**Compatible Modules:**

<table>
<thead>
<tr>
<th>Model Code</th>
<th>Model Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>F3NC32-0N</td>
<td>Positioning Module (with Pulse Output)</td>
</tr>
<tr>
<td>F3NC34-0N</td>
<td>Positioning Module (with Pulse Output)</td>
</tr>
</tbody>
</table>
Applicable Product

Range-Free Multi-Controller FA-M3
- Model Code: SF662-MCW
- Model Name: FA-M3 ToolBox for Positioning Modules (for F3NC32/34)

The document number and document model code for this manual are given below. Refer to the document number in all communications; also refer to the document number or the document model code when purchasing additional copies of this manual.

- Document Number: IM 34M06Q31-01E
- Document Model Code: DOCIM
Important

■ About This Manual

- This Manual should be passed on to the end user.
- Before using the controller, read this manual thoroughly to have a clear understanding of the controller.
- This manual explains the functions of this product, but there is no guarantee that they will suit the particular purpose of the user.
- Under absolutely no circumstances may the contents of this manual be transcribed or copied, in part or in whole, without permission.
- The contents of this manual are subject to change without prior notice.
- Every effort has been made to ensure accuracy in the preparation of this manual. However, should any errors or omissions come to the attention of the user, please contact the nearest Yokogawa Electric representative or sales office.

■ Symbols Related to Safety

⚠️

**Danger.** This symbol on the product indicates that the operator must follow the instructions laid out in this user's manual to avoid the risk of personnel injuries, fatalities, or damage to the instrument. Where indicated by this symbol, the manual describes what special care the operator must exercise to prevent electrical shock or other dangers that may result in injury or the loss of life.

.timezone="30°E"

Protective Ground Terminal. Before using the instrument, be sure to ground this terminal.

.function="ground"

Function Ground Terminal. Before using the instrument, be sure to ground this terminal.

.frequency="alternate"

Alternating current. Indicates alternating current.

.intValue="direct"

Direct current. Indicates direct current.
The following symbols are used only in the user's manual.

**WARNING**

Indicates a “Warning”.
Draws attention to information essential to prevent hardware damage, software damage or system failure.

**CAUTION**

Indicates a “Caution”.
Draws attention to information essential to the understanding of operation and functions.

**TIP**

Indicates a “TIP”.
Gives information that complements the present topic.

**SEE ALSO**

Indicates a “SEE ALSO” reference.
Identifies a source to which to refer.

### Safety Precautions when Using/Maintaining the Product

- For the protection and safe use of the product and the system controlled by it, be sure to follow the instructions and precautions on safety stated in this manual whenever handling the product. Take special note that if you handle the product in a manner other than prescribed in these instructions, the protection feature of the product may be damaged or impaired. In such cases, Yokogawa cannot guarantee the quality, performance, function and safety of the product.

- When installing protection and/or safety circuits such as lightning protection devices and equipment for the product and control system as well as designing or installing separate protection and/or safety circuits for fool-proof design and fail-safe design of processes and lines using the product and the system controlled by it, the user should implement it using devices and equipment, additional to this product.

- If component parts or consumable are to be replaced, be sure to use parts specified by the company.

- This product is not designed or manufactured to be used in critical applications which directly affect or threaten human lives and safety — such as nuclear power equipment, devices using radioactivity, railway facilities, aviation equipment, shipboard equipment, aviation facilities or medical equipment. If so used, it is the user’s responsibility to include in the system additional equipment and devices that ensure personnel safety.

- Do not attempt to modify the product.

- In order to prevent electrical shock, turn off all the power sources before connecting wires, etc.

- This product is classified as Class A for use in industrial environments. If used in a residential environment, it may cause electromagnetic interference (EMI). In such situations, it is the user’s responsibility to adopt the necessary measures against EMI.
Exemption from Responsibility

- Yokogawa Electric Corporation (hereinafter simply referred to as Yokogawa Electric) makes no warranties regarding the product except those stated in the WARRANTY that is provided separately.
- Yokogawa Electric assumes no liability to any party for any loss or damage, direct or indirect, caused by the use or any unpredictable defect of the product.

Software Supplied by the Company

- Yokogawa Electric makes no other warranties expressed or implied except as provided in its warranty clause for software supplied by the company.
- Use the software with one computer only.
- You must purchase another copy of the software for use with each additional computer.
- Copying the software for any purposes other than backup is strictly prohibited.
- Store the original media that contain the software in a safe place.
- Reverse engineering, such as decompiling of the software, is strictly prohibited.
- Under absolutely no circumstances may the software supplied by Yokogawa Electric be transferred, exchanged, or sublet or leased, in part or as a whole, for use by any third party without prior permission by Yokogawa Electric.
General Requirements for Using the FA-M3 Controller

- Set the product in a location that fulfills the following requirements:
  - Where the product will not be exposed to direct sunlight, and where the operating surrounding air temperature is from 0°C to 55°C (32°F to 131°F).
  - There are modules that must be used in an environment where the operating surrounding air temperature is in a range smaller than 0°C to 55°C (32°F to 131°F). Refer to hardware user’s manual or the applicable user’s manual. In case of attaching such a module, the entire system’s operating surrounding air temperature is limited to the module’s individual operating surrounding air temperature.
  - Where the relative humidity is from 10 to 90%.
  - In places where there is a chance of condensation, use a space heater or the like to constantly keep the product warm and prevent condensation.
  - For use in Pollution Degree 2 Environment.
  - Where there are no corrosive or flammable gases.
  - Where the product will not be exposed to mechanical vibration or shock that exceed specifications.
  - Where there is no chance the product may be exposed to radioactivity.

- Use the correct types of wire for external wiring:
  - USE COPPER CONDUCTORS ONLY.
  - Use conductors with temperature ratings greater than 75°C.

- Securely tighten screws:
  - Securely tighten module mounting screws and terminal screws to avoid problems such as faulty operation.
  - Tighten terminal block screws with the correct tightening torque. Refer to the hardware user’s manual or the applicable user’s manual for the appropriate tightening torque.

- Securely lock connecting cables:
  - Securely lock the connectors of cables, and check them thoroughly before turning on the power.

- Interlock with emergency-stop circuitry using external relays:
  - Equipment incorporating the FA-M3 controller must be furnished with emergency-stop circuitry that uses external relays. This circuitry should be set up to interlock correctly with controller status (stop/run).

- Ground for low impedance:
  - For safety reasons, connect the [FG] grounding terminal to a Japanese Industrial Standards (JIS) Class D (earlier called Class 3) Ground. For compliance to CE Marking, use braided or other wires that can ensure low impedance even at high frequencies for grounding.

  *1 Japanese Industrial Standard (JIS) Class D Ground means grounding resistance of 100 Ω max.
Configure and route cables with noise control considerations:
- Perform installation and wiring that segregates system parts that may likely become noise sources and system parts that are susceptible to noise. Segregation can be achieved by measures such as segregating by distance, installing a filter or segregating the grounding system.

Configure for CE Marking Conformance:
- For compliance with CE Marking, perform installation and cable routing according to the description on compliance to CE Marking in the “Hardware Manual”.

We recommend that you stock up on maintenance parts:
- We recommend that you stock up on maintenance parts, including spare modules, in advance.
- Preventive maintenance (replacement of the module or its battery) is required for using the module beyond 10 years. For enquiries on battery replacement service (for purchase), contact your nearest Yokogawa Electric representative or sales office. (The module has a built-in lithium battery. Lithium batteries may exhibit decreased voltage, and in rare cases, leakage problems after 10 years.)

Discharge static electricity before touching the system:
- Because static charge can accumulate in dry conditions, first touch grounded metal to discharge any static electricity before touching the system.

Wipe off dirt with a soft cloth:
- Gently wipe off dirt on the product's surfaces with a soft cloth.
- If you soak the cloth in water or a neutral detergent, tightly wring it out before wiping the product.
  Letting water enter the module interior can cause malfunctions.
- Do not use volatile solvents such as benzine or paint thinner or chemicals for cleaning, as they may cause deformity, discoloration, or malfunctioning.

Avoid storing the FA-M3 controller in places with high temperature or humidity:
- Since the CPU module has a built-in battery, avoid storage in places with high temperature or humidity.
- Since the service life of the battery is drastically reduced by exposure to high temperatures, take special care (storage surrounding air temperature should be from –20°C to 75°C).
- There is a built-in lithium battery in a CPU module and temperature control module which serves as backup power supply for programs, device information and configuration information. The service life of this battery is more than 10 years in standby mode at room temperature. Take note that the service life of the battery may be shortened when installed or stored at locations of extreme low or high temperatures. Therefore, we recommend that modules with built-in batteries be stored at room temperature.

Always turn off the power before installing or removing modules:
- Failing to turn off the power supply when installing or removing modules, may result in damage.
Do not touch components in the module:
- In some modules you can remove the right-side cover and install ROM packs or change switch settings. While doing this, do not touch any components on the printed-circuit board, otherwise components may be damaged and modules may fail to work.

Do not use unused terminals:
- Do not connect wires to unused terminals on a terminal block or in a connector. Doing so may adversely affect the functions of the module.

Use the following power source:
- Use only power supply module F3PU□□-□□ in FA-M3 Controller for supplying power input for control circuit connection.
- If using this product as a UL-approved product, for the external power supply, use a limited voltage / current circuit power source or a Class 2 power source.

Refer to the user’s manual before connecting wires:
- Refer to the hardware user’s manual or the applicable user’s manual for external wiring drawing.
- Refer to “A3.6.5 Connecting Output Devices” in the hardware user’s manual before connecting the wiring for the output signal.
- Refer to “A3.5.4 Grounding Procedure” in the hardware user’s manual for attaching the grounding wiring.
Waste Electrical and Electronic Equipment

Waste Electrical and Electronic Equipment (WEEE), Directive 2002/96/EC
(This directive is only valid in the EU.)

This product complies with the WEEE Directive (2002/96/EC) marking requirement. The following marking indicates that you must not discard this electrical/electronic product in domestic household waste.

Product Category
With reference to the equipment types in the WEEE directive Annex 1, this product is classified as a “Monitoring and Control instrumentation” product.
Do not dispose in domestic household waste.
When disposing products in the EU, contact your local Yokogawa Europe B. V. office.

How to Discard Batteries

The following description on DIRECTIVE 2006/66/EC (hereinafter referred to as the EU new directive on batteries) is valid only in the European Union.

Some models of this product contain batteries that cannot be removed by the user. Make sure to dispose of the batteries along with the product.

Do not dispose in domestic household waste.
When disposing products in the EU, contact your local Yokogawa Europe B. V. office.

Battery type: Lithium battery

Note: The symbol above means that the battery must be collected separately as specified in Annex II of the EU new directive on batteries.
Introduction

■ Overview of the Manual

This is the user manual for the FA-M3 ToolBox for Positioning Modules (for F3NC32/34) (abbreviated simply as ToolBox in this manual) software. It describes how to set up parameters of the positioning modules and pattern operation, as well as how to perform action tests, action monitoring and debugging.

For enquiries, please contact the nearest Yokogawa Electric representative or sales office.

We recommend using this manual together with the operation manuals of your computer or printer, as required.

■ Structure of the Manual

This manual consists of three parts: A, B and C.

● Part A: Startup Manual

Part A describes how to install the ToolBox software on a personal computer, use the online manual and connect to the FA-M3.

● Part B: Operation Manual

Part B describes how to edit a project with ToolBox. In particular, it describes how to set up the parameters of positioning modules, perform action testing and monitoring of positioning modules, as well as download data to, upload data from or compare data with positioning modules.

● Part C: Reference Guide

Part C lists certain limitations of ToolBox and describes each parameter.
# How to Read This Manual

Read the “Introduction” and “How to Read This Manual” section of this manual, as well as the “FA-M3 ToolBox Manual” (IM34M06Q30-01E) carefully before attempting to use ToolBox.

The “FA-M3 ToolBox Manual” describes basic operations and general editing functions of ToolBox, applicable to other advanced-function modules. This manual describes how to operate and setup data in ToolBox for Positioning Modules.

The content is structured so that each chapter or section in Part A and Part B can be read independently to understand the detailed specifications of ToolBox.

---

## TIP

The term “ToolBox” as used in this manual, unless otherwise stated, refers to the FA-M3 ToolBox for Positioning Modules, while the term “ToolBox” or “setup tool” as used in the FA-M3 ToolBox Manual refers to FA-M3 ToolBox.

---

# Notation

### Notation for Windows Screens and Operation

Items in initial Caps denote symbols, names and window names.

Example: ToolBox, Local Device

Bracketed items denote menu bar items, dialog box fields, commands, and buttons.

Example: Select [File]-[New] from the menu bar.
This means to click [File] on the menu bar, followed by [New] on the pull-down menu.

### Representations in ToolBox Figures and Screens

The screen examples given in this manual essentially assumes a Windows XP operating environment.

Icons and application names may differ in other windows operating environments such as Windows 2000, Windows Vista and Windows 7.

Some figures in this manual may, for reasons of convenience, be emphasized or simplified, or parts of it may be omitted. Some screen images in this manual may differ from actual screens due to differences in the operating machine environment.

### Function Keys and Shortcut Keys

In addition to using a mouse, you can operate the ToolBox menus using function keys and shortcut keys.

### See Also

For information on the function and shortcut keys, see:
Section B.1.3, “ToolBox Operation Commands” of the “FA-M3 ToolBox Manual”. 
Other Instruction Manuals

- For information on the Positioning Modules, see:
  ToolBox is designed for use with the F3NC32-0N and F3NC34-0N Positioning Modules (with pulse output).
  Always have the following Positioning Modules user's guide handy when using the ToolBox software.

<table>
<thead>
<tr>
<th>Document Name</th>
<th>Document Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positioning Modules (with Pulse Output)</td>
<td>IM34M06H56-02E</td>
</tr>
</tbody>
</table>

- For information on functions of sequence CPU modules, see:

<table>
<thead>
<tr>
<th>Document Name</th>
<th>Document Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sequence CPU – Functions (for F3SP28-3N/3S, F3SP38-6N/6S, F3SP53-4H/4S, F3SP58-6H/6S, F3SP59-7S)</td>
<td>IM34M06P13-01E</td>
</tr>
<tr>
<td>Sequence CPU – Functions (for F3SP66-4S, F3SP67-6S)</td>
<td>IM34M06P14-01E</td>
</tr>
<tr>
<td>Sequence CPU – Network Functions (for F3SP66-4S, F3SP67-6S)</td>
<td>IM34M06P14-02E</td>
</tr>
<tr>
<td>Sequence CPU – Functions (for F3SP71-4N/4S, F3SP76-7N/7S)</td>
<td>IM34M06P15-01E</td>
</tr>
<tr>
<td>Sequence CPU – Network Functions (for F3SP71-4N/4S, F3SP76-7N/7S)</td>
<td>IM34M06P15-02E</td>
</tr>
<tr>
<td>Sequence CPU Modules – Functions (for F3SP21, F3SP25 and F3SP35)</td>
<td>IM34M06P12-02E</td>
</tr>
</tbody>
</table>

- For information on instructions of sequence CPU modules, see:

<table>
<thead>
<tr>
<th>Document Name</th>
<th>Document Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sequence CPU – Instructions</td>
<td>IM34M06P12-03E</td>
</tr>
</tbody>
</table>

- For FA-M3 specifications and configurations*¹, installation and wiring, test run, maintenance, inspection and system-wide module installation restrictions:

*¹: For hardware other than power supply modules, base modules, input/output modules, cables and terminal units, refer to the relevant product manuals for detailed specifications.

<table>
<thead>
<tr>
<th>Document Name</th>
<th>Document Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hardware Manual</td>
<td>IM34M06C11-01E</td>
</tr>
</tbody>
</table>
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CONTENTS

Applicable Product........................................................................................................i
Important .......................................................................................................................... ii
Introduction....................................................................................................................... ix
Copyrights and Trademarks ............................................................................................. xii

Part A  Startup Manual
A1  Product Overview...................................................................................................... A1-1
   A1.1  Overview and Features ..................................................................................... A1-1
   A1.2  New and Updated Functions ............................................................................. A1-3
      A1.2.1  Differences between ToolBox for Positioning Modules R2 and R1 ................ A1-3
      A1.2.2  Differences between ToolBox for Positioning Modules R3 and R2 ................. A1-4
      A1.2.3  Differences between ToolBox for Positioning Modules R4 and R3 ................. A1-5
A2  Preparing ToolBox...................................................................................................... A2-1
   A2.1  Procedure for Using ToolBox ........................................................................... A2-1
   A2.2  Operating Environment for ToolBox ................................................................. A2-2
   A2.3  Installing ToolBox ............................................................................................ A2-3
   A2.4  Connecting ToolBox and FA-M3 System ......................................................... A2-5

Part B  Operation Manual
B1  Using ToolBox .......................................................................................................... B1-1
   B1.1  ToolBox Operation Screen ............................................................................... B1-1
      B1.1.1  Screen Layout ............................................................................................ B1-1
   B1.2  Configuring ToolBox ....................................................................................... B1-4
      B1.2.1  Setting Up User Environment ................................................................ B1-4
B2  Editing a Project ......................................................................................................... B2-1
   B2.1  Selecting a Project ............................................................................................ B2-1
      B2.1.1  Opening a Project ..................................................................................... B2-1
   B2.2  ToolBox Files .................................................................................................... B2-2
B3  Creating and Editing Various Types of Data ............................................................. B3-1
   B3.1  Creating and Editing Registered Parameters .................................................. B3-1
      B3.1.1  Creating New Registered Parameter File .................................................. B3-1
      B3.1.2  Opening Registered Parameter File ......................................................... B3-2
      B3.1.3  Registered Parameters Screen Layout ..................................................... B3-3
      B3.1.4  Editing Registered Parameters ................................................................ B3-4
B3.1.5 Relationship between Registered Parameters and Other Data ............................................B3-7
B3.2 Creating and Editing Pattern Data ...............................................................B3-8
B3.2.1 Opening Pattern Data ........................................................................B3-8
B3.2.2 Pattern Data Screen Layout ..............................................................B3-9
B3.2.3 Editing Pattern Data ........................................................................B3-10
B3.2.4 Drag and Drop ................................................................................B3-11
B3.2.5 Line Range Editing ........................................................................B3-12
B3.2.6 Editing Data of Various Action Types ................................................B3-14
B3.2.7 Editing Position Data on the Pattern Data Edit Screen ............B3-29
B3.3 Creating and Editing Position Data ...........................................................B3-31
B3.3.1 Opening Position Data .....................................................................B3-31
B3.3.2 Position Data Screen Layout ............................................................B3-32
B3.3.3 Editing Position Data .......................................................................B3-33

B4 Connecting to and Disconnecting from FA-M3 ......................B4-1
B4.1 Connecting to FA-M3 .............................................................................B4-1
B4.1.1 Checking Communications Setup and Connecting .................B4-1
B4.2 Disconnecting from FA-M3 ...................................................................B4-3
B4.2.1 Disconnecting ................................................................................B4-3
B4.3 Considerations for Multi-CPU Configuration .....................................B4-4
B4.4 Test Data.................................................................................................B4-5

B5 Downloading to Module .............................................................B5-1
B5.1 Downloading ..........................................................................................B5-1
B5.1.1 Downloading to Individual Modules .................................................B5-1
B5.1.2 Downloading to All Modules of a Project .......................................B5-4
B5.1.3 Messages about Results of Downloading .......................................B5-5
B5.2 Downloading Restrictions ....................................................................B5-6

B6 Checking Operation Status Using Action Monitor .............B6-1
B6.1 What is Action Monitor? .......................................................................B6-1
B6.2 Using Action Monitor ............................................................................B6-2
B6.2.1 Displaying Action Monitor Screen .................................................B6-2
B6.2.2 Axis Monitor Screen ...................................................................B6-3
B6.3 Using Pattern Monitor ...........................................................................B6-9
B6.3.1 Opening Pattern Monitor ...............................................................B6-10

B7 Action Test ...............................................................................................B7-1
B7.1 Action Test Flow ....................................................................................B7-1
B7.1.1 Action Test Screen Layout ..............................................................B7-2
B7.1.2 Starting Action Test .......................................................................B7-4
B7.2 Jog ..........................................................................................................B7-5
B7.2.1 Jog Screen Layout .......................................................................B7-5
B7.2.2 Single-axis Jog ..............................................................................B7-6
B7.2.3 Multi-axis Jog ................................................................................B7-7
B7.3 Single-axis Positioning .........................................................................B7-8
B7.3.1 Single-axis Screen Layout ..............................................................B7-8
B7.3.2 Testing Single-axis Movement .......................................................B7-9
B7.4 Linear Interpolation ................................................................. B7-10
  B7.4.1 Linear Interpolation Screen Layout ............................ B7-10
  B7.4.2 Testing Linear-interpolated Movement .................... B7-11
B7.5 Circular Interpolation ................................................................. B7-13
  B7.5.1 Circular Interpolation Screen Layout ....................... B7-13
  B7.5.2 Testing Circular Interpolation ................................. B7-14
B7.6 Helical Interpolation ................................................................. B7-16
  B7.6.1 Helical Screen Layout .............................................. B7-16
  B7.6.2 Testing Helical Interpolation ............................. B7-17
B7.7 Index Positioning ................................................................. B7-19
  B7.7.1 Index Screen Layout ................................................ B7-19
  B7.7.2 Testing Index Control Movement ....................... B7-20
B7.8 Origin Search ................................................................. B7-21
  B7.8.1 Origin Search Screen Layout ............................... B7-21
  B7.8.2 Performing Origin Search ................................. B7-22
B7.9 Manual Pulse Generator (MPG) ........................................... B7-23
  B7.9.1 MPG Screen Layout .............................................. B7-23
  B7.9.2 Testing Manual Pulse Generator ...................... B7-24
B7.10 Counter ................................................................. B7-25
  B7.10.1 Counter Screen Layout and Testing Procedure ....... B7-25
B7.11 Pattern ................................................................. B7-26
  B7.11.1 Pattern Screen Layout and Testing Procedure ...... B7-26
B7.12 Output/Mode ................................................................. B7-27
  B7.12.1 Output/Mode Screen Layout and Testing Procedure .. B7-27
B7.13 Teaching ................................................................. B7-28
  B7.13.1 Teaching Screen Layout ........................................ B7-28
  B7.13.2 Teaching .......................................................... B7-29
B8 Uploading from Modules ......................................................... B8-1
  B8.1 Uploading ................................................................. B8-1
    B8.1.1 Uploading from Individual Modules .................... B8-1
    B8.1.2 Uploading from All Modules of a Project .......... B8-3
    B8.1.3 Messages about Results of Uploading .............. B8-5
  B8.2 Uploading Restrictions .............................................. B8-6
B9 Printing and Using Created Data .............................................. B9-1
  B9.1 Printing Created Data .............................................. B9-1
  B9.2 Using Created Data .............................................. B9-4
  B9.3 Reusing Various Data Types .................................. B9-5
  B9.4 Printing Various Data Types ................................ B9-7

Part C Reference Guide
C1 Technical Information ............................................................. C1-1
  C1.1 List of I/O Relays ..................................................... C1-1
    C1.1.1 Input Relays ................................................... C1-2
    C1.1.2 Output Relays ............................................... C1-3
<table>
<thead>
<tr>
<th>Section</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1.2</td>
<td>List of Parameters and Statuses</td>
<td>C1-4</td>
</tr>
<tr>
<td>C1.3</td>
<td>Axis Common Statuses</td>
<td>C1-5</td>
</tr>
<tr>
<td>C1.4</td>
<td>Axis Operation Statuses</td>
<td>C1-6</td>
</tr>
<tr>
<td></td>
<td>C1.4.1 Axis Registered Parameters</td>
<td>C1-6</td>
</tr>
<tr>
<td></td>
<td>C1.4.2 Axis Command Parameters</td>
<td>C1-8</td>
</tr>
<tr>
<td></td>
<td>C1.4.3 Axis Statuses</td>
<td>C1-9</td>
</tr>
<tr>
<td>C1.5</td>
<td>Pattern Operation Area</td>
<td>C1-10</td>
</tr>
<tr>
<td></td>
<td>C1.5.1 Pattern Registered Parameters</td>
<td>C1-10</td>
</tr>
<tr>
<td></td>
<td>C1.5.2 Pattern Command Parameters</td>
<td>C1-10</td>
</tr>
<tr>
<td></td>
<td>C1.5.3 Pattern Operation Statuses</td>
<td>C1-10</td>
</tr>
</tbody>
</table>

Index ............................................................................. Index-1

Revision Information ................................................................. i
A1 Product Overview

This chapter gives an overview and describes the features of the FA-M3 ToolBox for Positioning Modules (or simply referred to as ToolBox in this manual).

A1.1 Overview and Features

- **Overview of ToolBox**

  ToolBox is a tool for performing setup of positioning modules (with pulse output) (F3NC32-0N, F3NC34-0N). You can use it to set up or change the parameters of these modules, or to perform action test and monitoring on the modules.

  You can run ToolBox and the WideField3 ladder program development tool concurrently.
Features of ToolBox

- **User-friendly, Easy Setup**
  ToolBox provides context-sensitive help information for each operation, which makes registration of parameter data of positioning modules an easy job.

- **Editing Functions**
  Pattern data records and position data records of positioning modules can be edited together or separately.

- **Debugging Functions**
  - The jogging action test allows you to move multiple axes concurrently.
  - Action test maintains a history of up to five most recently-used data.

- **Pattern Monitor Function**
  The pattern monitor function allows you to monitor pattern data during execution.

- **Collaboration with Other Applications**
  - You can run ToolBox and the ladder programming tool WideField3 concurrently to edit data and communicate with FA-M3.
  - Parameters created in ToolBox can be saved in CSV-formatted files to be imported and reused in Microsoft Excel documents.
A1.2 New and Updated Functions

A1.2.1 Differences between ToolBox for Positioning Modules R2 and R1

This subsection describes differences in functions between ToolBox for Positioning Modules R2 and R1.

SEE ALSO

For details of individual functional differences, see sections given in the “See Also” column in Table A1.2.

TIP

To confirm the software version of ToolBox for Positioning Modules R2, select [Help]-[About ToolBox] from the menu bar. A dialog box as shown below appears. Verify that the version is displayed as “R2.xx”.

<table>
<thead>
<tr>
<th>Category</th>
<th>Function Details</th>
<th>Summary</th>
<th>See Also</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU</td>
<td>New sequence CPU types</td>
<td>Added newly supported sequence CPU types, along with their specific functions.</td>
<td>A2.2 Operating Environment for ToolBox R2.02 Screen Layout</td>
</tr>
<tr>
<td>Online</td>
<td>USB communication</td>
<td>Allows connection of ToolBox to FA-M3 using USB, with support of all the same functions available when connected using other communications medium.</td>
<td>A2.2 Operating Environment for ToolBox R2.02 Connecting ToolBox and FA-M3 System</td>
</tr>
<tr>
<td>Operating environment</td>
<td>Windows Vista support</td>
<td>Windows Vista support is included in the operating environment (for R2.02 and later).</td>
<td>A2.2 Operating Environment for ToolBox R2.02 Connecting ToolBox and FA-M3 System</td>
</tr>
</tbody>
</table>
A1.2.2 Differences between ToolBox for Positioning Modules R3 and R2

This subsection describes differences in functions between ToolBox for Positioning Modules R3 and R2.

SEE ALSO

For details of individual functional differences, see sections given in the "See Also" column in Table A1.3.

TIP

To confirm the software version of ToolBox for Positioning Modules R3, select [Help]-[About ToolBox] from the menu bar. A dialog box as shown below appears. Verify that the version is displayed as “R3.xx”.

Table A1.3 New and Updated Functions in ToolBox R3

<table>
<thead>
<tr>
<th>Category</th>
<th>Function Details</th>
<th>Summary</th>
<th>See Also</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU</td>
<td>Addition of sequence CPU modules</td>
<td>The following sequence CPU modules are added:</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- F3SP71-4N</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- F3SP76-7N</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- F3SP22-0S</td>
<td></td>
</tr>
<tr>
<td></td>
<td>And, functions specific to the</td>
<td>And, functions specific to the additional modules are supported.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>additional modules are supported.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operating</td>
<td>Windows 7 support</td>
<td>Windows 7 support is included in the operating environment.</td>
<td></td>
</tr>
<tr>
<td>environment</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Online</td>
<td>Multiple port connections</td>
<td>Allows for simultaneous operation of multiple ToolBox applications</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>connected online to FA-M3 CPU modules.</td>
<td></td>
</tr>
</tbody>
</table>
A1.2.3 Differences between ToolBox for Positioning Modules R4 and R3

This subsection describes differences in functions between ToolBox for Positioning Modules R4 and R3.

SEE ALSO

For details of individual functional differences, see sections given in the "See Also" column in Table A1.4.

TIP

To confirm the software version of ToolBox for Positioning Modules R4, select [Help]-[About ToolBox] from the menu bar. A dialog box as shown below appears. Verify that the version is displayed as "R4.xx".

![About ToolBox dialog box](image)

Table A1.4 New and Updated Functions in ToolBox R4

<table>
<thead>
<tr>
<th>Category</th>
<th>Function Details</th>
<th>Summary</th>
<th>See Also</th>
</tr>
</thead>
<tbody>
<tr>
<td>ToolBoxR4.01</td>
<td>Entire functions Language selection</td>
<td>Allows you to select the language mode of ToolBox.</td>
<td></td>
</tr>
<tr>
<td>CPU</td>
<td>Addition of sequence CPU modules</td>
<td>The following sequence CPU modules are added:</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- F3SP71-4S</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- F3SP76-7S</td>
<td></td>
</tr>
<tr>
<td>ToolBoxR4.02</td>
<td>Operating environment Windows Vista(64bit), Windows 7 (64bit) support</td>
<td>Windows Vista (64bit) and Windows 7 (64bit) support is included in the operating environment.</td>
<td></td>
</tr>
</tbody>
</table>
A2 Preparing ToolBox

This chapter describes how to install, run and stop the FA-M3 ToolBox for Positioning Modules (or simply referred to as ToolBox in this manual).

- Procedure for Using ToolBox → A2.1
- Operating Environment for ToolBox → A2.2
- Installing ToolBox → A2.3
- Connecting ToolBox and FA-M3 System → A2.4

A2.1 Procedure for Using ToolBox

[Chapter]

Install ToolBox A2

Install the ToolBox software.

Configure ToolBox B1

Configure ToolBox by specifying project folders, performing communications setup, etc.

Edit a project B2

Create and edit a project.

Check communications setup and connect to FA-M3 B4

Check hardware and software setup for connecting to FA-M3 and perform online connection.

Download data to FA-M3 B5

Send created data to FA-M3.

Monitor operation using action monitor B6

Run positioning module to verify setup data produces the expected operation.

Check operation using action test B7

Check module operation using action test.
### A2.2 Operating Environment for ToolBox

#### Operating Environment

The operating environment for ToolBox is shown below.

**Table A2.1 Operating Environment**

<table>
<thead>
<tr>
<th>Item</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>PC</td>
<td>PC/AT compatible</td>
</tr>
<tr>
<td>Operating System</td>
<td>Microsoft® Windows® 7 (32bit/64bit)</td>
</tr>
<tr>
<td></td>
<td>Microsoft® Windows® Vista (32bit/64bit)</td>
</tr>
<tr>
<td></td>
<td>Microsoft® Windows® XP</td>
</tr>
<tr>
<td></td>
<td>Microsoft® Windows® 2000 Professional</td>
</tr>
<tr>
<td>Required Software</td>
<td>Internet Explorer 5.01 or higher</td>
</tr>
<tr>
<td>CPU</td>
<td>Pentium 300MHz or faster, adequate for the operating system to run properly.</td>
</tr>
<tr>
<td>Memory</td>
<td>128MB or more, adequate for the operating system to run properly.</td>
</tr>
<tr>
<td>Hard Disk Capacity</td>
<td>200MB or more available</td>
</tr>
<tr>
<td>Display</td>
<td>1024 × 768 dots or more</td>
</tr>
<tr>
<td>Communications</td>
<td>RS-232C, Ethernet, FL-net</td>
</tr>
<tr>
<td>Printer</td>
<td>Any printer compatible with the operating systems listed above and supports A4 printing</td>
</tr>
<tr>
<td>Supported Modules</td>
<td>Positioning Modules (with Pulse Output) F3NC32-0N, F3NC34-0N</td>
</tr>
<tr>
<td>Compatible CPU</td>
<td>F3SP05-0P, F3SP08-0P, F3SP08-SP, F3SP21-0N, F3SP25-2N, F3SP35-2N</td>
</tr>
<tr>
<td></td>
<td>F3SP28-3N, F3SP38-6N, F3SP53-4H, F3SP58-6H</td>
</tr>
<tr>
<td></td>
<td>F3SP22-0S, F3SP28-3S, F3SP38-6S, F3SP53-4S, F3SP58-6S, F3SP59-7S</td>
</tr>
<tr>
<td></td>
<td>F3SPV3-4H, F3SPV8-6H, F3FP36-3N</td>
</tr>
<tr>
<td></td>
<td>F3SP66-4S, F3SP67-6S, F3SP71-4N, F3SP76-7N, F3SP71-4S, F3SP76-7S</td>
</tr>
</tbody>
</table>

*1: ToolBox only supports the 32-bit (x86) version but not the 64-bit (x64) version of the Windows XP operating system.

*2: For FL-net communications, CPU speed must be Pentium III 750 MHz or higher.

*3: For FL-net communications, memory must be 128MB or more.

*4: For FL-net communications, network card must support TCP/IP protocol.

Usable communications conditions vary with CPU type.

*5: Depending on the chipset used by the PC running the ToolBox software, reliable USB connection is not always guaranteed.
A2.3 Installing ToolBox

This section describes how to install ToolBox. Note the following precautions before starting installation.

⚠️ **CAUTION**

Log in with system administrator (Administrator) privileges before performing ToolBox setup, maintenance or deletion. These ToolBox operations cannot be performed by a user without Administrator privileges.

In addition, select [Run as administrator] when executing the installer program in Windows Vista/Windows 7. Installation cannot proceed without Administrator privileges.

⚠️ **CAUTION**

In Windows Vista/Windows 7, if UAC is enabled, the installer program in the product CD-ROM may be blocked, and cannot be automatically executed.

In this case, select "Setup.exe" in the CD-ROM using Explorer or some other means and start the installer using [Run as administrator].

**TIP**

The details of the installation procedure may depend on the OS. We describe here how to set up on Windows XP as an example.

1. Insert the ToolBox CD-ROM into the CD-ROM drive of the personal computer where ToolBox is to be installed.

   ⇒ Either screen (1) or (2) will be displayed.

   Screen (1): ToolBox is not installed.

   Screen (2): The Toolbox for Positioning and Monitoring Modules component is already installed.

   Select [Modify] to add components.

   **TIP**

   If another ToolBox component is already installed on the PC, the Positioning Modules component is added to the existing ToolBox installation.

   In this case, you cannot specify a different installation folder.

---

[Screen (1)]
2. Proceed with installation according to the instructions displayed.

SEE ALSO
For details on the installation procedure, see Section A2.3, “Installing and Uninstalling ToolBox” of the “FA-M3 ToolBox Manual”.

Screen (2)
### A2.4 Connecting ToolBox and FA-M3 System

#### System Environment When Using ToolBox

![Diagram showing the connection between ToolBox and FA-M3 System]

- Computer
- RS-232C
- USB/Ethernet/FL-net
- FA-M3
- Positioning module
- CPU
- Setup
- Adjustment
- Internal parameters for setup

**Connectors:**
- Counter
- Motor
B1 Using ToolBox

This chapter describes what a user must know before using the FA-M3 ToolBox for Positioning Modules (or simply referred to as ToolBox in this manual).

- ToolBox Operation Screen → B1.1
- Configuring ToolBox → B1.2

B1.1 ToolBox Operation Screen

B1.1.1 Screen Layout

The screen layout of ToolBox is shown below.

The screen layout and operation are similar to those of Microsoft Windows.
● Title Bar
The title bar shows the name of an open project, an active window, or a file being edited.

● Menu Bar
The menu bar shows the ToolBox main menu. Clicking a menu item displays a pull down menu showing a list of available commands related to that item. Available commands depend on the current CPU operating mode. Unavailable commands are displayed in gray.

● Project Window
The project window shows a list of execution parameters of an open project and a list of registered parameter files of advanced function modules.

● Debugger Window
The debugger window shows debug and maintenance information for each registered parameter file.
**Toolbar**

The toolbar shows icons of frequently used commands for easier access.

![Toolbar icons]

**Window List Bar**

The Window List Bar shows icons of open windows in ToolBox.

![Window List Bar icons]

**Action Status Bar**

The action status bar shows the operating status of the FA-M3 system (primarily the CPU module).

![Action Status Bar]

**CAUTION**

The display of the action status bar is not updated when the monitor is suspended or when uploading is being performed using WideField3. To update the display of the action status bar, resume monitoring or wait for uploading to complete.

**Status Bar**

The status bar shows the operation status of ToolBox.

![Status Bar]

**SEE ALSO**

For details on the information displayed in the menu bar, toolbar, action status bar, and status bar, see:

Section B1.1, "ToolBox Operation Screen" of the "FA-M3 ToolBox Manual".
B1.2 Configuring ToolBox

B1.2.1 Setting Up User Environment

The section describes how to define the folder for storing project files, contents of the toolbar, display language, and so on, after installing ToolBox.

SEE ALSO
For details on environment setup, see:
Section B1.4.2, “Environment Setup” of the "FA-M3 ToolBox Manual".

Specifying a Project Folder

1. Select [Tools]-[Environment Setup for ToolBox] from the menu bar.
   ⇒ Screen (1) is displayed.

2. Select the Folder Setup tab.

3. If required, specify a different folder for projects and click [OK]. Usually, no change is required.
   TIP
   Clicking [Default] reverts the screen to default values.
   SEE ALSO
   - To specify a different project folder, first create the folder using Explorer.
   - For details on the default project folder, see:
     Section B1.4.1, “Folder Configuration” of the "FA-M3 ToolBox Manual".

Screen (1)
## Customizing the Toolbar

1. Select the Toolbar Setup tab in the Environment Setup window.
   ⇒ Screen (2) is displayed.

2. To add an item to the toolbar, highlight the item in the right window, and click [Insert]. To remove an item from the toolbar, highlight the item in the left window, and click [Delete].

3. Click [OK] to confirm the setup.

**TIP**

Clicking [Default] reverts to the default toolbar setup.

## Selecting the Display Language

   ⇒ Screen (3) is displayed.

2. Select a language from the [Select Language] list for the display language of ToolBox, and click [OK].
**Detailed Setup**

You can also specify whether to write to the ROM when downloading, select the items to be displayed on Pattern Data edit screens and define the communication timeout interval.

1. Select [Tools]-[Environment Setup for ToolBox Positioning Modules] from the menu bar.
   ⇒ Screen (4) is displayed.

2. Click the Pattern Data tab.
   ⇒ Screen (4) is displayed.

3. Select the items to be displayed on Pattern Data edit screens.

4. Click the Write ROM/Communication Timeout tab.
   ⇒ Screen (5) is displayed.

5. Specify whether to write to ROM when downloading and specify the communication timeout interval. Click [OK].
B2 Editing a Project

This chapter describes how to edit project files.

- Selecting a Project  →  B2.1
- ToolBox Files  →  B2.2

B2.1 Selecting a Project

This section describes how to select and open a project for editing.

B2.1.1 Opening a Project

1. Run ToolBox.

2. Select [File]-[Open Project] from the menu bar.
   ⇒ Screen (1) is displayed.

3. Select a project folder, and either double-click it or click [Open].
   ⇒ Screen (2) is displayed.

4. Select a project, and either double-click it or click [Open].
   ⇒ Screen (3) is displayed.

5. The project is displayed in the Project window.
B2.2 ToolBox Files

This section describes positioning module files used in ToolBox.

List of ToolBox Files

Example file "ABC" is used in the table below for illustration.

<table>
<thead>
<tr>
<th>Positioning Module Name</th>
<th>File Type</th>
<th>File Extension</th>
</tr>
</thead>
<tbody>
<tr>
<td>F3NC32-0N</td>
<td>Registered Parameters</td>
<td>ABC.YPUP013</td>
</tr>
<tr>
<td></td>
<td>Pattern A Data</td>
<td>ABC.YPPAA013</td>
</tr>
<tr>
<td></td>
<td>Pattern B Data</td>
<td>ABC.YPPAB013</td>
</tr>
<tr>
<td></td>
<td>Position Data</td>
<td>ABC. YPPO 013</td>
</tr>
<tr>
<td>F3NC34-0N</td>
<td>Registered Parameters</td>
<td>ABC.YPUP014</td>
</tr>
<tr>
<td></td>
<td>Pattern A Data</td>
<td>ABC.YPPAA014</td>
</tr>
<tr>
<td></td>
<td>Pattern B Data</td>
<td>ABC.YPPAB014</td>
</tr>
<tr>
<td></td>
<td>Pattern C Data</td>
<td>ABC.YPPAC014</td>
</tr>
<tr>
<td></td>
<td>Pattern D Data</td>
<td>ABC.YPPAD014</td>
</tr>
<tr>
<td></td>
<td>Position Data</td>
<td>ABC. YPPO 014</td>
</tr>
</tbody>
</table>

TIP

- Creating a new registered parameter file automatically generates individual pattern data files and a position data file.
- File extensions differ for different FA-M3 advanced function module types.
B3 Creating and Editing Various Types of Data

This chapter describes how to create and edit registered parameters, position data and pattern data.

- Creating and Editing Registered Parameters → B3.1
- Creating and Editing Pattern Data → B3.2
- Creating and Editing Position Data → B3.3

B3.1 Creating and Editing Registered Parameters

B3.1.1 Creating New Registered Parameter File

1. Click [File]-[New] from the menu bar.
⇒ Screen (1) is displayed.
2. Enter data on the displayed screen. Click [OK].

- Enter a file name for storing registered parameter data.
- Select the model of the positioning module.
- Enter a title for registered parameter data.
- Enter the name of each axis. Assigning an appropriate name to each axis enhances readability.
- Defines the number of records for each pattern data table. A data table for storing the specified number of pattern data records is generated. Reducing this value on the Properties dialog deletes extra records.
- Defines the number of position data records to be used. A data table for storing the specified number of position data records is generated. Reducing this value on the Properties dialog deletes extra records.
- Closes Properties dialog and opens Registered Parameters edit screen. All parameter data are displayed with default values. The newly created pattern data file or position data file is added to the Project window.
- Exits without creating registered parameter data.

TIP
- If other modules besides positioning module are installed in ToolBox, a module selection screen will be displayed. Select positioning module to display the above New – Positioning Module screen.
- You should define only the required number of pattern data records and position data records as reducing the data size shortens communication time with positioning modules and improves performance of the PC.
B3.1.2 Opening Registered Parameter File

1. Click [File]-[Open] from the menu bar.
   ⇒ Screen (2) is displayed.

2. Double-click a registered parameter file to be edited. Alternatively, click a registered parameter file to be edited and then click [Open].
   ⇒ The Registered Parameters screen is displayed.

**TIP**

- You can also open a registered parameter file by selecting and double-clicking the registered parameter data from the Project window.
- Filename extension of registered parameter file
  The filename extension of a registered parameter file depends on the positioning module type as shown below.

<table>
<thead>
<tr>
<th>Positioning Module Type</th>
<th>Registered Parameter Filename Extension</th>
</tr>
</thead>
<tbody>
<tr>
<td>F3NC32-0N</td>
<td>YPUP013</td>
</tr>
<tr>
<td>F3NC34-0N</td>
<td>YPUP014</td>
</tr>
</tbody>
</table>
B3.1.3 Registered Parameters Screen Layout

There are 4 Registered Parameters tab screens. We describe here how to perform editing on these screens.

(1) Basic Parameters
(2) Automatic Origin Search
(3) Counter/Encoder
(4) Pattern Registered Parameters

Clicking a cell displays a list box or an input helper screen. The cell containing the cursor is displayed with blue background. A cell is displayed with different background colors to indicate different statuses as follows:
- White : Default value
- Yellow : Modified and confirmed value
- Pink : Modified but unconfirmed value
- Red : Invalid value
- Gray : Disregarded value

Displays number and name of axes. Name of axes can be changed from the Properties screen.

Allows you to change title name or enter names of axes.

Displays help information.

Saves edited data to file.

Closes the screen and exits from editing. Any modified but unconfirmed changes are saved to file.

 Cancels editing and closes the screen. If there are any modified but unconfirmed changes, a dialog box will appear to confirm whether to save the changes.
B3.1.4 Editing Registered Parameters

Highlighting a parameter cell shows a button for opening a list box or an input helper screen. This section describes how to use the list box and the parameter input helper screen.

You can also use the [Edit] menu on the menu bar to set a highlighted cell to the default, maximum or minimum value; or hide or show a highlighted column of cells.

■ Using the List Box

1. On a parameter edit screen (1), (a) click an item to be edited.

2. (b) Click the displayed button, and (c) select the required setup value from the displayed list box.

![Screen (1)](image)

■ Using the Parameter Input Helper Screen

In the parameter input helper screen, you may directly key in a number, or select a value using the mouse or keyboard.

1. On a parameter edit screen (2), (a) click an item to be edited.

2. (b) Click the displayed button.
   ⇒ A parameter input helper screen will be displayed. The actual screen displayed will depend on the selected parameter.

![Screen (2)](image)
3. Perform setup using the displayed input helper screen (3).

- Using mouse:
  Click desired radio buttons, and click [OK].

- Using keyboard:
  Move to the item to be setup using the [Tab] key, select the desired option using the [←] and [→] keys. When you are done, move to the [OK] button using the [Tab] key, and press the [Enter] key.

Advanced Editing Functions

- Modifying the value of a cell

  1. In a parameter edit screen (4), (a) click the cell to be changed.

  2. (b) Select [Edit] from the menu bar, and (c) select one of the following commands:
     - [Set to Default Value]: Changes the setting to the default value.
     - [Set to Maximum Value]: Changes the setting to the maximum value.
     - [Set to Minimum Value]: Changes the setting to the minimum value.

TIP

Right-clicking in a Registered Parameters screen also lists this command menu.
Hiding/showing a column of cells

1. In a parameter edit screen (5), (a) highlight a column of cells to be hidden by clicking the column title.

2. (b) Select [View] from the menu bar, and (c) select the [Hide] command. In this example, the Axis 2 column will be hidden.

TIP
- To redisplay hidden columns, select [View]-[Show] from the menu bar.
- Right-clicking on a parameter edit screen also displays the same command menu.
- The menu displays [Show] if some columns or cells are hidden. Else it displays [Hide].
B3.1.5 Relationship between Registered Parameters and Other Data

Registered parameters, pattern data and position data are closely related. The measurement unit and usage of pattern data and position data are determined by registered parameters.

For instance, beware that changing the Display Unit registered parameter value automatically changes the measurement unit and data value of position and pattern data.

Example about Change in Display Unit

We illustrate how data values change with the Display Unit setting using data of axis 1 as an example.

<table>
<thead>
<tr>
<th>Setup Item and Value</th>
<th>Value Before Change</th>
<th>Value After Change</th>
<th>Value After Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data value</td>
<td>1</td>
<td>0.0001</td>
<td>0.00001</td>
</tr>
<tr>
<td>Display Unit registered parameter</td>
<td>Pulse</td>
<td>mm</td>
<td>degree</td>
</tr>
<tr>
<td>Axis 1 position data</td>
<td>Pulse</td>
<td>mm</td>
<td>degree</td>
</tr>
<tr>
<td>Axis 1 speed</td>
<td>Pulse/s</td>
<td>mm/s</td>
<td>degree/s</td>
</tr>
</tbody>
</table>
B3.2 Creating and Editing Pattern Data

Pattern data and position data are automatically generated when you create registered parameter data. You can change the number of pattern data records using the Properties dialog.

SEE ALSO
For details on individual parameters of pattern data, see the manual entitled “Positioning Module (with Pulse Output)” (IM34M06H56-02E).

B3.2.1 Opening Pattern Data

1. Double-click the pattern data to be edited in the Project window.

⇒ The Pattern Data edit screen is displayed.

TIP
You can also display the Pattern Data edit screen by moving the cursor to the pattern data to be opened using arrow keys, and then press the [Enter] key.
### B3.2.2 Pattern Data Screen Layout

**No** | **Item** | **Display or Setup Description**  
--- | --- | ---  
**a** | Data List area | Displays pattern data.  
**b** | Button group | Moves to previous or next data record.  
**c** | Edit area | Edits pattern data. Selecting a data item in the Data List area or entering a record number in the [No.] field in the Edit area allows editing of a data record. The display of the Edit area changes with the value selected in the [Action Code] field. Only fields that require setup are displayed. Non-required fields are not displayed.  
**d** | Right mouse click Edit menu Switching views | Displays a menu. You can switch between default view or custom view, which displays only items defined in the environment setup. The menu contains useful commands for editing that applies either on a record or on all data.

![Pattern Data Screen Layout Diagram](image_url)
### B3.2.3 Editing Pattern Data

1. Select a pattern record to be edited in the Data List area. Alternatively, select or enter the number of a record to be edited in the [No.] field in the Edit area.

   ⇒ The selected record in the Data List area is displayed in blue, and its data is displayed in the Edit area.

2. The display of the Edit area changes with the action selected for each record in the [Action Code] field. If no setup is required for an action type, nothing is displayed.

   **SEE ALSO**
   For details on how to edit data for different action types, see: Subsection B3.2.6, "Editing Data of Various Action Types".

3. Edit the pattern data displayed in the Edit area. Edited data is immediately reflected in the Data List area.

   **SEE ALSO**
   For details on how to edit data for different action types, see: Subsection B3.2.6, "Editing Data of Various Action Types".
B3.2.4 Drag and Drop

You can drag and drop position data from a Position Data edit screen to a Pattern Data edit screen.

1. Select a pattern record on Pattern Data edit screen (1).
   ⇒ The selected pattern is displayed in blue, and its data is displayed in the Edit area.

2. On the Position Data screen (2), select the position data to be inserted, and drag-and-drop it to the Pattern Data window.

   **TIP**
   To perform a drag-and-drop operation, depress and hold the left mouse button on an item, drag it to the destination and release the mouse button.

3. The dropped position data is registered in Pattern Data edit screen (3).
   ⇒ The position data is displayed in both the Edit area and the Data List area.

**SEE ALSO**
For details on how to edit data for different action types, see:
Subsection B3.2.6, "Editing Data of Various Action Types".
B3.2.5 Line Range Editing

You can perform line range editing by selecting a range of lines in the Data List area. Only 1-to-N-line operations and N-to-N-line operations are allowed. Edit operations between two line ranges of different sizes are not allowed unless the first range contains only one line.

- **1-to-N-line operations**

- **N-to-N-line operations**

- **N-to-M-line operations**

  Editing operations between two line ranges of different sizes are not allowed unless the first line range contains only one line.
Procedure

1. Select a line or a range of lines in the Data List area.
   ⇒ The color of the selected line(s) changes.

   **TIP**
   When performing line range edit operations such as copying and pasting, only 1-to-N-line and N-to-N-line operations are allowed. N-to-M-line operations are not allowed unless N is one.

2. Select [Cut] or [Copy] from the Edit menu.

   **TIP**
   To display the Edit menu, click the right mouse button.

3. Select the range of destination lines, and select [Paste] from the Edit menu.
   ⇒ The pasted data is displayed.
B3.2.6 Editing Data of Various Action Types

The display of the Edit area on the Pattern Data screen changes with the action selected in [Action Code] in the Action Mode group. Parameters that do not require setup are not displayed. If you change the selected action code of an existing pattern, existing data is retained but an error is generated. You should correct the data to remove the error.

**Screen Layout for Various Action Types**

The display of the Edit area changes with the action selected for a pattern. The displayed items are divided into groups (a) to (e).

### Action Code | Action | Function
--- | --- | ---
1 | Linear positioning | Performs linear interpolated positioning using 1, 2, 3 or 4 axes.
2 | CI using sub point | Performs circular interpolated or helical interpolated positioning using a specified sub point.
3 | CW CI using center | Performs clockwise circular interpolated or helical interpolated positioning using a specified center point.
4 | CCW CI using center | Performs counter-clockwise circular interpolated or helical interpolated positioning using a specified center point.
5 | (Sub position) | Specifies a sub position (sub point or center point) for circular interpolated positioning or helical interpolated positioning.
10 | Position->speed | Switches from position control mode to speed control mode.
11 | Speed->pos. (reset) | Switches from speed control mode to position control mode. (Resets the current position to zero)
12 | Speed->pos. (cont.) | Switches from speed control mode to position control mode.
13 | Speed control | Performs linear interpolated speed control positioning using 1, 2, 3 or 4 axes. (retaining the current position value)
15 | Index positioning | Performs single-axis positioning using index control.
16 | Index speed control | Performs single-axis speed control positioning using index control.
20 | Contact o/p on/off | Sets output of selected external contacts to ON or OFF.
21 | Set current position | Changes the current position.
96 | FOR | Executes action pattern records within the FOR-NEXT loop a specified number of iterations.
97 | NEXT | Executes action pattern records within the FOR-NEXT loop a specified number of iterations.
98 | JUMP | Jumps to a specified action pattern record number.
99 | NOP | No operation. Moves to next action pattern record.

**SEE ALSO**

For details on setup for different action types, see Section 8.1, "Action Pattern Data" of "Positioning Module (with Pulse Output)" (IM34M06H56-02E)
Blank (No Action)

A blank [Action Code] field indicates empty data. All setup data are ignored. Data is also not transferred during downloading.
Linear positioning

Selects linear positioning movement. You do not need to set up non-displayed parameters.

![Diagram of linear positioning settings]

<table>
<thead>
<tr>
<th>No.</th>
<th>Item</th>
<th>Description of Displayed Item and Its Setup</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>No. Label Comment</td>
<td>Select a record number. Changing [No.] changes the displayed data. Labels and comments are optional features that can help in identifying a pattern, in place of using the pattern number.</td>
</tr>
<tr>
<td>b</td>
<td>Action Mode</td>
<td>Action Code: 1: Linear positioning Axes: AX1, AX2, AX3, AX4 You can select from 1 to 4 axes for concurrent movement. Selecting only one axis performs single-axis positioning with optional specified startup speed.</td>
</tr>
<tr>
<td>c</td>
<td>Position Data</td>
<td>Position Data No.: 1 to No. of Position Data Records Used defined in properties (2,000 max) The target position can be specified as an absolute position or an incremental position by specifying the position data number. The measurement unit for display can be changed using the Registered Parameters window.</td>
</tr>
<tr>
<td>d</td>
<td>Speed Data Acceleration/Deceleration Time</td>
<td>Speed Type: Combined, Axis 1, Axis 2, Axis 3 or Axis 4 Speed: 1 to 2,147,483,647 (position reference unit) The speed type can be specified as a combined-speed or the speed of a movement axis. Acceleration/Deceleration Time can be specified as default or using numerical value input. ACC: -1, 0 to 32,767 (ms) DCC: -1, 0 to 32,767 (ms) Turning on the [Default] checkbox selects the acceleration time and deceleration time defined by the pattern registered parameters if [Speed Type] is specified as combined speed but selects the acceleration time and deceleration time defined by registered parameters of an individual axis if [Speed Type] is specified as the speed of an axis. The acceleration time and deceleration time can also be specified as required by deselecting the [Default] checkbox.</td>
</tr>
<tr>
<td>e</td>
<td>Detailed Setup</td>
<td>Specify the startup mode, end mode, dwell time and M code.</td>
</tr>
</tbody>
</table>

SEE ALSO

For details on how to perform setup, see Section 8.2.1, "Specifying Linear Interpolation" of "Positioning Module (with Pulse Output)" (IM34M06H56-02E).
Circular interpolation (CI using sub point, CW CI using center, CCW CI using center)

Selects circular interpolated movement. You do not need to set up non-displayed parameters.

<table>
<thead>
<tr>
<th>No.</th>
<th>Item</th>
<th>Description of Displayed Item and Its Setup</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>No. Label Comment</td>
<td>Select a record number. Changing [No.] changes the displayed data. Labels and comments are optional features that can help in identifying a pattern, in place of using the pattern number.</td>
</tr>
</tbody>
</table>
| b   | Action Mode                    | Action Code: 2: CI using sub point, 3: CW CI using center, 4: CCW CI using center  
Axes: AX1, AX2, AX3, AX4  
CI Axes: AX1, AX2, AX3, AX4  
CI Turns: 0 to 32,767 (turns)  
You can select from 2 to 4 axes for concurrent movement. You must specify two axes to be used for circular interpolation in [CI Axes]. Setting [CI Turns] to a non-zero integer rotates for the specified number of turns from the starting position before moving to the target position. Setting [CI Turns] to zero moves directly to the target position without making any turns. |
| c   | Position Data                  | Position Data No.: 1 to No of Position Data Records Used defined in properties (2,000 max.)  
Enter the target position for circulation interpolation. The measurement unit for display can be changed using the Registered Parameters window. |
| d   | Speed Data                     | Speed Type: Combined  
Speed: 1 to Speed Limit (position reference unit)  
Specify the speed type and speed. Speed type can only be specified as combined speed.  
Acceleration/Deceleration Time can be specified as default or using numerical value input.  
ACC: -1, 0 to 32,767 (ms)  
DCC: -1, 0 to 32,767 (ms)  
Turning on the [Default] checkbox selects the acceleration time and deceleration time defined by the pattern registered parameters. The acceleration time and deceleration time can also be specified as required by deselecting the [Default] checkbox. |
| e   | Detailed Setup                 | Startup Mode: 0 to 5  
End Mode: 0 to 3  
Dwell Time: 0 to 32,767 (ms)  
M Code: 0 to 32,767  
Specify the startup mode, end mode, dwell time and M code. |

SEE ALSO

For details on how to perform setup, see Section 8.2.2, "Specifying Circular Interpolation" of "Positioning Module (with Pulse Output)" (IM34M06H56-02E).
**Sub position (CI using sub point, CW CI using center, CCW CI using center)**

If the selected action of a pattern record is circular interpolation, the action code of the next pattern data record is automatically selected as '(Sub position)' for circular interpolation. You do not need to set up non-displayed parameters.

![Diagram showing sub position for circular interpolation](image)

<table>
<thead>
<tr>
<th>No.</th>
<th>Item</th>
<th>Description of Displayed Item and Its Setup</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>No. Label Comment</td>
<td>Select a record number. Changing [No.] changes the displayed data. Labels and comments are optional features that can help in identifying a pattern, in place of using the pattern number.</td>
</tr>
<tr>
<td>b</td>
<td>Position Data</td>
<td>Position Data No.: 1 to No of Position Data Records Used defined in properties (2,000 max.) Specify a sub point for circular interpolation. Only data for the selected axes are used.</td>
</tr>
</tbody>
</table>

**SEE ALSO**

For details on how to perform setup, see Section 8.2.2, "Specifying Circular Interpolation" of "Positioning Module (with Pulse Output)" (IM34M06H56-02E).
### Position->speed

Selects action to switch from position control to speed control. You do not need to set up non-displayed parameters.

<table>
<thead>
<tr>
<th>No.</th>
<th>Item</th>
<th>Description of Displayed Item and Its Setup</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>No. Label</td>
<td>Select a record number. Changing [No.] changes the displayed data. Labels and comments are optional features that can help in identifying a pattern, in place of using the pattern number.</td>
</tr>
<tr>
<td>b</td>
<td>Action Mode</td>
<td>Action Code: 10: Position-&gt;speed Axes: AX1, AX2, AX3, AX4 Select axes for switching from position control to speed control.</td>
</tr>
<tr>
<td>c</td>
<td>Detailed Setup</td>
<td>End Mode: 0 to 1 M Code: 0 to 32,767 Specify the end mode and M code.</td>
</tr>
</tbody>
</table>

**SEE ALSO**

For details on how to perform setup, see Section 8.3.1, “Specifying Position Control to Speed Control Switchover” of “Positioning Module (with Pulse Output)” (IM34M06H56-02E).
### Speed->pos. (reset)

Selects action to switch from speed control to position control, and reset the current position to zero. You do not need to set up non-displayed parameters.

#### Description of Displayed Item and Its Setup

<table>
<thead>
<tr>
<th>No</th>
<th>Item</th>
<th>Description of Displayed Item and Its Setup</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>No.</td>
<td>Select a record number. Changing [No.] changes the displayed data. Labels and comments are optional features that can help in identifying a pattern, in place of using the pattern number.</td>
</tr>
<tr>
<td>b</td>
<td>Action Mode</td>
<td>Action Code: 11: Speed-&gt;pos. (reset) Axes: AX1, AX2, AX3, AX4 You must select one and only one axis for control switchover in [Axes].</td>
</tr>
<tr>
<td>c</td>
<td>Position Data</td>
<td>Position Data No.: 1 to No of Position Data Records Used defined in properties (2,000 max.) Specify the new target position for positioning after switching to position control. The measurement unit for display can be changed using the Registered Parameters window.</td>
</tr>
<tr>
<td>d</td>
<td>Speed Data</td>
<td>Speed Type: Axis 1, Axis 2, Axis 3 or Axis 4 Speed: Startup Speed to Speed Limit (speed reference unit) Acceleration/Deceleration Time can be specified as default or using numerical value input. ACC: -1, 0 to 32,767 (ms) DCC: -1, 0 to 32,767 (ms) Turning on the [Default] checkbox selects the acceleration time and deceleration time defined by the registered parameters of the selected axis. To specify different rates of acceleration and deceleration, turn off the [Default] checkbox, and enter the required acceleration time and deceleration time.</td>
</tr>
<tr>
<td>e</td>
<td>Detailed Setup</td>
<td>Startup Mode: 0 to 5 End Mode: 0 to 3 Dwell Time: 0 to 32,767 (ms) M Code: 0 to 32,767 Specify the startup mode, end mode, dwell time and M code.</td>
</tr>
</tbody>
</table>

**SEE ALSO**

For details on how to perform setup, see Section 8.3.2, "Specifying Speed Control to Position Control Switchover" of "Positioning Module (with Pulse Output)" (IM34M06H56-02E).
**Speed->pos. (cont.)**

Selects action to switch from speed control to position control, retaining the current position. You do not need to set up non-displayed parameters.

---

### No. Item Description of Displayed Item and Its Setup

<table>
<thead>
<tr>
<th>No.</th>
<th>Item</th>
<th>Description of Displayed Item and Its Setup</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>No. Label</td>
<td>Select a record number. Changing [No.] changes the displayed data. Labels and comments are optional features that can help in identifying a pattern, in place of using the pattern number.</td>
</tr>
<tr>
<td>b</td>
<td>Action Mode</td>
<td>Action Code: 12: Speed-&gt;pos. (cont.) Axes: AX1, AX2, AX3, AX4 You must select one and only one axis for control switchover in [Axes].</td>
</tr>
<tr>
<td>c</td>
<td>Position Data</td>
<td>Position Data No.: 1 to No of Position Data Records Used defined in properties (2,000 max.) Specify the new target position for positioning after switching to position control. The measurement unit for display can be changed using the Registered Parameters window.</td>
</tr>
<tr>
<td>d</td>
<td>Speed Data Acceleration/Deceleration Time</td>
<td>Speed Type: Axis 1, Axis 2, Axis 3 or Axis 4 Speed: Startup Speed to Speed Limit (speed reference unit) Acceleration/Deceleration Time can be specified as default or using numerical value input. ACC: -1, 0 to 32,767 (ms) DCC: -1, 0 to 32,767 (ms) Turning on the [Default] checkbox selects the acceleration time and deceleration time defined by the registered parameters of the selected axis. To specify different rates of acceleration and deceleration, turn off the [Default] checkbox, and enter the required acceleration time and deceleration time.</td>
</tr>
<tr>
<td>e</td>
<td>Detailed Setup</td>
<td>Startup Mode: 0 to 5 End Mode: 0 to 3 Dwell Time: 0 to 32,767 (ms) M Code: 0 to 32,767 Specify the startup mode, end mode, dwell time and M code.</td>
</tr>
</tbody>
</table>

---

**SEE ALSO**

For details on how to perform setup, see Section 8.3.2, "Specifying Speed Control to Position Control Switchover" of "Positioning Module (with Pulse Output)" (IM34M06H56-02E).
**Speed control**

Selects speed control movement. You do not need to set up non-displayed parameters. An error is generated if the module has not been switched from position control to speed control mode.

### Table of Displayed Item and Its Setup

<table>
<thead>
<tr>
<th>No</th>
<th>Item</th>
<th>Description of Displayed Item and Its Setup</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>No. Label</td>
<td>Select a record number. Changing [No.] changes the displayed data. Labels and comments are optional features that can help in identifying a pattern, in place of using the pattern number.</td>
</tr>
<tr>
<td>b</td>
<td>Action Mode</td>
<td>Action Code: 13: Speed control</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Axes: AX1, AX2, AX3, AX4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>You can select from 1 to 4 axes for concurrent movement. Selecting only one axis performs single-axis speed control movement with startup speed.</td>
</tr>
<tr>
<td>c</td>
<td>Speed Data</td>
<td>AX1 Speed, AX2 Speed. AX3 Speed, AX4 Speed:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(Speed Limit) to (Speed Limit) (speed reference unit)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Specify the speed for each movement axis. For single-axis speed control movement, the specified speed must not be lower than the startup speed. Specified speed must be non-zero.</td>
</tr>
<tr>
<td>d</td>
<td>Acceleration/Deceleration Time</td>
<td>Acceleration/Deceleration Time can be specified as default or using numerical value input. ACC: -1, 0 to 32,767 (ms) DCC: -1, 0 to 32,767 (ms)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>If you turn on the [Default] checkbox, the module computes the acceleration time and deceleration time of each movement axis using its specified speed, as well as its Default Acceleration Time and Default Deceleration Time axis registered parameters, and then selects the longest acceleration time and deceleration time from the computed values.</td>
</tr>
<tr>
<td>e</td>
<td>Detailed Setup</td>
<td>Startup Mode: 0 to 5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>End Mode: 0 to 2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Dwell Time: 0 to 32,767 (ms)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>M Code: 0 to 32,767</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Specify the startup mode, end mode, dwell time and M code.</td>
</tr>
</tbody>
</table>

**SEE ALSO**

For details on how to perform setup, see Section 8.3.3, "Specifying Linear Speed Control Movement" of "Positioning Module (with Pulse Output)" (IM34M06H56-02E).
# Index positioning

Selects index positioning movement.

---

![Diagram](image)

<table>
<thead>
<tr>
<th>No</th>
<th>Item</th>
<th>Description of Displayed Item and Its Setup</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>No.</td>
<td>Select a record number. Changing [No.] changes the displayed data. Labels and comments are optional features that can help in identifying a pattern, in place of using the pattern number.</td>
</tr>
<tr>
<td>b</td>
<td>Label</td>
<td>Action Mode: 15: Index positioning</td>
</tr>
<tr>
<td></td>
<td>Comment</td>
<td>Axes: AX1, AX2, AX3, AX4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>You must select one and only one movement axis in [Axes].</td>
</tr>
<tr>
<td>c</td>
<td>Position Data</td>
<td>Position Data No.: 1 to No of Position Data Records Used defined in properties (2,000 max.)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Enter the target position for index positioning. The measurement unit for display can be changed using the Registered Parameters window.</td>
</tr>
<tr>
<td>d</td>
<td>Speed Data Acceleration/Deceleration Time</td>
<td>Speed Type: Axis 1, Axis 2, Axis 3 or Axis 4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Speed: Startup Speed to Speed Limit (speed reference unit)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The speed type can only be specified as the speed of a movement axis. Acceleration/Deceleration Time can be specified as default or using numerical value input.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>ACC: -1.0 to 32,767 (ms)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>DCC: -1.0 to 32,767 (ms)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Turning on the [Default] checkbox selects the acceleration time and deceleration time defined by the registered parameters of the selected axes. The acceleration time and deceleration time can also be specified as required by deselecting the [Default] checkbox.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Specify the speed type, speed, acceleration time and deceleration time.</td>
</tr>
<tr>
<td>e</td>
<td>Detailed Setup</td>
<td>Startup Mode: 0 to 5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>End Mode: 0 to 3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Dwell Time: 0 to 32,767 (ms)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>M Code: 0 to 32,767</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Specify the startup mode, end mode, dwell time and M code.</td>
</tr>
</tbody>
</table>

---

**SEE ALSO**

For details on how to perform setup, see Section 8.4.1, "Specifying Index Positioning" of "Positioning Module (with Pulse Output)" (IM34M06H56-02E).
## Index speed control

Selects index speed control movement.

### Table of Displayed Item and Its Setup

<table>
<thead>
<tr>
<th>No.</th>
<th>Item</th>
<th>Description of Displayed Item and Its Setup</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>No. Label Comment</td>
<td>Select a record number. Changing [No.] changes the displayed data. Labels and comments are optional features that can help in identifying a pattern, in place of using the pattern number.</td>
</tr>
<tr>
<td>b</td>
<td>Action Mode</td>
<td>Action Code: 16: Index speed control&lt;br&gt;Axes: AX1, AX2, AX3, AX4&lt;br&gt;You must select one and only one movement axis in [Axes]. Select an axis for positioning.</td>
</tr>
<tr>
<td>c</td>
<td>Speed Data</td>
<td>Speed Type: Axis 1, Axis 2, Axis 3 or Axis 4&lt;br&gt;Speed: (Speed Limit) to (Speed Limit) (speed reference unit)&lt;br&gt;The speed type can only be specified as the speed of a movement axis.&lt;br&gt;Acceleration/Deceleration Time can be specified as default or using numerical value input.&lt;br&gt;ACC: -1, 0 to 32,767 (ms)&lt;br&gt;DCC: -1, 0 to 32,767 (ms)&lt;br&gt;Turning on the [Default] checkbox selects the acceleration time and deceleration time defined by the registered parameters of the selected axis.&lt;br&gt;The acceleration time and deceleration time can also be specified as required by deselecting the [Default] checkbox.&lt;br&gt;Specify the speed type, speed, acceleration time and deceleration time.</td>
</tr>
<tr>
<td>d</td>
<td>Detailed Setup</td>
<td>Startup Mode: 0 to 5&lt;br&gt;End Mode: 0 to 2&lt;br&gt;Dwell Time: 0 to 32,767 (ms)&lt;br&gt;M Code: 0 to 32,767&lt;br&gt;Specify the startup mode, end mode, dwell time and M code.</td>
</tr>
</tbody>
</table>

### SEE ALSO

For details on how to perform setup, see Section 8.4.2, "Specifying Index Speed Control Movement" of "Positioning Module (with Pulse Output)" (IM34M06H56-02E).
## Contact o/p on/off

Sets output of externals contacts specified as general input or general output to ON or OFF.

<table>
<thead>
<tr>
<th>No.</th>
<th>Item</th>
<th>Description of Displayed Item and Its Setup</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>No. Label Comment</td>
<td>Select a record number. Changing [No.] changes the displayed data. Labels and comments are optional features that can help in identifying a pattern, in place of using the pattern number.</td>
</tr>
</tbody>
</table>
| b   | Contact Output Data   | Axis 1: General 1: ON/OFF, General 2: ON/OFF, General 3: ON/OFF  
Axis 2: General 1: ON/OFF, General 2: ON/OFF, General 3: ON/OFF  
Axis 3: General 1: ON/OFF, General 2: ON/OFF, General 3: ON/OFF  
Axis 4: General 1: ON/OFF, General 2: ON/OFF, General 3: ON/OFF  
Specify the external contact outputs to be turned on or off. Outputs of unselected contacts will remain unchanged. |
| c   | Detailed Setup        | Startup Mode: 0 to 5  
End Mode: 0 to 1  
M Code: 0 to 32,767  
Specify the startup mode, end mode and M code. |

**SEE ALSO**

For details on how to perform setup, see Section 8.5, "Specifying Contact Outputs On/Off" of "Positioning Module (with Pulse Output)" (IM34M06H56-02E).
## Set current position

Changes the current position.

<table>
<thead>
<tr>
<th>No</th>
<th>Item</th>
<th>Description of Displayed Item and Its Setup</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>No. Label Comment</td>
<td>Select a record number. Changing [No.] changes the displayed data. Labels and comments are optional features that can help in identifying a pattern, in place of using the pattern number.</td>
</tr>
<tr>
<td>b</td>
<td>Action Mode</td>
<td>Action Code: 21: Set current position&lt;br&gt;You can select from 1 to 4 axes for changing current position. Select the axes for current position setup.</td>
</tr>
<tr>
<td>c</td>
<td>Position Data</td>
<td>Position Data No.: 1 to No of Position Data Records Used defined in properties (2,000 max.)&lt;br&gt;Enter the new current position. The measurement unit for display can be changed using the Registered Parameters window.</td>
</tr>
<tr>
<td>d</td>
<td>Detailed Setup</td>
<td>Startup Mode: 0 to 5&lt;br&gt;End Mode: 0 to 1&lt;br&gt;M Code: 0 to 32,767&lt;br&gt;Specify the startup mode, end mode and M code.</td>
</tr>
</tbody>
</table>

**SEE ALSO**

For details on how to perform setup, see Section 8.6, "Specifying Set Current Position Action" of "Positioning Module (with Pulse Output)" (IM34M06H56-02E).
# FOR–NEXT

Specifies a FOR–NEXT loop.

FOR–NEXT action records must be specified in pairs.

<table>
<thead>
<tr>
<th>No.</th>
<th>Item</th>
<th>Description of Displayed Item and Its Setup</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>No.</td>
<td>Select a record number. Changing [No.] changes the displayed data.</td>
</tr>
<tr>
<td></td>
<td>Label</td>
<td>Labels and comments are optional features that can help in identifying a pattern, in place of using the pattern number.</td>
</tr>
<tr>
<td>b</td>
<td>FOR–NEXT</td>
<td>Iterations: 0 to 32767 Repeats execution of action pattern records between FOR and NEXT for specified iterations. Specifying 0 or 1 iteration produces the same result. Specify the number of iterations for the FOR–NEXT loop.</td>
</tr>
</tbody>
</table>

**SEE ALSO**

For details on how to perform setup, see Section 8.7, "Specifying FOR–NEXT Actions" of "Positioning Module (with Pulse Output)" (IM34M06H56-02E).
**JUMP**

Performs a JUMP.

![JUMP Diagram]

### Table of Displayed Item and Its Setup

<table>
<thead>
<tr>
<th>No.</th>
<th>Item</th>
<th>Description of Displayed Item and Its Setup</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>No. Label Comment</td>
<td>Select a record number. Changing [No.] changes the displayed data. Labels and comments are optional features that can help in identifying a pattern, in place of using the pattern number.</td>
</tr>
<tr>
<td>b</td>
<td>JUMP Destination</td>
<td>No.: 1 to No. of Pattern Data Records Used defined in properties (500 max.) Specify the destination for a jump. You may specify the jump destination as a pattern data record number or pattern data record label.</td>
</tr>
</tbody>
</table>

**SEE ALSO**

For details on how to perform setup, see Section 8.8, "Specifying Jump Action" of "Positioning Module (with Pulse Output)" (IM34M06H56-02E).

**NOP**

No operation. Moves to next action pattern record.

![NOP Diagram]

**SEE ALSO**

For details on how to perform setup, see Section 8.9, "Specifying NOP Action" of "Positioning Module (with Pulse Output)" (IM34M06H56-02E).
B3.2.7 Editing Position Data on the Pattern Data Edit Screen

You can edit pattern data, as well as position data in ToolBox.

Position data is part of pattern data, and is used during pattern execution. You can reuse one position data in multiple patterns.

SEE ALSO
For details on how to perform setup, see Section 8.1, "Action Pattern Data" of "Positioning Module (with Pulse Output)" (IM34M06H56-02E).

Position data in ToolBox are linked. Changing position data for an axis also changes associated position data in pattern data.
Adding New Position Data

To add new position data on the Pattern Data edit screen, use the following procedure.

1. Select an unused position data number in the [No.] field and enter position data. ⇒ The entered data is automatically stored to position data.

Editing Position Data

You can edit position data while editing pattern data. To do so, select the position data to be edited in the Position Data Edit area and modify the data.

CAUTION

Editing position data that is used in multiple patterns affects all associated pattern data.
B3.3 Creating and Editing Position Data

Pattern data and position data are automatically generated when you create a registered parameter file. You can change the number of position data records used using the Properties dialog.

**SEE ALSO**
For information on internal registers, see “Positioning Module (with Pulse Output)” user manual (IM34M06H56-02E).

B3.3.1 Opening Position Data

1. Double-click the position data to be edited in the Project window.

⇒ The Position Data edit screen is displayed.

**TIP**
You can also display the Position Data edit screen by moving the cursor to [Position Data] using arrow keys, and then press the [Enter] key.
B3.3.2 Position Data Screen Layout

Data List area
Displays position data. You can edit one line at a time.

Edit area
Right mouse click
Click the right mouse button to display this menu. You can customize the displayed items using environment setup.

Error data are displayed with red background.
B3.3.3 Editing Position Data

1. Select a position data to be edited in the Data List area.
   ⇒ The selected line in the Data List area is displayed in blue, and its data is displayed in the Edit area.

   **TIP**
   You can also display data to be edited by selecting or entering the number of a position data record in the [No.] field in the Edit area.

2. Edit data in the Edit area.
   ⇒ Edited data is immediately reflected in the Data List area.

   **TIP**
   A cell containing invalid data is displayed with red background.

   **TIP**
   The range check for the position data of each axis is based on the setup range defined by the registered parameters. A cell containing out of range data is displayed with red background.
B4 Connecting to and Disconnecting from FA-M3

This chapter describes how to connect the PC to the FA-M3, as well as how to perform communications setup.

- Connecting to FA-M3 → B4.1
- Disconnecting from FA-M3 → B4.2
- Considerations for Multi-CPU Configuration → B4.3
- Test Data → B4.4

B4.1 Connecting to FA-M3

Before you start connecting online to FA-M3, you must first connect your PC to the CPU module with a cable and set up communication settings according to the mode of connection.

B4.1.1 Checking Communications Setup and Connecting

1. Run ToolBox.

2. Select [Online]-[Connect] from the menu bar.
   ⇒ The Connection Check dialog box is displayed.

3. Click the [Setting...] button of the communication port to be used for the connection.
   ⇒ Screen (2) is displayed.

4. Ensure that settings are correct, and click [OK].

SEE ALSO
For details on communications setup, see: Section B3.1, "Communications Setup" of the "FA-M3 ToolBox Manual".
5. Click [Connect] on the Connection Check dialog box.

⇒ FA-M3 system and the PC is connected. The connection status is displayed on the action status bar and the status bar at the bottom of the operation screen.
B4.2 Disconnecting from FA-M3

This section describes how to disconnect the CPU module and PC.

B4.2.1 Disconnecting

1. Select [Online]-[Disconnect] from the menu bar.
⇒ Screen (1) will be displayed

   TIP
   This message may also be displayed when you close an open online screen.

2. Click [OK].
⇒ FA-M3 and the PC are disconnected from each other.

   CAUTION

Disconnecting from FA-M3 is not allowed while an Action Test screen is displayed.
To disconnect during an action test, you must first close the Action Test screen.
B4.3 Considerations for Multi-CPU Configuration

In a multi-CPU configuration, online processing is not allowed when another CPU not connected to ToolBox is accessing the positioning module. For proper use, a CPU not using ToolBox must either download a program that has the positioning module defined as 'Not used' in the DIO Setup of the project configuration, or stop refreshing of input and output (X/Y) relays.

- **Sequence CPU Using ToolBox**
- **Sequence CPU Not using ToolBox**
- **Positioning Module Module to be used**

---

**CAUTION**

When one positioning module is accessed from two or more sequence CPUs, the input/output (X/Y) relay values change with individual CPUs, and ToolBox cannot run normally.
B4.4 Test Data

Before performing action testing or pattern monitoring on a positioning module, you must first select the data to be used in the test.

You can select to use either of two data sets: project data or module data. Project data refers to data stored on the PC while module data refers to data stored in the module.

When using project data, you should first check the file name and date. If data are inconsistent, the motor may not operate as expected.

TIP

The number of data records to be uploaded depends on the number of data items used as defined in the module. If the number of data records does not match the data on the PC, you should upload all data before performing an action test.

CAUTION

A filename on the PC can be up to 255 bytes according to Microsoft Windows specifications but beware that only the first 10 characters of the filename are stored in the module. To check whether data has been changed, compare the displayed file date and module date. The displayed dates refer to the dates of the last edit.
This chapter describes how to download registered parameters from a PC to FA-M3.

- Downloading → B5.1
- Downloading Restrictions → B5.2

## B5.1 Downloading

### B5.1.1 Downloading to Individual Modules

There are two options for downloading to individual modules: download module or download project. The download project option downloads data to all modules according to the parameter configuration definition.

#### Download Module Screen

This section describes the operation of the Download Module screen.

- **File name and date/time**
- **Date/time when data was downloaded to the module.**
- **Up to 10 characters are stored for the file name.**
- **The number of position data records used and downloadable.**
- **Starts downloading.**
- **Exits without downloading.**
- **The number of pattern data records used and downloadable.**
- **Specifies whether to store downloaded data to the ROM of the positioning module.**
- **Enter the number of pattern data records to be downloaded. The default value is the number of pattern data records used defined in the project properties.**
- **Performs validation of parameter data.**
■ Downloading to Individual Modules

1. Select [Online]-[Download]-[Module] from the menu bar.
   ⇒ Screen (1) is displayed.

2. Select module data to be downloaded by clicking in the Select column.

- Color Codes for Availability for Downloading

Modules are color-coded to indicate their availability for downloading as follows:
- White:
  Downloading to the module is allowed.
- Red:
  Downloading is not allowed because of a mismatch between the I/O configuration and the file structure of the module. Check the file or the connected FA-M3 system for compatibility.
- Yellow:
  For positioning modules, this color indicates that downloading to the module is allowed.

  **TIP**

  For other types of modules, yellow indicates that the address setup for the CPU module is invalid or not done.

- Gray
  Not selectable

3. Click [Module].
   ⇒ Screen (2) is displayed.

4. Select the items to be downloaded.
5. Click [Download].
⇒ The Download dialog box is displayed during downloading. When download is completed, screen (3) is displayed.

TIP
Clicking [Abort] on the Download screen aborts the download process.

6. Click [OK].
⇒ The Results of Downloading window is displayed for verification.

SEE ALSO
- For information on the messages on the results of downloading, see:
  Section B5.1.3, "Messages about Results of Downloading".
- For information on how to verify downloaded parameters, see:
  Section B4.2, "Verifying Downloaded Registered Parameters" of the "FA-M3 ToolBox Manual".
- The CPU module is switched to Stop mode before downloading.
- When downloading registered parameters to positioning module, the module is switched to Stop mode before downloading.

CAUTION
- Downloading positioning module data to the CPU module using ToolBox is not allowed.
- Downloading to a positioning module is not allowed while an action test or monitor is running.
- Title and names of axes defined in properties are not downloaded to the module.
B5.1.2 Downloading to All Modules of a Project

1. Select [Online]-[Download]-[Project] from the menu bar.
⇒ Screen (4) is displayed.

2. Click [Module].
⇒ The Download dialog box is displayed during downloading. When download is completed, screen (5) is displayed.

SEE ALSO
For information on the color codes of modules indicating their availability for downloading, see the description entitled “Color Codes for Availability for Downloading” in Section B5.1.1.

TIP
Clicking [Abort] on the Download screen aborts the download process.

3. Click [OK].
⇒ The Results of Downloading window is displayed for verification.

SEE ALSO
- For information on messages about results of downloading, see:
  Section B5.1.3, “Messages about Results of Downloading”.
- For information on how to verify downloaded parameters, see:
  Section B4.2, “Verifying Downloaded Registered Parameters” of the “FA-M3 ToolBox Manual”.
- The CPU module is switched to Stop mode before downloading.
- When downloading registered parameters to an advanced function module, the module is switched to Stop mode before downloading.
### B5.1.3 Messages about Results of Downloading

The Results of Downloading window may display one or more of the following messages. Read the messages and take appropriate actions, as required.

<table>
<thead>
<tr>
<th>No.</th>
<th>Message</th>
<th>Description</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Execution completed successfully.</td>
<td>Downloading completed successfully.</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Execution was aborted.</td>
<td>The [Abort] button was clicked during downloading, and downloading was aborted.</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Failed to write registered parameter.</td>
<td>Error was encountered while writing to module. Registered parameter is invalid.</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Position data (NNN): write failure</td>
<td>Error was encountered while writing to module. Position data (NNN) is invalid (e.g. out of valid range).</td>
<td>*1</td>
</tr>
<tr>
<td>5</td>
<td>&lt;<strong>&gt; Pattern data (NNN) [</strong>*]: write failure</td>
<td>Error was encountered while writing to module. Parameter [*<strong>] of record (NNN) of pattern &lt;</strong>&gt; data is invalid.</td>
<td>*2</td>
</tr>
<tr>
<td>6</td>
<td>Communication server is busy.</td>
<td>The communication server is busy.</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Invalid dialog information file</td>
<td>Dialog information file was found to be damaged during online processing. The ToolBox environment file may have been changed by a user.</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Memory error</td>
<td>Available memory is insufficient.</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Downloading was not allowed because action test or action monitoring was in progress.</td>
<td>Downloading to positioning module is not allowed during online processing. Close all online screens before downloading.</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>ToolBox connection error encountered.</td>
<td>The positioning module selected for downloading is used by another application. Check all usages.</td>
<td></td>
</tr>
</tbody>
</table>

*1: (NNN) denotes a position data number.
*2: (NNN) denotes a pattern data record number.
[***] denotes a parameter name.
B5.2 Downloading Restrictions

- **Operation Status of Positioning Module**
  - Downloading is not allowed during positioning.

- **CPU Operating Mode**
  - The CPU must be switched to Stop mode before downloading. After downloading completes, switch the CPU module to Run mode manually as required.

- **Operation Status of ToolBox**
  - Downloading is not allowed when an action test or action monitor screen is open. Close all online processing screens before downloading.

- **If Operating Mode of CPU Module is in ROM Writer Mode**
  - Downloading is not allowed if the CPU module is in ROM Writer mode. In this case, the following dialog box will be displayed. You should exit from ROM Writer mode using WideField3 or other means.
Checking Operation Status Using Action Monitor

This chapter describes how to display Action Monitor screens and how to save displayed data.

- What is Action Monitor? → B6.1
- Using Action Monitor → B6.2
- Using Pattern Monitor → B6.3

B6.1 What is Action Monitor?

Using the Action Monitor, you can read and display status information of positioning modules on a computer screen.

---

![Diagram of Action Monitor functions]

Action Monitor functions

- Axis monitor
- Monitors for various statuses
- All pattern data monitor
- XY relay monitor

---

**CAUTION**

Do not pull out the cable during communication between FA-M3 and ToolBox.
B6.2 Using Action Monitor

B6.2.1 Displaying Action Monitor Screen

1. Run ToolBox, open a project, and connect to FADM3.

2. Select [Debug/Maintenance]-[Action Monitor...] from the menu bar.
   ⇒ The Select Action Monitor screen is displayed.

3. In the Select Action Monitor screen, highlight the positioning module to be monitored by clicking the corresponding cell.
   ⇒ Screen (1) is displayed.

4. From the displayed buttons ([All Axes], [Pattern A], ...), select and click the button for the item to be monitored.
   ⇒ The Action Monitor screen is displayed.

   **TIP**
   As an alternative way to display the Action Monitor screen, you may also double-click Action Monitor under the name of the positioning module to be monitored in the Debugger Window.
B6.2.2 Axis Monitor Screen

The Axis Monitor screen displays the following information.

- **Operation Monitor 1**
  - Row 1: Current position
  - Row 2: Current speed

- **Operation Monitor 2**
  - Row 1: Counter current position
  - Row 2: Counter current speed

- **Position/speed status**
  - **Error display**
  - **Error status**
  - **I/O relays**

- **Status of individual axes**

- **Pattern operation status**

- **Help**
Position/Speed Status

Clicking the [Pos./Speed Status] button on the Axis Monitor screen displays the following screen.

SEE ALSO
For details on the displayed status information, see Subsection C1.4.3, "Axis Statuses"
For further details, see "Positioning Module (with Pulse Output)" (IM34M06H56-02E).
All Axis Status

Clicking the [All Axis Status] button on the Axis Monitor screen displays the following screen.

Click to display screen below.

Selecting different tabs changes the displayed items.

SEE ALSO
For details on the displayed status information, see Subsection C1.4.3, "Axis Statuses"
For further details, see "Positioning Module (with Pulse Output)" (IM34M06H56-02E).
**Error Status**

Clicking the [Error Status] button on the Axis Monitor screen displays the following screen.

SEE ALSO

For details on the displayed status information, see Subsection C1.4.3, "Axis Statuses"

For further details, see "Positioning Module (with Pulse Output)" (IM34M06H56-02E).
Pattern Operation Status

Clicking the [Pattern Op. Status] button on the Axis Monitor screen displays the following screen.

SEE ALSO
For details on the displayed status information, see Subsection C1.4.3, "Axis Statuses"
For further details, see "Positioning Module (with Pulse Output)" (IM34M06H56-02E).
**I/O Relay Status**

Clicking the [I/O Relays] button on the Axis Monitor screen displays the following screen.

SEE ALSO

For details on I/O relays, see Section C1.1, "List of I/O Relays".

For further details, see "Positioning Module (with Pulse Output)" (IM34M06H56-02E).
B6.3 Using Pattern Monitor

You can use the Pattern Monitor to check data using Pattern Data edit screen, as well as monitor pattern operation. In addition to monitoring the pattern number or label being executed, you can also check data of preceding and following pattern numbers.

- Blinks when [Start Monitoring] is selected.
- Stops monitoring
- The pattern being executed is displayed in blue.
- Background color differs from the Pattern edit screen. Default: yellow
B6.3.1 Opening Pattern Monitor

1. Double-click the required pattern monitor from the Debugger window.  
   ⇒ The Pattern Monitor screen is displayed.

   **TIP**
   Test data refers to data to be used in online operations. (Test data is selected when ToolBox is initially connected online to the FA-M3.)

2. Click [Start].  
   ⇒ Monitoring begins.

   **TIP**
   The data to be monitored is displayed according to the test data selected on the Data Confirmation screen. Test data is selected when ToolBox is initially connected to the FA-M3.
B7  Action Test

This chapter describes how to adjust data downloaded to a positioning module and perform action tests.

- Action Test Flow ➔ B7.1
- Jog ➔ B7.2
- Single Axis Positioning ➔ B7.3
- Linear Interpolation ➔ B7.4
- Circular Interpolation ➔ B7.5
- Helical Interpolation ➔ B7.6
- Index Positioning ➔ B7.7
- Origin Search ➔ B7.8
- Manual Pulse Generator (MPG) ➔ B7.9
- Counter ➔ B7.10
- Pattern ➔ B7.11
- Output/Mode ➔ B7.12
- Teaching ➔ B7.13

B7.1 Action Test Flow

The Action Test function allows you to modify various data of a positioning module online and immediately check its operation.

Only one positioning module can be tested using ToolBox at any one time. Concurrent testing of multiple modules is not allowed.

Data to be used in action tests is known as the test data. You select the test data before starting the Action Test or Pattern Monitor. You can select either project data or module data as the test data.

⚠️ CAUTION

Do not disconnect an online connection while an action test is being executed. If an error is encountered in the positioning module, the connected motor may not operate as expected.

Ensure that the test data is appropriate for the module. Otherwise, the positioning module may not operate normally.

Exercise special care when running ladder programs during an action test.

⚠️ CAUTION

Action tests must be run in position control mode. Running an action test in speed control mode generates an error.

You can use the Output/Mode tab of the Action Test screen to switch the control mode.

⚠️ CAUTION

The following operations are not allowed during an action test: download, upload, compare, ROM management and change communication speed. You should close all online screens before running an action test.
**B7.1.1 Action Test Screen Layout**

This section describes the Data Confirmation screen and the Common Action Test screen.

For details on the individual action test screens, refer to the relevant section in this chapter.

### Data Confirmation

The Data Confirmation screen allows you to select the test data to be used in action tests.

**File name and date/time of PC data for the module to be tested.**

**File name and date/time of data for module to be tested.**

**Action test is to be performed using data on PC.**

**No uploading is performed.**

**Action test is to be performed using data in module.**

**Data is uploaded before testing.**

**Uploads data is intended for temporary use, to be discarded after action test is completed.**

**If data is modified during testing, a dialog will be displayed to confirm whether to save data.**

**Saves uploaded data to the project.**

**This action has the same effect as performing a module upload.**

**Selects item to be uploaded. Registered parameters are always uploaded as they determine the data range.**

**Opens Action Test screen based on entered data.**

**Aborts action test.**

**TIP**

The number of data uploaded is determined by the number of data used defined in the module. If the specified number of data used does not tally with actual data on the PC, you should upload all data before running an action test.

---

**CAUTION**

Do not disconnect an online connection while an action test is running. If an error is encountered in the positioning module, the connected motor may not operate as expected.

Ensure that the test data is appropriate for the module. Otherwise, the positioning module may not operate normally.

Exercise special care when running ladder programs during an action test.
Common Action Test Screen

The Common Action Test screen contains screen elements that are common to various action test types. The screen elements may be either shown or hidden on individual action test screens.

**Axis Button Group:**
- **Reset Axis Errors:** Resets errors of test/movement axis. The button changes to red color if an axis error is detected.
- **Stop Immediately:** Stops test/movement axis immediately.
- **Decelerate & Stop:** Decelerates and stops test/movement axis.

**Test/Movement Axis Selection:**
- Select the test axis. Changing the test/movement axis resets setup data.

**All Axes Button Group:**
- **Reset All Errors:** Resets errors of all axes. The button changes to red color if any axis error is detected.
- **Stop All Axes:** Stops all axes immediately.
- **Close:** Closes Action Test screen.

**Specifications:**
- **Speed:** Specifies speed.
- **Target Position:** Specifies target position. You can either use pre-defined position data or enter numeric data directly.
- **Override Value:** Specifies override value.
- **Acceleration/Deceleration Time:** Specifies rate of acceleration or deceleration. Default values refer to registered parameter values.
B7.1.2 Starting Action Test

1. With FA-M3 connected online, select [Debug/Maintenance]-[Action Test] from the menu bar.
   ⇒ The Module Selection screen is displayed.

   **SEE ALSO**
   For details on how to connect online to FA-M3, see:
   Section B4.1, "Connecting to FA-M3".

2. Select the positioning module to be tested, and select [Action Test].
   ⇒ The Data Confirmation screen for action test is displayed.

   **CAUTION**
   The Data Confirmation screen allows you to select whether to use data in the positioning module or data in the PC in action tests. If the test data and actual equipment is inconsistent, it may lead to equipment damage or accidents.

3. Select [Start] on screen (1).
   ⇒ The Action Test screen is displayed.

   **TIP**
   You can also initiate an action test from the Debugger Window with FA-M3 connected online by double-clicking the positioning module to be tested.
B7.2 Jog

Selecting the [Jog] tab on the Action Test screen displays the Jog screen. Jogging allows you to check wiring, confirm connection and perform teaching. ToolBox allows you concurrent jogging of multiple axes.

B7.2.1 Jog Screen Layout

Select different tabs to switch between action test screens.

Constantly refreshes and displays the current position and speed. Values are displayed according to the Display Unit registered parameter value of the positioning module.

Performs forward or reverse jogging. Performs jogging when the mouse button is clicked or while the space key is depressed. Releasing the space key stops jogging. To jog multiple axes concurrently, click the mouse button with the [Shift] key depressed.

Specify the acceleration and deceleration time. Default values refer to registered parameter values.

Opens the Teaching screen.

Specify the speed. You can select the speed from a list containing up to five historical speeds stored for each axis.

This button changes to red color if any axis error is detected. Clicking the button resets all axis errors.

Stops all axes immediately.

Exits from action test and closes the screen.
B7.2.2 Single-axis Jog

1. Sets up data for the axis to be tested on the Jog Screen.

2. Select the axis to be tested by clicking the mouse button or pressing the space key.
   ⇒ The display of the axis being executed changes color.

3. Releasing the mouse button or the space key stops the axis.
B7.2.3 Multi-axis Jog

You can jog multiple axes concurrently using the positioning module.

1. Set up data for the axes to be tested on the Jog Screen.

2. Select one axis to be tested by clicking the mouse or pressing the space key on the corresponding button with the [shift] key depressed.

3. With the [shift] key depressed, select other axes to be tested concurrently. ⇒ The display of the axes being executed change color.

   **TIP**
   Performing forward jog and reverse jog simultaneously for the same axis is not allowed.

4. Releasing the [shift] key stops all axes. 

   **TIP**
   To stop one specific axis while testing multiple axes, select the axis again. Clicking a button toggles between starting and stopping execution as follows:
   Execute⇒Stop⇒Execute⇒Stop………
   Releasing the [shift] key stops all axes.
B7.3 Single-axis Positioning

Selecting the [Axis/Linear] tab on the Action Test screen displays the action test screen for single-axis positioning.

B7.3.1 Single-axis Screen Layout

Select the test axis. The button for the selected axis changes color.

Select Single-axis test mode. The screen layout changes with the selected mode. Items that do not require setup are either disabled or hidden from the display.

Performs positioning.

Sets up the override value.

Specify the speed.

Specify the acceleration time and deceleration time.

Enter position data number or label if the [Position Data] option is selected.

Enter target position data directly if the [Enter Value] option is selected.

Select this option to enter target position data directly.

SEE ALSO

For details on how to perform setup, see Section 6.9.1, "Single-axis Positioning" of "Positioning Module (with Pulse Output)" (IM34M06H56-02E).
B7.3.2 Testing Single-axis Movement

1. Select the axis to be tested as shown in Single-axis Action Test Screen (1). Select [Single Axis] for [Mode].
⇒ The selection button of the selected test axis changes color.

2. Specify the target position for the test axis. Two options are available for specifying the target position: [Position Data] and [Enter Value].

   TIP
   - If [Position Data] is selected, data values cannot be changed.
   - If [Enter Value] is selected, only the input area for the test axis is displayed in the Target Position List column.
   - If the [INC] checkbox is selected, the entered position data value should be incremental from the current position.

3. Set up the specified speed, acceleration time and deceleration time, and click [Start Positioning].
⇒ The test axis is moved to the target position.

   TIP
   - To use acceleration time and deceleration time values defined by registered parameters, turn on the [Default] checkbox.
   - If an error is detected after you click [Start Positioning], the error buttons at the bottom of the screen changes to red color. If this happens, check the setup data using the Action Monitor, rectify the problem and re-execute the action test.
B7.4 Linear Interpolation

Selecting the [Axis/Linear] tab on the Action Test screen displays the action test screen for linear interpolated positioning.

B7.4.1 Linear Interpolation Screen Layout

Select the test axis. The button for the selected axis changes color.

Select the test mode. Two test modes are available: [Single Axis] and [Linear Interpolation]. The screen layout changes with the selected mode.

Select the other axes, in addition to the test axis, for linear interpolation.

Enter position data number or label if the [Position Data] option is selected.

Select this option to enter target position data directly.

Sets up the override value.

Enter target position data directly if the [Enter Value] option is selected.

Specify the speed.

Specify the acceleration time and deceleration time.

Performing positioning.

SEE ALSO

For details on how to perform setup, see Section 6.9.2, "Linear Interpolation" of "Positioning Module (with Pulse Output)" (IM34M06H56-02E).
B7.4.2 Testing Linear-interpolated Movement

1. Select the test axis and select [Linear Interpolation] for the [Mode] as shown in Linear Interpolation Action Test Screen (1).
   ⇒ The test axis is disabled in the Interpolation Axes Selection area.

   **TIP**
   Changing the test axis resets all setup data.

2. Specify the target position.
   ⇒ Screen (2) is displayed.

   **TIP**
   - You can select the [Position Data] option to use pre-defined position data for the target position. Entering a value in [No.] or [Label] in the Target Position group displays the selected position data in the corresponding target position rows.
   - If [Position Data] is selected, target position data cannot be changed. To change target position data, select the [Enter Value] option instead.

3. Specify the speed. There are two options for specifying speed: [Command Axis] and [Combined Speed].
4. Specify the acceleration time and deceleration time. Default values refer to values defined by the registered parameters.

5. Click [Start Positioning] to start execution.
### B7.5 Circular Interpolation

Selecting the [Circular/Helical] tab on the Action Test screen displays the action test screen for circular interpolation.

#### B7.5.1 Circular Interpolation Screen Layout

Select the test mode. Three circular interpolation modes are available: CI Using Sub Point ⇒ Passes through a sub point. CW CI Using Center ⇒ Moves CW around a center. CCW CI Using Center ⇒ Moves CCW around a center. Select the circular interpolation axes. The action test axis (disabled in display) and the selected axis form the circular interpolation axes. Circular interpolation is performed with only 2 axes. To move 3 or more axes, select [CW Helical] or [CCW Helical] in the Mode group.

Specify the number of circular interpolation turns.

Specify the center point or sub point. The X and Y axes refer to the circular interpolation axes with X axis denoting the axis having the smaller axis number, and Y axis denoting the axis having the larger axis number.

**SEE ALSO**

For details on how to perform setup, see Section 6.9.3, "Circular Interpolation" of "Positioning Module (with Pulse Output)" (IM34M06H56-02E).
B7.5.2 Testing Circular Interpolation

1. Select the test axis and select the required circular interpolation mode as shown in Circular Interpolation Action Test Screen (1).
   ⇒ The test axis is selected and disabled in [CI Axes].

   **TIP**
   Changing the test axis resets all setup data.

2. Specify the circular interpolation axes (CI Axes) and the circular interpolation turns (CI Turns).

3. Specify the target position.
   ⇒ Screen (3) is displayed.

   **TIP**
   - You can select the [Position Data] option to use pre-defined position data for the target position. Entering a value in [No.] or [Label] in the Target Position screen area displays the selected position data in the Target Position area.
   - If [Position Data] is selected, target position data cannot be changed. To change target position data, select the [Enter Value] option instead.
4. Specify the speed, acceleration time and deceleration time. You can select the speed from a list containing up to five historical speeds stored. To make use of acceleration and deceleration time defined by the registered parameters, turn on the [Default] checkbox.

5. Specify the center point or the sub point. You can make use of pre-defined position data, just as for the target position. The X axis denotes the circular interpolation axis having the smaller number and the Y axis denotes the circular interpolation axis having the larger number.

**TIP**
For instance, when performing circular interpolation using axis 1 and axis 4, X axis denotes axis 1 and Y axis denotes axis 4.

**CAUTION**
Changing the test axis resets all setup data.

6. Click [Start Positioning] to start execution.
B7.6 Helical Interpolation

Selecting the [Circular/Helical] tab on the Action Test screen displays the action test screen for helical interpolation.

B7.6.1 Helical Screen Layout

Two helical interpolation modes are available: clockwise (CW) or counter-clockwise (CCW).

Specify the circular interpolation axes.

Specify the helical line axis. You cannot select the test axis or circular interpolation axis as the helical line axis.

Specify the number of circular interpolation turns.

Specify the target position.

Specify the speed.

Specify a sub point.

Perform helical interpolation.

Specify the acceleration time and deceleration time. Default values are registered parameter values.

SEE ALSO

For details on how to perform setup, see Section 6.9.4, "Helical Interpolation" of "Positioning Module (with Pulse Output)" (IM34M06H56-02E).
B7.6.2 Testing Helical Interpolation

1. Select the test axis and select the required helical interpolation mode as shown in Helical Interpolation Action Test Screen (1).

   ⇒ The test axis is selected and disabled in [CI Axes].

   **TIP**
   Changing the test axis resets all setup data.

2. Specify the circular interpolation axes, helical line axis and the circular interpolation turns. Axes that are disabled in the display are either movement axes or not selectable.

3. Specify the target position.

   **TIP**
   - You can select the [Position Data] option to use pre-defined position data for the target position. Entering a value in [No.] or [Label] in the Target Position screen area displays the selected position data in the Target Position area.
   - If [Position Data] is selected, target position data cannot be changed. To change target position data, select the [Enter Value] option instead.
4. Specify the speed, acceleration time and deceleration time. You can select the speed from a list containing up to five historical speeds stored. To make use of acceleration and deceleration time defined by the registered parameters, turn on the [Default] checkbox.

5. Specify the center point or the sub point. You can make use of predefined position data, just as for the target position. The X axis denotes the circular interpolation axis having the smaller axis number and the Y axis denotes the circular interpolation axis having the larger axis number.

**TIP**

For instance, when performing circular interpolation using axis 1 and axis 4, X axis denotes axis 1 and Y axis denotes axis 4.

**CAUTION**

Changing the test axis resets all setup data.

6. Click [Start Positioning] to start execution.
B7.7 Index Positioning

Selecting the [Index] tab on the Action Test screen displays the Index action test screen. Two control modes are available: index positioning and index speed control.

B7.7.1 Index Screen Layout

Select the test axis. Axes not set up for index control are disabled and cannot be selected.

Select the mode. Performs index control positioning using the setup data.

Performs index control positioning using the setup data.

Specify the acceleration and deceleration time.

Specify the target position. You can either make use of pre-defined position data or enter data directly.

Specify the speed.

SEE ALSO

For details on how to perform setup, see Section 6.11, "Index Control" of "Positioning Module (with Pulse Output)" (IM34M06H56-02E).
B7.7.2 Testing Index Control Movement

1. Select the test axis and select the required mode as shown in Index Action Test Screen (1).
   ⇒ The selection button of the selected test axis changes color.
   ⇒ Screen elements may be either shown or hidden depending on the selected mode.

   TIP
   Non-displayed items do not require setup.

2. Specify the speed, acceleration time, deceleration time and target position.

3. Select [Index Control].
   ⇒ Execution begins.
B7.8 Origin Search


B7.8.1 Origin Search Screen Layout

Select the required origin search mode. Two options are available:
- Automatic: Positioning module performs origin search automatically.
- Manual: User sets up parameters and then performs origin search.

Sets up parameters for manual origin search. These screen elements are not displayed if Automatic mode is selected.

Specify the current position value.

CAUTION

For details on the parameters used in manual origin search mode, see Section 6.7.2, "Manual Origin Search" of "Positioning Module (with Pulse Output)" (IM34M06H56-02E).
### B7.8.2 Performing Origin Search

1. Select the axis for origin search and select the required mode as shown in Origin Search Screen (1). If you select manual mode, you will need to set up the parameters for origin search.

2. Set up the parameters, and click [Start Origin Search].

⇒ Origin search begins.
B7.9 Manual Pulse Generator (MPG)

Selecting the [MPG/Counter] tab on the Action Test screen displays the MPG Action Test screen.

B7.9.1 MPG Screen Layout

Select the axis for manual pulse generator.

Select the axis using the counter in Manual Pulse Generator mode.

Specify the MPG multiplication and decimal point position.

Starts manual pulse generator.

Stops manual pulse generator.

- **Multiplication and Decimal Point**

  Calculate and set up the multiplication and decimal point for manual pulse generator mode as follows:

  Example: If Multiplication is set to 1234 and Decimal Point is set to 2:1/100, the value is \(1234 \times 1/100 = 12.34\)

SEE ALSO

For details on how to set up individual parameters, see Section 6.6.2, "Starting Manual Pulse Generator Mode" and Section 6.6.3, "Stop Manual Pulse Generator Mode" of "Positioning Module (with Pulse Output)" (IM34M06H56-02E).
B7.9.2 Testing Manual Pulse Generator

1. Select the axis to be tested and the axis using the counter as shown in MPG Screen (1).

   **TIP**
   The Axis Using Counter refers to the counter axis used in the manual pulse generator.

2. Specify the speed and other parameters for manual pulse generator mode and click [Start].
   ⇒ Manual pulse generator is executed.
**B7.10 Counter**

Selecting the [MPG/Counter] tab on the Action Test screen displays the Counter Action Test screen.

**B7.10.1 Counter Screen Layout and Testing Procedure**

- Select the axis for counter testing.
- Set up the counter Coincidence: specify the counter coincidence value.
- Zone Coincidence: specify the upper limit and lower limit.
- Set up the current position of the counter. You can select either to use the current position of the module or to enter a value.
- Resets the Counter Coincidence relay.
- Starts reading absolute encoder manufactured by Yaskawa Electric Corporation.

**SEE ALSO**

For details on how to set up each parameter, see Section 6.17, "Counter Functions" of "Positioning Module (with Pulse Output)" (IM34M06H56-02E).
B7.11 Pattern

Selecting the [Pattern] tab on the Action Test screen displays the Pattern Action Test screen.

B7.11.1 Pattern Screen Layout and Testing Procedure

Select the pattern to be tested.

Normal Execution:
Performs normal pattern execution run. Enter a starting pattern number or label and then click [Execute Pattern] to start execution.

Test Operation:
Executes pattern records between the specified Start Record No. and End Record No. If the range contains a FOR-NEXT loop, the pattern records within the loop are executed for the specified number of iterations.

Decelerates and stops axis.

Opens the Teaching Screen.

Restart Operation:
This area displays either the number and label of the pattern record currently being executed or the pattern record where execution has stopped. Click [Restart Operation] to execute the displayed pattern.

Resets pattern error.

Stops axes immediately.

Resets the M code.

SEE ALSO

For details on how to set up each parameter, see Chapter 7, "Pattern Operation Programming" of "Positioning Module (with Pulse Output)" (IM34M06H56-02E).
B7.12 Output/Mode

Selecting the [Output/Mode] tab on the Action Test screen displays the action test screen for turning contact outputs on or off and for switching the control mode.

Action tests cannot be executed in speed control mode. If the module has been switched to Speed Control mode during pattern execution or pattern test execution, switch the control mode to Position control before performing action tests.

B7.12.1 Output/Mode Screen Layout and Testing Procedure

Displays the ON ● / OFF ○ statuses of general outputs of each axis. Also allows a user to turn on or turn off general outputs.

Switches control mode. For each axis, the current mode is indicated by a green button. Press a button to switch an axis between position control and speed control mode.

SEE ALSO

For details on how to set up each parameter, see Section 6.10, "Speed Control" and Section 6.18, "Contact Outputs On/Off" of "Positioning Module (with Pulse Output)" (IM34M06H56-02E).

CAUTION

You can switch from speed control mode to position control mode only in positioning completed state. At this time, the current position is reset to zero.
**B7.13 Teaching**

Teaching is used to change position data values of a positioning module. You can jog axes, and then write the current position.

**B7.13.1 Teaching Screen Layout**

- **Performing ROM transfer** saves all module data to ROM.
- **Select data for teaching.**
- **Select axis for writing.**
- **Displays current position and counter current position.**
- **Specify whether to reflect teaching data to project and module ROM after writing to the module. We recommend doing so to ensure data integrity.**
- **Closes screen**
- **Teach target position values by enabling the Specified Value area and entering position data.**
- **Performs teaching according to setup.**

**CAUTION**

Teaching using ToolBox is allowed only if no axis is positioning and no pattern is being executed.
B7.13.2 Teaching

1. Open the Teaching screen (screen (1)) from the Jog or Pattern screen, and select a position data number for writing.
⇒ The position data label is displayed.

TIP
Alternatively, selecting a position data label displays the corresponding position data number.

2. Set up the target position by selecting axes for writing and entering required values.

TIP
The Specify Value data input area may be hidden or shown, depending on the selected mode.

3. Select the options for data saving, and click [Teach].
⇒ Position data is updated.

TIP
- If test data is to be saved, a dialog is displayed at the end of the test to confirm whether to save data.
- Reflecting data to a project modifies the data on the PC.
B8 Uploading from Modules

This chapter describes how to upload registered parameters from FA-M3 to a PC.

- Uploading → B8.1
- Uploading Restrictions → B8.2

B8.1 Uploading

Before uploading, you must first connect your CPU module and the PC with a cable, and perform environment setup according to the mode of connection.

B8.1.1 Uploading from Individual Modules

Upload Module Screen

This section describes the operation of the Upload Module screen.

- File name and date/time
- Date/time when data was downloaded to the module
- The number of position data records used and uploadable.
- Starts uploading
- Exits without uploading.
- Enter the number of pattern data records to be uploaded.

The number of pattern data records used and uploadable.

File name and date/time
# Uploading from Modules

   ⇒ Screen (1) is displayed.

2. Select module data to be uploaded by clicking in the Select column.

### Color Codes for Availability for Uploading

Modules are color-coded to indicate their availability for uploading as follows:

- **White:**
  - Uploading from the module is allowed.

- **Red:**
  - Uploading is not allowed because of a mismatch between the I/O configuration and the file configuration of the module. Check the file or the connected FA-M3 system for compatibility.

- **Yellow:**
  - Uploading from the CPU module is not allowed because the address setup for the CPU module is invalid or not done. Uploading from the module is allowed.

- **Gray**
  - Not selectable.

3. Click [Module].
   ⇒ Screen (2) is displayed.

   **TIP**

   Uploading from CPU is not allowed in ToolBox for Positioning Modules.

4. Select the items to be uploaded.

5. Click [Upload].
   ⇒ The Upload dialog box is displayed during uploading. When the upload is completed, it is replaced by screen (3).

   **TIP**

   Clicking [Abort] on the Upload screen aborts the upload process.
6. Click [OK].

7. The Results of Uploading window is displayed for verification.

SEE ALSO
- For information on messages about results of uploading, see:
  Section B8.1.3, "Messages about Results of Uploading".
- For details on uploading, see:
  Section B6.1, "Uploading Registered Parameters" of the "FA-M3 ToolBox Manual".
- All running action monitors are suspended during uploading.

B8.1.2 Uploading from All Modules of a Project

1. Select [Online]-[Upload]-[Project] from the menu bar.
   ⇒ Screen (4) is displayed.

2. Click [OK].
   ⇒ The Upload dialog box is displayed during uploading. When the upload is completed, it is replaced by screen (5).

SEE ALSO
For information on the color codes of modules indicating their availability for uploading, see the description entitled "Color Codes for Availability for Uploading" in Section B8.1.1.

TIP
Clicking [Abort] on the Upload screen aborts the upload process.
3. Click [OK].

4. The Results of Uploading window is displayed for verification.

**SEE ALSO**
- For information on messages about results of uploading, see: Section B8.1.3, “Messages about Results of Uploading”.
- For details on uploading, see: Section B6.1, “Uploading Registered Parameters” of the "FA-M3 ToolBox Manual".
- All running action monitors are suspended during uploading.
B8.1.3  **Messages about Results of Uploading**

The Results of Uploading window may display one or more of the following messages. Read the messages and take appropriate actions, as required.

**Table B8.1  List of Messages about Results of Uploading**

<table>
<thead>
<tr>
<th>No.</th>
<th>Message</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Execution completed successfully.</td>
<td>Uploading completed successfully.</td>
</tr>
<tr>
<td>2</td>
<td>Execution was aborted.</td>
<td>The [Abort] button was pressed during uploading, and uploading was aborted.</td>
</tr>
<tr>
<td>3</td>
<td>Communication server is busy.</td>
<td>The communication server is busy.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>WideField3 may be connected online to FA-M3.</td>
</tr>
<tr>
<td>4</td>
<td>Invalid dialog information file</td>
<td>Dialog information file was found to be damaged during online processing.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The ToolBox environment file may have been changed by a user.</td>
</tr>
<tr>
<td>5</td>
<td>Memory error</td>
<td>Available memory is insufficient.</td>
</tr>
<tr>
<td>6</td>
<td>Uploading was not allowed because action test or action monitoring was in progress.</td>
<td>Uploading from positioning module is not allowed during online processing. Close all online screens before uploading.</td>
</tr>
<tr>
<td>7</td>
<td>ToolBox connection error encountered. Another ToolBox is connected.</td>
<td>The positioning module selected for uploading is used by another application. Check all usages.</td>
</tr>
</tbody>
</table>
B8.2 Uploading Restrictions

● **Operation Status of ToolBox**
  - Uploading is not allowed when an action test or action monitor screen is open. You should close all online screens before performing uploading.

![ToolBox - Positioning Modules](image1)

● **If the CPU Module is in ROM Writer Mode**
  - Uploading is not allowed if the CPU module is in ROM writer mode. In this case, the following dialog box will be displayed. You should exit from ROM Writer mode using WideField3 or other means.

![ToolBox](image2)
Printing and Using Created Data

This chapter describes how to print or export created data.

- Printing Created Data → B9.1
- Using Created Data → B9.2
- Reusing Various Data Types → B9.3
- Printing Various Data Types → B9.4

B9.1 Printing Created Data

You can print created project information or registered parameter values. Print pattern data and position data using MS-Excel. Before printing, ensure that a PC running ToolBox is properly configured and connected to a printer.

SEE ALSO
For details on how to prepare for printing, see:
Section B7.1, “Printing Created Data” of the "FA-M3 ToolBox Manual”.

Printing Registered Parameters

1. Run ToolBox, open a project, and open the Registered Parameters screen to be printed.

2. Select [File]-[Print]-[Screen] from the menu bar.
⇒ Screen (1) is displayed.

3. Select the items to be printed.

4. Verify the print setup, and click [Preview] to preview the printout.
5. Confirm the printer name, and click [Print].
⇒ Parameters are printed (see Printout (2)).

TIP
Each registered parameter is printed as a row in a table. Texts that are too long will be truncated.

---

■ Printing a Project

1. Run ToolBox, and open a project to be printed.

⇒ Screen (3) is displayed.

3. Select the items to be printed.

4. Verify the print setup, and click [Preview] to preview the printout.
5. Confirm the printer name, and click [Print].
⇒ Data is printed (see Printout (4)).

TIP
Each registered parameter is printed as a row in a table. Texts that are too long will be truncated.

<table>
<thead>
<tr>
<th>Data Printout (4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parameter Name</td>
</tr>
<tr>
<td>-------------------------------</td>
</tr>
<tr>
<td>Parameter 1</td>
</tr>
<tr>
<td>Parameter 2</td>
</tr>
<tr>
<td>Parameter 3</td>
</tr>
</tbody>
</table>

---

Note: Depending on the printer used, these may differ from actual values.

* This table is printed in columns 2 and 3 for units 1 and 2 respectively.
B9.2 Using Created Data

Registered Parameters File Data

You can convert and save registered parameter data of a project into a CSV-formatted file, which you can later process using Microsoft Excel (hereinafter abbreviated as Excel) or other application programs to produce various reports on registered parameters.

SEE ALSO
For details on how to save registered parameters to a file, see:
Section B7.2, "Using Created Data" of the "FA-M3 ToolBox Manual".

1. Run ToolBox, and open a project to be printed.

2. Select [File]-[Export] from the menu bar.

3. Select the files to be exported by clicking in the Select column.

4. Click [Export].

5. Enter a file name for storing exported data.

TIP
The full pathname of the CSV file must not be longer than 254 characters.

6. Click [Save].
⇒ Data will be saved as a CSV file.

7. Run Excel.

8. Select [File]-[Open] from the menu bar.

9. Select [All Files] in the Files of Type field. All available files will be listed.

10. Double click the required file. Its content will be displayed (see Sample Content (5)).

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Project</td>
<td>NC Module Data</td>
</tr>
<tr>
<td>2</td>
<td>CPU Type</td>
<td>F3ISP64/6S</td>
</tr>
<tr>
<td>3</td>
<td>Title</td>
<td>12/17/2004</td>
</tr>
<tr>
<td>4</td>
<td>Date Modified</td>
<td>12/17/2004</td>
</tr>
<tr>
<td>5</td>
<td>File</td>
<td>F3INC450X10</td>
</tr>
<tr>
<td>6</td>
<td>Title</td>
<td>12/17/2004</td>
</tr>
<tr>
<td>7</td>
<td>Module Type</td>
<td>F3INC450N</td>
</tr>
<tr>
<td>8</td>
<td>No. of Axes</td>
<td>4</td>
</tr>
<tr>
<td>9</td>
<td>Name of Axes</td>
<td>12/17/2004</td>
</tr>
<tr>
<td>10</td>
<td>[Basic Parameters]</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>[Axis 1]</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Register</td>
<td>Comment</td>
</tr>
<tr>
<td>13</td>
<td>10</td>
<td>Maximum Speed Selection</td>
</tr>
<tr>
<td>14</td>
<td>102</td>
<td>Pulsing Output Mode</td>
</tr>
<tr>
<td>15</td>
<td>103</td>
<td>Motor Direction Selection</td>
</tr>
<tr>
<td>16</td>
<td>104</td>
<td>Contact Usage Selection</td>
</tr>
<tr>
<td>17</td>
<td>105</td>
<td>Contact I/O Polarity</td>
</tr>
<tr>
<td>18</td>
<td>109</td>
<td>Display Unit</td>
</tr>
<tr>
<td>19</td>
<td>111</td>
<td>Electronic Gear M Value</td>
</tr>
<tr>
<td>20</td>
<td>113/114</td>
<td>Electronic Gear N Value</td>
</tr>
<tr>
<td>21</td>
<td>113/114</td>
<td>Electronic Gear N Value</td>
</tr>
<tr>
<td>22</td>
<td>116</td>
<td>Index Control</td>
</tr>
<tr>
<td>23</td>
<td>117/118</td>
<td>Index Range</td>
</tr>
<tr>
<td>24</td>
<td>124/122</td>
<td>Forward Limit</td>
</tr>
<tr>
<td>25</td>
<td>123/124</td>
<td>Reverse Limit</td>
</tr>
<tr>
<td>26</td>
<td>158/163</td>
<td>Speed Limit</td>
</tr>
<tr>
<td>27</td>
<td>120</td>
<td>Acceleration/Deceleration Time</td>
</tr>
<tr>
<td>28</td>
<td>131</td>
<td>Default Acceleration Time</td>
</tr>
<tr>
<td>29</td>
<td>132</td>
<td>Default Deceleration Time</td>
</tr>
<tr>
<td>30</td>
<td>135/136</td>
<td>0: Error Tolerance</td>
</tr>
<tr>
<td>31</td>
<td>[Axis 2]</td>
<td></td>
</tr>
<tr>
<td>32</td>
<td>Register</td>
<td>Comment</td>
</tr>
<tr>
<td>33</td>
<td>401</td>
<td>Maximum Speed Selection</td>
</tr>
<tr>
<td>34</td>
<td>402</td>
<td>Pulsing Output Mode</td>
</tr>
</tbody>
</table>
B9.3 Reusing Various Data Types

This section describes how to reuse pattern data.

- **Reusing Pattern Data**

1. Open Explorer, and select the pattern data file to be reused.
   
   **TIP**
   
   The file extension is in the form of 
   "abc.YPPA*013" or "abc.YPPA*014" where 
   "abc" denotes the filename and '*' denotes the 
   pattern name (A, B, C or D).

2. Copy and then paste the pattern data file.
3. Rename the copied file with the desired new filename.

   TIP
   If a file having the new name already exists, you need to first delete it.

4. Open ToolBox, and then open the project.

   ⇒ The files are linked.

   TIP
   You can reuse position data similarly.
B9.4 Printing Various Data Types

- **Printing Pattern Data**

**CAUTION**
Before printing a pattern file using Excel, we recommend that you make a copy of the file in case inadvertent damage to the file makes it inaccessible to ToolBox.

1. Open Explorer, and select the pattern data file to be printed.

   **TIP**
   The file extension is in the form of "abc.YPPA*013" or "abc.YPPA*014" where "abc" denotes the filename and '*' denotes the pattern name (A, B, C or D).

2. Copy the pattern data file, and change its filename extension to "CSV".

   **CAUTION**
   Do not modify the original pattern data file.

3. Open the renamed pattern data file in Excel to display its contents.

4. Select [Print] from Excel's menu bar to print the data.

   **TIP**
   You can open position data in Excel similarly.
C1 Technical Information

This chapter describes registered parameters, pattern data registers, position data registers, and input/output relays.

- List of I/O Relays → C1.1
- List of Parameters and Statuses → C1.2
- Axis Common Statuses → C1.3
- Axis Operation Statuses → C1.4
- Pattern Operation Area → C1.5

C1.1 List of I/O Relays

The positioning module provides 32 input relays and 32 output relays for interfacing with the CPU module of FA-M3. For details on each output relay and input relay, see the relevant sections in this manual.

⚠️ CAUTION

Never set output relays associated with axis 3, axis 4, pattern C or pattern D on a F3NC32-0N module. Input relays associated with axis 3, axis 4, pattern C or pattern D should be ignored on a F3NC32-0N module.
## C1.1.1 Input Relays

The following table lists the input relays available in the positioning module. The module can be made to raise an interrupt to the CPU module when an input relay changes from OFF to ON.

### Table C1.1 List of Input Relays

<table>
<thead>
<tr>
<th>Input Relay No.</th>
<th>Signal Name</th>
<th>Description</th>
<th>Relationship with Other Relays</th>
</tr>
</thead>
<tbody>
<tr>
<td>X30001</td>
<td>AX1 Execute Command ACK</td>
<td>Turns on when execution of direct command for axis 1 is successfully completed.</td>
<td>Turning off Y30033 turns off this relay.</td>
</tr>
<tr>
<td>X30002</td>
<td>AX2 Execute Command ACK</td>
<td>Turns on when execution of direct command for axis 2 is successfully completed.</td>
<td>Turning off Y30034 turns off this relay.</td>
</tr>
<tr>
<td>X30003</td>
<td>AX3 Execute Command ACK</td>
<td>Turns on when execution of direct command for axis 3 is successfully completed.</td>
<td>Turning off Y30035 turns off this relay.</td>
</tr>
<tr>
<td>X30004</td>
<td>AX4 Execute Command ACK</td>
<td>Turns on when execution of direct command for axis 4 is successfully completed.</td>
<td>Turning off Y30036 turns off this relay.</td>
</tr>
<tr>
<td>X30005</td>
<td>AX1 Positioning Completed</td>
<td>Turns on when axis 1 is in positioning completed state.</td>
<td></td>
</tr>
<tr>
<td>X30006</td>
<td>AX2 Positioning Completed</td>
<td>Turns on when axis 2 is in positioning completed state.</td>
<td></td>
</tr>
<tr>
<td>X30007</td>
<td>AX3 Positioning Completed</td>
<td>Turns on when axis 3 is in positioning completed state.</td>
<td></td>
</tr>
<tr>
<td>X30008</td>
<td>AX4 Positioning Completed</td>
<td>Turns on when axis 4 is in positioning completed state.</td>
<td></td>
</tr>
<tr>
<td>X30009</td>
<td>AX1 Error Detected</td>
<td>Turns on when error is encountered on axis 1.</td>
<td></td>
</tr>
<tr>
<td>X30010</td>
<td>AX2 Error Detected</td>
<td>Turns on when error is encountered on axis 2.</td>
<td></td>
</tr>
<tr>
<td>X30011</td>
<td>AX3 Error Detected</td>
<td>Turns on when error is encountered on axis 3.</td>
<td></td>
</tr>
<tr>
<td>X30012</td>
<td>AX4 Error Detected</td>
<td>Turns on when error is encountered on axis 4.</td>
<td></td>
</tr>
<tr>
<td>X30013</td>
<td>Pattern A Execute Command ACK</td>
<td>Turns on when execution of pattern command of pattern A is successfully completed.</td>
<td>Turning off Y30049 turns off this relay.</td>
</tr>
<tr>
<td>X30014</td>
<td>Pattern B Execute Command ACK</td>
<td>Turns on when execution of pattern command of pattern B is successfully completed.</td>
<td>Turning off Y30050 turns off this relay.</td>
</tr>
<tr>
<td>X30015</td>
<td>Pattern C Execute Command ACK</td>
<td>Turns on when execution of pattern command of pattern C is successfully completed.</td>
<td>Turning off Y30051 turns off this relay.</td>
</tr>
<tr>
<td>X30016</td>
<td>Pattern D Execute Command ACK</td>
<td>Turns on when execution of pattern command of pattern D is successfully completed.</td>
<td>Turning off Y30052 turns off this relay.</td>
</tr>
</tbody>
</table>

### Table C1.1 List of Input Relays (Continued)

<table>
<thead>
<tr>
<th>Input Relay No.</th>
<th>Signal Name</th>
<th>Description</th>
<th>Relationship with Other Relays</th>
</tr>
</thead>
<tbody>
<tr>
<td>X30017</td>
<td>Pattern A Execution Completed</td>
<td>Turns on when execution of pattern A is successfully completed.</td>
<td></td>
</tr>
<tr>
<td>X30018</td>
<td>Pattern B Execution Completed</td>
<td>Turns on when execution of pattern B is successfully completed.</td>
<td></td>
</tr>
<tr>
<td>X30019</td>
<td>Pattern C Execution Completed</td>
<td>Turns on when execution of pattern C is successfully completed.</td>
<td></td>
</tr>
<tr>
<td>X30020</td>
<td>Pattern D Execution Completed</td>
<td>Turns on when execution of pattern D is successfully completed.</td>
<td></td>
</tr>
<tr>
<td>X30021</td>
<td>Pattern A Error Detected</td>
<td>Turns on when error is encountered during pattern A execution.</td>
<td></td>
</tr>
<tr>
<td>X30022</td>
<td>Pattern B Error Detected</td>
<td>Turns on when error is encountered during pattern B execution.</td>
<td></td>
</tr>
<tr>
<td>X30023</td>
<td>Pattern C Error Detected</td>
<td>Turns on when error is encountered during pattern C execution.</td>
<td></td>
</tr>
<tr>
<td>X30024</td>
<td>Pattern D Error Detected</td>
<td>Turns on when error is encountered during pattern D execution.</td>
<td></td>
</tr>
<tr>
<td>X30025</td>
<td>Pattern A M Code Detected</td>
<td>Turns on during M Code output of pattern A.</td>
<td>Turning on Y30057 turns off this relay.</td>
</tr>
<tr>
<td>X30026</td>
<td>Pattern B M Code Detected</td>
<td>Turns on during M Code output of pattern B.</td>
<td>Turning on Y30058 turns off this relay.</td>
</tr>
<tr>
<td>X30027</td>
<td>Pattern C M Code Detected</td>
<td>Turns on during M Code output of pattern C.</td>
<td>Turning on Y30059 turns off this relay.</td>
</tr>
<tr>
<td>X30028</td>
<td>Pattern D M Code Detected</td>
<td>Turns on during M Code output of pattern D.</td>
<td>Turning on Y30060 turns off this relay.</td>
</tr>
<tr>
<td>X30029</td>
<td>AX1 Counter/Zone Coincidence Detected</td>
<td>Turns on when counter coincidence or zone coincidence is detected on axis 1.</td>
<td>Turning on Y30061 when counter coincidence is detected turns off this relay.</td>
</tr>
</tbody>
</table>
### C1.1.2 Output Relays

The following table lists the outputs relays available in the positioning module.

<table>
<thead>
<tr>
<th>Output Relay No.</th>
<th>Signal Name</th>
<th>Description</th>
<th>Relationship with Other Relays</th>
</tr>
</thead>
<tbody>
<tr>
<td>Y●●●33</td>
<td>AX1 Execute Command</td>
<td>Request to execute direct command for axis 1.</td>
<td>Turn this relay off after confirming that X●●●01 has turned on.</td>
</tr>
<tr>
<td>Y●●●34</td>
<td>AX2 Execute Command</td>
<td>Request to execute direct command for axis 2.</td>
<td>Turn this relay off after confirming that X●●●02 has turned on.</td>
</tr>
<tr>
<td>Y●●●35</td>
<td>AX3 Execute Command</td>
<td>Request to execute direct command for axis 3.</td>
<td>Turn this relay off after confirming that X●●●03 has turned on.</td>
</tr>
<tr>
<td>Y●●●36</td>
<td>AX4 Execute Command</td>
<td>Request to execute direct command for axis 4.</td>
<td>Turn this relay off after confirming that X●●●04 has turned on.</td>
</tr>
<tr>
<td>Y●●●37</td>
<td>AX1 Stop Immediately</td>
<td>Request to stop axis 1 immediately.</td>
<td></td>
</tr>
<tr>
<td>Y●●●38</td>
<td>AX2 Stop Immediately</td>
<td>Request to stop axis 2 immediately.</td>
<td></td>
</tr>
<tr>
<td>Y●●●39</td>
<td>AX3 Stop Immediately</td>
<td>Request to stop axis 3 immediately.</td>
<td></td>
</tr>
<tr>
<td>Y●●●40</td>
<td>AX4 Stop Immediately</td>
<td>Request to stop axis 4 immediately.</td>
<td></td>
</tr>
<tr>
<td>Y●●●41</td>
<td>AX1 Forward Jog</td>
<td>Request to jog axis 1 forward.</td>
<td></td>
</tr>
<tr>
<td>Y●●●42</td>
<td>AX2 Forward Jog</td>
<td>Request to jog axis 2 forward.</td>
<td></td>
</tr>
<tr>
<td>Y●●●43</td>
<td>AX3 Forward Jog</td>
<td>Request to jog axis 3 forward.</td>
<td></td>
</tr>
<tr>
<td>Y●●●44</td>
<td>AX4 Forward Jog</td>
<td>Request to jog axis 4 forward.</td>
<td></td>
</tr>
<tr>
<td>Y●●●45</td>
<td>AX1 Reverse Jog</td>
<td>Request to jog axis 1 backward.</td>
<td></td>
</tr>
<tr>
<td>Y●●●46</td>
<td>AX2 Reverse Jog</td>
<td>Request to jog axis 2 backward.</td>
<td></td>
</tr>
<tr>
<td>Y●●●47</td>
<td>AX3 Reverse Jog</td>
<td>Request to jog axis 3 backward.</td>
<td></td>
</tr>
<tr>
<td>Y●●●48</td>
<td>AX4 Reverse Jog</td>
<td>Request to jog axis 4 backward.</td>
<td></td>
</tr>
<tr>
<td>Y●●●49</td>
<td>Pattern A Execute Command</td>
<td>Request to execute pattern command of pattern A.</td>
<td>Turn this relay off after confirming that X●●●13 has turned on.</td>
</tr>
<tr>
<td>Y●●●50</td>
<td>Pattern B Execute Command</td>
<td>Request to execute pattern command of pattern B.</td>
<td>Turn this relay off after confirming that X●●●14 has turned on.</td>
</tr>
<tr>
<td>Y●●●51</td>
<td>Pattern C Execute Command</td>
<td>Request to execute pattern command of pattern C.</td>
<td>Turn this relay off after confirming that X●●●15 has turned on.</td>
</tr>
<tr>
<td>Y●●●52</td>
<td>Pattern D Execute Command</td>
<td>Request to execute pattern command of pattern D.</td>
<td>Turn this relay off after confirming that X●●●16 has turned on.</td>
</tr>
<tr>
<td>Y●●●53</td>
<td>Pattern A Stop Immediately</td>
<td>Request to stop pattern A operation immediately.</td>
<td></td>
</tr>
<tr>
<td>Y●●●54</td>
<td>Pattern B Stop Immediately</td>
<td>Request to stop pattern B operation immediately.</td>
<td></td>
</tr>
<tr>
<td>Y●●●55</td>
<td>Pattern C Stop Immediately</td>
<td>Request to stop pattern C operation immediately.</td>
<td></td>
</tr>
<tr>
<td>Y●●●56</td>
<td>Pattern D Stop Immediately</td>
<td>Request to stop pattern D operation immediately.</td>
<td></td>
</tr>
<tr>
<td>Y●●●57</td>
<td>Pattern A Reset M Code</td>
<td>Request to reset M Code Detected relay for pattern A.</td>
<td>Turn this relay off after confirming that X●●●25 has turned off.</td>
</tr>
<tr>
<td>Y●●●58</td>
<td>Pattern B Reset M Code</td>
<td>Request to reset M Code Detected relay for pattern B.</td>
<td>Turn this relay off after confirming that X●●●26 has turned off.</td>
</tr>
<tr>
<td>Y●●●59</td>
<td>Pattern C Reset M Code</td>
<td>Request to reset M Code Detected relay for pattern C.</td>
<td>Turn this relay off after confirming that X●●●27 has turned off.</td>
</tr>
<tr>
<td>Y●●●60</td>
<td>Pattern D Reset M Code</td>
<td>Request to reset M Code Detected relay for pattern D.</td>
<td>Turn this relay off after confirming that X●●●28 has turned off.</td>
</tr>
<tr>
<td>Y●●●61</td>
<td>AX1 Reset Counter Coincidence</td>
<td>Request to reset Counter Coincidence Detected relay for axis 1.</td>
<td>Turn this relay off after confirming that X●●●29 has turned off.</td>
</tr>
<tr>
<td>Y●●●62</td>
<td>AX2 Reset Counter Coincidence</td>
<td>Request to reset Counter Coincidence Detected relay for axis 2.</td>
<td>Turn this relay off after confirming that X●●●30 has turned off.</td>
</tr>
<tr>
<td>Y●●●63</td>
<td>AX3 Reset Counter Coincidence</td>
<td>Request to reset Counter Coincidence Detected relay for axis 3.</td>
<td>Turn this relay off after confirming that X●●●31 has turned off.</td>
</tr>
<tr>
<td>Y●●●64</td>
<td>AX4 Reset Counter Coincidence</td>
<td>Request to reset Counter Coincidence Detected relay for axis 4.</td>
<td>Turn this relay off after confirming that X●●●32 has turned off.</td>
</tr>
</tbody>
</table>

Note: □□□□ denotes the slot number of the FA-M3 where the positioning module is installed.
C1.2 List of Parameters and Statuses

The positioning module provides parameters and statuses for interfacing with the CPU module of FA-M3.

This section lists all parameters and statuses available in the positioning module. For details on individual parameters, refer to the relevant chapters and sections.

Table C1.3 Layout of Parameter and Status Areas

<table>
<thead>
<tr>
<th>Data Position No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0001 to 0100</td>
<td>Axis Common Statuses</td>
</tr>
<tr>
<td>0101 to 0200</td>
<td>Axis 1 Registered Parameters</td>
</tr>
<tr>
<td>0201 to 0300</td>
<td>Axis 1 Command Parameters</td>
</tr>
<tr>
<td>0301 to 0400</td>
<td>Axis 1 Statuses</td>
</tr>
<tr>
<td>0401 to 0500</td>
<td>Axis 2 Registered Parameters</td>
</tr>
<tr>
<td>0501 to 0600</td>
<td>Axis 2 Command Parameters</td>
</tr>
<tr>
<td>0601 to 0700</td>
<td>Axis 2 Statuses</td>
</tr>
<tr>
<td>0701 to 0800</td>
<td>Axis 3 Registered Parameters</td>
</tr>
<tr>
<td>0801 to 0900</td>
<td>Axis 3 Command Parameters</td>
</tr>
<tr>
<td>0901 to 1000</td>
<td>Axis 3 Statuses</td>
</tr>
<tr>
<td>1001 to 1100</td>
<td>Axis 4 Registered Parameters</td>
</tr>
<tr>
<td>1101 to 1200</td>
<td>Axis 4 Command Parameters</td>
</tr>
<tr>
<td>1201 to 1300</td>
<td>Axis 4 Statuses</td>
</tr>
<tr>
<td>1301 to 1330</td>
<td>Pattern A Registered Parameters</td>
</tr>
<tr>
<td>1331 to 1350</td>
<td>Pattern A Command Parameters</td>
</tr>
<tr>
<td>1351 to 1400</td>
<td>Pattern A Statuses</td>
</tr>
<tr>
<td>1401 to 1430</td>
<td>Pattern B Registered Parameters</td>
</tr>
<tr>
<td>1431 to 1450</td>
<td>Pattern B Command Parameters</td>
</tr>
<tr>
<td>1451 to 1500</td>
<td>Pattern B Statuses</td>
</tr>
<tr>
<td>1501 to 1530</td>
<td>Pattern C Registered Parameters</td>
</tr>
<tr>
<td>1531 to 1550</td>
<td>Pattern C Command Parameters</td>
</tr>
<tr>
<td>1551 to 1600</td>
<td>Pattern C Statuses</td>
</tr>
<tr>
<td>1601 to 1630</td>
<td>Pattern D Registered Parameters</td>
</tr>
<tr>
<td>1631 to 1650</td>
<td>Pattern D Command Parameters</td>
</tr>
<tr>
<td>1651 to 1700</td>
<td>Pattern D Statuses</td>
</tr>
<tr>
<td>1701 onwards</td>
<td>(System reserved)</td>
</tr>
</tbody>
</table>
This section lists status information common to all axes.

**Table C1.4  List of Axis Common Statuses**

<table>
<thead>
<tr>
<th>Data Position No.</th>
<th>Parameter Name</th>
<th>Data Range and Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0001</td>
<td>Module Information</td>
<td>&quot;F3&quot;</td>
</tr>
<tr>
<td>0002</td>
<td>Module Information</td>
<td>&quot;NC&quot;</td>
</tr>
<tr>
<td>0003</td>
<td>Module Information</td>
<td>&quot;32&quot; or &quot;34&quot;</td>
</tr>
<tr>
<td>0004</td>
<td>Module Information</td>
<td>&quot;0N&quot;</td>
</tr>
<tr>
<td>0005</td>
<td>Module Information</td>
<td>&quot; &quot;</td>
</tr>
<tr>
<td>0006</td>
<td>Module Information</td>
<td>&quot; &quot;</td>
</tr>
<tr>
<td>0007</td>
<td>Module Information</td>
<td>&quot;RV&quot;</td>
</tr>
<tr>
<td>0008</td>
<td>Module Information</td>
<td>&quot; &quot; (&quot; denotes the revision number)</td>
</tr>
<tr>
<td>0009</td>
<td>(System reserved)</td>
<td></td>
</tr>
<tr>
<td>0010</td>
<td>(System reserved)</td>
<td></td>
</tr>
<tr>
<td>0011 / 0012</td>
<td>No. of Write Operations to Flash Memory</td>
<td>non-negative integer</td>
</tr>
<tr>
<td>0013</td>
<td>No. of Pattern Data Records Used</td>
<td>1 to 500</td>
</tr>
<tr>
<td>0014</td>
<td>No. of Position Data Records Used</td>
<td>1 to 2000</td>
</tr>
<tr>
<td>0015 to 0100</td>
<td>(System reserved)</td>
<td></td>
</tr>
</tbody>
</table>
## C1.4 Axis Operation Statuses

This area stores parameters and statuses for each axis in separate sub-areas.

### C1.4.1 Axis Registered Parameters

<table>
<thead>
<tr>
<th>Data Position No.</th>
<th>Parameter Name</th>
<th>Data Range and Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0101</td>
<td>Maximum Speed Selection</td>
<td>0: Standard mode; 1: High-speed mode (Factory setting: 0)</td>
</tr>
<tr>
<td>0102</td>
<td>Pulse Output Mode</td>
<td>0: CW/CCW pulse 1: Travel/direction 2: Phase A/B (x4) 3: Phase A/B (x2) 4: Phase A/B (x1) (Factory setting: 0)</td>
</tr>
<tr>
<td>0103</td>
<td>Motor Direction Selection</td>
<td>0: Forward movement produces CW pulse output 1: Reverse movement produces CW pulse output (Factory setting: 0)</td>
</tr>
<tr>
<td>0104</td>
<td>Contact Usage Selection</td>
<td>$0000 to $073F (bit data) (Factory setting: $0000)</td>
</tr>
<tr>
<td>0105</td>
<td>Contact I/O Polarity</td>
<td>$0000 to $073F (bit data) (Factory setting: $0000)</td>
</tr>
<tr>
<td>0106 to 0108</td>
<td>(System reserved)</td>
<td></td>
</tr>
<tr>
<td>0109</td>
<td>Display Unit</td>
<td>0: pulse; 1: mm; 2: degree (Factory setting: 0)</td>
</tr>
<tr>
<td>0110</td>
<td>(System reserved)</td>
<td></td>
</tr>
<tr>
<td>0111 / 0112</td>
<td>Electronic Gear M Value</td>
<td>1 to 2,147,483,647 (Factory setting: 1)</td>
</tr>
<tr>
<td>0113 / 0114</td>
<td>Electronic Gear N Value</td>
<td>1 to 2,147,483,647 (M/N&lt;100) (Factory setting: 1)</td>
</tr>
<tr>
<td>0115</td>
<td>(System reserved)</td>
<td></td>
</tr>
<tr>
<td>0116</td>
<td>Index Control</td>
<td>0: No index control 1: Index control (Factory setting: 0)</td>
</tr>
<tr>
<td>0117 / 0118</td>
<td>Index Range</td>
<td>4 to 2,147,483,647 (position reference unit) (Factory setting: 4)</td>
</tr>
<tr>
<td>0119 / 0120</td>
<td>(System reserved)</td>
<td></td>
</tr>
<tr>
<td>0121 / 0122</td>
<td>Forward Limit</td>
<td>-2,147,483,648 to 2,147,483,647 (position reference unit) (Factory setting: 2,147,483,647)</td>
</tr>
<tr>
<td>0123 / 0124</td>
<td>Reverse Limit</td>
<td>-2,147,483,648 to (Forward Limit – 1) (position reference unit) (Factory setting: -2,147,483,648)</td>
</tr>
<tr>
<td>0125 / 0126</td>
<td>Speed Limit</td>
<td>1 to 5,000,000 (pulse/s) 1 to 2,147,483,647 (x 10^-4 mm/s) 1 to 2,147,483,647 (x 10^-5 degree/s) (Valid data range depends on Display Unit) (Factory setting: 1,000,000)</td>
</tr>
<tr>
<td>0127</td>
<td>(System reserved)</td>
<td></td>
</tr>
<tr>
<td>0128</td>
<td>Acceleration/deceleration Curve</td>
<td>0: Automatic trapezoidal acceleration/deceleration 1: S-shape acceleration/deceleration (Factory setting: 0)</td>
</tr>
<tr>
<td>0129 / 0130</td>
<td>Startup Speed</td>
<td>0 to Speed Limit (speed reference unit) (Factory setting: 0)</td>
</tr>
<tr>
<td>0131</td>
<td>Default Acceleration Time</td>
<td>0 to 32,767 (ms) (Default Acceleration Time specified for Speed Limit) (Factory setting: 1,000)</td>
</tr>
<tr>
<td>0132</td>
<td>Default Deceleration Time</td>
<td>0 to 32,767 (ms) (Default Deceleration Time specified for Speed Limit) (Factory setting: 1,000)</td>
</tr>
<tr>
<td>0133 to 0134</td>
<td>CI Error Tolerance</td>
<td>0 to 2,147,483,647 (x 10^-15 mm/s) (Factory setting: 0)</td>
</tr>
<tr>
<td>0137 to 0149</td>
<td>(System reserved)</td>
<td></td>
</tr>
</tbody>
</table>
### Table C1.6 List of Axis Registered Parameters (Automatic Origin Search)

<table>
<thead>
<tr>
<th>Data Position No.</th>
<th>Parameter Name</th>
<th>Data Range and Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0150 0450 0750 1050</td>
<td>AOS Mode</td>
<td>$0000 to $0003 (bit data)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(Factory setting: $0000)</td>
</tr>
<tr>
<td>0151 0451 0751 1051</td>
<td>AOS Direction</td>
<td>0: Reverse; 1: Forward</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(Factory setting: 0)</td>
</tr>
<tr>
<td>0152 0452 0752 1052</td>
<td>AOS Dwell Time</td>
<td>0 to 32,767 (ms)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(Factory setting: 10)</td>
</tr>
<tr>
<td>0153 0453 0753 1053</td>
<td>AOS Speed 1</td>
<td>1 to Speed Limit (speed reference unit)</td>
</tr>
<tr>
<td>0154 0454 0754 1054</td>
<td></td>
<td>(Factory setting: 10,000)</td>
</tr>
<tr>
<td>0155 0455 0755 1055</td>
<td>AOS Speed 2</td>
<td>1 to AOS Speed 1 (speed reference unit)</td>
</tr>
<tr>
<td>0156 0456 0756 1056</td>
<td></td>
<td>(Factory setting: 1,000)</td>
</tr>
<tr>
<td>0157 0457 0757 1057</td>
<td>AOS Acceleration Time</td>
<td>0 to 32,767 (ms)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(Factory setting: 1,000)</td>
</tr>
<tr>
<td>0158 0458 0758 1058</td>
<td>AOS Deceleration Time</td>
<td>0 to 32767 (ms)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(Factory setting: 1,000)</td>
</tr>
<tr>
<td>0159 0459 0759 1059</td>
<td>AOS Z-phase Edge Selection</td>
<td>0: Rising edge; 1: Falling edge</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(Factory setting: 0)</td>
</tr>
<tr>
<td>0160 0460 0760 1060</td>
<td>AOS Z-phase Search Count</td>
<td>0 to AOS Z-phase Search Count</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(Factory setting: 0)</td>
</tr>
<tr>
<td>0161 0461 0761 1061</td>
<td>AOS Z-phase Search Range</td>
<td>0 to 2147483647 or 0 to AOS Z-phase Search Count</td>
</tr>
<tr>
<td>0162 0462 0762 1062</td>
<td></td>
<td>(position reference unit)</td>
</tr>
<tr>
<td>0163 0463 0763 1063</td>
<td>AOS Deviation Pulse Clear Time</td>
<td>0 to 32,767 (ms)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(Factory setting: 10)</td>
</tr>
<tr>
<td>0164 0464 0764 1064</td>
<td>(System reserved)</td>
<td></td>
</tr>
<tr>
<td>0165 0465 0765 1065</td>
<td>AOS Offset</td>
<td>-2,147,483,648 to 2,147,483,647 (position reference unit)</td>
</tr>
<tr>
<td>0166 0466 0766 1066</td>
<td></td>
<td>(Factory setting: 0)</td>
</tr>
<tr>
<td>0167 to 0171</td>
<td>(System reserved)</td>
<td></td>
</tr>
</tbody>
</table>

### Table C1.7 List of Axis Registered Parameters (Counter/Encoder)

<table>
<thead>
<tr>
<th>Data Position No.</th>
<th>Parameter Name</th>
<th>Data Range and Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0172 0472 0772 1072</td>
<td>Counter Type Selection</td>
<td>0: General-purpose incremental</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1: Sanyo Denki’s Manchester Coding</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2: Yaskawa Electric’s Serial</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(Factory setting: 0)</td>
</tr>
<tr>
<td>0173 0473 0773 1073</td>
<td>Counter Direction Selection</td>
<td>0: Forward pulse input denotes forward movement</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1: Reverse pulse input denotes forward movement</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(Factory setting: 0)</td>
</tr>
<tr>
<td>0174 0474 0774 1074</td>
<td>Counter Multiplication</td>
<td>1: x1; 2: x2; 4: x4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(Factory setting: 4)</td>
</tr>
<tr>
<td>0175 0475 0775 1075</td>
<td>Counter Display Unit</td>
<td>0: pulse; 1: mm; 2: degree</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(Factory setting: 0)</td>
</tr>
<tr>
<td>0176 0476 0776 1076</td>
<td>(System reserved)</td>
<td></td>
</tr>
<tr>
<td>0177 0477 0777 1077</td>
<td>Counter Electronic Gear M Value</td>
<td>1 to 2,147,483,647 (M/N&lt;100)</td>
</tr>
<tr>
<td>0178 0478 0778 1078</td>
<td></td>
<td>(Factory setting: 1)</td>
</tr>
<tr>
<td>0179 0479 0779 1079</td>
<td>Counter Electronic Gear N Value</td>
<td>1 to 2,147,483,647 (M/N&lt;100)</td>
</tr>
<tr>
<td>0180 0480 0780 1080</td>
<td></td>
<td>(Factory setting: 1)</td>
</tr>
<tr>
<td>0181 0481 0781 1081</td>
<td>(System reserved)</td>
<td></td>
</tr>
<tr>
<td>0182 0482 0782 1082</td>
<td>Counter Index Control</td>
<td>0: No index control</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1: Index control (Factory setting: 1)</td>
</tr>
<tr>
<td>0183 0483 0783 1083</td>
<td>Counter Index Range</td>
<td>0: 4 to 2,147,483,647 (counter index reference unit)</td>
</tr>
<tr>
<td>0184 0484 0784 1084</td>
<td></td>
<td>(Factory setting: 0)</td>
</tr>
<tr>
<td>0185 0485 0785 1085</td>
<td>ABS Encoder Offset</td>
<td>0 to 2,147,483,647 (counter position reference unit)</td>
</tr>
<tr>
<td>0186 0486 0786 1086</td>
<td></td>
<td>(Factory setting: 0)</td>
</tr>
<tr>
<td>0187 0487 0787 1087</td>
<td>ABS Encoder Pulses Per Rev.</td>
<td>-2,147,483,648 to 2,147,483,647 (pulse)</td>
</tr>
<tr>
<td>0188 0488 0788 1088</td>
<td></td>
<td>(Factory setting: 32,768)</td>
</tr>
<tr>
<td>0189 0489 0789 1089</td>
<td>ABS Encoder Bit Length</td>
<td>17 to 28 (bits)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(Factory setting: 28)</td>
</tr>
<tr>
<td>0190 0490 0790 1090</td>
<td>Counter Usage Selection</td>
<td>0: Counter coincidence</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1: Zone coincidence (Factory setting: 0)</td>
</tr>
<tr>
<td>0191 0491 0791 1091</td>
<td>Counter Coincidence Value</td>
<td>-2,147,483,648 to 2,147,483,647 (counter position reference unit)</td>
</tr>
<tr>
<td>0192 0492 0792 1092</td>
<td></td>
<td>(Factory setting: 0)</td>
</tr>
</tbody>
</table>
### C1.4.2 Axis Command Parameters

Table C1.8  List of Axis Command Parameters

<table>
<thead>
<tr>
<th>Data Position No.</th>
<th>Parameter Name</th>
<th>Data Range and Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>02</td>
<td>Direct Command Code</td>
<td>0 to 32,767</td>
</tr>
<tr>
<td>05</td>
<td>Command Options</td>
<td>$0000 to $FFFF (meaning depends on Direct Command Code)</td>
</tr>
<tr>
<td>06</td>
<td>Startup Condition</td>
<td>0: Normal startup; Non-zero: Startup condition code</td>
</tr>
<tr>
<td>07</td>
<td>End Condition</td>
<td>0: Normal end; Non-zero: End condition code</td>
</tr>
<tr>
<td>09</td>
<td>Target Position</td>
<td>-2,147,483,648 to 2,147,483,647 (position reference unit) or position data no. (1 to No. of Position Data Records Used)</td>
</tr>
<tr>
<td>10</td>
<td>Specified Speed</td>
<td>1 to Speed Limit (speed reference unit) or -(Speed Limit) to (Speed Limit) (speed reference unit)</td>
</tr>
<tr>
<td>11</td>
<td>Acceleration Time</td>
<td>-1: Default acceleration; 0 to 32,767 (ms)</td>
</tr>
<tr>
<td>12</td>
<td>Deceleration Time</td>
<td>-1: Default deceleration; 0 to 32,767 (ms)</td>
</tr>
<tr>
<td>13</td>
<td>Dwell Time</td>
<td>0 to 32,767 (ms)</td>
</tr>
<tr>
<td>14</td>
<td>Preset Override Value</td>
<td>1 to 500 (%)</td>
</tr>
<tr>
<td>15</td>
<td>CI Turns</td>
<td>0 to 32,767 (turns)</td>
</tr>
<tr>
<td>17</td>
<td>CI Sub Position</td>
<td>-2,147,483,648 to 2,147,483,647 (position reference unit) or position data no. (1 to 2,000)</td>
</tr>
<tr>
<td>18</td>
<td>Contact Output Setting</td>
<td>$0000 to $0707 (bit data)</td>
</tr>
<tr>
<td>19</td>
<td>MPG Mode Multiplication</td>
<td>-32,768 to 32,767</td>
</tr>
<tr>
<td>20</td>
<td>MPG Mode Decimal Point</td>
<td>0: x 1; 1: x 1/10; 2: x 1/100; 3: x 1/1,000; 4: x 1/10,000</td>
</tr>
<tr>
<td>21</td>
<td>Origin Search Direction</td>
<td>0: Reverse; 1: Forward</td>
</tr>
<tr>
<td>22</td>
<td>Z-phase Edge Selection</td>
<td>0: Rising edge; 1: Falling edge</td>
</tr>
<tr>
<td>23</td>
<td>Z-phase Search Count</td>
<td>0 to 32,767 (pulses)</td>
</tr>
<tr>
<td>24</td>
<td>Z-phase Search Range</td>
<td>0 to 2147483647 or 0 to Z-phase Search Count (position reference unit)</td>
</tr>
<tr>
<td>25</td>
<td>Deviation Pulse Clear Time</td>
<td>0 to 32,767 (ms)</td>
</tr>
<tr>
<td>26</td>
<td>Counter Coincidence Value</td>
<td>-2,147,483,648 to 2,147,483,647 (counter position reference unit)</td>
</tr>
<tr>
<td>27</td>
<td>Counter Upper Limit</td>
<td>-2,147,483,648 to 2,147,483,647 (counter position reference unit)</td>
</tr>
<tr>
<td>28</td>
<td>Counter Lower Limit</td>
<td>-2,147,483,648 to Counter Upper Limit (counter position reference unit)</td>
</tr>
</tbody>
</table>

5th Edition: Sep.7, 2012-00    IM 34M06031-01E
## C1.4.3 Axis Statuses

### Table C1.9 List of Axis Statuses

<table>
<thead>
<tr>
<th>Data Position No.</th>
<th>Status Name</th>
<th>Data Range and Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0301</td>
<td>Error Status</td>
<td>Error code when error occurs</td>
</tr>
<tr>
<td>0302</td>
<td>Warning Status</td>
<td>Warning code when warning occurs</td>
</tr>
<tr>
<td>0303</td>
<td>Extended Status 1</td>
<td>Action information such as axis or pattern where action was initiated</td>
</tr>
<tr>
<td>0304</td>
<td>Extended Status 2</td>
<td>Movement information such as whether axis is accelerating, decelerating or changing speed.</td>
</tr>
<tr>
<td>0305</td>
<td>Origin Search Status</td>
<td>Status related to origin search</td>
</tr>
<tr>
<td>0306</td>
<td>(System reserved)</td>
<td></td>
</tr>
<tr>
<td>0307</td>
<td>Contact Input Status</td>
<td>State of contact inputs (bit data)</td>
</tr>
<tr>
<td>0308</td>
<td>Contact Output Status</td>
<td>State of contact outputs (bit data)</td>
</tr>
<tr>
<td>0309</td>
<td>(System reserved)</td>
<td></td>
</tr>
<tr>
<td>0310</td>
<td>Remaining DCC Time Status</td>
<td>-1: Accelerating or moving at constant speed 0: At rest 1 to 32,767: Remaining deceleration time (ms)</td>
</tr>
<tr>
<td>0311</td>
<td>Remaining Travel Status</td>
<td>Remaining travel to target position 0 to 2,147,483,647 (position reference unit)</td>
</tr>
<tr>
<td>0312</td>
<td>Current Override Value Status</td>
<td>1 to 500 (%)</td>
</tr>
<tr>
<td>0313</td>
<td>Current Position Status</td>
<td>-2,147,483,648 to 2,147,483,647 (position reference unit)</td>
</tr>
<tr>
<td>0314</td>
<td>Target Position Status</td>
<td>-2,147,483,648 to 2,147,483,647 (position reference unit)</td>
</tr>
<tr>
<td>0315</td>
<td>Current Speed Status</td>
<td>-5,000,000 to 5,000,000 (pulse/s) -2,147,483,648 to 2,147,483,647 (x 10^-4 mm/s) -2,147,483,648 to 2,147,483,647 (x 10^-5 degree/s) (Data range depends on Display Unit)</td>
</tr>
<tr>
<td>0316</td>
<td>Counter Current Position Status</td>
<td>-2,147,483,648 to 2,147,483,647 (Counter position reference unit)</td>
</tr>
<tr>
<td>0317</td>
<td>Counter Current Speed Status</td>
<td>-5,000,000 to 5,000,000 (pulse/s) -2,147,483,648 to 2,147,483,647 (x 10^-4 mm/s) -2,147,483,648 to 2,147,483,647 (x 10^-5 degree/s) (Data range depends on Display Unit)</td>
</tr>
<tr>
<td>0318</td>
<td>Counter Latched Position Status</td>
<td>-2,147,483,648 to 2,147,483,647 (Counter position reference unit)</td>
</tr>
<tr>
<td>0319</td>
<td>Counter Absolute Data Status</td>
<td>Received raw absolute data (when Counter Type Selection is Sanyo Denki's Manchester Coding) Absolute position status (when Counter Type Selection is Yaskawa Electric's Serial)</td>
</tr>
<tr>
<td>0320</td>
<td>(System reserved)</td>
<td></td>
</tr>
</tbody>
</table>
## C1.5 Pattern Operation Area

### C1.5.1 Pattern Registered Parameters

Table C1.10  List of Pattern Registered Parameters

<table>
<thead>
<tr>
<th>Data Position No.</th>
<th>Parameter Name</th>
<th>Data Range and Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1301 / 1302</td>
<td>Pattern Combined-speed Limit</td>
<td>1 to 2,147,483,647 (\times 10^{-4}) mm/s (Factory setting: 1,000,000)</td>
</tr>
<tr>
<td>1303</td>
<td>Pattern Combined-speed ACC Time</td>
<td>0 to 32,767 (ms) (Default acceleration time specified for Pattern Combined-speed Limit)</td>
</tr>
<tr>
<td>1304</td>
<td>Pattern Combined-speed DCC Time</td>
<td>0 to 32,767 (ms) (Default deceleration time specified for Pattern Combined-speed Limit)</td>
</tr>
<tr>
<td>1305 to 1330</td>
<td>(System reserved)</td>
<td></td>
</tr>
</tbody>
</table>

### C1.5.2 Pattern Command Parameters

Table C1.11  List of Pattern Command Parameters

<table>
<thead>
<tr>
<th>Data Position No.</th>
<th>Parameter Name</th>
<th>Data Range and Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1331</td>
<td>Pattern Command Code</td>
<td>0 to 32,767</td>
</tr>
<tr>
<td>1332</td>
<td>Pattern Preset Override Value</td>
<td>Do not write any non-zero value.</td>
</tr>
<tr>
<td>1333</td>
<td>Pattern Start Record No.</td>
<td>1 to No. of Pattern Data Records Used</td>
</tr>
<tr>
<td>1334</td>
<td>Pattern End Record No.</td>
<td>1 to No. of Pattern Data Records Used</td>
</tr>
<tr>
<td>1335 to 1338</td>
<td>(System reserved)</td>
<td></td>
</tr>
<tr>
<td>1339</td>
<td>Pattern Current Override Value</td>
<td>1 to 500 (%)</td>
</tr>
<tr>
<td>1340 to 1350</td>
<td>Pattern Action Record Label</td>
<td>1 to 500</td>
</tr>
</tbody>
</table>

### C1.5.3 Pattern Operation Statuses

Table C1.12  List of Pattern Operation Statuses

<table>
<thead>
<tr>
<th>Data Position No.</th>
<th>Status Name</th>
<th>Data Range and Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1351</td>
<td>M Code Status</td>
<td>0 to 32,767</td>
</tr>
<tr>
<td>1352</td>
<td>Pattern Error Status</td>
<td>Error code when error occurs</td>
</tr>
<tr>
<td>1353</td>
<td>Pattern Warning Status</td>
<td>Warning code when warning occurs</td>
</tr>
<tr>
<td>1354</td>
<td>Pattern Error Code 1</td>
<td>Detailed error code 1 when error occurs</td>
</tr>
<tr>
<td>1355</td>
<td>Pattern Error Code 2</td>
<td>Detailed error code 2 when error occurs</td>
</tr>
<tr>
<td>1356</td>
<td>Pattern Action Status</td>
<td>Movement information for pattern operation</td>
</tr>
<tr>
<td>1357</td>
<td>Pattern Action Record No.</td>
<td>1 to 500</td>
</tr>
<tr>
<td>1358</td>
<td>Pattern Current Override Value</td>
<td>1 to 500 (%)</td>
</tr>
<tr>
<td>1359 to 1362</td>
<td>Pattern Action Record Label</td>
<td>Label corresponding to Pattern Action Record No.</td>
</tr>
<tr>
<td>1363 to 1400</td>
<td>(System reserved)</td>
<td></td>
</tr>
</tbody>
</table>
## Index

### A
- action code .................................................. B3-14
- action monitor ........................................... B6-1
- action monitor screen .................................. B6-3
- action status bar ......................................... B1-3
- action test flow .......................................... B7-1
- action test .................................................. B7-1
- administrator .............................................. A2-3
- applicable product ..................................... ii
- automatic origin search ................................ B7-21
- axes, name of ............................................. B3-1
- axis common statuses ................................... C1-5
- axis operation statuses ................................. C1-4
- axis statuses ............................................... B6-5

### C
- cell color .................................................. B3-3
- circular interpolation .................................. B3-17
- circular ...................................................... B7-13
- color codes for availability for downloading .... B5-2
- communication method ............................... B1-5
- communication timeout interval ................. B1-6
- communications setup ................................ B4-1
- compatible CPU modules ........................... A2-2
- connecting to FA-M3 system ....................... A2-4
- contact o/p on/off ...................................... B3-25
- contact output .......................................... B7-27
- control mode, switching ............................ B7-27
- counter ...................................................... B7-25
- CSV file .................................................... A1-2
- CSV format ............................................... B9-4

### D
- data confirmation ....................................... B7-2
- debugger window ....................................... B1-2
- display unit, changing ............................... B3-7
- download .................................................. B5-1
- downloading to all modules of a project ....... B5-4
- drag and drop ........................................... B3-11

### E
- edit area .................................................. B3-9
- environment setup for positioning modules ... B1-6
- environment setup ..................................... B1-5
- error status ............................................. B6-6
- Ethernet/FL-net ........................................ A2-2
- Excel ...................................................... B9-4
- export ..................................................... B9-4

### F
- FOR-NEXT ............................................... B3-27

### H
- helical ..................................................... B7-16
- how to read this manual ................................ ix

### I
- I/O relay status ......................................... B6-8
- I/O relays, list of ...................................... C1-1
- important .................................................. iii
- index ......................................................... B7-19
- index positioning ...................................... B3-16
- index speed control .................................. B3-24
- installation ............................................... A2-3
- jog ......................................................... B7-5
- jog, multi-axis ......................................... B7-6
- JUMP ....................................................... B3-28

### L
- line range editing ...................................... B3-12
- linear interpolation .................................. B7-10
- linear positioning ..................................... B3-16
- list box .................................................... B3-4

### M
- manual origin search ................................ B7-21
- manual pulse generator (MPG) ..................... B7-23
- menu bar .................................................. B1-2
- messages about results of downloading ....... B5-5
- messages about results of uploading ........... B8-5
- monitoring, start ...................................... B6-9
- monitoring, stop ...................................... B6-9
- multi-axial movement test .......................... B7-7

### N
- New .......................................................... B3-1
- No. of pattern data records used ................ B3-1
- No. of position data records used ............... B3-1
- NOP .......................................................... B3-28
- notation ................................................... ix

### O
- online ...................................................... B4-1
- online connection .................................... B4-1
- operating environment .............................. A2-2
- operating mode ....................................... B5-6
- operation status ....................................... B6-1
- origin search .......................................... B7-21
- other instruction manuals .......................... x
output test ........................................................ B7-27

P
parameters, list of .............................................. C1-4
pattern data display, customizing ....................... B1-6
pattern monitor ................................................... B6-9
pattern operation area .......................................................... C1-10
pattern operation statuses .............................................. B6-7
pattern test ................................................................. B7-26
position/speed status ............................................... B6-4
position->speed ...................................................... B3-19
positioning module ..................................................... A1-1
print ................................................................. B9-1
product overview ...................................................... A1-1
project folder ............................................................ B1-4
project window ........................................................ B1-2
project, selecting a ................................................ B2-1

R
registered parameter .............................................. B3-1
registered parameters screen ...................................... B3-3
registered parameters, description of ....................... C1-6
reset all errors ....................................................... B7-3
Results of Downloading screen ............................... B5-3
ROM Writer mode ...................................................... B5-6
RS-232 ................................................................ A2-2

S
screen layout ............................................................. B1-1
set current position ..................................................... B3-26
single axis .............................................................. B7-8
speed control ........................................................... B3-22
speed->pos. (cont.) ..................................................... B3-21
speed->pos. (reset) .................................................... B3-20
status bar ................................................................. B1-3
statuses, list of .......................................................... C1-4
stop all axes ............................................................ B7-3
sub position ............................................................ B3-18

T
teaching ............................................................... B7-28
title bar ................................................................. B1-2
toolbar ............................................................... B1-3, B1-5
toolbar, customizing .................................................. B1-5
ToolBox ................................................................. A1-1
ToolBox connection error ......................................... B5-5
ToolBox files, list of .................................................. B2-2
ToolBox for Positioning Modules ................................. A1-1

U
upload ................................................................. B8-1
upload module ........................................................ B8-2
upload project ........................................................ B8-3
USB ................................................................ A2-2

V
view, switching ....................................................... B3-9

W
WideField3 ............................................................. A2-2
window list bar .......................................................... B1-3
write to ROM .......................................................... B1-6

X
X axis ..................................................................... B7-13

Y
Y axis ..................................................................... B7-13
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<tr>
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