

Users Manual

Retractor

ERM-2
ERM-4/ERM-4S
ERM-6/ERM-6S
ERM-8/ERM-8S



For safe and correct operation of the product, please be sure to read this manual and fully understand its content before use.

After reading, keep the manual safe so that you can find and use it readily.

In case of resale or transfer of ownership of this product, make sure to transfer the manual to the new owner.

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1. Introduction

Thank you very much for your purchase of the Retractor. To prevent any possibility misuse to and obtain the best performance, please be sure to read this manual and fully understand its content.

Notation in this manual

Hazard levels

This product is designed with ultimate priority on the safety of operators. However, due to the nature of the system, there are risks that cannot be totally removed.

In this manual, the level of significance and risk is defined and indicated in three stages: "WARNING", "CAUTION", and "NOTICE". Thoroughly read and fully understand the indicated items before operating the product and performing maintenance procedures. The indications for "WARNING", "CAUTION", and "NOTICE" are in order of risk significance (WARNING > CAUTION > NOTICE). Their details are described below.

 WARNING	A situation that, if mishandled, may cause death or serious disability.
 CAUTION	A situation that, if mishandled, may cause minor or moderate injury.
NOTICE	Indicates a situation that, if mishandled, may cause property damage.

The extent of the problem described above (disability, injury, and property damage) is defined as follows.

Serious disability: Loss of eyesight, wound, burn (high-temperature or low-temperature), electric shock, bone fracture, poisoning, and other injuries that leave aftereffects and that require hospitalization or long-term outpatient treatment.

Moderate injury: Burn, electric shock, bone fracture, and other injuries that do not require hospitalization or long-term outpatient treatment.

Minor injury: Scratch, bruise, laceration, and other injuries that have a minor impact on health.

Property damage: Damage to buildings, household articles, and injury to domestic animals or pets.

Other than WARNING, CAUTION, and NOTICE described above, matters important to workers are indicated using the following format.

 REMINDER	Describes important details to be remembered for the operation.
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Symbols

This Operation Manual uses the following symbols to simply provide information in addition to the indications above.

	Indicates a PROHIBITED action that must not be performed.		Indicates potential property damage or a danger that may inflict bodily injury.
	Indicates a REQUIRED action that must be performed.		Indicates that it is necessary to thoroughly read the manual and the relevant documents.

Scope of warranty and liabilities for the equipment

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 of ownership.
 - 2) Repair or modification performed by a party other than the manufacturer, agents, or dealers.
3. The warranty period is one (1) year from the date of purchase.
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-authorized parts.
 - 3) Failure/damage caused by fire, earthquake, natural disaster, or other unexpected incident.
 - 4) Harm caused by fall, shock, negligence, or by inadequate storage.
 - 5) Failure/damage caused by use of parts or other equipment that is not included in this product.
 - 6) Replacement of consumables.
 - 7) Usage in violation of dangers or cautions stipulated in this manual.
 - 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 imposed on you/your customer as a result of the failure of our product(s) are outside the scope of the warranty.

Copyright and liabilities

The copyright for this manual is issued to Endo Kogyo Co., Ltd.

The manual is provided for the limited purpose of supporting the safe and proper use of the product. It cannot be used for other purposes.

The customer may not use or make copies of this manual, in whole or in part, outside of this purpose without receiving prior consent from Endo Kogyo Co., Ltd.

The customer is also prohibited from translating or modifying the content of the manual, in whole or in part.

The content described in the manual is subject to change without advance notice. Please note this in advance.

Definition of intended users for this manual

This manual has been prepared to help all intended users involved with this product. From stand point of safety, we have defined intended users according to their ability and experience and provided detailed descriptions for each group. This manual defines four user levels.

Operator	The operator is a user who engages in general operations. Maintenance and other operations that require special skills are excluded from the general operations. The operator is therefore not permitted to disassemble the main equipment. The operator should read the manual thoroughly and carry out their work with complete understanding of the operating procedures.
Maintenance operator	In addition to the work of the operator described above, the maintenance operator is permitted to perform installation, simple troubleshooting, and periodic inspections. The maintenance operator is required to develop sufficient knowledge and operating skill for this product. The maintenance operator should read the manual thoroughly and carry out their work with complete understanding of the equipment's characteristics and all work contents.

Management supervisor	The management supervisor is required to have sufficient knowledge of the product and advanced operating skill for this product. The management supervisor should manage not only the product itself but on-site operations that handle the product, comprehensively.
Service engineer	The service engineer is a worker with special knowledge and skills for installing the product, investigating the causes of a failure or damage, and performing repairs and overhauls. Service engineering (the work by the service engineer) is performed by our service technicians or authorized our service technicians.

Emergency contact in case of malfunctions

If any problem with the product arises, contact us or your dealer.

2. Precautions for handling

Incorrect handling of this product may cause damage to the product itself as well as a fire or injury. Thoroughly read the following precautions and be sure to heed the instructions when handling the machinery.

 WARNING	
	- Do not use in explosive, flammable gas, or dusty atmospheres, any place where water or oil may splash, and near combustibles. This may cause fire or injury. - Do not perform any modification of the product.
	The maintenance should be performed by a maintenance operator who has developed sufficient knowledge and operating skill for the retractor.
	- Incorrect usage of the product may cause an injury. Use the product correctly in accordance with the descriptions in this manual. - Particularly, “WARNING”, “CAUTION”, and “NOTICE” described in this manual must be fully understood and always observed. - Install the product correctly in accordance with the descriptions in this manual.

 CAUTION	
	Be sure to perform daily and periodic inspections.

3. Unpacking and Installation

3-1 Packaging arrangement and transportation

The standard set of this product is packaged for delivery in a cardboard box.
The total weight of the package is the sum of the weight described in “4-3 Product specifications” and the weight of the packing materials (approximately 0.5 kg).
When transporting the package, do not drop or allow impact to it.
Prepare a box of a similar size for re-packaging.

3-2 Checks after unpacking

After opening the package, check that the following products are included.
Please contact us if you find anything missing or damaged.

- Retractor (main equipment) 1set
- Support Site guide or Users Manual 1copy

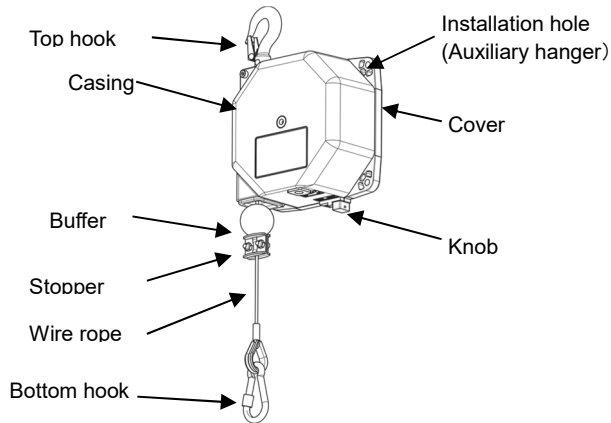
3-3 Disposal of packing materials

After opening the package, dispose of any packing and cushioning materials in accordance with the local regulations of the area where the product is used.

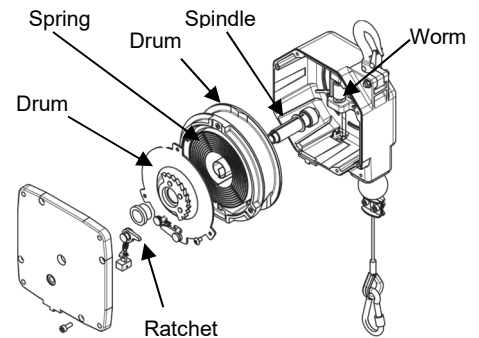
4. Product Description

4-1 Components

4-1-1 Retractor (Appearance)



4-1-2 Retractor (Internal parts)



4-2 Operating environment

Installation location: General indoor
 Ambient temperature: 10°C to +50°C (no freezing)
 Humidity: 85% or less (no condensation)
 Atmosphere: Non-explosive, free of flammable or corrosive gas, or dust, water/oil should not splash directly

4-3 Product specifications

The retractor is an industrial tool used to suspend tools and objects.
 The tension increases as the wire rope is extended.

Model	Load range (kg)	Factory set weight (kg)	Max. wire travel (m)	Mass (kg)
ERM-2	1.0 - 2.0	1.8	3.5	1.8
ERM-4	2.0 - 4.0	2.5	3.5	2.0
ERM-6	4.0 - 6.0	4.0	2.5	2.0
ERM-8	6.0 - 8.0	5.5	2.5	2.0
ERM-4S	2.0 - 4.0	2.5	3.5	2.0
ERM-6S	4.0 - 6.0	4.0	2.5	2.0
ERM-8S	6.0 - 8.0	5.5	2.5	2.0

* ERM-4S, ERM-6S, ERM-8S are equipped with a fall arrest device.

* The factory set weight when the wire is fully retracted.

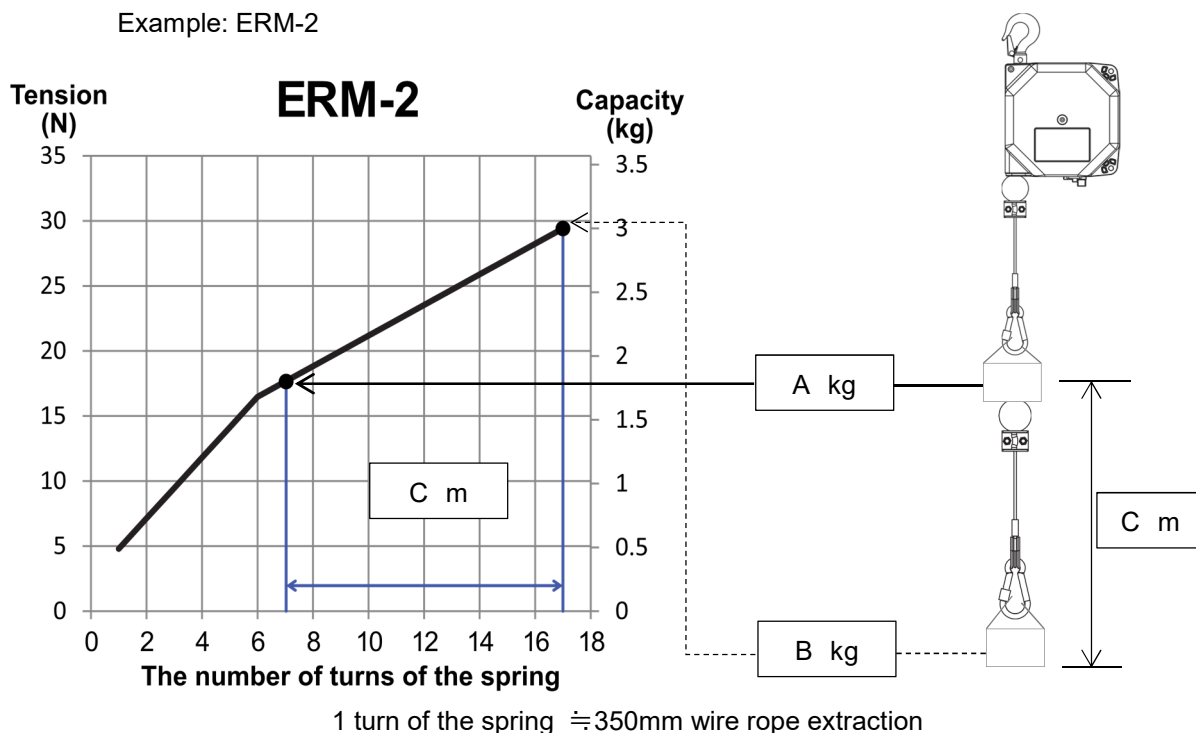
This example is at the factory set weight. The factory setting is the upper limit of the full stroke extraction.

■ Initial status

Model	Factory set weight A(kg)	Capacity at Factory set weight B(kg)	Max. wire travel C(m)	Available spring turns
ERM-2	1.8	3.0	3.5	17
ERM-4/ERM-4S	2.5	5.0	3.5	13
ERM-6/ERM-6S	4.0	7.0	2.5	11
ERM-8/ERM-8S	5.5	10.0	2.5	11

*There are individual variations in the set weight.

Example: ERM-2



4-4 Functions

4-4-1 The Ratchet

The ratchet stops wire rope in position. Refer to "6-3 Operation method of the ratchet device".

4-4-2 The Stopper

The stopper can be adjusted to stop the wire rope at any point. Refer to "5-2-2 Installation of tools (equipment) and adjustment of the spring tension" to change stopper position.

4-4-3 The Fall arrest device (ERM-4S, ERM-6S, ERM-8S)

If the spring fails, this device prevents the suspended tool from falling. If this device is activated, read "6-4 Release of the ratchet device (ERM-4S, ERM-6S, ERM-8S)" for directions.

4-5 Torque curve

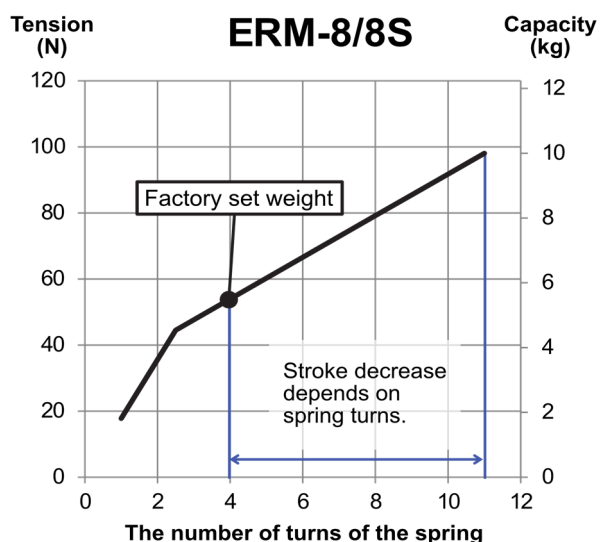
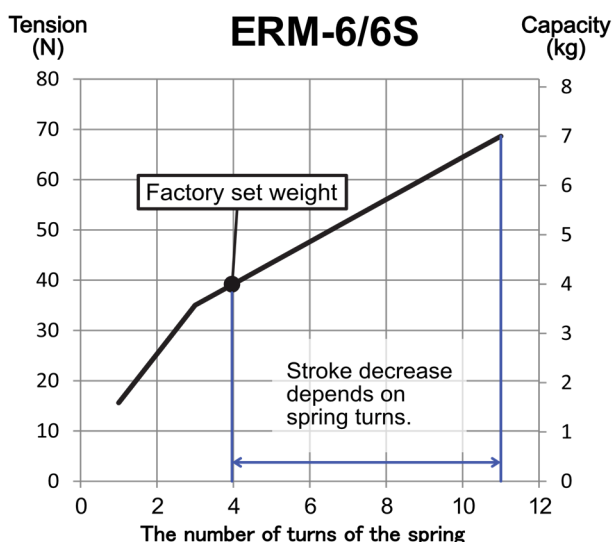
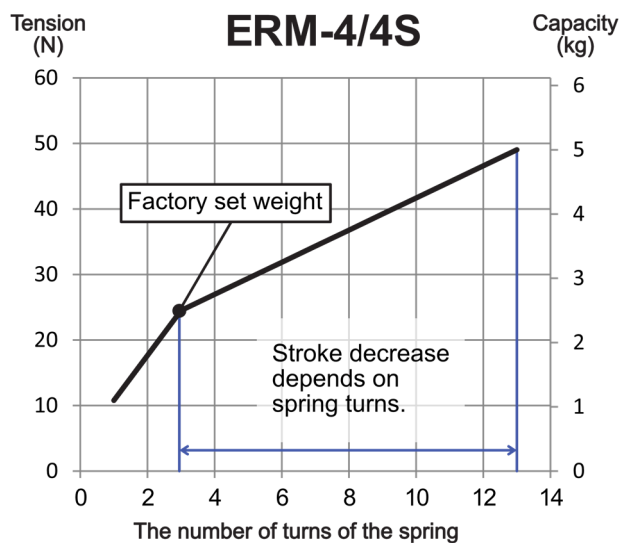
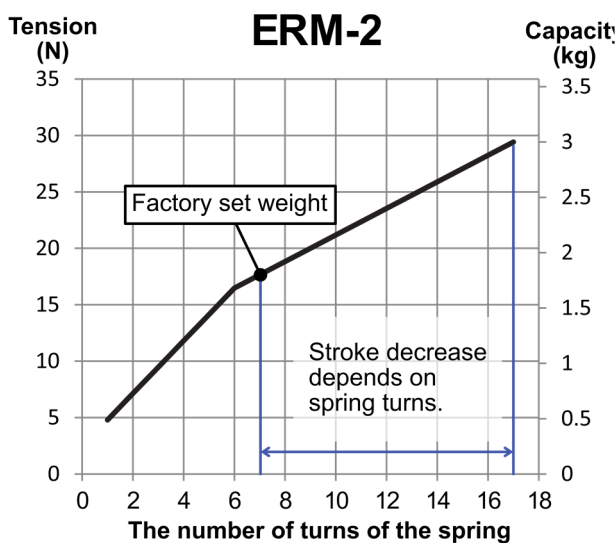
It shows the torque curve for each model.

There may be variations, please use it as reference only.

NOTICE



- If you increase the tension from factory set weight, the wire rope cannot be extended to the full length. If the wire rope is extended beyond the maximum spring rotations, the spring may be damaged.
- If you decrease the tension too much, it may not retract the wire rope.
- If you decrease the tension too much on the ERM-4S, ERM-6S and ERM-8S models, the fall arrest device will be activated and lock the wire rope extraction.



1 turn of the spring $\doteq$ 350mm wire rope extraction
1 turn of the spring = 14 turns of worm

4-6 Applicable standards

■ Machinery (Directive 2006/42/EC)

EN ISO 12100 : Safety of machinery. General principles for design. Risk assessment and risk reduction

- * Note: Only the standard specification of this product complies with the standards. If the product is used in combination with non-standard parts or modified by the customer, the standards may no longer be complied with. Please note this in advance.

5. Installation

WARNING



- Install the retractor correctly in accordance with the descriptions in this manual. Incorrect installation may cause an injury, property damage, or damage to the Retractor.
- Be sure to attach an auxiliary wire rope or chain to the retractor to protect workers in case the top hook or the support member (metal hanger) for the retractor should be damaged.

CAUTION



The installation should be performed by a maintenance operator who has developed sufficient knowledge and operating skill for the retractor.

5-1 Preparation and checks before installation

5-1-1 Tools and equipment for installation

All of the following items must be prepared by the customer.

- Support members (metal hangers)
- Auxiliary wire rope or chain
- Allen key(6mm)

5-1-2 Check of installation location

Before installing the product, check that the installation location does not have any of the following problems.

- 1 Check that the support members have a sufficient strength.
- 2 Ensure that sufficient space for performing maintenance, including the adjustment of the spring tension, is available on a side of the main equipment.
- 3 Ensure that adequate work space is available around the main equipment.
- 4 Check that the installation location has the installation environment described in "4-2 Operating environment".
- 5 If a trolley is used, attach a carabiner.
- 6 Check that there are no sharp edges in the installation location.

5-2 Installation procedures

5-2-1 Installation of the Retractor

CAUTION

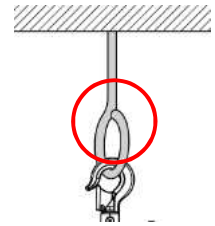


Do not fix the top hook. Using the product with the top hook fixed may cause damage or a fall.

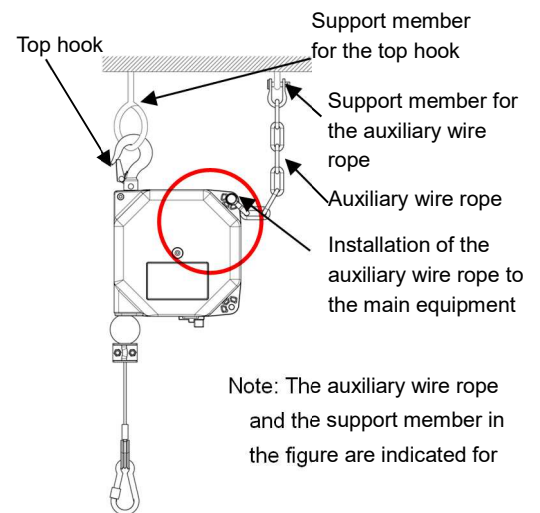
NOTICE



- Use a support member (metal hanger) with no opening as shown in the figure on the right, so that the retractor does not come off while in motion.
- Attach the support member such that the retractor does not collide with its surroundings.
- When installing multiple retractors alongside, place them at different heights so that they do not collide with each other.



- 1 Prepare a support member (metal hanger) with a sufficient strength. Attach the top hook of the retractor directly to the support member (metal hanger).
- 2 Check that the top hook latch is closed
- 3 Ensure that the retractor moves freely.
- 4 Prepare an auxiliary wire rope or chain that has a strength at least 10 times greater than the maximum capacity of the retractor.
- 5 As shown in the figure on the right, attach an end of the auxiliary wire rope or chain to a support member (metal hanger) different from the support member (metal hanger) to which the top hook has been attached. Attach the other end of the auxiliary wire rope or chain to the main equipment of the retractor.

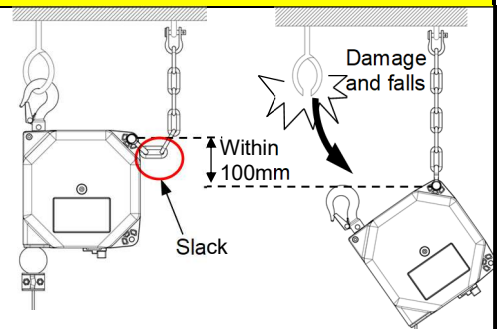


Note: The auxiliary wire rope and the support member in the figure are indicated for

CAUTION



Loosen the auxiliary wire rope or chain allow the retractor to move freely. The slack must be such that the retractor stops within 100mm if the top hook or the support member (metal hanger) for the retractor are damaged and the retractor falls.



5-2-2 Installation of tools (equipment) and adjustment of the spring tension

WARNING



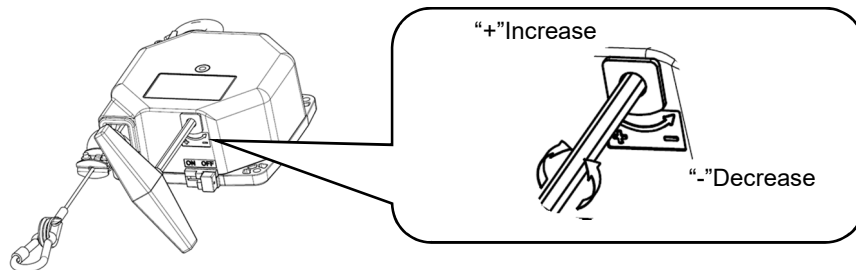
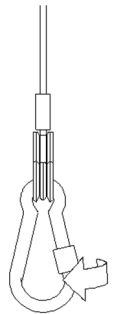
Do not extend the wire rope when the retractor is not loaded. If the wire rope is released by mistake while being pulled out without a load, it may quickly be wound up, causing an injury.

NOTICE

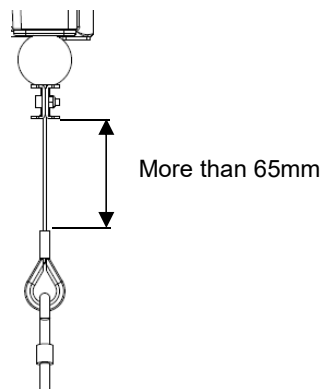


- If you increase the tension from factory set weight, the wire rope cannot be extended to the full length. If the wire rope is extended beyond the maximum spring rotations, the spring may be damaged.
- If you decrease the tension too much, it may not retract the wire rope.
- If you decrease the tension too much on the ERM-4S, ERM-6S and ERM-8S models, the fall arrest device will be activated and lock the wire rope extraction.

- 1 Check whether the total mass (weight) of the tool (equipment) and the accessories is within the capacity range of the Retractor.
- 2 Refer to "0" and follow the directions to release ratchet device.
- 3 Lift the tool (equipment) and attach it to the bottom hook of the retractor. Turn the screw lock and close the ring. If the tool (equipment) mass (weight) is over the spring tension, the tool (equipment) will fall down. Please hold the tool (equipment) and down slowly.
- 4 Turn the worm with a spanner or the like to adjust the spring tension. If you increase tension more than the factory setting weight, the wire rope extension will become shorter.
 - The tension will increase if you turn the worm in the "+" direction (clockwise).
 - The tension will decrease if you turn the worm in the "-" direction (counterclockwise).



- 5 If you would like to limit the winding length, change the stopper position, but do not set below the factory set position.



5-3 Post-installation checks

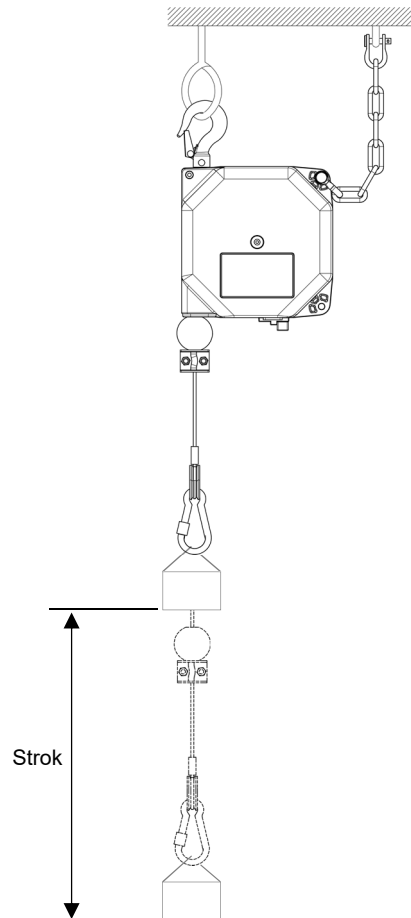
5-3-1 Checking the working range (stroke)

NOTICE



- Do not extend the wire rope beyond the stroke. Doing so may damage the retractor.

- 1 Ensure that work can be performed within the range of setting stroke.
- 2 If the range of the stroke is insufficient, lower the installation height of the retractor or use an appropriate sling between the bottom hook and the tool (equipment).



Note: The auxiliary wire rope, the support member and the tool in the figure are indicated for reference.

6. Usage

6-1 Pre-operation inspections and checks

WARNING



If any abnormality is found as a result of inspection, do not use the retractor.



- If any loose bolts or screws are found in the inspections, retighten the bolts and screws.
- When you notice any wear, deterioration or deformation of the parts, contact us or your dealer.

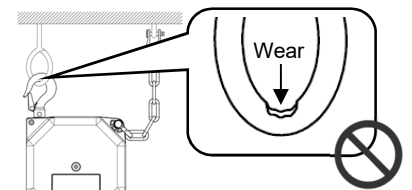
Inspect and check the following items before starting the operation:

■ Check of the surroundings

- 1 Ensure that there is no trash or unnecessary equipment around the retractor or in the work space.
- 2 If there is any obstacle and the like that cannot be removed, contact the person in charge of the work.

■ Inspection of the support member (metal hanger)

- 1 Check that the support member (metal hanger) is not worn.
- 2 If any wear is found, immediately stop the operation.

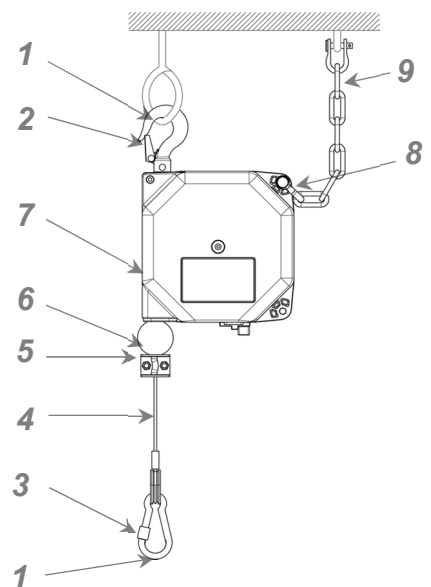


Note: The support member (metal hanger) in the figure

■ Check of the main equipment of the retractor

For the main equipment of the retractor, perform the following inspections and checks.

- 1 Check that the top and bottom hooks are not worn and can rotate smoothly.
- 2 Check that the latches of the top and bottom hooks are not deformed and do not come off the hooks.
- 3 Be sure that the bottom hook (carabiner) screw is locked.
- 4 Check that the wire rope is not worn (Note: particular attention should be paid to wire breakage and the stopper).
- 5 Check that the buffer is not worn or cracked.
- 6 Check for significant wear or cracks in the wire guide.
- 7 Check that the case is not worn.
- 8 Check that the Installation hole (auxiliary hanger) is not worn.
- 9 Check that the auxiliary wire rope (or chain) is not worn and the mounting bolts are not loose.
- 10 Check that the screws and the bolts in various parts are not loose.



Note: The support member (metal hanger) and the auxiliary wire rope in the figure are indicated for reference.

6-2 Precautions for use

WARNING



- Do not move directly under the tool (equipment) suspended from the retractor.
- Do not perform any modification of the retractor.
- Do not remove tools (equipment) with the wire rope pulled out. The wire rope may be quickly wound up, causing an injury.

CAUTION



Be sure to use the product within the capacity range. (Refer to the capacity range in "4-3 Product specifications")

NOTICE



- If you increase the tension from factory set weight, the wire rope cannot be extended to the full length. If the wire rope is extended beyond the maximum spring rotations, the spring may be damaged.
- Do not extend the wire rope further than its stroke. It may cause damage to the drum.
- Do not extend the wire rope in an oblique direction. It may cause damage to the wire guide and wire rope.



Adjust the spring tension before the operation.

6-3 Operation method of the ratchet device

WARNING



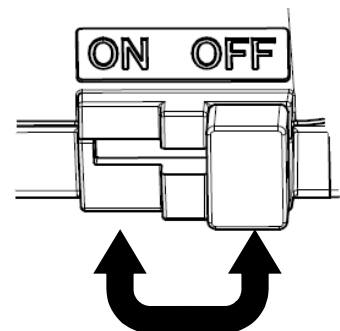
Do not adjust the spring tension while the ratchet device is activated. If the ratchet is released with high spring tension, the wire rope will be wound up rapidly. Which may cause injury.

6-3-1 Activate the Ratchet device

- 1 Slide the switch to the "ON" position.
- 2 If the wire rope is slowly returned to the click, the ratchet will be activated.

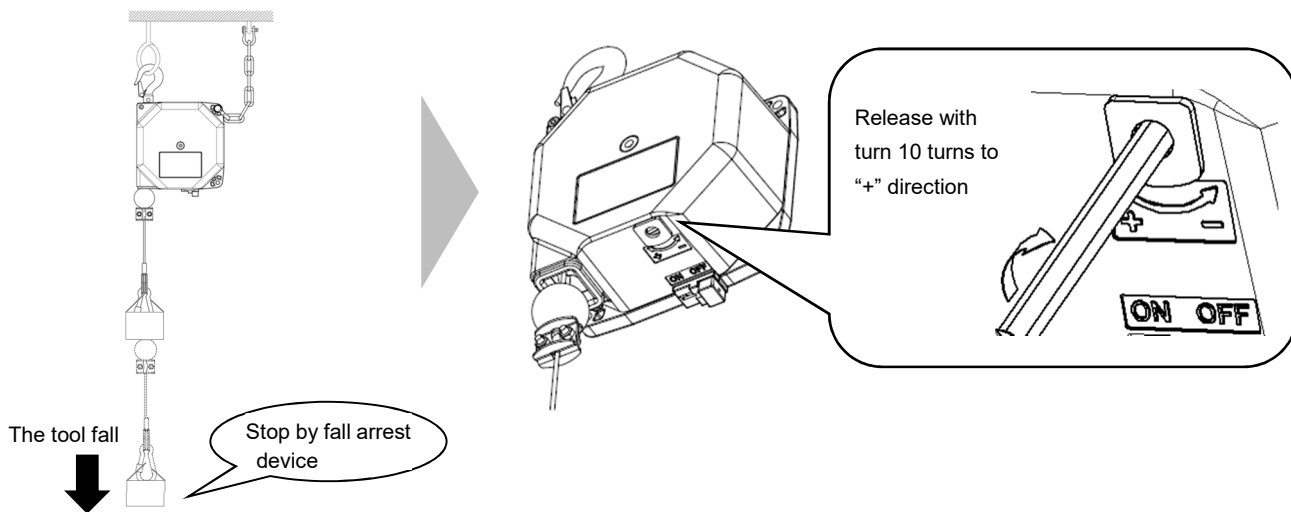
6-3-2 Releasing the Ratchet device

- 1 Slide the switch to the "OFF" position.
- 2 If the ratchet device is activated, pull down the wire rope. Then the Ratchet device will be released.



6-4 Release of the ratchet device (ERM-4S, ERM-6S, ERM-8S)

If the fall-arrest device is activated due to an over reduction of tension, turn about 10 turns to “+” direction (clockwise) while the tool (equipment) is attached. Then fall-arrest device will be released.



6-5 Replacement of the tools (equipment)

WARNING



- Do not move directly under the tool (equipment) suspended from the retractor.
- Do not remove tools (equipment) with the wire rope pulled out. The wire rope may be quickly wound up, causing an injury.

NOTICE



Adjust the spring tension before the operation

- 1 Confirm that the tool (equipment) can be moved up and down.
- 2 Lift the tool and wind the wire rope completely inside the drum. Remove the tool (equipment).
- 3 Install the tool (equipment) and adjust the spring tension in accordance with “5-2-2 Installation of tools (equipment) and adjustment of the spring tension”

6-6 Periodical inspections

Perform an inspection at least once per month.

If the product is used in an unfavorable environment or used frequently, reduce the interval between the inspections.

For the method of the periodical inspections, download “Repair Manual” from our website and refer to “Periodical inspections” in “Repair Manual”.

<http://www.endo-kogyo.co.jp>

7. Troubleshooting

7-1 Countermeasures

WARNING



Do not remove the tool (equipment) attached to the wire rope end until the cause of the failure is identified. If the tool (equipment) is removed, the wire rope may be quickly wound up, causing an injury.

CAUTION

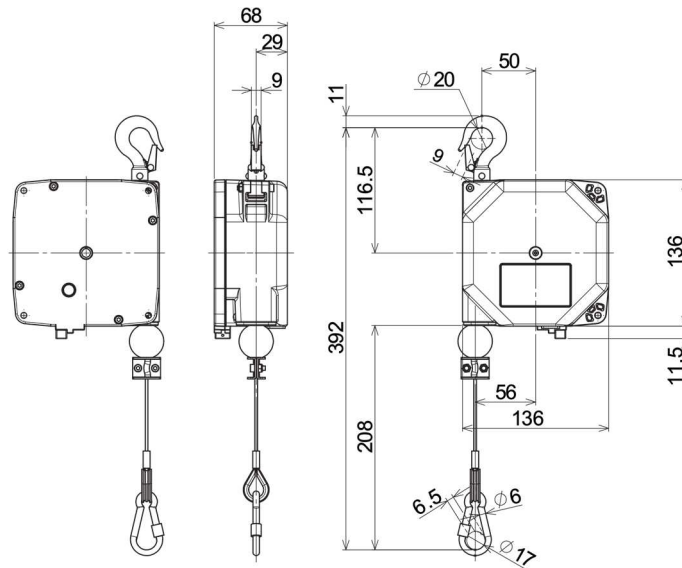


- If you notice anything unusual, stop the operation immediately. After checking the items listed in the table below, appropriate measures should be taken by a maintenance operator who has developed sufficient knowledge and operating skill for the retractor.
- If the situation does not relate to any of the listed items in the table below, contact us or your dealer.

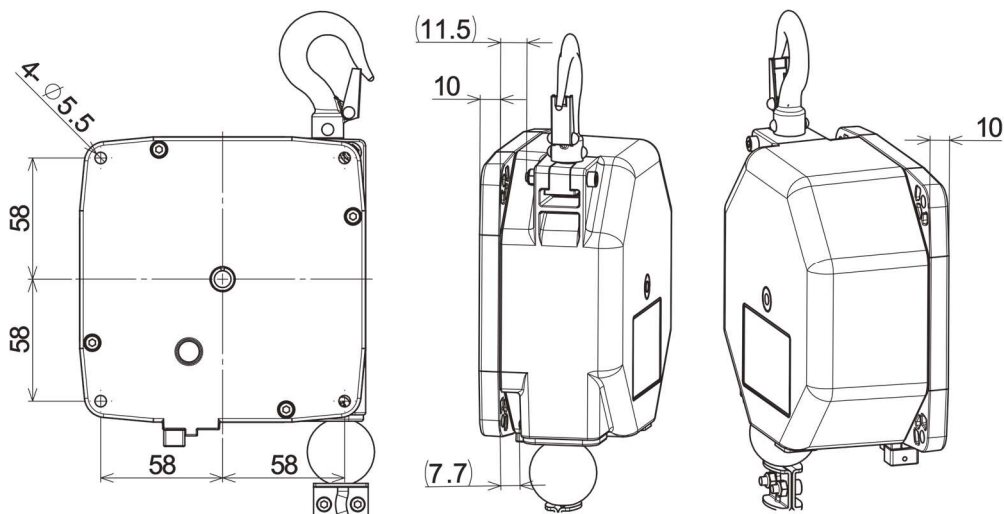
Failure	Reason	Measure
• The wire rope cannot be pulled out or wound.	• The spring has been ruptured.	• Replace the spring.
• The wire rope cannot be pulled out.	• The spring tension is increased too much and the spring has been tightly wound.	• Decrease the spring tension. • See “5-2-2 Installation of tools (equipment) and adjustment of the spring tension”
	• The spring tension is decreased too much and the fall-arrest device has been activated.	• Release the fall-arrest device. See “6-4 Release of the ratchet device (ERM-4S, ERM-6S, ERM-8S)”

8. Dimensional Drawing

8-1 Main equipment



8-2 Details of installation holes



9. Consumables and Special Accessories

9-1 Consumables

- Spring
- Wire rope
- Wire guide
- Drum

Note: For the replacement of the consumables and other parts, download "Repair Manual" from our website or contact us or your dealer.

10. Disposal of Product

When disposing of the product, follow the local regulations of the area where the product is used, and properly treat it as industrial waste.

ENDO 遠藤工業株式会社

〒959-1261 新潟県燕市秋葉町 3 丁目 14 番 7 号
<http://www.endo-kogyo.co.jp>

本社営業部	〒959-1261 新潟県燕市秋葉町 3 丁目 14 番 7 号 TEL : 0256-62-5133 FAX : 0256-62-5772
エコファクトリー	〒959-1276 新潟県燕市小池 5181 番地 1 TEL : 0256-63-9306 FAX : 0256-63-4393
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大阪営業部	〒556-0021 大阪府大阪市浪速区幸町 2 丁目 3 番 14 号ダイトービル 3F TEL : 06-6568-1571 FAX : 06-6568-1573
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サービス営業グループ	〒959-1261 新潟県燕市秋葉町 3 丁目 14 番 7 号 TEL : 0256-64-4786 FAX : 0256-62-5772 E-mail : service@endo-kogyo.co.jp

ENDO ENDO KOGYO CO., LTD.

3-14-7, Akiba cho, Tsubame, Niigata 959-1261, Japan

<http://www.endo-kogyo.co.jp/> TEL: 81-256-62-5133

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Repair Manual

Retractor

ERM-2
ERM-4/ERM-4S
ERM-6/ERM-6S
ERM-8/ERM-8S



For safe and correct operation of the product, please be sure to read this manual and fully understand its content before use.

After reading, keep the manual safe so that you can find and use it readily.

In case of resale or transfer of ownership of this product, make sure to transfer the manual to the new owner.

Introduction

Thank you very much for purchasing the Spring Balancer. To prevent any trouble and obtain the best performance, please be sure to read this Repair Manual and the separate Users Manual, and fully understand their content.

Notation in this manual

Hazard levels

This product is designed with ultimate priority on the safety of operators. However, due to the nature of the system, there are risks that cannot be removed.

In this manual, the level of significance and risk is defined and indicated in three stages: "WARNING", "CAUTION", and "NOTICE". Thoroughly read and fully understand the indicated items before operating the product and performing maintenance procedures. The indications for "WARNING", "CAUTION", and "NOTICE" are in order of risk significance (WARNING > CAUTION > NOTICE). Their details are described below.

 WARNING	A situation that, if mishandled, may cause death or serious disability.
 CAUTION	A situation that, if mishandled, may cause minor or moderate injury.
NOTICE	A situation that, if mishandled, may cause property damage.

The extent of the problem described above (disability, injury, and property damage) is defined as follows.

Serious disability: Loss of eyesight, wound, burn (high-temperature or low-temperature), electric shock, bone fracture, poisoning, and other injuries that leave aftereffects and that require hospitalization or long-term outpatient treatment.

Moderate injury: Burn, electric shock, bone fracture, and other injuries that do not require hospitalization or long-term outpatient treatment.

Minor injury: Scratch, bruise, laceration, and other injuries that have a minor impact on health.

Property damage: Extended damage to buildings, household articles, and injury to domestic animals or pets.

Other than WARNING, CAUTION, and NOTICE described above, matters important to workers are indicated using the following format.

REMINDER

Describes important details to be remembered for the operation.

Symbols

This Users Manual uses the following symbols to simply provide information in addition to the indications above.

	Indicates a PROHIBITED action that must not be performed.		Indicates potential property damage or a danger that may inflict bodily injury.
	Indicates a REQUIRED action that must be performed.		Indicates that it is necessary to thoroughly read the manual and the relevant documents.

Illustrations

This manual covers multiple models of the Spring Balancer. If their functions and details of operations are identical and can be correctly described in the same way, illustrations are provided taking a specific model as an example. Therefore, please note that the illustrations may be different from the actual equipment.

Scope of warranty and liabilities for the equipment

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 or modification performed by a party other than the manufacturer, agents, or dealers.
3. The warranty period is one (1) year from the date of purchase.
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 the User's Manual and this manual.
 - 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 imposed on you/your customer as a result of the failure of our product(s) are outside the scope of the warranty.

Copyright and liabilities

The copyright for this manual belongs to Endo Kogyo Co., Ltd.

The manual is provided for the limited purpose of supporting the safe and proper use of the product. It cannot be used for other purposes.

The customer may not use or make copies of this manual, in whole or in part, outside of this purpose without receiving prior consent from Endo Kogyo Co., Ltd.

The customer is also prohibited from translating or modifying the content of the manual, in whole or in part.

The content described in the manual is subject to change without advance notice. Please note this in advance.

Definition of intended users for this manual

This manual has been prepared to help all intended users involved with this product. From the standpoint of safety, we have defined intended users according to their ability and experience and provided detailed descriptions for each group.

This manual defines four user levels.

Operator	The operator is a user who engages in general operations. Maintenance and other operations that require special skills are excluded from the general operations. The operator is therefore not permitted to disassemble the main equipment. The operator should read the manual thoroughly and carry out their work with complete understanding of the operating procedures.
Maintenance operator	In addition to the work of the operator described above, the maintenance operator is permitted to perform installation, simple troubleshooting, and periodic inspections. The maintenance operator is required to develop sufficient knowledge and operating skill for this product. The maintenance operator should read the manual thoroughly and carry out their work with complete understanding of the equipment's characteristics and all work contents.
Management supervisor	The management supervisor is required to have sufficient knowledge of the product and advanced operating skill for this product. The management supervisor should manage not only the product itself but on-site operations that handle the product, comprehensively.
Service engineer	The service engineer is a worker with special knowledge and skills for installing the product, investigating the causes of a failure or damage, and performing repairs and overhauls. Service engineering (the work by the service engineer) is performed by our service technicians or other authorized service personnel.

Emergency contact in case of malfunctions

If any problem with the product arises, contact us or your dealer.

CONTENTS

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Notation in this manual	1
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Definition of intended users for this manual	4
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2. Maintenance.....	7
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2-4 Replacement of the spring	15
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1. Precautions for handling

Incorrect handling of this product may cause damage to the product itself as well as a fire or injury. Thoroughly read the following precautions and be sure to heed the instructions when handling the machinery.

WARNING



- Do not use in explosive, flammable gas, or dusty atmospheres, any place where water or oil may splash, or near combustibles. This may cause fire and injury.
- Do not perform any modifications to the product.



The maintenance should be performed by a maintenance operator who has developed sufficient knowledge and operating skill for the balancer.



- Incorrect usage of the product may cause injury. Use the product correctly in accordance with the descriptions in this manual.
- Particularly, “WARNING”, “CAUTION”, and “NOTICE” described in this manual must be fully understood and always observed.
- Install the product correctly in accordance with the descriptions in this manual.

CAUTION



- Be sure to perform daily and periodic inspections.

2. Maintenance

WARNING



The maintenance should be performed by a maintenance operator who has developed sufficient knowledge and operating skill for the balancer.

CAUTION



Replace any parts using genuine parts only.

Daily and periodic inspections are required for the product to be used safely and properly. If any failure is found in the inspections, the relevant parts must be replaced. For details, contact us or your dealer.

2-1 Daily inspections

Before starting the operation, refer to “6-1 Pre-operation inspections and checks” of the separate User’s Manual and perform the inspections and checks daily.

2-2 Periodical inspections

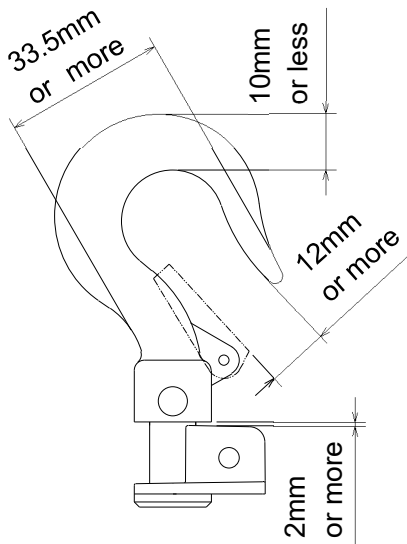
Perform an inspection at least once per month.

If the product is used in an unfavorable environment or used frequently, reduce the interval between the inspections.

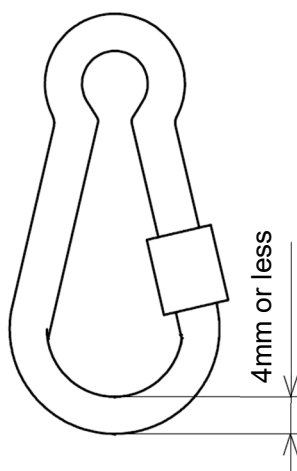
2-2-1 Inspection of the hook

See the figure below and measure the dimensions of the hook. The hook must be replaced when any dimensions have reached the limiting dimensions. Stop using the balancer, and contact us or your dealer.

■ Operating limit of the top hook



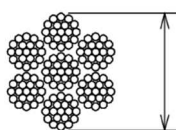
■ Operating limit of the bottom hook



2-2-2 Inspection of the wire rope

See the figure below and measure the dimension of the wire rope. The wire rope must be replaced when the dimension has reached the limiting dimension or the limiting number of broken wires within one pitch. Stop using the balancer and change the wire rope (see “2-3 Replacement of the wire rope”), or contact us or your dealer.

■ Operating limit of the wire rope



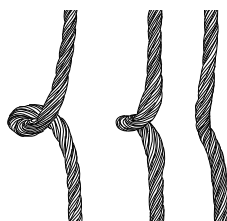
Reference dimension	Limiting dimension	Limiting number of broken wires within one pitch
2.5mm	2.3mm	13

■ Check of the state of the wire rope

Check that there is no deformation or kink in the wire rope.



Deformation



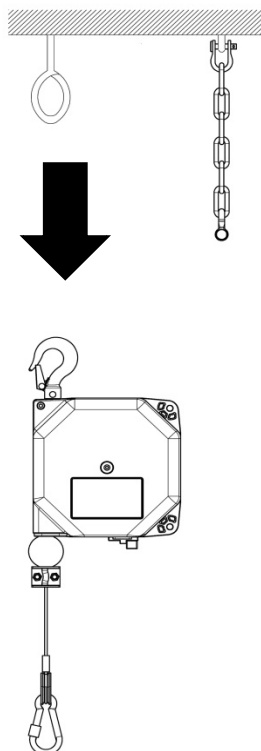
Kink

Note: Kink is the state in which the wire rope is partially deformed due to torsion or looseness.

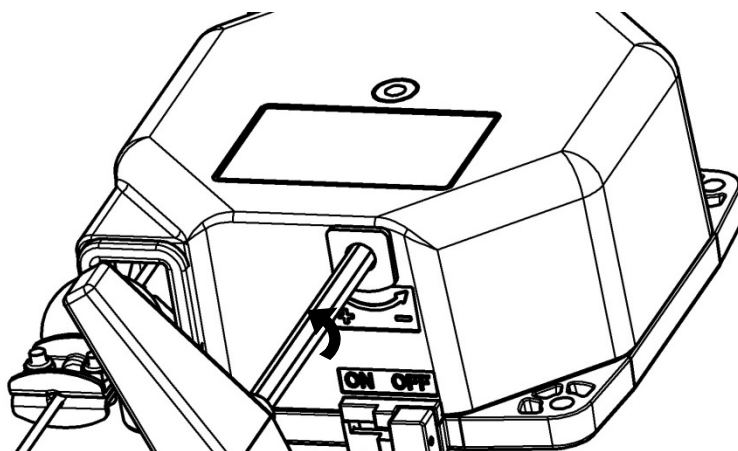
2-3 Replacement of the wire rope

2-3-1 Disassembly

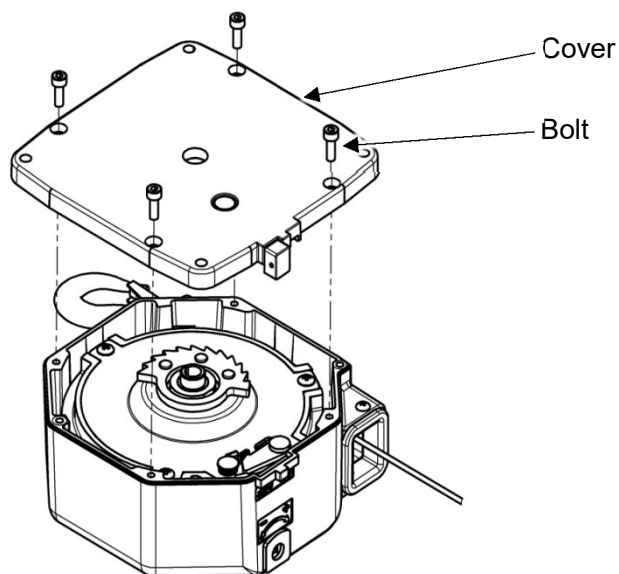
- 1 Lift the tool (equipment) and retract the wire rope completely. Remove the tool (equipment) from the bottom hook.
- 2 Disconnect the auxiliary wire rope or chain from the retractor.
- 3 Remove the retractor from the support member (metal hanger).



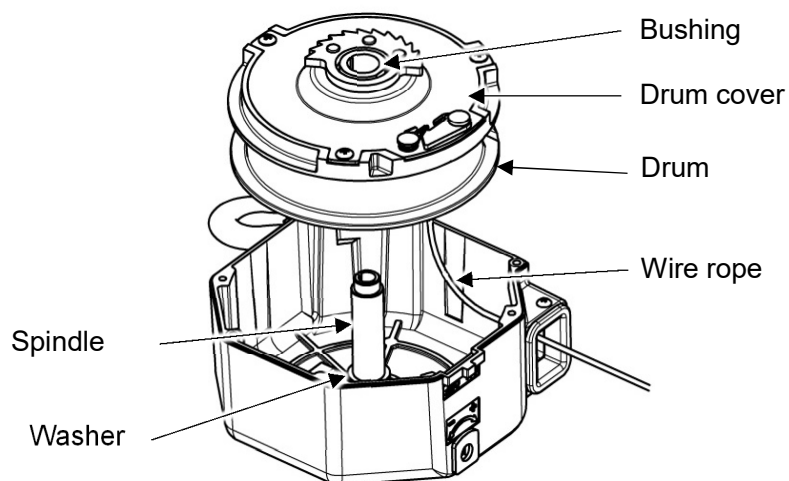
- 4 Turn the worm to the " - " direction (counterclockwise) and decrease tension to 0. Test the wire rope by pulling it to make sure the spring tension is 0.



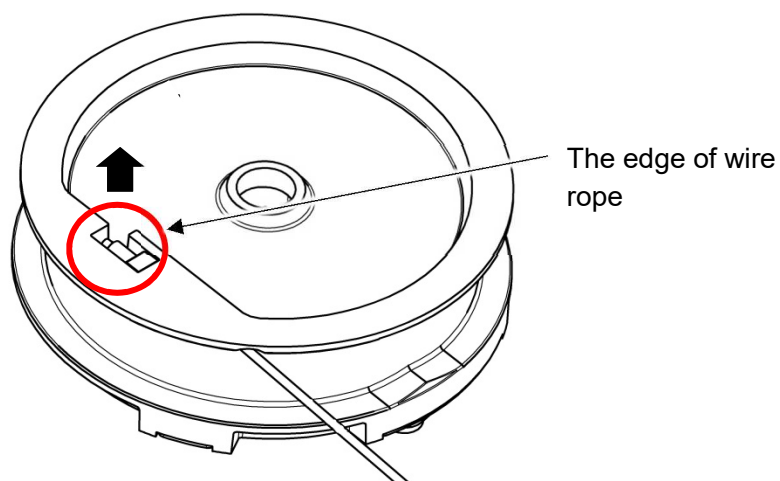
- 5** Remove the bolts and remove the cover.



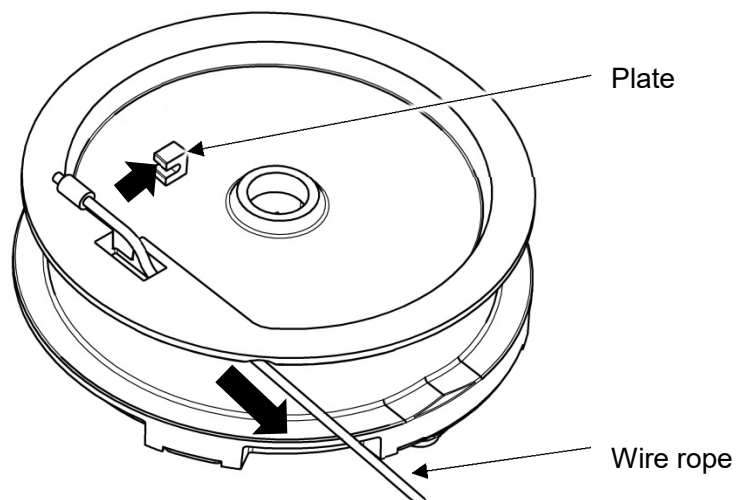
- 6** Remove the bushing, drum, drum cover and wire rope as one unit from the casing. Do not remove the washer and spindle.



- 7** Turn the drum over and lift up the edge of wire rope using a flat head screwdriver.

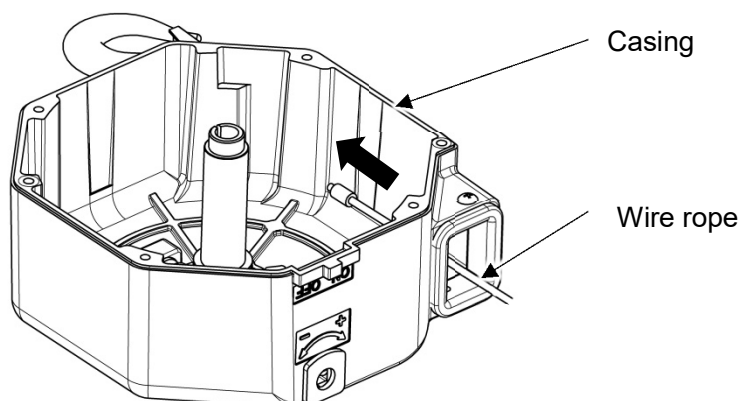


- 8** Remove the plates from the edge of wire rope.
Pull out and completely remove the wire rope.

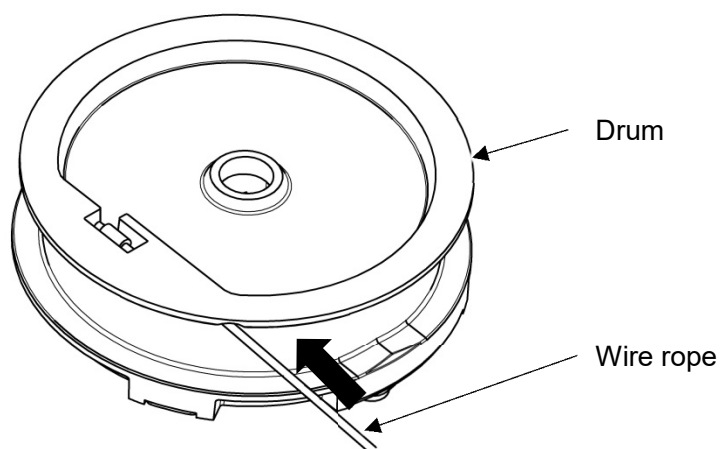


2-3-2 Installation of wire rope

- 1** Insert the new wire rope into casing.



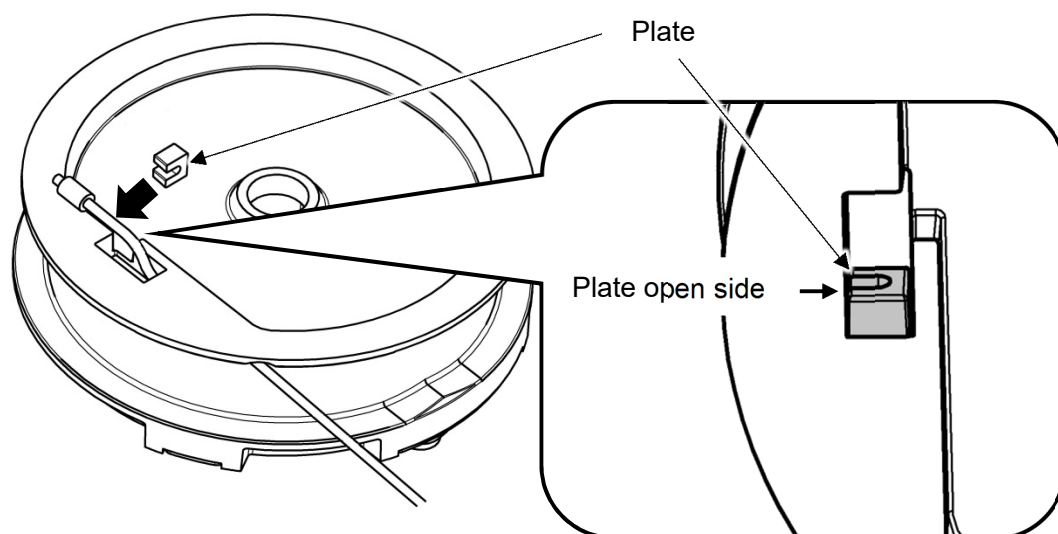
- 2** Insert the new wire rope into the drum.



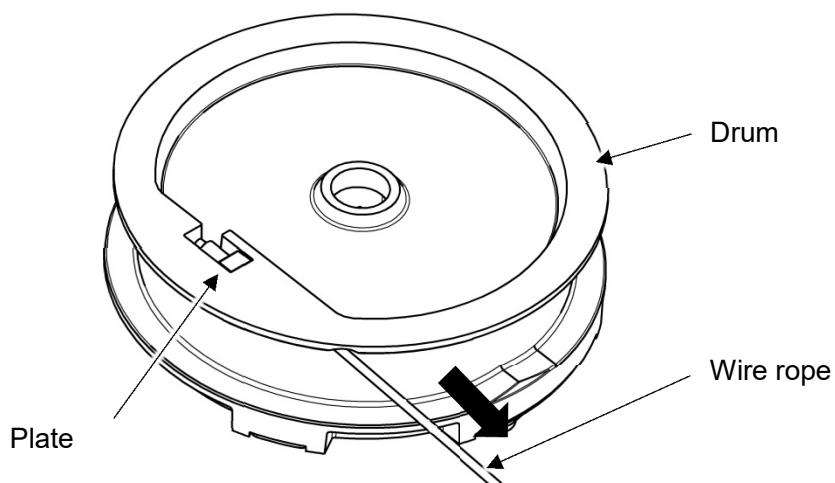
Point

You can easily insert wire rope by pushing while twisting it.

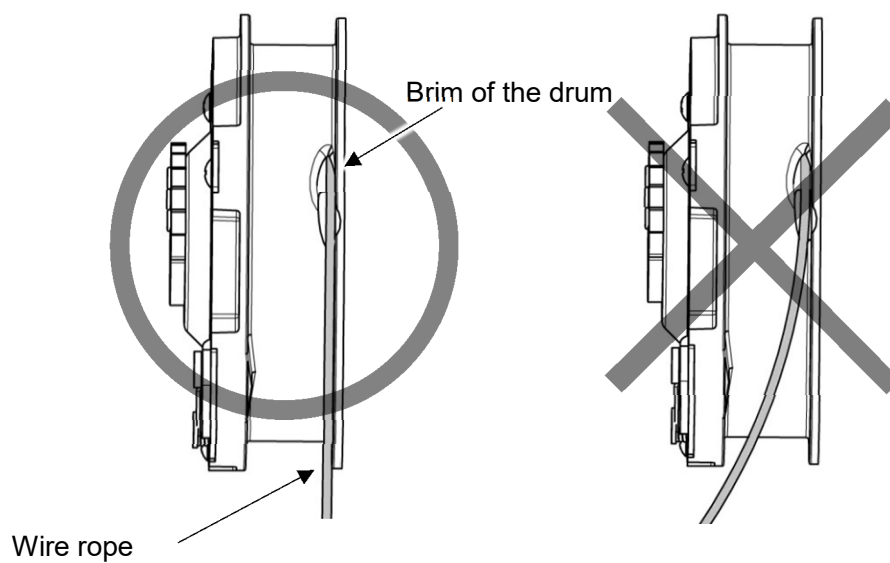
- 3** Raise up the edge of the wire rope with a flat head screwdriver and insert the plate.



- 4** Pull the wire rope and fix the wire rope and plate into the notch of drum.

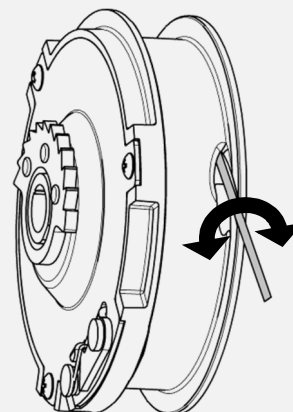


- 5** Make sure the wire rope is parallel to the side of the drum.

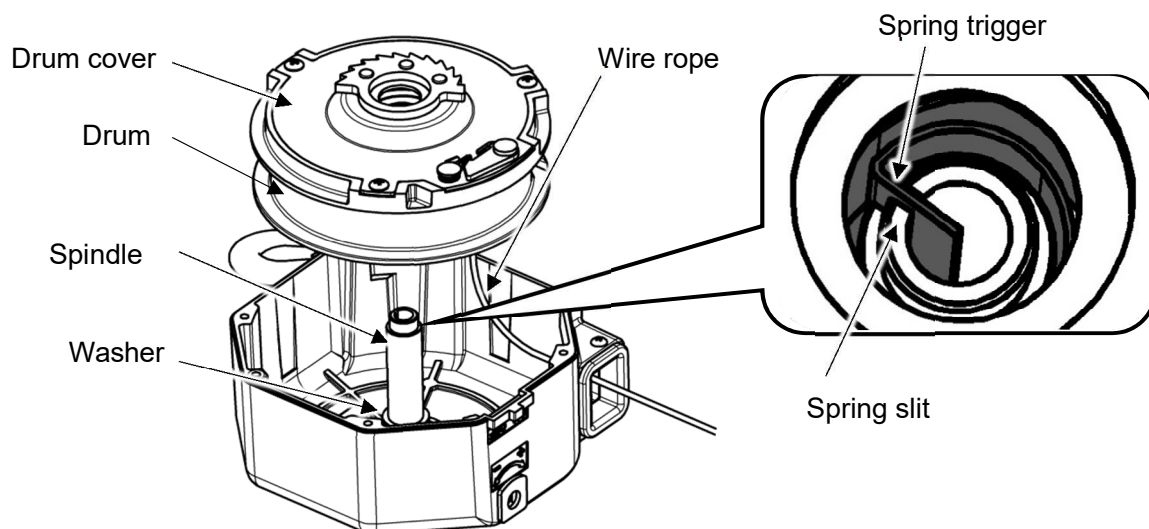


! Point

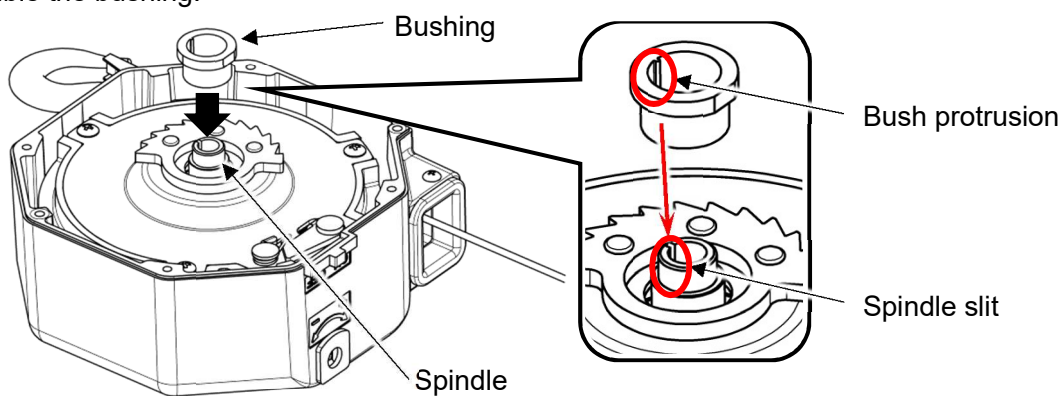
The wire rope position can be changed by rotating the drum.



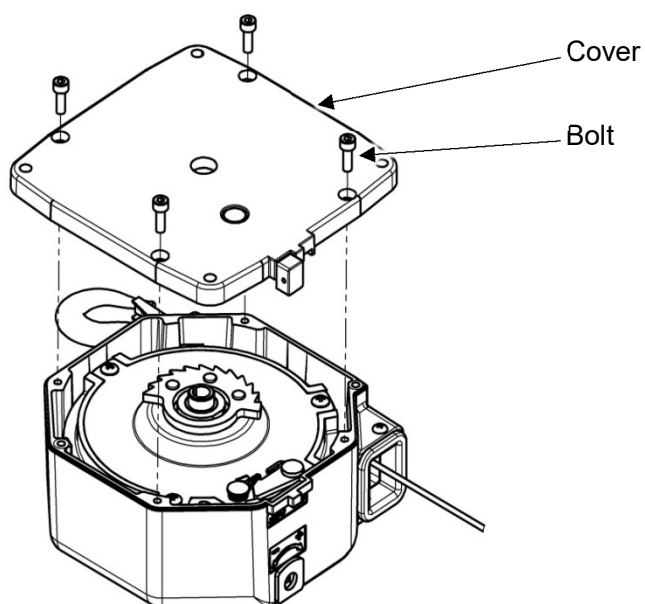
- 6** Assemble drum, drum cover and wire rope.
Before assembling, make sure washer is inserted to the spindle.



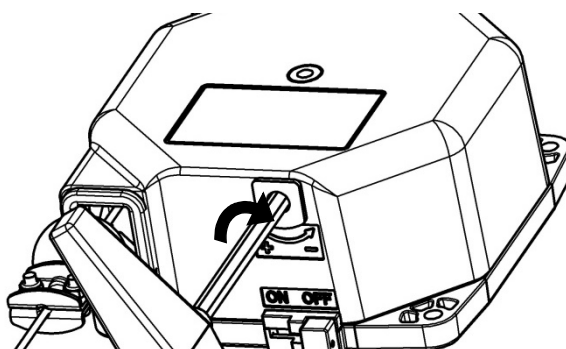
- 7** Assemble the bushing.



8 Reassemble cover and bolts.



9 Turn the worm in the “+” direction (clockwise) and wind the spring.



! REMINDER

When the worm is turned, the wire rope is wound inside the drum.

Wind while pulling the wire rope to prevent slack.

After the wire rope is completely wound inside the drum, further turn the worm by the number of times described in the table below.

Model	Number of turns from zero to factory set weight
ERM-2	Approx.98
ERM-4/ERM-4S	Approx.42
ERM-6/ERM-6S	Approx.56
ERM-8/ERM-8S	Approx.56

10 Adjust the spring tension (Refer to 5-2-2, in Users manual)

2-4 Replacement of the spring

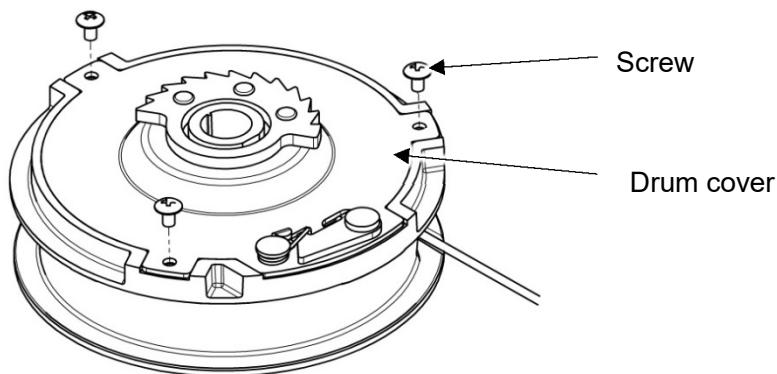
WARNING



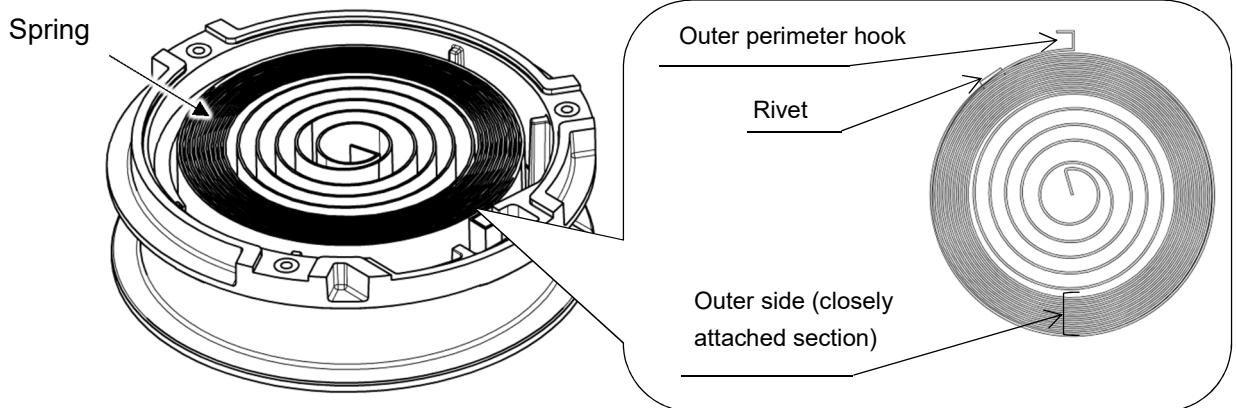
- The spring should be replaced by a maintenance operator who has developed sufficient knowledge and operating skill for the balancer.
- The spring of the product is highly dangerous if handled incorrectly. Handle the spring with great caution when replacing it.

2-4-1 Removal of the spring

- 1 Remove the casing from the drum according to steps 1 to 6 in “2-3-1 Disassembly”.
- 2 Remove the screw and remove the drum cover.



- 3 Check the position where the spring is ruptured and the state of the rivet.
If the spring is ruptured in the closely attached section on the outer side, or if the rivet is damaged, install the cover again and consult with your dealer.

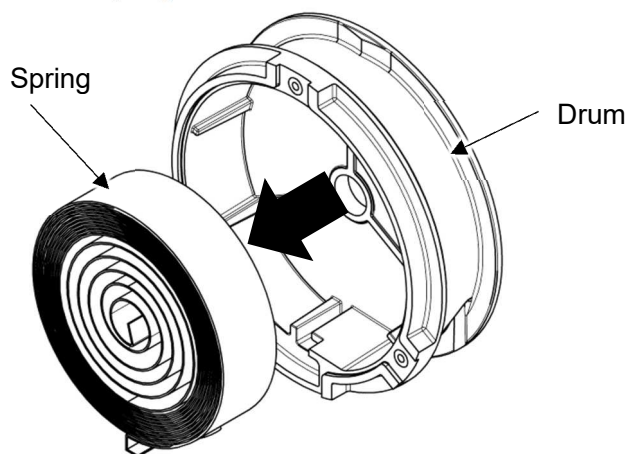


WARNING



If the spring is ruptured in the closely attached section on the outer perimeter, or if the rivet on the spring is damaged, never remove the spring from the drum. If the spring is removed in such a case, the spring may rapidly extend, causing injury.

- 4** Remove the spring from the drum.



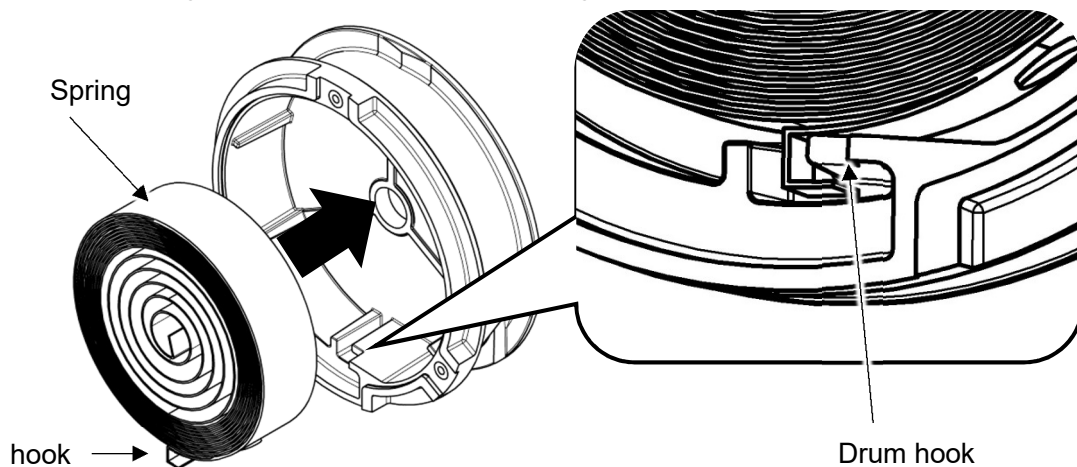
WARNING



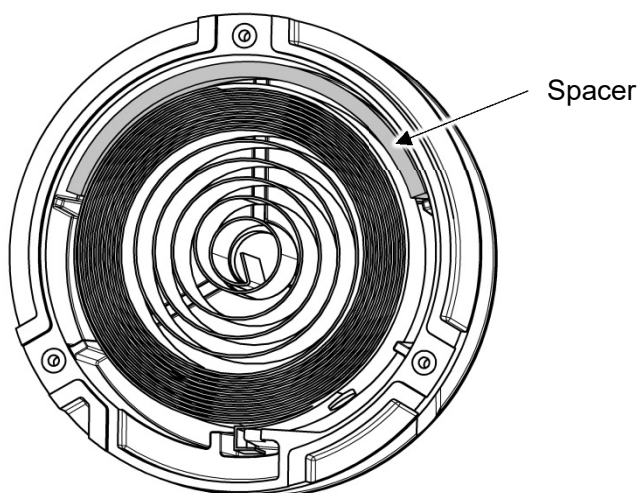
Do not pull out the spring from inner side. The spring may rapidly extend, causing injury.

2-4-2 Assembling the spring

- 1** Insert the spring into the drum so that the spring hook catches the drum hook.



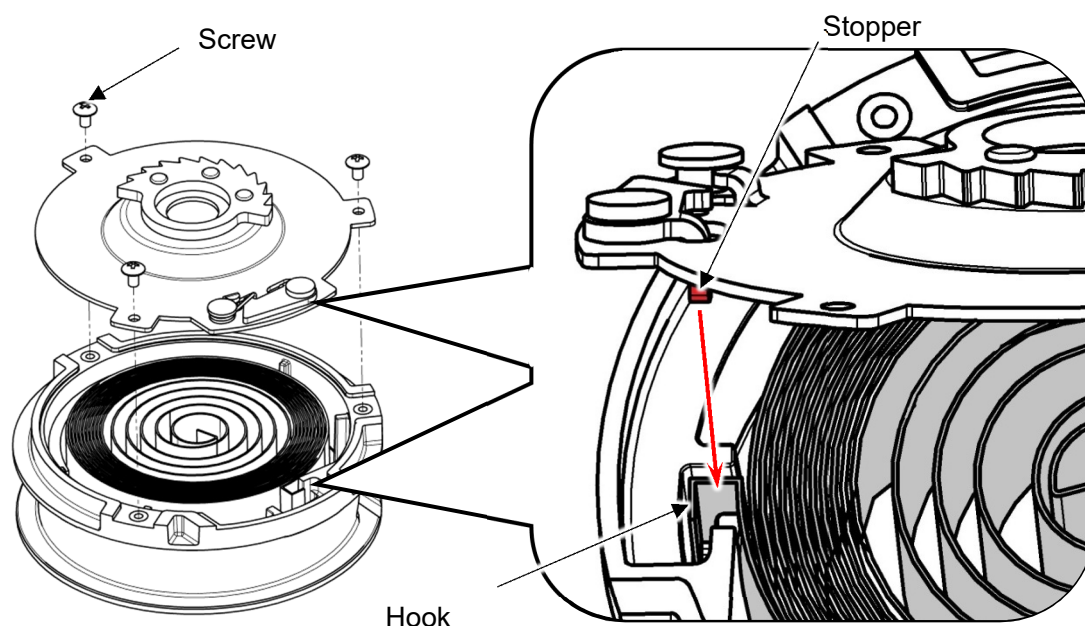
- 2** Make sure the spacers are inside the drum, except ERM-8 and ERM-8S.



- 3 Put grease to the top surface of the spring.
The recommended grease is listed below or grease that meets the same specifications.

Brand	Grease model
Kyodo Yushi	ONE LUBER MP2

- 4 Attach the drum cover to the drum and tighten the 3 screws.



NOTICE

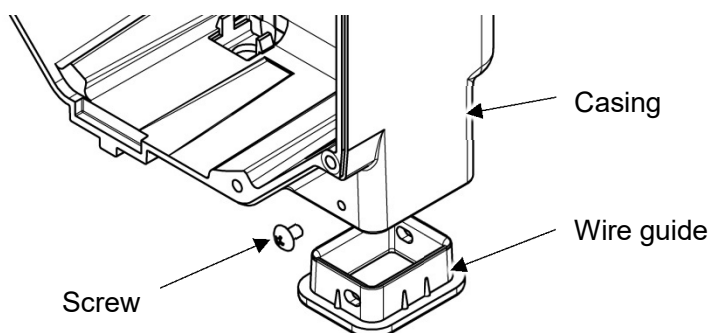


For ERM-4S, ERM-6S, ERM-8S, attach the cover to the drum so the stopper enters the spring hook.
After assembling, check that the stopper moves smoothly.

- 5 To reassemble, refer to 6~10 in “2-3-2 disassembly of wire rope”.

2-5 Replacement of the wire guide

- 1 Follow 1~8 in “2-3-1 Disassembly”, remove the wire rope from the drum and casing.
- 2 Remove screw and remove the wire guide from casing.



- 3 Install new wire guide and tighten screw.
- 4 To install the wire rope refer to “2-3-2 installation of wire rope”.

ENDO 遠藤工業株式会社

〒959-1261 新潟県燕市秋葉町 3 丁目 14 番 7 号
<http://www.endo-kogyo.co.jp>

本社営業部	〒959-1261 新潟県燕市秋葉町 3 丁目 14 番 7 号 TEL : 0256-62-5133 FAX : 0256-62-5772
エコファクトリー	〒959-1276 新潟県燕市小池 5181 番地 1 TEL : 0256-63-9306 FAX : 0256-63-4393
東京営業部	〒101-0042 東京都千代田区神田東松下町 12 番 2 号 JBSL 神田ビル 2F TEL : 03-5295-3711 FAX : 03-5295-3717
名古屋営業所	〒460-0011 愛知県名古屋市中区大須 1 丁目 7 番 14 号パーク IM ビル 3F TEL : 052-253-6231 FAX : 052-253-6240
大阪営業部	〒556-0021 大阪府大阪市浪速区幸町 2 丁目 3 番 14 号ダイトービル 3F TEL : 06-6568-1571 FAX : 06-6568-1573
九州営業所	〒812-0013 福岡県福岡市博多区博多駅東 3 丁目 11 番 15 号文喜ビル 3F TEL : 092-412-5281 FAX : 092-412-5280
サービス営業グループ	〒959-1261 新潟県燕市秋葉町 3 丁目 14 番 7 号 TEL : 0256-64-4786 FAX : 0256-62-5772 E-mail : service@endo-kogyo.co.jp

 **ENDO KOGYO CO., LTD.**

3-14-7, Akiba cho, Tsubame, Niigata 959-1261, Japan
<http://www.endo-kogyo.co.jp/> TEL: 81-256-62-5133

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PARTS LIST

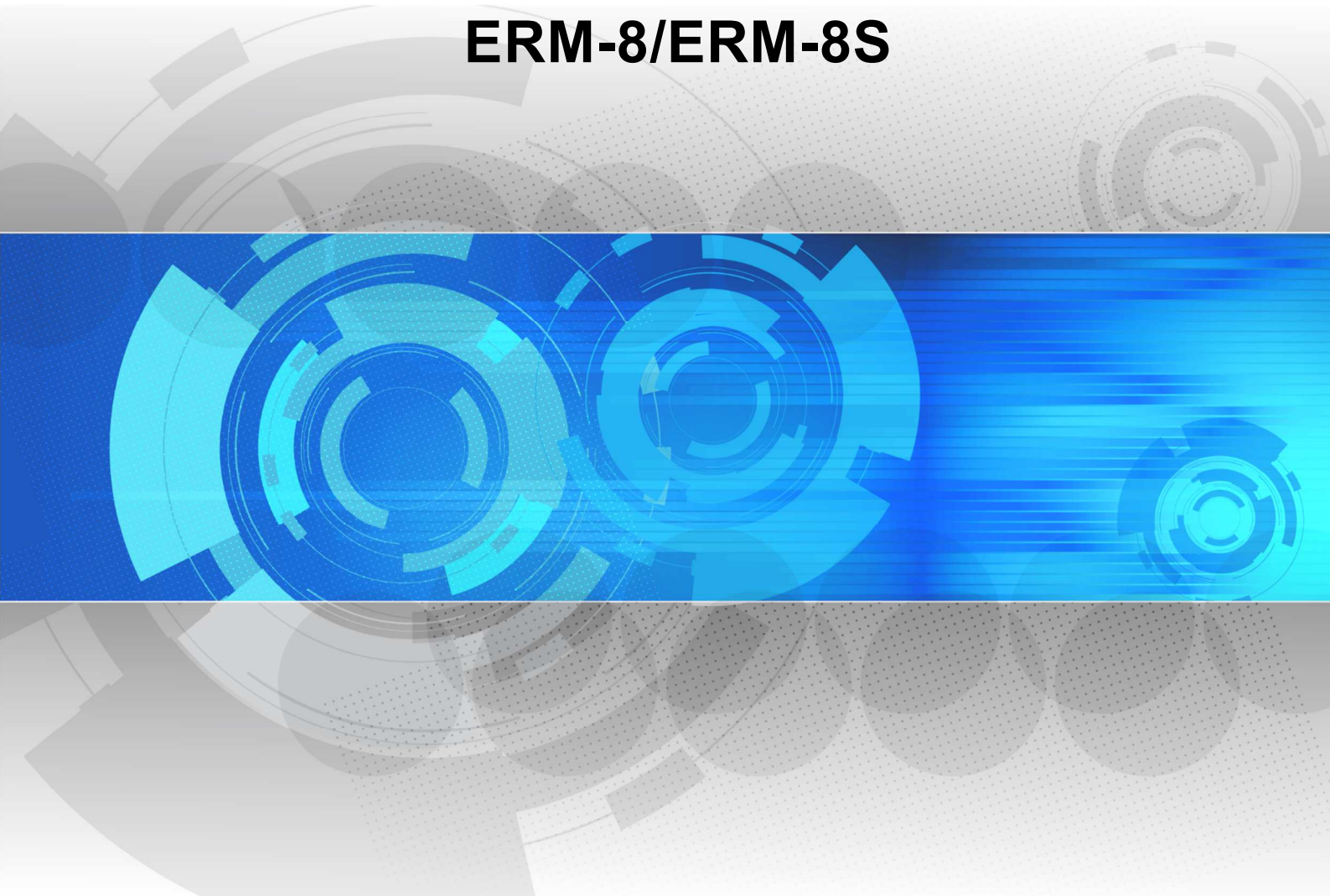
Retractor

ERM-2

ERM-4/ERM-4S

ERM-6/ERM-6S

ERM-8/ERM-8S



This Parts List covers products from 2021 onwards. Please contact us for any inquiries regarding other parts of the product.

BMP-0012
Issued in December 2022

1. Introduction

- Please use only genuine parts for replacements or repairing.

- Scope of the parts list

This parts list shows parts for the Retractor ERM series. Models are as below.

Model	Load range (kg)	Factory set weight (kg)	Max cable travel (m)	Mass (kg)
ERM-2	1.0~2.0	1.8	3.5	1.8
ERM-4	2.0~4.0	2.5	3.5	2.0
ERM-6	4.0~6.0	4.0	2.5	2.0
ERM-8	6.0~8.0	5.5	2.5	2.0
ERM-4S	2.0~4.0	2.5	3.5	2.0
ERM-6S	4.0~6.0	4.0	2.5	2.0
ERM-8S	6.0~8.0	5.5	2.5	2.0

- How to find the parts from the list

Please refer the reference number on the exploded view and choose the parts from the list according to its reference number.

- How to order the parts

Please inform us or our distributors of the parts information which include the model, part description, parts number and quantity.

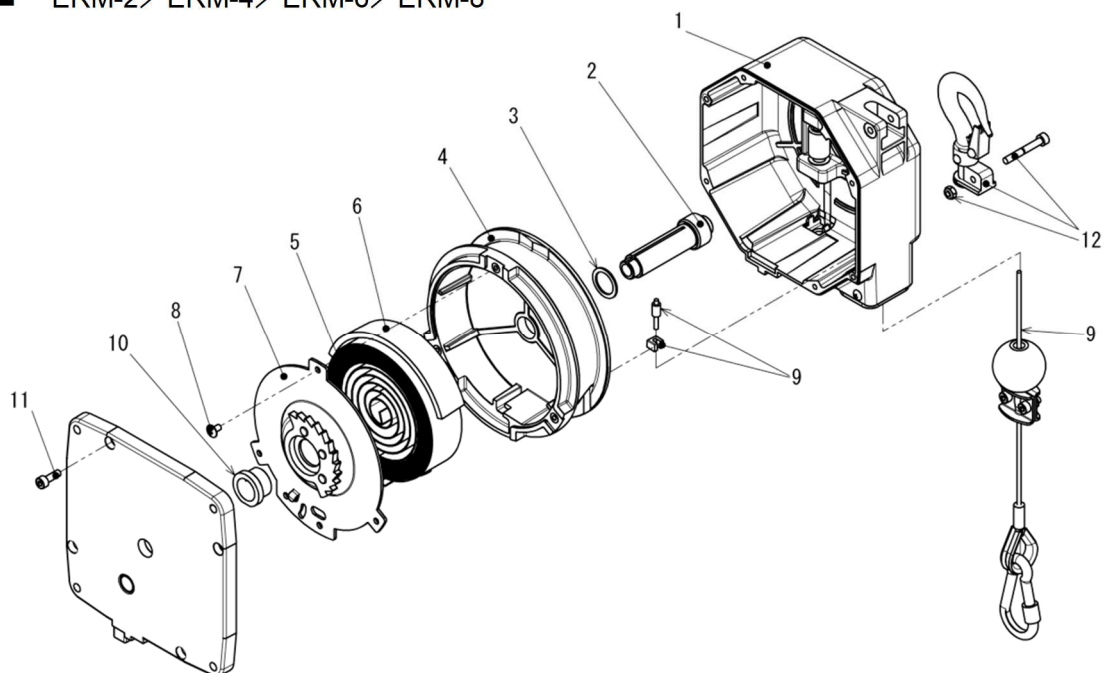
Example

model:ERM-2 parts name:drum parts number:P2B200280 quantity:1

2. Parts list

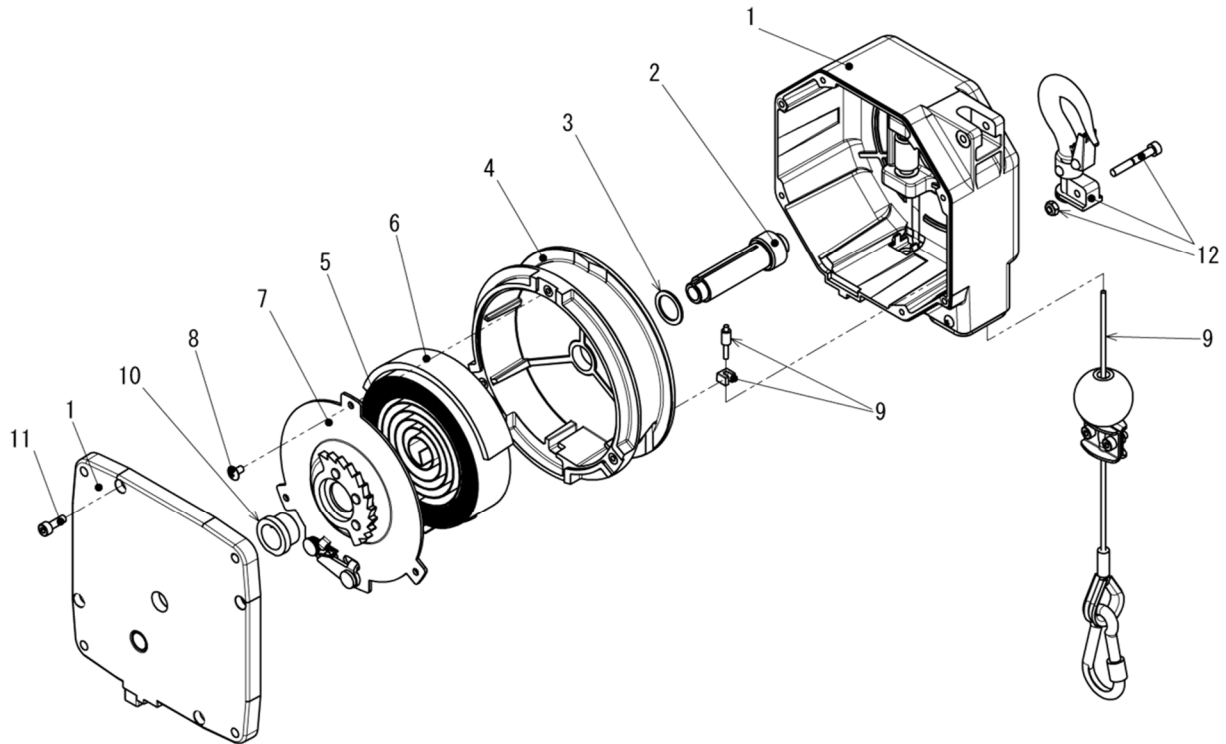
2-1 Retractor Body

■ ERM-2/ERM-4/ERM-6/ERM-8



Ref. No.	Parts No.	Description	Quantity				Remarks
			ERM-2	ERM-4	ERM-6	ERM-8	
1	LBP002268	Casing assembly	1	1	1	1	Refer to P.9
2	P2B301706	Spindle	1	1	1	1	
3	P2B402883	Washer	1	1	1	1	
4	P2B200280	Drum	1	1	1	1	
5	P2B300089	Spring	1	-	-	-	
5	P2B300507	Spring	-	1	-	-	
5	P2B300508	Spring	-	-	1	-	
5	P2B301707	Spring	-	-	-	1	
6	P2B402884	Spacer	1	1	1	-	
7	LBP002240	Drum cover assembly	1	1	1	1	
8	P2B402889	Screw	3	3	3	3	
9	LBP002271	Wire rope set	1	1	-	-	Refer to P.10
9	LBP002272	Wire rope set	-	-	1	1	Refer to P.10
10	P2B402892	Bush	1	1	1	1	
11	KA00910412	Cap screw	4	4	4	4	
12	LBP002269	Top Hook assembly	1	1	1	1	
13	P2B301709	Name plate	1	-	-	-	
13	P2B301710	Name plate	-	1	-	-	
13	P2B301711	Name plate	-	-	1	-	
13	P2B301712	Name plate	-	-	-	1	

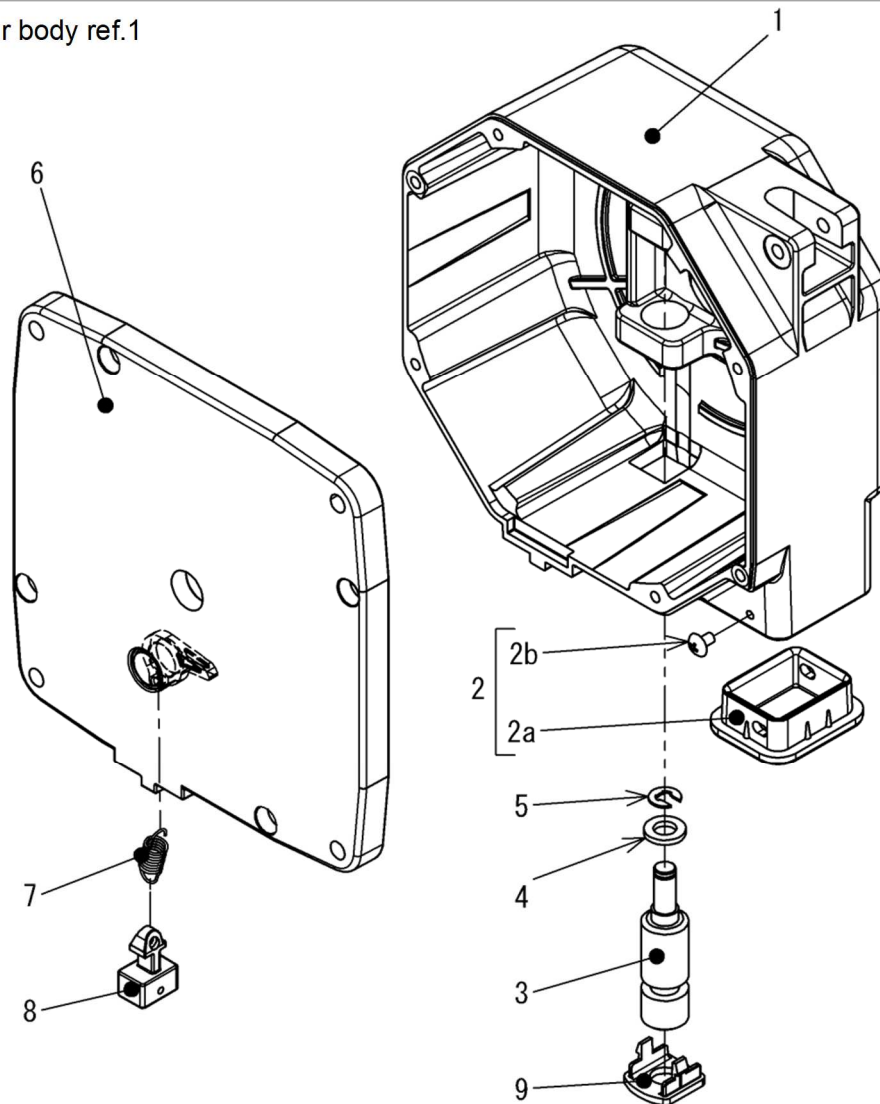
■ ERM-4S/ERM-6S/ERM-8S



Ref. No.	Parts No.	Description	Quantity			Remarks
			ERM-4S	ERM-6S	ERM-8S	
1	LBP002268	Casing assembly	1	1	1	Refer to P.9
2	P2B301706	Spindle	1	1	1	
3	P2B402883	Washer	1	1	1	
4	P2B200280	Drum	1	1	1	
5	P2B300507	Spring	1	-	-	
5	P2B300508	Spring	-	1	-	
5	P2B301707	Spring	-	-	1	
6	P2B402884	Spacer	1	1	-	
7	LBP002241	Drum cover assembly	1	1	1	
8	P2B402889	Screw	1	1	1	
9	LBP002271	Wire rope set	1	-	-	
9	LBP002272	Wire rope set	-	1	1	Refer to P.10
10	P2B402892	Bushing	1	1	1	Refer to P.10
11	KA00910412	Cap screw	1	1	1	
12	LBP002269	Top Hook assembly	1	1	1	
13	P2B301713	Name plate	1	-	-	
13	P2B301714	Name plate	-	1	-	
13	P2B301715	Name plate	-	-	1	

2-2 Casing assembly

- Retractor body ref.1

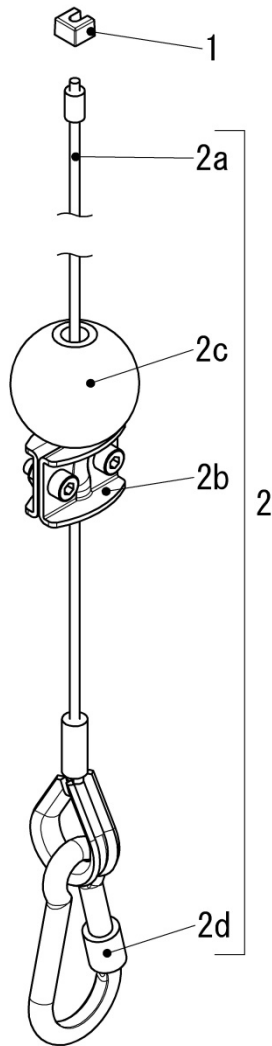


Parts No.LBP002268

Ref. No.	Parts No.	Description	Quantity	Remarks
1	-	Casing	1	With painted
2	LBP002267	Wire guide assembly	1	
2a	-	Wire guide	1	
2b	-	Screw	1	
3	-	Worm	1	
4	-	Washer	1	
5	-	Retaining ring	1	
6	-	Cover assembly	1	With painted / With ratchet
7	P2B402895	Spring	1	
8	P2B402896	Knob	1	
9	P2B402897	Cap	1	

2-3 Wire rope set

■ Retractor body ref.9



Model :ERM-2/ERM-4/ERM-4S

Parts No. :LBP002271/3.5m

Ref. No.	Parts No.	Description	Quantity
1	P2B402890	Plate	1
2	LBP002244	Wire rope assembly	1
2a	LBP002242	Wire rope	1
2b	LBP002237	Stopper	1
2c	P2B402879	Buffer	1
2d	P2B402891	Hook	1

Model :ERM-6/ERM-8/ERM-6S/ERM-8S

Parts No. :LBP002272/2.5m

Ref. No.	Parts No.	Description	Quantity
1	P2B402890	Plate	1
2	LBP002245	Wire rope assembly	1
2a	LBP002243	Wire rope	1
2b	LBP002237	Stopper	1
2c	P2B402879	Buffer	1
2d	P2B402891	Hook	1

ENDO 遠藤工業株式会社

〒959-1261 新潟県燕市秋葉町 3 丁目 14 番 7 号
<http://www.endo-kogyo.co.jp>

本社営業部	〒959-1261 新潟県燕市秋葉町 3 丁目 14 番 7 号 TEL : 0256-62-5133 FAX : 0256-62-5772
エコファクトリー	〒959-1276 新潟県燕市小池 5181 番地 1 TEL : 0256-63-9306 FAX : 0256-63-4393
東京営業部	〒101-0042 東京都千代田区神田東松下町 12 番 2 号 JBSL 神田ビル 2F TEL : 03-5295-3711 FAX : 03-5295-3717
名古屋営業所	〒460-0011 愛知県名古屋市中区大須 1 丁目 7 番 14 号パーク IM ビル 3F TEL : 052-253-6231 FAX : 052-253-6240
大阪営業部	〒556-0021 大阪府大阪市浪速区幸町 2 丁目 3 番 14 号ダイトービル 3F TEL : 06-6568-1571 FAX : 06-6568-1573
九州営業所	〒812-0013 福岡県福岡市博多区博多駅東 3 丁目 11 番 15 号文喜ビル 3F TEL : 092-412-5281 FAX : 092-412-5280
サービス営業グループ	〒959-1261 新潟県燕市秋葉町 3 丁目 14 番 7 号 TEL : 0256-64-4786 FAX : 0256-62-5772 E-mail : service@endo-kogyo.co.jp

 **ENDO KOGYO CO., LTD.**

3-14-7, Akiba cho, Tsubame, Niigata 959-1261, Japan
<http://www.endo-kogyo.co.jp/> TEL: 81-256-62-5133

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