

KU-KA44143A Connection Tester User Manual



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Disclaimer

Regarding the specifications of this product, it is considered that you have agreed to the disclaimer described below.

1. When the application system is designed using this product, please design the system at your own risk. Please read, consider, and apply appropriate usage notes and description in this standard.
2. When designing your application system, please take into the consideration of break down and failure mode occurrence and possibility in semiconductor products. Measures on the systems such as, but not limited to, redundant design, mitigating the spread of fire, or preventing glitch, are recommended in order to prevent physical injury, fire, social damages, etc. in using the Nuvoton Technology Japan Corporation (hereinafter referred to as NTCJ) products.
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6. Unless this product is indicated by NTCJ to be used in applications as meeting the requirements of a particular industry standard (e.g., ISO 9001, IATF 16949, ISO 26262, etc.), this product is neither designed nor intended for use in such environments for that applications. NTCJ shall not be held responsible for not meeting the requirements of a particular industry standard.
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Chapter 1 : Introduction

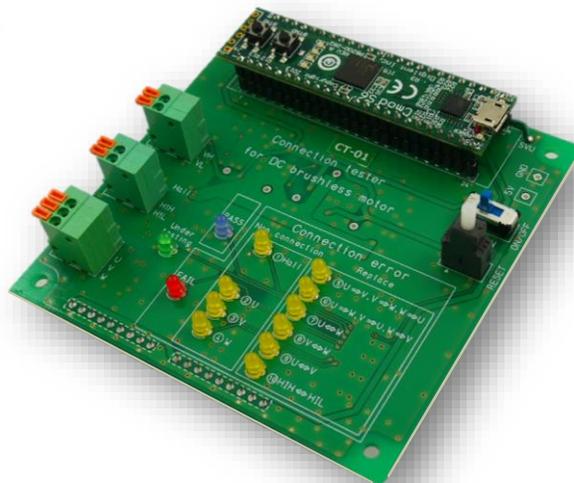
■ Overview

This connection tester is a support tool for driving a 3-phase BLDC motor with KE-KA44143A evaluation board.

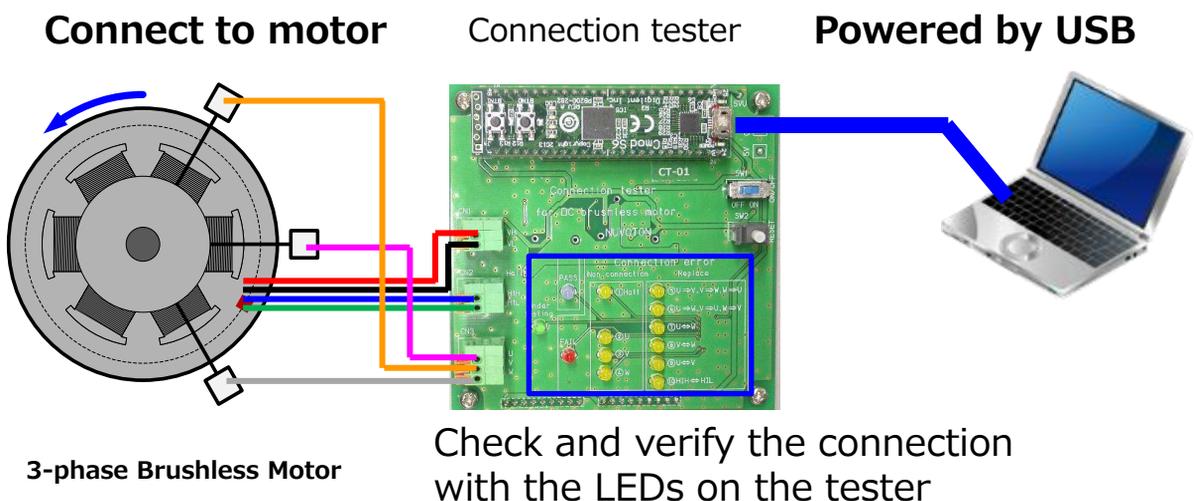
Power of this connection tester is supplied from a PC via USB. The connection between the KE-KA44143A evaluation board and the motor can be determined by connecting the 3-phase terminal and the Hall signal terminal of the motor to the tester and rotating the motor manually.

The test result can be confirmed by the LED on the tester. If the connection are correct, the blue color [PASS LED](#) will light up. If the connection is incorrect, the red color [FAIL LED](#) lights up. The yellow color [Error LEDs](#) indicate the details of the connection error, so the incorrect connection can be corrected easily.

■ Tester photo



■ Connection diagram



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Chapter 2 : Prepare items

Please prepare the following items for motor connection checking.



3-phase Brushless motor



Connection tester



PC or USB battery



USB cable (micro USB B type)



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Chapter 3 : Connection between Motor and Tester

3 – 1. Connection description

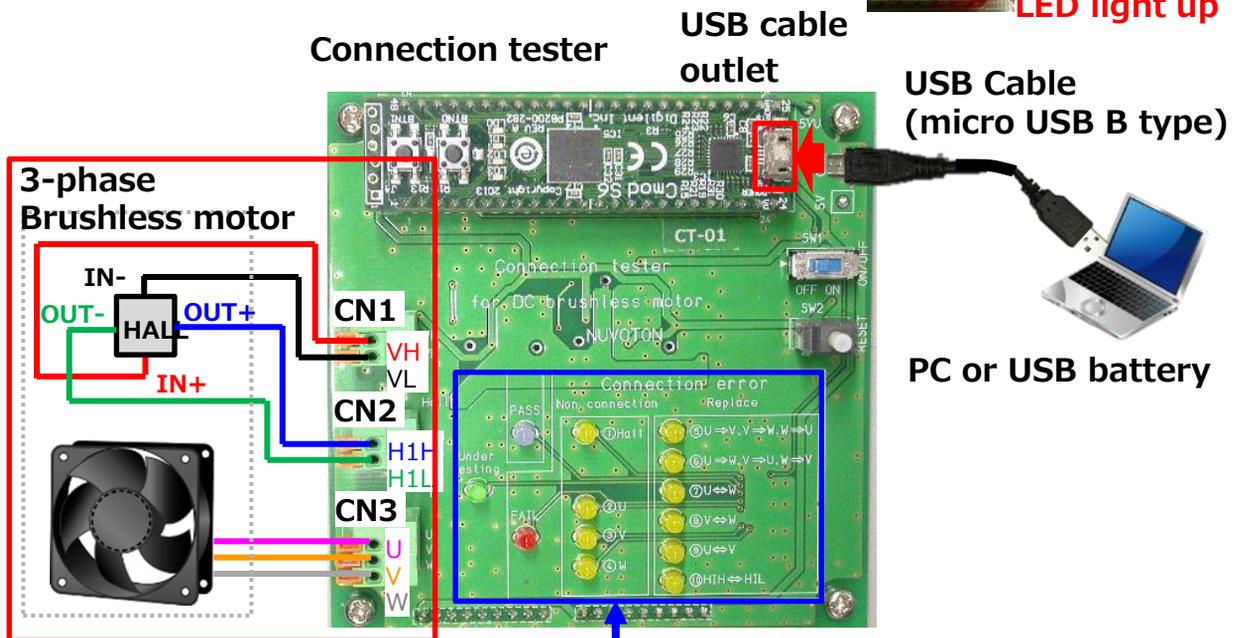
Connect the motor, connection tester, USB cable, and PC as follows.

■ Connection diagram

When you connect the PC and the tester with a USB cable, the LED shown below light up.
(Power is supplied to the tester via USB)



LED light up



Refer to the next page for the connection of motor outputs and hall signals.

(note)

After connecting the PC and the tester with a USB cable, all the LEDs will turn on for about 1 second, and then turn off.

Please be noted that it is not a malfunction. Follow the procedure in the remaining pages to check the connection.

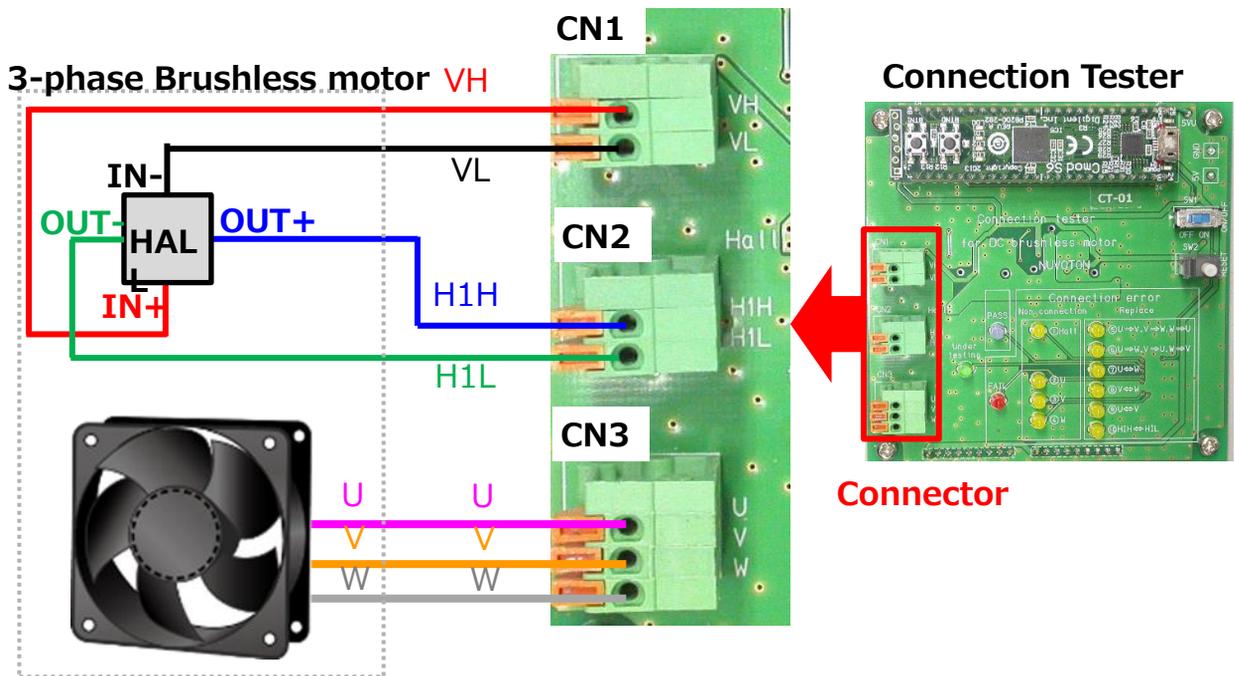


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Chapter 3 : Connection between Motor and Tester

3 – 2. Connection between Motor and Tester

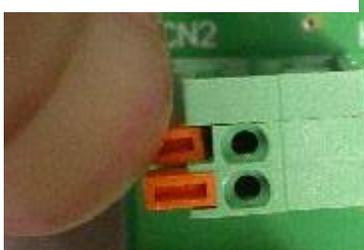
Connect the wirings between motor and tester as shown in the figure below.



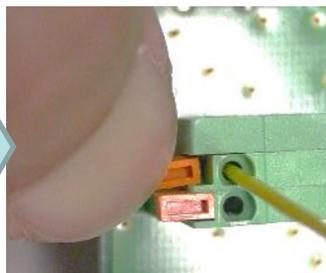
■ How to connect the tester connector and motor wiring

Connect the wirings from motor to the connector on the tester as shown in the figure below.

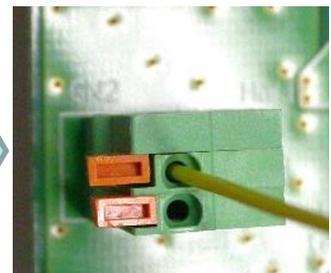
1) Press down **the orange switch** on the connector



2) Insert the motor wiring into the hole



3) Check that the wires do not come out of the hole.



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Chapter 4 : How to use

4 – 1. How to use

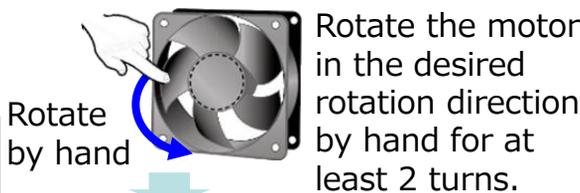
Please follow the steps below to check the connection

Step (1) Power on



Slide the SW1 knob to the right

Step (2) Rotate the motor by hand



Rotate the motor in the desired rotation direction by hand for at least 2 turns.

Step (3) Reset



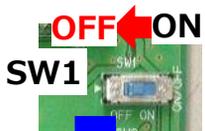
Push SW2 knob once while the motor is rotating.

Step (4) Check LEDs for connection confirmation



PASS LED lights up

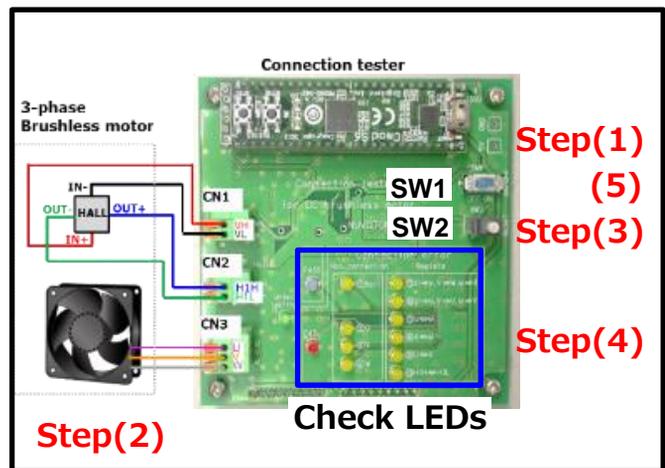
Step (5) Power off



Slide the SW1 knob to the left to POWER OFF

Step (6) Reconnect to KE-KA44143 EVB

In case of FAIL, repeat from Step (1)



Step(2)

Check LEDs

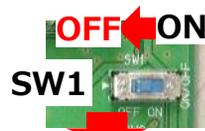
Step(1)
(5)
Step(3)
Step(4)

FAIL LED lights up

FAIL Lights up

Error code LEDs

Step (5) Power off



Slide the SW1 knob to the left to POWER OFF

Step (6) Correct according to the error code

Reconnect the wirings to the KE-KA44143A evaluation board, as shown in next page

Correct the connection according to the error code table in Page 11 and repeat the steps from Step (1).

Go to next page

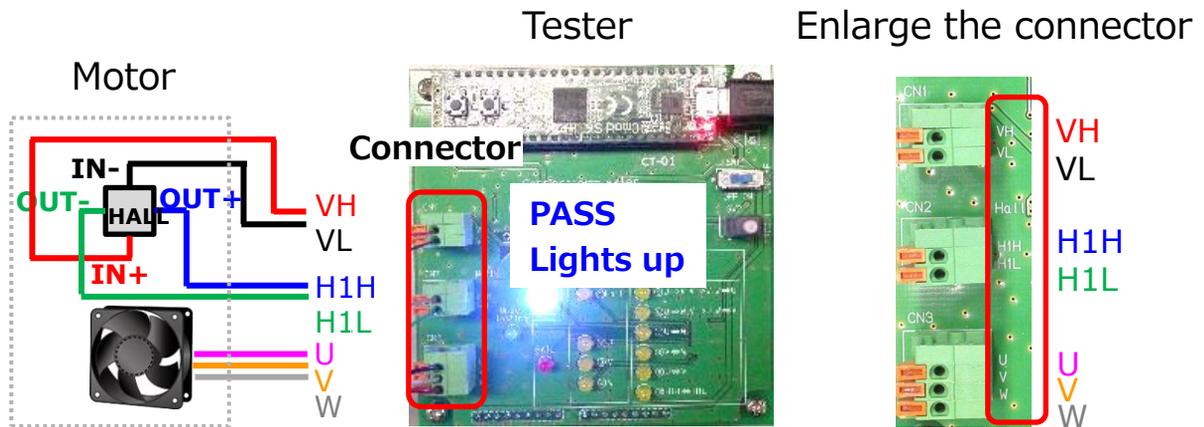


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Chapter 4 : How to use

4 – 2. Swap the KE-KA44143A evaluation board

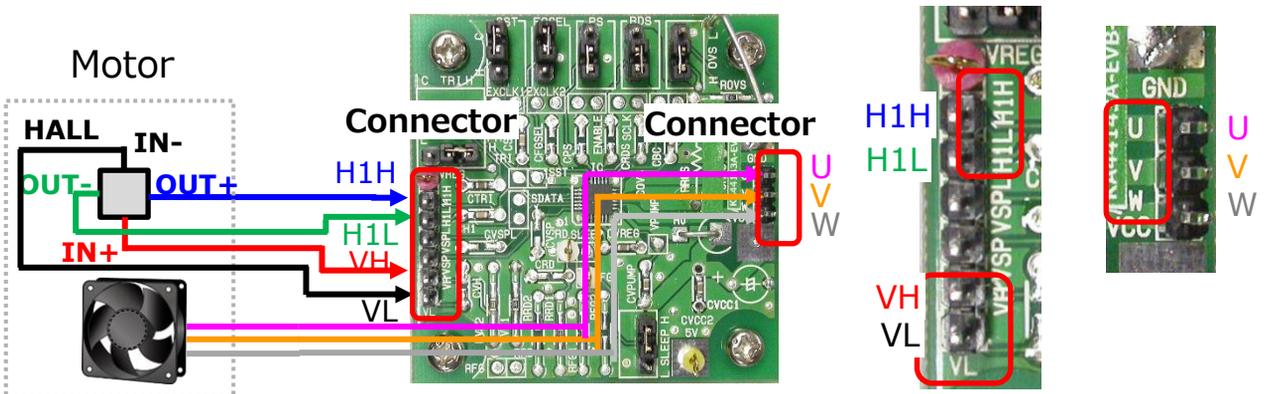
If the PASS LED lights up, disconnect the motor wires from the tester one at a time,



Connect to the same terminal name

Reconnect the wire to the terminal on the KE-KA44143A evaluation board with the same name accordingly

KE-KA44143A Evaluation Board Enlarge the connector



With this, the connection setting is completed. Now, KE-KA44143A EVB is ready to drive the motor. Experience the stable and high efficiency driving with KA44143A.

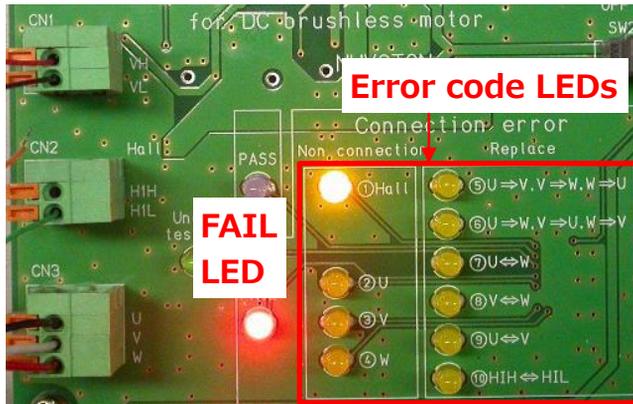


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Chapter 4 : How to use

4 – 3. What to do when fail LED lights up

Correct the connection according to the error code table below.



If the connection is incorrect, the FAIL LED and the corresponding error code LEDs will light up at the same time.

(note)

Multiple error code LEDs may light up. In this case, **please deal with all the wrong connections indicated by error code LEDs.**

The corrective action for the error code LED differs depending on the LED. A list of error code LEDs is shown in the table below, so refer to the corresponding section.

Error Code	Error details		Countermeasure	Page	
FAIL	①	Signal Input error	Hall signal	Check connection of the Hall signal (VH, VL, H1H, H1L)	P.12
	②		Motor U	Check connection of the motor U	P.12
	③		Motor V	Check connection of the motor V	P.13
	④		Motor W	Check connection of the motor W	P.13
	⑤	Wrong connection	Motor U,V,W	Reconnect the connection $U \Rightarrow V, V \Rightarrow W, W \Rightarrow U$	P.14
	⑥		Motor U,V,W	Reconnect the connection $U \Rightarrow W, V \Rightarrow U, W \Rightarrow V$	P.14
	⑦		Motor U,W	Reconnect the connection between motor U and W	P.15
	⑧		Motor V,W	Reconnect the connection between motor V and W	P.15
	⑨		Motor U,V	Reconnect the connection between motor U and V	P.16
	⑩		Hall signal	Reconnect the connection between Hall H1H and H1L	P.16
No light	Open connection for all wiring. No power input.		Check connection of all wiring. Confirm that the power is applied and SW1 is ON.	P.17	



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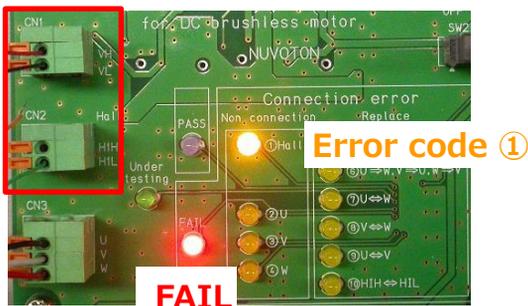
Chapter 4 : How to use

4 – 4. Countermeasures(error code ① and ②)

If the error code LED lights up, please take the following countermeasures.

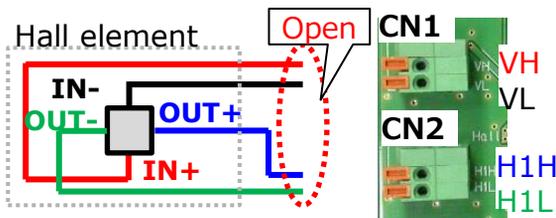
【Error code ① lights up】

Make sure that the LED is lit as shown below.



■ Error contents

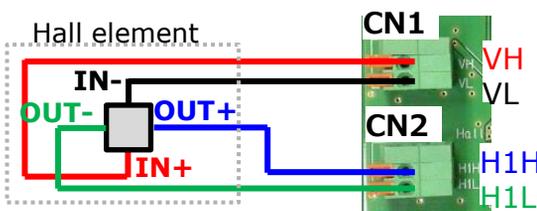
Hall signals (VH, VL, H1H, H1L terminals) are not connected correctly.



Check the connection of hall signals (VH, VL, H1H, H1L)

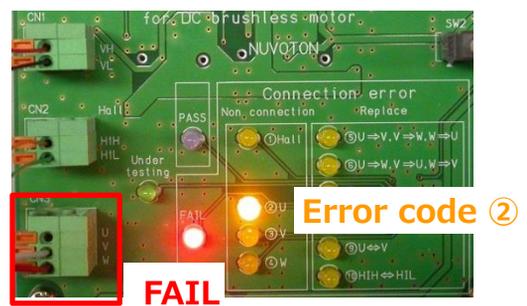
■ Countermeasures

Check the connection of hall signals (VH, VL, H1H, H1L)



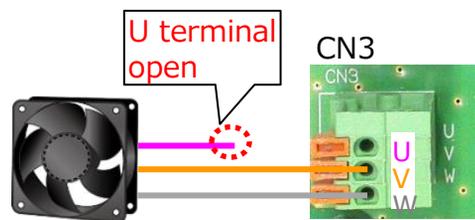
【Error code ② lights up】

Make sure that the LED is lit as shown below.



■ Error contents

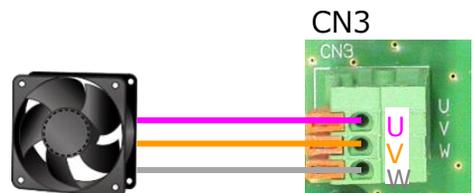
The U terminal is not connected correctly.



Check the U terminal connection

■ Countermeasures

Check the connection of the U terminal.



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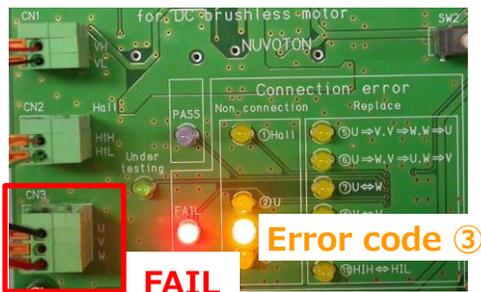
Chapter 4 : How to use

4 – 5. Countermeasures(error code ③ and ④)

If the error code LED lights up, please take the following countermeasures.

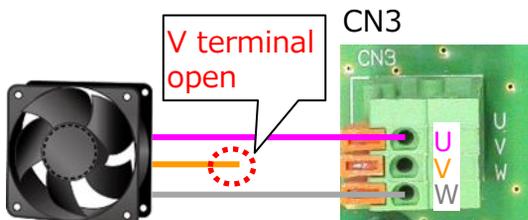
【Error code ③ lights up】

Make sure that the LED is lit as shown below.



■ Error contents

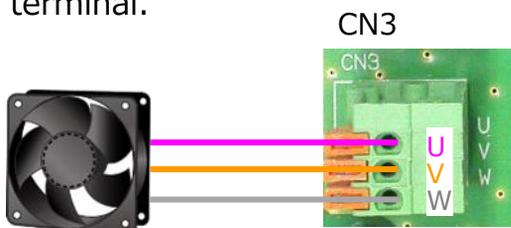
The V terminal is not connected correctly.



Check the V terminal connection

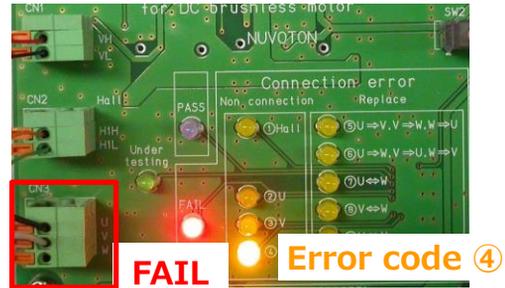
■ Countermeasures

Check the connection of the V terminal.



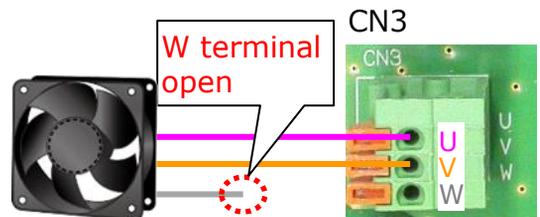
【Error code ④ lights up】

Make sure that the LED is lit as shown below.



■ Error contents

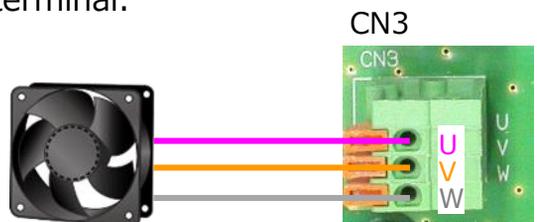
The W terminal is not connected correctly.



Check the W terminal connection

■ Countermeasures

Check the connection of the W terminal.



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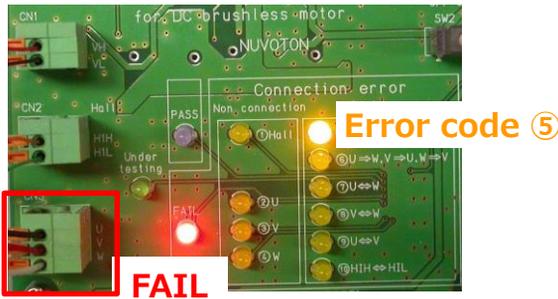
Chapter 4 : How to use

4 – 6. Countermeasures(error code ⑤ and ⑥)

If the error code LED lights up, please take the following countermeasures.

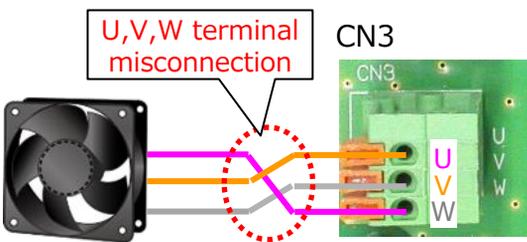
【Error code ⑤ lights up】

Make sure that the LED is lit as shown below.



■ Error contents

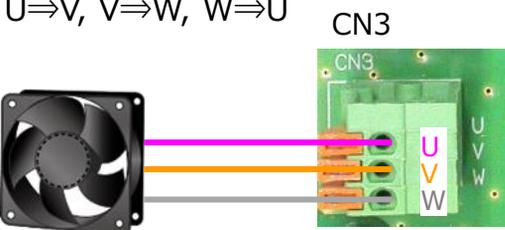
U, V, W terminals are not connected correctly



■ Countermeasures

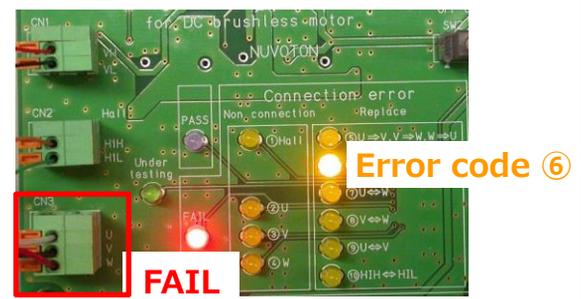
Reconnect the U, V, W terminal connections.

$U \Rightarrow V, V \Rightarrow W, W \Rightarrow U$



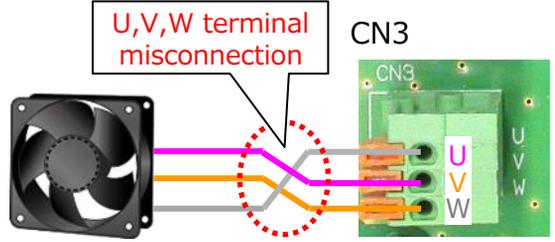
【Error code ⑥ lights up】

Make sure that the LED is lit as shown below.



■ Error contents

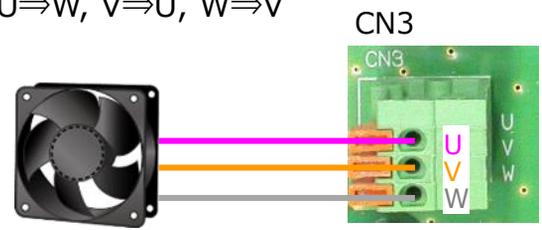
U, V, W terminals are not connected correctly



■ Countermeasures

Reconnect the U, V, W terminal connections.

$U \Rightarrow W, V \Rightarrow U, W \Rightarrow V$



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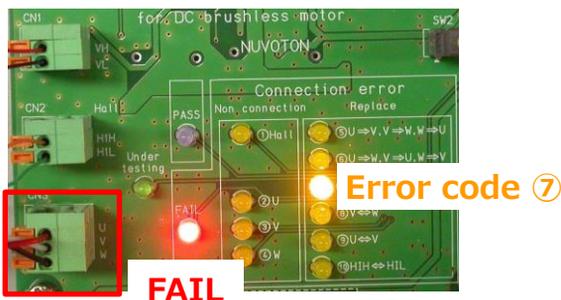
Chapter 4 : How to use

4 – 7. Countermeasures(error code ⑦ and ⑧)

If the error code LED lights up, please take the following countermeasures.

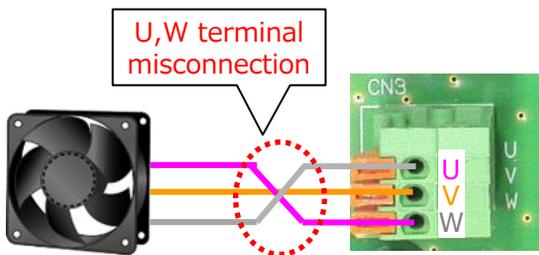
【Error code ⑦ lights up】

Make sure that the LED is lit as shown below.



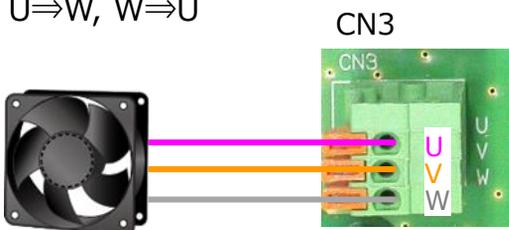
■ Error contents

U, W terminals are not connected correctly



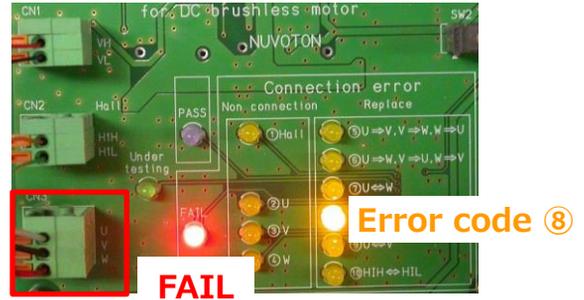
■ Countermeasures

Reconnect the U and W terminal connections.
 $U \Rightarrow W, W \Rightarrow U$



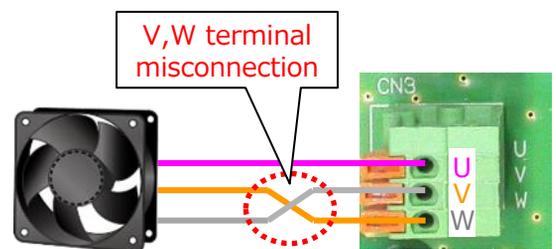
【Error code ⑧ lights up】

Make sure that the LED is lit as shown below.



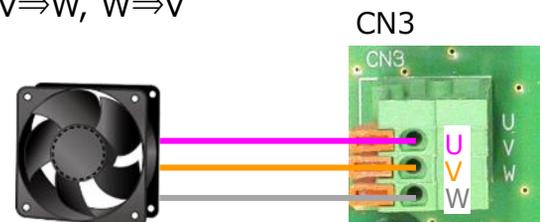
■ Error contents

V, W terminals are not connected correctly



■ Countermeasures

Reconnect the V and W terminal connections.
 $V \Rightarrow W, W \Rightarrow V$



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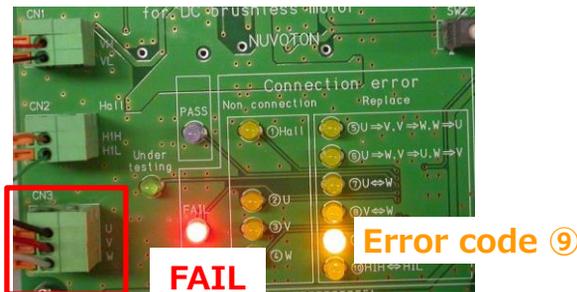
Chapter 4 : How to use

4 – 8. Countermeasures(error code ⑨ and ⑩)

If the error code LED lights up, please take the following countermeasures.

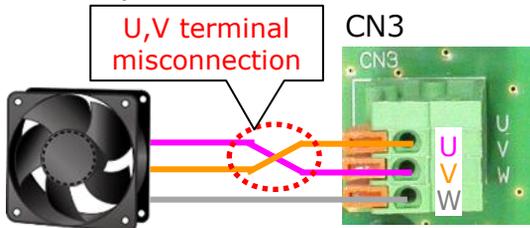
【Error code ⑨ lights up】

Make sure that the LED is lit as shown below.



■ Error contents

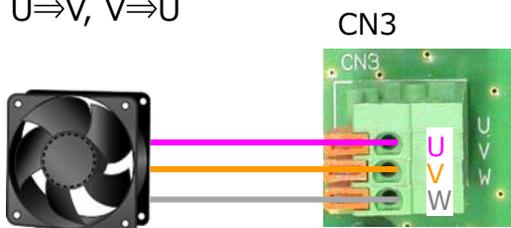
U, V terminals are not connected correctly



■ Countermeasures

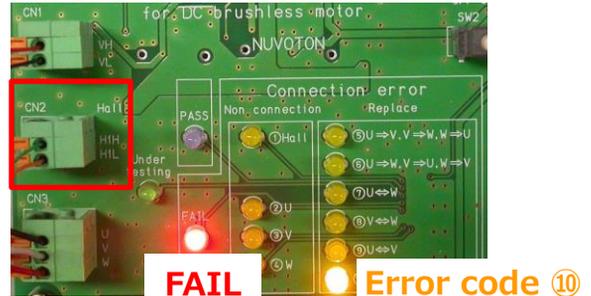
Reconnect the U and V terminal connections.

$U \Rightarrow V, V \Rightarrow U$



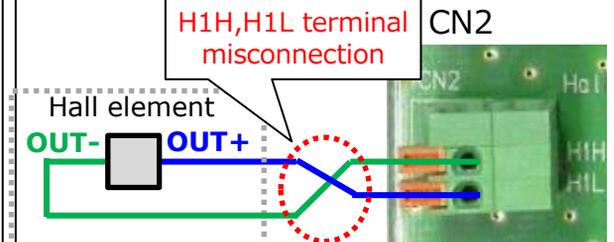
【Error code ⑩ lights up】

Make sure that the LED is lit as shown below.



■ Error contents

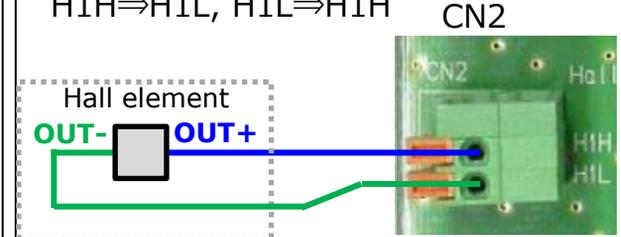
H1H, H1L terminals are not connected correctly



■ Countermeasures

Reconnect the H1H and H1L terminal connections.

$H1H \Rightarrow H1L, H1L \Rightarrow H1H$



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Chapter 4 : How to use

4 – 9 . If none of the LEDs light up

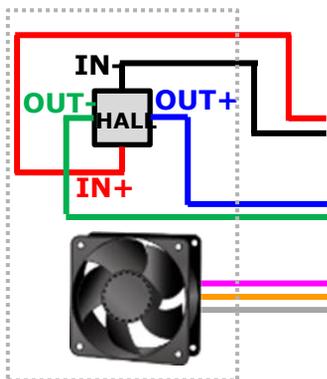
If none of the LEDs light up, please check the followings.

In this case, it could be because:

- All motor wirings are open
- SW1 is not turned on
- The USB cable is not connected to the tester or PC.

Please confirm if the above are properly and correctly done.

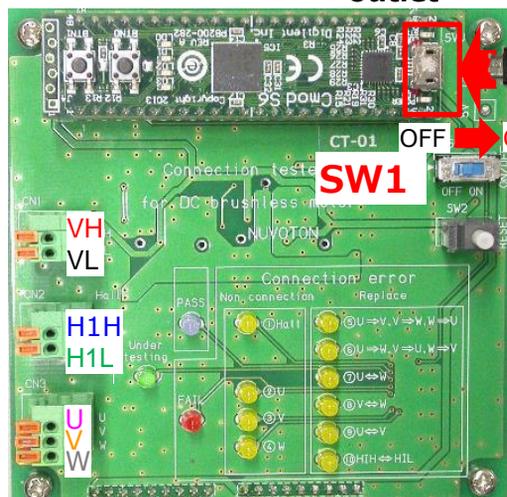
Make sure all wiring from the motor are connected



3-phase Brushless Motor

Make sure the USB cable is connected to the tester

Tester USB cable outlet



Make sure SW1 is ON



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Revision History

Date	Revision	Description	Page.
2023.11.1	1.00	1. initially issued.	



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Important Notice

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Insecure usage includes, but is not limited to: equipment for surgical implementation, atomic energy control instruments, airplane or spaceship instruments, the control or operation of dynamic, brake or safety systems designed for vehicular use, traffic signal instruments, all types of safety devices, and other applications intended to support or sustain life.

All Insecure Usage shall be made at customer's risk, and in the event that third parties lay claims to Nuvoton as a result of customer's Insecure Usage, customer shall indemnify the damages and liabilities thus incurred by Nuvoton.

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