

# NX100 INSTRUCTIONS

SUPPLEMENTARY FOR EXPLOSION-PROOF PROGRAMMING PENDANT

---

Upon receipt of the product and prior to initial operation, read these instructions thoroughly, and retain for future reference.

---

## MOTOMAN INSTRUCTIONS

MOTOMAN-□□□ INSTRUCTIONS  
NX100 INSTRUCTIONS  
NX100 OPERATOR'S MANUAL  
NX100 OPERATOR'S MANUAL FOR BEGINNERS

The NX100 operator's manuals above correspond to specific usage.  
Be sure to use the appropriate manual.

Part Number: 174073-1CD  
Revision: 0

---

Explosion-Proof  
Programming Pendant

---

Copyright © 2015, Yaskawa America, Inc.

#### Terms of Use and Copyright Notice

All rights reserved. This manual is freely available as a service to Yaskawa customers to assist in the operation of Motoman robots, related equipment and software. This manual is copyrighted property of Yaskawa and may not be sold or redistributed in any way. You are welcome to copy this document to your computer or mobile device for easy access but you may not copy the PDF files to another website, blog, cloud storage site or any other means of storing or distributing online content.

Printed in the United States of America

First Printing, 2015

Yaskawa America, Inc.  
Motoman Robotics Division  
100 Automation Way  
Miamisburg, OH 45342  
Phone: 937-847-6200

[www.motoman.com](http://www.motoman.com)



## MANDATORY

- This manual explains the explosion-proof programming pendant of the NX100 system. Read this manual carefully and be sure to understand its contents before handling the NX100.
- General items related to safety are listed in the Chapter 1: Safety of the NX100 Instructions. To ensure correct and safe operation, carefully read the NX100 Instruction Manual before reading this manual.



## CAUTION

- Some drawings in this manual are shown with the protective covers or shields removed for clarity. Be sure all covers and shields are replaced before operating this product.
- The drawings and photos in this manual are representative examples and differences may exist between them and the delivered product.
- YASKAWA may modify this model without notice when necessary due to product improvements, modifications, or changes in specifications. If such modification is made, the manual number will also be revised.
- If your copy of the manual is damaged or lost, contact a YASKAWA representative to order a new copy. The representatives are listed on the back cover. Be sure to tell the representative the manual number listed on the front cover.
- YASKAWA is not responsible for incidents arising from unauthorized modification of its products. Unauthorized modification voids your product's warranty.

We suggest that you obtain and review a copy of the ANSI/RIA National Safety Standard for Industrial Robots and Robot Systems (ANSI/RIA R15.06-2012). You can obtain this document from the Robotic Industries Association (RIA) at the following address:

Robotic Industries Association  
900 Victors Way  
P.O. Box 3724  
Ann Arbor, Michigan 48106  
TEL: (734) 994-6088  
FAX: (734) 994-3338  
[www.roboticonline.com](http://www.roboticonline.com)

Ultimately, well-trained personnel are the best safeguard against accidents and damage that can result from improper operation of the equipment. The customer is responsible for providing adequately trained personnel to operate, program, and maintain the equipment. **NEVER ALLOW UNTRAINED PERSONNEL TO OPERATE, PROGRAM, OR REPAIR THE EQUIPMENT!**

We recommend approved Yaskawa training courses for all personnel involved with the operation, programming, or repair of the equipment.

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications.

---

## NOTES FOR SAFE OPERATION

Read this manual carefully before installation, operation, maintenance, or inspection of the NX100. In this manual, the Notes for Safe Operation are classified as “WARNING”, “CAUTION”, “MANDATORY”, or “PROHIBITED”.



### WARNING

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



### CAUTION

Indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury to personnel and damage to equipment. It may also be used to alert against unsafe practices.



### MANDATORY

Always be sure to follow explicitly the items listed under this heading.



### PROHIBITED

Must never be performed.

Even items described as “CAUTION” may result in a serious accident in some situations. At any rate, be sure to follow these important items.



To ensure safe and efficient operation at all times, be sure to follow all instructions, even if not designated as “CAUTION” and “WARNING”.



## WARNING

- Before operating the manipulator, check that servo power is turned off when the emergency stop buttons on the front door of the NX100 and programming pendant are pressed.  
When the servo power is turned off, the SERVO ON lamp on the playback panel and the SERVO ON icon on the programming pendant are turned off.

Injury or damage to machinery may result if the emergency stop circuit cannot stop the manipulator during an emergency. The manipulator should not be used if the emergency stop buttons do not function.

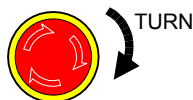
Emergency Stop Button



- Once the emergency stop button is released, clear the cell of all items which could interfere with the operation of the manipulator. Then turn the servo power ON.

**Injury may result from unintentional or unexpected manipulator motion.**

Release of Emergency Stop



- Observe the following precautions when performing teaching operations within the working envelope of the manipulator:
  - View the manipulator from the front whenever possible.
  - Always follow the predetermined operating procedure.
  - Ensure that you have a safe place to retreat in case of emergency.

Improper or unintended manipulator operation may result in injury.

- Confirm that no persons are present in the manipulator's work envelope and that you are in a safe location before:
  - Turning on the NX100 power
  - Moving the manipulator with the programming pendant
  - Running check operations
  - Performing automatic operations

Injury may result if anyone enters the working envelope of the manipulator during operation. Always press an emergency stop button immediately if there are problems. The emergency stop button is located on the right of the front door of the NX100 and on the upper center of the programming pendant.



## CAUTION

- Perform the following inspection procedures prior to conducting manipulator teaching. If problems are found, repair them immediately, and be sure that all other necessary processing has been performed.
  - Check for problems in manipulator movement.
  - Check for damage to insulation and sheathing of external wires.

- Always return the programming pendant to the hook on the NX100 cabinet after use.

The programming pendant can be damaged if it is left in the manipulator's work area, on the floor, or near fixtures.

- Read and understand the Explanation of the Warning Labels in the NX100 Instructions before operating the manipulator.

## Definition of Terms Used Often in This Manual


The MOTOMAN manipulator is the YASKAWA industrial robot product.

The manipulator usually consists of the controller, the programming pendant, and supply cables.

In this manual, the equipment is designated as follows.

Equipment	Manual Designation
NX100 Controller	NX100
NX100 Programming Pendant	Programming Pendant

Descriptions of the programming pendant and playback panel keys, buttons, and displays are shown as follows:

Equipment		Manual Designation
Programming Pendant	Character Keys	The keys which have characters printed on them are denoted with [ ]. ex. [ENTER]
	Symbol Keys	The keys which have a symbol printed on them are not denoted with [ ] but depicted with a small picture. ex. page key  The cursor key is an exception, and a picture is not shown.
	Axis Keys	"Axis Keys" are generic names for the keys for axis operation.
	Keys pressed simultaneously	When two keys are to be pressed simultaneously, the keys are shown with a "+" sign between them, ex. [SHIFT] + [COORD]
	Displays	The menu displayed in the programming pendant is denoted with { }. ex. {JOB}

## Description of the Operation Procedure

In the explanation of the operation procedure, the expression "Select •••" means that the cursor is moved to the object item and the SELECT key is pressed, or that the item is directly selected by touching the screen.



## Table of Contents

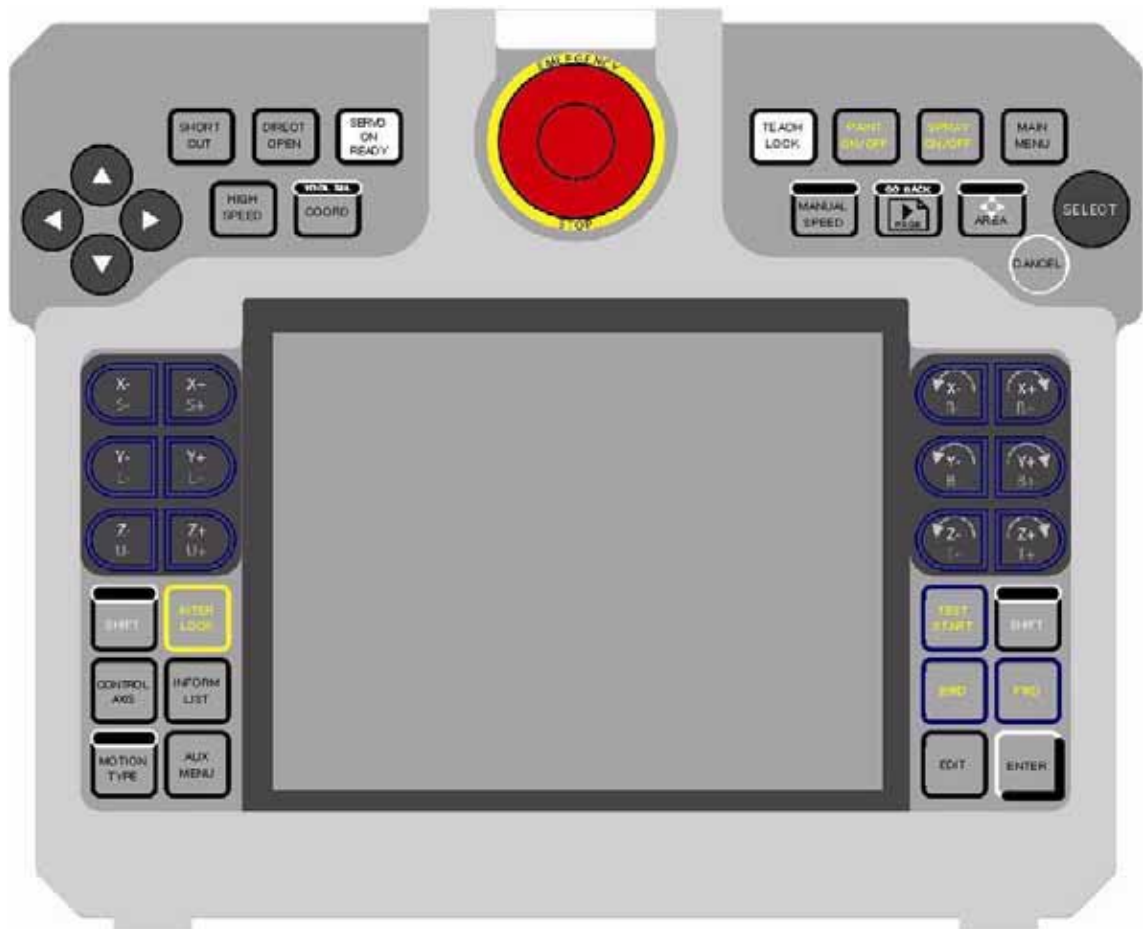
<b>1 Programming Pendant Overview .....</b>	<b>1-1</b>
1.1 Key Description .....	1-3
1.1.1 Character Keys .....	1-3
1.1.2 Symbol Keys .....	1-3
1.1.3 Axis Keys .....	1-3
1.1.4 Keys Pressed Simultaneously .....	1-3
1.2 Programming Pendant Keys .....	1-4
1.3 Main Menu Screen .....	1-10
1.4 External Memory .....	1-11

## 1 Programming Pendant Overview

The programming pendant is equipped with the keys and buttons used to conduct manipulator teaching operations and to edit jobs.




<Overview of JZRCR-NPP03-\*>




&lt;Overview of JZRCR-NPP07-\*&gt;

## 1.1 Key Description

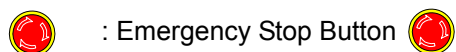
### 1.1.1 Character Keys

The keys which have characters printed on them are denoted with [ ].  is shown as [ENTER]

and  is shown as [TEACH LOCK].

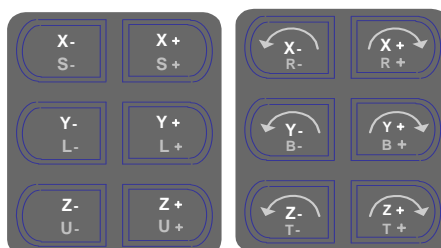
### 1.1.2 Symbol Keys

The keys which have a symbol printed on them are not denoted with [ ] but depicted with a small picture, with the exception of the cursor key, which is not shown with a picture.



### 1.1.3 Axis Keys




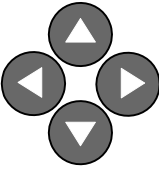








The keys pictured in the following are referred to as the axis keys when described.





















### 1.1.4 Keys Pressed Simultaneously

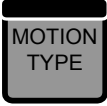



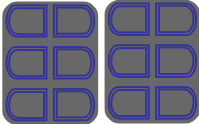




When two keys are to be pressed simultaneously, the keys are shown with a “+” sign between them, such as [SHIFT] + [COORD].

## 1.2 Programming Pendant Keys



















<p>E.STOP Button</p> 	<p>Turns off the servo power.</p> <ul style="list-style-type: none"> <li>• When the servo power is turned off, the SERVO ON icon on the programming pendant and the SERVO ON lamp on the playback panel will extinguish.</li> <li>• An emergency stop message is displayed on the screen.</li> </ul>
<p>Enable Switch</p> 	<p>Turns on the servo power. Enable switch is active only when the SERVO ON icon is flashing and both the safety plug and Teach Lock are on.</p>
<p>[TEACH LOCK]</p> 	<p>Sets to Teach Lock. When the Teach Lock is set, the TEACH LOCK icon appears on the programming pendant. When you set Teach Lock, start operation is disabled and mode changes are locked out until TEACH LOCK is turned off.</p>
<p>Cursor</p> 	<p>Moves the cursor in the direction of the arrow.</p> <ul style="list-style-type: none"> <li>• The size of the cursor and the range /place where the cursor can move will vary depending on the display.</li> <li>• If the UP cursor button is pressed when the cursor is on the first line, the cursor will move to the last line of the job. Conversely, if the cursor is on the last line of the job and the DOWN cursor button is pressed, the cursor will jump to the first line of the job.</li> </ul> <p>When [SHIFT] is pressed simultaneously:</p> <p>[SHIFT]  + UP </p> <p>Goes back to the previous page.</p> <p>[SHIFT]  + DOWN </p> <p>Goes to the next page.</p> <p>[SHIFT]  + RIGHT </p> <p>Scrolls the instruction area of the job content or play back display to the right.</p> <p>[SHIFT]  + LEFT </p> <p>Scrolls the instruction area of the job content or playback display to the left.</p>





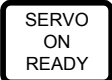


<p>[SELECT]</p> 	<p>Selects menu items such as main menu, pull down menu, etc.</p>
<p>[MAIN MENU]</p> 	<p>Displays the main menu.</p> <p>When [SHIFT] is pressed simultaneously:</p> <p>[SHIFT]  + [MAIN MENU] </p> <p>When any display appears, the screen changes in the order of the display, sub-menu and main menu.</p>
<p>[AREA]</p> 	<p>Moves the cursor between "Menu Area" and "General Purpose Display Area".</p> <p>When [SHIFT] is pressed simultaneously:</p> <p>[SHIFT]  + [AREA] </p> <p>The language can be switched when the bilingual function is valid. (Bilingual function is optional.)</p>
<p>[PAGE]</p> 	<p>Displays the next page.</p> <p>When [SHIFT]  is pressed simultaneously, the previous page is displayed.</p> <p>The page can be changed when the page icon appears in the status area.</p>
<p>[DIRECT OPEN]</p> 	<p>Displays the content related to the current line.</p> <ul style="list-style-type: none"> <li>To display the content of a CALL job or condition file, move the cursor to the next line and press [DIRECT OPEN]. The file will be displayed for the selected line. Display content will vary depending on the type of instruction used in the job.</li> </ul> <p>Example:  For a CALL instruction, the content of the called job will be displayed.  For a work instruction, the content of the condition file will be displayed.  For Input/output instructions, the input/output condition will be displayed.</p>

<p>[COORD]</p> 	<p>Select the operation coordinate system when the manipulator is operated manually.</p> <ul style="list-style-type: none"> <li>• Five coordinate systems (joint, rectangular, cylinder, tool and user) can be used. Each time this key is pressed, the coordinate system is switched in the following order:</li> </ul> <p>"JOINT"→"WLD/CYL"→"TOOL"→"USER"</p> <ul style="list-style-type: none"> <li>• The selected coordinate system is displayed on the status display area.</li> </ul> <p>When [SHIFT] is pressed simultaneously:</p> <p>[SHIFT]  + [COORD] </p> <p>The coordinate number can be changed when the "TOOL" or "USER" coordinate system is selected.</p>
<p>[MANUAL SPEED]</p> 	<p>Sets the speed for manual operation. This speed is also valid for operations with [FWD] and [BWD].</p> <ul style="list-style-type: none"> <li>• There are four speed levels (slow, medium, fast, and inching). Each time [MANUAL SPEED] is pressed, manual speed changes in the following order. The selected speed is displayed on the status area.</li> </ul> <p>Each time [MANUAL SPEED]  is pressed: "INCH"→" SLOW"→"MED"→"FST"</p> <p>Each time [SHIFT]  + [MANUAL SPEED]  is pressed simultaneously: "FST"→" MED"→"SLOW"→"INCH"</p>
<p>[HIGH SPEED]</p> 	<p>Changes the speed of axis operation when the axis button is pressed. The speed of the manipulator will change to high regardless of the programmed speed while this key is pressed.</p> <ul style="list-style-type: none"> <li>• The speed for [HIGH SPEED] is specified in advance.</li> <li>• Note that only one axis can be operated at high speed. High-speed operation of multiple axes is not possible.</li> </ul>

<p>[MOTION TYPE]</p> 	<p>Selects the interpolation type for playback operation. The selected interpolation type is shown in the status display area on the screen.</p> <ul style="list-style-type: none"> <li>Each time this key is pressed, the interpolation type changes in the following order: "MOVJ"→" MOVL"→"MOVC"→"MOVS"</li> </ul> <p>When [SHIFT] is pressed simultaneously:</p> <p>[SHIFT]  + [MOTION TYPE] </p> <p>The interpolation mode changes in the following order: "STANDARD"→" EXTERNAL REFERENCE POINT"*→" CONVEYOR"*</p> <p>Interpolation type can be changed in any mode.</p> <p>* These modes are purchased options.</p>
<p>[CONTROL AXIS]</p> 	<p>Changes axis operations between the robot axis and the external axis.</p> <ul style="list-style-type: none"> <li>Pressing this key enables the robot axis and external axis operation.</li> <li>[CONTROL AXIS] is active for the system where multiple manipulators are controlled by one NX100, or the system with external axes.</li> </ul>
<p>Axis Key</p> 	<p>Moves specified axes on manipulator.</p> <ul style="list-style-type: none"> <li>The manipulator axes only move while the key is held down.</li> <li>Multiple axes can be operated simultaneously by pressing two or more keys at the same time.</li> </ul> <p><b>NOTE</b></p> <p><b>The manipulator operates in the selected coordinate system. Be aware of safety hazards.</b></p>
<p>[TEST START]</p> 	<p>Moves the manipulator through to check the path of taught steps in a continuous motion when [TEST START] and [INTERLOCK] are simultaneously pressed.</p> <ul style="list-style-type: none"> <li>The manipulator operates according to the currently selected operation cycle: "AUTO", "1CYCLE", or "STEP".</li> <li>If the taught speed exceeds the maximum teaching speed, the operation proceeds at the maximum teaching speed.</li> </ul> <p>When [INTERLOCK] is pressed simultaneously:</p> <p>[INTERLOCK]  + [TEST START] </p> <p>The manipulator operates at the taught speed.</p> <p>Operation stops immediately when [TEST START]  is released.</p>

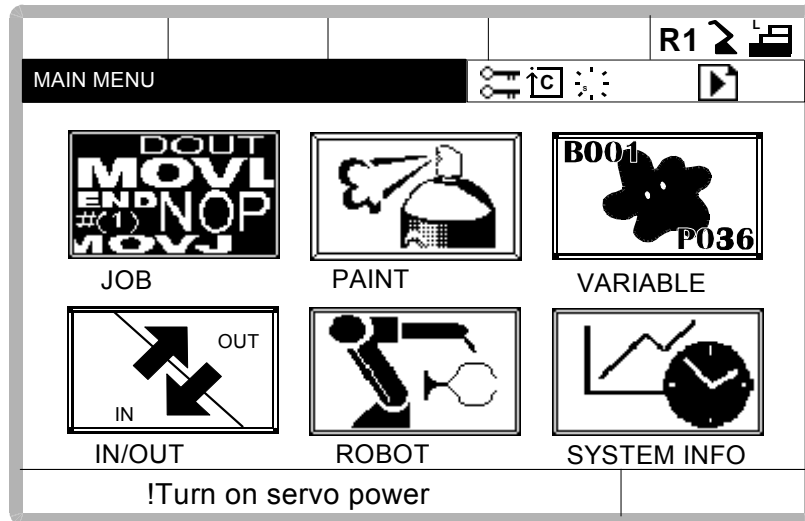


<p>[FWD]</p> 	<p>Moves the manipulator through the taught steps while this key is pressed.</p> <ul style="list-style-type: none"> <li>• Only move instructions are executed.</li> </ul> <p>When [INTERLOCK] is pressed simultaneously:</p> <p>[INTERLOCK]  + [FWD] </p> <p>All instructions except move instructions are executed.</p>
<p>[BWD]</p> 	<p>Moves the manipulator through the taught steps in the reverse direction while this key is pressed.</p> <ul style="list-style-type: none"> <li>• Only move instructions are executed.</li> </ul>
<p>[INFORM LIST]</p> 	<p>Displays instruction lists of commands available for job editing.</p>
<p>[CANCEL]</p> 	<p>Cancels data input and resets errors.</p>
<p>[EDIT]</p> 	<p>By pressing this key, the following functions are available:</p> <ul style="list-style-type: none"> <li>• Insert (when the INS icon is displayed on the P.P.)</li> <li>• Modify (when the ALT icon is displayed on the P.P.)</li> <li>• Delete (when the DEL icon is displayed on the P.P.)</li> </ul>
<p>[ENTER]</p> 	<p>Registers instructions, data, current position of the manipulator, etc.</p> <ul style="list-style-type: none"> <li>• When [ENTER]  is pressed, the instruction or data displayed in the input buffer line moves to the cursor position to complete a registration, insertion, or modification.</li> </ul>
<p>[SHIFT]</p> 	<p>Changes the functions of the other keys by pressing together.</p> <p>&lt;Can be used with the following keys:&gt;</p> <p>[MAIN MENU]  , [COORD]  , [MOTION TYPE]  ,</p> <p>CURSOR  , [SHORTCUT]  , [PAGE]  ,</p> <p>[AREA]  , [MANUAL SPEED] </p> <p>Refer to the description of each key for the alternate [SHIFT] functions.</p>

<p>[INTERLOCK]</p> 	<p>Changes the functions of the other keys by pressing together. &lt;Can be used with the following keys:&gt;</p> <p>[TEST START]  , [FWD]  , [SPRAY ON/OFF] </p> <p>Refer to the description of each key for the alternate [INTERLOCK] functions.</p>
<p>[SERVO ON READY]</p> 	<p>Enables the servo power supply to be turned ON. Press this button to enable the servo power supply to be turned ON if the servo power supply is shut OFF by the emergency stop or overrun signal. When this button is pressed:</p> <ul style="list-style-type: none"> <li>• In the play mode, the servo power supply is turned ON if the safeguarding is securely closed.</li> <li>• In the teach mode, the SERVO ON icon flashes and the servo power supply is turned ON when the Enable switch is ON.</li> </ul> <p>The SERVO ON icon is lit while the servo power is ON.</p>
<p>[PAINT ON/OFF]</p> 	<p>&lt;Teach Mode&gt; Used to output a permission signal to prohibit painting of a spray signal. To turn OFF the permission signal, press this key again.</p> <p>&lt;Play Mode&gt; Used to stop outputting a spray signal while the spray signal is being output by the SPYON instruction. To start outputting the spray signal, press this key again.</p>
<p>[SPRAY ON/OFF]</p> 	<p>Used to execute the same process as the "SPYON" instruction to start the spray or the "SPYOF" instruction to end the spray by pressing this key and [INTERLOCK] simultaneously.</p> <ul style="list-style-type: none"> <li>• Each time this key is pressed, the same instruction as "SPYON" or "SPYOF" is executed alternately.</li> </ul>

### 1.3 Main Menu Screen

Main menu screen of the explosion-proof specification programming pendant is displayed as follows. The screen for JZRCR-NPP07-\* of the explosion-proof specification programming pendant is displayed in black-and-white inversion differently from JZRCR-NPP03-\*. To display the screen in the same way as JZRCR-NPP03-\*, press [SHIFT] + [←] or [SHIFT] + [→].



## 1.4 External Memory

For the explosion-proof programming pendant, a CF card slot is prepared on the front door of the NX100. (Refer to the figures below.)



Fig. 1 CF Slot (Cover Opened)



Fig. 2 CF Slot (Cover Closed)



Removing the CF or disconnecting the control power supply while writing data to the CF/ reading data from the CF may cause data corruption in the CF.

Please DO NOT remove the CF or disconnect the control power supply while

- the remaining bytes indication is switching to the file list window after the data of the external memory device is saved, loaded, or verified, and the hourglass icon disappears.
- the screen is switching to the file list window after the data of the external memory device is deleted.
- the folder list is being updated after a folder is created to or deleted from a folder of the external memory.
- the message "Under running auto backup is being displayed.
- CMOS.BIN is being saved with the message "Saving system data. Don't turn the power off" displayed.
- CMOS.BIN is being loaded with the message "Loading system data. Don't turn the power off" displayed.

# NX100

# INSTRUCTIONS

SUPPLEMENTARY FOR EXPLOSION-PROOF PROGRAMMING PENDANT

---

## HEAD OFFICE

2-1 Kurosakishiroishi, Yahatanishi-ku, Kitakyushu 806-0004, Japan  
Phone +81-93-645-7703 Fax +81-93-645-7802

YASKAWA America Inc. (Motoman Robotics Division)  
100 Automation Way, Miamisburg, OH 45342, U.S.A.  
Phone +1-937-847-6200 Fax +1-937-847-6277

YASKAWA Europe GmbH (Robotics Division)  
Yaskawastrasse 1, 85391 Allershausen, Germany  
Phone +49-8166-90-100 Fax +49-8166-90-103

YASKAWA Nordic AB  
Bredbandet 1 vån. 3 varvsholmen 392 30 Kalmar, Sweden  
Phone +46-480-417-800 Fax +46-480-417-999

YASKAWA Electric (China) Co., Ltd.  
22/F One Corporate Avenue No.222, Hubin Road, Huangpu District, Shanghai 200021, China  
Phone +86-21-5385-2200 Fax +86-21-5385-3299

YASKAWA SHOUGANG ROBOT Co. Ltd.  
No7 Yongchang North Road, Beijing E&T Development Area, China 100176  
Phone +86-10-6788-2858 Fax +86-10-6788-2878

YASKAWA India Private Ltd. (Robotics Division)  
#426, Udyog Vihar, Phase- IV, Gurgaon, Haryana, India  
Phone +91-124-475-8500 Fax +91-124-475-8542

YASKAWA Electric Korea Co., Ltd  
9F, Kyobo Securities Bldg., 26-4, Yeouido-dong, Yeongdeungpo-gu, Seoul 150-737, Korea  
Phone +82-2-784-7844 Fax +82-2-784-8495

YASKAWA Electric Taiwan Corporation  
12F, No.207, Sec. 3, Beishin Rd., Shindian District, New Taipei City 23143, Taiwan  
Phone +886-2-8913-1333 Fax +886-2-8913-1513

YASKAWA Electric (Singapore) PTE Ltd.  
151 Lorong Chuan, #04-02A, New Tech Park, Singapore 556741  
Phone +65-6282-3003 Fax +65-6289-3003

YASKAWA Electric (Thailand) Co., Ltd.  
252/125-126 27th Floor, Tower B Muang Thai-Phatra Complex Building,  
Rachadaphisek Road, Huaykwang, Bangkok 10320, Thailand  
Phone +66-2693-2200 Fax +66-2693-4200

PT. YASKAWA Electric Indonesia  
Secure Building-Gedung B Lantai Dasar & Lantai 1 Jl. Raya Protokol Halim Perdanakusuma,  
Jakarta 13610, Indonesia  
Phone +62-21-2982-6470 Fax +62-21-2982-6741

---

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