

# ***FiTOP***

## ***D-series OPERATIONS MANUAL***





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## 1. DEFINITION OF SIGNS

D-series electric chain hoist was designed to apply in normal work condition; lifting direction is VERTICAL; cannot be used to shift any person.

The following are the caution signs used to alert the level of danger:

**⚠ DANGER** Extremely risky and very dangerous. If it is inevitable, it will cause user injury or loss of property extremely severe

**⚠ CAUTION** Highly risky; if it is inevitable, it may cause user injury or loss of property

**⚠ WARNING** Potentially risky; if it is inevitable, it may cause user injury or slight loss of property

Actions without cautions would cause serious injuries; moreover, no matter what signs you see, please always use the equipment safely. Furthermore, you shall put this operation manual in a place where the users could see and take it to READ conveniently.

## 2. RESTRICTIONS

### 2.1 General Regulations

Incorrectly use of the hoist or forget to maintain the hoist PERIODICALLY would cause danger, for instance, the material lifted could not be successfully loaded above ground. In brief, before installation, operation, or maintenance, kindly read the instructions for safety.

We will not be responsible for the problems which caused by mis-applications. If the product could be used wrongly, please discuss with your regional distributor in advance.

#### ⚠ DANGER



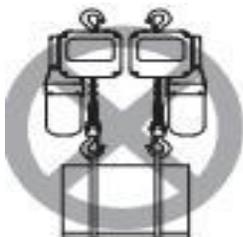
Do NOT use a hoist to lift or support any person



Do NOT lift or shift material over people



The weight of material should be UNDER its allowable capacity



Do NOT lift a material with more than one hook



Do NOT weld the hook and to lift weight



Do NOT screw the lifting chain

**CAUTION:** When you use the hoist, please be CAREFUL with the people who work nearby the zone. People who are NOT clear with the operation instructions should NOT be allowed to use the hoist.

## 2.2 Pre-operational Check

- ⚠ CAUTION** This manual was compiled for hoist-users' safety; before users start using the equipment, he/she should UNDERSTAND all the instructions in the manual with sufficient sense of safety
- ⚠ WARNING** If the hook seemed to be deformed, please do NOT keep using it. Kindly contact your regional distributor, and replace with a new hook which supplied by FiTOP
- ⚠ WARNING** Do NOT repair the lifting chain which was installed in the hoisting equipment
- ⚠ CAUTION** Before loading, please FILL 0.7 Kg of "L-CKD-100 closed-typed grease" INTO the GEARBOX, and "L-CKD-100 gear oil" or "Calcium-based grease" ON the SURFACE of chain
- ⚠ CAUTION** The electric chain hoist must only be used when it is EARTHED well
- ⚠ CAUTION** When the chains are TWISTED, please STOP using the machine, and INSPECT for the problem caused and carefully solve it
- ⚠ CAUTION** Please ensure that the users MAINTAIN the machine for good conditions
- ⚠ CAUTION** ASSESS the weight of the lifting materials; select a hoist which is capable to your applications
- ⚠ CAUTION** CHECK the "upper-hook-shaft" and "hook-shaft" to ensure that they are not deformed or loosened
- ⚠ CAUTION** CHECK the position-limit's work condition manually, to CONFIRM that it is in a good condition
- ⚠ CAUTION** The load chain is made of special alloy steel and CANNOT be welded or replaced; essential spare parts are always available at your product-provider
- ⚠ CAUTION** When the temperate is below 0°C, please CHECK the brake whether it is frozen or iced

## 2.3 Cautions in Operation

### ⚠ WARNING



Do NOT use the hoist when the lifting chain is damaged, Deformed, or cracked



ALWAYS use the hook to lift materials; do NOT use the chain itself as carrier



Do NOT lift the goods with an angle exceeded 12° than a vertical direction



Do NOT hang the weight OUT of the hook tab



Do NOT let the lifting chain pass through an obstacle's surface such as steel plate



Do NOT perform welding or cutting tasks when the hoist is lifting a material

**⚠️ WARNING** Do NOT shake the lifting goods

**⚠️ WARNING** Do NOT use hoist when it was broken or operating with abnormal sound

**⚠️ WARNING** Do NOT lift and decline the chain block at the same time when it is lifting the goods; you are Advised to operate with an experienced instructor for a period of time, in the beginning

**⚠️ CAUTION** Please ensure that your goods were always correctly placed in the hook tab; before lifting goods, operator must keep the chain CLEAN in order to avoid accident

## 2.4 Finished Operation

**⚠️ CAUTION** When you use hoist, please ensure that the load was safely landed on ground to AVOID goods dropped off

**⚠️ WARNING** When the operation is finished, kindly TURN OFF the power of your control pendant in order to avoid accidents due to wrong operations

## 2.5 Item Inspection and Maintenance

**⚠️ CAUTION** Please ensure that the inspection and maintenance activities are done by a well-trained staff as advised in **Chapter 4** and **Chapter 5**; otherwise, please contact your distributor for help; kindly make sure that the equipment are always correctly used

**⚠️ WARNING** The load chain was made of special alloy steel. You are PROHIBITED to weld or extend it with additional links. Essential spare parts are always available at our distributor

## 2.6 Other Items

**⚠️ CAUTION** If you would like to use the hoist under a SPECIAL condition (including in salt water, sea water, acid material, basic material, explosive environment), please contact our regional distributor for safety

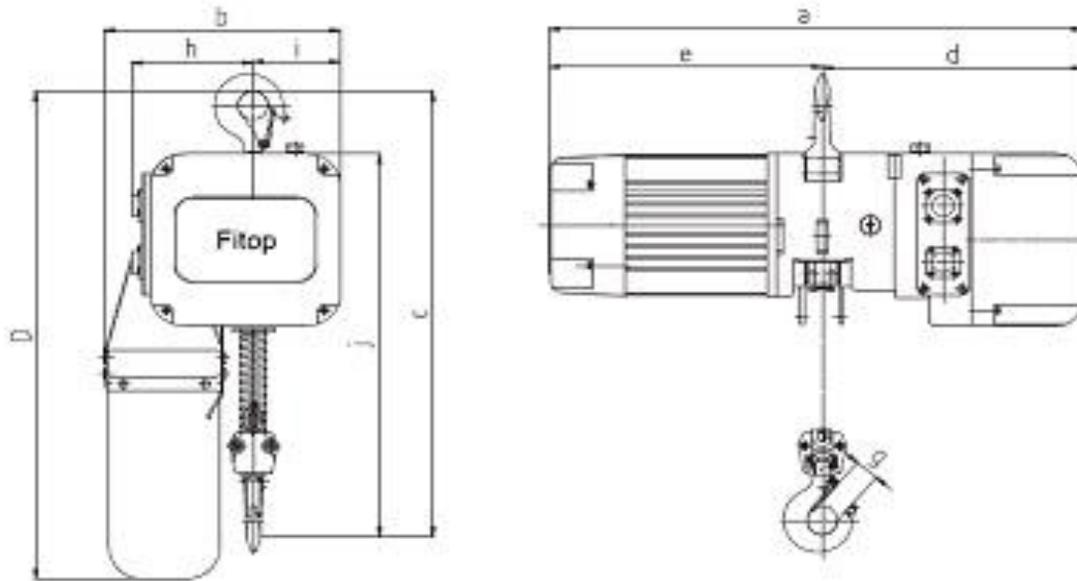
**⚠️ WARNING** Please STOP using the hoist when you found it is TIME to maintain it periodically

# 3. TECHNICAL DATA

## 3.1 Operation Condition and Environment

- If you need hoist to work in an EXTREME environment, for instance  $\geq 50^{\circ}\text{C}$ , please firstly consult your product-provider for safety
- Relative humidity (RH):  $\leq 85\%$ ; this product is NOT designed and fabricated to use in underwater environment
- Altitude height:  $\leq 1000\text{m}$ ; it is NOT appropriate to operate in conditions where it is extremely high temperature, or exposed in natural gas; moreover, it CANNOT lift melted-steel and poisonous, inflammable, explosive goods

### 3.2 Specifications



**List 1. General Specifications of D-series Electric Chain Hoist**

Type	DTS0E1	DTS011	DTS022	DTS031	DTS052		
Capacity (T)	0.5	1	2	3	5		
Lifting Speed (M. /min.)	7.2/2.5	5.8/1.7	2.5/0.85	6.0/2.0	3.0/1.0		
Classification	M5		M4				
Lining Motor Power (Kw)	09/0.3	1.1/0.37		3.0/1.0			
Duty Rating (% ED)	40						
Standard Lifting Height (M)	3						
Load Chain	∅6.3x19	∅8x24		∅11.2x34			
No. of Fall	1		2	1	2		
Tested Load (Kg)	625	1250	2500	3750	6250		
Main Dimensions	C	510	520	590	630	860	
	D	610	630	780	780	870	
	a	Single-speed	592	592	592	694	694
		Double-speed	632	652	652	740	740
		VFD (Inverter)	622	622	622	694	694
	b	276	276	276	430	430	
	d	Single-speed	273	273	273	336	336
		Double-speed	303	303	303	336	336
		VFD (Inverter)	303	303	303	336	336
	e	Single-speed	319	319	319	358	358
		Double-speed	329	349	349	384	384
		VFD (Inverter)	319	319	319	358	358
	g	31	38	45	45	61	
	h	142	142	185	185	240	
i	102	102	165	165	110		
j	420	430	482	487	665		

**List 2. Electrical Specifications of D-series electric chain hoist**

STYLE	Power plant voltage (V)	Control pendant voltage (V)	Frequency (Hz)	Ampere without load (A)	Ampere with load (A)	Electric motor with percentage of duty cycle (%)	Electrical machinery connection per hour (n)
DTS0E1	220v-440v/3P	24	50/60	2.25	3	40	240
DTS011	220v-440v/3P	24	50/60	4.5	5	40	240
DTS022	220v-440v/3P	24	50/60	5	6.5	40	240
DTS031	220v-440v/3P	24	50/60	5	6.5	40	240
DTS052	220v-440v/3P	24	50/60	5	6.5	40	240

### 3.3 Product Features

- Compact body: Integrally-formed machine box; superior rigidity makes it dust- and water-proof
- Improved ease of maintenance: Scratch resistance and all carburised makes it hard in surface and solid in structure
- Enhanced durability of load chain: FEC 80, ultra-treated alloy steel chain
- Double safety mechanism: The motor is equipped with limit switch and thermal-protection device for usage safety
- Improved production efficiency: The machine is equipped with two-staged gear for transmission; the hoist is installed with a helical, triple-reduction gear for high-speed transmission, making its operation stable and noise low, 65dB
- Increased ease of use and service life: Aluminium alloy shell protects the key parts, greatly improves its capability of corrosion resistance and heat dissipation
- Reduced running costs: Mode brake makes the gap in clutch smaller, saves the electricity

### 3.4 Classification of Machine and Period of Operation

You could ensure the safety and the period of operation of the hoist only if you operate AS INSTRUCTED. D-series electric chain hoist is suitable for the GRADES as **List 3**.

From **List 4** to **List 7**, you would understand how to determine the grade. It is determined by averaged time of operation and full time of operation and load condition.

**List 3**  
Model Numbers and Grades

STYLE	CAPACITY (T)	GRADE	
		FEM	ISO
DTS0E1	0.5	2m	M5
DTS011	1	1Am	M4
DTS022	2	2m	M5
DTS031	3	1Am	M4
DTS052	5	2m	M5

**List 4**  
IAm (FEM)

Load range	Definition	Average value	Daily hour used <sub>(h)</sub>	Total hours of operation <sub>(h)</sub>
1 Light	Usually in light load	$k \leq 0.50$	2-4	6300
2 Moderate	Usually in light load, sometimes in heavy load	$0.50 < k \leq 0.63$	1-2	3200
3 Heavy	Usually in moderate load, sometimes in heavy load	$0.63 < k \leq 0.80$	0.5-1	1600
4 Extremely Heavy	Usually in heavy load, sometimes in max. load	$0.80 < k \leq 1.00$	0.25-0.5	800

**List 5**  
2m (FEM)

Load range	Definition	Average value	Daily hour used <sub>(h)</sub>	Total hours of operation <sub>(h)</sub>
1 Light	Usually in light load	$k \leq 0.50$	2-4	12500
2 Moderate	Usually in light load, sometimes in heavy load	$0.50 < k \leq 0.63$	1-2	6300
3 Heavy	Usually in moderate load, sometimes in heavy load	$0.63 < k \leq 0.80$	0.5-1	3200
4 Extremely Heavy	Usually in heavy load, sometimes in max. load	$0.80 < k \leq 1.00$	0.25-0.5	1600

**List 6**  
M4 (ISO/JIS)

Load status	Definition	Value of std. load range <sub>(KM)</sub>	Daily hour used <sub>(h)</sub>	Total hours of operation <sub>(h)</sub>
1 Light	ISO: Usually in light load	0.125	————	6300/6400
2 Moderate	JIS: Usually in 1/3 of allowable load, rarely in allowable load	————	24	
3 Heavy	ISO: Usually in light load, sometimes in heavy load	0.25	————	3200
	JIS: Usually in 1/3-2/3 of allowable load, rarely in allowable load	————	1-2	
1 Light 2 Moderate	ISO: Usually in moderate load, sometimes in heavy load	0.50	————	1600
	JIS: Usually in more than 2/3 of allowable load, always in allowable load	————	0.5-1	
3 Heavy	ISO: Usually in allowable load	1.00	————	600
	JIS: Nearly in allowable load	————	0.25-0.5	

**List 7**  
M5 (ISO/JIS)

Load status	Definition	Value of std. load range (KM)	Daily hour used (h)	Total hours of operation (h)
1 Light 2 Moderate	ISO: Usually in light load	0.125	————	12500
	JIS: Usually in 1/3 of allowable load, rarely in allowable load	————	4-8	
3 Heavy	ISO: Usually in light load, sometimes In heavy load	0.25	————	6300/6400
	JIS: Usually in 1/3-2/3 of allowable load, rarely in allowable load	————	2-4	
1 Light 2 Moderate	ISO: Usually in moderate load, sometimes in heavy load	0.50	————	3200
	JIS: Usually in more than 2/3 of allowable load, always in allowable load	————	1-2	
3 Heavy	ISO: Usually in allowable load	1.00	————	1600
	JIS: Nearly in allowable load	————	0.5-1	

## 4. OPERATION SAFETY

### 4.1 Declaration

Operating with an overloaded weight may lead to dangerous outcome. As a result, before operation, please read the **Chapter 1.2** to aware of the prohibitions first. Complete the manual readings efficiently so that you may start using the hoist.

Before operating the hoist, please ensure that the work environment meets the following safety requirements:

- Ensure the work space enables the hoist to work stably
- Ensure the user has good eye-sight

### 4.2 Installation and test

Kindly PUT the hoist into a reliable frame, CONNECT it to a correct power, then PUSH the up- or down-button of control pendant, and OBSERVE the work condition of hoist. If the hook moves up or down smoothly, it indicated that the connection of the electrical wire is fine. If you push it, and the hook does NOT move, it reveals that the electrical wire is wrongly connected or your wall socket has to be repaired. Just switch the three-phase wires, and the hoist shall run normally.

### 4.3 Loaded Operation

The hoist which operates at the first time (or it has not been used for a longer period of time), we recommend you to let it run 15 minutes without loads. Kindly observe the work condition of the hoist; if it runs normally, you may then use it to lift materials.

## 5. ITEM INSPECTION

If you would use the hoist CONTINUALLY for a longer period of time, for example, more than SIX (6) HOURS, you must inspect it monthly so that you can be aware of when would be the time to change new parts to be FREE FROM DANDER.

The INTERVALS of the item inspection may be determined according to real condition of use and work classification. Moreover, you should check it according to the environment which it exposed to and the rate of key parts ageing. Periodic inspection such as daily, monthly, quarterly checking are always encouraged by FITOP as you may be free from risk.

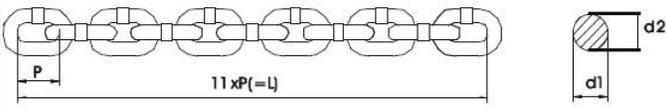
- Daily inspection: Before or during daily use, user or technical staff may inspect it visually.
- Periodic Inspection: Check by your technical staff according to the work environment.

### 5.1 Regular Inspection

Project	Method	Standard of Judgement	Solution
Label Warning Mark	Inspect visually	Stick correctly clean and clearly read	Change
Control Pendant	Inspect visually	Without fraction	Change
	Push stop button without load	Hoist stops, rotates at the right side; after pushing the stop button, hoist runs	Change
	Push start button without load	Bottom hook could lift and land	Repair or change
Brake	Lift and land 2 or 3 times without load	Check the Brake effect is good or not	Repair or change
Up & Down position limit	Operate the hook into the limit position without load	When touches the down position limit, the electric motor should stop, but could work in a reverse direction	Repair or change
Lifting chain	Inspect visually	Surface with lubricate grease without deformation, without crackle	Clean. Lubricate it; or change it if necessary
Hook	Inspect functions visually	Without deformation, and it could move, slide, and rotate freely	Change
Position limit spring	Inspect visually	Without deformation	Change

### 5.2 Check List for Periodic Inspection

Project	Method	Standard of Judgement	Solution
Control pendant	Push button to STOP function	Is the push button stable? No problem?	Repair
Power plant	Measure by voltmeter	$\pm 10\%$ rated voltage	Check the power plant and wire
Earth	Check earth point	Smaller than <b>0.1</b> $\Omega$ (ohm)	Adjust
Insulation	Measure by ohmmeter	Larger than 1.5 $\Omega$	Change defected parts
Hoist frame	Inspect visually	Not broken and cracked	Change
Nameplate	Inspect visually	The capacity of hoist can be clearly seen	Clean with banana oil, petrol
Screw	Inspect visually	Screw should not be loosen or missing	Kindly fasten the screw
Abnormal condition on operation	Lifting and landing operation with small capacity load	Users should not be able to hear abnormal sound from hoist machine or lifting motor	Repair
Gear oil	Inspect visually	Should be in accordance with the frequency of use	Add gear oil or use new oil

Brake	Lifting, landing, stopping operation within its rated-capacity load	Stop when landing, the down slide speed cannot over 1% of lifting speed	Repair				
Load limiter	Lifting earthed load; let the chain side (less than 5 seconds) then lift with rated-capacity load	<ul style="list-style-type: none"> <li>Can slide</li> <li>Can lift rated capacity bad</li> </ul>	Adjust or change				
Position limit switch	Lift to the limit position with rated-capacity load	Hoist could stop, could move reversely; the spring has certain flexibility	Repair or change				
Lifting Chain wear	Measure 			Change			
	Capacity (t)	$D=(d1+d2)/2$			L (mm)		
		Standard	Rejected		Standard	Rejected	
	0.25	5	$\leq 4.5$		165.8	$\geq 170.5$	
	0.5	6.3	$\leq 5.7$		210	$\geq 217.36$	
1	8	$\leq 7.2$	265.3	$\geq 274.56$			
2-10	11.2	$\leq 10.1$	375.8	$\geq 388.96$			
Caution: If the lifting chain was wear out, make sure you checked the chain guider							
Lifting chain deformation	Inspect visually	<ul style="list-style-type: none"> <li>without deformation (such as distortion)</li> <li>without deeper scratch and indent</li> </ul>	Change				
Lifting chain welding scar	Inspect visually	Warning: without welding scar	Change				
Lifting clan rust	Inspect visually	Warning: without obvious rust; lubricate the lifting chain with grease	Change				
Hook	Please measure and keep a record for the sizes when you buy A, B, C					Change	
	Original size		Standard of Rejection				
	A, B, C		More than 5% decrease of the original size				
	Capacity (t)	A*(mm)	B (mm)		C (mm)		
	Normal	Standard	Rejected	Standard	Rejected		
		d	d	d			
0.25-0.5	30	18	$\leq 7.1$	21	$\leq 19.95$		
1	37	20	$\leq 19$	24	$\leq 22.8$		
2-3	45	26	$\leq 24.7$	42	$\leq 39.9$		
5	61	35	$\leq 33.3$	50	$\leq 47.5$		
10	6	60	$\leq 57$	75	$\leq 71.3$		
The values indicated above are standard, because the sizes cannot be controlled within general range of tolerance. When you purchase new hoist, you could use the measured value as a standard, so that you may judge whether the hook is deformed by extending the hook and compare with its original size and length							
Hook deformation	Inspect visually	Without obvious deformation and crack; without deeper cracks; screw and bolt should be well tightened; without welding scar	Change				
Hook rotation	Inspect visually	Hook should rotate normally	Change				
Hook	<ul style="list-style-type: none"> <li>Inspect visually</li> <li>Inspect the overall condition</li> </ul>	Hook tab should be in the hook tip	Change				
Basal plate	<ul style="list-style-type: none"> <li>Inspect visually</li> <li>Inspection the overall condition</li> </ul>	<ul style="list-style-type: none"> <li>Should work normally</li> <li><b>⚠WARNING</b> Please do NOT use the hoist if the hook tab is missing</li> </ul>	Change				

**⚠ CAUTION** Add **No. 1 Lithium-based grease** to all bearings each year when maintaining

**⚠ CAUTION** The result of inspection should be done by technical staff so that the hoist may work safely after maintenance

**⚠ WARNING** Do not use the spares which is not approved by manufacturer

## 6. MAINTENANCE

### 6.1 General Rules

Wrong maintenance may cause severe injury or death; only qualified person could be authorized to maintain the hoist. Kindly contact regional distributor if you do not have qualified staff for maintenance.

**⚠ CAUTION** Do NOT use the hoist when it is under maintenance

**⚠ CAUTION** During the period of operation, if you find the hoist is abnormal, please check all the items as advised on **Chapter 5**

**⚠ CAUTION** Do NOT store the hoist with load. Please store hoist individually for safety

**⚠ CAUTION** Kindly CLEAN the dirt of hoist, and store the hoist in a place where is clear and dry

**⚠ CAUTION** Lifting chain explosion may cause injury or death. Please maintain the lifting chain carefully, operate it correctly with good maintenance and inspection

### 6.2 Lubrication

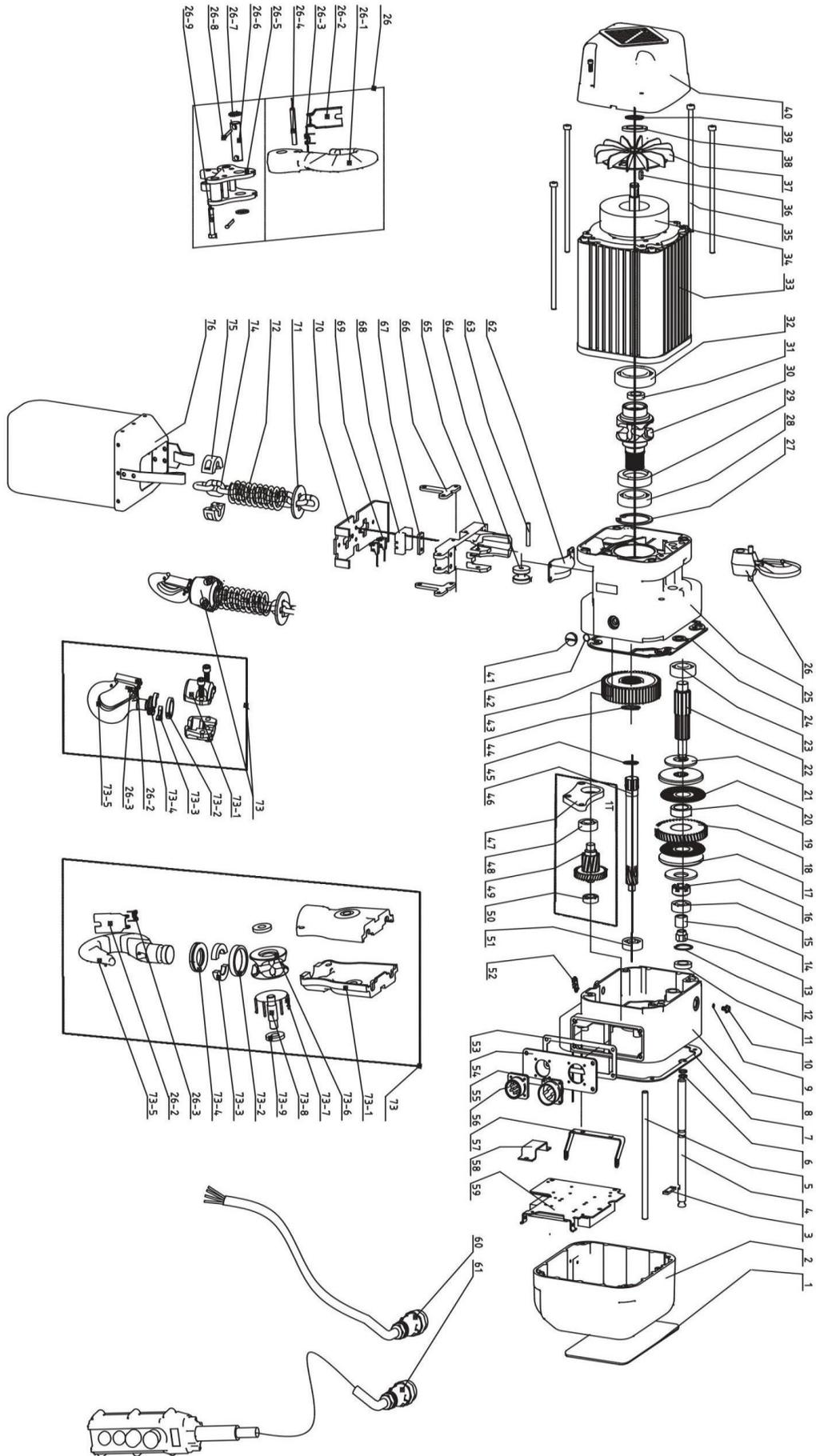
Kindly ensure that you lubricate the parts as the lifting chain, hook nock are the important parts of hoist. Please use mechanical oil (as effective as butter) to lubricate it

### 6.3 Malfunctions and Solutions

Malfunctions	Causes	Solution
The hoist unable to operate when it is switched on	Wire disconnected or power off due to plug loosened	Check and fasten all the wire connection points
	Electrical parts were damaged	Replace with new electrical parts
After switched off, the load dropped while braked	Dust or oil in the brake disc	Clean the disc
	Severe abrasion of disc	Replace with new disc
Chain runs with strange noise	The chain was not well-lubricated	Lubricate chain by oil or grease
	Load-guider broken	Change a new load-guider
Leakage of electricity	The electricity was not well-earthed	Ensure the earthed connection
	High humidity	Use dehumidifier to eliminate the problem
	Too much dust in the electrical parts	Clean the electrical parts
Skid when lifting the load	Load limit is flexible	Screw down the load limiter
Hook extension	Maintain the load with hook tip	Maintain the load at the middle section of hook
	The chain sling of load is not correct	Use a correct chain sling
Inverter alarm	Please read the instruction about the inverter	

# 7. APPENDIX

## 7.1 Explosion Chart

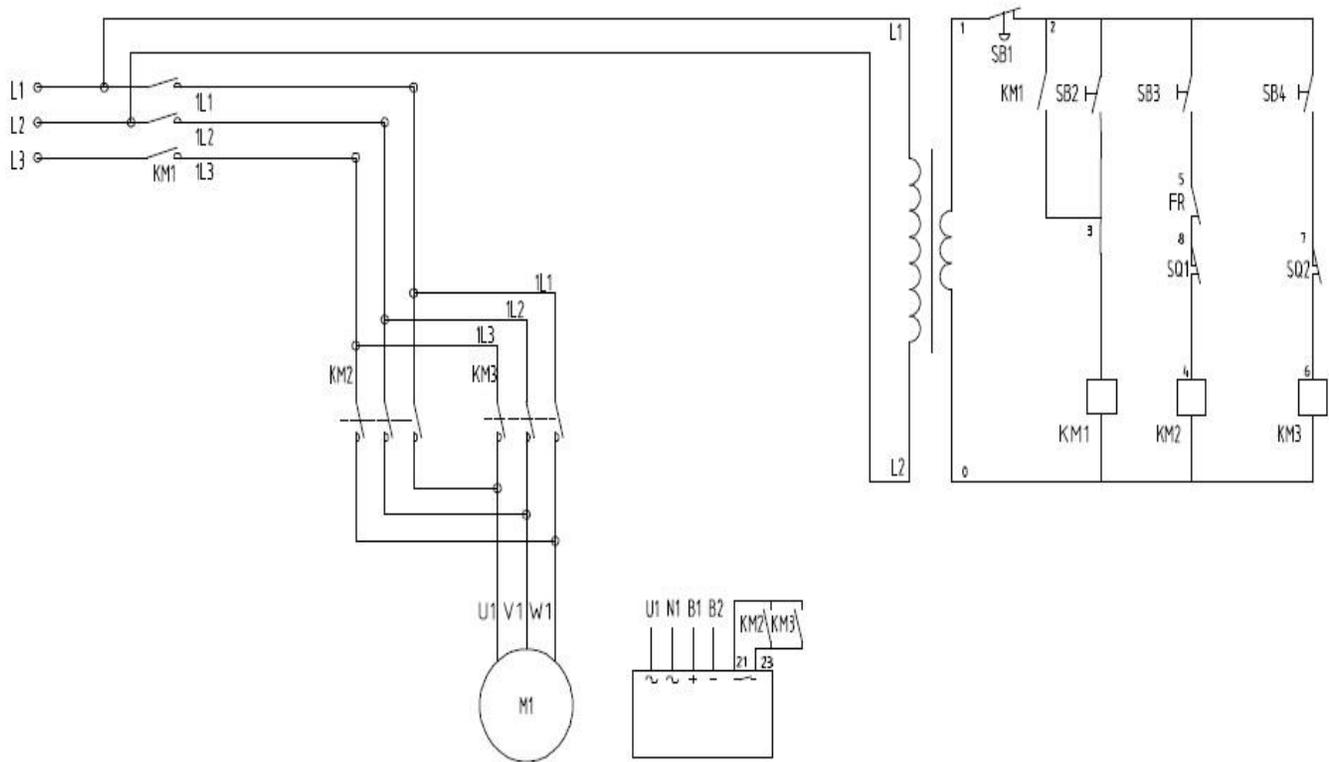


## 7.2 Parts List

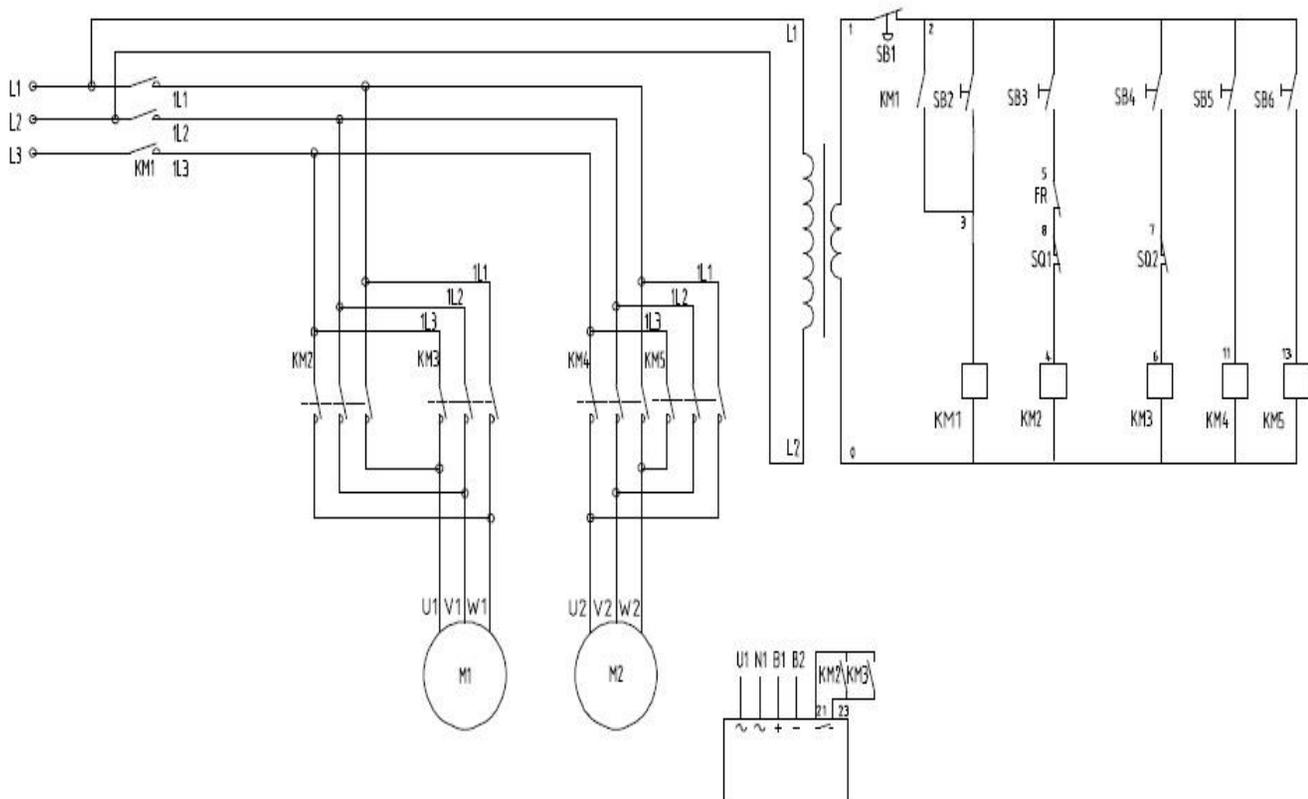
No.	Item	No.	Item	No.	Item
1	Label	26-8	Cotter pin	57	Electric plate connection shelf
2	Cover of Control panel	26-9	Hook pin	58	Sealing plate
3	Hook shaft baffle	27	Hole spring	59	Electric parts
4	Hook shaft	28	Bearing	60	Power plant wire set
5	Hook ring shaft	29	Lip-shaped sealing ring	61	Control pendant set
6	O-shaped rubber cushion circle	30	Chain wheel	62	Chain stopper plate
7	Rubber pad for Control panel	31	Lip-shaped sealing ring	63	Guider roller shaft
8	Reducer cover	32	Bearing	64	Guider roller
9	O-shaped rubber cushion ring	33	Electric motor	65	Chain guider
10	Outer six corner snail (M14)	34	Brake	66	Fasten plate C
11	Lip-shaped sealing ring	35	Motor screw	67	Micro switch seat fasten plate
12	Hole ring	36	Flat key	68	Micro switch seat
13	Self-locking nut	37	Fan blade	69	Micro switch
14	Deep channel bearing	38	Flat washer	70	Position limit floor boards
15	Bearing	39	Shaft ring	71	Position limit baffle plate
16	Deep channel bearing	40	Motor cover	72	Limit spring
17	Friction pressing pad	41	Plug screw	73-1	Down hook
18	Big gear2	42	O-shaped sealing ring	73-2	Hook ring sheave
19	Shaft sleeve	43	Spline gear	73-3	Hook ring
20	Friction disc	44	Shaft ring	73-4	Bearing
21	Dish spring	45	Shaft ring	73-5	Down hook
22	Small gear shaft3	46	Small gear shaft 1	73-6	Pulley
23	Bearing	47	Bearing support plate	73-7	Roller needle
24	Gearbox seal	48	Bearing	73-8	Pulley shaft
25	Gear box	49	Gear shaft2 set	73-9	Pulley shaft ring
26-1	Top hook	50	Bearing	74	Lilting chain
26-2	Safe wedge	51	Bearing	75	Chain stopper stripper
26-3	Double spring	52	Electric wire board 2	76	Chain bucket set
26-4	Heavy-typed elastic pin	53	Rubber cushion for wire box		
26-5	Tool hook shelf	54	Aviation plug		
26-6	Hook Shaft	55	Aviation plug		
26-7	Hook Shaft ring	56	Aviation plug		

## 7.3 Electric Schematic Diagram

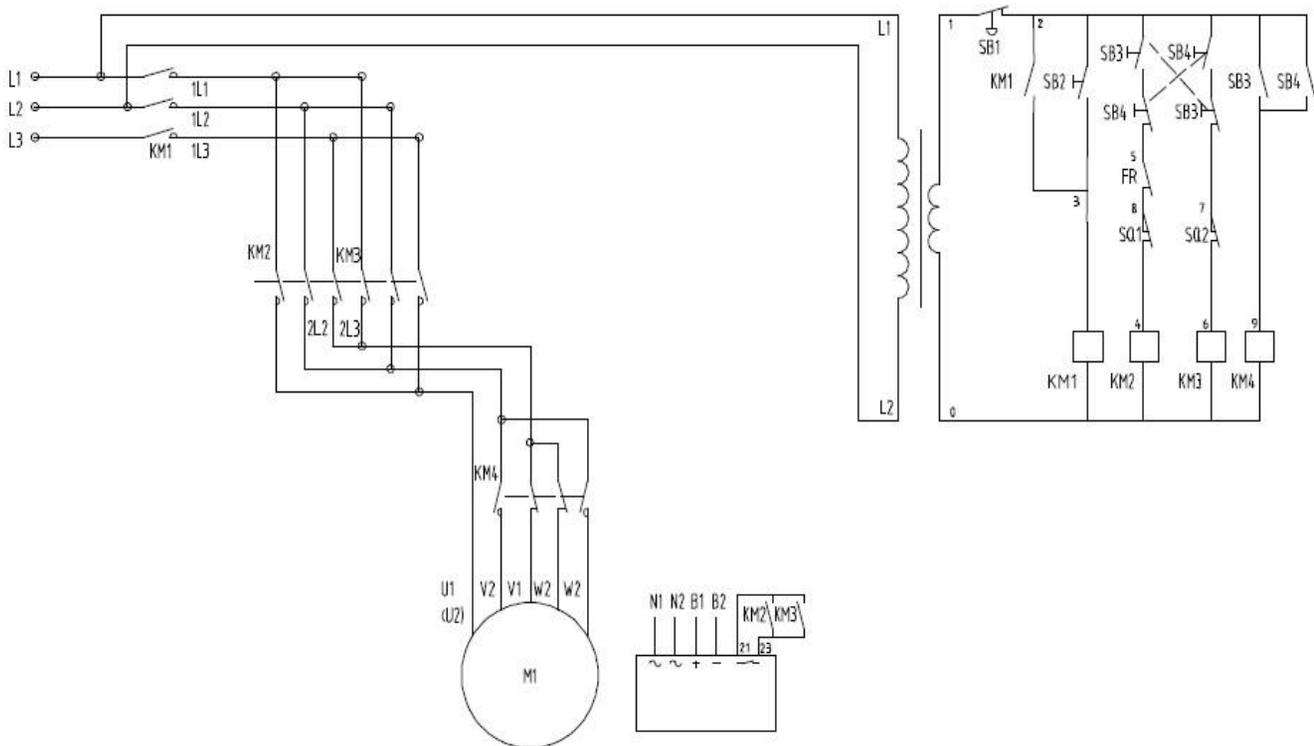
### 7.3.1 The diagram for Foot-mounted, Single-speed



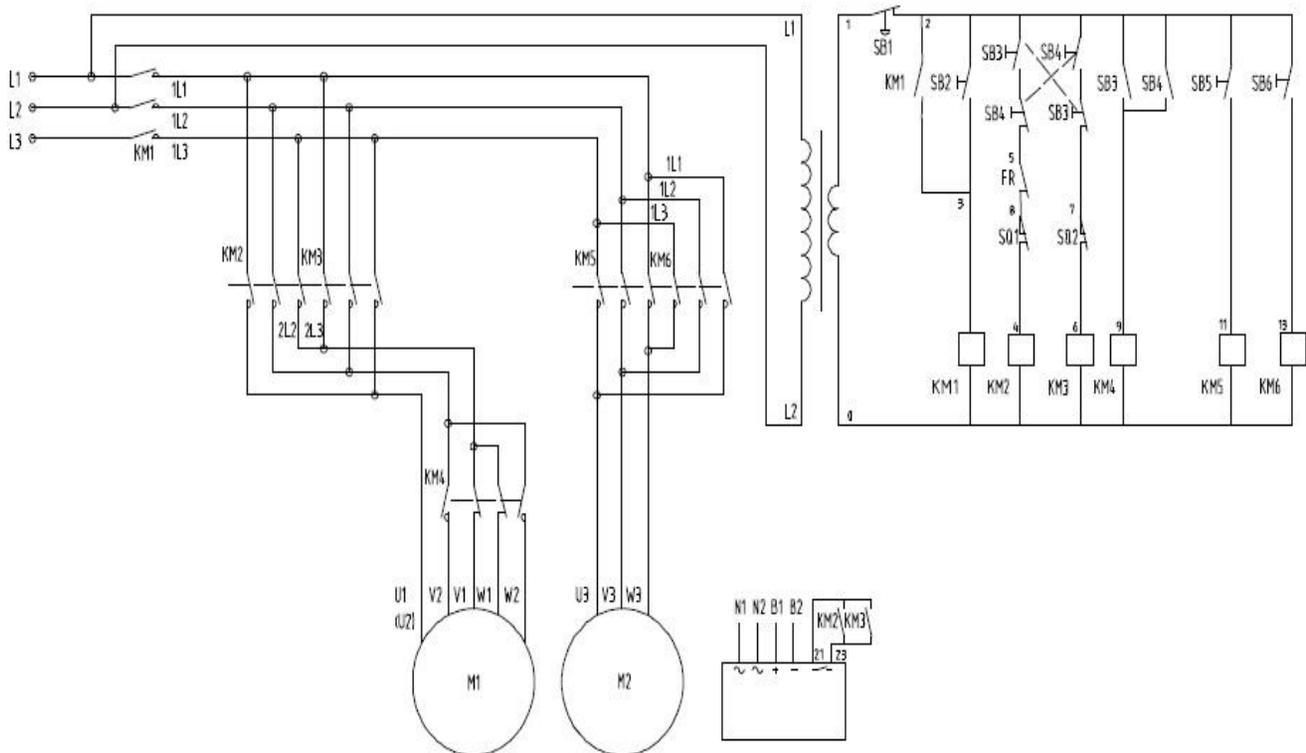
### 7.3.2 The Diagram for Mono-travelling, Single-speed



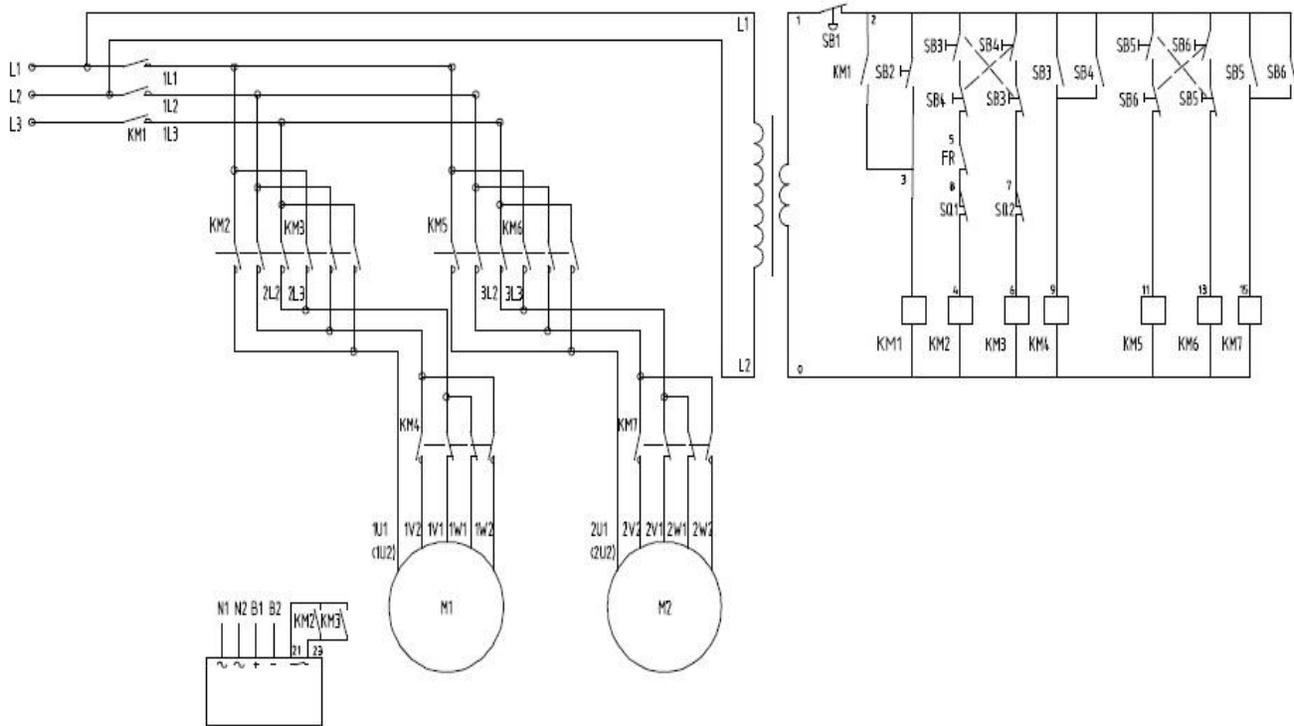
### 7.3.3 The Diagram for Foot-mounted, Double-speed



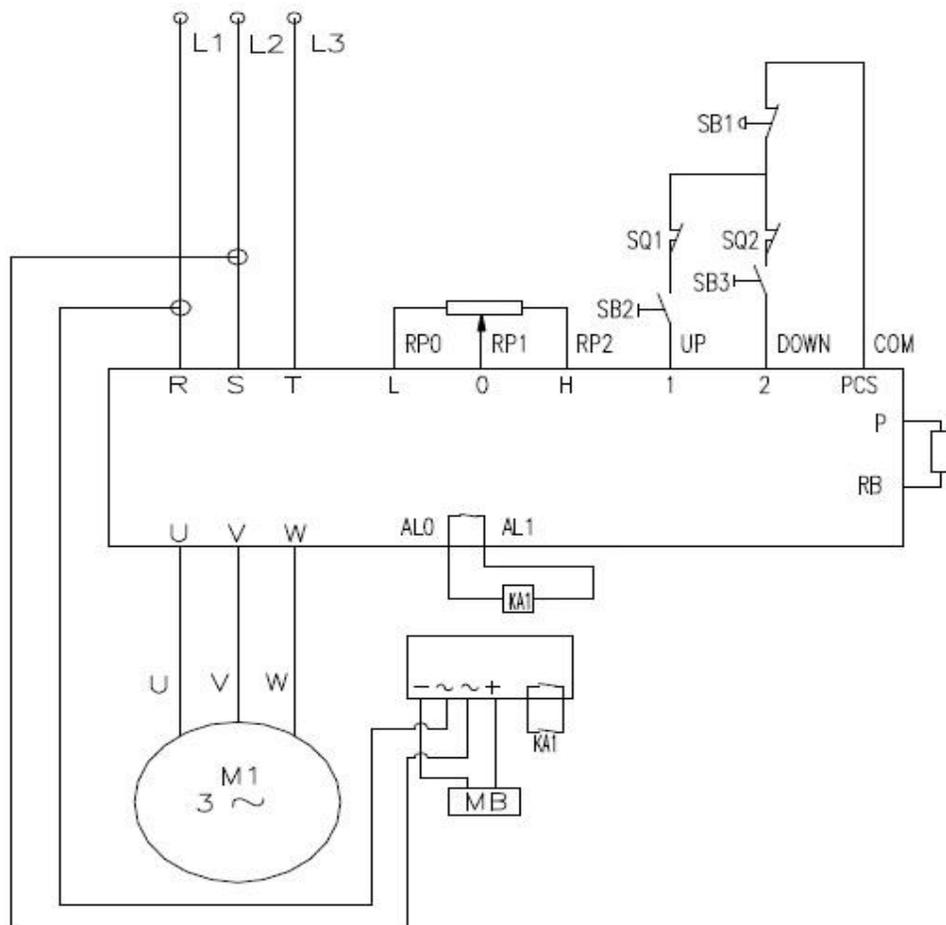
### 7.3.4 The Diagram for Mono-travelling, Double-speed



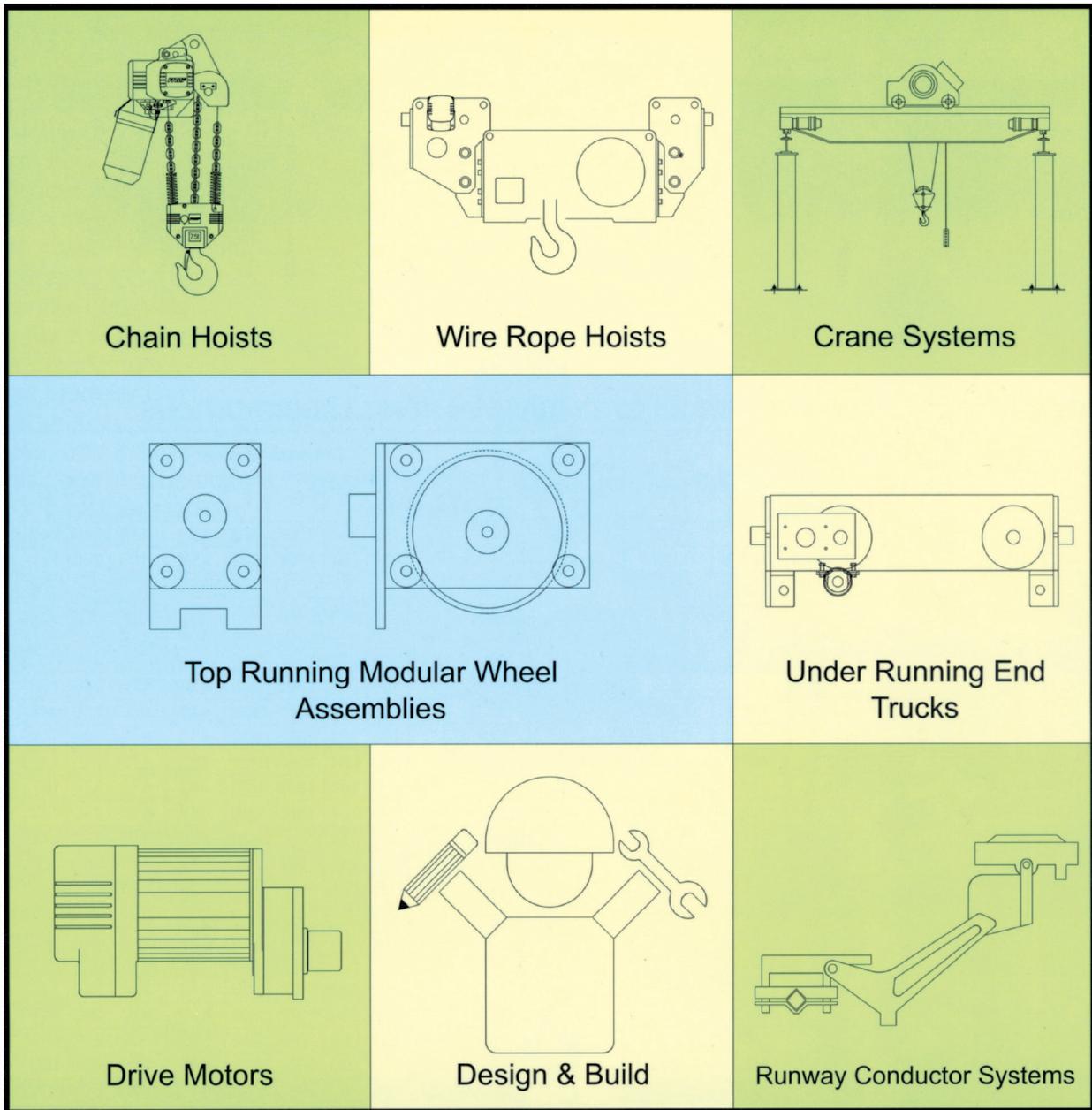
### 7.3.5 The Diagram for Dual-travelling, Double-speed



### 7.3.6 The Diagram for VFD (inverter)-controlled-speed







**WARNING:** The equipment shown in this catalog is intended for industrial use only and should not be used to lift, support, or otherwise transport people, or to suspend loads over people.