3S LIFT
SAFE I SIMPLE I SPECIALIZED

Ladder Hoist Operation, Maintenance and Installation Manual

Model: MH04L120

TD-RND-MH04L120
Rev A
2023-08-09

en
Translation of the original manual

Preface

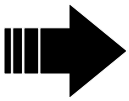
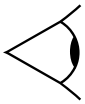
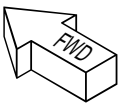
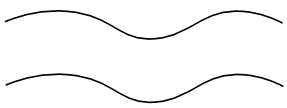
General Description

This manual is intended for the operator to install, operate and maintain the ladder hoist safely and effectively.

This manual provides safety instructions and operation procedures that shall be followed for operation of the ladder hoist.

- Pictures in this manual may not reflect the actual appearance, color or structure of the product. However, such differences will not affect the product functions or safety performance.
- All the dimensions and figures in the manual are for reference only, and subject to change without prior notice.

Conventions

Symbol	Description	Symbol	Description
Bolt text	Explanatory text on or adjacent to control buttons and knobs		Moving direction
-------	An annotation line which indicates the hidden or invisible part of the drawing		Visual inspection
	Forward direction of the product	- - - - - - - -	Explode lines of exploded parts (explode lines indicate assembly paths between parts in an exploded view.)
	View from A		Removed or hidden length of an object which cannot be displayed in full

Expected Use and Application Fields

⚠DANGER

Will result in death or serious injury!

• No carrying people!

This equipment is a kind of ladder hoisting equipment and is mainly used for transporting goods and construction materials. The manufacturer/supplier is not responsible for any damage caused by any other using method beyond this scope and this risk shall be undertaken by the customer.

Copyright Protection

Environmental Protection

The equipment shall be disposed and scrapped in accordance with national regulations, including:

- Discharge of lubricating grease/oil used for the equipment
- Recycling of metal parts
- Recycling of plastic parts
- Recycling of electrical parts
- Recycling of batteries

Table of contents

1. Safety

1.1. General Requirements

The installation personnel, operator and maintenance personnel shall pay attention to the environmental protection, occupational health, personal safety and equipment safety, and observe the ISO 45001, Occupational Health and Safety Management Systems, as well as the current standards, procedures and requirements when performing their tasks.

The installation personnel, operator and maintenance personnel shall read, understand and follow the current safety instructions contained in this manual and provided by the work site.

No modification, extension or reconstruction of the ladder hoist is allowed without the written consent of 3S LIFT. 3S LIFT is not liable for any loss or injury which may incur due to using non-original parts.

Use of non-original parts, in particular use of critical parts or components such as the motor, guide rail, wire ropes that are not supplied by 3S LIFT or its authorized suppliers, will void the 3S LIFT warranty and CE certification.

1.2. Safety Warning Messages

1.2.1. Hazard Classification

The following safety warning messages are contained in this manual:

Table 1 - Hazard Classification

Types	Possible consequences if the hazard is not avoided
⚠DANGER	Will result in death or serious injury.
⚠WARNING	Could result in death or serious injury.
⚠CAUTION	Could result in minor or moderate injury.
NOTICE	Could result in equipment damage.

1.2.2. Safety Signs

Table 2 - Warning signs

Signs	Description
	Warning: Electric shock

Table 2 - Warning signs (continued)

Signs	Description
	Warning: Pinching of hands
	General warning sign

Table 3 - Mandatory Action Signs

Signs	Description	Purpose
	Wear safety footwear	Prevent injury to feet by heavy objects falling or slipping.
	Wear a helmet	Prevent injury to head by heavy objects falling.
	Wear protective gloves	Protect hands from scraps, punctures, and cuts.

1.3. Precautions

⚠WARNING

Death or severe injury!

• Before using the ladder hoist, read this manual and make sure that you fully understand the instructions contained in it.

⚠WARNING

Death or severe injury!

• Do not transport persons using the ladder hoist.

- The ladder hoist is intended for transporting goods and construction materials only. Access and transport of persons are not allowed.
- The installation personnel, operator and maintenance personnel shall be over 18 years of age. Make sure that they are aware of potential problems that can occur when using the ladder hoist, and the solutions to these problems.
- This manual shall be provided to each installation personnel, operator and maintenance personnel, and shall always be available for reference.

- There is a risk of falling during the operation, maintenance and installation of the ladder hoist. All persons within the danger area shall use Personal Protective Equipment (PPE) such as safety cloths, safety helmet, safety footwear, etc.
- Only original parts or those approved by 3S LIFT, such as the motor, wire rope, and guide rail, may be used.
- Electrical connection of the ladder hoist shall be made in accordance with EN 60204-1. Electrical installation and maintenance shall be performed only by qualified electricians.
- Except for bolts that need to be removed frequently, lock nuts shall be used at all times, and the followings shall be observed:
  - The screw shall extend from the nut by at least 0.4 times the thread diameter.
  - The lock nut shall not be used anymore if it can be loosened by hand.
- If any damage or faults which may jeopardize personal safety are revealed during operation, immediately stop the work, remove the equipment from service and notify the equipment administrator.
- Use of non-original parts, in particular use of critical parts or components such as the motor, guide rail, wire ropes that are not supplied by 3S LIFT or its authorized suppliers, will void the 3S LIFT warranty and CE certification.
- The operator shall keep in touch with the supervisor on the ground through communication equipment such as walkie-talkie or mobile phone during operation.
- No modification, extension or reconstruction of the ladder hoist is allowed without the written consent of 3S LIFT.

1.4. Residual Risks

⚠WARNING

Death or severe injury!

• Before using the ladder hoist, make sure that you are fully aware of the hazardous points and preventive actions.

The ladder hoist has been designed and built in such a way that hazardous situations that can be avoided are either eliminated by the respective constructive measures or not made accessible. In order to perform tasks safely with the ladder hoist, you shall be aware of the residual risks.

It is essential that, when performing your tasks near the hazardous points, you shall take proper precautions to keep the risk of injuries and equipment damage as low as possible. These hazardous points and the measures to minimize them are illustrated in the safety instructions of this manual.

Residual risk points and necessary preventive actions are included in the following table.

Table 4 - List of Residual Risks and Preventive Actions

Hazardous point	Hazard	Preventive action
Drive units and guide rail	Crushing hazard at the rollers during operation	Keep away from the carriage during operation; remove foreign objects on the guide rail periodically.
Work area	Impact due to falling objects	Stay away from below below the ladder hoist; keep a safe distance from the ladder hoist.
Electrical control cabinet	Electric shock	Only qualified electrician may dismantle and maintain the electrical control cabinet.

1.5. Personnel Qualification

Table 5 - Personnel Qualification

Personnel type	Fields and qualifications
Installation personnel	Persons who shall read and understand all the contents of this manual, are able to install the electrical system and mechanical system safely and to recognize and avoid potential dangers on their own.
Operator	Persons who shall read and understand all the contents of this manual, are able to operate the ladder hoist safely and to recognize and avoid potential dangers on their own.
Repair and maintenance personnel	3S LIFT or a party authorized by 3S LIFT. Installation/operation personnel who received guidance by 3S LIFT or an party authorized by 3S LIFT.

1.6. Environment Conditions

The ladder hoist shall be used in the following environment conditions:

- Ambient temperature range: - 15°C to 40°C (- 4°F - 104°F). Do not use the ladder hoist beyond this range.
- Wind speed: ≤ 45 km/h (28 mph).
- Protect the electrical components (drive unit, upper limit switch, and pendant control) properly in bad weather conditions such as rain and snow.

1.7. Electrical Safety Precautions

⚠WARNING

Death or severe injury!

• Before using the ladder hoist, read this manual and make sure that you fully understand the instructions contained in it.

In the event of electrical equipment failure, immediately shut down the equipment.

Before performing any maintenance work, disconnect the power supply and remove the battery pack.

- Only qualified electricians may repair or release electrical equipment components.
- Do not work on energized components. Before inspecting, maintaining, or repairing equipment components, always disconnect the power supply and remove the battery pack.
- In special circumstances where it's necessary to work on energized components, only insulated tools shall be used, and there must be an additional person present at all times who can promptly cut off the equipment's power switch.
- During repairs, do not modify the original design features to avoid any negative impact on safety. (e.g., electrical equipment's creepage distance and clearance).

1.8. Requirements on Safe Operation

⚠WARNING

Death or severe injury!

• Use appropriate PPE such as safety helmet, safety footwear, safety gloves, etc. when you are within the work site.

All persons working with the ladder hoist shall follow the regulatory safety instructions provided by local authority, work site and the company. The safety instructions are listed below:

- Select appropriate PPE such as safety helmet, safety footwear, safety gloves, etc. and use them correctly.
- Refer to the load chart to determine the working load of ladder hoist, and do not exceed the permitted load.

- In situations that present a risk for the operator or the equipment, press the E-Stop button to shut down the equipment.
- If any damage or faults which may jeopardize personal safety are revealed during operation, immediately stop the work, remove the equipment from service and notify the equipment administrator.
- Strictly follow the industrial safety standard and instructions when working on low-voltage electrical appliances. The electrical connections shall conform to the requirements of EN 60204-1.
- All repairs shall be performed by qualified technicians from 3S LIFT or its authorized parties.
- Perform inspections and maintenance of the equipment per day, week, and month as required.

1.9. Battery Safety Precautions

⚠WARNING

Death or severe injury!

• Before using the ladder hoist, read this manual and make sure that you fully understand the instructions contained in it.

The safety precautions about battery usage are listed below:

- Lithium-ion batteries shall be provided with test reports in compliance with UN Manual of Tests and Criteria Part III - Lithium metal and lithium-ion batteries.
- Lithium-ion batteries shall be subjected to an 1.2-meter drop test before leaving the factory.
- Batteries shall be clearly labeled with its capacity.
- Do not mix new and old batteries or use batteries of different models together.
- Do not heat the battery or throw it into water or fire.
- Do not use sharp objects to puncture the battery.
- Do not allow children to replace lithium-ion batteries without adult supervision. Keep batteries out of the reach of children.

1.10. Battery Charger Safety Precautions

The safety precautions about battery usage are listed below:

- The charger is only intended for charging the specified batteries and should not be used for any other purposes. Otherwise, it may result in fire, electric shock, or injury.
- Do not expose the charger to rain or snow.
- When disconnecting the charger, grip the plug and pull it out, instead of pulling the power cord directly. This reduces the risk of damaging the plug and cable.
- Do not modify or tamper with the power cord. Do not use extension cords. Do not use a charger with a damaged power cord or plug.

- The charger requires proper ventilation through slots at the top and bottom of the casing. Do not place any objects on top of the charger or position it on a soft surface that might block the ventilation slots, as this could cause overheating.
- Keep the charger away from any heat sources.
- Make sure that the charger is placed in a stable and secure location. If the charger experiences strong impact, falls, or shows signs of damage, do not continue using it.
- The charging area should be clean and dry. Using the charger in dirty or damp places could result in fire, electric shock, or injury.

1.11. Foreseeable Misuse

Foreseeable misuses include the following:

- Installation, operation and maintenance of the ladder hoist by persons who have not read or fully understood this manual.
- Operating the ladder hoist when the actual load exceeds the permitted limit.
- Performing manual descent without giving a warning message or advising persons who are in danger area.
- Operating the ladder hoist without prior inspection.
- Operating the ladder hoist without normal or emergency lighting in the work area.
- Operating the ladder hoist when there is strong wind.

2. Overview

2.1. General Description

The battery ladder hoist is a material lifting appliance.

It is capable of vertical and inclined hoisting of goods and construction materials such as solar panels and finishing materials.

This ladder hoist can be installed and dismantled without the need of tools.

2.2. Specifications

Table 6 - General Specifications

Product/Component	Function/Performance		Technical specification
Ladder hoist	Rated load	kg	120
		lbs	265
	Lifting speed	m/min	15
		ft/min	49.2
	Power (kW)		0.55
	Battery voltage/capacity (V/Ah)		18/5 (×2), or 18/8 (×2)
	Max. lifting height	m	9.8
		ft	32
Drive unit	Dimensions	mm	290 × 610 × 220
		in	11.4 × 24 × 8.7
	Drive unit	kg	20
		lbs	44
	Motor speed (r/min)		2 800
	Noise level (dB)		≤ 79
	Duty cycle		S3-60%
	Ingress protection		IP54
	Corrosion protection		C3-M

Table 6 - General Specifications (continued)

Product/Component	Function/Performance		Technical specification
	Control device		Wireless remote control
Foot section	Length	m	1.8
		ft	6
Standard (rail) section	Length	m	1.8/1.2/0.6
		ft	6/4/2
Wire rope	Diameter	mm	5
		in	1/5

Table 7 - Battery Specifications

Model	DCB184	DCB208
Type	Lithium-ion battery	Lithium-ion battery
Rated voltage (V) /capacity (Ah)	18 /5	18 /8
Rated capacity (Wh)	90	144
Charging temperature range (°C)	0 to 35	0 to 35
Discharging temperature range (°C)	-20 to 40	-20 to 40
Corrosion protection	IP54	IP54
Chemical system	Lithium manganese oxide / graphite	Lithium manganese oxide / graphite
Cycle life	500 cycles, with remaining capacity not less than 80%	500 cycles, with remaining capacity not less than 80%
Weight	0.95 kg	0.95 kg

Table 8 - Load Carrying Device (LCD) Specifications

LCD type		General-purpose platform	Solar panel platform
Weight	kg	17	11

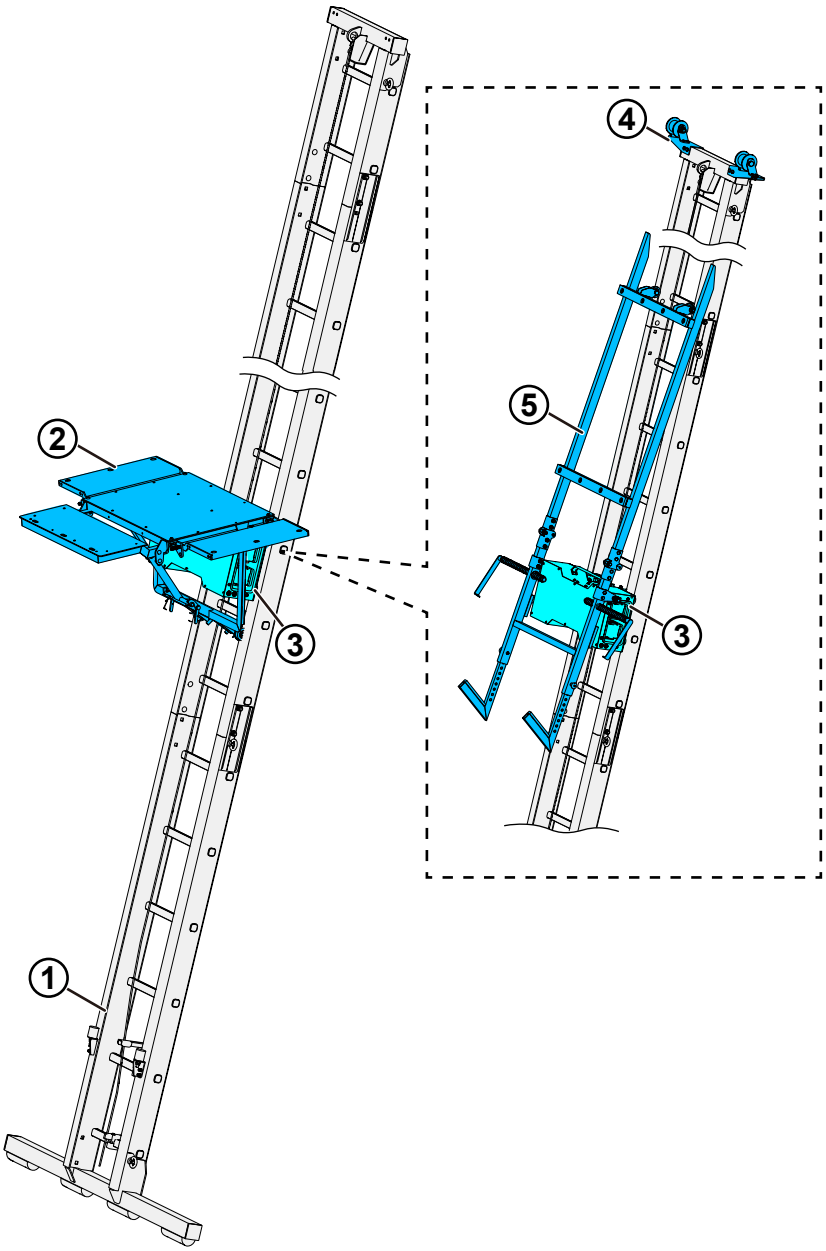
Table 8 - Load Carrying Device (LCD) Specifications (continued)

	lbs	37.5	24
Max. load	kg	100	110
	lbs	220.5	242.5
Dimensions	mm	• 580 × 740 × 480 • 540×1 182×775 (when expanded)	• 1 440 × 810 × 350 • 2 300 × 1 190 × 255 (when expanded)
	in	• 21.7 × 29.2 × 18.9 • 21.3 × 46.6 × 30.6 (when expanded)	• 56.7 × 31.9 × 13.8 • 90.6 × 46.9 × 10 (when expanded)
Intended use		It has a wide range of applications, e.g., to transport bricks, furniture, materials, boxes and scaffolds. The side boards can be folded down for transportation of large objects.	It is intended to carry a variety of panel-shaped materials, e.g., solar panels OSB, gypsum boards, window panels. It can carry a maximum of 3 solar panels in a single run. The side boards can be folded down for purposes of transportation or storage.

The battery is a standardized product which can be purchased at the place of use.

3. General Description

3.1. System Components



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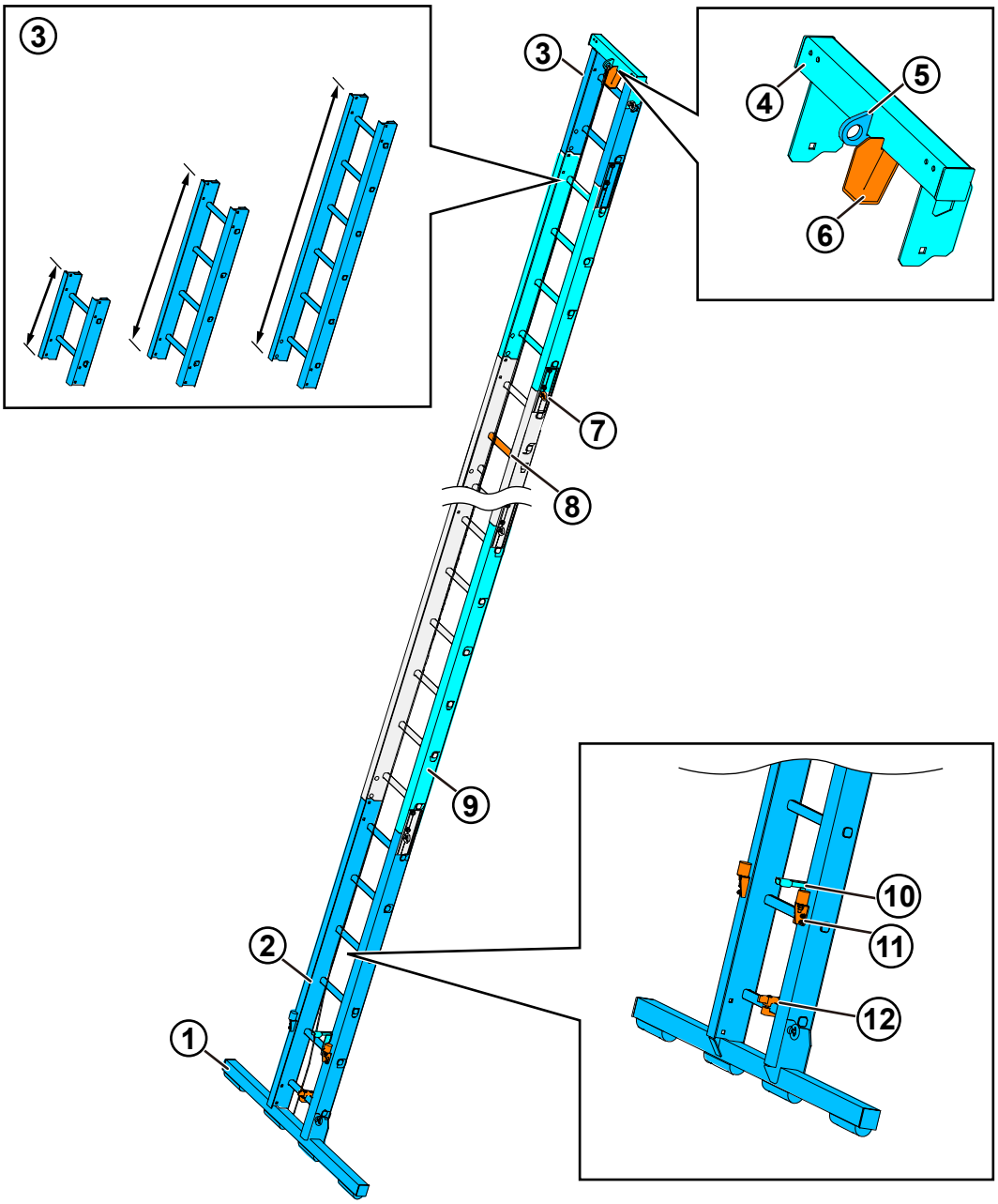
1. Guide rail assembly
2. . General-purpose platform
3. Drive unit
4. Guide roller
5. Solar panel platform

Fig 1. Battery Ladder Hoist Components

3.2. Guide Rail Assembly



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1. Stabilizer profile	7. Eye nut
2. Foot (rail) section	8. Rung
3. Standard (rail) section	9. Guide rail (stile)
4. Head (rail) section	10. Bottom actuator plate
5. Hook attachment point	11. Buffer
10. Top actuator plate	12. Wire rope retainer

Fig 2. Guide Rail Assembly

The main parts of the guide rail assembly are:

Stabilizer profile [1]

The stabilizer profile [1] is positioned at the bottom of the foot section [2]. It has slip-resistant pads at the bottom.

Foot section [2]

A wire rope retainer [12] and a bottom actuator plate [10] are attached to the bottom rung and 2nd bottom rung of the foot section respectively.

Two shock absorbers [11] are installed on both stiles of the foot section.

The load chart and inclination angle scale are affixed to one side of the foot section. They are intended for determining the working load according to the length and inclination angle of the guide rail.

Standard section [3]

The standard rail sections are of different length including 1.8 m, 1.2 m and 0.6 m. The overall length of the guide rail and number of the standard sections needed are based on the actual lifting height.

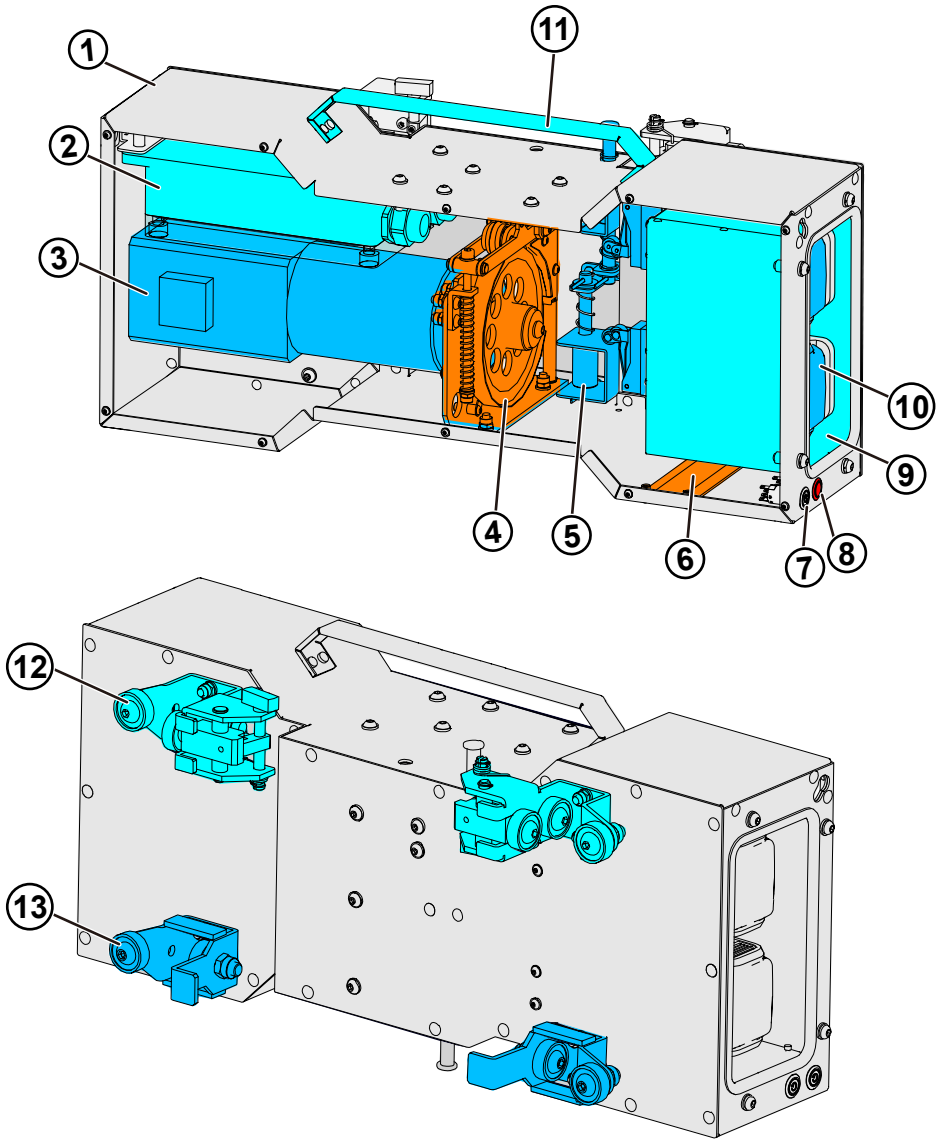
Head section [4]

The top limit actuator plate [6] and hook attachment point [5] are installed on the head section.

The top limit actuator plate is intended to limit the travel of the ladder hoist at the top. When the ladder hoist reaches its top limit position, the top limit switch will be actuated, causing the ladder hoist to stop automatically. This prevents overrunning of the ladder hoist, which can cause equipment damage.

The suspension wire rope is attached to the hook attachment point at the top.

3.3. Drive unit



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1. Housing	8. Fault indicator light
2. Junction box	9. Battery box
3. Motor	10. Battery (×2)
4. α rope sheave mechanism	11. Carrying handle
5. Limit switch actuator mechanism	12. Rotary guide roller assembly (×2)
6. Patch antenna	13. Guide roller assembly (×2)
7. Control button	

Fig 3. Drive unit

Housing [1]

The housing has a carrying handle [11] that allows for easy handling.

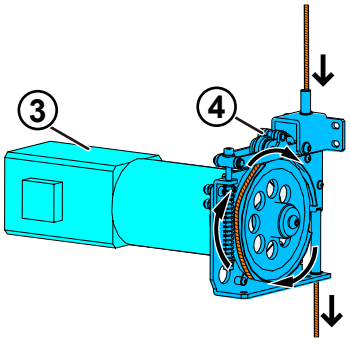
The power button [1] and fault indicator light [8] are positioned on one side of the housing.

The housing is attached onto the guide rail by means of the rotary guide roller assembly [12] and side guide roller assembly [13].

Drive system

The drive system includes a motor [3] and an α rope sheave mechanism [4].

The suspension wire rope is wound around the rope sheave, allowing the drive system to travel up and down the guide rail.



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3. Motor
4. α rope sheave mechanism

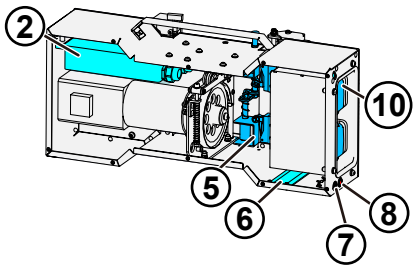
Fig 4. Drive System

Electrical control system

The electrical control system consists of the control buttons, limit switch assemblies, antenna, and batteries.

The patch antenna enables the control system to receive command signals.

The batteries provide power for the drive system.



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2. Junction box
5. Limit switch actuator mechanism
6. Patch antenna
7. Power switch and power indicator light
8. Fault indicator light
10. Battery

Fig 5. Electrical Control System

Battery assembly

The battery box can store two 5 Ah or 8 Ah batteries.

9. Battery box
10. Battery

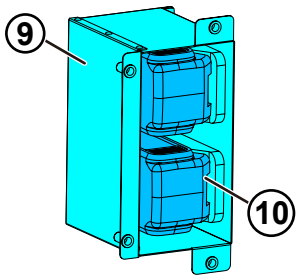

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Fig 6. Battery Box

Rotary guide roller assembly

The rotary guide roller assemblies, in conjunction with the side guide roller assemblies, allow the drive system housing to be attached to the guide rail.

The rotary guide roller assembly has a rotating mechanism which allows for easy attachment to the guide rail.

14. Rotary shaft
15. Swing block
16. Roller positioning block
17. Rotary guide roller
18. Guide roller
19. Side retaining roller

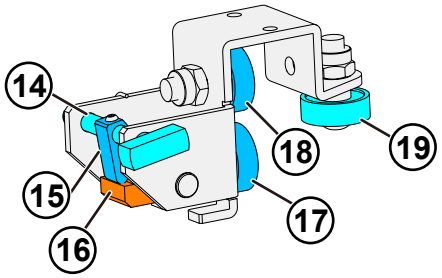

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Fig 7. Rotary Guide Roller Assembly

Guide roller assembly

The guide roller assemblies, in conjunction with the rotary guide roller assemblies, guide the drive system to travel up and down the guide rail.

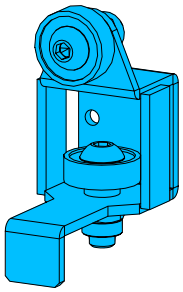

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Fig 8. Guide Roller Assembly

3.4. Load Carrying Devices

⚠WARNING

Death or severe injury!

• Do not transport personnel with the load carrying platform!

3.4.1. General-Purpose Platform

The main parts of the general-purpose platform are:

Expandable platform

The general-purpose platform can be expanded for transportation of large objects. The expandable platform consists of the following parts:

- Side board (×2) (foldable)

  For easy transportation, the side boards are not assembled onto the platform. Before using the platform, it is necessary to attach the side boards onto the platform using the rotary assemblies. Refer to 6.4.3. Installing the Load Carrying Platform *(p40)* for the installation procedure.

- Floor board [3] (foldable)
- Back board [1]

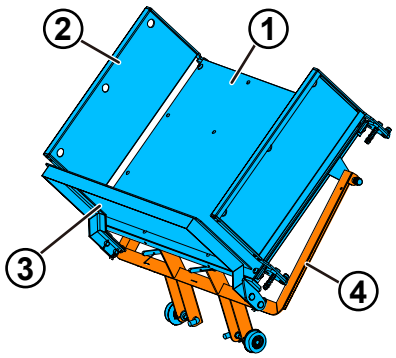

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Fig 9. General-Purpose Platform (Normal Condition)

Adjustable frame [4]

The adjustable frame allows adjusting the angle of the platform.

1. Back board
2. Side board
3. Floor board
4. Adjustable frame

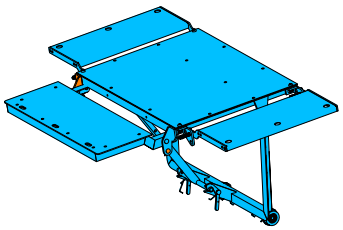

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Fig 10. General-Purpose Platform (Expanded)

3.4.2. Solar Panel Platform

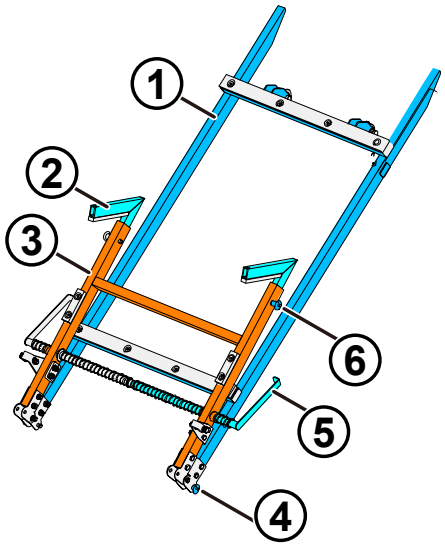

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Fig 11. Solar Panel Platform (Folded)

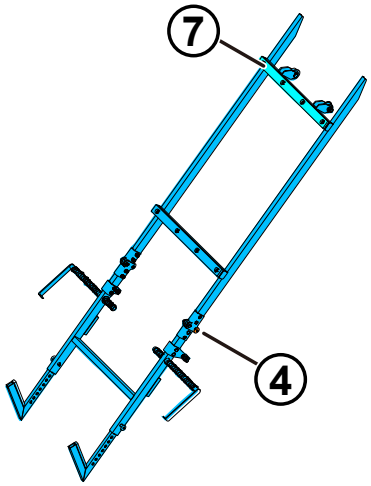

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Fig 12. Solar Panel Platform (Expanded)

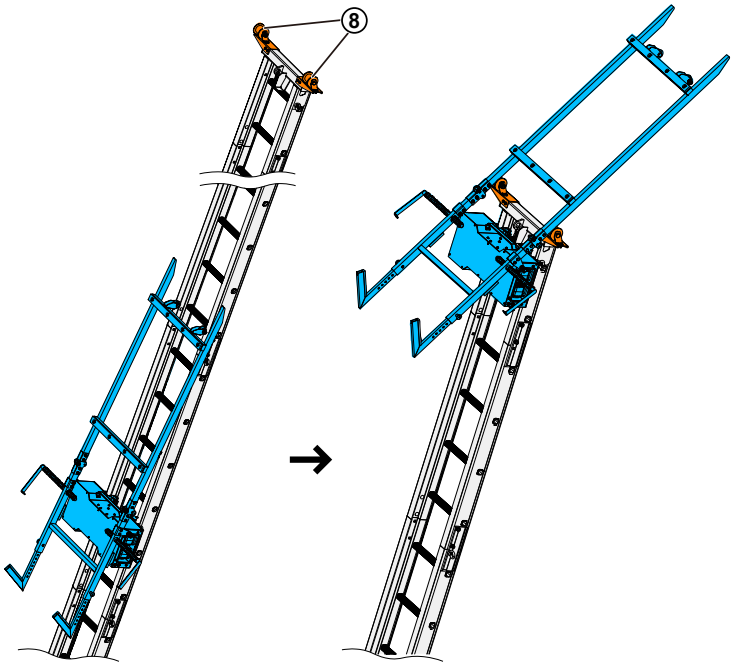

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Fig 13. Top Guide Roller

1. Upper frame
2. Bottom fork (×2)
3. Lower frame
4. Quick release pin (×2)
5. Retaining lever (×2)
6. Quick release pin (×2)
7. Rubber strip
8. Top guide roller assembly

The solar panel platform consists of the upper frame [1], lower frame [3], bottom fork [2], retaining lever [5], and top guide roller assembly [8].

For easy transportation, the solar panel platform is in the folded condition when delivered to the work site. Before using the platform, it is necessary to extend the platform to the expanded condition. Refer to 6.4.3. Installing the Load Carrying Platform *(p40)* for the extending procedure.

Upper frame [1]

The platform can be unfolded by pulling out the quick-release pins [4]. This allows the upper frame [1] and the lower frame [3] to be on the same plane.

Bottom fork [2]

Panel materials are placed on the bottom fork. By pulling out or releasing the quick-release pins [6], the bottom fork can be extracted from or retracted into the tubes of the lower frame [3], making the platform height adjustable. The maximum extension length is 150 mm. After adjustment of the extension length, insert the quick-release pins [6] to fix the tube.

Lower frame [3]

The lower frame is attached to the drive unit. As the solar panel platform approaches the top, the platform rotates.

Retaining lever [5]

The retaining levers [5] are used to secure the transported panel materials. To place panel materials on the platform, pull and hold the left and right retaining levers [5] at the same time. Then put the panels on the platform and release the retaining levers.

Rubber strip [7]

Rubber strip [7] is attached to the platform to protect panels from vibration and impact during transport.

Top guide roller assembly [8]

The top guide roller assemblies allows the platform to move up further, making it easier to unload the transported panels.

The top guide roller assemblies are mounted on the top of the guide rail.

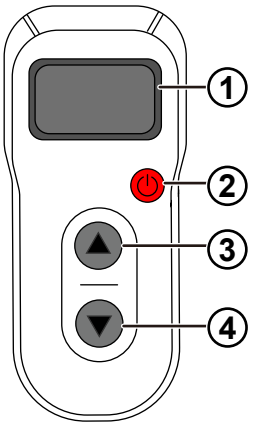
3.5. Wireless Remote Control

3.5.1. General Description

The wireless remote control has a display [1], power button [2], UP button [3], and DOWN button [4].

The display shows the SN code, upward and downward operating status, battery level, etc.

1. Display
2. Power button
3. UP button
4. DOWN button



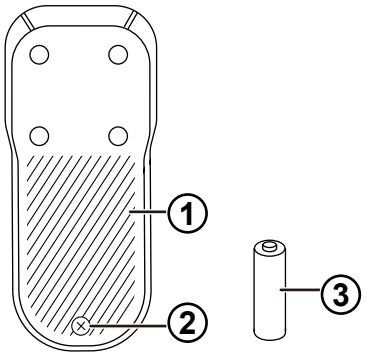
GMH1105

Fig 14. Remote Control

3.5.2. Batteries in the Remote Control

Three AA batteries are used for the remote control.

1. Battery compartment cover
2. Screw
3. AA battery



GMH1106

Fig 15. Placing Battery

3.5.3. Function Description

Switching On/Off

To switch on the remote control, press and hold the Power button for 3 s, and release the button when the display starts showing device information.

To switch off, press and hold the Power button for 3 s, and release the button when the display becomes inactive.

- If the remote control is not operated for an extended time (above 20 min), it will enter standby mode. To exit standby mode, press and hold the power button for 3 seconds to restart it.
- It is recommended to turn off the remote control when not in use to prolong its lifespan.
- After an extended period of non-use, replace the batteries.
- If the remote control is not needed for an extended period, remove the batteries and store them in an indoor environment.

SN Code Pairing

Prior to using the remote control, it is necessary to pair the remote control to the ladder hoist.

1. Obtain the SN code of the ladder hoist.

   The ladder hoist SN code is included in the nameplate. Refer to 3.6. Documents and Labels *(p25)*.

2. With the device in the power-on state, press the power button twice within 2 s. The corresponding SN value should start flashing.

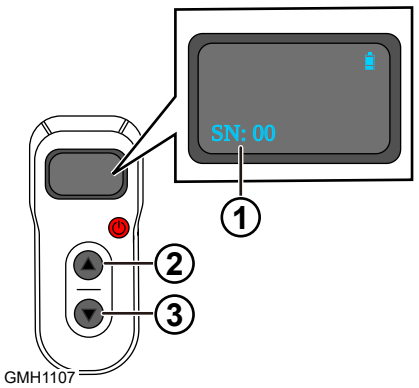
3. **⚠CAUTION**

   Minor or moderate injury

   • Make sure that you set the SN code only when the SN value is flashing. When the SN value is not flashing, pressing the UP or DOWN button can initiate the operation of the ladder hoist.

   Select the SN code by pressing ▲ or ▼ button.

4. Make sure that the SN code of the remote control is the same with that of the ladder hoist.
5. Wait for 3 s. The setting is complete when the SN code stops flashing.



1. SN code
2. UP button
3. DOWN button

Fig 16. Display

Using the Remote Control

NOTICE

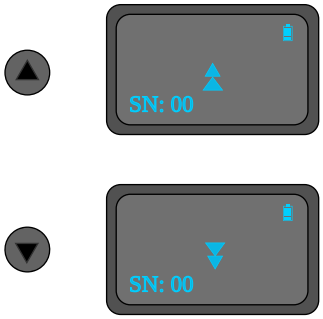
Equipment damage!

• Do not press the UP and DOWN buttons at the same time, since this will stop the signal transmission.

1. Make sure that the pairing of the remote control and the ladder hoist is complete.
2. To travel up, press and hold the button. The display should show , and the ladder hoist should travel up. To stop, release the button.
3. To travel down, press and hold the button. The display should show , and the ladder hoist should travel down. To stop, release the button.

If the ladder hoist does not stop even if you have released the or buttons, press the power button for 3 s to switch off the remote control. This is disconnect the signal transmission.

Pressing the UP and DOWN buttons at the same time will stop the signal transmission.

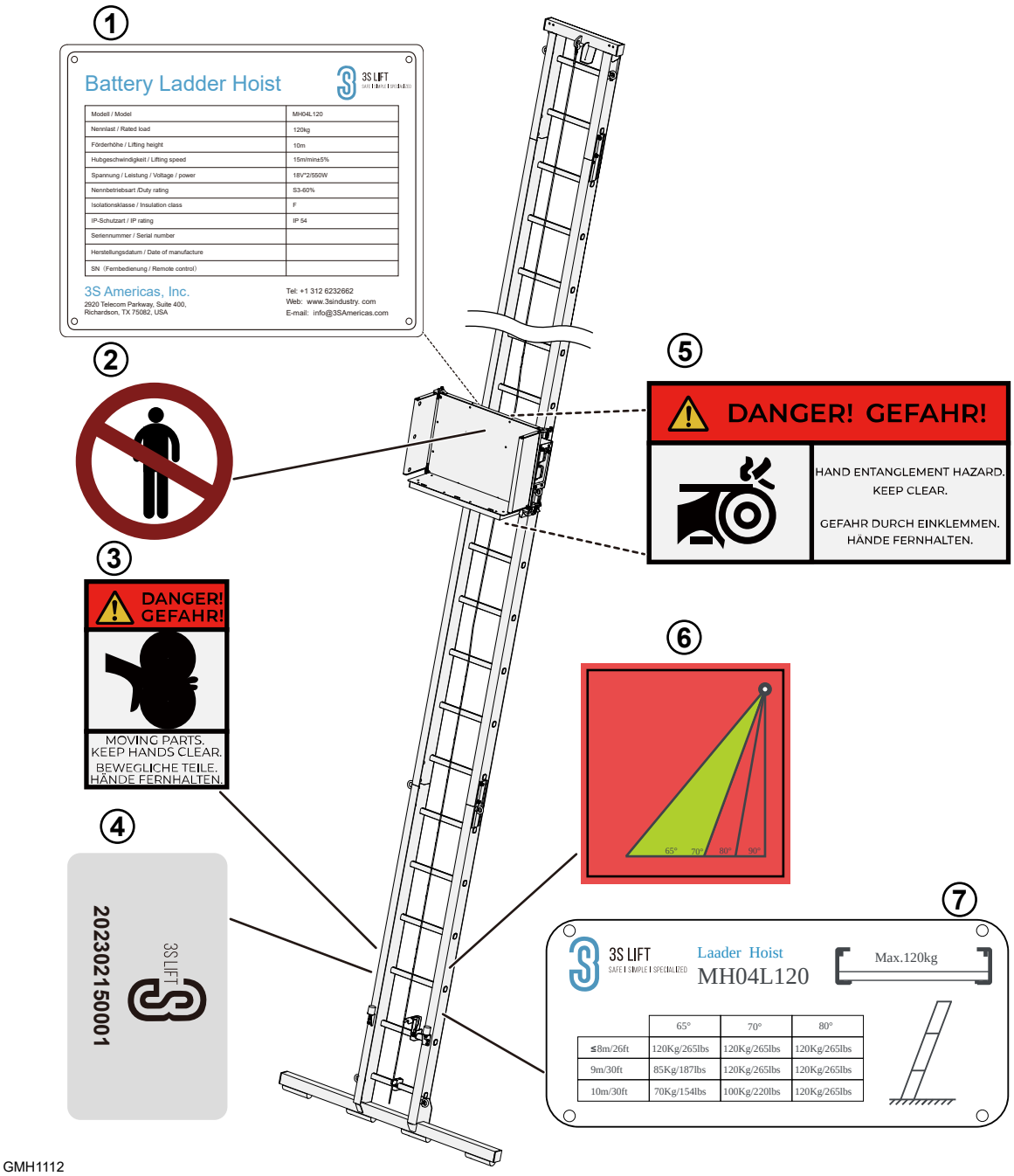


GMH1110

Fig 17. Display of Travel Status (UP and DOWN)

3.6. Documents and Labels

Ensure all labels and signs are in place and valid. Replace damaged or missing labels. All labels shall be clear, perfectly conspicuous, plastic-coated or equivalently protected and permanently affixed.



GMH1112

1. Ladder hoist name plate
2. Prohibition sign - No person transporting
3. Warning sign - Crushing of hands hazard
4. Guide rail label
5. Warning sign - Drawing-in hazard
6. Guide rail inclination angle indicator
7. Load chart

Fig 18. Positions of Labels/Signs

4. Storage

4.1. General Description

Perform the following operations before putting the battery ladder hoist into storage:

1. Turn off the power of the main power.
2. Turn off the remote control.
3. Take the batteries out.

4.2. Storing the Battery

Battery storage requirements are as follow:

- Make sure that the battery capacity reaches 30% to 40% of the nominal capacity.
- Place the the battery out of the reach of the children.
- Make sure that the battery is placed in an enclosed environment. Make sure that the storage environment is dry and clean.
- Do not put the batteries in the hoist for storage.
- Do not store the battery in conductive packaging.
- The storage temperature of the battery is -20°C to 40°C. If the battery is stored for a long time, charge the battery every three months to prevent battery capacity loss.
- Keep the battery away from the fire and any fluid.

4.3. Storing the Charger

Battery charger storage requirements are as follow:

- Keep the charger away from the fire and any fluid.
- Unplug the charger from the socket and take the battery out.
- Place the the charger out of the reach of the children.
- Make sure that the charger is placed in an enclosed environment and is separated with the battery. Make sure that the storage environment is dry and clean.
- The storage temperature is -20°C to 40°C.

5. Transportation

5.1. Precautions

⚠WARNING

Could result in death or serious injury!

• Read and understand the content of this manual before transporting the ladder hoist.

The ladder hoist is dismantled to separate parts for transporting. Assemble the product according to the instruction manual.

Transport personnel shall read and understand all the contents of this manual and be competent to transport the ladder hoist safely. They shall be able to recognize and avoid potential dangers on their own.

5.2. Transporting the Ladder Hoist

Ladder hoist transport requirements are as follow:

- Take the batteries out before transporting.
- Make sure that the transport is steady to prevent collision of the parts.

5.3. Transporting the Battery

Battery transport requirements are as follow:

- Do not store the battery in conductive packaging.
- Attach the battery firmly inside the package to prevent unintended movement.
- Do not transport the battery in the same package case with any flammable or explosive materials.

6. Installation Instruction

6.1. General Description

This section provides the information regarding the installation of the ladder hoist, including the safety requirements, material inspection, work site installation instructions, installation procedures and precautions.

6.2. Material Inspection

The ladder hoist is dismantled to separate parts for transporting. Inspection requirements are as follow:

- Check the integrity of the device according to the package list after receiving the product. Make sure the device is intact before assembling.
- Contact with the delivery personnel immediately if any damage is found.

6.3. Installation Site Requirements

⚠WARNING

Could result in death or serious injury!

• Do not step on the load carrying platform!

⚠WARNING

Could result in death or serious injury!

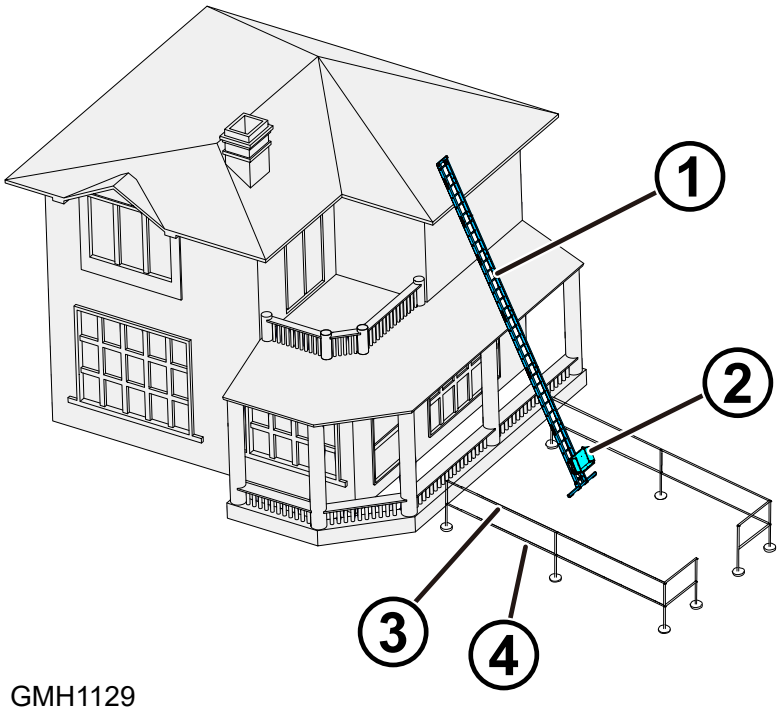
• Wear Personal Protective Equipment (PPE).

• All parts and circuits shall function properly.

• Set warning signs at proper position in the installation area.

Before commencement of the assembly, inspect the surrounding of the installation site. Requirements are as follow:

- Avoid pedestrian or public traffic.
- Set barriers around the site to prevent unauthorized entry.
  - Use red and white warning tapes to circulate the barriers. The height of the first warning tape [3 shall be 1.1 m (3.6 ft) and the second [4] 0.5 m (1.6 ft).
  - The enclosed area shall cover the ladder hoist [1] and the area of the its projection. The minimum distance between the barrier and the ladder hoist shall be 1.4 m (4.6 ft) and the maximum width of its entryway shall be 1.4 m (4.6 ft).



1. Ladder hoist
2. Load carrying platform
3. Upper warning tape
4. Lower warning tape

GMH1129

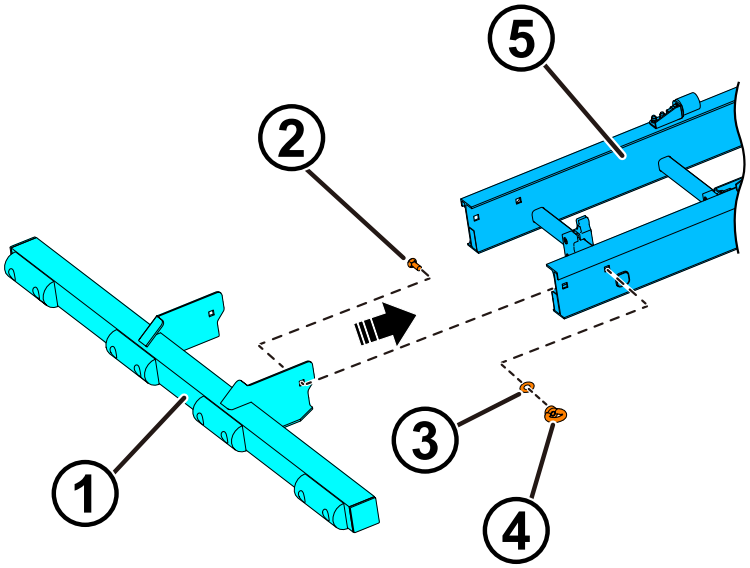
Fig 19. Site Conditions

6.4. Installation Procedures

6.4.1. Installing the Guide Rail Assembly

1. Installing the stabilizer profile.

   Install the ladder rung to the lower position. Make sure all rungs are not installed upside down.



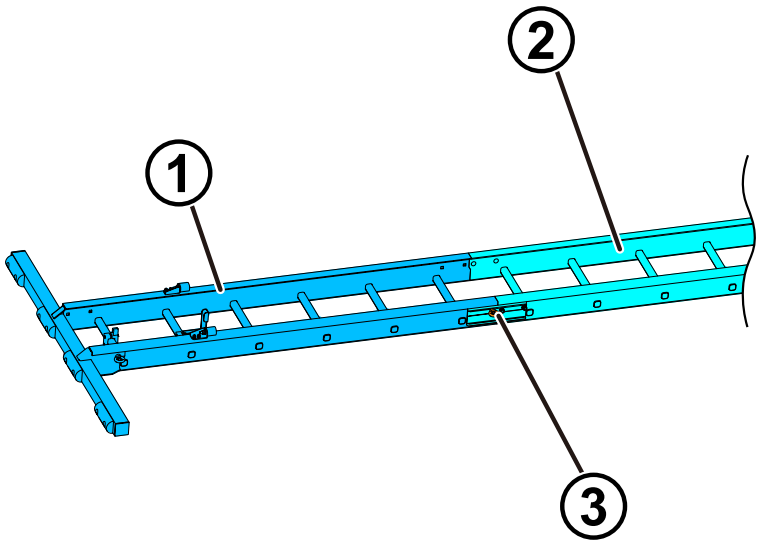
1. Stabilizer profile
2. Square neck bolt M10 × 30 (×2)
3. Curved single coil spring lock washer 10 (×2)
4. Eye nut M10 (×2)
5. Foot (rail) section

GMH1102

Fig 20. Installing the Stabilizer Profile

2. Assemble the standard (rail) section to the required length according to the installation method of the stabilizer profile.

   When assembling the guide rail sections, install the ladder rung to the lower position. Make sure all rungs are not installed upside down.



1. Foot (rail) section
2. Standard (rail) section
3. Eye bolt

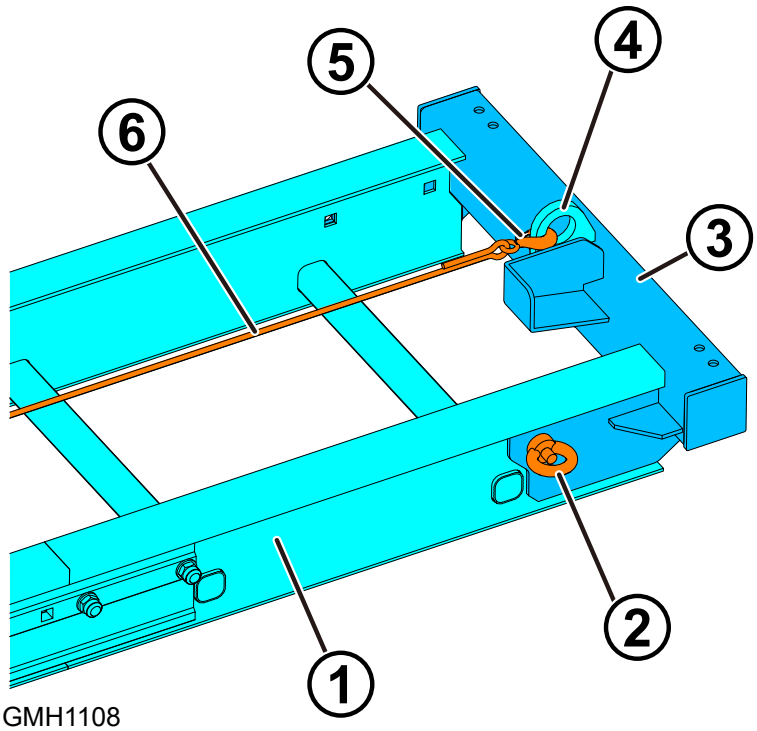
GMH1103

Fig 21. Assembling the Guide Rail Sections

3. Install the head (rail) section according to the installation method of the stabilizer profile.

The hook attachment point [4] shall be installed facing up.

4. Connect the wire rope [6] hook [5] to the hook attachment point [4].

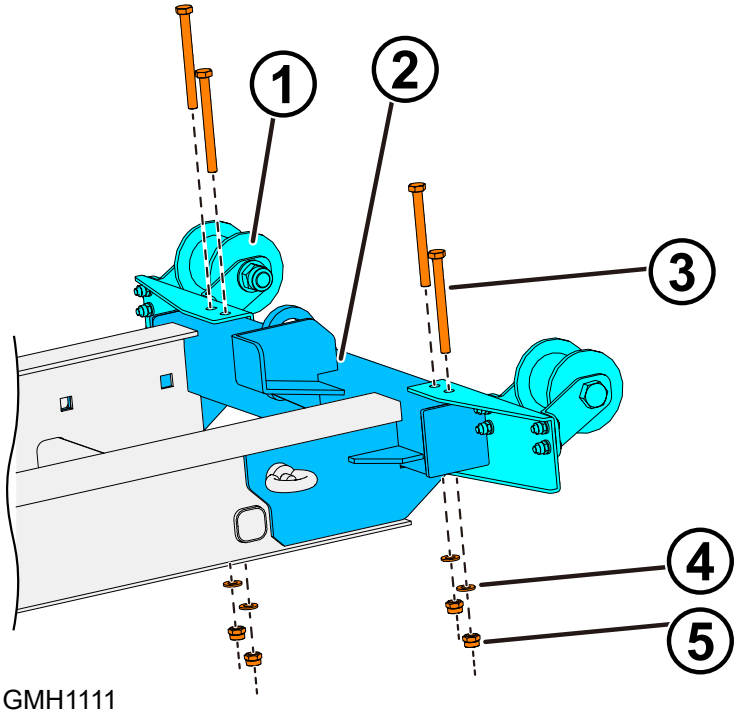


1. Standard (rail) section
2. Eye bolt
3. Head (rail) section
4. Hook attachment point
5. Hook
6. Wire rope

GMH1108

Fig 22. Installing the Head (Rail) Section

5. (Optional) If the solar panel platform is needed, install the upper guide roller [1] on the head (rail) section [2].

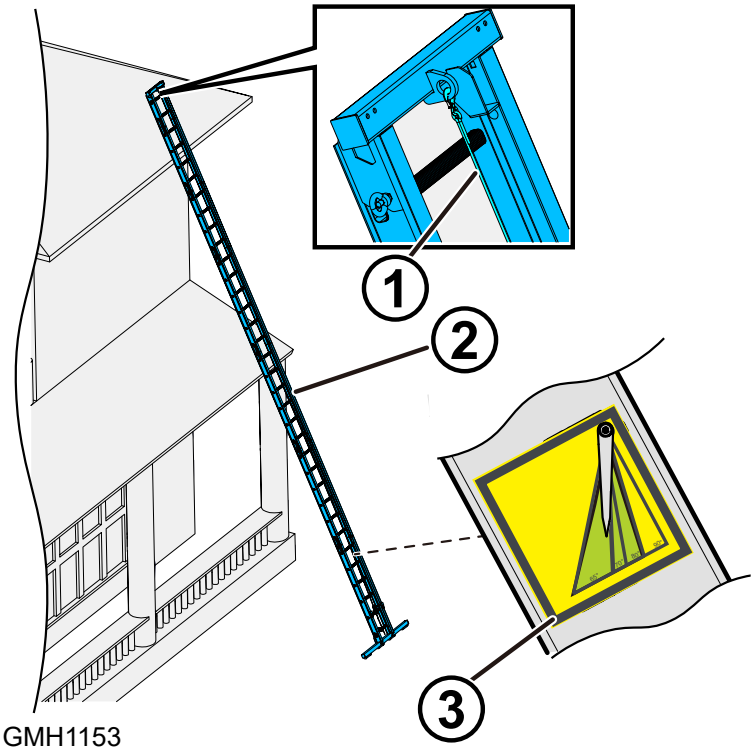


1. Upper guide roller (×2)
2. Head (rail) section
3. Bolt M10 × 85 (×4)
4. Plain washer 8 (×4)
5. Lock nut M8 (×4)

GMH1111

Fig 23. Installing the Upper Guide Roller

6. Attach the guide rail.



1. Wire rope
2. Guide rail
3. Angle indicator

GMH1153

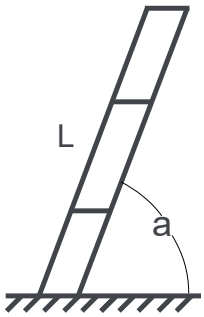
Fig 24. Attaching the Guide Rail

a. Place the stabilizer profile of the foot (rail) section on the ground and place the other end of the guide rail [2] against the building.

b. Adjust the wire rope [1] to let the free end drop near the ground.

c. Refer to the load chart and determine the angle of the guide rail.

L \ a	65°	70°	80°
≤8m/26ft	120Kg/265lbs	120Kg/265lbs	120Kg/265lbs
9m/30ft	85Kg/187lbs	120Kg/265lbs	120Kg/265lbs
10m/30ft	70Kg/154lbs	100Kg/220lbs	120Kg/265lbs



GMH1090

In the load chart, Load = drive unit + load carrying platform + materials.

Fig 25. Load Chart

Length of the guide rail = stabilizer profile (0.06 m) + foot (rail) section (1.8 m) + length of the standard (rail) section (lifting height × 1.015 + 0.3) + head (rail) section (0.06 m).

Keep the calculated value of the total length of the standard (rail) section two decimal places upward.

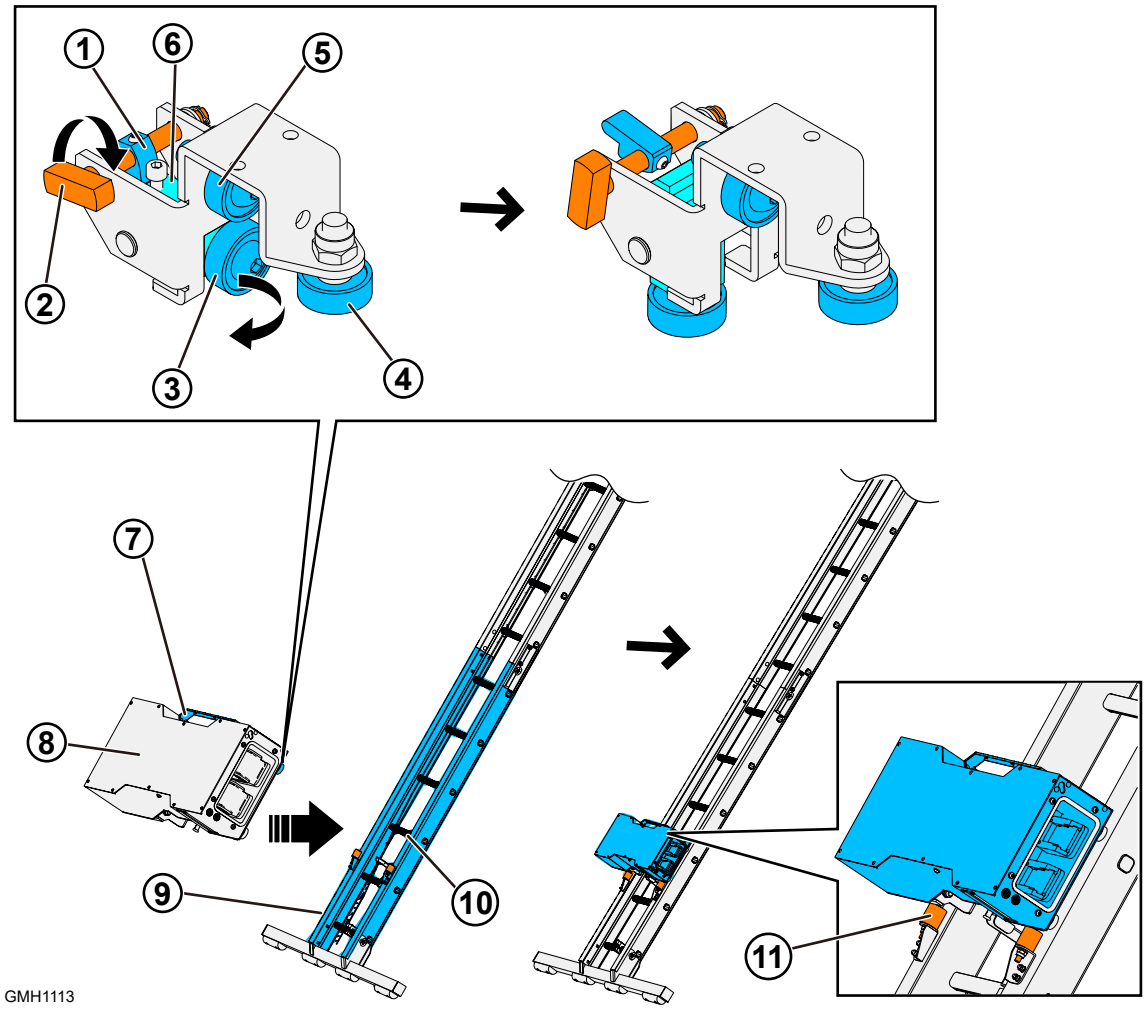
For example, when the lifting height is 6 m (32.8 ft), the guide rail length is 6 m × 1.015 + 0.3 = 6.39 m according to the formula. Length of the guide rail = stabilizer profile (0.06 m) + foot (rail) section (1.8 m) + length of the standard (rail) section (6.39 m) + head (rail) section (0.06 m) = 8.31 m.

The guide rail length shall be less than 10.32 m.

d. Make sure that the angle indicator [3] points at the area between 65° to 80°.
e. Choose the proper rung and connect it with the building.

6.4.2. Installing the Drive Unit

6.4.2.1. Attaching the Drive Unit



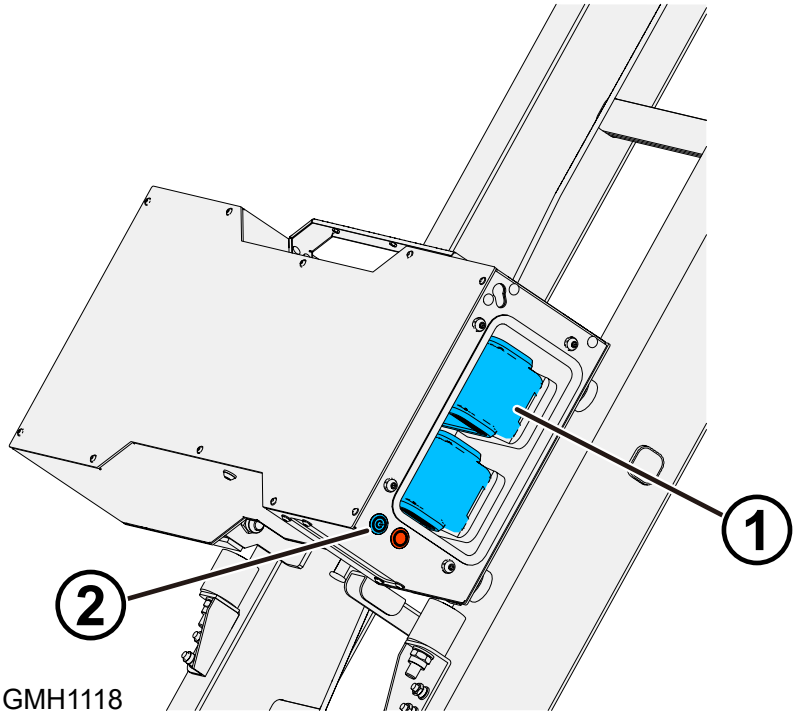
1. Swing block
2. Rotary shaft
3. Rotary guide roller
4. Side retaining roller
5. Guide roller
6. Adjusting roller fixing block
7. Handle
8. Drive unit
9. Foot (rail) section
10. The third lowest rung of the foot (rail) section
11. Lower buffer (×2)

Fig 26. Attaching the Drive Unit

1. Turn the rotary shaft [2] to detach the swing block [1] from the adjusting roller fixing block [6].
2. Turn the adjusting roller fixing block [6] so that the adjusting roller [3] is vertical to the guide roller [5].
3. Adjust the adjusting roller assembly at the other side in the same method.
4. Pull the drive unit handle [7] to lift the drive unit [8] to the position of the third lowest rung [10] of the foot (rail) section and stick the four side retaining rollers [4] to the guide rail.
5. Turn the adjusting roller fixing block [6] to reset it. Restore the adjusting roller [3] to the former position and stick to the guide rail.

6. Turn the rotary shaft [2] back to press the adjusting roller fixing block.
7. Slide the drive unit down to the buffer [11] and release the drive unit handle.

6.4.2.2. Activating the Drive Unit



1. Batteries (×2)
2. START button (with power indicator)

Fig 27. Activating the Drive Unit

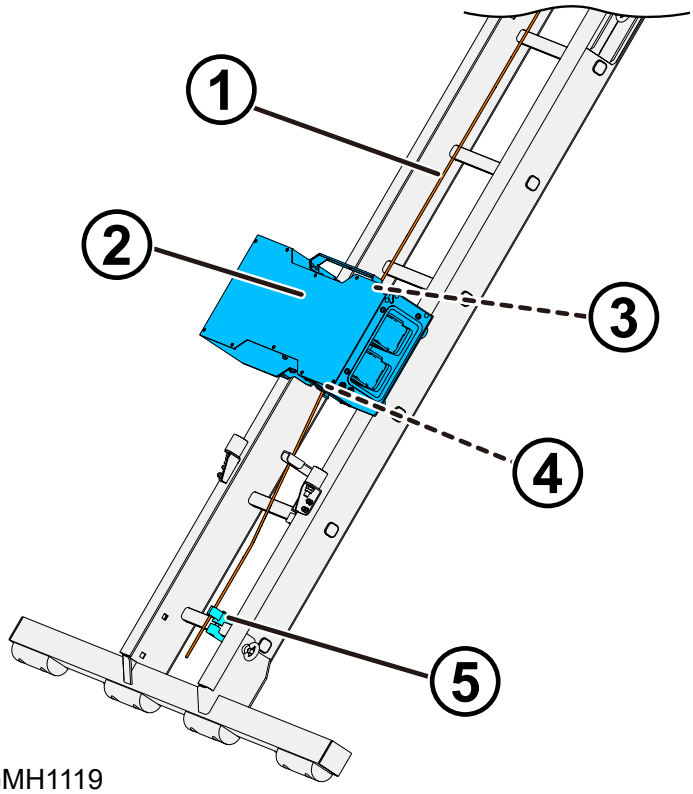
1. Insert the two batteries [1] into the drive unit.

   The two batteries shall have same specifications and battery level.

2. Press the START button (with power indicator) [2] to activate the drive unit after hearing the sound of the fixing clamp indicating that the batteries are installed correctly.
3. To set the remote control, see 3.5. Wireless Remote Control *(p23)*.

   Before using the system for the first time, the remote control shall be set.

6.4.2.3. Installing the Wire Rope



1. Wire rope
2. Drive unit
3. Wire rope inlet tube
4. Wire rope outlet tube
5. Wire rope retainer

GMH1119

Fig 28. Installing the Wire Rope

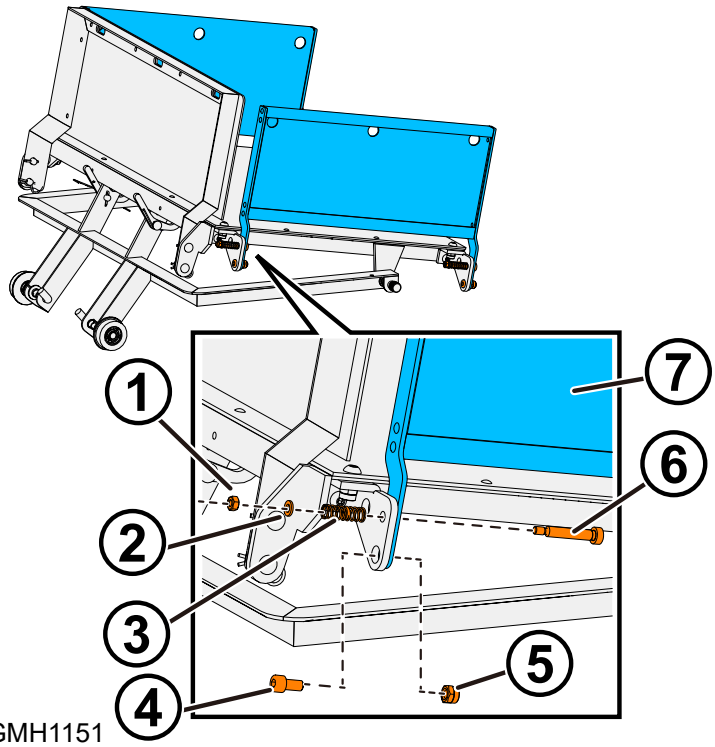
1. Insert the dropping wire rope [1] into the wire rope inlet tube [3] of the drive unit.
2. Press and hole the ▲ button of the remote control until the wire rope goes inside the wire rope inlet tube [3] and pass through the wire rope outlet tube [4].
3. Continue to press and hold ▲ button of the remote control. Release the ▲ button when the wire rope above the inlet tube is completely tensioned.
4. Tension the wire rope below the outlet tube and attach it to the wire rope retainer [5].
5. Wind the rest wire rope up and place it at the rear of the stabilizer profile.
6. Turn off the remote control.
7. Turn off the power of the drive unit.

6.4.3. Installing the Load Carrying Platform

A variety of platforms are available according to the goods that need to be carried. The removing procedures of the load carrying platform are reverse to the installation procedures.

6.4.3.1. Installing the General-Purpose Load Carrying Platform

1. Installing the Side Board.

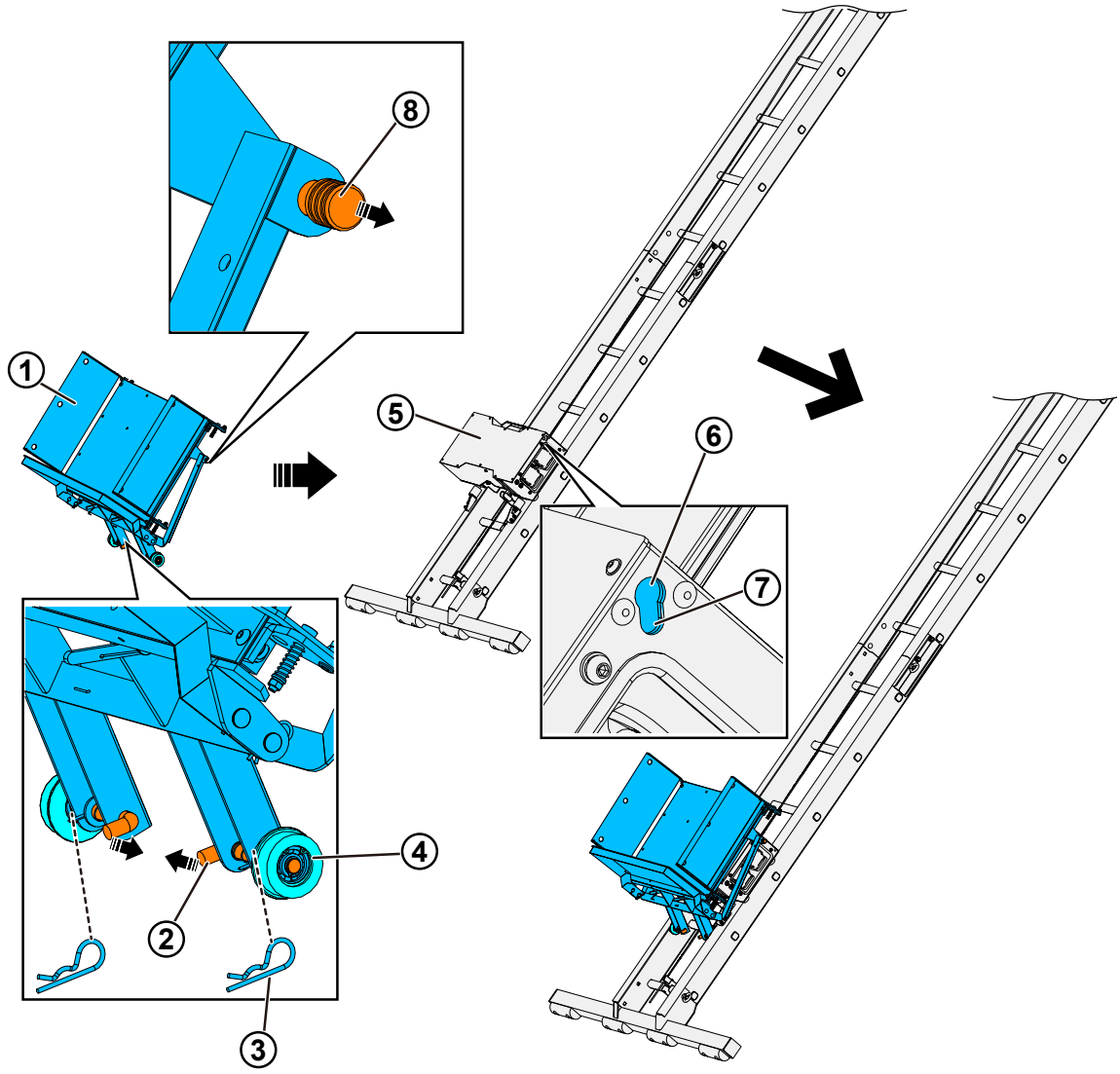


1. Screw M6 × 40 (×4)
2. Plain washer 6
3. Nut
4. Spring
5. Screw M8 × 16 (×4)
6. Side board (×2)
7. Lock nut M8 (×4)

GMH1151

Fig 29. Installing the Side Board

2. Remove the R-shape latch [3] from the latch [2]. See Fig 30.
3. Pull the latch [2] out and stick the side retaining roller [4] to the inner guide rail. See Fig 30.
4. Reinsert the R-shape pin [3] into the latch [2]. See Fig 30.
5. Make sure that the side retaining roller [4] is correctly attached to the inner guide rail. See Fig 30.
6. Pull out the locking pin [8] and point the locking pin [8] to the drive unit [5] upper platform installation hole [6]. See Fig 30.
7. Release the locking pin [8] to attach the locking pin [8] to the drive unit [5]. See Fig 30.
8. Press the platform downward to stick the general-purpose load carrying platform to the lower platform installation hole [7].



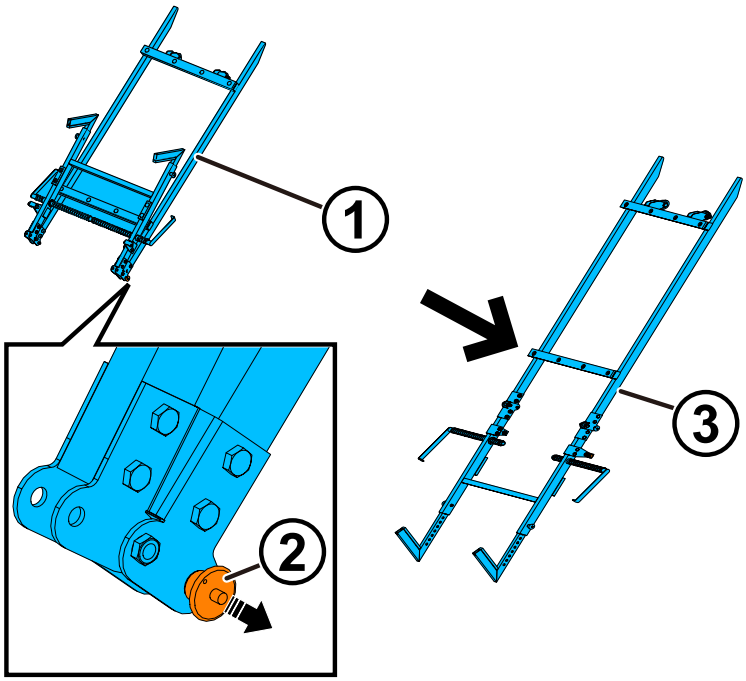
GMH1128

1. General-purpose load carrying platform	2. Latches (×2)
3. R-shape pin (×2)	4. Side retaining roller (×2)
5. Drive unit	6. Upper platform installation hole
7. Lower platform installation hole	8. Locking pin (×2)

Fig 30. Installing the General-Purpose Load Carrying Platform

6.4.3.2. Installing the Solar Panel Platform

1. Pull the quick release pin [1] out and unfold the solar panel platform. See Fig 31.
2. Insert the quick release pin.

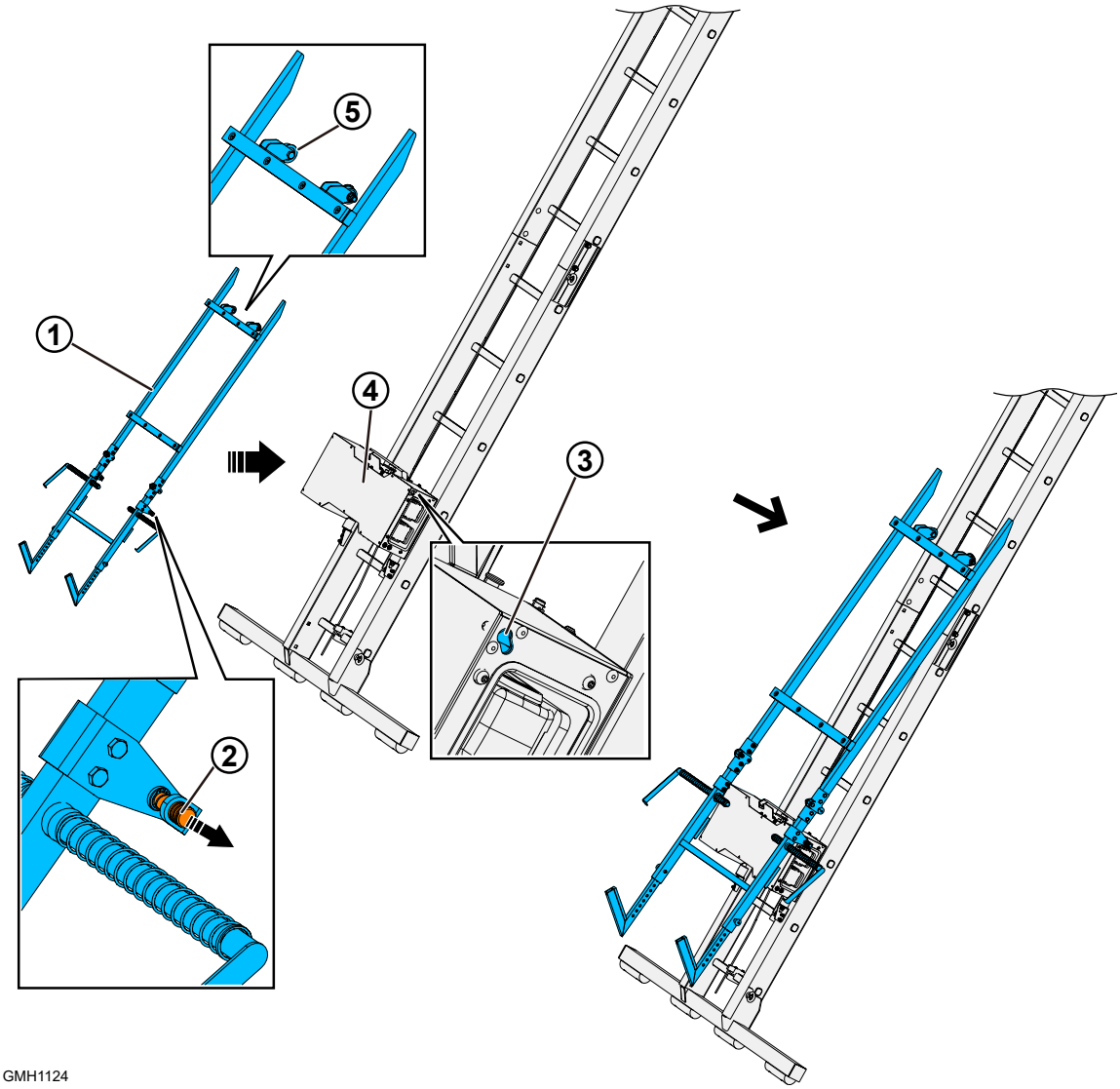


1. Solar panel platform (folded)
2. Quick release pin (×2)
3. Solar panel platform (unfolded)

GMH1130

Fig 31. Unfolding the Solar Panel Platform

3. Pull out the locking pin [2] and point the locking pin [2] to the drive unit platform installation hole [3]. See Fig 32.
4. Release the locking pin [2] to attach the locking pin [2] to the drive unit [4]. See Fig 32.
5. Make sure that the guide roller [5] is attached to the guide rail correctly.



GMH1124

1. Solar panel platform
2. Locking pin (×2)
3. Platform installation hole
4. Drive unit
5. Guide roller

Fig 32. Installing the Solar Panel Platform

7. Operation

7.1. Overview

This clause provides the material operating information, including the operation requirements, normal operating instructions and exceptional and emergency operating instructions.

7.2. Operation Requirements

7.2.1. Safety Instructions

⚠WARNING

Could result in death or serious injury!

- Transport of personnel with the ladder hoist is prohibited.
- Do not operate the ladder hoist when it is overloaded.
- Do not stay under the guide rail.

Operator of the ladder hoist shall read and understand this manual. The operator shall be qualified for operating the ladder hoist and be able to recognize and avoid potential dangers on their own.

Safety Instructions:

- All persons inside the danger area shall wear Personal Protective Equipment (safety helmet, safety gloves, safety footwear, etc.).
- The operator shall have full vision of the work area at all times. Sufficient lighting shall be provided for this purpose.
- Inspect the device following the instruction of this manual before operation.
- The load shall be distributed evenly on the load carrying platform. It is prohibited that a large cargo protrudes the side of the platform.
- If the ladder hoist breaks down at height, operator shall manage to remove the load. Do not leave the load at height without operation.

7.2.2. Operating Restrictions

Do not operate the ladder hoist when:

- The actual load exceeds the load indicated in the load chart.
- The wind speed exceeds 45 km/h (28 mph, or level 6 in Beaufort scale).
- The ladder hoist stops operating due to abnormal cause.
- The ladder hoist is not maintained as required.

7.3. Daily Operation

7.3.1. Inspection Before Use

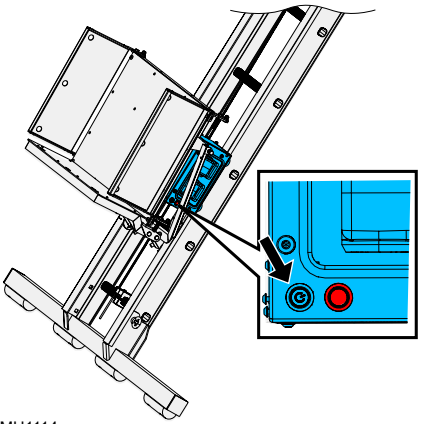
Inspection items before use are as follow:

- The ground protecting barriers shall be set following the requirements. See 6.3. Installation Site Requirements *(p31)*.
- Attach the guide rail shall properly.
- All indicating signs shall be present and legible.
- The wire rope shall remain tensioned and pass through the drive unit correctly.
- The wire rope shall not be damaged.

7.3.2. Commissioning

1. Press the power button and the power indicator should lights up.

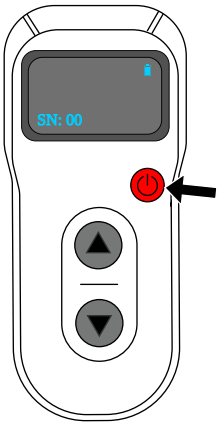
   If the power indicator lights up and remain, the battery level is sufficient. If the power indicator lights up and becomes off shortly (for approx. 1 s), the battery level is lower than 20%. Replace the battery to ensure the normal operation.



GMH1114

Fig 33. Activating the System

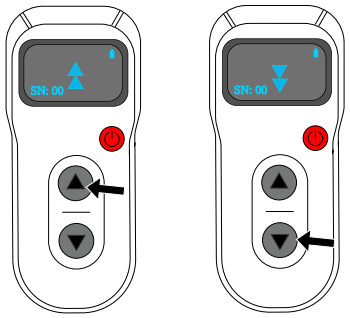
2. Press and hold the power button on the remote control for 3 s. Release the power button after the startup picture is displayed. The system is correctly started.
3. Set the SN code in accordance with the system information. See 3.5.3. Function Description *(p23)*. The setting is needed only for the first use.



GMH1115

Fig 34. Activating the Remote Control

4. Press and hold, the hoist travels up. The hoist stops traveling up after releasing.
5. Press and hold, the hoist travels down. The hoist stops traveling down after releasing.
6. During the upward or downward travel, make sure that the side retaining rollers, guide rollers, and rotary rollers rotate normally.

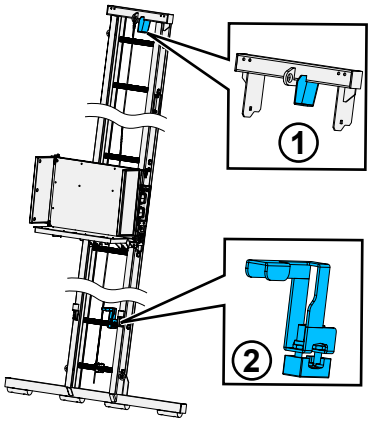


GMH1116

Fig 35. Operating the Remote Control

7. Repeat the operation cycle for three times. The ladder hoist shall not produce abnormal noise, and shall be able to stop automatically when reaching the upper limit actuator plate and lower limit actuator plate.

1. Top limit actuator plate
2. Bottom limit actuator plate



GMH1117

Fig 36. Top Limit Actuator Plate and Bottom Limit Actuator Plate

7.3.3. Normal Operation

See 7.3.2. Commissioning *(p46)*for normal operation procedures.

If the ambient temperature is low (lower than 0°C) before the operation, perform no-load operation for three to five times to rise the battery temperature so that the motor and transmission mechanism can operate normally.

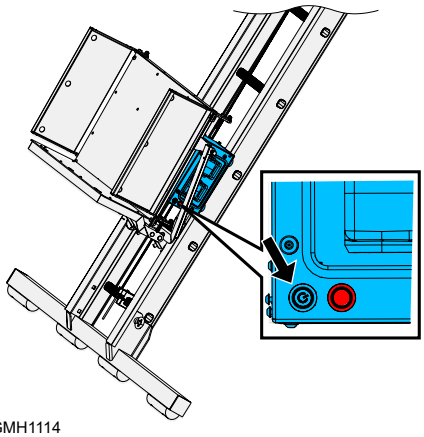
Precautions:

- Determine the working load by referring to the length of the guide rail and the angle between the guide rail and the ground according to 6.4.1. Installing the Guide Rail Assembly *(p33)*. Overload operation is prohibited.
- Keep the entire operation supervised.
- Tie up or clamp the materials in the load carrying platform which may fall (the effect of wind load shall be considered).

- Press the power button of the remote control immediately if any emergency occurs during the operation.
- If the power indicator of the drive unit flashes, take the batteries out and charge.

7.3.4. Out of Service

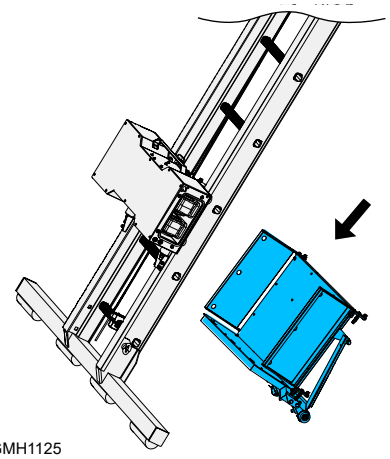
1. Park the drive unit at the position of the bottom limit switch of the guide rail.
2. Press the power button at the right side of the drive unit. Make sure that the power indicator is off.



GMH1114

Fig 37. Turning off the Power Button

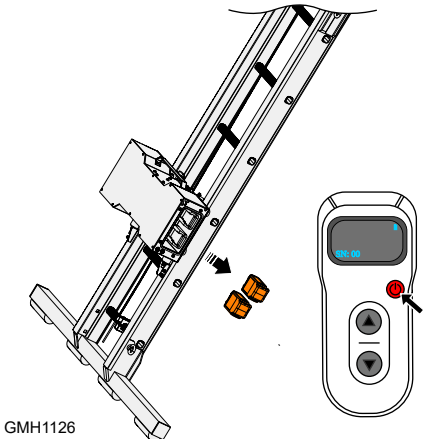
3. Remove the load on the load carrying platform.
4. To remove the load carrying platform, see 6.4.3.1. Installing the General-Purpose Load Carrying Platform *(p40)*.



GMH1125

Fig 38. Removing the Load Carrying Platform

5. Take the batteries out of the drive unit.
6. Turn off the remote control.



GMH1126

Fig 39. Taking out the Batteries

7.3.5. Inspecting the Battery Level

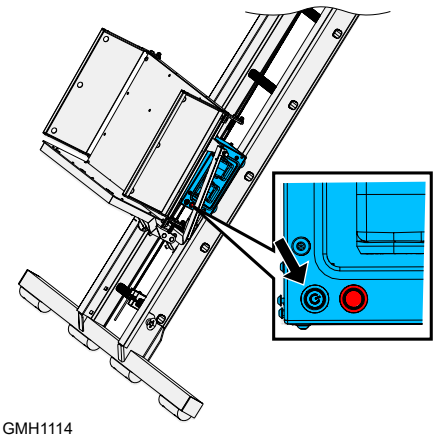
Inspect the battery level before the operation to ensure the normal use.

Charge the battery when its power level is lower than 20%.

Confirm the battery level through the power button.

Press the power button.

- If the power indicator lights up and remain, the battery level is higher than 20%.
- If the power indicator flashes, the battery level is lower than 20%.
- If the power indicator is off, the battery level is low.



GMH1114

Fig 40. Power Indicator

Confirm the battery level through the battery.

Press the power button of the battery.

- If all the three yellow indicators light up, the battery level is higher than 75%.
- If two yellow indicators light up, the battery level is higher than 40%.
- If only one yellow indicator lights up, the battery level is higher than 5%.
- If no yellow indicator lights up, the battery level is too low.

GMH1132

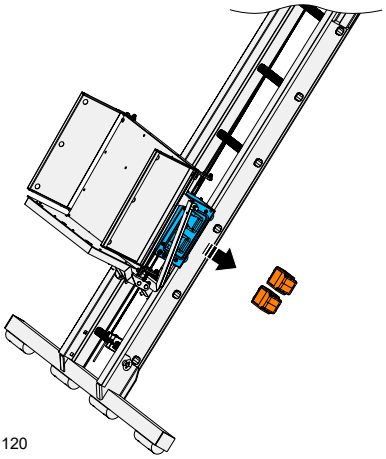
Fig 41. Power Indicator

1. Power button
2. Battery power level indicators

7.3.6. Charging the Battery

Fully charge the battery before the first use to ensure the maximum battery efficiency and service lift of the lithium ion battery.

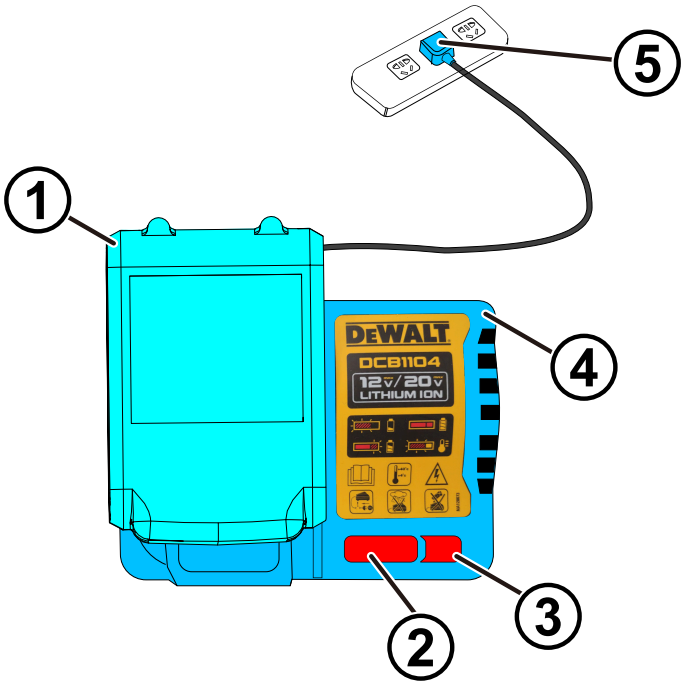
1. Press the clamps of the batteries and take the batteries out of the drive unit.



GMH1120

Fig 42. Taking out the Batteries

2. Connect the charger plug [5] to the socket. See Fig 43.
3. Attach the battery [1] to the charger. Make sure that the battery is properly attached.

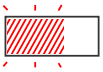
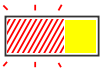


1. Battery
2. Charging indicator 1
3. Charging indicator 2
4. Charger
5. Charger plug

GMH1133

Fig 43. Charging the Battery

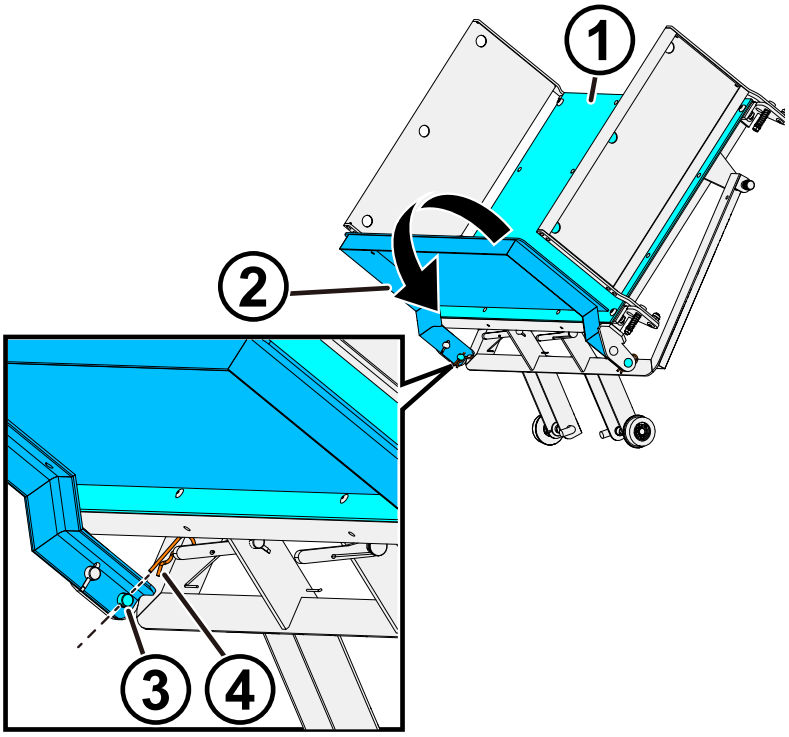
4. Confirm the states of the charger indicator. The states of the charger indicator are as follow:

State	Description	Meaning
	◦ Indicator 1 is red and flashes. ◦ Indicator 2 is off.	Charging stage 1 is ongoing.
	◦ Indicator 1 is on and remain. ◦ Indicator 2 is red and flashes.	Charging stage 1 is finished. Charging stage 2 is ongoing.
	Indicator 1 and indicator 2 are on and remain.	Charging is complete.
	◦ Indicator 1 is red and flashes. ◦ Indicator 2 is yellow and remain.	Battery temperature is too low or too high.

The yellow indicator goes off when the battery temperature is normal (4°C to 40°C). The charger will restore the charging.

7.3.7. Unfold the General-Purpose Load Carrying Platform

7.3.7.1. Unfolding the Floor Board



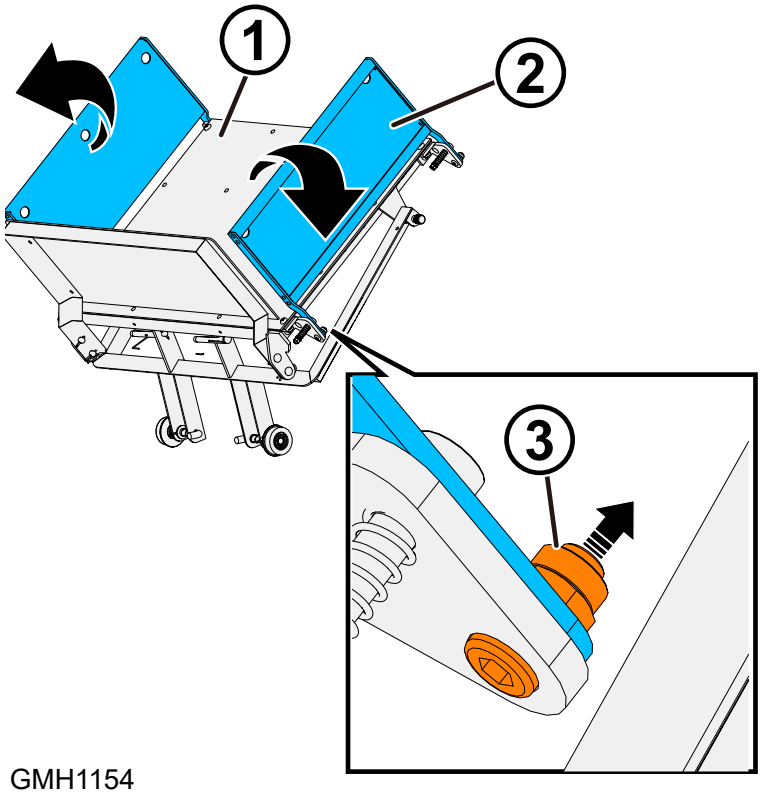
1. Back board
2. Floor board
3. R-shape pin (×2)
4. Pin roll (×2)

GMH1148

Fig 44. Unfolding the Floor Board

1. Remove the R-shape pin [3].
2. Remove the pin roll [4].
3. Turn the floor board [2] so that it is on the same level with the back board [1].
4. Insert the pin roll and R-shape pin to attach the floor board and back board.

7.3.7.2. Unfolding the Side Board



1. Back board
2. Side board (×2)
3. Rotary assembly (×2)

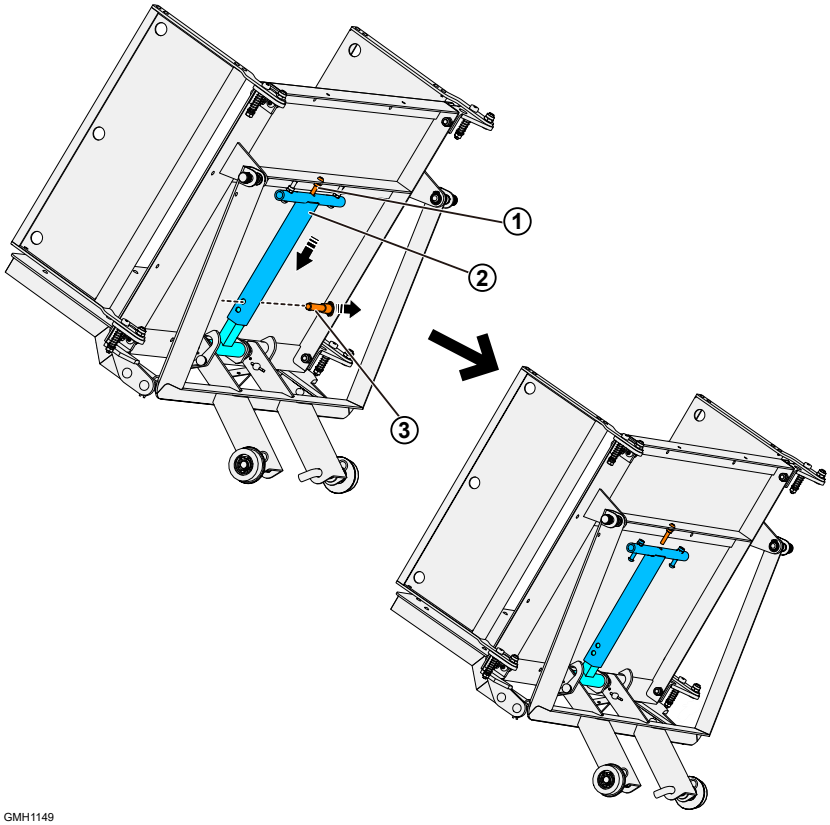
GMH1154

Fig 45. Unfolding the Side Board

1. Pull the side board [2] upward to enable the rotary assembly [3] to come out of the angle adjustable platform.
2. Turn the side boards [2] so that they are on the same level with the back board [1].
3. Insert the rotary assembly [3] to the angle adjustable platform to lock the side boards.

7.3.8. Adjusting the Angle of the General-Purpose Load Carrying Platform

1. Pull out the quick release pin [3]. See Fig 46.
2. Move the member bar [2] to let the screw [1] out.

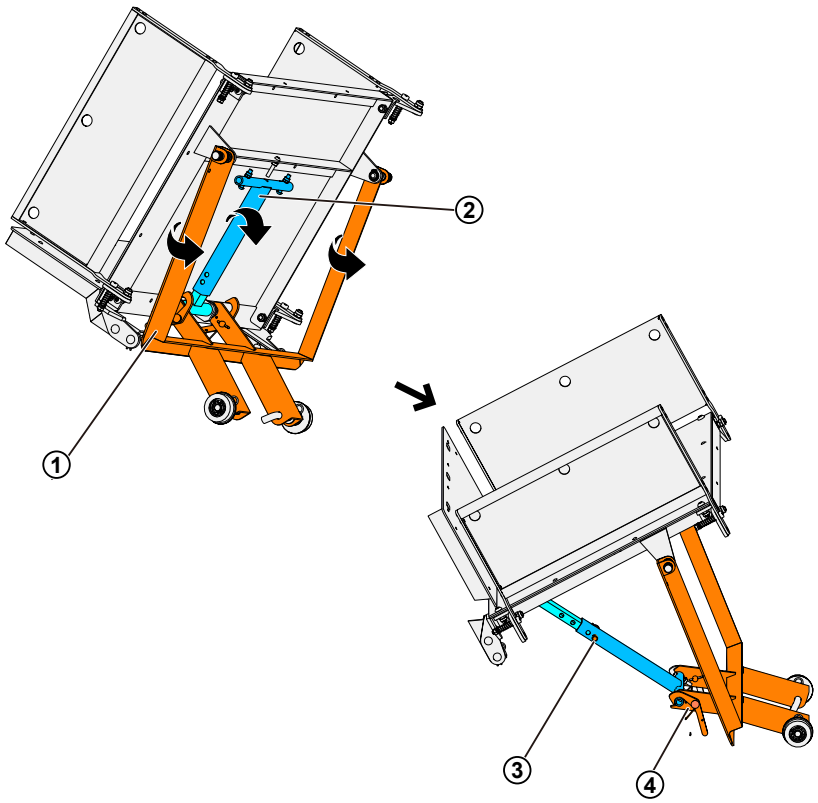


1. Screw
2. Member bar
3. Quick release pin

Fig 46. Adjusting the Member Bar

3. Turn the adjustable frame [1] and member bar [2]. Attach the member bar [2] to the lock lever [4]. See Fig 47.

4. Adjust the length of the member bar and lock it with the quick release pin [3].



1. Adjustable frame
2. Member bar
3. Quick release pin
4. Lock lever (×2)

GMH1150

Fig 47. Adjusting the Angle of the Platform

8. Troubleshooting

8.1. Safety Instructions

The instructions below shall be obeyed:

- Only qualified maintenance personnel may troubleshoot.
- Lower the load carrying platform to the ground and unload the loads before the troubleshooting.
- Do not troubleshoot under the protection state for broken rope.
- Release the START button (with power indicator) to turn off the drive unit before electrical maintenance.

8.2. Troubleshooting for Common Faults

The troubleshooting steps for common faults are as follows:

1. Inspect the batteries. Confirm that they are fully charged.
2. Confirm that the batteries are correctly installed in the battery box.
3. Inspect the serial number (SN). Confirm that it is set correctly.

8.3. Troubleshooting for Typical Faults

8.3.1. Power Indicator Light Does Not Light Up

Symptom:

When the power button is pressed, the power indicator light does not light up.

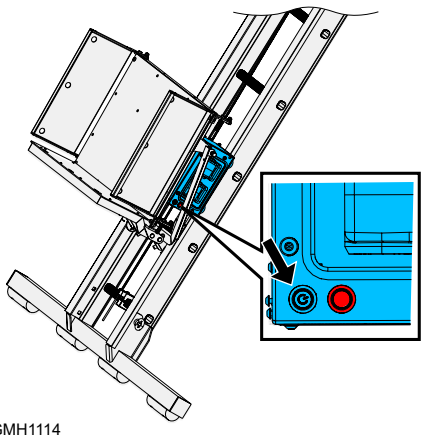


Fig 48. Power Indicator Light

Causes:

- The power button is not pressed fully.
- No battery or only one battery is inserted.
- Both inserted batteries (or one of them) are not fully charged.
- The battery temperature is lower than -15°C or higher than 40°C.

Solutions:

1. Fully press down the power button.
2. Insert two batteries.
3. Confirm that the batteries are fully charged. Refer to 7.3.5. Inspecting the Battery Level *(p49)*.
4. Take the batteries out. Reinsert them when they return to the proper temperature.
5. Contact 3S LIFT or its authorized party if the problem is not solved.

8.3.2. Power Indicator Light Flashes

Symptom:

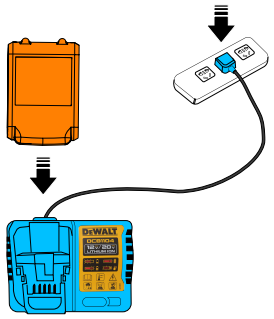
When the power button is pressed, the power indicator light flashes.

Causes:

- One of the batteries inserted into the battery box is less than 20% battery level.
- The two batteries inserted into the battery box are both less than 20% battery level.

Solutions:

1. Inspect the ladder hoist according to said causes, and fix the problem.
2. After taking out the batteries and charging, operate the equipment.
3. Contact 3S LIFT or its authorized party if the problem is not solved.



GMH1121

Fig 49. Taking Out the Batteries and Charging

8.3.3. Fault Indicator Light Lights Up

Symptom:

The fault indicator light lights up after the drive unit is started.

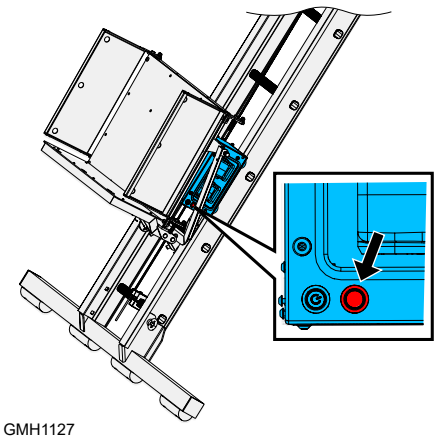

GMH1127

Fig 50. Fault Indicator Lights Up

Causes:

- The ladder hoist is overloaded. Therefore, the load that the drive unit bears is too large.
- The motor is locked, and the drive unit is stuck on the wire rope.
- The guide roller is stuck.

Solutions:

1. Reduce the load of the drive unit.
2. Inspect the operating status of the drive unit.
3. Inspect the guide rail. There should be no deformation, and the connecting parts shall not become loose. Replace the connecting parts or guide rail if necessary.
4. Contact 3S LIFT or its authorized party if the problem is not solved.

8.3.4. Fault Indicator Light Flashes Slowly

Symptom:

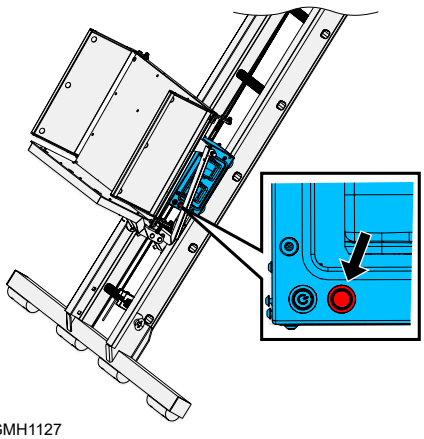
During the operation, the fault indicator light flashes slowly (on in 1 s, off in 0.2 s).

Causes:

- The ladder hoist is overloaded. Therefore, the load that the drive unit bears is too large.
- The wheel is worn.

Solutions:

1. Reduce the load of the drive unit.
2. Replace the wheel. Refer to 9.6. Replacement of Consumable Parts *(p72)*.
3. Contact 3S LIFT or its authorized party if the problem is not solved.



GMH1127

Fig 51. Fault Indicator Light Flashes Slowly

8.3.5. Fault Indicator Light Flashes Rapidly

Symptom:

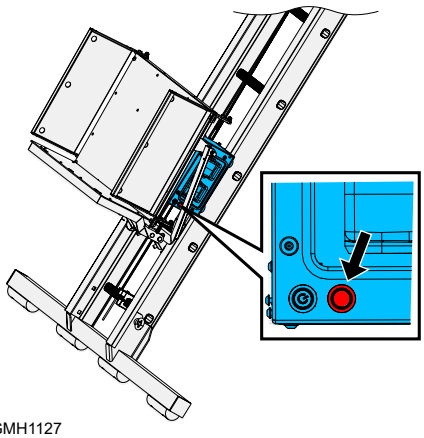
During the operation, the fault indicator light flashes rapidly (on in 0.2 s, off in 0.2 s).

Causes:

- The battery temperature is lower than 4°C or higher than 40°C.
- The battery is overcharged, and the voltage is too high.

Solutions:

1. Take the batteries out, and then heat or cool them to service temperature.
2. Use the recommended charger to charge the batteries to prevent overcharging.
3. Contact 3S LIFT or its authorized party if the problem is not solved.



GMH1127

Fig 52. Fault Indicator Light Flashes Rapidly

8.3.6. Drive Unit Falling

Symptom:

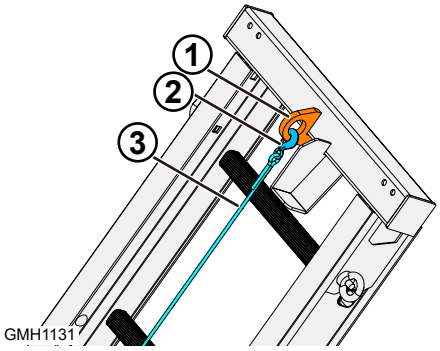
When the wire rope suddenly loses suspension force, the drive unit automatically falls off.

Causes:

- The wire rope is broken.
- The hook attachment point on top of the guide rail falls off.
- The wire rope hook falls off.
- The wire rope hook is broken.

Solutions:

1. If the wire rope breaks, replace the wire rope. Refer to 6.4.2.3. Installing the Wire Rope *(p39)*and inspect it regularly.
2. Contact 3S LIFT or its authorized party for any other problem.



1. Hook attachment point
2. Wire rope hook
3. Wire rope

Fig 53. Drive Unit Falling

9. Inspection and Maintenance

9.1. General Description

The inspection should be performed by the installation personnel and the operator.

The maintenance should be performed by 3S LIFT or its authorized party, or by the installation personnel or the operator under the guidance of 3S LIFT or its authorized party.

⚠WARNING

Could result in death or serious injury!

• Before the cleaning and maintenance, move the drive unit down to the bottom of the guide rail, turn off the drive unit, and take the batteries out.

9.2. Inspection Before Use

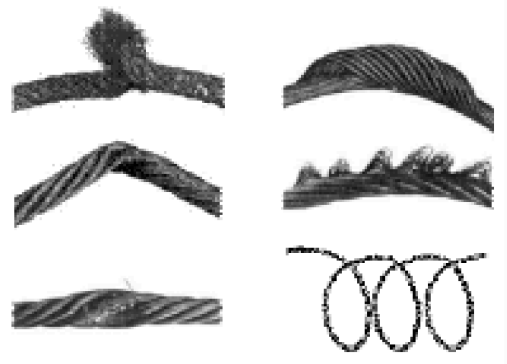
Refer to 7.3.1. Inspection Before Use *(p46)*.

9.3. Weekly Inspection

9.3.1. General Inspection

1. Remove dirt on the load carrying device and the guide rail.
2. Inspect the protection barriers on the ground. Refer to 6.3. Installation Site Requirements *(p31)*.
3. Replace the wire rope if any of the followings occurs:

   ◦ The wire rope has visible surface damage or severe mechanical damage, including:
   - loose strands
   - kinks
   - bends
   - local deformation
   - protrusion of wires or strands
   - strand breaks
   - other defects than the above.



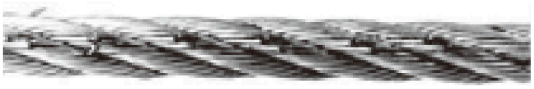
G100211

Fig 54. Wire rope damage

   ◦ The wire rope has severe internal or external corrosion.

- The wire rope has obvious discoloration caused by overheating.

- The wire rope has more than 20 broken wires over a length 30 times the diameter (30d) of the wire rope, or more than 10 broken wires over a length 6 times the diameter (6d).



G100212

Fig 55. Wire breaks

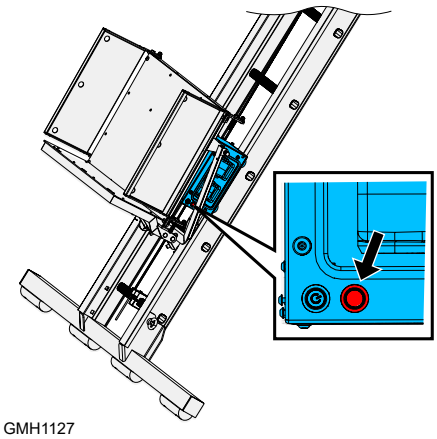
- The wire rope diameter is reduced by more than 20% compared to nominal diameter

G100213

Fig 56. Measuring the wire rope diameter

9.3.2. Inspecting the Electrical Function

1. Inspect the power indicator light. It should function normally. Refer to:
   - 8.3.1. Power Indicator Light Does Not Light Up *(p58)*
   - 8.3.2. Power Indicator Light Flashes *(p59)*
   - 8.3.3. Fault Indicator Light Lights Up *(p60)*
   - 8.3.4. Fault Indicator Light Flashes Slowly *(p61)*



GMH1127

Fig 57. Inspecting the Indicator Lights

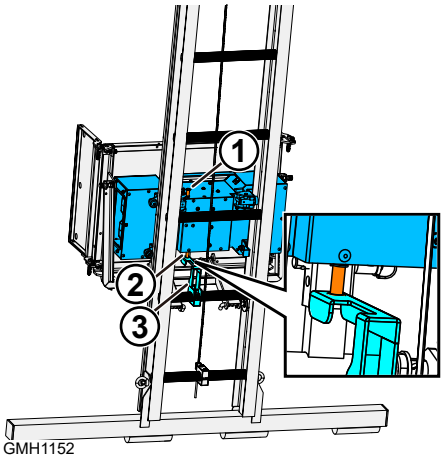
2. Inspect the top limit switch and the bottom limit switch. They should function normally.

   Method:

   Operate the ladder hoist to travel up and down. When the top limit switch is actuated, the hoist should stop traveling up. When the bottom limit switch is actuated, the hoist should stop traveling down.

   Solutions:

   Contact 3S LIFT or its authorized party if the problem is not solved.



GMH1152

Fig 58. Inspecting the Top/Bottom Limit Switches

1. Top limit switch
2. Bottom limit switch
3. Bottom limit actuator plate

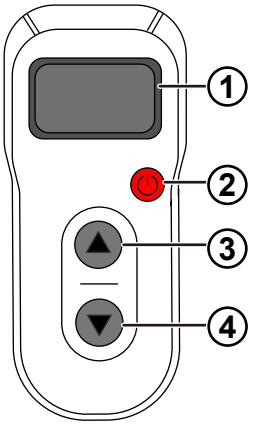
3. Inspect the wireless remote control. It should function normally.

   Methods:

   When the power of the wireless remote control is sufficient, and the power button, UP button, and DOWN button are pressed, the ladder hoist shall be able to run correspondingly.

   Solutions:

   If the function of the wireless remote control is abnormal, the solutions are as below:
   - Replace with the new battery. Ensure the installation of the battery is correct.
   - Contact 3S LIFT or its authorized party if the problem is not solved.



GMH1105

1. Display
2. Power button
3. UP button
4. DOWN button

Fig 59. Inspecting the Wireless Remote Control

9.4. Monthly Inspection

9.4.1. Inspecting the Signs and Labels

Inspect the labels (refer to3.6. Documents and Labels *(p25)*). They should be complete and legible.

9.4.2. Inspecting the Foot Section

1. Inspect the slip-resistant pads of the stabilizer profile for wear.

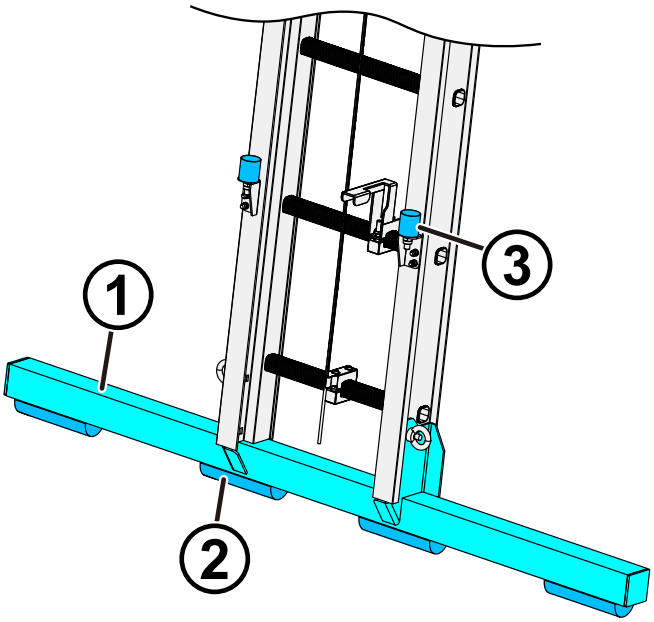
   Replacement criteria:

   If the diameter R of the slip-resistant pad [2] is ≤ 29 mm, replace it. Refer to 9.6. Replacement of Consumable Parts *(p72)* for the replacement procedure.

2. Inspect the bottom buffers for wear.

   Replacement criteria:

   If the bottom buffer [3] has obvious damages, replace it.



1. Stabilizer profile
2. Slip-resistant pad (×4)
3. Bottom buffers (×2)

GMH1134

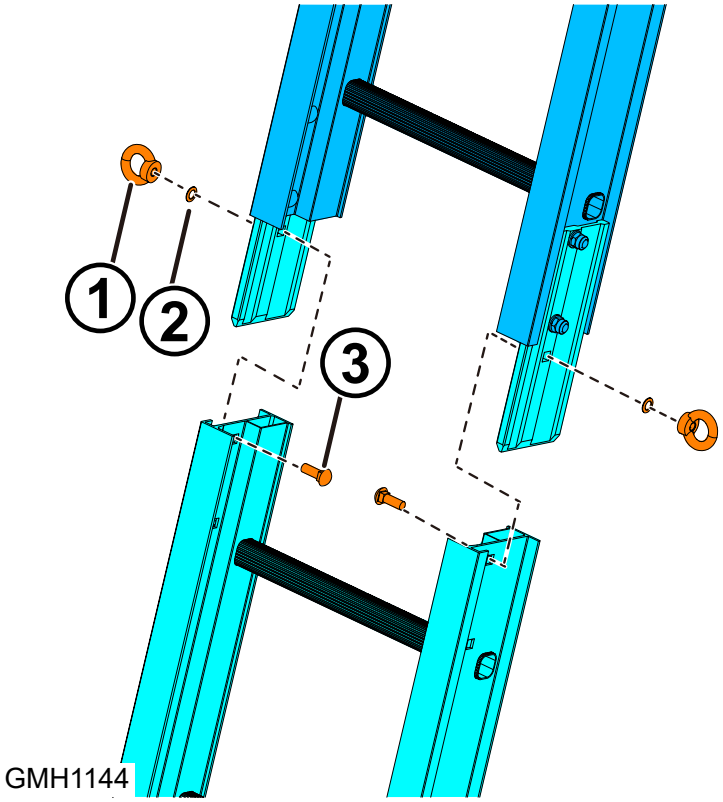
Fig 60. Inspecting the Slip-Resistant Pads of the Stabilizer Profile and the Bottom Buffers

9.4.3. Inspecting the Guide Rail

Inspect the connecting parts of the guide rail. There should be no looseness and wear.

Replacement criteria:

Consumable parts	Replacement criteria
Cup head square neck bolt	Damage Refer to 9.6. Replacement of Consumable Parts *(p72)* for the replacement procedure.
Curved single coil spring lock washer	
Eye nut	



1. Eye bolt
2. Curved single coil spring lock washer
3. Cup head square neck bolt

Fig 61. Inspecting the Connecting Parts of the Guide Rail

9.4.4. Inspecting the Drive Unit

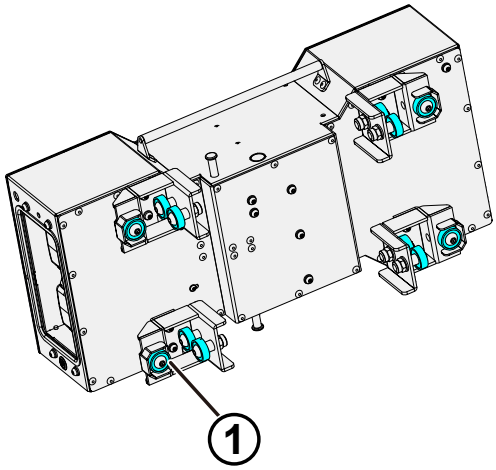
Inspect the guide rollers for wear.

Replacement criteria:

Replace the roller if any of the following situation occurs:

- The roller breaks or detaches from the mandrel.
- The rollers have uneven wear, and the roller radius R is reduced to a criterion that needs replacement: R ≤ 14 mm (5/9 in).

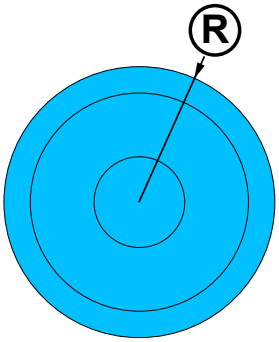
Refer to 9.6. Replacement of Consumable Parts *(p72)* for the replacement procedure.



GMH1157

1. Drive unit guide roller (×12)

Fig 62. Drive Unit Guide Rollers



GMH1081

Fig 63. Inspecting the Size of Guide Rollers

9.4.5. Inspecting the General-Purpose Platform

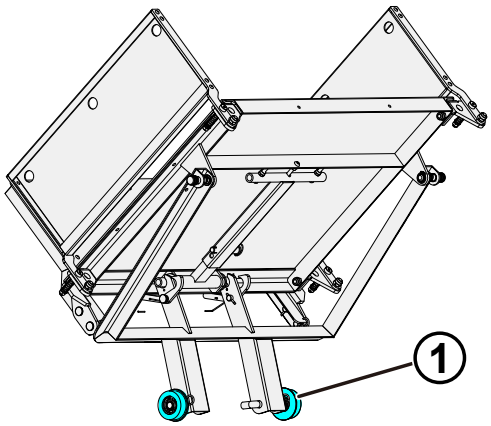
Inspect the guide rollers for wear.

Replacement criteria:

Replace the roller if any of the following situation occurs:

- The roller breaks or detaches from the mandrel.
- The rollers have uneven wear, and the roller radius R is reduced to a criterion that needs replacement: R ≤ 24 mm (9/10 in).

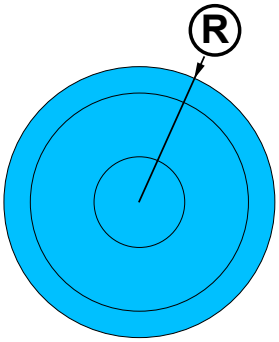
Refer to 9.6. Replacement of Consumable Parts *(p72)* for the replacement procedure.



GMH1158

1. Platform guide roller (×2)

Fig 64. Guide Rollers of the General-Purpose Platform



GMH1081

Fig 65. Inspecting the Size of Guide Rollers

9.4.6. Inspecting the Solar Panel Platform

1. Inspect the guide rollers for wear.

   Replacement criteria:

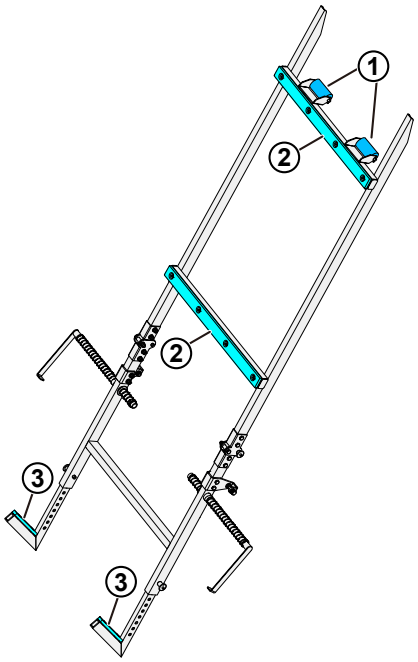
   Replace the roller if any of the following situation occurs:
   - The roller breaks or detaches from the mandrel.
   - The rollers have uneven wear, and the roller radius R is reduced to a criterion that needs replacement: R ≤ 21.5 mm (17/20 in).

   Refer to 9.6. Replacement of Consumable Parts *(p72)* for the replacement procedure.

2. Inspect the rubber strip for wear.

   Replacement criteria:

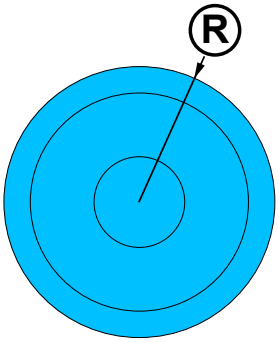
   If the rubber strip has obvious damage, replace it. Refer to 9.6. Replacement of Consumable Parts *(p72)* for the replacement procedure.



GMH1161

1. Platform guide roller (×2)
2. Upper rubber strip (×2)
3. Lower rubber strip (×2)

Fig 66. Solar Panel Platform Guide Rollers



GMH1081

Fig 67. Inspecting the Size of Guide Rollers

9.4.7. Inspecting the Top Guide Roller Assembly

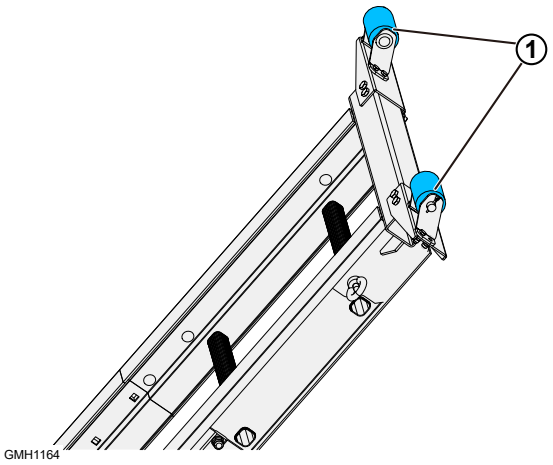
Inspect the rollers for wear.

Replacement criteria:

Replace the roller if any of the following situation occurs:

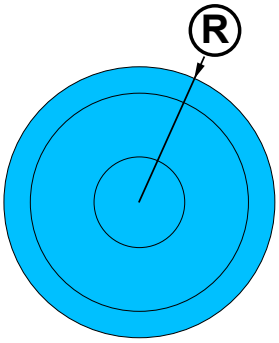
- The roller breaks or detaches from the mandrel.
- The rollers have uneven wear, and the roller radius R is reduced to a criterion that needs replacement: R ≤ 24 mm (9/10 in).

Refer to 9.6. Replacement of Consumable Parts *(p72)* for the replacement procedure.



1. Upper guide roller (× 2)

Fig 68. Top Guide Roller



GMH1081

Fig 69. Inspecting the Size of Guide Rollers

9.5. Annual Inspection

Inspect the general-purpose platforms. Their connection should be firm.

1. General-purpose platforms (×2)
2. Drive unit
3. Latch (×2)

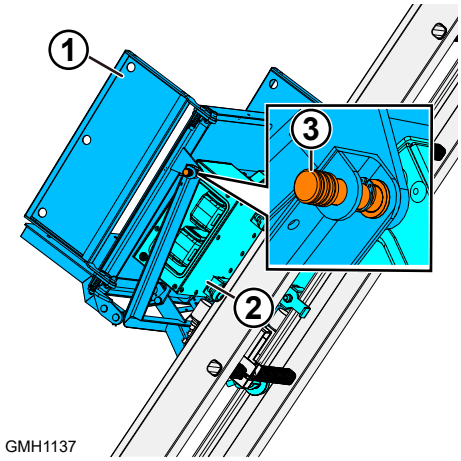


Fig 70. General-Purpose Platforms Connection

9.6. Replacement of Consumable Parts

9.6.1. Consumable Parts List

To purchase wear parts, contact 3S LIFT or its authorized suppliers.

Table 11 - Consumable Parts List

S/N	Position	Part No.	Part name	Specification/model	Qty.
1	Drive unit	MH001000076	Guide rollers (general-purpose platform) (×2)	φ30 (1.2 in)	12
		R230250010112	Wire rope inlet tube	/	1
		R230250010110	Rope separator	/	1
		R230250010111	Wire rope outlet tube	/	1
2	Guide rail	BKA10030	Cup head square neck bolt	M10 × 30	Refer to actual quantity
		BK956001	Curved single coil spring lock washer	φ10	Refer to actual quantity
		BS904010	Eye nut	M10	Refer to actual quantity
		MH001000217	Rubber pad	/	4
3	General-purpose platform	R230250010074	Guide rollers (general-purpose platform) (×2)	Φ50 (2 in)	2
4	Solar panel platform	R230250010448	Guide rollers (general-purpose platform) (×2)	Φ45 (1.8 in)	2
		R230250010007	Upper rubber strip	/	2
		R230250010024	Lower rubber strip	/	2
5	Top guide roller assembly	R230250010449	Guide rollers (general-purpose platform) (×2)	Φ50 (2 in)	2
6	/	BS934320	Cotter pin	3.2 × 20	Refer to actual quantity
7	/	R23025064	Wire rope assembly	11 m (36 ft)	1

Table 11 - Consumable Parts List (continued)

S/N	Position	Part No.	Part name	Specifica-tion/model	Qty.
8	/	R230250010450	Battery	DCB184/ DCB208	2

The two batteries shall have same specifications and battery level.

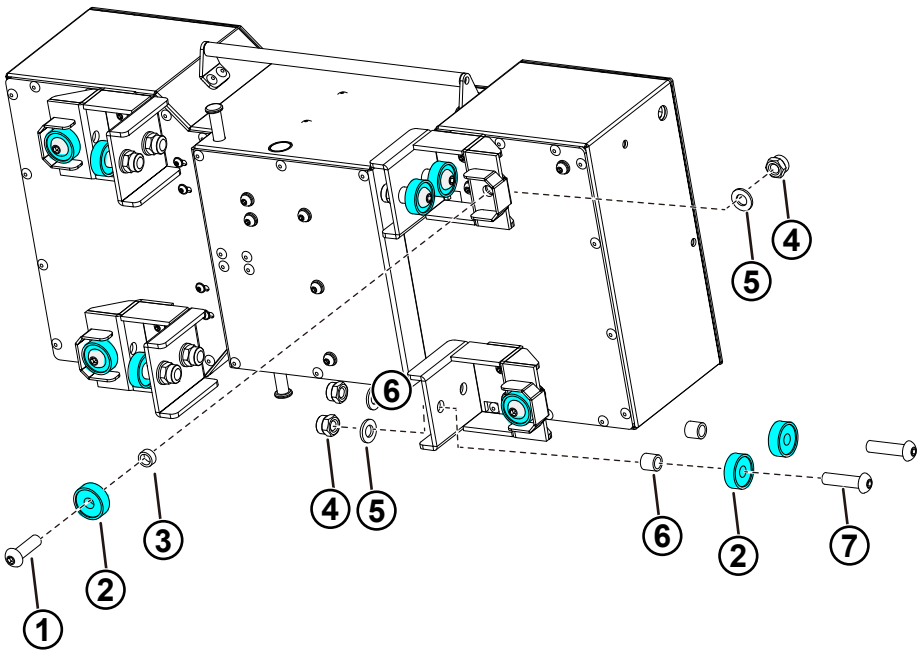
9.6.2. Replacing Consumable Parts of the Drive Unit

9.6.2.1. Replacing Guide Rollers

Replacement criteria:

Refer to 9.4. Monthly Inspection *(p66)*.

Replacement method:



GMH1159

1. Screw M10 × 35
2. Guide roller
3. Bushing 14 × 6
4. Lock nut M10
5. Flat washer 10
6. Bushing 14 × 13
7. Screw M10 × 40

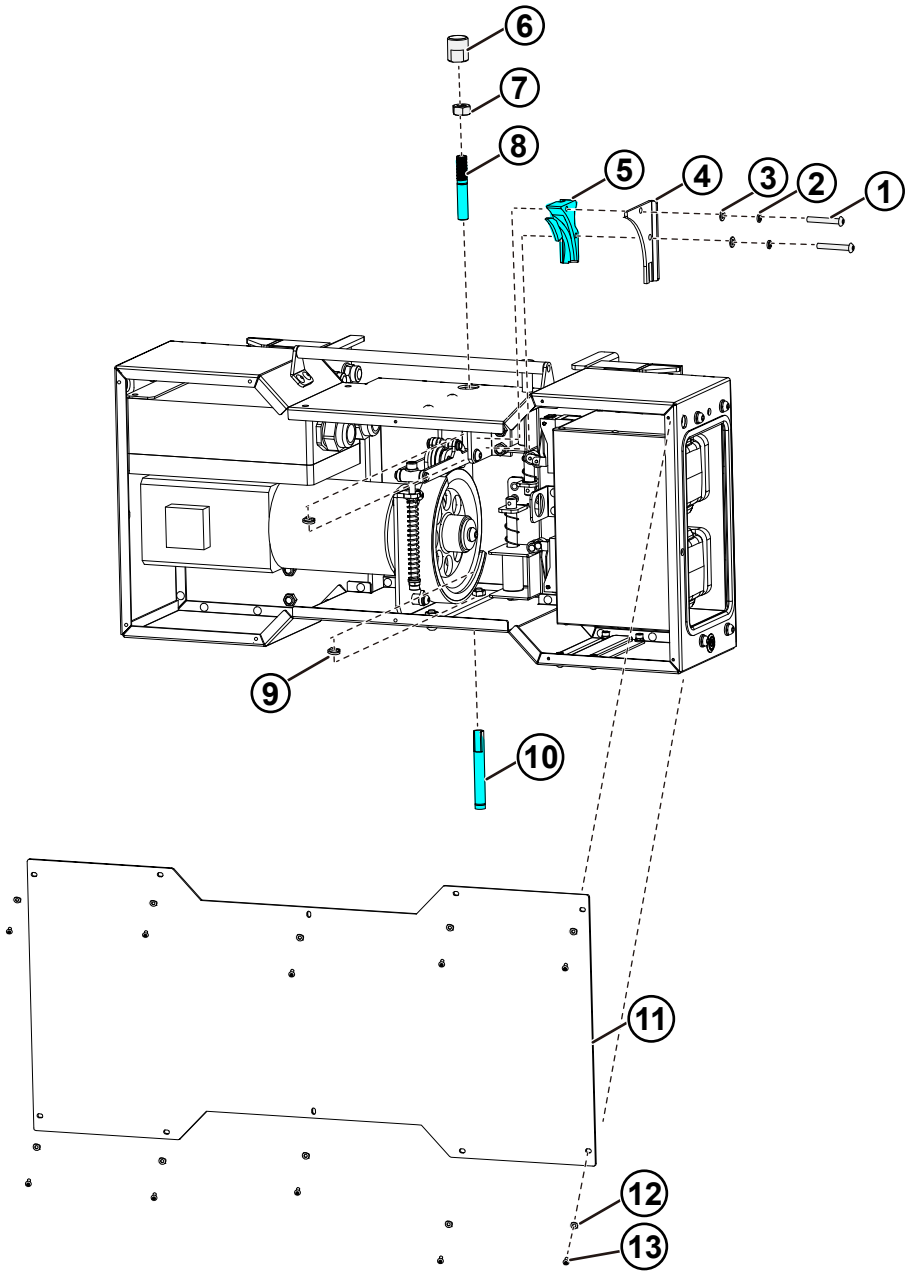
Fig 71. Replacing Guide Rollers

9.6.2.2. Replacing the Rope Inlet Tube, Rope Separator, and Rope Outlet Tube

Replacement criteria:

Wear or damage of the rope inlet tube, rope separator, or rope outlet tube.

Replacement method:



GMH1156

1. Screw M5 × 35	2. Single coil spring lock washer 5
3. Flat washer 5	4. Retaining plate
5. Rope separator	6. Taper bush
7. Nut M10	8. Wire rope inlet tube
9. Shaft circlip 10	10. Wire rope outlet tube

11. Housing cover	12. Flat washer 3
13. Screw M10 × 8	

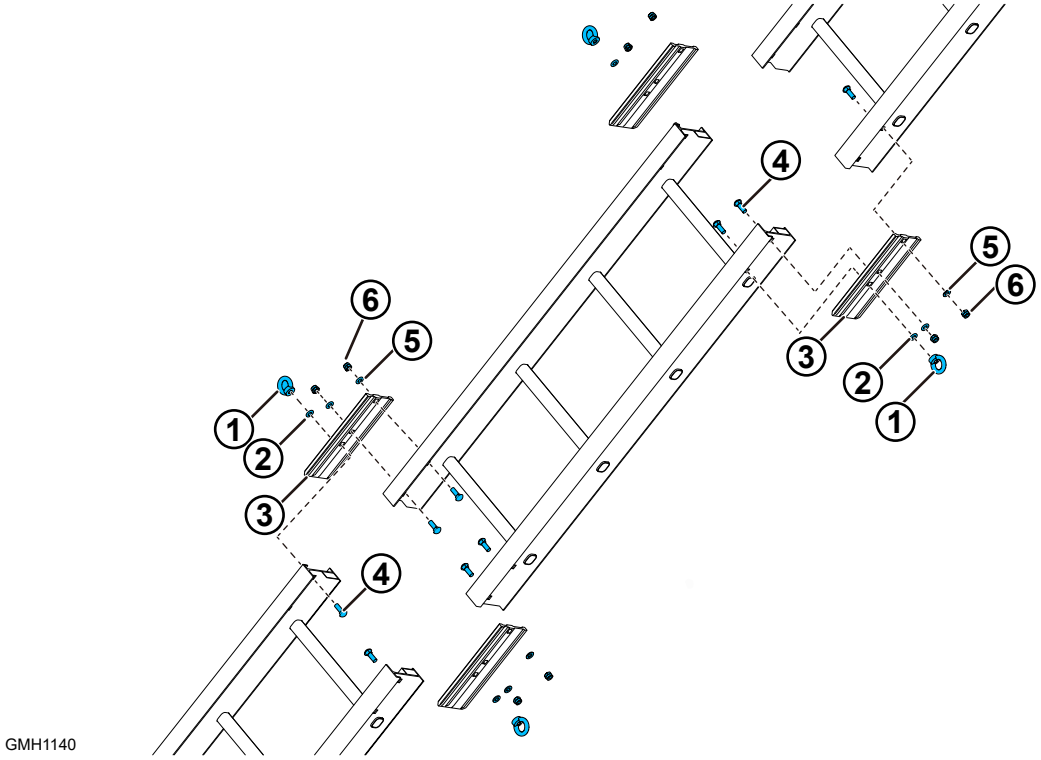
Fig 72. Replacing the Rope Inlet Tube, Rope Separator, and Rope Outlet Tube

9.6.3. Replacing Consumable Parts of the Guide Rail

Replacement criteria:

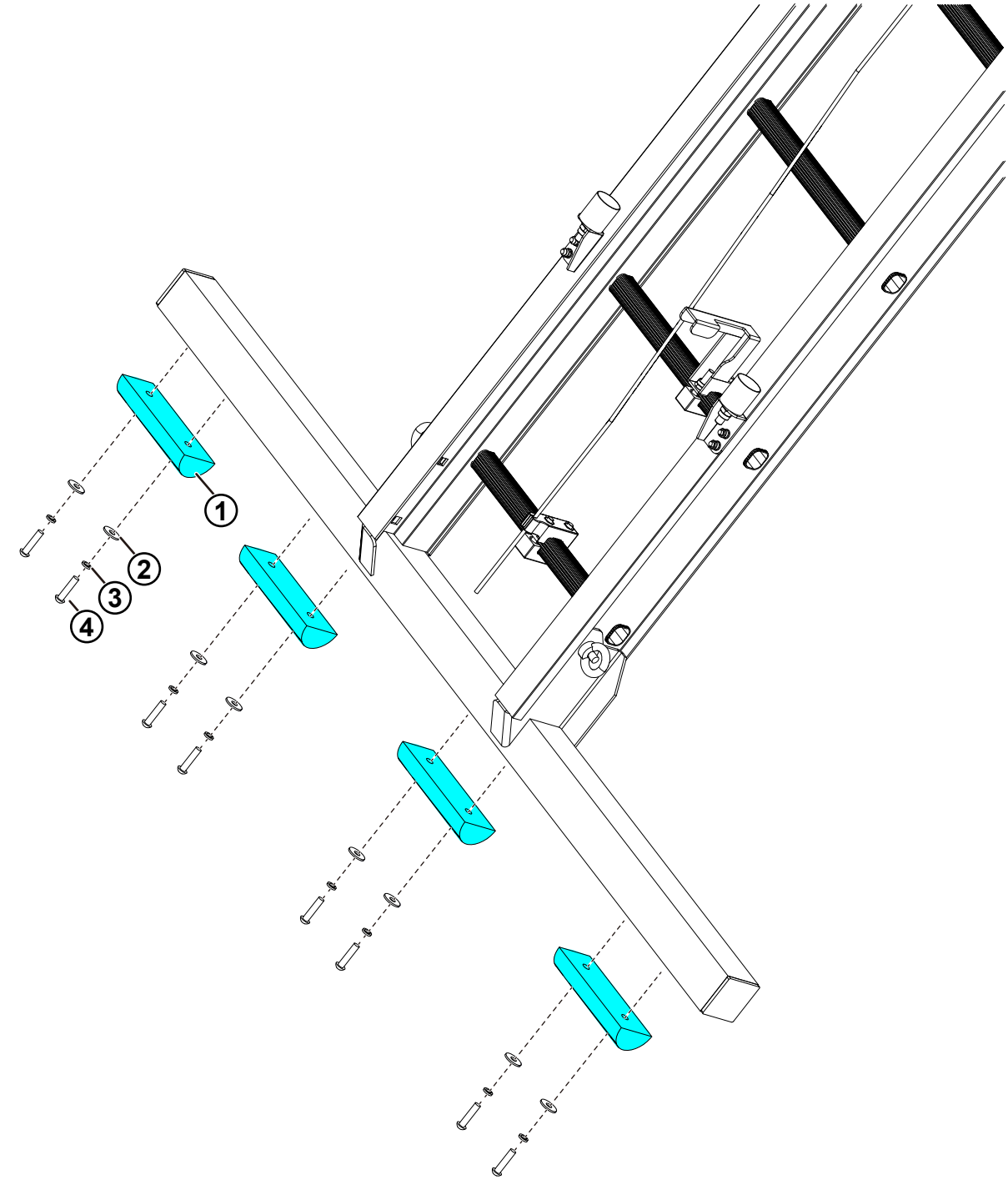
Refer to 9.4. Monthly Inspection *(p66)*.

Replacement method:



1. Eye nut M10	2. Curved single coil spring lock washer 10
3. Ladder connecting plate	4. Square neck bolt M10×30
5. Flat washer 10	6. Lock nut M10

Fig 73. Replacing Consumable Parts of the Guide Rail



GMH1163

1. Slip-resistant pad	2. Large plain washer C 8
3. Single coil spring lock washer 8	4. Screw M10 × 35

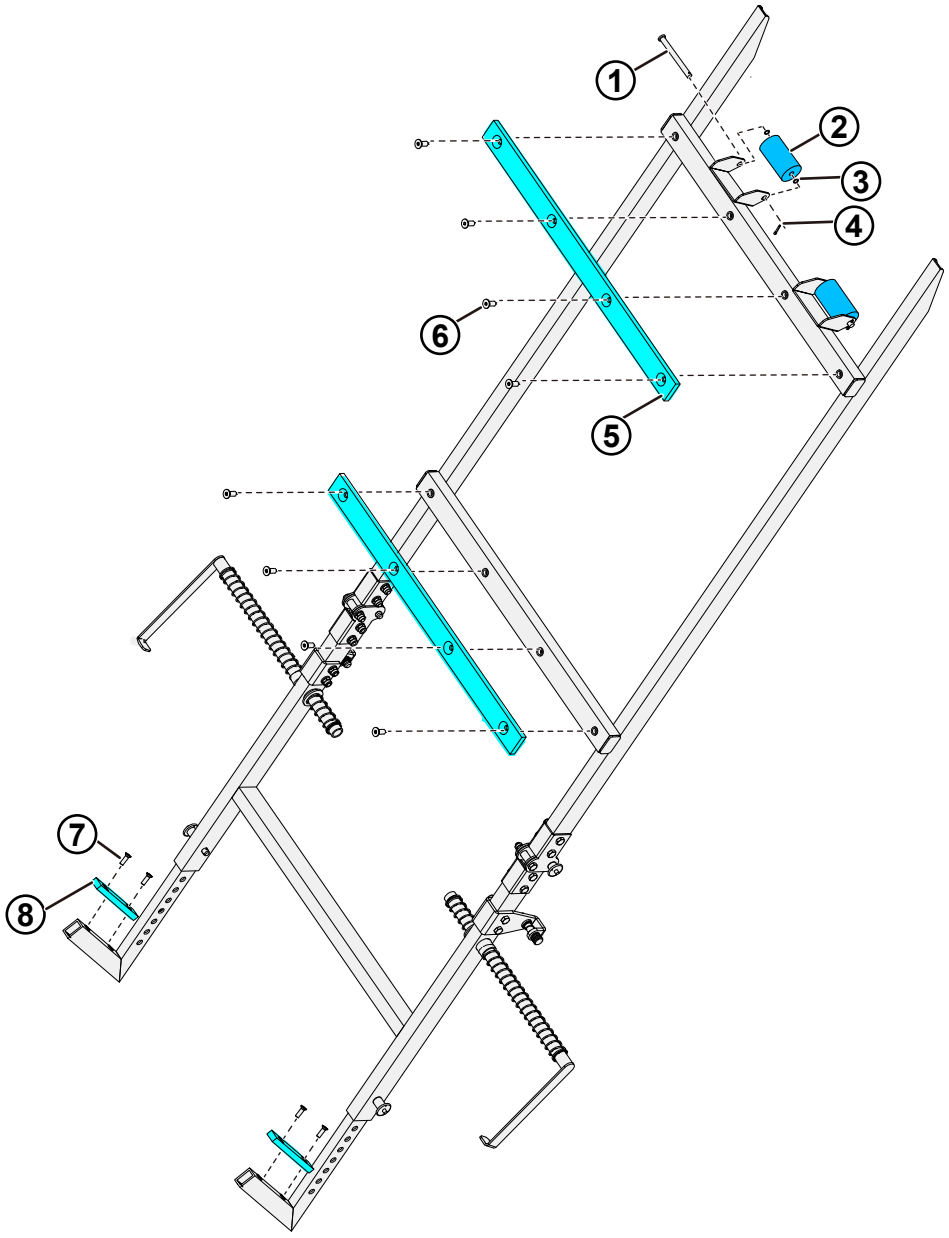
Fig 74. Replacing the Slip-Resistant Rad

9.6.4. Replacing Consumable Parts of the Solar Panel Platform

Replacement criteria:

Refer to 9.4. Monthly Inspection *(p66)*.

Replacement method:



GMH1162

1. Cylindrical pin M10 × 100	2. Guide rollers (general-purpose platform) (×2)
3. Bushing	4. Cotter Pin
5. Upper rubber strip	6. Screw M8 × 20
7. Screw M6 × 20	8. Lower rubber strip

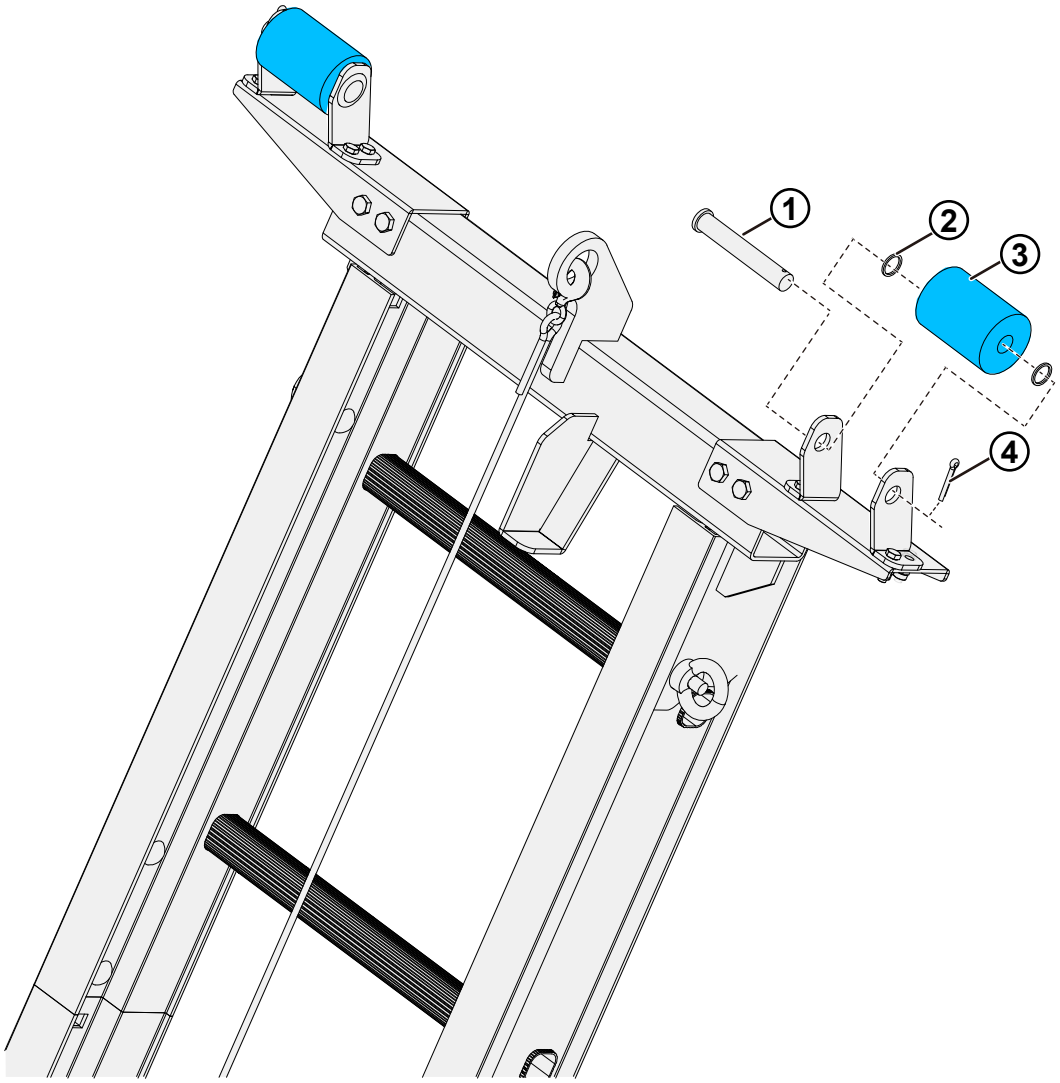
Fig 75. Replacing Consumable Parts of the Solar Panel Platform

9.6.5. Replacing Consumable Parts of the Upper Guide Roller

Replacement criteria:

Refer to 9.4. Monthly Inspection *(p66)*.

Replacement method:



GMH1165

1. Cylindrical pin M10 × 90	2. Cotter Pin
3. Guide rollers (general-purpose platform) (×2)	4. Adjusting washer

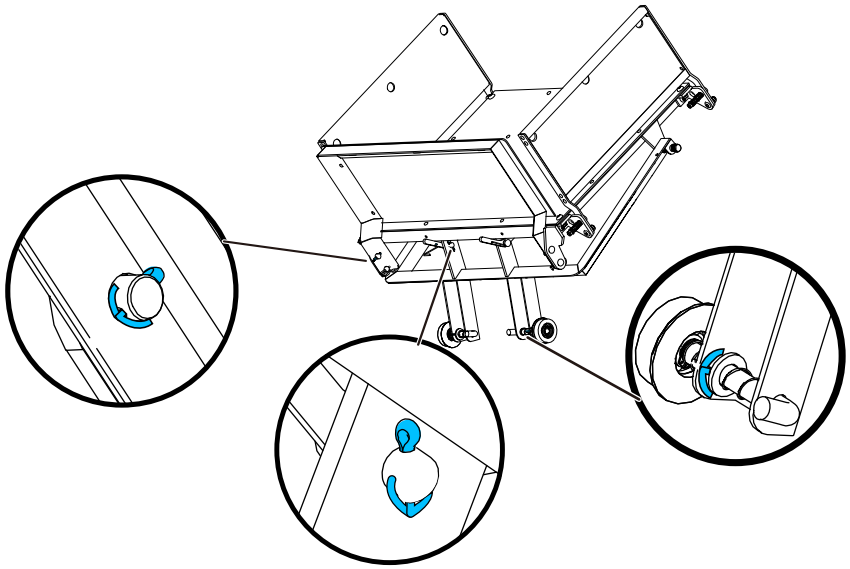
Fig 76. Replacing Consumable Parts of the Upper Guide Roller

9.6.6. Replacing the Cotter Pin

Replacement criteria:

Replace the cotter pin if the cotter pin is missing or damaged, or has fallen off.

Replacement illustration:



GMH1141

Fig 77. Replacing the Cotter Pin

9.6.7. Replacing the Wire Rope

9.6.7.1. Wire Rope Assembly

Replacement criteria:

Refer to 9.3. Weekly Inspection *(p63)*.

Replacement method:

1. Remove the old wire rope.
2. Install the new wire rope. Refer to 6.4.2.3. Installing the Wire Rope *(p39)*.

10. Removal of the Ladder Hoist

⚠WARNING

Could result in death or serious injury!

- Always wear Personal Protective Equipment!
- Ensure that all the parts and components are in good condition.
- Cut off the power!

The disassembling personnel of the ladder hoist shall read and understand all the contents of this manual. The requirements as described in 6. Installation Instruction *(p31)* also apply to the disassembling, and these requirements shall be strictly obeyed.

The disassembling procedure is in the reverse order against those of the installation instructions.

Place the disassembled parts neatly and properly. Avoid the disorder and piling up.

11. Order of Parts/Components

When ordering accessories, please provide the following information:

- Purchasing date
- Order No.
- Model
- Parameters of power supply
- Motor power
- Quantity required.

The preceding information can be checked on the equipment nameplate.

Please contact 3S LIFT for purchasing parts and components. The contact details for sales and aftersales service are as follows:

3S Europe GmbH

Erdmannstr. 10 22765 Hamburg, Germany

T: +49 40 32518887

Email: info@3SEurope.de

MH-Sales@3slift.com

Ficont Industry (Beijing) Technology Co., Ltd

11 Tongji South Road, Yizhuang Economic and Technological Development Zone, Beijing

T: +86 10 69597866

Email: info-china@3SLift.com

MH-Sales@3slift.com

12. Warranty

3S LIFT provides a 24-month warranty period. During the warranty period, 3S LIFT will repair or replace the parts damaged due to material or manufacturing defects under normal service conditions free of charge.

This warranty does not apply if the ladder hoist:

- has been damaged due to overload operation
- has been damaged due to improper operation
- has been altered without the authorization of 3S LIFT
- has been fitted with improper accessories
- has not been maintained properly or adequately.

Appendix A. Operation Log Sheet

Equipment Administrator:			Production batch No.:	
S/N	**Operator**	**Operating time**	**Operating hour (h)**	**Accumulated operating time (h)**
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				

The equipment administrator shall fill in this log sheet every time the ladder hoist is used. This sheet can be duplicated if needed.

Appendix B. Maintenance Service Log of Ladder Hoist

Customer		Product name	
Tel		Product model	
Address		Art. No.	
Purchasing date		Purchasing Qty.	
Repair record:			
Repaired by			
Date of repair			
Tel			

The maintenance personnel of the 3S LIFT ladder hoist shall fill in this log after maintenance. This table can be duplicated if needed.

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