SYSMAC
CXONE-AL□□C-EV2/
CXONE-AL□□D-EV2

CX-Drive

OPERATION MANUAL

OMRON

CXONE-AL□□C-EV2/
CXONE-AL□□D-EV2
CX-Drive

Operation Manual

Revised June 2007

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.

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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, Me, NT 4.0, 2000, XP, or Vista 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 3G3JV Compact Simplified Inverters User's Manual	I528-E1
	SYSDRIVE 3G3MV Multi-function Compact Inverter 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	SMARTSTEP A Series Servomotors/Servo Drives Models R7M-A☐ (Servomotors)/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 MECHA-TROLINK-II Communications Models R88M-W☐ (AC Servomotors)/R88D-WN☐-ML2 (AC Servo Drives) User's Manual	I544-E1

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-AL☐☐C-EV2/AL☐☐D-EV2	CX-One Ver. 2.1 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 17) and then specify "V1" in the specification field.

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.

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.

Warranty and Limitations of Liability

WARRANTY

OMRON's exclusive warranty is that the products are free from defects in materials and workmanship for a period of one year (or other period if specified) from date of sale by OMRON.

OMRON MAKES NO WARRANTY OR REPRESENTATION, EXPRESS OR IMPLIED, REGARDING NON-INFRINGEMENT, MERCHANTABILITY, OR FITNESS FOR PARTICULAR PURPOSE OF THE PRODUCTS. ANY BUYER OR USER ACKNOWLEDGES THAT THE BUYER OR USER ALONE HAS DETERMINED THAT THE PRODUCTS WILL SUITABLY MEET THE REQUIREMENTS OF THEIR INTENDED USE. OMRON DISCLAIMS ALL OTHER WARRANTIES, EXPRESS OR IMPLIED.

LIMITATIONS OF LIABILITY

OMRON SHALL NOT BE RESPONSIBLE FOR SPECIAL, INDIRECT, OR CONSEQUENTIAL DAMAGES, LOSS OF PROFITS OR COMMERCIAL LOSS IN ANY WAY CONNECTED WITH THE PRODUCTS, WHETHER SUCH CLAIM IS BASED ON CONTRACT, WARRANTY, NEGLIGENCE, OR STRICT LIABILITY.

In no event shall the responsibility of OMRON for any act exceed the individual price of the product on which liability is asserted.

IN NO EVENT SHALL OMRON BE RESPONSIBLE FOR WARRANTY, REPAIR, OR OTHER CLAIMS 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 OR REPAIR.

Application Considerations

SUITABILITY FOR USE

OMRON shall not be responsible for conformity with any standards, codes, or regulations that apply to the combination of products in the customer's application or use of the products.

At the customer's request, OMRON will provide applicable third party certification documents identifying ratings and limitations of use that apply to the products. This information by itself is not sufficient for a complete determination of the suitability of the products in combination with the end product, machine, system, or other application or use.

The following are some examples of applications for which particular attention must be given. This is not intended to be an exhaustive list of all possible uses of the products, nor is it intended to imply that the uses listed may be suitable for the products:

- Outdoor use, uses involving potential chemical contamination or electrical interference, or conditions or uses not described in this manual.
- Nuclear 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.
- Systems, machines, and equipment that could present a risk to life or property.

Please know and observe all prohibitions of use applicable to the products.

NEVER USE THE PRODUCTS FOR AN APPLICATION INVOLVING SERIOUS RISK TO LIFE OR PROPERTY WITHOUT ENSURING THAT THE SYSTEM AS A WHOLE HAS BEEN DESIGNED TO ADDRESS THE RISKS, AND THAT THE OMRON PRODUCTS ARE PROPERLY RATED AND INSTALLED FOR THE INTENDED USE WITHIN THE OVERALL EQUIPMENT OR SYSTEM.

PROGRAMMABLE PRODUCTS

OMRON shall not be responsible for the user's programming of a programmable product, or any consequence thereof.

Disclaimers

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 model numbers when published ratings or features are changed, or when significant construction changes are made. However, some specifications of the products may be changed without any notice. When in doubt, special model numbers may be assigned to fix or establish key specifications for your application on your request. Please consult with your OMRON representative at any time to confirm actual specifications of purchased products.

DIMENSIONS AND WEIGHTS

Dimensions and weights are nominal and are not to be used for manufacturing purposes, even when tolerances are shown.

PERFORMANCE DATA

Performance data given in this manual 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 users must correlate it to actual application requirements. Actual performance is subject to the OMRON Warranty and Limitations of Liability.

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

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** 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 Startup 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.

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

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.
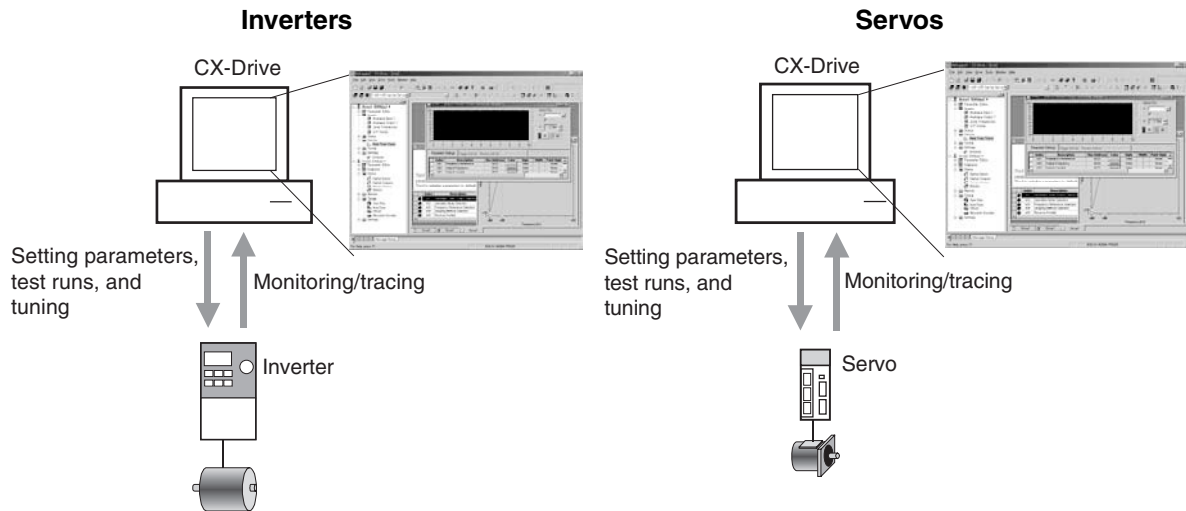
Inverters | **Servos**

1-1-2 Features

Supports Most OMRON Inverters and Servos

The CX-Drive can be used with OMRON's 3G3JV, 3G3MV, and 3G3RV Inverters, as well as OMRON's SMARTSTEP, W-series, and MECHATROLINK-II-compliant (see note) 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.)
Inverters	3G3JV	Supported. RS-232C Communications Unit (3G3JV-PSI232JC) or RS-422/485 Communications Unit (3G3JV-PSI485J) required. Uses Modbus-RTU protocol.	---	---
	3G3MV	Supported. RS-422A/485: Modbus-RTU protocol	Supported. DeviceNet Communications Unit (3G3MV-PDRT2) required.	---
	3G3RV (including version-1 models)	Supported. RS-422A/485: Modbus-RTU protocol	Supported. DeviceNet Communications Unit (3G3RV-PDRT2) required.	---
Servos	SMARTSTEP A Series (R7D-AP)	Supported. RS-232C: Special protocol	---	---
	W Series (R88D-WT)	Supported. RS-232C: Special protocol	---	Supported. MECHATROLINK-II Interface Unit (JUSP-NS115/FNY-NS115) required.
	W Series with MECHA-TROLINK-II (R88D-WN)	---	---	Supported.

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 *Save to File Option* 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 Ver. 2.1 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 Ver. 2.1, which contains the CX-Drive.

Cat. No.	Model number	Manual name	Contents
W463	CXONE-AL☐☐C-EV2/AL☐☐D-EV2	CX-One Ver. 2.1 FA Integrated Tool Package Setup Manual	Provides an overview of the CX-One FA Integrated Tool and installation procedures.

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.

1,2,3...   1. CX-Drive

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

CX-Drive Availability

The CX-Drive must be installed from the CX-One Package. Refer to the following manual for installation procedures for the CX-One Package.

Cat. No.	Model number	Manual name	Contents
W463	CXONE-AL□□C-EV2/AL□□D-EV2	CX-One Ver. 2.1 FA Integrated Tool Package Setup Manual	Provides an overview of the CX-One FA Integrated Tool and installation procedures.
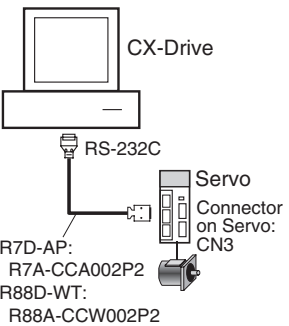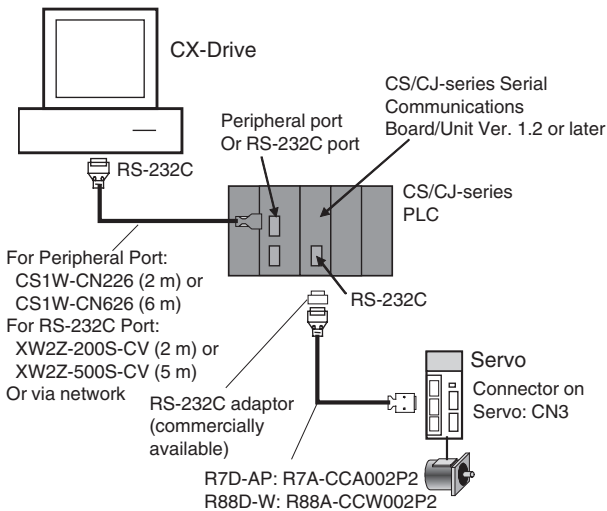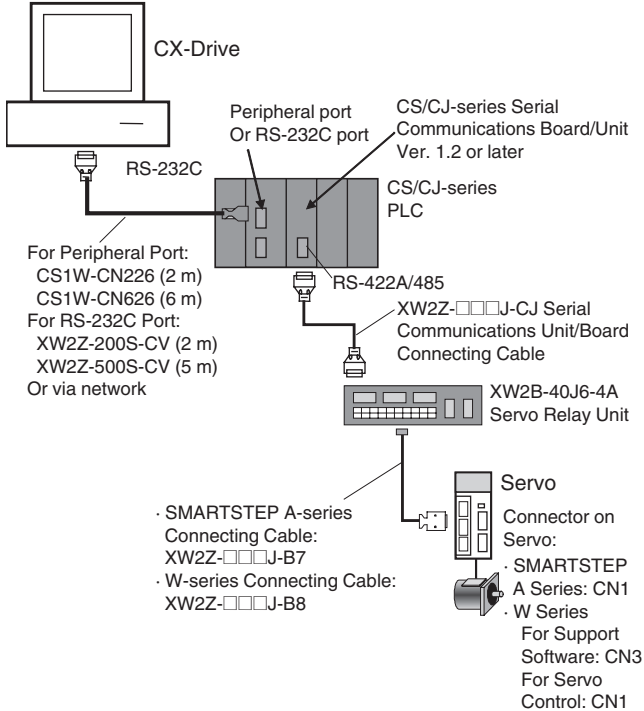
1-3 System Configuration

1-3-1 Inverter Connection

Connection type		Direct serial connection		PLC Serial Communications Board/ Unit connection	
Connection name		**Direct**		**Via PLC (SCU/SCB)**	
Configuration					
Required devices	**3G3JV**	3G3IV-PWV103 Computer-Inverter Connecting Cable and 3G3JV-PSI232JC RS-232C Communications Unit		3G3JV-PSI485J RS-422/485 Communications Unit	CS/CJ-series Serial Communications Board/Unit Ver. 1.2 or later.
	3G3MV	3G3IV-PWV103 Computer-Inverter Connecting Cable	Remove the Digital Operator from the Inverter and connect the cable to the Digital Operator connector.	RS-422/485 communications are built into the Inverter.	**Note** The Serial Gateway Mode is used as the serial communications mode for the RS-422A/485 port.
	3G3RV (including version-1 models)	3G3IV-PWV103 Computer-Inverter Connecting Cable		RS-422/485 communications are built into the Inverter.	

Connection type		PLC DeviceNet connection (via DeviceNet Unit)
Connection name		**Via PLC (DeviceNet)**
Configurations		
Required devices	**3G3JV**	---
	3G3MV	3G3MV-PDRT2 DeviceNet Communications Unit
	3G3RV	3G3RV-PDRT2 DeviceNet Communications Card

1-3-2 Servo Connection

Connection type	Direct serial connection	PLC Serial Communications Board/Unit connection
Connection name	**Direct**	**Via PLC (SCU/SCB)**
Configuration	R7D-AP: R7A-CCA002P2 R88D-WT: R88A-CCW002P2	• Without Servo Relay Unit (operated only with CX-Drive) • With Servo Relay Unit to Control Servo

Connection type		Direct serial connection	PLC Serial Communications Board/Unit connection	
Connection name		**Direct**	**Via PLC (SCU/SCB)**	
Required devices	**SMARTSTEP A Series (R7D-AP)**	R7A-CCA002P2 (2 m)	• R7A-CCA002P2 (2 m) + RS-232C 9-pin adaptor Or • XW2Z-☐☐☐J-CJ Serial Communications Unit/Board Connecting Cable + XW2B-40J6-4A Servo Relay Unit + XW2Z-☐☐☐J-B7 SMARTSTEP A-series Connecting Cable	CS/CJ-series Serial Communications Board/Unit Ver. 1.2 or later **Note** The Serial Gateway Mode is used as the serial communications mode for the RS-232C port.
	W Series (R88D-WT)	R88A-CCW002P2 (2 m)	• R88A-CCW002P2 (2 m) + RS-232C 9-pin adaptor Or • XW2Z-☐☐☐J-CJ Serial Communications Unit/Board Connecting Cable + XW2B-40J6-4A Servo Relay Unit + XW2Z-☐☐☐J-B8 SMARTSTEP A-series Connecting Cable	
	W Series with MECHA-TROLINK-II (R88D-WN)	---	---	

Connection type		PLC (MCH/NCF Unit) MECHATROLINK-II connection
Connection name		**Via PLC (MCH/MECHATROLINK-II)** **Via PLC (NCF/MECHATROLINK-II)**
Configuration		
Required devices	**SMARTSTEP A Series: R7D-AP**	---
	W Series: R88D-WT	MECHATROLINK-II Cable MECHATROLINK-II Interface Unit (JUSP-NS115 or FNY-NS115)
	W Series with MECHA-TROLINK-II: R88D-WN	MECHATROLINK-II Cable

⚠ **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.

1-4   Overall Operating Procedure

1-4-1   Inverters

No.	Step			Operations
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).
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.	Method 1 Detect the drives connected online automatically and create drive file for the desired drive.		Select **File - Autodetect** from the menu bar.
		Method 2 Create a new drive file on the computer without a drive.	Select *Inverter* as the drive type and then select one of the following series. • 3G3JV • 3G3MV • 3G3RV (See note.)	Select **File - New** from the menu bar and then select the drive type in the New Drive Dialog Box. **Note** For version 1 of the 3G3RV, click the **Settings** Button and select **-V1** for the **Specification**.
			Select one of the following connection types. • Direct • Via PLC (SCU/SCB) • Via PLC (DeviceNet)	Select the connection type in the New Drive Dialog Box.
5	Edit the parameters.	Edit the parameters for the Inverter. Edit parameters in numeric order or by functional category.		In the Workspace, double-click **Parameter edit** and then the required categories in the drive file.
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	Perform the following: Forward/reverse operation, stopping, frequency references, acceleration/deceleration, S-curve display, and dwelling.	Double-click **Test Run** in the Workspace.
		Auto Tune (3G3RV only)	Enter the motor parameters, perform auto-tuning, and then save the new parameters.	Double-click **Auto Tune** in the Workspace.
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…**

1-4-2   Servos

No.	Step			Operations
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).
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.	Method 1 Detect the drives connected online automatically and create drive file for the desired drive.		Select **File - Autodetect** from the menu bar.
		Method 2 Create a new drive file on the computer without a drive.	Select Servo as in the drive type and then select one of the following series. • R7D-AP (SMARTSTEP A Series) • R88D-WN (MECHATROLINK-II-compliant W Series) • R88D-WT (W Series)	Select **File - New** from the menu bar and then select the drive type in the New Drive Dialog Box.
			Select one of the following connection types. • Direct • Via PLC (SCU/SCB) • Via PLC (MCH/MLII) • Via PLC (NCF/MLII)	Select the connection type in the New Drive Dialog Box.
5	Edit the parameters.	Edit the parameters for the Servo. Edit parameters in numeric order or by functional category.		In the Workspace, double-click **Parameter edit** and then the required categories in the drive file.
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 (R7D-AP or R88D-WT only)	Perform the following: Jogging, origin searches, forward/reverse operation, stopping, and speed control.	Double-click **Test Run** in the Workspace.
		Auto Tune (R7D-AP or R88D-WT only)	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.	Double-click **Auto Tune** in the Workspace.
		Offset (R7D-AP or R88D-WT only)	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.	Double-click **Offset** in the Workspace.
		Absolute Encoder Setting (R88D-WT only)	An absolute encoder and multi-turn limit can be set.	Double-click **Absolute Encoder** in the Workspace.
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**...

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 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.
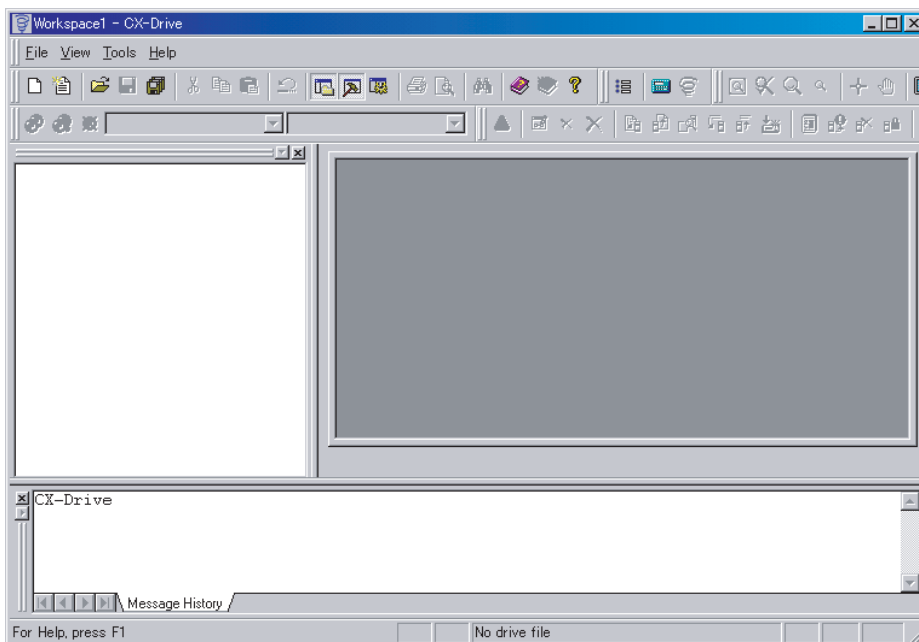
2-2 Creating New Drive Files

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.

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

<u>Serial Direct Connection</u>

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

The Autodetect Dialog Box will be displayed and automatic detection will start.
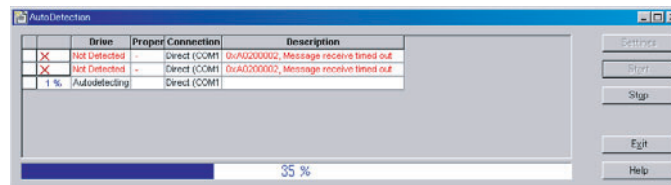
The detected drives will be displayed

The detected drives are displayed in a list.
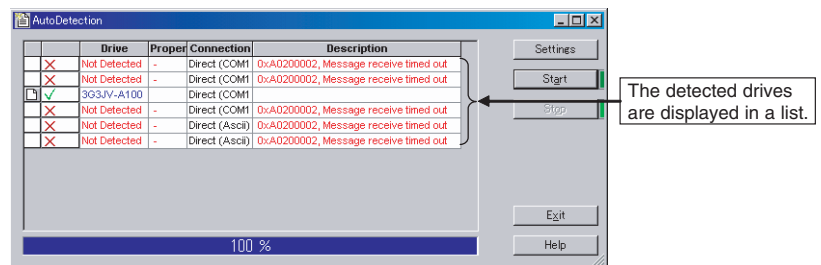
2.   Select the drive from the list to create a new drive file in the Workspace.

Automatically registered in the Workspace.
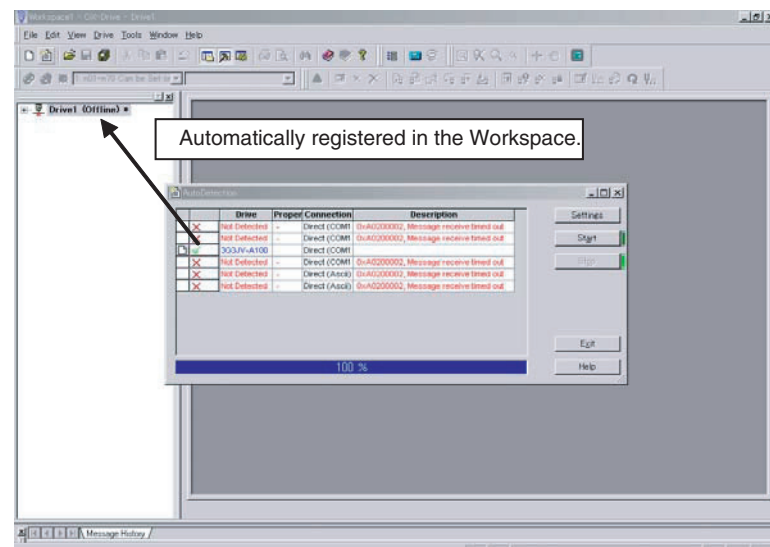
Other Connections

1,2,3...   1.   Select *Tool - Options*. Alternately click the **Settings** Button in the Autodetection Dialog Box
The Options Dialog Box will be displayed.
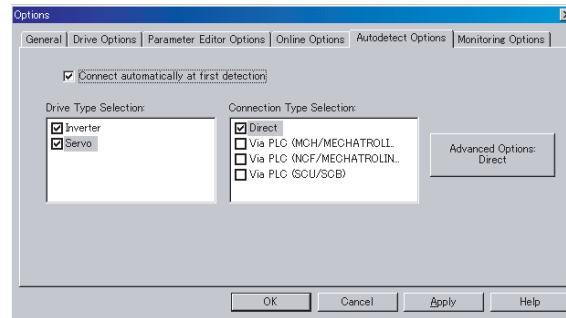
2.   Click the **Autodetect Options** Tab and then select one or more connection types other than *Direct*.
For Inverters:
• Via PLC (DeviceNet)
• Via PLC (SCU/SCB)
For Servos:
• Via PLC (MCH/MECHATROLINK II)
• Via PLC (NCF/MECHATROLINK II)
• Via PLC (SCU/SCB)

3.   Click the **OK** Button.

4.   Select *File - Autodetect.*

5.   Click the **Start** Button in the Autodetection Dialog Box. The rest of the procedure is the same as for a direct serial connection.

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

Select *File - New*. The following New Drive Dialog Box will be displayed.
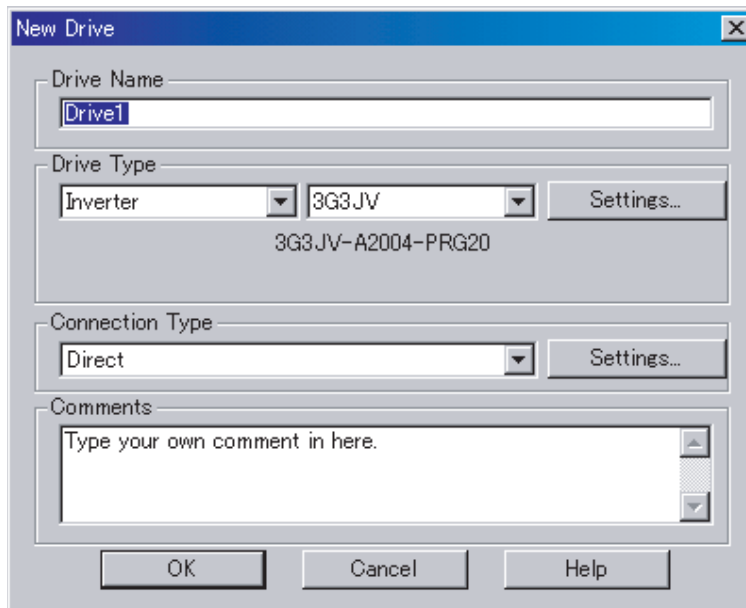
Drive Name
Any name may be input for the drive name. The default name is "Drive" plus a sequential number.

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.

- 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-AP: SMARTSTEP A Series
- R88D-WN: MECHATROLINK-II W Series
- R88D-WT: W Series

Detailed Drive Settings

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

Inverters

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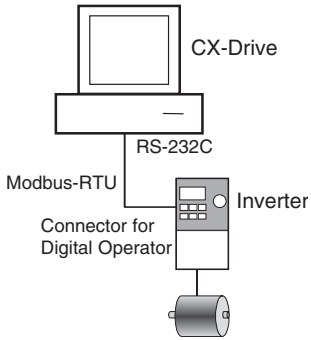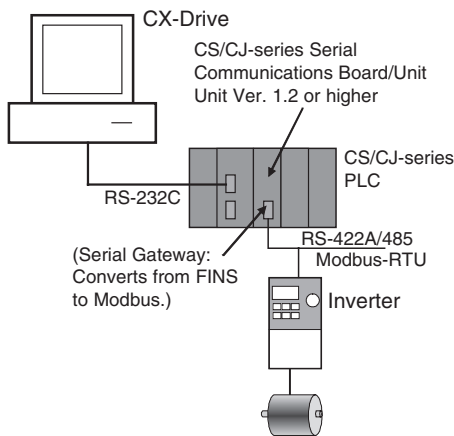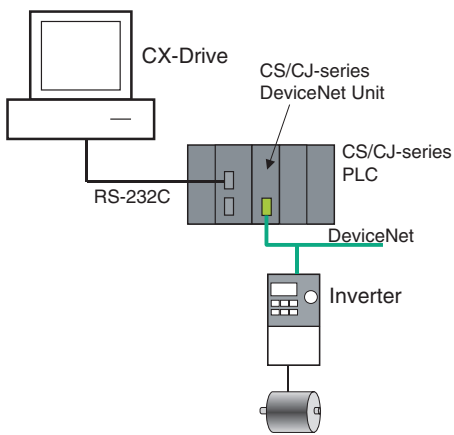
Servo Series		R7D-AP	R88D-WN	R88D-WT
Dialog box				
Drive Type	Maximum Motor Capacity	A3 (30 W) to 08 (750 W)	A5 (50 W) to 30 (3 kW)	A3 (30 W) to 150 (15 kW)
	Voltage Class	H (200 V), L (100 V)	H (200 V), L (100 V)	H (200 V), HF (400 V), HH (200 V), HL (150 V)
	Specifications	---	ML2	---

Connection Type
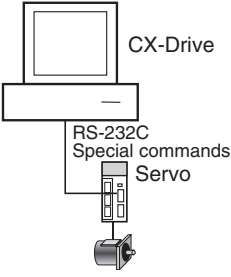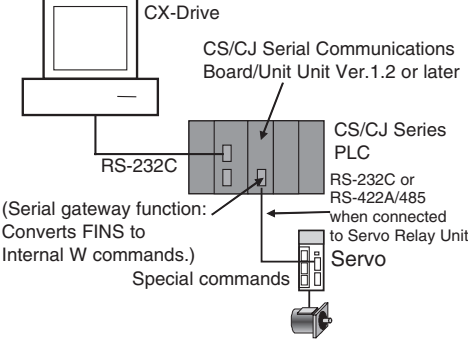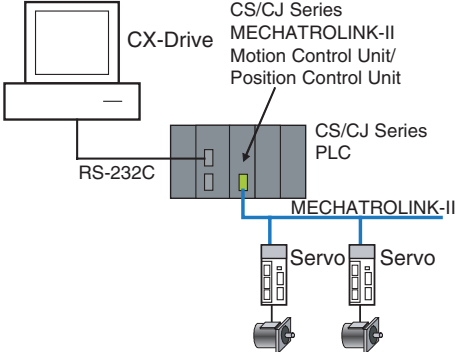
Connection Type Selection

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

Inverters

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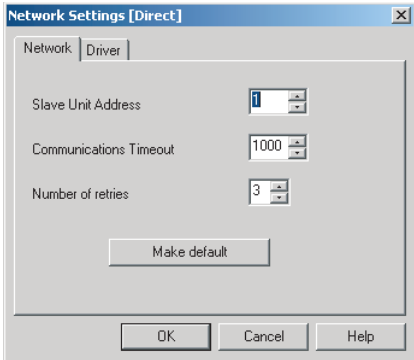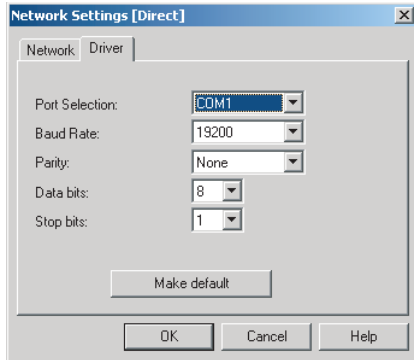
Servos

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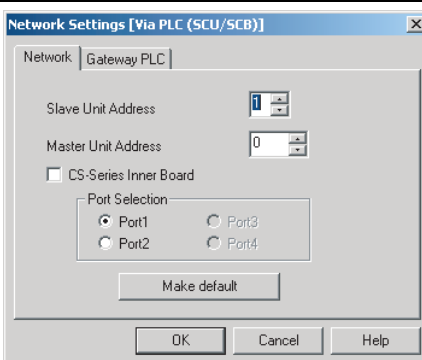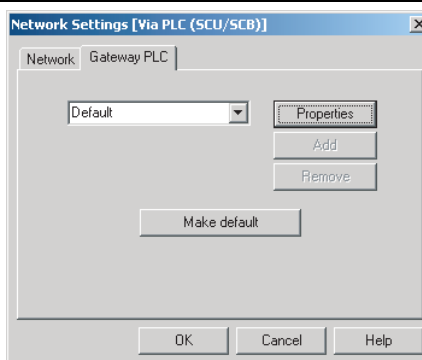
Network Settings

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	• 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	• 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	• 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	• 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

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

Item	Network Tab Page	Gateway PLC Tab Page
Dialog box		
Inverter	• 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 *CS-Series Inner Board* Option (Serial Communications Board). • Port Selection: Port 1 or Port 2	Click the **Properties** Button to set the PLC (with a Serial Communications Unit/Board) to use as the gateway.
Servo	• 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 *CS-Series Inner Board* 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
• Slave Unit Address: 0 to 63 (DeviceNet slave address) • Master Unit Address: 0 to 15 (DeviceNet unit number)	Click the **Properties** Button to set the PLC (with a DeviceNet Unit) to use as the gateway.

Via PLC (MCH/MECHATROLINK-II) or
Via PLC (NCF/MECHATROLINK-II) (R88D-WN)

Network Tab Page	Gateway PLC Tab Page
• Axis Number: 1 to 32 for MCH or 1 to 16 for NCF • Master Unit Address: 0 to 15 (MCH or NCF unit number)	Click the **Properties** Button to set the PLC (with a MCH or NCF Unit) to use as the gateway.

2-3 User Interface

2-3-1 Window Structure
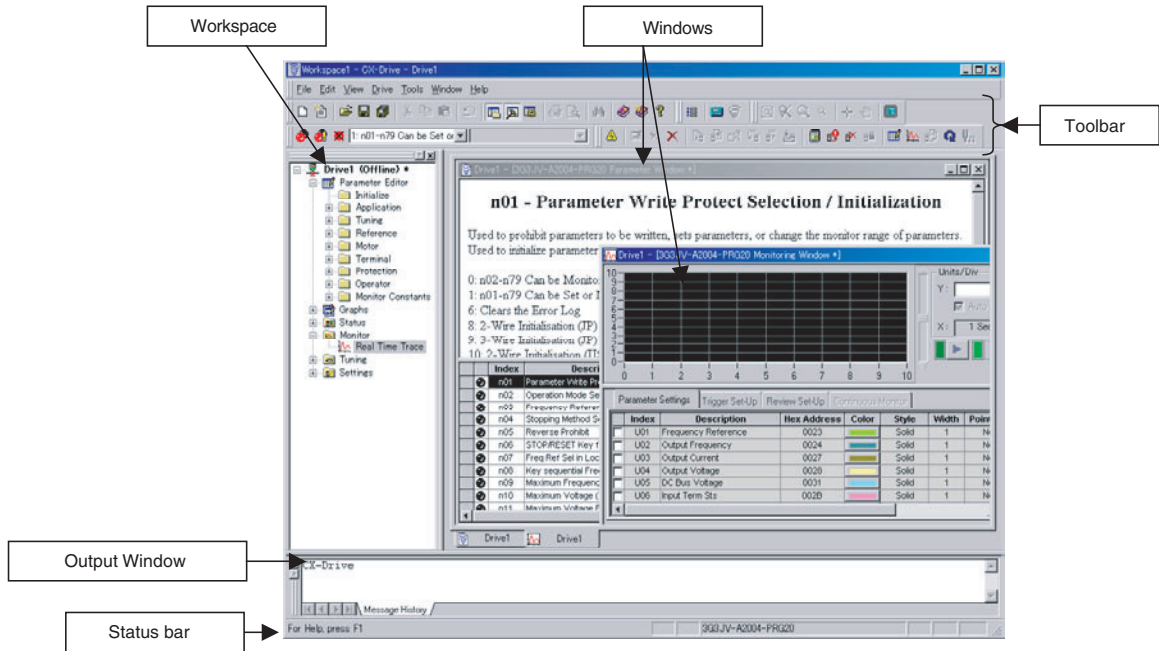
2-3-2 Workspace

Folder	Contents	Inverters			Servos		
		3G3JV	**3G3MV**	**3G3RV**	**R7D-AP**	**R88D-WN**	**R88D-WT**
Parameter Editor	Edits the parameters of Inverters or Servos.	OK	OK	OK	OK	OK	OK
Graphs	Displays parameters graphically.	OK	OK	OK	---	---	---
Diagrams	Displays parameters in block diagrams.	---	OK	OK	---	---	OK
Status	Displays online drive status.	OK	OK	OK	OK	---	OK (See note.)
Monitor	Enables realtime traces and other monitoring of online drives.	OK	OK	OK	OK	---	OK (See note.)
Tuning	Enables test runs and auto-tuning of online drives.	OK	OK	OK	OK	---	OK (See note.)
Settings	Enables initializing online drives.	OK	OK	OK	OK	---	OK

Note These functions are not supported when communicating via MECHA-TROLINK II.

Inverters

Folder	3G3JV	3G3MV	3G3RV
Parameter Editor	• Initialize • Application • Tuning • Reference • Motor • Terminal • Protection • Operator • Monitor Constants	• Initialize • Application • Tuning • Reference • Motor • Options • Terminal • Protection • Operator • Up 2/Down 2 • Monitor Constants	• Initialize • Application • Tuning • Reference • Motor • Options • Terminal • Protection • Special Adjustment • Operator • Motor Auto-tuning • Monitor Constants
Graphs	• Analogue Input 1 • Analogue Output 1 • Jump Frequencies • V/F Profile	• Analogue Output 1 • Frequency Reference Input • Jump Frequencies • Multifunction Analogue Current Input • Multifunction Analogue Voltage Input • V/F Profile	• Analogue Input 1 • Analogue Input 2 • Analogue Output 1 • Analogue Output 2 • Jump Frequencies • V/F Profile • V/F Profile Motor 2
Diagrams	---	• PID Control Loop • PID Target Value • PID Feedback Value	• PID Control Loop
Status	• Digital Inputs • Digital Outputs • Inverter Status 1 • Status Signal • Alarms	• Digital Inputs • Digital Outputs • Inverter Status 1 • Status Signal • Alarms	• Digital Inputs • Digital Outputs • Inverter Status 1 • Status Signal • Alarms
Monitor	• Real Time Trace	• Real Time Trace	• Real Time Trace
Tuning	• Test Run	• Test Run	• Test Run • Auto-tune
Settings	• Initialize	• Initialize	• Initialize • Password Authorization

Servos

| Folder	R7D-AP	R88D-WN	R88D-WT
Parameter Editor	• Other Constants • Function Selection Constants • Gain Related Constants • Position Related Constants • Speed Related Constants • Torque Related Constants • Sequence Related Constants	• 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	• Other Constants • Function Selection Constants • Gain Related Constants • Position Related Constants • Speed Related Constants • Torque Related Constants • Sequence Related Constant
Diagrams	---	---	• Position Block Diagram • Speed Block Diagram • Torque Block Diagram
Status	• Input signals • Output signals • Motion Status • Alarms	---	• Input signals • Output signals • Motion Status • Alarms
Monitor	• Real Time Trace • Data Trace	---	• Real Time Trace • Data Trace
Tuning	• Test Run • Auto Tune • Offset	---	• Test Run • Auto Tune • Offset • Absolute Encoder
Settings	• Initialize • Password Authorization • Product Information	---	• Initialize • Module Detection Clear • Password Authorization • Product Information

2-3-3   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 Operation		Shows or hides the motor operation window.	OK	OK	
	Zoom		Zooms in and out using a rectangle, initial setting, etc.	OK	OK	
	Pan Mode		Actives the full scroll mode.	OK	OK	
	Cursor Mode		Actives 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	
	Real Time Trace		Displays the current values of the selected parameters.	OK	OK	

Menu	Submenu/Command	Contents	Inverter	Servo	Icon
Drive	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	

2-4 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.
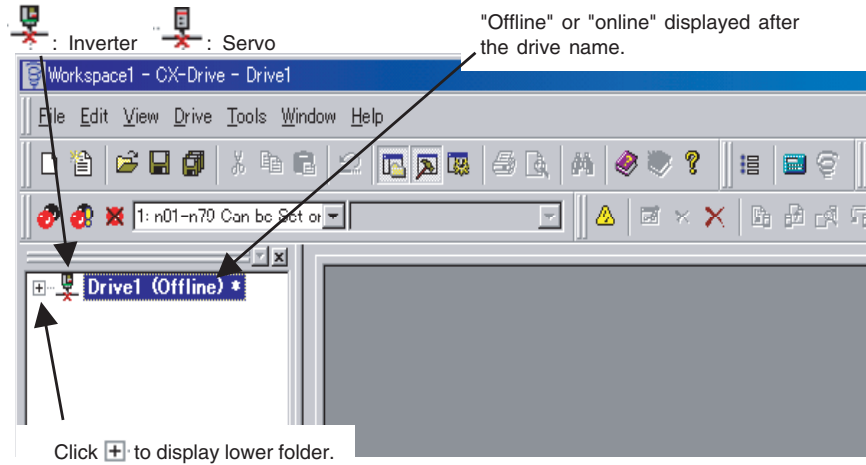
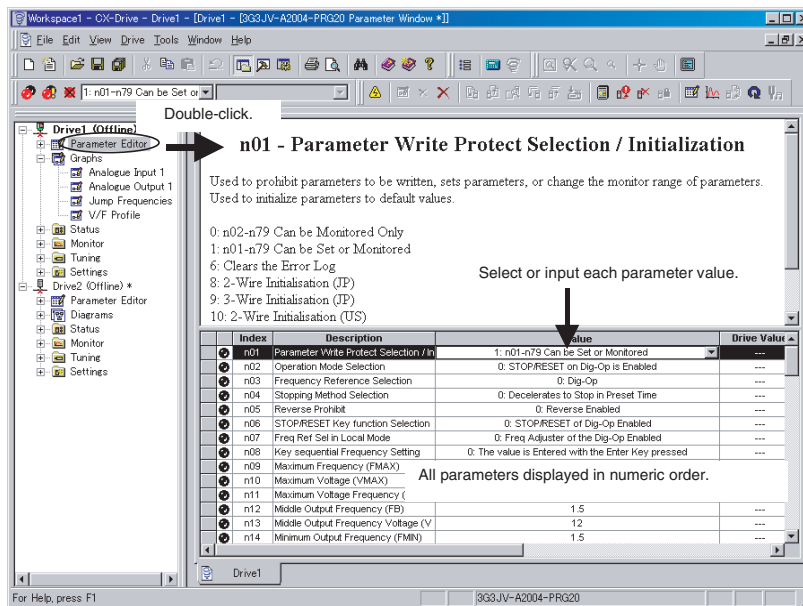Click ⊞ at the left of the drive name to display the following tree.
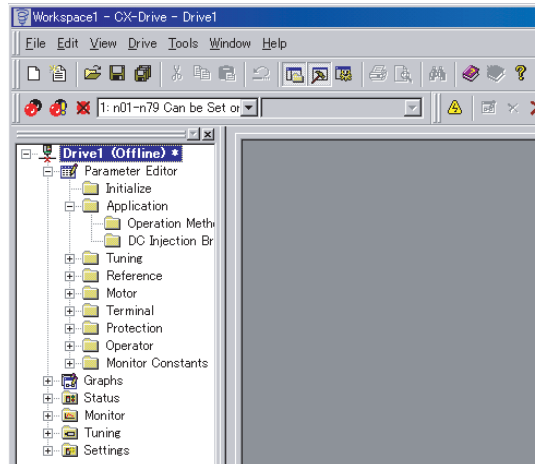
2-4-1 Editing Parameters

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.
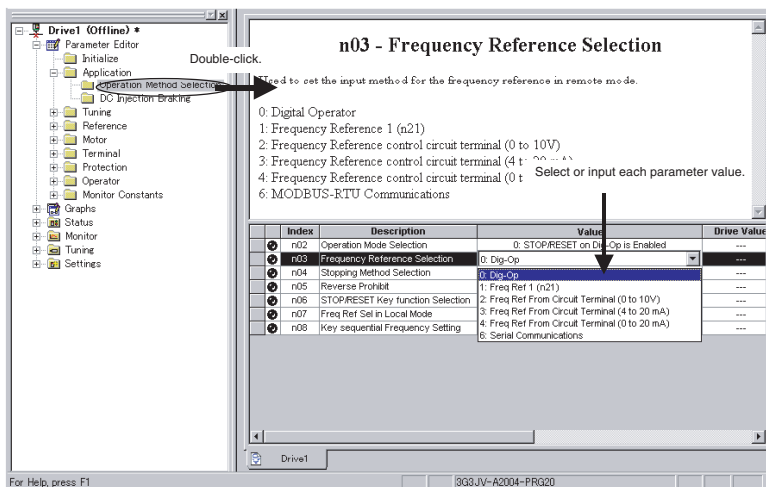
Comparing Drive and Parameter Data

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.

2-4-2 Graphs

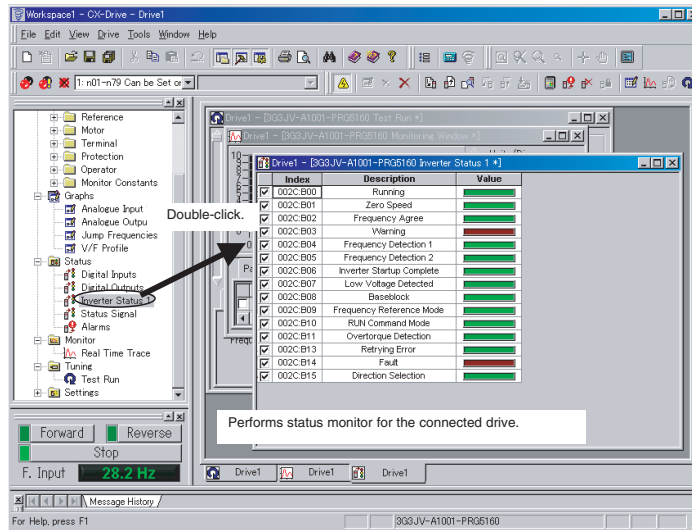Parameters can be displayed in graphic form for review (for Inverters only).
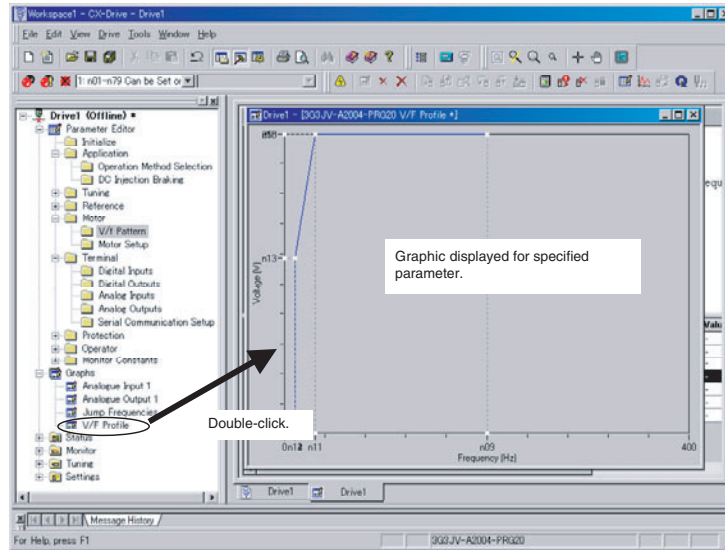
2-4-3 Diagrams

Parameters can be displayed in block diagrams for relevant parameters. Inverters support PID block diagrams, and Servos support position, speed and torque block diagrams.
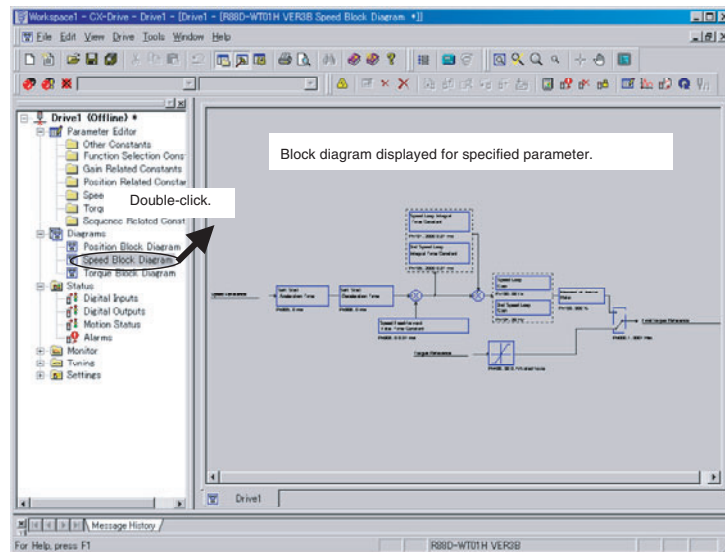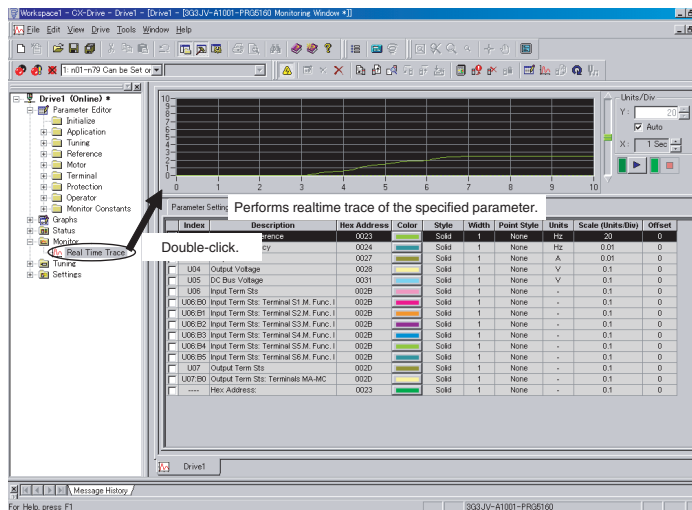
2-4-4 Status Displays

The status of the online drive can be displayed.

2-4-5 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.

2-4-6 Tuning

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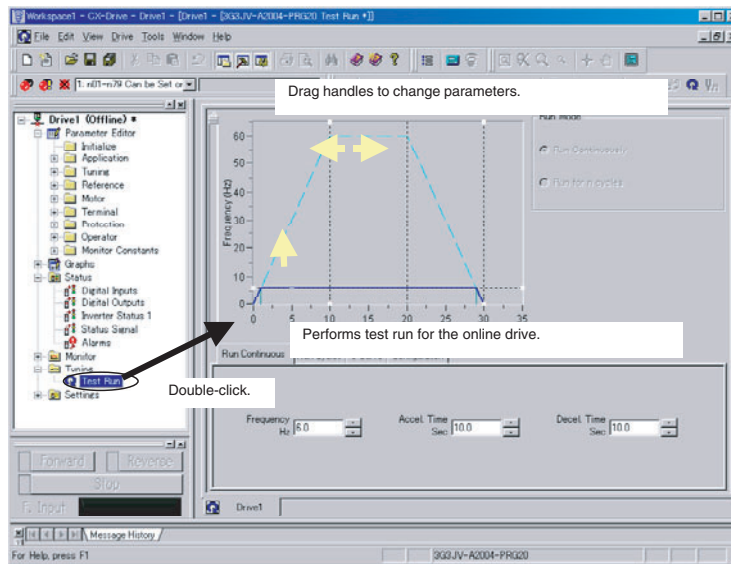
For Servos, auto-tuning, motor current detect offset adjustments, and absolute multi-turn limit settings are also supported.

2-4-7 Settings

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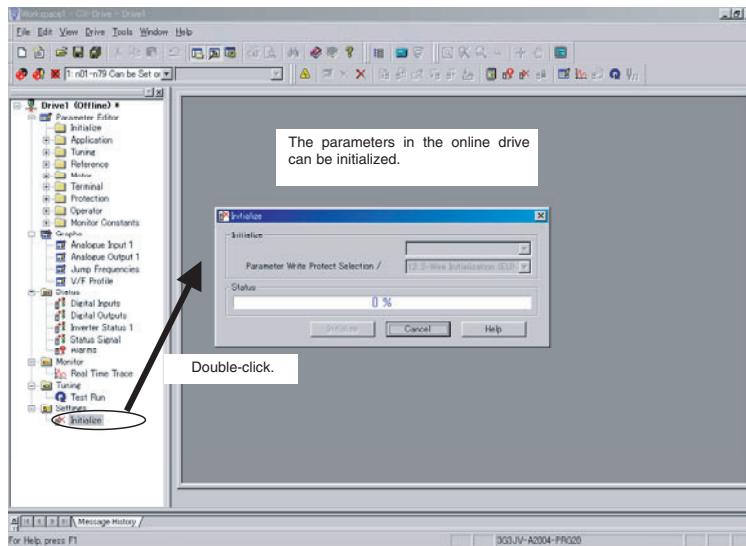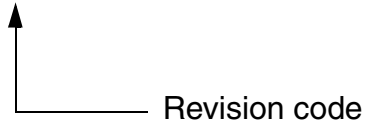

Also refer to the *CX-Drive Online Help* for operating procedures and functions.

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-E1-05

Revision code

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).

OMRON