

# 起升高度限制器(限位开关)使用说明书

## 一、概述

QGX 型系列起升高度限制器（或称限位开关），是在消化吸收国外同类产品的先进技术基础上，结合国内起重机实际装备情况，自行设计制造的新产品。它适用于各类起重机起升机构，限制起升高度的安全保护装置。它采用蜗杆、蜗轮、凸轮和微动开关进行工作，具有重量轻、体积小、安装可靠、寿命长等优点，对上升和下降都能起限制作用，并能与老式的螺杆结构起升高度限制器进行互换。也可和编码器组装在一起，用在我厂的高度指示仪上，组成机电双保险控制。

## 二、工作原理

本装置一般安装在卷筒轴承座的闷盖上，蜗杆与卷筒轴连接。卷筒轴带动蜗杆、蜗轮转动，在蜗轮轴上的凸轮也随之转动，当转到某一位置即凸轮的凸缘部分与微动开关接触时，使微动开关动作，切断上升或下降控制电源，使吊具停止在所需的位置上。本产品一般设有四个微动开关，用户可以改变对应凸轮的位置来自行设定保护点。一般应该对上升和下降各设两道保护，即报警限位和极限限位。

机械结构和安装尺寸详见后面的附图。

## 三、工作条件和性能

1、工作环境：-25℃~60℃ 、 90%RH

2、额定容量：380V/5A

3、微动开关：型号 Z15GW2-B，默认为四个，见附图中的 a、b、c、d 四个位置的开关。

4、开关接点：1 脚（COM）为公共接点，2 脚（NC）为常闭接点，3 脚（NO）为常开接点（开关接点旁有标记）。

5、限位凸轮：可在 360°范围内调节，默认为 4 个。

6、在无爆炸危险的介质中且无足以腐蚀和破坏绝缘的气体 and 导电尘埃的场合中，安装时确保同轴度一致。

7、电寿命：20 万次、机械寿命：100 万次，防护 IP54。

#### 四、起升高度限制器的调试

在起升高度限制器安装到位后，蜗杆轴和起重机的卷筒轴就能够上下联动，然后如下操作：

1、用螺丝刀卸掉四个螺钉，打开后盖 3。

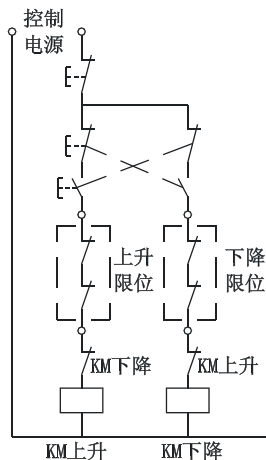
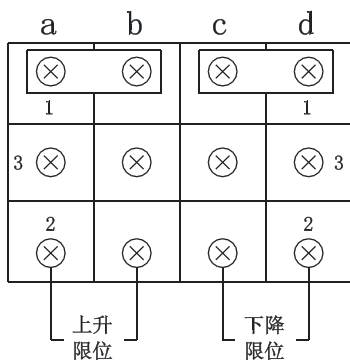
2、根据需要选用微动开关上的常闭或常开接点，将各接点接入起升机构相应的控制回路。

3、用扳手松开螺母 8，使压簧 6 放松，但必须使弹簧有一定的预紧力，此时凸轮 5 在预紧力下能自由转动。

4、微动开关 a 和 b 为上升的两道保护（出厂时通过一片铜块已串联），微动开关 c 和 d 为下降的两道保护（出厂时通过一片铜块已串联）。调整上升限位时，先使吊具处于上升限位极限或报警位置上，然后分别转动 a 和 b 开关对应的凸轮，使这两个凸轮所处的位置刚好打开，切断动力源。调整下降

限位时，先使吊具处于下限位极限或报警位置上，然后分别调整 c、d 微动开关接点对应的凸轮，使这两个凸轮所处的位置刚好打开。起升高度限制器(常闭点接法)的接线原理如下图所示。如确实需其它接法，可自行调整，但是上限、下限必须分别接两道保护。

起升高度限制器的接线原理图  
(常闭点接法)



5、旋紧螺母 8 后，使凸轮 5 不能转动。

6、将吊钩下降或上升离极限位置 1 米左右，然后再上升或下降，检查是否在行程限位和极限限位上分别报警或切断电源。如有必要可再进行调整，使之完善，在整个过程要注意安全。

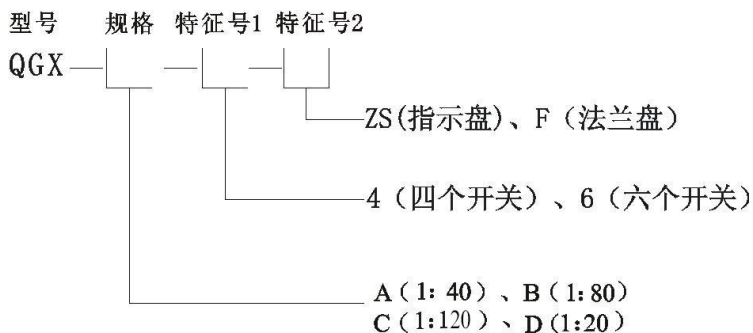
7、调试完毕后盖上后盖，经空吊和满载几个回合试验后，方可投入正常运行。

## 五、使用及维护

- 1、对起升高度限制器应在每班工作前进行撞击试验。
- 2、定期（三个月）检查蜗轮箱内是否有油，不足时适量补入。
- 3、定期检查起升高度限制器的完整性，如有损坏应及时修复或更换。

## 六、产品选用说明

- 1、QGX-A 适用于卷筒工作卷数在 40 圈以下的起升机构上。
- 2、QGX-B 适用于卷筒工作卷数在 80 圈以下的起升机构上。
- 3、QGX-C 适用于卷筒工作卷数在 120 圈以下的起升机构上。
- 4、实际订货时，用户的特殊要求较多：如开关数量多于四个，起升高度限制器上要带指示盘，连接形式改方套为法兰盘等特殊要求。因此，非标起升高度限制器的型号标注如下：



- 5、例如：“QGX-B-6-F”表示工作圈数在 80 圈内，有六个开关，连接形式为法兰盘的非标起升高度限制器（该形式

的一般同时配中心高为 160 的支架)。

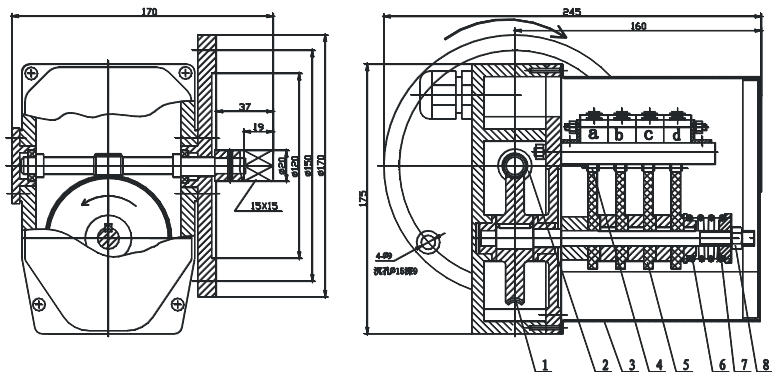
### 6、注意:

A、调整完毕后一定要将螺母拧紧，压紧凸轮组。

B、切不可因为安装了本装置，而忽视安全操作。

C、上升或下降必须接两道保护，严防冲顶。

### 7、装配图



(1) 附图说明:

- 1、蜗轮 2、蜗杆 3、后盖 4、微动开关 5、凸轮  
6、压簧 7、压盖 8、锁紧螺母

1. Worm wheel 2. Worm 3. Rear Cover 4. Sensitive Switch  
5. Cam 6. Spreader spring 7. Gland 8. Nut

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# **Hoisting Height Limiter Operation Manual**

## **I .Summarization**

QGX series hoisting height limiter (limit switch) is designed and manufactured with digesting the related information of overseas one and combining with the practical condition in China. It is a safeguard applied for limiting the hoisting height of cranes. It operates with worm, worm wheel, cam and sensitive switch .It has the advantages of light weight, compact, reliable installation and long service life. It also can be assembled with height control meter through connecting with encoder, which forms electromechanical dual fail-safe

## **II .Operation Principle**

The hoisting height limiter is generally installed on the cover of reel's bearing pedestal and the worm is connected with barrel arbor. The reel rotates with worm wheel and worm. When the rim of cam contacts with the contact of sensitive switch, the sensitive switch operates cutting off the power for lifting and lowering. The hook block shall stop in the limiting position. Lifting and lowering has two protections respectively.

Note: Mechanical structure and installation sizes are shown in attached figure.

### **III.Operation condition and Capability**

1.Operation Environment:  $-25^{\circ}\text{C}\sim 60^{\circ}\text{C}$  、 90%RH

2.Rated Capacity: 380V/5A

3.Sensitive Switch : Model Z15GW2-B, default number is four, refer to four position ( marked with 'a', 'b', 'c', 'd')from attached figure.

4.Switch point: pin 1 (COM) is common point, pin 2(NC) is normally closed ,pin 3(NO) is normally open.

5.Limit Cam: May adjust in  $360^{\circ}$ ,default number is four.

6.In which there is not any medium resulting in explosion, gas in corrosion and breaking insulation and dust in electric conduction

7.Eelctric lifetime: 200.000,Machinery lifetime: 100.0000,IP54.

### **IV.Readjustment of Hoisting Height Limiter**

1.Open the Rear-cover-3.

2.Choose normally open or closed point on sensitive switch ,Connect each point into relative controlling circuit.

3.Loose the Hand-wheel-8 with a wrench to relieve the Spring-6.Caution:A certain pre-tension should be exerted to the spring. In this case, the cam can rotate freely under the pre-tension.

4.Sensitive Switch 'a' and 'b' are used for protection of lifting(a and b is serial ) .Sensitive Switch 'c' and 'd' are used for

protection of lowering(c and d is serial ). When lifting limit is readjusted , the hook block is made in the lifting limit position, the cams for limit point-a and b are rotated to make them in open position. When lowering limit is readjusted, the hook block is made in the lowering limit position, the cams for limit point-c and d are rotated to make them in open position.

5.After fastening the Handwheel-8,it is ensured that Cam-5 can not rotate.

6.Lift or lower the hook about 1meter away from the limit position. And then, lift or lower the hook again. Check that they are respectively in the alarm limit position or power-cut limit position. If necessary, the above-mentioned procedure should be made again to ensure that they conform with the requirement. In the whole readjusting procedure, attention should be paid to safe operation.

7.After finishing the readjustment ,close the rear-cover. With several no-load and full-load test, it can bring into normal operation.

## **V.Operation and Maintenance**

1.Please do bump test before operation.

2. Regularly check whether the oil in the worm gear cast is enough. The period of qualification is 6 months.



3. When the hoisting height limiter malfunctions, should promptly inspect the reason, and carries on the repair or the replacement.

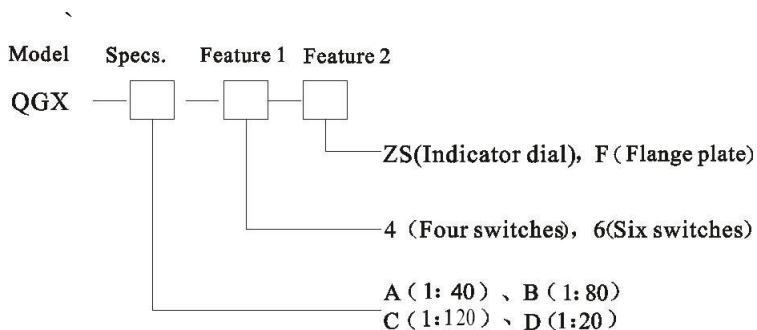
## VI. Classification of Products

1. Model QGX-A is applied for lifting mechanism with reel working in 40 cycles below and transmission ratio is 1:40.

2. Model QGX-B is applied for lifting mechanism with reel working in 80 cycles below and transmission ratio is 1:80.

3. Model QGX-C is applied for lifting mechanism with reel working in 120 cycles below and transmission ratio is 1:120.

### 4. Designation of Model and Size



5. Example: "QGX-B-6-F": meaning in 80 circles, six switches, connection type is flange plate.

6. Notes:

**A. Do tighten up the nuts and press cams firmly after adjustment.**

**B. Although this unit is a safety protecting system, don't ignore the safety operation regulations.**

**C. Two-way protecting should be connected to hoisting or descending circuit, which prevent hoisting device from overrunning.**

7.Assembly Drawing(refer to Chinese part)

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