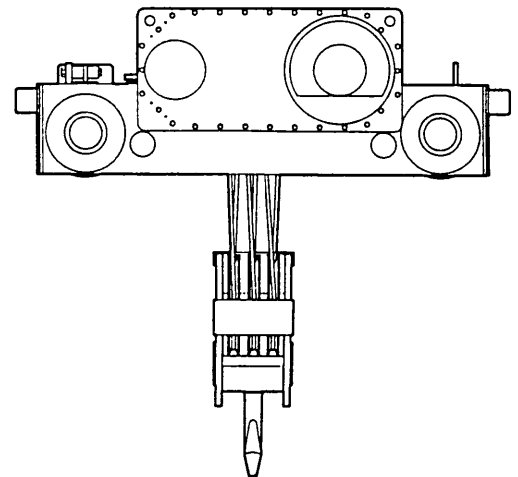
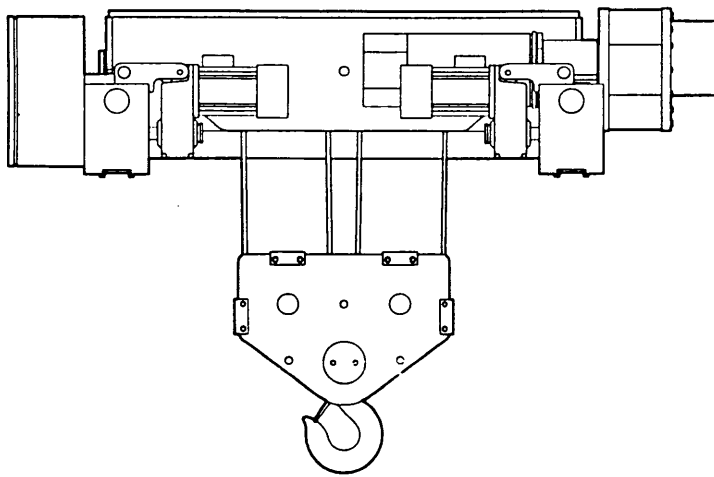


# FRAME G

## SPACEMASTER II



**Series DG HOISTS**

### **INSTALLATION, OPERATION AND MAINTENANCE INSTRUCTIONS**

**SERIAL NO.:** \_\_\_\_\_

(RECORD HOIST SERIAL NUMBER FOR FUTURE REFERENCE)



**R&M**  
**MATERIALS HANDLING**

**Bulletin G-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 B30.6-1987 (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.

|                  |
|------------------|
| <b>IMPORTANT</b> |
|------------------|

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  
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 assure 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 assure 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.

The Serial Number of your hoist is on a metal nameplate and the nameplate is affixed to hoist frame. Your serial number may show a ten digit number, where the seventh and eighth digits indicate year manufactured and the ninth and tenth digits indicate quantity of units. An example of this type of serial number would be 1779959601 where year manufactured is 96 and quantity is one.

### **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  
4501 Gateway Blvd.  
Springfield, OH 45502

## SECTION 1 INSTALLATION

### 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 Spacemaster G hoist is load tested at factory at 125 percent of rated capacity. Crane manufacturers shall be responsible for load tests at job site of hoist in accordance with ASME B30.2d and/or other codes that may apply. Units purchased and shipped without controls, motors, and/or bottom blocks are bench run only and require load testing at job site by the user after installation.

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 wire rope 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, insure 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.

Spacemaster 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.

### Reeving

Bottom block must hang straight, and wire ropes must be free of kinks or twists. Make sure limit switch weight is not hung up, hangs freely suspended from its supporting cable/chain, and nothing impedes its upward or downward motions. Bottom block may rotate during initial lifts due to new wire rope not having taken a permanent "set", causing the wire rope falls to twist, or wrap around each other. See Section 4 Operation Maintenance, Wire Rope for corrective action.

See Section 6 for reeving diagrams and instructions.

### Lubrication

All our hoists are shipped completely lubricated, including 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 lubrication schedule, Section 5 for recommended types for hoist. See separate trolley manual for lubrication schedule and recommended types.

If hoist gearcase has been shipped with solid oil filler plug, replace with attached breather plug to prevent oil leakage due to pressure build up.

Make sure wire rope is adequately greased and free from any contamination or dirt. See Section 5, for proper lubricant, if necessary.

### 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 ASME B30.10. See Section 4, Operation Maintenance for Bottom Block/Sheaves.

#### **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  $\pm 10\%$  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.



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 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 the 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 insure 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

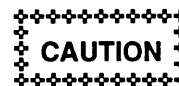
Do *not* attempt to reverse hoist motion by changing control leads in the push button or at the contactor or Adjustable Frequency Drive, and do not change the nameplate on the P/B. The pilot circuit limit switch is in series with the "up" control circuit wiring as furnished from the factory. Changing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

### IMPORTANT

*Do not run the hoist with 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*.



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.

### Trolley Adjustments

The optional electronic softstart may be adjusted to provide optimum starting acceleration for normal load conditions as described in a separate attachment found in last section of this manual.

The trolley brake may be adjusted to provide the optimum stopping deceleration for normal load conditions as described in a separate Installation, Operation, and Maintenance Instructions for Trolley Drive Assembly.

### Limit Switch Action

Spacemaster Frame G hoists are equipped with a weight type upper limit switch which acts as an emergency limit to stop the upward travel of the load block.

Spacemaster Frame G hoists are equipped with a gear type limit, the switch is factory adjusted to stop upward travel of the load block approximately 2" below the weight of the weight type upper limit switch.

After proper direction has been established, run bottom block down several feet from upper limit and stop. Check weight type upper limit action by slowly lifting the weight manually with a wooden stick or pole, while operating hoist in the hoisting direction. Block should stop after lifting weight no more than 1/4 inch. If block does not stop, immediately release the up button, shut off power to the hoist and check out control circuit wiring, switches, and possible binding of limit switch levers/shafts.

If the weight type upper limit is operating properly, and equipped with gear type limit, inch the hoist upward



until the gear type limit switch is activated with bottom block approximately 2" below limit weight.

If gear limit is not operating properly, check and adjust as instructed in Section 6.

Lower gear type switch is set to trip with two wraps of wire rope remaining on drum. For adjustment of trip location, refer to Section 6.

#### **No Load Operational Checks**

Check each hoist brake adjustment. Block should stop without load on hook with maximum 1" of hook drift. See Section 6, Hoist Brake Components and Adjustment Instructions.

Run bottom block to within 6" of weight of upper weight type limit switch. With a wooden stick or pole, lift weight and attempt to raise hook block from push button. If hoist runs, disconnect from power source and check for cause of malfunction and correct before putting hoist into operation.

Next, check gear type limit, lower block out of upper limit 1 to 1 1/2 feet and stop. Run bottom block up, toward upper gear limit, at maximum hoist speed. Block motion should be stopped by gear limit switch action before contacting the weight of the weight limit switch. If it does not, readjust the gear limit switch. See Section 6 for gear type switch adjustment instructions.

#### **Overload Limit**

Spacemaster Frame G hoists are equipped with an electromechanical overload 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 and should not require field adjustment. Sound operating practices should be followed to avoid attempts to lift over capacity loads.

#### **Load/Run Test**

While all R&M Materials Handling hoists are load tested at the factory, full load testing shall be performed in accordance with ASME B30.2d latest edition after installation by the user, and after completion of all No Load Operational Checks.

Attach a near-capacity load and lift/lower several feet. If brakes or controls chatter under a near-capacity load, check voltage at motor. See separate instruction manual for Adjustable Frequency Drives.

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 assuring 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 Procedures shown are taken in part from the following publications:

American National Standard Institute (ANSI)  
Safety Standards for Cranes, Derricks, Hoists,  
Hooks  
ASME B30.2 - Overhead and Gantry Cranes  
ASME B30.16 - Overhead Hoist  
ASME/ANSI B30.10 - Hooks

#### 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 or rope 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 hoist rope or 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 chain or rope as ground for welding. NEVER touch a live welding electrode to the chain or rope.
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 over-heating and heat failure, or burn-out, if continued to excess.
5. CHECK operation of brakes for excessive drift.
6. CHECK operation of limit switches.
7. CHECK for damaged hooks and wire ropes.
8. KEEP load wire rope clean and well lubricated.
9. CHECK the wire rope for improper seating, twisting, kinking, wear, or other defects before operating the hoists.
10. CHECK for broken wires in wire rope. See Wire Rope, Section 4 for complete inspection procedure.
11. MAKE SURE a load clears neighboring stock piles, machinery, or other obstructions when raising, lowering, or traveling the load.

### 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, ropes, brakes, and limit switches. See pages 5-0 and 5-1.
12. CENTER hoist over the load before operating.
13. AVOID swinging of load or load hook when traveling the hoist.
14. BE SURE the load attachment is properly seated in the saddle of the hook. Balance load properly before handling. Avoid hook tip loading.
15. PULL in a straight line, so that neither hoist body nor load chain or rope are angled around an object.
16. TAKE up slack slowly.
17. 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 DG model may have some slight variation in design/arrangement, all models have the same basic elements.

1. *Motor/Coupling* – basic drive package. Speed control via motor through regenerative braking, or through optional Adjustable Frequency Drive if furnished.
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* – three reduction gear reducer coupling the motor to the drum.
4. *Hoist Holding Brake* – a second brake that automatically prevents motion when power is off.
5. *Frame/Drum* – basic structural components which support the load to be handled.
6. *Bottom Block and Sheaves* – includes bottom block and sheaves.
7. *Wire Rope* – hoisting rope and end connections for picking up the load.
8. *Controls/Enclosures* – electromechanical devices for supplying power to, and reversing direction of, the motor(s). Refer to Separate Instruction Manual for Adjustable Frequency Drive.
9. *Weight Limit Switch* – emergency shut-off switch to stop hook motion at maximum safe upper elevation of bottom block.
10. Adjustable upper and lower gear limit switch.
11. Overload limit switch.
12. *Trolley Drive Assembly* – consists of gear box and motor with brake. Refer to Separate Installation, Operation and Maintenance Instructions for Trolley Drive Assembly.

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

#### Motor/Couplings

The hoist motors are designed to provide dependable hoisting service. Standard motors are enclosed for protection against normal hazards of dust and moisture.

Standard motors are furnished with thermal protection in the form of normally closed, automatic reset control circuit thermostats. These are pilot circuit devices which open the control circuit if the motor overheats. The hoist motor protector opens only the "up" circuit.

Hoist motor coupling is a flexible type. One hub is keyed to the shaft of motor and the other hub is keyed to the primary shaft of gearcase.

#### Hoist Brakes

Spacemaster Frame G hoists are furnished with two (2) electromagnetic disc type brakes with minimum torque rating equal to 200% full load torque of the motor. The purpose of the brakes is twofold:

- 1) To minimize hook drift by bringing the motor to a quick and smooth stop.
- 2) To help 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 against the brake pole plate, thereby releasing the pressure on the friction discs. This permits the discs to turn freely with motor rotation. When the motor is de-energized, the brake coils are simultaneously deenergized, releasing the armature plate which applies pressure to the friction discs and the motor is brought to a quick stop. The kinetic energy of the motor is dissipated as heat on the friction surfaces.

Proper maintenance and adjustment of the brakes are essential to the reliable operation of the hoist. Heat is generated and wear occurs each time the motor is stopped and 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 pushbutton by an operator causes unnecessary brake heating and wear. The frequency of brake wear adjustment depends on the duty cycle. To adjust brake, follow instruction in Section 6, Hoist Brake Components and Adjustments.

### Hoist Gearcase Assembly

Drive train consists of three reductions of precision cut helical gears/pinions, keyed or splined to steel shafts, supported on bearings. All gears and bearings operate in an oil bath and do not require additional lubrication. Reference Section 6, Hoist Gearcase Assembly.

It is recommended that the oil seals and the gearcase cover gasket or sealant be replaced whenever inspection or servicing of the gearcase requires cover removal.

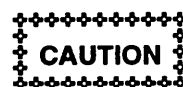


Fill gearcase to oil level with lubrication as recommended in lubrication schedule, Section 5, prior to putting hoist back in service.

### Frame and Drum

The frame and drum are both constructed of steel, and unless damaged from abuse (impact with another hoist or building structure) require no maintenance. Any hoist with a frame or drum that is no longer serviceable for any reason should be referred to the factory for replacement/repair. Drum bearings require lubrication. See Section 5, Preventative Maintenance, Lubrication Schedule.

### Wire Rope



A hoist should never be used if the wire rope shows any evidence of mechanical damage or excessive wear.

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

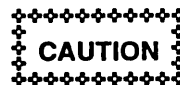
Improper wire rope storage or installation procedure can render the wire rope unusable prior to the first lift.

Wire rope inspection should be conducted weekly by a designated person using good judgment in evaluating the remaining service lift. Any deterioration of the wire rope 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 report, dated and signed by the inspector.

- 1) Improper lubrication of wire rope.
- 2) Worn outside wires.
- 3) Broken or corroded wires at the end connections.
- 4) Crushing, slicing, unstranding, or kinking.
- 5) Internal wear caused by grit penetrating the strands.
- 6) Broken outside wires and the concentration of such wires.
- 7) Reduction of original rope diameter.
- 8) Damaged, worn, or improperly applied end connections.
- 9) Birdcaging.

### WARNING

Also evaluate those sections which are normally hidden during inspections, such as sections which pass over equalizer sheaves.



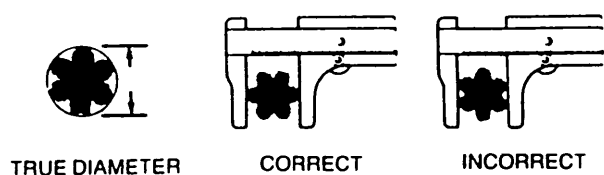
Wear gloves whenever handling wire rope.

The wear life of the wire rope depends mainly upon the frequency and severity of service and its maintenance. All wire rope will eventually deteriorate to a point where it is no longer serviceable or safe.

No precise rules can be given for determination of the exact time for replacement of wire rope because of the many factors involved. Any one of the following conditions is sufficient reason for replacement.

- 1) Twelve randomly distributed broken wires in any one rope lay, or four broken wires in any one strand in one rope lay.
- 2) Wear of one-third of the original diameter of individual outside wires.
- 3) Kinking, crushing, birdcaging, or any damage resulting in distortion of the rope structure.
- 4) Evidence of any heat damage from any cause.
- 5) Reductions from nominal diameter of more than:
  - a) 1/64" for diameters up to and including 5/16".
  - b) 1/32" for diameters 3/8" to 1/2" inclusive.
  - c) 3/64" for diameters 9/16" to 3/4" inclusive.
- 6) The development of 2 broken wires adjacent to a socketed or swaged fitting, or signs of corrosion at that point.

The correct diameter of a wire rope is the diameter of a circumscribed circle which will enclose all the strands. It is the largest cross-sectional measurement as illustrated in Figure 4-1. The measurement should be made carefully with calipers. The illustrations show the correct and incorrect methods of measuring the diameter of wire rope. The measurement of the rope diameter on a new hoist or a replacement cable should be recorded for future checking as in 5 above.



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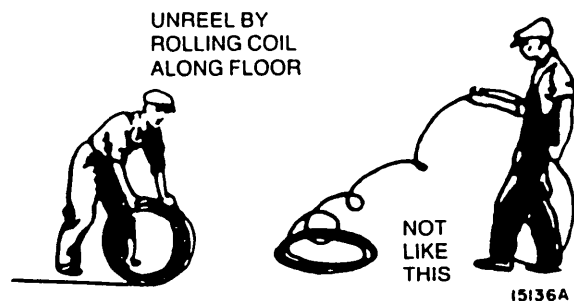
Figure 4-1.

Generalized instructions for inspection/servicing of wire rope follow. See Reeving Instructions and Reeving Diagrams, Section 6, for specific reeving arrangement.

- 1) Hoisting ropes as furnished on new hoists or as a service part from R&M Materials Handling are of special construction, designed specifically for hoist applications. It is recommended that replacement wire ropes with necessary end fittings be obtained from an authorized R&M Materials Handling, Inc. service station or the factory.

Use of non-authorized wire rope may seriously shorten the life of the rope.

- 2) When unreeling a new replacement wire rope, follow procedure sketched below to avoid developing kinks or twists.



- 3) Lubrication of the Wire Rope. Depending on the operating conditions, lubrication of the wire rope is sometimes desirable, and is best achieved by pulling the rope through a greased (preferably heated grease) cloth. The rope can be left unlubricated but should then be inspected more often than normal since its service life will be decreased. See Lubrication Schedule, Section 5, for proper lubricant.
- 4) Make sure replacement wire ropes are properly reeved through sheaves and bottom block. See Reeving Instructions and Reeving Diagrams, Section 6.
- 5) Any new or replacement wire rope when first installed may cause the bottom block to turn or twist when a load is applied, resulting in the hoist ropes twisting around each other. To correct, run bottom block to the floor and disconnect the wire rope at the end anchor on the hoist frame. See wire rope reeving instructions, Section 6. Turn the end of the wire rope several revolutions in the direction opposite of block twist and reconnect. Run empty bottom block up and down a few times to stabilize wire rope twist. It may be necessary to repeat more than once during the first few days of hoist operation with new wire ropes.

#### Bottom Block/Sheaves

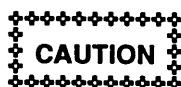
Sheaves showing evidence of scored grooves or broken/cracked flanges or sharp edges generated from wear, should be replaced. Worn sheaves can greatly reduce the life of the hoisting rope. Check hooks for

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 4-2.

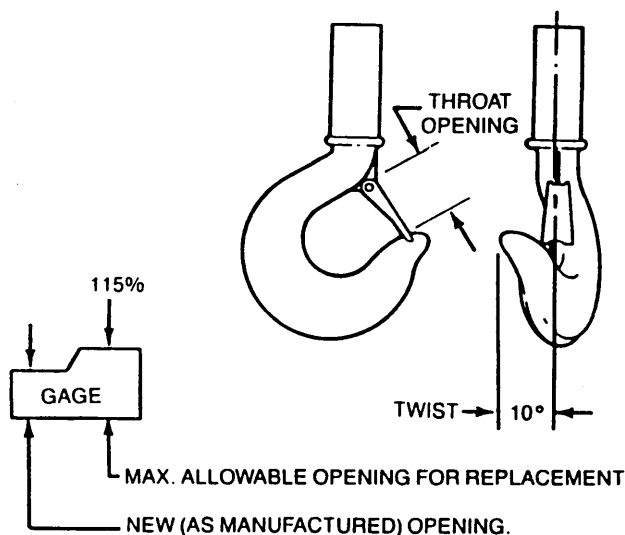
Due to the many types and sizes of hooks which can be furnished and specified by the user, it is recommended that the user measure the actual throat opening of the hook as originally furnished and record on the sketch and retain for a permanent record. This record can then be used for determining when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



Repairs by welding or reshaping of hooks *is not recommended and must be avoided.*



15137A

Figure 4-2.

## Controls/Enclosure

### WARNING

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

Standard basic control components consist of the following:

- 1) Motor Contactor – three pole reversing contactor, or adjustable frequency drive which closes the power leads to the motor when actuated by the push button.
- 2) Push Button Station, if provided.
- 3) Control Circuit Transformer – reduces the incoming power supply voltage to 115 volts for control circuit operation.
- 4) Limit Switches (see Section 6).
- 5) 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). Electrical malfunctions can be minimized by a monthly to quarterly inspection for loose connections/broken or frayed wiring, and replacement of contacts on starters/relays when severely pitted.

### Limit Switches

The upper and lower limit switch is an adjustable gear type. Weight type upper limit switch consists of a weight suspended from a cable, which, when lifted by upward motion of the bottom block, opens the hoist

control circuit and stops further block travel. See Section 6. An overload limit switch protects against a load in excess of the rated load of the hoist being lifted. See Section 6.



The standard limit switches are emergency devices only and are not to be used as *automatic stops*. Consult factory if automatic stops are required.

Hoist motor *must* be properly phased for limit to function as intended. See warnings/instructions under "Installation – Initial Start Up", Section 2.

Since good hoisting practice dictates the use of the upper limit switches as emergency devices only, and in many installations are seldom used, limit switch parts do not normally need replacement due to wear. Maintenance consists of making sure that the limit remains functional and does not become inoperative due to dirt, dust, corrosion, or physical damage. See Section 5, Preventative Maintenance.

#### IMPORTANT

When checking the weight type upper limit switch manually, make sure bottom block is lowered several feet below upper limit.

#### Adjustable Upper and Lower Gear Type Limit Switch

Adjustable upper and lower gear type limit switches are provided to allow setting the hoist travel within a prescribed travel range. See Section 6, Adjustable Gear Type Limit Switch.

#### Overload Limit Switch

Spacemaster Frame G hoists are equipped with an electromechanical overload device to help protect against damage which may be caused by the accidental attempts to lift an over capacity load. See Section 6, Overload Limit Switch Assembly and Adjustment Instructions.

#### Trolley Drive Assembly

Refer to separate Installation, Operation and Maintenance Instructions.



## SECTION 5 PREVENTATIVE MAINTENANCE

### Inspection/Preventative Maintenance Schedule

The intervals between inspections will vary due to the wide range of applications, duty cycles, and environmental conditions encountered by hoisting equipment. The following schedule lists *minimum* requirements, based on intermittent operation of the hoist on an 8-hour/day, 5-day/week work schedule, under normal environmental conditions (free from excessive dust, moisture, and corrosive fumes). 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  |
|----------------------|--|
| Start of each shift  | <p><i>Upper and lower gear limit switch</i> – check both travel limits by carefully inching empty hook into upper and lower design elevations of block. Block should stop at upper level 2" below round weight of weight type over-travel upper limit and with not less than 2 wraps of wire rope remaining on the rope drum at the lower limit.</p> <p><i>Hoist/trolley brakes</i> – excessive coast without load.</p> <p><i>Reeving</i> – twisted or kinked wire ropes.</p> <p><i>Controls</i> – proper operation from pushbutton.</p>   |
| Weekly               | <p><i>Reeving</i> – check for kinks, unstranding, broken wires, corrosion, etc. See Wire Rope, Section 4. A signed monthly report is required by OSHA.</p> <p><i>Bottom Block</i> – check for bent or twisted hook and/or safety latches and damage or cracks on hook.</p> <p>For complete instructions on wire ropes/bottom block, refer to Operation/Maintenance section under Wire Rope, Section 4.</p>   |
| Monthly to Quarterly | <p><i>Motor Brakes</i> – remove, inspect, clean magnetic disc plate and linings. Replace as required. Adjust brake to proper setting. See Hoist Brake Components and Adjustment Instructions, Section 6.</p> <p><i>Lubrication</i> – refer to Lubrication Schedule, Section 5. Regrease lubrication points and check oil level in gearcase.</p> <p>See separate manual for Lubrication Schedule for Trolley Drive.</p> <p><i>Controls</i> – inspect contacts of motor starters. <i>Note:</i> discoloration and slight pitting are normal. Replace if silver is worn thin or is severely pitted. Check for loose or broken connections.</p> <p><i>Weight Type Overtravel Upper Limit Switch</i> – remove any accumulated dirt/dust on exposed shafts/levers. Lift the limit weight manually, using a wooden stick or pole, to make sure that shaft/bearings rotate freely. (IMPORTANT: When checking manually, make sure bottom block is lowered several feet below upper limit.)</p> |

### INSPECTION/PREVENTATIVE MAINTENANCE SCHEDULE (Cont)

| Time Interval  | Inspection Function   |
|--|---|
| Monthly to Quarterly   | <p>Check torque of bolts for rope clamps on rope drum and rope dead end.</p> <p>Upper and Lower Gear Limit Switch – remove any accumulated dirt or dust on open gearing, shafts.</p>  |
| Semi Annually to Annually<br>(Includes all items listed above for more frequent inspections)   | <p>Drain and replace oil in hoist gearcase. Check for loose bolts and/or connections on both hoist/trolley and suspension system.</p> <p>Check all load carrying parts, such as sheaves, drums, bottom block assembly, wheel pins, frames, suspension bolts and welds on load sustaining components for wear, cracks, distortion or signs of overload. Replace/tighten/secure as required.</p> <p>Inspect coupling for hoist motor.</p> <p>If noise level of hoist gearcase has increased, remove cover and inspect for damaged/worn gears, bearings, and shafts.</p> |
| <div style="text-align: center; border: 1px solid black; padding: 5px; margin: 10px auto; width: 150px;"> <b>IMPORTANT</b> </div> <p>After any major tear down, repair, or alteration, unit should be functionally load tested as described in section "Installation-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.</p> |   |

## TROUBLESHOOTING

While the chart below can be used for diagnosing typical equipmental functions, the basic underlying cause in many cases in insufficient voltage maintenance at motor and control terminals. Not only must the equipment be connected to the proper nominal voltage source, the power supply leads must be of sufficient size to maintain rated voltage during starting and full load operation. Excessive voltage drop during starting or under load can cause:

- 1) Sluggish starting and overheating of motors.
- 2) Chattering and overheating of contactor and brake coils.
- 3) Overheating and possible burn out of transformers.
- 4) Non-release of motor brakes.
- 5) Excessive arcing of electrical contacts.
- 6) Erratic performance of optional electronic overload devices.

### WARNING

When any of the following problems are encountered, the hoist should be immediately removed from service and returned to service only after the problem has been diagnosed and corrected.

| PROBLEM                                     | DIAGNOSIS                                   | POTENTIAL SOLUTION  |
|---|---|---|
| Hook does not raise or lower                | No power.                                   | Check switches, breakers, fuses, and power line connections for open circuit, grounded or faulty connections.   |
|   | Contactor not operating.                    | Check connections in control circuit. Check contactor coils and pushbutton control cable for open or short circuit. Reset overload relay if used. Defective transformer. Check contactor armatures for freedom of movement. |
|   | Limit switch open circuit.                  | Check limit switch contacts.  |
|   | Brake not releasing.                        | Check adjustment. Check for loose connections. Check auxiliary contacts and rectifier.  |
|   | Excessive load.                             | Check weight of load against rated hoist capacity.  |
| Hook moves in wrong direction.              | Phase reversal of three-phase power supply. | Interchange any two of the three lead connections either at the power source or at the lead in connections to the hoist. ( <i>See Caution - Initial Start Up.</i> )   |
|   | Wire rope wound on wrong side of drum.      | Rewind and check wire rope for damage. Check operation of lower limit switch.   |
| Hook does not stop at extreme of up travel. | Limit Switch(es) are not opening circuit.   | Check operation and setting of both gear type and weight operated limit switch(es).   |
| Hook up motion stops after heavy use.       | Thermal detectors sense overheated motor.   | Avoid concentrating many lifts in short time period. Avoid excessive jogging of hook.   |

## TROUBLESHOOTING (Cont)

| PROBLEM  | DIAGNOSIS   | POTENTIAL SOLUTION   |
|--|---|--|
| Motor overheats.                               | <p>Excessive load.</p> <p>Excessive duty cycle.</p> <p>Incorrect voltage or frequency.</p> <p>Three-phase power supply phase failure or unbalanced current.</p> <p>Wrong voltage.</p> <p>Brake does not release completely.</p> | <p>Check weight of load. Do not exceed hoist capacity.</p> <p>Avoid concentrating many lifts in short time period and excessive jogging.</p> <p>Check for correct power supply. Voltage should be within <math>\pm 10\%</math> of nameplate rating.</p> <p>Check motor windings for open or short circuits. Check supply lines for balanced voltages.</p> <p>Check current rating on motor dataplate against power supply. Check motor connections.</p> <p>Check brake adjustment. Check brake control circuit and brake coil.</p> |
| Hoist lifts lighter loads but not heavy loads. | <p>Hoist overloaded.</p> <p>Overload device set too low if so equipped.</p>   | <p>Reduce load.</p> <p>The device is adjusted at the factory for the design load capacity of the hoist and should not require field adjustment.</p> <p style="text-align: center;">           ++++++<br/>           + CAUTION +<br/>           ++++++         </p> <p>Never set overload device above rated load.</p> <p>Consult factory if adjustment is required.</p>  |
| Bottom block fails to stop quickly.            | Magnetic brake slips.   | Check hoist brake adjustments, Section 6. Check brake linings. Clean or repair as necessary, Section 6.  |
| Load lowers when hoist not being operated.     | The brakes are inoperative.   | Refer to Hoist Brake Components and Adjustment Instructions, Section 6.  |
| Hoist operates intermittently.                 | <p>Collectors making poor contact.</p> <p>Defective pushbutton.</p>   | <p>Check collectors for free movement of spring loaded arm, weak spring, connections, and free movement of shoe or roller.</p> <p>Check pushbutton inserts.</p>  |
| Excessive wire rope wear.                      | <p>Lack of lubrication.</p> <p>Sheaves damaged or worn.</p> <p>Hoist being used for side pulling.</p>   | <p>Lubricate wire rope. See lubrication schedule, Section 5 and lubrication of wire rope, page 4-3.</p> <p>Check sheaves for narrowing or scored rope grooves and cracked or damaged flanges or sharp edges.</p> <p>Hoist should be centered over the load before starting lift so that wire rope wraps smoothly on drum.</p>  |

### TROUBLESHOOTING (Cont)

| PROBLEM                          | DIAGNOSIS   | POTENTIAL SOLUTION   |
|----------------------------------|---|--|
| Magnetic brake does not release. | Low voltage.  | Check voltage.   |
|                                  | Rectifier   | Replace rectifier.   |
|                                  | Magnetic coil is open or shorted. Open brake circuit.                 | Check connection. Check magnetic coil for open or short circuit.         |
| Oil leaks.                       | Vent plug clogged.  | Check to be sure vent plug is open.                                      |
|                                  | Oil seals worn or damaged. Gasket leaking between gearcase and cover. | Replace oil seals. Tighten any loose bolts. Replace gasket if necessary. |

### LUBRICATION SCHEDULE

| LOCATION  | No. of fittings | INTERVAL  | TYPE OF LUBRICANT  |
|---|-----------------|---|--|
| Bottom Block Trunnion   | 2               | Monthly to quarterly  | Mobilux EP No. 1 or Equal  |
| Trolley wheel bearing- 2 bearings                                 | 8               | Monthly to quarterly  | Mobilux EP No. 1 or Equal  |
| Drum bearings at each end of drum                                 | 2               | Monthly to quarterly  | Mobilux EP No. 1 or Equal  |
| Opening Gearing<br>Upper/Lower<br>Gear Type Limit<br>Switch Gears |                 | Monthly to quarterly  | Dubois Outside Gear Lube or Equal  |
| Hook Thrust Bearing   | 1               | Monthly to quarterly  | Mobilux EP No. 1 or Equal  |
| Drive Spline on Drum  | 1               | Monthly to quarterly  | Mobilux EP No. 1 or Equal  |
| Wire Rope   |                 | Monthly to quarterly  | 600 Weight Grease  |
| Hoist Gearcase oil capacity 24 quarts (23 liters)                 |                 | Check oil level monthly to quarterly. Drain and refill semi-annually to annually. | Mobil DTE-AA or equivalent. Low or no sulphur mineral oil, ISO viscosity, Grade 320. For extended life for very heavy duty, Mobil HSC 632 synthetic oil, ISO viscosity, grade 320. |

Rope sheave bearings are lifetime lubricated and normally do not need further attention. If disassembled, however, a light coat of grease on shaft and housing is recommended to prevent bearings freezing in place.

## SECTION 6

### SPARE PARTS IDENTIFICATION/ADJUSTMENT AND REPLACEMENT INSTRUCTIONS

#### General

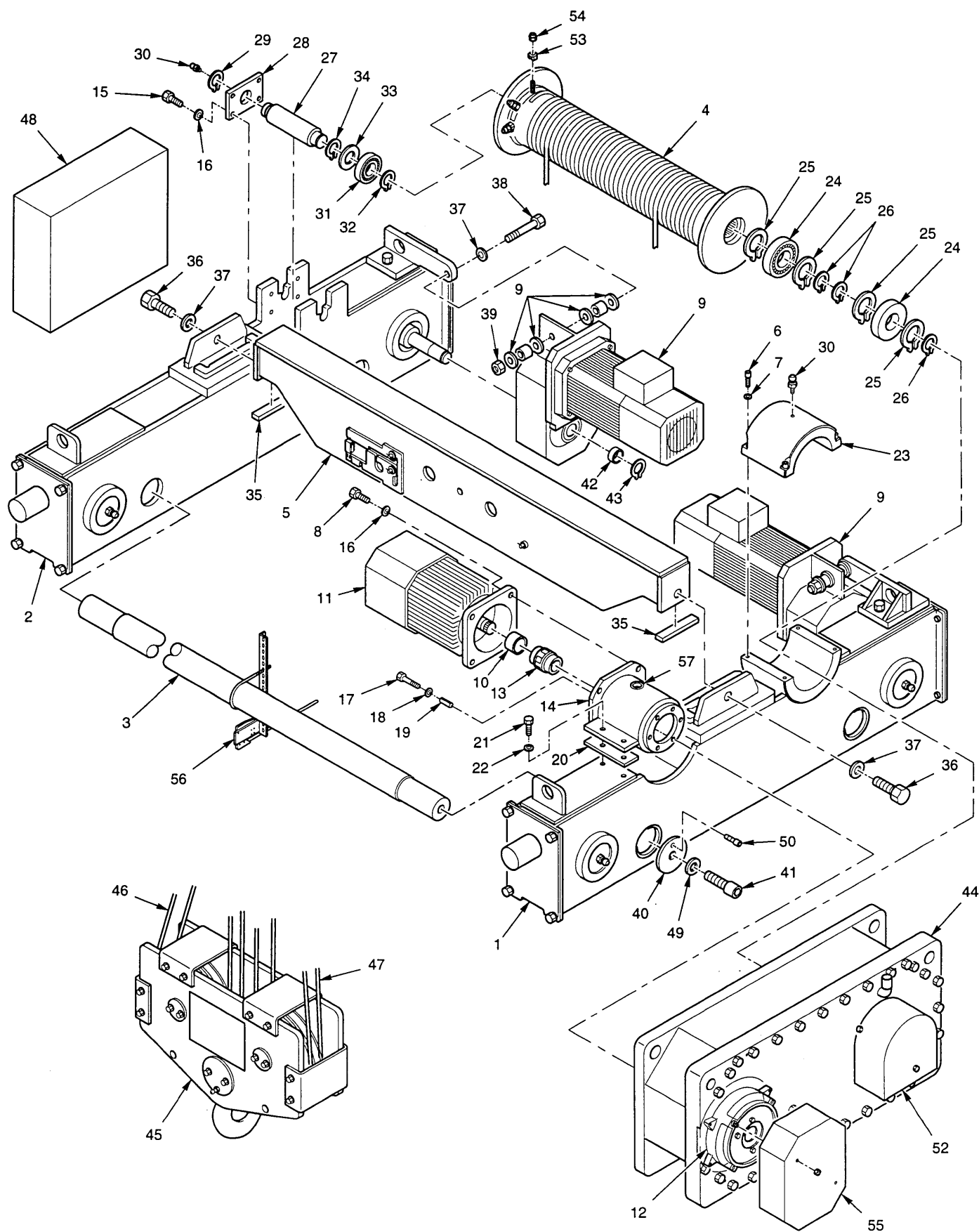
The pages in this section all refer to the specific R&M Materials Handling, Inc. hoist whose serial number is on a metal nameplate affixed to the trolley mounting tube or hoist frame.

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

|                  |
|------------------|
| <b>IMPORTANT</b> |
|------------------|

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

| Index of Exploded View Parts Illustration and Adjustments Instructions     | Number  | Page No. |
|--|---------|----------|
| Hoist Frame and Components . . . . .                                       | FR-G-1  | 6-2      |
| Hoist Gearcase Assembly . . . . .  | FR-G-2  | 6-4      |
| Hoist Motor Assembly . . . . .   | FR-G-3  | 6-5      |
| Load Bar Assembly-2 Part Double . . . . .                                  | FR-G-4  | 6-6      |
| Load Bar Assembly-4 Part Double . . . . .                                  | FR-G-5  | 6-7      |
| Load Bar Assembly-6 Part Double . . . . .                                  | FR-G-6  | 6-8      |
| Weight Type Upper Limit Assembly . . . . .                                 | FR-G-7  | 6-9      |
| Overload Limit Switch Assembly and Adjustment Instructions . . . . .       | FR-G-8  | 6-10     |
| Adjustable Gear Type Limit Switch . . . . .                                | FR-G-9  | 6-12     |
| 2 Part Double Bottom Block Assembly . . . . .                              | FR-G-10 | 6-14     |
| 4 Part Double Bottom Block Assembly . . . . .                              | FR-G-11 | 6-15     |
| 6 Part Double Bottom Block Assembly . . . . .                              | FR-G-12 | 6-16     |
| 2 Part Double Wire Rope Reeving Diagram . . . . .                          | FR-G-13 | 6-17     |
| 4 Part Double Wire Rope Reeving Diagram . . . . .                          | FR-G-14 | 6-18     |
| 6 Part Double Wire Rope Reeving Diagram . . . . .                          | FR-G-15 | 6-19     |
| Wire Rope Double Reeving Instructions . . . . .                            | FR-G-16 | 6-20     |
| Wire Rope Dead End Assembly . . . . .                                      | FR-G-17 | 6-23     |
| Hoist Brake Components and Adjustment Instructions . . . . .               | FR-G-18 | 6-25     |
| Hoist Brake Installation Instructions and Bolt Tightening Torques. . . . . | FR-G-19 | 6-27     |
| Trolley Wheel Assembly. . . . .  | FR-G-20 | 6-30     |



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

# HOIST FRAME AND COMPONENTS

## SPARE PARTS IDENTIFICATION FR-G-1 PAGE 2

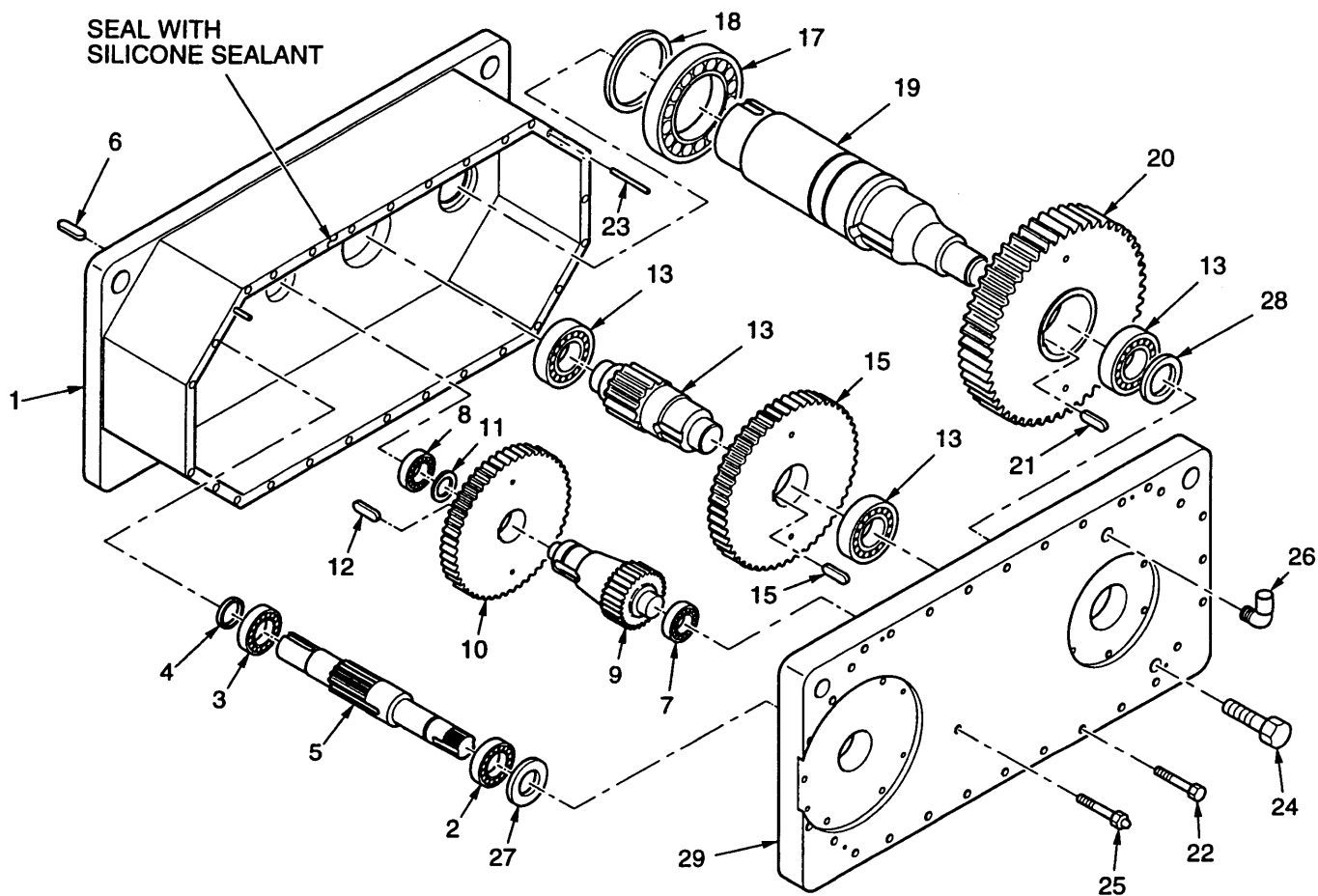
| DWG. ITEM | REFERENCE NUMBER | PART DESCRIPTION         | QTY. | DWG. ITEM | REFERENCE NUMBER | PART DESCRIPTION            | QTY. |
|-----------|------------------|--------------------------|------|-----------|------------------|-----------------------------|------|
| 1         | FR-G-20          | END CARRIAGE             | 1    | 41        | G10116           | HEX HEAD CAP SCREW          | 8    |
| 2         | FR-G-20          | END CARRIAGE             | 1    | 42        | G10075           | SPACER                      | 2    |
| 3         | G10107           | DISTANCE BEAM            | 2    | 43        | G63021           | RETAINING RING, EXTERNAL    | 2    |
| 4         | G10016           | ROPE DRUM                | 1    | 44        | FR-G-2           | GEARCASE ASSY               | 1    |
| 5         | FR-G-4,5,6       | LOADBAR ASSEMBLY         | 1    | 45        | FR-G-10,11,12    | BOTTOM BLOCK ASSY           | 1    |
| 6         | G10104           | SOCKET HEAD CAP SCREW    | 4    | 46        | G10117           | WIRE ROPE, RIGHT LAY        | 1    |
| 7         | G90055           | FLAT WASHER              | 4    | 47        | G10118           | WIRE ROPE, LEFT LAY         | 1    |
| 8         | G10108           | SOCKET HEAD CAP SCREW    | 4    | 48        | G20000           | TERMINAL BOX/CONTROL BOX    | 1    |
| 9         | G80200           | GEAR MOTOR ASSY          | 2    | 49        | G90020           | LOCK WASHER                 | 4    |
| 10        | G80207           | SPACER                   | 1    | 50        | G90067           | SET SCREW                   | 4    |
| 11        | FR-G-3           | MOTOR & BRAKE            | 1    | 51        | G90059           | FLAT WASHER                 | 8    |
| 12        | FR-G-18          | BRAKE (GEARCASE)         | 1    | 52        | FR-G-9           | ADJUSTABLE GEAR TYPE SWITCH | 1    |
| 13        | G50001           | MOTOR COUPLING           | 1    | 53        | G10017           | ROPE CLAMP                  | 10   |
| 14        | G50005           | COUPLING HOUSING         | 1    | 54        | G90068           | SELF-LOCKING HEX NUT        | 10   |
| 15        | G10057           | HEX HEAD CAP SCREW       | 4    | 55        | G40020           | BRAKE COVER                 | 1    |
| 16        | G90079           | LOCK WASHER              | 4    | 56        | FR-G-7           | WEIGHT TYPE UPPER LIMIT     | 1    |
| 17        | G10109           | SOCKET HEAD CAP SCREW    | 6    | 57        | G90066           | PLASTIC CAP                 | 1    |
| 18        | G90063           | HARDENED WASHER          | 6    |           |                  |                             |      |
| 19        | G90064           | SPRING PIN               | 6    |           |                  |                             |      |
| 20        | G10110           | RUBBER PLATE             | 1    |           |                  |                             |      |
| 21        | G10062           | HEX HEAD CAP SCREW       | 2    |           |                  |                             |      |
| 22        | G90045           | LOCK WASHER              | 2    |           |                  |                             |      |
| 23        | G10111           | BEARING COVER            | 1    |           |                  |                             |      |
| 24        | G60012           | BEARING                  | 2    |           |                  |                             |      |
| 25        | G63015           | RETAINING RING, INTERNAL | 4    |           |                  |                             |      |
| 26        | G63016           | RETAINING RING, EXTERNAL | 3    |           |                  |                             |      |
| 27        | G10112           | DRUM SHAFT               | 1    |           |                  |                             |      |
| 28        | G10113           | SUPPORT PLATE            | 1    |           |                  |                             |      |
| 29        | G63017           | RETAINING RING, EXTERNAL | 1    |           |                  |                             |      |
| 30        | G90065           | STRAIGHT NIPPLE          | 2    |           |                  |                             |      |
| 31        | G63004           | BEARING                  | 1    |           |                  |                             |      |
| 32        | G63018           | RETAINING RING, EXTERNAL | 1    |           |                  |                             |      |
| 33        | G63019           | NILOS RING               | 1    |           |                  |                             |      |
| 34        | G63020           | RETAINING RING, INTERNAL | 1    |           |                  |                             |      |
| 35        | G10114           | PLATE, NON-METALIC       | 2    |           |                  |                             |      |
| 36        | G10103           | HEX HEAD CAP SCREW       | 2    |           |                  |                             |      |
| 37        | G90026           | LOCK WASHER              | 2    |           |                  |                             |      |
| 38        | G10077           | HEX HEAD CAP SCREW       | 2    |           |                  |                             |      |
| 39        | G90067           | NUT, LOCKING             | 2    |           |                  |                             |      |
| 40        | G10115           | PLATE                    | 4    |           |                  |                             |      |

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



**SPARE PARTS IDENTIFICATION  
FR-G-2**

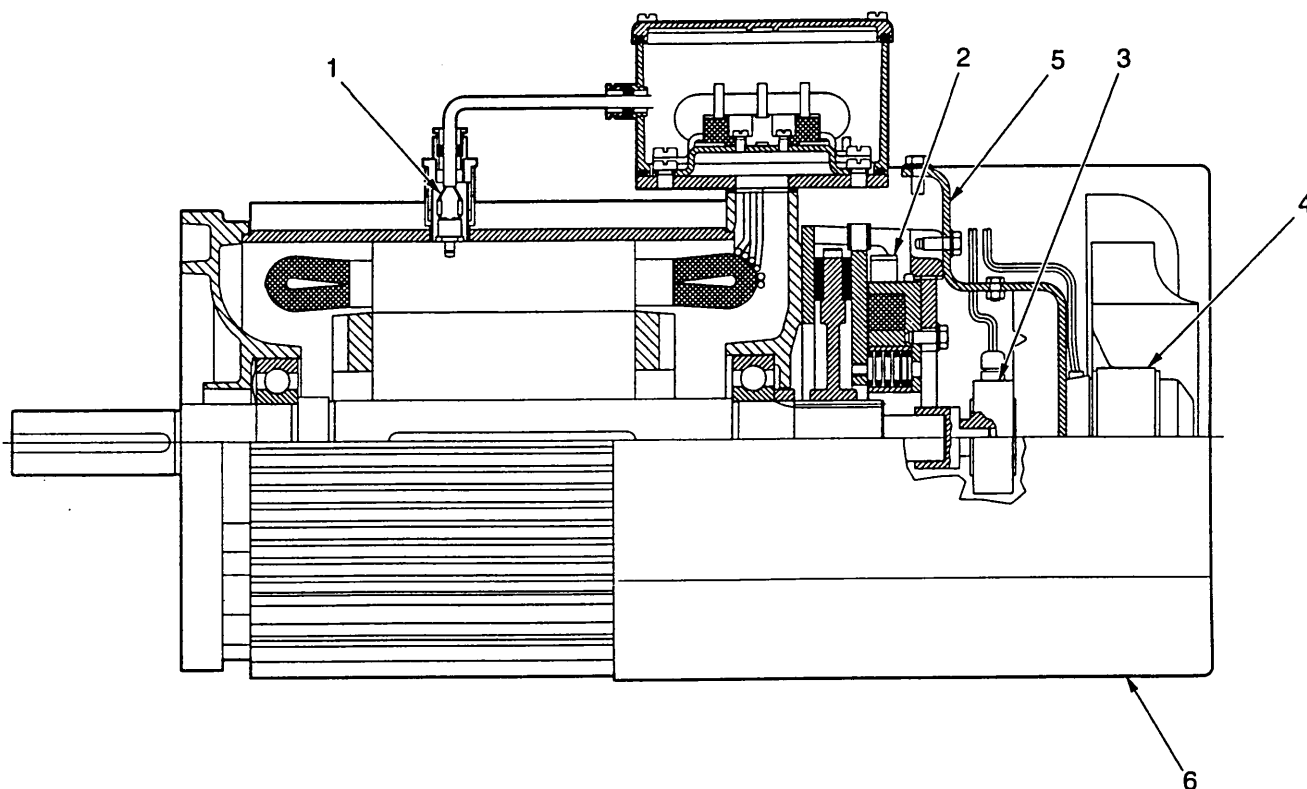
**HOIST GEARCASE ASSEMBLY**



| DWG. ITEM | REFERENCE NUMBER | PART DESCRIPTION      | QTY. | DWG. ITEM | REFERENCE NUMBER | PART DESCRIPTION                 | QTY. |
|-----------|------------------|-----------------------|------|-----------|------------------|----------------------------------|------|
| 1         | G30001           | GEAR CASE             | 1    | 25        | G90050           | OIL LEVEL INDICATOR, SIGHT GLASS | 1    |
| 2         | G63009           | BEARING               | 1    | 26        | G90023           | BREATHER                         | 1    |
| 3         | G63010           | BEARING               | 1    | 27        | G70004           | SEAL                             | 1    |
| 4         | G70001           | SEAL                  | 1    | 28        | G70005           | SEAL                             | 1    |
| 5         | G30004           | PRIMARY SHAFT         | 1    | 29        | G30002           | COVER, GEARCASE                  | 1    |
| 6         | G30055           | KEY                   | 1    |           | G30400           | GEARCASE ASSY                    |      |
| 7         | G63005           | BEARING               | 1    |           |                  |                                  |      |
| 8         | G63006           | BEARING               | 1    |           |                  |                                  |      |
| 9         | G30043           | INTERMEDIATE SHAFT    | 1    |           |                  |                                  |      |
| 10        | G30042           | INTERMEDIATE GEAR     | 1    |           |                  |                                  |      |
| 11        | G30044           | RETAINING RING        | 1    |           |                  |                                  |      |
| 12        | G30045           | KEY                   | 1    |           |                  |                                  |      |
| 13        | G63011           | BEARING               | 3    |           |                  |                                  |      |
| 14        | G30056           | INTERMEDIATE SHAFT    | 1    |           |                  |                                  |      |
| 15        | G30057           | INTERMEDIATE GEAR     | 1    |           |                  |                                  |      |
| 16        | G30058           | KEY                   | 3    |           |                  |                                  |      |
| 17        | G63012           | BEARING               | 1    |           |                  |                                  |      |
| 18        | G70003           | SEAL                  | 1    |           |                  |                                  |      |
| 19        | G30033           | DRUM SHAFT            | 1    |           |                  |                                  |      |
| 20        | G30032           | DRUM GEAR             | 1    |           |                  |                                  |      |
| 21        | G30034           | KEY                   | 1    |           |                  |                                  |      |
| 22        | G90053           | SOCKET HEAD CAP SCREW | 26   |           |                  |                                  |      |
| 23        | G90044           | DOWEL PIN             | 4    |           |                  |                                  |      |
| 24        | G90022           | DRAIN PLUG            | 1    |           |                  |                                  |      |

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

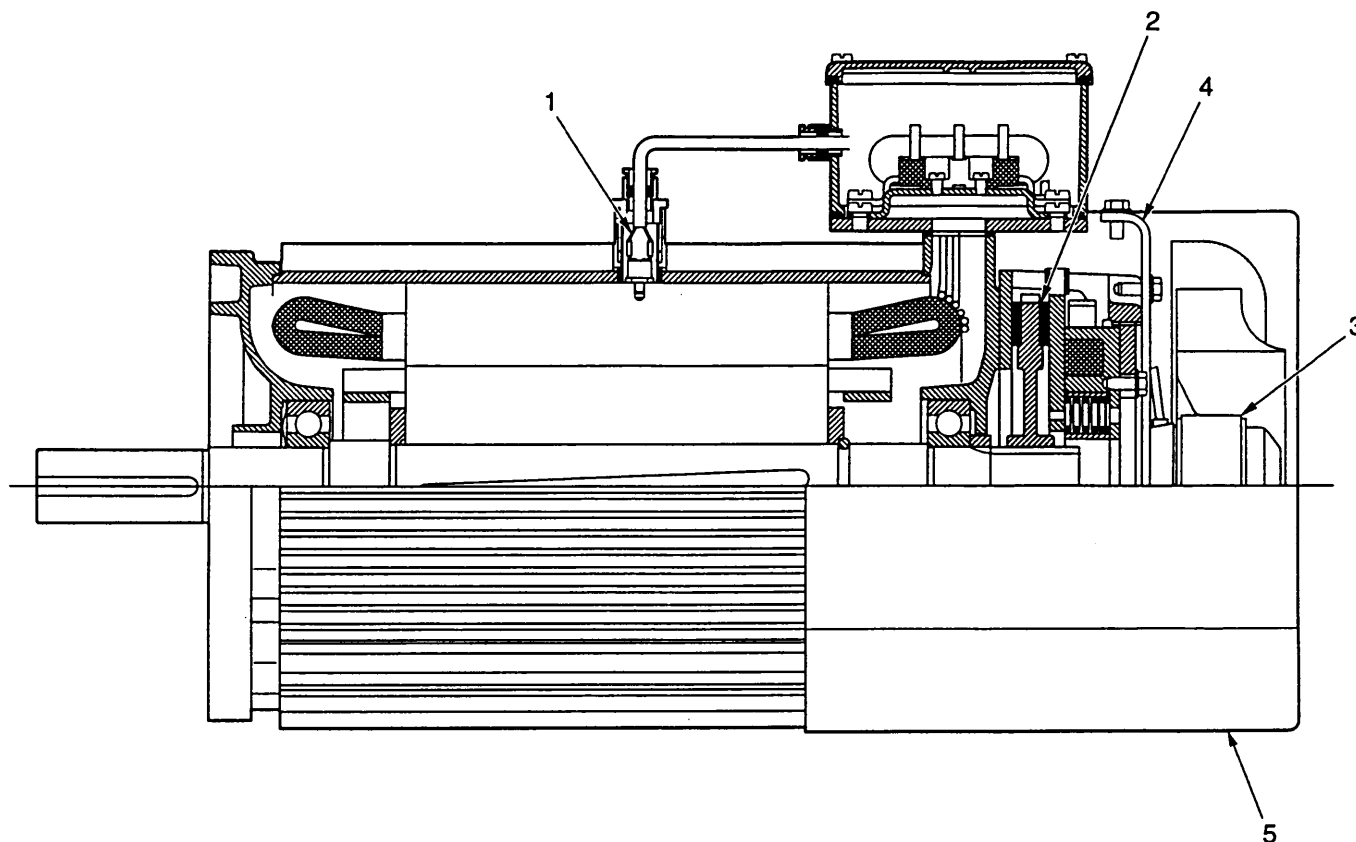
## HOIST MOTOR ASSEMBLY

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

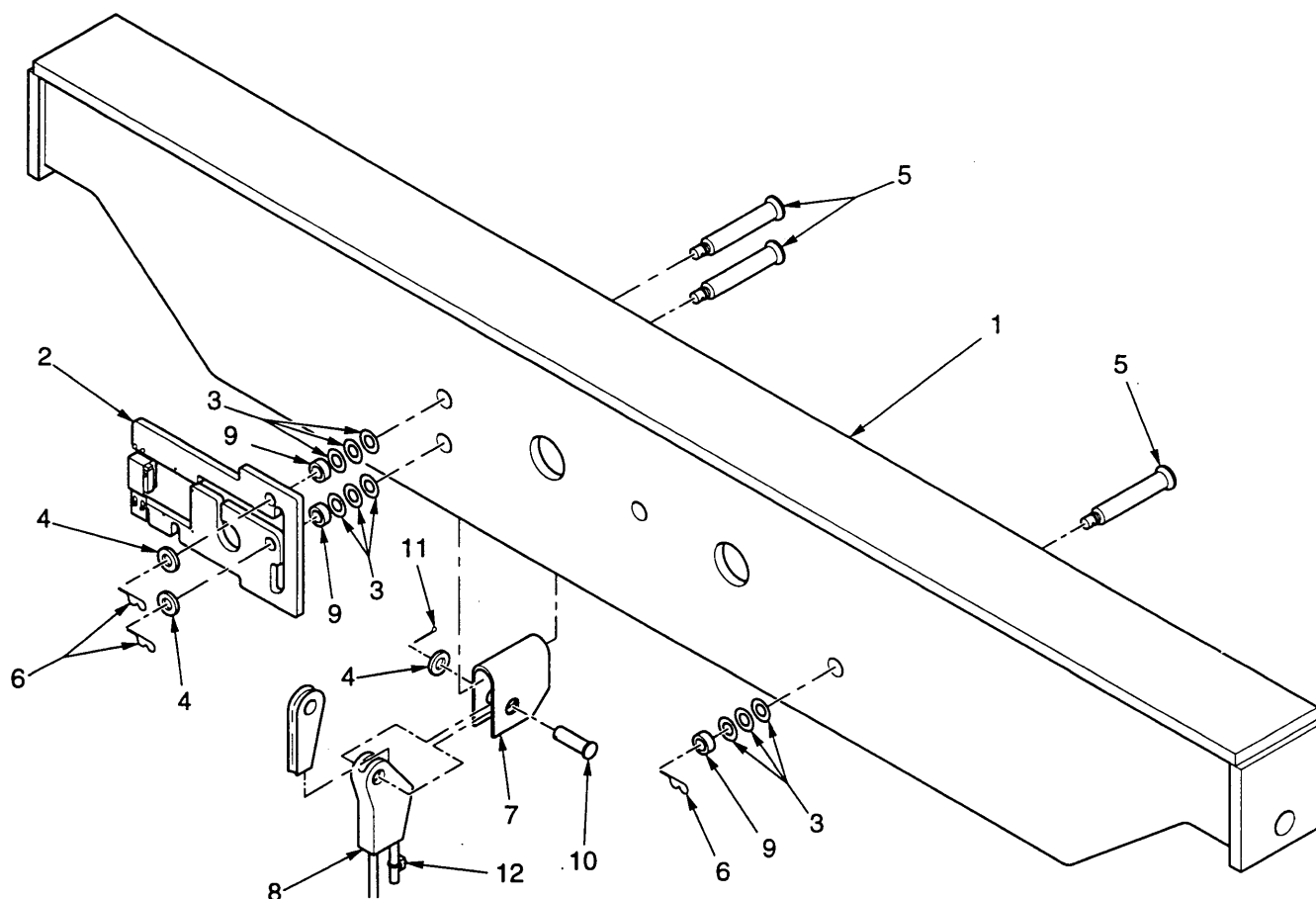
## HOIST MOTOR ASSEMBLY

**SPARE PARTS IDENTIFICATION**  
**FR-G-3 PAGE 2**

[illegible]

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

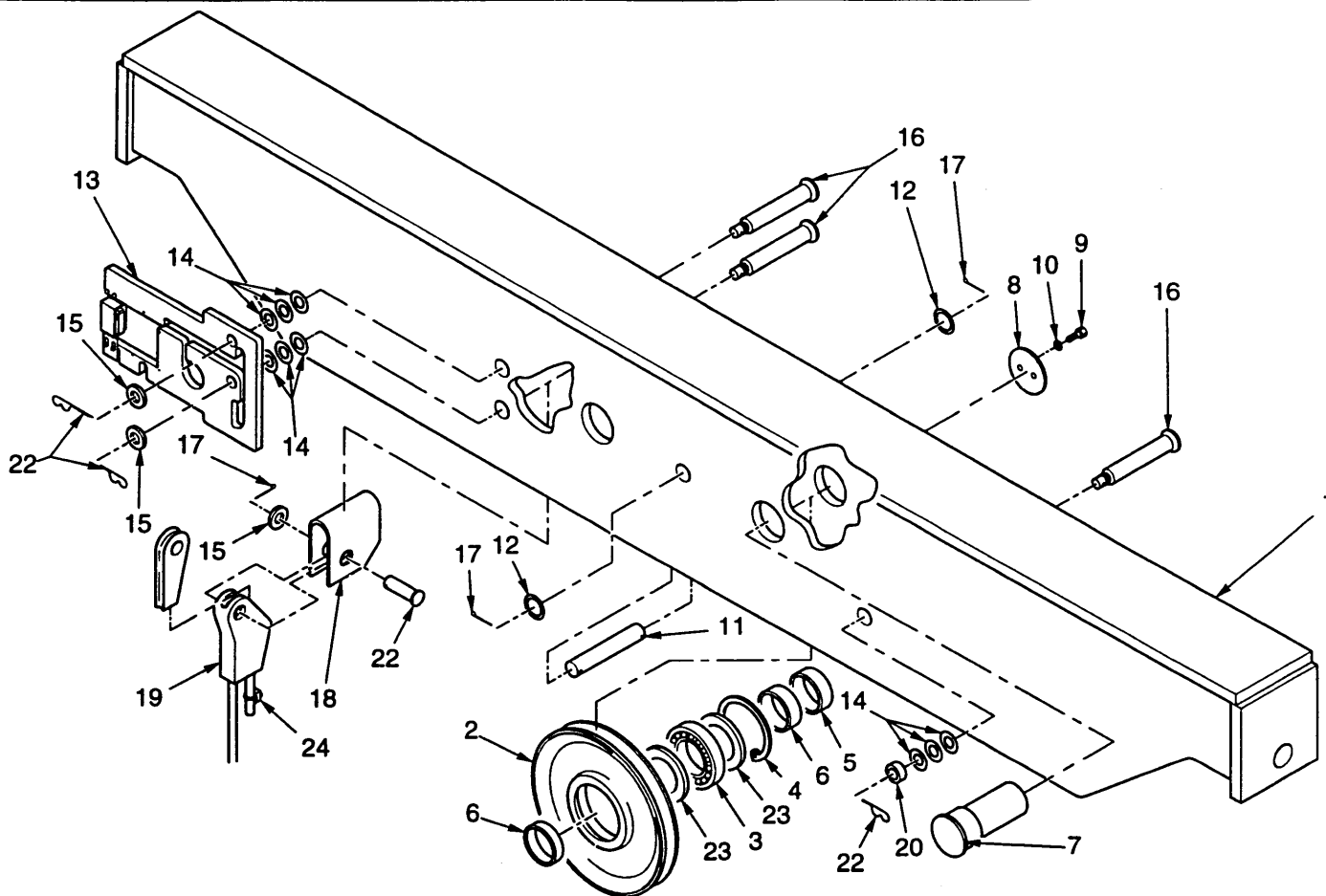
## LOAD BAR ASSEMBLY - 2 PART DOUBLE

[illegible]

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

# LOAD BAR ASSEMBLY - 4 PART DOUBLE

## SPARE PARTS IDENTIFICATION FR-G-5

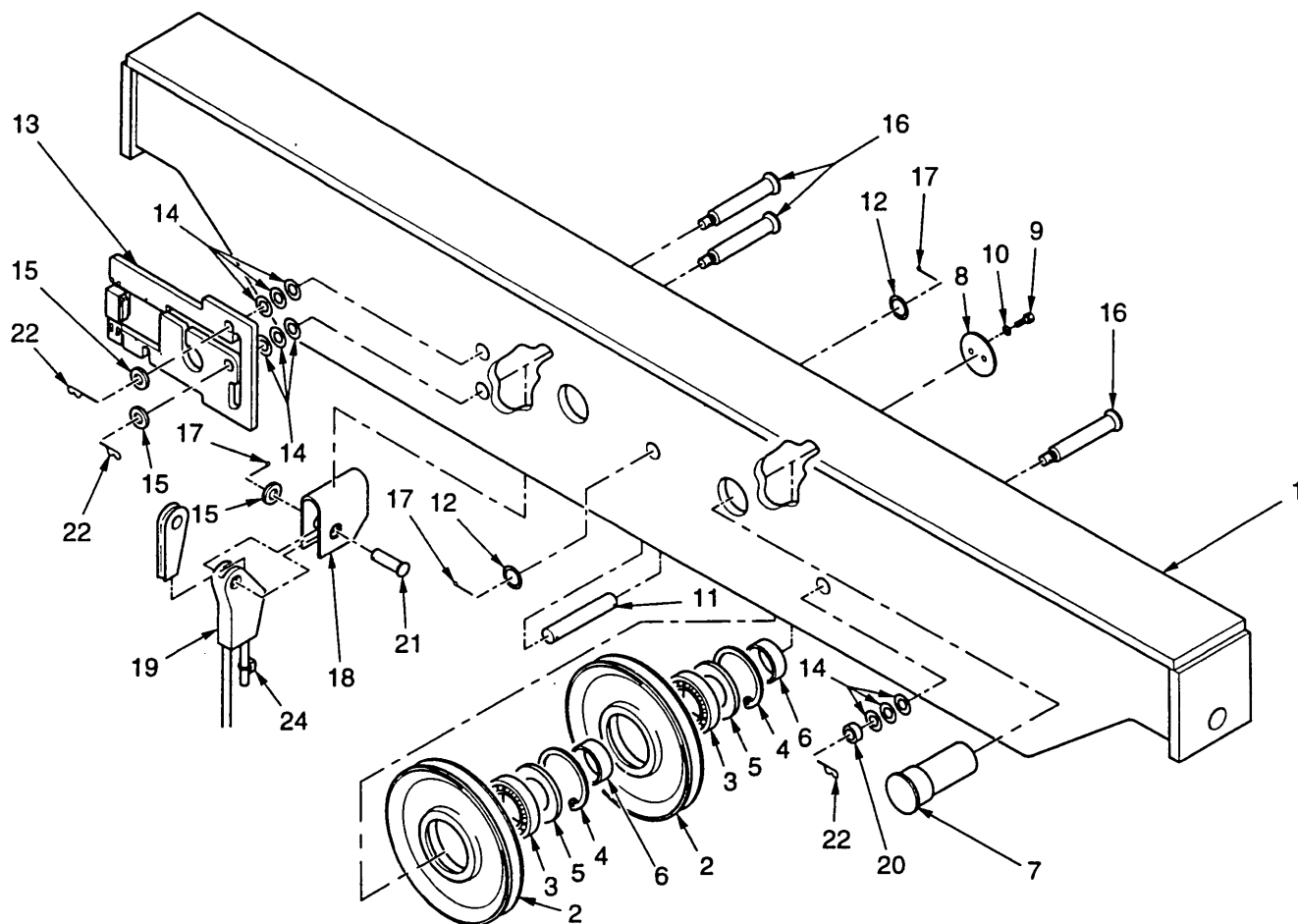


| DWG. ITEM | REFERENCE NUMBER | PART DESCRIPTION         | QTY. | DWG. ITEM | REFERENCE NUMBER | PART DESCRIPTION | QTY. |
|-----------|------------------|--------------------------|------|-----------|------------------|------------------|------|
| 1         | G10051           | LOADBAR FRAME            | 1    |           |                  |                  |      |
| 2         | G10072           | ROPE SHEAVE              | 2    |           |                  |                  |      |
| 3         | G10073           | BEARING                  | 2    |           |                  |                  |      |
| 4         | G10121           | RETAINING RING, INTERNAL | 2    |           |                  |                  |      |
| 5         | G10098           | SPACER                   | 2    |           |                  |                  |      |
| 6         | G10105           | SPACER                   | 4    |           |                  |                  |      |
| 7         | G10122           | SHEAVE PIN               | 2    |           |                  |                  |      |
| 8         | G10076           | RETAINER, SHEAVE PIN     | 2    |           |                  |                  |      |
| 9         | G90054           | HEX HEAD CAP SCREW       | 4    |           |                  |                  |      |
| 10        | G90073           | LOCK WASHER              | 4    |           |                  |                  |      |
| 11        | G10124           | PIN                      | 1    |           |                  |                  |      |
| 12        | G10123           | SHIM WASHER              | 2    |           |                  |                  |      |
| 13        | FR-G-8           | OVERLOAD DEVICE          | 1    |           |                  |                  |      |
| 14        | G90069           | SHIM WASHER              | 9    |           |                  |                  |      |
| 15        | G90056           | FLAT WASHER              | 3    |           |                  |                  |      |
| 16        | G90070           | AXLE                     | 3    |           |                  |                  |      |
| 17        | G90071           | COTTER PIN               | 4    |           |                  |                  |      |
| 18        | G10119           | SUPPORT TUBE             | 2    |           |                  |                  |      |
| 19        | G10120           | ROPE ANCHOR              | 2    |           |                  |                  |      |
| 20        | G10097           | SPACER                   | 3    |           |                  |                  |      |
| 21        | G10023           | PIN, CLEVIS              | 2    |           |                  |                  |      |
| 22        | G90072           | HAIR PIN                 | 3    |           |                  |                  |      |
| 23        | G10125           | NILOS RING               | 4    |           |                  |                  |      |
| 24        | G10021           | ROPE CLIP                | 2    |           |                  |                  |      |

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

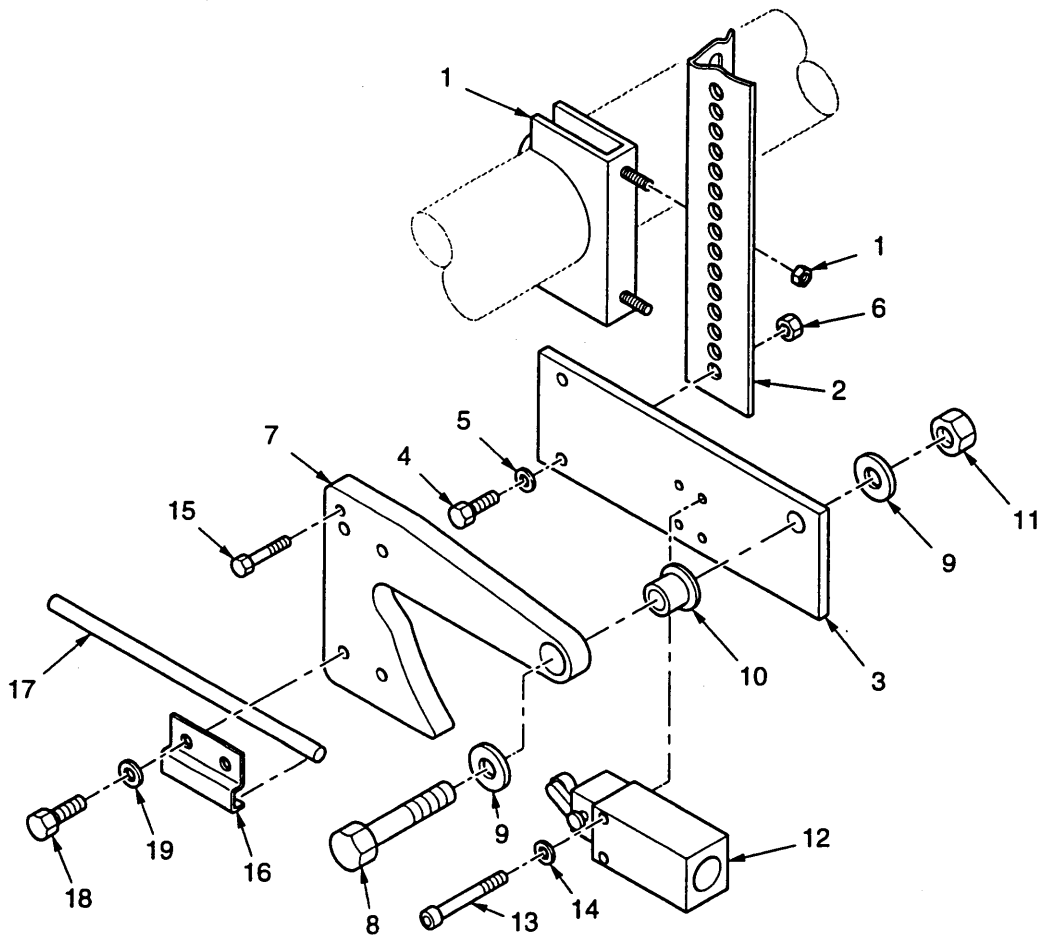
**SPARE PARTS IDENTIFICATION  
FR-G-6**

**LOAD BAR ASSEMBLY - 6 PART DOUBLE**



| DWG. ITEM | REFERENCE NUMBER | PART DESCRIPTION         | QTY. | DWG. ITEM | REFERENCE NUMBER | PART DESCRIPTION | QTY. |
|-----------|------------------|--------------------------|------|-----------|------------------|------------------|------|
| 1         | G10051           | LOADBAR FRAME            | 1    |           |                  |                  |      |
| 2         | G10072           | ROPE SHEAVE              | 4    |           |                  |                  |      |
| 3         | G10073           | BEARING                  | 4    |           |                  |                  |      |
| 4         | G10121           | RETAINING RING, INTERNAL | 4    |           |                  |                  |      |
| 5         | G10125           | NILOS RING               | 8    |           |                  |                  |      |
| 6         | G10105           | SPACER                   | 4    |           |                  |                  |      |
| 7         | G10122           | SHEAVE PIN               | 2    |           |                  |                  |      |
| 8         | G10076           | RETAINER, SHEAVE PIN     | 2    |           |                  |                  |      |
| 9         | G90054           | HEX HEAD CAP SCREW       | 4    |           |                  |                  |      |
| 10        | G90073           | LOCK WASHER              | 4    |           |                  |                  |      |
| 11        | G10124           | PIN                      | 1    |           |                  |                  |      |
| 12        | G10123           | SHIM WASHER              | 2    |           |                  |                  |      |
| 13        | FR-G-8           | OVERLOAD DEVICE          | 1    |           |                  |                  |      |
| 14        | G90069           | SHIM WASHER              | 9    |           |                  |                  |      |
| 15        | G90056           | FLAT WASHER              | 3    |           |                  |                  |      |
| 16        | G90070           | AXLE                     | 3    |           |                  |                  |      |
| 17        | G90071           | COTTER PIN               | 6    |           |                  |                  |      |
| 18        | G10119           | SUPPORT TUBE             | 2    |           |                  |                  |      |
| 19        | G10120           | ROPE ANCHOR              | 2    |           |                  |                  |      |
| 20        | G10097           | DISTANCE RING            | 1    |           |                  |                  |      |
| 21        | G10023           | PIN, CLEVIS              | 2    |           |                  |                  |      |
| 22        | G90072           | HAIR PIN                 | 3    |           |                  |                  |      |
| 23        | G10021           | ROPE CLIP                | 2    |           |                  |                  |      |

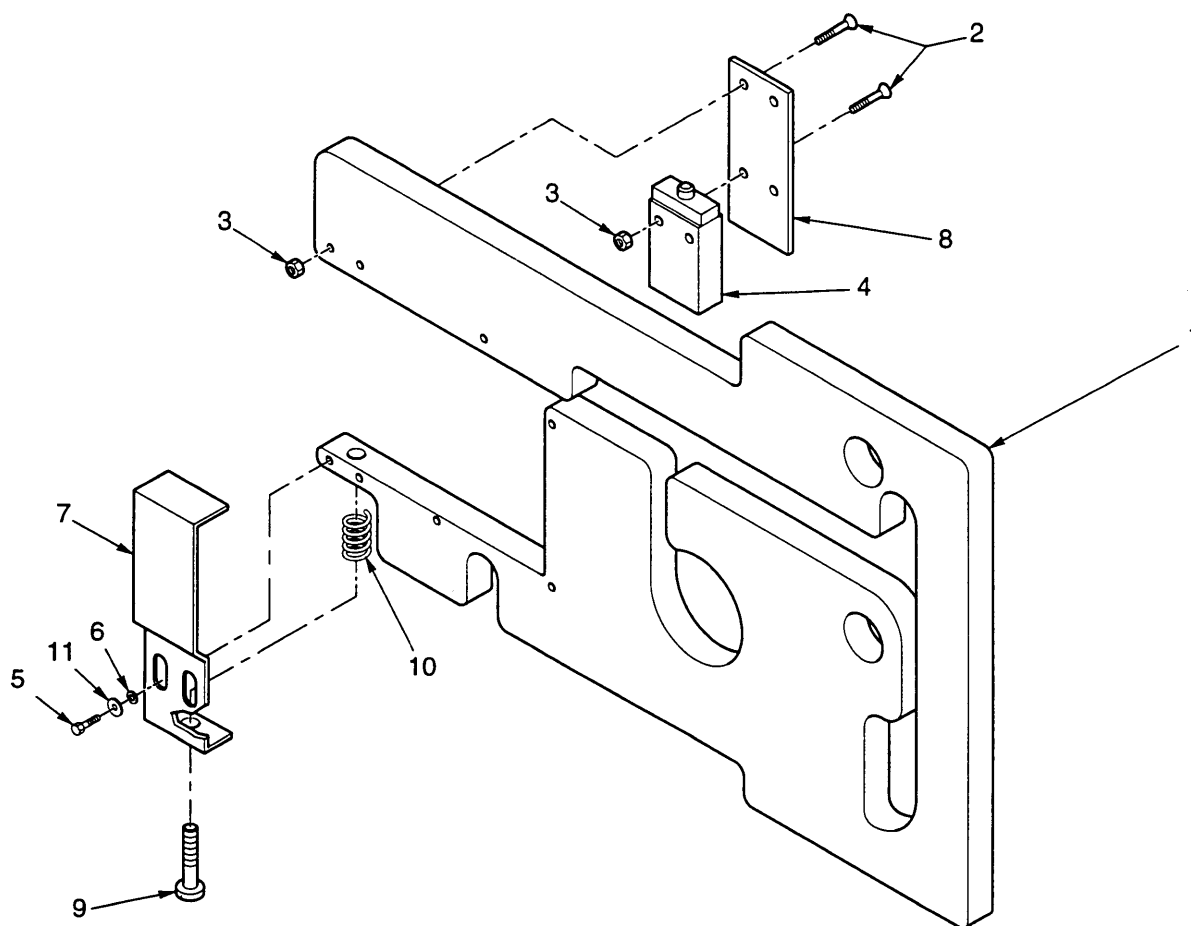
HOIST SERIAL NUMBER AND PART REFERENCE NUMBER MUST BE PROVIDED WHEN ORDERING REPLACEMENT PARTS.

**WEIGHT TYPE UPPER LIMIT**
**SPARE PARTS IDENTIFICATION  
FR-G-7**


| DWG. ITEM | REFERENCE NUMBER | PART DESCRIPTION      | QTY. | DWG. ITEM | REFERENCE NUMBER | PART DESCRIPTION | QTY. |
|-----------|------------------|-----------------------|------|-----------|------------------|------------------|------|
| 1         | G10226           | U-BOLT ASSEMBLY       | 1    |           |                  |                  |      |
| 2         | G10229           | BRACKET, MOUNTING     | 1    |           |                  |                  |      |
| 3         | G10230           | PLATE                 | 1    |           |                  |                  |      |
| 4         | G10218           | HEX HEAD CAP SCREW    | 2    |           |                  |                  |      |
| 5         | G10231           | FLAT WASHER           | 2    |           |                  |                  |      |
| 6         | G10232           | HEX NUT               | 2    |           |                  |                  |      |
| 7         | G10233           | BRACKET, PIVOT        | 1    |           |                  |                  |      |
| 8         | G10234           | HEX HEAD CAP SCREW    | 1    |           |                  |                  |      |
| 9         | G10235           | FLAT WASHER           | 2    |           |                  |                  |      |
| 10        | G10236           | PIVOT                 | 1    |           |                  |                  |      |
| 11        | G10237           | LOCKNUT               | 1    |           |                  |                  |      |
| 12        | G10214           | SWITCH                | 1    |           |                  |                  |      |
| 13        | G10225           | SOCKET HEAD CAP SCREW | 2    |           |                  |                  |      |
| 14        | G10238           | FLAT WASHER           | 2    |           |                  |                  |      |
| 15        | G10239           | HEX HEAD CAP SCREW    | 1    |           |                  |                  |      |
| 16        | G10240           | BRACKET               | 1    |           |                  |                  |      |
| 17        | G10241           | ROD                   | 1    |           |                  |                  |      |
| 18        | G10242           | HEX HEAD CAP SCREW    | 2    |           |                  |                  |      |
| 19        | G10243           | FLAT WASHER           | 2    |           |                  |                  |      |
|           | G10200           | COMPLETE UPPER LIMIT  |      |           |                  |                  |      |
|           |                  |                       |      |           |                  |                  |      |
|           |                  |                       |      |           |                  |                  |      |
|           |                  |                       |      |           |                  |                  |      |
|           |                  |                       |      |           |                  |                  |      |

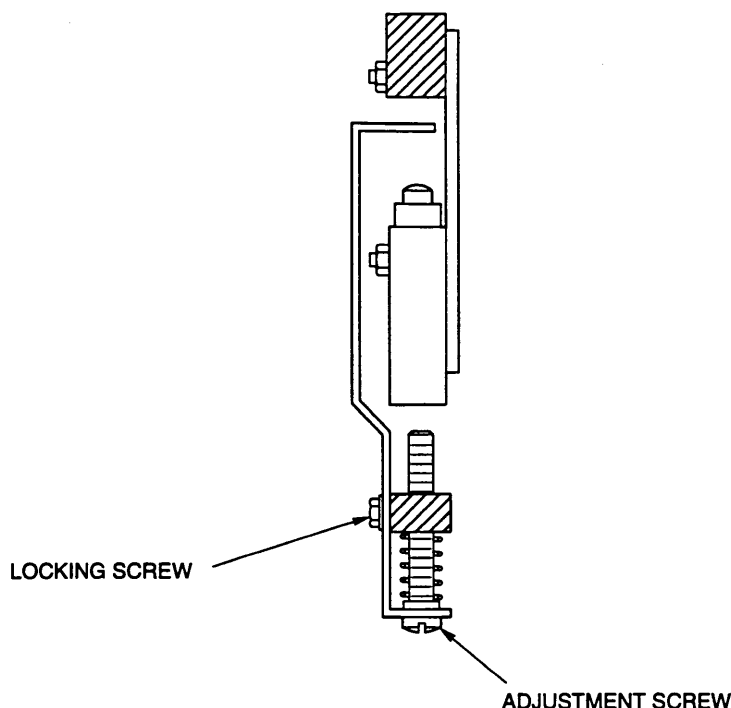
HOIST SERIAL NUMBER AND PART REFERENCE NUMBER MUST BE PROVIDED WHEN ORDERING REPLACEMENT PARTS.

## OVERLOAD LIMIT SWITCH ASSEMBLY

[illegible]

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





An overload limit switch is provided to help prevent the hoist from raising a freely suspended load which would cause permanent deformation of a properly maintained hoist and trolley. The overload switch is pre-set at the factory. If adjustment is necessary, follow the instructions below.

#### NOTE

The hoist contains a thermal overload device which, if tripped, will also prevent the hoist from raising the load. Verify that the motor is not overheated before attempting to adjust the overload switch.

#### ADJUST LIMIT AS FOLLOWS:

- a. DISCONNECT HOIST FROM POWER SUPPLY.
- b. Loosen both locking screws.
- c. Turn adjustment screw to adjust the limit switch setting.  
Counter-clockwise rotation decreases the load which can be raised.  
Clockwise rotation increases the load which can be raised.
- d. Connect hoist to power supply.
- e. Operate hoist with a test load of 100% to verify that the load can be raised. If the load cannot be raised, repeat steps a thru e.
- f. Operate hoist with a test load of 125% to verify that the load cannot be raised. If the load is raised, lower the load and repeat steps a thru f.

#### WARNING

The overload switch adjustment should never be set such that the hoist will try to raise a load greater than 125% of rated capacity.

The overload switch is an emergency device and must not be used as part of normal operation of the hoist or as a load weighing device.

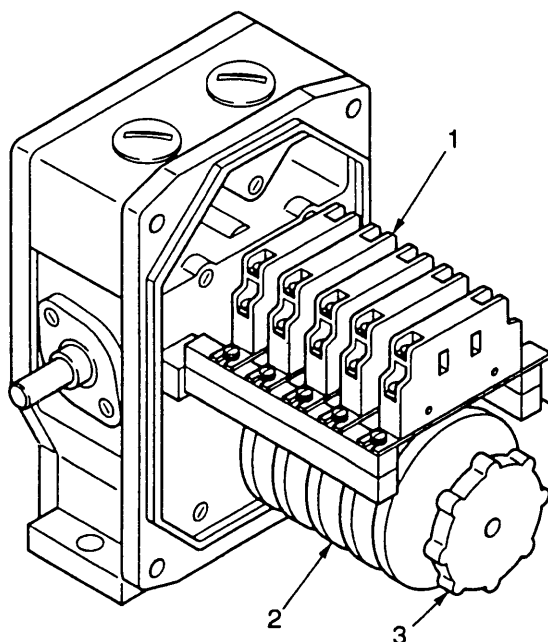
Adjustable upper and lower limit switches are provided to allow setting the hoist travel within a prescribed travel range. Care should be exercised when adjusting either lower or upper limit of travel.

++++++  
CAUTION  
++++++

If the wires running to the limit switches are disconnected for any purpose, refer to applicable wiring diagram for proper location of wires.

**Adjustment of the upper limit:**

1. Carefully raise the bottom block to a point where the top of the block is a minimum of two inches below the weight of the weight type limit switch (or to the limit desired in the particular application, allowing the minimum two inches).
2. DISCONNECT HOIST FROM POWER SUPPLY.
3. Remove covers to gain access to switch points (1) and can disc (2) on the limit switch.
4. Loosen slightly the clamping nut (3). This will allow every individual cam disc to be turned for adjustment.
5. Identify the cam disc for the upper limit and rotate cam disc until the cam follower is seated in the indent on the cam disc.
6. Tighten clamping nut and mount covers.



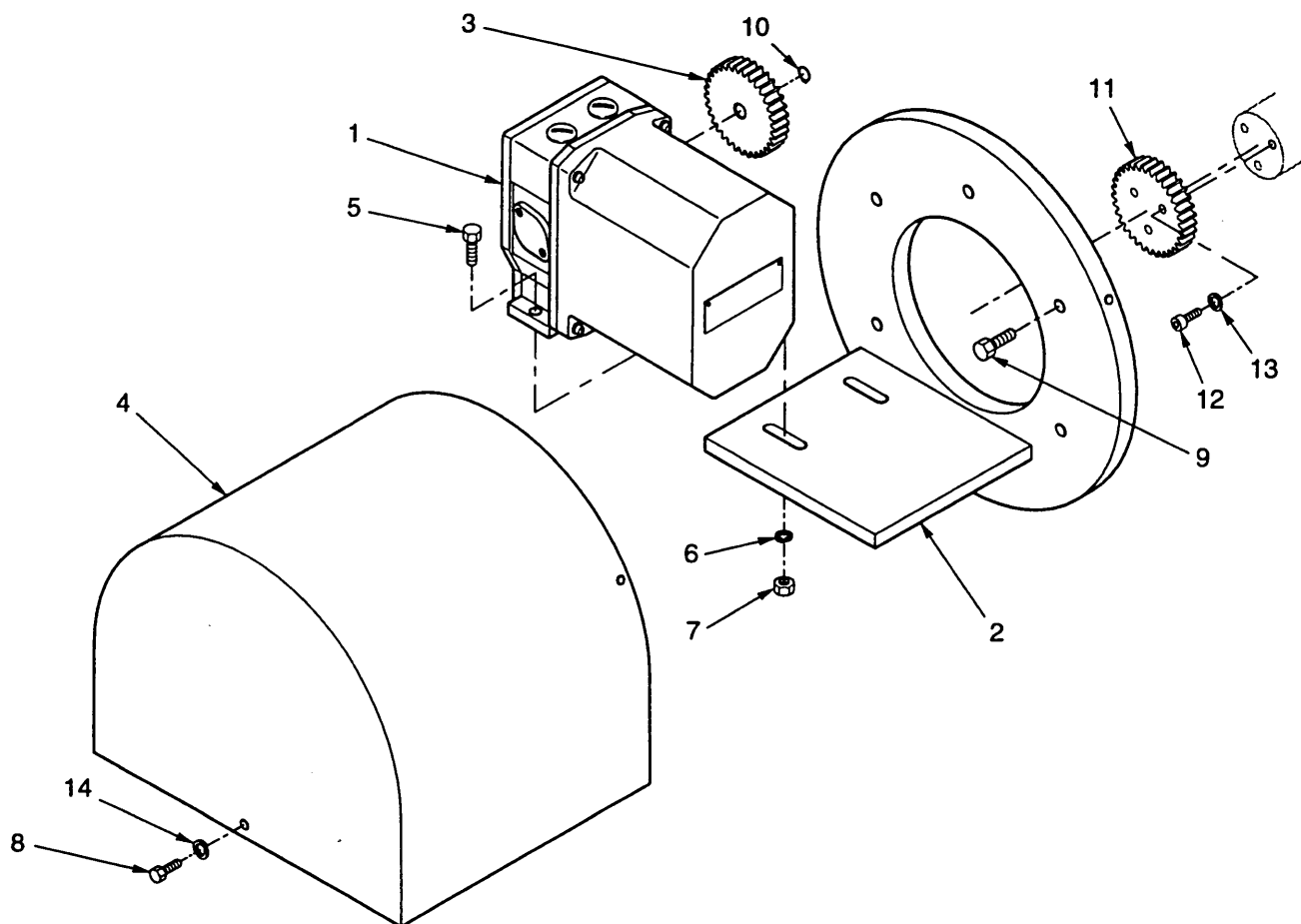
**Adjustment of the lower limit:**

1. Carefully lower the bottom block to a point where at least two full wraps of wire rope remain on each end of drum.
2. DISCONNECT HOIST FROM POWER SUPPLY.
3. Remove covers to gain access to switch points (1) and cam disc (2) on the limit switch.
4. Loosen slightly the clamping nut (3). This will allow every individual cam disc to be turned for adjustment.
5. Identify the cam disc for the lower limit and rotate cam disc until cam follower is seated in the indent on the cam disc.
6. Tighten clamping nut and mount covers.

**WARNING**

CAREFULLY CHECK OPERATION OF BOTH THE UPPER AND LOWER LIMIT SWITCH AFTER ADJUSTING EITHER SWITCH OR CHANGING WIRE ROPES.

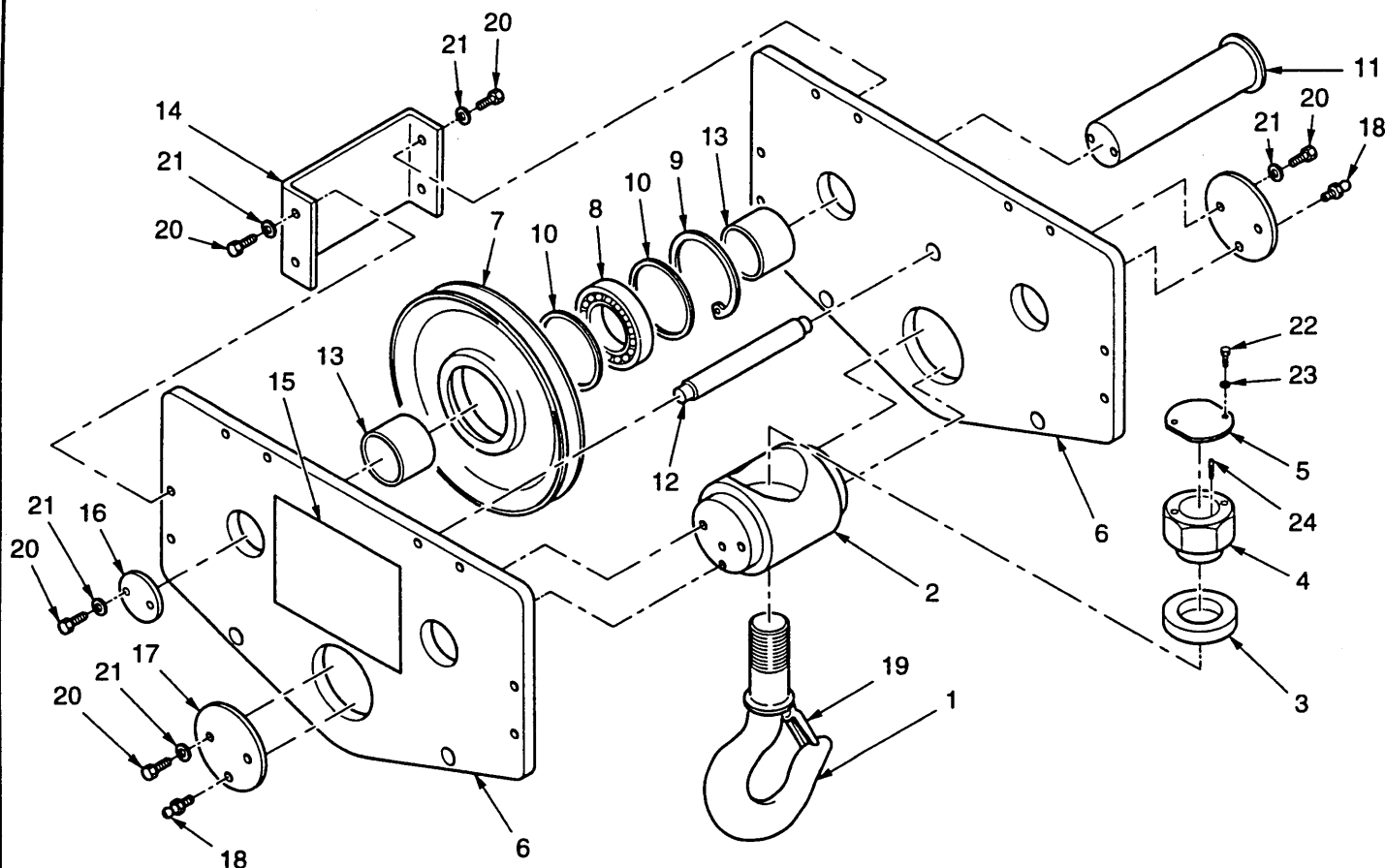
### ADJUSTABLE UPPER AND LOWER GEAR TYPE LIMIT SWITCH

SPARE PARTS IDENTIFICATION  
FR-G-9 PAGE 2[illegible]

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

**SPARE PARTS IDENTIFICATION**  
**FR-G-10**

**2 PART BOTTOM BLOCK ASSEMBLY**

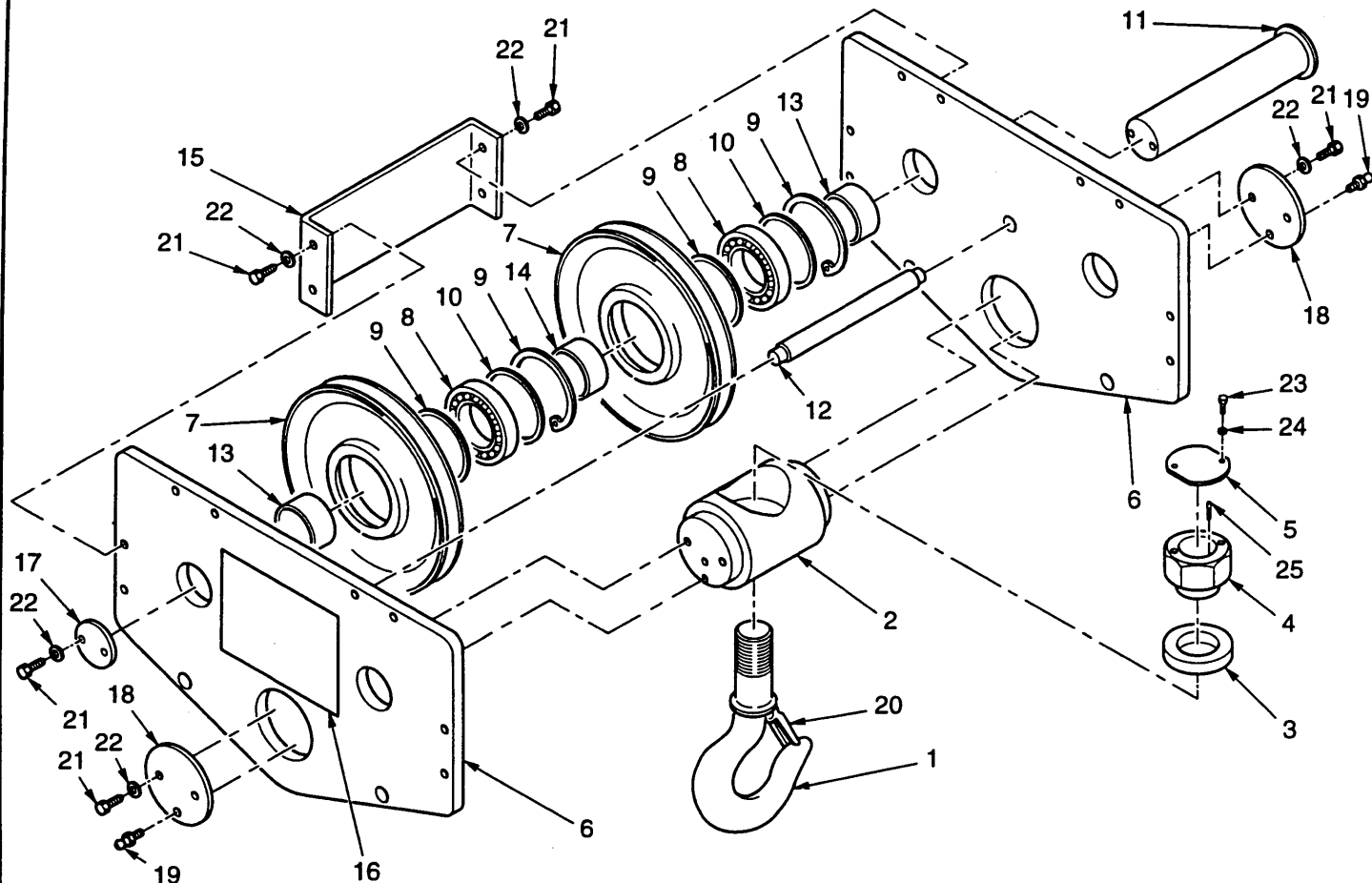


| DWG. ITEM | REFERENCE NUMBER | PART DESCRIPTION         | QTY. | DWG. ITEM | REFERENCE NUMBER | PART DESCRIPTION  | QTY. |
|-----------|------------------|--------------------------|------|-----------|------------------|-------------------|------|
| 1         | G10510           | HOOK                     | 1    |           | G10500           | BOTTOM BLOCK ASSY |      |
| 2         | G10530           | TRUNNION                 | 1    |           |                  |                   |      |
| 3         | G10509           | BEARING, THRUST          | 1    |           |                  |                   |      |
| 4         | G10508           | HOOK NUT                 | 1    |           |                  |                   |      |
| 5         | G10536           | COVER                    | 1    |           |                  |                   |      |
| 6         | G10501           | SIDE PLATE               | 2    |           |                  |                   |      |
| 7         | G10502           | ROPE SHEAVE              | 2    |           |                  |                   |      |
| 8         | G10503           | BEARING                  | 2    |           |                  |                   |      |
| 9         | G10504           | RETAINING RING, INTERNAL | 2    |           |                  |                   |      |
| 10        | G10537           | NILOS RING               | 4    |           |                  |                   |      |
| 11        | G10512           | SHEAVE PIN               | 1    |           |                  |                   |      |
| 12        | G10538           | SPACER PIN               | 3    |           |                  |                   |      |
| 13        | G10505           | SPACER                   | 4    |           |                  |                   |      |
| 14        | G10539           | END PLATE                | 4    |           |                  |                   |      |
| 15        | G10520           | CAPACITY PLATE           | 2    |           |                  |                   |      |
| 16        | G10529           | CAP                      | 2    |           |                  |                   |      |
| 17        | G10528           | CAP                      | 2    |           |                  |                   |      |
| 18        | G90080           | GREASE NIPPLE            | 3    |           |                  |                   |      |
| 19        | G10511           | SAFETY LATCH             | 1    |           |                  |                   |      |
| 20        | G10531           | HEX HEAD CAP SCREW       | 24   |           |                  |                   |      |
| 21        | G10527           | LOCK WASHER              | 24   |           |                  |                   |      |
| 22        | G10540           | HEX HEAD CAP SCREW       | 2    |           |                  |                   |      |
| 23        | G10541           | LOCK WASHER              | 2    |           |                  |                   |      |
| 24        | G90005           | SET SCREW                | 1    |           |                  |                   |      |

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

# 4 PART DOUBLE BOTTOM BLOCK ASSEMBLY

## SPARE PARTS IDENTIFICATION FR-G-11

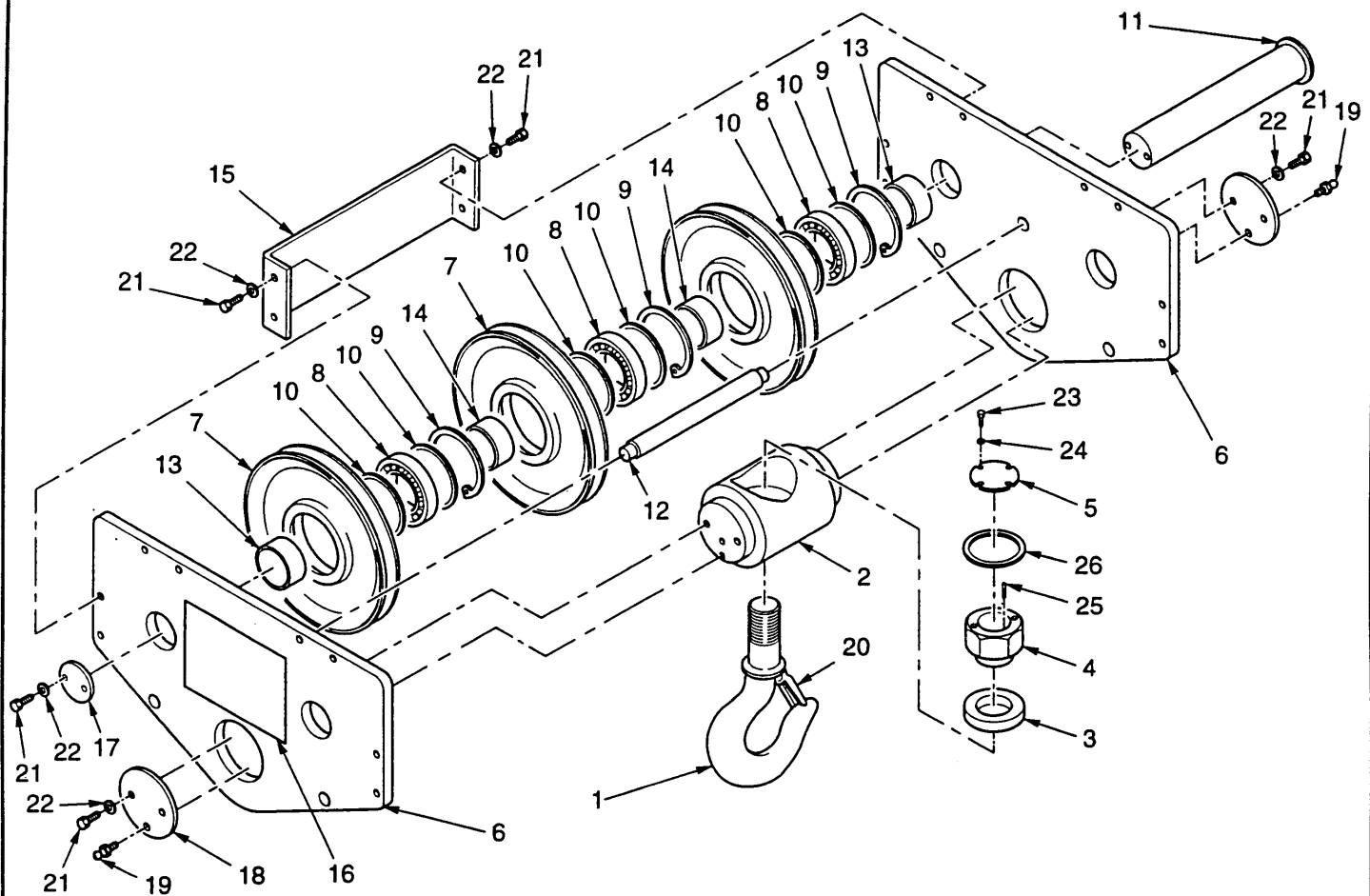


| DWG. ITEM | REFERENCE NUMBER | PART DESCRIPTION         | QTY. | DWG. ITEM | REFERENCE NUMBER | PART DESCRIPTION  | QTY. |
|-----------|------------------|--------------------------|------|-----------|------------------|-------------------|------|
| 1         | G10510           | HOOK                     | 1    | 25        | G90005           | SET SCREW         | 1    |
| 2         | G10530           | TRUNNION                 | 1    |           | G10500           | BOTTOM BLOCK ASSY |      |
| 3         | G10509           | BEARING, THRUST          | 1    |           |                  |                   |      |
| 4         | G10508           | HOOK NUT                 | 1    |           |                  |                   |      |
| 5         | G10536           | COVER                    | 1    |           |                  |                   |      |
| 6         | G10501           | SIDE PLATE               | 2    |           |                  |                   |      |
| 7         | G10502           | ROPE SHEAVE              | 4    |           |                  |                   |      |
| 8         | G10503           | BEARING                  | 4    |           |                  |                   |      |
| 9         | G10504           | RETAINING RING, INTERNAL | 4    |           |                  |                   |      |
| 10        | G10537           | NILOS RING               | 8    |           |                  |                   |      |
| 11        | G10512           | SHEAVE PIN               | 2    |           |                  |                   |      |
| 12        | G10538           | SPACER PIN               | 3    |           |                  |                   |      |
| 13        | G10505           | SPACER                   | 4    |           |                  |                   |      |
| 14        | G10533           | SPACER                   | 2    |           |                  |                   |      |
| 15        | G10539           | END PLATE                | 4    |           |                  |                   |      |
| 16        | G10520           | CAPACITY PLATE           | 2    |           |                  |                   |      |
| 17        | G10529           | CAP                      | 2    |           |                  |                   |      |
| 18        | G10528           | CAP                      | 2    |           |                  |                   |      |
| 19        | G90080           | GREASE NIPPLE            | 3    |           |                  |                   |      |
| 20        | G10511           | SAFETY LATCH             | 1    |           |                  |                   |      |
| 21        | G10531           | HEX HEAD CAP SCREW       | 24   |           |                  |                   |      |
| 22        | G10527           | LOCK WASHER              | 24   |           |                  |                   |      |
| 23        | G10540           | HEX HEAD CAP SCREW       | 2    |           |                  |                   |      |
| 24        | G10541           | LOCK WASHER              | 2    |           |                  |                   |      |

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

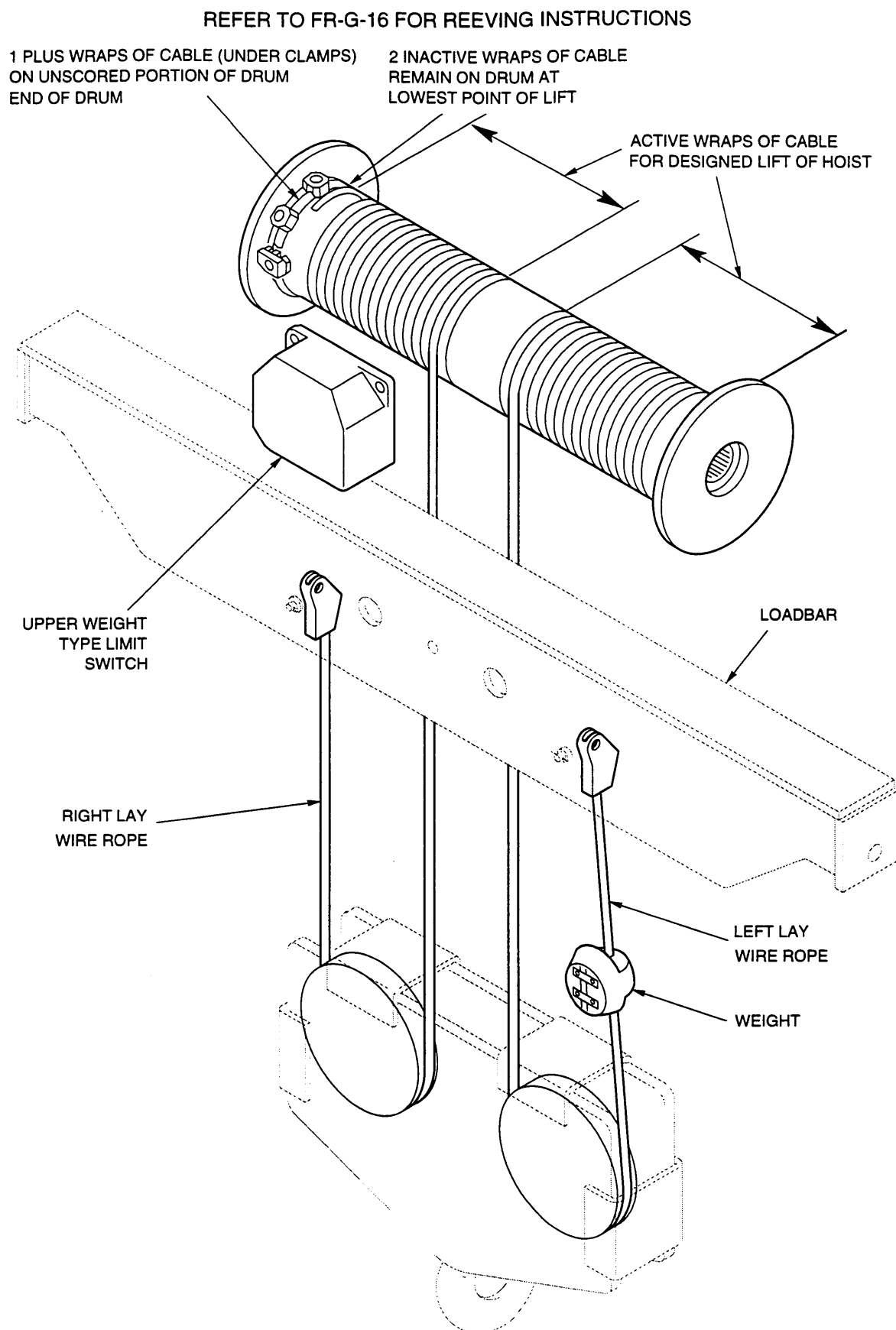
**SPARE PARTS IDENTIFICATION  
FR-G-12**

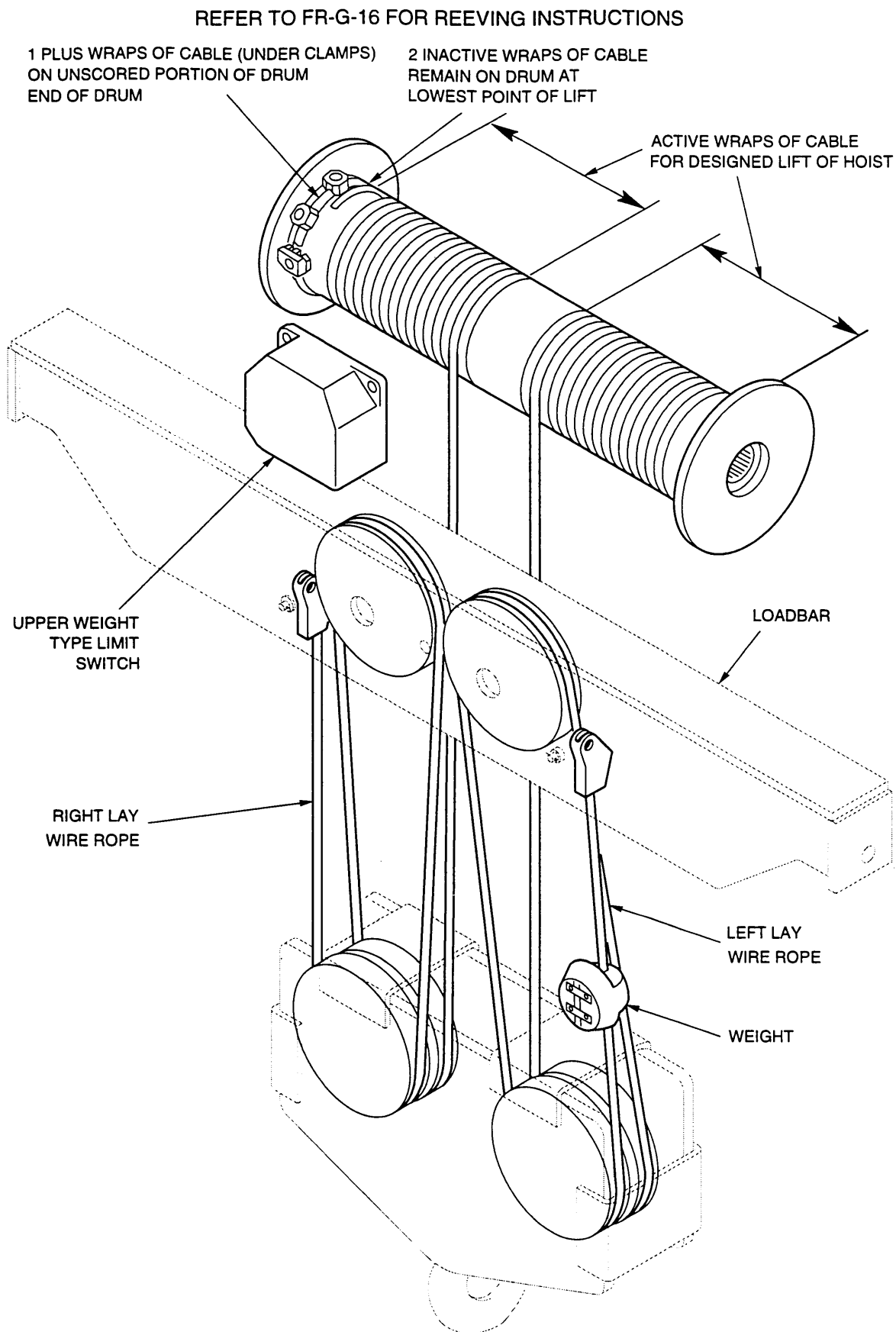
**6 PART DOUBLE BOTTOM BLOCK ASSEMBLY**



| DWG. ITEM | REFERENCE NUMBER | PART DESCRIPTION         | QTY. | DWG. ITEM | REFERENCE NUMBER | PART DESCRIPTION  | QTY. |
|-----------|------------------|--------------------------|------|-----------|------------------|-------------------|------|
| 1         | G10510           | HOOK                     | 1    | 25        | G90005           | SET SCREW         | 1    |
| 2         | G10530           | TRUNNION                 | 1    | 26        | G10535           | SPACER            | 1    |
| 3         | G10509           | BEARING, THRUST          | 1    |           | G10500           | BOTTOM BLOCK ASSY |      |
| 4         | G10508           | HOOK NUT                 | 1    |           |                  |                   |      |
| 5         | G10536           | COVER                    | 1    |           |                  |                   |      |
| 6         | G10501           | SIDE PLATE               | 2    |           |                  |                   |      |
| 7         | G10502           | ROPE SHEAVE              | 6    |           |                  |                   |      |
| 8         | G10503           | BEARING                  | 6    |           |                  |                   |      |
| 9         | G10504           | RETAINING RING, INTERNAL | 6    |           |                  |                   |      |
| 10        | G10537           | NILOS RING               | 12   |           |                  |                   |      |
| 11        | G10512           | SHEAVE PIN               | 2    |           |                  |                   |      |
| 12        | G10538           | SPACER PIN               | 3    |           |                  |                   |      |
| 13        | G10505           | SPACER                   | 4    |           |                  |                   |      |
| 14        | G10533           | SPACER                   | 4    |           |                  |                   |      |
| 15        | G10539           | END PLATE                | 4    |           |                  |                   |      |
| 16        | G10520           | CAPACITY PLATE           | 2    |           |                  |                   |      |
| 17        | G10529           | CAP                      | 2    |           |                  |                   |      |
| 18        | G10528           | CAP                      | 2    |           |                  |                   |      |
| 19        | G90080           | GREASE NIPPLE            | 3    |           |                  |                   |      |
| 20        | G10511           | SAFETY LATCH             | 1    |           |                  |                   |      |
| 21        | G10531           | HEX HEAD CAP SCREW       | 24   |           |                  |                   |      |
| 22        | G10527           | LOCK WASHER              | 24   |           |                  |                   |      |
| 23        | G10540           | HEX HEAD CAP SCREW       | 2    |           |                  |                   |      |
| 24        | G10541           | LOCK WASHER              | 2    |           |                  |                   |      |

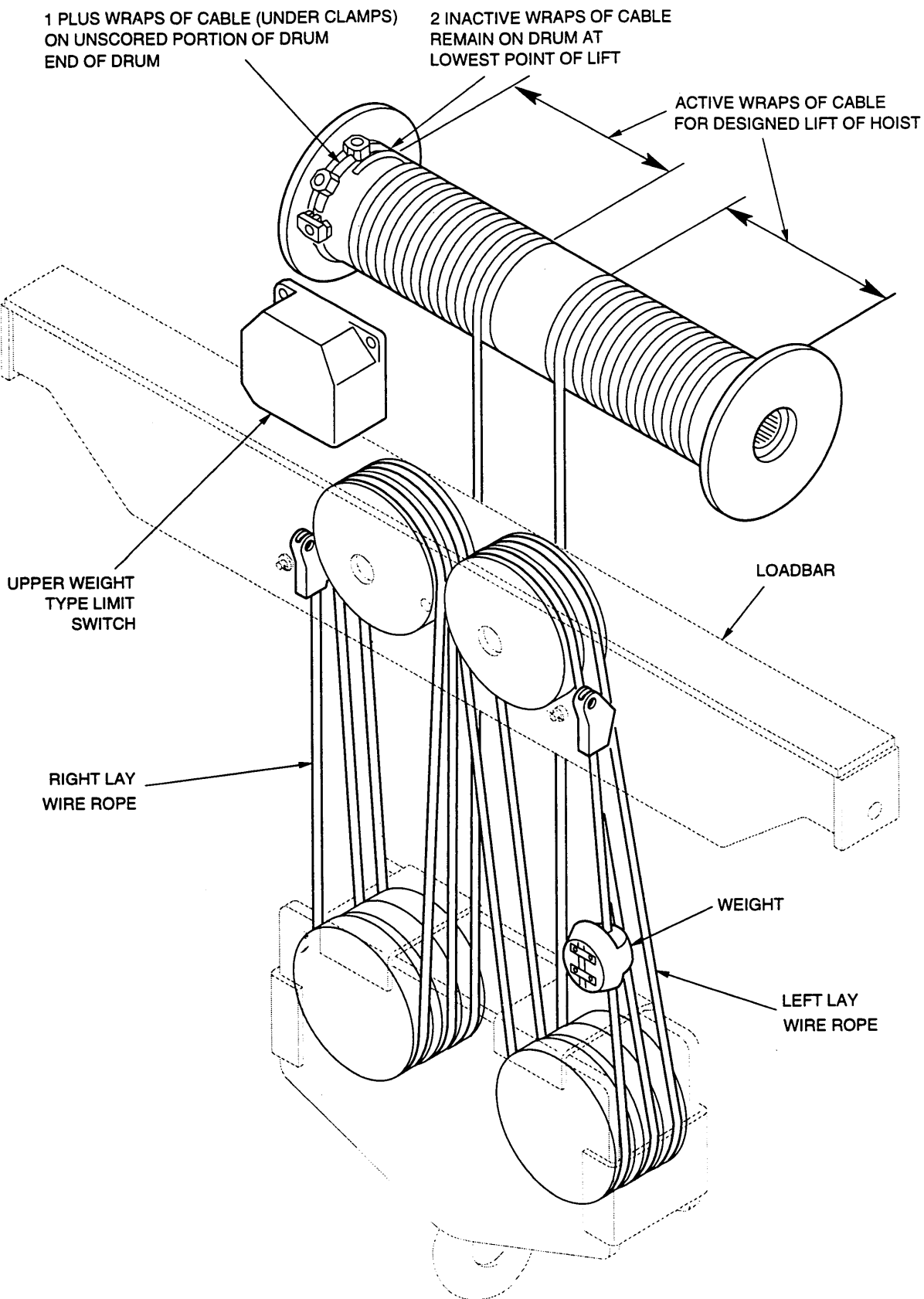
HOIST SERIAL NUMBER AND PART REFERENCE NUMBER MUST BE PROVIDED WHEN ORDERING REPLACEMENT PARTS.







REFER TO FR-G-16 FOR REEVING INSTRUCTIONS



**INSTRUCTIONS  
FR-G-16, SHEET 1**

**WIRE ROPE DOUBLE REEVING INSTRUCTIONS**

The drum of the Frame G Hoist with double reeving is reeved with two separate and opposite lay, right and left lay, wire ropes. See figure 1 and figure 2 for right and left lay. When installing new wire ropes onto the drum, be sure that the right lay wire rope and left lay wire rope are on the proper sides of the drum. See Wire Rope Reeving Diagram.

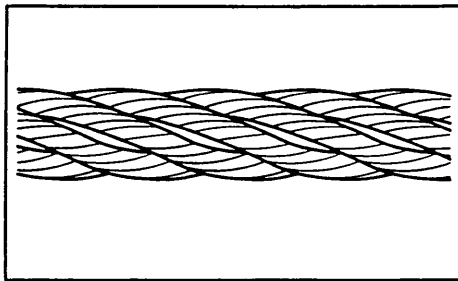


Figure 1 Right Lay Wire Rope

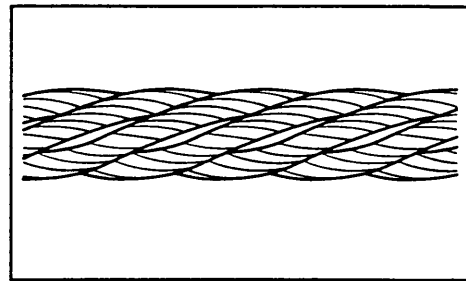


Figure 2 Left Lay Wire Rope

When the need for wire rope replacement has been established, ALWAYS REPLACE BOTH WIRE ROPES.



Always wear heavy gloves when handling wire ropes to avoid hand injuries from possible broken wires.

To remove wire rope from hoist:

1. Run hoist in the down direction until bottom block is resting on the floor or work platform. Continue to run in the down direction until the lower limit switch is activated (2 wraps of active rope should remain on the drum at this point). Run hoist up to position the rope clamps which hold the wire rope to the drum are most accessible for removable as described in step 4.
2. Disconnect hoist from power source.
3. Disassemble the weight of the weight type upper limit switch from the wire rope of hoist.
4. Remove or loosen rope clamps sufficiently to allow the rope to be freed from the drum.
5. Pull the rope from the bottom block.
6. Remove the dead end fitting from the load bar to completely free rope from hoist. Remove rope clips and anchor and retain for use on new wire rope. Discard old wire rope.
7. Inspect rope sheaves, bearings, pins and all other load bearing parts of the bottom block and upper sheave assemblies for signs of wear or damage. Especially check sheave for signs of reduced groove radius or "imprinting" by the rope. Any indication of such wear of the sheaves would severely shorten life of the newly installed wire rope and could cause premature failure. Such sheaves should be discarded and replaced.

**WIRE ROPE REEVING INSTRUCTIONS****INSTRUCTIONS  
FR-G-16, SHEET 2**

To install new wire rope:

1. Before unreeling the replacement wire rope, read Operation Maintenance for Wire Rope in Section 4. Unreel the replacement wire rope in a clean area free of dirt and inspect for any damage, kinks, etc. due to shipping. If replacement ropes are held in storage for extended periods of time, check for dried out lubricant or possible corrosion. If necessary, re-lubricate with grease as recommended in Lubrication Schedule, Section 5.
2. Install one end of wire rope into first available groove of the rope drum closest to the studs for the rope clamps, near flange of the drum. Extend the end of the wire rope approximately 2 inches (50 mm) past the first stud, then continue to wrap the wire rope into the groove past the other studs. Clamp the wire rope to the drum by using the rope clamps. Follow this same procedure for the other wire rope on the other side of the drum. Tighten nut for each rope clamp to 65 LB-FT.
3. Thread the free end of the wire rope through the bottom block sheave and through the sheave in load bar. Repeat this step until sheaves have been threaded with each wire rope. Refer to Reeving Diagram specifically for your hoist.
4. Install rope anchor and rope clip on each new rope per Rope Anchor Assembly Instructions FR-G-19.
5. Attach both rope anchors to load bar. Reference Load Bar Assembly for installation.
6. Reassemble the weight of the weight type upper limit switch to the wire rope and manually move up and down to ensure free movement on the rope.
7. Reconnect power source.
8. Rotate the drum to wind the wire rope on the drum while applying tension to the wire rope to ensure proper spooling on the drum until the load block is hanging on the ropes. Check to be certain that the rope sheaves are rotating freely and that bottom block hangs properly as shown on the Reeving Diagram. If wire ropes are twisted, refer to Operation Maintenance for Wire Rope in Section 4, for instructions on correction of twist of new or replacement wire ropes. Be sure to disconnect power before any corrective actions.
9. Reconnect hoist to power source.
10. Operate the block through the full range of lift for 2 or 3 cycles with empty hook using extreme caution not to allow load block to approach closer than 12 inches to the weight of weight type upper limit switch weight. See caution warning at the end of these instructions. Check wire rope with block at near full up position to insure the bottom blocks hangs properly. Make 1 or 2 short lifts from the floor with near capacity load. If twisting of the wire rope occurs, see Step 8 above.
11. Retighten rope clamps on drum to torque listed in Step 2 above.
12. Retighten rope clip nuts to torque listed in FR-G-19, Rope Anchor Assembly.

\*\*\*\*\*  
CAUTION  
\*\*\*\*\*

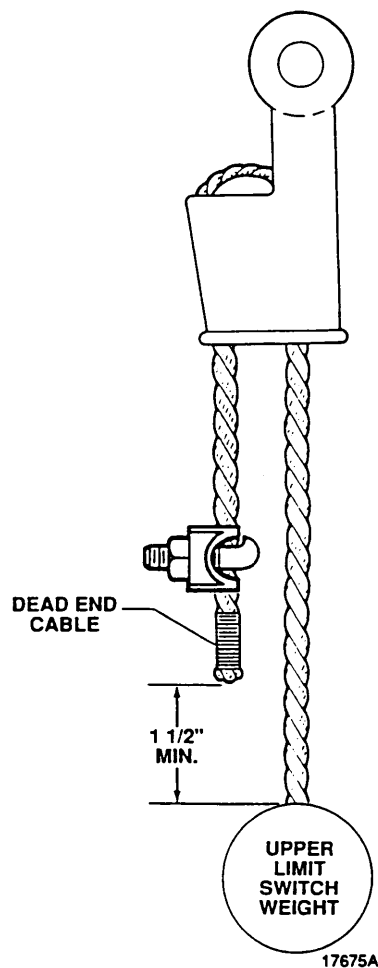
The upper and lower limit switch must be adjusted to maintain the original stop positions:

1. With 2 active wraps of rope remaining on the drum in the lowest position of the hook (unless set for a shorter than standard design lift).
2. With the bottom block "strike point" 3 inches below the weight of the weight type upper limit switch.

See Adjustment Instructions for Upper and Lower Geared Type Limit Switch.

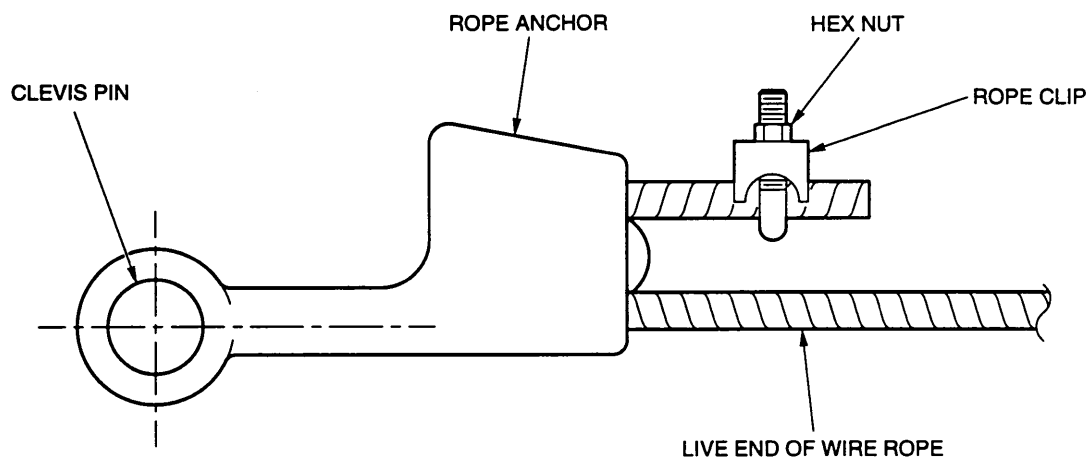
\*\*\*\*\*  
CAUTION  
\*\*\*\*\*

After installation of a new cable there *must* be a minimum 1-1/2" of hoisting cable between the upper limit switch weight ball and the end of the dead end cable.



**HOW TO APPLY CLIPS***Recommended Method of Applying U-Bolt Clip to Get Maximum Holding Power of the Clip*

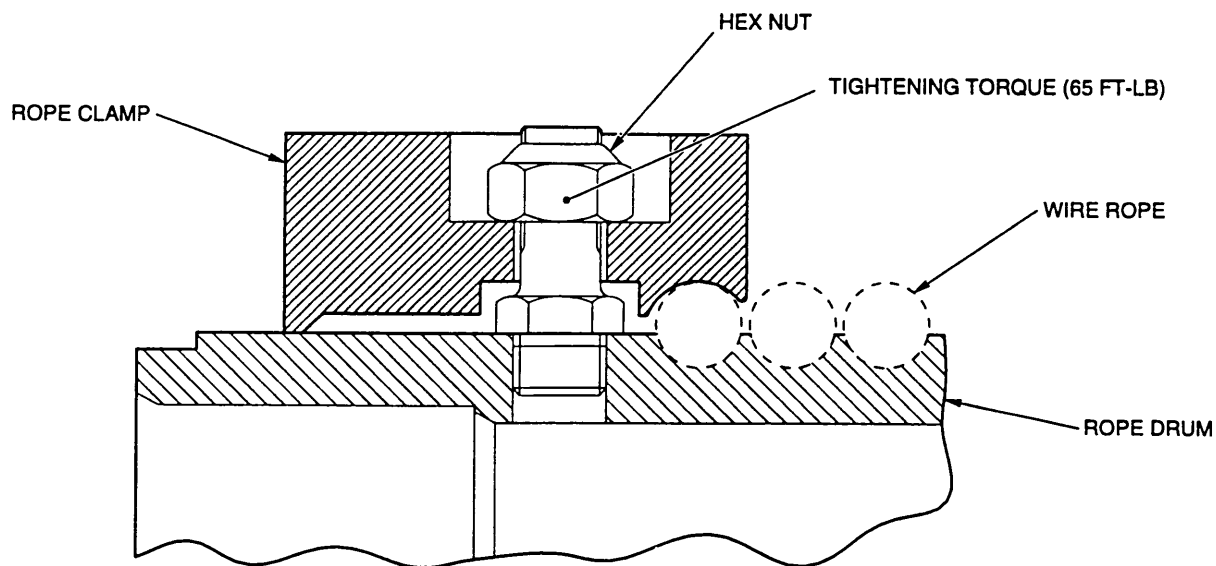
1. Turn back the specified amount of rope. Apply the clip near the dead end of the wire rope. Tighten nuts evenly to recommended torque. Be sure that the rope clip tightens on the cable and does not bottom out on the threads.
2. **CAUTION:** Live end of cable must be mounted on centerline with clevis pin as shown.
3. **NOTICE!** Apply the initial load and retighten nuts to the recommended torque. Rope will stretch and be reduced in diameter when loads are applied. Inspect periodically and retighten to recommended torque.
4. Both ends of a new cable must be seized with wire wrapping, or welded to prevent brooming of the strands in order to maintain the integrity of the cable and rope clips.

**TORQUE RECOMMENDED FOR SADDLE HEX NUTS:**

7/16" DIAMETER WIRE ROPE 65 lbs-ft  
1/2" DIAMETER WIRE ROPE 65 lbs-ft  
9/16" DIAMETER WIRE ROPE 95 lbs-ft  
5/8" DIAMETER WIRE ROPE 95 lbs-ft



For all newly installed wire rope, check torque of hex nuts after initial application of load to hook



To remove wire rope from drum, loosen hex nut for each rope clip until wire rope can freely slide through clip.

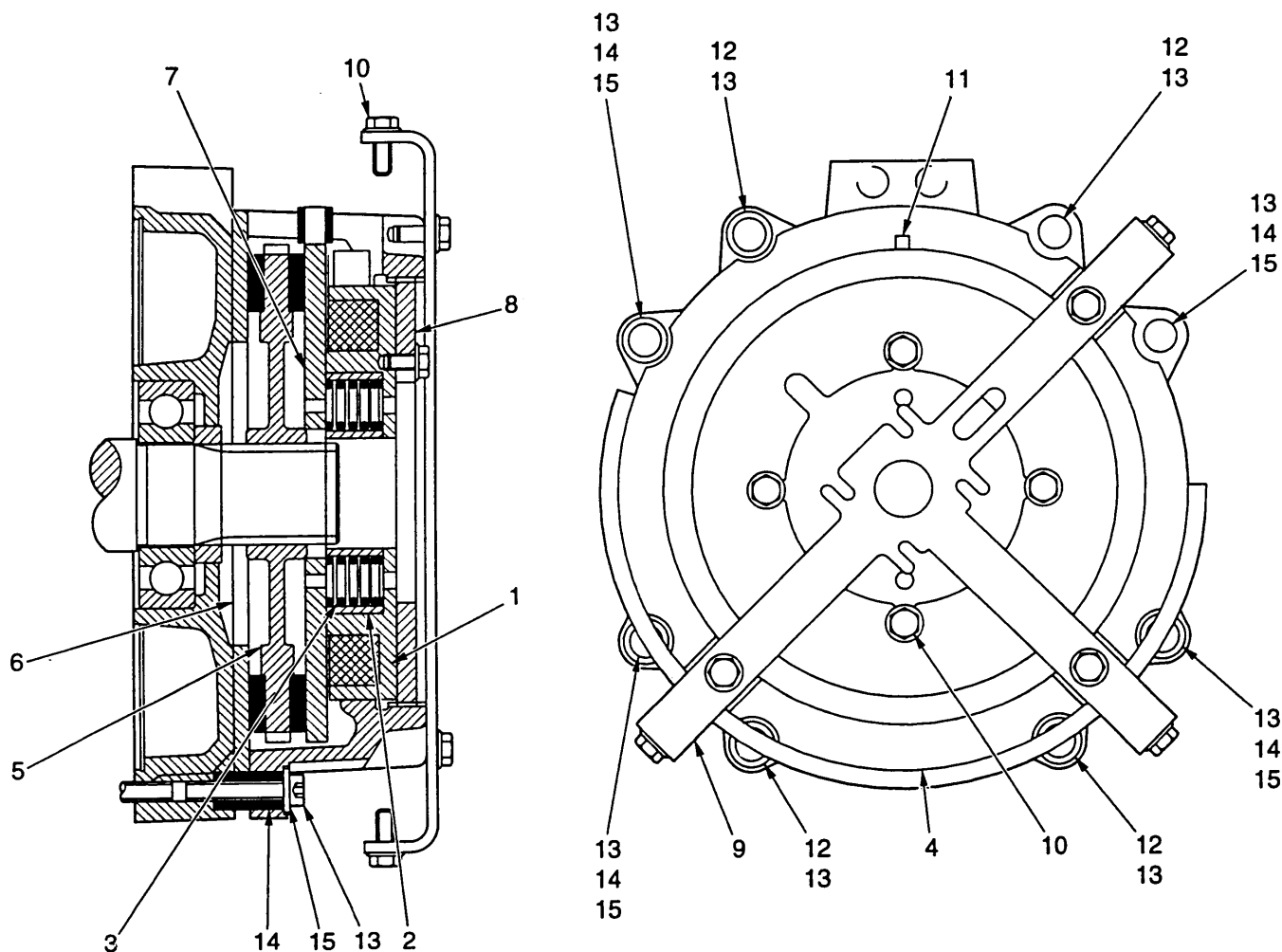
After installing wire rope to rope drum, tighten hex nut for rope clip to recommended torque.

**NOTICE:** Apply the initial load and retighten nuts to recommended torque. Rope will stretch and be reduced in diameter when loads are applied.

Both ends of new wire rope must be seized with wire wrapping, or welded to prevent brooming of the strands in order to maintain the integrity of the cable and rope clips.

\*\*\*\*\*  
**CAUTION**  
\*\*\*\*\*

For all newly installed wire rope, check the torque of hex nuts after initial application of a load to hook.



| DWG. ITEM | REFERENCE NUMBER | PART DESCRIPTION             | QTY. |
|-----------|------------------|------------------------------|------|
| 1         | G40003           | BRAKE COIL                   | 1    |
| 2         | SEE ITEM 16      | SPRING HOUSING               | 1    |
| 3         | G40025           | SPRING                       | A/R  |
| 4         | G40026           | BRAKE HOUSING                | 1    |
| 5         | G40027           | BRAKE WHEEL                  | 1    |
| 6         | SEE ITEM 5       | BACK PLATE + FRIC MATERIAL   | 1    |
| 7         | SEE ITEM 5       | ANCHOR PLATE + FRIC MATERIAL | 1    |
| 8         | SEE ITEM 4       | SET PLATE                    | 1    |
| 9         | FR-G-3           | FAN SUPPORT                  | 1    |
| 10        | G40028           | HEX BOLT, DURLOCK            | 10   |
| 11        | G40029           | SET SCREW                    | 1    |
| 12        | G40030           | HARDENED WASHER              | 4    |
| 13        | G40021           | SOCKET HEAD CAP SCREW        | 8    |
| 14        | G40031           | SPRING PIN                   | 4    |
| 15        | G40032           | HARDENED WASHER              | 4    |
| 16        | G40000           | COMPLETE BRAKE               | 1    |
|           |                  |                              |      |
|           |                  |                              |      |

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

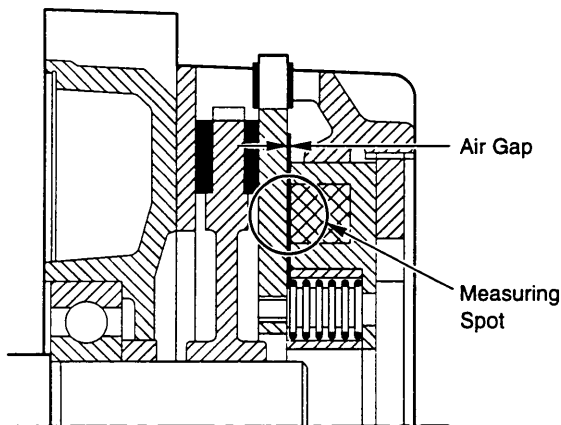
The hoist brake is adjusted for proper torque when shipped from the factory and should not require adjustment in the field.

The air gap between the magnet and anchor plate will require adjustment from time to time. This time interval will depend upon the frequency of operation and wear of the friction material.

The air gap as set at the factory is 0.027 in. (0.7 mm). The maximum air gap, and the gap at which time the brake must be adjusted, should not exceed 0.047 in. (1.2 mm). Regular inspections of the brake will determine this air gap dimension. If the load block, at any time, shows signs of drifting after the pushbuttons are released, immediately take the hoist out of service and check the brakes for excessive wear and air gap.

#### AIR GAP

MAXIMUM AIR GAP (1.2 mm) 0.047 in  
MINIMUM AIR GAP (0.7 mm) 0.027 in  
Air gap is measured with feeler gauge  
between anchor plate and magnet outer  
surface.

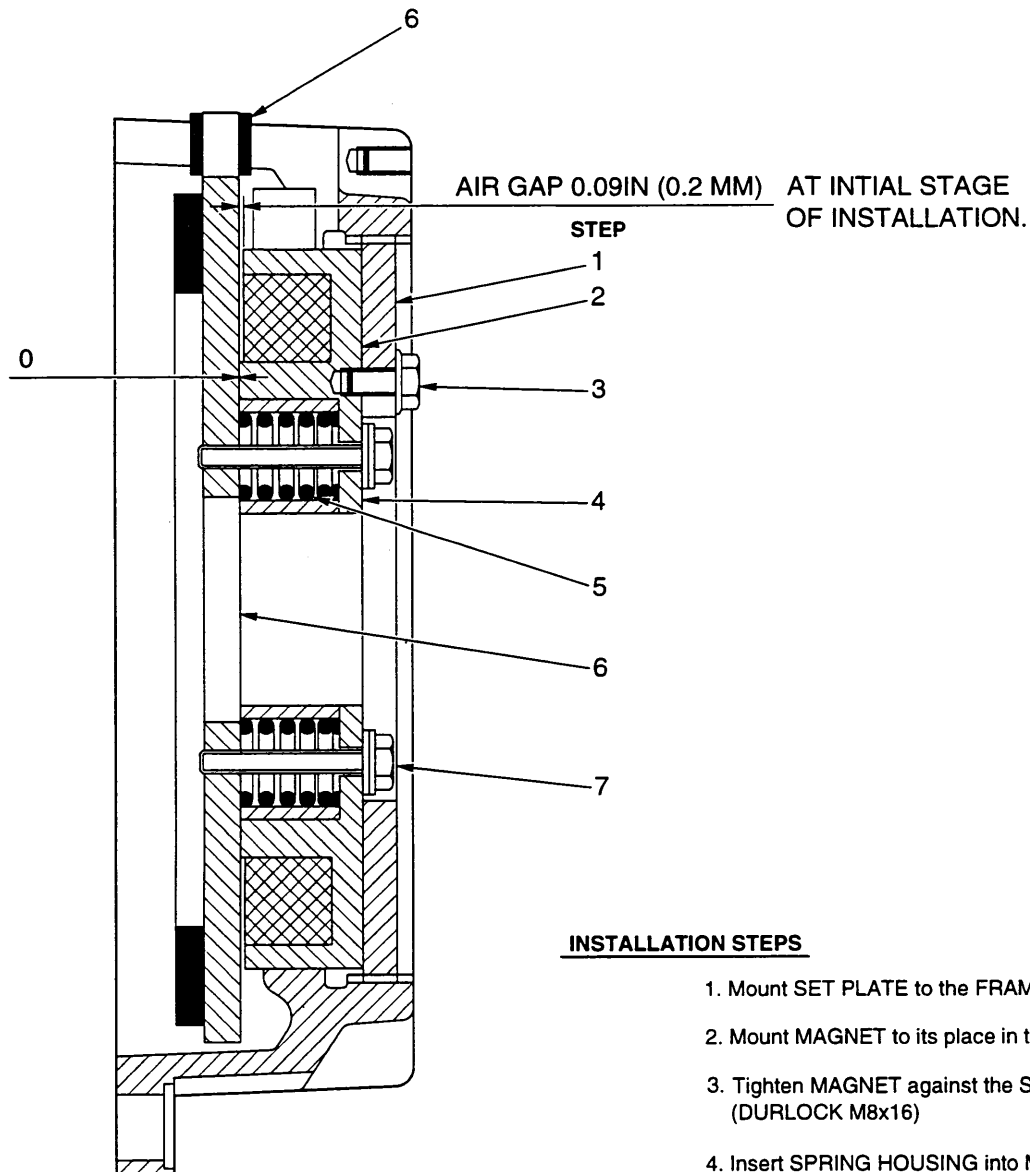


#### TO ADJUST THE AIR GAP TO MINIMUM

1. Remove bolts holding FAN SUPPORT, item 9, and the SET SCREW, item 11.
2. Tighten the ANCHOR PLATE, item 7, against the MAGNET, item 1, with bolts M8. (air gap is 0.009 in. (0.2 mm)).
3. Release the SET PLATE, item 8, by loosening the DURLOK M8 bolts.
4. Press the ANCHOR PLATE against the BRAKE WHEEL, item 5, by turning the SET PLATE clockwise.
5. Turn SET PLATE counter-clockwise 60 ° for gap of 0.020 in. (0.5 mm) between BRAKE WHEEL and ANCHOR PLATE.
6. Lock SET PLATE with the DURLOCK M8 x 16 bolts by placing the bolts into the nearest open slots.
7. Release ANCHOR PLATE by loosening the M8 x 50 bolts and measure air gap.
8. Tighten SET SCREW.

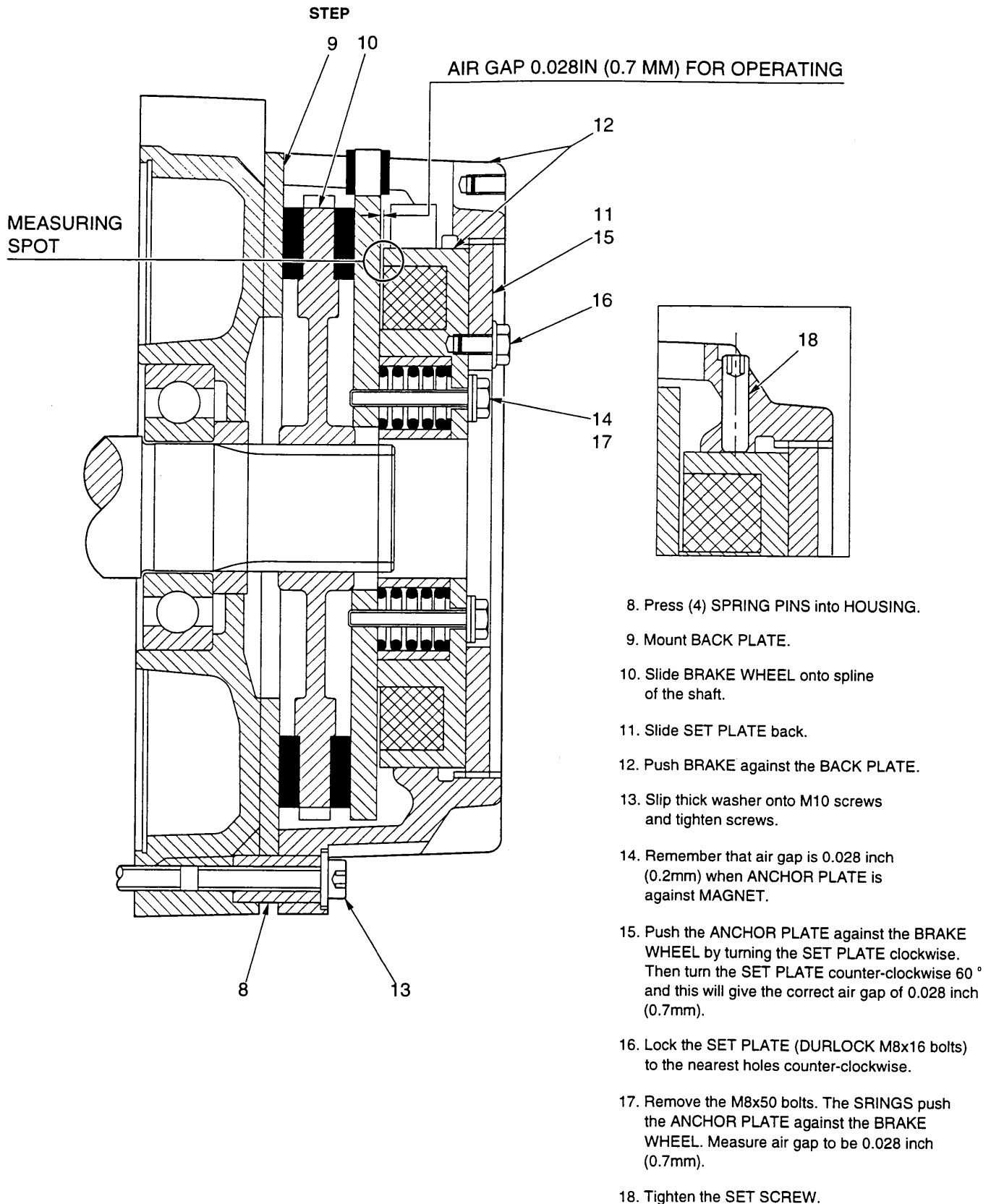


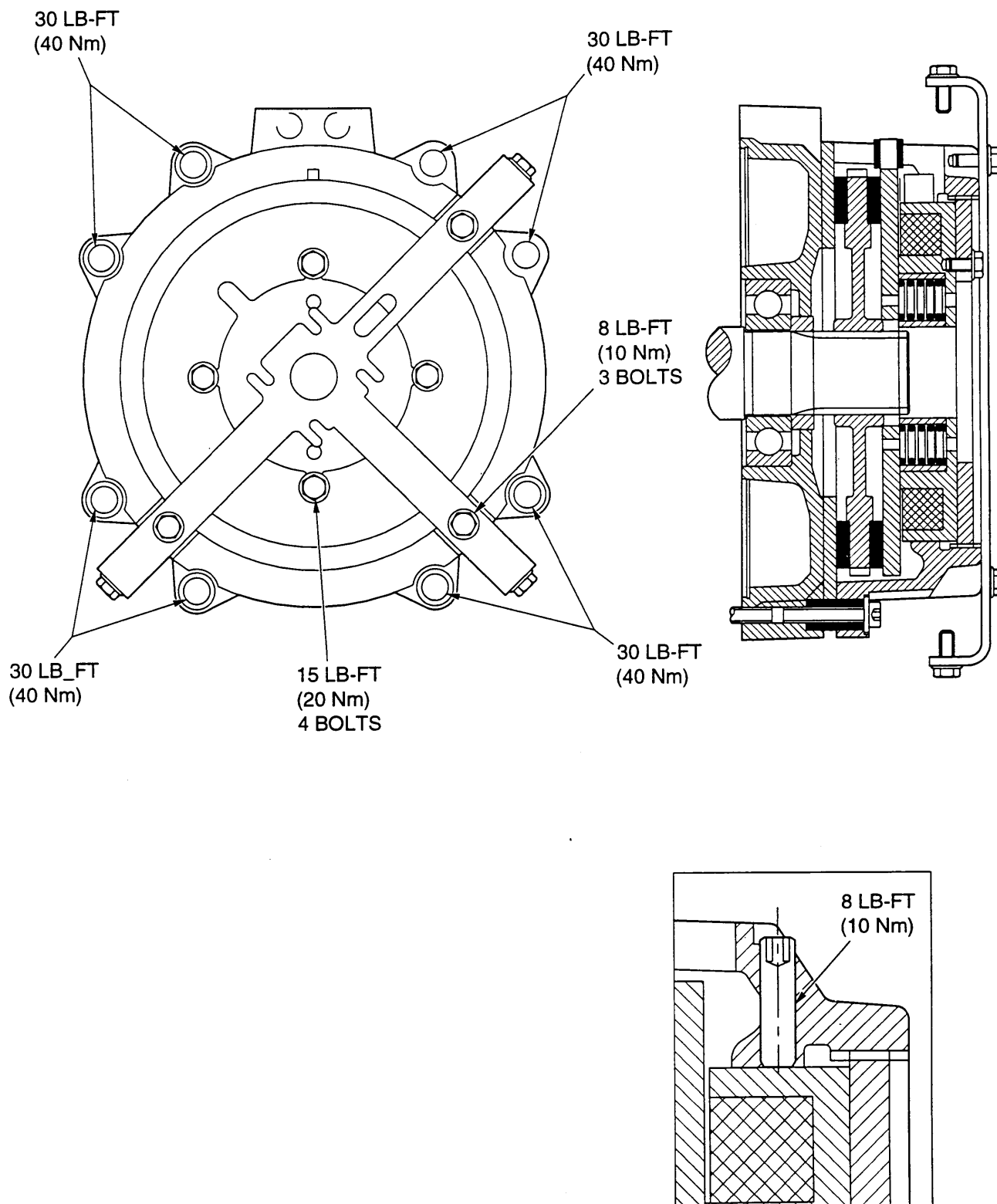
## INSTALLATION



### INSTALLATION STEPS

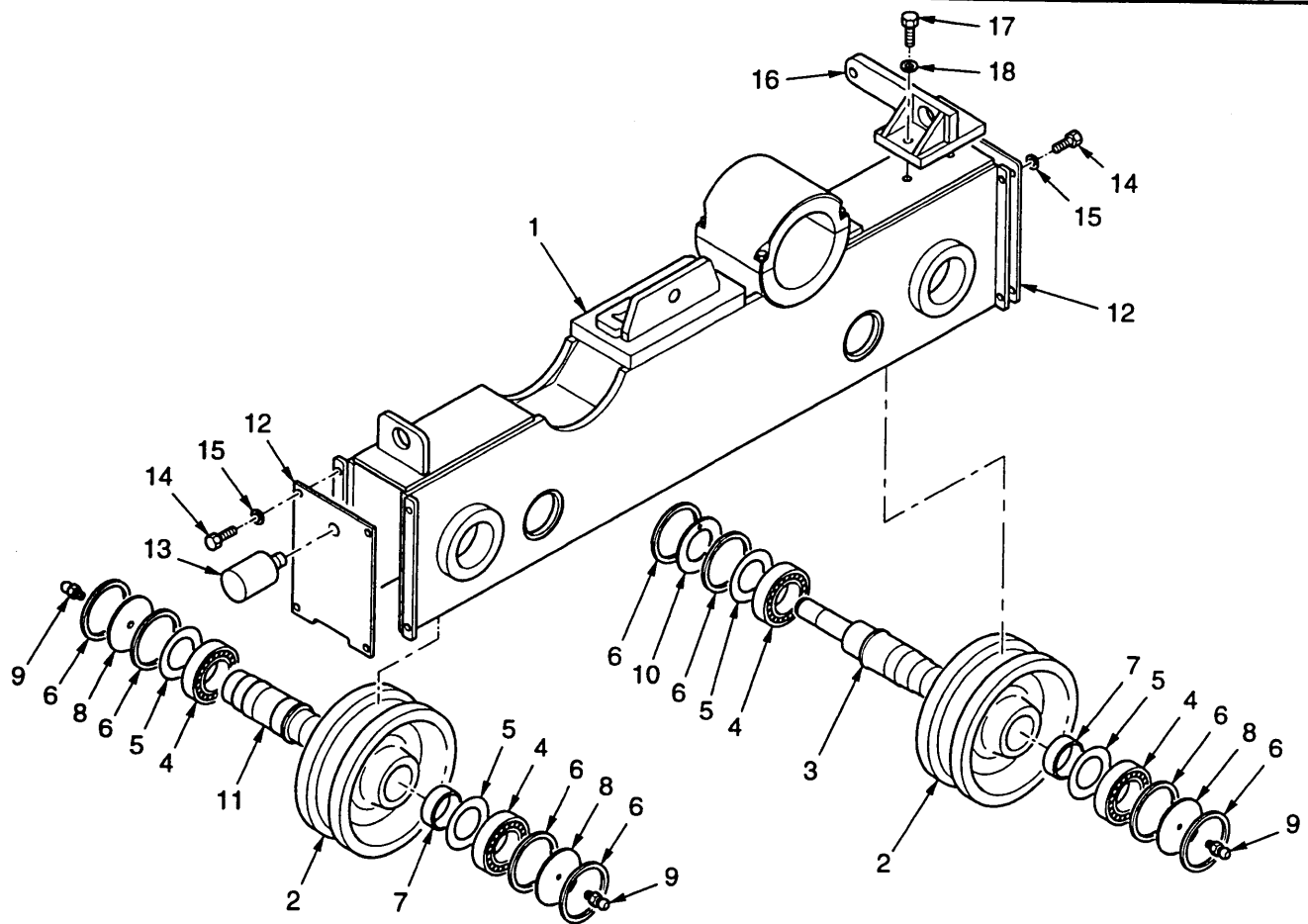
1. Mount SET PLATE to the FRAME.
2. Mount MAGNET to its place in the FRAME.
3. Tighten MAGNET against the SET PLATE.  
(DURLOCK M8x16)
4. Insert SPRING HOUSING into MAGNET.
5. Insert SPRINGS into SPRING HOUSING.
6. Mount ANCHOR PLATE against SPRINGS.  
Notice the PLASTIC PARTS
7. Fasten SPRING HOUSING to MAGNET.  
At this stage of installation, the air gap is 0.09 inch (0.2mm) between the MAGNET and ANCHOR PLATE. Two M8x50 bolts with two washers per bolt required.





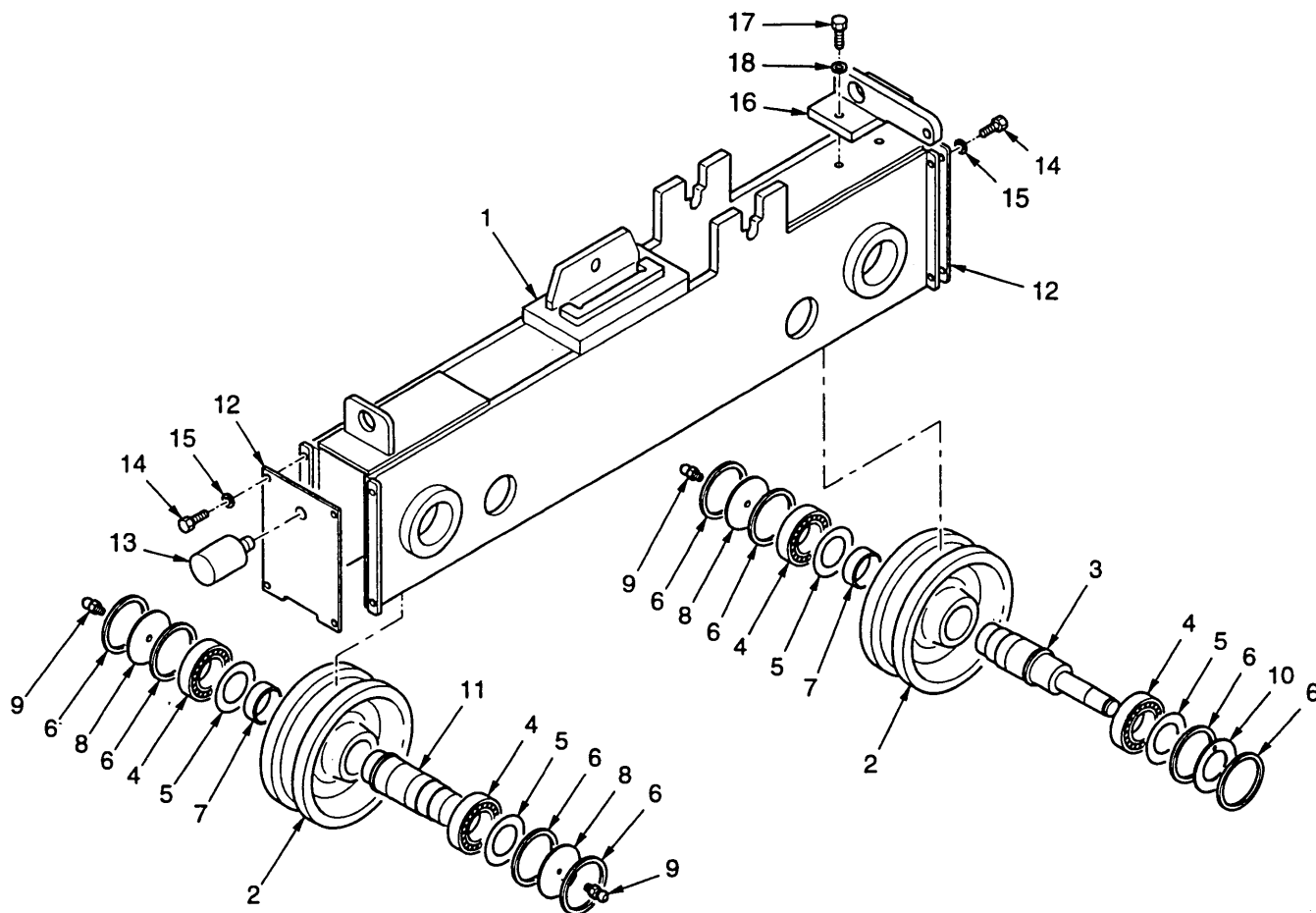
HOIST SERIAL NUMBER AND PART REFERENCE NUMBER MUST BE PROVIDED WHEN ORDERING REPLACEMENT PARTS.

## TROLLEY WHEEL ASSEMBLY

[illegible]

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

**SPARE PARTS IDENTIFICATION**  
**FR-G-20 PAGE 2**

[illegible]

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