

Engineering Data & Quick Reference Guide

EFFECTIVE DATE OCTOBER 1, 2000



Phone (800) 955-5541 • FAX (800) 742-9270 Manufactures of World Famous SHAW-BOX®, BUDGIT®, TUGIT2® Crane Components and Hoists

Yale Lift-Tech Manufactures all Budgit/Tugit2 Chain Hoists in accordance with our interpretation of applicable sections of:

ASME/ANSI B30.16	Safety Standards for Overhead Hoists	(Underhung)
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ASME/ANSI B30.10 Hooks

ASME/ANSI B30.11 Monorails and Underhung Cranes

ASME/ANSI Performance Standards for Hoists

HST-1M Electric Chain Hoist

HST-2M Hand Chain Manually Operated Chain Hoist

- HST-3M Manually Lever Operated Chain Hoist
- HST-4M Electric Wire Rope Hoists
- HST-5M Air Chain Hoist
- HST-6M Air Wire Rope Hoists

All Hoists receive load test to 125% of Rated Capacity in Accordance with these Standards.

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SOURCES American National Standard Institute National Electric Code Compressed Air & Gas Institute Hoist Manufacturers Institute

Crane Manufacturers Association of America

Budgit Repair Manuals

ANSI B30.16 ANSI B30.17

National Electrical Manufactures Association

RECOMMENDED PRACTICES FOR POWERED HOISTS

Because the manufacturer has no direct control over the hoist and its operation, conformance with good safety practice is the responsibility of the user and operating personnel. ANSI/ASME B30.16 has been used as a guide in preparing this list of SHALL's and SHALL NOT's. Ask your supervisor for a copy. Each is identified according to ANSI/NEMA Z535.4 with either the signal word CAUTION or WARNING to indicate the degree of seriousness.

Improper operation of a hoist can create a potentially hazardous situation which, if not avoided, could result in <u>death</u> or <u>serious</u> injury. To avoid such a potentially hazardous situation, the operator shall:

- 1. NOT operate a damaged, malfunction or unusually performing hoist.
- 2. NOT operate the hoist until you have thoroughly read and understood the manufacturer's Operating and Maintenance Instructions or Manuals.
- **3. NOT** operate a hoist which has been modified without the manufacturer's approval or without certification that it is in conformity with ANSI/AMSE B30 volumes.
- 4. NOT lift more than rated load for the hoist.
- 5. NOT use hoist with twisted, kinked, damaged, or worn load chain or wire rope.
- 6. NOT use the hoist to lift, support, or transport people.
- 7. NOT lift loads over people.
- 8. NOT operate a hoist unless all persons are and remain clear of the supported load.
- 9. NOT operate unless load is centered under hoist.
- **10. NOT** attempt to lengthen the load wire rope or chain or repair damaged load wire rope or chain.
- **11.** Protect the hoist's load wire rope or chain from weld splatter or other damaging contaminants.
- **12. NOT** Operate hoist when it is restricted from forming a straight line from hook to hook in the direction of loading.
- 13. NOT use load wire rope or chain as a sling, or wrap load wire rope or chain around load.
- **14. NOT** apply the load to the tip of the hook or to the hook latch.
- **15.** NOT apply load unless load chain is properly seated in the chain wheel(s) or sprocket(s) or wire rope is properly seated in its groove(s).
- **16. NOT** apply load if bearing prevents equal loading on all load supporting ropes or chains.
- 17. NOT operate beyond the limits of the load wire rope or chain travel.
- NOT leave load supported by the hoist unattended unless specific precautions have been taken.
- **19. NOT** allow the load wire rope, chain or hook to be used as an electrical or welding ground.
- **20.** NOT allow the load wire rope, chain or hook to be touched by a live welding electrode.
- 21. NOT remove or obscure the warnings on the hoist.
- **22.** NOT operate a hoist on which the safety placards or decals are missing or illegible.
- **23. NOT** operate a hoist unless it has been securely attached to a suitable support.
- 24. NOT operate a hoist unless load slings or other approved single attachments are properly sized and seated in the hook saddle.
- **25.** Take up slack carefully make sure load is balanced and load holding action is secure before continuing.
- **26.** Shut down a hoist that malfunctions or performs unusually and report such malfunction.

ACAUTION

Improper operation of a hoist can create a potentially hazardous situation which, if not avoided, could result in <u>minor</u> or <u>moderate injury</u>. To avoid such a potentially hazardous situation, the operator shall:

- 1. Maintain a firm footing or be otherwise secured when operating the hoist.
- 2. Check brake function by tensioning the hoist prior to each lift operation.
- **3.** Use hook latches. Latches are to retain slings, chains, etc. under slack conditions only.
- 4. Make sure the hook latches are closed and not supporting any parts of the load.
- 5. Make sure the load is free to move and will clear all obstructions.
- 6. Avoid swinging the load or hook.
- 7. Make sure hook travel is in the same direction as shown on the controls.
- 8. Inspect the hoist regularly, replace damaged or worn parts and keep appropriate records of maintenance.
- **9.** Use the hoist manufacturer's recommended parts when repairing the unit.
- **10.** Lubricate load wire rope or chain per hoist manufacturer's recommendations.
- **11. NOT** use the hoist load limiting or warning device to measure load.
- **12. NOT** use limit switches as routine operating stops unless allowed by manufacturer. They are emergency devices only.
- **13. NOT** allow your attention to be diverted from operating the hoist.
- **14. NOT** allow the hoist to be subjected to sharp contact with other hoists, structures, or objects through misuse.
- **15. NOT** adjust or repair the hoist unless qualified to perform such adjustments or repairs.

DISCLAIMER

Under no circumstances does the Hoist Manufacturers Institute (HMI) assume any liability for the use of these voluntary recommendations and no warranty whatsoever is made in connection with them. The recommendations do not take precedence over existing plant safety rules and regulations, OSHA regulations or instructions issued by the Hoist Manufacturer. It is the user's intent to absolve and protect HMI from any and all liability, in tort or otherwise.

O.S.H.A. COMPLIANCE RECOMMENDATIONS

The equipment listed below is recommended for O.S.H.A. compliance:

HOIST APPLICATIONS

Motorized hoist in fixed location.

Motorized hoist with push or hand geared trolley operating on a monorail system or jib crane.

*O.S.H.A. REQUIREMENT

Hoist meets O.S.H.A. requirements as standard. Customer must have a readily accessible fused disconnect switch or circuit breaker in power supply to each hoist within view of the operator.

Customer must have a fused disconnect switch or circuit breaker in the power supply; if this disconnect means is not readily accessible and within view of the operator, provide a mainline contactor panel (trolley mounted). If more than one hoist will operate on a given monorail system or jib crane (same electrical system), provide a fuse panel (trolley mounted) for each hoist.

Motorized hoist with motorized trolley operating on a monorail system or jib crane.

Provide a fuse panel (trolley mounted) for each hoist/trolley. Customer must have a fused disconnect switch or circuit breaker in the power supply; if this disconnect means is not readily accessible and within view of the operator, provide a mainline contactor panel (trolley mounted).

CRANE APPLICATIONS WITH MOTORIZED HOIST

ITEM		*O.S.H.A REQUIREME	NT
		MANUAL BRIDGE	MOTORIZED BRIDGE
Pushbutton From Trolley	Motorized Trolley	Fuse panel (trolley mounted). Mainline contactor panel (trolley mounted). Crane disconnect switch (bridge mounted).	
		Mainline contactor panel (trolley mounted).	
	Manual Trolley	Crane disconnect switch (bridge mounted).	Standard bridge control panel meets all requirements for the bridge. (Panel includes fused disconnect switch, mainline contactor, and bridge motor
		Fuse panel (trolley mounted).	fuses). Also required: Fuse panel (trolley mounted).
Pushbutton From Bridge	Motorized Trolley	Mainline contactor and crane disconnect switch (bridge mounted).	
	Manual Trolley	Mainline contactor and crane disconnect switch (bridge mounted).]
*F	Requirements are Y	ale Lift-Tech's recommendations based on standard ap	oplications only.

HOIST & TROLLEY SELECTION

MANUAL HOISTS

Hand Chain Hoists:

General Use

Anything lifting in the plant, such as one-of-a- kind lifting, maintenance, intermittent or stand-by lifting. General use on construction sites, repair shops and warehouses.

Production Lines:

May be used where lift is short, where operator can accomplish lift with one or two pulls of the hand chain. Such as, end of an assembly line, or conveyor.

Fine Control Applications:

Where accurate positioning of the load is required, such as installing and removing tools and dies from machinery.

Hazardous Areas:

Waterfront construction, ship repair, and where electrical service is hazardous. Hazardous environments where vapor or dust ignition is a concern, such as, petroleum and chemical plants. Optional spark resistant features are available.

Lever Hoists:

Lever hoists are used in many of the same applications noted above for Hand Chain Hoists. Also, they are the only hoist designed for horizontal pulling in such applications as lineman pulling power cables.

POWERED HOISTS

Electrical Hoists:

General Use

Electric hoists are used in high volume, production type applications or long lifts where manual hoists are not practical.

Production Lines

Electrical hoists are excellent in repetitive lifting operations, where the amount of time to lift loads is critical.

Operator Fatigue

Electric hoists saves on operator fatigue and possible injuries. Higher capacity manual hoists requires great amount of effort to lift loads close to capacity over long distances, where on electric hoists a push of a button lifts the load.

Air Hoists:

General Use

Air hoists offers all the advantages noted above for electric hoists. Moreover, they are uniquely suitable for heavy usage and environments that make electrical hoist impractical.

Hazardous Locations

Since there is no electrical arching with the air motors, these hoists are excellent in chemical and petrochemical industries with hazardous environments. Optional spark resistant features are available.

Variable Speed Control

On some models the pendant throttle control offers a true variable speed control from creep speed to full speed at the pendant. This feature is excellent when accurate positioning or spotting is required, or when a smooth acceleration in lifting or lowering a load is required.

HOIST & TROLLEY SELECTION

Selecting Type of Trolley and Bridge Crane

Better than 90% of all hoists are trolley mounted. Some hoists are stationary and only offer one axis, "Up - Down", motion. Trolleys offer two axis, "Up-Down-Left-Right", motion. Bridge cranes provide the third axis of motion, "Forward and Reverse". Hoists trolley mounted on monorails, jib cranes or bridge cranes provide a greater coverage area offering greater flexibility in lifting and transporting loads.

Trolley Suspension:

Hook Mount

Hook mount trolleys provide portability to the hoist. Hoist can be hooked-on or removed from the trolley easily. Typical use is maintenance applications. Trolleys are installed on monorails through a plant. Hoists are kept in tool stores, installed on a trolley when required, removed once work is completed and returned to stores to await use elsewhere.

Lug Mount

Lug or rigid mount trolleys are lug suspended hoists, forms a integral trolley-hoist combination. This arrangement offers closer headroom than hook mount arrangements. This arrangement offers closer headroom than hook mount arrangements. This type of installation is usually a permanent type, and the only time the hoist is removed is for maintenance. Rigid mount is also used on Motor Driven Trolleys due to the electrical connections between the hoist and trolley. Hook suspended hoist are free to rotate and swing on the trolley, which could pull on the electrical connections and cause damage to the equipment.

Trolley/Crane Types:

Push Type

Push type trolleys and cranes are used when loads are light, 2 Ton or less, and the monorail/runway are not more than 20 feet above the finish floor. Also, push types are good when accurate positioning of loads is not required.

Hand Geared Type

Hand Geared Trolleys/Cranes are excellent for accurate positioning of loads. They are good for operation on short monorails/runways, under 50 feet, and when trolley operation is infrequent.

Motor Driven Type

Motor Driven trolleys/bridges are excellent for moving heavy loads over long distances. Speeds allow for higher cycling and frequent moves, plus eliminates operator fatigue.

Top Running vs. Underhung Crane:

Top running cranes offers higher hook height than underhung but require higher ceiling height above the runway. Runways are supported by either the building columns, or free standing on their own supports. Loads are generally transmitted through the floor to column footings.

Underhung cranes offer better end approach of the hoist along the bridge girder, because hoists can be positioned underneath or outside of the runway. Runways are generally supported from the ceiling joists, with the loads transmitted through the ceiling, therefore ceiling supports must be adequately sized to handle these loads.

Type of Beams:

Trolleys & Underhung Cranes

Trolleys and end trucks are designed for operation on American Standard S (I-beams) and W section (Wide Flange or H beams). They are adjustable for beam flange widths in a standard range. Wider flange adjustments and patented track wheels are available as options. One must determine the monorail/runway beam size and flange width and apply the proper trolley/End Truck to the application.

Top Running Cranes

Top running end trucks for cranes are designed for operation on ASCE rail from 20 to 45 lbs/yard range. This rail is made a high quality grade of steel and resembles railroad track rail.

CHECKLIST FOR ORDERING BUDGIT HOIST & COMPONENTS

CHECKLIST FOR MANUAL CHAIN HOIST

Hoist Model Number Lift Requirements - 8' Standard * Hand Chain Drop - 6' - 6" Standard (USA only) 6' - 0" for Hi-Cap 2 aluminum hand chain hoist Suspension - Hook Lug – Plain Trolley Handgeared Trolley - Standard Hand Chain (Drop is 6' - 6")

Spark & Corrosion Resistant Plated Load Chain **Chain Bucket** Overload Device (Standard on USA Hi-Cap 2 Models)

* On higher capacity long lift hoists take note on the hand chain overhaul in feet to lift load one foot.

CHECKLIST FOR LEVER HOIST

Hoist Model Number Lift Requirements - 5' - 0" Standard Plated Load Chain **Overload Device – Optional**

CHECKLIST FOR MANUAL TROLLEYS

Trolley Model Number Suspension – Hook Type Lug – Plain Trollev Handgeared Trolley - Standard Hand Chain Drop is 9' - 6"

Spark Resistant Features (if required) Beam size Trolley is to run on Straight Monorail or Curve (Radius Requirements Needed)

CHECKLIST FOR ELECTRIC CHAIN HOIST

Hoist Model Number Lift Requirements – Maximum Recommended Lift (7 x Lift Speed) Electric Hoists with lifts over 90', a lug mounted trolley is recommended Lift Speed – Single or Two Speed Suspension - Hook Lug – For Plain or Handgeared Trolley Lug – For Motor Driven Trolley Voltage - Need to Specify for Two Speed Indoor Service – Standard Outdoor Service – Weatherproofing Adder (includes plated chain) or Cover Pendant Drop - If other than Standard Lift on Hook Mount, Lug Suspension for Plain & Handgeared Trolleys. Hoists with Motorized Trolleys, the Pendant Cable is Added to the Trolley, instead of the Hoist. See Trolley Options. Type of Trolley – Check Beam Size and Radius Requirements (if any) Plain

Handgeared - Standard Hand Chain Drop is 9' - 6"

Motorized - Standard Pushbutton Drop is 7'

Indoor - Standard

Outdoor – NEMA 3R, NEMA 4/12

Recommended Adders - Mainline Disconnect panel for Monorail Hoist.

Two speed Hoist require a different trolley from a Single Speed Hoist. When ordering for a Bridge Crane you will need fusing, and Extra Pushbuttons to operate the Crane if the Pushbutton is from the Hoist.

CHECKLIST FOR ORDERING BUDGIT HOIST & COMPONENTS

CHECKLIST FOR ELECTRIC CHAIN HOIST (CONTINUED) Pushbutton deduct is for the hoist with Motorized Trolley only. Chain Bucket **Electrification for Monorail Hoist** Cord Reel **Retractile Cord** Festooned Conductor System C-track Supported Festooned Conductor System Wire rope Supported Conductor Kits figure 8 Bar Spring type Slide Collectors Required, Collector Pole & Bracket Required on Trolley. CHECKLIST FOR AIR CHAIN HOISTS Hoist Model Number Lift Requirements – 10' Standard – Maximum lift of 6000 Series Air Hoist is (7 x Lift Speed) Air chain Hoists with lifts over 90', a lug mounted hoist is recommended. Lift Speed Suspension - Check Beam Size and Radius Requirements (if any) Hook Lug – Handgeared – 9' - 6" Standard Hand Chain Drop Push Type Air Motor Driven Trollev Pull Cord Drop - Included in Additional Lift Price Pendant Drop - 6' Standard 2200 Series – Maximum Pendant Drop 72' 6000 Series - Maximum Pendant Drop 36' Spark Resistant Features Plated Load Chain Option Air Motor Driven Trolley - Check Beam Size and Radius Requirements (if any) Standard Pendant Drop is 6' Maximum Pendant Drop is 36' **Spark Resistant Features Chain Container** Air Supply Hose Air Hose Trolleys Wire Rope Festoon System Filter - Recommended Lubricator – Recommended Regulator - Recommended if air Supply is over 90 PSI **Recoil Air Hose** Nylon coated Cable Recommended CHECKLIST FOR ELECTRIC BRIDGE CRANES End Trucks - Check runway beam size for underhung bridges Gear Reducer Motor Indoor - Standard Controls – Outdoor - NEMA 3R NEMA 4/12 NEMA 4X and 7 available upon request Fused Disconnect Switch - Indoor - Standard Outdoor - NEMA 3R, NEMA 4/12, NEMA 4X and 7 available upon request Cross Shaft Support **Cross Shaft Coupling**

CHECKLIST FOR ORDERING BUDGIT HOIST & COMPONENTS

CHECKLIST FOR ELECTRIC BRIDGE CRANES (CONTINUED)

Bumpers Bridge Electrification Runway Electrification Collector Pole & Bracket Main Collectors Some Recommended Optional Equipment Electronic Acceleration Control Bridge Brake

ITEMS NEEDED TO BE ADDED TO ELECTRIC HOIST FOR ELECTRIC BRIDGE CRANE.

Fuses

Extra Pushbuttons to Operate Bridge Crane (4 additional buttons needed) Tow Arm – Use Catalog Number 931103 115 Control voltage on Hoist

HOIST SPECIFICATIONS SHEET

Capacity	
Lift	
Lift Speed	
Voltage or Air Supply	
Headroom Requirements	
Type of Suspension	
Lug	Hook
Spark Resistance (Air/Manual only)	
OPTIONS	
Weatherproofing	
Plated Load Chain	
 Chain Bucket	
Monorail Electrification	
Air Host	
Filter & Lubricator	
Special Paint	
Type of Trolley	
Plain	
Handgeared	
Motorized	
Voltage	or Air Supply
Pendant Drop	
Trolley Speed	
Spark Resistance (Air/Manual only)	
Beam Size to Run on	Beam Radius
OPTIONS	
2 Spood	
Trollov Brako	
Pollect Posistore	
Electronic Acceleration Control	
Evera Pushbuttons	
Extra Hand Chain Drop	
Wide Flange Adjustment	_
Collector Pole & Bracket	—
	—
Trolley Locking Clamp	-
Trolley Locking Clamp	
Trolley Locking Clamp Special Paint Fuses	

	BRIDGE CRANE SPE	CIFICATIONS
Capacity Span Top-Running Underhung Bridge Movement Push Hand Motor	(5 ton Max.) (36' - 0" Max.) Runway Rail to Run on Beam to Run on Pull geared Hand Chain Drop rized Bridge Speed	
Bridge Electrificat Runway Electrific Runway Length _ Pushbutton From HOIST FOR BRII Capacity	Voltage Control Enclosure (NEMA 1 Standard) Disconnect Enclosure (NEMA 1 Standard) ion ation Hoist (Extra Pushbuttons Required) OGE	
Headroom Requir Lift Speed Voltage Trolley Type Plain Hand Motor	rements geared rized Trolley Speed	
BRIDGE COMPC Electronic Accele 2 Speed Motors & Ballast Resistors Bridge Brake Motor Protection . Weatherproofing . Main Collector Wide Flange Adju	PNENTS OPTIONS ration Control Controls	

#1 – NEMA CLASSIFICATIONS FOR NONHAZARDOUS LOCATIONS

NEMA 1	General Purpose — Indoor
NEMA 2	Drip proof — Indoor
NEMA 3	Dust tight — Rain tight and Sleet (Ice) Proof — Outdoor
NEMA 3R	Rain proof and Sleet (Ice) Proof — Outdoor
NEMA 3S	Dust tight — Rain tight and Sleet (Ice) Proof — Outdoor
NEMA 4	Water tight, Dust tight — Indoor and Outdoor
NEMA 4X	Water tight, Dust tight and Corrosion Resistant — Indoor and Outdoor
NEMA 5	Supersedes by NEMA 12
NEMA 6	Submersible Water tight, Dust tight and Sleet (Ice) Resistant Indoor and Outdoor
NEMA 7-8 & 9-10	Enclosures for Hazardous Locations (See Attached Hoist Tips for Hazardous Hoist)
NEMA 11	Corrosion Resistant and Drip proof — Oil Immersed — Indoor
NEMA 12	Industrial Use — Dust tight and Drip tight — Indoor
NEMA 13	Oil tight and Dust tight — Indoor

HOIST DUTY SERVICE CLASSIFICATION

HOIST CLASS

H1 (INFREQUENT OR STANDBY)

Powerhouses & Utilities. Infrequent handling. Hoists used primarily to install & service heavy equipment, where loads frequently approach hoist capacity, with periods of utilization being infrequent and widely scattered.

H2 (LIGHT)

Light machine shop and fabricating industries and service and maintenance work, where loads & utilization are randomly distributed with capacity loads infrequently handled, and where total running time of equipment does not exceed 10 - 15% of the work period.

H3 (STANDARD)

General Machine Shop, fabricating, assembly, storage and warehousing, where loads and utilization are randomly distributed, with total running time of equipment not exceeding 15 - 25% of the work period.

H4 (HEAVY)

High volume handling in steel warehousing, machine shops, fabricating plants, mills and foundries. Manual or automatic cycling operations in heat treating and plating operations. Total running time of equipment normally approaches 25 - 50% of work period, with loads at or near rated capacity frequently handled.

H5 (SEVERE)

Bulk handling of material in combination with buckets, magnets, or other heavy attachments. Equipment often cab operated. Duty cycles approaching continuous operation are frequently necessary. User must specify details of operation, including weight of attachments.

CRANE SERVICE CLASSIFICATION

CLASS A

The class is further divided into two subclasses due to the nature of the loads to be handled.

CLASS A1 (STANDBY SERVICE)

This service covers cranes used in installations such as; power houses, public utilities, turbine rooms, motor rooms and transformer stations, where precise handling of valuable machinery at slow speeds with long idle periods between lifts required. Capacity loads may be handled for initial installation of machinery and for infrequent maintenance.

CLASS A2 (INFREQUENT USE)

These cranes will be used in installations such as; small maintenance shops, pump rooms, testing laboratories, and similar operations where the loads are relatively light, the speeds are slow, and a low degree of control accuracy is required. The loads may vary anywhere from no load to full capacity with a frequency of a few lifts per day or month.

CLASS B (LIGHT SERVICE)

This service covers cranes such as used in repair shops, light assembly operations, service buildings, light warehousing etc., where service requirements are light and the speed is slow. Loads vary from no load to full rated with an average load of 50% of capacity with 2 to 5 lifts per hour, averaging 15 feet, not over 50% of the lifts at rated capacity.

CLASS C (MODERATE SERVICE)

This service covers cranes such as used in machine shops, paper mill machine rooms etc., where the service requirements are moderate. In this type of service the crane will handle loads which average 50% of the rated capacity with 5 to 10 lifts per hour, averaging 15 feet, not over 50% of the lift at rated capacity.

CLASS D (HEAVY DUTY)

This service covers cranes, usually cab operated, such as are used in heavy machine shops, foundries, fabricating plants, steel warehouses, lumber mills etc., and standard duty bucket and magnet operation where heavy duty production is required but with no specific cycle of operation. Loads approaching 50% of the rated capacity will be handled constantly during the working period. High speeds are desirable for this type of service with 10 to 20 lifts per hour averaging 15 feet, not over 65% of the lifts at rated capacity.

CLASS E (SEVERE DUTY CYCLE SERVICE)

This type of service requires a heavy duty crane capable of handling the rated load continuously, at high speed, in repetition throughout a stated period per day, in a predetermined cycle of operation. Applications include magnet, bucket, magnet-bucket combinations of cranes for scrap yards, cement mills, lumber mills, fertilizer plants etc., with 20 or more lifts per hour all at rated capacity. The complete cycle of operation should be specified.

CLASS F (STEEL MILL AISE SPECIFICATION)

Cranes in this class are covered by the current issue of The Association of Iron and Steel Engineers' Standard, No. 6 for Electric Overhead Traveling Cranes for Steel Mill Service.

HOIST/TROLLEY SELECTION

HOIST CAPACITY

Determine the maximum load to be lifted. If the load falls between standard rated capacities, always go the higher capacity (i.e., for 4,300 lb. maximum load, use 6,000 lb., 3 ton capacity hoists).

HOIST LIFT

To determine the total lift required measure the distance from the bottom of the beam to the lowest point on the floor to be reached and subtract the hoist "A" dimension shown in the specifications. The remaining distance is the lift required on the hoist. Always select a standard lift equal to or greater than the distance required.

HOIST SUSPENSION

Hook type suspension allows hoist be to hung up almost anywhere and is used when hoist must be readily moved to other locations. Lug type (Coil chain hoists only) saves headroom and is used with rigid mount trolleys or when hoist is permanently mounted in a fixed location.

HOW TO SELECT THE CORRECT BUDGIT MANGUARD™ ELECTRIC HOIST

FIRST – Determine amount of Travel/Lift Required Per Hour

This can easily be done by taking the distance a load must be lifted and lowered, then multiplying by the number of times this must be done per hour to do the job required. Always use maximums that can be expected to occur. Example: Must lift pipe six feet to rack, then lower empty hook for next load 20 times per hour.

SECOND - Count Number of "Starts" Needed Per Hour

"Starts" are the actuations of the push buttons. In our example, let's assume under a maximum condition that in the raise cycle the hoist push buttons are actuated six (6) times — in the lowering cycle, five (5) times. The number of starts per hour is calculated per example below:

THIRD - Calculate Maximum Load and Average Load

Maximum load is the highest load to be lifted and must not exceed the hoist rating. To arrive at an average load weight, take one up and down cycle (the heaviest anticipated), add the load on the hook in the up direction to the load on the hook in the down direction. Divide this sum by two (2) and you will have the average load condition. Using 3300 pounds and a below-the-hook weight of 300 pounds, average load is calculated as follows:

	Travel/Lift	Starts Per Hour	Average Load
up	6'	6	3600 lbs. Max Load
down	6'	5	0
total	12'	11	3600
	x 20	<u>x 20</u>	÷ 2
Cycles/hour	240'	220	1800 lbs. Avg. Load

Be sure to include weight of below-the-hook lifting devices. All BUDGIT Electric Hoist figures are based on the average load not exceeding 65% of the rated capacity of the hoist.

FOURTH – Select the Basic Hoist

From our calculations, we know that we need a hoist that will lift a maximum load of 3600#, move the load 240' per hour with 220 push button starts, and whose average load is 1800#. From the following table you can select the proper BUDGIT Hoist to do the job:

TROLLEY TYPE

There are three standard trolley types that can be used to suspend BUDGIT Hoists.

Push Trolley – Recommended for light capacities and lifts less than 20 feet. An economical method for moving loads.

Hand Geared Trolley – Offers most precise control for load spotting. Most favorable for higher capacities and short monorails where this control is desired. Also recommended where lifts are more than 20 feet.

Motor Driven Trolley – Most widely used method of suspension, particularly 2 ton capacity and above. Virtually a necessity where long monorails are used.

Supporting structure must be rated at least 100% of the hoist capacity or greater than the hoist rating.

Note: Average load is used in lieu of the correct **Mean Equivalent Load** for simplification: See ANSI/ASME HST-1M "Performance Standard for Electric Chain Hoists."

	BUDGIT HOIST RATINGS			
Hoist Type	Hoist Duty Class	Max. No. Starts Hr.	Max. on Time Min/Hr.	
Single Phase	H4	300	30 (50%)	
Three Phase (HD)	H4	300	30 (50%)	

Note: The above chart is for single speed models only. On twospeed hoists the high speed winding is rated for HMI Class H4 heavy duty, the low speed winding is rated for HMI Class H3 standard duty (25% on time) service.

Continuing our example, we have selected a Catalog No. BEH0216 heavy duty hoist (2-ton capacity, 10-foot lift, 16 FPM lifting speed).

	Requirement	BEH0216
Travel/Lift	240'	16 FPM x 30 Min. = 480 Ft.
Starts	220	300
Avg. Load	1800 lbs.	2600
Max. Load	3600 lbs.	4000

If you follow this simple method of hoist application, you will never buy more hoist than you need, can be sure the hoist will perform the required duty, and won't find yourself on the short end of application versus hoist.

The duty rating as described will meet or exceed most industrial applications. Where the duty cycle is anticipated to exceed this duty rating, contact your Yale Lift-Tech field representative or the factory at Muskegon, Michigan, for the hoist to meet your needs.

TYPICAL MOTOR AMPERAGE DATA

	Three-phase ac	squirrel-cage & wound rotor induction type motors			Single-phase ac motors	
HP/Volts	208V	230V	460V	575V	115V	230V
1/4	1.4	1.3	.65	.5	5.8	2.9
1/2	2.2	2.0	1.0	.8	9.8	4.9
3/4	3.1	2.8	1.4	1.1	13.8	6.9
1	4.0	3.6	1.8	1.4	16	8
1.5	5.7	5.2	2.6	2.1	20	10
2	7.5	6.8	3.4	2.7	24	12
3	10.6	9.6	4.8	3.9	34	17
5	16.7	15.2	7.6	6.1	56	28
7.5	24.2	22.0	11.0	9.0	80	40
10	30.8	28.0	14.0	11.0	100	50
15	46.2	42.0	21.0	17.0	_	
20	59.4	54.0	27.0	22.0	_	
25	74.8	68.0	34.0	27.0	_	_
30	88.0	80.0	40.0	32.0	_	_
40	114.4	104.0	52.0	41.0	_	_
50	143.0	130.0	65.0	52.0	_	_

Above is a table with typical motor amperage by HP by voltage. This is provided as a guide only. Where exact amperage is required for a specific motor please consult the factory.

BUDGIT MANGUARD ELECTRIC HOISTS MOTOR CURRENTS

FULL LOAD, LOCKED ROTOR & NO LOAD AMPS

	S	INGLE SPEED MOTOR	S	
		1/4 HORSEPOWER		
RPM	VOLTS	FLA	LRA	NLA
1800	115/230 208 230/460 575	4.36/2.18 1.30 1.10/0.55 .045	19.20/9.60 7.10 6.40/3.20 2.60	3.60/1.80 .094 .085/.043 .034
	•	1/2 HORSEPOWER		
1800	115/230 208 230/460 575	6.30/3.15 2.20 2.00/1.00 0.80	32.80/16.40 11.70 10.60/5.30 4.30	4.20/2.10 1.80 1.60/0.80 0.64
		1 HORSEPOWER		
1800	115/230 208 230/460 575	11.20/5.60 3.30 3.00/1.50 1.30	53.40/26.70 18.10 16.00/8.00 6.60	6.00/3.00 1.90 1.70/0.852 0.68
		2 1/2 HORSEPOWER		
3600	115/230 208 230/460 575	24.20/12.10 7.50 6.80/3.40 2.70	121.20/60.60 38.00 35.40/17.70 15.00	13.60/6.80 2.50 2.30/1.15 0.92

			TWO SPEED MOTORS		
			.50/.17 HORSEPOWER		
RP	м	VOLTS	FLA	LRA	NLA
1800/	/600	208 230 460 575	1.80/1.80 1.60/1.60 0.80/0.80 0.70/0.70	7.80/3.20 7.00/3.00 3.50/1.50 2.90/1.30	1.20/1.70 1.00/1.50 0.52/0.81 0.46/0.64
3600/	1200	208 230 460 575	15.62/12.32 14.20/11.20 7.10/5.60 5.68/4.48	9.46/6.82 8.60/6.20 4.30/3.10 3.44/2.48	0.70/1.12 0.64/1.02 0.32/0.51 0.26/0.41
			1.0/.33 HORSEPOWER		
1800/	600	208 230 460 575	3.20/3.60 2.90/3.30 1.50/1.50 1.30/1.30	14.60/6.90 12.90/6.00 6.80/3.00 5.40/2.20	1.60/3.70 1.50/3.20 0.80/1.50 0.70/1.20
3600/*	1200	208 230 460 575	3.30/2.42 3.00/2.20 1.50/1.10 1.20/0.88	20.02/12.54 18.20/11.40 9.10/5.70 7.28/4.56	1.56/2.20 1.42/2.00 0.71/1.00 0.57/0.80
			2.25/.66 HORSEPOWER	R	
3600/	1200	208 230 460 575	3.20/3.60 2.90/3.30 1.50/1.50 1.30/1.30	14.60/6.90 12.90/6.00 6.80/3.00 5.40/2.20	1.60/3.70 1.50/3.20 0.80/1.50 0.70/1.20

CONNECTING HOIST TO ELECTRICAL SERVICE

a. All hoists are equipped with a flexible power cable extending from the hoist. A grounding type male plug or permanent connection in an outlet box may be used for connecting hoist to power supply. See table for branch circuit conductor sizes.

				AWG WI	RE SIZE		
H.P.	Power Supply	#16	#14	#12	#10	#8	#6
	115-1-60	80	130	210	330		
1/4	230-1-60	230	330	835			
1/4	200, 230-3-60	465	740	1180			
	460, 575-3-60	1440	2390				
	115-1-60	45	75	120	190	310	490
4/0	230-1-60	195	305	490	775	1235	
1/2	200, 230-3-60	280	450	715	1135)	
	460, 575-3-60	860	1440				
	115-1-60	*	45	75	120	190	300
1	230-1-60	120	190	300	475	720	
	200, 230-3-60	180	290	460	730		
•	460, 575-3-60	560	900				
2.4/2	200, 230-3-60	60	100	150	250		
2 1/2	460, 575-3-60	260	420				

* Do not use

Branch Circuit Conductor Size. Maximum length in feet for maximum wire sized based on Horsepower and power supply. Wire size for entire length of branch circuit and permanent wiring to main feeder. Power supply measured at hoist, while running and with normal load, must not vary more than $\pm 5\%$ of voltage on motor nameplate.

b. Follow local & National Electrical Codes when providing electrical service to hoist. Connect power wires in accordance with appropriate wiring diagram. Power supply must be the same voltage, frequency and phase as specified on the hoist nameplate.

SPARK RESISTANT FEATURES

Spark and Corrosion Resistant models are designed for service in certain hazardous atmospheres and area where resistance to friction sparks is vitally important. These models are constructed from the following materials:

BUDGIT "USA" and Hi-Cap2 Aluminum Hand Chain Hoists

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Hooks:	Bronze Alloy
Hook Latch:	Stainless Steel
Lower Block:	Bronze Sleeve on single line hoists
	(2 Ton and below) USA Only
	Cast Aluminum on multiple line hoists
	with Bronze idler sprockets
	(3 Ton and above)
Load Chain:	Type 304 Stainless Steel
Hand Chain:	Bronze (1/4 and 1/2 Ton) USA Only
	Aluminum (1 Ton and above)
Hoist Frame:	Heat treated, cast aluminum alloy
	BUDGIT Series 2200 Air Chain Hoists
Hooks.	Bronze Allov
Hook Latch:	Stainless Steel
Lower Block:	Stainless Steel single line hoists
	(3/8 Ton and below)
	Cast Aluminum on multiple line hoists
	(3/4 Ton and above)
Load Chain:	Type 304 Stainless Steel
Hoist Frame:	Heat treated, cast aluminum alloy
	BUDGIT Series 6000 Air Chain Hoist
Hooks:	Bronze Allov
Hook Latch:	Stainless Steel
Lower Block:	Stainless Steel single line hoists
	(1/2 Ton and below)
	Cast Aluminum on multiple line hoists
	(1 and 2 Ton and above)
Limit Stop:	Bronze
Load Chain:	Type 304 Stainless Steel
Hoist Frame:	Heat treated, cast aluminum alloy
	BUDGIT Trolleys
Wheels:	Bronze or Beryllium Copper
Hand Chain:	Aluminum (Hand Geared Trolleys)
Bumpers:	Vinyl Sleeves provided on wrap around bumpers

CFM REQUIREMENTS

To determine if your shop Air Compressor has enough delivered air to operate the Budgit Series 6000, and series 2200 Air Hoist properly, the chart below can help determine your air requirements. The chart is an average of CFM of delivered air for industrial two stage reciprocating air compressors at 90 PSI. This is only a average, for exact CFM requirements for your compressor, check your compressor manufacturers listed specifications for delivered air. The chart below lists the CFM by compressor HP.

3 HP	11 CFM
5 HP	18 CFM
7.5 HP	26 CFM
10 HP	35 CFM
15 HP	53 CFM
20 HP	70 CFM
25 HP	88 CFM

The air requirements for the Budgit Air Hoists are as follows;

Series 2200	48 CFM @ 90 PSI
Series 6000	80 CFM @ 90 PSI

DATA TABLES															
DALA, LABLES, I															
		Friction	of Air in	Hose, Pul	Isating Flo	*M0									
					Cu	Ft Free A	ir per Min	Passing	Through	50-ft Len	gths of H	ose			
Size of Hose,		20	30	40	50	60	20	80	06	100	110	120	130	140	150
Couplea Each End In.	dage Pressure at Line, Ib					Loss	of Pressi	i (isd) i	n 50-ft L€	engths of	Hose				
	50	1.8	5.0	10.1	18.1										
	60	1.3	4.0	8.4	14.8	23.4									
	70	1.0	3.4	7.0	12.4	20.0	28.4								
1/2	80	0.9	2.8	9	10.8	17.4	25.2	34.6							
	06	0.8	2.4	5.4	9.5	14.8	22.0	30.5	41.0						
	100	0.7	2.3	4.8	8.4	13.3	19.3	27.2	36.6						
	110	0.6	2.0	4.3	7.6	12.0	17.6	24.6	33.3	44.5					
	50	0.4	0.8	1.5	2.4	3.5	4.4	6.5	8.5	11.4	14.2				
	60	0.3	0.6	1.2	1.9	2.8	3.8	5.2	6.8	8.6	11.2				
	20	0.2	0.5	0.9	1.5	2.3	3.2	4.2	5.5	7.0	8.8	11.0			
3/4	80	0.2	0.5	0.8	1.3	1.9	2.8	3.6	4.7	5.8	7.2	8.8	10.6		
	06	0.2	0.4	0.7	1.1	1.6	2.3	3.1	4.0	5.0	6.2	7.5	9.0		
	100	0.2	0.4	0.6	1.0	1.4	2	2.7	3.5	4.4	5.4	6.6	7.9	9.4	11.1
	110	0.1	0.3	0.5	0.9	1.3	1.8	2.4	3.1	3.9	4.9	5.9	7.1	8.4	9.9
	50	0.1	0.2	0.3	0.5	0.8	1.1	1.5	2.0	2.6	3.5	4.8	7.0		
	60	0.1	0.2	0.3	0.4	0.6	0.8	1.2	1.5	2.0	2.6	3.3	4.2	5.5	7.2
	20	:	0.1	0.2	0.4	0.5	0.7	1.0	1.3	1.6	2.0	2.5	3.1	3.8	4.7
~	80	:	0.1	0.2	0.3	0.5	0.7	0.8	1.1	1.4	1.7	2.0	2.4	2.7	3.5
	06	:	0.1	0.2	0.3	0.4	0.6	0.7	0.9	1.2	1.4	1.7	2.0	2.4	2.8
	100	:	0.1	0.2	0.2	0.4	0.5	0.6	0.8	1.0	1.2	1.5	1.8	2.1	2.4
	110	:	0.1	0.2	0.2	0.3	0.4	0.6	0.7	0.9	1.1	1.3	1.5	1.8	2.1
*For longer or sho	orter lengths of hos	se the frict	ion loss is	proportio	inal to the	length, i.e.	., for 25 ft	one-half c	of the abo	ve; for 150	ft, three t	imes the a	above, etc.		

10000 C

DATA, TABLES, F	-ORMULAS (conti	inued)													
		Friction	of Air in F	Hose, Pul:	sating Flc	۰ ۳ *									
					Cu	Ft Free Ai	ir per Min	Passing	Through	50-ft Len	gths of H	ose			
Size of Hose,		20	30	40	50	60	70	80	06	100	110	120	130	140	150
Coupled Each End In.	Gage Pressure at Line, Ib					Loss	of Pressu	re (psi) iı	ז-50-ft Le	ngths of	Hose				
	20		:	0.1	0.2	0.2	0.3	0.4	0.5	0.7	1.1				
	09		:		0.1	0.2	0.3	0.3	0.5	0.6	0.8	1.0	1.2	1.5	
	02	:			0.1	0.2	0.2	0.3	0.4	0.4	0.5	0.7	0.8	1.0	1.3
1 1/4	80		:			0.1	0.2	0.2	0.3	0.4	0.5	0.6	0.7	0.8	1.0
	06	:				0.1	0.2	0.2	0.3	0.3	0.4	0.5	0.6	0.7	0.8
	100	:	2			-	0.1	0.2	0.2	0.3	0.4	0.4	0.5	0.6	0.7
	110	:	:				0.1	0.2	0.2	0.3	0.3	0.4	0.5	0.5	0.6
	50	:	:	:	÷		0.1	0.2	0.2	0.2	0.3	0.3	0.4	0.5	0.6
	60	:	:	:			i	0.1	0.2	0.2	0.2	0.3	0.3	0.4	0.5
	20	:	:	:					0.1	0.2	0.2	0.2	0.3	0.3	0.4
1 1/2	80	:	:	:	:					0.1	0.2	0.2	0.2	0.3	0.4
	06	:	:	:	:			-			0.1	0.2	0.2	0.2	0.3
	100	:	:	:	:	:	:					0.1	0.2	0.2	0.2
	110	:	:	:	:	:	:	:				0.1	0.2	0.2	0.2

*For longer or shorter lengths of hose the friction loss is proportional to the length, i.e., for 25 ft one-half of the above; for 150 ft, three times the above, etc.

N.Y

CFM FREE AIR	1/2	3/4	1	1 1/4	1 1/2	2
10	1.00	.15	.04	.01		
20	3.97	.59	.17	.04	.02	
30		1.39	.39	.09	.04	
40		2.47	.69	.16	.07	.02
50		3.86	1.07	.25	.11	.03
60		5.55	1.54	.36	.16	.04
70			2.10	.49	.22	.06
80			2.74	.64	.28	.06
90			3.47	.80	.36	.08
100			4.28	1.00	.44	.12
125			4.62	1.24	.70	.18
150				2.24	.99	.26
175				3.08	1.34	.36
200				3.97	1.76	.47
250			Ţ		2.75	.74
300					3.96	1.06
350					5.40	1.44
400						1.86
450		C				2.37
500						2.97

In PSI in 100 ft of pipe 60 lb. gage initial pressure

CFM FREE AIR	1/2	3/4	1	1 1/4	1 1/2	2
10	.79	.12	.03			
20	3.14	.47	.14	.03		
30	7.08	1.09	.30	.07	.03	
40		1.95	.54	.13	.06	
50		3.05	.85	.20	.09	
60		4.38	1.22	.29	.12	.03
70		5.98	1.66	.39	.17	.05
80		7.82	2.16	.50	.22	.06
90			2.74	.64	.28	.08
100			3.38	.79	.37	.09
125			4.62	1.24	.55	.14
150			7.62	1.77	.78	.20
175		į		2.48	1.06	.29
200		ļ		3.14	1.39	.37
250			,	4.90	2.17	.58
300		i		7.06	3.12	.84
350					4.25	1.14
400					5.55	1.47
450						1.87
500						2.33

In PSI in 100 ft. of pipe 80 lb. gage initial pressure

		-				
CFM FREE AIR	1/2	3/4	1	1 1/4	1 1/2	2
10	.65	.10	.03			
20	2.59	.39	.11	.03	.01	
30	5.85	.90	.25	.06	.03	
40		1.60	.45	.10	.05	
50		2.51	1.00	.16	.07	.02
60		3.62	1.00	.23	.11	.03
70		4.93	1.40	.32	.14	.04
80		6.45	1.78	.41	.18	.05
90		8.30	2.26	.52	.23	.06
100			2.79	.65	.29	.08
125			4.86	1.02	.45	.12
150			6.28	1.46	.64	.17
175				1.98	.88	.24
200				2.59	1.14	.31
250				4.04	1.79	.48
300				5.82	2.58	.69
350					3.51	.94
400					4.58	1.21
450		G)			5.80	1.54
500					7.16	1.92

In PSI in 100 ft. of pipe 100 lb. gage initial pressure

CFM FREE AIR	1/2	3/4	1	1 1/4	1 1/2	2
10	.54	.09	.03			
20	2.13	.33	.10	.03		
30	4.80	.75	.21	.05	.03	
40		1.32	.37	.09	.04	
50		2.06	.58	.14	.06	
60		2.97	.83	.19	.09	.03
70		4.05	1.12	.27	.12	.04
80		5.30	1.47	.35	.16	.04
90		6.80	1.86	.43	.19	.05
100			2.29	.53	.24	.06
125			3.99	.84	.37	.10
150			5.16	1.20	.53	.14
175				1.63	.72	.20
200				2.13	.94	.25
250	····			3.32	1.47	.40
300				4.73	2.12	.56
350					2.88	.77
400					3.76	1.00
450		<u> </u>			4.77	1.27
500					5.88	1.57

In PSI in 100 ft. of pipe 125 lb. gage initial pressure

BUDGIT 2200 SERIES AIR HOIST PERFORMANCE CHARTS

1/4 TON CAPACITY HOIST

				1/4	TON CAP	ACITY HO	DIST					
LOAD		125	lbs.			250	lbs.			500	lbs.	
	U	IP	DO	WN	ι	IP	DO	WN	ι	IP	DO	WN
PSIG	Min.	Max.	Min.	Max	Min.	Max	Min.	Max	Min.	Max	Min.	Max
0	0	0	5	8	0	0	15	40	0	0	25	65
60	35	70	30	75	30	65	35	85	20	50	40	95
70	40	75	30	80	35	70	35	85	25	60	40	95
80	40	80	35	80	35	75	35	85	30	60	40	95
90	40	80	35	80	35	80	35	85	30	65	40	95
100	40	80	35	80	40	80	35	85	30	65	40	95

1/2 TON CAPACITY HOIST

LOAD		250	lbs.			500	lbs.		1000 lbs.				
	Air Pressure UP DOWN		U	IP	DO	NWN	ι	UP DOWN					
PSIG	Min.	Max.	Min.	Max	Min.	Max	Min.	Max	Min.	Max	Min.	Max	
0	0	0	15	40	0	0	25	65	0	0	45	125	
60	30	65	35	85	20	50	40	95	0	20	45	125	
70	35	70	35	85	25	60	40	95	0	30	50	120	
80	35	75	35	85	30	60	40	95	10	40	55	120	
90	35	80	35	85	30	65	40	95	15	45	55	120	
100	40	80	35	85	30	65	40	95	20	50	55	120	

1 TON CAPACITY HOIST

LOAD		500	lbs.		S	1000) Ibs.		2000 lbs.					
	-	IP	DOWN		UP		DOWN		U	IP	DOWN			
PSIG	Min. Max.		Min.	Max	Min.	Max	Min.	Max	Min.	Max	Min.	Max		
0	0	0	8	20	0	0	13	33	0	0	25	65		
60	15	32	16	42	10	25	20	50	0	10	25	65		
70	16	35	17	42	12	30	20	50	0	15	25	60		
80	17	37	18	42	14	31	20	48	5	20	30	60		
90	18	40	18	42	15	32	20	47	7	23	30	60		
100	20	40	18	42	15	34	20	45	10	25	30	60		

NOTE: Hoist Speeds are shown in feet per minute (f.p.m.)

BUDGIT 6000 SERIES AIR HOIST PERFORMANCE CHARTS

1 TON CAPACITY HOIST

LOAD	500) lb.	100	0 lb.	150	0 lb.	2000 lb.			
Air				DOWN				DOWN		
Plessure	UP	(Max.)	UP	(Max.)	UP	(Max.)	UP	Min.	Max.	
60	40	36	33	36	28	36	20	25	36	
70	43	39	36	39	31	39	24	28	39	
80	47	42	39	42	34	42	28	32	42	
90	50	47	42	47	38	47	30	36	47	

2 TON CAPACITY HOIST

LOAD	100	0 lb.	200	0 lb.	300	0 lb.	4000 lb.			
Air				DOWN		DOWN		DOWN		
Plessure	UP	(Max.)	UP	(Max.)	UP	(Max.)	UP	Min.	Max.	
60	19	17	16	17	14	17	10	12	17	
70	21	19	17	19	15	19	12	14	19	
80	22	20	19	20	16	20	14	16	20	
90	24	22	20	22	18	22	15	18	22	

3 TON CAPACITY HOIST

LOAD	150	0 lb.	300	0 lb.	450	0 lb.	6000 lb.			
Air		DOWN		DOM/N		DOWN		DO	WN	
Plessure	UP	(Max.)	UP	(Max.)	UP	(Max.)	UP	Min.	Max.	
60	13	11	11	11	9	11	6	8	11	
70	14	12	12	12	10	12	8	9	12	
80	15	13	13	13	11	13	9	10	13	
90	16	14	14	14	12	14	10	11	14	

NOTE: Hoist Speeds are shown in feet per minute (f.p.m.)

STANDARD I-BEAM SIZES

Standard Beam Sizes

These charts show common standard beam sizes, weights and nominal flange widths for both American Standard Section "S" Shapes and Wide Flange Shapes (as listed by American Institute of Steel Construction). Wide Flange Shapes are W Shapes effective approximately September 1, 1978.

Always include beam sizes when ordering BUDGIT Trolleys and Trolley Hoists.



	AMERICAN ST SECTIONS ("S'	'ANDARD " BEAMS)		WIIDE	FLANGE SECTIO	NS ("W" BI	EAMS)	
	Designation (ins. & Lbs.)	Flange Width (Ins.)						
	S4 X 7.7	2 5/8	W6 X 9	4	W12 X 14	4	W18 X 35	6
	S4 X 9.5	2 3/4	W6 X 12	4	W12 X 16	4	W18 X 40	6
	S5 X 10	3	W6 X 15	6	W12 X 19	4	W18 X 46	6
	S5 X 14.75	3 1/4	W6 X 16	4	W12 X 22	4	W18 X 50	7 1/2
	S6 X 12.5	3 3/8	W6 X 20	6	W12 X 26	6 1/2	W18 X 55	7 1/2
	S6 X 17.25	3 5/8	W6 X 25	6	W12 X 30	6 1/2	W18 X 60	7 1/2
	S7 X 15.3	3 5/8	W8 X 10	4	W12 X 35	6 1/2	W18 X 65	7 1/2
	S7 X 20	3 7/8	W8 X 13	4	W12 X 40	8	W18 X 71	7 5/8
	S8 X 18.4	4	W8 X 15	4	W12 X 45	8	W18 X 76	11
	S8 X 23	4 1/8	W8 X 18	5 1/4	W12 X 50	8	W18 X 86	11
	S10 X 25.4	4 5/8	W8 X 21	5 1/4	W12 X 53	10	W18 X 97	11 1/8
	S10 X 35	5	W8 X 24	6 1/2	W12 X 58	10	W18 X 106	11 1/4
	S 12 X 31.8	5	W8 X 28	6 1/2	W14 X 22	5	W18 X 119	11 1/4
	S12 X 35	5 1/8	W8 X 31	8	W14 X 26	5	W21 X 44	6 1/2
	S12 X 40.8	5 1/4	W8 X 35	8	W14 X 30	6 3/4	W21 X 50	6 1/2
	S12 X 50	5 1/2	W8 X 40	8	W14 X 34	6 3/4	W21 X 57	6 1/2
	S15 X 42.9	5 1/2	W8 X 48	8 1/8	W14 X 38	6 3/4	W21 X 62	8 1/4
	S15 X 50	5 5/ 8	W8 X 58	8 1/4	W14 X 43	8	W21 X 68	8 1/4
X	S18 X 54.7	6	W8 X 67	8 1/4	W14 X 48	8	W21 X 73	8 1/4
	<mark>S18 X 7</mark> 0	6 1/4	W10 X 12	4	W14 X 53	8	W21 X 83	8 1/4
	<mark>S2</mark> 0 X 66	6 1/4	W10 X 15	4	W14 X 61	10	W24 X 55	7
	<mark>S2</mark> 0 X 75	6 3/8	W10 X 17	4	W14 X 68	10	W24 X 62	7
	S <mark>2</mark> 0 X 85	7	W10 X 19	4	W14 X 74	10	W24 X 68	9
	S20 X 95	7 1/4	W10 X 22	5 3/4	W14 X 82	10 1/8	W24 X 76	9
	S24 X 80	7	W10 X 26	5 3/4	W16 X 26	5 1/2	W24 X 84	9
	S24 X 90	7 1/8	W10 X 30	5 7/8	W16 X 31	5 1/2	W24 X 94	9
	S24 X 100	7 1/4	W10 X 33	8	W16 X 36	7	W27 X 84	10
	S24 X 106	7 7/8	W10 X 39	8	W16 X 40	7	W27 X 94	10
	S24 X 120	8	W10 X 45	8	W16 X 45	7	W27 X 102	10
			W10 X 54	10	W16 X 50	7	W27 X 114	10
			W10 X 60	10	W16 X 57	7 1/8	W30 X 108	10 1/2
			W10 X 68	10 1/8	W16 X 67	10 1/4	W30 X 116	10 1/2
			W10 X 77	10 1/4	W16 X 77	10 1/4	W30 X 124	10 1/2
			W10 X 88	10 1/4	W16 X 89	10 3/8	W30 X 132	10 1/2
			W10 X 100	10 3/8	W16 X 100	10 3/4		
			W10 X 112	10 1/2				

CHANNELS

STANDARD STRUCTURAL

A	Weight Lbs. per Foot	B	C		
Depth in Inches		Flange Width Inches	Web Thickness Inches		
3	4.1	1.410	.170		
	5.0	1.498	.258		
	6.0	1.596	.356		
4	5.4	1.580	.180		
	6.25	1.647	.247		
	7.25	1.720	.320		
5	6.7	1.750	.190		
	9.0	1.885	.325		
6	8.2	1.920	.200		
	10.5	2.034	.314		
	13.0	2.157	.437		
7	9.8	2.090	.210		
	12.25	2.194	.314		
	14.75	2.299	.419		
8	8.5	1.875	.180		
	11.5	2.260	.220		
	13.75	2.343	.303		
	18.75	2.527	.487		
9	13.4	2.430	.230		
	15.0	2.485	.285		
	20.0	2.648	.448		
10	15.3	2.600	.240		
	20.0	2.739	.379		
	25.0	2.886	.526		
	30.0	3.033	.673		
12	20.7	2.940	.280		
	25.0	3.047	.387		
	30.0	3.170	.510		
13	33.9	3.400	.400		
	40.0	3.520	.520		
	50.0	3.716	.716		

J

METRIC CONVERSION FACTORS

English to Metric

	Multiply		Ву		To Obtain
	Pounds (avoirdupois)		.45359		Kilograms
	Net Tons (2000 Lbs.)		.90718		Metric Tons
	Gross Tons (2240 Lbs.)		1.01605		Metric Tons
	Inches	2	25.4001		Millimeters
	Feet		.304801		Meters
	Yards		.914402		Meters
	Miles (statute)		1.60935		Kilometers
	Square Inches	(6.45163		Sq. Centimeters
	Square Feet		.092903		Square Meters
	Pounds per Lineal Ft.		1.48816		Kilograms per Lineal Meter
	Pounds per Sq. Inch		.07031		Kilograms per Sq. Centimeter
	Pounds per Sq. Ft.	4	4.88241		Kilograms per Sq. Meter
	Pounds per Cu. Foot	1	6.01837		Kilograms per Cu. Meter
		Metric	To English	1	
	Kilograms		2 20462		l bs. (avoirdupois)
	*Metric Tons		1.10231		Net Tons 2000 Pounds
	*Metric Tons		.98421		Gross Tons 2240 Pounds
	Millimeters		.03937		Inches
	Meters	3	.280833		Feet
	Meters		1.09361		Yards
	Kilometers		.62137		Miles (statute)
	Square Centimeters		.155		Square Inches
	Square Meters	1	0.76387		Square Feet
	Kilograms per Linear Mete	r	.67197		Lbs. per Lineal Ft.
	Kilograms per Sq. Centime	ter ·	14.2234		Pounds per Sq. In.
	Kilograms per Square Mete	er	.20482		Pounds per Sq. Ft.
	Kilograms per Cubic Meter		.06243		Pounds per Cu. Ft.
NOTE:	Length, width and cube on Mass and weight denote Capacity denotes liters	denote meters Grams			
One N	letric Ton = 2204.62 Lbs.				
		Abbr	eviations		
	Kilometer -	km		Kilogram	- kg
	Meter -	m		Gram	- g or gm
	Centimeter -	cm		Centigrar	n - cg
	Millimeter -	mm		Milligram	- mg

TERMS & DEFINITIONS

Abnormal Operating Conditions – environmental conditions that are unfavorable, harmful, or detrimental to or for the operation of a hoist, such as excessively high or low ambient temperatures, exposure to weather, corrosive fumes, dust laden or moisture laden atmospheres, and hazardous locations.

Appointed – assigned specific responsibilities by the employer or the employer's representative.

Authorized - appointed by a duly constituted administrative or regulatory authority.

Brake - a device, other than a motor, used for retarding or stopping motion by friction or power means

Brake, Mechanical Load – an automatic type of friction brake used for controlling loads in a lowering direction. This unidirectional device requires torque from the motor or hand chain wheel to lower a load but does not impose any additional load on the motor or hand chain wheel when lifting a load.

Braking, Dynamic – a method of controlling speed by using the motor as a generator, with the energy being dissipated by resistance.

Braking, Eddy Current – a method of controlling or reducing speed by means of an energy induction load brake.

Braking, Mechanical - a method of controlling or reducing speed by friction.

Braking, Pneumatic – a method of controlling or powering a drive or brake by means of a compressed gas.

Braking, Regenerative – a method of controlling speed in which the electrical energy generated by the motor is fed back into the power system.

Bridge – that part of an overhead crane, consisting of one girder, trucks, and (if applicable) drive mechanism, which carries the trolley or trolleys.

Bridge Girder – a crane member of which carriers or trolleys travel horizontally, mounted between and supported by the end trucks.

Bridge Travel - the crane movement in a direction parallel to the crane runway.

Bumper – a device for reducing impact when a moving crane or trolley reaches the end of its permitted travel, or when two moving cranes or trolleys come into contact. This device may be attached to the bridge, trolley, or runway stop.

Chain, Hand – the chain grasped by a person to apply force required for the lifting or lowering motion.

Chain, Load – the load-bearing chain in a hoist.

Chain, Roller – a series of alternately assembled roller links and pin links in which the pins articulate inside the bushings and the rollers are free to turn on the bushings. Pins and bushings are press fit in their respective link plates.

Chain, Welded Link – a chain consisting of a series of interwoven links formed and welded.

Clearance – the distance from any part of the crane to the nearest obstruction.

Collectors, Current – contacting devices for conducting current from runway or bridge conductors.

Conductors, Bridge – the electrical conductors located along the bridge structure of the crane that transmit control signals and power to the trolley(s).

TERMS & DEFINITIONS (Continued)

Conductors, Runway (Main) – the electrical conductors located along a crane runway that transmit control signals and power to the crane.

Control Panel – an assembly of components (magnetic, static, hydraulic, pneumatic, etc.) which governs the flow of power to or from a motor or other equipment in response to signals from a master switch, push button station, remote control, automatic program control, etc.

Crane – a machine for lifting and lowering a load, and moving it horizontally. Cranes, whether fixed or mobile, are driven manually, by power, or by a combination of both.

Crane, Cantilever Gantry – a gantry or semigantry crane in which the bridge girders or trusses extend transversely beyond the crane runway on one or both sides.

Crane, Floor Operated – a crane that is controlled by a means suspended from the crane, operated by a person on the floor or on an independent platform.

Crane, Gantry – a crane similar to an overhead crane, except that the bridge for carrying the trolley or trolleys is rigidly supported on two or more legs running on fixed rails or other runway.

Crane, Manually Operated – a crane whose hoist mechanism is drive by pulling an endless chain or whose travel mechanism is driven in the same manner or by manually moving the load.

Crane, Overhead – a crane with a movable bridge carrying a movable or fixed hoisting mechanism and traveling on an overhead, fixed runway structure.

Crane, Power-Operated – a crane whose mechanism is driven by electric, pneumatic, hydraulic, or internal combustion means.

Crane, Semigantry – a gantry crane with one end of the bridge rigidly supported on one or more legs that run on a fixed rail or runway, the other end of the bridge being supported by an end truck running on an elevated rail or runway.

Crane Service, Normal – that service which involves operation with randomly distributed loads within the rated load limit, or with uniform loads of less than 65% of the rated load, for no more than 15% of the time of a single work shift for manually operated cranes and 25% of the time of a single work shift for electrically or pneumatically powered cranes.

Crane Service, Heavy – that service which involves operation within the rated load limit which exceeds normal service.

Crane Service, Severe - that service which involves normal or heavy service with abnormal operating conditions.

Crane Service, Standby – a crane which is not regular service but which is used occasionally or intermittently as required.

Designated – selected or assigned by the employer or the employer's representative as being competent to perform specific duties.

Drift Point – a point on a travel motion master switch or on a manual controller that maintains the brake released while the motor is not energized. This allows for coasting.

End Truck – the assembly consisting of the frame and wheels which support the crane girder and allow movement along the runway.

Guide, Chain – a means to guide the load chain at the load sprocket.

TERMS & DEFINITIONS (Continued)

Hazardous (Classified) Locations – Locations where fire or explosion hazards may exist. Locations are classified depending on the properties of the flammable vapors, liquids or gases, or combustible dusts or fibers which may be present and the likelihood that a flammable or combustible concentration or quantity is present.

Class 1 Locations – locations in which flammable gases or vapors are or may be present in the air in quantities sufficient to produce explosive or ignitable mixtures.

Class 2 Locations - locations that are hazardous because of the presence of combustible dust.

Class 3 Locations – locations that are hazardous because of the presence of easily ignitable fibers or flyings, but in which such fibers or flyings are not likely to be in suspension in the air quantities sufficient to produce ignitable mixtures.

Headroom – the distance from the bottom of the beam or top of the hoist to the saddle hook in its highest position.

Hoist – a suspended machinery unit that is used for lifting or lowering a freely suspended (unguided) load.

Hoist, Auxiliary – a supplemental hoisting unit, usually of lower load rating and higher speed than the main hoist.

Hoist Motion - that motion which lifts or lowers a load.

Limit Device – a device which is operated by some part or motion of a power driven hoist to limit motion.

Lifting Devices – devices which are not reeved onto the hoist rope or chain, such as hooks on buckets, magnets, grabs, and other supplemental devices used for ease of handling certain types of loads. The weight of these devices is to be considered part of the rated load.

Load – the total superimposed weight on the load block or hook.

Load Block – the assembly of hook or shackle, swivel, bearing, sheaves, sprockets, pins, and frame suspended by the hoisting rope or load chain. This shall include any appurtenances reeved in the hoisting rope or load chain.

Load Rated – the maximum load for which a hoist is designated by the manufacturer or qualified person.

Load Suspension Parts – the load suspension parts of the hoist are the means of suspension (hook or lug), the structure or housing which supports the drum or load sprocket, the rope or load chain, the sheaves or sprockets, and the load block or hook.

Normal Operating Conditions – conditions during which a hoist is performing functions within the scope of the original design.

Overload – any load greater that the rated load.

Overtravel Restraint – a device used to prevent the slack load chain from inadvertently being lowered out of the load sprocket.

Parts (Lines) – number of lines of rope or chain supporting the load block or hook.

Pawl - a device for holding the machinery against undesired rotation by engaging a ratchet.

Pendant Station – controls suspended from the hoist for operating the unit from the floor.

Power Transmission Parts – the machinery components including the gears, shafts, clutches, couplings, bearings, motors, and brakes.

TERMS & DEFINITIONS (Continued)

Qualified Person – a person who, by possession of a recognized degree or certificate of professional standing, or who, by extensive knowledge, training, and experience, as successfully demonstrated the ability to solve or resolve problems relating to the subject matter and work.

Rail Sweep – a device attached to the crane and located in front of the crane's leading wheels to push aside loose obstruction.

Ratchet – a toothed member for engagement with the pawl.

Reeving - a system in which a rope or chain travels around drums, sheaves, or sprockets.

Runway - an assembly of rails, beams, girders, brackets, and framework on which the crane travels.

Service, Normal – that distributed service which involves operation with randomly distributed loads within the rated load limit, or uniform loads less than 65% of rated load for not more than 15% of the time for manually operated hoists, and 25% of the time for electric or air-powered hoists.

Service, Heavy – that service which involves operation within the rated load limit which exceeds normal service.

Service, Severe – that service which involves normal or heavy service with abnormal operating conditions.

Sheave – a grooved wheel or pulley used with a rope or chain to change direction and point of application of pulling force.

Side Pull – the component of the hoist pull acting horizontally when the hoist lines are not operated vertically.

Span – the horizontal distance, center to center, between runway rails.

Sprocket, **Idler** – a freely rotation device that changes the direction of the load chain.

Sprocket, Load – a hoist component that transmits motion to the load chain. This component is sometimes called load wheel, load sheave, pocket wheel or chain wheel.

Stop – a device to limit travel of a trolley or crane bridge. This device normally is attached to a fixed structure and normally does not have energy absorbing ability.

Switch – a device for making, breaking, or changing the connections in an electric, hydraulic, or pneumatic circuit.

Switch, Limit – a device that is actuated by the motion of a part of a power-driven machine or equipment to alter or disconnect the electric, hydraulic, or pneumatic circuit associated with the machine or equipment.

Top Running – to run on top of the bridge beams or runway beams.

Trolley – the unit which travels on the bottom flange of the bridge girder and carries the hoist.

Trolley Travel – the trolley movement in directions at right angles to the crane runway.

Unattended – a condition in which the operator of a hoist is not at the operating control devices (pendant station or hand chain). However, if the control devices are within an unobstructed distance of 26 ft. (8.0 m) and within sight of the operator, the hoist should be considered attended.

Under Hung – to ride on the lower flange of the runway beams or bridge beam.

Wheel, Hand Chain – a wheel with formed pockets on its periphery to allow torque to be transmitted when a force is applied to the hand chain.

INSPECTIONS & MAINTENANCE

RECOMMENDED HOIST MAINTENANCE AND INSPECTION

Daily or start of each shift — Check operation of all functional mechanisms including limit switch operation, brakes, & control. Check hoist load chain for gouges, nicks, weld spatter, corrosion, distorted links, or twists in the chain. Inspect hooks, upper and lower blocks, hook latches, and all load bearing components for signs of damage.

FOLLOW INSPECTION GUIDELINES IN REPAIR MANUAL & ANSI B30.16 INSPECTION PROCEDURES

HOISTS

Lubricate Load Chain Frequently Lubricate Upper Hook & Lower Block Assembly Lubricate Limit Lever Control Shaft Gears Change Gear Case Oil – Electric & 6000 Series Air Hoist 1-½ pints Dexron II Automatic Transmission Fluid required Check & drain air line filters daily — Air Hoists only Check & fill air line lubricators daily — Air Hoists only

TROLLEYS

Check for proper Trolley spacing on beams Drive wheel gears are to be lubricated with an open type gear grease Change gear case oil on gear reducers on powered trolleys, if needed drain and replace with a 90 wt. gear oil

HAND CHAIN OPERATED HOISTS

MISC.

Change Gearcase Lub. Grounding Faults

Req. Warning Labels

*See text for DAILY & WEEKLY REQUIREMENTS O INSPECTION INTERVAL

Grease Wheels

HOIST	INSPECTION SCHEDULE AND MAINTENANCE REPORTCUSTOMER HOIST IDENTITY NO											
RAIED	LOAD							LOCA TH	I ION IN IS INSF	PLAN	N IS MONTLY ANNUAL	
								INSPE	CTED	BY		
СОМ	PONENT, UNIT OR PART and location on hoist	*Reco Ins	omme spectio nterva	nded on Il	(Che or un	ck columr it is inspe con	CON best ind cted. Use dition is r	DITION icating col note colu	ndition wh umn to the pelow.)	nen part e right if	CORRECTIVE ACTION NOTES	
LOCATION	COMPONENT, UNIT OR PART	ΜΟΝΤΗLΥ	SEMIANNUAL ANNUAL ANNUAL GOOD GOOD GOOD ADUSTMENT REQUIRED REQUIRED (Loose Parts or Wires) REPLACEMENT		(Indicate corrective action taken during inspection and note date. For corrective action to be done after inspection, a designated person must determine that the existing deficiency does not constitute a safety hazard before allowing unit to operate. When corrective action is completed, describe and note date in this column.)							
	Motor	0										
	Motor Brake	0										
	Mechanical Load Brake	0										
	Overload Clutch	0									If so equipped	
	Hook Latch Operation	0										
	Gears Shafts & Bearings	0										
F	Upper Block & Hook	0										
PIOF	Lower Block & Idler Sprockets	0										
-	Hook & Throat Opening	•		x							Record Hook Throat Opening	
	Load Chain	0		~							In Accordance with ANSI B30 16	
	Load Sprocket	0	0									
			0									
	Guards		0									
	Limit Switch	0									A	
7	Load Chain Reeving	0	~									
1 Ng l	Air Hoso	0	0									
HBU-	Pendant Throttle	0										
STA USF	Wiring	0	0									
<u> </u>	Motor								-			
	Brake (when so equipped)	0										
	Gears Shafts & Bearings	0										
	Frame			0								
~	Wheels		0	Ť								
LLE,	Wheel Spacing on Beam	0		-							In Accordance with Manufacture Specs.	
TRO	Bumpers		0									
	Guards		0	C								
	Hand Chain & Wheel	0										
	Conductors	0										
	Collectors	0										
	Air Lines & Valves	0										
R M M	Filters	0									Drained (daily)	
All	Lubricators	0									Filled (when needed)	
0.	Regulators	0	/									
0	Monorail Joints		0									
VAYS	Monorail		0									
NN	Main Conductors	0										
R	Main Collectors	0										
	General Condition		0									
	Load Attachment Chains	•										
	Rope Slings & Connections	•										

If equipped with grease fitting on axles

SIGNED & DATED REPORT REQUIRED - OSHA
 X MAGNETIC PARTICLE OR EQUIVALENT EXAMINATION REQUIRED.

0

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0

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HAND CHAIN OPERATED HOISTS

INSPECTION SCHEDULE AND MAINTENANCE REPORT

HO RA

•	••	•••		_
1	F١	/F	E_	

RUN-WAYS

MISC.

Wheels

Monorail

Wheel Spacing on Beam

Grease Wheels

Monorail Joints

General Condition Load Attachment Chains

Req. Warning Labels

O INSPECTION INTERVAL

Rope Slings & Connections

*See text for DAILY & WEEKLY REQUIREMENTS

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0

0 0 0

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DIST SERIAL NO. (MFGRS)_	
TED LOAD	
PE	

CUSTOMER HOIST IDENTITY NO. _

YPE								TH	IS INSE		
										20110	SEMI-ANNUAL
					1			INSPE	ECTED	BY	DATE
COM	PONENT, UNIT OR PART and location on hoist	*Rec In	omme specti Interva	ended on al	(Che or ur	ck colum nit is inspe cor	CON n best ind ected. Us ndition is	DITION dicating co e note col not listed	l ondition w lumn to th below.)	hen part e right if	CORRECTIVE ACTION NOTES
LOCATION	COMPONENT, UNIT OR PART	ΜΟΝΤΗΓΥ	SEMIANNUAL	ANNUAL	GOOD	ADJUSTMENT REQUIRED	REPAIR REQUIRED (Loose Parts or Wires)	REPLACEMENT REQUIRED (Worn or Damaged)	LUBRICATION REQ. (Low Oil or Grease Rust or Corrosion)	CLEANING OR PAINTING REQUIRED	(Indicate corrective action taken during inspection and note date. For corrective action to be done after inspection, a designated person must determine that the existing deficiency does not constitute a safety hazard before allowing unit to operate. When corrective action is completed, describe and note date in this column.)
	Load Brake	0									
	Overload Clutch	0									If so equipped
	Gears, Shafts & Bearings	0									
	Upper Block & Hook	0									
	Lower Block & Idler Sprockets	0									
IST	Hook & Throat Opening	•		Х							Record Hook Throat Opening
우	Hook Latch Operation	0									
	Hand Chain & Wheel		0								
	Guards		0								
	Load Chain	0					7				In Accordance with ANSI B30.16
	Capacity Labels	0									
	Load Chain Reeving	0									
	Hand Chain & Wheel	0									
	Loose Nuts & Bolts		0								
	Gears, Shafts & Bearings	0									
Ϋ́	Frame			0							
SOLLI	Bumpers		0								
TRC	Guards		0								

In Accordance with Manufacture Specs.

If equipped with Grease fittings on Axles

SIGNED & DATED REPORT REQUIRED - OSHA
 X MAGNETIC PARTICLE OR EQUIVALENT EXAMINATION REQUIRED.

MANGUARD ELECTRIC CHAIN HOIST TROUBLE SHOOTING

Trouble	Cause May Be	Remedy
1. Hoist Will Not Operate.	a. No power to hoist.	a. Check switches, circuit breakers and connections in power supply lines. Check power collectors
	b. Wrong voltage.	b. Check voltage required on motor data plate against power supply.
	c. No control voltage.	c. Check transformer fuse. If blown, check for grounding and/or short in the push buttor station. Check the transformer coils for signs of overheating. Replace transformer if burned out. Verify the transformer secondary is the same voltage as the coils to which it is connected.
	d. Loose or broken wire connections in hoist electrical system.	d. Shut off power supply, remove electrical cover from hoist and check wiring connections. Also check connections in push button station and limit switches.
	e. Contactor assembly not functioning.	e. Check for burned out solenoid coil. See that necessary jumper wires are properly installed.
	f. Starting switch burnes out (single phase motor).	f. Replace burned out parts.
	g. Motor burned out	g. Replace motor. On single-phase motors the starting switch may be burned out.
2. Hook Moves in Wrong Direction.	a. Reverse phasing on three-phase hoists.	a. Interchange any two of three power supply line leads. Do not change green ground lead.
	b. Hoist wired wrong.	b. Check wiring connections with appropriate wiring diagram.
	c. Starting switch not working correctly (single phase motor).	c. Check for correct starting switch part number and function. Replace if necessary.
3. Hook Will Raise But Not Lower.	a. "DOWN" electrical circuit open	a. Check for loose connections. See that necessary jumper wires are properly installed on contactor. Check limit switch condition and electrical conditions.
5/	b. Contactor assembly not functioning.	b. See that necessary jumper wires are properly installed. Verify that the contactor armatures are free to move. If binding occurs replace contactor. Check for burned out contactor Coils.
	c. Push button inoperative.	c. Check push button contacts and wires.
	d. Load brake locked up and overload clutch slipping.	Station.

MANGUARD ELECTRIC CHAIN HOIST TROUBLE SHOOTING

Trouble	Cause May Be	Remedy
1. Hook Will Lower But Not Raise.	a. Excessive Load, causing overload clutch to slip.	a. Reduce loading to rated load of hoist, as shown on nameplate.
	b. Overload clutch out of adjustment.	b. Test hoist and replace clutch if hoist will not lift rated load.
	c. "UP" electrical circuit open.	c. Check for loose connections. See that necessary jumper wires are properly installed on contactor. Check limit switch condition and electrical connections.
	d. Contactor assembly not functioning.	d. See that necessary jumper wires are properly installed. Verify that the contactor armatures are free to move. If binding occurs replace contactor. Check for burned out contactor coils.
		e. Check push button contacts and wires.
	e. Push button inoperative	
 Hoist Will Not Lift Rated Load. 	a. Low voltage.	a. See that power supply is same voltage listed on motor data plate. Check size of power supply lines.
	b. Overload clutch out of adjustment.	b. Remove and replace clutch assembly.
	c. Motor brake not releasing.	c. Check brake components.
3. Excessive Drift When Stopping.	a. Excessive load.	a. Reduce loading to rated load, shown on nameplate.
	b. Motor brake not holding.	b. Check brake components.
	c. Load brake not holding.	c. Remove load brake and inspect parts.
4. Hoist Motor Overheats.	a. Excessive load.	a. Reduce loading to rated load of hoist, shown on nameplate.
	b. Excessive duty-cycle.	b. Reduce frequency of lifts.
	c. Excessive "jogging".	c. Reduce frequency of jogs.
	d. Wrong Voltage.	d. Check voltage rating on motor data plate against power supply.
	e. Starting switch on single-phase motors not opening starting winding.	e. Inspect switch.
5/	f. Damaged motor or worn bearings in motor or hoist frame.	f. Dissemble hoist and inspect for worn or damaged parts.

2200 SERIES AIR CHAIN HOIST TROUBLE SHOOTING

Trouble	Cause May Be	Remedy
1. Hoist does not operate.	a. Insufficient air pressure at source.	a. Check air pressure and adjustment.
	b. Brake improperly adjusted.	b. Adjust brake.
	c. Clogged air intake screen.	c. Shut off air - disconnect air hose - clean inlet swivel screen.
	d. Excessive Overload.	d. Reduce load.
	e. Clogged valve.	e. Remove valve caps - remove any obstructions, clean and lubricate valve.
	f. Valve shifter not functioning.	f. Check for proper installation of drive pin in valve shifter and control lever and also that shifter pin is assembled solidly to throttle valve.
	g. Motor failure.	g. Disassemble motor and check rotor blades. Replace defective parts.
2. Hoist will not hold load in	a. Brake out of adjustment.	a. Adjust brake.
suspension.	b. Brake lining oily, glazed or badly worn.	b. Remove brake arms and replace with new.
	c. Excessive overload.	c. Reduce load
3. Control lever does not return to	a. Control shaft bent.	a. Remove shaft and straighten or replace.
norizontal position.	b. Foreign material, rust or corrosion causing it to bind.	b. Remove shaft and clean. Lubricate bearings, brake cam and valve shifter.
	c. Foreign material, rust or corrosion in control cylinders or pendant throttle control.	c. Clean control cylinders.
	d. Brake improperly adjusted.	d. Adjust brake.
4. Hoist loses power.	a. Insufficient air pressure.	a. Check air pressure and adjust.
	b. Clogged air intake screen.	b. See this section, paragraph 1.
	c. Clogged muffler screen.	c. Remove throttle valve housing. Clean screen and muffler.
	d. Worn or broken rotor blades.	d. Replace rotor blades.

2200 SERIES AIR CHAIN HOIST TROUBLE SHOOTING

Trouble	Cause May Be	Remedy
1. Cannot regulate speed by control handles.	a. Brake improperly adjusted.	a. Adjust Brake.
	b. Speed adjustment screws improperly set.	b. Readjust screws.
2. Cannot regulate speed by pendant	a. Brake improperly adjusted.	a. Adjust brake.
	b. Control cylinders improperly adjusted.	b. Adjust control cylinder set screws.
3. Hoist lifting or lowering speed differs from rated speed at full load.	a. Valve shifter or control shaft bent or damaged.	a. Repair or install new parts, and lubricate.
	b. Incorrect air pressure or inadequate air supply.	b. Check pressure near hoist when hoist is operating.
	c. Speed adjustment screws improperly set.	c. Readjust screws.
	d. Loss of power.	d. See paragraph 4
	e. Set screw in control cylinder is improperly set.	e. Screw set screw all of the way in, then back of screw about 1/2 to 1 turn.

6000 SERIES AIR CHAIN HOIST TROUBLE SHOOTING

Trouble	Cause May Be	Remedy
1. Hoist does not operate.	a. Insufficient air pressure at source.	a. Check air pressure and adjust.
	b. Insufficient air supply at hoist.	b. Use correct size supply hose.
	c. Clogged air intake.	c. Shut off air — disconnect air hose — clean air filter.
	d. Excessive overload.	d. Reduce loading to rated capacity of hoist, as shown on nameplate.
	e. Clogged valve — pendant throttle control.	e. Disassemble and check pendant throttle control.
	f. Clogged or Inoperative valve — supply head assembly.	f. Disassemble and check supply head assembly.
	g. Motor failure.	g. Disassemble motor and check rotor vanes and springs. Replace defective parts.
2. Hoist will not hold load in suspension.	a. Load brake not holding.	a. Remove load brake and inspect parts.
3. Hoist will raise but not lower.	a. Load brake locked up and overload clutch slipping (Caused by excessive overload).	a. Consult Authorized BUDGIT Hoist Repair Station.
4. Hoist loses power.	a. Insufficient air pressure.	a. Check air pressure and adjust.
	b. Clogged air intake.	b. See this Section, Paragraph 1.
	c. Clogged muffler (Iced).	c. Remove muffler cover. Clean screen and muffler. Reduce frequency of lift to prevent icing.
	d. Worn or broken rotor vanes, springs, or pins.	d. Replace rotor vanes, springs and pins.
5. Cannot regulate speed by control handles.	a. Clogged valve — Pendant throttle control.	a. See this Section, Paragraph 1.
6. Hoist lifting or lowering speed differs from rated speed at full load.	a. Incorrect air pressure or inadequate air supply.	a. Check pressure at hoist when hoist is operating.
	b. Loss of power.	b. See this Section, Paragraph 4.

BUDGIT USA MANUAL CHAIN HOIST TROUBLE SHOOTING

Trouble	Cause May Be	Remedy
1. Hoist is hard to operate in hoisting direction.	a. Hoist is overloaded.	a. Reduce load to within rated hoist capacity Hoist should be dismantled and thoroughly inspected for additional damage from overloading.
	b. Load chain is damaged, worn, elongated or binding between load chain sprocket and guide.	b. Check chain for bent or twisted links, gouges or nicks. Check for wear between links and gauge chain. Replace if necessary.
	c. Load chain dry, rusty corroded or dirty with foreign material adhering to chain.	c. Clean chain by tumble polishing or clean with solvent.
	d. Load chain sprocket worn or clogged with foreign material.	d. Clean and inspect sprocket. Replace if necessary.
	e. Chain twisted.	e. Rereeve chain hoist keeping chain free of twist.
 Load brake slips and chain hoist will not support load. 	a. Brake friction surfaces coated with excessive oil or friction washers glazed.	a. Remove and disassemble load brake. Clean and buff friction washers or install new washers.
	b. Brake parts worn or damaged.	b. Remove brake parts. Inspect brake parts. Replace worn or damaged parts.
	c. Load chain reeved incorrectly	c. Remove load chain and install correctly.
	d. Brake pawl hangs up.	d. Check brake pawl engagement and brake pawl spring.
3. Load brake drags, hard to lower load. (Hand chain is hard to pull).	a. Dirty or corroded internal parts.	a. Remove and disassemble brake. Clean and buff surfaces. Install Brake.
	b. Brake friction surfaces scored.	b. Refer to a. above. Replace if scored excessively.
	c. Load gearing damaged from overloading.	c. Remove damaged gears and install new gears. Hoist should be dismantled and throughly inspected for additional damage from overloading.
	d. Chain binding.	d. See items 1.b., 1.c. and 1.d.

BUDGIT USA MANUAL CHAIN HOIST TROUBLE SHOOTING

Trouble	Cause May Be	Remedy
1. Chain hoist works erratically.	a. Load chain incorrectly installed.	a. Remove load chain. Install chain correctly.
	b. Load brake pawl or ratchet teeth worn or damaged.	b. Remove load brake parts. Inspect parts. Replace damaged parts.
	c. Frame cracked or mulitated.	c. Replace frame.
	d. Hand chain rubbing on cover.	d. Remove interference.
	e. Hand chain hanging up in hand wheel.	e, Clean and lubricate hand chain.
2. Hooks opened.	a. Chain hoist overloaded.	a. Replace opened hooks. Hoist should be dismantled and throughly inspected for additional damage from overloading.
3. Frame damaged.	a. Hoist subjected to overloading.	a. Load chain hoist only to rated capacity. Replace damaged frame. Hoist should be dismantled and thoroughly inspected for additional damage from overloading.
	b. Load chain run too far through chain block frame.	b. Replace damaged frame.
	c. Chain hoist subjected to extreme angular or side pulls, causing chain to bind.	c. Operate chain hoist properly. Replace damaged frame.
	d. Chain hoist damaged by dropping or throwing.	d. Disassemble chain hoist. Inspect chain hoist. Replace damaged parts and asemble chain hoist. Whenever the frame shows evidence of damage from misuse or rough handling, the hoist should be completely dismantled, all parts inspected and damaged or worn parts replaced. Always apply the safety rules shown on the inside of the back cover when using BUDGIT USA hand chain hoist.
4. Clutch slipping excessively.	a. Hoist is overloaded.	a. Reduce load to within rated hoist capacity. Hoist should be dismantled and throughly inspected for additional damage from overloading.
	b. Internal binding.	b. See item 6.d.
	c. Load brake locked up.	c. See item 2.a.
	d. Clutch worn.	d. Replace clutch.

HI-CAP 2 ALUMINUM HAND CHAIN HOIST TROUBLE SHOOTING

Trouble	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.	a. Check gage of chain. Replace if worn excessively.
	b. Load chain rusty, corroded or clogged up with foreign matter such as cement or mud.	b. Clean by tumble polishing or using a non-acie or non-caustic type solvent. Lubricate with Lubriplate Bar and Chain Oil 10-R (Fiske Bros. Refining Co.) or equal lubricant.
	c. Load chain damaged.	c. Check chain for gouges, nicks, bent or twister links. Replace if damaged.
	d. Liftwheel clogged with foreign matter or worn excessively, causing binding between the liftwheel and chain guide.	d. Clean out pockets. Replace if worn excessively.
	e. Hand chain worn long to gage, thus binding between handwheel and cover.	e. Check gage of chain.
	f. Handwheel clogged with foreign matter or worn excessively, causing binding of chain between the handwheel and cover.	f. Clean out pockets. Replace if worn excessivel
	g. Liftwheel or gear teeth deoformed.	g. Excessive overload has been applied. Replac damaged parts.
 Hoist is hard to operate in the lowering direction. 	a. Brake parts corroded or coated with foreign matter.	a. Disassemble brake and clean thoroughly (by wiping with a cloth-not by washing in a solvent.) Replace washers if gummy, visibily worn or coated with a foreign matter. Keep washers and brake surfaces clean and dry.
	b. Chain binding.	b. See items 1A, 1B and 1C
Hoist is hard to operate in the hoisting direction.	a. Chain binding.	a. See items 1A, 1B and 1C
	b. Chain twisted (3 ton capacity or larger.)	b. Rereeve chain on 3 and 4 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. Overload.	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.	a. Install or replace key.
	b. Gears jammed.	b. Inspect for foreign matter in gear teeth.

HI-CAP 2 ALUMINUM HAND CHAIN HOIST TROUBLE SHOOTING (continued)

Trouble	Cause May Be	Remedy
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 than by operating unit in the lowering direction.	a. With hoist under load keep chain taut, pull sharply on hand chain in the lowering direction to loosen brake.
	b. Chain binding.	b. See items 1A, 1B and 1C
	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 items 1A, 1B and 1C
 Hoist will not hold load in suspension. 	a. Lower hook or load side of chain on wrong side of liftwheel.	a. Lower hook must be on same side of liftwheel as upper hook.
	b. Ratchet assembled in reverse.	b. Ratchet must be assembled correctly.
	c. Pawl not engaging with ratchet.	c. 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.
	d. Ratchet teeth or pawl worn or broken.	d. Replace pawl and/or ratchet.
	e. Worn brake parts.	e. Replace brake parts which are worn.
	f. Oil, dirty or corroded brake friction surfaces.	f. See item 2A.

WHEN SERVICING OR REPAIRING A BUDGIT HOIST, ALWAYS REFER TO THE CORRECT BUDGIT REPAIR MANUAL FOR COMPLETE INSTRUCTIONS ON SERVICING & REPAIRING OF THE HOIST, OR CONSULT AN AUTHORIZED BUDGIT HOIST REPAIR STATION.

TUGIT2 LEVER HOISTS TROUBLE SHOOTING

Trouble	Cause May Be	Remedy
1. Is hard to operate in either	a. Load chain worn long to gauge, thus binding	a. Check chain and replace if worn excessively
direction	between liftwheel and frame.	
	b. Load chain rusty, corroded or clogged with foreign matter such as cement or mud.	b. Clean chain by tumble polishing or using a non- acid or non-caustic type solvent. Check chain for gouges, damaged or bent links. Lubricate with Lubriplate, Bar and Chain Oil 10-R (Fiske Bros. Refining Co.) or equal lubricant.
	c. Bushings clogged with matter such as cement and dust.	c. Disassemble and clean liftwheel bushings, pinion shaft bushings, ratchet bushings and sliding surfaces of ratchet plunger and lever plunger. Any parts worn excessively should be replaced.
	d. Lever head binding on frame.	d. Clean by removing any foreign matter that may be between the head of the lever and the frame section surrounding the brake.
	e. Brake parts corroded or clogged with foreign matter.	e. Disassemble brake and clean thoroughly (by wiping with a cloth-not by washing in a solvent.) Replace washers if too gummy, worn or scored. Keep washers and brake surfaces clean and dry.
	f. Liftwheel pockets clogged with foreign matter or worn excessively causing chain to bind between liftwheel and frame.	f. Clean out pockets and use if not worn excessively.
	g. Liftwheel twisted or bent - gear teeth bent (1½, 3 & 6 ton only.)	g. Excessive overload has been applied. Replace damaged parts.
2. Is hard to operate in down	a. Brake adjusting nut is too tight.	a. See instructions on brake assembly.
direction.	b. Brake parts corroded or clogged with foreign matter.	b. See item 1E.
	c. Chain binding in frame.	c. See items 1A and 1B.
3. Is hard to operate in up	a. Chain binding in frame.	a. See items 1A and 1B.
direction.	b. Chain twisted - 3 & 6 ton only.	b. Rereeve chain or on 3 ton unit, if both chains are twisted, capsize hook block through loop in chain until twists are removed. Caution: Do not operate the Puller in the up direction with twisted chain or chain may become jammed in frame or hook block.
	c. Overload.	c. Reduce load or use correct capacity unit.



Notes



Notes



Notes



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