# **INSTRUCTION MANUAL**

# **SQUARE BALANCER**

BS3W/BS3N
BS5W/BS5N
BS7W/BS7N

### **A** WARNING

- ·Read this manual before use.
- ·Keep this manual available.

ENDO KOGYO CO., LTD.

BM-10121c

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#### SAFETY ALERT SYMBOL AND ALERT SIGNS SIGNS

Please read this manual carefully and follow its instructions. The SAFETY ALERT SYMBOL ( $\hat{\mathbf{A}}$ ), WARNING, CAUTION, and NOTE carry special messages.



This SAFETY ALERT SYMBOL is used to call your attention to items or operations that could be dangerous to you or other persons using this equipment.

Please read these messages and follow these instructions carefully.



**WARNING**: WARNING indicates a hazardous situation which, if not avoided, could result in death or serious



A CAUTION : CAUTION indicates a hazardous situation which, if not avoided, could result in minor or moderate injury, damage or destruction of the equipment and others.

NOTE: NOTE indicates a special instruction in operation or maintenance.

#### Scope of warranty and liabilities for the equipment

- We will repair or replace the product free of charge if a failure due to manufacturing defects occurs under proper usage during the warranty period.
   For details, contact us or your dealer.
- 2. The warranty will be void in the following cases:
  - 1) Change in ownership.
  - 2) Repair, adjustment, or modification performed by a party other than the manufacturer, agents, or dealers.
- 3. Warranty period is 1 year from your purchase.

  However, wire rope, wire guide and spring are not covered by warranty.
- 4. Repairs applicable to any of the following shall be charged even during the warranty period:
  - 1) Failure/damage caused by incorrect use.
  - 2) Failure/damage caused by use of non-genuine parts.
  - 3) Failure/damage caused by fire, earthquake, natural disaster, or other unexpected incident.
  - 4) Incident caused by fall, shock, negligence, or by inadequate storage.
  - 5) Failure/damage caused by use of parts or other equipment that are not included in this product.
  - 6) Replacement of consumables.
  - 7) Usage in violation of dangers or cautions stipulated in this Instruction Manual or the warning labels
  - 8) Failure/damage caused by any reason that is not attributable to the manufacturer.
- 5. Warranty exclusions such as opportunity loss.

Either during or after the warranty period, opporunity loss, damage to anything other than our product(s), or other duties incurred on you/your customer as a result of the failure of our product(s) are outside the scope of the warranty.

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### 1. A Safety Instructions

### A

#### **WARNING**

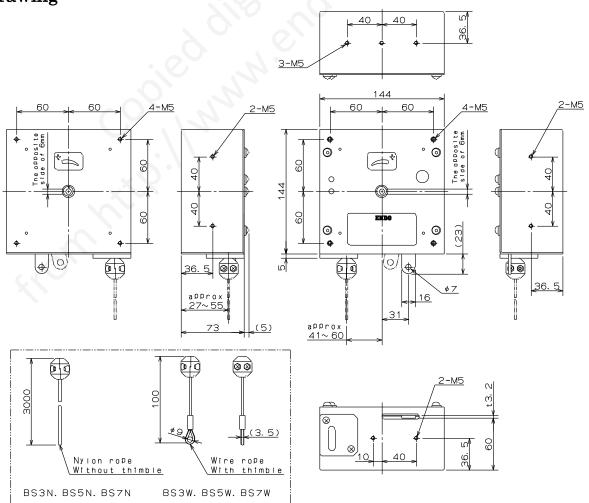
- · Incorrect use of the balancer could cause personal injury.
- · Observe instructions in the manual and use the spring rod correctly.
- · Install the balancer correctly.
- Never use overhead or at the place where may cause an accident in case of suspended load falling.
- · Never place hands, feet, etc., under suspended loads or movable range of rope.
- · Never alter the balancer.
- · Periodically inspect the balancer.

#### 2. Specifications

Model	Capacity range(kg)	Stroke(m)	Type of rope	Mass(kg)
BS3W	1.5~3.0	1.3	777	Approx.2.3
BS5W	3.0 <b>~</b> 5.0		Wire rope With thimble	Approx.2.5
BS7W	5.0 <b>~</b> 7.0		with thimble	Approx.2.5
BS3N	1.5~3.0		N. L.	Approx.2.3
BS5N	3.0~5.0	X	Nylon rope Without thimble	Approx.2.5
BS7N	5.0 <b>~</b> 7.0	70	without thimble	Approx.2.5

■ Working conditions Application area: Indoor and normal atmospheric conditions Temperature range: -10 ° C to +50 ° C

#### 3. Drawing



#### 4. Spring tension attachment



#### **CAUTION**

- · Never move releasing lever with inserting hexagon socket screw key(adjustment tool).
- 1) Confirm that the weight of suspended load is within the capacity range of the balancer when you suspend tool/device or when you pull rope sideways.
- 2) Increase the spring tension by turning the spindle to the + side with a hexagon socket screw key. (see Fig.1)

**CAUTION:** turn it to the opposite direction, the spring will break.

Please confirm indication of main body, the direction of two sides is not same.

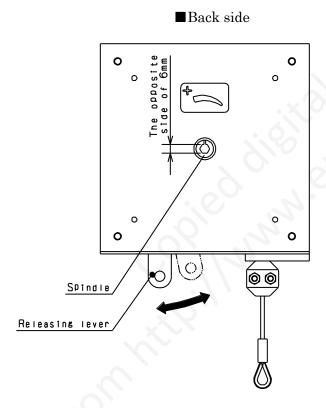
Decrease the spring tension by moving releasing lever in right and left.

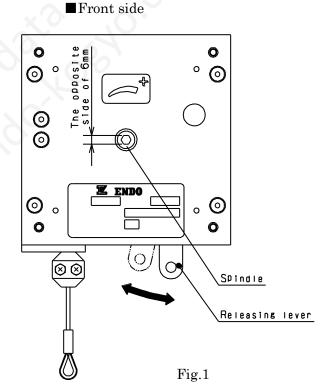
**NOTE**: Factory setting of spring tension

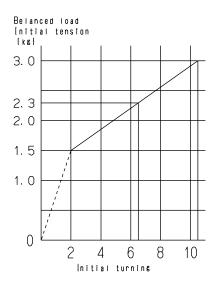
- · BS3W/BS3N....Approx.2.3kg
- $\cdot$  BS5W/BS5N...Approx.4.0kg
- · BS7W/BS7N...Approx.6.0kg

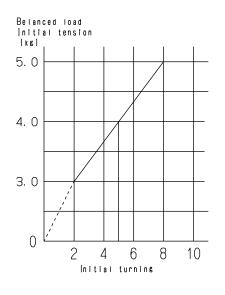
Refer to graph and adjust tension that load is balanced. (see Fig.2)

("0"indicates the condition that wire rope is fully retracted into drum and all spring tension is released.)









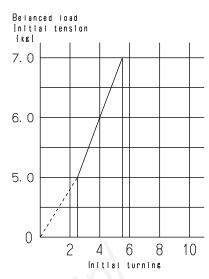


Fig.2

**CAUTION:** Initial tension indicates the number of revolutions of the spindle when rope is fully retracted into drum.

Use in the range of dotted line will lose balance.

E.g. When setting BS5W in 4kgf

Turning the spindle 5 times from the condition that rope is fully retracted into drum and spring tension is released.

XThe graph shows a reference level. ★

#### 5. Safety instructions on use



#### **WARNING**

- · Never use overhead or at the place might lead to injury accident when load dropped.
- · Never place hands, feet, etc., under suspended loads or movable range of rope.
- · Never alter the balancer.



#### **CAUTION**

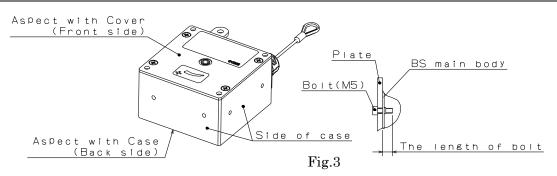
- · Always use within maximum spring tension.
- · Always adjust the spring tension before use.
- Do not extend the rope past the maximum cable travel.
- Do not pull the rope at an angle. Fix main body so that rope does not touch to plate. It will cause recovery problem resulting in uneven winding.
- Nylon rope type: attach surely so that wire does not come loose with the tension of the balancer.
- Fix the main body in two M5 bolts or more.

The bolt length

6-10mm: cover and case (front and back side)

8-10mm: side of case (see fig. 3)

Clamping torque: 3N·m



#### 6. Inspections



#### **WARNING**

Periodically inspect the balancer, and replace any worn or damaged parts.



#### **CAUTION**

Always use genuine parts for replacement.

- ■Inspect the balancer at least once a month.

  Correct and repair any problems which are detected.

  Make the inspection interval shorter when operating frequently or under hostile environments.
- ■Items to be inspected
  - •Wire rope type
    - · Is there any broken wire, deformation or kink in wire?

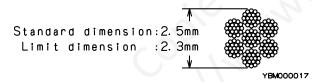


Allowable number of broken wires in 1 pitch 13.





• Is there any part of wire rope worn beyond service limit?



- · Is there any remarkable wear of thimble?
- ●Nylon rope type
  - Is there any broken fiber or damage (kink, fuzzing)?
  - Is there any loosen on the rope attaching device?
  - Is there any melting by heat?
- Is there any loosen screws?

#### 7. Rope replacement

1) Get rid of the spring tension by moving releasing lever in right and left. See Chapter 4 "Spring tension attachment".

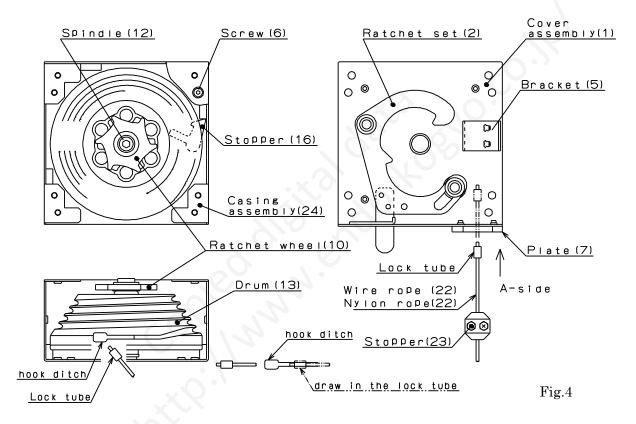


#### **WARNING**

Do not take the body apart before tensility of the spring disappears. It take it apart, the rope will snap back and could cause personal injury.

- 2) Remove Hex. Head screw (6) then remove cover (1).
- 3) Remove old rope from the drum.
- 4) Insert the lock tube of the new rope from the A side of the plate (1). Then install lock tube to the hook ditch of the drum (13). (see Fig.4)
- 5) Reassemble in reverse order.
- 6) Turn spindle (13) and wind the rope.

Be careful that a rope does not come off from the ditch of the drum.



#### 8. Spring replacement

Never remove the spring from the drum unless the replacement is required.



#### WARNING

- · The spring is extremely dangerous. Be careful when handling the spring.
- · Never pull the center of the spring when removing the spring from the drum. If pulled, the spring will expand explosively and cause personal injury.

Referring to the disassembly drawing (on page 7),

- 1) Remove the balancer when in the state that rope rolled up.
- 2) Check the spring tension by pulling rope.

If the tension is left, of the tension by moving ratchet set lever (2) in right and left. Tension should not be left. See clause 4 ''spring tension attachment''

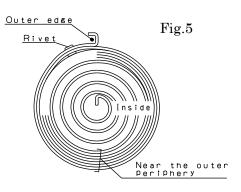
3) Remove Hex. Head screw (6) then remove cover (1).

- 4) Remove the set of drum (15) and plate (15) from casing assembly (24).
- 5) Remove rope (22) from drum.
- 6) Loosen Screws (21) and remove Plate (15) from Drum (13).
- 7) Check spring (14) fracture point and rivet condition.

  If fracture caused in the inside, remove spring.

  If fracture caused near outer periphery or rivet of spring is broken. do not remove spring.

  Reassemble the plate (15) to drum (13), then contact to the store. (see Fig.5)
- 8) Remove spring (14) from drum (13).





#### **WARNING**

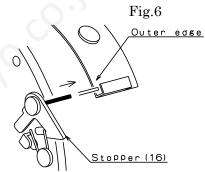
Never remove Spring (14) from Drum (13) when Spring is broken near the outer periphery or the rivet of Spring is broken (see Fig.5). If removed, Spring will expand explosively and cause personal injury.

- 9) Reassemble in reverse order.
  - After drum (13) assembling, install spring (14).
  - · After assembling new Spring (14), lubricate Spring with grease.
  - When installing Plate (15) on Drum (13), place Stopper (16) in the outer edge Spring (14). (see Fig.6)

Check Stopper can move smoothly after installing Plate.

NOTE: Turn spindle (13) and wind rope (22).

Be careful that a rope does not come off from the ditch of the drum.



#### 9. Spring disposal

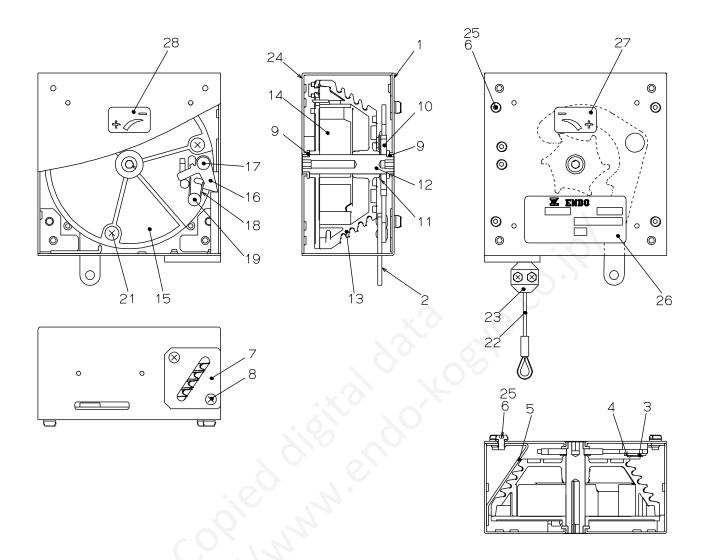


#### WARNING

The spring is dangerous due to remaining tension even if it is broken.

Give a warning to disposal companies that the spring will expand explosively and cause danger if the spring is treated roughly or the center of the spring is pulled.

### 10. PARTS LIST



Ref. No.	Part No.	Description	Quantity					
Kel. No.			BS3W	BS3N	BS5W	BS5N	BS7W	BS7N
1	LBP001776	Cover assembly	1	1	1	1	1	1
2	LBP001777	Ratchet set	1	1	1	1	1	1
3	KA30220800	Plain washer	2	2	2	2	2	2
4	KA40310060	Retaining ring	2	2	2	2	2	2
5	P2B301333	Bracket	1	1	1	1	1	1
6	P2B402102	Hex. socket button bolt	6	6	6	6	6	6
7	P2B402092	Plate	1	1	1	1	1	1
8	KA10220410	Screw	2	2	2	2	2	2
9	P2B402093	Bushing	2	2	2	2	2	2
1 0	P2B301336	Ratchet wheel	1	1	1	1	1	1
1 1	P2B402034	Washer	1	1	1	1	1	1
1 2	P2B301337	Spindle	1	1	1	1	1	1
1 3	P2B100163	Drum	1	1	1	1	1	1
1 4	P2B300089	Spring	1	1	_	_	_	_
1 4	P2B300507	Spring	_	_	1	1	_	_
1 4	P2B300508	Spring	_	_	_	_	1	1
_	LBP000750	Plate assembly	1	1	1	1	1	1
1 5	_	-Plate	1	1	1	1	1	1
1 6		-Stopper	1	1	1	1	1	1
1 7	_	-Rivet	1	1	1	1	1	1

D-£ N	Part No.	Description	Quantity					
Ref. No.			BS3W	BS3N	BS5W	BS5N	BS7W	BS7N
1 8	_	-Spring	1	1	1	1	1	1
1 9	_	-Rivet	1	1	1	1	1	1
2 1	KA10220512	Screw	3	3	3	3	3	3
_	LBP001668	Wire rope assembly	1	_	1	_	1	_
_	LBP001868	Nylon rope assembly	_	1	_	1	_	1
2 2	_	-Wire rope	1	_	1	_	1	_
2 2	_	-Nylon rope	_	1	_	1	_	1
2 3	LBP000924	-Stopper	1	1	1	1	1	1
2 4	LBP001778	Casing assembly	1	1	1	1	1	1
2 5	KA31120500	Spring washer	6	6	6	6	6	6
2 6	P2B301342	Name plate	1	=	_	=	=	_
2 6	P2B301418	Name plate	_	1	_	_	_	_
2 6	P2B301343	Name plate	_	=	1	=	=	_
2 6	P2B301419	Name plate	_	_	_	1	_	_
2 6	P2B301344	Name plate	_	_	_	_	1	_
2 6	P2B301420	Name plate	_	_	_	_	_	1
2 7	P2B301347	Label	1	1	1	1	1	1
2 8	P2B301348	Label	1	1	1	1	1	1

**NOTE)** When placing an order, clearly specify the product model, part number and description. Parts without a part number cannot be supplied individually. Please purchase a set or complete unit.

## **Z** ENDO KOGYO CO., LTD.

Head Office: 3-14-7, Akiba-cho, Tsubame, Niigata, Japan

Tel. 0256-62-5133 Fax. 0256-62-5772

Tokyo Office: JBSL Kanda Bldg., 2F, 12-2, Kanda Higashimatushita-cho,

Chiyoda-ku, Tokyo Japan

Tel. 03-5295-3711 Fax. 03-5295-3717

Osaka Office: Daito Bldg., 3F, 3-14, Saiwai-cho 2-chome,

Naniwa-ku, Osaka, Japan

Tel. 06-6568-1571 Fax. 06-6568-1573

Nagoya Office: Park IM Bldg., 3F, 1-7-14, Osu,

Naka-ku, Nagoya, Aichi, Japan

 $Tel.\ 052 \hbox{-} 253 \hbox{-} 6231 \quad Fax.\ 052 \hbox{-} 253 \hbox{-} 6240$ 

Kyusyu Office: Bunki Bldg., 3F, 11-15, Hakataekihigashi 3-chome,

Hakata-ku, Fukuoka, Japan

Tel. 092-412-5281 Fax. 092-412-5280 URL http://www.endo-kogyo.co.jp

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