UNI-T®

Instruments.uni-trend.com

UNI-TREND.VN

User's Manual

UTL8200+ Series DC Electronic Load

Foreword

Dear Users,

Hello! Thank you for choosing this brand new UNI-T instrument. In order to use this instrument safely and correctly, please read this manual thoroughly, especially the Safety Requirements part.

After reading this manual, it is recommended to keep the manual at an easily accessible place, preferably close to the device, for future reference.

Warranty

UNI-T warrants that the product will be free from defects for a three-year period. If the product is re-sold, the warranty period will be from the date of the original purchase from an authorized UNI-T distributor. Probes, other accessories, and fuses are not included in this warranty.

If the product is proved to be defective within the warranty period, UNI-T reserves the rights to either repair the defective product without charging of parts and labor, or exchange the defected product to a working equivalent product. Replacement parts and products may be brand new, or perform at the same specifications as brand new products. All replacement parts, modules, and products become the property of UNI-T.

The "customer" refers to the individual or entity that is declared in the guarantee. In order to obtain the warranty service, "customer" must inform the defects within the applicable warranty period to UNI-T, and to perform appropriate arrangements for the warranty service. The customer shall be responsible for packing and shipping the defective products to the designated maintenance center of UNI-T, pay the shipping cost, and provide a copy of the purchase receipt of the original purchaser. If the product is shipped domestically to the location of the UNI-T service center, UNI-T shall pay the return shipping fee. If the product is sent to any other location, the customer shall be responsible for all shipping, duties, taxes, and any other expenses.

This warranty shall not apply to any defects or damages caused by accidental, machine parts' wear and tear, improper use, and improper or lack of maintenance. UNI-T under the provisions of this warranty has no obligation to provide the following services:

a) Any repair damage caused by the installation, repair, or maintenance of the product by non UNI-T service representatives.

b) Any repair damage caused by improper use or connection to an incompatible device.

c) Any damage or malfunction caused by the use of a power source which does not conform to the requirements of this manual.

d) Any maintenance on altered or integrated products (if such alteration or integration leads to an increase in time or difficulty of product maintenance).

This warranty is written by UNI-T for this product, and it is used to substitute any other express or implied

UNI-TREND.VN

warranties. UNI-T and its distributors do not offer any implied warranties for merchant ability or applicability purposes.

For violation of this guarantee, regardless of whether UNI-T and its distributors are informed that any indirect, special, incidental, or consequential damage may occur, UNI-T and its distributors shall not be responsible for any of the damages.

Trademark

UNI-T is the registered trademark of Uni-Trend Technology (China) Co., Ltd.

Statement

- UNI-T products are protected by patent rights in China and foreign countries, including issued and pending patents.
- UNI-T reserves the rights to any product specification and pricing changes.
- UNI-T reserves all rights. Licensed software products are properties of Uni-Trend and its subsidiaries or suppliers, which are protected by national copyright laws and international treaty provisions. Information in this manual supersedes all previously published versions.

UNI-TREND.VN

1. Introduction

This manual includes safety requirements, installment and the operation of UTL8200+ DC electronic load.

2. Safety Requirements

This section contains information and warnings that must be followed to keep the instrument operating under safety conditions. In addition, user should also follow the common safety procedures.

Safety Precautions	
Warning	Please follow the following guidelines to avoid possible electric shock and risk to personal safety.

	Users must follow the following conventional safety precautions in operation, service and maintenance of this device. UNI-T will not be liable for any personal safety and property loss caused by the user's failure to follow the following safety precautions. This device is designed for professional users and responsible organizations for measurement purposes. Do not use this device in any way not specified by the manufacturer. This device is only for indoor use unless otherwise specified in the product manual.
Safety Statement	
Warning	"Warning" indicates the presence of a hazard. It reminds users to pay attention to a certain operation process, operation method or similar. Personal injury or death may occur if the rules in the "Warning" statement are not properly executed or observed. Do not proceed to the next step until you fully understand and meet the conditions stated in the "Warning" statement.
Caution	"Caution" indicates the presence of a hazard. It reminds users to pay attention to a certain operation process, operation method or similar. Product damage or loss of important data may occur if the rules in the "Caution" statement are not properly executed or observed. Do not proceed to the next step until you fully understand and meet the conditions stated in the "Caution" statement.
Note	"Note" indicates important information. It reminds users to pay attention to procedures, methods and conditions, etc. The contents of the "Note" should be highlighted if necessary.
Safety Sign	
	Danger	It indicates possible danger of electric shock, which may cause personal injury or death.
	Warning	It indicates that you should be careful to avoid personal injury or product damage.
	Caution	It indicates possible danger, which may cause damage to this device or other equipment if you fail to follow a certain procedure or condition. If the "Caution" sign is present, all conditions must be met before you proceed to operation.
	Note	It indicates potential problems, which may cause failure of this device if you fail to follow a certain procedure or condition. If the "Note" sign is present, all conditions must be met before this device will function properly.
	AC	Alternating current of device. Please check the region's voltage range.

UNI-TREND.VN

	DC	Direct current device. Please check the region's voltage range.
	Grounding	Frame and chassis grounding terminal
	Grounding	Protective grounding terminal
	Grounding	Measurementgrounding termina
	OFF	Main power off
	ON	Main power on
	Power Supply	Standby power supply: when the power switch is turned off, this device is not completely disconnected from the AC power supply.
CAT I	Secondary electrical circuit connected to wall sockets through transformers or similar equipment, such as electronic instruments and electronic equipment; electronic equipment with protective measures, and any high-voltage and low-voltage circuits, such as the copier in the office.	
CAT II	Primary electrical circuit of the electrical equipment connected to the indoor socket via the power cord, such as mobile tools, home appliances, etc. Household appliances, portable tools (e.g. electric drill), household sockets, sockets more than 10 meters away from CAT III circuit or sockets more than 20 meters away from CAT IV circuit.	
CAT III	Primary circuit of large equipment directly connected to the distribution board and circuit between the distribution board and the socket (three-phase distributor circuit includes a single commercial lighting circuit). Fixed equipment, such as multi-phase motor and multi-phase fuse box; lighting equipment and lines inside large buildings; machine tools and power distribution boards at industrial sites (workshops).	
CAT IV	Three-phase public power unit and outdoor power supply line equipment. Equipment designed to "initial connection", such as power distribution system of power station, power instrument, front-end overload protection, and any outdoor transmission line.	
CE	Certification	CE indicates a registered trademark of EU.
UK CA	Certification	UKCA indicates a registered trademark of UK.
	Certification	ETL indicates a registered trademark of Intertek. It conform to UL STD 61010-1 and 61010-2-030, CSA STD C22.2 No.61010-1 and 61010-2-030.
	Waste	This product complies with the marking requirements of WEEE Directive (2002/96/EC). This additional label indicates that this electrical / electronic product must not be discarded in household waste.

UNI-TREND.VN

	EFUP	This environment-friendly use period (EFUP) mark indicates that dangerous or toxic substances will not leak or cause damage within this indicated time period. The environment-friendly use period of this product is 40 years, during which it can be used safely. Upon expiration of this period, it should enter the recycling system.
Safety Requirements		
Warning		
Preparation before use	Please connect this device to AC power supply with the power cable provided. The AC input voltage of the line reaches the rated value of this device. See the product manual for specific rated value. The line voltage switch of this device matches the line voltage. The line voltage of the line fuse of this device is correct.	
Check all terminal rated values	Please check all rated values and marking instructions on the product to avoid fire and impact of excessive current. Please consult the product manual for detailed rated values before connection.	
Use the power cord properly	You can only use the special power cord for the instrument approved by the local and state standards. Please check whether the insulation layer of the cord is damaged or the cord is exposed, and test whether the cord is conductive. If the cord is damaged, please replace it before using the instrument.	
Instrument Grounding	To avoid electric shock, the grounding conductor must be connected to the ground. This product is grounded through the grounding conductor of the power supply. Please be sure to ground this product before it is powered on.	
AC power supply	Please use the AC power supply specified for this device. Please use the power cord approved by your country and confirm that the insulation layer is not damaged.	
Electrostatic prevention	This device may be damaged by static electricity, so it should be tested in the anti-static area if possible. Before the power cable is connected to this device, the internal and external conductors should be grounded briefly to release static electricity. The protection scale of this device is 4 kV for contact discharge and 8 kV for air discharge.	
Measurement accessories	Measurement accessories are of lower class, which are definitely not applicable to main power supply measurement, CAT II, CAT III or CAT IV circuit measurement.	
Use the input / output port of this device properly	Please use the input / output ports provided by this device in a properly manner. Do not load any input signal at the output port of this device. Do not load any signal that does not reach the rated value at the input port of this device. The probe or other connection accessories should be effectively grounded to avoid product damage or	

UNI-TREND.VN

	abnormal function. Please refer to the product manual for the rated value of the input / output port of this device.
Power fuse	Please use power fuse of specified specification. If the fuse needs to be replaced, it must be replaced with the specified fuse by the maintenance personnel authorized by UNI-T.
Disassembly and cleaning	There are no components available to operators inside. Do not remove the protective cover. Maintenance must be carried out by qualified personnel.
Service environment	This device should be used indoors in a clean and dry environment with ambient temperature from 0 ℃ to 40 ℃. Do not use this device in explosive, dusty or humid air.
Do not operate in humid environment	Do not use this device in a humid environment to avoid the risk of internal short circuit or electric shock.
Do not operate in flammable and explosive environment	Do not use this device in a flammable and explosive environment to avoid product damage or personal injury.
Caution	
Abnormality	If this device may be faulty, please contact the authorized maintenance personnel of UNI-T for testing. Any maintenance, adjustment or parts replacement must be done by the relevant personnel of UNI-T.
Cooling	Do not block the ventilation holes at the side and back of this device. Do not allow any external objects to enter this device via ventilation holes. Please ensure adequate ventilation, and leave a gap of at least 15 cm on both sides, front and back of this device.
Safe transportation	Please transport this device safely to prevent it from sliding, which may damage the buttons, knobs or interfaces on the instrument panel.
Proper ventilation	Poor ventilation will cause the device temperature to rise, thus causing damage to this device. Please keep proper ventilation during use, and regularly check the vents and fans.
Keep clean and dry	Please take actions to avoid dust or moisture in the air affecting the performance of this device. Please keep the product surface clean and dry.
Note	
Calibration	The recommended calibration period is one year. Calibration should only be carried out by qualified personnel.

UNI-TREND.VN

3. Introduction of UTL8200+ Series

UTL8200+ Series DC electronic load includes two models, UTL8211+ and UTL8212+.
The measurement range is as follows.

Model	Channel Number	Measurement Range		
		Voltage	Current	Power
UTL8211+	Single channel	0~150V	0~40A	0~400W
UTL8212+	Dual channel	0~150V	0~20A	0~200W

UTL8200+ series DC electronic load is equipped with 2.8 inch LCD, which is convenient and simple to operate and has a fashionable appearance. The electronic load has a wide range of power measurement, voltage and current sampling rate up to 4.8MHz, test resolution up to 1mV/1mA, while equipped with rich test functions and modes for your choice. The equipment is equipped with RS232 communication module, which is flexible to meet various field test conditions and is convenient to connect seamlessly with automated production lines and automatic test systems (ATS). The electronic load is stable and widely used to meet various testing requirements.

UNI-TREND.VN

Characteristics

- Four modes CC/CV/CR/CP
- Resolution is up to 1mV/1mA
- Sampling rate of voltage/current is up to 4.8MHz
- Multi-modes battery discharge test
- List mode supports automatic test
- Independent short circuit test function
- Overvoltage, low voltage, overcurrent, overpower, overheat and anti-reverse connection protection
- RS232 communication interface (RS485 interface optional)
- Matched upper computer software for remote control and monitor
- Power cutoff memory
- Smart temperature controlled fans
- Chinese/English display

4. Product Overview

4.1 Front Panel

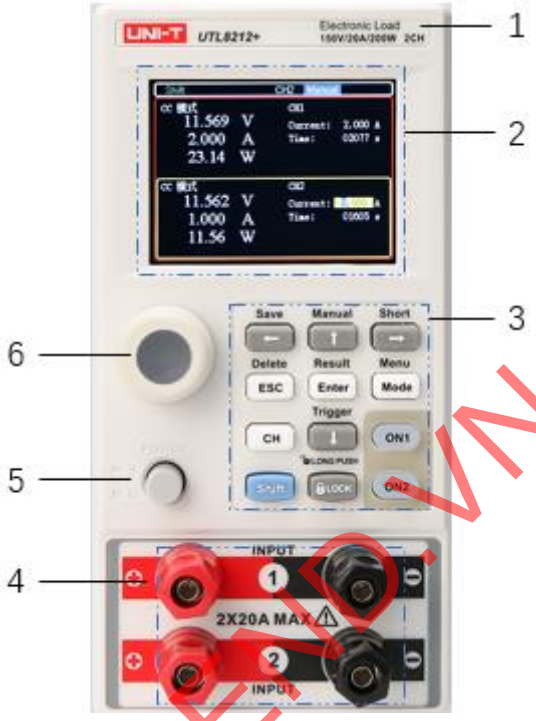


Figure 4-3 Front Panel

No.	Name	Description
1	Label	Model name and specification
2	Screen Display	Display the operating state of channel with load, measurement parameter and operation mode
3	Key	Select test mode (CC, CV, CR, CP, and etc.)
		For the specified function.
4	Channel-input port	Input load power, do not reverse connecting the instrument to avoid the damage
5	Power Switch	Turn on/off electronic load
6	Rotary Knob	Adjusting the size of parameter or adjusting the cursor poistion in the menu

UNI-TREND.VN

4.1.1 Key

Key function of UTL8200+ series is as follows.

Name	Description
Shift	Press to execute the function
Direction Key	Move the cursor or modify the numerical value of the selected parameter
Enter	Confirm/modify the current option or parameter
ESC	Turn back to the last menu
Mode	Set the operation mode of the instrument
CH	Swtich the channel (only forUTL8212+ dual channel)
ON1/ON2	Control input state of the load: ON/OFF
LOCK	Lock key (long press to unlock / short press to lock)

4.4.2 Quick Function Key

In the specified interface, key can be combined with Shift key to quickly execute the function. Press Shift at first and then press other key.

Quick key function of UTL8200+ series is as follows.

Key Name	Description
Shift +← (Save)	Save list file
Shift + ↑ (Manual)	Switch to control by the instrument when in remote
Shift + → (Short)	Turn on short circuit test
Shift + ESC (Delete)	Delete list file
Shift + Enter (Result)	Check result of list test
Shift + Mode (Menu)	Main menu: system configuration, parameter setting, file operation and device information
Shift + ↓ (Trigger)	Manual trigger

UNI-TREND.VN

4.2 Rear Panel

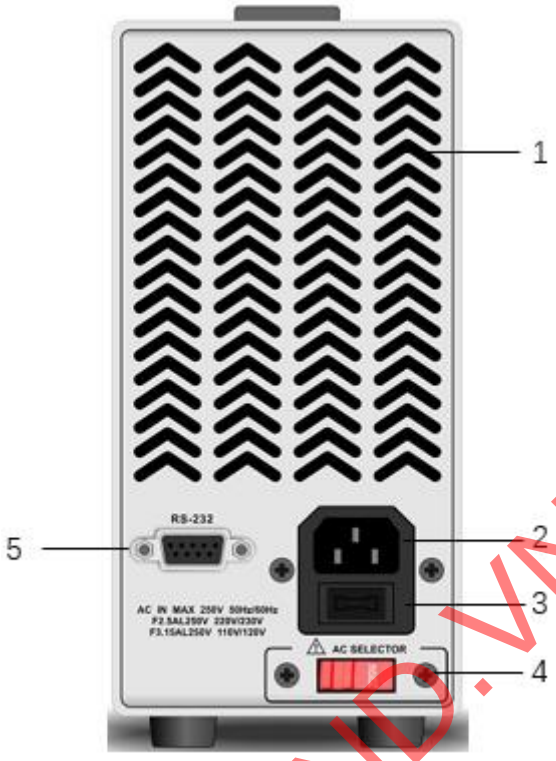


Figure 4-4 Rear Panel

No.	Name	Description
1	Air Outlet	For cooling
2	Power Socket AC 220/110V	AC power socket
3	Fuse	
4	Power Switch AC 220/110V	Switch of AC voltage
5	RS232	External communication interface for remote control the electronic load

UNI-TREND.VN

5. Inspection and Installment

5.1 Packing List

Please inspect the instrument before using

1. Check whether the appearance is damaged, scratched or has other defects;
2. Check with packing list to confirm that accessories has no loss.

If there have any problem, please contact with Uni-Trend Instrument Sale Department or the distributor.

Components	Quantity	Remarks
DC Electronic Load	1	UTL8211+ UTL8212+ The model is subject to the actual order
Power Cord	1	
RS232 Communication Line	1	No communication line for RS485 interface
Spare Fuse	2	Fuse with different specifications according to different orders 250V/0.5A only for input voltage 110V 250V/0.25A only for input voltage 220V
User's Manual	1	Electronic file，it can download from the official website

5.2 Power Requirements

UTL8200+ series can only use under the power supply terms as follows.

Parameter	Requirements
Voltage	AC 220/110(±10%)V
Frequency	50/60HZ
Power Consumption	50W
Fuse	AC 220V input voltage: 250V/0.25A AC 110V input voltage: 250V/0.5A

- Factory supply three-core power cable, please make sure power cable of three phase socket is connect with ground before use.
- The instrument with power conversion switch, please check and make sure that the conversion switch is move to the right scale before connecting the power supply.
- This instrument 220V is select fuse of 250V/0.25A, the specification is 5×20mm. It all set and equip with spare fuse of 250V/0.25A or 250V/5A in fuse box before the product leave the factory.
- Please remove the external power cable before replace the fuse, open the fuse socket slot under the power supply plug, take out the old fuse and replace the new fuse into it, after that the instrument can be used normally.

Warning: Do not use power cable with any signs of damage to avoid danger!
If use 110V AC input, please change fuse of 250V/0.5A.

UNI-TREND.VN

5.3 Operating Environment

The operating environment requirements of UTL8200+ series is as follows.
Ventilation fans speed rate will change with the temperature of cooling fin when the electronic load is loading.

Operating Environment	Environmental Requirements
Humidity	20%~80% (non- condensation)
Temperature	0℃~40℃
Storage Temperature	-10℃~60℃
Altitude	≤2000 meters
Pollution Degree	2

5.4 Cleaning

To prevent from the risk of electric shock, please pull out power cord befor cleaning.
Please use a clean and damp cloth to clean the cover and panel.
Do not clean the inside of the instrument.

Caution：Do not use solvents (alcohol or gasoline) to clean the instrument.

6. Measurement

6.1 Power Up

The correct self-inspection of electronic load is as follows.

1. Connecte the power cord corretly and make sure the 110V/220V power switch is selected correctly. Press the power switch to power up the electronic load. The screen will show the progress bar of the current state.
2. After the initialization, the screen displays the current measurement state. If the boot-up mode is set, the instrument will enter the preset measurement mode.

   When the self-inspection is finished, it means that the instrument is meets the factory standard. User can use the product normally.

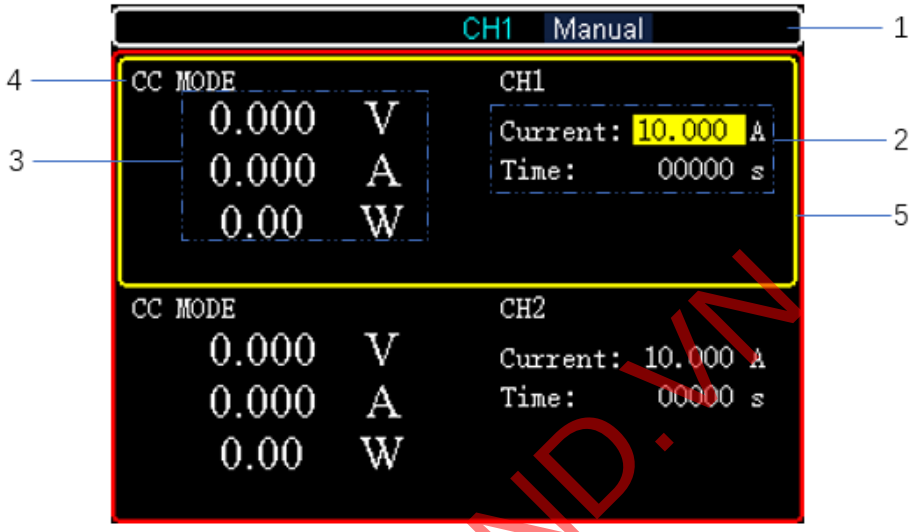
Warning: Please make sure the power voltage is matched with the utility power. Otherwise, the instrument will be damaged.
Power plug should connect with the protective grounding power socket. Do not use a wiring board without protective grounding.

UNI-TREND.VN

6.2 Measurement Interface

6.2.1 Screen Display

LCD will divided into several areas to display information when enter the measurement mode. Take CC mode of UTL8212+ dual channel as an example as shown in the following figure.



6.2.2 Measurement Interface

No.	Name	Description
1	State and mode information	Display the current state of on-load channel, remote control, short circuit test and trigger function
2	Setting area	Display the information of mode and the operating time information
3	Operating data	Display the real-time voltage, current and power
4	Current mode	Display the mode
5	Yellow wire frame	Display the currently selected channel (only for UTL8212+ dual channel)

UNI-TREND.VN

6.2.3 State Information

Mode	State	Description
Mode	CC/CV/CP/CR	Display the current measurement state or operation mode
Control mode	COMM	The load is in remote mode (if it not display, the load is in local mode.)
Lock key	Lock	The key is locked, so the operation is invalid
Trigger mode	[Manual]/[Ext Trig]	Trigger mode is manua/external mode
Waiting for trigger	[Trigger]	The current mode is waiting for trigger, the mark will disappear when it generated
Short circuit	[Short]	The load is in short circuit state

6.2.4 Operation Indicator

UTL8200+ series has operation indicator. When the electronic load is operating, ON key will illuminated with red. Press ON key again to turn off the electronic load and the indicator will be extinguished.

⚠

Caution: Yellow wireframe represents the cursor position, which is the currently selected mode.

UNI-TREND.VN

7. Measurement Setting

7.1 Mode Setting and Measurement

UTL8200+ series have 7 common test modes, which is CC, CV, CR, CP, dynamic, list and battery.
Press Mode key to enter mode interface, use direction key or rotaty knob to select the mode and then press Enter key to enter the selected mode interface.

Mode Introduction

Name	Function
CC Mode	No matter how the input voltage changes, the electronic load always consumes the constant current.
CV Mode	The electronic load maintains the input voltage as the set value by changing the current consumption.
CR Mode	The electronic load is equals to a resistance, linear change the current with the changing of input voltage to maintain a constant resistance load.
CP Mode	The electronic load consumes a fixed power and the current decreases as the voltage increases to maintain a constant power.
Dynamic Test	Set two different current values, the electronic load can step through the two values.
List Test	It can only set up to 16 stepes with different load modes, the customizable step mode and the upper and lower limit of test judgement, list test file with save function.
Battery Test	CC/CR/CP can discharge the battery under test, it will automatically stop when it meets cut-off condition and display the battery capacity.

UNI-TREND.VN

7.1.1 CC Test (Constant Current Test)

In CC mode, no matter how the input voltage changes, the electronic load always consumes the constant current.
Select CC mode in mode interface, press Enter key to enter CC mode and input current value;
Press ON key, the electronic load will in load state and the indicator will be illuminated;
Press ON key again to stop the load and the indicator will be extinguished.

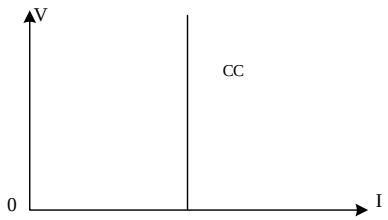


Figure 7-1-1 Relation Schema of Voltage-Current in CC Mode

Operation steps

1. After the instrument is boot-up, press CH key to select the channel, yellow wireframe area is the selected channel and it will display the prompt of CH1 or CH2 at top of the screen (UTL8211+ single channel don't need to choose.)
2. Press Mode key to enter the selection interface, use rotary knob or direction key to select CC mode and then press Enter key to enter test interface.
3. Rotate the rotary knob to change the current value (constant current value).
4. Press ON key to operating, press ON key again to stop the operation.

7.1.2 CV Voltage Test (Constant Voltage Test)

In CV mode, the electronic load maintains the input voltage as the set value by changing the current consumption.

Select CV mode in mode interface, press Enter key to enter CV mode and input voltage value;

Press ON key, the electronic load will in load state and the indicator will be illuminated;

Press ON key again to stop the load and the indicator will be extinguished.

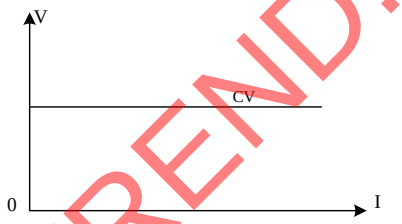


Figure 7-1-2 Relation Schema of Voltage-Current in CV Mode

Operation steps

1. After the instrument is boot-up, press CH key to select the channel, yellow wireframe area is the selected channel and it will display the prompt of CH1 or CH2 at top of the screen (UTL8211+ single channel don't need to choose.)
2. Press Mode key to enter the selection interface, use rotary knob or direction key to select CV mode and then press Enter key to enter test interface.
3. Rotate the rotary knob to change the voltage value (constant voltage value).
4. Press ON key to operating, press ON key again to stop the operation.

7.1.3 CR Test (Constant Resistance Test)

In CR mode, the electronic load is equals to a resistance, linear change the current with the changing of input voltage to maintain a constant resistance load.

Select CR mode in mode interface, press Enter key to enter CR mode and input resistance value;

Press ON key, the electronic load will load state and the indicator will be illuminated;

Press ON key again to stop the load and the indicator will be extinguished.

UNI-TREND.VN

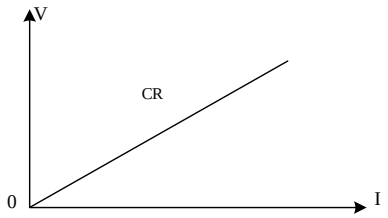


Figure 7-1-3 Relation Schema of Voltage-Current in CR Mode

Operation steps

1. After the instrument is boot-up, press CH key to select the channel, yellow wireframe area is the selected channel and it will display the prompt of CH1 or CH2 at top of the screen (UTL8211+ single channel don't need to choose.)
2. Press Mode key to enter the selection interface, use rotary knob or direction key to select CR mode and then press Enter key to enter test interface.
3. Rotate the rotary knob to change the resistance value (constant resistance value).
4. Press ON key to operating, press ON key again to stop the operation.

7.1.4 CP Test (Constant Power Test)

In CP mode, the electronic load consumes a fixed power and the instrument will adjust the current with the changing of voltage to maintain a constant power.
Select CP mode in mode interface, press Enter key to enter CP mode and input power value;
Press ON key, the electronic load will in load state and the indicator will be illuminated;
Press ON key again to stop the load and the indicator will be extinguished.

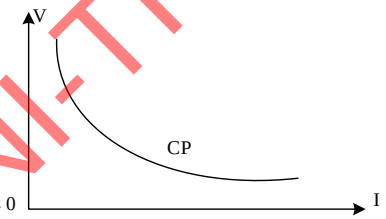


Figure 7-1-4 Relation Schema of Voltage-Current in CP Mode

In order to meet the various test needs, UTL8200+ series electronic load provides multiple test modes for user, which includes dynamic test, list test and batter test.

Operation steps

1. After the instrument is boot-up, press CH key to select the channel, yellow wireframe area is the selected channel and it will display the prompt of CH1 or CH2 at top of the screen (UTL8211+ single channel don't need to choose.)
2. Press Mode key to enter the selection interface, use rotary knob or direction key to select CP mode and then press Enter key to enter test interface.
3. Rotate the rotary knob to change the power value (constant power value).
4. Press ON key to operating, press ON key again to stop the operation.

UNI-TREND.VN

7.1.5 Dynamic Test

UTL8200+ series electronic load has dynamic current load mode. In dynamic mode, user can set the two constant parameter, the electronic load can switch the two constant value by set the operation mode. The following table is an example of the set interface in this mode.

[Dynamic]			[Manual]		
Operation mode	Continuous		Repeat Times	01000	
Low value	1.000	A	Timing of low scale	100.0	ms
High value	5.000	A	Timing of high scale	100.0	ms
Rising Slop	0.100	A/us	Falling Slop	0.100	A/us

Parameter of Dynamic Test

Dynamic Test	Description
Operation mode	Set operation mode:continuous, pulse, reversal
Low value	Set the parameter value of low scale
Timing of low scale	Set the load time of low scale
High value	Set the parameter value of high scale
Timing of high scale	Set the load time of high scale
Rising Slop	Set the rising slop
Falling Slop	Set the falling slop
Repeat Times	Set the repeat times

UNI-TREND.VN

Operation Description of Dynamic Mode

1. Continuous Mode

   The electronic load will automatically switch the two setting high/low scale until it reaches to the repeat times and the test is over. Continous transient operation as shown in the following figure.

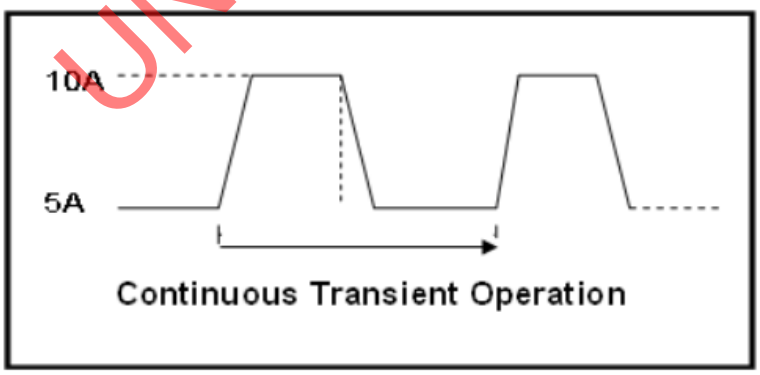


Figure 7-1-5-11 Continous Transient Operation

2. Pulse Mode

   The electronic load will running with the low value, and then the electronic load switches to the high value when it receives a trigger signal for each time. After maintaining the set time, the electronic load switches to the low value. The electronic load will only reverse one time when it receives a

trigger signal for each time and don't need to set the timing of low value. Pulsed transient operation as shown in the following figure.

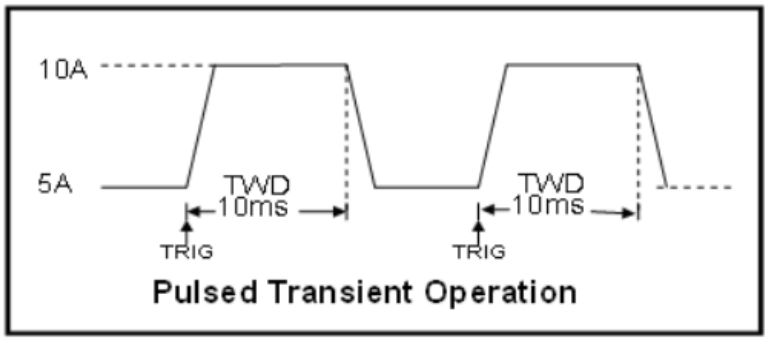


Figure 7-1-5-2 Pulsed Transient Operation

3. Reversal Mode
   The electronic load will switch between the high and low values once for each trigger. At this time, there is no need to set the timing for both high and low. And it will only switch to the other state after each trigger is performed. Toggled transient operation as shown in the following figure.

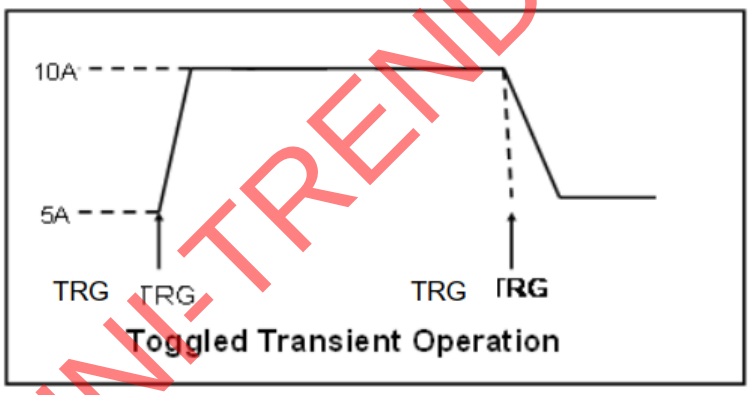


Figure 7-1-5-3 Toggled Transient Operation

UNI-TREND.VN

Operation steps

1. After the instrument is boot-up, press CH key to select the channel, yellow wireframe area is the selected channel and it will display the prompt of CH1 or CH2 at top of the screen (UTL8211+ single channel don't need to choose.)
2. Press Mode key to enter the selection interface, use rotary knob or direction key to select dynamic mode and then press Enter key to enter test interface.
3. Rotate the rotary knob to select the parameter to adjust, press Enter key to change and press it again to save the setting.
4. After the parameter is set, press ON key to enter dynamic test interface (press ON1 to enter CH1, press ON2 to enter CH2).
5. Press ON key to operating, press ON key again to stop the operation.

7.1.6 List Test

List test can switch different mode in rotation according to the set parameter. For power supply products and charger device, etc., the multi-parameter mixed test can provide a more comprehensive and in-depth understanding of the comprehensive working characteristics of the tested products in practical applications.

Parameter of List Mode

Item	Parameter	Description
Group	1~60	Set the group number of list test file for using
Step	1~16	Set the step for the group of list test
Repeat Times	0~99999	Set the repeat operating times for the list file
Mode	Cont/Trig/ContEX/TrigEX	Set the switching mode and stop mode for each step

Group Number

The internal Flash of electronic load can store 60 groups of list files. When set the list parameters, set a group number at first. Press Shift and then the Save key to save the setting.

Operation Mode

Four operation mode: Cont/Trig/ContEX/TrigEX.

Cont Mode: The electronic load will stop the test if it over the limit or error occurs.

Trig Mode: The electronic will stop when a step is finished, and waits for trigger signal to continue next step.

EX Mode: The electronic load will continue to next step even though it over the limit or error occurs.

Mode Parameter Setting

Item		Description
Mode	CC/CV/CR/CP/Open/Short	Select the current step
Value	Set the constant value for the mode	Set the constant value for the mode, default constant value of Open/Short is 1
Time	300~999999ms	Set the load timing of each step, the range is from 300 to 999999ms
Check	OFF/Current/Voltage/Power	Select the check item
Upper	The upper limit of check item	Set the upper limit of check item
Lower	The lower limit of check item	Set the lower limit of check item

UNI-TREND.VN

When the test is finished, user can press Shift+Result to check the test result. If the test result is within the upper/lower limit, then it shows Pass. If the test result is out of the the upper/lower limit, then it shows Fail. User can also check whether each item is pass or not.
When using the list mode check function, user cannot check the range of the item in the mode of a single constant value. For example, in CC mode, the voltage and power value can be checked, but the upper and lower limit of the current cannot be checked.
After the parameter is set, press ON1 or ON2 to input the list file to the channel.

Operation steps

1. After the instrument is boot-up, press CH key to select the channel, yellow wireframe area is the selected channel and it will display the prompt of CH1 or CH2 at top of the screen (UTL8211+ single channel don't need to choose.)
2. Press Mode key to enter the selection interface, use rotary knob or direction key to select list mode and then press Enter key to enter the set interface.
3. Rotate the rotary knob to select the parameter to adjust, press Enter key to change and press it again to save the setting.

- Set list parameter (group number, step, repeat times and mode), press Enter key to enter the adjustable state, use rotary knob to select the mode or adjust the numerical value of the parameter and then press Enter to complete the setting.
- Set mode parameter (mode, check), move the cursor to the parameter, press Enter key to go through different parameter option and stay at the selected parameter, use direction key or rotary konb to enter the next parameter setting.
- Set mode parameter (constant value, timing, upper, lower), move the cursor to the parameter, press Enter key and xxxx at the bottom of the screen will turn to the specified value, use rotary konb to adjust the numerical value and then press Enter key to complete the setting.

Caution:

During the setting, if the setting value exceeds the limit, ERROR: DATA IS OVER LIMIT prompt will pop out. Press Enter key to cancel it. The value should adjust to within the range by the rotary knob to complete the setting. Otherwise, pop-up prompt will continue to appear.

4. After the parameter is set, press ON key to enter list test interface (press ON1 to enter CH1, press ON2 to enter CH2).
5. Press ON key to operating, press ON key again to stop the operation.

UNI-TREND.VN

7.1.7 Battery Test

Battery test is used to detect the battery capacity. Battery capacity is an important index of battery, it reflect the using time and reliability issue of battery.

During the battery test, the voltage will decreasing with the increasing of discharge time, so it need to set the cut-off voltage, the test will stop when it meets the cut-off voltage.

Parameter of Battery Test

Parameter	Description
Load Mode	Set discharge mode to CC/CR/CP
Load Size	Set the load value
Cut-off Voltage	Set the lower limit for cut-off discharge

In battery test, select discharge mode and set the load parameter and cut-off voltage for the mode. The electronic load will automatically stop when the battery discharges to the cut-off voltage.

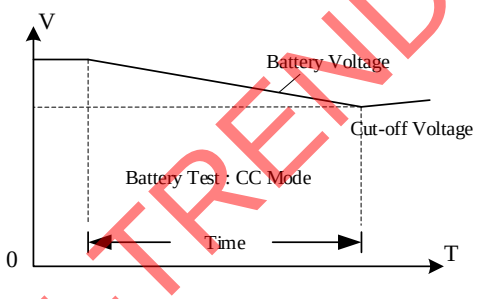


Figure 7-1-7 Battery Test

UNI-TREND.VN

Battery Test Mode

During the actual test, user can view the battery voltage, discharge current and discharged capacity at any time.

Operation steps

1. After the instrument is boot-up, press CH key to select the channel, yellow wireframe area is the selected channel and it will display the prompt of CH1 or CH2 at top of the screen (UTL8211+ single channel don't need to choose.)
2. Press Mode key to enter the selection interface, use rotary knob or direction key to select battery mode and then press Enter key to enter the set interface.
3. Rotate the rotary knob to select the parameter to adjust, press Enter key to change and press it again to save the setting.
4. After the parameter is set, press ON key to enter list test interface (press ON1 to enter CH1, press ON2 to enter CH2).
5. Press ON key to operating, press ON key again to stop the operation.

7.2 Independent Short Circuit Test

In CC/CV/CP/CR mode, when the electronic load is with voltage (at least 0.5V), press Shift and then press the right arrow key (Shift+→ = short) to turn on the short circuit test mode, the short circuit mark [Short] will appear on the screen, indicating that the electronic load is ready for short circuit test.

Operation Steps

1. After the instrument is boot-up, press CH key to select the channel, yellow wireframe area is the selected channel and it will display the prompt of CH1 or CH2 at top of the screen (UTL8211+ single channel don't need to choose.)
2. Press Shift+Mode key to enter the main menu interface.
3. Rotate the rotary knob to select the parameter setting and press Enter key to enter the set interface.
4. Rotate the rotary knob to set the time for short circuit and press Enter key to complete the setting.
5. Press Mode key to enter selection interface, select CC/CV/CP/CR mode, press ▶ Shift + (short) to enter short circuit mode, the short circuit mark [Short] will appear on the screen, indicating that the electronic load is ready for short circuit test.
6. Rotate the rotary knob to set the current value, press ON1/ON2 key to complete the short circuit test.

7.3 Parameter Input and Operation Control

The electronic load has two parameter input methods. User can use direction key or rotary konb to change the parameter.

7.3.1 Parameter Input

In parameter setting interface, use direction key or rotary konb to input the parameter.
If the parameter is out of the range, press Enter key cannot save the setting. The parameter should be reset.

7.3.2 Operation Control

When the electronic load is power on but not in loading state, press ON1/ON2 key on the front panel to control the input switch of the electronic load
If ON indicator is illuminated, it indicating that the electronic load is in load state; If ON indicator is extinguished, it indicating that the electronic load is not in load state.

UNI-TREND.VN

7.4 Alarm

The following alarm prompts may appear during the input of the set parameters to run the test, and the user needs to readjust the input.
Overvoltage protection: If input voltage of the load is greater than the setting value of overvoltage protection, it will trigger the overvoltage protection event.
Overcurrent protection: If load current is greater than the setting value of overcurrent protection, it will trigger the overcurrent protection event.
Power protection: If load power is greater than the setting value of power protection, it will trigger the power protection event.
Polarity error: If the positive and negaitive of input port is reverse connected, it will trigger polarity error event.
Under-voltage protection: When the load is operating, if it detects the input voltage is less than the setting value of unload voltage, it will trigger under-voltage protection event.

7.5 Local/Remote

The electronic load provides two operation mode, local operation and remote control. The default mode is local operation. When the electronic load is connect with RS232 communication port to operating SCPI remote control, the electronic load will automatically switch to remote control and lock the keyboard, mode information in system state bar will change from Manual to COMM and display LOCK information.
Long press Lock key to unlock the keyboard and cancel the remote control, the operation mode will switch to local.

UNI-TREND.VN

8. System (Menu)

The main menu divides into four parts: system setting, parameter setting, file operation and device information. The parameter setting is only activated for the selected channel (such as UTL8212+ needs to use CH key to select the channel), other setting are all valid.

<Main Menu>

Press Shift and then Mode to enter system <Menu> setting interface, as shown in the Figure 8-1.

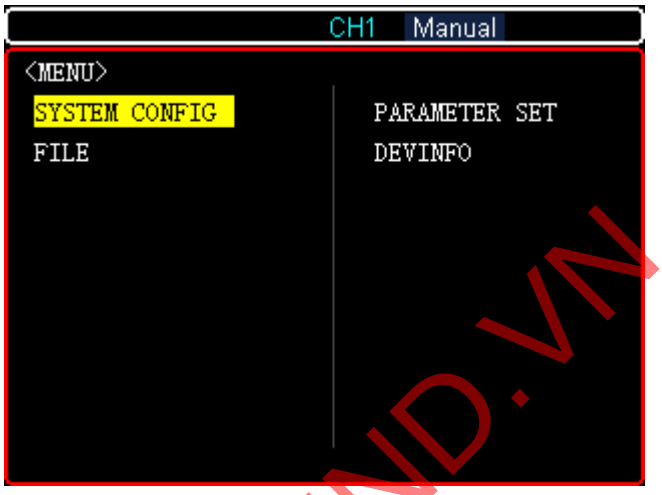


Figure 8-1 System Main Menu

UNI-TREND.VN

8.1 System Setting

Move the cursor to【System Config】, press【Enter】key to enter < System Config > page, this page includes the list setting as follows.

System Parameter	Setting	Description
Language	CHN/Englishh	Set the system language
Knob Active	ON/OFF	The data adjust by the rotary knob will take effect immediately when the load is in activating state
Warning	ON/OFF	Turn on/off alarm sound
KeyVoice	ON/OFF	Turn on/off key sound
Initial Mode	Last/Default	Select Default, the electronic load enters CC test interface Select Last, the electronic load enters the test mode at last time
Address	001~032	Set the communication address
Baud Rate	9600/19200/38400/57600/115200	Set the baud rate of RS232 port
Factory Set	Default	Restore to the factory setting

Set【Language】

Figure 8-2 Language Setting

Setup Steps

(1) Use rotary knob or direction key to move the cursor to【LANGUAGE】, as shown in Figure 8-2.
(2) Press Enter key to complete the setting.
(3) Press ESC key to go back to the last level, press ESC key again to enter the main operating interface.

Other parameter setting as the same, system configuration as shown in Figure 8-3

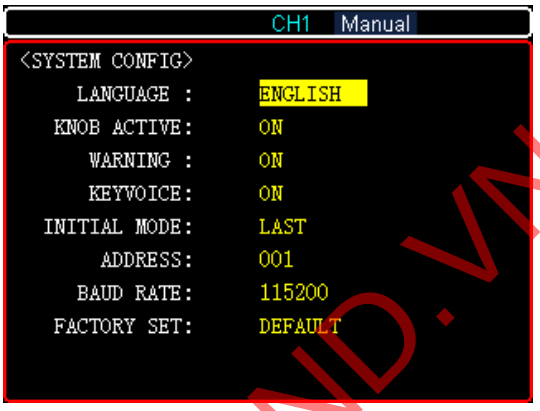


Figure 8-3 System Configuration

Set【Baud Rate】

Figure 8-4 Baud Rate Setting

Setup Steps

(1) Use rotary knob or direction key to move the cursor to【baud rate】, as shown in Figure 8-3.
(2) Use rotary knob or direction key to switch baud rate.
(3) Press Enter key to confirm and set the selected the baud rate.
(3) Press ESC key to go back to the last level, press ESC key again to enter the main operating interface.

8.2 Parameter Setting

In parameter setting is used to set operating parameter and protective parameter, the specified range is related with the model.

UNI-TREND.VN

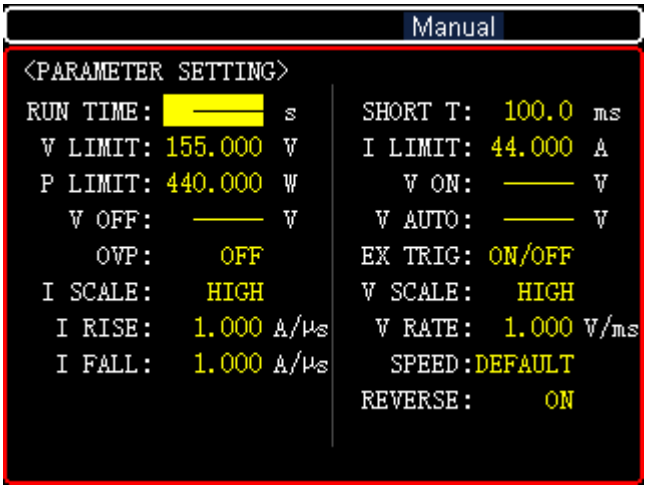


Figure 8-5 UTL8211+ Parameter Setting (Example)

Parameter	Range	Description
Run T	0~99999s	Set the time of load, the load will automatically stop when it runs to the set time no matter in which mode
V Limit	0~150V(500V)	Set the voltage value for overvoltage protection
P Limit	0~200W(400W)	Set the power value for overpower protection
V Off	0~150V(500V)	Set the low voltage for the load is automatically stop
OVP	ON/OFF	When the voltage of input port is higher than the protective voltage, it will directly short circuit the input port
I Scale	LOW/HIGH	Select the current range by manual. The default setting is HIGH
I Rise	0.01A/uS~1A/uS	Rising speed of the current
I Fall	0.01A/uS~1A/uS	Falling speed of the current
Short T	0~9999.9mS	Set the protective detection time for short overcurrent
I Limit	0~40A(20A/15A)	Set the current value of overcurrent protection
V ON	0~150V(500V)	Set load voltage for initial operation at each time
V Auto	0~150V(500V)	Automatic operation in list mode when the load detects a voltage value is higher than the self-start voltage at the measurement end
EX Trig	ON/OFF	DB9 port for external trigger to control signal input
V Scale	LOW/HIGH	Set voltage range by manual. The default setting is LOW
V Rate	0.01V/mS~2V/mS	Set the rising/falling spped of voltage
Speed	1~8	8 scales for CV loop speed
Reverse	ON/OFF	Turn on/off power anti-reverse connection protection

*Remarks: If the protective value is 0, the system disables the protection function and displays "————" on the screen.

UNI-TREND.VN

8.3 File Operation

File operation is used to recall and delete the file. List files are stored in internal Flash for check.

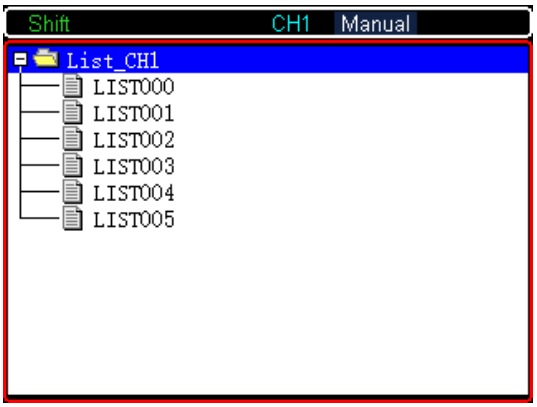


Figure 8-6 UTL8211+ List File Management

Select one of the list file, use combination key Shift+ESC (Delete) to delete the file.
Select one of the list file, press ON key to enter the file.

8.4 Device Information

Check the device information, which includes the model, version number and serial number as shown in the following figure.

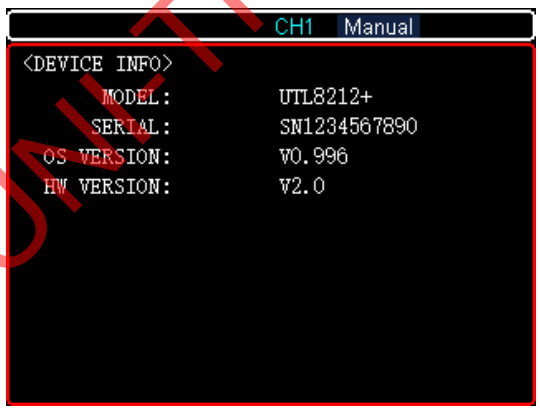


Figure 8-7 UTL8212+ Device Information

UNI-TREND.VN

9. Communication

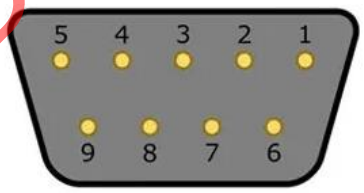
9.1 Communication Interface

UTL8200+ series electronic load has standard RS232 communication mode. User can select the communication line to remote control the load.
The electronic load has a DB9 femal port at the end, which can be connected to the COM port of the computer via standard RS-232 cable.

Select USB-to-serial port RS232 cable.
Caution: In actual practice, the electronic load uses only three of the 2.3.5 pins to communicate with the device.

RS232 Pin Definition

Pin No.	Symbol	Description
1	DCD	Data Carrier Detect
2	TXD	Transmit Data (RS485-A)
3	RXD	Receive Data (RS485-B)
4	DTR	Data Terminal Ready
5	GND	Ground
6	DSR	Data Set Ready
7	RTS	Request to Send
8	CTS	Clear to Sent
9	RI	Ring Indicator



UNI-TREND.VN

9.2 Communication Setting

Communication setting is used to set the communication parameter between the electronic load and the upper computer. The electronic load communicates with the upper computer through RS232, and users can purchase the required connection cable to realize the remote control with the electronic load. Before connecting to the host computer, please make sure you have purchased the specified connection cable and set the correct communication parameters in the system settings.

Setup Steps
1. Press Shift key and then Mode key to enter system <Menu> setting interface.
2. Press【System Config】to enter the setting interface.
3. Select【Communication address】【Baud rate】in < System Config > page, set the communication parameters to be consistent with the upper computer.

9.3 Factory Setting

After the factory setting is executed, all settings of the instrument will be restored to the preset parameters.

Setup Steps

1. Press Shift key and then Mode key to enter system <Menu> setting interface.
2. Press【System Config】to enter the setting interface.
3. Select【Factory setting】in < System Config > page, press confirm key to restore the instrument to the preset parameters.

10. Technical Index

Model		UTL8211+		UTL8212+	
Display Screen		LCD		LCD	
Rated Value 0~40℃	Input Voltage	0~150V		0~150V	
	Input Current	0~40A		0~20A(single group channel)	
	Input Power	400W		200W x 2	
	Minimum of Operating Voltage	2.0V at 40A		2.0V at 20A	
CV (Constant Voltage) Mode	Range	0~150V		0~150V	
	Resolution	1mV		1mV	
	Accuracy	±(0.05%+0.1%FS)		±(0.05%+0.1%FS)	
CV (Constant Current) Mode	Range	0~4A	0~40A	0~2A	0~20A
	Resolution	1mA	10mA	1mA	10mA
	Resolution	±(0.1%+0.1%FS)		±(0.1%+0.1%FS)	
CR(Constant Resistance) Mode	Range	0.05Ω~7.5KΩ		0.05Ω~7.5KΩ	
	Resolution	12bit		12bit	
	Accuracy	±(0.3%Vin/Rset+0.2%IF.S)		±(0.3%Vin/Rset+0.2%IF.S)	
CP(Constant Power) Mode	Range	400W		400W	
	Resolution	10mW		10mW	
	Accuracy	±(0.1%+0.5%FS)		±(0.1%+0.5%FS)	
Dynamic Mode	T1&T2	100μS~50S/Res:100μS		100μS~50S/Res:100μS	
	Rising/falling slope	0.08A/mS~0.4A/μS		0.04A/mS~0.2A/μS	
	Minimum of Rising Time	100us		100us	
Readback	Range	0~15V	0~150V	0~15V	0~150V

UNI-TREND.VN

Voltage	Resolution	1mV	10mV	1mV	10mV
	Accuracy	±(0.1%+0.1%FS)		±(0.1%+0.1%FS)	
Readback Current	Range	0~4A	0~40A	0~2A	0~20A
	Resolution	1mA	10mA	1mA	10mA
	Accuracy	±(0.1%+0.1%FS)		±(0.1%+0.1%FS)	
Readback Power	Range	400W		200W	
	Resolution	10mW		10mW	
	Accuracy	±(0.1%+0.5%FS)		±(0.1%+0.5%FS)	
Overpower Protection		Delay protection, immediate protection			
Overcurrent Protection		Delay protection, immediate protection			
Overvoltage Protection		Delay protection, immediate protection			
Overtemperature Protection		≥85℃			
Short Circuit		√			
Impedance of Input Terminal		300KΩ			
Fuse Specification		0.5A(110V)/0.25A(220V)			
Communication Interface		RS232			
Protocol		SCPI			
Data Acquisition Software		√			
Power Requirements		110V±10%/220V±10% Frequency 50/60Hz			
Size mm(Length*Width* Height)		88W*174.6H*230Dmm			
Net Weight(kg)		3.42 KG		3.59 KG	

Notes:

1. Calibration period: 1 year
2. CV mode only has high scale.
3. It is forbidden to use the electronic load when in series-parallel connection.

UNI-TREND.VN

11. Appendix

11.1 Appendix A Maintenance and Cleaning

(1) General Maintenance

Keep the instrument away from the direct sunlight.

Caution

Keep sprays, liquids and solvents away from the instrument or probe to avoid damaging the instrument or probe.

(2) Cleaning

Check the instrument frequently according to the operating condition. Follow these steps to clean the

external surface of the instrument:

a. Please use a soft cloth to wipe the dust outside the instrument.

b. When cleaning the LCD screen, please pay attention and protect the transparent LCD screen.

c. When cleaning the dust screen, use a screwdriver to remove the screws of the dust cover and then remove the dust screen. After cleaning, install the dust screen in sequence.

d. Please disconnect the power supply, then wipe the instrument with a damp but not dripping soft cloth. Do not use any abrasive chemical cleaning agent on the instrument or probes.

Warning

Please confirm that the instrument is completely dry before use, to avoid electrical shorts or even personal injury caused by moisture.

11.2 Appendix B Warranty Overview

UNI-T (UNI-TREND TECHNOLOGY (CHINA) CO., LTD.) ensures the production and sale of products, from authorized dealer's delivery date of three years, without any defects in materials and workmanship. If the product is proven to be defective within this period, UNI-T will repair or replace the product in accordance with the detailed provisions of the warranty.

To arrange for repair or acquire warranty form, please contact the nearest UNI-T sales and repair department.

In addition to permit provided by this summary or other applicable insurance guarantee, UNI-T does not provide any other explicit or implied guarantee, including but not limited to the product trading and special purpose for any implied warranties.

In any case, UNI-T does not bear any responsibility for indirect, special, or consequential loss.

UNI-TREND.VN

11.3 Appendix C Contact Us

If the use of this product has caused any inconvenience, if you in mainland China you can contact UNI-T company directly.

Service support: 8am to 5.30pm (UTC+8), Monday to Friday or via email. Our email address is infosh@uni-trend.com.cn

For product support outside mainland China, please contact your local UNI-T distributor or sales center.

Many UNI-T products have the option of extending the warranty and calibration period, please contact your local UNI-T dealer or sales center.

To obtain the address list of our service centers, please visit our website at URL: http://www.uni-trend.com