JENCO®
VisionPlus

9010M使用说明书

溶解氧测定仪

沪制02270148号

9010M

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概述

感谢您选购9010M。9010M是一台测量溶解氧及温度的精密仪器，内建的微处理器，计算和补偿所有与溶解氧和温度有关的测量数据。

本仪器拥有防水的外壳，机械式的按键提供高可信任度，高触觉及声响告知等功能，使用单一9V的干电池为电源，校正数据永久储存在EEPROM内存中，下次使用时不需再次校正。

此仪器使用大型的LCD，可显示具有温度补偿的溶氧值及相关的指示。即使在校正或测量程序下，也会提供使用者各种提示。

9010M具有50组测量数据的记忆功能，可以通过回叫界面轻松的查询所存储的测量数据。存储的数据也可通过清除界面选择全部删除还是单一删除。

9010M专配一支原电池式溶氧电极：LD-900-11,此溶氧电极内置一温度传感器，可以自动感测温度。9010M还包含自动切换测试量程、自动温度补偿、超长电池寿命以及50/60HZ交流噪声排除能力，此仪器适合在野外和实验室。

产品检视

小心地打开包装，检视仪器及配件是否有因运输而损坏，如有发现，请立即通知 JENCO 的代理。

防水外壳

9010M具有防水外壳但不可在水中使用(因溶解氧电极与仪器连接处不具防水功能）。这个防水特性可避免仪器因为不小心掉入非腐蚀性溶液中而造成的损坏。若仪器不小心掉入溶液中时，请立即做以下步骤处理：

（1） 用蒸馏水小心的清洗仪器，在清洗及晒干后，须将连接器内的污物清理干净，否则会影响电极的连接。

（2） 再重新使用之前须确定仪器及电极已晒干。

（3） 若完成上述步骤仍无法使用，请联络JENCO的代理商。(请参考“质量保证”章节）

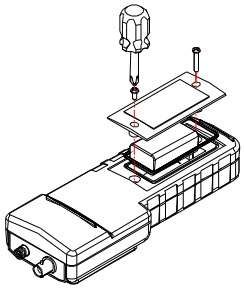
电池的更换

当LCD上的“BAT”闪烁时，表示电力不足，大概可再使用1小时即需更换新电池，更换电池步骤如下：

1. 使用螺丝起子取出两颗螺丝，即可取下电池盖。（请参考图一）

2. 取出9V旧电池并装上新电池，更换时，请注意电池极性放置要正确。

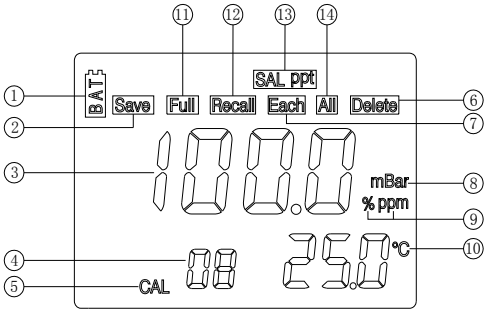
3. 放回防水圈和电池盖，并将刚取出的两个螺丝锁紧即可。



图一：电池安装图

显示及按键功能

A. 显示



图二： LCD 显示

1. **BAT-** 表示需更换电池信号。	8. **mBar-** 在校正模式提示使用者在压力参数的设定界面。
2. **Save-** 表示存储当前的测量值。	9. **%/ppm-** 表示溶解氧单位。
3. **MAIN DISPLAY-** 显示溶氧值.	10. 显示温度及其温度单位。
4. 显示存储数据位置。	11. **Full-** 表示存储值已满 50 组，需要删除才能再次存入。
5. **CAL-** 表示进入校正模式。	12. **Recall-** 表示进入回叫模式，可回叫存储的数据记录。
6. **Delete-** 表示进入清除模式，可清除存储的数据记录。	13. **SAL ppt-** 在校正模式提示使用者在盐度参数的设定界面。
7. **Each-** 表示选择了单个清除功能，存储数据将单个单个的被清除。	14. **All-** 表示选择了全部清除功能，存储数据将一次性全部清除。

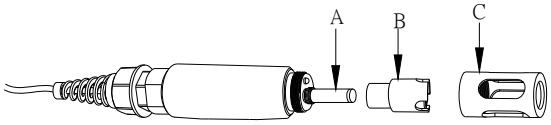
B. 按键

ON OFF	**ON/OFF-** 开关键。按住开关键打开或关闭主机。
MODE	**MODE-** 选择键。 选择仪器的显示模式。连续按此键，显示的顺序为“溶解氧--%”、“溶解氧—ppm(mg/L)” “Recall(回叫)”和“Delete（清除）”四个模式。 校正模式下，按此键退出校正模式。 在校正“Recall”和“Delete”模式，按此键可以退出此两个模式。

∧ ∨	**UP/DOWN-** 上键和下键在校正状态下起增加、减少需变动的设置项目值。在测试状态不起作用。 在“Recall”模式，按上键和下键可以翻看存储的数据记录。 在“Delete”模式，按上键和下键可选择删除的方式 “Delete Each”或者“Delete All”；在“Delete Each”删除方式中，按此两键可以选择需删除的存储的数据记录。
CAL	**CAL-** 按此键进入校正状态。
ENTER	**ENTER-** 在校正状态按此键，把当前的设定值存储到微处理中。 在测量状态下，按此键一次，机器将存储此时界面的显示值并记录相对应的位置号。9010M 可存储 50 组数据。 在“回叫”模式，按此键一次，机器将显示最后一个存储的数据。 在“清除”模式，按此键一次，机器将进入清除方式：“Delete All”和“Delete Each”选择，按上键下键进行选择。在“Delete All”界面，再按此键一次，机器将删除所有存储的数据。在“Delete Each”界面，再按此键一次，机器将进入删除单个存储数据的界面，此时，可以按上键和下键，选择需要删除的数据，按此键确认，机器将删除此位置号的存储数据，同时，由后一存储数据代替此位置号的存储数据。

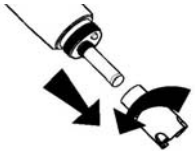
操作步骤

A. 电极准备

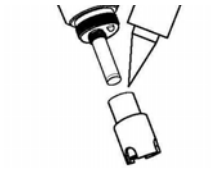


(A) 电极头　　(B) 电极膜头　　(C) 电极膜头保护帽

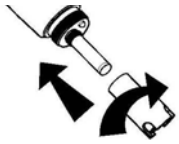
1. 旋下电极膜头保护帽。



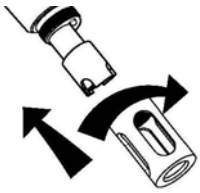
2. 旋下电极膜头。



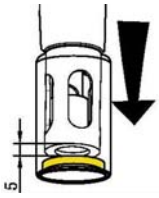
3. 加电解液到电极膜头内。



4. 旋上电极膜头。用蒸馏水清洗电极并吸干电极膜头上的水珠。



5. 旋上电极膜头保护帽。



6.滴 5~6 滴的蒸馏水到校正瓶的海绵上，让海绵湿润。电极插入校正瓶，保证电极膜片离湿润海绵有5mm 的距离，垂直放置。

B. 溶解氧校正

9010M在校正瓶内做校正，校正过程简单、快速。

1. 连接溶解氧电极LD-900-11到主机的输入端口，然后按开关键开机。

2. 把准备好的电极及电极瓶垂直放置，按“MODE” 键选择到“溶解氧--%”模式。

3. 等待温度及溶氧值稳定后，按“CAL”键进入“校正”模式，此时“CAL” 的字体将显示在界面上，主显示会显示“1013 mBar”(出厂定值)，整机提示输入当地的大气压力。

4. 按“上键”和 “下键”可增加和减少大气压力值（调整范围：600~1100 mBar），按“ENTER” 键确认，机器将存储此大气压力值并进入下一个校正界面：空气中饱和氧（100%）的设定。如果此时按“MODE”键，机器不存储调整过的大气压力值，还是计算上次存储的大气压力值，并进入下一个校正界面：空气中饱和氧（100%）的设定。

5. 在此界面中，用户将看到次显示100%的饱和氧校正值，等主显示数值稳定后，请按“ENTER” 键，此时整机将存储次显示的100%的饱和氧校正值并进入下一个校正界面：盐度的设定。如果此时按“MODE”键，机器不存储100%的饱和氧校正值，还是计算上次存储的100%的饱和氧校正值，并进入下一个校正界面：盐度的设定。

6. 盐度的出厂值设定为0.0 ppt，调整此出厂值请按按“上键”和“下键”，调整范围是：0 ~ 40 ppt，按“ENTER” 键，此时整机将存储此设定值并直接进入测量模式。此时整机校正已完成。如果按“MODE”键，机器不存储此盐度值，还是计算上次存储的盐度值，并直接进入测量模式。

C. 溶解氧测量

1. 按“MODE”键选择“溶解氧--%”或“溶解氧—ppm(mg/L)”模式。

2. 把溶氧电极用蒸馏水清洗后放入被测溶液中，被测溶液要不断的搅动（被测溶液的流动速度约为每秒一英尺，可用磁力搅拌机搅拌）。

3. 待读值稳定后，即为被测溶液的溶氧值。

D. 存储、回叫和清除数据

a. 存储数据。

1. 在“溶解氧--%”和“溶解氧—ppm(mg/L)”模式，按“CLEAR/ENTER”键一次，机器将存储当前数据值。此时“Save”显示将显示一次，并且有一位置号也同时显示，表示当前界面值已被存储并做了此位置号的记录。

2. 如果界面上显示“Full”，则代表机器的50组数据已存储满了，不能再存储其他数据。使用者只能删除或删除部分数据才能存储新的数据。

b. 回叫存储数据。

1. 按“MODE”键进入回叫模式，按“CLEAR/ENTER”键，机器将显示最后一组存储数据。

2. 此时按上键或下键选择位置号，找到自己需要读取的存储数据。.

3. 读取完存储数据后可按“MODE”键退出回叫模式。

c. 清除存储数据。

1. 按“MODE”键进入清除模式，按“CLEAR/ENTER”键，机器将进入清除方式的选择，可按上键或下键在“Delete All”和“Delete Each”之间选择。

2. 在“Delete All”界面，按此键一次，机器将删除所有存储的数据，并显示None，表示没有存储数据。

3. 在“Delete Each”界面，按此键一次，机器将进入删除单个存储数据的界面，此时，可以按上键和下键选择需要删除的位置号，按此键确认，机器将删除此位置号的存储数据，同时，此位置号的存储数据将由下一个位置号的存储数据所代替。
   例如：01,100.0%,25℃;
   02,7.65ppm,23.8℃;
   03,5.43ppm,15.6℃;
   …
   如果清除了02位置号的存储数据，则机器存储数据变为：
   01,100.0%,25℃;
   02,5.43ppm,15.6℃;
   …

4. 清除完数据后可按“MODE”键退出清除模式。

错误显示及原因

主显示	可能的原因
“OvEr”or“Undr”	1. 检查膜片及电解液。 2. 清洗电极的阳极和阴极。
次显示	可能的原因
“Udr”	1. 被测溶液温度低于-6.0℃.
“Ovr”	1. 被测溶液温度高于46.0℃.

[注意：如果机器仍然不能正常工作，请联系 Jenco 的服务部门。]

规格

显示	测量范围	分辨率	精确度
溶氧值ppm (mg/L)	0~20.00ppm (mg/L)	0.01ppm(mg/L)	±0.5%FS
溶氧值%	0~200.0 %	0.1%	±0.5%FS
温度	-6.0~46.0° C	0.1° C	±0.3° C±1个字

压力补偿	600 ~ 1100mBar (450 ~ 825mmHg)
盐度补偿	0.0 ~ 40.0ppt
温度探棒	热敏电阻,10 kΩ （25° C）
电源	9V电池
校正数据存储	EEPROM
测量数据存储	50组
自动关机功能	未做任何操作，45分钟后自动关机。
音效回馈	所有按键
显示（溶氧值：温度）	12mm ： 8mm 字高 LCD
环境温度	0 ~ 50 ° C
相对湿度	90%以下
外壳	IP65
尺寸（长 x 宽 x 高）	70mm x 198mm x 37mm
重量	260g（包含电池）

质量保证

仪器保修一年（以购买日为准）。在保修期内如有质量问题，本公司将无偿代为修复；如有人为因素造成故障或损坏，本公司竭诚代为修复，但需酬收工本费（配件如电极头、标准液等消耗品不在保证范围内）。在将本机退回本公司时，请用包装材料妥为包好，以避免运输途中碰伤。无论何种情况，在退回本机前，请先与本公司联系，并得到本公司认可，方可退回本机。

JENCO（中国)公司:上海任氏电子有限公司
地址:上海市松江区泗泾镇望东中路18号
邮编:201601
电话:57619600,57619008
传真:57619240

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GENERAL INTRODUCTION

Thank you for selecting the 9010M meter. The 9010M is a precision tool that measure dissolved oxygen in % and ppm (mg/L) and temperature. A built-in microprocessor stores, calculates and compensates for all parameters related to DO determinations including DO electrode temperature characteristics.

This unit has a waterproof IP65 case. The touch mode keys are highly reliable with tactile and audio feedback. This meter can operate with one 9V battery. Re-calibration is not required when power is turned on again.

The front of the meter has a large LCD that displays DO % or ppm, and temperature simultaneously along with user prompts and mode indicators. The unit prompts the user through calibration and measurement procedures.

The 9010M uses a galvanic electrode with convenient screw-on cap membranes. The LD-900-11 field probe comes with a built-in temperature sensor for automatic temperature compensation.

The unit is also equipped with a non-volatile memory allowing the user to store 50 different sets of readings. This unit will assign a site number for each set of reading, so the user can review the data easily.

Other features include long battery life and 50/60Hz AC noise rejection. This meter is user-friendly for field, industrial and laboratory applications.

INITIAL INSPECTION

Carefully unpack the unit and accessories. Inspect for damages made in shipment. If any damage is found, notify your **Jenco** representative immediately. All packing materials should be saved until satisfactory operation is confirmed.

WATER PROOF

Though the 9010M meter is housed in a watertight case, **DO NOT** use it underwater. The watertight case prevents permanent damage to the unit if accidentally dropped into non-corrosive solutions.

Follow these steps immediately if the unit is immersed in any solution:

1. Rinse unit carefully with distilled water. After rinsing and drying, inspect and clean connectors to remove all contaminants that

may affect probe connections.

2. Wait for the unit and probe to dry completely before resuming operation.

3. If the unit does not function correctly after steps1 and 2, call JENCO for possible repair or replacement (see Warranty).

INSTALLING THE BATTERIES

The 9010M meter is packaged with one 9V battery required for operation. To insert the batteries into the meter, follow the procedure outlined below.

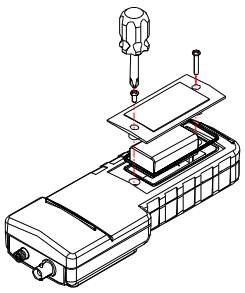


Figure 1: Battery compartment

1. Use a screw driver to remove the two screws and battery cover to expose the battery compartment. (Figure 1.)

2. Replace the 9V battery.

3. Replace the battery cover and make sure to secure the two screws for the water-tight feature.

[**Note:** Press the “ON/OFF” key to turn the unit on. If the unit is running then you can press the ”ON/OFF “ key to turn the unit off. The unit will automatically turn off after 45 minutes of no key activity.]

DISPLAY & KEYS FUNCTIONS

A. Display

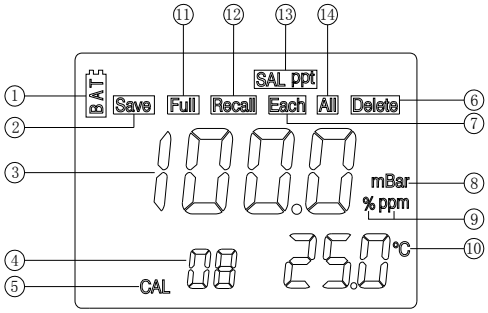


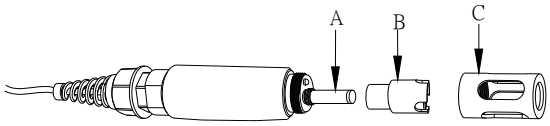
Figure 2: Active LCD screen

1. **BAT-** Low battery indicator.	8. **mBar-** Display during calibration to prompt user for barometric pressure.
2. **Save-** To save a reading into the data storage.	9. **%/ppm-** Unit indicators.
3. **MAIN DISPLAY-** Main display for DO dissolved oxygen values.	10. Temperature and unit display
4. Data storage site number.	11. **Full-** This will indicate that all 50 data storage sites are used up.
5. **CAL-** Calibration mode indicator	12. **Recall-** To recall data from the data storage.
6. **Delete-** To delete stored data.	13. **SAL ppt-** Displays during calibration when user is prompted for the approximate salinity of the sample in parts per thousand (ppt).
7. **Each-** To delete a single set of data from the data storage.	14. **All-** To delete all the data in the data storage.

B. Keys

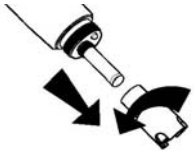
ON OFF	**ON/OFF-** Powers on and shuts off the meter.
MODE	**MODE-** Selects display mode. In normal operation, press this key to sequentially display Dissolved Oxygen in % air saturation, Dissolved Oxygen in ppm (mg/L), Recall and Delete interface. In calibration mode, press this key to exit the current calibration parameter and enter into the next one. In “Recall” and “Delete” modes, press this key to exit “Recall” and “Delete” modes respectively.
∧ ∨	**UP/DOWN-** Increases or decreases the display value as desired. In “Recall” mode, view saved data and data storage site number by pressing these keys. In “Delete” mode, press these keys to select between the “Delete Each” and “Delete All” mode. In “Delete Each” mode, view to be deleted data and data site numbers by pressing these keys.
CAL	**CAL-** In “Measurement” mode, press this key to enter into “Calibration” mode.
ENTER	**ENTER-** In “Calibration” mode, press this key to save the current parameter to memory. In “Measurement” mode, press this key to save reading into the next available data storage site. At the Recall interface, press this key to display the last set of saved data. At the Delete interface, press this key to go into “Delete” mode. In the “Delete All” mode, press this key to delete all saved data. In the “Delete Each” mode, press this key to delete a single set of data.

A. Probe Preparation

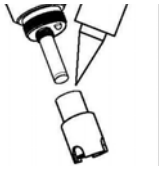


(A) Lead (B) Membrane Cap (C) Guard Cap

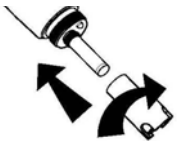
1. Remove the guard cap.



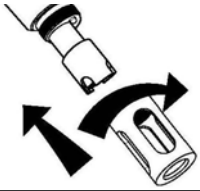
2. Remove the membrane cap.



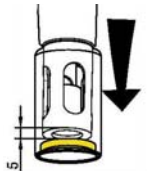
3. Fill solution into cover cap.



4. Twist the membrane cap back on to the probe. Rinse the probe well with distilled water, wipe the end of the probe dry.



5. Twist the guard cap back on to the probe.



6. Place 5~6 drops of clean water into the sponge inside the calibration bottle. Slide the probe into the calibration bottle. Be sure the membrane does not touch the sponge, at least 5mm space between the probe and the sponge.

B. Dissolved Oxygen Calibration

The 9010M can be calibrated quickly and easily in air.

1. Connect the DO probe LD-900G-1 to the unit and turn the unit on.

2. Hold the probe in the air gently with the sensor facing down and press “MODE” key to select “Dissolved Oxygen in %” mode.

3. Wait 10 to 15 minutes for the dissolved oxygen and temperature reading to stabilize, press the “CAL” key to enter the “Calibration” mode. The “CAL” icon appears on the LCD. The main screen will display “1013mBar” (factory default value). The meter is now ready for atmospheric pressure calibration.

4. To change the pressure factor, use the “UP” and “DOWN” keys to adjust the value between 600 and 1100mBar. Press “ENTER” key to save the new value and the unit will automatically go into the next calibration parameter which is the value of 100% saturation in air. If “MODE” key is pressed instead of the “ENTER” key, any changes made will be cancelled and the previous calibration settings will be retained.

5. In this interface, the user can views the calibration value in the secondary display. Once the value in the main display stabilizes, press “ENTER” key to save the new value and the unit will automatically go into the salinity compensation parameter. If “MODE” key is pressed instead of the “ENTER” key, any changes made will be cancelled and the previous calibration settings will be retained.

6. The salinity default factor value is 0.0 ppt. To change the salinity compensation factor, use the “UP” and “DOWN” keys to adjust the value between 0 and 40 ppt. Press “ENTER” key to save the new value and the unit will automatically switch to “Measurement” mode. Calibration is now complete. If “MODE” key is pressed instead of the “ENTER” key, any changes

made will be cancelled and the previous calibration settings will be retained and will automatically switch to “Measurement” mode.

C. Dissolved Oxygen Measurements

Press “MODE” key to choose the dissolved oxygen in % mode or dissolved oxygen in ppm mode. Rinse the DO probe with distilled water and immerse it in the sample to be measured.

D. Save, Recall and Delete Data

a. Saving readings to memory.

1. In “Measurement” mode, press the “ENTER” key to save data. The “Save” icon with the corresponding site number will lit up for a brief moment to indicate a successful data save.

2. If the “Full” icon is displayed, this means that all 50 data saving sites are used up. No new data can be saved until existing saved data are deleted.

b. Recalling readings from memory.

1. To recall saved data, press “ENTER” key at the Recall interface to go into “Recall” mode.

2. Press the “UP” or “DOWN” keys to select the storage site number.

3. Press “MODE” key to exit “Recall” mode.

c. Deleting data.

1. Press the “ENTER” key at the Delete interface to go into “Delete” mode.

2. Select “Delete All” or “Delete Each” mode by pressing the “UP” or “DOWN” key.

3. In the “Delete all” mode, press “ENTER” key to clear all stored data. Deletion is now complete.

4. In the “Delete Each” mode, use “UP” and “DOWN” key to select data to be deleted. Then press “ENTER” key to delete. Deletion is now complete. The next set of saved data will automatically move up a slot in the storage site.

5. Press “MODE” key to exit “Delete” mode.

ERROR DISPLAYS AND TROUBLESHOOTING

Main Display	Possible Cause(s)
“OvEr” or Undr	1. Check membrane and electrolyte solution. 2. Clean anode and cathode.
Secondary Display	**Possible Cause(s)**
"Udr"	1. Heat the sample to above -6.0℃.
“Ovr”	1. Cool the sample to below 46.0℃.

[Note: If the meter still does not perform normally after the above measures are taken, call **Jenco** Service Department.**]**

SPECIFICATIONS

Display	Range	Resolution	Accuracy
Dissolved Oxygen ppm (mg/L)	0 to 20.00 ppm (mg/L)	0.01 ppm (mg/L)	±0.5FS
Dissolved Oxygen %	0 to 200.0 %	0.1%	±0.5FS
Temperature	-6.0 to 46.0 °C	0.1 °C	±0.3°C±1 digit

Pressure compensation	600 to 1100 mBar (450 to 825 mmHg)
Salinity compensation	0.0 to 40.0 ppt
Temperature sensor	Thermistor, 10 kΩ at 25°C
Power	9Volt battery
Calibration Back-up	EEPROM
Datalogging capabilities	50 data sets
Automatic shut off function	45 minutes of non-use
Audio Feedback	All Touch Keys
Display (pH / mV : Temp)	12mm : 8mm high LCD
Ambient Temperature Range	0 to 50 °C
Relative Humidity	At 90% RH
Case	IP65 waterproof
Dimensions (W x D x H)	70mm x 198mm x 37mm
Weight	260 grams (Batteries included)

WARRANTY

Jenco warrants this product to be free from significant deviations in material and workmanship for a period of 1 year from date of purchase. If repair or adjustment is necessary and has not been the result of abuse or misuse, within the year period, please return-freight-prepaid and the correction of the defect will be made free of charge. If you purchased the item from our **Jenco** distributors and it is under warranty, please contact them to notify us of the situation. **Jenco** Service Department alone will determine if the product problem is due to deviations or customer misuse.

Out-of-warranty products will be repaired on a charge basis.

RETURN OF ITEMS

Authorization must be obtained from one of our representatives before returning items for any reason. When applying for authorization, have the model and serial number handy, including data regarding the reason for return. For your protection, items must be carefully packed to prevent damage in shipment and insured against possible damage or loss. **Jenco** will not be responsible for damage resulting from careless or insufficient packing. A fee will be charged on all authorized returns.

NOTE: Jenco reserves the right to make improvements in design, construction and appearance of our products without notice.

Jenco Instruments, Inc.
7968 Arjons Drive, Suite C
San Diego, CA 92126 USA
TEL: 858-578-2828
FAX: 858-578-2886
E-Mail: jencoinfo@jencoi.com; sales@jencoi.com
Website: www.jencoi.com

Jenco Electronics Inc.
1F., NO. 11, Lane 370, Sec. 6, Zhongxiao E. Rd. Nangang Dist.,
Taipei, Taiwan
TEL: 886-2-2782-3226
FAX: 886-2-2782-3234

Shanghai Jenco Instruments, Ltd.
18 Wang Dong Zhong Road
Sijing Town, Songjiang
Shanghai, China
TEL: 86-021-5761-9599
FAX: 86-021-5761-9598
E-Mail: jencos@jenco.com.cn
Website: www.jenco.com.cn