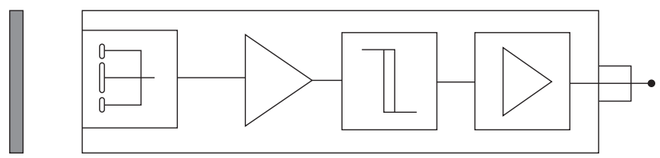
电容式接近开关的工作原理 Working principle of capacitance proximity switch

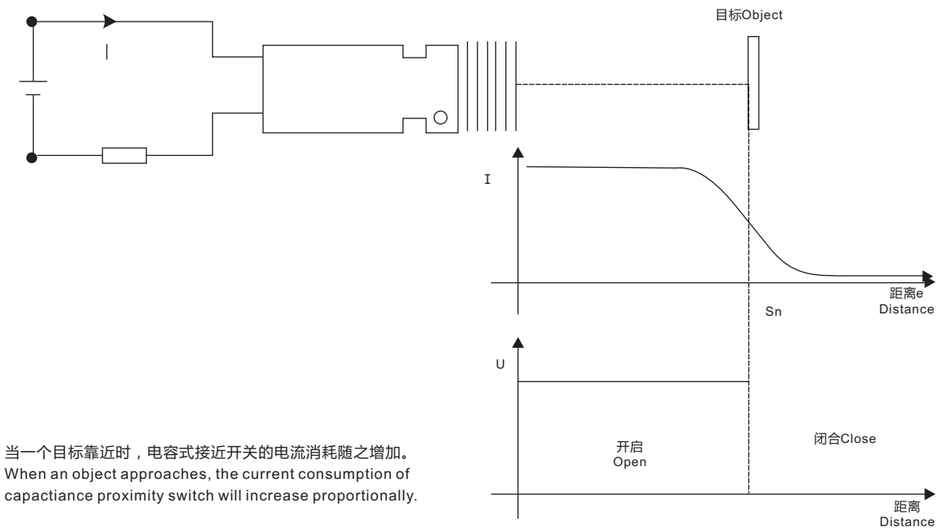
结构分类 Structural category	目标 Object	感应面 Inductive surface	RC振荡器 RC oscillator	开关级 switching stage	输出级 magnified output stage
外形图例 Outward appearance illustration					



电容式接近开关 Capacitance proximity switch

- 电容式传感器的感应面由两个同轴金属电极构成，很象"打开的"电容电极，该两个电极构成一个电容，串接在RC震荡回路中。
- 电源接通时，RC振荡器不振荡，当一个目标朝着电容器的电极靠近时，电容器的容量增加，使振荡器开始振荡。通过后级电路的处理，将停振和振荡两种信号转换成开关信号，从而起到了检测有无物体存在的目的。该传感器能检测金属物体，也能检测非金属物体，对金属物体可以获得最大的动作距离，对非金属物体动作距离决定于材料的介电常数ε，材料的介电常数越大，可获得的动作距离越大。
- The induction surface of capacitance sensor is composed of two coaxial mental electctrodes, which from a capacitor and connected on RC oscillation circuit, just like an open capacitor electrode.
- When connecting to power supply, RC oscillator does not work. When an object is clos eto capacitor electrode, the capacitor capacity will increase, and the oscillator will vibrate. Through the treatment of behind stage circuit, both signals of stop oscillation and oscillation will be converted to switch signs for checking the existence of object. this distance can be obtained, but to nonmetal object, the action distance is d etermined by material dielectric constant, the more dielectric constant, the more action distance will be obtained.

外形图例 Outward appearance illustration



当一个目标靠近时，电容式接近开关的电流消耗随之增加。
When an object approaches, the current consumption of capactiance proximity switch will increase proportionally.

一些重要材料的介电常数如下表:

The dielectric constants foe some important materials are as; osted as below;

材料 Materials	介电常数 Dielectric constant	材料 Materials	介电常数 Dielectric constant	材料 Materials	介电常数 Dielectric constant	材料 Materials	介电常数 Dielectric constant
合成树脂粘接剂 Synthectic resin adhesive	3.6	苯乙烯 Styrene	3	酒精 Alcohol	25.8	聚乙烯化合物 Polyvinyl	2.9
云母 Mica	6	陶瓷 Prorcelain	4.4	玻璃 Glass	5	石英玻璃 Quartz glass	3.7
硬橡胶 Ebonite	4	石蜡 Petrolin	2.2	硬纸 Cardboard	4.5	硅 Silicon	2.8
大理石 Marble	8	石英沙Quartz sand	4.5	电缆胶皮化合物 Cable rubber compound	2.5		
纸 Paper	2.3	软橡胶 Soft rubber	2.5	汽油 Gasoline	2.2		
有机玻璃 Organic glass	3.2	水 Water	80	木材 Wood	2.7		

应用图例 application illustration

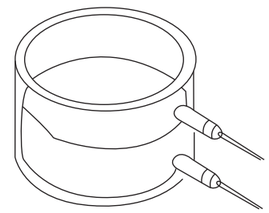


图1、液位测量--塑料或玻璃器皿
Liquid level measurement-plastic or glass container

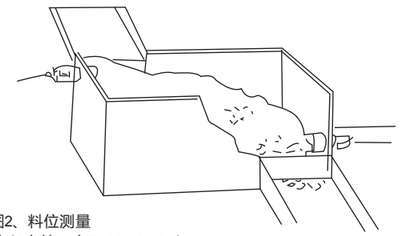


图2、料位测量
Material level measurement

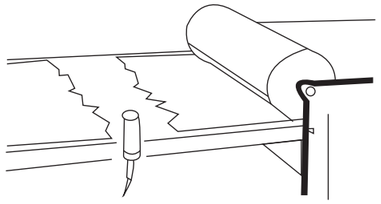


图3、断板检测
chart 3 checking for broken board

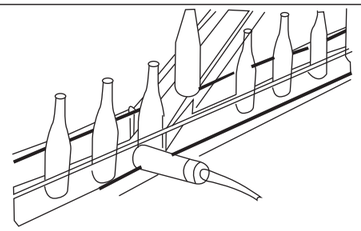


图4、瓶子计数
Fig.4 Count the bottles

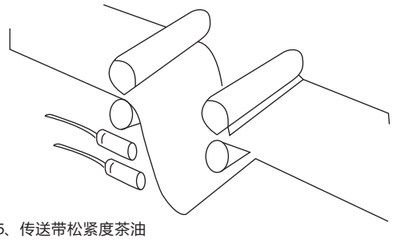


图5、传送带松紧度茶油
Fig.5 detect the tightness of conveyor belt

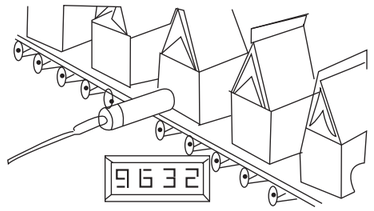
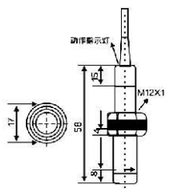
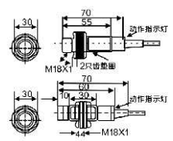
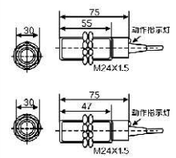
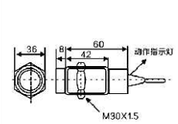
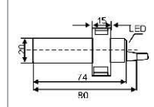
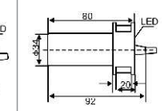
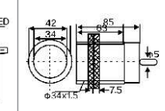
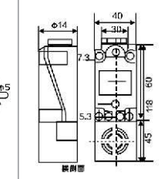
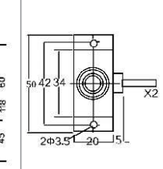


图6、计数及料位检测
Fig.6 Counter and detect the material level

结构分类 Structural category				电容式接近开关 Capacitance proximity switch			
外形编号Outward Appearance code				CM12	CM18	CM24	CM30
外形图例 Outward appearance illustration							
外形尺寸 Overall dimensions							
检测距离 DETECTION DISTANCE				0-2mm	0-5mm	0-8mm	0-10mm
埋入式 Flush	直流 DC 6-36 VDC	NPN	NO	CM12-3002NA	CM18-3005NA	CM24-3008NA	CM30-3010NA
			NC	CM12-3002NB	CM18-3005NB	CM24-3008NB	CM30-3010NB
			NO+NC	CM12-3002NC	CM18-3005NC	CM24-3008NC	CM30-3010NC
		PNP	NO	CM12-3002PA	CM18-3005PA	CM24-3008PA	CM30-3010PA
			NC	CM12-3002PB	CM18-3005PB	CM24-3008PB	CM30-3010PB
			NO+NC	CM12-3002PC	CM18-3005PC	CM24-3008PC	CM30-3010PC
	交流 AC 90-250 VAC	SCR 可控硅 Control-lable silicon	NO	CM12-2002A	CM18-2005A	CM24-2008A	CM30-2010A
			NC	CM12-2002B	CM18-2005B	CM24-2008B	CM30-2010B
检测距离 DETECTION DISTANCE				0-4mm	0-8mm	0-12mm	0-15mm
非埋入式 Non-Flush	直流 DC 6-36 VDC	NPN	NO	CM12-3004NA	CM18-3008NA	CM24-3012NA	CM30-3015NA
			NC	CM12-3004NB	CM18-3008NB	CM24-3012NB	CM30-3015NB
			NO+NC	CM12-3004NC	CM18-3008NC	CM24-3012NC	CM30-3015NC
		PNP	NO	CM12-3004PA	CM18-3008PA	CM24-3012PA	CM30-3015PA
			NC	CM12-3004PB	CM18-3008PB	CM24-3012PB	CM30-3015PB
			NO+NC	CM12-3004PC	CM18-3008PC	CM24-3012PC	CM30-3015PC
	交流 AC 90-250 VAC	SCR 可控硅 Control-lable silicon	NO	CM12-2004A	CM18-2008A	CM24-2012A	CM30-2015A
			NC	CM12-2004B	CM18-2008B	CM24-2012B	CM30-2015B
可检测体 Detectable object				导体及介电体 conductor and dielectric body			
消耗电流 Consumption current				直流(NPN PNP)型 DC12V时8mA 24V时15mA、交流型: 10mA以下、DC＜15mA、AC＜10mA			
输出电流 Output current				直流:200mA，交流型:300mA			
可输出电压降 Output voltage drop DC/AC				直流(NPN PNP)3V以下，交流型:7V以下、DC＜3V、AC＜7V			
响应频率 DC/AC Response frequency				直流:50Hz，交流型:10Hz			
外壳材料 Shell material				金属 Metal	ABS树脂/金属 Resin,Metal	金属 Metal	金属 Metal/ABS树脂 Resin
工作环境温度 Working environment temperature				-25℃~70℃			
绝缘电阻 Insulation resistance				50MΩ			
防护等级 Protection grade				IEC标准IP54 IEC standard IP54			
可替代国内型号 Alyemative model at home and abroad					LJC18A3-□□	LJC24A3-□□	E2K-X15M□

结构分类 Structural category				电容式接近开关 Capacitance proximity switch				
外形编号Outward Appearance code				CM20	CM34	CM35	CMF37	E2K
外形图例 Outward appearance illustration								
外形尺寸 Overall dimensions								
检测距离 DETECTION DISTANCE								
埋入式 Flush	直流 DC 6-36 VDC	NPN	NO					
			NC					
			NO+NC					
		PNP	NO					
			NC					
			NO+NC					
	交流 AC 90-250 VAC	SCR 可控硅 Control-lable silicon	NO					
			NC					
检测距离 DETECTION DISTANCE				0-10mm	0-20mm	0-25mm	0-25mm	0-10mm
非埋入式 Non-Flush	直流 DC 6-36 VDC	NPN	NO	CM20-3010NA	CM34-3020NA	CM35-3025NA	CM37-3025NA	E2K-F10MC1
			NC	CM20-3010NB	CM34-3020NB	CM35-3025NB	CM37-3025NB	E2K-F10MC2
			NO+NC	CM20-3010NC	CM34-3020NC	CM35-3025NC	CM37-3025NC	E2K-F10MC3
		PNP	NO	CM20-3010PA	CM34-3020PA	CM35-3025PA	CM37-3025PA	E2K-F10MF1
			NC	CM20-3010PB	CM34-3020PB	CM35-3025PB	CM37-3025PB	E2K-F10MF2
			NO+NC	CM20-3010PC	CM34-3020PC	CM35-3025PC	CM37-3025PC	E2K-F10MF3
	交流 AC 90-250 VAC	SCR 可控硅 Control-lable silicon	NO	CM20-2010A	CM34-2020A	CM35-2025A	CM37-2025A	E2K-F10MA0
			NC	CM20-2010B	CM34-2020B	CM35-2025B	CM37-2025B	E2K-F10MAC
可检测体 Detectable object				导体及介电体 conductor and dielectric body				
消耗电流 Consumption current				直流(NPN PNP)型 DC12V时8mA 24V时15mA、交流型: 10mA以下、DC＜15mA、AC＜10mA				
输出电流 Output current				直流:200mA，交流型:300mA				
可输出电压降 Output voltage drop DC/AC				直流(NPN PNP)3V以下，交流型:7V以下、DC＜3V、AC＜7V				
响应频率 DC/AC Response frequency				直流(NPN-PNP) 50Hz，交流型:10Hz				
外壳材料 Shell material				ABS树脂 Resin	ABS塑料 Plastic	ABS塑料 Plastic	ABS塑料 Plastic	ABS塑料 Plastic
工作环境温度 Working environment temperature				-25℃~70℃				
绝缘电阻 Insulation resistance				50MΩ				
防护等级 Protection grade				IEC标准IP54 IEC standard IP54				
可替代国内型号 Alyemative model at home and abroad					E2K-C25□□			