

HANDLING and MAINTENANCE INSTRUCTIONS

for

ELECTRIC CHAIN HOIST ES SERIES

Approved by CSA

IMPORTANT

When assembling a hoist with trolley, follow each assembling method of the manual which was shipped with the product.

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Pre-operational cares and checks

1. Check supply voltage and electrical wiring

The ES series electric chain hoists are available in several voltage ratings. Before the first test operation after installation, confirm that the supply voltage is proper and the electrical wiring is correctly done.

2. Fill gear oil into gear box

The gear box does not contain oil at time of delivery. Remove the eye bolt. Pour all the gear oil that was packed with the hoist into the gear case and re-plug eye bolt.

Use only the specified gear oil for the ES type and fill to the level of the oil check hole as shown below (Table 1). by using packed oil pot.

Table 1. Amount of Gear Oil

Cap (ton)	Amount of Oil (l)	
	standard type hoists	Mechanical brake type hoists
1/4, 1/2-L, 1/2-S, 1-L	0.4	0.6
1-S, 2-L	0.6	1.0
1 1/2, 2-S, 2 1/2, 3, 5, 7 1/2	1.0	2.0 (1.0x2)

Standard gear oil : ANTOIL B made by Nippon Oil Co.,Ltd.

Recommended gear oil : MEPOPA No.68 made by TEXACO Oil,Co.

3. Install a load chain container to hoist body

A special canvas chain container is available as an option.

When the chain container is used, install it to the hoist body as shown in Fig.1. Every chain container is indicated with the load chain capacity it can contain. Should a smaller capacity chain container be used, all of the required length of chain can not be collected in it. This is undesirable. Check the length of load chain and select a proper capacity chain container.

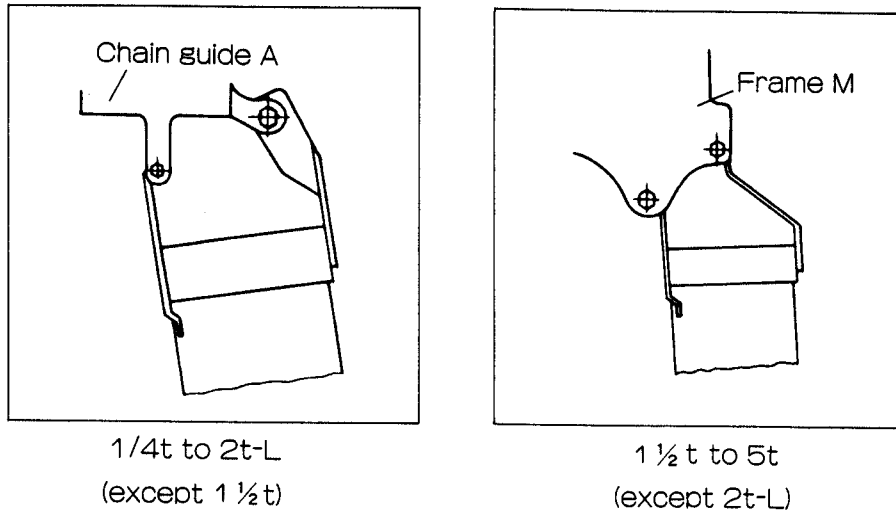


Fig. 1

Note:

In case of 1/4t to 2t-L capacities, socket bolt is used for installing chain container to hoist body, and special bolt is used in case of 1 1/2 t to 5t capacities.

4. Make up chain terminal

Mount a stopper at the 15th link in case of 1/4t to 2t-L capacities and 13th link in case of 1 1/2t to 5t capacities from the end of load chain as shown is Fig.2 and connect the end of the load chain to the hoist body without twisting in the load chain.

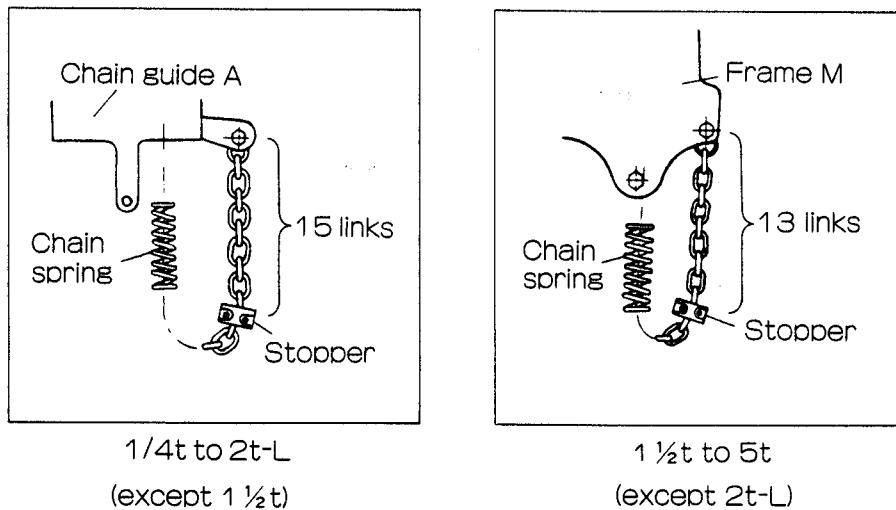


Fig. 2

Note: A lift (length of load chain) has been determined assuming a hoist with chain container, and in that case, the position of the stopper is on the third link from the end of load chain.

Therefore, in the above case, the lift is slightly shorter.

5. Coat load chain with oil

For a longer service of the load chain, lightly coat it with machine oil or gear oil.

6. Prevent capsize in load chain

If your hoist is any of 1/2t-L, 1t-L, 2t-L, 3t and 5t capacities, the bottom hook is suspended by a two falls load chain. Check to see if the bottom hook is not capsized, giving a twist in the load chain as shows in Fig.3. If the load is capsized, restore it to normal.

Never try to suspend a load onto the twisted chain. If the load chain is not twisted, the welded part of the chain are in alignment (Fig.3).

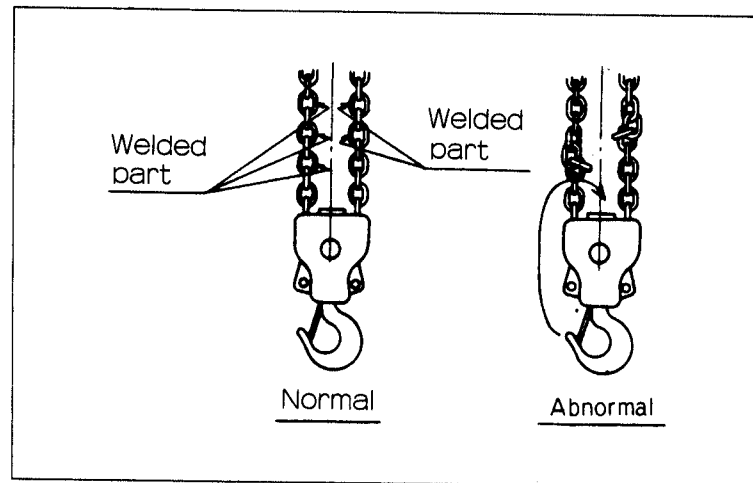


Fig. 3

Assembling

1. Assemble and mount the trolleys

1-1 Assembling of trolley

- (1) In the case of motorized trolley, which has been delivered in jointed state, remove shaft stopper pin and take off side-plate S, suspender and spacers from suspension shaft.
- (2) Referring to Fig. 4 and Table 2 install the inner adjusting spacers and the suspender onto the suspension shaft.
- (3) Insert the suspension shaft through side plate S, put outer spacers to the outside, insert the shaft stopper pin into the suspension shaft and insert a split pin into the shaft stopper pin.

CAUTION : The track wheels in 7.5t trolley are different in shape between the ones for tapered flange and the others for flat flange.

Wheel for tapered flange has tapered tread; as standard and wheel for flat flange has flat tread as option.

Before use, confirm beam flange type and wheel tread shape.

To avoid possible hazards, never apply a trolley having flat flange wheels to a tapered flange beam.

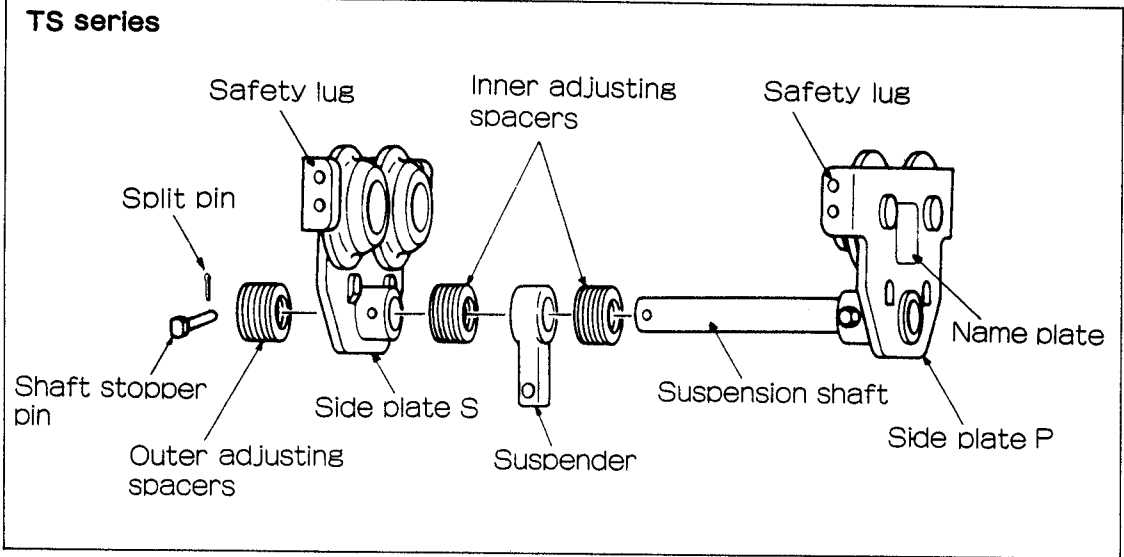


Fig. 4-1

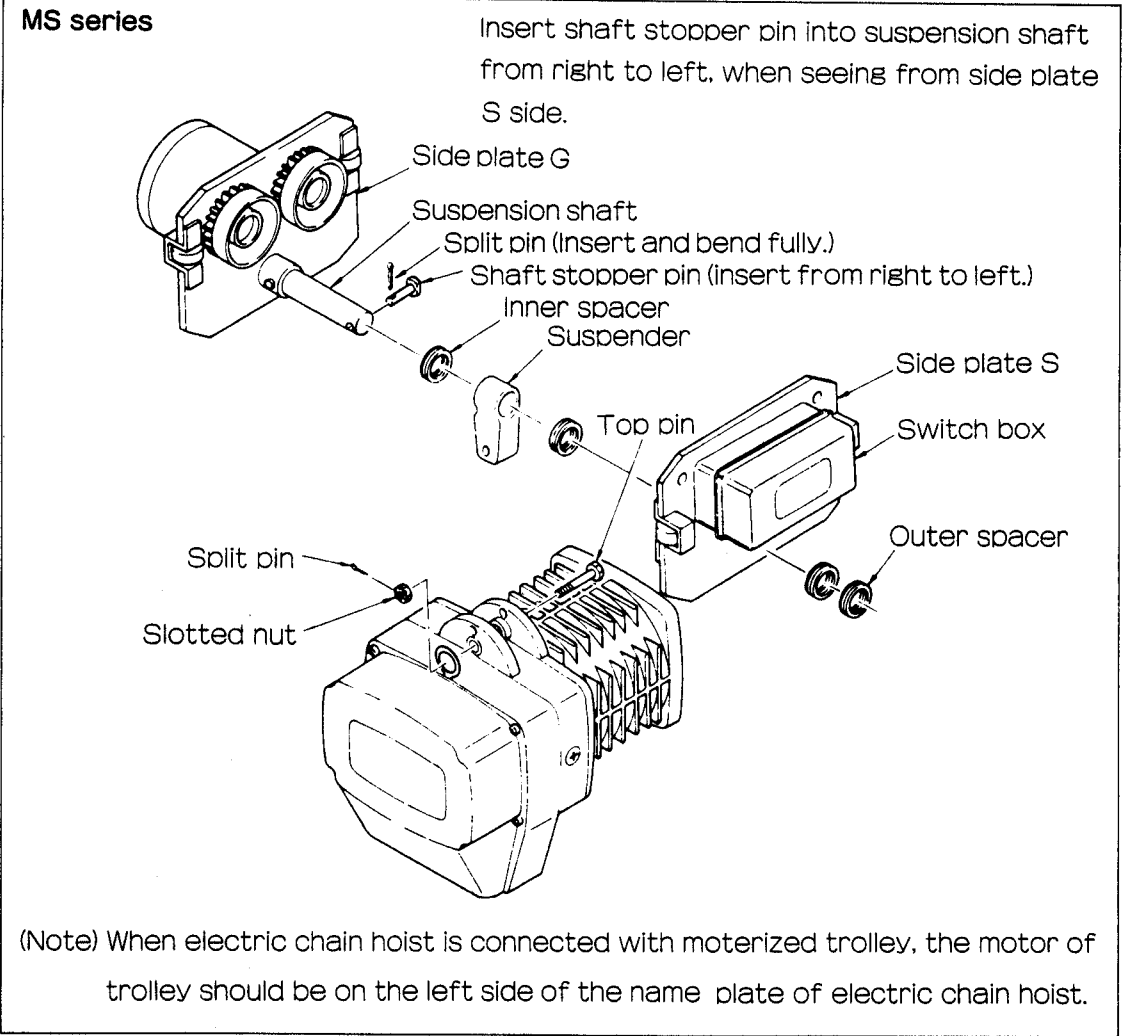


Fig. 4-2

For plain or geared trolley (TS series)

		Number of adjusting spacers																													
I-Beam width	(in)	2	2 ⁵ / ₁₆	2 ¹ / ₂	2 ³ / ₄	2 ⁷ / ₈	3 ¹ / ₄	3 ³ / ₁₆	3 ⁷ / ₁₆	3 ¹ / ₂	4	4 ¹ / ₁₆	4 ⁵ / ₁₆	4 ³ / ₈	4 ⁷ / ₁₆	5	5 ³ / ₁₆	5 ⁵ / ₁₆	5 ³ / ₈	5 ¹ / ₂	5 ⁵ / ₈	5 ⁷ / ₈	5 ¹ / ₆	6	6 ¹ / ₁₆	6 ³ / ₁₆	6 ⁵ / ₁₆	6 ³ / ₈	6 ¹ / ₆	6 ⁵ / ₆	7
	Capacity	(mm)	50	58	64	66	73 74	82	90 91	98	100	102	106	110	113	119 120	125	127	131	135	137	140	143	149	150	153	155	160	163	170	175
• 1 1/2 TPT	Inner	0+1	1+1	1+2	2+2	2+3	3+4	4+5	5+6	6+7	7+7	8+8																			
	Outer	15	14	12	12	9	7	4	2	1	0																				
• 2 1 TPT-GT	Inner			0+0	1+1	2+3	3+4	4+5	5+5	5+5	5+6	6+6	6+7	7+7	8+8	9+9	9+10														
	Outer			19	17	14	12	9	9	8	7	6	5	3	1	0															
2 TPT-GT	Inner				0+0	1+1	2+2	2+3	3+3	3+4	4+4	4+4	4+5	5+5	6+6	7+7	7+7	7+8	8+8	8+8	9+9	9+9	9+9	10+10	10+11	11+11					
	Outer					22	20	18	17	16	15	14	13	11	9	8	7	6	5	4	4	2	2	1	0						
3 TPT-GT	Inner						0+0	0+0	1+1	1+1	2+2	2+3	3+4	4+4	4+4	5+5	5+6	5+6	6+6	6+7	7+8	7+8	7+8	8+9							
	Outer						17	17	16	15	14	13	11	9	9	7	6	6	5	4	2	2	0								
5 TPT-GT	Inner							0+0	0+0	1+1	1+1	2+2	2+3	3+4	4+4	4+5	5+5	5+6	6+6	6+7	7+8	7+8	7+8	8+8	8+8	9+9	9+10	10+11	11+12	12+12	
	Outer								24	24	23	22	21	19	17	16	15	14	13	12	11	9	9	8	8	6	5	3	1	0	

*1 : 50 to 57mm available for only straight beam.

*2 : 66 to 73mm available for only straight beam.

(Note) In case a beam width is required to be larger than the above extent, consult your local distributor.

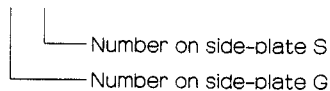
Table. 2

For motorized trolley (MS series)

		Number of adjusting spacers																						
I-Beam width	(in)	2 ⁵ / ₁₆	2 ¹ / ₂	2 ⁷ / ₈	3 ¹ / ₄	3 ³ / ₁₆	3 ⁷ / ₁₆	3 ¹ / ₂	4 ¹ / ₁₆	4 ⁵ / ₁₆	4 ³ / ₈	4 ⁷ / ₁₆	4 ¹ / ₆	4 ⁵ / ₁₆	5 ³ / ₁₆	5 ¹ / ₂	5 ⁵ / ₁₆	5 ³ / ₈	5 ¹ / ₆	6 ¹ / ₁₆	6 ³ / ₁₆	6 ⁵ / ₁₆	6 ³ / ₈	
	Capacity (ton)	(mm)	58	64 66	73 74	82	90 91	98	100	106	110	113	119 120	125	131	135 137	140	143	149 150	155	160	170	175	
1/2 • 1	Inner	1+2	2+3	4+4	5+6	6+7	8+8	8+8	9+9	9+10	10+10	11+11	12+12											
	Outer	21	19	16	13	11	8	8	6	5	4	2	0											
2 • 3	Inner							0+0	1+1	1+2	2+2	3+3	4+4	5+5	6+6	6+7	7+7	8+8						
	Outer							16	14	13	12	10	8	6	4	3	2	0						
5	Inner												0+0	1+1	2+2	2+3	3+3	4+4	5+5	5+6	7+7	7+8		
	Outer												16	14	12	11	10	8	6	5	2	1		

(Note) ○ Take note the number of spacers on inner side, figures left shows the number on side-plate G and figure right show the number on side-plate. S.

Example 1 + 2



○ In case a beam width is required to be larger than the above extent, consult your local distributor.

Table. 3

1-2 Adjusting trolley width

Adjust the trolley width for the following proper clearance.

(See Fig.5)

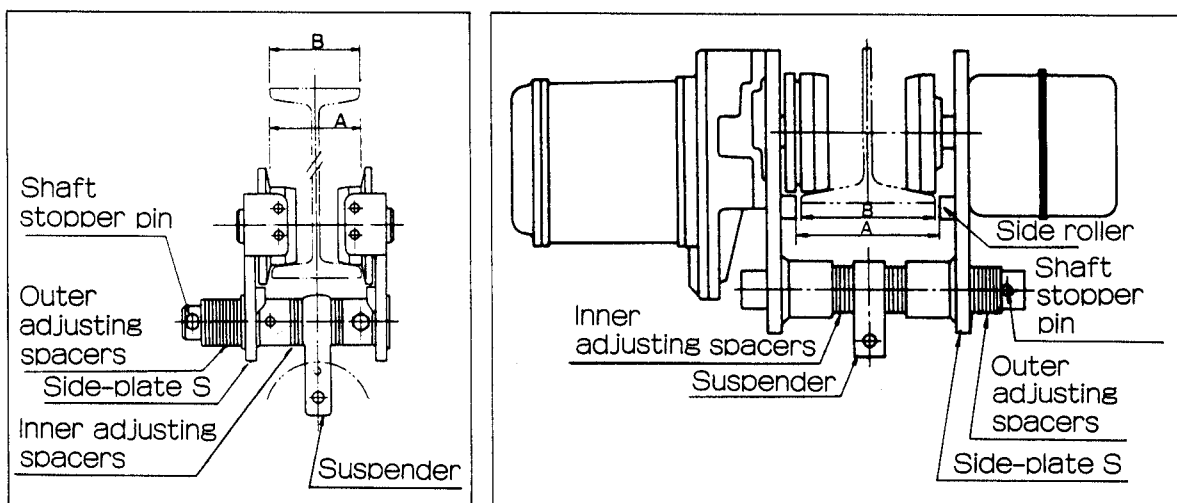
○ Adjustment of "A" dimension

Proper "A" dimension when both side-plates are spread fully outside is :
Beam width (B) + approx. 4mm for every model.

To obtain the above "A" dimension, increase or decrease the number of outer adjusting spacers irrespective of the numbers in Table 2 or 3.

There may be difference of spacers between the right and left side. However, this does not pose any problem.

After proper "A" dimension is obtained, insert a split pin into the shaft stopper pin and bend to an extent where it may not slip out.



Plain or geared trolley

Motorized trolley

Fig. 5

1-3 Connecting trolley with hoist.

After adjusting trolley width, connect it with an electric chain hoist, referring to Fig. 4-1 or 4-2.

- (1) Remove top hook, if equipped, from the electric chain hoist, and assemble a suspender of trolley to the electric chain hoist, using a top pin.
- (2) Screw up slotted nut tightly, insert a split pin into the slotted nut and bend it securely.

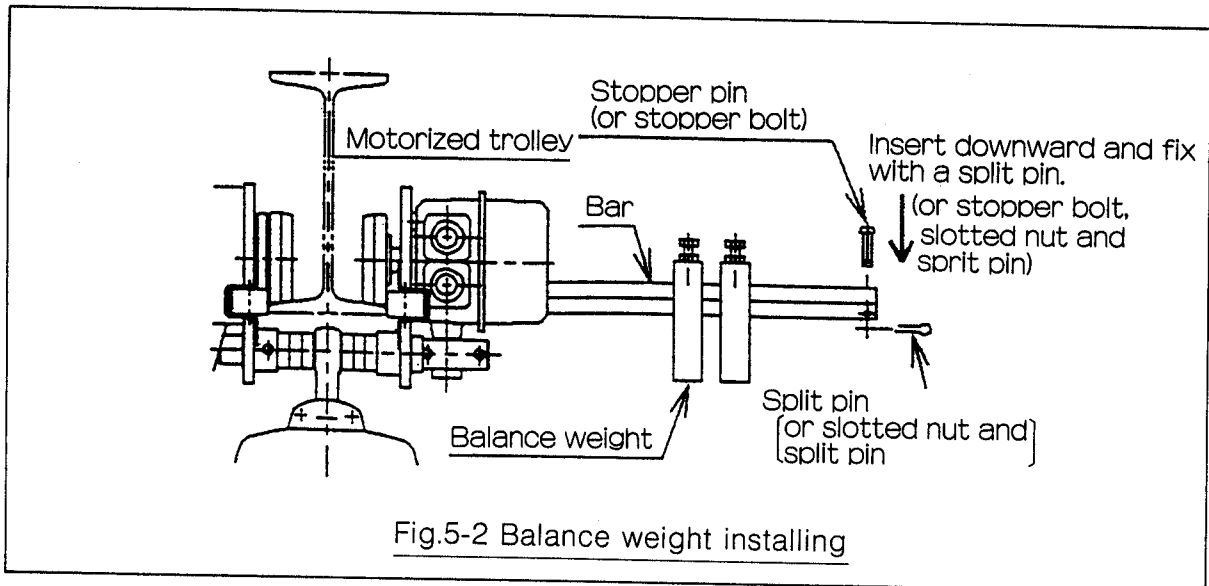
1-4 Mounting trolley onto beam

- (1) In case a trolley is mounted from beam end as it is connected with hoist ;
 - 1) Remove stopper at a beam end and mount the trolley from the beam end.
 - 2) Install the stopper surely on the beam.
- (2) In case the trolley can not be mounted from a beam end in its jointed state;
 - 1) Remove top pin and separate the trolley and the hoist. (Leave suspender on suspension shaft)

- (2) In case the trolley can not be mounted from a beam end in its jointed state;
- 1) Remove top pin and separate the trolley and the hoist. (Leave suspender on suspension shaft)
 - 2) Mount the trolley on the beam, where ;
 - ① Take out the stopper pin from hole ④ and insert it into hole ③ of the suspension shaft.
(Bend the split pin to an extent that it does not come off.)
 - ② Lift the trolley until the wheels are on the same level of the travelling surface of the beam, with the right and left side-plates spread outside, and put the wheel of side-plate G on the travelling surface of the beam.
 - ③ Press the side-plate G firmly so that it may not come off the travelling surface, and at the same time push the side-plate S and put its wheel onto the travelling surface of the beam.
 - ④ Take out the stopper pin from hole ③ and insert it into hole ④, and bend the split pin surely.
 - ⑤ Connect the electric chain hoist with the trolley having been mounted on the beam, paying attention to the direction of electric chain hoist (See 1-5).

Note: Avoid to mount at one time a trolley and a hoist, which have been connected, on account that the work may become so dangerous. Mount the trolley only first, and connect with the hoist in the next.

Note: For a motorized trolley which needs balance weights on it in order to keep stability on even a smaller rail flange, a stopper pin or a stopper bolt for falling off prevention of the balance weight has been assembled previously at the end of the bar. If the pin or the bolt is removed temporarily for any reason, ALWAYS reassemble the pin or the bolt and fix either with a split pin or a slotted nut and a split pin.



1-5 Posturing electric chain hoist

Connect electric chain hoist in the direction shown in Fig. 4 at page 4.

1-6 Applying grease to beam tread

In case a motorized trolley is to be run on a curved beam, the service life of the wheel and running beam will be substantially lengthened if a small amount of grease is applied to the tread of the curved part of the beam.

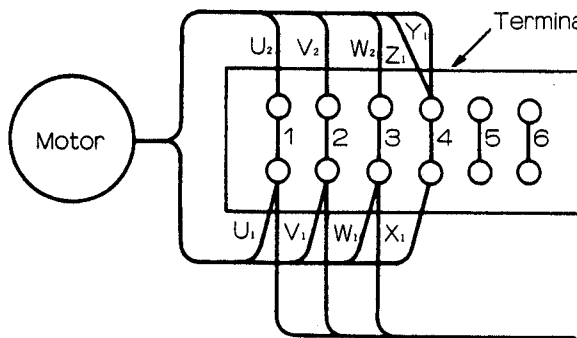
Where, take care not to apply too much to keep a trolley out of slipping or overrunning.

2. Make wiring connections

2-1 Checking or changing inside the equipment

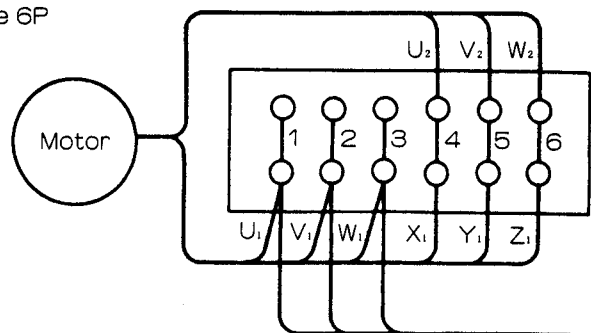
It is necessary to check or change the motor wiring connection of the electric chain hoist and motorized trolley and the connection of transformer, depending on voltage used. Make wiring connections referring to the following figure. (It is not necessary to change those connections in case of the equipment for 575V.)

2-1-1 Motor winding (common to hoist and trolley)



220V Connection

Fig. 6



440V Connection

Fig. 7

2-1-2 Transformer

A. 1/4t to 1t-L

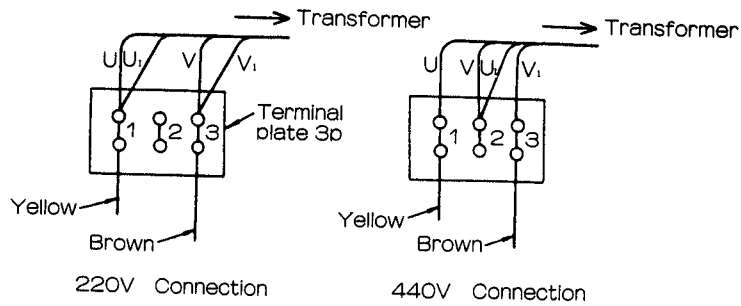


Fig. 8

B. 1t-S to 5t

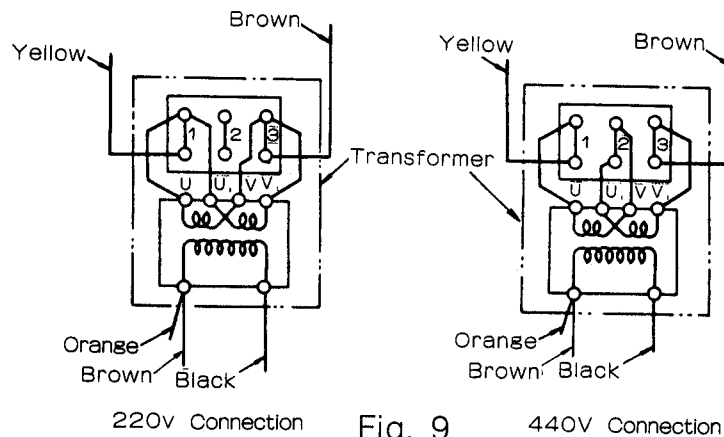


Fig. 9

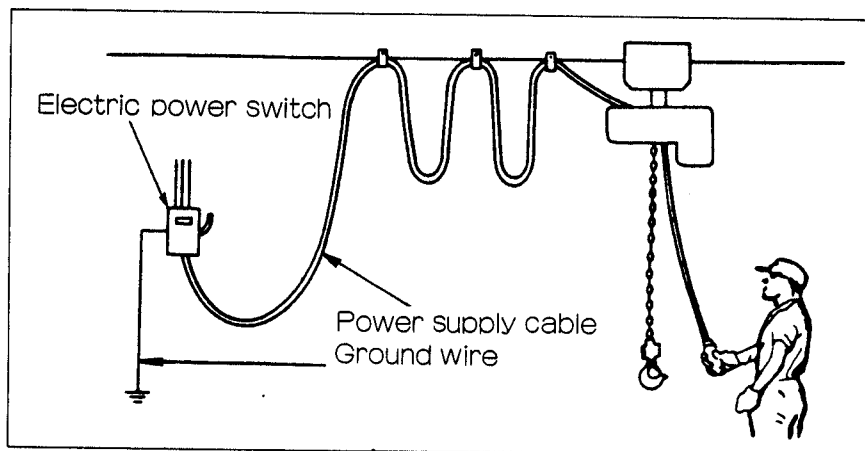


Fig. 10

2-2 Connecting ground wire

The green colored wire is the ground wire, which shall be always be connected to a suitable ground. Unless the wire is grounded, operators may sometimes feel a shock when touching any part of the hoist or chain.

*Do not paint the trolley running surface of the beam when electrical grounding work is not provided by means of standard power supply cable.

2-3 Connecting switch boxes and fuses

A breaker and a fuse specified in Table 4 should be used for the sake of safety.

Model	Capacity (ton)	Motor output				Min. size of wiring (mm ²)	Rating						Ordinary graduation of ammeter	Min. size of ground wire (mm ²)		
		Lift		Travel			Fuse (A)			Breaker (A)						
		kW	HP	kW	HP		220V	440V	575V	220V	440V	575V				
ES	250kg, 500kg-L	0.45	0.6	—	—	2.0	10	5	3	10	5	3	5	5	5	2.0
	500kg-S, 1-L	0.8	1.1	—	—	2.0	15	5	5	15	5	5	10	5	5	2.0
ESP	1-S, 2-L	1.5	2.0	—	—	2.0	20	10	5	20	10	5	15	10	5	2.0
ESG	1½, 2-S, 2½, 3, 5	3.0	4.0	—	—	2.0	40	20	15	40	20	15	30	15	10	2.0
ESM	250kg, 500kg-L	0.45	0.6	0.4	0.54	2.0	10	5	3	10	5	3	15	5	5	2.0
	500kg-S, 1-L	0.8	1.1	0.4	0.54	2.0	15	10	5	15	10	5	15	10	5	2.0
	1-S, 2-L	1.5	2.0	0.4	0.54	2.0	20	10	10	20	10	10	20	10	10	2.0
	1½, 2-S	3.0	4.0	0.4	0.54	2.0	50	20	15	50	20	15	40	20	15	2.0
	2½, 3, 5, 7½	3.0	4.0	0.75	1.00	2.0	50	20	15	50	20	15	40	20	15	2.0

Table. 4

3. Notes on trial operation

Please perform trial operation in addition to regular checks prior to everyday operation to make sure that the hoist functions satisfactorily.

3-1 Check voltage

Check supply voltage before everyday use. If the voltage varies over plus or minus 10% of the rated value, electrical devices may not function normally.

3-2 Check control buttons ; only for a hoist connected with motorized trolley ;

Confirm—

—that, when the main line buttons on the push button station are "OFF" condition, the equipment does not do any motion even which button is pushed,

—that all moving directions are correct matching with each push button indication, if not, follow 3-3,

—that, when the main line button "ON" becomes effective, the equipment does not do any motion when any button is not pushed, and

—that, if the main line button "OFF" is pushed when the equipment is being operated under "ON" condition, the equipment stops all motions even any of button or buttons are kept pushing.

3-3 Check operation

Make sure that if push-button ① is pressed, bottom hook is lifted and if push-button ② is pressed, the bottom hook is lowered.

In case the operation of bottom hook is reversed, exchange any two of the three wires (red, white and black colored) of the power supply cable at the electric power switch. (See Fig. 10)

Then the bottom hook will operate normally as explained above.

Notes on Handling

1. Avoid wrong-phased operation.

If a load is lifted or lowered excessively to each travel limit with the operation of bottom hook being reversed against the indications of the push-buttons, the hoist

may be damaged and an unexpected accident may occur due to inoperativeness on limit switch.

Never fail to change connections according to 3-3.

2. Never overload.

Overloading may become causes of burning of motor, shortening the life of machine or various accidents. Avoid definitely overloading.

3. Hang precisely any load on hook.

As shown in the Fig. 11, hang precisely. As shown in the Fig. 12, if you hang any load forcibly or bind directly a load to the hook, the load may be slipped off, the hook will be deformed or the chain will be injured, which may bring upon you serious consequences. As for slings it is recommended to use safe and useful KITO Chain-sling or Polyester-sling.

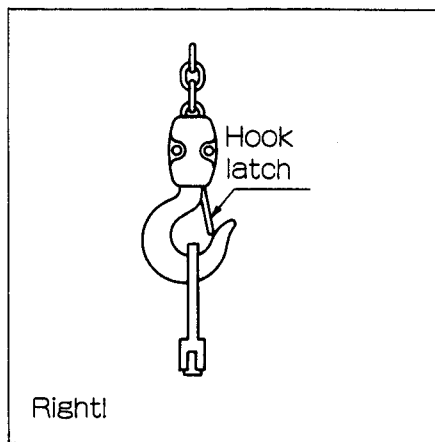


Fig. 11

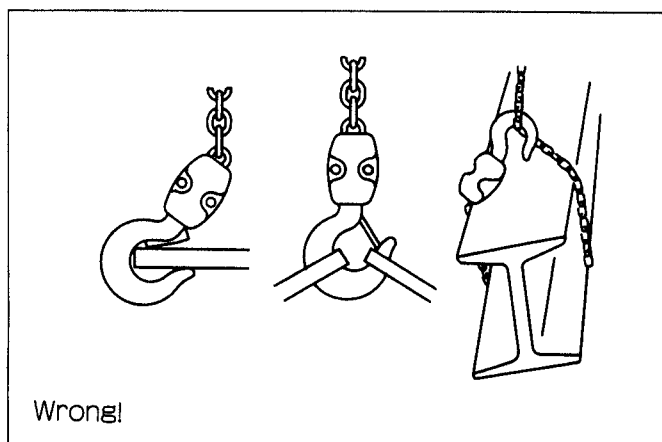


Fig. 12

4. Set correct hooking position.

A hook latch is provided on a bottom hook to avoid a sling from slipping off the hook. Make sure before hoisting if a load and the hook latch are correctly positioned as shown in Fig. 11.

5. Do not hoist a load with two or more hoists.

This is dangerous. Never use two or more hoists to treat a single load. If such is unavoidable, distribute the load evenly to each hoist used and do not overload to any hoist.

6. Treat load at its center of gravity.

If not, the load may not only exert a harmful influence upon the hoist as an overload but also be moved like a dangerous pendulum to injure people, load itself and/or surrounding matters.

7. Do not reverse the motor rotation abruptly and do not make inching operation excessively.

Always make a complete stop of the motor when you move one motion (ex. lifting) to the next (ex. lowering). Abrupt reversal of motor rotation and excessive inching operation may cause malfunction and/or life shortening of the hoist.

This also applies to travelling motion of the motorized trolley.

8. Do not bump trolley against beam stopper.

A stopper is generally provided at each end of the beam to prevent the trolley from running off. Bumping against it may injure the trolley itself and/or hoist mechanism. Care must be also exercised when work is done near the stopper.

9. Do not pull push button cord.

Do not try to move the trolley by pulling the push button cord. Electrical trouble may result.

10. Be cautious at welding.

When welding work is being performed near the hoist, keep the load chain and the hook away from the grounding wire of the working electric welder.

11. Do not push up load chain container.

When a load is hang without use of sling chain or other devices and lifted to the full height, the load may push up the load chain container. This may prevent the container to accomodate all necessary length of the load chain in it, causing an excess length to hang down from the container to iujure hoist body and/or chain itself. Whenever the bottom hook directly connects with a load, care must be exercised so as not to allow the load to push up the container

12. Check capsizing in load chain and correct its positioning.

- 1) Capsizing in the load chain must be avoided at any time.

Particularly capsizing in load chain of double-falls type hoist (1/2t-L, 1T-L, 2t-L, 3t or 5t types) requires special attention.

Correct the capsizing in accordance with Fig.3 in page 3.

- 2) The correct load chain attitude concerning the hoist center is that the weld of every link faces outward as shown in Fig. 13. When you replace a load chain, set it up correctly with respect to the welds.

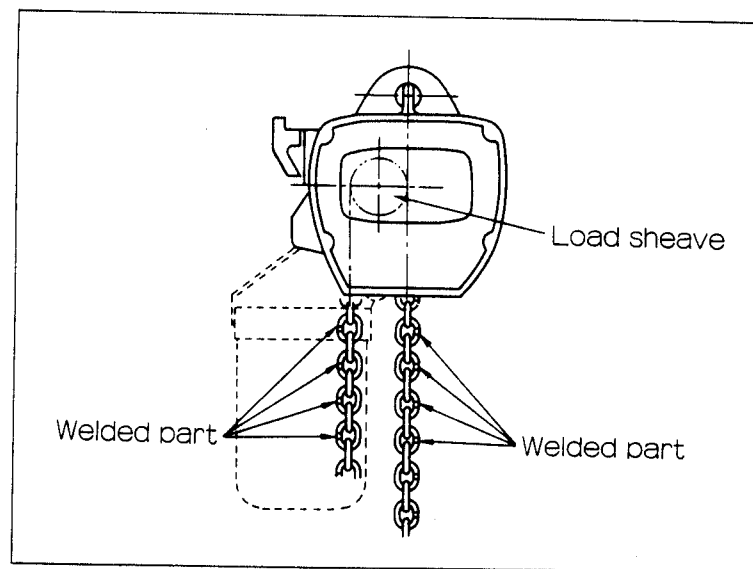


Fig. 13

Care and Maintenance

1. Inspect and exchange oil.

Electric chain hoist : In case the hoist is used at a normal frequency*, the oil in the gearbox can be used semi-permanently without requiring replenishment. However, when it is used at a high frequency** , exchange oil with new one according to the frequency of use at your discretion.

Standard Gear Oil : (1) "Antoil B" made by Nippon Oil Co.

Recommended Gear Oil : (2) "Meropa lubricant No. 68" made by Texaco Oil Co., or Caltex Oil Co.

Note: *Normal frequency : operating condition a little far from hoist ratings

**High frequency : operating condition almost equal to hoist ratings

Trolley : The following parts require to be inspected and oiled. Inspect and oil these parts according to the frequency of use at your discretion.

- Pinion, tooth part of wheels - grease, general purpose
- Guide roller pin - machine oil or gear oil

2. Clean and coat oil to load chain.

Clean the load chain once in a while and coat it lightly with oil (machine oil or gear oil) to assure long service life as well as safe operation.

3. Keep your hoist as follows.

- 1) Do not expose the hoist to rain or dew.
- 2) Do not store it in a humid place.
- 3) Cover it or move it back under the roof after use, if the hoist is used outdoors.
- 4) Hang the hoist from the ceiling or suitable beam to store it.

Trouble shooting

Trouble	Cause	Remedy	Remark
Inoperativeness	Broken fuse	Install new regular fuse.	Never use except the regular fuse.
	Discontinuity in power cable or in push button cord	Check discontinuity in the cable or the cord where either is subject to frequent bending. Repair the cable.	Interrupt the operation immediately if the motor hums and/or does not rotate.
	Voltage drop	Check the voltage with a volt meter at the electric power switch or at the connecting points inside circuit and check wiring. Supply correct power that is rated voltage plus or minus 10%.	
Brake slip	Overload	Check the load.	
Abnormal sound on chain	Worn brake shoe	Check and repair the brake.	Allowable slipping distance is equivalent to two chain link pitches or shorter.
	No oil on load chain or excessively rusted load chain	Lubricate load chain or, if necessary, clean up chain removing rust before lubricating.	Either gear oil or machine oil is proper.
	Worn load chain	Check and repair, if necessary, load chain.	For chain link diameter at contact section, wearing limit is 6%, and for total pitch length of continuous five links is limited its wearing to 2%.

Trouble	Cause	Remedy	Remark
Overrunning trolley	Loose braking on motorized trolley	Check and repair brake.	Pay attention to braking time over 1 second.
	Beam undulation	Check and correct, if necessary, beam.	
	Too much oil on beam tread	Wipe off excessive oil.	A slight grease on tread produces proper results on service life.
Electrical leak	Poor grounding	Provide correct grounding.	Grounding method may be ruled by local authority, if so, follow it.
	Painted beam tread (for collector type power supply)	Remove paint.	In case power supply cable is not used for motorized trolley, travelling beam becomes grounding conductor.
	Foreign matters or moisture deposited over electrical parts	Remove foreign matters. Keep parts dry.	
Oil leak	No oil plug or no oil plug packing	Instal regular oil plug and/or oil plug packing, and tighten them.	If oil leak occurs at other than oil plug, disassemble and check carefully especially on gear case packing(s) and oil seals.



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