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Original Instruction

OWNER'S (OPERATOR'S) MANUAL AND SAFETY INSTRUCTIONS FOR KITO ELECTRIC CHAIN HOIST

EDIII SERIES

ALWAYS SAVE THIS BOOK FOR FUTURE REFERENCE.

KITO

CONTENTS

1. DEFINITIONS

⚠ DANGER : **indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.**

⚠ WARNING : **indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.**

⚠ CAUTION : **indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.**

WLL : indicates maximum mass (working load limit) which a hoist is designed to support in general service.

2. INTENDED PURPOSE

This hoist has been designed for vertically lifting and lowering by means of the pendant push button switches and cylinder switches and horizontally carrying loads by means of manual trolley under normal atmospheric conditions of the work place.

This is a Class A product. In a domestic environment this product may cause radio interferance, in which case the user may be required to take adequate measures.

3. BEFORE USE

3.1 Safety summary

Danger exists when heavy loads are transported, particularly when the equipment is not being used properly or is poorly maintained.
Because accidents and serious injury could result, special safety precautions apply to the operation, maintenance and inspection of the KITO electric chain hoist ED Ⅲ series.

⚠ WARNING

NEVER use a hoist for lifting, supporting or transporting people.

NEVER lift or transport loads over or near people.

NEVER lift more than WLL which is shown on the hoist name plate.

ALWAYS let people around you know when a lift is about to begin.

ALWAYS read the operation and safety instructions.

Remember proper rigging and lifting techniques are the responsibility of the operator. Check all applicable safety codes, regulations and other applicable laws for further information about the safe use of your hoist.

3.2 Safety instructions

⚠ WARNING

3.2.1 Before use

ALWAYS allow the instructed (trained in safety and operation) people to operate the hoist.

ALWAYS check the hoist before daily use.

ALWAYS make sure that the chain length is long enough for the intended job.

ALWAYS check that the hook latches work properly and replace missing or broken hook latches.

ALWAYS check the brake before use.

ALWAYS use two hoists which each has WLL equal to or more than the load to be lifted whenever you must use two hoists to lift a load.

ALWAYS use KITO original load chains marked "KITO". KITO shall not be responsible for any claims or damages arising from the use of other chains.

ALWAYS check and keep oil to be on the surface of the load chain.

NEVER use a hoist without a hoist name plate.

NEVER use modified or deformed hooks.

NEVER use a hoist in explosive atmosphere.

3.2.2 While operation

ALWAYS make sure that the load is properly seated in the hook.

ALWAYS tighten the slack out of the chain and sling when starting a lift to prevent a sudden loading.

ALWAYS avoid excessive inching operation.

ALWAYS make sure the hoist motor completely stops before reversing.

ALWAYS use a hoist within the "Duty rating", ED%.

ALWAYS make sure that Proper limit switch actuation and motor stopping when the hook rises at upper limit under no load.

ALWAYS make sure that No deformed, peeled and cracked cushion rubber.

ALWAYS make sure that No damaged chain spring (option), and minimum free length, 75mm(130mm), of the chain spring.

Note: Initial free length of the spring 85mm(150mm). ( ): 60～240kg.

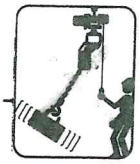
NEVER dropping or releasing a load could result in death or serious injury. To avoid this hazard, do not operate the bottom hook release mechanism (hook cam) when the hoist with cylinder-controlled or optional detachable hook is under load.

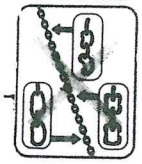
NEVER operate unless the load is centered under the hoist.

NEVER use the hoist chain as a sling.

NEVER use a twisted, kinked, damaged or stretched load chain.

NEVER swing a suspended load.





NEVER support a load on the tip of the hook.

NEVER contact the load chain over an edge.

NEVER weld or cut a load suspended by a hoist.

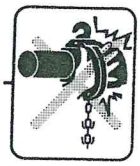
NEVER use the hoist chain as a welding electrode.

NEVER operate a hoist if chain jumping or excessive noise occurs.

NEVER use the limit switch or friction clutch as limit switch regularly, otherwise a hoist will be severely damaged to bring serious injury. These devices are for emergency use only.

NEVER pull the push button cord.

NEVER handle the arm-fitting during the hoist operation.



3.2.3 After operation

NEVER leave a suspended load unattended, and/or for an extended period of time.

NEVER throw or drop the hoist when carrying it.

3.2.4 Maintenance

ALWAYS let the qualified service personnel inspect the hoist periodically.

ALWAYS oil the load chain.

ALWAYS have KITO or an authorized dealer adjust the friction clutch.

NEVER splice, add and weld a load chain for extension.

NEVER touch live electrical parts.

3.2.5 Others

ALWAYS consult the manufacturer or your dealer if you plan to use a hoist in an excessively corrosive environment (salt water, sea, air and/or acid, explosive environment or other corrosive compounds, etc.).

4. MAIN SPECIFICATIONS

4.1 Specifications

The following specifications are common to all KITO electric chain hoists ED Ⅲ series.

Table 4-1 Specifications

Item		Detail
Working temperature range (°C)		−20 to +40
Working humidity range (%)		85 or less
Protection	Hoist	IP 54
	Push button	IP 65
	Cylinder switch	IP44
Electric power supply		Single phase, 230V, 50Hz *
Noise level (dB)		83 (A scale)
Sound power level (dB)		94 (A scale)

Remarks : (1) Contact KITO or authorized KITO dealer for information on using the hoist outside the working temperature or humidity range.

(2) Noise level were measured at a distance of lm horizontally from the hoist during normal operation.

(3) * The hoist can be also used for 220V-50Hz and 240V-50Hz, Single phase.

4.2 Mechanical classification (Grade) and life

Safety and life for electric chain hoists are guaranteed only when the said equipment is operated in accordance with the prescribed grade.

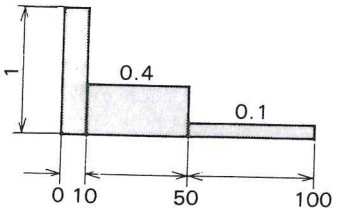
KITO electric chain hoists ED Ⅲ series have been designed for grade 1Am in the FEM regulations (FEM 9.511).

Details are provided in Table 4-2.

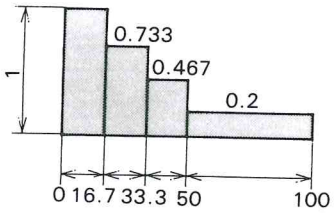
Average daily operating time and total operating time are determined by load distribution.

Table 4-2 Mechanical classification

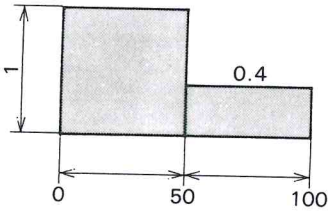
Load spectrum (Load distribution)	Definitions	Cubic mean value	Average daily operating time (h)	Total operating time (h)
1 (light)	Mechanisms or parts thereof, usually subject to very small loads and in exceptional cases only to maximum loads.	$k \leqq 0.50$	2−4	6300
2 (medium)	Mechanisms or parts thereof, usually subject to small loads but rather often to maximum loads.	$0.50 < k \leqq 0.63$	1−2	3200
3 (heavy)	Mechanisms or parts thereof, usually subject to medium loads but frequently to maximum loads.	$0.63 < k \leqq 0.80$	0.5−1	1600
4 (very heavy)	Mechanisms or parts thereof, usually subject to maximum or almost maximum loads.	$0.80 < k \leqq 1.00$	0.25−0.5	800



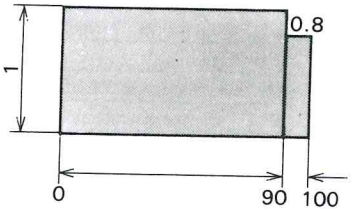
% operating time
Load spectrum 1



% operating time
Load spectrum 2

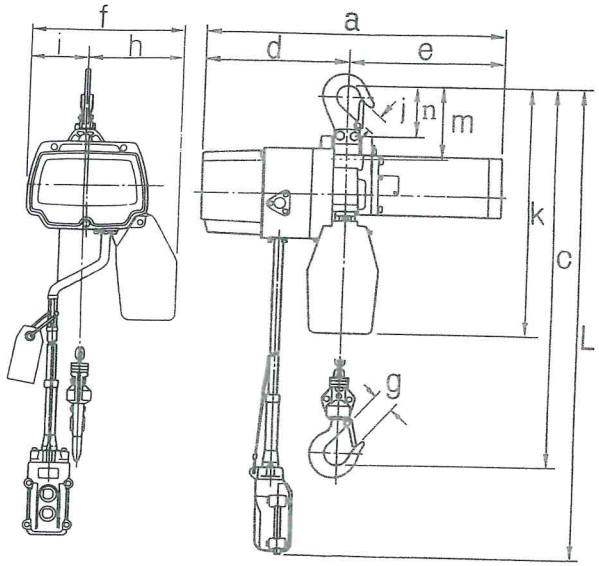


% operating time
Load spectrum 3

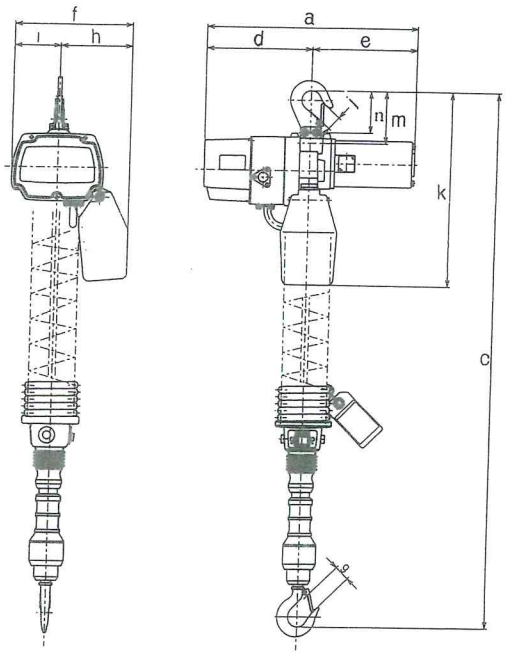


% operating time
Load spectrum 4

4.3 Specifications and dimensions



Single speed type and Dual speed type



Dual speed cylinder type

Power Supply		230V-50Hz																	
Type		Single speed type						Dual speed type						Dual speed cylinder type					
Model		ED06S	ED10S	ED18S	ED16S	ED24S	ED48S	ED06ST	ED10ST	ED18ST	ED16ST	ED24ST	ED48ST	EDC06SD	EDC10SD	EDC18SD	EDC16SD	EDC24SD	
WLL	(kg)	60	100	180	160	240	480	60	100	180	160	240	480	60	100	180	160	240	
Motor output	(W)	300			600			300			600			300			600		
Intermittent duty	%ED	30		20	30			30		20	30			30		20	30		
	Max. starting frequency (Times per hour)	180		120	180			180		120	180			180		120	180		
Rated Current	(A) 230V	3			5			3			5			3			5		
Lifting speed	(m/min) High	20.1	12.5	7.7	19.2	12.9	6.7	20.1	12.5	7.7	19.2	12.9	6.7	20.1	12.5	7.7	19.2	12.9	
	Low	—	—	—	—	—	—	4	3	3	4	3	2	4	3	3	4	3	
Standard lift	(m)	3						3						1.8					
Push button cord length : L	(m)	2.5						2.5						—					
Load chain diameter	(mm)	4						4						4					
Net weight	(kg)	11.5			15.5		21(21.5) ※1	12.0			16.0		21(21.5) ※1	14.5			18.5		
Min. distance between hooks : C	(mm)	315			330		520	315			330		520	945			960		
IP (Degree of protection)		IP54												IP44					
Insulation		F																	
Dimensions	(mm) a	364			428			364			428			364			428		
	d	187			205			187			205			187			205		
	e	177			223			177			223			177			223		
	f	205		219			229	205			219		229	205			219		
	h	125		135			155	125			135		155	125			135		
	i	80		84			74	80			84		74	80			84		
	g	25					24	25					24	25					
	j	25					24	25					24	25					
	k	340			362		454	340			362		454	340			362		
	m	92					149	92					149	92					
	n	73					104	73					104	73					

- WLL : Indicates maximum mass (working load limit) which a hoist is designed to support in general service.
- Control : Direct voltage control.
- The lifting speed is equal to the average value of the lifting/lowering speed at the rated load capacity. The speed will vary according to the load.

⚠ CAUTION

Actual power source voltage should not exceed max. allowable voltage:264V.

The lifting speed varies according to the actual power source voltage as shown in following table.

Relationship between power source voltage and lifting speed

Rated voltage (V)	Actual power source voltage / Operation voltage (V)	Lifting speed (m/min)					
		300w			600w		
		60kg	100kg	180kg	160kg	240kg	480kg
230	220/220	19.3	11.9	7.3	18.3	12.4	6.1
	230/230	20.1	12.5	7.7	19.2	12.9	6.4
	240/240	21	13	8	20	13.5	6.7

4.4 Special features

(1) Brake

Both dynamic brake and mechanical brake provide high braking capability for the most sure way to stop the load at the desired positions. The mechanical brake uses non-asbestos material.

(2) Hook and hook latch

Drop-forged heat treated hooks will not fracture but open slowly when over loaded excessively.

Built-in bearing assures easy swiveling of bottom hook. In addition, the hook latch adds another safety.

(3) Friction clutch

This hoist equips with friction clutch mechanism, specially developed by KITO, that causes the motor to idle when over loaded, thus preventing the load from being lifted. Also, the motor turns idly at the lift and lower limits to prevent overwinding. The mechanism works also when lifting grounded overloads. It is not necessary to adjust the friction clutch under normal usage. The friction clutch uses non-asbestos material.

(4) Emergency stop device (option)

This button is used to stop the hoist in an emergency situation. It is a red and mushroom type button. When pressed, power to the equipment is shut off and the button locks automatically. Turn it to the right to release the lock and to enable re-start.

5. PREPARATION AND CHECKING BEFORE USE

5.1 Packed contents

Before using, make sure the following contents are packed :

Hoist unit (containing oil)

Chain container (including bolt, nut, and split pin for attaching to hoist unit) available as option.

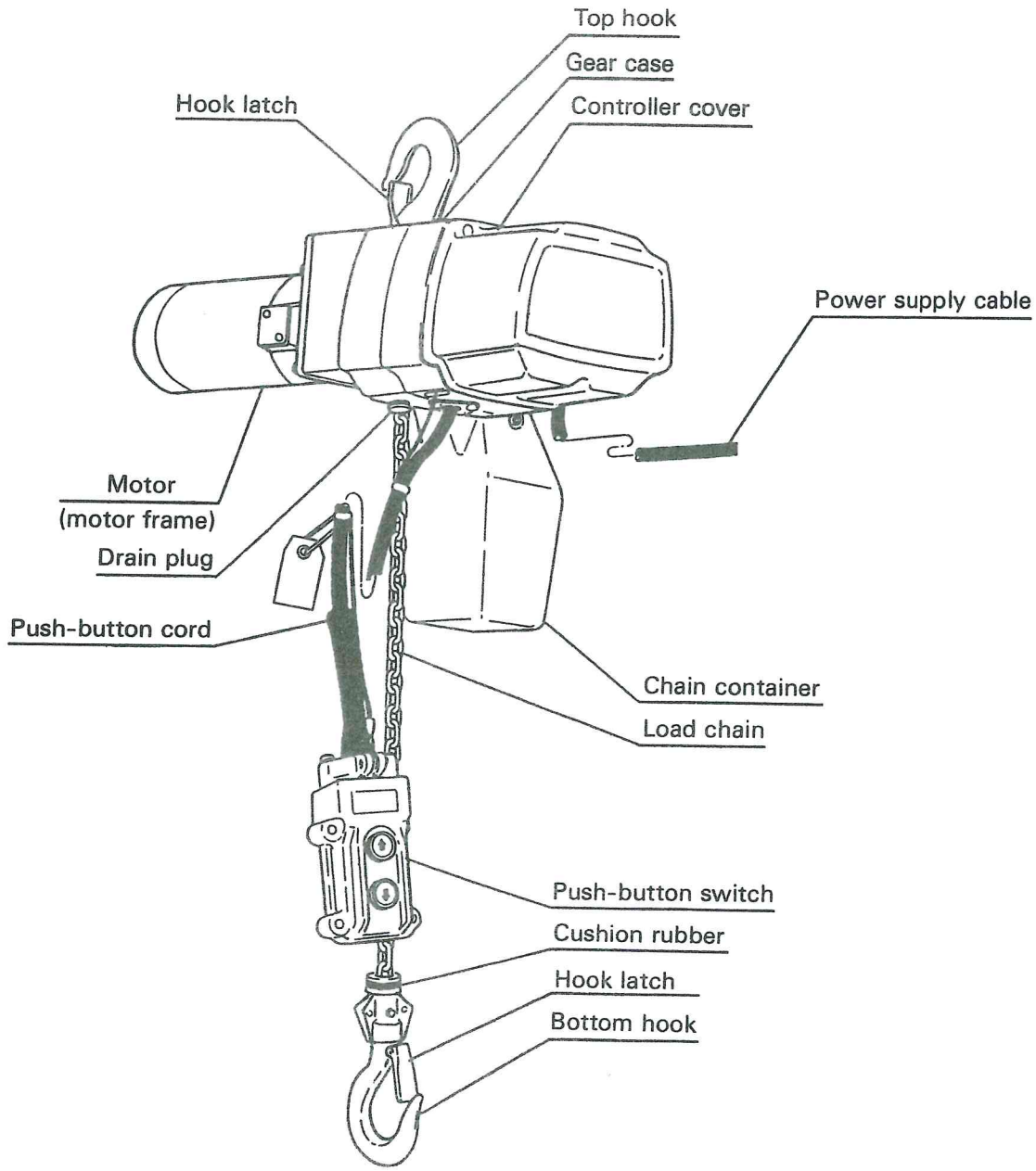
Push button cord (the dual speed cylinder type is equipped with a curled cord and fastening belt.)

Load chain

Owner's (Operator's) manual and safety instructions.

5.2 Preparation and checking before use

The appearance and profile are as shown in the next ;



5.3 Before using, prepare and check the following five items.

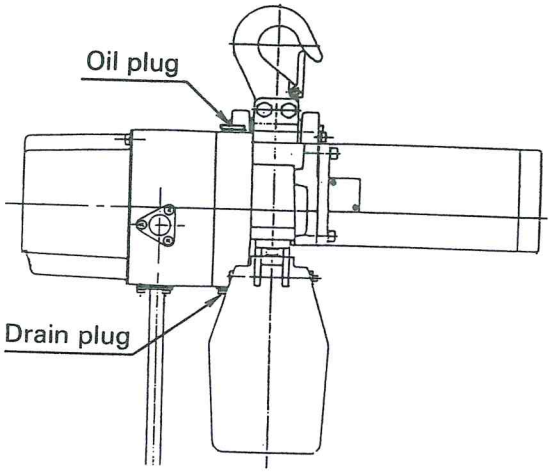
(1) Gear oil supply

Gear oil is pre-supplied in the gear box.

To change gear oil: Remove oil plug and drain plug from gear box. Drain contaminated oil completely, fasten drain plug, supply the specified gear oil sufficiently from the oil plug hole, then firmly fasten the oil plug.

⚠ WARNING

Use of the hoist without sufficient oil can cause immediate and severe damage to the hoist's gear and clutch mechanisms, which can result in hoist malfunctioning. To avoid these hazards, **NEVER** use the chain hoist without sufficient oil. Refer to the following table.



Gear oil quantity

W.L.L. (kg)	Oil quantity (ℓ)
60	0.27
100	
180	
160	0.35
240	
480	

Use of oils other than the specified Kito's gear oil might not allow full exertion of the built-in friction clutch, which can cause load to drop. To avoid these hazards:

ALWAYS use the specified Kito's gear oil.

To avoid oil leak, make sure to firmly fasten drain plug.

(2) Chain container assembly

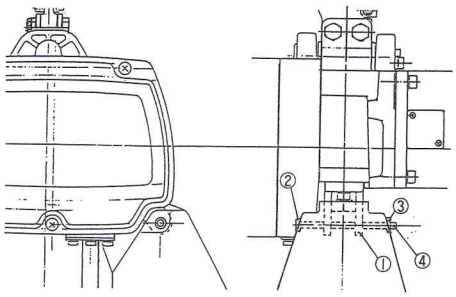
The chain container stores the load chain on the no-load side. In connecting it to the hoist body, fasten it completely and pay attention to the following points:

⚠ CAUTION

Firmly fasten bolt and nut as shown in the following figure appearing on the next page.

ALWAYS be sure that the load chain on the no-load side is properly stored in the chain container and stored correctly from the end.

NEVER store chain in the chain container which exceed the specified length of the chain container.



Assembly procedure :

Attach the chain container to the chain guide ① with socket bolt ② and U-nut ③.

Attach the split pin ④ to prevent the U-nut ③ from dropping. Bend pin ends 90° or more.

(3) Assembling push button cord and curled cord

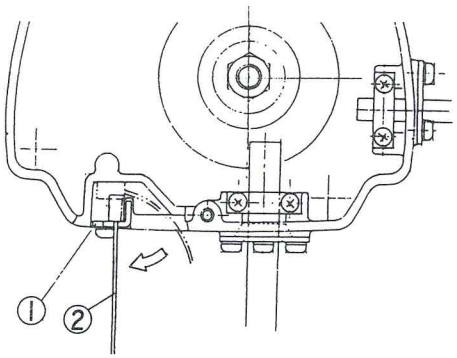
a. Single and dual speed types

While the push button cord is being connected to the hoist body, the strain relief wire may not be connected yet. After the push button cord connecting, be sure to assemble the end of the strain relief wire to the hoist body.

⚠ CAUTION

Short circuit and electric shock may result if the push button cord is pulled when the strain relief wire is not connected to the hoist body.

ALWAYS make sure that the strain relief wire is properly attached to the hoist body as described in the next.

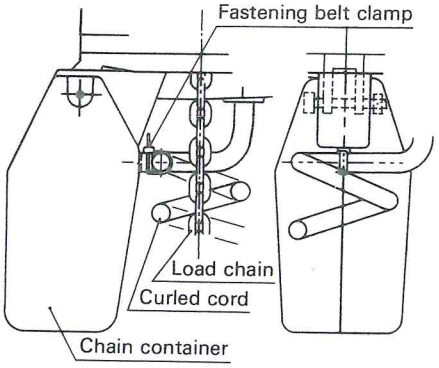


Assembly procedure :

As illustrated, hook the strain relief wire ② to the cable support L ① of the hoist body.

b. Dual speed cylinder type

While the curled cord is being connected to the hoist body, it may not be fixed to the chain container yet. As illustrated, attach it to the chain container so that the clamp of the fastening belt faces the way it does in the figure and so that the load chain comes to the center of the curled cord at that time.



⚠ WARNING

To avoid damage on the curled cord, fix the curled cord to the chain container with the fixing band.
To avoid wear between load chain and chain guide, straighten up load chain before fitting the curled cord to the chain container.
To avoid damaging the curled cord, attach the chain container so that the fastening belt clamp faces up.

(4) Lubricating the load chain

⚠ WARNING

Chain lubrication is a critical factor in the service life of a load chain. Apply enough machine or gear oil regularly.

Lubrication Procedures

- Vertically suspend the chain under no load conditions.
- Remove dust or water drops from the chain.
- Apply lubricant around the sections where the chain links come into contact with each other and the load sheave or idle sheave as shown in the following figures.

- After the chain lubrication is done, lift and lower without any load to spread the lubricant thoroughly.

Please consult with KITO Corporation if any of lubricants are not allowed at your site.

(5) Power supply cable specifications

Use a power supply cable of an outer diameter specified in the below table in relation with a distance to power source.
Use a three conductors cable including Ground wire as for power supply cable.

Power supply cable diameter (nominal cross-section area of conductor)	Max. length of power supply cable (m)
2.0mm²	30
1.25mm²	15

〔Connection to power supply source〕

⚠ CAUTION

ALWAYS ground the electric chain hoist before using.
NEVER ground the electric chain hoist to a gas pipe as this can create the possibility of explosion.
In addition to grounding, **ALWAYS** connect to a power supply source equipped with an earth leakage breaker.
Actual power source voltage should not exceed max. allowable voltage : 264V.

5.4 Installing trolley

(1) MINI trolley

Attachment of adjusting spacers

Remove the top hook of the electric chain hoist and fit together abjusting spacers to the trolley with the top yoke. 34 adjusting spacers (3.2mm thickness) and 2 Adjusting Spacer-Bs (1mm) are accompanied. With 32 of Adjusting Spacer as shown in the following table, fix the trolley frames' distance so that Dimension A approximately equals Dimension B (beam width) plus 3mm as illustrated.

(Reference)

Beam width (mm)		Inside trolley frame	Outside trolley frame
50	H-beam	Right/left, 8 pcs. each	Right/left, 8 pcs. each
68	H-beam	Right/left, 11 pcs. each	Right/left, 5 pcs. each
	I-beam		
98	H-beam	Right/left, 16 pcs. each	Right/left, 0 pcs. each
100	I-beam		

⚠ WARNING

Incorrect number of adjusting spacers may cause the trolley not to move or to drop. To avoid these hazards :

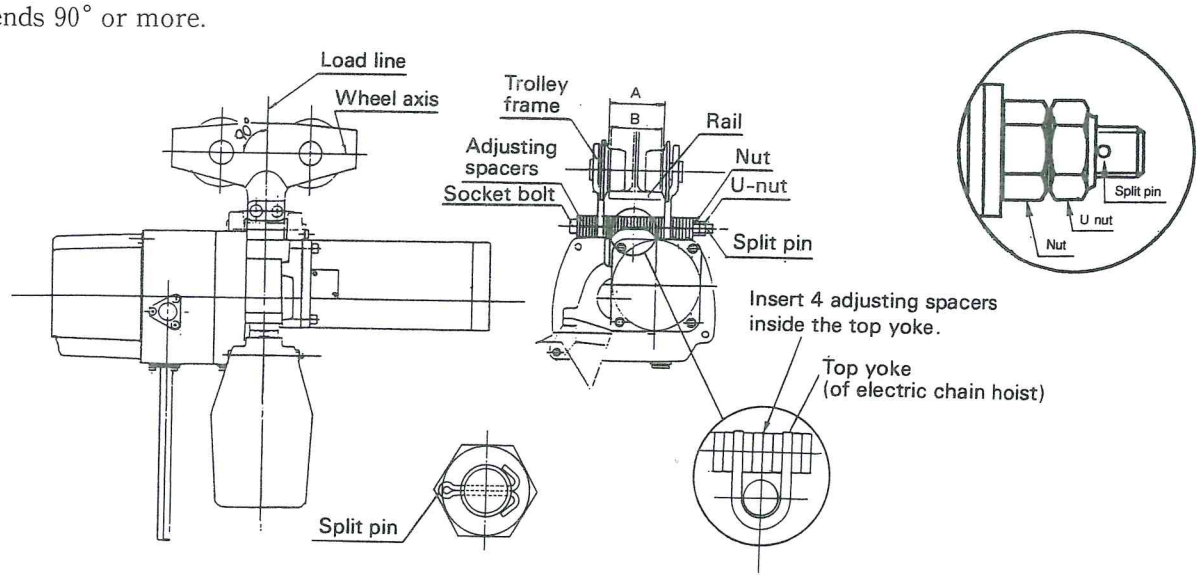
ALWAYS make sure to use all 32 pieces and confirm that A−B≒3 mm.

Fitting of socket bolt

Set the trolley so that the wheel axis is right angle to the load line. Attach the socket bolt, nut and U nut (double nut system), adjusting the clearance of 2mm or less between the split pin hole and U nut with 2 Adjusting Spacers and 2 Adjusting Spacer-Bs, and then tighten them and secure the split pin to the bolt.

⚠ WARNING

To avoid the trolley from dropping, firmly fasten the socket bolt, nut and U nut. Insert split pin and bend its ends 90° or more.



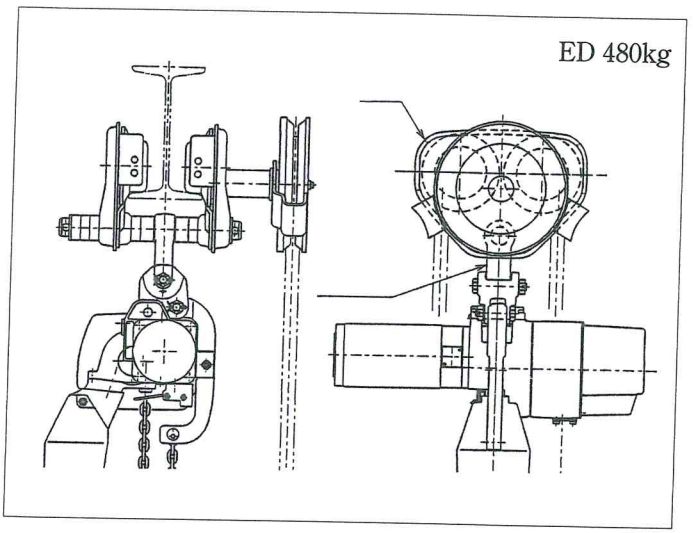
(2) Installing trolley to rail

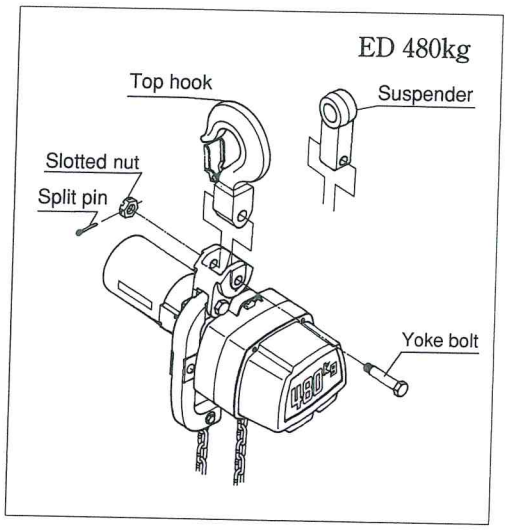
⚠ WARNING

For all trolley suspended electric chain hoists, rail stops must be installed at each end of the rail. Failure to install rail stops will allow the hoist and trolley to fall off the end of the rail and thus cause an accident that could result in injury and/or property damage. The stops must be positioned so as to not exert impact force on the electric chain hoist frame or trolley wheels. They must contact the ends of the trolley side frames.

Rail stops should be attached with buffers to alleviate trolley impact force.

(3) TSseries trolley (480kg only)





※ For more details of connection with TS series trolley, refer to the manual of TS series trolley.

6. OPERATION

As soon as pre-usage preparation and checks have been completed, the hoist will be ready for operation.

⚠ WARNING

In shifting operation between lifting up and lowering down under the loaded condition, ensure to avoid the immediate reverse operation before the hoist motor completely stops. If not avoided, it could result in the hoist's damage.

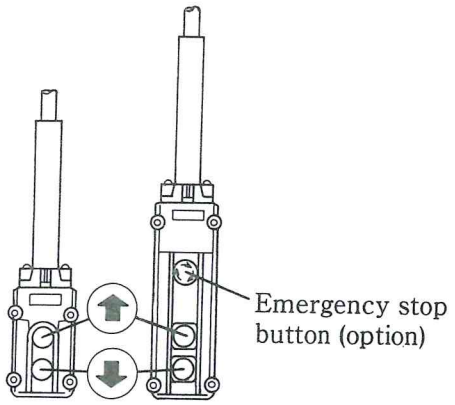
Ensure to avoid the excessive inching operation. (Inching operation: very frequent lifting or lowering operations in a very short time for positioning the hook with very small repeated hook movements.) If not avoided, it could result in the hoist's damage.

6.1 Single speed type

The push button switch is single step push in type. Push ⓤ to lift and ⓓ to lower.

Emergency stop device (option)

This button is used to stop lifting or lowering in an emergency situation. It is a red, mushroom type button, located in the upper most position on the push button switch box. When pushed, power to the equipment is shut off and the button locks automatically. Turn it to the right to release the lock.



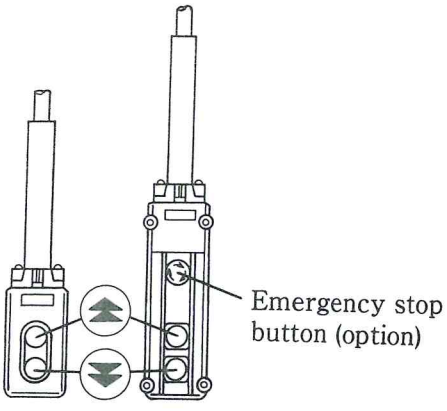
Single speed type

6.2 Dual speed type

The push button switch is dual step push in type. The first step is for low speed operation and the second step for high speed. Push ⓤⓤ to lift and ⓓⓓ to lower.

〔Low speed adjustment procedure〕

The push button can be adjusted by setting the low speed side for the actual power source voltage in each country. However, if the low speed does not work or is too fast or slow (owing to voltage and frequency fluctuation), adjust the switch in the following way :



Dual speed type

⚠ DANGER

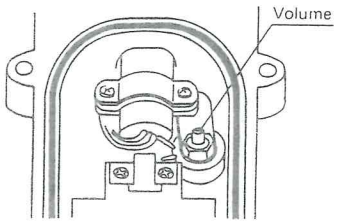
NEVER touch live portions of cables, terminals, and terminal screws during adjustment so as not to incur electric shock.

ALWAYS make sure to turn power off before servicing.

Open the back lid of the push button switch (as depicted in the next illustration).

Turn the volume clockwise to increase speed or counterclockwise to lower it.

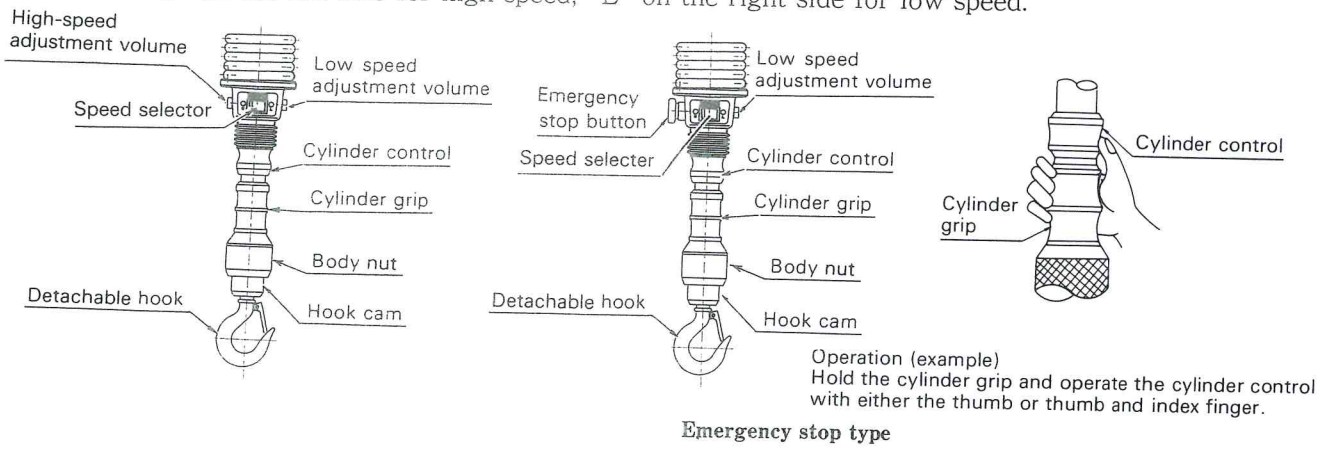
Close the back lid of the push button switch.



6.3 Dual speed cylinder type

(1) This is a handling switch type hoist. The switch is directly attached to the bottom hook. As illustrated, the switch is cylinder shaped. Load is lifted when the switch is flipped up and lowered when flipped down.

* The operation box has an alternate lighting switch.
* High or low lifting speed is selected by the alternate switch.
* "H" on the left side for high speed, "L" on the right side for low speed.



Emergency stop type

〔Speed adjustment procedure〕

If the hoist does not operate or have the proper speed, adjust the speed volume as follows:

* For increasing the lifting speed, turn the volume clockwise.
* For decreasing the lifting speed, turn the volume counterclockwise.

(2) The bottom hook is detachable. Detachment and setting are described next.

To detach bottom hook :

Holding the body nut, turn the hook cam to be the left (counterclockwise).

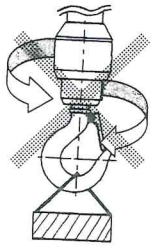
To set the bottom hook :

The bottom hook can be set by simply pushing it in from underneath.

⚠ WARNING

ALWAYS make sure the hook cam is completely locked.

NEVER dropping or releasing a load could result in death or serious injury. To avoid this hazard, do not operate the bottom hook release mechanism (hook cam) when the hoist with cylinder-controlled or optional detachable hook is under load.



6.4 Electric chain hoist with trolley

To operate the electric chain hoist with trolley, move it horizontally by either pushing the lifted load or the load chain.

⚠ WARNING

NEVER pull the curled cord, push button switch or push button cord. Pulling the curled cord, push button switch or push button cord may disconnect cord wires. Disconnected wire (s) may cause a short circuit in the hoist body or any surrounding conductor, giving the operator electric shock.

ALWAYS move the horizontally by grasping the cylinder grip or pushing the load.

ALWAYS pay your attention on your back when you attempt to push a lifted load or the load chain.

7. INSPECTION

7.1 Inspection classification

(1) Initial inspection : Prior to initial use, all new, altered, or modified hoists shall be inspected by a designated personnel to ensure compliance with the applicable provisions of this Manual.

(2) Inspection procedure for hoists in regular service is divided into two general classifications based upon the intervals at which inspection should be performed. The intervals in turn are dependent upon the nature of the critical components of the hoist and the degree of their exposure to wear, deterioration, or malfunction. The two general classifications are herein designated as daily and periodic with respective intervals between inspections as defined below.

(a) Daily inspection : visual examinations by the operator or other designated personnel.

(b) Periodic inspection : visual inspection by a designated personnel.

1) normal service ; yearly

2) heavy service ; semiannually

3) severe service ; quarterly

4) special or infrequent service ; as recommended by a qualified person before the first such occurrence and as directed by the qualified service personnel for any subsequent occurrences.

7.2 Occasionally used hoist

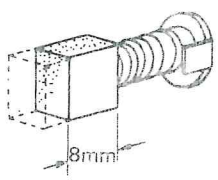
(1) A hoist which has been idle for a period one month or more but less than one year shall be given an inspection conforming to the requirements of section 7.4 before it is placed in service.

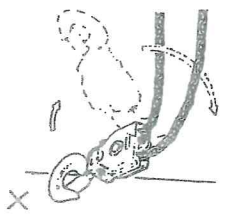
(2) A hoist which has been idle for a period of one year shall be given an inspection conforming to the requirements of section 7.4 before it is placed in service.

7.3 Inspection record

Dated inspection reports and records should be maintained at time intervals and such records are stored where they are available to authorized personnels.

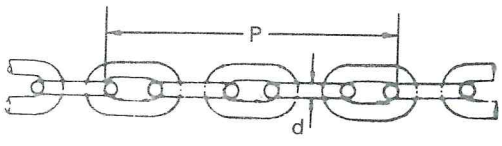
7.4 Inspection methods and judgement criteria

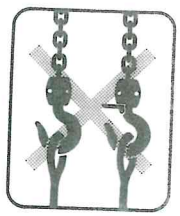
Item	Inspection methods	Discard limit/criteria	Remedy
1. Hoist body			
(1) Casing damage	Check visually.	• No cracks on hoist body.	Replace.
(2) Abnormal sounds during operation	Lift and lower a light load.	• No vibration or irregular noise from the motor or from inside the hoist body.	Overhaul.
(3) Gear oil quantity ; contamination	Check visually.	• Change gear oil regularly, matching usage frequency.	Replace.
(4) Controller cover and case damage	Check visually.	• No deformation or cracks.	Replace.
(5) Name plate damage	Check visually.	• Capacity should be legible.	Replace.
(6) Cable and cord joint damage	Check visually.	• No damage or loose screws.	Replace/repair.
(7) Brake function	Check brake slipping on lifting or lowering with no load.	• Braking distance : approx. 5 chain links.	Ask service shop to inspect and repair.
	Check brake slipping on lifting or lowering with rated load at high speed.	• Braking distance : approx. 5 chain links.	Ask service shop to inspect and repair.
(8) Brush	Check visually.	• The discard limit of this brush is 8 mm (brush should not be worn past this limit). 	Replace.

Item	Inspection methods	Discard limit/criteria	Remedy
2. Operation switch			
(1) Function	Operate switch with no load.	• The bottom hook shall lift and lower based on push button switch and cylinder switch indications.	Check power source and make sure cord is connected. Replace if defective (electrical equipment included).
		• To change from low to high speed. (Dual speed and dual speed cylinder types)	Replace.
(2) Emergency stop function	Operate switch with no load.	• Make sure the hoist stops instantaneously when the emergency stop button is operated while lifting or lowering.	Check power source and make sure cord is connected. Replace if defective (electrical equipment included).
(3) Case cracking	Check visually.	• No cracks.	Replace.
(4) Loose wiring joints	Check visually.	• No loosening or missing of screws.	Repair.
3. Load chain			
(1) Appearance	Check visually.	• Load chain shall be oiled.	Supply oil.
(2) Load chain Appearance	Check visually for greasing and twisting.	Load chain is well lubricated.	If chain is dry, apply the specified lubricant in the section '5.2(4).'
		 Load chain is not twisted or capsized.	If chain is twisted, untwist it and restore it to normal chain condition.
(3) Wear	Measure with calipers.	• Dimension "P" or "d" shall be within the following values :	Replace.

Unit (mm)

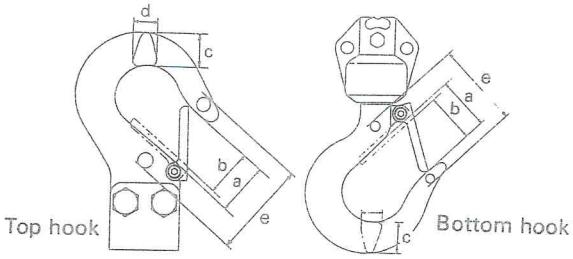
Chain diameter (d)	Number of measured chain links	Sum of pitches (P) of measured chain links		Wear limit of d
		Normal	Discard	
4	5	60.5	62.3	3.3

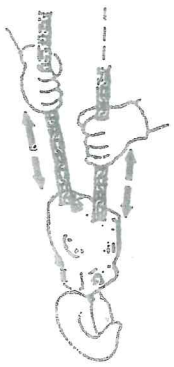


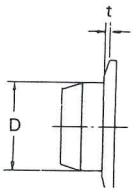
Item	Inspection methods	Discard limit/criteria	Remedy
4. Hook (1) Deformation	Check visually.	• No deformation from original shape (at time of purchase).	Replace.
	Measure dimension "e" between two embossed marks at time of purchase with calipers.	• No deformation from original shape (at time of purchase).	Replace.
	Measure with calipers.	• Dimensions "c" and "d" are within their limits.	Replace.

(Reference values)

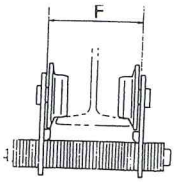
		c mm		d mm	
		Normal size	Discard limit	Normal size	Discard limit
Bottom hook		17.0	16.2	12.1	11.5
Top hook		17.0	16.2	7.0	6.5
480 kg	Bottom hook	23.5	21.0	17.5	16.0
	Top hook				



(2) Flaws	Check visually.	• No deep flaws.	Replace.
(3) Bend at shank of bottom hook	Check visually.	• Never use if bent.	Replace.
(4) Bottom hook movement	Turn hook.	• Hook should turn lightly.	Replace.
(5) Deformation of bottom yoke	Check visually.	• Should be free from deformation.	Replace.
(6) Hook latch	Check visually.	• No deformation from original shape (at time of purchase).	Replace.
(7) Rotation of idle sheave	Turn idle sheave by lifting the load chain up and down, as illustrated.	The idle sheave rotates smoothly. 	Inspect and repair if rotation is not smooth.

Item	Inspection methods	Discard limit/criteria	Remedy
5. Chain spring and Cushion rubber			
(1) Chain spring deformation (Option)	Check visually.	**NEVER** use deformed chain spring as illustrated or un-springy one, and make sure that the size of free chain spring is the minimum of 75mm(130mm) the initial size of the spring is 85mm (150mm) * ( )60～240kg 	Replace chain spring with a new one if deformed.
(2) Cushion rubber deformation	Check visually.	**NEVER** use cushion rubber if it is deformed as illustrated. 	Replace cushion rubber with a new one if deformed.
6. Chain container	Check visually.	• Chain container should not be damaged. • Screws and pins should not be loosend or damaged. • No foreign matter or dust.	Replace with new ones if damaged. Replace with new ones if damaged. Remove any foreign matter or dust.
7. Electric cable			
(1) Damage of electric cable	Check visually.	• No damage.	Replace.
(2) Loose of electric cable connection	Check visually.	• No loosening.	Repair.
(3) Poor grounding	Check visually.	• Shall be grounded.	Ground.
8. Mini trolley (60～240kg) In the case of 480kg, refer to the manual of TS series trolley.			
(1) Function	Move (trolley) under no-load condition.	• Should run smoothly.	Replace.
(2) Falling of split pins	Check visually.	• Not fall.	Repair.
(3) Wheel wear	Measure with calipers. 	• Contact face and flange wear should be within the following limits :	Replace.

Diameter of tread D (mm)		Discard limit of flange
Normal	Discard limit	t (mm)
40	38	1.5

Item	Inspection methods	Discard limit/criteria	Remedy
(4) Frame deformation	Check visually. Measure with calipers. 	• No deformation. • Frame top dimensions "F" shall not exceed dimensions before use by 5% or more.	Replace. Replace.

8. MAINTENANCE

⚠ WARNING

NEVER perform maintenance on the hoist while it is supporting a load.

Before performing maintenance, attach the tag :

〔"DANGER" : DO NOT OPERATE EQUIPMENT BEING REPAIRED.〕

Only allow qualified service personnel to perform maintenance.

ALWAYS lock-out power source before conducting maintenance.

After performing any maintenance on the hoist, always test to its rated capacity before returning to service.

8.1 Gear lubrication

Change gear oil at least once a year.

⚠ WARNING

To change oil, **ALWAYS** remove both the oil plug and drain plug to drain contaminated oil completely before supplying the specified Kito's new gear oil.

Use of oils other than the specified Kito's gear oil might not allow full exertion of the friction clutch, which can cause load to drop.

To avoid these hazards :

Always use the specified Kito's gear oil.

8.2 Load chain lubrication

Refer to '5.3 (4) Lubricating the load chain

⚠ WARNINNG

ALWAYS lubricate load chain weekly, or more frequently, depending on severity of service.

ALWAYS lubricate more frequently than normal in corrosive environment. (Salt water, sea air and/or acid or other corrosive compounds)

ALWAYS clean chain with an acid free solvent only to remove rust or abrasive dust build-up. After cleaning, lubricate the chain.

ALWAYS lubricate each link of the chain and apply new lubricant over existing layer.

8.3 Mechanical brake with friction clutch

The mechanical brake with friction clutch has both slip clutch and brake functions.

⚠ WARNINNG

NEVER disassemble and adjust the mechanical brake with friction clutch.

ALWAYS contact your local KITO dealer in case of malfunction of mechanical brake with friction clutch.

9. CONNECTION DIAGRAM

The electric instruments of the controller (contactor and converter) are installed on a panel and contained in the hoist body.

To check the connection, open the controller cover of the hoist body. Make sure that lead wires are connected correctly and firmly, referring to the following connection diagram.

⚠ DANGER

To avoid possible electric shock, **ALWAYS** make sure to turn off the power source before checking the connection.