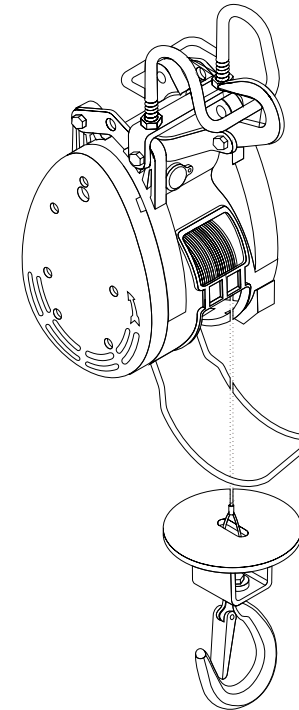


TOHO®

Instruction Manual
Mini Electric winch
S-series, T-series, M-series



READY THIS MANUAL BEFORE USING THESE PRODUCTS
This manual contains important safety, installation, operation and maintenance information. Make this manual available to all persons responsible for the operation, installation and maintenance of the mini electric winch.

Table of Contents

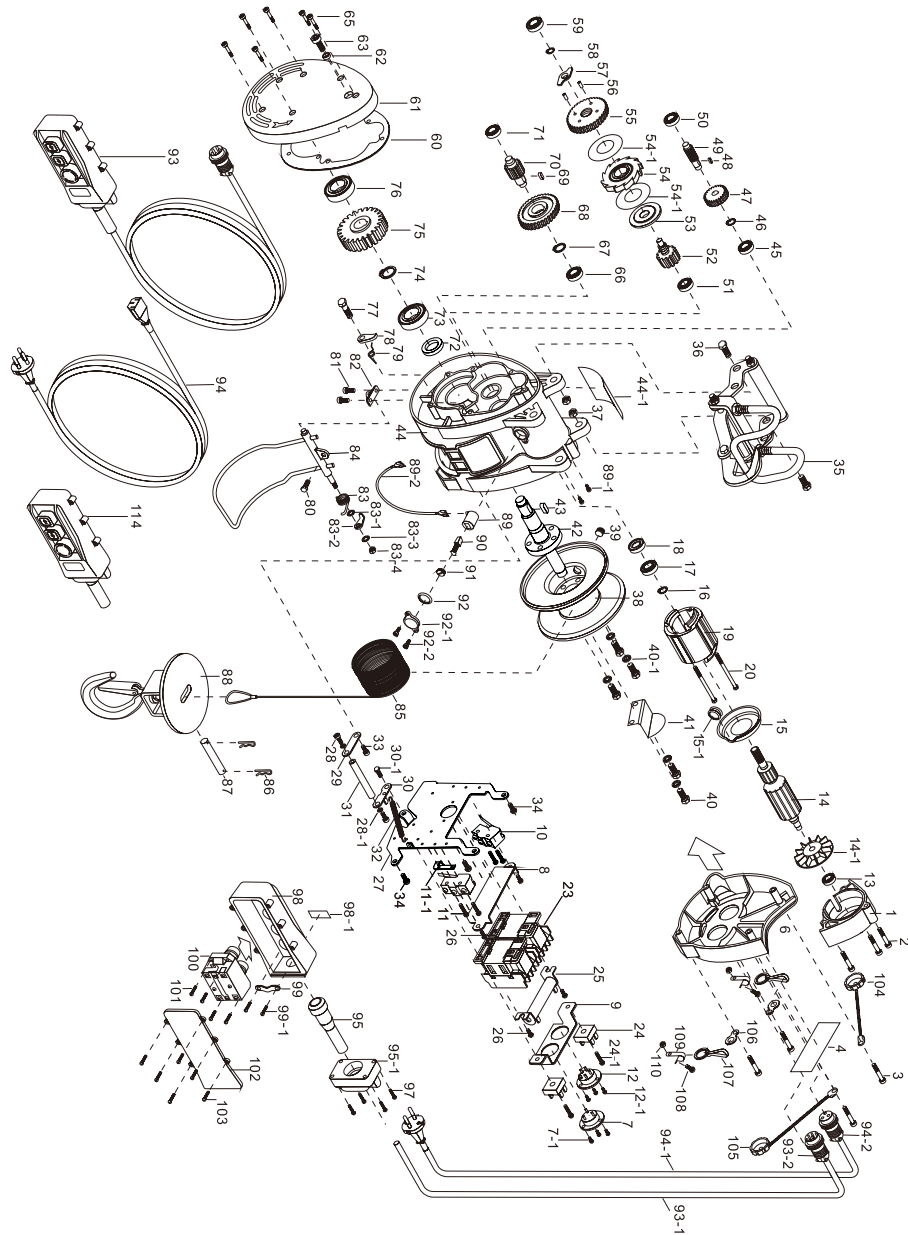
1. Specifications and Dimensions	2
2. Precautions	
2.1 General Safety Precautions	3
2.2 Environmental Precaution	3
2.3 Handling Precautions	8
3. Installation	5
3.1 Winch Assembly	5
3.2 Mounting	5
3.3 Plug Insertion	5
4. Winch Principles	
4.1 Percentage Duty Cycle (%ED)	6
4.2 Load Rated	6
4.3 Braking	6
4.4 Over-winding Lift Prevention	7
4.5 Reverse-Winding Prevention	7
5. Maintenance and Replacement	
5.1 Carbon Brush Replacement	7
5.2 Wire Rope Replacement	8
5.3 Oil Lubrication	8
6. Checking Reference	9
7. Trouble Shootings	10
8. Wiring Diagram	11
9. Parts Drawing S-Series-160kg,180kg,230kg,250kg,300kg	12
Parts Drawing T-Series-160kg,180kg,230kg,250kg,300kg	13
Parts Drawing M-Series-160kg,180kg,230kg,250kg,300kg	14
Parts Drawing S-Series-280kg,360kg,500kg	15
Parts Drawing T-Series-280kg,360kg,500kg	16
Parts Drawing M-Series-280kg,360kg,500kg	17
10. Parts List	18

10. Part List

No.	Parts description	No.	Parts description	No.	Part description
1	MotorCover	37	Nut	81	Screw
2	Socket Bolt	38	Reel Drum	82	Upper Limit Holder
3	Socket Bolt	39	Wire Rope Fixing Screw	83	Spring
4	Label	40	Screw	83-1	Washer
5	Rectifier Fixing Plate (M)	40-1	Spring Washer	83-2	Upper Limit Push Rod
5-1	Screw (M)	41	Wire Rope Side Cover	83-3	Washer
6	Wiring Box Cover	42	OutputShaft	83-4	Nut
7	Power Cable Connector	43	key	84	Upper Limit
7-1	Screw	44	Main Body Base	85	Wire Rope
8	Contacting Fixing Plate (M)	44-1	Sticker	86	R Pin
9	Control Connector Fixing Plate	45	Bearing	87	Wire Rope Fixing Pin
10	Micro Switch	46	Circlip	88	Lower Hook Set
11	Screw	47	First Reduction Gear	89	Carbon Brush Base
11-1	Fixing Plate	48	Key	89-1	Carbon Cable Fixing Screw
12	Switch Cable Connector	49	First Reduction Pinion	89-2	Carbon Base Cable
12-1	Screw	50	Bearing	90	Carbon Brush
13	Bearing	51	Bearing	91	Carbon Brush Cover
14	Rotator	52	Second Reduction Pinion	92	O Ring
14-1	Fan	53	Brake Disk	92-1	Carbon Brush Protection
15	AirGuiding Cover	54	Brass Ratchet Disc	92-2	Screw
15-1	PlasticTube	54-1	Copper Washer	93	Control Switch Set
16	Circlip	55	Second Reduction Gear	93-1	Switch Cable
17	Bearing	56	Spring Pin	93-2	Switch Cable Connector
18	Oil Seal	57	Rotary Stop Plate	94	Power Cable Set
19	Stator	58	Circlip	94-1	Power Cable with Plug
20	Socket Bolt	59	Bearing	94-2	Power Cable Connector
21	Terminal Block(T)	60	Gasket	95	Cable Support
22	Screw (T)	61	Gear Cover	95-1	Cable Support Socket
23	Electromagnetic Contactor(M)	62	Oil Seal	97	Screw
24	Bridge Rectifier	63	Socket Bolt	98	Switch Box
24-1	Screw	65	Socket Bolt	98-1	Sticker
25	Resistor	66	Bearing	99	Cable Fixing Plate
26	Screw	67	Circlip	99-1	Screw
27	Wiring Rack	68	Third Reduction Gear	100	Internal Switch Contact
28	Screw	69	Key	101	Screw
28-1	Washer	70	Third Reduction Pinion	102	Switch Cover
29	Limit Lever Fixing Plate	71	Bearing	103	Screw
30	Limit Lever Fixing Plate	72	Oil Seal	104	PLT Cover Protection (T)
30-1	Screw 73 Bearing	73	Bearing	105	PLT Cover Protection (T)
31	Anti-reverse Reel Push Rod	74	Circlip	106	Twins -Hole Hook
32	Spring	75	Fourth Reduction Gear	107	Clasp
33	Screw	76	Bearing	108	Screw
34	Screw	77	Pawl Screws	109	Cable Fixing Clip
35	Upper Hook Set	78	Pawl	114	Switch without Cable
36	Socket Bolt	79	Socket Bolt		
36-1	Upper hook Bolt Sleeve	80	Upper hook Bolt Sleeve		

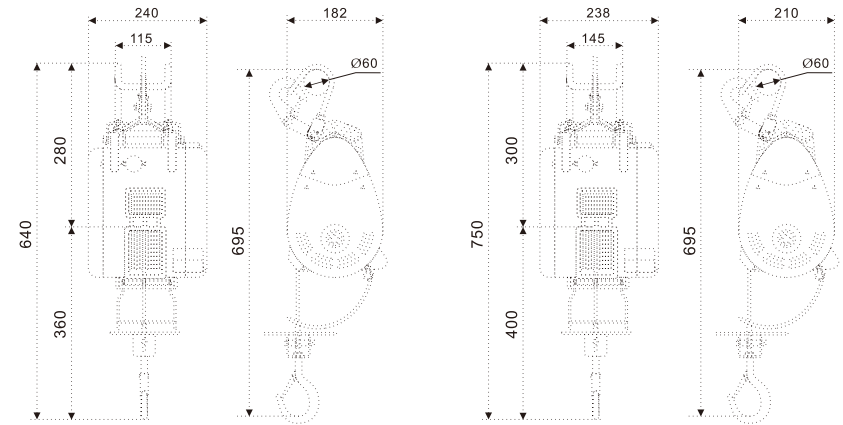
9. Parts drawing M-Series

280kg,360kg,500kg



9. Specifications and Dimensions

Model	S-series T-Series M-series		
Rated Load	160kg/180kg/230kg/250kg/300kg	280kg/360kg	500kg
Lifting Height	30m	60m	30m
Wire Rope Dia.	5mm	5mm	6mm
Motor	1200W	160kg	
	1300W	180kg/230kg/280kg	
	1500W	250kg	
	1600W	300kg/360kg/280kg	
Lifting Speed	50Hz	160kg/180kg/230kg/250kg/300kg	19m/min
	60Hz	280kg/360kg/500kg	13m/min
Speed	50Hz	160kg/180kg/230kg/250kg/300kg	23m/min
	60Hz	280kg/360kg/500kg	15m/min
Power	Single-phase, 110V-220V, 220-240V, AC 50/60Hz		
Duty	ED 25% Max. on time: 15min/hr. Max. number of starts: 150/hr		
Internation Class	54		
Insulation Class	F		



160KG, 180KG, 230KG, 250KG, 300KG

280KG, 360KG, 500KG

2. Precautions

2.1 General Safety Precautions

The winch has been designed to give safe and dependable service if operated according to the instructions. Please read and understand this manual before installation and operation of the winch.

Follow these general safety precautions:

- Confirm that the winch complies with the using conditions.
- Keep the winch secure strongly and the rope is not wound to be deviated to the drum.
- Don't use unsuitable pulleys or accessories concerned.
- Don't use unsuitable rope in construction, strength or having any defects.
- Pay attention to the grounding, it provides a path of least resistance for electric current to reduce the risk of shock.
- Check the winch for smooth operation without load before loading operation.
- Make sure the wire rope to be wound evenly in the first layer on the drum, rewind it if a mixed windings in existence.
- If a wire rope is found an uneven winding or accumulated at one side of the drum, align it adequately.



WARNING

1. The winch is not to be used to lift, support or otherwise transport personnel.
2. A minimum of five (5) wraps of rope around the drum is necessary to support the load rated.
3. The owner and/or the operator shall have an understanding of these operating instructions and the warning before operating the electrical winch. Failure to follow these warnings may result in loss of load, damage to the winch, property damage, personal, or fatal injury.
4. The owner shall retain this manual for further reference to important warnings, installation, operating and maintenance instructions.

2.2 Environmental Precaution



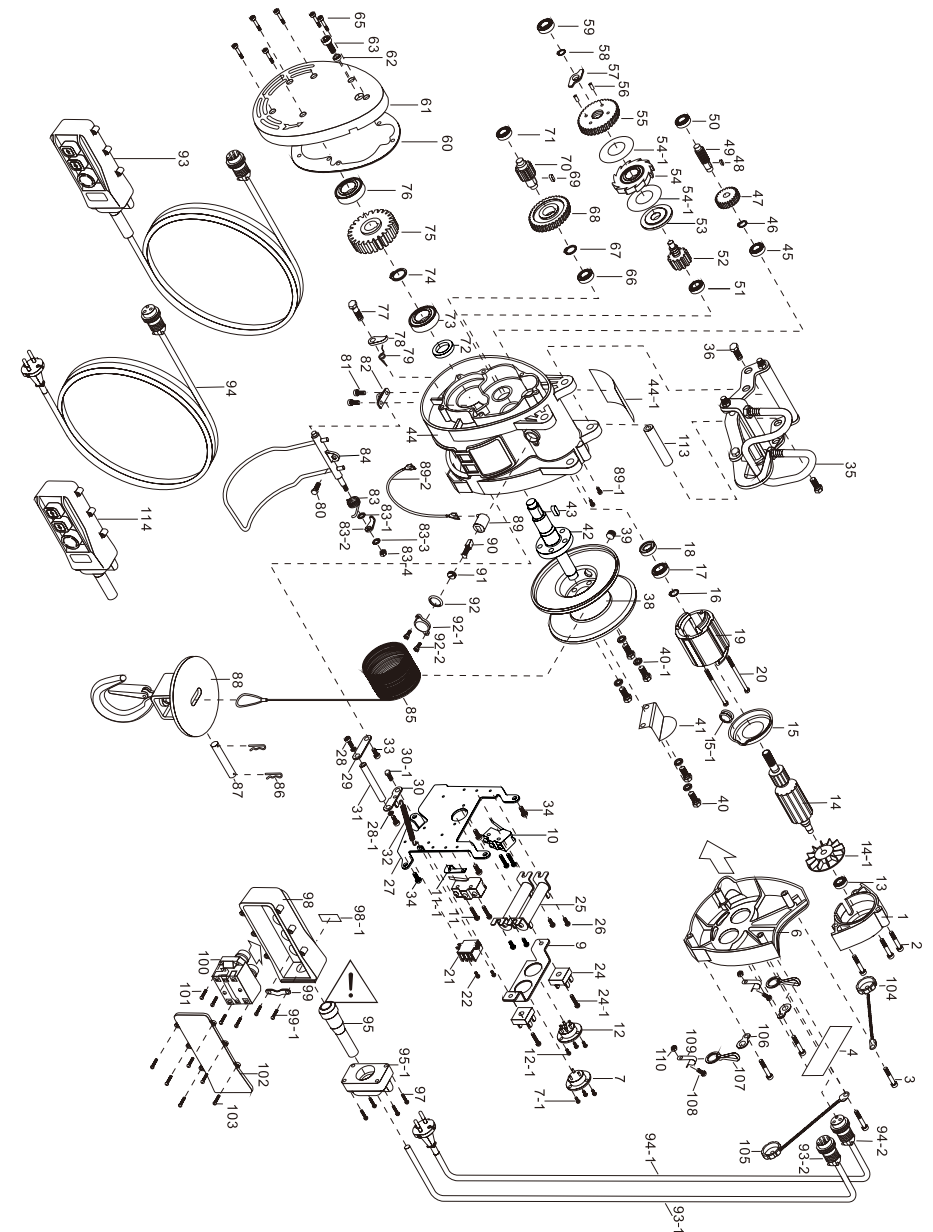
WARNING

The following environmental conditions may result in the possible causes of winch trouble.

- Low temperature below -10°, high temperature above 40° or humidity above 90% conditions.
- In an organic chemistry or explosive power conditions.
- In heavy acid or salty conditions.
- In the rain or snow condition.
- In a heavy general powder conditions.

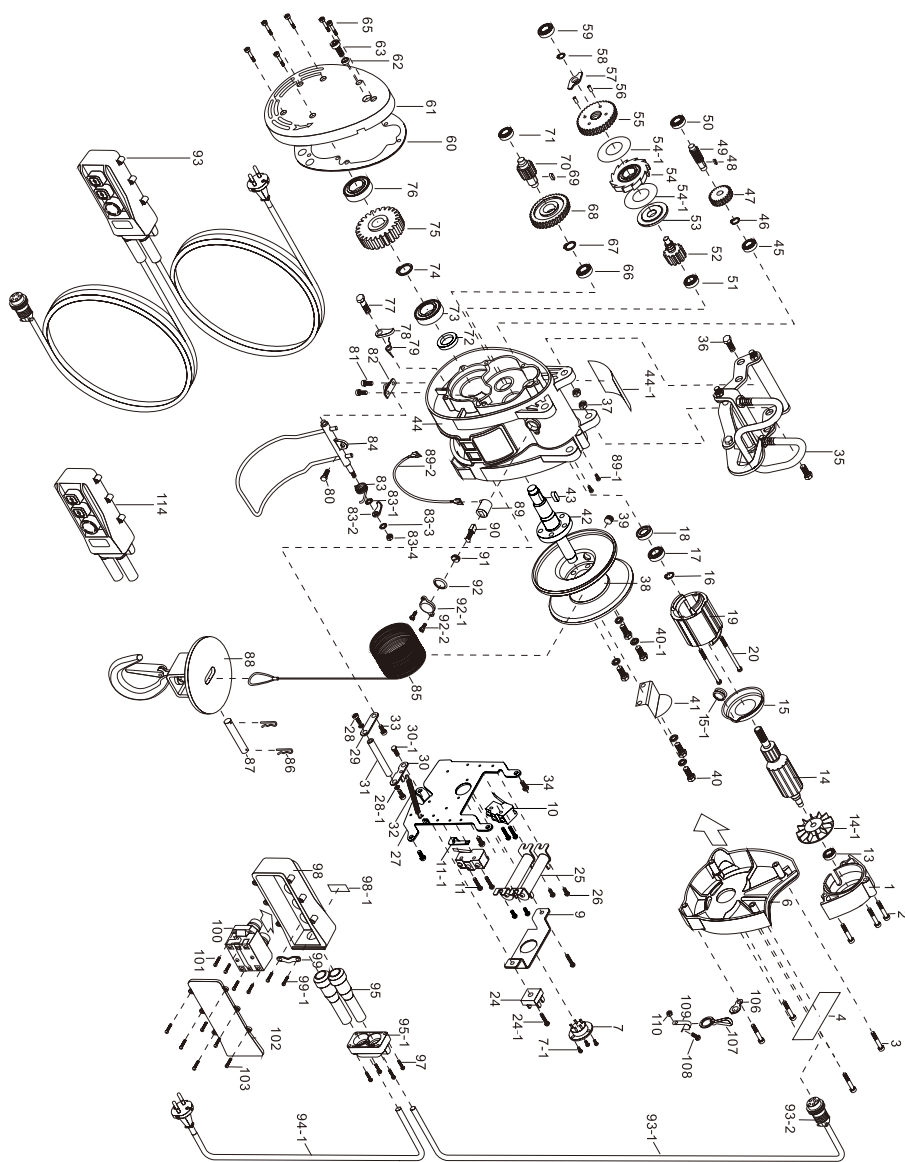
9. Parts drawing T-Series

280kg, 360kg, 500kg



9. Parts drawing S-Series

280kg,360kg,500kg



2. Precautions

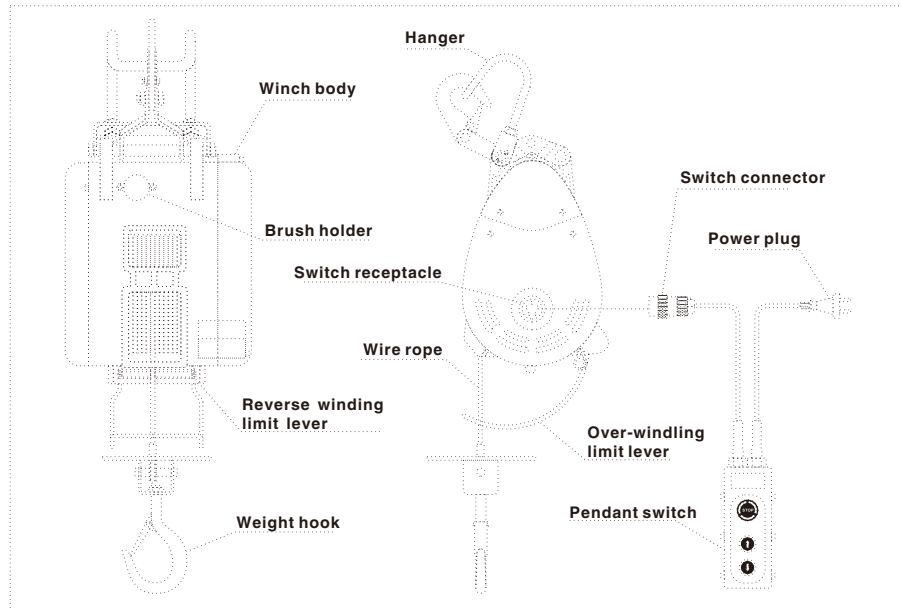
2.1 General Safety Precautions

The winch has been designed to give safe and dependable service if operated according to the instructions. Please read and understand this manual before installation and operation of the winch.

- To prevent the risk of electric shock, the power plug must be plugged into a matching outlet and grounded in good condition.
- Never try to lift a load higher than the rated capacity.
- Never hitch a ride on the hook, sling or load being moving.
- Winches are not to be used for lifting or lowering people.
- Don't work, walk or stand under an operating winch.
- Always remain in control. Never neglect the winch while actually hoisting a load.
- While working, never stand under a lifting load or within the conveying area.
- Always look up when working around winch, there is potential danger overhead.
- Never gravitate a load free.
- Be sure to lift a load vertically. Slack may allow wires to be caught in the drum.
- Prior to starting of use, carry out the daily checking without fail, and after confirming the safety of function. If having a counter rotation incurred, make sure to correct its rotation direction.
- Prior to lifting. Make sure to have a precise performance of brake. If any malfunction of brake happened, stop the operation immediately.
- When load suspended in air, it will not allow to be welding.
- Wire rope with one or more of the following defects shall be removed or replaced immediately.
 - 1) kink, 2) distortion, 3) corrosion, 4) Broken wires more than 10%,
 - 5). Decreasing of diameter more than 7%,
- Stop the operation if there is any queer noise or vibration in the gear box to be happened.
- Do not connect the wire rope with the grounding of welding machine.
- While welding, do not have any contact with the welding objects because of having spark.
- Do not pull the switch.
- Never plugging (instant reverse-winding) or inching.
- Do not over the short time ratings of the winch.
- In order to prevent the layer down due to over loosening of rope irregular winding, etc., operate according to the suitable operating method.
- Use a winch by fixing so securely that the rope around the drum is even.
- Be sure to fix a rope in the center of weight hook.
- Avoid catching the hook or lifting a load on a fixed obstruction.
- Always leave the pendant switch positioned immediately after use.
- Make sure that the load being lifting is well balanced and secured before starting.
- Avoid water splashes on the pendant switch.
- Never wrap the load with the wire rope.

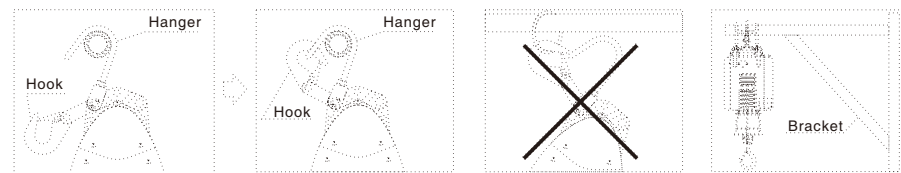
3. Installation

3.1 Winch Assembly



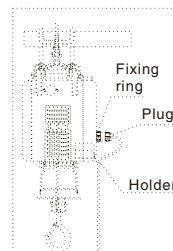
3.2 Mounting

The winch designed to be hanged or mounted on a firm or stable bar or a bracket. When hanging, do not allow the body or load to be caught by any construction of frame, or other obstruction. Be sure to lock the hanger for extra safety.



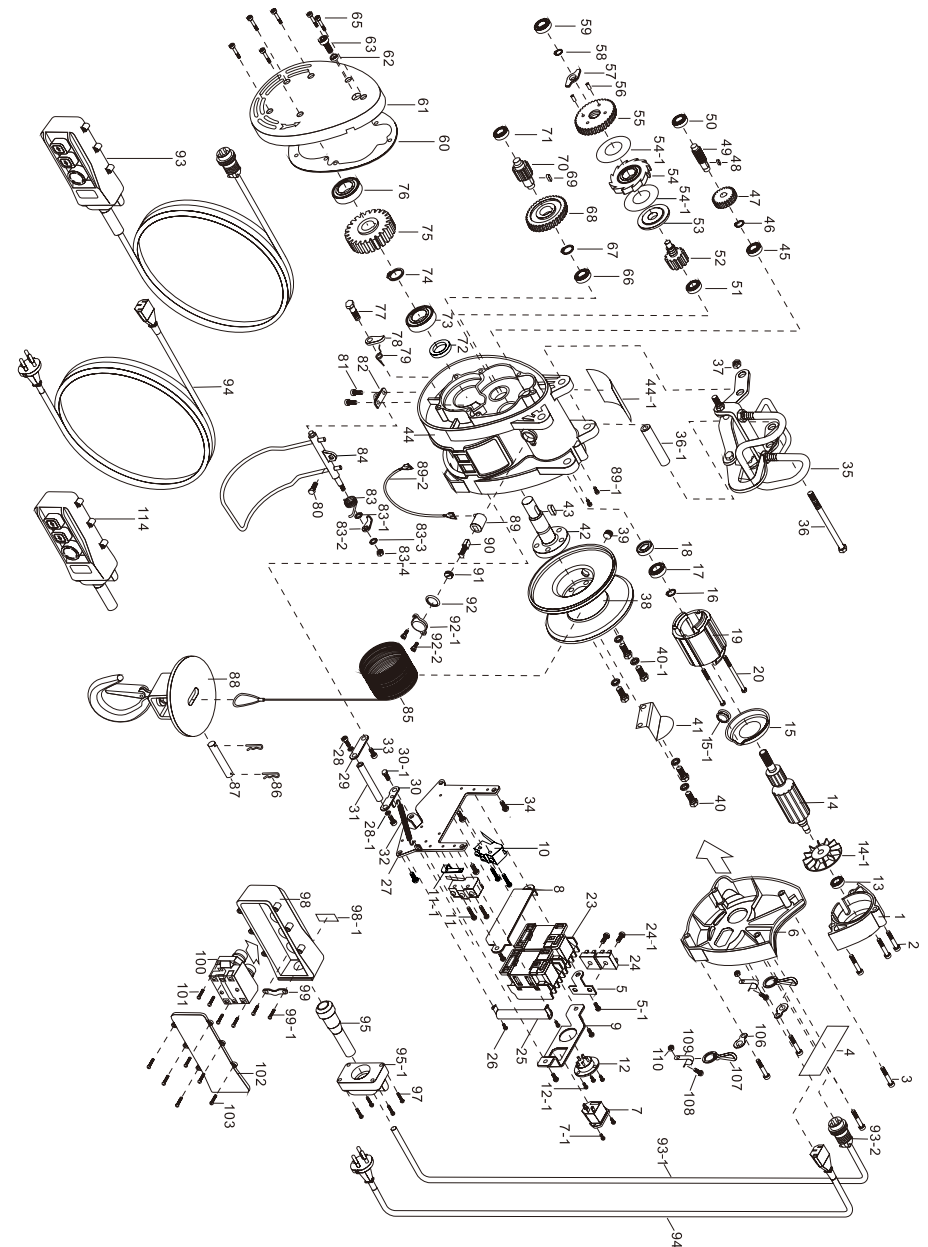
3.3 Plug insertion

- Insert the power plug into the power receptacle of the winch, and clockwise tighten it by turning the locking ring. Be sure to lock the lead by a holder. Do not allow it to be caught by wire rope, drum or other obstacle.
- The length of power cord is subject to the distance of 20 meter, for any other cases, please use a bigger section cord such as 2.0 mm or 3.5 mm or a magnetic switch equipped to prevent a considerable voltage drop to be happened.



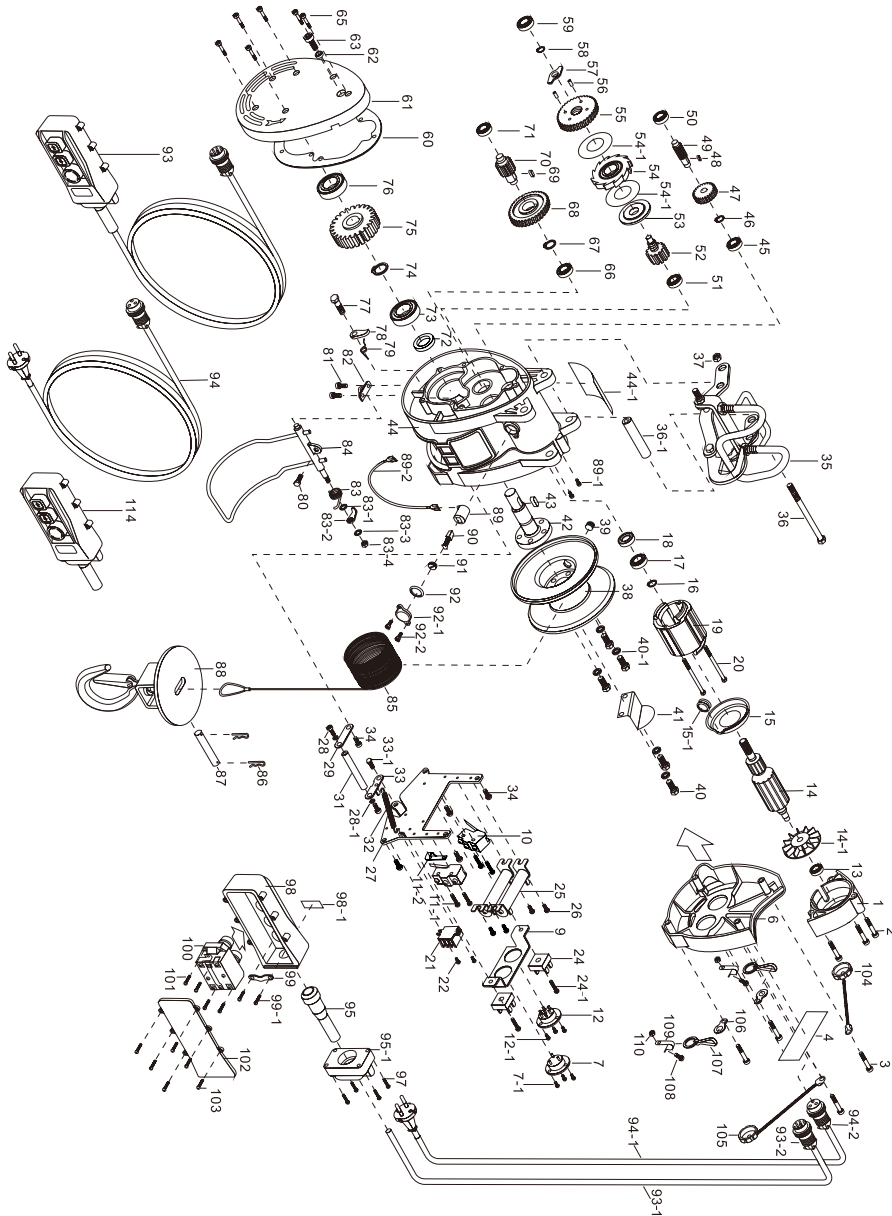
9. Parts drawing M-Series

160kg, 180kg, 230kg, 250kg, 360kg



8. Parts drawing T-Series

160kg, 180kg, 230kg, 250kg, 300kg



4. Winch principles

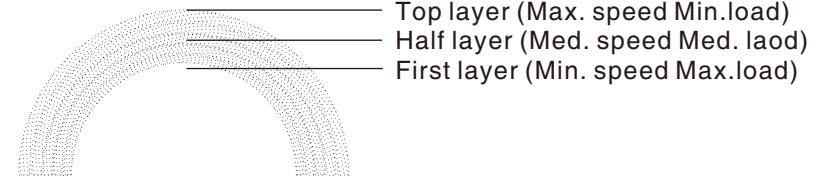
4.1 Percentage Duty Cycle

! WARNING Never hoist over the rated percentage duty cycle.

The life of the winch is depending on the conditions of the load and working frequency. In the long time operation, make sure to use the machine within its shorttime ratings. Shorttime ratings mean the working duty cycle is subject to the rated voltage, rated frequency and a 63% of rated load. All mini winches are rated 25% percentage duty cycle.

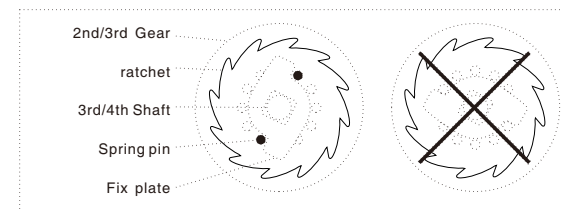
$$\text{percentage duty cycle} = \frac{\text{Operating hours}}{\text{Operating hours} + \text{stopping hours}} \%$$

4.2 Load Rated



4.3 Breaking

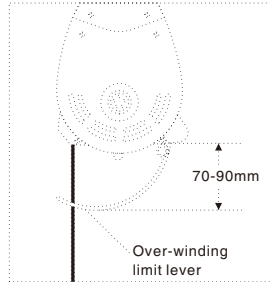
- Braking device is composed of a mechanic brake and an electronic generated brake. The brake distance from the time of braking until stopping completely should be within 1.5% of rope length to the wound in during 1 minute.
- Owing to the rope speed on no load is 1.5-1.8 times faster than that on rated load, the brake distance on no load will be longer, but still within 1.5% of rope length.
- It is highly recommended that any adjustments are carried out by a qualified technician at an authorized service center.
- Brake adjustment procedures.
 - Step 1. Remove retaining ring and spring pin.
 - Step 2. Tighten 3rd gear/4th shaft counter-clockwise until holding to the ratchet.
 - Step 3. Find the closed pole between spring pins and fit plate (one between four selections), then put the fix plate onto the square hole of 3rd or 4th shaft.
 - Step 4. Insert spring pins and lock retaining ring.



4. Winch principles

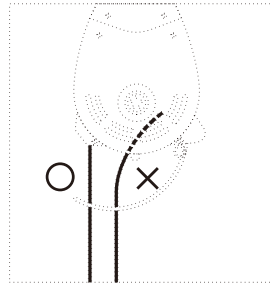
4.4 Over-winding Lift Prevention

- A special mechanism prevents an over-winding when lifting.
- When the weight hook touches the limit lever. Lifting is automatically stopped.
- However, if the limit lever is set too close to the winch body, it will cause serious damage to the limit lever and the winch body.
- A suggested distance (S) between the limit lever and winch bottom is as follows.



4.5 Reverse-Winding Prevention

- A special mechanism prevents a reverse-winding when lowering.
- When lowering, a wire rope is fully extended, the wire rope will be shifted its position from O to X.
- When a wire rope touches the limit lever of over-winding prevention device. Lowering will be automatically stopped.
- When the wire rope is shifted to the position of X, pull it and press the T button to return its position to O.



5. Maintenance and Replacement

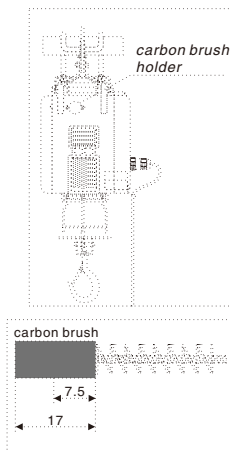
5.1 Carbon Brush Replacement



WARNING

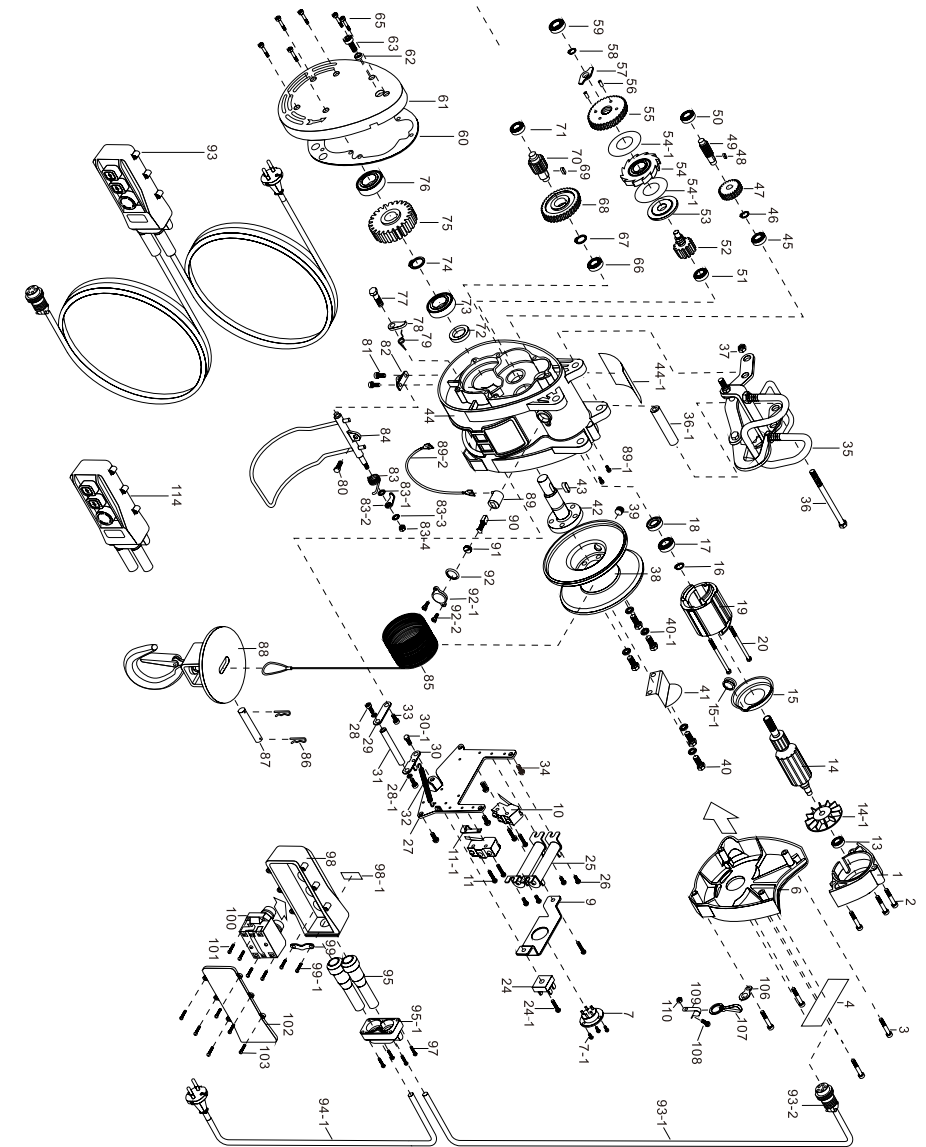
Clean the accumulated powder of carbon brush periodically to ascertain the insulation resistance upto 1 MΩ

- It is essential to check the carbon brush periodically. If its length is less than 7.5 mm resulting from wear, it is absolute necessary to replace carbon brush immediately.
- While replacing, smoothly insert carbon brush into carbon holder in the first place, then put brush cap into the hole.
- Before tightening the carbon brush holder, make sure to position O-ring.
- A set of carbon brush consists 2 piece of carbon brush. Ascertain to replace 2 pieces of carbon brush on opposite sides of winch body at the same time.

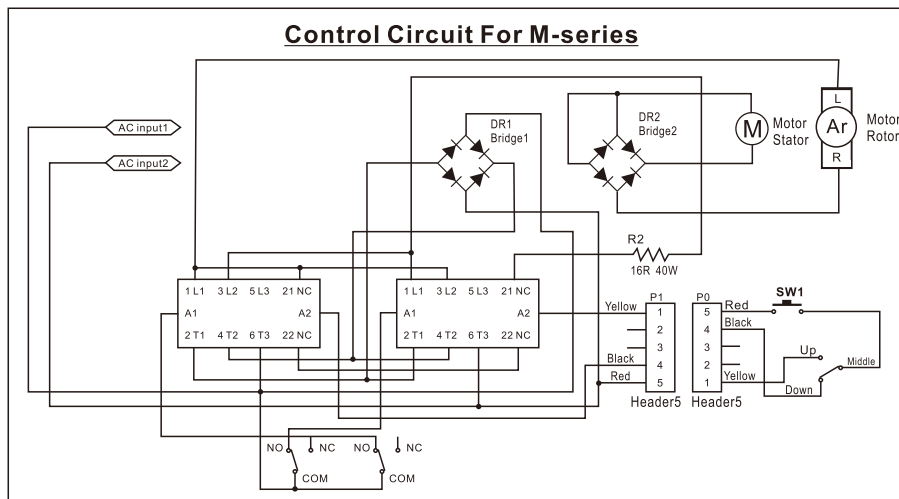
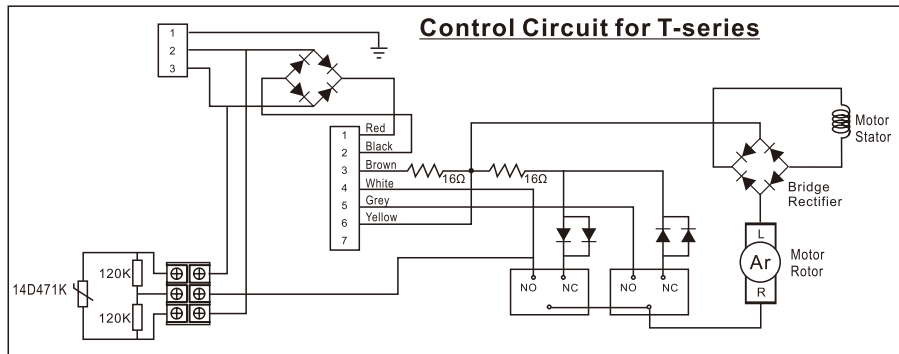
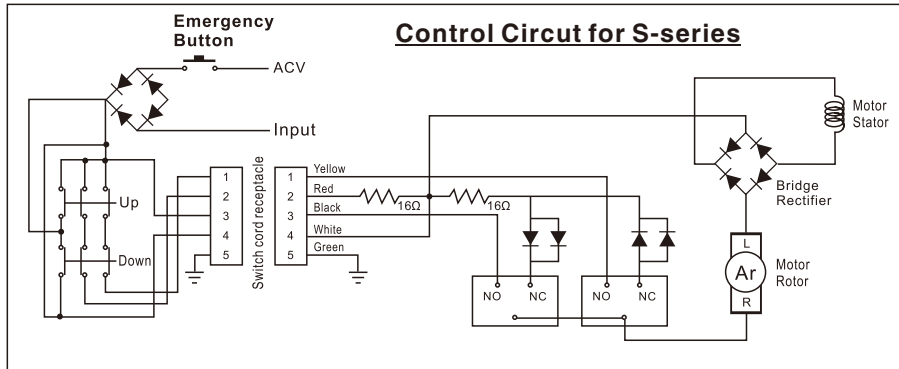


1. Parts drawing S-Series

160kg,180kg,230kg,250kg,300kg



8. Wiring Diagram



5. Maintenance and Replacement

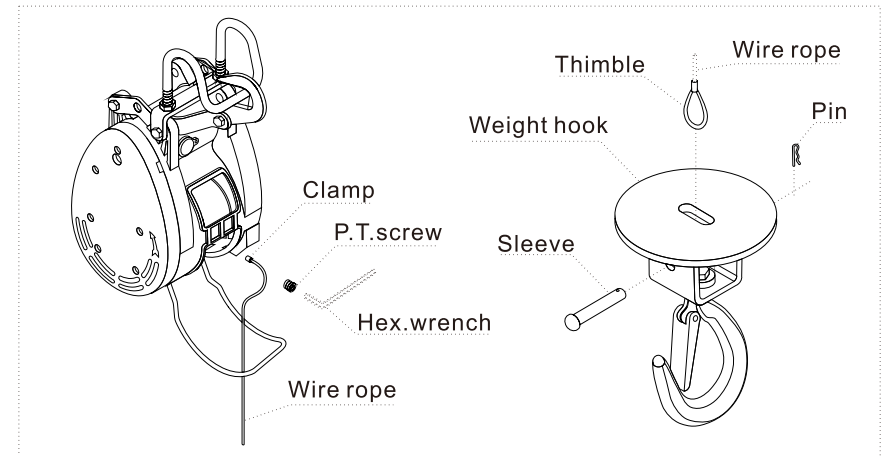
5.2 Wire Rope Replacement

Weight hook

- Put a new wire rope through the hole of the round plate of weight hook.
- Insert a sleeve pin through the thimble of wire rope.
- Insert a pin through the sleeve pin and bent it by pliers.

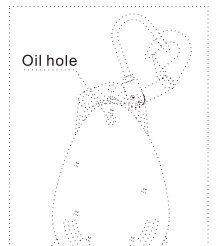
Drum

- Let a new wire rope w/clamp through the limit lever and insert it into the hole of the drum.
- Put a P.T. screw into the hole of the drum and tighten it by a hexagon wrench.
- Press the ↑ button to rotate the drum in the lifting direction.
- An uneven winding of wire rope may cause the load to be swing, that will damage the rope and reducing its service life.



5.3 Oil Lubrication

Gear lubrication is an important component in insuring the long life of your winch. The type of lubricant will have a great influence. Winch are pre-lubricated at the factory and do not require initial lubrication. Re-lubrication interval depends upon service. Consult your local lubricant distributor on the selection that best fits your climate and application.



Grease Grade	Quantity	Intervals
Caltex Multifak EP, Cosmogear Sp460	250 cc	1 Year

6. Checking reference

- The specified person performs the checking of winch.
- Divide the checking into daily checking and periodic checking.
- The checking items and checking method in daily and periodic checking shall be carried out and different according to the using frequency.

Checking Items			Checking Methods	Classification of Checks			
				Daily	Periodical		
					3 Months/ 20 Hours	1 Year	Years or 250 Hours
1	Brake	Performance Wearing of lining, and pressed plate Brake or escaping of spring	Visual Decomposition check Decomposition check	▲			▲
2	Carbon brush	Wearing	Decomposition check		▲		
3	Motor	Condition of insulation Staining , damage Carbon powder accumulation	Measuring,50MΩmin Visual Decomposition check	▲	▲		▲
4	Remote control	Working Outer damage of switch cords Attaching condition of earth line Condition of insulation	Manual Visual Visual Measuring,50MΩmin	▲ ▲ ▲			▲
5	Safety device	Over-wincing prevention function Reverse-winding prevention function Distortion of over winding lever Wrong rotary direction-winding	Visual Visual Visual Visual	▲ ▲ ▲ ▲			
6	Wire rope	Kink phenomena Broken wires more than 10% Decreasing of diameter more than 7% Deforming or corrosion	Visual Visual Visual Visual	▲ ▲ ▲ ▲			
7	Weight hook and hanger	Distortion Damage Loosening	Visual Visual Visual	▲ ▲ ▲			
8	Drum	Rupture of flange Wearing	Visual Visual	▲	▲ ▲		
9	Gear trains	Damage , waring Condition of oil feeding Lubrication for couplings	Visual Measuring Measuring	▲			▲ ▲
10	Fastenings	Loosening	Manual	▲			▲
11	Marking	Label and the like	Manual	▲			

7. Trouble Shootings

Symptom	Possible cause	Remedy
No reaction or open circuit	Open circuit on power lead or switch cord	Check power lead or switch cord
	Burnt rectifier at power source side	Replace rectifier and pay attention to its poles
	Burnt motor	Replace motor
	Burnt or communicated motor resulting from over load.	Replace
	Improper installation or wearing of carbon brush	Check or replace carbon brush
	Escape or open circuit of carbon brush lead	Check or replace carbon brush lead
Can lift, but fail to lower	Deformation of Down spring plate of limit switch	Adjust or re-stall the limit switch until having sound
	Burnt diode	Replace diode and pay attention to its poles
	Burnt limit switch	Replace limit switch
	Burnt rectifier at motor side	Replace rectifier and pay attention to its poles
	Malfunction of the Down contact of the pendant switch	Replace pendant switch
Can lower, but fail to lift	Deformation of Up spring plate of limit switch	Adjust or re-stall the limit switch until having sound
	Burnt limit switch	Replace limit switch
	Loose of the transmitting arm resulting in malfunction of Down limit switch	Adjust
	Loose adjustable nut	Adjust
	Burn diode	Replace diode and pay attention to its poles
	Burnt Up limit switch	Replace pendant switch
	Burnt rectifier at motor side	Replace rectifier and pay attention to its poles
	Malfunction of the Up contact of the pendant switch	Replace pendant switch
Short circuit	Melted B contact of pendant switch	Replace pendant switch
	Burnt diode	Replace diode and pay attention to its poles
	Short circuit on rectifier at motor side	Replace rectifier and pay attention to its poles
	Burnt D type resistor	Replace resistor
	Having too much carbon powder on carbon brush holder	Disassembly the winch and clean carbon powder
	Burnt motor	Replace motor
	Damaged circuit board resulting from the winding-in of rope	Replace circuit board
Fail to lift the load rated	Overload	Reduce load
	Short circuit on the commutator of the armature core or burnt parts of armature coils.	Replace commutator of the armature core
	Burnt parts of armature winding.	Replace armature winding
	Incorrect carbon brush specification or too short	Replace carbon brush
	Burnt, deformation of carbon brush holder	Replace carbon brush holder
Fail to hold the load after stopping	The gap of ratchet brake is too large	Adjust the ratchet brake
	Malfunction of pressed spring of ratchet brake	Replace pressed spring
	The oil is too dirty or includes contamination	Replace oil
	Having too much oil in gear box	Reduce the quantity of oil
Brake distance is too long at no load	Malfunction of D type resistor	Check or replace D type resistor
Having smell or smoke	Malfunction of pressed spring of ratchet brake	Replace pressed spring
	Burnt D type resistor	Replace D type resistor
	Malfunction of B contact of the pendant switch	Replace pendant switch
Too noise whiling lifting	The noise result from the click between ratchet stopper and wheel	It is normal