
Wiring diagram



2) TEST PROCEDURE

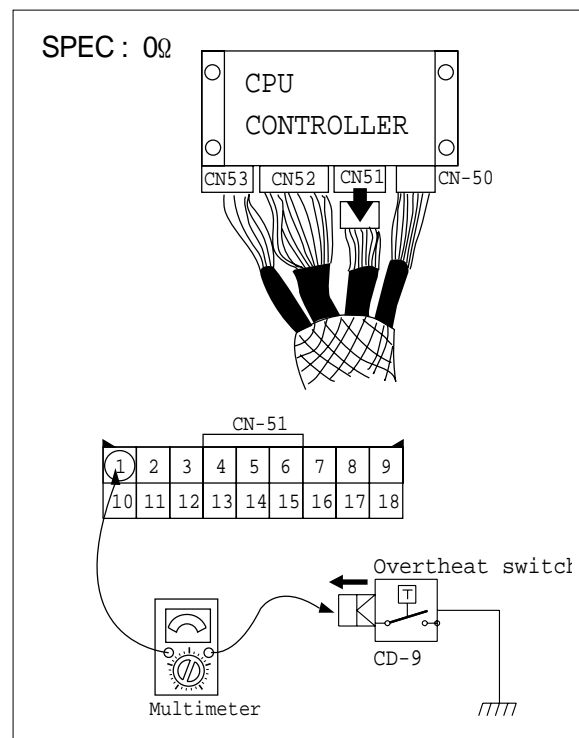
(1) **Test 22** : Check resistance between connector CD-9 - GND.

- ① Starting key OFF.
- ② Disconnect connector CD-9 of overheat switch at engine head.
- ③ Check resistance as figure.



(2) **Test 23** : Check resistance between connector (1) of CN-51 - CD-9.

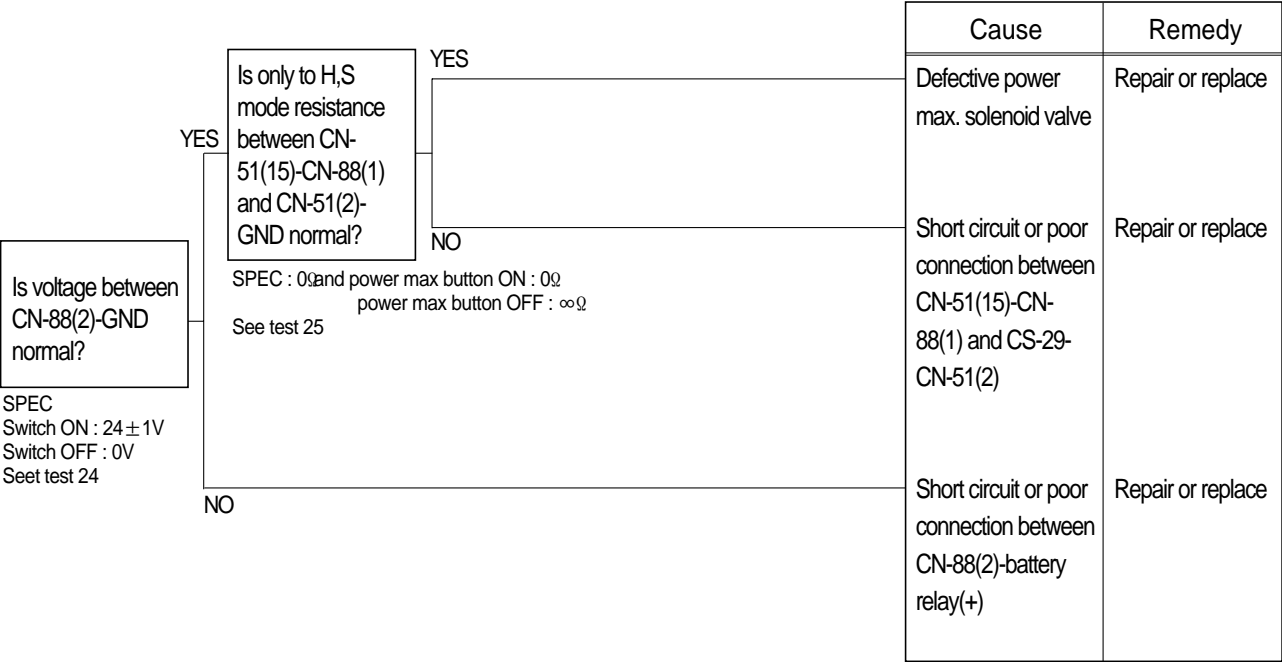
- ① Starting key OFF.
- ② Remove CPU controller and disconnect connector CN-51 from CPU controller.
- ③ Disconnect connector CD-9 of overheat switch at engine head.
- ④ Check resistance as figure.



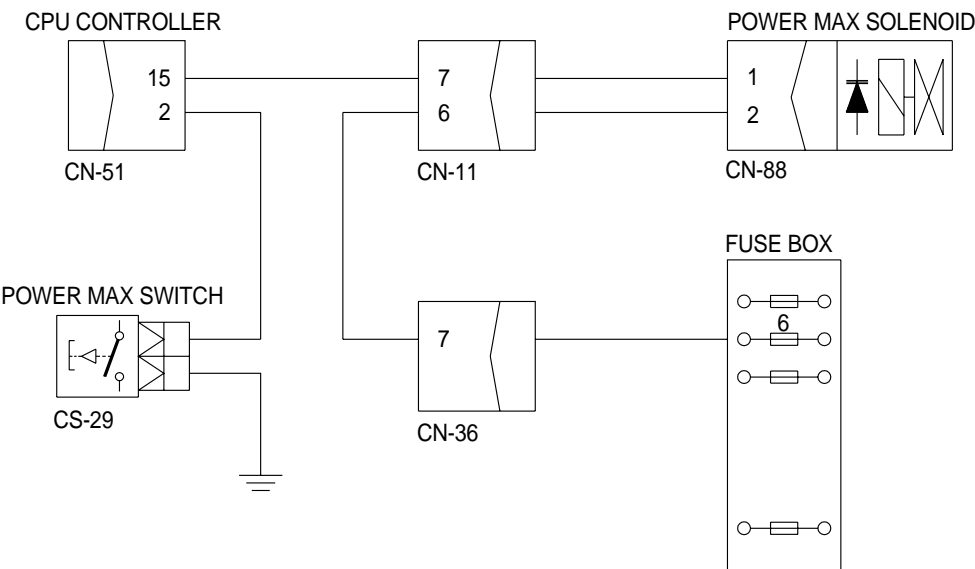
11. MALFUNCTION OF POWER MAX

※ Before carrying out below procedure, check all the related connectors are properly inserted.

1) INSPECTION PROCEDURE



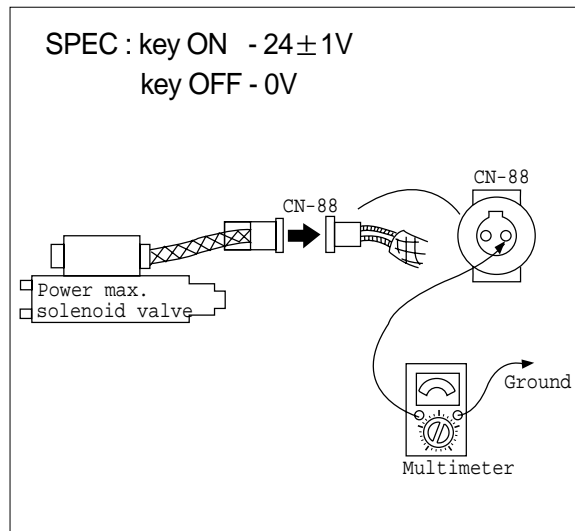
Wiring diagram



2) TEST PROCEDURE

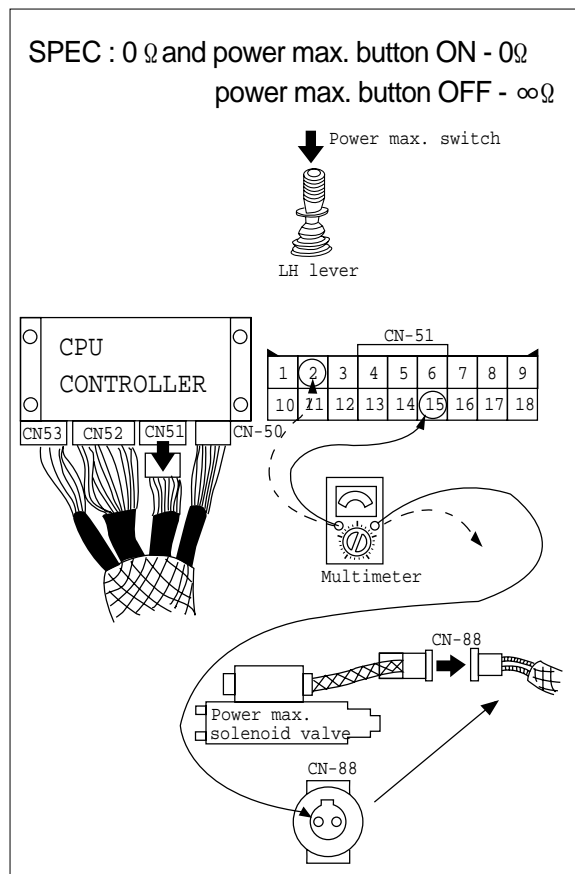
(1) **Test 24** : Check voltage at (2) of connector CN-88 - GND.

- ① Start key ON.
- ② Disconnect connector CN-88 from power max. solenoid valve.
- ③ Check voltage as figure.



(2) **Test 25** : Check resistance between connector (15) of CN-51-(1) of CN-88 and CND-(2) of CN-51.

- ① Starting key OFF.
- ② Remove CPU controller and disconnect connector CN-51 from CPU controller.
- ③ Disconnect connector CN-88 from power max. solenoid valve.
- ④ Check resistance as figure.



12. OPEN OR SHORT CIRCUIT OF GOVERNOR MOTOR SYSTEM

- Before checking, check all the related connectors are properly inserted.
- Before carrying out next procedure, connect the disconnected connectors again immediately unless otherwise specified.

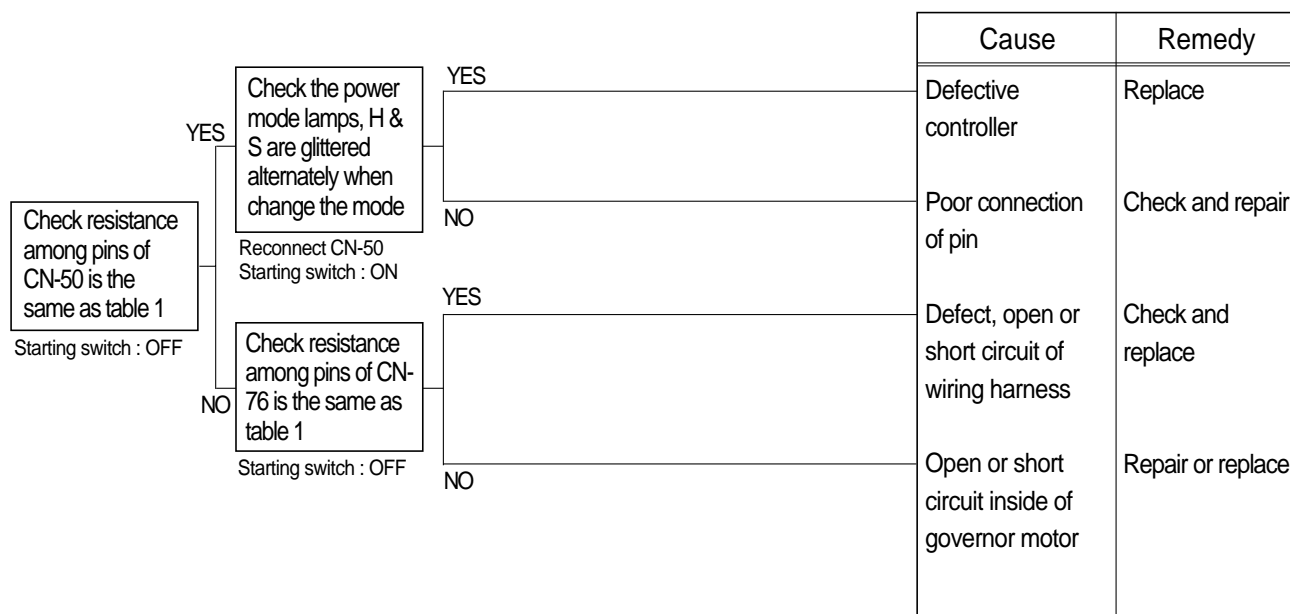
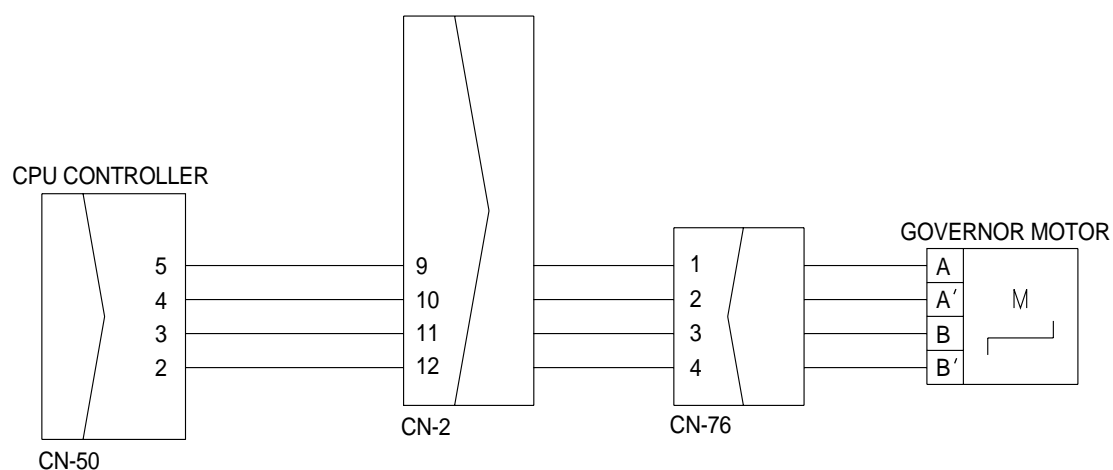


Table 1

CN-50(Female)	CN-76(Male)	Resistance
(5) - (4)	(1) - (2)	4 ~ 9Ω
(3) - (2)	(3) - (4)	4 ~ 9Ω
(5) - (3)	(1) - (3)	Min 1MΩ
(5) - (2)	(1) - (4)	
Pin(2),(3),(4),(5) - chassis	Pin (1),(2),(3),(4) - chassis	



13. OPEN OR SHORT CIRCUIT OF POTENTIOMETER SYSTEM

- Before checking, check all the related connectors are properly inserted.
- Before carrying out next procedure, connect the disconnected connectors again immediately unless otherwise specified.

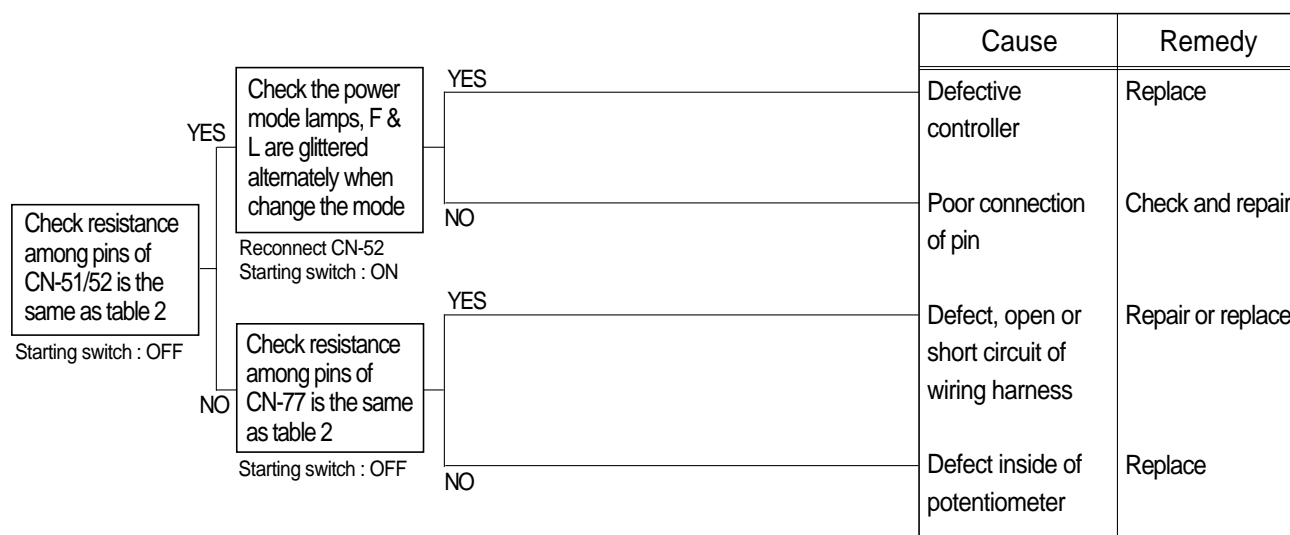


Table 2

CN-51,CN-52(Female)	CN-77(Male)	Resistance
(23) - (24)	(2) - (3)	0.25 ~ 6KΩ
(23) - (10)	(2) - (1)	0.25 ~ 6KΩ
(24) - (10)	(1) - (3)	4 ~ 6KΩ

