

INSTRUCTION MANUAL

PROGRAMMABLE HIGH PRECISION DC POWER SUPPLY

PPR SERIES

PPR20-5

PPR20-5G

PPR36-3

PPR36-3G



■ About Brands and Trademarks

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All company names and product names mentioned in this manual are the trademark or the registered trademark of each company or group in each country and region.

■ About the Instruction Manual

Permission from the copyright holder is needed to reprint the contents of this manual, in whole or in part. Be aware that the product specifications and the contents of this manual are subject to change for the purpose of improvement.

The latest version of the instruction manual is posted on our website (<https://www.texio.co.jp/download/>).

In order to be environmentally friendly and reduce waste, we are gradually discontinuing the use of paper or CD manuals that come with our products. Even if there is a description in the instruction manual that the product is included, it may not be included.

■ About the Firmware version

This instruction manual is compatible with firmware version 1.31 and later.

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SAFETY INSTRUCTIONS

This chapter contains important safety instructions that you must follow during operation and storage. Read the following before any operation to insure your safety and to keep the instrument in the best possible condition.

Safety Symbols

These safety symbols may appear in this manual or on the instrument.



WARNING

Warning: Identifies conditions or practices that could result in injury or loss of life.



CAUTION

Caution: Identifies conditions or practices that could result in damage to the PPR or to other properties.



DANGER High Voltage



Attention Refer to the Manual



Protective Conductor Terminal



Earth (ground) Terminal



Do not dispose electronic equipment as unsorted municipal waste. Please use a separate collection facility or contact the supplier from which this instrument was purchased.

Safety Guidelines

General Guideline



CAUTION

- Do not place any heavy object on the PPR.
- Avoid severe impact or rough handling that leads to damaging the PPR.
- Do not discharge static electricity to the PPR.
- Use only mating connectors, not bare wires, for the terminals.
- Do not disassemble the PPR unless you are qualified.

Power Supply



CAUTION

- AC Input Voltage: 100Vac/120Vac/220Vac/240Vac $\pm 10\%$, 50Hz/60Hz, single phase
- Frequency: 47Hz to 63Hz
- Before connecting the power plug to an AC line outlet, make sure the voltage selector switches of the bottom panel in the correct position.
- Disconnect power cord and test leads before replacing fuse.
- The fuse specification is as following:

FUSE	LINE
250V T3.15A	100V~ 120V~
250V T1.6A	220V~ 240V~

- To avoid electrical shock connect the protective grounding conductor of the AC power cord to an earth ground.

Cleaning the PPR

- Disconnect the power cord before cleaning.
- Use a soft cloth dampened in a solution of mild detergent and water. Do not spray any liquid.
- Do not use chemicals containing harsh material such as benzene, toluene, xylene, and acetone.

Operation Environment

- Location: Indoor, no direct sunlight, dust free, almost non-conductive pollution (Note below)
- Relative Humidity: 20%~ 80% (no condensation)
- Altitude: < 2000m
- Temperature: 0°C to 40°C

(Pollution Degree) EN61010-1:2010 specifies the pollution degrees and their requirements as follows. The PPR falls under degree 2.

Pollution refers to “addition of foreign matter, solid, liquid, or gaseous (ionized gases), that may produce a reduction of dielectric strength or surface resistivity”.

- Pollution degree 1: No pollution or only dry, non-conductive pollution occurs. The pollution has no influence.
- Pollution degree 2: Normally only non-conductive pollution occurs. Occasionally, however, a temporary conductivity caused by condensation must be expected.
- Pollution degree 3: Conductive pollution occurs, or dry, non-conductive pollution occurs which becomes conductive due to condensation which is expected. In such conditions, equipment is normally protected against exposure to direct sunlight, precipitation, and full wind pressure, but neither temperature nor humidity is controlled.

Storage environment

- Location: Indoor
 - Temperature: -20°C to 70°C
 - Relative Humidity: 20 to 85%(no condensation)
-

Disposal



Do not dispose this instrument as unsorted municipal waste. Please use a separate collection facility or contact the supplier from which this instrument was purchased. Please make sure discarded electrical waste is properly recycled to reduce environmental impact.

1 GETTING STARTED

This chapter describes the power supply in a nutshell, including its main features and front / rear panel introduction. After going through the overview, please read the theory of operation to become familiar with the operating modes, protection modes and other safety considerations.



1.1 PPR Series Overview

1.1.1 Lineup

Model	Voltage	Current	Power	GP-IB
PPR20-5	0-20V	0-5A	100W	-
PPR20-5G	0-20V	0-5A	100W	○
PPR32-3	0-32V	0-3A	96W	-
PPR32-3G	0-32V	0-3A	96W	○

1.1.2 Main Features

Features	2.4-inch TFT-LCD Panel. Low noise: Temperature controlled cooling fan. Remote sensing to compensate for voltage drop in load leads . Output On/Off delay control. CV, CC priority start function. (prevents overshoot with output ON) Adjustable voltage and current slew rates. Bleeder circuit ON/OFF setting. OVP, OCP and OTP protection. Supports test sequence. With 3 measuring currents function.
Interface	Built-in USB and LAN interface. GP-IB interface (G Type). External trigger control function.

1.2 Accessories

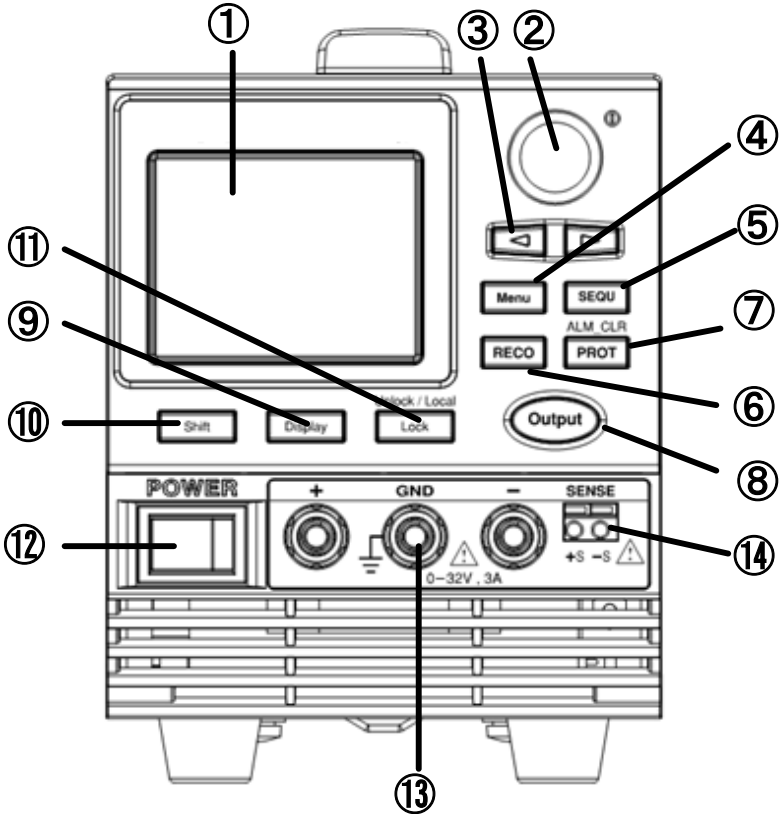
Before using the PPR power supply unit, check the package contents to make sure all the standard accessories are included.

Standard Accessories	Part number	Description	Qty.
	GTL-104A	Test leads 1m, 10A	1
		Short Bar (Binding Posts Terminal)	1
		Power Cord	1

Optional Accessories	Part number	Description
	GRA-441-J	Rack for JIS
	GRA-441-E	Rack for EIA
	GTL-246	USB Cable (USB 2.0 Type A- Type B Cable, 4P)
	CB-2420P	GP-IB Cable, 2000mm
	GTL-303	SMA Cable

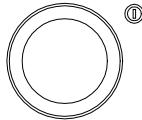
2 Appearance

2.1 Front Panel Overview



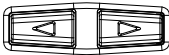
1. Display area

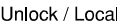
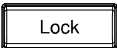
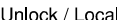
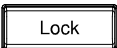
2. Knob Key



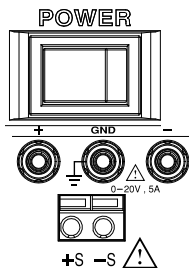
The display area shows set values, output values and parameter settings.

Used to navigate menu, and to configure or confirm voltage/current/time values, among others. Also, the indicator on the upper-right corner shows current state and power mode.

- | | | | |
|-----|--------------------------|--|--|
| 3. | Left/Right
Arrow Keys |  | Used to select a parameter number in the Function settings. Also the left arrow key can be used as backspace. |
| 4. | Menu Button |  | Used to enter the Menu page. Refer to page 92 for detail. |
| 5. | SEQU Button |  | Used to run customized test sequence. Refer to page 64 for detail. |
| 6. | PROT Button | 
 | Used to set OVP, OCP protecting functions. Refer to page 45 for details. |
| | ALM_CLR
Button | 
+

 | (+Shift) Used to release protection functions that have been activated. The tripped protection alarms include the following: OVP Alarm, OCP Alarm, OTP Alarm, Sense Alarm. |
| 7. | RECO Button |  | Used to run recorder function. Refer to page 62 for detail. |
| 8. | Output
Button |  | Used to turn the output on or off. |
| 9. | Display
Button |  | Used to switch among 3 different display modes. |
| 10. | Shift Button |  | Used to enable the functions that are written in blue characters above certain buttons. |
| 11. | Lock Button | 
 | Used to lock all front panel buttons other than the Output Button. Refer to page 60 for detail. |
| | Unlock/Local
Button | 
+

 | (+Shift) Used to unlock the front panel buttons or it switches to local mode. |

12. Power Switch



Used to turn the power on/off.

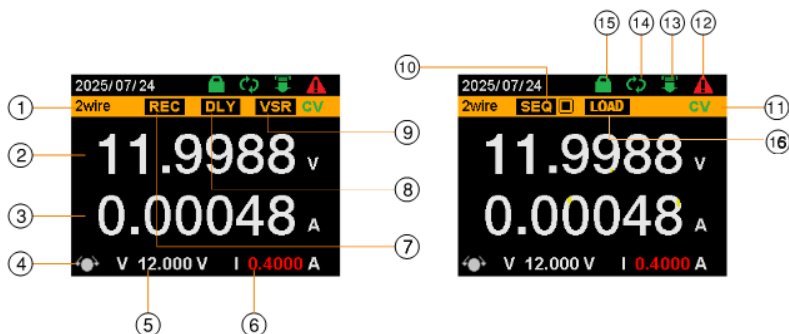
13. Output terminal

DC output terminal.

14. Sensing Terminal

Terminal to connect the sensing cables, which compensate voltage drop occurred in load leads.

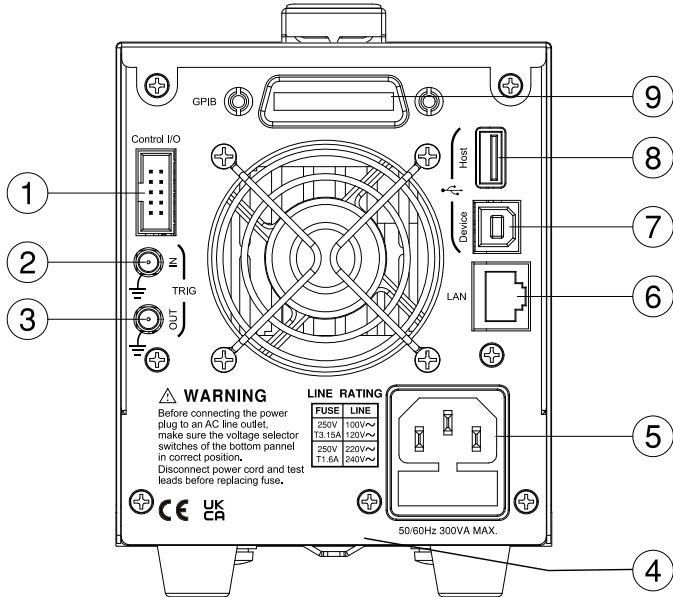
2.1.1 Display Area



1. 2Wire/4Wire 2-wire or 4-wire indicator.
2. Voltage Meter Displays the voltage.
3. Current Meter Displays the current.
4. V/A Set Guidance The scrolling symbol indicates to select between V and A set via scrolling knob key.
5. V Set Manually sets voltage.
6. I(A) Set Manually sets current.
7. REC Icon When Recorder is enabled, the icon will be shown accordingly. Note that when SEQ appears, the icon will be faded out.
8. DLY Icon When Output On/Off delay is enabled, the icon will be shown accordingly. Note that when SEQ appears, the icon will be faded out.

- | | |
|-------------------------------------|--|
| 9. VSR/ISR Icon | When CV/CC Slew Rate Priority (CVLS/ CCLS) is activated, the icon will be shown . Note that when SEQ appears, the icon will be faded out. |
| 10. SEQ Icon | When Sequence function is turned On, the icon will be shown accordingly. |
| 11. CC/CV indicator | It shows when constant voltage or constant current mode is ongoing. However, when output is unregulated, which means neither in CV mode nor CC mode. If it is not under power output, it simply shows Off. |
| 12. Error Indicator | When error occurs from command of remote control, the icon will be shown. |
| 13. Remote Control Indicator | When remote control (USB/LAN/GPIB) is underway, the icon will be shown |
| 14. Communication Monitor Indicator | When communication monitor is enabled, the icon will be shown. |
| 15. Lock Indicator | When the lock mode is activated, the icon will be shown. |
| 16. Load MODE | When Load function is turned On, the icon will be shown accordingly. |

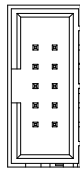
2.1.2 Rear Panel Overview



1. Control I/O

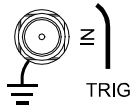
Control I/O

Status Monitoring



2. Trigger-IN

External Trigger Signal Input Terminal

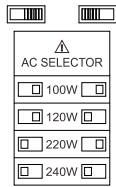


3. Trigger-OUT

Trigger Signal Output Terminal



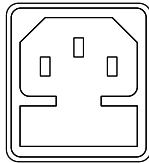
4. AC Select Switch



The AC selector is located at the bottom side of the unit.

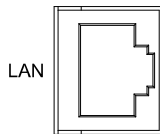
Switch Voltage to 100 V, 120 V, 220 V or 240 V.

5. Power Cord / Fuse Socket



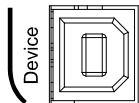
The power cord socket accepts the AC mains. The fuse holder contains the AC mains fuse .

6. LAN



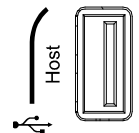
Ethernet port for controlling the PPR remotely

7. USB



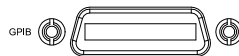
USB port for controlling the PPR remotely.

8. USB A Port



USB A port for data transfer, loading test scripts and firmware update.

9. GPIB



GPIB connector for units equipped with IEEE programming option. (G Type)

2.2 Theory of Operation

The theory of operation chapter describes the basic principles of operation, protection modes and important considerations that must be taken into account before use.

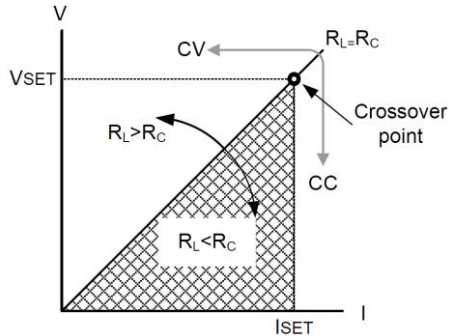
2.2.1 CC and CV Mode

CC and CV mode	When the power supply is operating in constant current mode (CC) a constant current will be supplied to the load. When in constant current mode the voltage output can vary, whilst the current remains constant. When the load resistance increases to the point where the set current limit(ISET) can no longer be sustained the power supply switches to CV mode. The point where the power supply switches modes is the crossover point.
Description	When the power supply is operating in CV mode, a constant voltage will be supplied to the load, whilst the current will vary as the load varies. At the point that the load resistance is too low to maintain a constant voltage, the power supply will switch to CC mode and maintain the set current limit.

The conditions that determine whether the power supply operates in CC or CV(VSET), the load resistance (RL) and the critical resistance (RC). The critical resistance is determined by VSET/ISET. The power supply will operate in CV mode when the load resistance is greater than the critical resistance. This means that the voltage output will be equal to the VSET voltage but the current will be less than ISET. If the load resistance is reduced to the point that the current output reaches the ISET level, the power supply switches to CC mode.

Conversely the power supply will operate in CC mode when the load resistance is less than the critical resistance. In CC mode the current output is equal to ISET and the voltage output is less than VSET.

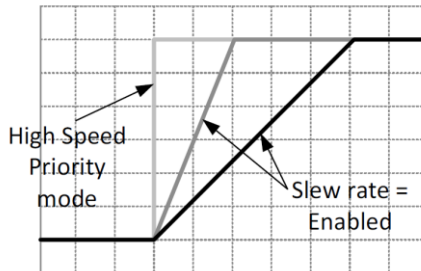
Diagram



2.2.2 Slew Rate

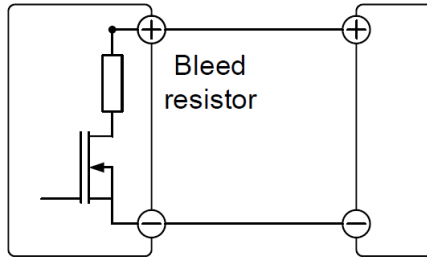
Theory

The PPR has selectable slew rates for CC and CV mode. This gives the PPR power supply the ability to limit the current/voltage draw of the power supply. Slew rate settings are divided into High Speed Priority and Slew Rate Priority. High speed priority mode will use the fastest slew rate for the instrument. Slew Rate Priority mode allows for user adjustable slew rates for CC or CV mode. The rising and falling slew rate can be set independently.



2.2.3 Bleeder Control

Background The PPR DC power supplies employ a bleed resistor in parallel with the output terminals.



Bleed resistors are designed to dissipate the power from the power supply filter capacitors when power is turned off and the load is disconnected. Without a bleed resistor, power may remain charged on the filter capacitors for some time and be potentially hazardous.

In addition, bleed resistors also allow for smoother voltage regulation of the power supply as the bleed resistor acts as a minimum voltage load.

The bleed resistance can be turned on or off using the configuration settings.



Note

By default the bleed resistance is on. For battery charging applications, be sure to turn the bleed resistance off as the bleed resistor can discharge the connected battery when the unit is off.

2.2.4 Alarms

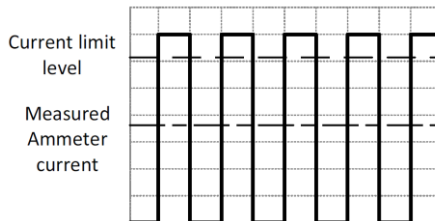
The PPR power supplies have a number of protection features. When one of the protection alarms is tripped, an alarm message will appear on the display, the corresponding alarm icon (OCP, OVP etc) will appear in the status bar. When an alarm has been tripped, the output will be automatically turned off or the power supply will turn off, depending on the type of alarm and on the Breaker Control settings. For details on how to clear an alarm or to set the protection modes.

OVP	Over voltage protection (OVP) prevents a high voltage from damaging the load. This alarm can be set by the user.
OCP	Over current protection prevents high current from damaging the load. This alarm can be set by the user.
OTP	Over temperature protection protect the instrument from overheating.

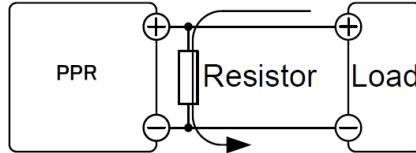
2.2.5 Considerations

The following situations should be taken into consideration when using the power supply.

- Inrush current** When the power supply switch is first turned on, an inrush current is generated. Ensure there is enough power available for the power supply when first turned on, especially if a number of units are turned on at the same time.
- Pulsed or Peaked loads** When the load has current peaks or is pulsed, it is possible for the maximum current to exceed the mean current value. The PPR power supply ammeter only indicates mean current values, which means for pulsed current loads, the actual current can exceed the indicated value. For pulsed loads, the current limit must be increased, or a power supply with a greater capacity must be chosen. As shown below, a pulsed load may exceed the current limit and the indicated current on the power supply ammeter.



Reverse Current: Regenerative load When the power supply is connected to a regenerative load such as a transformer or inverter, reverse current will feed back to the power supply. The PPR power supply cannot absorb reverse current. For loads that create reverse current, connect a resistor in parallel to the power supply to bypass the reverse current. This description only applies when the bleed resistance is off.



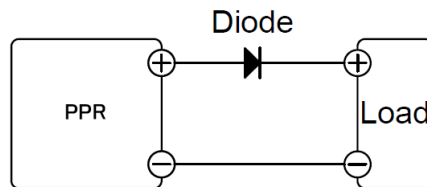
Reverse current



Note

The current output will decrease by the amount of current absorbed by the resistor. Ensure the resistor used can withstand the power capacity of the power supply/load.

Reverse Current: Accumulative energy. When the power supply is connected to a load such as a battery, reverse current may flow back to the power supply if the bleed resistance is on. To prevent damage to the power supply under this condition, use a reverse-current-protection diode in series between the power supply and load. If the bleed resistor is turned off or set to auto, there is no need to add a diode.



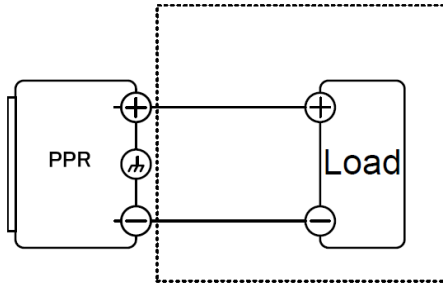
Caution

Ensure the reverse withstand voltage of the diode is able to withstand 2 times the rated output voltage of the power supply and the forward current capacity can withstand 3 to 10 times the rated output current of the power supply. Ensure the diode is able to withstand the heat generated in the following scenarios. When the diode is used to limit reverse voltage, remote sensing cannot be used.

2.2.6 Grounding

The output terminals of the PPR power supplies are isolated with respect to the protective grounding terminal. The insulation capacity of the load, the load cables and other connected devices must be taken into consideration when connected to the protective ground or when floating.

Floating As the output terminals are floating, the load and all load cables must have an insulation capacity that is greater than the isolation voltage of the power supply.

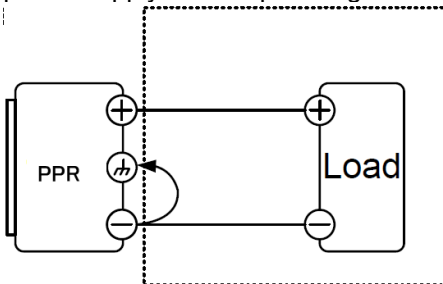


Warning

If the insulation capacity of the load and load cables are not greater than the isolation voltage of the power supply, electric shock may occur.

Grounded output terminal

If the positive or negative terminal is connected to the protective ground terminal, the insulation capacity needed for the load and load cables is greatly reduced. The insulation capacity only needs to be greater than the maximum output voltage of the power supply with respect to ground.



Caution

If using external voltage control, do not ground the external voltage terminal as this will create a short circuit.

3 Operation

3.1 SETUP

This chapter describes how to properly power up and configure the PPR series before operation.

3.1.1 Power Up

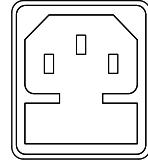
Background

Make sure that the power source is shut off.

Steps

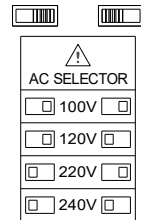
Use the AC power cable supplied with the product.

1. Connect the AC power cord to the rear panel socket.



Note

Before connecting the power plug to an AC line outlet, make sure the voltage selector switches of the bottom panel in the correct position. Disconnect power cord and test leads before replacing fuse.



2. Press the POWER switch on. If used for the first time, the default settings will appear on the display, otherwise the PPR recovers the state right before the power was last turned OFF.



Caution

Do not turn the power on and off quickly. Please wait for the display to fully turn off.

3.1.2 Wire Gauge Considerations

Background

Before connecting the output terminals to a load, the wire gauge of the cables should be considered.

It is essential that the current capacity of the load cables is adequate. The rating of the cables must equal or exceed the maximum current rated output of the instrument.

Recommended wire gauge	Wire Gauge	Nominal Cross Section	Maximum Current
	28	0.1	3
	26	0.15	4
	24	0.25	5
	22	0.35	7
	20	0.55	9
	18	1	12

The maximum temperature rise can only be 60 degrees above the ambient temperature. The ambient temperature must be less than 30 degrees.

3.1.3 Output Terminals

Background Before connecting the output terminals to the load, first consider whether voltage sense will be used, the gauge of the cable wiring and the withstand voltage of the cables and load.

 **Warning** Dangerous voltages. Ensure that the power to the instrument is disabled before handling the power supply output terminals. Failing to do so may lead to electric shock.

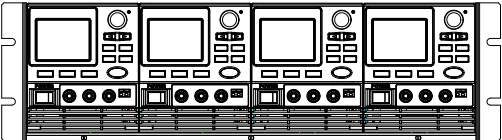
3.1.4 Connection with the front panel output terminal

- Steps**
1. Turn the power switch off. 
 - 2.Connect the test lead includes in the accessory parts to front panel output terminal.
 - 3.Fix the load cables firmly to eliminate loose connections from the front output terminals and load cables.

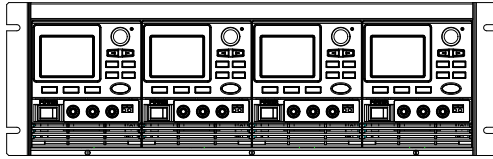
3.1.5 Using the Rack Mount Kit

Background The PPR series has an optional Rack Mount Kit (GRA-441-J [JIS], GRA-441-E [EIA])that can be used to hold up to 4 PPR units into rack.

GRA-441-E
[EIA] Rack
mount diagram



GRA-441-J [JIS] Rack mount diagram



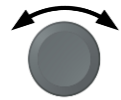
3.1.6 How to Use the Instrument

Background The PPR power supplies generally use the knob key and arrow keys to enter each page and setting, to return to previous page, to edit numerical values or to confirm settings.

The following section will explain some of these concepts in detail.

Example1 Use the knob key and arrow keys to set a voltage of 10.100 volts.

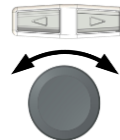
1. From the main display, scroll knob key to move cursor to V Set field.



2. Click the knob key to enter the V Set field.



- Use arrow keys to move the cursor to desired digits followed scrolling knob key to edit values. Repeat the step for each digit until target value.



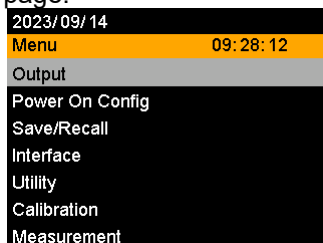
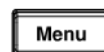
- Click the knob key to confirm the input value setting(10.100).



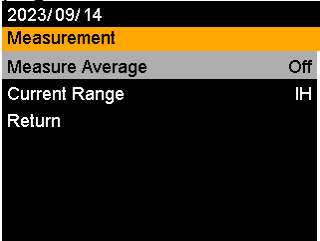
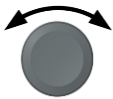
Example2

Use the knob key to enter Measurement Average field and setting Middle option. Also, use the left arrow key to return to the previous page.

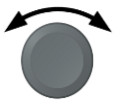
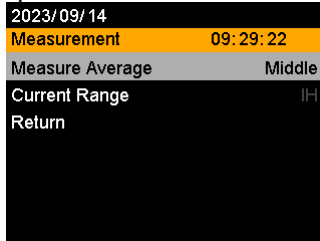
- Press the Menu key to enter the Menu page.



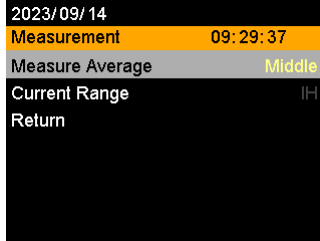
2. Scroll the knob key to move to the Measurement field followed by clicking the knob key to enter the Measurement page.



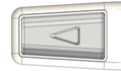
3. Click the knob key to enter the Measurement Average field followed by scrolling the knob key to select Middle option.



4. Click the knob key to confirm the Middle option for Measurement Average.



- Click the left arrow key to return to the previous page –Menu page.



2023/09/14	
Menu	09:30:09
Output	
Power On Config	
Save/Recall	
Interface	
Utility	
Calibration	
Measurement	

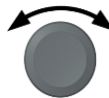
3.1.7 Reset to Factory Default Settings

Background There's a group of Default value, the non-modifiable factory default setting. User is able to restore Default or proceed to Preset operation from Power On under System.

Steps 1. Press the Menu key to enter the Menu page.



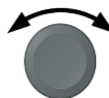
2. Scroll the knob key to move to the Power On Config field followed by clicking the knob key to enter the Power On Config page.



2023/09/14	
Menu	09:25:31
Output	
Power On Config	
Save/Recall	
Interface	
Utility	
Calibration	
Measurement	



3. Scroll knob key to move to the Power On Status Set field. Click knob key to enter the field followed by scrolling knob key to select Default option. Click knob key again to confirm setting.



2023/09/14	
Power On Config	09:25:52
Power On Status	Default
Return	

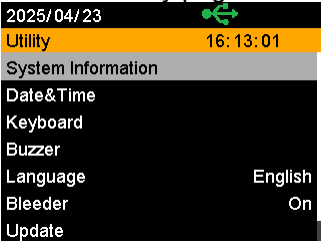
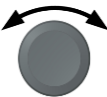


3.1.8 View System Version

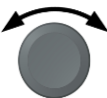
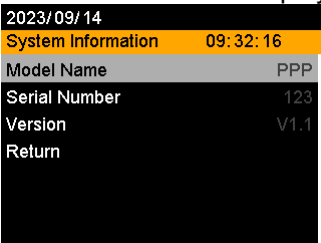
Background The System Information allows you to view the PPR model name, serial number as well as firmware version.

Steps

1. Press the Menu key to enter the Menu page.
2. Scroll the knob key to move to the Utility field followed by clicking the knob key to enter the Utility page.



3. Click the knob key to enter the System Information page where PPR model name, serial number, as well as firmware version are displayed.

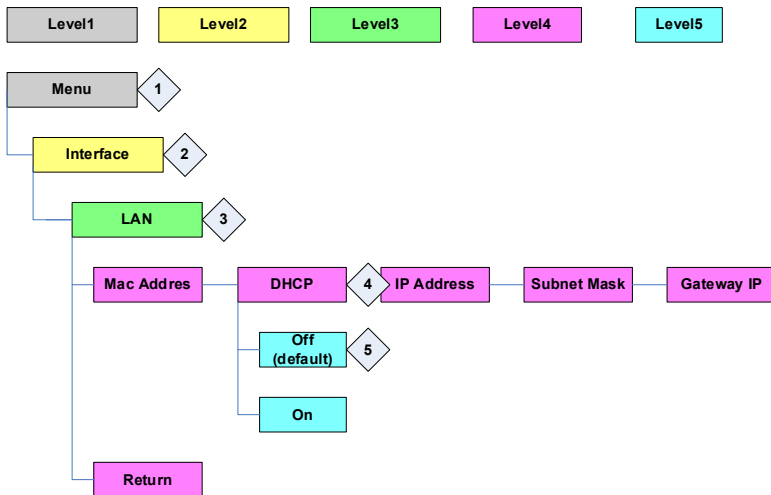


3.2 Menu Tree

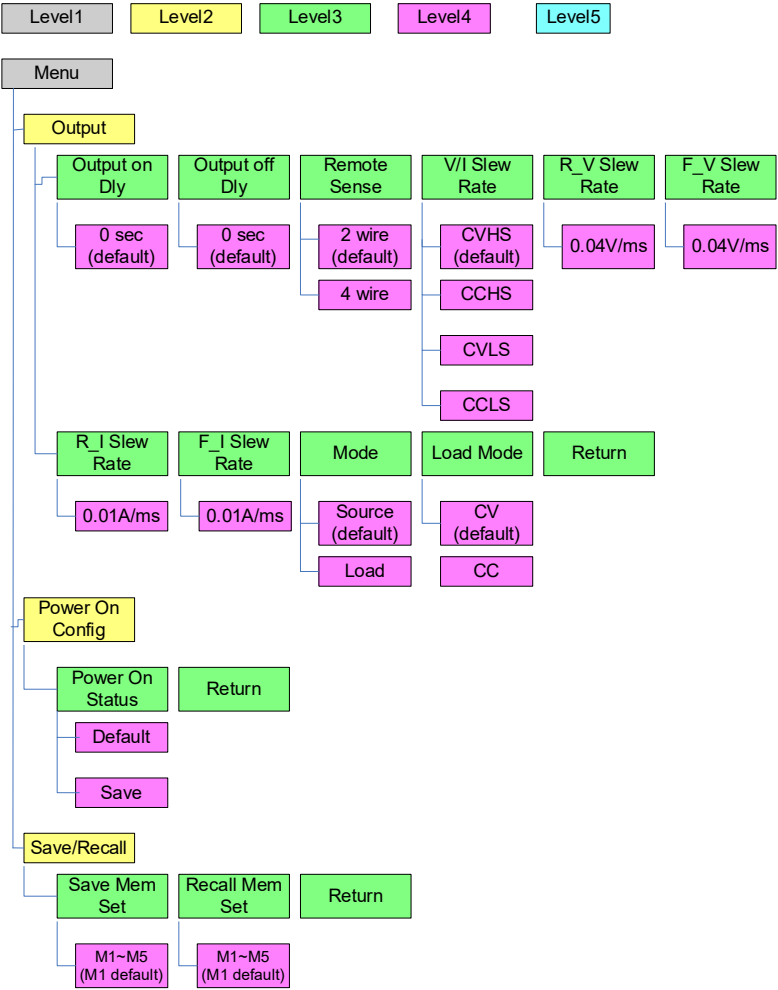
Convention Use the menu trees as a handy reference for the power supply functions and properties. The PPR menu system is arranged in a hierarchical tree. Each hierarchical level, which is coated in varied colors, can be navigated through the orders within the diagrams below.

For example: To set the measurement average high:

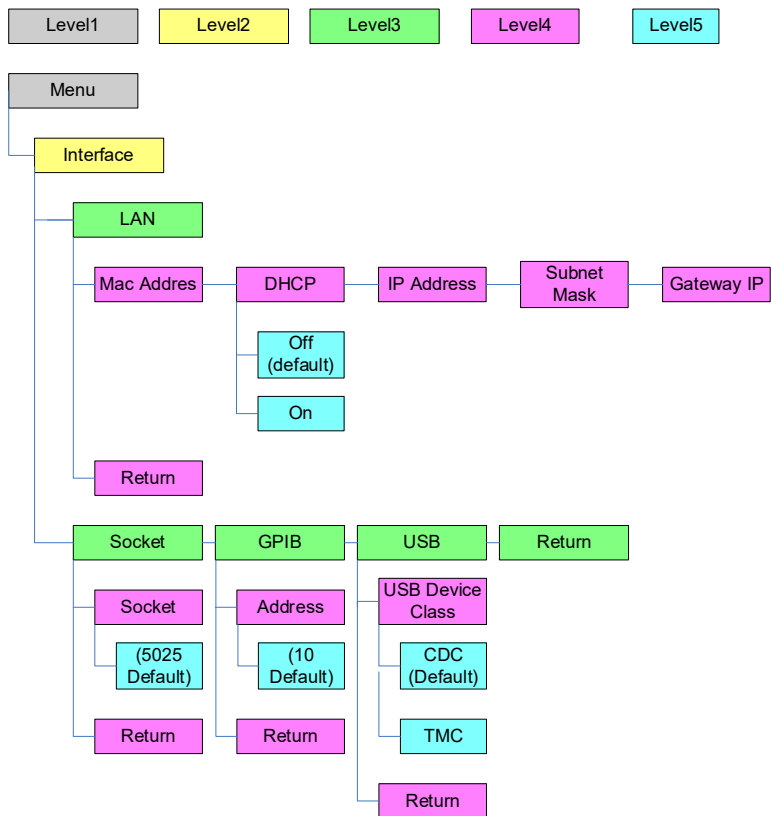
- ① Press the Menu key.
- ② Navigate to the Interface option.
- ③ Enter the LAN option.
- ④ Enter the DHCP option.
- ⑤ Select Off



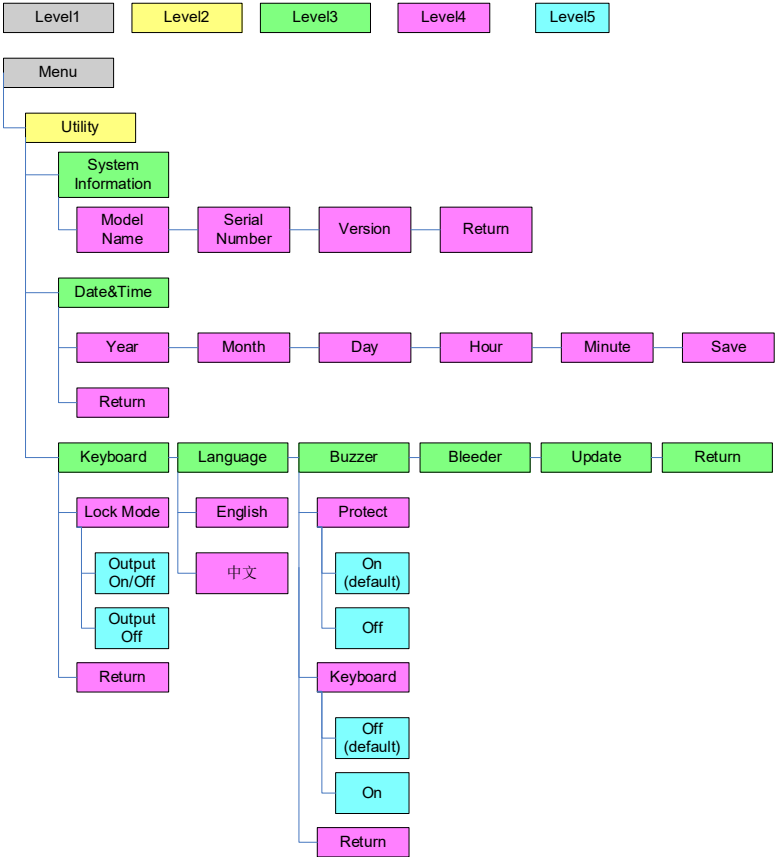
3.2.1 Menu Page - 1



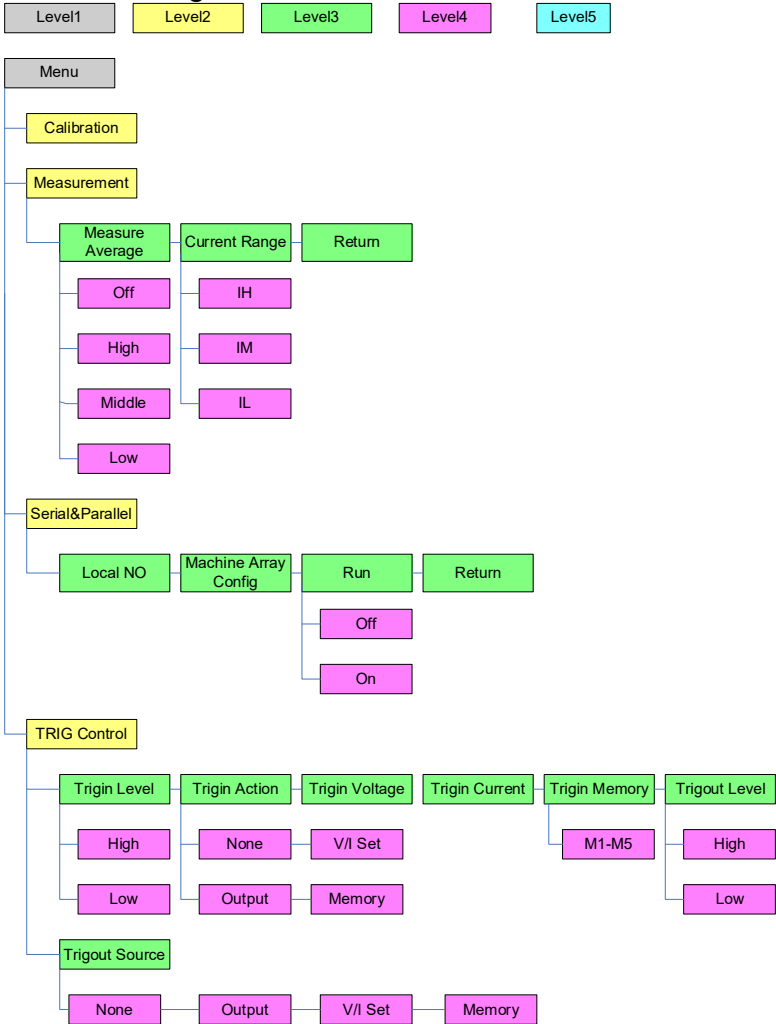
3.2.2 Menu Page - 2



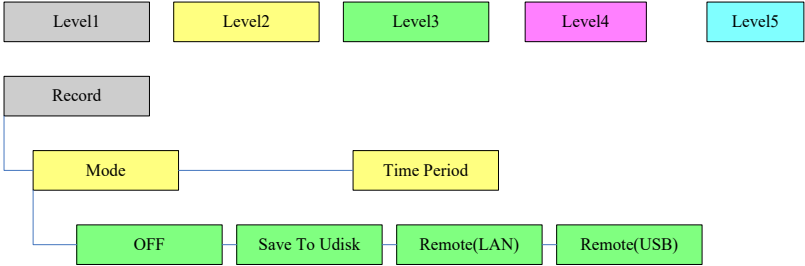
3.2.3 Menu Page - 3



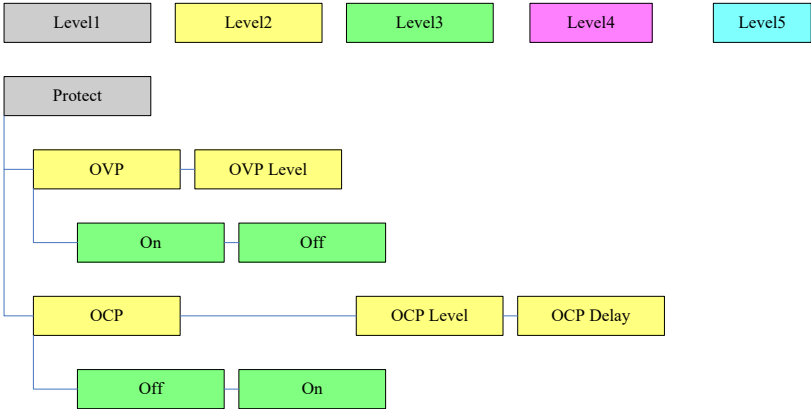
3.2.4 Menu Page - 4



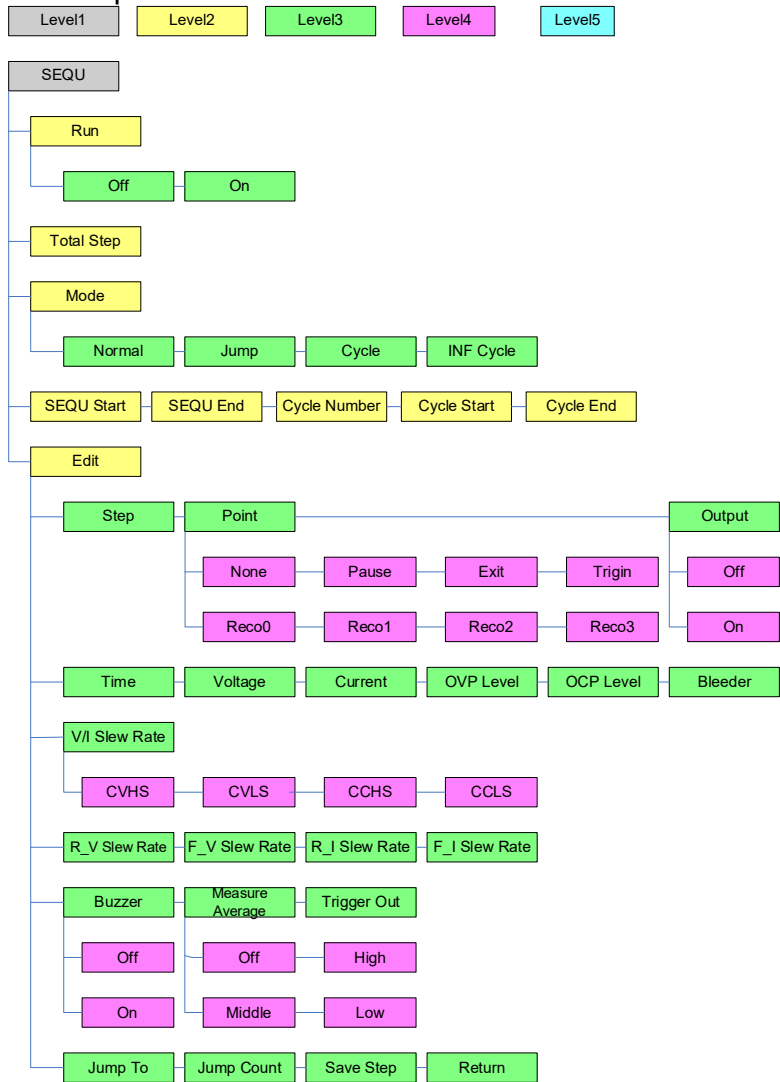
3.2.5 Record



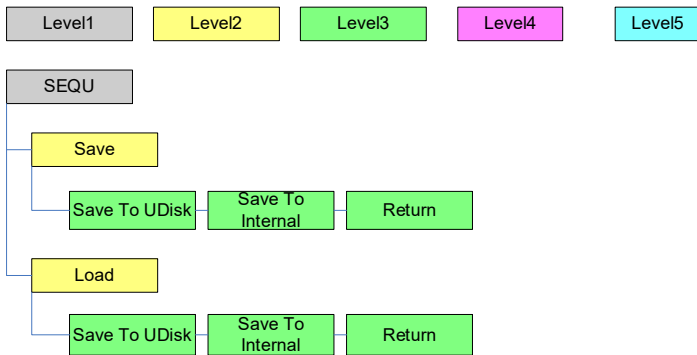
3.2.6 Protect



3.2.7 Sequence-1



3.2.8 Sequence-2



3.3 Basic Operation

This section describes the basic operations required to operate the power supply.

3.3.1 Setting OVP/OCP Levels

Background The OVP level and OCP level has a selectable range that is based on the output voltage and output current, respectively. The OVP and OCP level is set to the highest level by default. The actual selectable OVP and OCP range depends on the PPR.

When one of the protection measures are on, the type of alarm message will be shown on display. Press Shift + PROT key to clear any protection alarm messages that have been tripped. By default, the output will turn off when the OVP or OCP protection levels are tripped.

Before setting the protection settings:

- Ensure the load is not connected.
- Ensure the output is turned off.

Steps

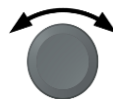
1. Press the PROT key to enter the Protect page.



2025/04/23		
Protect		16:15:03
OVP		On
OVP Level	22.00	V
OCP		On
OCP Level	5.500	A
OCP Delay	0.20	s

Enable/Disable OVP and OCP

2. Scroll the knob key to move between OVP/OCP fields. Click the knob key to enter each field, respectively. Scroll the knob key to turn ON/OFF the function. Further click the knob key again to confirm your setting.
Option On,Off



Setting the Protection Level

3. Scroll the knob key to move among OVP/OCP Level fields. Click the knob key to enter each field, respectively. Scroll the knob key to adjust value, along with the arrow keys to change among digits followed by clicking the knob key to confirm set value.

Model	OCP	OVP
PPR12-5	0.25 A to 5.5 A	1 V to 22 V
PPR32-3	0.15 A to 3.3 A	1.8 V to 35.2 V

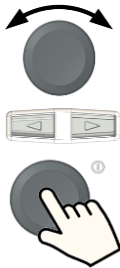
2025/04/23		
Protect		16:15:03
OVP		On
OVP Level	22.00	V
OCP		On
OCP Level	5.500	A
OCP Delay	0.20	s



- The OVP setting range is from 5 % to 110 % of the rated output voltage.
- The OCP setting range is from 5 % to 110 % of the rated output current.

Setting the
Delay Time

4. Scroll the knob key to move between OCP Delay fields. Click the knob key to enter each field, respectively. Scroll the knob key to adjust value, along with the arrow keys to change among digits followed by clicking the knob key to confirm set value.

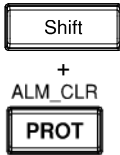


Setting Range OCP Delay : 0.20 s to 2.50 s

2025/04/23		
Protect 16:16:51		
OVP		On
OVP Level	22.00	V
OCP		On
OCP Level	5.500	A
OCP Delay	0.20	s

Clear
OVP/OCP
protection

The OVP and OCP protection can be cleared after it has been tripped by clicking Shift key + ALM CLR key.



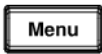
3.3.2 Set to C.V. Priority Mode

When setting the power supply to constant voltage mode, a current limit must also be set to determine the crossover point. When the current exceeds the crossover point, the mode switches to C.C. mode. For details about C.V. operation.

C.C. and C.V. mode have two selectable slew rates: High Speed Priority and Slew Rate Priority. High Speed Priority will use the fastest slew rate for the instrument while Slew Rate Priority will use a user-configured slew rate.

Background Before setting the power supply to C.V. mode, ensure:
The output is off.
The load is connected.

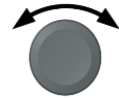
Steps 1. Press the Menu key followed by clicking on Output to enter the Output page.



2023/09/14	
Menu	09:24:58
Output	
Power On Config	
Save/Recall	
Interface	
Utility	
Calibration	
Measurement	

2. Scroll the knob key to move to the V/I Slew Rate field followed by clicking the knob key to enter the field.

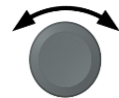
2023/09/14	
Output	09:34:48
Remote Sense	2 Wire
V/I Slew Rate	CVHS
R_V Slew Rate	0.0400V/ms
F_V Slew Rate	0.0400V/ms
R_I Slew Rate	0.01000A/ms
F_I Slew Rate	0.01000A/ms
Mode	Source



3. Scroll the knob key to select between CVHS(CV High Speed Priority) and CVLS (CV Slew Rate Priority) options.

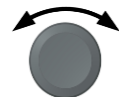
Options CVHS = CV High Speed Priority
CVLS = CV Slew Rate Priority

4. Press the knob key to save the selected option.

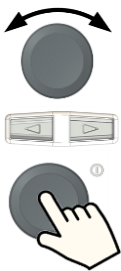


5. When CV Slew Rate Priority was chosen as the operating mode, scroll knob key to R_V Slew Rate and F_V Slew Rate fields followed by clicking knob key to enter the fields, respectively.

2023/09/14	
Output	09:35:32
Remote Sense	2 Wire
V/I Slew Rate	CVLS
R_V Slew Rate	0.0001V/ms
F_V Slew Rate	0.0400V/ms
R_I Slew Rate	0.01000A/ms
F_I Slew Rate	0.01000A/ms
Mode	Source



6. Scroll the knob key to adjust value, along with the arrow keys to change among digits followed by clicking the knob key to confirm set value, respectively.

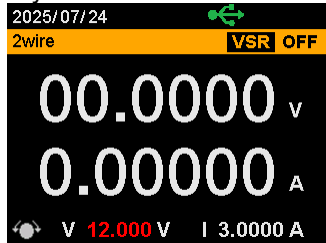
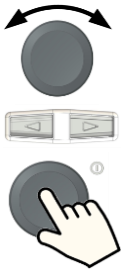


Model	R_V Slew Rate/ F_V Slew Rate Setting Range	
	Max. Value	Min. Value
PPR32-3	0.0001 V/ms	0.04 V/ms
PPR12-5	0.0001 V/ms	0.04 V/ms

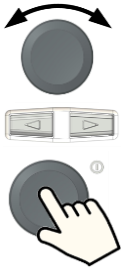
7. Press the Menu key again to return to the main screen.



8. Scroll the knob key to move to V Set. Click knob key followed by scrolling knob key, along with the arrow keys to change among digits, to set the voltage. Click knob key to confirm the set value.



9. Scroll the knob key to move to I (A) Set. Click knob key followed by scrolling knob key, along with the arrow keys to change among digits, to set the current limit (crossover point). Click knob key to confirm the set value.



10. Press the Output key. The Output key becomes illuminated.



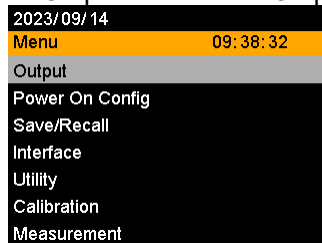
3.3.3 Set to C.C. Priority Mode

When setting the power supply to constant current mode, a voltage limit must also be set to determine the crossover point. When the voltage exceeds the crossover point, the mode switches to C.V. mode. For details about C.C. operation/ C.C. and C.V. mode have two selectable slew rates: High Speed Priority and Slew Rate Priority. High Speed Priority will use the fastest slew rate for the instrument while Slew Rate Priority will use a user-configured slew rate.

Background Before setting the power supply to C.C. mode, ensure:

- ☐ The output is off.
- ☐ The load is connected.

Steps 1. Press the Menu key followed by clicking on Output to enter the Output page.



2. Scroll the knob key to move to the V/I Slew Rate field followed by clicking the knob key to enter the field.



2023/09/14	
Output	09:40:42
Remote Sense	2 Wire
V/I Slew Rate	CCHS
R_V Slew Rate	0.0001V/ms
F_V Slew Rate	0.0400V/ms
R_I Slew Rate	0.01000A/ms
F_I Slew Rate	0.01000A/ms
Mode	Source

3. Scroll the knob key to select between CCHS (CC High Speed Priority) and CCLS (CC Slew Rate Priority) options.



Options

CCHS= CC High Speed Priority

CCLS= CC Slew Rate Priority

4. Press the knob key to save the selected option.

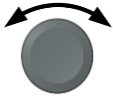


5. When CC Slew Rate Priority was chosen as the operating mode, scroll knob key to R_C Slew Rate and F_C Slew Rate fields followed by clicking knob key to enter the fields, respectively.



2023/09/14	
Output	09:41:17
Remote Sense	2 Wire
V/I Slew Rate	CCLS
R_V Slew Rate	0.0001V/ms
F_V Slew Rate	0.0400V/ms
R_I Slew Rate	0.00001A/ms
F_I Slew Rate	0.01000A/ms
Mode	Source

6. Scroll the knob key to adjust value, along with the arrow keys to change among digits followed by clicking the knob key to confirm set value, respectively.



Model	R_C Slew Rate / F_C Slew Rate Setting Range	
	Max. Value	Min. Value
PPR32-3	0.00001 A/ms	0.01 A/ms
PPR12-5	0.00001 A/ms	0.01 A/ms

7. Press the Menu key again to return to the main screen.



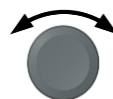
8. Scroll the knob key to move to V Set. Click knob key followed by scrolling knob key, along with the arrow keys to change among digits, to set the voltage limit (crossover point).



Click knob key to confirm the set value.



9. Scroll the knob key to move to I (A) Set. Click knob key followed by scrolling knob key, along with the arrow keys to change among digits, to set the current. Click knob key to confirm the set value.



10. Press the Output key. The Output key becomes illuminated.



3.3.4 Display Modes

The PPR series power supplies allow you to view the output in 3 different modes: General (V/A), Power (V/A/W), Sequence(V/A/Sequence).

Steps

1. Press the Display key on main screen to toggle among each mode.



V and A



V, A and W



V, A and Sequence



2. Scroll the knob key to change between V and I (A) Set fields. Click the Knob key followed by scrolling it to adjust value, along with the arrow keys to change among digits followed by click knob key again to confirm value.



Note

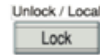
When sequence mode is selected, V and I set can Not be modified here.

3.3.5 Panel Lock

The panel lock feature prevents settings from being changed accidentally. When activated, all keys including the knob key except the Shift key, Lock(Unlock/Local)key and Output key (if active) will be disabled.

If the instrument is remotely controlled via the USB/LAN/GPIB interface, the panel lock is automatically enabled.

Activate the panel lock Press the Lock (Unlock/Local)key to activate the panel lock. The lock icon will be shown on display.



Disable the panel lock Press the Shift key followed by the Lock (Unlock/Local)key to disable the panel lock. The lock icon will thus be cleared from display.



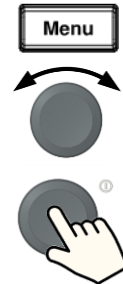
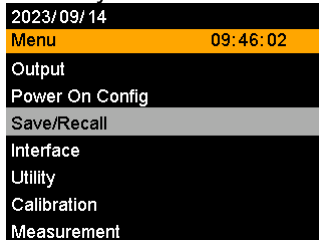
Note

By default, the output key is disabled when lock function is activated. However, if Output On/Off function is selected under Utility section, the output key can be tuned On/Off even though the lock mode is activated.

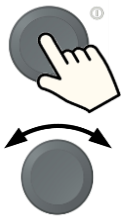
3.3.6 Save Setup

The PPR has up to 5 memory storage (M1 to M5) to save the set current, set voltage, OVP and OCP settings.

- Steps**
1. Press the Menu key to enter the Menu page.
 2. Scroll the knob key to move to the Save/Recall field followed by clicking the knob key to enter the Save/Recall page.



3. Click knob key to enter the Save Mem Set field followed by scrolling knob key to select one of the options for saving setting. Click knob key again to confirm the saving.



Options

M1 ~ M5

2023/09/14	
Save/Recall	09:47:12
Save Mem Set	M3
Recall Mem Set	M3
Return	

3.3.7 Recall Setup

The PPR has up to 5 memory storage (M1 to M5) to recall the set current, set voltage, OVP and OCP settings.

Recall
Memory
from
Save/Recal
l

1. Press the Menu key to enter the Menu page.



2. Scroll the knob key to move to the Save/Recall field followed by clicking the knob key to enter the Save/Recall page.



2023/09/14	
Menu	09:46:02
Output	
Power On Config	
Save/Recall	
Interface	
Utility	
Calibration	
Measurement	

3. Scroll knob key to move to the Recall Mem Set field. Click knob key to enter the field followed by scrolling knob key to select one of the options to recall setting. Click knob key again to confirm.



Options
M1 to M5

2023/09/14	
Save/Recall	09:47:12
Save Mem Set	M3
Recall Mem Set	M3
Return	

3.3.8 Remote Sense

Remote sense is used to compensate for the voltage drop seen across load cables due to the resistance inherent in the load cables. The remote sense terminals are connected to the load terminals to determine the voltage drop across the load cables. Remote sense can compensate up to 0.5 volt for PPR. Load cables should be chosen with a voltage drop less than the compensation voltage.



Warning

Ensure the output is off before handling the remote sense connector.

Use sense cables with a voltage rating exceeding the isolation voltage of the power supply.

Never connect sensing cables when the output is on. Electric shock or damage to the power supply could result.

Output
terminal
Connector
Overview

When using the remote sensing, make sure the wires that are used follow the following guidelines:

Wire gauge: AWG 20 to AWG 14
Strip length: 6.5 mm // 0.26 in
+S: + Sense terminal
-S: - Sense terminal



+S -S

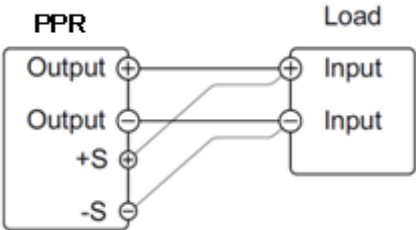


Note

Be sure to remove the Sense joining cables so the units are not using local sensing.

Single Load

1. Connect the +S terminal to the positive potential of the load. Connect the -S terminal to the negative potential of the load.



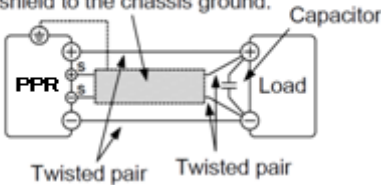
2. Operate the instrument as normal. See the Basic Operation chapter for details.

Wire
Shielding
and Load line
impedance

To help to minimize the oscillation due to the inductance and capacitance of the load cables, use an electrolytic capacitor in parallel with the load terminals.

To minimize the effect of load line impedance use twisted wire pairing.

Shield the sense wires and connect the shield to the chassis ground.

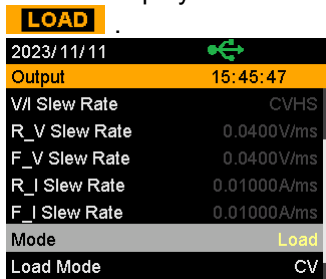


3.3.9 Load Function

Description PPR series can be set to the Load Mode function, under which both series/ parallel and Sequence function are Not available.



Parameter Description Load Under PWR. mode, press menu->output->mode to enter the Load mode. LCD will display the status



Vset Set rating range of voltage value under constant voltage mode of load:
3.000V-32.000V (PPR32-3)
3.000V-20.000V (PPR12-5)

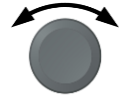
Iset Set rating range of current value under constant current mode of load :
0.0000A-3.0000A (PPR32-3)
0.0000A-5.0000A (PPR12-5)

Others OPP : Fixed 100W, non-revisable
OVP/OCP : indential to Source

Parameter setting Vset 1.Press the Menu key followed by clicking on Output to enter the Output page.



2.Scroll the knob key to move to the Load Mode field followed by clicking the knob key to enter the field.



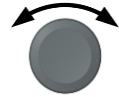
3.Scroll the knob key to select CV options.



Options

CC = Constant Current Mode

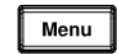
CV = Constant Voltage Mode



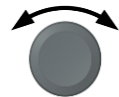
4.Press the knob key to save the selected option.



5.Press the Menu key again to return to the main screen.

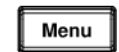


6.Scroll the knob key to move to V Set. Click knob key followed by scrolling knob key, along with the arrow keys to change among digits, to set the voltage. Click knob key to confirm the set value.

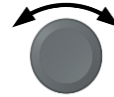


Iset

1.Press the Menu key followed by clicking on Output to enter the Output page.



2.Scroll the knob key to move to the Load Mode field followed by clicking the knob key to enter the field.



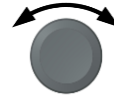
3.Scroll the knob key to select CC options.



Options

CC = Constant Current Mode

CV = Constant Voltage Mode



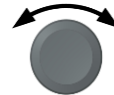
4.Press the knob key to save the selected option.



5.Press the Menu key again to return to the main screen.



6.Scroll the knob key to move to I (A) Set. Click knob key followed by scrolling knob key, along with the arrow keys to change among digits, to set the current. Click knob key to confirm the set value.

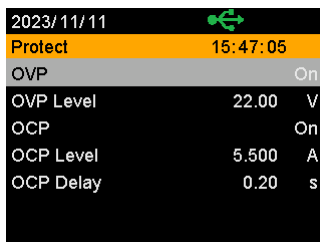


Iset



OVP/O
CP

The setting method is identical to Source.



Operation ON/
OFF Press the Output key. The Output key becomes illuminated.



Note

The voltage ($\geq 1V$) or --.---(<1V) pertaining to port appears when Output is Off.



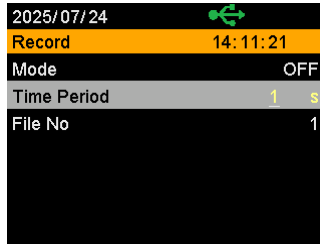
3.3.10 Record

The PPR series can save measured voltage, current and time data into either USB flash disk or send the data to program via remote control. After rebooting, the record function will be automatically disabled, and the record parameters will return to the default settings.

Steps

1. Press the RECO key to enter the Recorder page.
2. Scroll the knob key to move to the Sample Period field, which determines the interval of data log saving. Click knob key followed by scrolling it to adjust value, along with the arrow keys to change among digits. Click knob key again to confirm set period. Range 1s to 999s





3. Scroll the knob key to move to the Type field. Click knob key followed by scrolling it to select a type for data log saving. Click knob key to confirm setting.

Type

None

No action will be executed.

Save to Udisk

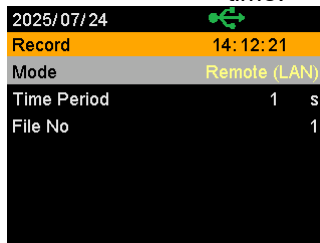
Save data log into USB flash drive. It is required to insert USB flash drive first.

Remote(LAN)

Send data log to remote side via LAN in real time.

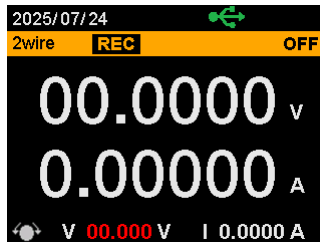
Remote(USB)

Send data log to remote side via USB in real time.



Recorder icon in main display

When Recorder is activated, the RECO icon will be shown on the main screen.



**Note**

When the Save USB is selected, make sure that return to Data Logger page to select None for Type so that the latest data file can be saved properly.

Owing to the fact that data log is being transmitted in real time via remote control, when the Remote is selected, there is no need to return to Data Logger page to select None for Type.

3.4 Sequence Test

This section describes how to use the Sequence function to edit, run, load and save sequence scripts for automated testing. The sequence function is useful if you want to perform a number of tests automatically. The PPR sequence function can store up to 5 test scripts in internal memory and also into the connected USB flash drive.

Each test script can also be programmed in a scripting language. For more information on how to create sequence scripts via programs, please contact TEXIO TECHNOLOGY.

After rebooting, the sequence function will be automatically disabled, and the sequence parameters will return to the state before shutdown.

3.4.1 Sequence Script File Format

Background The sequence script files are saved in the *.csv file format. When saving script file into internal memory, each file is saved as file X.csv where X is the file number from 1 to 5. When saving script file into the USB flash drive, each file is saved as SEQU_X.csv where X is the file serial number from 1 to 255.

3.4.2 Sequence Script Settings

Background This section mainly introduces the settings within the Sequence page.

Run It runs sequence script automatically. A script can be saved in or loaded from the internal memory or USB flash drive. Once the Run field is turned On, return to the main display followed by pressing Output key to initiate the set sequence script.

Run On, Off

Total Step	It determines the total steps for a sequence script. Each step can be edited from the Edit field. Total Step 1 to 999
Mode	Normal :It sets Normal Mode. Jump :It sets Jump Mode. Cycle :It sets cycle Mode. INF Cycle :It indicates infinite cycles.
SEQU Start	It sets which step is the starting step of an entire sequence script. Be aware that this Start step can only be set equal to or earlier than the "Cycle Start".
SEQU End	It sets which step is the end step of an entire sequence script. Be aware that this End step can only be set equal to or later than the "Cycle End".
Cycle Number	It sets how many cycles will be repeated. For example, when a script consists of 6 steps and cycle number is set 3, the sequence runs the script, which contains step 1 to 6, for 3 times in a row. Cycle Number 1 to 999 It sets cycle(s) from 1 to 999 times.
Cycle Start	It sets which step is the starting step of cycle. The available steps options vary per total steps. Cycle Start 1 to 999 It sets which step is the starting point of cycle.
Cycle End	It sets which step is the end step of cycle. The available steps options vary per total steps. Cycle End 1 to 999 It sets which step is the end point of cycle.
Save	It saves a select sequence script into either internal memory or the connected USB flash drive. Save From Edit To select currently edited script as a source of script to be saved. SEQU If connected USB flash drive contains saved _X.csv scripts, the files are available to select. Save To Internal File To save the selected source script into a X.csv select internal memory from no. 1 to 5. Save To USB SEQU To save the selected source script into the _X.csv USB flash drive from no. 001 to 255.

Load It loads a select sequence script from either connected USB flash drive or internal memory. Note that when USB flash drive is plugged in, memory from USB flash drive will prioritize over internal memory.

File X.csv / To load script from USB flash
 SEQU_X.csv drive (SEQU_X.csv) or
 internal memory (File X.csv).



Note

When there is any issue occurred from settings, PPR series will not be able to run sequence script. The error code along with warning message will be shown within the prompt message box when Run filed is enabled.

3.4.3 Sequence Step Edit Settings

Background This section mainly introduces the settings within the Sequence Edit page, which is used to edit several parameters for each step.

Step To select which step to be edited. The available option(s) depends on the total step setting.

Step 1 to 999

Point It sets a core action for select step. The available options are described as follows.

Point

None

Pause

It sets which step will be paused during a sequence script. When a sequence is paused, press Test key to continue running the sequence.

Exit

It sets which step is the exit step of an entire sequence script. Generally, a sequence script can be executed again after finishing by pressing Output key. However, when Exit step is set, the sequence function won't be executed again after finishing by Output key directly.

RECO 0

It sets which step will be executed in stop action for the data log function. This relates to the RECO 1 ,RECO 2 and RECO 3 actions as the following sections.

	RECO 1	It sets which step will be executed in the action of saving data log into USB flash drive. Once a sequence script runs to this step, data log will be kept saving into USB flash drive instantly until next RECO 0 action is met.
	RECO 2/RECO 3	It sets which step will be executed in the action of sending data log to remote control side. Once a sequence script runs to this step, data log will be kept sending to remote control side until next RECO 0 action is met. RECO 2---USB CDC, RECO 3--LAN
	Trigin	It sets which step will be executed by trig-in signal. The Trig in step will be held until trig-in signal is received by PPR series unit.
Output	It sets if power output will be activated for the select step.	
	Output	ON, OFF
Time	It sets time duration of execution for the select step.	
	Time	0.1 s to 999.99 s
Voltage	It sets output voltage of CV mode for the select step.	
	Voltage	0 V to 105 % rated voltage
Current	It sets output limit current of CC mode for the select step.	
	Current	0 V to 105 % rated current
OVP Level	It sets over voltage protection setting for the select step.	
	OVP Level	5 % to 110 % rated voltage
OCP Level	It sets over current protection setting for the select step.	
	OCP Level	5 % to 110 % rated current
Bleeder	It enables or disables discharge loop control for the select step.	
	Bleeder	None, ON, OFF

V/I Slew Rate	It sets High Speed Priority and Slew Rate Priority of CV and CC modes for the select step. V/I Slew Rate CVHS It utilizes the fastest slew rate of CV mode. CCHS It utilizes the fastest slew rate of CC mode. CVLS It utilizes the user-configured slew rate of CV mode. When this option is selected, go to configure the R_V slew Rate (rising) and F_V slew rate (falling) settings, respectively. CCLS It utilizes the user-configured slew rate of CC mode. When this option is selected, go to configure the R_C slew Rate (rising) and F_C slew rate (falling) settings, respectively.
Buzzer	It enables or disables buzzer sound for the select step. Buzzer ON, OFF
Measure Average	It sets the speed level of display sampling for the measure average setting for the select step. More the average numbers (High), slower the display update. Measure Off, Low, Middle, High Average
Jump To	It sets the target step to jump to. For example, when step 5 is set for Jump To under the step 2 Edit page, it means that when sequence runs to step 2, it will directly jump to step 5 at the end of step 2. The available step option(s) depends on the total step setting. Jump To 1 to 999
Jump Count	It sets the number of times to loop the Jump To step action. Jump Count 1 to 999
Trigger Out	It sets if trigger out signal will be transmitted when the sequence runs to the step. Trigger Out ON, OFF
Save Step	To select which step to be saved.



Note

When there is any issue occurred from settings, PPR series will not be able to run sequence script. The error code along with warning message will be shown within the prompt message box when Run filed is enabled.

3.4.4 Setting Sequence Script Configurations

Steps

1. Press SEQU key followed by clicking on Sequence field via knob key to enter the Sequence page.



2023/09/14	
Sequence	09:47:44
Run	Off
Total Step	4
Mode	Cycle
SEQU Start	1
SEQU End	4
Cycle Number	1
Cycle Start	1

2. Scroll knob key to move to the Total Step field followed by clicking knob key to enter the field. Scroll knob key to adjust value along with arrow keys to change among digits followed by clicking knob key to confirm total steps.



Total 1 to 999
Step

2023/09/14	
Sequence	09:47:53
Run	Off
Total Step	4
Mode	Cycle
SEQU Start	1
SEQU End	4
Cycle Number	1
Cycle Start	1



3. Mode

2023/09/14	
Sequence	09:48:48
Run	Off
Total Step	4
Mode	Normal
SEQU Start	1
SEQU End	4
Cycle Number	1
Cycle Start	1

4. SEQU Start

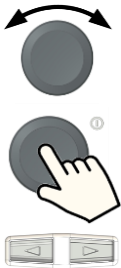
2023/09/14	
Sequence	09:49:13
Run	Off
Total Step	4
Mode	Normal
SEQU Start	1
SEQU End	4
Cycle Number	1
Cycle Start	1

5. SEQU End

2023/09/14	
Sequence	09:49:19
Run	Off
Total Step	4
Mode	Normal
SEQU Start	1
SEQU End	4
Cycle Number	1
Cycle Start	1

6. Scroll knob key to move to the Cycle Number field followed by clicking knob key to enter the field. Scroll knob key to adjust value along with arrow keys to change among digits followed by clicking knob key to confirm cycle number.

Cycle Number 1 to 999



2023/09/14	
Sequence	09:50:19
Total Step	4
Mode	Cycle
SEQU Start	1
SEQU End	4
Cycle Number	1
Cycle Start	1
Cycle End	4

7. Scroll knob key to move to the Cycle Start field followed by clicking knob key to enter the field. Scroll knob key to adjust value along with arrow keys to change among digits followed by clicking knob key to confirm cycle start.

Cycle 1 to 999
Start

2023/09/14	
Sequence	09:50:32
Total Step	4
Mode	Cycle
SEQU Start	1
SEQU End	4
Cycle Number	1
Cycle Start	1
Cycle End	4



8. Scroll knob key to move to the Cycle End field followed by clicking knob key to enter the field. Scroll knob key to adjust value along with arrow keys to change among digits followed by clicking knob key to confirm cycle end.

Cycle 1 to 999
End

2023/09/14	
Sequence	09:50:50
Total Step	4
Mode	Cycle
SEQU Start	1
SEQU End	4
Cycle Number	1
Cycle Start	1
Cycle End	4



9. Scroll knob key to move to the Edit field followed by clicking knob key to enter the Sequence Edit page.

2023/09/14	
Edit	09:52:03
Step	1
Point	None
Output	On
Time	0.90 S
Voltage	2.000 V
Current	1.0000 A
OVP Level	21.0 V



10. Scroll knob key to move to the Step field followed by clicking knob key to enter the field. Scroll knob key to select a step along with arrow keys to change among digits followed by clicking knob key to confirm the step to edit.

2023/09/14		
Edit 09:52:20		
Step	1	
Point	None	
Output	On	
Time	0.90	S
Voltage	2.000	V
Current	1.0000	A
OVP Level	21.0	V



11. Scroll knob key to move to the Point field followed by clicking knob key to enter the field. Scroll knob key to select an action followed by clicking knob key to confirm the action for the step to edit.

Point None, Exit, Pause, Trigin,
 RECO 0, RECO 1,RECO
 2,RECO 3

2023/09/14		
Edit 09:53:22		
Step	1	
Point	None	
Output	On	
Time	0.90	S
Voltage	2.000	V
Current	1.0000	A
OVP Level	21.0	V



12. Scroll knob key to move to the Output field followed by clicking knob key to enter the field. Scroll knob key to turn on/off output followed by clicking knob key to confirm output action.

Output ON,OFF

2023/09/14		
Edit	09:53:54	
Step	1	
Point	None	
Output	On	
Time	0.90	S
Voltage	2.000	V
Current	1.0000	A
OVP Level	21.0	V



13. Scroll knob key to move to the Time field followed by clicking knob key to enter the field. Scroll knob key to adjust value along with arrow keys to change among digits followed by clicking knob key to confirm time setting.

Time 0.1 s to 999.99 s

2023/09/14		
Edit	09:54:08	
Step	1	
Point	None	
Output	On	
Time	0.90	S
Voltage	2.000	V
Current	1.0000	A
OVP Level	21.0	V



14. Scroll knob key to move to the Voltage field followed by clicking knob key to enter the field. Scroll knob key to adjust value along with arrow keys to change among digits followed by clicking knob key to confirm voltage setting.

Voltage 0 V to 105 % rated voltage

2023/09/14		
Edit	09:54:20	
Step	1	
Point	None	
Output	On	
Time	0.90	S
Voltage	2.000	V
Current	1.0000	A
OVP Level	21.0	V



15. Scroll knob key to move to the Current field followed by clicking knob key to enter the field. Scroll knob key to adjust value along with arrow keys to change among digits followed by clicking knob key to confirm current setting.

Current 0 A to 105 % rated current

2023/09/14		
Edit	09:54:31	
Step	1	
Point	None	
Output	On	
Time	0.90	S
Voltage	2.000	V
Current	1.0000	A
OVP Level	21.0	V



16. Scroll knob key to move to the OVP Level field followed by clicking knob key to enter the field. Scroll knob key to adjust value along with arrow keys to change among digits followed by clicking knob key to confirm OVP setting.

OVP 5 % to 110 % rated voltage
Level

2023/09/14	
Edit	09:54:44
Step	1
Point	None
Output	On
Time	0.90 S
Voltage	2.000 V
Current	1.0000 A
OVP Level	21.0 V



17. Scroll knob key to move to the OCP Level field followed by clicking knob key to enter the field. Scroll knob key to adjust value along with arrow keys to change among digits followed by clicking knob key to confirm OCP setting.

OCP 5 % to 110 % rated current
Level

2023/09/14	
Edit	09:54:57
Point	None
Output	On
Time	0.90 S
Voltage	2.000 V
Current	1.0000 A
OVP Level	21.0 V
OCP Level	5.25 A



18. Scroll knob key to move to the Bleeder field followed by clicking knob key to enter the field. Scroll knob key to turn on/off bleeder followed by clicking knob key to confirm bleeder action.

Bleeder ON,OFF



19. Scroll knob key to move to the V/I Slew Rate field followed by clicking knob key to enter the field. Scroll knob key to select an option followed by clicking knob key to confirm V/I slew rate setting.

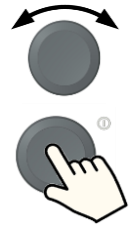
2023/09/14		
Edit 09:55:39		
OVP Level	21.0	V
OCP Level	5.25	A
V/I Slew Rate	CVLS	
R_V Slew Rate	0.210V/ms	
F_V Slew Rate	0.210V/ms	
R_I Slew Rate	0.0525A/ms	
F_I Slew Rate	0.0525A/ms	

V/I Slew Rate CVHS, CCHS, CVLS, CCLS

When CVLS is selected in previous step, scroll knob key to R_V Slew Rate and F_V Slew Rate fields respectively followed by clicking knob key to enter each field.

Scroll the knob key to adjust value, along with the arrow keys to change among digits followed by clicking knob key to confirm set value, respectively.

2023/09/14		
Edit 09:56:11		
OVP Level	21.0	V
OCP Level	5.25	A
V/I Slew Rate	CVLS	
R_V Slew Rate	0.001V/ms	
F_V Slew Rate	0.001V/ms	
R_I Slew Rate	0.0525A/ms	
F_I Slew Rate	0.0525A/ms	



When CCLS is selected in previous step, scroll knob key to R_C Slew Rate and F_C Slew Rate fields respectively followed by clicking knob key to enter each field.



Scroll the knob key to adjust value, along with the arrow keys to change among digits followed by clicking knob key to confirm set value, respectively.

2023/09/14	
Edit 09:56:54	
OVP Level	21.0 V
OCP Level	5.25 A
V/I Slew Rate	CCLS
R_V Slew Rate	0.001V/ms
F_V Slew Rate	0.001V/ms
R_I Slew Rate	0.0001A/ms
F_I Slew Rate	0.0125A/ms

20. Scroll knob key to move to the Buzzer field followed by clicking knob key to enter the field. Scroll knob key to turn on/off buzzer followed by clicking knob key to confirm buzzer setting.



2023/09/14	
Edit 09:57:12	
V/I Slew Rate	CVHS
R_V Slew Rate	0.001V/ms
F_V Slew Rate	0.001V/ms
R_I Slew Rate	0.0001A/ms
F_I Slew Rate	0.0125A/ms
Buzzer	On
Measure Average	Off

Buzzer ON,OFF

21. Scroll knob key to move to the Measure Average field followed by clicking knob key to enter the field. Scroll knob key to select an option followed by clicking knob key to confirm the setting.



2023/09/14	
Edit 09:57:30	
V/I Slew Rate	CVHS
R_V Slew Rate	0.001V/ms
F_V Slew Rate	0.001V/ms
R_I Slew Rate	0.0001A/ms
F_I Slew Rate	0.0125A/ms
Buzzer	On
Measure Average	Off

Measure Off, Low, Middle, High
Average

22. Scroll knob key to move to the Trigger Out field followed by clicking knob key to enter the field. Scroll knob key to turn on/off the function followed by clicking knob key to confirm the selection.



Trigger ON, OFF
Out

23. Scroll knob key to move to Jump To field followed by clicking knob key to enter the field. Scroll knob key to select a step number along with arrow keys to change among digits followed by clicking knob key to confirm step to jump to.



2023/09/14	
Edit 09:58:33	
F_I Slew Rate	0.0525A/ms
Buzzer	Off
Measure Average	Off
Jump To	2
Jump Count	1
Save Step	
Return	

Jump To 1 to 999



24. Scroll knob key to move to Jump Count field followed by clicking knob key to enter the field. Scroll knob key to select a count number along with arrow keys to change among digits followed by clicking knob key to confirm jump count.

2023/09/14	
Edit	09:58:56
F_I Slew Rate	0.0525A/ms
Buzzer	Off
Measure Average	Off
Jump To	3
Jump Count	8
Save Step	
Return	

Jump 1 to 999
Count

25. Repeat the previous step 9 to step 24 for each step individually within a sequence script.



3.4.5 Run Sequence Script

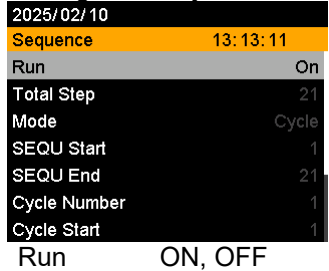
Overview After well setting the relevant configurations from Sequence and Sequence Edit pages, it is ready to launch a sequence script test. Also, it is available to load script from internal memory or the connected USB flash drive.

Steps 1. Press SEQU key followed by clicking on Sequence field via knob key to enter the Sequence page.

2023/09/14	
Sequence	09:59:39
Run	Off
Total Step	4
Mode	Jump
SEQU Start	1
SEQU End	4
Cycle Number	1
Cycle Start	1



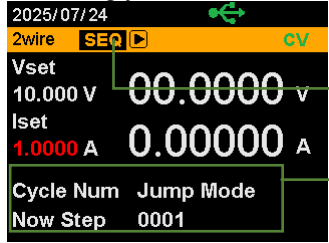
2. Scroll knob key to move to the Run field followed by clicking knob key to enter the field. Scroll knob key to turn On followed by clicking knob key to confirm setting.



3. The SEQ icon is displayed on the top banner accordingly.



4. Press the SEQU key to switch to display mode in which press Display key repeatedly until the V, A and Sequence mode is shown. The SEQ icon is displayed on the top banner accordingly.



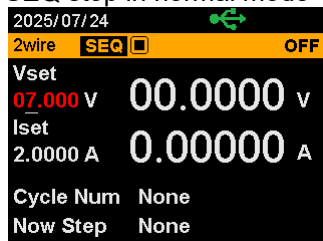
SEQ icon

Sequence info section

5. Press the Output key to execute the sequence script test. See the figures below for descriptions on varied conditions.



SEQ stop in normal mode



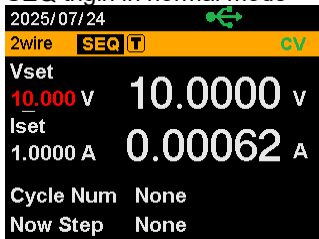
SEQ run in normal mode



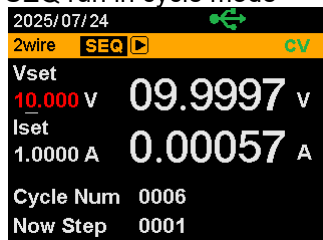
SEQ pause in normal mode



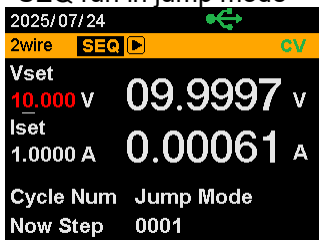
SEQ trigin in normal mode



SEQ run in cycle mode



SEQ run in jump mode



SEQ run in inf mode



Note

When a script is running, pressing the Output key will abort the execution of the script immediately. The Output key illumination will turn off.

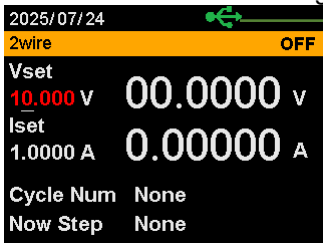
3.4.6 Load Sequence Script

Overview A sequence script can be loaded from either USB flash drive or internal memory. When USB flash drive is connected with PPR series, the script file in USB flash drive has higher priority over internal memory; that is, user can only load script file in USB flash drive when USB flash drive is plugged in. Prior to loading script from USB flash drive, ensure the script file is placed in root directory.

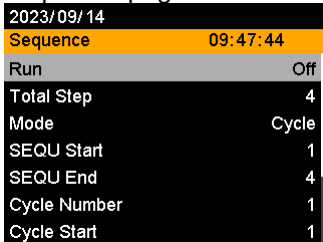
Load script from USB flash drive 1. Insert a USB flash drive into the front panel USB-A port. Ensure the USB flash drive contains a test script in root directory.



2. The icon of USB flash drive detection will be displayed on the upper status bar after a few seconds if the USB flash drive is recognized.



3. Press SEQU key followed by clicking on Sequence field via knob key to enter the Sequence page.



4. Scroll knob key to move to the Load field followed by clicking knob key to enter the field. Scroll knob key to select an available script from USB flash drive.(Format: SEQU X.csv).

2023/09/14	
Load	14:07:23
Load From Udisk	
Load From Internal	file 1
Return	



5. The prompt window appears as follows. Click knob key to confirm loading the select script file.



Load script from internal memory

1. Press SEQU key followed by clicking on Sequence field via knob key to enter the Sequence page.

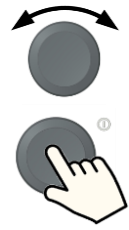
2023/09/14	
Sequence	09:47:44
Run	Off
Total Step	4
Mode	Cycle
SEQU Start	1
SEQU End	4
Cycle Number	1
Cycle Start	1



SEQU

2. Scroll knob key to move to the Load field followed by clicking knob key to enter the field. Scroll knob key to select an available script from internal memory (Format: File X.csv).

2023/09/14
Load 14:07:34
Load From Udisk
Load From Internal file 1
Return



3. The prompt window appears as follows. Click knob key to confirm loading the select script file.



3.4.7 Save Sequence Script

Overview A sequence script can be saved from either an edited one or USB flash drive to either internal memory or USB flash drive. Prior to saving script from USB flash drive, ensure the script file is placed in root directory. When saving script to USB flash drive, ensure USB flash drive is plugged into PPR series.

Save script from edited one to internal memory 1. Press SEQU key followed by clicking on Sequence field via knob key to enter the Sequence page.

2023/09/14
Sequence 09:47:44
Run Off
Total Step 4
Mode Cycle
SEQU Start 1
SEQU End 4
Cycle Number 1
Cycle Start 1



2. Scroll knob key to move to the Save To Internal field followed by clicking knob key to enter the field. Scroll knob key to select a target memory (Format: File X.csv).

2023/09/14	
Save	14:06:58
Save To UDisk	0
Save To Internal	file 1
Return	



3. Click knob key and the prompt window shows as follows. Click knob key again to confirm saving Edit to target File X.csv.



Save script from USB flash drive to internal memory

1. Insert a USB flash drive into the front panel USB-A port. Ensure the USB flash drive contains a test script in root directory.



2. The icon of USB flash drive detection will be displayed on the upper status bar after a few seconds if the USB flash drive is recognized.

3. Press Test key followed by clicking on Sequence field via knob key to enter the Sequence page.

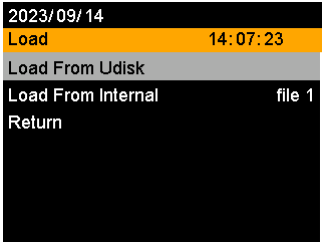
2023/09/14	
Sequence	09:47:44
Run	Off
Total Step	4
Mode	Cycle
SEQU Start	1
SEQU End	4
Cycle Number	1
Cycle Start	1



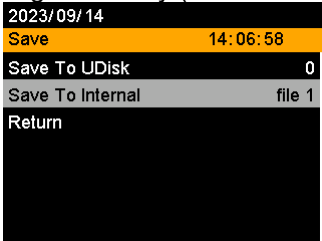
4. Scroll knob key to move to the Load field followed by clicking knob key to enter the Sequence Load page.



5. Click knob key to enter the Load From Udisk field followed by scrolling knob key to select a script file from USB flash drive (Format: SEQU_X.csv). Click knob key to confirm selection.



6. Scroll knob key to move to the Save To Internal field followed by clicking knob key to enter the field. Scroll knob key to select a target memory (Format: File X.csv).



7. Click knob key and the prompt window shows as follows. Click knob key again to confirm saving SEQU_X.csv to target File X.csv.



Save script from edited one to USB flash drive

1. Insert a USB flash drive into the front panel USB-A port.



2. The icon of USB flash drive detection will be displayed on the upper status bar after a few seconds if the USB flash drive is recognized.

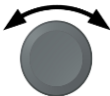
3. Press Test key followed by clicking on Sequence field via knob key to enter the Sequence page.

2023/09/14	
Sequence	09:47:44
Run	Off
Total Step	4
Mode	Cycle
SEQU Start	1
SEQU End	4
Cycle Number	1
Cycle Start	1

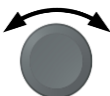


4. Scroll knob key to move to the Save To USB field followed by clicking knob key to enter the field. Scroll knob key to select a target memory (Format: SEQU_X.csv).

2023/09/14	
Save	14:06:58
Save To UDisk	0
Save To Internal	file 1
Return	



5. Click knob key and the prompt window shows as follows. Click knob key again to confirm saving Edit to target SEQU_X.csv.



4 MENU CONFIGURATION

4.1 Overview

The MENU configuration of PPR series consists of Output setting, Measurement setting, TRIG Control setting, PWR On Config setting, Save/Recall setting, Interface setting, Utility setting and Calibration setting. The last Calibration setting, which also includes System firmware update, is generally not recommended for end-user use.

4.2 Output

Output

On/Off

Delay

It delays turning the output on/off for a designated amount of time. Note that this function has a maximum deviation (error) of 20ms and is disabled when the output is set to external control.

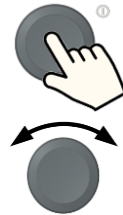
1. Press the Menu key followed by scrolling knob key to move to Output field.

2023/09/14	
Menu	09:24:58
Output	
Power On Config	
Save/Recall	
Interface	
Utility	
Calibration	
Measurement	



2. Click knob key to enter the Output page. Scroll knob key to move to Output On/Off Dly fields, respectively, followed by clicking knob key to enter each field.

2023/09/14	
Output	09:25:29
Output On Dly	00h:00m:00.00s
Output Off Dly	00h:00m:00.00s
Remote Sense	2 Wire
V/I Slew Rate	CVHS
R_V Slew Rate	0.0001V/ms
F_V Slew Rate	0.0400V/ms
R_I Slew Rate	0.00001A/ms



3. Click arrow keys to move among each unit (h:m:s). Scroll knob key to change value followed by clicking the knob key to confirm the set value.

Output On/Off 00h:00m:00.00s
 Delay 99h:59m:59.99s



Remote Sense

To determine 2 Wire or 4 Wire connection.

4. Scroll knob key to move to Remote Sense field followed by clicking knob key to enter the field.



5. Scroll the knob key to select option followed by clicking the knob key to confirm the selection.

2023/09/14	
Output	15:17:37
Output On Dly	00h:00m:00.00s
Output Off Dly	00h:00m:00.00s
Remote Sense	2 Wire
V/I Slew Rate	CVHS
R_V Slew Rate	0.0400V/ms
F_V Slew Rate	0.0400V/ms
R_I Slew Rate	0.01000A/ms

Remote 2 Wire, 4 Wire
 Sense



V/I Slew Rate

The C.V. and C.C. mode have two selectable slew rates: High Speed Priority(CVHS, CCHS)and Slew Rate Priority(CVLS, CCLS). High Speed Priority will use the fastest slew rate for the instrument while Slew Rate Priority will use a user-configured slew rate.

6. Scroll knob key to move to V/I Slew Rate field followed by clicking knob key to enter the field.

2023/09/14	
Output	09:34:48
Remote Sense	2 Wire
V/I Slew Rate	CVHS
R_V Slew Rate	0.0400V/ms
F_V Slew Rate	0.0400V/ms
R_I Slew Rate	0.01000A/ms
F_I Slew Rate	0.01000A/ms
Mode	Source



7. Scroll the knob key to select option followed by clicking the knob key to confirm the selection.

V/I Slew Rate CVHS, CVLS,
CCHS, CCLS



8. When CVLS or CCLS is selected, scroll knob key to R_V Slew Rate or F_V Slew Rate fields followed by clicking knob key to enter the fields, respectively.

2023/09/14	
Output	09:35:32
Remote Sense	2 Wire
V/I Slew Rate	CVLS
R_V Slew Rate	0.0001V/ms
F_V Slew Rate	0.0400V/ms
R_I Slew Rate	0.01000A/ms
F_I Slew Rate	0.01000A/ms
Mode	Source



9. Scroll the knob key to adjust value, along with the arrow keys to change among digits followed by clicking the knob key to confirm set value, respectively.



R_V Slew Rate / F_V Slew Rate Setting Range

Model	Max. Value	Min. Value
PPR32-3	0.0001 V/ms	0.04 V/ms
PPR20-5	0.0001 V/ms	0.04 V/ms

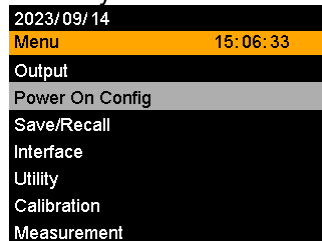
- Mode** It sets basic power function or Load mode function.
- Load Mode** The PPR series models have additional Load function with 2 modes: CV (Constant Voltage) and CC (Constant Current), all of which can be selected through the function keys on the front panel.

4.3 PWR On Config

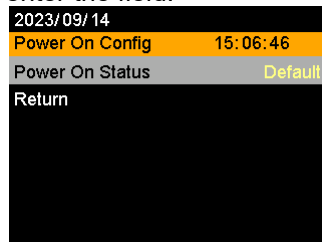
Power On Status It determines power output Default value when PPR unit is starting up.

- ☐ Default: non-modifiable factory default setting.
- ☐ Save: the last shut down status.

1. Press the Menu key followed by scrolling knob key to move to PWR On Config field.



2. Click knob key to enter the PWR On Config page. Scroll knob key to move to Power On Status field followed by clicking knob key to enter the field.



3. Scroll knob key to select option followed by clicking the knob key to confirm the selection.
- Power Save, Default
On
Status



4.4 Save/Recall

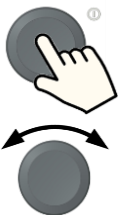
Save Mem Up to 5 memory setups (M1 to M5) can be saved to the
Set internal storage.

1. Press the Menu key followed by scrolling knob key to move to Save/Recall field.



2023/09/14	
Menu	15:07:02
Output	
Power On Config	
Save/Recall	
Interface	
Utility	
Calibration	
Measurement	

2. Click knob key to enter the Save/Recall page. Scroll knob key to move to Save Mem Set field followed by clicking knob key to enter the field.



2025/02/10	
Save/Recall	15:37:36
Save Mem Set	M1
Recall Mem Set	M1
Return	

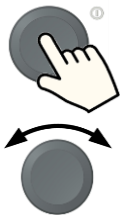
3. Scroll knob key to select an option followed by clicking the knob key to confirm the selection .Scroll knob key to move to OK followed by clicking knob key again to confirm save.
- Save M1 to M5
Mem Set



Recall Mem Set Up to 5 memory setups (M1 to M5) can be recalled from the internal storage

4. Scroll knob key to move to Recall Mem Set field followed by clicking knob key to enter the field.

2025/02/10	
Save/Recall	15:37:57
Save Mem Set	M1
Recall Mem Set	M1
Return	



5. Scroll knob key to select an option followed by clicking the knob key to confirm the selection .Scroll knob key to move to OK followed by clicking knob key again to confirm recall.

Recall Mem Set M1 to M5 From the internal memory M1 to M5.

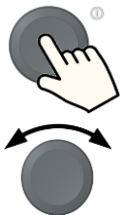


4.5 Interface

LAN The PPR series use the Ethernet LAN (Local Area Network) port for a number of different applications. Ethernet can be configured as a socket server.

1. Scroll knob key to move to LAN field followed by click knob key to enter the LAN page.

2025/02/10	
LAN	15:46:08
MAC Address	00:22:24:6A:B1:B9
DHCP	Off
IP Address	192.168.000.123
Subnet Mask	255.255.255.000
Gateway IP	192.168.000.001
Return	



2. There are several relevant settings for LAN interface as following details. Use knob key to scroll and click to configure each setting.



MAC Address	Displays the MAC address in 6 parts. This setting is not configurable. 0x00 to 0xFF
DHCP	Turns DHCP on or off .When DHCP is Off, the following IP Address, Subnet Mask, Gateway IP and DNS Address are configurable. Off, On
IP Address	Sets the default IP address. IP address 1 to 4 splits the IP address into four sections. 0 to 255, 0 to 255, 0 to 255, 0 to 255
Subnet Mask	Sets the subnet mask. The subnet mask is split into four parts. 0~255, 0~255, 0~255, 0~255
Gateway IP	Sets the gateway address. The gateway address is split into 4 parts. 0 to 255, 0 to 255, 0 to 255, 0 to 255
Socket	The Socket port is fixed in 5025 (Not configurable) and is specifically for when Ethernet LAN is configured as a socket server.

3. Scroll knob key to move to Socket field followed by click knob key to enter the Socket page.

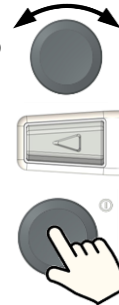
2025/02/10	
Socket	15:46:38
Socket	5025
Return	



4. The Socket info is as follows

Select Port The Socket port is fixed in 5025.

5. Scroll knob key to move to Return field followed by clicking knob key to return back to the previous page. Also, it is available to return by clicking the left arrow key.



GPIB The PPR series use the GPIB connector for basic remote control.

6. Scroll knob key to move to GPIB field followed by click knob key to enter the GPIB page.

2023/09/14	
GPIB	15:20:03
Address	10
Return	

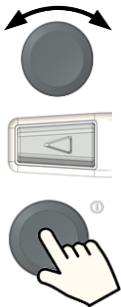


7. There is only an Address field for GPIB interface as the following detail. Use knob key to scroll and click to configure Address setting.



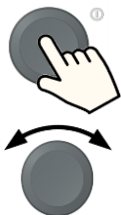
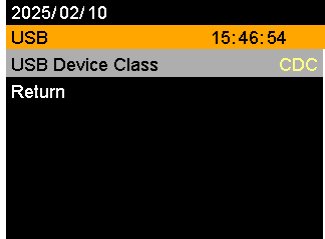
Address Displays the GPIB address.
1 to 30

8. Scroll knob key to move to Return field followed by clicking knob key to return back to the previous page. Also, it is available to return by clicking the left arrow key.



USB The PPR series use the USB B-type port for basic remote control.

9. Scroll knob key to move to USB field followed by click knob key to enter the USB page.

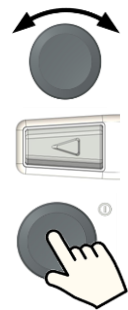


10. There is only an USB field for USB interface as the following detail. Use knob key to scroll and click to configure USB setting.



USB Device Class
Sets the USB Device Class.
CDC,TMC

11. Scroll knob key to move to Return field followed by clicking knob key to return back to the previous page. Also, it is available to return by clicking the left arrow key.

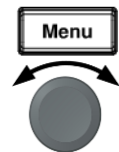


4.6 Utility

System Information
The system information including Model Name, Serial Number as well as Version of PPR series are shown in this section.

1. Press the Menu key followed by scrolling knob key to move to Utility field.

2023/09/14	
Menu	15:36:44
Save/Recall	
Interface	
Utility	
Calibration	
Measurement	
Serial&Parallel	
Screen Shot	



2. Click knob key to enter the Utility page. Scroll knob key to move to System Information field followed by clicking knob key to enter the System Information page.

2023/09/14	
System Information	15:37:06
Model Name	GPP_1323
Serial Number	GEY123456
Version	V1.1
Return	

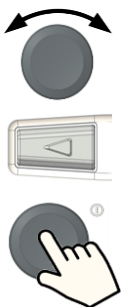


3. There is several information as the following details, which are displayed only and not configurable.



- Model Name The specific model's name of PPR series.
- Serial Number The serial number of PPR series.
- Version The firmware version of PPR series.

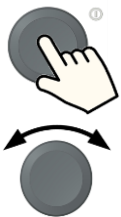
4. Scroll knob key to move to Return field followed by clicking knob key to return back to the previous page. Also, it is available to return by clicking the left arrow key.



Date & Time The system time of PPR series can be configured within this section.

5. Scroll knob key to move to Date & Time field followed by click knob key to enter the Date & Time page.

2023/09/14	
Date&Time	15:37:22
Year	2023
Month	9
Day	14
Hour	15
Minute	37
Save	
Return	

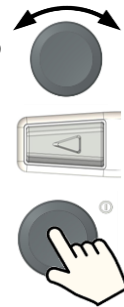


6. There are several relevant settings for Date & Time setting as following details. Use knob key to scroll and click to configure each setting.



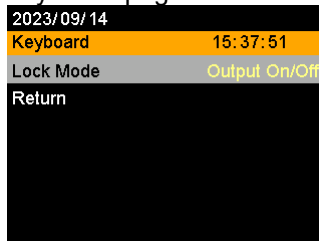
Year	To configure year field.
Month	To configure month field.
Day	To configure day field.
Hour	To configure hour field.
Minute	To configure minute field.
Save	To save the configured system time.

7. Scroll knob key to move to Return field followed by clicking knob key to return back to the previous page. Also, it is available to return by clicking the left arrow key.



Keyboard	Basically this section relates to Lock mode .It determines if power output is available when lock mode is activated.
----------	--

8. Scroll knob key to move to Keyboard field followed by click knob key to enter the Keyboard page.



9. There is only a Lock Mode field for Keyboard setting as the following detail. Use knob key to scroll and click to configure Lock Mode setting.



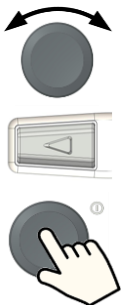
Lock Mode Output On/Off

Power output can be turned On/Off when lock mode is activated.

Output Off

Power output can only be turned Off when lock mode is activated.

10. Scroll knob key to move to Return field followed by clicking knob key to return back to the previous page. Also, it is available to return by clicking the left arrow key.

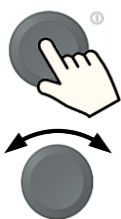


Buzzer

It turns the buzzer sound On or Off when either protection alarm function is tripped or keyboard entry is engaged.

11. Scroll knob key to move to Buzzer field followed by click knob key to enter the Buzzer page.

2023/09/14	
Buzzer	15:38:03
Protect	On
Keyboard	Off
Return	



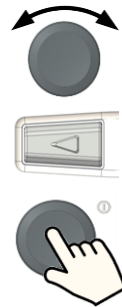
12. There are two relevant settings for Buzzer setting as following details. Use knob key to scroll and click to configure each setting.



Protect To turn On or Off the buzzer sound for protection alarm.
On, Off

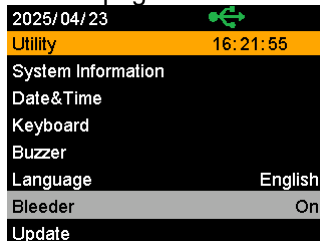
Keyboard To turn On or Off the buzzer sound for keyboard entry.
On, Off

13. Scroll knob key to move to Return field followed by clicking knob key to return back to the previous page. Also, it is available to return by clicking the left arrow key.



Bleeder It turns the bleeder control On or Off for the bleeder resistor, which is critical for discharge. For more details, [refer to page 21](#).

14. Scroll knob key to move to Bleeder field followed by click knob key to enter the Bleeder page.

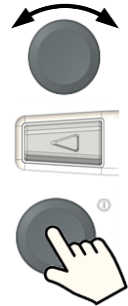


15. There is only a Bleeder field for Bleeder setting as following detail. Use knob key to scroll and click to configure the setting.



Bleeder To turn On or Off the bleeder control for the bleeder resistor.
On, Off

16. Scroll knob key to move to Return field followed by clicking knob key to return back to the previous page. Also, it is available to return by clicking the left arrow key.



4.7 Calibration

System Update The Calibration section is used to access to the calibration function, which requires a password to enter the menu. Please see your distributor or dealer for details when necessary.

4.8 Serial&Parallel

Master-Slave It does not work in the current version.

4.9 Measurement

Measure Average It sets the speed level of display sampling for the measure average setting. More the average numbers (High), slower the display update. By contrast, the Off option indicates max sampling average and thus with the lowest speed in display update.

1. Press the Menu key followed by scrolling knob key to move to Measurement field.

2023/09/14	
Menu	09:24:58
Output	
Power On Config	
Save/Recall	
Interface	
Utility	
Calibration	
Measurement	



2. Click knob key to enter the Measurement page. Scroll knob key to move to Measure Average field followed by clicking knob key to enter the field.

2023/09/14	
Measurement	09:28:48
Measure Average	Off
Current Range	I-H
Return	



3. Scroll knob key to change option followed by clicking the knob key to confirm the selection.

Measure High, Middle, Low, Off
Average



Current
Range

It sets display range for current.

4. Scroll knob key to move to Current Range field followed by clicking knob key to enter the field.

2023/09/14	
Measurement	09:28:48
Measure Average	Off
Current Range	I-H
Return	



5. Scroll the knob key to select option followed by clicking the knob key to confirm the selection.



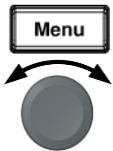
Current Range	
IH	0 to rated current
IM	0 to 0.1 * rated current
IL	0 to 0.01 * rated current

4.10 TRIG Control

Trigin Level It determines what signal (High or Low) will trigger the trigger-in action.
Before setting the TRIG Control, ensure that:
The output is off.
The load is not connected.

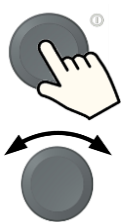
1. Press the Menu key followed by scrolling knob key to move to TRIG Control field.

2025/02/10	
Menu	15:25:53
Interface	
Utility	
Calibration	
Measurement	
Serial&Parallel	
Screen Shot	
TRIG Control	



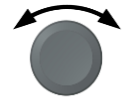
2. Click knob key to enter the TRIG Control page. Scroll knob key to move to Trigin Level field followed by clicking knob key to enter the field.

2025/02/10	
TRIG Control	15:15:35
Trigin Level	High
Trigin Action	None
Trigin Voltage	0.000 V
Trigin Current	0.0000 A
Trigin Memory	M1
Trigout Level	High
Trigout Source	None



3. Scroll knob key to select option followed by clicking the knob key to confirm the selection.

Trigin High, Low
Level

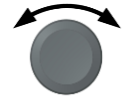


Trigin
Action

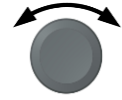
To determine the ensuing action when trigger-in signal is received.

4. Scroll knob key to move to Trigin Action field followed by clicking knob key to enter the field.

2025/02/10	
TRIG Control	15:16:44
Trigin Level	High
Trigin Action	Output
Trigin Voltage	0.000 V
Trigin Current	0.0000 A
Trigin Memory	M1
Trigout Level	High
Trigout Source	None



5. Scroll the knob key to select option followed by clicking the knob key to confirm the selection.



Trigin Action

- None None of actions will be executed.
- Output PPR will turn On/Off power output when trigger-in signal is received.
- V/I Set PPR will change to the predefined V/I settings when trigger-in signal is received. It is required to set Trigin Voltage and Trigin Current, individually before enabling V/I Set.
- Memory PPR will change to the predefined Trigin Memory when trigger-in signal is received. It is required to set Trigin Memory before enabling Memory.

Trigin
Voltage &
Trigin
Current

6. Scroll knob key to move between Trigin Voltage and Trigin Current fields. Click the knob key to enter each field, respectively. Scroll the knob key to adjust value, along with the arrow keys to change among digits followed by clicking the knob key to confirm set value.



2025/ 02/ 10		
TRIG Control 15: 23: 07		
Trigin Level	High	
Trigin Action	V/I Set	
Trigin Voltage	1.000	V
Trigin Current	1.0000	A
Trigin Memory	M1	
Trigout Level	High	
Trigout Source	None	

Setting Range

Model	Trigin Voltage	Trigin Current
PPR32-3	0 V to 33.600 V	0 A to 3.1500 A
PPR20-5	0 V to 21.000 V	0 A to 5.2500 A

Trigin
Memory

7. Scroll knob key to move to Trigin Memory field. Click the knob key to enter the field. Scroll the knob key to selection option followed by clicking knob key to confirm the memory selection.



2025/ 02/ 10		
TRIG Control 15: 23: 57		
Trigin Level	High	
Trigin Action	Memory	
Trigin Voltage	1.000	V
Trigin Current	1.0000	A
Trigin Memory	M1	
Trigout Level	High	
Trigout Source	None	

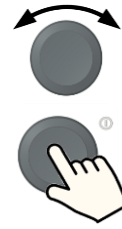
Trigin M1 to M5
Memory

Trigout
Level

It determines what trigger-out signal (High or Low) will be transmitted after execution of predefined Trigout Source from PPR series.

8. Scroll knob key to move to Trigout Level field followed by clicking knob key to enter the field.

2025/02/10	
TRIG Control 15:24:17	
Trigin Level	High
Trigin Action	Memory
Trigin Voltage	1.000 V
Trigin Current	1.0000 A
Trigin Memory	M1
Trigout Level	Low
Trigout Source	None



9. Scroll knob key to select option followed by clicking the knob key to confirm the selection.
Trigout High, Low
Level



Trigout
Source

To determine what source of action to launch the trigger-out signal.

10. Scroll knob key to move to Trigout Source field followed by clicking knob key to enter the field.

2025/02/10	
TRIG Control 15:24:47	
Trigin Level	High
Trigin Action	Memory
Trigin Voltage	1.000 V
Trigin Current	1.0000 A
Trigin Memory	M1
Trigout Level	High
Trigout Source	Output



11. Scroll the knob key to select option followed by clicking the knob key to confirm the selection.



Trigout Source

None	No trigger-out signal will be sent out.
Output	When power output is turned On/Off, a trigger-out signal will be sent out.
V/I Set	When V/I set is adjusted from PPR, a trigger-out signal will be sent out.
Memory	When one of memories is recalled on PPR, a trigger-out signal will be sent out.

5 DIGITAL CONTROL

The Digital Control chapter describes how to control the voltage or current output using an external trigger signal, monitor the voltage or current output as well as remotely turning off the output or shutting down the power supply.

5.1 External Trigger In / Out

Background The trigger input can be configured to perform an action such as toggling the output on/off, load a memory setting or apply a voltage/current setting when a trigger is received.

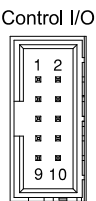
The trigger output can be configured to be active when the output is turned on/off, a voltage/current setting is changed or when a memory setting has been recalled. The trigger output pulse width can also be configured.

Pinout	Name and Pin Description	
	TRIG OUT	Trigger output: approx. 3.3 V Pulse width: approx. 4 ms, Output impedance: approx. 50 Ω It outputs a pulse when power output, V/I set operation or memory recall is executed.
	TRIG IN	A high or low level TTL signal is applied for 100 us or longer. It receives a pulse to perform actions like power output, V/I set operation or memory recall.

5.2 External Operation and Status Monitoring

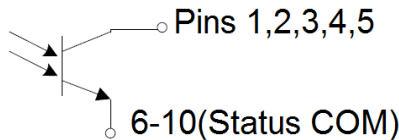
Overview The Control I/O Connector is a 10-pin connector that can be used with the plug for wiring connection. The pins used determine what remote control mode is used.

Pin Assignment



Pinout	Name and Pin	Description
	OUT ON Status 1	On when the output is on (open-collector photocoupler output).
	CV Status 2	This line is On when the PPR is in CV mode (open-collector photocoupler output).
	PWR OFF Status 3	Outputs a low level signal when power is turned off. (open-collector photocoupler output).
	CC Status 4	This line is On when the PPR is in CC mode (open-collector photocoupler output).
	Alarm Status 5	On when a protection function (OVP, OCP,OTP or Sense Alarm) has been activated or when an output shutdown signal is being applied (open-collector photocoupler output).
	Status COM 6 to 10	This is the common line for the status signal pins 6 to 10.
	Open collector output: Maximum voltage of 30 V and maximum current of 8 mA. The common line for the status pins is floating (isolated voltage of 60 V or less). It is isolated from the output and control circuits.	

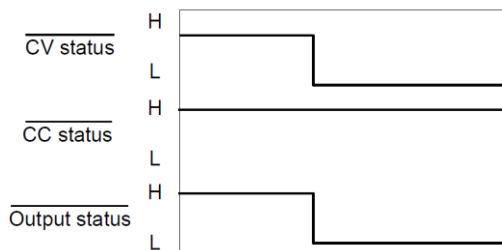
Schematic



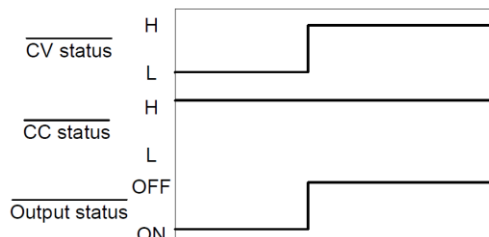
Timing diagrams

Below are 4 example timing diagrams covering a number of scenarios.

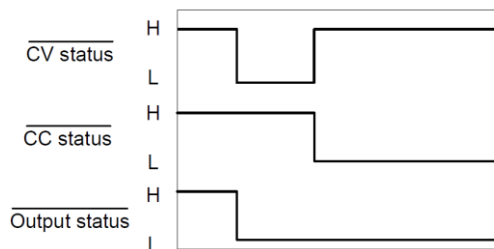
CV MODE: The diagram below shows the timing diagram when the Output is turned on when the PPR is set to CV mode.



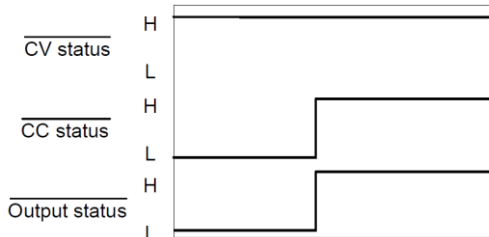
CV MODE: The diagram below shows the output status lines when the output is turned off in CV mode.



CC MODE: The diagram below shows the timing diagram when the Output is turned on when the PPR is set to CC mode.



CCMODE: The diagram below shows the output status lines when the output is turned off in CC mode.



6 COMMUNICATION INTERFACE

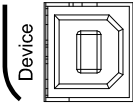
This chapter describes basic configuration of IEEE488.2 based remote control. For a command list, refer to the programming manual.

6.1 USB Remote Interface

6.1.1 Configuration

USB	PC side connector	Type A, host
Configuration	PPR side connector	Rear panel Type B, slave
	Speed	2.0 (full speed)
	USB Class	CDC / TMC

- Steps
1. Connect the USB cable to the rear panel USB B port.



2. Set the USB Device Class setting as CDC
3. The indicator will be shown when a remote connection has been established.

6.1.2 USB CDC Function Check

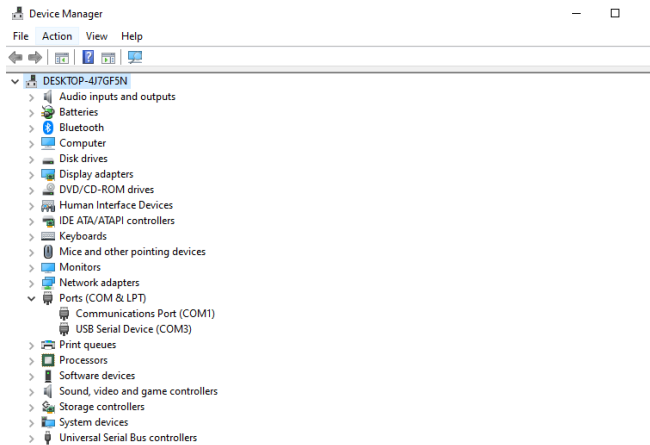
Background To test the USB CDC functionality, National Instruments Measurement and Automation Explorer can be used. This program is available on the NI website, www.ni.com., via a search for the VISA Runtime Engine page, or “downloads” at the following URL, <http://www.ni.com/visa/>

Requirement Operating System: Windows 10,11
s

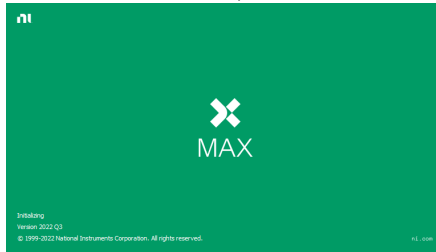
Functionality check 1. In case of Window 10 64 bits, once the USB Cable was connected to PC correctly for a while (around 1 min).

2. Then it will automatically grab the device driver and appear" Device is ready".

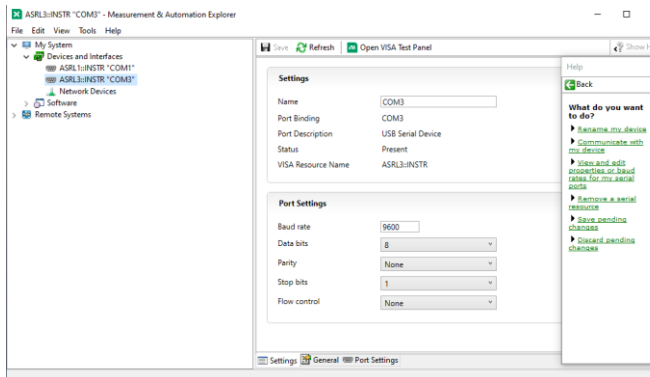
3. Double check the "Device Manager". The port should like below.



4. Start the NI MAX, Start > NI MAX

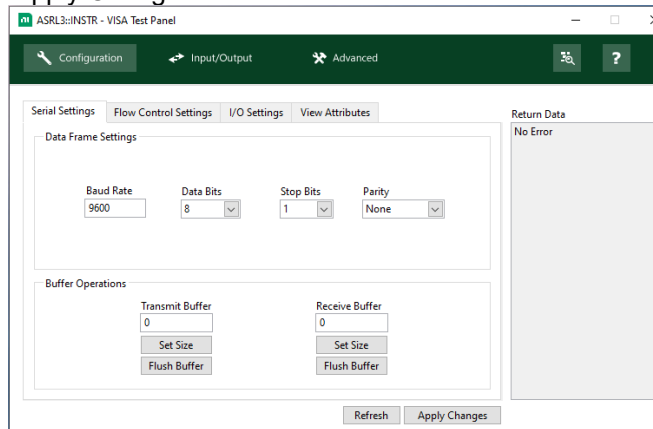


5. From the Configuration panel access; My System > Devices and Interfaces > ASRL3::INSTR "COM3" (for this example)



6. Click Open VISA Test Panel

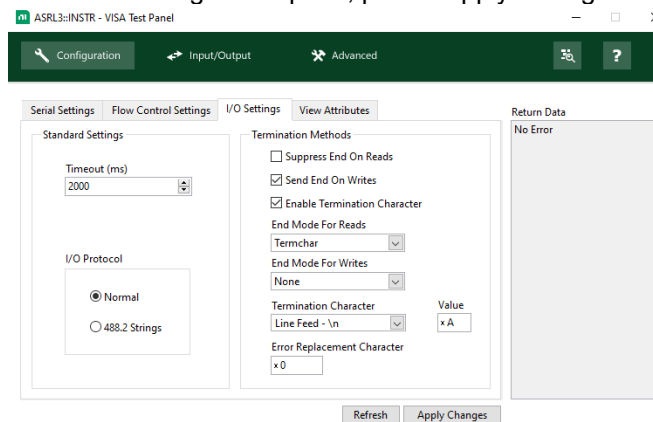
7. Click Configuration, set the “Serial Settings”, when the setting is complete, customer needs to press “Apply Changes”.



8. Click Configuration > I/O Settings

9. Make sure the Enable Termination Character check box is checked, and the terminal character is \n (Value: xA).

When the setting is complete, press “Apply Changes”.



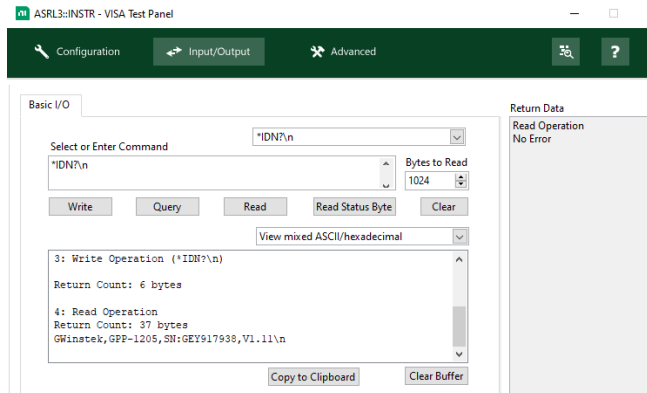
10. Click the Input/Output icon.

11. Enter *IDN? in the Select or Enter Command dialog box if it is not already.

12. Click the Query button.

13. The *IDN? query will return the Manufacturer, model name, serial number and firmware version in the dialog box.

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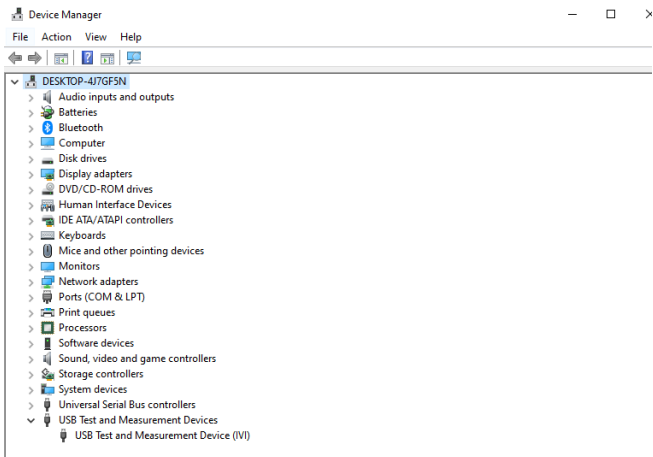
6.1.3 USB TMC Function Check

Background To test the USB TMC functionality, National Instruments Measurement and Automation Explorer can be used. This program is available on the NI website, www.ni.com., via a search for the VISA Runtime Engine page, or “downloads” at the following URL, <http://www.ni.com/visa/>

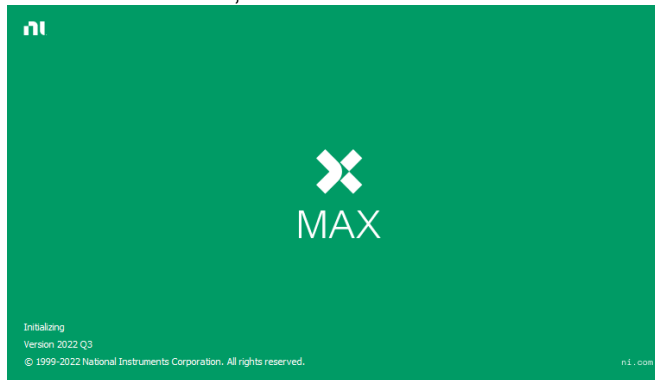
Requirement Operating System: Windows 10,11

S

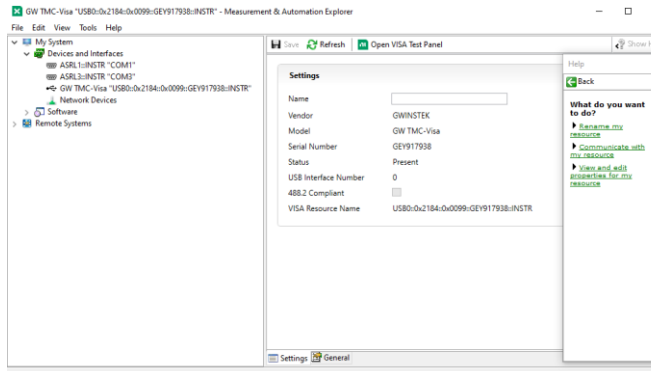
Functionality check 1. If it has already been installed NI VISA, Then the driver program will automatically appear.



2. Start the NI MAX, Start > NI MAX

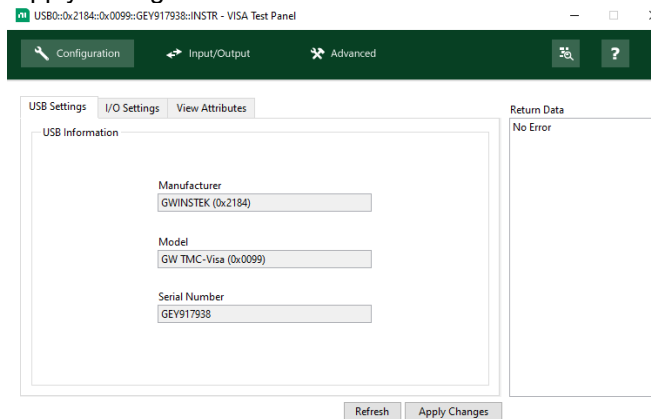


3. From the Configuration panel access; My System > Devices and Interfaces > TEXIO TMC-Visa USB0:0x098F::0x0181::GEY917938::INSTR (for this example)



4. Click Open VISA Test Panel

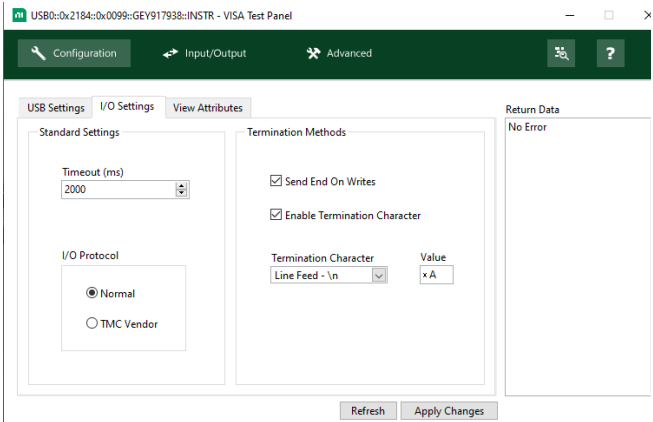
5. Click Configuration, set the “USB Settings”, when the setting is complete, customer needs to press “Apply Changes”.



6. Click Configuration > I/O Settings

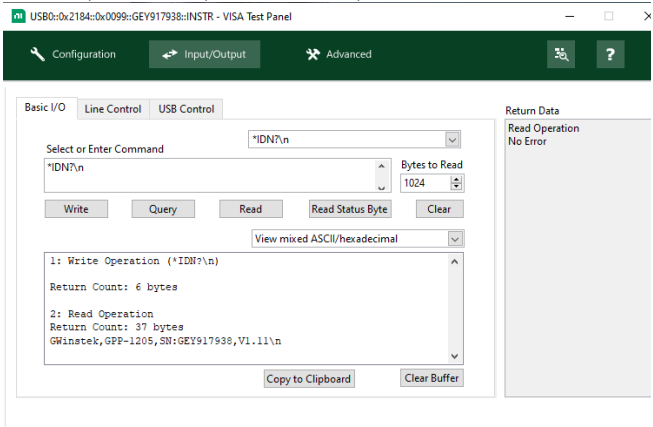
7. Make sure the Enable Termination Character check box is checked, and the terminal character is \n (Value: xA).

When the setting is complete, press “Apply Changes”.



- 8. Click the Input/Output icon.
- 9. Enter *IDN? in the Select or Enter Command dialog box if it is not already.
- 10. Click the Query button.
- 11. The *IDN? query will return the Manufacturer, model name, serial number and firmware version in the dialog box.

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6.2 GPIB Remote Interface

6.2.1 Configuration

Only one GPIB address can be used at a time.

- | | |
|------------------|---|
| Configure GPIB | <ol style="list-style-type: none">1. Ensure the PPR is off before proceeding.2. Connect the GPIB cable from a GPIB controller to the GPIB port on the PPR.3. Turn the PPR on.4. Set the GPIB Address setting per application.5. The indicator will be shown when a remote connection has been established. |
| GPIB constraints | <ul style="list-style-type: none">☐ •Maximum 15 devices altogether, 20m cable length, 2m between each device☐ •Unique address assigned to each device☐ •At least 2/3 of the devices turned On☐ •No loop or parallel connection |

6.2.2 GPIB Function Check

Background To test the GPIB functionality, National Instruments Measurement and Automation Explorer can be used. This program is available on the NI website, www.ni.com., via a search for the VISA Run-time Engine page, or “downloads” at the following URL, <http://www.ni.com/visa/>

Requirements Operating System: Windows 10,11

Functionality check 1. Start the NI Measurement and Automation Explorer (MAX) program. Using Windows, press:

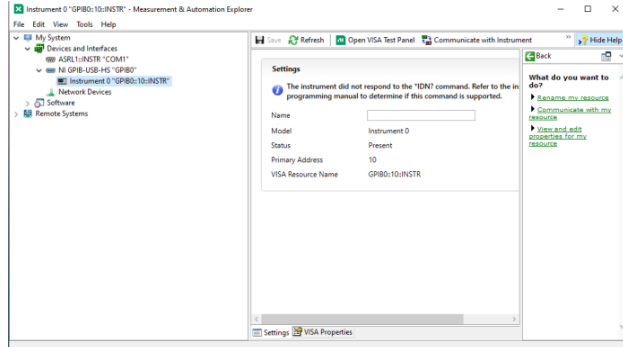
Start>All Programs>National Instruments>Measurement & Automation



2. From the Configuration panel access;

My System>Devices and Interfaces>GPIB

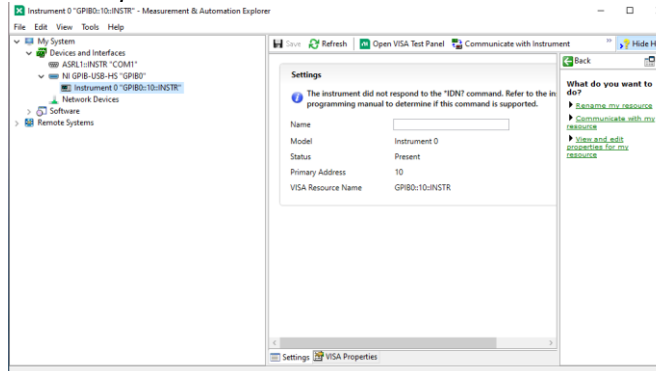
3. Press *Scan for Instruments*.



4. Select the device (GPIB address of PPR) that now appears in the *System>Devices and Interfaces > GPIB-USB-HS "GPB0"* node.

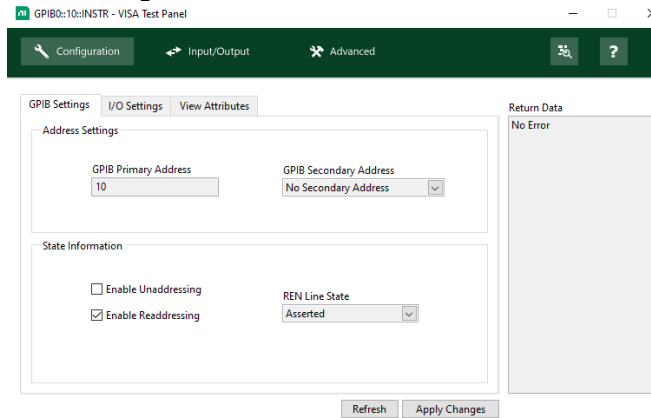
5. Click on the *VISA Properties* tab on the bottom.

6. Click *Open Visa Test Panel*.



7. Click on *Configuration*.

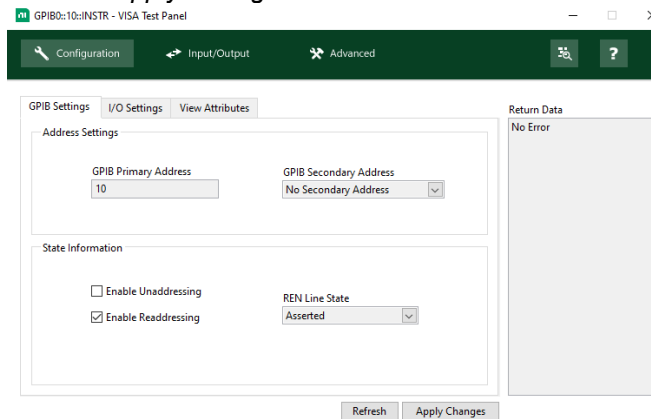
8. Click on the *GPIB Settingstab* and confirm that the GPIB settings are correct.



9. Click on the *I/O Settingstab*.

10. Make sure the *Enable Termination Charactercheck* box is checked, and the terminal character is \n (Value: xA).

11. Click *Apply Changes*.



12. Click on *Input/Output*.

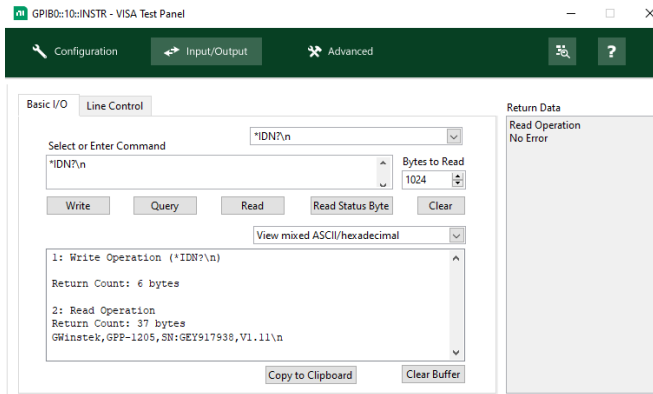
13. Click on the *BasicI/Otab*.

14. Enter *IDN? in the *Select or Enter Command* drop down box.

15. Click *Query*.

16. The *IDN? query will return the Manufacturer, model name, serial number and firmware version in the dialog box.

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Note

For further details, please see the programming manual.

6.3 Configure Ethernet Connection

The PPR series supports both DHCP connections so the instrument can be automatically connected to an existing network or alternatively, network settings can be manually configured.

Ethernet configuration For details on how to configure the Ethernet settings, please see the configuration chapter on [page 105](#).

Parameters	MAC Address	
	(display only)	
	DHCP On/Off	IP Address
	Subnet Mask	Gateway IP

6.3.1 Configuration

Configuration This configuration example will configure the PPR socket server.

The following configuration settings will manually assign the PPR an IP address and enable the socket server. The socket server port number is fixed at 5025.

1. Connect an Ethernet cable from the network to the rear panel Ethernet port.
2. Turn Off DHCP setting followed by setting the relevant settings including IP Address, Subnet Mask, Gateway IP.
3. The indicator will be shown when a remote connection has been established.

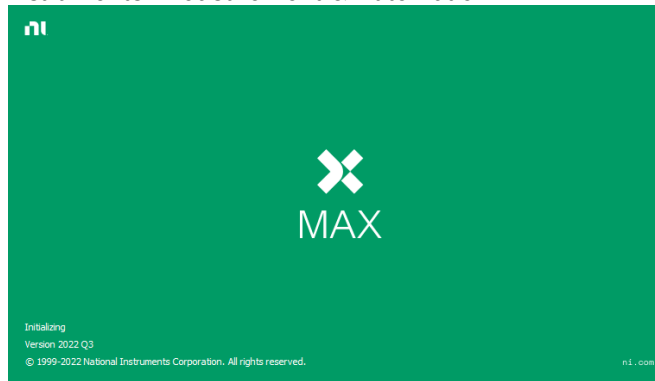
6.3.2 Socket Server Function Check

Background To test the socket server functionality, National Instruments Measurement and Automation Explorer can be used. This program is available on the NI website, www.ni.com., via a search for the VISA Runtime Engine page, or “downloads” at the following URL, <http://www.ni.com/visa/>

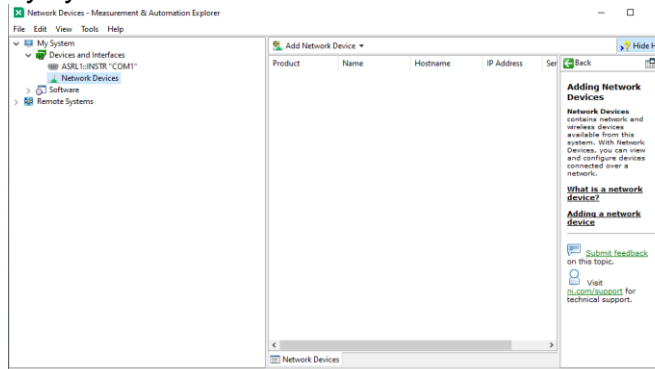
Requirement Operating System: Windows 10, 11
s

Functionality check

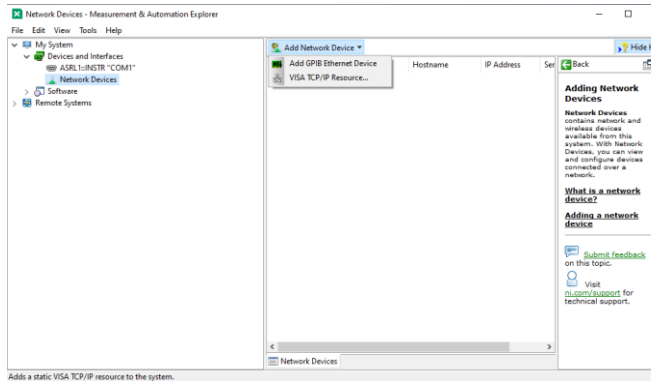
1. Start the NI Measurement and Automation Explorer (MAX) program. Using Windows, press.
Start>All Programs>National Instruments>Measurement & Automation



2. From the Configuration panel access;
My System>Devices and Interfaces>Network Devices

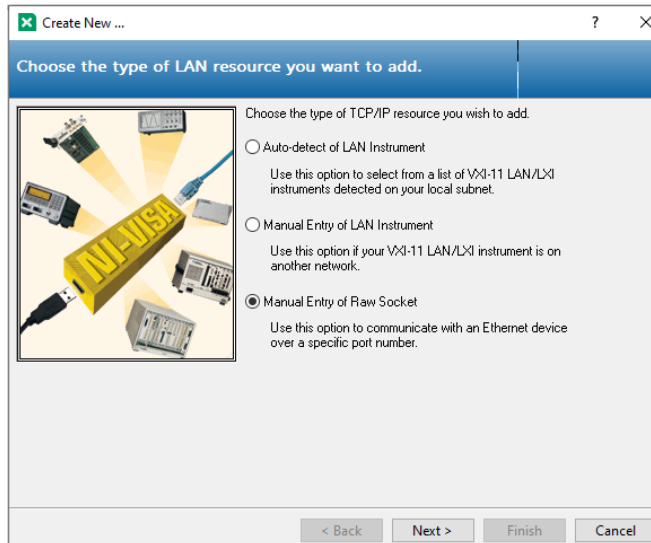


3. Press **Add New Network Device>Visa TCP/IP Resource...**



Add a static VISA TCP/IP resource to the system.

4. Select **Manual Entry of Raw Socket** from the popup window.



5. Enter the IP address and the port number of the PPR. The port number is default at 5025.

6. Click the Validate button.

7. A popup will appear if a connection is successfully established.

8. Click Next.

The screenshot shows a 'Create New' dialog box with a blue header bar containing the text 'Enter the LAN resource details.' Below the header, on the left, is an illustration of a yellow VISA network interface module connected to various devices. To the right of the illustration, the text reads: 'Enter the TCP/IP address of your VISA network resource in the form of xxx.xxx.xxx.xxx, the hostname of the device, or a computer@some.domain'. There are two input fields: 'Hostname or IP address' with the value '192.168.38.98' and 'Port Number' with the value '5025'. A 'Validate' button is located to the right of the Port Number field. At the bottom of the dialog are four buttons: '< Back', 'Next >', 'Finish' (highlighted with a blue border), and 'Cancel'.

Enter the LAN resource details.

Enter the TCP/IP address of your VISA network resource in the form of xxx.xxx.xxx.xxx, the hostname of the device, or a computer@some.domain

Hostname or IP address
192.168.38.98

Port Number
5025

Validate

< Back Next > **Finish** Cancel

9. Next configure the Alias (name) of the PPR connection. In this example the Alias is: GPP_DC1
10. Click finish.

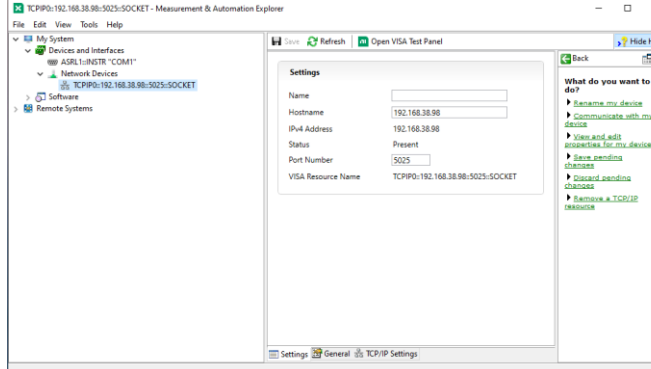
The screenshot shows the Measurement & Automation Explorer (MAX) interface. On the left is a tree view showing the hierarchy: 'My System' > 'Devices and Interfaces' > 'ASRL1-INSTR: "COM1"' > 'Network Devices' > 'TCPiP0:192.168.38.98:5025:SOCKET'. The 'TCPiP0:192.168.38.98:5025:SOCKET' item is selected. On the right is a 'Settings' panel for the selected device. It contains a table with the following information:

Settings	
Name	
Hostname	192.168.38.98
IP-v4 Address	192.168.38.98
Status	Present
Port Number	5025
VISA Resource Name	TCPiP0:192.168.38.98:5025:SOCKET

Below the table, there are tabs for 'Settings', 'General', and 'TCP/IP Settings'. On the far right, there is a 'What do you want to do?' section with several green links: 'Rename my device', 'Communicate with my device', 'View and edit resources for my device', 'View my device aliases', 'Default resource aliases', and 'Remove a TCP/IP resource'.

11. The IP address of the PPR will now appear under Network Devices in the configuration panel. Select this icon now.

12. Click *Open VISA Test Panel*.

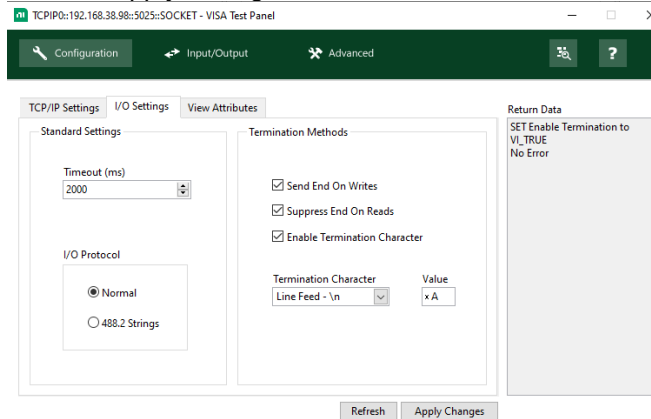


13. Click the *Configuration* icon,

14. Click on *I/O Settings*.

15. Make sure the *Enable Termination Character* check box is checked, and the terminal character is \n (Value: xA).

16. Click *Apply Changes*.



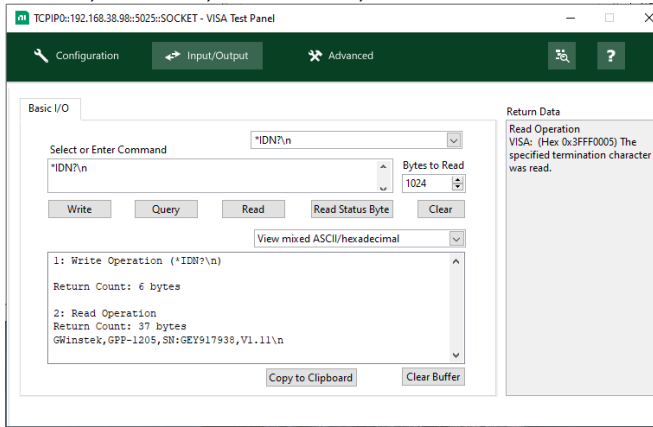
17. Click the *Input/Output* icon.

18. Enter **IDN?* in the *Select or Enter Command* dialog box if it is not already.

19. Click the *Query* button.

20. The *IDN? query will return the Manufacturer, model name, serial number and firmware version in the dialog box.

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7 FAQ

- How often should the power supply be calibrated?
- The OVP voltage is triggered earlier than expected.
- Can I combine more than 1 cable together for the output wiring?
- The accuracy does not match the specification.
- How often should the power supply be calibrated?

The PPR should be calibrated by an authorized service center at least every 2 years.

- The OVP voltage is triggered earlier than expected.

When setting the OVP voltage, take into account the voltage drop from the load cables. As the OVP level is set from the output terminals and not the load terminals, the voltage at the load terminals may be slightly lower.

- Can I combine more than 1 cable together for the output wiring?

Yes. Cables can be used together (in parallel) if the current capacity of a single cable is insufficient. However the withstand voltage should also be taken into account. Ensure the cables are twisted together and are the same length.

- The accuracy does not match the specification.

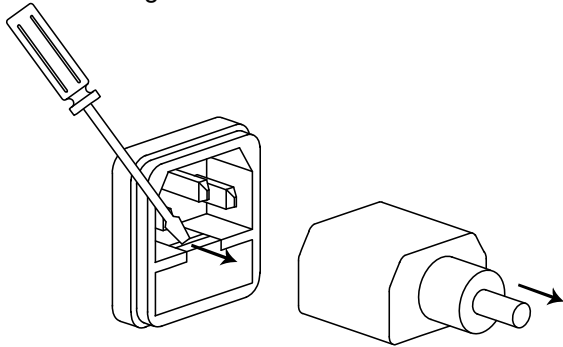
Make sure the device is powered On for at least 30 minutes, within $23^{\circ}\text{C}\pm 5^{\circ}\text{C}$. This is necessary to stabilize the unit to match the specification.

8 APPENDIX

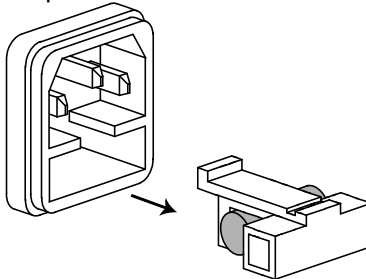
8.1 Fuse Replacement

Steps

1. Take off the power cord and remove the fuse socket using a minus driver.



2. Replace the fuse in the holder.



Rating

- 100 V / 120 V : T3.15 A / 250 V
- 220 V / 240 V : T1.6 A / 250 V

8.2 PPR Factory Default Settings

The following default settings are the factory configuration settings for the power supply.

Initial	Default Setting
Output	Off
LOCK	Disabled
Voltage Set	0.000 V
Current Set	0.0000 A
Output	Default Setting
Output On Dly(Delay)	00(hour):00(minute):00.00(sec)
Output Off Dly(Delay)	00(hour):00(minute):00.00(sec)
Remote Sense	2 Wire
V/I Slew Rate	CVHS = CV high speed priority
R_V(Rising Voltage) Slew Rate	0.04 V/ms
F_V(Falling Voltage) Slew Rate	0.04 V/ms
R_C(Rising Current) Slew Rate	0.01 A/ms
F_C(Falling Current) Slew Rate	0.01 A/ms
Measurement	Default Setting
Measure Average	Off
Current Range	IH
Mode Control	Default Setting
Mode	Source
PWR(Power) On Config	Default Setting
Power On Status	Default
Utility -Buzzer	Default Setting
Protect	On
Keyboard	Off
Utility -Bleeder	Default Setting
Bleeder	On
Utility -Keyboard	Default Setting
Lock Mode	Output On/Off
Protect	Default Setting
Voltage Limit	On
OVP Level	1.1 X Vrate
Current Limit	On
OCF Level	1.1 X Irate
OCF Delay	0.20 s

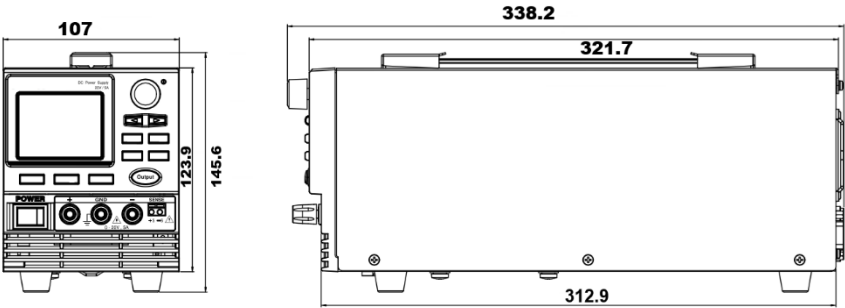
8.3 PPR Series Specifications

The specifications apply when the PPR is powered on for at least 30 minutes.

Output Rating	Output voltage	32.000 V(PPR32-3)	20.000 V(PPR20-5)
	Output current	3.0000 A(PPR32-3)	5.0000 A(PPR20-5)
Load	Output power	96 W(PPR32-3)	100 W(PPR20-5)
	Power	96 W(PPR32-3)	100 W(PPR20-5)
	Current	3.0000 A(PPR32-3)	5.0000 A(PPR20-5)
	Setting range(CV)	3.000 V to 32.000 V(PPR32-3)	
		3.000 V to 20.000 V(PPR20-5)	
	Setting/Readback accuracy(CV)	$\leq 0.1\% + 30\text{ mV}$	
	Resolution(CV)	1 mV	
	Setting range(CC)	0 A to 3.0000 A(PPR32-3)	
		0 A to 5.0000 A(PPR20-5)	
	Setting/Readback accuracy(CC)	$\leq \pm 0.3\% + 10\text{ mA}$	
Voltage	Resolution(CC)	0.1 mA	
	Line regulation	$\pm (0.01\% \text{ of setting} + 3\text{ mV})$	
	Load regulation	$\leq 0.01\% + 3\text{ mV}$ (rating current $\leq 3\text{ A}$)	
		$\leq 0.02\% + 5\text{ mV}$ (rating current $> 3\text{ A}$)	
	Transient response	$< 100\text{ us}$	
	Ripple noise	0.8 mVrms	
	Setting range	33.6 V(PPR32-3)	21 V(PPR20-5)
	Rise time	$\leq 100\text{ ms}$	
	Fall time	$\leq 100\text{ ms}$	
	Maximum remote sensing compensation voltage (single line)	0.5 V	
	Temperature Coefficient (TYP.)	300 ppm/°C	
Current	Line regulation	$\leq 0.1\% + 3\text{ mA}$	
	Load regulation	$\leq 0.1\% + 3\text{ mA}$	
	Setting range	3.15 A(PPR32-3)	5.25 A(PPR20-5)
	Ripple noise (Arms)	$\leq 2\text{ mArms}$	
	Temperature Coefficient (TYP.)	300 ppm/°C	
Resolution	Voltage	programming 1 mV, readback 0.1 mV	
	Current	programming 0.1 mA, readback 0.01 mA (H) programming 10 uA, readback 1 uA (M) programming 1 uA, readback 0.1 uA (L)	
Accuracy	Setting accuracy	Voltage: $\pm (0.03\% \text{ of reading} + 10\text{ mV})$ Current: $\pm (0.3\% \text{ of reading} + 10\text{ mA})$ (H) Current: $\pm (0.3\% \text{ of reading} + 1\text{ mA})$ (M) Current: $\pm (0.3\% \text{ of reading} + 0.1\text{ mA})$ (L)	
	Readback accuracy	Voltage: $\pm (0.03\% \text{ of reading} + 10\text{ mV})$ Current: $\pm (0.3\% \text{ of reading} + 10\text{ mA})$ (H)	

OVP	Current: $\pm (0.3 \% \text{ of reading} + 1 \text{ mA})$ (M) Current: $\pm (0.3 \% \text{ of reading} + 0.1 \text{ mA})$ (L)	
	Setting range	1.8 V - 35.2 V (PPR32-3) 1.0 V - 22.0 V (PPR20-5)
	Setting Accuracy	$\pm 100 \text{ mV}$
OCP	Operation	Turns the output off, displays OVP
	Setting range	0.15 A - 3.3 A (PPR32-3) 0.25 A - 5.5 A (PPR20-5)
	Setting Accuracy	$\pm 20 \text{ mA}$
OTP Trigger Signal*1	Operation	Turns the output off, displays OCP
	Operation	Turns the output off, displays OTP
	Trigger Input	A high or low level CMOS signal is applied for 100 μs or longer. It receives a pulse to perform actions like power output, V/I set operation or memory recall.
	Trigger Output	Trigger output: approx. 3.3 V Pulse width: approx. 1ms, Output impedance: approx. 50 Ω It outputs a pulse when power output, V/I set operation or memory recall is executed.
Status Signal Out*1*2	OUT ON/OFF STATUS	Turns on when the output is on
	CV STATUS	Turns on during CV operation
	CC STATUS	Turns on during CC operation
	ALM STATUS	Turns on when an alarm has been activated
	PWR ON STATUS	Turns on when the power is turned on
Interface Capabilities	LAN	MAC Address, Gateway IP Address, Instrument IP Address, Subnet Mask
	USB	Type A: Host, Type B: Slave, Speed: 1.1/2.0, USB-CDC/USB-TMC
	GPIB (G Model)	SCPI-1993, IEEE 488.2 compliant interface
Input Characteristics	Nominal input voltage	100 Vac / 120 Vac / 220 Vac / 240 Vac ($\pm 10 \%$)
	Input frequency range	50 Hz / 60 Hz
	Max. Inrush current	30 A max or less
	Max. power consumption	300 VA
General Specifications	Operating environment	Indoor use, Overvoltage Category II
	Altitude	Maximum 2000 m
	Operating temperature	0 °C - 40 °C
	Storage temperature	-20 °C to 70 °C
	Operating humidity	20 % to 80 % RH; No condensation
	Storage humidity	20 % to 85 % RH; No condensation
	Dimensions	107 mm x 124 mm x 313 mm (W x H x D) (not including protrusions)
	Weight	Approx. 5.5 kg
Insulation resistance	Between chassis and terminal	20 M Ω or above (DC 500 V)
	Between chassis and AC power cord	30 M Ω or above (DC 500 V)

8.4 PPR Series Dimensions





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