

LAN Interface Manual

Regulated DC Power Supply

PAV Series

200 W type

PAV10-20 PAV160-1.3
PAV20-10 PAV320-0.65
PAV36-6 PAV650-0.32
PAV60-3.5
PAV100-2

400 W type

PAV10-40 PAV160-2.6
PAV20-20 PAV320-1.3
PAV36-12 PAV650-0.64
PAV60-7
PAV100-4

600 W type

PAV10-60 PAV160-4
PAV20-30 PAV320-2
PAV36-18 PAV650-1
PAV60-10
PAV100-6

800 W type

PAV10-72 PAV160-5
PAV20-40 PAV320-2.5
PAV36-24 PAV650-1.25
PAV60-14
PAV100-8

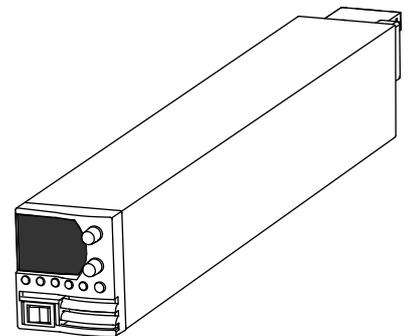
1. Description 4

2. Network Connection 6

3. Webpage 18

4. Specifications 33

Appendix 35



About PAV manual

The manuals are intended for users of the PAV series and their instructors. Explanations are given under the presumption that the reader has knowledge of power supplies.

Manual construction

- **Setup Guide**
This manual is intended for first-time users of the product. It gives an overview of the product, connecting procedures, safety precautions, etc. Please read this manual before you operate the product.
- **Quick Reference**
The quick reference briefly explains the control panel and the basic operation of it.
- **Safety Information**
This document contains general safety precautions for this product. Keep them in mind and make sure to observe them.
- **User's manual (PDF)**
This manual is intended for first-time users of this product. It provides an overview of the product, notes on usage, and specifications. It also explains how to connect the product, configure the product, operate the product, perform maintenance on the product, and so on.
- **USB/RS232/RS485 Communication Interface Manual (PDF)**
This manual explains how to control the product remotely using SCPI commands.
The interface manual is written for readers with sufficient basic knowledge of how to control measuring instruments using a PC.
- **LAN Interface Manual (PDF)**
This manual explains how to control the product remotely for users of the PAV series with the optional LAN interface.
The interface manual is written for readers with sufficient basic knowledge of how to control measuring instruments using a PC.

You can download the most recent version of these manuals from the Kikusui Electronics Corporation website (<http://www.kikusui.co.jp/en/download/>).

You can view the PDF files using Adobe Reader 10 or later.

Before reading this manual

First read the User's Manual, which includes information on the product's hardware, to avoid connecting or operating the product incorrectly.

Trademarks

Microsoft, Windows, and Internet Explorer are registered trademarks or trademarks of Microsoft Corporation in the United States and/or other countries.

All company names and product names used in this manual are trademarks or registered trademarks of their respective companies.

Copyrights

The contents of this 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 manual are subject to change without prior notice.

Notations used in this manual

- The PAV series is categorized into four types according to the output capacity. This manual contains sections that describe each type separately or several types collectively. The type categories are provided on the front cover.
- The PAV series with a LAN interface is also referred to as the "PAV with LAN" or simply PAV.
- The term "PC" is used to refer generally to both personal computers and workstations.
- The following markings are used in the explanations in this manual.

NOTE

Indicates information that you should know.

Copyright© 2015 Kikusui Electronics Corporation

Contents

About PAV manual	2	Socket Communication	39
Notations used in this manual	2	Communication using sockets.....	39
Contents	3	WAN Connection.....	41
1 Description	4	LAN Commands.....	42
Features.....	4	Global Commands for Multi-Drop Connection	43
2 Network Connection	6	Selecting the PAV	43
LAN port.....	6	Responses to global commands	43
LAN configuration.....	7	Index.....	44
Network types.....	7		
Selecting the LAN interface.....	8		
Control functions that can be used simultaneously with LAN	10		
LAN Connection.....	11		
Starting a connection.....	11		
Displaying and changing the IP address	11		
Checking the host name.....	13		
Displaying the MAC address	13		
LAN reset	14		
RS485 Multi-Drop Connection	15		
Description	15		
LAN connections	16		
RS485 connection	17		
3 Webpage	18		
Home Page	18		
Opening the Home page	18		
Description of the Home page.....	19		
Logging In and Logging Out.....	20		
Logging in.....	20		
Logging Out.....	21		
DC Power Page	22		
Output tab.....	22		
Protection tab	24		
System tab	25		
Utility tab.....	26		
LAN Page.....	27		
Configure tab.....	27		
Advanced tab	30		
Users tab	31		
Help Page	32		
4 Specifications	33		
Appendix			
Troubleshooting	35		
Driver Software	37		
Control using a VISA driver	37		
Control using an IVI driver.....	38		

1 Description

The local area network (LAN) option can be used to perform remote control, measurement, and status check on the PAV series.

The PAV can be controlled from a PC web browser through the web interface embedded in the PAV.

Automatic control and measurement applications can be created using the standard network protocol and measurement commands.

Features

Standard TCP/IP network communication

- LAN (local area network)
- WAN (wide area network)
- Communication with remote locations using the Internet

Webpage

- Network communication configuration
- Controlling and reading the PAV output and status from a GUI screen.
- Multi-user control and security settings to eliminate dangerous connection procedures
- Password for webpage protection

LAN protocol

- Supports VISA drivers, TCP socket, and UDP socket
- Supports VXI-11 discovery and Ping server
- LAN status indicator LED that lights when a network connection is established
- Simple creation of original auto control programs

Remote programming function

- Standard SCPI command language
- Supports VISA drivers and all test and measurement utilities
- TCP socket and UDP socket support PLCs, Linux, and other non-VISA controllers.

Front panel

- IP address and MAC address can be verified from the front panel.
- IP address can be assigned from the front panel.
- LAN reset can be performed from the front panel.
- Users can remotely control the blinking of the front panel display to identify which PAV is being controlled in a rack.

Rear panel

- Equipped with an Ethernet RJ-45 port (standard 8-pin jack port for LAN)
- The RJ-45 port is equipped with a link LED and activity LED.
- The LAN status indicator LED on the rear panel shows the LAN communication status. The LED can be controlled to blink to identify which PAV is being controlled.

RS485 multi-drop connection

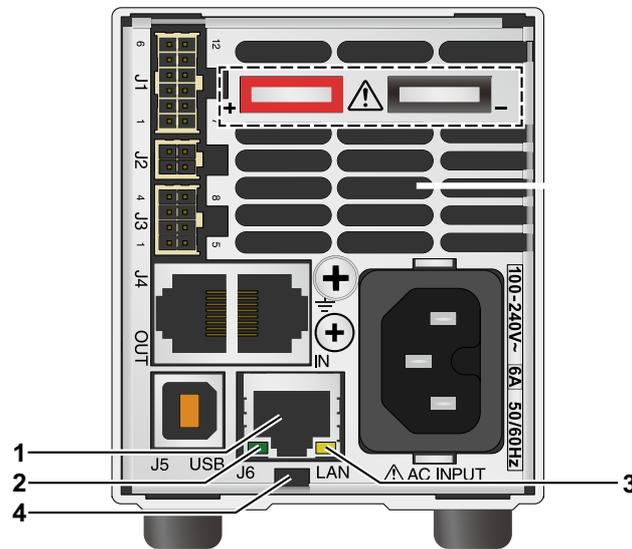
- Up to 30 PAVs can be connected using the included RS485 link cables.
- All the PAVs in a RS485 multi-drop connection can be controlled using a single IP address.
- PAVs in a RS485 multi-drop connection do not require the LAN option (except the master unit).

2 Network Connection

This chapter describes the LAN port, LAN configuration, and RS485 multi-drop connection.

LAN port

The LAN port is on the rear panel. The following figure is for the 10 V to 100 V rated output voltage model, but the LAN port is in the same location on the 160 V to 650 V rated output voltage model.



No.	Name	Function	
1	LAN port	RJ-45 port for LAN connection.	
2	Link LED	Green solid: When the PAV is connected to LAN.	
3	Activity LED	Orange blinking: When a message packet is detected.	
4	LAN status indicator LED	Normal operation	Green solid: When the PAV can connect to LAN.
		PAV identification	Green blinking ^{1,2}
		LAN fault	Red solid: When the PAV is not in LAN remote mode, when a LAN connection failed to be completed, or when the LAN connection is disconnected.

- 1 You can use the identification function by accessing the webpage from a PC or the like or by sending an SCPI command. When used, this LED blinks in sync with the front panel display. This function is useful to identify which PAV you are controlling when there are several PAVs mounted in the rack. If the PAVs are connected in a multi-drop configuration, only the LED of the PAV with LAN (master unit) blinks.
- 2 To stop this blinking, click Blink Identify (p.22) on the webpage, send an SCPI command (p.42), or turn or press the setting knob of the front panel.

LAN cable

Prepare a category 5 or better straight or crossover LAN cable.

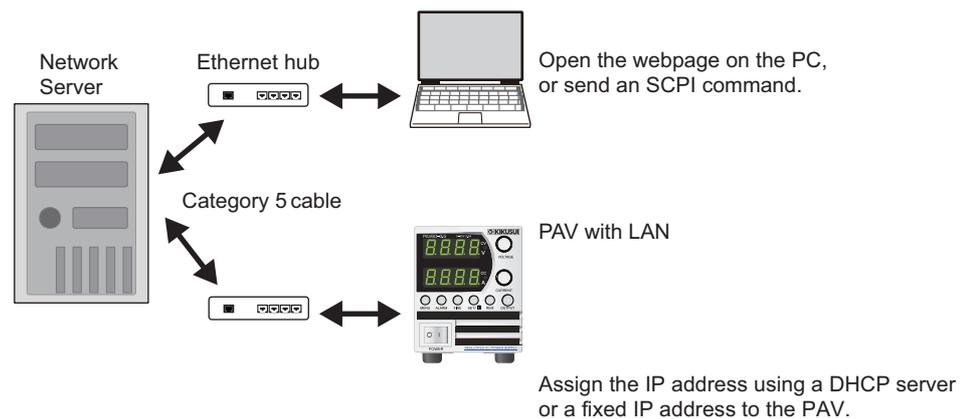
NOTE The RS485 link cable included with the PAV cannot be used for LAN connection.

LAN configuration

Network types

Network connection using a server

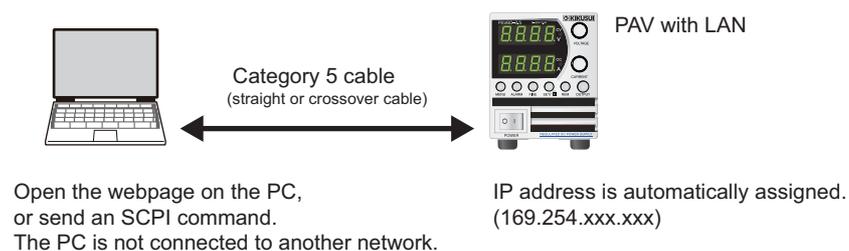
This is the typical network connection. A LAN is operated with a server under the management of network administrators. The server assigns an IP address and other LAN parameters to the PAV.



P2P (peer-to-peer) network connection

This is a connection where the PAV and the PC are connected directly. The PC only connects to the PAV, not to any other network.

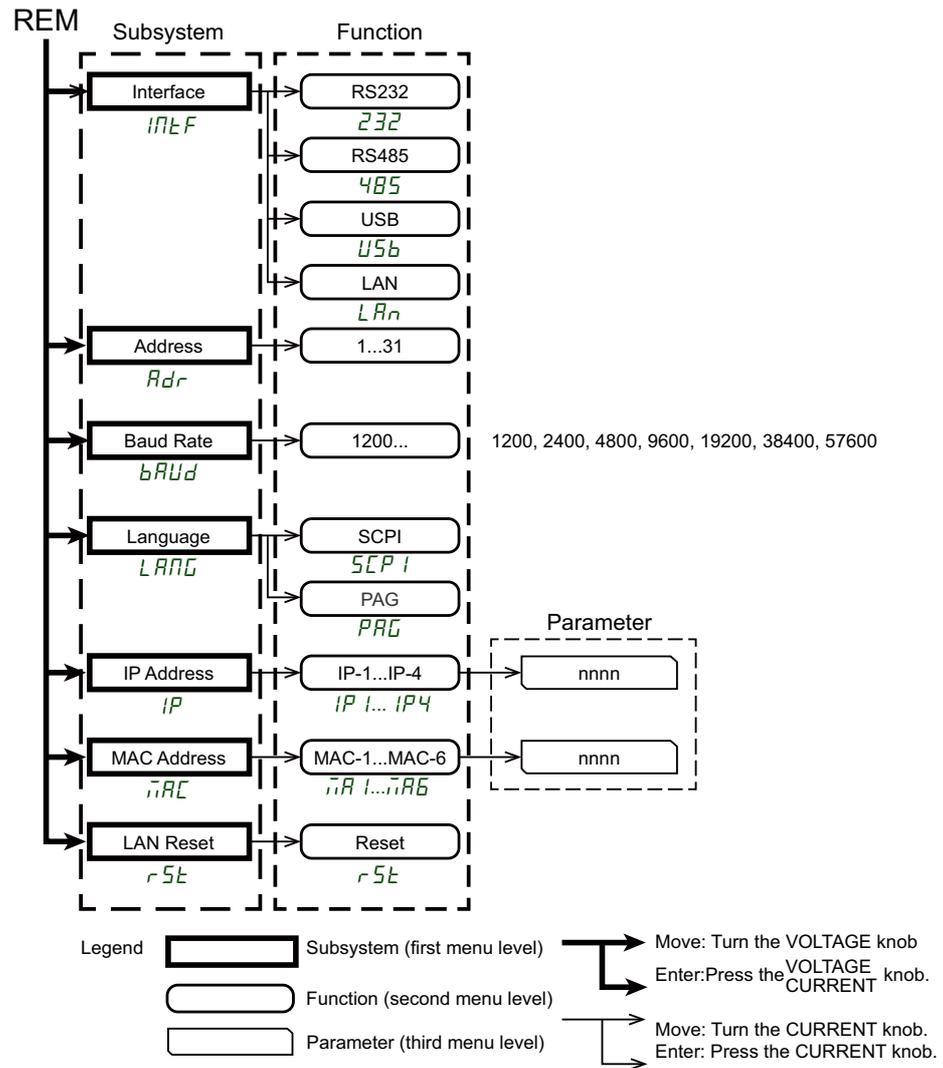
In the factory default setting, the PAV automatically assigns its own IP address and other LAN parameters. To return to the default settings, perform a LAN reset (p.14). In addition, if the PC is configured for automatic IP address assignment, the PAV assigns an IP address to the PC. For details on IP addresses, see “Displaying and changing the IP address .” (p.11).



Selecting the LAN interface

Use the REM menu to select the LAN interface. This menu is also used to set the IP address, MAC address and perform LAN reset.

REM menu structure



■ Subsystem and function

The subsystem and function correspond to first and second menu levels.

Subsystem item	Panel display	Function item	Panel display
Interface	<i>INTF</i>	RS232 ¹	<i>232</i>
		RS485	<i>485</i>
		USB	<i>USB</i>
		LAN ²	<i>LAN</i>
Address	<i>Adr</i>	1 to 31 6 ¹	<i>1 to 31</i>
Baudrate ³	<i>BRUD</i>	1200 to 57600 9600 ¹	<i>1200 to 576</i>
Command language	<i>LANG</i>	SCPI ¹	<i>SCPI</i>
		PAG ⁴	<i>PAG</i>
IP address ⁵	<i>IP</i>	IP1 to IP4	<i>IP1 to IP4</i>
MAC address ⁵	<i>MAC</i>	MAC1 to MAC6	<i>MAC1 to MAC6</i>
LAN reset ⁵	<i>rSt</i>	Reset	<i>rSt</i>

- 1 Factory default setting
- 2 Valid when equipped with LAN
- 3 The setting is valid when RS232/RS485 is selected.
- 4 PAG series communication commands, cannot be used when the LAN interface is selected
- 5 Displayed on models with LAN installed when LAN is selected

■ Parameter

The third menu level. It contains the IP address and MAC address items.

LAN remote mode setup procedure

- 1 Turn the POWER switch on.**
- 2 Press REM.**
The REM LED lights, and the voltmeter shows "*INTF*."
- 3 Press the VOLTAGE knob.**
The voltmeter shows "*INTF*," and the ammeter shows the communication interface name.
- 4 Turn the CURRENT knob to select the communication interface "*LAN*".**
- 5 Press the CURRENT knob.**
When the interface is set, the display blinks¹ and returns to the original screen.

Control functions that can be used simultaneously with LAN

On a PAV with LAN, you can use local mode and external control simultaneously with LAN. However, LAN cannot be used simultaneously with serial communication (USB/RS232/RS485) remote mode. For the serial communication setup procedure, see the USB/RS232/RS485 communication interface manual.

Local mode (front panel setup)

Even when connected to LAN, the PAV can be configured using the front panel knobs and keys.

■ Switching to local mode

When the PAV is in LAN remote mode, the front panel REM LED is lit. Press REM to turn off the REM LED and switch to local mode.

If the PAV does not switch to local mode even when you press REM, perform one of the following procedures.

Procedure (switching to local mode)	Description
<ul style="list-style-type: none"> Stop sending commands. Press REM. 	If the PAV continuously receives configuration change commands through LAN, the PAV switches to remote mode each time it receives a command.
<ul style="list-style-type: none"> SYSTEM:REMOte[:STATe] LOC/0 Send this command. 	The PAV may be set to local lockout mode through LAN.
<ul style="list-style-type: none"> Turn the POWER switch off and then back on. Press REM. 	

External control

Even when connected to LAN, you can control and monitor the PAV series using external analog signals through the PAV's J1 and J3 connectors.

LAN Connection

Starting a connection

A PAV with LAN automatically determines whether a network connection is available. Then, it automatically detects a network server and receives an IP address assignment or assigns an IP address to itself. Further, it sends its IP address and host name to other devices in the network.

NOTE

You can connect the LAN cable regardless of whether the PAV is turned on or off.

1 Turn the POWER switch on.

The front panel voltmeter displays “*LRn*” for about 2 seconds. Then, the PAV proceeds as follows.

In safe start mode, “*FFF*” is displayed.

In auto start mode, the output is in the state that it was in immediately before the AC input was turned off.

■ In a typical network (network server) connection

When the PAV rear panel LAN status indicator LED lights green about 10 seconds later, the connection is complete.

■ In a P2P (peer-to-peer) network

When the PAV rear panel LAN status indicator LED lights green about 30 to 40 seconds later, the connection is complete.

When the PAV obtains an IP address, the LAN status indicator LED lights green.

You can check the IP address on the front panel.

If the LAN status indicator LED does not light green, see “Troubleshooting” (p.35).

Displaying and changing the IP address

Displaying the IP address

To display the IP address on the front panel, follow the procedure below.

1 Press REM.

2 Turn the VOLTAGE knob until the voltmeter shows “*IP*.”

3 Press the VOLTAGE knob.

4 Turn the VOLTAGE knob.

The voltmeter shows “*IP 1*” to “*IP 4*,” and the ammeter displays the corresponding IP address.

■ Changing the IP address

You can change all four numbers (octets) of the IP address from the front panel. An IP address has four numbers (e.g., 10.97.4.4). Set each number in the range of 1 to 254.

5 Turn the **CURRENT knob**.

You can change the IP address.

6 Press the **CURRENT knob**.

The IP address is confirmed.

The voltmeter shows “*L R n*”, and the ammeter shows “*H Q L d*” for about 1 second.

If the address that you want to assign is already used by another device, the front panel LED blinks, and the address returns to the original value.

Press any key to stop the blinking.

NOTE

- If you change the IP address from the front panel or by performing the procedure on the Modify page on the Configure tab of the LAN page on the webpage, the PAV's IP address becomes static (fixed).
- In this case, address assignment through DHCP and auto IP are invalid.

IP address explained

Network connection is possible by assigning an IP address to the PAV. An IP address is a group of four numbers delimited by periods. The following three modes are available for IP address assignment: DHCP, auto IP, and static (fixed) IP.

Item	DHCP	Auto IP	Static (fixed) IP
Mode setting	After a LAN reset, set to DHCP.	If a DHCP server is not available, after a LAN reset, set to auto IP.	Set using the Modify page on the Configure tab of the LAN page on the webpage or through IP1 to IP4 address on the front panel.
Assignment	Network server assignment.	PAV self-assignment.	
Range	No limitation.	169.254.xxx.xxx	No limitation.
Valid period	Changes when many devices are connected to the DHCP server.	Fixed as long as there is no address overlapping.	Always fixed.
Address overlapping	Address overlapping is prohibited by the DHCP server.	Automatically obtains a different IP address.	The LAN status indicator LED and front panel LED blink.

Checking the host name

A host name is a text address used in place of a numerical address (e.g., PAV60-7-678).

You cannot view the host name from the PAV front panel. You can view and create a host name from the webpage. (p.28)

For example, if you set the host name to “KIKUSUI,” you can send commands also to “KIKUSUI.”

After a LAN reset (p.14), the PAV is automatically assigned with a host name made up of a combination of the model name and serial number.

Example:

Model name	Serial number	Automatically generated host name ¹
PAV10-40 WITH LAN	VJ000123	PAV10-40-123
PAV160-2.6 WITH LAN	VJ000456	PAV160-2P6-456

1 <model><rated voltage>-<rated current>-<last three digits of the serial number>

The handling of the host name varies depending on the network connection. See the following table. When using host names for communication, assign unique host names to each PAV.

Item	DHCP	Auto IP	Static (fixed) IP
Format	PAVvv-aa-nnn	PAVvv-aa-nnn	Host name not allowed
Host name protocol	NetBIOS	NetBIOS	Host name not allowed
Host name on the webpage	The IP address is displayed on the homepage of the webpage and on the Configure tab of the LAN page.		

Displaying the MAC address

To display the MAC address on the front panel, follow the procedure below.

- 1 Press REM.**
- 2 Turn the VOLTAGE knob until the voltmeter shows “ $\bar{V}AC$.”**
- 3 Press the VOLTAGE knob.**
- 4 Turn the VOLTAGE knob.**
The voltmeter shows “ $\bar{V}AC$ ” to “ $\bar{V}ACB$,” and the ammeter displays the corresponding MAC address.

LAN reset

The LAN reset function returns the LAN parameters to their factory default values.

- 1 Press REM.**
- 2 Turn the VOLTAGE knob until the voltmeter shows “r 5L.”**
- 3 Press the VOLTAGE knob.**
- 4 The ammeter shows “r 5L.”**
- 5 Press the CURRENT knob.**
The system is reset.
The voltmeter shows “L Rn”, and the ammeter shows “HDL d” for about 1 second.
- 6 Turn the POWER switch off and then back on.**

Default LAN settings

Item	Default value	See
TCP/IP mode	DHCP enabled (If DHCP setting fails, auto IP assignment is used.)	(p.29)
IP address	169.254.xxx.xxx (The numbers in “xxx” are automatically assigned.)	
Subnet mask	255.255.0.0	(p.27)
Default gateway	0.0.0.0	
DNS server	0.0.0.0	(p.27)
Description	PAV Power Supply	
Controller access	One client only	(p.29)
Ping server	Enabled	
LAN timeout	1800 seconds (30 minutes)	(p.30)
Auto negotiation	Auto detection of the data rate	
VXI-11 discovery	Enabled	
Password	None	(p.31)

RS485 Multi-Drop Connection

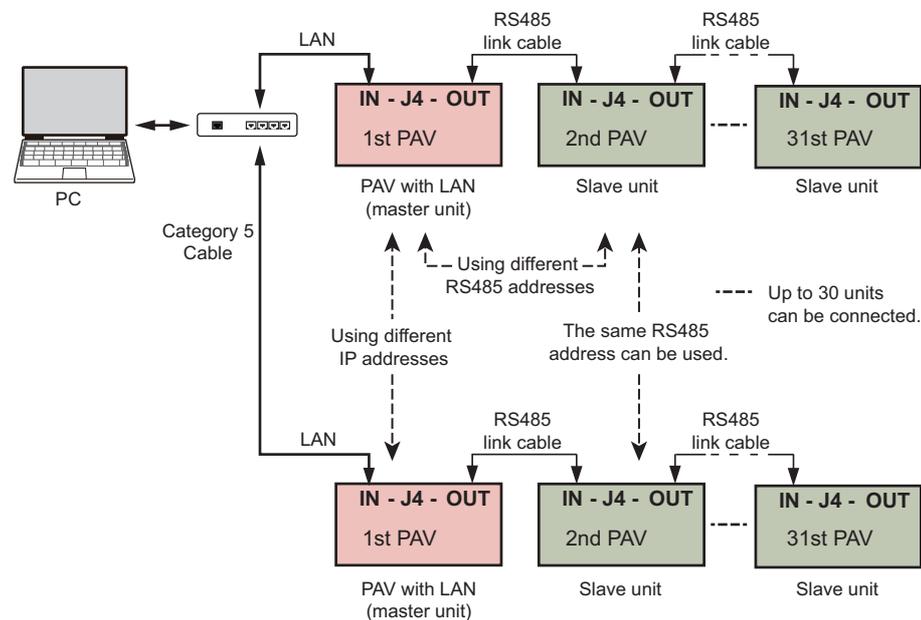
Description

Up to 30 PAVs without LAN can be connected to a PAV with LAN. An IP address is assigned to the PAV with LAN, and the other PAVs without LAN can connect to the LAN through the PAV with LAN. This scheme is called multi-drop connection. (See the following figure.)

In a multi-drop connection, global commands can be applied to all PAVs connected through RS485 link cables.

NOTE

In a multi-drop connection, only a single controller (e.g., PC) can connect to the PAV with LAN at any given time. Make sure it is a one-to-one connection.



LAN connections

The PAV connected to LAN is called the master unit.

Configuring the master unit

- 1 Connect the master unit to the LAN.**
- 2 Using RS485 link cables, connect J4-OUT to J4-IN on the rear panel of each PAV.**
See the connection diagram on the previous page.
- 3 Turn on the POWER switch of each PAV.**
- 4 Set the master unit to LAN remote mode.**
- 5 Set the RS485 addresses of each PAV other than the master unit.**

Setting the RS485 addresses

On PAVs without LAN, set RS485 addresses.

If PAVs without LAN are in analog remote mode, switch to local mode. [\(p.10\)](#)

- 1 Press REM on the front panel.**
The ammeter shows "Rdr."
- 2 Press the CURRENT knob.**
The voltmeter shows "Rdr," and the ammeter shows the address.
- 3 Turn the CURRENT knob to select the address.**
- 4 Press the CURRENT knob.**
The default RS485 address is 6, but you can change it in the range of 1 to 31. The RS485 address is not related to the IP address. When connecting multiple PAVs through RS485, be sure to assign a unique address to each PAV.

RS485 connection

PAVs configured for RS485 connection are called slave units.

Each slave unit sends or receive commands independently through the master unit's LAN port.

Configuring the RS485 multi-drop connection

- 1** Using an RS485 link cable, connect the J4-OUT connector of the master unit to the J4-IN connector of a slave unit.
- 2** Turn on the POWER switch of each PAV.
- 3** Set each PAV to RS485 remote mode.
- 4** Set each PAV's address.
 - **Setting the data rate (baudrate)**
- 5** Press REM.
- 6** Turn the VOLTAGE knob until the voltmeter shows "BAUD."
- 7** Press the VOLTAGE knob.
The ammeter shows the baudrate.
- 8** Turn the CURRENT knob to set the value to "57.6."
Be sure to set the same baudrate (57.6) on each PAV.
- 9** Press the CURRENT knob.

3 Webpage

The PAV webpages consists of the Home page, DC Power page, LAN page, and Help page. They have the following features.

- Model name, model information, firmware version, and LAN settings can be read.
- Configuring the LAN connection is easy.
- Configuring and monitoring the PAV output are easy.

Home Page

Opening the Home page

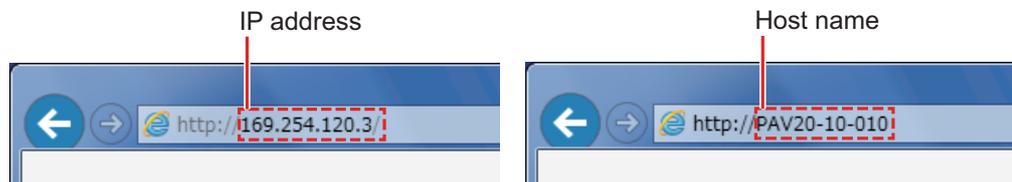
When the PAV rear panel LAN status indicator LED is lit green, the PAV webpages are available.

NOTE

When an auto control program is in progress, you cannot open webpages.

- 1 Check the IP address from the front panel. (p.11)**
- 2 On the PC, open Internet Explorer or other web browser.**
- 3 Enter the PAV's IP address or host name as shown in the following figure.**

If the PAV is set to DHCP or auto IP and the PC is running a NetBIOS naming service, you can enter a host name. For the procedure to enter host names, see "Checking the host name" (p.13).



- 4 Press ENTER.**

The PAV Home page appears. If it does not, see "Troubleshooting" (p.35).

Description of the Home page

Click Home to open the Home page.



PAV Series
Regulated DC Power Supply
200W/400W/600W/800W

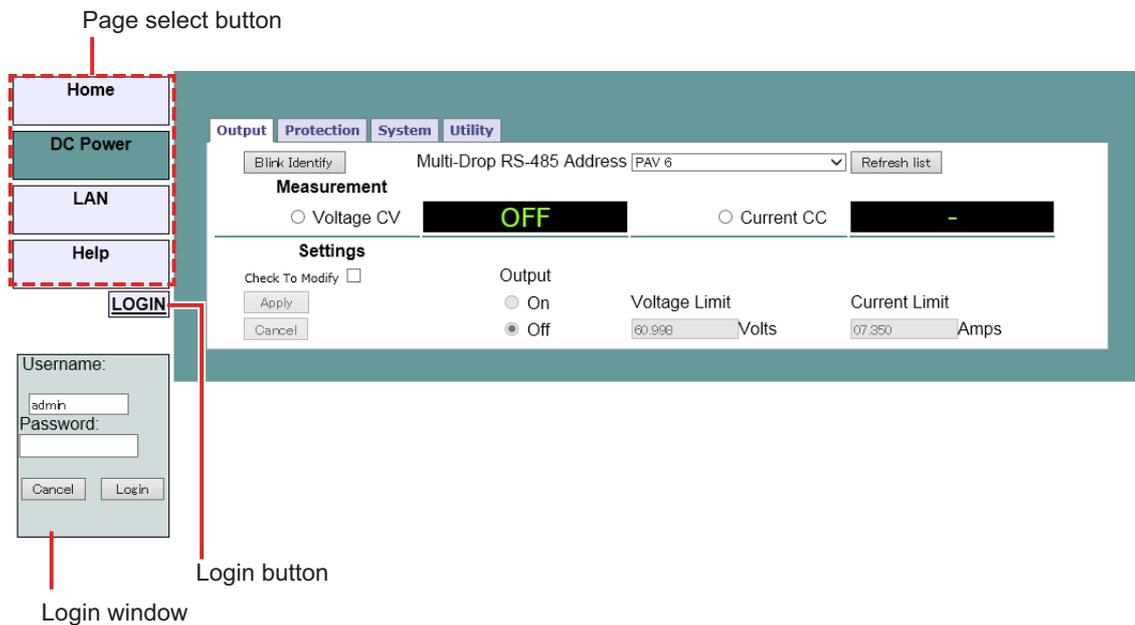


Home	Welcome	LAN
DC Power	Model: PAV60-7-LAN	IP Address 169.254.120.3
LAN	Manufacturer: KIKUSUI	MAC Address 00:0F:CE:18:03:77
Help	Serial Number: 12345678	Hostname PAV60-7-678
	Description: PAV Power Supply	Auto-MDIX Yes
	Maximum Output Ratings: 60 V - 7 A - 420 W	Auto-Negotiate Auto select
	Firmware Revision: PAV:2.23010-LAN:1.00410	
	VISA Name using IP Address: TCPIP::169.254.120.3::INSTR	
	VISA Name using Hostname: TCPIP::PAV60-7-678::INSTR	
	RS-485 Address: 6	

1 2 3 4 5 6

No.	Item	Description
1	VISA Name using IP Address	In auto control programming, VISA is one of various communication drivers. On LAN devices, the IP address is also used in the VISA resource name. (p.11)
2	VISA Name using Hostname	In auto control programming, a host name can be used in place of a VISA resource. (p.13)
3	RS-485 Address	This address is necessary for multi-drop connection. The PAV with LAN is the master unit of the multi-drop connection.
4	Hostname	A unique name of a device on the network. For details on default host names, see ""Checking the host name" (p.13) ." For the procedure to change host names, see ""Modify page (Configure tab > LAN Modify window)" (p.28) ." If a host name is not registered in the network name server, the IP address is displayed.
5	Auto-MDIX	When connected with a LAN cable (straight or crossover cable), devices on the network are automatically detected.
6	Auto-Negotiate	The LAN is automatically adjusted to the maximum speed.

Logging In and Logging Out



Logging in

To change the PAV output settings and LAN settings you must log in.

- 1 Click DC Power or LAN.**
The color of the selected button changes. (The above figure is an example of the DC Power page.)
- 2 Click LOGIN.**
A login window appears.
- 3 In the Username box, enter “admin.”**
- 4 In the Password box, enter the password.**
The default password is blank. We recommend that you set a password after logging in.
- 5 Click Login in the Login window.**
The controls become available. The LOGIN button changes to a LOGOUT button.

Password

You can set the password on the Users tab ([p.31](#)) of the LAN page. If you perform a LAN reset from the front panel, the password will be cleared.

NOTE

- Only a single user can log in to change the PAV settings.
- The webpages can be viewed by several users simultaneously, but the data rate will be lower.
- If an auto control program is in progress through a VISA or socket connection, webpages can be viewed, but login is not possible so settings cannot be changed.
- While logged in, VISA and socket connection by an auto control program is not possible.
- While logged in, you cannot copy the webpage that you are logged in to and open it as a duplicate.

Logging Out



The following three methods are available for logging out.

- Click LOGOUT.
- Close the web browser.
- Not access the web browser before the LAN timeout period ([p.30](#)).

DC Power Page

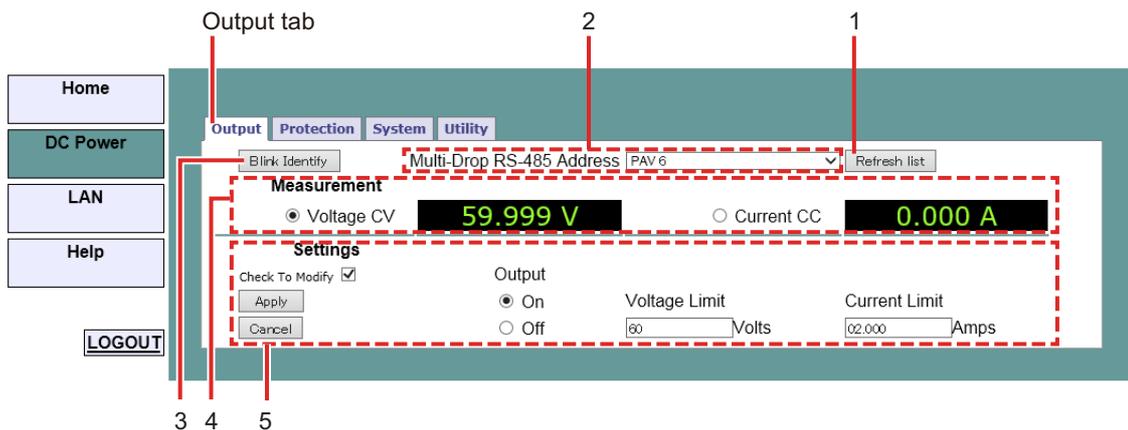
Click DC Power to open the DC Power page. You can use the sub menus to control the PAV and configure the output.

■ DC Powerpage hierarchy

First level	Second level
DC Power page	Output tab
	Protection tab
	System tab
	Utility tab

Output tab

Click the Output tab on the DC Power page.

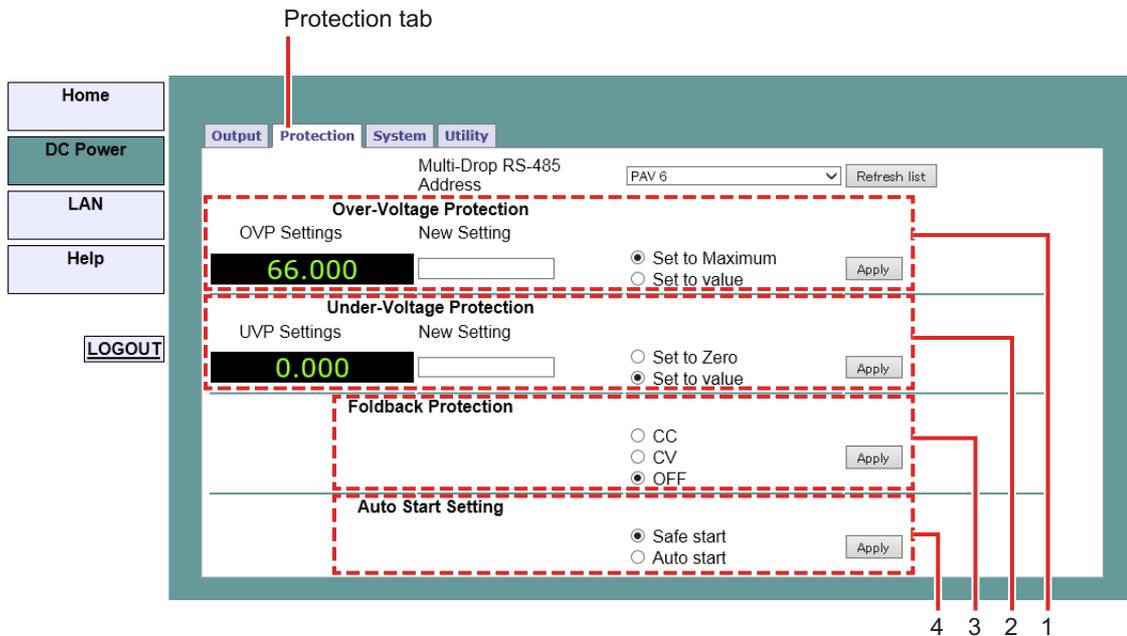


No.	Item	Description
1	Refresh list button	Click this button to detect PAVs connected through multi-drop connection. Their addresses are displayed in the Multi-Drop RS-485 Address list box. This button is available for PAV with LAN. (p.15)
2	Multi-Drop RS-485 Address	This address is valid when a RS485 multi-drop connection is configured. If a multi-drop connection is not available, only the address of the PAV with LAN is displayed.
3	Blink Identify button (blink setting)	Clicking this button causes the corresponding PAV's front panel and the LAN status indicator LED (green) on the rear panel to blink. This function enables you to identify the PAV that you are currently controlling when several PAVs are mounted in a rack. In a multi-drop connection, only the LED of the PAV with LAN (master unit) blinks. ¹

No.	Item	Description
4	Measurement (output status display)	Displays the selected PAV's voltmeter, ammeter, and operation mode (Voltage CV: constant voltage, Constant CC: constant current, or OFF). When an error occurs, the voltmeter shows the status.
5	Settings	"Voltage Limit" is for setting the CV voltage, and "Current Limit" is for setting the CC current. "Output" is for turning the output on and off. This area shows the present PAV settings. To change the settings, select the Check To Modify check box, enter values, and click Apply. To view the settings, clear the Check To Modify check box.
1		To stop the blinking of the PAV's identification LED (green), execute one of the following steps. <ul style="list-style-type: none">• Click Blink Identify again.• Turn a setting knob or key on the PAV front panel.• Send an SCPI command.

Protection tab

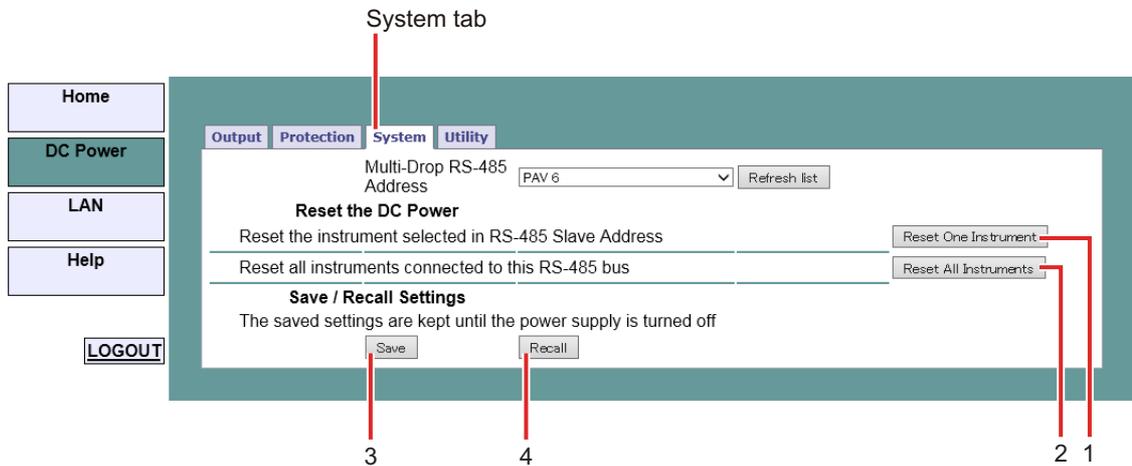
Click the Protection tab on the DC Power page. You can set the four protection functions shown in the following table. However, in a multi-drop connection, the settings are applied only to the PAV selected from the Multi-Drop RS-485 Address list box.



No.	Item	Description
1	Over-Voltage Protection	Enter a new value in New Setting and click Apply to change the over-voltage protection setting. Set to Maximum: The value is set to the maximum value that can be set. Set to value: The value is set to the value that you enter.
2	Under-Voltage Protection	Enter a new value in New Setting and click Apply to change the under-voltage protection setting. Set to Zero: The value is set to zero. Set to value: The value is set to the value that you enter.
3	Foldback Protection	CV: Activated when switching from CC to CV mode. CC: Activated when switching from CV to CC mode. OFF: Not activated regardless of the switching between CV and CC modes.
4	Auto Start Setting	Safe start: The output is off when the PAV starts. Auto start: When the PAV starts, the output is in the state that it was in immediately before the AC input was turned off.

System tab

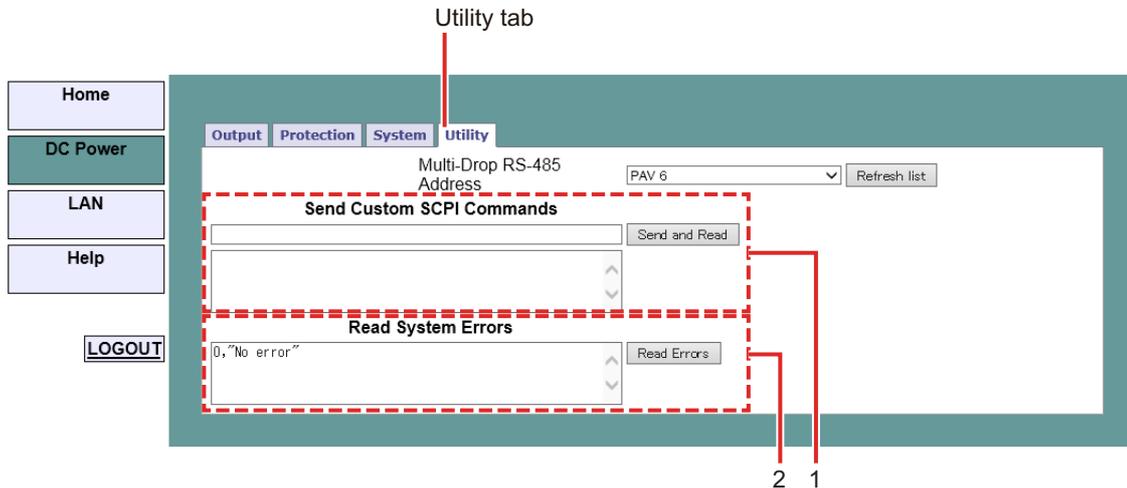
Click the System tab on the DC Power page. The following four functions are available. These functions apply to PAVs in a group connected in a multi-drop configuration.



No.	Item	Description
1	Reset One Instrument button	Resets the PAV selected in the Multi-Drop RS485 Address list box.
2	Reset All Instruments button (reset entire group)	Resets all the PAVs connected in the multi-drop configuration.
3	Save button	Saves the settings of the PAV (single unit) selected in the Multi-Drop RS485 Address list box. The PAV has four memory banks, but when saved from the webpage, the settings are saved to memory number 1.
4	Recall button	Recalls the settings of the PAV (single unit) selected in the Multi-Drop RS485 Address list box. The PAV has four memory banks, but when recalled from the webpage, the settings are recalled from memory number 1.

Utility tab

Click the Utility tab on the DC Power page. Use this tab to send and receive SCPI commands. From this tab, you can use functions that are not available on the webpages.



No.	Item	Description
1	Send Custom SCPI Commands	Enter an SCPI command ¹ in this text box and click Send and Read to display the response from the PAV in the text box below the command input text box. Some commands do not have responses.
2	Read System Errors	Click Read Errors to display system error messages in this text box. To view system error message, send a SYSTem:ERRor:ENABle in advance to enable error messages. If there is no error, "No error" is displayed.

1 If you send a command using Internet Explorer to output trigger pulses from J3-3 (Trigger Out), pulses may be output under conditions other than the trigger output conditions (TRIG or FSTR) specified by the OUP:TTL:MODE command or through the front panel. To avoid this problem, use other browsers such as Google Chrome or Mozilla Firefox.

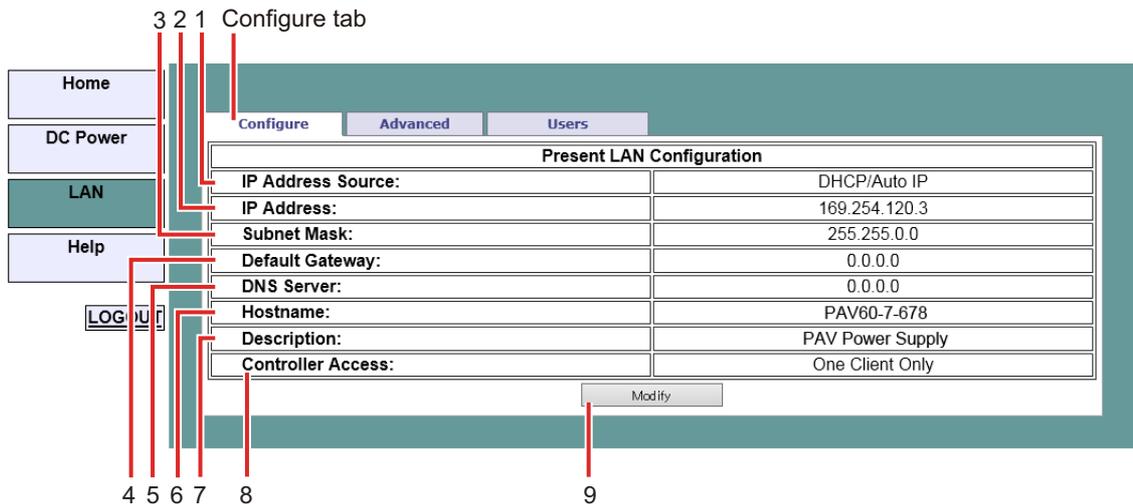
Click LAN to open the LAN page. From the sub menus, you can set the PAV LAN parameters.

■ LAN page hierarchy

First level	Second level	Third level
LAN page	Configure tab	Modify page
	Advanced tab	Modify page
	Users tab	-

Configure tab

Click the Configure tab on the LAN page.



No.	Item	Description
1	IP Address Source	Displays the method in which the IP address was obtained (DHCP/ Auto IP or Static IP).
2	IP Address	Displays the IP address assigned to the PAV using DHCP, auto IP, or static (fixed) IP.
3	Subnet Mask	Displays the subnet mask of DHCP, auto IP, or static (fixed) IP.
4	Default Gateway	Displays the address of the network router that the PAV uses to communicate with devices outside the local subnet.
5	DNS Server	This is used when the PAV is accessed with a host name.
6	Hostname	The host name of the PAV can be used in place of the IP address when establishing a communication link. The default host name is made up of the model name and serial number. (p.13) You can change the host name. (p.28)
7	Description	The initial value is PAV Power Supply. You can change it according to the procedure explained in "Modify page (Configure tab > LAN Modify window)" (p.28).

No.	Item	Description
8	Controller Access	The initial value is One Client Only. You can change it according to the procedure explained in “Modify page (Configure tab > LAN Modify window)” (p.28).
9	Modify button	You can change the parameters on the Configure tab. For details, see the following explanation.

Modify page (Configure tab > LAN Modify window)

Click Modify on the Configure tab to open the LAN Modify window.

You can change the settings in this window.

Depending on whether you set TCP/IP Mode to Static IP or DHCP Enabled/Auto IP, the parameters that you can change vary. To apply the changes you make, click Apply.

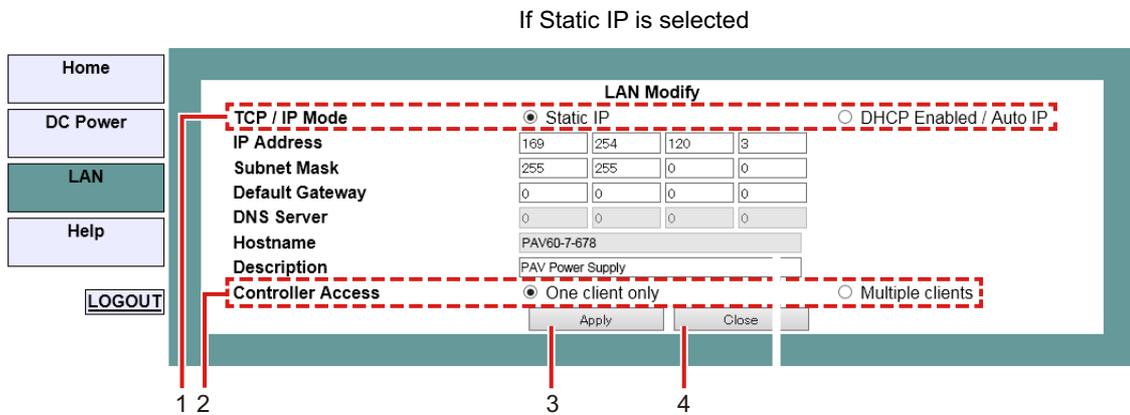
After changing the LAN settings, you will be asked to close the Web browser. Re-open using the new address.

If changing the parameters results in a duplicate IP address, the LAN status indicator LED and the front panel LED blink, and the parameters return to their original values.

To stop the LED blinking, press any key on the front panel.



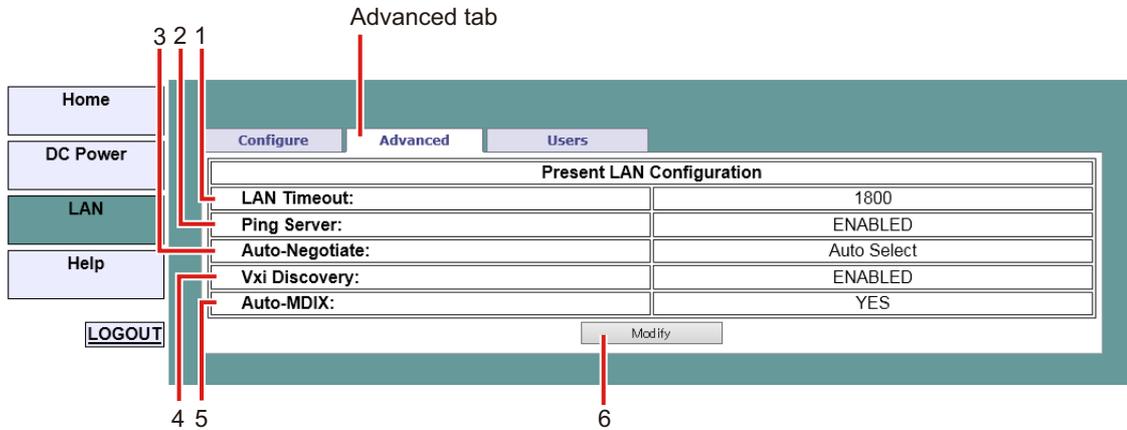
After you change the LAN parameters, you may need to restart the PAV.



No.	Item	Description
1	TCP/IP Mode	This specifies how IP addresses and the like are assigned to the PAV in the network. Select DHCP Enabled/Auto IP or Static IP.
	Static IP	You can edit the IP Address, Subnet Mask, and Default Gateway parameters. Change these parameters only when connecting the PAV to a different LAN. These parameters must meet network server requirements. You cannot edit the DNS Server and Hostname parameters (they are unavailable).
	DHCP Enabled/Auto IP	Because the parameters are assigned by the network DHCP server, you cannot edit the IP Address, Subnet Mask, Default Gateway, and DNS Server parameters (they are unavailable). If these parameters are not assigned by the server, the PAV recovers in Auto IP mode, which is described in "IP address explained" (p. 12). In this mode, you can edit the Hostname and Description parameters. Do not click Apply when Hostname or Description is empty.
2	Controller Access	To control webpage access, select One client only or Multiple clients.
	One client only	Uses a single TCP socket to provide highly reliable network security. Only a single client can view the webpages. UDP socket is unavailable.
	Multiple clients	Uses UDP sockets to allow multiple clients to view the webpages. Multiple TCP sockets can also be used.
3	Apply button	Applies the parameter changes and saves them.
4	Close button	Closes the window.

Advanced tab

Click the Advanced tab on the LAN page.

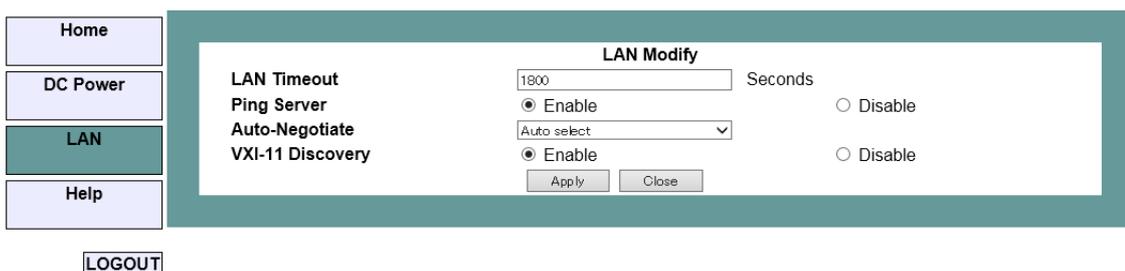


No.	Item	Description
1	LAN Timeout	After a login, if there is no activity on the webpages for a given period of time, the user is automatically logged out. The default value is 1800 seconds (30 minutes). Click Modify and enter a value for LAN Timeout (unit: seconds).
2	Ping Server	Ping is used to check the connection to the server from a PAV connected to the LAN through the network utility. This function is disabled while the LAN Modify window on the Advanced tab of the LAN page is open.
3	Auto-Negotiate	Indicates the network speed that the LAN card supports.
4	Vxi Discovery	This protocol is used by the network server to detect devices connected to the LAN. This function is disabled while the LAN Modify window on the Advanced tab of the LAN page is open.
5	Auto-MDIX	This service is always enabled and automatically determines whether the LAN cable is straight or crossover.
6	Modify button	You can change the parameters on the Advanced tab. For details, see "Modify page (Advanced tab > LAN Modify window)" (p.30) on the next page.

Modify page (Advanced tab > LAN Modify window)

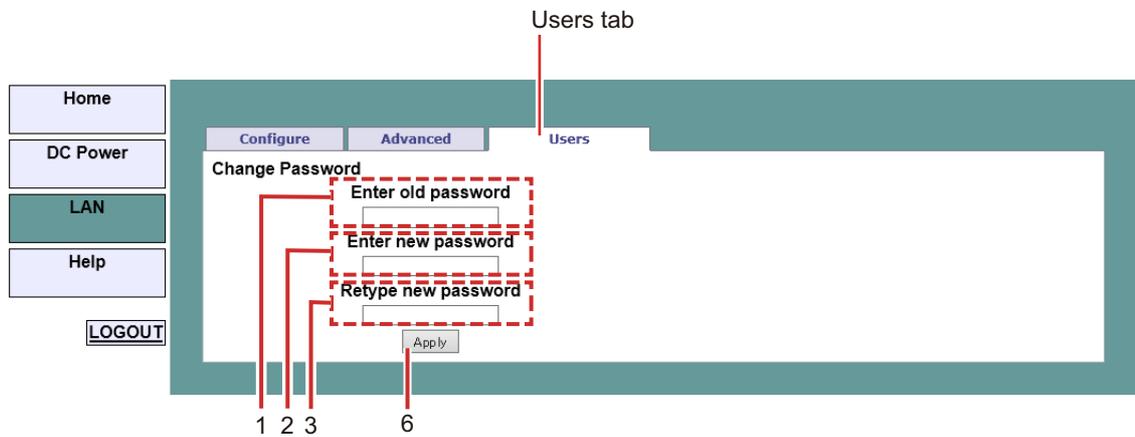
Click Modify on the Advanced tab to open the LAN Modify window.

You can change the settings in this window. To apply the changes you make, click Apply.



Users tab

Click the Users tab on the LAN page. You can set a password for the webpages. Password protection is invalid for auto control programming that uses VISA or sockets.



No.	Item	Description
1	Enter old password	The default value is blank because there is no set password.
2	Enter new password	Enter a password using at least four characters. Spaces and special characters cannot be used in the password.
3	Retype new password	Enter the same password again.
4	Apply button	Applies the changes.

- **Resetting the password**

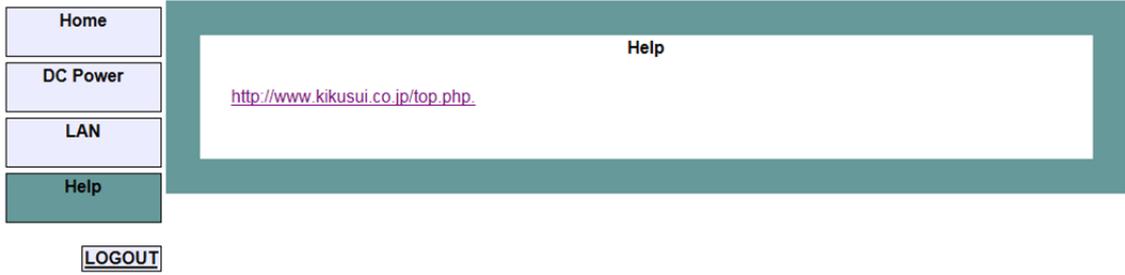
To reset the password to its default value (blank), reset it from the front panel ([p.14](#)), or send a SYST:COMM:LAN:RES command ([p.42](#)).

NOTE

- After changing LAN parameters, you may be asked to close the webpage.
- After you change the LAN parameters, you may be asked to restart the PAV.

Help Page

Click Help to open the Help page.
There is a link to the Kikusui website.



4 Specifications

Output specifications

Item	Specifications
Rating	
Rating and accuracy when LAN is used	Same as when the PAV is remotely controlled using RS232 or RS485.

LAN specifications

Item	Specifications
Electric specifications	
Ethernet	Complies with IEEE 802.3u.
Auto MDIX	Automatically detects whether the connection uses a straight or crossover cable.
Auto negotiation	Automatically detects 10Base-T (10 Mbps) or 100Base-T (100 Mbps).
Network configuration	
MAC address	KIKUSUI address: 00:0F:CE:xx:xx:xx
IP address	Can be viewed or changed from the front panel.
DHCP	The PAV obtains the address from a DHCP server on the network.
Auto IP	The PAV automatically assigns the IP address to itself. 169.254.xxx.xxx
Static (fixed) IP	An IP address of your choice can be set from the PAV front panel.
Host name	Complies with the NetBIOS protocol. Can be set from the webpage.
Duplicate IP detection	Rejects duplicate IP addresses or disconnects from the network.
Subnet mask	Assigned by DHCP or can be set from the webpage.
Default gateway	Assigned by DHCP or can be set from the webpage.
DNS server	Can be set by DHCP.
LAN reset	Reset is possible from the front panel or using an SCPI command.
LAN protocol	
TCP	LAN packets comply with the Transmission Control Protocol.
IPv4	Internet Protocol version 4
Implemented protocols	
VXI-11	Supports core channel. Abort channel and interrupt channel are not supported.
VISA	VXI-11 compliant Uses RPC, Portmapper, and SCPI commands.
TCP socket	Sends SCPI commands to port number 8003.
UDP socket	Sends SCPI commands to port number 8005.
VXI-11 discovery	Detects connected devices.
SNMP Ping server	Checks the LAN connection to devices.
HTTP	Web server supporting JavaScript and Java applets
Command	
SCPI	Commands, measurement, and status comply with SCPI 1999.
IEEE 488.2	Supports status and event register tree.

Item	Specifications
Webpages	
Multi user	Can be viewed by multiple users.
PAV identification	Displays the model name, serial number, firmware version, etc.
LAN settings	LAN settings can be viewed and changed.
GUI based control	Output can be set and read.
Command transmission	SCPI commands can be transmitted, and errors can be read.
Help	Link to the KIKUSUI website.
LAN and other controls	
Local control	Front panel control is possible even when the PAV is being monitored through LAN.
LAN remote control	The PAV can be controlled and monitored through LAN.
RS232/RS485 communication	When RS232/RS485 communication is in use, LAN is disabled.
External control	The PAV can be monitored even while the output is being configured through external control.
Series/parallel operation	Available even when LAN is in use
Advanced Output Programmable Function	Available even when LAN is in use
Display function	
IP address, MAC address	Address can be viewed on the front panel.
Multi-drop address	The RS485 address can be viewed on the front panel.
Link LED	Lights when an Ethernet cable is connected to the PAV.
Activity LED	Lights when LAN packets are detected.
LAN status indicator LED	Lights green when the IP connection is normal or red otherwise.
LED blinking for identification	The corresponding PAV's front panel and rear panel LEDs blink.
REM LED	Lights when the PAV output is being controlled through LAN.
Switch, encoder	
LAN reset	LAN reset can be performed from the front panel.
IP address	IP address can be changed from the front panel.
Multi-drop address	RS485 address can be changed from the front panel.
LAN/RS selection	LAN is disabled when RS232/RS485 is in use or when the PAV is a slave in a multi-drop connection.
Security	
Webpage password	A password can be set. (It prevents LAN settings and PAV output settings from being changed without permission or accidentally.)
One client only	Prevents control from multiple controllers.
UDP socket block	Prevents attacks through UDP sockets.
VXI-11 discovery invalidation	Stops PAV detection.
Ping server invalidation	Stops PAV connection verification.

LAN command speed

A typical data rate is used. The PAV LAN interface data rate varies depending on the controller or the network path. The data rate specification is subject to change without notice.

Item	Specifications
VISA driver, socket	
Response speed of typical commands and queries	The PAV returns a response in the range of 45 ms to 50 ms for all commands and queries.

Appendix

Troubleshooting

■The IP address cannot be set. The LAN status indicator LED is lit red.

Inspection	Remedy
<ul style="list-style-type: none">• Turn the PAV's POWER switch off and then back on. Check that the voltmeter shows "L Rn" for a few seconds.	<ul style="list-style-type: none">• If this does not appear, set the PAV to LAN remote mode. (p.9)• If IP1 to IP4 do not appear, LAN is disabled. Check that LAN is selected. (p.9)

■The IP address is all zeros. The LAN status indicator LED is lit red.

Inspection	Remedy
<ul style="list-style-type: none">• Check that the LAN cable is connected to a valid network.	<ul style="list-style-type: none">• Connect the LAN cable to a valid network. Wait a moment, and display the IP address again. (p.11) In auto IP mode, the IP address is generated within 30 seconds of turning on the POWER switch.• If the link LED on the rear panel is not lit green, the LAN cable is not connected properly.
<ul style="list-style-type: none">• Two devices on the network may be set to the same IP address. If the PAV is in this condition, an IP address cannot be assigned. This may occur when the PAV is in static (fixed) IP address mode (p.11).	<p>Perform either of the following remedies (1 or 2).</p> <p>Remedy 1:</p> <ul style="list-style-type: none">• Reset LAN from the front panel. (p.14) The PAV obtains an address from a DHCP server on the network or generates an address in the 169.254.xxx.xxx subnet.• If this subnet is different from the address, set an IP address compatible with the network from the front panel. (p.11) <p>Remedy 2:</p> <ul style="list-style-type: none">• Remove the LAN device with the same address from the network.• Turn the front panel POWER switch on and then back on. After 10 seconds, the PAV assigns a static (fixed) IP address.

■Even when I click Refresh list on the webpage, slave PAVs are not detected.

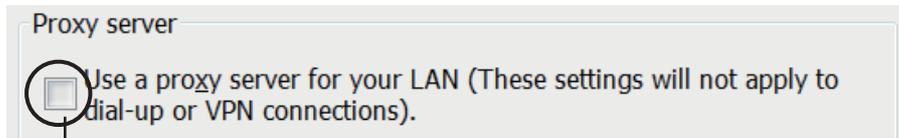
Inspection	Remedy
<ul style="list-style-type: none">• Check that the master unit is connected to the LAN.• Check that all slave units are set to RS485.• Check that all slave units have unique addresses and that the data rate (baudrate) is set to 57.6 kbps.	<ul style="list-style-type: none">• Connect the master unit to the LAN.• Set all slave units to RS485.• Assign unique addresses to all slave units, and set the data rate (baudrate) to 57.6 kbps.

■ **The LAN status indicator LED is lit green, and the IP address can be verified from the front panel, but the webpage cannot be opened, or communication using VISA or socket is not possible.**

Inspection	Remedy
<ul style="list-style-type: none"> • Ping the PAV. The Ping utility enables you to verify whether messages can be sent on the network and whether responses from the PAV can be received. 	<p>Using the Windows 7 command line:</p> <ul style="list-style-type: none"> • 1: Click the Start button. • 2: Click Programs. • 3: Click Accessories. • 4: Click Run. A Run window opens. • 5: Enter "ping <IP address>". • 6: Click OK.
<ul style="list-style-type: none"> • Check whether the ping was successful. 	<ul style="list-style-type: none"> • If an error occurs, there may be a problem with the LAN settings of the PAV or PC or both, or the PAV's ping function may be disabled. (p.30) If an error occurs, perform a LAN reset on the PAV (p.14), and send another ping.

■ **The webpage cannot be opened over a P2P network.**

Inspection	Remedy
<ul style="list-style-type: none"> • If there is no gateway on the network, check whether the browser's proxy server setting is disabled. 	<p>Open Microsoft Internet Explorer, from the Tools menu, click Internet Options, Connections, LAN settings, and check that the proxy server check box is not selected.</p>



Check that this is not selected.

■ **The webpage cannot be opened from a PC or a PC with two LAN cards.**

Inspection	Remedy
<ul style="list-style-type: none"> • If you are using a PC with two LAN cards, check that the IP addresses are not overlapped. 	<ul style="list-style-type: none"> • Disable the port that you are not using, or disconnect it. The PC may not know which card to use to open the PAV's webpage.
<ul style="list-style-type: none"> • On a notebook PC, check whether the Ethernet jack and wireless LAN are being used simultaneously. 	<ul style="list-style-type: none"> • Disable the wireless LAN port.

Control using a VISA driver

About VISA

Virtual Instrument Software Architecture (VISA), which consists of a hardware driver, configuration utility, and connection manager, is one of the several typical frameworks used for testing and measurement in manufacturing sites.

VISA supports various types of bus communication. VISA drivers are already used in several measuring instrument manufacturers. Programming languages that support Windows COM or DLL libraries can call VISA functions.

Compatibility with VXI-11

VXI-11 is a protocol for connecting measuring instruments to a PC. VISA complies with VXI-11 specifications.

The PAV is compatible with the VXI-11 protocol.

- VXI-11 Device_link: Starts a link with a measuring instrument.
- VXI-11 Device_write: Writes text in a measuring instrument.
- VXI-11 Device_read: Reads text from a measuring instrument.
- VXI-11 Destroy_link: Disconnects the link to a measuring instrument.

Starting a VISA connection

Using a VISA library, you can easily create test programs and auto control programs.

The VISA functions that the PAV supports include Open, Read, Write, and Close.

VISA resource assignment is written for each PAV. You can view the PAV LAN descriptor from the PAV home page. The VISA resource uses the PAV's IP address or host name.

Communication using VISA

The VISA write function sends SCPI commands to the PAV. The VISA read function reads the responses of SCPI queries.

Example of PAV LAN VISA resource assignment:

Format: TCPIP[board]::IP address/Host Name[::LAN device name]::INSTR]

[board] is the LAN card number. "0" is optional.

The default value of [::LAN device name] is "inst0".

[::INSTR] is optional.

Example: TCPIP::10.225.26.60::inst0::INSTR

TCPIP1::PAV10-40-001::INSTR

KI-VISA

KI-VISA is an original VISA library developed by Kikusui Electronics Corporation that supports the VXIplug&play VISA specifications. It is included in the CD-ROM. You can also download the most recent version of this library from the Kikusui Electronics Corporation website (<http://www.kikusui.co.jp/en/download/>).

If NI-VISA or Keysight VISA is already installed on your PC, you do not need to install KI-VISA.

Control using an IVI driver

About IVI

Interchangeable Virtual Instrument (IVI) contains specifications used to standardize measuring instrument drivers for testing and measurement in manufacturing sites. IVI is built on the VISA hardware driver. IVI has an interface that most programming languages, such as .NET, COM, and DLL libraries, can call in a standard manner.

The IVI instrument can be configured with a management utility such as National Instruments Measurement and Automation Explorer (MAX) program or the Keysight Technologies I/O Libraries. It is also possible to configure IVI using option parameters in a program.

The following advantages are available for system designers.

- To save time in learning commands for a new IVI instrument, common functions are standardized. There is no need to learn SCPI commands for the PAV.
- Designers can run code in simulation mode even when instruments are not connected.
- Status check is performed automatically to see if the settings of each instrument will be accepted.
- Wrappers allow easy connection to a variety of programming environments on Windows.
- IVI drivers are compatible. Instruments can be switched without changing the program.

IVI support

For information on IVI, visit the following website.

- Explanation for using IVI in various programming languages is provided in the “IVI Getting Started Guide” available at the IVI Foundation homepage.
www.ivifoundation.org

Socket Communication

The PAV LAN VISA driver is a typical driver in the testing and measurement field. However, you may not be able to use VISA due to installation or license issues or because the controller does not support VISA (e.g., industrial PLC).

If you cannot use the VISA driver, you can use the socket communication feature of the PAV. Socket communication is a low-level LAN protocol available in most operating systems and programming environments.

Communication using sockets

In socket communication, a connection is established through a socket, and SCPI text commands are exchanged through this socket.

The function that manages sockets in programming languages is called the TCP stack.

Two socket protocols are available: TCP (p.40) and UDP (p.40).

A port number is assigned to each socket.

Controller access (single or multiple clients)

Security settings can be applied to webpages to limit the number of PCs (clients) that connect to the PAV at any given time.

NOTE

The performance of webpages through the PAV LAN interface is affected by the number of simultaneously used webpages, ports, and sockets. We recommend up to three simultaneous uses.

• Limitation to single and multiple clients

Item	Single client	Multiple clients
Not logged in to webpages	Multiple webpages can be opened simultaneously. Access is display only; the PAV cannot be controlled.	←
Logged in to webpage using "admin"	If a VISA or socket port is open, login is not possible. After logging in, communication from other devices are shut off.	←
VISA communication	Only a single VISA port can be opened.	←
TCP socket	If a VISA or "admin" webpage is not open, only a single TCP socket can be opened. UDP sockets are shut off.	If a VISA or "admin" webpage is not open, multiple connections are possible through TCP and UDP sockets.
UDP socket		

Input buffer request

In communication with a controller using a TCP or UDP socket, the PAV can receive commands continuously. The commands are processed one by one. To prevent the PAV internal processing from overloading, design the controller so that it not only sends commands but also queries from time to time to wait for responses from the PAV.

An acknowledge from the PAV signifies that the processing of all commands have been completed successfully.

NOTE

When using a socket, keep the number of SCPI instruction commands from exceeding 20 for every query.

Message terminator

When sending multiple SCPI commands through a TCP socket, the socket driver concatenates all messages in a single long packet. As such, add a terminator at the end of each SCPI command.

	Terminator (ASCII hexadecimal notation)
Commands from the controller	Terminators are required. <ul style="list-style-type: none"> • Line feed (0x0A) • Carriage return (0x0D)
Responses from the PAV LAN	Line feed (0x0A) and carriage return (0x0D) are appended.

Using TCP sockets

TCP sockets are the most common type of sockets. It can be used to establish communication, check received messages, and detect and correct transmission errors. To send SCPI commands, set the TCP socket port number to 8003.

A terminator consisting of a line feed and carriage return is appended automatically to responses to queries.

If the LAN controller is set to Multiple clients from the webpage (set Controller Access on the Modify page on the Configure tab of the LAN page to Multiple Clients) (p.29), up to three controllers can open TCP sockets on the corresponding PAV.

Using UDP sockets

UDP sockets are a simple type of socket with reduced network information. It is a connectionless protocol, which does not return acknowledges to received messages. To send SCPI commands, set the UDP socket port number to 8005.

A terminator consisting of a line feed and carriage return is appended automatically to responses to queries.

Before opening the UDP socket, open the webpage, and set Controller Access on the Modify page on the Configure tab of the LAN page to Multiple Clients (p.29).

Up to three controllers can open UDP sockets on the corresponding PAV.

WAN Connection

To connect to the Wide Area Network (WAN: global internet), configure the network server as follows.

Displaying webpages through WAN

PAV with LAN has a server (port number 80) for displaying webpages.

This port is used to connect to the Internet.

Ask your network administrator to assign a global IP address to the PAV with LAN. In addition, configure the port transfer setting of the network server's port number 80 to allow a WAN connection.

Socket connection through WAN

Ask your network administrator to assign a global IP address to the PAV with LAN. In addition, configure the port transfer setting of the network server's port number 8003 for the TCP socket and 8005 for the UDP socket to allow a WAN connection.

LAN Commands

LAN commands are listed below. For details on other commands, see the USB/RS232/RS485 Communication Interface Manual.

SYST:COMM:LAN:HOST?

Queries the host name.

Command `SYSTem:COMMunicate:LAN:HOST?`

Ex. `SYST:COMM:LAN:HOST?`

Response Returns the host name in CRD format in response to SYST:COMM:LAN:HOST?. A host name can be up to 16 characters in length.

SYST:COMM:LAN:IP?

Queries the IP address.

Command `SYSTem:COMMunicate:LAN:IP?`

Ex. `SYST:COMM:LAN:IP?`

Response Returns the IP address in CRD format in response to SYST:COMM:LAN:IP?. An IP address can be up to 15 characters in length.

SYST:COMM:LAN:MAC?

Queries the MAC address.

Command `SYSTem:COMMunicate:LAN:MAC?`

Ex. `SYST:COMM:LAN:MAC?`

Response Returns the MAC address in CRD format in response to SYST:COMM:LAN:MAC?. A MAC address can be up to 17 characters in length.

SYST:COMM:LAN:RES

Resets the LAN settings to their factory default values. As sending this command also changes the IP address and host name, the LAN connection will become invalid. Therefore, use this command only for diagnosis purposes.

After sending this command, you may need to restart the PAV.

Command `SYSTem:COMMunicate:LAN:RESet`

Ex. `SYST:COMM:LAN:RES`

SYST:COMM:LAN:IDLE

Sets the PAV identification LED to blinking mode.

Command `SYSTem:COMMunicate:LAN:IDELd <bool>`

Parameter	Value	ON (1)
		OFF (0)

Ex. `SYST:COMM:LAN:IDEL 1`

Global Commands for Multi-Drop Connection

Selecting the PAV

To select the PAV you want to control, send

INSTRument:NSElect <address>

A PAV that has been specified by an address (1 to 31) can receive SCPI commands.

Until the above command is received again, all commands and queries are applied only to the specified PAV.

At power-on, the LAN master unit is automatically selected.

After sending the INSTRument:NSElect<address> command, send an INSTRument:NSElect? query or SYSTem:ERRor? query to check that the specified RS485 address is correct.

■ Command example

The PAV status that has been specified by INSTRument:NSElect <address> command is valid even when a global command is sent until the address is changed.

```
INST:nSEL 4
:VOLT 50
GLOB:VOLT 70
```

(Wait 20 ms before sending the next command.)

```
:VOLT 90
```

After the command is sent, the output voltage setting of PAVs other than that with address 4 is 70 V.

The output voltage setting of the PAV with address 4 is 90 V. There is no need to send the INSTRument:NSElect <address> command again.

Responses to global commands

When you send a global command, the command is applied to all PAVs in the multi-drop connection and the PAV with LAN.

As global commands cannot be used to control error and status registers, it must be performed for each PAV separately. Global commands do not comply with SCPI. For details on global commands, see the USB/RS232/RS485 Communication Interface Manual.

■ Checking the responses

Check that when you send a SYSTem:ERRor? query to each PAV, none of them returns an error message. PAVs that return error messages cannot respond to global commands.

■ Command transmission interval

After sending a global command, wait at least 20 ms before sending the next global command. If you want to send global command consecutively, allow at least 20 ms between each global command. Otherwise, commands may not be accepted.

■ Query syntax

There is no query syntax for global commands. To check the settings of each PAV after sending a global command, you must select the PAV individually and query the settings.

Index

A	
activity LED	6
Auto IP	12
Auto-MDIX	19, 30
Auto-Negotiate	19, 30
B	
Blink Identify button	22
C	
Controller Access	28
D	
default gateway	27
Description	27
DHCP	12
DHCP Enabled/Auto IP	29
DNS server	27
G	
global commands	43
H	
host name	13
Hostname	27
hostname	19
I	
IP address	11, 27
IP Address Source	27
IVI	38
L	
LAN cable	7, 35
LAN port	6
LAN reset	14
LAN status indicator LED	6
LAN Timeout	30
link LED	6
login	20
logout	21
M	
MAC address	13
Multi-drop connection	15
Multiple clients	29
O	
One client only	29
P	
P2P (peer-to-peer)	7, 11
password	20
ping server	30
proxy server	36
R	
Recall button	25
Refresh list button	22
Reset All Instruments button	25
Reset One Instrument button	25
RS-485 Address	19
RS485 link cable	7
S	
Save button	25
Static (fixed) IP	12
static IP	29
subnet mask	27
T	
TCP socket	40
two LAN cards	36
U	
UDP socket	40
V	
VISA	37
Vxi Discovery	30
VXI-11	37

If you find any misplaced or missing pages in the manuals, 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 your Kikusui agent or distributor. At that time, inform your agent or distributor of the "Part No." written on the front cover of this manual.

Every effort has been made to ensure the accuracy of this manual. However, if you have any questions or find any errors or omissions, please contact your Kikusui agent or distributor.

After you have finished reading this manual, store it so that you can use it for reference at any time.

KIKUSUI ELECTRONICS CORP.

1-1-3 Higashiyamata, Tsuzuki-ku, Yokohama,
224-0023, Japan
Tel: +81-45-593-7570 Fax: +81-45-593-7571



Website

<http://www.kikusui.co.jp/en>