

INSTRUCTION MANUAL

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CABLE REEL

◎ TCR - RS TYPE



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1. INTRODUCTION AND FEATURES

1.1 INTRODUCTION

The Spring Type Cable Reel adapts the elastic force of spring.

And when the vehicle moves, the reel unwinds the cable, winding its spring in the drum simultaneously, building up the torque at the same time.

When the moving vehicle moves back, the cable drum winds the cable by the spring torque.

1.2 FEATURES

- 1) The structure is simple, almost trouble free, and installation is easy.
- 2) No additional power supply is necessary.
- 3) Since the size is small, Spring Type Cable Reel is appropriate in a limited space and economical.
- 4) As there are various models, you can choose the most suitable one according to the field conditions.

2. INSTALLATION OF CABLE REEL

When delivering a spring type cable reel to a customer, all items are packed. Namely : Reeling drum, slip ring, spring case.

After removing the packing and checking for transport damage, install the cable reel in the following order.

2.1 CABLE REEL INSTALLATION

- 1) Transport the cable reel by attaching slings to the lifting eyes. raise slowly. If out of balance occurs, attach one more sling around cable reel.
- 2) After assembling on the base plate. Align cable centerline and adjust with shims for level, bolt down securely using bolts, nuts, and spring washers.
- 3) Open the upper cover of slip ring, inspect carbon brush and wiring of slip ring.

2.2 GUIDE ROLLER INSTALLATION

Move guide roller and place on supporting beams and bolt securely in position -bolts, nuts, and spring washers.

2.3 REELING DRUM CABLE CONNECTION AND WIRING

2.3.1 REELING DRUM SIDE

Before cable connection, please check the cable specifications such as section area (mm²), number of cores, outside diameter (mm) and weight per meter length.

Overall length of cable includes

- a. Length of cable for inside connection of drum.
 - b. 2 times dead turns on reeling drum.
 - c. Length to ground level through guide rollers.
 - d. Winding length.
 - e. One turn round drum and the length required for junction box
- 1) Take off the drum cover and unscrew the sealing part of the cable gland.
 - 2) Remove cable clamp.
 - 3) Remove outer cover of cable allowing sufficient length for connection to terminal block inside of cable drum (this length can be measured).
Fit terminals to the ends of the cables.
 - 4) Feed cable through the guide rollers and through the gland into the reeling drum.
 - 5) Fit sealing part of cable gland over the cables and tighten securely.
 - 6) Where the cable sits on the mating part of cable clamp, wrap rubber strip (thickness 2~3mm) 2 or 3 times around the cable and then fit and fasten

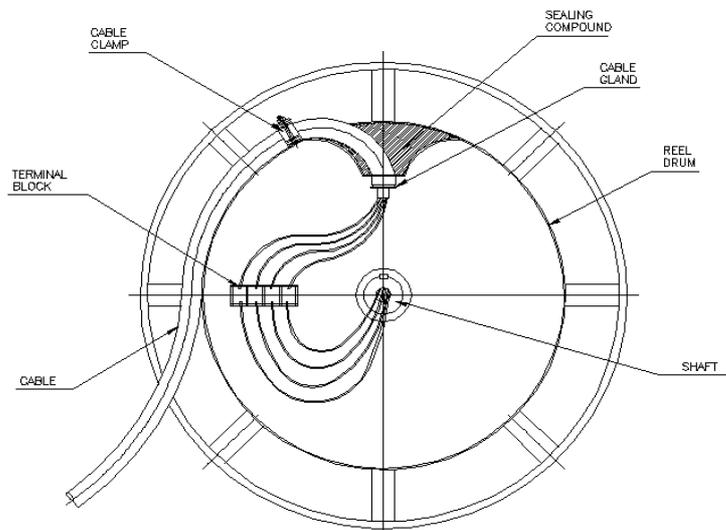


Figure 1. Reel Drum Cable Connection & Wiring

2.3.2 FIXED CABLE SIDE

- 1) Open the junction box, and feed the cable in the junction box by using the cable gland.
- 2) Connect the wires to the terminal block and then fit the junction box cover. Take care that it seals properly.

2.4 WIRING INSIDE OF SLIP RING HOUSING

- 1) Remove the slip ring housing mounting bolts and remove housing.
- 2) Take off the sealing part of the cable gland.
- 3) Remove the outer cover of the cable allowing sufficient length for the removal of the housing for maintenance.
- 4) Fit cable protection tube and the cable gland sealing part to prevent moisture from entering the housing. And, tighten the gland securely.
- 5) Connect the cables inside the housing to the terminal block according to the cable numbers.
- 6) Replace housing carefully so that it seals against moisture.

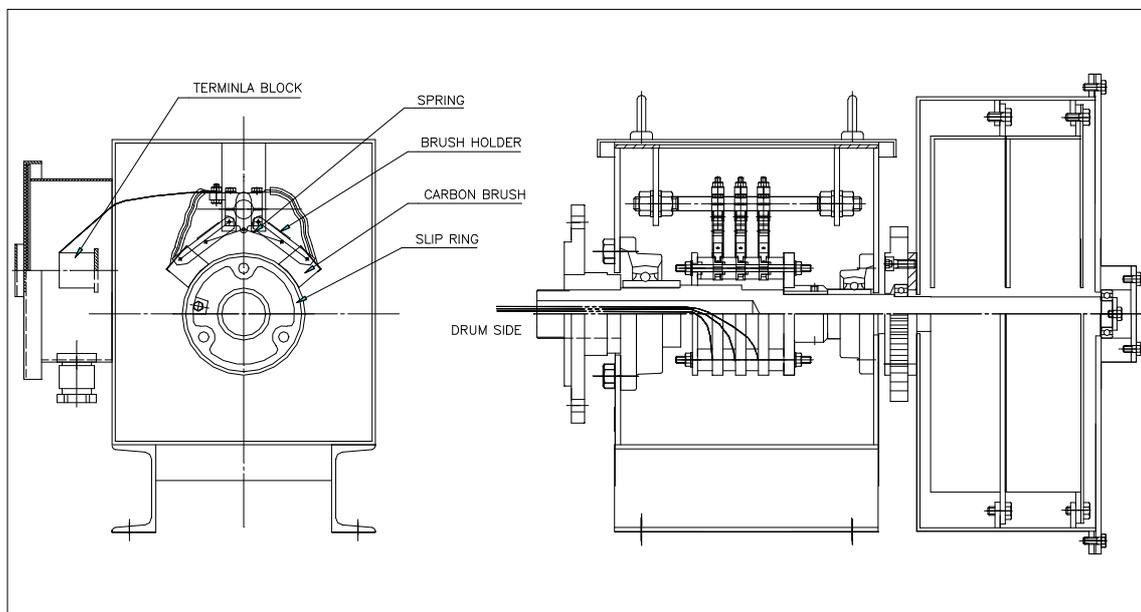


Figure 2. Wiring Inside of Slip Ring Housing

3. OPERATION

- 1) Turn on the power supply, and operate the cable reel by using the equipment controls in the crane cabin.
- 2) Check by jog operation whether the moving direction of the equipment(or moving direction) is in accordance with the rotating direction of the reeling drum.
- 3) If the rotation direction of the cable reel drum is correct, precede over the full length of travel and check whether over tension is applied to the cable or cable slack occurs.
- 4) During the above operation, if over tension or cable slack occurs, stop the machine and adjust the tension of the guide rollers and spring force to avoid damaging the cable.

For tension adjustment of the cable, refer to 5.1 chapter.

4. STRUCTURE AND FUNCTION

4.1 SPRING TYPE CABLE REEL STRUCTURE

Cable reel is composed of 4 parts, drum, slip ring, ratchet wheel and spring case.

- 1) According to the length and diameter of the cable, the drum is reeled and unreeled with single, double or multi rows of cable.
- 2) When the drum of the cable reel is rotated, power is supplied through the slip rings via the carbon brush, carbon brush holder to the machine.
- 3) For checking or exchanging carbon brush and cable, ratchet wheel prevents the drum from rotating.
- 4) As the spring pole is fixed to the center of the shaft and the other end of the spring is fixed to the spring case. When unreeling the cable of the drum, the spring is wound and the spring force is stored in the spring. When reeling the cable on to the drum, this automatically done by the stored spring force.

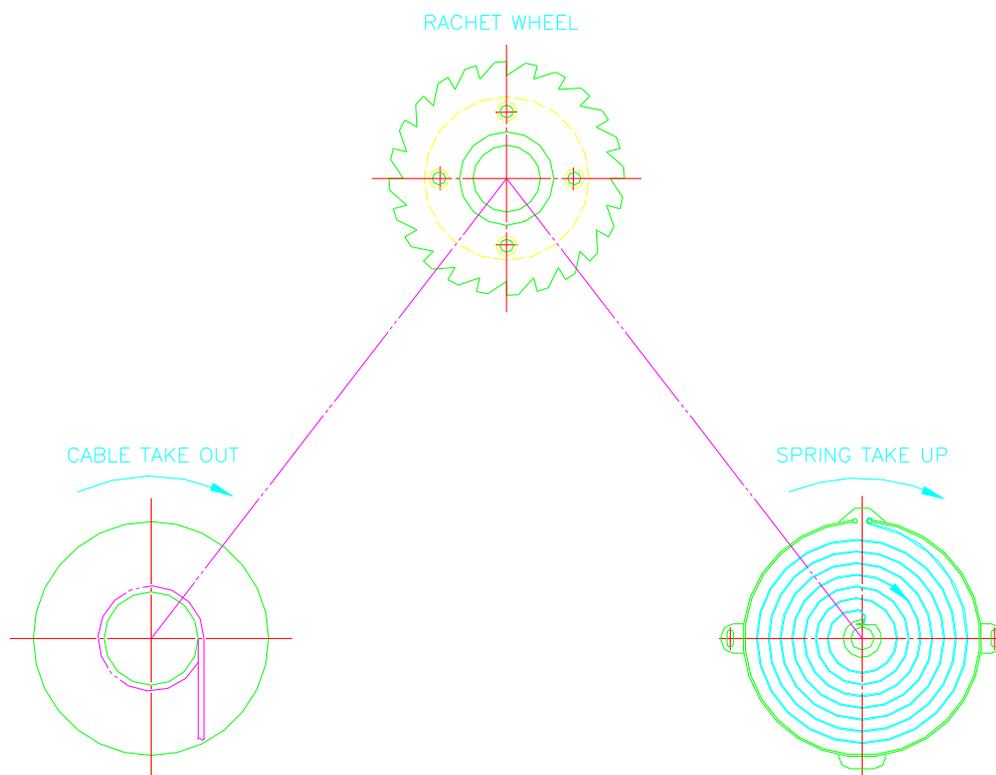


Figure 3. Structure

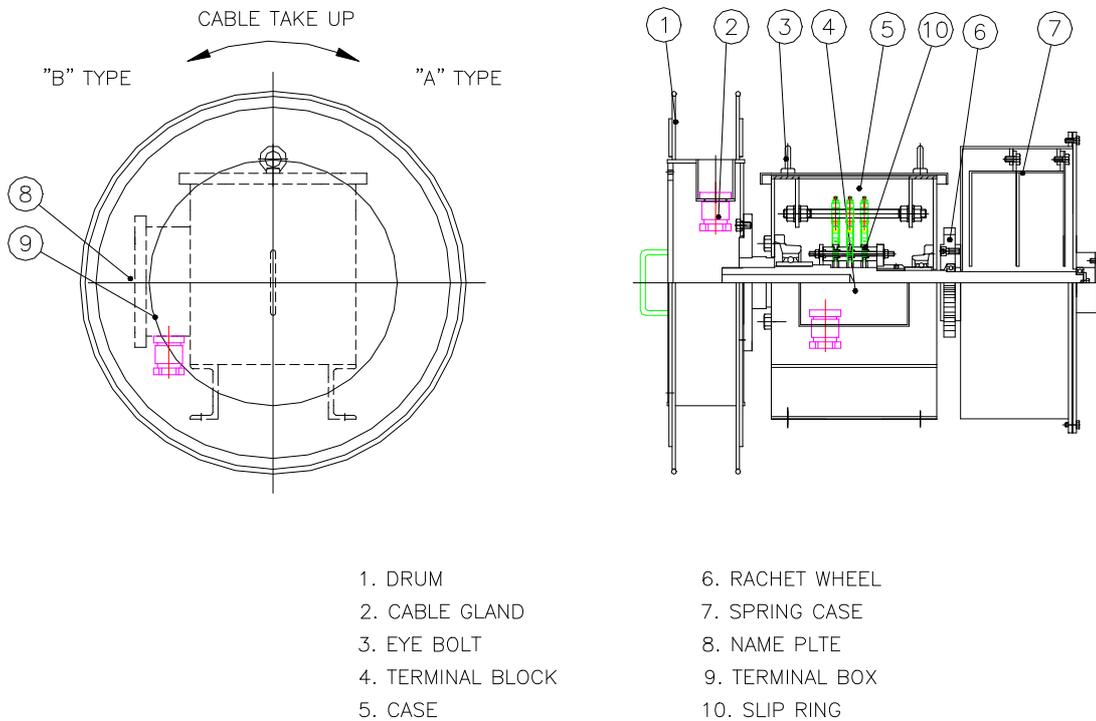


Figure 4. Slip Ring Box Arrangement

4.2 SLIP RING BOX ARRANGEMENT

- 1) Slip Ring Brush Holder and Terminal Box are located behind of the drum
- 2) Connecting wires are led to slip ring from reel drum through drum and shaft supporting slip ring
- 3) The power is transmitted by means of slip ring brushes to a terminal block.
The outgoing cable to power, the crane or equipment is connected to this terminal block.
- 4) Therefore, the external power connected to the terminal block inside.
The reeling drum is transferred via the slip rings and brushes to the crane or equipment.

5. REPAIR AND PRESERVATION

5.1 ADJUSTMENT OF THE REELING TORQUE

Be sure not to wind the cable more than the reeling length that is specified because the drum is designed for the initial tension of the cable at the initial reeling length and to wind up the reeling length and two dead turns for safe operation. (see figure 5.)

After winding the cable, operate the reel to pay out the cable to specification. and then wind the cable again.

If the cable couldn't be wound to the last turn, unbolt the spring case and rotate the spring case against the winding direction, and re-bolt the spring case.

If when using the cable reel, the cable tension is poor. Adjust the tension in the same way.

When the spring can be rotated more, adjust the tension to have spare tension. but in case of having over tension, the spiral spring could be broken out, so give attention.

Do not rotate the spiral spring more than the required turns, or the cable will be cut. So, Don't make the drum rotate more than the required turns.

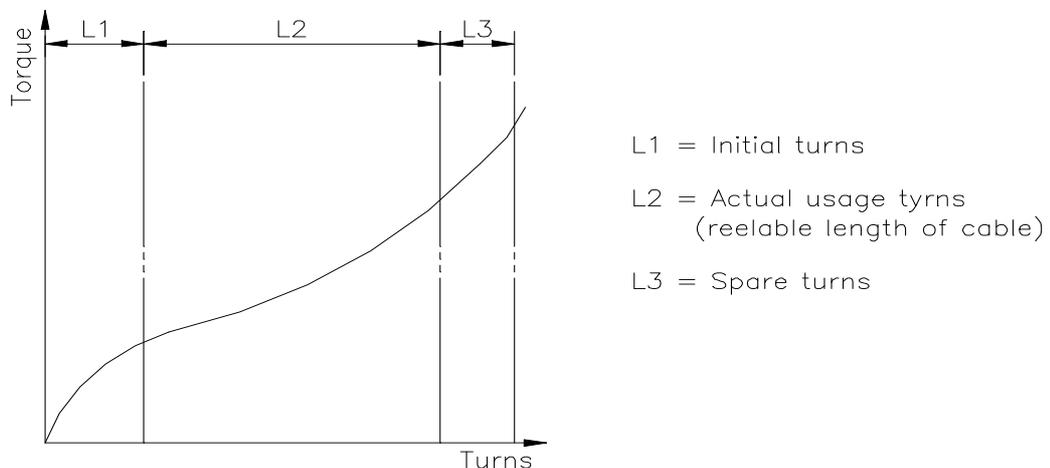


Figure 5. Torque Adjustment

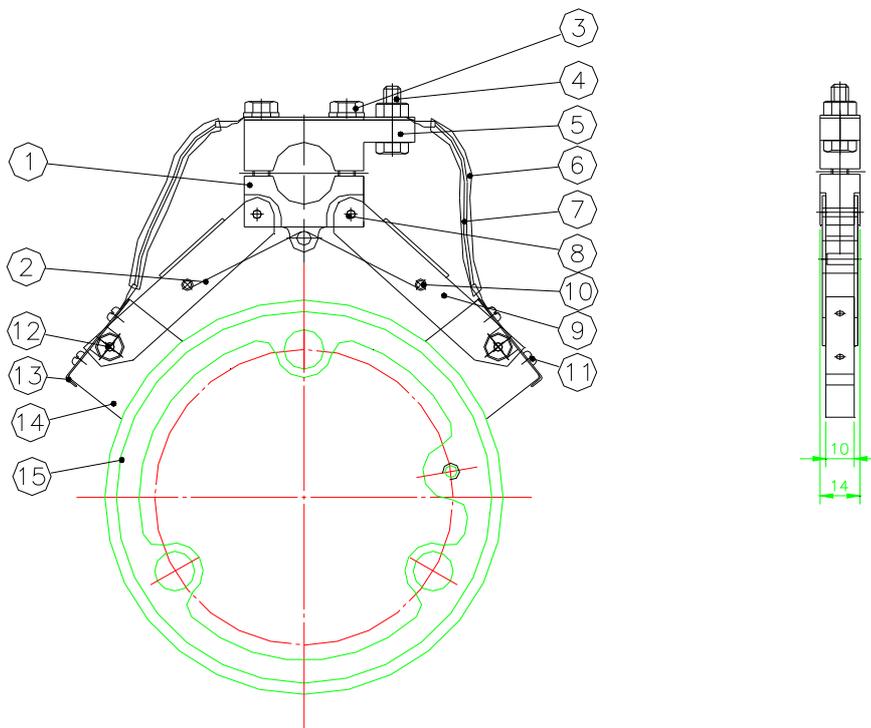
5.2 CHANGE OF THE SPIRAL SPRING

Read carefully this paragraph before attempting to change spring for your safety.

- 1) Turn off the main power before changing the spiral spring
- 2) Unfasten fixing bolts of the spiral spring, and move the body of the cable and the shaft carefully. Take care not to damage the terminal box. Unbolt the bearing cover that is at the edge of the spring case and then take off the ending plate. Detach the bearing from the cover after unbolting the spring cover. (detach the spring cover too.)
- 3) When the spring is shown, if the spring is stuck fast at the core of the coil, unroll the spring carefully while rotating the spring case
- 4) When the spring is unwound perfectly, fix the drum with ratchet not to rotate.
- 5) Check the direction of the rolling core
- 6) Take out the spring case with the rolling core
- 7) Take out the coil spring and the pin that is embedded in the shaft. at this time, be careful not to lose the pin and the coil spring. Be sure not to turn the spring upside down after taken out. It will be better that the spring is tied more two point with wire not to be loosen. If the other springs are in there. detach them in the same way. The order of assembly is reverse order of disassembly. When assembling,
Check the reeling direction and connect the spring with rolling core.
After assembling, Confirm whether the drum rotate or not by a hand.
Inject grease into the spring to prevent corrosion and to extend the life of the spring.
But grease shouldn't leak.

.3 CHANGE OF THE CARBON BRUSH

- 1) Turn off the main power before changing the carbon brush.
- 2) Even if the carbon brush is shortened by wear, you don't need to adjust the contact force. if the carbon brush(see the figure 6.) has worn about 2/3 of thickness, Change to new one.
- 3) When changing the carbon brush, unfasten fixing bolts and fit new brushes.
- 4) Confirm whether contacting face between the slip ring and the new carbon brush has good contact or not. if it isn't good, use sand paper and polish it to have a high contacting area. Firstly, use a rough sand paper and then use a smooth sand paper.
Eliminate carbon dust completely from the contacting face
- 5) If this contacting area is small, then the carbon brush will be damaged when operating



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|-----------------|------------------|------------------|
| 1. BRUSH HOLDER | 6. SILICONE TUBE | 11. BOLT |
| 2. SPRING | 7. CABLE | 12. PIN |
| 3. BOLT | 8. RIVET | 13. CARBON COVER |
| 4. BOLT | 9. CARBON HOLDER | 14. CARBON BRUSH |
| 5. HOLDER | 10. PIN | 15. SLIP RING |

Figure 6. Carbon brush Structure

6. LUBRICATION AND CHECK LIST

6.1 LUBRICATION

The bearings which support the revolving parts are shield type bearings. Therefore, Injection of grease is not required.

6.2 CHECK LIST

NO	CHECK POINT	PERIOD	SOLUTION
1	Slip Ring Surface	1 month	In case of flaws, smooth with sand paper.
2	Brush Abrasion Amount	1 month	In case of excessive abrasion (2/3 over) replace the brush.
3	Spring Tension of brush holder	1 month	In case of lack of tension, Replace the brush.
4	Disengagement of brush	1 month	Restore the brush to the original position.
5	Infiltration of moisture or dust into slip ring box or reel drum	1 month	Replace the cover packing if Damaged. Check the condition of fixing bolt (maybe loose).