



# FX3U-2HSY-ADP INSTALLATION MANUAL



|               |               |
|---------------|---------------|
| Manual Number | JY997D16401   |
| Revision      | G             |
| Date          | December 2025 |

This manual describes the part names, dimensions, mounting, and specifications of the product. Before use, read this manual and manuals of relevant products fully to acquire proficiency in handling and operating the product. Make sure to learn all the product information, safety information, and precautions. And, store this manual in a safe place so that it can be taken out and read whenever necessary. Always forward it to the end user. Registration The company name and the product name to be described in this manual are the registered trademarks or trademarks of each company.

Effective December 2025  
Specifications are subject to change without notice.  
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## Safety Precautions (Read these precautions before use.)

This manual classifies the safety precautions into two categories:

**⚠WARNING** and **⚠CAUTION**

|                 |                                                                                                                                     |
|-----------------|-------------------------------------------------------------------------------------------------------------------------------------|
| <b>⚠WARNING</b> | Indicates that incorrect handling may cause hazardous conditions, resulting in death or severe injury.                              |
| <b>⚠CAUTION</b> | Indicates that incorrect handling may cause hazardous conditions, resulting in medium or slight personal injury or physical damage. |

Depending on the circumstances, procedures indicated by **⚠CAUTION** may also cause severe injury. It is important to follow all precautions for personal safety.

## Associated Manuals

| Manual name                                                                                | Manual No.  | Description                                                                                    |
|--------------------------------------------------------------------------------------------|-------------|------------------------------------------------------------------------------------------------|
| FX3U Series User's Manual - Hardware Edition                                               | JY997D16501 | Explains FX3U Series PLC specification details for I/O, wiring, installation, and maintenance. |
| FX3S/FX3G/FX3GC/FX3U/FX3UC Series Programming Manual - Basic & Applied Instruction Edition | JY997D16601 | Describes PLC programming for basic/applied instructions and devices.                          |
| FX3S/FX3G/FX3GC/FX3U/FX3UC Series User's Manual - Positioning Control Edition              | JY997D16801 | Describes positioning control and programming using FX3S/FX3G/FX3GC/FX3U/FX3UC Series PLC      |

### How to obtain manuals

For the necessary product manuals or documents, consult with the Mitsubishi Electric dealer from where you purchase your product.

## Applicable Standard

FX3U-2HSY-ADP complies with EC directive (EMC Directive) and UL standards (UL, cUL). Further information can be found in the following manual.

→ **Refer to FX3U Series Hardware Manual (Manual No. JY997D50301).**

### Attention

This product is designed for use in industrial applications.

## 1. Outline

The FX3U-2HSY-ADP high-speed output special adapter (hereinafter called high-speed output special adapter) is a special adapter dedicated to FX3U Series PLC. It outputs pulse signals of a differential line driver system for applicable Servo Amplifiers (or Drive Unit) of an AC servomotor or stepper motor. Up to two units of this special adapter can be connected to the main unit per system.

→ **For system configuration, refer to the FX3u Series User's Manual - Hardware Edition.**

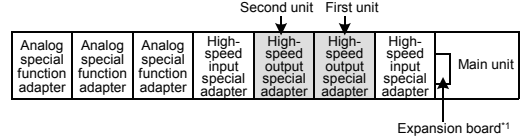
### 1.1 Incorporated Items

Check if the following product and items are included in the package:

| Product        | FX3U-2HSY-ADP high-speed output special adapter |
|----------------|-------------------------------------------------|
| Included items | Installation Manual (This manual)               |

### 1.2 Output Number and Signal

When power is turned on, the output numbers and signals of the high-speed output special adapters are allocated as shown in the table below in the order of it near the main unit.



\*1 An expansion board is required to use any special adapters other than high-speed I/O special adapters.

→ **For system configuration, refer to the FX3u Series User's Manual - Hardware Edition.**

| Status of output form setting switch | Signal name              | Output number |          |             |          |
|--------------------------------------|--------------------------|---------------|----------|-------------|----------|
|                                      |                          | First unit    |          | Second unit |          |
|                                      |                          | 1st axis      | 2nd axis | 1st axis    | 2nd axis |
| FP•RP side                           | Forward pulse train (FP) | Y000          | Y001     | Y002        | Y003     |
|                                      | Reverse pulse train (RP) | Y004          | Y005     | Y006        | Y007     |
|                                      | SG                       | SGA           | SGB      | SGA         | SGB      |
| PLS•DIR side                         | Pulse train              | Y000          | Y001     | Y002        | Y003     |
|                                      | Direction                | Y004          | Y005     | Y006        | Y007     |
|                                      | SG                       | SGA           | SGB      | SGA         | SGB      |

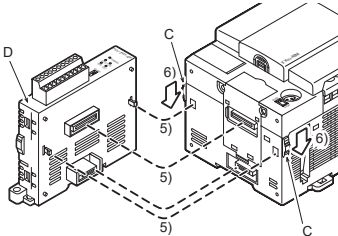
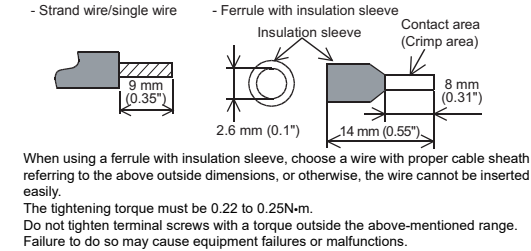
### Caution

1) When a high-speed output special adapter is connected, the same output number is allocated to both the main unit and this adapter. Use either output terminal and do not wire to the unused output terminal.

The outputs from the high-speed output special adapter and main unit are operated as below:

| instructions                                 | High-speed output special adapter | Output operation       |                                                                                                                    |
|----------------------------------------------|-----------------------------------|------------------------|--------------------------------------------------------------------------------------------------------------------|
|                                              |                                   | Transistor-output type | Relay-output type/ triac-output type                                                                               |
|                                              |                                   | Operated <sup>*1</sup> | Do not use the PWM instruction with relay-output type <sup>*2</sup> or triac-output type <sup>*3</sup> main units. |
| PLSY,PLSR,DSZR, DVIT,TBL,ZRN, PLSV,DRV1,DRVA | Operated                          | Operated <sup>*1</sup> | While instruction is activated, relevant output is ON. (LED is also ON.)                                           |
| PWM                                          | Operated                          | Operated               |                                                                                                                    |

- Connect the high-speed I/O special adapter (Right fig.D) to the main unit as shown on the right.
- Slide back the special adapter slide lock (Right fig.C) of the main unit to fix the high-speed I/O special adapter (Right fig.C).



## 4. Specification

| STARTUP AND MAINTENANCE PRECAUTIONS                                                                                                                                                                                                                                                                                 | ⚠CAUTION |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|
| <ul style="list-style-type: none"> <li>Do not disassemble or modify the PLC. Doing so may cause fire, equipment failures, or malfunctions. *For repair, contact your local Mitsubishi Electric representative.</li> <li>Do not drop the product or exert strong impact to it. Doing so may cause damage.</li> </ul> |          |

| DISPOSAL PRECAUTIONS                                                                                                                                                               | ⚠CAUTION |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|
| <ul style="list-style-type: none"> <li>Please contact a certified electronic waste disposal company for the environmentally safe recycling and disposal of your device.</li> </ul> |          |

| TRANSPORT AND STORAGE PRECAUTIONS                                                                                                                                                                                                                                                                                                                                                                                 | ⚠CAUTION |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|
| <ul style="list-style-type: none"> <li>The product is a precision instrument. During transportation, avoid impacts larger than those specified in the general specifications by using dedicated packaging boxes and shock-absorbing pallets. Failure to do so may cause failures in the product. After transportation, verify operation of the product and check for damage of the mounting part, etc.</li> </ul> |          |

### 4.1 Applicable PLC

| Model name      | Applicability                                |
|-----------------|----------------------------------------------|
| FX3U Series PLC | Ver. 2.20 (from the first product) and later |

The version number can be checked by monitoring D8001 as the last three digits indicate it.

### Note

Cannot be connected to FX3G/FX3UC Series PLC.

### 4.2 General Specifications

For general specifications, refer to the manual of the PLC main unit. The items other than the following are equivalent to those of the PLC main unit. → **Refer to FX3u Series User's Manual - Hardware Edition.**

| Item                         | Specification                                           |                                                                                                   |
|------------------------------|---------------------------------------------------------|---------------------------------------------------------------------------------------------------|
| Dielectric withstand voltage | 500 V AC for one minute                                 | Between output terminal of high-speed output special adapter and ground terminal of PLC main unit |
| Insulation resistance        | 5 MΩ or higher by 500 V DC insulation resistance tester |                                                                                                   |

### 4.3 Power Supply Specification

| Item                                | Specification                                                                     |
|-------------------------------------|-----------------------------------------------------------------------------------|
| Output circuit driving power supply | 80 mA for 24 V DC<br>Internally supplied from the main unit service power supply. |
| Adapter driving power supply        | 30 mA for 5 V DC<br>5 V DC power is supplied internally from the main unit.       |

### 4.4 Performance Specification

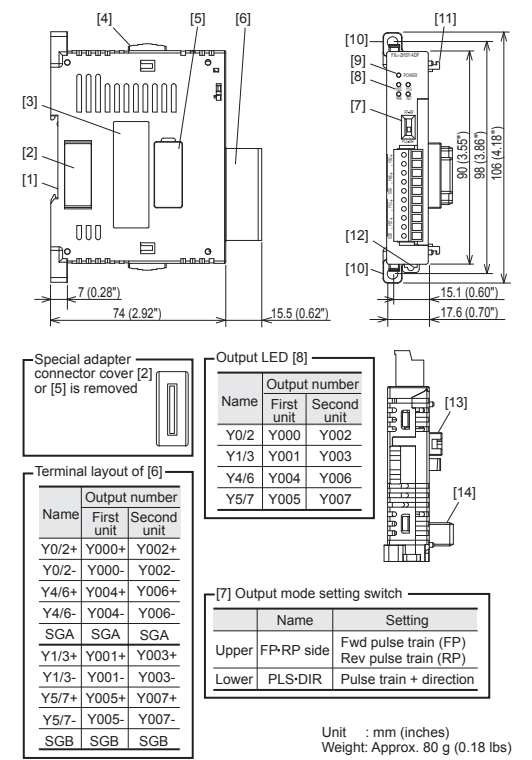
| Item                      | Specification                                                 |
|---------------------------|---------------------------------------------------------------|
| Number of controlled axis | Independent two axes                                          |
| Output points             | 4 points (Not counted among the total I/O points of the PLC.) |
| Output system             | Differential line driver (Equivalent to AM26C31)              |

| instructions | Output operation                  |                        |                                      |
|--------------|-----------------------------------|------------------------|--------------------------------------|
|              | High-speed output special adapter | Main unit              |                                      |
|              |                                   | Transistor-output type | Relay-output type/ triac-output type |
| Other        | Operated                          | Operated               | Operated                             |

- The output frequency of transistor outputs in the main unit is a maximum of 100kHz. If the load is operated using pulses at a frequency more than 100kHz, PLC may be damaged.
- PWM instruction has not supported the relay output for the reasons of the response delay of the output, chattering of contact, the contact life, etc.
- PWM instruction does not support the triac output due to the possibility of response delay of the output.

- During STOP or PLC power off modes, set the output form operation. Do not set the output form operation during pulse train output.

### 1.3 External Dimensions, Part Names, and Terminal Layout



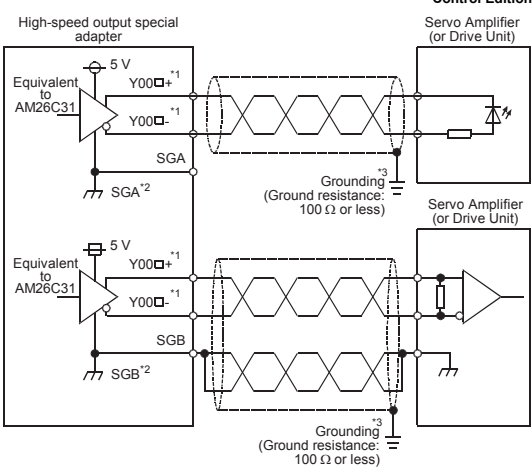
- DIN rail mounting groove (DIN rail: DIN46277)
- High-speed I/O special adapter connector cover: Remove this cover for connecting high-speed I/O special adapter on the left side.
- Name plate
- Special adapter slide lock: Used to connect special adapter on left side of this special adapter.
- Special adapter connector cover: Remove this cover for connecting special adapter on the left side.
- Output terminal block (European type): Connected to Servo Amplifier (or Drive Unit) to which pulse signal of differential line driver system can be input.

| Item                     | Specification                                                                                                                                                                                      |
|--------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Output form              | Forward pulse train, reverse pulse train, or pulse train + direction                                                                                                                               |
| Load current             | 25 mA or less                                                                                                                                                                                      |
| Maximum output frequency | 200 kHz                                                                                                                                                                                            |
| Insulation               | <ul style="list-style-type: none"> <li>External cables of output area are insulated from PLC by photo coupler or transformer.</li> <li>SG are insulated from each other by transformer.</li> </ul> |
| Wiring length            | Maximum 10 m (32' 9")                                                                                                                                                                              |

### 4.5 Output Interface Internal Circuit

For connection example and wiring, refer to the following manual.

→ **Refer to FX3S/FX3G/FX3GC/FX3u/FX3uc Series User's Manual - Positioning Control Edition**



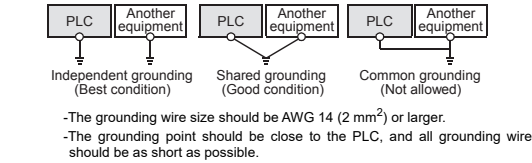
- Y00 □ indicates output number of the high-speed output special adapter.
- 'SGA' is insulated from 'SGB'.
- Ground properly with reference to the Servo Amplifier (or Drive Unit) manual. If not indicated, ground as below.

### Grounding

Ground properly with reference to the Servo Amplifier (or Drive Unit) manual. If not indicated, ground as below.

- Grounding (when not indicated)
- The grounding resistance should be 100 Ω or less.
- Independent grounding should be performed for best results. When independent grounding is not performed, perform "shared grounding" of the following figure.

→ **For details, refer to the FX3u Series User's Manual - Hardware Edition.**



- The grounding wire size should be AWG 14 (2 mm<sup>2</sup>) or larger.
- The grounding point should be close to the PLC, and all grounding wire should be as short as possible.

- Output form setting switch  
Either "Forward pulse train (FP)/Reverse pulse train (RP)" or "pulse train + direction" is selected. For setting, refer to the following manual.  
→ **Refer to FX3S/FX3G/FX3gc/FX3u/FX3uc Series User's Manual - Positioning Control Edition.**

- Output LED (red):  
Lit when output turns ON (if output turns ON and OFF alternately at high speed, LED flickers fast).
- POWER LED (green):  
Lit while power is properly supplied from main unit.
- Direct mounting hole: 2 holes of φ4.5 (0.18") (mounting screw: M4 screw)
- Special adapter fixing hook
- DIN rail mounting hook
- Special adapter connector:  
Used to connect communication special adapter or analog special adapter to this adapter on left side.
- High-speed I/O special adapter connector:  
Used to connect high-speed I/O special adapter to this adapter on left side.

## 2. Installation

The product can be mounted on DIN rail (DIN46277) or mounted directly using screws.

For installation/uninstallation and safety precautions, refer to the following manual, too:

→ **Refer to the FX3u Series User's Manual - Hardware Edition.**

| INSTALLATION PRECAUTIONS                                                                                                                                                                                                            | ⚠WARNING |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|
| <ul style="list-style-type: none"> <li>Make sure to cut off all phases of the power supply externally before attempting installation or wiring work. Failure to do so may cause electric shock or damage to the product.</li> </ul> |          |

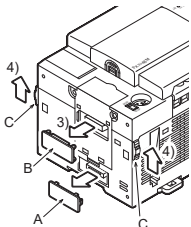
| INSTALLATION PRECAUTIONS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | ⚠CAUTION |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|
| <ul style="list-style-type: none"> <li>Use the product within the generic environment specifications described in PLC main unit manual (Hardware Edition). Never use the product in areas with excessive dust, oily smoke, conductive dusts, corrosive gas (salt air, Cl<sub>2</sub>, H<sub>2</sub>S, SO<sub>2</sub> or NO<sub>2</sub>), flammable gas, vibration or impacts, or expose it to high temperature, condensation, or rain and wind. If the product is used in such conditions, electric shock, fire, malfunctions, deterioration or damage may occur.</li> <li>When drilling screw holes or wiring, make sure cutting or wire debris does not enter the ventilation slits. Failure to do so may cause fire, equipment failures or malfunctions.</li> <li>Do not touch the conductive parts of the product directly. Doing so may cause device failures or malfunctions.</li> <li>Connect the special adapter securely to their designated connectors. Loose connections may cause malfunctions.</li> </ul> |          |

### 2.1 Connection to the FX3u Series PLC

- Refer to the procedure 2) for configuring a new system.
- Refer to the procedure 1) for adding product to an existing system.

### Procedure

- Turn off the power.  
Disconnect all the cables connected to the PLC main unit and special adapter. Dismount the main unit and special adapter mounted on DIN rail or mounted directly using screws.
- Install an expansion board to the main unit.  
For installation of expansion board, refer to the following manual:  
→ **Refer to the FX3u Series User's Manual - Hardware Edition**
- Remove the high-speed I/O special adapter connector cover (Right fig. A) and the special adapter connector cover (Right fig. B) on the main unit.  
In case of connecting this product to a high-speed I/O special adapter as an addition, please replace the 'main unit' in the above description with a 'special adapter' and perform the procedure as indicated. (Please replace the following procedures similarly.)
- Slide the special adapter slide lock (Right fig. C) of the main unit.



- Connect the high-speed I/O special adapter (Right fig.D) to the main unit as shown on the right.
- Slide back the special adapter slide lock (Right fig.C) of the main unit to fix the high-speed I/O special adapter (Right fig.C).

## 3. Used cables and Tightening Torque on Terminal

For connection example and wiring, refer to the following manual.

→ **Refer to FX3S/FX3G/FX3gc/FX3u/FX3uc Series User's Manual - Positioning Control Edition.**

| WIRING PRECAUTIONS                                                                                                                                                                                                                  | ⚠WARNING |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|
| <ul style="list-style-type: none"> <li>Make sure to cut off all phases of the power supply externally before attempting installation or wiring work. Failure to do so may cause electric shock or damage to the product.</li> </ul> |          |

| WIRING PRECAUTIONS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | ⚠CAUTION |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|
| <ul style="list-style-type: none"> <li>When drilling screw holes or wiring, make sure cutting or wire debris does not enter the ventilation slits. Failure to do so may cause fire, equipment failures or malfunctions.</li> <li>Make sure to observe the following precautions in order to prevent any damage to the machinery or accidents due to abnormal data written to the PLC under the influence of noise:               <ol style="list-style-type: none"> <li>Do not bundle the main circuit line together with or lay it close to the main circuit, high-voltage line or load line. Otherwise, noise disturbance and/or surge induction are likely to take place. As a guideline, lay the control line at least 100 mm (3.94") or more away from the main circuit or high-voltage lines.</li> <li>Ground the shield wire or shield of the shielded cable at one point on the PLC. However, do not use common grounding with heavy electrical systems.</li> </ol> </li> <li>Make sure to properly wire to the terminal block (European type) in accordance with the following precautions. Failure to do so may cause electric shock, equipment failures, a short-circuit, wire breakage, malfunctions, or damage to the product.               <ul style="list-style-type: none"> <li>- The disposal size of the cable end should follow the dimensions described in the manual.</li> <li>- Tightening torque should follow the specifications in the manual.</li> <li>- Twist the end of strand wire and make sure that there are no loose wires.</li> <li>- Do not solder-plate the electric wire ends.</li> <li>- Do not connect more than the specified number of wires or electric wires of unspecified size.</li> <li>- Affix the electric wires so that neither the terminal block nor the connected parts are directly stressed.</li> </ul> </li> </ul> |          |

- Wire size  
To connect to the desired unit, use a shielded twisted pair cable having a conductor(s) of size AWG22-20.
- Applicable cable
 

| Type        | Wire size                                                |
|-------------|----------------------------------------------------------|
| Single-wire | 0.3 mm <sup>2</sup> to 0.5 mm <sup>2</sup> (AWG22 to 20) |
| 2-wire      | 2 pieces of 0.3 mm <sup>2</sup> (AWG22)                  |

- Termination of cable end  
Strip the coating of strand wire and twist the cable core before connecting it, or strip the coating of single wire before connecting it. An alternative connection is to use a ferrule with insulating sleeve.
 

| Manufacturer              | Model      | Caulking tool                                            |
|---------------------------|------------|----------------------------------------------------------|
| Phoenix Contact Co., Ltd. | AI 0.5-8WH | CRIMPFOX 6 <sup>1</sup><br>(CRIMPFOX 6T-F <sup>2</sup> ) |

\*1 Old model name: CRIMPFOX ZA 3

\*2 Old model name: CRIMPFOX UD 6

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### Warranty

- Exclusion of loss in opportunity and secondary loss from warranty liability  
Regardless of the gratis warranty term, Mitsubishi shall not be liable for compensation to:
- Damages caused by any cause found not to be the responsibility of Mitsubishi.
  - Loss in opportunity, lost profits incurred to the user by Failures of Mitsubishi products.
  - Special damages and secondary damages whether foreseeable or not, compensation for accidents, and compensation for damages to products other than Mitsubishi products.
  - Replacement by the user, maintenance of on-site equipment, start-up test run and other tasks.

| ⚠ For safe use                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>This product has been manufactured as a general-purpose part for general industries, and has not been designed or manufactured to be incorporated in a device or system used in purposes related to human life.</li> <li>Before using the product for special purposes such as nuclear power, electric power, aerospace, medicine or passenger movement vehicles, consult with Mitsubishi Electric.</li> <li>This product has been manufactured under strict quality control. However when installing the product where major accidents or losses could occur if the product fails, install appropriate backup or failsafe functions in the system.</li> </ul> |