

BUDGIT®

Engineering Data & Quick Reference Guide

EFFECTIVE DATE OCTOBER 1, 2000



Shall and Shall Not's of Hoist Operation

Hoist & Trolley Selection

Checklist For Ordering Budgit Hoist and Components

Engineering Data

Terms & Definitions

Inspections & Maintenance

Basic Trouble Shooting



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)
ASME/ANSI B30.17	Manually Lever Operated Hoists
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
ANSI B30.16
ANSI B30.17
National Electric Code
Compressed Air & Gas Institute
Hoist Manufacturers Institute
Crane Manufacturers Association of America
Budgit Repair Manuals
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.

WARNING

Improper operation of a hoist can create a potentially hazardous situation which, if not avoided, could result in death or serious 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.
18. **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.

CAUTION

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

*O.S.H.A. REQUIREMENT

Motorized hoist in fixed location.

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.

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

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 REQUIREMENT		
		MANUAL BRIDGE	MOTORIZED BRIDGE
Pushbutton From Trolley	Motorized Trolley	Fuse panel (trolley mounted). Mainline contactor panel (trolley mounted). 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 fuses). Also required: Fuse panel (trolley mounted).
	Manual Trolley	Mainline contactor panel (trolley mounted). Crane disconnect switch (bridge mounted).	
Pushbutton From Bridge	Motorized Trolley	Fuse panel (trolley mounted). Mainline contactor and crane disconnect switch (bridge mounted).	
	Manual Trolley	Mainline contactor and crane disconnect switch (bridge mounted).	

*Requirements are Yale Lift-Tech's recommendations based on standard applications 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 save on operator fatigue and possible injuries. Higher capacity manual hoists require 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 offer 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 arcing 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 Trolley

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

Retractable 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 Trolley

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

Controls – Indoor – Standard

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 _____

TROLLEY

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 Speed _____
Trolley Brake _____
Weatherproofing _____
Ballast Resistors _____
Electronic Acceleration Control _____
Extra Pushbuttons _____
Extra Hand Chain Drop _____
Wide Flange Adjustment _____
Collector Pole & Bracket _____
Collectors _____
Trolley Locking Clamp _____
Special Paint _____
Fuses _____
Mainline Disconnect Panel _____

BRIDGE CRANE SPECIFICATIONS

Capacity _____ (5 ton Max.)

Span _____ (36' - 0" Max.)

Top-Running _____ Runway Rail to Run on _____

Underhung _____ Beam to Run on _____

Bridge Movement

Push Pull _____

Handgeared _____

Hand Chain Drop _____

Motorized _____

Bridge Speed _____

Voltage _____

Control Enclosure (NEMA 1 Standard) _____

Disconnect Enclosure (NEMA 1 Standard) _____

Bridge Electrification _____

Runway Electrification _____

Runway Length _____

Pushbutton From Hoist (Extra Pushbuttons Required) _____

HOIST FOR BRIDGE

Capacity _____

Lift _____

Headroom Requirements _____

Lift Speed _____

Voltage _____

Trolley Type

Plain _____

Handgeared _____

Motorized _____

Trolley Speed _____

See Hoist Specification Sheet for Hoist & Trolley Options.

BRIDGE COMPONENTS OPTIONS

Electronic Acceleration Control _____

2 Speed Motors & Controls _____

Ballast Resistors _____

Bridge Brake _____

Motor Protection _____

Weatherproofing _____

Main Collector _____

Wide Flange Adjustment _____

ENGINEERING DATA

#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

ENGINEERING DATA

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.

ENGINEERING DATA

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.

ENGINEERING DATA

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.

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.

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	x 20	÷ 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:

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."

Hoist Type	BUDGIT HOIST RATINGS		
	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 two-speed 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

HP/Volts	Three-phase ac squirrel-cage & wound rotor induction type motors				Single-phase ac motors	
	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

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

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

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

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 Alloy
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 Alloy
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, FORMULAS																
Size of Hose, Coupled Each End In.	Gage Pressure at Line, lb	Friction of Air in Hose, Pulsating Flow*														
		Cu Ft Free Air per Min Passing Through 50-ft Lengths of Hose														
		20	30	40	50	60	70	80	90	100	110	120	130	140	150	
		Loss of Pressure (psi) in 50-ft Lengths of Hose														
1/2	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									
	80	0.9	2.8	6	10.8	17.4	25.2	34.6								
	90	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							
3/4	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					
	70	0.2	0.5	0.9	1.5	2.3	3.2	4.2	5.5	7.0	8.8	11.0				
	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			
	90	0.2	0.4	0.7	1.1	1.6	2.3	3.1	4.0	5.0	6.2	7.5	9.0			
1	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	
	70	...	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	
1	90	...	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 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.

DATA, TABLES, FORMULAS (continued)																
Size of Hose, Coupled Each End In.	Gage Pressure at Line, lb	Friction of Air in Hose, Pulsating Flow*														
		Cu Ft Free Air per Min Passing Through 50-ft Lengths of Hose														
		20	30	40	50	60	70	80	90	100	110	120	130	140	150	
1 1/4	50	...	...	0.1	0.2	0.2	0.3	0.4	0.5	0.7	1.1					
	60	...	...	...	0.1	0.2	0.3	0.3	0.5	0.6	0.8	1.0	1.2	1.5		
	70	...	...	...	0.1	0.2	0.2	0.3	0.4	0.4	0.5	0.7	0.8	1.0	1.3	
	80	...	...	...	...	0.1	0.2	0.2	0.3	0.4	0.5	0.6	0.7	0.8	1.0	
	90	...	...	...	...	0.1	0.2	0.2	0.3	0.3	0.4	0.5	0.6	0.7	0.8	
	100	...	...	...	...	...	0.1	0.2	0.2	0.3	0.3	0.4	0.4	0.5	0.6	0.7
1 1/2	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	...	...	...	...	...	...	0.1	0.2	0.2	0.2	0.3	0.3	0.4	0.5	0.6
	70	...	...	...	...	...	...	...	0.1	0.2	0.2	0.2	0.3	0.3	0.4	0.5
	80	...	...	...	...	...	...	...	...	0.1	0.2	0.2	0.2	0.3	0.3	0.4
	90	...	...	...	...	...	...	...	...	0.1	0.2	0.2	0.2	0.3	0.3	0.4
1 1/2	100	...	...	...	...	...	...	...	...	...	...	0.1	0.2	0.2	0.2	0.3
	110	...	...	...	...	...	...	...	...	...	...	...	0.1	0.2	0.2	0.3
	120	...	...	...	...	...	...	...	...	...	...	...	...	0.1	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.

LOSS OF AIR PRESSURE DUE TO FRICTION

NOMINAL DIAMETER

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					2.75	.74
300					3.96	1.06
350					5.40	1.44
400						1.86
450						2.37
500						2.97

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

LOSS OF AIR PRESSURE DUE TO FRICTION

NOMINAL DIAMETER

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				2.48	1.06	.29
200				3.14	1.39	.37
250				4.90	2.17	.58
300				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

LOSS OF AIR PRESSURE DUE TO FRICTION

NOMINAL DIAMETER

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					5.80	1.54
500					7.16	1.92

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

LOSS OF AIR PRESSURE DUE TO FRICTION

NOMINAL DIAMETER

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					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

LOAD	125 lbs.				250 lbs.				500 lbs.			
Air Pressure PSIG	UP		DOWN		UP		DOWN		UP		DOWN	
	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 PSIG	UP		DOWN		UP		DOWN		UP		DOWN	
	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.				1000 lbs.				2000 lbs.			
Air Pressure PSIG	UP		DOWN		UP		DOWN		UP		DOWN	
	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.		1000 lb.		1500 lb.		2000 lb.		
Air Pressure PSIG	UP	DOWN (Max.)	UP	DOWN (Max.)	UP	DOWN (Max.)	UP	DOWN	
								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	1000 lb.		2000 lb.		3000 lb.		4000 lb.		
Air Pressure PSIG	UP	DOWN (Max.)	UP	DOWN (Max.)	UP	DOWN (Max.)	UP	DOWN	
								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	1500 lb.		3000 lb.		4500 lb.		6000 lb.		
Air Pressure PSIG	UP	DOWN (Max.)	UP	DOWN (Max.)	UP	DOWN (Max.)	UP	DOWN	
								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

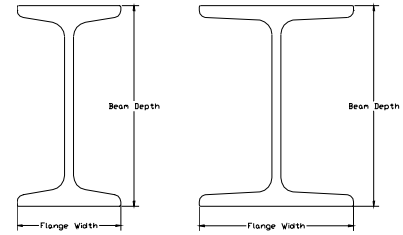
NOTE: Hoist Speeds are shown in feet per minute (f.p.m.)

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 Standard I-Beams

Flange Slope
9° 27' - 44"
Bevel 2 in 12

Wide Flange Shapes

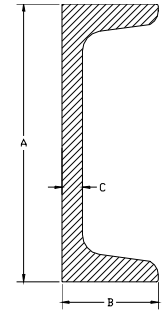
Flange Slope Varying
0° Thru 5 Percent
(5 Percent Slope)
Is 2° 51' - 47"

AMERICAN STANDARD SECTIONS ("S" BEAMS)		WIDE FLANGE SECTIONS ("W" BEAMS)					
Designation (ins. & Lbs.)	Flange Width (ins.)	Designation (ins. & Lbs.)	Flange Width (ins.)	Designation (ins. & Lbs.)	Flange Width (ins.)	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
S18 X 54.7	6	W8 X 67	8 1/4	W14 X 48	8	W21 X 73	8 1/4
S18 X 70	6 1/4	W10 X 12	4	W14 X 53	8	W21 X 83	8 1/4
S20 X 66	6 1/4	W10 X 15	4	W14 X 61	10	W24 X 55	7
S20 X 75	6 3/8	W10 X 17	4	W14 X 68	10	W24 X 62	7
S20 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 Depth in Inches	Weight Lbs. per Foot	B Flange Width Inches	C 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



METRIC CONVERSION FACTORS

English to Metric

Multiply	By	To Obtain
Pounds (avoirdupois)	.45359	Kilograms
Net Tons (2000 Lbs.)	.90718	Metric Tons
Gross Tons (2240 Lbs.)	1.01605	Metric Tons
Inches	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.	4.88241	Kilograms per Sq. Meter
Pounds per Cu. Foot	16.01837	Kilograms per Cu. Meter

Metric To English

Kilograms	2.20462	Lbs. (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	10.76387	Square Feet
Kilograms per Linear Meter	.67197	Lbs. per Lineal Ft.
Kilograms per Sq. Centimeter	14.2234	Pounds per Sq. In.
Kilograms per Square Meter	.20482	Pounds per Sq. Ft.
Kilograms per Cubic Meter	.06243	Pounds per Cu. Ft.

NOTE: Length, width and cube denote meters
 Mass and weight denote Grams
 Capacity denotes liters

*One Metric Ton = 2204.62 Lbs.

Abbreviations

Kilometer	- km	Kilogram	- kg
Meter	- m	Gram	- g or gm
Centimeter	- cm	Centigram	- 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 than 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

INSPECTION SCHEDULE AND MAINTENANCE REPORT

HOIST SERIAL NO. (MFGRS) _____
 RATED LOAD _____
 TYPE _____

CUSTOMER HOIST IDENTITY NO. _____
 LOCATION IN PLANT _____
 THIS INSPECTION IS MONTHLY ☐ ANNUAL ☐
 SEMI-ANNUAL ☐
 INSPECTED BY _____ DATE _____

COMPONENT, UNIT OR PART and location on hoist		*Recommended Inspection Interval			CONDITION (Check column best indicating condition when part or unit is inspected. Use note column to the right if condition is not listed below.)							CORRECTIVE ACTION NOTES	
LOCATION	COMPONENT, UNIT OR PART	MONTHLY	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.)	DATE	
HOIST	Motor	☐											
	Motor Brake	☐											
	Mechanical Load Brake	☐											
	Overload Clutch	☐									If so equipped		
	Hook Latch Operation	☐											
	Gears, Shafts & Bearings	☐											
	Upper Block & Hook	☐											
	Lower Block & Idler Sprockets	☐											
	Hook & Throat Opening	☒		X							Record Hook Throat Opening		
	Load Chain	☐									In Accordance with ANSI B30.16		
	Load Sprocket		☐										
	Guards		☐										
	Limit Switch	☐											
	Load Chain Reeving	☐											
CONTROL STATION OR PUSHBUTTON	Pushbutton		☐										
	Air Hose	☐											
	Pendant Throttle	☐											
	Wiring		☐										
TROLLEY	Motor	☐											
	Brake (when so equipped)	☐											
	Gears, Shafts & Bearings	☐											
	Frame			☐									
	Wheels		☐										
	Wheel Spacing on Beam	☐									In Accordance with Manufacture Specs.		
	Bumpers		☐										
	Guards		☐										
	Hand Chain & Wheel	☐											
	Collectors	☐											
AIR SYSTEM	Air Lines & Valves	☐											
	Filters	☐									Drained (daily)		
	Lubricators	☐									Filled (when needed)		
	Regulators	☐											
RUNWAYS	Monorail Joints		☐										
	Monorail		☐										
	Main Conductors	☐											
	Main Collectors	☐											
MISC.	General Condition		☐										
	Load Attachment Chains	☒											
	Rope Slings & Connections	☒											
	Change Gearcase Lub.			☐									
	Grounding Faults		☐										
	Req. Warning Labels	☐											
	Grease Wheels			☐							If equipped with grease fitting on axles		

*See text for DAILY & WEEKLY REQUIREMENTS
 O INSPECTION INTERVAL

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

HAND CHAIN OPERATED HOISTS

INSPECTION SCHEDULE AND MAINTENANCE REPORT

HOIST SERIAL NO. (MFGRS) _____
 RATED LOAD _____
 TYPE _____

CUSTOMER HOIST IDENTITY NO. _____
 LOCATION IN PLANT _____
 THIS INSPECTION IS MONTHLY ☐ ANNUAL ☐
 SEMI-ANNUAL ☐
 INSPECTED BY _____ DATE _____

COMPONENT, UNIT OR PART and location on hoist		*Recommended Inspection Interval			CONDITION (Check column best indicating condition when part or unit is inspected. Use note column to the right if condition is not listed below.)							CORRECTIVE ACTION NOTES	
LOCATION	COMPONENT, UNIT OR PART	MONTHLY	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.)		
											DATE		
HOIST	Load Brake	○											
	Overload Clutch	○									If so equipped		
	Gears, Shafts & Bearings	○											
	Upper Block & Hook	○											
	Lower Block & Idler Sprockets	○											
	Hook & Throat Opening	●		X							Record Hook Throat Opening		
	Hook Latch Operation	○											
	Hand Chain & Wheel		○										
	Guards		○										
	Load Chain	○									In Accordance with ANSI B30.16		
	Capacity Labels	○											
	Load Chain Reeving	○											
TROLLEY	Hand Chain & Wheel	○											
	Loose Nuts & Bolts		○										
	Gears, Shafts & Bearings	○											
	Frame			○									
	Bumpers		○										
	Guards		○										
	Wheels		○										
	Wheel Spacing on Beam	○									In Accordance with Manufacture Specs.		
	Grease Wheels			○							If equipped with Grease fittings on Axles		
RUN- WAYS	Monorail Joints		○										
	Monorail		○										
MISC.	General Condition		○										
	Load Attachment Chains	●											
	Rope Slings & Connections	●											
	Req. Warning Labels	○											

*See text for DAILY & WEEKLY REQUIREMENTS
 ○ INSPECTION INTERVAL

● 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. b. Wrong voltage. c. No control voltage. d. Loose or broken wire connections in hoist electrical system. e. Contactor assembly not functioning. f. Starting switch burnes out (single phase motor). g. Motor burned out	a. Check switches, circuit breakers and connections in power supply lines. Check power collectors b. Check voltage required on motor data plate against power supply. c. Check transformer fuse. If blown, check for grounding and/or short in the push button 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. Shut off power supply, remove electrical cover from hoist and check wiring connections. Also check connections in push button station and limit switches. e. Check for burned out solenoid coil. See that necessary jumper wires are properly installed. f. Replace burned out parts. 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. b. Hoist wired wrong. c. Starting switch not working correctly (single phase motor).	a. Interchange any two of three power supply line leads. Do not change green ground lead. b. Check wiring connections with appropriate wiring diagram. 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 b. Contactor assembly not functioning. c. Push button inoperative. d. Load brake locked up and overload clutch slipping.	a. Check for loose connections. See that necessary jumper wires are properly installed on contactor. Check limit switch condition and electrical conditions. 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. Check push button contacts and wires. d. Consult Authorized BUDGIT Hoist Repair Station.

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.

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. b. Overload clutch out of adjustment. c. "UP" electrical circuit open. d. Contactor assembly not functioning. e. Push button inoperative	a. Reduce loading to rated load of hoist, as shown on nameplate. b. Test hoist and replace clutch if hoist will not lift rated load. c. Check for loose connections. See that necessary jumper wires are properly installed on contactor. Check limit switch condition and electrical connections. 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.
2. Hoist Will Not Lift Rated Load.	a. Low voltage. b. Overload clutch out of adjustment. c. Motor brake not releasing.	a. See that power supply is same voltage listed on motor data plate. Check size of power supply lines. b. Remove and replace clutch assembly. c. Check brake components.
3. Excessive Drift When Stopping.	a. Excessive load. b. Motor brake not holding. c. Load brake not holding.	a. Reduce loading to rated load, shown on nameplate. b. Check brake components. c. Remove load brake and inspect parts.
4. Hoist Motor Overheats.	a. Excessive load. b. Excessive duty-cycle. c. Excessive "jogging". d. Wrong Voltage. e. Starting switch on single-phase motors not opening starting winding. f. Damaged motor or worn bearings in motor or hoist frame. g. Motor brake not releasing.	a. Reduce loading to rated load of hoist, shown on nameplate. b. Reduce frequency of lifts. c. Reduce frequency of jogs. d. Check voltage rating on motor data plate against power supply. e. Inspect switch. f. Disassemble hoist and inspect for worn or damaged parts. g. Check brake components.

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2200 SERIES AIR CHAIN HOIST

TROUBLE SHOOTING

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

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2200 SERIES AIR CHAIN HOIST

TROUBLE SHOOTING

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

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6000 SERIES AIR CHAIN HOIST

TROUBLE SHOOTING

Trouble	Cause May Be	Remedy
1. Hoist does not operate.	a. Insufficient air pressure at source. b. Insufficient air supply at hoist. c. Clogged air intake. d. Excessive overload. e. Clogged valve — pendant throttle control. f. Clogged or Inoperative valve — supply head assembly. g. Motor failure.	a. Check air pressure and adjust. b. Use correct size supply hose. c. Shut off air — disconnect air hose — clean air filter. d. Reduce loading to rated capacity of hoist, as shown on nameplate. e. Disassemble and check pendant throttle control. f. Disassemble and check supply head assembly. 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. b. Clogged air intake. c. Clogged muffler (Iced). d. Worn or broken rotor vanes, springs, or pins.	a. Check air pressure and adjust. b. See this Section, Paragraph 1. c. Remove muffler cover. Clean screen and muffler. Reduce frequency of lift to prevent icing. 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. b. Loss of power.	a. Check pressure at hoist when hoist is operating. b. See this Section, Paragraph 4.

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

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BUDGIT USA MANUAL CHAIN HOIST

TROUBLE SHOOTING

Trouble	Cause May Be	Remedy
1. Chain hoist works erratically.	a. Load chain incorrectly installed. b. Load brake pawl or ratchet teeth worn or damaged. c. Frame cracked or mutilated. d. Hand chain rubbing on cover. e. Hand chain hanging up in hand wheel.	a. Remove load chain. Install chain correctly. b. Remove load brake parts. Inspect parts. Replace damaged parts. c. Replace frame. d. Remove interference. e. Clean and lubricate hand chain.
2. Hooks opened.	a. Chain hoist overloaded.	a. Replace opened hooks. Hoist should be dismantled and thoroughly inspected for additional damage from overloading.
3. Frame damaged.	a. Hoist subjected to overloading. b. Load chain run too far through chain block frame. c. Chain hoist subjected to extreme angular or side pulls, causing chain to bind. d. Chain hoist damaged by dropping or throwing.	a. Load chain hoist only to rated capacity. Replace damaged frame. Hoist should be dismantled and thoroughly inspected for additional damage from overloading. b. Replace damaged frame. c. Operate chain hoist properly. Replace damaged frame. d. Disassemble chain hoist. Inspect chain hoist. Replace damaged parts and assemble 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. b. Internal binding. c. Load brake locked up. d. Clutch worn.	a. Reduce load to within rated hoist capacity. Hoist should be dismantled and thoroughly inspected for additional damage from overloading. b. See item 6.d. c. See item 2.a. d. Replace clutch.

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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. 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 matter or worn excessively, causing binding of chain between the handwheel and cover. g. Liftwheel or gear teeth deformed.	a. Check gage of chain. Replace if worn excessively. b. Clean by tumble polishing or using a non-acid or non-caustic type solvent. Lubricate with Lubriplate Bar and Chain Oil 10-R (Fiske Bros. Refining Co.) or equal lubricant. c. Check chain for gouges, nicks, bent or twisted links. Replace if damaged. d. Clean out pockets. Replace if worn excessively. e. Check gage of chain. f. Clean out pockets. Replace if worn excessively. g. 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 items 1A, 1B and 1C
3. Hoist is hard to operate in the hoisting direction.	a. Chain binding. b. Chain twisted (3 ton capacity or larger.) c. Overload.	a. See items 1A, 1B and 1C 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. 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.

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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. b. Chain binding. c. Lower hook all the way out. Load chain fully extended.	a. With hoist under load keep chain taut, pull sharply on hand chain in the lowering direction to loosen brake. b. See items 1A, 1B and 1C 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
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. Oil, dirty or corroded brake friction surfaces.	a. Lower hook must be on same side of liftwheel as upper hook. b. Ratchet must be assembled correctly. 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. Replace pawl and/or ratchet. e. Replace brake parts which are worn. f. See item 2A.

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TUGIT2 LEVER HOISTS

TROUBLE SHOOTING

Trouble	Cause May Be	Remedy
1. Is hard to operate in either direction	a. Load chain worn long to gauge, thus binding between liftwheel and frame. b. Load chain rusty, corroded or clogged with foreign matter such as cement or mud. c. Bushings clogged with matter such as cement and dust. d. Lever head binding on frame. e. Brake parts corroded or clogged with foreign matter. f. Liftwheel pockets clogged with foreign matter or worn excessively causing chain to bind between liftwheel and frame. g. Liftwheel twisted or bent - gear teeth bent (1½, 3 & 6 ton only.)	a. Check chain and replace if worn excessively. 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. 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. Clean by removing any foreign matter that may be between the head of the lever and the frame section surrounding the brake. 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. Clean out pockets and use if not worn excessively. g. Excessive overload has been applied. Replace damaged parts.
2. Is hard to operate in down direction.	a. Brake adjusting nut is too tight. b. Brake parts corroded or clogged with foreign matter. c. Chain binding in frame.	a. See instructions on brake assembly. b. See item 1E. c. See items 1A and 1B.
3. Is hard to operate in up direction.	a. Chain binding in frame. b. Chain twisted - 3 & 6 ton only. c. Overload.	a. See items 1A and 1B. 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. Reduce load or use correct capacity unit.

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