

COLUMBIA

WINCHES & HOISTS

Manufactured by Allied Power Products, Inc.

AC Electric L/N/R Series Owner's Manual

Installation and Operating Instructions

Model:

Serial Number:

VAC

Ø

Hz

ALLIED POWER PRODUCTS, INC.

THE WINCH & HOIST SPECIALISTS

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CAUTION

The final determination as to the suitability of this product for any purpose is solely that of the user.
Columbia products are not to be used to lift people or to lift anything over people.

READ THIS FIRST.

The information in this manual is intended to help ensure your Columbia product is properly installed, operated and maintained.

Although every effort has been made to make this manual complete and understandable, it is not a definitive guide to every possible situation or circumstance.

The proper installation, operation and maintenance of this product is solely the responsibility of the owner.

Safe operation of this product is directly dependent on the operator's skill, knowledge and judgment before, during and after the use of the product.

To avoid hazardous situations, every operator must be knowledgeable about appropriate safety guidelines, codes and regulations related to rigging, wire rope, and winch / hoist usage. Remember that an uninformed or careless operator can make the operation of any equipment dangerous.

Ultimately, the owner / operator must make the final decision as to how this product will be used and whether that intended use is safe.

If, after reading this manual, you have any questions regarding the installation or use of this Columbia product, contact your dealer or the Customer Service Manager of Allied Power Products, Inc. for an answer to your question.

Replacement manuals are available free of charge by writing:

**Allied Power Products, Inc.
6590 SW Fallbrook Place
Beaverton, OR 97008**

THIS MANUAL CONTAINS EXTREMELY IMPORTANT INFORMATION ABOUT THE INSTALLATION AND OPERATION OF YOUR COLUMBIA PRODUCT. FOR YOUR OWN SAFETY, READ THIS MANUAL COMPLETELY PRIOR TO PRODUCT INSTALLATION AND / OR OPERATION.



⚠ WARNING

COLUMBIA PRODUCTS ARE NOT TO BE USED FOR LIFTING PEOPLE OR THINGS OVER PEOPLE.

Contents

General Information.....	4
Installation Guidelines.....	5-9
Location.....	5
Fleet Angle.....	5
Mounting.....	5-6
Electrical Guidelines.....	7
Wire Rope.....	7-9
Operation Instructions.....	10-11
Maintenance.....	11-15
Troubleshooting Guide.....	15-16
Appendix: Parts Breakdown, Wiring Diagram and/or Mounting Template	
Limited Warranty	

Sample Model Number

HG3700-4A34-L-01

A B C D E F G

Model Number Information

When instructions in this manual refer to specific specifications on different models, identify your unit by referring to the model number as shown on the unit nameplate and the front of this manual.

A	H = Hoist, rated for hoisting	W = Winch, rated for pulling
B	Model Series	
C	Model Specification	
D	2A = 230VAC 3Ø 3A = 380VAC 3Ø 4A = 460VAC 3Ø 5A = 575VAC 3Ø	
E	17 = 1725 RPM motor speed	
F	L = Low-voltage control model X = Unit supplied without controls	
G	00 = Custom Drum Configuration	

General Information

Columbia L/N/R Series winches and hoists consist of a base, electric motor and drum assembly.

Electric Motor

The severe-duty motor utilized in this unit is Totally Enclosed Fan Cooled (TEFC) and rated for continuous duty.

Drum

The drum is attached to the motor through planetary gear reductions to deliver the required pulling capacity and performance. The drum consists of three basic assemblies:

1. Drum with integral ring gear
2. Output planetary gear set
3. Primary planetary gear set

Controls

Standard control models include a control box which converts AC input power to a lower voltage for the remote pendant control. The control box and remote pendant control are rated NEMA 4X for indoor or outdoor use.

Ratings and Suitability

Columbia winches and hoists are not to be used to lift, pull, support or otherwise transport people or loads over people. Line pull ratings represent the maximum load that can be placed on a new unit. This load rating varies with the amount of wire rope wound on the drum and is affected by the age and condition of the unit.

WARNING

DO NOT ATTEMPT TO MOVE LOADS GREATER THAN THE RATED CAPACITY.

Even if the unit appears to be able to handle the load, it can cause the unit to fail or create undetectable damage that could cause the unit to fail while using the unit within its rated capacity.

Factors of Operation

Harsh environments decrease the load rating of the unit and make it more susceptible to damage. Avoid installation in extreme temperatures, dirty surroundings and wet environments.

Improper installation can create excessive wear or failure of any of the component parts or fasteners in the unit. Be sure that the unit is properly installed, the fasteners checked for tightness and the mounting inspected for damage on a periodic basis.

Use of the unit will create wear in the components. The more frequently it is used and the heavier the load, the greater the strain and wear on the components. This may result in damage that causes a failure over a period of time. Periodic inspection of the unit is the only way to ensure its continued operating capability.

CAUTION

The amount of wire rope on the drum affects the performance of the unit. Line-pull decreases with each additional layer of wire rope wound on the drum. Line-speed increases with each additional layer of wire rope wound on the drum.

Installation Guidelines

The safe installation of this product is solely dependent upon the owner and/or operator's skill, knowledge and judgment. Installation must be done only by those qualified and familiar with all operating guidelines, safety codes and regulations related to rigging, wire rope and winch and/or hoist usage. The determination of suitability for this product for any specific use is the responsibility of the owner and/or operator.

The following guidelines are to be used only as a reference.

Location

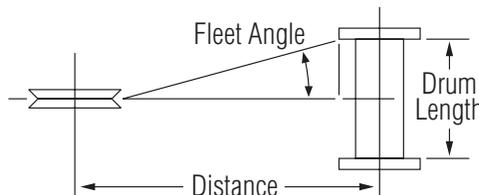
When selecting a location for the unit, the following guidelines must be met:

1. An unobstructed area that keeps the operator and others out of the path of the unit and the path of broken wire rope. Broken wire rope can snap back and cause serious injury to personnel and machinery.
2. A location where it will not interfere with or be damaged by other objects or machinery.
3. A location with adequate lighting and heat for both the operator and unit. Although the unit is rated for operation in temperatures ranging from -50° to $+125^{\circ}$ Fahrenheit, extremes in temperature will affect the performance of the unit.
4. A position near an appropriate power source. Do not install the unit in any area defined as hazardous by the National Electric Code.
5. A location that permits proper fleet angle. Maintaining proper fleet angle allows the wire rope to spool uniformly onto the drum and prevents damage to the wire rope.

Fleet Angle

Proper fleet angle is less than $1\text{-}1/2^{\circ}$ measured as illustrated below (Diagram 1). As a "rule of thumb", the absolute minimum distance from the drum to a fixed sheave should be equal in feet to the drum length in inches. For example, with a drum width of 10 inches, the minimum distance to a fixed sheave should be 10 feet.

Diagram 1



Mounting

The unit must be attached to a rigid and level foundation or support structure that is adequate to support the unit and its load under all load conditions, including shock-loads, without flexing. Three different mounting positions are shown on the following page.

⚠ WARNING

Do not attach the unit to wood, sheet rock, or similar type materials.

Compression-Type Mount

If possible, a compression-type mount (unit on top of the mounting plate) should be used. This is the strongest and safest type of mount. There must be adequate clearance for the wire rope to pass without touching the mounting plate.

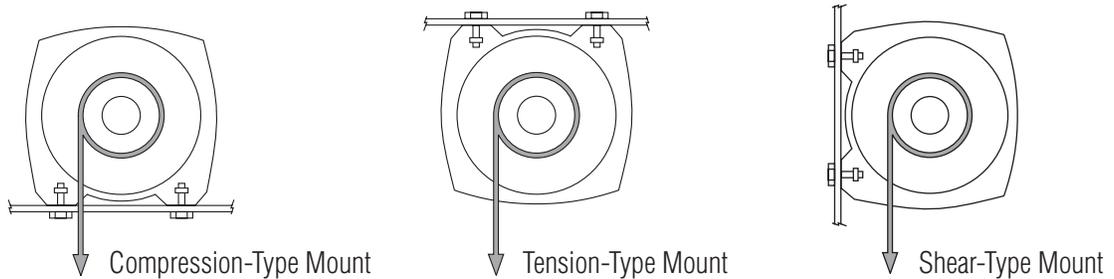
Tension-Type Mount

Use a tension type mount (unit below the mounting plate) when a compression mount is not possible. This is the second best mounting method.

Shear-Type Mount

A shear type mount (unit in front of the plate) is the least desirable. While the strength of this mount exceeds the unit's rated capacity, it has far less tolerance to shock-loads that exceed the rated capacity.

Diagram 2



⚠ CAUTION

When using a shear-type mount, an underwound configuration (wire spooling from the underside of the drum) is the preferred method. An overwound configuration (wire spooling from the top side of the drum) can still be used when necessary.

Mounting Holes

The mounting hole pattern is of critical importance to the strength of the unit. Mounting holes **must** match the template and/or drawings supplied with this owner's manual. Any deviation from the mounting dimensions or instructions can cause the drum supports to break under load. This can create an unsafe working condition, causing serious injury or property damage.

The unit base **must** be flat in all directions within + 0.020 inches. An uneven base can cause binding, twisting, excessive wear or catastrophic failure of the gear train and ultimately the unit. If necessary, use shim stock to ensure even mounting.

⚠ WARNING

Do not weld any fastener used for attaching the unit or mounting plate. Welding makes the fasteners brittle and subject to failure even in a no-load situation.

Electrical Guidelines

This Columbia unit is driven by AC power. Input voltage is listed on the front of this manual.

WARNING

Make sure all electrical power is off before making any electrical connections to existing power sources. Use a qualified electrician for all electrical work.

Make all electrical connections according to the supplied wiring diagram. All applicable local codes and regulations must be followed during installation of the unit. These units are shipped pre-wired to the AC motor and the low-voltage pendant control.

General Safety Precautions

1. Never put any type of cutoff device between the motor and controls. This could result in equipment failure or severe personal injury.
2. Install proper branch circuits, disconnect devices, protection and grounding in accordance with all applicable electric codes and regulations. Amperage and voltage information is listed on the motor name plate.
3. A power shut-off switch must be visible, clearly marked and within 25 feet of the operator. If the unit is permanently wired into a junction box, the installation of a master power shut-off is required.
4. Never open the control box with electrical power on or manually operate the relays inside the box. This could cause equipment failure or serious personal injury.
5. Never put any type of cutoff device between the motor, control box and/or pendant control. This could result in equipment failure or severe personal injury.

Wire Rope

WARNING

Keep a minimum of five wraps of line on the drum at all times to achieve rated load. Line anchors are **not** designed to hold rated loads. Loads applied directly to any style line anchor may cause the line to pull free and result in the sudden loss of load control and cause property damage, personal injury or death.

To correctly spool the wire rope, it is necessary to unwind the wire rope and then rewind the wire rope under load. It is recommended that during the initial tensioning of the wire rope, a load of approximately 15% of the rated first layer line pull be used. In the event that tension is taken off the line, the wire rope must be re-tensioned according to the above guidelines.

WARNING

Wire rope must be spooled on under tension before initial use of this unit.
Factory installed wire rope is not spooled on under load.

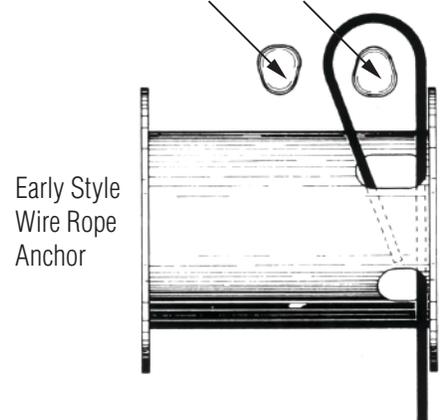
Anchoring Wire Rope: L Series

Take the free end of the wire rope and insert it through the small opening of the anchor pocket. Loop the wire rope and push the free end about half of the way back through the pocket. Install the wedge, then pull the slack out of the wire rope. The wedge will slip into the pocket and secure the wire rope into the drum. The early style anchor wedge is designed to accommodate several different sizes of wire rope. You may anchor 7/16 and 1/2 in. (11 & 13 mm) wire rope by inserting the wedge, large end first. Anchor 9/16 and 5/8 in. (14 & 16 mm) wire rope by inserting the wedge, small end first. Contact APPI for other wire rope sizes.

Diagram 3

9/16 - 5/8 in. (14-16 mm) wire rope
Insert small end first.

7/16 - 1/2 in. (11-13 mm) wire rope
Insert large end first.

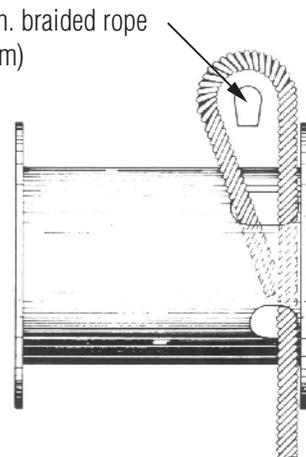


Anchoring Braided Rope: L Series

A special wedge is used to anchor 1 and 1 1/8 in. (25 & 28 mm) braided synthetic rope. The installation procedure is the same as for anchoring wire rope.

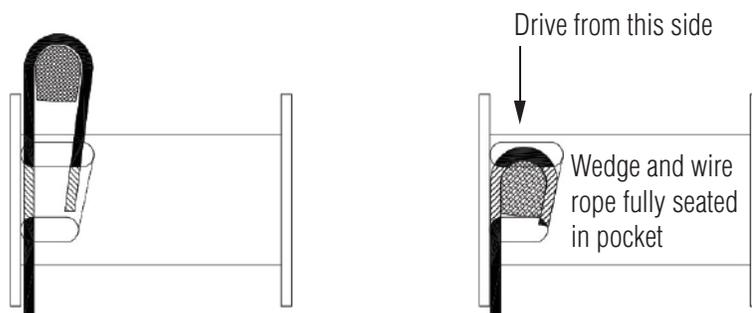
Diagram 4

1 - 1 1/8 in. braided rope (25-28 mm)



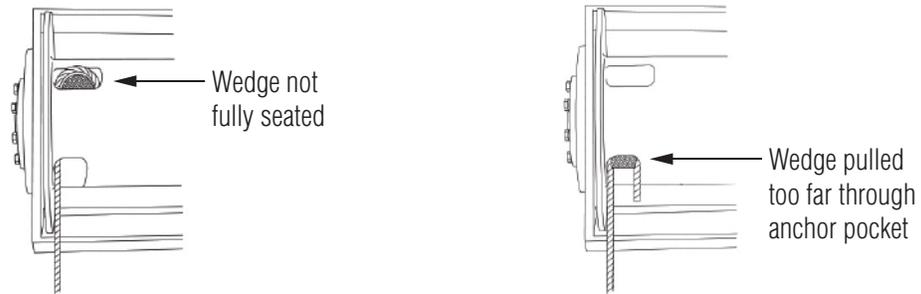
Correct Installation

Diagram 5



Incorrect Installation

Diagram 6

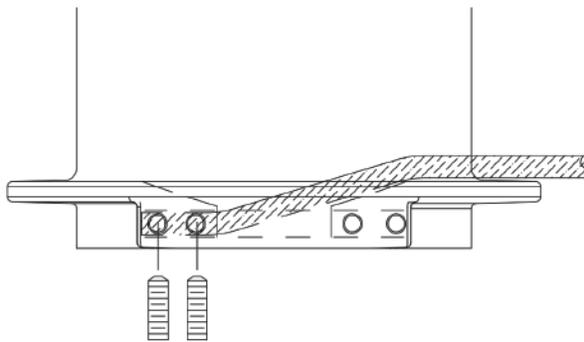


Anchoring Wire Rope: N Series

Prepare the end of the wire rope as recommended by the wire rope manufacturer. Insert the free end of the wire rope through the opening in the drum flange. Push the wire rope into the anchor pocket until the end of the wire rope is even with the outer edge of the pocket. Install the set screws and tighten until the wire rope deforms under the set screws and the wire rope is held securely.

The set screw anchor system is designed for use only with 9/16 - 5/8 in. (14-16 mm) wire rope.

Diagram 7



Anchoring Wire Rope: R Series

Re-usable, field-installed spiral ferrules for the recommended wire rope size are supplied with all winches, and also are available from APPI. The ferrules are for use with standard sixstrand, IWRC (Independent Wire Rope Core) type wire rope.

Step One

Insert cable through the small opening of the ferrule. Spread strands and lay them in individual grooves in spiral wedges.

Step Two

Tap wedges and cable into the ferrule leaving approximately 3/8 in. (10 mm) extending from the top. The first load will seat cable and wedges securely in the ferrule.

Diagram 8



Operating Instructions

The safe operation of this product is solely dependent upon the owner and/or operator's skill, knowledge and judgment. Only those qualified and familiar with all operating guidelines, safety codes and regulations related to rigging, wire rope and winch and/or hoist usage should operate this unit.

The determination of suitability for this product for any specific use is the responsibility of the owner and/or operator. The following guidelines are to be used only as a reference.

Preparing for Operation

Inspect the condition of all components, including mounting bolts, electrical connections, sheaves, wire rope, hook, rigging, etc.

Verify the line pull required to move your desired load and make sure you do not exceed the load rating of the unit.

Test for proper forward and reverse operation without a load.

Operating the Unit

Ensure that the load is free of objects around it.

Connect the load to hook with a sling or other approved device. Never hook the wire rope around a load and onto itself.

Use the control switch on the pendant intermittently to take up wire rope slack to avoid shock-loads, which can momentarily exceed the unit and wire rope rating. Move the load slowly at first to make sure the load is securely attached to the hook.

Do not allow the hook to be any closer than two feet from the drum to prevent damage to the unit and wire rope.

Always inspect and carefully rewind the wire rope after each use. Improperly spooled, kinked or tangled wire rope will damage and shorten the life of the wire rope.

Remote Control Pendant

The remote pendant control is used to "power in" and "power out" the wire rope. Depressing the power in button will cause wire rope to wind on the drum and depressing the power out button will cause wire rope to wind off the drum. Each button is spring-loaded and will automatically return to the 'OFF' position when released. Do not attempt to push both buttons at the same time. If the buttons do not work properly, **stop using the unit immediately** and contact your dealer. **Do not operate the unit** until the problem is corrected.

Duty Cycle

These units are rated for continuous duty and may be operated up to 40 minutes out of each hour. Factors such as altitude, ambient temperature, air quality, fluctuations in voltage, motor cleanliness and the frequency of start/stop cycles all affect the duty cycle.

Braking System

Any time the unit is stopped, the brake will automatically engage against the load. The manual release on the motor/brake assembly will disengage the brake in emergency situations. Never leave any load unattended without properly securing it.

Operating Safety Precautions

1. Never touch the wire rope or rigging while another person is at the control switch or at anytime while operating the unit.
2. Never attempt to pull a load with less than five wraps of wire rope around the drum. Fewer wraps could cause the wire rope anchor to break and release the wire rope and load.
3. Keep the operator, assistants and spectators at a safe distance from the wire rope and rigging and out of the path of the load during the lifting operation. If the wire rope breaks or pulls loose under load, it can lash back with enough force to cause property damage, injury or even death.
4. Keep hands away from wire rope and hook while operating the unit. Never let the wire rope slide through your hands. Always wear heavy leather gloves when handling wire rope.
5. Never touch the wire rope or hook while they are under load.

Maintenance

Maintenance of this product is the sole responsibility of the owner and/or operator.

The determination of suitability for this product for any specific use is the responsibility of the owner and/or operator. The following guidelines are to be used only as a reference.

Periodically inspect the unit for general wear and tear. Immediately determine the cause of any change in performance or sound during operation and take corrective action as required.

Keep unit, wire rope and remote control free from contaminants. Use a clean rag or towel to remove any dirt and debris. If necessary, unwind the unit completely, wipe clean, and rewind properly before storage.

Inspect the remote control and/or pendant for damage. Store remote control and/or pendant in a protected, clean, dry area whenever possible.

Gearmotor Maintenance

WARNING

Always ensure equipment is secure and electrical power is off before removing or performing maintenance on the drive assembly.

All gearmotors are supplied with the correct grade and quantity of lubricating oil for the specified mounting position.

The oil level should be checked periodically. Remove the plated (non-painted) oil level plug. The oil level is correct when the surface of the oil is level with the lowest point of that tapped hole.

Oil levels and oil quality should be checked at frequent intervals, depending on usage and the operating environment. Oil changes are required at intervals of 10,000 operating hours or every two years, whichever comes first. If a synthetic oil lubricant is used, then this period can be extended to 20,000 operating hours or every four years, whichever comes first. In applications where hostile operating conditions exist, such as high humidity, corrosive environment, or large temperature changes, the lubricant should be changed at more frequent intervals.

Grease packed bearings should be cleaned and regreased every 10,000 hours or 20,000 hours for synthetic grease. Input (high speed) bearings should not be overgreased. They should be filled with grease not to exceed 1/3 of the bearing's free volume. For output bearings and bearings with replaceable grease shields, fill to 2/3 of their free volume.

When the recommended lubricant is not available, it is permissible to use a lubricant having equivalent characteristics but we do not recommend that lubricants of different brands be mixed. Under no circumstances should synthetic lubricants be mixed with one another or with one another or with one having a mineral base.

Readjusting the Brake Air Gap

A properly adjusted brake air gap is critical for correct operation. The following table indicates the required air gap measurement:

Motor Size	Brake Size	Air Gap
DT71 – DT100	BM(G)05 – BM(G)4	0.010-0.024" (0.25-0.6 mm)
DV112 – DV225	BM(G)8 – BM31	0.012-0.047" (0.3-1.2 mm)
DV180 – DV225	BM32 – BM62 Double Disc	0.016-0.047" (0.4-1.2 mm)
DV250 – DV280	BMG61	0.012-0.047" (0.3-1.2mm)
	BMG122 Double Disk	0.016-0.047" (0.4-1.2mm)

Prolonged use of the brake will wear the brake disc lining. This wear increases the air gap. When the air gap approaches its maximum value, the brake must be re-adjusted. To readjust the brake, follow the procedure below.

1. Remove the fan cover, fan snap ring, fan, rubber seal, and any accessories at the fan end.
2. Insert a feeler gauge between the brake coil body and the stationary disc, tighten the adjusting nuts until the minimum value for the air gap is reached equally around the brake. With motor size 160L and up (brakes BM30 to BM62) first screw the threaded bushings (24) into the endshield. After setting the air gap, lock the bushings against the coil body.
3. Ensure a play of 0.06" to 0.08" (1.5 to 2 mm) in the releasing arm. See "THE HAND RELEASE MECHANISM."

Replacement of the Brake Disc

Extended operation of the brake may wear the brake disc beyond acceptable limits. The thickness of the brake disc can be measured to determine if this has occurred.

Motor Size	Brake Size	Min. Disc (26) Thickness
DT71 – DT100	BM05 – BM4	0.354" (9 mm)
DV112 – DV225	BM8 – BM62	0.394" (10 mm)
DV250 – DV280	BMG61 – BMG122	0.472" (12 mm)

If the brake disc (26) is worn below the measurement given, it must be replaced. If the thickness is greater than the specifications above, the brake disc is still usable and the brake can be readjusted.

The Hand-Release Mechanism

Most brakes are supplied with a hand-operated release lever. This allows opening of the brake without applying power, allowing for adjustments on the driven machinery.

There are two brake release mechanisms available:

1. The “BMHR” type requires a lever to be inserted into the release arm. To open the brake, pull the lever away from the motor. It will re-engage automatically, once the lever is released. The lever, when not used, is attached to the motor’s cooling fins with clamps.
2. The screw-type “BMHF” arrangement requires a hexagon key which, when turned clockwise, opens the brake.

Since the stationary disc will move away from the coil body during the brake’s operation, it is vital that there is free play (floating clearance) on the release arm of 0.060-0.080” (1.5-2.0 mm). The springs should be placed between the arm and the nuts to eliminate noise.

⚠ CAUTION
The brake release mechanism is not used to change the brake’s torque setting. There must always be clearance on the lever.

Drum

Mobilgear SHC 629 or 630 synthetic gear oil or equivalent can be utilized in temperatures from -30°F to 130°F.

⚠ CAUTION
The drum portion of the assembly is shipped with a minimum amount of lubricating oil. Lubricating oil must be added to the drum prior to operation.

Gear oil changes are recommended for every 1000 hours or six (6) months of use. Use recommended type of gear oil for prevailing ambient temperature. Annual disassembly and inspection of all wear items in compliance with American National Standards Institute (ANSI) specification B30.5c 1987 and American Petroleum Institute (API) recommended practice RP 2D section 3 is recommended.

The gear oil level should be checked every 500 operating hours or three (3) months, whichever occurs first. The oil should be level with the bottom of this opening.

The gear oil should be changed after the first one hundred (100) hours of operation, then every 1,000 operating hours or six (6) months, whichever occurs first. The gear oil must be changed to remove wear particles that erode bearings, gears and seals. The gear oil should also be changed whenever the ambient temperature changes significantly and an oil from a different temperature range would be more appropriate.

Approximate Oil Capacities	
HL Series, -01 Drum	6 pints
HL Series, -02 Drum	6 pints
HL Series, -04 Drum	7 pints
HL Series, -05 Drum	7 pints
HN/WN Series, -01 Drum	5 pints
HR/WR Series, -01 Drum	14 pints
HR/WR Series, -02 Drum	15 pints

⚠ WARNING

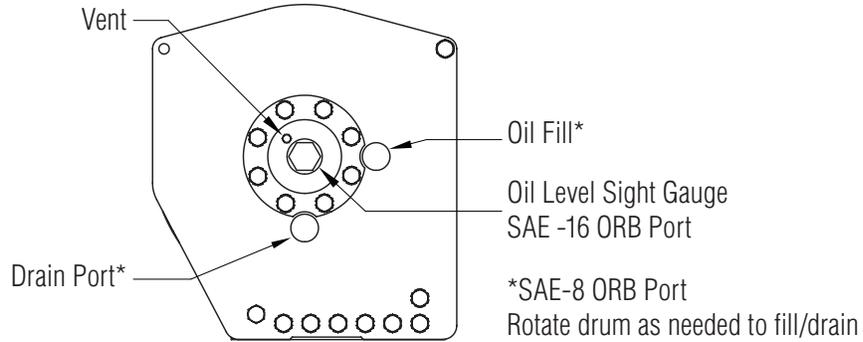
Always ensure equipment is secure and electrical power is off before removing or performing maintenance on the drive assembly.

⚠ CAUTION

When the recommended lubricant is not available, it is permissible to use a lubricant having equivalent characteristics but we do not recommend that lubricants of different brands be mixed. Under no circumstances should synthetic lubricants be mixed with one another or with one having a mineral base.

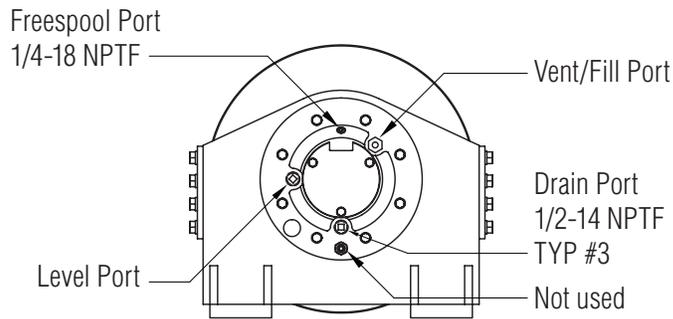
HL Series

Diagram 9



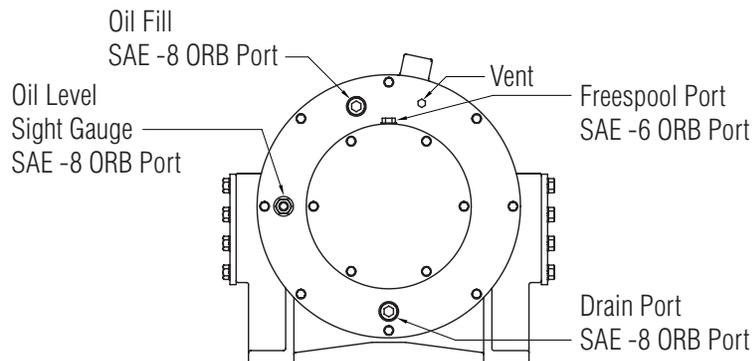
HN/WN Series

Diagram 10



HR/WR Series

Diagram 11



Wire Rope

Inspect the wire rope before and after each operation. The life of the wire rope is directly related to the care and use it receives. Wire rope must be replaced when it has one or more of the following defects as defined in the American National Standards Industry Handbook A10.5 or as defined by OSHA:

- Corrosion
- Frayed or broken wire
- Abrasions
- Kinking
- Heat damage
- Any apparent reduction of wire rope diameter

STOP USING THE UNIT AND REPLACE THE WIRE ROPE if any of the defects listed above are discovered.

Using light oil on the wire rope and hook can keep rust and corrosion from forming.

Troubleshooting Guide

General Symptom	Potential Cause
Unit will not produce line pull/line speed as listed.	1. Unit is mounted to an uneven surface.
	2. Cable sheaves or block purchase not turning freely.
	3. Load is constrained.
	4. Inadequate voltage.
Unit overheats prematurely.	1. Environmental factors (altitude, ambient temperature, air quality, fluctuations in voltage, motor cleanliness).
	2. Start/stop cycles too frequent to allow proper spool-up of unit.
	3. Load beyond rated capacity.
Unit does not respond to control input.	1. Limit switch contacts are OPEN.
	2. Unit is not correctly connected to power source.
Unit will lower load, but will not raise load.	1. Load is beyond rated capacity.
	2. Load is constrained.
	3. Upper limit switch contact is OPEN.
Motor brake does not hold.	1. Manual release lever is engaged.
	2. Brake lining is worn.
	3. Improper gap adjustment.

General Symptom	Potential Cause
Motor brake drags/ overheats.	1. Unit operated beyond suggested duty cycle.
	2. Solenoid which releases brake gets inadequate voltage (use of extension cords is a common cause).
	3. Solenoid which releases brake has failed.
	4. Improper gap adjustment.
	5. Damage to fan or fan cover.
Wire rope stacks against flanges.	1. Unit is not level.
	2. Line leads to a point not in line with the drum.
	3. Distance to cable sheaves, block purchase or load inadequate for proper fleet angle.
Wire rope spools poorly.	1. Wire rope tension was lost.
	2. Wire rope not installed properly.
	3. Tension not adequate to spool wire rope on tightly.
	4. Distance to cable sheaves, block purchase or load inadequate for proper fleet angle.

LIMITED WARRANTY

Allied Power Products, Inc. (APPI) warrants the products it manufactures to be free from defects in material and workmanship to the original buyer for a period of 24 MONTHS from the date of shipment from APPI. All warranties for products sold but not manufactured by APPI are solely that of the manufacturer.

This warranty and liability of APPI is limited to the replacement or repair of any product manufactured by APPI if the product is found – upon examination at our facility – defective due to materials or workmanship. All freight, removal and/or installation charges shall be borne by the Buyer.

This warranty does not cover failures or malfunctions found by APPI to result from:

- Improper installation, operation and/or maintenance of the product.
- Replacements, repairs and/or alterations made by or on behalf of the buyer without written approval from APPI.
- Use of accessories and/or other components in conjunction with the product without written approval from APPI.

APPI SHALL NOT IN ANY EVENT BE HELD LIABLE FOR ANY CONSEQUENTIAL OR INCIDENTAL DAMAGE OR FOR EXPENSES OR DELAY CAUSED BY DEFECTIVE MATERIAL OR WORKMANSHIP.

Except for the above warranty, APPI makes no other express or implied warranties and NO WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

This warranty shall be governed by and construed in accordance with the laws of the State of Oregon and enforced in Oregon courts. If any portion of this limited warranty and limitation on damages is determined to be invalid or unenforceable, the remainder of the warranty shall remain in full force and effect.

All warranty claims must be submitted to APPI in writing to:

Allied Power Products, Inc.
6590 SW Fallbrook Place
Beaverton, OR 97008



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