ONMEAS®

Rev.B1.0

AT680A

Leakage Current Meter



User's Guide

Scan QR code for operation video

Safety Notice

⚠Warning ⚠Danger: If any of the following abnormal conditions occurs, stop operation immediately and disconnect the power cord. Contact the Onmeas sales department immediately for repair. Otherwise, a fire may occur or the operator may be exposed to a potential electric shock hazard.

- The instrument operates abnormally.
- The instrument produces abnormal noise, odor, smoke, or flashes during operation.
- The instrument generates high temperature or electric shock during operation.
- The power cord, power switch, or power socket is damaged.
- Foreign matter or liquid has entered the instrument.

Safety Information

⚠Warning ⚠Danger: To avoid possible electric shock and ensure personal safety, follow the guidelines below during operation.

Disclaimer	Please read the following safety information carefully before using the instrument. Onmeas assumes no liability for any personal injury or property damage caused by the user's failure to comply with the following provisions.
Instrument Grounding	To prevent electric shock hazard, connect the power ground wire properly.
Do Not Use the Instrument in Explosive Gas Atmospheres	Do not use the instrument in an environment containing flammable or explosive gases, vapors, or excessive dust. Using any electronic equipment in such an environment poses a risk to personal safety.
Do Not Open the Instrument Case	Non-professional maintenance personnel must not open the instrument enclosure in an attempt to repair the instrument. Charge that has not been fully discharged may remain inside the instrument for some time after it is switched off, which may cause an electric shock hazard to persons.
Do Not Use a Damaged Instrument	If the instrument has been damaged, the hazards are unpredictable. Disconnect the power cord, do not use the instrument again, and do not attempt to repair it yourself.
Do Not Use a Malfunctioning Instrument	If the instrument is not operating normally, the hazards are unpredictable. Disconnect the power cord, do not use the instrument again, and do not attempt to repair it yourself.
Do Not Use the Instrument Beyond the Methods Specified in This Manual	Beyond the specified scope, the protective measures provided by the instrument will become ineffective.

Limited Warranty and Limitation of Liability

Onmeas Ltd. (hereinafter referred to as Onmeas) warrants that every AT680A you purchase is fully compliant in terms of quality and metrology. This warranty does not cover the fuse, nor damage caused by negligence, misuse, contamination, accident, or abnormal conditions of use. This warranty applies only to the original purchaser and is not transferable.

From the date of shipment, Onmeas provides one year of free warranty; this warranty also covers VFD or LCD. If the instrument is damaged due to improper operation of the user during the one-year free warranty period, the repair costs shall be borne by the user. After one years and until the end of the instrument's service life, Onmeas will provide repairs on a chargeable basis. For replacement of the VFD or LCD, the cost will be charged at the current cost price.

If the product is found damaged, please contact Onmeas to obtain information and approval for return or exchange. Then send the product to the dealer for return or exchange. Be sure to state the cause of the product damage, and prepay the postage and insurance to the destination. For repair or replacement of a product within the warranty period, Onmeas will bear the return shipping costs. For repair of a product not under warranty, Onmeas will estimate the repair cost and carry out the repair only after obtaining your consent; all costs arising from the repair shall be borne by the user, including the return shipping costs.

This warranty is the only warranty provided by Onmeas and is your sole and exclusive remedy. Beyond this, there are no other express or implied warranties (including fitness for a particular purpose), and all other warranties are expressly disclaimed. Neither Onmeas nor any of its agents has made any oral or written representation to establish a warranty or to expand the scope of this warranty in any way. Onmeas assumes no liability for any special, indirect, incidental, or consequential damage or loss (including loss of data) arising from any cause beyond the scope of the specifications. If any provision of this warranty conflicts with local regulations, or if a particular jurisdiction does not permit the exclusion or limitation of implied warranties, local regulations shall prevail, and therefore such provision may not apply to you. However, the ruling on such a provision does not affect the validity and enforceability of the other provisions.

People's Republic of China
Jiangsu Province
Onmeas Ltd.
October 2009
Rev.B

Contents

Safety Notice 2
Safety Information 2
Limited Warranty and Limitation of Liability 3
Contents 4
1 Installation and Setup Guide 5
1.1 Packing List 5
1.2 Power Requirements 5
1.3 Fuse Replacement 6
1.4 Operating Environment 6
1.5 Cleaning 6
2 Overview 7
2.1 Introduction 7
2.2 Main Specifications 7
2.3 Main Features 7
3 Getting Started 9
3.1 Getting to Know the Front Panel 9
3.1.1 Front Panel Description 9
3.1.2 Getting to Know the Display 10
3.1.3 Getting to Know the Keys 11
3.2 Rear Panel 11
3.3 Power-On Startup 12
3.3.1 Powering on: the key marked “+” at the lower left of the panel is the power switch. 12
3.3.2 Startup sequence: when the AT680A starts, the instrument performs a series of self-tests: 12
3.3.3 Warm-up time: to achieve the specified accuracy, the instrument needs to warm up for at least 30 minutes. 12
3.4 Preparing for Test 12
3.4.1 Connecting the Test Terminals 12
3.4.2 Voltage Setting [VOLT] 13
3.4.3 Comparator Setting [COMP] 13
3.4.4 Charge/Test [CHAR] 14
3.4.5 Discharge [DISCH] 14
3.4.6 Main Menu [MENU] 14
4 Handler Interface 15
4.1 Terminal Blocks and Signals 15
4.2 Connection Methods 16
4.3 Timing Table 17
5 Specifications 19
5.1 Technical Specifications 19
5.2 General Specifications 19
5.3 Dimensions 20

1 Installation and Setup Guide

Thank you for purchasing our product! Please read this chapter carefully before use.
In this chapter, you will learn about the following:

- Main Features Packing List
- Power Requirements
- Fuse Replacement
- Operating Environment
- Cleaning

1.1 Packing List

Before formally using the instrument, please first:
1. Check the product appearance for damage, scratches or other defects;
2. Check the instrument accessories against the table below for anything missing;

Table1-1 Instrument Accessories

NAME	QUANTITY	REMARKS
User's Guide	1 copy	
Power cord	1 piece	220V/50Hz
Fuses	2 pieces	250V, 1A slow-blow
ATL507 test cable	1 set	three cables
ATL801 communication cable	1 piece	
Warranty card (with product certificate)	1 copy	

If there is any damage or missing accessories, contact the Onmeas sales department or your dealer immediately.

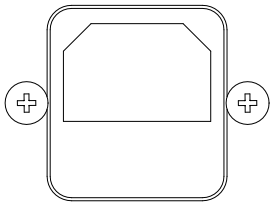
1.2 Power Requirements

The AT680A can only be used under the following power conditions:
Voltage: 198-252VAC
Frequency: 47.5-52.5Hz
Power: max. 100VA



Warning: To prevent electric shock hazard, connect the power ground wire properly
If the user replaces the power cord, make sure that the ground of the power cord is reliably connected.

1.3 Fuse Replacement



~Line: 47.5Hz-52.5Hz
198VAC– 242VAC
100VA MAX
Fuse:250V 3A
Slow Blow
Figure 1-1 Fuse Holder on the Rear Panel

Note: use a 250V, 3A slow-blow fuseFuses

1.4 Operating Environment

The AT680A must be used under the following environmental conditions:
Temperature: 0°C~55°C,
Humidity: below 70%RH at 23°C

1.5 Cleaning

To prevent electric shock, unplug the power cord before cleaning.
Use a clean cloth dampened with a little water to clean the case and panel.
Do not clean the inside of the instrument.

Note: Do not use solvents (such as alcohol or gasoline) to clean the instrument.

2 Overview

In this chapter you will learn the following:

- Introduction
- Main Specifications
- Main Features

2.1 Introduction

Thank you for purchasing the AT680A ultracapacitor leakage current tester.

The AT680A is a capacitor leakage current tester controlled by a high-performance microprocessor. It provides a 2A charging current, 4-range testing, a leakage current measurement range of 1μA~200mA and a maximum display of 9,999 counts. The test speed reaches 55 readings/second; the ultra-high-speed test offers the best solution for automated production.

The instrument has a sorting function and sorting beeper settings; an optional Handler interface supports automatic sorting systems for fully automatic assembly-line testing. An optional RS-232 interface provides remote control and data acquisition and analysis.

The computer remote control commands are compatible with SCPI (Standard Command for Programmable Instrument), efficiently accomplishing remote control and data acquisition.

The unique high-current design of the AT680A is especially suitable for leakage current testing of ultracapacitors.

2.2 Main Specifications

The AT680A technical specifications include the basic technical specifications of the instrument and the ranges allowed for instrument testing. These specifications are what the instrument can achieve at the factory.

See: For the complete technical specifications, see Appendix A.

- Test source: 0.001V~10.000V, basic accuracy: 1%, max. charging current 2A±200mA
- Accuracy: 1%
- 4-range automatic or manual testing
  provides a leakage current test range of 1μA~200mA.
- High-speed, high-accuracy testing
  at medium and fast speeds the maximum reading is 1,999 counts.
- 3 speeds selectable.
  Slow: 3 readings/second, 4-digit reading, max. 9,999;
  Medium: 25 readings/second, 3-1/2-digit reading, max. 1,999;
  Fast: 55 readings/second, 3-1/2-digit reading, max. 1,999.
- Multiple trigger modes
  internal, manual, external and remote triggering.

2.3 Main Features

- High-brightness, ultra-clear 4-color VFD display
  the display window is 98mm×58mm; multiple parameters are shown at the same time and the VFD brightness is adjustable.
- Correction function:
  full-range open zeroing.
- Comparator (sorting) function:

makes a GD/NG judgment on the device under test.

·**Comparator function display:**shown directly with flags on the VFD and/or in display window C.

·**Comparator output:**sorting results can be output via the optional Handler interface and RS232C.

·**Beeper:**The beeper can be switched on/off.

- Interfaces:
  1. **Built-in Handler interface**: sorting result output, trigger signal input, EOC signal output.
  2. **Built-in RS232C interface**: a simple 3-wire serial interface. Compatible with the SCPI command set, ASCII transmission, completing all instrument functions.

3 Getting Started

In this chapter you will learn the following:

- Getting to know the front panel — introduction to the keys, VFD and test terminals.
- Rear panel — introduces the power supply and interface information.
- Power-on startup — includes the power-on self-test process, instrument defaults, and instrument warm-up time.
- Display messages — about the prompt information that will be encountered during instrument startup and use.
- Preparing for test — how to connect to the test terminals and instrument function settings.
- Starting a test — tells you the settings available during testing.

3.1 Getting to Know the Front Panel

3.1.1 Front Panel Description

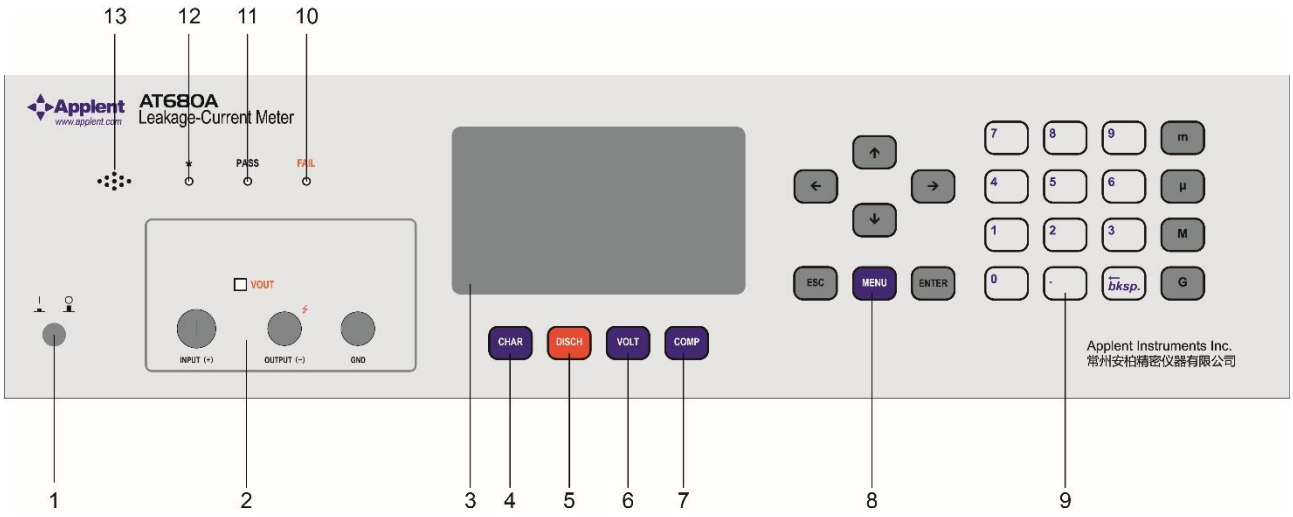


Figure3-1 Front Panel

No.	Function
1	Power switch. Pressed: on; released: off ⚠ Warning: do not switch the instrument on and off rapidly and continuously; momentary surges may shorten the instrument's life or even damage it.
2	Front panel test input terminals. Used to connect the test cable for testing. (+) positive terminal (current sampling) (-) negative terminal (voltage output) GND ground terminal (for shielding the device under test; not connected if the device is a cable or capacitor, etc.) ⚠ Warning: do not connect the negative terminal and the ground terminal together.
3	Display window.

	See: for details refer to the “VFD” section
4	CHAR: charge/test key
5	DISCH: discharge key
6	VOLT: voltage setting key
7	COMP: comparator setting key
8	Menu setting key area
9	Numeric keypad area
10	FAIL: leakage current fail indicator
11	PASS: leakage current pass indicator
12	TRIG’ED: trigger indicator
13	Beeper indicator

3.1.2 Getting to Know the Display

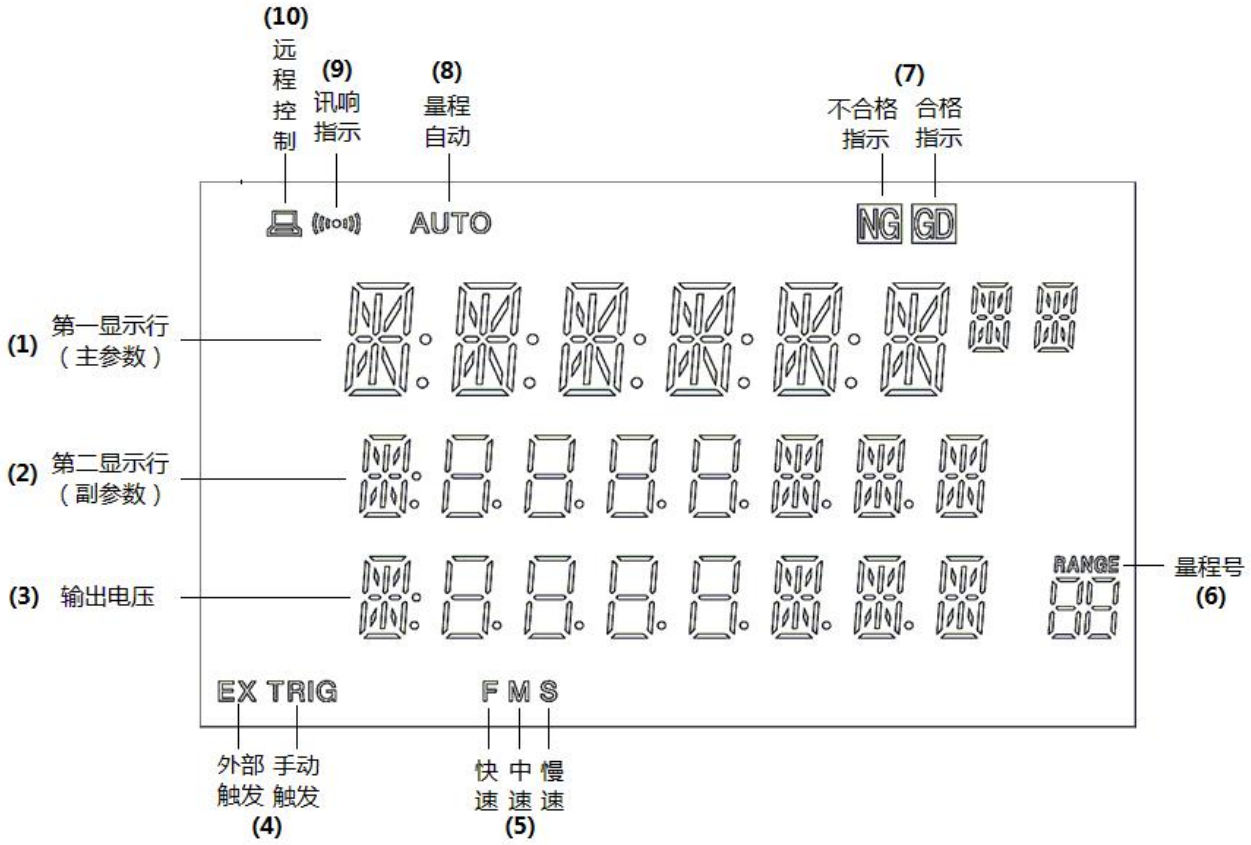


Figure 3-2 Display

No.	Icon	Function
(1)	Digit x8	First display row: shows DISCH in the discharge state, and the test result (resistance or current value) in the test state.
(2)	Digit x8	Second display row: shows the sorting result.
(3)	Digit x8	Third display row: shows the current output voltage value.
(4)	EX TRIG	TRIG: manual trigger indicator; EX TRIG: external trigger indicator
(5)	FMS	Test speed indicator.

(6)		Range number indicator.
(7)	NG GD	Comparison result: NG = fail, GD = pass
(8)	AUTO	Auto range indicator
(9)		Beeper indicator
(10)		Remote control indicator: means the instrument can currently communicate online with a computer.

3.1.3 Getting to Know the Keys

English	*Chinese*	*Function*
VOLTAGE	Voltage	Voltage setting
REFER	Comparator	Comparator setting menu; enter the upper/lower limits.
CHAR	Charge	Charge/test.
DISCH	Discharge	Discharge key.
ESC	Cancel	In the setting state, cancels or returns to the previous level.
ENTER	Enter	In the setting interface, confirms selections and input.
1~9		Numeric keys
m μ M G		Unit keys

3.2 Rear Panel

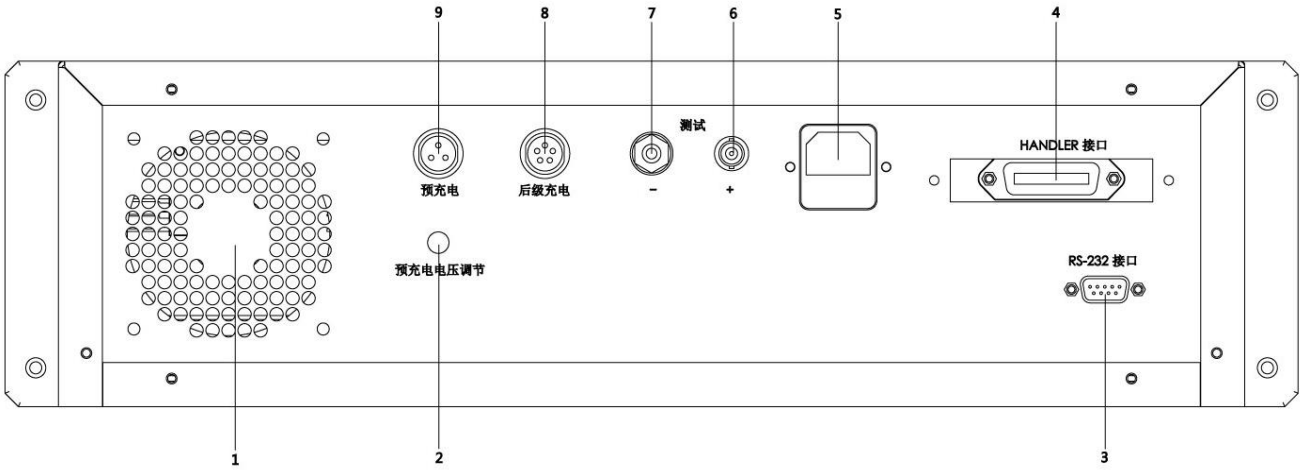


Figure3-3 Rear Panel

No.	Function
1	Cooling fan
2	Not used in this version
3	RS-232 interface
4	HANDLER interface

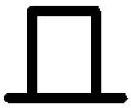
5	Power socket (with fuse)
6	Not used in this version
7	Not used in this version
8	Not used in this version
9	Not used in this version

3.3 Power-On Startup

3.3.1 Powering on: the key marked “+” at the lower left of the panel is the power switch.



Power on.



Power off.

3.3.2 Startup sequence: when the AT680A starts, the instrument performs a series of self-tests:

- All VFD segments light up;
- Displays the company name, model and version number;
- Instrument self-test.

3.3.3 Warm-up time: to achieve the specified accuracy, the instrument needs to warm up for at least 30 minutes.

3.4 Preparing for Test

3.4.1 Connecting the Test Terminals

Connecting an ultracapacitor or other polarized device under test:

Polarized devices under test, such as capacitors, have positive and negative terminals; test as follows and pay attention to the polarity.

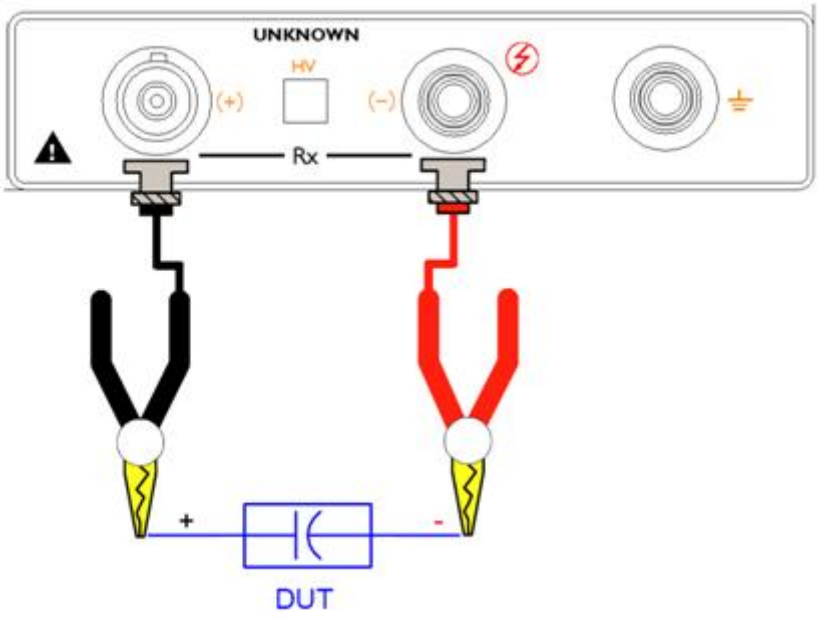
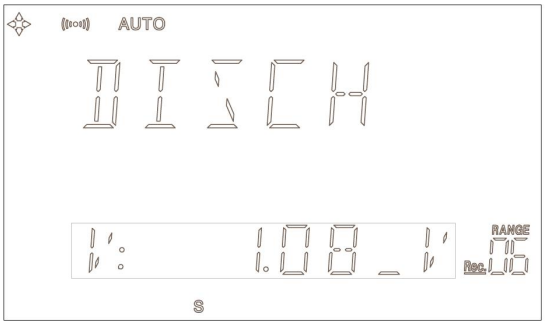


Figure 3-5 Measuring a Polarized Device Under Test

3.4.2 Voltage Setting [VOLT]

The test voltage of the AT680A is 0.001V~10.000V.

Control command: VOLT 100



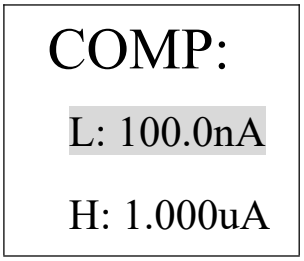
1. In the discharge state, press the VOLT [voltage] key; the input cursor appears in the third display window.
2. Enter the desired voltage value with the numeric keys.
3. Enter [Enter] finishes the input; the result is saved and the instrument returns to the discharge state.
   Or press Esc [Cancel] to cancel the input and return to the discharge state.

In the example, to input 1.08V press the keys in order:

1 . 0 8 Enter [Enter]

3.4.3 Comparator Setting [COMP]

Sets the upper/lower limits of the leakage current.



1. In the discharge state, press the Press the [Comparator] key to enter the comparator settings.
2. The comparator has upper/lower limit settings: the second display row shows the lower limit, the third display row shows the upper limit.
3. Press Numeric keys, then key in the desired value.
4. Press ENTER confirms, saves and returns to the discharge state.
   Or press Esc [Cancel] key to cancel the input.

3.4.4 Charge/Test [CHAR]

In the discharge state, press [CHAR] and the instrument enters the testing state; the negative output terminal of the test terminals outputs voltage.

Control command: stat:char or char

3.4.5 Discharge [DISCH]

In the testing state, press [DISCH] and the instrument enters the discharge state; the voltage at the negative terminals of the front/rear test terminals and the pre-charge output terminal is cut off and testing stops.

Control command: stat:disc or dich

3.4.6 Main Menu [MENU]

[MENU]	
TRIG	Trigger setting
INT	Internal trigger
MAN	Manual trigger
EXT	External trigger
AUTO	Auto range setting
OFF	Manual range control
ON	Auto range control
SPEED	Speed setting
SLOW	Slow
MED	Medium
FAST	Fast
BEEP	Beeper setting
OFF	Off
ON	On
COM	Remote control
OFF	Off
ON	When on, the baud rate defaults to 9600bps
CLEAR	Zero calibration
OPEN	Open calibration
ADMIN	Administrator
PSW	Password-protected function
EXIT	Exit

4 Handler Interface

You will learn about the following:

- Terminals
- How to connect and the interface schematic
- Timing Table

The AT680A provides a full-featured Handler interface, including sorting outputs, the EOC (end-of-test) signal, the TRIG (external trigger start) input and other signals. Through this interface, the instrument can easily implement automatic control together with the user's system control components.

The Handler interface can only be used in "external trigger mode".

4.1 Terminal Blocks and Signals

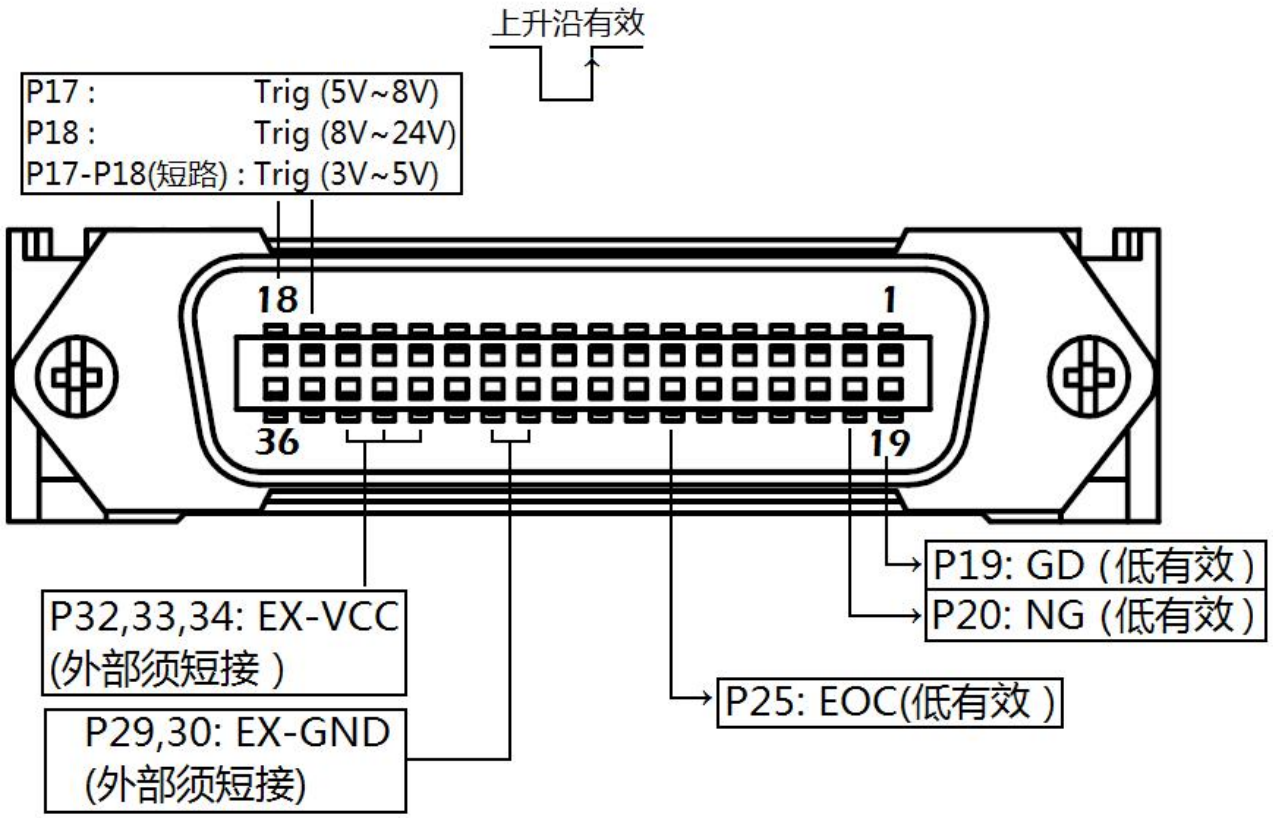


Figure4-1 Terminal Block

■ External control signal input terminals

14	DISCH	Discharge signal (valid in the test state). (Active low)
15	CHARG	Charge/test signal (valid in the discharge state). (Active low)
17	TRIG 8V	Test trigger terminal. (rising-edge active) 17-18 shorted: TRIG 5V
18	TRIG24V	

■ External output signal terminals

4	UNAGE NG	Unage fail signal (active low)
6	HI	Comparator measurement over (high) output (active low)
7	LO	Comparator measurement under (low) output (active low)
19	GD	Comparator pass output. (Active low)
20	NG	Comparator fail output. (Active low)
25	EOC	End-of-test signal (busy signal). (Active low)

■ Power terminals

27	IN-GND	*Internal GND: not recommended.*
28	IN-GND	*Internal GND: not recommended.*
29	EX-GND	External GND
30	EX-GND	External GND
32	EX-VCC2	External VCC2: powers the 5kΩ pull-up resistors of the output optocouplers; if the user provides pull-up resistors, leave this pin floating.
33	EX-VCC1	External VCC1: powers the input optocouplers.
34	EX-VCC1	External VCC1: powers the input optocouplers.
35	IN-VCC	*Internal*3.3V*: not recommended.*
36	IN-VCC	*Internal*3.3V*: not recommended.*

4.2 Connection Methods

■ Electrical Parameters

Power requirements: +3.3~24VDC

Output signal: collector output with optional built-in pull-up resistors.
Optocoupler isolated.
Active low.
Max. voltage: the power supply voltage.

Note: if an external power supply above 8V is used, use external pull-up resistors, i.e. leave pin 32 floating.

Note: the output cannot drive a relay; use a transistor circuit at the output to drive it.

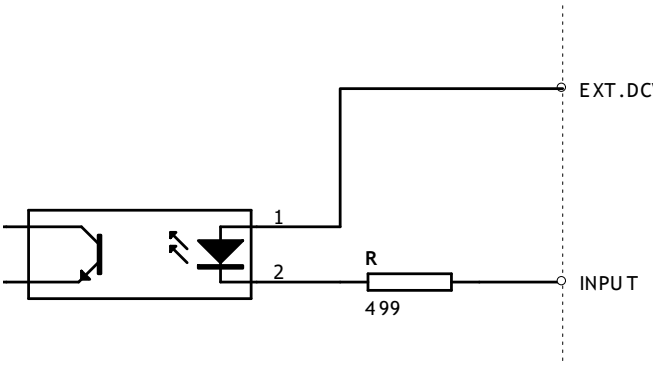
Input signals: Optocoupler isolated.
Active low.
Max. current: 50mA

Note: If an external power supply above 8V is used, connect a resistor in series at the input: typically 1kΩ for 8V and 2kΩ for 24V.



Note: To avoid damaging the interface, do not allow the power supply voltage to exceed the power requirements.
To avoid damaging the interface, wire the connections after the instrument is turned off.
If the output signal is used to control a relay, the relay must use a reverse energy-release diode.

■ Input Circuit Schematic



■ Output Circuit Schematic

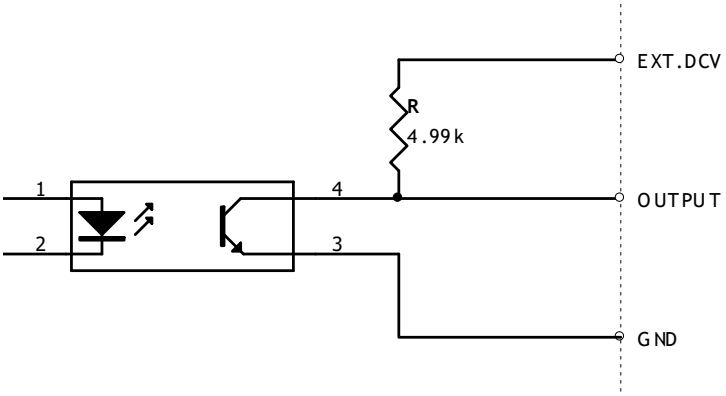
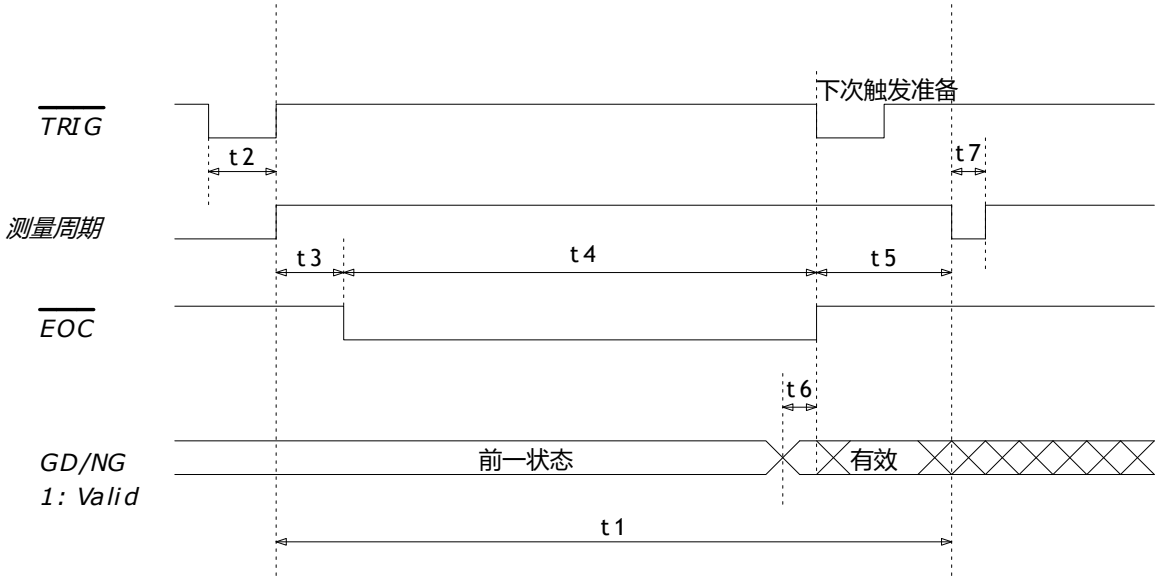


Figure 5-2 Internal Schematic

4.3 Timing Table



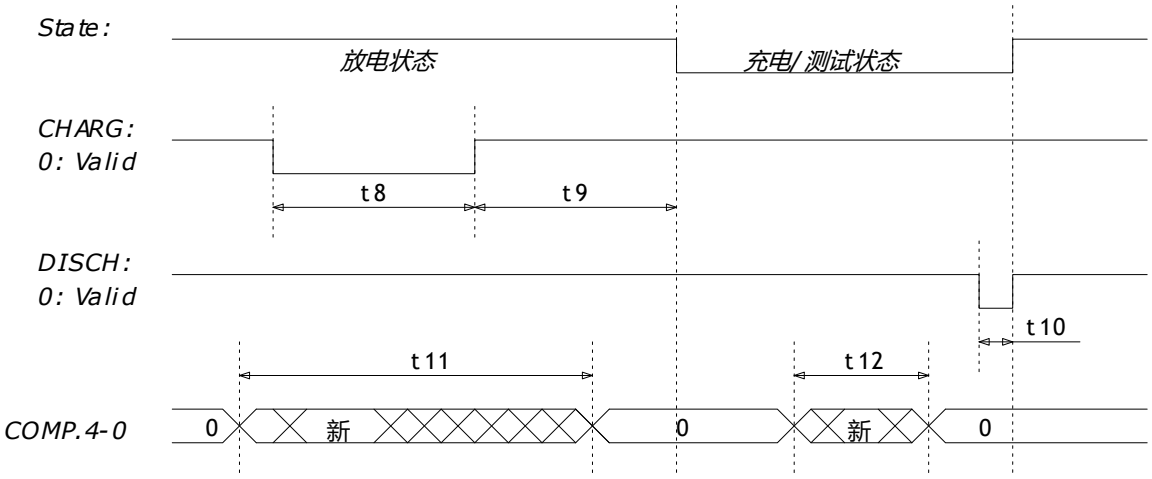


Figure5-4 Timing Table

	Description		Time (approx.)		
			Min.	Typ.	Max.
t1	One conversion cycle	Fast	-	-	17ms
		Medium	-	-	67ms
		Slow	-	-	260ms
t2	Trig signal pulse width		1ms	-	-
t3	Time from Trig active to conversion start		-	1ms	
t4	AD conversion time (EOC[BUSY])	Fast	-	-	12.2ms
		Medium	-	-	62.6ms
		Slow	-	-	256ms
t5	Result output time		4ms	4.4ms	4.8ms
t6	Time from sorting output to EOC end		-	10μs	-
t7	Interval before the next conversion starts		-	10μs	-
t8	CHARG charge/test signal active low level hold time		50ms	-	110ms
t9	Delay before the system enters the charge/test state		-	100ms	-
t10	DISCH discharge signal active low level hold time		10ms	-	-
t11	In the discharge state: record number change hold time		100ms	-	-
t12	In the test state: record number change hold time				=t1

5 Specifications

In this chapter you will learn the following:

- Technical specifications.
- General specifications.
- Dimensions.

5.1 Technical Specifications

The following data are measured under the following conditions:

Temperature condition: 23℃±5℃

Humidity: ≤65% R.H.

Zero adjustment: open zeroing before testing

Warm-up time: >60 minutes

Calibration interval: 12 months

Sampling rate: fast: about 55 readings/second

medium: about 25 readings/second

slow: about 3 readings/second

Test voltage accuracy: 1%

5.2 General Specifications

Screen:	4-color vacuum fluorescent display (VFD); screen size 98x55mm.
Test voltage:	-0.001V~-10.000V DC
Test voltage accuracy:	1%
Displayed parameters:	leakage current value and sorting result.
Display range:	1μA~200.0mA
Basic accuracy:	within slow range 1%
Max. reading:	slow: 9,999; medium and fast: 1,999
Max. charging current:	2A ± 200mA
Test speed:	fast: 55 readings/second, medium: 25 readings/second, slow: 3 readings/second
Trigger:	Internal, external, manual, and remote trigger.
Range:	auto or manual.
Zeroing:	open zeroing.
Comparator:	outputs NG, GD.
Interfaces:	built-in Handler interface;
	built-in RS232 interface;
Programming language:	SCPI
Environment:	Rated: temperature 18℃~28℃ humidity ≤ 65% R.H.

Operating: temperature 10℃~40℃ humidity 10~80% R.H.

Storage: temperature 0℃~50℃ humidity 10~90% R.H.

Power: 198V ~ 252VAC 48.5Hz ~ 52.5Hz

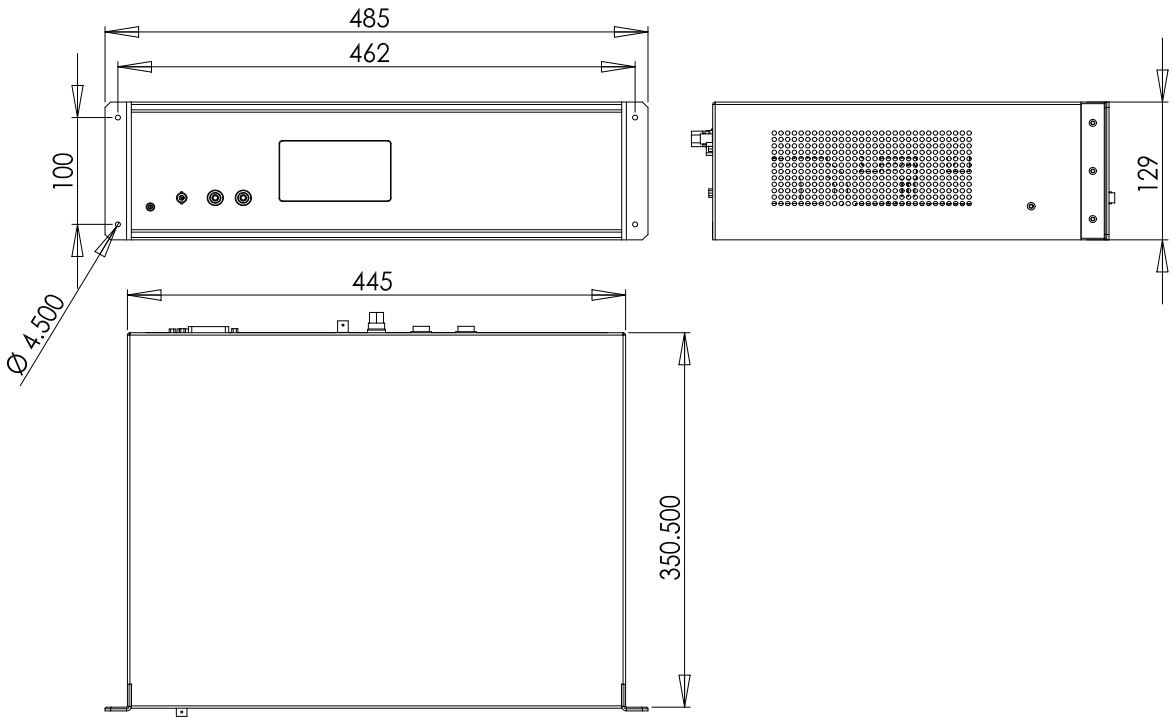
Fuse: 250V 3A slow-blow

Power consumption: Max. 100VA

Weight: Approx. 5 kg.

Accessories: User’s Guide, ATL680 test cable, AC power cord and warranty card.

5.3 Dimensions



©2011 Copyright: Onmeas Ltd.

Onmeas Ltd.
#14,No. 9 Caoxi Road, Wujin district, Changzhou, Jiangsu province, China.

400-600-1217

TEL：0519-88805550

https://www.onmeas.com

Sales Service Email: sales@onmeas.com

Tech Support Email: tech@onmeas.com

©2005-2026 Onmeas Ltd.

Specifications are subject to change without prior notice.

All are trademarks or registered trademarks of Onmeas Ltd.