# KCE HOIST

# **OPERATING INSTRUCTION MANUAL**











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#### 1. OUTLINE(SUMMARY)

#### KCE hoists are designed and manufactured according to the following standards.

- ♦ KOREA OCCUPATIONAL SAFETY & HEALTH AGENCY
- ◆ EUROPEAN FEDERATION OF MATERIALS HANDLING FEM 1.001

#### 2. CHECKLIST BEFORE COMMENCING WITH THE OPERATION OF HOIST

- ① Check if the hoist specifications are met.
- Correct use of working voltage.
- ③ Check whether or not an appropriate lift is applied in accordance with each working condition.
- (4) Check whether or not wire ropes are damaged.
- (5) Check whether or not the arrangement of pendant push button.
- (6) Check whether or not the hook safety hook.
- Check whether or not the load limit.

#### 3. CHECKLIST TO DECIDE PROPER HOIST FOR EACH WORKING CONDITION

#### Average usage per day(hr/day)

- t=(2xHxNxT) / (Vx60)
- H = Average hoisting lift(m)
- N = Frequency of use per hour(cycle/hr)
- T = Working hour(hr)
- V = Hoisting speed(m/min)







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#### Scope of hoist base on the working hour

	WORKING HOUR PER DAY (hr/day)					
LOAD(%)	ISO / FEM					
	≤0.5	≤1	≤2	≤4	≤8	≤16
Light	_	_	МЗ	M4	M5	M6
Ligit			1Bm	1Am	2m	Зm
Madium	_	МЗ	M4	M5	M6	M7
mearum		1Bm	1Am	2m	Зm	4m
Heever	МЗ	M4	M5	M6	M7	_
Tieavy	1Bm	1Am	2m	Зm	4m	
Vory Hoovy	M4	M5	M6	M7		
very meavy	1Am	2m	Зm	4m		

#### 4. SAFETY GUIDE

#### 4.1 SAFE USE

- Shall be used only for carrying heavy material.
- E Shall be operated by the permitted person in compliance with safety raw.
- Shall be used for industrial equipment applying 50V~690V AC circuit voltage.
- Electric cables shall be insulated.
- While hoist is being used or the main S/W of hoist is being operated it is possible that there is in danger of the remaining voltage.

#### ※ Possible dangerous situations for operators

- -. When the cover is arbitrarily removed by unauthorized operators
- -. When is operated in inappropriate ways
- -. When abnormally operated
- -. Insufficient maintenance
- -. When operators are working directly under the hoist







#### 4.2 THE PROPER USE OF HOIST

- -. Match the model and grade of hoist to an actual environment
- -. Do not use any other wire ropes for hoist except standard ones
- -. Only rated voltage and frequency(Hz) are available for hoist
- -. Complete ground connection of hoist in order to prevent possible electric shock
- -. Make sure that there is no reverse power when doing an initial installation of hoist
- -. Do not operate hoist under the single phase electric power system
- -. The girders for hoist shall be strong enough and in case of trolly type it shall be operated on the parallel transference rail(H-beam / I-beam) having enough strength and precision
- -. Operators are obliged to perform the regular inspections of equipment before the use and periodic inspections as well
- -. Check the condition of wire ropes if there are any unnecessary winding, twisting or kinking observed, in those cases, operators shall make the wire rope be the original condition
- -. Do not load excessively(above rate load) for hoist apart from doing its load test and never give any impulsive force while using it
- -. When changing the hoisting direction from lift up to lift down operators are required to stop first before changing the direction (Plugging shall be avoided)
- -. Excessive inching shall be avoided
- Do not frequently use excessive winding protection function
- Do not apply a rapid force to the wire rope
- -. Do not obliquely pull on a rope
- -. Do not use hoist when the loaded heavy material wobbles too much
- -. Do not wind the rope around the heavy materials
- -. Do not give an excessive force on the tip of hook
- -. Do not pull and parallelly transfer the push button codes or control string
- -. When hoist is operated under the condition of low or high temperature, the area causing any possible corrosion or any other specific condition needed special handling, operators shll correctly comply with the instructions from manufactures
- Do not do welding work when the heavy material is taken off by hoist (Except the cases using an insulated swivel hook ot belt sling)
- -. Hoisting wire shall be used with the use of an appropriate lubricant
- -. Gear, Bearing and other components having possibilities to be rubber shall be used with the use of an appropriate lubricant
- -. When hoist is operated in an outdoor area, users are recommended to use outdoor hoist to avoid any damage caused by rain fall or install a hoist shelter.
- -. Hoist cannot be converted by a user without permission
- When hoist is applied to cranes, whip cranes, ships, mines or factories related to petrochemical industry, operators shall pay attention to the related raws
- -. When hoist is not operated for a long time, it shall be kept with an appropriate rust prevention
- -. Operator shall wear globes when handling gear oil to prevent operators from being harmed
- -. It is prohibited to convert hoist to an elevator for both passengers and heavy good





#### 5. SAFETY CAUTION

- The purpose of safety caution is to protect user's safety and prevent users from losing their property.
- Please thoroughly read the contents listed below and apply them to an appropriate way.
- Safety caution is divided into "Warning" & "Caution" and the meaning is defined as below.
- The purpose of following symbols is to call attention to any possible danger when operating the device.

WARNING	Causing fatal injuries or death to operators when the mentioned regulations are not complied.
	Causing minor injuries to operators or damages to goods when the mentioned regulations are not complied.

General regulations					
WARNING	<ol> <li>The installation, operation, maintenance and repair of hoist shall be done by authorized operators who are well educated about safety regulations and wearing safety equipment.</li> <li>Before performing the previously mentioned tasks (installation, operation, maintenance</li> </ol>				
	and repair), operators shall thoroughly read all contents of user's manual.				
<b>A</b>	1. Prepare protective process in precaution of an accident due to the improper operation done by an authorized person.				
CAUTION	2. The people in conditions of drunk or drug addiction are prohibited performing the				
	previously mentioned tasks.				

-	Carriage and Storage
	1. Do not walk directly under the suspended heavy goods because there is a possibility for
	fatal injuries or death due to the falling object.
	2. In case of violation the legal inspection(based on occupation safety
	and health acts) the representative can be imprisoned or fined.
	3. Hook the heavy goods strongly by using the hook of hoist main body to prevent the goods
	from separating if not complied, operators can be fatally injured.
$\wedge$	1 .Check the safety of connection between the hook and object.
	2. Check the correct weight of hoist and use the appropriate equipment based on the weight

Installation				
WARNING	<ol> <li>Use an explosion proof type of hoist in any explosion district the use of normal hoist in the area will cause fatal damage for people and properties because of a fire and an explosion.</li> <li>Before providing power after the installation, please do grounding as specified If the connection is improperly change, or no ground connection done, an electric shock occurs.</li> </ol>			









Operation					
	<ul> <li>1. Excessive change of the used voltage (over ±10%) and frequency (over ±5%) of hoist will cause a lack of torque and overheating and consequently, operators will experience inconvenience while operating hoist.</li> </ul>				
	<ul><li>2. Appoint a person in charge of operating hoist. Because frequent inching shortens the life of hoist due to the temperature rise of motors, brakes and magnets, do not do inching frequently especially when commencing with lift up or finishing lift down.</li></ul>				
	3. Do not operate hoist when the loading goods juddered, and hooking the goods at the tip of the hook and pulling the wire rope considerably shall also be avoided.				
	4. Do not pull the goods at the outside of travelling lanes. If pulling the hanging goods extremely, the disorder winding, abrasion and damage can be caused.				
CAUTION	5. Rapid reversible operations significantly force to hoist and can be the root causes of malfunctions. Operators are recommended to stop the operation first when changing the direction.				
	6. When hooking the goods, operators shall check the condition of winding through lifting up in dribs and drabs checking whether the rope are tightly winded or not. When checking the condition, ropes have to be force evenly and also goods have to maintain the horizontal angle.				
<ul> <li>7. Be careful when handling push buttons. Cable connected to push buttons have to avoid any obstacles while traversing.</li> <li>8. Do not crash hoist into the stop bar. The frequent crash will shorten the life to the stop bar.</li> </ul>					
	$\frac{1}{100}$				
000000	$\begin{array}{c} 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 $				
<b>¢</b> 100 %	86 <sup>1</sup> / <sub>2</sub> % Normal working load limit of standard sling				



sling Maximum working load limit of sling











#### 6. MAINTEANCE & INSPECTION

The purpose of this manual is for operators to use hoist in proper and safe ways.
 The inappropriate installation, operation and maintenance are the main causes of falling object
a fire, an explosion or an electric shock and, consequently cause the damage to people and
properties, After thorough read a person in charge shall post the manual on the bulletin board.

# A KOREA CRANE ENGINEERING

TYPE					
CAPACITY		kg	H.T MOTOR	kW	Р
RATING 30 min	LIFT	m	H.T AMP.S		А
POWER SOURCE 3 Ø	Hz	۷	H.T SPEED		m/min
WIRE ROPE		ø	T.S MOTOR	kW	Р
WEIGHT		kg	T.S AMP.S		А
DATE 202		V	T.S SPEED		m/min
SERIAL NO.			WIDTH <mark>OF RAIL</mark>		mm
🚯 KCE Inc	).			TEL. +82-70-4068- FAX. +82-32- 233-	-7985 -7984
Korea Crane Engineering				www.newkce.com	

#### 6.1 Inspection, Carriage and Storage

#### 6.1.1 Acceptance inspection

- 1) Check instantly whether there are any damages observed while transporting hoist and whether the specifications written in labels are correctly match to the previously ordered ones.
- 2) Oil quantity of a reducer and grease of wheels condition are also thoroughly inspected.
- 3) Should you experience any problems please contact KCE Inc.(+82-70-4068-7985)

#### 6.1.2 Components of hoist manual

- Components of hoist manual when supplying hoist are listed as below.
  - -. User's Manual
  - -. Quality Certificates
  - -. Test Report



#### 6.1.3 Carriage

-. When moving hoist, please use the loop in its main body and be careful that the important components (hook, wire rope, upper limit) are not damage.

WARNING	<ol> <li>Do not walk right beneath the cranes operated(In danger of falling object)</li> <li>When moving hoist, please use the loop in its main body. If not complied, fatal injuries and death can occur due to the falling object.</li> </ol>	
	Check the loop, appearance and hook condition of hoist while transporting the goods and also the correct weight of hoist must be checked so as to use the appropriate equipment based on its weight.	

#### 6.1.4 Storage

- -. Hoist shall be kept the place whose condition is clear, dry and well ventilated, and fluctuation of temperature is not huge and with no vibration detected. In case of storing for more than 2 months, please store the goods as recommended below.
- 1) Hoist is treated with the rust resistant pain. It, however, is possible to be rusted according to each storage condition. For that reason, operators are required to check the condition regularly to prevent possible rust.
- 2) Measure the insulation resistance per every 2 months by using 500V insulation resistance tester so as to check the condition of insulation.
   Stand Value = rated voltage(kV) + over 1MΩ (40°C)
- 3) Use a desiccating agent when storing electric components (without any use) of hoist (motor, control panel etc.) over 3 months or when they are stored in the place whose humidity is high. Used desiccating agent shall be replaced regularly.

#### 6.1.5 Installation

-. Proper place for an installation.

Operate hoist in the place of an ambient temperature : -10°C ~ +40°C
 humidity : below 80%, an altitude : below 1000M
 In case hoist is operated at either lowland or highlands, or in the places whose temperature are either high or low, please contract the personnel from of KCE Inc.

2) Do not store hoist in the humid or oily area and avoid the places with the high level of vibration.



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- -. Installation of Traversing Rail
- Traversing rails shall be manufactured correctly according to the manufacturing and installation drawings from the crane manufacture in compliance with the specifications from manufactures, interal regulations or related standard.



- 2) Traversing rails are made of either normal (light) rails or square rails. Normal(light) rails - 15kg/m, 22kg/m, 30kg/m, 37kg/m, 50kg/m, 73kg/m
- 3) Operators shall install the traversing rails according to the specifications as listed below in the case of the use of normal(light) rails.
- The deviation of rail to rail elevation for 4 central points of the wheel : Within ±1/5000 of span and maximum deviation of 0.5mm
- The difference between left and right rails for traversing : No bigger than 1/1000 of rail gauge.
- Traversing rail gauge : Within ±1.5/1000 of rail gauge and no bigger than the deviation of 4mm.
- Acceptable mismatching of the connection parts of traversing rail : Within 0.5mm (both upper side and bilateral sides)

ITEM	FIGURE	OVERALL TOLERANCE	MAXIMUM RATE OF CHANGE
CRANE SPAN (L) MEASURED AT CRANE WHEEL CONTACT SURFACE	max L = L + A	L $\leq 50'$ A $= \frac{1}{16}''$ L $> 50' \leq 100'$ A $= \frac{1}{4}''$ L $> 100'$ A $= \frac{1}{6}'''$	¼″ IN 20'−0"
STRAIGHTNESS (B)		$\mathbf{B} = \frac{3}{8}''$	$\frac{1}{4}''$ IN 20'-0'
ELEVATION (C)		$C = \frac{3}{8}''$	$\frac{1}{4}''$ IN 20'-0'
TOP RUNNING TRANSVERSE RAIL TO RAIL ELEVATION (D)		$L \le 50'$ $D = \pm \frac{3}{16}''$ $L \ge 50 \le 100'$ $D = \pm \frac{1}{12}''$	N/A
TRANSVERSE GIRDER TO GIRDER ELEVATION <u>UNDER RUNNING</u> (D)	D SPAN L	$L > 100'$ $D = \pm \frac{3}{8}''$	N/A

Inspection after rail installation(CMAA#70)





#### 6.1.6 Stopper Installation

-. Maker sure to install stopper each ends of traversing rail to prevent hoist falling down. Install stopper at the end of traversing and or travelling rail.

#### Mono-rail type





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#### 6.2 OPERATION

#### 6.2.1 Checking the line connection

- Wiring and line connection of hoist shall be done by the personnel who is an authorized and well educated about the related courses.
- Check whether the charged power and frequency of hoist is correctly matched to the label attached.
  When initially operating hoist, put 'UP' button slightly. If the hook is going up, the connection is properly operated. If the hook is going down when doing the same there is a possibility of the wrong power connection. In this case, the connection of R(red) phase and T(black) phase are switched improperly. If pushing 'DOWN' buttons for the initial test with the wrong connection, the over winding proof device is not operated but the main power will be shut off. (Hoist will be not moving to any directions)

WARNING	<ul> <li>Do not change the control circuit of hoist arbitrarily. Pulling or bending the power cables by force may cause the malfunctioning, electric shock or fire.</li> </ul>
	1. Excessive change of the used voltage (over $\pm 10\%$ ) and frequency (over $\pm 5\%$ ) of hoist
$\Lambda$	inconvenience while operating hoist.
CAUTION	2. Minimize the voltage drop within 2%
	(the longer cables are used the bigger voltage drop occurs)

#### 6.2.2 Test Operation

- Operate hoist side to side and up and down without loading and check the safety and whether there are any obstacles.
- If no problem detected with check the voltage, current, speed, lift and so on without loading.
   (recommend load the full capacity : 100%)
- If there is an abnormal exothermic reaction, When doing the test according to pperators shall check whether the temperature is risen over the rated limitation and any abnormal noise with the reducer and bearing parts. If the defect is detected, please contact KCE Inc.



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#### 6.2.3 Operation while working

- The operators of hoist shall inspect the performance of an emergency stop, load limit and brake and comply with all recommendations mentioned in the user's manual. If any defect detected, the operators shall stop the operation and repair the defect. The repair shall be performed by an authorized personnel.
- 1. Excessive change of the used voltage (over  $\pm 10\%$ ) and freqency (over  $\pm 5\%$ ) of hoist will of hoist will cause a lack of torgue and overheating and consequenly operators will experience inconvenience while operating hoist. Minimize the voltage drop within 2% (the longer cables are used the DIST HANDLING CAUTION bigger voltage drop occurs) 2. Appint a person in charge of operating hoist. Because frequent inching shortens the life of hoist due to the temperature rise of motors, brake and magnets, do not do inching frequently especially when **ACAUTION** commencing with life up or finishing life down. 3. Do not operate hoist when the loading goods juddered, and hooking the goods at the tip of the hook and pulling the wire rope considerably shall also be avoided. 4. Do nat pull the goods at the outside of travelling lanes. If pulling the hanging goods extremely, the disorder winding, abrasion and damage can be caused. 5. Rapid reversible operations significantly force to hoist and can be the root causes of malfunctions. Operators are recommended to stop the operation first when changing the direction. 6. When hooking the goods, operators shall check the condition of winding through lifting up in dribs checking whether the tope are tightly winded or not. When checking the condition, ropes have to be forced enenly and also goods have to maintain the horizontal angle. 7. Be careful when handling push buttons. Cables connected to push buttons have to avoid any obstacles while traversing. 8. Do not crash hoist into the stop bar. The frequent crash will shorten the life of hoist.





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#### 6.2.4 Repair and Maintenance

The make hoist be in good condition and have a better durability, the repair and maintenance is very important.

Please do the repair and maintenance according to the standards mentioned at the end of user's manual. Monthly and yearly inspection reports shall be kept for more than 2 years.

It is convenience to have the designated repair and maintenance spaces for the fastest treatment and it is mandatory to have the space if the factory is using the high quantity of hoist.

Appoint the person in charge of the maintenance of hoist

#### Replacement of oil

way for each injection needed.

Every oil of hoist is injected for an initial use. The oil in the gear case shall be replaced 2 or 3times for 1 month from the initial installation.
 Afterwards, the oil shall be replaced once a year. The following table shows the



	Injection method	Injection term
Gear case (main body)	0 <mark>il pressu</mark> re type gear oil MP-220#	Once a year
Electric traversing wheels, gear case	Injecting grease	Once a year
Wir rope	Spreading grease	-
Bearing parts	Injecting grease	Every 3 months

#### Replacement of fuse

-. The fuse is assembled in the power parts of control circuit (C phase).

The fuse is disconnected when there are some problems with grounding, magnet switch or cable connection.

Check the insulation and problems with the push button and if no defect observed, change

the fuse (3 extra fuses are included in the hoist box)





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#### Regular inspection

- -. The regular inspection of hoist without loading shall be done everyday before commencing with the operation.
  - ① Check all push buttons whether they are working properly as indicated.
  - 2 Check the limit switch whether they are working properly.
  - ③ Checkthe brake.
  - ④ Check if there is any abnormal noise.
  - (5) Check whether the sheave in the load block, hook and loose stopper of the hook nut are operating properly. Operators shall assure that wire ropes are not separated from the sheave.
  - (6) Winding condition of wire ropes around the drum.
  - Fastening condition of the goods hooked.
  - (8) Function of the load limit.
  - (9) Check whether there is any defect with the safety pin of hook.



#### Monthly inspection

-. The inspection lead time for the monthly inspection of hoist components shall be decided according to the importance for safety, difficulty level for repair.

frequency of the usage and the fact whether the component is consumable or not.

For that reason, the frequency of an inspection for the specific part of hoist shall be done according to the standards mentioned in the following table.

Please find the inspection details and report format from Annex 2 at the bottom.

If the frequency of the use is higher than other components, operators shall inspect the components more than recommended.

classification	criteria for classification	inspection	
А	Important part for safety	Once a month	
В	Important part for the maintenance and repair.	Once every 3 month	
С	Parts having a low level of abrasion & damage	Once every 6 month	

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Rate of operation	operation High Medium		Low
Percentage of the use(%)	Over 25%	25 ~ 10%	Below 10%
Frequency per dat	Over 1,500	1500 ~ 400	Below 400

 Percentage of the use(%) Sum of applying an electricity to motors for an hour(min) x 100 60 minute

② An ambient temoerature shall be kept below 40 °C

=

- ③ The standard places for operations are normal factories and stocks, and the places with high temperature, high humidity, dusty and alkalinity shall be considered differently.
- ④ Magnet switch : Check the moving condition of the parts and whether there are any loosening of bolts in the terminal.

(5) Wire rope : The use is prohibited in case if any of the following problems are observed.

- -. When the quantity of snapping of wire is more than 10%.
- -. When the actual diameter compared to the rated one is smaller than 93%.
- -. When a wire rop<mark>e is twiste</mark>d or has similar defect.

DOGLEGS

-. When having a significant damage or being considerably corroded.

CORROSION





BIRDCAGING



SEVERE WEAR



DAMAGED FITTINGS



**BROKEN WIRES** 

케이씨이주식회사 www.newkce.com ⑥ Load block : Check whether or not the hook has no crack and well rotating, the sheave are well spinning, and the wire rope are not splitted.



⑦ Over winding-proof device : To check whether there are any loosening of bolts in the terminal,

operators check on-off control condition by moving the lever near limit switch up and down. The first gear of limit switch is disconnecting the control circuit and second gear is disconnecting the main circuit.



Normally the first gear of limit switch when malfunctioning and the second gear is operated when having a special malfunction.

Operators shall understand the previously mentioned difference between the first and second gear check whether the gears are operated properly according to the situation.

③ Current collector and wiring : Check whether any disconnection existing due to the abrasion of brush

Adjustment and inspection of brake: Adjust gap when exceeding the durability
 of gap.

Inspection of the quantity of oil and grease : Fill oil and grease when the quantity in the hoisting gear case is not function.

1 Other factors to be checked.

- -. Drum : If any damage existing and its elevating function.
- -. The abrasion of traversing wheel and traversing condition.
- -. Check the bolts assembled in each part whether they are tightly fastened or not.



② Upper limit switch : It is a double action structure that cuts the operation line in one step operation and cuts the power line in two step operation by using mechanical LEVER CAM. Check whether it works or not.



#### Annual inspection

- -. Check the aging condition of hoist once a year so that operators find out the possible defect.
- -. The inspection shall be done by an authorized person according to Annex 3.

① Check the traversing rails whether there are any twisting, abrasion, loosening of bolt and problems with the stopper observed.

- ② Inspection of brakes : Check the condition of a brake lining and an operation, after assembly check the overall condition and whether any abnormal heating existing.
- ③ Inspection of the reducer : Check the gearing condition and whether there are any abrasion, damage and loosening of bolt existing.
- ④ Inspection of motors: Check the condition of the bearing, rotor, air gap, end ring and coil.
- (5) Inspection of limit switch : Check the contact part whether or not there is any abrasion, problem with conductive part, loosening of a bolt or problem with on-off operation.
- (6) Inspection of magnet switch : Inspect it in accordance with the list of monthly inspection.
- ⑦ Inspection for traversing related parts: Traversing wheel check the external abrasion and condition of bearings.

(a) Other factors to be inspected : Hook block, hook, wire rope and current collector shall be checked in accordance with the list of a monthly inspection. The insulation condition of each electric component shall also be checked. Standard Value = Rated voltage(kV) + over 1MQ (40°C)

(9) Inspect following matters after the reassembly.

- -. Measure the overall insulation resistance.
- -. Check the condition of oil and grease.
- -. Lifting and traversing tests without load.
- -. Lifting and traversing tests with rated load.







WARNING	<ul> <li>When doing repair and maintenance, operators shall make the safety area using safety types or chains and installation of a warning light is mandatory. If not complied there are possibilities for fatal damages for both people and properties due to the falling object or malfunction.</li> </ul>
WARNING	<ol> <li>The installation operation, maintenance and repair of hoist shall be done by authorized operators who are well educated about safety regulation and wearing safety equipment.</li> <li>Do not use the components with an arbitrary conversion to prevent components from being malfunctioned.</li> <li>Before doing the repair or opening the terminal cover, operators shall shut off the power of hoist to prevent an electric shock.</li> <li>The power shall be disconnected when checking the reducer of hoist to prevent operators from being harmed.</li> </ol>
	<ol> <li>When changing lubricating oil, operators shall comply with the user's manual properly (methods and sort of oil) and shut off the power of the reducer. inconvenience while operating hoist.</li> <li>Regularly inject grease and pay attention to the prevention of penetration of any foreign substance.</li> </ol>

#### The limitation of use for equipment

Lasting(Abrasion) limit of each part shall be checked in accordance with a yearly inspection report.
 In this section, some of the important components are highlighted.

The use of components over the lasting limit is very dangerous so an appropriate replacement is mandatory. When planning to purchase the new components for the replacement, please refer to the part catalogs of **KCE Inc.** 



#### 1 Hook

-. The part(b) cannot be used as it is if it is deformed excessively(having a huge gap).

In addition do not use the hook having a problem with its bolt & nut.

It is very dangerous to repair the doformed hook for the reuse so place the hook if it is worn out and exceeding the abrasion limit.

The weakest part against an abrasion is the bottom part of hook where goods are carried. Please find the abrasion limit from the following table.





Capacity	Dimension (mm)				
(ton)	Øa	b	t	0.1xt	
2N	56	41	54	5.4	
3N,D	71	50	66	6.6	
5N,D	90	63	84	8.4	
7.5N,D	120	90.5	111.4	11.14	
10N,D	120	90.5	111.4	11.14	
15N,D	148	111	140	14	
20D	140	112	132	13.2	
30D	160	128	142.8	14.28	
40D	190	144	165	16.5	
50D	200	160	182	18.2	
60D	215	172	200	20	
700	245	196	260	26	

② Sheave

-. The abrasion limit of sheave is mentioned in the following table in compliance with the standard of FEM 2M.

The shape of sheave can affect the life of wire ropes so it shall be inspected together with dimension.

wir	e rope	(d)	ł	
_			w(0.15xd)	ØD
	_ t			

Capacity	Dimension (mm)				
(ton)	Ød	ØD	t	w(0.15xd)	
2N	8	220	34	1.2	
ЗN	12.5	237.5	48	1.875	
3D	9	170.6	34	1.35	
5N	16	304	52	2.4	
5D	12.5	212	46	1.875	
7.5N,D	14	314	46	2.1	
10N,D	16	314	46	2.4	
15N,D	20	390	51	3	
20D	22.4	436	58	3.36	
30D	22.4	475	58	3.36	
40D	28	532	60	4.2	
50D	28	532	60	4.2	
60D	28	532	60	4.2	
70D	28	196	260	4.2	





- ③ Main body of hoist
- Gear
  - -. The abrasion limit for the use of gears is within
  - either W=0.05t(1st standard) or W=0.1t(2nd standard).
- Spindle

-. When being worn out by 1% or more from the original diameter the spindle shall be replaced.

- ④ Traversing wheel parts.
- Traversing wheel
  - -. Refer to the abrasion limit for the use of traversing wheel from the following table.



Capacity	Dimension(mm)		Abrasion	limit(mm)
(to <mark>n</mark> )	ØD	t	0.95xD	0.5xt
2 <mark>N</mark>	125	10	118.75	5
<mark>3N</mark>	125	10	118.75	5
3D	140	11.5	133	5.75
5 <mark>N</mark>	160	14	152	7
5D	165	11.5	156.75	5.75
7.5N	160	12.3	152	6.15
7.5D	165	14	156.75	7
10N	160	12.3	152	6.15
10D	165	14	156.75	7
15N	180	12.7	171	6.35
15D	180	14	171	7
20N	180	12.7	171	6.35
20D	220	14	209	7
30D	250	16	237.5	8
40D	395	19	375.25	9.5
50D	490	19	465.5	9.5
60D	490	19	465.5	9.5
70D	540	19	513	9.5







Gear

-. Traversing gears can cause less danger than hoisting gears and consequently be use up to 30% of abrasion of its initial thickness (W=0.3xt).

#### Brake lining

-. When the lining thickness is worn out by 2mm, it shall be replace.



		. (	`		
Capacity	Dimension (mm)				
(ton)	ØD	t	t–2mm		
2	144	4	2		
3	160	4.5	2.5		
5	200	4	2		
7.5	200	4	2		
10	200	4	2		
15	240	5	3		
20	240	5	3		
30	240	5	3		
40	375	5	3		
50	375	5	3		
60	375	5	3		
70	375	5	3		

- Lubrication
  - -. Lubricate the various of the hoist, referring the lubricants specified below to assure extra life and best performance.

Part to be lubricated	Instruction	Lubricants	Frequency	Remarks
Main body gear case	Fill-up	Mobile(mobilgear 630) Shell(Omala 220) ISO VG220 or equiv'	Once in a year Check quantity once a year	Replace it 2 or 3 in the 1st month at initial use
Traversing gear case	Apply grease	Mobil(EP2)	Once in a year	Apply grease in gear
Trolley gear wheel	Apply grease in the gear	Shell(R2) or equivalent	Once in a year	Apply grease in gear
Wire rope	Apply light coat	Heavy motor oil or cable compound	Once in a year	_

Capacity	3 ton	5 ton	7.5 ton	10 ton	15 ton	20~30 ton	35~70 ton
Oiling amount(liter)	1.2	1.5	1.8	2	2.5	6	20
Grease amount(liter)	0.5	0.7	1	1	1.5	1.5	2~2.5

### Korea Crane Engineering

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#### Hoisting Brake

- -. The adjustment of hoisting brake and replacement of lining is as followings. be use up to 30%
  - 1) Adjustment of the brake air gap must be made in following conditions.
  - Brake slipping in no load operation or with light load operation.
  - Delayed stop or does not fully opening/releasing (or dragging).
    - \* The motor would be damaged with excessive over-load, if the brake does not fully released.
  - The air gap is excessively enlarged due to wear of the brake lining. (Adjust brake air gap)

-. The adjustment of hoisting brake and replacement of lining is as followings. be use up to 30%

- 2) Brake air gap adjustment
- Remove nuts & cover, and take off a Adjust handle from a Armature, and assemble a Adjust handle, fastening with Adjust bolts to eliminate a gap between a Magnet core and a Spacer plate as shown in Fig. A
- Loosen the fully tightened Adjust bolts by 1~1.5 turn, and then adjust the air gap Spacer plate as shown in below Table 5 <Air Gap of Hoisting Brake>.

<Air Gap of Hoisting Brake> Table 5.

Capacity	Air gap	o (mm)
(ton)	Adjustment	Wear limit
3	0.75	2
5	0.75	2
7.5~20	0.75	2
25~70	0.75	2





(adjustment like table 5)

- 3) Warning in the brake adjustment
  - \* Do not attempt to carry out brake adjustment with load. (Load may falling down.)
- 4) Replacement of lining
  - \* Replace the brake linings, it is less than 50% of the nominal thickness.
  - \* Use only factory supplied replacement lining and parts.
- 5) Warning in the replacement
  - \* Disconnect power supply before the replacement.
  - \* Leave a load or a hook on the floor in safe place before the replacement.
  - \* Make sure that the hoist is in safe condition by trial runs with no load, light load and rated load after replacement.



Malfunctions and solutions

-. In order to solve the malfunctions efficiently and quickly when having troubles while using hoist, please take a look at "Malfunctions & Solutions of hoist" as follows.

- 💶 Quality assurance
- ① Warrentee due
  - -. For a year from the date of purchase or receipt.
- Warrentee detail

-. Guarantee that if users perform the operation, installation or repair properly in compliance with the user's manual, hoist will be operated properly.

- ③ Scope of Warrentee
  - -. KCE Inc guarantees any problems with its functions, components and used materials.
- ④ The cases not covered by warranty policy of KCE Inc.
  - -. When doing a lack of maintenance and repair or operate it in an abnormal condition.
  - -. When converting the structures or systems of hoist arbitrarily.
  - -. Malfunctions due to the abnormal external factors like supplying an abnormal voltage.
  - -. Malfunctions of accidents due to overload.
  - -. When using standard hoist in the areas demanding an explosion or an acid proof type of hoist.
  - -. Malfunctions of accidents due to natural disasters (earthquake, fire, flood lightning strike)
- (5) Contact info of KCE Inc.

-. TEL: +82-70-4068-7985









-. Malfunctions & Solutions of hoist

Situation	Cause	Solution no.	Solution
	Single phasing	(1)	(1) Measure the voltage of 3 phase of power cables by the tester in order of R-S, S-T and find the phase which does not teact. It is rarely observed that there is
Fail to operate hoist when pushing the push button	Power voltage drop	(2) (3)	a serious disconnection of lines in the motors so please check whether any problems with wiring condition or loosening of a bolt in the terminal observed. the fuse
R	Problem with the covvection of current collector	(3)	shall also be checked whether any disconnection occurs.
	Brakes are not functioning	(4) (21) (22)	If not, the reason for voltage drop is caused because of the wiring resistance between the switch and hoist
Not instantly operated when pushing the push button	Wider gap of brakes than rated	(4)	(3) Operation in the place containing a lot of dust or powdered coal can also cause the voltage drop due to the continuos accumulation of dust or powder which resist the electricity. In this case operators shall clean
	Single phasing	(1)	the lines through using sand paper or similar means.
	Power voltage drop	(2)	<ul><li>(4) Adjust the gap of magnet brakes.</li><li>(5) The motors are excessively heated due to the high.</li></ul>
Motor are over heating	High ambie <mark>nt</mark> temperature	(5)	(6) Due to the destruction of silicon rectifier, the brake are not functioning, for that reason motor is spinning excessively so over-heated. In this case the silicon rectifier shall be replaced.
	Broken silicon rec <mark>tifier</mark>	(6) (22)	(7) Overloadings is caused the malfunctioning of motors. Must comply with the rated load.
	Overloading	(7)	(8) When pushing the push buttons, 400~600% bigger operation current runs. The temperature of a motor is
	Excessive inching	(8)	increasing as much as the proportion of the square of its current valve, and consequently, is increasing 16~36 times more when using the push buttons. For that
	Too frequent use	(9)	reason the frequent inching is causing the motor being excessively heated.
Hook block is descending excessively	Only surface of brake lining	(10)	(9) The motor case can bear with the temperature upto 105°C.
after stopping the operation	Brake circuit is not shut off	(12)	the lining can be stained with the used oil. In that case, please remove the oil through using thinner.
Abnormal noise occurs when operating hoist	None of oil in the gear case	(13)	(11) If the hook keeps sliding down even after stopping the operation, it is not interrupted properly. If applying a customized wiring, operators shall inspect whether there is any misconnection and loosening of a bolt observed.
	Gears and spindles are worn out	(10)	<ul><li>(12) Supplying insufficient oil, the loud noise will occur.</li><li>(13) Excessive abrasion of gear will make a loud noise.</li><li>If so, please replace the gears.</li></ul>



Feel a little electric shock wher touching th hook of hoist	When no grounding(Earthing)	(14)	<ul><li>(14) Complete grounding needed.</li><li>(15) The detachment of a current collecting connector is caused due to the inappropriate wiring. Please check the wiring condition</li></ul>
Current collector poles	Improper installation of trolley line	(15)	(16) The current collector of KCE Inc is controlled and affected widely so carefully investigate the location.
are easily slipped out	Improper positioning	(16)	(17) Do not apply the sidewise force, and check whether the adjustment of an installation method of hoist is needed or not.
Excessive abrasion of	When winded irregularly	(18)	(18) The irregular winding is caused due to the improper usage. Operators shall also check whether the
wire ropes	When supplied wire ropes with insufficient oil	(13) (19)	(19) Use grease for wire ropes.
Brake are not working properly	Excessive brake gap	(4)	(20) Check whether there is any loosening of a bolt and disconnection of cables.
	Disconnection of a wire in the brake ci <mark>rcuit</mark>	(20)	a. Abnormal voltage is applied due to the improper
	When the sili <mark>con</mark> rectifier is dam <mark>aged</mark>	(21)	b. Misconnection for the applied wiring.









-. Malfunctions & Solutions of the electrical parts of hoist

Situation	Malfunctions & Solutions
	① Check whether the circuit breaker whether or not it is powered on, and indicate 'TRIP' status.
1) When the power of an inverter is not supplied	② Check whether the magnetic contactor is powered ON or not
	③ If no problem with No. ①, ②, check whether the rated voltage is apply or not through using a tester.
	④ Check whether there is any disconnection with the phase, C phase or fuse through using a tester.
<b>U</b>	(5) If none of the previously mentioned problems detected while having a problem in supplying the power, please contact KCE Inc to solve it.
2) Hoist is not operated even though no problem	① Check the status window of an inverter and techeck it after pressing the alarm reset button.
machine.	Alarm RESET button : Inverter 'ESC' or 'PRG/RESET' button
	② If the same problem repeated even after pressing the alarm 'RESET' button, please contact KCE Inc.
-	① Check the sor <mark>t of timer</mark> if it is off delay timer, and also check whether the setting value of time is more than 3 seconds.
3) When feeling burning smell or smoke coming out.	<ol> <li>Check the deceleration time of an inverter whether or not it is shorter than the value that the timer has.</li> </ol>
	<ul> <li>Parameter for the deceleration time(Fuji inverter F.08 sec)</li> <li>I he deceleration time of an inverter has to be shorter than the value that timer has.</li> <li>If not, it will cause damage to the brake pad and over current or speed error to the inverter</li> <li>If an excessive abrasion of the pads observed although brakes are operated without</li> </ul>
2008	any problem, operators shall adjust the gap between brakes.
	① Measure the resistance of traversing brake cores through using the tester.
4) When the traversing	② Check the insulation condition of traversing brake cores.
rectifier of hoist damaged.	③ In case the insulation and resistance of brake are changes unintentionally or when the resisting value becomes '0', please contact KCE Inc.
5) When the setting value of cam switch is	① Check the location of cam switch whether assembled in the right places through opening the yellow case in the panel.
change or the power is turned off because the main switch hit by hook is turned off.	② If the location of cam switch is movable, please tighten the band between the cam switch and drum.





6) Sparking when hook	① Check if any problem with grounding of cranes, hoist or trolley bar.				
the ground.	② Check if any problem with grounding of controlling trans.				
7) Hoist is not operate when raining.	1 Check whether the transformer of the crane or hoist is an autotransformer or a transformer.				
	② Measure the OV(primary & secondary) resistance of the transformer by using the tester.				
	③ If the resistance detected when measuring No ②, it is an autotransformer. In this case, the autotransformer shall be change to the transformer(insulated).				
S					
	1 The power leakage occurs due to the water percolation into the traversing limiter.				
8) Fuse is disconnected	② Open the gap of traversing limit and do the silicone treating.				
when traversing or doing the normal.	③ P phase shall be grounded and the use of enamel wires instead of fuse is the main cause of fire in the panel.				
	④ Check the condition of wire insulation and coating.				
	⑤ If any resistance detected between grounding and C phase, there is a problem with wire coating.				
	(1) Check the battery				
	Check the battery.     Check if there is any colligion of the signale while using the remote control				
9) Problem in operating the remote controller.	(2) Check if there is any collision of the signals while using the remote control.				







-. Annual inspection report.

Туре	Manufacturing No.	
	Date.	
Standard	Date for next inspection.	

Checklist		Standard	Result	problem detail	Date of completion of a repair
	1. Any obstacles existing.	Remove the dust.			
	2. Vontaminated oil on the rail surfa	Remove the unnecessary oil			
	3. Loosening of a bolt.	No loosening			
	4. Rail span	Tolerance 5mm(Suspension type)			
Traversing rail	5. Rail slope.	Below 1/300(Suspension type), Below1/500(top running type)			
	6. Difference of altitude.	Within 1/500(span)			
	7. Staggering value of the connected part of rails	Within 0.5mm		nu	
	8. Gap between each connecti <mark>on</mark>	<mark>Within</mark> 3mm			
	9. Deformation of rails	No deformation available.			
	10. Abrasion of rails	Within 10%			
	11. Abrasion of gears.	Within 1% from an initial diameter		2	
	12. Abrasion of spindles.	Within 2% from an initial diameter	Ň		
Spindle, bearing and oil room	13. Gap between spindles and bearings	When spindle diameter is below 25mm- >0.6mm. When spindle diameter is below 40mm->1.6mm			
	14. Gap between couplings and bearings.	When spindle diameter is below 25mm- >1.2mm. When spindle diameter is below 40mm->1.6mm			
	15. Abnormal noise, vibration and heating.	No abnormal noise, vibration and heating.			
	16. Contaminated oil	Do not use the contaminated oil.			



Checklist		Standard	Result	problem detail	Date of completion of a repair
	17. Abrasion of lining.	Within 35% from an initial diameter			
Brake	18. Deformation of brake wheels and other related components.	No deformation.			
	19. Loosening of disk ass'y.	No loosening.			
	20. Adjustment of torque and stroke.	Appropriate adjustment and operation.			
	21. Abrasion of the surface.	Within 5%			
Travers	22. Roundness.	Within 0.8mm			
wheel	23. Diameter difference of the paired wheels.	Within 1%			
	24. Abrasion of flange thickness.	Within 50% from an initial thickness.			
	25. Partial abrasion.	Within 5% from an initial diameter.			
	26. Specification of opening part	Within 5% from an <mark>init</mark> ial diameter.			
Hook	27. Cracking and damage.	No problem detected while doing the magnetic particle test.	ER	NG	0
0	28. Wobbling of screws	Make sure no wobbling of screw.			L I
Sheave	29. Abrasion of the part where ropes passed through.	Within 20% of the rope diameter.			-
	30. Disconnection of each wire of the wire rope.	Within 10%.			
	31. Abrasion of ropes.	Within 7% of the rated diameter.		2	
Wire rope	32. Deformation and corrosion of ropes.	Not considerably deformed and corroded	X		
	33. Condition at the tip of ropes.	No disconnection and other damage observed.			
	34. Specification of ropes.	In compliance with the standard.			
Spindle connection	35. Problem with spline parts.	No deformation and abrasion observed.			
	36. Damage.	No damage observed.			
Switch	37. Damage on the contact parts.	Within 50% from an initial thickness.			
	38. Damage on each equipment.	No problem in operating it.			
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Checklist		Standard	Result	problem detail	Date of completion of a repair
Ourset	39. Abrasion of brush.	Within 20% from an actual specs.			
collector	40. Check the condition of grounding, arc and rust	No problem with grounding and check the level arc and rust.			
Wiring	41. The condition of cabtyre cables and lead wires.	No damage, aging, disconnection and malfunction of C/H detected.			
Insulation	42. Insulation resistance of all circuits.	Over 1.0MΩ			
Power switch	43. Check the fuse capacity.	Use the one with rated capacity.			
	44. Lubrication.	Inject an appropriate q'ty.			
General	45. Painting.	Complete painting needed according to the specs.			
Over winding proof device	46. Over winding proof device.	Operate it in the designated area(over 50m), and make sure no abrasion and deformation detected.	EERI	NG	6 .
	47. Operation of emergency st <mark>op.</mark>	Power supply shall be shut off instantly.			
Emergency stop	48. Operation of load limit and its	1. Operations shall be stopped when applying 10% heavier weight than the rated one.		10	
	sealing.	2. The limiter shall be sealed completely to prevent any adjustment		9	
Stopper	49. Operation of stopper.	No crack, deformation and damage observed and stopping and alarming functions are operated well.			
Safety latch	50. Operation of safety latch.	No crack, deformation and damage observed			
Lift	51. Lift	An extra length of some shall be remained when the hook is approaching to the lowest point.			



Checklist		Standard	Result	problem detail	Date of completion of a repair
Brake	52. Functioning while lifting down.	Braking distance of 1% out of total lifting height for one minute.			
Hoisting	53. Check the operation without load and with rated load.	No problem with hoisting operations.			
Traversing	54. Check the operation without load and with rated load.	No problem with traversing operations.			

#### Additional Checklist

- ① Operators shall inspect throughly whether there is either loosening or absence of bolt and screw.
- 2 Thoroughly inspect both loosening of a screw and condition of each wire at the tip of lead wire.
- ③ Consider the load, actual operation time, operation equipment and the frequency of inching when doing the inspection.
- ④ If the braking distance is limited within 1% out of its total lifting height as soon as the operator stops pushing the push buttons, the brake performs its function successfully.







-. Monthly inspection Report.

Туре	Manufacturing No.	
	Date.	
Standard	Date for next inspection.	

Possible problems		Classificat ion	Result	problem detail	Date of completion of a repair	
		1. Any obstacles existing.				
		2. Any deformation observed.				
Travaraina	Travoroing	3. Any deformation with the stopper and loosening of a bolt observed.			2	
rail	rail	4. Any loosening of a bolt found in the connection parts.				
		5. Abnormal abrasion on the rail.				
		6. Loosening of a connection part, any damage and flection observed.				
		7. Appearance p <mark>roblem.</mark>				
	Push button	8. Operation pro <mark>blem.</mark>				5
		9. Case condition.			5	1
	Magnet switch	10. Any loosening <mark>of a bolt &amp;</mark> nut in the terminal.			-	
		11. Operational problem with an interlock			-	
Control part	Cable	12. Any damage shown and any problem with connection.			2	
		13. Any operational problem with limit switch		Š		
	Limit switch	14. Loosening of a bolt in the terminal.				
	SWIGH	15. Shall have extra length of 50mm or more after the operation of limit switch when hoisting.				
		16. Inappropriate gap between each brake lining.				
Brake	Brake	17. Abrasion of lining over the limit.				
		18. Loosening of a bolt.				





		19. Disconnection of wires(The q'ty of disconnection of each wire shall not exceed 10% out of total)			
		20. Abrasion condition.			
		21. Wire twisting.			
Wire rope	wire rope	22. Considerable deformation or corrosion.			
		23. Damage at the tip of rope.			
		24. None of necessary oil spreaded on the surface of ropes.			
	Hook block	25. Spining condition of thrust bearings.			
		26. The bad condition of loosening proof system of hook nuts.			
Hook block		27. Damage on the sheave.			
		28. Damage on the sheav <mark>e case.</mark>			
		29. Excessive abrasion.			
	Hook block	30. Crack.			
		31. Deformation o <mark>f opening</mark> part.			
Power supply	Current	32. Crack and connection problem with cables.	CIVI	NC	9
	collector	33. Disconnectio <mark>n of cable</mark> s.		NUI	-
		34. Improper mov <mark>ing of han</mark> ger.			

- 🕥 Head Office : 647-3, Yulsang-ri, Daegot-myeon, Gimpo-si Gyeonggi-do, Korea
- Branch : 140, TL15 street, Thanh Loc ward, district 12, HCM, Vietnam
- ☑ TEL : +84(0)282-249-7700 / 7711 / 7733
  - +82(0)70-4068-7985
- E-mail : sales@newkce.com

