Mot Series Gas Detector

User Manual

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Catalog

Notice:

1) Key description

Unscrew the cover of the detector, there are four buttons beneath the display screen: Return,Up,Down,Ok（form left to right）;

Three operation interface：Detector interface,menu,parameter setting.

The following form is description for the four buttons.

	Detector interface	menu	parameters settings
Return	Mute	Return to Detector interface	Return to Previous Menu
Up	Press the Up and Down key for five second at the same time to enter the menu	Move up	Move up/
Down		Move down	Move down/
Ok	Void	Enter Submenu	Enter/Select/Save

2) Gas Detector Processing Operation under Outrange Status

Users should avoid to have sensor impacted by the gas with a pressure value greater than the maximum of the detector, which might affect the service life and precision of the detector, or even directly damage detector.

When a user accidentally makes outrange operation, he should evacuate the instrument out of the detecting site and place it in the clean air for more than half of an hour. During the time, user should observe whether the density value of the instrument is keeping decreasing or not. If it can straightly go down to normal value, then he can continue to use it after the zero calibration of instrument. While the instrument after the outrange operation and user has placed it in clean air for hours, the density value remains high, then it should be sent back to the manufacturer or agent for maintenance, be ready to replace the sensor.

Special Note: detector damage resulted from outrange operation is not within the warranty.

3)Detector Calibration and Warranty

We guarantee all detector were under precise calibrated with certain density standard gas. It's not necessary for customer to re-calibrate the detector after purchase unless encounter special situation. Also the calibration need to be operate under the guidance of the professional.

All MOT series products we provide 12-Mounth warranty for the detector and 3-Mounth warranty for the accessories. Beside , we have free calibration once a year during the entire products service life.

4)MOT Series Products Hot Key Instruction

Mute: When detector is in the state of alarming user can mute the detector by press the "Return" button.

Function menu: When detector is in the detecting menu user can enter system menu by pressing "Up" and "Down" key at the same time for 5 seconds.

5)Detector Terminal Block Connection Description

Power supply terminal and signal terminal were setting by default with following situations:

1:Three build-out wires(Red,Yellow,Black):4-20mA signal output model, Red wire connected to DC 24V +,Yellow wire connected to 4-20mA output+, Black wire is universal wire(function as DC 24V- and 4-20mA output- at the same time)

2:Four build-out wires(Red,Black,Yellow,White):RS485 output model, Red wire connected to DC 24V +, Black wire connected to 4-20mA output- ,Yellow wire function as RS485 output-,White wire function as RS485 output terminal A+, White wire function as RS485 output terminal B-.

Special Note: The power supply rang of all MOT series products were DC16V-30V, it is strong recommended to choose 24V

1 Product Brief Introduction

MOT series intelligent gas detector(transmitter) used the most advanced large scale integration circuit, designed according to international standard intelligence technology that ensure our products are technology advance,well performance,high stability,excellent communication ability. MOT series products combine digital signal with analog signal and it's high stability makes our detector extremely satisfied the requirement of technical grade environment safety monitor. Our detector is wildly used in variety industry including oil,chemical,metallurgical,refinery,liquefied natural gas transportation,bio-pharmaceutical. The MOT series detector compatible with all kinds of controlling device ,PLC and DCS etc, allow user to remote monitoring and control and alarm,Monitoring data can be save and analyze by computer.

2 Key Feature

- ●With the most advance nanometer semiconductor technology ,ultra low power 32bit microprocessor,24bit ADC data acquisition chip.
- ●2.4 inches technical grade display with a pixel up to 320*240
- ●Three concentration units are available PPM,%VOL,mg/m3
- ●The limit of detection were 0.001ppm-99.999%vol ,depending on different sensor
- ●Variety signal output model :
  - 4-20mA signal :Standard 16bit 4-20mA output chip, transmission distance 1Km
  - RS485 signal: Standard MODBUS RTU protocol, transmission distance 2Km
  - Two relays output: Concentration alarm value adjustable, there are high alarm and low alarm respectively
  - 0-5V,0-10V output are optional
- ●Variety signal transmission are available :3-4 core cable,Optical fiber network,Network cable,3G transmission,Wireless transmission,Video transmission
- ●With life detection function,able to monitor core chips,components,sensor in real time
- ●With overvoltage protection,lightning protection,short-circuit protection,wrong connection protection,electrostatic prevention,magnetic-field

interference prevention

●All software automatic calibration, sensor up to 6 level target calibration,ensure the accuracy and linearity of the entire measurement

●Chinese and English operation model are available,user friendly ,four buttons to operation

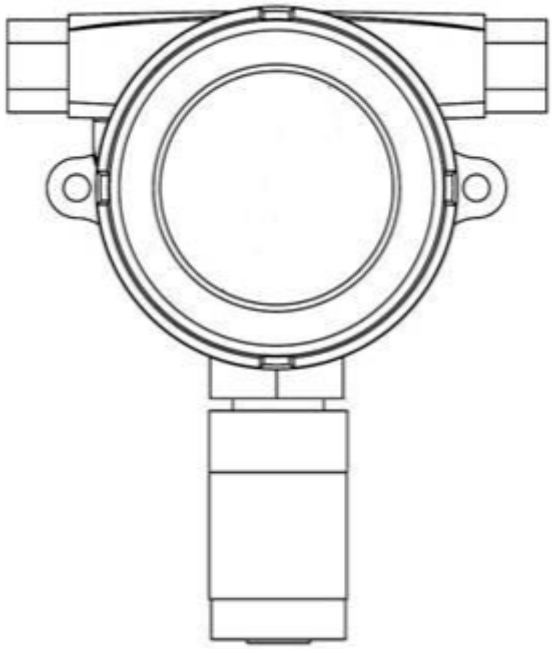
●Following function are optional:Temperature,Humidity sensor,Audible and visual alarm

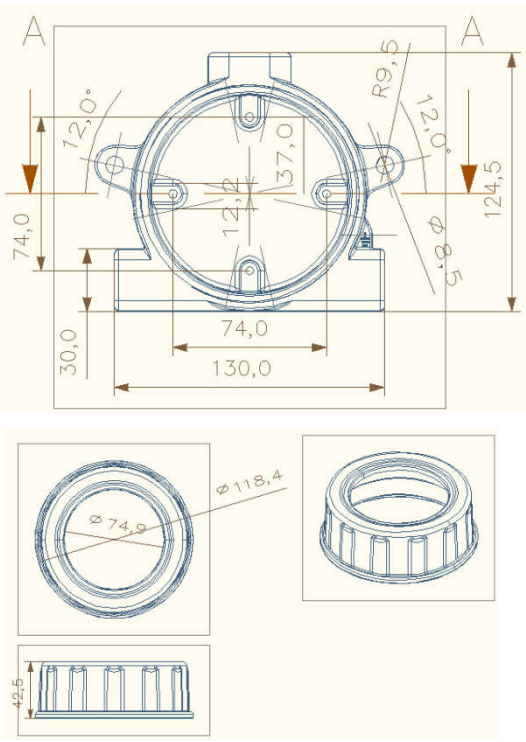
3 Technical Parameters

Gas：	Pure gas（please refer to sensor list）		
Sensor：	Electrochemistry,Catalytic combustion,Semiconductor,PID（photoionization sensor),Infrared Gas sensor		
Detection Pattern：	Diffusion,Pipeline(screw thread size:M40*1.5MM),Circulation,Pumping is available，Online detection		
Detection Range：	Depend on different sensor，please refer to sensor list		
Display：	Depend on different sensor，please refer to sensor list		
Detection Accuracy：	≤±3%F.S	Linearity error:	≤±1%F.S
Reaction Time:	≤20S（T90）	Zero drift:	≤±1%（F.S/Year）

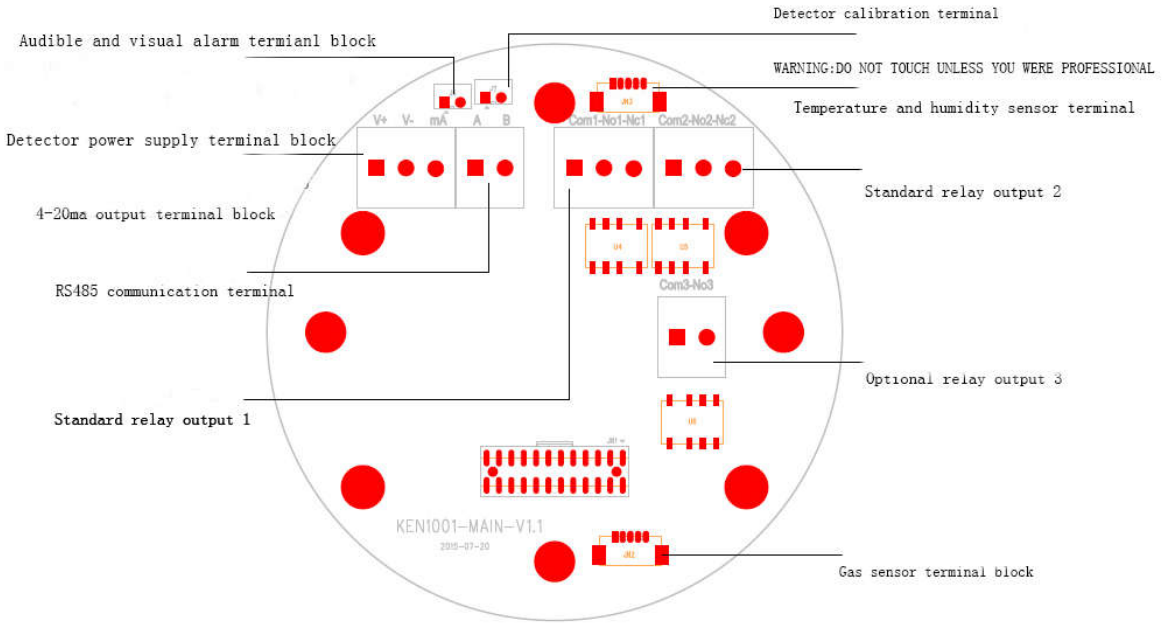
Recovery Time:	≤20S	Repeatability:	≤±1%F.S
Relay：	Two relays output，Contact rating：24VDC 3A/220VAC 3A		
Explosion proof sigh：	ExdII CT6，Certification Number of Explosion-proof ：CNEx10.1807		
IP Rating ：	IP65		
Material：	Aluminum ,Explosion and corrosion proof	Connection：	3/4″NPT,1/2″NPT
Dimensions：	200×160×80mm（L×W×H）	Weight：	1.5 Kg（Net weight）
Temperature：	-30 ～ 60℃	Humidity：	≤95%RH，Non-condensing
Pressure：	0 ～ 200Kpa		

4 Product Structure and Terminal Block





Structure and Dimension



MOT Series Products Wiring Procedure

Notes:

V+ : DC 24V output anode terminal block;
V-DC 24V output cathode terminal block and 4-20ma out cathode terminal;
Ma: 4-20ma output anode terminal block;
A:RS485 output anode terminal block;
B:RS485 output cathode terminal block;
No:Relay terminal block(normally open)
Nc:Relay terminal block(normally closed)
Com:Shared relay terminal block.

5:Detection Instructions

5.1 Buttons definition

Unscrew the cover of the detector, there are four buttons beneath the display screen: Return,Up,Down,Ok（form left to right）；
Three operation interface：Detector interface,menu,parameters settings.
The following form is description for the four buttons.

	Detector interface	menu	parameter setting
Return	Mute	Return to Detector interface	Return to Previous Menu
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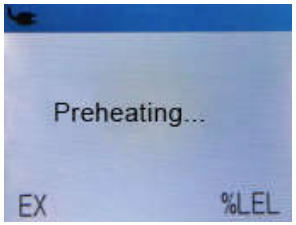
Down		Move down	Move down/
Ok	Void	Enter Submenu	Enter/Select/Save

5.2 Power On /Off

When detector is power off, connect V+,V- to DC 24V to power supply terminal block enlighten the display ,automatic switch on. The screen appears “Sensor information” “Sensor Heating” “Detecting” in sequence, As shown in figure 1-3; When enter the interface of “Detecting” detector will start to detect the concentration of relevant gas automatic, concentration value and alarm status will alarm status will be shown on the display directly. Cut off the power supply to shutdown detector.



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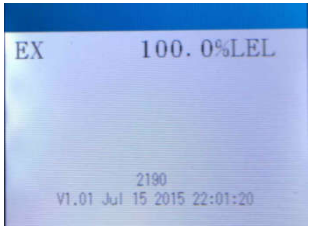

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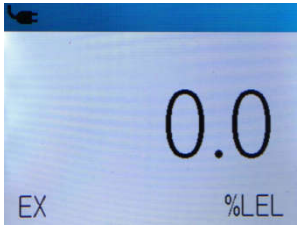

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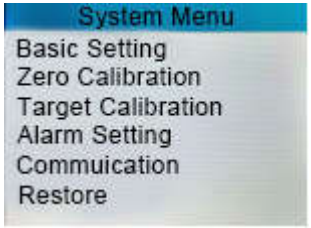
6 Operation Instructions

6.1 Gas Detection Interface

As it shown in figure 3 is the combustible gas EX detection interface. Icon at the top left corner indicate power supplying, lower left corner shows the chemical formula of the gas ,lower right corner shows the concentration unit, figure in the middle of the display indicate the real-time concentration of gas.

6.2 System Setting Menu



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Unscrew the cover of the detector, enter the system setting menu by pressing “Up” and “Down” key for five seconds at the same time(as it shown in figure 4).there are six submenu which are Basic Parameter Settings ,Zero Calibration, Target Calibration, Alarm Value Setting, Communication Setting and Factory Reset. User can move cursor by “Up” and “Down” key and chose different submenu, press “Ok” to enter submenu and press “Return” to return to detection interface.

6.2.1 Basic Setting

User can view all kind of parameters shown as figure 5 after enter basic parameters settings, move the cursor by pressing “Up” and “Down” key and modify parameter by pressing “Ok”. User can check and modify the range of concentration of the detector by enter “Range ”; “Unit ” allow user to switch the unit between volume concentration(PPM, LEL% and VOL%) and mass concentration(mg/ m³) as shown in figure 6.User can adjust the temperature humidity level in “Temp” and “Humidity ” as shown in figure 7.Chinese and English are available in “language ” as shown in figure 8.

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6.2.2 Zero Calibration

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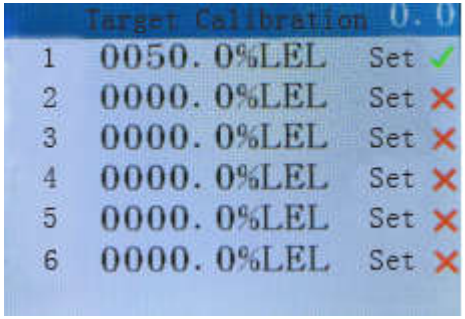
If zero drift of the sensor is over range, user can proceed zero calibration ,the gas concentration are defaulted set to zero after zero calibration as shown in figure 9.

Procedures: Enter System Setting menu, chose “Zero calibration” ,press “Ok” key, the cursor remain at “Set” then press “Ok” again, detector interface shown as the figure 9,press “Up” and “Down” key to move cursor to “Confirm” then press Ok, detector will start calibrating, after zero calibration the gas concentration value should be zero, press “Return” to return to previous menu.

Special Note: Zero calibration must be proceed in fresh air or high-purity inert gas(for example 99.999%VOL N2 etc)

6.2.3 Target Calibration(Do Not Calibrate Unless You Are Professional)



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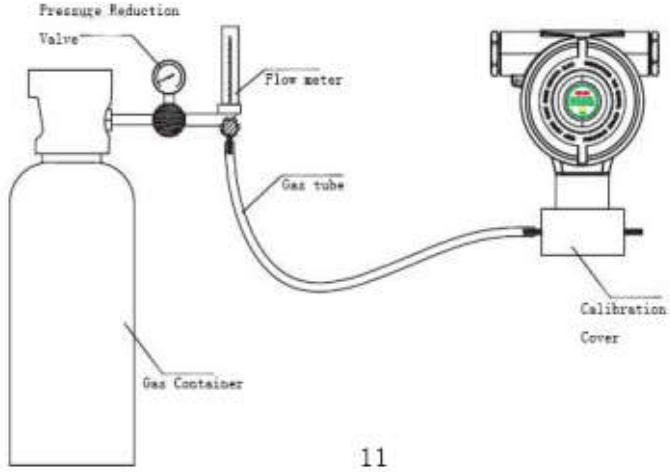
MOT series gas detector provide 6 levels target gas concentration calibration as shown in figure 10,This calibration should be operate under conditions of certain standard concentration gas, Pressure reduction valve , Flow meter, Calibration cover and make sure all instruments are well connected, otherwise this function is forbidden.

Procedures: Connect all instruments as shown in figure 11,enter target gas calibration interface,release standard gas slowly and control gas flow within 500ml/min,observe the real-time concentration value(concentration value should be increasing),wait untill real-time concentration value rise to the peak reading and stay still, user can chose a un-calibrate option to operate(√ indicate this level has been calibrated and × indicate this level still need to be calibrate).

First of all input a concentration value of standard gas then calibrate. Target gas concentration value will set up to be the standard gas concentration value after calibration.

Warning: Some electrochemical sensor only function under aerobic environment ,it is recommended user to chose a calibration environment(pure oxygen or air)



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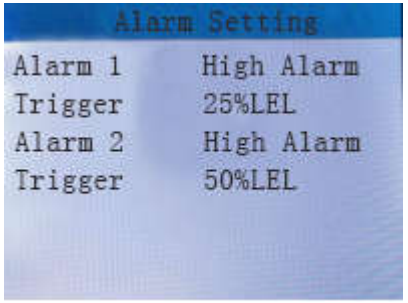
6.2.4 Alarm setting



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User can set the alarm limit and alarm mode in this menu, as shown in figure 12,there are two alarm value setting, which are high alarm and low alarm. When user set as the low alarm mode, it will trigger alarm when real-time concentration is lower than preset value and when user switch to high alarm mode it will trigger alarm when real-time concentration is higher than preset value.

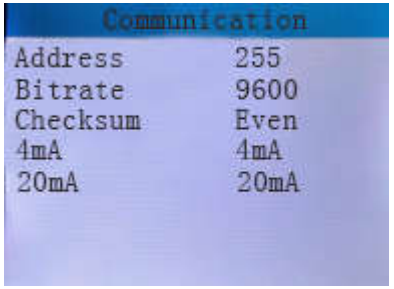
Procedures: Enter alarm setting submenu, Move the cursor to “First level alarm” or “Second level alarm” press sure to select and press “Up” and “Down” to switch alarm mode, press “ok” to save .Move the cursor to “Alarm value” press “Ok” to chose, press “Up” and “down” to move the cursor to the number that user need to change, press “Ok” to confirm, press “Up” and “Down” to modify alarm value then press “Ok” to sure your modification.

Special Notes:

First level alarm corresponded to standard relay output 1(COM1,NO1,NC1)

Second level alarm corresponded to standard relay output 2(XOM2,NO2,NC2)

6.2.5 Communication



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User can set this menu when it is required to connect with controller, host computer, PLC and DCS.As shown in figure 13,detector address range 001-255(defaulted address :255),baud rate 9600,4800, 2400 is available(defaulted rate :9600),verification mode： No verification, ODD,ECC.(defaulted verification mode: No verification)

Special Notes:

RS485 communication mode is RTU, When detector is communicating with terminal device, detector address, bout rate and verification mode must be keep correspondence with terminal device, please make sure each detector’s address is exclusive when you have several detectors communicating with one terminal.

6.2.6 Factory Reset

If user proceeded an wrong operation by accidentally or need to reset all parameters to factory setting,you can reset all parameter to factory setting as shown in figure 14.

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7 Other Notices

- ◆Please read User Manuel carefully before use the detector.
- ◆It is strictly forbidden user to disassemble the detector or replacement parts.
- ◆Installation, adjustment, calibration and parameters setting must be progress by professionals.
- ◆Regular inspection of calibration is necessary, expired or broken sensor should be replace immediately.
- ◆It is strictly forbidden to impact sensor with gas which is over detection value.
- ◆User should prevent drop or impact detector.
- ◆It is strictly forbidden to use detector in high temperature, high humidity or high pressure environment ,if working environment is high humidity, detector need to equip with vapor filter.
- ◆Man-made damage is not within warranty.

8 Common Faults and Exclusions

- ◆ Problem: Concentration value is not stably when detector place in air, reading is unstable
  Possible reasons: Electrochemical sensor might interfered with unrelated colorless and odorless gas
  Solutions: Place detector at pure gas environment to see whether the concentration value decreasing or not, if it is that the environment is clear but the concentration value remains high, you need to proceed zero calibration

- ◆ Problem: No response or weak response when detecting

Possible reasons: Oxygen content value of gas is too low: <5%VOL
Gas pressure is too high, the pump can't not afford it
Expired sensor might cause the problem too

Solutions: Make sure the oxygen content value of the gas is higher than 5%VOL when equip with Electrochemistry sensor, Catalytic combustion sensor or Semiconductor sensor. Detector working pressure is -30Kpa~100Kpa, User can proceed zero calibration if has standard gas. If oxygen content value, working pressure are eligible for detection but problems still remain, user should return detector to factory for maintenance.

◆ Problem: Concentration value is unstable when start detecting

Possible reasons: Normally dude to gas oxygen content is too low or changing of gas concentration value.

Solutions: Increase gas oxygen content value and make sure the gas flow speed is stable.

◆ Problem:4-20mA output <4mA or >20mA

Possible reasons: Faulted ammeter or detector failure

Solutions: Check detector and ammeter if problem still remains, please return to factory for maintenance

◆ Problem: Detector can't not connected with host computer or controller by RS485 terminal

Possible reasons: Host computer incorrect setting or detector address is not correspondence with host computer and controller.
RS485 terminal block wrong connection, detector address conflict, wiring failure or RS485 output failure

Solutions: Check detector address, check host computer and controller setting, check connection, if problem still remain please return to factory

◆ Problem: Cannot turn on power

Possible reasons: Wrong connection of power supply, low voltage or power supply bad contact.

Solutions: Check terminal block V+ and V- make sure DC 24V input is available
If no power supply please check circuit and adapter, and if problem still remain please return to factory

9 Customer Service and Accessories

◆12 months warranty for detector
◆3 months warranty for accessories
◆Detector will still under warranty after maintenance
◆Freight will not be bear if customer need maintenance
◆We will charge from customer for overdue maintenance according to relevant standard
◆Damage resulted from man-made or improper operation is not within warranty
◆Disassemble detector without permission of factory professional is not within warranty

Standard Accessories list

① MOT series gas detector (1)
② User manual/Product certification card (1)

Optional Accessories list

① RS485 to RS232 converter, data acquisition software
① Temperature and humidity transmitter
③ Wireless transmission module
④ Visual and audible alarm
⑤ DC 24V adapter and joint
⑥ Drier filter
⑦ Tube and pump
⑧ Vapor separator
⑨ Infrared control function and infrared remote

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