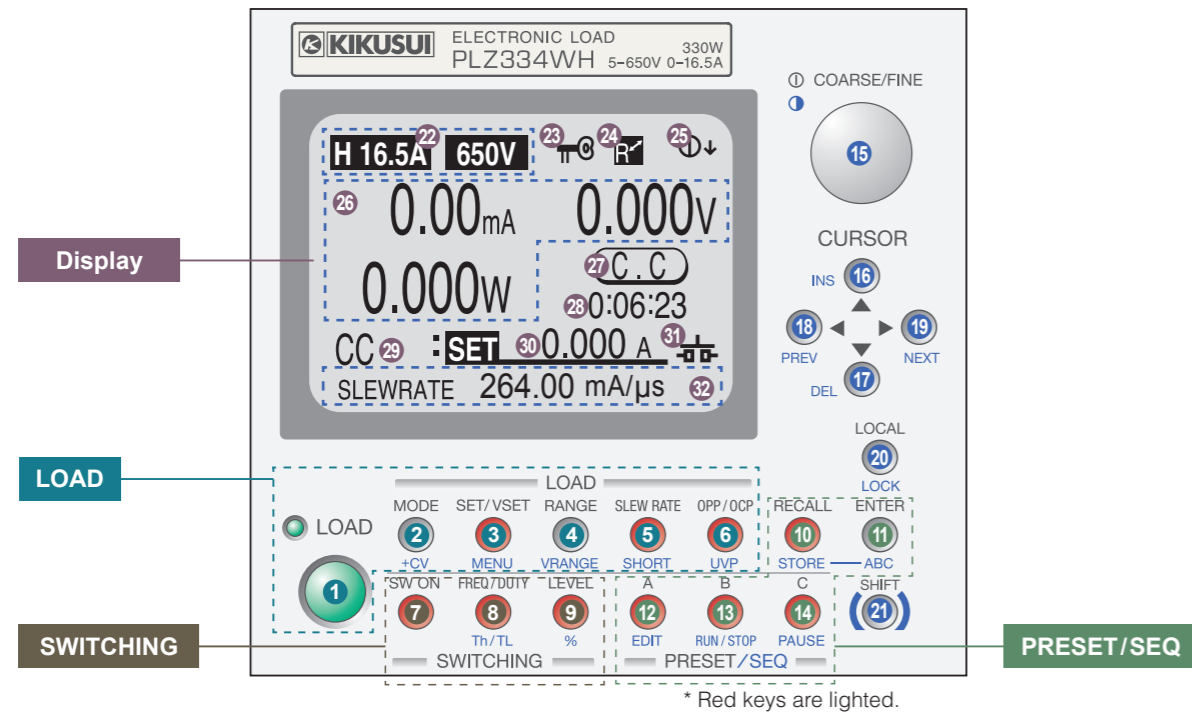


PLZ-4WH Series

Quick Reference

You can download the most recent manuals from the following website.
<http://www.kikusui.co.jp/en>



* Red keys are lighted.

LOAD

- 1 LOAD key**
Turns the load on and off. The LED lights when the load is on and turns off when the load is off.
- 2 MODE key**
Sets the operation mode.
+CV (SHIFT + MODE) key
Adds CV to CC or CR mode.
- 3 SET/VSET key**
Sets the fundamental settings (current/conductance/voltage/power).
MENU (SHIFT + SET/VSET) key
Used to set features and environment settings, calibrate the PLZ, and display product information.
- 4 RANGE key**
Sets the range (L/M/H).
VRANGE (SHIFT + RANGE) key
Switches the voltage value range (65 V/ 650 V).
- 5 SLEW RATE key**
Sets the slew rate value.
SHORT (SHIFT + SLEW RATE) key
Activates or deactivates the short function.
- 6 OPP/OCP key**
Sets the power at which OPP is activated or the current at which OCP is activated.
UVP (SHIFT + OPP/OCP) key
Sets the voltage at which UVP is activated.

SWITCHING

- 7 SW ON key**
Turns switching mode on and off.
- 8 FREQ/DUTY key**
Sets the switching frequency or the duty ratio.
Th/TL (SHIFT+FREQ/DUTY) key
Sets the switching time (Th: HIGH/TL: LOW).
- 9 LEVEL key**
Sets the switching level. The key lights when the level can be set.
% (SHIFT + LEVEL) key
Sets the switching level as a percentage of the set value (0 % to 100 %).

PRESET/SEQ

- 10 RECALL key**
Recalls the saved panel settings into the setup memory.
STORE (SHIFT + RECALL) key
Saves the panel settings to the setup memory.
- 11 ENTER key**
Sets various values and releases alarms.
ABC (SHIFT + ENTER) key
Saves the panel settings to the preset memory. After you press this key, press the A, B, or C key.
- 12 A key**
Recalls the settings in preset memory A. When this key is pressed after the ABC key, it saves the settings.
EDIT (SHIFT + A) key
Displays the sequence editing screen.
- 13 B key**
Recalls the settings in preset memory B. When this key is pressed after the ABC key, it saves the settings.
RUN/STOP (SHIFT + B) key
Displays the sequence screen. Starts and stops sequence execution.
- 14 C key**
Recalls the settings in preset memory C. When this key is pressed after the ABC key, it saves the settings.
PAUSE (SHIFT + C) key
Temporarily stops or restarts sequences.

Miscellaneous

- 15 Rotary knob**
Changes the settings. Press the knob to switch between coarse and fine adjustment.
Contrast (SHIFT + knob)
Adjusts the contrast of the display.
- 16 ▲ key**
The up key.
INS (SHIFT+▲) key
Adds a step (sequence function).
- 17 ▼ key**
The down key.
DEL (SHIFT+▼) key
Deletes a step (sequence function).
- 18 ◀ key**
The left key.
PREV (SHIFT+◀) key
Returns to the previous screen.
- 19 ▶ key**
The right key.
NEXT (SHIFT+▶) key
Switches to the next screen.
- 20 LOCAL key**
Switches from remote mode to local mode.
LOCK (SHIFT + LOCAL) key
Enables or disables the key lock.
- 21 SHIFT key**
Enables the functions displayed in blue below the keys.

Display

- 22 Range display**
Displays the current and voltage ranges.
- 23 π (key icon)**
Appears when the key lock is enabled.
- 24 R (remote icon)**
Appears during external communication.
- 25 ⬇ (COARSE/FINE icon)**
Indicates whether the rotary knob is set to coarse or fine adjustment.
- 26 Measured value display**
Indicates the measured values (current, voltage, and power).
- 27 Operation status display**
Displays the current operation mode.
- 28 Elapsed time display**
Displays the amount of time that has elapsed since the load was turned on.
- 29 Operation mode display**
Displays the set operation mode.
- 30 Setting display**
Displays the set value.
- 31 ⏏ (short icon)**
Appears when the short function is being executed.
- 32 Multi display**
Displays various settings and statuses.

Main Specifications

Ratings

Model	PLZ164WH	PLZ334WH	PLZ1004WH
Operating voltage (DC) ¹	5 V to 650 V		
Current	8.25 A	16.5 A	50 A
Power	165 W	330 W	1000 W

¹The Minimum operating voltage at which current begins to flow through the PLZ-4WH is approximately 0.5 V. At the load input terminals

Constant Current Mode (CC)

Model	Range	PLZ164WH	PLZ334WH	PLZ1004WH
Operating range	H	0 A to 8.25 A	0 A to 16.5 A	0 A to 50 A
	M	0 A to 825 mA	0 A to 1.65 A	0 A to 5 A
	L	0 A to 82.5 mA	0 A to 165 mA	0 A to 500 mA
Accuracy of setting	H, M	± (0.2 % of set + 0.1 % of f.s ¹)		
	L (300 μA or more)	± (0.2 % of set + 0.1 % of f.s)		
	L (less than 300 μA)	± (0.2 % of set + 0.1 % of f.s ¹) + Vin ² / 2.21 MΩ		
Input voltage variation ³	H, M	20 mA		
	L	2 mA		

¹ The full scale of range. However, for the M range, it is the full scale of the H range.

² Vin: The voltage at the load input or sensing terminals

³ When the input voltage is changed from 0.3 V to 30 V at a current equal to the rated power/30 V.

Constant Resistance Mode (CR)

Model	Range	PLZ164WH	PLZ334WH	PLZ1004WH
Operating range ¹	H	165 S to 30 μS (606.06 mΩ to 33.333 kΩ)	3.3 S to 60 μS (303.03 mΩ to 16.666 kΩ)	10 S to 200 μS (100 mΩ to 5 kΩ)
	M	165 mS to 3 μS (6.06 Ω to 333.333 kΩ)	330 mS to 6 μS (3.03 mΩ to 166.666 kΩ)	1 S to 20 μS (1 Ω to 49.999 kΩ)
	L	16.5 mS to 0.3 μS (60.606 Ω to 3.333 MΩ)	33 mS to 0.6 μS (30.303 Ω to 1.666 MΩ)	100 mS to 2 μS (10 Ω to 500 kΩ)
Accuracy of setting ²	H, M	± (0.5 % of set ³ + 0.5 % of f.s ⁴)		
	L	± (0.5 % of set ³ + 0.5 % of f.s) + Vin ⁵ / 2.21 MΩ		

¹ Conductance [S] = Input current [A]/input voltage [V] = 1/resistance [Ω]

² Converted value based on the input current at the sensing point.

³ set = Vin/Rset

⁴ The full scale of range. However, for the M range, it is the full scale of the H range.

⁵ Vin: The voltage at the load input or sensing terminals

Constant Voltage Mode (CV)

Model	Range	PLZ164WH	PLZ334WH	PLZ1004WH
Operating range	H	5 V to 650 V		
	L	5 V to 65 V		
Accuracy of setting ¹	---	± (0.2 % of set + 0.2 % of f.s)		
Input current variation ²	---	65 mV		

¹ At the sensing point during remote sensing when the input voltage is within the operation range.

² At an input voltage of 5 V when the current changes from 10 % to 100 % of the rating (during remote sensing)

Constant Power Mode (CP)

Model	Range	PLZ164WH	PLZ334WH	PLZ1004WH
Operating range	H	16.5 W to 165 W	33 W to 330 W	100 W to 1000 W
	M	1.65 W to 16.5 W	3.3 W to 33 W	10 W to 100 W
	L	0.165 W to 1.65 W	0.33 W to 3.3 W	1 W to 10 W
Accuracy of setting	H, M	± (3 % of f.s ¹)		
	L (0.25 W or more)	± (3 % of f.s)		
	L (less than 0.25 W)	± (3 % of f.s + Vin ² / 2.21 MΩ)		

¹ The full scale of range. However, for the M range, it is the full scale of the H range.

² Vin: The voltage at the load input or sensing terminals

General

Model	PLZ164WH	PLZ334WH	PLZ1004WH
Input voltage range	100 Vac to 240 Vac (90 Vac to 250 Vac) single phase, continuous		
Input frequency range	47 Hz to 63 Hz		
Power consumption	80 VA max.	90 VA max.	160 VA max.

The User's Manual (contained in the accompanying CD-ROM) contains the following additional information.

Methods for Ensuring Stable Operation... p.20	External Control... p.84	Calibration... p.118
Remote Sensing... p.27	Monitor Signal Output... p.102	Troubleshooting... p.125
Sequences... Chapter 4	Parallel Operation... p.104	Specifications... Chapter 8
	Maintenance... Chapter 7	

¹ In the appendix, there are explanations of the operation modes and the operating area and a sequence program creation table.

² For information about remote control, see the communication interface manual (contained in the accompanying CD-ROM).

Turing on the Load

- 1 Make sure that the load is off.**
- 2 Select an operation mode.**
Press MODE to switch between modes.
- 3 Select a current range.**
Press RANGE to switch between ranges.
- 4 Select a voltage range.**
Press VRANGE (SHIFT + RANGE) to switch between ranges.
- 5 Set the current, voltage, conductance, or power value.**
Press SET/VSET to select a value, and set the value using the rotary knob.
- 6 Turn on the load.**
Press LOAD. You can change the setting (current, voltage, conductance, or power) while the load is on.

• +CV Mode

You can press +CV (SHIFT + MODE) in CC mode or CR mode to add CV. You can add CV even while the load is on.

The value that you can set changes when you press SET/VSET.

Protection Functions

The electronic load has seven kinds of protection functions. When a protection function is activated, an alarm occurs.

You can set the value to detect for the OCP, OPP, and UVP functions.

You can choose the action (load off or limit) that is performed by the OCP and OPP functions from the menu.

You can stop an alarm by pressing ENTER. The alarm will be activated again if its cause has not been eliminated.

Overcurrent Protection (OCP)

Activated at the specified value or at 110% of the maximum current.

To set the value, press OPP/OCP, and turn the rotary knob. Press OPP/OCP to switch between OCP and OPP.

Overvoltage Protection (OVP)

Activated at 110 % of the maximum voltage of range.

Overpower Protection (OPP)

Activated at the specified value or at 110 % of the maximum power.

To set the value, press OPP/OCP, and turn the rotary knob. Press OPP/OCP to switch between OCP and OPP.

Undervoltage Protection (UVP)

Activated when the voltage goes below the set value.

To set the value, press UVP, and turn the rotary knob. If you do not want to use UVP, select OFF.

Reverse-Connection Protection (REV)

Activated when reverse voltage is applied to the load input terminals. Turn off the power of the DUT immediately.

Overheat Protection (OHP)

Activated when the temperature of the internal power unit exceeds the defined limit.

Alarm Input Protection

Activated when a low-level signal is applied to the ALARM INPUT pin of the EXT CONT connector.

ABC Preset Memory

The preset memory can be used to save and recall current, resistance, voltage, and power values.

• Saving

- 1 Switch to the operation mode that you want to save, and set its ranges and value.**

- 2 Press ABC.**

The A, B, and C keys blink.

- 3 Press the key that corresponds to the memory that you want to save to.**

The key will light. After you change the settings, the key light will turn off.

• Recalling

Switch to the operation mode that you want to load values into, and press the key that corresponds to the memory that you want to recall (A, B, or C). If Memory is set to SAFETY, press ENTER.

Setup Memory

You can use the setup memory to save and recall protection-function activation values, ABC setup memory settings, menu settings, and so on.

• Saving

- 1 Press STORE (SHIFT + RECALL).**

- 2 Use the rotary knob to select the memory no. that you want to save to.**

- 3 Enter a memo.**

- 4 Press ENTER.**

• Recalling

- 1 Press RECALL.**

You cannot recall settings while the load is on.

- 2 Use the rotary knob to select the memory no. that you want to recall.**

- 3 Press ENTER.**

Switching Function

You can use this function to set two load current values and switch between them.

Set the switching level and the switching interval.

• Switching Level

Press LEVEL to select a value, and set the value using the rotary knob. Press % (SHIFT + LEVEL) to set the level as a percentage.

• Switching Interval

You can set the switching interval by specifying a frequency and duty ratio or by specifying an amount of time.

Setting a Frequency and Duty Ratio

Use the FREQ/DUTY key and the rotary knob to set the values. Press FREQ/DUTY to switch between the frequency and the duty ratio.

Setting a Time

Use the Th/TL (SHIFT+FREQ/DUTY) key and the rotary knob to set a time. Press Th/TL (SHIFT+FREQ/DUTY) to switch between the high and low sides of the switching time.

Functions Useful for Battery Discharge Testing

• Elapsed Time Display (Count Time)

You can measure the time from the start of discharge to the cutoff voltage. You can enable the elapsed time display from the menu.

• Auto Load-Off Timer (Cut Off Time)

You can use this function to turn the load off after a specified amount of time has passed since the start of discharge and measure the closed circuit voltage immediately before the load is turned off. You can set the auto load-off timer from the menu.

Other Settings

• Soft Start

In CC mode, you can use this function to raise the electronic load's current gradually. This is useful in cases such as when voltage application begins at the same time that the load is turned on and when voltage is applied while the load is on and there is no load input.

You can enable the soft start function from the menu.

• Locking the Electronic Load

You can press LOCK (SHIFT + LOCAL) to lock the electronic load and disable all operations other than the turning on and off of the load, sequence execution, and memory recall. To release the lock, press and hold LOCK (until you hear a confirmation sound).

• Short Function

You can use this function to specify the maximum current value (CC mode) or the minimum resistance value (CR mode) instantaneously.

To activate the short function, press SHORT (SHIFT + SLEW RATE) while the load is on. Press SHORT again to deactivate the short function.

• Response Speed

This is the speed at which the input current and voltage values are detected and controlled through negative feedback. You can set the response speed in CC mode, CV mode and CR mode.

You can set the response speed from the menu.

• Slew Rate Setting

When the current changes rapidly because you are using the switching function or for some other reason, set the slew rate to determine the rate at which the current is changed.

Press SLEW RATE, and set the value using the rotary knob.

• Resetting to the Factory Default Settings

While holding ENTER, turn on the power switch. The contents of the memory are deleted.

Menu Settings

- 1 Make sure that the load is off.**

- 2 Press MENU (SHIFT + SET/VSET).**

The menu screen appears.

- 3 Use the cursor keys and ENTER to select the item that you want to set.**

Press PREV (SHIFT + ◀) to return to the previous screen.

Item 1 ¹	Item 2	Item 3	Settings	Description	
1.Setup	1.Function	Soft Start	1ms, 2ms, 5ms, 10ms, 20ms, 50 ms, 100 ms, 200 ms	Soft start time	
		Count Time	OFF, ON	Elapsed time display	
		Key Lock	SET-KEY, ALL-KEY	Key lock setting	
	2.Protect Action	OCP	LOAD OFF, LIMIT	Operation to be performed when OCP is activated	
		OPP	LOAD OFF, LIMIT	Operation to be performed when OPP is activated	
	3.Memory	Recall	DIRECT, SAFETY	Method for recalling the preset memory	
	4.Cut Off	Time	OFF, 0:00:01 to 999:59:59	Auto load-off timer	
	5.Response	CC/CR	1/1, 1/2, 1/5, 1/10	CC/CR mode response speed	
		CV	100, 10, 1, 1/10, 1/100	CV mode response speed	
	2.Configuration ²	1. Master/Slave	Operation	MASTER, SLAVE	Master-Slave control setting
Parallel ³			-, 2, 3, 4, 5	Number of electronic loads operation in parallel	
Booster ⁴			-, 1, 2, 3, 4	Number of boosters that are connected	
2.Power On		Load On	OFF, ON	State of the load when the power switch is turned on	
		Key Lock	OFF, ON	Key lock	
3.Interface		Control	GPIO, RS232C, USB	Interface setting	
		GPIO	Address	1 to 30	GPIO address
			RS232C	Baudrate	2400bps, 4800bps, 9600bps, 19200bps
			Data ⁵ , Stop	Data: 8 Stop: 1, 2	Data length (fixed at 8 bits) and the stop bit
			Parity ⁵	NONE	Parity (fixed at none)
			Ack	OFF, ON	Acknowledgment
		USB ⁵	VID	0x0B3E	Vendor ID
PID			0x1021: PLZ164WH 0x1022: PLZ334WH 0x1023: PLZ1004WH	Product ID	
S/N	xxxxxxx		Serial number		
4.External	Control	OFF, V, R, Rinv	External control for the CC, CR, CV, and CP modes		
	Control CV	OFF, ON	External control for the CV mode		
	LoadOn IN	LOW, HIGH	External control logic setting for turning the load on and off		
4.Model Info ⁵	(MODEL)	---	PLZxxxx	Model name	
	VERSION SUB	---	x.xx	Firmware version	
	VERSION MAIN	---	x.xx	ROM version	

¹In Item 1, 3. Calibration is for calibrating the electronic load. For details, see the User's Manual.

²The Configuration conditions, are enabled after the power switch is turned off and on again.

³This is enabled when Operation is set to Master on the 1.Master/Slave screen.

⁴This is enabled when a PLZ1004WH is being used as the master unit and Operation is set to Master on the 1.Master/Slave screen.

⁵Information about the PLZ4WH. It cannot be changed.