OPERATION MANUAL

This operation manual is intended as an instruction manual for trained personnel responsible for installation, maintenance, repair etc.

Before equipment use, please read this operation manual carefully.

Serial Number: _____

Date Purchased: _____

Table of Content

1.0 WARRANTY

Every product is thoroughly inspected and tested before it is shipped from the factory. If any problem develops within one year, return the product prepaid to the factory. If an inspection reveals that the problem is caused by defective workmanship or material, repairs will be made without charge and the product will be returned with the shipping prepaid.

Excluded Items

This warranty does not cover:

- Deterioration caused by normal wear, abuse, chemical or abrasive actions, improper maintenance or excessive heat.
- Problems resulting from repairs, modifications, or alterations made by people other than factory or ACI representatives.
- If the product has been abused or damaged due to an accident.
- If repair parts or accessories other than ACI equipment are used on the product; they are warranted only to the extent that they are warranted by the manufacturer of said parts or accessories.

Remarks

EXCEPT AS STATED HERE, ACI MAKES NO OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING WARRANTIES FOR A PARTICULAR PURPOSE.

2.0 SAFETY PRECAUTIONS

2.1 Terms & Summary

This manual provides important information for personnel involved with the installation, operation, and maintenance of the HOIST. Although you may be familiar with the hoist or similar equipment, it is strongly recommended that you read this manual before installing, operating or maintaining the product.

Each ACI Hand Hoist and Low Headroom Trolley Hoist is built in accordance with the specifications contained herein and at the time of manufacture complies with our interpretation of applicable sections of the American Society of Mechanical Engineers Code B30.16 "Overhead Hoist" and the Occupational Safety and Health Act.

2.1.1 Danger, Warning, Caution & Notice

Throughout this manual there are steps and procedures that can present hazardous situations. The following signals are used to identify the degree or level of hazard seriousness.

DANGER, WARNING AND CAUTION NOTICE

Symbol	Description
⚠ DANGER	**Danger** Indicates an imminently hazardous situation which, if not avoided, **will result in death or serious injury** and property damage.
⚠ WARNING	**Warning** Indicates an imminently hazardous situation which, if not avoided, **could result in death or serious injury** and property damage.
⚠ CAUTION	**Caution** Indicates a potentially hazardous situation which, if not avoided, **may result in minor or moderate injury** or property damage.
NOTICE	**Notice** Notifies people of installation, operation or maintenance information which is important but not directly hazard related.

2.2 Safety Rules

Inspect the hoist for loose, broken or malfunctioning parts. Any hoist should be tagged “out of order” and taken out of service until the problem is corrected.

Improper operation of a hoist can create a potentially hazardous situation which, if not avoided, could result in death or serious injury.

2.2.1 DOs & DON’Ts

These recommendations apply to all hand chain manually operated chain hoists for vertical lifting service involving material handling of freely suspended unguided loads.

- **DO** read ANSI B30.16 Safety Standard for Overhead Hoists and Hoist and Manufacturer’s Operating, Maintenance and Instructions.
- **DO** familiarize yourself with the operating control and procedures for the hoist.
- **DO** make sure the suspension hook for the hoist is securely attached to an appropriate support.
- **DO** establish firm footing or be otherwise secured when opening the hoist.
- **DO** make sure that load slings or other approved attachments are sized properly and seated correctly in the hook saddle.
- **DO** make sure the hook latch is closed and not supporting any part of the load.
- **DO** make sure that load is free to move and will clear all obstacles.
- **DO** make sure all persons stay clear of the suspended load.
- **DO** avoid swinging of the load or load hook.
- **DO** protect load chain from weld spatter or other damaging contaminants.
- **DO** promptly report any malfunction, unusual performance, or damage of the hoist.
- **DO** inspect hoist regularly, replace damaged or worn parts, and keep appropriate records of maintenance.
- **DO** use the hoist manufacturer’s recommended parts when repairing a hoist.

- **DO** use the hook latches wherever possible.
- **DO** apply lubricant to load chain as recommended.
- **DO NOT** lift more than rated load.
- **DO NOT** use damaged hoist or hoist that is not working correctly.
- **DO NOT** use hoist with twisted, kinked, damaged or worn chain.
- **DO NOT** Lift a load unless chain is properly seated in chain wheel(s) or sprockets(s).
- **DO NOT** use load chain as a sling or wrap load chain around the load.
- **DO NOT** lift a load if any binding prevents equal loading on all supporting chains.
- **DO NOT** apply the load to the tip of the hook.
- **DO NOT** operate unless load is centered under hoist.
- **DO NOT** operate hoist with other than manual power.
- **DO NOT** permit more than one operator to pull a single hand chain at one time.
- **DO NOT** allow your attention to be diverted from operating the hoist.
- **DO NOT** operate hoist beyond limits of load chain travel.
- **DO NOT** use hoist to lift, support, or transport people.
- **DO NOT** lift loads over people.
- **DO NOT** leave a suspended load unattended unless specific precautions have been taken.
- **DO NOT** allow sharp contact between two hoists or between hoist and obstructions.
- **DO NOT** allow the chain or hook to be used as a ground for welding.
- **DO NOT** allow the chain or hook to be touched by a live welding electrode.
- **DO NOT** remove or obscure the warnings on the hoist.

- **DO NOT** adjust or repair a hoist unless qualified to perform hoist maintenance.
- **DO NOT** attempt to lengthen the load chain or repair damaged load chain.
- **DO NOT** overload the hoist.
- **DO NOT** exert more than the hand chain pull to lift rated load by one operator. The hoist is designed to lift its rated capacity when a reasonable force is exerted. If effort appears to be excessive, recheck the load and use a larger capacity hoist if necessary.
- **DO NOT** side load the hoist. Make sure to pull in the straight line between hooks. Side loading the hoist over a sharp corner may fracture the hoist housing, load block or hook.
- Be sure there are NO twists in the chain. Make sure that the load chain is free to move and clear of all obstructions. With multiple chained hoists the load hook can be turned one or more times causing the chain to twist.
- **DO NOT** use the hoist from an unbalanced/unstable position. Operators should have firm footing or be secured before operating the hoist.
- Before raising and/or pulling a load always make sure that the slings and other rigging have sufficient capacity to support the load and are in good condition.
- **DO NOT** stand beneath a load! DO NOT operate a load in a way that will endanger personnel.
- **DO NOT** leave the hoist with a suspended load.
- **DO NOT** wrap the load chain around the load. Use a sling!
- **DO NOT** tip-load the hook as this will exert undue strain, resulting in hook failure.
- **DO NOT** use the hoist to lift, support, or otherwise transport people.
- The hand chain has a safety latch. When the safety latch opens or deforms, stop immediately to find out the cause.
- Use only parts and chains supplied by the authorized distributor.

3.0 GENERAL INFORMATION

This document provides information and maintenance of ACI Army Type Trolley Hand Chain Hoist. People who are operating or maintaining the hoist should be familiar with this manual. Following the precautions, procedures and maintenance practices in this manual should ensure long and reliable operation.

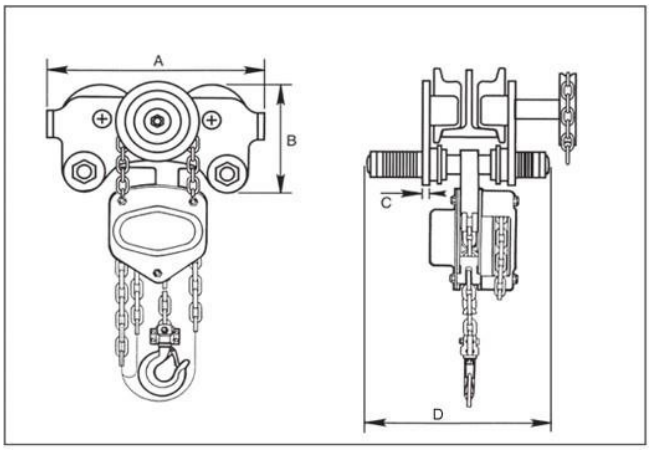
People responsible for the installation, operation, and/or maintenance of the equipment should be familiar with the American National Standard ANSI B30.16 for guidelines on the safe operation of hoists. That document contains rules on inspection requirements and records that may be required by some regulatory agencies.

3.1 Hoist Construction

The ACI Army Type Trolley Hand Chain Hoist is a low headroom hoist that has been expanded to include trolley suspended units. The Army Type Trolley Hoist consists of the lightweight, durable Hand Chain Hoist rigidly suspended from a four-wheel trolley. To suspend the hoist from the trolley, the upper hook is replaced by a pair of load bars.

This compact trolley hoist features reduced headroom, side clearances and end approach which make it ideal for operation in tight spaces. Integral trolley has hardened universal tread flanged trackwheels which minimize rolling friction. Capacities range from 1/2 thru 5 ton - plain or geared trolley. Adapts to a wide range of beam adjustments.

3.1.1 Specifications



ARMY TYPE TROLLEY HAND CHAIN HOIST

Capacity (Ton)	Model Number	Test Load** (125%) Lbf	Min. Radius (ft)	Pilling Force to lift full load (***Lbf)	Standard Lift (ft)	Dimensions (in)				Beam Width (in)	Min. Headroom (in)
						A	B	C	D		
1/2	HCHLH*-010-10	1,250	3.3	9	10	10.9	6.7	0.4	11.1	3.0-7.0	14.8
1	HCHLH*-020-10	2,500	3.3	9	10	10.9	6.7	0.4	11.1	3.0-7.0	14.8
2	HCHLH*--040-10	5,000	3.9	16	10	11.9	7.6	0.5	11.6	3.0-7.0	17.2
3	HCHLH*-060-10	3,750	4.6	15	10	14.3	9.1	0.6	12.0	3.0-7.0	23.3
5	HCHLH*-100-10	12,500	5.2	22	10	17.2	10.2	0.7	13.0	4.0-7.0	29.2

* Add G=Geared, P=Pushed
**Lbf pound force
***Load Test at 125%

Capacity (Ton)	Model Number	Standard Lift (ft)	Hand Chain Drop (ft)	Min. Radius of Curve (ft)	No. Of Chain Falls	Weight per Unit (lbs)
1/2	HCHLH*-010-10	10	8	3.3	1	53
1	HCHLH*-020-10				1	53
2	HCHLH*--040-10				1	86
3	HCHLH*-060-10				2	123
5	HCHLH*-100-10				2	191

* Add G=Geared, P=Pushed

4.0 INSTALLATION

Installation MUST be performed by a qualified person in accordance with ACI Hoist & Crane. Severe injury, death and/or property damage can result if the end trucks are not correctly installed. For service in this area, please contact:

ACI Hoist & Crane
2721 NE 4th Ave
Pompano Beach, FL 33064
Fax: (954)272-0334
Toll Free: 1-866-4-A-HOIST

4.1 Mounting Trolley

Prior to mounting the trolley (and hoist) ensure that the trolley beam and its supporting structure are adequate to support the trolley, hoist, and its loads. If necessary consult a professional that is qualified to evaluate the adequacy of the suspension location and its supporting structure.

The rail stops must be positioned so as to not exert impact force on the hoist portion of the unit or the trolley wheels. They must contact the ends of the trolley side frames. Due to the variations in beam flange widths, it is suggested that the beam flange width be measured to determine the exact distribution of spacer washers.

To install the trolley, measure the actual width of the beam. Assemble the required number of spacer washers equally to the inside of the trolley side plates so the dimension of the trolley wheel flanges is about 1/8 to 1/4 of inch greater than the width of the beam.

Loosely assemble the gear case, equalizer pin, lifting ring, spacer washers and hex nuts. Slacken off the hanger pin nuts and spread the side plates so the wheels can be slip peed up over the runaway beam. Screw the nuts firmly against the all four washers. Apply a light load to the suspension plate to ensure that all four wheels contact the beam flange. Then tighten the inside nuts firmly and secure them by firmly tightening the outside nuts to lock the nuts in positions.

⚠WARNING

Operating the trolley hoist on a beam that has no rail stops may allow the trolley hoist to fall off the end of the beam.
To Avoid Injury: Install rail stops at each end of the beam on which the trolley hoist is to operate.

⚠WARNING

If washer spacing recommendations are not followed, trolley hoist may fall from beam.

To Avoid Injury:

To determine the arrangement of the spacer washers, measure the actual beam flange on which the trolley hoist is to operate. Dimension of the trolley wheel flanges is about 1/8 to 1/4 of inch greater than the width of the beam.

4.2 Testing

Immediately after installation, operate trolley with a capacity load over the entire length of runway or monorail system to be sure that all adjustments and operations are satisfactory.

When applying a load, it should be directly under the trolley. Avoid off center loading of any kind. Side loading may spread trolley side frames.

On systems with curves, the edges of the rail at the curved sections should be lightly lubricated with grease.

⚠WARNING

An excessively worn beam flange may fail and allow the trolley hoist to fall from the beam.

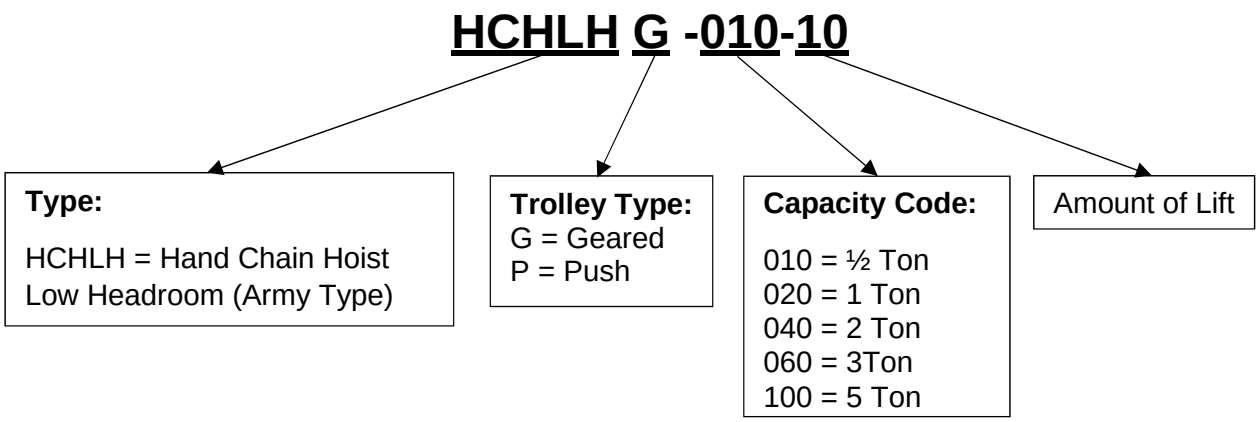
To Avoid Injury:

Periodically inspect the beam flange for wear. Replace beam if flange is worn.

Lift a light load with the hoist to check for a smooth operation and proper braking. If the hoist works properly with the light load, connect the rated load to the hoist and lift the load just clear of the floor. Check that the brake is holding the load before lifting it any higher. The hook shouldn't drift under any size loads that are within the hoist's load rating.

5.0 TECHNICAL INFORMATION

5.1 Model Numbering



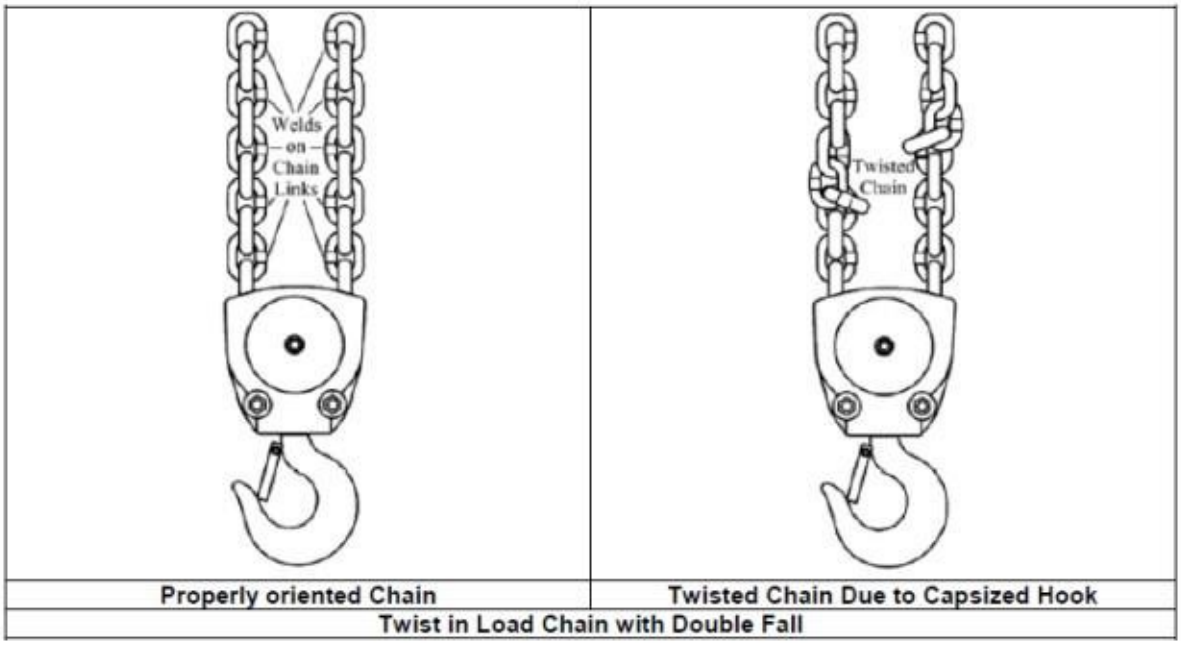
5.2 Features

Features	Description
Low Headroom	Hoist and trolley integrated offers minimum headroom
Load Chain	Super Strength alloy steel chain. Optional: Stainless steel chain
Hook	Hook with cast steel safety latches.
Durability	Robust all steel construction
Name Plate	Stainless steel name plate
Paint	Durable baked enamel paint
Brake	Water protected Weston brake
Special Options:	Chain Container
	Stainless Steel Chain
	Trolley Guards
	Stainless Steel Wheels
	Stainless Steel Hooks
	Nickel Plated Chain
	Overload Protection

6.0 PRE-OPERATIONAL PROCEDURES

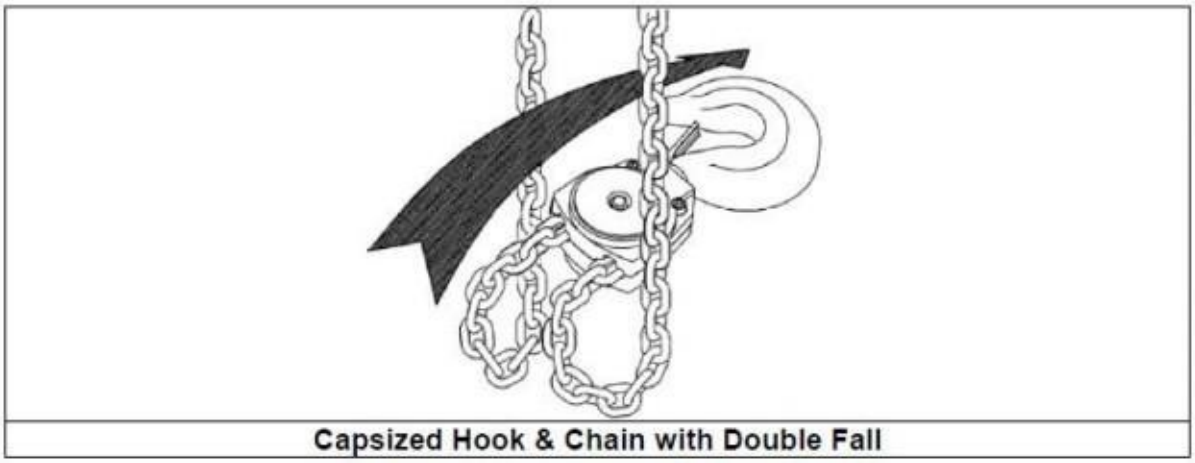
6.1 Chain

WARNING: Verify that the load chain is not twisted or tangled prior to operating the hoist. Make sure the bottom hook of the multiple fall hoists is not capsized. Correct all chain irregularities before conducting the first hoist operation.



Properly oriented Chain	Twisted Chain Due to Capsized Hook

Twist in Load Chain with Double Fall



Capsized Hook & Chain with Double Fall

6.2 Pre-Operational Checks

- Record Model, Serial Number, & Purchase Date in the space provided in this manual.
- **WARNING:** Confirm the adequacy of the rated capacity for all slings, chains, and all other lifting attachments before use. Inspect all load suspension members for damage prior to use and replace or repair all damage parts.
- **WARNING:** Verify and correct all chain irregularities prior to operating the hoist.
- Ensure that trolley is properly installed on the beam, and stops for the trolley are correctly positioned and securely installed on the beam.
- Ensure that all nuts, bolts, and split pins (cotter pins) are sufficiently fastened.
- Confirm proper operation:
    - Before operating, read and become familiar with the Operation section in this manual.
    - Before operating, ensure that the trolley meets the Inspection, testing and Maintenance requirements of ANSI/ASME B30.16.
    - Before operating, ensure that the hoist meets the Inspection, Testing, and Maintenance requirements ANSI/ASME B30.16.
    - Before operating, ensure nothing will interfere with the full range of the hoist's operation.
    - Before operating, ensure that nothing will interfere with the full range of the trolley's operation.
- Proceed with trial operation to confirm proper operation.
    - Operate the trolley through its full range of motion. Make sure the trolley runs smoothly and does not bind.

7.0 OPERATION

Per the ANSI/AME B30 standards, the use of a hoist is subject to certain hazards that cannot be mitigated by engineered features, but only by the exercise of intelligence, care, common sense, and experience in anticipating the effects and results of using the hoist. Use this guidance in combination with other warnings, cautions, and notices in this manual to administer the operation and use of your hoist.

7.1 Using the Hoist

Face the hand chain wheel side of the hoist.

- To raise the load, pull hand chain clockwise.
- To lower the load, pull hand chain counterclockwise.

Note: The clicking sound of the pawl when a load is being raised indicates normal operation.

7.2 Handling the Load

7.2.1 Attaching the Load

- The load should be attached to the hook with slings or other appropriate devices. Do not wrap the load chain around a load.
- Be sure the load is supported in the saddle of the hook and the latch is closed. Do not lift a load on the tip of the hook.

7.2.2 Lifting the Load

- Raise the load by pulling the right-side hand chain. Lift the load just clear of the floor. Check that the sling is securely in the hook and the load is well balanced, and hoist brake is holding the load. Lift the load to the desired height, standing clear of the load.
- Lower the load by pulling the left side hand chain. Pull smoothly and slowly. Do not “spin” the hand chain.
- Do not jam the hook block into the bottom of the hoist or run the hook down until the slack chain is pulled tight.

7.3 Trolley Controls

- **Push Trolley:** Movement is controlled by pushing/pulling on the load or the hook of the attached hoist

- **Gear Trolley:** When facing Trolley HandWheel:
  - Pull down on the right side of the Hand Chain (clockwise rotation) to move the Trolley left.
  - Pull down on the left side of the Hand Chain (counterclockwise rotation) to move the Trolley right.
  - Avoid collisions with the end stops or other Trolleys. Damage may result.

8.0 INSPECTION

To maintain continuous and satisfactory operation, a regular inspection procedure must be initiated to replace worn or damaged parts before they become unsafe. Inspection intervals must be determined by the individual application and are based on the type of service to which the hoist will be subjected and the degree of exposure to wear, deterioration or malfunction of the critical components.

8.1 Service & Frequency Information

The type of service to which the hoist is subjected can be classified as “Normal”, “Heavy” and “Severe”.

- **Normal Service** - Involves operation with randomly distributed loads within the rated load limit, or uniform loads less than 65% of rated load for not more than 25% of the time.

- **Heavy Service -** Involves operating the hoist within rated load limit which exceeds normal service.

- **Severe Service -** Is normal or heavy service with abnormal operating conditions.

Following are the recommended, minimum intervals of inspection. When the unit is subjected to extra heavy usage or dusty, gritty, moist, or other adverse atmospheric conditions, shorter time intervals must be assigned. During the Periodic Inspection, inspection must be made of all parts for unusual wear, corrosion effect or damage in addition to those specifically mentioned.

8.1.1 Minimum Inspection Schedule

- **Frequent Inspections**
  These inspections are visual examinations by the operator or other designated personnel with interval per the following criteria.

  - Normal Service – Monthly
  - Heavy Service – Weekly to Monthly
  - Severe Service – Daily to Weekly
  - Special or Infrequent Service – As recommended by a qualified person before and after each occurrence.

- **Periodic Inspections**
  Periodic inspections MUST be performed by a 'Certified Technician'.
  Visual inspection will be performed by a qualified person who will make records of apparent external conditions to provide the basis for a continuing evaluation.

  A qualified person shall determine whether conditions found during inspection constitute a hazard and whether maintenance of the equipment is required.

  - Normal Service – Yearly
  - Heavy Service – Semi-Annually
  - Severe Service – Quarterly
  - Special or Infrequent Service – As recommended by a qualified person before and after each occurrence.

  Written, dated and signed inspection reports should be maintained on all critical items; such as safety devices, brakes, hooks, chains, etc.

  All worn, damaged or malfunctioning parts should be repaired or replaced to maintain a SAFE operating crane. Warning labels affixed to the crane, hoist or trolley should be kept clean and visible at all times. Warning labels should be replaced if loose or illegible.

Inspection Schedule

Minimum Frequent Inspections		Inspection
Severe	Daily to weekly	a. All functional operating mechanisms for proper operation, proper adjustment, and unusual sounds b. Check hook for damage, cracks or excessive throat opening, latch engagement and latch operation in accordance with ANSI/ASME B30.10 c. Inspect load chain for adequate lubrication, signs of wear, twisting, damaged links or foreign matter Check chain for wear and twisting. d. Inspect reeving of the load chain to make sure it is proper e. Check brake for drift
Heavy	Weekly to Monthly	
Normal	Monthly	

Minimum periodic Inspections		Inspection
Severe	Quarterly	a. Frequent inspections as listed above b. Check for loose screws, nuts, bolts, nuts, pins, or rivets etc. c. Inspect for worn, corroded, cracked or distorted hook blocks, suspension bolts, gears, pins, bearings, hand chain wheel, frames, hoist hanger, load chain guide d. Inspect for worn gears, pawl, spring, ratchet, and shafts. e. Check for worn brake discs. f. Inspect chain in kerosene or other non-corrosive solvent and inspect for wear, nicks, or distortion of any kind. g. Supporting structure and trolley, if used, for continued ability to support the imposed loads. h. Inspect trolley wheels for external wear on the tread and flange, and for wear on the internal bearing as evidenced by looseness i. on the stud. j. Function, instruction and warning labels for legibility and placement.
Heavy	Semi-Annually	
Normal	Yearly	

⚠WARNING

Any deficiencies are to be corrected before returning the hoist to service. Operating a hoist with worn or damaged parts or a malfunctioning hoist may result in serious personal injury to the operator, nearby personnel and/or property damage.

8.1.2 Occasionally Used Trolleys

Trolleys that are used infrequently shall be inspected as follows prior to placing in service:

- Trolley Idle MORE THAN 1 month, LESS THAN 1 year: Inspect per FREQUENT Inspection Criteria.
- Trolley Idle MORE THAN 1 year: Inspect per PERIODIC Inspection Criteria

8.2 Inspection Methods & Criteria

This section covers the inspection of Push Trolleys & Gear Trolleys. The list of items in this section is based on those listed in ANSI/ASME B30.16 for Frequent & Periodic Inspection. These inspections are not intended to involve disassembly of the trolley. Such disassembly and further inspection should only be performed by a qualified person trained in the disassembly and re-assembly of the trolley.

Trolley Inspection Methods & Criteria			
Item	**Method**	**Criteria**	**Action**
Functional operating mechanism	Visual, Auditory	Mechanisms should be properly adjusted and should not produce unusual sounds when operated.	Repair or replace as required
Housing and Mechanical Components	Visual, Auditory, Vibration, Function	Trolley components including, suspension shafts, track wheels, track wheel axles, clevises, connection yokes, suspension bolts, shafts, gears, bearing, pins, rollers, and bumpers should be free of cracks, distortion, significant wear and corrosion. Evidence of same can be detected visually or via detection of unusual sounds or vibration during operation.	Replace
Side Plates	Visual	Must be free of significant deformation	Replace
Bolts, Nuts, Snap, Rings, and Split Pins	Visual, Check with Proper Tool	Bolts, Nuts, Snap, Rings, and Split Pins should not be loose.	Tighten or replace as required.
Track Wheel-Tread	Visual, Measure	Diameter of the inside and outside tread surface should not be les than the discard value.	Replace
Track Wheel-Gear	Visual	Teeth should not be cracked, damaged, or excessively worn	Replace.
Suspension Shaft	Visual, Measure	Suspension shaft should not be bent. Diameter should be worn by 10% or more.	Replace
Suspenders	Visual, Measure	Never use the suspender if its dimension of D2-D1, d or h exceed the limits	Replace
Cable Hangers	Visual	Cable Hangers should not be damaged or significantly worn. Movement should be smooth and should not cause the Power Supply Cable to twist or kink	Repair or replace as necessary
Pendant – Labels	Visual	Labels denoting functions should be legible	Replace
Warning Labels	Visual	Warning labels should be affixed to the pendant cord and they should be legible	Replace
Trolley Capacity Label	Visual	The label that indicates the capacity of the trolley should be legible and securely attached to the trolley	Replace

9.0 MAINTENANCE & HANDLING

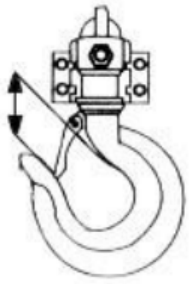
It is important to provide periodic inspection and lubrication to enable lengthy and satisfactory operation of the hoist. Inspections are recommended at the intervals listed in this manual and are based on intermittent use. The operator should increase or decrease inspection intervals based on usage and experience.

In addition to the above inspection procedure, a preventive maintenance program should be established to prolong the useful life of the hoist and maintain its reliability and continued safe use. The program should include the periodic inspections with particular attention being paid to the lubrication of various components using the recommended lubricants.

9.1 Hook Inspection

Inspect the hooks for deformation, damage or cracks. If the hook is twisted more than 10 degrees from the plane of the unbent hook it should be replaced. Hooks having a throat opening greater than the reject opening size shown in the following table must be replaced.

Capacity (Ton)	Reject Opening (in) Replace hook when opening is greater than:
1/2	1.08
1	1.30
2	1.45
3	1.73
5	1.84



Check to assure latch is not damaged or bent and that it operates properly with sufficient spring pressure to keep the latch tightly against the tip of the hook and allow the latch to spring back to the tip when released. If the latch does not operate properly, it should be replaced.

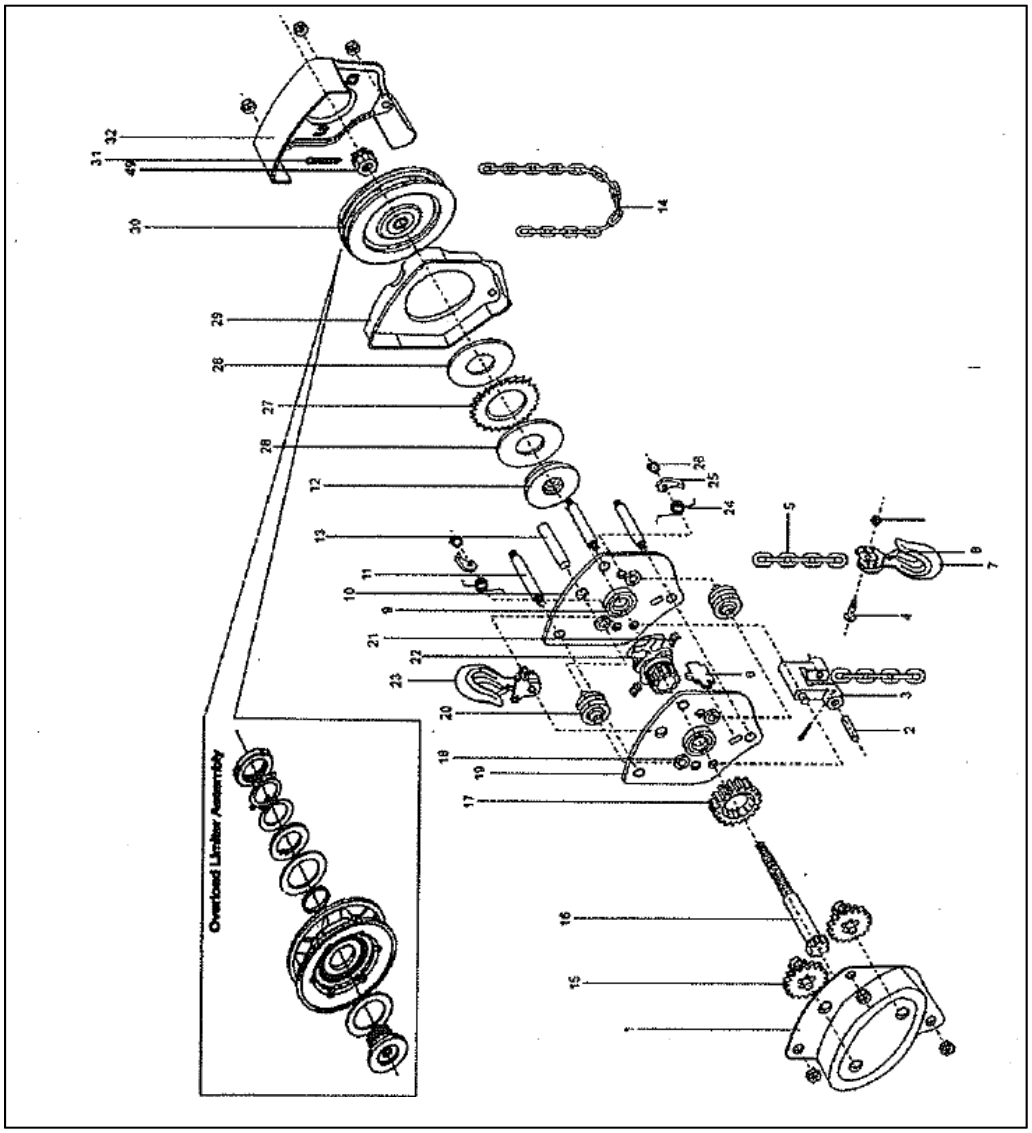
9.2 Load Chain Cleaning and Inspection

To clean the load chain first clean the chain with a non-acid or non-caustic type solvent, then slack the chain and make a link-by-link inspection for nicks, gouges, twisted links and excessive wear or stretching. Worn chain should be gaged throughout its entire length. If the chain is worn or otherwise damaged, replace entire chain with a new chain supplied by the hoist manufacturer. Do not substitute. Do not attempt to re-weld a damaged chain.

9.3 Disassembly

Breaking down the hoist is straightforward. Make a note of the locations and orientations of the hoist's different parts.

Hoist Exploded View



9.4 Lubrication

- Lubrication is essential to prolonged chain life. Always lubricate load chain weekly or more frequently depending on severity of service. Be sure the lubricant reaches the bearing surfaces between the links. Remove the excess oil from the chain. The load chain should be kept well lubricated with chain lube. Be sure that the oil-lube is worked into the area between the links.

- If the hoist is disassembled for inspection or repair, re-lubricate the moving parts according to the following table.

Part	Description	Frequency
Gears, Bearings	Check operation of the part	Annually
Pawl pivot pin, guide roller pin, and hook shanks	Check operation of the part	Annually
Chain wheel treads	Check operation of the part	Quarterly
Chain	Under normal usage – Lubricate chain Under heavy usage – Lubricate chain more frequently	Weekly

- The hoist normally requires no additional lubrication except when a unit has been disassembled for cleaning or repairs

⚠CAUTION

The brake surfaces must be kept free of any trace of oil or grease. Apply lubricant sparingly to the parts near the brake to avoid oil contamination of the brake.

- Recommended Lubricants

Unit	Part	Lubricant
Hoist	Gears, bearings, pawl pivot pin, guide roller pin, hook shanks, and chain wheel treads	Any good quality gear grease
	Chain	Chain Lube
	Brake parts, ratchet teeth	Do not Lubricate
Trolley	Track Gear Wheel[1]	NLGI (National Lubricating Grease Institute) #2 or equivalent grease.
	Trolley Wheel Bearings[2]	None
	Suspension Pins, Bolts, and Shafts[3]	Any good quality gear grease

[1] Track Gear Wheel- Clean and re-grease the Track Wheel gears and Hand Wheel output pinion every three months (more frequently for heavier usage or severe conditions). Do not use an excessive amount of grease and avoid getting any grease on the running surfaces of the Track Wheel or the beam.

[2] Trolley Wheel Bearings do not need to be lubricated and must be replaced if worn or damaged.

[3] Suspension Pins, Bolts, and Shafts – Grease at least twice per year for normal usage (more frequently for heavier usage or severe conditions).

⚠WARNING

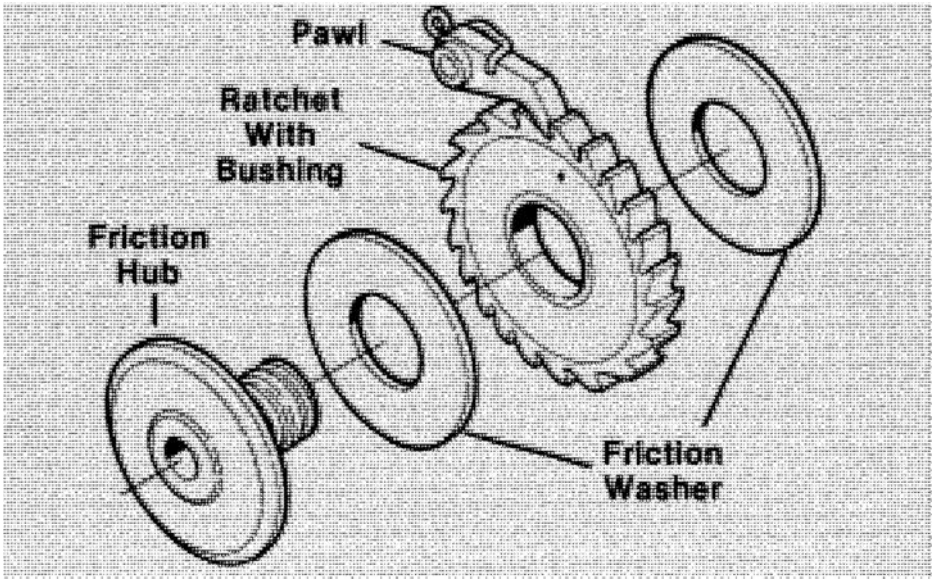
Used motor oils contain known carcinogenic materials.

To Avoid Health Problems:
Never use used motor oils as a chain lubricant.

- **Brake**- The brake parts should be thoroughly cleaned (by wiping with a cloth - not by washing with a solvent) and inspected for wear or scoring. The friction surfaces of the handwheel, ratchet and friction hub must be smooth and free from any score marks. When friction washers are visibly worn to a thickness of 0.100 inches or less, scored excessively, or coated with foreign matter, replace with new washers. Keep washers and brake surfaces clean and dry.

NOTE: The brake is designed to operate dry. Do not use any grease or lubricant on the braking surfaces. On reassembly when lubricating parts adjacent to the brake, do not use an excessive amount of lubricant which could seep onto the brake surfaces.

- Assemble the brake components per following figure. Check the ratchet to be sure the bushing is flush with or below the surface on both sides. When installed, the teeth must face as shown in Figure 10 and engage the pawl. Do not lubricate. The brake operates dry.



Brake Assembly

9.5 Outdoor Installation

For trolley and hoist installations that are outdoors, the trolley and hoist should be covered and protected from the weather when not in use.

Possibility of corrosion on components of the trolley increases for installations where salt air and high humidity are present. The trolley may require more frequent lubrication. Make frequent and regular inspections of the unit's condition and operation.

10.0 TROUBLESHOOTING

#	Problem	Cause May Be	Remedy
1	Hoist is hard to operate in either direction.	a) Load chain worn long to gage, thus binding between liftwheel and chain guide. b) Load chain rusty, corroded or clogged up with foreign matter such as cement or mud. c) Load chain damaged. d) Liftwheel clogged with foreign matter or worn excessively, causing binding between the liftwheel and chain guide. e) Hand chain worn long to gage, thus binding between handwheel and cover. f) Handwheel clogged with foreign mater or worn. g) Liftwheel or gear teeth deformed.	a) Replace if worn excessively. b) Clean by tumble polishing or using a nonacid or non-caustic type solvent. Lubricate c) Check chain for nicks, bent or twisted links. Replace if damaged. d) Clean out pockets. Replace if worn excessively. e) Clean out pockets. Replace if worn excessively. f) Excessive overload has been applied. Replace damaged parts.
2	Hoist is hard to operate in the lowering direction.	a) Brake parts corroded or coated with foreign matter. b) Chain binding.	a) Disassemble brake and clean thoroughly. (By wiping with a cloth - not by washing in a solvent). Replace washers if gummy, visibly worn or coated with a foreign matter. Keep washers and brake surfaces clean and dry. b) See 1a,1b, 1c
3	Hoist is hard to operate in the hoisting direction.	a) Chain binding. b) Chain twisted (3 & 5 ton capacity).	a) See 1a,1b, 1c b) Reeve chain on 3 and 5 ton unit, if both chains are twisted, capsize hook block through loop in chain until twists are removed. Caution - do not operate unit in hoisting direction with twisted chain or serious damage will result. c) Reduce load or use correct capacity hoist.
4	Hoist will not operate in either direction.	a) Liftwheel gear key or friction hub key missing or sheared. b) Gears jammed.	a) Install or replace key. b) Inspect for foreign matter in gear teeth.
5	Hoist will not operate in the lowering direction.	a) Locked brake due to a suddenly applied load, shock load, or load removed by means other	a) With hoist under load keep chain taut, pull sharply on hand chain in the lowering direction to loosen brake. b) See 1a,1b, 1c

#	Problem	Cause May Be	Remedy
		than by operating unit in the lowering direction. b) Chain binding. c) C) Lower hook all the way out. Load chain fully extended.	c) Chain taut between the liftwheel and loose end screw. Operate unit in hoisting direction only.
6	Hoist will not operate in the hoisting direction.	a) Chain binding	a) See 1a,1b, 1c
7	Hoist will not hold load in suspension.	a) Lower hook or load side of chain on wrong side of liftwheel. b) Ratchet assembled in reverse. c) Pawl not engaging with ratchet. d) Ratchet teeth or pawl worn or broken. e) Worn brake parts. f) Oily, dirty or corroded brake friction surfaces.	a) Lower hook must be on same side of lifwheel as upper hook. b) Pawl spring missing or broken. Pawl binding on pawl stud. Replace spring and clean so pawl operates freely and engages properly with ratchet. Do not oil. c) Replace pawl and/or ratchet. d) Replace brake parts which are worn. e) See item2a.