

OPERATOR'S MANUAL CONCERT ELECTRIC CHAIN HOIST

STAGEMAKER[®]

SM1-SM2-SM5-SM10-SM16/20/25

English

STD-R-KHA-F-CQD-ENG



THIS PAGE INTENTIONALLY LEFT BLANK



CAUTION: Read the instructions supplied with the product before installation and commissioning.



CAUTION: Keep the instructions in a safe place for future reference.

Table of contents

1	INTRODUCTION	4
1.1	Contact Information	4
1.2	Disclaimer of Warranty.....	4
1.3	Disclaimer of Liability	4
1.4	Indemnity.....	5
2	SCOPE AND PURPOSE	6
2.1	Scope.....	6
2.2	Purpose.....	6
2.3	Installation and Maintenance Manual	6
3	SAFETY	7
3.1	Training Requirements.....	7
3.2	Introduction to Safety.....	8
3.3	Owner / User / Operator Responsibilities.....	9
3.4	Recommended Operator Qualifications.....	11
4	ELECTRIC CHAIN HOIST CONSTRUCTION.....	12
4.1	General Hoist Construction	12
4.2	Lifting Medium	12
4.3	Power for Operation.....	12
4.4	Suspension Types	13
4.5	Directional Travel of Overhead Hoists	15
4.6	Principal Parts of an Electric Chain Hoist	16
5	SAFE OPERATING PRACTICES.....	26
5.1	Before Each Shift or the First Time the Hoist is Used Each Shift	27
5.2	Before Operating A Hoist and Applying a Load	29
5.3	Moving the Load	31
5.4	Parking the Load	32
5.5	Hoist Limit Devices	33
5.6	General Recommendations	33
5.7	Recommended General Do Not's.....	34
5.8	Operator Hand Signals	35
6	APPENDIX – A – DEFINITIONS OF ELECTRIC CHAIN HOIST TERMS.....	36
7	APPENDIX – B – REFERENCES.....	38
8	APPENDIX – C – RECOMMENDED PRACTICES – ELECTRIC POWERED HOISTS.....	40



1 INTRODUCTION

1.1 Contact Information

R&M MATERIALS HANDLING, INC.

4501 Gateway Boulevard

Springfield, OH 45502

General Telephone: 937 - 328-5100

Toll Free Telephone (US): 800 - 955-9967

General Fax: 937 - 325-5319

Parts Department Fax (US): 800 - 955-5162

Parts Dept. Fax (other): 937 - 328-5162

Website: www.rmhoist.com

1.2 Disclaimer of Warranty

All sales are subject to the R&M Materials Handling, inc. Standard Terms and Conditions of Sale (Revision 101707), a copy of which is available at www.rmhoist.com or upon request from R&M Materials Handling, inc. Customer service/sales representatives and the terms of which are incorporated as if fully rewritten herein.

1.3 Disclaimer of Liability

User specifically understands and agrees that R&M MATERIALS HANDLING, INC., its successors, assigns, officers, agents, employees and members shall not be liable in tort and in contract—whether based on warranty, negligence, strict liability, or any other theory of liability—for any action or failure to act in respect to the recommended operation or inspection or other characteristics of anything covered in this manual. By using or otherwise employing this manual, it is the user's intent and understanding to absolve and protect R&M MATERIALS HANDLING, INC., its successors, assigns, officers, agents, employees and members from any and all tort, contract, or other liability.



1.4 Indemnity

By referring to, or otherwise employing this manual the user agrees to defend, protect, indemnify, and hold R&M MATERIALS HANDLING, INC., its successors, assigns, officers, agents, employees and members harmless of, from and against all claims, losses, expenses, damages and liabilities, direct, incidental or consequential, arising from use of this manual including loss or profits and reasonable counsel fees, which may arise out of the use or alleged use of such manual, it being the intent of this provision and of the user to absolve and protect R&M MATERIALS HANDLING, INC., its successors, assigns, officers, agents, employees and members from any and all loss relating in any way to this manual including those resulting from their own negligence.



2 SCOPE AND PURPOSE

2.1 Scope

This Manual has been prepared by **R&M Materials Handling, Inc.** to provide recommendations for safe operation of **STAGEMAKER® COMPACT Concert Hoists** with warnings against specific hazards so as to avoid personal injury and/or damage to property.

2.2 Purpose

It is the purpose of this manual to promote the adoption and use of uniform and effective safe operating practices for hoist operators. This manual also provides a ready reference for training, evaluation, and review of **STAGEMAKER® COMPACT Concert Hoist** operating practices that are designed to assist in the prevention of personal injury and / or damage to property.

2.3 Installation and Maintenance Manual

The CONCERT ELECTRIC CHAIN HOIST OPERATOR'S MANUAL and the CONCERT ELECTRIC CHAIN HOIST INSTALLATION AND MAINTENANCE MANUAL are both provided with each **STAGEMAKER® COMPACT Concert Hoist**. Both manuals are shipped with each unit from the factory. Both manuals SHALL be read prior to installation and operation in order to provide a safe environment and ensure the proper care and maintenance of the product provided by **R&M Materials Handling, Inc.**

3 SAFETY

3.1 Training Requirements

STAGEMAKER® COMPACT Concert Hoist operator, inspector, and maintenance personnel training programs should be based on requirements in accordance with the latest edition of:

- **ASME B30.16** **Safety Standard for Overhead Hoists (Underhung)**



NOTE: When using the **STAGEMAKER® COMPACT Concert Hoist** in the inverted position, **ASME B30.16** Section 16-0.1, states that this **ASME** standard does not apply when “drawing both the load and the hoist up or down the load chain(s) or rope(s) of the hoist.” See **WARNING** section 3.3.

Such training programs should also provide information for compliance with any Federal, State, or Local Code requirements, existing plant safety rules and regulations, and **STAGEMAKER® COMPACT Concert Hoist** Operator's Manual and the appropriate **STAGEMAKER®** Installation and Maintenance Manual.

If an overhead hoist is installed as part of an overhead crane or monorail system, training programs should also include requirements in accordance with the latest edition, as applicable, of:

- **ASME B30.2** **Safety Standard for Overhead and Gantry Cranes, Top Running Bridge, Single or Multiple Girder, Top Running Trolley Hoist**
- **ASME B30.11** **Safety Standard for Monorails and Underhung Cranes**
- **ASME B30.17** **Safety Standard for Overhead and Gantry Cranes, Top Running Bridge, Single Girder, Underhung Hoist.**

3.2 Introduction to Safety



The above Safety Alert Symbol is used in this manual to indicate hazards and to alert the reader to information that should be known, understood, and followed in order to avoid **DEATH** or **SERIOUS INJURY**.

Read and understand this manual before using the hoist.

Important issues to remember during installation, operation, maintenance, and inspection are provided at the hoist control stations, at various locations on the hoist, in this manual, and in the **ELECTRIC CHAIN HOIST INSTALLATION AND MAINTENANCE MANUAL**. These issues are indicated by **DANGER**, **WARNING**, or **CAUTION** instructions or placards that alert personnel to potential hazards, proper operation, load limitations, and more.



DANGER: Indicates an imminently hazardous situation, which, if not avoided, will result in death or serious injury.



WARNING: Indicates a potentially hazardous situation, which, if not avoided, could result in death or serious injury.



CAUTION: Indicates a potentially hazardous situation, which, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.

The words **SHALL** and **SHOULD** are used throughout this manual in accordance with the definitions in the ASME B30 standards as follows:

SHALL	indicates that a rule is mandatory and must be followed.
SHOULD	indicates that a rule is a recommendation, the advisability of which depends on the facts in each situation.

Taking precedence over any specific rule, however, is the most important rule of all:

“USE COMMON SENSE”

3.3 Owner / User / Operator Responsibilities

READ and **OBEY** all **DANGER**, **WARNING**, **CAUTION**, and **OPERATION INSTRUCTIONS** on the hoist and in this manual. Make sure that all placards are in place and legible.

Failure to comply with safety precautions in this manual and on the hoist is a safety violation that may result in product failure, serious injury, death, or property damage.



NOTE: It is important that warning, control marking, and other safety labels and signs are present on the hoist and that the information on the label or sign is legible.



WARNING: Failure to read and comply with any one of the limitations noted in this manual and the Installation and Maintenance Manual furnished by R&M Materials Handling, Inc. can result in product failure, serious bodily injury or death, and/or property damage.

Conforming to good safety practices is the responsibility of the owner, the user, and its operating personnel. The hoist manufacturer has no direct involvement or control over the hoist's operation and application.

It is a responsibility of the hoist owner / user to establish programs to:

TRAIN and designate hoist operators, and

TRAIN and designate hoist inspection and maintenance personnel

Only those **Qualified Personnel** who have shown that they have read and have understood this manual and that they understand the proper operation of the hoist should be authorized to operate and/or repair the hoist.



NOTE: It is a responsibility of the owner / user to install, inspect, test, maintain, and operate a hoist in accordance with the ASME B30.16 Safety Standard, OSHA Regulations, and ANSI / NFPA 70, National Electric Code. If the hoist is installed as part of a total lifting system, it is also the responsibility of the owner / user to comply with the applicable ASME B30 volume that addresses other types of equipment used in the system.



NOTE: Further, it is the responsibility of the owner / user to require that all personnel who will install, inspect, test, maintain, and operate a hoist read the Instruction and Maintenance Manual furnished by R&M Materials Handling, Inc., ASME B30.16 Safety Standards for Overhead Hoists (Underhung), OSHA Regulations, and ANSI / NFPA 70, National Electric Code. If the hoist is installed as part of a total lifting system, all personnel must also read the applicable ASME B30 volume that addresses other types of equipment used in the system.



WARNING: Before installing, removing, inspecting or performing any maintenance on a hoist the main switch shall be de-energized. Lock and tag the main switch in the de-energized position in accordance with ANSI Z244.1. Follow other maintenance procedures outlined in the Installation and Maintenance Manual furnished by R&M Materials Handling, Inc., and ASME B30.16.



WARNING: Failure to properly ground the hoist presents the danger of electric shock.



WARNING: An improper or insufficient ground connection creates an electrical shock hazard when touching any part of the hoist or trolley.

3.4 Recommended Operator Qualifications

HOIST OPERATORS SHALL:

- Be required to read this manual (Operator's Manual).
- Be required to read the warnings in the Installation and Maintenance Manual supplied with hoist.
- Be required to read the instructions and warning labels on the hoist.
- Be required to read the operating section of ASME B30.16.
- Be required to be familiar with the hoist controls before being authorized to operate the hoist.
- Be trained in proper rigging procedures to be followed in the attachment of loads to the hoist load hook.
- Be trained and be familiar with any below-the-hook devices that may be used in lifting of loads.
- Be trained to be aware of potential malfunctions of the hoist that may require adjustment or repair.
- Be instructed to stop operation if malfunctions occur, and to immediately advise their supervisor so corrective action can be taken.

HOIST OPERATORS SHOULD:

- Have normal depth perception, field of vision, reaction time, manual dexterity, and coordination for the work to be performed.
- **NOT** be subject to seizures, loss of physical control, physical defects, or emotional instability that could result in actions of the operator being a hazard to the operator or others.
- **NOT** operate a hoist when under the influence of alcohol or drugs.
- **NOT** operate a hoist when under the influence of medication that could result in actions of the operator being a hazard to the operator or others.

4 ELECTRIC CHAIN HOIST CONSTRUCTION

4.1 General Hoist Construction

Overhead hoists are defined in the **ANSI / ASME** standards as a machinery unit that is used for vertical lifting service involving material handling of freely suspended (unguided) loads. Overhead hoists are a basic and versatile piece of equipment used in manufacturing, warehousing, construction, and numerous other applications to aid workers in the handling and moving of loads.

Overhead hoists are available in various types of configurations and constructions. Overhead hoist types are usually referred to using the terms that define a specific configuration and construction.

The following are three areas that further define the hoist type.

4.2 Lifting Medium

Lifting medium defines the type of component used to transmit and cause vertical motion of the hoist load hook or hoist load block. Chain is a lifting medium. The **STAGEMAKER® COMPACT Concert Hoist** uses welded link load chain.

Welded Link Load Chain

Welded link load chain consists of a series of interwoven formed and welded links. The links fit pockets of the hoist load sprocket that transmits motion to the load chain. The load sprocket may also be called load wheel, load sheave, pocket wheel, chain wheel, or lift wheel. Welded link load chain sizes are stated as the diameter of the wire used to form the link, i.e. 3.1 mm, 4.8 mm, 6.8 mm, etc. Welded link load chain is designed and manufactured to the specific dimensions and material strength requirements for a specific hoist. Welded link load chain is not interchangeable between different manufacturers' hoists; and is not interchangeable with welded link lifting chain used for other purposes such as chain slings and securing the load. Only original equipment welded link load chain, as supplied by **R&M Materials Handling, Inc.**, shall be used on any **STAGEMAKER® COMPACT Concert Hoist**.

4.3 Power for Operation

Power for operation defines the type of power used to operate the hoisting motion. The electric chain hoist uses electrical power to run an electric motor that provides the motion for lifting and lowering the load.



DANGER: ON ELECTRIC POWERED HOISTS, HAZARDOUS VOLTAGES ARE PRESENT IN THE CONTROL BOX, OTHER ELECTRICAL COMPONENTS, AND CONNECTIONS BETWEEN THESE COMPONENTS.

Electric Power

The hoisting motion (lifting or lowering) of an electric powered hoist is initiated when the operator grasps and activates a control device. The control device has push buttons that energize, through a series of contractors and other electrical components, an electric motor. The electric motor transmits power through the hoist gearing to the hoist load chain sprocket; thereby, lifting or lowering the hoist load hook. Lifting is accomplished by actuating the lifting control; and lowering is accomplished by actuating the lowering control. The controls could be marked: LIFT/LOWER; UP/DOWN; RAISE/LOWER; or a combination of such markings. Hoist lifting and lowering controls are usually group controllers, pendant stations (pickles) connected to the hoist, remote controls, pushbuttons mounted in a pendant control enclosure suspended from the hoist; or levers or switches mounted in a remote radio-control transmitter. Group controls pendant control enclosures, radio-control transmitters, or other control means could also be permanently mounted on the building structure or cab of an overhead crane depending on the application.

The control device used to lift and lower hoist motion may also contain controls for other motions or functions. Such controls include: trolley travel, overhead crane travel, power on/off, emergency stop, motions associated with below-the-hook lifting devices, and other special functions associated with a specific application. Examples of such control markings may include, but are not limited to, EAST / WEST; RIGHT / LEFT; OPEN / CLOSE; START / STOP; etc.

4.4 Suspension Types

Suspension defines the type of mounting or method used to mount or suspend the hoist. Common suspension types include hook mounted and trolley mounted. Other types of suspension may be designed to meet specific application requirements.

When the above various types of configurations or constructions are considered, some of the names used to refer to overhead hoists include: hook mounted electric chain hoists; lug mounted electric chain hoists; push trolley mounted electric chain hoists; motor driven trolley mounted chain hoists; etc.

Hook Mounted

Hook mounted hoists have a hook on the hoist frame or body, and one to which the chain is connected.

The hook can be used to suspend the hoist from the clevis or suspension pin of a trolley; the body hook can also be used to suspend the hoist to a trolley. The top hook can also be used on a fixed suspension device that will accept the hook, mounted on a beam or the structural framework of a building.



NOTE: When the hoist body is in the 'up' position, the hook is referred to as the 'hoist load hook'. When the hoist body is in the 'down' position, the hook is referred to as the 'body hook'.

Lug Mounted

Lug mounted hoists have a lug mounting attached to the top of the hoist frame, or a lug mounting attached as an integral part of the hoist frame. Lug mounted hoists are available in all hoist types. Lug mountings are used to suspend the hoist from a trolley, or a fixed suspension device mounted on a beam or the structural framework by the use of suspension pin(s) or stud(s).

Trolley Mounted

Trolley mounted hoists are hook mounted or lug mounted hoists suspended from a trolley; or a hoist having an integral trolley as part of the hoist frame, that allows travel motion on the lower flange of a monorail beam, or the lower flange of the bridge beam of an overhead crane.

Trolleys allow traverse motion of the hoist unit, and load being handled, by traveling: on the lower flange of a monorail beam; on the lower flange of a bridge beam of an overhead crane; or on top of the bridge beams of an overhead crane. Hoist trolleys are available in several types depending on the method used to obtain travel motion. Trolley types include:

Plain (Push) Trolleys

Plain type trolley motion is obtained by pulling or pushing the load or by some other means, such as the strain relief of a pendant control, suspended from the trolley or hoist. Plain type trolleys are recommended where trolley motion is infrequent or relatively short. Because of the force required to manually operate this type of trolley, it is recommended that the use of plain trolleys be limited to a maximum capacity load of 3 tons or 3000 kg, and that the elevation of the beam where the trolley is suspended be not more than 20 feet or 6 m above the operating floor level.

Hand Chain Operated (Hand Geared) Trolleys

Hand geared trolley motion is achieved by grasping and pulling a continuous hand chain that is connected to the trolley. Hand chain consists of a series of interwoven formed welded or un-welded links according to the design specifications of the hand chain. The hand chain links fit pockets of the trolley hand chain wheel, or sprocket. As the operator pulls the hand chain, the hand chain wheel turns and transmits power through gearing to the trolley wheels. Pulling the hand chain in one direction will cause the trolley to travel in the opposite direction. Hand chain manually operated trolleys provide excellent load spotting ability.

Electric Powered (Motorized) Trolleys

Motorized trolley motion is achieved by activating a control device in the same manner as described under electric powered hoists. The control device used to lift and lower hoist motion may also contain controls for trolley travel. Recommendations for use of electric powered are based on frequency of operation, distance of travel, capacity of load, height of beam, and type or size of load being handled.

4.5 Directional Travel of Overhead Hoists

Hoist motion is the vertical travel motion direction of the hoist load hook. The hoist operator should be familiar with the hoist (or crane) controls and understand what type of motion will occur when any one of the control devices is activated. The controls **SHALL** be marked, and all markings **SHALL** be legible. The daily inspection that is required to be performed by the operator at the start of each shift or at the time the hoist is first used during each shift, **SHOULD** include a check that all motions agree with control device markings.

Overhead hoists have one axis of directional travel. This is:

- the hoisting or vertical travel direction of the load hook/body hook

When overhead hoists are trolley suspended, the trolley hoist unit has two axes of directional travel. These include:

- the hoisting or vertical travel direction of the load hook/body hook
- the traverse travel direction of the trolley (including the hoist unit)

When trolley suspended overhead hoists are used on an overhead crane, the crane, including the trolley hoist unit has three axes of directional travel. These include:

- the hoisting or vertical travel direction of the load hook/body hook
- the traverse travel direction of the trolley (including the hoist unit)
- the traverse travel direction of the bridge (including the trolley and hoist unit)

Some hoists or cranes may have power-operated rotating hooks, power-operated below-the-hook lifting devices, or other power-operated accessories that result in additional axes of directional travel.

If more than one hoist or trolley hoist unit is used on an overhead crane, each hoist or trolley hoist **SHALL** have an identification mark on it or its load block, and these markings **SHALL** also appear on the controllers used by the operator.

For example, if a crane has two trolley hoist units, one trolley hoist unit shall be marked "1" (or some other designation) on the trolley hoist or load block, and the other trolley hoist unit shall be marked "2" (or some other designation) on the trolley hoist or load block.

The markings on the trolley hoists are to be visible to the operator and any signal person used in rigging the load. The controllers for trolley hoist 1 must be marked "1" (or other designation used on the trolley hoist), and the controllers for trolley hoist 2 must be marked "2" (or other designation used on the trolley hoist).

All motions of multi-speed powered hoists should be started in the slowest speed available for that motion, and then the speed should be increased until the desired speed is obtained. At the beginning of hoisting motion, the load should be lifted only a few inches and stopped to check the holding brake before continuing with the lift.

The hoist should be brought directly over the load before rigging the load to the hoist load hook. Failure to center the hoist over the load could cause the load to swing when it is lifted, or could cause side pulls or other forces to be transferred into the crane. Slack should be taken out of the chains, and slings, if used, before attempting to lift the load.

4.6 Principal Parts of an Electric Chain Hoist

Hoist operators should be familiar with the parts of a hoist and have a thorough knowledge of hoist control device functions.

Figure 1. Chain Hoist Positions

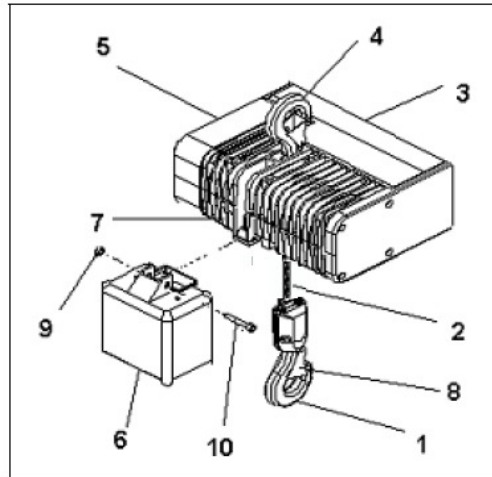


Normal Position



Inverted Position

Figure 2. Electric Chain Hoist



- 1 - HOOK BLOCK ASSEMBLY (NORMAL SUSPENSION 1-FALL SHOWN)
- 2 - LOAD CHAIN
- 3 - ELECTRICAL CONTROL ENCLOSURE
- 4 - BODY HOOK
- 5 - HOIST GEAR BOX ASSEMBLY
- 6 - CHAIN CONTAINER & HARDWARE
- 7 - HOIST BODY / MOTOR
- 8 - LOAD HOOK SAFETY LATCH
- 9 - FASTENER FOR CHAIN CONTAINER
- 10 - PIN / BOLT FOR CHAIN CONTAINER

Trolley Assemblies

Figure 3. Plain (Push) Trolley

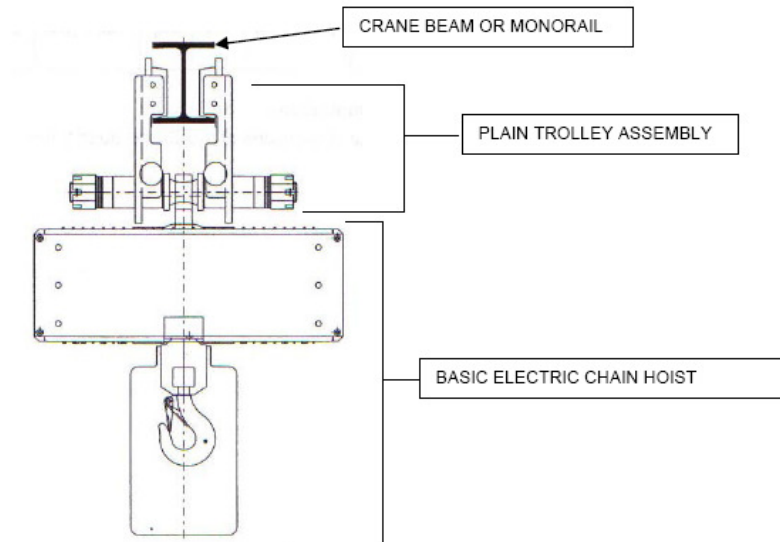


Figure 4. Hand Geared Trolley

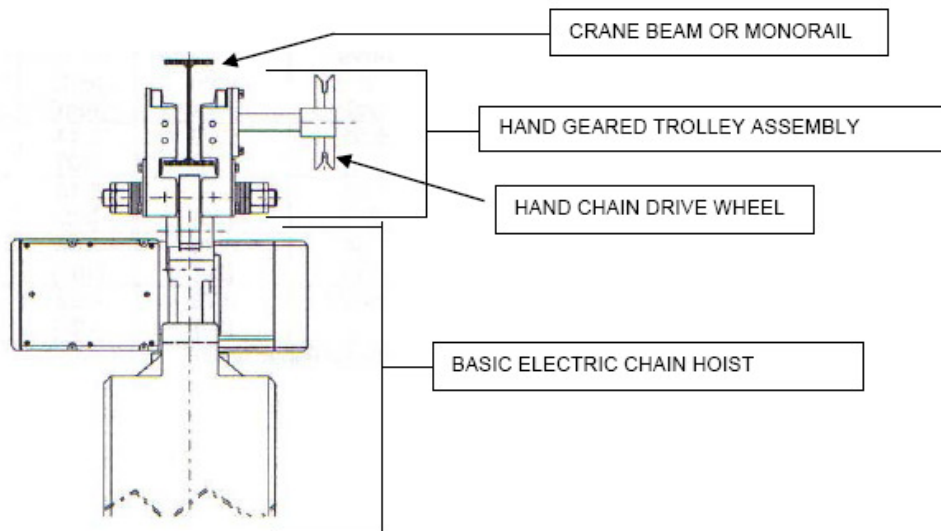


Figure 5. Motorized Trolley Assembly

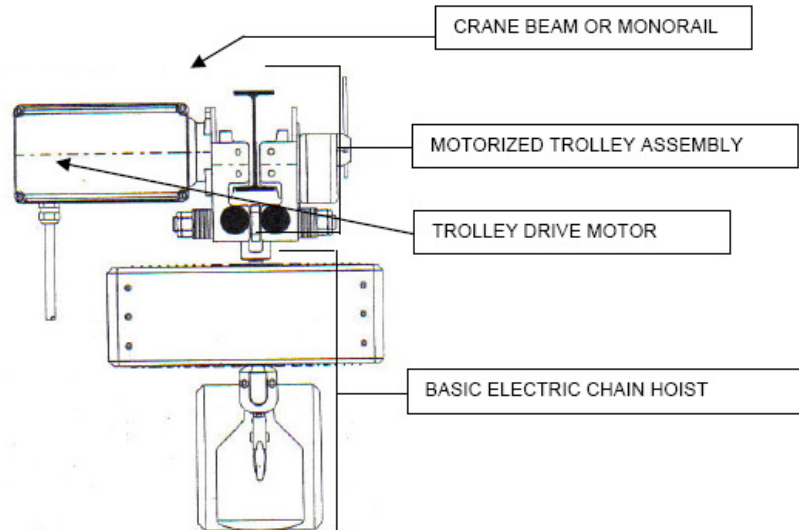


Figure 6. Group Controller with Remote Control

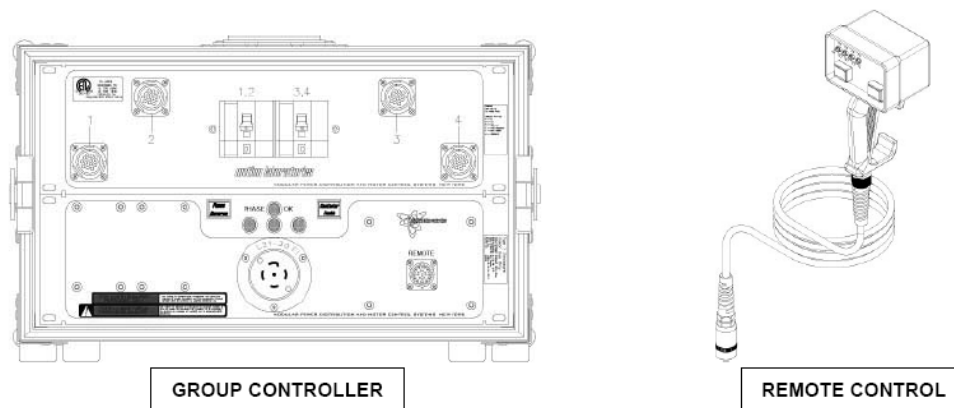


Figure 7. Pistol Grip "Pickle" Pushbutton Controller

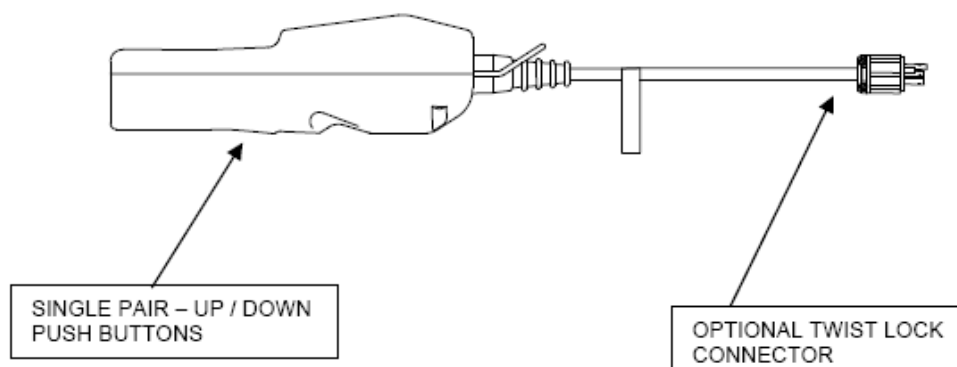
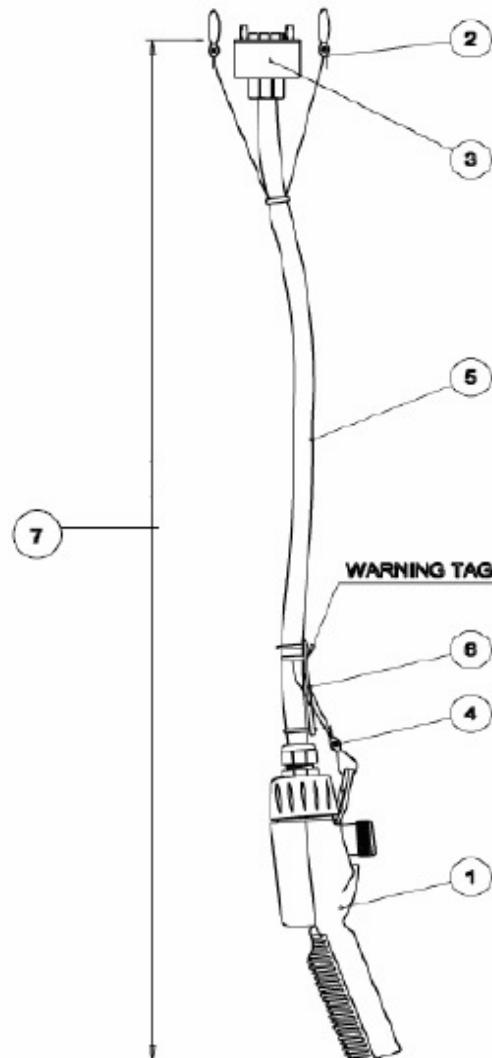


Figure 8. Push Button Control Assembly - Complete



- 1 – P/B CONTROL ENCLOSURE**
- 2 – UPPER SUSPENSION KIT**
- 3 – P/B CABLE PLUG ASSEMBLY**
- 4 – SUSPENSION UNIT**
- 5 – P/B ELECTRICAL CABLE**
- 6 – OPERATOR'S WARNING TAG**
- 7 – COMPLETE P/B ASSEMBLY**

The following pushbutton controllers are examples of several variations that may be encountered with the **STAGEMAKER® COMPACT Concert Hoist**. The operator must become familiar with the location and function of each button. Any hoist operator who is not familiar with a given installation **SHALL** operate the controller (WITH NO LOAD ATTACHED) to become familiar with the response of pressing each button and the relative movement of the load block within the surroundings of the hoist installation.

The markings on each of the pairs of motion control buttons may vary in format due to purchaser specifications. The hoist operator **SHALL** review the markings on each of the buttons and verify that the symbol represents the motion depicted on the button. For example, verify that the button with "UP" symbol actually activates the "UP" motion when depressed. Also, verify if the button activates a single-speed motion or multiple-speed motion. The button must be depressed slowly until fully depressed. Multi-speed buttons usually have distinct "steps" that can be felt during the full range of movement of the button.



WARNING: The hoist operator shall inspect and verify that the controller buttons are labeled and actually perform the motion indicated. If the motion labels are missing or the activated button is different from the motion label on the button, the hoist operator shall stop immediately and notify the supervisor.



WARNING: In case of an emergency, press the emergency stop button to de-energize all electrically driven motions. The stop button is usually red in color.

Figure 9. Hubble Pendant Controller With Connector (Also available without connector)

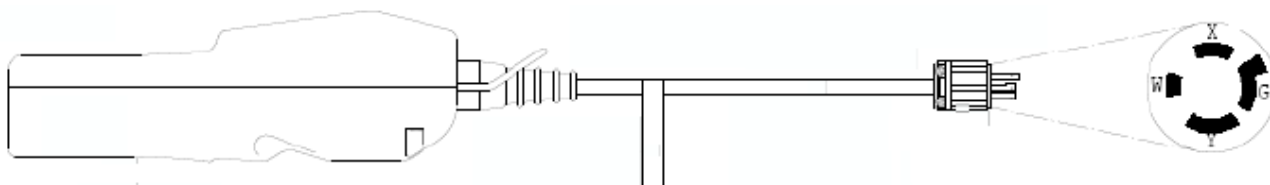


Figure 10. Pushbutton Controller – Vertical Pairs (Multiple)

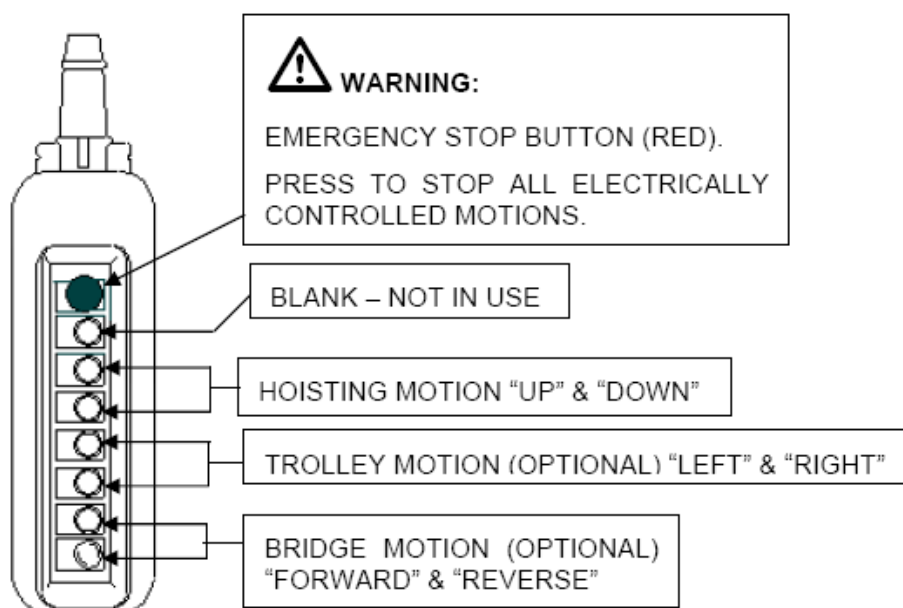


Figure 11. Pushbutton Controller – Horizontal Pairs (Multiple)

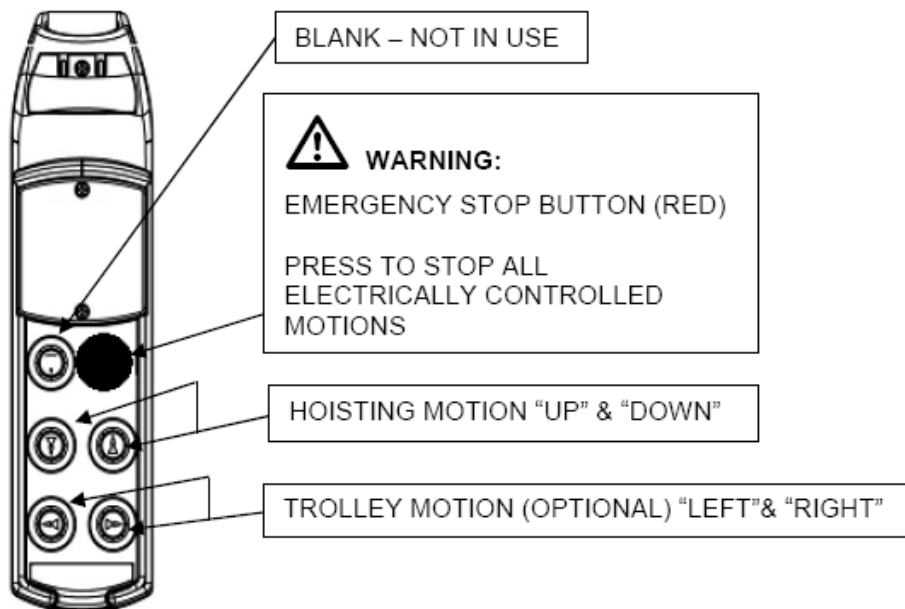
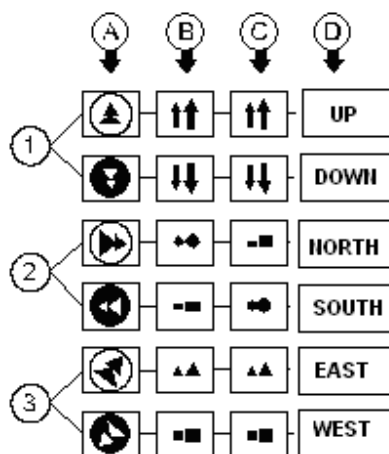


Figure 12. Pushbutton Label Symbols

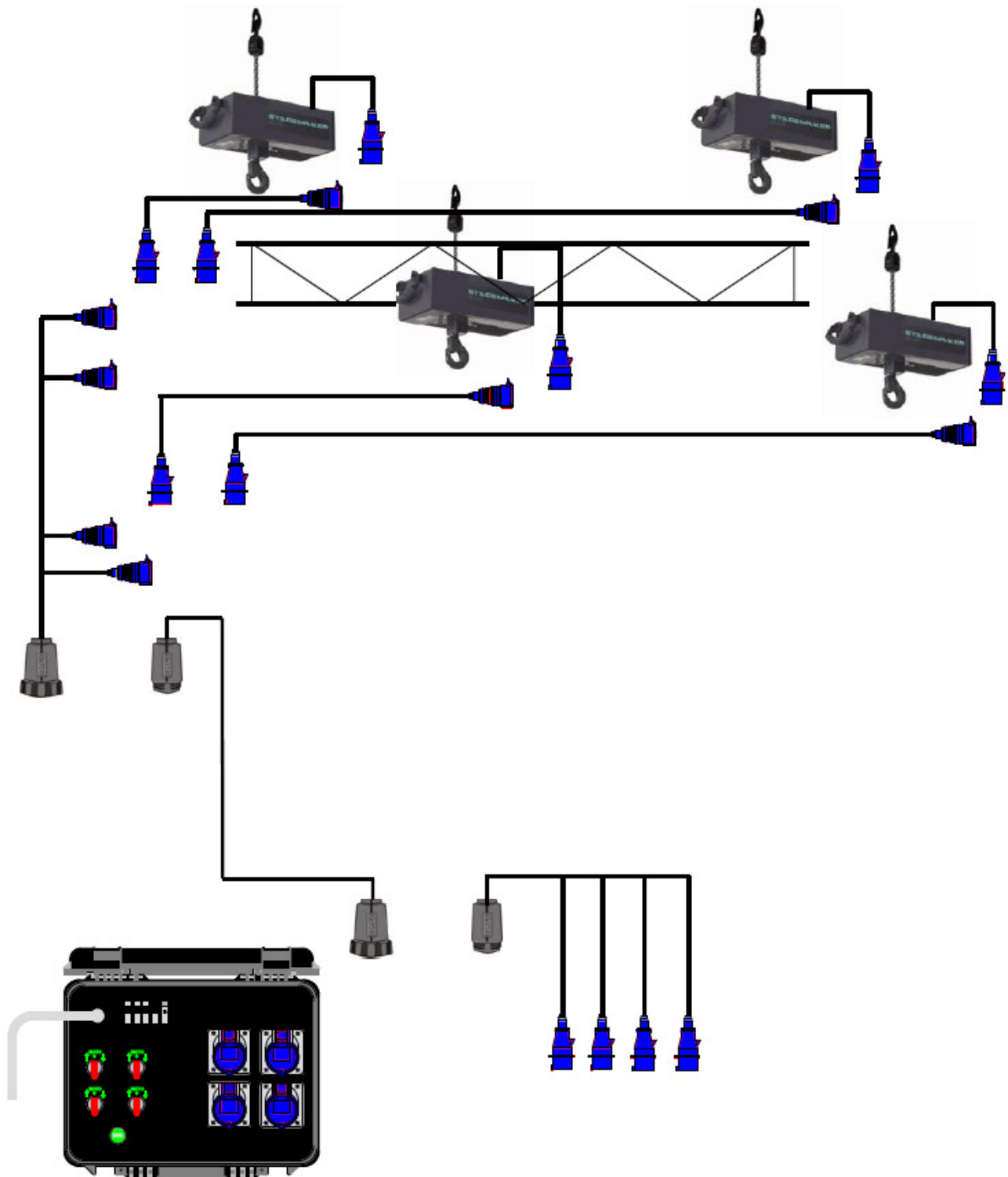


Columns A, B, C, and D represent sets of symbols. In order to meet local requirements, the purchaser specifies a particular set of symbols.

Rows 1, 2, and 3 represent the pairs of buttons for a particular button. For example, row 1 represents the pair of buttons for the hoisting motion, row 2 represents the pair of buttons for the trolley motion (optional), and row 3 represents the pair of buttons for the bridge motion (optional).

The control enclosure assembly will vary in the total number of buttons depending on the motions controlled and the number of hoists.

Figure 13. System arrangement with hoists, connection cables, and a control console.



5 SAFE OPERATING PRACTICES

The operation of an electric chain hoist can be categorized by the various sequential parts of a particular cycle of use. The typical sub-sections are:

- **before each shift or the first time the hoist is used each shift**
- **before operating a hoist and applying a load**
- **moving the load**
- **parking the load**

Taking precedence over any specific rule, however, is the most important rule of all:

“USE COMMON SENSE.”



WARNING:

Hoist operators should read this manual and the warnings contained in this manual; instruction and warning labels on the hoist; and the operation section of ASME B30.16. Hoist operators are to be familiar with the hoist and hoist controls before being authorized to operate the hoist.

Hoist operators are to be familiar with proper rigging procedures to be followed in the attachment of loads to the hoist hook.

Hoist operators must be aware of potential malfunctions of the equipment that require adjustment or repair, and stop the operation if such malfunctions occur, and immediately advise their supervisor so corrective action can be taken.

Hoist operators are not to operate a hoist when under the influence of alcohol or drugs; or under the influence of medication that could result in actions by the operator that may cause a hazard to the operator or others.

Hoists are intended only for vertical lifting service of freely suspended unguided loads; and are not intended to lift loads that are not lifted vertically, loads that are not freely-suspended, or loads that are guided. If such conditions exist, the operator should contact the supervisor or the manufacturer of the hoist for instructions.

Do not lift personnel or loads over people.

5.1 Before Each Shift or the First Time the Hoist is Used Each Shift

Operation of an overhead electric powered chain hoist involves more than operating the controls of the hoist. The operator must consider and anticipate the motions and actions that will occur as a result of operating the controls. In accordance with the requirements of ASME B30.16, the hoist operator should perform daily (pre-start) inspections at the start of each shift, or at the time the hoist is first used during each shift. The daily inspection is a visual and audible examination of the hoist. Records of the daily inspection are not required except as required by the hoist owner.

Daily inspection items that should be performed by the operator at the start of each shift, or at the time the hoist is first used during the shift, include the below items:

<u>ITEM</u>	<u>INSPECTION CHECK POINTS</u>
Tagged Hoist	Check that hoist is not tagged with an out-of-order sign.
Control Devices	Check that all travel motions agree with control device markings. When checking hoist travel motion, always use "UP" control first.
Brakes	Check that all travel motions do not have excessive drift and that stopping distances are normal.
Hook	Check for hook latch presence and that it operates properly.
Load Chain	Check for nicks, gouges, and any type of deformation or damage to the chain. Check for lubrication of load chain.
Reeving	Check that load chain is properly reeved, that load chain is not kinked or twisted, and that load chain parts are not twisted about each other.
Limit Devices	Check that the primary upper limit device stops lifting motion of the hoist load block at the upper limit of travel. If furnished, check that the lower limit device stops lowering motion of hoist load block at lower limit of travel.
Oil Leakage	Check for any sign of oil or grease leakage on the hoist and on floor area beneath hoist.
Unusual Sounds	Check for any unusual sounds from hoist and hoist mechanism while operating the hoist.
Warning & Safety Labels	Check that warning and other safety labels are not missing and that they are legible.

It is Recommended that the Operator:

- SHALL** perform a daily inspection. Refer to the above INSPECTION CHECK POINTS.
- SHALL** visually inspect load chain for nicks, gouges, any type of deformation or damage, and check load chain for proper lubrication.
- SHALL** visually inspect hooks for nicks, gouges, deformed throat opening, wear on saddle or load bearing point, and twisting.
- SHALL** visually inspect hook latches for proper operation or damage that does not allow proper operation.
- SHALL** test operation of the primary upper limit device of the hoisting motion.
- SHALL** report to supervisor if warning label or labels are missing or illegible.
- SHALL** report to supervisor any damage or malfunctions.
- SHALL NOT** operate hoist if any damage or malfunctions exist.
- SHALL NOT** operate hoist if it is tagged with an out-of-order sign.



WARNING:

If any damage or malfunctions are noted in the daily inspection items, the operator shall not operate the hoist, and shall immediately advise the supervisor so corrective action can be taken. If the hoist is tagged with an out-of-order sign, the operator shall not operate the hoist.

Hoist operators should be aware of malfunctions of the equipment that could occur during operation, and should immediately stop operation if such malfunctions occur, and should immediately advise the supervisor so corrective action can be taken.



WARNING:

If corrective action has not been completed by the end of the shift, the operator shall advise the operator or operators on the next shift that corrective action is required on the hoist and verify that the hoist is tagged with an out-of-order sign.



NOTE: The hoist operator shall not perform frequent or periodic inspections, or perform maintenance on a hoist unless the operator has been trained to perform such inspections or maintenance, and is designated by the host owner to perform such inspections or maintenance.

5.2 Before Operating A Hoist and Applying a Load

1. Bring the hoist directly over the load.
2. Lower the load hook so it can be attached directly to the load, the slings, or any other device used to rig the load. The load, sling(s), or other lifting device should be fully seated in the saddle or bowl of the hook. Verify that the hook latch is operational and closes the throat opening of the hook. Make sure that the hook latch is not supporting any part of the load or the slings or device used to attach the load to the hook. Verify that the weight of the load to be lifted does not exceed the rated load capacity of the hoist.
3. Remove slack from the hoisting chain(s) and slings, if used, before attempting to lift the load.
4. Lift the load only a few inches and stop to check:
 - That the load is properly balanced;
 - That slings, if used, are properly positioned;
 - That load or sling is seated in the saddle, base, or bowl of the load hook; and
 - That the hoist holding brake stops and holds the load before continuing with the lift.

If a particular motion (hoisting motion / trolley motion / bridge motion) has multiple speeds, always start the motion with the slowest speed and then increase speed until the desired speed is obtained. Some multiple-speed hoists may have other features that affect the lifting motion; the operator should become familiar with the operation of such features. Refer to the **STAGEMAKER® COMPACT Concert Hoist** Installation and Maintenance Manual furnished with the hoist.

The operator must verify that all personnel are clear of the load and the path of the load, and that the load will clear all obstacles, before lowering or landing a load. When lowering the load, if an electric chain hoist has multiple travel speeds, the lowering speed should be decreased to the slowest travel speed before the load is stopped or landed. Place blocks under the load ("block load") before landing if slings or other lifting devices must be removed from under the landed load.

A load should never be left suspended and unattended unless specific precautions to prevent the load from inadvertent lowering have been instituted and are in place, and guards or barriers are utilized on the floor to prevent people from entering the area affected by the suspended load. When the hoist is not in use, the empty load hook should be raised and positioned above head level for storage. Seven feet or greater above floor level is recommended.

It is recommended that the operator:

- | | |
|------------------|--|
| SHALL | be familiar with all operating controls of the hoist. |
| SHALL | be familiar with this <u>Electric Chain Hoist Operator's Manual</u> provided by R&M Materials Handling, Inc., instruction and WARNING labels on the hoist, and the OPERATION section of ASME B30.16. |
| SHALL | be familiar with the operations to be performed. |
| SHALL NOT | operate hoist if any damage or malfunctions exist. |
| SHALL | report to the supervisor any damage or malfunctions. |
| SHALL NOT | operate hoist if it is tagged with an out-of-order sign. |

SHALL	center hoist over load.
SHALL NOT	operate a hook mounted hoist when the hoist is restricted from forming a straight line from top hook to load hook in the direction of loading.
SHALL NOT	use the load chain as a sling to wrap around the load.
SHALL	attach the load to the hoist load hook by suitable means such as slings or lifting devices.
SHALL	verify that the size of the attachment part of the sling or other lifting device to be used is compatible with the size of the hoist load hook.
SHALL	verify that the capacity of the attachment part of the sling or other lifting device to be used is compatible with the capacity of the hoist load hook and the weight of the load to be lifted.
SHALL	only attach loads to the hoist load hook that do not exceed the rated load capacity of the hoist.
SHALL	verify that the attachment part of the sling or other lifting device is properly seated in the base, bowl, or saddle of the hoist load hook.
SHALL	verify that the hook latch operates properly and that the hook latch properly bridges and closes the hook throat opening.
SHALL	verify that the latch of the hoist hook will not support any part of the load.
SHALL	verify that the load or any part of the load will not be applied to and/or not supported by the tip or point of the hook.
SHALL	verify that load will be properly balanced when it is lifted.
SHALL	verify that side loads will not be applied to the hoist when the load is lifted.
SHALL	verify that load chain is not kinked or twisted, and that load chain parts are not twisted about each other.
SHALL	verify that the hoist load chain is properly seated in the chain sprockets.
SHALL NOT	use the hoist load limiting device or load warning device (if provided) to measure the load to be lifted.
SHALL	notify personnel in the area that a load will be lifted and verify that all personnel are clear of the load.
SHALL	verify that when the load is lifted, it will clear all material, machinery, or other obstructions in the area.

5.3 Moving the Load



WARNING: Do not lift personnel. Do not lift loads over people.



NOTE: Hoists are intended only for vertical lifting service of freely suspended, unguided loads. Do not use a hoist to lift loads that are not lifted vertically, loads that are not freely suspended, or loads that are guided. If such conditions exist, the operator should contact the supervisor for instructions.

When trolleys are used with a hoist, trolley motion is the traverse travel motion direction of the trolley hoist unit. Control device markings for this motion should be as stated in the HOIST TYPES section of this manual. Regardless of the marking designation used, the operator should be fully aware of the direction of trolley motion that will occur when the control device is activated.

If a load is to be lifted with the hoist hook before moving the trolley, refer to the HOIST MOTION section of this manual. If a powered trolley has multiple travel speeds, always start motion with the slowest speed and then increase speed until the desired speed is obtained. Motorized trolleys may have electronic devices that provide controlled acceleration of the motor and offer a soft or controlled start.

When bringing the trolley to a stop, if a powered trolley has multiple or variable travel speeds, it is recommended that the travel speed be decreased to the slowest speed before stopping the trolley to minimize load swing.

It is recommended that the operator:

- SHALL NOT** engage in any activity that will divert the attention of the operator.
- SHALL NOT** lift, lower, or transport a load with the hoist until the operator and all other personnel are clear of the load and the path of the load.
- SHALL** verify that the load and hoist will clear all obstacles before moving or rotating the load.
- SHALL** avoid moving loads over personnel.
- SHALL NOT** lift, lower, or transport personnel by means of the hoist, trolley, hoist hook, or load.
- SHALL** slowly inch the load hook into engagement with the load to eliminate load chain slack and minimize impact while loading the hoist.
- SHALL** avoid unnecessary inching and quick reversals of direction.
- SHALL** only lift the load a few inches to verify that the load is properly balanced before continuing with the lift.
- SHALL** only lift the load a few inches to verify that the hoist braking system is functioning properly before continuing with the lift.
- SHALL** avoid swinging of the load or hoist load hook when the trolley (if applicable) or hoist is traveling.
- SHALL** avoid sharp contact between trolleys or between trolley and stops (if applicable).

-
- | | |
|------------------|---|
| SHALL NOT | use the hoist load limiting device or load warning device (if provided) to measure the load to be lifted. |
| SHALL NOT | use hoist limit devices as a normal means of stopping the hoist. |
| SHALL NOT | use the slip clutch as a normal means of stopping the hoist. |
| SHALL NOT | permit continuous contact between the hoist body and the load block / slack fall stop. |

5.4 Parking the Load

It is recommended that the operator:

- | | |
|------------------|--|
| SHALL NOT | lower a load with the hoist until the operator and all other personnel are clear of the load and the path of the load. |
| SHALL | verify that the load will clear all obstacles before lowering the load. |
| SHALL | block loads before landing if slings or other lifting devices must be removed from under the landed load. |
| SHALL | exercise care when removing a sling from under a landed and blocked load. |
| SHALL NOT | leave a suspended load unattended unless specific precautions to prevent the load from inadvertent lowering have been instituted and are in place. |
| SHALL | position the hoist load block and load hook above head level for storage when the hoist is not in use. Seven feet or greater above floor level is recommended. |

5.5 Hoist Limit Devices

Powered hoists must be equipped with an upper limit device that will prevent the hoist load block from exceeding the upper limit of travel. Depending on the shape or size of the load being lifted, it may be possible for some part of the load to come into contact with some part of the hoist, trolley, crane, or building structure before the load block reaches the upper limit of travel. The operator must consider this possibility when it is required to lift the load to a level of close proximity to the hoist.

Powered hoists may have additional travel limit devices depending on the specific purchase specifications of the hoist. However, in such cases, the upper limit device that is activated to stop the upper limit of travel is considered the primary upper limit device.

Operation of the primary upper limit device, on powered hoists, is one of the items the hoist operator must check during the daily inspection to be performed at the start of each shift, or at the time the hoist is first used during each shift.



CAUTION: The primary limit device that controls the upper limit of travel is an emergency device only. It shall not be used as an operational means to stop travel during normal operations.

5.6 General Recommendations

It is recommended that the operator:

- | | |
|------------------|--|
| SHALL | know hand signals used for hoist and crane operations if a signal person is used in the operation, and accept signals of only persons authorized to give hand signals. |
| SHALL | obey a stop signal regardless of who gives it. |
| SHALL NOT | adjust or repair a hoist unless qualified and authorized to perform maintenance. |
| SHALL NOT | use the hoist limiting device or load warning device (if provided) to measure the load to be lifted. |

5.7 Recommended General Do Not's

It is recommended that the operator:

- DO NOT** operate a hoist that is damaged or has any actual or suspected mechanical or electrical malfunction.
- DO NOT** attempt to lengthen load chain or repair damaged load chain.
- DO NOT** use the load chain, any part of the hoist, or the load block and hook as a ground for welding.
- DO NOT** allow a welding electrode to be touched to the load chain or load hook.
- DO NOT** remove or obscure any instructions, warnings or warning labels on the hoist.
- DO NOT** walk under a suspended load or allow other personnel to walk under a suspended load.
- DO NOT** perform or allow any other person to perform **ANY** work on a suspended load that requires a worker to be positioned under the suspended load.



WARNING:

Do not walk under a suspended load.

Do not perform any work on a suspended load that requires a worker to be positioned under the suspended load.

If it is essential that a worker be positioned under a suspended load to perform work on the suspended load; such work shall not be started or performed until other auxiliary supporting means are placed under the suspended load. Failure to use other auxiliary supporting means could result in serious bodily injury or death, and/or property damage.

Do not leave a freely suspended load on hoist unattended.

A suspended load must always be tied off using appropriate chains, cables or other redundant load bearing means before access to the area beneath the load is permitted⁽¹⁾.

Failure to do so could result in property damage, death or serious injury to personnel.

⁽¹⁾ If the load cannot be tied off due to the nature of the application, redundancies and/or advanced safety features, including but not limited to multiple/redundant hoists, dual brakes on the hoist, a minimum ten to one safety factor on load bearing components, load monitoring devices etc. used either individually or as circumstances dictate, in conjunction with one another, must be incorporated into the design of the system.

5.8 Operator Hand Signals

Hoist operators are normally involved in rigging the load, attaching the load to the hoist load hook, and other tasks related to the load for which they have skills in addition to those required for operation of the hoist. Therefore, in addition to the specific information required to operate the hoist, hoist operators should be familiar with rigging procedures and practices. In many applications, a single hoist may be operated by several workers as part of their regular job responsibility.

In some instances, when a hoist is used on an overhead crane or when a hoist is used as a component in a larger material handling system, other persons, such as a signal person, in addition to the hoist operator, may be involved. Operations that involve an operator (either hoist or crane) and a signal person (normally the rigging or hookup person) require hand signals between the signal person and the hoist or crane operator unless voice communication, such as telephone, radio, or an equivalent method, is used. Where hand signals are used, the operator must be familiar with and understand hand signals, and must respond to hand signals from the designated signal person except to obey a stop signal regardless who gives it. When voice communication between the signal person and the operator is used, a dedicated channel is required in order to eliminate any commands from other personnel in the area that could confuse the operator.

Refer to standard hand signals, as shown in ASME B30.2, for use in overhead hoist, and overhead crane and gantry crane operations. A copy of the standard hand signals should be posted where the application requires both an operator and a signal person. Special hoist or crane operations may require the use of additional hand signals or modifications of the standard hand signals. When special signals are required, they should be documented by the crane owner / user, and agreed upon, and understood, by the signal person and hoist or crane operator. Special signals should not conflict with standard signals.

Operators, rigging personnel, signal persons, and maintenance personnel **SHALL** be required to know the location and operation of the main runway conductor disconnecting means for all hoists (and cranes, if applicable) in the area.



NOTE: Do not release operators and users from the responsibility of obtaining, reading, and fully understanding the strict execution and observation of ALL procedures in the **STAGEMAKER®** COMPACT Concert Hoist Operator's Manual. This will better qualify personnel to operate the hoist in a safe manner.

6 APPENDIX – A – DEFINITIONS OF ELECTRIC CHAIN HOIST TERMS

Below-the-hook lifting devices	Devices that are not normally reeved onto the hoist chain, such as hook-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 load to be lifted.
Block loads	An action that facilitates the removal of slings or other lifting devices from under the load, accomplished by bringing the load to rest on wood, metal, or other spacers between the floor and load.
Brake	A device, other than a motor, used for retarding or stopping motion by friction or power means.
Brake, holding	A friction brake for a hoist that is automatically applied and prevents motion when power to the brake is de-energized.
Chain, hand	The chain grasped by a person to apply force required for the lifting or lowering motion.
Chain, welded link	A chain consisting of a series of interwoven links formed and welded.
Designated person	A person selected or assigned by the employer or the employer's representative as being competent to perform specific duties.
Hand chain wheel	See wheel, hand chain.
Hoist	A machinery unit that is used for lifting or lowering a freely suspended (unguided) load.
Lifting devices	Devices that are not normally reeved onto the hoist chain, such as hook-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 load to be lifted.
Limit device, primary upper	See primary upper-limit device.
Load	The total superimposed weight on the load block or hook.
Load, rated	The maximum load for which a hoist is designated by the manufacturer or a qualified person.
Load block	The assembly of hook or shackle, swivel, bearing, sheaves, sprockets, pins, and frame suspended by the hoisting load chain. This shall include any apparatuses reeved in the hoisting load chain.
Load chain	See chain, load.
Load suspension parts	The load suspension parts of the hoist are the means of suspension (hook or lug), the structure or housing that supports the load sprocket, the load chain, the 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.
Parts (lines or falls)	Number of chain lines supporting the load block or hook.

Pendant station	A controller suspended from the hoist for operating the unit from the floor.
Primary upper-limit device	The primary upper-limit device is the first limit device that will be activated to control the upper limit of travel of the load block when a hoist is equipped with more than one upper-limit device.
Qualified person	A person who, by possession of a recognized degree in an applicable field or a certificate of professional standing, or who by extensive knowledge, training, and experience, has successfully demonstrated the ability to solve or resolve problems relating to the subject matter and work.
Rated load	See load, rated.
Reeving	A system in which chain travels around sprockets.
Side pull	The component of the hoist pull acting horizontally when the hoist lines are not operated vertically.
Slack fall stop	A device used to prevent the slack end of load chain from inadvertently being lowered out of the load sprocket.
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.
Switch	A device for making, breaking, or changing the connections in an electric or pneumatic circuit (valve).
Trolley	A machine unit that travels on a monorail track or crane bridge girder.
Trolley hoist	A hoist and trolley unit consisting of a hoist suspended from or mounted to a trolley, or a hoist with an integral trolley.
Welded link chain	See chain, welded link.
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.

7 APPENDIX – B – REFERENCES



NOTE: The current edition date of a listed document or standard, in effect at the time of publication of this manual, is shown. It is recommended that the reader refer to the latest edition.

- **HMI Hoist Operator's Manual**
- **HMI Recommended Practices – Electric And Air Powered Hoists**
- **HMI Consensus of the NEC**

Publisher: Hoist Manufacturers Institute
8720 Red Oak Blvd., Suite 201
Charlotte, NC 28217
- **ASME HST-1-1999 Performance Standard for Electric Chain Hoists**
- **ASME B30.2-1996 Safety Standard, Overhead and Gantry Cranes (Top Running Bridge, Single or Multiple Girder, Top Running Trolley Hoist)**
- **ASME B30.9-1996 Safety Standard, Slings**
- **ASME B30.10-1999 Safety Standard, Hooks**
- **ASME B30.11-1998 Safety Standard, Monorails and Underhung Cranes**
- **ASME B30.16-1998 Safety Standard, Overhead Hoists (Underhung)**
- **ASME B30.20-1999 Safety Standard, Below-the-Hook Lifting Devices**
- **The American Society of Mechanical Engineers**

Three Park Avenue
New York, NY 10016-5990
- **CMAA Specification No. 70, Revised 1999 Specification for Top Running Bridge and Gantry Type Multiple Girder Electric Overhead Traveling Cranes**
- **CMAA Specification No. 74, Revised 1999 Specifications for Top Running & Under Running Single Girder Electric Overhead Traveling Cranes Utilizing Under Running Trolley Hoist**
- **CMAA Crane Operators Manual**

Publisher: Crane Manufacturers Association of America, Inc.
8720 Red Oak Blvd., Suite 201
Charlotte, NC 28217
- **ANSI/MMA MH27.1-1996 Specifications for Patented Track Underhung Cranes and Monorail Systems**



- **MMA MH27.2-1997 Specifications for Enclosed Track Underhung Cranes and Monorail Systems**

Publisher: Monorail Manufacturers Association, Inc.
8720 Red Oak Blvd., Suite 201
Charlotte, NC 28217

- **NFPA 70-1999 National Electrical Code**

Publisher: National Fire Protection Association
Battermarch Park
Quincy, MA 02269

- **ANSI Z244.1-1982(R1993) Safety Requirements for the Lockout / Tagout of Energy Sources**

Publisher: American National Standards Institute
11 West 42nd Street
New York, NY 10036

8 APPENDIX – C – RECOMMENDED PRACTICES – ELECTRIC POWERED HOISTS

RECOMMENDED PRACTICES - ELECTRIC POWERED HOISTS

Because R&M Materials Handling, Inc. 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 **SHALLs** and **SHALL NOTs**. 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:

- **NOT** operate a damaged, malfunctioning or unusually performing hoist.
- **NOT** operate the hoist until he has thoroughly read and understood the Operator's Manual and the Installation and Maintenance Manual provided with this hoist.
- **NOT** operate a hoist that has been modified without the manufacturer's approval or without certification that it is in conformity with ANSI/AMSE B30 volumes.
- **NOT** lift more than the rated load for the hoist.
- **NOT** use hoist with twisted, kinked, damaged, or worn load chain.
- **NOT** use the hoist to lift, support, or transport people.
- **NOT** lift loads over people.
- **NOT** operate a hoist unless all persons are and remain clear of the supported load.
- **NOT** operate unless load is centered under hoist.
- **NOT** attempt to lengthen the chain or repair damaged load chain.
- Protect the hoist's chain from weld splatter or other damaging contaminants.
- **NOT** operate hoist when it is restricted from forming a straight line from hook-to-hook in the direction of loading.
- **NOT** use load chain as a sling, wrap load chain around load.
- **NOT** apply the load to the tip of the hook or to the hook latch.
- **NOT** apply load unless load chain is properly seated in the chain wheel(s) or sprocket(s).
- **NOT** apply load if bearing prevents equal loading on all load supporting chains.
- **NOT** operate beyond the limits of the load chain travel.
- **NOT** leave load supported by the hoist unattended unless specific precautions have been taken.
- **NOT** allow the load chain or hook to be used as an electrical or welding ground.
- **NOT** allow the load chain or hook to be touched by a live welding electrode.
- **NOT** remove or obscure the warnings on the hoist.
- **NOT** operate a hoist on which the safety placards or decals are missing or illegible.
- **NOT** operate a hoist unless it has been securely attached to a suitable support.
- **NOT** operate a hoist unless load slings or other approved single attachments are properly sized and seated in the hook saddle.
- Take up slack carefully – make sure load is balanced and load holding action is secure before continuing.

- Make sure hoist limit switches function properly.
- Warn personnel of an approaching load.
- Shut down a hoist that malfunctions or performs unusually and report such malfunctions.



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:

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

DISCLAIMER

Under no circumstances does R&M Materials Handling, Inc. 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, and OSHA regulations. It is the user's intent to absolve and protect R&M Materials Handling, Inc. from any and all liability, in tort or otherwise.