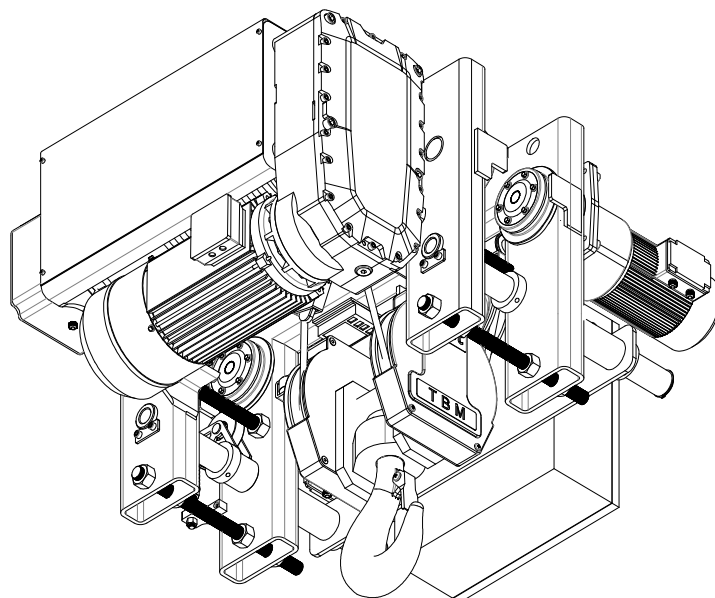


SHA8-D Wire Rope Hoist Operation Manual



Dear Customer:

We feel honor that our brand wire rope hoists serve for you, thanks a lot for your cooperation and support.

In order to supply you better service and help you win more profit, also use our product safely, please read our operation manual seriously, and operate according to our relevant standard.

Warning

NO OVERLOAD

NO LIFT WEIGHT SLIGHTLY

DON'T STAND UNDER THE WEIGHT

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1. Product description

1.1 Features

SHA8 series electric wire rope hoists are new kinds of light lifting equipments, which are complete in types and specifications and suitable for various applications and conduct M5 working classification. Upon client's special requirement, SHA8 series electric hoists under M4, M6 working classification can also be designed. They are characterized by good look, low dead weight, compact structure, reasonable layout, high efficiency and stable operation. During design the following standards are adopted:

GB 3811 "Design rules for crane"

GB6067 "Electric wire rope hoist safety procedures"

JB/T9008 "Electric wire rope hoist"

JB 9009 "Electric wire rope hoist - Safety rules"

EN60204 "Safety standard for electrical system"

1.2 Safety Instruction

Contact with concentrated acids or corrosive liquid may result in damage to plastic component or the corrosion of metal parts; any parts affected by such damage or corrosion must be replaced in good time.

Severe personal injury or damage to property may occur as a result of (1)The forbidden removal of safety clip on the hook assembly, (2)Improper use, (3)Incorrect operation, (4)untimely repair and maintenance.

Failure to comply with the safety instructions given in this Manual may lead to injury or even to fatal accidents. This product may cause hazards to life if it is operated incorrectly or by non-trained or inadequately trained person. The operator of the product must get necessary train before operation and maintenance. Because of the risk of injury due to clothes or parts of the body catching on or being drawn into the equipment, operator must not wear any loose clothing, unprotected long hair or jewellery. Ring is prohibited during operation. Persons under the negative influence of alcohol, drugs or medicines are prohibited from operation or maintenance. The product must not be operated in hazardous environment except the product has been specifically designed for such use.

During operation:

- Compliance with all the precautions required in this manual before, during and after commissioning and all the general safety requirement, especially those concerning operational safety and accident prevention. Failure to comply with these precautions and requirements may lead to personal injury or even fatal accidents.
- The use of non-approved or unsuitable tools or auxiliary equipment may result in injury.
- During the movement of hoist components, squeeze and twist may occur on the equipment, operator must keep sufficient safety distance from moving or rotating components to prevent the body, clothes or hair from being caught by the hoist.

1.3 Product operation

The hoist described in this document is fit for the carrying and lifting of loads subject to the maximum load capacity, the FEM and ISO classification for which it has been designed. Load capacity, FEM group and load group are indicated in the data sheet or test book of each product.

Use properly is also included to strictly obey installation, operating and maintenance instruction.

Among other things, equipment is not considered to have been used for the intended purpose if

- The maximum admissible load capacity is exceeded,
- Loads are pulled diagonally,
- Loads are torn away, dragged or pulled,
- It is used to lift persons with or without loads,
- Inching operation

- Reversing operation (operation of opposite direction when system is in motion)
- Intentional operation against emergency end stops

1.4 Warranty

We will assume no liability for any damage to the crane or hoist resulting from operation abnormal or work performed improperly or by unauthorized personnel or for claims by third parties.



Caution!

If you modify any, components under your own responsibility, assemble components other than in accordance with the installation instruction and/or plans or use any components other than genuine components, We will be released from any warranty obligations for the entire equipment.

For the safe and reliable operation of the product and for the retention of warranty rights, it is essential to use genuine parts when you need spare parts.

Safe operation is only possible within the service life stated if the crane/hoist is operated within its rating and the installation, operation and maintenance instructions are followed. You will find the hoist class, load group and FEM group of your crane/hoist in the text book and data sheet for the product concerned.

Notes on the theoretical service life of the hoist are given in the appropriate installation, operation and maintenance instructions. Our products must be maintained and repaired only by trained, authorized, specialist personnel.

1.5 Other notes

The declaration of conformity/manufacture's declaration is included in the test book. The year of manufacture is stated in the data sheet in the test book.

The product will only continue to perform reliably to your satisfaction in the long term if it is operated, maintained and repaired by persons assigned to these tasks by the operator. Such persons must be familiar with the installation, operation and maintenance instructions and the applicable safety regulations and accident prevention regulations.

2. Main applications and application scope

2.1 Applications

SHA8 series electric wire hoists may be hung on single or double girder to lift various loads. They are usually equipped on electric single-girder, double-girder, gantry crane and loading or unloading machinery to widen operation range. Because of easy operation, load and unload, low over headroom, they are widely used in plant, mining, railway, port, warehouse, good yards and service industries, and are the absolutely necessary machines to improve productivity of labor.

SHA8 series electric wire rope hoists are suitable for:

- Simple cargos lifting
- Equipment installation, finished products handling and parts loading and unloading in plants.
- Operation in production line.
- Constructing areas.
- The application can be extended to lifting of hot and liquid loads if the working classification of the mechanism is improved.

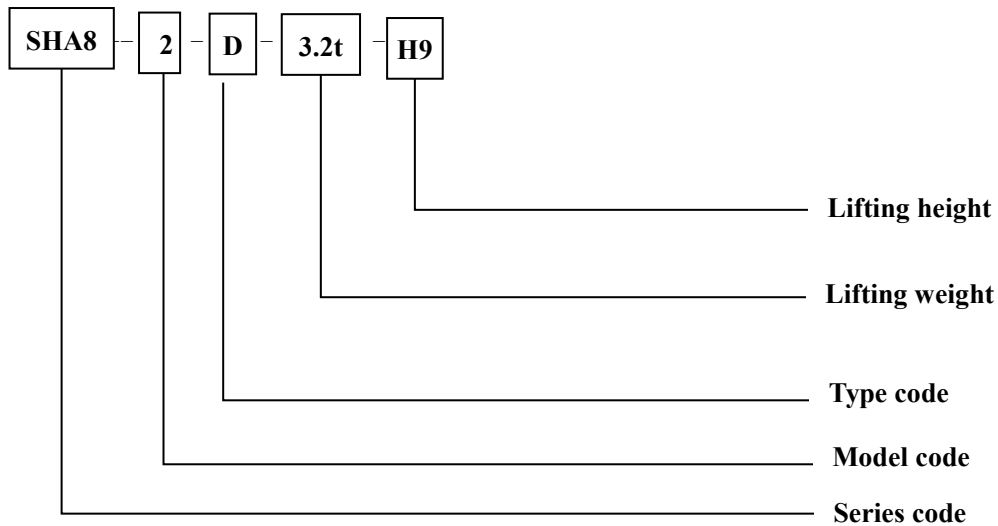
2.2 Working Conditions

This product is applicable to work under the environment below 1000m, range with temperature $-25^{\circ}\text{C}\sim+40^{\circ}\text{C}$ and humidity $\leq 85\%$, which is free of fire and explosion risk, corrosive medium and dust. Lifting of toxic, inflammable or explosive goods shall not be allowed.

The standard power supply should be 3-phase AC, 50HZ, 380V, but special power supply is also available. It is a middle duty factor mechanism and when the working classification is increased by one class, rated lifting capacity shall be correspondingly decreased by 20%.

3 Type and Technical Parameter

Product type and specification is as follow:



Parameter

The type SHA8-D hoist sketch is as Figure1

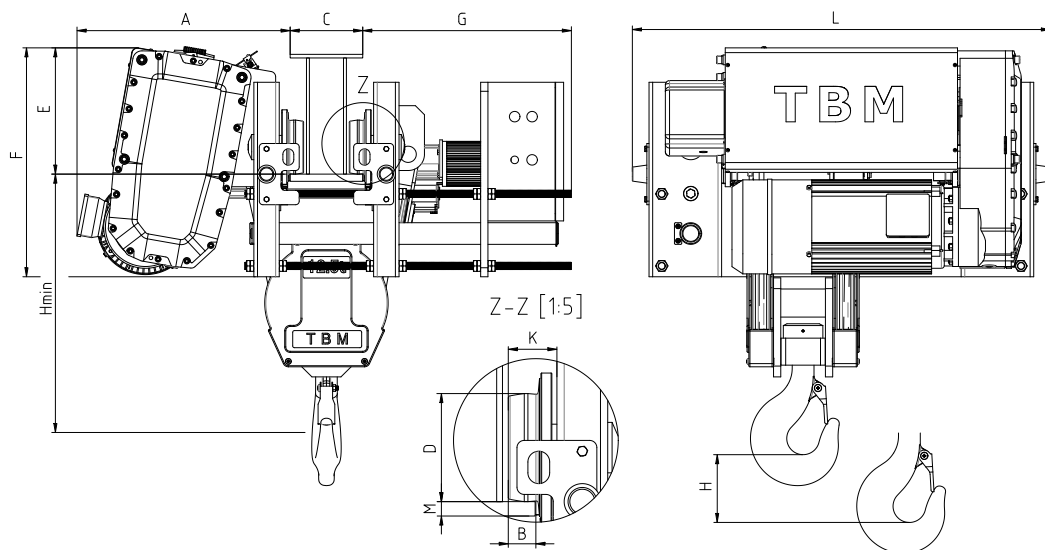


Fig.1

Type XD hoist main technical parameter is as table 1

Model	Capacity (t)	Rope reeving	Wire rope length/m	H min /mm	Classification	Lifting Motor /Kw	Lifting speed /m/min	Traveling Motor /Kw	Traveling Speed /m/min	Size /mm	Lifting height H/m 4/1 (2/1)			
											6 (12)	9 (18)	12 (24)	15 (30)
2	3.2	4/1	4H+3.5	470	M	0.37/2.5	0.66/4	0.37 /0.1	20 /5 (or inverter)	L	945	1157	1369	1581
						0.45/3.2	0.8/5							
	1.6	2/1	2H+2.5	560		0.37/2.5	1.32/8							
						0.45/3.2	1.6/10							
3	5	4/1	4H+5	550	0.8/4.9	0.72/4.5	0.55 /0.15	20 /5 (or inverter)	L	980	1190	1400	1610	
					1.1/7.6	0.9/5.6								
	2.5	2/1	2H+3	700	0.8/4.9	1.44/9								
					1/6.1	1.8/11.2								
4	10	4/1	4H+6.5	700	M	1.5/9.5	0.8/5	0.75 /0.3	20 /5 (or inverter)	L	1093	1305	1517	1729
						5	2/1							
	12.5	4/1	4H+6.5	700		2/12.5	0.8/5							
							6.3							

Model	A	B	C	D	E	F	G	Mmax	K	Wire rope
2	432	30	94-400	100	226	431	491	30	59	8×19S-1960-φ7
3	499	30	116-460	125	271	519	491	32	59	8×19S-1960-φ9
4	601	37	142-460	150	351	641	562	40	67	8×19S-1960-φ13

Table 1

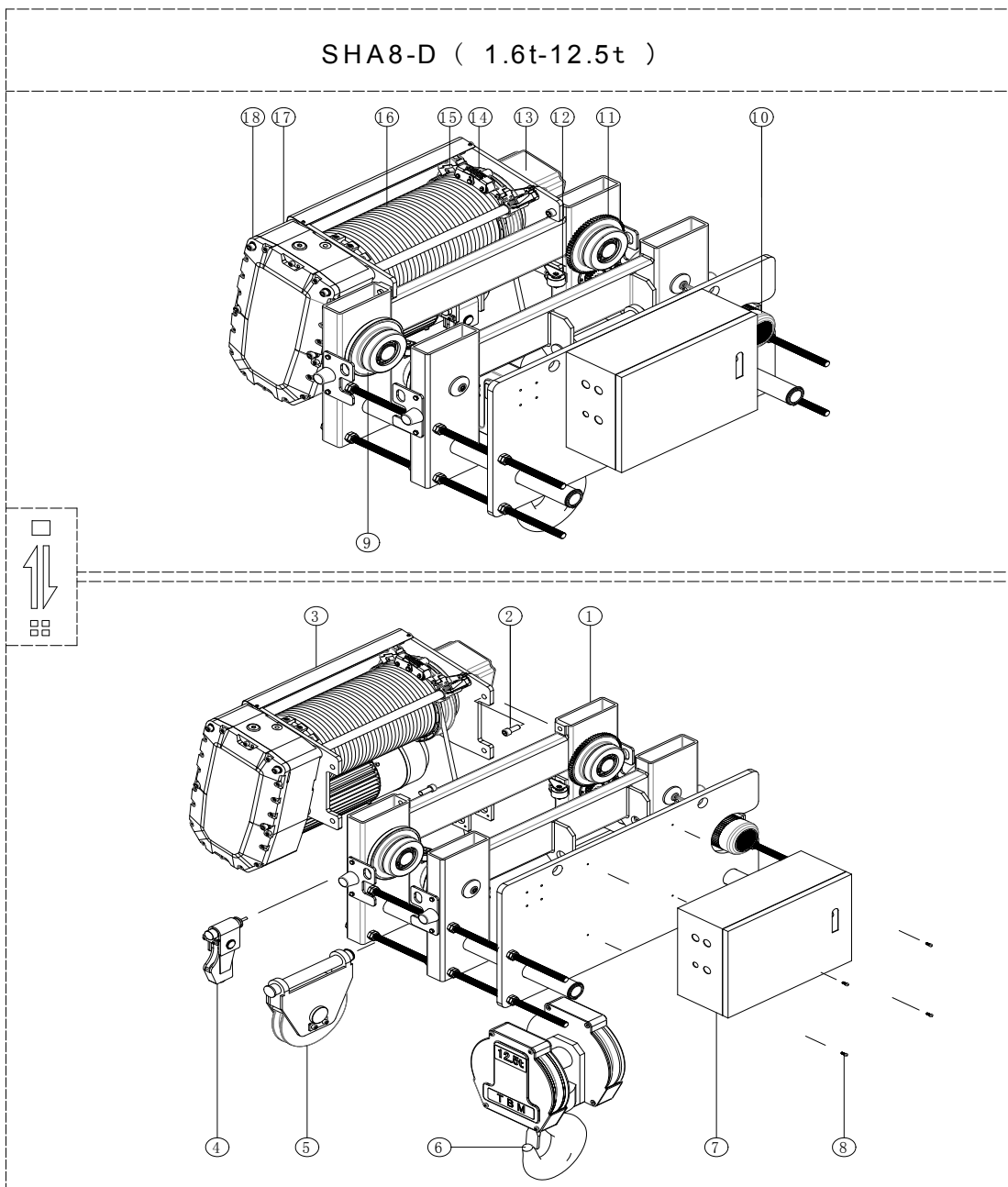
* Due to the continuous improvement of products, such as the technical parameters in this manual are modified without additional notice.

4. Assemble Description

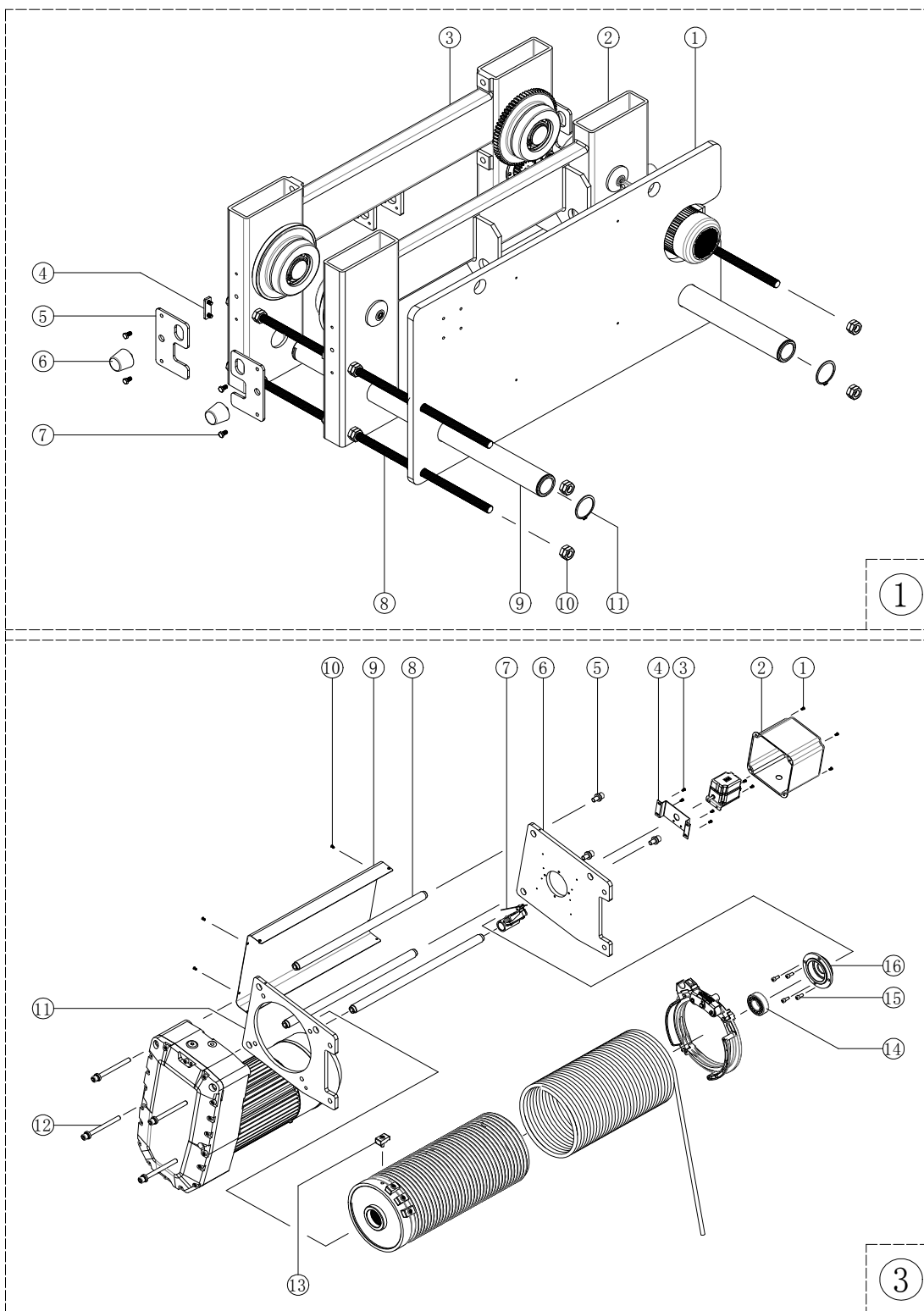
4.1 Exploded View and spare parts list

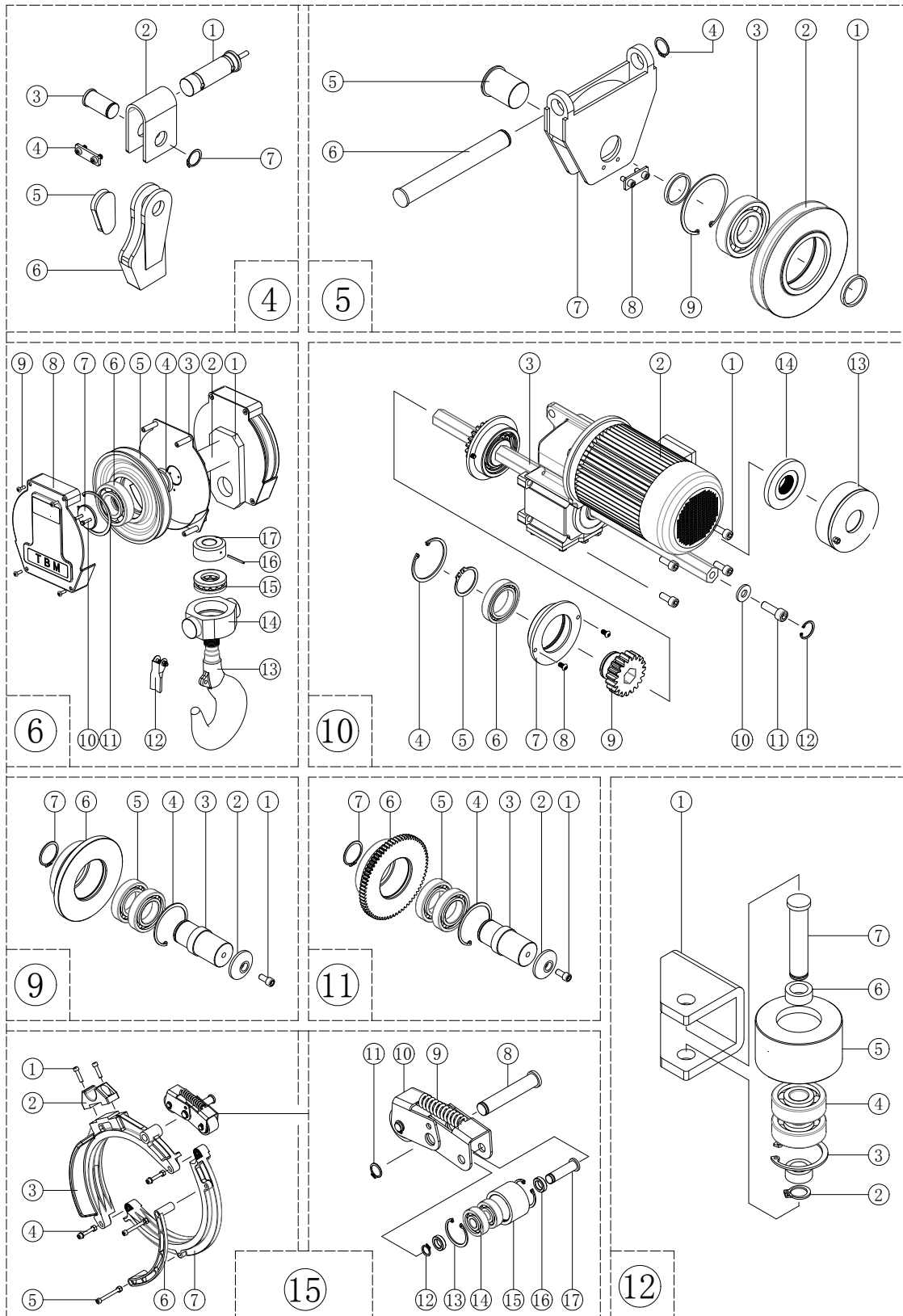
A. Check the exploded view for the general structure(Fig.2)

Including trolley frame, Hoisting drive assembly, Rope wedge device, equalizer pulley(only in 4/1 rope reeving), hook assembly and electric control device, all the brake disk in this products don't contain asbestos.

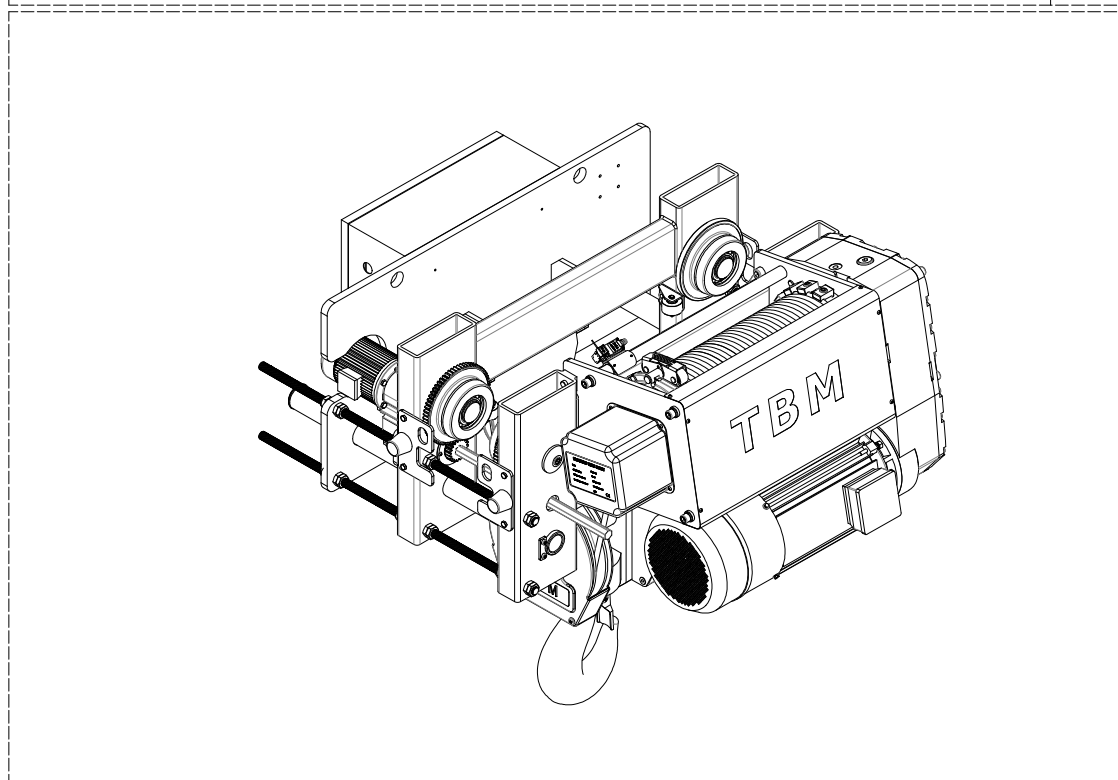
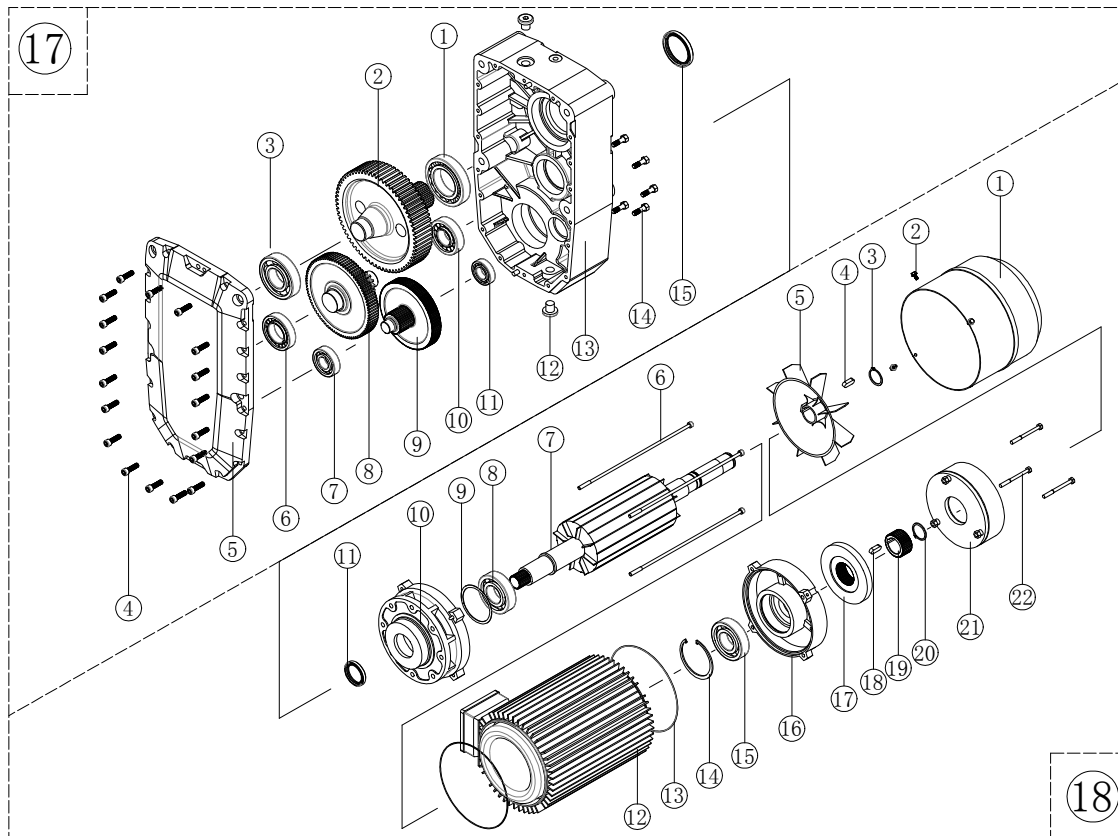


1.trolley frame, 3.hoisting drive assembly





17: main gearbox; 18: main motor



Spare parts list (table 2) :

No.	Name	No.	Name	No.	Name	No.	Name
1	Trolley frame	3.14	Spherical bearing	9.7	Shaft circlip	15.14	Deep groove ball bearing

2	Bolt	3.15	Bolt	10.1	Bolt	15.15	Clamping roller
3	Hoisting drive assembly	3.16	Bearing base	10.2	Integrated motor	15.16	Clamping roller sleeve
4	Rope wedge device	4.1	Sensor shaft	10.3	Hexagon rod	15.17	Clamping roller shaft
5	Equalizer pulley	4.2	U-shape plate	10.4	Hole circlip	17.1	Bearing
6	Hook assembly	4.3	Wedge shaft	10.5	Shaft circlip	17.2	Gear wheel 3
7	Electric control device	4.4	Fixed shaft plate	10.6	Deep groove ball bearing	17.3	Bearing
8	Bolt	4.5	Block	10.7	Bearing base 2	17.4	Bolt
9	Passive trolley frame	4.6	Wedge	10.8	Bolt	17.5	Gearbox case
10	Trolley driving mechanism	4.7	Shaft circlip	10.9	Trolley gear wheel	17.6	Bearing
11	Motorized trolley frame	5.1	Pulley sleeve	10.10	Retainer plate	17.7	Bearing
12	Side press pulley mechanism*	5.2	Pulley	10.11	Bolt	17.8	Gear wheel 2
13	Height limiter	5.3	Deep groove ball bearing	10.12	Shaft circlip	17.9	Gear wheel 1
14	Drum	5.4	Shaft circlip	10.13	Electric chuck	17.10	Bearing
15	Rope guider	5.5	Pulley shaft	10.14	Friction disk	17.11	Bearing
16	Wire rope	5.6	Pulley beam shaft	11.1	Bolt	17.12	Oil plug
17	Main gearbox	5.7	Pulley U-shaft plate	11.2	Press cover	17.13	Gear body
18	Main motor	5.8	Fixed shaft plate	11.3	Wheel shaft	17.14	Bolt
1.1	Control panel fix plate	5.9	Hole circlip	11.4	Hole circlip	17.15	Oil seal
1.2	Trolley cover 2	6.1	Hanging board	11.5	Deep groove ball bearing	18.1	Fan cover
1.3	Trolley cover 1	6.2	Pulley shaft	11.6	Motorized wheel	18.2	Bolt
1.4	Fixed shaft plate	6-3	Pulley shell 1	11.7	Shaft circlip	18.3	Shaft circlip
1.5	Safety plate	6.4	Sleeve	12.1	side press pulley base	18.4	Flat key
1.6	Buffer	6.5	Pulley	12.2	Shaft elastic circlip	18.5	Fan
1.7	Bolt	6.6	Deep groove ball bearing	12.3	Hole elastic circlip	18.6	Bolt
1.8	Adjusting screw bar	6.7	Pulley retainer plate	12.4	Deep groove ball bearing	18.7	Rotator

1.9	Connecting bar	6.8	Pulley cover 2	12.5	Side press pulley	18.8	Bearing
1.10	Hexagon screw nut	6.9	Bolt	12.6	Side press pulley sleeve	18.9	corrugated gasket
1.11	Shaft circlip	6.10	Bolt	12.7	Side press pulley shaft	18.10	Front block cover
3.1	Bolt	6.11	Hole circlip	15.1	Bolt	18.11	Oil seal
3.2	Limiter cover	6.12	Safety clip	15.2	Slip block	18.12	Stator
3.3	Bolt	6.13	Hook	15.3	Rope guide ring (right)	18.13	Sealing ring
3.4	Limiter fixed plate 2	6.14	Hook Beam	15.4	Bolt	18.14	Hole circlip
3.5	Bolt	6.15	Ball thrust bearing	15.5	Bolt	18.15	Bearing
3.6	Cover 2	6.16	Elastic pin	15.6	Rope guide ring (right)	18.16	Back block cover
3.7	ME8107	6.17	Hook nut	15.7	Rope guide ring (right)	18.17	Friction disk
3.8	Slip rod	9.1	Bolt	15.8	Clamping roller pin	18.18	Flat key
3.9	Cover plate	9.2	Bearing cap	15.9	Clamping roller spring	18.19	Spline sleeve
3.10	Bolt	9.3	Wheel shaft	15.10	Clamping roller frame	18.20	Shaft circlip
3.11	Cover 1	9.4	Hole circlip	15.11	Shaft circlip	18.21	Electric chuck
3.12	Bolt	9.5	Deep groove ball bearing	15.12	Shaft circlip	18.22	Bolt
3.13	Press plate	9.6	Passive wheel	15.13	Hole circlip		

*Spare parts for optional(Special design)

4.2 Trolley frame

SHA8-D Series wire rope hoists are equipped with a trolley mechanism made from welded steel sheets. The frame keeps the non-load balance through adjusting the electric control panel fixed plate. The width of trolley applies to normal I beam and steel sheet. The integrated motor is a 4/12-pole squirrel cage motor or 4-pole squirrel cage motor with frequency inverter. They are equipped with A.C. magnetic disc brake and gearbox with insulation class F and protection type IP 54.

4.3 Hoisting drive assembly

Hoisting drive mainly consists of hoist motor and gearbox, drum cover, drum, rope guider wire rope and limiter. The hoist motor is a 2/12-pole squirrel cage motor with integral A.C. magnetic disc brake and gearbox. Insulation class F, protection type IP 54.

The rope guider applies to the FEM classification. It's made of anti-friction and anti-skid material to prevent wire from twisting and make sure the wire is wiring tightly on the drum. High strength wire is adopted in SHA8 series. This special designed wire rope's min breaking force and resistance life better than traditional wire. This is another reason to choose TBM original parts. Limiter is a part to limit the lift and down of hook and protect efficiently from bumping and hitting the ground, except it is strictly prohibited to use as switch.

4.4 Hook assembly

The hook is made of hook-purpose forged steel and connected with the cover through its suspension beam with thrust ball bearing to ensure free gyration within 360°C.

4.5 Electric component

Wire rope hoist control units feature advanced technology and cover a wide range of applications thanks to their modular design. Movement in all directions is possible in two-stage poles - changing operation. All motor, power and control lines are connected using plug-type connectors for easy maintenance.



Caution!

Work on electrical systems must be performed only by qualified personnel. The power supply must be disconnected before starting work.

4.5.1 Control box

The control box is installed on the wire rope hoist and has IP 54 protection. Reversing contactors are mechanically interlocked with each other. The design of the control systems with ducted wiring and no fuses ensures ease of maintenance. Each drive group is protected against overloading by a standard motor circuit breaker or an electronic overload protection device. In order to prevent thermal overloading of the motor as a result of repeated inching operation, the changeover contracts for pole-changing hoist and trolley travel motors are released with a time delay of 0.5s.

4.5.2 Mains connection line

Conductor cross sections for power supply circuits from the distribution assembly via the mains switch to the contact conductor input terminals must be determined by the operator. The-cross section of the power supply circuit must be sufficient to ensure that the voltage at the input terminals of the contact conductor system does not fall below the specified minimum value, without using the negative 5% tolerance.

4.5.3 Mains switch

In accordance with EN60204, Part 32, it must be possible to disconnect a hoist using a mains switch and to lock out the power supply. The mains switch is not included in hoist system and is intended to disconnect the crane or hoist system from the power supply for repair and maintenance work. If necessary, this switch may also be used for emergency shut-downs or emergency stopping.

4.5.4 Trolley travel limit switch (optional)

Advance slow-down switches to slow the crane or trolley to low speed before the end of the track is reached are normal practice. This configuration prevents the crane or hoist from being run against the end stops at high speed, causing severe load swinging, with the attendant risk of damage and injury. A limit switch recognizes the speed limit in both directions. The unit may be moved out of the advanced slow-down area at high speed in the

opposite direction. For speeds above 30 m/min., an end shutdown system is always combined with an advance slow-down switch.

4.5.5 Pendant control

(a) Operation

Motors are operated using two-stage spring-loaded switches. It is recommended to use the first stage for load positioning work. Frequent inching may damage the motors and switchgear. A mechanical interlock is provided to prevent simultaneous operation of the control for both directions of travel.

(b) Emergency stopping

The emergency stop function from ground level and from the operating position required by EN60204, part32 is implemented using the red mushroom button.



Caution!

An emergency stop is not the same as an emergency shutdown. Only the power supply to the supply to the travel drives is cut off and the brakes are operated. The system is not disconnected from the power supply.

An emergency stop is initiated by pushing the mushroom switch. The system can be restarted by turning the switch to the left.

An emergency stop must be initiated under the following conditions:

- (1) if the crane travel motors fail to obey normal control commands and hazardous situations may occur
- (2) if the crane operator leaves the control position

4.6 Lubricants

All roller bearings are provided with lubricant. The hoist gear is oil-lubricated. The gears of the trolley drives are provided with a fluidized-grease lubrication. If a drive system is replaced, you must sure that all the lubrication points of the new drive system are lubricated.

4.6.1 Quantity of lubricants

The lubricant quantities for the gear units are indicated in the table below.

Table 3: Quantities of lubricants

Hoisting gear			
Model	Oil type		Quantity (L)
	0 度以上	0 度以下	
2	ISO VG680	ISO VG220	1.4
3	ISO VG680	ISO VG220	4
4	ISO VG680	ISO VG220	5

Trolley drives		
Model	Oil type	Quantity (L)
2	BT860-0	0.2
3	BT860-0	0.2
4	BT860-0	0.2

4.6.2
Slection
n of
lubrica
nts
The

same viscosity lubricant can be replaced. No mixture of cogasin and mineral oil is allowed.

5 Install

5.1 Store Hoist

If the hoist can not be installed immediately after shipped from factory, or the hoist is not used after the installation, or is used after a long period, then the hoist should be stored in a clean and dry place, all parts of hoist need to be protected.

5.2 Preparation before install

a when the hoist was shipped to right place, check the case according to packing list to find any parts was lack or broken.

b Read operational manual and other files clearly before install the hoist

c clear the ash in the travelling wheel.

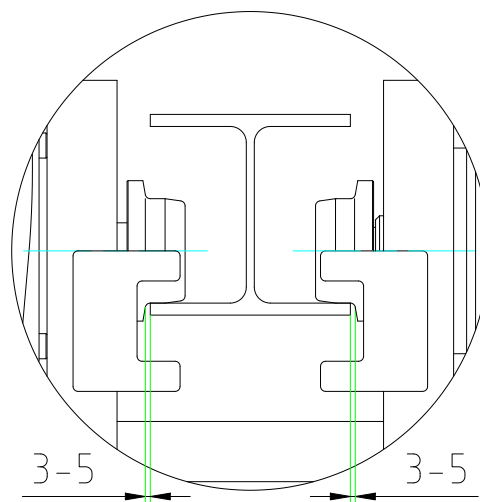
5.3 Install instruction

Only specified worker could assemble hoist.

5.4 Mechanical installation

The installation of electric rope hoists must only be carried out by authorized persons. Electric rope hoists are supplied correctly matched with hook block and counterweighted if required. Monorail hoist trolleys are delivered pre-adjusted for the specified flange width. The clearance between the beam and wheel flanges should amount to 1/16th inch on each side. It is shown in Fig. 3.

Fig. 3: The beam and wheel flanges



If necessary, corrections can be made by inserting washers or by reducing the length of the spacer tubes. If the beam is open at the ends, the trolley can be pushed on. Proper end stops must be installed and rubber wheel stops must be used as end stops. If it is not possible to push the hoist on to the end of the beam, the trolley bolts must be loosened and trolley frame split. The hoist must be properly secured and lifted into place. The trolley bolts and nuts must then be re-tightened.

During commissioning, it may be found that not all of four wheels are in contact. In this case, the trolley must be adapted to the track. To do so, attach a load of about 25% of the load capacity to the load hook and lift it about 5 cm. Then loosen the nuts of the four tensioned bolts one turn and tighten them with the specified torque.

5.5 Electric installation

The electric wiring personnel shall have the qualification certificate of electric job. Under cutting off power supply, the external wiring may be made on the basis the actual use or the auxiliary items of the electric hoist and referring to the electric schematic diagram. The electric schematic diagram can find in the electric cabinet cover.

Caution!

The rope hoist must be wired to a three phase fused disconnect or circuit breaker (per NEMA)



properly sized and grounded. The maximum voltage deviations are -10% from the lower and +10% from the upper voltage limit. The hoist can be operated in the voltage ranges shown.

6 Put SHA8 Wire rope hoist in service

Before starting to operate the installation check the following points:

- Have all fastening screws been properly tightened and locked?
- Has transport caused damage to the wire rope?
- Make sure the wire rope fit tight at the screw thread undercuts of the rope drum?
- Are the track ends equipped with operative buffers?
- Does the moving direction of the hook or the trolley correspond to the symbol at the pendant control? In case of a wrong moving sense, 2 phases of the feed line must be exchanged; only then can the operativeness of the emergency hoist-limit switch in the contactor box be guaranteed.
- Does the hoist limit switch cut off the highest and lowest hook position?



Caution!

Before starting any work on electrical systems during commissioning, the crane system must be disconnected from the power supply.

6.1 Checking the rotation direction of motor

When the motors are first switched on the direction of rotation must be compared with the rotation direction required by the control system. The direction of rotation depends on the phase sequence of the mains connection. After unlocking the red mushroom switch, the precision lifting button must be pressed first. Never press the lowering button first. If the hook is raised or no movement is produced because the upper limit switch had already been tripped, the phase sequence is correct. Press the precision lowering button as a counter-check. If the equipment does not move in the direction indicated on the controls, the connections of two phase conductors of the power supply cable must be interchanged. If you do not ensure that motors rotate in the correct direction, damage may occur.

6.2 Examination and Inspection

(Responsibilities of the operator)



Caution!

If tests and inspections are not conducted by specialist personnel of the crane manufacturer and third parties are commissioned for such work, the organization operating the crane is responsible for selecting suitably qualified personnel commissioning and conducting the tests.

Requirements to be met by inspectors:

- Comprehensive knowledge of the mechanical and electrical systems of cranes.
- Sufficient experience in the assembly and repair of cranes.
- Comprehensive knowledge of the state of the art of crane testing and of the applicable codes, standards and should the occasion arise safety regulations.
- All the requirements in the implemented regulation should be considered, such as *German Hoist Accident Protection Measures*.

6.3 Examination before test

The acceptance test before initial commissioning must be performed by the inspector on a crane ready for

operation under normal operating conditions. During the inspection, no-one must be exposed to avoidable risks. Personnel required for operation during the inspection including crane operators and load handles must be provided by the organization operating the crane and must be suitable qualified for the work which is involved. All persons involved in the inspection must be able to communicate effectively with each other during the inspection. If direct communication between control points and load handling points is not possible, the organization operating the crane must provide suitable communication systems.

The inspection must include at least the following items:

- Inspection of the crane test book in the list of contents.
- Inspection of compliance between the completed system and the technical data.
- Check whether the CE mark and the declaration of conformity are available.(Only for the EU)
- Inspection of compliance with all applicable safety rules, for example: accident prevention regulations
- Testing of all safety systems and precautions and all brakes for effectiveness
- Inspection of possible to requiring safety distances
- Dynamic load test at 1.1 times the rated load capacity of the crane
- In the case of slewing jib cranes, the most unfavorable position is position with the jib fully extended.
- In the case of all other cranes, such as bridge cranes, ceiling-mounted travelling cranes and suspended monorail systems, the most unfavorable positions are with the trolley positioned at the centre of the span or operated in the trolley start-up distance. Lifting and travelling should be operated simultaneously. Use spring balancer or spring to connect the hook and subjects fixed on the ground to test is not allowed.
- Record load test(except for lifting movement, there is no further travelling operation). The test should also be carried out in the most unfavorable lifting environment. All human induced movements need to be tested:
- Under the condition of 1.5 times the rated load
- All other hoists must be tested at 1.25 times the rated load. The heavy objects must be lifted slowly before they leave the ground. No permanent deformation or obvious defects can be found on the hoist.
- The results of the test must be recorded on the test report
- The inspector must decide whether the device is put into use
- The owner to operate the hoists is responsible for the defects found during maintenance and testing. The inspector made further tests on whether it needs repaired or not.



Caution!

The acceptance tests mentioned in this chapter are not intended to replace the tests required by other applicable international regulations. In addition to the acceptance tests in this chapter, such tests should also be carried out. Prior to the start of the test, the supplier must clarify the following point: the requirements of the international test regulations are higher than the dynamic or static load tests indicated in this section.

7. Safe operation

7.1 Operator qualification

- They shall master knowledge on mechanical and electrical operation and should be healthy.
- They shall be familiar with the structure, performances, safety regulations and this instruction of electric hoist.
- They shall be trained and qualified in examination before taking posts.

7.2 No operating in following cases

- Over-load or unclear load weight, withdrawal buried objects, or oblique tying or lifting;

- Defects or damage on electric hoist that impairing safe work, such as malfunction of brake and limiter, damage of anti-loosing unit of hook nuts, or damage of wire rope till rejection degree.
- Possible slide due to not-strong binding or suspension or unbalance, or no liner between edges of load and wire rope.
- Impossibility to make the site and to-be-lifted load visible due to insufficient lighting in working place.

7.3 Operation rules

- Before daily use, conduct test without load to check the control push-button and limiter for normal function, the wire rope for being normally winded round the drum, for abnormal sound during running, and the braking for being reliable, and timely correct faults, if found. Common faults and corrective measures are shown in
- Before each shift operation, make daily check as per
- The electric hoist shall run under the rated load and over-load shall not be allowed.
- The electric hoist is merely allowed for vertical lifting, pulling load along ground or long-term suspension of load in sky shall not be allowed.
- After work, lift the hook 2m above ground and cut off power supply.
- The brake shall not be adjusted, checked or repaired during lifting.
- For lifting objects approaching or reaching its rated load, a trial lifting with small height and short travel shall be made at the minimum. During lifting, objects shall not pass over people.
- If the lower limit cam switch of electric hoist is removed for need of lifting, when hook is at its lowest work position, at least two safe revolutions of wire rope shall be kept round the drum.
- Any safety unit in the electric hoist shall not be removed or modified.
- In case of abnormal sound during operation, one shall stop machine, and check and eliminate faults before resuming operation.
- In case of malfunction of brake after stopping lifted load, one should keep calm, immediately press "up" push-button to make load lift somewhat and then press "down" push-button. Through repeated operation, slowly lower the load to ground and then repair the hoist.

7.4 Requirement for users

- The user shall set up necessary system and safe operation regulations.
- User's modification, if especially required, shall be approved by the manufacturer.
- The user shall set up files for electric hoist, which include technical documentations of delivery of electric hoist, installation site, and date putting into operation, records of installation, commissioning check, daily use, maintenance, and equipment and personal accidents, and problems in the equipment and its assessment.

8. Inspection, maintenance and trouble-shooting

Manufacturer or supplier of standard hoist are responsible to make declaration of theoretical service time in the operation manual.

The data of electric wire rope hoist are in the table 4 and table 5.

1. Proper working hour/working day

$$t_m = \frac{2 * \text{average distance(m)} * \text{working cycle per hour(1/h)} * \text{working time(h/day)}}{60 * \text{lifting speed(m/min)}}$$

FEM ISO		1Dm M1	1Cm M2	1Bm M3	1Am M4	2m M5	3m M6	4m M7	5m M8
Load group/load factor		Theoretical service life D, (h)							
1	Light 1/L1, $K=0.5$ ($K m_1 = 0.125 = 0.5^3$)	800	1600	3200	6300	12500	25000	50000	100000
2	Medium 2/L2, $0.5 < K < 0.63$ ($K m_2 = 0.25 = 0.63^3$)	400	800	1600	3200	6300	12500	25000	50000
3	Heavy 3/L3, $0.63 < K < 0.8$ ($K m_3 = 0.5 = 0.8^3$)	200	400	800	1600	3200	6300	12500	25000
4	Very heavy 4/L4, $0.8 < K < 1$ ($K m_4 = 1 = 1^3$)	100	200	400	800	1600	3200	6300	12500

Table4: Theoretical service life D, (h)

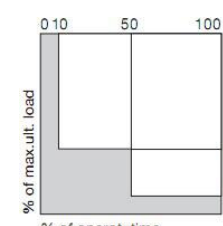
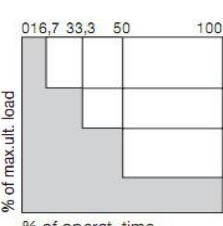
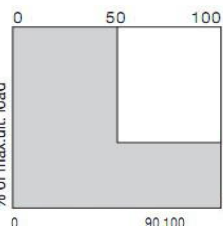
1.light	($k \leq 0,50$) Rarely work at maximum load case, the major lifting the low burden, small light weights		2	2-4	4-8	8-16	>16	
2.medium-sized	($0,5 < k \leq 0,63$) Often in the case of the maximum load work, Continuing burden of low-and medium-sized heavy objects		1	1-2	2-4	4-8	8-16	
3.heavy-duty	($0,63 < k \leq 0,80$) Frequent at the maximum load conditions, the persistent lifting heavy weights		0,5	0,5-1	1-2	2-4	4-8	
4.super-heavy	($0,80 < k \leq 1$) Long-term lifting heavy, super-heavy weights		0,25	0,25-0,5	0,5-1	1-2	2-4	
Note: the longitudinal axis of the table:% of the maximum load; horizontal axis indicates:% operating time			FEM	1Bm	1Am	2m	3m	4m
			ISO	M3	M4	M5	M6	M7

Table 5

8.2 Install Tool

Please prepare install tool according to below table 6:

Serial Number	Tool	Application
1	Crane	Auxiliary lift
2	multimeter	Check electric circle
3	inner hexagon spanner	Bolt and nut

4	Cross screw driver	screw
5	Circlip pliers	Circlip
6	Press machine	Press Bearing
7	Other	other

Table 6

8.3 Daily maintenance

The items and requirements of daily inspection are shown in Table 7.

Inspection items	Requirements
Operation place	No obstructs within operator's walk range
Traveling rail	No abnormalities of rail, observed from ground
Pendant control	Free, and correct lifting, lowering and rightwards and leftwards movement. When one group of buttons is pressed simultaneously, the electric hoist shall not activate.
Limiter	When the hook without load is lifted to limit position, the limit switch shall be correct and reliable.
Hook assembly	The hook shall be able to freely horizontally rotate within 360° and vertically gyrate within 180°. The hook sheave shall be able to freely rotate without any seizure or collision. The anti-loosing unit of hook nuts should be free of abnormality and the hook closing unit shall be normal.
Wire rope	Make daily observation as per 2.4.1.1 in GB5972-1986
Brake	The braking for lifting, lowering and traveling shall be sensitive and reliable.
Wire rope guider and other safety units	Normal action and smooth rope-discharge.

8.4 Monthly maintenance

The inspection interval shall be decided on the basis of the structure of each section of the electric hoist, their important degree, use frequency and use of wearable parts, and is divided in three grades. For grade 1, inspection should be made monthly; for grade 2, every 3 months; and for grade 3, every 6 months. The items, requirements and grade of monthly inspection are shown in Table 8.

Table 8: Monthly inspection of electric hoist and its requirements and grade

Inspection items		Requirements	Grade
Traveling rail	Obstructs within the traveling range	Within the traveling range, its distance from building and other equipment shall be at least 100mm.	1
	Stopper at rail ends and connection bolts	The stopper at rail end shall be free of deformation and damage, and the connection bolts shall not be loosed. In case of connection through welding, and the weld shall be free of cracks.	1
	Connection bolts of fixing rail	The bolt shall not be loosed.	3
	Joint welds of rail	The weld shall be free of cracks.	3
	Abrasion of rail	The rail, running face of wheel and rim shall be complete and free of local abnormal deformation or abrasion.	3

Hook assembly	Hook sheave	The hook sheave groove shall be free of abnormal abrasion and the rim shall be complete and free of damage.	1
	Appearance	The cover, the hook sheave shall be free of damage, and retaining ring of shaft stopper and the pin shall not be loosed, and hook closing unit shall function normally.	1
	Working state	The hook sheave shall freely rotate.	3
Balance sheave	Appearance	The rotation of balance sheave shall be free of damage and the unit shall be surely connected.	3
	Wallboard	The connection bolts shall not be loosed.	3
	Wheel	The running face and rim shall be free of abnormal abrasion or scratch.	3
Wire rope	Fixing of rope ends	The fixing of each tail end of wire rope shall be durable, reliable and free of abnormalities.	1
	Appearance	It shall be free of defects such as twisting, burnt-damage, and obvious loosing and corrosion and be normally greased.	1
	Safety degree of use (specified scrap)	In accordance with 2.5.1-2.5.11 in GB5972.	1
Gear	Lubrication of gear	The open gear surface shall be regularly greased and the closed gear regularly oiled.	2
Cable	Appearance	Cable shall be free of defects such as external damage, abnormal bending or torsion, and aging.	2
	Assembly condition	The connection of cable with switch shall not be loosed and the neutral loop shall not be separated from the slide way. The both ends of support wire shall not be loosed.	3

8.5 Annual maintenance

The normal-running electric hoist shall be annually subjected to an overall safety check and its items and requirement are shown in Table 9.

Table 9: Items and requirements of annual check of electric hoist

Check items		Requirements
Traveling rail	Cleanness of the running face	It shall be adhered with oily stain or excessive dust.
	Inclination	Not above 1/1000.
	Joint	The welds and rail shall be free of cracks and the offset of top, bottom and both sides shall not exceed 1.
	Abrasion	The abrasion of face and width of the running shall not exceed 10% and 5% of the original one respectively.
Wheel	Rim	The abrasion of rim thickness shall not exceed 50% of the original thickness. The total sidewise gap between the rim and the rail shall be less than 50% of the width of the running face of wheel.
	The running face	Measured on the basis of diameter of the running face, the abrasion shall be less than 5% of the original dimension and the difference in diameter of running face shall be less than 1% of the nominal diameter and the roundness difference shall be below 0.8
	Appearance	Free of crack or damage

Gear	Abrasion of gear of lifting mechanism	Allowable abrasion for 1-stage gear shall be less than 15% of the original tooth thickness, and that of the other stages less than 20%
	Abrasion of gear of traveling mechanism	Allowable abrasion for 1-stage gear shall be less than 15% of the original tooth thickness, and that of the other stages less than 20%, and that of open gear less than 30%.
	Check defects on tooth face	The tooth shall be free of crack and broken tooth. The spot corrosion damage on tooth face shall not exceed 30% of the meshed face and the depth shall not exceed 10% of tooth thickness.
Hook	Appearance	The threads, dangerous section and the neck shall be free of plastic deformation and defects shall not be re-welded.
	Abrasion of dangerous section	Not above 5% of the original dimensions.
	Opening	Not above 10% of the original dimensions.
	Torsion deformation	Not above 10%
Brake	Repeatedly check in accordance with requirements of monthly check	
Hook sheave	Uneven abrasion of the hook sheave groove shall be below 3mm, the abrasion of wall thickness of hook sheave groove shall not below 20% of original thickness, and the abrasion of bottom of hook sheave groove shall be less than 25% of original rope diameter. There shall be free of defects harmful to wire rope.	
Drum	There shall be no crack and the abrasion of drum wall shall not exceed 10% of original wall thickness.	
Key, Spline	The connection between keys and key groove shall be free of losing, deformation and abnormal abrasion.	
Roll bearing	It shall be free of damage and crack.	
Oil seal	No crack on matched faces	
Cable	Repeatedly check in accordance with requirements of monthly inspection.	
Current collector and switch	Repeatedly check in accordance with requirements of monthly inspection.	
Resistance of normal-live body and earth screws	Not above 10 Ω .	
Resistance of circuit to the earth	Not above 4 Ω .	

9 Repairs

All the malfunctions described below must be remedied by a specialist.

Table 10: Trouble-shooting

Part	Malfunction	Usual Cause	Solution
1.Motor	Abnormity or failure of lifting motor	The electric pressure is too low	Ensure the voltage of the motor output is 90-110% of rated pressure
		The electric cable is too small while the pressure drop of cable is too high	Select adequate electric cable following the instruction
		The three phase voltage vary too much from each other	Adjust the power and ensure the voltage tolerance among three phases is lower than 3%
		Phase short, phase fault	Inspect the electric circuit
		The brake wheel of motor are	Disassemble the brake wheel,

		rusted	clean the rust of end cover, assemble and adjust again
		Inner part of motor is in wet condition	Change the motor
2.Reducer	a. The noise is beyond allowable value	Lack of grease	Add grease
	b. Oil leak	The reducer is over oiled, or the under oil plug goes without seal packing, or the seal packing is not tight	Keep the oil mass as much as 2/5-1/2 of the total volume capacity, screw the seal packing tight
3. Electric Control Box	a. The contact point of contactor or the voltage transformer is over-burned	The voltage is too high or too low or the power is left uncut when it stops working	Make sure the deviation of voltage from rated voltage is within 10%; always cut off power supply after working time
		The operational temperature or humidity is too high	Avoid to operate in the circumstance: temperature above 40 centigrade, humidity above 40%
	b. Loose connector lug or poor contact	Be vibrated during transportation	Inspect and tighten it before installation
	c. Malfunction of press button	The handle is seriously knocked	Check the button and contact timely
The inner control cable is broken		Change the cable of handle, never twist off the electric cable during operation	
4.Others	a. The upper limit switch breaks down	The electric cable is wrongly connected	Inspect and exchange the contacts
		The memory cam is ill-adjusted	Readjust the memory cam
	b. The rope guider is damaged	Lift and pull inclined	The operator shall be trained and familiar with the instruction
	c. The trolley travels unsteadily, one of its wheel misses the path	The tram rail is not smooth and straight	Inspect and amend the tram rail

10 Scrap

A Brake

When braking slipping distance is greater than specified requirement, it should be timely adjusted if the brake ring wear seriously, then the brake need to be scrapped.

B Rope guider

When wire rope on drum loose or disorder, then should open the rope guide and adjust, if the rope guide can not work, then it should be scrapped.

C Wire rope

Wire rope directly affect the safe use of electric hoist, must focus on maintenance. Therefore, regularly check their use, it is always in good lubrication condition, and regularly check the wire rope end fixed. When the wire

rope hoist machinery to GB5972-86 "steel wire rope for examination and discard the utility specification" standard in the "2.5" provisions of the circumstances should be scrapped, or in any of the following circumstances, should be scrapped and timely replace the new rope:

- A. when the broken wire closes to the formation of local aggregation;
- B. if the whole strand of fracture;
- C. fiber core damage when the wire rope caused significant decrease the diameter of the rope;
- D. when the outer steel wire rope wear reaches 40% of wire rope diameter.
- E. when the diameter of wire rope due to wear and reduced to 7% than the nominal diameter

Cage shape distortion, wire extrusion, rope and the rope is increased and the local bending should be immediately scrapped.

D Hoist

When hoist meet the service life time, then it should be scrapped.

Because SHA8 wire rope hoist is our new product, so our product has the declaration right.

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