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**RM-33**

**Rinse Water Control System**

**User Guide**

清洗水控制系统

用户手册

2012年6月



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## Section 1 第一章

### Introduction简介

The RM-33 is a precision instrument that uses the latest contact-free electrodeless sensor technology to control the use of rinse water.

The control of rinse water gives the following important advantages:-

Lower, more consistent water usage and cost.

More consistent chemical concentration in tank outflow resulting in simpler water treatment process control.

Lower operator intervention needed to suit changing work patterns.

The RM-33 is a complete rinse water control system kit including everything required to control the rinse water in a single swill tank. The kit comes pre-wired and installation time has been reduced to a minimum.

A specially designed polypropylene encapsulated conductivity sensor is used to measure the concentration of chemical contamination in the rinse tank, and a rugged solenoid valve is used to regulate the flow of water.

The volume of rinse water flow is measured with an integrated digital flow meter.

The system uses low 24 volt power to operate the controller and solenoid valve, so that the maximum safety benefits can be gained from use in the plating environment.

RM-33 是采用最新无接触电极传感技术来控制清洗水的精密仪器。这个控制方式有以下几个优点：

- 1) 更连续的用水和低成本；
- 2) 使槽内药液更能连续流出，致使水处理控制过程更为简便；
- 3) 更少操作干预，适用于变化的工作模式；
- 4) RM-33是一个完整的清洗水控制系统工具包含一个独立冲洗槽所需的一切。这工具使得预接线和安装时间降到最少；
- 5) 配有一个特别的聚炳烯封装导电传感装置用于测量清洗槽的药液浓度，同时配置电磁阀用于调整水流；
- 6) 配有集成数字流量计以测量清洗水的流量；
- 7) 这系统采用低压24V以操控控制器和电磁阀，以便提高电镀环境的安全性。

## Section 2 第二章

### Principles of rinse water control using conductivity FAQs

#### 清洗水控制导电原理：常见问题

##### 2.1 What is conductivity? 什么是导电率

The conductivity of a liquid is a measure of its ability to conduct an electric current from one point to another. In liquids this current flow is made possible by positively and negatively charged ions, cations (+) and anions (-) respectively. When the liquid conducts a current the ions move to the oppositely charged regions in the liquid, so the anions flow to the anode (+) and the cations flow to the cathode (-). This is the basis of electrolytic conduction, the greater the number of ions present, the greater the conductivity of the liquid. The two main techniques for measuring conductivity are contacting sensors (electrode) and non-contacting sensors sometimes known as electrodeless or toroidal.

液体的导电率是一个测量其把电流从一个点传导致另一点的能力。在液体中，电流由正负两荷离子构成，阳离子 (+) 和阴离子 (-)。当液体传导电流时，离子移动到在液体中的带相反电荷的区域，以致使阴离子流向阳极 (+) 和阳离子流向阴极 (-)。这就是电解导电的基础，离子数量越大，液体中的导电率越大。两种主要测量导电率的方法是接触式传感器和非接触式传感器，亦被称作无电极和环状。

##### 2.2 How does an electrodeless sensor work? 无电极传感器如何工作

Electrodeless, conductivity measurement does not require any electrode contact with the liquid being measured. Instead, a pair of wire-wound toroidal cores encapsulated in a protective body act as the sensor.

One toroid is driven with a constant voltage which generates a magnetic field in the liquid. In turn the current induced by this magnetic field in the liquid magnetically couples with the second toroid to produce a current. This current induced in the second toroid's windings is in direct proportion to the amount of magnetic coupling, and so varies proportionally to the conductivity of the solution. This current is amplified, and gives an output of conductivity in the solution being measured.

无电极传感器，导电率的测量并不需要电极接触待测量的液体。而是用一对绕线环形磁芯作为传感器封装在保护体中。

一个磁环是由恒定电压驱动的，这个恒定的电压在液体中产生磁场。相反地，液体中由磁场所牵引的电流与第二个磁环藕合产生一个电流。这个由第二个磁线圈所牵引的电流是与磁藕合的数量成正比，因此，该电流与溶液的导电率成比例变化。该电流增强致使溶液中导电率的输出可测量。

##### 2.3 Temperature Compensation 温度补偿

A characteristic of conductive liquids is that as their temperature increases so does their conductivity. The conductivity measured at a certain temperature therefore has to be compensated for so all readings for different liquids can be compared at a fixed temperature. The RM-33 conductivity sensor actually contains signal processing electronics which carry out temperature compensation, ensuring very accurate conductivity measurement with variations in water temperature.

一个导电液体的特性是其温度上升其导电率上升。一定的温度测得的导电率必然被补偿，因而不同液体的读数可与一个固定温度作比较。RM-33的导电传感器实际上包含一个信号处理电子

元件，该元件带有温度补偿，以确保在水温变化中取得一个精确的导电率测量值。

#### **2.4 What are the units of conductivity? 导电性的单位是什么？**

Conductivity of water is expressed in the inverse of resistance, and the units are Siemens. One Siemen represents a very conductive solution and is not usually experienced in most situations, so a smaller unit is used, the micro-Siemen.

There are 1000,000 uS to 1 Siemen.

水的导电率以电阻的倒数表示，其单位是欧姆。

一个欧姆代表一个导电性强的溶液，但通常情况都不适用，因而一个更小的单位会被使用，这单位是微欧姆。

1000,000 uS 等于1 Siemen。

#### **2.5 How conductive is water? 水的导电性如何？**

Distilled water and de-ionised water have low conductivity. The conductivity of water purified in this way is about 2-5uS.

蒸馏水和去离子水都有低导电率。以此方式纯化的水，其导电率约为2-2.5uS。

#### **2.6 What is the conductivity of my water supply? 我们供水的导电性是多少？**

The baseline conductivity of the water supply varies from area to area, and there is also a small variation over time dependent on the amount of dissolved solids in the water supply.

This conductivity is usually in the region of 100 to 700 uS.

此种供水导电率的基线随区域变化，也随时间推移因溶解固体数量变化而有轻微改变。该导电率通常在100-700uS的范围。

#### **2.7 How can I measure the baseline conductivity of my water supply?要如何测量供水的基线导电性？**

Baseline conductivity of the water supply can be measured with our new compact electrodeless conductivity meter – the Stick Meter 5JI. It is ideally suited for this purpose and is specifically designed for on-site dipping into water supply and rinse tanks giving precise conductivity measurements.

The meter used to measure baseline conductivity must be recently calibrated as otherwise it may give false reading which will cause problems.

供水的基线导电性可用我们的新型紧凑型电极电导率仪（即the Stick Meter 5JI）来测量。这能理想地测量供水基线导电性，并且专门为在现场测量而设计，只需直接浸于供水和清洗槽中便能精确测量导电率。



Fig 2.7 – Stick Meter 5JI. 图-2.7

Another way of measuring the baseline conductivity is to fill the rinse tank with clean water and take a reading from the RM-33 in the mode.

When measuring the baseline conductivity, it is essential to ensure that the tank is fairly clean of deposits and chemicals, as this value will be needed for the correct setting of the control set-point.

另一个方式去测量基线导电率是在清洗槽内加满清水，然而从RM-33中用该模式直接读数。测量基线导电率时，必须确保槽中沉积物和化学品都已清除，因为这个值影响到正确控制设定点的设置。

## 2.8 How does this apply to the regulation of rinse water in my rinse tank? 这如何应用于清洗槽内调节清洗水?

When work parts enter a rinse tank, they carry in chemicals from a previous process, and this carry in of chemicals causes the conductivity of the water to rise in proportion to the strength of the ionic solution formed.

**The RM-33 monitors the conductivity of the rinse water, and opens the water control valve into the rinse tank when a preset level of conductivity is reached.**

The set-point will be determined by the type of process and the level of rinse water purity that is required. Factors to consider are staining, discoloration, rusting, or contamination of following processes.

当工件进入清洗槽，工件上带着前工序的药液，这些药液会导致水的导电率与离子溶液强度成正比提升。RM-33监控清洗水的导电率，和当达到一个预设的导电水平，它就开启清洗槽的水控制阀。该设置点会取决于程序的类型和清洗水的纯度。

## 2.9 What should I use as an initial setting for the RM-33? 我该如何应用RM-33的初始设置。

Section 5 gives details of how to set up the RM-33.

第五章详细介绍该如何设置RM-33。

## Section 3 第三章

### Installing the RM-33 RM-33的安装

#### 3.1) Fitting Conductivity Sensor in rinse tank清洗槽内安装导电率传感器:

##### Step 1) Positioning Sensor & rinse tank considerations:

第一步，放置传感器和清洗槽注意事项：

The correct positioning of the sensor is critical to ensure the optimal performance from your system. In a counter-flow system the sensor goes in the clean final swill. The sensor should be positioned by the tank outflow or, in the case of a counter-flow system, by the weir into the dirty swill.

Depending on your tank design, this is usually in the corner diagonally opposite the water feed, as shown in the diagram below. A sensor position on the same side of the tank as the outflow, and the opposite side to the water entry is acceptable.

传感器的正确位置是要确保系统达最佳性能。在一个逆流系统，传感器进入最终干净的冲洗水中。传感器应根据槽的外流作定位，或在一个逆流系统的状态下，依据脏冲洗水的堰口定位。

依槽的设计，通常在对角的位置放至供水口（如下图所示）。传感器的位置将与外流的位置一致，且与进水位置相反。

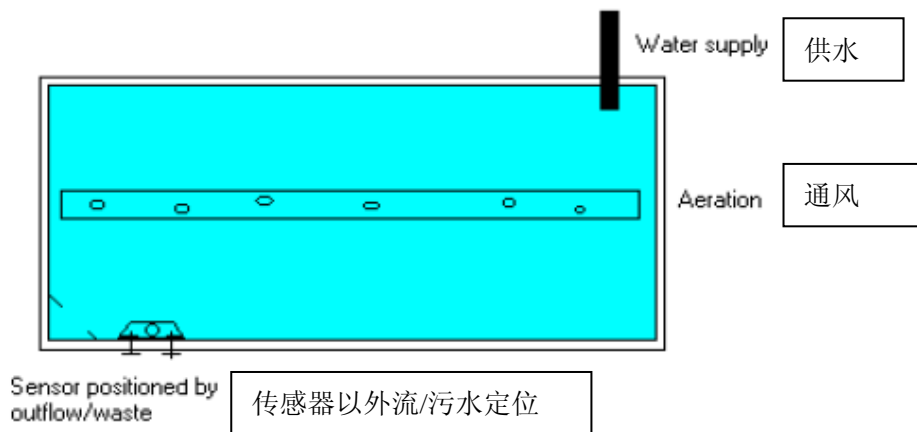


Fig 3.1a – Typical tank layout. 典型槽布局

It is important that the sensor is *not* next to the water supply to the tank as this will dilute the reading, and cause the water control valve to cycle needlessly.

The tank sensor comes with 5m of cable to connect to the control unit. Extension cables in 5m and 10m lengths are available if necessary, depending on where the control unit is to be mounted.

必须注意传感器不能放在槽的供水旁，因为这会影响读数，并使得水控制阀在不必要的情况下运转。

槽的传感器配有5米电线以连接控制单元。如需要的情况下可配更长一些的线，5米至10米为宜，具体长度取决于控制单元的位置。

#### Water supply pipe 供水管

It is good practice to direct the water supply pipe back towards the edge of the tank so that water is forced to mix as much as possible before exiting the tank. This can be achieved by fitting an elbow on the end of the inlet pipe. A baffle can be used to achieve the same result.

供水管最好能引至背向槽沿处，以便水在退出槽前能被充分混合。把弯头放在进水管的端部便可达到这种效果，采用导流板的方式同样能达到这种效果。

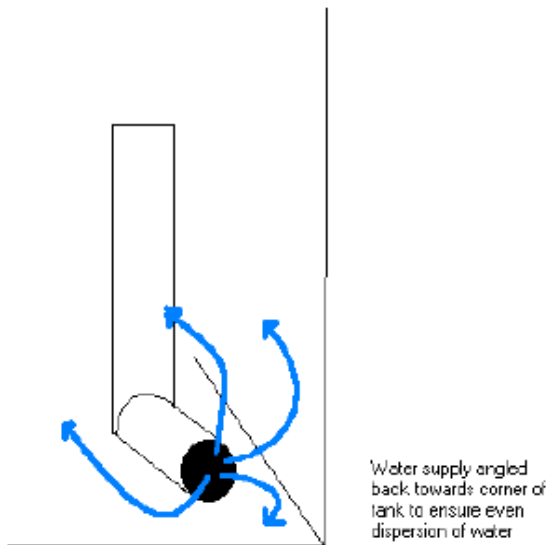


Fig 3.1b – directing water feed pipe. 图3.1—引导供水管

### Step 2) Mounting the conductivity sensor to the tank 安装导电率传感器在槽中

The sensor clamps to the side of the tank – tighten the screw so that the sensor is held firmly in place. 传感器夹在槽边——修紧螺丝以固定传感器。

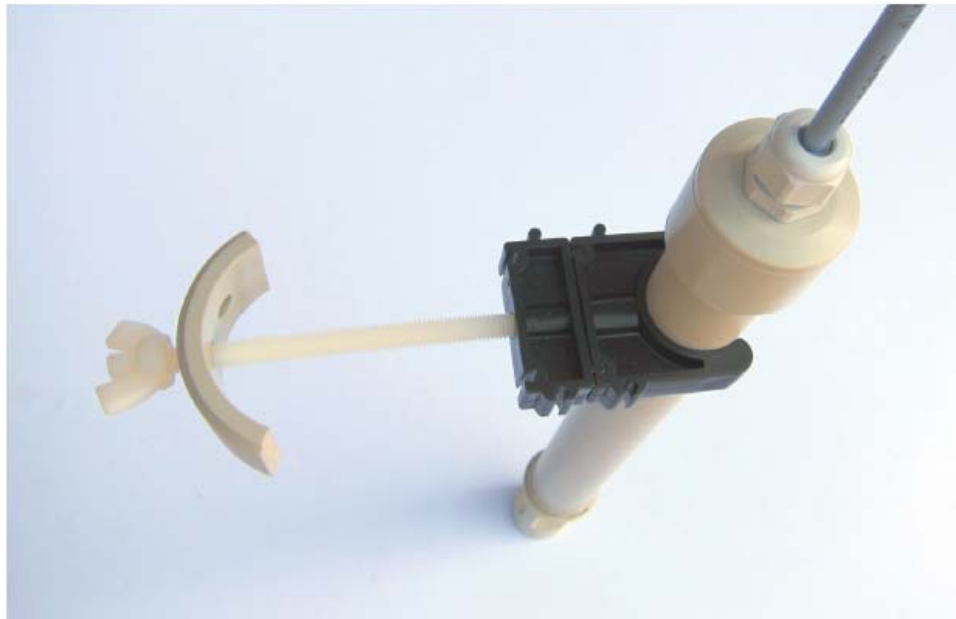


Fig 3.1c – tank conductivity sensor clamp. 槽内传感器夹

It is possible to add a rubber gasket that goes between the clamp plate and the tank side for increased grip.

为了增加拉力在夹板和槽沿之间加上橡胶垫圈。

### Adjusting sensor submersion depth 调整传感器的潜水深度

The sensor head up to the welding joint must be completely submerged in water as shown in picture below. The position of sensor mounting clamp can be adjusted by moving the clamp



up and down the sensor tube until desired level of submersion is achieved.

如下图所示，该传感器头的焊接接头必须完全浸没在水中。传感器安装夹的位置可通过上下移动传感器管来调节，直至浸没至所需水位为止。



Fig 3.1d – lowest possible sensor submersion depth in rinse water.传感器可接受清洗水最低浸没深度

### 3.2) Installing Water Control Valve & Flow Meter Module. 安装水控制阀和流量计模块



Fig 3.2a – water control valve & flow meter module. 水控制阀和流量计模块

The RM-33 has a pre-assembled water control valve and integrated flow meter module.  
RM-33配有预装的水控制阀和集成的流量计模块。

### **Connecting to pipe work:连接管工作**

The module is terminated at either end with plain 25mm PVC socket unions for insertion into the water feed pipe work.

**IMPORTANT:** Ensure that you fit the solenoid and flow meter in the correct water flow direction (marked by arrow on valve – see fig 3.b above). The preferable orientation of the valve is with the operating coil uppermost. Take care the excessive strain is not placed on the flow meter wire and that there is some slack in the wiring when in its final position.

Prepare the sockets first with an abrasive paper and ensure they are clean using a suitable solvent.

Apply a thin, even layer of glue to both the pipe and the solenoid adaptor and push both firmly together. It is important to ensure that solvent is not allowed to enter the valve body/flow meter assembly itself, otherwise damage may occur to the valve seating and sealing as well as to the flow meter bearings.

The module comes pre-wired to 5m of cable for connection to the control unit cabinet. Extension cables in 5m and 10m lengths are available if necessary depending on the mounting position of the control unit.

该模块的两处末端皆配25mm PVC套接口以便连接供水管。

**重要：** 确保把电磁阀和流量计安装在正确的水流方向下（见上图3.b 电磁阀的箭头方向）。电磁阀最好的方向是在作业线圈的最上面。留意别把流量计电线弄得太紧，需要为最终定位预留空间。

先备好插座以及砂纸并确保其经过适合的溶剂的处理。

采用薄胶水粘合管和电磁适配器，并使之粘牢。并确保溶液无法进入阀体/流量计，否则将损坏阀座和流量计轴承。

该模块配预装5米电线以连接控制单元柜。如需要可以增加电线长度，5至10为为宜，同时其长度取决于控制单元的位置。

### **IMPORTANT:**

**Remember to wait until the solvent adhesive is thoroughly hardened before pressurising the system.**

**The flow meter and valve assembly contain very small orifices which can be blocked by debris in the water system.**

**Ensure that the pipe system is flushed through before fitting the assembly.**

### **重要：**

切记要等到溶剂型粘合至彻底硬化后方向系统加压。

流量计和阀座包含一个非常小的孔。这小孔在水系统中可能会被污物堵塞。

在安装前，请确保管路系统被冲洗。

### 3.3) Installing the Control Unit 控制单元的安装

With the sensor fitted to the tank and the water control valve and flow meter module fitted in the water feed the next step is to install the control unit.

当传感器在槽中安装好，而控制阀与流量计模块也安装完成，下一步就是安装控制单元了。



Fig3.3a – the control unit. 控制单元

#### Mounting the control unit. 安装控制单元

Mount the control unit at a convenient wall position where it will not be subjected to direct spills of water or chemicals. The control unit has 3 mounting points, 2 at the lower corners and one on the upper rear of the case.

Drilling measurements are moulded on the rear of the case.

The cabinet should be positioned within reach of the water control valve module, the tank conductivity sensor and a mains supply. However if the cabinet has to be mounted further away than the 5m reach of the cables, 5m and 10m extension cables are available for both the water control valve/flow meter module and the tank sensor.

把控制单元安装在方便的墙上不会造成水和药液直接泄漏的位置。控制单元有三个安装点，两个在背面下角，一个在上角。

钻孔测量器装在盒子背后。

控制柜应装在够得着水控制阀、槽的导电传感器和电源的位置上。然而如果控制柜需要安在5米以外，需为水控制阀/流量计模块和槽的传感器备上5至10米的延长线。

#### Connections: 连接



Fig 3.3b – connections to the control unit. 连接控制单元

The water control valve/flow meter module plugs into the 6-pin socket, and the conductivity sensor plugs into the 4-pin socket as shown in picture above.

When plugging in the connectors line up the polarising keyways on the plug and socket, push gently in and then turn the locking ring gently clockwise to hold in place.

如上图所示，水控制阀/流量计模块接入6针插座，导电率传感器接入4针插座。  
接入连接器时，排列好插头和插座上的偏光键槽，轻轻推入，顺时针转动锁环以便锁紧固定。

### **Power Supply Connection 电源连接**

RM-33 system comes with universal switching power supply which is able to operate on both 110 volts and 240 volts mains voltages. The power supply is mounted in separate waterproof box and supplies 24 volts DC. The power cable has 3-pin female socket on one end and 3-pin male connector on another end. The female socket plugs into the controller while the male connector plugs into the power supply. The mains cable comes with 3-amp fused English mains plug by default, although other plugs may be fitted upon customer's request.

RM-33系统配有通用的开关电源，该电源能在110V 与240V下操作。该电源安装于独立的防水箱中，供应24V直流。电源线一端配有三针母插座，另一端配三针插入式连接器。母插座接入连接器而插入式连接器则接入电源中。默认的情况下，电源线配3安英国制造主插头，如客户有需要也可配其他插头。



**Fig3.3c – control unit's power supply with power cable 控制单元的电源以及电源线**

## Section 4第四章

### How the RM-33 operates如何操作RM-33

#### 4.1 The control panel控制面板:

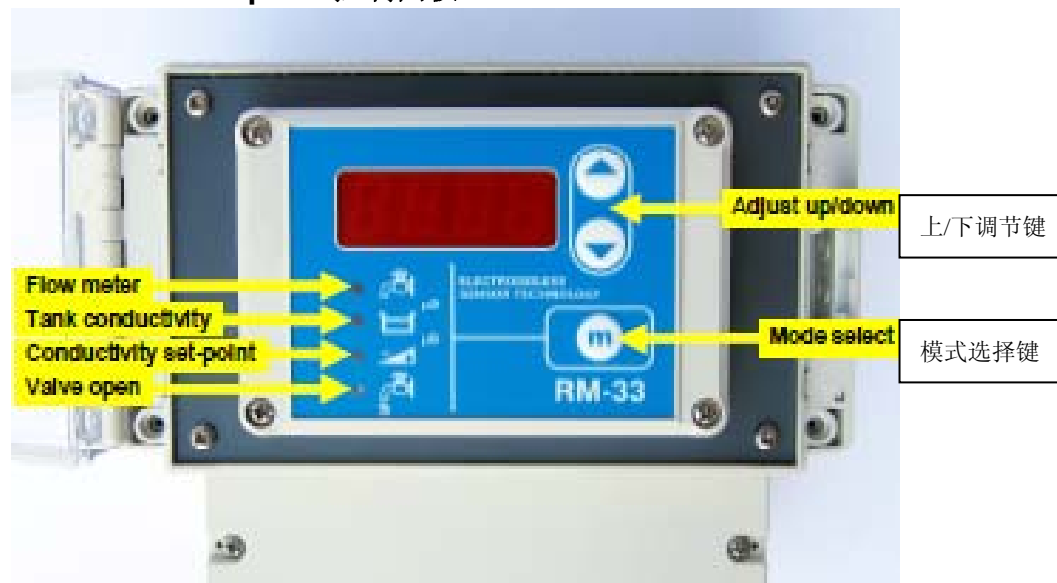


Fig 4.1a – RM-33 control panel. RM-33控制面板

In order to switch between display modes press the Mode select button – the selected mode will be indicated by a red LED. All values are displayed on the LCD display.

按模式选择键可切换显示模式——红色的LED会标示备选模式。

The display modes are as follows: 其显示的模式分别为



– **flow meter display mode.** The RM-33 has an integrated digital flow meter.

In this mode the amount of water used is displayed in cubic metres and litres.

流量计显示模式: RM-33有一个精确的数字流量计。在这种模式下,水量会以米和升显示。



– **tank conductivity display mode.** In this mode the conductivity of the rinse tank is displayed in  $\mu\text{S}$ .

槽导电率显示模式: 在这种模式下,清洗槽的导电率将以 $\mu\text{S}$ 单位显示。



– **set-point adjust mode.** In this mode the set-point conductivity value at which the water control valve starts dosing the rinse tank is determined.

设置点调节模式: 在这种模式下,设置点导电率值在水控制阀开始加药时就已确定。



– **solenoid open.** A blue led comes on whenever the conductivity is above the set-point to indicate that the water control valve is set to open. If the water valve has been shut for less than 10 seconds however, the LED will light, and the valve will open after a delay to prevent the valve from excessive wear.


电磁阀开启: 一旦电导率高于设定点,一个蓝色的LED灯就会亮起,以显示水控制阀设置开启。如果电磁阀被关闭少于10秒,LED会亮起,阀会在延时后开启以避免电磁阀过度磨损。


## 4.2 Viewing rinse tank conductivity:查看清洗槽导电率



To view the conductivity of the rinse water in the tank;

通过  查看槽内清洗水的导电率;

- Repeatedly press the Mode select button until the  LED lights up.

重复按模式选择键直至  LED灯亮起。


- The LCD display indicates the level of conductivity in the tank in  $\mu\text{S}$ .

LCD显示屏会以 $\mu\text{S}$ 单位指示出槽内导电率水平。

## 4.3 Adjusting rinse water conductivity set-point:




To adjust the rinse water conductivity set-point at which the water control valve opens to control the tank carry-in level;

当水控制阀开启以控制槽内转入水平时，通过  调节清洗水导电率设置点;

- Repeatedly press the Mode button until the  LED lights up.

反复按模式选择键直至  标志的LED灯亮起。

- Hold the Mode button down for 10 seconds and the  LED will start to flash.

按住模式选择键10秒， 标志的LED灯会开始闪动。

- Now use the Up/Down adjust buttons to change the Set-point indicated on the LCD display to the desired value.

通过上/下调节键切换LCD显示屏上的设置点至所需值。


- Once the desired set-point is reached, press the Mode button - this value will be stored as the new set-point and the water control valve will now be opened whenever this value is reached.

一旦达到所需的设置点，按模式选择键——该值将被记录为新设置点，无论何时当达到该值时，水控制阀就会开启。

## 4.4 Water flow meter:水流量计



How to show the amount of rinse water used;如何显示清洗用水是多少;


- Repeatedly press the Mode select button until the  LED is illuminated.

反复按模式选择键直至  标志的LED灯亮起。

- The display first shows the cubic metres of water used (1000's of litres).

显示屏首先用“立方米”显示用水量（即1000升）。

- By pressing the mode button again ( LED still illuminated) the remaining litres (indicated by an L on the display) are displayed.

再次按住模式选择键（ 标志的LED灯仍然亮着）剩余升数会被显示（在显示屏上以单位“L”显示）。

- Once the counter reaches 9, 999, 999 litres it will roll over to zero. If you wish to manually reset the counter to zero litres at any time press the up/down buttons simultaneously.

计算器一旦达到9, 999, 999升，它就会归零。如果你想手动设置计算器到0升，同时按住“上/下”两键即可。

## Section 5 第五章

### Setting the RM-33 to suit your process 为适应你生产流程需要设置RM-33

#### 5.1 Establish the baseline water supply conductivity

##### 建立基线供水导电率

Section 2.7 details how this can be done using the RM-33 or the Stick Meter 5JI.

第2.7中详细叙述了如何采用RM-33和Stick Meter 5JI建立方基线供水导电率。

#### 5.2 Adjusting the set-point level to suit your process 依你的生产流程调节设置点水平

If the set-point level is adjusted to be the same conductivity as the incoming water supply, then the solenoid will open continuously, and no water saving will be made. Setting the set-point to a higher value will cause the water control valve to close until such time as the rinse water contamination reaches the conductivity level that is set. The higher the value above the incoming water conductivity, the more contamination will be permitted, and the more water will be saved. The exact level to be set is very much a matter of judgment where the quality and sensitivity of the processes to rinse water contamination will be the deciding factor.

如果设置点水平的导电率与供水一致，电磁阀会持续开启，水将不能被储存。把设置点设得高于阀的水平，会导致水控制阀关闭至清洗水导电率达至设定水平为止。水平的设定是衡量生产流程中哪一处清洗水污染物的质量和灵敏度会起决定作用的一个重点。

The table below is a good starting guide for setting the system initially. Generally speaking, processes that require conductivity levels of less than 500uS will require demin water in order to meet the uS levels that are shown below, unless local water purity is unusually high in that area.

下表显示系统设定的一个好开始指南。一般来说，所需导电率少于500uS的流程时需要除盐水，以便达到下表的uS水平，除非车间供水的纯度高于当地区的水平。

One way of empirically determining the set-point is to set it to a very high value which will effectively shut off the water supply to the tank, at a time when it contains clean water, and take note of the conductivity reading during rinse tank use.

另一个以经验设定设置点的方法是将其设至一个非常高的值，槽内需盛着净水，该值会有效切掉槽内供水，此时便可以记录清洗槽导电率的读数。

Take note of the reading in uS, when the contamination has reached a level which is estimated to be acceptable. This can be used as the control set-point, and then further refined if more savings are required.

当污染物达到估计可接受值时，用uS为单位记录读数，这可以用作控制设置点，同时该数据可随更多所需记录而进一步完善。

<b>Guideline Rinse water Contaminant Limits</b> 清洗水污染物限制指引	
Alkaline cleaner 碱清洗剂	1,700 $\mu$ S
Hydrochloric acid 盐酸	5,000 $\mu$ S
Sulfuric acid 硫酸	4,000 $\mu$ S
Tin acid 锡酸	500 $\mu$ S
Tin alkaline 锡碱	70-340 $\mu$ S
Gold cyanide 氰化金	260-1,300 $\mu$ S
Nickel acid 镍酸	640 $\mu$ S
Zinc acid 锌酸	630 $\mu$ S
Zinc cyanide 氰化锌	280-1,390 $\mu$ S
Chromic acid 铬酸	450-2,250 $\mu$ S

## Section 6

### RM-33 Specifications 产品规格

#### RM-33 Kit comprises:

<b>Control unit (wall-mounted) 控制单元（装在墙上）</b>
Enclosure dimensions : 180 x 240 x 120 mm (HxWxD)
内尺寸：180 x 240 x 120 mm (高 x 宽 x 长)
Power Supply: 220V to 250V AC supply
电源：220V 至 250V 交流
Display: 0 – 9999 $\mu$ S temperature compensated conductivity, resolution 1 $\mu$ S LCD display.
显示：0–9999 $\mu$ S 温度补偿电导率，分辨率 1 $\mu$ S LCD 显示。
Valve opening set-point: 0 - 9999 $\mu$ S in 1 $\mu$ S increments.
阀门设置点：0 - 9999 $\mu$ S范围，以 1 $\mu$ S作增量。
Set-point Hysteresis: none, solenoid off-time is restricted to 10secs min
设置点滞后：无；电磁阀关断时间定为最小 10 秒
Enclosure IP: to IP65
防护等级 IP：至 IP65
External Connections: IP68 connectors
外接：IP68 连接器
Mains plug: 3amp fused
电源插头：3 安配保险丝

<b>Conductivity sensor 电导率传感器</b>
Electrodeless technology (no cleaning required).无电极技术（无需清洁）
High temperature all-polypropylene construction.高温全聚丙烯结构



Cable length: 5m 电线长度为 5 米

<b>Water control valve &amp; flow meter module 水控制阀和流量计模块</b>
24VDC Burkert Fluid Control Systems type 6213 13mm dia seat direct acting.
24V 直流阀流体控制系统, 6213 型, 直径 13mm 位直接作用
Integrated digital flow-meter.
集成数字流量计
Other valves to suit, eg larger seat sizes for low pressure operation.
其它合适的阀, 如适用于低压力操作的大座
Cable length 5m
电线长 5 米

**RM-33-DI Kit comprises:**

<b>Control unit (wall-mounted) 控制单元 (装在墙上)</b>
Enclosure dimensions : 180 x 240 x 120 mm (HxWxD)
内尺寸: 180 x 240 x 120 mm (高 x 宽 x 长)
Power Supply: 220V to 250V AC supply
电源: 220V 至 250V 交流
Display: 0 – 999.9 $\mu$ S temperature compensated conductivity, resolution 0.1 $\mu$ S LCD display.
显示: 0– 9999 $\mu$ S 温度补偿导电率, 分辨率 0.1 $\mu$ S LCD 显示。
Valve opening set-point: 0 – 999.9 $\mu$ S in 0.1 $\mu$ S increments.
阀门设置点: 0 - 9999 $\mu$ S 范围, 以 0.1 $\mu$ S 增加。
Set-point Hysteresis: none, solenoid off-time is restricted to 10secs min
设置点滞后: 无; 电磁阀关断时间定为最小 10 秒
Enclosure IP: to IP65
防护等级 IP: 至 IP65
External Connections: IP68 connectors
外接: IP68 连接器
Mains plug: 3amp fused
电源插头: 3 安配保险丝

<b>Conductivity sensor 导电率传感器</b>
Stainless Steel contacts. 不锈钢连接
High temperature all-polypropylene construction. 高温全聚丙烯结构
Cable length: 5m 电线长度为 5 米

<b>Water control valve &amp; flow meter module 水控制阀和流量计模块</b>
24VDC Burkert Fluid Control Systems type 6213 13mm dia seat direct acting Stainless Steel
24V 直流阀流体控制系统, 6213 型, 直径 13mm 位直接作用不锈钢
Integrated digital flow-meter. 集成数字流量计
Cable length 5m 电线长 5 米

## **Section 7 第七章**

### **Options 其他可选配:**

#### **Audible Alarm Option: RM-33-A 声响报警选项: RM-33-A**

An option allows the factory addition of an audible alarm which is actuated if the feed water flow drops below 4 litres/min as would occur in the case of a failure in the water supply, or a tap being closed inadvertently.

This can offer an important safety feature which can prevent lost work when used with robotic lines.

The alarm can be cleared by pressing the up or down keys but will sound again after 1 minute if the flow is still below 4 litres/min.

一个选项允许工厂加装声响报警器，当供水低于4升/分钟时，它就会如供水失败或龙头关闭时一样报警。

这提供一个避免工作丢失重要的安全功能。

这报警铃声可以通过按上/下键消除，但中果水位仍然低于4升/分钟，它会在一分钟后重新响起。

#### **Tank Sensor Extension Cable: RM-33-S5, RM-33-S10 槽内传感器延长电线: RM-33-S5, RM-33-S10**

Extension cable available in 5 and 10 metre lengths.

电线可延到5至10米长。

#### **Water control valve/Flow meter Extension Cable: RM-33-V5, RM-33-V10 水控制阀/流量计延长线: RM-33-V5, RM-33-10**

Extension cable available in 5 and 10 metre lengths.

电线可延到5至10米长。

#### **Compact electrodeless conductivity meter Stick Meter 5JI**

##### **紧凑型无极导电率测量仪Stick Meter 5JI**

Small and easy to use conductivity meter designed for on-site dipping into rinse tanks and water supply. It uses the same electrodeless technology as the RM-33 sensor. The meter is auto ranging and measures conductivity from 1 $\mu$ S to 500mS, and temperature as well.

导电率测量仪小型、操作简便，可于直接在现场浸于槽内和供水中进行测量。它与RM-33传感器一样采用无电极技术。此测量仪是自动变换量程，导电率测量范围为1 $\mu$ S to 500mS，同样可测温度。

## Section 8

### Safety precautions 安全注意事项

The RM-33 can be used in environments where toxic and corrosive chemicals are present. The user of this system must be aware of dangers of these hazardous substances and take all necessary precautions in this respect when installing and using the RM-33.

The RM-33 control unit must be powered by suitable 24 volts DC power supply. Ensure that proper cables with the right connectors are used, and never try to cut or shorten the mains lead.

RM-33可用在有毒和带腐蚀性的化学品的环境中。此系统的使用者需注意这此危险物质，在安装与使用RM-33时务必注意安全。

RM-33控制单元必须用24V直流供电。确保采用合适的电线，配备正确的连接器，不要尝试剪断或缩短电源线。

#### **CAUTION!**

**To avoid electric shock never place the power supply in places where water could get inside, and never open the box of power supply as it contains live mains voltage! Never attempt to connect the control unit directly to the mains, and never short circuit the output of power supply as it will result permanent damage to the control unit or power supply!**

#### **注意！**

**为避免由于进水而引而电源的电击现象，不要开启供电箱，因为其含有现场电源电压！不要试图直接用主线连接控制单元，不要使电源输出短路，因为这个导致控制单元或电源的永久损害。**

If conductivity sensor needs to be replaced use protective clothing to protect your skin from hazardous chemicals, and make sure that sensor surface is rinsed after pulling the sensor out of the tank. Care should also be taken to avoid electrical shock when it is used in an electroplating environment, since although the body of conductivity sensor is made of insulator, circumstances can occur when current may track across the wetted surface of the sensor.

如果导电率传感器需要更换，使用防护衣以保护你的皮肤以免受到危化物的伤害，并确保传感器的表面在槽外冲洗过。虽然导电率传感器外壳用绝缘材料制造，但亦需注意避免在电镀环境下发生电击，因为电流可能会追踪传感器浸湿的表面。

Section 9 第九章

# Block Diagram 简图

