BST-MG01 Single Gas Detecting Alarm
Manual Instruction

Notice:

BST-MG01 single gas detecting alarm is applied to operation of portable gas detectors like Oxygen(O_2), Hydrogen Sulphid(H_2S), Carbon Monoxide(CO), Nitrogen Monoxide(NO), Nitrogen Dioxide(NO_2), Hydrogen(H_2), Sulphur Dioxide(SO_2), Chlorine(CL_2), Ammonia(NH_3), thylene Oxide(ETO), Carbon Dioxide (CO_2), etc.

This manual will take Oxygen(O_2) gas detector for example to demonstrate, gas detector for other gases have similar specification, please refer to appendix for detailed parameters.

1.Application

BST-MG01O2 portable O_2 gas detecting alarm is applied to the underground coal mine, petrochemical industry, municipal, environmental protection and other spaces where it need to detect the O_2 gas concentration in the environment and provide a alarm function. When the O_2 gas concentration in the environment is higher or lower than that of preset alarm point, this device will send out sound and light alarm to warn the user who wears it to take protective actions. This device is portable and can be also used as a fixed device. This device is intrinsically safe and explosion-proof under mine, the explosion-proof sign is Exib I.

2.Working principle

The sensor of this device adopts electrochemical principle. The electrode inside the O_2 sensor will react with O_2 gas in the role of catalyst to achieve the directional movement of electron between electrodes, and make the electrical signal amplified and displayed by amplifyingcircuit technology and other existing technologies so that to achieve the detection of concentration.IR CO_2 sensor adopts infrared principle.

3.Charging this device

Notice: To charge the battery, ensure you are in a safe, non-hazardous area.

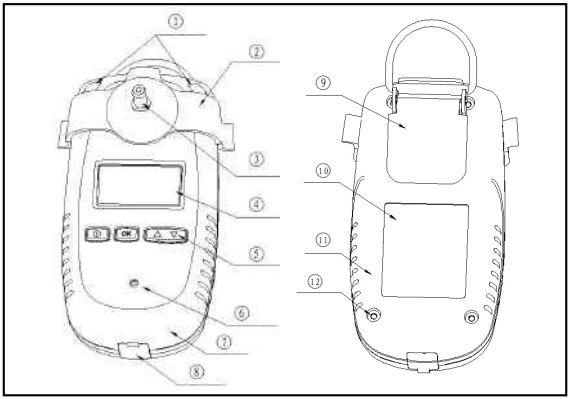
① Input voltage: 110-240V, 50-60Hz Output voltage: 5V, 500mA.

② It can be charged from 5V USB socket through connecting USB cord with this device. USB socket could from computer, phone adapter, power station, etc.

③ After connecting USB cord with this device, green LED flashing indicates regularly charging.

④ When green LED stops flashing and remains light, it indicates charging is basically completed, to enlarge battery life, please don't unplug charging device right away, instead remain it on charge for another hour.

4.Drawing sketch and components list



Item	Description
1	Alarm light
2	Calibration mask fixator
3	Calibration mask
4	Display screen
5	button
6	Buzzer
7	Front cover
8	USB plug
9	Clip
10	Label
11	Back cover
12	Mounting screw

5.Technical specification

Technical indicator	Parameter
Measuring range	(0.0-30.0)% vol
Measurement error	(0.0-5.0)% vol：±5%vol (>5.0~30.0)%vol：±0.9%vol
Resolution ratio	0.1%vol
Display	Liquid crystal display（LCD）display
Response time	≤35s (T90)
Alarm sound intensity	≥75dB
Alarm light	≥20m visible
High alarm point	25.0%vol (can be adjusted in whole range)
Low Alarm point	18.0%vol (can be adjusted in whole range)
Alarm way	Sound, light
Continuous working time	＞300 hours

Technical indicator	Parameter
Sensor lifetime	≥2 year (≥5 years for IR sensor)
Working current	5mA
Battery model	3.7V/1500mA
Battery short circuit current	2A
Charging time	4-5 hours
Protection degree	IP65
Working temperature	-25℃~55℃; short time for -40℃~55℃
Size	105×54×32 (mm)

6.Operation instruction

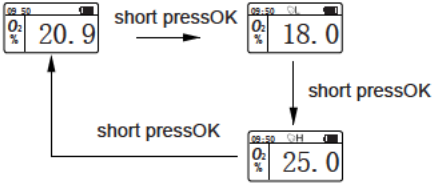
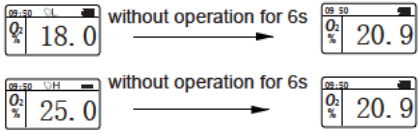
① Instruction of buttons

Button	Description
⏻	● On/ off button start this device or shut it down, please long press ⏻
OK	● yes button press OK (change between detecting interface and function interface)
△	● up button set the data value
▽	● down button set the data value

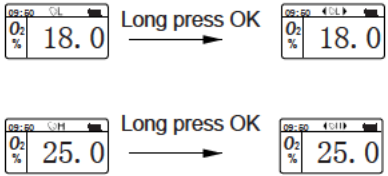
② On/ off operation

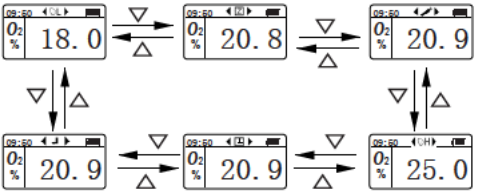
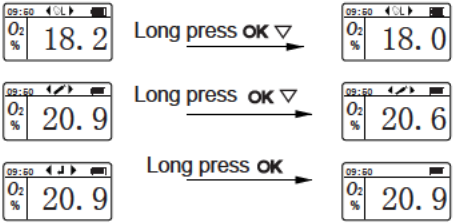
Step	display
Long press on/off button to activate this device, display our company logo "BESANTEK", then go into normal detecting interface.	⏻ Long press → BESANTEK → 09:50 O_2 % 20.9

③ Interface switch operation

Step	display
Short press OK button, switch between detection interface, high alarm point and low alarm point, etc.	
Without operation for 6s, automatically returns detecting interface.	

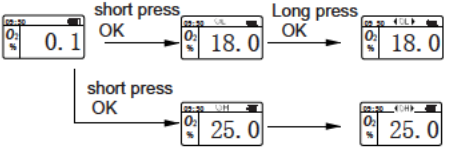
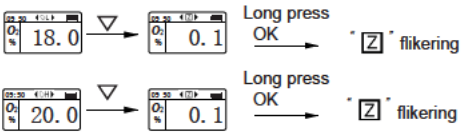
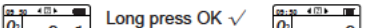
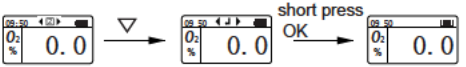
④ Setting interface operation

Step	display
Long press OK button to enter the setting interface from high or low alarm point interface, and remain the alarm point setting option with the tip ◖♡L◗ (low alarm point setting) or ◖♡H◗(high alarm setting)	

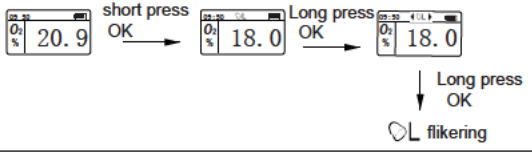
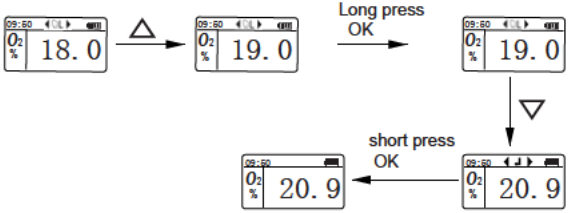
Step	display
Press" △▽ ",to choose different setting option, eg.: zero setting option ◖ ⊡ ◗, cal bration option ◖ ◢ ◗ , time setting option ◖ □ ◗, exit option ◖ ⌟ ◗	
Enter into each option by long pressing OK button, and exit it by short pressing OK button under exit option ◖ ⌟ ◗ to return the detecting interface. Without operation for 6s, automatically returns detecting interface.	

⑤ Zero setting

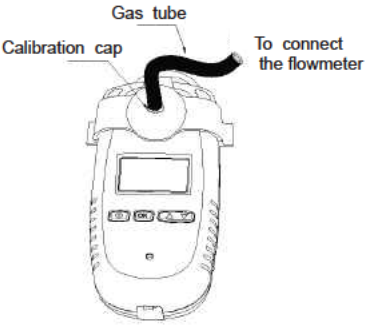
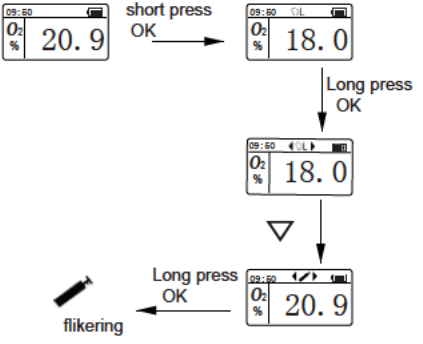
Tip: When this device occurs drift of small value in clean air, user needs to do zero setting operation. Use 100%vol nitrogen gas to zero O2 and CO2 sensors. For other gases, it should be carried out in clean air.

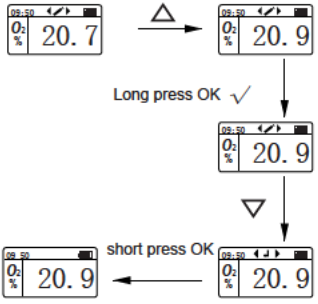
Step	display
If the display value is not 0 of a clean device under 200ml/min nitrogen gas flow,short press OK button and enter into the alarm point interface, then long press OK button to enter the setting option interface ♡L low alarm point or ♡H high alarm point and remain in i nterface of alarm point option ◀♡L▶ low alarm point or ◀♡H▶ high alarm point.	
Press up/down button to choose the zero setting option, ◀ Z ▶then long press OK button, Z blinking, now carry out the zero setting.	
When the value is stable, long press OK button to finish the setting successfully and return the zero setting option Z , display value is 0.	
Wait for 6s or press up/down button to exit options ◀ ⌟ ▶,then short press OK button to return the detecting interface.	

⑥ Alarm point setting

Step	display
Short press OK button under detecting interface to enter alarm point interface ◡L or ◡H,then long press OK button to enter setting option interface and remain alarm point option ◖◡L◗ or ◖◡H◗ , then long press OK button to enter the alarm point setting interface, at this time, ◡L or ◡H is blinking.	
Press up/down button to set the alarm point value. Long press OK button to finish it and return back alarm point option ◖◡L◗ or ◖◡H◗ , the display value will be same with the setting alarm point value. Wait for 6s or press up/down button to exit this option ◖⌟◗ ,then short press OK button to return the detecting interface.	

⑦ Calibration

Step	display
Notice: Always carry on zero setting firstly before cal bration O_2 sensor can be calibrated in clean air, it also can be calibrated under 20.9%vol oxygen gas, let's take calibration under oxygen gas for example to demonstrate. ① Connect the specialized cal bration cap to the standard gas tube, and adjust the gas flow to 300ml/min (make sure the flow is stable), exhaust the gas for 30s to empty air in the gas tube.	
② Short press OK button under detecting interface to enter the alarm point interface ◡L or ◡H , then long press OK button to enter setting option interface and remain in the alarm point option interface ◖◡L◗or◖◡H◗, then press up/down button to choose the calibration option ◖🔧◗, long press ok button, and then the ◖🔧◗ under 🔧 blinks, then user can carry out the calibration.	

Step	display
③ When the value is stable, press up/down button to adjust the display value and make it same with cal bration gas concentration. Long press ok button to finish calibration and return calibration option ◀ ✎ ▶ , wait for 6s or press up/down button to exit the option ◀ ⌟ ▶ , then short press OK button to return detecting Interface.	

Notice:

A Please don't carry out calibration when the device is alarming for low power

B Before calibration, open this device for at least 5 minutes, then carry on zero setting.

C Standard gas cylinder could not be shut off during the process of calibration.

D Suggest to use 20.9%vol oxygen gas to do the calibration

E Calibration cycle is 3-6 months.

7.Attentions of using this device

① Battery of this device shouldn't be removed in underground places, and DO NOT use different batteries from standard one.

② Charge this device in ground and safe places.

③ The replaceable sensor must be provided by BESANTEK Corporation.

8.Storage and maintenance

Notice: When maintain this device, please don't change any component's parameter, specification and model name

① This device should be kept by special person, and build a registration system.
② This device should be stored in dry and well ventilated places if it's not used for a long time.
③ DO NOT disassemble this device at will, it must be repaired by specialists.

9.Trouble shooting

① If this device couldn't be turned on, maybe it has no power, please charge it firstly.
② If the value of this device is not zero in clean air, please carry on zero setting firstly.
（except Oxygen）
③ If this device couldn't test accurately, please carry on calibration firstly.
④ If this device becomes expired, please purchase a new one.

Appendix

Parameter (Zero setting for all these gas sensors except oxygen sensor must be carried out in clean air)

Gas	Detecting range	Resolution	Respond time	Zero setting gas & concentration	Calibration gas &concentration	Gas flow(ml/min)
O_2	(0~30)%vol	0.1%vol	≤35s(T90)	N_2 100%vol	O_2 20.9% / Clean air	300
CO	(0~1000)ppm	1ppm	≤45s(T90)	Clean air	CO 500ppm	300
SO_2	(0~20)ppm	1ppm	≤45s(T90)	Clean air	SO_2 10ppm	300
NO	(0~250)ppm	1ppm	≤45s(T90)	Clean air	NO 100ppm	300
H_2S	(0~100)ppm	1ppm	≤45s(T90)	Clean air	H_2S 50ppm	300
H_2	(0~1000)ppm	1ppm	≤45s(T90)	Clean air	H_2 500ppm	300
NO_2	(0~20)ppm	1ppm	≤45s(T90)	Clean air	NO_2 10ppm	300
NH_3	(0~100)ppm	1ppm	≤45s(T90)	Clean air	NH_3 50ppm	300
CL_2	(0~10)ppm	1ppm	≤45s(T90)	Clean air	CL_2 5ppm	500
ETO	(0~20)ppm	1ppm	≤140s(T90)	Clean air	C_2H_4O 10ppm	300
$IRCO_2$	(0.00~5.00)%vol	0.01%vol	≤45s(T90)	N_2 100%vol	CO_2 2.50%vol	250
$IRCH_4$	(0.00~5.00)%vol	0.01%vol	≤45s(T90)	Clean air	CH_4 2.50%vol	250

Sensor name	Error /Deviation
CO	(0-20)ppm: ≤± 2ppm
	(20-100)ppm: ≤ ±4ppm
	(100-500)ppm: ≤± 5% of testing gas
	(500-1000)ppm: ≤ ± 6% of testing gas
H_2S	(0-49)ppm: ≤± 3ppm
	(50-100)ppm: ≤ ±10% of testing gas
O_2	(0.0-5.0)%vol: ≤± 5%vol
	(5.0-30.0)%vol: ≤ ± 0.9 %
SO_2	(0-20)ppm : ≤ ± 5%FS or ± 1ppm
NO	(0-250)ppm : ≤ ±5%FS
NO_2	(0-20)ppm: ≤± 5%FS or ±1ppm
H_2	(0-1000)ppm : ≤± 5% of testing gas
NH_3	(0-100)ppm: ≤± 5%FS
CL_2	(0-10)ppm: ≤± 5%FS or ± 1ppm
ETO	(0-20)ppm: ≤±10%FS
IR CH_4	(0.00-1.00)%vol: ≤± 0.06%vol
	(1-100)%vol: ≤± 7% of displayed value
IR CO_2	(0-0.5)%vol: ≤± 0.10%vol
	(0.5-5.0)%vol: ≤± (0.1%vol + 5% of testing gas)