INSTRUCTION MANUAL

SPRING BALANCER

EWA-15

⚠ WARNING

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

ENDO KOGYO CO., LTD.

BM-10097

ENDO

Issued on Dec. 2012

Copyright and liabilities

ENDO KOGYO CO., LTD.

SAFETY ALERT SYMBOL AND ALERT SIGNS

Please read this manual carefully and follow its instructions.

The SAFETY ALERT SYMBOL (⚠), 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 injury.

⚠ **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

1. 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, opportunity 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.

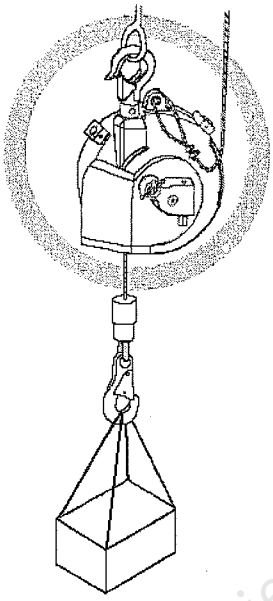
CONTENTS

1. ⚠ Safety Instructions

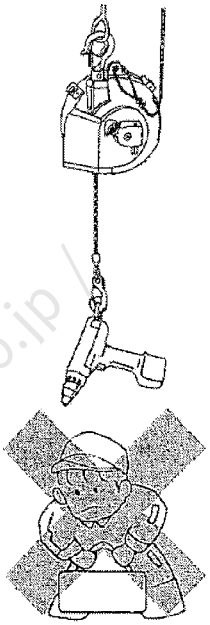
⚠ WARNING

- Incorrect use of the spring balancer could personal injury.
- Observe instructions in the manual and use the balancer correctly.

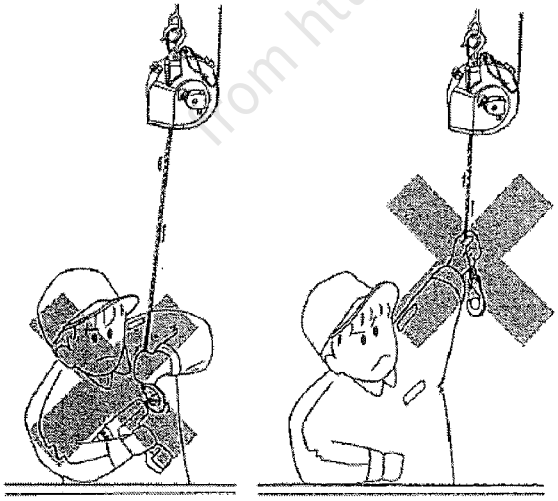
- Install the balancer correctly.
- Always attach a secondary support cable or chain.



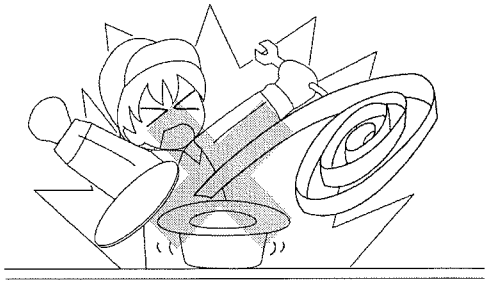
- Never stand under the suspended tool/device.



- Never remove tool/device while the wire rope is extended.
- Never pull the wire rope when unloaded.
- Never release the drum lock when unloaded.



- Be careful when handling the spring.



- Never alter the balancer.
- Periodically inspect the balancer.

2. Description of product

2-1. Specifications

Model	Capacity range(kg)	Cable travel(m)	Mass(kg)
EWA-15	9~15	1.3	Approx.4.7

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

2-2. Main features

■Fall prevention device

A mechanism to prevent the suspended tool/device from falling to the maximum cable travel in case of spring breakage.
This mechanism can not prevent the tool/device from falling at all when the spring breaks.

■Drum lock (See Chapter 4-2 "Drum lock operation")

A mechanism to lock the drum at every 1/6 turn.
This mechanism is used when removing the suspended tool/device (see Chapter 4-3) or replacing the wire rope (see Chapter 7).

■A snap back arrest device

This device is provided to arrest Wire rope snap back in case that Wire rope is cut or suspended tool is disengaged. As soon as Wire rope is cut, drum revolves rapidly winding Wire rope up. The centrifugal force makes Ratchet on a spring case pushed out and the ratchet sticks in wheel fixed on a cover, stopping the revolution of the drum.
This is not engineered to keep the machine away from Wire rope snap back in advance.
Snap back arrest device works when the length of pulled wire is between 300mm and 1300mm. Between 100m and 200m of Wire rope must be wound very fast until Snap back arrest device works in case of the cutting.
The device is only for emergency.

3. Installation

3-1. Balancer installation

⚠ WARNING

- **Install the balancer correctly.**
  Incorrect installation could cause personal injury or damage to the balancer or other equipment.
- **Always attach a secondary support cable or chain.**
  It is required to protect personnel in case of failure of the top hook or the fitting.

1) Prepare a fitting that can support at least 10 times the maximum capacity of the balancer .
NOTE: The fitting must have no opening as shown in Fig. 1 to prevent the balancer from disengaging when it swings.

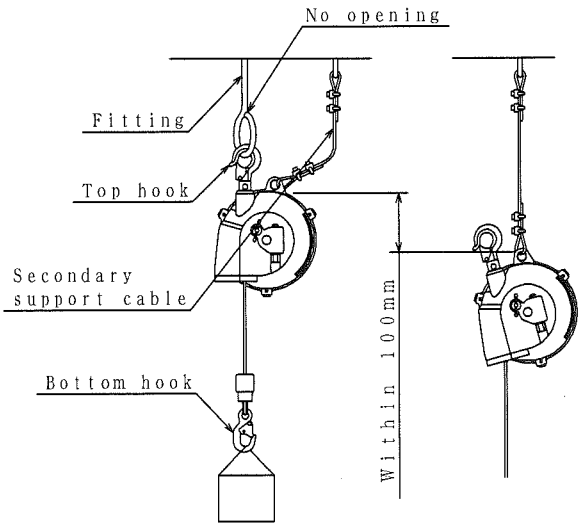
2) Attach the top hook of the balancer directly to the fitting. Check the latch is closed.
NOTE: Take care the balancer does not hit surrounding objects.
Make the mounting height different for each balancer to avoid collision.

3) Check the top hook can swivel freely.
NOTE: Do not fasten the top hook to the balancer body.

4) Prepare a secondary support cable or chain that can support at least 10 times the maximum capacity of the balancer .

5) As shown in Fig. 1, attach an end of the secondary support cable or chain to the balancer body, and attach the other end to a separate fitting which does not support the balancer.
NOTE: Leave some slack in the secondary support cable or chain to allow the balancer to rotate freely. The slack must be a suitable length so that the balancer will stop within 100 mm when falling in case of failure of the top hook or the fitting (See Fig. 1).

Fig.1



3-2. Tool/device attachment and spring tension adjustment

⚠ WARNING

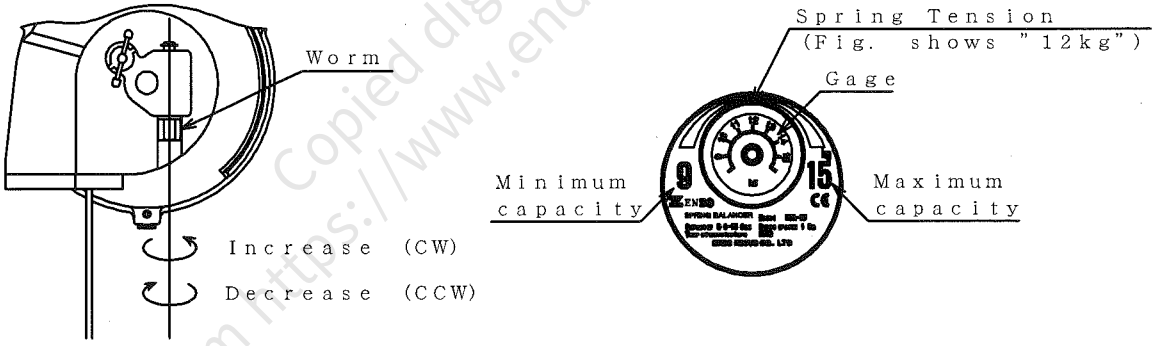
Never pull the wire rope when unloaded.
If the wire rope is released when extended with no load, it will snap back and could cause personal injury.

⚠ CAUTION

If the spring tension is set over the maximum capacity, the balancer can not provide the specified cable travel and the spring life will be shortened.
If the spring tension is set under the minimum capacity, the fall prevention device will operate and stop the suspended tool/device.

1) Before attaching, check the mass (weight) of the complete tool/device, including all accessories, is within the capacity range of the balancer.
2) While watching the gauge, pre-adjust the spring tension to the mass of the complete tool/device by turning the worm with a wrench etc. turn clockwise for increasing the spring tension, turn counterclockwise for reducing.
3) Lift the complete tool/device up to the bottom hook and attach it. Never pull the wire rope down to the tool/devise.
4) After attaching the complete tool/devise. Adjust the spring tension again and check tool/devise is balanced.
   NOTE: Over tensioning could cause damage to the balancer body or the wire rope

Fig.2



3-3. Working stroke (cable travel) check

⚠ CAUTION

Extending the wire rope past the maximum cable travel could cause damage to the balancer.

1) Check the cable travel is long enough for the application.
2) If necessary, lower the mounting height of the balancer or insert a suitable fitting between the bottom hook and tool/device.

4. Use

4-1. Safety instructions on use

⚠ WARNING

- Never remove tool/device from the bottom hook while the wire rope is extended.
- Never stand under the suspended tool/device.
- Never alter the balancer.

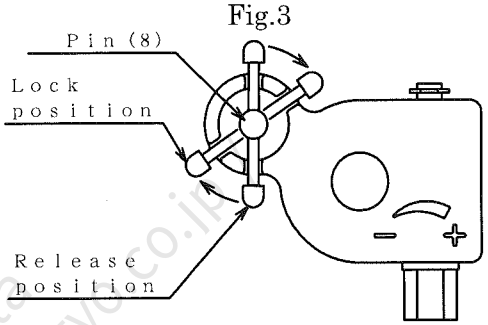
⚠ CAUTION

- Always use within the capacity range of the balancer.
- Always adjust the spring tension before use.
- Do not extend the wire rope past the maximum cable travel.
- Do not pull the wire rope at an angle.

4-2. Drum Lock operation

1) Pull Pin (8) out and turn it clockwise to place in the lock position (See Fig. 3).
2) Move the suspended tool/device upward or downward until Pin (8) enters the slot/ hole in the drum and the drum becomes locked.
3) Move the tool/device again to check the drum is locked securely.
4) Remove the tool/device from the bottom hook.

Fig.3



⚠ WARNING

Never remove the suspended tool/device before checking the drum is locked securely.
If the drum is not locked securely, the drum lock could be released allowing the wire rope to snap back, possibly causing personal injury.
Drum lock check is very important factor for safety . Never fail to verify the sufficient drum lock .

5) Before releasing the drum lock, attach a new tool/device if the old one has been removed. The new tool/device must have almost the same mass (weight) as the old one.
6) Release the drum lock by pulling Pin (8) out. Turn Pin (8) counterclockwise and place it in the release position.

⚠ WARNING

Never release the drum lock when the balancer is unloaded or the new tool/device has a different mass (weight) to the old one.
If released, the wire rope will snap back or the tool/device could drop down respectively, possibly causing personal injury.
Always release the drum lock after arranging the tension of spring suspending a tool.
This is important factor for safety. Never fail to abide by procedure instructed in the manual.

4-3. Tool/device replacement

■Method 1 - With drum lock

1) Lock the drum according to Chapter 4-2 "Drum lock operation" Remove the suspended tool/device.

> **⚠ WARNING**
>
> **Move the tool/device upward and downward to check the drum is locked securely.**
> **Never remove the tool/device before checking this.**
> **If the drum is not locked securely, the drum lock could be released allowing the wire rope to snap back, possibly causing personal injury.**
> **Drum lock check is very important factor for safety. Never fail to verify the sufficient drum lock.**

2) Before attaching, check the mass (weight) of the new complete tool/device, including all accessories, is within the capacity range of the balancer.
3) While watching the gauge, pre-adjust the spring tension to the mass of the new complete tool/device by turning the worm with a wrench etc.
   Turn clockwise for increasing the spring tension, turn counterclockwise for reducing.
   The gauge shows the approximate spring tension (see Fig.2).
4) Attach the new complete tool/device to the bottom hook. Releasing the drum lock

> **⚠ WARNING**
>
> **Never release the drum lock when the balancer is unloaded.**
> **If released, the wire rope will snap back, possibly causing personal injury.**
> **Always hold the suspended new tool/device by hand when releasing the drum lock, if the new tool/device has a different mass (weight) to the old one.**
> **Otherwise, the tool/device could rise up or drop down suddenly, possibly causing personal injury.**

5) After attaching the new complete tool/device and releasing the drum lock, adjust the spring tension again and check the tool/device is balanced.
   NOTE: Over-tensioning could cause damage to the balancer body or the wire rope.

■Method 2 - Without drum lock

> **⚠ WARNING**
>
> **Never remove the suspended tool/device while the wire rope is extended.**
> **If removed, the wire rope will snap back and could cause personal injury.**

1) Lift then remove the suspended tool/device when the wire rope is fully retracted.
2) Attach a new tool/device according to Chapter 3-2
   "Tool/device attachment and spring tension adjustment".

5. Troubleshooting

⚠ WARNING

If a malfunction occurs during operation, stop operation immediately and take the necessary steps to rectify the problem.
Never remove the suspended tool/device before identifying causes of the malfunction.
If removed, the wire rope will snap back and could cause personal injury.
Never take off a tool suspend to make the work safe. Wire rope snap back protection is for only emergency.

5-1. Common malfunctions and their causes

Malfunction	Cause	Solution
• Wire rope cannot be pulled out and retracted.	• Drum lock is engaged. • Fall prevention device is engaged because the spring tension is set under the maximum capacity . • Wire rope has slipped off from the drum groove and is caught between drum and casing. • Spring has broken.	• Release drum lock See Chapter 4-2 . • Release fall prevention device See Chapter 5-2 . • Return wire rope to the drum groove. See Chapter 5-2. • Replace spring. See Chapter 8.
• Wire rope can not be retrieved.	• Wire rope snap back protection actuated • Wire rope has slipped off from the drum groove and is caught between drum and casing .	• Release the wire rope snap back protection See Chapter 5-2 . • Return wire rope to the drum groove . See Chapter 5-2.

Contact your dealer or us if a malfunction not listed above occurs.

5-2. Solutions (Refer to the disassembly drawings on page 13)

⚠ CAUTION

Careless repairs can cause personal injury or damage to the balancer.
Therefore, be careful but thorough when making repairs.

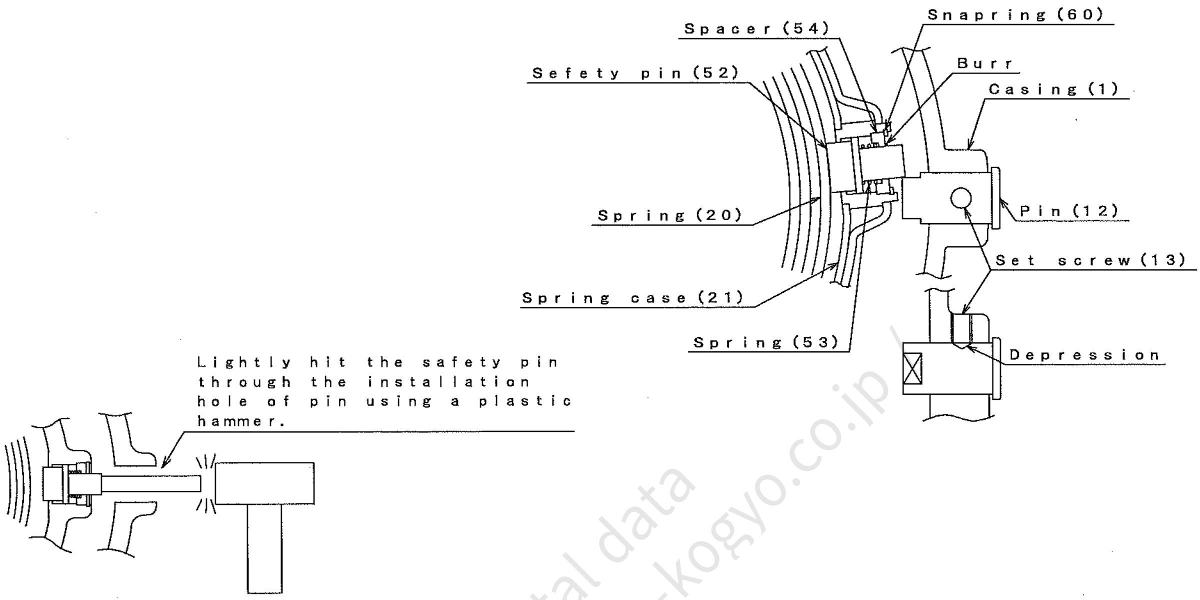
■When the fall prevention device has engaged because the spring tension is set under the minimum capacity

1) Move the suspended tool/device upward and downward by hand.
   The tool/device can be moved about 70 to 140 mm.
   If the tool/device raises after being lowered and then released, turn Worm (49) counterclockwise until the toll/device starts dropping down. If the tool/device drops down after being lifted and then released, turn Worm clockwise until the tool/device starts rising.
2) Loosen Set screws (13), and remove all pins (12) while holding the tool/device by hand.
   NOTE: For safety reasons, perform this work with two persons.
3) Lift then remove the tool/device from bottom Hook (40) when check the mass (weight) of removed tool/device is within the capacity range of the balancer.
4) Attach a weight, which has been measured to be within the capacity range, to bottom Hook (40) and adjust the spring tension.
5) Move the tool/device upward or downward so that Safety pin (52) appears at the opening (cut off portion) of Causing (1).
6) Check safety pin (52) does not project out from the surface of Spacer (54).If protruding, lightly tap the top of safety pin with a plastic hammer etc.
7) If safety pin does not return, it has burrs or spring (53) is broken. Remove Spacer (54) and check Safety pin. Spring (53) pops out when Spacer (54) is removed, therefore be careful not to lose it.

8) Attach Pins (12) to Casing (1).
Fasten depressions in pins (12) with set screws (13).

> **⚠ WARNING**
> **If installation of Safety pin (52) or pins (12) is incorrect or missed, the fall prevention device will not operate in case of spring breakage, causing personal injury or damage to equipment.**

Fig. 4



■When the wire rope is caught between drum and casing

1) Release Wire rope (38) by jerking it strongly while the tool/device is suspended.
   NOTE: After jerking, check Wire rope and replace if damaged.
2) If Wire rope can not be released by jerking, disassembly is required.
   Remove Retaining ring (55) from Worm (49).
3) Release all spring tension by turning Worm (49) counterclockwise, and remove the balancer from the fitting. .
4) Remove the tool/device from bottom Hook (40), and remove the balancer from the fitting.
5) Loosen Set Screws (13) and remove all pins (12).
6) Remove Gauge (50).
7) Loosen Cap screw (36), and remove Cover (32).
8) Return wire rope (38) to the groove of Drum (19).
   NOTE: Check wire rope (38) and replace if damaged.
9) Install Cover (32)
10) Install Worm (49), and attach Retaining ring (55) .
11) Adjust the spring tension, and install Gage (50) and Pins (12) .
   See Chapter 8 “Spring replacement”

■In case that the Wire rope snap back protection has actuated by sudden retrieve.

1) Pull out Wire rope (38) and release Ratchet (26), suspending a tool.

> **⚠ WARNING**
> **Never remove the suspended tool when Wire rope snap back protection has actuated.**
> **Release of Wire rope snap back protection may cause a serious danger, retrieving cable rapidly if has performed without a tool suspended.**
> **Wire rope pilling out one recovery work will release Wire rope snap back protection, causing personal injury. Wire rope will be retrieved about 100mm－200mm rapidly.**

2) If Ratchet is not released despite cable pulls out enough, Lock the drum according to Chapter 4-2 Drum lock operation.
3) Remove Retaining ring (55) from Worm (49) after checking the sure lock of drum.

4) Release all spring tension by turning Worm (49) counterclockwise, and remove Worm.
5) Remove the tool/device from bottom (40), and remove the balancer from the fitting.
6) Loosen Set screw (13), and remove all pins (12).
7) Remove Gauge (50).
8) Remove Cap screw (36).
9) Remove Cover (32).
NOTE: Replace Wheel (34), Ratchet (26),Spring (31) etc. if they has damaged.
10) Install Cover (32).
11) Mount Cap screw (36).
12) Install Worm (49), and attach Retaining ring (55).
13) Adjust the spring tension, and install Gauge (50) and Pins (12).
See chapter 8 "Spring replacement", 10-11)

■In case that Snap back protection has actuated due to wire rope cut etc.

⚠ WARNING

If snap back protection has actuated due to Wire rope cut etc, Stop operation at once and perform proper solution. Wire rope will be retrieved suddenly, causing injury of personal in case that the damaged Wire rope is pulled out or machine receives excessive shock.
Wire rope pulling out or excessive shock to the Balancer will release Wire rope snap back protection, causing personnel injury. Wire rope will be retrieved about 100mm – 200mm rapidly.

1) Lock Drum according to Chapter 4-2 [Drum lock operation]
2) Remove retaining ring (55) from Worm (49) after checking the sure lock of drum.
3) Release all spring tension by turning Worm (49) counterclockwise, and remove Worm.
4) Take off a Spring balancer from the support.
5) Loosen Set screw (13), and remove all pins (12).
6) Remove Gauge (50).
7) Remove Cap screw (36).
8) Remove Cover (32).
NOTE: Replace Wheel (34), Ratchet (26), Spring (31) etc. if they has been damaged.
9) Install Cover (32).
10) Mount Cap screw (36)
11) Install Worm (49), and attach Retaining ring (55).
12) Equip Wire rope (38) to Drum (19) after passing Wire rope through the Wire rope entrance on Casing (1) and then fix wire rope with Plug (48).
13) Adjust the spring tension, and install Gauge (50) and Pins (12).
See Chapter 8 "Spring replacement"

6. Inspections

⚠ WARNING

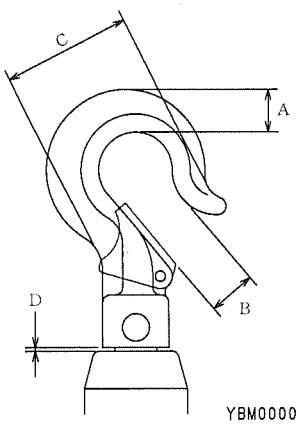
Periodically inspect the balancer, and replace any worn or damaged parts.

⚠ CAUTION

Always use genuine parts for replacement.

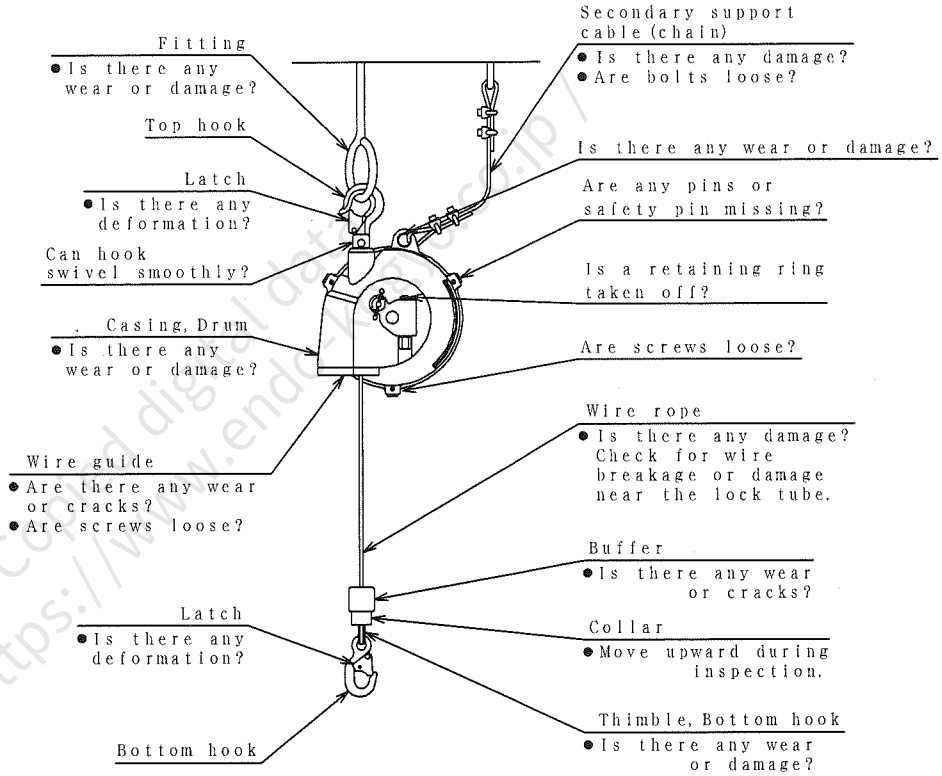
■Inspect the balancer at least once a month.
Correct and repair any problems which are detected.
Make the inspection interval shorter when operating frequently or under hostile environments.
(See Fig. 5)

■Service limit of top hook

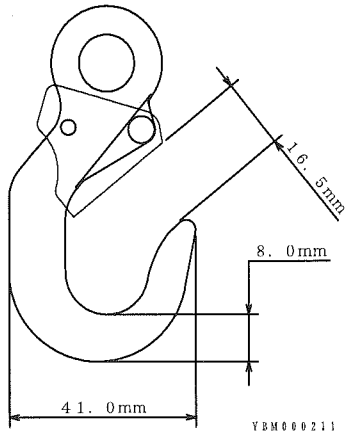


Limit dimension (mm)			
A	B	C	D
11.7	15.5	44.0	1.5

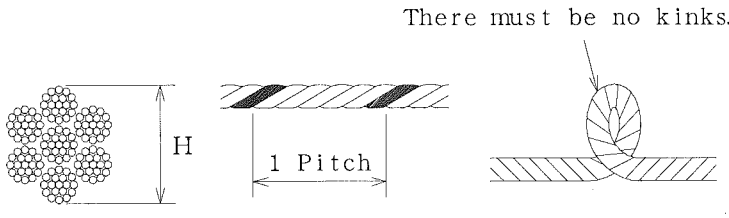
Fig.5



■Service limit of bottom hook



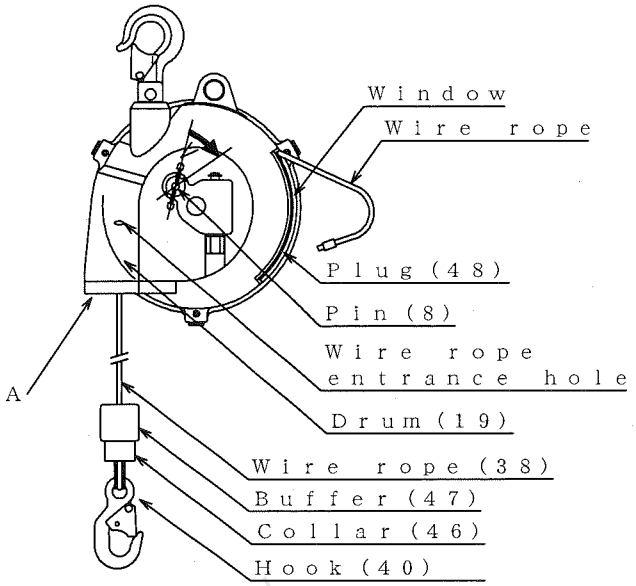
■Service limit of wire rope



H dimension (mm)		Allowable number of broken wires in 1 pitch
Standard	Limit	
4	3.7	11

7. Wire rope replacement

Fig.6



1) Lower the tool/device, extending Wire rope to the maximum cable travel.
2) Position Plug (48) at the casing opening as shown in Fig. 6, and engage the drum lock. See Chapter 4-2 "Drum lock operation".
3) Move the tool/device upward and downward to check Drum is locked securely. Remove the tool/device from bottom Hook (40).

⚠ WARNING

Never remove the suspended tool/device before checking Drum (19) is locked securely.
If Drum (19) is not locked securely, the drum lock could be released allowing Wire rope to snap back or Drum to rotate suddenly, possibly causing personal injury.
Drum lock check is very important for safety.
Never fail to verify the sufficient in the manual.

4) Remove the balancer from the fitting and place on the floor.
5) Remove Plug (48), and remove old Wire rope from drum.
6) Insert new Wire rope from A-side, pass it through Drum.
7) Attach the end of Wire rope to Drum and fasten with plug (48).
8) Install the balancer on the fitting. See Chapter 3-1 "Balancer installation"
9) Attach the tool/device to bottom Hook, and release the drum lock.

⚠ WARNING

Never release the drum lock before attaching the tool/device.
If released, Wire rope (38) will snap back and could cause personal injury.
Always release the drum lock after arranging the tension of spring suspending a tool. This is important factor for safety. Never fail to abide by the procedure instructed in the manual.

8. Spring replacement

⚠ WARNING

Never remove the spring from the spring case. If removed, the spring will expand explosively and cause personal injury.
Replace the spring assembly as a whole.

Referring to the disassembly drawing (on page13), disassemble the balancer using the following procedure.

1) A. When the spring has broken;
   Remove the tool/device from bottom Hook (40).
   B. When the spring has not broken;
   Lift then remove the tool/device from bottom Hook (40) when Wire rope (38) is fully retracted into Drum (19).
2) Remove the balancer from the fitting and place on the floor.
3) Remove Gauge (50)
4) Remove Retaining ring (55) from Worm (49). Release all spring tension by turning worm (49) counterclockwise until Worm can almost be removed. If the drum lock is engaged, check there is no spring tension remaining, and then release the drum lock.
   NOTE: Check the spring tension by pulling Wire rope.
5) Turn Worm (49) further and remove it.
6) Loosen Set screws (13), and remove all Pins (12).

7) Remove Plug (48), and remove Wire rope (38) from Drum (19).
8) Remove Cover (32), and remove Spring case (21), Drum (19), and Spindle (15), together from the Casing(1).
9) Remove Spindle (14).
10) Remove Hex. head bolt (24), and remove Spring case (21) from Drum (19).
11) Remove Bushing (23) from Spring case (21) .

⚠ WARNING

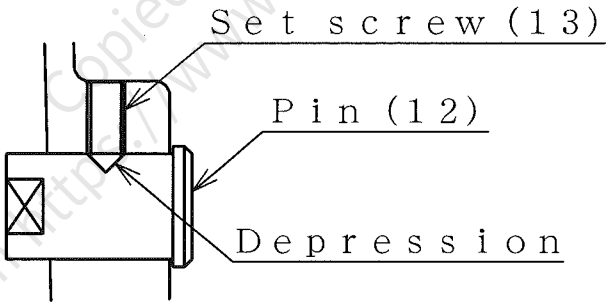
Never remove cover (22) from Spring case(21).
If removed, the internal spring could pop out and cause personal injury.

12) Reassemble in reverse order.
Pins (12) should be installed after adjusting the spring tension as instructed below.
13) Wind the spring by turning worm (49) clockwise.
NOTE: While turning Worm, Wire rope (38) will be retracted into drum (19). Pay attention Wire rope does not slip out from the drum groove. After Wire rope is fully retracted, turn worm 50 times.
14) Attach a weight, which has been measured to be within the capacity range, to bottom Hook (40) and adjust the spring tension.
15) Attach and adjust Gauge (50).
16) Attach Pins (13) to Casing (1) (See Fig.7)
fasten depressions in Pins (12) with set screws (13).

⚠ WARNING

If installation of Pins (12) is incorrect or missed, the fall prevention device will not operate in case of spring breakage, causing personal injury or damage to equipment.

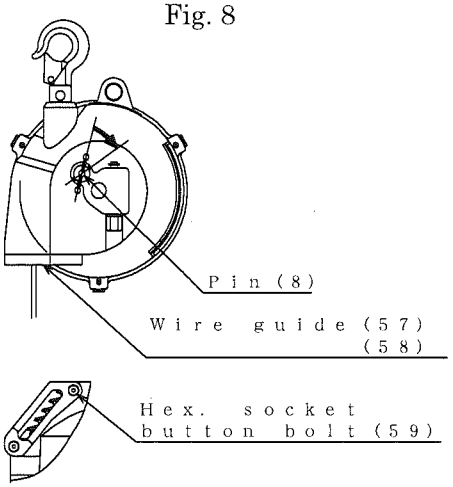
Fig.7



9. Wire guide replacement

1) Pull out the wire rope (57), (58) to the position which wire guide replacement is available and lock drum with drum lock device(refer to Fig-8). Refer to Chapter 4-2 "Drum lock operation".
2) After confirming that drum lock is surely on work, moving a suspended tool up and down, take off a suspended tool.

Fig. 8



⚠ WARNING

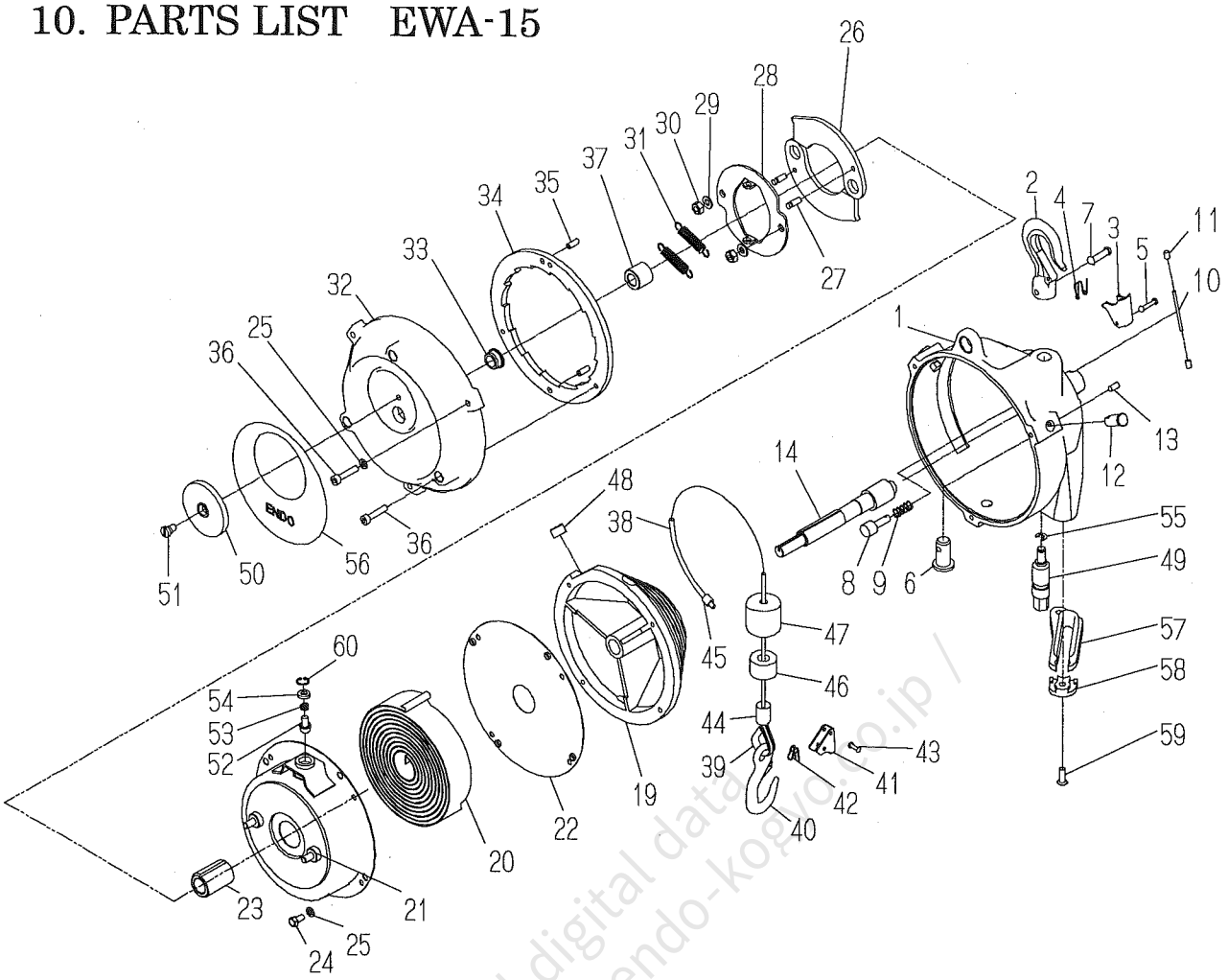
Never remove the suspended tool/device before checking Drum (19) is locked securely. If Drum (19) is not locked securely, the drum lock could be released allowing Wire rope (38) to snap back or Drum to rotate suddenly, possibly causing personal injury.

3) Remove the balancer from a fitting and place on the floor.
4) Remove Hex. Socket button bolts (59) are old wire guide from casing.
5) Fix new wire guide (57) (58)
   NOTE: Hex. Socket button bolts (59) are sealed against looseness
   Always replace old ones with new ones when they are remove.
   Tighten the hex. Socket bolts with torque of 2.8~3.0N・m{0.28~0.3kgf・m}.
6) Mount the balancer on a fitting.
   Refer to Chapter 3-1 "Balancer Installation".
7) Attach the tool/device to bottom Hook, and release the drum lock.

⚠ WARNING

Never release the drum lock before attaching the tool/device.
If released, Wire rope will snap back and could cause personal injury.

10. PARTS LIST EWA-15



Ref. No.	Part No.	Quantity	Description
-	LBP001097	1	Casing assembly
1	P2B100131	1	-Casing
-	LBP000262	1	-Hook complete
2	—	1	--Hook
-	LBP000263	1	--Latch set
3	—	1	---Latch
4	—	1	---Spring
5	—	1	---Rivet
6	—	1	--Shaft
7	—	1	--Rivet
8	P2B400347	1	-Pin
9	P2B400081	1	-Spring
10	P2B400224	1	-Spring pin
11	P2B400348	2	-Cap
12	P2B400044	3	-Pin
13	P2B400041	3	-Set screw
14	P2B301252	1	Spindle
19	P2B100045	1	Drum
-	LBP001661	1	Spring assembly
20	—	1	-Spring
21	—	1	-Spring case

Ref. No.	Part No.	Quantity	Description
-	LBP001822	1	-Safety pin set
52	—	1	--Safety pin
53	—	1	--Spring
54	—	1	--Spacer
60	—	1	--Retaining ring
22	—	1	-Cover
23	P2B300163	1	Bushing
24	KA00120510	4	Hex. head bolt
25	KA31120500	7	Spring washer
-	LBP001662	2	Ratchet set
26	—	2	-Ratchet
27	—	2	-Pin
28	P2B301254	1	Plate
29	KA31120600	2	Spring washer
30	KA20320600	2	Hex. nut
31	P2B401895	2	Spring
-	LBP001663	1	Cover complete
32	—	1	-Cover
33	—	1	-Bushing
34	P2B301255	1	Wheel
35	KA42410512	2	Spring pin
36	KA00910525	6	Cap screw
37	P2B401896	1	Collar
-	LBP000136	1	Wire rope assembly
38	—	1	-Wire rope
39	—	1	-Thimble
-	LBP001505	1	-Hook complete
40	—	1	--Hook
-	LBP001524	1	--Latch set
41	—	1	---Latch
42	—	1	---Spring
43	—	1	---Rivet
44	—	1	-Lock tube
45	—	1	-Lock tube
46	P2B400150	1	-Collar
47	P2B400147	1	-Buffer
48	P2H400007	1	Plug
49	P2B300062	1	Worm
50	P2B300166	1	Gauge
51	P2B400165	1	Screw
55	KA40310050	1	Retaining ring
56	P2B301256	1	Name plate
-	LBP001096	1	Wire guide set
57	—	1	-Wire guide
58	—	1	-Wire guide
59	P2B401213c	2	-Hex. socket button bolt

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.

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事業所情報につきましては、
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