

## ACサーボドライブ $\Sigma$ -IIシリーズ

### 安全上のご注意

#### MECHATROLINK-II アプリケーションモジュール

形式：JUSP-NS115

対象サーボパック形式：SGDH-□□□E-□

製品を安全にお使い頂くために、本書を必ずお読みください。

また、本書をお手元に保管していただくとともに、最終的に本製品をご使用になるユーザー様のお手元に確実に届けられるよう、お取り計らい願います。

## AC Servo Drives

## $\Sigma$ -II Series

### SAFETY PRECAUTIONS

#### MECHATROLINK-II Application Module

Model: JUSP-NS115

Applicable SERVOPACK Model: SGDh-□□□E-□

To properly use the product, read this manual thoroughly and retain for easy reference, inspection, and maintenance. Ensure the end user receives this manual.

Copyright © 2002 株式会社 安川電機 YASKAWA ELECTRIC CORPORATION

---

本書の内容の一部または全部を、当社の文書による許可なしに、転載または複製することは、固くお断りします。

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form, or by any means, mechanical, electronic, photocopying, recording, or otherwise, without the prior written permission of Yaskawa. No patent liability is assumed with respect to the use of the information contained herein. Moreover, because Yaskawa is constantly striving to improve its high-quality products, the information contained in this manual is subject to change without notice. Every precaution has been taken in the preparation of this manual. Nevertheless, Yaskawa assumes no responsibility for errors or omissions. Neither is any liability assumed for damages resulting from the use of the information contained in this publication.

# 1 INTRODUCTION

This instruction manual covers  $\Sigma$ -II series SGD<sub>H</sub> MECHATROLINK-II Application Module NS115 Module (hereinafter called NS115 Module), which is an application module to be connected to  $\Sigma$ -II series SGD<sub>H</sub> SERVOPACK for MECHATROLINK-II.

To safely use the application module, read this manual thoroughly and retain for easy reference for inspections and maintenance etc. Make sure that these manuals reach the end user.

# 2 REFERENCE MANUALS

Reference manuals are listed below:

Manual Titles	Manual No.
$\Sigma$ -II series SGM□H/SGD <sub>H</sub> User's Manual Servo Selection and Data Sheets	SIE-S800-32.1
$\Sigma$ -II series SGM□H/SGD <sub>H</sub> User's Manual Design and Maintenance	SIE-S800-32.2
$\Sigma$ -II series SGD <sub>H</sub> MECHATROLINK-II Application Module User's Manual	SIEPC71080001
AC SERVOMOTOR INSTRUCTIONS	TOE-C231-2
$\Sigma$ -II series AC SERVOPACK SGD <sub>H</sub> /SGDM Safety Precautions	TOBPS80000004

# 3 GENERAL PRECAUTIONS

The following describes general precautions. Note the following to ensure safe application.

- Some drawings in this manual are shown with the protective cover or shields removed, in order to describe the detail with more clarity. Make sure all covers and shields are replaced before operating this product.
- Some drawings in this manual are shown as typical example and may differ from the shipped product.
- This manual may be modified when necessary because of improvement of the product, modification or changes in specifications.  
Such modification is made as a revision by renewing the manual No.
- To order a copy of this manual, if your copy has been damaged or lost, contact your YASKAWA representative listed on the last page stating the manual No. on the front cover.
- YASKAWA is not responsible for accidents or damages due to any modification of the product made by the user since that will void our guarantee.

---

## 4 SYMBOLS FOR SAFE OPERATION


In this manual, the NOTES FOR SAFE OPERATION are classified as “WARNING” or “CAUTION”. The following symbols are used.




Indicates a potentially hazardous situation which, if not avoided, could result in death or serious personal injury.




Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate personal injury and/or damage to the equipment.

In some instances, items described in  may also result in a serious accident. In either case, follow these important items.



Indicates prohibited actions that must not be performed. For example, this symbol would be used to indicate that fire is prohibited as follows: .





Indicates compulsory actions that must be performed. For example, this symbol would be used as follows to indicate that grounding is compulsory: .

## 5 NOTES FOR SAFE OPERATION

Read this manual thoroughly before checking products on delivery, storage and transportation, installation, wiring, operation and inspection, and disposal of the NS115 Module.

### WARNING

- Never touch any motor rotating parts while the motor is running.  
Failure to observe this warning may result in injury.
- Before starting operation with a machine connected, make sure that an emergency stop can be applied at any time.  
Failure to observe this warning may result in injury.
- Never touch the inside of the SERVOPACKs.  
Failure to observe this warning may result in electric shock.
- Do not remove the panel cover while the power is ON.  
Failure to observe this warning may result in electric shock.
- Do not touch terminals for five minutes after the power is turned OFF.  
Residual voltage may cause electric shock.
- Do not touch terminals for five minutes after voltage resistance test.  
Residual voltage may cause electric shock.
- Follow the procedures and instructions for trial operation precisely as noted in the relevant User's Manual.  
Malfunctions that occur after the servomotor is connected to the machine not only damage the machine, but may also cause an accident resulting in death or injury.
- Do not remove the terminal cover, cables, connectors, or optional items while the power is ON.  
Failure to observe this warning may result in electric shock.
- Do not damage, press, pinch, exert excessive force or place heavy objects on the cables.  
Failure to observe this warning may result in electric shock, stopping operation of the product, or burning.
- Do not modify the product.  
Failure to observe this warning may result in injury or damage to the product.
- Provide an appropriate stopping device on the machine side to ensure safety. A holding brake for a servomotor with brake is not a stopping device for ensuring safety.  
Failure to observe this warning may result in injury.
- Do not come close to the machine immediately after resetting momentary power loss to avoid an unexpected restart. Take appropriate measures to ensure safety against an unexpected restart.  
Failure to observe this warning may result in injury.
-  SERVOPACK grounding must be in accordance with the national code and consistent with sound local practices.  
Improper grounding may result in electric shock or fire.
-  Installation, disassembly, or repair must be performed only by authorized personnel.  
Failure to observe this warning may result in electric shock or injury.

## ■ CHECKING ON DELIVERY

### CAUTION

- Always use the NS115 Module and the SERVOPACK in one of the specified combinations.  
Failure to observe this caution may result in motor overrun or shutdown of the products.

## ■ STORAGE AND TRANSPORTATION

### CAUTION

- Do not store or install the product in the following places.  
Failure to observe this caution may result in fire, electric shock, or damage to the product.
  - Locations subject to direct sunlight.
  - Locations subject to temperatures outside the range specified in the storage/installation temperature conditions.
  - Locations subject to humidity outside the range specified in the storage/installation humidity conditions.
  - Locations subject to condensation as the result of extreme changes in temperature.
  - Locations subject to corrosive or flammable gases.
  - Locations subject to dust, salts, or iron dust.
  - Locations subject to exposure to water, oil, or chemicals.
  - Locations subject to shock or vibration.
- If disinfectants or insecticides must be used to treat packing materials such as wooden frames, pallets, or plywood, the packing materials must be treated before the product is packaged, and methods other than fumigation must be used.

Example: Heat treatment, where materials are kiln-dried to a core temperature of 56°C for 30 minutes or more.

If the electronic products, which include stand-alone products and products installed in machines, are packed with fumigated wooden materials, the electrical components may be greatly damaged by the gases or fumes resulting from the fumigation process. In particular, disinfectants containing halogen, which includes chlorine, fluorine, bromine, or iodine can contribute to the erosion of the capacitors.

## ■ INSTALLATION

### CAUTION

- Never use the products in an environment subject to water, corrosive gases, inflammable gases, or combustibles.

Failure to observe this caution may result in electric shock or fire.

- Do not step on or place a heavy object on the product.

Failure to observe this caution may result in injury.

- Do not cover the inlet or outlet ports and prevent any foreign objects from entering the product.

Failure to observe this caution may cause internal elements to deteriorate resulting in malfunction or fire.

- Be sure to install the product in the correct direction.

Failure to observe this caution may result in malfunction.



## CAUTION

- Provide the specified clearances between the SERVOPACK and the control panel or with other devices.

Failure to observe this caution may result in fire or malfunction.

- Do not apply any strong shock.

Failure to observe this caution may result in malfunction.

### ■ WIRING



## CAUTION

- Be sure to wire correctly and securely.

Failure to observe this caution may result in motor overrun, injury, or malfunction.

- Do not connect a three-phase power supply to the U, V, or W output terminals.

Failure to observe this caution may result in injury or fire.

- Securely connect the power supply terminal screws and motor output terminal screws.

Failure to observe this caution may result in fire.

- Do not bundle or run power and signal lines together in the same duct. Keep power and signal lines separated by at least 30 cm.

- Use twisted-pair shielded wires or multi-core twisted pair shielded wires for signal and encoder (PG) feedback lines.

The maximum length is 3 m for reference input lines and is 20 m for PG feedback lines. If feedback lines are longer than 20 m, use the 50 m cable.

### ■ OPERATION



## CAUTION

- Conduct trial operation on the servomotor alone with the motor shaft disconnected from machine to avoid any unexpected accidents.

Failure to observe this caution may result in injury.

- Before starting operation with a machine connected, change the settings to match the parameters of the machine.

Starting operation without matching the proper settings may cause the machine to run out of control or malfunction.

## ■ MAINTENANCE AND INSPECTION

### CAUTION

- Do not disassemble the servomotor.  
Failure to observe this caution may result in electric shock or injury.
- Do not attempt to change wiring while the power is ON.  
Failure to observe this caution may result in electric shock or injury.
- When replacing the SERVOPACK, resume operation only after transferring the previous SERVO-PACK parameters to the new SERVOPACK.  
Failure to observe this caution may result in damage to the product.

## ■ DISPOSAL

### CAUTION

- When disposing of the products, treat them as ordinary industrial waste.

## 6 CHECKING ON DELIVERY

When  $\Sigma$ -II Series products are delivered, check the following items:

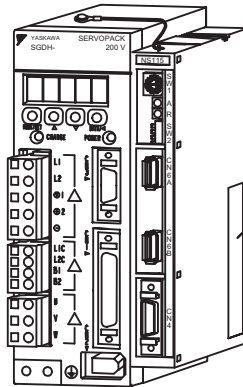
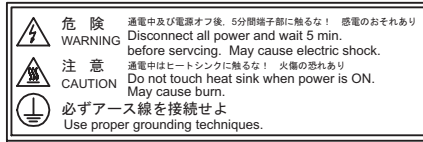
Check Items	Remarks
Check if the delivered products are the ones you ordered.	Check the types marked on the nameplates of the NS115 Module.
Check for damage.	Check the overall appearance, and check for damage or scratches resulting from transportation.
Check if SERVOPACK is the type applicable for NS115 Module.	<ol style="list-style-type: none"> <li>1. Check the nameplate of SERVOPACK. SERVOPACK Type SGDH-□□□E-□ ① ② “SGDH” in ①, and “E” in ②</li> <li>2. Check the software version of the SGDH SERVOPACK in the version seal on the front face underneath the model number or use the auxiliary function mode of Fn012 without installing the NS115 Module. <ul style="list-style-type: none"> <li>• When checking the software version with the version seal, make sure <u>the lower two digits of the software version should be 33 or more.</u></li> <li>• When using the auxiliary function mode, make sure <u>the software version should be 33 or more.</u></li> </ul> </li> </ol>

If any of the above items are faulty or incorrect, contact the dealer from which you purchased the products or your nearest local sales representative.



## 7 WARNING LABEL

The following illustration shows the SERVOPACK warning level and position.

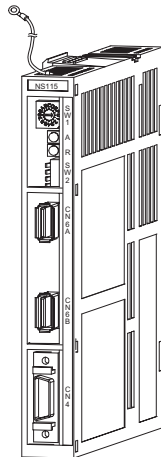


NS115 Module  
warning label position

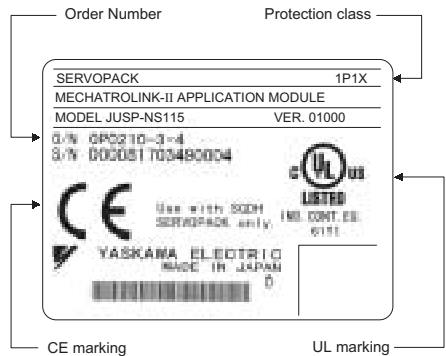
Warning Label and Grounding Mark Position

## 8 NAMEPLATE

The following illustration shows the SERVOPACK nameplate and position.



NS115 Module



## 9 INSTALLING AN NS115 Module

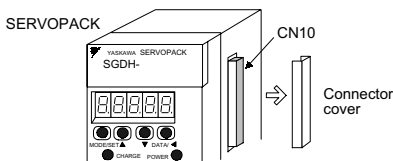
This section describes the methods and the installation sites for mounting an NS115 Module on a SERVOPACK.

### ■ Mounting of the NS115 Module

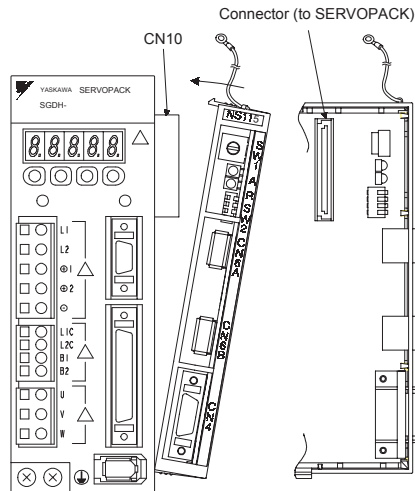
Mount an NS115 Module on a SGDH SERVOPACK in the following manner.

Mounting Method	SERVOPACK Type	Screw	Remarks
Base mounted	SGDH-A3 to 02BE SGDH-A3 to 10AE	M3×10 round head screws (with spring washer and plain washer)	Use attached screws on the NS115 Module.
	SGDH-15 to 50AE SGDH-05 to 50DE	M4×10 round head screws (with spring washer and plain washer)	Use attached screws on the NS115 Module.
	SGDH-60 to 1EAE SGDH-60 to 1EDE	M4×8 round head screws (with spring washer and plain washer)	Use the screw of the front panel.
Rack mounted	SGDH-A3 to 02BE-R SGDH-A3 to 50AE-R SGDH-05 to 50DE-R	M4×6 round head screws (with spring washer and plain washer)	Use attached screws on the NS115 Module. Note: Make sure that spring washers and plain washers are used for mounting. (Otherwise, the screw for connecting ground wire sticks out from the other side of the flange, and the SERVOPACK cannot be mounted properly.)
Duct ventilated	SGDH-60 to 1EAE-P SGDH-60 to 1EDE-P	M4×8 round head screws (with spring washer and plain washer)	Use the screw of the front panel.

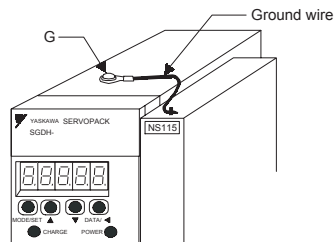
1. Remove the connector cover mounted on the CN10 of the SERVOPACK.



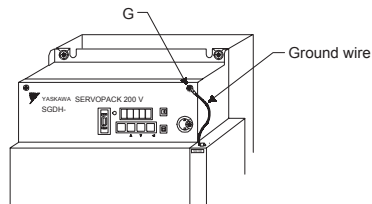
## 2. Mount an NS115 Module.



## 3. For grounding, connect the ground wire of the NS115 Module to the terminal marked "G" on the SERVOPACK.

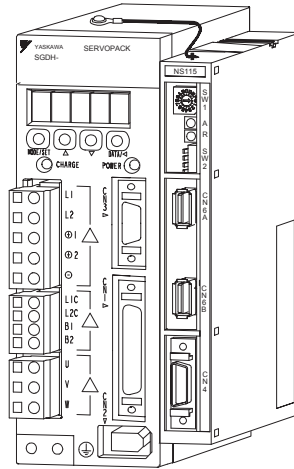


For the SERVOPACK (30 W to 5.0 kW)



For the SERVOPACK (6.0 kW to 7.5 kW)

The following diagram shows the SERVOPACK with the NS115 Module correctly mounted.



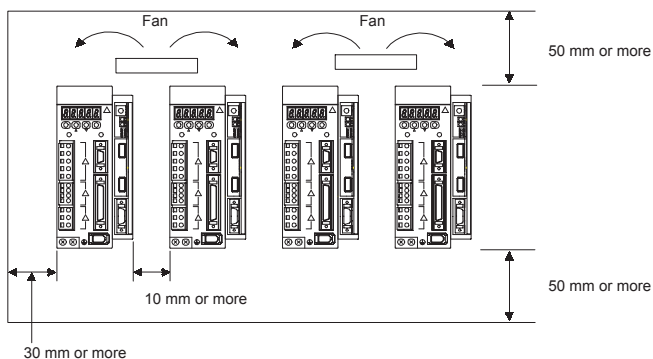
## ■ Installation Sites

For installation sites, use proper care with the following notes.

Situation	Notes on Installation
When installed in a control panel	Design the control panel size, unit layout, and cooling method so that the temperature around the periphery of the SERVOPACK does not exceed 55°C.
When installed near a heating unit	Suppress radiation heat from the heating unit and a temperature rise caused by convection so that the temperature around the periphery of the SERVOPACK does not exceed 55°C.
When installed near a source of vibration	Install a vibration isolator underneath the SERVOPACK to prevent it from receiving vibration.
When installed in a place receiving corrosive gases	Corrosive gases do not immediately affect the SERVOPACK but will eventually cause contactor-related devices to malfunction. Take appropriate action to protect against corrosive gases.
Others	Avoid installation in a hot and humid place or where excessive dust or iron powder is present in the air. Install in a place where the altitude is 1000 m or less.

## ■ Installation Precautions

When installing multiple SERVOPACKs side by side in a control panel, observe the following installation method:



## ■ Environments in Control Panel

Maintain the following conditions inside the control panel:

- Ambient temperature for SERVOPACK: 0 to 55°C
- Humidity: 90%RH or less
- Vibration: 4.9 m/s<sup>2</sup>
- Condensation and freezing: None
- Ambient temperature to ensure long-term reliability: 45°C or less
- Altitude: 1000 m or less.

## 10 INSPECTION AND MAINTENANCE

This section describes the basic inspections and maintenance. If any failure occurs on the SERVOPACK, refer to  $\Sigma$ -II Series SGM□H/SGDH User's Manual Design and Maintenance Section 9.2 Troubleshooting (SIE-S800-32.2) and  $\Sigma$ -II Series SGDH MECHATROLINK-II Application Module User's Manual (SIEPC71080001). Contact your Yaskawa representative if the problem cannot be solved by the procedures described.

### ■ NS115 Module Inspection

For inspections and maintenance of the NS115 Module, follow the inspection procedures in the table below at least once every year.

Item	Frequency	Procedure	Remedy
Clean unit interior and circuit boards	At least once a year	Check for dust, dirt, and oil on surfaces.	Clean with compressed air or cloth.
Loose screws	At least once a year	Check for loose terminal block and connector screws.	Tighten any loose screws.
Defective parts in unit or on circuit boards	At least once a year	Check for discoloration, damage or discontinuities due to heating.	Contact your YASKAWA representative.

## 11 GENERAL SPECIFICATIONS

The following table shows the NS115 Module general specifications.

Item	Specifications
Operating/Storage Temperature	0 to +55 °C/-20 to +85 °C
Operating/Storage Humidity	90 %RH or less (non-condensing)
Operating Environment	Installation category (Overvoltage category): II Pollution degree: 2 Protection class: 1X Altitude: 1,000 m or less
Vibration Resistance	4.9 m/s <sup>2</sup>
Shock Resistance	19.6 m/s <sup>2</sup>

## 12 MEASURES TO SATISFY THE EMC DIRECTIVES

This section describes the measures required for NS115 Module to conform to EMC Directives: EN50081-2 and EN50082-2.

### ■ MECHATROLINK-II Communication Cable

For MECHATROLINK-II communication (CN6A, CN6B) connector, use the connector for special use.

Max. cable length is 50 m.

### ■ Fully Closed Encoder Cable

For fully closed encoder (CN4) connector, use the following connector.

Use the twisted pair shielded cable.

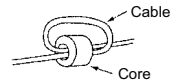
Connector: 54306-2011 (Made by Molex Japan)

Connector case: 54331-0201 (Made by Molex Japan)

### ■ The Core on the Cable

Attach the core on the cable as shown below:

Core Model	ESD-SR-25
Quantity	1
Turn	2
Manufacturer	Tokin



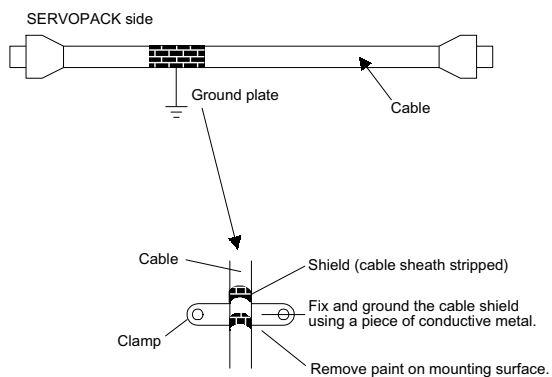
Cable line and the line position where the core are attached are shown below.

Cable Name	Mounting Position of Core
MECHATROLINK-II Communication Cable	Near the host controller and SERVOPACK side
Fully Closed Encoder Cable	Near the SERVOPACK side

## ■ Cable Clamp

Fix and ground the cable shield using a piece of conductive metal.

<Example of Cable Clamp>

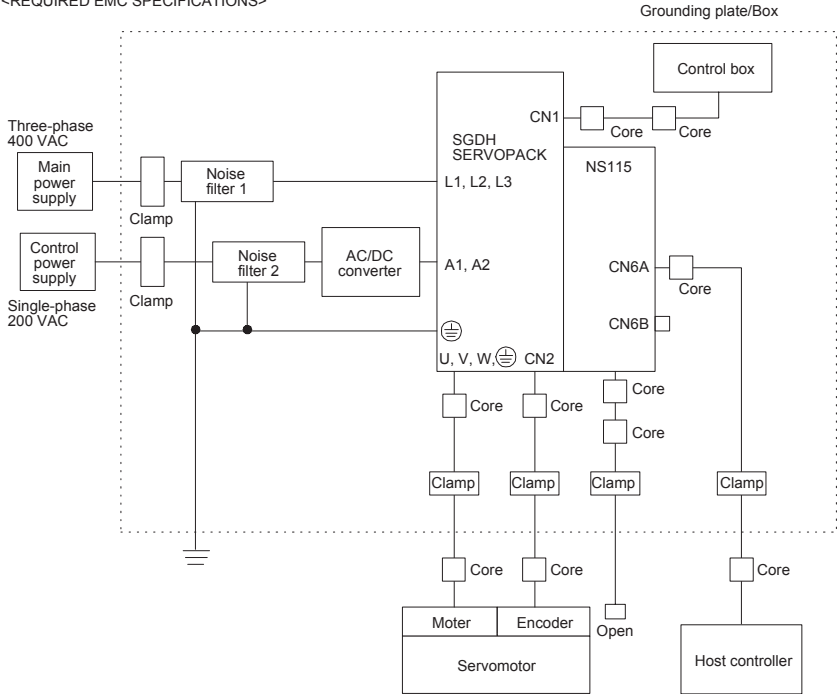




## ■ Wiring Examples

The following diagrams show the wiring example. Before wiring, turn OFF the Power ON/OFF switch and post a notice of “No Conduction.” Only an electrical expert can perform the wiring. The noise filter and the core are shown in the diagram.

<REQUIRED EMC SPECIFICATIONS>



- Note: 1. Clamp: Secure and ground cable shields using conductive metal parts.  
 2. Make sure that the grounding plate are securely connected to the grounding.  
 3. Remove the paint from the grounding plate to insure a good connection with filter, SERVOPACK, clamp, etc.

# AC Servo Drives

# $\Sigma$ -II Series

## SAFETY PRECAUTIONS

## MECHATROLINK-II Application Module

---

### **IRUMA BUSINESS CENTER (SOLUTION CENTER)**

480, Kamifujisawa, Iruma, Saitama, 358-8555, Japan  
Phone 81-4-2962-5151 Fax 81-4-2962-6138  
<http://www.yaskawa.co.jp>

### **YASKAWA AMERICA, INC.**

2121, Norman Drive South, Waukegan, IL 60085, U.S.A.  
Phone 1-800-YASKAWA (927-5292) or 1-847-887-7000 Fax 1-847-887-7310  
<http://www.yaskawa.com>

### **YASKAWA ELÉTRICO DO BRASIL LTDA.**

777, Avenida Piraporinha, Diadema, São Paulo, 09950-000, Brasil  
Phone 55-11-3585-1100 Fax 55-11-3585-1187  
<http://www.yaskawa.com.br>

### **YASKAWA EUROPE GmbH**

185, Hauptstraße, Eschborn, 65760, Germany  
Phone 49-6196-569-300 Fax 49-6196-569-398  
<http://www.yaskawa.eu.com>

### **YASKAWA ELECTRIC KOREA CORPORATION**

9F, Kyobo Securities Bldg. 26-4, Yeouido-dong, Yeongdeungpo-gu, Seoul, 150-737, Korea  
Phone 82-2-784-7844 Fax 82-2-784-8495  
<http://www.yaskawa.co.kr>

### **YASKAWA ELECTRIC (SINGAPORE) PTE. LTD.**

151, Lorong Chuan, #04-02A, New Tech Park, 556741, Singapore  
Phone 65-6282-3003 Fax 65-6289-3003  
<http://www.yaskawa.com.sg>

### **YASKAWA ELECTRIC (THAILAND) CO., LTD.**

252/125-126, 27th Floor, Muang Thai-Phatra Tower B, Rachadapisek Road, Huaykwang, Bangkok, 10310, Thailand  
Phone 66-2693-2200 Fax 66-2693-4200  
<http://www.yaskawa.co.th>

### **YASKAWA ELECTRIC (CHINA) CO., LTD.**

22F, One Corporate Avenue, No.222, Hubin Road, Shanghai, 200021, China  
Phone 86-21-5385-2200 Fax 86-21-5385-3299  
<http://www.yaskawa.com.cn>

### **YASKAWA ELECTRIC (CHINA) CO., LTD. BEIJING OFFICE**

Room 1011, Tower W3 Oriental Plaza, No.1, East Chang An Ave.,  
Dong Cheng District, Beijing, 100738, China  
Phone 86-10-8518-4086 Fax 86-10-8518-4082

### **YASKAWA ELECTRIC TAIWAN CORPORATION**

9F, 16, Nanking E. Rd., Sec. 3, Taipei, 104, Taiwan  
Phone 886-2-2502-5003 Fax 886-2-2505-1280

---

# YASKAWA

**YASKAWA ELECTRIC CORPORATION**

In the event that the end user of this product is to be the military and said product is to be employed in any weapons systems or the manufacture thereof, the export will fall under the relevant regulations as stipulated in the Foreign Exchange and Foreign Trade Regulations. Therefore, be sure to follow all procedures and submit all relevant documentation according to any and all rules, regulations and laws that may apply.

Specifications are subject to change without notice for ongoing product modifications and improvements.

© 2002-2015 YASKAWA ELECTRIC CORPORATION

MANUAL NO. TOBP C710800 01A <12>-0

Published in Japan April 2015

14-9-10