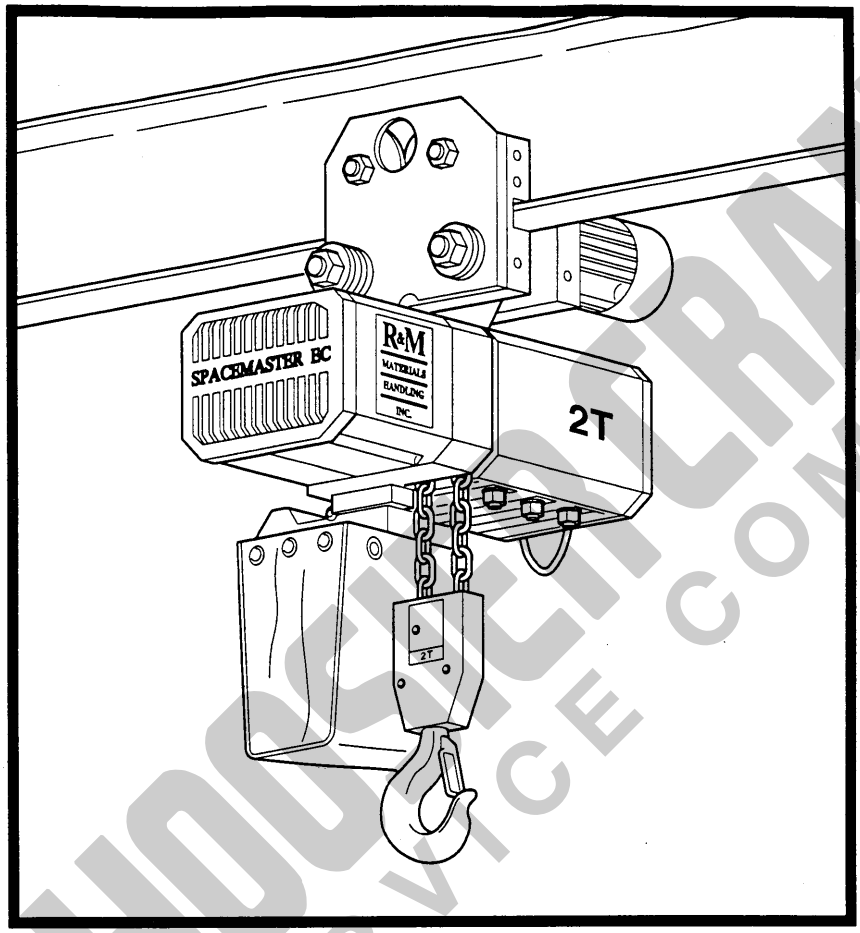
SPACEMASTER EC - HOIST



ELECTRIC CHAIN HOISTS

INSTALLATION, OPERATION AND MAINTENANCE INSTRUCTIONS

SERIAL NO.: _____

(RECORD HOIST SERIAL NUMBER FOR FUTURE REFERENCE)

R&M MATERIALS HANDLING

Bulletin EC-1997-1

Before proceeding with the installation, operation, or maintenance of the hoist it is important that the installation, operating, and maintenance personnel read this bulletin carefully in order to ensure the safe and efficient use of the hoist.

Also, it is strongly recommended that the personnel responsible for the operation, inspection, and servicing of this hoist, read and follow the Safety Standard ANSI B30.16-1981 (or current revised edition) covering Overhead Hoists (underhung) as promulgated by the American National Standards Institute and published by the American Society of Mechanical Engineers. Copies of this publication are available from the Society at United Engineering Center, 345 East 47th St., New York, NY 10017.

If any instructions are unclear, contact the manufacturer or distributor of the hoist before attempting to install or use the hoist.

IMPORTANT

An electrical wiring diagram has been packed with this manual. Also, if an optional hand geared or motorized trolley has been purchased, a manual has also been included for it.

If these items are missing, contact the manufacturer or distributor before attempting to install or use the hoist.

Manufactured by: R & M Materials Handling, Inc.
4501 Gateway Blvd.
Springfield, Ohio 45502
(937) 328-5100
Telex 205 427
FAX (937) 325-5319

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FOREWORD

This manual has been prepared to acquaint you with the procedures necessary for the installation, operation, and maintenance of the hoist you have purchased.

Proper installation is important to the ultimate performance of this equipment. Careful study, of and adherence to, the instructions will help ensure safe, dependable operation. It is also recommended that you keep this manual readily accessible in case of an emergency.

Information in this manual is subject to change without notice.

Standard Guarantee and Warranty
The Company will repair or replace, at its option, defects in material or workmanship developing within one year from date of shipment from the factory, providing the Company receives immediate written notice of such defects upon their discovery and such claims are substantiated by the Company's inspection department. Correction of such defects by repair or replacement, FOB the Company's factory, shall constitute fulfillment of this guarantee. The return of all parts submitted for inspection under this guarantee must be authorized by the Company and transportation prepaid by the shipper. The guarantee will not be applicable unless the apparatus has been properly cared for and operated under normal conditions. The Company will not be responsible for damage resulting from improper storage or handling prior to placing the apparatus in service. The Company has no liability for any repairs made outside the Company's factory unless with the prior written consent of the Company.

Guarantee on Purchased Items
The guarantee of the Company on purchased items, assemblies, or accessories which are installed as a separate unit shall not extend beyond the guarantee made by the manufacturer of the item, assembly, or accessory.

How to Order Repair Parts Correctly
The Parts Catalog section of this manual covers replacement parts required for your R&M Materials Handling, Inc. hoist and/or crane. To ensure prompt service, each repair parts order must contain the following information:

1. Hoist and/or crane serial number (see cover).
2. Capacity.
3. Reference number from applicable bulletin, or Spare Parts Identification sheet.
4. Quantity.
5. Description.
6. Voltage, phase, cycles.
7. Correct shipping destination.

On the metal nameplate affixed to the hoist will be found the Serial Number of your hoist. An example of the serial number would be 7123459301. Without this serial number we cannot be sure of sending you correct parts, so always mention serial number for prompt service.

Minimum Charges
All orders for repair parts are subject to a minimum charge.

Return of Parts
R&M Materials Handling, Inc. will not accept return of any parts unless accompanied by a claim tag. These claim tags are issued at the time authorization of such return is made. Tags must be attached to the outside of the package.

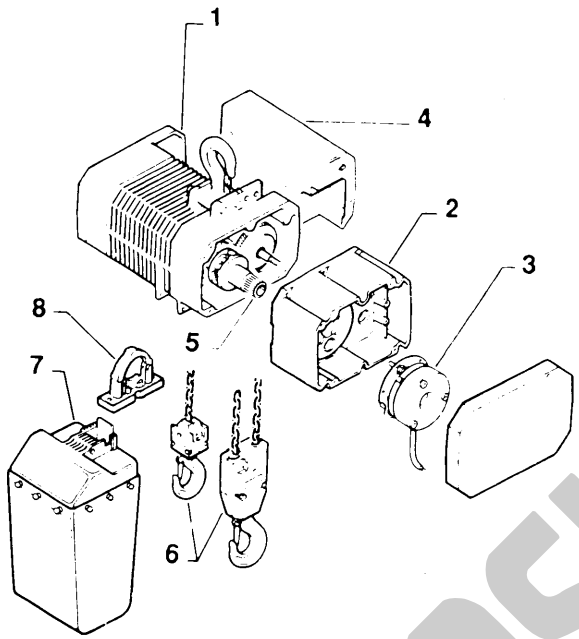
Claims for Damage in Shipment
All shipments are carefully inspected and are delivered to the carrier in good order. Upon receipt of shipment caution should be exercised that there is no loss or damage. If damage has occurred, refuse to accept the shipment until the carrier makes the proper notation to that effect. In the event of concealed loss or damage, notify the carrier immediately. By following these suggestions you will encounter less difficulty collecting your claim.

Orders telephoned or telegraphed to us must immediately be confirmed by letter since we cannot assume responsibility for the correctness of the phone or telegraphed message.

R&M Materials Handling, Inc. spare parts are available locally in major industrial areas. Contact our Customer Service Department should you desire the name and address of the Authorized Stocking Parts Distributor for your area.

R&M Materials Handling, Inc.
Customer Service Department
1311 Lagonda Avenue
Springfield, OH 45503

SECTION 1
INSTALLATION



1. Hoist motor
2. Gearbox
3. Brake
4. Electrical control panel
5. Load wheel
6. 1- or 2-fall hoisting hook
7. Chain container
8. Chain guide

IMPORTANT

Hoists/trolleys are designed for lifting and transporting of materials only. Under no conditions or circumstances, either during initial installation or in regular use, are hoists to be used for lifting or transporting of personnel.

General

Each complete Spacemaster Electric Chain Hoist is load tested at the factory, at 125% of rated capacity, and shipped assembled.

All hoists/trolleys are designed for the type of mounting specified by the purchaser. The adequacy of the supporting members (monorail beams, cranes, hangers, supports, framing, etc.) is the responsibility of the user and shall be determined by qualified personnel.

Prior to installation, the unit should be checked thoroughly for damage during shipment or handling at the job site. Particular attention should be taken to make sure that the hoisting chain and limit switch mechanism has not been damaged by improper use of fork lifts or sling chains.

Read the instructions contained in this manual and observe the warning tags attached before installation is started.

WARNING

Before installation of hoist, ensure that the main power switch applying current to the hoist is in the open and locked position.

Mounting

Before installing trolley mounted hoists, rail stops must be installed for all trolleys mounted on open end beams. These stops must be positioned such that impact forces are absorbed by the trolley side frames only. Do not allow trolley wheel to impact rail stops.

On straight rolled I-beams or WF sections, wheel clearance must be such that there is approximately 1/8" clearance between wheel flange and rail with hoist/trolley centered on the beam. For curved tracks, this clearance should be 3/16".

Special trolleys designed to run on only patented type rails should have 1/16" clearance each side between wheel flange and rail.

After trolley hoists have been hung on the beam, check for balance. Spacemaster Electric Chain Hoists are balanced at the factory for the "as shipped" condition. Any auxiliary devices (control boxes, cable reels, etc.) furnished and mounted by customer may require the addition of counter-weight. Hoists must hang straight without a load or there will be a noticeable kick when a load is applied to the hook.

Lubrication
All our hoists are shipped with gear cases filled with oil or grease; however, to avoid potential damage from low oil or grease levels resulting from leakage during handling/shipping, all levels must be checked, and oil or grease added where necessary. See Section 5, Lubrication Schedule, for recommended types.

Open wheel gearing has not been greased at the factory. See Section 5, Lubrication Schedule, for proper lubricant to add before hoist is installed on the monorail.

Make sure the load chain is free from any contamination or dirt and adequately lubricated with SAE 80 grade oil. Bottom block must hang straight, and chain must be free of kinks or twists.

Load Hook Throat Opening
It is recommended that the throat opening of the load hook be measured and recorded prior to putting the hoist in service and that a gage be made to provide a quick visual inspection for a bent hook as required during monthly inspections by ANSI B30.16-1981. See Section 4, page 4-4.

Power Connections
Make sure that power supply voltage is the same as that shown on the hoist nameplate and is protected by fuses or other current overload devices. The power source/conductors must be sized sufficiently to maintain the voltage at the hoist at ±6% of the nominal voltage under all operating conditions. Standard nominal voltages are 230/460/575. Improper voltage maintenance can cause motor overheating or sluggishness, and chattering or inoperative motor brakes and controls.

A wiring diagram is included in this manual showing the identification of the power lead connections. Refer to wiring diagram prior to start up and/or any electrical work. If drawing has been misplaced, you may obtain one from the factory upon request with the serial number of the unit.

CAUTION

It is recommended that a power disconnect be installed no more than 30 feet from the hoist.

Make sure power source disconnect is off and locked in open position while making connections.

Make sure all collectors, if furnished, are compatible and properly lined up and make good contact with conductor bars on rail.

Note: All standard Spacemaster Electric Chain Hoists are furnished with motor and control circuit protection which, in the Company's interpretation, meet the requirements of the National Electrical Code in effect at time of shipment from the factory. The protective devices required for the power feed are outlined in Article 610 of the NEC and are tne responsibility of the user. It is recommended that this article be reviewed by the user for compliance requirements.

Follow National, State, and Local Codes when providing electrical service to the hoist.

All electrical connections shall be made only by a qualified electrician.

SECTION 2
INITIAL START-UP

WARNING

Check all "motion" buttons in push button station to ensure that none bind or stick in any position before connecting hoist to power supply. Check pendant cable and supporting wires to ensure they are not damaged.

Once power has been supplied to the hoist, several important checks must be made.

Proper Hook Motion (Hoist Motor Rotation)
Since direction of rotation of any three-phase A.C. motor can be reversed by reversing any two of the three lines feeding the motor, it is important that the motion travel is in correct relationship with the button being depressed.

To check/correct hook motion (motor rotation), first *carefully* inch the *up button* and observe hook motion. If block does not travel up, stop and open the power source disconnect.

WARNING

Do *not* attempt to reverse hoist motion by changing control leads in the push button or at the contactor, and do not change the nameplate on the P/B. The pilot circuit limit switch is in series with the "up" control circuit wiring as furnished from the factory. Changing the push button control leads or nameplates will prevent the limit switch from functioning properly.

IMPORTANT

Do not run the hoist with the down button if direction is reversed. **To correct the direction of the hook block travel, reverse any two leads supplying power to the hoist, at the main power source, or at the lead in connections to the hoist. Do not change the internal wiring of the hoist.**

Proper Trolley Motion
If necessary to change trolley motion to orient direction with P/B markings, change any two power leads at the *load side of the trolley contactor only.*

CAUTION

Do not reverse main power leads for trolley motion correction. This will cause a reversal also of hoist motion, with resulting hazards at limit switch as listed above.

Note: Always leave at least 6 inches of chain behind the slack fall stop (Figure 2-1).

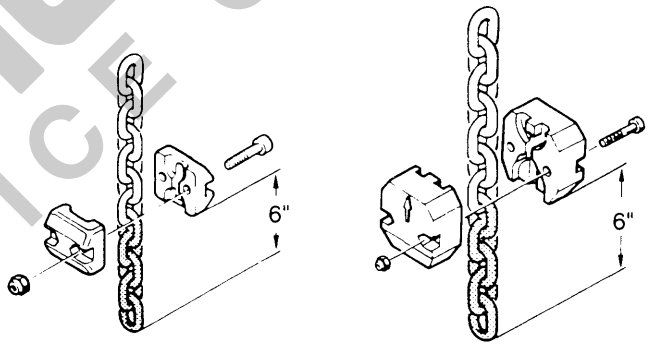


Figure 2-1

Fitting the Chain Container
Install chain container on hoist with screw and nut (Figure 2-2). After installation, check that the slack fall stop operates correctly.

Note: The electric chain hoist must always be transported with chain container loose.

Note: The chain container must be used for effective operation of the limit of travel.

No Load Operational Checks
Check hoist motor brake adjustment. Block should stop without load on hook with maximum 1" of hook drift. See Section 4, Operation/Maintenance, page 4-2, for adjustment instructions.

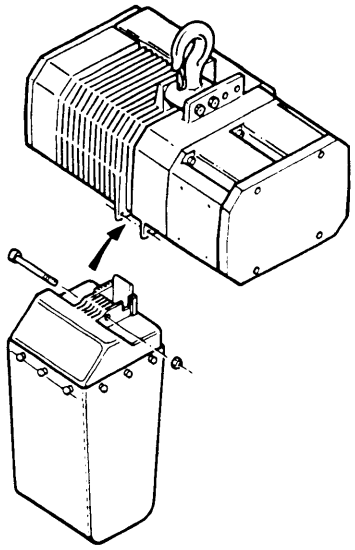
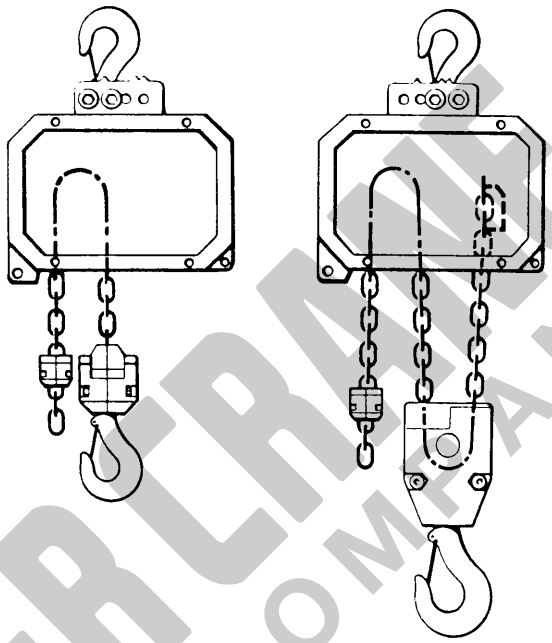


Figure 2-2



Torque Limiter
The Spacemaster Electric Chain Hoist is equipped with a torque limiting device to help protect against the damage which may be caused by the accidental attempts to lift an over-capacity load. This device is not intended as a measuring device and should not be used as such. This device is adjusted at the factory for the designed load capacity of the hoist. Sound operating practices should be followed to avoid attempts to lift over-capacity loads.

Upper Hook/Trolley Assembly
The mounting position of the upper hook or trolley assembly is important for maintaining proper balance. The mounting position of the upper hook or trolley is indicated by marks on the load frame (Figure 2-3).

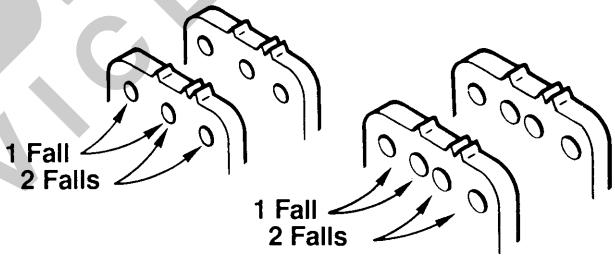


Figure 2-3

Load/Run Test
While all R&M Materials Handling hoists are load tested at the factory, full load testing should be performed after installation by the user and completion of No Load Operational Checks.

Run the load chain up and down several times without a load while checking for proper tracking of the chain. If no problems are observed, attach a near-capacity load and lift/lower the load the full length of lift ensuring the load chain does not become twisted in the bottom block. Check to ensure welds of the vertical links are facing the load wheels (Figure 2-4).

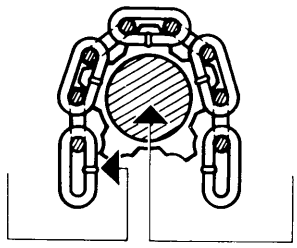


Figure 2-4

Run trolley full length of monorail or crane and check for binding of trolley wheels on rail and/or interference at splice joints, hanger connections/bolts, etc. Check contact with rail end stops. Contact should be made with trolley side plates or bumpers. Rail stops designed to make contact with wheels must be avoided.

SECTION 3
SAFE OPERATING PRACTICES

General

There is no one single factor that is more important for minimizing the possibility of personal injury to the operator and those working in the area, or damage to property, equipment, or material, than being familiar with the equipment and using *Safe Operating Practices.*

Hoist/trolleys are designed for *lifting and transporting of material only.* Under no circumstances, either during initial installation or in any other use, should the hoist be used for lifting or transporting personnel.

No operator should be permitted to use the equipment who is not familiar with its operation, is not physically or mentally fit, or has not been schooled in safe operating practices. The misuse of hoists can lead to certain hazards which cannot be protected against by mechanical means; hazards which can only be avoided by the exercise of intelligence, care, and common sense.

Safe Operating Practices also involves a program of periodic inspection and preventative maintenance (covered in separate section). Part of the operator's training should be an awareness of potential malfunctions/hazards requiring adjustments or repairs, and bringing these to the attention of supervision for corrective action.

Supervision and management also have an important role to play in any safety program by ensuring that a maintenance schedule is adhered to, and that the equipment provided for the operators is suitable for the job intended without violation of one or more of the rules covering safe operating practices and good common sense.

The Safe Operating Practices shown are taken in part from the following publications:

American National Standard Institute (ANSI)
Safety Standards for Cranes, Derricks, Hoists
ANSI B30.2 - Overhead and Gantry Cranes
ANSI B30.16 - Overhead Hoist

Do's and Don'ts (Safe Operation of Hoists)

The following are Do's and Don'ts for safe operation of overhead hoists. Taking precedence over any specific rule listed here, however, is the most important rule of all, USE COMMON SENSE. A few minutes spent reading these rules can make an operator aware of dangerous practices to avoid and precautions to take for his own safety and the safety of others. Frequent examinations and periodic inspections of the equipment as well as a conscientious observance of safety rules may save lives as well as time and money.

DON'TS - HOISTS

1. NEVER lift or transport a load until all personnel are clear and do not transport the load over personnel.
2. DO NOT allow any unqualified personnel to operate hoist.
3. NEVER pick up a load beyond the capacity rating appearing on the hoist. Overloading can be caused by jerking as well as by static overload.
4. NEVER carry personnel on the hook or the load.
5. DO NOT operate hoist if you are not physically fit.
6. DO NOT operate hoist to extreme limits of travel of chain without first checking for proper limit switch action.
7. AVOID sharp contact between two hoists or between hoist and end stops.
8. DO NOT tamper with or adjust any parts of the hoist unless *specifically authorized* to do so.
9. NEVER use the load chain as a sling.
10. DO NOT divert attention from load while operating hoist.
11. NEVER leave a suspended load unattended.
12. DO NOT use limit switch(es) for normal operating stop(s). These are safety devices only and should be checked on a regular basis for proper operation.

13. NEVER operate a hoist which has an inherent or suspected mechanical or electrical defect.

14. DO NOT use load chain as ground for welding. NEVER touch a live welding electrode to the load chain.

15. DO NOT jog controls unnecessarily. Hoist motors are generally high torque, high slip types. Each start causes an inrush of current greater than the running current and leads to overheating and heat failure, or burn-out, if continued to excess.

DO'S - HOISTS

1. READ and follow manufacturer's instruction, installation, and maintenance manuals. When repairing or maintaining a hoist, use only manufacturer's recommended parts and materials.

2. READ and follow all instruction and warning information on or attached to a hoist.

3. REMOVE the hoist from service and thoroughly inspect and repair, as necessary, if unusual performance or visual defects (such as peculiar noise, jerky operations, travel in improper direction, or obviously damaged parts) are noticed.

4. ESTABLISH a regular schedule of inspection and maintain records for all hoists with special attention given to hooks, load chains, brakes, and limit switches. See Section 5, Preventative Maintenance.

5. CHECK operation of brakes for excessive drift.

6. NEVER lift loads over people, etc.

7. CHECK for damaged hooks and load chains.

8. KEEP load chain clean and well lubricated.

9. CHECK the load chain for improper seating, twisting, kinking, wear, or other defects before operating the hoists.

10. MAKE SURE a load clears neighboring stock piles, machinery, or other obstructions when raising, lowering, or traveling the load.

11. CENTER hoist over the load before operating.

12. AVOID swinging of load or load hook when traveling the hoist.

13. BE SURE the load attachment is properly seated in the saddle of the hook. Balance load properly before handling. Avoid hook tip loading.

14. PULL in a straight line, so that neither hoist body nor load chain are angled around an object.

15. TAKE up slack slowly.

16. KNOW the hand signals for hoisting, cross travel, and crane travel if working with cab-operated hoists or cranes. Operators should accept the signals of only those persons authorized to give them.

SECTION 4
OPERATION/MAINTENANCE

Typical Construction
While each Series Spacemaster Electric Chain Hoist may have some slight variation in design/arrangement, all hoists have the same basic elements.

1. *Motor* - basic drive package.

2. *Hoist Motor Brake* - brings motor to quick stop, and is a part of the braking system that enables a load to be suspended from the hook with power off.

3. *Gearcase Assembly* - two or three reduction gear reducers coupling the motor to the chain sprocket. Also houses the torque limiting device.

4. *Torque Limiting Device* - to help prevent lifting of excessive loads which may damage the hoist.

5. *Frame* - basic structural components which support the load to be handled.

6. *Bottom Block and Load Wheel* - includes bottom block and chain sprocket.

7. *Load Chain* - load chain and end connections for picking up the load.

8. *Controls/Enclosures* - devices for supplying power to, and reversing direction of, the motor(s).

The following details the operation/maintenance instructions for each basic element.

Motors
The hoist motors are designed to provide dependable hoisting service. Standard motors are enclosed for protection against normal hazards of dust and moisture. All bearings are sealed and lifetime lubricated and do not require greasing.

Hoist Motor Brake
Spacemaster Electric Chain Hoists are furnished with D.C. disc type brakes with minimum torque rating equal to 200% full load torque of the motor. The purpose of the motor brake is twofold:

1. To minimize hook drift by bringing the motor to a quick and smooth stop.

2. To hold loads suspended from the hook with power off.

When the hoist motor is energized, the magnet brake coils are also energized, pulling the armature plate (2, Figure 4-1) against the coil, thereby releasing the pressure on the friction discs (3). This permits the discs (3) to turn freely with motor rotation. When the motor is de-energized, the brake coils are simultaneously de-energized, releasing the armature plate (2) which applies pressure to the friction discs (3) and the motor is brought to a quick stop. The kinetic energy of the motor is dissipated as heat on the friction surfaces.

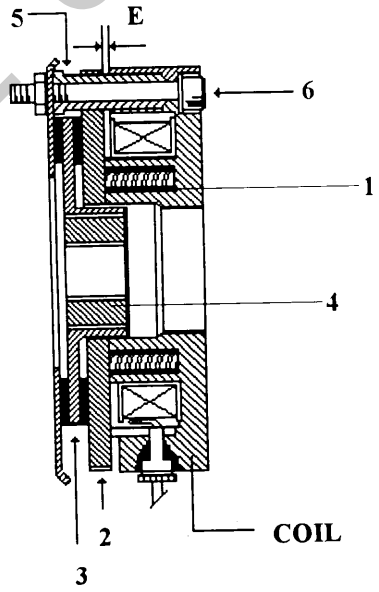


Figure 4-1

Proper maintenance and adjustment of the motor brake is essential to the reliable operation of the hoist. Heat is generated and wear occurs each time the motor is stopped. The work done by the brake is not reduced with light load or empty hook operation. The brake life and serviceability will be greatly extended by adequate maintenance. The practice of excessive and unnecessary inching of push-button by

an operator causes unnecessary brake heating and wear. The frequency of brake wear adjustment depends on the duty cycle. To adjust brake, proceed as follows:

Adjustment
The hoist motor brake is adjusted for proper torque when shipped from the factory and should not require adjustment in the field.

IMPORTANT

It is essential to adjust the brake when the value of gap E reaches 0.020" (0.5 mm). The gap must be set to 0.010" (0.25 mm). When the friction disc (3) wears to a thickness of 0.28 inch (7.2 mm), it should be replaced immediately.

Disconnect the hoist from the power supply.

Remove the cover of the junction box, disconnect the brake cables on the terminals marked "brake."

The airgap between the armature plates (2, Figure 4-2) and the motor head will require adjustment from time to time. This time interval will depend upon the frequency of operation and wear of the friction discs (3).

The nominal gap "E" as set at the factory is 0.010" (0.5 mm). The maximum gap "E," and the gap at which time the brake must be adjusted should not exceed 0.020" (0.25 mm). Regular inspections of the brake will help determine this airgap dimension. If, any time, the load hook shows signs of drifting after the push buttons are released, immediately take the hoist out of service and check the motor brake for excessive wear and airgap.

To adjust the airgap to the nominal, or minimum, dimension:

1. Slightly loosen machine screws (6).

2. Turn spacers (5) counterclockwise (seen from the rear as shown by the arrow at the cover) to adjust the airgap to the nominal (0.010") dimension.

3. Tighten the machine screws (6) firmly and measure the airgap, which should be uniform all around.

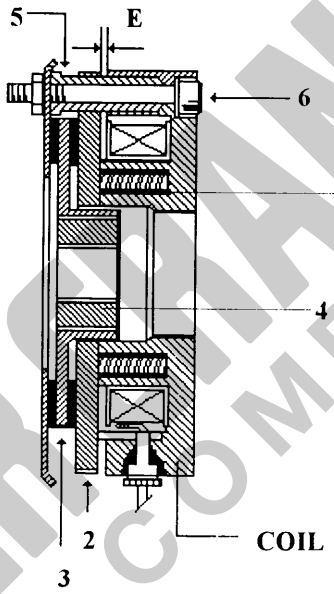


Figure 4-2

Refit the brake cable, and connect it to the "brake" terminals.

Close the junction box. Refit the cover.

Check that the brake operates correctly. A slight "click" will be heard when switching on.

Maintenance
If the faces of the armature plates (2) are greasy, clean then with a degreasing agent to prevent slipping. If the armature faces are scored, they should be reversed. Replace the friction disc (3) if necessary (Figure 4-1).

Gearcase Assembly (See drawing, Section 6)
Drive train consists of two or three reductions of precision cut helical gears/pinions, keyed or splined to steel shafts, supported on ball bearings. All gears and bearings operate in a semi-fluid grease and do not require additional lubrication.

The gearcase should be serviced every 250 hours of operation. This service includes inspection of the mechanical components, changing the lubricant, check the motor brake gap and making proper adjustments. Check and adjust the load limiter, and replace all gearcase seals and gaskets.

CAUTION

Fill gearcase to oil level with lubrication as recommended in lubrication schedule, Section 5, prior to putting hoist back in service.

Torque Limiting Device

Spacemaster Electric Chain Hoists are furnished with a torque limiting device inside the hoist gearcase which helps prevent the lifting of excessive loads which may damage the hoist.

Operation of Torque Limiting Device

In the hoisting direction, the limiter gear (14, Figure 4-3), which is a slide-fit on the pinion shaft (12), rotates between two friction discs (15). Pressure is applied to the assembly by a spring washer (16). The amount of pressure is dependent on the adjustment nut (21).

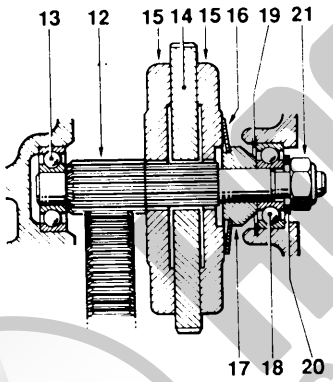


Figure 4-3

The torque limiting device should be tested periodically to ensure the load does not slip.

Load Capacity Lbs.	Hoist Type		Setting Load	
	ECA	ECB	Min. Lbs.	Max. Lbs.
250	1/8 20 S4 1/8 40/10 T4		375	397
500	1/4 40/10 T4 1/4 20 S4 1/4 20/5 T4		750	794
1000	1/2 40/10 T3 1/2 10 S4 1/2 20/5 T4 1/2 20 S4 1/2 40 S3		1488	1598
2000	1 10 S4 1 20/5 T3 1 20 T3	1 32/8 T3	2976	3197
4000		2 8 S3 2 16/4 T3 2 16 S4	5952	6393
6000		3 12 S3 3 12/4 T3	8929	9590

Note: When the load which causes the torque limiter to slip becomes less than 120% of the S.W.L., tighten the adjustment nut (21) so that the setting is within the range shown above.

WARNING!

Never adjust the torque limiter to allow lifting of more than the maximum setting load shown in the chart above. Failure to adhere to the maximum setting restrictions may result in personal injury or property damage.

Frame

The frame is constructed of steel and, unless damaged from abuse (impact with another hoist or building structure), requires no maintenance. Any hoist with a frame that is no longer serviceable for any reason should be referred to the factory for replacement/repair.

LOAD CHAIN

CAUTION

A hoist should never be used if the load chain shows any evidence of mechanical damage or exscessive wear.

Replacement must be made using load chain of exact size, quality, and fittings with which your hoist was originally equipped from the factory.

Improper load chain storage or installation procedure can render the load chain unusable prior to the first lift.

Load chain inspection should be conducted weekly by a designated person using good judgment in evaluating the remaining service life. Any deterioration of the load chain resulting in appreciable loss of the original strength, such as situations described below, should be noted and evaluated. A monthly inspection should include a written record, dated and signed by the inspector.

1. Improper lubrication of load chain.
2. Worn outside or inside chain.
3. Crushing, kinking, or signs of distortion.
4. Reduction of original diameter more than 10%.

At regular intervals, check the chain for wear. If any of the links show cracks or signs of distortion, the chain must be replaced immediately. The maximum permissible wear on any link is 10% of the cable diameter. (Dimension X according to the type of chain (new chain)).

5 x 15 Chain Dimension X Over 5 Links	6.5 x 19.5 Chain Dimension X Over 5 Links	8 x 24 Chain Dimension X Over 11 Links
$3.327^{+.016}_{-.008}$	$4.33 \pm .008$	$10.394^{+.031}_{-.016}$

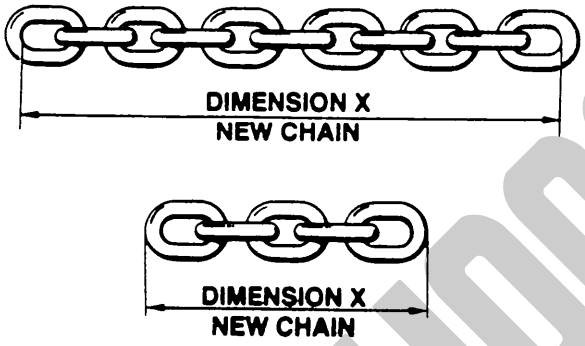


Figure 4-4

WARNING

Also evaluate those sections which are normally hidden during inspections, such as sections which pass over equal load wheel.

Load Chain Installation

With a 2 ft. long piece of electrical wire, or chain installation tool, install wire, or tool, in chain guide. Attach last chain link to wire, or tool, then pull chain over chain sprocket.

IMPORTANT

The chain welds have to be toward the chain sprocket. See Figure 2-4.

Install slack fall stop (Figure 2-1). When using limit switches, be sure that the slope of the slack chain stop is toward the limit switches.

Install the hook. When using 2-fall reeving, attach the dead-end of the chain to the hoist body.

Be sure the chain is not twisted (Figure 2-1). Run the load chain up and down a few times without load.

Lubricate the load chain. See Section 5, Preventative Maintenance, Lubrication Schedule.

Bottom Block and Load Whee.

Load wheels showing evidence of scored grooves or broken/cracked flanges or sharp edges generated from wear, should be replaced. Worn load wheels can greatly reduce the life of the load chain.

Check hooks for deformation or cracks. Hooks having a throat opening more than 15% of normal, or more than a 10 degree twist from the plane of the unbent hook, must be replaced. See Figure 4-5.

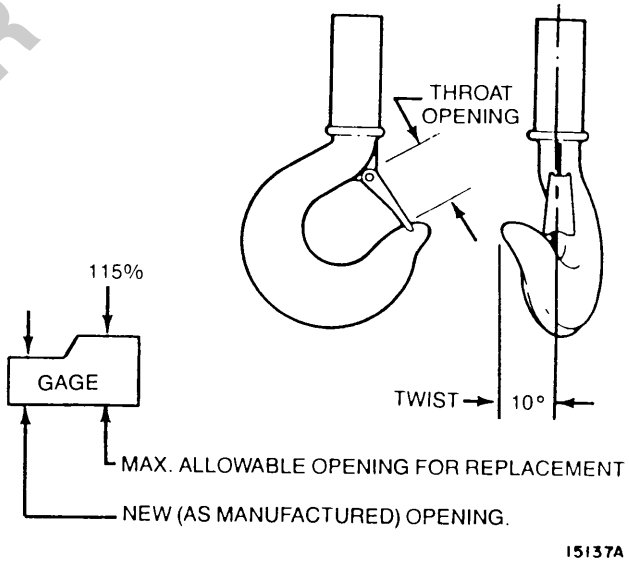


Figure 4-5

Due to the many types and sizes of hooks which can be furnished and specified by the user, it is recommended that the user measure the actual throat opening of the hook as originally furnished and record on the sketch and retain for a permanent record. This record can then be used for determining when hook must be replaced due to deformation/ excessive throat opening. A gage, such as shown (Figure 4-5), can be used as a quick check of the throat opening.

Note: Any hook that is twisted or has throat opening in excess of normal indicates abuse or overloading of the unit. Other load bearing components should be checked for damage.

Safety latches should be replaced if bent or broken to the extent that they no longer provide proper closure of throat opening of hook.

CAUTION

Repairs by welding or reshaping of hooks *must* be avoided.

Controls/Enclosure

WARNING

Before removing or checking any electrical component, be sure the power supply is shut off and the disconnect locked in the open position.

Standard basic control components consist of the following:

1. Printed Circuit Board - housing the control transformer (48 Volt) and directional contactors which close the power leads to the motor when actuated by the push button.

2. Push Button Station.

3. Motor Thermal Protection - pilot circuit contact which opens the hoisting circuit if motor overheats.

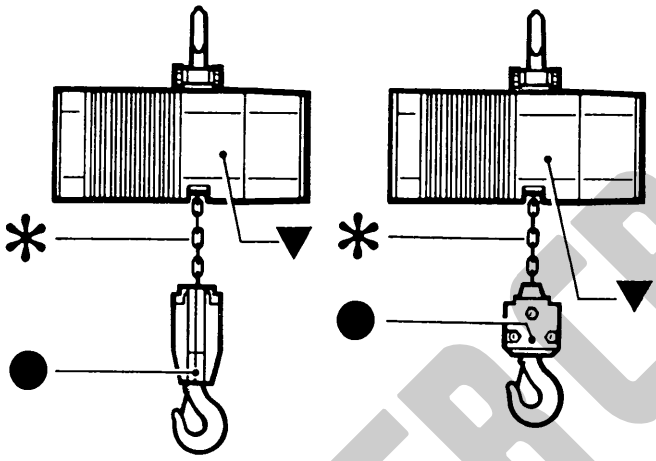
Note: The number, size, and quantity of control devices vary considerably, depending on the number and types of motors and the many control options that are available. Refer to wiring diagram for specific details on power/control devices.

No specific rules can be given as to the frequency of replacement of electrical devices. Deterioration of electrical components is directly related to the heat generated (on time) in contactor coils and transformers, and the arcing of contactors when motor circuit is opened (starts/stops).

CAUTION

Hoist motor must be properly phased for limit to function as intended. See warnings/instructions under "Installation-Initial Start Up."

SECTION 5
PREVENTATIVE MAINTENANCE



Gearcase Inspection/Preventative Maintenance Schedule
The gearcase should be serviced every 250 hours of operation or every three years, whichever comes first. The service includes inspection of the mechanical components, changing the lubricating oil, checking the motor brake gap and making proper adjustments, checking and adjusting the load limiter, and replacing all gearcase seals and gaskets.

The intervals between inspections will vary due to the wide range of applications, duty cycles, and environmental conditions encountered by hoisting equipment. If duty is heavier, or the environment severe, inspections should be more frequent.

The operator should also bring to the attention of maintenance personnel any unusual operating conditions that occur between inspection periods, and not operate hoist until unit has been repaired and is functioning properly.

INSPECTION/PREVENTATIVE MAINTENANCE SCHEDULE

TIME INTERVAL	INSPECTION FUNCTION
Monthly	*Load Chain* - Inspect load chains for wear, cracks, signs of distortion, or other visible signs of fatigue. If any of the links show signs of distortion or other visible signs of fatigue, the chain must be replaced immediately. The maximum of wear on any link is 10% the original chain diameter. (Dimension X, according to the type of original chain (see page 4-4)). To ensure optimum operation of the hoist, the manufacture recommends that only genuine R&M replacement chain be used. See Section 4 for proper installation of new chain and additional cautions. *Hoist/trolley brakes* - excessive coast without load. *Controls* - proper operation from push-button.

INSPECTION/PREVENTATIVE MAINTENANCE SCHEDULE (Cont)

TIME INTERVAL	INSPECTION FUNCTION
After 250 hours of Operation	*Motor Brake* - Inspect and clean the motor brake and brake disc. Reset the brake airgap. If necessary clean the brake with a degreasing agent. *Lubrication* - refer to Lubrication Schedule below. Regrease lubrication points and check lubrication level in gearcases. Drain and replace lubrication in hoist gearcase. Check for loose bolts and/or connections on both hoist/trolley and suspension system. Check and adjust the load limiter, and replace all gearcase seals and gaskets. The gearcase lubricant is Mobilux EP1 semi-fluid grease; capacity 0.5 qt. for ECA hoist and 1.6 qt. for ECB hoist. Keep load chain clean and free of deposits. If necessary, clean the chain with kerosene. Drain the chain off and re-oil. Under no circumstances should the chain be cleaned with thinners or degreasing agents.

IMPORTANT

After any major teardown, repair, or alteration, unit should be functionally load tested as described in Sections 1, Installation, and 2, Initial Start-Up. Also, any hoist which has been out of service one month or more should have a complete maintenance/inspection, followed by a functional load test.

LUBRICATION SCHEDULE

	LOCATION	INTERVAL	TYPE LUBRICANT
▼	Hoist Gearcase (capacity: ECA - 0.5 qt.; ECB - 1.6 qt.).	Check level monthly to quarterly. Drain and refill after 250 hours of operation.	Mobilux EP1 semi-fluid grease or equivalent.
✻	Load Chain	Every two weeks	Apply SAE 80 Grade with a brush.
	Open Wheel Gearing	Monthly to Quarterly	Dubois outside gear lube or equivalent.
●	Hook Bearing	Monthly to Quarterly	Dubois outside gear lube or equivalent.

ECA Model Hoists

CAPACITY FPM SPEED/DUTY	1/8 20 S4	1/8 40/10 T4	1/4 20 S4	1/4 40/10 T4	1/4 20/5 T4
SPEED	Single	Two	Single	Two	Two
MAX. LOAD LBS.	250	250	500	500	500
NO. OF FALLS	1	1	1	1	2
CHAIN DIMENSION	5x15 mm	5x15 mm	5x15 mm	5x15 mm	5x15 mm

CAPACITY FPM SPEED/DUTY	1/2 10 S4	1/2 20/5 T4	1/2 20 S4	1/2 40 S3	1/2 40/10 T3	1 10 S4	1 20 S3	1 20/5 T3
SPEED	Single	Two	Single	Single	Two	Single	Single	Two
MAX. LOAD LBS.	1000	1000	1000	1000	1000	2000	2000	2000
NO. OF FALLS	2	2	1	1	1	2	2	2
CHAIN DIMENSION	5x15 mm	5x15 mm	5x15 mm	5x15 mm	5x15 mm	5x15 mm	5x15 mm	5x15 mm

ECB Model Hoists

CAPACITY FPM SPEED/DUTY	1 32/8 T3	1 32 S4	2 8 S3	2 16/4 T3	2 16 S4	3 12 S3	3 12/4 T3
SPEED	Two	Single	Single	Two	Single	Single	Two
NO. OF STEPS	2	2	2	2	2	3	3
MAX. LOAD LBS.	2000	2000	4000	4000	4000	6000	6000
NO. OF FALLS	1	1	2	2	2	2	2
CHAIN DIMENSION	6.5x19.5 mm	8x24 mm	6.5x19.5 mm	6.5x19.5 mm	8x24 mm	8x24 mm	8x24 mm

SECTION 6
SPARE PARTS IDENTIFICATION/ADJUSTMENT AND REPLACEMENT INSTRUCTIONS

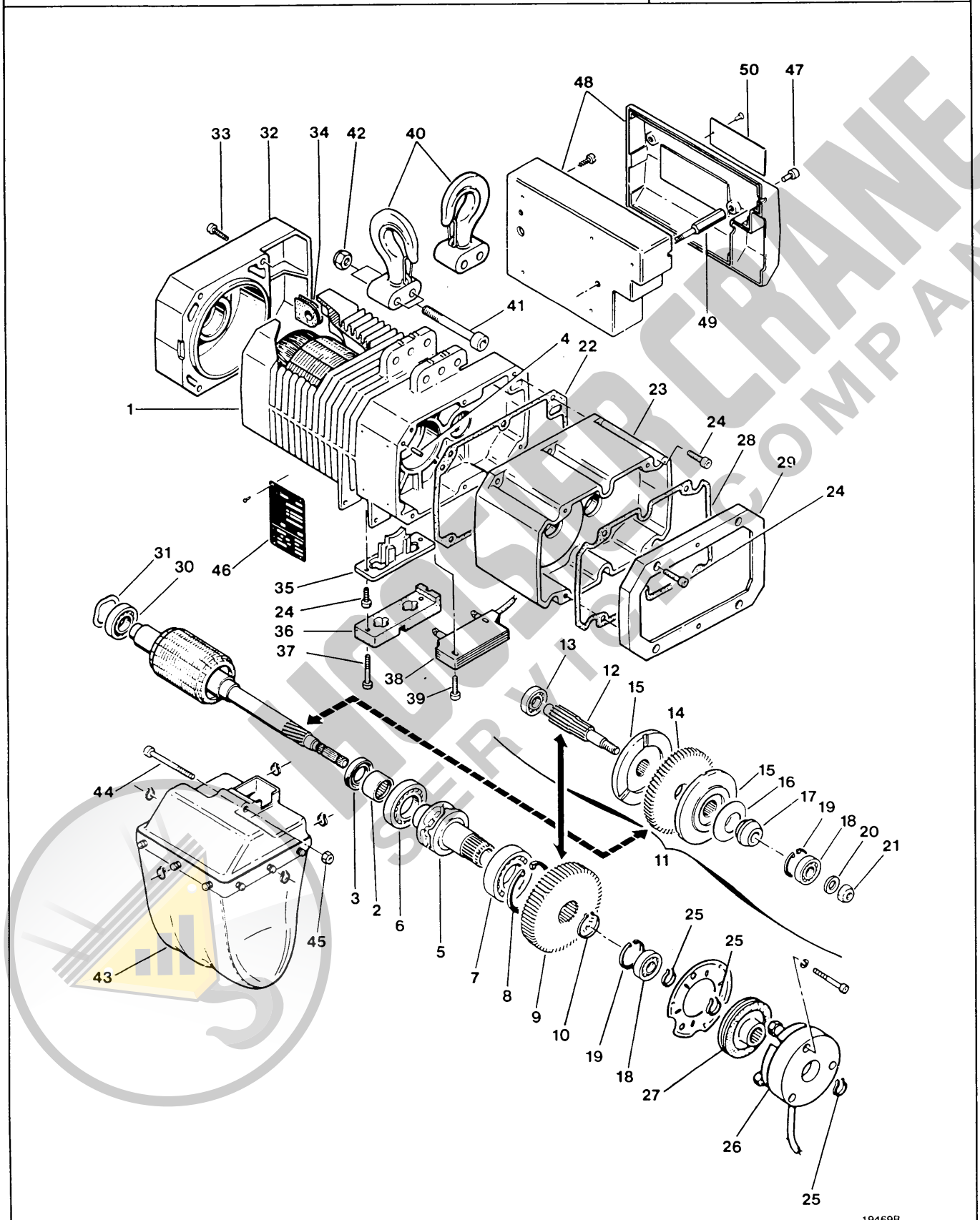
General

The pages in this section all refer to the specific R&M Materials Handling, Inc. hoist whose serial number is on a metal nameplate affixed to the trolley mounting tube or hoist frame side tube.

Also included are specific operation and adjustment instructions applying to components and assemblies in the hoist.

IMPORTANT

Both the reference number and the hoist serial number must be provided to ensure the proper ordering of parts.



HOIST **SERIAL NUMBER** AND PART **REFERENCE** NUMBER MUST BE PROVIDED WHEN ORDERING REPLACEMENT PARTS

ELECTRIC CHAIN HOIST MODEL ECA SINGLE SPEED			SPARE PARTS IDENTIFICATION EC-1, PAGE 2				
			MODEL				
			1/8 20 S4	1/4 20 S4	1/2 20 S4	1/2 10 S4	1 10 S4
DWG. ITEM	REFERENCE NUMBER	PART DESCRIPTION	QTY.	QTY.	QTY.	QTY.	QTY.
1		BODY	1	1	1	1	1
2		IHA HK 22 12 (22 × 28 × 12) NEEDLES SOCKET	1	1	1	1	1
3		PAULSTRA 22 × 32 × 7 SEAL	1	1	1	1	1
4		8 × 20 CYLINDRICAL PIN	2	2	2	2	2
5	556 255	LOAD WHEEL FOR 5 × 15 CHAIN	1	1	1	1	1
6		6006 2RS BEARING (30 × 55 × 13)	1	1	1	1	1
7		6206 2NS BEARING (30 × 62 × 16)	1	1	1	1	1
8		SNAP RING 62 I	1	1	1	1	1
9		82 TOOTH GEAR WHEEL	1	1	1	1	1
10		26 E SNAP RING	1	1	1	1	1
11		LIMITER SUBASSEMBLY: 1/8 - 1/4 TON - SINGLE FALL	1	1		1	
		LIMITER SUBASSEMBLY: 1/2 TON - SINGLE FALL			1		1
12	*	13 TOOTH PINION SHAFT	1	1	1	1	1
13	*	6201 BEARING (12 × 32 × 10)	1	1	1	1	1
14	*	94 TOOTH LIMITER GEAR	1	1	1	1	1
15	*	FRICTION DISC	2	2	2	2	2
16	*	SPRING WASHER (50 × 25.4 × 1.5)	1	1	2	1	2
17	*	LIMITER RING	1	1	1	1	1
18	*	6201 2RS (12 × 32 × 10) BEARING	2	2	2	2	2
19	*	32 I SNAP RING	2	2	2	2	2
20	*	Z 12 U WASHER	1	1	1	1	1
21	*	THISERT BRAKE NUT M 12 - 125	1	1	1	1	1
22	556 242	GEARBOX GASKET	1	1	1	1	1
23		GEARBOX	1	1	1	1	1
24		HEX, SOCKET HEAD SCREW M6-20	12	12	12	12	12
		MOBILUX EP 1 GREASE (CAPACITY 0.5 QUART)	1	1	1	1	1
25		12 E SNAP RING	3	3	3	3	3
26	556 553	COMPLETE BRAKE ERD FOR 115 V POWER SUPPLY	1	1		1	
	556 556	COMPLETE BRAKE ERD 10 OR L8 OR M4 - 96 V FOR 230 V POWER SUPPLY			1		1
	556 557	COMPLETE BRAKE ERD 10 OR L8 OR M4 - 190 V FOR 460 V POWER SUPPLY			1		1
		SUPPLIED TOGETHER WITH SECURING SCREWS AND WASHERS					
27		BRAKE LINING (PLEASE MENTION MAKE AND TYPE)	1	1	1	1	1
28	556 241	COUNTERWEIGHT GASKET	1	1	1	1	1
29	556 513	COUNTERWEIGHT	1	1	1	1	1
30		6203 2NS BEARING (17 × 40 × 12)	1	1	1	1	1
31	832 040	CORRUGATED (ONDUFLEX) E542901-00 WASHER	1	1	1	1	1
32	556 512	REAR CASING	1	1	1	1	1
33		HEX, SOCKET HEAD SCREW M6-50	4	4	4	4	4
34	833 431	CABLE GROMMET	1	1	1	1	1
35	556 235	CHAIN GUIDE	1	1	1	1	1

HOIST **SERIAL NUMBER** AND PART **REFERENCE** NUMBER MUST BE PROVIDED WHEN ORDERING REPLACEMENT PARTS

			MODEL				
			1/8 20 S4	1/4 20 S4	1/2 20 S4	1/2 10 S4	1 10 S4
DWG. ITEM	REFERENCE NUMBER	PART DESCRIPTION	QTY.	QTY.	QTY.	QTY.	QTY.
36	556 236	SHOCK-ABSORBING STOP (IF ELECTRICAL LIMIT SWITCH NOT FITTED)	1	1	1	1	1
37	550 979	HEX, SOCKET HEAD SCREW M6-25 FOR SHOCK ABSORBING STOP	2	2	2	2	2
38	556 619	MOLDED UPPER AND LOWER LIMIT SWITCH (OPTIONAL)	1	1	1	1	1
39	830 930	HEX, SOCKET HEAD SCREW M4-20 + AZ4 WASHER (OPTIONAL)	2	2	2	2	2
40	556 641	UPPER HOOK SUBASSEMBLY: PERPENDICULAR VERSION 012	1	1	1		
	556 643	UPPER HOOK SUBASSEMBLY: PERPENDICULAR VERSION 025				1	1
41	830 926	HEX, SOCKET HEAD SCREW M10-70	2	2	2	2	2
42	831 593	NYLOCK NUT M10	2	2	2	2	2
43		CHAIN CONTAINER WITH SUPPORT					
	556 622	B1 CHAIN CONTAINER, CAPACITY 19 FT					
	556 623	B2 CHAIN CONTAINER, CAPACITY 39 FT	1	1	1	1	1
	556 624	B3 CHAIN CONTAINER, CAPACITY 55 FT					
	556 621	B4 CHAIN CONTAINER, CAPACITY 131 FT					
44		HEX, SOCKET HEAD SCREW M6-70	1	1	1	1	1
45		NYLOCK NUT M6	1	1	1	1	1
46	*	SERIAL PLATE	1	1	1	1	1
		U TYPE SIM RIVET, GAUGE 4, LENGTH 6.4	4	4	4	4	4
47		HEX, SOCKET HEAD SCREW M6×12 (COVERS JUNCTION BOX)	6	6	6	6	6
48	556 548	JUNCTION BOX	1	1	1	1	1
49		ADJUSTING SLEEVE	2	2	2	2	2
50	556 736	1/8 TON LOAD PLATE	1				
	556 737	1/4 TON LOAD PLATE		1			
	556 738	1/2 TON LOAD PLATE			1	1	
	556 739	1 TON LOAD PLATE					1
	*	RIVETS - 11P7	2	2	2	2	2

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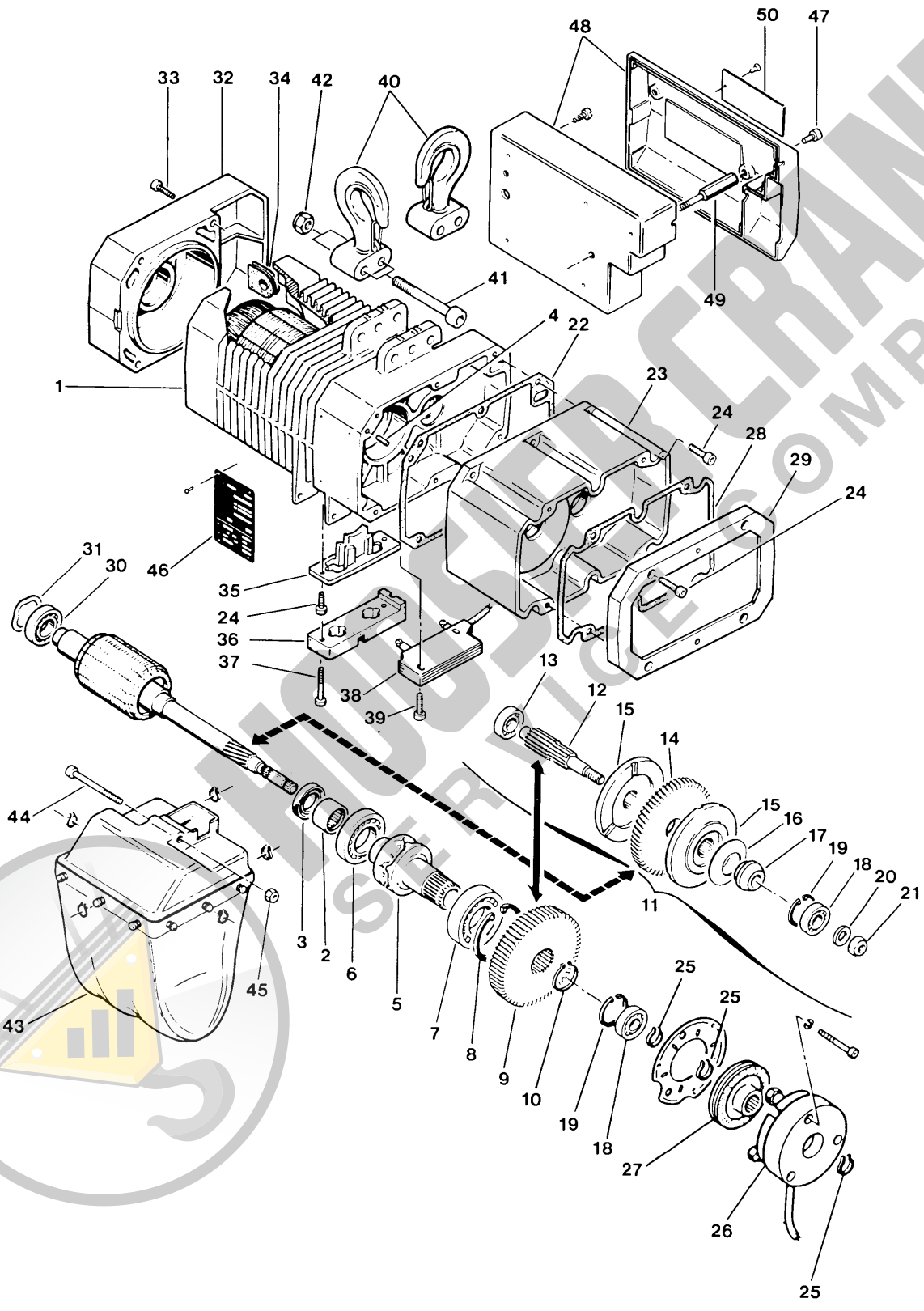

HOIST **SERIAL NUMBER** AND PART **REFERENCE** NUMBER MUST BE PROVIDED WHEN ORDERING REPLACEMENT PARTS

DWG. ITEM	REFERENCE NUMBER	PART DESCRIPTION	MODEL 1/8 40/10 T4 QTY.	1/4 40/10 T4 QTY.	1/4 20/5 T4 QTY.	1/2 40/10 T3 QTY.	1/2 20/5 T4 QTY.	1 20/5 T3 QTY.
1		BODY	1	1	1	1	1	1
2		IHA HK 22 12 (22 × 28 × 12) NEEDLES SOCKET	1	1	1	1	1	1
3		PAULSTRA 22 × 32 × 7 SEAL	1	1	1	1	1	1
4		8 × 20 CYLINDRICAL PIN	2	2	2	2	2	2
5	556 255	LOAD WHEEL FOR 5 × 15 CHAIN	1	1	1	1	1	1
6		6006 2RS BEARING (30 × 55 × 13)	1	1	1	1	1	1
7		6206 2NS BEARING (30 × 62 × 16)	1	1	1	1	1	1
8		SNAP RING 62 I	1	1	1	1	1	1
9		82 TOOTH GEAR WHEEL	1	1	1	1	1	1
10		26E SNAP RING	1	1	1	1	1	1
11		LIMITER SUBASSEMBLY: 1/8 - 1/4 TON - SINGLE FALL	1	1		1		
		LIMITER SUBASSEMBLY: 1/2 TON - SINGLE FALL				1		1
12	*	13 TOOTH PINION SHAFT	1	1	1	1	1	1
13	*	6201 BEARING (12 × 32 × 10)	1	1	1	1	1	1
14	*	94 TOOTH LIMITER GEAR	1	1	1	1	1	1
15	*	FRICTION DISC	2	2	2	2	2	2
16	*	SPRING WASHER (50 × 25.4 × 1.5)	1	1	1	2	1	2
17	*	LIMITER RING	1	1	1	1	1	1
18	*	6201 2RS (12 × 32 × 10) BEARING	2	2	2	2	2	2
19	*	32 I SNAP RING	2	2	2	2	2	2
20	*	Z 12 U WASHER	1	1	1	1	1	1
21	*	THISERT BRAKE NUT M 12 - 125	1	1	1	1	1	1
22	556 242	GEARBOX GASKET	1	1	1	1	1	1
23		GEARBOX	1	1	1	1	1	1
24		HEX, SOCKET HEAD SCREW M6-20	12	12	12	12	12	12
		MOBILUX EP 1 GREASE (CAPACITY 0.5 QUART)	1	1	1	1	1	1
25		12 E SNAP RING	3	3	3	3	3	3
26	556 553	COMPLETE BRAKE FOR 115 V POWER SUPPLY	1	1	1			
	556 556	COMPLETE BRAKE ERD 10 OR L8 OR M4 - 96 V FOR 230 V POWER SUPPLY				1		1
	556 557	COMPLETE BRAKE ERD 10 OR L8 OR M4 - 190 V FOR 460 V POWER SUPPLY				1		1
		SUPPLIED TOGETHER WITH SECURING SCREWS AND WASHERS						
27		BRAKE LINING (PLEASE MENTION MAKE AND TYPE)	1	1	1	1	1	1
28	556 241	COUNTERWEIGHT GASKET	1	1	1	1	1	1
29	556 513	COUNTERWEIGHT	1	1	1	1	1	1
30		6203 2NS BEARING (17 × 40 × 12)	1	1	1	1	1	1
31	832 040	CORRUGATED (ONDUFLEX) E542901-00 WASHER	1	1	1	1	1	1
32	556 512	REAR CASING	1	1	1	1	1	1
33		HEX, SOCKET HEAD SCREW M6-50	4	4	4	4	4	4
34	833 431	CABLE GROMMET	1	1	1	1	1	1
35	556 235	CHAIN GUIDE	1	1	1	1	1	1

DWG. ITEM	REFERENCE NUMBER	PART DESCRIPTION	MODEL 1/8 40/10 T4 QTY.	1/4 40/10 T4 QTY.	1/4 20/5 T4 QTY.	1/2 40/10 T3 QTY.	1/2 20/5 T4 QTY.	1 20/5 T3 QTY.
36	556 236	SHOCK-ABSORBING STOP (IF ELECTRICAL LIMIT SWITCH NOT FITTED)	1	1	1	1	1	1
37	550 979	HEX, SOCKET HEAD SCREW M6-25 FOR SHOCK ABSORBING STOP	2	2	2	2	2	2
38	556 619	MOLDED UPPER AND LOWER LIMIT SWITCH (OPTIONAL)	1	1	1	1	1	1
39	830 930	HEX, SOCKET HEAD SCREW M4-20 + AZ4 WASHER (OPTIONAL)	2	2	2	2	2	2
40	556 641	UPPER HOOK SUBASSEMBLY: PERPENDICULAR VERSION 012	1	1	1	1		
	556 643	UPPER HOOK SUBASSEMBLY: PERPENDICULAR VERSION 025					1	1
41	830 926	HEX, SOCKET HEAD SCREW M10-70	2	2	2	2	2	2
42	831 593	NYLOCK NUT M10	2	2	2	2	2	2
43		CHAIN CONTAINER WITH SUPPORT						
	556 622	B1 CHAIN CONTAINER, CAPACITY 19 FT						
	556 623	B2 CHAIN CONTAINER, CAPACITY 39 FT	1	1	1	1	1	1
	556 624	B3 CHAIN CONTAINER, CAPACITY 55 FT						
	556 621	B4 CHAIN CONTAINER, CAPACITY 131 FT						
44		HEX, SOCKET HEAD SCREW M6-70	1	1	1	1	1	1
45		NYLOCK NUT M6	1	1	1	1	1	1
46		SERIAL PLATE	1	1	1	1	1	1
		U TYPE SIM RIVET, GAUGE 4, LENGTH 6.4	4	4	4	4	4	4
47		HEX, SOCKET HEAD SCREW M6×12 (COVERS JUNCTION BOX)	6	6	6	6	6	6
48	556 548	JUNCTION BOX	1	1	1	1	1	1
49		ADJUSTING SLEEVE	2	2	2	2	2	2
50	556 736	1/8 TON LOAD PLATE	1					
	556 737	1/4 TON LOAD PLATE		1	1			
	556 738	1/2 TON LOAD PLATE				1	1	
	556 739	1 TON LOAD PLATE						1
		RIVETS - 11P7	2	2	2	2	2	2

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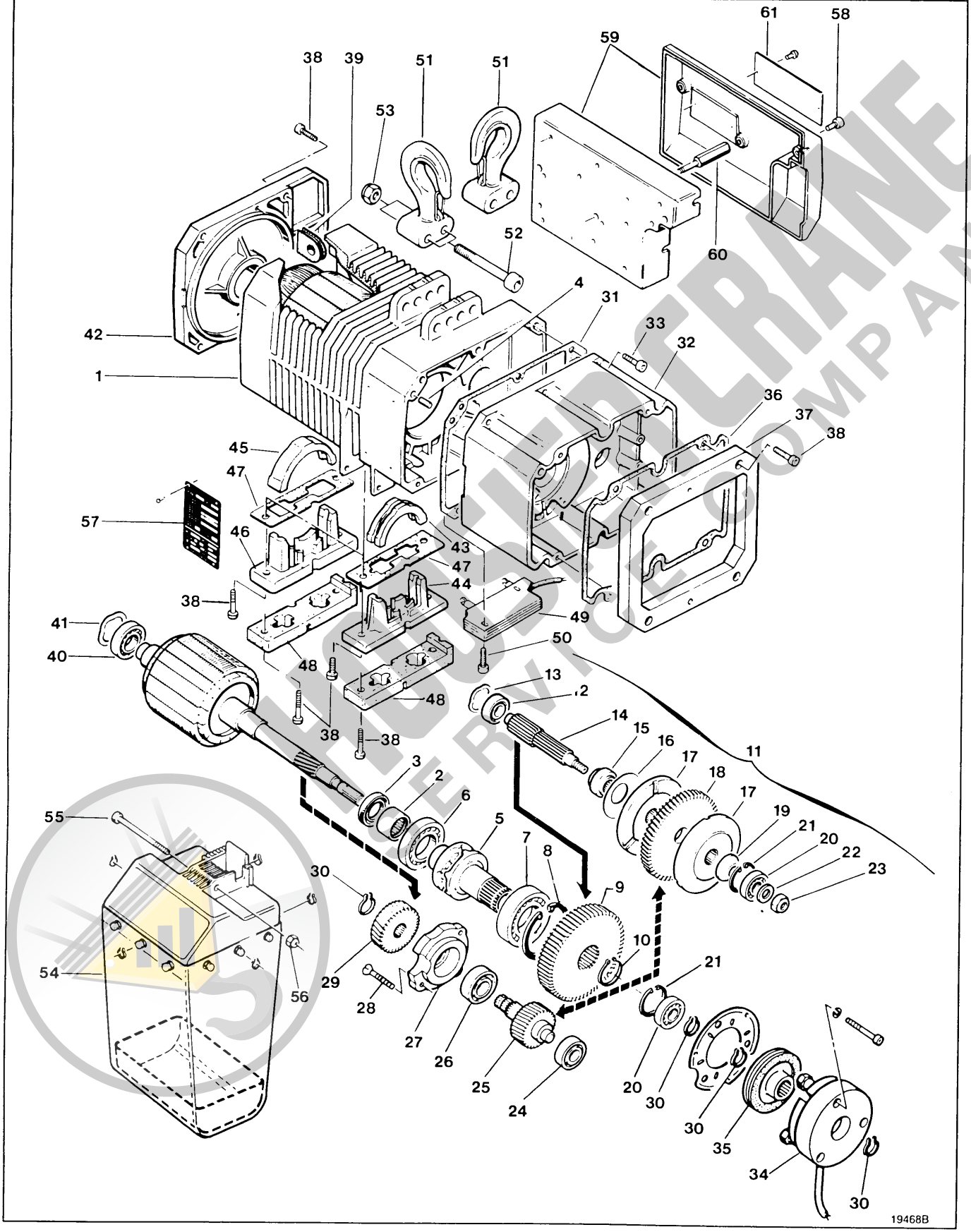

ELECTRIC CHAIN HOIST MODEL ECB SINGLE SPEED			SPARE PARTS IDENTIFICATION EC-3, PAGE 2			
			MODEL			
			1 32 S4	2 8 S3	2 16 S4	3 12 S3
DWG. ITEM	REFERENCE NUMBER	PART DESCRIPTION	QTY.	QTY.	QTY.	QTY.
1		BODY	1	1	1	1
2		IHA HK 22. 12 (22 × 28 × 12) NEEDLES SOCKET	1	1	1	1
3		PAULSTRA 22 × 32 × 7 SEAL	1	1	1	1
4		8 × 20 CYLINDRICAL PIN	2	2	2	2
5	557 710	LOAD WHEEL FOR 6.9 × 19.5 CHAIN	1	1	1	1
	557 711	LOAD WHEEL FOR 8 × 24 CHAIN				
6		6008 2RS BEARING (40 × 68 × 15)	1	1	1	1
7		6011 2RS BEARING (55 × 90 × 18)	1	1	1	1
8		SNAP RING 90 I	1	1	1	1
9		102 TOOTH GEAR WHEEL		1		1
10		50 E SNAP RING	1	1	1	
11		LIMITER SUBASSEMBLY (14 AND 141 TEETH) (2 GEARS)		1		
12	*	6204 (20 × 47 × 14) BEARING		1		
13	*	54 × 35 × 1 CORRUGATED (ONDUFLEX) WASHER	1		1	1
14	*	14 TOOTH PINION SHAFT		1		
15	*	SPRING WASHER SUPPORT RING	1	1	1	
16	*	CRIBO 80 × 31 × 3 WASHER	1	1	1	2
17	*	FRICTION DISC	2	2	2	2
18	*	141 TOOTH LIMITING GEARWHEEL	1	1	1	1
19	*	LIMITING SPACER	1	1	1	1
20	*	6002 2NSL (15 × 32 × 9) BEARING	2	2	2	2
21	*	32 I SNAP RING	2	2	2	2
22	*	Z 12 U WASHER	1	1	1	1
23	*	TRISTOP BRAKE NUT M 12 - 125	1	1	1	1
24		6002 BEARING (15 × 32 × 9) NACHI				1
25		39 TOOTH HELICAL PINION SHAFT				1
26		6003 BEARING (17 × 35 × 10) NACHI				1
27		HAT SOCKET				1
28		FHC/90 M 5 - 25 SCREW				3
29		50 TOOTH HELICAL GEARWHEEL				1
30		SNAP RINGS 15 E	3	3	3	3
31	557 038	GEARBOX GASKET	1	1	1	1
32		GEARBOX	1	1	1	1
33		HEX, SOCKET HEAD M6 - 20	6	6	6	6
		MOBILUX EP 1 GREASE (CAPACITY 1.6 QUART)	1	1	1	1
34	557 052	ERD 20 OR L 10 - 96 V BRAKE FOR 230 V POWER SUPPLY OR	1	1	1	1
	557 051	ERD 20 OR L 10 - 190 V BRAKE FOR 460 V POWER SUPPLY				
	556 553	BRAKE FOR 115 V POWER SUPPLY				
35		BRAKE LINING (PLEASE INDICATE MAKE AND TYPE)	1	1	1	1
36	557 036	COUNTERWEIGHT GASKET	1	1	1	1
37	557 104	COUNTERWEIGHT	1	1	1	1
38		HEX, SOCKET HEAD SCREW M6-30 + SHOCK ABSORBING STOP	10	8 + 2	10	10
39	833 431	CABLE GROMMET	1	1	1	1

HOIST **SERIAL NUMBER** AND PART **REFERENCE** NUMBER MUST BE PROVIDED WHEN ORDERING REPLACEMENT PARTS

ELECTRIC CHAIN HOIST MODEL ECB SINGLE SPEED			SPARE PARTS IDENTIFICATION EC-3, PAGE 3			
			MODEL			
			1 32 S4	2 8 S3	2 16 S4	3 12 S3
DWG. ITEM	REFERENCE NUMBER	PART DESCRIPTION	QTY.	QTY.	QTY.	QTY.
40		6203 2 RS BEARING (17 × 40 × 12)	1	1	1	1
41	832 040	CORRUGATED (ONDUFLEX) WASHER TYPE E REF. 54 29 01	1	1	1	1
42	557 103	BACKPLATE	1	1	1	1
43	558 105	UPPER CHAIN GUIDE FOR 6.5 × 19.5 CHAIN		1		
44	557 106	LOWER CHAIN GUIDE FOR 6.5 × 19.5 CHAIN		1		
45	557 107	UPPER CHAIN GUIDE FOR 8 × 24 CHAIN	1		1	1
46	557 108	LOWER CHAIN GUIDE FOR 8 × 24 CHAIN	1		1	1
47	557 037	LOWER CHAIN GUIDE GASKET	1	1	1	1
48	557 141	SHOCK-ABSORBING STOP (IF ELECTRICAL LIMIT SWITCH NOT FITTED)	1	1	1	1
49	556 619	MOLDED UPPER AND LOWER LIMIT SWITCH (OPTIONAL)	1	1	1	1
50		HEX. SOCKET HEAD SCREW M4 - 20 + AZ4 WASHER (OPTIONAL)	2	2	2	2
51	557 645	UPPER HOOK SUBASSEMBLY: PERPENDICULAR VERSION 05			1	1
	557 643	UPPER HOOK SUBASSEMBLY: PERPENDICULAR VERSION 025	1	1		
52		HEX, SOCKET HEAD SCREW M10 - 100	2	2	2	2
53		NYLOC NUT M 10	2	2	2	2
54		CHAIN CONTAINER WITH SUPPORT AND BASE OF CHAIN CONTAINER				
	557 622	BE4 CAPACITY 45 FT (6.5 × 19.54) - 26 FT (8 × 24)	1	1	1	1
	557 623	BE5 CAPACITY 95 FT (6.5 × 19.5) - 59 FT (8 × 24)				
	557 624	BE6 CAPACITY 160 FT (6.5 × 19.5) - 98 FT (8 × 24)				
55		HEX, SOCKET HEAD SCREW M10-100	1	1	1	1
56		NYLOC NUT M10	1	1	1	1
57		SERIAL PLATE	1	1	1	1
58		HEX, SOCKET HEAD SCREW M6 - 12 (COVERS JUNCTION BOX)	7	7	7	7
59	557 548	JUNCTION BOX	1	1	1	1
60		ADJUSTING SLEEVE	3	3	3	3
61	556 739	1 TON LOAD PLATE	1			
	557 737	2 TON LOAD PLATE		1	1	
	557 739	3 TON LOAD PLATE				1
		RIVETS 11 P7	2	2	2	2

HOIST **SERIAL NUMBER** AND PART **REFERENCE** NUMBER MUST BE PROVIDED WHEN ORDERING REPLACEMENT PARTS

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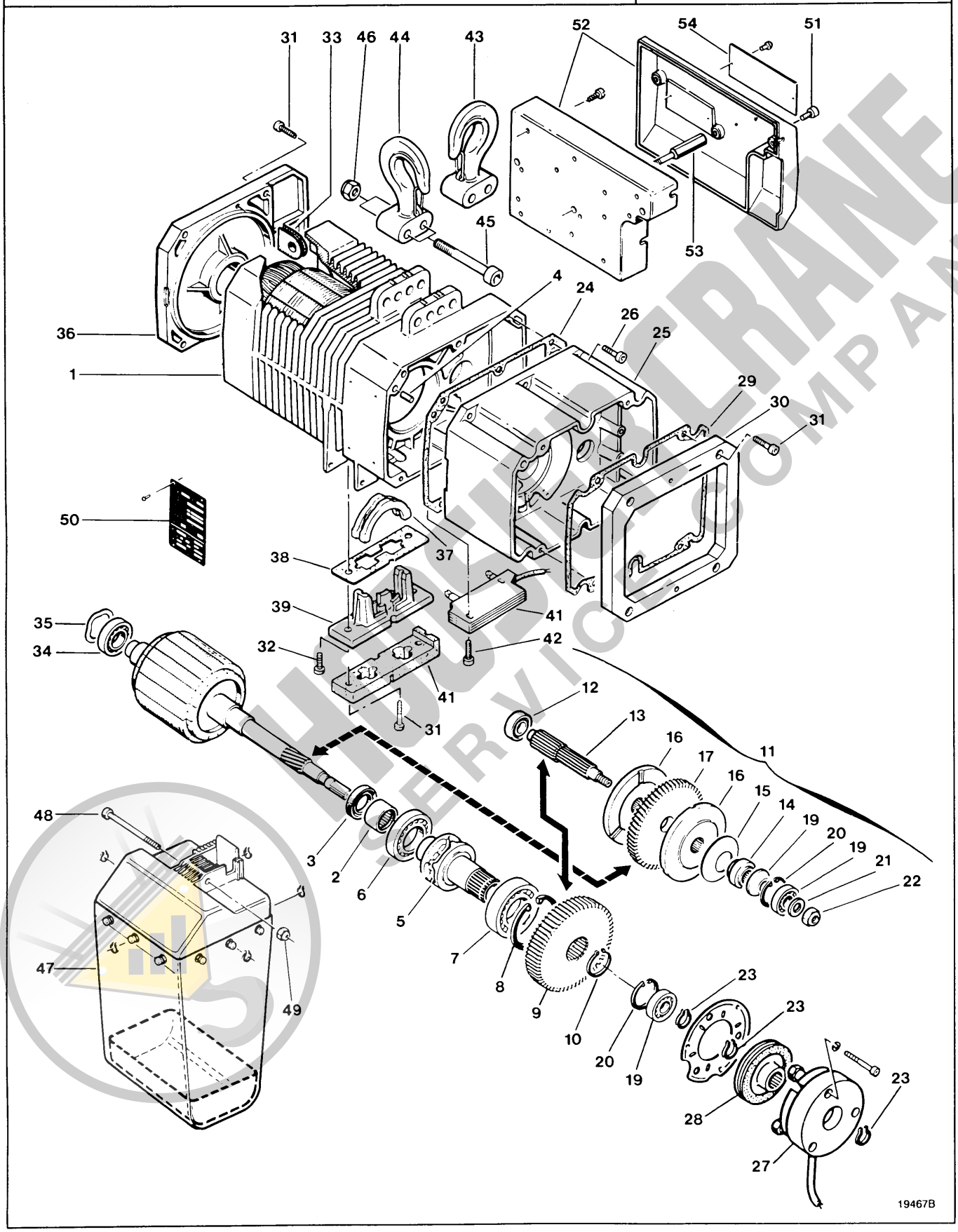
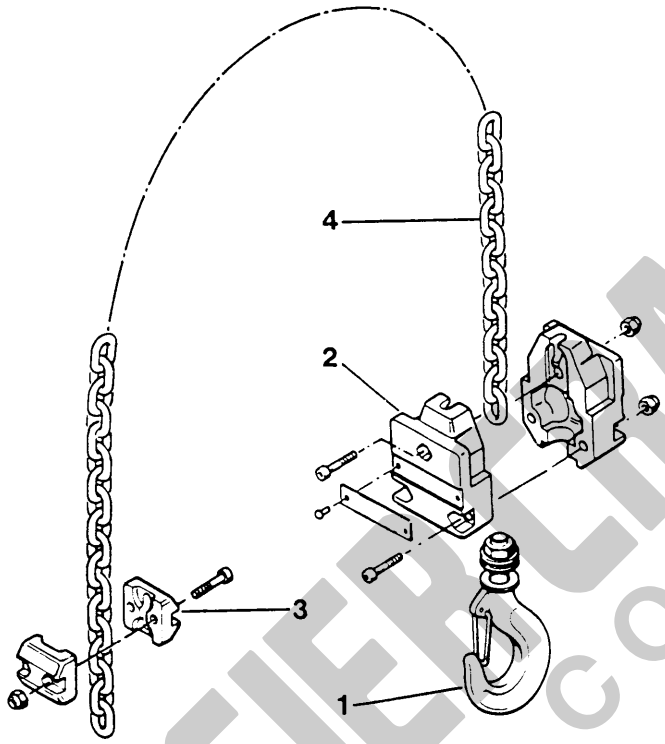


ELECTRIC CHAIN HOIST MODEL ECB TWO SPEED			SPARE PARTS IDENTIFICATION EC-4, PAGE 2		
			MODEL		
			1 32/8 T3	2 16/4 T3	3 12/4 T3
DWG. ITEM	REFERENCE NUMBER	PART DESCRIPTION	QTY.	QTY.	QTY.
1		BODY	1	1	1
2		INA HK 22. 12 (22 × 28 × 12) NEEDLES SOCKET	1	1	1
3		PAULSTRA 22 × 32 × 7 SEAL	1	1	1
4		8 × 20 CYLINDRICAL PIN	2	2	2
5	557 710	LOAD WHEEL FOR 6.9 × 19.5 CHAIN	1	1	1
	557 711	LOAD WHEEL FOR 8 × 24 CHAIN			
6		6008 2RS BEARING (40 × 68 × 15)	1	1	
7		6011 2RS BEARING (55 × 90 × 18)	1	1	
8		SNAP RING 90 I	1	1	
9		102 TOOTH GEARWHEEL	1	1	
10		50 E SNAP RING	1	1	
11		LIMITER SUBASSEMBLY (14 AND 141 TEETH) (2 GEARS)	1	1	
12	*	6204 (20 × 47 × 14) BERAING			1
13	*	14 TOOTH PINION SHAFT	1	1	
14	*	SPRING WASHER SUPPORT RING	1	1	
15	*	CRIBO 80 × 31 × 3 WASHER	1	1	2
16	*	FRICTION DISC	2	2	2
17	*	141 TOOTH LIMITER GEARWHEEL	1	1	1
18	*	LIMITER SPACER	1	1	1
19	*	6002 2NSL (15 × 32 × 9) BEARING	2	2	2
20	*	32 I SNAP RING	2	2	2
21	*	Z 12 U WASHER	1	1	1
22	*	TRISTOP BRAKE NUT M 12 × 125	1	1	1
23		SNAP RINGS 17 E	3	3	3
24	557 038	GEARBOX GASKET	1	1	1
25		GEARBOX	1	1	1
26		HEX, SOCKET HEAD SCREW M6 - 20	6	6	6
		SCREW MOBILUX EP1 GREASE (CAPACITY 1.6 QUART)	1	1	1
27	557 052	ERD 20 OR L10 - 96 V BRAKE FOR 230 V POWER SUPPLY OR	1	1	1
	557 051	ERD 20 OR L10 - 190 V BRAKE FOR 460 V POWER SUPPLY	1	1	1
	556 553	BRAKE FOR 115 V POWER SUPPLY			
28		BRAKE LINING (PLEASE INDICATE MAKE AND TYPE)	1	1	1
29	557 036	COUNTERWEIGHT GASKET	1	1	1
30	557 104	COUNTERWEIGHT	1	1	1
31		HEX, SOCKET HEAD SCREW M6 - 30 + SHOCK ABSORBING STOP	8 + 2	8 + 2	10
32		HEX, SOCKET HEAD SCREW M6 - 25	2	2	2
33	833 431	CABLE GROMMET	1	1	1
34		6203 2 RS BEARING	1	1	1
35	832 040	CORRUGATED (ONDUFLEX) WASHER TYPE E REF. 542901	1	1	1
36	557 103	BACKPLATE	1	1	1
37	557 105	UPPER CHAIN GUIDE FOR 6.5 × 19.5 CHAIN	1	1	

HOIST **SERIAL NUMBER** AND PART **REFERENCE** NUMBER MUST BE PROVIDED WHEN ORDERING REPLACEMENT PARTS

			MODEL		
			1 32/8 T3	2 16/4 T3	3 12/4 T3
DWG. ITEM	REFERENCE NUMBER	PART DESCRIPTION	QTY.	QTY.	QTY.
38	557 106	LOWER CHAIN GUIDE FOR 6.5 × 19.5 CHAIN	1	1	
39	557 037	LOWER CHAIN GUIDE GASKET			1
40	557 141	SHOCK-ABSORBING STOP (IF ELECTRICAL LIMIT SWITCH NOT FITTED)	1	1	1
41	556 619	MOLDED UPPER AND LOWER LIMIT SWITCH (OPTIONAL)	1	1	1
42		HEX, SOCKET HEAD SCREW M4 - 20 + AZ 4 WASHER (OPTIONAL)	2	2	2
43	557 643	UPPER HOOK SUBASSEMBLY: PERPENDICULAR VERSION 025	1		
	557 645	UPPER HOOK SUBASSEMBLY: PERPENDICULAR VERSION 05		1	1
44	557 642	UPPER HOOK SUBASSEMBLY: PARALLEL VERSION 025	1		
	557 644	UPPER HOOK SUBASSEMBLY: PARALLEL VERSION 05		1	1
45		HEX, SOCKET HEAD SCREW M10-100	2	2	2
46		NYLOC NUT M10	2	2	2
47		CHAIN CONTAINER WITH SUPPORT AND BASE OF CHAIN CONTAINER WITH 5 EXTERNAL HOOKS			
	557 622	BE4, CAPACITY 14 M (6.5 × 19.5) - 26 FT (8 × 24)	1	1	1
	557 623	BE5, CAPACITY 30 M (6.5 × 19.5) - 59 FT (8 × 24)			
	557 624	BE6, CAPACITY 50 M (6.5 × 19.5) - 98 FT (8 × 24)			
48		HEX, SOCKET HEAD SCREW M10-100	1	1	1
49		NYLOC NUT M 10	1	1	1
50	*	SERIAL PLATE	1	1	1
51		HEX, SOCKET HEAD SCREW M6 - 12 (COVERS AND JUNCTION BOX)	7	7	7
52	557 548	JUNCTION BOX	1	1	1
53		ADJUSTING SLEEVE	3	3	3
54	557 737	2 TON LOAD PLATE	1		
55	557 739	3 TON LOAD PLATE		1	1
	*	RIVETS 11 P7	2	2	2

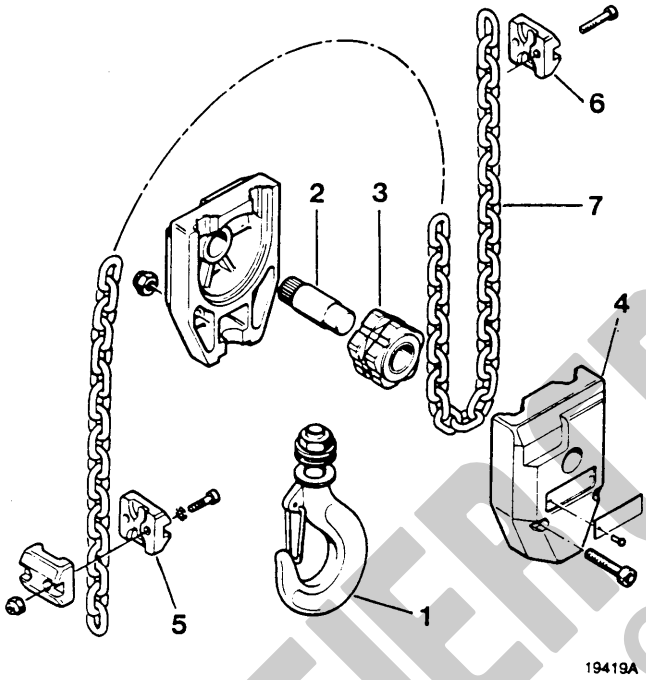
LOWER HOOK ASSEMBLY – ECA SINGLE FALL	APRIL 1995 EC-5



DWG. ITEM	REFERENCE NUMBER	PART DESCRIPTION	QTY.	DWG. ITEM	REFERENCE NUMBER	PART DESCRIPTION	QTY.
1	556 651	LOWER HOOK SUBASSEMBLY	1				
		M 14 U WASHER					
		AX4 15 28 NEEDLE ROLLER BEARING					
		CP 2 15 28 BACKPLATE					
		H M 14 NUT (WELDED)					
2		COVER ASSEMBLY	1				
		3 HEX. SOCKET HEAD SCREWS M6 - 45					
		3 NYLOC NUTS M 6					
	556 732	1/8 TON LOAD PLATES	2				
	556 733	1/4 TON LOAD PLATES	2				
	556 734	1/2 TON LOAD PLATES	2				
		4 SIM TYPE U RIVETS, GAUGE 4, WIDTH 6.4, HEAD R					
3	556 232	SLACK FALL STOP	1				
		2 HEX, SOCKET HEAD SCREWS M 6 - 25					
		2 M 6 NYLOC NUTS					
4	820 153	5 x 15 HARDENED CHAIN	1				

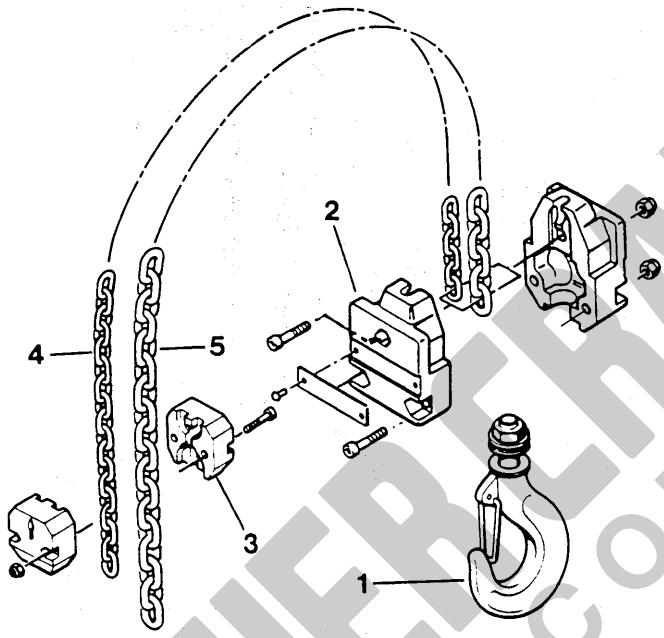
HOIST **SERIAL NUMBER** AND PART **REFERENCE** NUMBER MUST BE PROVIDED WHEN ORDERING REPLACEMENT PARTS

LOWER HOOK ASSEMBLY – ECA DOUBLE FALL	APRIL 1995 EC-6



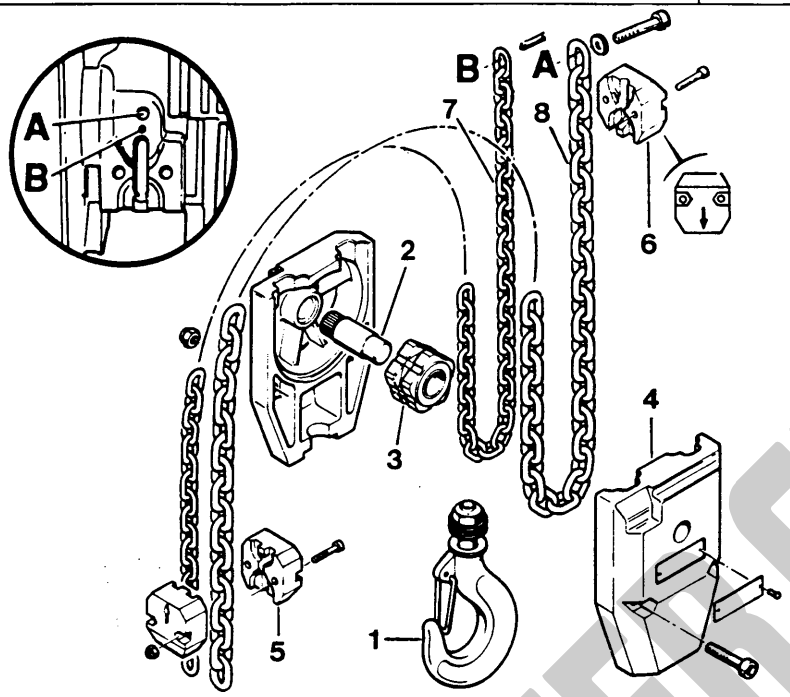
DWG. ITEM	REFERENCE NUMBER	PART DESCRIPTION	QTY.	DWG. ITEM	REFERENCE NUMBER	PART DESCRIPTION	QTY.
1	556 652	LOWER HOOK SUBASSEMBLY	1				
		Z 16 U WASHER					
		AXK 17-30 NEEDLE ROLLER BEARING					
		2 OFF LS 17-30 BACKPLATES					
		H M 16 NUT (WELDED)					
2	556 001	LOAD WHEEL SHAFT	1				
3	554 330	LOAD WHEEL PULLEY	1				
		SELF-LUBRICATING RING SKY GLY PG 18202517					
4		PULLEY	1				
		2 HEX. SOCKET HEAD SCREWS M 6 - 40					
	556 737	1/4 TON LOAD PLATES	2				
	556 738	1/2 TON LOAD PLATES	2				
	556 739	1 TON LOAD PLATES	2				
		4 SIM TYPE U RIVETS, GAUGE 4, WIDTH 6.4, HEAD R					
5	556 232	SLACK FALL STOP	1				
		2 HEX. SOCKET HEAD SCREWS M 6 - 25					
		2 M 65 NYLOC NUTS					
6	556 233	FIXED POINT	1				
		2 HEX. SOCKET HEAD SCREWS M 6 - 20					
7	820 153	5 x 15 HARDENED CHAIN	1				

LOWER HOOK ASSEMBLY – ECB SINGLE FALL	APRIL 1995 EC-7



DWG. ITEM	REFERENCE NUMBER	PART DESCRIPTION	QTY.	DWG. ITEM	REFERENCE NUMBER	PART DESCRIPTION	QTY.
1	557 651	HOOK ASSEMBLY 05	1				
		Z 16 U WASHER					
		NEEDLE ROLLER BEARING AXK 17-30					
		H M 16 NUT (WELDED)					
2		COVER ASSEMBLY	1				
		3 HEX. SOCKET HEAD SCREWS M 8 - 50					
		3 NYLOC NUTS M8					
	556 738	1/2 TON LOAD PLATES	2				
	556 739	1 TON LOAD PLATES	2				
		4 SIM TYPE U RIVETS, GAUGE 4 WIDTH 6.4, HEAD R					
3	557 142	SLACK FALL STOP	1				
		2 HEX. SOCKET HEAD SCREWS M 8 - 35					
		2 M 8 NYLOC NUTS					
4	820 148	CHAIN 6.5 x 19.5 HARDENED	1				
5	820 147	CHAIN 8 x 24 HARDENED	1				

HOIST **SERIAL NUMBER** AND PART **REFERENCE** NUMBER MUST BE PROVIDED WHEN ORDERING REPLACEMENT PARTS



DWG. ITEM	REFERENCE NUMBER	PART DESCRIPTION	QTY.
1	557 652	HOOK SUBASSEMBLY 05	1
		Z 20 U WASHER	
		AXK 20-35 NEEDLE ROLLER BEARING	
		LS 20-35 BACKPLATE	
		H M 20 NUT (WELDED)	
	557 653	HOOK ASSEMBLY 08	1
		NEEDLE ROLLER BEARING AXK 2542	
		LS 2542 BACKPLATE	
		H M 24 WELDED NUT	
		Z 24 U WASHER	
2		LOAD WHEEL SHAFT	1
3	556 124	LOAD WHEEL PULLEY FOR 6.5 × 19.5 CHAIN	1
		SELF LUBRICATING RING SKF GLY.PG 202330A	
	556 172	LOAD WHEEL PULLEY FOR 8 × 24 CHAIN	1
		SELF LUBRICATING RING SKF GLY.PG	
4	557 145	PULLEY FOR 6.5 × 19.5 CHAIN	1
		2 HEX. SOCKET HEAD SCREWS M 6 - 50	
		2 NYLOC NUTS M6	
	557 739	2 TON LOAD PLATES	2
		4 SIM TYPE U RIVETS, GAUGE 4, WIDTH 6.5, HEAD R	

DWG. ITEM	REFERENCE NUMBER	PART DESCRIPTION	QTY.
	557 146	PULLEY FOR 8 × 24 CHAIN	1
		2 HEX. SOCKET HEAD SCREWS M 8 - 50	
		2 NYLOC NUTS M 8	
	557 737	2 TON LOAD PLATES	2
	557 739	3 TON LOAD PLATES	2
		4 SIM TYPE U RIVETS, GAUGE 4, LENGTH 6.4, HEAD R	
5	557 142	SLACK FALL STOP	1
		2 HEX. SOCKET HEAD SCREWS M 8 - 35	
		2 NYLOC NUTS M 8	
6	557 143	FIXED POINT	1
		2 HEX. SOCKET HEAD SCREWS M 8 - 30 (CHAIN 6.5 × 19.5)	
		1 MECANINDUS ~ 3 × 20 (CHAIN 6.5 × 19.5)	
		1 M 8 U WASHER (CHAIN 8 × 24)	
		1 HEX. SOCKET HEAD SCREW M 8 - 30 (CHAIN 8 × 24)	
7	820 148	CHAIN 6.5 × 19.5 HARDENED	1
8	820 147	CHAIN 8 × 24 HARDENED	1

HOIST **SERIAL NUMBER** AND PART **REFERENCE** NUMBER MUST BE PROVIDED WHEN ORDERING REPLACEMENT PARTS

48 VOLT CONTROL

PUSH BUTTONS						
FIG. NO.	REFERENCE NUMBER	1 SPEED HOISTING	2 SPEEDS HOISTING	1 SPEED TROLLEY	2 SPEEDS TROLLEY	ON/OFF CONTROL
3	1H	●				
5	S*1H	●				●
7	1H1T	●		●		
8	S*1H1T	●		●		●
7	1H2T	●			●	
8	S*1H2T	●			●	●
3	2H		●			
5	S*2H		●			●
7	2H1T		●	●		
8	S*2H1T		●	●		●
7	2H2T		●		●	
8	S*2H2T		●		●	●

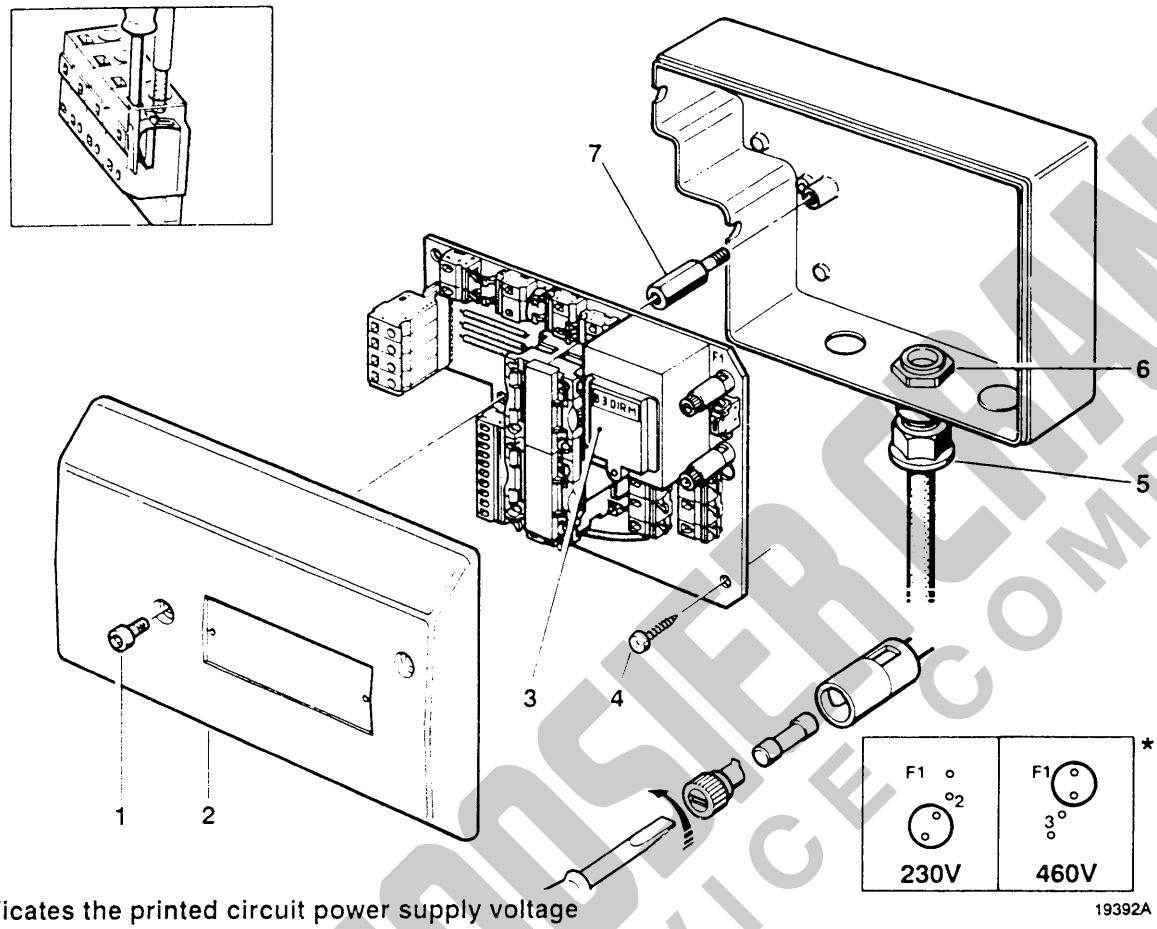
FIG. 3 FIG. 5 FIG. 7 FIG. 8

19396A

ECA PRINTED CIRCUIT BOARDS						
TYPE OF PRINTED CIRCUIT BOARD	DESCRIPTION	ECA HOISTING JUNCTION BOX	VE5 HOISTING & VE5 TRAVELLING JUNCTION BOX	EXPLODED VIEW PAGE	CONNECTION DIAGRAM PAGE	CODE
B 3 DIR M	1 speed, hoisting	●		6-24	6-25	834 187
B 4 DIR M	1 speed, hoisting + on/off control	●		6-24	6-25	834 188
B 3 DIR B	2 speeds, hoisting	●		6-28	6-29	834 181
B 4 DIR B	2 speeds, hoisting + on/off control	●		6-28	6-29	834 182
B 3 DIR M + DIR 1	1 speed, hoisting + 1 speed, trolley		●		6-25	834 187 551 038
B 4 DIR M + DIR 1	1 speed, hoisting + 1 speed trolley with on/off control		●		6-25	834 188 551 038
B 3 DIR B + DIR 1	2 speeds, hoisting + 1 speed, trolley		●		6-29	834 181 551 038
B 4 DIR B + DIR 1	2 speeds, hoisting + 1 speed, trolley with on/off control		●		6-29	834 182 551 038
B 3 DIR M + DIR 2	1 speed, hoisting + 2 speeds, trolley		●		6-25	834 187 551 039
B 4 DIR M + DIR 2	1 speed, hoisting + 2 speeds, trolley with on/off control		●		6-25	834 188 551 039
B 3 DIR B + DIR 2	2 speeds, hoisting + 2 speeds trolley		●		6-29	834 181 551 039
B 4 DIR B + DIR 2	2 speeds, hoisting + 2 speeds, trolley with on/off control		●		6-29	834 182 551 039

Note: 460 V power supply: 460 V to the motor, 190 V to the brake, travelling board via fuse 3 (460 V)
230 V power supply: 230 V to the motor, 96 V to the brake, travelling board via fuse 2 (230 V)

SINGLE SPEED HOIST ONLY 48 VOLT CONTROL	APRIL 1995 ECA



*Indicates the printed circuit power supply voltage

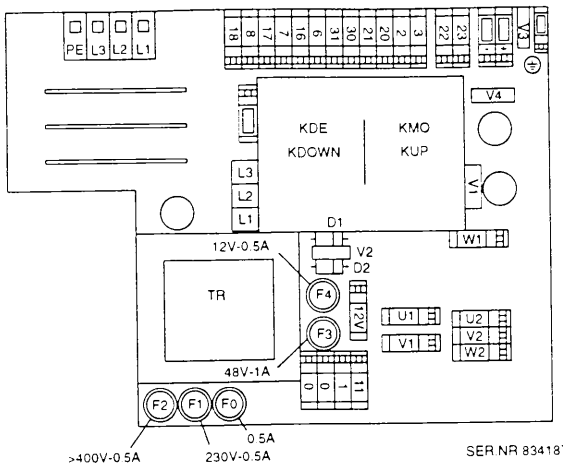
DWG. ITEM	REFERENCE NUMBER	PART DESCRIPTION	QTY.	DWG. ITEM	REFERENCE NUMBER	PART DESCRIPTION	QTY.
1	830924	SOCKET HEAD SCREW, M6 x12	2				
2	556508	ELECTRICAL JUNCTION BOX, ECA	1				
3		PRINTED CIRCUIT, TBT 48 V					
	833168	B4DIRM, 1 SPEED, HOISTING + ON/ OFF CONTROL	1				
	833167	B3DIRM, 1 SPEED, HOISTING	1				
4	831023	SECURING SCREW, PRINTED CIRCUIT	6				
5	833257	UNION, 16 MM	1				
6	833203	NUT, 16 MM	1				
7	990755	ADJUSTING SLEEVE	2				

HOIST **SERIAL NUMBER** AND PART **REFERENCE** NUMBER MUST BE PROVIDED WHEN ORDERING REPLACEMENT PARTS

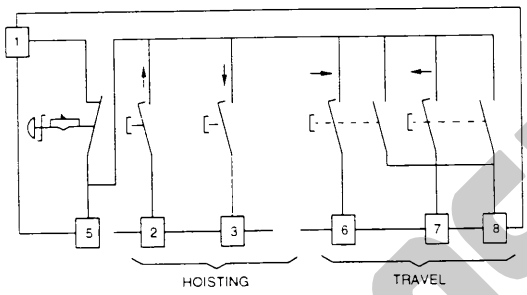
SINGLE SPEED HOIST
ELECTRICAL CONNECTION DIAGRAM
48 VOLT CONTROL

FEBRUARY 1997
ECA

1 HOISTING SPEED
K3 DIR M: WITHOUT EMERGENCY STOP



SER NR 834187



ELECTRICAL CONNECTIONS very low voltage (48V)

PUSHBUTTON BOX:
1 common
2 up control
3 down control
5 emergency stop
6 right control
7 left control
8 travel selector

OPTIONS:
20-21 upper limit switch (blue wire)
22-23 lower limit switch (red wire)
30-31 hoisting protection (thermal sensor)

PUSHBUTTON TRAVEL:
0 common coil
11 travel protection coil
16 right control
17 left control
18 travel selector

BRAKE:
+- brake

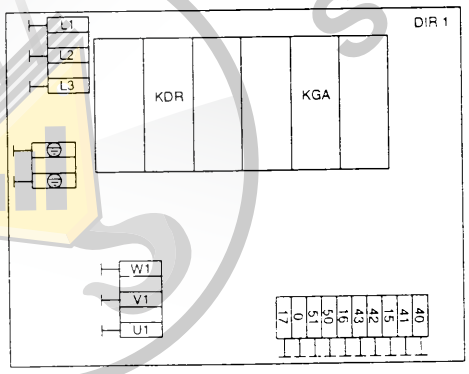
POWER SUPLY HOISTING:
L1 L2 L3 PE

POWER SUPPLY TRAVEL:
L1 L2 L3 ⏚ earth

HOISTING MOTOR:

230V	>400V	
U1 W2	U1	U2
V1 U2	V1	V2
W1 V2	W1	W2

1 TRAVEL SPEED



DIR 1 BOARD
CODE 833193

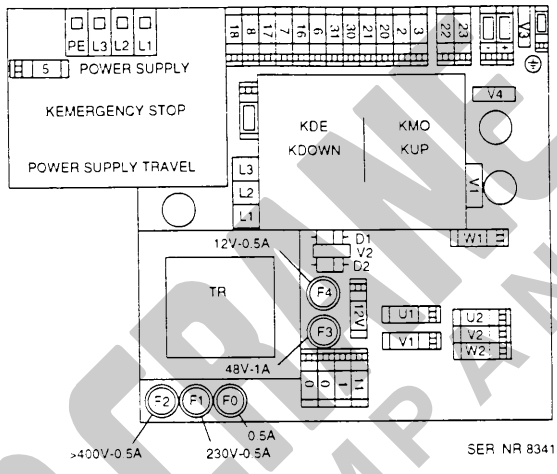
POWER SUPPLY, TRAVELING:
L1 L2 L3 460V ~

MOTOR:
W1
V1
U1

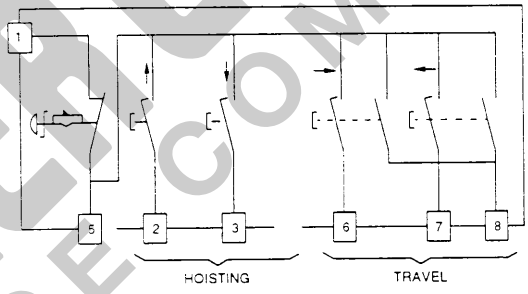
TRAVEL CONTROL:
15 Left control
16 Right control
17 Fast
0 Common. coil

TRAVEL OPTIONS:
40-41 Right limit switch
42-43 Left limit switch
50-51 Trolley thermal detector

1 HOISTING SPEED
K4 DIR M: WITH EMERGENCY STOP



SER NR 834188



ELECTRICAL CONNECTIONS very low voltage (48V)

PUSHBUTTON BOX:
1 common
2 up control
3 down control
5 emergency stop
6 right control
7 left control
8 travel selector

OPTIONS:
20-21 upper limit switch (blue wire)
22-23 lower limit switch (red wire)
30-31 hoisting protection (thermal sensor)

PUSHBUTTON TRAVEL:
0 common coil
11 travel protection coil
16 right control
17 left control
18 travel selector

BRAKE:
+- brake

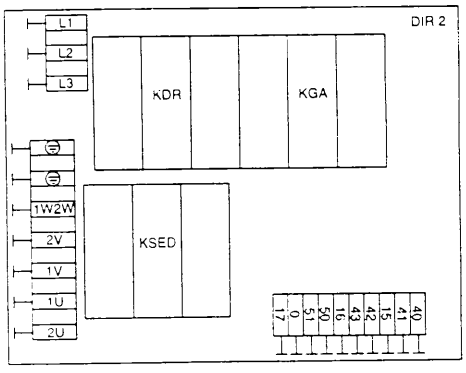
POWER SUPLY HOISTING:
L1 L2 L3 PE

POWER SUPPLY TRAVEL:
L1 L2 L3 ⏚ earth

HOISTING MOTOR:

230V	>400V	
U1 W2	U1	U2
V1 U2	V1	V2
W1 V2	W1	W2

2 TRAVEL SPEEDS



DIR 2 BOARD
CODE 833194

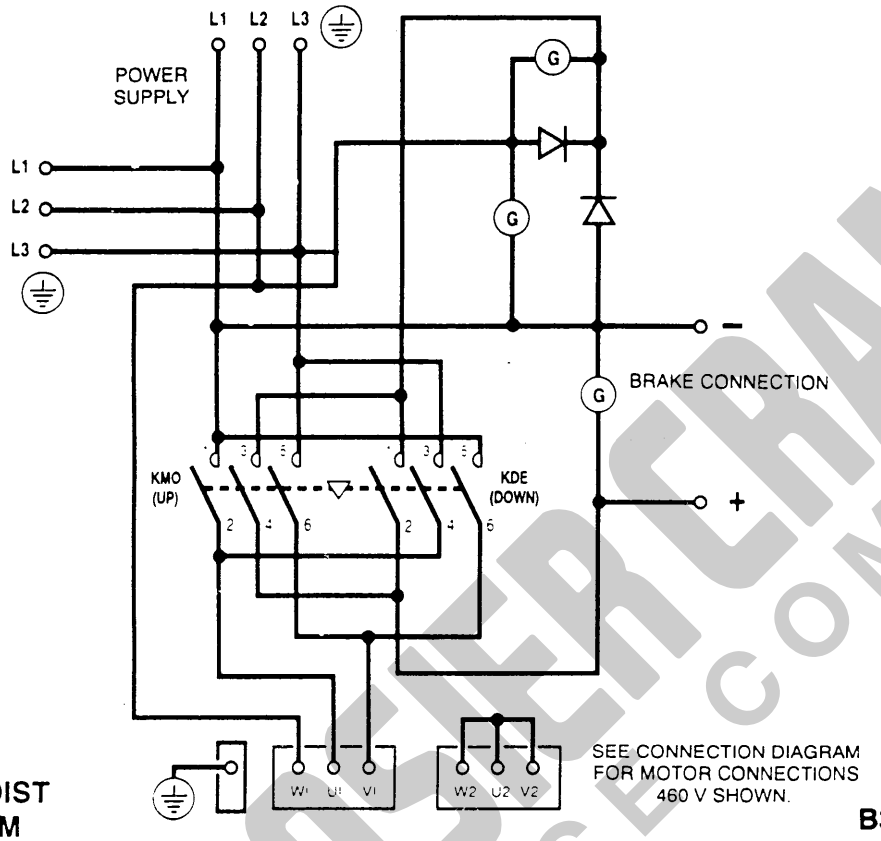
POWER SUPPLY, TRAVELING:
L1 L2 L3 460V ~

MOTOR:
1U, 1V Low speed
2U, 2V High speed
1W, 2W Common

TRAVEL CONTROL:
15 Left control
16 Right control
17 Fast
0 Common. coil

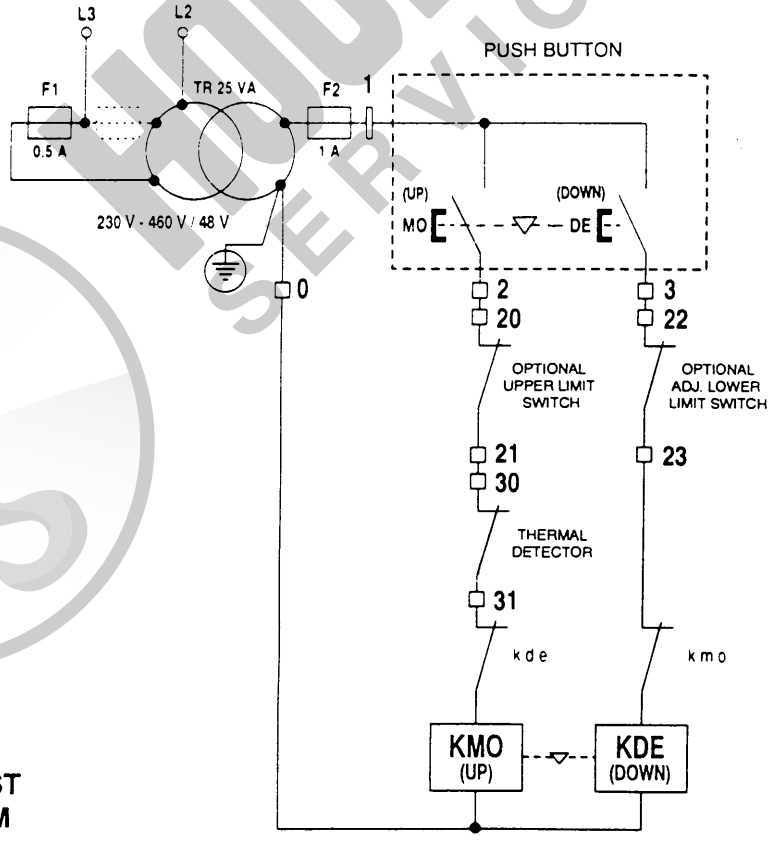
TRAVEL OPTIONS:
40-41 Right limit switch
42-43 Left limit switch
50-51 Trolley thermal detector

HOIST **SERIAL NUMBER** AND PART **REFERENCE** NUMBER MUST BE PROVIDED WHEN ORDERING REPLACEMENT PARTS.



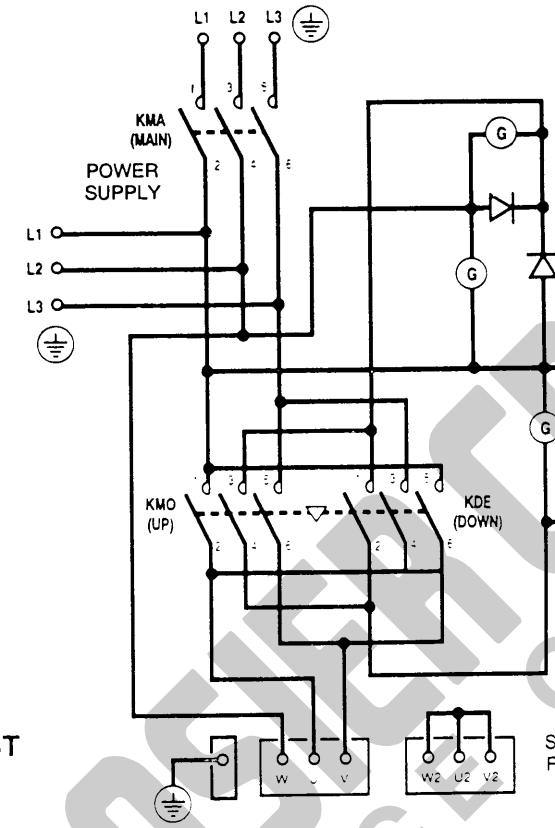
SINGLE SPEED HOIST POWER DIAGRAM

B3DIRM



SINGLE SPEED HOIST CONTROL DIAGRAM

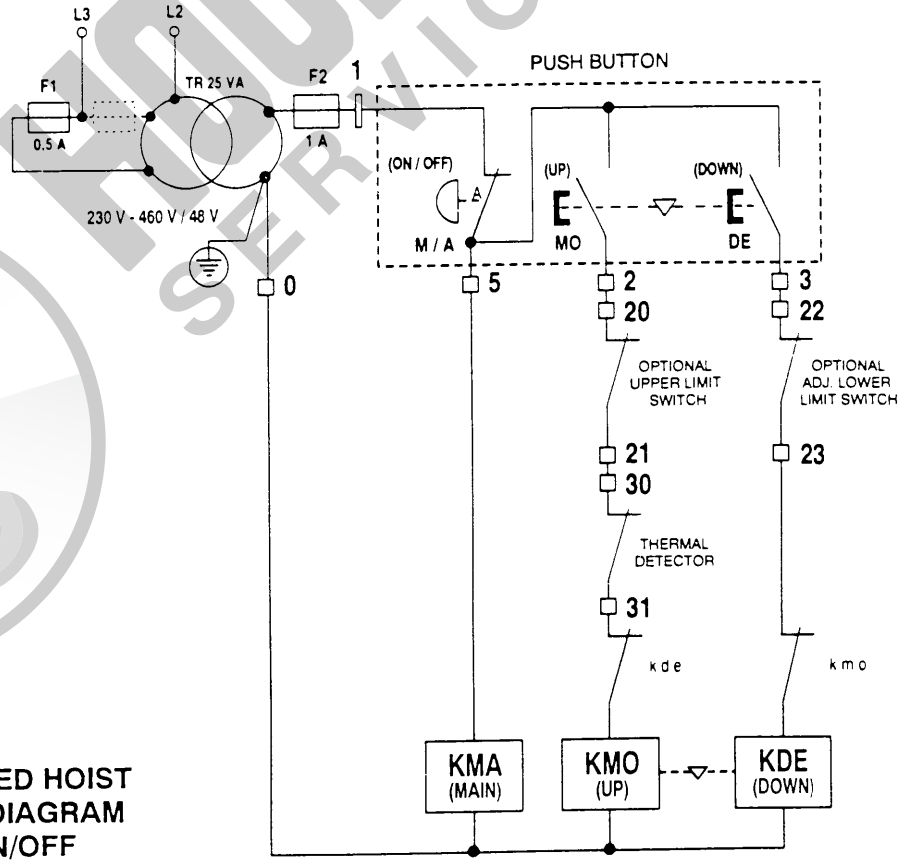
B3DIRM
19397A



SINGLE SPEED HOIST
POWER DIAGRAM
WITH ON/OFF

SEE CONNECTION DIAGRAM
FOR MOTOR CONNECTIONS
460 V SHOWN.

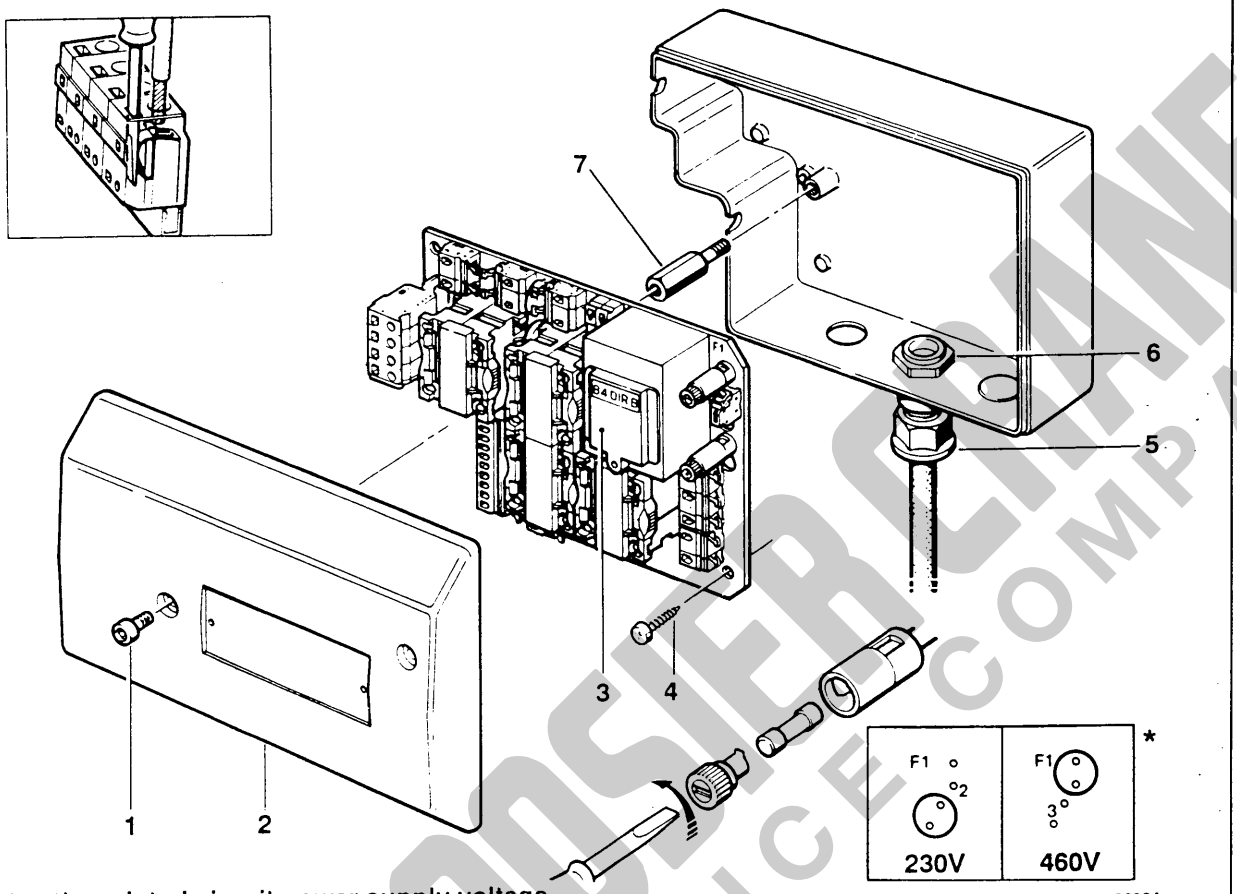
B4DIRM



SINGLE SPEED HOIST
CONTROL DIAGRAM
WITH ON/OFF

B4DIRM
19398A

TWO SPEED HOIST ONLY 48 VOLT CONTROL	APRIL 1995 ECA



*Indicates the printed circuit power supply voltage

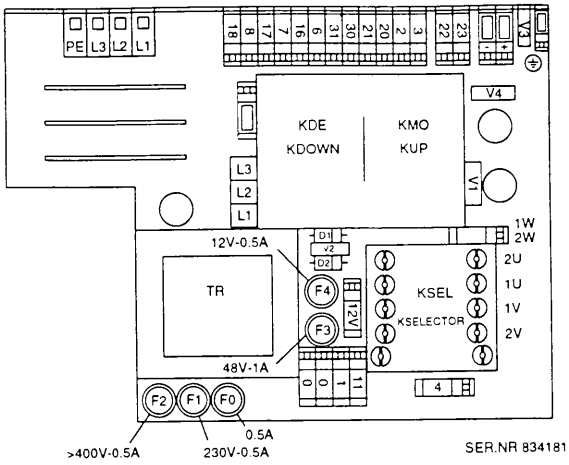
DWG. ITEM	REFERENCE NUMBER	PART DESCRIPTION	QTY.	DWG. ITEM	REFERENCE NUMBER	PART DESCRIPTION	QTY.
1	830924	SOCKET HEAD SCREW, M6 x12	2				
2	556508	ELECTRICAL JUNCTION BOX, ECA	1				
3		PRINTED CIRCUIT, TBT 48 V					
	833162	B4DIRB, 2 SPEEDS, HOISTING + ON/OFF CONTROL	1				
	833161	B3DIRB, 2 SPEEDS, HOISTING	1				
4	831023	SECURING SCREW, PRINTED CIRCUIT	6				
5	833257	UNION, 16 MM	1				
6	833203	NUT, 16 MM	1				
7	990755	ADJUSTING SLEEVE	2				

HOIST **SERIAL NUMBER** AND PART **REFERENCE** NUMBER MUST BE PROVIDED WHEN ORDERING REPLACEMENT PARTS

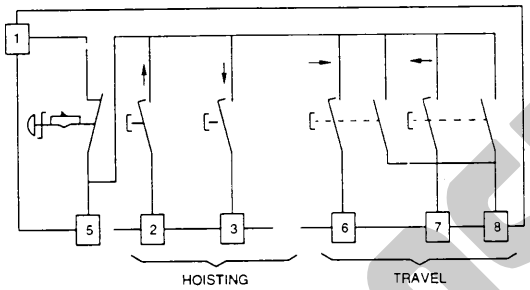
TWO SPEED HOIST
ELECTRICAL CONNECTION DIAGRAM
48 VOLT CONTROL

FEBRUARY 1997
ECA

2 HOISTING SPEEDS
K3 DIR M: WITHOUT EMERGENCY STOP



SER.NR 834181



ELECTRICAL CONNECTIONS very low voltage (48V)

PUSHBUTTON BOX:
1 common
2 up control
3 down control
4 hoisting selector
5 emergency stop
6 right control
7 left control
8 travel selector

OPTIONS:
20-21 upper limit switch (blue wire)
22-23 lower limit switch (red wire)
30-31 hoisting protection (thermal sensor)

PUSHBUTTON TRAVEL:
0 common coil
11 travel protection coil
16 right control
17 left control
18 travel selector

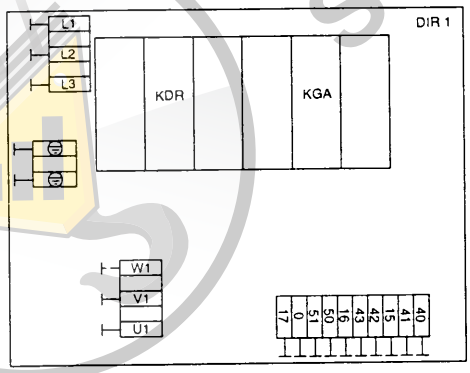
BRAKE:
+- brake

POWER SUPLY HOISTING:
L1 L2 L3 PE

POWER SUPPLY TRAVEL:
L1 L2 L3 ⏚ earth

HOISTING MOTOR:
1U 1V low speed
2U 2V high speed
1W 2W common

1 TRAVEL SPEED



DIR 1 BOARD
CODE 833193

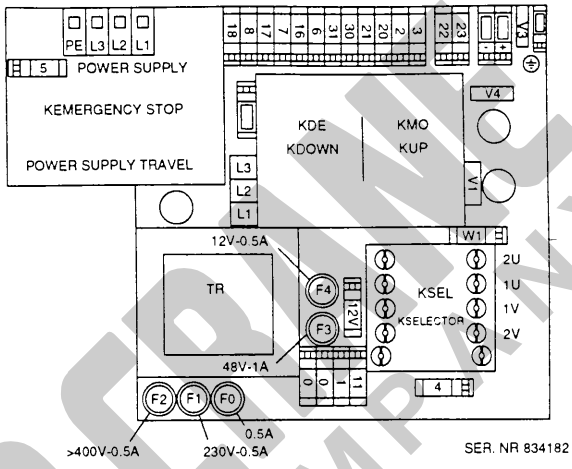
POWER SUPPLY, TRAVELING:
L1 L2 L3 460V

MOTOR:
W1
V1
U1

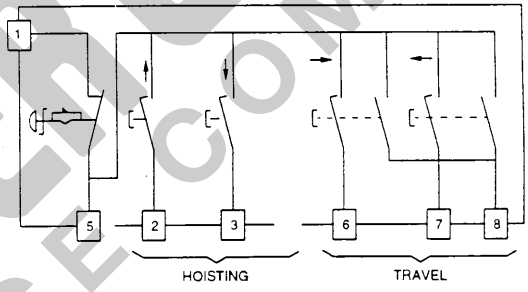
TRAVEL CONTROL:
15 Left control
16 Right control
17 Fast
0 Common, coil

TRAVEL OPTIONS:
40-41 Right limit switch
42-43 Left limit switch
50-51 Trolley thermal detector

2 HOISTING SPEEDS
K4 DIR M: WITH EMERGENCY STOP



SER. NR 834182



ELECTRICAL CONNECTIONS very low voltage (48V)

PUSHBUTTON BOX:
1 common
2 up control
3 down control
4 hoisting selector
5 emergency stop
6 right control
7 left control
8 travel selector

OPTIONS:
20-21 upper limit switch (blue wire)
22-23 lower limit switch (red wire)
30-31 hoisting protection (thermal sensor)

PUSHBUTTON TRAVEL:
0 common coil
11 travel protection coil
16 right control
17 left control
18 travel selector

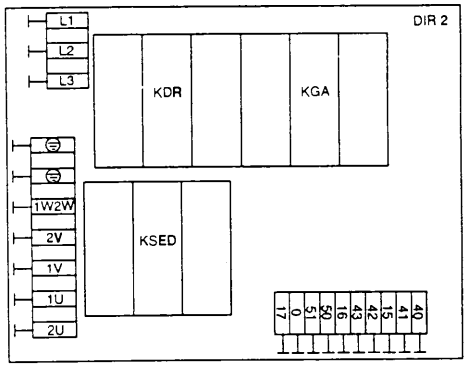
BRAKE:
+- brake

POWER SUPLY HOISTING:
L1 L2 L3 PE

POWER SUPPLY TRAVEL:
L1 L2 L3 ⏚ earth

HOISTING MOTOR:
1U 1V low speed
2U 2V high speed
1W 2W common

2 TRAVEL SPEEDS



DIR 2 BOARD
CODE 833194

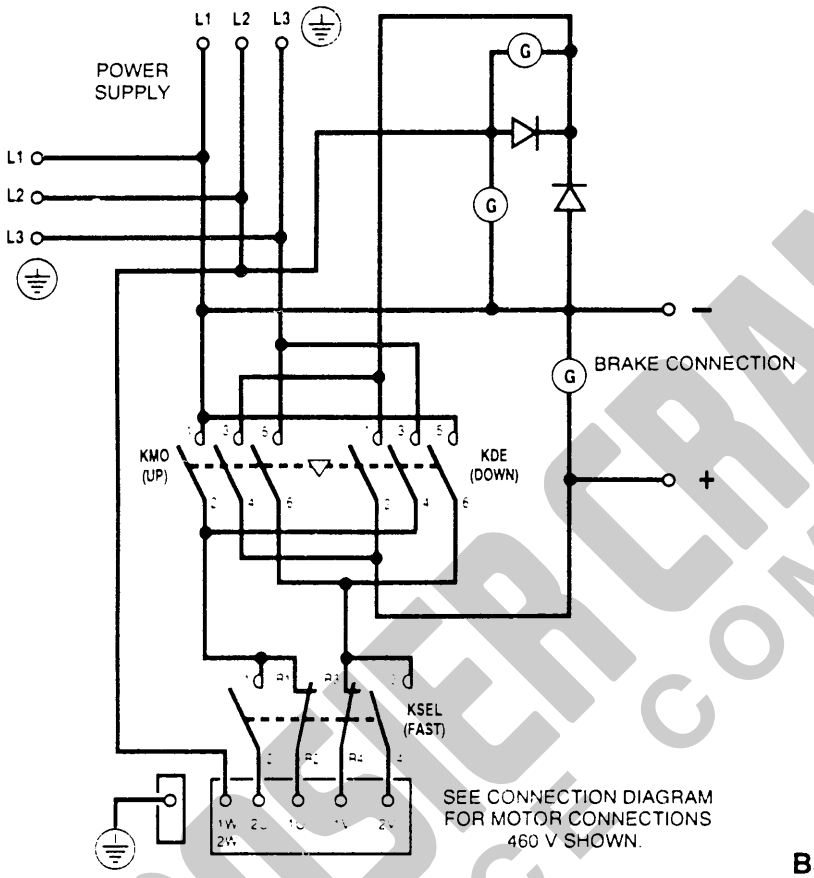
POWER SUPPLY, TRAVELING:
L1 L2 L3 460V

MOTOR:
1U, 1V Low speed
2U, 2V High speed
1W, 2W Common

TRAVEL CONTROL:
15 Left control
16 Right control
17 Fast
0 Common, coil

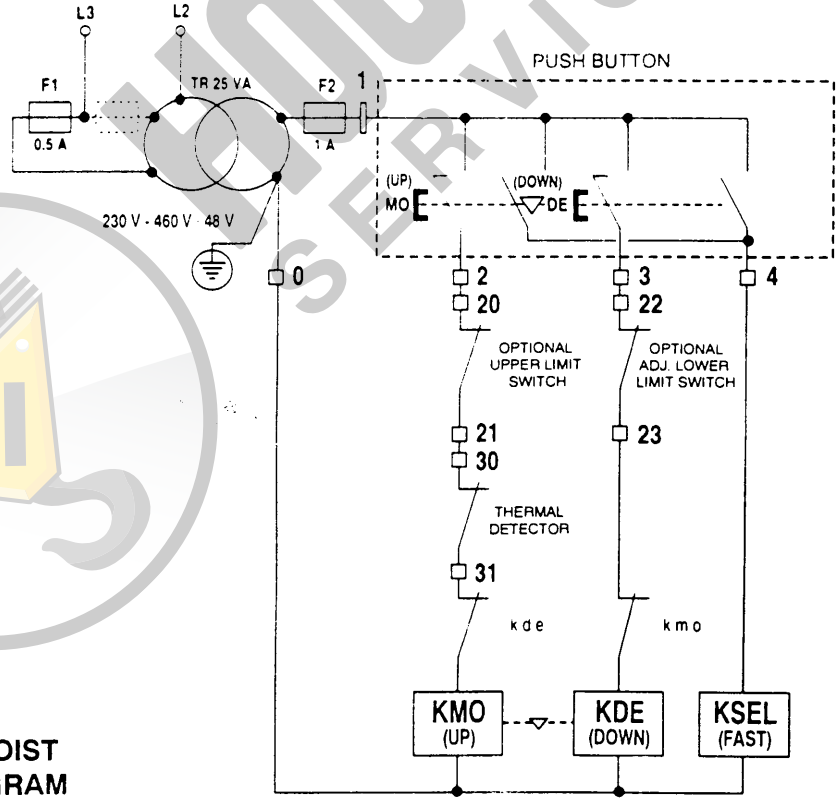
TRAVEL OPTIONS:
40-41 Right limit switch
42-43 Left limit switch
50-51 Trolley thermal detector

HOIST **SERIAL NUMBER** AND PART **REFERENCE** NUMBER MUST BE PROVIDED WHEN ORDERING REPLACEMENT PARTS.



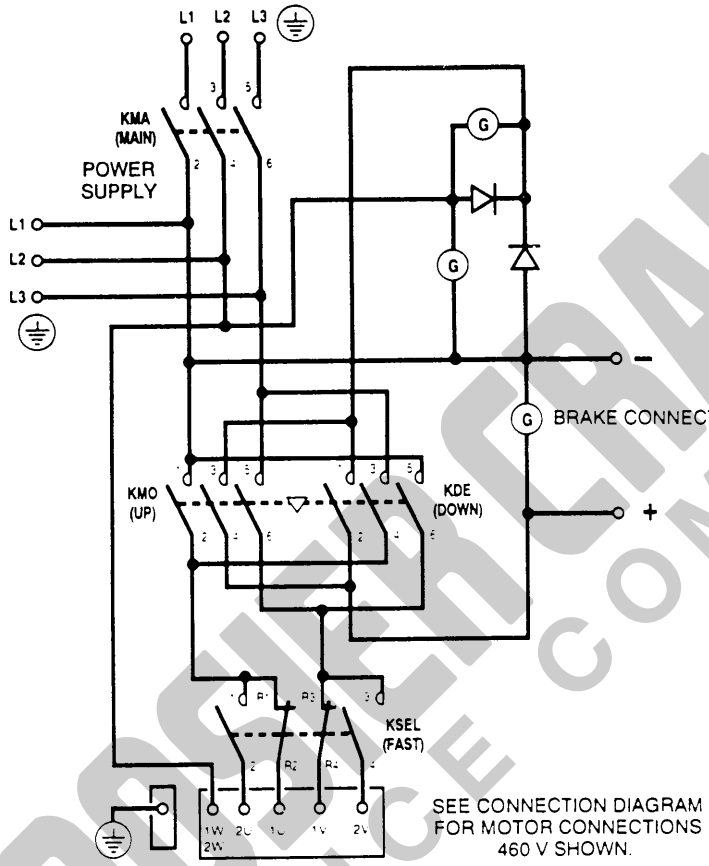
TWO SPEED HOIST
POWER DIAGRAM

B3DIRB



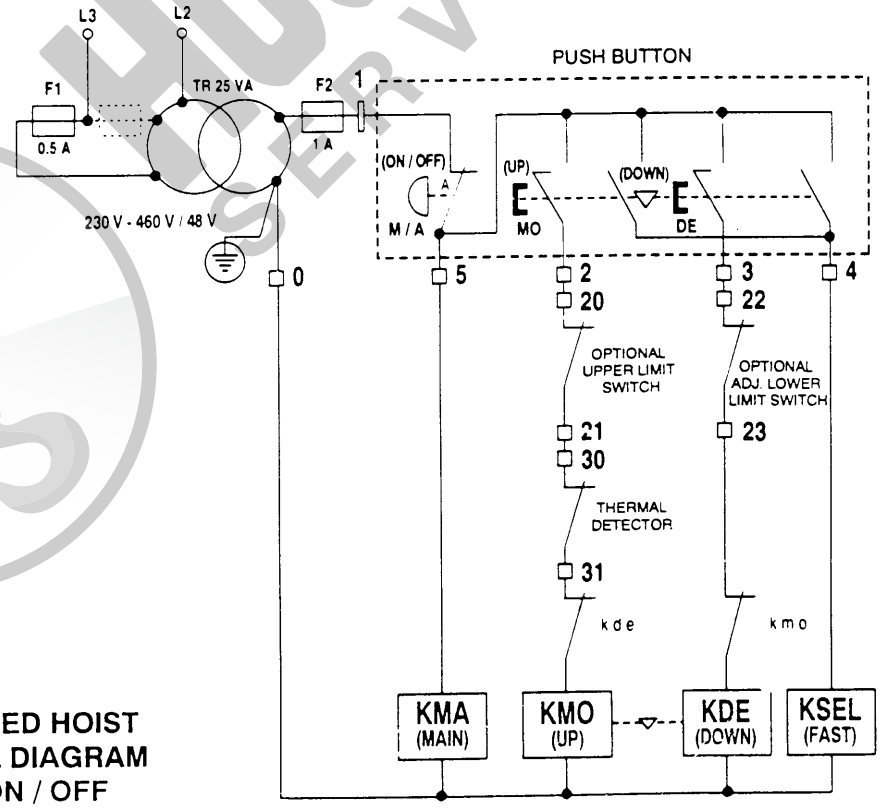
TWO SPEED HOIST
CONTROL DIAGRAM

B3DIRB
19401A



TWO SPEED HOIST
POWER DIAGRAM
WITH ON / OFF

B4DIRB



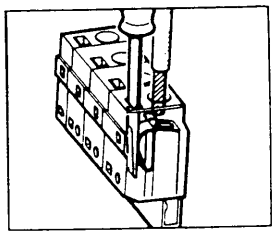
TWO SPEED HOIST
CONTROL DIAGRAM
WITH ON / OFF

B4DIRB
19404A

ECA PRINTED CIRCUIT BOARDS					
TYPE OF PRINTED CIRCUIT BOARD	DESCRIPTION	ECA HOISTING JUNCTION BOX	EXPLODED VIEW PAGE	CONNECTION DIAGRAM PAGE	CODE
B 3 DIR M	1 speed, hoisting	●	6-33	6-34	834 187
B 4 DIR M	1 speed, hoisting + on/off control	●	6-33	6-34	834 188
B 3 DIR B	2 speeds, hoisting	●	6-37	6-38	834 181
B 4 DIR B	2 speeds, hoisting + on/off control	●	6-37	6-38	834 182
P 5	1 speed, hoisting + 1 speed, trolley	●		6-34	834 091
P 6	1 speed, hoisting + 1 speed, trolley with on/off control	●		6-34	834 092
P 7	2 speeds, hoisting + 1 speed, trolley	●		6-38	834 093
P 8	2 speeds, hoisting + 1 speed, trolley with on/off control	●		6-38	834 094
P 9	2 speeds, hoisting + 2 speeds, trolley	●		6-38	834 095
P 10	2 speeds, hoisting + 2 speeds, trolley with on/off control	●		6-38	834 096
P 11	1 speed, hoisting + 2 speeds, trolley	●		6-34	834 097
P 12	1 speed, hoisting + 2 speeds, trolley with on/off control	●		6-34	834 098

Note: 460 V power supply: 460 V to the motor, 190 V to the brake, travelling board via fuse 3 (460 V)
230 V power supply: 230 V to the motor, 96 V to the brake, travelling board via fuse 2 (230 V)

SINGLE SPEED HOIST ONLY 48 VOLT CONTROL	APRIL 1995 ECB



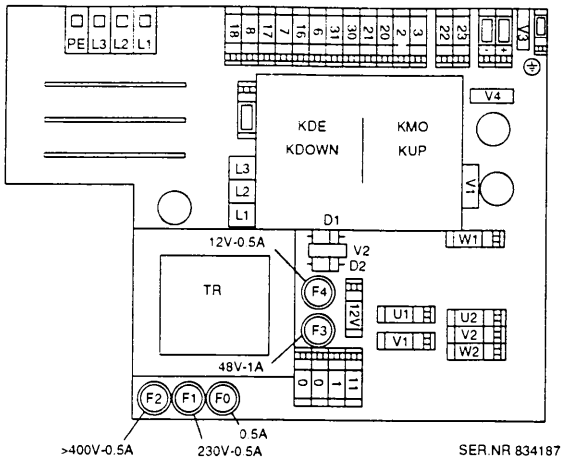
*Indicates the printed circuit power supply voltage

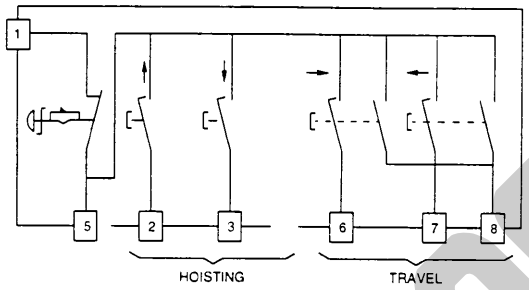
DWG. ITEM	REFERENCE NUMBER	PART DESCRIPTION	QTY.	DWG. ITEM	REFERENCE NUMBER	PART DESCRIPTION	QTY.
1	830924	SOCKET HEAD SCREW, M6 x12	3				
2	557508	ELECTRICAL JUNCTION BOX, ECB	1				
3	831023	SECURING SCREW, PRINTED CIRCUIT	8				
4		PRINTED CIRCUIT, TBT 48 V					
	833168	B4DIRM, 1 SPEED, HOISTING + ON/OFF CONTROL	1				
	833167	B3DIRM, 1 SPEED, HOISTING	1				
5	833257	UNION, 16 MM	1				
6	833203	NUT, 16 MM	1				
7	990755	ADJUSTING SLEEVE	3				

FEBRUARY 1997 ECB	SINGLE SPEED HOIST ELECTRICAL CONNECTION DIAGRAM 48 VOLT CONTROL

1 HOISTING SPEED

K3 DIR M: WITHOUT EMERGENCY STOP





ELECTRICAL CONNECTIONS very low voltage (48V)

PUSHBUTTON BOX:	OPTIONS:	PUSHBUTTON TRAVEL:	BRAKE:
1 common	20-21 upper limit switch (blue wire)	0 common coil	+- brake
2 up control	22-23 lower limit switch (red wire)	11 travel protection coil	
3 down control	30-31 hoisting protection (thermal sensor)	16 right control	
5 emergency stop		17 left control	
6 right control		18 travel selector	
7 left control			
8 travel selector			

POWER SUPLY HOISTING: L1 L2 L3 PE

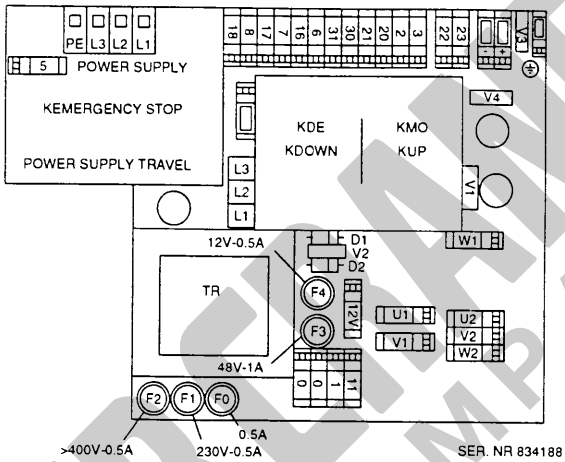
POWER SUPPLY TRAVEL: L1 L2 L3 ⏚ earth

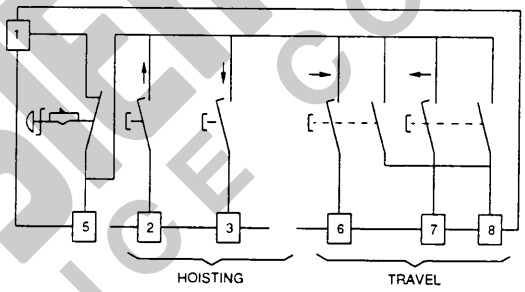
HOISTING MOTOR:

230V	>400V	
U1 W2	U1	U2
V1 U2	V1	V2
W1 V2	W1	W2

1 HOISTING SPEED

K4 DIR M: WITH EMERGENCY STOP





ELECTRICAL CONNECTIONS very low voltage (48V)

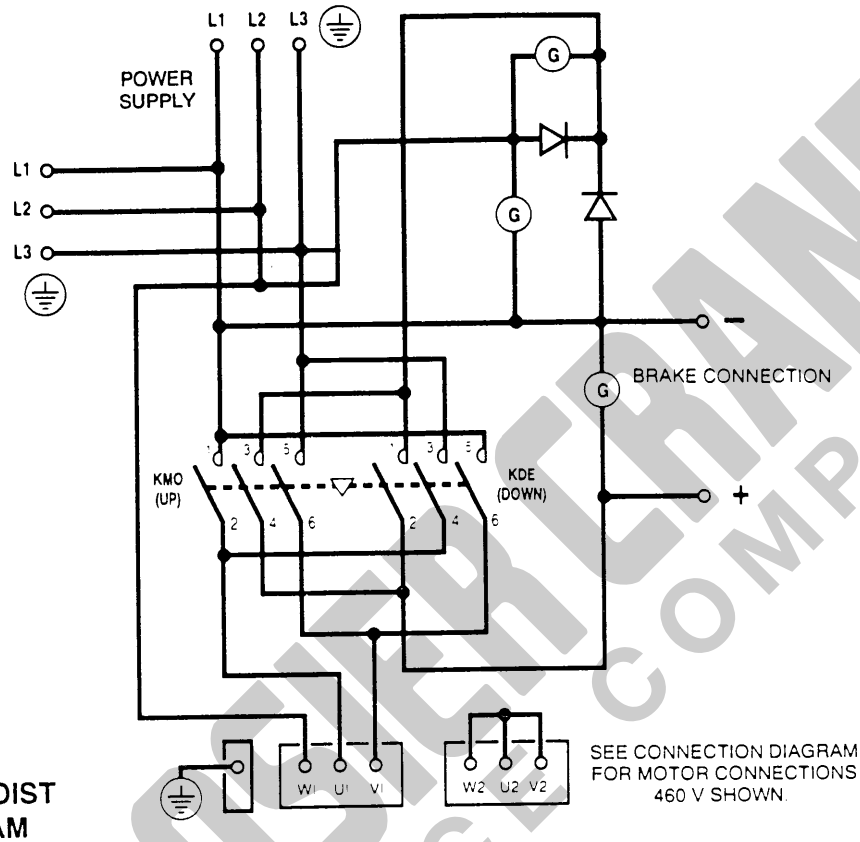
PUSHBUTTON BOX:	OPTIONS:	PUSHBUTTON TRAVEL:	BRAKE:
1 common	20-21 upper limit switch (blue wire)	0 common coil	+- brake
2 up control	22-23 lower limit switch (red wire)	11 travel protection coil	
3 down control	30-31 hoisting protection (thermal sensor)	16 right control	
5 emergency stop		17 left control	
6 right control		18 travel selector	
7 left control			
8 travel selector			

POWER SUPLY HOISTING: L1 L2 L3 PE

POWER SUPPLY TRAVEL: L1 L2 L3 ⏚ earth

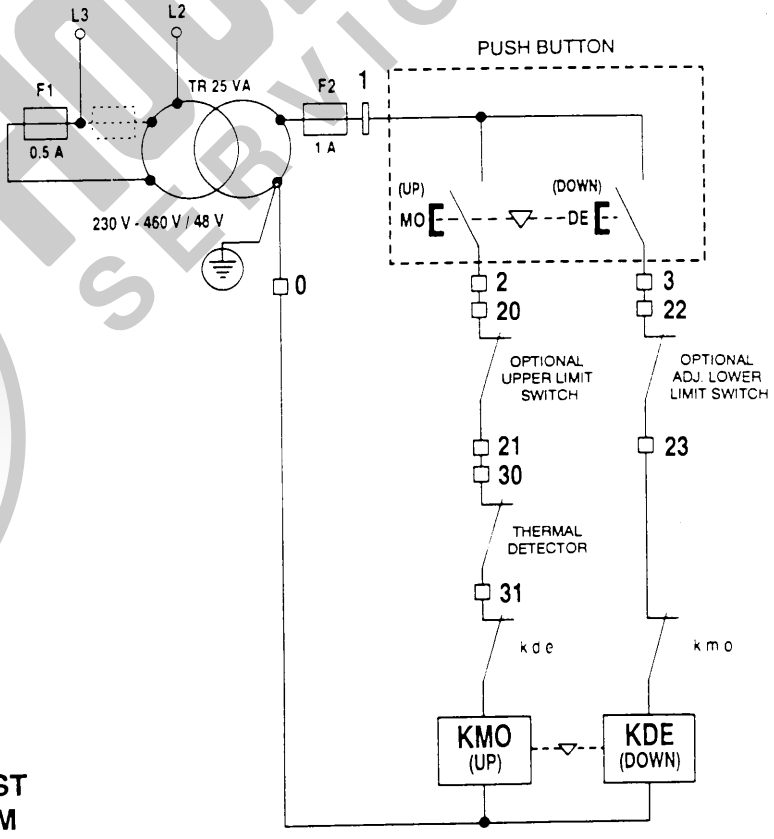
HOISTING MOTOR:

230V	>400V	
U1 W2	U1	U2
V1 U2	V1	V2
W1 V2	W1	W2



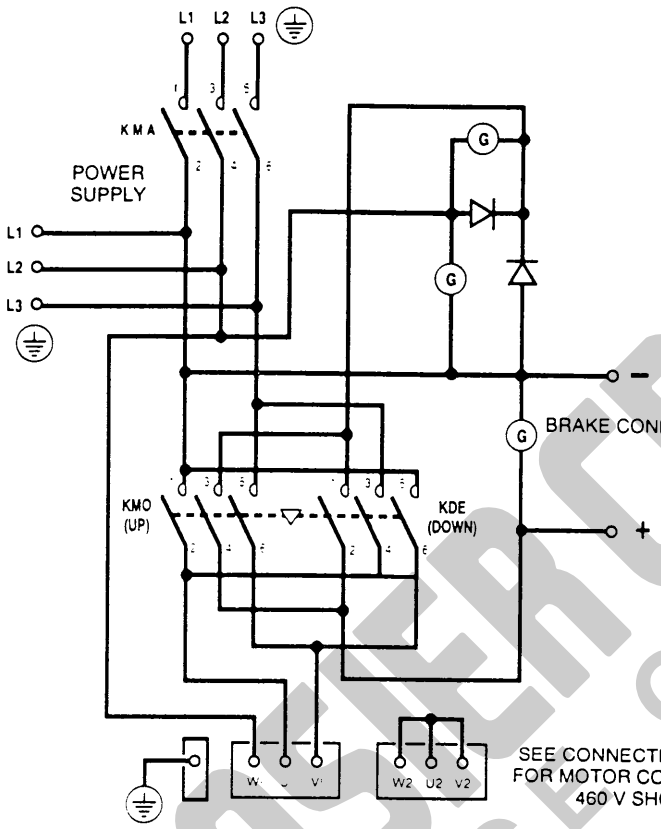
SINGLE SPEED HOIST POWER DIAGRAM

B3DIRM



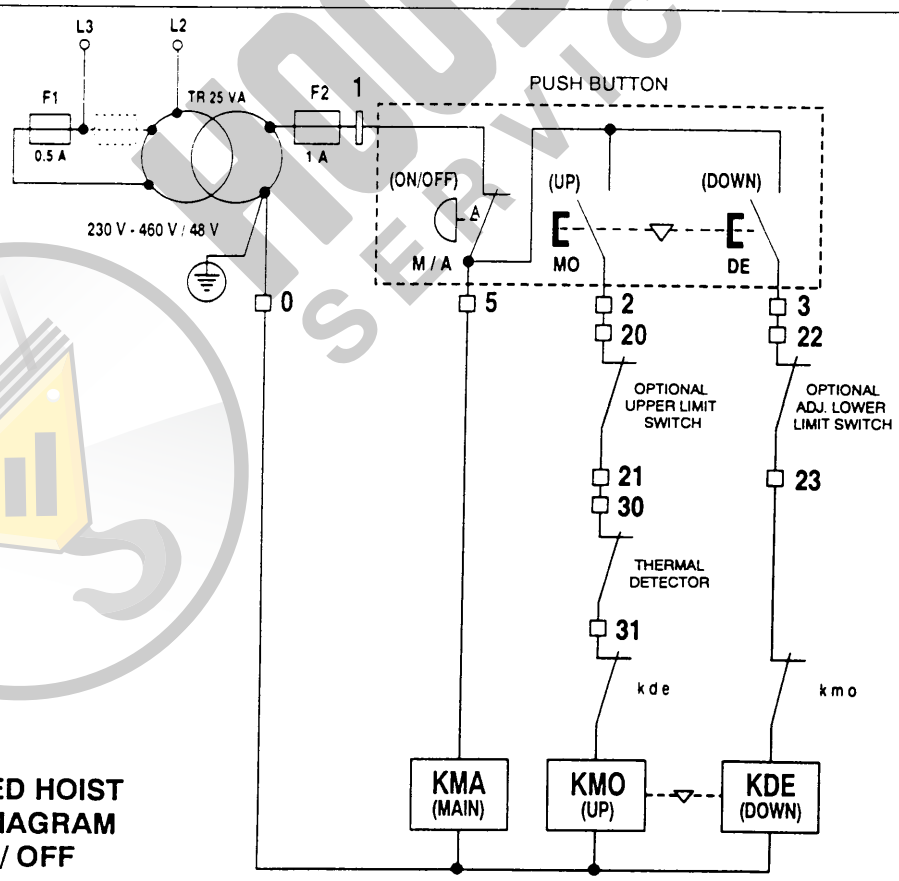
SINGLE SPEED HOIST CONTROL DIAGRAM

B3DIRM
19400A



SINGLE SPEED HOIST POWER DIAGRAM WITH ON / OFF

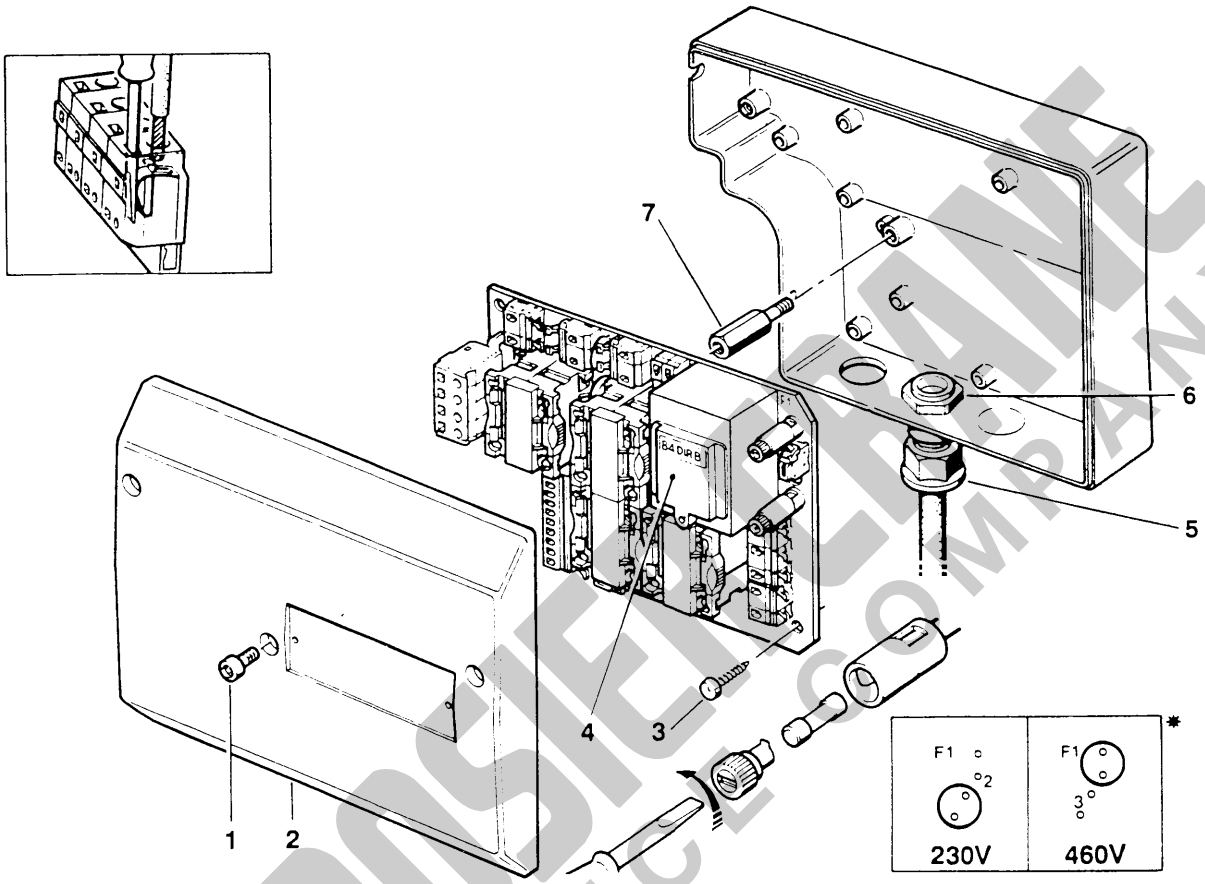
B4DIRM



SINGLE SPEED HOIST CONTROL DIAGRAM WITH ON / OFF

B4DIRM
19399A

TWO SPEED HOIST ONLY 48 VOLT CONTROL	APRIL 1995 ECB



*Indicates the printed circuit power supply voltage

19394A

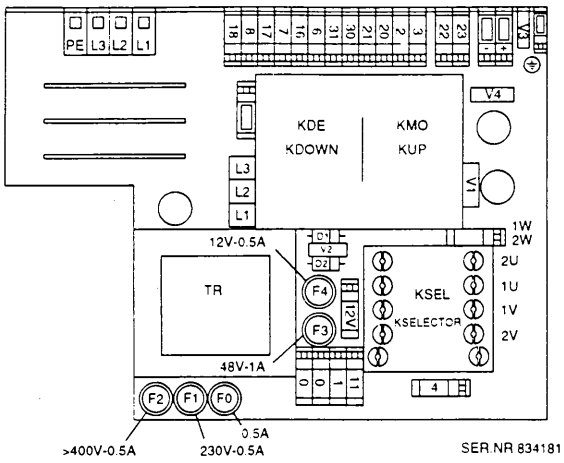
DWG. ITEM	REFERENCE NUMBER	PART DESCRIPTION	QTY.	DWG. ITEM	REFERENCE NUMBER	PART DESCRIPTION	QTY.
1	830924	SOCKET HEAD SCREW, M6 x12	3				
2	557508	ELECTRICAL JUNCTION BOX, ECB	1				
3	831023	SECURING SCREW, PRINTED CIRCUIT	8				
4		PRINTED CIRCUIT, TBT 48 V					
	833162	B4DIRB, 2 SPEEDS, HOISTING + ON/OFF CONTROL	1				
	833161	B3DIRB, 2 SPEEDS, HOISTING	1				
5	833257	UNION, 16 MM	1				
6	833203	NUT, 16 MM	1				
7	990755	ADJUSTING SLEEVE	3				

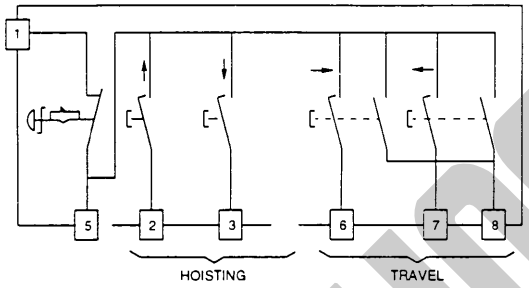
HOIST **SERIAL NUMBER** AND PART **REFERENCE** NUMBER MUST BE PROVIDED WHEN ORDERING REPLACEMENT PARTS

TWO SPEED HOIST
ELECTRICAL CONNECTION DIAGRAM
48 VOLT CONTROL

FEBRUARY 1997
ECB

2 HOISTING SPEEDS
K3 DIR M: WITHOUT EMERGENCY STOP



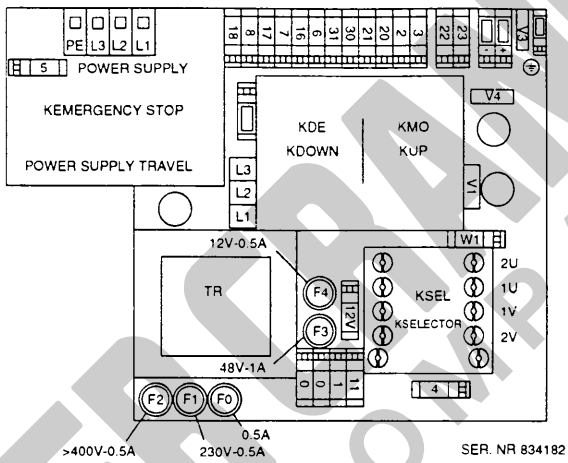


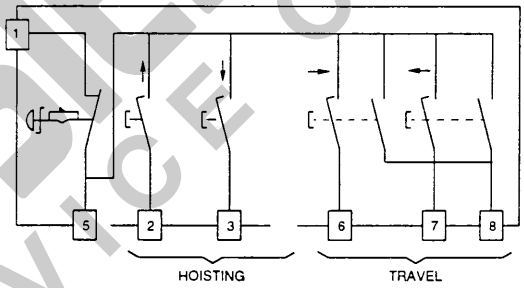
ELECTRICAL CONNECTIONS very low voltage (48V)

PUSHBUTTON BOX:	OPTIONS:	PUSHBUTTON TRAVEL:	BRAKE:
1 common	20-21 upper limit switch (blue wire)	0 common coil	+- brake
2 up control	22-23 lower limit switch (red wire)	11 travel protection coil	
3 down control	30-31 hoisting protection (thermal sensor)	16 right control	
4 hoisting selector		17 left control	
5 emergency stop		18 travel selector	
6 right control			
7 left control			
8 travel selector			

POWER SUPLY HOISTING:	POWER SUPPLY TRAVEL:	HOISTING MOTOR:
L1 L2 L3 PE	L1 L2 L3 ⏚ earth	1U 1V low speed
		2U 2V high speed
		1W 2W common

2 HOISTING SPEEDS
K4 DIR M: WITH EMERGENCY STOP

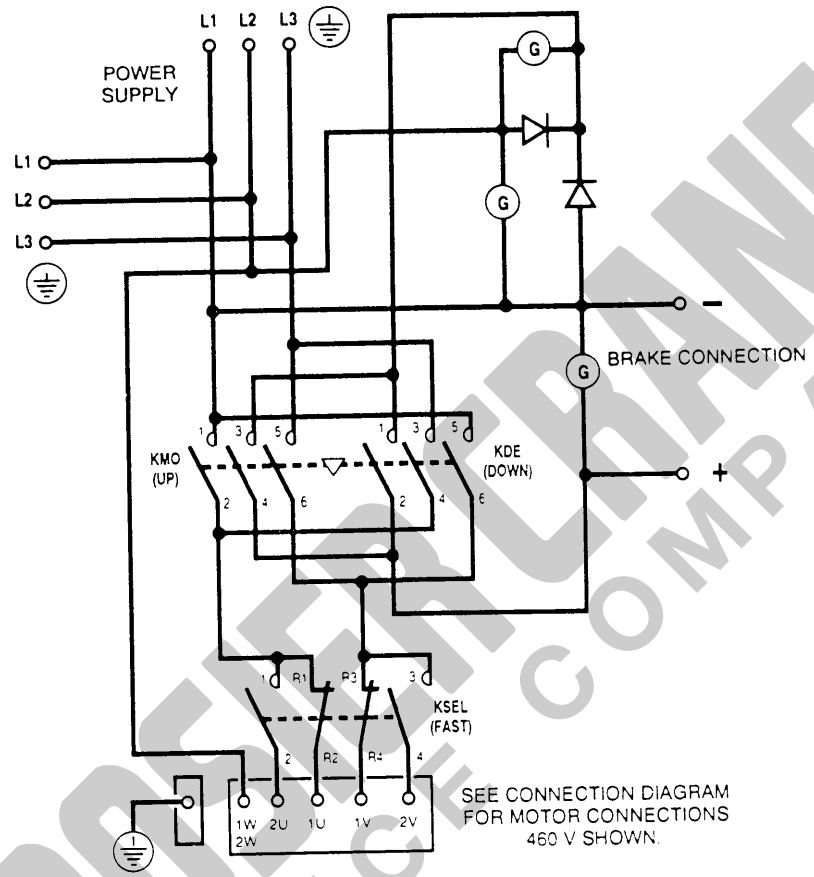




ELECTRICAL CONNECTIONS very low voltage (48V)

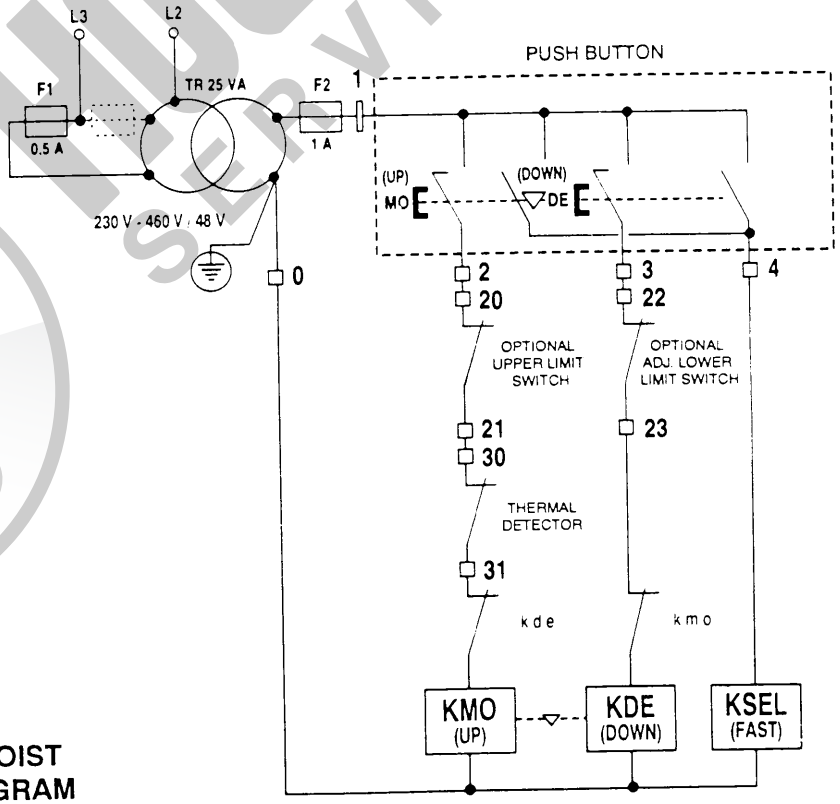
PUSHBUTTON BOX:	OPTIONS:	PUSHBUTTON TRAVEL:	BRAKE:
1 common	20-21 upper limit switch (blue wire)	0 common coil	+- brake
2 up control	22-23 lower limit switch (red wire)	11 travel protection coil	
3 down control	30-31 hoisting protection (thermal sensor)	16 right control	
4 hoisting selector		17 left control	
5 emergency stop		18 travel selector	
6 right control			
7 left control			
8 travel selector			

POWER SUPLY HOISTING:	POWER SUPPLY TRAVEL:	HOISTING MOTOR:
L1 L2 L3 PE	L1 L2 L3 ⏚ earth	1U 1V low speed
		2U 2V high speed
		1W 2W common



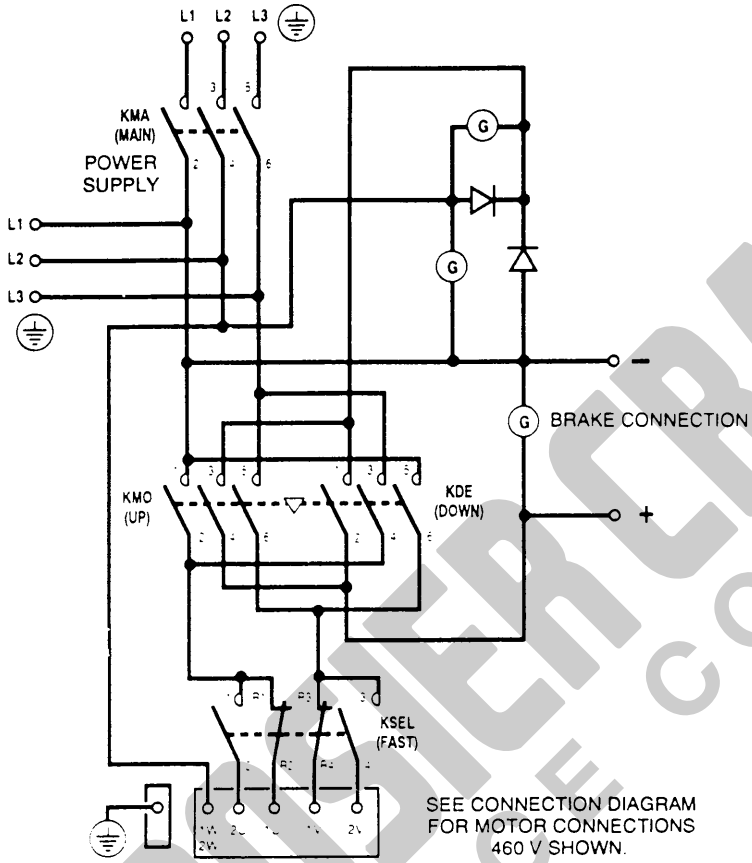
TWO SPEED HOIST POWER DIAGRAM

B3DIRB



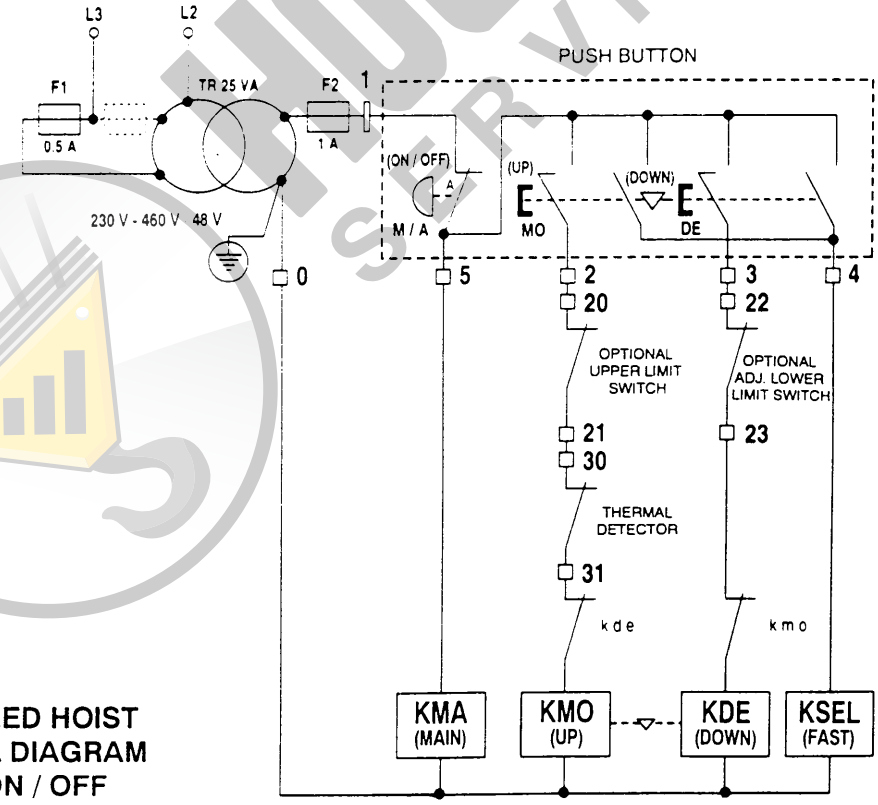
TWO SPEED HOIST CONTROL DIAGRAM

B3DIRB
19402A



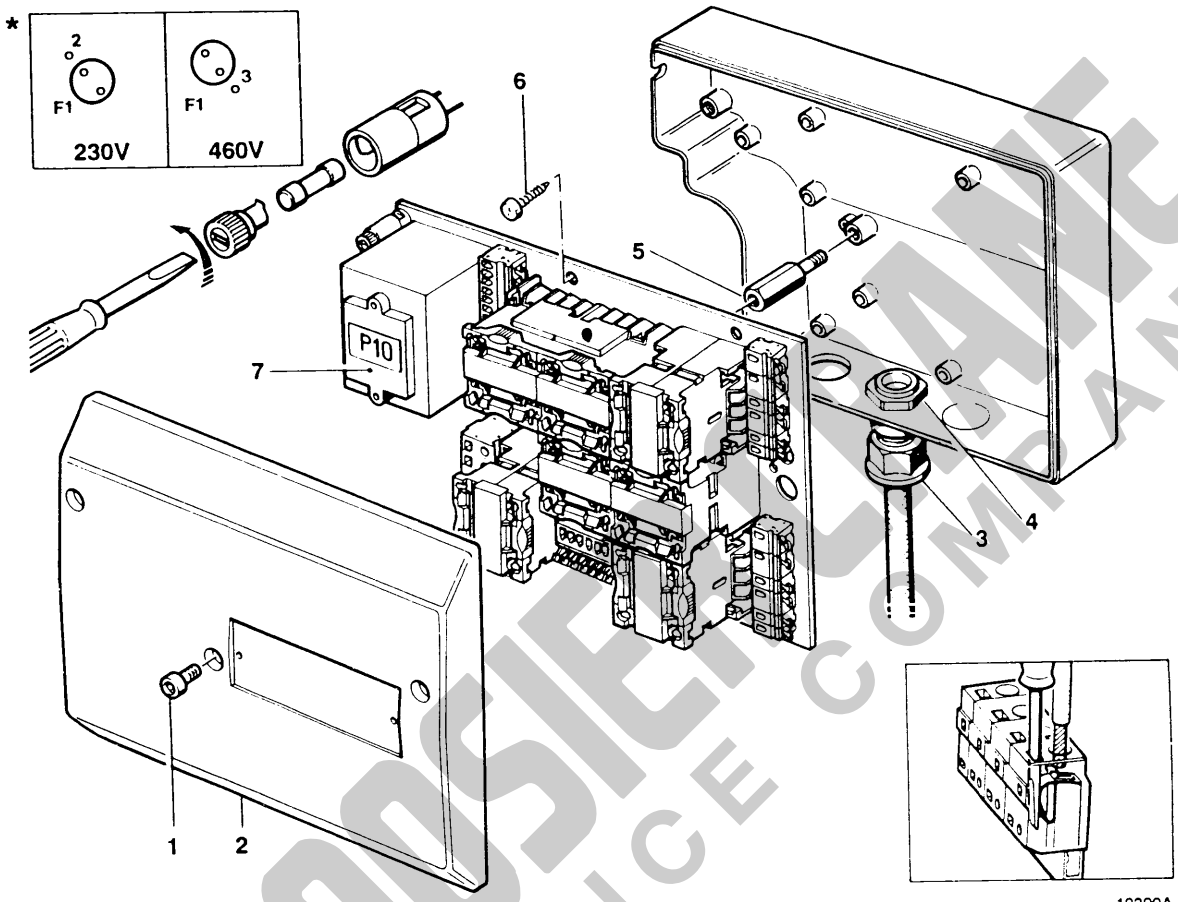
TWO SPEED HOIST
POWER DIAGRAM
WITH ON / OFF

B4DIRB



TWO SPEED HOIST
CONTROL DIAGRAM
WITH ON / OFF

B4DIRB
19403A



19390A

***Indicates the printed circuit power supply voltage**

DWG. ITEM	REFERENCE NUMBER	PART DESCRIPTION	QTY.	DWG. ITEM	REFERENCE NUMBER	PART DESCRIPTION	QTY.
1	830924	SOCKET HEAD SCREW, M 6 x 12	3				
2	557508	ELECTRICAL JUNCTION BOX, VE10	1				
3	833257	UNION, 16 MM	1				
4	833203	NUT, 16 MM	1				
5	990755	ADJUSTING SLEEVE	3				
6	831023	SECURING SCREW, PRINTED CIRCUIT	8				
7		PRINTED CIRCUIT, TBT 48 V	1				
	833151	P5 1 SPEED HOISTING + 1 SPEED TRAVEL					
	833152	P6 1 SPEED HOISTING + 1 SPEED TRAVEL + ON/OFF CONTROL					
	833153	P7 2 SPEEDS HOISTING + 1 SPEED TRAVEL					
	833154	P8 2SPEEDS HOISTING + 1 SPEED TRAVEL + ON/OFF CONTROL					
	833155	P9 2 SPEEDS HOISTING + 2 SPEEDS TRAVEL					
	833156	P10 2 SPEEDS HOISTING + 2 SPEEDS TRAVEL + ON/OFF CONTROL					
	833157	P11 1 SPEED HOISTING + 2 SPEEDS TRAVEL					
	833158	P12 1 SPEED HOISTING + 2 SPEEDS TRAVEL + ON/OFF CONTROL					

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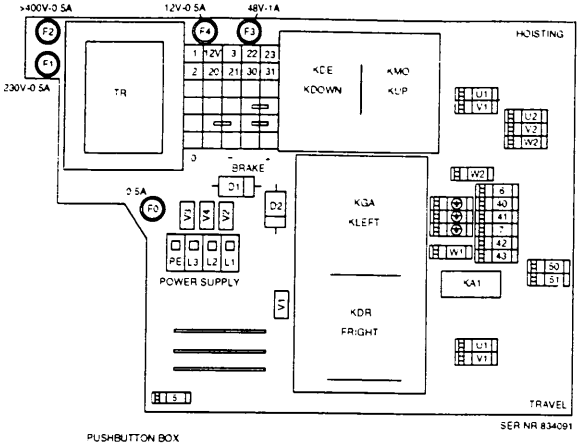
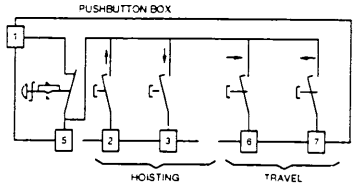
SINGLE SPEED HOIST WITH TROLLEY ELECTRICAL CONNECTION DIAGRAM 48 VOLT CONTROL

1 HOISTING SPEED
1 TRAVELLING SPEED
K5 WITHOUT EMERGENCY STOP





TRAVEL MOTOR CONNECTION:
U1 V1 W1 ⏚ earth

POWER SUPLY HOISTING:
L1 L2 L3 PE

BRAKE:
↞ brake

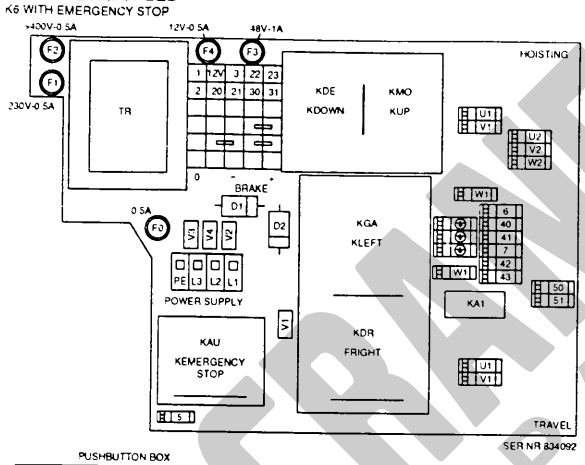
ELECTRICAL CONNECTIONS very low voltage (48V)

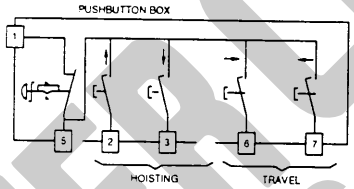
PUSHBUTTON BOX:	OPTIONS:
1 common	20-21 upper limit switch (blue wire)
2 up control	22-23 lower limit switch (red wire)
3 down control	30-31 hoisting protection (thermal sensor)
5 emergency stop	40-41 nght limit switch
6 nght control	42-43 left limit switch
7 left control	50-51 travel protection (thermal sensor)

HOISTING MOTOR CONNECTION:

230V		>400V	
U1	W2	U1	U2
V1	U2	V1	V2
W1	V2	W1	W2

1 HOISTING SPEED
1 TRAVELING SPEED
K6 WITH EMERGENCY STOP





TRAVEL MOTOR CONNECTION:
U1 V1 W1 ⏚ earth

POWER SUPLY HOISTING:
L1 L2 L3 PE

BRAKE:
↞ brake

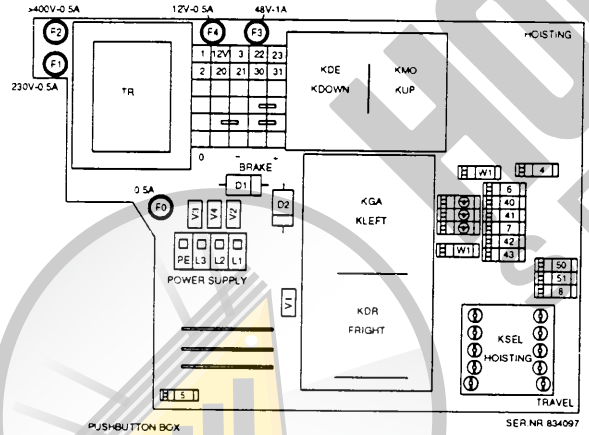
ELECTRICAL CONNECTIONS very low voltage (48V)

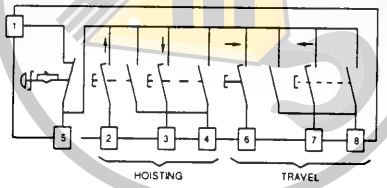
PUSHBUTTON BOX:	OPTIONS:
1 common	20-21 upper limit switch (blue wire)
2 up control	22-23 lower limit switch (red wire)
3 down control	30-31 hoisting protection (thermal sensor)
5 emergency stop	40-41 nght limit switch
6 nght control	42-43 left limit switch
7 left control	50-51 travel protection (thermal sensor)

HOISTING MOTOR CONNECTION:

230V		>400V	
U1	W2	U1	U2
V1	U2	V1	V2
W1	V2	W1	W2

1 HOISTING SPEED
2 TRAVELLING SPEED
K9 WITHOUT EMERGENCY STOP





POWER SUPLY HOISTING:
L1 L2 L3 PE

BRAKE:
↞ brake

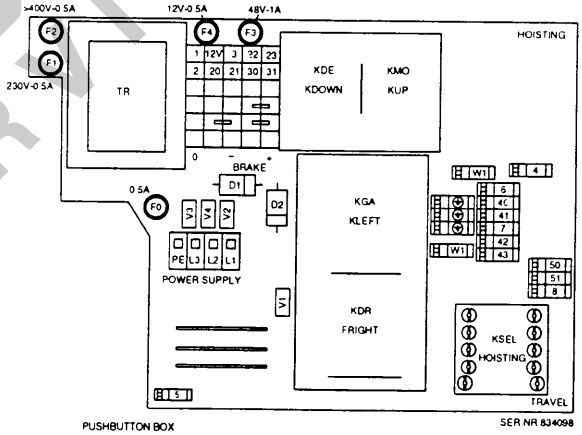
ELECTRICAL CONNECTIONS very low voltage (48V)

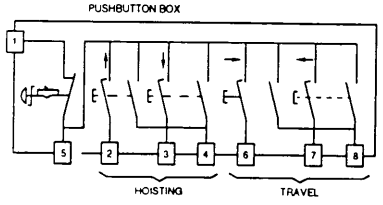
PUSHBUTTON BOX:	OPTIONS:
1 common	20-21 upper limit switch (blue wire)
2 up control	22-23 lower limit switch (red wire)
3 down control	30-31 hoisting protection (thermal sensor)
4 hoisting selector	40-41 right limit switch
5 emergency stop	42-43 left limit switch
6 right control	50-51 travel protection (thermal sensor)
7 left control	
8 travel selector	

MOTOR CONNECTION:

1W	2W	Common
1U	1V	Low speed
2U	2V	High speed

1 HOISTING SPEED
2 TRAVELLING SPEED
K10 WITHOUT EMERGENCY STOP





POWER SUPLY HOISTING:
L1 L2 L3 PE

BRAKE:
↞ brake

ELECTRICAL CONNECTIONS very low voltage (48V)

PUSHBUTTON BOX:	OPTIONS:
1 common	20-21 upper limit switch (blue wire)
2 up control	22-23 lower limit switch (red wire)
3 down control	30-31 hoisting protection (thermal sensor)
4 hoisting selector	40-41 right limit switch
5 emergency stop	42-43 left limit switch
6 right control	50-51 travel protection (thermal sensor)
7 left control	
8 travel selector	

MOTOR CONNECTION:

1W	2W	Common
1U	1V	Low speed
2U	2V	High speed

TWO SPEED HOIST WITH TROLLEY
ELECTRICAL CONNECTION DIAGRAM
48 VOLT CONTROL

FEBRUARY 1997
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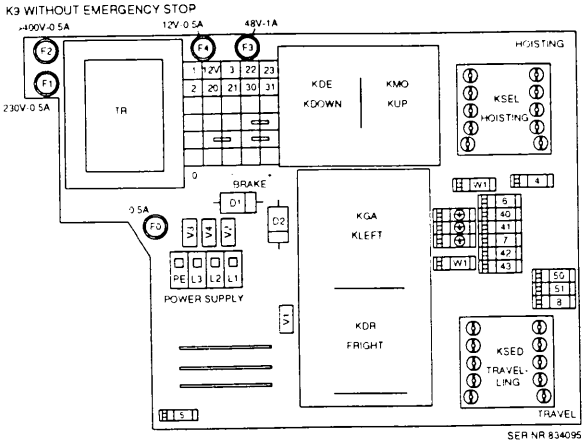
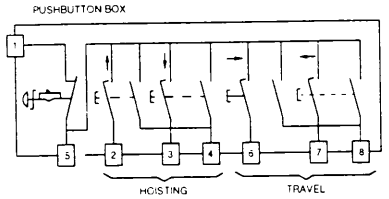
2 HOISTING SPEEDS
2 TRAVELLING SPEEDS
K9 WITHOUT EMERGENCY STOP





POWER SUPLY HOISTING:
L1 L2 L3 PE

BRAKE:
+- brake

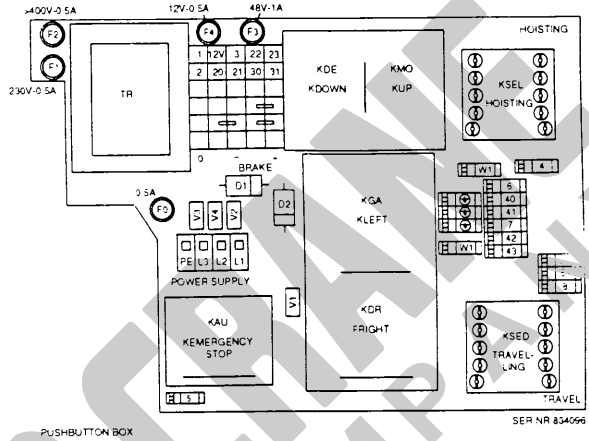
ELECTRICAL CONNECTIONS very low voltage (48V)

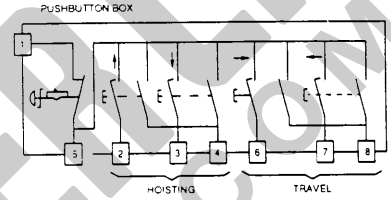
MOTOR CONNECTION:
1W 2W Common
1U 1V Low speed
2U 2V High speed

OPTIONS:
20-21 upper limit switch (blue wire)
22-23 lower limit switch (red wire)
30-31 hoisting protection (thermal sensor)
40-41 right limit switch
42-43 left limit switch
50-51 travel protection (thermal sensor)

PUSHBUTTON BOX:
1 common
2 up control
3 down control
4 hoisting selector
5 emergency stop
6 right control
7 left control
8 travel selector

1 HOISTING SPEED
1 TRAVELING SPEED
K10 WITH EMERGENCY STOP





POWER SUPLY HOISTING:
L1 L2 L3 PE

BRAKE:
+- brake

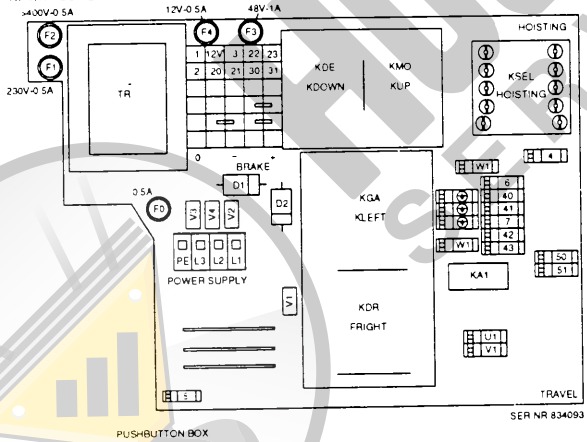
ELECTRICAL CONNECTIONS very low voltage (48V)

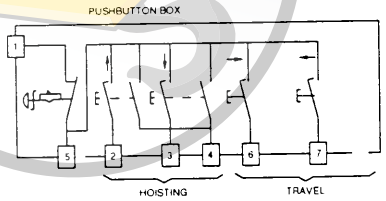
MOTOR CONNECTION:
1W 2W Common
1U 1V Low speed
2U 2V High speed

OPTIONS:
20-21 upper limit switch (blue wire)
22-23 lower limit switch (red wire)
30-31 hoisting protection (thermal sensor)
40-41 right limit switch
42-43 left limit switch
50-51 travel protection (thermal sensor)

PUSHBUTTON BOX:
1 common
2 up control
3 down control
4 hoisting selector
5 emergency stop
6 right control
7 left control
8 travel selector

2 HOISTING SPEEDS
1 TRAVELLING SPEED
K7 WITHOUT EMERGENCY STOP





TRAVEL MOTOR CONNECTION:
U1 V1 W1 ⏚ earth

POWER SUPLY HOISTING:
L1 L2 L3 PE

BRAKE:
+- brake

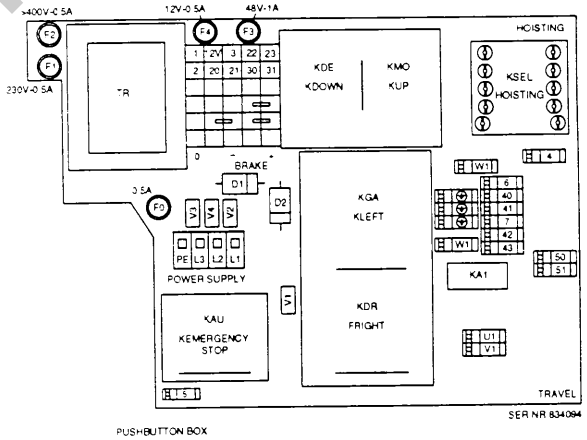
ELECTRICAL CONNECTIONS very low voltage (48V)

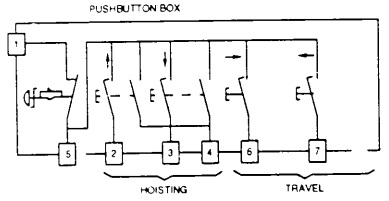
PUSHBUTTON BOX:
1 common
2 up control
3 down control
4 hoisting selector
5 emergency stop
6 right control
7 left control

OPTIONS:
20-21 upper limit switch (blue wire)
22-23 lower limit switch (red wire)
30-31 hoisting protection (thermal sensor)
40-41 right limit switch
42-43 left limit switch
50-51 travel protection (thermal sensor)

HOISTING MOTOR CONNECTION:
1W 2W Common
1U 1V Low speed
2U 2V High speed

2 HOISTING SPEEDS
1 TRAVELLING SPEED
K8 WITH EMERGENCY STOP





TRAVEL MOTOR CONNECTION:
U1 V1 W1 ⏚ earth

POWER SUPLY HOISTING:
L1 L2 L3 PE

BRAKE:
+- brake

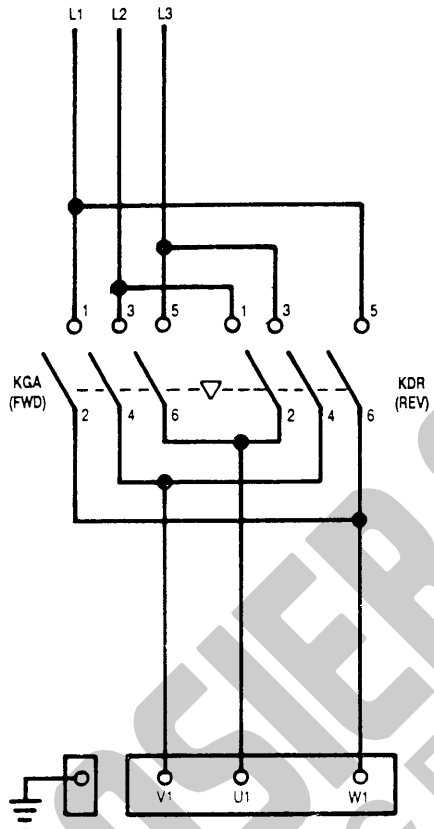
ELECTRICAL CONNECTIONS very low voltage (48V)

PUSHBUTTON BOX:
1 common
2 up control
3 down control
4 hoisting selector
5 emergency stop
6 right control
7 left control

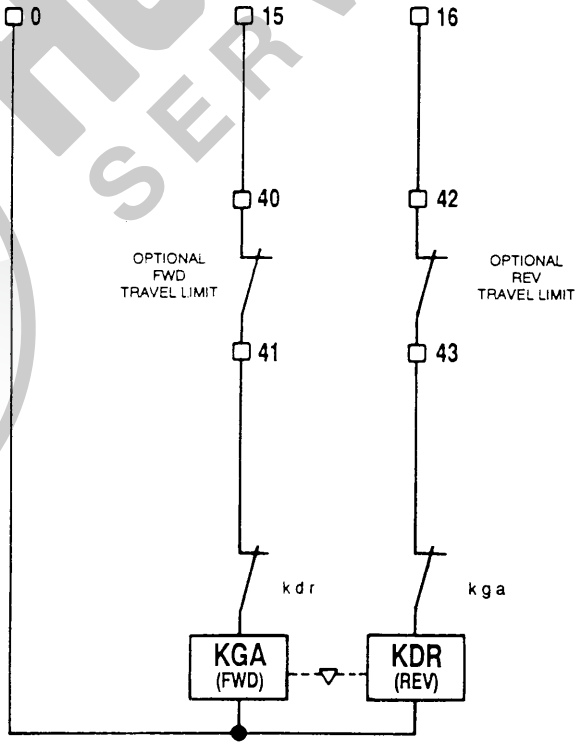
OPTIONS:
20-21 upper limit switch (blue wire)
22-23 lower limit switch (red wire)
30-31 hoisting protection (thermal sensor)
40-41 right limit switch
42-43 left limit switch
50-51 travel protection (thermal sensor)

HOISTING MOTOR CONNECTION:
1W 2W Common
1U 1V Low speed
2U 2V High speed

SINGLE SPEED TROLLY CONTROL AND POWER DIAGRAM 48 VOLT CONTROL	APRIL 1995 ECA

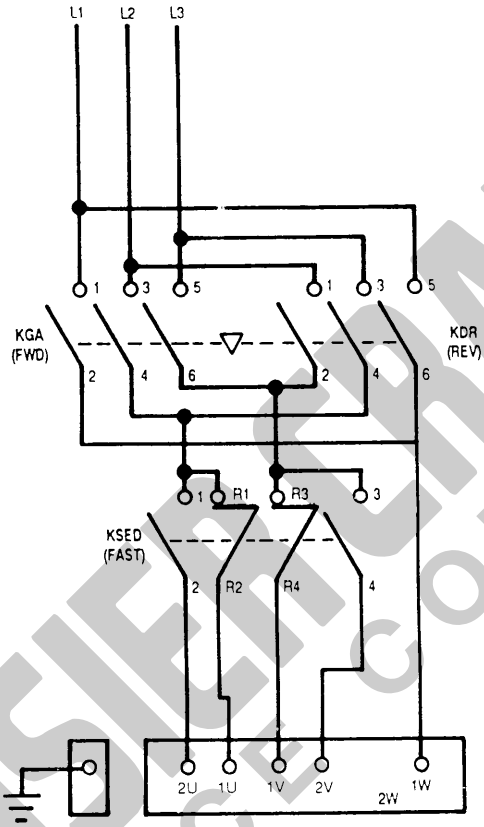


SINGLE SPEED
TROLLEY
POWER DIAGRAM

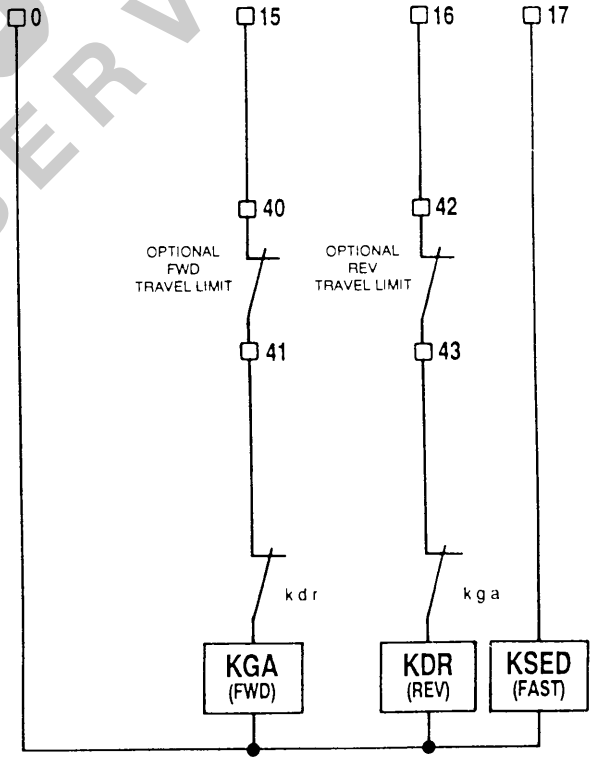


SINGLE SPEED
TROLLEY
CONTROL DIAGRAM

TWO SPEED TROLLEY CONTROL AND POWER DIAGRAM 48 VOLT CONTROL	APRIL 1995 ECA

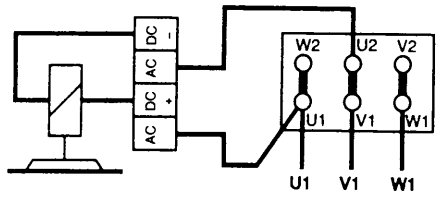


TWO SPEED
TROLLEY
POWER DIAGRAM

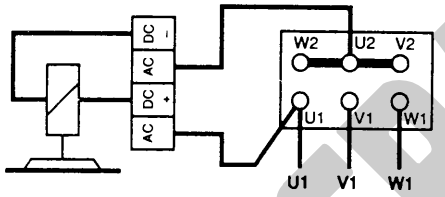


TWO SPEED
TROLLEY
CONTROL DIAGRAM

SINGLE SPEED TROLLEY BRAKE CONNECTIONS

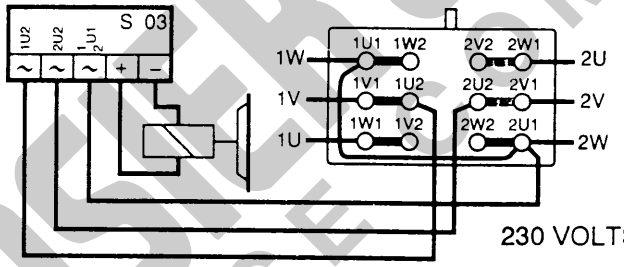


230 VOLTS

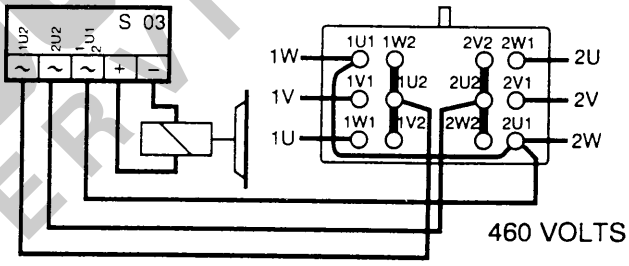


460 VOLTS

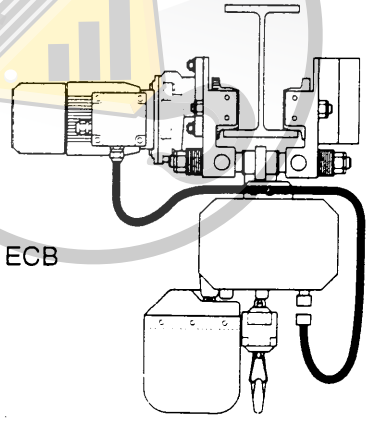
TWO SPEED TROLLEY BRAKE CONNECTIONS



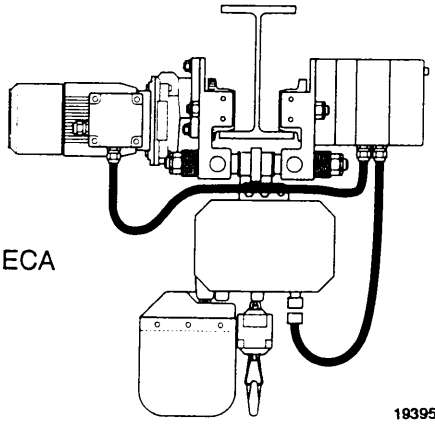
230 VOLTS



460 VOLTS



ECB



ECA

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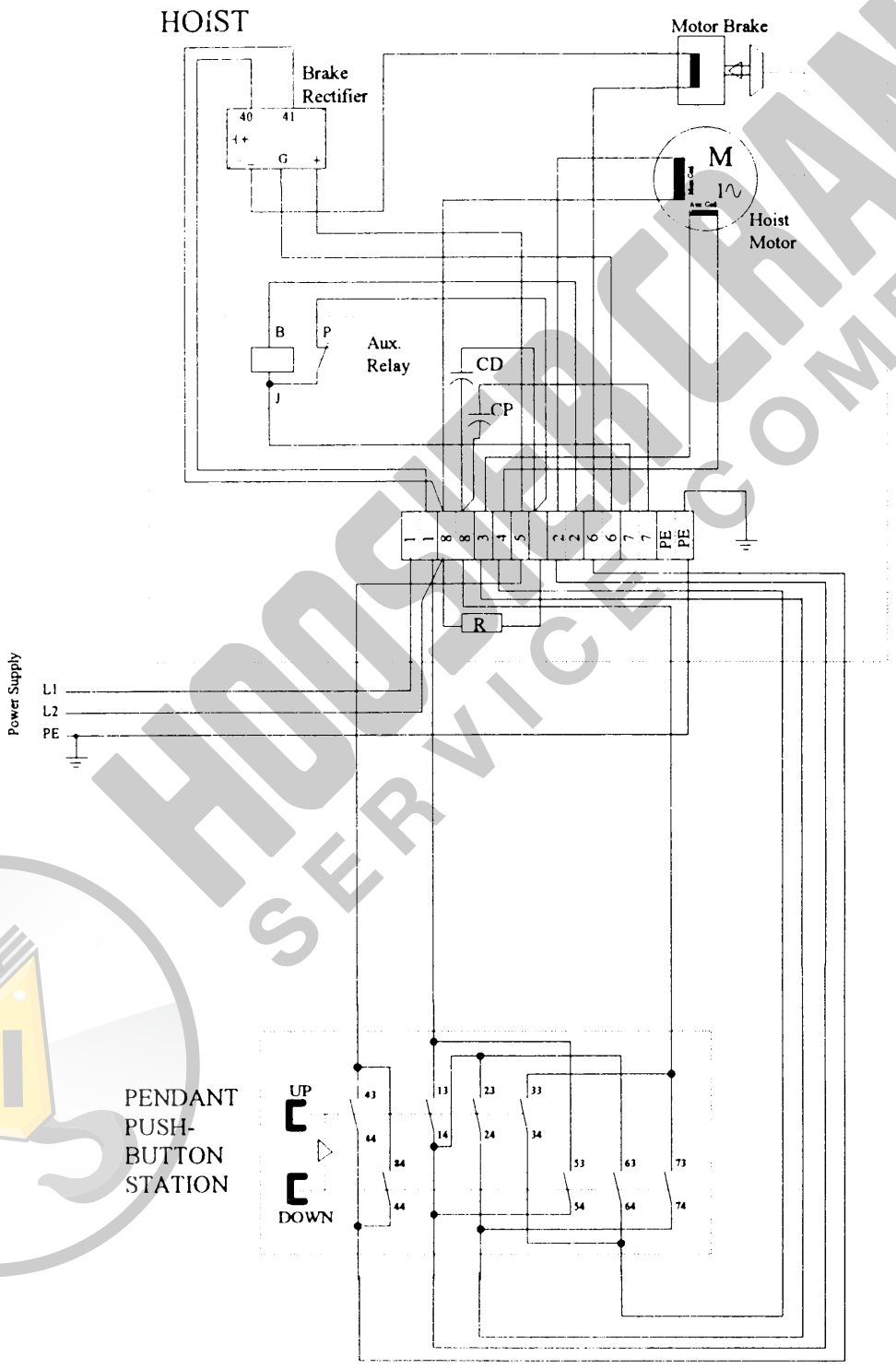

Quality Parts and Service Support

R&M is dedicated to providing top-quality hoist products and top-quality support. We use computer technology in our parts and customer service programs to help monitor custom orders, inventory, product availability and stock locations. This efficient management system helps us maintain critical scheduling and ensure prompt delivery of your order.

Product Support

Our parts and service centers are located nationwide to provide you with product support and quick fulfillment of maintenance and repair requests. R&M includes an Operations, Maintenance, and Spare Parts Manual with every hoist or crane product sold. If you need additional help, R&M field representatives are always ready to help you solve your toughest hoisting problems. They know your equipment, trouble-shoot problems fast, and save you downtime and labor. From initial installation and start-up to full-scale operation, R&M's field representatives give you the quality support you need for successful results.

Our Commitment To Quality

R&M's commitment to quality is further enhanced by our unique Quality Insurance Plan. R&M is the only hoist manufacturer that will replace your hoist free if it fails due to defects in materials and/or workmanship, or if it does not perform to specifications during the first 30 days of ownership. Every hoist is also backed by our standard one-year warranty.

On-Site Product Specification

Call your local regional office or distributor to discuss your specific hoist requirements. They can provide you with immediate price quotations and performance specifications with computer accuracy, as well as explain specific Spacemaster features related to your application. They can also give you information on a wide range of other R&M material handling products.

CAUTION: Do not use R&M hoists or trolleys for passenger elevator applications.

R&M Materials Handling, Inc., reserves the right to alter technical specifications.

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