CE OPERATION MANUAL

COMPACT ELECTRIC WIRE WINCH

DUKE Compact Electric Wire Winch Introduction

The Duke Compact Electric Wire Winch is designed for building sites, commercial and domestic, as well as various construction workplaces, such as warehousing, buildings, storage areas, factories in general, as well as domestic applications.

CONTENTS

1. Preface

- Please read this Instruction Manual carefully before you start using the electric winch. You will find many useful hints which will help you to keep the winch always in its first-class condition.
- You are kindly requested to read this manual thoroughly, to follow scrupulously the instructions given and for safety reasons, avoid controlling, adjusting or performing procedures other than those specified.
- This winch has been designed and built in full compliance with EN ISO 12100, ISO 14121 and EN 60204 standards on machine and further modification, with high-quality materials and particularly studying the possibilities to reduce as much as possible the risks of accident.
- Foreword to the operating instructions
  The operating instructions are designed to familiarize the user with the winch and its designated use.
- The instruction manual contains important information on how to operate the winch safety, properly and most efficiently. Observing these instructions helps to avoid danger, to reduce repair costs and downtimes and to increase the reliability and life of the winch.
- The instruction manual is to be supplemented by the respective national rules and regulations for accident prevention and environmental protection.
  The operating instructions must always be available wherever the winch is in use.
  These operating instructions must be applied by any person in change of carrying out work with and on the winch, such as
  - operation including setting up, troubleshooting in the course of work, care of consumables
  - maintenance (serving, inspection, repair) and/or
  - transport

  This electric winch is designed and built in full compliance with the safety standard, please read carefully before installing the machine.You will find many hints to keep the machine in its best condition, also to avoid the risk of accident.
- In addition to the operating instructions and to the mandatory rules and regulations for accident
- Prevention and environment protection in the country and place of use of the winch, the generally recognized technical rules for safe and proper working must also be observed.

2. Safety Instruction

2-1 Safety regulations

2-1-1 General safety rules

1. This electric winch is designed for lifting products only. Do not apply the electric winch for lifting person.
2. The electric winch should be mounted on a flat solid place.
3. Installing the electric winch at a proper levelling condition to ensure the steel rope arranged neatly. This may avoid steel rope friction against the winch body due to regular winding.
4. Make sure your power source comply with the voltage indicated on the electric winch before connecting the power wires to the power source.
5. Connect the power wires. Tighten the terminals securely.
6. Make sure the electric winch has been properly grounded. The power circuit should be equipped with an electric shock breaker.
7. Before operating the electric winch, read and follow the instructions for allowable lifting weight, speed and voltage etc. Indicated on the attached plate.
8. Do not exceed the rated lifting capacity of the electric winch. Allowable lifting weight is indicated on the attached plate.
9. The electric winch should be operated by a skilled operator. Before operating the electric winch check again if all lock screws are tightened securely without loosening.
10. Before operating the electric winch check to see if the steel rope drum runs to the correct direction and the brake works normally.
11. Do not allow any person approaches under the electric winch, bracket or weight.
12. Select a proper location for mounting the electric winch, to prevent the lifting weight bumping against any construction, steel frame or construction beam etc while lifting.
13. Always keep the steel rope in a good condition. When applying the electric winch for lifting heavy load, keep the steel rope at least 3 turns wounded around the drum.
14. Lift weight vertically. Do not lift weight in a slant or horizontal direction. Do not have weight hooked on the steel rope for a long time.
15. Do not use the electric winch to pull out any object fixed in the floor or any construction.
16. When the electric winch is running, keep your hands or any object away from it to avoid danger.
17. Prevent control wire or power wire from hooking or contacting by the wire rope. This may avoid electric shock or any danger.
18. In case any malfunction or abnormal noise occurs during operation, stop the electric

winch immediately. Check and repair it immediately for safety.

19. Do not alter the electric circuit or use any other replacement parts not supplied from the original manufacturer.. This avoids affection on the winch performance or any accident.
20. The operator is requested to fully obey the safety rules listed for safety protection.

2-1-2 Electrical safety rules

1. Before installing, please pay attention to the input rated voltage and current and make sure the winch is grounded, in order to prevent accident.
2. There must be a main power switch (main breaker) at main input side of electric control system.
3. Remember to disconnect the main power before repair, maintenance and clean.
4. Unauthorized or untrained personnel cannot repair or maintain any electric equipment.
5. The keys of electric box and mode select should be conserved by authorized personnel. Don't give the key or authorized code to unauthorized personnel.
6. Comply with the maintenance instruction to repair and maintain the electric equipment.
7. Before operating the winch, check all of the electric equipments and parts are broken or damaged or not. If there is something broken or damaged, replace a new one immediately and please note its original rated specification.
8. After connecting power, check the direction of motor rotation and the direction of winch is correct or not.
9. Please check whether the function of emergency stop button is normal or not. The emergency stop button is used under emergency situation to cut off power of winch. (Operator usually misunderstand that the winch is broken down when they forgot to release the emergency stop button.)
10. Please check whether the function of each safety parts is normal or not, such as emergency stop button, emergency stop wire, interlocking switch, main power switch, safety valve, limit switch, and etc.
11. Please check whether the screws of each terminal base are tightened or not. If the screws loose, screw them tightly.
12. The wiring practices of electric control system must be complied with circuit diagram.

2-1-3 Safety rules of winch

1. Don't misuse the winch, to avoid danger.
2. Before start the winch, make sure all the protecting covers are not breakdown and damage.
3. If the mechanism or any part breakdown, operator should stop the winch immediately and then examine and repair it.
4. If it results abnormal sound during operation, operator should stop the winch immediately and then examine and repair it.
5. If abnormal temperature phenomenon happens during operation, operator should stop the winch immediately and then examine and repair it.
6. Don’t modify the original design of mechanical structure, in order to keep the best efficiency and security.
7. Please store the spare parts and tools well, and avoid moist and damage.
8. Untrained or unauthorized operator is prohibited operating, installing or maintaining winch.
9. Please maintain and repair the winch according to service instruction.
10. Please replace broken part according to the specification in part list.

2-2. Location of warning sign, CE mark, nameplate

Electric shock

CE symbol
CE
Nameplate

2-3. Checklist of electrical and safety function

Item	Content inspection and safety requirement	Result	Comment
1	Is every terminal protected by isolation plate (IP2X)?	YES	
2	Does technician follow the procedure number to wire?	YES	
3	Are the diameter of grounding wire and each circuit accord with safety requirement of designed electrical circuit?	YES	
4	Is fuse accord with safety requirement of designed electrical circuit?	YES	
5	Are these screws on electric box fixed tightly?	YES	
6	Is the electric box equipped with a ventilator (e.g. fan)?	YES	
7	Does the design of electric box conform to IP requirement?	YES	
8	Is all the function of every control switch and component described specifically on this operation manual?	YES	
9	Are input voltage, frequency, and phase marked correctly?	YES	
10	Is the machine earthed?	YES	
11	Is there an independent earth copper plate equipped inside electric box?	YES	
12	Is every function of control device regular?	YES	
13	Is the emergency stop device functional?	YES	
14	Is the rotary direction of motor or transmission correct?	YES	
15	Is the cover functional (fixed or movable)?	YES	
16	Is the machine set stable?	YES	
17	Have all the acute angle and fur been ground?	YES	
18	Has the machine been pasted a CE mark?	YES	
19	Has the machine been pasted a nameplate?	YES	
20	Has the machine been pasted related warning marks?	YES	
21	Have the listed related safety parts in TCF 1.6 been installed indeed?	YES	
22	Have all the safety information and attentions been provided completely for user?	YES	
23	Does the written language of manual and machine conform to local country?	YES	
24	Has the operation manual been provided?	YES	
25	Has the EC Declaration of Conformity been signed?	YES	

3. Compact Electric Wire Winch Description

3-1 General characteristics

3-1-1 Usages

Fit for various workplace applications, such as general factories, warehouse, construction, plumbing, and agriculture industries. Designed for unique rigging applications encountered at small venues, lightweight, quiet, and portable. Operates on 1-phase 100V~240V, or 3-phase 220V~380V depends on request.

3-1-2 Features

Braking: designed for both static and dynamic loading. Brake will automatically apply in the event of power loss.

Gearing: Precision machined gears heat treated for strength and durability, the ball or needle bearings at all rotating points run in oil bath lubrication for a quieter, smoother and cooler operation. Planetary gearing for maximum mechanical efficiency.

Motor: Equipped with induction motor, quiet and durable.

Switch: Simply layout of the control with 2M power cable as standard and emergency stop as option.

3-2 Specifications

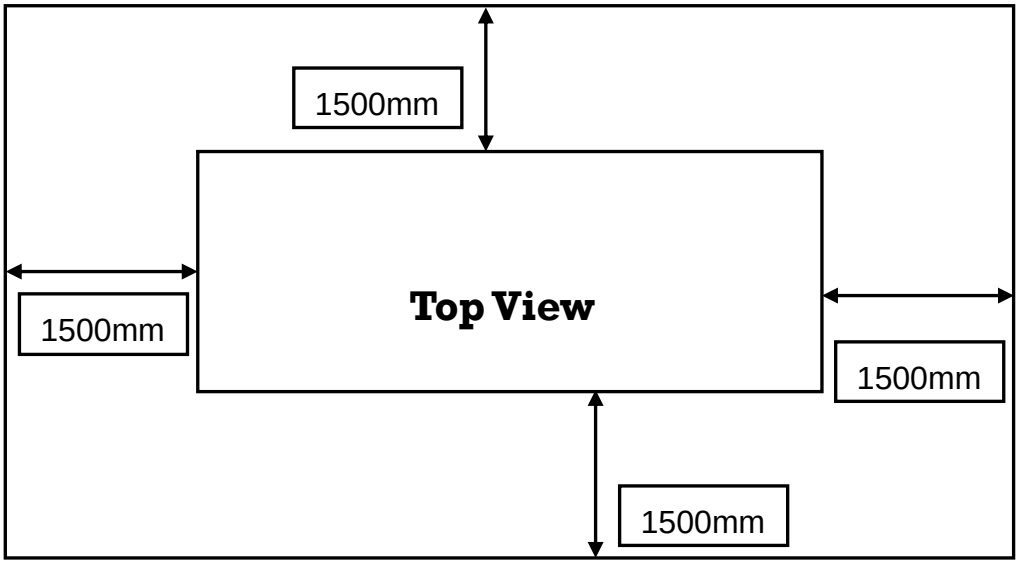
Model	DU-300S	DU-500S
Dimensions		
Length (mm)	500	500
Width (mm)	250	250
Height (mm)	330	300
Capacity (kg)	300	500
Standard Lift(m)	30	30
Control Cable(m)	3	3
Lifting Speed(m/min)	50HZ/60HZ-14	50HZ/60HZ-7
Wire Rope(mm)	6	6
Safety Factor	WLL x 1.5	
Insulation Class	F	
ED%	35%	
No. Of Starts per hr	300	
Power Cable (m)	5	5
Net Weight (kg)	19	19

3-3 Overall dimensions

MODEL	Length(mm)	Width(mm)	Height(mm)
DU-300S	490	170	180
DU-500S	490	170	180

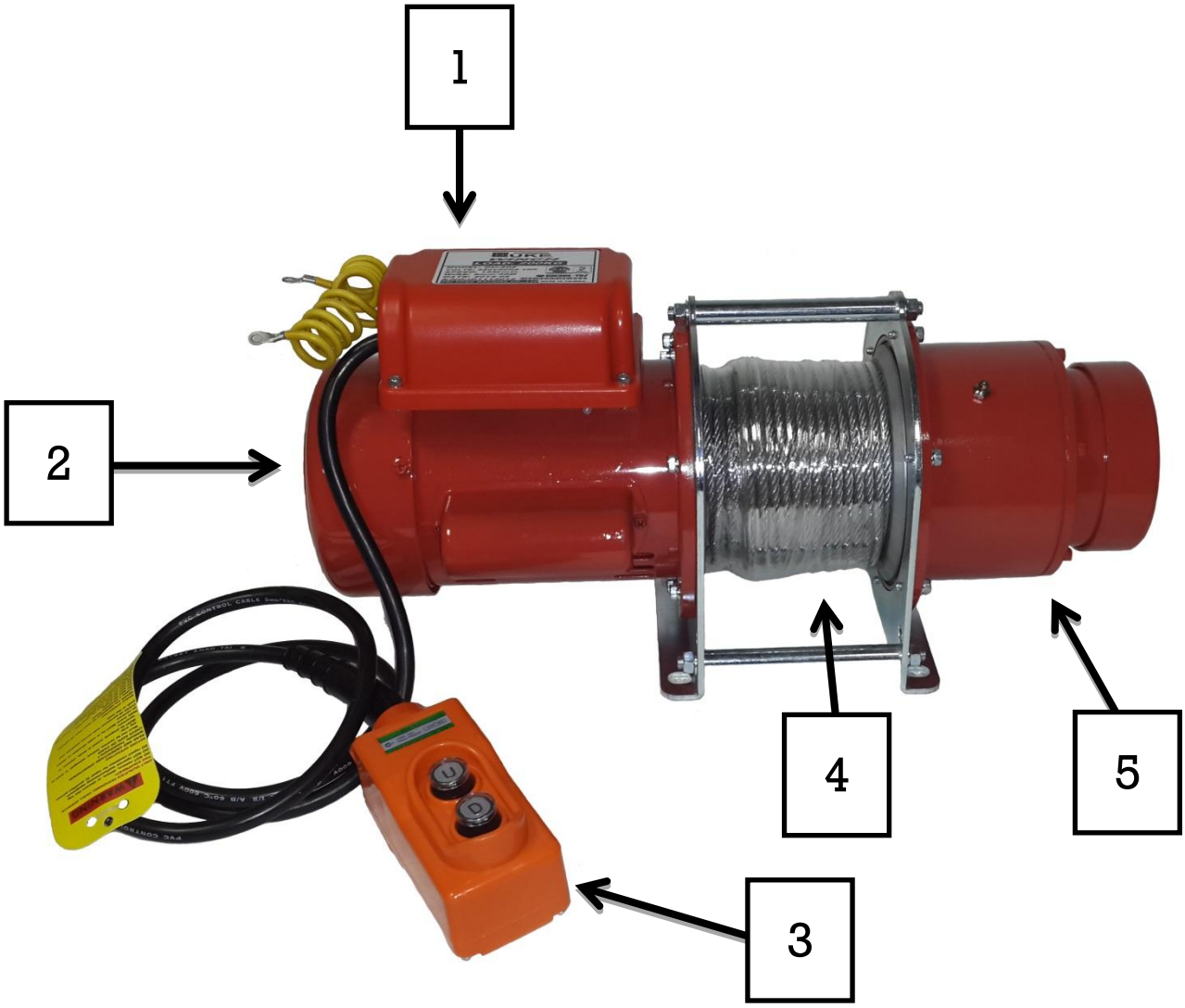
3-4 Working space required and operating position

FRONT OPERATOR



FRONT OPERATOR

3-5 Main units and name



Item	Part's name
1	Electric Department
2	MOTOR
3	PUSH BUTTON
4	WIRE ROPE
5	GEAR BOX

4. Pre-use Preparation

4-1 Notice and inspection before operation

4-1-1 Mechanical Check

1. Are all transport protection facilities removed?
2. Is there any mechanical damage?
3. Are all the safety device, safety covers refitted from the set-up installation?
4. Are all winch unit correctly aligned and locked in position?
5. Are all mobile and rotating parts exempt of foreign bodies? Is there mobility unimpaired (tools wire, yarns, waste, etc.)

4-1-2 Electrical Check

1. Are all ground conductors connected?
2. Are all cables connected?
3. Is there any mechanical damage of electrical control operating and indicator units
4. Are all plug-in connection to the winch fitted correctly?
5. Are all the cable near mobile parts fixed correctly?
6. Are the cable fitting tightened?
7. Were wire rests and metal objects removed and cleaned away from switch box, junction box, control cabinets, and operating panel?
8. Are frequency inverters motor set for the correct V/Hz ratio if applied?
9. Are the drive rotating direction correct?

4-2 Expected use and limits of use

Specification of essential parts:

Please refer to the list of specification in operation manual.

This winch is expected to be used under industrial environment:

The well lighting, well ventilation, clean environment, dry, and maintains a normal temperature.

The winch needs the following supplies:

Electric power: 1-phase / 220-240V / 50Hz and 60Hz,(or base on previous designation).

Working Duty (ED%):

35%.

No more than 20 minutes use within 60 minutes frame.

The required technique and experience during safety operation and use.

They should be a proficient operator or trained staff.

5. Transport and Install

5-1 Transport

Always carry the winch with two hands to prevent a strike.

Below table shows net weight and gross weight for each model of winch.

MODEL	NET WEIGHT (kg)	GROSS WEIGHT (kg)
DU-300S	19	21
DU-500S	19	21

5-2 Install

5-2-1 Environment Precautions

The following environmental conditions may adversely affect the winch

- Low temperature below -10°C
  High temperature above 40°C
  High humidity conditions above 90%

- In organic, chemical, or explosive conditions

- In wet weather conditions or snow *(Cause rust or short circuit)*

- In heavy dusty conditions
  (Cause malfunction or poor performance)

5-2-2 Power Cord Insertion

- Insert the power plug into the power receptacle of the winch, firmly hand tighten by turning the locking ring clockwise.
- Be sure to lock the cord onto the holder mounted on the winch.
- Do not allow the cords to be tangled into the wire rope and drum

Determining the appropriate cord based on length required

Grounding

- To prevent the risk of electric shock, the power plug must be plugged into a matching grounded socket.

Switch/Pendant cord connection

- Insert the pendant plug into the pendant receptacle of the winch and tighten it by turning the locking ring clockwise. Be sure to hook the cord on the holder.
- To extend the length of the cord connect an extension cord of 15feet max. Do not exceed 50feet in total

5-2-3 Mounting

- The winch is designed to be hung or mounted on a firm or stable bar or bracket. Which ensures the winch doesn't move from side to side, or swing in a 360°
- As an optional accessory the winch Bracket can be purchased.
- When hung, do not allow the body or load to be caught by any obstruction.

Be sure to lock the hanger for extra safety
Never hang from the hook only.
This hook is not designed to take a load

5-2-4 Continuous rating

- *Never use the winch beyond the 20 minutes permitted per hour.*

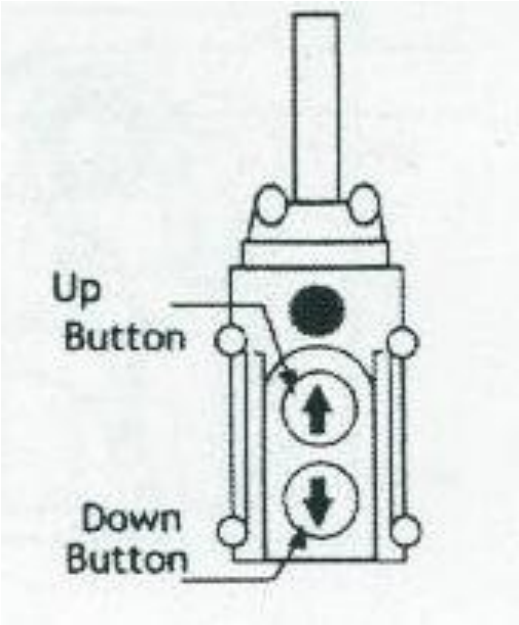
- The life of the winch depends on the conditions of the load and working frequency. During long operating periods make sure to use the winch within its continuous rating.

- Continuous Rating means the amount of allowable usage within one hour which is 35% or 20 minutes per hour or 300 starts per hour.

- The maximum number of starts means the number of times the motor starts within the hour.

6. Operation

6-1 Control device: Control panel

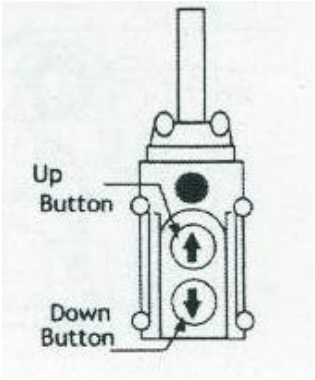


6-2 Operating procedure

The person who is untrained or unfamiliar with the operation procedure is prohibited from operating machine.

Preparation before Working

- Check all safety and environmental conditions
- Ensure there are a minimum of five(5) wraps of wire wound around the drum
- Check the wire rope and discard should there be any signs of excessive wear, too many broken wires, corrosion, or other defects.
- One wire rope consists of 7 strands. One strand has 19 wires. So one of the 7 strands must not have more than 3 of the 19, damaged wires.
- Connect the main power source and ensure grounding.
- Do not lift loads exceeding the rated load.
- Always use power source at the rated voltage.



Up and Down Control Switch

- **To Lift a Load.** Press ▲ Button
- **To Lower a Load. Press** ▼ Button

6-3 Handling Precautions

WARNING

Pay close attention to the following instructions.

Incorrectly operating the winch may result in personal injury or equipment damage.

- Never try to lift a load more than the rated capacity
- Always remain in control. Never leave a load
- Don't work, walk or stand under and operating winch
- Never ride on the hook, sling, or load
- A minimum of five (5) wraps of rope around the drum is necessary to support the rated load
- Always look up when working the winch. Watch for overhead danger
  Be sure to lift a load vertically. Any slack may allow wire to be tangled.
- Prior to lifting make sure the brake is performing correctly.
  If any malfunction is detected stop the operation immediately.
- Never wrap the load with the wire rope
- Wire rope with one or more of the following defects must be replaced immediately.
  1. Kink
  2. Distortion
  3. Corrosion
  4. Showing signs of excessive wear or if 1 of the 7 strands has more than 3 of the 19 wires damaged
- Do not pull the control pendant to move/pull a load
  Do not exceed the continuous rating
- Do not rapidly change from Lifting to Lowering
- Never work on or weld on a suspended load
- Stop operation immediately if the wire rope slackens.
- Ensure the slings are fixed in the centre of the swivel hook

- **Other Important Precautions**

Stop operating the winch if there is an abnormal noise or vibration in the gear box.
Do not use the winch or the wire rope as grounding for a welding machine
Make sure the load being lifted is well balanced and secured before commencing.

7. Maintenance and Adjustment

7-1 Periodical Checking

	Parts	Checks	Checking Method	Timing			
				Daily	3mths/ 20 hrs	1 year	3 years
1	Brake	Performance	Visual		✓		
		Wearing of pressed plate	Decomposition Check				✓
		Broken springs	Decomposition check				✓
2	Motor	Condition of insulation	Visual	✓			
		Staining damage	Visual		✓		
		Carbon Powder accumulation	Decomposition Check			✓	
3	Control Assy	Working	Manual	✓			
		Outer damage of switch cords	Visual	✓			
		Connection of earth wire	Visual	✓			
		Condition of Insulation	Visual		✓		
4	Safety devices	Over prevention function	Visual	✓			
		Reverse winding prevention function	Visual	✓			
		Distortion over winding function	Visual	✓			
		Wrong rotary direction-winding	Visual	✓			
5	Wire Rope	Kinking	Visual	✓			
		Broken wires	Visual	✓			
		Decreased diameter by more than 10%	Visual	✓			
		Deforming or corrosion	Visual	✓			
6	Swivel hook & Hanger	Distortion	Visual	✓			
		Damage	Visual	✓			
		Loosening	Visual	✓			
7	Drum	Rupture of Flange	Visual		✓		
		Wearing	Visual		✓		
8	Gear Case	Damaged	Visual	✓			
		Check oil level	Measuring		✓		
		Lubrication for couplings	Measuring		✓		
9	Fastenings	Loosening	Manual	✓			

***It is Important that*:**

1. **Only Qualified persons can conduct any form of Checking**
2. **Each Item listed above is to be carried out according to the specified Timing**

7-2 Maintenance

Drum

- Insert a new wire rope w/clamp through the limit switch 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 key
- Uneven winding of the rope may cause the load to swing thus damaging the rope and reducing its life swan

Oil Lubrication

- The Winches are prefabricated at the factory and do not require initial lubrication.
- Re-lubrication interval depends upon service.

7-3 Troubleshooting

If the winch fails to start after several attempts or the winch's operation appears to be defective check the following:

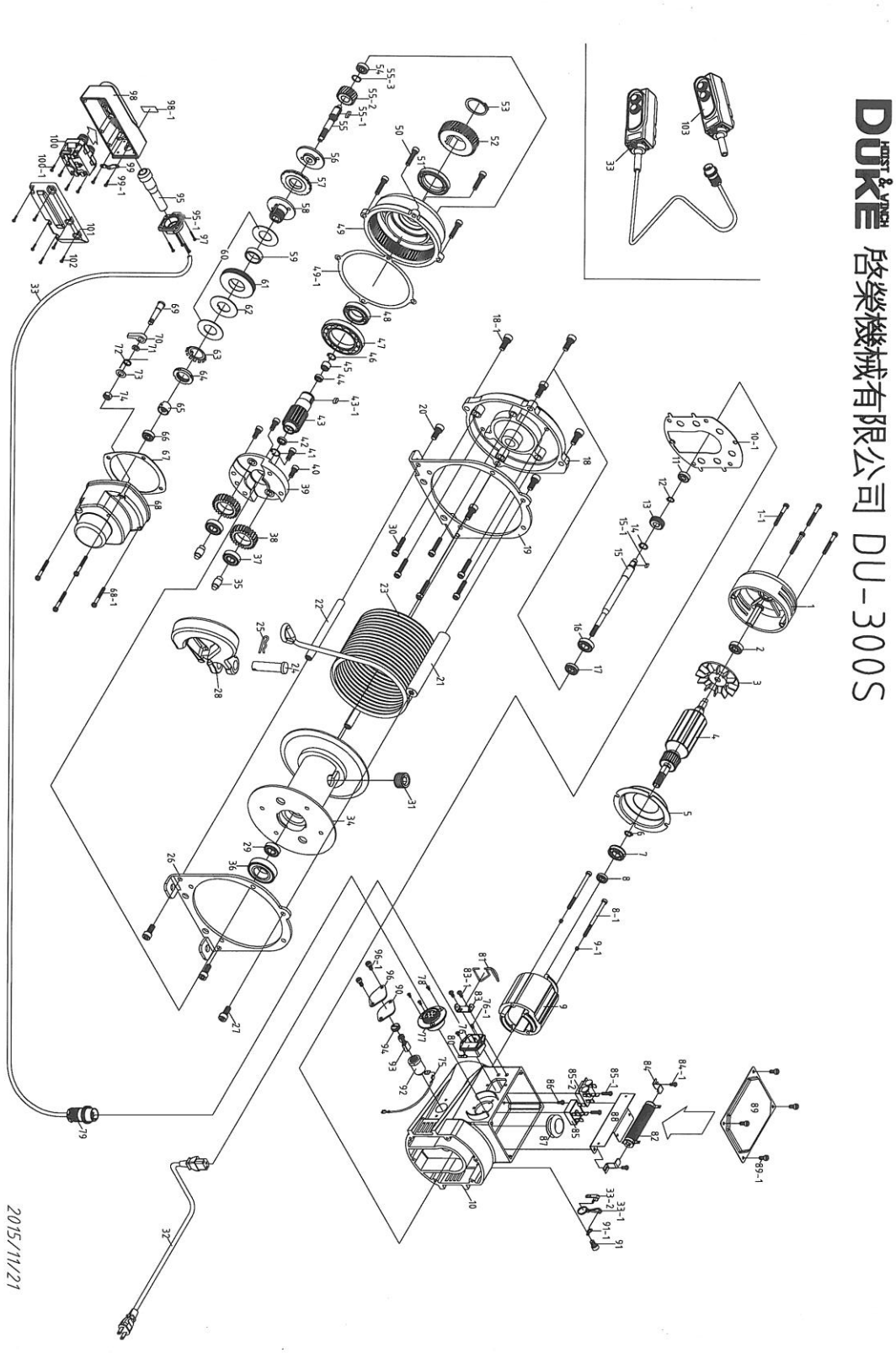
Observed Anomaly	***Possible Cause***	***Solution***
No Reaction after pressing the buttons on the control pendant	No power	Check power source
	Disconnection of plug, power cord or pendant cord	Replace or repair
	Damaged motor resulting from overload	Replace
	Burnt diode assy	Replace
	Considerable voltage drop	Adjust to rated voltage
	Wearing of carbon brushes	Replace carbon brushes
Brake distance too long	Wearing of lining, pressed plate and pawl	Replace
	Disconnection of electronic generated braking	Repair nut cord or Replace D type resister
	Voltage Too high	Adjust to rated voltage
No over-winding Prevention while swivel hook touches limit lever	Disconnection of electronic generated braking	Repair nut cord or Replace D type resister
	Malfunction of limit switch	Replace
Lifting speed too slow	Overload	Reduce Load
	Considerable voltage drop	Adjust to rated voltage and check the section of the power cord
Electrical leakage or shock	Burnt motor resulting from overload	Replace motor
	Wearing of carbon brushes	Replace carbon brushes and clean any carbon powder in the motor
	Water invaded motor or push button	Dry it or replace motor if badly saturated
Abnormal sound in gear box	Insufficient oil resulting from oil leakage	Replace oil seal and refill with sufficient oil
	Distortion of gear box	Repair

NB: All mechanical or electrical work must be carried out by a qualified tradesperson

8. Drawings and Part list

8-1 Assembly drawings and part list

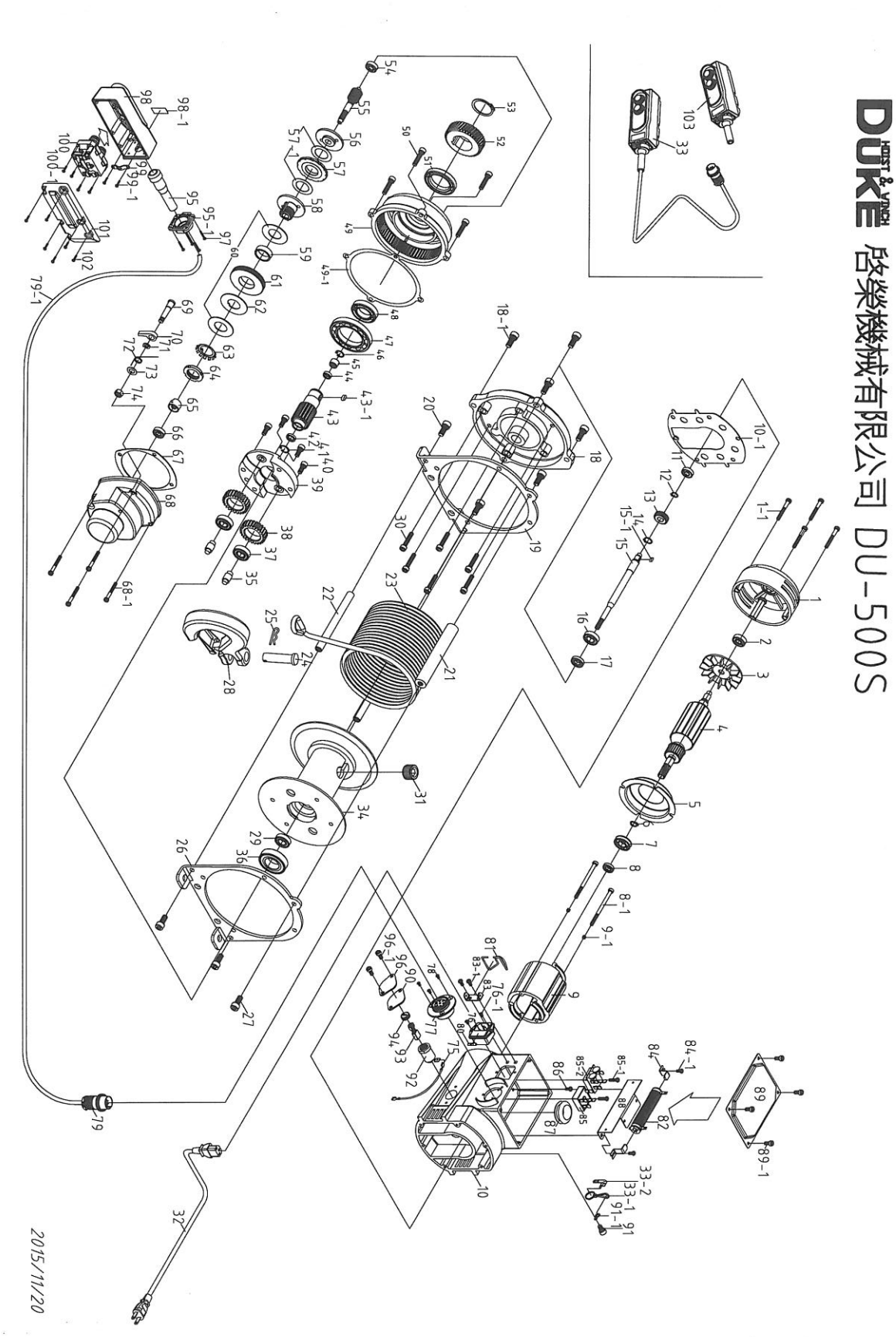
MODEL: DU-300S - Assembly drawings



MODEL: DU-300S - Part List

1	MOTOR COVER	55	THIRD SECTION GEAR SHAFT
1-1	SCREW	55-1	KEY
2	BEARING	55-2	GEAR
3	FAN OF ROTOR	55-3	SNAP RING
4	ROTOR	56	PLATE
5	AIR GUIDING IRON COVER	57	PAWL BRAKE LINING
6	FIXING SPRING	58	BRAKE DEPRESSOR (LOWER)
7	BEARING	59	COPPER COVER
8	OIL SEAL	60	PRESS DISK TYPE SPRING
8-1	SCREW	61	KEYLESS GEAR
9	STATOR	62	NUTS FIXING SHEET
9-1	SCREW	63	NUTS
10	MAIN BODY BASE	64	TORQUE LIMITED NUTS
10-1	GASKET	65	BAKE DEPRESSOR (UPPER)
11	BEARING	66	BEARING
12	FIXING SPRING	67	PARKING
13	GEAR	68	FIRST LAYER GEAR BOX
14	FIXING SPRING	68-1	SCREW
15	FIRST SECTION GEAR SHAFT	69	FIX PING
15-1	KEY	70	CLICK
16	BEARING	71	CLICK FIXING BOLT
17	OIL SEAL	72	CLICK SPRING
18	GEAR COVR	73	SPRING WASHER
18-1	SCREW	74	WASHER
19	Main Body Frame	75	CABLE
20	BOLT	76	POWER CONNECTOR SOCKET
21	SHAFT (Upper)	76-1	SCREW
22	SHAFT (LOWER)	77	SWITCH CONNECTOR SOCKET
23	WIRE ROPE	78	SCREW
24	HOOK FIX PIN	79	SWITCH CONNECTOR
25	R PIN	80	FUSE
26	Main Body Frame	81	CABLE HANGER
27	BOLT	82	RESISTOR
28	HOOK	83	FIX PLATE
29	BEARING	83-1	SCREW
30	BOLT	84	FIX PIN
31	SCREW	84-1	SCREW
32	POWER CABLE	85	REGULATOR
33	BUTTON CONTROL W/ CABLE	85-1	SCREW
33-1	LANYARD CLIP	85-2	REGULATOR W/ VARISTOR
33-2	BINDER OF CABLE	86	SCREW
34	DRUM	87	PLASTIC TUBE
35	ROD OF GEAR SHAFT	88	FIX PLATE
36	BEARING	89	ELECTRIC BOX COVER
37	BEARING	89-1	SCREW
38	GEAR	90	CARBON BRUSH SET PROTECTION
39	FIXING BASE OF GEAR SHAFT	91	NUTS
40	SCREW	91-1	NUTS
41	SNAP RING	92	BASE OF CARBON BRUSH
42	OIL SEAL	93	CARBON BRUSH
43	THIRD SECTION GEAR SHAFT	94	CARBON BRUSH COVER
43-1	KEY	95	SWITCH PLASTIC TUBE
44	OIL SEAL	95-1	SWITCH TUBE COVER
45	BEARING	96	CARBON BRUSH PROTECTION
46	SNAP RING	97	SCREW
47	BEARING	98	SWITCH COVER
48	BEARING	98-1	STICKER
49	GEAR REDUCE BOX OF SECOND LAYER	99	FIX PLATE
49-1	GASKET	99-1	SCREW
50	SCREW	100	INTERNAL SWITCH CONNECTOR
51	BEARING	101	SWTICH COVER
52	THIRD SECTION GEAR	102	SCREW
53	SNAP RING	103	SWITCH WITHOUT CABLE
54	BEARING		

MODEL: DU-500S - Assembly drawings



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43	THIRD SECTION GEAR SHAFT	95-1	SWITCH TUBE COVER
43-1	KEY	96	CARBON BRUSH PROTECTION
44	OIL SEAL	97	SCREW
45	BEARING	98	SWITCH COVER
46	SNAP RING	98-1	STICKER
47	BEARING	99	FIX PLATE
48	BEARING	99-1	SCREW
49	GEAR REDUCE BOX OF SECOND LAYER	100	INTERNAL SWITCH CONNECTOR
49-1	GASKET	101	SWTICH COVER
50	SCREW	102	SCREW
51	BEARING	103	SWITCH WITHOUT CABLE
52	THIRD SECTION GEAR	102	SCREW
53	SNAP RING	103	SWITCH WITHOUT CABLE
54	BEARING		

8-2 Electrical system drawings and part list

MODEL:DU-300S, DU-500S - Electrical system drawings