



CARRY-UP

OPERATION MANUAL

CU406
CU406SF
CU606
CU606SF

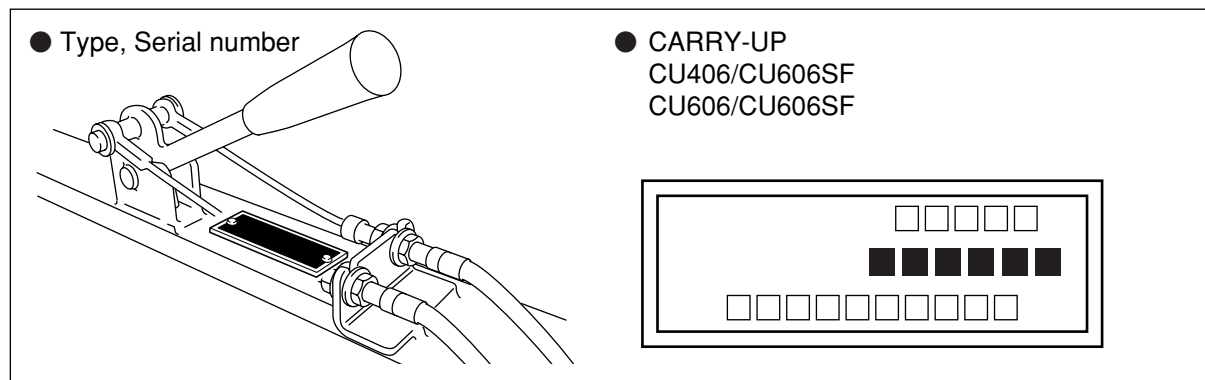
INTRODUCTION

Thank you for purchasing Heavy Duty Carrier Series, SUNWA CARRY-UP.
This manual describes proper operating procedure, inspection and maintenance.
Before running the machine, be sure to read this manual thoroughly.
Please keep this manual on easy place to take it.

All machines are referred to by each own serial number. Whenever you inquire about a machine, be sure to inform us of its serial number.

The serial number is inscribed on the side of the machine. Please write down the number and year, month and date of purchase in the operation manual.

● This instruction manual applies to several models. Please refer to the following instructions.






Please write the serial number and date purchased in the following blank space.

Serial number			
Purchased date	Year	Month	Date

When you inquire about the machine, please inform us of its serial number and purchase date.

SAFETY PRECAUTIONS

To maintain safe operation, important safety precautions, classified into Danger, Warning and Caution, are indicated in corresponding parts of the operation manual. The definition of each precaution is explained in the following section.

 DANGER	Neglecting this warning indication or operating the machine improperly may cause serious personal injury or even death.
 WARNING	Neglecting this warning indication or operating the machine improperly may seriously endanger the concerned person's health or life.
 CAUTION	Neglecting this warning indication or operating the machine improperly may cause injury to the concerned person or damage the machine or related items.

– If you transfer this machine, be sure to attach this operation manual to the machine. –

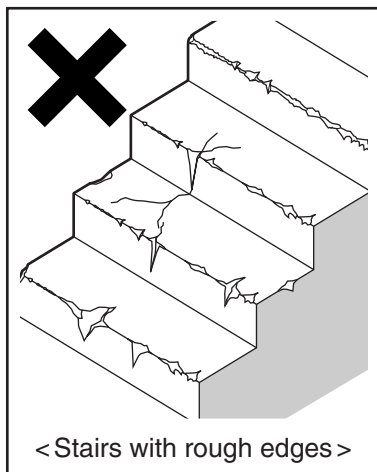
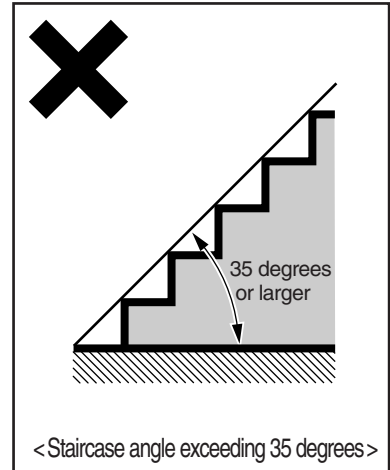
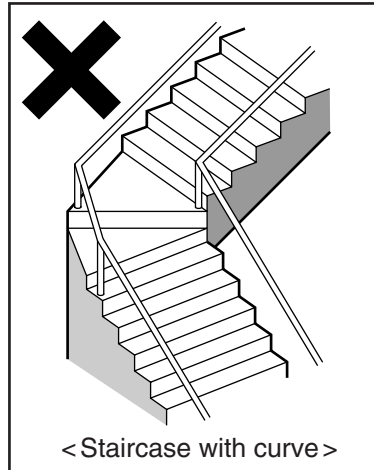
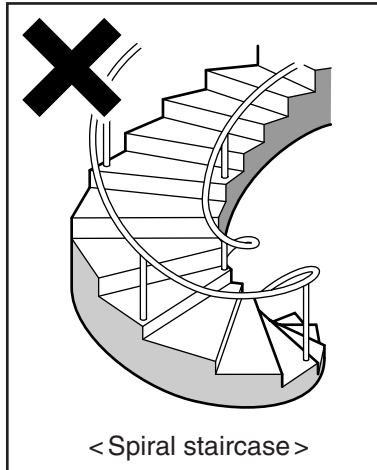
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1. ESSENTIALS OF SAFE OPERATION

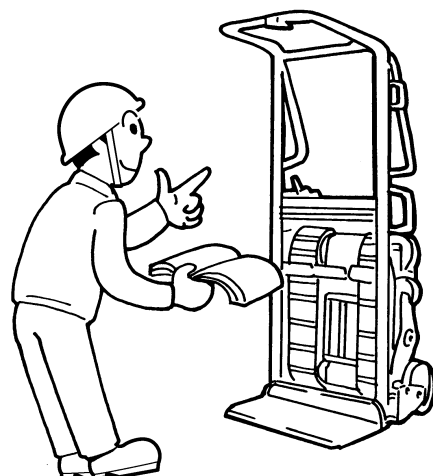
Before using CARRY-UP

- CARRY-UP cannot be used on spiral staircases, curved staircases, staircase angle exceeding 35 degrees, Stairs with larger pitch or Stairs with rough edges.



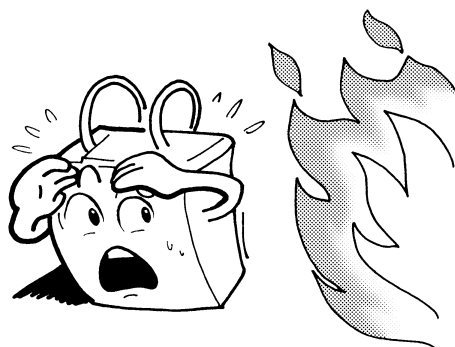
1 Always check CARRY-UP before using it

- The operator must check CARRY-UP before using it.
The initial inspection is necessary for safe operation.



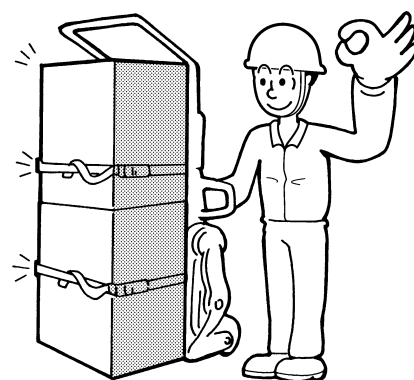
2 Handling of Battery

- Battery is a sealed type. It is unnecessary to refill it with water. Never dismantle Battery.
- Never position Battery near a flame or short-circuit Battery.
- If Battery is cracked and its electrolytic solution contacts skin or clothes, immediately rinse the contaminated area with plenty of water.
If electrolytic solution splashes into the eye, rinse the eye with plenty of clean water and consult an ophthalmologist.
- Use Battery Charger of CARRY-UP for charging Battery.



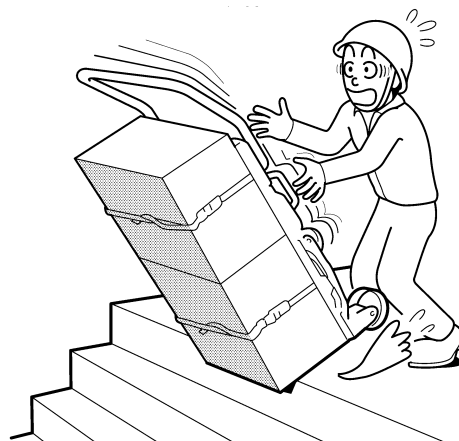
3 Safe operation with proper knowledge

- The operator needs sufficient training. Be sure the training is undertaken before the operator attempts to run this machine for the first time.
- Proper clothes, suitable to machine control, must be worn.
- Be sure to observe the weight limit. Over weight operation will cause machine malfunction or produce improper or dangerous machine function.



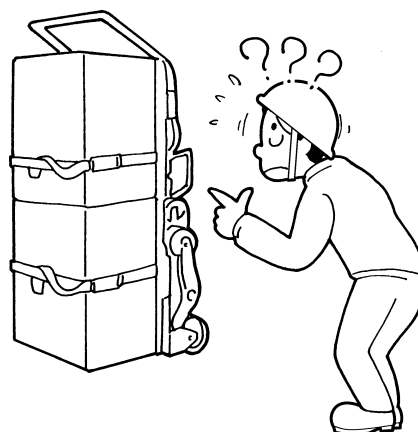
4 Operation on a staircase

- Never run the machine on a staircase angle exceeding 35 degrees, on a curved staircase, an oily staircase, an icy staircase, a wet or slippery staircase or any other inappropriate staircase.
- Never load any cargo which center of gravity is difficult to maintain at the same point.
- Before the carrier is set on a stair landing, be sure to allow enough space for the carrier to be handled.
- Whenever running the machine upward, the operator must always pay attention to the area behind himself.
Do not run CARRY-UP if the stairs are crowded.
- Whenever running the machine downward, the operator must always pay attention to the front of the machine.
Do not run CARRY-UP if the stairs are crowded.
- Never let go of the machine unless unavoidable circumstances separate the operator from the machine.



5 Machine stoppage

- If the machine gives trouble, malfunctions or is damaged, immediately stop operating the machine.
Running it with a trouble cause existing can result in a serious accident.



2. CONFIGURATION AND SPECIFICATIONS

2-1 PRODUCT CONFIGURATION

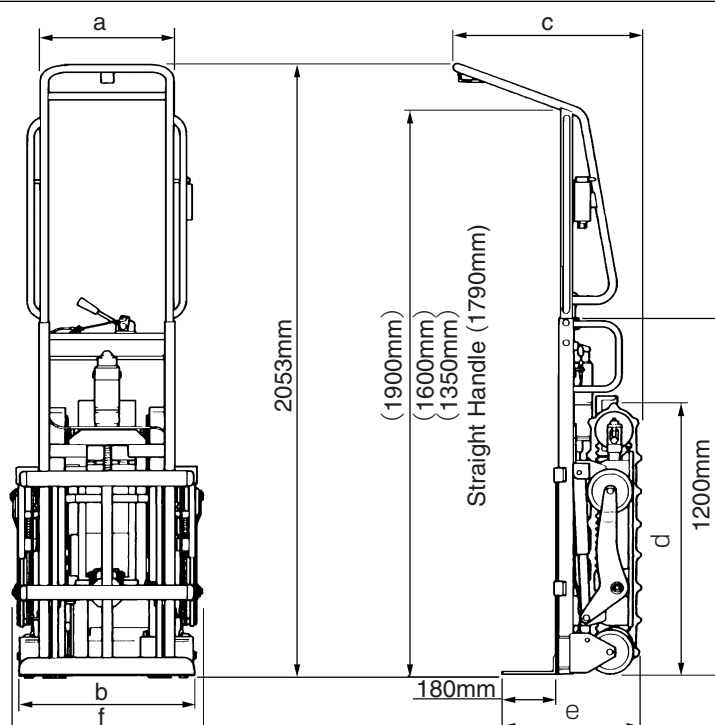
CARRY-UP consists of the following assemblies.

<ul style="list-style-type: none"> • Cargo Frame • Drive Unit • Assist Wheel • Battery Pack 	<ul style="list-style-type: none"> • Cargo tie (5m) 1 set • Charger (24V) 1 unit • Parts List 1 copy
<ul style="list-style-type: none"> • Slide Fork (Model SF) 	

2-2 SPECIFICATIONS

Model		CU406	CU406SF	CU606	CU606SF
Maximum load		400kg		600kg	
Maximum stair angle		35°			
Rubber Crawler		2 Rubber Crawlers (Width : 90 mm)			
Operators		3 or more			
Stair ascent speed		4.3m / min		3.3m / min	
Stair descent speed		5.2m / min		4.0m / min	
Running time (min) / charge	Ascending	840 steps / 60 min		660 steps / 60 min	
	Descending	1020 steps / 60 min		780 steps / 60 min	
Motor		Type : permanent-magnet DC motor			
Rubber Crawler Brake		Spring loaded electromagnetic brake			
Battery		Maintenance free type sealed lead battery 24V-24Ah/20HR			
Charger		Input : 115 / 230VAC, 50/60Hz, 1.0A MAX Output : 24VDC, 3A			
Slide fork elevation range	Up	—	400	—	400
	Down	—	200	—	200
Weight		120kg	135kg	120kg	135kg
External dimensions		a : 495mm b : 580mm c : 630mm d : 920mm e : 458mm f : 678mm			

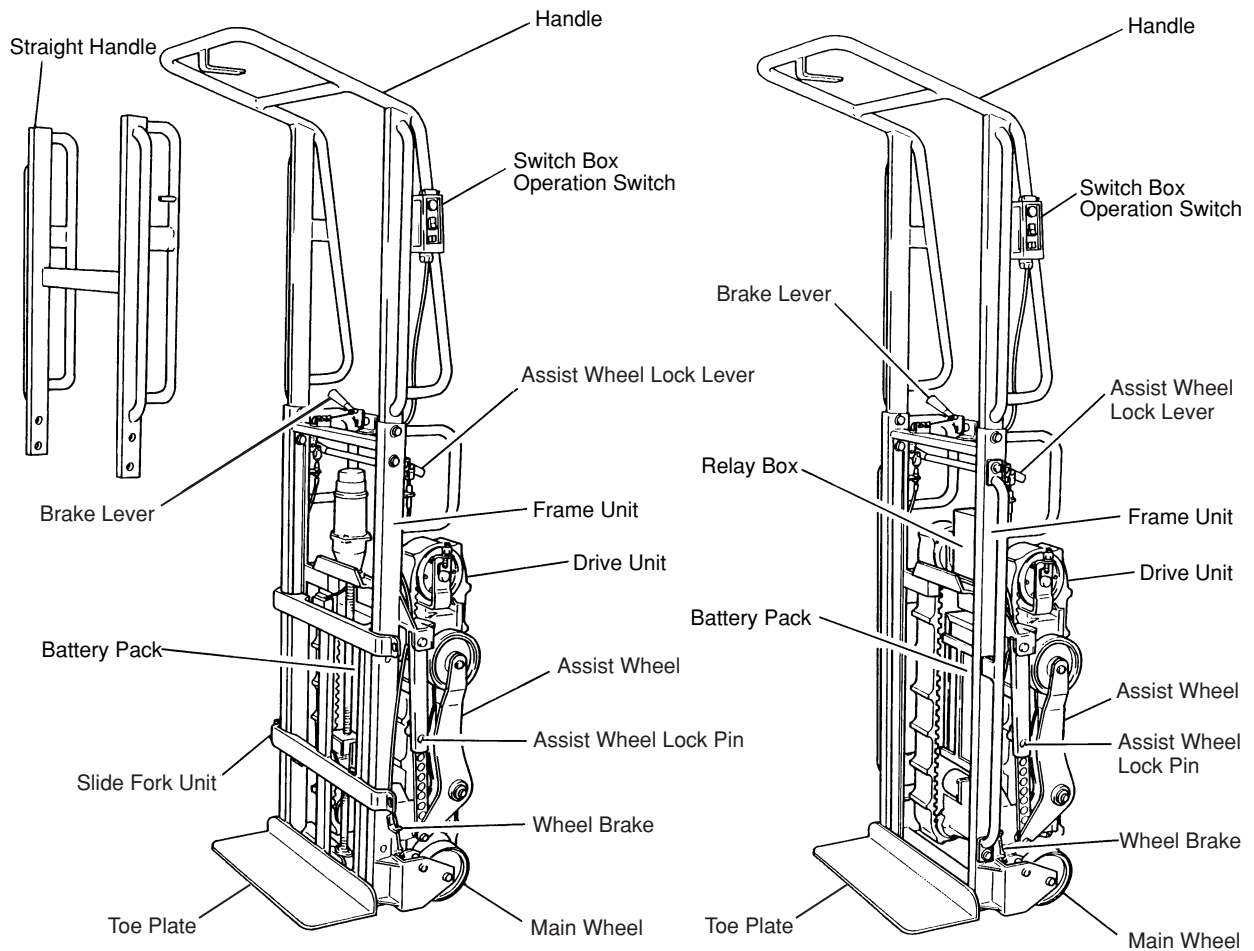
External dimensions :



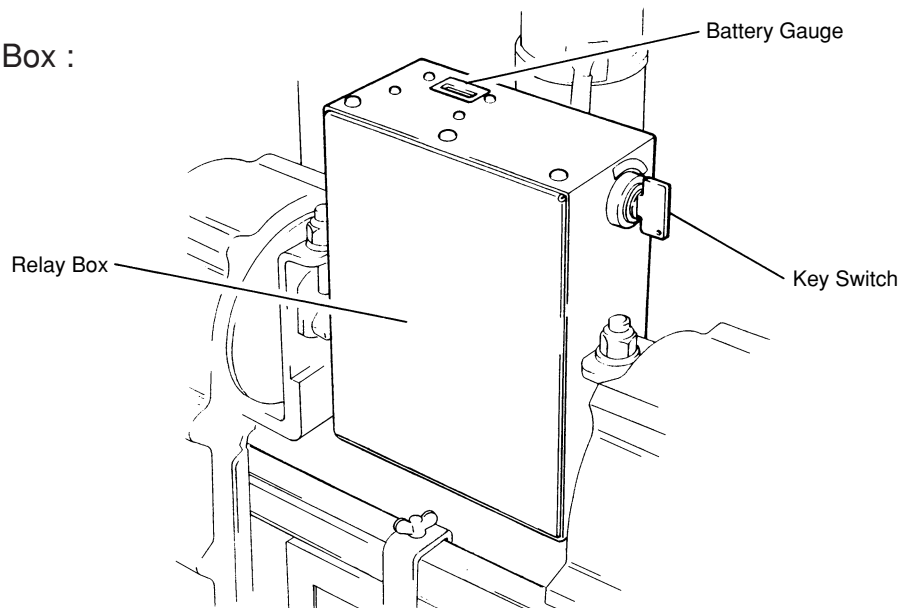
3. NAME OF EACH UNIT

●Sliding Fork Type
(Model SF)

●Fixed Fork Type



Relay Box :



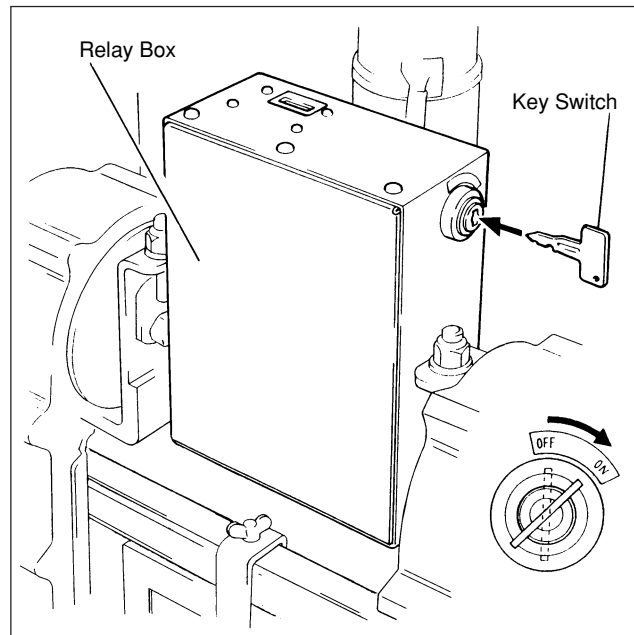
4. DESCRIPTION OF EACH UNIT

4-1 KEY SWITCH

Key Switch, positioned atop relay box turns on/off the power supply.

When it is turned clockwise, the power will be ON and when turned counter-clockwise, the power will be OFF.

NOTE : When CARRY-UP is not to be used (to be stored, to be charged, to be transported), turn off Key Switch, remove Key and keep it in an appointed place.



CAUTION

If Key Switch is kept in the ON position, Battery will more quickly discharge.

When the machine is not to be in use, be sure to turn off Key Switch and remove it.

4-2 SWITCHES

① TOE PLATE/DRIVE SELECT Switch

WINCH or RUN modes can be selected by pressing the corresponding side of Seesaw Switch.

- When Winch mode is selected, it will be possible to command Winch Unit (Model SF) to elevate Slide Fork for adjusting the cargo's center of gravity.

- When Run mode is selected, it is possible that CARRY-UP climbs/descends a stair by Rubber Crawler.

② UP/DOWN Switch

Selects ascent or descent mode.

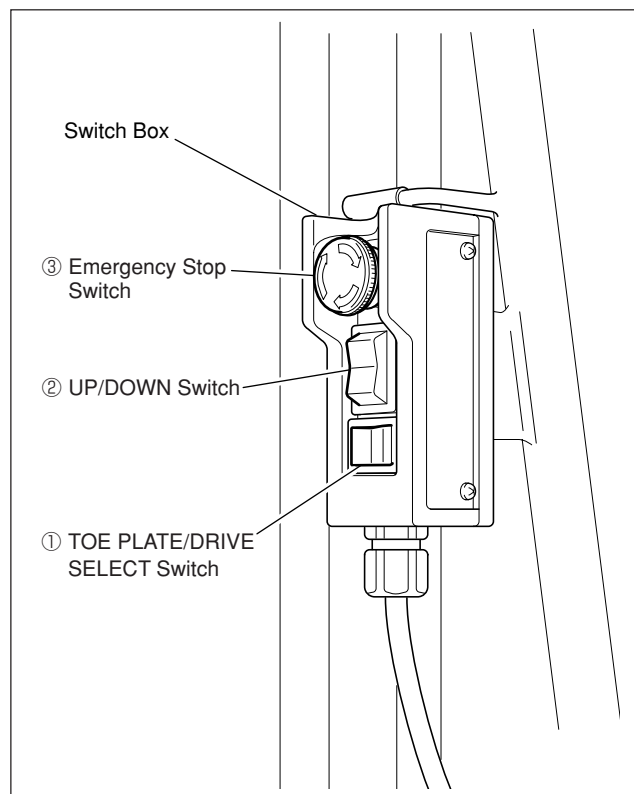
Only while this Switch is pressed, does the machine run. If UP side is pressed, the machine will ascend. If DOWN side is pressed, the machine will descend.

When the finger is released, Switch will automatically return its neutral position and the machine will stop.

③ Emergency Stop Switch

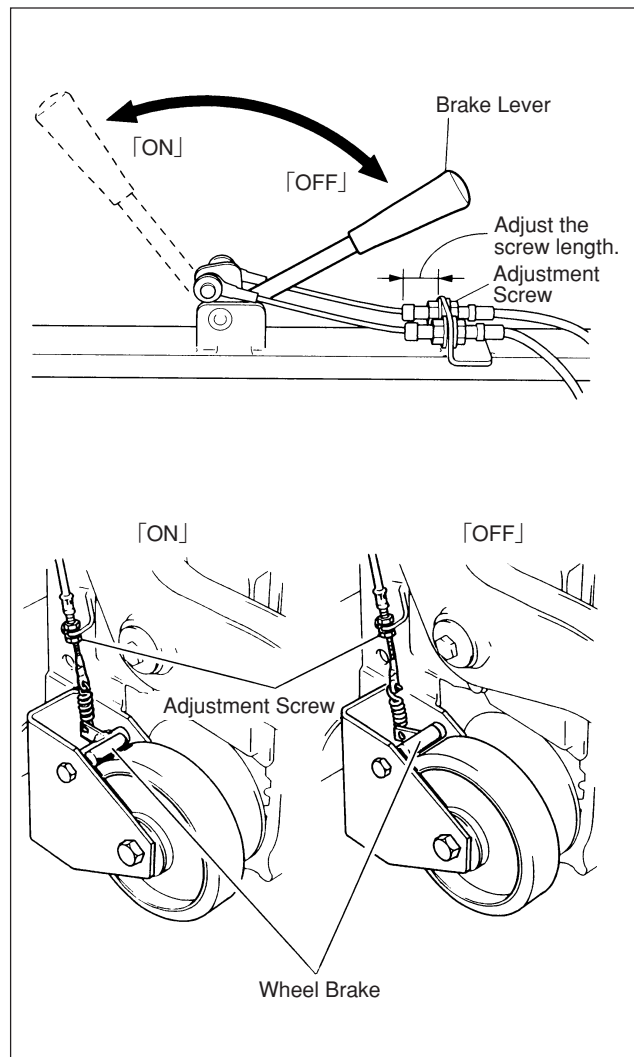
When this Switch is pressed, the machine will stop immediately. CARRY-UP won't restart. Even when the other Switch is pressed.

To release the emergency stop condition, turn Emergency Stop Switch in the "arrow" indicated direction.



4-3 WHEEL BRAKE

When Brake Lever is set to its ON position, Main Wheels will be prevented from running.
To release the brake, set the brake position to OFF.
Before stopping CARRY-UP on level ground or raising/lowering its frame, be sure to apply the brake to prevent dangerous movement of the machine.



CAUTION

If the brake pressure weakens, turn in Adjustment Screw clockwise/counter-clockwise.
Set enough brake pressure for the lever to lock Main Wheel. Excessive adjustment is unnecessary.

4-4 ASSIST WHEEL

Before CARRY-UP climbs the stairs, be sure to fully retract its Assist Wheels.

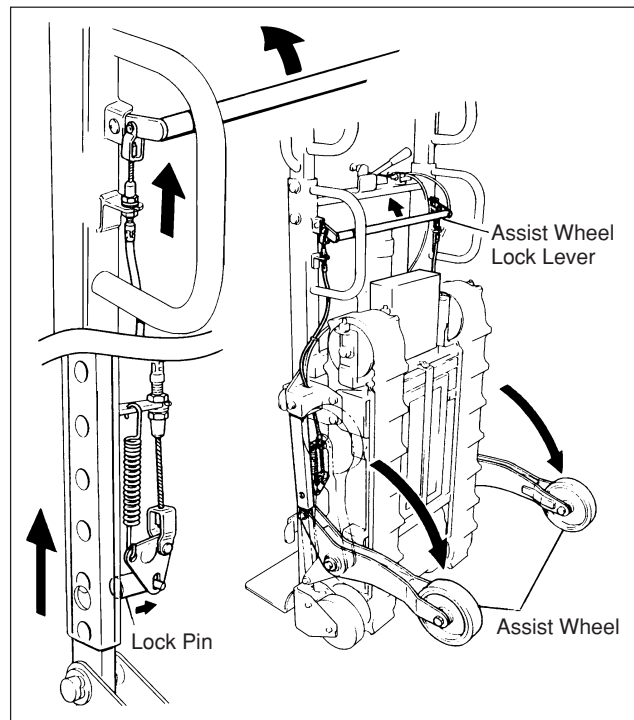
● When Assist Wheels are to be used:

- ① Pull Assist Wheel Lock Lever in the arrowed direction shown in the figure at right. Lock Pin will be released and Assist Wheels will extend from the machine. After Assist Wheels extend, return Lock Lever to its normal position. Lock Pin will reset itself.
- ② When the frame is vertically oriented, pull Assist Wheels while pulling Lock Lever.

There are eight holes for securing Assist Wheels. You can set Assist Wheels to the desired angle.

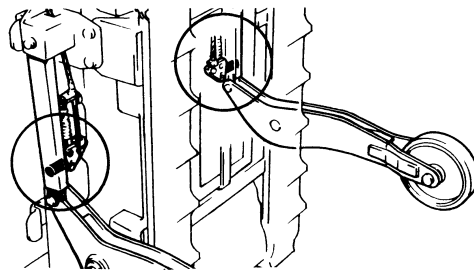
● To retract Assist Wheels:

While pulling one of Assist Wheels stow them following the reverse procedure of their extension.



⚠ WARNING

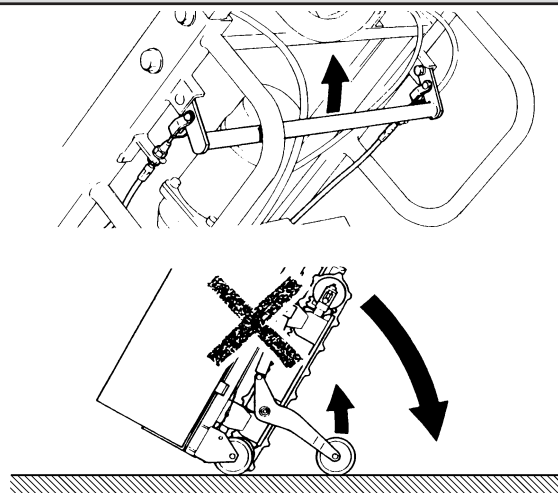
- Before using Assist Wheels check that the two Lock Pins (right and left sides of the machine) are securely locked.
- Before starting to climb the stairs, be sure to check that Assist Wheels are completely retracted.



⚠ WARNING

To maintain safety, only when Assist Wheel is unloaded, can Assist Wheel's lock be released. Before Assist Wheel is to be retracted, be sure to remove the load from Main Wheels and pull Lock Lever to the arrowed direction shown in the figure at right.

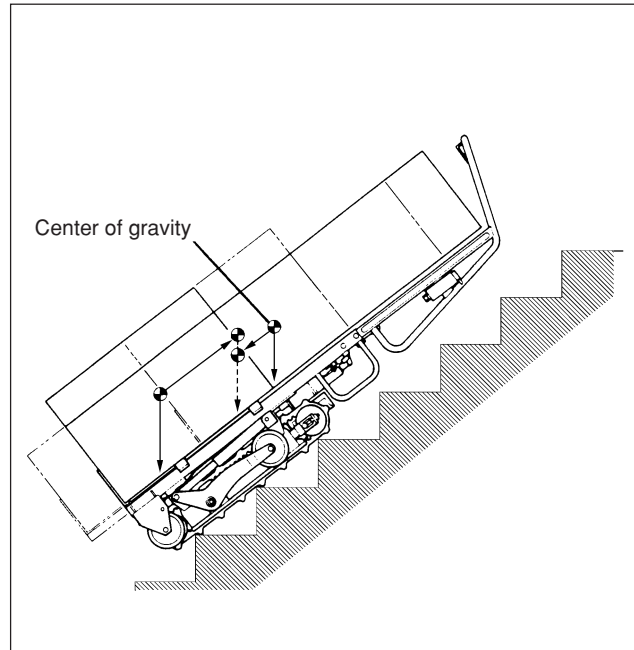
If the lock is released while a load is applied to Assist Wheels, the frame will fall due to gravity resulting in a dangerous situation.



4-5 SLIDE FORK UNIT (Model SF)

Slide Fork Unit is used for stair ascent/descent and during ground transfer for cargo balance adjustment. Set Select Switch on Switch Box to TOE PLATE and control Slide Fork Unit via its switch.

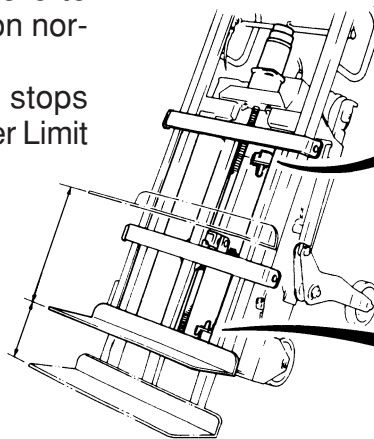
When Slide Fork Unit reaches its highest or lowest positions, the upper or lower Limit Switches will activate, and Slide Fork Unit will automatically stop.



WARNING

Before starting operation, be sure to check that Limit Switches function normally.

It is normal that Slide Fork Unit stops when it contacts the upper or lower Limit Switch.

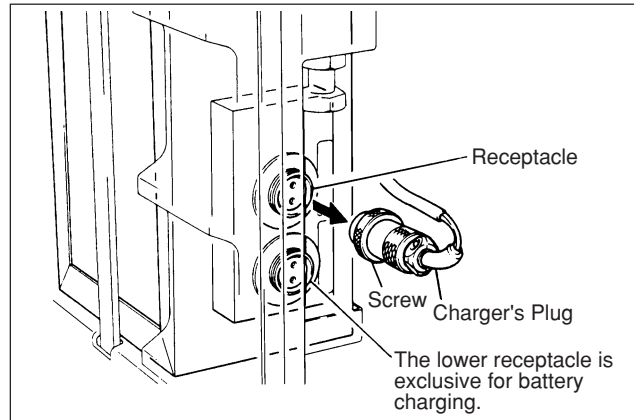


Upper Limit Switch

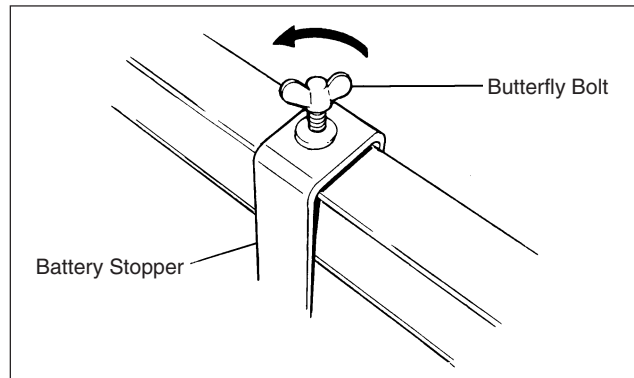
Lower Limit Switch

4-6 BATTERY PACK REMOVAL AND REINSTALLATION

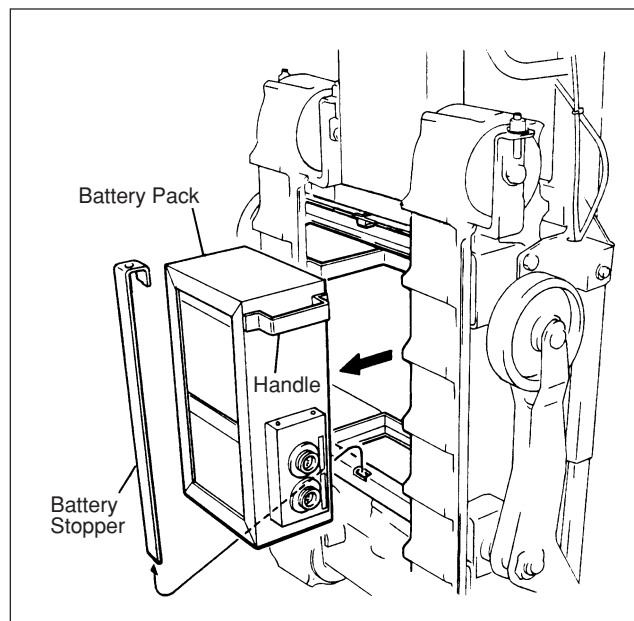
- ① Loosen Battery Pack's Plug Screw and disconnect Plug from its receptacle. Pay attention not to pull the cord to disconnect Plug.



- ② Loosen Butterfly Head Bolt that secures Battery Stopper and remove Battery Stopper.



- ③ Remove Battery Pack from the machine lifting by its handle and body. To install Battery Pack, follow the reverse procedure of its removal.

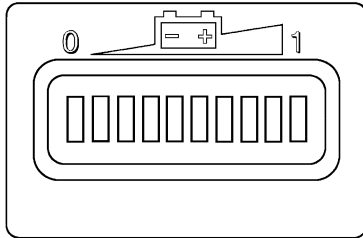


CAUTION

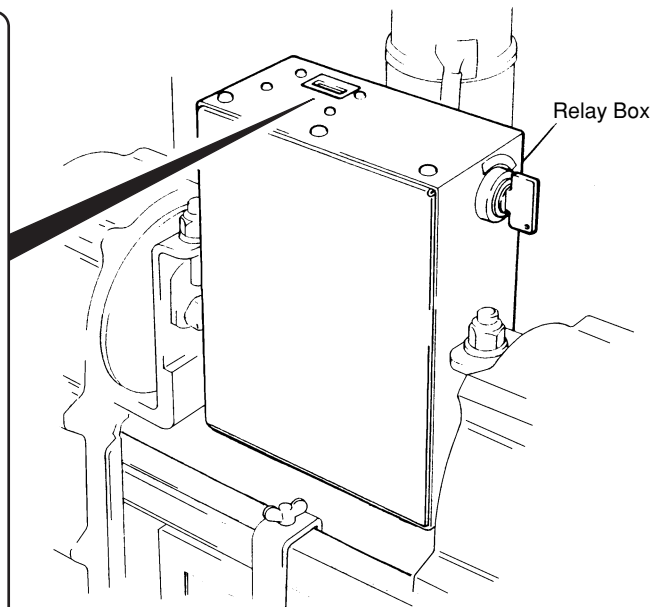
- After Battery Pack is reinstalled, be sure to retighten Battery Plug's Screw.
- After Battery Pack is reinstalled, be sure to retighten Battery Stopper's Butterfly Screw.
- If Battery Pack is dropped, Battery may be damaged. Pay attention to safe handling during Battery removal/re-installation.

4-7 BATTERY GAUGE INSPECTION

■ BATTERY GAUGE



- Check that the right end lamp of Battery Gauge is illuminated.
When the charge level decreases, the illumination will shift to the left.
If Battery Gauge is not illuminated at the right end, it means Battery is not fully charged or battery capacity is reduced due to its deterioration. The total running period will be diminished.



● Battery Gauge indication

Battery Gauge		Available time (Charging percentage)
1	<p>The right end LED illuminates</p>	60 min. (100%)
2	<p>The fourth LED from the right end illuminates</p>	30 min. (50%) After the operation, charge CARRY-UP's Battery Pack
3	<p>The seventh LED from the right end illuminates</p>	15 min. (25%) After the operation, charge CARRY-UP's Battery Pack
4	<p>The second LED from the left end flashes</p>	Stop (0%) Stop operating the machine and charge Battery immediately
5	<p>The first and second LEDs from the left end flashes</p>	This indication being prolonged will result in rapid Battery deterioration. Be sure to stop the machine at the "4" indication and charge Battery



CAUTION




When the Key Switch is set to ON, Battery Gauge indication may differ from its previous indication. (when the power was last turned on.)

5. BATTERY CHARGE SYSTEM

5-1 BATTERY

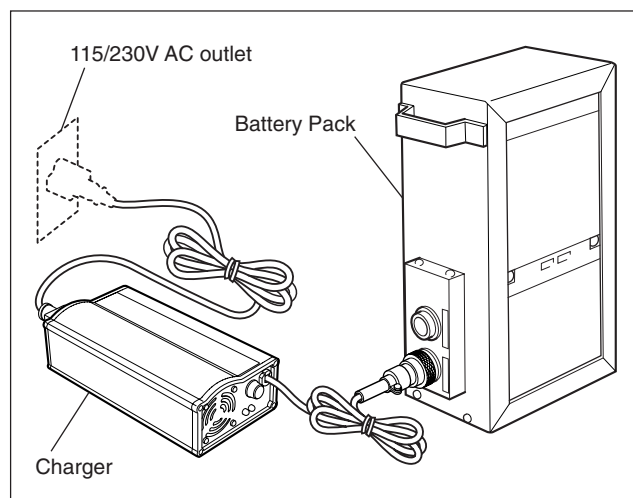
A Sealed Lead Battery is used in CARRY-UP. It is a maintenance-free and non water requiring Battery. Whenever Battery is handled, be sure to follow the cautions shown below.

NOTE : Immediately after Battery is used, Battery must be charged using Battery Charger of CARRY-UP. If insufficient battery charge is left, less power for following operations will result in difficulty of operation. Or if Battery is left depleted for a long period of time, it may be damaged.

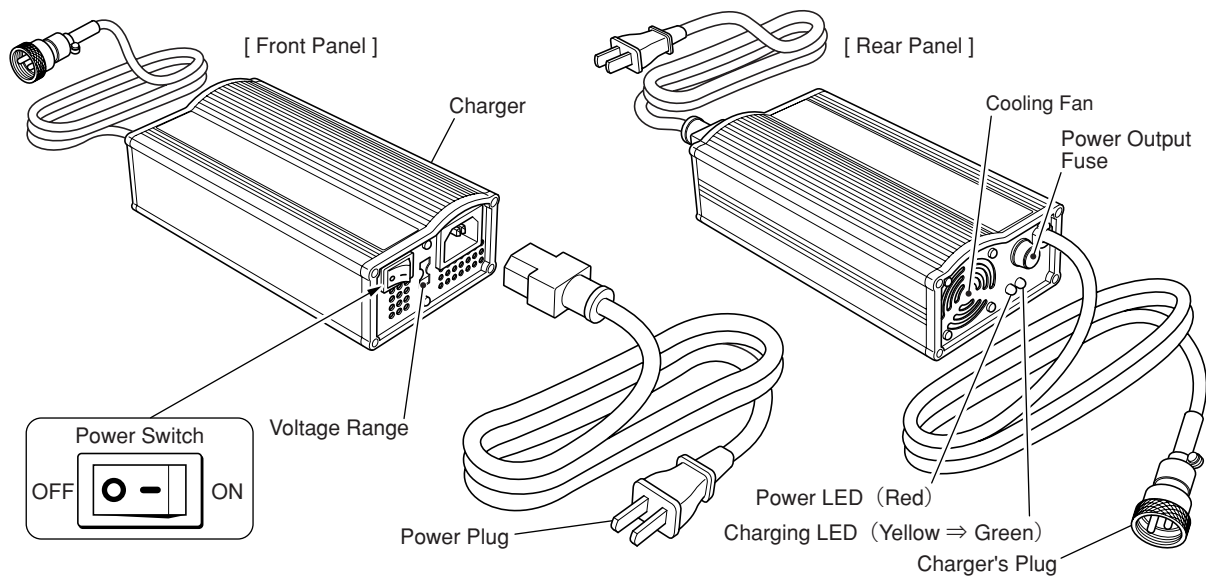
 DANGER	<ul style="list-style-type: none">• Never charge Battery in a closed room.• Never bring Battery near a flame.• Never disassemble Battery.• Never connect Battery Terminals with tools or metals.
 WARNING	<ul style="list-style-type: none">• Use Battery Charger of CARRY-UP for charging Battery.• Always check Battery's condition. If any crack or deformation or water leakage is observed, replace with a new one.• Clean and wipe Battery with a cool or warm water moistened cloth. Never wipe with gasoline, thinner, organic solvent or oil moistened cloth.• If the electrolytic liquid from a damaged Battery contacts skin or clothes, rinse the area with plenty of water immediately. If the electrolytic liquid invades the operator's eye, rinse it with clean water immediately and consult an ophthalmologist.
 CAUTION	<ul style="list-style-type: none">• Battery is a sealed type. Never remove its cover. If the cover is removed, Battery will become unusable.• Battery may lose its usefulness if it is over discharged.• If Battery is not to be used for a long period of time, remove it from the machine and charge it completely. Keep it in cool and dry place and charge it again monthly. <p>Even though Battery is not used during storage, its capacity constantly decreases. Therefore its performance will decrease compared with the previous occasion the machine was used.</p>

5-2 CHARGER

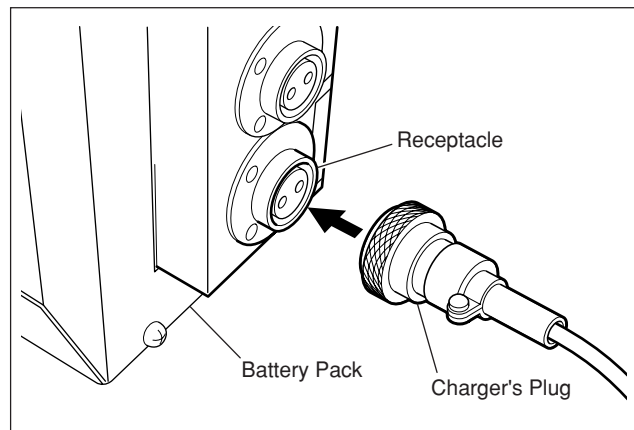
Use Battery Charger of CARRY-UP.
Battery is automatically charged depending on battery discharge rate at a given time.
This Battery Charger is not equipped with a timer function.
Be sure to disconnect Charger's Plug from Battery Pack after Green LED illuminates.
(Charging Battery completely will take 8 hours.)



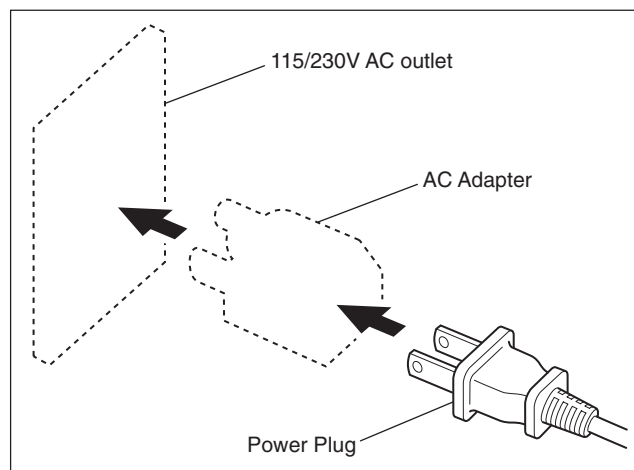
5-3 CHARGING PROCEDURE



- ① Connect Battery Charger's Plug to Receptacle of Battery Pack.



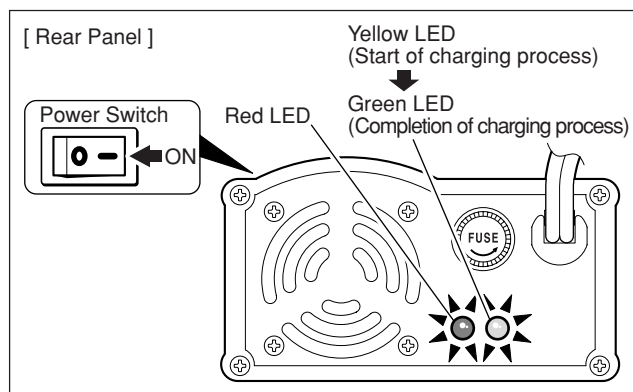
- ② Connect AC Adapter to outlet (AC115/230V) and connect Power Plug.



CAUTION

Prepare an area-specific AC conversion Adapter for installation between AC outlet and Power Plug.

- ③ Turn on Charger's Power Switch. (Set it to ☐)
When Red and Yellow LEDs illuminate, the charging process will start.
- ④ When the charging process advances and Green LED illuminates instead of Yellow LED, the charging process will stop.
- ⑤ Turn off Charger's Power Switch. (Set it to ☐)
- ⑥ Disconnect Power Plug from the 115V/230V AC outlet.



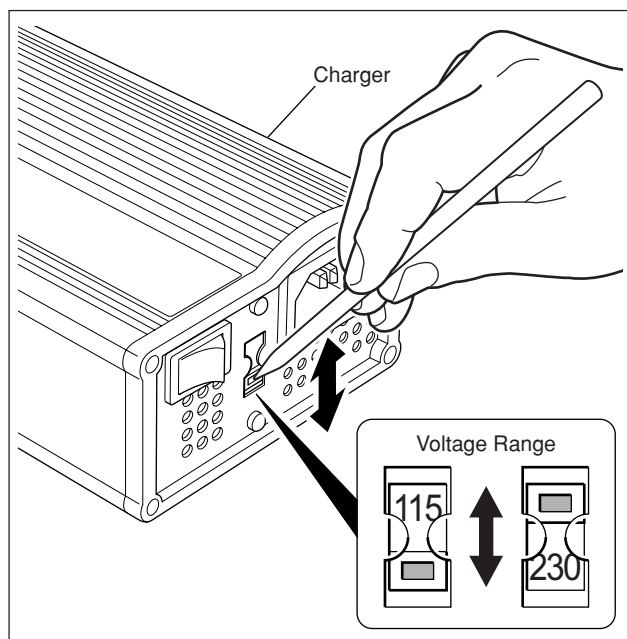
CAUTION

- Within 12 hours after Battery Charger's Green LED illuminates (indicating Battery Pack is fully charged), be sure to turn off Power Switch. (Set it to ☐)
Over charging will cause deterioration of Battery and decrease Battery capacity and shorter Battery life.
- High temperature will be indicated on Battery Charger while it is charging Battery Pack. Never leave any combustibles near Charger.

5-4 VOLTAGE RANGE SELECTION

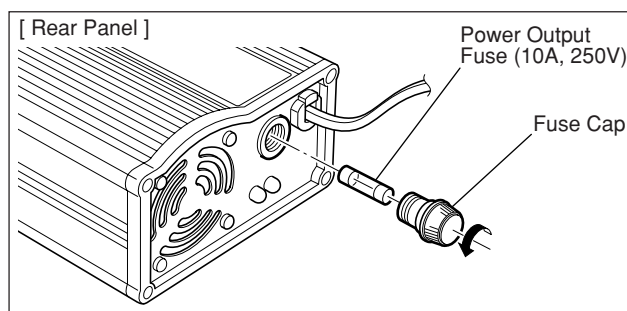
The twin power supply voltage (115VAC / 230VAC) can be selected by setting Voltage Selection Switch. A table of initial settings for the destination countries is shown in the table below. Before using Charger for the first time, be sure to check that the power voltage is set to suit to the site's voltage.

AREA / COUNTRY	115VAC	230VAC
NORTH AMERICA	<input type="radio"/>	
EUROPE / UK		<input type="radio"/>
KOREA		<input type="radio"/>
TAIWAN	<input type="radio"/>	
SINGAPORE		<input type="radio"/>
MALAYSIA		<input type="radio"/>
HONG KONG		<input type="radio"/>
CHINA		<input type="radio"/>
OCEANIA		<input type="radio"/>



5-5 POWER OUTPUT FUSE REPLACEMENT

Turn Fuse Cap counter-clockwise to open. Then remove the blown Fuse and replace it with a new one (10A, 250V).



5-6 MALFUNCTION, INSPECTION, RESOLUTION PROCEDURE

TROUBLE	CAUSE	COUNTERMEASURE
No power supplied. LED won't illuminate.	Insufficient insertion of Power Plug into outlet.	Check outlet and securely connect Power Plug.
	No power is supplied.	Check power and other relevant parts.
	Power Cord is broken.	Arrange its repair or replacement.
	Battery Charger's power source trouble.	Arrange a check or repair.
	Receptacle and Plug are improperly connected.	Check the connecting parts and securely connect them.
	Battery Pack is improperly connected.	Check the connecting parts and securely connect them.
Green LED illuminates soon after the start of charging.	Battery is normally charged.	Normal.
	Battery malfunction.	Replace with a new Battery. (See P15.)
The charging process is completed however workable period is shortened.	Battery nearly dead.	Replace with a new Battery. (See P15.)
	Ambient temperature is low during charging.	Charge Battery in an ambient temperature between 5 and 40°C.

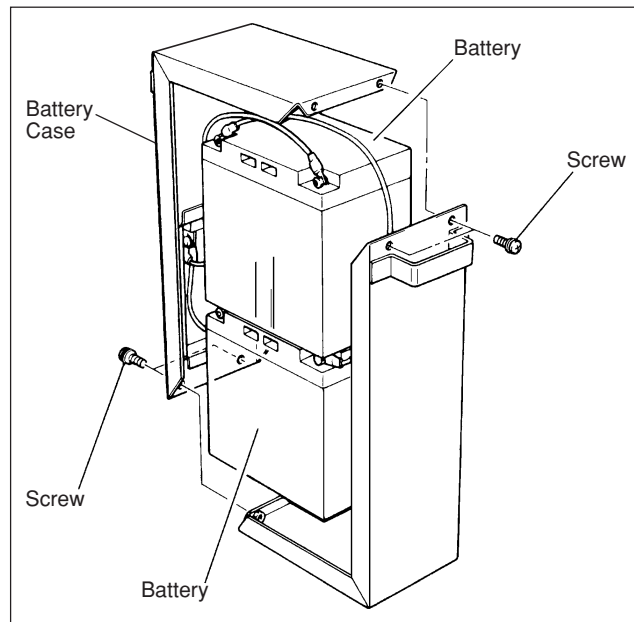


CAUTION

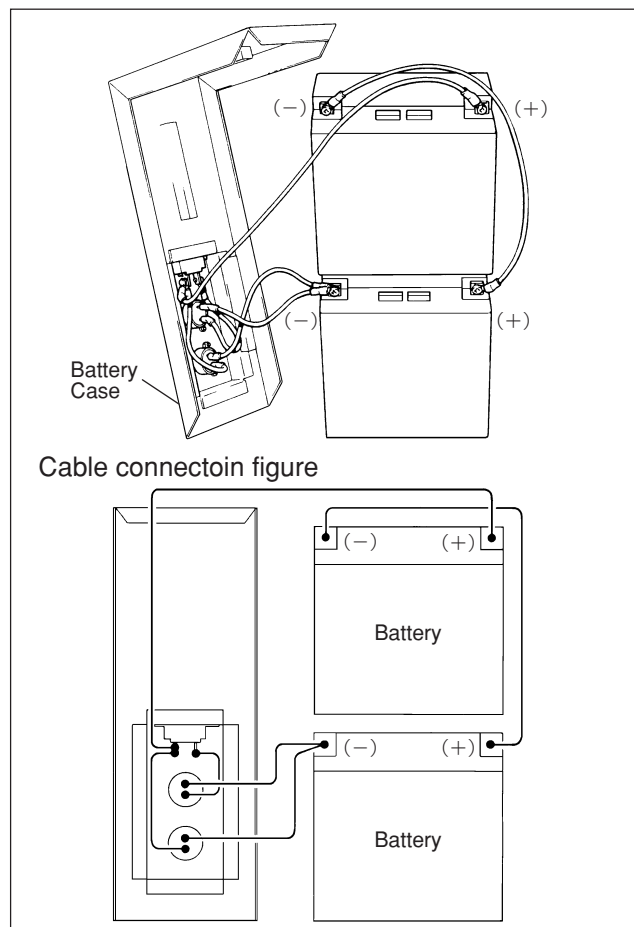
- For safe handling of Charger, be sure to read the instructions thoroughly before using Charger.
- Charger is only to be used with an AC115V/230V power source. Never connect Power Cable to any other power source specification.
- Extended charging may reduce Battery capacity resulting in shorter Battery life.
- Battery and Charger's Output Terminals have polarity. Confirm that those Terminals are correctly connected according their polarity. Improper connection will result in a short circuit and cause a cable to melt or other serious charger malfunction.
- Never remove Charger Cover or you will risk receiving an electric shock.
- Keep Charger indoors, away from direct sunlight and water splashes. Neglecting this can cause fire, electric shock or equipment malfunction.
- As Battery deteriorates, its voltage will fail to reach normal full-charge voltage.

5-7 BATTERY REPLACEMENT

- ① Unscrew the screws mounting Battery Case and Cover.



- ② Disconnect cables from Battery Terminals, remove exhausted Batteries, and install new ones.
- ③ Connect cables to Battery Terminals as shown in the figure below. Confirm that cables are properly connected to the proper terminals. Then apply an adhesive to Connectors to prevent their loosening.



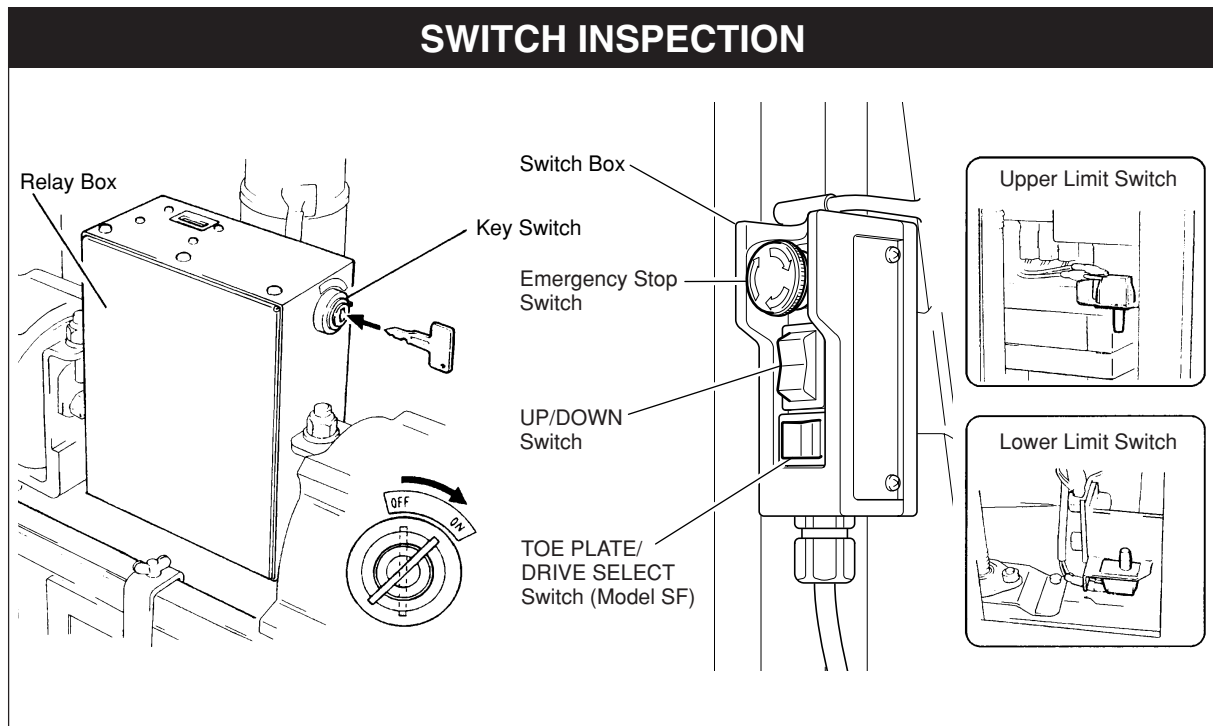
CAUTION

While Key Switch is set to ON, power will be supplied from Battery. If CARRY-UP is not be used, be sure to set Key to OFF and remove it from Key Switch.

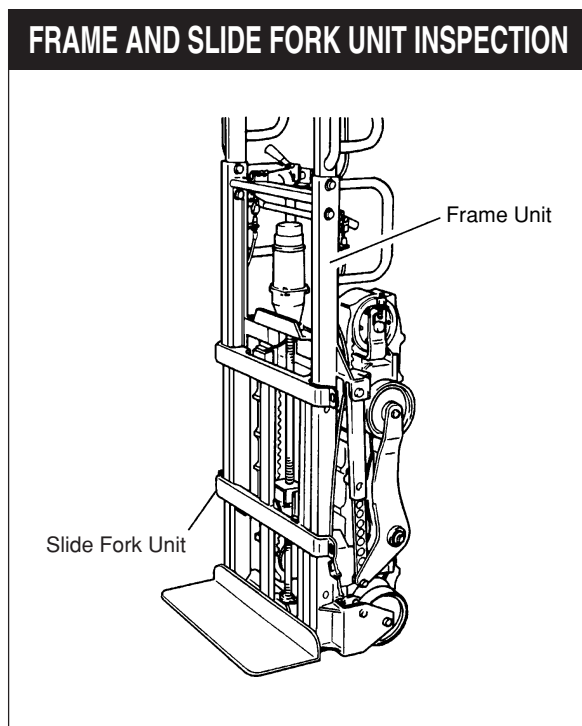
6. PRE-USE INSPECTION

Before using the machine, be sure to carry out the daily inspection.

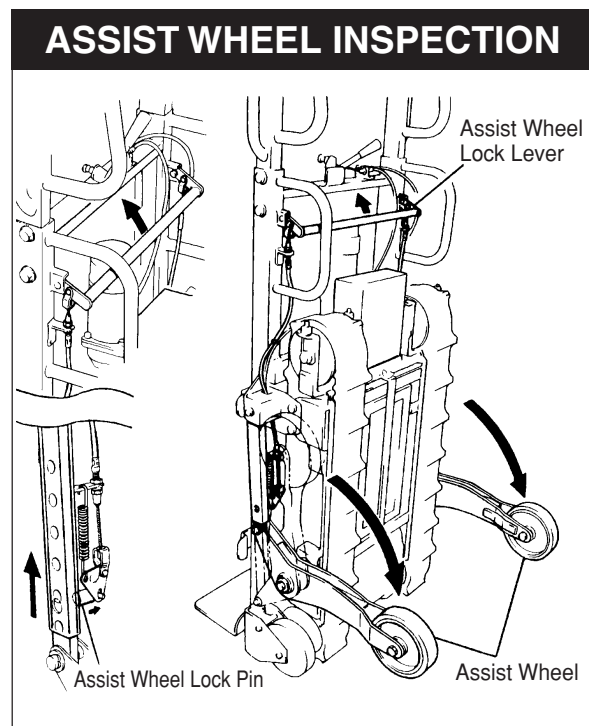
The daily inspection will prevent trouble. It is essential before handling CARRY-UP.



- Check that all Switches function correctly.

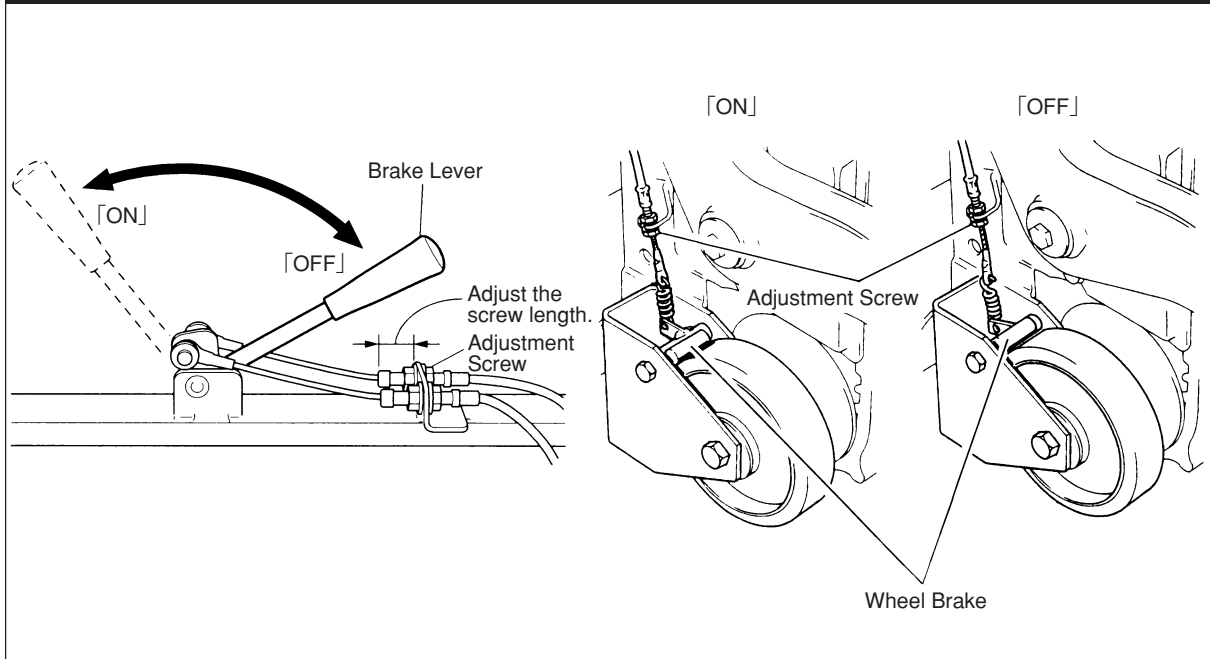


- Check that there is no crack or damage affecting Frame or Slide Fork Units.



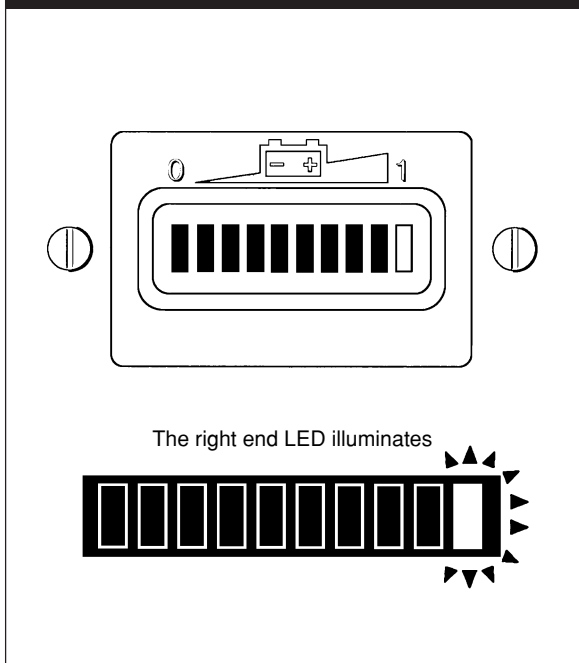
- Check that Assist Wheel's lock system functions normally.

WHEEL BRAKE INSPECTION



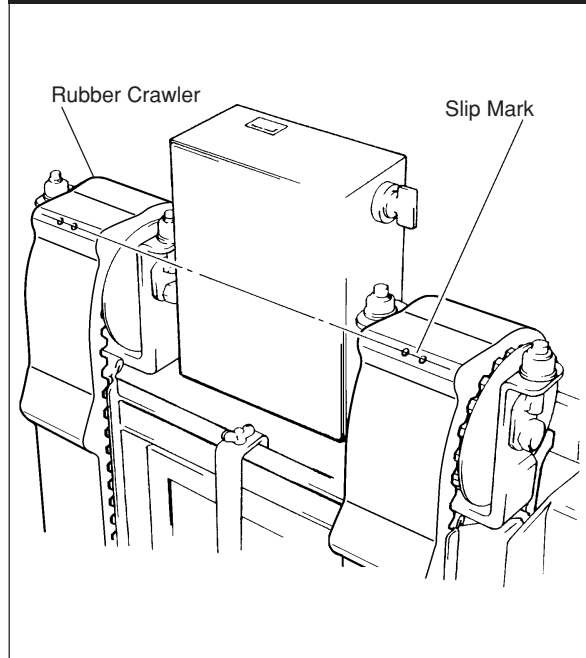
- Check that Main Wheel Brake for ground transfer functions normally.

BATTERY GAUGE INSPECTION



- Check that the right end lamp of Battery Gauge is illuminated.
When the charge level decreases, the illumination will shift to the left.
If Battery Gauge is not illuminated at the right end, it means Battery is not fully charged or battery capacity is reduced due to its deterioration. The total running period will be diminished.

RUBBER CRAWLER INSPECTION



- Check that there is no crack, wear or pitch error regarding Rubber Crawlers.
- The pitch error can be confirmed from Slip Mark deviation.

SCREWS INSPECTION

- Check that no Screw has dropped out and that all Screws are tightly attached.

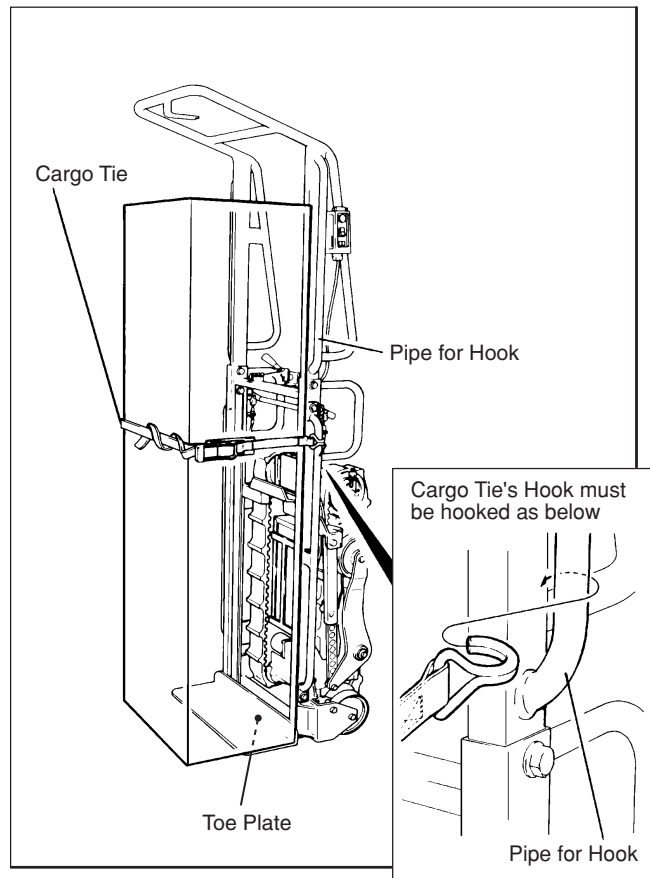
7. OPERATION

7-1 CARGO SECURING PROCEDURE

Load the cargo on Fork and tighten it securely with the attached Cargo Tie.

[Fixed Fork Model]

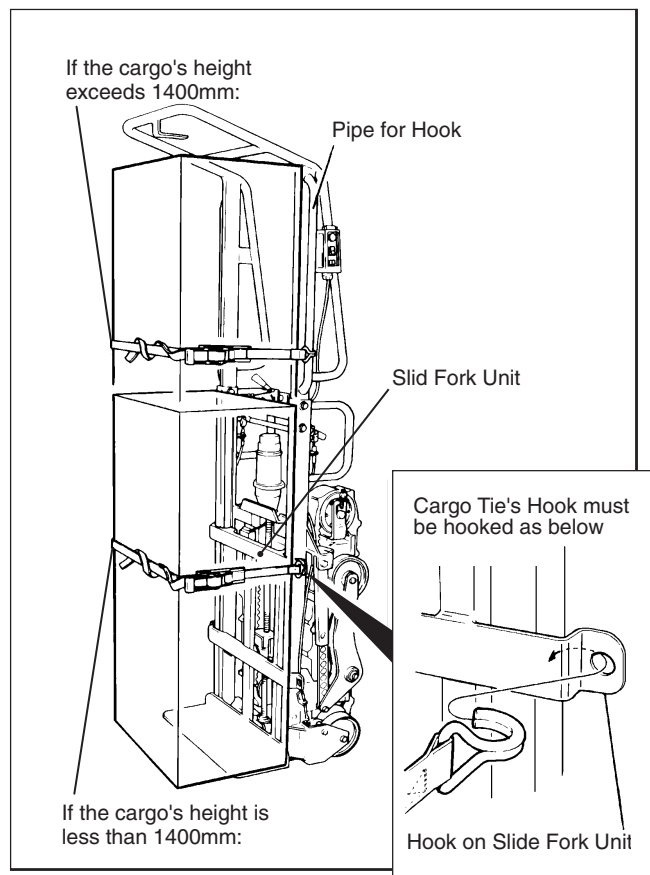
Cargo Tie shall be tightened at slight upper position from the middle position of cargo. Cargo Tie must be hooked to Pipes for Hook that are positioned at Both sides of Frame.



[Model SF]

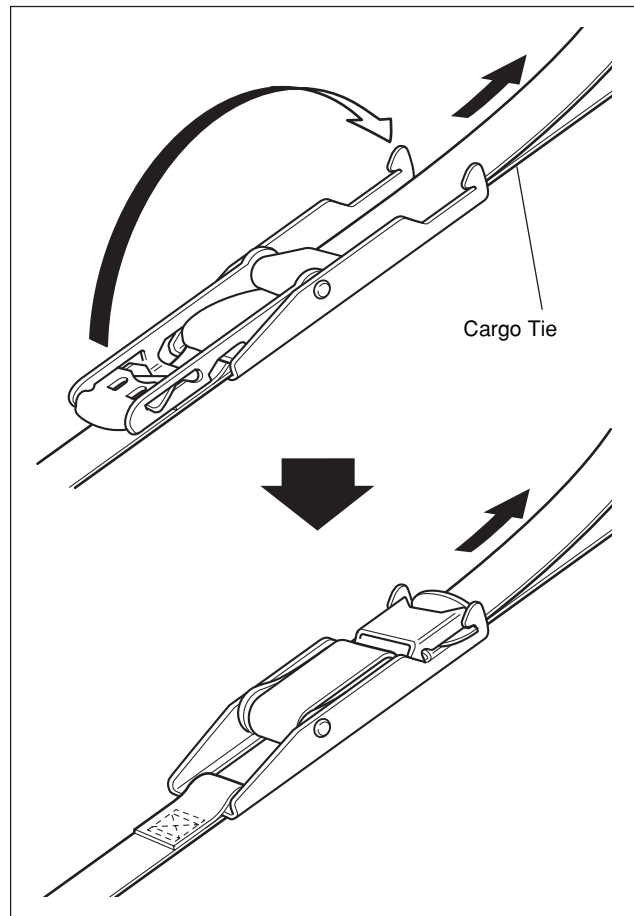
If cargo's height exceeds 1400 mm, secure it with Cargo Tie hooked to Pipes for Hook that are positioned at both sides of Handle.

If cargo's height is less than 1400 mm, secure it with Cargo Tie hooked to Hooks on Slide Fork Unit.



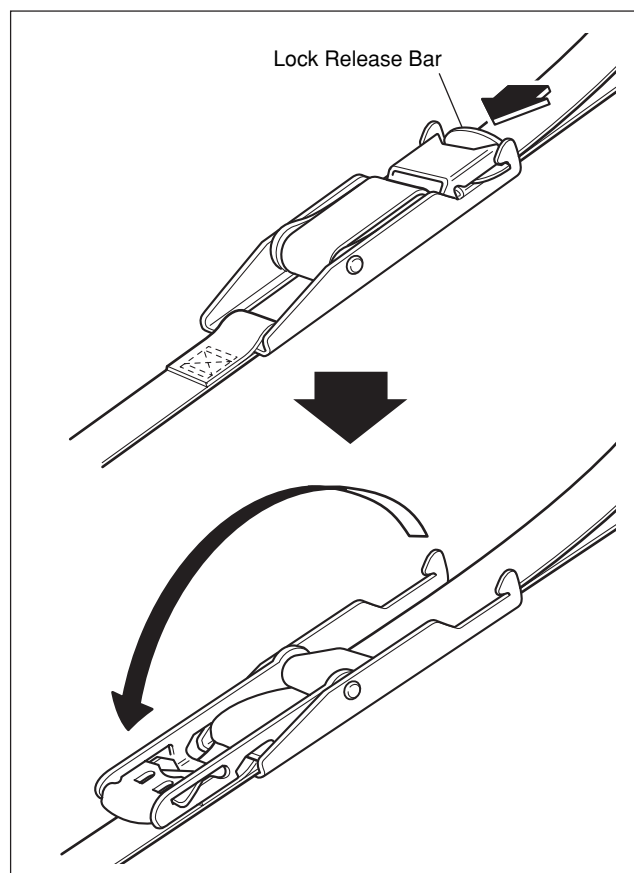
● Cargo Tie securing procedure

- ① Set Cargo Tie to the hook on the machine, and tighten Cargo Tie firmly while pressing Cargo to the machine. After Cargo is in place, raise and tighten the buckle.
- ② Before starting operation, be sure to check that Cargo is secure.



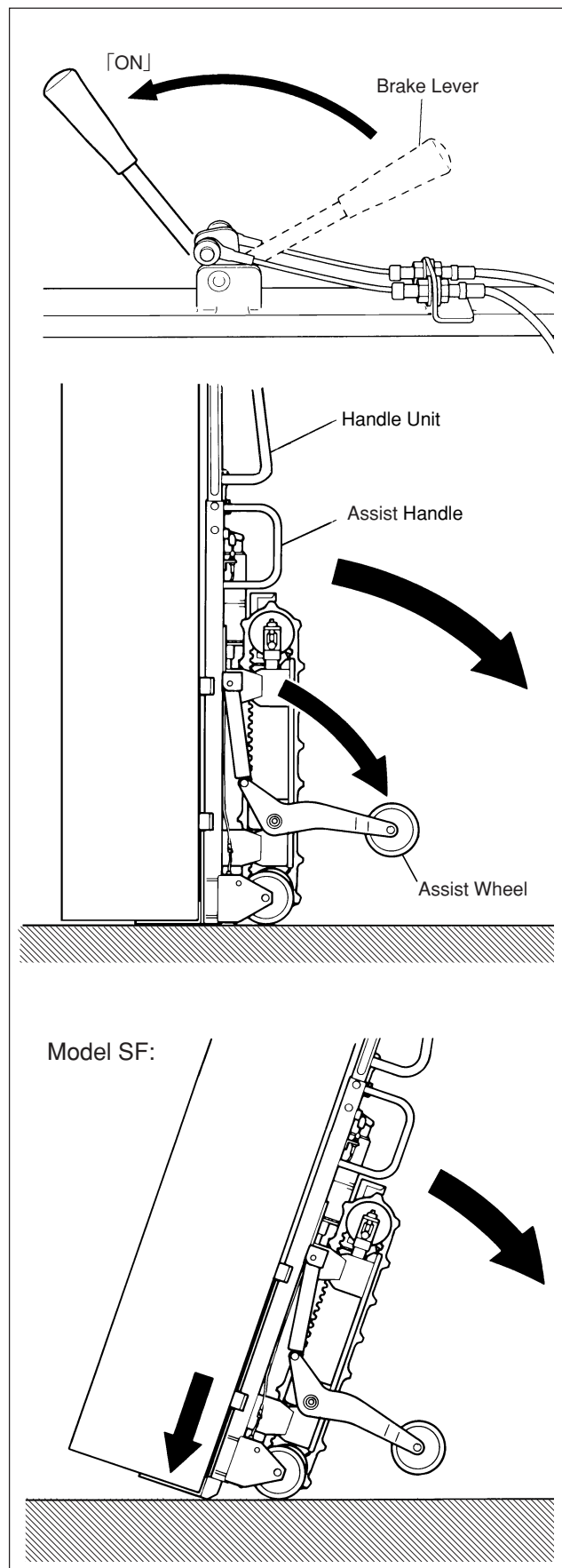
● Cargo Tie releasing procedure

- ③ Push Lock Release Bar and raise the buckle to loosen Cargo Tie.



7-2 GROUND TRANSFER

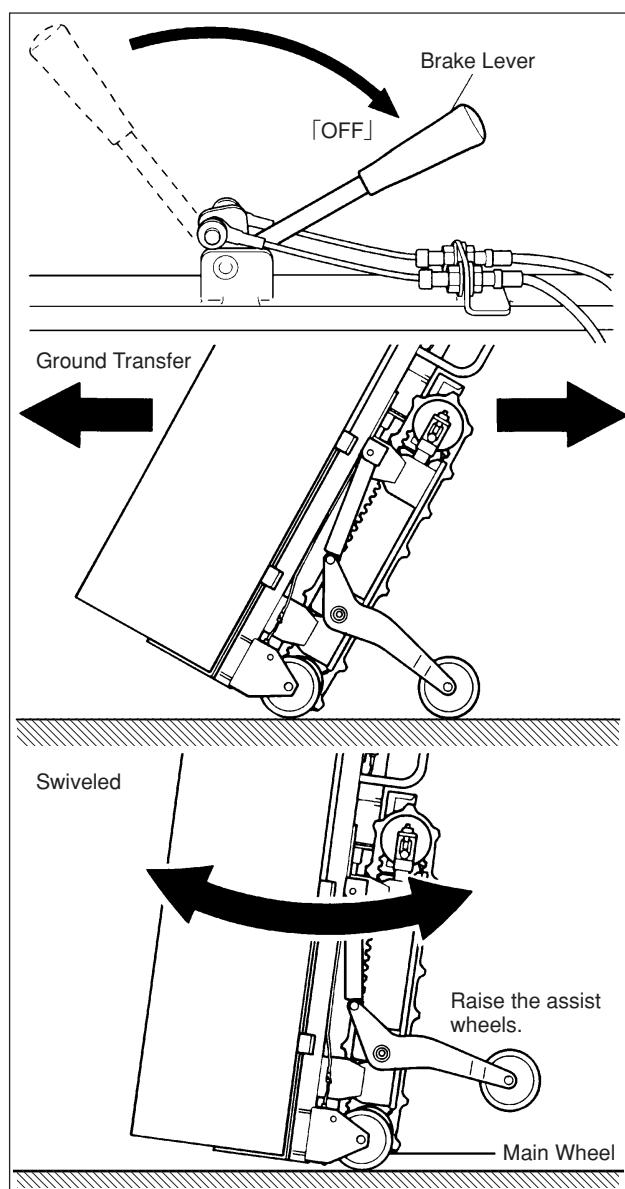
- ① Apply the brake for ground transfer.
- ② Before starting ground transfer, be sure to extend Assist Wheels to maintain safety. Pull the handle carefully to Assist Wheel's side to tilt the machine as below.



[Model SF]

In case of Model SF, at first down Slide Fork Unit carefully, then the machine is tilted easily.

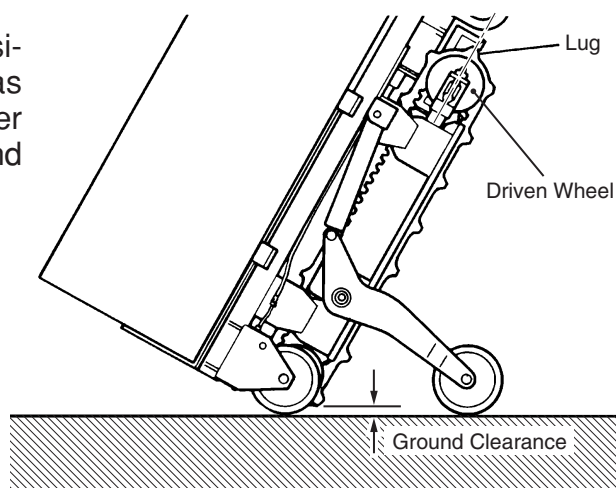
- ③ After balancing the machine, release Main Wheel brake and manually transfer CARRY-UP with cargo by its Main Wheels and Assist Wheels.



- ④ Using Assist Wheels for ground transfer adds the stability of four wheel support. However, when CARRY-UP is needed to turn, use only Main Wheels carefully after making machine stand up-right.

⚠ CAUTION

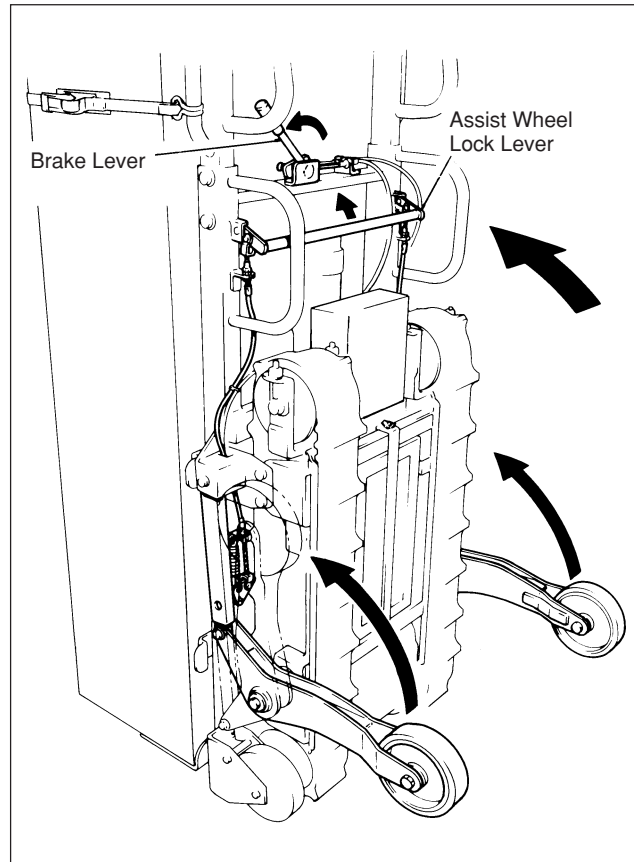
When Rubber Crawler's lugs are positioned at the top of Driven Wheel as shown in the figure at right, it is easier to maneuver the machine on the ground due to increased ground clearance.



7-3 ASCENDING STAIRS

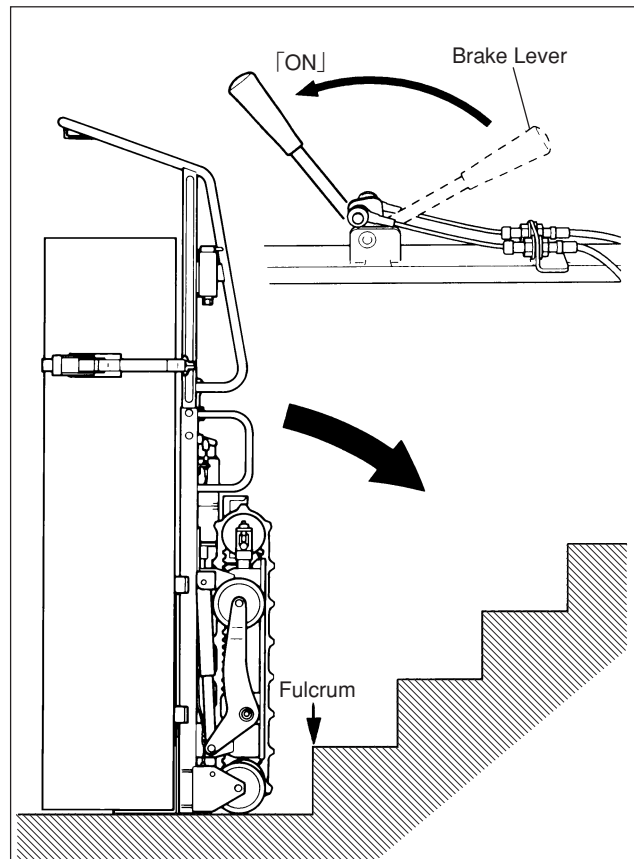
(1) Position CARRY-UP at the stairs

- ① When the machine reaches the front of the bottom stair, apply brakes to Main Wheels, raise Frame and retract Assist Wheels.

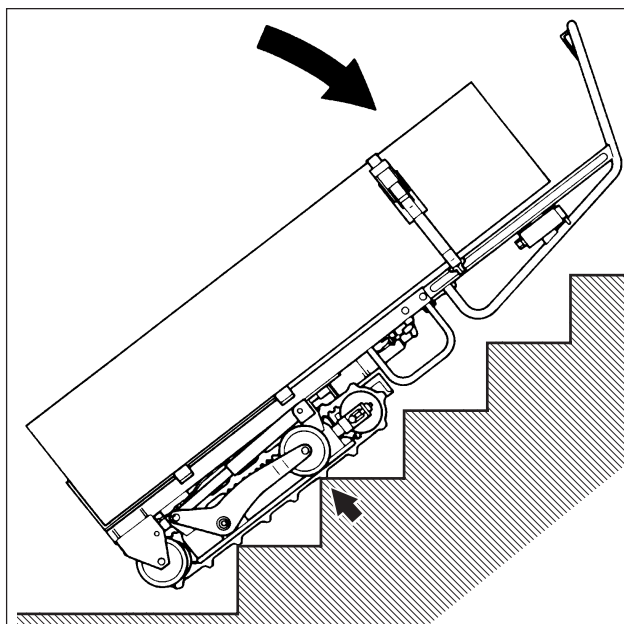


- ② Approach the stairs with the machine and set it at a right angle to the stair. Check that Main Wheel Brake is applied. Then tilt the machine to the stairs. Because the first stair will function as fulcrum, if the machine is positioned too close to the stair, it will be difficult to tilt it. Keep an appropriate distance between the machine and the first stair.

NOTE : The operator must stand upward of the machine during ascent.



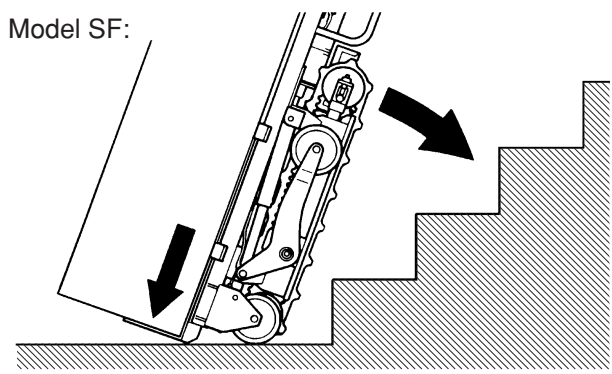
- ③ Tilt slowly until Rubber Crawler contact the second stair.



[Model SF]

Set Select Switch to TOE PLATE and lower Slide Fork Unit. The machine should easily and safely level up to align with the stairs. Pay attention that both Rubber Crawler approach the first stair at right angle.

Model SF:



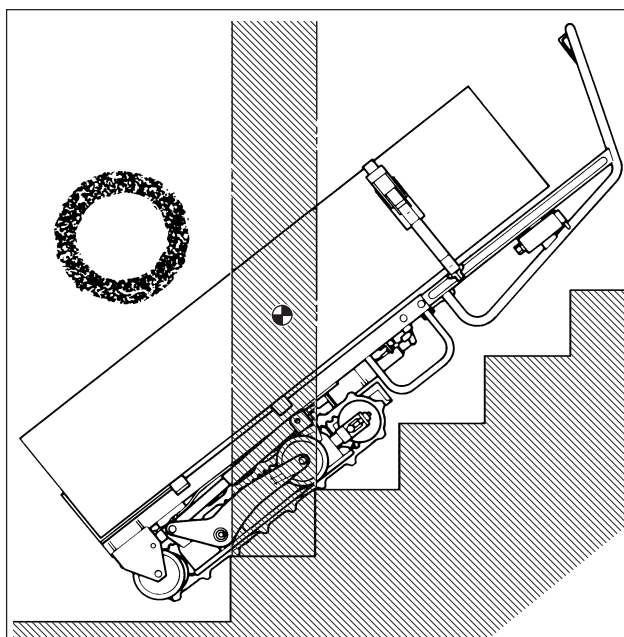
WARNING

If the lugs of the left and right Rubber Crawlers do not contact a stair nose at the same time, CARRY-UP will climb the stairs askew. This is a highly risky situation.

- (2) Proper weight balance:

Lay the machine on the stairs with Main Wheels a little aloft.

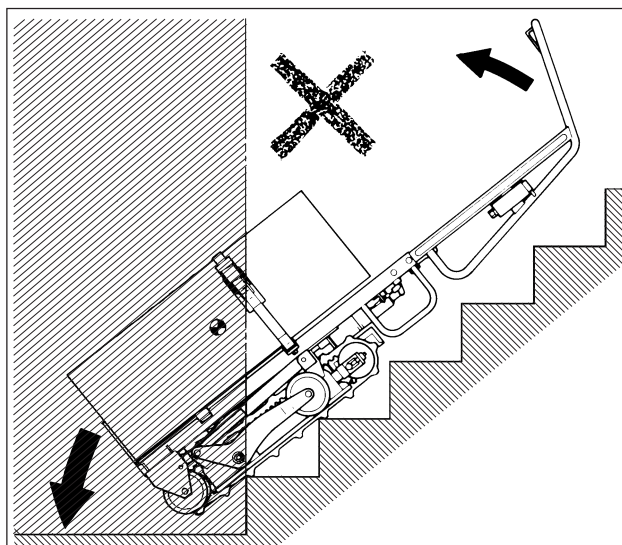
If the machine does not turn to the handle side or Main Wheels side, the center of gravity is within the proper range.



(3) Improper weight balance:

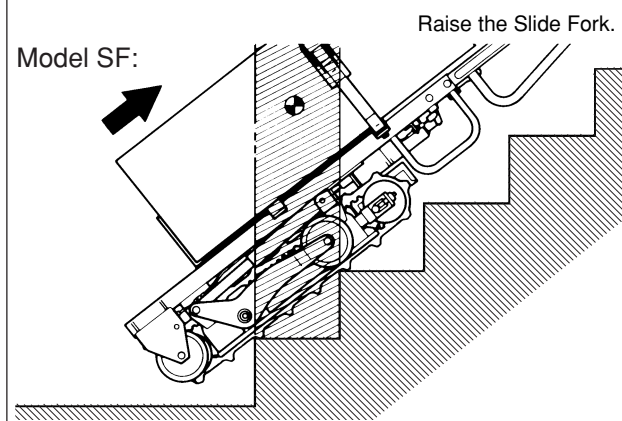
Lay the machine on the stairs with Main Wheels a little aloft.

If the top of the machine (handle side) is floated, the center of gravity should be in the bottom side. Danger will result. Reload Cargo with its center of gravity on the upper side of the machine. If it is difficult to shift the center of gravity to the upper side, maintain pressure on the handle downward by applying the operator's weight.



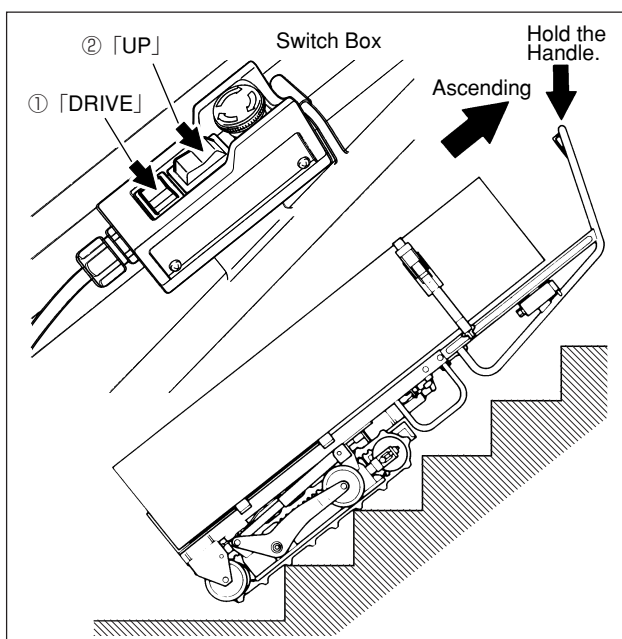
[Model SF]

Set Select Switch to TOE PLATE and raise Slide Fork Unit the center of gravity is within the proper range.



(4) Start ascent

- ① After the proper weight balance is confirmed, set Select Switch to DRIVE.
- ② When UP is pressed, the machine will start ascent operation.



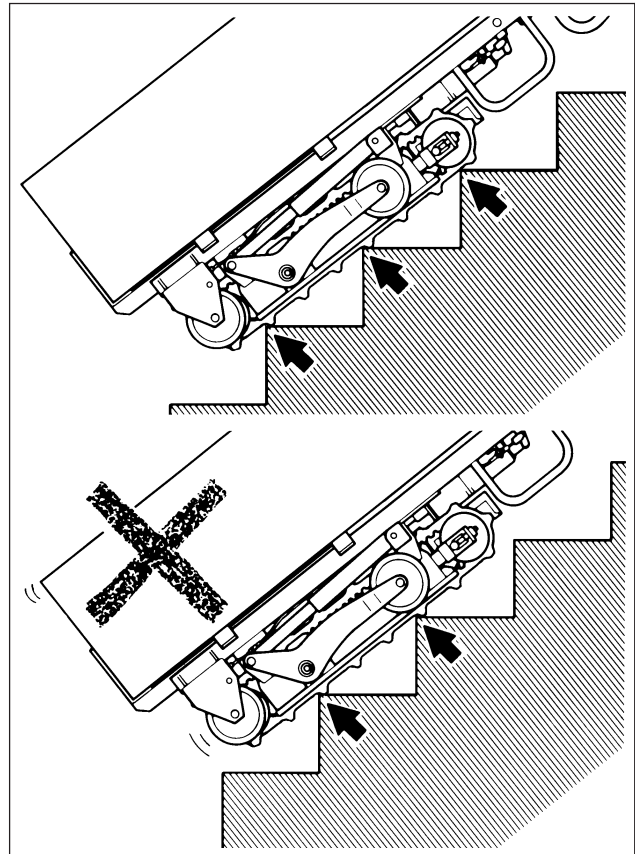
WARNING

- Before starting the ascent operation, be sure to confirm that there is no dangerous situation behind the operator.
- Be sure to press the handle downward to prevent machine toppling. If it is difficult to keep the handle by operator's own force, check the weight balance again or avoid using the machine for such cargo.

(5) Temporary stoppage

If the operator releases Operation Switch, Electro Magnetic Brake will function and the machine will immediately stop.

Rubber Crawler lugs catch the stair noses preventing the machine from sliding down.



WARNING

If cargo balance and the machine stopping position are unstable, a dangerous situation may occur.

Try to have a lot of contact points between crawler track and stairs as much as possible.

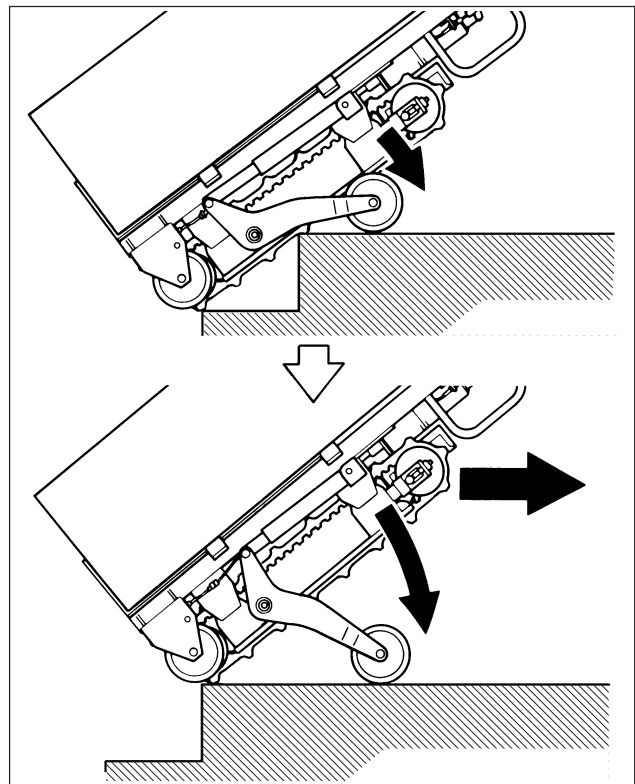
(6) Stop ascent

① When Assist Wheels overhang the top stair, extend them.

② Adjust Assist Wheel's angle so that the machine can ascend the stairs at the same angle.

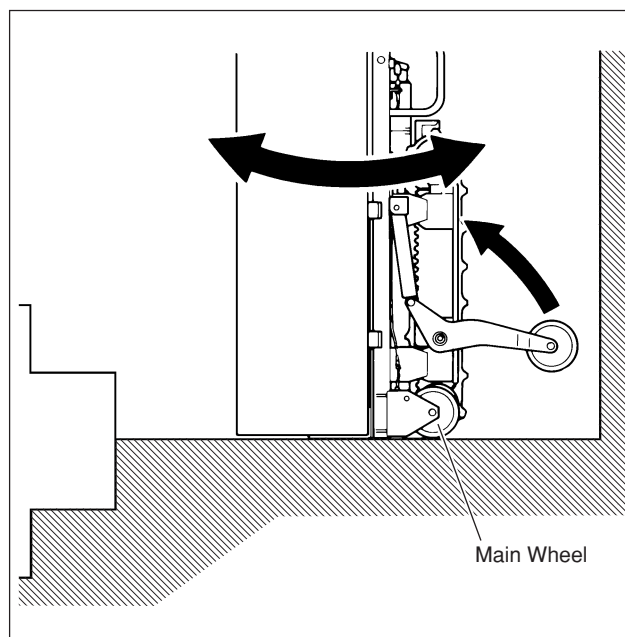
When Main Wheels reach the top stair, release Main Wheel brake and pull back the machine until the machine is on the top floor.

If cargo or Handle contacts the wall or the ceiling of the landing, cease using the machine for further ascent to prevent danger.



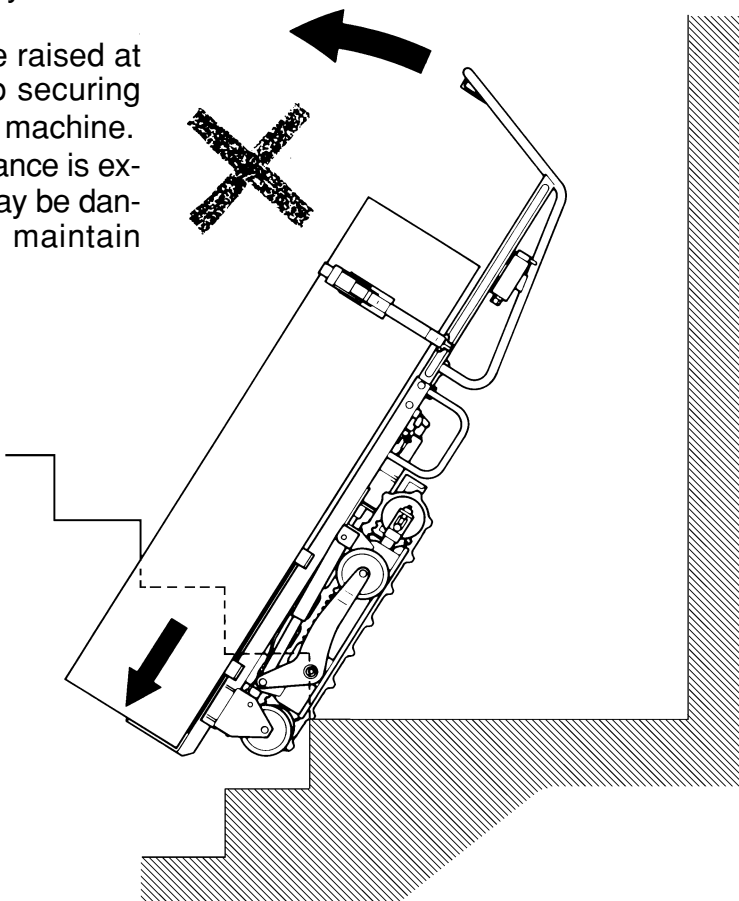
- ③ When the machine reaches the landing, retract Assist Wheels and transfer and turn the machine on its Main Wheels.

If a landing is too small to operate the machine, pay attention to maintaining enough space to raise and turn the machine. If a landing is spacious, Assist Wheels are not needed to retract to turn the machine.



DANGER

- Never load any cargo which center of gravity is difficult to maintain at the same point. This cargo may be dangerous.
- When the machine is to be raised at a landing, pay attention to securing enough space to raise the machine.
- Model SF: If the gravity balance is exceedingly bottomward, it may be dangerous. Pay attention to maintain cargo's gravity balance.

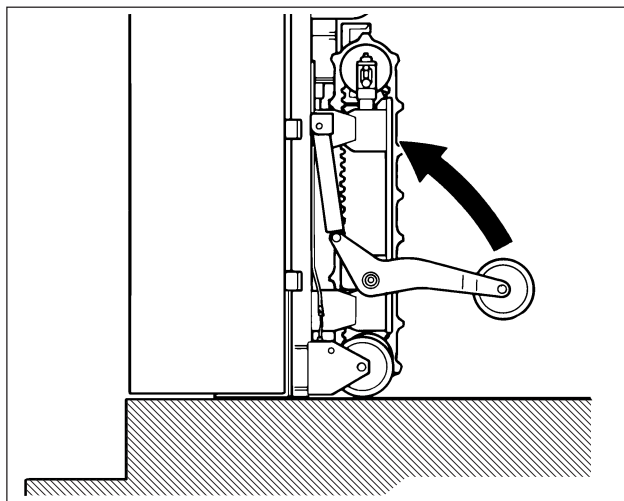


7-4 DESCENDING STAIRS

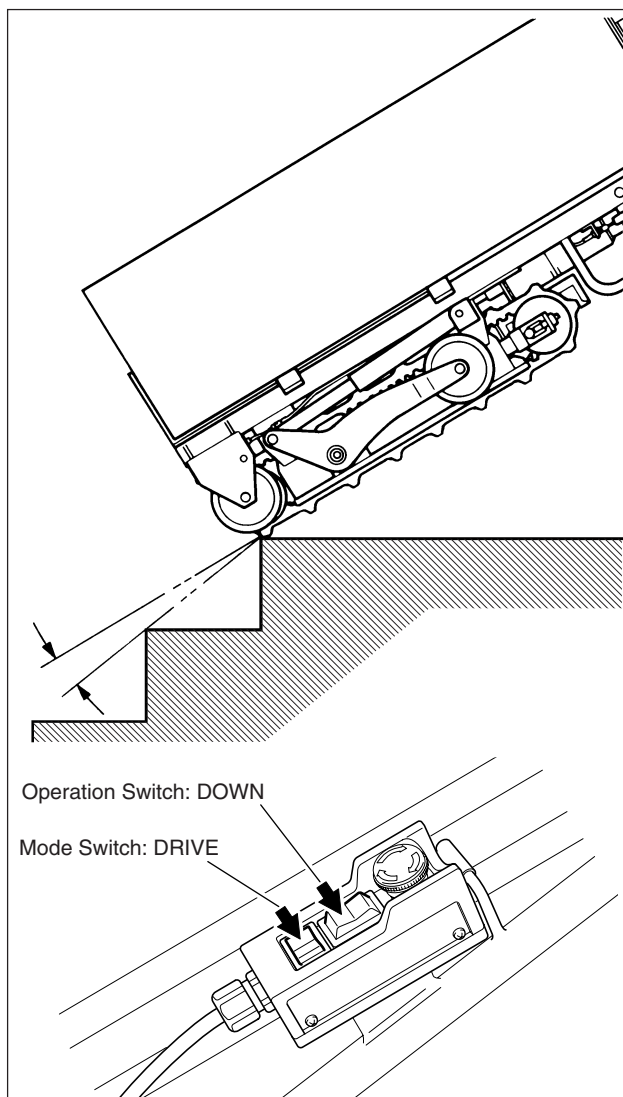
(1) Start descending

- ① When the machine reaches the edge of the top stair, retract Assist Wheels.

NOTE : The operator must stand upward of the machine during descent.



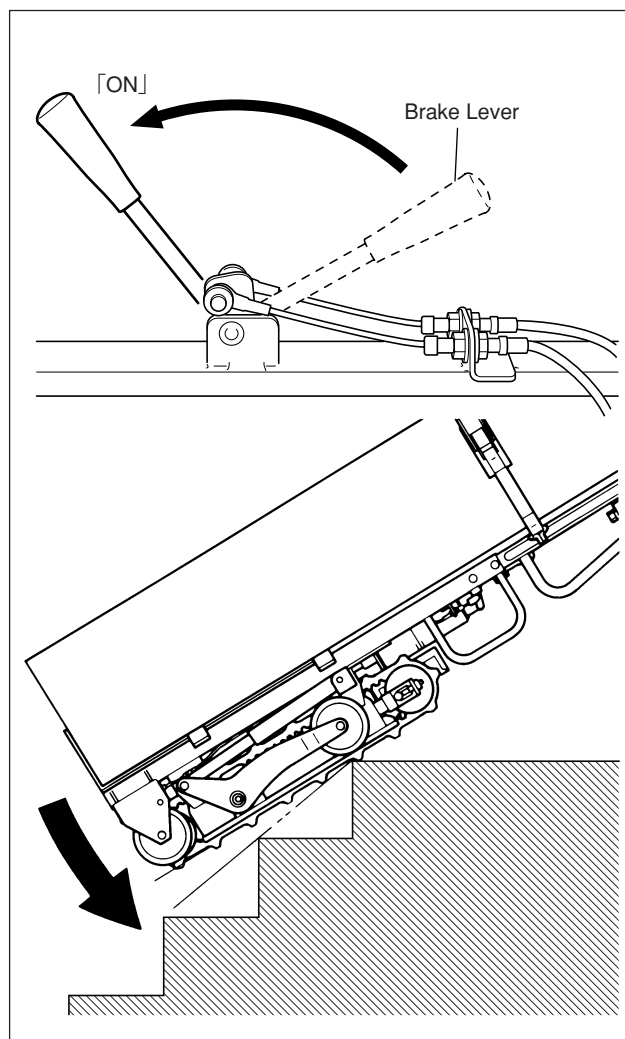
- ② Check that Select Switch is set to DRIVE and then tilt the machine to a shallower angle than the stairs' angle. Press DOWN. The machine will start descending the stairs. Pay attention that both Rubber Crawlers run at a right angle to the stair.



WARNING

If the lugs of the left and right Rubber Crawlers do not contact a stair nose at the same time, CARRY-UP will descend the stairs askew. This is a highly risky situation.

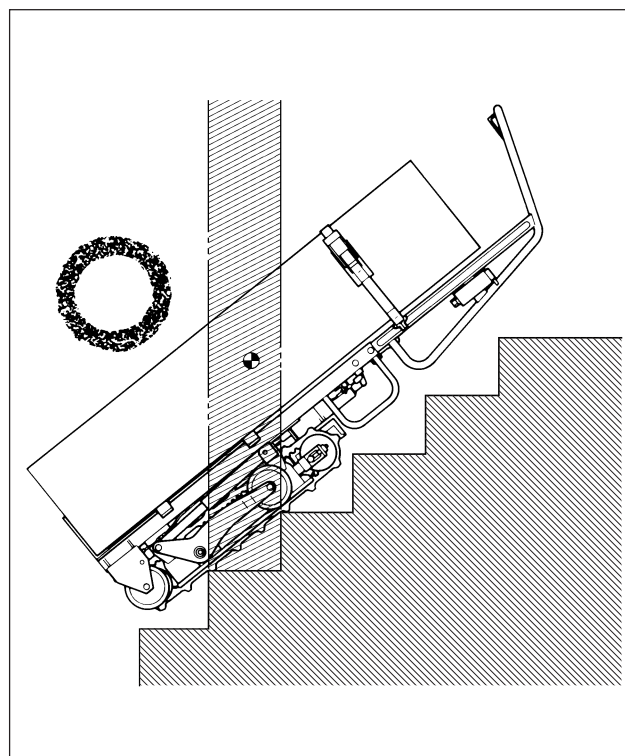
- ③ When the bottom end of Rubber Crawlers reach the second stair, stop the machine, lift up Handle carefully to make machine position at a right angle to the stair with keeping the balance.



(2) Proper weight balance

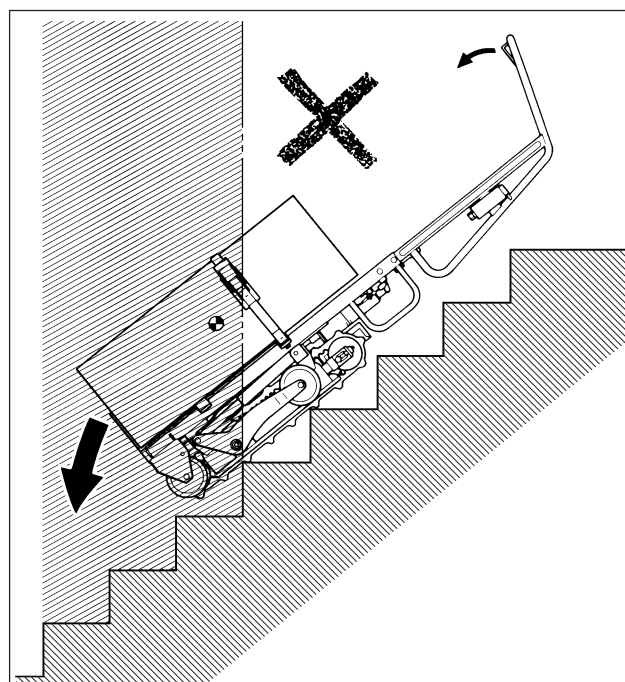
To check the weight balance lay the machine on the stairs with Main Wheels a little aloft.

If the machine does not turn to the handle side or Main Wheels side, the center of gravity is in the proper range.



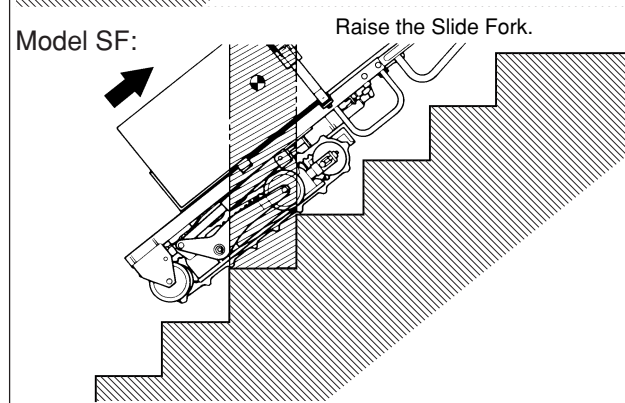
(3) Improper weight balance

If the top of the machine (handle side) is aloft, the center of gravity is on the bottom side. Danger will result. Reload Cargo with its center of gravity on the higher side of the machine. If it is difficult to shift the center of gravity to the higher side, maintain pressure on the handle toward the stairs by applying the operator's weight.



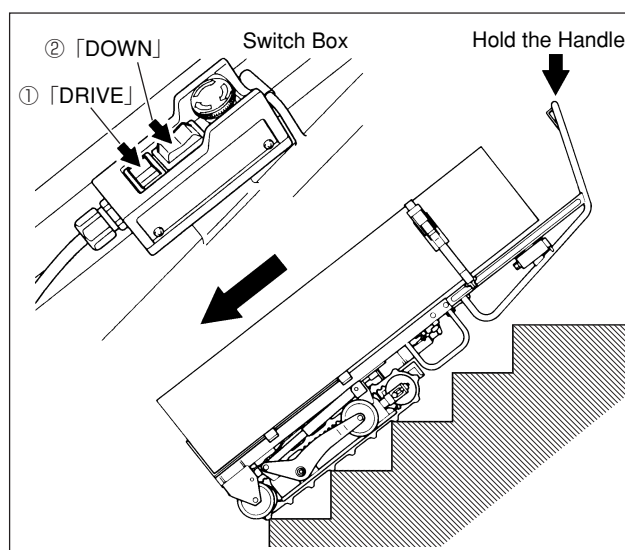
[Model SF]

Set Select Switch to TOE PLATE and raise Slide Fork Unit the center of gravity is within the appropriate range.



(4) Start descent

- ① After the proper weight balance is confirmed, set the Select Switch to DRIVE.
- ② When DOWN is pressed, the machine will start descent operation.

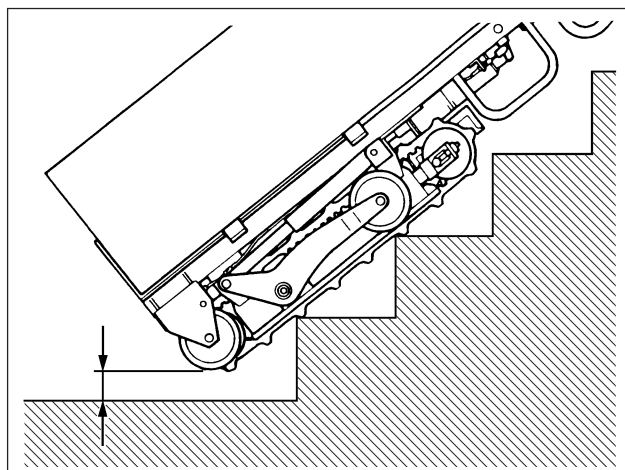


WARNING

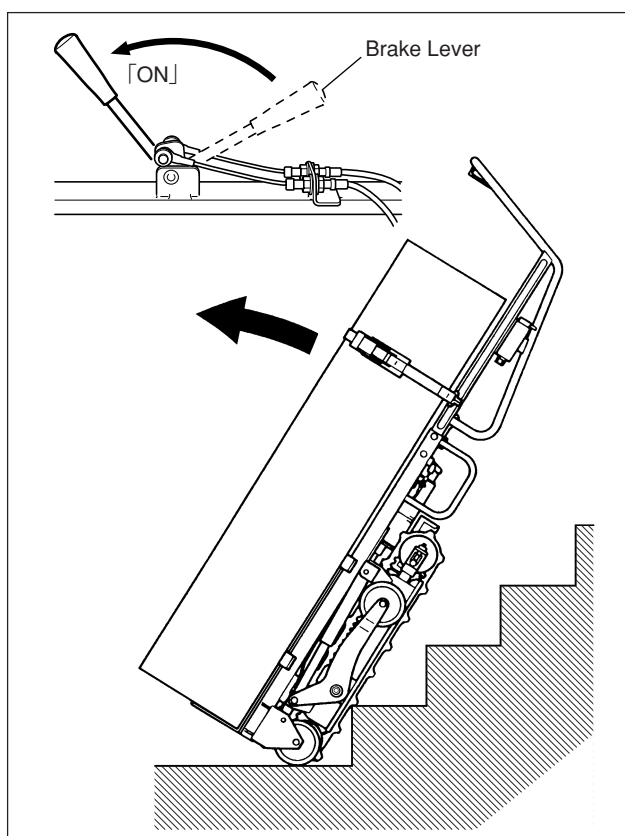
- Before starting descent operation, be sure to confirm that there is no dangerous situation in front of the operator.
- Be sure to press the handle perpendicularly toward the stairs to prevent machine toppling. If it is difficult to press the handle, check the weight balance again or avoid using the machine for such cargo.

(5) Stop descent

- ① When the machine has nearly reached the bottom floor, stop the machine.



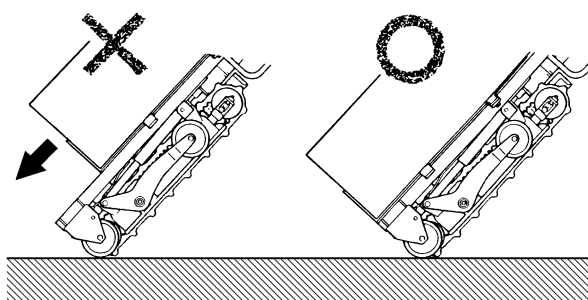
- ② Apply Main Wheel Brake by raising Brake Lever. When Main Wheels contact the ground, raise the machine carefully.



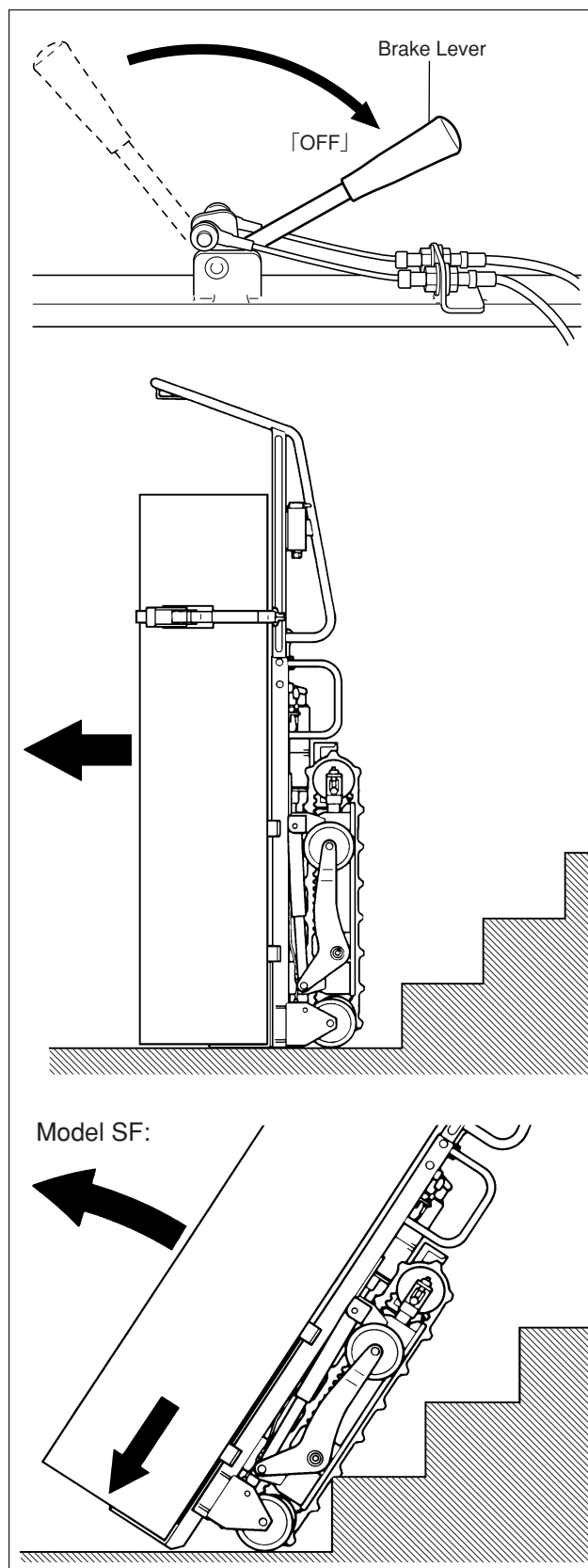
WARNING

Model SF:

If Slide Fork Unit is highly positioned, be sure to lower it. Neglecting Slide Fork Unit's lowering may cause the machine to topple frontward dangerously.



- ③ Release Main Wheel Brake and manually transfer the machine.



[Model SF]

When Main Wheels contact the ground, lower Slide Fork Unit to shift the center of gravity to promote easier raising of the machine.



WARNING

The operator must be trained for stair ascent/descent operations and turning operation on landings. Firstly try to operate the machine without cargo. Then increase the cargo type and weight in phases to master control of the machine.

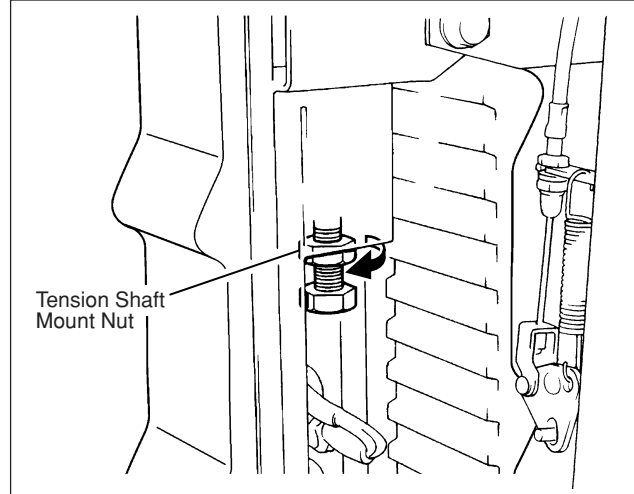
8 RUBBER CRAWLERS ADJUSTMENT AND REPLACEMENT

Since Jan. 2005, Rubber Crawler specifications for CU-406 to CU606SF Series were revised in keeping with model improvements.

8-1 ADJUSTMENT

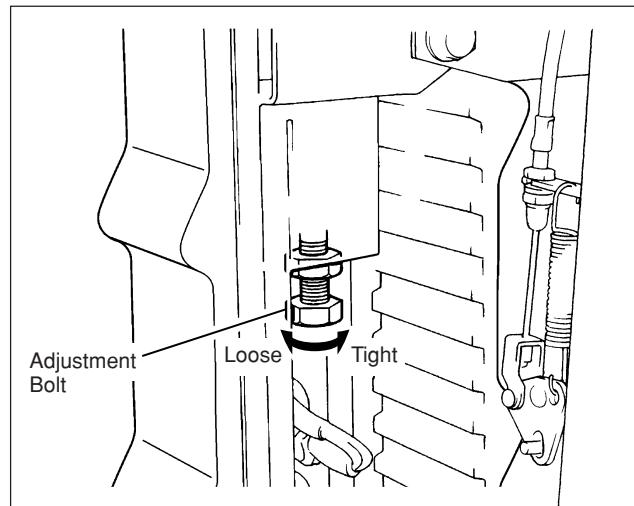
(1) Tension adjustment

- ① Raise the machine upright, then loosen Tension Shaft Mount Nut.



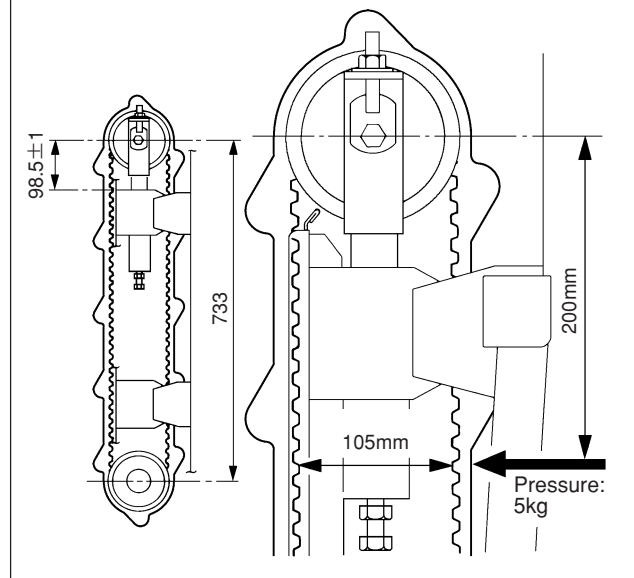
- ② Adjust the tension by turning Adjustment Bolt. As Adjustment Bolt turns clockwise, tension will increase. To obtain the standard tension, adjust the distance between the inside of Rubber Crawler to 105 mm while 5kg pressure is applied to Rubber Crawler 200 mm from the center of Sprocket Wheel. (Fig. B)

It is possible to adjust the tension with 2 other tension adjustment procedures: the distance between the center of Driven wheel and the top of the bracket should be 98.5 mm or the distance between the centers of the front and rear Sprocket Wheels should be 733 mm. (Fig. A)



(Fig. A)

(Fig. B)



NOTE : After tension adjustment, be sure to tighten Tension Shaft Mount Nut securely.

(2) Rubber Crawler alignment correction

Set Select Switch to DRIVE and press DOWN or UP to power Rubber Crawlers.

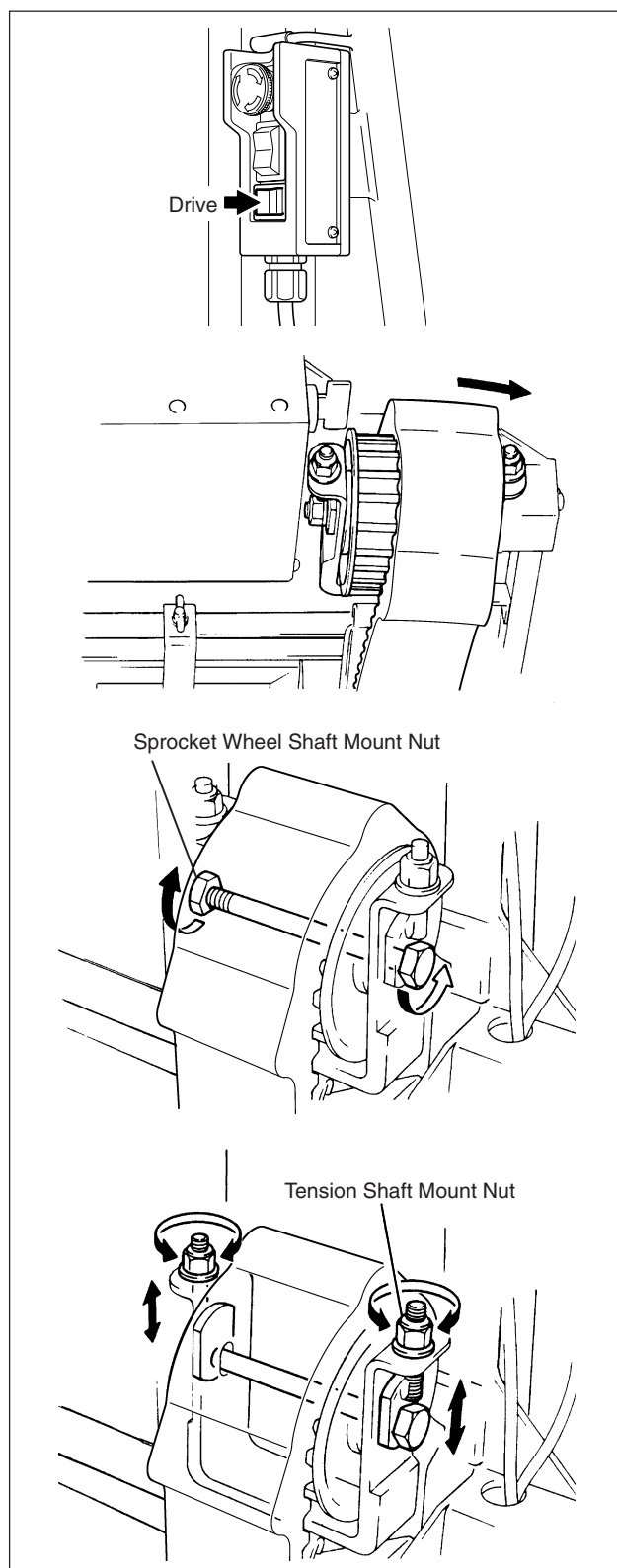
Check that Rubber Crawler keeps running on center of Sprocket Wheel. If the angle of Sprocket Wheel is incorrect, Rubber Crawler deviates gradually from the center of Sprocket Wheel.

Loosen Driven Wheel Shaft Mount Nut and adjust the angle of Driven Wheel by turning the right or left Tension Shaft Mount Nut.

If the center of Rubber Crawler has gradually shifted to the inside of Driven Wheel, turn the nut on the inside of Sprocket Wheel clockwise.

If the center of Rubber Crawler has gradually shifted to the outside of Driven Wheel, turn the nut on the outside of Sprocket Wheel clockwise.

NOTE : After the alignment adjustment is completed, securely retighten Sprocket Wheel Shaft Mount Nut and Tension Shaft Mount Nut.



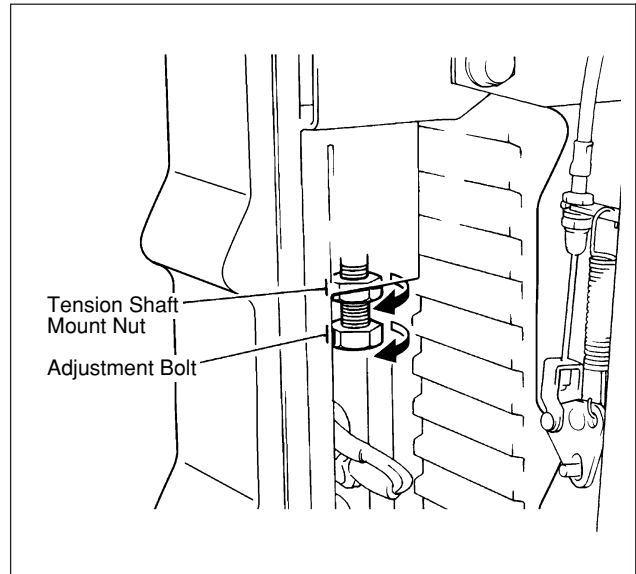
CAUTION

- If Rubber Crawler tension is insufficient, it may derail. If the tension is excessive, the motor load will increase and battery life will shorten.
- Adjust the right and left Rubber Crawlers equally. Unequal adjustment prevents machine straight running.

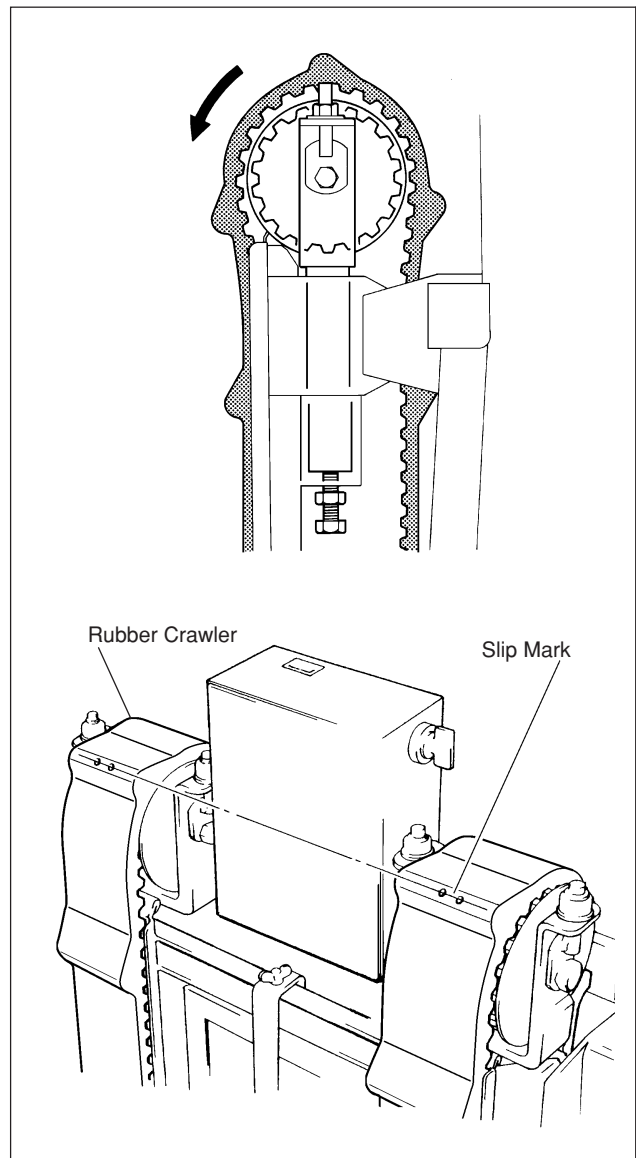
8-2 RUBBER CRAWLER PITCH ERROR CORRECTION PROCEDURE

Rubber Crawler pitch error will prevent smooth stair ascent/descent and may cause Rubber Crawler derailment.

- ① Loosen Tension Shaft Mount Nut. Turn Adjustment Bolt counter-clockwise in order to loosen Rubber Crawler.

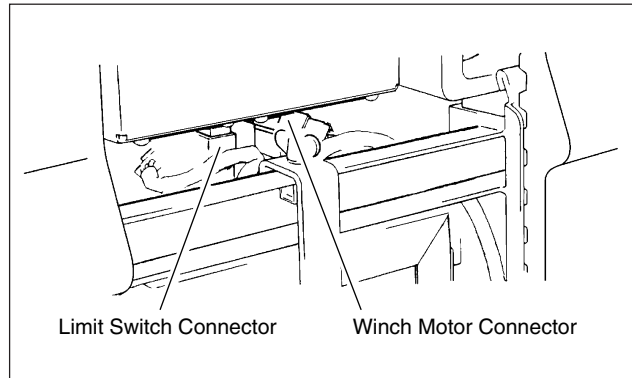


- ② Shift one of Rubber Crawlers and align each lettered Slip Mark to the same position. Turning one of Rubber Crawlers in the arrowed direction as shown in the figure at right will help easier pitch error correction. After completion of adjustment, be sure to retighten Tension Shaft Mount Nut securely.

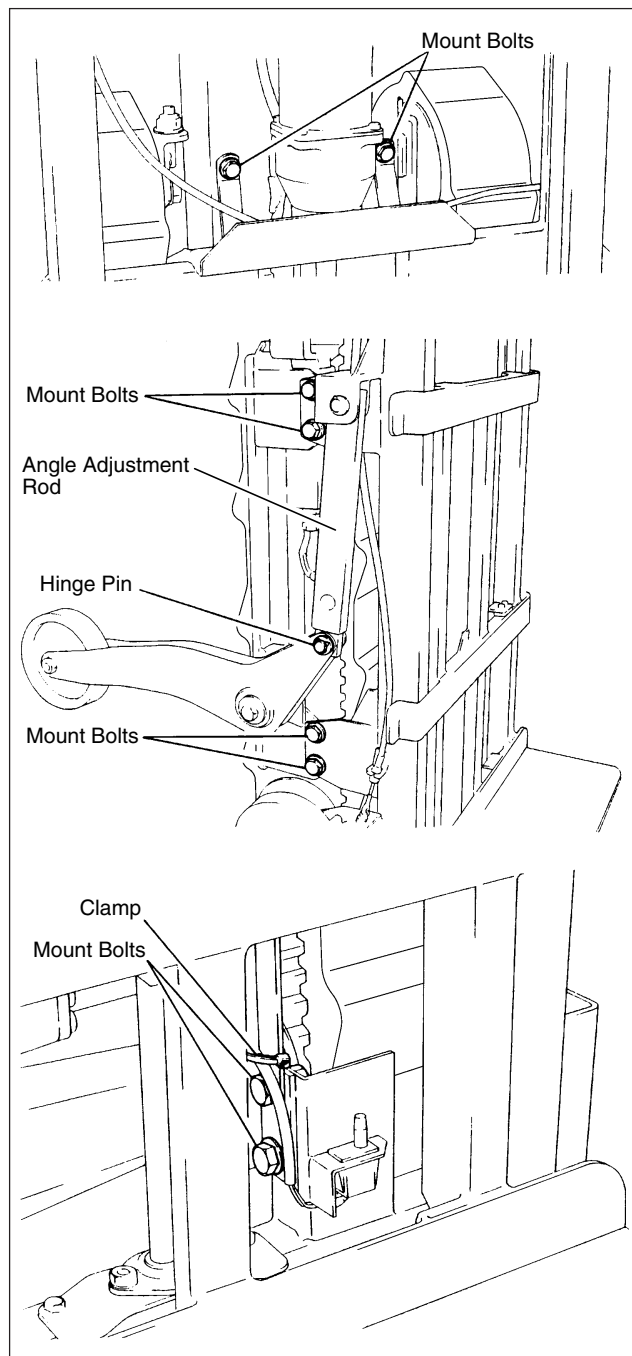


8-3 RUBBER CRAWLER REPLACEMENT

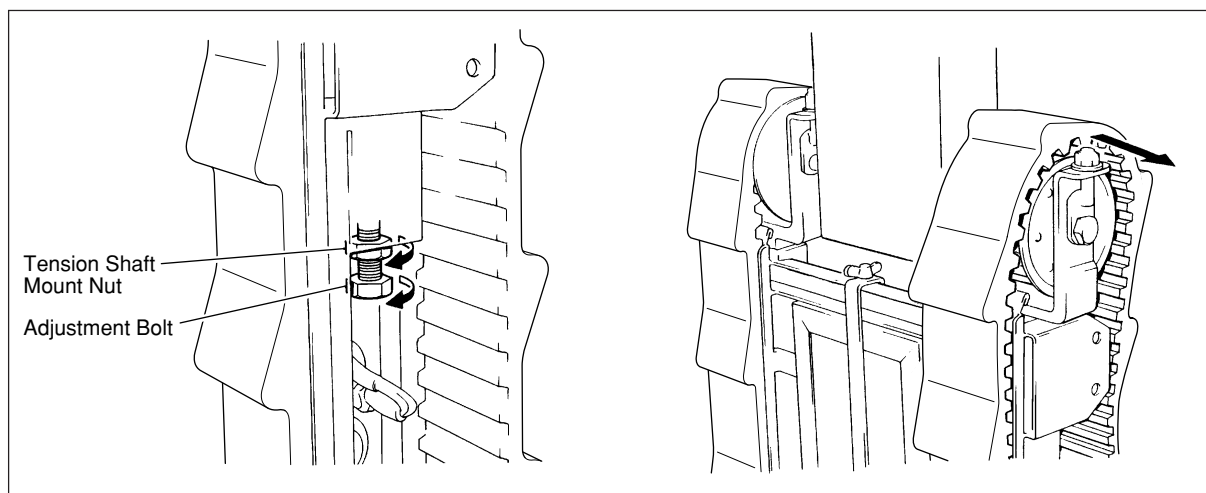
- ① Disconnect the winch and Limit Switches wire harness connector from Switch Box and remove the winch and Limit Switches wire harness from the chassis.



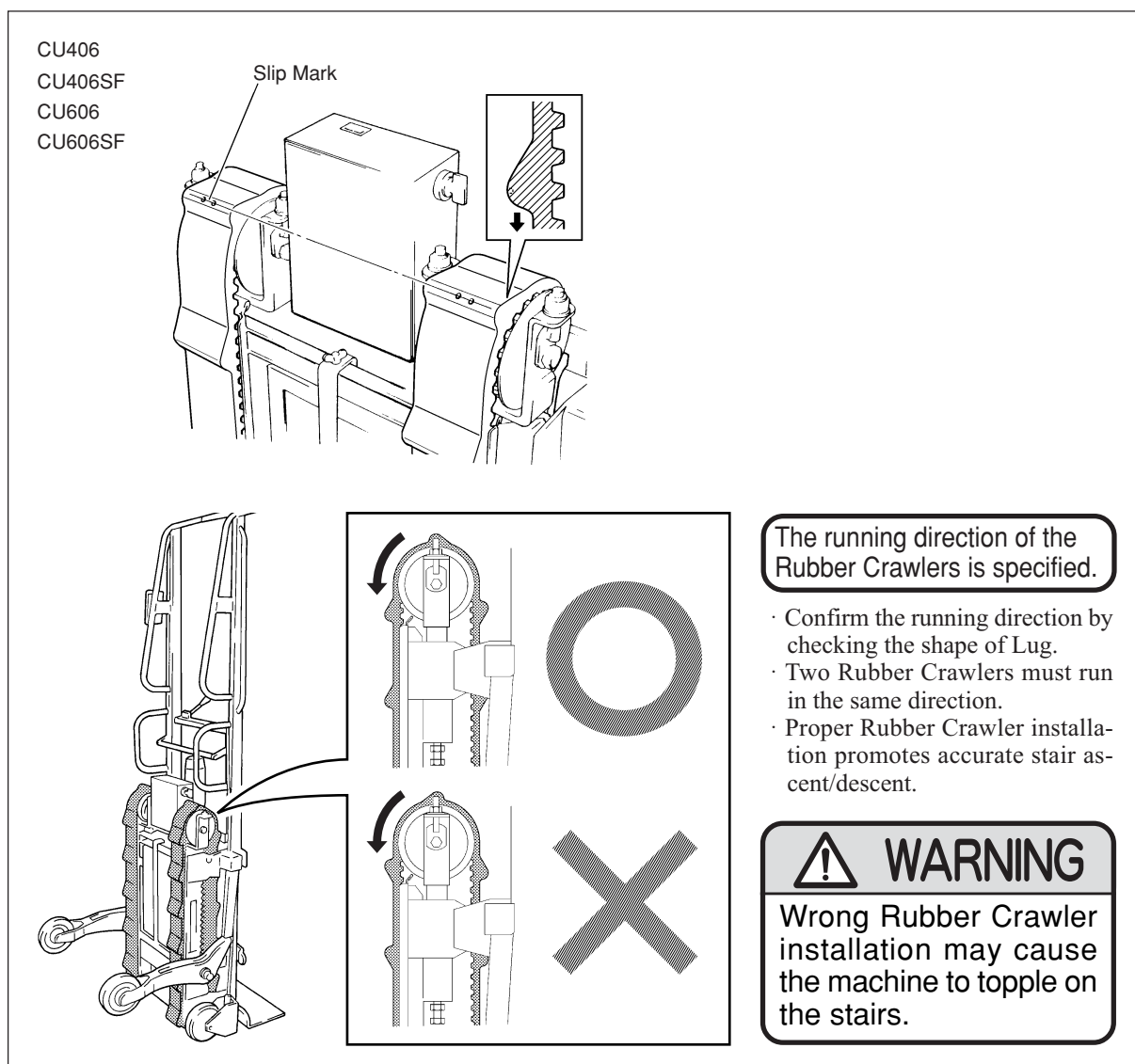
- ② Remove Mount Bolts and nuts that connect the cargo bed to be drive unit and remove the hinge pin that connects Assist Wheel arm and Angle Adjustment Rod to allow the drive unit to be removed.



- ③ Loosen Drive Unit's Tension Shaft Mount Nut. Turn Adjustment Bolt counter-clockwise to loosen Rubber Crawler. Remove Rubber Crawler.



- ④ Mount New Rubber Crawler with the reverse procedure of its removal. Align the two Rubber Crawlers' lugs with each other's while aligning their Slip Marks.



9. DAILY MAINTENANCE AND CARE

9-1 BATTERY

- When CARRY-UP is not to be used or its Battery Pack is to be charged, turn off Key Switch and remove Key. If Key Switch is kept in the ON position, Battery will quickly discharge and it may not have capacity to run CARRY-UP the following day.
- After the end of operation or before storing it, be sure to charge Battery using Charger of CARRY-UP. (Because it requires a long charging time, if it is not charged enough, it will be difficult to operate the following day.)
- When storing CARRY-UP for a long period of time, maintain its Battery in a fully charged state. Not doing so will result in an extremely short life. (Even if Battery is already fully charged, recharge Battery again monthly.)

9-2 RUBBER CRAWLERS

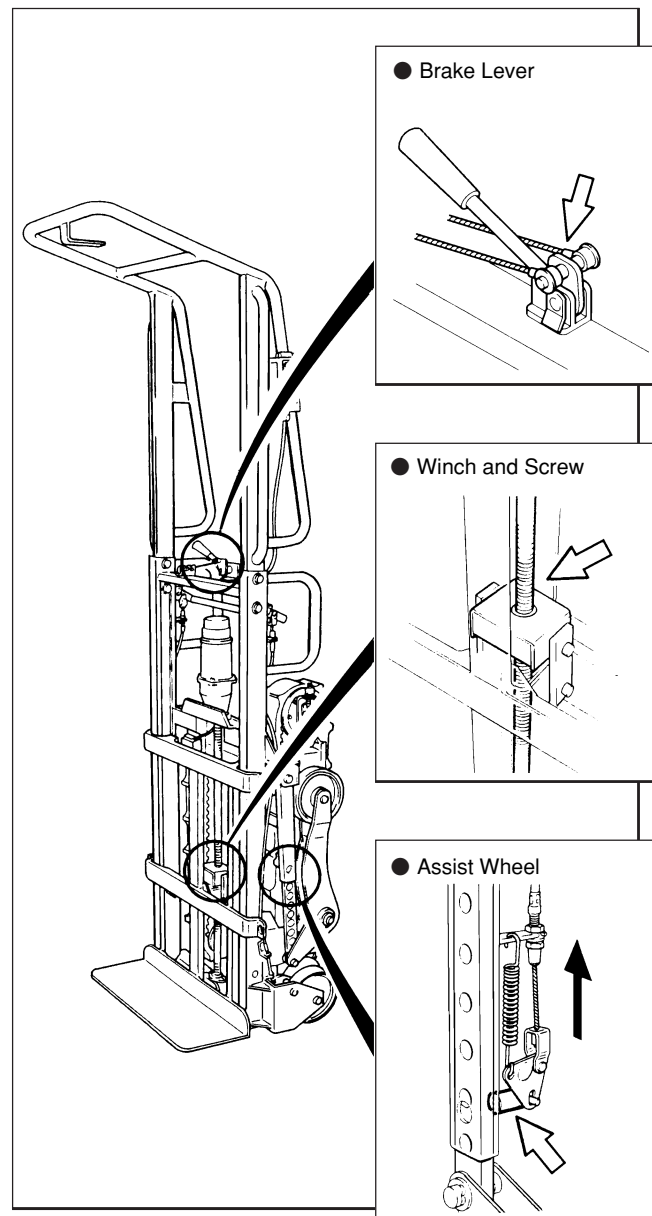
- If oil adheres, immediately wipe it off completely.
- Check there is no crack or wear concerning Rubber Crawlers. If any defect on Rubber Crawler is found, stop CARRY-UP immediately and replace the part with a new one.

9-3 LUBRICATION

- Brake Lever
Lubricate Brake Lever so that it moves smoothly.

- Winch and Screw Rods
Remove dust with a clean cloth and lubricate them with a penetrating rustproof lubricant. (low viscosity lubricant)

- Assist Wheels
Remove dust with a clean cloth and lubricate them with penetrating rustproof lubricant. (low viscosity lubricant). Check that Assist Wheels can be extended and retracted smoothly while checking for smooth cam, Lock Pin and lever movement.



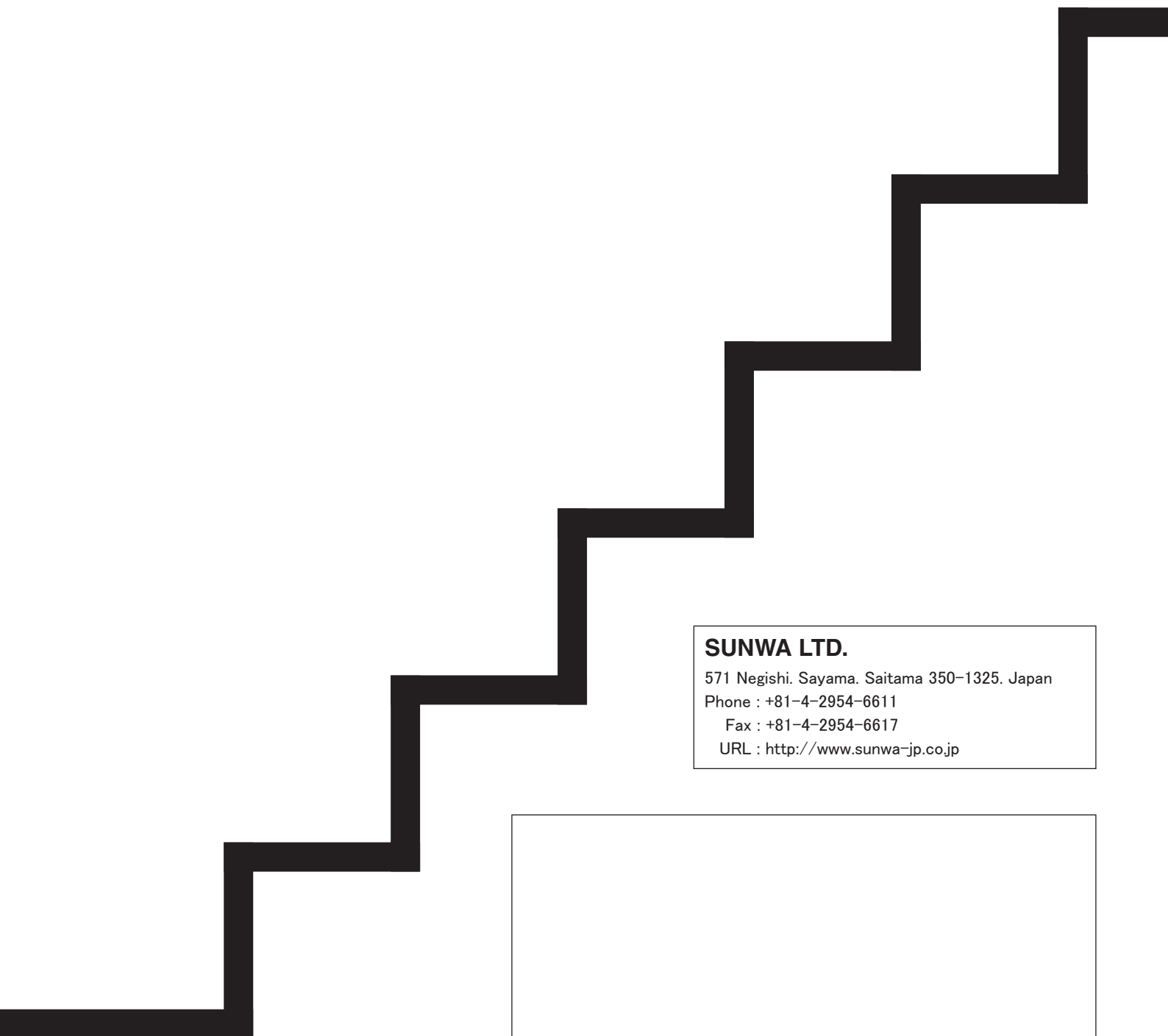
10. INSPECTION AND MAINTENANCE

Daily maintenance keeps CARRY-UP in good condition. Lack of daily inspection will greatly reduce the life of CARRY-UP.

To prevent possible trouble and to extend CARRY-UP's life, undertake daily inspections.

	CHECK ITEM	CHECK PROCEDURE	COUNTERMEASURE
Electronic Parts	Key Switch (Relay Box)	Check its functioning.	Replace.
	Operation Switch	UP/DOWN Switch	Check its functioning.
		TOE PLATE/DRIVE Select Switch	Check its functioning.
		Emergency Stop Switch	Check its functioning.
	Limit Switch (Upper / Lower)	Check its functioning.	Replace.
	Battery Gauge	Check for damage.	Replace.
	Switch Box	Check for cable breakage or twist.	Repair or Replace.
	Relay Box	Check cable coupler damage or drop out.	Repair or Replace.
Drive Unit	Rubber Crawlers	Check for cracking or wear.	Replace.
		Check for looseness.	Adjust.(See P32.)
		Check for pitch error.	Adjust.(See P34.)
	Reduction Gear	Check for abnormal noise.	Replace.
		Check for oil leakage.	Replace.
	Motor	Check for abnormal noise.	Replace.
	Sprocket	Check for damage.	Replace.
	Driven Wheel	Check for damage.	Replace.
Slide Fork Unit	Winch and Screw Rod	Check for rust, bends or rattles.	Lubricate or replace.
	Winch and Reduction Gear	Check for abnormal noise.	Replace.
	Winch and Motor	Check for abnormal noise.	Replace.
Frame Unit	Assist Wheel	Check for cracking or wear.	Replace.
	Assist Wheel Lock Lever	Check for its functioning.	Repair or Replace.
	Assist Wheel Lock Wire	Check for looseness or damage.	Repair or Replace.
	Assist Wheel Lock Pin	Check its functioning.	Replace.
	Wheel	Check for cracking or wear.	Replace.
	Brake Lever	Check its functioning.	Replace.
	Brake Wire	Check for looseness or damage.	Repair or Replace.
	Brake	Check for cracking or wear.	Replace.
Battery Pack	Battery Case	Check for damage.	Repair or Replace.
		Check for receptacle damage.	Replace.
	Battery	Check for wear or damage.	Replace.
Charger	LED	Check its functioning.	Replace.
	Plug	Check for damage.	Replace.
	Wiring	Check for cable breakage or cracking.	Adjust or replace.
Other	Bolts &Nuts	Check for looseness or drop out.	Retighten or tighten with a new screw.
	Operation Manual	Check that a manual exists.	If no manual exists, obtain one.

- If any trouble or malfunction has arisen which is not described in the preceding table, contact the sales agency. An improper countermeasure may cause danger.
- For details on periodical inspections, consult the sales agency where you purchased CARRY-UP.



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