柯普乐® 磁性浮球开关

KSR KUEBLER® Magnetic Float Switch

安装和操作说明书

Mounting and operating instructions

上海柯普乐自动化仪表有限公司
Shanghai KSR-KUEBLER Automation Instrument Co., Ltd.

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工作原理　磁性浮球开关是基于浮力原理并带动各个触点对每个液位状态变化进行监控。它利用带有内设磁性系统的浮球通过导管内吸合一个小的干簧触点。因此这种开关的工作与液体无直接的接触，无磨损和开裂，并且不需要任何电源。

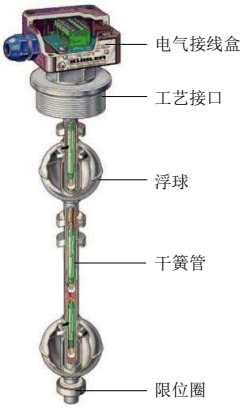


图 1 结构图

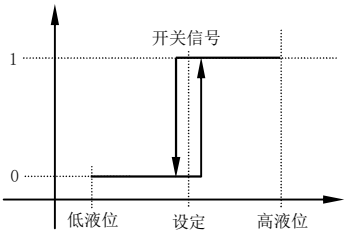


图 2 开关信号波形图

适用范围　耐腐蚀性强，适用于各种工业场所，广泛应用于化工、石油化学、天然气、制药业、海上勘探、造船业、发电厂、动力装置、机器制造业、纯净水净化装置、饮料和食品工业等。

结构安装　**1. 垂直安装：**导管与水平面的垂直度≦±15°

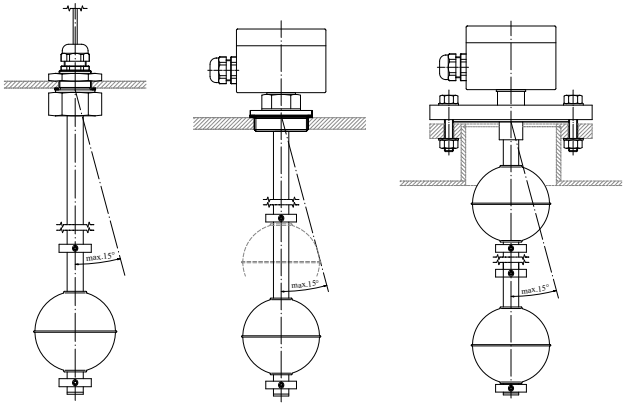


图 3 安装示意图（垂直安装）

2. 水平安装：确保浮球上下摆动不受影响

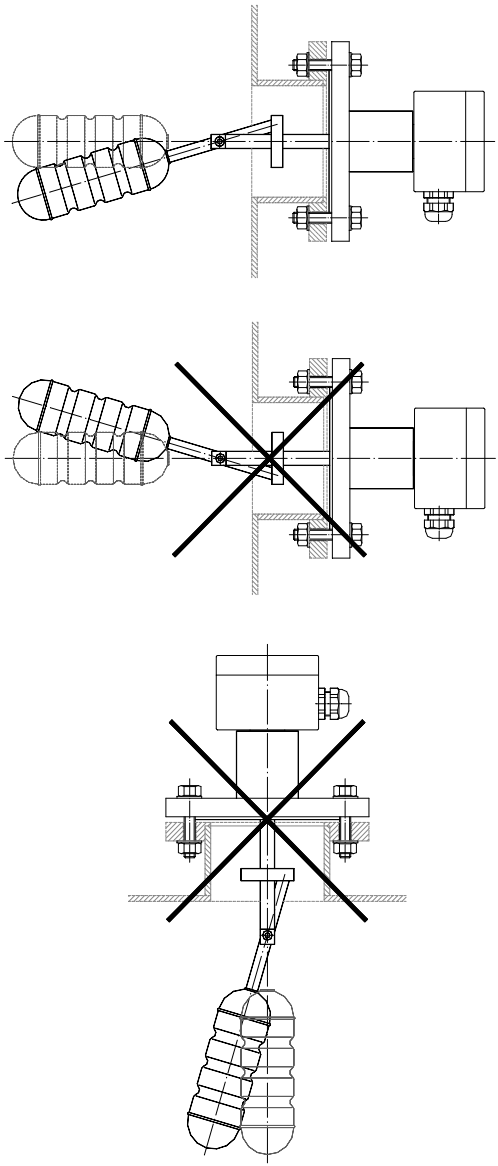
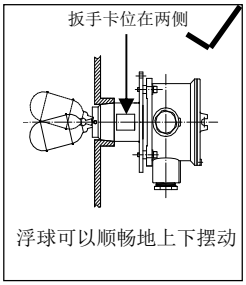
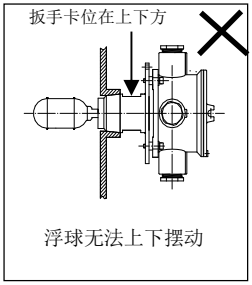


图 4.1 安装示意图（水平安装）

3. 水平螺纹安装：安装时需在螺纹上涂抹上适量的螺纹密封剂或缠绕上适当的生料带，以保证螺纹的密封性能以及防止螺纹发生咬死。螺纹最终旋紧时图 5 的标示位于正上方或正下方（如此标示位于正上方则是正向安装，反之则是反向安装），此时扳手卡位位于两侧（图 4.2），以确保浮球能上下顺畅地摆动。





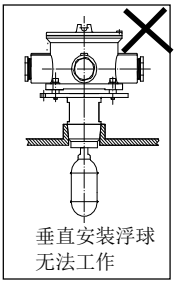


图 4.2：安装示意图一　　图 4.3：安装示意图二　　图 4.4：安装示意图三

图 5：辨向标示

电气安装：浮球开关通断信号的工作点在产品出厂时已经设置完成，浮球开关的安装位置就是液位控制点的位置。开关安装好后才能接线，接线时先打开接线盒盖，请结合电气接线标示（图 6）和“辨向标示”（图 5）来确定和调整触点的初始状态。

注：可以通过改变接线盒的安装方向（旋转 180°）来改变初始的触点状态。

※依次拧下固定电气接线盒和底板的 4 个紧定螺钉，将电气接线盒旋转 180°（电气接线盒上下颠倒），再依次将 4 个紧定螺钉拧上，此过程中需防止接线盒掉落造成损坏，接线盒和底板间 4 个白色的 PTFE 隔热环不可漏装，漏装会造成产品无法正常工作甚至损坏。

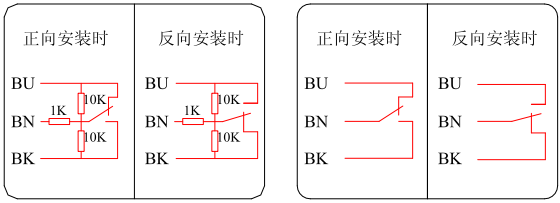


图 6：电气接线标示

4. 旁路安装：旁路管引出

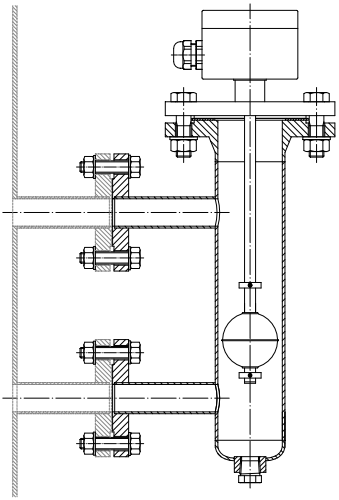


图 7 安装示意图（旁路安装）

注意：1. 开关安装好后一般不用调试，在开关符合设备工况条件的情况下，开关所输出的通断切换信号就是设备内液体的位置信号；

2. 在铁磁环境内部安装时，开关的功能可能会受到抑制，这可能引起误动作，并造成货品损伤。

警告！当罐体内的液体是有压、有毒、易燃的危险性液体时，安装前应放空罐体内的液体，必要时应进行冲洗，待内部干净后再进行安装。

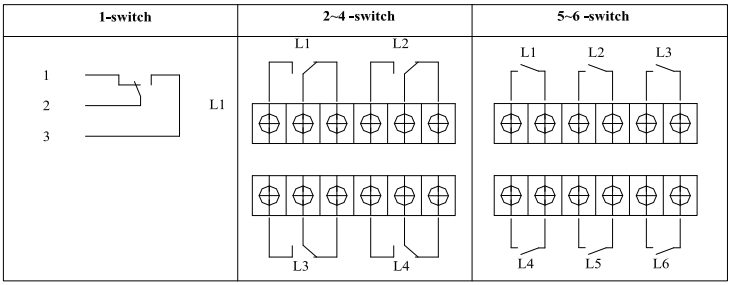
电气连接

开关通断信号的工作点在产品出厂时已经完善，其工作点的位置是按液位控制点的需要而被固定。开关安装好后才能接线，接线时先打开接线盒盖，连接电缆穿过电缆接口进入到接线盒内，按端子排列图进行接线,无接线盒按照线缆颜色及接线示意图接线。

注意：电缆敷设和电气连接必须按照设备适用的规则进行，并由具有资格的人员完成。

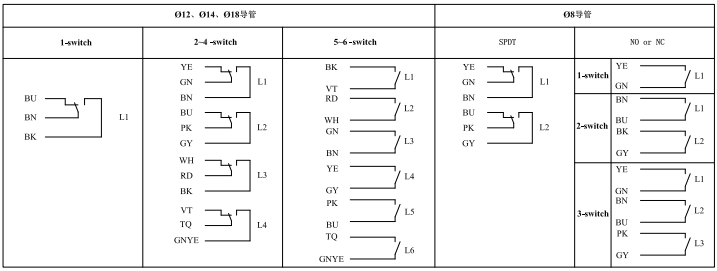
警告！电流脉冲信号可能因使用较长的电缆或线路与动力线路一并敷设而引发故障，所以必须使用屏蔽电缆并一端接地。

端子排接线示意图

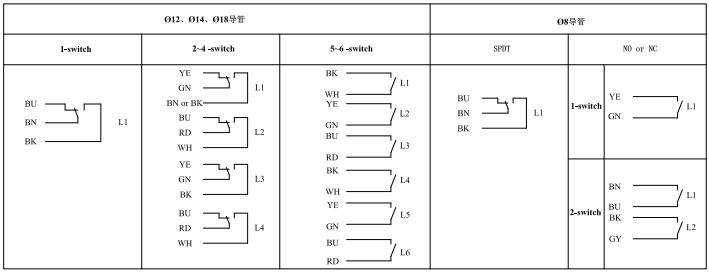


线缆接线示意图

1. PVC 线缆接线示意图

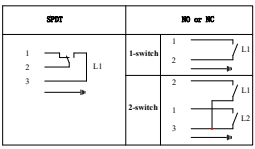


2. 硅树脂线缆接线示意图

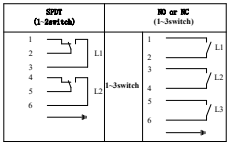


3. ASC 线缆接线示意图

ASC4



ASC5 or ASC7



颜色代码：黑色—BK，棕色—BN， 红色—RD， 橙色—OG，黄色—YE，绿色—GN
蓝色—BU， 紫色—VT， 灰色—GY， 白色—WH， 粉色—PK， 蓝绿—TQ， 绿黄—GNYE

电路保护

1. 电感负载 AC

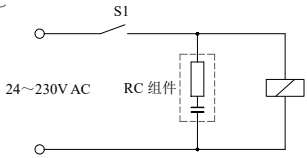


图 9 触点保护电路图（电感负载 AC）

2. 电感负载 DC

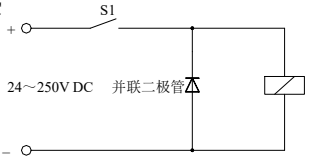


图 10 触点保护电路图（电感负载 DC）

3. 电容性负载

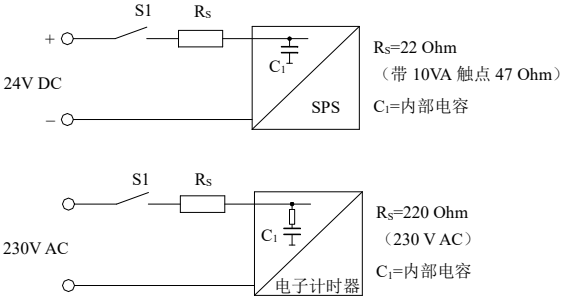


图 11 触点保护电路图（电容性负载）

4.本安电路

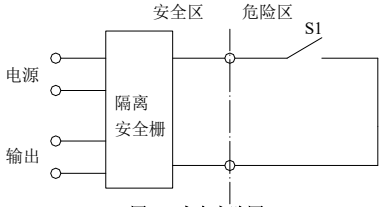


图 12 本安电路图

警告！使用带感性负载或容性负载的磁性浮球开关可能导致干簧开关损坏，这可能引起控制线路故障，并对人员或货品造成损伤。感性交流负载时，开关必须与一个 RC 保护电路连接，如图 9 所示，感性直流负载时，开关必须与一个二极管保护电路连接，如图 10 所示。容性负载时，当连接电缆长于 50m 或与带容性输入电路的 PLC 连接时，则需要串联连接一个 22Ω 的电阻，触点容量为 10VA 时，开关必须串联一个 47Ω 的电阻，如图 11 所示，以限制峰值电流的产生。当连接一个电子计时器时，应接入一个 220Ω 的电阻器。本安电路时，必须在安全区安装本安认证的隔离安全栅，电气参数按照本安参数选定。

5.示波器测量

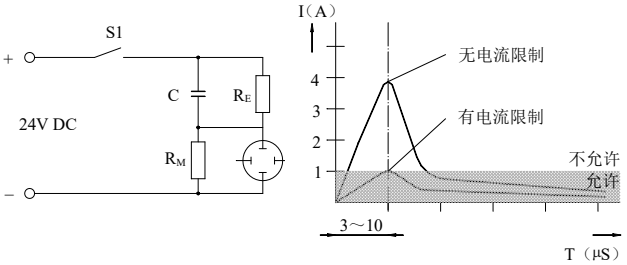


图 13 触点保护电路图（示波器测量）

警告！磁性浮球开关过载可能导致干簧开关损坏，这可能引起控制电路误动作，并对人员或货物造成伤害。

危险！连接电缆无接地保护的磁性浮球开关在故障工况下，可能带电，触及外壳可能对人员造成伤害，甚至致人死亡。

注意：

1、磁性浮球开关必须仅在具有保护低电压的情况下使用，或必须安装成开关接地。

2、不带接线盒的以及电气连接为赫斯曼接头的产品，客户的罐体必须安装接地，并且液位开关安装时螺纹不许使用生料带密封。

信号调试

当需要对开关通断状态进行预期确认时可进行开关的人工模拟调试，调试前先打开接线盒盖，并准备好一只通用电表。

调试时可先让开关的浮球向上保持挡圈或下保持挡圈靠近，当浮球要接触挡圈时，开关的输出会出现通断切换动作；然后再使浮球向相反的方向移动，当浮球移动并超过原来动作处的位置时，开关的输出通断切换还原，这样来回数次而开关均能满足这一过程，则开关工作完好，其额定点的工作可靠。当开关有多个球多个工作点时，则每个工作点均须作这样的调试。

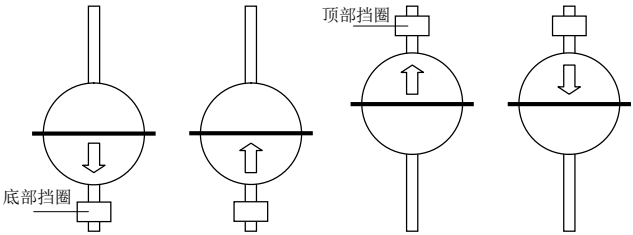


图 14 信号调试方法示意图

注意：当开关工作在危险区域时请将开关移至安全的场所进行调试。

使用

1. 开关使用时如果设备内有碎屑或铁粉类杂质，则开关浮球移动的通道有可能被堵塞，这样开关的使用就会受到影响；

2. 开关工作时，其内部所受的压力极限在每台开关的技术指标中都已规定，如果使用中设备中的压力超过了所规定的指标，开关就有可能被损坏；

3. 开关使用时设备内的液面变化应平稳过渡，出现有突变时，开关的输出可能会出现反常现象，此时只要待液面重新稳定后信号即会立刻恢复正常；

4. 开关使用时周围环境应无明显的磁现象，避免影响开关本身的工作磁场；

5. 开关工作时的电气供电应该稳定，信号传输应考虑电气的屏蔽；

6. 开关安装的牢固和接线的可靠也是开关正常工作的首要保证。

注意：

- 开关工作时应避免强烈的振动；
- 开关不应在强磁场的环境和物体旁工作；
- 对防爆型的开关在故障检查时应在安全场所进行，且故障排除后应仍确保其防爆性能；
- 开关的电气结构应避免直接雨淋和日晒，应采取防护措施。

维护

1. 开关工作时一般不用进行特别的维护，只是当工作介质的流动性和洁净度不够理想时，使用时请注意对开关进行经常的清洗；

2. 如果开关一经工作后又需经长期的停用，此时应将开关的表面工作介质冲洗干净；

3. 长期不用的开关其浮球最好能与开关适当分开，以避免浮球的磁性与电气吸引造成的长期静态工作而影响开关的使用性能。

故障检查

1. 开关如不能正常工作时，可按如下步骤进行检查：

- 开关连接口处的密封是否完好；
- 开关的浮球是否有损坏或脱落；
- 开关信号传输的连接是否有断损；
- 开关的易损件是否损坏（包括：浮球，干簧开关）。

2. 开关易损件的检查：

- 当罐体内确实有液位额定点处的液面变化而开关的输出信号始终无反应时，检查浮球是否损坏；如浮球完好，则手动使浮球模拟液位上下移动，此时观察输出信号有无变化，如仍无变化则开关的干簧传感损坏；
- 当罐体内的液体有波动并有规律平稳的运行，而开关的有信号输出的位置却不是在额定点处，此时检查开关传感器上的保持挡圈是否松动或脱落，如有之则使其复位再让开关重新投入运行。

注意：开关经以上检查修理后仍不能正常工作，请与制造厂联系。

防爆说明

1. 隔爆产品的使用应严格遵循下列内容：

隔爆产品经国家级仪器仪表防爆安全监督检验站（NEPSI）检验，符合标准 GB/T3836.1-2021、GB/T3836.2-2021、GB/T3836.31-2021 的有关要求，其防爆标志为 Ex db IIC T1~T6 Gb、Ex tb IIIC T85℃...T400℃ Db

产品使用应遵循下列事项：

- 产品使用环境温度：-40℃～+60℃；
- 现场使用应遵守“严禁带电开盖”的原则；
- 电缆引入装置需外购，防爆标志为 Ex db IIC 并有防爆合格证，检查其使用环境温度是否符合要求，连接螺纹为 1/2”NPT 或 3/4”NPT 或 M20×1.5，安装时必须拧紧；
- 引入电缆护套外径应与外购的电缆引入装置密封圈内径允差±1mm；
- 产品使用时外壳应可靠接地；
- 温度组别与被测介质最高温度的关系如下：

温度组别	T1	T2	T3	T4	5	T6
被测介质最高温度（℃）	440	290	190	130	95	80

- 安装现场应不存在对铝合金有腐蚀作用的有害气体；
- 维修必须在安全场所进行；当现场确认无可燃性气体存在时方可维修；
- 产品的安装、使用、维护、检查应同时遵守产品说明书、GB/T3836.15-2017“爆炸性气体环境用电气设备 第 15 部分：危险场所电气安装（煤矿除外)”、GB50257-1996“电气装置安装工程爆炸和火灾危险环境电力装置施工及验收规范”、 GB/T3836.13-2021“爆炸性气体环境用电气设备 第 13 部分：爆炸性气体环境用电气设备的检修”和 GB/T3836.16-2017“爆炸性气体环境用电气设备 第 16 部分：电气装置的检查和维护（煤矿除外）”的规定。

2. 本安产品的使用应严格遵循下列内容：

本安产品经国家级仪器仪表防爆安全监督检验站（NEPSI）检验，符合标准GB/T3836.1-2021、GB/T3836.4-2021、GB/T3836.31-2021的有关要求，其防爆标志为 Ex ia ⅡC T1~T6 Ga，Ex ib ⅢC T85℃...T400℃ Db

产品必须与安全栅配套组成本安防爆系统。

产品使用应遵循下列事项：

- 产品使用环境温度：-40℃～+60℃；
- 温度组别与被测介质最高温度的关系如下：

温度组别	T1	T2	T3	T4	T5	T6
被测介质最高温度（℃）	440	290	190	130	95	80

- 磁性浮球开关的本安参数为：
  转换型：Ui=28V Ii=50mA Pi=0.35W Ci≈0uF Li=0uH
  常开、常闭型：Ui=28V Ii=100mA Pi=0.7W Ci≈0uF Li=0uH
- 温度传感器的本安参数为：
  Pt100：Ui=10V Ii=200mA Pi=0. 5W Ci≈0uF Li=0uH
  TH：Ui=28V Ii=100mA Pi=0.7W Ci≈0uF Li=0uH
- 安装现场不存在对产品外壳有腐蚀性作用的气体；
- 该产品与安全栅本安端之间的连接电缆为屏蔽电缆（必须有绝缘护套），每根线芯截面积>0.5mm^2，其屏蔽层在安全场所接地。电缆布线应尽可能排除电磁干扰的影响；
- 用户不得自行更换该产品的零部件，应会同产品制造商共同解决运行中出现的故障，以杜绝损坏现象的发生；
- 产品的安装、使用和维护应同时遵守产品说明书、GB/T3836.13-2021“爆炸性气体环境用电气设备 第 13 部分：爆炸性气体环境用电气设备的检修”、GB/T3836.15-2017“爆炸性气体环境用电气设备 第 15 部分：危险场所电气安装（煤矿除外）”、GB/T3836.16-2017“爆炸性气体环境用电气设备 第 16 部分：电气装置的检查和维护（煤矿除外）”和 GB50257-1996“电气装置安装工程爆炸和火灾危险环境 电气装置施工及验收规范”的有关规定。

防护说明

为了满足电气防护等级，按照产品上电缆锁口的线径范围、防爆等级选择合适的电缆线，接线完成后，使用开口扳手拧紧电缆锁口；接线盒盒盖的密封件放置平整，接线盒盒盖安装均匀受力，用工具拧紧；冗余电气接口需要用螺塞封堵，并拧紧。

质量保证

在用户按文件规定使用的前提下，从发货日起 12 个月的保证期内，产品因质量问题而不能正常工作或不符合文件的技术条件时将给予无偿修理或更换。

产品附件

装箱单；产品说明书；产品合格证；用户附加定购的配件或附件。

型号说明　　本安产品型号说明

A a b-c-d e/f-Lg/h/M i-j

AD a b-c-d e/f-Lg/h/M i-j

AV a b-c-d e/f-Lg/h/M i-j

AVD a b-c-d e/f-Lg/h/M i-j

a:代表接口形式,向下旋入螺纹(R 或 NPT),法兰(F,-HIF(无 PT100)),食品与卫生型接口（MR 或 FC)，向上旋入螺纹（ER 或 ENPT)；

b：代表接口材质：不锈钢（V)、钛（T)、哈氏合金（HC)；

c：代表接口规格，与防爆性能无关，不做要求；

d：代表传感器外壳材质：不锈钢（V)、钛（T)、哈氏合金（HC)；

e：代表触点类型和数位：U（转换型)，S（常闭型)，O（常开型)；

f：代表传感器工作温度：普通（空白)，高温（HT，最高380℃）或低温（TT）

g：代表公称长度：≤6000mm；

h：导管外径：Ø12、Ø14、Ø18。

i：浮球型式，代码为不锈（V...A)，钛（T...A)，塑（P...A)，其中...代表浮球外径，浮球外径 mm×长度 mm（V...×...)，哈氏合金（HC)

j：代表可选要求：角形设计跨距（W)，可调节（verst)，活动套管型（TIT)，无（空白)。

隔爆产品型号说明

Aa Db c-d-e f/g-Lh/i/M j-k-l

a：接线盒材质：不锈钢（V)，铝（空白)。

b：接口型式：向下旋入螺纹（R 或 NPT)，法兰（F)，食品与卫生型接口（MR 或 FC)，侧装法兰（-HIF)，旁路引出（-B)，侧装螺纹（-HINPT)；

c：接口材质：不锈钢（V)、不锈钢电抛光（VE)、不锈钢 E-CTFE 涂层（VEC)、不锈钢 PTFE 贴面（VTF)、钛（T)、哈氏合金 B（HB)、哈氏合金 C（HC)。

d：接口规格。

e：外壳材质：不锈钢（V)、不锈钢电抛光（VE)、不锈钢 E-CTFE 涂层（VEC)、不锈钢 PTFE 贴面（VTF)、钛（T)、哈氏合金 B（HB)、哈氏合金 C（HC)。

f：触点类型和数位：U（转换型)，S（常闭型)，O（常开型)。

g：特殊要求：无（空白)，高温（HT)，低温（TT)，带温度传感器（Pt100)，带温度开关（TH...)，带限流电阻（R...)，带 NAMUR 电路（N)。

h：导管插入深度：≤20000mm；控制位置 L1~Ln（另行标注)。

i：导管外径：Ø12、Ø14、Ø18。

j：浮球规格。

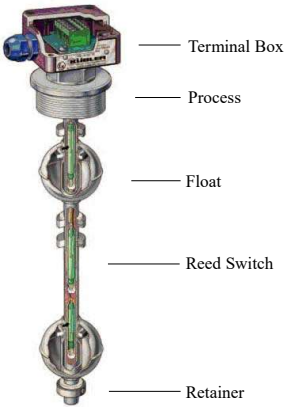
k：表示其他要求：角形设计跨距（W...)，可调节（verst...)，活动套管型（TIT)，无（空白)。

l：表示其他：船用（C)，陆用（空白)。

特别声明：本手册以中文版本为标准，英文版本仅供参考

Operating Principle

Based on the Buoyant effect, the Magnetic Float Switches can monitor liquid level by means of individual contacts. A float with built-in magnetic system attracts a small reed contact inside pipe. So during switching operation, there is no direct contact to the liquid, no wear and tear, and no power supply is required.



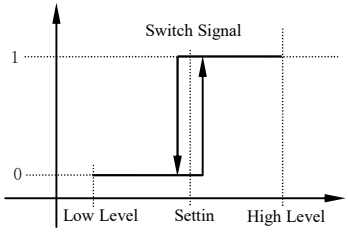


Fig. 1 Structure drawing **Fig. 2 Oscillogram of switch signal**

Application Scope

High corrosion resistant, applied in various industrial places: widely used in chemical industry, petrochemical, natural gas, pharmaceutical industry ,off-shore exploitation, ship-building, power plants, power units, machine building industry, water purification equipment, food and beverages industry, etc.

Structural Installation

1. Vertical installation:
Vertical degree of pipe to horizontal shall be less than or equal to ±15°.

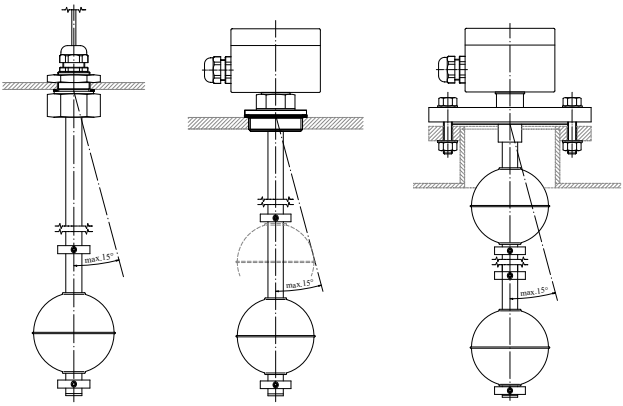


Fig. 3 Installation schematic diagram (vertical installation)

2. Horizontal installation:

Be sure there is no affect on swing upwards and downwards of the float.

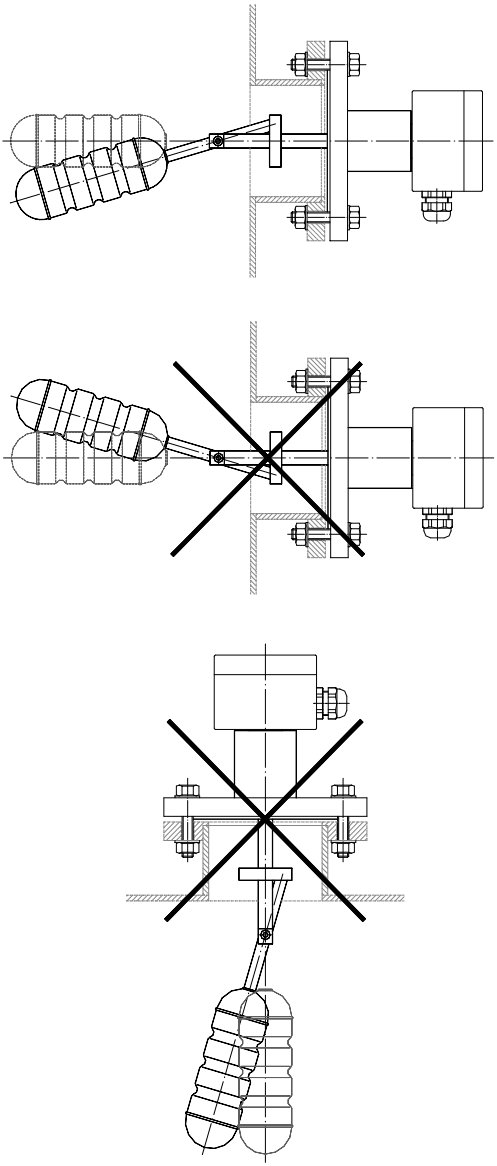


Fig. 4 Installation schematic diagram (horizontal installation)

3. By-pass installation: lead out through by-pass tube.

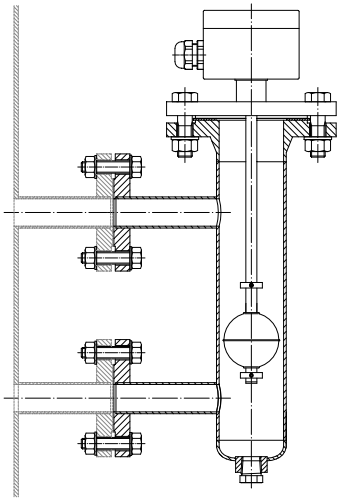


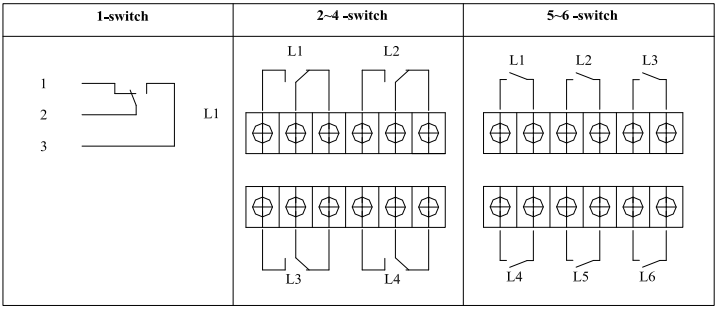
Fig. 5 Installation schematic diagram (by-pass)

Note:
1. After installation of switch, the commissioning is no needed in general. When the condition of switch is in accordance with the working condition of equipment, the on/off switchover signal from the switch will be acted as the position signal of level.
2. In the event the switch is installed in the ferromagnetic environment, the functioning of switch will be influenced, and may damage to property.
Warning! In the event that liquid in container is pressurized, toxic, flammable and dangerous, it shall be emptied before the installation and flushed if necessary; and installation shall not be performed until the inside of the container is cleaned.

Electrical Connection

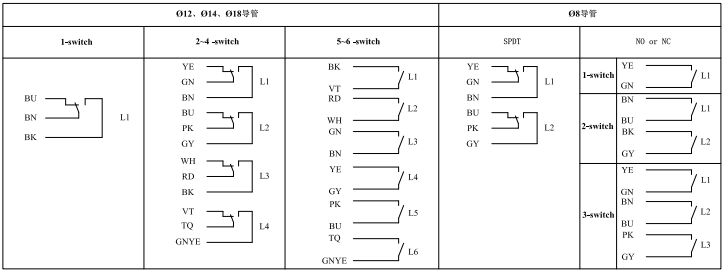
Functioning point for on/off signal of switch has been preset before ex-works, and its position is fixed according to liquid level control point. Wiring can be carried out after installation of switch; during wiring, the cover of terminal box is opened at first, and then introducing the cable into the terminal box via the cable port; the cables are wired according to arrangement diagram of terminals. If no box, cables are wired according to color of cables and the diagram below.
Note: cable routing and electric connection shall be carried out by qualified persons according applicable regulations of equipment.
Warning! The current pulse signal may be failure due to longer cables or the signal line is laid together with power line, so the shielded cable with grounding at one end must be used.

Wiring diagram of switch with box

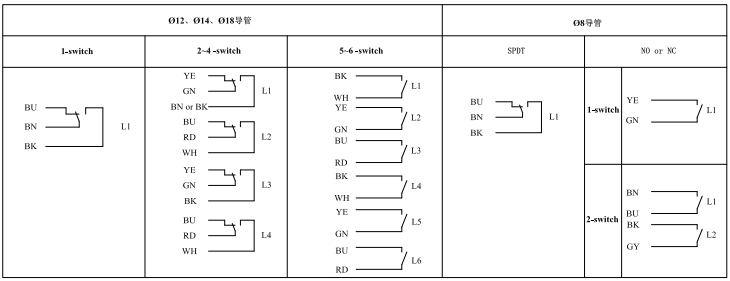


Wiring diagram of switch without box

1. PVC cable

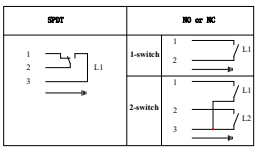


2. Silicone cable

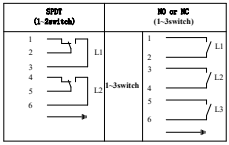


3. ASC

ASC4



ASC5 or ASC7



Circuit Protection

1. Inductive load AC

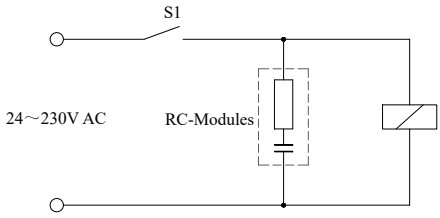


Fig. 6 Contact protection circuit diagram (inductive load AC)

2. Inductive load DC

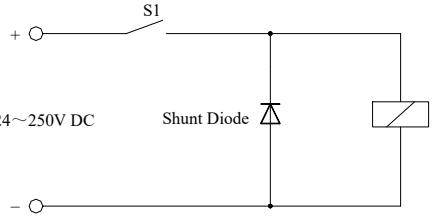


Fig. 7 Contact protection circuit diagram (inductive load DC)

3.capacitive load

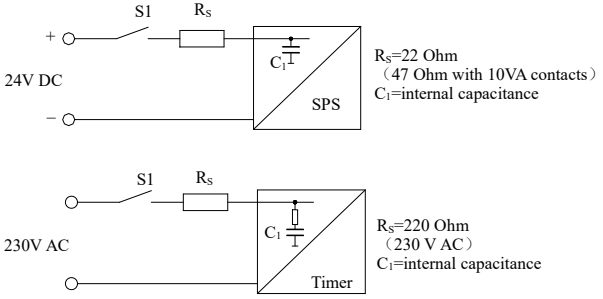


Fig. 8 Contact protection

Warning!

The magnetic float switch with inductive load or capacitive load may result in the damage to the reed switch and cause the failure of control circuit and damage to person or property.With inductive load AC,magnetic switches have to be connected to a RC Network（Fig.6）.With inductive load DC,magnetic switches have to be connected to a diode protection circuit（Fig.7）. In case of capacitive load, if the length of connecting cable is more than 50m or PLC with capacitive input line is connected, it is necessary to connect with a resistance of 22Ω .In case of contact capacity is 10VA, magnetic switches have to be connected to a resistance of 47Ω （Fig.8），in order to limit the peak current. When connecting with a timer, a resistor of 220Ω shall be connected.

4. Measurement with oscilloscope

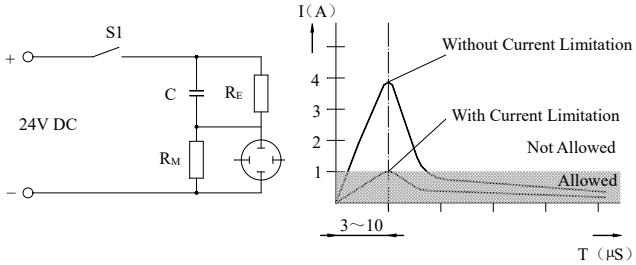


Fig. 9 Contact protection circuit diagram (measurement with oscilloscope)

Warning! Overload of magnetic float switch may cause damage to reed switch, and it may cause misoperation of control circuit, and cause damage to property or hurt person.

Danger! In case of the failure, touching with the housing of the magnetic float switch without earthing connection may hurt person, even cause death.

Note: Magnetic float switches can only be put into operation with low-voltage protection, or installed with earthing connection.

For products without junction boxes or with hersman connectors for electrical connections, the customer's tank must be grounded, and the PTFE material tape shall not be used for screw mounting of level switches.

Signal Commissioning

If pre-confirmation of on/off status of switch is necessary, manual simulation for commissioning can be performed; open the terminal box before commissioning and a universal meter shall be provided.

During commissioning, move the float close to upper or lower retainer, when the float touches the retainer, ON/OFF switching operation will send output of the switch; then move the float in an opposite direction, and when the float moves and surpasses the original position, the ON/OFF switching operation of switch will be reset; if above-mentioned operations can be repeated and the switches satisfied, then the switches operate normally and the rated points work reliably. In the event that the switches have many floats and many functioning points, then such commissioning shall be carried out for each functioning point.

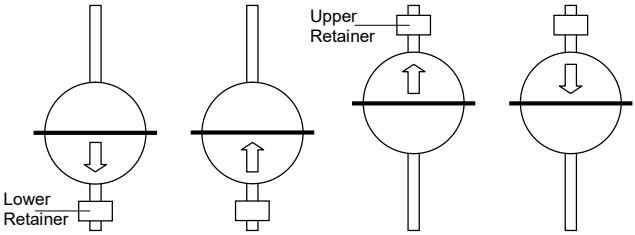


Fig. 10 Schematic diagram of signal commissioning

Note: in the event that the switches are operating in dangerous zones, they shall be moved to safe place for commissioning.

Application

1. If there is any foreign substance such as scrap or iron powder inside the container when the switches are operating, the channel for movement of float may be clogged, then the use of the switches will be influenced;
2. When the switch operates, the allowable pressure limit of the switch is stipulated in technical specification; if the pressure is above the specified limit, the switch may be damaged;
3. The change of liquid level in container shall be stable when the switch operates, if sudden change happens, the output of switch may be abnormal, at this time, the signal can get right immediately after the level has settled down again.
4. The surrounding environment shall have no obvious magnetic field when the switch operates, so as to avoid affecting the magnetic filed of the switch.
5. The power supply shall be stable when operation of switch, and electric shield shall be taken into consideration for signal transmission.
6. It is the prerequisite of normal operation of the switch that the installation is firm and wiring is reliable.
Note:

- Strong vibration at the time of operation of switch shall be avoided;
- The switch must not be operated at and nearby strong magnetic field;
- The check for failure of explosion-proof switch shall be carried out in safe place, and the explosion-proof performance shall still be ensured after troubleshooting.
- The protective measures shall be also taken for electric system of switch against rain and sunshine.

Maintenance

1. In general, no special maintenance is necessary for switch when operation. In the event that fluidity and cleanliness of working medium is not good, regular cleaning shall be carried out for switch;
2. In the case of lengthy stoppages of the switch after running, be sure to clean the working medium on the surface of the switch;
3. If the switch is shut down for a longer period of time, the float of switch has to be separated properly from the switch, in order to prevent electric attraction of magnetism of float and cause long-term static working of switch and affect its performance.

Troubleshooting

1. If the switch cannot operate normally, the check shall be carried out according to the following steps:

- Check seals at the connect of switch;
- Check float of switch for damage or spalling;
- Check connection of signal transmission of switch for breaking and damage;
- Check wearing parts of switch for damage (including: float, reed switch).

2. Check wearing parts of switch:

- If the liquid level changes at the rating point in tank while output of switch has no response, check float for damage; if the float is in a good condition, then make the simulated liquid level of float move upwards and downwards manually, at this time, observe whether the output signal has change, if no, it means the reed sensor of the switch has been damaged;
- When the liquid in container varies and move smoothly, and position with output of switch is not in the preset point, check the retainer on switch sensor for loosens or falls off, if has, make it reset and then the switch operate again.

Note: if the switch cannot operate normally after above-mentioned inspection and repairing, please contact manufacturer.

Information on Explosion-proof

1. Application of explosion-proof product shall be strictly in accordance with the following:
The explosion-proof product has been inspected by National Supervision and Inspection Center for Explosion Protection and Safety of Instrumentation (NEPSI) and conforms to relative requirements in standard GB/T3836.1-2021, GB/T3836.2-2021, GB/T3836.31-2021 and its explosion-proof mark is Ex db II C T1 to T6Gb、Ex tb IIIC T85℃...T400℃ Db
The following points shall be observed during using this product:

- Ambient temperature: -40℃ to +60℃;
- The principle of "DO NOT OPEN WHILE ENERGIZED" shall be adhered on site;
- Cable entry device is to be purchased, and its explosion-proof mark is Ex db IIC and explosion-proof certificate shall be provided; check whether its ambient temperature is in accordance with requirement; its connecting thread is 1/2"NPT or 3/4"NPT or M20×1.5, which shall be screwed down at the time of installation;
- The allowable deviation between the outer diameter of cable shield and inner diameter of the seal ring of purchased cable entry is ±1mm;
- Make absolutely sure that housing of the product shall be ground reliably during using the product;
- The relationship between temperature group and max. temperature of the medium to be measured is as following:

Temperature group	T1	T2	T3	T4	T5	T6
Max. temperature of the medium to be measured (℃)	440	290	190	130	95	80

- Dangerous corrosive gas to aluminum alloy shall not exist on the installation site;
- Repairing shall be carried out on safe site; repairing can be carried out only after making sure there is no inflammable gas exists on site.

Installation, use, maintenance and inspection shall be carried out according to stipulations in Product instructions, GB/T3836.15-2017- Electrical apparatus for explosive gas atmospheres Part 15: Electrical installations in hazardous areas(other than mines), GB50257-1996-Code for construction and acceptance of electric device for explosion atmospheres and fire hazard electrical equipment installation engineering, GB/T3836.13-2021- Electrical apparatus for explosive gas atmospheres Part 13: Repair and overhaul for apparatus used in explosive gas atmospheres and GB/T3836.16-2017- Electrical apparatus for explosive gas atmospheres Part 16: Inspection and maintenance of electrical installation (other than mines)

2. Application of IS product shall be strictly in accordance with the following:
The IS product has been inspected by National Supervision and Inspection Center for Explosion Protection and Safety of Instrumentation (NEPSI) and conforms to relative requirements in standard GB/T3836.1-2021, GB/T 3836.4-2021, , GB/T3836.31-2021 and its explosion-proof mark is Ex ia IIC T1 to T6 Ga、Ex ib IIIC T85℃...T400℃ Db The product and safety barrier will comprise the IS explosion protection system.
The following points shall be observed during using this product:
● Ambient temperature: -40℃ to +60℃;
● The relationship between temperature group and max. temperature of the medium to be measured is as following:

Temperature group	T1	T2	T3	T4	T5	T6
Max. temperature of the medium to be measured (℃)	440	290	190	130	95	80

● IS parameters of magnetic float switch are:
U：Ui=28V Ii=50mA Pi=0.35W Ci≈0uF Li≈0mH
S、O：Ui=28V Ii=100mA Pi=0.7W Ci≈0uF Li≈0mH
● IS parameters of Temperature sensor are:
Pt100：Ui=10V Ii=200mA Pi=0. 5W Ci≈0uF Li≈0mH
TH：Ui=28V Ii=100mA Pi=0.7W Ci≈0uF Li≈0mH
● Dangerous corrosive gas to housing of product shall not exist at the installation site;
● The connection cable between the product and safety barrier is shielded cable (must have insulated shield), cross-sectional area of each core shall be more than 0.5 mm^2 and its shielding layer will earth at safe site. Routing of cable shall be prevented from electromagnetic interference as far as possible;
● No customer is allowed to change parts of the product. In case of any failure during the operation of the product, the customer shall work together with manufacturer to solve the product and eliminate the damage to product.
Installation, use, maintenance and inspection shall be carried out according to stipulations in Product instructions, GB/T3836.13-2021- Electrical apparatus for explosive gas atmospheres Part 13: Repair and overhaul for apparatus used in explosive gas atmospheres, GB/T3836.15-2017- Electrical apparatus for explosive gas atmospheres Part 15: Electrical installations in hazardous areas(other than mines), GB/T3836.16-2017- Electrical apparatus for explosive gas atmospheres Part 16: Inspection and maintenance of electrical installation (other than mines) and GB50257-1996-Code for construction and acceptance of electric device for explosion atmospheres and fire hazard electrical equipment installation engineering.

Ingressive protection

In order to meet the ingress protection, select the appropriate cable according to the wire diameter and explosion-proof grade of the cable gland. After wiring, tighten the cable gland with an open wrench. The sealing parts of junction box cover shall be placed in a flat way, and junction box cover shall be tightened with tools in uniform strength. The redundant electrical interface shall be sealed with a screw plug and tightened.

Warranty

Under the prerequisite that users operate the product according to stipulations in relative documents, within the guarantee period of 12 months from shipping date, if the products cannot operate normally due to quality issues or be not in accordance with technical conditions stipulated in documents, they can be repaired or replaced free of charge.

Accessories

Packing list; product instructions; product certificate; additional fittings or accessories to be ordered by customer.

Special Statement：This manual is subject to Chinese, English is only for reference

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Zip: 201600
E-mail: info@ksr-kuebler.com.cn
Website: www.ksr-kuebler.com.cn