

# 深圳市能点科技有限公司

SHENZHEN EPT TECHNOLOGY CO., LTD.

## 规格书 SPECIFICATION



### A1MF-A

单点分离式光电液位传感器

(自带水箱检测)

Single-point Separated Photoelectric Liquid Level Sensor  
(Able to detect if the tank is taken away)



版本 Version: F-L

日期 Date: 2021/03/17

[www.eptsz.com](http://www.eptsz.com)

[www.eptsensor.com](http://www.eptsensor.com)

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This specification is the standard for the operation of the corresponding products. It will be used as the basis for production and supply after confirmation by the customer. If you have special requirements, please contact our sales and issue an acknowledgement.

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### 1. 修订记录/Revision History

No.	日期/Date	备注/Remark	修订/Revision
1	20060410	初始规格书版本发行/ MP Version issue	A
2	20080709	添加部分细节要求/ Added some details	B
3	20160515	结构细节修改/ Structural details modification	C
4	20180715	新规格书版本发行/ New specification version	D
5	20200619	细节修改/ Details modification	E
6	20210317	规格书更新/Specification update	F



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## 2. 应用领域/Application

饮水机/ Water dispenser

热水器/Water heater

加湿器/Humidifier

医疗设备/Medical devices or equipment

需要侦测液体的电器、设备等/Electrical equipment and devices which need to detect liquid

## 3. 产品特征/Product Features

无机械运动部件、可靠性高

No mechanical moving components and with high reliability

体积小、成本低

Small size and low cost

液位控制精度高

High precision of liquid level control

符合 RoHS 要求

The sensor itself satisfies RoHS requirements

## 4. 电气参数特性/ Electrical Specification (Ta=25°C)

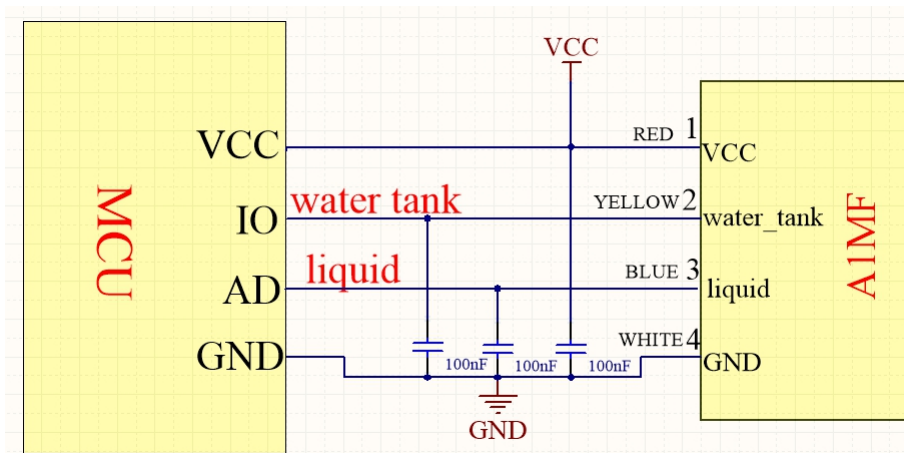
参数/Parameter	符号/Symbol	条件/Condition	最小值	典型/Typ	最大值/Max	单位/Units		
输入特性/direct-current	工作电压/Working Voltage	VD	4.5	5.0	5.5	V		
	消耗功率 (空载)	P	VDD = 5V 有水状态/in Water		50	75	110	mW
	Power Consumption	D	VDD = 5V 无水状态/in Air		75	100	125	mW
输出特性/output characteristic	输出信号类型/Output Signal		电压					
	有水状态输出电压/Output Voltage in Water	VO	VDD = 5V Ta = 25°C		—	—	0.30	V
	无水状态输出电压/Output Voltage in Air	VO	VDD = 5V Ta = 25°C		4.0	—	—	V
	响应时间/Response Time		VDD = 5V Ta = 25°C		—	—	1	S
	水箱侦测Tanks DET SG @5V Input		有水箱或者磁铁With Water Tanks(or Magnet)		—	0	—	V
	水箱侦测Tanks DET SG @5V Input		无水箱或无磁铁With/O Water Tanks (or Magnet)		—	5	—	V
极限值/limit value	工作温度/Operating Temperature	Topr	VDD = 5V		-20	—	80	°C
	储存温度/Storage Temperature	Tst	—		-25	—	85	°C
	工作寿命/Working Time	Wt	VDD = 5V Totg = 25°C		—	50000	—	H



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## 5. 推荐应用电路/Recommended Application Circuit



## 6. 应用及检测/Application & Detection

将液位传感器按下述方式之一安装，再将其按如上电路连接，信号端将输出与水位状况一致的电压信号，此信号作为液位传感器高度控制信号接入 MCU（单片机）A/D（模数转换）口，当液位超过临界液位而淹没传感器本体时，此时信号输出为低电压，当液位低于临界液位而显露传感器本体时，此时信号输出为高电压，具体参数如上表所示。

Install the level sensor according to one of the following modes (8. Recommended Installation) and connect it according to the circuit above (5. Recommended Application Circuit), The signal end will output a voltage signal consistent with the water level. This voltage signal is used as the height control signal of the liquid level sensor to be accessed to the A/D (analog-to-digital conversion) port of the MCU (microcontroller). When the liquid level is over the critical level and the sensor body is submerged, output voltage signal is low voltage; When the liquid level is below the critical level and the sensor body is exposed, output voltage signal is high voltage. Specific parameters please refer to above table (4. Electrical Specification).

### 注意/Notice:

1. 当被探测液体为水，水位高度低于临界液位时，水汽、水蒸汽或水珠会在传感器本体表面集结，从而导致信号输出电压下降。所以在实际应用时，考虑到水汽、水蒸汽或水珠的影响，将传感器阈值电压设置为  $V_T$ ，即信号端输出电压如果大于  $V_T$ ，则判断液位低于临界液位，信号端输出电压如果小于  $V_T$ ，则判断液位高于临界液位。 $V_T$  一般取值为 0.3—0.5V，具体数值根据水汽、水蒸汽或水珠的产生以及影响程度来确定。当被探测液体为其它时，也会受到水珠的影响，故也按此法考虑。
2. 考虑到液面的波动特性，如果波动性较大，且波动幅度  $>1\text{MM}$ ，在程序中要加入防抖逻辑。
3. 长期使用过程中，棱镜表面因液体杂质产生污垢，轻微的污垢不会影响到传感器的效能，如有严重的污垢产生，导致棱镜整体覆盖，需要提前告知特殊性，以便我方技术部做优化处理。
4. 传感器在阳光直射下会受到干扰，请安装在避免阳光照射的位置内。
5. 由于现有原理，无水箱时 AD 输出会判断为有水状态，增加霍尔传感器以作辅助判断用

1. When the liquid level (water/oil/milk etc.) lower than the critical level, liquid steam or liquid droplets will accumulate on the surface of the sensor body, which will cause the value of output voltage signal to drop. In practical application, considering of the influence of steam and dirt, the liquid level threshold voltage is set as  $V_T$ . That is, if the output voltage



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from signal end is higher than VT, the liquid level is decided to be lower than the critical liquid level; and if the output voltage from signal end is lower than VT, the liquid level is decided to be higher than the critical liquid level.

VT is generally set between 0.3V and 0.5 V, and the specific value is determined to the generation speed and degree of influence of liquid steam or liquid droplets.

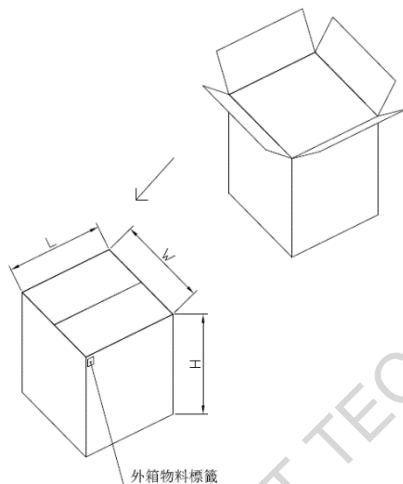
2.Considering the fluctuation characteristics of the liquid level, if the fluctuation is large and the fluctuation range is larger than 1 MM, anti-shake logic should be added to the program

3.During long-term use, the surface of the sensor will be dirty due to liquid impurities. Slight dirt will not affect the performance of the sensor. If there is serious dirt covers all the surface of sensor, please inform us the particularity in advance for our technical department to do optimize treatment.

4.The sensor will be affected when exposed to direct sunlight. Please install it away from direct sunlight.

5.According to the existing principle, the AD output will be judged as in water when the tank is taken away, so add a Hall sensor to help to get right judgment

## 7. 包装/ Package



说明：

1. 外箱尺寸：34X27.5X33.5 CM

1箱产品数量：800 PCS

2. 包装盒尺寸：33.5X13.5X8 CM

1盒产品数量：100 PCS

Description:

1. Carton size: 34X27.5X33.5 CM

Quantity/CTN:800PCS

2. Packing box size: 33.5X13.5X8 CM

Quantity/box: 100 PCS

## 8. 尺寸和推荐安装/Outline Drawing and Recommended Installation

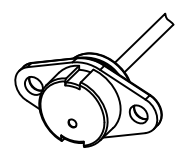


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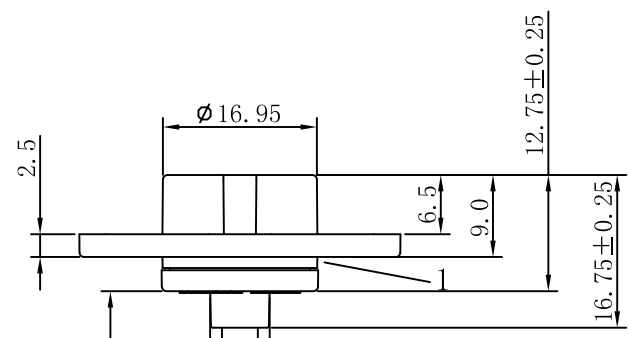
1 2 3 4 5 6

A



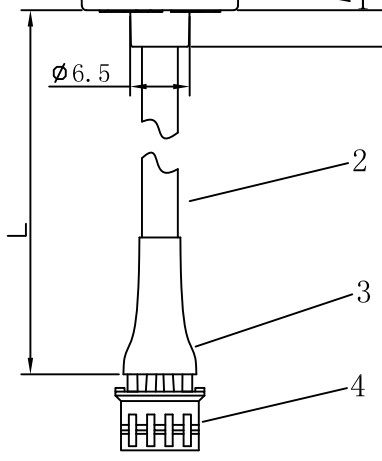
A

B



B

C



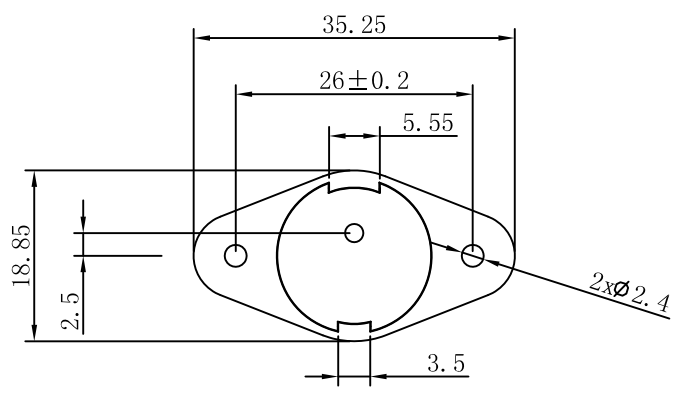
C

D

- 1 VCC Red
- 2 Tank DET Yellow
- 3 Water DET Blue
- 4 GND white

D

E



E

耐溫 Temperature resistance	80°	耐壓 Withstand voltage	300V
鍍錫 Tin plating	*	長度 Length	220
UL線規 UL wire gauge	2464	UL編號 UL number	E187208
顏色 Colour	Black	線號 Line number	28AWG

線材規格  
Wire specification

腳距 Foot distance	2.0	孔數 Number of holes	4
顏色 Colour	White	型號 Model	PH

端子規格  
Terminal Specifications

4	端子 Terminal	1	
3	熱收縮管 Heat shrink tube	1	
2	線材 Wire	1	
1	感測器主體 Sensor body	1	PC
編號 NO.	名稱 Name	數量 QTY	備註 P.S.

F

G

G

H

H

設計 Designer	Chen	材料 Material	*	單位 Unit	mm
檢查 Checked	Chen	表面處理 Finish	*	比例 Scale	*
審批 Approver	Wei	數量 Quantity	*	篇幅 Size	A4
一般公差 Tolerances	0-10	±0.10	0.8	備註 Remarks	*
	10-35	±0.15		視圖 View	
	35-70	±0.20			



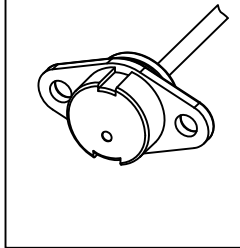
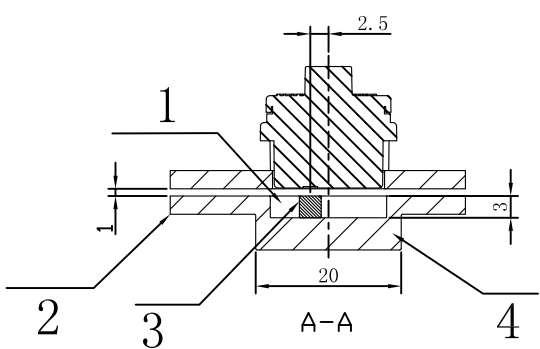
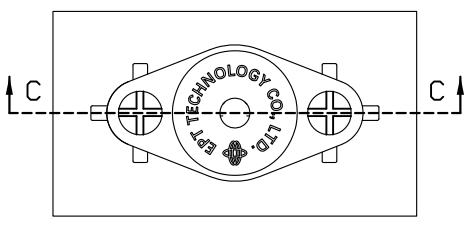
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產品名 Product Name	A1MF-A	日期 Date	21-03-17
頁面內容 Page content	產品圖	版本 REV	F
圖號 DWG NO.	*	頁數 Pages NO.	1/2

1 2 3 4 5 6

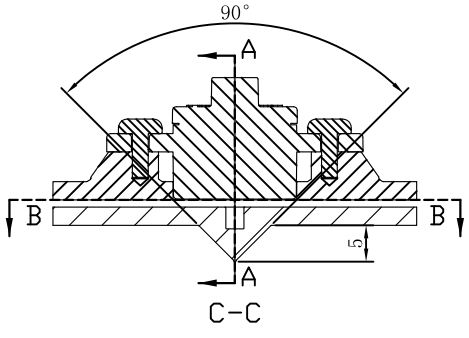
1 2 3 4 5 6

A



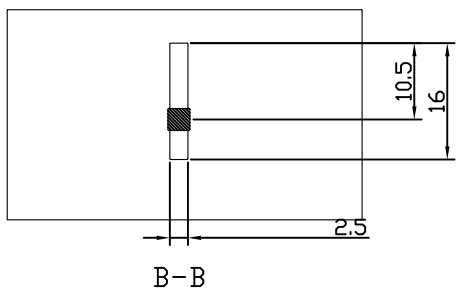
A

B



B

C



C

D

D

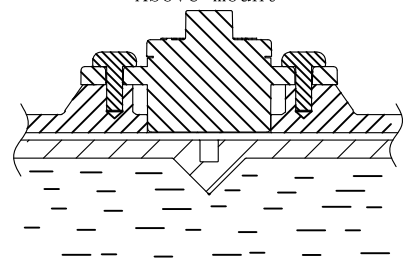
- 1、防縮水槽: shrinkproof water channel
- 2、水箱壁: water tank wall
- 3、磁鐵: magnet
- 4、稜鏡: prism

传感器与磁鐵测试距离 ≤ 5mm  
 Test distance between sensor and magnet ≤ 5mm  
 磁鐵量產範圍 ≥ 350mT  
 Magnet volume production range ≥ 350mT  
 磁鐵建議尺寸: φ4\*3mm  
 Recommended magnet size: φ4\*3mm  
 鈹鐵硼磁鐵: Conventional Rubidium Iron Boron (Nd2Fe14B)

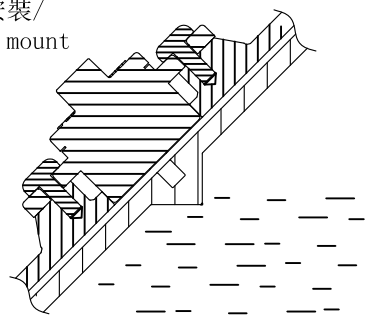
E

E

上置安裝/  
Above mount



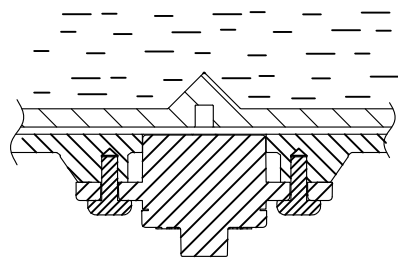
斜置安裝/  
Slope mount



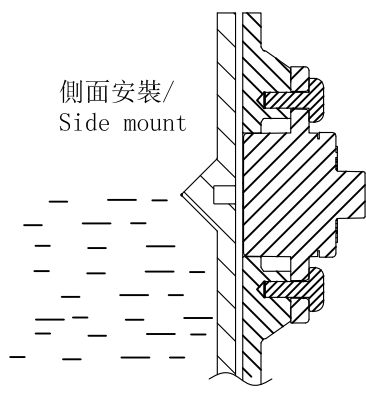
F

F

下置安裝/  
Bottom mount





側面安裝/  
Side mount



G

G

設計 Designer	Chen	材料 Material	*	單位 Unit	mm	 能點科技有限公司 EPT technology co., LTD			
檢查 Checked	Chen	表面處理 Finish	*	比例 Scale	*				
審批 Approver	Wei	數量 Quantity	*	篇幅 Size	A4	產品名 Product Name	A1MF-A	日期 Date	21-03-17
一般公差 Tolerances	0-10	±0.10	0.8	備註 Remarks	*	頁面內容 Page content	產品安裝示意圖	版本 REV	F
	10-35	±0.15		視圖 View		圖號 DWG NO.	*	頁數 Pages NO.	2/2
35-70	±0.20								

1 2 3 4 5 6

H

H