

PRINCO™

Instrumentation designed with user in mind.

具有先进技术的测量和控制仪表

● 物位 Level



阻旋式料位控制器

Rotary Paddle Level Controller



中美合资上海普菱柯(PRINCO)仪器仪表有限公司
Sino-US Joint Venture Shanghai Princo Instrumentation Co., Ltd.

公 司 简 介

中美合资上海普菱柯 (PRINCO) 仪器仪表有限公司是由创立于1910年的美国公司PRINCO INSTRUMENTS CO., LTD和上海雄风自控工程有限公司共同投资建立的中美合资企业。专业从事物位仪表的技术引进、新产品研发和制造。公司拥有世界一流的生产基地和强大的技术研发团队。目前已推向市场的产品有超声波液位计、雷达物位计、重锤物位计、音叉物位计、阻旋料位计、射频导纳物位计、磁性液位计等。“完美的物位控制过程就是一件完美的艺术品”是我们不懈追求的目标。立足合资品牌，力求完美品质，上海普菱柯 (PRINCO) 仪器仪表有限公司竭诚为全球用户提供值得信赖的产品和服务。

Company Introduction

Shanghai Princo Instrumentation Co, Ltd is a Sino-US joint venture company established by Princo Instrument, Inc, the American company founded in 1910, and Shanghai Xiongfeng Automation Control Engineering Co., Ltd, the Chinese company founded in 1995.

We are specialized in importing advanced technology of level control instruments, researching, designing and producing instruments with high quality. Shanghai Princo have top graded production base and outstanding technology research group. Our main products on offer includes the ultrasonic level meter, smart radar level controller, smart inventory level monitor, vibrating fork level controller, rotary paddle level controller, radio frequency level controller, magnetic liquid level switch, etc. Our unremitting goal is “Making the level control process as perfect as excellent art craft”. Based on JV brand, aiming for perfection in quality, Shanghai Princo will make zealous efforts to provide most reliable products and service to customers all over the world.

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Applications Help is J

目 录

工作原理.....	1
特点.....	1
应用场合.....	1
技术参数.....	2
产品选型.....	2
仪表接线图.....	3
使用方法.....	3
旋翼（叶片）形状及尺寸.....	5
法兰形状及尺寸.....	7
外形尺寸.....	8
扭力调整.....	11
常见故障与排除.....	11
日常维护.....	11
开箱检验.....	11

阻旋式料位控制器

中美合资上海普菱柯有限公司是美国PRINCO仪器仪表有限公司和上海雄风自控工程有限公司共同出资成立的合资公司。

L6700系列阻旋式料位控制器，适用于工业生产过程中敞开容器或密闭及带微压容器内的料位进行控制。当料位到达高、低限时，控制器的微动开关触点输出报警或控制信号。

控制器分防爆和非防爆两大类。防爆型控制器采用隔爆形式，防爆等级为dIIBT4。

控制器结构简单，安装容易，可被安装在任何形状的仓、斗、罐等容器内，用来测量大多数的固体物料，工作可靠，准确控制物料，使用极其广泛，维护方便，是一种理想的简易料位控制仪表。

■工作原理：

控制器由减速同步电机，叶片（旋翼）和过载检测微动开关等部分组成。

当被测物料上升时，叶片旋转受阻，主轴停转，电机继续运行，从而过载检测部分作微量转动，使其中一只微动开关动作，发出触点通断信号，在电机继续运行情况下，又使另一只微动开关动作，达到自动关闭同步电机电源，延长使用寿命，减少日常维护的作用。

叶片旋转不受阻时，电机电源接通，叶片开始旋转，微动开关又回复到原来状态，触点信号变化。

■特点：

- 1、由于采用机械式的检测方法，没有复杂的电路放大部分，安装后无需调整。
- 2、内部结构可以很方便地拆卸，便于点检、维护。
- 3、具有优良的耐久性，由于无力矩损失，再现性良好，性能极稳定。
- 4、可简单地进行力矩调整。
- 5、叶片即使受到了过份的力，由于打滑机构的作用，可保护电机的安全。
- 6、不会产生因温度、湿度、粘附等环境因素造成的误动作。
- 7、由于部件数很少，加之采用点焊、铆接，特别耐振动。
- 8、主轴采用多重密封，可完全防止粉尘的侵入。
- 9、采用了密封结构，可在露天使用。
- 10、采用了隔爆形式，适用于防爆dIIBT4等级场合。

■应用场合：

通常的应用场合包括，但不限于：

饲料、面粉、皮革料、研磨料、泥土、石块、木料、橡胶、豆类、钙粉、沙子、药丸、锯末、煤、合成树脂、谷物、石灰石、混合沙料、金属物、食盐类等。

■技术参数:

- 1、电源选择: AC 110V 50HZ或220V 50HZ
- 2、最大功耗: 1.8W
- 3、环境温度: -10℃ ~ 80℃
- 4、工作温度: 常温、高温<200℃ (特规另订)
- 5、触点容量: AC 220V 5A
- 6、旋转速度: 1R.P.M.
- 7、静力矩: 约1.0kgcm (可变范围0.6 ~ 1kgcm)
- 8、使用压力: 0 ~ 0.2Mpa
- 9、测量范围: 普通型<0.5m, 默认标准0.25m
伸缩杆0.5 ~ 3m
钢丝绳 1 ~ 30m
- 10、防爆等级: dIIBT4
- 11、安装型式: 管螺纹NPT1½”
法兰 (也可根据用户特订)
- 12、电气接口: M20 × 1.5

■产品选型:

L6700阻旋式料位控制器

L6700 - X X XX X XX XX

防爆标志

无标志: 不防爆
Ex: 隔爆型

插入形式与
插入长度

PX: 侧面或垂直安装, 带保护管, X为插入长度, 默认标准250mm, 用户可自选, 最长500mm
PA: 垂直安装, 伸缩杆式, 插入长度无级可调, 范围在500 ~ 1000mm内
PB: 垂直安装, 伸缩杆式, 插入长度无级可调, 范围在1000 ~ 2000mm内
PC: 垂直安装, 伸缩杆式, 插入长度无级可调, 范围在1500 ~ 3000mm内
WX: 垂直安装, 钢丝绳式, X为插入长度, 由用户自选, 选用范围在1000 ~ 30000mm内。

旋翼形状

A: 括刀旋翼
B: 单片旋翼 (必须法兰安装)
C: 单片大旋翼 (必须法兰安装)
D: 可收缩旋翼 (必须垂直安装)
E: 十字旋翼 (可定位)
F: 重锤旋翼 (必须法兰、垂直安装)
G: 3片旋翼 (必须法兰安装)

结构形状

00: 1½” 管螺纹安装
01A: 标准法兰安装
01B: 单片大旋翼法兰安装
01C: 3片旋翼法兰安装
01D: 用户自定义法兰安装
02: 高温型
03: 加强型

安装方式

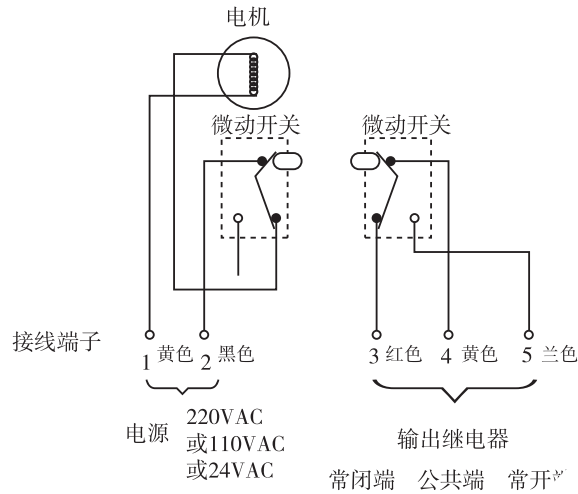
C: 侧装式 (水平)
D: 顶装式 (垂直)

供电电源

1: 110VAC
2: 220VAC
3: 24VAC

例：L6700-2D01ABPB	220VAC	顶装	标准法兰	单片旋翼	伸缩杆1000 ~ 2000mm
L6700-2C00BP300	220VAC	侧装	1½” 管螺纹	单片旋翼	带保护管插入300mm
L6700-2C00BP	220VAC	侧装	1½” 管螺纹	单片旋翼	带保护管插入250mm
L6700-2D01AFW2000	220VAC	顶装	标准法兰	重锤旋翼	钢丝绳式插入2000mm

■仪表接线图：



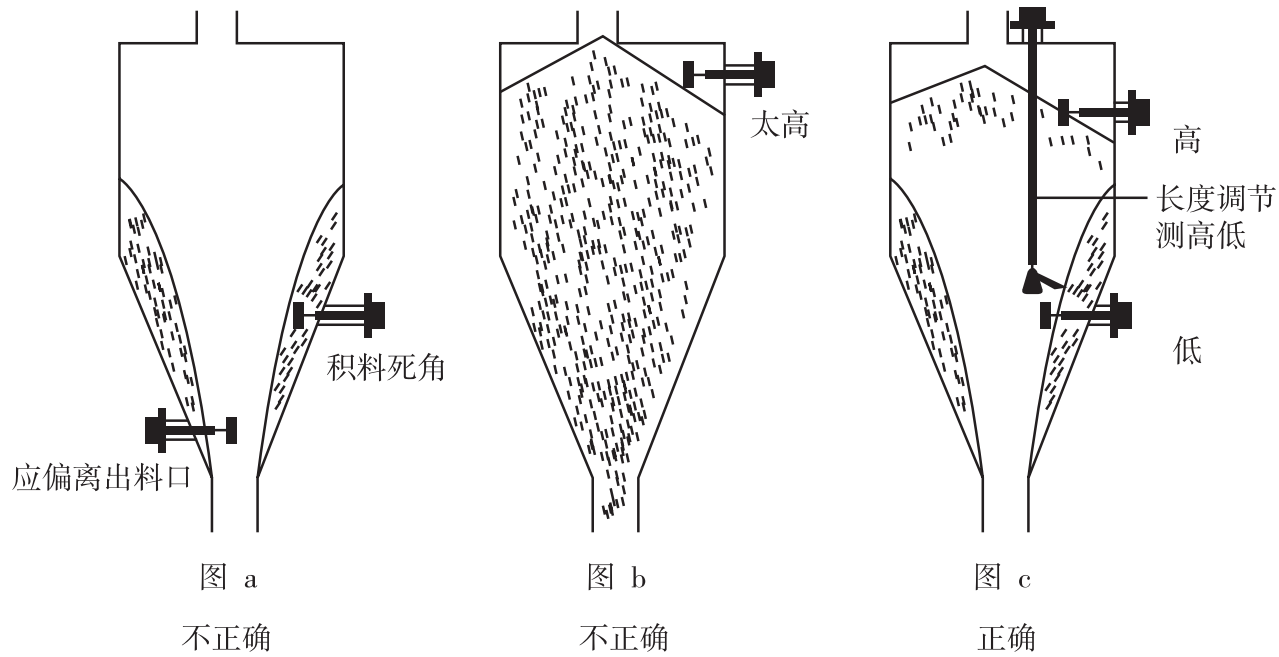
■使用方法：

1、安装位置的正确选择：

为保证控制器输出正确，除选择正确的插入长度规格外，安装的高度，位置要适当，以免输出错误的料位信号。

a. 请安装在物料实际变化的位置。

物料必须能够自由地流向或离开旋翼和转轴。



例如所选控制器插入长度规格较短，下料位安装位置过低或没避开积料死角，结果空仓时仍输出有料信号（图a）。上料位安装位置过高，满仓时，仍输出未满仓信号（图b），正确位置应如图C。

- b. 应防止加料时使旋翼和转轴受到块状物料的冲击。必要时，应加保护罩（板）或使安装位置偏离料流。
- c. 安装应尽可能避开有长时间连续振动的位置。
- d. 上料位控制：可采用水平安装形式，但建议采用垂直安装，转轴长度可在现场进行调整，以满足不同用途的需要。垂直安装工作可靠，安装方便，转轴长度调整容易，还可防止振动。

旋翼应安装得足够低，以使物料安息角最大时，旋翼也能被物料完全盖住。

- e. 下料位或中间料位控制：

一般采用水平安装，但对中、小型料仓，有时采用垂直安装也很好。

如果旋翼可能受到大股料流的冲击，建议采用加强型结构安装（水平）。另外下料位检测时，旋翼应偏离出料口，否则在卸料时旋翼会随料流摆动，从而使输出信号不断变化波动。（图a）

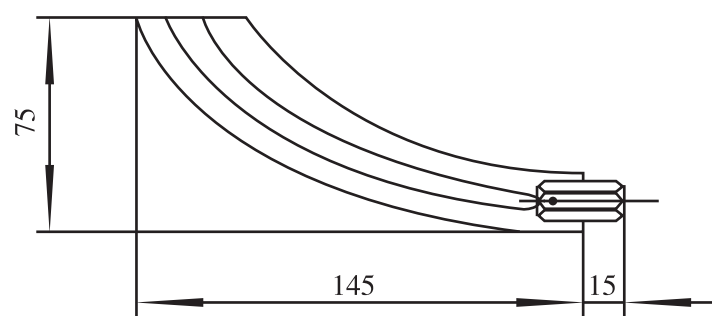
2. 环境条件的对策：

- a. 腐蚀性：所有伸入仓内的零部件都采用不锈钢制造。
- b. 温度：一般可达 $-10^{\circ}\text{C} \sim 80^{\circ}\text{C}$ ，如超过 80°C 而低于 200°C 可用高温型带散热片的结构。
- c. 潮气：在压力不大于 0.2MPa 的情况下，轴封能防止内部驱动轴和轴承受到潮气的侵蚀。
潮气会影响物料的流动性，并使它粘附在仓壁上，因此建议采用垂直安装，使旋翼向下延伸到自由流动区。
- d. 细粉：对于细微粉末，建议采用大的旋翼。对于非常轻质的材料（比重小于 0.48g/cm^3 ）或采用气力输送的粉料，应垂直安装和大的旋翼。
- e. 大块物料：建议采用带有挠性的旋翼结构，适于垂直安装，并且必须安装在紧靠仓壁的地方。
- f. 压力或真空：该控制器中的轴封在压力不大于 0.2MPa 时，能阻止 0.5 微米的粒子进入轴承，这对气力输料系统尤为重要。

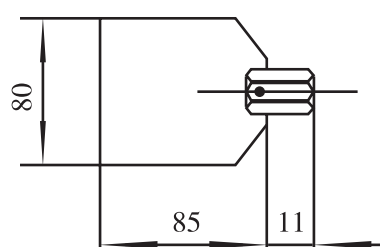
在真空中，轴封额定压力为 -0.05MPa 。如因较高的真空度，只需在出线孔内加上密封件，在表盖密封垫圈上涂上适当的密封化合物。

■旋翼（叶片）形状及尺寸：

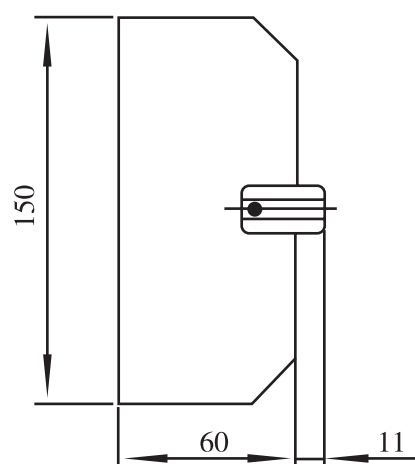
括刀旋翼(A型)



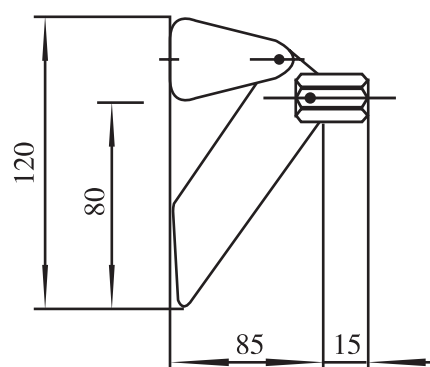
单片旋翼(B型)



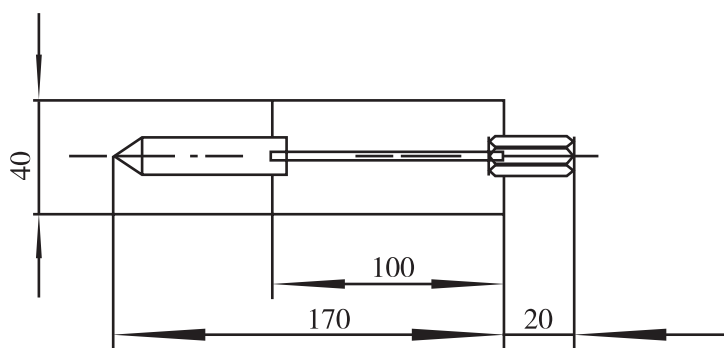
单片大旋翼(C型)



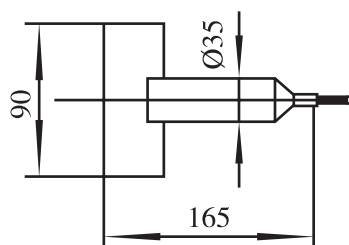
可收缩旋翼(D型)



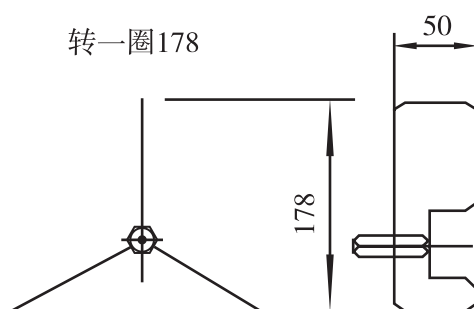
十字旋翼(E型)



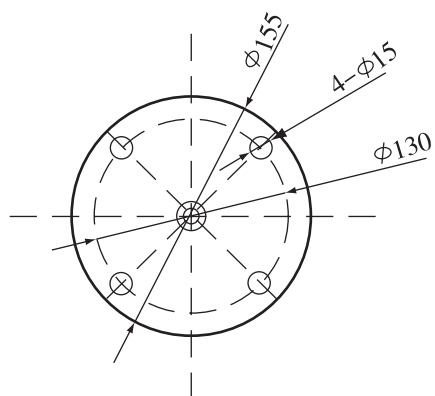
钢丝绳垂锤旋翼(F型)



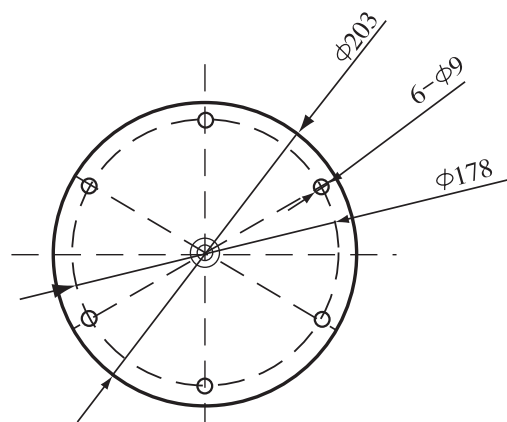
3片旋翼(G型)



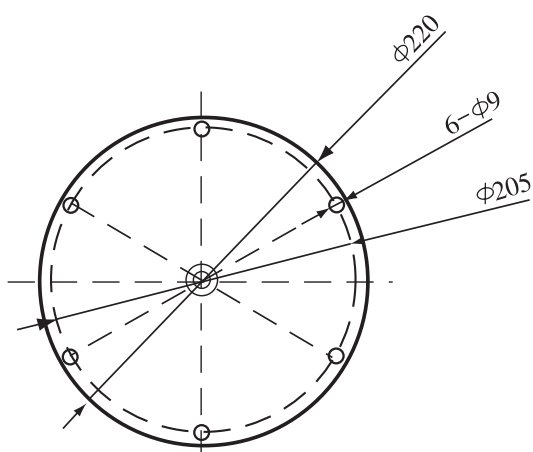
■ 法兰形状及尺寸：



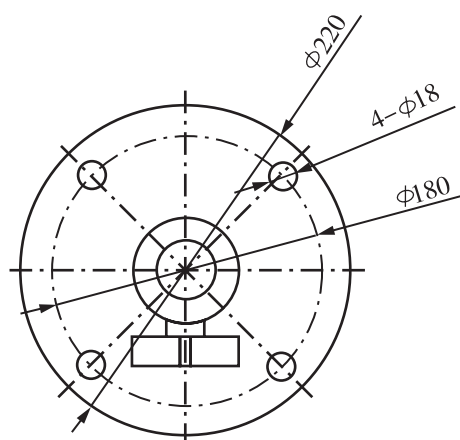
01A. 标准法兰



01B. 单片大旋翼法兰



01C. 3片旋翼法兰



03. 加强型法兰

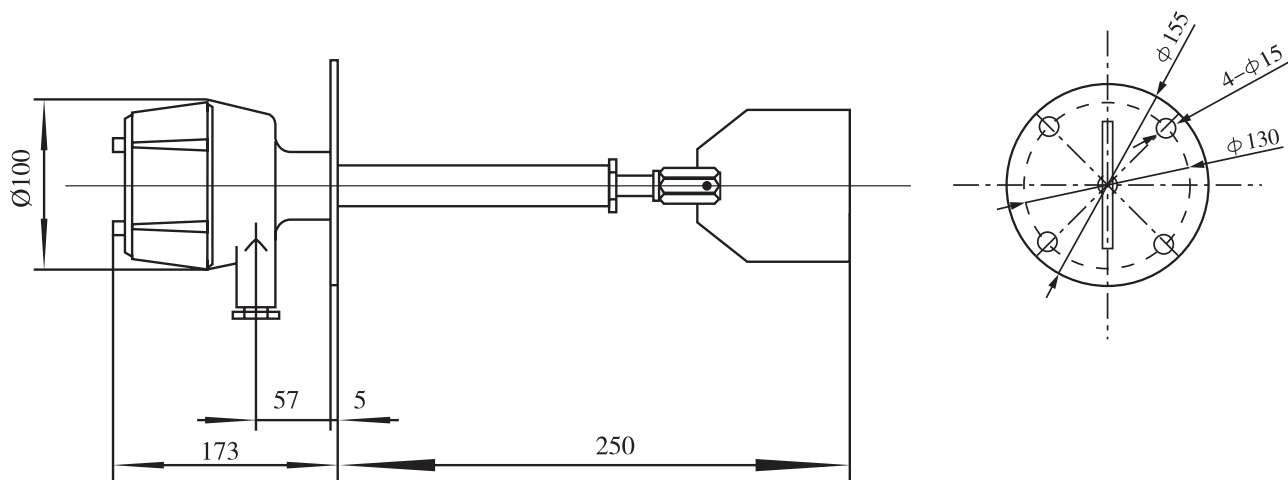
备注： 01A. 用户可开孔-5

01B. 用户可开孔-55

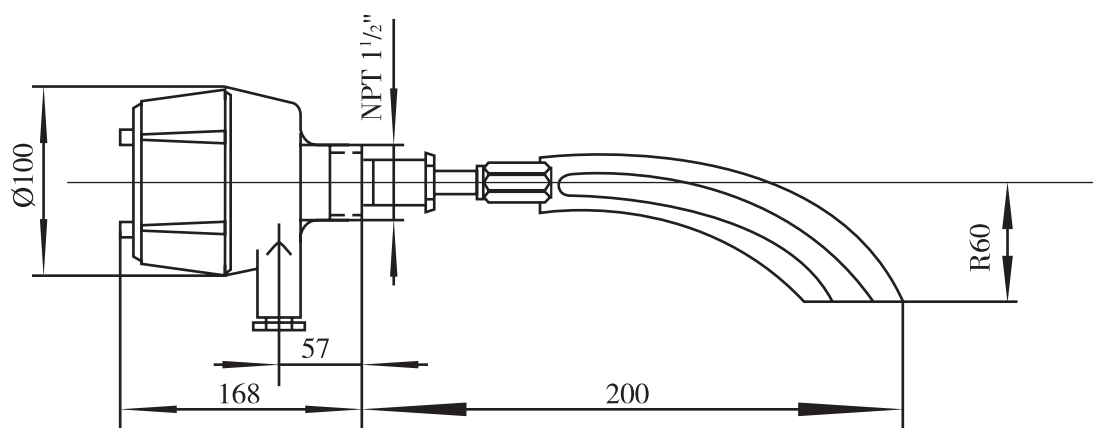
01C. 用户可开孔-85

■外形尺寸:

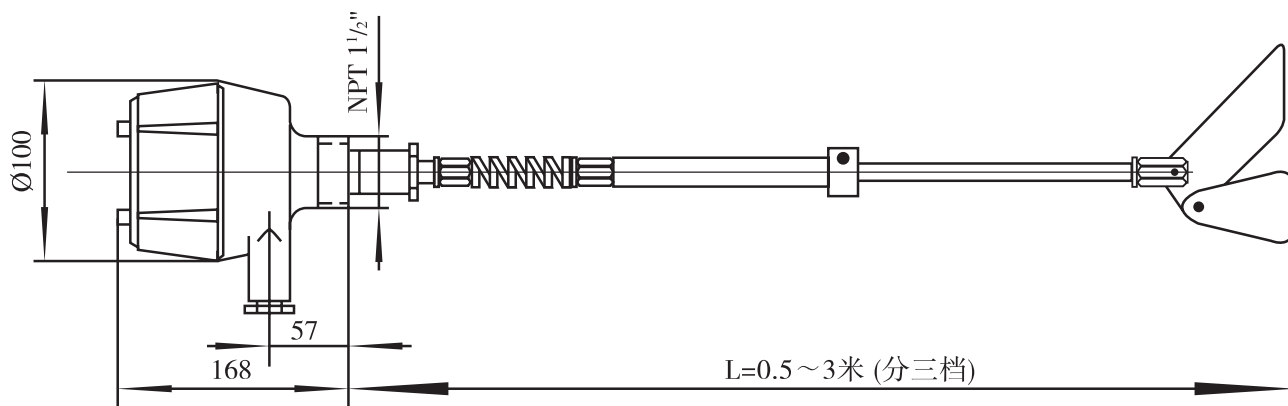
标准型法兰水平安装（带保护管）



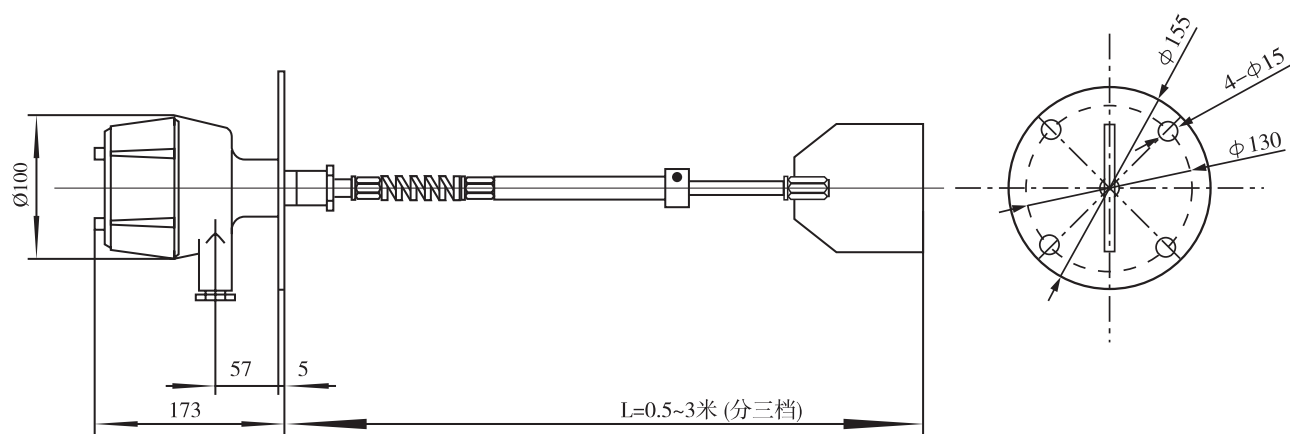
标准型管螺纹水平安装



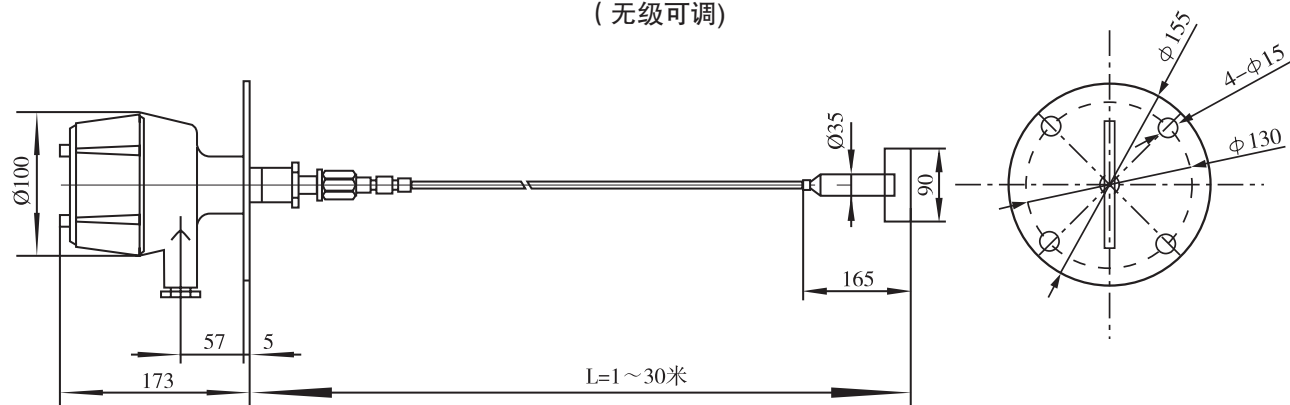
杆式螺纹垂直安装
(无级可调)



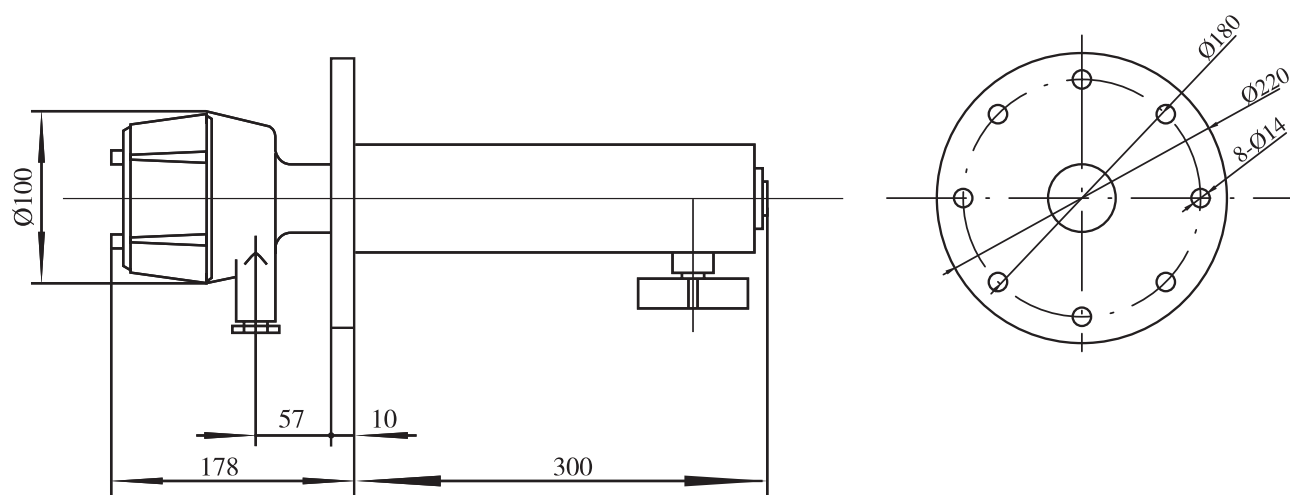
杆式法兰垂直安装
(无级可调)



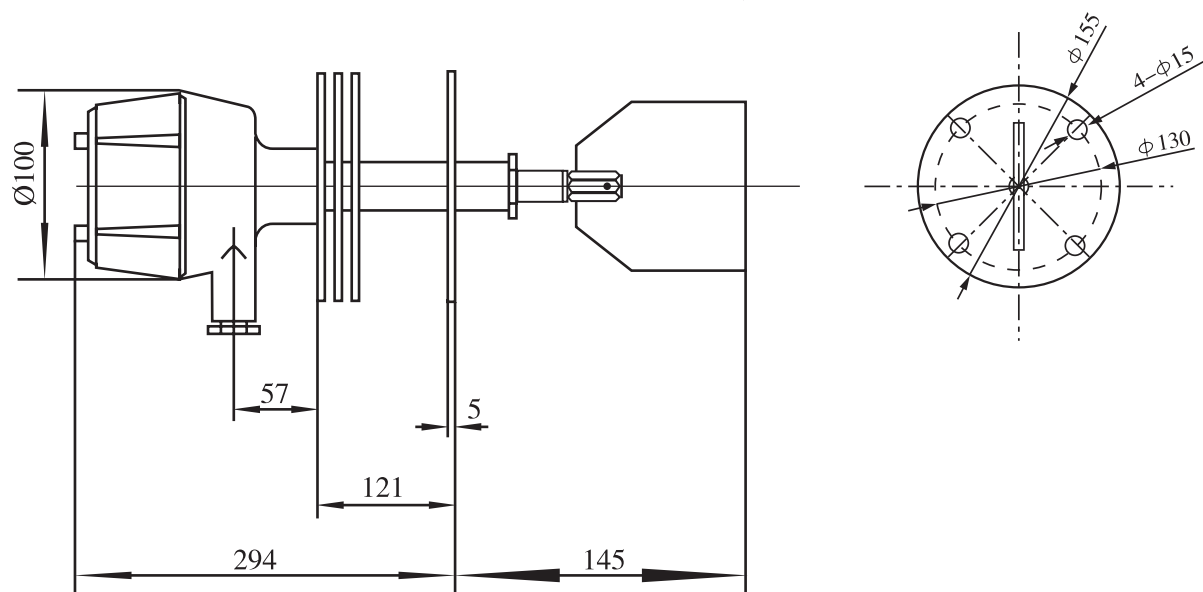
钢丝绳法兰垂直安装
(无级可调)



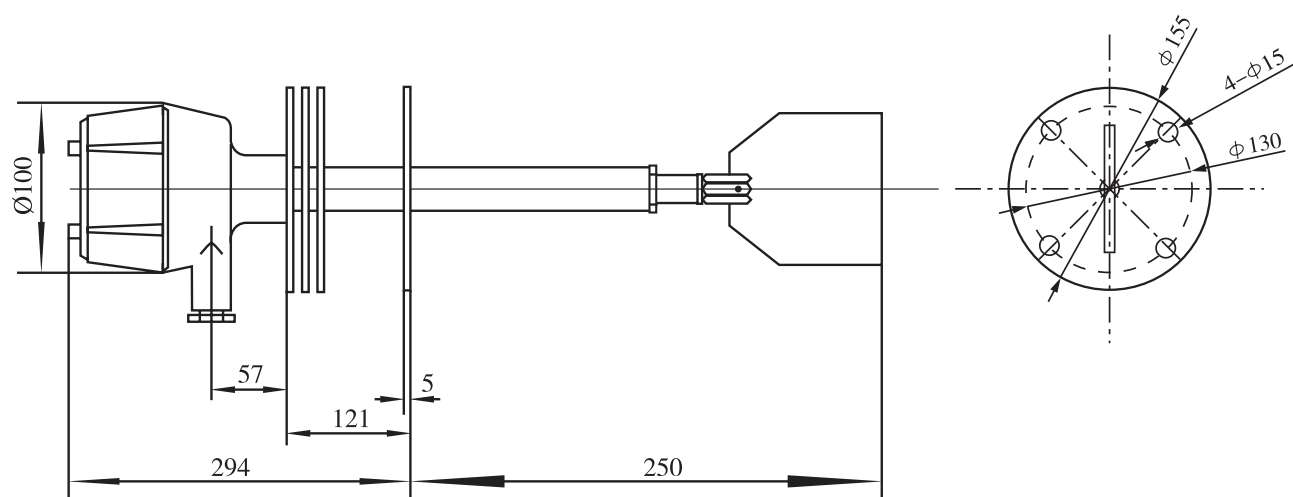
加强型法兰水平安装



高温法兰垂直安装



高温法兰水平安装（带保护管）



■扭力调整：

1.用户可根据被测物的比重大小进行扭力调整。当被测物比重大时，可将弹簧扭力调至强档（外档）。当被测物比重小时，可将弹簧扭力调至弱档（内档）。

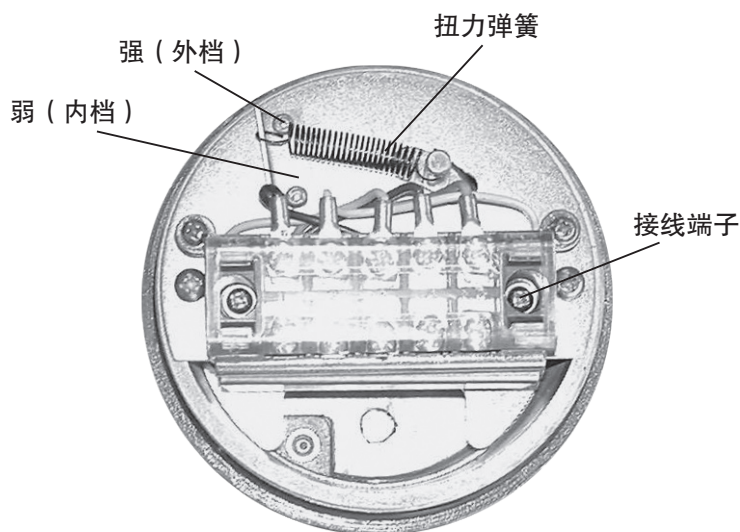
2.具体方法：打开接线盒盖，将扭力弹簧从调节孔一端取出。根据需要插入相应的调节孔中（靠近接线端子端的孔调节扭力最弱）。

建议：A. 块状料，弹簧放外档。

B. 小石子或粒子料，弹簧放中档。

C. 粉体料，弹簧放内档。

注意：在使用过程中，请勿随意更换扭力弹簧的位置。



■常见故障与排除：

故障现象	原因分析	排除方法
1.物料达到时旋翼仍转动。	旋翼尺寸与物料比重不符。	重新选定旋翼形状。
2.旋翼变形或传动轴变形弯曲。	物料冲击力太大。	改变安装位置、形式，加防护措施。
3.旋翼不转动。	电源未接好， 电机烧坏。	检查线路将电源接好， 与本公司联系更换电机。

■日常维护：

1.检查传动轴、旋翼是否弯曲变形或损坏。

2.检查传动轴与旋翼之间的连接是否牢固。

3.定期清除旋翼及传动轴上的物料及杂物。

■开箱检验：

1.外包装应完好无损。

2.开箱时若发现本产品有损坏或零部件脱落，请及时通知本公司。

3.装箱内容：

a) 产品台件数。

b) 产品说明书。

c) 产品合格证明。

Table of Contents

Principle of Operation	E-1
Features	E-1
Typical Application include	E-1
Specific	E-2
Ordering Information	E-2
Electrical Connection	E-3
Installation	E-3
Paddle Model & Dimension	E-5
Flange Model & Dimension	E-7
L6700 Model & Dimension	E-8
Adjustment of twisting force	E-11
Troubleshooting	E-11
Maintenance	E-11
Receiving and checking	E-11

Rotary Paddle Level Controller

Shanghai Princo Instrumentation Co., Ltd is a JV company established by Princo Instruments Co., Ltd (US) and Shanghai Xiongfeng Automation Control Engineering Co., Ltd.

Model L6700 rotary paddle level controller is widely used in open tank or airtight tank with low pressure in industrial applications. The L6700 controller will detect the level of material in tank, and turn into alarm status when the tank is full/empty.

The L6700 can be mounted onto different shaped tank, vessels easily. It can work reliable to measure the level of most kinds of solid material.

Principle of Operation:

When the paddle is impeded by material, the paddle will be stopped: the motor rotates within the housing which triggers two switches. The first switch will send out an On/Off signal; at the same time, the other switch will cut the power to the motor, preventing a locked rotor condition, thus extending motor life.

When the material is below the paddle, the controller will be re-powered and work again.

Features:

1. Easy to install, use, repair and maintenance.
2. The user can adjust the moment easily.
3. Technology of the skid part can protect the paddle, and extends motor life.
4. The technology of seal keeps the instrument from powder.

Typical Application include, but are not limited to:

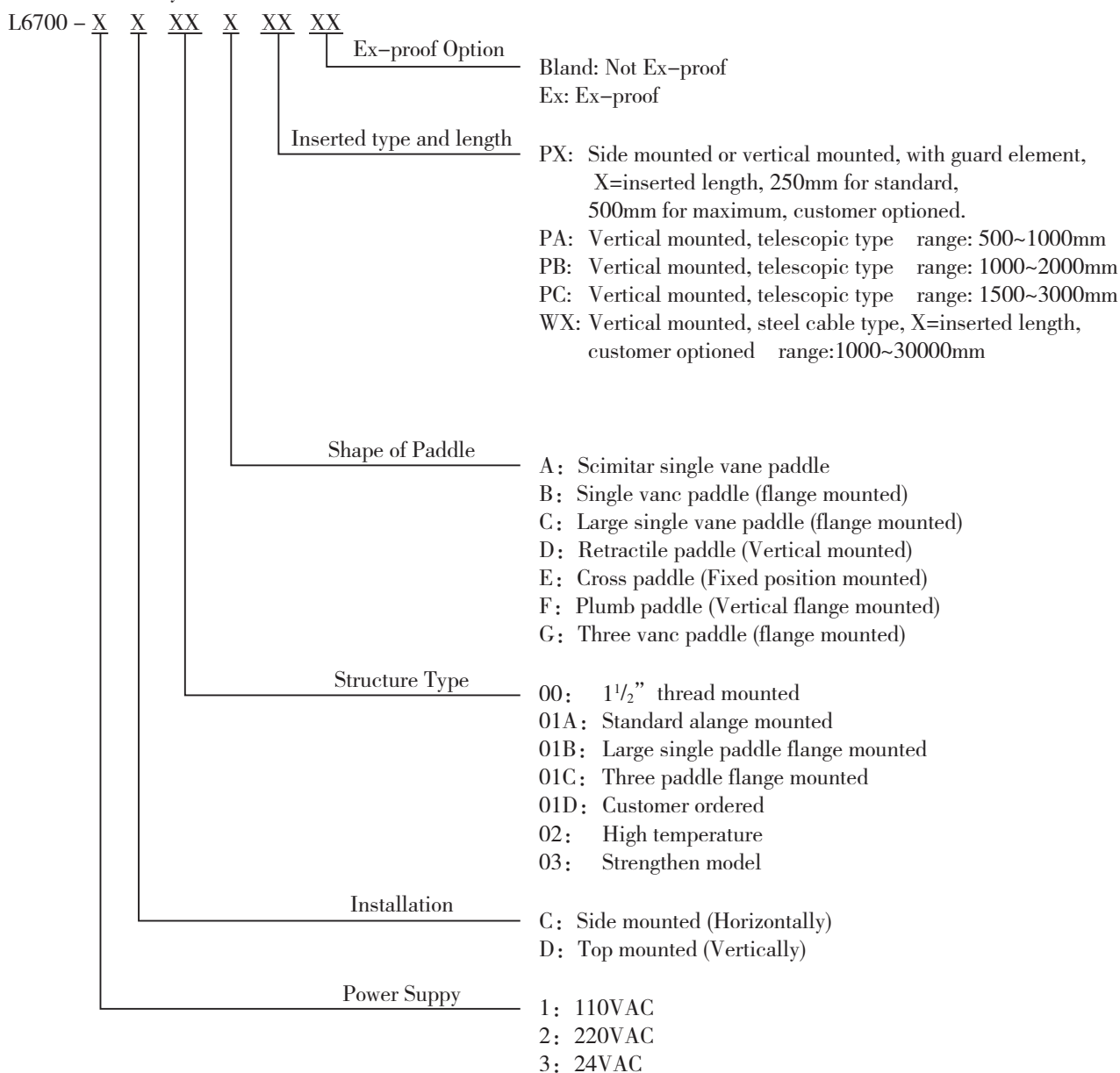
Feed, flour, leather, regrind, clays, rocks, wood, rubber, legume, calcium dust, sand, medicine, sawdust, coal, Vinylite, grain, limestone, mixed ingredients, metals, salt.

Specific:

1. Power requirements: AC 110V 50HZ or 220V 50HZ
2. Power Consumption: 1.8W max
3. Ambience Temperature: -10℃ ~80℃
4. Operator Temperature: common temperature, high temperature<200℃ (customer ordered)
5. Contact capacity: AC 220V 5A
6. Rotary speed: 1 R.P.M
7. Static moment: 1.0kgcm (variable 0.6-1kgcm)
8. Pressure: 0-0.2Mpa
9. Range of measurement: Ordinary type <0.5m, default standard=0.25m
Vertical mount: a. Telescopic 0.5-3m
b. Steel cable 1-30m
10. Explosion-proof Class: dIIBT4
11. Mounting connection: NPT 1½"; flange mounted (customer ordered)
12. Conduit connection: M20 × 1.5

Ordering Information:

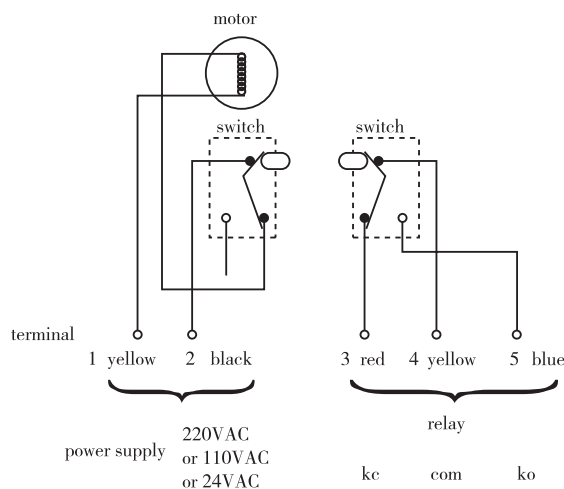
L6700 Rotary Paddle Level Controller



Examples:

L6700-2D01ABPB	220VAC, top-mounted, standard flange, single vane paddle, telescopic type range: 1000~2000mm
L6700-2C00BP300	220VAC, side mounted, 1½" thread mounted, single vane paddle, inserted length 300mm with guard element
L6700-2C00BP	220VAC, side mounted, 1½" thread mounted, single vane paddle, inserted length 250mm with guard element
L6700-2D01AFW2000	220VAC, top mounted, standard flange, plumb paddle, steel cable type of 2000mm

Electrical Connection:

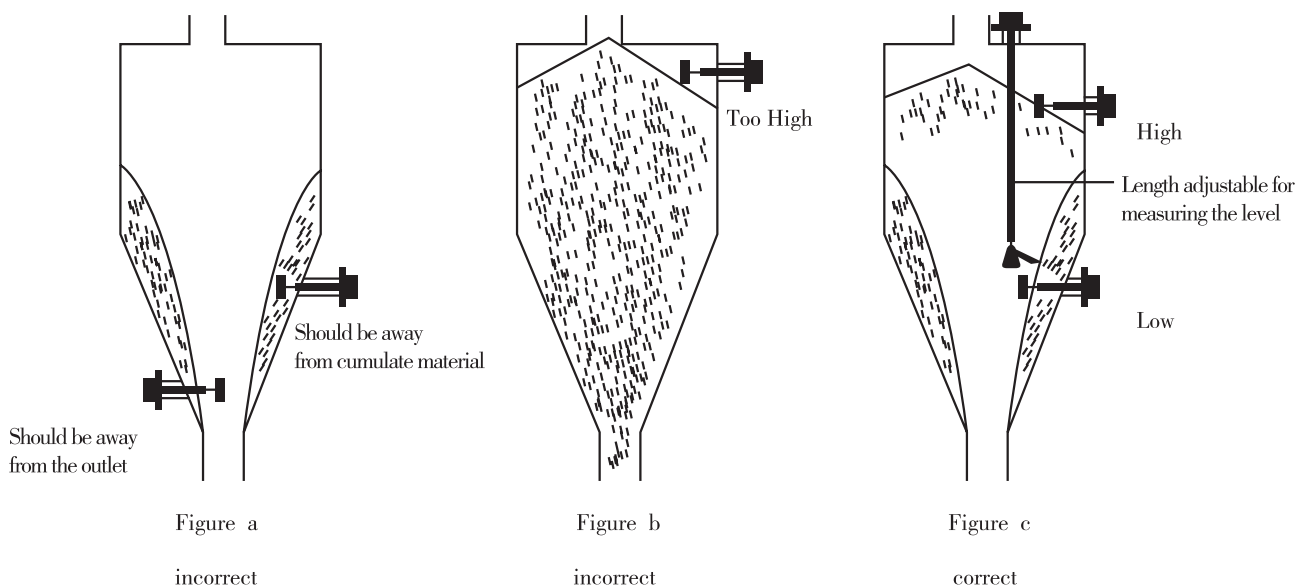


Installation:

1. Install position:

To ensure the correct current output, the user must choose the right position to install the rotary paddle level controller.

a. Install the instrument on the position that shows the change of material level.



If probe is too short, or mounted too close to the outlet or the cumulate material, the rotary paddle controller may show full even the tank is empty (see figure a); vice versa, if mounted too high. the controller may always show empty, even the tank is full (see figure b).

- b. Make sure the paddle and rotary shaft won't be impacted when adding the material into the tank. The user can add a guard element/board in the tank to protect the probe, if needed.
- c. Keep the unit away from the area that vibrating continuously.
- d. For the high position, it can be mounted in horizontal, but vertical mounting is recommended.

The length of rotary shaft can be adjusted on field according to the user's needs. Note: the paddle should be mounted low enough for measurement.

- e. For the low/middle position, it usually mounted in horizontal; the user also can choose vertical mount if the instrument is used on small or middle-sized tank.

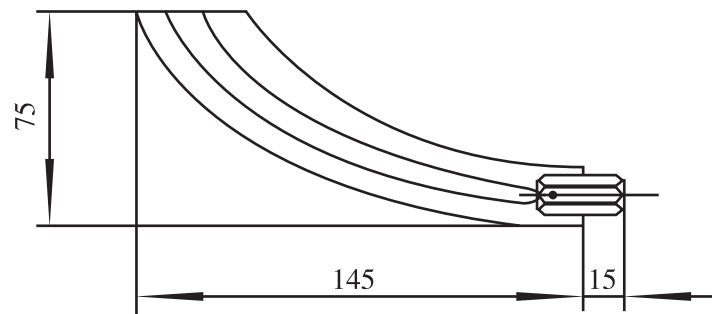
If the paddle may be impacted by material, the strengthen model is recommended this kind of application (horizontal mounted). Note, make sure the paddle is away from the outlet to avoid measuring mistake.

2. Environmental Factor:

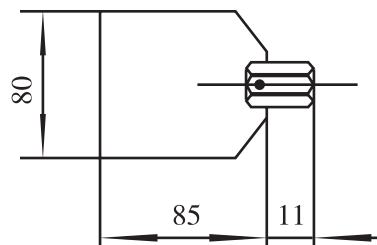
- a. Corrosive: All the parts that inserted into the tank should be made of stain steel.
- b. Temperature: For standard model: $-10^{\circ}\text{C}\sim 80^{\circ}\text{C}$ high temperature (with heat emission structure):
 $80^{\circ}\text{C}\sim 200^{\circ}\text{C}$
- c. Moisture: If the working pressure is smaller than 0.2MPa, the shaft seal can prevent the internal of unit away from moisture. As moisture will make the material tend to heap up on the probe, vertical mounting is commended.
- d. Fine power: Large single vane paddle (vertical mounting) is recommended for this application.
- e. Heavy material: Ex-flex probe (vertical mounting) is recommended. Note: The probe should be mounted close to tank wall.
- f. Pressure and vacuum: When the pressure is less than 0.2MPa, the shaft seal can prevent the internal of unit away from article of $0.5\mu\text{m}$. For application of vacuum, the rated pressure of axletree is -0.05MPa . If the degree of vacuum is high, customer can add some sealant into conduit to ensure the instrument is sealed.

Paddle Model & Dimension:

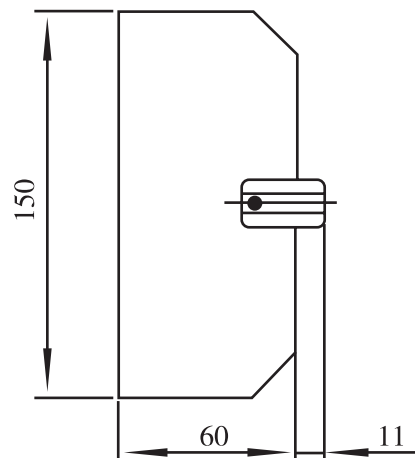
Scimitar single vane paddle (option A)



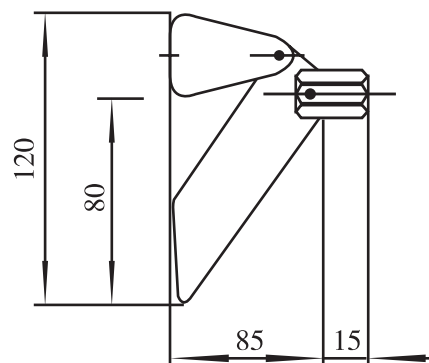
Single vane paddle (option B)



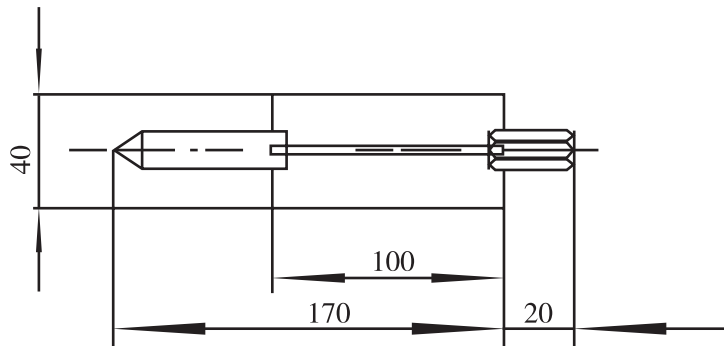
Large single vane paddle (option C)



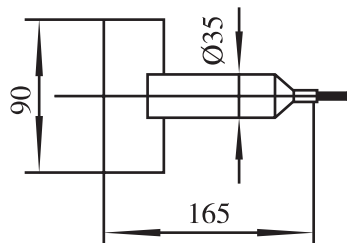
Retractable paddle (option D)



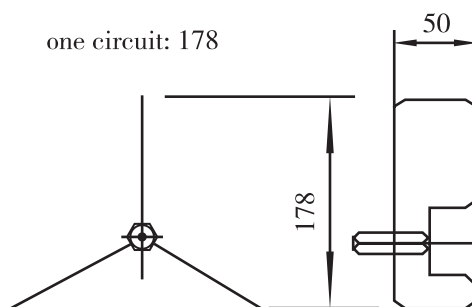
Cross paddle (option E)



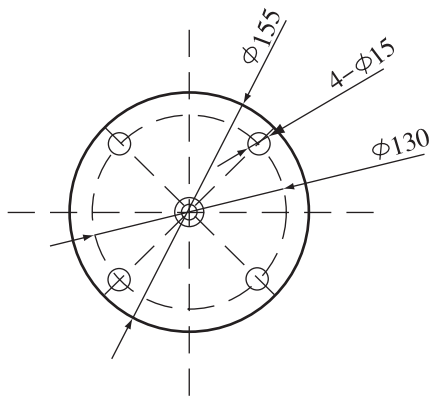
Plumb paddle (option F)



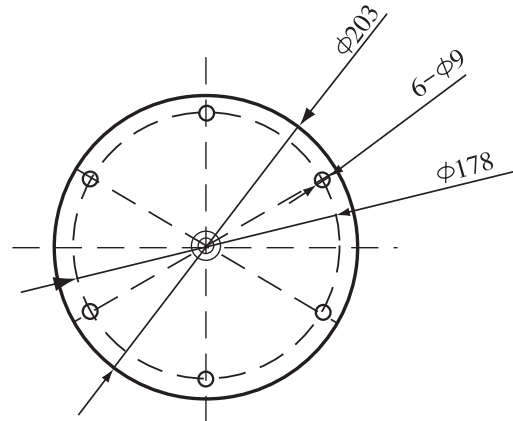
Three vane paddle (option G)



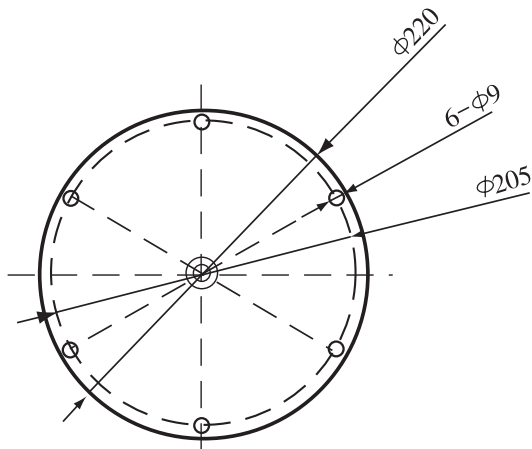
Flange Model & Dimension:



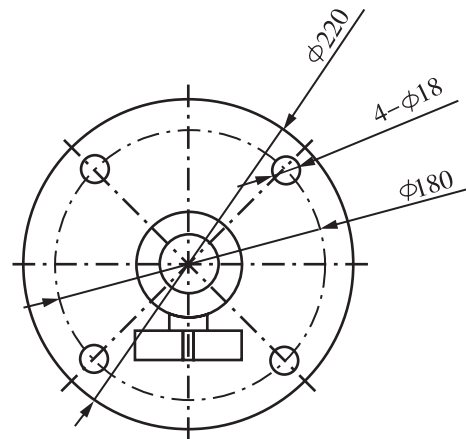
01A. Standard flange



01B. Flange for large single vane paddle



01C. Flange for three vane paddle



03. Flange for the strengthen model

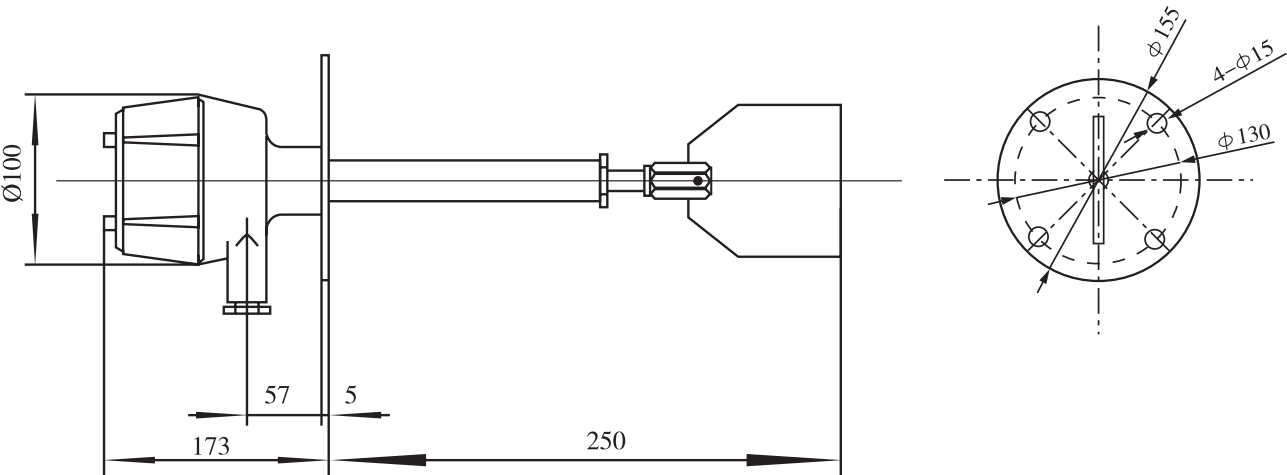
Note: 01A. Customer mounting hole ~ 5

01B. Customer mounting hole ~ 55

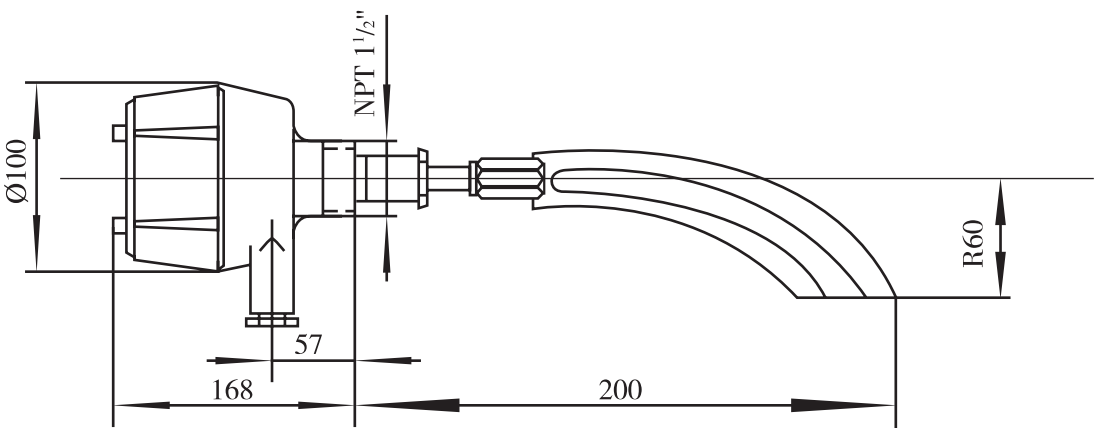
01C. Customer mounting hole ~ 85

L6700 Model & Dimension:

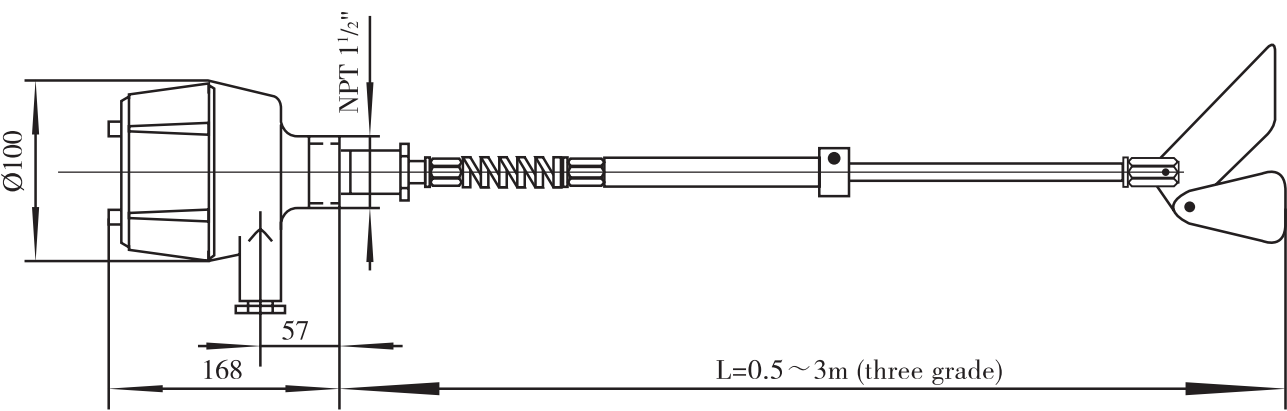
Standard horizontal flange-mounted, with guard element



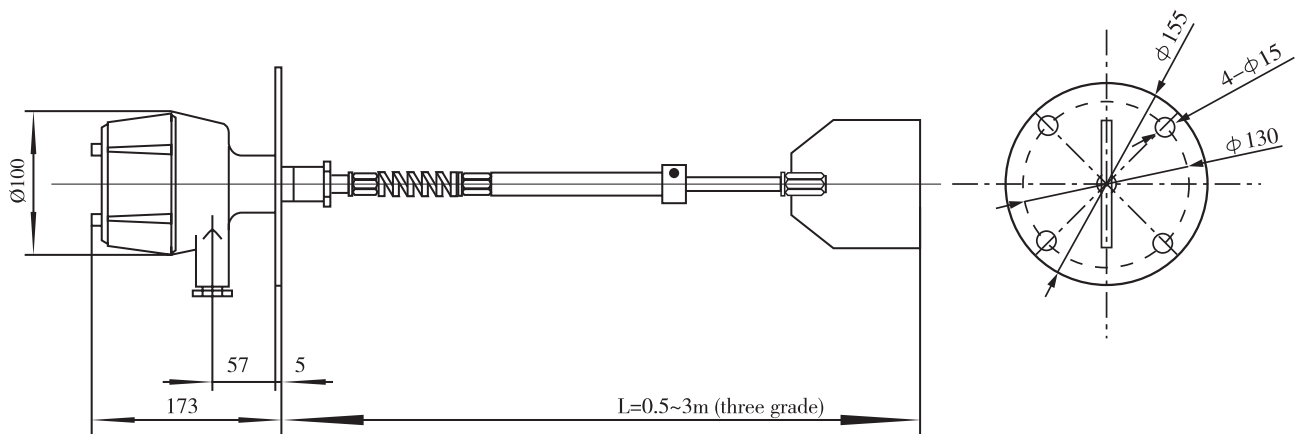
Standard horizontal thread-mounted



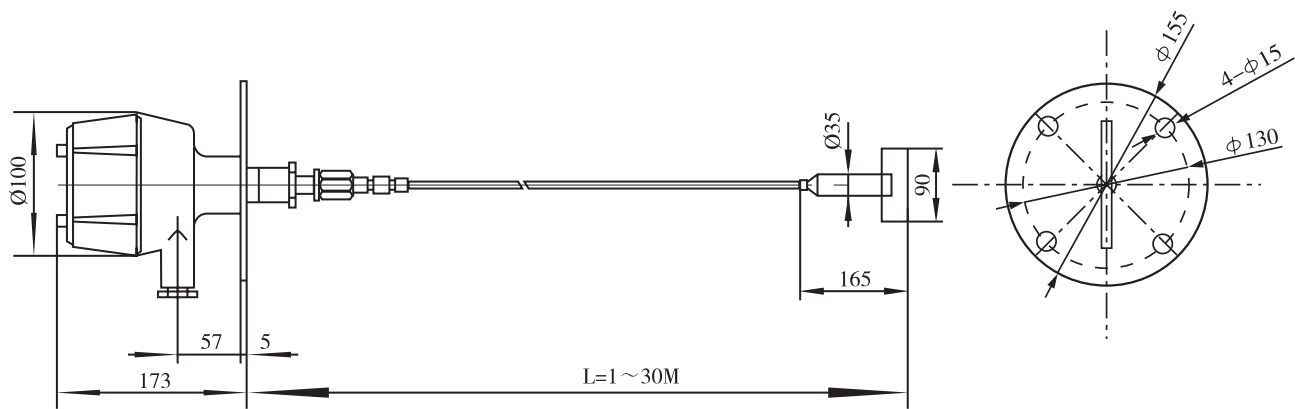
Pole style vertical thread-mounted



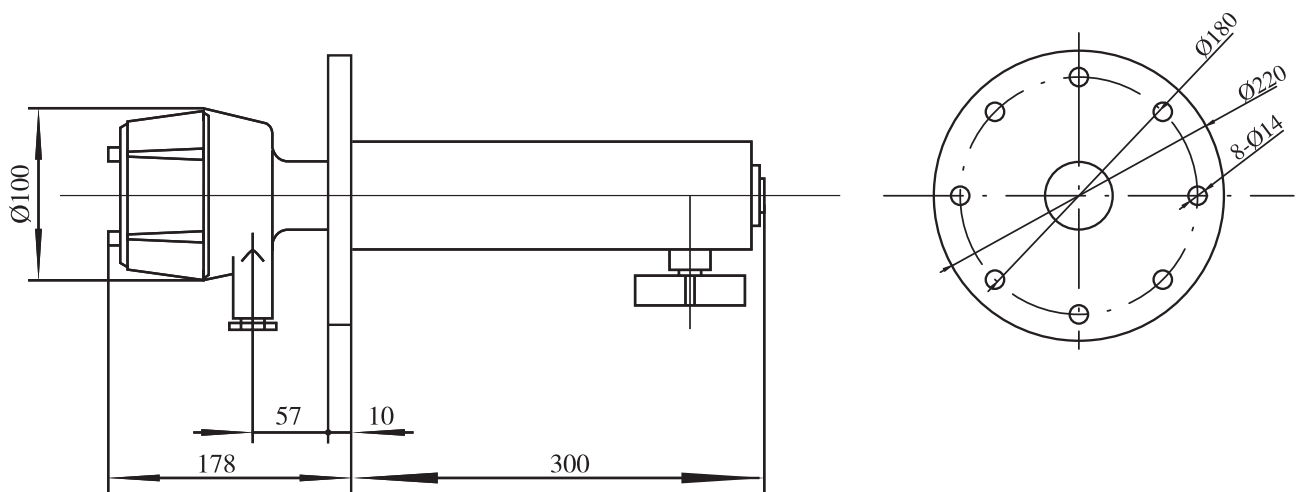
Pole style vertical flange-mounted



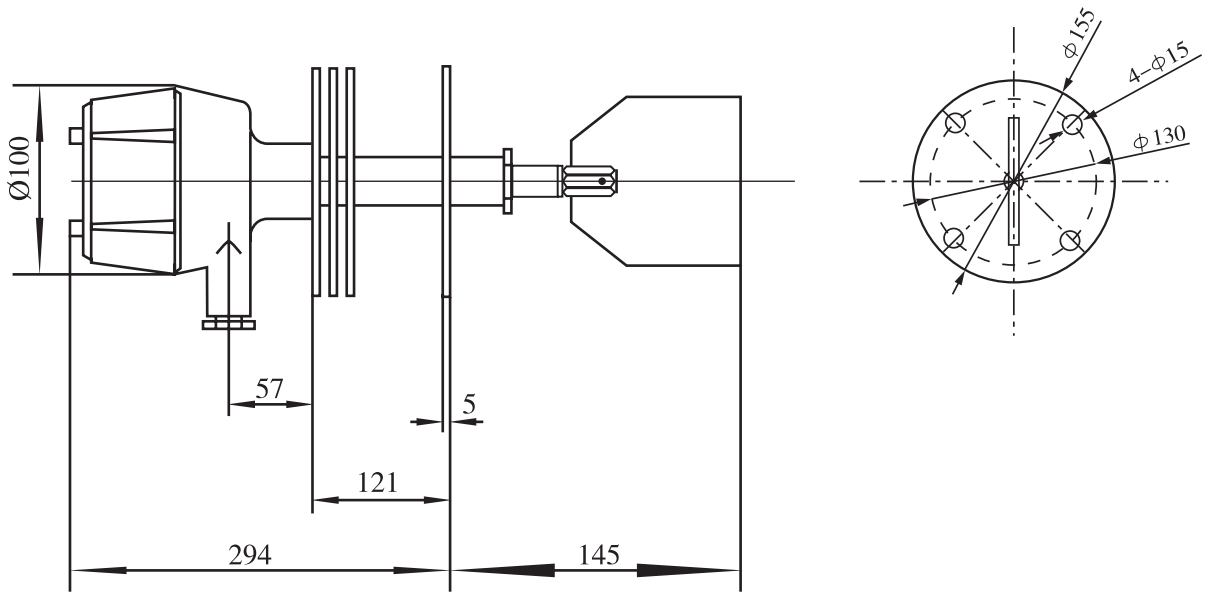
Steel cable vertical flange-mounted



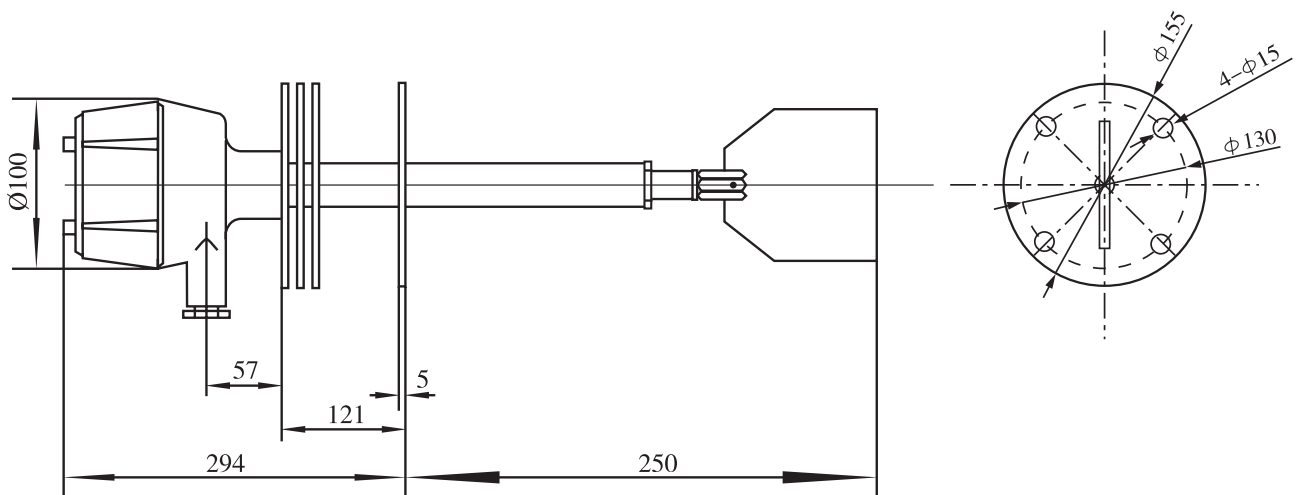
Strengthen model horizontal flange-mounted



High temperature vertical flange-mounted



High temperature horizontal flange-mounted (with guard element)



Adjustment of twisting force:

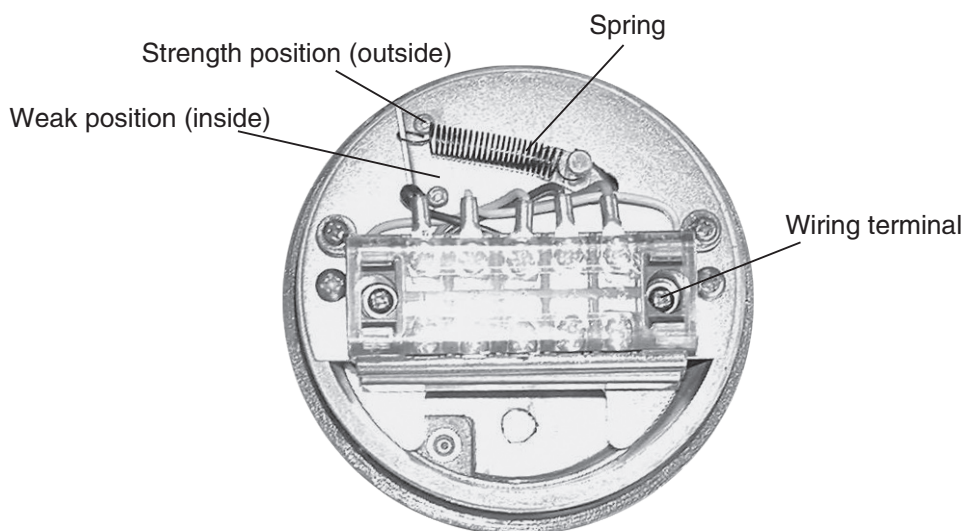
1. Twisting force can be adjusted according to the specific gravity of material. For heavy material, please adjust the spring to the position of intense (outside); for light material, the position of weak(inside) can be chosen.

2. Process of adjustment: open the junction box, take out one side of the spring, and put it into the position needed.

Suggestion:

- For heavy material, the position of strength (outside) is recommended.
- For scree or other grain, the middle position (middle side) is recommended.
- For powder, the position of weak (inside) is recommended.

Note: Please don't move the spring when the instrument is working.



Troubleshooting:

Failure	Cause	Solution
1. Paddle still rotary when touch the material	Dimension of paddle didn't accord with Specific gravity of material.	Change the paddle.
2. Paddle or rotary shaft deformed.	Wallop of material is too strong	Change install position or model, take measure to protect the paddle
3. Paddle doesn't rotate.	Power not supplied, motor burned.	Check the circuit and wiring, contact the factory to replace the motor

Maintenance:

- Check the rotary shaft and the paddle for deformation or damage.
- Check the joint of shaft and paddle.
- Clear the paddle and rotary shaft timely.

Receiving and checking:

- Checking the package for delivery damager.
- Contact factory, if the instrument is broken.
- Content of package:
 - The instrument ordered
 - User manual
 - Certificate of quality



Applications

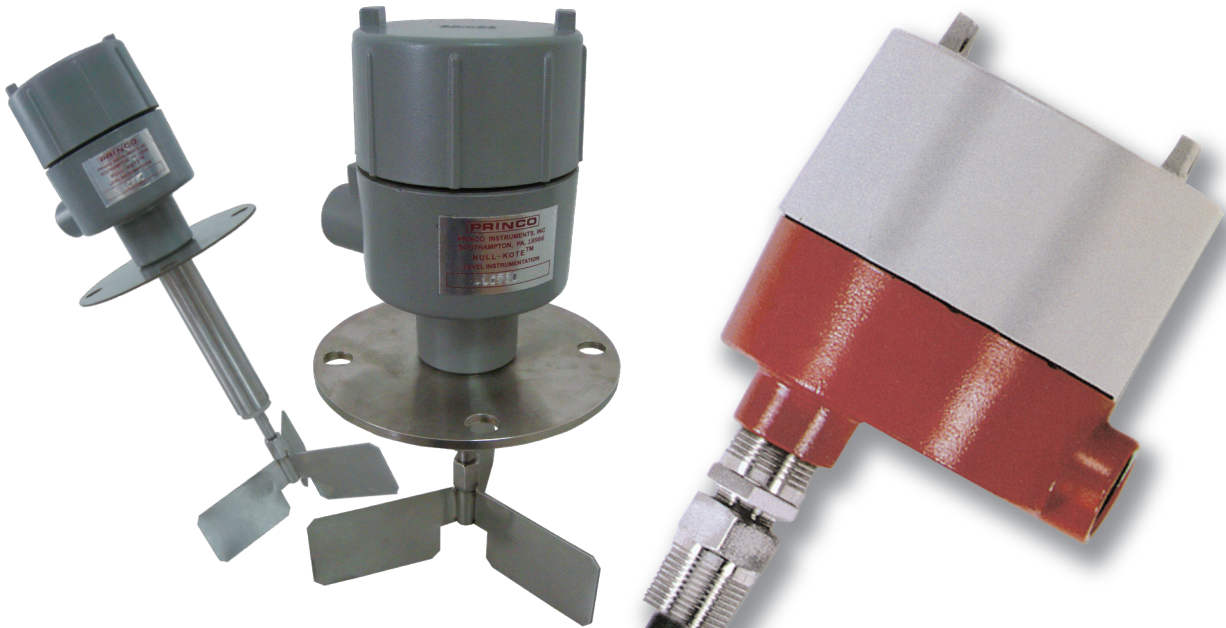
HELP

21-9237

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阻旋式料位控制器

Rotary Paddle Level Controller



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