SPRING BALANCER

INSTRUCTION MANUAL

MODEL **TW-9,TW-15,TW-22,TW-30,TW-40,TW-50,TW-60,TW-70**

Specifications

MODEL	CAPACITY		STROKE		NET WEIGHT	
	kg	lb	meter	feet	kg	lb
TW-9	4.5~9	9.9~19.8	1.3	4.3	3.4	7.48
TW-15	9~15	19.8~33.0	1.3	4.3	3.8	8.36
TW-22	15~22	33.0~48.0	1.5	5.0	7.2	7.48
TW-30	22~30	48.0~66.0	1.5	5.0	8.5	15.84
TW-40	30~40	66.0~88.0	1.5	5.0	9.8	21.56
TW-50	40~50	88.0~110.0	1.5	5.0	10.4	22.88
TW-60	50~60	110.0~132.0	1.5	5.0	11.6	25.52
TW-70	60~70	132.0~154.0	1.5	5.0	11.8	25.96

- **Read all instructions before operating tool.**
- **Keep this instruction manual with your tool.**
- **These specifications and design may be changed for improvement without prior notice.**

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Thank you for your purchasing Nitto Kohki-Mijin's spring balancer.

◈ Before using our spring balancer, please read this manual carefully so that you may use it properly to get the most out of it.

This instruction manual should be kept close at hand.

The following safety notations are used throughout the manual to highlight safety precautions for the user and for the machine.

⚠ DANGER	**DANGER indicates a potentially hazardous situation which, if not avoided by following the instructions given, could result in death or serious injury.**
⚠ WARNING	**WARING indicates a potentially hazardous situation which, if not avoided by following the instructions given, could result in death or serious injury.**
⚠ CAUTION	**CAUTION indicates a potentially hazardous situation which, if not avoided by following the instructions given, could result in injury or material damage.**

1. SAFETY INSTRUCTIONS(Spring Balancer)

Important safety instructions for all spring balancers

When using spring balancers, basic safety precautions should always be followed to reduce risk of personal injury.

1-1 Spring Balancer Installation

⚠WARNING

- **Install the balancer correctly.**
  Incorrect installation could cause personal injury or damage to the Spring Balancer or other equipment.
- **Install secondary wire rope or chain to the Spring Balancer.**
  If the Spring Balancer's main hanger of fitting link is damaged, it could protect workers' safety from accidents.
- **Make sure that the assist wire rope or secondary chain should be suspended different fitting link from the Spring Balancer's main hanger.**
- **Make sure that there is enough slack in assist wire rope or secondary chain, so that it is able to be movement spring balancer freely. In this install, if the main hanger break or fall down, the enough slack could be stopped before being injury to workers or other equipments,**
- **Install stronger fitting link than the maximum capacity of the Spring Balancer.**
- **The fitting link must be closed so that it does not fall when even Spring Balancer's shakes.**
- **Do not fix the main hanger of spring balancer which can swivel freely.**

1-2 Directions for the use of Spring Balancer

⚠WARNING

- **Never pull down the cable while being unloaded.**
- **Never remove the tool from the Spring Balancer's hook while the wire rope is suspended. The fast winding of cable could cause personal injury when you let go the cable.**
- **Never stay right under the suspended spring balancer and tool.**
- **Never alter the Spring Balancer.**

⚠CAUTION

- **Always use within the capacity range of the Spring Balancer.**
- **Always adjust the spiral spring tension before using the Spring Balancer.**
- **Do not pull down the cable over its maximum weight.**
- **Do not use more than two tools for one unit Spring Balancer.**

1-3 Maintenance and Inspection

⚠WARNING

- **Do inspect the Spring Balancer on a regular basis.**
  Stop using, if there is abrasion or damage on Cable or Hook.
- **Never alter or disassemble the Spring Balancer.**
- **There is a spiral spring in the body of Spring Balancer.**
  When you have the Spring Balancer disassembled, the sudden expansion of the spiral spring is caused personal injury.
- **Contact your sales agency of Nitto Kohki-Mijin for repair or replacement.**
- **If any label or name plate is damaged, contact your sales agency of Nitto Kohki-Mijin**

1-4 Disuse

⚠WARNING

- **Contact your disposal dealer, in case of disuse Spring Balancer. There is a sudden expansion of the spiral spring, when you have the Spring Balancer disassembled is the cause of danger or damage.**

2. USEAGE

Spring Balancer is a tool which has a tool suspended using like as electric tool, air tool and other device by its weight.

3. CHECK THE CONTENTS OF THE PACKAGE

When you pick the new balancer out from the box, you should check the contents and the condition such as breakages or oil leakages during on transportation. You may refer the contents to the part list of manual. If you have any problem with our Spring Balancer, contact your sales agency.

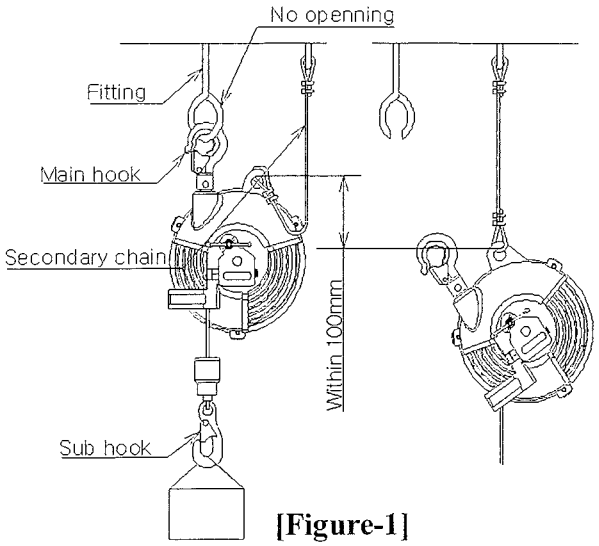
4. INSTALLATION

4-1 SPRING BALANCER INSTALLATION (Figure-1)

⚠WARNING

- You should install the Spring Balancer which has enough strength and strong fitting link from its capacity range. Secure at least 10 times of the strength for the Spring Balancer's maximum capacity.
- The fitting link must be closed so that it does not fall when even spring balancer's shakes.
- Make sure that there is enough slack in assist wire rope or secondary chain, so that it is able to be movement spring balancer freely.
- Do not fix the main hanger of spring balancer. Be free for movement freely.
- Avoid possibility of collision with other spring balancer in horizontal movement on the rail.

I. Attach the main hook of the spring balancer to the fitting link.
II. Check the Spring Balancer which can move (rotation or gradient) freely.
III. Attach an end of the wire rope or secondary chain to the spring balancer's body.
IV. Attach the other end of the wire rope or secondary chain to a separate fitting link which does not support the spring balancer
V. Check the spring balancer working smoothly with suspended tool



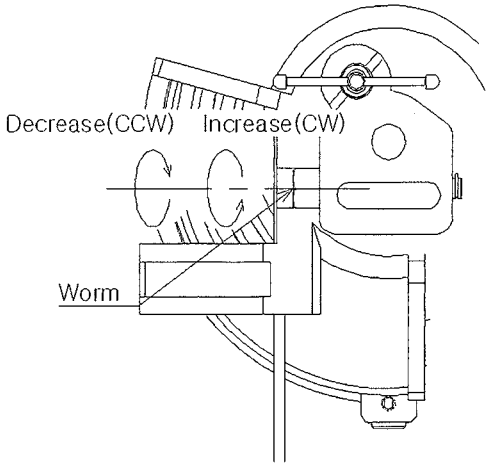
[Figure-1]

⚠CAUTION

- **Use within the capacity range of the Spring Balancer.**
  ☞ In this case, figure up the total weight not only tool, device and accessories (Air hose, wire etc) but also the Spring Balancer's weight.
- **When you adjust spiral spring tension of the Spring Balancer, you must refer to gauge only by reference**
  ☞ It has difference numerical value of gauge by user's working condition

4-2 Tool and device attach and adjustment of spiral spring tension

I. Make sure that whether tool or device has capacity range within the Spring Balancer's range.
II. Adjust the spiral spring tension to be accord with tool or device
  ▣ **Adjust the spiral spring tension at the same time turning the worm with spanner etc and you may refer gauge's scale.**
  ▣ **Turn clockwise for increasing the spiral spring tension and turn counterclockwise for decreasing it**
III. Lift up the Tool or Device to the fitting link



⚠WARNING

- **Keep checking on that there is no person or object under the hook, when you attach the hook or release the manual stopper lock. If the weight of the tools or device on the hook is heavier than the maximum spring tension, it could drop and cause personal injury.**

▣ Lock the manual stopper when the weight is unloaded.
▣ Attach the tool or device to the spring balancer hook.
▣ Check that there is no people or object under the hook, then release the manual stopper lock.

4-3 Secure work

⚠CAUTION

- **Excessive cable's exposure or the maximum stroke of the cable could cause damage to the Spring Balancer and its life would be shortened.**

I. Check that the working is in cable stroke range.
II. If necessary, adjust the height of Spring Balancer or use a suitable Jig between the hook and tool.

5. HOW TO OPERATE

5-1. Manual stopper operation (Figure-3)

⚠DANGER

- Check the drum is locked certainly
- Check the confirmation of the drum's lock situation is to hear the click sound with a little bit gap, when you pull the cable.

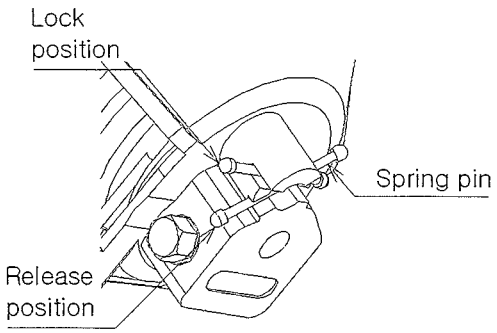
◈ **Lock operation**

I. Pull down the spring pin and turn it counterclockwise and place it in the lock position of the groove.

II. Re-adjust the spiral spring tension until being comfortable with your working condition, and check the balance.

III. Move the suspended tool or device upward or downward until the spring pin enters the case of the groove then the drum becomes locked.

IV. Move the tool or device again to check that the drum is locked securely.



[Figure-3]

◈ **Release operation**

I. Pull down the spring pin and turn it clockwise and place it in the release position

II. When the spring pin goes into the case of the groove and the drum is released.

5-2 Tool or device replacement

⚠DANGER

- **Never remove the suspended Tool or Device before checking the drum which is locked securely.**
- **Never release the drum lock when the spring balancer is unloaded. If release, the fast winding of the cable would cause personal injury.**

I. Lock the drum like as "5-1 Manual Stopper Operation" and remove the suspended tool or device.

II. Before attaching, check the total weight of the new tool or device, including all accessories, are within the capacity range of the Spring Balancer.

III. Adjust the Spiral Spring tension at the same time turning the worm with spanner etc and you may refer gauge's scale.

▣ **Turn clockwise for increasing the spring tension and turn counterclockwise for decreasing it.**

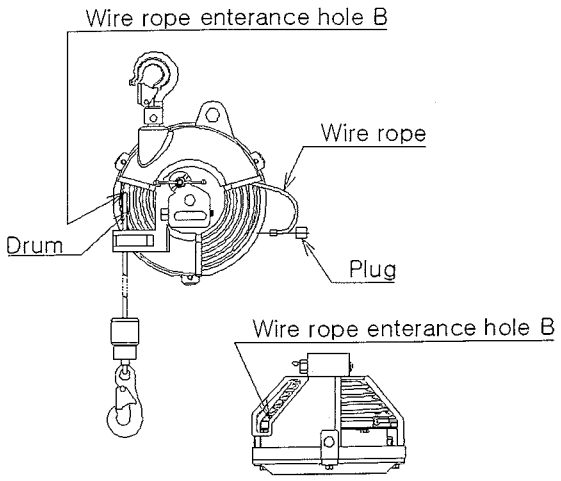
IV. After attaching the new tool or device to the hook and release the drum's lock.

5-3 Cable Replacement (Figure-4)

⚠CAUTION

- **Cable replacement could be done without the product disassembly.**

☞ **If you need Spring Balancer's disassembly, the spiral spring tension should be situated at "0(zero)" and to do according to "6-3 COVER DISASSEMBLY AND ASSEMBLY (Figure-5)".**



[Figure-5]

I. Pull down the cable to the maximum cable travel and then lock the manual stopper.
II. After checking the drum lock, remove the tool or device from the hook
III. Remove the cable set bolt (plug) and pull out the cable from the drum.
IV. Separate the collar and shock absorber from old cable and assemble the new cable.
V. Attach the cable to the drum of inside of the case.
VI. Assemble the cable set bolt (plug)
VII. After attaching the tool or device to the hook and release the drum lock by using manual stopper.

5-4 SAFETY DEVICE

⚠WARNING

- **Never remove the spiral spring from the spring case.**
  Contact your sales agency of Nitto Kohki-Mijin for repair or replacement.

I. It is a device which prevents the rotation of the drum or the falling tools, when the spiral spring is damaged,
II. This device could operate that the load of the spiral spring is higher than the tool.
III. The way of lock releasing refers to "item 5-1."

6. SOLUTIONS FOR TROUBLES

⚠WARNING

- **Stop your working and take precautions when you have trouble in using Spring Balancer.**
- **Never release Tool or Device until you find out the cause of trouble.**

Actual Condition	Cause	Measure
The cable does not move almost.	▶ The manual stopper is operating.	▶ Release the Manual Stopper(refer to item 5-1)
	▶ The cable is getting between the Drum and Case's gap.	▶ Release the tension of spiral spring and after disassembly wind the cable again. (refer to item 6-2)
The cable moves only a little.	▶ The tension of spiral spring is set lowly and the lock of safety device is operating.	▶ Release Safety Device Lock. (refer to item 6-1)
	▶ The spring is damaged and the lock of safety device is operating.	▶ Spring Replacement (refer to item 5-4)

6-1 Solution for Safety Device Lock

▣ **When lock is worked since the low tension of the Spiral Spring.**

I. Check that the scale of gauge was set at less than the minimum weight.
II. Move upward and downward the suspended tool and turn the worm with clockwise direction for raising the tension of the spiral spring until it escapes LOCK point.
III. Confirm that the safety device is not locked in all section of the stroke.
IV. When the safety device pin is locked under the minimum weight, the capacity range of spiral spring is higher than the weight of the tool. Then you should change one stage lower capacity of spring balancer.

▣ **The case that the Spiral Spring is damaged.**

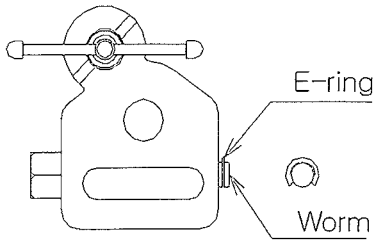
I. Confirm the scale of gauge is set in the capacity range.
II. Replace the spring after disassembly like as "item 6-3 COVER disassembly"

6-2 Solution for Getting Cable between drum and case

I. Pull down the cable when the tool is suspended on it.
II. When you can't pull down the cable, you can replace the cable after disassembling to be followed item 6-3.
III. If necessary, replace the cable which checks the wire status. Make sure that in cases of the wire twist or kink of trace, you must replace it.

6-3 Cover Disassembly and Assembly

I. Adjust the worm until the tension of spring is situated on zero.
II. Remove the E-RING at the end of the worm.
III. Release the bolt which connects the case and the cover . And disassemble the cover.
IV. The assembly is in reverse order of disassembly.



7. MAINTENANCE AND INSPECTION

◈ **Periodically inspect the Spring Balancer and replace any abrasion or damaged parts.**

⚠WARNING

- Periodically inspect the balancer, and replace any worn or damaged parts.
- Always use genuine parts for replacement.