NITCHI-MATIC ELECTRIC CHAIN HOIST

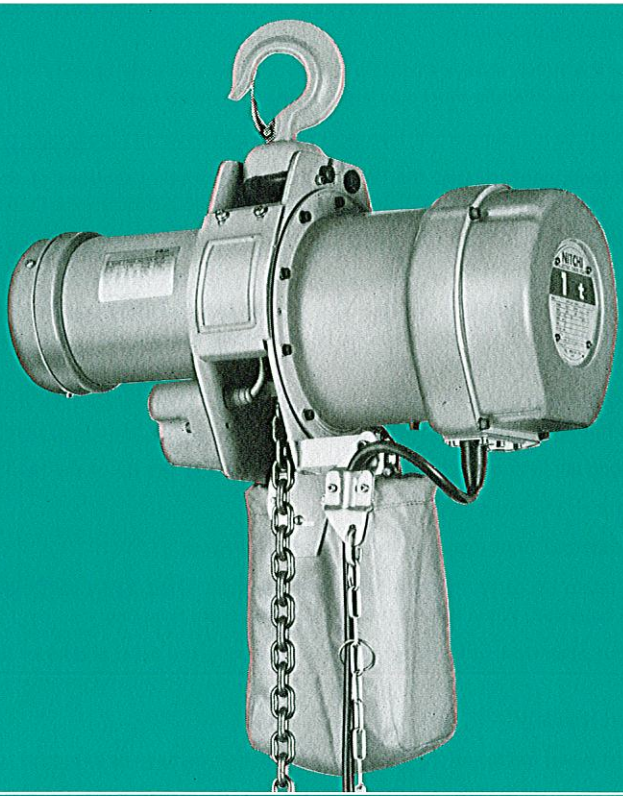
MODELS

No. 3

● MH-5 ● MHT-5 ● MHC-5

(including Trolley connected Hoists)

Operating and Maintenance Handbook



CAUTION – IMPORTANT **NEVER HOIST HUMANSI**

Install, operate and maintain properly to avoid the possibility of personal injury or damage of materials. In the succeeding pages are given important instructions and recommendations to all persons who will install, operate and maintain Our Electric Chain Hoists and ancillary products – read thoroughly the contents before use and retain this handbook for future use for safe, dependable and economical operation.

WARRANTY

Our products are guaranteed to be free from any defects in materials or workmanship. If any part of parts proves defective within six months from the date of purchase, we will replace the part no-charge, F.O.B. Osaka, Japan, provided the part claimed defective is returned to our factory through authorized our agents or dealers with transportation prepaid. We reserve the right to decline responsibility for these which repairs are made or attempted by others or misused or carelessly operated or maintained.

WARNING

The following warnings and safety procedures are essential for avoiding possible bodily injury and property damage:

1. The hoist operator must read this handbook and be completely familiar with the operating controls and operating procedures.
2. When operating the hoist, always maintain a firm footing and only operate from a location that will be safe at all times. People must stay clear of the suspended load.

   Never use the hoist to lift, support or transport people and never lift loads over or near people.
3. Before lifting a load, confirm that the limit switch and the other sections of the hoist function properly.
4. Always keep the load chain well lubricated and protect it from weld spatter or other damaging contaminants.

   Never allow the chain or hook to be used as a ground form welding and never touch them with live welding electrodes. Never use the hoist with twisted, kinked, damaged or worn chains and never attempt to lengthen the load chain.
5. Always use proper slings and attachments in the correct manner and confirm that they are seated properly in the hook. Also confirm that the safety latch assembly has closed completely.

   Never use the load chain as a sling and never apply the load to the tip of the hook.
6. Never lift more than the rated load.
7. Never operate the hoist unless the load is centered underneath it.
8. Slack must be taken up carefully. After the load has been lifted a few centimeter, confirm that the load is well balanced. When lifting, prevent the load from swinging.
9. Never allow your attention to be diverted when operating the hoist and never leave a suspended load unattended.
10. Inspect the hoist regularly.

    Never use a hoist when malfunction, unusual performance, damage or extensive wear are found.
11. Never adjust or repair a hoist unless your are qualified to perform hoist maintenance.
12. Never modify the hoist. Our approval is required for all nonstandard applications of the hoist.
13. Use only genuine parts for repairs.
14. Never remove or obscure the warnings on the hoist.

PREFACE

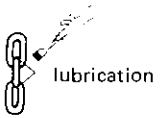
Our Electric Chain Hoists and ancillary products are made of the best selected materials, manufactured and processed through up-to-date streamlined production facilities by skilled our engineers under severe quality control. Our materials handling equipment is tested for absolute safety, dependable and satisfactory performance with a rigid final inspection before leaving our plants.

CONTENTS

1 – 1 INSTALLATION

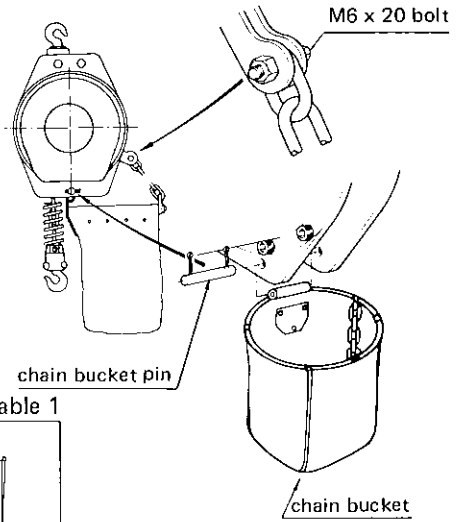
a) Before installation, lubricate the load chains along their whole length with machine oil.

Fig. 1



b) Attach the chain bucket, supplied with the hoist, as illustrated in Fig. 2. When setting the load chains into the chain bucket, place the load chains from the end as if when hoisted through the hoist.

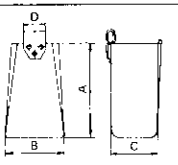
Fig. 2



Chain buckets dimensions (mm)

Table 1

No.	A	B	C	D
1	260	170	150	65
2	365	200		
3	350	240	185	85
4	420	260		
5				65



Applications of chain collecting buckets

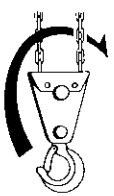
Table 2

Capacity (ton)	Load chain diameter x nos. of fall		Lift (m) 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25
0.5 · 1	H7 x 1	MH-5 · MHC-5	1 · 2 · 5 · S1
		MHT5	2 · 5 · S1 · — · —
2 · 3	H11 x 1	MH-5	3 · 4 · S1 · S2 · S3
5	H11 x 2	MHT-5	4 · S1 · S2 · S3 · S4 · S5 · S6
10	H11 x 4	MH-5	4 · S1 · S2 · S3 · S4 · S5 · S6

N. B. The S-Series chain buckets are made of steel. Please apply for a list of dimensions.

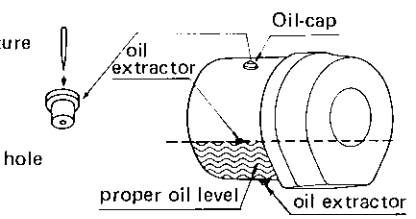
c) Examine the load chains to ensure that there are no twists. When the hoist lifts on two and more falls of load chains, twists can arise from the bottom hook block being accidentally turned over.

Fig. 3



d) The Gear box of the new hoist contains the proper quantity of lubricating oil – additional lubrication is not necessary. Make a hole in the oil-cap as illustrated in Fig. 4

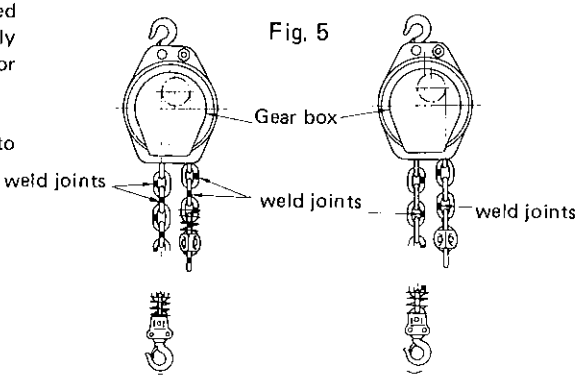
Fig. 4



e) Confirm that the load chain is threaded through the hoist properly. Check especially when your hoist is ordered for extra lift or when the load chain is replaced.

f) For connecting methods to trolleys, refer to Section 3 – 1.

Fig. 5



OK!
weld joints outside

No!
weld joints inside

1 – 2 ELECTRICAL WIRING

a) Electrical wiring should be done by professional electricians.

b) Proper capacity power source switch and fuse must be used for safe and dependable operation. The hoist's power source switch and fuse should not be used along with other machinery. In the Table 3 is given information on the proper capacities power source switches and fuses for different models and load capacities.

c) Refer to Table 4 for the proper power source cables to be used with different models and load capacities.

Power source switches & fuses:

Table 3

Model	Capacity (ton)	Hoist Motor (kw) 50Hz/60Hz	Travelling Motor (kw)	Power source Switch (amp)	Fuse (amp)
MH-5	0.5	0.83/1.0	–	15	5
	1	1.17/1.4	–		
	2 ~ 5	2.5/3.0	–		10
	10	2.5/3.0 x 2	–	30	20
EMT-MH-5	0.5	0.83/1.0	0.2	15	5
	1	1.17/1.4			10
	2 ~ 3	2.5/3.0	0.4		
	5				15
	10	2.5/3.0 x 2	0.75	30	20
MHT-5	0.5 · 1	0.21/0.83/0.25/1.0	–	15	5
	2 ~ 5	0.46/1.83/0.55/2.2	–		10
EMT-MHT-5	0.5 · 1	0.21/0.83/0.25/1.0	0.2		5
	2 ~ 2.5	0.46/1.83/0.55/2.2	0.4		10
	5	0.46/1.83/0.55/2.2			10
MHC-5	0.5 · 1	0.62	–	20	20

Table 4

Model	Capacity (ton)	Hoist Motor (kw) 50Hz/60Hz	Travelling Motor (kw)	Power Source Cable Size (mm^2) Cable Length (m—max.) 10 15 20 25 30 35 40 45
MH-5	0.5	0.83/1.0	—	1.25
	1.0	1.17/1.4	—	
	2～5	2.5/3.0	—	2.0 / 3.5
	10	2.5/3.0 x 2	—	
EMT-MH-5	0.5	0.83/1.0	0.2	1.25
	1	1.17/1.4		
	2・3	2.5/3.0	0.4	2.0
	5	2.5/3.0		
	10	2.5/3.0 x 2	0.75	3.5
MHT-5	0.5・1.0	0.21/0.83/0.25/1.0	—	1.25
	2～5	0.46/1.83/0.55/2.2	—	2.0
EMT-MHT-5	0.5・1.0	0.21/0.83/0.25/1.0	0.2	1.25
	2～2.5	0.46/1.83/0.55/2.2	0.4	2.0
	5	0.46/1.83/0.55/2.2		
MHC-5	0.5・1.0	0.62	—	2 / 3.5 / 5.5 / 8.0

N.B. The above values for three-phase are for voltages around 380-volt and the values for single-phase are for voltages around 100-volt.

d) Four-core coloured cords are used for the power source cable consisting of yellow/green or green, black, white and red, of which the yellow/green or green is for earth cord. Connect the cords marked R.S.T. with the power source. Refer to Fig. 6.

e) The hoist is equipped with an antiphase protection relay (warning relay for negative phase.) When the hoist does not function when the pendant push-buttons are pressed, the antiphase protection relay is functioning. If this happens, interchange the position of two cords of the power source cable (black, white and/or red) as illustrated in Fig. 7.

f) For power source feeding methods of hoist connected with trolleys, refer to Section 3 – 3.

g) For circuit diagram of this hoist
Please refer to the hoist circuit diagram that is located inside P/No. C12 Switch cover.

Fig. 6

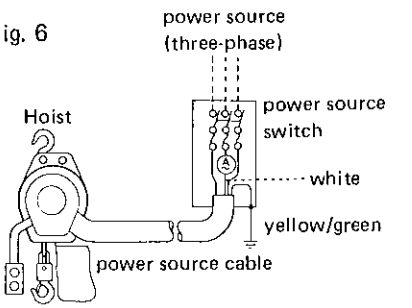
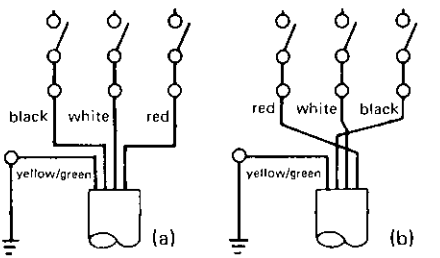


Fig. 7



1 – 3 INSTALLATION AND ELECTRIC WIRING CHECK POINTS

Check carefully the following points before turning on the power source.

a) Is your hoist (and Trolley) installed properly? Refer to the Sections 1 – 1 & 3 – 1.

b) Are all bolts, nuts and cotter pins, etc. in position and secured?

c) Are the wirings correct and have proper power source switch, fuse, and cable been used? Are the terminal screws tightened?

d) Is the hoist grounded properly?

e) Is the load chain lubricated and not twisted?

f) Is the top of the oil-cap made a hole?

g) Is the chain bucket connected properly?

h) Is the voltage of the power source correct?

1 – 4 TEST RUNNING

a) Press the pendant push-buttons to see if the hoist operates properly, without load.

When the hoist does not respond, the antiphase protection relay is functioning. When this happens, refer to the e) in the Section 1 – 2.

b) Check the limit switch by lowering and hoisting the bottom hook, without load, where the hoist will stop automatically.

c) Check the hoisting and lowering with a load within the rated capacity. Trolleys should also be tested in the same way first without a load, then with a load within the rated capacity.

2 – 1 CARE IN USE

a) Never lift load in excess of the rated capacity.

b) The hoist is designed for hoisting loads vertically and should not be used for hoisting at an angle.

c) Lifting a load with two hoists is not recommended. If such operation is unavoidable, the load should be hoisted with utmost care keeping proper balance, angle and hoisting speed, etc.

d) When the hoist has two bodies, deviation of the load chain toward one side may arise. Adjusting methods are illustrated in Fig. 10.

Fig. 8

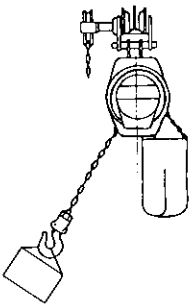


Fig. 9

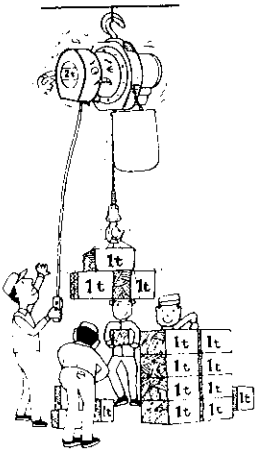
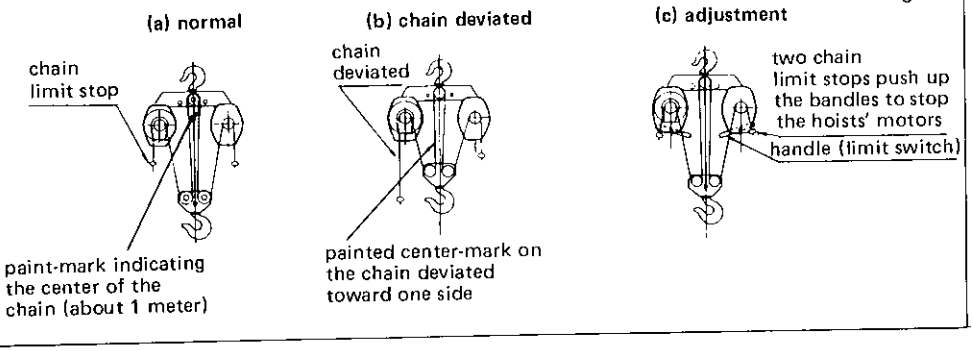


Fig. 10



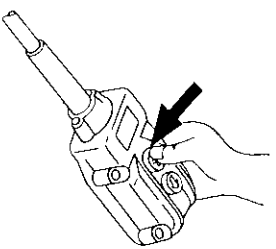
e) The load chain must always be free from twists. Internal parts of the hoist may be damaged when load chain is hoisted through with twists.

f) When the hoist is used with Trolley, do not shift the load by pulling on the pendant control cable.

g) Do not abuse the limit switch mechanism by frequent overhoisting and overlowering.

h) Press the pendant push-buttons all the way down for positive contacts.

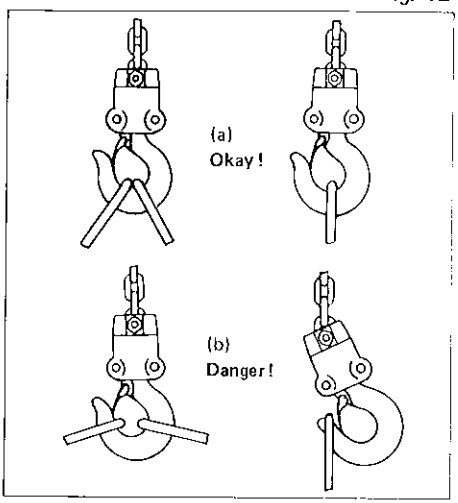
Fig. 11



i) Hoisting operations should never be done with the bottom hook caught with any stationary object.

j) Never lift with the point of the bottom hook. Never use the load chain as a sling, i.e. by back hooking. Always use proper slings and attachments in correct methods.

Fig. 12



k) No dynamic swings or abrupt shocks should be imposed on the load during hoisting or lowering operation. Dynamic swings or abrupt shocks may give the hoist excessive burden twice or more the load being lifted or lowered.

l) The toughness of the chains may be reduced considerably when operating the hoist in fiercely cold weather or areas. Loads should be hoisted or lowered very slowly and carefully.

m) Never walk along or work under a load which is being hoisted.

n) Never lift a load so it comes into contact with the chain bucket, because the chain bucket may be damaged or the flow of the load chain be interrupted so to cause damage to the hoist.

o) Avoid frequent inching and abrupt changes of directions – make full stop before changing directions.

With Two-Speed hoists, run on the lower speed before stopping and never stop directly from the higher speed.

p) With hoists connected with trolleys, never let the trolley come into strong contact with the stoppers. Strong contact may cause damage to the hoist besides the trolley.

q) When the motor hums, smokes, or stops, stop the operation immediately and inspect the following points: Overloading, Out of lifting or lowering range, Fuse blown out, Voltage drop, Faulty connection in circuit, for example; contact failure, disconnections, etc.) Refer to the Section 4 – 1.

2 – 2 CARE AFTER USE

a) Turn the power off after use.

b) When not in use, do not leave a load hanging on the hoist.

c) Make it a habit to hang the pendant push button switch in a high place to protect it from damage. When laid on the floor or other objects, the buttons may be depressed accidentally.

d) Store the hoist correctly against rain and damp. When installed outdoors, exceptional care should be taken.

2 – 3 INSPECTION AND MAINTENANCE

To ensure safe, economical and long life of your hoist, daily, monthly and annual inspections must be made. The inspections and any repairs must be carried out only by competent responsible people authorized by the person in charge.

a) Turn off the power source switch before inspection, and hang out a distinct sign indicating the hoist is under inspection. Inspections should be made without a load.

b) For repairs or parts replacements, contact authorized DEALERS where the hoist was purchased.

c) **USE ONLY GENUINE PARTS!**

d) Keep records of the inspections, adjustments, parts replacements, etc. of the hoist for future reference.

DAILY INSPECTION POINTS

The hoist must be inspected thoroughly before each use, including the following points.

a) The whole length of the load chain, especially the contact points between the links must be well lubricated.

b) The load chain must not have any twists.

Fig. 13

(proper chain)

(twisted chain)

c) The chain bucket must be secured properly.

d) The hooks and safety latches must not be deformed.

e) The bottom hook must rotate smoothly.

f) There must not be any obstacles in the area that will interfere with hoisting or lowering.

g) The pendant push-button switch must respond smoothly.

h) The power source must be the correct voltage.

i) The limit switch and brake must respond properly.

j) When the hoist is connected with a trolley, the rail must be free of obstacles and must not be damaged from the last use. The power source cable must move smoothly and must not show signs of wear.

CHECK POINTS AT PERIODIC INSPECTIONS

In the Table 5 is given some useful information on the check points at the periodic inspections.

MODELS MH/MHT/MHC – INSPECTION POINTS

Table 5

Section	Check points	Proper condition
Body	External view	No crack or deformation.
	Abnormal sound	Motor and other parts sound normal.
	Side-plates	No wearing and deformation.
	Gears	No wearing and cracks.
	Load sheave	No wearing and cracks.
Hooks	Opening	Refer to the Table 8.
	Holders	No crack and deformation.
	Bottom swivel hook	Rotates smoothly on a thrust ball bearing.
	Pins for the holders	No wearing and bending.
Load chain	Dimensions	Refer to section 2 – 4
	Rust and crack	No excessive rust and no crack.
Lubricant	Gear box	Should contain proper quantity.
	Load chain	Well lubricated with machine oil along the whole length, particularly at the contact points.
Limit switch	Limit mechanism	Proper function of the limit switch guide.
	Chain limit stop	Bolt and nut are held securely. No crack.
Brakes	Motor & mechanical brakes	No slip exceeding 5 cm on pressing push-buttons several times during hoisting and lowering the hoist with its rated load.
Electrical components	Power source cable and pendant control cable	No breakage and damage of the rubber-covered cables. No disconnection.
	Push-button switch	Effective contact of the contact points and proper functioning.
	Switch box	Proper function of the limit switch, and complete absorbing performance of the magnetic switch.
	Motor	No humming and overheating.
	Leak	Insulation resistance exceeds 2MΩ by DC 500 V Megger.
Others	Bearings	Properly and smoothly engaging with shafts.
	Chain bucket	Inside free of rust, dirt, grease and other foreign objects.
	Bolts, nuts, etc.	All are in proper condition and position.
	Name-plate (mark-plate)	Clearly observable.

TROLLEYS (PLAIN/GEARED/ELECTRIC) – INSPECTION POINTS

Table 6

Section	Check points	Proper condition
All Trolleys	Side-plates	No bending, crack and other deformations.
	Bolts, nuts, cotter-pins and snap-rings, etc.	No looseness, breakage and missing.
	Trolley wheels	No excessive wear in the wheel tread and toothed wheels, and rotate smoothly. Well lubricated gears.
	Bearings	Proper engagement with shafts and rotate smoothly.
	Capacity mark	Distinctly observable.
Geared Trolleys	Handwheels	No excessive wear in the ratcheted section and pocket sections to engage with hand chain.
	Shaft area of handwheels	Well lubricated for smooth rotation.
	Hand chain	No excessive elongation and deformation that cause smooth engagement with the handwheel pockets.
Electric trolleys	Reduction gear section	No flaw, crack and excessive wear. Well lubricated. No back-lash in the gears and bearings.
	Brake mechanism	Stops smoothly without coasting too long.
	Control and power source cables	No breakage and damaged of the rubber-covered cables and no disconnection.
	Motor	No humming and overheating.
	Leak	Insulation resistance exceeds 2MΩ by DC 500-volt Megger.

TEST RUNNING AFTER PERIODIC INSPECTION

Table 7

Check points	Testing methods
Test running without a load	Operate the pendant push-buttons to see that the hoist works properly.
Limit switch function	Test without and with a load within the rated capacity.
Test running with a load within the rated capacity	Check for noises and vibrations when hoisting and lowering. No brake slip exceeding 5 cm.
Over-loading test	Test with a test load.

2 – 4 CHAIN & HOOK INSPECTIONS

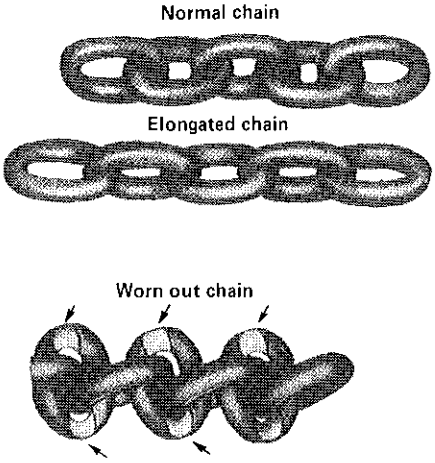
The load chains and hooks should be thoroughly inspected before and after daily use and at periodic intervals, because they are important vital components of your hoist.

The load chains and hooks are made of special alloy steel and are heat treated for extra strength and long wearing. But, wear, elongation and corrosion are unavoidable in a long or short period depending on operating condition. **Worn out, elongated or deformed load chains and hooks must be replaced immediately.**

No dynamic swing or abrupt shock should be imposed on the load chains and hooks, and keep them away from heat and corrosive chemicals, etc. These factors considerably reduce the strength of the load chains and hooks.

N.B. **Replace the whole load chain even if only one link of the load chain is extensively worn, elogated or damaged.**

Fig. 14

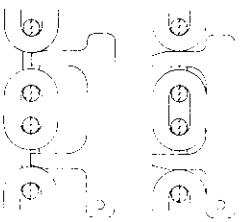


N.B. **The load chains and hooks are precisely heat treated. Never weld or heat treat them again!**

HOW TO USE THE CHAIN GAUGE

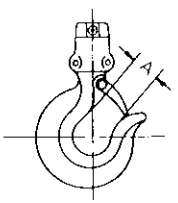
A chain limit gauge is supplied with each hoist. The pitch must be checked periodically along the whole length of the load chain with the chain limit gauge as shown in Figure 15. If it is possible to insert the chain limit gauge into any one section of the load chain, the whole load chain must be replaced immediately.

Fig. 15



HOOKS INSPECTION POINTS

Table 8



Capacity (ton)	Standard dimension – A mm, approx.	Permissible limit – A mm, approx.
0.5 (top)	28	33.5 max.
0.5 (bottom)	23	27.5
1 (top)	32	38.0
1 (bottom)	28	33.5
2	33	39.5
3	41	49.2
5	48	57.5
10	75	90.0

2 – 5 LUBRICATION

a) The load chain should be thoroughly cleaned and lubricated along the whole length as often as possible for long wearing, especially at the contact points between the links – use machine oil.

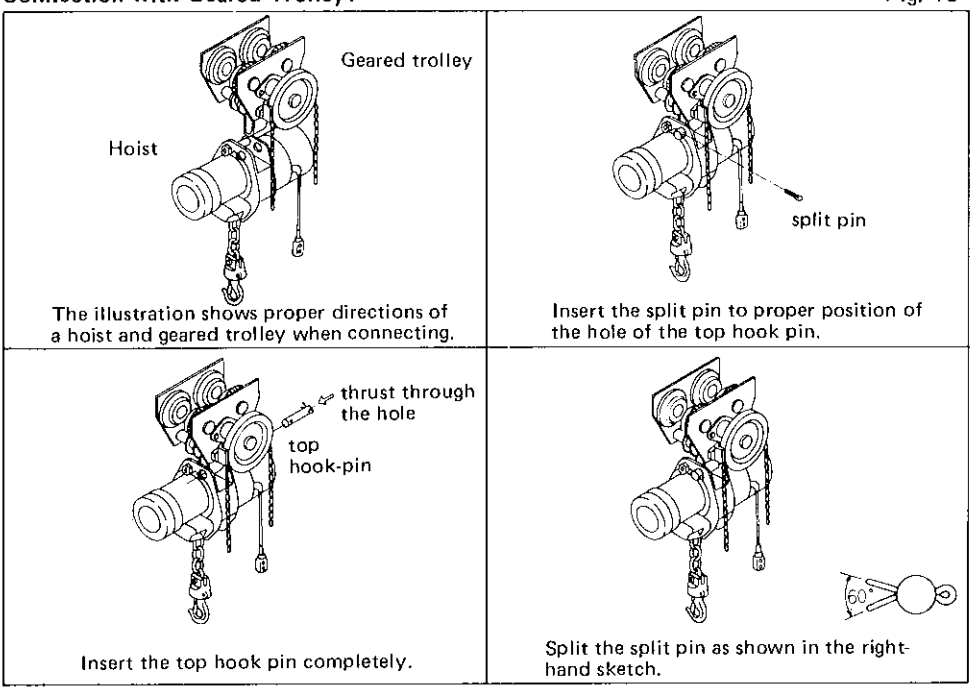
b) The lubricating oil in the gear box must be changed or added at pertinent intervals. The hoist will generate abnormal sounds and the mechanical brake may not function properly when there is a deficiency of lubricating oil.

Use lube oils for general diesel engines (API Service Classification CC) or recommend premiumquality industrial oils of low viscosity.

3 – 1 CONNECTING METHODS WITH TROLLEYS

The hoist can be connected with great ease to different types of Trolleys, just insert a connecting pin and fasten it with two split pins to the direct-coupling plate. (The direct-coupling plate differs with the capacities.)
There are different ways of setting a trolley connected to hoist on to a runway rail, I-type beam or H-type beam. When setting the trolley on to the runway rail, be sure that the trolley and the hoist are both facing the proper direction.

Connection with Geared Trolley: Fig. 16



The illustration shows proper directions of a hoist and geared trolley when connecting.

Insert the split pin to proper position of the hole of the top hook pin.

Insert the top hook pin completely.

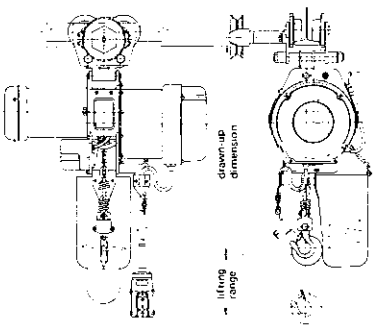
Split the split pin as shown in the right-hand sketch.

Proper Directions of the Trolleys and Hoists:

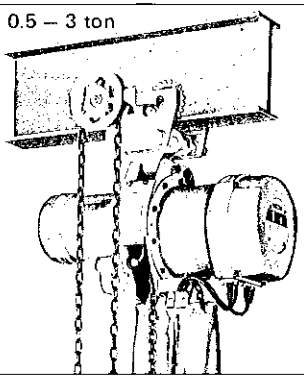
The Figure 17 illustrates the standard connecting method and proper directions in which the trolley and hoist should face. The directions and connecting methods will differ under certain conditions. Please contact you dealers for drawings, when the standard methods do not apply for your operating condition.

Fig. 17

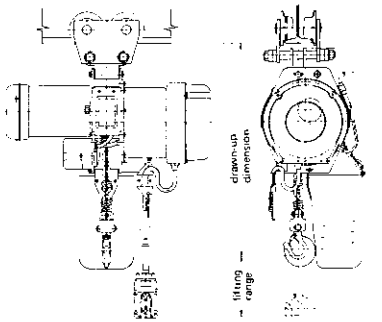
MHG-5 0.5 – 3 ton



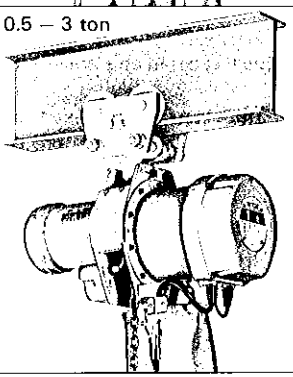
MHG-5 0.5 – 3 ton



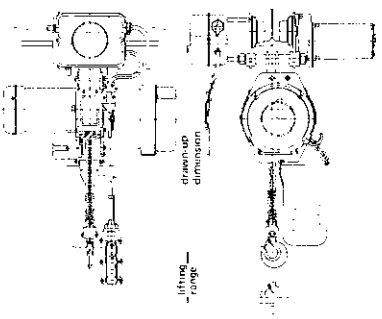
MHP-5 0.5 – 3 ton



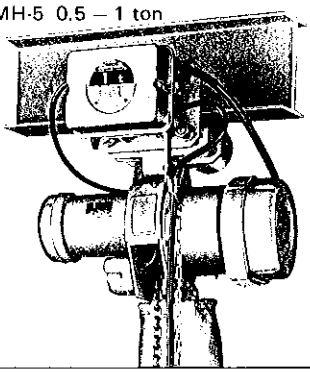
MHP-5 0.5 – 3 ton



EMT-MH-5 0.5 – 1 ton



EMT-MH-5 0.5 – 1 ton



3 – 2 METHODS OF MOUNTING TROLLEYS ON RUNWAY BEAMS

The following procedures are recommended when mounting a trolley (connected with a hoist) on an I-type or H-type beam.

a) Adjust the trolley to suit the beam breadth (width) between the wheels by shifting the adjusting collars on the stay bolts to the outside or inside of the side-plates. See the Fig. 18a and 18b.

Fig. 18a

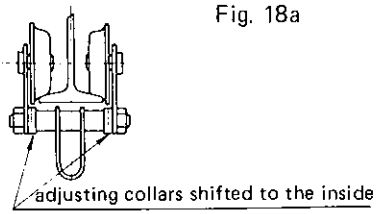
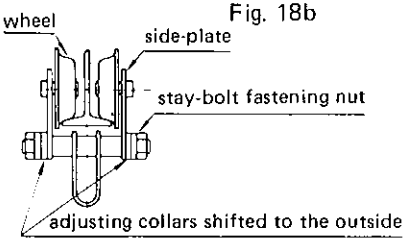


Table 9

nos. of collars / Capacity (ton)	Range of applicable beam breadth (mm)		
	0	2	4
0.5 · 1	75	100	125
2	100	125	150
3	100	125	150
5	125	150	175

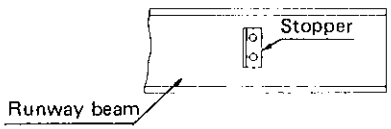
N.B. The Table 9 is based on standard trolleys.

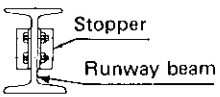
Fig. 18b



b) Protective stoppers must be fixed on both ends of the runway beam to prevent the trolley from falling. Refer to the Fig. 19.

Fig. 19





c) When mounting a geared trolley onto a curved runway beam, be sure to insert the trolley with the geared wheels facing outside of the curved beam.

3 – 3 FEEDING METHODS FOR HOISTS CONNECTED WITH TROLLEYS

Cable Method:

A popular wiring arrangement applying a messenger wire with cable carriers at about 1.5 meter intervals to guide the flexible rubber-covered power source cable.

a) A cable carrier is needed for each 1.5 lineal meter.

b) A single length flexible rubber-covered power source cable must be used without intermediate connection, and it must be connected properly to the power source or terminal box.

c) Refer to the Fig. 21 for recommended position of the messenger wire. This method is not recommended for a runway beam exceeding 10 meter long.

d) There are also other power feeding methods besides the Cable Method. Contact your dealers for further information.

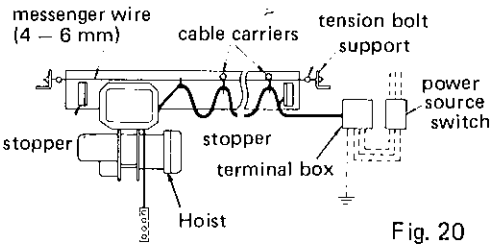


Fig. 20

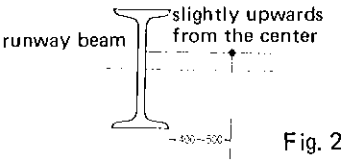


Fig. 21

4 – 1 HOIST TROUBLE-SHOOTING

Table 10

Condition	Troubles		Trouble-shooting methods
Doesn't start	Electric power is properly supplied	Doesn't start when pressing hoisting and lowering push-buttons.	Press the buttons hard. Polish or clean the contact points. Repair the control cable that may be disconnected or faulty contacts of the terminals.
		Reverse performance of hoisting & lowering push-buttons.	The contact of the limit switch is disconnected, place the limit handle to the normal position.
		The motor hums or gets overheated.	Repair disconnection of the power source cable or bring the cords connections to perfection.
Poor starting and drop of power	Single-phase operation	The motor hums or temperature rises.	Use the correct voltage. Replace faulty power source switch, cable or fuse.
Motor stops occasionally in operation	Limit switch turns off	Twist of the load chains or their tangle causes the limit handle to push up unintentionally, when pulling a load excessively at angle.	Position the load chains properly. Lift the load vertically. Replace the limit handle to proper position.
	Faulty contact	Intermittent or irregular operation due to ineffective contact at power source cable, terminal or switches.	Have the faulty contactor replaced by a person qualified to perform hoist maintenance.
	Overloading	The motor hums and over-current arises.	Lift loads within the rated capacity.
Ineffective braking	Poor braking	Due to wear of the brake lining on the brake wheel	Have the brake adjusted by a person qualified to perform hoist maintenance.
	Slipping slowly all the way down	Mechanical brake	
Electrical accidents	Leak	The hoist generates electric shock when touching metal components.	The hoist should be earthed effectively. Examine insulation resistance. Inspect switches to ensure that they are not moistened – keep them dry.