

E4000 SAFETY RELAY BOX

取扱説明書 / OPERATION MANUAL

日本語：P1 - P8 / English：P9 - P16

OM-K0597 002

このたびは、E4000 セーフティリレー BOX をお買い求め頂きまして誠にありがとうございます。本製品をご使用頂くためには、「E4000 コントローラ」、「モータ」、「スピンドル」が必要です。ご使用前にこの取扱説明書および「E4000 コントローラ」、「モータ」、「スピンドル」の取扱説明書をよくお読み頂き、末永くご愛用くだされば幸いです。

1. 安全上の注意事項・表示について

- 使用前に必ずこの安全上の注意をよくお読み頂き、正しくお使いください。
- ここに示した注意事項は、製品を安全にお使い頂き、あなたや他の人への危害や損害を未然に防止するものです。危害や損害の大きさと切迫の程度に分類しています。いずれも安全に関する内容ですから、必ずお守りください。

注意区分	危害や損害の大きさと切迫の程度
⚠ 警告	「人が傷害を負ったり、物的損害の発生がある注意事項」を説明しています。
⚠ 注意	「軽傷、中程度の傷害、または物的損害が発生する可能性がある注意事項」を説明しています。

⚠ 警告

- ① 本製品は、ハンドツールではありません。コントローラに取り付けてご使用ください。
- ② 濡れた手で電源コードプラグの抜き差しおよびモータコード、中継コード、非常停止用コードに触れないでください。感電のおそれがあります。
- ③ 安全を確認するまでは、本製品の取り扱い・取り外しを絶対にしないでください。
 - 1) 本製品を取り扱うときは、各種の損害を防止するため、設置機器の安全確認をしてから取り扱ってください。
 - 2) 本製品を取り外すときは、設置機器の安全を確認し、エネルギー源である電源や供給空気を遮断し、該当する設備システム内の圧縮空気を排気してから取り外してください。
- ④ 本製品を接続する際は、必ず電源スイッチを **OFF** にしてから接続してください。電源スイッチが **ON** の状態でコードの接続をすると製品破損の原因になります。
- ⑤ 本製品の背面には、接地線用ネジが付いています。設置の際は必ず接地線を確実に接続してください。
- ⑥ 高温・多湿・結露しやすい周辺環境や腐食性ガス、爆発性ガス・可燃ガス、および塩害のある場所を避け、切削油や水、オイルミストがかからないようにコントローラとセーフティリレー **BOX** を設置してください。故障や火災・感電の原因になります。

⚠ 注意

- ① 本製品を落下させたり、ぶつけたりしないでください。発熱、故障の原因になります。
- ② 本製品を分解、改造しないでください。分解、改造した場合には、以後の性能について保証できなくなります。また、修理をお断りする場合があります。
- ③ 本製品を使用しないときは、安全、防塵のため、付属のコネクタキャップ **A**、コネクタキャップ **EMG** を **MOTOR-IN** コネクタ、**MOTOR-OUT** コネクタ、**EMG** コネクタへ取り付けてください。
- ④ 前面パネルには、⚠ のシンボル表示がされている部品があります（2箇所）。これらの部品は大きな電圧が入力、出力されますので、取扱いには十分に注意してください。

Thank you for purchasing E4000 SAFETY RELAY BOX. The E4000 <CONTROLLER>, <Motor> and <Spindle> are required to drive this SAFETY RELAY BOX. Read this Operation Manual carefully before use. Also read E4000 <CONTROLLER>, <Motor> and <Spindle> Operation Manuals.

1. CAUTIONS FOR HANDLING AND OPERATION

- Read these warnings and cautions carefully and only use in the manner intended.
- These warnings and cautions are intended to avoid potential hazards that could result in personal injury or damage to the device. These are classified as follows in accordance with the seriousness of the risk.

Class	Degree of Risk
 WARNING	A safety hazard could result in bodily injury or damage to the device if the safety instructions are not properly followed.
 CAUTION	A hazard that could result in light or moderate bodily injury or damage to the device if the safety instructions are not followed.

 WARNING

- ① The SAFETY RELAY BOX is not a hand tool. It is designed to be used on CONTROLLER.
- ② Never connect, disconnect or touch the Power Cord Plug, Motor Cord Connector, Relay Cord Connector and Emergency Stop Connector with wet hands. This may cause an electric shock.
- ③ Never operate or handle the SAFETY RELAY BOX until you have thoroughly read the owner's manual and safe operation has been confirmed.
 - 1) To prevent injuries / damages, check the SAFETY RELAY BOX for proper installation, before operating the CONTROLLER.
 - 2) Before disconnecting the SAFETY RELAY BOX, always turn the control power off and turn the compressed air supply to the CONTROLLER off. Then it is safe to remove the SAFETY RELAY BOX.
- ④ Make sure to turn OFF the Main Power Switch of the CONTROLLER before install the SAFETY RELAY BOX to the CONTROLLER.
- ⑤ There is a grounding screw on the rear of the product. Be sure to connect the grounding conductor when installing the product.
- ⑥ Do not use in dangerous environments. Protect the CONTROLLER and the SAFETY RELAY BOX from moisture and other contaminants.
Failure to CONTROLLER and SAFETY RELAY BOX can result in damage to internal components and injury to the operator.

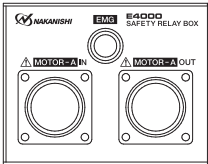
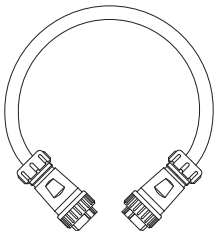
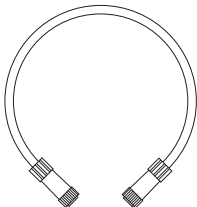
 CAUTION

- ① Do not drop or hit the SAFETY RELAY BOX, as shock can damage to the internal components.
- ② Do not disassemble, modify or attempt to repair this SAFETY RELAY BOX. Additional damage will occur to the internal components. Service must be performed by NSK NAKANISHI or an authorized service center.
- ③ Attach the provided Connector Cap A, Connector Cap EMG to the MOTOR-IN connector, MOTOR-OUT connector and EMG connector for safety and dust proofing when not using the SAFETY RELAY BOX.
- ④ Note that  symbols are shown on the front panel (for 2 parts). Be careful when handling these parts because a high voltage is input and output at them.

2. BASIC PACKAGE

When opening the package, check if it includes all items listed in " Table 1. Packing List Contents ".
In the event of any shortage, please contact either NAKANISHI (see the " 4. CONTACT US " section) or your local dealer.

Table 1. Packing List Contents

E4000 SAFETY RELAY BOX main body • • 1pc. 	Relay Cord (Motor Power Line) • • 1pc. 	Emergency Stop Cord • • 1pc. 
Connector Cap A • • 2pcs.* 	Connector Cap EMG • • 1pc.* 	Operation Manual • • 1set. 

* The Connector Cap A, Connector Cap EMG are attached to the SAFETY RELAY BOX.

3. WARRANTY

We provide a limited warranty for our products. We will repair or replace the products if the cause of failure is due to the following manufacturers defects. Please contact us or your local distributor for details.

- (1) Defect in manufacturing.
- (2) Any shortage of components in the package.
- (3) Where damaged components are found when initially opening the package.
- (This shall not apply if the damage was caused by the negligence of a customer)

4. CONTACT US

For safe use / purchase of our products, we welcome your questions.
If you have any questions about operation, maintenance and repair of the product, please contact us.

Contact Us

- For U.S. Market

Company Name : **NSK America Corp**
Industrial Div.
Business Hours : 8:30am to 17:00pm (CST)
(closed Saturday, Sunday and Public Holidays)
U.S. Toll Free No. : 800-585-4675
Telephone No. : 847-843-7664
Fax No. : 847-843-7622
Web Address : www.nskamericacorp.com

- For Other Markets

Company Name : **NAKANISHI INC.** 
Business Hours : 8:00am to 17:00pm
(closed Saturday, Sunday and Public Holidays)
Telephone No. : +81 (0) 289-64-3520
e-mail Address : webmaster-ie@nsk-nakanishi.co.jp

5. FEATURES

- ① Install the SAFETY RELAY BOX to the CONTROLLER for use the SAFETY RELAY BOX. The Safety Relay "a" contacts switch the Motor Power Line and "b" (*1) contacts switch the external outputs to the machining center's CNC controller.
 - ② The Safety Relay utilizes Normally Open contacts. The Emergency Stop Signal lines must be supplied with power to hold the Safety Relay contacts closed and allow the CONTROLLER to supply power to the motor. Any system errors, trouble with the machining center or the connections between the CONTROLLER and the machining center's controller will cause the relay contacts to open and the motor to stop.
 - ③ The Emergency Stop Signal Input can be connected to any and all portions of the machine's safety systems (E-Stop String) to stop the motor any time that stoppage of the spindle and motor is required.
 - ④ The "b" contact outputs can be used to detect an open circuit on the motor line and integrated with the machines safety systems to stop the machine in case a problem occurs.
- *1 : The Safety Relay "b" shows SAFE-1A, SAFE-1B, SAFE-2A and SAFE-2B of External Input / Output Connector B.

6. SPECIFICATIONS AND DIMENSIONS

6 - 1 Specifications

Product Name	E4000 SAFETY RELAY BOX
Model	E4000 -SRB
Applicable CONTROLLER	E4000 CONTROLLER
Weight	850g (Main Body Only)

6 - 2 Outside View

- ① SAFETY RELAY BOX main body

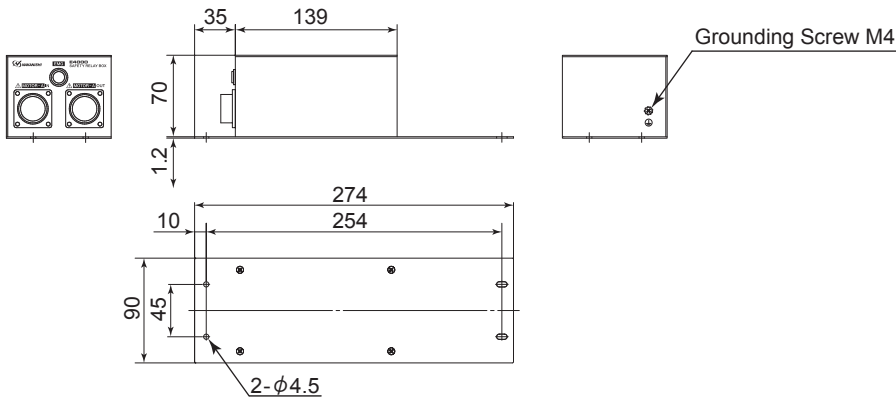


Fig. 1

② Placing CONTROLLER horizontally with SAFETY RELAY BOX

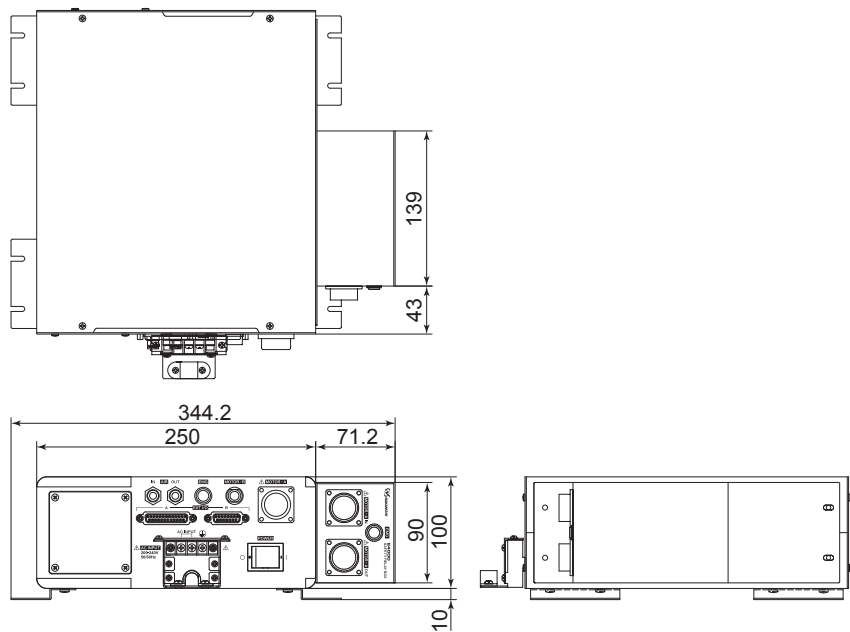


Fig. 2

③ Placing CONTROLLER vertically with SAFETY RELAY BOX

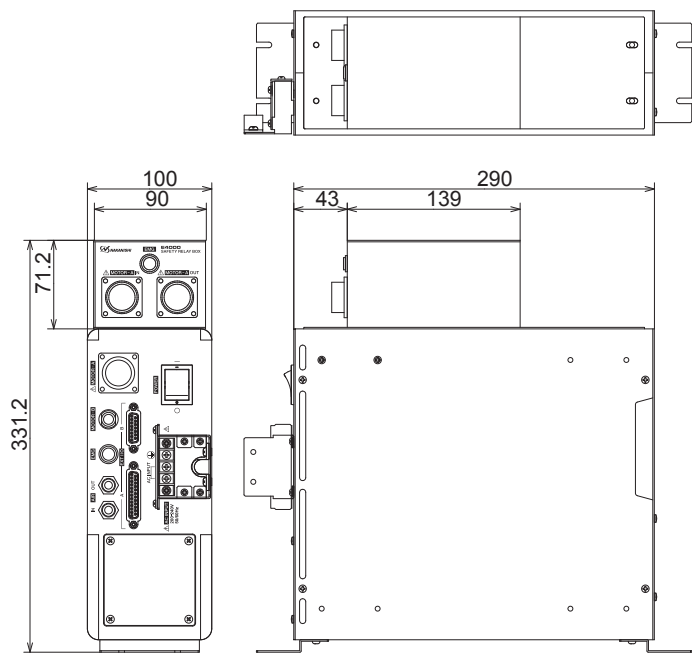


Fig. 3

7. INSTALLATION

⚠ WARNING

- When installing to the SAFETY RELAY BOX, turn the CONTROLLER and machine power supply OFF. If the power is on when installing to the SAFETY RELAY BOX, damage to this product will occur.
- When you use the SAFETY RELAY BOX, install the SAFETY RELAY BOX to the CONTROLLER. By doing this, SAFETY RELAY BOX is grounded and the system will be protected against electric shock.

⚠ CAUTION

When connecting the Relay Cord Plug and Emergency Stop Cord Plug, secure the Fastening Ring firmly. If the connection is not made correctly, an intermittent malfunction can occur.

- Install the SAFETY RELAY BOX to one of the CONTROLLER side faces.
 - Installing the SAFETY RELAY BOX, using the mounting screws (4pcs.) attached to the CONTROLLER side face (Fig. 4).
- ① Remove the Mounting Screws (4pcs.) from side of the CONTROLLER.

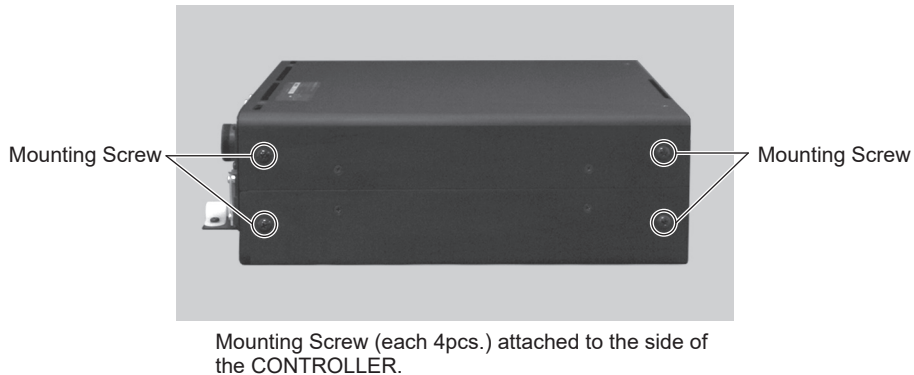
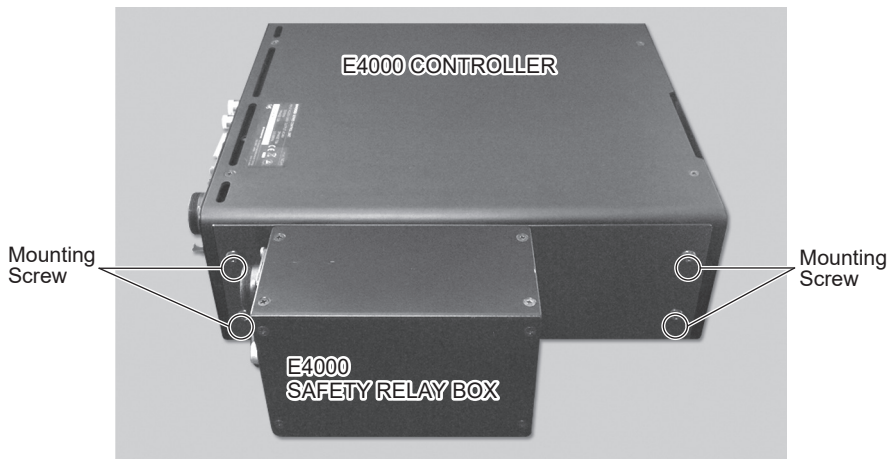


Fig. 4

- ② Install the SAFETY RELAY BOX to the side of CONTROLLER by using removed Mounting Screws (4pcs.) (Fig. 5).



* Attach the SAFETY RELAY BOX to the E4000 CONTROLLER using the removed Mounting Screw.

Fig. 5

- ③ Insert the provided Relay Cord Plug into the MOTOR-A Connector of the CONTROLLER and the MOTOR-A IN Connector of the SAFETY RELAY BOX. Secure the Fastening Ring turn the clockwise (Fig. 6).

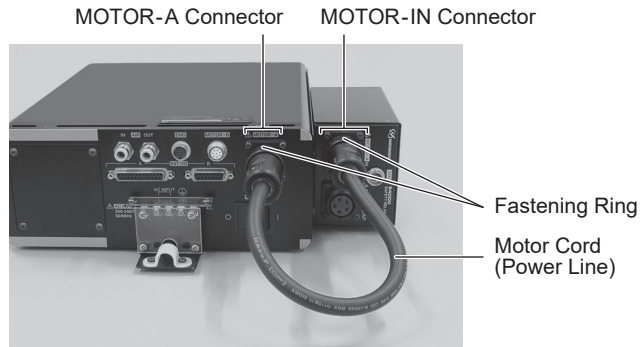


Fig. 6

- ④ Insert the provided Emergency Stop Cord Plug into the EMG Connector (EMG) of the CONTROLLER and EMG Connector (EMG) of the SAFETY RELAY BOX. Secure the Fastening Ring turn the clockwise (Fig. 7).

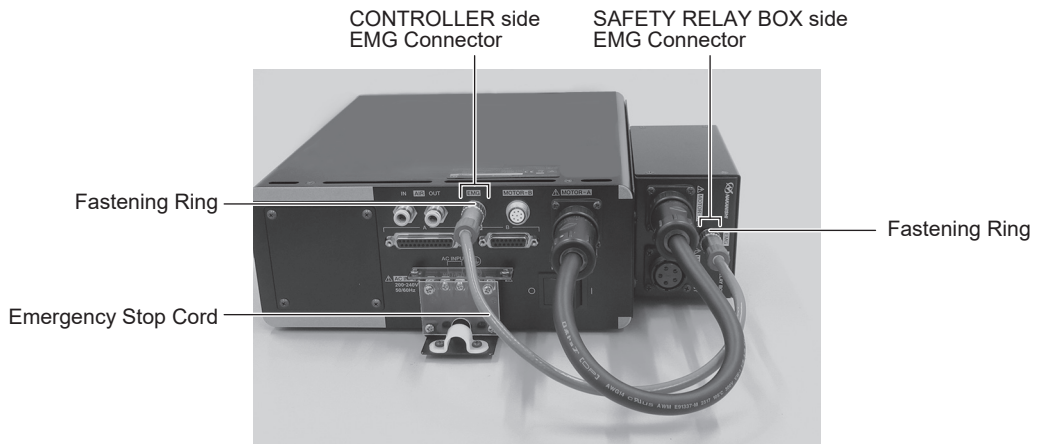


Fig. 7

- ⑤ Insert the Motor Cord Plug (Motor Power Line) into the MOTOR-OUT Connector of the SAFETY RELAY BOX, Secure the Fastening Ring turn the clockwise (Fig. 8).
Insert the Motor Cord Plug (Motor Signal Line) into the MOTOR-B Connector of the CONTROLLER, Secure the Fastening Ring turn the clockwise (Fig. 8).

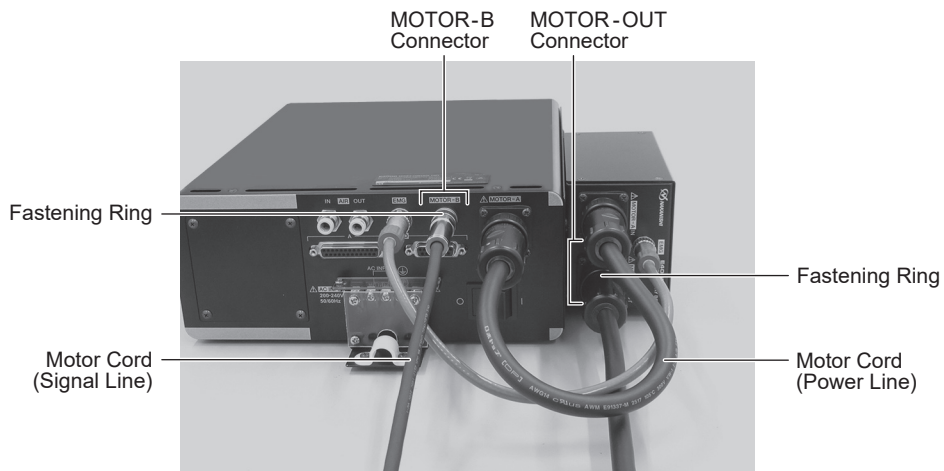


Fig. 8

8. INPUT SIGNAL

⚠ CAUTION

When using the SAFETY RELAY BOX, never rotating the motor without inputting Emergency Stop Signal (terminals No. 1, No.9) of the external Input / Output connector B. This should be checked in both AUTO mode and MANUAL modes.

Refer to P78 "16 - 2 - (1) Details of External Input / Output Connector B Signals " section of the CONTROLLER Operation Manual and Fig. 9.

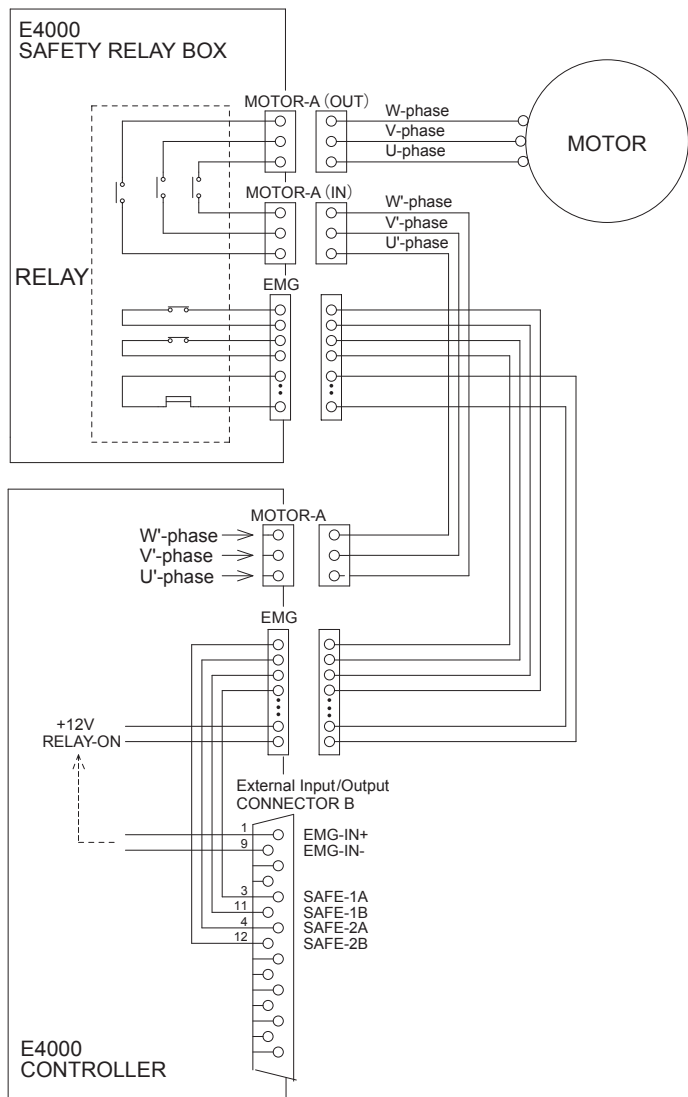


Fig. 9

9. TROUBLESHOOTING

If a problem or concern occurs, please check the following prior to consulting your dealer.

Trouble	Cause	Inspection / Corrective Action
Emergency Stop function is not function properly.	Relay Cord Plug is not connected to the MOTOR-A Connector of the CONTROLLER and MOTOR-IN Connector of the SAFETY RELAY BOX.	Connect to the Relay Cord Plug correctly to the MOTOR-A Connector of the CONTROLLER and MOTOR-IN Connector of the SAFETY RELAY BOX.
	Emergency Stop Cord Plug is not connected to the EMG Connector of the CONTROLLER and the SAFETY RELAY BOX.	Connect to the Emergency Stop Cord Plug correctly to the EMG Connector of the CONTROLLER and the SAFETY RELAY BOX.
	Motor Cord plug is not connected to the MOTOR-OUT Connector of the SAFETY RELAY BOX.	Connect to the Motor Cord Plug correctly to the MOTOR-OUT Connector of the SAFETY RELAY BOX.
External Input / Output Signal is not output correctly.	Emergency Stop Cord is disconnected.	Replace the Emergency Stop Cord. (Return to NAKANISHI dealer service.)

10. DISPOSAL OF THIS PRODUCTS

When disposal of a E4000 SAFETY RELAY BOX is necessary, follow the instructions from your local government agency for proper disposal of electrical components .

株式会社 **ナカニシ** www.nakanishi-inc.com

本社・工場 〒322-8666 栃木県鹿沼市下日向 700
TEL : 0289(64)3380 FAX : 0289(62)5636

NAKANISHI INC.  www.nakanishi-inc.com

700 Shimohinata, Kanuma, Tochigi 322-8666, Japan

NSK America Corp www.nskamericacorp.com

1800 Global Parkway, Hoffman Estates, IL 60192, USA