## Compatible Modules:

<table>
<thead>
<tr>
<th>Model Code</th>
<th>Model Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>F3CU04-0</td>
<td>Temperature Control and PID Module</td>
</tr>
<tr>
<td>F3CU04-1</td>
<td>Temperature Control and PID Module</td>
</tr>
<tr>
<td>F3CX04-0</td>
<td>Temperature Monitoring Module</td>
</tr>
</tbody>
</table>
Applicable Product:

Range-Free Multi-Controller FA-M3

- Model Code: SF661-MCW
- Model Name: FA-M3 ToolBox for Temperature Control and Monitoring Modules

The document number for this manual is given below.
Refer to the document number in all communications, including when purchasing additional copies of this manual.

- Document Number: IM 34M06Q31-02E
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.

■ Safety symbols

⚠️ **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.

---

- **Protective Conductor Terminal**
  This terminal is to prevent electric shock. Before using the instrument, connect to the Protective earth (Comply with the regulation of each country.), and route the line through the shortest path possible.

---

- **Functional Earth Terminal**
  This terminal is for stable operation. Before using the instrument, be sure to ground this terminal.

---

- **Alternating current.** Indicates alternating current.

---

- **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.

- To avoid electrical shock, turn off the power before wiring.

- 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 rating above 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 as given in this manual. 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 protective earth (Comply with the regulation of each country.). For compliance to CE Marking, use braided or other wires that can ensure low impedance even at high frequencies for grounding.

- **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 to CE Marking, perform installation and cable routing according to the description on compliance to CE Marking in the “Hardware Manual” (IM 34M06C11-01E).

Keep spare parts on hand:
- We recommend that you stock up on maintenance parts, including spare modules, in advance.
- Preventive maintenance (replacement of the module) is required for using the module beyond 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 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 F3PU□□□□ as the power supply module.
- 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 the 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 (WEEE)

This product complies with the WEEE Directive 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 dispose the batteries

This is an explanation about the new EU Battery Directive (DIRECTIVE 2006/66/EC). This directive is only valid in the EU.

Batteries are included in some modules of this product. The procedure is different when the user can remove or cannot remove.

① Batteries the user can remove
The battery of F3RP6□ can be removed by yourself.
When you remove the battery from F3RP6□ and dispose it, discard them in accordance with domestic law concerning disposal. See the User’s Manual of F3RP6□ for the removal procedure. Take a right action on waste batteries, because the collection system in the EU on waste batteries are regulated. If you don’t remove the battery from this product, please see ②.

② Batteries the user cannot remove
Dispose the battery together with this product.
When you dispose this product in the EU, contact your local Yokogawa Europe B.V.office.
Do not dispose them as domestic household waste.

Battery category: Lithium battery

Note: With reference to Annex II of the new Battery Directive 2006/66/EC, the above symbol indicates obligatory separate collection.
Introduction

■ Overview of the Manual

This user’s manual is for the FA-M3 ToolBox for Temperature Control and Monitoring Modules (simply ToolBox in this manual). It describes how to set up parameters of the monitor and debug the temperature control and monitoring modules, perform operation tests, as well as monitor and debug the modules.

For enquiries, please contact the store where you purchased the product or the nearest Yokogawa sales offices listed at the back of this manual.

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

The ToolBox software must be installed on a personal computer before it can be executed on the computer. Part A describes how to install the ToolBox software on a personal computer and how to use the online manual and connect the personal computer 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 the temperature control and monitoring modules, tune registered parameters while operating the modules, and download projects to or upload projects from the modules.

● Part C: Reference Guide

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

Be sure to read the “Introduction” and “How to Read this Manual” section of this manual, as well as the “FA-M3 ToolBox Manual” carefully before using ToolBox.

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

This manual describes only the functions of ToolBox that are specific to temperature control and monitoring modules. For information on basic operations and general editing functions of ToolBox, applicable to other advanced-function modules, see the FA-M3 ToolBox Manual.

TIP

The term “ToolBox” as used in this manual, unless otherwise stated, refers to the FA-M3 ToolBox for Temperature Control and Monitoring 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 individual sequence CPU modules, please refer to the relevant instruction manuals. These manuals are available separately.

#### For information on functions of sequence CPU modules, refer to:

<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, F3SP69-7S)</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, refer to:

<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 information on the Temperature Control and Monitoring Modules:

ToolBox is designed for use with the following temperature control and monitoring modules:

<table>
<thead>
<tr>
<th>Module Code</th>
<th>Document Name</th>
<th>Document Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>F3CU04-0N</td>
<td>Temperature Control and PID Module</td>
<td>IM34M06H62-01E</td>
</tr>
<tr>
<td>F3CU04-1N</td>
<td>Temperature Control and PID Module</td>
<td>IM34M06H62-02E</td>
</tr>
<tr>
<td>F3CU04-0S</td>
<td>Temperature Control and PID Module</td>
<td>IM34M06H62-02E-T01</td>
</tr>
<tr>
<td>F3CU04-1S</td>
<td>Temperature Control and PID Module</td>
<td>IM34M06H62-02E-T01</td>
</tr>
<tr>
<td>F3CU04-0G</td>
<td>Temperature Control and PID Module</td>
<td>IM34M06H62-02E-T01</td>
</tr>
<tr>
<td>F3CU04-1G</td>
<td>Temperature Control and PID Module</td>
<td>IM34M06H62-02E-T01</td>
</tr>
<tr>
<td>F3CX04-0N</td>
<td>Temperature Monitoring Module</td>
<td>IM34M06H63-01E</td>
</tr>
<tr>
<td>F3CX04-0G</td>
<td>Temperature Monitoring Module</td>
<td>IM34M06H63-01E-T01</td>
</tr>
</tbody>
</table>

#### For the FA-M3 specifications and configurations*1, installation and wiring, test run, maintenance, and module installation limits for the whole system:

*1: Refer to the relevant product manuals for specifications except for power supply modules, base modules, input/output modules, cables and terminal units.

<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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FA-M3 ToolBox for Temperature Control and Monitoring Modules

IM 34M06Q31-02E  6th Edition

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A1 Product Overview

This chapter describes the outline and features of the FA-M3 ToolBox for Temperature Control and Monitoring Modules (or simply referred to as ToolBox in this manual).

A1.1 Overview and Features

Overview

ToolBox is a tool for performing setup of temperature control and monitoring modules. 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.

Components of the temperature control and monitoring modules

- Simple setup
- Debug
- Logging
- Collaboration with other applications
Features

ToolBox has the following features:

- **User Friendly, Easy Setup**
  You can easily set up the registered parameters of the temperature control and monitoring modules using ToolBox’s user-friendly parameter input method.

- **Advanced Debugging Functions**
  Two types of debugging functions (action tests) are available: parameter adjustment and tuning. The parameter adjustment function allows for online modification of each registered parameter. The tuning function allows online fine-adjustment (or tuning) of the registered parameters for a specific loop of a temperature control or monitoring module while monitoring the behavior of that loop.

  **CAUTION**
  While these action test functions can be used to continuously modify the parameters or monitor the behavior of a running module, they are really designed for initial module setup. As such, they are not guaranteed to function properly as an operation panel for continuous process monitoring.

- **Data Logging**
  - You can specify to save data of selected registered parameters or CPU registers in a file as log data. Using ToolBox, you can display saved log data as graphs to allow a better grasp of the operation condition of the temperature control and monitoring modules.
  - Data may be automatically saved at specified intervals even while data logging is in progress.
  - You can also monitor data of CPU devices (data registers or file registers).

  **CAUTION**
  Although the action monitor function can be used to continuously sample data from a module, it is really designed for data sampling during initial module setup. As such, it is not guaranteed to function as a recorder for continuous process monitoring.

- **Collaboration with Other Applications**
  - You can run ToolBox and the WideField3 ladder program development tool concurrently on the same computer to edit module parameters and programs at the same time, as ToolBox and WideField3 can communicate with modules independently.
  - You can prepare registered parameters with ToolBox and save them as CSV-formatted files so that the data can be incorporated into Microsoft Excel documents.

- **Transferring Registered Parameters to CPU Module**
  You can prepare registered parameters with ToolBox and transfer them to the data (file) registers of the CPU module collectively so that the data can be used by a ladder program running in the CPU module.
A1.2 New and Updated Functions

A1.2.1 Differences between ToolBox R2 and ToolBox R1

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

SEE ALSO

For details of individual functional differences, see sections given in the “See Also” column in Table A1.1.

TIP

To confirm the software version of ToolBox R2, select [Help]-[About ToolBox] from the menu bar. A dialog box as shown below appears (the screen capture will be in Japanese as there is no English version for ToolBox R2). Verify that the version is displayed as “R2.xx”. The version of ToolBox is determined by the version of the module installed.

Table A1.1 New and Updated Functions in ToolBox R2

<table>
<thead>
<tr>
<th>Category</th>
<th>Function Details</th>
<th>Summary</th>
<th>See Also</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tuning</td>
<td>Modified loop selection operation</td>
<td>On the Tuning screen, a loop can be selected from a list.</td>
<td>B5.2 Action Test Tuning</td>
</tr>
<tr>
<td>Screen display</td>
<td>Action progress display</td>
<td>Progress display during time-consuming communications processing</td>
<td>—</td>
</tr>
</tbody>
</table>
A1.2.2 Differences between ToolBox R3 and ToolBox R2

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

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 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”. The version of ToolBox is determined by the version of the module installed.

Table A1.2 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>New sequence CPU types</td>
<td>New sequence CPU types are added, together with their specific functions.</td>
<td>A2.2 Operating Environment for ToolBox B1.1.1 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 A2.4 Connecting ToolBox and FA-M3 System</td>
</tr>
<tr>
<td>Parameter edit</td>
<td>Items Setup</td>
<td>A button is added to the parameter edit window for opening a screen to select the parameter items to be displayed in simple setup view.</td>
<td></td>
</tr>
<tr>
<td>Parameter adjustment</td>
<td>Background color</td>
<td>The background color of parameter adjustment screens are changed to light yellow to distinguish them from online screens</td>
<td></td>
</tr>
<tr>
<td>Action monitor</td>
<td>Support for CPU device</td>
<td>CPU devices (D, B) can be monitored on Action Monitor screens.</td>
<td>B4 Checking FA-M3 Operation Using Action Monitor</td>
</tr>
<tr>
<td></td>
<td>Specify scale for graph display</td>
<td>Scale range can be specified for graphs to be displayed on monitor screens.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Zoom display</td>
<td>Display on Action Monitor screens can be enlarged or reduced.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>ToolTip support</td>
<td>Monitored objects can be checked using ToolTip.</td>
<td></td>
</tr>
</tbody>
</table>
This subsection describes differences in functions between ToolBox R4 and ToolBox R3.

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 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”. The version of ToolBox is determined by the version of the module installed.

Table A1.3 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>CPU</td>
<td>Added CPU modules that support the</td>
<td>The following CPU modules are added:</td>
<td>A2.2 Operating Environment for ToolBox B1.1.1 Screen Layout</td>
</tr>
<tr>
<td></td>
<td>temperature control and PID module</td>
<td>- F3CU04-0S</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- F3CU04-1S</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>In addition, the SP backup function for the above modules is supported.</td>
<td></td>
</tr>
<tr>
<td>Module type</td>
<td>Function for changing the module type</td>
<td>A function is added for changing the module type specified in a registered parameter file.</td>
<td>A2.2 Operating Environment for ToolBox A2.4 Connecting ToolBox and FA-M3 System</td>
</tr>
<tr>
<td>change</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tuning</td>
<td>Added alarm lamp</td>
<td>The “parameter error” alarm lamp is separated into “Controller or I/O parameter error” and “Operation parameter error”.</td>
<td>B5.2.6 Checking for Error or Alarm Conditions</td>
</tr>
<tr>
<td></td>
<td>Monitoring the number of write operations</td>
<td>A counter value for the number of write operations to the EEPROM is displayed on the error status confirmation dialog.</td>
<td>B5.2.6 Checking for Error or Alarm Conditions</td>
</tr>
<tr>
<td></td>
<td>to the EEPROM</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operating</td>
<td>Windows Vista support</td>
<td>Windows Vista support is included in the operating environment.</td>
<td></td>
</tr>
<tr>
<td>environment</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
A1.2.4 Differences between ToolBox R5 and ToolBox R4

This subsection describes differences in functions between ToolBox R5 and ToolBox R4.

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 R5, select [Help]-[About ToolBox] from the menu bar. A dialog box as shown below appears. Verify that the version is displayed as “R5.xx”. The version of ToolBox is determined by the version of the module installed.

Table A1.4 New and Updated Functions in ToolBox R5

<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></td>
<td>And, functions specific to the additional modules are supported.</td>
<td></td>
</tr>
<tr>
<td>Operating environment</td>
<td>Windows 7 support</td>
<td>Windows 7 support is included in the operating environment.</td>
<td></td>
</tr>
<tr>
<td>Online</td>
<td>Multiple port connections</td>
<td>Allows for simultaneous operation of multiple ToolBox applications connected online to FA-M3 CPU modules.</td>
<td></td>
</tr>
</tbody>
</table>
A1.2.5 Differences between ToolBox R6 and ToolBox R5

This subsection describes differences in functions between ToolBox R6 and ToolBox R5.

SEE ALSO

For details of individual functional differences, see sections given in the “See Also” column in Table A1.5.

TIP

To confirm the software version of ToolBox R6, select [Help]-[About ToolBox] from the menu bar. A dialog box as shown below appears. Verify that the version is displayed as “R6.xx”. The version of ToolBox is determined by the version of the module installed.

Table A1.5 New and Updated Functions in ToolBox R6

<table>
<thead>
<tr>
<th>Category</th>
<th>Function Details</th>
<th>Summary</th>
<th>See Also</th>
</tr>
</thead>
<tbody>
<tr>
<td>Entire functions</td>
<td>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>Operating</td>
<td>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 Installing ToolBox

This chapter describes how to install, run and stop the FA-M3 ToolBox for Temperature Control and Monitoring 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

[Page]

Install ToolBox

Install the ToolBox software.

Configure ToolBox

Configure ToolBox by specifying project folders and perform communications setup.

Edit a project

Create and edit a project.

Check communications setup and connect to FA-M3

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

Download parameters to FA-M3

Download registered parameters from ToolBox to the FA-M3 system.

Check FA-M3 operation using action monitor

Run the FA-M3 system to verify the registered parameter values produce the expected operation.

Adjust parameters using action test

Tune the registered parameters so that the FA-M3 system operates as designed.
## 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><strong>PC</strong></td>
<td>PC/AT compatible</td>
</tr>
<tr>
<td><strong>OS</strong></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><strong>Required applications</strong></td>
<td>Internet Explorer 5.01 or higher</td>
</tr>
<tr>
<td><strong>CPU</strong></td>
<td>Pentium 133MHz or faster, adequate for the operating system to run properly.</td>
</tr>
<tr>
<td><strong>Memory</strong></td>
<td>32MB or more, adequate for the operating system to run properly.</td>
</tr>
<tr>
<td><strong>Hard disk capacity</strong></td>
<td>200 MB or more available</td>
</tr>
<tr>
<td><strong>Display</strong></td>
<td>800×600 dots or more (1024×768 recommended)</td>
</tr>
<tr>
<td><strong>Communications</strong></td>
<td>USB, RS-232C, Ethernet, FL-net</td>
</tr>
<tr>
<td><strong>Printer</strong></td>
<td>Any printer compatible with the operating systems listed above and supports A4 printing</td>
</tr>
<tr>
<td><strong>Compatible advanced-function modules</strong></td>
<td>FA-M3 Temperature Control and PID Modules F3CU04-0S, F3CU04-0N, F3CU04-1S, F3CU04-1N, F3CU04-0G and F3CU04-1G</td>
</tr>
<tr>
<td><strong>Compatible CPU modules</strong></td>
<td>F3SP05-0P, F3SP08-0P, F3SP08-SP, F3SP21-0N, F3SP26-2N, F3SP35-2N, F3SP28-3N, F3SP38-6N, F3SP38-6H, F3SP58-6H, F3SP22-0S, F3SP28-3S, F3SP38-6S, F3SP53-4S, F3SP53-4H, F3SPV3-4H, F3SPV8-6H, F3SP36-3N, F3SP66-4S, F3SP67-6S, F3SP71-4N, F3SP71-4S, F3SP71-4N, F3SP76-7N, F3SP76-7N, 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.

*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. Check the following precautions before 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 Temperature Control and Monitoring Modules component is already installed. Select Modify to add components.

   **TIP**

   If another ToolBox component is already installed on the PC, add the Temperature Control and Monitoring Modules component to the existing ToolBox installation.

   In this case, you cannot specify a different installation folder.
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.
A2.4 Connecting ToolBox and FA-M3 System

System Environment When Using ToolBox

- ToolBox
- Computer
- RS-232C
- USB/Ethernet/FL-net
- FA-M3
  - CPU
  - Temperature monitoring module
  - Input
  - Output
  - Temperature control and PID module
  - Heater, etc.
- Computer Setup
  - Register
  - Parameters
- Computer Adjustment
- Thermocouple
- RTD
- Voltage input
- Input
This chapter describes what a user must know before using the FA-M3 ToolBox for Temperature Control and Monitoring 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 ToolBox operation screen consists of the following components. The screen layout and operation are similar to those of Windows.
• Title Bar
The title bar displays the name of the open project, the name of the active window and the name of the file being edited.

• Menu Bar
The menu bar displays the standard menus of ToolBox. Clicking each item on the menu bar displays a pull-down menu, from which available commands can be selected for execution. The set of enabled (available) commands at any point depends on the current CPU operating mode and the action mode. Disabled commands are grayed out in the display.

• Project Window
The project window displays the execution parameters of an open project or a list of advanced function module parameter files.

• Debugger Window
The debugger window displays debug/maintenance information for each registered parameter file.
- **Toolbar**
  The toolbar shows the icons of frequently used commands for easier access. These commands can also be selected from the menu bar.

- **Window List Bar**
  The Window List Bar displays a list of icons for windows that are displayed in ToolBox.

- **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 indicates the 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 user 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) will be 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.
Customizing the Toolbar

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

2. To include an item in 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

1. Select the Toolbar Setup tab in the Environment Setup for ToolBox window. ⇒ 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 other user environment conditions, such as whether to display confirmation messages at download or what registered parameters are to be displayed in simple setup windows.

   ⇒ Screen (4) is displayed.

2. Click the Detailed Setup tab.

3. Select checkboxes for the desired EEPROM write confirmation options.
   
   TIP
   By default, a dialog confirming whether to write to EEPROM is displayed when parameters are adjusted.

4. Click OK to confirm the selection. To customize the simple setup screens, follow the procedure below.
   
   TIP
   Clicking Default reverts to default values.
5. Select the Simple Setup tab.  
⇒ Screen (5) will be displayed.

6. Select registered parameters to be displayed for editing in the Simple Setup screens.

   **TIP**
   If you check all registered parameters, the contents of the simple setup screens will be the same as those of detailed setup screens.

7. Click **OK** when you have finished setup.

   **TIP**
   Clicking **Default** reverts to default values.

**SEE ALSO**
For details on parameters to be displayed in the Simple Setup screens, see Section C1.1.1, “Tables of Registered Parameters.”
B2 Editing a Project
This chapter describes how to edit a project.

- Selecting a project → B2.1
- Creating and editing registered parameters → B2.2

B2.1 Selecting a Project
This section describes how to select a project and how to open the registered parameter edit window.

B2.1.1 Selecting a Project

1. Run ToolBox.

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

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

4. Select a project, and either double-click it or click [Open].
   ⇒ Screen (3) will be displayed.
5. The structure of the project will be displayed in the project window.

B2.1.2 Opening the Registered Parameter Edit Window

1. Select [File]-[Open] from the menu bar.
   ⇒ Screen (4) will be displayed.

2. Select a registered parameter file, and either double-click it or click Open.
   ⇒ Screen (4-1) will be displayed.
   
   **TIP**
   - Double-clicking the "Registered Parameters" icon under a registered parameter file in the project window in screen (3) also opens the file.
   - The file name extension depends on the advanced function module type:
     - YPUP101 for F3CU04-0N
     - YPUP102 for F3CU04-1N
     - YPUP105 for F3CU04-0S
     - YPUP106 for F3CU04-1S
     - YPUP107 for F3CU04-0G
     - YPUP108 for F3CU04-1G
     - YPUP111 for F3CX04-0N
     - YPUP114 for F3CX04-0G

3. Click **Yes** or **No** to specify the first registered parameter screen to be displayed in the registered parameter edit window.
   ⇒ The following registered parameter screen is displayed:
      - **Yes**: Controller Parameter Setup screen
      - **No**: Operation Parameter Setup screen
   
   **TIP**
   If you click **No**, the system presents the Operation Parameter Setup screen for editing, skipping the Controller Parameter Setup screen and Input/Output Parameter Setup screen.
B2.1.3 Registered Parameter Setup Screens

The following three registered parameter setup screens are displayed in the registered parameter edit window. Clicking Next causes the next screen to appear. This section describes how to set up registered parameters, using as an example simple setup on the controller parameter setup screen.

- ① Controller parameter setup (or monitor parameter setup)
- ② I/O parameter setup
- ③ Operation parameter setup

Highlighting a cell (in dark blue) displays a list box or other input helper screen. A cell is in different colors to indicate different statuses as follows:
- White: Default value
- Yellow: Modified and confirmed value
- Pink: Modified but unconfirmed value
- Red: Invalid value
- Gray: Read-only value

Clicking this button displays a Detailed Setup screen showing all parameters for the current setup screen. The button name changes to Simple Setup. Clicking the button toggles between “Simple Setup” and “Detailed Setup.”

Clicking the cell of a parameter displays its description.

Specify the items to be displayed in Simple Setup.

Allows you to enter or edit a title name and loop names.

Cancels all unconfirmed changes. If there are modified but unconfirmed parameters, a confirmation screen is displayed.

Shows the next screen (I/O Parameter Setup screen). All modified but unconfirmed parameters, if any, are validated.

Cancels editing. If there are any modified but unconfirmed parameters, a dialog box will appear to confirm whether to save or initialize the parameters.

Confirms all changes. All valid parameters have their cell colors changed from pink to yellow. If an invalid value is found, a range error message is displayed. If there are modified but unconfirmed controller or I/O parameters, a dialog box is displayed to confirm initialization. This button is enabled only when if there is one or more modified but unconfirmed parameters.
B2.2 Creating and Editing Registered Parameters

The internal registers (parameters) of temperature control and monitoring modules are grouped and shown in three parameter setup screens in ToolBox. Parameter groups (1), (2) and (3) should be created or edited in that order as shown below.

Each parameter setup screen is either a Detailed or a Simple Setup screen. While a Detailed Setup screen shows all parameters, a Simple Setup screen shows only frequently used ones.

Temperature control and monitoring modules' internal registers (parameters)

<table>
<thead>
<tr>
<th>Common process data</th>
<th>ToolBox's editing function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Analog output settings</td>
<td>1 Controller parameter setup</td>
</tr>
<tr>
<td>Setup control parameters</td>
<td>2 I/O parameter setup</td>
</tr>
<tr>
<td>Controller/monitor parameters</td>
<td>3 Operation parameter setup</td>
</tr>
<tr>
<td>Process data</td>
<td></td>
</tr>
<tr>
<td>Operation control parameters</td>
<td></td>
</tr>
<tr>
<td>I/O parameters</td>
<td></td>
</tr>
<tr>
<td>Operation parameters</td>
<td>Setup parameters</td>
</tr>
<tr>
<td></td>
<td>PID parameters</td>
</tr>
</tbody>
</table>

SEE ALSO
- For details on the registers of temperature control and monitoring modules, see the user's manual for the temperature control and PID module or the temperature monitoring module.
- For details on parameters that can be edited on the registered parameter setup screens, such as the type, valid data range and default value, see Section C1.1.1, "Tables of Registered Parameters."
B2.2.1 Editing Registered Parameters (controller parameter setup)

1. Select the cell for a parameter you want to edit in screen (5) (controller parameter setup).
   ⇒ The list box button will appear.

   Tip
   For the temperature monitoring module, the name of the screen will be "Monitor Parameter Setup" instead.

2. Click the button to open a list box, and select a desired value from the list.

   See Also
   You may also directly key in a value in a cell. For information on how to use a list box, see Section B2.2.4, "About Parameter Input Helper Screens."

3. To edit a parameter that is not shown in the Simple Setup screen, click Detailed Setup to show the Detailed Setup screen. Otherwise, skip to Step 5.

   See Also
   You can define in the Environment Setup window which parameters to show in the Simple Setup screen. For the procedure, see Section B1.2, "Configuring ToolBox."

4. Select a cell, click the button to open a list box, and select a desired value from the list or specify a desired range.

5. Click Next.
   ⇒ Screen (6) will be displayed.

   Tip
   This screen is not displayed if no parameter has been modified.

6. Click Initialize or Don’t Initialize to initialize or to not initialize the parameters on subsequent setup screens.
   ⇒ The I/O Parameter Setup screen (screen (7)) will be displayed.

   Tip
   The registered parameter file is updated.
B2.2.2 Editing Registered Parameters (I/O parameter setup)

1. Select the cell for a parameter you want to edit in screen (7) (I/O parameter setup).
   ⇒ The list box button will appear.

2. Click the button to open a list box, and select a desired value from the list.

   SEE ALSO
   For information on how to use a list box, see Section B2.2.4, “About Parameter Input Helper Screens.”

3. To edit a parameter that is not shown in the Simple Setup screen, click Detailed Setup to show the Detailed Setup screen. Otherwise, skip to Step 5.

4. Select a cell, click the button to open a list box, and select a desired value from the list or specify a desired range.

   TIP
   For some parameters, you may have to click OK after editing.

5. Click Next.
   ⇒ Screen (8) will be displayed.

   TIP
   This screen is not displayed if no parameter has been modified.

6. Click Initialize or Don’t Initialize to initialize or to not initialize the parameters on the next setup screen.
   ⇒ The operation Parameter Setup screen (screen (9)) will be displayed.

   TIP
   The registered parameter file is updated.
B2.2.3 Editing Registered Parameters (operation parameter setup)

1. Select the cell for a parameter you want to edit in screen (9) (operation parameter setup).
   ⇒ The button to open a list box or input helper screen will appear.

   **TIP**
   For a temperature monitoring module, the PID Parameters tab is replaced by the SP parameters tab.

2. Click the button, and select a desired value from the list or specify a desired range.

   **SEE ALSO**
   For information on how to use a list box, see Section B2.2.4, "About Parameter Input Helper Screens."

   **TIP**
   For some parameters, you may have to click OK.

3. To edit a parameter that is not shown in the Simple Setup screen, click Detailed Setup to show the Detailed Setup screen. Otherwise, skip to Step 5.

4. Select a cell, click the button to open a list box and select a desired value from the list, or specify a desired range.

5. Click Finish.
   ⇒ Screen (10) will be displayed.

   **TIP**
   This screen is not displayed if no parameter has been modified.

6. Click Save.
   ⇒ The parameter file is updated.
B2.2.4 About Parameter Input Helper Screens

Highlighting a parameter setup 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. In a parameter setup screen, highlight a cell to be edited.
2. Click the button to open a list box, and select from the list.

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. The look of the parameter input helper screen depends on the selected parameter. The following description explains how to select an input value, using different parameter input helper screens as examples.

1. In a parameter setup screen, highlight a cell to be edited.
2. Click the button displayed.

⇒ A parameter input helper screen will be displayed. The actual screen displayed will depend on the selected parameter.
• **Example 1**
  - Using the mouse:
    Modify the setting by clicking the spin button control, and click **OK**.
  - Using the keyboard:
    Modify the setting by pressing the `↓` and `↑` keys, select **OK** by pressing the `Tab` key, and finally press the `Enter` key.

• **Example 2**
  - Using the mouse:
    Click desired radio buttons, and click **OK**.
  - Using the keyboard:
    Select a loop or other item to be modified by pressing the `Tab` key, and modify the setting by pressing the `→` and `←` keys for each item. After setting all items, select **OK** by pressing the `Tab` key, and finally press the `Enter` key.

• **Example 3**
  - Using the mouse:
    Drag each slider to a desired position, and click **OK**.
  - Using the keyboard:
    Select each slider by pressing the `Tab` key, modify the setting by pressing the arrow keys, select **OK** by pressing the `Tab` key, and finally press the `Enter` key.
    To modify the lower limit, use `→` and `←`.
    To modify the upper limit, use `Shift + →` and `Shift + ←`.

• **Example 4**
  - Using the mouse:
    Click a desired radio button, and click **OK**. If a spin button is available, modify the setting by clicking the spin button control.
- Using the keyboard:
  Select a desired radio button by pressing the ↓ and ↑ keys. If a spin button is available, select it by pressing the → key, and adjust the setting by pressing the ↓ and ↑ keys. Select OK by pressing the Tab key, and finally press the Enter key.

- Example 5
  - Using the mouse:
    Drag each slider to a desired position, and click OK.
  - Using the keyboard:
    Select each slider by pressing the Tab key, and modify the setting by pressing the → and ← keys. Select OK by pressing the Tab key, and finally press the Enter key.

- Example 6
  - Using the mouse:
    Drag the slider to a desired position, and click OK.
  - Using the keyboard:
    Select the slider by pressing the Tab key, and modify the setting by pressing the → and ← keys. Select OK by pressing the Tab key, and finally press the Enter key.
Advanced Editing Functions

- Modifying the value of a cell
  1. In a parameter setup screen, highlight a cell.
  2. Select [Edit] from the menu bar, and 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 parameter setup screen also lists these commands.

- Hiding/showing a column of cells
  1. In a parameter setup screen, highlight a column of cells that you want to hide by clicking the column title.
  2. Select [Edit] from the menu bar, and select the [Hide] command. In this example, the loop 2 column will be hidden.

TIP
- A hidden column on the Controller/Monitor Parameter Setup screen will no longer be hidden once another parameter setup screen is displayed.
- A hidden column on the I/O or Operation Parameter Setup Screen remains hidden until you issue the [Show] command for that column. To issue the [Show] command, select [Edit]-[Show] from the menu bar.
- Right-clicking on a parameter setup screen also lists these commands.
- The [Show] command is available only when one or more columns are hidden.
B2.2.5 Changing Module Type of a Parameter File

You can change the module type of an existing registered parameter file created previously for use with another temperature control and PID module or temperature monitoring module.

1. Select [Project]-[Change Module Type] from the menu bar.
   ⇒ The Select File dialog box is displayed.

   **TIP**
   You can also select a registered parameter file whose module type is to be modified from the Project window, and then select [Change Module Type] from its right-click pop-up menu.

2. Select a registered parameter file whose module type is to be changed, and click [Select].
   ⇒ The Change Module Type dialog box is displayed.

3. Select a module type to be changed, and click [Select].

   **TIP**
   - Any parameter that is present in the old module type but not present in the new module type will have its parameter value, if any, deleted. Any parameter that is not present in the old module type but present in the new module type will be stored with a default value.
   - If you directly modify a parameter file created using a different version of ToolBox, some parameters may not be correctly modified.
   - Processing of a module type change may take a while due to the time required for parameter matching.
B3 Downloading Registered Parameters

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

- Connecting to FA-M3 → B3.1
- Downloading → B3.2
- Downloading to CPU module → B3.3
- Downloading restrictions → B3.4

B3.1 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.

B3.1.1 Checking Communications Setup and Connecting Online

1. Run ToolBox.

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

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

⇒ Communication is established between the FA-M3 system and the PC. The communication status is displayed on the action status bar and the status bar at the bottom of the operation screen.
B3.2 Downloading

B3.2.1 Downloading to Individual Modules

Download to Individual Modules

1. Select [Online]-[Download]-[Module...] from the menu bar.
⇒ Screen (3) will be displayed.

2. Select modules to which you want to download data 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 configuration of the module. Verify the configuration of the file or the connected FA-M3 system.
- Yellow:
  Downloading to the CPU module is not allowed because the address setup for the CPU module is invalid or not done.
- Gray:
  Not accessible.

3. Click Module.
⇒ Screen (4) will be displayed.

4. Select the loops for which parameters are to be downloaded.

5. Click Download.
⇒ The Download dialog box is displayed during downloading. When the download is completed, it is replaced by screen (5).

TIP
Clicking Stop during downloading aborts the download process.
6. Click **OK**.

7. **The Results of Downloading window is displayed for you to verify the results of downloading.**

   **SEE ALSO**

   - For information on the messages on the result of downloading, see:
     Section B3.2.4, “Messages on the Result of Downloading.”
   
   - For information on how to verify downloaded parameters, see:
     Section B4.2, “Verifying Downloaded Registered Parameters,” of the FA-M3 ToolBox Manual, and
     Section B3.2.5, “Messages on the Result of Comparison,” of this manual.
   
   - The CPU module must be in Stop mode before downloading can be performed.
   
   - When registered parameters are downloaded to an advanced function module, the module is first put into Stop mode. After downloading, you can run the module again from the tuning window.

---

## Downloading to the CPU Module

1. **Select [Online]-[Download]-[Module…] from the menu bar.**

   ⇒ Screen (6) will be displayed.

2. **Select modules to which you want to download data by clicking in the Select column.**

   **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 B3.2.1.

3. **Click **CPU**.**

   ⇒ Screen (7) will be displayed.
4. Set up the CPU address from which downloading is to begin.

5. Click **Download**.

   ⇒ The Download dialog box is displayed during downloading. When the download is completed, it is replaced by screen (8).

   **TIP**

   Clicking **Stop** during downloading aborts the download process.

6. Click **OK**.

7. The Results of Downloading window is displayed for you to verify the results of downloading.

   **SEE ALSO**

   - For information on the messages on the result of downloading, see:
     Section B3.2.4, “Messages on the Result of Downloading.”
   - For information on how to verify downloaded parameters, see:
     Section B4.2, “Verifying Downloaded Registered Parameters,” of the FA-M3 ToolBox Manual, and
     Section B3.2.5, “Messages on the Result of Comparison,” of this manual.
B3.2.2 Downloading to All Modules of a Project

1. Select [Online]-[Download]-[Project…] from the menu bar.
   ⇒ Screen (9) will be displayed.

2. Click [CPU] or [Module] to specify the download destination.
   ⇒ The Download dialog box is displayed during downloading. When the download is completed, it is replaced by screen (10).

   **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 B3.2.1.

   **TIP**
   Clicking [Stop] during downloading aborts the download process.

3. Click [OK].

4. The Results of Downloading window is displayed for you to verify the results of downloading.

   **SEE ALSO**
   - For information on the messages on the result of downloading, see:
     Section B3.2.4, “Messages on the Result of Downloading.”
   - For information on how to verify downloaded parameters, see:
     Section B4.2, “Verifying Downloaded Registered Parameters,” of the FA-M3 ToolBox Manual, and
     Section B3.2.5, “Messages on the Result of Comparison,” of this manual.
   - The CPU module must be in Stop mode before downloading can be performed.
   - When registered parameters are downloaded to an advanced function module, the module is first put into Stop mode. After downloading, you can run the module again from the tuning window.
B3.2.3 Downloaded Registered Parameters

Created registered parameters are downloaded to the registers of the temperature control and monitoring modules as follows:

<table>
<thead>
<tr>
<th>Tool Box</th>
<th>Parameters for control and monitoring</th>
</tr>
</thead>
<tbody>
<tr>
<td>Analog output settings</td>
<td>Download</td>
</tr>
<tr>
<td>Controller/monitor parameters</td>
<td></td>
</tr>
<tr>
<td>I/O parameters</td>
<td></td>
</tr>
<tr>
<td>Setup parameters</td>
<td></td>
</tr>
<tr>
<td>PID parameters</td>
<td></td>
</tr>
</tbody>
</table>

B3.2.4 Messages on the Result of Downloading

The Results of Downloading window may display one or more of the following messages. Read the messages and take necessary actions, if any.

Table B3.1 List of Messages on the Result of Downloading

<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 is successfully completed.</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Aborted.</td>
<td>The [Stop] button was pressed during downloading, and downloading was aborted.</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>NNN parameter (9999) is invalid.</td>
<td>The NNN parameter value is beyond the upper or lower limit. *1</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Failed to write &quot;NNN&quot; parameter (9999).</td>
<td>An error has occurred when the NNN parameter is being written. *1</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Invalid module type</td>
<td>There is a mismatch in the temperature control and monitoring module type between ToolBox and FA-M3. The last 2 digits of the type may be different, for example, &quot;F3CU04-0N&quot; for ToolBox but &quot;F3CU04-1N&quot; for FA-M3.</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Communication server is busy.</td>
<td>The communication server is busy. WideField3 may be communicating with FA-M3.</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>
</tbody>
</table>

*1: "NNN" denotes either "Controller/Monitor," "Input/Output," or "Operation." *9999" denotes the number of the register in error. For details on register numbers, see Section C1.1.1, "Tables of Registered Parameters." For example, the following error message may appear if downloading from ToolBox fails due to an error: "Input/Output" parameter (147) is invalid.
B3.2.5 Messages on the Result of Comparison

The Results of Comparison window shows one or more of the following messages. Confirm the displayed information and take action as necessary.

<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>Comparison is successfully completed.</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Aborted.</td>
<td>The [Stop] button was pressed during downloading, and downloading was aborted.</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Failed to read &quot;NNN&quot; parameter (9999).</td>
<td>An error has occurred when (uploading) the NNN parameter is being read.</td>
<td>*1</td>
</tr>
<tr>
<td>4</td>
<td>Value mismatch for &quot;NNN&quot; parameter (9999).</td>
<td>There is a mismatch between the NNN parameter value in ToolBox and FA-M3 (module).</td>
<td>*1</td>
</tr>
<tr>
<td>5</td>
<td>Invalid module type</td>
<td>There is a mismatch in the temperature control and monitoring module type between ToolBox and FA-M3. The last 2 digits of the type may be different, for example, &quot;F3CU04-0N&quot; for ToolBox but &quot;F3CU04-1N&quot; for FA-M3.</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Communication server is busy.</td>
<td>The communication server is busy. WideField3 may be communicating with FA-M3.</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Invalid dialog information file</td>
<td>Dialog information is 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>
</tbody>
</table>

*1: "NNN" denotes either "Controller/Monitor," "Input/Output," or "Operation." *9999" denotes the number of the register in error.
For details on register numbers, see Section C1.1.1, "Tables of Registered Parameters."
For example, the following error message may appear if downloading from ToolBox fails due to an error: "Input/Output" parameter (147) is invalid.

TIP

For details on how to perform comparison, see:
Section B4.2, "Verifying Downloaded Registered Parameters," of the FA-M3 ToolBox Manual.
### B3.3 Downloading to CPU Module

#### Registered Parameters Downloaded to a CPU Module

Registered parameters (files) downloaded to the CPU module are stored in its data (file) registers as shown below.

**Table B3.3  Internal Data Registers of CPU Module Used**

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Number of Data (File) Registers Used</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>F3CU04-0S</td>
</tr>
<tr>
<td>1 Controller/monitor parameters</td>
<td>13</td>
</tr>
<tr>
<td>2 Analog output settings</td>
<td>-</td>
</tr>
<tr>
<td>3 I/O and operation parameters (for loops 1, 2, ...)</td>
<td>128</td>
</tr>
<tr>
<td>Total number of registers used</td>
<td>525</td>
</tr>
</tbody>
</table>

Controller/monitor parameters, analog output settings, I/O parameters, and operation parameters (for loops 1, 2, ...) downloaded from ToolBox to the CPU module are stored in data registers of the CPU module in ascending order of the addresses. Although you can specify which parameters are to be downloaded, this will not affect the number of data registers used as registers for all parameters are reserved regardless of whether the parameters are actually downloaded.

**SEE ALSO**

- You can manually change the start register address for storing each group of parameters. For details, see the description entitled "Downloading to the CPU Module" in Section B3.2.1.
- For details on the addresses (positions) of the data registers of the CPU module used, see Section C1.1.4, "CPU Parameter Positions."

#### When Multiple CPU Module Areas are Specified in Configuration Definition

When an area is newly added in configuration definition (detailed setup), the addresses of the CPU module data (file) registers are automatically rearranged so that new addresses for the added area are appended to the existing addresses (see screen (11)).

All relevant data register addresses are reserved for their corresponding parameters at the time of configuration definition. This mapping between data registers and their addresses is not affected even if some detailed setup data is deleted in configuration definition. In this case, an empty area with no data still has its addresses reserved (see screen (12)).
B3.4 Downloading Restrictions

- **Operation of the Temperature Control and Monitoring Modules**
  - When downloading begins, the modules enter Setup mode, and execution stops.

- **Operation of the CPU Module**
  - The CPU module changes from Run to Stop mode. When downloading completes, you can run the CPU module as required.

- **Debugging Function of ToolBox**
  - If downloading is done when the action monitor, tuning, or parameter adjustment screen is displayed, the debugger function is suspended until downloading completes. When downloading completes, the debugger function automatically resumes provided the parameter scale or some other parameters are not changed. Otherwise, the debugger function remains suspended.
  - If the registered parameter NBKUP is set to "1: No backup," the download function transfers the registered parameters to the registers but does not save them in the EEPROM in the module. In this case, the following dialog box will be displayed before download begins. You may change the NBKUP parameter as required.

- **If the CPU Operation Mode of the CPU Module is ROM Writer Mode**
  - Downloading is not available if the CPU operation mode of the CPU module is set to ROM writer mode. In this case, the following dialog box will be displayed. Terminate ROM writer mode of the CPU module using WideField3 as required.
● If the Input Type Is Determined Using the Hardware Switches
  - If the input type is determined using hardware switches, set the input type selection parameter to match the setting of the hardware switches before downloading. If the hardware switches of an advanced function module are not set to "0: Software setting," the setting of the input type selection parameter downloaded from ToolBox to the module will be ignored. However, if the input type determined by the hardware switches is not the same as the setting of the input type selection parameter as downloaded, a range error may occur during downloading depending on the range/scale setting.
B4 Checking FA-M3 Operation Using Action Monitor

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

- What is Action Monitor? → B4.1
- Using Action Monitor → B4.2

B4.1 What is Action Monitor?

Using the Action Monitor function, you can read and display on a computer screen the contents of registers of temperature control and monitoring modules, as well as data of devices of CPU modules. You can check registered parameters with the following dataflow.

**CAUTION**

- Do not change the system time setting of your computer when using the Action Monitor. The Action Monitor uses the system timer of your computer for its time management. If the system time setting of your computer is changed during action monitoring, the Action Monitor may not operate correctly.
- Although the Action Monitor can continuously sample data from a module, the data sampling function is really designed for temporary module adjustment, and thus is not guaranteed to function as a data recorder for continuous process operation.
- The Action Monitor samples data from a module through communication. If the communications channel suffers noise or other interference, incorrect graphs may be displayed.
B4.2 Using Action Monitor

B4.2.1 Displaying Action Monitor Screens

1. Run ToolBox, open a project, and connect to FA-M3.

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

3. In the Select Action Monitor screen, highlight the module you want to monitor by clicking the corresponding cell.
   ⇒ See screen (1).

4. Click [Action Monitor].
   ⇒ Action Monitor screen (2) will be displayed.

TIP
- As an alternative way to display the Action Monitor screen, you may also double click Action Monitor under the relevant module name in the Debugger Window.
- You may open up to four Action Monitor screens concurrently. The Action Monitor screen first opened for a particular slot is the main monitor, and any other Action Monitor screens opened concurrently for the same slot are auxiliary monitors. Auxiliary monitors allow monitoring only and data displayed in them cannot be saved.
- **Action Monitor Screen (2)**
  The screen layout of an Action Monitor screen is shown below.

### Button Keys Description

- `<` [Shift] + `<` Shift left by 1 point.
- `>` [Shift] + `>` Shift right by 1 point.
- `<<` [Shift] + `<` Shift left by 20 points.
- `>>` [Shift] + `>` Shift right by 20 points.
- `[Shift] + [↑]` Jump to the first point.
- `[Shift] + [↓]` Jump to the last point.

### Sampling status:
- Green: Receiving data
- Orange: Received all data
- Red: Not accessing

### Information displayed here:
- Slot No.
- File name
- Title
- Module type

### Sampling period

### Starts or stops data logging

### Zoons in/out of time axis (abscissa)

### Upper scale limit

### Splits the screen

### Lower scale limit

### Graph area

### Saves data manually or automatically

### Exit Action Monitor

### Sets monitoring conditions

### Moves graphic cursor

### Log information:
- **For a register of a module:**
  
  **Loop No.-Symbol-Name**

  Meaning of the displayed loop No.:
  - 0 denotes common parameters.
  - 1-4 denotes loops 1-4 respectively.

- **For a device of a CPU module:**
  - CPU (Specified device No.)
B4.2.2 Selecting Data to be Monitored

Specifying Log Items

1. Click Setup on the Action Monitor screen (2).
   ⇒ Screen (3) will be displayed.

2. Specify the sampling period by clicking a radio button, and specify registers to be monitored by selecting from the loop and register list boxes.

- Registers Listed in the Register List Box
  - When loop number is set to 0:
    Registers for controller/monitor parameters as displayed in the Simple Setup screens for registered parameters are displayed in the list box.
  - When loop number is set to 1-4:
    The following registers are displayed in the list box in the given order:
    ① Common process data registers
    ② Registers as displayed in the Simple Setup screens for registered parameters
    ③ Registers used for tuning

SEE ALSO
For details on common process data registers, see Section C1.1.2, "Common Process Data."
For details on registered parameters, see Section C1.1.1, "Tables of Registered Parameters."
For details on registers used for tuning, see Section C1.1.3, "Registers Used for Tuning."

- When loop is set to [CPU] (for monitoring of a CPU device):
  Devices registered using CPU Device Registration are displayed in the list box.

TIP
For details on how to register CPU devices, see:
- Monitoring CPU Devices.

<table>
<thead>
<tr>
<th>Period</th>
<th>Duration</th>
<th>Total Number of Samples</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 s</td>
<td>24 min</td>
<td>Up to 1440 samples can be taken for each of 8 registers (Log 1 to Log 8). Old sample values are replaced by new sample values chronologically.</td>
</tr>
<tr>
<td>2 s</td>
<td>48 min</td>
<td></td>
</tr>
<tr>
<td>5 s</td>
<td>2 hr</td>
<td></td>
</tr>
<tr>
<td>10 s</td>
<td>4 hr</td>
<td></td>
</tr>
<tr>
<td>1 min</td>
<td>24 hr</td>
<td></td>
</tr>
<tr>
<td>10 min</td>
<td>240 hr</td>
<td></td>
</tr>
</tbody>
</table>
3. Specify the scale range for a graph to be displayed on the monitor screen by entering appropriate values in the [Upper Limit] and [Lower Limit] columns.

   **TIP**
   When you select an item to be monitored, its predefined default upper and lower limit values are displayed.

4. Click **OK**.
   ⇒ Screen (4) will be displayed.

5. Click **OK** to acknowledge the displayed information.
   ⇒ Edited changes are applied.

   **TIP**
   Accumulated log data is discarded when edited changes are applied so you should always save any required log data before applying edited changes.
Monitoring CPU Devices

1. Click [CPU Device Registration] on the Monitor Setup screen.
   ⇒ Screen (5) will be displayed.

2. Select either ‘D’ (data register) or ‘B’ (file register) for the device type to be registered, and enter a device number.

3. Click [OK].
   ⇒ Control returns to the Monitor Setup screen.

4. Select “CPU” in the Loop column, and then select a register from the registered CPU devices displayed in the Register list box.

   **TIP**
   - Monitored data is sampled on word basis; monitoring of long word data is not allowed.
   - You can specify any upper and lower limits between -32768 and 32767 for a CPU device.
Starting and Ending Logging

**Starting Logging**

1. Specify registers to be logged, and click **Start** in the Action Monitor screen (2).
   ⇒ Screen (7) will be displayed.

2. **Click OK**.
   ⇒ The selected registers will be logged at the specified sampling period.

*TIP*
If you stop and then restart logging, sampling begins anew. All accumulated log data will be discarded so you should always save any required data before restarting data logging.

**Ending Logging**

1. **Click Stop** in the Action Monitor screen (2).
   ⇒ Screen (8) will be displayed.

2. **Click OK**.
   ⇒ Logging will stop.

*TIP*
If you disconnect an online connection in ToolBox, logging is stopped automatically. All accumulated log data is retained as usual, the same as when logging is stopped manually.
Splitting the Graph Area of the Action Monitor Screen

You can split the graph area of the Action Monitor screen as shown below.

1. Click **Split** on the Action Monitor screen.
   
   ⇒ Screen (10) will be displayed.

2. **Specify how logged data is to be displayed in the sub screens.**

   **TIP**
   - If [1 screen] is selected, Screens 2 to 4 are not available.
   - If [2 screens] is selected, Screens 3 and 4 are not available.

3. Click **OK**.
   
   ⇒ The graph area will be split into sub-screens and data is displayed accordingly, as shown in screen (9).
B4.2.3 Saving Monitored Data

The Action Monitor function tries to acquire samples from an advanced function module at a fixed sampling period. Depending on the communications conditions, however, samples may not be acquired exactly at the specified sampling period. To compensate for any deviation in sampling timing, the function may be set to correct sampled data with respect to correct sampling timing. The Action Monitor screen displays such corrected data.

You can either save raw or corrected data as log data. Other application programs may then be used to display the log data in graphs.

Log data may be saved in CSV format manually or automatically as follows:
- Manually: You can manually save a part of the log data by specifying a logging duration or a range of points.
- Automatically: You can set up the Action Monitor function to automatically save part of the log data, by specifying a time and duration.

SEE ALSO

You may use Microsoft Excel or other application programs to display these saved log data as graphs. For details on the procedure, see Section B7.2, "Using Created Data."

Saving Manually

1. Click **Save** on the Action Monitor screen.

   ⇒ Screen (11) will be displayed.

2. Select the Manual tab.

3. Specify the output range by clicking a radio button in the output range area.
   - **All**: All log data points are saved.
   - **Points**: A specified range of log data points is saved.
   - **Time**: Log data points falling within a specified duration are saved.

![Screen (11)]
4. Specify whether to correct sampled data with respect to correct sampling timing (interval correction) by clicking a relevant radio button.
   - Yes:
     Sampled log data is corrected with respect to correct sampling timing before output for easier subsequent display in graphs.
   - No:
     Sampled log data is saved without correction.

5. Checkmark the data to be saved in the Output Data area.

6. Click **Save**.  
   ⇒ Screen (12) will be displayed.

7. Enter a file name.
   
   **TIP**
   The full pathname (including folder name) of the CSV-formatted file to be exported must not be longer than 254 characters.

8. Click **Save**.  
   ⇒ The log data will be saved in the specified file.
   
   **TIP**
   The file is saved in the same folder containing the project that is currently open.

**Saving Automatically**

1. Click **Save** on the Action Monitor screen (2).

2. Select the Automatic tab.  
   ⇒ Screen (13) will be displayed.
3. **Click [Yes] in the Save Data Automatically area.**
   - Yes: Log data is automatically saved.
   - No: Log data is not automatically saved.

4. **Specify whether to perform automatic saving periodically by clicking a radio button and specifying an interval and/or start time in the Automatic Save Setup area.**
   - Periodic: Automatic saving is performed periodically at the specified interval (selectable from 5 to 2880 minutes) starting at the specified time.
   - Specified time: Automatic saving starts at the specified time.

5. **Specify whether to correct sampled data with respect to correct sampling timing by clicking a radio button in the Interval Correction area.**
   - Yes: Sampled log data is corrected with respect to correct sampling timing before output for easier subsequent display in graphs.
   - No: Sampled log data is output without correction.

6. **Checkmark the data to be output in the Output Data area.**

7. **Specify the folder for saving log data files, and enter the common file name prefix for log data files.**

   **TIP**
   - File names are automatically assigned to log data files as follows:
     Supposing that automatic saving starts at 15:40, July 1, 2005, the file name will be (common file name prefix)_0507011540.csv
   - The full pathname of the exported CSV-formatted file must not be longer than 254 bytes.

8. **Click **Save**.**
   The log data will be automatically saved in files.
B5 Adjusting Registered Parameters Using Action Test

This chapter describes how to adjust registered parameters using the Action Test functions while running temperature control and monitoring modules.

- Action Test Flow → B5.1
- Action Test Tuning → B5.2
- Action Test Parameter Adjustment → B5.3

B5.1 Action Test Flow

The Action Test feature allows for online modification of the registered parameters of temperature control and monitoring modules while running the modules. Action Test consists of two functions: Tuning and Parameter Adjustment.

- Action Test Tuning
  With the Action Test Tuning function, you can, while running and monitoring the operation of a temperature control and monitoring module, control its operation by issuing directives such as running and stopping the module, selecting a PID/SP parameter group to be used or modifying parameter values, switching to manual operation mode, starting auto-tuning, etc.

- Action Test Parameter Adjustment
  The Action Test Parameter Adjustment function is intended to be used with the Action Monitor function. With the Action Test Parameter Adjustment function, you can modify any registered parameters of a temperature control and monitoring module and then use the Action Monitor function to check how the modified parameters affect its operation. Note that modification of some registered parameters may affect other registered parameters.

```
Ensure safety

Required operation?

Tune operation/control values

Go to Section B5.2, “Action Test Tuning”

Go to Section B5.3, “Action Test Parameter Adjustment”
```

CAUTION

Do not change the system time setting of your computer when using the Action Test Tuning function. The Action Test Tuning function uses the system timer of your computer for its time management. If the system time setting of your computer is changed during tuning, the Action test may not function properly.
B5.2 Action Test Tuning

B5.2.1 Opening and Closing the Tuning Screen

**CAUTION**
- Although the Action Test function can continuously control and monitor a module, it is really designed for temporary module adjustment, and thus is not guaranteed to function as an operation panel for continuous process control and monitoring.
- The Action Test Tuning samples and graphs data from a module through communications. If communication channels suffer from noise or other interference, incorrect graphs may be displayed.

- **Opening the Tuning Screen**
  1. Run ToolBox, open a project, and connect online to the FA-M3 system.
     SEE ALSO
     For details on how to connect online, see Section B3.1, "Connecting to FA-M3."

  2. In the Debugger Window, double click [Tuning] under the relevant module name.
     ⇒ Screen (1) will be displayed.

     **TIP**
     - As an alternative way to display the Tuning screen, you may select [Debug/Maintenance]-[Action Test...] from the menu bar, and then highlight a module and click Tuning.
     - The Tuning screen is displayed for the loop that was last monitored.
     - Clicking Simple View will replace the current detailed screen with a simplified screen (see screen (2)).

- **Closing the Tuning Screen**
  3. Click Close on the Tuning screen.
     ⇒ The Tuning screen closes.
• **Layout of the Tuning Screen**

The tuning screen contains the following functions and information:

- **Indicators:**
  - **RUN** Green: Run; White: Stop
  - **AUTO** Green: automatic; White: manual
  - **CAS** Orange: cascade; White: automatic or manual
  - **RMT** Green: remote; White: local
  - **EXPV** Green: external PV; White: normal PV
  - **EXOUT** Green: external output; White: normal output
  - **B.OUT** Red: PV burnout; Orange: PV over; White: PV normal
  - **HBREAK** Red: Heater discontinuity detected; White: normal
  - **ALM** Red: error; White: normal

- **Symbols Color Codes**

<table>
<thead>
<tr>
<th>Symbols</th>
<th>Color Codes</th>
</tr>
</thead>
<tbody>
<tr>
<td>RUN</td>
<td>Green: Run; White: Stop</td>
</tr>
<tr>
<td>AUTO</td>
<td>Green: automatic; White: manual</td>
</tr>
<tr>
<td>CAS</td>
<td>Orange: cascade; White: automatic or manual</td>
</tr>
<tr>
<td>RMT</td>
<td>Green: remote; White: local</td>
</tr>
<tr>
<td>EXPV</td>
<td>Green: external PV; White: normal PV</td>
</tr>
<tr>
<td>EXOUT</td>
<td>Green: external output; White: normal output</td>
</tr>
<tr>
<td>B.OUT</td>
<td>Red: PV burnout; Orange: PV over; White: PV normal</td>
</tr>
<tr>
<td>HBREAK</td>
<td>Red: Heater discontinuity detected; White: normal</td>
</tr>
<tr>
<td>ALM</td>
<td>Red: error; White: normal</td>
</tr>
</tbody>
</table>

- **Sampling period (default is 5 s)**

- **Select a loop to be tuned**

- **Zooms in/out of monitored graph**

- **Information displayed here:**
  - Slot No.
  - File name
  - Title
  - Module type

- **Corresponds to parameters a, b, and c of Table B5.1.**

- **Toggles between the detailed and simplified screens (the button names toggle between Simple View and Details).** See Screen (2).

- **Displays the Tuning Setup screen for sampling period and indicator color setup.** See the description entitled "Tuning Setup Screen".

- **Saves parameters d through n to the module.** Parameters d through o of Table B5.1 are arranged sequentially from top to bottom and from left to right. See Table B5.1.
Table B5.1  Control and Operation Parameters

<table>
<thead>
<tr>
<th>No</th>
<th>Symbol</th>
<th>Selection or Value</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>Run</td>
<td>Run/stop</td>
<td>*</td>
</tr>
<tr>
<td>b</td>
<td>Remote</td>
<td>Remote/local</td>
<td>*</td>
</tr>
<tr>
<td>c</td>
<td>Start AT</td>
<td>Start/stop AT</td>
<td>*</td>
</tr>
<tr>
<td>d</td>
<td>A/M/C</td>
<td>Auto/manual/cascade</td>
<td>*</td>
</tr>
<tr>
<td>e</td>
<td>INSEL</td>
<td>Input 1/2</td>
<td>*</td>
</tr>
<tr>
<td>f</td>
<td>EXPV/PV</td>
<td>External/normal PV</td>
<td>*</td>
</tr>
<tr>
<td>g</td>
<td>EXOUT/OUT</td>
<td>External/normal output</td>
<td>*</td>
</tr>
<tr>
<td>h</td>
<td>SPNO</td>
<td>SP No.</td>
<td></td>
</tr>
<tr>
<td>i</td>
<td>PID/SP Setup</td>
<td>PID and SP related parameters setup</td>
<td></td>
</tr>
<tr>
<td>j</td>
<td>EXPV</td>
<td>External PV value</td>
<td></td>
</tr>
<tr>
<td>k</td>
<td>EXOUT</td>
<td>External output value</td>
<td>*</td>
</tr>
<tr>
<td>l</td>
<td>MOUT</td>
<td>Manual output value</td>
<td>*</td>
</tr>
<tr>
<td>m</td>
<td>MOUTC</td>
<td>Manual cooling output value</td>
<td>*</td>
</tr>
<tr>
<td>n</td>
<td>EXRJC</td>
<td>EXRJC temperature</td>
<td></td>
</tr>
<tr>
<td>o</td>
<td>RSP</td>
<td>Remote SP value</td>
<td>*</td>
</tr>
</tbody>
</table>

* Not available with the temperature monitoring module.

- **Tuning Setup Screen**

Clicking **Tuning Setup** in the Tuning screen (see screen (1)) displays the Tuning Setup screen (see screen (3)) for setting the sampling period and the colors of graph lines and indicators.

---

**Screen (3)**

**Default Tuning Settings**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Symbol</th>
<th>Line Color</th>
<th>Line Type</th>
<th>Indicator Color</th>
</tr>
</thead>
<tbody>
<tr>
<td>Process value</td>
<td>PV</td>
<td>Green</td>
<td>Solid line</td>
<td>Green</td>
</tr>
<tr>
<td>Control set point</td>
<td>CSP</td>
<td>Blue</td>
<td>Solid line</td>
<td>Blue</td>
</tr>
<tr>
<td>Control output</td>
<td>HOUT</td>
<td>Red</td>
<td>Solid line</td>
<td>Red</td>
</tr>
<tr>
<td>Cooling control output</td>
<td>COUT</td>
<td>Red</td>
<td>Solid line</td>
<td>Red</td>
</tr>
<tr>
<td>Analog output setting</td>
<td>AOUT</td>
<td>Red</td>
<td>Solid line</td>
<td>Red</td>
</tr>
</tbody>
</table>

---

**TIP**

Clicking **Default** resets all settings to their default.
B5.2.2 Running and Stopping a Module

- **Running a Module**
  1. In the Tuning screen (see screen (4)), click Run to run the module.
     ⇒ The screen will change to screen (5).
     
     **TIP**
     The Run button changes to the Stop button when a module is running.

- **Stopping a Module**
  2. In the Tuning screen (see screen (5)), click Stop to stop the module.
     ⇒ The screen will change to screen (4).
     
     **TIP**
     - The Stop button changes to the Run button when a module is not running.
     - You may change parameters when a module not running, but any changes will be reflected only when the module is run.
B5.2.3 Tuning Individual Operation Parameters

This section describes how to tune individual operation parameters using the Action Test Tuning function. Specifically, it describes how to select the operation mode from the A/M/C list box, and how to modify individual operation parameters using the PID/SP Setup button in the Tuning screen.

SEE ALSO
For information on other I/O related parameters, see Table B5.1.

- **A/M/C Switching**
  You can choose automatic, manual or cascade operation mode from the A/M/C list box.
  - **Automatic**
    System performs PID computation according to the group of parameters designated by the SP No. parameter, and controls the module output automatically.
  - **Manual**
    System does not perform PID computation according to the group of parameters designated by the SP No. parameter. Instead, the manual output (MOUT) and cooling manual output (MOUTC) parameters are used to directly control module output.
  - **Cascade**
    System performs PID computation according to a pair of parameter groups designated by a pair of SP Nos., and controls the module output automatically.

- **SP Switching**
  You can choose from the SPNO list box an SP (PID) No. parameter for designating a group of operation parameters to be used for PID computation in automatic operation.
  To modify individual operation parameters, click **PID/SP Setup**.

⚠️ **CAUTION**

When you modify individual operation parameters for a specific SP (PID) No., a parameter setting on the Tuning screen may become out of range. In this case, further modification of individual operation parameters will not be allowed. Update the setting range by clicking the Save button in the Tuning screen.

SEE ALSO
- For information on the parameter adjustment function of the Action Test, see Section B5.3, "Action Test Parameter Adjustment."
- For details on the group of PID parameters designated by the SP No parameter, see the User's Manual for the Temperature Monitoring Module or Temperature Control and PID Module.
B5.2.4 Changing between Remote and Local
You can toggle between remote SP and local SP by clicking **Remote** (to select remote SP) or **Local** (to select local SP).

![Remote vs Local]

**TIP**
When remote SP is selected, the **Remote** button changes to **Local**.

B5.2.5 Action Test Auto-tuning
This section describes how to start the Action Test Auto-tuning function. In Action Test Auto-tuning, as the module runs according to a group of PID parameters designated by the SP No. parameter, PID parameters are automatically tuned for optimum module operation and the tuning results are displayed.

1. Select an SP No. to define a group of parameters to be tuned automatically.
2. Click **PID/SP Setup**, and modify the displayed parameters for the SP No. specified in 1 as required.
3. Set A/M/C to Auto.
4. Click **Run**.
5. Select a PID/SP number to specify the group of parameters to be tuned.
6. Click **Start AT** to start auto-tuning. When auto-tuning completes, its completion status is displayed in [AT.STUS].

**TIP**
When auto-tuning is in progress, the **Start AT** button changes to **Stop AT**.
B5.2.6 Checking for Error or Alarm Conditions

You can check temperature control and monitoring modules for error or alarm conditions using the Error Status screen, which can be displayed from the Tuning screen. Module errors, and statuses of alarms as defined by operation parameters are displayed on the Error Status screen.

If any error is detected in the module, the ALM lamp in the Tuning screen turns red.

**TIP**

Error conditions that may occur with a module are:
- System data error
- A/D converter error
- Calibration value error
- RJC error
- Controller or I/O parameter error
- EEPROM error.

**SEE ALSO**

For details on module errors, see the User's Manual for Temperature Monitoring Module or Temperature Control and PID Module.

1. **Click the Check button in the Tuning screen.**
   
   ⇒ The Error Status screen will be displayed.

2. **Check for any error or alarm condition on the Error Status screen.**

   **TIP**

   - The EEPROM write-operation counter is displayed only for F3CU04-0S, F3CU04-1S (revision 06:05 or higher), F3CU04-0G, F3CU04-1G.
B5.3 Action Test Parameter Adjustment

B5.3.1 Opening the Parameter Adjustment Window

1. Run ToolBox, open a project, and connect online to the FA-M3 system.
   ⇒ Screen (1) will be displayed.

   SEE ALSO
   For information on how to connect online, see Section B3.1, "Connecting to FA-M3."

2. In the Debugger Window, double click [Parameter Adjustment] under the relevant module name (slot No.).
   ⇒ Screen (2) will be displayed.

   TIP
   You can also display the Parameter Adjustment window by selecting [Debug/Maintenance]-[Action Test...] from the menu bar, and then selecting a project.

3. Click Yes or No, and select a screen that contains the parameters you want to modify.
   ⇒ The first screen that appears depends on whether the Yes or No button is clicked:
      Yes: Controller Parameter Setup screen
      No: Operation Parameter Setup screen

   TIP
   If you click No, the system presents the Operation Parameter Setup screen for editing, skipping the Controller Parameter Setup screen and Input/Output Parameter Setup screen.

   SEE ALSO
   If the NBKUP parameter is set to "1: No backup," a confirmation dialog box will appear before the Parameter Adjustment window appears. For more information, see Sections B5.3.3, "Setting Not to Save Registered Parameters," and C1.1.1, "Tables of Registered Parameters."
B5.3.2 Modifying Registered Parameters

TIP
If the CPU operation mode of the CPU module is set to ROM Writer, registered parameters of advanced function modules cannot be updated from ToolBox. In this case, a dialog box appears to inform you of the situation. Terminate the ROM writer mode of the CPU module using WideField3 as required. The dialog box displayed is the same as that displayed at downloading. For details, see Section B3.4, "Downloading Restrictions."

1. On the Controller Parameter Setup screen (see screen (7)), highlight a register you want to modify by clicking the relevant setup cell.

⇒ The list box button will appear.

TIP
For a temperature monitoring module, the name of the screen is "Monitor Parameter Setup" instead.

2. Click the list box button to open the list box, and select a desired setting.

SEE ALSO
- For information on how to use a list box, see Section B2.2.4, "About Parameter Input Helper Screens."
- For information on how to use buttons on the screen, see Section B2.1.3, "Registered Parameter Setup Screens."
- For information on registered parameters, see Section C1.1.1, "Tables of Registered Parameters."

3. Click Next.

⇒ Screen (8) will be displayed.

TIP
- Screen (8) is not displayed if no parameter has been modified.
- If you modify a parameter and click Apply, screen (8) is displayed but screen (7) remains. To go to Step 6, click Next.
4. **Click OK.**
⇒ **Screen (10) will be displayed.**

**TIP**
Data can be written to an EEPROM up to 100,000 times.

**SEE ALSO**
If the NBKUP parameter is set to “1: No backup,” screen (9) is not displayed. See Section B5.3.3, "Setting Not to Save Registered Parameters."

5. **In the I/O Parameter Setup screen (see screen (10)), highlight a register you want to modify by clicking the relevant cell.**

6. **Click the list box button and select a setting from a list box or specify a range.**

**SEE ALSO**
- For information on how to use a list box, see Section B2.2.4, "About Parameter Input Helper Screens."
- For information on how to use buttons on the screen, see Section B2.1.3, "Registered Parameter Setup Screens."
- For information on registered parameters, see Section C1.1.1, "Tables of Registered Parameters."

7. **Click Next.**
⇒ **Screen (11) will be displayed.**

**TIP**
- Screen (11) is not displayed if no parameter has been modified.
- You cannot return to the Controller Parameter Setup Screen by clicking the Back button on the Input/Output Parameter Setup screen. To edit parameters on the Controller Parameter Setup screen, you must reopen the Controller Parameter Setup screen.

8. **Click OK.**
⇒ **Screen (12) will be displayed.**

**TIP**
Data can be written to an EEPROM up to 100,000 times.
9. In the operation Parameter Setup screen (see screen (13)), highlight a register you want to modify by clicking the relevant cell.

10. Click the list box button and select a setting from a list box or specify a range.

SEE ALSO
- For information on how to use a list box, see Section B2.2.4, "About Parameter Input Helper Screens."
- For information on how to use buttons on the screen, see Section B2.1.3, "Registered Parameter Setup Screens."
- For information on registered parameters, see Section C1.1.1, "Tables of Registered Parameters."

11. Click **Finish**.

   ⇒ Screen (14) will be displayed.

   **TIP**
   - Screen (14) is not displayed if no parameter has been modified.
   - You cannot return to the Input/output Parameter Setup Screen by clicking the **Back** button on the Operation Parameter Setup screen. To edit parameters on the Input/output Parameter Setup screen, you must reopen the Controller Parameter Setup screen.

12. Click **OK**.

   **TIP**
   Data can be written to an EEPROM up to 100,000 times.

SEE ALSO
If the NBKUP parameter is set to "1: No backup," screen (14) is not displayed. See Section B5.3.3, "Setting Not to Save Registered Parameters."
B5.3.3 Setting Not to Save Registered Parameters

If the NBKUP parameter is set to "1: No backup", when you perform a parameter adjustment or modify parameters on a parameter setup screen, ToolBox displays the following message. And, the parameter values are not saved to the EEPROM in the module. Modify the setting of the NBKUP parameter when needed.

![ToolBox-Temperature Control and Monitoring Module](image)

 NBKUP parameter is set to "No Backup" to not save registered parameter values to the EEPROM. (Since parameter values are not saved to the EEPROM, all data changes will be lost once power is switched off.)

Continue?

OK Cancel

B5.3.4 SP Backup

When registered parameters are written in the module, a backup function of the module works and the parameter data is backed up in the internal EEPROM.

Whether or not to back up SP (set point) values depends on the specified NBKUP parameter and module types as shown in the table below.

<table>
<thead>
<tr>
<th>NBKUP</th>
<th>F3CU04-0S</th>
<th>F3CU04-1S</th>
<th>F3CU04-0G</th>
<th>F3CU04-1G</th>
<th>F3CU04-0N</th>
<th>F3CU04-1N</th>
<th>F3CX04-0N</th>
<th>F3CX04-0G</th>
</tr>
</thead>
<tbody>
<tr>
<td>0: Backup at download</td>
<td>Backed up to EEPROM</td>
<td>Backed up to EEPROM</td>
<td>Backed up to EEPROM</td>
<td>Backed up to EEPROM</td>
<td>Backed up to EEPROM</td>
<td>Backed up to EEPROM</td>
<td>Backed up to EEPROM</td>
<td>Backed up to EEPROM</td>
</tr>
<tr>
<td>0: Backup at parameter adjustment</td>
<td>Not backed up to EEPROM</td>
<td>Backed up to EEPROM</td>
<td>Not backed up to EEPROM</td>
<td>Not backed up to EEPROM</td>
<td>Not backed up to EEPROM</td>
<td>Not backed up to EEPROM</td>
<td>Not backed up to EEPROM</td>
<td>Not backed up to EEPROM</td>
</tr>
<tr>
<td>1: No backup at download</td>
<td>Not backed up to EEPROM</td>
<td>Not backed up to EEPROM</td>
<td>Not backed up to EEPROM</td>
<td>Not backed up to EEPROM</td>
<td>Not backed up to EEPROM</td>
<td>Not backed up to EEPROM</td>
<td>Not backed up to EEPROM</td>
<td>Not backed up to EEPROM</td>
</tr>
<tr>
<td>1: No backup at parameter adjustment</td>
<td>Not backed up to EEPROM</td>
<td>Not backed up to EEPROM</td>
<td>Not backed up to EEPROM</td>
<td>Not backed up to EEPROM</td>
<td>Not backed up to EEPROM</td>
<td>Not backed up to EEPROM</td>
<td>Not backed up to EEPROM</td>
<td>Not backed up to EEPROM</td>
</tr>
</tbody>
</table>

On F3CU04-0S and F3CU04-1S, F3CU04-0G, F3CU04-1G, writing operation in the EEPROM during parameter adjustment and so on is limited, and SP values are never backed up.

If you want to back up SP values in the EEPROM at parameter adjustment, you must do it manually.

To back up SP values manually after parameter adjustment, use the following procedure.

1. Open the Operation parameter setup screen from the Registered Parameters Edit screen.

2. Modify and update SP values.

   A confirmation dialog box is displayed to confirm that you want to back up the SP values.
3. **Click [OK].**

⇒ The SP values are copied to the EEPROM.

**TIP**

Even if you cancel on the confirmation dialog box in step 2 or 3, you can click the [SP Backup] button later to perform a manual backup.

**TIP**

You can check the number of write operations to the EEPROM of the module in [No. of EEPROM writes] on the Error Status dialog box for the tuning function.
B6  Saving Registered Parameters to ToolBox

This chapter describes how to save tuned registered parameters from FA-M3 modules to a PC running ToolBox.

• Uploading Registered Parameters  →  B6.1

B6.1  Uploading Registered Parameters

You can upload and save tuned registered parameters as a file on a PC. You can upload data either from individual or all modules of a project.

B6.1.1  Uploading from Individual Modules

Uploading Directly from Advanced Function Modules

1. Run ToolBox and connect online to FA-M3.

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

3. Checkmark the modules from which data is 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 to 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.

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

-  Gray:
  Not accessible.

Screen (1)
4. Click **Module**.  
⇒ Screen (2) will be displayed.

5. **Select the loops for which parameters are to be uploaded, and click **Upload**.**  
⇒ The Upload dialog box is displayed during uploading. When the upload is completed, it is replaced by screen (3).

   **TIP**  
   Clicking **Stop** during uploading aborts the upload process.

6. **When uploading completes, click **OK**.**  
⇒ The Results of Uploading window will be displayed.

   **SEE ALSO**  
   For information on the messages on the result of uploading, see Section B6.1.3, "Messages on the Result of Uploading."

7. **Save the uploaded data as a project file.**  

   **SEE ALSO**  
   For information on how to save uploaded data as a project file, see Section B6.1.3, "Saving Uploaded Data," of the FA-M3 ToolBox Manual.
Uploading from the CPU Module

1. Select [Online]-[Upload]-[Module...] from the menu bar.
⇒ Screen (4) will be displayed.

2. Checkmark the modules for which data is to be uploaded by clicking in the Select column.

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 B6.1.1.

3. Click CPU.
⇒ Screen (5) will be displayed.

4. When you have completed setup, click Upload.
⇒ The Upload dialog box is displayed during uploading. When uploading is completed, it is replaced by screen (6).

TIP
Clicking Stop during uploading aborts the upload process.
5. **When uploading completes, click OK.**
   ⇒ The Results of Uploading window will be displayed.

   **SEE ALSO**
   For information on the messages on the result of uploading, see Section B6.1.3, "Messages on the Result of Uploading."

6. **Save the uploaded data as a project file.**

   **SEE ALSO**
   For information on how to save uploaded data as a project file, see Section B6.1.3, "Saving Uploaded Data," of FA-M3 ToolBox Manual.

### B6.1.2 Uploading from All Modules of a Project

1. **Select [Online]-[Upload]-[Project...] from the menu bar.**
   ⇒ Screen (7) will be displayed.

2. **Click OK.**
   ⇒ The Upload dialog box is displayed during uploading. When the upload is completed, it is replaced by screen (8).

   **TIP**
   - If you try to perform upload when a project is open, a dialog box is displayed to confirm whether to close the currently opened project.
   - Clicking **Stop** during uploading aborts the upload process.
3. When uploading completes, click **OK**.
   ⇒ The Results of Uploading window will be displayed.

   **SEE ALSO**
   For information on the messages on the result of uploading, see Section B6.1.3, "Messages on the Result of Uploading."

4. Save the uploaded data as a project file.

   **SEE ALSO**
   For information on how to save uploaded data as a project file, see Section B6.1.3, "Saving Uploaded Data," of the FA-M3 ToolBox Manual.

### B6.1.3 Messages on the Result of Uploading

The Results of Uploading screen may display one or more of the messages listed below. Read the messages and take necessary actions, if any.

<table>
<thead>
<tr>
<th>No.</th>
<th>Messages</th>
<th>Description</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Execution completed successfully</td>
<td>Upload is successfully completed.</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Aborted.</td>
<td>The [Stop] button was pressed during uploading, and uploading was aborted.</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>NNN parameter (9999) is invalid.</td>
<td>The NNN parameter value is beyond the upper or lower limit.</td>
<td>*1</td>
</tr>
<tr>
<td>4</td>
<td>Failed to read “NNN” parameter (9999).</td>
<td>An error has occurred when the NNN parameter is being read.</td>
<td>*1</td>
</tr>
<tr>
<td>5</td>
<td>Communication server busy</td>
<td>The communication server is busy. WideField3 may be communicating with FA-M3.</td>
<td></td>
</tr>
<tr>
<td>6</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>7</td>
<td>Memory error</td>
<td>Available memory is insufficient.</td>
<td></td>
</tr>
</tbody>
</table>

*1: "NNN* denotes either "Controller/Monitor," "Input/Output," or "Operation."

For details on register numbers, see Section C1.1.1, "Tables of Registered Parameters."

For example, the following error message may appear if uploading fails due to an error:

"Input/Output" parameter (147) is invalid.
B7 Printing and Using Created Data

This chapter describes how to print or export created data.

- Printing Created Data → B7.1
- Using Created Data → B7.2

B7.1 Printing Created Data

Ensure that a PC running ToolBox is properly configured and connected to a printer.

SEE ALSO
For general information on printing, see Section B7.1, "Printing Created Data," of the FA-M3 ToolBox Manual.

Printing Registered Parameters

1. Run the ToolBox, and open a project.

2. Open the Registered Parameters Edit screen.

3. Select [File]-[Print]-[Screen] from the menu bar.
⇒ Screen (1) will be displayed.

4. Specify whether all or some parameters are to be printed.

   TIP
   If you want to print data for only some of the modules, click the radio button next to "Some Modules," click Browse, and specify the modules for which parameters are to be printed.

5. Click Preview to preview the printout.

Screen (1)
6. Confirm the name of the selected printer, and click **OK**.

   ⇒ Parameters will be printed (see Printout (2)).

   **TIP**

   Each registered parameter, item, file name, and other table entry is printed on a line. If a line is too long, it will be truncated.

---

**Printing a Project**

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

2. Select [File]-[Print]-[Project...] from the menu bar.

   ⇒ Screen (3) will be displayed.

3. Specify the data is to be printed. Select either or both of the options:

   - Parameter configuration
     Title, date of creation, CPU module, and parameter configuration
   - Registered parameters (for each slot No.)
     File name, module type, and CPU module (where parameters are stored)

   **TIP**

   If you want to print data for only some of the modules, click the radio button next to "Some Modules," click the displayed **Browse** button, and specify the modules for which data is to be printed.

4. Click **Preview** to preview the printout.
5. Confirm the name of the selected printer, and click [OK].

⇒ Data will be printed (see Printout (4)).

**TIP**

Each registered parameter, item, file name, and other table entry is printed on a line. If a line is too long, it will be truncated.

Printout (4)
Registered Parameters File Data

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

SEE ALSO

For information on how to save registered parameters in a file, see Section B7.2, "Using Created Data," of the FA-M3 ToolBox manual.

1. Run the ToolBox, and open a project.

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

3. Checkmark registered parameters files to be exported by clicking the corresponding checkboxes in the Select column.

4. Click Export.

5. Enter a name of a destination CSV file for storing registered parameters 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)).

Sample Content (5)
Log File Data

You can use Excel or other software applications to process the log data (see screen (6)) saved using the Action Monitor function.

SEE ALSO

For information on how to save log data using the Action Monitor function, see Section B4.2.3, "Saving Monitored Data."

1. Run Excel.

2. Select [File]-[Open…] from the menu bar.

⇒ Screen (7) will be displayed.

   TIP

   In screen (7), log data is saved in the My Documents folder.

3. Go to the folder where you have saved log data, and select Text Files in the Files of Type field.

4. Double click the required CSV file. The content of the file will be displayed (see Sample Content (8)).
5. Specify the data range to be displayed. In this example, data range A6 to D40 (for two loops) is specified.

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
<th>I</th>
<th>J</th>
</tr>
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<td>1</td>
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<td>26</td>
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<td>76.5</td>
<td>76.5</td>
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<td>76.5</td>
</tr>
</tbody>
</table>

6. Select [Insert]-[Chart…] from the menu bar.

7. In the [Standard Types] tab, select Line as a chart type, select a chart sub-type, and click Finish.

⇒ The log data will be displayed as a chart (see Sample Display (9)).
This chapter lists ToolBox registered parameters, common process data, registers used for tuning, and CPU parameter positions.

- Registers → C1.1

C1.1 Registers

C1.1.1 Tables of Registered Parameters

The FA-M3 ToolBox for Temperature Control and Monitoring Modules supports the following advanced function modules:
- F3CU04-0S, -0N, -0G: Temperature Control and PID Module with four inputs/outputs
- F3CU04-1S, -1N, -1G: Temperature Control and PID Module with four inputs/outputs plus continuous analog output
- F3CX04-0N, -0G: Temperature Monitoring Module with four inputs

### Controller/Monitor Parameters

<table>
<thead>
<tr>
<th>No.</th>
<th>Symbol</th>
<th>Description</th>
<th>Data Range</th>
<th>Default Value</th>
<th>F3CU04</th>
<th>F3CX04</th>
</tr>
</thead>
<tbody>
<tr>
<td>75</td>
<td>NBKUP</td>
<td>Disable backup function</td>
<td>0: Backup, 1: No backup</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>77</td>
<td>EEPROM</td>
<td>Counter for the number of write operations to the EEPROM</td>
<td>Number of write operations to the EEPROM</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>78</td>
<td>SWDT</td>
<td>DIP switches settings</td>
<td>Hexadecimal value ($XXXX)</td>
<td>$0000</td>
<td>$0000</td>
<td>$0000</td>
</tr>
<tr>
<td>81</td>
<td>FREQ</td>
<td>Power frequency selection</td>
<td>0: 50 Hz, 1: 60 Hz</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>82</td>
<td>SMP</td>
<td>Input sampling period</td>
<td>0: 100 ms - only loops 1 &amp; 2 configurable 1: 200 ms - loops 1 to 4 configurable</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>83</td>
<td>MD12</td>
<td>Controller mode for loops 1 and 2</td>
<td>0: Two single loops 1: Two-input changeover control 2: Cascade control 3: Single loop (odd-numbered loops disabled)</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>84</td>
<td>MD34</td>
<td>Controller mode for loops 3 and 4</td>
<td>4: Both loops disabled</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>87</td>
<td>OUTPUT</td>
<td>Output type selection</td>
<td>Hexadecimal value ($XXXX) for bit control where an ON bit means analog output bit 0 for output 1, bit 4 for output 5 bit 1 for output 2, bit 5 for output 6 bit 2 for output 3, bit 6 for output 7 bit 3 for output 4, bit 7 for output 8</td>
<td>$0000</td>
<td>$0000</td>
<td>$0000</td>
</tr>
<tr>
<td>91</td>
<td>OUTSEL1</td>
<td>Output terminal selection 1</td>
<td></td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>92</td>
<td>OUTSEL2</td>
<td>Output terminal selection 2</td>
<td></td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>93</td>
<td>OUTSEL3</td>
<td>Output terminal selection 3</td>
<td></td>
<td>3</td>
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<td>Output terminal selection 4</td>
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<td>Output terminal selection 6</td>
<td></td>
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<td>OUTSEL7</td>
<td>Output terminal selection 7</td>
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<tr>
<td>98</td>
<td>OUTSEL8</td>
<td>Output terminal selection 8</td>
<td></td>
<td>14</td>
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</tr>
</tbody>
</table>

**TIP**

- Shaded rows indicate parameters displayed in the Simple Setup screen by default.
- Parameters with no default value indicated for a module are unavailable in that module.
## Output Preset Values

<table>
<thead>
<tr>
<th>No.</th>
<th>Symbol</th>
<th>Description</th>
<th>Data Range</th>
<th>Default Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>61</td>
<td>AOUT1</td>
<td>Output preset value 1</td>
<td>-500 to 10500 (-5.00 to 105.00%)</td>
<td>- - 0 0 - -</td>
</tr>
<tr>
<td>62</td>
<td>AOUT2</td>
<td>Output preset value 2</td>
<td>- - - 0 0 - -</td>
<td>- - 0 0 - -</td>
</tr>
<tr>
<td>63</td>
<td>AOUT3</td>
<td>Output preset value 3</td>
<td>- - - 0 0 - -</td>
<td>- - 0 0 - -</td>
</tr>
<tr>
<td>64</td>
<td>AOUT4</td>
<td>Output preset value 4</td>
<td>- - - 0 0 - -</td>
<td>- - 0 0 - -</td>
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<tr>
<td>65</td>
<td>AOUT5</td>
<td>Output preset value 5</td>
<td>- - - 0 0 - -</td>
<td>- - 0 0 - -</td>
</tr>
<tr>
<td>66</td>
<td>AOUT6</td>
<td>Output preset value 6</td>
<td>- - - 0 0 - -</td>
<td>- - 0 0 - -</td>
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<tr>
<td>67</td>
<td>AOUT7</td>
<td>Output preset value 7</td>
<td>- - - 0 0 - -</td>
<td>- - 0 0 - -</td>
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<tr>
<td>68</td>
<td>AOUT8</td>
<td>Output preset value 8</td>
<td>- - - 0 0 - -</td>
<td>- - 0 0 - -</td>
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## I/O Parameters

### Input/Output Type Parameters

<table>
<thead>
<tr>
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<th>Symbol</th>
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<th>Data Range</th>
<th>Default Value</th>
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<tr>
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<td>4</td>
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<tr>
<td>141</td>
<td>341</td>
<td>541 741</td>
<td>OT Control type selection (available only for even-numbered loops if two-input changeover or cascade control mode is selected)</td>
<td>0: PID control 1: On/off control 2: Heating/cooling PID control 3: Heating/cooling on/off control 0 0</td>
</tr>
<tr>
<td>142</td>
<td>342</td>
<td>542 742</td>
<td>IN Input type selection</td>
<td>See the Instrument Range and Accuracy table in the User's Manual for individual modules.</td>
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### Input Range Parameters

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<tr>
<td>143</td>
<td>343</td>
<td>543 743</td>
<td>RH Input range upper limit</td>
<td>See the Instrument Range and Accuracy table in the User's Manual for individual modules.</td>
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<tr>
<td>144</td>
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<td>544 744</td>
<td>RL Input range lower limit</td>
<td>See the Instrument Range and Accuracy table in the User's Manual for individual modules.</td>
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<tr>
<td>145</td>
<td>345</td>
<td>545 745</td>
<td>DEC.P Decimal point position</td>
<td>See the Instrument Range and Accuracy table in the User's Manual for individual modules.</td>
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### Scaling Parameters

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<tr>
<td>146</td>
<td>346</td>
<td>546 746</td>
<td>SH Scaling upper limit</td>
<td>DCV: 1000; Others: RH</td>
</tr>
<tr>
<td>147</td>
<td>347</td>
<td>547 747</td>
<td>SL Scaling lower limit</td>
<td>DCV: 0; Others: RL</td>
</tr>
<tr>
<td>148</td>
<td>348</td>
<td>548 748</td>
<td>SDP Scaling decimal point position</td>
<td>DCV: 1; Others: DEC.P</td>
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### Reference junction compensation

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<td>349</td>
<td>549 749</td>
<td>RJC Reference junction compensation</td>
<td>0: Fixed value (EXJCT), 1: On</td>
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<tr>
<td>150</td>
<td>350</td>
<td>550 750</td>
<td>BSL Burnout selection</td>
<td>0: Off, 1: Up Scale, 2: Down Scale</td>
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### Two-input Range Parameters (available only in two-input changeover mode)

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<th>Symbol</th>
<th>Description</th>
<th>Data Range</th>
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<td>151</td>
<td>351</td>
<td>551 751</td>
<td>PRH PV range upper limit (available only for even-numbered loops in two-input changeover mode)</td>
<td>-30000 to 30000 provided 0 &lt; (SH - SL) ≤ 30000 (changeable only for even-numbered loops in two-input changeover mode with a maximum resolution of 14 bits (16384), otherwise fixed to SH/SL)</td>
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<tr>
<td>152</td>
<td>352</td>
<td>552 752</td>
<td>PRL PV range lower limit (available only for even-numbered loops in two-input changeover mode)</td>
<td>-30000 to 30000 provided 0 &lt; (SH - SL) ≤ 30000 (changeable only for even-numbered loops in two-input changeover mode with a maximum resolution of 14 bits (16384), otherwise fixed to SH/SL)</td>
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<td>153</td>
<td>353</td>
<td>553 753</td>
<td>PDP PV range decimal point position (available only for even-numbered loops in two-input changeover mode)</td>
<td>0 to 4 (changeable only in two-input changeover mode, otherwise fixed to SH/SL)</td>
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### Operation Parameters

#### SP-related Parameters

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</thead>
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<td>SELMD</td>
<td>Two-input changeover mode (available only for even-numbered loops)</td>
<td>0: Changeover by temperature range 1: Changeover by SELH 2: Changeover with INSEL</td>
<td>0 0 0</td>
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<td>2</td>
<td>SELH</td>
<td>Two-input changeover upper limit (available only for even-numbered loops)</td>
<td>PRL to PRH if SEL &lt; SELH; if SEL &gt; SELH, changeover occurs with respect to SELH</td>
<td>PRL+1 PRL+1 PRL+1</td>
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<tr>
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<td>SELL</td>
<td>Two-input changeover lower limit (available only for even-numbered loops)</td>
<td>PRL</td>
<td>PRL</td>
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<tr>
<td>4</td>
<td>SPH</td>
<td>Upper SP limit</td>
<td>PRL to PRH if SPL &lt; SPH; If SPL ≥ SPH, fixed to SPL</td>
<td>PRH</td>
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<tr>
<td></td>
<td>SPL</td>
<td>Lower SP limit</td>
<td>PRL</td>
<td>PRL</td>
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<tr>
<td>5</td>
<td>X1</td>
<td>Broken line input 1</td>
<td>-(SH - SL) to (SH - SL)</td>
<td>SL SL SL</td>
</tr>
<tr>
<td>6</td>
<td>Y1</td>
<td>Broken line bias 1</td>
<td>-(SH - SL) to (SH - SL)</td>
<td>0 0 0</td>
</tr>
<tr>
<td>7</td>
<td>X2</td>
<td>Broken line input 2</td>
<td>-(SH - SL) to (SH - SL)</td>
<td>SL SL SL</td>
</tr>
<tr>
<td>8</td>
<td>Y2</td>
<td>Broken line bias 2</td>
<td>-(SH - SL) to (SH - SL)</td>
<td>0 0 0</td>
</tr>
<tr>
<td>9</td>
<td>X3</td>
<td>Broken line input 3</td>
<td>-(SH - SL) to (SH - SL)</td>
<td>SL SL SL</td>
</tr>
<tr>
<td>10</td>
<td>Y3</td>
<td>Broken line bias 3</td>
<td>-(SH - SL) to (SH - SL)</td>
<td>0 0 0</td>
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<tr>
<td>11</td>
<td>SR</td>
<td>Square root extraction</td>
<td>0: Off (no square root extraction) 1: On (square root extraction)</td>
<td>0 0</td>
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<tr>
<td>12</td>
<td>LC</td>
<td>Low-cut</td>
<td>0.0 to 5.0% of 0 to (SH - SL)</td>
<td>(PRH - PRL) x 0.5% (PRH - PRL) x 0.5% (PRH - PRL) x 0.5%</td>
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#### PV-related Parameters

<table>
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<tbody>
<tr>
<td>13</td>
<td>BS</td>
<td>Fixed bias</td>
<td>-(SH - SL) to (SH - SL)</td>
<td>0 0 0</td>
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<td>14</td>
<td>FL</td>
<td>Input filter</td>
<td>0: Off, 1-120 seconds</td>
<td>0 0 0 0</td>
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<tr>
<td>15</td>
<td>X1</td>
<td>Broken line input 1</td>
<td>-5.0 to 105% of (SH - SL)</td>
<td>SL SL SL</td>
</tr>
<tr>
<td>16</td>
<td>Y1</td>
<td>Broken line bias 1</td>
<td>-(SH - SL) to (SH - SL)</td>
<td>0 0 0</td>
</tr>
<tr>
<td>17</td>
<td>X2</td>
<td>Broken line input 2</td>
<td>-5.0 to 105% of (SH - SL)</td>
<td>SL SL SL</td>
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<td>18</td>
<td>Y2</td>
<td>Broken line bias 2</td>
<td>-(SH - SL) to (SH - SL)</td>
<td>0 0 0</td>
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<td>19</td>
<td>X3</td>
<td>Broken line input 3</td>
<td>-5.0 to 105% of (SH - SL)</td>
<td>SL SL SL</td>
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<td>20</td>
<td>Y3</td>
<td>Broken line bias 3</td>
<td>-(SH - SL) to (SH - SL)</td>
<td>0 0 0</td>
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<tr>
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<td>SR</td>
<td>Square root extraction</td>
<td>0: Off (no square root extraction) 1: On (square root extraction)</td>
<td>0 0</td>
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<tr>
<td>22</td>
<td>LC</td>
<td>Low-cut</td>
<td>0.0 to 5.0% of 0 to (SH - SL)</td>
<td>(PRH - PRL) x 0.5% (PRH - PRL) x 0.5% (PRH - PRL) x 0.5%</td>
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#### Operation-related Parameters

<table>
<thead>
<tr>
<th>Loops</th>
<th>Symbol</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>23</td>
<td>SELF</td>
<td>Dynamic auto-tuning enable</td>
<td>0: Disabled, 1: Enabled</td>
<td>0 0 0</td>
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<tr>
<td>24</td>
<td>SC</td>
<td>&quot;Super&quot; (overshoot suppression) enable code</td>
<td>0: Disabled, 1: Enabled</td>
<td>0 0 0</td>
</tr>
<tr>
<td>25</td>
<td>ARW</td>
<td>ARW setting</td>
<td>0: Automatic, 50 to 200%</td>
<td>0 0 0</td>
</tr>
<tr>
<td>26</td>
<td>CMD</td>
<td>Control mode</td>
<td>0: Standard PID control 1: Fixed-point control</td>
<td>0 0 0</td>
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<tr>
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<td>ZONE</td>
<td>Zone PID selection</td>
<td>0: Disabled, 1: Enabled</td>
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<tr>
<td>28</td>
<td>1RP</td>
<td>Reference point 1</td>
<td>PRL to PRH</td>
<td>PRL</td>
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<td>29</td>
<td>2RP</td>
<td>Reference point 2</td>
<td>PRL</td>
<td>PRL</td>
</tr>
<tr>
<td>30</td>
<td>RHY</td>
<td>Zone switching hysteresis</td>
<td>0 to (PRH - PRL)</td>
<td>(PRH - PRL) x 0.5% (PRH - PRL) x 0.5% (PRH - PRL) x 0.5%</td>
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<tr>
<td>31</td>
<td>RDV</td>
<td>Reference deviation</td>
<td>0: Off, 0 to (PRH - PRL)</td>
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#### Output-related Parameters

<table>
<thead>
<tr>
<th>Loops</th>
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<th>Data Range</th>
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<tbody>
<tr>
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<td>CT</td>
<td>Cycle time</td>
<td>5 (0.5 s) to 1200 (120.0 s) in multiples of 5 (0.5 s)</td>
<td>30.0 s 30.0 s</td>
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<td>33</td>
<td>CTc</td>
<td>Cooling cycle time</td>
<td>0</td>
<td>0 0 0</td>
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<td>34</td>
<td>MVR</td>
<td>Rate-of-change limit</td>
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<td>0 0 0</td>
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<tr>
<td>Loops</td>
<td>Symbol</td>
<td>Description</td>
<td>Data Range</td>
<td>Default Value</td>
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<td>601</td>
<td>801</td>
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<td>602</td>
<td>802</td>
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<td>603</td>
<td>803</td>
<td>1.A2</td>
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<td>404</td>
<td>604</td>
<td>804</td>
<td>1.A3</td>
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<td>805</td>
<td>1.A4</td>
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<td>406</td>
<td>606</td>
<td>806</td>
<td>1.PB</td>
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<td>407</td>
<td>607</td>
<td>807</td>
<td>1.T1</td>
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<td>1.OH</td>
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<td>1.MR</td>
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<td>1.DR</td>
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<td>814</td>
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<td>1.POUT</td>
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<td>218</td>
<td>418</td>
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**PID/SP2 Parameters**

<table>
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<td>2.MR</td>
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### PID/SP3 Parameters

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<th>841</th>
<th>3.SP</th>
<th>Set point (SP)</th>
<th>PRL to PRH</th>
<th>PRL</th>
<th>PRL</th>
<th>PRL</th>
<th>PRH</th>
<th>PRH</th>
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<td>442</td>
<td>642</td>
<td>842</td>
<td>3.A1</td>
<td>Alarm 1 preset value</td>
<td>PRH</td>
<td>PRH</td>
<td>PRH</td>
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<td>443</td>
<td>643</td>
<td>843</td>
<td>3.A2</td>
<td>Alarm 2 preset value</td>
<td>PRL</td>
<td>PRL</td>
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<td>444</td>
<td>644</td>
<td>844</td>
<td>3.A3</td>
<td>Alarm 3 preset value</td>
<td>PRH</td>
<td>PRH</td>
<td>PRH</td>
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<td>445</td>
<td>645</td>
<td>845</td>
<td>3.A4</td>
<td>Alarm 4 preset value</td>
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<td>PRL</td>
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<td>246</td>
<td>446</td>
<td>646</td>
<td>846</td>
<td>3.PB</td>
<td>Proportional band</td>
<td>1 to 9999 (0.1 to 999.9%)</td>
<td>5.00%</td>
<td>5.00%</td>
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<td>447</td>
<td>647</td>
<td>847</td>
<td>3.TI</td>
<td>Integral time</td>
<td>0: Off 1 to 6000 (1 to 6000 s)</td>
<td>240 s</td>
<td>240 s</td>
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<tr>
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<td>448</td>
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<td>848</td>
<td>3.TD</td>
<td>Derivative time</td>
<td>60 s</td>
<td>60 s</td>
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<tr>
<td>249</td>
<td>449</td>
<td>649</td>
<td>849</td>
<td>3.OH</td>
<td>Upper output limit</td>
<td>-5.0 to 105.0% if OL &lt; OH; 100.00% 100.00%</td>
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<td></td>
<td></td>
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</tr>
<tr>
<td>250</td>
<td>450</td>
<td>650</td>
<td>850</td>
<td>3.OL</td>
<td>Lower output limit</td>
<td>Fixed to OL if OL &gt; OH 0.00% 0.00%</td>
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<td>675</td>
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<td>676</td>
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<td>877</td>
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<td>Preset output</td>
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<td>4.POUT.C</td>
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## Alarm-related Parameters

|   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 282 | 482 | 682 | 882 | AL2 | Alarm 2 type | 2: Lower limit | 1: Upper limit | 2: Lower limit | 1: Upper limit |
| 283 | 483 | 683 | 883 | AL3 | Alarm 3 type | 1: Upper limit | 1: Upper limit | 1: Upper limit |
| 284 | 484 | 684 | 884 | AL4 | Alarm 4 type | 2: Lower limit | 2: Lower limit | 2: Lower limit |
| 285 | 485 | 685 | 885 | HY1 | Alarm 1 hysteresis | 0 to (PRH - PRL) | (PRH-PRL) x 0.5% | (PRH-PRL) x 0.5% | (PRH-PRL) x 0.5% |
| 286 | 486 | 686 | 886 | HY2 | Alarm 2 hysteresis | 0 to (PRH - PRL) | (PRH-PRL) x 0.5% | (PRH-PRL) x 0.5% | (PRH-PRL) x 0.5% |
| 287 | 487 | 687 | 887 | HY3 | Alarm 3 hysteresis | 0 to 999 s | 0 | 0 | 0 |
| 288 | 488 | 688 | 888 | HY4 | Alarm 4 hysteresis | 0 to 999 s | 0 | 0 | 0 |
| 289 | 489 | 689 | 889 | DLY1 | Alarm 1 ON delay | 0 to 999 s | 0 | 0 | 0 |
| 290 | 490 | 690 | 890 | DLY2 | Alarm 2 ON delay | 0 to 999 s | 0 | 0 | 0 |
| 291 | 491 | 691 | 891 | DLY3 | Alarm 3 ON delay | 0 to 999 s | 0 | 0 | 0 |
| 292 | 492 | 692 | 892 | DLY4 | Alarm 4 ON delay | 0 to 999 s | 0 | 0 | 0 |
### C1.1.2 Common Process Data

<table>
<thead>
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<th>Symbol</th>
<th>Description</th>
<th>Data Range</th>
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<td>Process value</td>
<td>0.0 to 100.0% of (PRH - PRL)</td>
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<td>CSP*</td>
<td>Control set point</td>
<td>0.0 to 100.0% of (PRH - PRL)</td>
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<td>Cooling control output</td>
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<td>Operating status</td>
<td>Hexadecimal value for bit on/off control</td>
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<tr>
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<td>ERR.STUS.*</td>
<td>Error status</td>
<td>Hexadecimal value for bit on/off control</td>
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*: A loop number between 1 and 4

Shaded rows do not apply to F3CX04-0N, F3CX04-0G.

### C1.1.3 Registers Used for Tuning

<table>
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<td>PV</td>
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<td>PRL to PRH</td>
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<td>CSP</td>
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<td>PRL to PRH</td>
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<td>104</td>
<td>HOUT</td>
<td>Control output (available for single or heating/cooling output)</td>
<td>For single output: OL to OH  For heating/cooling output: 0 to OH</td>
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<td>ERR.STUS</td>
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<td>Hexadecimal value for bit on/off control</td>
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</table>

111   | AT.STUS | Auto-tuning status |

121   | RUN/STP | Run/stop selection | 0: Stop, 1: Run |

122   | A/M/C   | Automatic/manual/cascade selection (the A/M/C register for an odd-numbered loop is not used in cascade mode) | 0: Automatic, 1: Manual, 2: Cascade |

123   | INSEL  | Input selection | 0: Input 1, 1: Input 2 |

124   | RMT/LOC | Remote/local selection | 0: Local, 1: Remote |

125   | EXPV/ PV | External/normal input selection | 0: Normal input, 1: External input |

126   | EXOUT/OUT | External/normal output selection | 0: Normal output, 1: External output |

127   | AT | Start auto-tuning | 0: Stop AT, 1-5: Start AT (reverts to zero when auto-tuning completes) |

128   | SPNO | SP number selection | 1-4 |

131   | EXPV | External input | -5.0 to 105.0% of (SH - SL) |

132   | EXRJC | Reference junction temperature (available when RJC is set to 0) | -100 to 700 (-10.0 to 70.0°C) for Celsius, or 140 to 1580 (14.0 to 158.0°F) for Fahrenheit |

133   | RSP | Remote set point | PRL to PRH |

134   | MOUT | Manual output (for single or heating output) | OL to OH for PID control single output, 0.0% to OH for PID control heating/cooling output, 0.0 or 100.0% for on/off control, MOUT is automatically limited within the range. |

135   | MOUTC | Manual cooling output (available when heating/cooling is selected) | 0.0% to OL for PID control heating/cooling output, 0.0 or 100.0% for on/off control, MOUTC is automatically limited within the range. |

136   | EXOUT | External output | -5.0 to 105.0% |

Shaded rows do not apply to F3CX04-0N, F3CX04-0G.
### C1.1.4 CPU Parameter Positions

When downloaded to the CPU module, registered parameters are stored at CPU parameter positions shown in the tables below. The table shows addresses relative to the starting address of the destination for individual advanced function module.

Example: If the starting address for the destination is D0001, the OUTSEL1 parameter for F3CU04-ON is stored at relative address 9, or at absolute address D0010 (= D0001 + 9).

#### Controller/Monitor Parameters

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## I/O Parameters

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## Operation Parameters

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<td>Mar. 2004</td>
<td>New publication</td>
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<td>Jul. 2007</td>
<td>Support for ToolBox R4</td>
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<td>Jan. 2012</td>
<td>Support for ToolBox R6.01</td>
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<td>Sep. 2012</td>
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<td>Dec. 2014</td>
<td>Added documentation for F3CU04-0G, F3CU04-1G,F3CX04-0G support</td>
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For Questions and More Information  
If you have any questions, you can send an E-mail to the following address.  
E-mail: plc_message@csv.yokogawa.co.jp

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