Applent Instruments Ltd.

Telephone (Sales):
0086-0519-88805550 / 89966117/89966227
Fax：0086-0519-89966550
Sales Email: sales@applent.com
Tech Email: tech@applent.com
http://www.applent.com

FIRMWARE REVISIONS
This manual applies directly to instruments that have the firmware
Rev. A18

Manual Print History

The print history shown below lists the printing dates of all Revisions and Addenda created for this manual. The Revision Level letter increases alphabetically as the manual undergoes subsequent updates. Addenda, which are released between Revisions, contain important change information that the user should incorporate immediately into the manual. Addenda are numbered sequentially. When a new Revision is created, all Addenda associated with the previous Revision of the manual are incorporated into the new Revision of the manual. Each new Revision includes a revised copy of this print history page.

Revision A January, 2010

[AT6830 Megohmmeter]

User's Guide

Safety Summary

⚠Warning ⚠Dangerous:

When you notice any of the unusual conditions listed below, immediately terminate operation and disconnect the power cable.
Please Contact Lead sales representative for repair of the instrument. If you continue to operate without repairing the instrument, there is a potential fire or shock hazard for the operator.

- Instrument operates abnormally
- Instrument emits abnormal noise, smell, smoke or a spark-like light during the operation.
- Instrument generates high temperature or electrical shock during operation.
- Power cable, plug, or receptacle on instrument is damaged.
- Foreign substance or liquid has fallen into the instrument.

⚠Warning ⚠Dangerous:

The following general safety precautions must be observed during all phases of operation, service, and repair of this instrument. Failure to comply with these precautions or with specific WARNINGS elsewhere in this manual may impair the protection provided by the equipment. In addition it violates safety standards of design, manufacture, and intended use of the instrument.

Disclaimer	*The Lead Co.Ltd assumes no liability for the customer's failure to comply with these requirements.*
Ground The Instrument	To avoid electric shock hazard, the instrument chassis and cabinet must be connected to a safety earth ground by the supplied power cable with earth blade.
DO NOT Operate In An Explosive Atmosphere	Do not operate the instrument in the presence of inflammable gasses or fumes. Operation of any electrical instrument in such an environment constitutes a definite safety hazard.
Keep Away From Live Circuits	Operating personnel must not remove instrument covers. Component replacement and internal adjustments must be made by qualified maintenance personnel. Do not replace components with the power cable connected. Under certain conditions, dangerous voltages may exist even with the power cable removed. To avoid injuries, always disconnect power and discharge circuits before touching them.
DO NOT Service Or Adjust Alone	Do not attempt internal service or adjustment unless another person, capable of rendering first aid and resuscitation, is present.
DO NOT Substitute Parts Or Modify Instrument	Because of the danger of introducing additional hazards, do not install substitute parts or perform unauthorized modifications to the instrument. Return the instrument to a Lead Sales and Service Office for service and repair to ensure that safety features are maintained.

Megohmmeter Safety

WARNING :

The AT6830 Megohmmeter can provide an output voltage as high as 1000VDC to the external device under test (DUT).

Although the AT6830 unit is designed with full attention to operator safety, serious hazards could occur if the instrument is used improperly and these safety instructions are not followed.

- The AT6830 is designed to be operated with its chassis connected to earth ground. The instrument is shipped with a three-prong power cord to provide this connection to ground. The power cord should only be plugged in to a receptacle that provides earth ground. Serious injury can result if the Sentry unit is not connected to earth ground.
- Tightly connect cable(s) to the (red) GND terminal. If this is not done, the DUT's casing can be charged to the high voltage test level and serious injury or electrical shock hazards could result if the DUT is touched.
- **NEVER** touch the metal of the High Voltage probe directly. Touch only the insulated parts of the lead(s).
- **NEVER** touch the test leads, test fixture or DUT in any manner (this includes insulation on all wires and clips) when the high voltage is applied and the red **HV LED** is lit.
- Before turning on the AT6830, make sure the AC power cord is plugged into the proper voltage source and that there is no device (DUT) or fixture connected to the test leads.
- After each test, press the [DISCH] button for safety. This terminates the high voltage being applied to the output terminals.
- When the **HV LED** is lit NEVER touch the device under test, the lead wires or the output terminals.

CERTIFICATION, LIMITED WARRANTY, & LIMITATION OF LIABILITY

Applent Instruments, Inc. （shortened form **Applent**） certifies that this product met its published specifications at the time of shipment from the factory. Applent further certifies that its calibration measurements are traceable to the People's Republic of China National Institute of Standards and Technology, to the extent allowed by the Institution's calibration facility or by the calibration facilities of other International Standards Organization members.

This Applent instrument product is warranted against defects in material and workmanship for a period corresponding to the individual warranty periods of its component products. **The warranty period is 1 years and begins on the date of shipment.** During the warranty period, Applent will, at its option, either repair or replace products that prove to be defective. This warranty extends only to the original buyer or end-user customer of a Applent authorized reseller, and does not apply to fuses, disposable batteries or to any product which, in Applent's opinion, has been misused, altered, neglected or damaged by accident or abnormal conditions of operation or handling.

For warranty service or repair, this product must be returned to a service facility designated by Applent. The buyer shall prepay shipping charges to Applent and Applent shall pay shipping charges to return the product to the Buyer. However, the Buyer shall pay all shipping charges, duties, and taxes for products returned to Applent from another country.

Applent warrants that its software and firmware designated by Applent for use with an instrument will execute its programming instruction when properly installed on that instrument. Applent does not warrant that the operation of the instrument, or software, or firmware, will be uninterrupted or error free.

The foregoing warranty shall not apply to defects resulting from improper or inadequate maintenance by the Buyer, Buyer-supplied software or interfacing, unauthorized modification or misuse, operation outside the environmental specifications for the product, or improper site preparation or maintenance.

THIS WARRANTY IS BUYER'S SOLE AND EXCLUSIVE REMEDY AND IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. APPLENT SHALL NOT BE LIABLE FOR ANY SPECIAL, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES OR LOSSES, INCLUDING LOSS OF DATA, WHETHER ARISING FROM BREACH OF WARRANTY OR BASED ON CONTRACT, TORT, RELIANCE OR ANY OTHER THEORY.

Applent Instruments, Inc.
Changzhou,
Jiangsu,
China,
Rev.A2 January, 2005
Rev.B0 January, 2008

Contents

1 Unpacking and Preparation

This chapter describes how to set up and start the AT6830 Megohmmeter.

- Incoming Inspection
- Power Requirements
- Setting up the Fuse
- How to Remove the Handle
- Environmental Requirements
- Cleaning

1.1 Incoming Inspection

After you receive the instrument, carry out checks during unpacking according to the following procedure.

WARNING

If the external face of the instrument (such as the cover, front/rear panel, VFD screen, power switch, and port connectors) appears to have been damaged during transport, do not turn on the power switch. Otherwise, you may get an electrical shock.

1. Check that the packing box or shock-absorbing material used to package the instrument has not been damaged.
2. Referring to Table 1-1, check that all packaged items supplied with the meter have been provided as per the specified optioned.

NOTE

If an abnormality is detected, contact the company and transport the meter to your nearest Applent Instruments sales or service office. For inspection by the transport company, save the packing box, shock-absorbing material, and packaged items as you received them.

Table 1-1 **Items Packaged with the meter**

Name	Qty	remark
AT6830 Megohmmeter	1	
User's Manual	1	
Power Cable	1	220V/50Hz
Fuse	2	250V, 1A Slow-blow
ATL507 Test Clip Leads	1	
ATL801 RS232 Cable	1	

1.2 Power Supply

Confirm that the power supplied to the AT6830 meets the following requirements:

Voltage：198-252VAC

Frequency：47.5-52.5Hz

Power-consumption: 200VA max

1.3 Setting up Fuse

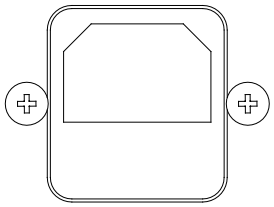


Figure 1-1 **Fuse Holder**

Please use the following fuse type.

UL/CSA type, Slow-Blow, 5×20-mm miniature fuse, 3A, 250 V

When you need a fuse, contact your nearest Applent Instruments sales or service office. To verify and replace the fuse, remove the power cable and pull out the fuse holder.

Two fuses in Fuse Holder.

1.4 Environmental Requirements

Set up the AT6830 where the following environmental requirements are satisfied.

Operating Environments

Ensure that the operating environment meets the following requirements.

Temperature: 0°C to 55°C

Temperature range at calibration: 23°C±5°C (<1°C deviation from the temperature when performing calibration)

Humidity: 15% to 85% at wet bulb temperature ≤ 40°C (non-condensation)

Altitude: 0 to 2,000m

Vibration: Max. 0.5 G, 5 Hz to 500 Hz

1.5 Cleaning

To prevent electrical shock, disconnect the AT6830 power cable from the receptacle before cleaning.

Use a dry cloth or a cloth slightly dipped in water to clean the casing.

Do not attempt to clean the AT6830 internally.

WARNING: Don’t Use Organic Solvents (such as alcohol or gasoline) to clean the Instrument.

2 Overview

This chapter contains general information about the AT6830 Megohmmeter .The information is organized as follows

- Introduction
- Main Specifications
- Feature overview

2.1 Introduction

Thank you for purchasing AT6830 Megohmmeter.

AT6830 is a Megohmmeter (Insulation Resistance Meter) for automatic testing system. AT6830 is used for measuring insulation resistance of electronic components, devices, dielectric materials, wires, cables and etc.

The AT6830 Dual Display (insulation resistance and leakage current) Megohmmeter includes 4-digit (9,999 counts), 6-range (auto and manual), broad measurement range (10kΩ~1TΩ) and super fast test rate (55 readings per second).

The AT6830 can output comparison/decision results for sorting components into 2 bins. Furthermore, by using the handler interface, AT6830 can be easily combined with a component handler and a system controller to fully automate component testing, sorting, and quality-control data processing. A GD/NG indicator on VFD provides a visual display of test results based on a preset limit.

The RS232C (used SCPI) and Handler interfaces are standard interfaces on the AT6830 and enabled automatic testing.

2.2 Main Specifications

Some main specifications of the AT6830include:

Full specifications are included in Appendix A.

- Test Voltage：-10V、-25V、-50V、-100V、-250V、-400V and -500VDC，Basic Accuracy：1%，Max Charge Current: 150mA ± 15mA
- Pre-charge Voltage: -10V、-25V、-50V、-100V、-250V、-400V and -500VDC，Max Charge Current: 500mA ± 50mA
- Basic Accuracy: <1G: ±1%，≥ 1G: ±3%，≥10G: ±5%
- Automatic Test with 6 Ranges
- Super Fast Test Rate
  55 readings/second with 1,999 readers
- Trigger mode: Internal Trig, Manual (Remote) Trig and External (Handler) Trig.

2.3 Feature Overview

- High brightness VFD
  window size: 98mm×58mm
- Correction (Zeroing) Function
  Zero out test lead and fixture measurement errors.
- Built-in Comparator (Sorting)
  Display on VFD Screen and/or Output to Handler.
- Beep and VFD Brightness can be Adjusted
  Setup GD or NG Beep and adjust VFD Brightness.
- Interfaces
  1. Handler interface: GD/NG Output, Trig Signal Input and EOC (Busy) Output.
  2. RS232C interface: SCPI Compatibility, ASCII Transmission.

3 Getting Started

This chapter describes names and functions of the front panel, rear panel, and screen display and provides the basic procedures for operating the AT6830.

- Front Panel Summary
- Real Panel Summary
- Power-up
- Begin Measuring

3.1 Front Panel

3.1.1 Front Panel Summary

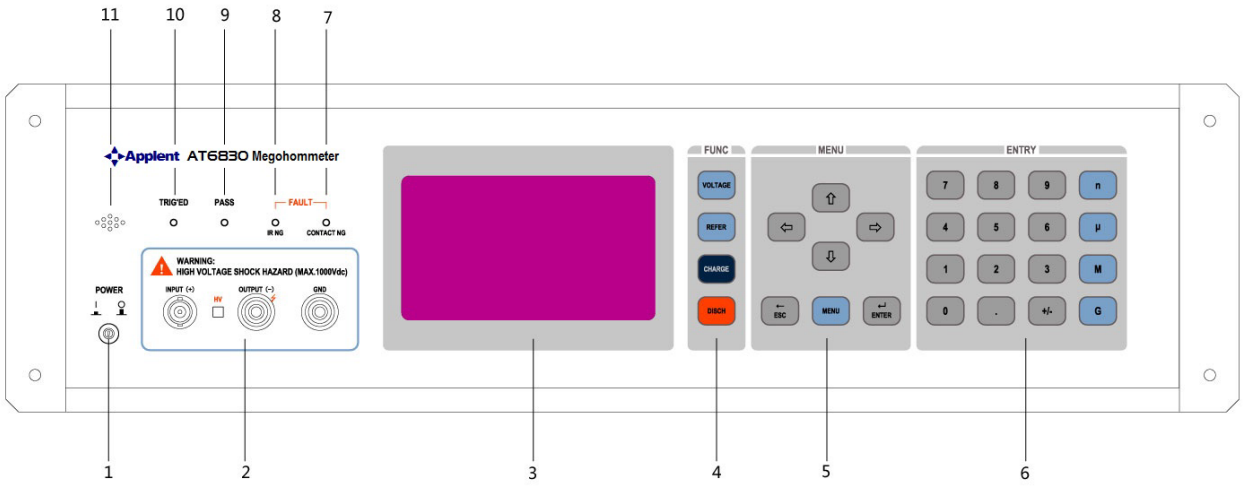


Figure 3-1 **Front Panel**

No.	Function
1	**Power Switch** *To apply power to the instrument, Push Down: ON, Push Up:* OFF
2	**Terminals** *INPUT(+)* *BNC (Red) (Sense)* *OUTPUT(-)* *High Negative Voltage Output (Black)* *(Drive)* *GND* *Ground (Red) (Ground Terminal for jumper of (+) Input Terminal or Guard Input to Chassis GND)*
3	**Display**
4	**Main Function Keypad**，Includes【VOLTAGE】,【REFER】,【CHARGE】and【DISCH】。
5	**Menu** Enter programming mode, select menu
6	**Entry** Enter numerical values
7	**CONTACT NG** When lit, indicates contact fault.
8	**IR NG** When lit, indicates IR failure or fault
9	**PASS** When lit, indicates IR pass.
10	**TRIG'ED.** When lit, indicates the instrument is measuring.

11	BEEP

3.1.2 VFD

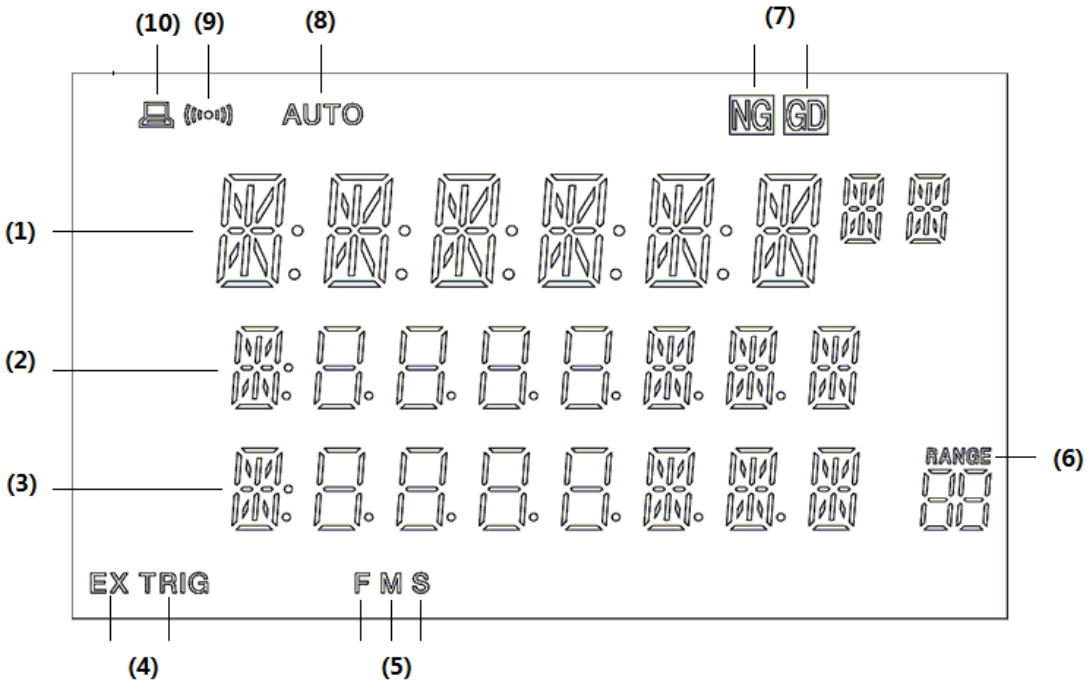


Figure 3-2 **VFD**

No	ICON	Function
(1)		No.1 Display Line.
(2)		No.2 Display Line
(3)		No.3 Display Line
(4)	EX TRIG	TRIG: Manual Trig，EX TRIG：External Trig
(5)	FMS	Rate (Fast, Medium and Slow)
(6)	RANGE Rec.	Range No.
(7)	NG GD	Sorting Result
(8)	AUTO	Range Auto
(9)		Beep On
(10)		Remote

3.1.3 Keypad

Keypad	Function
VOLTAGE	Setup Voltage
REFER	Setup Comparator

CHARGE	Charge/Test.
DISCHARGE	Discharge. The Test Voltage and Pre-Charge Voltage will be shut off.
MENU	Menu. Enter Setup Menu.

3.2 Real Panel Summary

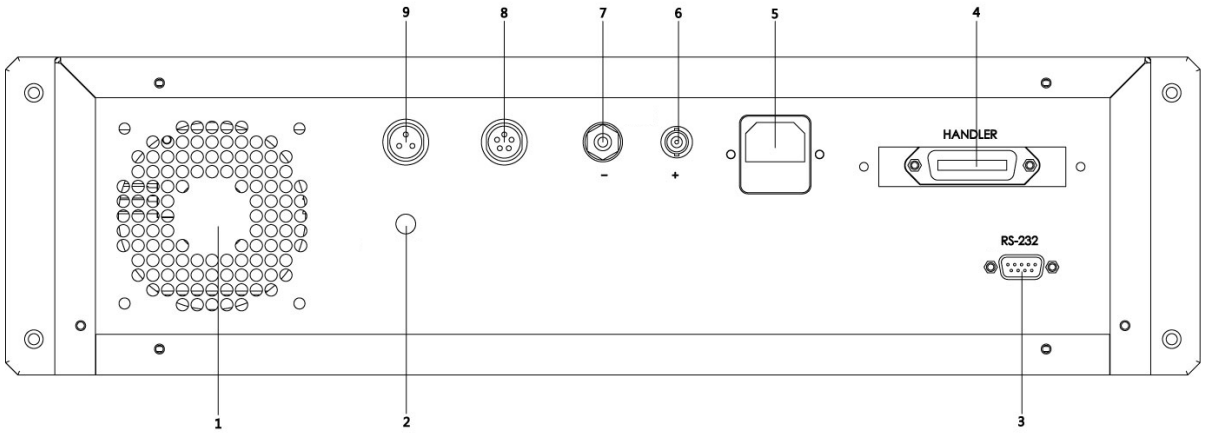


Figure 3-3 **Real Panel**

No	Function
1	Fan
2	Pre-charge Voltage Adjust
3	RS-232 Interface
4	Handler Interface
5	AC Inlet Module
6	Real Test Terminal (Input +)
7	Real Test Terminal (Output -) (30mA)
8	Second Pre-charge Voltage (150mA) 2：Output-，4：Input+
9	Pre-charge Voltage (500mA) 1：Output-，3：Input+

3.3 Power-up

3.3.1 Line Power Connection

Follow the procedure below to connect the AT6830 to line power and turn on the instrument.

1. Before plugging in the power cord, make sure that the front panel power switch is in the off (0) position.
2. Connect the female end of the supplied power cord to the AC receptacle on the

rear panel. Connect the other end of the power cord to a grounded AC outlet.

WARNING :

The power cord supplied with the AT6830 contains a separate ground wire for use with grounded outlets. When proper connections are made, instrument chassis is connected to power line ground through the ground wire in the power cord. Failure to use a grounded outlet may result in personal injury or death due to electric shock..

3. Turn on the instrument by pressing the front panel power switch to the on (1) position.

Power On

Power Off

3.3.2 Power-up Sequence

On power-up, AT6830 performs self-tests on its FlashRom and RAM and momentarily lights all segments and annunciators. If a failure is detected, the instrument will not enter the measurement state.

3.3.3 Power-up Defaults

The power-on default will be the last configuration you saved.

3.3.3 Warm-up Time

AT6830 is ready to be used as soon as the power-up sequence has completed. However, to achieve the accuracy rating, warm up the instrument for 30 minutes.

3.4 Measurement configuration

3.4.1 Connection to Device under Test (DUT)

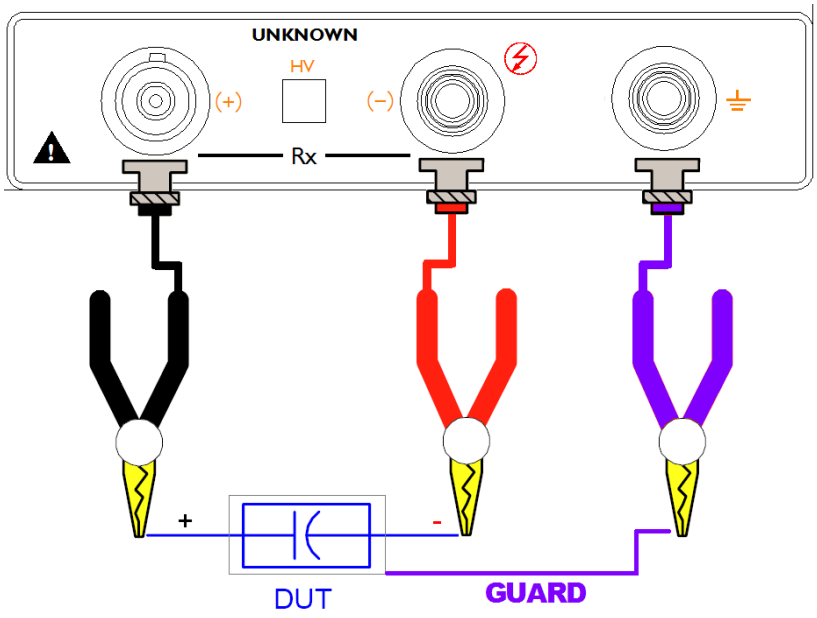
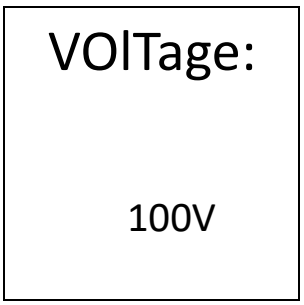


Figure 3-4 **Connection to DUT**

WARNING:
When the **HV LED** is lit, **No touching** the device under testing, the lead wires or the output terminals.

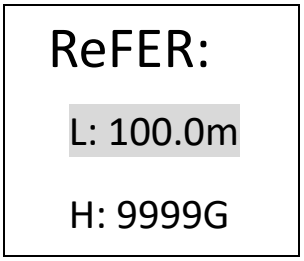
3.4.2 Setup Voltage

Voltage Select Include: -10V、-25V、-50V、-100V、-250V、-400V and -500VDC



1. Press VOLTAGE key under Discharge state
2. Press < or > to select wanted voltage.
3. Press Enter to finish input, the value will save in Flashrom and back to Discharge State.
   Press Esc key to cancel input and back to Discharge State.

3.4.3 Setup Comparator【REFER】



1. Press REFER Key under Discharge state.
2. No.2 line Display the Low limit and No.3 line display the High limit.
3. Press Enter to finish input, the value will save in Flashrom and back to Discharge State.
   Press Esc key to cancel input and back to Discharge State.

3.4.4 Charge

Press CHARGE key AT6830 will enter TEST state.

3.4.5 Discharge

Press DISCHARGE key AT6830 will enter DISCH state.

3.4.6 MENU

Under Discharge State, Press MENU key to enter setup menu.

Press⇧⇩key to select setup menu and ⇦⇨ key to select item.

【MENU】	
SPEED	
SLOW	
MED	
FAST	
BEEP	
OFF	
ON	
AUTO	Range Auto Setup
OFF	
ON	
TRIG	Trigger Setup
INT	Internal Trigger
MAN	Manual Trigger
EXT	External Trigger
COM	Remote Setup
OFF	
ON	
CLEAR	Clear Zero Correction
OPEN	NOTE: The Input(+) test lead must be opened and suspended. DON'T touching any objects (such as table).
HILMT	High Limit Setup
OFF	
ON	
ADMIN	Administrator with password protected
PSW	Input Password.
EXIT	

5 Handler Interface

This chapter describes how to use the handler interface.

- Pin Assignment
- Circuit Diagram
- Timing Chart

By using the handler interface, you can output the measurement completion signal (EOC), the screening result of the comparator function (GD/NG), and so on to external devices from the AT6830. You can also input the external trigger signal and the comparator select signal to the AT6830. With this interface and the comparator function, you can build an automatic screening system composed of the AT6830 and the handler.

5.1 Pin Assignment

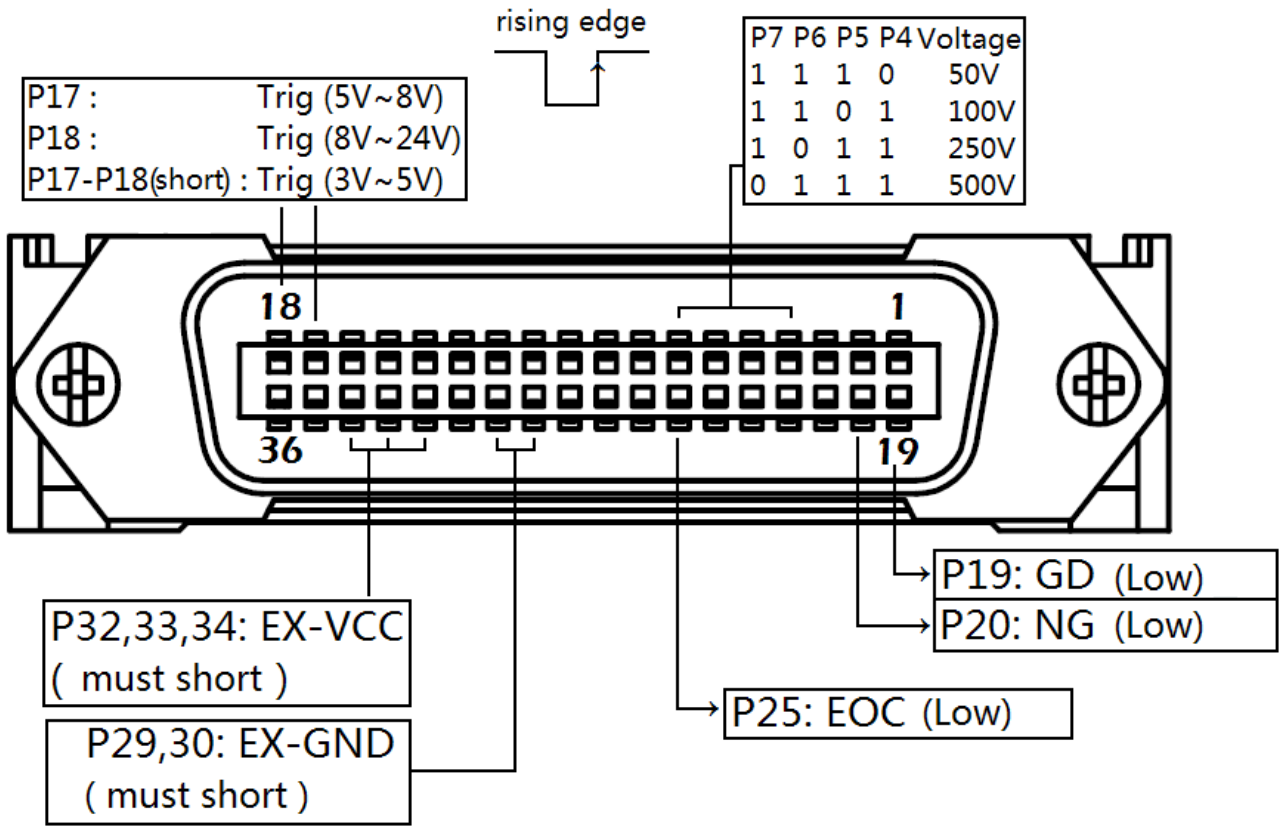


Figure 5-1 **Pin Assignment of Handler Interface Connector**

Table 5-1 **Description of Handler Interface Input Signals**

14	DISCH	Discharge. (Low)
15	CHARG	Charge and Test. (Low)
17	TRIG 8V	External Trigger Signal (Rising edge) 17-18 SHORT = TRIG5V
18	TRIG24V	

Table 5-3 **Output Signals**

4	CNG	Contact NG（LOW）
5	NO-VOL	No Voltage output（LOW）
19	GD	IR GD（LOW）
20	NG	IR NG（LOW）
25	EOC	End of Convert（LOW）

Table 5-5 **Power Signal**

27	IN-GND	*Internal GND: Not Recommend to use*
28	IN-GND	*Internal GND: Not Recommend to use*
29	EX-GND	External GND
30	EX-GND	External GND
32	EX-VCC2	External VCC2: Pull-up Resistance(5kΩ) Power Supply
33	EX-VCC1	External VCC1: Main Power Supply
34	EX-VCC1	External VCC1: Main Power Supply
35	IN-VCC	*Internal* 3.3V: *Not Recommend to use.*
36	IN-VCC	*Internal* 3.3V: *Not Recommend to use.*

5.2 Electrical Characteristics

Input Signal:

Each input signal is connected to the LED (cathode side) of the photo-coupler. The LED (anode side) is connected to the pull-up power supply voltage.

Output Signal:

Each output signal is outputted via an open collector by using a photo-coupler. The voltage of each output is obtained by connecting pull-up resistors, inside or outside of the AT6830.

NOTE:

If the external power supply greater than 8VDC, use external pull-up resistance please. The Pin 32 leaves float.

The output signal current cannot drive relay.

Power supply

The power supply for the judgment output signal pull-up and that for the operation output signal pull-up and input signal drive can be set separately. You can select +3.3V of the internal power supply or from +3.3V to +24V external power supply.

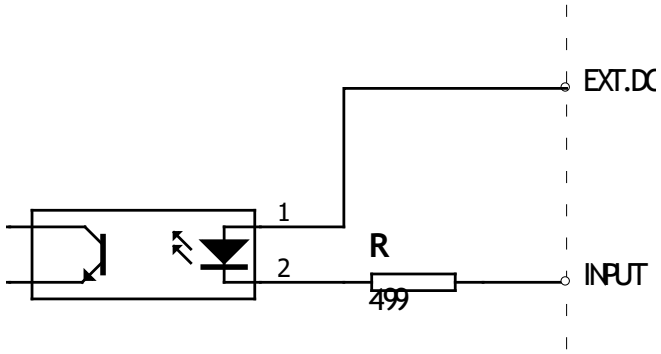


Figure 5-2 **Typical Circuit Diagram of Handler Interface Input signals.**

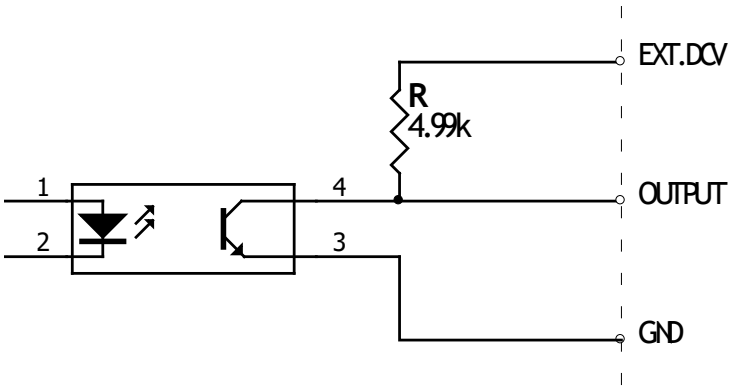
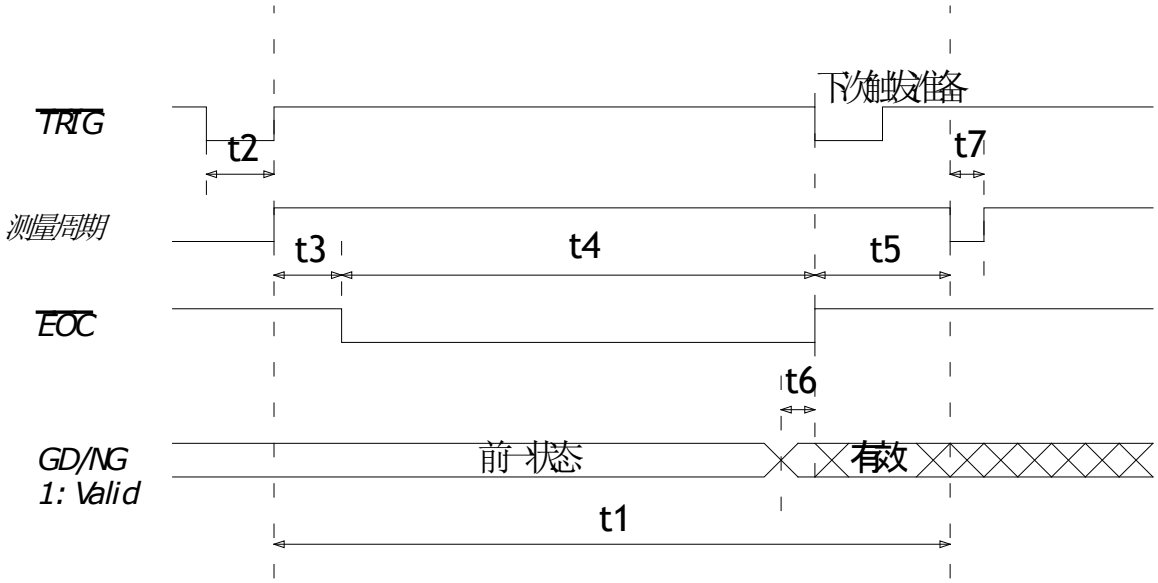


Figure 5-3 **Typical Circuit Diagram of Handler Interface Output signals.**

5.3 Timing Chart



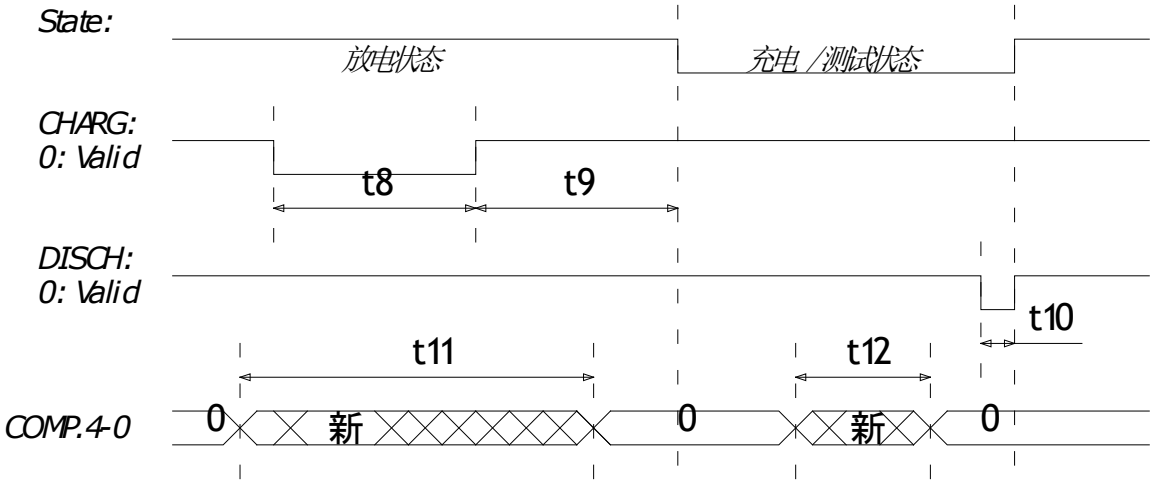


Figure 5-4 **Timing Chart**

Description			Time（App.）		
			Min.	Typical	Max.
t1	One Measurement Circle	Fast	-	-	17ms
		Med	-	-	67ms
		Slow	-	-	260ms
t2	Trigger pulse width		1ms	-	-
t3	Trig Delay Time		-	1ms	
t4	AD Time（EOC[BUSY]）	Fast	-	-	12.2ms
		Med	-	-	62.6ms
		Slow	-	-	256ms
t5	Print Result Time		4ms	4.4ms	4.8ms
t6	Handler Out to EOC Time		-	10μs	-
t7	Next Start Time		-	10μs	-
t8	CHARG Signal Hold Time		50ms	-	110ms
t9	CHARG to Measure Delay Time		-	100ms	-
t10	DISCH Signal Hold Time		10ms	-	-
t11	Under DISCHARGE STATE, The Record Signals Hold Time		100ms	-	-
t12	Under TEST STATE, The Record Signals Hold Time.				=t1

A Specifications

This chapter describes the specifications and supplemental performance characteristics of the AT6830:

- Specifications
- Dimension。

Specifications

Accuracy is defined as meeting all of the following conditions.

Temperature: 23℃±5℃

Humidity: ≤65% R.H.

Zeroing: Open Correction

Warm up time is 30 min or more.

Rate: Slow

A 1-year calibration cycle

Insulation Resistance: Accuracy <1G: ±1% ≥1G: ±3% ≥10G: ±5% M=10^6,G=10^9,T=10^{12}

RANGE / VOLTAGE	1	2	3	4	5	6
50V	50k~500k	500k~5M	5M~50M	50M~500M	500M~5G	5G~50G
100V	100k~1M	1M~10M	10M~100M	100M~1G	1G~10G	10G~100G
250V	250k~2.5M	2.5M~25M	25M~250M	250M~2.5G	2.5G~25G	25G~250G
400V	400k~4M	4M~40M	40M~400M	400M~4G	4G~40G	40G~400G
500V	500k~5M	5M~50M	50M~500M	500M~5G	5G~50G	50G~500G

Display:	Vacuum-Fluorescent-Display (4-Colors VFD) Size: 98x55mm
Output Voltage:	-10V、-25V、-50V、-100V、-250V、-400V and -500VDC
Resistance Range:	100kΩ ~ 1TΩ
Basic Accuracy:	(@Slow Rate) <1G: ±1% ≥1G: ±3% ≥10G: ±5%
Maximum Reading:	Slow Rate: 9999 Medium and Fast: 1999
Maximum Charge Current:	TEST Voltage: 150mA ±15mA Pre-Charge Voltage: 500mA±50mA
Rate (App.):	Fast: 55 readings/s Med.:25 readings/s Slow: 3 reading/s
Trigger:	Internal, Manual (Remote) and External Trigger
Range:	Auto and Manual 6 ranges.
Correction:	Open Clear Zero
Beep:	ON and OFF

Interfaces:	Built-in Handler Interface. Built-in RS232C Interface.
Program Language:	SCPI
Environmental:	MIL-T-28800D, Type 3, Class 5, Style E & F Operating: 0□C to 50□C, stated accuracy <45% RH Storage: -40□C to 71□C Altitude: <2000m, Installation Category 1, Pollution Degree 1
Power:	198V ~ 252VAC 48.5Hz ~ 52.5Hz 200W max
Fuse:	250V 3A Slo-Blo
Weight:	Approximately 10kg (NET)

Dimensions