INSTRUCTION MANUAL

PADDLE TYPE LEVEL SWITCH

MODEL: PRL-300

Meanings of indications for safety used in this Instruction Manual are as follows.

WARNING: Indicates that improper handling assumes the risk of a fatal or serious injury.

CAUTION: Indicates that improper handling assumes the risk of injury or damage to property only.

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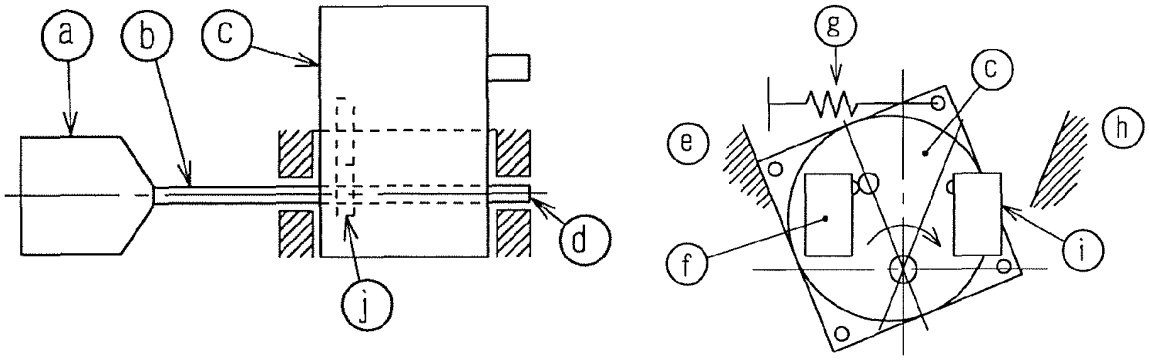
Paddle Type Level Switch (Model: PRL-300) Instruction Manual

Contents

1. Operating Principles



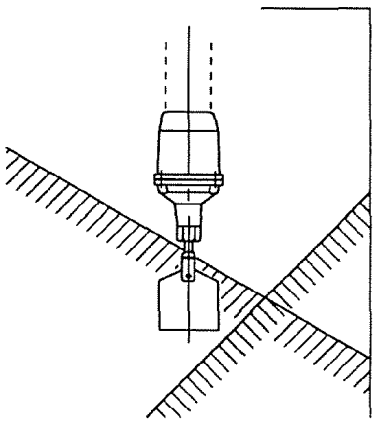
The motor (c) is placed at a position (e) because of the spring (g) and the shaft (b) rotates with the mounted paddle (a). If rotation of the shaft (b) is restricted by sediment together with the paddle (a), the motor (c) overcomes the spring (g) by the internal reduction gear (j) to rotate around the shaft of motor (d) and tilt toward the (h) side, and the level detection signal is output by the micro switch (f). Then, the motor (c) is stopped by the micro switch (i).

2. Precautions for use

CAUTION

a. Determination of the mounting location

Mount a level switch on a location where the level of powder and particles actually changes.



b. Impact of powder and particles

When the level switch is mounted just under the point where powder and particles fall, it may be broken by impact such as an arching phenomenon in the hopper. Change the mounting location or mount a protection plate.

Vibration of the hopper

Do not mount the switch at a location where mechanical vibration of the hopper itself and vibration of the vibrator and others continuously apply for a long time whenever possible.

c. Relationship with transportation facilities

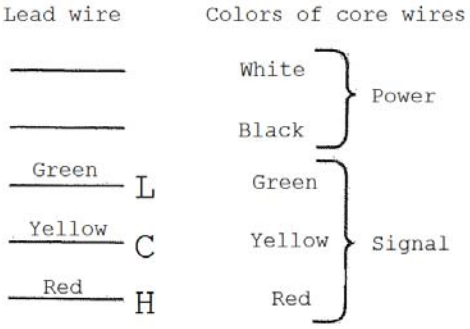
For example,

Full: mount the switch at a location where if all remaining materials on the conveyor are put in, no material overflows.

Empty: mount the switch at a location where the time when the hopper empty signal is output, the conveyor rotates and raw materials are fed is anticipated.

CAUTION 3. Precautions for connection

a. Color coding of level switch external terminals is as follows:



a-1. Signals

L green (blue): conduction to "C" in the condition where no measured object comes into contact with the paddle (During rotation of the paddle)

C yellow: the neutral point of signals (common of a contact point)

H red: No conduction to "C" in the condition where no measured object comes into contact with the paddle

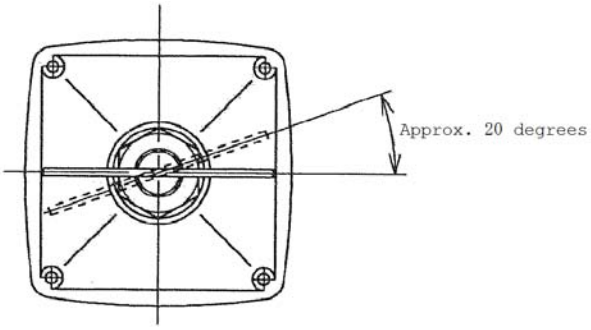
a-2. Checking method of signal switching

Slightly twist the paddle approximately 20 degrees counterclockwise.

Conducted between C and H

No longer conducted between C and L

When the paddle is twisted strongly, a slight and metallic clicking noise is generated and the paddle idles by 90 degrees. This is caused by operation of the slip mechanism and there is no problem.



CAUTION b. Electric wires to be used

b-1 Crimp an electric wire to be used on a crimp-type terminal via a strand wire to connect to an internal terminal.

*Do not use single wires whenever possible.

b-2 When using cables, use cables with a finished outside diameter of φ10 to 11.

Example:

CVV (vinyl cable for control)

1.25mm^2, 4 cores, finished outside diameter φ11

2mm^2, 3 cores, finished outside diameter φ11

VCT (vinyl cap tire cable)

0.75mm^2, 5 cores, finished outside diameter φ10.5

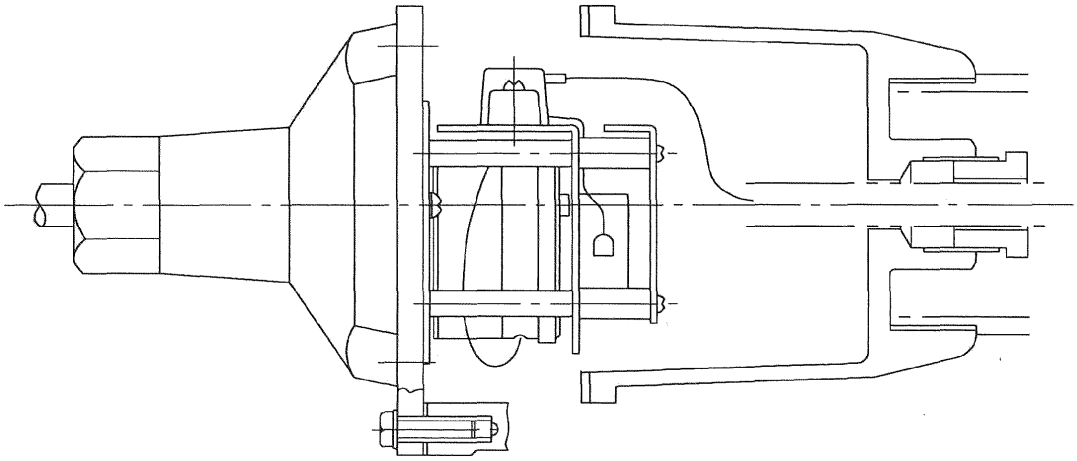
1.25mm^2, 4 cores, finished outside diameter φ10.5

b-3 Securely tighten electric wire mounting fittings after wiring. As rubber packing is in a fitting, tighten the cable to prevent rain and moisture. If the cable is loose tightened, rain and dust will enter the fitting and cause the switch to malfunction. Also, the same applies if a fitting that does not match with the size of a cable is used.

c. Detachment and attachment of a cover

Screws of ISO 5mm are used for a cover.

CAUTION If screws are not securely tightened, rain, moisture and dust will enter the switch as with b-4, causing a malfunction.



4. Inspection

Remove the front seal cap before inspection of a seal.

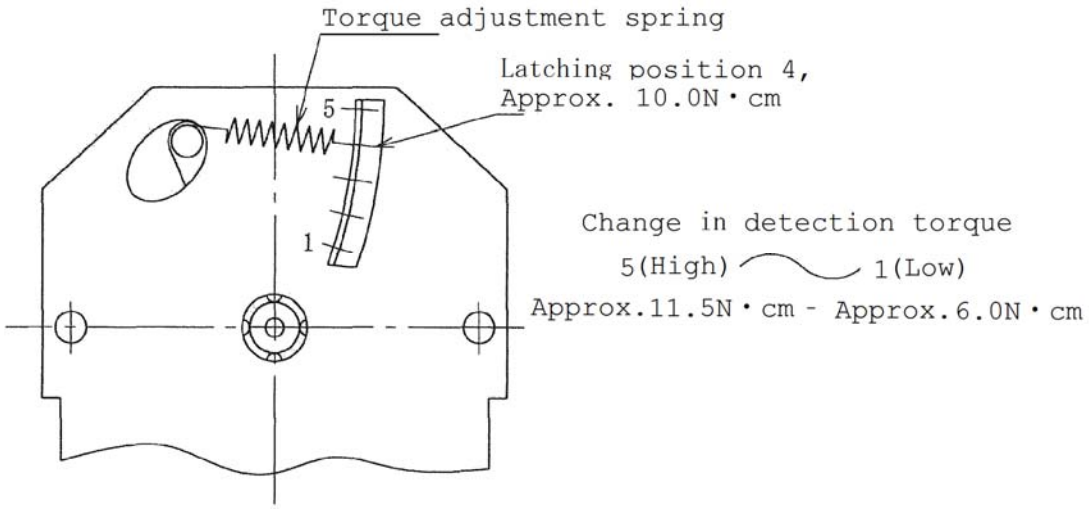
The seal cap is a right-handed type.

Keep in mind that the shaft and paddle boss are left-handed types. As for inspection of the internal equipment, if the rear case is removed in the same way as the time of connection, the operating condition of the limit switch can be confirmed. And the mechanism can be removed by loosening the two (+) screws tightened on the right and left sides of the frond case. Pay special attention to lead wires at this time.

5. Torque adjustment

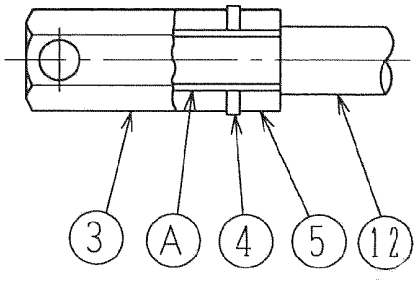
The torque adjustment of the shaft is provided on the mechanism mounting plate. Torque can be adjusted by changing the latching position of the spring.

Mechanism mounting plate back side



6. Repair method

Mounting of paddles on the shaft is as follows:



The screw (A) is a left-handed type. The nut (5) is screwed on the shaft (12) to put the spring washer in and the paddle boss (3) is screwed on. Keep in mind that a screw lock agent is used for the screw portion.

7. Method of assembly inspection

a. Make sure that wiring is correctly connected using a tester.

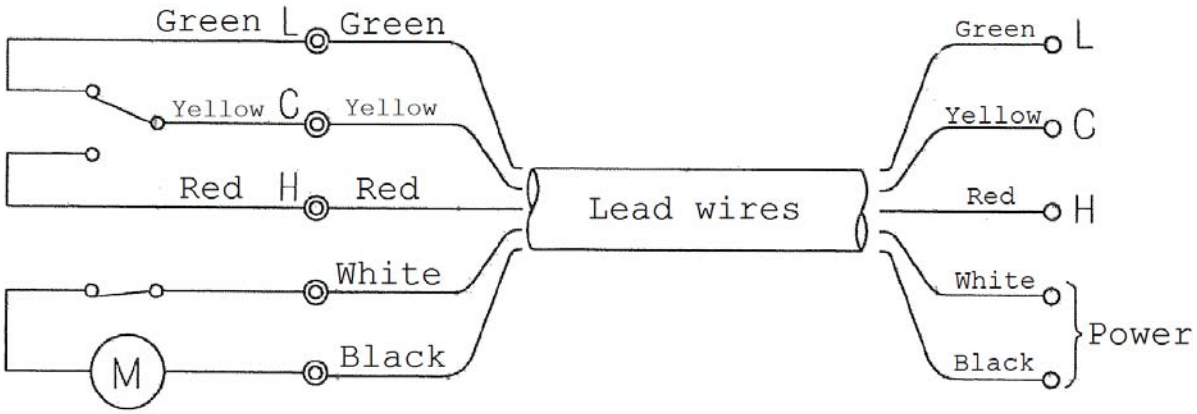
b. Make sure that there is the insulation resistance between each terminal and the earth using a Megger.

c. c-1 Turn on power.

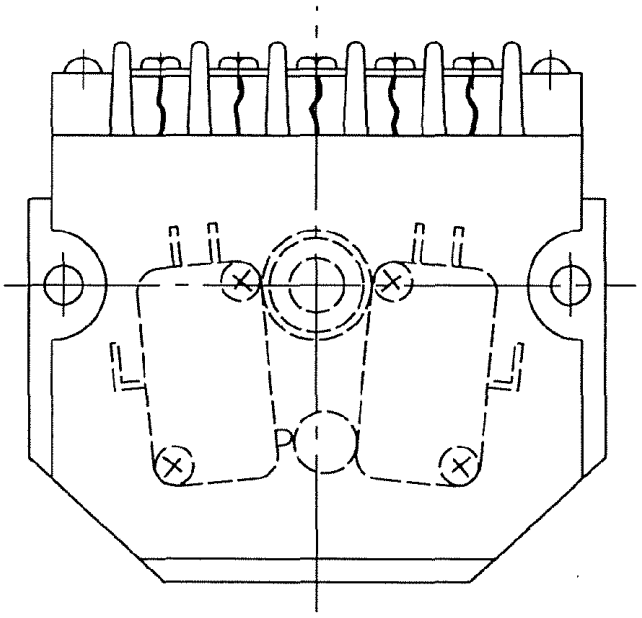
c-2 Make sure that the paddles and the shaft rotate smoothly.

c-3 Make sure that signals change by touching the paddles by hand or putting a hand into the powder.
(2 or 3 locations during one rotation)

c-4 Make sure that rotation of the shaft slips by restricting rotation of the paddle by hand.
(2 or 3 locations during one rotation)



9. Internal equipment



10. Problem examples (typical examples)

a. Problem caused by a short circuit accident of the micro switch

When the micro switch is wired into the internal equipment, it is wired to the alarm side (L, C, H) instead of the power side.

◎ Make sure to energize the switch after confirmation of the side to be wired.

b. Poor tightening of the cover

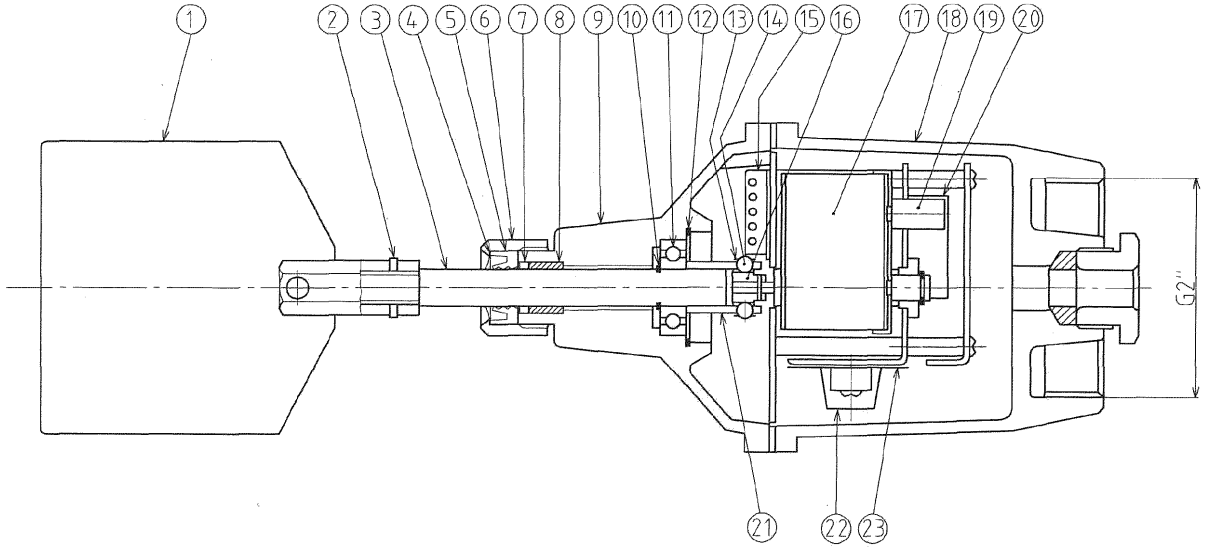
◎ Make sure to securely tighten the cover.

c. Problem caused by damage to the screws on the terminal block/cover

◎ Make sure to tighten screws using the appropriate driver.

CAUTION Be careful not to touch the terminal block with fingertips, etc. (Watch out for electric shock)

Reference structural drawing



8	Metal	BsBM	16	Motor coupling boss	SS400 carbon quenching			
7	Grease	U-ret EI-1	15	Torque adjustment plate	SPC (plating)	23	Insulation sheet	
6	Seal cap	BsBM (plating)	14	Ball	High-carbon bearing steel	22	Terminal	5P
5	Oil seal	Nitrile rubber 10-20-7	13	Plate spring	Spring steel	21	Shaft coupling boss	SS400 chromate plating
4	Seal	Teflon t0.5	12	Snap ring for hole	Spring steel	20	Micro switch	
3	Shaft	SUS304	11	Bearing	6000ZZ	19	Actuating bar	SS400 chromate plating
2	Washer	M8 Left SUS	10	Snap ring for shaft	Spring steel	18	Cover	Aluminum casting
1	Paddle	SUS304	9	Case	Aluminum casting	17	Motor	PTM-12EG MS
No	Parts name	Description	No	Parts name	Description	No	Parts name	Description