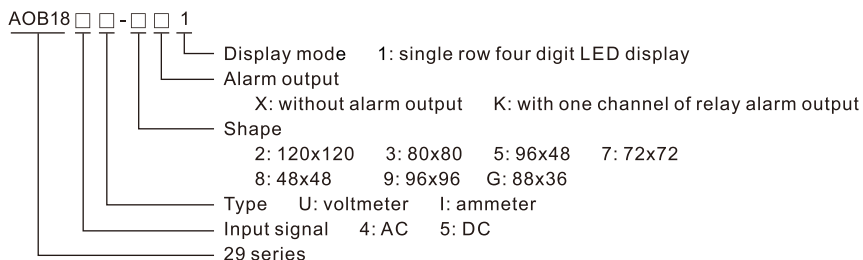


Chapter 1. General instruction

AOB29 series voltmeter/ammeter are used in the real-time measurement and indication on AC/DC voltage/current in the electric circuit. And it can be added one channel of alarm output.

Chapter 2. Type and designation



Chapter 3. Technical Parameters

- 3.1 Measuring range (can continued overload 1.2 times, please ask us if you need other specifications)
 - 3.1.1 AC voltmeter Direct measurement: AC 0~100V or 0~500V Need PT external: AC *100V
 - 3.1.2 DC voltmeter Direct measurement: DC 0~±500V
 - 3.1.3 AC ammeter Direct measurement: AC 0~1A or 0~5A Need CT external: AC */1A or */5A
 - 3.1.4 DC ammeter Direct measurement: DC 0~±5A Need shunt external: DC */75mV
- 3.2 Accuracy: class 0.5
- 3.3 Frequency of AC input signal: 45~65Hz
- 3.4 Input circuit: voltage (input resistance ≥ 5kΩ/V), current (internal resistance voltage drop < 0.11V)
- 3.5 Measurement method: AC true RMS measurement, DC average measurement
- 3.6 Sampling rate: 1.5 times/s
- 3.7 Overflow indication: positive overflow displays HHHH, negative overflow displays LLLL
- 3.8 Auxiliary power supply: Default AC220V±20% 50/60Hz, optional AC110V, AC380V, AC440V, AC/DC18~60V, AC/DC85~264V, consumption < 2VA
- 3.9 Alarm output: contact capacity 2A/250VAC, 2A/30VDC, resistive load
- 3.10 Operational environment: places free of gas corruption with temperature of -10~50°C, and relative humidity≤85%RH.

Chapter 4. Programming

4. 1 Key explanations

Key	State in the measured value display state	in programming state
SET key	Press and hold the SET key continuously for 2s to enter the programming mode of main menu. (Note 1)	Press the SET key once to switch to the next menu. Press and hold the SET key continuously for 2s to exit the programming mode.
SHIFT key	Press and hold the SHIFT key continuously for 2s to enter the programming mode of alarm menu. (Note 1)	Press the SHIFT key once to move the flashing cursor one digit to the left. Press and hold the SHIFT key continuously for 2s to move back to the previous menu.
DOWN key	Press and hold the DOWN key continuously for 2s to view the software version number.	Press the DOWN key once to decrease the parameter value of menu; Hold down the DOWN key continuously to quickly decrease the parameter value.
UP key	Press and hold the UP key continuously for 2s, it displays "rSt" and unlocks the alarm. (Note 2)	Press the UP key once to increase the parameter value of menu; Hold down the UP key continuously to quickly increase the parameter value.

Note 1: When entering the programming state, if the meter displays "codE", it indicates that a programming password needs to be entered. For details of the programming password, see menu of codE for details .

Note 2: This operation is only valid when the meter is equipped with alarm and in the alarm lock state. For the alarm lock function, see the Hundreds place of menu ALE.

Note 3: When the alarm output mode is "pulse output mode": AH or AL alarm indicator lights up and the last decimal point of Nixie tube flashes, indicating that the pulse output has ended. AH or AL alarm indicator is not on and the last decimal point of Nixie tube flashes, indicating that the pulse output is not finished.

4.2 Menu description (No.1 to 8 are the main menu, which can be accessed by pressing and holding the SET key for 2s)

NO.	Parameter code	Parameter name	Setting range	Explanations
1	dP	Position of decimal point dP	0~3	dP is used to define the position of the decimal point. dP is 0, no decimal points, display format is xxxx dP is 1, decimal points in tens place, display format is xxx.x dP is 2, decimal points in hundreds place, display format is xx.xx dP is 3, decimal points in thousands place, display format is x.xxx inPH and inPL are used to set the measuring range, transformer or shunt specifications. Examples are as follows: 1. Input specification is 500V (Set: dP=1, inPH=500.0, inPL=0.0) 2. Input specification is 5A (Set: dP=3, inPH=5.000, inPL=0.000) 3. Input specification is 10kV/100V (Set: dP=2, inPH=10.00, inPL=0.00) 4. Input specification is 200A/5A (Set: dP=1, inPH=200.0, inPL=0.0) 5. Input specification is 1500A/75mV (Set: dP=0, inPH=1500, inPL=0) 6. Input specification is DC 4-20mA, display -1.000~1.000 (Set: dP=3, inPH=1.000, inPL=-1.000) 7. Input specification is DC 0-10V, display 0.00~50.00 (Set: dP=2, inPH=50.00, inPL=0.00)
2	inPH	Higher limit of measuring range inPH	-1999~9999 (Decimal position is decided by dP)	
3	inPL	Lower limit of measuring range inPL	-1999~9999 (Decimal position is decided by dP) Default value: 0	
4	biAS	Shift correction of measuring range biAS	-1000~1000 (Decimal position is decided by dP) Default value: 0	biAS makes shift correction on the measured value: Measured value(after correction)=Measured value(before correction)+biAS gAin makes gain correction on the measured value: Measured value(after correction)=(Measured value(before correction)-inPL) $\times(1+gAin)$
5	gA in	Gain correction of measuring range gAin	-0.500~1.000 Default value: 0.000	AC input only supports gAin correction, DC input supports biAS and gAin correction. When using it at the same time, biAS is corrected first.
6	Scr	Menu Hidden, Zero point shield of measured value Scr	0.1~999.9 Default value: 000.4	Thousands place of Scr: Main menu hidden Thousands place = 2, the main menu only shows dP, inPH Thousands place = 3, the main menu only shows dP, inPH, inPL Thousands place = 5, the main menu is closed Hundreds place of Scr: Alarm menu hidden Hundreds place = 1, the alarm menu only shows AH Hundreds place = 2, the alarm menu only shows AH, AL Hundreds place = 3, the alarm menu only shows AH, AL, dF Hundreds place = 5, the alarm menu is closed Hundreds place = 6, the alarm menu only shows AL Hundreds place = 7, the alarm menu only shows AH, dF Hundreds place = 8, the alarm menu only shows AL, dF Tens and units place of Scr: Input zero shielding of measured value Due to temperature drift, environmental interference, components aging and other reasons, the meter may display a non-zero (inPL) value in the absence of input signals. Setting the Scr can shield it. That is: when the absolute value of (display value - inPL) < (inPH - inPL) \times last two digits of Scr \div 100, it will fixed display 0(inPL).
7	inE	Input extension settings inE	0~9999 Default value: 0000 Input specification is DC4-20mA or DC1-5V Default value: 0001	Thousands place of inE: input digital filtering The meter adopts the first-order integral digital filtering. Thousands place of 1~9 indicates that the filtering coefficients are 2, 3, 4, 5, 6, 7, 8, 10 and 20 respectively. When the displayed value jumps, it can be smoothed by digital filtering. Hundreds place of inE: Sampling rate switching Hundreds place =0: the update rate of the measured value is 1.5 times/s; Hundreds place =1: the update rate of the measured value is 3 times/s; Hundreds place =2: the update rate of the measured value is 5 times/s; Hundreds place =5: the update rate of the measured value is 0.75 times/s; Hundreds place =9: the update rate of the measured value is 1.5 times/s, and the high sampling rate mode is used to reduce the measurement value jump. For example, measuring pulsating DC, truncated waveform of thyristor output, etc Tens place of inE: Special treatment for measuring values less than 0 and Prohibition of frequency tracking. Tens place =1, when the measured value < 0, it fixed display 0. Tens place =2, when the measured value < 0, it will be converted to its absolute value to display and alarm processing. Tens place =9, when the measured value < 0, a negative number is displayed but converted to an absolute value for alarm processing. Tens place =5, the frequency tracking is prohibited during AC input, and the input signal frequency is 50Hz \pm 0.5Hz. Tens place =6, the frequency tracking is prohibited during AC input, and the input signal frequency is 60Hz \pm 0.5Hz. Prohibit frequency tracking for situations where the correct/stable frequency cannot be detected but the frequency is basically stable. Units place of inE: Input specification switching Units place =1, Switch the input specification DC0-20mA/DC0-5V to DC4-20mA/DC1-5V. Units place =2~9, it will change the measuring range as 4/5, 2/3, 3/5, 1/2, 2/5, 1/3, 1/4, 1/5 of the original range.

NO.	Parameter code	Parameter name	Setting range	Explanations
8	<i>code</i>	Programming password codeE	0~9999 Default value: 0	codE is used to set the password for entering programming. Setting the codE as 0 means there is no password and you can directly enter the programming state; Setting it as 503 also means that there is no password and you can directly enter the viewing mode (all menus can only be viewed and cannot be modified); When setting as other values, you should enter the password when entering the programming state.

No. 9-16 are the alarm menus, press and hold the SHIFT key for 2s to enter the programming status of the alarm menu.

9	<i>AH</i>	Setting value of higher limit alarm AH	-1999~9999 (Decimal position is decided by dP) Default value: 1100	The meter can realize three alarm modes: higher limit alarm, lower limit alarm, higher and lower limit alarm. When light AH is on, it indicates that the higher limit alarm is generated, and when light AL is on, it indicates that the lower limit alarm is generated. To set AH as the maximum value 9999 will turn off the higher limit alarm function. To set the AL as the minimum value -1999 will turn off the lower limit alarm function.
10	<i>AL</i>	Setting value of lower limit alarm AL	-1999~9999 (Decimal position is decided by dP) Default value: 0	The dF menu is for setting the alarm return difference, that is, the difference between the point when the alarm is generated and the point when the alarm is released. 1. Higher limit alarm mode(set AL as -1999) When the display value is \geq AH, the higher limit alarm will be generated, and when the display value is $<$ (AH- dF), the higher limit alarm will be released. 2. Lower limit alarm mode(set AH as 9999) When the display value is \leq AL, the lower limit alarm will be generated, and when the display value is $>$ (AL+ dF), the lower limit alarm will be released. 3. Higher and lower limit alarm mode When the display value is \geq AH, the higher limit alarm will be generated, When the display value is \leq AL, the lower limit alarm will be generated, and it will release the alarm when the display value $>$ (AL+dF) and the display value $<$ (AH-dF).
11	<i>dF</i>	Alarm switch difference dF	0~9999 (Decimal position is decided by dP) Default value: 5	
12	<i>ont</i>	Delay time of generating alarm ont	0.0~3000 Default value: 0.0	Unit: s ont is the delay time of the relay output when the meter is switched from the "non-alarm state" to the "alarm state". When the alarm duration is $<$ ont, the switching process will be ignored. If ont=0, the relay will switch to the "alarm state" immediately when an alarm is generated.
13	<i>oFt</i>	Delay time of releasing alarm oFt	0.0~3000 Default value: 0.0	Unit: s oFt is the delay time of the relay output when the meter is switched from the "alarm state" to the "non-alarm state". When the releasing alarm duration $<$ oFt, the switching process will be ignored. If oFt=0, the relay will switch to the "non-alarm state" immediately when releasing alarm.
14	<i>ALE</i>	Alarm extension settings ALE	0~9999 Default value: 0000	Thousands place of ALE: power-on alarm delay function. Thousands place of ALE =5, enable power-on alarm delay function, that is, when it is powered on every time, it will delay for a period of time before the alarm function starts running. The delay time is determined by the units place of menu ALE. Hundreds place of ALE: Alarm locking and instantaneous trip function Hundreds place =1, enable the alarm locking function. That means, after the alarm, even if the alarm conditions disappear, the relay output and warning lights will always be in the alarm state and will not recover automatically. In the measuring display mode, if pressing the UP key for 2s or power on the meter again, it will release the alarm lock. Hundreds place =2, enable alarm locking + instantaneous trip function Hundreds place =3, turn on the instantaneous trip function. The instantaneous trip is when the display value $>$ the higher limit alarm setting value AH \times 1.5, even if not reach the setting delay time ont, the higher limit alarm will be generated immediately. Tens place of ALE: No alarm function when the measured value is 0 / Power-on alarm suppression function Tens place =1, enable No alarm function when the measured value is 0. Tens place =2, No alarm function when the measured value is 0 + power-on alarm suppression Tens place =3, power-on alarm suppression Power on alarm suppression means it will not alarm immediately even if it meets the alarm condition when power on. When the alarm condition is cancelled, the alarm output will be restarted if meeting the alarm condition again. 0 step alarm delay function: When the tens place of the ALE menu are set to 1 or 2, the 0 step alarm delay function is enabled. That is, the measured value changes from 0 to non 0, and the alarm function will delay for a period of time before it starts running. The delay time is determined by the units place of menu ALE. Units place of ALE: Power on and 0 step alarm delay time Units place =0 means no delay Units place of ALE =1~7 indicate that the delay time is 1, 2, 5, 10, 15, 20 and 30(Unit: s) respectively.

NO.	Parameter code	Parameter name	Setting range	Explanations
14	<i>ALE</i>	Alarm extension settings ALE	0~9999 Default value: 0000	Units place =9 indicates user-defined delay time. The power-on alarm delay function and the 0 step alarm delay function are used to shield the alarms generated during the process of equipment switching from shutdown or standby state to normal working state. For example, the current is 0 when the motor is not working, but the instant current of starting is big. Setting the delay time corresponding to "Units place of ALE" greater than the actual starting time of the motor can avoid the higher limit alarm caused by large current when the motor starts.
15	<i>out</i>	Alarm output mode out	0~9999 (Decimal position is decided by the thousands place of out) Default value: 0000	Thousands place of menu out: alarm output method Thousands place =0, the relay is in the released state when there is no alarm, and the relay is in the closed state when there is an alarm. Thousand place =1, the relay is in the closed state when there is no alarm, and the relay is in the released state when there is an alarm. Thousands place =2 or 4, the relay is in the released state when there is no alarm. When there is an alarm, the relay automatically returns to the released state after being closed for a period of time (the closing time is determined by the last three digits of the menu out) (pulse output mode) Thousands place =3 or 5, the relay is in the closed state when there is no alarm. When there is an alarm, the relay automatically returns to the closed state after being released for a period of time (the release time is determined by the last three digits of the menu out) (pulse output mode) Release status: COM and N/C on, COM and N/O off. Closing status: COM and N/O on, COM and N/C off, and the relay is activated. The last three digits of the menu out: pulse width / pulse duration settings in pulse output mode. Thousands place of menu out =2 or 3, the last three digits of menu out can be set within the range of 00.0 to 99.9 seconds (00.0 represents 1 second). Thousands place of menu out =4 or 5, the last three digits of menu out can be set within the range of 000-999 seconds (000 represents 1 second).
16	<i>St</i>	User-defined delay time of power on and 0 step alarm St	0.0~600.0 Default value: 0.0	When the units place of menu ALE is 9, the delay can be customized and this menu can be visible and effective. The menu St is used to customize the power on and 0 step alarm delay time.(Unit: s)

Chapter 5. Installation and wiring

5.1 Shape and hole cutout dimension

Unit: mm

Instrument shape	Panel dimension		Case dimension			Hole cutout dimension	
	W	H	W	H	D	W	H
96X48	96	48	91	44	80	92	45
72X72	72	72	67	67	80	68	68
48X48	48	48	44	44	100	45	45
96X96	96	96	91	91	80	92	92

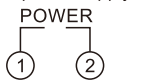
5.2 Description of Wiring and terminal

POWER: Auxiliary power input port, default 220V±20%, 50/60Hz.

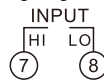
INPUT: Input port of measuring signal (when DC input, HI is positive +, LO is negative -).

OUT: Alarm relay output port. COM is the common port, N/O is normally open contact, N/C is normally closed contact.

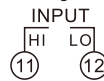
Aux. power supply



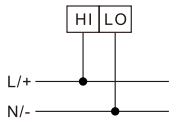
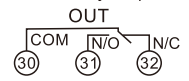
Voltage signal input



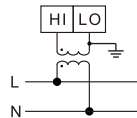
Current signal input



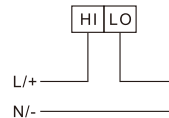
Alarm relay output



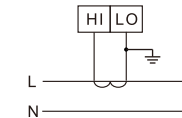
Input directly
(when AC/DC voltage
≤600V)



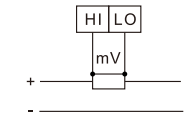
Input via PT
(when AC voltage
>600V)



Input directly
(when AC/DC current
≤6A)



Input via CT
(when AC current
>6A)



Input via the electrical
shunt (when DC current
>6A)

Chapter 6. Cautions

6.1 Please enter the password "5643" if you forget the programming password.

6.2 When the main menu and alarm menu are partially shielded or completely closed or the menu is set as view mode, you can press and hold the SET key and the UP key for 2s at the same time, use the password 5643 to enter the programming mode of the main menu. Press and hold the left SHIFT key and the UP key at the same time for 2s, and use the password 5643 to enter the programming mode of alarm menu. When entering the programming mode in this way, the main menu or alarm menu will be displayed completely and can be modified.