

SYSMAC

CXONE-□□□□C-V□/CXONE-□□□□D-V□

WS02-DRVC1 Ver. 1.92

CX-Drive Software

OPERATION MANUAL

OMRON

CXONE-□□□□C-V□/

CXONE-□□□□D-V□

WS02-DRVC1

CX-Drive

Operation Manual

Revised February 2010

Notice:

OMRON products are manufactured for use according to proper procedures by a qualified operator and only for the purposes described in this manual.

The following conventions are used to indicate and classify precautions in this manual. Always heed the information provided with them. Failure to heed precautions can result in injury to people or damage to property.



DANGER

Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury. Additionally, there may be severe property damage.



WARNING

Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury. Additionally, there may be severe property damage.



Caution

Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury, or property damage.

OMRON Product References

All OMRON products are capitalized in this manual. The word “Unit” is also capitalized when it refers to an OMRON product, regardless of whether or not it appears in the proper name of the product.

The abbreviation “Ch,” which appears in some displays and on some OMRON products, often means “word” and is abbreviated “Wd” in documentation in this sense.

The abbreviation “PLC” means Programmable Controller. “PC” is used, however, in some Programming Device displays to mean Programmable Controller.

Visual Aids

The following headings appear in the left column of the manual to help you locate different types of information.

Note Indicates information of particular interest for efficient and convenient operation of the product.

1,2,3... 1. Indicates lists of one sort or another, such as procedures, checklists, etc.

© OMRON, 2009

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 OMRON.

No patent liability is assumed with respect to the use of the information contained herein. Moreover, because OMRON 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, OMRON 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.

TABLE OF CONTENTS

| | |
|---------------------------------|-----------|
| PRECAUTIONS | xv |
| 1 Intended Audience | xvi |
| 2 General Precautions | xvi |
| 3 Safety Precautions | xvi |
| 4 Application Precautions | xvii |

SECTION 1

| | |
|--|----------|
| Overview | 1 |
| 1-1 Introduction | 2 |
| What Is the CX-Drive? | 2 |
| Features | 2 |
| Applicable Drives and Communications | 4 |
| Files Created by CX-Drive | 5 |
| Computer System Requirements | 5 |
| Confirming Product Contents | 5 |
| 1-2 Installation | 6 |
| Required Software | 6 |
| 1-3 System Configuration | 7 |
| Inverter Connection | 7 |
| Servo Connection | 13 |

SECTION 2

| | |
|--|-----------|
| Basic Operations | 21 |
| 2-1 Overall Operating Procedure | 22 |
| Inverters | 22 |
| Servo | 24 |
| 2-2 Starting the CX-Drive | 26 |
| 2-3 Creating New Drive Files | 27 |
| Method 1: Automatically Detecting the Connected Drives | 27 |
| Method 2: Creating a New Data File without a Connected Drive | 30 |
| 2-4 User Interface | 39 |
| Window Structure | 39 |
| Functions | 39 |
| Menu Commands | 46 |
| 2-5 Editing Drive Files | 49 |
| Editing Parameters | 50 |
| Graphs | 51 |
| Diagrams | 51 |
| Status Displays | 52 |
| Monitoring | 52 |
| Data Trace | 53 |
| Test Run | 53 |
| FFT | 54 |
| Settings | 54 |

| | |
|-------------------------------|-----------|
| Revision History | 55 |
|-------------------------------|-----------|

TABLE OF CONTENTS

About this Manual:

This manual provides information required to use the CX-Drive Inverter/Servo Support Software, including specifications and operating methods. The CX-Drive runs on Windows 98, 2000, XP, Vista, or Windows 7 and is used to set, transfer, and compare parameters; perform test runs and adjustment; and performing monitoring and data tracing for OMRON Inverters and Servos.

Please read this manual carefully and be sure you understand the information provided before attempting to use the CX-Drive. Be sure to read the precautions provided in the following section.

Please read the relevant Inverter or Servo manuals carefully and be sure you understand the information provided before setting up or using an application for a drive.

| Drive type | Manual Name | Cat. No. (suffixes omitted) |
|------------------------------|---|-----------------------------|
| Inverters | SYSDRIVE JX Series Models 3G3JX Compact Simplified Inverters User's Manual | I558-E1 |
| | SYSDRIVE MX Series Models 3G3MX Multi-function Compact Inverters User's Manual | I559-E1 |
| | SYSDRIVE RX Series Models 3G3RX High-function General-purpose Inverters User's Manual | I560-E1 |
| | SYSDRIVE MX2 Series Models 3G3MX2 Multi-Function Compact Inverters User's Manual | I570-E1 |
| | SYSDRIVE 3G3JV Compact Simplified Inverters User's Manual | I528-E1 |
| | SYSDRIVE 3G3MV Multi-function Compact Inverters User's Manual | I527-E1 |
| | SYSDRIVE RV Series Models 3G3RV High-function General-purpose Inverters User's Manual | I532-E1 |
| | SYSDRIVE RV Series Models 3G3RV-V1 High-function General-purpose Inverters Setup Manual | I549-E1 |
| | DeviceNet Communications Unit/Card 3G3MV-PDRT2, 3G3RV-PDRT2 User's Manual | I539-E1 |
| Servomotors/ Servo Drives | SMARTSTEP2 Series Servomotors/Servo Drives Models R88M-G□ (Servo-motors)/R7D-BP□ (Servo Drives) User's Manual | I561-E1 |
| | OMNUC G5 Series Models R88M-K□ (AC Servomotors)/Models R88D-KT□ (AC Servo Drives) AC Servomotors/Servo Drives User's Manual | I571-E1 |
| | OMNUC G5 Series AC Servomotors/Servo Drives with Built-in MECHATROLINK-II Communications Models R88M-K□ (AC Servomotors)/R88D-KN□-ML2 (AC Servo Drives) User's Manual | I572-E1 |
| | OMNUC G Series Models R88M-G□ (AC Servomotors)/Models R88D-GT□ (AC Servo Drives) AC Servomotors/Servo Drives User's Manual | I562-E1 |
| | OMNUC G Series AC Servomotors/Servo Drives with Built-in MECHATROLINK-II Communications Models R88M-G□ (AC Servomotors)/R88D-GN□-ML2 (AC Servo Drives) User's Manual | I566-E1 |
| | SMARTSTEP A Series Servomotors/Servo Drives Models R7M-A□ (Servo-motors)/R7D-AP□ (Servo Drives) User's Manual | I533-E1 |
| | OMNUC W Series Models R88M-W□ (AC Servomotors)/Models R88D-WT□ (AC Servo Drives) AC Servomotors/Servo Drives User's Manual | I531-E1 |
| | OMNUC W Series AC Servomotors/Servo Drives with Built-in MECHATROLINK-II Communications Models R88M-W□ (AC Servomotors)/R88D-WN□-ML2 (AC Servo Drives) User's Manual | I544-E1 |

For installing procedures of CX-Drive standalone product WS02-DRVC1, refer to the Product Guide in the package.


For details on procedures for installing the CX-Drive from the CX-One FA Integrated Tool Package, refer to the *CX-One Setup Manual* (W463) provided with CX-One.

| Cat. No. | Model | Name | Contents |
|----------|-----------------------------|--|--|
| W463 | CXONE-□□□□C- V□/□□□□D-V□ | CX-One FA Integrated Tool Package Setup Manual | Installation and overview of CX-One FA Integrated Tool Package. |

Precautions provides general precautions for using the CX-Drive, Programmable Controller, and related devices.

Section 1 provides an overview of the CX-Drive, and describes the functions and system requirements required to operate the CX-Drive. It also provided installation methods and the overall procedure for using the CX-Drive.

provides basic operating procedures for using the CX-Drive, including descriptions of CX-Drive windows and parameter setting procedures.

Also refer to the *CX-Drive Online Help* for operating procedures and functions. Select **Help** from the Help Menu or click the  Button to display context help, which displays help about the currently displayed window.

Version Improvements

Addition of Supported Inverters

Support for the following Inverters has been added for version 1.12 of the CX-Drive:
3G3RV Inverters, Version 1 (-V1)

To specify the 3G3RV-V1 offline with CX-Drive version 1.3, select "3G3RV" in the *Drive Type* dialog box (see page 30) and then specify "V1" in the specification field.

Ver.1.61 supports

OMNUC G series R88D-GT servo drives and SMARTSTEP2 series servo drives.
Data Trace function improvements.

Ver.1.62 supports

OMNUC G series R88D-GN servo drives.

Ver.1.70 supports

3G3JX/MX/RX Inverters.

Ver.1.80 supports

OMNUC G5 Series R88D-KT servo drives.
FFT Analysis function

Ver.1.90 supports

3G3MX2 Inverters.

Ver.1.91 supports

OMNUC G5 Series R88D-KN Servo Drives with Built-in MECHATROLINK-II Communications

Ver.1.92 supports

OMNUC G5 Series R88D-KN with Built-in EtherCAT Communications

Change to Relative Path Information for Workspace Files (Extension .sdw)

| Item | Ver. 1.12 | Ver. 1.3 |
|--|--|--|
| Workspace files (file name extension .sdw) | Link information is held using absolute paths for all drive data files (.sdd). This prevents moving files. | Link information is held using relative paths for all drive data files (.sdd). This enables moving files as long as the relative position of all drive data files is the same. |

Support for Windows Vista

CX-Drive version 1.4 or higher will run on Windows Vista.

Support for Windows 7

CX-Drive version 1.91 or higher will run on Windows 7.

Registered Trademark

- MECHATROLINK is a registered trademark of the MECHATROLINK Members Association.

Read and Understand this Manual

Please read and understand this manual before using the product. Please consult your OMRON representative if you have any questions or comments.

1. WARRANTY

- (1) The warranty period for the Software is one year from either the date of purchase or the date on which the Software is delivered to the specified location.
- (2) If the User discovers a defect in the Software (i.e., substantial non-conformity with the manual), and returns it to OMRON within the above warranty period, OMRON will replace the Software without charge by offering media or downloading services from the Internet. And if the User discovers a defect in the media which is attributable to OMRON and returns the Software to OMRON within the above warranty period, OMRON will replace the defective media without charge. If OMRON is unable to replace the defective media or correct the Software, the liability of OMRON and the User's remedy shall be limited to a refund of the license fee paid to OMRON for the Software.

2. LIMITATION OF LIABILITY

- (1) THE ABOVE WARRANTY SHALL CONSTITUTE THE USER'S SOLE AND EXCLUSIVE REMEDIES AGAINST OMRON AND THERE ARE NO OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO, WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. IN NO EVENT WILL OMRON BE LIABLE FOR ANY LOST PROFITS OR OTHER INDIRECT, INCIDENTAL, SPECIAL, OR CONSEQUENTIAL DAMAGES ARISING OUT OF USE OF THE SOFTWARE.
- (2) OMRON SHALL ASSUME NO LIABILITY FOR DEFECTS IN THE SOFTWARE BASED ON MODIFICATION OR ALTERATION OF THE SOFTWARE BY THE USER OR ANY THIRD PARTY.
- (3) OMRON SHALL ASSUME NO LIABILITY FOR SOFTWARE DEVELOPED BY THE USER OR ANY THIRD PARTY BASED ON THE SOFTWARE OR ANY CONSEQUENCE THEREOF.

3. APPLICABLE CONDITIONS

THE USER SHALL NOT USE THE SOFTWARE FOR A PURPOSE THAT IS NOT DESCRIBED IN THE ATTACHED USER MANUAL.

4. CHANGE IN SPECIFICATIONS

The software specifications and accessories may be changed at any time based on improvements or for other reasons.

5. EXTENT OF SERVICE

The license fee of the Software does not include service costs, such as dispatching technical staff.

6. ERRORS AND OMISSIONS

The information in this manual has been carefully checked and is believed to be accurate; however, no responsibility is assumed for clerical, typographical, or proofreading errors, or omissions.

PRECAUTIONS

This section provides general precautions for using the CX-Drive.

The information contained in this section is important for the safe and reliable application of the CX-Drive. You must read this section and understand the information contained before attempting to install or use the CX-Drive.

| | | |
|---|-------------------------------|------|
| 1 | Intended Audience | xvi |
| 2 | General Precautions | xvi |
| 3 | Safety Precautions | xvi |
| 4 | Application Precautions | xvii |

1 Intended Audience

This manual is intended for the following personnel, who must also have knowledge of electrical systems (an electrical engineer or the equivalent).

- Personnel in charge of installing FA systems.
- Personnel in charge of designing FA systems.
- Personnel in charge of managing FA systems and facilities.


2 General Precautions

The user must operate the product according to the performance specifications described in the operation manuals.






Before using the product under conditions which are not described in the manual or applying the product to nuclear control systems, railroad systems, aviation systems, vehicles, combustion systems, medical equipment, amusement machines, safety equipment, and other systems, machines, and equipment that may have a serious influence on lives and property if used improperly, consult your OMRON representative.

Make sure that the ratings and performance characteristics of the product are sufficient for the systems, machines, and equipment, and be sure to provide the systems, machines, and equipment with double safety mechanisms.

This manual provides information for programming and operating the Unit. Be sure to read this manual before attempting to use the Unit and keep this manual close at hand for reference during operation.

 **WARNING** It is extremely important that the CX-Drive and related devices be used for the specified purpose and under the specified conditions, especially in applications that can directly or indirectly affect human life. You must consult with your OMRON representative before applying CX-Drive and related devices to the above-mentioned applications.

3 Safety Precautions

-  **Caution** It may become impossible to stop motor rotation if serial communications fail during test runs. Always provide an external hardware means of stopping the motor.
-  **Caution** Confirm safety at the destination node before transferring parameters or other data to another node from the CX-Drive. Doing either of these without confirming safety may result in injury.
-  **Caution** Always confirm the axis number carefully before starting operation from the CX-Drive.
-  **Caution** Stop the inverter "RUN" when connecting CX-Drive to X-Series inverters during Frequency Reference Selection(A001) is Operator. The motor speed is affected.
-  **Caution** The CS1W-CIF31 Serial Conversion Cable cannot be used to connect a computer running the CX-Drive to the 3G3MV. (See the following note.)

Note USB-Serial Conversion Cables That Can Be Used

For 3G3JV- and 3G3RV-series Inverters: CS1W-CIF31 USB-Serial Conversion Cable.

(The commercially available products listed below can also be used.)

For 3G3MV-series Inverters: The CS1W-CIF31 cannot be used. Use the commercially available products listed below.

Commercially Available USB-Serial Conversion Cables

BHS-US01/GP manufactured by Buffalo

USB-CVRS9 manufactured by Sanwa

The commercially available USB-serial converters have been successfully tested for OMRON Inverters but operation may be unstable in some operating environments (mainly depending on the ambient temperature, humidity, and noise). The functions, performance, and reliability of these converters may not be as specified under all possible conditions. Check the warranty information from the manufacturer.

4 Application Precautions

Observe the following precautions when using the CX-Drive.

- Confirm that set parameters operate properly before using them in actual applications.
- Do not turn OFF the power to the Servo Drive while writing to flash memory. In the worst case, doing so may damage the flash memory.
- After replacing an Inverter or Servo Drive, restart operation only after saving the required parameters in the new Inverter or Servo Drive.
- Confirm that no adverse effect will occur in the system before attempting any of the following. Not doing so may result in an unexpected operation.
 - Changing the operating mode of the PLC (including changing the Start-up Mode)
 - Changing parameter settings
 - Automatically downloading parameters (This function is enable by selecting the *Autodownload when a parameter is updated* Option on the Online Options Tab Page in the window that appears when **Tools - Options** is selected from the menu bar.)
- Do not turn OFF the power to the computer while installing or uninstalling the CX-Drive. Doing so may result in corrupted data in the computer.
- The multi-turn counter and alarms will be set in the absolute serial encoder if the absolute encoder setting function is performed. If the absolute encoder's multi-turn counter is reset to zero, the coordinate system of the mechanical system will change from what it was previously. Be sure that the encoder is set correctly before resetting the mechanical system to the zero point.
- The load will move back and forward during auto tune operation. Please consider what are the conditions you can stop this operation at anytime.
- The motor speed will have extreme variations during FFT analysis operation. Please consider what are the conditions you can stop this operation at anytime.

SECTION 1

Overview

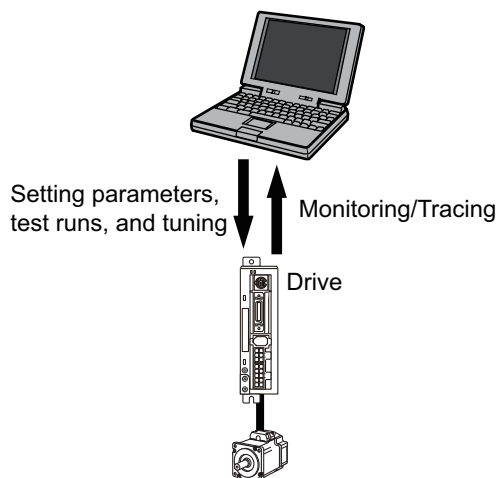
This section provides an overview of the CX-Drive, and describes the functions and system requirements required to operate the CX-Drive. It also provided installation methods and the overall procedure for using the CX-Drive.

| | | |
|-----|--------------------------------|---|
| 1-1 | Introduction | 2 |
| 1-2 | Installation | 6 |
| 1-3 | System Configuration | 7 |

1-1 Introduction

1-1-1 What Is the CX-Drive?

The CX-Drive is a software application that enables 1) setting, downloading, uploading, and comparing parameters, 2) test runs and tuning, and 3) monitoring and data tracing for Inverters and Servos.



1-1-2 Features

Supports Most OMRON Inverters and Servos

The CX-Drive can be used with OMRON's 3G3JX, 3G3MX, 3G3MX2, 3G3RX, 3G3JV, 3G3MV, and 3G3RV Inverters, as well as OMRON's SMARTSTEP2, SMARTSTEP, OMNUC G5-series, OMNUC G-series, OMNUC W-series Servo Drives.

Wide Range of Parameter Editing Functions

Easy and Dependable Parameter Editing for Inverters and Servos

Inverter and Servo parameters can be edited using parameter numbers or by category. Parameter editing tables show parameter ID numbers, descriptions, units, default values, and ranges in the same way as in the Servo manuals. Parameters can be set using pull-down menus or by typing in settings.

Parameter settings can be easily reviewed because setting status (e.g., modified, warning, default, or disabled) is shown for each parameter to avoid setting mistakes.

Easily Check Drive Parameters and Upload/Download Only Selected Parameters

When connected online, you can easily display drive parameters by using a comparison function. Also, the selected parameters can be downloaded to or uploaded from the drive as required.

Edit Parameters in Graphic Form

Inverter parameters, such as V/F profiles and jump frequencies, can be displayed in graphic charts.

Display Parameters in Diagrams

Drive parameters can be displayed in diagrams, such as PID diagrams or position/speed/torque block diagrams.

Automatically Detect Drives

The connected drives can be detected automatically and displayed in a list without setting model numbers or connection types. Just select a drive to add it to the Workspace.

Inverter Tuning and Test Runs

Auto-tuning for the 3G3RV Just enter the specified motor parameters and let the Servo automatically tune itself to match the characteristics of the motor.

Inverter Test Runs The test run options enable the acceleration, deceleration, and frequency references of the motor to be determined for testing purposes. Additional options allow the motor to be run continuously or cycled for 'n' number of cycles. Forward or reverse operation and stopping are also possible, and the feedback input can be displayed.

The parameters can be set either by entering them directly into the appropriate fields or graphically by dragging handles in the Test Run Setup Diagram.

Servo Tuning and Test Runs

Auto-tuning The auto-tuning function calculates the load moment of inertia during operation of the Servo and sets parameters to achieve Servo gains that are consistent with the machine rigidity settings. These parameters can be saved in the Servo and used the next time power is turned ON.

Servo Test Runs The test run options enable the jog speed, acceleration, and deceleration of the motor to be determined for testing purposes. Continuous operation, cyclic operation, origin searches, turning the Servo ON/OFF, forward/reverse direction selection, stopping, and speed display are also possible.

The parameters can be set either by entering them directly into the appropriate fields or graphically by dragging handles in the Test Run Setup Diagram.

Adjust Offsets for the R7D-AP and R88D-WT The speed/torque offset can be adjusted automatically or manually, the offset and gain of the analog monitor output can be adjusted, and the current detection offset can be adjusted automatically or manually.

Absolute Encoder Setting for the R88D-WT An absolute encoder and multi-turn limit can be set for the R88D-WT.

Realtime Tracing The Real Time Monitor Window enables monitoring a specific set of parameters. The parameter values are displayed simultaneously in graphic and digital forms.

The graphic display shows the parameter values per unit time.

Note Online functions are supported for only one axis at a time.

1-1-3 Applicable Drives and Communications

The CX-Drive supports the following drives and communications.

| Drive type | Series | Communications | | | |
|------------|--|-----------------------|--------------|-----------------------------|------------|
| | | Serial communications | DeviceNet | MECHATROLINK-II (See note.) | EtherCAT |
| Inverters | 3G3JX | Supported. | --- | --- | --- |
| | 3G3MX | Supported. | --- | --- | --- |
| | 3G3RX | Supported. | --- | --- | --- |
| | 3G3MX2 | Supported.*1 | --- | --- | --- |
| | 3G3JV | Supported.*2 | --- | --- | --- |
| | 3G3MV | Supported.*3 | Supported.*4 | --- | --- |
| | 3G3RV (including version-1 models) | Supported.*3 | Supported.*5 | --- | --- |
| Servos | SMARTSTEP2 Series (R7D-BP) | Supported.*6 | --- | --- | --- |
| | OMNUC G5 Series (R88D-KT) | Supported.*7 | --- | --- | --- |
| | OMNUC G5 Series with MECHATROLINK-II (R88D-KN) | Supported.*7 | --- | --- | --- |
| | OMNUC G5 Series with EtherCAT (R88D-KN) | Supported.*7 | --- | --- | Supported. |
| | OMNUC G Series (R88D-GT) | Supported.*6 | --- | --- | --- |
| | OMNUC G Series with MECHATROLINK-II (R88D-GN) | Supported.*6 | --- | --- | --- |
| | SMARTSTEP A Series (R7D-AP) | Supported.*6 | --- | --- | --- |
| | OMNCU W Series (R88D-WT) | Supported.*6 | --- | Supported.*8 | --- |
| | OMNUC W Series with MECHATROLINK-II (R88D-WN) | --- | --- | Supported. | --- |

*1.USB: Modbus-RTU protocol.

*2.RS-232C Communications Unit (3G3JV-PSI232JC) or RS-422/485 Communications Unit (3G3JV-PSI485J) required. Uses Modbus-RTU protocol.

*3.RS-422A/485: Modbus-RTU protocol.

*4.DeviceNet Communications Unit (3G3MV-PDRT2) required. Work online when motor operation is stopped.

*5.DeviceNet Communications Unit (3G3RV-PDRT2) required.

*6.RS-232C: Special protocol.

*7.USB: Special protocol.

*8.MECHATROLINK-II Interface Unit (JUSP-NS115/FNY-NS115) required.

Refer to 1-3 System Configuration for the system configuration.

1-1-4 Files Created by CX-Drive

The CX-Drive creates the following files.

| File type | File name extension | Contents | Saving method |
|--------------------------|---------------------|--|--|
| Work-space file | .sdw | Contains the tree for all related drive files. This file contains the relative path name for each data file. Note Relative path information is held, so files can be moved as long as the relative position of all drive data files is the same (CX-Drive Ver. 1.3 or higher). | File - Save Workspace or Save as Workspace... |
| Drive file | .sdd | Each drive file | File - Save or Save As... |
| Monitor review file | .sdm | Data of the Real Time Trace or Data Trace. | Select the <i>Save to File Option</i> on the Review Set-up Tab Page in the Real Time Trace or Data Trace Window. |
| Text file for drive file | .csv or .txt | Each drive file | File - Export |

Note Consecutive parameters can be exported to Microsoft Excel via the clipboard by selecting the required parameters with the mouse or from the keyboard (Shift + Cursor Keys) and then selecting **Edit - Copy** from the menu.

The CX-Drive can import the following data files.

| File type | File name extension | Contents | Saving method |
|----------------|---------------------|------------|---------------|
| Text file | .txt | Drive file | File - Import |
| WMON data file | .usr | | |

1-1-5 Computer System Requirements

Refer to the *CX-One Setup Manual* (W463) for the computer system requirements for the CX-Drive.

1-1-6 Confirming Product Contents

Refer to the following manual for the product configuration of the CX-One, which contains the CX-Drive.

| Cat. No. | Model number | Manual name | Contents |
|----------|-------------------------|--|--|
| W463 | CXONE-□□□□C-V□/□□□□D-V□ | CX-One FA Integrated Tool Package Setup Manual | Provides an overview of the CX-One FA Integrated Tool and installation procedures. |

For Computer System Requirements and Product Contents of CX-Drive standalone product WS02-DRVC1, refer to the Product Guide in the package.

1-2 Installation

1-2-1 Required Software

To use the CX-Drive, the software applications listed below must be installed on the same computer.

- CX-Drive
- Communications driver: CX-Server (including CX-Server Driver Management Tool)

CX-Drive Availability

Refer to the following manual for installation procedures for the CX-One Package.

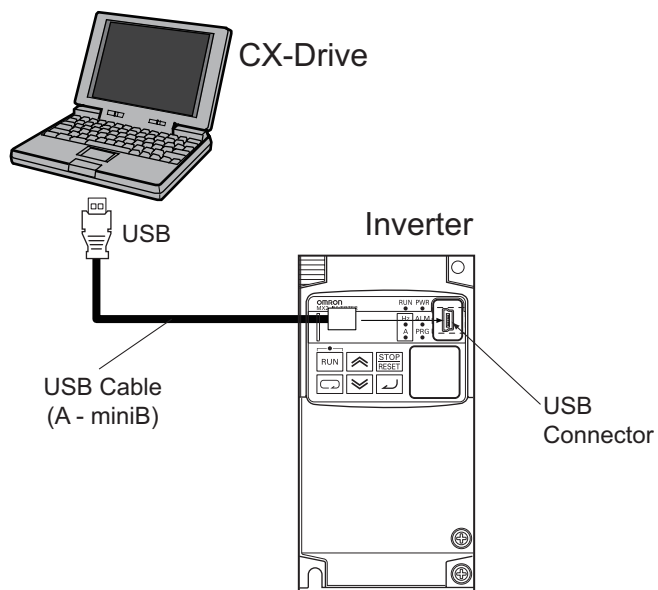
| Cat. No. | Model number | Manual name | Contents |
|----------|-------------------------|--|--|
| W463 | CXONE-□□□□C-V□/□□□□D-V□ | CX-One FA Integrated Tool Package Setup Manual | Provides an overview of the CX-One FA Integrated Tool and installation procedures. |

For installing procedures of CX-Drive standalone product WS02-DRVC1, refer to the Product Guide in the package.

1-3 System Configuration

1-3-1 Inverter Connection

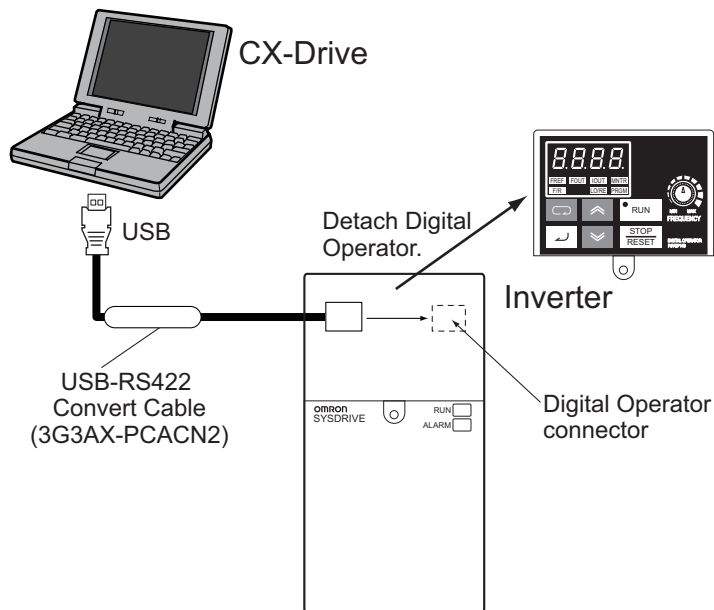
USB direct connection



Note Please use a 2m or shorter USB cable.

Direct serial connection

Configuration for 3G3JX/MX/RX



Note 3G3JX/MX/RX

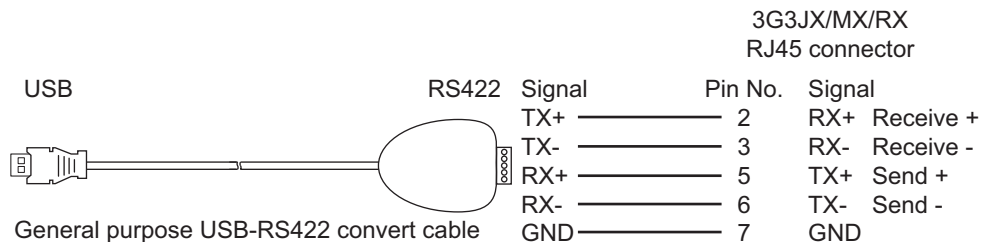
3G3JX : Set parameter C070=02(OPE).

3G3MX/RX : Remove front digital operator panel to connect communication cable.

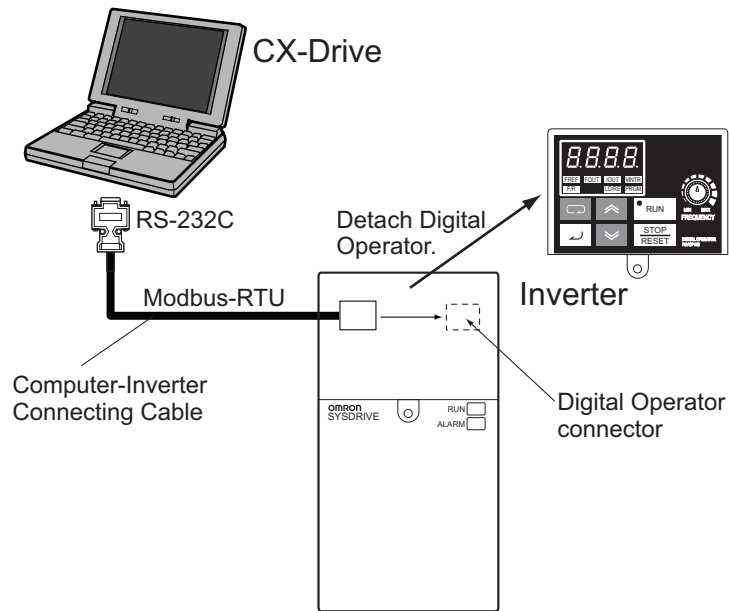
3G3JX/MX : Turn the RS485/OPE switch to OPE side.

USB-RS422 convert cable for PC-3G3JX/MX/RX connection is 3G3AX-PCACN2.

Refer to following figure to connect general purpose USB-RS422 convert cable in the market to 3G3JX/MX/RX connector.



Configuration for 3G3JV/MV/RV



Required devices

| Model | Required Devices |
|----------------|--|
| 3G3JX | USB - RS422 Convert Cable (3G3AX-PCACN2) |
| 3G3MX | |
| 3G3RX | |
| 3G3JV | 3G3IV-PWV103 Computer-Inverter Connecting Cable and 3G3JV-PSI232JC RS-232C Communications Unit |
| 3G3MV *1 | 3G3IV-PWV103 Computer-Inverter Connecting Cable |
| 3G3RV (-V1) *1 | |

*1.Remove the Digital Operator from the Inverter and connect the cable to the Digital Operator connector.

! Caution

The CS1W-CIF31 Serial Conversion Cable cannot be used to connect a computer running the CX-Drive to the 3G3MV. (See the following note.).

Note USB-Serial Conversion Cables That Can Be Used

For 3G3JV- and 3G3RV-series Inverters: CS1W-CIF31 USB-Serial Conversion Cable.

(The commercially available products listed below can also be used.)

For 3G3MV-series Inverters: The CS1W-CIF31 cannot be used. Use the commercially available products listed below.

Commercially Available USB-Serial Conversion Cables

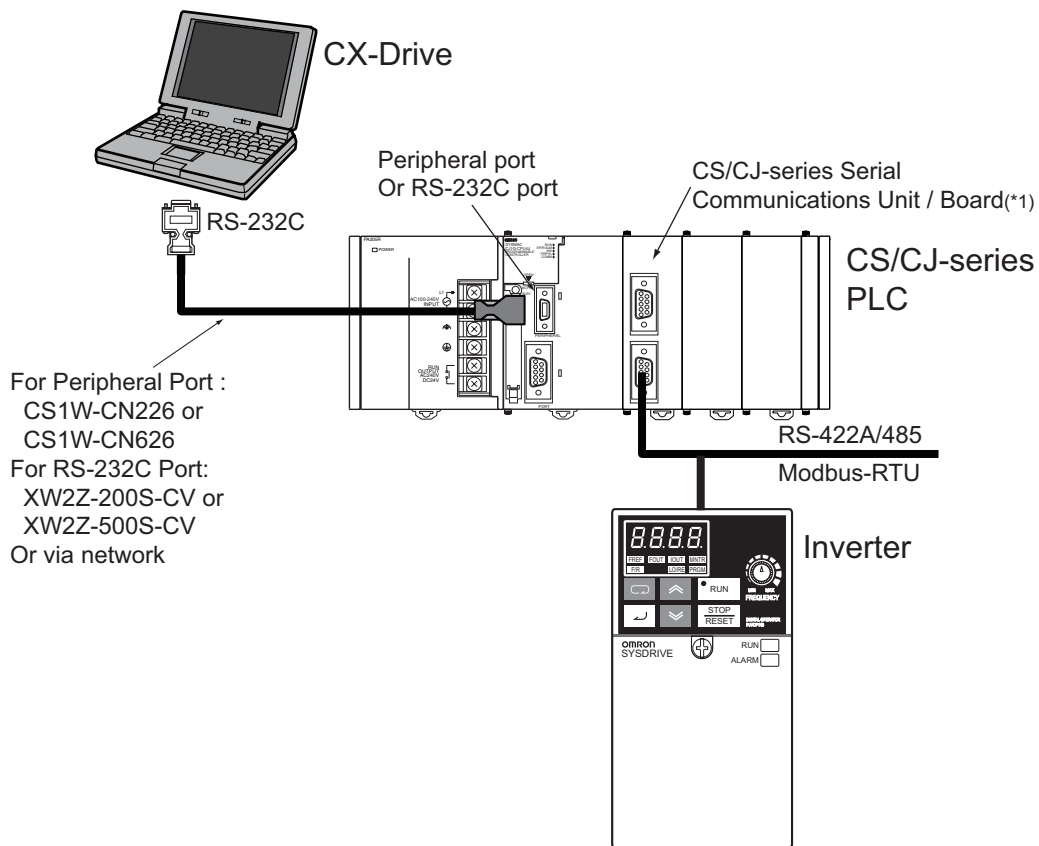
BHS-US01/GP manufactured by Buffalo

USB-CVRS9 manufactured by Sanwa

The commercially available USB-serial converters have been successfully tested for OMRON Inverters but operation may be unstable in some operating environments (mainly depending on the ambient temperature, humidity, and noise). The functions, performance, and reliability of these converters may not be as specified under all possible conditions. Check the warranty information from the manufacturer.

**PLC Serial
Communications Unit
/ Board connection**

Configuration



*1. CS/CJ-series Serial Communications Board/Unit Ver. 1.2 or later.

Required devices

| Model | Required Devices |
|-------------|--|
| 3G3JV | 3G3JV-PSI485J RS-422/485 Communications Unit |
| 3G3MV | RS-422/485 communications are built into the Inverter. |
| 3G3RV (-V1) | |

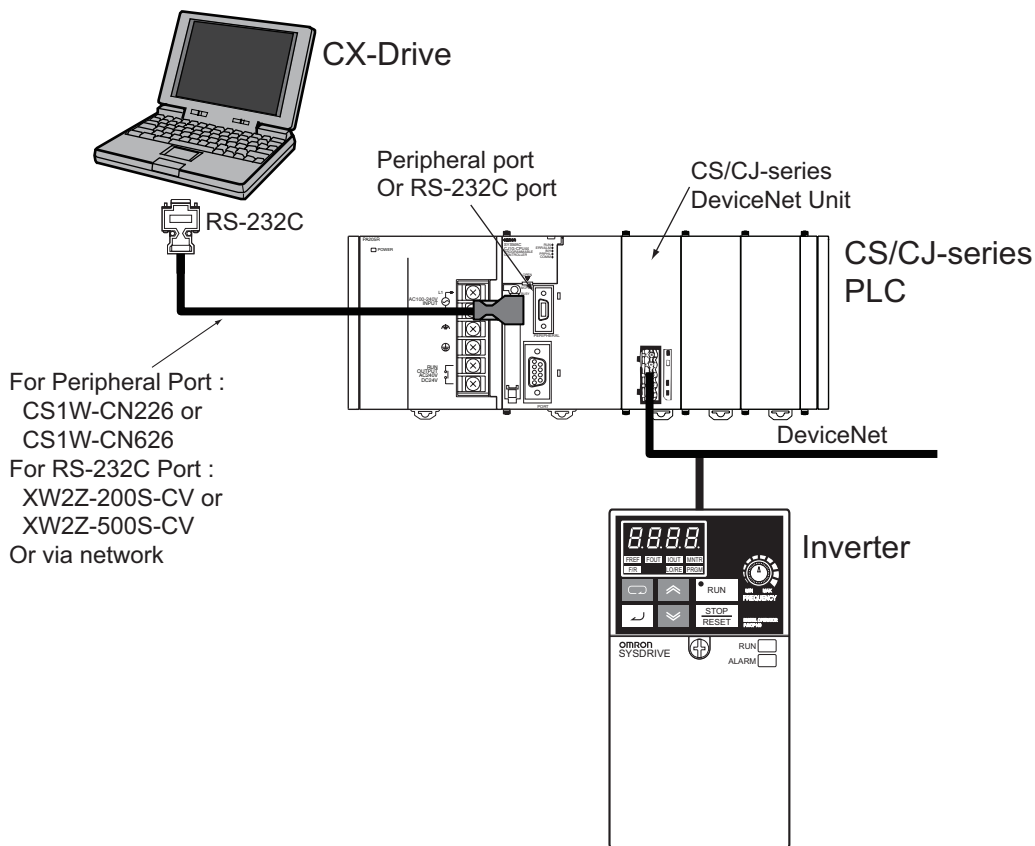
Note The Serial Gateway Mode is used as the serial communications mode for the RS-422A/485 port.

USB-Serial Conversion Cables That Can Be Used

For 3G3JV- and 3G3RV-series Inverters: CS1W-CIF31 USB-Serial Conversion Cable.

PLC DeviceNet connection

Configuration



Required devices

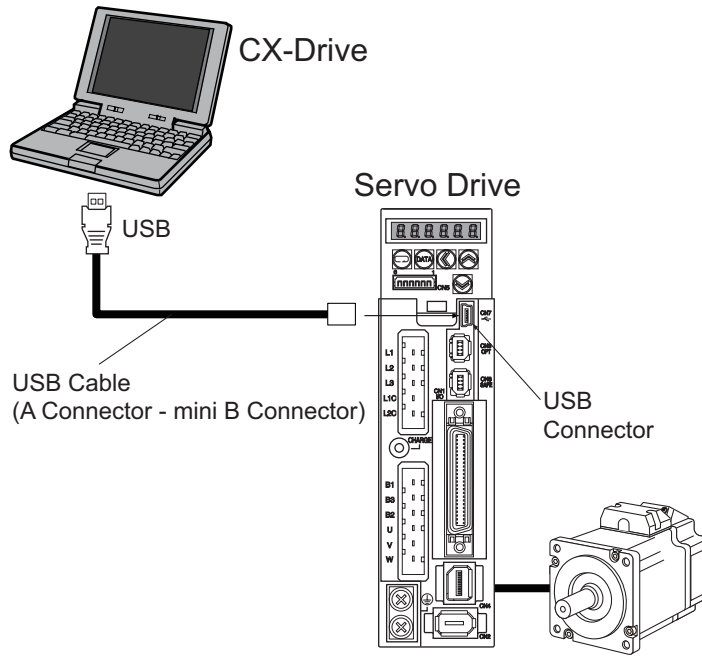
| Model | Required Devices |
|-------------|---|
| 3G3JV | ---*1 |
| 3G3MV | 3G3MV-PDRT2 DeviceNet Communications Unit*2 |
| 3G3RV (-V1) | 3G3RV-PDRT2 DeviceNet Communications Card |

*1.DeviceNet connection is not available.

*2.Work online when motor operation is stopped.

1-3-2 Servo Connection

USB direct connection



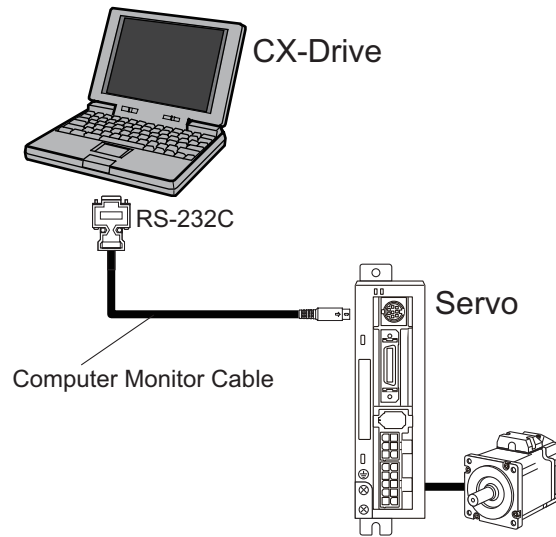
Required devices

| Model | Required Devices |
|---------|--|
| R88D-KT | USB cable (A Connector - mini B Connector) |
| R88D-KN | |

Note Please use a 2m or shorter USB cable.

Direct serial connection

Configuration



Required devices

| Model | Required Devices |
|-----------------------------|--------------------------------------|
| SMARTSTEP2 Series (R7D-BP) | R88A-CCG002P2 Computer Monitor Cable |
| OMNUC G Series (R88D-GT)*1 | |
| OMNUC G Series (R88D-GN) | |
| SMARTSTEP A Series (R7D-AP) | R7A-CCA002P2 Computer Monitor Cable |
| OMNUC W Series (R88D-WT) | R88A-CCW002P2 Computer Monitor Cable |
| OMNUC W Series (R88D-WN) | ---*2 |

*1.R88D-GT Serial port for Computer is CN3B.

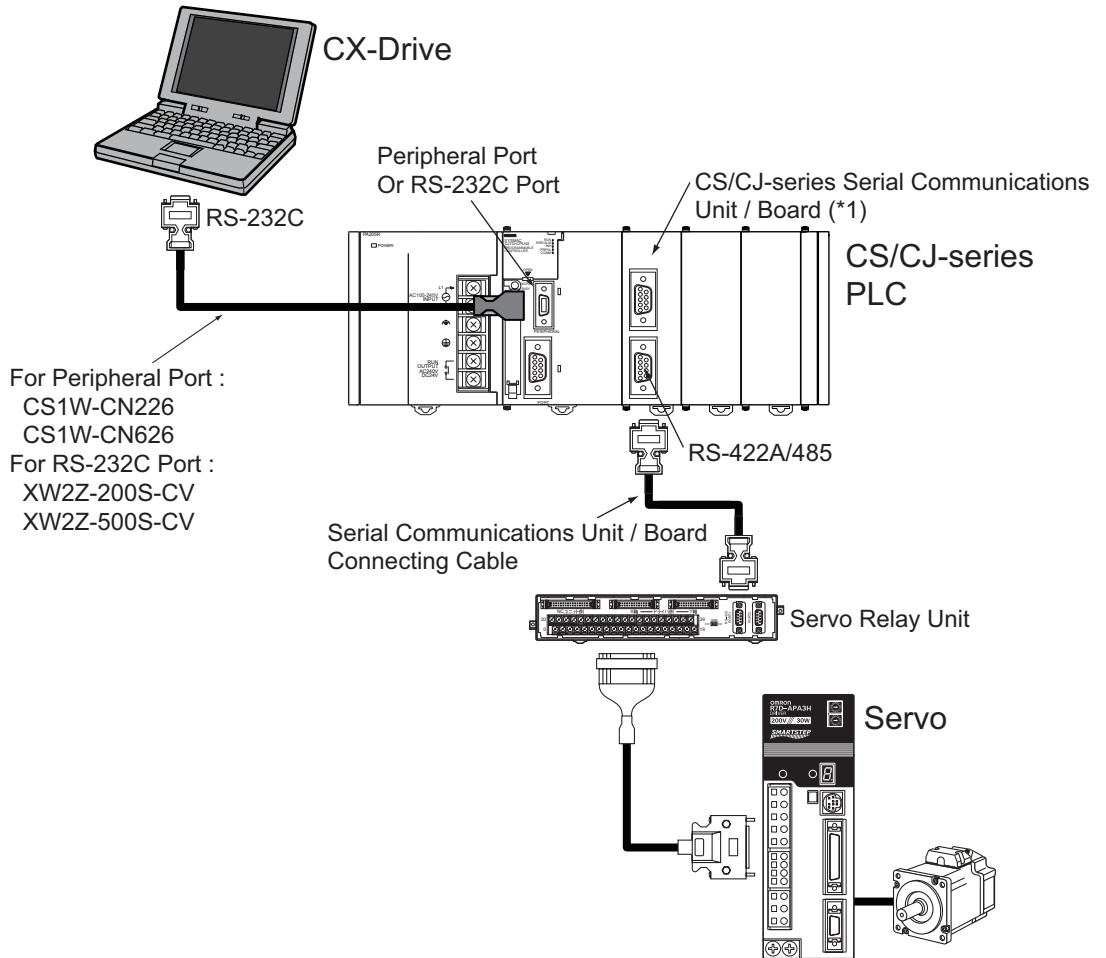
Multiple R88D-GT can be connected with R88A-CCG001P4 or R88A-CCG0R5P4 (first drive No. 0's CN3A to next drive No. n's CN3B, and so on) and one Computer can be online to another R88D-GT through these connections.

*2.Direct serial connection is not available.

**PLC Serial
Communications Unit
/ Board connection**

With Servo Relay Unit to
Control Servo

• **Configuration**



- **Required devices**

| Model | Required Devices |
|-----------------------------|--|
| SMARTSTEP2 Series (R7D-BP) | ---*1 |
| OMNUC G Series (R88D-GT) | ---*1 |
| OMNUC G Series (R88D-GN) | ---*1 |
| SMARTSTEP A Series (R7D-AP) | XW2Z-□□□J-CJ Serial Communications Unit / Board Connecting Cable + XW2B-40J6-4A Servo Relay Unit + XW2Z-□□□J-B7 SMARTSTEP A-series Connecting Cable. |
| OMNUC W Series (R88D-WT) | XW2Z-□□□J-CJ Serial Communications Unit / Board Connecting Cable + XW2B-40J6-4A Servo Relay Unit + XW2Z-□□□J-B8 SMARTSTEP A-series Connecting Cable. |
| OMNUC W Series (R88D-WN) | ---*2 |

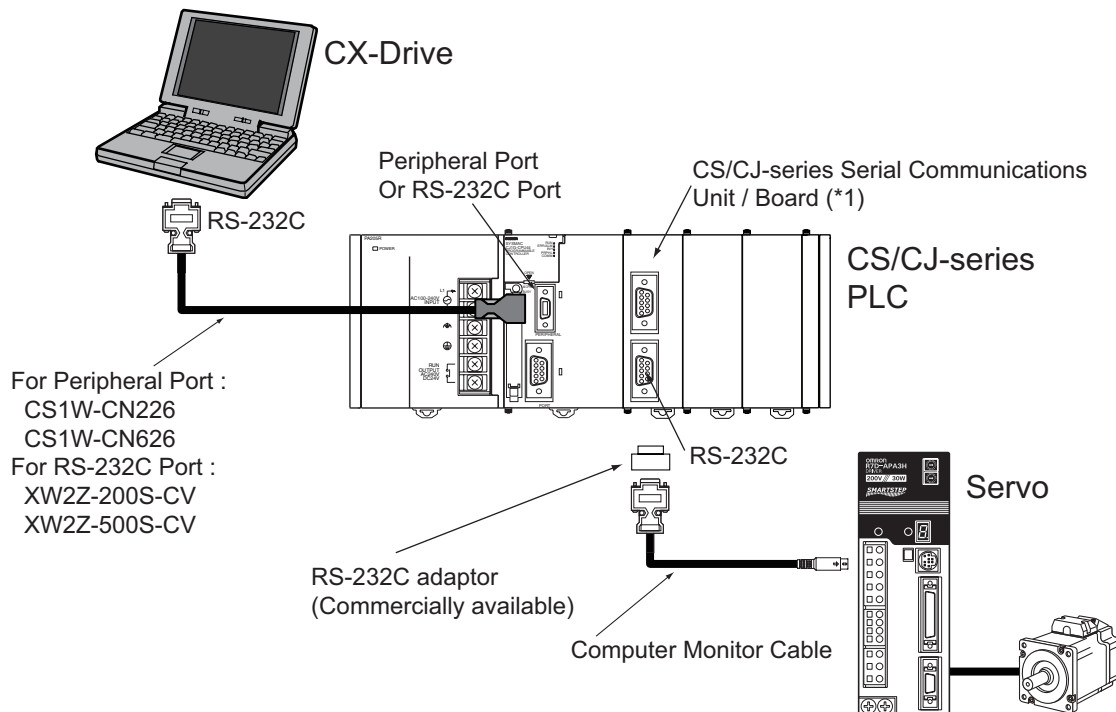
*1. Serial communication via PLC is not available.

*2. Serial communication is not available.

Note The Serial Gateway Mode is used as the serial communications mode for the RS-232C port.

Without Servo Relay Unit

• **Configuration**



*1. CS/CJ-series Serial Communications Unit / Board Ver. 1.2 or later

• **Required devices**

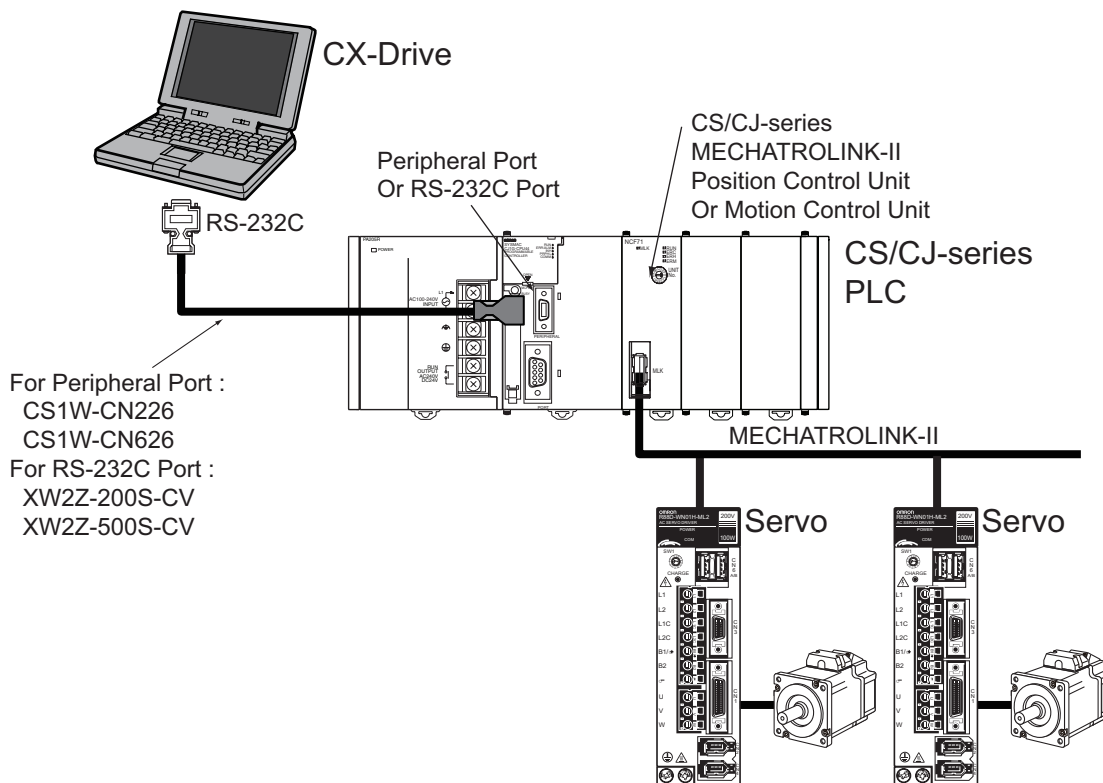
| Model | Required Devices |
|-----------------------------|---|
| SMARTSTEP2 Series (R7D-BP) | ---*1 |
| OMNUC G Series (R88D-GT) | ---*1 |
| OMNUC G Series (R88D-GN) | ---*1 |
| SMARTSTEP A Series (R7D-AP) | R7A-CCA002P2 (2 m) + RS-232C 9-pin adaptor |
| OMNUC W Series (R88D-WT) | R88A-CCW002P2 (2 m) + RS-232C 9-pin adaptor |
| OMNUC W Series (R88D-WN) | ---*2 |

*1. Serial communication via PLC is not available.
 *2. Serial communication is not available.

Note The Serial Gateway Mode is used as the serial communications mode for the RS-232C port.

**PLC (MCH / NCF Unit)
MECHATROLINK-II
connection**

Configuration



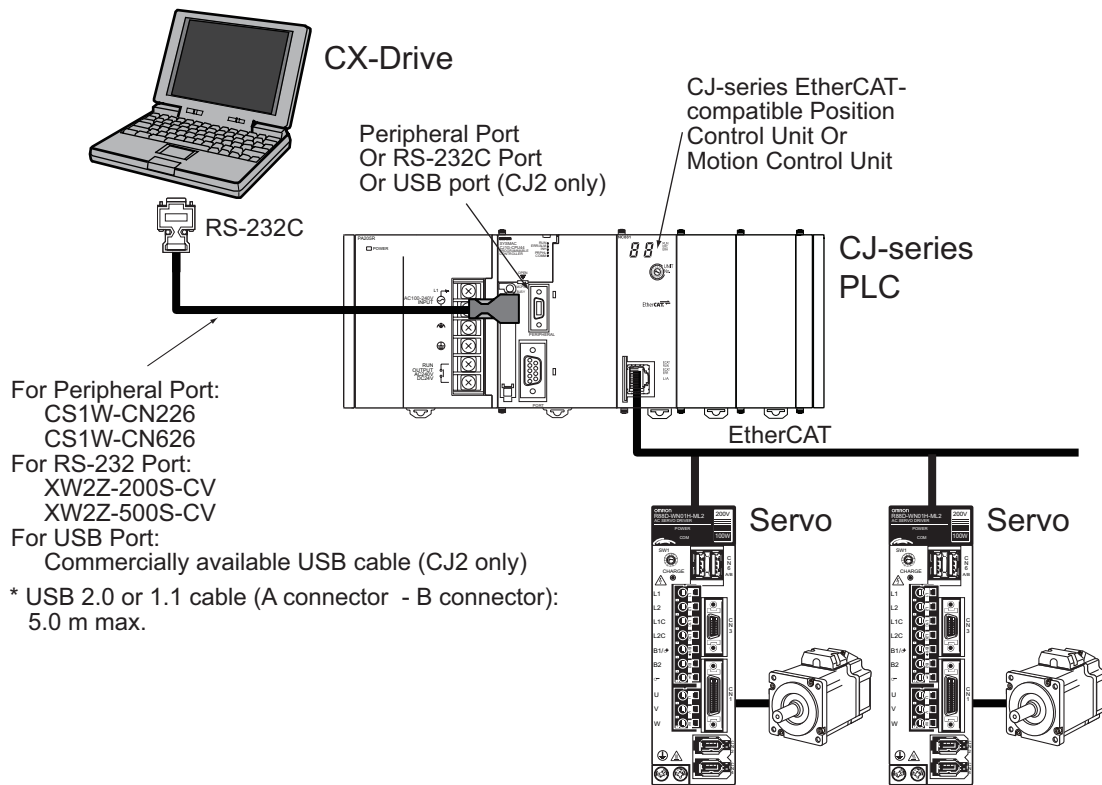
Required devices

| Model | Required Devices |
|-----------------------------|---|
| SMARTSTEP2 Series (R7D-BP) | ---*1 |
| OMNUC G Series (R88D-GT) | ---*1 |
| OMNUC G Series (R88D-GN) | ---*2 |
| SMARTSTEP A Series (R7D-AP) | ---*1 |
| OMNUC W Series (R88D-WT) | MECHATROLINK-II Cable MECHATROLINK-II Interface Unit (FNY-NS115) |
| OMNUC W Series (R88D-WN) | MECHATROLINK-II Cable |

*1.MECHATROLINK-II communication via PLC is not available.
*2.CX-Drive does not support R88D-GN MECHATROLINK-II connection.
Controller support tool (CX-Motion-NCF) can be used.

PLC EtherCAT connection

Configuration



Required devices

| Model | Required Devices |
|----------------------------------|------------------|
| SMARTSTEP2 Series (R7D-BP) | --- |
| OMNUC G Series (R88D-GT) | --- |
| OMNUC G Series (R88D-GN) | --- |
| OMNUC G5 Series (R88D-KN□□□-ECT) | Ethernet cable |
| SMARTSTEP A Series (R7D-AP) | --- |
| OMNUC W Series (R88D-WT) | --- |
| OMNUC W Series (R88D-WN) | --- |

SECTION 2

Basic Operations

This section provides basic operating procedures for using the CX-Drive, including descriptions of CX-Drive windows and parameter setting procedures.

- 2-1 Overall Operating Procedure 22
- 2-2 Starting the CX-Drive 26
- 2-3 Creating New Drive Files 27
- 2-4 User Interface 39
- 2-5 Editing Drive Files 49

2-1 Overall Operating Procedure

2-1-1 Inverters

- 1,2,3...
1. **Install the software.**
 - Install the CX-Server and CX-Drive from the CX-One.
 - Refer to the *CX-One Ver. 2.1 Setup Manual* (Cat. No. W463).
 - Follow the setup display about CX-One Autoupdate or CX-Drive stand-alone install.
 2. **Connect the drive to the computer.**
 - Connect the CX-Drive (computer) to the drive (Inverter or Servo) using one of the system configurations.
 - Refer to *1-3 System Configuration*
 3. **Start the CX-Drive.**
 - Select **Program - OMRON - CX-One - CX-Drive - CX-Drive** from the Windows Start Menu.
 4. **Create a new drive file.**
 - Detect the drives connected online automatically and create drive file for the desired drive.
Select **File - Autodetect** from the menu bar.
 - Create a new drive file on the computer without a drive.
 - a. Select **File - New** from the menu bar and then select the drive type in the New Drive Dialog Box.
Select *Inverter* as the drive type and then select one of the following series.
 - 3G3JX
 - 3G3MX
 - 3G3RX
 - 3G3MX2
 - 3G3JV
 - 3G3MV
 - 3G3RV (For version 1 of the 3G3RV, click the **Settings** Button and select **-V1** for the **Specification**.)
 - b. Select the connection type in the New Drive Dialog Box.

| Connection Types | Connection |
|---------------------|---|
| Via PLC (DeviceNet) | PLC DeviceNet connection |
| Via PLC (SCU/SCB) | PLC Serial Communications Unit / Board connection |
| Direct | Direct serial connection |

5. **Edit the parameters.**
 - Edit the parameters for the Inverter.
 - In the Workspace, double-click **Parameter edit** and then the required categories in the drive file.
 - Edit parameters in numeric order or by functional category.
6. **Connect online to the drive.**
 - Select **Drive - Work Online** from the menu bar.
7. **Transfer and verify the parameters.**
 - Select **Drive - Transfer - To drive** from the menu bar.
8. **Tune and test operation.**
 - Test Run
Double-click **Test Run** in the Workspace.
Perform the following:
Forward / Reverse operation, stopping, frequency references, acceleration / deceleration, S-curve display, and dwelling.
 - Auto Tune (3G3RV only)
Double-click **Auto Tune** in the Workspace.
Enter the motor parameters, perform auto-tuning, and then save the new parameters.
9. **Monitor operation.**
 - Perform a Real Time Trace.
Double-click **Real Time Trace** in the Workspace.
 - Check the status.
Double-click **Status** in the Workspace.
10. **Save the data.**
 - Save the Workspace and/or the drive file.
 - Select **File - Save Workspace**, or **select File - Save as Workspace...**

2-1-2 Servo

- 1,2,3...
1. **Install the software.**
 - Install the CX-Server and CX-Drive from the CX-One.
 - Refer to the *CX-One Ver. 2.1 Setup Manual* (Cat. No. W463).
 - Follow the setup display about CX-One Autoupdate or CX-Drive stand-alone install.
 2. **Connect the drive to the computer.**
 - Connect the CX-Drive (computer) to the drive (Inverter or Servo) using one of the system configurations.
 - Refer to *1-3 System Configuration*
 3. **Start the CX-Drive.**
 - Select **Program - OMRON - CX-One - CX-Drive - CX-Drive** from the Windows Start Menu.
 4. **Create a new drive file.**
 - Detect the drives connected online automatically and create drive file for the desired drive.
Select **File - Autodetect** from the menu bar.
 - Create a new drive file on the computer without a drive.
 - c. Select **File - New** from the menu bar and then select the drive type in the New Drive Dialog Box.
Select *Servo* as the drive type and then select one of the following series.

| Model | Series Name |
|---------|---|
| R7D-BP | SMARTSTEP 2 Series |
| R88D-GT | OMNUC G Series |
| R88D-GN | OMNUC G Series with MECHATROLINK-II |
| R88D-KT | OMNUC G5 Series |
| R88D-KN | OMNUC G5 Series with MECHATROLINK-II OMNUC G5 Series with EtherCAT |
| R7D-AP | SMARTSTEP A Series |
| R7D-ZN | SMARTSTEP Junior with MECHATROLINK-II |
| R88D-WT | OMNUC W Series |
| R88D-WN | OMNUC W Series with MECHATROLINK-II |

- d. Select the connection type in the New Drive Dialog Box.

| Connection Types | Connection |
|---------------------------------|---|
| Via PLC (MCH / MECHATROLINK-II) | MECHATROLINK-II connection Motion Control Unit |
| Via PLC (NCF / MECHATROLINK-II) | MECHATROLINK-II connection Position Control Unit |
| Via PLC (SCU/SCB) | PLC Serial Communications Unit / Board connection |
| Direct | Direct serial connection |

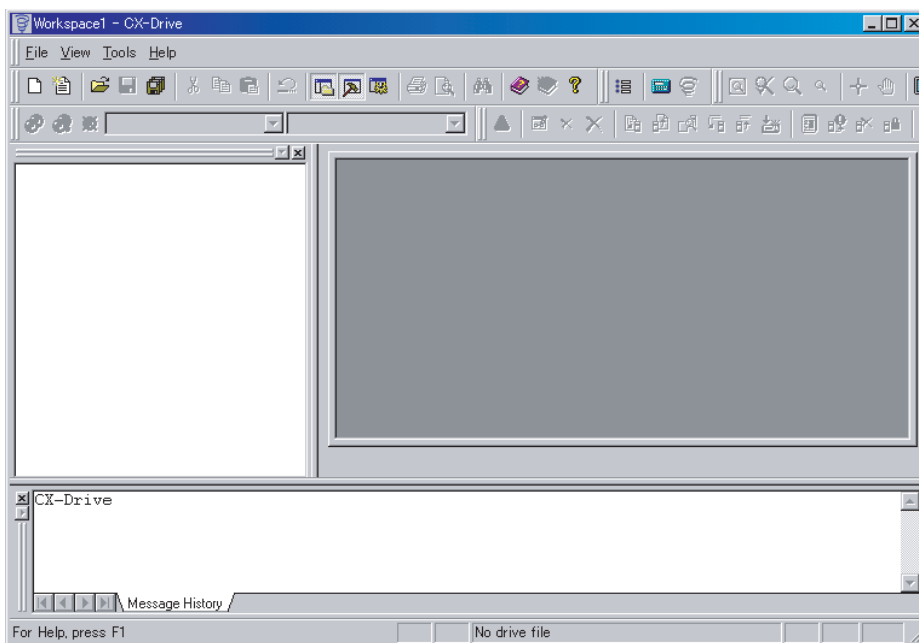
5. **Edit the parameters.**
 - Edit the parameters for the Servo.
 - In the Workspace, double-click **Parameter edit** and then the required categories in the drive file.
 - Edit parameters in numeric order or by functional category.
6. **Connect online to the drive.**
 - Select **Drive - Work Online** from the menu bar.
7. **Transfer and verify the parameters.**
 - Select **Drive - Transfer - To drive** from the menu bar.
8. **Tune and test operation.**
 - Test Run (R88D-KT, R88D-KN, R88D-GT, R88D-GN, R7D-AP, R88D-WT)
Double-click **Test Run** in the Workspace.
Perform the following: Jogging, origin searches, forward/reverse operation, stopping, and speed control.
 - Auto Tune (R7D-BP, R88D-KT, R88D-KN, R88D-GT, R88D-GN, R7D-AP, R88D-WT)
Double-click **Auto Tune** in the Workspace.
The auto-tuning function calculates the load moment of inertia during Servo operation and sets parameters to achieve Servo gains that are consistent with the machine rigidity settings.
 - Offset (R7D-AP, R88D-WT)
Double-click **Offset** in the Workspace.
The speed/torque offset can be adjusted automatically or manually, the offset and gain of the analog monitor output can be adjusted, and the current detection offset can be adjusted automatically or manually.
 - Absolute Encoder Setting (R88D-GT, R88D-WT)
Double-click **Absolute Encoder** in the Workspace.
An absolute encoder and multi-turn limit can be set.
 - FFT (R7D-BP, R88D-KT, R88D-KN, R88D-GT, R88D-GN)
Double-click **FFT** in the Workspace.
The FFT analysis can be performed.
9. **Monitor operation.**
 - Perform a Real Time Trace. (R7D-AP or R88D-WT only)
Double-click **Real Time Trace** in the Workspace.
 - Check the status.
Double-click **Status** in the Workspace.
10. **Save the data.**
 - Save the Workspace and/or the drive file.
 - Select **File - Save Workspace**, or **select File - Save as Workspace...**

2-2 Starting the CX-Drive

Select **Program - OMRON - CX-One - CX-Drive - CX-Drive** from the Windows Start Menu to start the CX-Drive. (The path depends on where the CX-Drive was installed.)

Note When using the 3G3MV or 3G3RV as a DeviceNet slave, right-click the Inverter on the CX-Integrator network configuration, and select **Start special application - Start with Settings Inherited** from the pop-up menu.

The following window will be displayed when the CX-Drive starts.



2-3 Creating New Drive Files

There are two methods to create a new drive file in the Workspace.

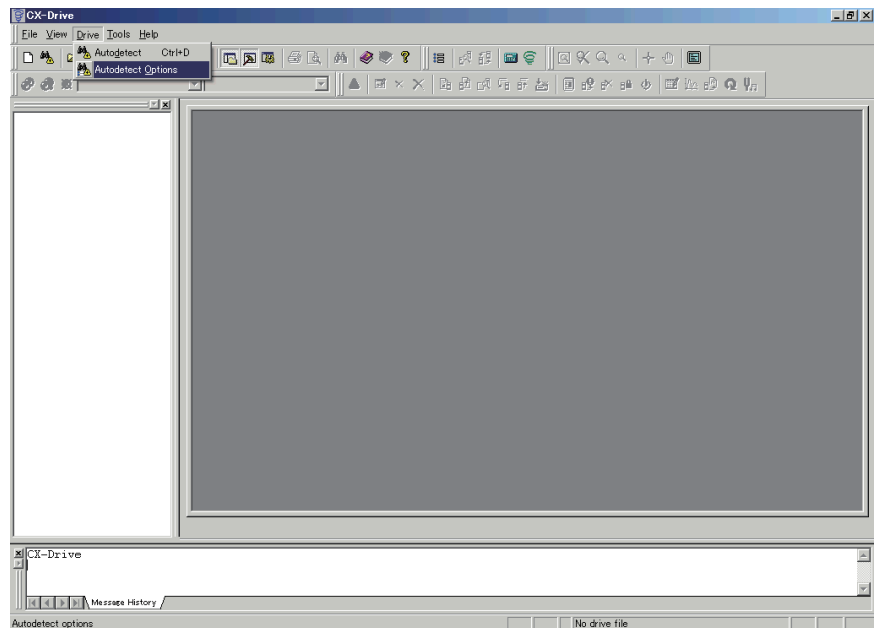
Method 1: Go online and automatically detect the connected drives to create the drive file.

Method 2: Create a new data file without using a connected drive.

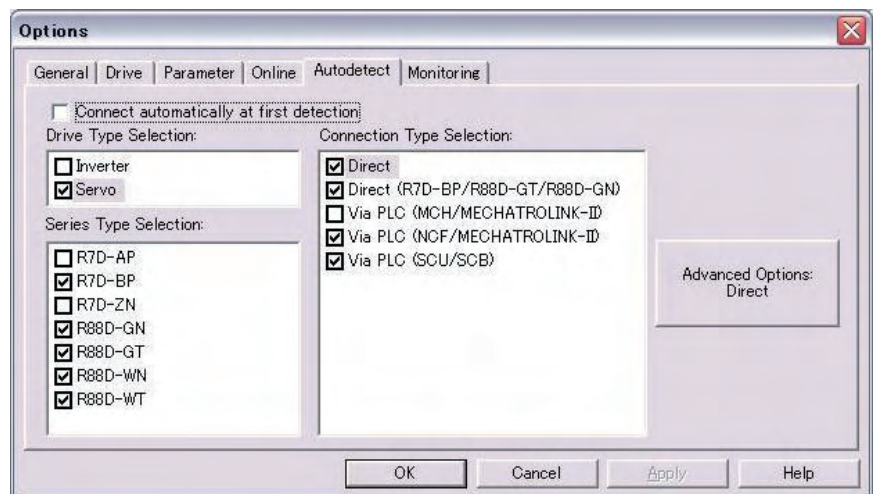
2-3-1 Method 1: Automatically Detecting the Connected Drives

Serial Direct Connection

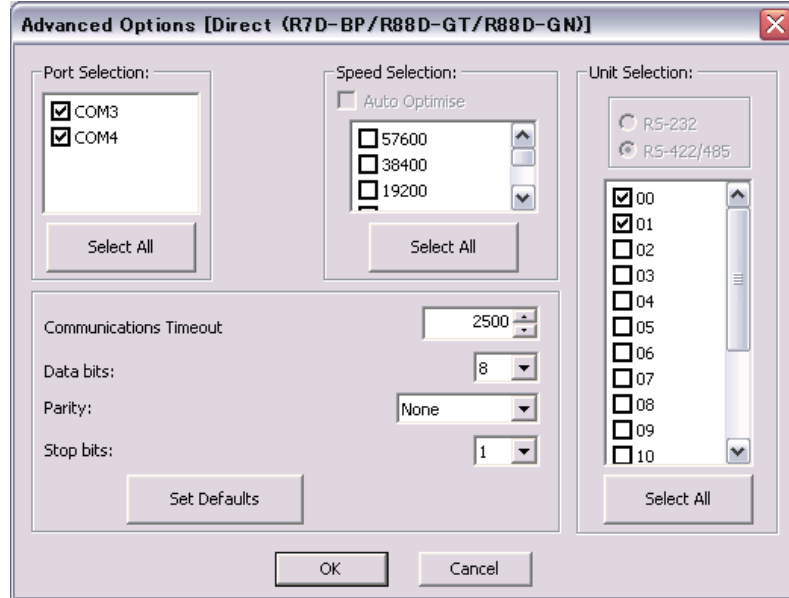
- 1,2,3... 1. Select **File - Autodetect**.



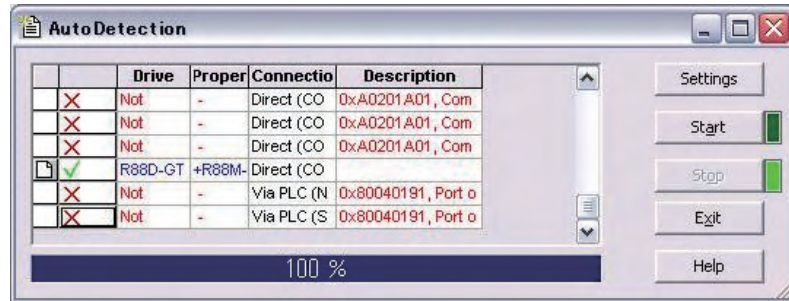
2. Select the target within known scope.
This dialogue is the same with **Tool Option menu, Autodetect tab**.



3. Push Advanced **Options** button, and select further settings.



4. Select **Drive-Autodetect menu**.
CX-Drive searches selected targets in option settings, and creates the drive data for detected target.



Other Connections

- 1,2,3... 1. Select **Drive- Autodetect Option**.
 "via PLC" can be selected besides the Serial Direct Connections.

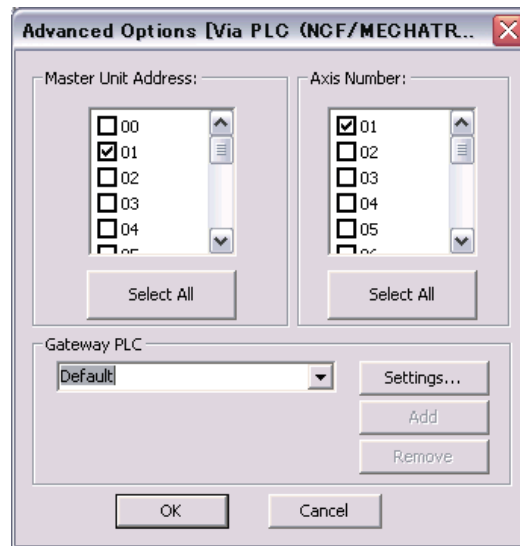
For Inverters:

- Via PLC (DeviceNet)
- Via PLC (SCU/SCB)

For Servos:

- Via PLC (MCH/MECHATROLINK II)
- Via PLC (NCF/MECHATROLINK II)
- Via PLC (SCU/SCB)

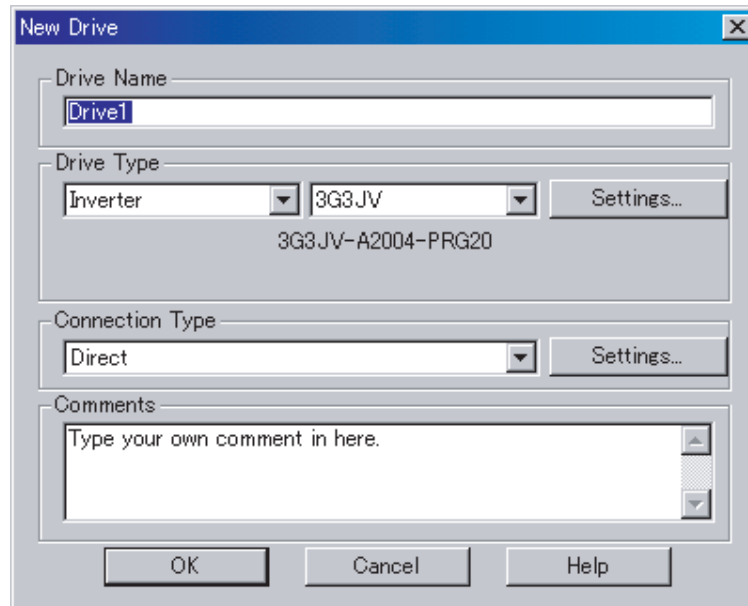
2. Push **Advanced Options** and select settings.



3. Select **Drive - Autodetect**.
 4. The rest of the procedure is the same as Serial Direct Connection.

2-3-2 Method 2: Creating a New Data File without a Connected Drive

Select **File - New**. The following New Drive Dialog Box will be displayed.



Drive Name

Any name may be input for the drive name. The default name is “Drive” plus a sequential number.

Drive Type

Drive Type Selection

Select *Inverter* or *Servo*.

Drive Type Name

For an Inverter, select one of the following series from the pull-down list.

- 3G3JX
- 3G3MX
- 3G3RX
- 3G3MX2
- 3G3JV
- 3G3MV
- 3G3RV (See note.)

Note For version 1 of the 3G3RV, select 3G3RV, click the **Settings** Button and select **-V1** from the **Specification** pull-down list.

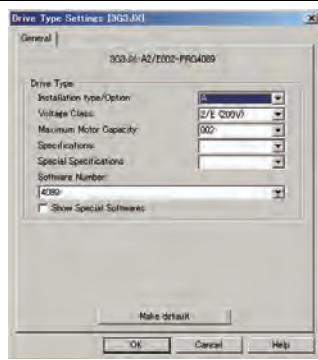


For a Servo, select one of the following series from the pull-down list.

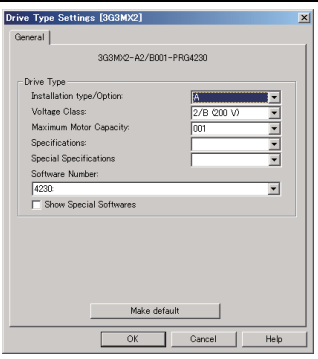
- R7D-BP: SMARTSTEP2 Series
- R88D-GT: OMUNC G Series
- R88D-GN: MECHATROLINK-II OMNUC G Series
- R88D-KT: OMNUC G5 Series
- R88D-KN: MECHATROLINK-II OMNUC G5 Series
EtherCAT OMNUC G5 Series
- R7D-AP: SMARTSTEP A Series
- R88D-WT: OMNUC W Series
- R88D-WN: MECHATROLINK-II OMNUC W Series

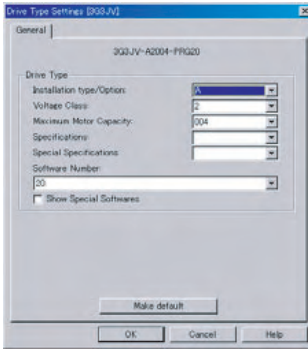

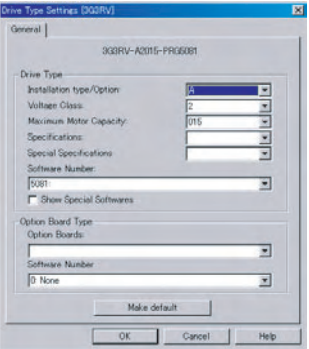
Detailed Drive Settings

Click the **Settings...** Button to open the Detail Setting Dialog Box.




Inverters

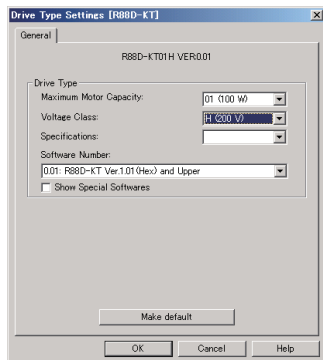
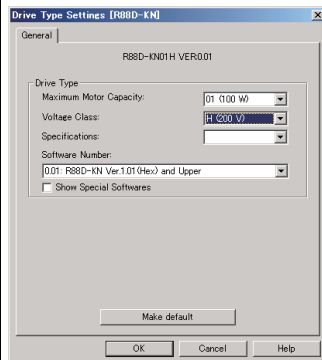
| Inverter Series | | 3G3JX | 3G3MX | 3G3RX |
|-----------------|--------------------------|---|--|---|
| Dialog box | |  |  |  |
| Drive Type | Installation Type/Option | A | A | A |
| | Voltage Class | 2/E | 2/E, 4 | 2, 4 |
| | Maximum Motor Capacity | 002, 004, 007, 015, 022, 037 | 002, 004, 007, 015, 022, 037, 055, 075 | 004, 007, 015, 022, 037, 055, 075, 110, 150, 185, 220, 300, 370, 550 |
| | Specifications | --- | --- | --- |
| Options | Option Board | --- | --- | --- |


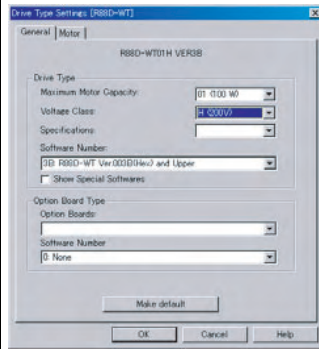
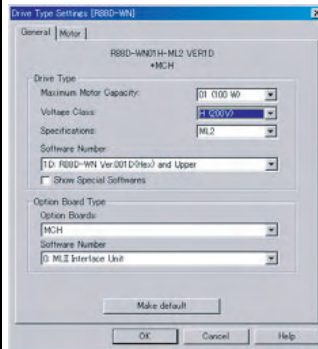
| Inverter Series | | 3G3MX2 |
|-----------------|--------------------------|---|
| Dialog box | |  |
| Drive Type | Installation Type/Option | A |
| | Voltage Class | 2, 4, B |
| | Maximum Motor Capacity | 001, 002, 004, 007, 015, 022, 030, 037, 040, 055, 075, 110, 150 |
| | Specifications | --- |
| Options | Option Board | --- |

| Inverter Series | | 3G3JV | 3G3MV | 3G3RV |
|-----------------|--------------------------|---|--|---|
| Dialog box | |  |  |  |
| Drive Type | Installation Type/Option | A | A, X | A, B, X |
| | Voltage Class | 1, 2, 4, B | 2, 4, B | 2, 4 |
| | Maximum Motor Capacity | 001, 002, 004, 007, 015, 022, 037 | 001, 002, 004, 007, 015, 022, 037, 040, 055, 075 | 004, 007, 015, 022, 037, 055, 075, 110, 150, 185 |
| | Specifications | --- | --- | None or V1 |
| Options | Option Board | --- | 3G3MV-PDRT2 | 3G3RV-PDRT2 |

Servos

| Servo Series | | R7D-BP | R88D-GT | R88D-GN |
|--------------|------------------------|---|--|---|
| Dialog box | |  |  |  |
| Drive Type | Maximum Motor Capacity | A5 (50 W) to 04 (400 W) | 01 (100 W) to 75 (7.5 kW) | 01 (100 W) to 75 (7.5 kW) |
| | Voltage Class | H (200 V), HH(200V), L (100 V) | H (200 V), L (100 V) | H (200 V), L (100 V) |
| | Specifications | --- | --- | MECHATROLINK-II (ML2) |

| Servo Series | | R88D-KT | R88D-KN |
|--------------|------------------------|--|---|
| Dialog box | |  |  |
| Drive Type | Maximum Motor Capacity | A5(50W) to 50(5kW) | A5(50W) to 50(5kW) |
| | Voltage Class | H(200V), L(100V), F(400V) | H(200V), L(100V), F(400V) |
| | Specifications | --- | MECHATROLINK-II (ML2) EtherCAT (ECT) |

| Servo Series | | R7D-AP | R88D-WT | R88D-WN |
|--------------|------------------------|---|--|---|
| Dialog box | |  |  |  |
| Drive Type | Maximum Motor Capacity | A3 (30 W) to 08 (750 W) | A3 (30 W) to 150 (15 kW) | A5 (50 W) to 30 (3 kW) |
| | Voltage Class | H (200 V), L (100 V) | H (200 V), HF (400 V), HH (200 V), HL (150 V) | H (200 V), L (100 V) |
| | Specifications | --- | --- | MECHATROLINK-II (ML2) |

Connection Type

Connection Type Selection

Select one of the following connection types for the *Connection Type*.

Inverters

| Selection | Connection type | Inverter Series | | | |
|---------------------|---|-----------------|----------------|----------------|----------------|
| | | 3G3JX | 3G3MX | 3G3RX | 3G3MX2 |
| Direct | Direct USB Connection | Not supported. | Not supported. | Not supported. | Supported. |
| | Direct Serial Connection | Supported. | Supported. | Supported. | Not supported. |
| Via PLC (SCU/SCB) | PLC Serial Communications Unit / Board connection | Not supported. | Not supported. | Not supported. | Not supported. |
| Via PLC (DeviceNet) | PLC DeviceNet connection | Not supported. | Not supported. | Not supported. | Not supported. |

| Selection | Connection type | Inverter Series | | |
|---------------------|---|-----------------|----------------|----------------|
| | | 3G3JV | 3G3MV | 3G3RV |
| Direct | Direct USB Connection | Not supported. | Not supported. | Not supported. |
| | Direct Serial Connection | Supported. | Supported. | Supported. |
| Via PLC (SCU/SCB) | PLC Serial Communications Unit / Board connection | Supported. | Supported. | Supported. |
| Via PLC (DeviceNet) | PLC DeviceNet connection | Not supported. | Supported. | Supported. |

Servos

| Selection | Connection type | Servo Series | | | | |
|-------------------------------|---|----------------|----------------|----------------|----------------|----------------|
| | | R7D-BP | R88D-KT | R88D-KN | R88D-GT | R88D-GN |
| Direct | Direct USB Connection | Not supported. | Supported. | Supported. | Not supported. | Not supported. |
| | Direct Serial Connection | Supported. | Not supported. | Not supported. | Supported. | Supported. |
| Via PLC (SCU/SCB) | PLC Serial communications Unit / Board Connection | Not supported. | Not supported. | Not supported. | Not supported. | Not supported. |
| Via PLC (MCH/MECHATROLINK-II) | PLC (MCH Unit) MECHATROLINK-II Connection | Not supported. | Not supported. | Not supported. | Not supported. | Not supported. |
| Via PLC (NCF/MECHATROLINK-II) | PLC (NCF Unit) MECHATROLINK-II Connection | Not supported. | Not supported. | Not supported. | Not supported. | Not supported. |
| Via PLC (NC□81/EtherCAT) | PLC EtherCAT Connection | Not supported. | Not supported. | Supported.*1 | Not supported. | Not supported. |

*1. Only models with built-in EtherCAT communications.

| Selection | Connection type | Servo Series | | |
|-------------------------------|---|----------------|---------------------------|----------------|
| | | R7D-AP | R88D-WT | R88D-WN |
| Direct | Direct Serial Connection | Supported. | Supported. | Not supported. |
| Via PLC (SCU/SCB) | PLC Serial communications Unit / Board Connection | Supported. | Supported. | Not supported. |
| Via PLC (MCH/MECHATROLINK-II) | PLC (MCH Unit) MECHATROLINK-II Connection | Not supported. | Supported with FNY-NS115. | Supported. |
| Via PLC (NCF/MECHATROLINK-II) | PLC (NCF Unit) MECHATROLINK-II Connection | Not supported. | Supported with FNY-NS115. | Supported. |

Network Settings

Click the **Settings...** Button to the right of the *Connection Type* Field. The following dialog box will be displayed.

Detailed Settings for Direct Connections

| Item | Network Tab Page | Drive Tab Page |
|-------------------|--|---|
| Dialog box | | |
| Inverter | <ul style="list-style-type: none"> • Slave Unit Address: 1 to 32 (Modbus-RTU slave address) (See note 1.) • Communications Timeout: 500 to 5,000 ms • Number of retries: 1 to 6 | <ul style="list-style-type: none"> • Port Selection: COM1, COM2, etc. • Baud Rate: 2400, 9600, 19200, or 38400 bits/s • Parity: None, Odd, or Even • Data bits: 7 or 8 • Stop bits: 1 or 2 |
| Servo | <ul style="list-style-type: none"> • Slave Unit Address: 0 to F (Servo Drive communications Unit No.) (See note 2.) • Communications Timeout: 500 to 5,000 ms • Number of retries: 1 to 6 | <ul style="list-style-type: none"> • Port Selection: COM1, COM2, etc. • Baud Rate: 9600 or 19200 bits/s • Parity: None, Odd, or Even • Data bits: 7 or 8 • Stop bits: 1 or 2 |

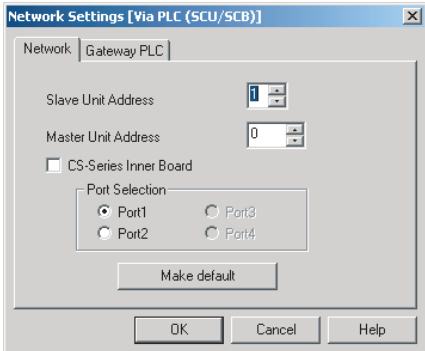
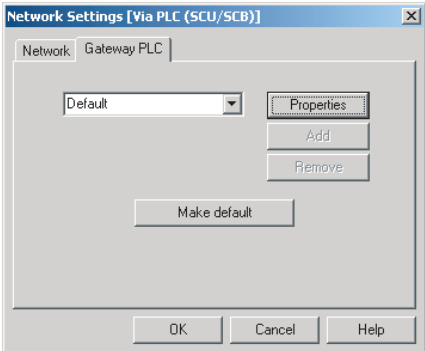
Note (1) Modbus-RTU Slave Address Setting:
The Modbus-RTU slave address (01 to 32) is set in the following parameter using the Digital Operator on front of the Inverter before connecting the CX-Drive.

| Inverter Series | 3G3JV | 3G3MV | 3G3RV |
|----------------------|-------|-------|-------|
| Parameter No. | n70 | n153 | H5-01 |

(2) The Servo Communications Unit No. (0 to F) is set using the following method before connecting the CX-Drive.

| Servo Series | R7D-AP | 3 R88D-WT |
|---------------|--|--|
| Method | Unit number rotary switch on the Servo | Change to the Setting Mode using the Servo front panel settings and set the unit number in digit 2 of Pn000. |

Via PLC (SCU/SCB) Connections (Except R88D-WN)

| Item | Network Tab Page | Gateway PLC Tab Page |
|-------------------|--|---|
| Dialog box |  |  |
| Inverter | <ul style="list-style-type: none"> • Slave Unit Address: 1 to 32 (Modbus-RTU slave address) (See note 1.) • Master Unit Address: 0 to 15 (Unit address for Serial Communications Unit). Or select <i>CS-Series Inner Board</i> Option (Serial Communications Board). • Port Selection: Port 1 or Port 2 | <p>Click the Properties Button to set the PLC (with a Serial Communications Unit/Board) to use as the gateway.</p> |
| Servo | <ul style="list-style-type: none"> • Slave Unit Address: 0 to F (Servo Communications Unit No.) (See note 2.) • Master Unit Address: 0 to 15 (Unit Address for Serial Communications Unit). Or select <i>CS-Series Inner Board</i> Option (Serial Communications Board). • Port Selection: Port 1 or Port 2 | |

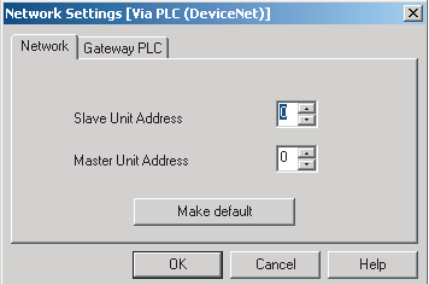
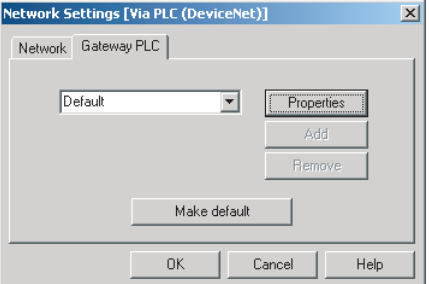
Note (1) Modbus-RTU Slave Address Setting:
The Modbus-RTU slave address (01 to 32) is set in the following parameter using the Digital Operator on front of the Inverter before connecting the CX-Drive.

| Inverter Series | 3G3JV | 3G3MV | 3G3RV |
|-----------------|-------|-------|-------|
| Parameter No. | n70 | n153 | H5-01 |

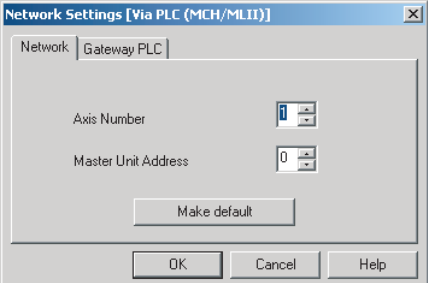
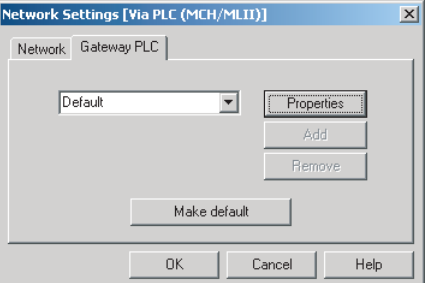
(2) The Servo Communications Unit No. (0 to F) is set using the following method before connecting the CX-Drive.

| Servo Series | R7D-AP | 3 R88D-WT |
|--------------|--|--|
| Method | Unit number rotary switch on the Servo | Change to the Setting Mode using the Servo front panel settings and set the unit number in digit 2 of Pn000. |

Via PLC (DeviceNet) Connections (3G3MV, 3G3RV)

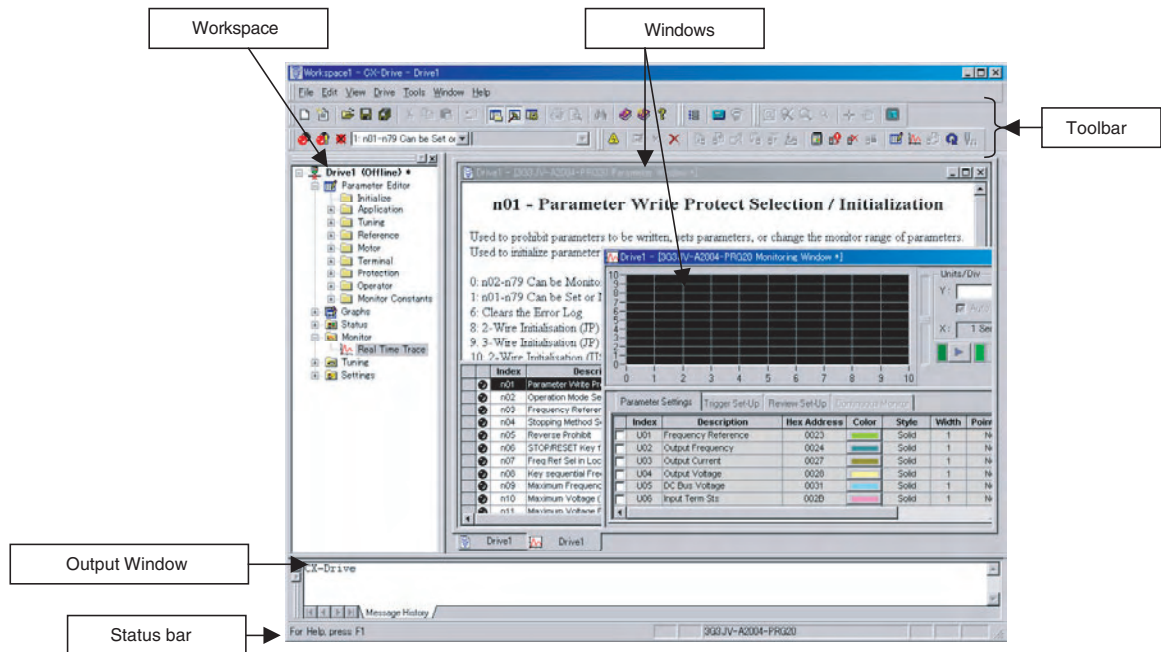
| Network Tab Page | Gateway PLC Tab Page |
|---|---|
|  |  |
| <ul style="list-style-type: none"> • Slave Unit Address: 0 to 63 (DeviceNet slave address) • Master Unit Address: 0 to 15 (DeviceNet unit number) | <p>Click the Properties Button to set the PLC (with a DeviceNet Unit) to use as the gateway.</p> |

**Via PLC (MCH/MECHATROLINK-II) or
Via PLC (NCF/MECHATROLINK-II) (R88D-WN) or
Via PLC (NC□81/EtherCAT)(R88D-KN)**

| Network Tab Page | Gateway PLC Tab Page |
|--|--|
|  |  |
| <ul style="list-style-type: none"> • Axis Number: 1 to 32 for MCH or 1 to 16 for NCF • Master Unit Address: 0 to 15 (MCH or NCF unit number) | <p>Click the Properties Button to set the PLC (with a MCH or NCF Unit) to use as the gateway.</p> |

2-4 User Interface

2-4-1 Window Structure



2-4-2 Functions

Functions Table

| Folder | Contents |
|------------------|--|
| Parameter Editor | Edits the parameters of Inverters or Servos. |
| Graphs | Displays parameters graphically. |
| Diagrams | Displays parameters in block diagrams. |
| Status | Displays online drive status. |
| Monitor | Enables realtime traces and other monitoring of online drives. |
| Tuning | Enables test runs and auto-tuning of online drives. |
| Settings | Enables initializing online drives. |

Functions

| Folder | Inverters | | | | | | |
|------------------|-----------|-------|-------|--------|-------|-------|-------|
| | 3G3JX | 3G3MX | 3G3RX | 3G3MX2 | 3G3JV | 3G3MV | 3G3RV |
| Parameter Editor | OK | OK | OK | OK | OK | OK | OK |
| Graphs | --- | --- | --- | --- | OK | OK | OK |
| Diagrams | --- | --- | --- | --- | --- | OK | OK |
| Status | OK | OK | OK | OK | OK | OK | OK |
| Monitor | OK | OK | OK | OK | OK | OK | OK |
| Tuning | --- | OK | --- | --- | OK | OK | OK |
| Settings | OK | OK | OK | OK | OK | OK | OK |

| Folder | Servos | | | | | | | |
|------------------|--------|---------|---------|---------|---------|--------|----------------|---------|
| | R7D-BP | R88D-KT | R88D-KN | R88D-GT | R88D-GN | R7D-AP | R88D-WT | R88D-WN |
| Parameter Editor | OK | OK | OK | OK | OK | OK | OK | OK |
| Graphs | --- | --- | --- | --- | --- | --- | --- | --- |
| Diagrams | OK | --- | --- | OK | OK | --- | OK | --- |
| Status | OK | OK | OK | OK | OK | OK | OK (See note.) | --- |
| Monitor | OK | OK | OK | OK | OK | OK | OK (See note.) | --- |
| Tuning | OK | OK | OK | OK | OK | OK | OK (See note.) | --- |
| Settings | OK | OK | OK | OK | OK | OK | OK | --- |

Note These functions are not supported when communicating via MECHATROLINK II.

Inverters

| Folder | 3G3JX | 3G3MX | 3G3RX |
|-------------------------|---|---|---|
| Parameter Editor | <ul style="list-style-type: none"> • Basic Settings • Analog Input • Multi-Step Speed, Jogging • Characteristics, Torque Boost • DC Injection Braking • Upper/Lower Limit, Jump • PID Control • AVR • RUN Mode, Accel/Decel Functions • External Frequency Adjustment • Operation Frequency • Frequency Addition • VR Adjustment • Restart During Momentary Power Interruption • Electronic Thermal • Overload Limit • Frequency Pull-In • Lock • Non-Stop Function at Momentary Power Interruption • Initialization • Multi-Function Input Terminals • Multi-Function Output Setting • Level Output Status Setting • Communication Function Adjustment • Various Adjustment • Control Parameters • Monitor Constants(Fault History/Trace) | <ul style="list-style-type: none"> • Basic Settings • Analog Input • Multi-Step Speed, Jogging • Characteristics, Torque Boost • DC Injection Braking • Upper/Lower Limit, Jump • PID Control • AVR • RUN Mode, Accel/Decel Functions • External Frequency Adjustment • Operation Frequency • Frequency Addition • VR Adjustment • Restart During Momentary Power Interruption • Electronic Thermal • Overload Limit • Lock • Initialization • Multi-Function Input Terminals • Multi-Function Output Setting • Level Output Status Setting • Communication Function Adjustment • Various Adjustment • Control Parameters • Monitor Constants(Fault History/Trace) | <ul style="list-style-type: none"> • Basic Settings • Analog Input • Multi-Step Speed, Jogging • Characteristics, Torque Boost • DC Injection Braking • Upper/Lower Limit, Jump • PID Control • AVR • RUN Mode, Accel/Decel Functions • External Frequency Adjustment • Acceleration/Deceleration • Operation Frequency • Restart During Momentary Power Interruption • Electronic Thermal • Overload Limit • Lock • Non-Stop Function at Momentary Power Interruption • Torque Limit • Vf Free Setting • Multi-Function Input Terminals • Multi-Function Output Setting • Analog Monitor • Level Output Status Setting • Communication Function Adjustment • Various Adjustment • Meter Adjustment • Output Terminal Operation Function • Input Terminal Response • Control Parameters • Absolute Position Control • User Parameter • Monitor Constants(Fault History/Trace) |
| Status | <ul style="list-style-type: none"> • Digital Inputs • Digital Outputs • Inverter Status • Alarms | <ul style="list-style-type: none"> • Digital Inputs • Digital Outputs • Inverter Status • Alarms | <ul style="list-style-type: none"> • Digital Inputs • Digital Outputs • Inverter Status • Alarms |
| Monitor | <ul style="list-style-type: none"> • Real Time Trace | <ul style="list-style-type: none"> • Real Time Trace | <ul style="list-style-type: none"> • Real Time Trace |
| Tuning | --- | <ul style="list-style-type: none"> • Test Run | --- |
| Settings | <ul style="list-style-type: none"> • Initialize | <ul style="list-style-type: none"> • Initialize | <ul style="list-style-type: none"> • Initialize |

| Folder | 3G3MX2 |
|-------------------------|---|
| Parameter Editor | <ul style="list-style-type: none"> • Fault History • Set-up • Basic Settings • Analog Input • Multi-Step Speed, Jogging • V/f Profile • DC Injection Braking • Limit, Jump • PID Control • AVR • RUN Mode, Accel/Decel Functions • External Frequency Adjustment • Acceleration/Deceleration • Operation Frequency • Restart After Momentary Power Interruption • Electronic Thermal • Overload Limit • Lock • Torque Limit • Controlled Stop Operation at Power Loss • Window Comparator • Vf Free Setting • Password • Multi-Function Input Terminals • Multi-Function Output Terminals • Analog Monitor • Level Output Status Setting • Communication Function • Adjustment • Input/Output Terminals Function • Control Constants • Simple Position Control • Simple Torque Control • Pulse Input • Communication Between Inverters • User Parameter • Others |
| Graphs | <ul style="list-style-type: none"> • V/f Profile |
| Status | <ul style="list-style-type: none"> • Digital Inputs • Digital Outputs • Drive Status • Alarms |
| Monitor | <ul style="list-style-type: none"> • Real Time Trace |
| Settings | <ul style="list-style-type: none"> • Initialize |

| Folder | 3G3JV | 3G3MV | 3G3RV |
|-------------------------|--|--|--|
| Parameter Editor | <ul style="list-style-type: none"> • Initialize • Application • Tuning • Reference • Motor • Terminal • Protection • Operator • Monitor Constants | <ul style="list-style-type: none"> • Initialize • Application • Tuning • Reference • Motor • Options • Terminal • Protection • Operator • Up 2/Down 2 • Monitor Constants | <ul style="list-style-type: none"> • Initialize • Application • Tuning • Reference • Motor • Options • Terminal • Protection • Special Adjustment • Operator • Motor Auto-tuning • Monitor Constants |
| Graphs | <ul style="list-style-type: none"> • Analogue Input 1 • Analogue Output 1 • Jump Frequencies • V/F Profile | <ul style="list-style-type: none"> • Analogue Output 1 • Frequency Reference Input • Jump Frequencies • Multifunction Analogue Current Input • Multifunction Analogue Voltage Input • V/F Profile | <ul style="list-style-type: none"> • Analogue Input 1 • Analogue Input 2 • Analogue Output 1 • Analogue Output 2 • Jump Frequencies • V/F Profile • V/F Profile Motor 2 |
| Diagrams | --- | <ul style="list-style-type: none"> • PID Control Loop • PID Target Value • PID Feedback Value | <ul style="list-style-type: none"> • PID Control Loop |
| Status | <ul style="list-style-type: none"> • Digital Inputs • Digital Outputs • Inverter Status 1 • Status Signal • Alarms | <ul style="list-style-type: none"> • Digital Inputs • Digital Outputs • Inverter Status 1 • Status Signal • Alarms | <ul style="list-style-type: none"> • Digital Inputs • Digital Outputs • Inverter Status 1 • Status Signal • Alarms |
| Monitor | <ul style="list-style-type: none"> • Real Time Trace | <ul style="list-style-type: none"> • Real Time Trace | <ul style="list-style-type: none"> • Real Time Trace |
| Tuning | <ul style="list-style-type: none"> • Test Run | <ul style="list-style-type: none"> • Test Run | <ul style="list-style-type: none"> • Test Run • Auto-tune |
| Settings | <ul style="list-style-type: none"> • Initialize | <ul style="list-style-type: none"> • Initialize | <ul style="list-style-type: none"> • Initialize • Password Authorization |















Servos
























| Folder | R7D-BP | R88D-GT | R88D-GN |
|-------------------------|---|---|---------|
| Parameter Editor | <ul style="list-style-type: none"> • Function Selection Parameters • Gain Related Parameters • Position Control Related Parameters • Internal Speed Control Related Parameters • Sequence Related Parameters | <ul style="list-style-type: none"> • Function Selection Parameters • Gain Related Parameters • Position Control Related Parameters • Speed Control and Torque Control Related Parameters • Sequence Related Parameters | |
| Diagrams | <ul style="list-style-type: none"> • Internal Speed Control Mode • Position Control Mode | <ul style="list-style-type: none"> • Position Control Mode • Speed Control Mode • Torque Control Mode | |
| Status | <ul style="list-style-type: none"> • CN1 Input Signal Monitor • CN1 Output Signal Monitor • Drive Status • Load Status • Pulse Status • Alarms | <ul style="list-style-type: none"> • CN1 Input Signal Monitor • CN1 Output Signal Monitor • Drive Status • Load Status • Pulse Status • Alarms | |
| Monitor | <ul style="list-style-type: none"> • Real Time Trace • Data Trace | <ul style="list-style-type: none"> • Real Time Trace • Data Trace | |
| Tuning | <ul style="list-style-type: none"> • Auto Tune | <ul style="list-style-type: none"> • Test Run • Auto Tune • Absolute Encoder | |
| Settings | <ul style="list-style-type: none"> • Initialize • Product Information | <ul style="list-style-type: none"> • Initialize • Product Information | |










| Folder | R88D-KT | R88D-KN |
|-------------------------|---|---|
| Parameter Editor | <ul style="list-style-type: none"> • Basic Parameters • Gain Parameters • Vibration Suppression Parameters • Analog Control Parameters • I/F Monitor Setting Parameters • Extended Parameters • Special Parameters | <ul style="list-style-type: none"> • Basic Parameters • Gain Parameters • Vibration Suppression Parameters • Analog Control Parameters • I/F Monitor Setting Parameters • Extended Parameters • Special Parameters1 to 3 |
| Status | <ul style="list-style-type: none"> • CN1 Input Signal Monitor • CN1 Output Signal Monitor • Drive Status • Extended Input Signal • Extended Output Signal • Physical Input Signal • Physical Output Signal • Pulse Status • Rotation Hindering • Status • Warning Data • Alarms | <ul style="list-style-type: none"> • CN1 Input Signal Monitor • CN1 Output Signal Monitor • Drive Status • Extended Input Signal • Extended Output Signal • Physical Input Signal • Physical Output Signal • Pulse Status • Rotation Hindering • Status • Warning Data • Alarms |
| Monitor | <ul style="list-style-type: none"> • Real Time Trace • Data Trace | <ul style="list-style-type: none"> • Real Time Trace • Data Trace |
| Tuning | <ul style="list-style-type: none"> • Test Run • Offset • Absolute Encoder • FFT | <ul style="list-style-type: none"> • Test Run • Absolute Encoder • FFT |
| Settings | <ul style="list-style-type: none"> • Initialize | <ul style="list-style-type: none"> • Initialize |

| Folder | R7D-AP | R88D-WT | R88D-WN |
|-------------------------|--|---|---|
| Parameter Editor | <ul style="list-style-type: none"> • Function Selection Constants • Gain Related Constants • Position Related Constants • Speed Related Constants • Torque Related Constants • Sequence Related Constants • Other Constants | <ul style="list-style-type: none"> • Function Selection Constants • Gain Related Constants • Position Related Constants • Speed Related Constants • Torque Related Constants • Sequence Related Constant • Other Constants | <ul style="list-style-type: none"> • Function Selection Constants • Gain Related Constants • Position Related Constants • Speed Related Constants • Torque Related Constants • Sequence Related Constants • Regenerative Resistor Capacity • Motion Parameters • MECHATROLINK-II Constants |
| Diagrams | --- | <ul style="list-style-type: none"> • Position Block Diagram • Speed Block Diagram • Torque Block Diagram | --- |
| Status | <ul style="list-style-type: none"> • Input signals • Output signals • Motion Status • Alarms | <ul style="list-style-type: none"> • Input signals • Output signals • Motion Status • Alarms | --- |
| Monitor | <ul style="list-style-type: none"> • Real Time Trace • Data Trace | <ul style="list-style-type: none"> • Real Time Trace • Data Trace | --- |
| Tuning | <ul style="list-style-type: none"> • Test Run • Auto Tune • Offset | <ul style="list-style-type: none"> • Test Run • Auto Tune • Offset • Absolute Encoder | --- |
| Settings | <ul style="list-style-type: none"> • Initialize • Password Authorization • Product Information | <ul style="list-style-type: none"> • Initialize • Module Detection Clear • Password Authorization • Product Information | --- |

2-4-3 Menu Commands

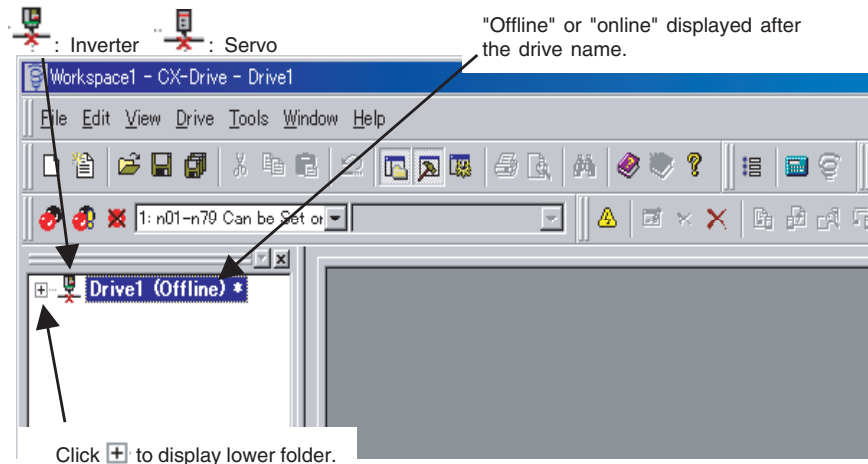
| Menu | Submenu/Command | Contents | Inverter | Servo | Icon |
|------------|-------------------|---|--|-------|---|
| File | New | Creates a new drive file. | OK | OK |  |
| | Autodetect | Detect drives automatically. | OK | OK |  |
| | Open | Opens an existing drive file (.sdd), or monitor review file (.sdm). | OK | OK |  |
| | Close | Closes an open drive file (.sdd). | OK | OK | --- |
| | Open Workspace | Opens an existing Workspace (.sdw). | OK | OK |  |
| | Close Workspace | Closes the active Workspace (.sdw). | OK | OK | --- |
| | Save Workspace | Saves the active Workspace (.sdw). | OK | OK | --- |
| | Save as Workspace | Saves the active Workspace with a new name (.sdw). | OK | OK | --- |
| | Save | Saves an open drive file using its existing file name (.sdd). | OK | OK |  |
| | Save As | Saves an open drive file using a specified file name and directory (.sdd). | OK | OK | --- |
| | Save All | Saves all currently open drive files (.sdd). | OK | OK |  |
| | Print | Prints the current drive file. | OK | OK |  |
| | Print Preview | Displays a print preview of the drive file in the active window. | OK | OK |  |
| | Page Setup | Changes printing options, such as margins, include drive information, drive type page heading, etc. | OK | OK | --- |
| | Import | Imports a file from the specified directory. | OK | OK | --- |
| | Export | Exports the current drive file to a file in the specified directory as a CSV or text file. | OK | OK | --- |
| | Recent file | Opens a recent drive file. | OK | OK | --- |
| | Recent Workspace | Opens a recent Workspace. | OK | OK | --- |
| | Exit | Exits the CX-Drive. | OK | OK | --- |
| | Edit | Undo | Undoes the previous editing operation. | OK | OK |
| Cut | | Deletes data from the drive file and places it on the clipboard. | OK | OK |  |
| Copy | | Copies data from the drive file and places it on the clipboard. | OK | OK |  |
| Paste | | Pastes data from the clipboard into the drive file. | OK | OK |  |
| Delete | | Deletes selected data from the drive file. | OK | OK | --- |
| Select All | | Selects all the data in the drive file. | OK | OK | --- |
| Find | | Searches for a specific item in the drive file. | OK | OK |  |
| View | Tool Bars | Shows or hides the toolbars (Standard, Modes, Drive, View, and Tools). | OK | OK | --- |
| | Status Bar | Shows or hides the status bar for the drive type name and other information. | OK | OK | --- |
| | Workbook Mode | Shows the selected windows with tabs. | OK | OK | --- |
| | Full Screen | Displays the active view in full screen mode. | OK | OK |  |
| | Output | Shows or hides the output window. | OK | OK |  |

| Menu | Submenu/Command | Contents | Inverter | Servo | Icon | |
|---------------------------|---|--|--|---|---|---|
| View | Workspace | Shows or hides the Workspace window. | OK | OK | --- | |
| | Motor Management | Shows or hides the motor operation window. | OK | OK |  | |
| | Zoom | Zooms in and out using a rectangle, initial setting, etc. | OK | OK |  | |
| | Pan Mode | Activates the full scroll mode. | OK | OK |  | |
| | Cursor Mode | Activates the cursor mode. | OK | OK |  | |
| | Show Parameter Labels | Shows or hides parameter labels. | OK | OK | --- | |
| | Show Parameter Value | Shows or hides parameter values. | OK | OK | --- | |
| | Show Changes Only | Displays only parameters with modified values. | OK | OK |  | |
| | Show Differences Only | Displays only parameters with values different from the drive. | OK | OK |  | |
| | Show Invalids Only | Displays only parameters with invalid values. | OK | OK |  | |
| | Display Format | Changes to one of the following display formats: Normal, High Low Text, Orange LED, Red LED, Green LED, or Blue LED. | OK | OK | --- | |
| Drive | Change | Edits the active drive properties. | OK | OK |  | |
| | Work Online | Connects to the drive. | OK | OK |  | |
| | Initialize | Initializes the parameters of the drive to the default values. | OK | OK |  | |
| | Password Protection | Sets the password for the drive. | OK | OK |  | |
| | Parameter Editor | Opens the parameter editor view for the current drive. | OK | OK |  | |
| | Select Parameter Graph | Opens the graphical editor containing the selected parameter. | OK | OK |  | |
| | Reset Selection | Resets the currently selected parameters. | OK | OK |  | |
| | Reset All | Resets all parameters. | OK | OK |  | |
| | Save To FROM (for Servo via MCH only) | Saves the parameters to the flash memory in the Servo via MCH. | --- | OK |  | |
| | Transfer | To Drive | Downloads the complete parameter set to the drive. | OK | OK |  |
| | | From Drive | Uploads the complete parameter set from the drive. | OK | OK |  |
| | | Compare with Drive | Uploads the parameters of the drive in the Drive Value Column to enabling comparing the parameter set. | OK | OK |  |
| | | Selection To Drive | Downloads the selected parameters to the drive. | OK | OK |  |
| | | Selection From Drive | Uploads the selected parameters from the drive. | OK | OK |  |
| | Alarms | Opens the drive alarm window showing the current alarms and alarm trace. | OK | OK |  | |
| No Module Detection Clear | Clears the A.E7 (No module detection) error. | --- | OK | --- | | |
| Data Trace | Configures and activates the Servo data trace function. | --- | OK |  | | |

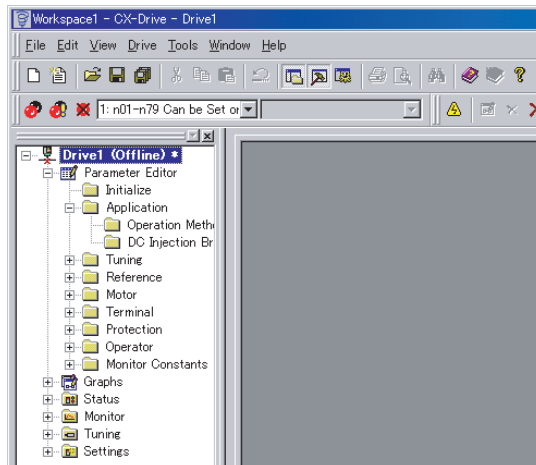
| Menu | Submenu/Command | Contents | Inverter | Servo | Icon |
|--------|----------------------|---|----------|-------|---|
| Drive | Real Time Trace | Displays the current values of the selected parameters. | OK | OK |  |
| | FFT | Performs the FFT analysis. | --- | OK |  |
| | Test | Performs a test run. | OK | OK |  |
| | Auto-Tune | Executes the auto-tuning function built into the drive. | OK | OK |  |
| | Set Absolute Encoder | Configures a Servomotor absolute encoder. | --- | OK | --- |
| | Adjust Offsets | Configures Servo offsets. | --- | OK | --- |
| | Product Information | Displays product information. | OK | OK | --- |
| Tools | Database Upgrade | Upgrades the database to the latest version. | OK | OK | --- |
| | Options | Sets CX-Drive options. | OK | OK |  |
| | Calculator | Displays the Microsoft calculator. | OK | OK |  |
| | Compare Drives | Displays the parameter differences between 2 drive files. | OK | OK | --- |
| Window | Close All | Closes all open windows. | OK | OK | --- |
| | Cascade | Arranges windows as overlapping files. | OK | OK | --- |
| | Tile Horizontally | Arranges windows as horizontal, non-overlapping tiles. | OK | OK | --- |
| | Tile Vertically | Arranges windows as vertical, non-overlapping tiles. | OK | OK | --- |
| | Arrange Icons | Arranges the icons at the bottom of the window. | OK | OK | --- |
| Help | Help Topics | Displays an index to topics on which help is available. | OK | OK |  |
| | Help | Provides contextual help to provide help relating to the active window. | OK | OK |  |
| | Online Registration | Registers your application on the OMRON website. | OK | OK | --- |
| | Omron on the web | Opens the OMRON Corporate website. | OK | OK | --- |
| | About CX-Drive | Displays the version number of the application. | OK | OK |  |

2-5 Editing Drive Files

1. Use the New Drive Dialog Box to set the drive name, drive type, connection type, and other information, or 2. Use **Autodetect** to select the target drive. The following window will be displayed.



Click **+** at the left of the drive name to display the following tree.

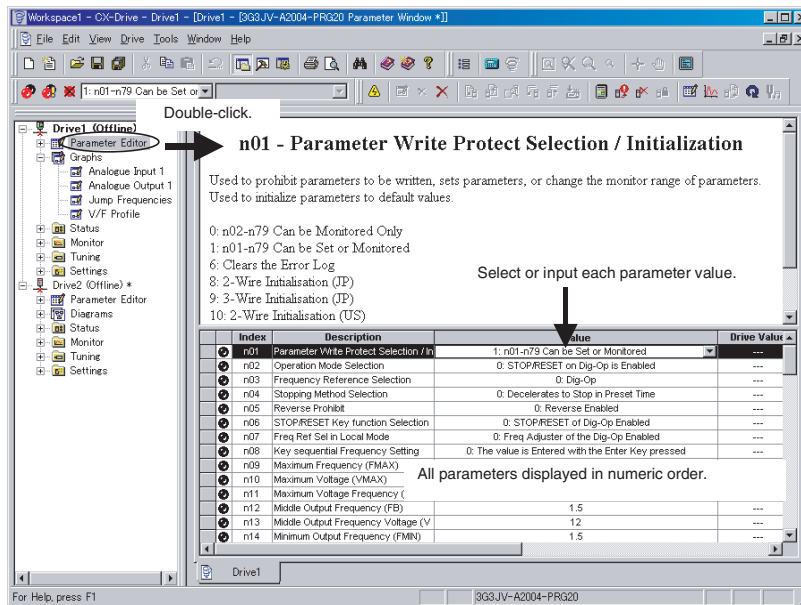


2-5-1 Editing Parameters

The parameters for each drive (an Inverter or Servo) can be edited under the parameter numbers.

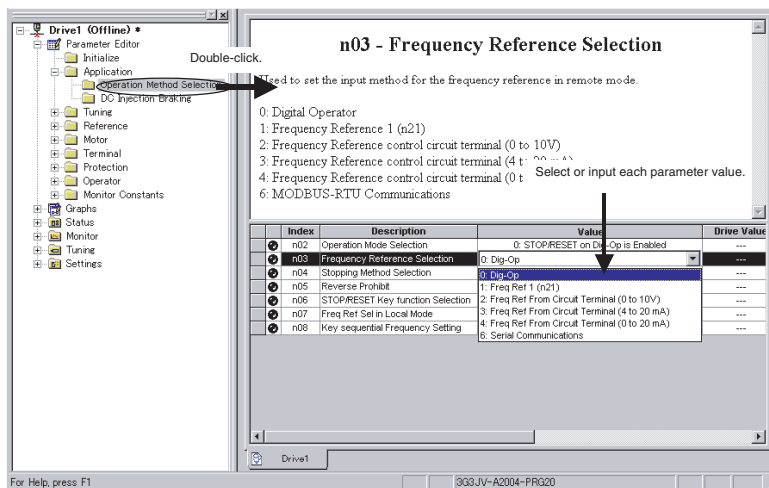
Parameter Editor: Numeric Order

Double-click **Parameter Editor** to open the Parameter Editor Window in numeric order. Select and set each parameter.



Parameter Editor in Functional Categories

Double-click the category folder to open the Categorized Parameter Editor Window. Select and set each parameter.



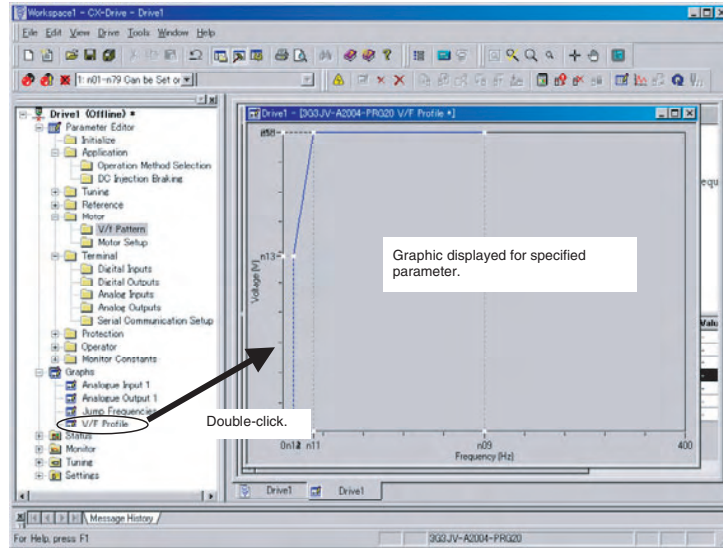
Comparing Drive and Parameter Data

The comparison operation uploads drive parameters without changing parameter values in the file data. The Parameter Editor Window shows both the drive file and the file data at the same time, and indicates the differences.

- ⦿: Default, ⦿: Default but different from the drive, ⦿: Not default, ⦿: Not default and different from the drive.
- ✗: Invalid, ✗: Invalid and different from the drive.

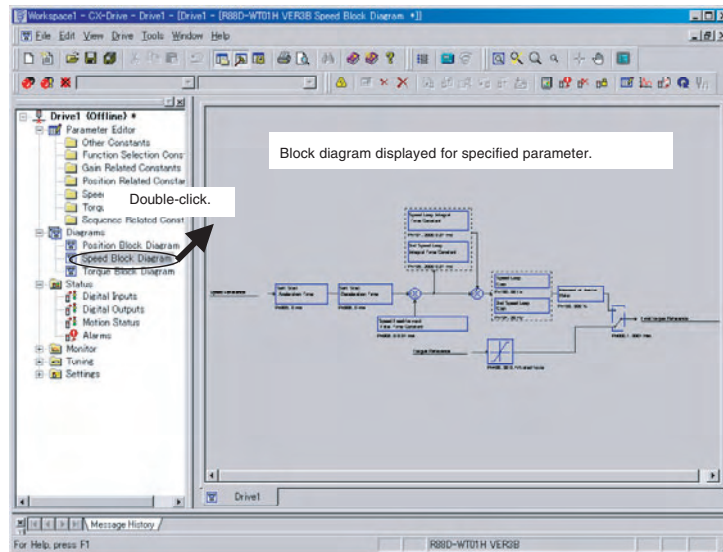
2-5-2 Graphs

Parameters can be displayed in graphic form for review (for Inverters only).



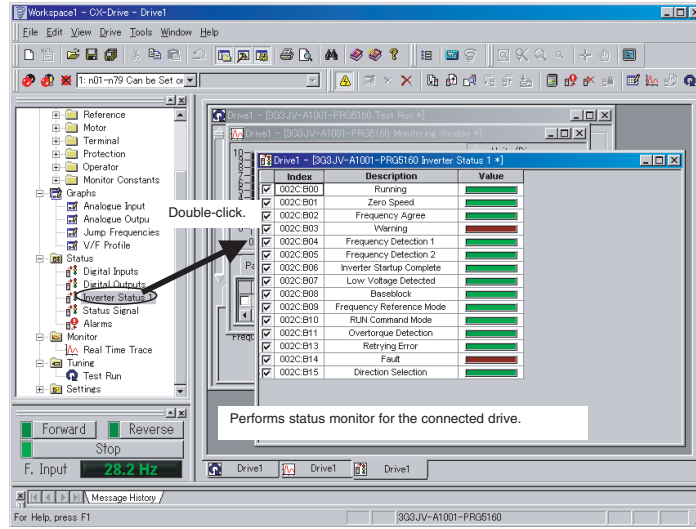
2-5-3 Diagrams

Parameters can be displayed in block diagrams for relevant parameters. Inverters support PID block diagrams, and Servos support position, speed and torque block diagrams.



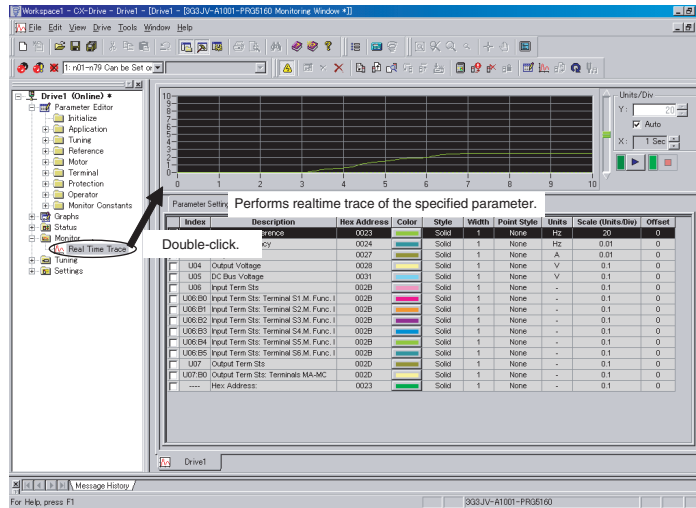
2-5-4 Status Displays

The status of the online drive can be displayed.



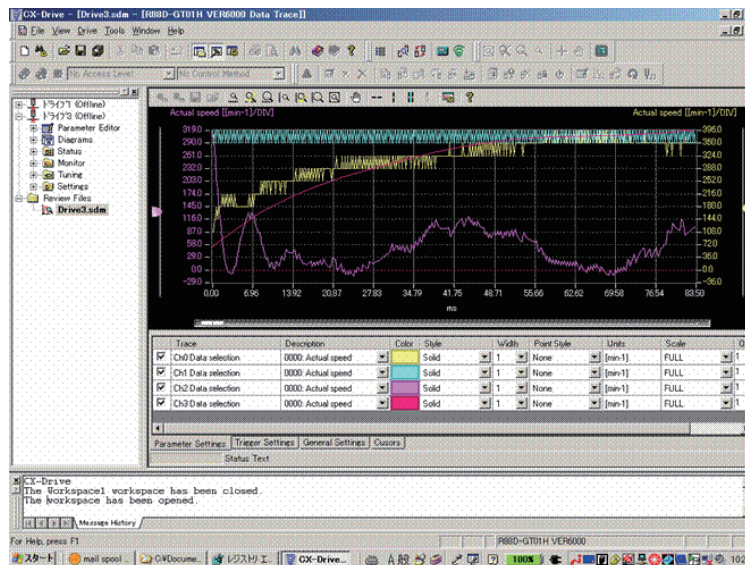
2-5-5 Monitoring

Realtime traces can be displayed for the selected parameters of the online drive. Data traces are also possible for the R7D-AP and R88D-WT Servos.



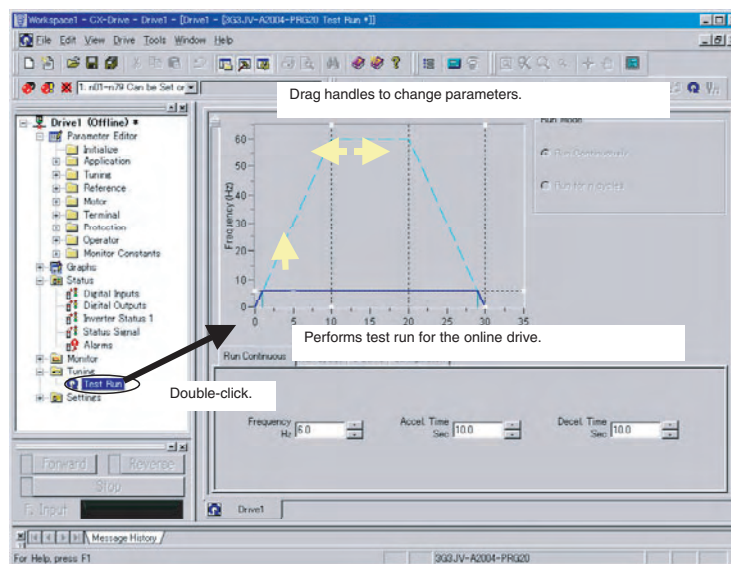
2-5-6 Data Trace

There is the Data Trace function for Servo drive serial direct connection communication to get Servo Drive Trace data in detail and show it and save it into the file. At the CX-Drive Version 1.6, there are some operation improvements such as graph area expanding, showing Vertical and Horizontal line cursors to measure the difference of two points of data (before V1.6, there are cross cursors), zoom in/out, both side vertical (Y axis) scale on the graph and saving the setting data with graphical data.



2-5-7 Test Run

Test runs can be performed for the online drive. The frequency reference, jog speed, acceleration time, and deceleration time on the graph can be changed by entering values directly or by dragging handles.



For Servos, auto-tuning, motor current detect offset adjustments, and absolute multi-turn limit settings are also supported.

Note Please execute this function when an EtherCAT connection is not established.

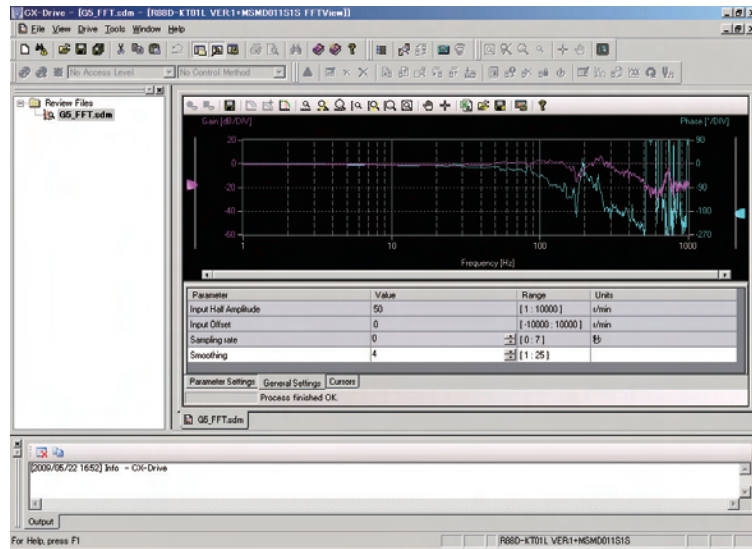
2-5-8 FFT

FFT analysis can be performed for the online drive.

The resonant frequency of the device can be specified by checking the gain of frequency response. This is effective when manually making the notch filter settings.

The response of the device can be verified by checking the phase of frequency response.

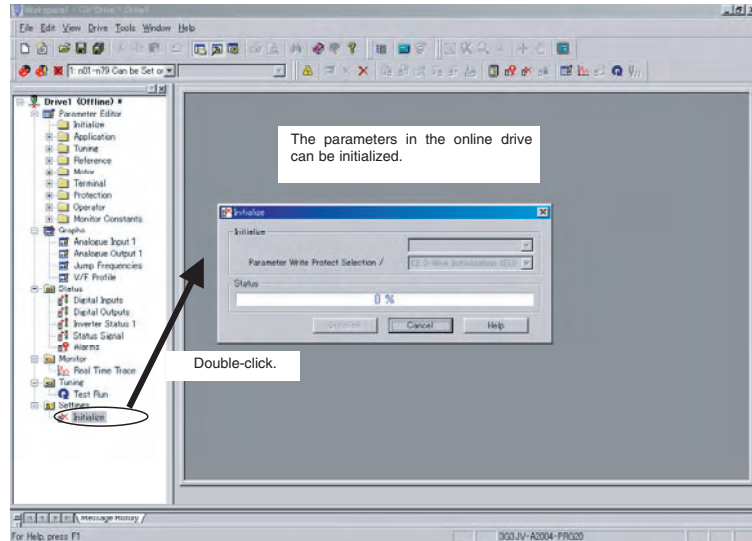
This is effective when adjusting the response of the device such as the integration time constant of velocity loop and velocity feedforward amount.



Note Please execute this function when an EtherCAT connection is not established.

2-5-9 Settings

The parameters of the online drive can be initialized, and password authorization can be set for some drive models.



Also refer to the *CX-Drive Online Help* for operating procedures and functions. Select **Help** from the Help Menu or click the Button to display context help, which displays help about the currently displayed window.

Revision History

A manual revision code appears as a suffix to the catalog number on the front cover of the manual.

Cat. No. W453-E1-13



The following table outlines the changes made to the manual during each revision. Page numbers refer to the previous version.

| Revision code | Date | Revised content |
|---------------|---------------|---|
| 01 | November 2005 | Original production |
| 02 | January 2006 | Pages xvi and 9: Caution on the use of the USB serial converter added. |
| 03 | April 2006 | Caution on the use of the USB serial converter revised and revisions for product version 1 accompanying upgrade to CX-Drive version 1.12 added. |
| 04 | July 2006 | Corrections accompanying upgrade from CX-Drive version 1.12 to 1.3. (Specifications changed from absolute path information for all drive data files in the workspace (file name extension .sdw) to relative path information.) |
| 05 | June 2007 | Corrections accompanying upgrade from CX-Drive version 1.3 to 1.4 (Windows Vista). |
| 06 | May 2008 | Adding the support of OMNUC G series and SMARTSTEP2 series Direct serial connections. Changing the Data Trace function operation and GUI improvement. |
| 07 | July 2008 | Adding the support of OMNUC G series R88D-GN Direct serial communications. |
| 08 | October 2008 | Adding the support of 3G3JX/MX/RX. |
| 09 | March 2009 | Adding the cable name for 3G3JX/MX/RX. |
| 10 | June 2009 | Adding the support of OMNUC G5-series R88D-KT Direct USB connections. Adding the support of the FFT analysis function. |
| 11 | October 2009 | Adding the support of 3G3MX2. Adding the support of R88D-KN (with Built-in MECHATROLINK-II Communications) Direct USB connections. |
| 12 | December 2009 | Additions related to Windows 7. |
| 13 | February 2010 | Adding the support of OMNUC G5-series R88D-KN (with Built-in EtherCAT Communications). |

Revision History

Terms and Conditions of Sale

1. **Offer; Acceptance.** These terms and conditions (these "Terms") are deemed part of all quotes, agreements, purchase orders, acknowledgments, price lists, catalogs, manuals, brochures and other documents, whether electronic or in writing, relating to the sale of products or services (collectively, the "Products") by Omron Electronics LLC and its subsidiary companies ("Omron"). Omron objects to any terms or conditions proposed in Buyer's purchase order or other documents which are inconsistent with, or in addition to, these Terms.
2. **Prices; Payment Terms.** All prices stated are current, subject to change without notice by Omron. Omron reserves the right to increase or decrease prices on any unshipped portions of outstanding orders. Payments for Products are due net 30 days unless otherwise stated in the invoice.
3. **Discounts.** Cash discounts, if any, will apply only on the net amount of invoices sent to Buyer after deducting transportation charges, taxes and duties, and will be allowed only if (i) the invoice is paid according to Omron's payment terms and (ii) Buyer has no past due amounts.
4. **Interest.** Omron, at its option, may charge Buyer 1-1/2% interest per month or the maximum legal rate, whichever is less, on any balance not paid within the stated terms.
5. **Orders.** Omron will accept no order less than \$200 net billing.
6. **Governmental Approvals.** Buyer shall be responsible for, and shall bear all costs involved in, obtaining any government approvals required for the importation or sale of the Products.
7. **Taxes.** All taxes, duties and other governmental charges (other than general real property and income taxes), including any interest or penalties thereon, imposed directly or indirectly on Omron or required to be collected directly or indirectly by Omron for the manufacture, production, sale, delivery, importation, consumption or use of the Products sold hereunder (including customs duties and sales, excise, use, turnover and license taxes) shall be charged to and remitted by Buyer to Omron.
8. **Financial.** If the financial position of Buyer at any time becomes unsatisfactory to Omron, Omron reserves the right to stop shipments or require satisfactory security or payment in advance. If Buyer fails to make payment or otherwise comply with these Terms or any related agreement, Omron may (without liability and in addition to other remedies) cancel any unshipped portion of Products sold hereunder and stop any Products in transit until Buyer pays all amounts, including amounts payable hereunder, whether or not then due, which are owing to it by Buyer. Buyer shall in any event remain liable for all unpaid accounts.
9. **Cancellation; Etc.** Orders are not subject to rescheduling or cancellation unless Buyer indemnifies Omron against all related costs or expenses.
10. **Force Majeure.** Omron shall not be liable for any delay or failure in delivery resulting from causes beyond its control, including earthquakes, fires, floods, strikes or other labor disputes, shortage of labor or materials, accidents to machinery, acts of sabotage, riots, delay in or lack of transportation or the requirements of any government authority.
11. **Shipping; Delivery.** Unless otherwise expressly agreed in writing by Omron:
 - a. Shipments shall be by a carrier selected by Omron; Omron will not drop ship except in "break down" situations.
 - b. Such carrier shall act as the agent of Buyer and delivery to such carrier shall constitute delivery to Buyer;
 - c. All sales and shipments of Products shall be FOB shipping point (unless otherwise stated in writing by Omron), at which point title and risk of loss shall pass from Omron to Buyer; provided that Omron shall retain a security interest in the Products until the full purchase price is paid;
 - d. Delivery and shipping dates are estimates only; and
 - e. Omron will package Products as it deems proper for protection against normal handling and extra charges apply to special conditions.
12. **Claims.** Any claim by Buyer against Omron for shortage or damage to the Products occurring before delivery to the carrier must be presented in writing to Omron within 30 days of receipt of shipment and include the original transportation bill signed by the carrier noting that the carrier received the Products from Omron in the condition claimed.
13. **Warranties.** (a) **Exclusive Warranty.** Omron's exclusive warranty is that the Products will be free from defects in materials and workmanship for a period of twelve months from the date of sale by Omron (or such other period expressed in writing by Omron). Omron disclaims all other warranties, express or implied. (b) **Limitations.** OMRON MAKES NO WARRANTY OR REPRESENTATION, EXPRESS OR IMPLIED, ABOUT NON-INFRINGEMENT, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OF THE PRODUCTS. BUYER ACKNOWLEDGES THAT IT ALONE HAS DETERMINED THAT THE PRODUCTS WILL SUITABLY MEET THE REQUIREMENTS OF THEIR INTENDED USE. Omron further disclaims all warranties and responsibility of any type for claims or expenses based on infringement by the Products or otherwise of any intellectual property right. (c) **Buyer Remedy.** Omron's sole obligation hereunder shall be, at Omron's election, to (i) replace (in the form originally shipped with Buyer responsible for labor charges for removal or replacement thereof) the non-complying Product, (ii) repair the non-complying Product, or (iii) repay or credit Buyer an amount equal to the purchase price of the non-complying Product; provided that in no event shall Omron be responsible for warranty, repair, indemnity or any other claims or expenses regarding the Products unless Omron's analysis confirms that the Products were properly handled, stored, installed and maintained and not subject to contamination, abuse, misuse or inappropriate modification. Return of any Products by Buyer must be approved in writing by Omron before shipment. Omron Companies shall not be liable for the suitability or unsuitability or the results from the use of Products in combination with any electrical or electronic components, circuits, system assemblies or any other materials or substances or environments. Any advice, recommendations or information given orally or in writing, are not to be construed as an amendment or addition to the above warranty. See <http://www.omron247.com> or contact your Omron representative for published information.
14. **Limitation on Liability; Etc.** OMRON COMPANIES SHALL NOT BE LIABLE FOR SPECIAL, INDIRECT, INCIDENTAL, OR CONSEQUENTIAL DAMAGES, LOSS OF PROFITS OR PRODUCTION OR COMMERCIAL LOSS IN ANY WAY CONNECTED WITH THE PRODUCTS, WHETHER SUCH CLAIM IS BASED IN CONTRACT, WARRANTY, NEGLIGENCE OR STRICT LIABILITY. Further, in no event shall liability of Omron Companies exceed the individual price of the Product on which liability is asserted.
15. **Indemnities.** Buyer shall indemnify and hold harmless Omron Companies and their employees from and against all liabilities, losses, claims, costs and expenses (including attorney's fees and expenses) related to any claim, investigation, litigation or proceeding (whether or not Omron is a party) which arises or is alleged to arise from Buyer's acts or omissions under these Terms or in any way with respect to the Products. Without limiting the foregoing, Buyer (at its own expense) shall indemnify and hold harmless Omron and defend or settle any action brought against such Companies to the extent based on a claim that any Product made to Buyer specifications infringed intellectual property rights of another party.
16. **Property; Confidentiality.** Any intellectual property in the Products is the exclusive property of Omron Companies and Buyer shall not attempt to duplicate it in any way without the written permission of Omron. Notwithstanding any charges to Buyer for engineering or tooling, all engineering and tooling shall remain the exclusive property of Omron. All information and materials supplied by Omron to Buyer relating to the Products are confidential and proprietary, and Buyer shall limit distribution thereof to its trusted employees and strictly prevent disclosure to any third party.
17. **Export Controls.** Buyer shall comply with all applicable laws, regulations and licenses regarding (i) export of products or information; (ii) sale of products to "forbidden" or other proscribed persons; and (iii) disclosure to non-citizens of regulated technology or information.
18. **Miscellaneous.** (a) **Waiver.** No failure or delay by Omron in exercising any right and no course of dealing between Buyer and Omron shall operate as a waiver of rights by Omron. (b) **Assignment.** Buyer may not assign its rights hereunder without Omron's written consent. (c) **Law.** These Terms are governed by the law of the jurisdiction of the home office of the Omron company from which Buyer is purchasing the Products (without regard to conflict of law principles). (d) **Amendment.** These Terms constitute the entire agreement between Buyer and Omron relating to the Products, and no provision may be changed or waived unless in writing signed by the parties. (e) **Severability.** If any provision hereof is rendered ineffective or invalid, such provision shall not invalidate any other provision. (f) **Setoff.** Buyer shall have no right to set off any amounts against the amount owing in respect of this invoice. (g) **Definitions.** As used herein, "including" means "including without limitation"; and "Omron Companies" (or similar words) mean Omron Corporation and any direct or indirect subsidiary or affiliate thereof.

Certain Precautions on Specifications and Use

1. **Suitability of Use.** Omron Companies shall not be responsible for conformity with any standards, codes or regulations which apply to the combination of the Product in the Buyer's application or use of the Product. At Buyer's request, Omron will provide applicable third party certification documents identifying ratings and limitations of use which apply to the Product. This information by itself is not sufficient for a complete determination of the suitability of the Product in combination with the end product, machine, system, or other application or use. Buyer shall be solely responsible for determining appropriateness of the particular Product with respect to Buyer's application, product or system. Buyer shall take application responsibility in all cases but the following is a non-exhaustive list of applications for which particular attention must be given:
 - (i) Outdoor use, uses involving potential chemical contamination or electrical interference, or conditions or uses not described in this document.
 - (ii) Use in consumer products or any use in significant quantities.
 - (iii) Energy control systems, combustion systems, railroad systems, aviation systems, medical equipment, amusement machines, vehicles, safety equipment, and installations subject to separate industry or government regulations.
 - (iv) Systems, machines and equipment that could present a risk to life or property. Please know and observe all prohibitions of use applicable to this Product.

NEVER USE THE PRODUCT FOR AN APPLICATION INVOLVING SERIOUS RISK TO LIFE OR PROPERTY OR IN LARGE QUANTITIES WITHOUT ENSURING THAT THE SYSTEM AS A WHOLE HAS BEEN DESIGNED TO ADDRESS THE RISKS, AND THAT THE OMRON'S PRODUCT IS PROPERLY RATED AND INSTALLED FOR THE INTENDED USE WITHIN THE OVERALL EQUIPMENT OR SYSTEM.
2. **Programmable Products.** Omron Companies shall not be responsible for the user's programming of a programmable Product, or any consequence thereof.
3. **Performance Data.** Data presented in Omron Company websites, catalogs and other materials is provided as a guide for the user in determining suitability and does not constitute a warranty. It may represent the result of Omron's test conditions, and the user must correlate it to actual application requirements. Actual performance is subject to the Omron's Warranty and Limitations of Liability.
4. **Change in Specifications.** Product specifications and accessories may be changed at any time based on improvements and other reasons. It is our practice to change part numbers when published ratings or features are changed, or when significant construction changes are made. However, some specifications of the Product may be changed without any notice. When in doubt, special part numbers may be assigned to fix or establish key specifications for your application. Please consult with your Omron's representative at any time to confirm actual specifications of purchased Product.
5. **Errors and Omissions.** Information presented by Omron Companies has been checked and is believed to be accurate; however, no responsibility is assumed for clerical, typographical or proofreading errors or omissions.

OMRON

OMRON ELECTRONICS LLC • THE AMERICAS HEADQUARTERS

Schaumburg, IL USA • 847.843.7900 • 800.556.6766 • www.omron247.com

OMRON CANADA, INC. • HEAD OFFICE

Toronto, ON, Canada • 416.286.6465 • 866.986.6766 • www.omron247.com

OMRON ELETRÔNICA DO BRASIL LTDA • HEAD OFFICE

São Paulo, SP, Brasil • 55.11.2101.6300 • www.omron.com.br

OMRON ELECTRONICS MEXICO SA DE CV • HEAD OFFICE

Apodaca, N.L. • 52.811.156.99.10 • 001.800.556.6766 • mela@omron.com

OMRON ARGENTINA • SALES OFFICE

Cono Sur • 54.11.4783.5300

OMRON CHILE • SALES OFFICE

Santiago • 56.9.9917.3920

OTHER OMRON LATIN AMERICA SALES

54.11.4783.5300

© 2009 Omron Electronics LLC

Cat. No. W453-E1-13 02/10

Specifications are subject to change without notice.

Printed in U.S.A.