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PG-FP6 V1.02 Flash Memory Programmer

User's Manual

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Preface

Thank you for purchasing the PG-FP6. The PG-FP6 is a flash memory programmer for MCUs from Renesas Electronics.

If you have any questions about the PG-FP6, contact your local distributor.

You can download the latest manuals from the Renesas Tools homepage (<https://www.renesas.com/pg-fp6>).

Important

Before using this product, be sure to read this user's manual carefully.

Keep this user's manual, and refer to it when you have questions about this product.

Purpose of use of the product:

This product is a device to support the development of systems that uses MCUs from Renesas Electronics. This product is a tool that erases, writes and verifies programs on a Renesas Electronics on-chip flash memory MCU on the target system.

Be sure to use this product correctly according to said purpose of use. Please avoid using this product other than for its intended purpose of use.

For those who use this product:

This product can only be used by those who have carefully read the user's manual and know how to use it.

Use of this product requires basic knowledge of electric circuits, logical circuits, and MCUs.

When using this product:

- (1) This product is a development-support unit for use in your program development and evaluation stages. When a program you have finished developing is to be incorporated in a mass-produced product, the judgment as to whether it can be put to practical use is entirely your own responsibility, and should be based on evaluation of the device on which it is installed and other experiments.
- (2) In no event shall Renesas Electronics Corporation be liable for any consequence arising from the use of this product.
- (3) Renesas Electronics Corporation strives to provide workarounds for and correct trouble with products malfunctions, with some free and some incurring charges. However, this does not necessarily mean that Renesas Electronics Corporation guarantees the provision of a workaround or correction under any circumstances.
- (4) Renesas Electronics Corporation cannot predict all possible situations and possible cases of misuse that carry a potential for danger. Therefore, the warnings in this user's manual and the warning labels attached to this product do not necessarily cover all such possible situations and cases. The customer is responsible for correctly and safely using this product.
- (5) The power adapter that comes with the product covered by this document conforms to the region-specific standard. This fact must be taken into account when the product is to be used in some other country.
- (6) Renesas Electronics Corporation will not assume responsibility of direct or indirect damage caused by an accidental failure or malfunction in this product.

When disposing of this product:

Penalties may be applicable for incorrect disposal of this waste, in accordance with your national legislation.

Usage restrictions:

This product has been developed as a means of supporting system development by users. Therefore, do not use it as an embedded device in other equipment.

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Some diagrams in this user's manual may differ from the objects they represent.

Precautions for Safety

This chapter describes the precautions which should be taken in order to use this product safely and properly. Be sure to read and understand this chapter before using this product.

Contact us if you have any questions about the precautions described here.



WARNING

WARNING indicates a potentially dangerous situation that will cause death or heavy wound unless it is avoided.



CAUTION

CAUTION indicates a potentially dangerous situation that will cause a slight injury or a medium-degree injury or property damage unless it is avoided.

In addition to the two above, the following are also used as appropriate.

△ means WARNING or CAUTION.

Example:



CAUTION AGAINST AN ELECTRIC SHOCK

⊘ means PROHIBITION.

Example:



DISASSEMBLY PROHIBITED

● means A FORCIBLE ACTION.

Example:



UNPLUG THE POWER CABLE FROM THE RECEPTACLE.

WARNING

Warnings for Power Supply:



If the power cable of the power adapter that comes with the product does not fit the receptacle, do not alter the power cable and do not plug it forcibly. Failure to comply may cause electric shock and/or fire.

Use a power cable which complies with the safety standard of the country.

Do not touch the plug of the power cable when your hands are wet. This may cause electric shock.

This product is connected signal ground with frame ground. If yours developing product is transform-less (not having isolation transformer of power), this may cause electric shock. Also, this may give an un-repairable damage to this product and your developing product.

While developing, connect power of the product to commercial power through isolation transformer in order to avoid these dangers.

To eliminate differences in potential between the grounds of this product and of the user system, only connect the plug of the power cable to the outlet after connecting this product and the user system.

If other equipment is connected to the same branch circuit, care should be taken not to overload the circuit.



If you smell a strange odor, hear an unusual sound, or see smoke coming from this product, then disconnect power immediately by unplugging the power cable from the outlet.

Do not use this as it is because of the danger of electric shock and/or fire. In this case, contact your local distributor.

Before setting up this product and connecting it to other devices, turn off power or remove a power cable to prevent injury or product damage.

Warnings to Be Taken for Handling:



Do not modify this product. Personal injury due to electric shock may occur if this product is modified. Modifying the product will void your warranty.

Warning for Installation:



Do not set this product in water or areas of high humidity. Spilling water or some other liquid into the product may cause un-repairable damage.

Warning for Use Temperature:



The maximum allowable ambient temperature for using this product is 35 °C. Care should be taken that a maximum ambient temperature is not exceeded when this product is to be used.

 **CAUTION****Caution on the Power Adapter:**

Use only the supplied dedicated power adapter for this product.
Do not use the power adapter for other equipment.

Caution on Turning on the Power:

Observe the following specified order for the power-on and power-off procedures of the user system and this product. Doing otherwise may cause the user system or this product to fail.

Power ON: (1) This product ON, (2) User system ON

Power OFF: (1) User system OFF, (2) This product OFF

Caution on Handling This Product:

Exercise caution when handling the product. Be careful not to apply a mechanical shock.

Do not touch the connector pins of this product and the target MCU connector pins directly. Static electricity may damage the internal circuits.

When attaching and removing the cable, hold the plug of the cable and do not touch the cable. Do not pull this product by the communications interface cable or the flexible cable. Excessive flexing or force may break conductors.

 **CAUTION****Caution on System Malfunctions:**

If this product malfunctions because of interference like external noise, do the following to remedy the trouble.

- (1) Exit the FP6 Terminal, and shut OFF this product and the user system. If the power cannot be turned off with the power switch of this product, unplug the power adapter.
- (2) After a lapse of 10 seconds, turn ON the power of this product and the user system again, and then launch the FP6 Terminal.

Caution on Disposal:

Penalties may be applicable for incorrect disposal of this waste, in accordance with your national legislation.

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The WEEE (Waste Electrical and Electronic Equipment) regulations put responsibilities on producers for the collection and recycling or disposal of electrical and electronic waste. Return of WEEE under these regulations is applicable in the European Union only. This equipment (including all accessories) is not intended for household use. After use the equipment cannot be disposed of as household waste, and the WEEE must be treated, recycled and disposed of in an environmentally sound manner.

Renesas Electronics Europe GmbH can take back end of life equipment, register for this service at "<http://www.renesas.eu/weee>".

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Terminology

The meanings of the terms used in this document are as follows.

Term	Meaning
FP6	Abbreviation of the flash memory programmer PG-FP6
FP6 Terminal	Windows® application for setting up the PG-FP6 main unit and handling commands
Target MCU	On-chip flash memory microcontroller from Renesas Electronics
Target system	User-designed board on which the target MCU is mounted
ESF file	FP6's setup file (file extension: *.esf). This file contains settings regarding the programming environment such as the target MCU and options.
Program file	Program to be written to the MCU. For the FP6, the following file formats are supported. <RL78, 78K, and V850> a. Intel HEX format HEX file b. Intel HEX format HCUHEX file c. Motorola S-record format HEX file d. Motorola S-record format HCUHEX file <RX family and SuperH family> a. Intel HEX format HEX file b. Motorola S-record format HEX file c. DDI file <RH850 family and R8C family> a. Intel HEX format HEX file b. Motorola S-record format HEX file Note Only the ASCII character code (1 byte) is supported. Unicode is not supported.
Flash-option data	General term for MCU operation settings such as security settings
HEX file	HEX file of Intel HEX format type or Motorola S-record format type that does not include flash-option data
HCUHEX file	For details, refer to the following Web page. https://www.renesas.com/search/keyword-search.html#g=HEX+Consolidation+Utility
DDI file	File that contains data in multiple flash areas generated by the Flash Development Toolkit
RPI file	Image file generated by the RFP that combine usable HEX files and flash-option data.
Flash Development Toolkit	Software for programming the on-chip flash memory of Renesas MCUs. For details, refer to the following Web page. https://www.renesas.com/fdt
RFP	Abbreviation of "Renesas Flash Programmer", software for programming the on-chip flash memory of Renesas MCUs. For details, refer to the following Web page. https://www.renesas.com/rfp
PR5 file	Information file specific to the target MCU. This file is generated by the PG-FP6. Each PR5 file holds parameter information required for programming of the flash memory in the target MCU.

Term	Meaning
FINE	Single- or dual-line communications interface operating through the FINE pins of an MCU. Some of our MCUs support programming via single-line FINE.
ID authentication mode	One of the security features of the MCU. Connection of the flash programmer is protected by ID authentication. For details, refer to the user's manual of the MCU.
Command protection mode	One of the security features of the MCU. Execution of individual commands (e.g., the erase command) can be restricted. For details on operations while the security feature is enabled, refer to the user's manual of the MCU.

Replacing Terms

Some terms used in this document should be replaced as shown in the tables below, depending on the MCU in use.

- When an RX100 or RX200 MCU is in use:

Term in This Manual	To be Replaced with
Set Security	Access window program

- When an RL78 MCU is in use:

Term in This Manual	To be Replaced with
Flash access window	Flash shield window

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1. Overview

The FP6 is a tool that is used to erase, write, and verify programs on a Renesas Electronics on-chip flash memory MCU on the target system.

1.1 Features

- Standalone programming
- Programming through a dedicated GUI under PC control
- Up to eight instances of programming environment available
- Specialized for use on production lines (command control via serial communication and remote control of signals from external devices)
Compatibility with the PG-FP5 interface allows utilization of resources developed with the PG-FP5.
- Programming of a unique code to a designated area of flash memory
- The FP6 Manager allows the customization required in development and mass-production, such as prevention of a programming operator from modifying the programming settings.
- Self-testing function

1.2 Supported MCUs

MCUs supported by the FP6 are listed on the Web page at the following link:

<https://www.renesas.com/pg-fp6>

1.3 FP6 System Configuration

The system configuration of the FP6 is shown below.

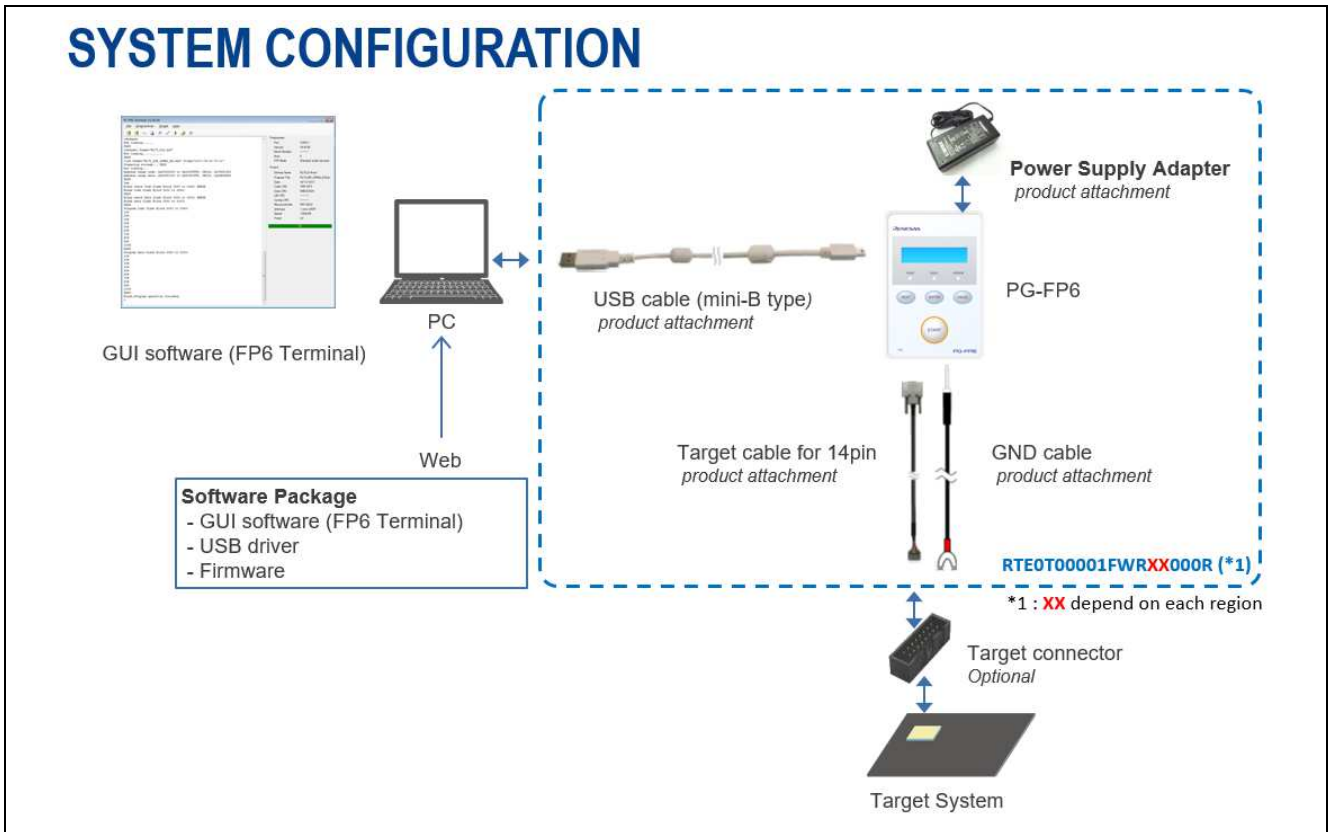


Figure 1.1 Image of FP6 Connection

*Note: The product type name and the standard with which the power adapter that comes with the FP6 complies vary with the region where it is to be used. Be sure to use the power adapter that is appropriate for your region.

Table 1.1 Product Type Names for Ordering

Target Regions and Certification	Product Type Name	Plug Shape	Voltage Range
Japan (PSE)	RTE0T00001FWRJP000R	A	AC: 90-264 V
Europe (CE) and USA (FCC, UL, ENEC)	RTE0T00001FWREA000R	SE C BF A	
China (CCC), Hong Kong (CE), Chinese Taipei (Rohs), South Korea (KCC), Singapore (SAFETY M.A.R.S.)	RTE0T00001FWRAS000R	SE C BF A	

- Notes:
1. Since regulations that apply to the FP6 vary with the region, we cannot ship a product to a region other than that from which the order was made. For example, if you place an order in Japan, you cannot purchase a product intended for Europe and the USA. Please purchase the product from a Renesas Electronics Corporation representative (responsible for sales) or distributor in the region where it is to be used.
 2. If you wish to know which model is available in a region not included in the above table, please contact either a Renesas Electronics Corporation representative (responsible for sales) or distributor.
 3. The power adapter that comes with the FP6 complies with the regulations that are applicable in the target region. Its plug is also in the shape that is usable in that region.

1.4 Operating Environments

1.4.1 Hardware environment

- Host PC
 - Processor: At least 1 GHz
 - Main memory: We recommend at least 2 GB.
At least 1 GB (or at least 2 GB for 64-bit editions of Windows OS) is required.
 - Display: Resolution should be at least 1024 x 768.
 - Interface: USB2.0 or serial interface (RS-232C)

1.4.2 Software environment

- Operating System
 - Windows 7 (32-bit edition, 64-bit edition)
 - Windows 8.1 (32-bit edition, 64-bit edition)
 - Windows 10 (32-bit edition, 64-bit edition)
 - Microsoft .NET Framework 4.5.2

1.5 Hardware Specifications

Table 1.2 Hardware Specifications

Hardware	Items	Specifications
FP6 main unit	Operating power supply	Supplied via the power adapter (5 V, 2 A): recommended USB-bus power supply (VBUS 4.5 V min. / 500 mA max.)
	Operating environment condition	Temperature: 5°C to 35°C (no condensation)
	Storage environment condition	Temperature: -15°C to 55°C (no condensation)
	Package size	140 × 90 × 30 mm (not including projections)
	Weight	Approximately 245 g
	Operation mode	FP6 Terminal operation, standalone operation, remote operation, and communication command operation
Power adapter	Specifications	Power adapter for each region *1
Host PC interface	Target host PC	PC/AT compatible
	USB connector	Type mini-B, USB 2.0
	USB cable	Approximately 2 m
	Serial port	9-pin D-Sub male port for RS-232C *2
Target interface	Target connector	15-pin D-Sub female connector
	Target cable	14-pin type Cable length: Approximately 42 cm
	Power supply	1.8 V to 5.5 V Note: Power cannot be supplied in USB-bus power operation.
	Power supply detection	Available
	GND cable	Approximately 1 m
Remote interface	Remote connector	15-pin D-sub female connector

Notes: 1. The power adapter that comes with the FP6 varies with the region where it is to be used. For the product type names, see Table 1.1, Product Type Names for Ordering.

2. Connecting to the host PC has to use a cross cable.

1.6 Formats of Program Files

For a HEX file to be readable by the FP6, it must have the correct format and satisfy the following conditions. If a program file with a non-supported format is read, an error will occur.

1.6.1 Intel HEX format

- The format file ends with the end record.
- All lines consist solely of record types 00 to 05.

1.6.2 Motorola S format

- The format file ends with the end record (S7, S8, or S9).
- All lines consist solely of record types S0 to S9 (excluding S4).

1.7 Regulatory Compliance Notices

1.7.1 European Union regulatory notices

This product complies with the following EU Directives. (These directives are only valid in the European Union.)

CE Certifications:

- Electromagnetic Compatibility (EMC) Directive 2014/30/EU
EN 55032 Class A

WARNING: This is a Class A product. This equipment can cause radio frequency noise when used in the residential area. In such cases, the user/operator of the equipment may be required to take appropriate countermeasures under his responsibility.

EN 55024

- Information for traceability
 - Authorized representative & Manufacturer
 - Name: Renesas Electronics Corporation
 - Address: TOYOSU FORESIA, 3-2-24, Toyosu, Koto-ku, Tokyo 135-0061, Japan
 - Person responsible for placing on the market
 - Name: Renesas Electronics Europe GmbH
 - Address: Arcadiastrasse 10, 40472 Dusseldorf, Germany
 - Trademark and type names
 - Trademark: Renesas
 - Product name: PG-FP6
 - Type names: RTE0T00001FWRJP000R
RTE0T00001FWREA000R
RTE0T00001FWRAS000R

Environmental Compliance and Certifications:

- Waste Electrical and Electronic Equipment (WEEE) Directive 2012/19/EU

1.7.2 United States regulatory notices

This product complies with the following EMC regulation. (This is only valid in the United States.)

FCC Certifications:

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

CAUTION: Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

2 FP6 Main Unit: Names and Functions of Parts

This chapter gives the names and functions of the parts on the FP6 main unit.

2.1 FP6 control panel

Indicators and buttons are placed on the top of the FP6.

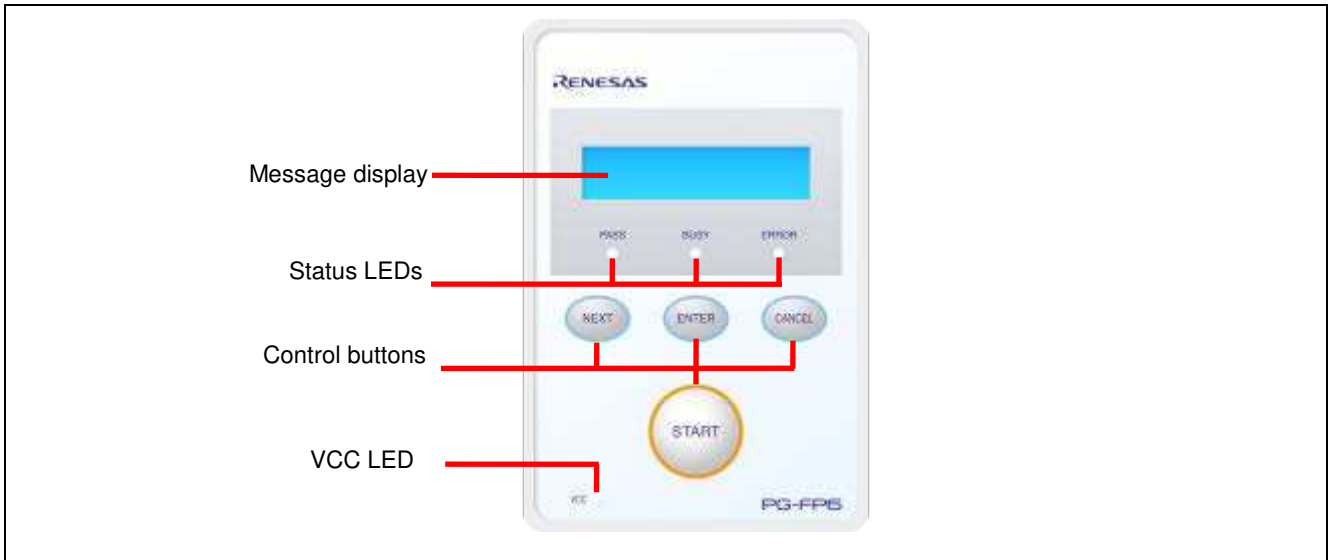


Figure 2.1 FP6 Top View <Control Panel>

(1) Indicators

- **Message display** An LCD display of 16 × 2 characters that indicates the operating mode or menus. It is mainly used when the FP6 is in standalone mode.
- **Status LEDs** These LEDs show the operating state of the FP6.
PASS (blue) indicates a normal end, BUSY (orange) indicates processing in progress, and ERROR (red) indicates an abnormal end.
- **VCC LED** This LED is illuminated (green) when power is being supplied to the user system.

(2) Buttons

- **[NEXT] button** Proceeds to the next menu item.
- **[ENTER] button** Selects the item shown in the message display.
- **[CANCEL] button** Cancels the current selection and returns to the previous menu item. The currently running command cannot be stopped, except for the [Read] command.
- **[START] button** Executes the [Start] command with the current active-programming-area setting.

2.2 FP6 connectors

The power-supply connector, serial port, and USB connector are placed on the host interface side of the FP6.

The target connector, GND connector, and remote connector are placed on the target connector side of the FP6.

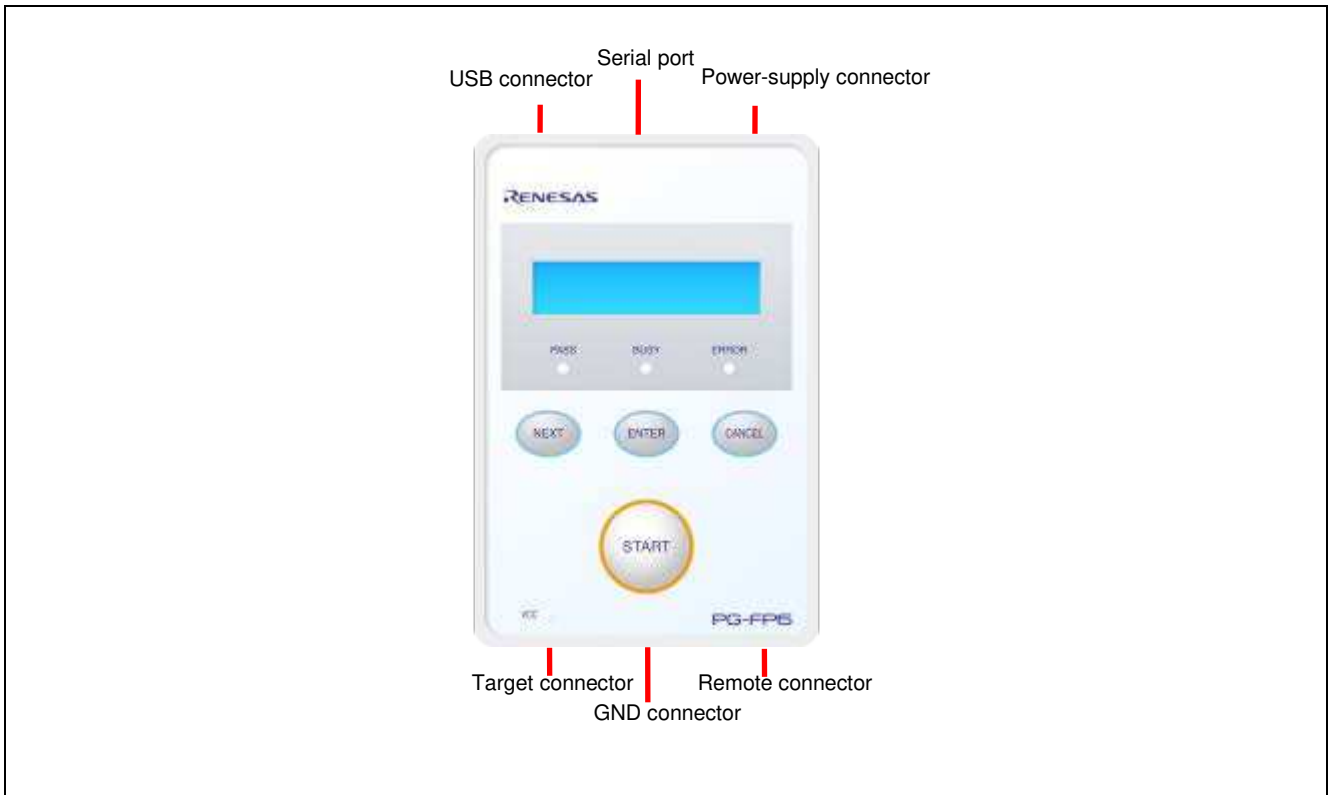


Figure 2.2 FP6 Top View <Connectors>

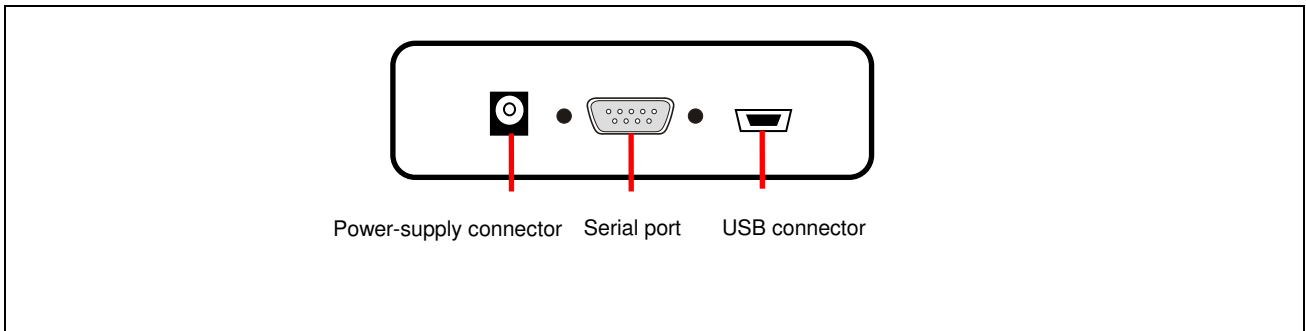


Figure 2.3 FP6 Host Interface Side

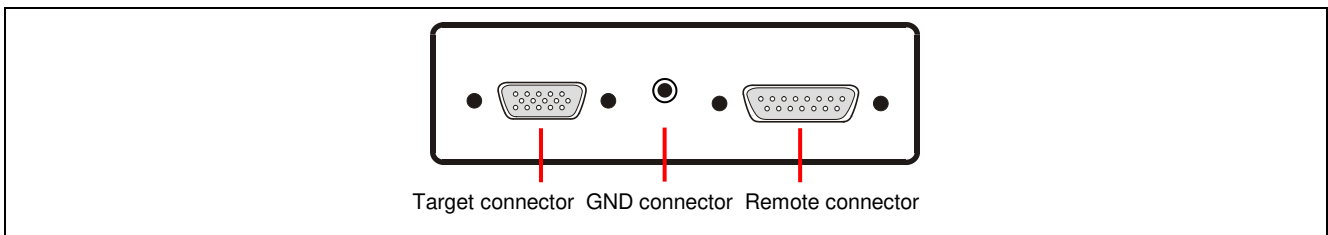


Figure 2.4 FP6 Target Connector Side

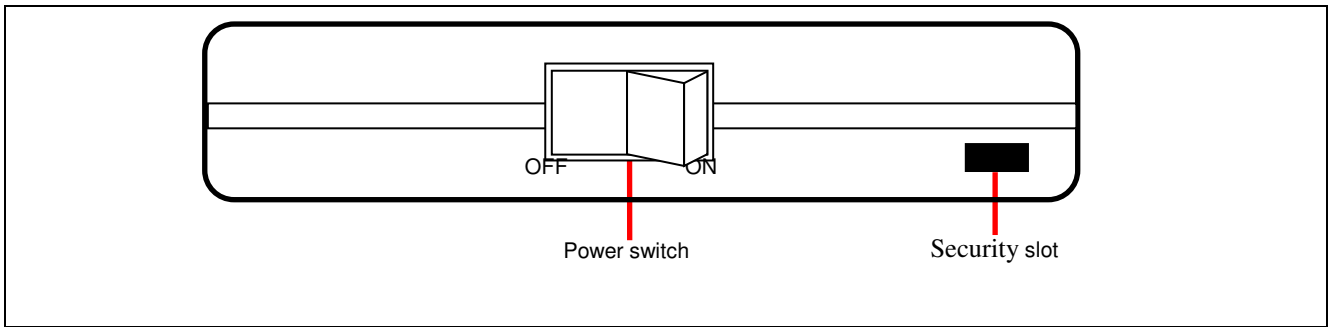


Figure 2.5 Power Switch

(1) Power-supply connector

Connect the power-supply connector to the power adapter for your region. For details on the power-supply connector specifications, refer to chapter 8, Connectors and Cables.

Note: Do not use a power adapter other than that included with the PG-FP6.

(2) Serial port

Communication is established by connecting the host PC serial port and the FP6 serial port via a serial cable (RS-232C crossover cable). The data transfer conditions are as follows.

- Data transfer speed: 9,600 bps, 19,200 bps, 38,400 bps, 57,600 bps, or 115,200 bps
- Data bit: 8 bits
- Parity: none
- Stop bit: 1 bit
- Flow control: hardware

The transfer speed can be changed although it is set to 9,600 bps by default. For details on the serial connector specifications, refer to chapter 8, Connectors and Cables.

(3) USB connector

Communication is established by connecting the FP6 USB connector (mini-B type) and the host PC USB port via a USB cable. This connector conforms to USB 2.0 standards. For details on the USB connector specifications, refer to chapter 8, Connectors and Cables.

(4) Target connector

Connect the target connector to the target system via the target cable. For details on the target connector specifications, refer to chapter 8, Connectors and Cables.

(5) GND connector

To reinforce the GND, connect the GND connector of the FP6 and the GND of the target system via the GND cable. For details on the GND connector specifications, refer to chapter 8, Connectors and Cables.

Note: The FP6 and target system may be damaged if there are differences in potential between the grounds of the FP6 and of the target system. Use the GND cable to eliminate differences in potential before connecting the target cable.

(6) Remote connector

The FP6 can be remote controlled by connecting the remote connector and an external control device. For details on remote operation, refer to chapter 6, Usage of the Remote Connector, and chapter 8, Connectors and Cables.

(7) Power switch

The power switch turns on/off the FP6.

(8) Security slot

This is a security slot for the Kensington lock.