

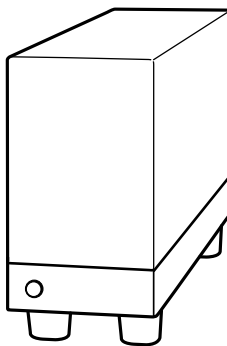
Part No. Z1-002-092, IA00235A

Jul. 2006

OPERATION MANUAL

PIA4800 SERIES
POWER-SUPPLY CONTROLLER

PIA4830



Use of Operation Manual

Please read through and understand this Operation Manual before operating the product. After reading, always keep the manual nearby so that you may refer to it as needed. When moving the product to another location, be sure to bring the manual as well.

If you find any incorrectly arranged or missing pages in this manual, they will be replaced. If the manual gets lost or soiled, a new copy can be provided for a fee. In either case, please contact Kikusui distributor/agent, and provide the “Kikusui Part No.” given on cover.

This manual has been prepared with the utmost care; however, if you have any questions, or note any errors or omissions, please contact Kikusui distributor/agent.

Disposing of used Kikusui products in the EU

Under a law adopted by member nations of the European Union (EU), used electric and electronic products carrying the symbol below must be disposed of separately from general household waste.

This includes the power cords and other accessories bundled with the products. When disposing of a product subject to these regulations, please follow the guidance of your local authority, or inquire with your Kikusui distributor/agent where you purchased the product.

The symbol applies only to EU member nations.



Disposal outside the EU

When disposing of an electric or electronic product in a country that is not an EU member, please contact your local authority and ask for the correct method of disposal.

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The contents of this Operation Manual may not be reproduced, in whole or in part, without the prior consent of the copyright holder.

The specifications of this product and the contents of this Operation Manual are subject to change without prior notice.

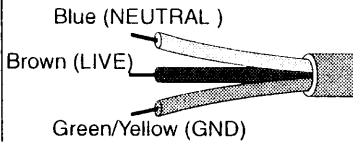
Power Requirements of this Product

☐ AC power cord

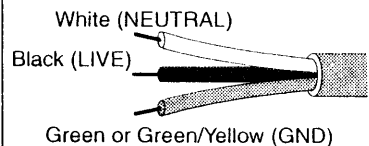
The product is provided with AC power cords described below. If the cord has no power plug, attach a power plug or crimp terminals to the cord in accordance with the wire colors specified in the drawing.

⚠ WARNING • The attachment of a power plug or crimp terminals must be carried out by qualified personnel.

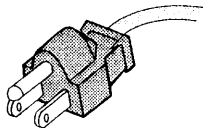
☐ Without a power plug



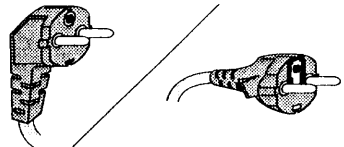
☐ Without a power plug



☐ Plugs for USA



☐ Plugs for Europe



☐ Provided by Kikusui distributor/agent

Kikusui agents can provide you with suitable AC power cord. For further information, contact Kikusui distributor/agent.

Safety Symbols

For the safe use and safe maintenance of this product, the following symbols are used throughout this manual and on the product. Understand the meanings of the symbols and observe the instructions they indicate (the choice of symbols used depends on the products).



Indicates that a high voltage (over 1,000 V) is used here. Touching the part causes a possibly fatal electric shock. If physical contact is required by your work, start work only after you make sure that no voltage is output here.

DANGER

Indicates an imminently hazardous situation which, if ignored, will result in death or serious injury.



Indicates a potentially hazardous situation which, if ignored, could result in death or serious injury.



Indicates a potentially hazardous situation which, if ignored, may result in damage to the product and other property.



Shows that the act indicated is prohibited.



Is placed before the sign “DANGER,” “WARNING,” or “CAUTION” to emphasize these. When this symbol is marked on the product, see the relevant sections in this manual.



Indicates a protective conductor terminal.



Indicates a chassis(frame) terminal.

Safety Precautions

The following safety precautions must be observed to avoid fire hazard, electrical shock, accidents, and other failures. Keep them in mind and make sure that all of them are observed properly.



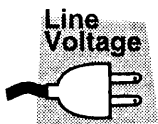
Users

- This product must be used only by qualified personnel who understand the contents of this operation manual.
- If it is handled by disqualified personnel, personal injury may result. Be sure to handle it under supervision of qualified personnel (those who have electrical knowledge.)



Purposes of use

- Do not use the product for purposes other than those described in the operation manual.



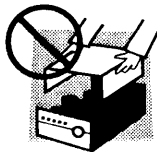
Input power

- Use the product with the specified input power voltage.
- For applying power, use the AC power cord provided. Note that the provided power cord is not use with some products that can switch among different input power voltages or use 100 V and 200 V without switching between them. In such a case, use an appropriate power cord. For details, see the relevant page of this operation manual.



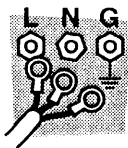
Fuse

- With products with a fuse holder on the exterior surface, the fuse can be replaced with a new one. When replacing a fuse, use the one which has appropriate shape, ratings, and specifications.



Cover

- There are parts inside the product which may cause physical hazards. Do not remove the external cover.



Installation

- When installing products be sure to observe "Precautions for Installation" described in this manual.
- To avoid electrical shock, connect the protective ground terminal to electrical ground (safety ground).
- When applying power to the products from a switchboard, be sure work is performed by a qualified and licensed electrician or is conducted under the direction of such a person.
- When installing products with casters, be sure to lock the casters.



Relocation

- Turn off the power switch and then disconnect all cables when relocating the product.
- Use two or more persons when relocating the product which weights more than 20 kg. The weight of the products can be found on the rear panel of the product and/or in this operation manual.
- Use extra precautions such as using more people when relocating into or out of present locations including inclines or steps. Also handle carefully when relocating tall products as they can fall over easily.
- Be sure the operation manual be included when the product is relocated.



Operation

- Check that the AC input voltage setting and the fuse rating are satisfied and that there is no abnormality on the surface of the AC power cord. Be sure to unplug the AC power cord or stop applying power before checking.
- If any abnormality or failure is detected in the products, stop using it immediately. Unplug the AC power cord or disconnect the AC power cord from the switchboard. Be careful not to allow the product to be used before it is completely repaired.
- For output wiring or load cables, use connection cables with larger current capacity.
- Do not disassemble or modify the product. If it must be modified, contact Kikusui distributor/agent.



Maintenance and checking

- To avoid electrical shock, be absolutely sure to unplug the AC power cord or stop applying power before performing maintenance or checking.
- Do not remove the cover when performing maintenance or checking.
- To maintain performance and safe operation of the product, it is recommended that periodic maintenance, checking, cleaning, and calibration be performed.



Service

- Internal service is to be done by Kikusui service engineers. If the product must be adjusted or repaired, contact Kikusui distributor/agent.

Overvoltage category

To standardize insulation requirements with respect to the level of transient overvoltage, IEC60664 (Insulation coordination for equipment within low-voltage systems) classifies circuits into four categories according to the frequency of occurrence of voltage transients. For details, see the IEC Standards.

Overvoltage category I

Equipment of overvoltage category I is equipment for connection to circuits in which measures are taken to limit transient overvoltages to an appropriately low level.

Examples are protected electronic circuits.

Overvoltage category II

Equipment of overvoltage category II is energy-consuming equipment to be supplied from the fixed installation.

Examples of such equipment are appliances, portable tools and other household and similar loads.

If such equipment is subjected to special requirements with regard to reliability and availability, overvoltage category III applies.

Overvoltage category III

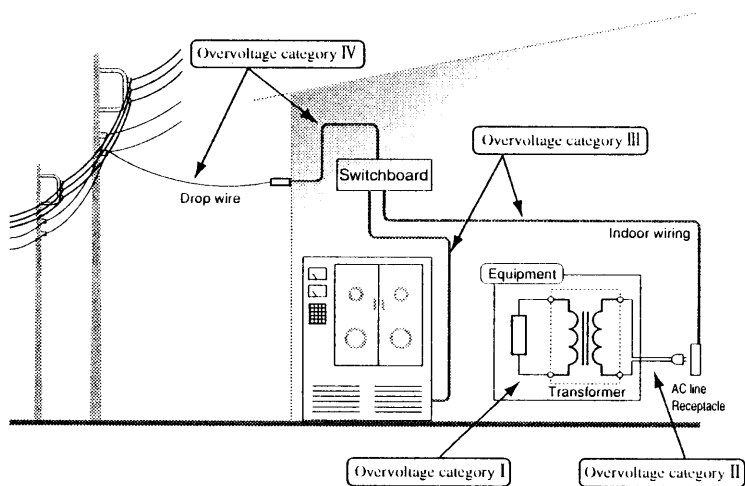
Equipment of overvoltage category III is equipment in fixed installations and for cases where the reliability and the availability of the equipment is subject to special requirements.

Examples of such equipment are switches in the fixed installation and equipment for industrial use with permanent connection to the fixed installation.

Overvoltage category IV

Equipment of overvoltage IV is for use at the origin of the installation.

Example of such equipment are electricity meters and primary overcurrent protection equipment.



Arrangement of this manual

This Operation Manual is made up of the following sections.

Preface

Provides a brief description of the product and specifies its features.

Chapter 1 Setup


This chapter explains the pre-operation processes for the PIA4830, starting with unpacking.

Chapter 2 Preparation for Control Operation

This chapter explains the preparations to be made for starting control operations.

Chapter 3 Components and Functions

This chapter describes the components, including the switches, indicators and connectors, on the front and rear panels, as well as their functions.

It also explains the alert symbols  indicated on the PIA4830 panels.

Chapter 4 Maintenance

This chapter explains the procedures for maintenance and inspection of the PIA4830.

Chapter 5 Specifications

This chapter provides the specifications for the PIA4830.

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Preface

About this Manual

This is the Operation Manual for Power-Supply Controller PIA4830.

It focuses on the setup process prior to the start of control operations.

For details on connection to the DC power-supply unit and on remote control, refer to the operation manual for each DC power-supply unit.

■ ROM Version of the product applicable to this manual

- PIA4830

Ver. 2.2X

The version can be checked using the *IDN? message. For details, refer to the operation manual for DC power-supply unit with a digital remote-control function.

When inquiring about your product, identify the version number and the manufacturer's serial number indicated on the rear panel.

Product Outline

The PIA4830 is a controller designed to control Kikusui's DC power-supply unit with a digital remote control via GPIB or RS-232C. They can be used to control multiple DC power-supply units via your personal computer (hereinafter referred to as a "PC").

Further, the Kikusui DC power-supply unit with an analog remote-control function can be controlled using the expansion unit PIA4820 and the control board OP01-PIA/OP02-PIA.

■ Features

Multi-channel compatibility

The PIA4830 can control up to 31 DC power-supply units with a digital remote-control function, if it is connected to them with a TP-BUS (Twisted-Pair BUS). (The TP-BUS has a total length of 200 m.)

GPIO/RS-232C

In addition to the GPIO, all PIA4830 models support the RS-232C (up to 19,200 bps) to provide a simple interface with a notebook PC.

■ Application

When used in combination with more than one Kikusui DC power-supply unit with a remote-control function, the Power-Supply Controller PIA4830 can play a central role in multi-channel control systems, such as battery charge/discharge testers, electrical-component testing instruments, electroplating controllers, and electron-accelerator testing machines.

System Configuration

This section describes the relationships between the PIA4830 and DC power-supply units and their peripheral subsystems.

All control operations are performed from a personal computer (PC) via GPIO or RS-232C. Fig. 1 shows the system configuration. First, a PC is connected to the PIA4830 with a GPIO or RS-232C. To control a DC power-supply unit with a digital remote-control function, the PIA4830 is directly connected to the power-supply unit using a TP-BUS connector. When a DC power-supply unit with an analog remote-control function is controlled, the expansion unit PIA4820 is connected to the power-supply unit with a TP-BUS connector. The PIA4820 must be equipped with the control board OP01-PIA or OP02-PIA. For details on the PIA4820, OP01-PIA, and OP02-PIA, refer to the PIA4820 Operation Manual.

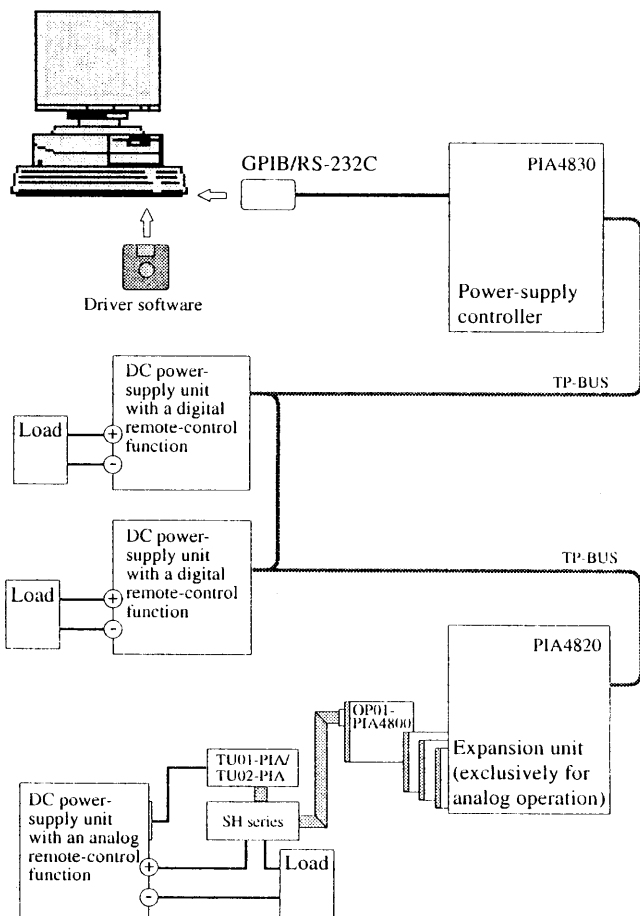


Fig. 1 System Configuration

■ PIA4830 Power-Supply Controller

The PIA4830 Power-Supply Controller is the main component of a system that controls Kikusui DC power-supply units with a digital remote-control function via GPIB or RS-232C.

■ PIA4820 Expansion Unit

The PIA4820 is an expansion unit designed to control Kikusui DC power-supply units with an analog remote-control function. Up to three expansion units can be connected to the PIA4830 unit via TP-BUS. This expansion unit can also be connected to up to four OP01-PIA or OP02-PIA control boards.

For details, see the PIA4820 Operation Manual.

■ OP01-PIA/OP02-PIA Control Board

The control board has two channels for control of two DC power-supply units.

Either OP01-PIA or OP02-PIA is selected, depending on the control parameters.

For details, see the PIA4820 Operation Manual.

■ TU01-PIA/TU02-PIA Terminal Unit

By connecting the TU01-PIA/TU02-PIA between the PIA4820 and a DC power-supply unit with an analog remote-control function, control parameters can be added.

For details, see the Operation Manual for the TU01-PIA/TU02-PIA and PIA4820.

■ SH-Series Shunt Resistor

The SH series ensures accurate current readback output when connected to the load cable on a DC power-supply unit with an analog remote-control function.

For details, see the operation manuals for the SH Series, PIA4820, and DC power-supply unit.

Optional Equipment

Kikusui offers several options for incorporation into a rack. For details, contact Kikusui distributor/agent.

- Rack adapter KRA3 (Inch rack on EIA standard)
 KRA150 (Millimeter rack on JIS)
- Blank panel KBP3-2
 KBP3-3
 BP191 (one unit panel on EIA standard)
 BP1H (one unit panel on JIS)

For one unit blank panels BP191 and BP1H, a mesh type is also available.

NOTE

- To install the PIA4830 in a rack, provide space for one unit panel.

(One unit panel: 44.5 mm on EIA, 50 mm on JIS)

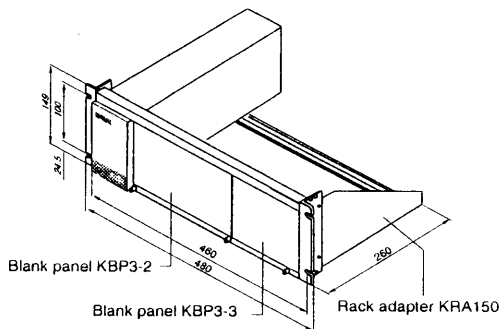
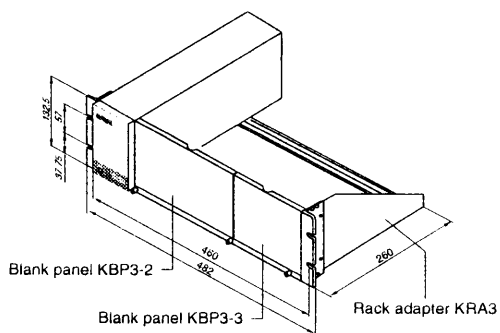


Fig. 2 KRA3 and KRA150

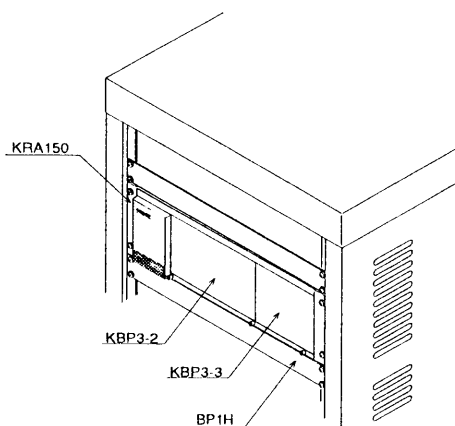


Fig. 3 One unit blank panel (for KRA150)

This chapter describes the steps from unpacking the PIA4830 through to putting it to use.

1.1 Checking at Unpacking

Upon receiving this product, make sure the package contains the necessary accessories and has not been damaged during transportation. See Figs. 1-1 and 1-2.

If any part is damaged or missing, contact Kikusui distributor/agent.

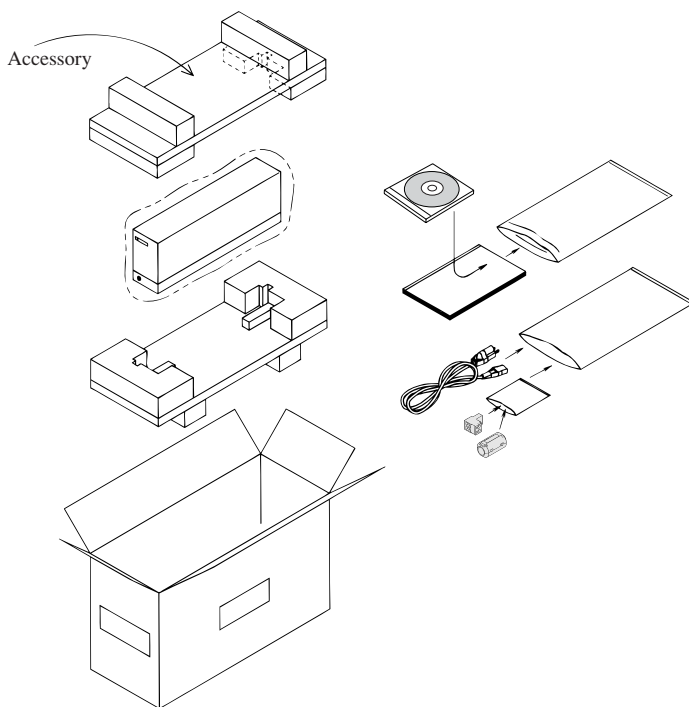


Fig. 1-1 Unpacking

NOTE

- Packing materials may be used for transport of the product, so it is recommended that they be retained.
-

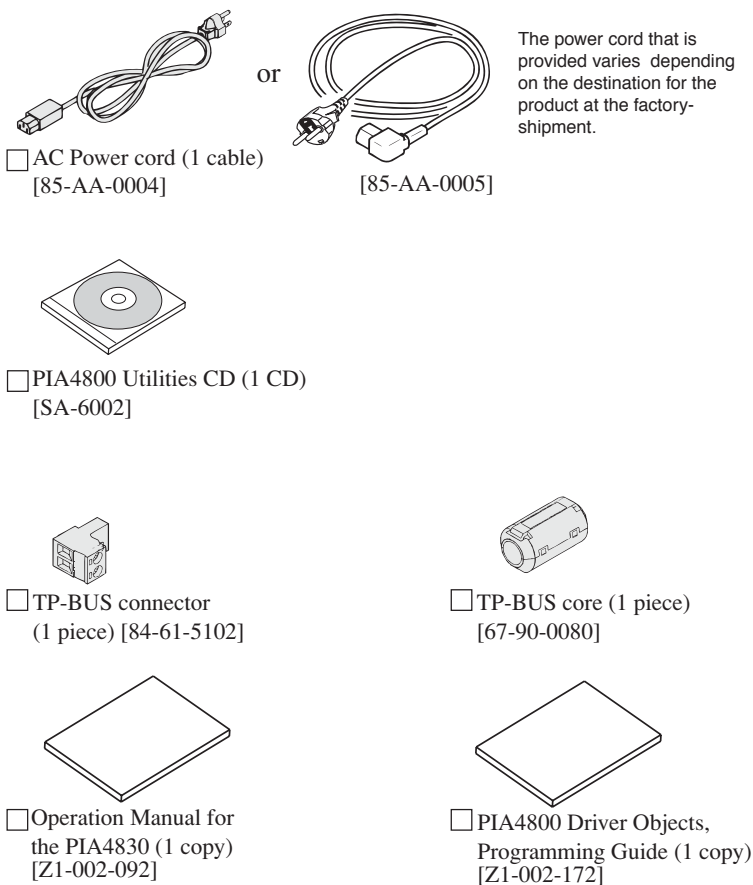


Fig. 1-2 Accessories

It is necessary for the user to obtain a GPIB interface cable and RS-232 interface cable (cross type), which are not included with the product.

For the interface cables, see 1.6.2, “Communication Cables.”

1.2 Precautions for installation

Be sure to observe the following precautions when installing the product.

■ Do not use the product in a flammable atmosphere.

To prevent explosion or fire, do not use the product near alcohol, thinner, or other combustible materials, or in an atmosphere containing such vapors.

■ Avoid locations where the product is exposed to high temperatures or direct sunlight.

Do not locate the product near a heater or in areas subject to drastic temperature changes.

Operating temperature range: 0°C to 40°C

Storage temperature range: -20°C to +70°C

■ Avoid humid environments.

Do not locate the product in a high-humidity environment—near a boiler, humidifier, or water supply.

Operating humidity range: 10% to 90% R.H

(no dew condensation is allowed)

Storage humidity range: 10% to 90% R.H

(no dew condensation is allowed)

Condensation may occur even within the operating humidity range. In that case, do not start using the product until the location is completely dry.

■ Do not place the product in a corrosive atmosphere.

Do not install the product in a corrosive atmosphere or one containing sulfuric acid mist or the like. This may cause corrosion of various conductors and imperfect contact with connectors, leading to malfunction and failure, or in the worst case, a fire.

■ Do not locate the product in a dusty environment.

Dirt and dust in the product may cause electrical shock or fire.

■ Do not use the product where ventilation is poor.

Prepare sufficient space around the product. Otherwise, heat may accumulate in the product, resulting in fire.

- **Do not place any object on the product.**

Particularly a heavy one, as doing so could result in a malfunction.

- **Do not place the product on a tilted surface or in a location subject to vibrations.**

If placed on a non-level surface or in a location subject to vibration, the product may fall, resulting in damage and injury.

- **Do not use the product in locations affected by strong magnetic or electric fields.**

Operation in a location subject to magnetic or electric fields may cause the product to malfunction, resulting in electrical shock or fire.

- **Secure adequate space around the power plug.**

Do not insert the power plug to an outlet where accessibility to the plug is poor. And, do not place objects near the outlet that would result in poor accessibility to the plug.

1.3 Precautions for moving

When moving or transporting the product to an installation site, observe the following precautions.

- **Turn the POWER switch off.**

Moving the product with the power on may result in electrical shock or damage.

- **Remove all wirings connected.**

Moving the product with cables connected may break the cables or cause the product to fall, resulting in injury.

- **For transportation, use the special packing material for the product.**

Transport the product in its original package to prevent vibration and falls, which may damage the product. If you require packing material, contact Kikusui distributor/agent.

1.4 AC power cord connection

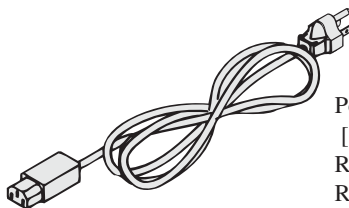
The AC power cord that is provided varies depending on the destination for the product at the factory-shipment.

⚠ WARNING

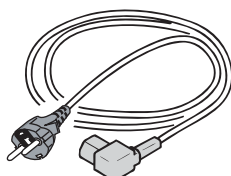
- The power supply is designed to operate from the overvoltage category II. Do not operate it from the overvoltage category III or IV. For the overvoltage categories, see Page VI "Overvoltage category".
- The AC power cord for 100 V system shown in Fig.1-3 has a rated voltage of 125 VAC. If this AC power cord is used at the line voltage of a 200 V system, replace the AC power cord with that satisfying that line voltage.

An appropriate AC power cord must be selected by qualified personnel. If it is difficult to obtain the AC power cord, consult your Kikusui distributor/agent.

- *Do not use the AC power cord provided with the product as a AC power cord for other instruments.*



Power cord for 100 V system
[85-AA-0004]
Rated voltage: 125 VAC
Rated current: 10 A



Power cord for 200 V system
[85-AA-0005]
Rated voltage: 250 VAC
Rated current: 10 A

Fig. 1-3 AC power cord

Connection procedure

1. Check that the supply voltage is within the line voltage range of the power supply.
Input voltage range: 85 VAC to 250 VAC
Frequency range: 48 Hz to 62 Hz
2. Turn OFF the POWER switch.
3. Connect the AC power cord to the AC INPUT connector on the rear panel.
Use the provided power code or power code that is selected by qualified personnel.
4. Plug in the AC power cord.

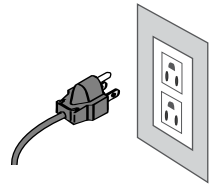
1.5 Grounding

- ⚠ WARNING** • Not grounding the PIA4830 creates danger of electric shock.
 - Connect the ground terminal to an electrical ground (safety ground).
 - ⚠ CAUTION** • Not performing adequate grounding work on the PIA4830 results in malfunction or the production of large noises from the PIA4830.
-

To ensure safety, provide secure grounding.

The PIA4830 can be grounded by the method specified below. Note that no grounding terminal is provided on the panels of the PIA4830.

- Plug the AC power cord into a 3-pole power outlet upon which grounding construction has been performed.



1.6 Software

The PIA4800 Utilities CD software is necessary only when a control program is created for a Kikusui DC power-supply unit with a digital remote-control function through the use of the device driver PIA4800 Driver Objects.

PIA4800 Driver Objects is composed of library modules that encapsulate command-based GPIB and RS-232C operations. If you are familiar with a programming language that supports a COM client, this software enables you to create a program using Microsoft Visual Basic or Excel 95 even if you are unfamiliar with GPIB commands or syntax.

For the setup procedure and other information, see the PIA4800 Driver Objects Programming Guide accompanying the PIA4830.

To control the Kikusui DC power-supply unit with an analog remote-control function through the use of the expansion unit PIA4820, the configuration software and calibration software in the PIA4800 Utilities CD must be used. For details, see the PIA4820 Operation Manual.

1.6.1 Operating Environment for Software

Required environment

■ IBM-PC/AT compatible PC

- Microprocessor of at least Pentium 90 MHz
- At least 16 MB of memory
- Hard disk drive (12 MB required for installation)
- Color display monitor of at least 800 x 600 x 256
- CD-ROM drive
- Microsoft mouse or equivalent pointing device

■ Operating system

- Windows 95/98/Me/NT4.0/2000/XP
(Windows 95 requires installation of IE4.0 or later. Windows NT 4.0 requires installation of Service Pack 6a or later.)

■ GPIB card (recommended)

Necessary for control using a GPIB.

- VISA-compatible GPIB card (by National Instruments, Agilent Technologies, Contec Co., LTD. or Interface Corp.)
- NI-VISA Ver.2.5 or later, Agilent I/O Library K.01.00 or later or KI-VISA2.2.3 or later.

■ Serial communication port

Necessary for control using an RS-232C.

- COM1, COM2 or COM3

1.6.2 Communication Cables

An interface cable is used to connect the PIA4830 to your PC. Use a cable compatible with the interface to be employed.

NOTE

- The PIA4830 does not include an interface cable for connection to your PC. GPIB cables are available from Kikusui. Contact Kikusui distributor/agent.
-

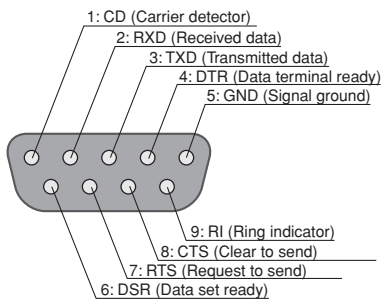
■ GPIB cable

If control is performed via GPIB, a GPIB cable is used to connect the GPIB card on your PC to the PIA4830.

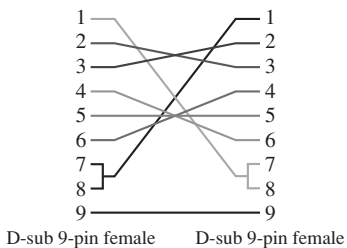
If a GPIB interface is to be used, GPIB address settings must be made on the PIA4830. For the GPIB address setting procedure, see 2.1, “Settings on the Rear Panel.”

■ RS-232C cross cable

If control is performed via an RS-232C on Windows, an RS-232C cross cable is used to connect your PC to the PIA4830. Use a D-sub 9-pin female-female AT type.



On the PIA4830



Cross cable (example)

Fig. 1-4 RS-232C cable

Chapter 2 Preparation for Control Operation

This chapter explains the preparations to be made prior to the start of control operations.

For connection to a DC power-supply unit and messages and sample programs to be used in programming, see the operation manual for the DC power-supply unit.

2.1 Settings on the Rear Panel

■ DIP switch

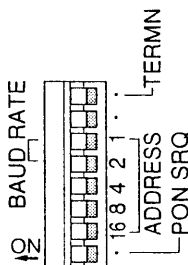


Fig. 2-1 DIP switch

Using the dip switch on the rear panel, make the settings specified below.

1. Setting PON SRQ (during GPIB control)

To use the PON SRQ (Power ON Service Request), turn the PON SRQ switch ON. This enables the status byte register to be used to check whether the POWER switch has been activated.

2. Address settings (during GPIB control)

Using the ADDRESS switch (1,2,4,8,16), set the GPIB address of the PIA4830. Do not use the same address more than once for the same system. The GPIB address can be determined by adding the figures located to the right of the switch that is ON.

3. Setting BAUD RATE (during RS-232C control)

Using GPIB address setting switches 1 and 2, set a baud rate for RS-232C control.

GPIB address setting switches		BAUD RATE
1	2	
ON	ON	19200 bps
OFF	ON	9600 bps
ON	OFF	4800 bps
OFF	OFF	2400 bps

Table 2-1 Baud rate settings

4. TERMN settings

Set the TERMN (Termination) switch to ON for the devices on both ends of the bus.

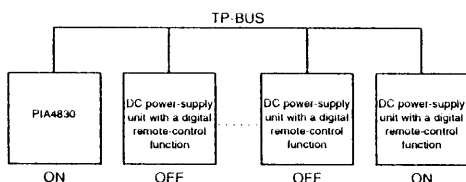


Fig. 2-2 Termination settings

CAUTION • Incorrect TERMN switch settings may cause unstable communication and malfunction.

■ SHUT DOWN

If the contact signal is input for at least one second, the outputs on all connected DC power-supply units are turned OFF. The positive (+) terminal on the SHUT DOWN connector is pulled up to +5 V through 4.7 kΩ.

The SHUT DOWN signal is latched. To release the signal, send a *RST message.

Example of a circuit

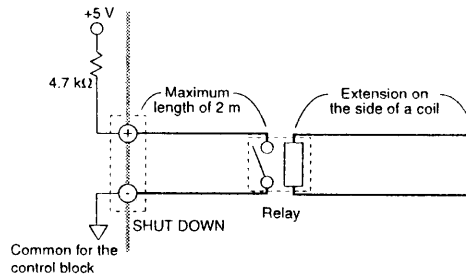


Fig. 2-3 Example of a shutdown circuit

Connection procedure

Applicable cables

- Single wire: $\phi 0.65$ (AWG 22)
- Twisted wire: 0.32 mm^2 (AWG 22), with an element wire diameter of $\phi 0.18$ or greater

1. Turn OFF the POWER switch of the PIA4830.
2. Using a wire stripper, remove 10 mm of insulation from the cable end.
3. As shown in Fig. 2-4, while pressing Point A with a slotted screwdriver, insert the cable.
4. Remove the screwdriver from Point A, and make sure the cable is securely fixed.

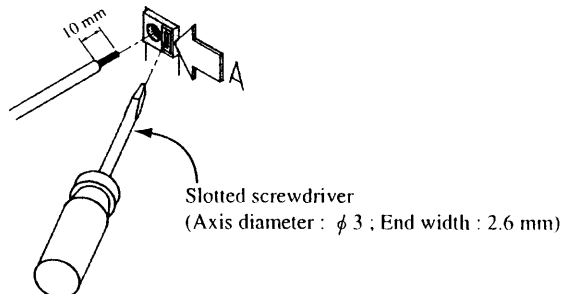


Fig. 2-4 Connection to the SHUT DOWN connector

2.2 Connection to the TP-BUS Connector

To connect the PIA4830 to a DC power-supply unit with a digital remote-control function or to the PIA4820, directly connect them using the TP-BUS (Twisted-Pair Bus) connector on the rear panel.

Up to 31 DC power-supply units with a digital remote-control function or up to three PIA4820 expansion units can be connected.

To connect the TP-BUS to the series, connect the twisted-pair cable to the TP-BUS connector (plug) accompanying the PIA4830.

Determine the length of the twisted-pair cable so that the total extension of the system is below 200 m.

■ Necessary cable and tool

1. Cable

Twisted wire: 0.32 mm² (AWG 22)

2. Slotted screwdriver

Axis diameter: ø3

End width: 2.6 mm

3. Wire stripper

One compatible with the cable specified above

■ Wiring the TP-BUS connector

1. Turn OFF the power switches on all devices to be connected.
2. As shown in Fig. 2-5 (a), insert the accompanying TP-BUS connector (plug) into the TP-BUS connector on the back panel.
Secure the connector to facilitate further wiring work.
3. Using a wire stripper, remove 7 mm of covering from the cable end.
4. As shown in Figs. 2-5 (b) and (c), insert the cable into the connector.
Polarity adjustment is not necessary because the TP-BUS is nonpolar.
5. Using a screwdriver, turn the connector screws to fasten the cable.

6. Check that the cable is securely connected.
7. Following the same steps above, wire the other connectors.

On completion of wiring to the TP-BUS connector, install the accompanying core on the twisted-pair wire.

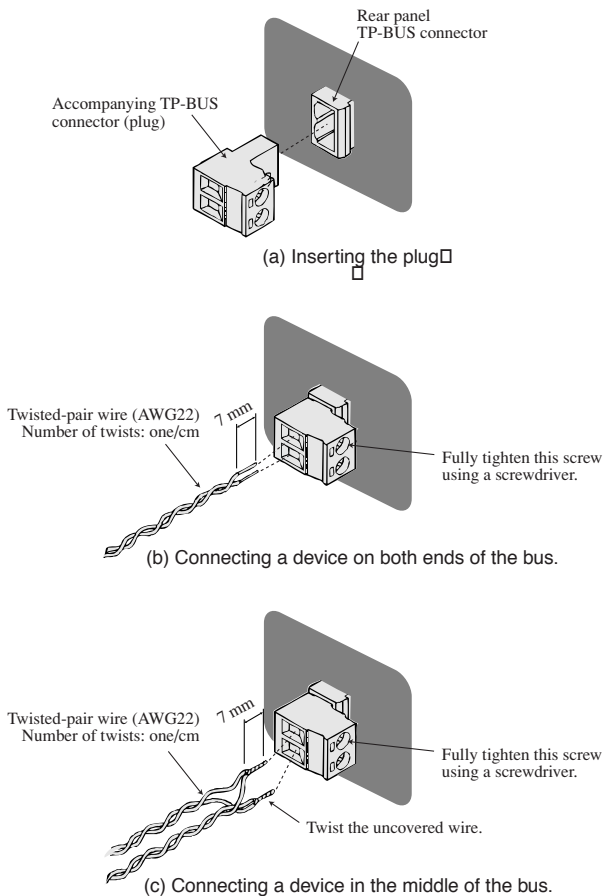


Fig. 2-5 Wiring the TP-BUS connector

■ Installing a TP-BUS core

1. As shown in Fig. 2-6 (a), unlock the core and open it.
2. As shown in Fig. 2-6 (b), wind the twisted-pair wire once around a half core.

Keep the distance between the core and the connector below 30 mm.

3. As shown in Fig. 2-6 (c), close the core. Avoid catching the wire on the core.
4. Check that the core is securely locked.
5. Follow the above procedure when installing the other cores.

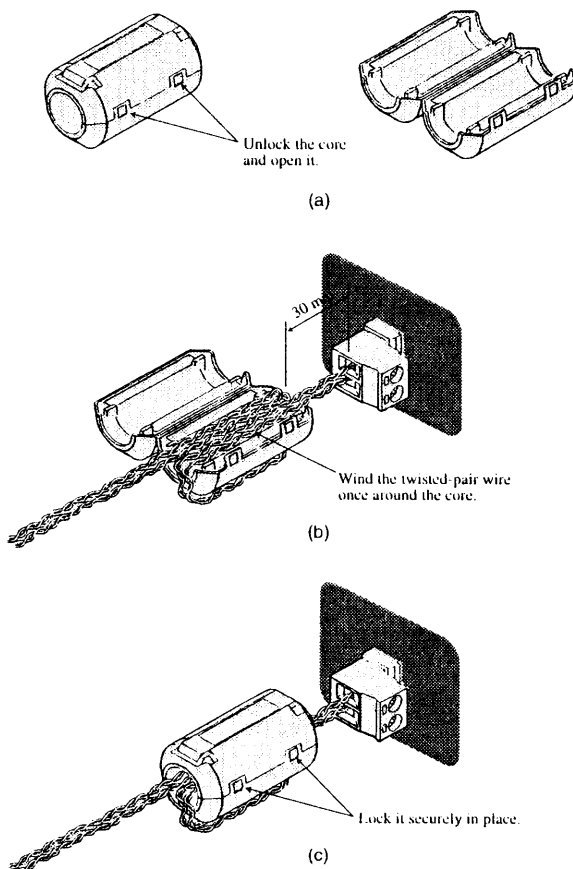


Fig. 2-6 Installing a TP-BUS core

2.3 Remote Control

The following describes the device messages used to create a program that controls DC power-supply units via GPIB or RS-232C. In programming, different device messages are used for the different DC power-supply units to be connected. For details, see the operation manual for the DC power-supply unit.

■ Outline of the Control Mechanism of the unit

In Kikusui's conventional power-supply controller PIA3200, if DC power-supply units are connected to CH1 and CH2, the following messages are sent to set the voltage:

```
CH1
VSET 32V
CH2
VSET 17V
```

In this new system, on the other hand, a DC power-supply unit or control board must be specified before a channel is specified. The identifier used to specify a DC power-supply unit or control board is known as a "node address," and is specified with a "NODE" message.

For instance, to set the CH1 and CH2 voltages when a DC power-supply unit with Node Address 2 is connected, the following messages must be sent:

```
NODE 2      Specify Node Address 2.
CH 1
VSET 32V
CH 2
VSET 17V
```

NODE:

"NODE" is a message used to specify a DC power-supply unit or control board. This message must be sent before a channel is specified.

Node address settings for a DC power-supply unit with a digital remote-control function must be made on the power-supply unit itself. For details, see the operation manual for the power-supply unit.

The configuration software must be used to set the node address of the control board mounted on the expansion unit PIA4820. To use the software, install PIA4800 Utilities in the PIA4800 Utilities CD. For details, see the PIA4820 Operation Manual.

2.4 Interface

The PIA4830 is provided with two interfaces: GPIB and RS-232C. If DC power-supply units are to be remotely controlled using the PIA4830, one of them must be used.

GPIB interface

To use the GPIB interface, set a GPIB address on the PIA4830. To set a GPIB address, see 2.1, “Settings on the Rear Panel.”

RS-232C interface

To use the RS-232C interface, make the following settings:

Baud rate

For baud rate settings, see 2.1, “Settings on the Rear Panel.”

Data bit/stop bit/parity bit

The number of bits used is fixed as shown below. Make settings for these bits. For bit settings, see the operation manual for your PC.

- Data bit: 8 bits
- Stop bit: 1 bit
- Parity bit: None

Control communication via RS-232C using flow control or acknowledgement messages. One-way transmission may make proper communication difficult.

■ RS-232C pin layout

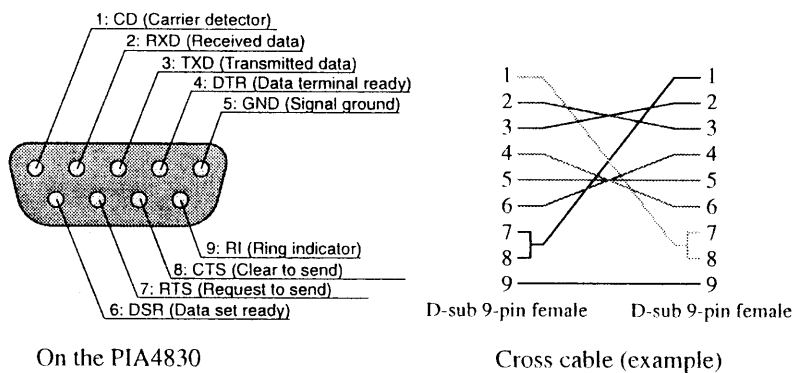


Fig. 2-7 Pin-9 AT-type connector

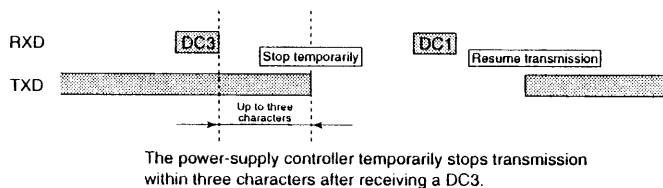
RS-232C flow control

By executing Xon/Xoff, communication between power-supply controller and device can be controlled. For control, DC (device control) codes are used.

	Function	ASCII code
DC1	Request transmission	11 h
DC3	Request termination of transmission	13 h

Table 2-2 Flow control

Control of transmission from the RS-232C terminal to the power-supply controller



Control of transmission from the power-supply controller to the RS-232C terminal

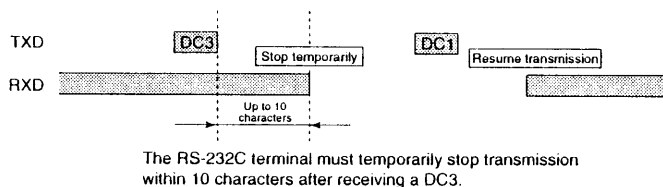


Fig. 2-8 Control of transmission

2.5 Message and Terminator

This section provides terminology and details concerning communication between the power-supply controller and devices.

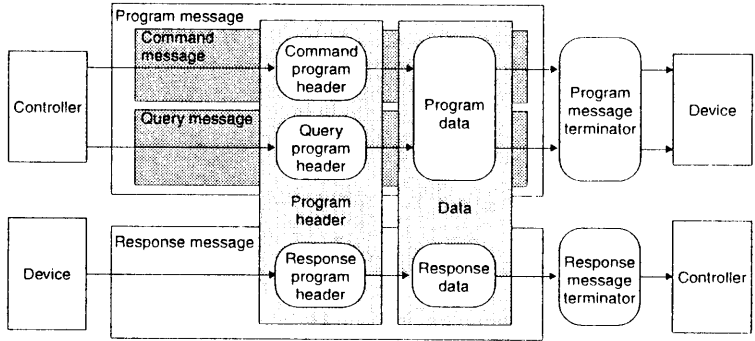


Fig. 2-9 Messages and terminators

2.5.1 Messages

The messages transmitted from the controller to a device are called “program messages.” The messages transmitted from a device to the controller are called “response messages.”

Each message is composed of a program header and data.

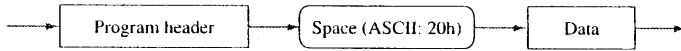
Program messages

There are two types of program messages: command messages and query messages.

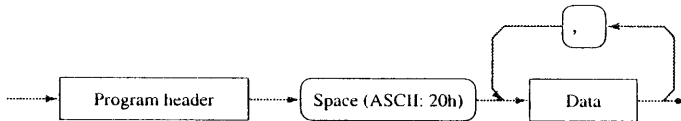
A command message is used to execute a specified function of a device and to alter settings. A query message is used to inquire about the settings and status of a device.

Writing program messages

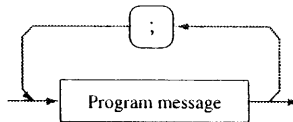
- Provide a space (ASCII: 20h) between the program header and the data.



- When there is more than one piece of data, connect them using “,” (ASCII: 2Ch).



- To connect one program message to another, use “;” (ASCII: 3Bh).

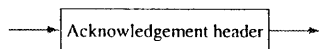


NOTE

- To describe data using hexadecimal numbers, add “#H.”
Example: To describe the decimal number “10” using a hexadecimal number, write “#H0A.”
 - When “@” is added to the end of a program message, the hold-off status is retained until execution of the message is completed.
-

Acknowledgement messages (RS-232C)

The acknowledgement message is peculiar to the RS-232C interface. This message is sent from the power-supply controller to a terminal. It indicates that a program message has been processed.



An acknowledgement message is a character string of ASCII code which is composed only of a header. There are two types such messages:

- OK: Normally terminated
- ERROR: Abnormality occurring, such as a syntax error

Through the use of a silent command message, it can be specified whether to return an acknowledgement message.

2.5.2 Terminator

The terminator used to indicate that a program message has been terminated is called a "program message terminator." The terminator used to indicate that a response message has been terminated is called a "response message terminator."

• Program message terminators

One of the following may be used. No preliminary settings are required.

LF
LF+EOI
EOI
CR+EOI

• Response message terminators

The initial setting is CR+LF+EOI. Using either a TRM or DELIMITER command message, it can be changed to one of the following:

CR+LF+EOI
LF+EOI
EOI
CR+EOI

2.6 DC Power-Supply Unit with an Analog Remote-Control Function

To control the Kikusui DC power-supply unit with an analog remote-control function through the use of the PIA4830, you must have the expansion unit PIA4820 and control board OP01-PIA or OP02-PIA.

Using the TP-BUS connector, connect the PIA4830 to the PIA4820 furnished with the OP01-PIA or OP02-PIA.

To control a DC power-supply unit with an analog remote-control function, the configuration software and the calibration software in the PIA4800 Utilities CD must be used.

For connection to a DC power-supply unit with an analog remote-control function, and for details on the configuration and calibration software, see the Operation Manual for the expansion unit PIA4820.

Chapter 3 Components and Functions

This chapter explains the switches, indicators, and connectors on the front and rear panels.

3.1 Front Panel

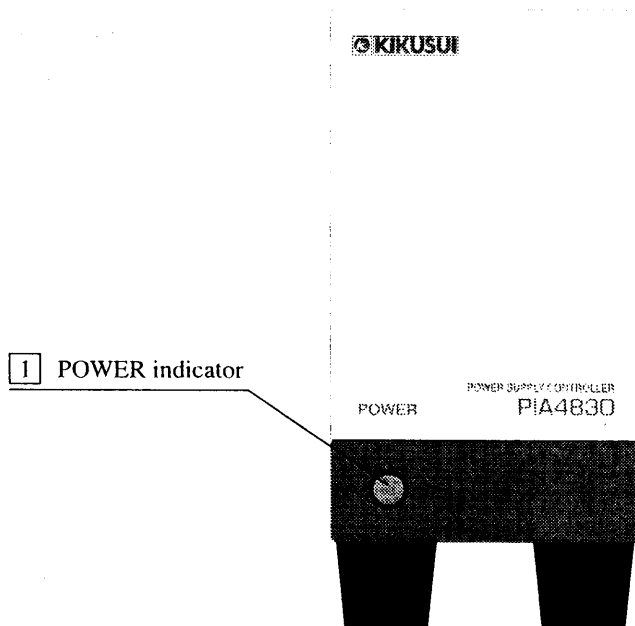


Fig. 3-1 Front panel

1 POWER indicator

Lights up when the POWER switch on the rear panel is ON.

3.2 Rear Panel

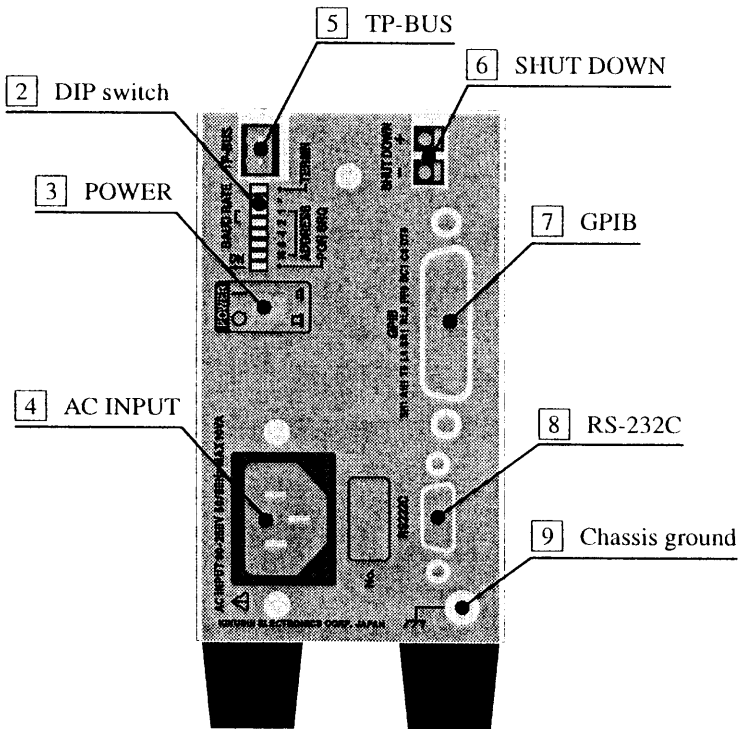


Fig. 3-2 Rear panel

2 DIP switch

The DIP switch is used to make the following settings:

- Device address during GPIB control
- ON/OFF of PON SRQ (Power ON Service Request) during GPIB control
- Baud rate during RS-232C control
- ON/OFF of TERMN (Termination)

3 POWER

Turn the power of the PIA4830 on and off. The power is ON (I) when the switch is in the pressed position, and OFF (O) when the switch is in the raised position.

4 AC INPUT ⚠

Connector for the AC power cord used to supply power to the PIA4830.

-
- ⚠ WARNING**
- Improper handling can cause electric shocks. When making connections, be sure to follow the instructions provided in “1.4 AC power cord connection.”
 - To ensure safety, be sure to ground the connector. For details, see “1.5 Grounding.”
-

5 TP-BUS

This is the connector used to connect the PIA4830 using a twisted-pair cable to the Kikusui DC power-supply unit with a digital remote-control function, or to the expansion unit PIA4820.

6 SHUT DOWN

Turns OFF the output of a connected power supply when the contact signal is input.

7 GPIB

A connector used to connect a GPIB cable.

8 RS-232C

A connector used to connect a RS-232C cable.

9 Chassis ground

Connected to the chassis of the PIA4830.

This chapter explains the maintenance and inspection of the PIA4830. To maintain high performance for an extended period, perform maintenance and inspect the PIA4830 regularly.

4.1 Cleaning

If the panel surface is stained, lightly wipe the stain using a cloth moistened with a water-diluted neutral detergent.

⚠ WARNING • Before cleaning, be sure to turn OFF the POWER switch and to unplug the power cord or turn OFF the switchboard.

⚠ CAUTION • Do not use volatile substances such as thinner or benzene for cleaning, as they may cause discoloration or erase printed characters.

4.2 Inspection

■ Power cord

Check the power cord for tearing of the insulation and loosening or cracking of the plug.

⚠ WARNING • Tearing of the insulation or other faults may cause electric shock. In such a case, discontinue use immediately.

To obtain accessories, contact Kikusui distributor/agent.

This chapter provides the specifications for the PIA4830.

Specifications

Item		Description
TP-BUS	Connection	Using the accompanying TP-BUS connector, connect the following: DC power-supply unit with a digital remote-control function: Up to 31 units Expansion unit PIA4820: Up to three units (Total cable length: Up to 200 m; Number of twists: 1 or more/cm)
	Polarity	None
	Applicable cable	Twisted wire: 0.32 mm ² (AWG22)
SHUT DOWN	Input signal	The output of all connected DC power-supply units is turned off when a contact signal is input for at least 1 second.
	+ terminal	Pulled up to +5 V with 4.7 k
	- terminal	Common for the control block
	Applicable cable	Single wire: 0.65 (AWG22) Twisted wire: 0.32 mm ² (AWG22) Element wire diameter of at least 0.18
Input	Voltage range	85 VAC to 250 VAC
	Frequency	48 Hz to 62 Hz
	Power consumption	Up to 17 VA
Installation location		Indoors and altitude of up to 2000 m
Operating ambient temperature and humidity		0 to 40 , 10% to 90% (No dew condensation)
Storage ambient temperature and humidity		-20 to 70 , 10% to 90% (No dew condensation)
Insulation resistance	Input - chassis	30 M or more at 500 VDC
	TP-BUS - chassis	30 M or more at 1000 VDC
Withstand voltage	Input - chassis	1500 VAC, 1 minute
	Input - TP-BUS	1500 VAC, 1 minute
	TP-BUS - chassis	600 VAC, 1 minute

Item	Description
Safety (*1, *2)	<p>Conforms to the requirements of the following directive and standard.</p> <p>Low Voltage Directive 73/23/EEC</p> <p>EN61010-1</p> <p>Class I</p> <p>Pollution degree 2</p>
Electromagnetic compatibility (EMC) (*1)	<p>Conforms to the requirements of the following directive and standard.</p> <p>EMC Directive 89/336/EEC</p> <p>EN61326</p> <p>EN61000-3-2</p> <p>EN61000-3-3</p>
Weight	Approximately 2 kg
Dimensions	See Fig. 5-1.
Accessory	AC power cord: 1
	PIA 4830 Utilities CD: 1
	TP-BUS connector: 1
	TP-BUS core: 1
	Operation Manual for the PIA4830: 1
	PIA4800 Driver-Objects Programming Guide: 1

*1. Only on models that have CE marking on the panel.

Not applicable to custom order models.

*2. This unit is a Class I equipment. Be sure to ground the protective conductor terminal of the unit. The safety of the unit is not guaranteed unless the unit is grounded properly.

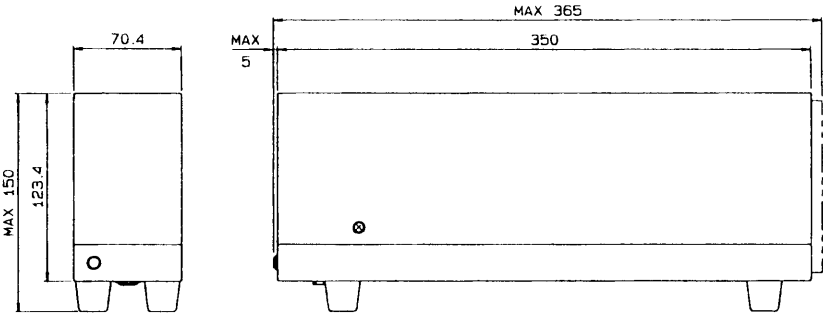
GPIB Interface

Code	Function
SH1	All source handshake functions
AH1	All acceptor handshake functions
T6	Talker function (basic outputs, serial poll, and talker cancellation through specification of a listener)
L4	Listener function (basic inputs, listener cancellation through specification of a talker)
SR1	All service request functions
RL0	No remote local function
PP0	No parallel poll function
DC1	No device clear function
C0	No controller function
DT0	No device trigger function

RS-232C Interface

Item	Description
Baud rate	One of 19200 bps, 9600 bps, 4800 bps, and 2400 bps can be selected using the DIP switch on the rear panel.
Data bit	8 bits (fixed)
Stop bit	1 bit (fixed)
Parity bit	None
Transmission/reception	Flow control or acknowledgement message
Cable	D-sub 9-pin, female-female AT type

External Dimensions



Unit: mm

Fig. 5-1 External dimensions

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POWER-SUPPLY CONTROLLER

PIA4830

OPERATION MANUAL