Pull MASTER

THE LOGICAL CHOICE

INSTRUCTION AND PARTS MANUAL

MODEL H75

PLANETARY HYDRAULIC WINCH

H75 - X - 191 - 3

TWG

POWER to Move the World™

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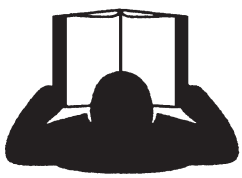
A DOVER COMPANY



READ THIS MANUAL BEFORE INSTALLING, OPERATING OR SERVICING THIS PRODUCT. THIS MANUAL CONTAINS IMPORTANT INFORMATION. MAKE THIS MANUAL AVAILABLE TO ALL PERSONS RESPONSIBLE FOR THE OPERATION, INSTALLATION, SERVICING AND MAINTENANCE OF THIS PRODUCT.

Effective 2011/10/01
SUPERSEDES ALL PRIOR WARRANTIES

LIMITED WARRANTY

50130-0

Seller warrants that each article (whether Gear Drive Products, Brake Products and/or Winch Products, all of which are covered hereunder) sold under this order shall at the time of shipment (i) conform to applicable specifications, and (ii) be free from defects in material and workmanship during normal and ordinary use and service (the "Warranty").

Buyer's exclusive remedy and Seller's sole obligation under this Warranty shall be, at Seller's option, to repair or replace any article or part thereof which has proven to be defective, or to refund the purchase price of such article or part thereof. Buyer acknowledges that Buyer is knowledgeable concerning the articles covered by this Warranty and sold in connection therewith which are being purchased, that Buyer has reviewed this Warranty and that the remedies provided hereunder are adequate and acceptable to Buyer.

This Warranty shall expire one (1) year from the date the article is first shipped by Seller. Notice of claimed breach of this Warranty must be given by Buyer to Seller within the applicable period. Such notice shall include an explanation of the claimed warranty defect and proof of date of purchase of the article or part thereof for which warranty coverage is sought. No allowances shall be made by Seller for any transportation, labor charges, parts, "in and out" costs, adjustments or repairs, or any other work, unless such items are authorized in writing and in advance by Seller. Nor shall Seller have any obligation to repair or replace items which by their nature are expendable.

If an article is claimed to be defective in material or workmanship, or not to conform to the applicable specifications, Seller will either examine the article at Buyer's site or issue shipping instructions for return to Seller. This Warranty shall not extend to any articles or parts thereof which have been installed, used, or serviced otherwise than in conformity with Seller's applicable specifications, manuals, bulletins, or instructions, or which shall have been subjected to improper installation, operation, or usage, misapplication, neglect, incorrect installation, overloading, or employment for other than normal and ordinary use and service. This Warranty shall not apply to any article which has been repaired, altered or disassembled, or assembled by personnel other than those of Seller. This Warranty shall not apply to any article upon which repairs or alterations have been made (unless authorized in writing and in advance by Seller). This Warranty shall not apply to any articles or parts thereof furnished by Seller to Buyer's specifications and/or furnished by Buyer or acquired from others at Buyer's request.

SELLER MAKES NO EXPRESS WARRANTIES AND NO IMPLIED WARRANTIES OF ANY KIND, OTHER THAN THE WARRANTY EXPRESSLY SET FORTH ABOVE. SUCH WARRANTY IS EXCLUSIVE AND IS MADE AND ACCEPTED IN LIEU OF ANY AND ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

Buyer expressly agrees that Seller is not responsible to perform any work or investigation related in any way to torsional vibration issues and is not responsible for the detection or remedy of Natural Frequency Vibration of the mechanical system in which the unit is installed. Buyer acknowledges, understands and agrees that this Warranty does not cover failures of the unit which result in any manner from the operation of the machine or unit at vibration frequencies at or near the natural frequency vibration of the machine in such a way that damage may result. Buyer expressly agrees that Seller is not responsible for failure damage or accelerated wear caused by machine or ambient vibration. Further, Buyer acknowledges and agrees that Buyer is always solely responsible for determination and final approval of the “application factor” which may be used in Seller’s calculations and this application factor is 1.0 unless otherwise stated in Seller’s quotation specifications.

The remedies for this Warranty shall be only those expressly set forth above, to the exclusion of any and all other remedies of whatsoever kind. The limited remedies set forth above shall be deemed exclusive, even though they may fail their essential purpose. No agreement varying or extending the foregoing Warranty, remedies, exclusions, or limitations shall be effective unless in writing signed by an executive officer of Seller and Buyer. This Warranty is non-transferable. If a party who had purchased articles from Buyer, or from persons in privity with Buyer, brings any action or proceeding against Seller for remedies other than those set forth in this Warranty, Buyer agrees to defend Seller against the claims asserted in such action or proceeding at Buyer’s expense, including the payment of attorneys’ fees and costs, and indemnify Seller and hold Seller harmless of, from and against all such claims, actions, proceedings or judgments therein. Buyer also agrees to defend and indemnify Seller of, from and against any loss, cost, damage, claim, debt or expenses, including attorneys’ fees, resulting from any claims by Buyer or third parties to property or injury to persons resulting from faulty installation, repair or modification of the article and misuse or negligent operation or use of the article, whether or not such damage to property or injury to persons may be caused by defective material, workmanship, or construction.

ADVISORY: *Winches and hoists are not approved for lifting or handling personnel or persons unless specifically approved in writing from Seller for the specific intended application.*

Under no circumstances shall Seller be liable (i) for any damage or loss to any property other than the warranted article or part thereof, or (ii) for any special, indirect, incidental, or consequential damage or loss, even though such expenses, damages, or losses may be foreseeable.

The foregoing limitations on Seller's liability in the event of breach of warranty shall also be the absolute limit of Seller's liability in the event of Seller's negligence in manufacture, installation, or otherwise, with regard to the articles covered by this Warranty, and at the expiration of the Warranty period as above stated, all such liabilities shall terminate. Buyer’s purchase of any article(s) covered by this Warranty shall constitute acceptance of the terms and conditions hereof and shall be binding upon Buyer and Buyer’s representatives, heirs and assigns. The laws of the Province of British Columbia shall govern Buyer’s rights and responsibilities in regard to this Warranty and the transaction(s) subject thereto, and the Province of British Columbia shall be the exclusive forum and jurisdiction for any action or proceedings brought by Buyer in connection herewith or any dispute hereunder. If any of the terms and conditions contained within this Warranty are void, the remaining provisions thereof are and shall remain valid and enforceable.

SAFETY RECOMMENDATIONS

DANGER

FAILURE TO COMPLY WITH THE FOLLOWING SAFETY RECOMMENDATIONS AND LOCAL RULES AND REGULATIONS WILL RESULT IN PROPERTY DAMAGE, SEVERE INJURY OR DEATH.

Definition: **Caution** indicates a potentially hazardous situation which, if not avoided may result in minor or moderate injury.

Definition: **Warning** indicates a potentially hazardous situation which, if not avoided could result in death or serious injury.

Definition: **Danger** indicates a potentially hazardous situation which, if not avoided will result in death or serious injury.

The planetary hydraulic winches are made for hoisting and lowering loads and to be operated by trained and professional personnel. They are not designed for operations involving lifting or moving personnel. The winches are powered by hydraulic power. The ropes / cables for hoisting operations are not supplied by PULLMASTER. The winches are always assembled in an application, they do not function as an independent machine and it is not allowed to use them as such.

The winches are to be used within the specifications as listed in the manual under “SPECIFICATIONS”. Other use as foreseen in the functional description of the hydraulic winch is not allowed without written permission from PULLMASTER.

1. Do not install, operate or service winch before reading and understanding manufacturer's instructions.
2. The winch described herein is not designed for operations involving lifting or moving personnel.
3. Do not lift or carry loads over people.
4. Do not exceed recommended operating pressure (psi) and operating volume (gpm).
5. Do not jerk the winch. Always smoothly accelerate and decelerate load.
6. Do not operate a damaged, noisy or malfunctioning winch.
7. Do not leave a load suspended for any extended period of time.
8. Never leave a suspended load unattended.
9. Winch should be maintained and operated by qualified personnel.
10. Inspect winch, rigging, mounting bolts and hoses before each shift.
11. Warm-up equipment before operating winch, particularly at low ambient temperatures.
12. Verify winch function by raising and lowering a full test load to a safe height before each shift.
13. Do not weld any part of the winch.
14. Verify gear lubrication and brake circulation supply and return before operating winch.
15. Be sure of equipment stability before operating winch.
16. Wear proper clothing to avoid entanglement in rotating machinery.
17. Always stand clear of the load.
18. Use only recommended hydraulic oil and gear lubricant.
19. Keep hydraulic system clean and free from contamination at all times.
20. Maintain winch and equipment in good operating condition. Perform scheduled maintenance regularly.
21. Keep hands clear when winding wire rope onto the winch drum.
22. Do not use the wire rope as a ground for welding.
23. Rig the winch carefully. Ensure that the wire rope is properly anchored to the correct cable anchor slot at the cable drum.
24. Do not lift a load with a twisted, kinked or damaged wire rope.
25. Consult wire rope manufacturer for size, type and maintenance of wire rope.
26. Maintain five wraps of wire rope under tension on the cable drum at all times.
27. In case of a power failure or breakdown leading to an unexpected stop of the hydraulic power circuit, stand clear of the area and the load being hoisted, take the necessary precautions to prevent access to area where the load is halted.
28. Clean up any oil spillage immediately.
29. Winches should be stored in inside facility.
30. Do not store beyond a period of one year without operation because of limited shelf life of “o” rings and oil seals.
31. Wear proper clothing and personal protection equipment such as, footwear, safety goggles and a hard hat. Read manual first.

DESCRIPTION OF THE MODEL H75

GENERAL DESCRIPTION:

The PULLMASTER Model H75 is a planetary hydraulic winch with reversing speeds 4.1 times faster than forward speed. The main components of this unit are:

- hydraulic gear motor
- multi disc brake with static and dynamic function
- primary planet reduction
- secondary planet reduction
- final planet reduction
- brake housing
- final drive housing
- cable drum

FUNCTION IN FORWARD ROTATION (HOISTING):

In forward rotation, or when the winch is pressurized for hoisting, the output torque and rpm of the hydraulic motor are transmitted to the sungear of the primary planet reduction. The output torque and rpm of the primary reduction stage are transmitted to the secondary reduction stage by the secondary sungear, which is splined to the primary planet hub. The final sungear is splined to the secondary planet hub and transmits the output torque and rpm of the secondary reduction stage to the final planet reduction stage. The final planet hub is splined onto the cable drum. In forward rotation, or when a load is raised, an over-running clutch, which connects the motor drive shaft to the automatic brake assembly, permits free rotation of the sungear, without effecting the brake. When the winch rotation is stopped, the load on the cable drum causes the over-running clutch to lock and the maximum load is held safely by the disc brake.

FUNCTION IN REVERSE ROTATION (LOWERING):

In reverse rotation, or when the winch is pressurized for lowering of a load, hydraulic pressure from the reverse side of the hydraulic motor is channelled to the brake piston, causing the brake piston to release the multi-disc brake against a number of brake springs. The over-running clutch, which connects the motor drive shaft with the internal gear of the primary planet reduction, locks, causing the internal gear to rotate at the same rpm as the primary sungear. Thus, the primary reduction stage is eliminated and the output torque and rpm of the hydraulic motor are transmitted directly to the final planet reduction stage. With the primary reduction stage eliminated, the reduction is reduced to a ratio of 37.9:1 and the cable drum will rotate 4.1 times faster than in forward or hoisting speed.

If the load on the cable drum tends to effect the lowering speed, the resulting pressure drop in the brake piston causes friction between the brake discs and divider plates. In this way a completely smooth lowering speed can be achieved in a stepless operation by modulation of the winch control handle. When the control handle is returned to neutral position, rotation stops and the disc brake applies automatically.

During the lowering operation of the winch, the friction created by the brake discs results in heat. This heat is dissipated by the circulation of hydraulic fluid through the brake housing, supplied internally from the motor, or externally, depending on the brake code of the winch. For efficient cooling of the automatic brake, models with external circulation should be adjusted to supply 7.0 (US) gpm - 26 l/min. This circulation flow must be returned directly to the reservoir with a permissible back pressure of 30 psi (2 bar).

IMPORTANT: Under no circumstances must the pressure in the brake housing be permitted to exceed 30 psi (2 bar). Excessive pressure in the brake housing will damage the oil seal separating the brake housing from the drum interior. Damage to this seal will cause the drum to fill up with hydraulic fluid. In order to prevent potential damage to the drum seals and the end cover of the winch, when the cable drum fills up with hydraulic fluid, a breather relief (see PARTS REFERENCE, item 130) is installed on the end cover. The breather relief bleeds to atmosphere and serves as a warning signal that the oil seal between brake housing and drum has been damaged.

EXPLANATION OF MODEL CODING

H 75 X - XX - XX - XX X - X XXXX

BASIC UNIT SERIES
H = Rapid reverse

SIZE OF UNIT

REDUCTION RATIO
Only used for non standard reduction ratios

TYPE OF BRAKE
-7 Automatic brake, clockwise drum rotation, external circulation flow

-8 Automatic brake, external brake release, clockwise drum rotation, external circulation flow

-9 Automatic brake, external brake release, counterclockwise drum rotation, external circulation flow

-10 Automatic brake, counterclockwise drum rotation, external circulation flow

HYDRAULIC MOTOR
-191 Hydraulic motor, 3 inch gear section (12.3 cubic inch displacement) (Other gear sections for this motor are optional)

DRUM SIZE
-3 14 inch drum diameter X 38 inch flange diameter X 36 inch length

OPTIONS

DESIGN REVISION

SPECIFICATION NUMBER
Describes features not identified by preceding codes

NOTE: Clockwise and counterclockwise drum rotation is the direction of rotation for pulling or hoisting, established by looking at the hydraulic motor.

OPTIONS

COUNTERCLOCKWISE ROTATION:

The drum rotation of the standard PULLMASTER Model H75 planetary winch is clockwise for hoisting when looking at the hydraulic motor of the winch. Drum rotation for counterclockwise hoisting direction is available as an option.

INTERNAL CIRCULATION:

The PULLMASTER Model H75 planetary winch has an external circulation flow supply line to cool the brake. Internal circulation is available as an option.

EXTERNAL BRAKE RELEASE:

PULLMASTER planetary winches can be supplied with an **external brake release** which permits release of the automatic disc brake from an external pressure source.

DANGER

FAILURE TO PROPERLY VENT EXTERNAL BRAKE RELEASE PORT WILL TRAP BRAKE PRESSURE AND ALLOW THE LOAD TO DROP, CAUSING PROPERTY DAMAGE, SEVERE INJURY OR DEATH. WINCHES SUPPLIED WITH EXTERNAL RELEASE OPTION MUST BE CONNECTED ACCORDING TO "TYPICAL HYDRAULIC CIRCUIT".

CABLE DRUM SIZES:

Aside from the standard drum sizes listed in APPENDIX A, the PULLMASTER Model H75 planetary winch can be supplied with optional drums to accommodate large wire rope storage capacity.

DRUM GROOVING:

Cable drums for the PULLMASTER Model H75 planetary winch can be grooved. Where this option is a requirement, it is necessary to state the size of wire rope which is to be used with the winch.

OPTIONAL GEAR SECTION FOR THE HYDRAULIC MOTOR:

The performance of the standard PULLMASTER Model H75 planetary winch may be changed by using a different displacement motor. (Contact the factory for performance information.)

HYDRAULIC MOTORS FOR HIGH PRESSURE HYDRAULIC SYSTEMS:

The operating pressure of the PULLMASTER Model H75 planetary winch is limited to 3000 psi (207 bar). For hydraulic systems operating with a higher range of hydraulic pressure, the winch can be supplied with a hydraulic piston motor, which will provide for the same basic performance in terms of line pull and line speed capacity. (Contact the factory for this requirement.)

FREESPOOLING:

This option permits wire rope being pulled off the cable drum by an operator. **Freespooling** should not be confused with **free fall**. The **freespool** coupling cannot be disengaged or re-engaged with a load on the wire rope or while the cable drum is turning.

The PULLMASTER WINCH CORPORATION will consider other options for quantity requirements.

SPECIFICATIONS

Performance specifications are based on standard hydraulic motor, gear ratio and cable drum with 1 1/8" inch diameter wire rope. For other cable drums refer to APPENDIX A. For other reductions or motors, refer to supplement inside back cover. Performance specifications for winches supplied with optional motors are provided in attached supplement.

CABLE DRUM DIMENSIONS (– 3 DRUM):

Barrel diameter	14.0 in	356 mm
Flange diameter	38.0 in	965 mm
Barrel length	36.0 in	914 mm

CABLE STORAGE CAPACITY:

(Size of wire rope)		
1 in	2489 ft	759 m
1 1/8 in	2104 ft	641 m
1 1/4 in	1503 ft	458 m

MAXIMUM OPERATING PRESSURE:	2650 psi	183 bar
MAXIMUM OPERATING VOLUME:	142 (US) gpm	538 l/min
MINIMUM OPERATING VOLUME:	30 (US) gpm	114 l/min
DRUM TORQUE AT MAXIMUM PRESSURE:	571,133 lb-in	64,529 Nm
DRUM RPM AT MAXIMUM VOLUME:	Hoisting	16 rpm
	Lowering	67 rpm

HOISTING LINE PULL AT MAXIMUM PRESSURE:

Bare drum	75,522 lb	335.9 kN
Full drum	31,244 lb	139.0 kN

MAXIMUM ALLOWABLE LINE PULL WHEN LOWERING:

Bare drum	18,229 lb	81.1 kN
Full drum	7,542 lb	33.5 kN

HOISTING LINE SPEED AT MAXIMUM VOLUME:

Bare drum	63 fpm	19.2 m/min
Full drum	153 fpm	46.6 m/min

LOWERING LINE SPEED AT MAXIMUM VOLUME:

Bare drum	262 fpm	79.9 m/min
Full drum	634 fpm	193.2 m/min

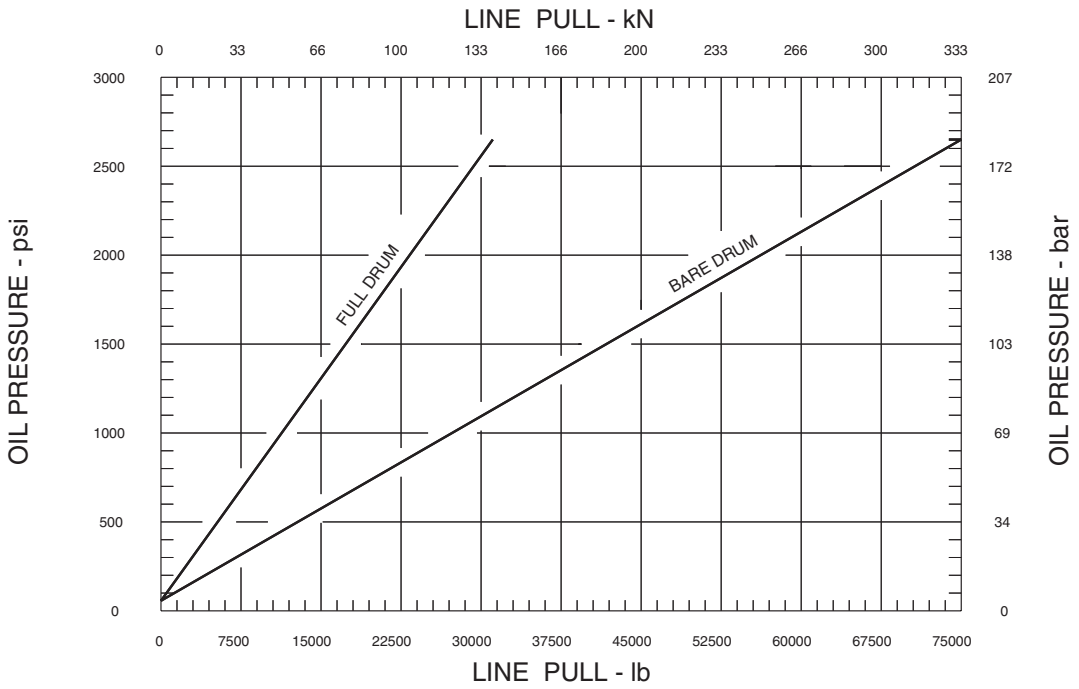
PERMISSIBLE SYSTEM BACK PRESSURE AT MOTOR RETURN PORT:	65 psi	4.5 bar
PERMISSIBLE PRESSURE AT CIRCULATION SUPPLY PORT:	30 psi	2 bar

LUBRICATING OIL: Refer to RECOMMENDATIONS for viscosity and instructions.

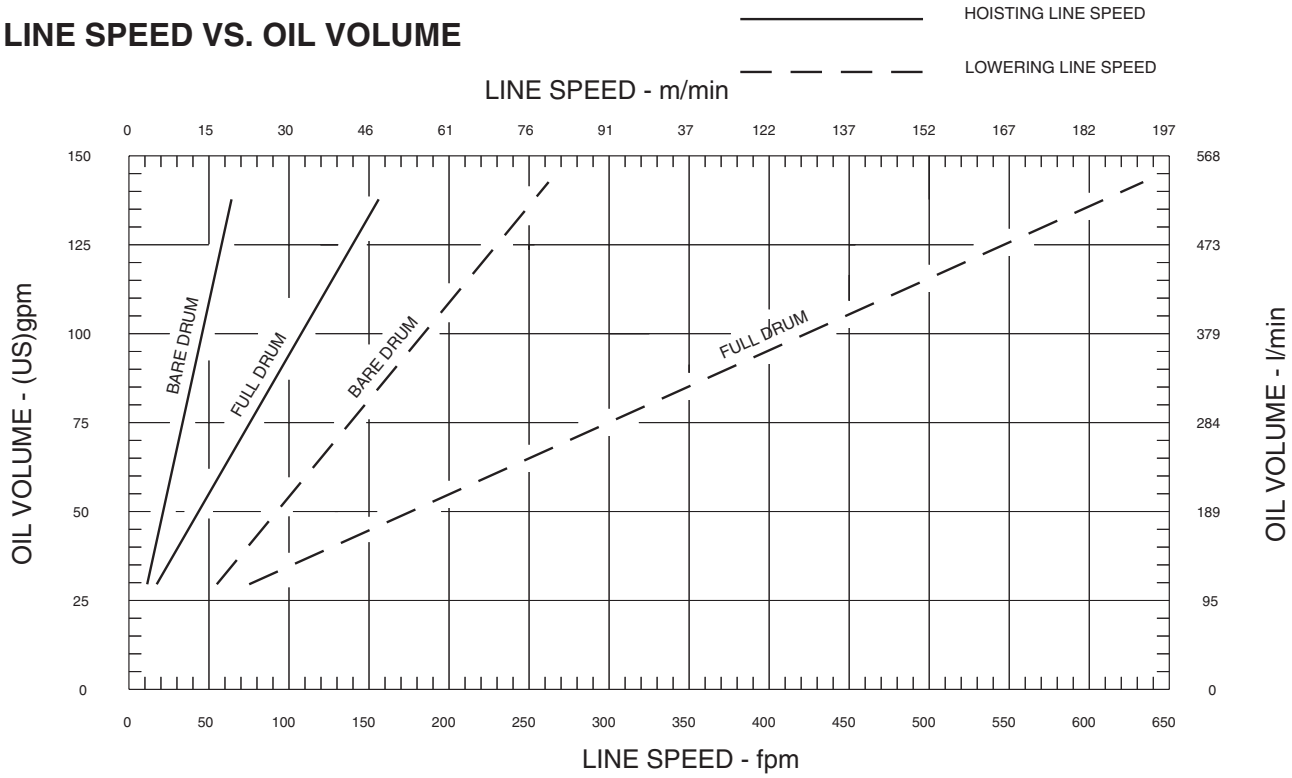
PERFORMANCE GRAPHS

PG-H75

LINE PULL VS. OIL PRESSURE



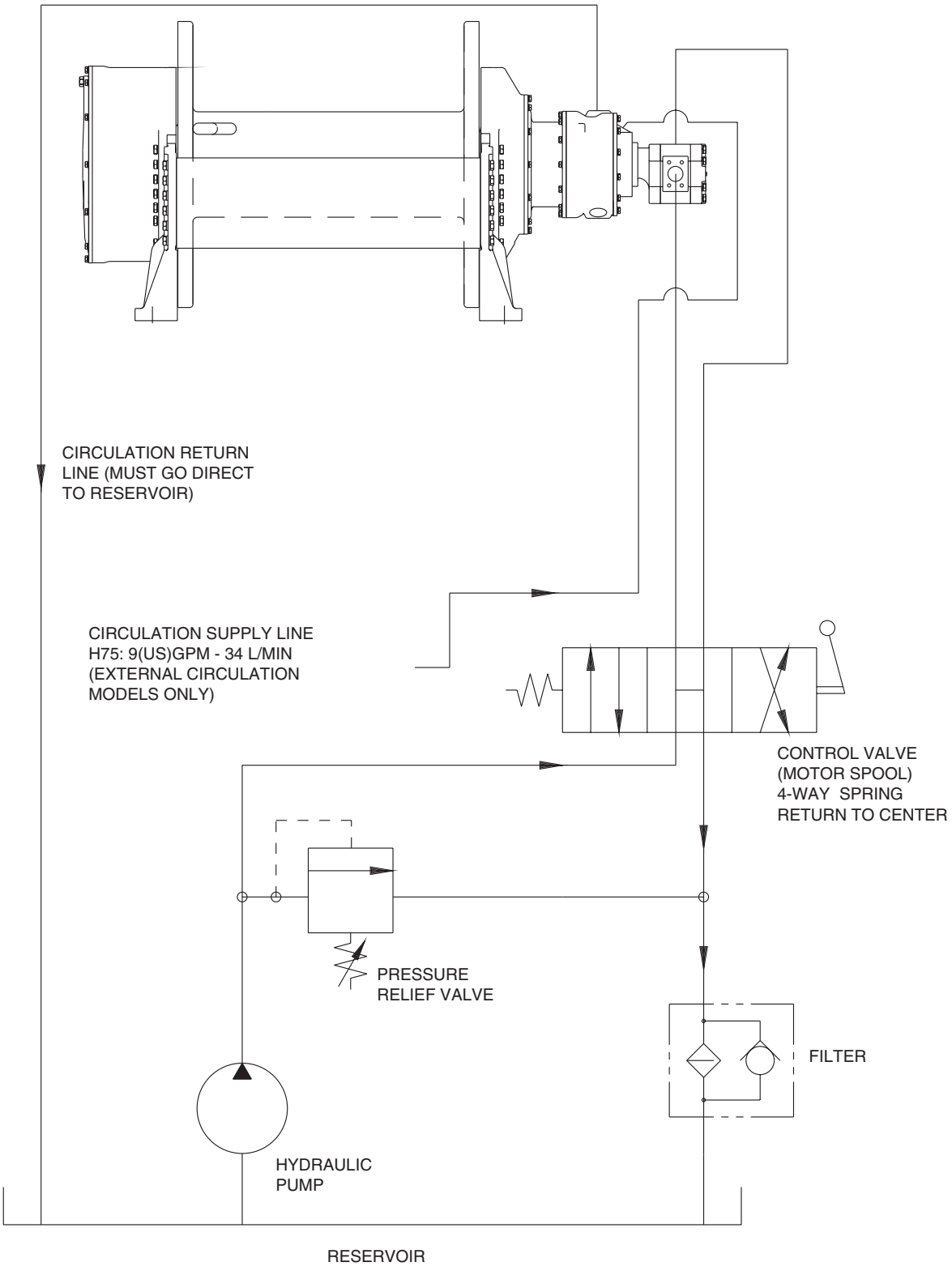
LINE SPEED VS. OIL VOLUME



Performance graphs are based on standard hydraulic motor, gear ratio and cable drum with 1 1/8 inch diameter wire rope.

TYPICAL HYDRAULIC CIRCUIT

HC-H75-C



RECOMMENDATIONS

HYDRAULIC FLUID:

The hydraulic fluid selected for use with PULLMASTER planetary winches should be a high grade, petroleum based fluid, with rust, oxidation and wear resistance. Fluid cleanliness and operating viscosity are critical to winch reliability, efficiency and service life.

For optimum performance, the recommended viscosity range at operating temperature is 81 - 167 SUS (16 - 36 CS). For extreme operating conditions of short duration, the maximum viscosity range of 58 - 4635 SUS (10 - 1000 CS) should not be exceeded.

For optimum performance, the winch recommended hydraulic fluid temperature operating range is 80 - 150F (27 - 66 C). For extreme operating conditions of short duration, the maximum temperature range of -5 - 180F (-21 - 82 C) should not be exceeded.

LUBRICATION:

The winch gear train requires oil bath lubrication. The winch is shipped from the factory without lubricating oil.

IMPORTANT: ADD LUBRICATING OIL BEFORE RUNNING WINCH.

Refer to INSTALLATION DIMENSIONS for location of lubricating oil fill port. Add 15 (US) Gallons (57 Liters) lubricating oil. For normal operating temperature use SAE 90 lubricating oil. Consult lubricating oil supplier or factory for temperatures beyond normal operating range.

HYDRAULIC PUMP:

For maximum performance of the PULLMASTER planetary winch, the hydraulic pump must supply the maximum flow of hydraulic fluid at the hydraulic pressure stated in SPECIFICATIONS.

HYDRAULIC CONTROL VALVE:

The standard control valve used for operation of the PULLMASTER planetary winch must have a four-way, spring return to neutral feature, which provides for open flow from the pressure ports of the winch to the reservoir in neutral position of the control (motor spool). It is important to point out that good speed control, especially when lowering a load, depends on the "metering" characteristics of the control valve. The better the oil flow is "metered" the better will be the speed control.

HYDRAULIC PRESSURE RELIEF:

The hydraulic circuit for the PULLMASTER planetary winch requires a pressure relief set at the operating pressure (see SPECIFICATIONS). Usually, a pressure relief is part of the hydraulic control valve. Where this is not the case, a separate pressure relief valve must be installed and set at the recommended maximum pressure.

HYDRAULIC RESERVOIR:

It is recommended that the hydraulic reservoir has sufficient capacity to provide good heat dissipation in order to prevent over-heating of the hydraulic fluid. The hydraulic reservoir should be made from clean and scale-free material to prevent contamination of the hydraulic fluid. In order to prevent air from being mixed with the hydraulic fluid, the reservoir should have an over-flow baffle separating the return lines from the suction line and all return lines should enter the reservoir below the fluid level. The reservoir should be mounted close to and above the hydraulic pump in a location which provides for free air circulation around the reservoir.

HYDRAULIC HOSES:

The following hydraulic hoses are recommended for maximum efficiency of the PULLMASTER Model H75 planetary winch:

Pressure lines:	Equivalent to SAE 100R12-32
Circulation return line:	Equivalent to SAE 100R4-20
Circulation supply line:	Equivalent to SAE 100R6-12*

* Only for models with external circulation

It is recommended that a larger size of hydraulic hose is installed where the pressure lines or the circulation lines are excessively long.

HYDRAULIC FILTER:

Hydraulic filter recommendations for the hydraulic circuit of the PULLMASTER planetary winch, based on a return line filter, are given as follows:

Average Atmosphere:	10 microns
Dusty Atmosphere:	5 microns

In order to prevent accidental stoppage of the return line flow, the oil filter should have a by-pass feature.

USE OF AN E STOP:

(FOR EUROPEAN MACHINERY DIRECTIVE APPLICATIONS)

The use of an E stop (emergency) is mandatory in the controls circuit. The E stop is to be placed in the operator's control panel. The E stop must be designed and placed in line with EN 60204 and EN 418.

INSTALLATION INSTRUCTIONS

DANGER

FAILURE TO FOLLOW INSTALLATION INSTRUCTIONS WILL RESULT IN PROPERTY DAMAGE, SEVERE INJURY OR DEATH.

The initial installation or mounting of a PULLMASTER planetary winch is critically important for proper operation and performance. If the winch is mounted to an uneven surface, the centre line of the unit can be distorted to a point where the winch will not operate in either direction. It is therefore very important that the following instructions are observed when a PULLMASTER planetary winch is installed:

1) Make certain that the mounting platform is sufficiently strong in order to avoid deflection when a load is lifted.

2) Set the winch on the mounting platform and check Gap “A”, “B”, “C” and “D”.

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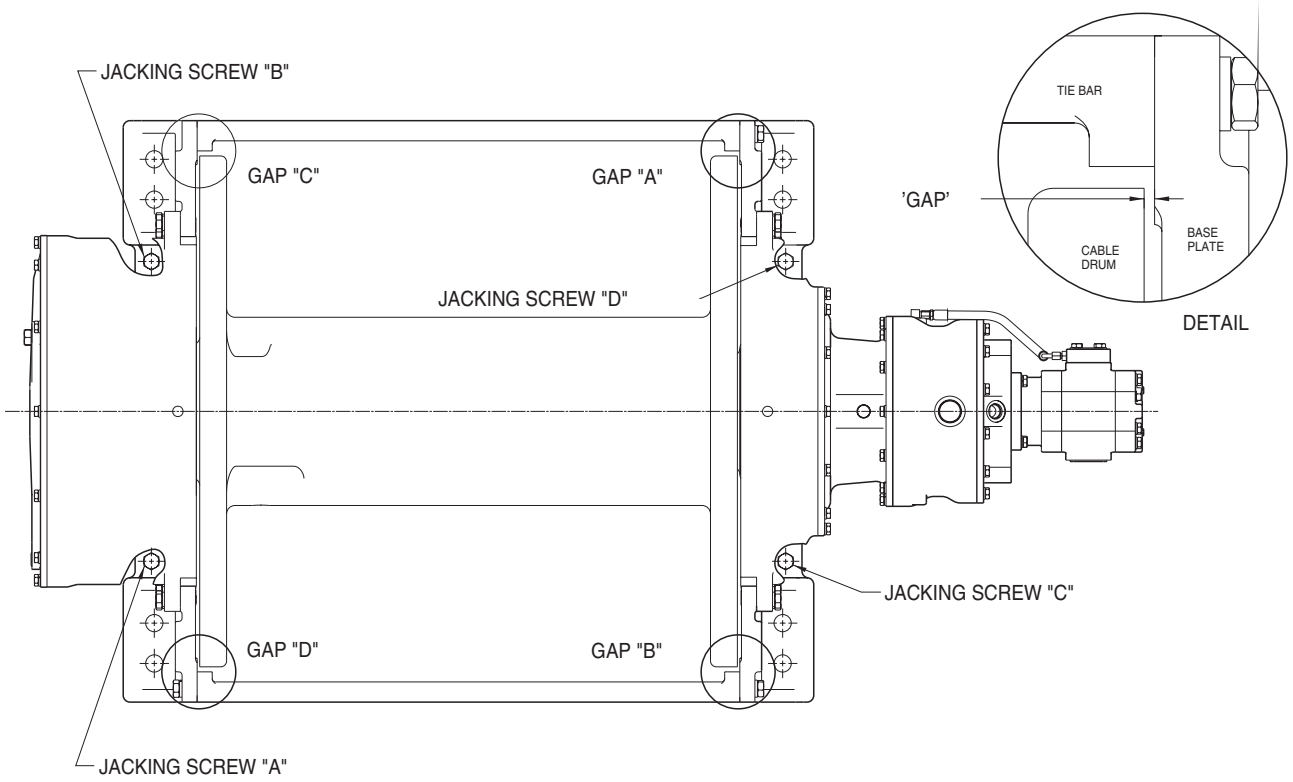


3) If Gap “A” is within .007” to Gap “B” and Gap “C” is within .007” to Gap “D”, proceed to step 5. If Gaps are outside this limit, proceed to step 4.

Note: Difference between Gaps “A” and “B” and Gaps “C” and “D” may not be equal.

INSTALLATION INSTRUCTIONS CONTINUED

4) Gaps can be adjusted as required by adjusting Jacking Screw diagonally opposite to the Gap. Reduce a gap by turning Jacking Screw clockwise or increase a gap by turning Jack Screw counterclockwise.

To adjust Gap “A”	TURN	Jacking Screw “A”.
To adjust Gap “B”	TURN	Jacking Screw “B”.
To adjust Gap “C”	TURN	Jacking Screw “C”.
To adjust Gap “D”	TURN	Jacking Screw “D”.

5) Measure the space underneath the four mounting pads with a feeler gauge and use shim stock of equivalent thickness in the space between the mounting pad and the mounting surface. Install mounting bolts (for bolt size and grade refer to INSTALLATION DRAWING). Tighten mounting bolts per BOLT TORQUE CHART.

6) Fill the winch with lubricating oil up to Oil Level Plug on End Cover or see RECOMMENDATION - LUBRICATION for oil volume required.

7) Use recommended circuit components and hydraulic hoses.

8) The Circulation Return line of the winch should be plumbed in such a manner that the brake housing remains full of oil at all times. Connect the return line directly to reservoir. Do not connect to a common return line.

9) Before operating the winch with a load, verify adequate circulation flow through the Circulation Return Line as stated in TYPICAL HYDRAULIC CIRCUIT. Verify that pressure inside the brake housing, measured at the Circulation Supply Port does not exceed the permissible pressure stated in SPECIFICATIONS.

10) Verify that Breather Relief, item 130, is in place on End Cover, item 120, above oil level. Rotate End Cover if Breather Relief is below oil level.

IMPORTANT: Do not replace breather relief with a pipe plug. The breather relief does not prevent oil seal failure but serves as an indicator or warning that the oil seals between brake housing and the cable drum interior have failed and must be replaced immediately. If these oil seals are changed, additional failure of the drum seal and potential damage to the end cover is prevented.

OPERATING INSTRUCTIONS

DANGER

FAILURE TO FOLLOW OPERATING INSTRUCTIONS WILL RESULT IN PROPERTY DAMAGE, SEVERE INJURY OR DEATH.

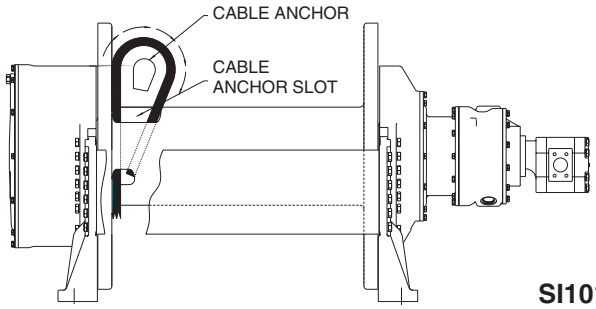
After the PULLMASTER planetary winch has been installed in accordance with the INSTALLATION INSTRUCTIONS, the wire rope can be fastened to the cable drum.

IMPORTANT: The ropes, chains, slings, etc. are not part of the winch and are not covered by this manual. Refer to manufacturer's handling, inspection and maintenance recommendations to avoid potential accidents. For selection of ropes, etc. please check the following product standards: DIN 15020, prEN 818-1/9, prEN 1492-1/2, prEN 1677-1/3 and other relevant product standards.

1) The cable drum of the PULLMASTER planetary winch has two cable anchor slots, one for clockwise and one for counterclockwise hoisting. Standard rotation for hoisting is clockwise when looking at the hydraulic motor of the unit. It is critical to select the cable anchor slot which will permit winding of the wire rope on the drum in the correct direction of rotation. If the wire rope is wound on the cable drum in the wrong direction of rotation, the winch will have no braking capacity. Each winch is shipped from the factory with a label on the drum indicating the correct cable anchor slot.

WIRE ROPE INSTALLATION
Clockwise hoisting winch shown.
(Use cable anchor slot on opposite side of drum for counterclockwise hoisting winch.)

Feed the wire rope through the cable anchor slot. Loop rope back into slot as shown. Insert cable anchor and pull rope tight to wedge rope in slot.



SI1013-75

2) On wire rope installation, care must be taken that the wire rope is wrapped completely around the cable anchor and properly pulled into the cable anchor slot in the cable drum. For safety the cable drum requires 5 wraps of wire rope under tension at all times.

3) The winch operation is controlled by a single control valve lever which has a **forward**, a **reverse** and a **neutral** position. Speed control in either direction is obtained by modulation of the control valve lever. Maximum line speed in either direction is obtained when the control valve lever is moved as far as it can go. The disc brake of the winch will come on automatically when the winch control lever is returned to **neutral**.

4) Always warm up equipment prior to operating winch, particularly in low ambient temperature. Circulate hydraulic oil through the winch control valve for several minutes to warm the hydraulic system. To prime the winch with warm oil, operate the winch at slow speed, forward and reverse, several times.

5) Prevent corrosion damage to winch interior. If not used regularly, run winch up and down at least once every two weeks.

6) To ensure proper winch installation and function, raise and lower a full test load to a safe height before using winch for regular operation at the start of each shift.

   If, after a new installation, the winch does not function properly, refer to the TROUBLESHOOTING section of this manual.

TROUBLE SHOOTING

GENERAL:

In most cases, when the hydraulic winch does not perform satisfactorily, the cause of malfunction is found somewhere in the hydraulic circuit. Before the winch is removed from its mounting and disassembled, all of the hydraulic circuit components should be checked for proper function.

IMPORTANT:

The hydraulic oil volume relates to the line speed or rpm of the winch.

Therefore, if the winch does not produce the specified maximum rated line speed or drum rpm, a loss of hydraulic flow somewhere in the hydraulic circuit system can be analysed. If this condition exists, install a flow meter into the hydraulic circuit to check the volume supplied to the pressure port of the hydraulic winch motor when the winch control is completely opened. The flow meter should indicate the maximum operating volume. If this test indicates a loss of hydraulic flow, check the hydraulic pump, the relief valve and the control valve. If the pump is driven by V-belts, check for belt slippage.

The hydraulic pressure relates to the line pull or lifting capacity of the winch.

If the winch will not lift the specified maximum line pull, install a pressure gauge into the pressure line leading to the hoisting port on the hydraulic winch motor. Stall the winch to prevent rotation of the drum and then open the control valve. Check the hydraulic pressure reading of the installed pressure gauge. If the pressure reads below the specified maximum operating pressure, look for trouble in the hydraulic pump, the relief valve and the control valve. If the pump is driven by V-belts, check for belt slippage. When checking oil pressure and volume in the hydraulic circuit, make certain that the hydraulic reservoir is filled to the top level and the hydraulic pump is running at maximum operating rpm.

Only if the hydraulic system has been checked and found to be in order, use the following indications for probable causes of failure in the winch:

FAILURE	PROBABLE CAUSE
Winch will not produce line pull at maximum pressure as listed in SPECIFICATIONS.	a) Winch is mounted to an uneven surface. (See INSTALLATION INSTRUCTIONS.) b) Cable sheaves or block purchase operated with the winch are not turning freely. c) Damage or wear in the hydraulic motor. d) Excessive back pressure in the hydraulic system. e) Relief valve may be set too low. (See SPECIFICATIONS for maximum operating pressure.)
Winch will not produce line speed at maximum volume as listed in SPECIFICATIONS.	a) Winch is mounted to an uneven surface. (See INSTALLATION INSTRUCTIONS.) b) Cable sheaves or block purchase operated with the winch are not turning freely. c) Damage or wear in the hydraulic motor. d) Excessive back pressure in the hydraulic circuit.
Winch will not reverse.	a) Leakage out of the brake piston prevents the brake from being released against the brake springs. This is caused by damaged O-ring seals on the brake piston. b) The O-ring seals, on the brake release channel between the motor adaptor and the brake housing is damaged. If this failure occurs there will be substantial leakage from between the motor adaptor and brake housing. c) Insufficient hydraulic pressure. (See SPECIFICATIONS for minimum operating pressure.) d) Winch is mounted to an uneven surface. (See INSTALLATION INSTRUCTIONS.) e) Hydraulic pressure is not reaching the brake piston (plugged brake release orifice in the brake housing).

TROUBLE SHOOTING CONTINUED

FAILURE	PROBABLE CAUSE
Brake will not hold.	a) Brake plates or divider plates have been damaged by contamination in the hydraulic fluid, or lack of circulation flow in the brake housing. b) Brake piston is seized in the brake housing because of contamination in the hydraulic fluid. c) Excessive back pressure in the return line causes the brake to be released. d) Control valve has incorrect spool, which traps hydraulic pressure in the brake piston when the control valve handle is returned to neutral position. For proper function of the automatic brake, both pressure ports of the winch must be open to the reservoir in neutral position of the control valve. e) Wire rope is fastened to the incorrect cable anchor slot. f) Sprag clutch is damaged or surfaces where sprag clutch engages on motor drive shaft or brake hub are worn or indented. g) Winch supplied with external brake release option is not plumbed per HYDRAULIC CIRCUIT. Failure to vent external brake release port to reservoir may trap pressure and cause winch brake to slip.
Brake vibrates when lowering a load.	a) Pump is too slow. Pump rpm must be maintained at normal operating speed when a load is lowered. b) Brake is running too hot. This is caused by a complete lack of, or insufficient circulation flow. To check the circulation, observe the flow of oil from the circulation return line of the winch (see TYPICAL HYDRAULIC CIRCUIT) when the winch is reversed. c) Control valve has poor metering characteristics. d) Damaged brake plates or divider plates. e) The over-running clutch, which connects the motor shaft with the brake assembly, is damaged. f) Air mixed with hydraulic oil (foamy oil).
Oil leaks.	a) Oil leaks from the hydraulic motor flange and the motor adaptor are caused by damaged O-ring seals. b) Oil leaks occurring between the cable drum flanges and housings are caused by excessive pressure in the brake housing. Excessive pressure will damage the oil seal which separates the brake housing from the cable drum interior. c) If the breather relief on the end cover leaks, the seal between the drum interior and the brake housing is damaged and must be replaced. This condition is caused by excessive pressure in the brake housing of the winch, operation with the incorrect hydraulic fluid during cold weather, or a restriction in the circulation return line leading back to tank.

Refer to the SERVICE INSTRUCTIONS if it becomes necessary to disassemble the Model H75 winch.

SERVICE INSTRUCTIONS

GENERAL:

Before attempting disassembly of the PULLMASTER model H75 planetary winch, the following instructions for disassembly and reassembly should be read and understood:

It is suggested that all expendable parts, such as O-rings and oil seals, are not reused on reassembly. It is therefore important to have a seal kit (Part No. 23839) on hand before the unit is taken apart.

NOTE: Oil seal must be installed with backup washer, if included with the seal kit (absence of backup washer in a seal kit indicates, no back up washer required for oil seals).

A clean working area is of prime importance, similar to conditions used for service work on any other hydraulic component.

All parts, as they are removed from the winch assembly, should be inspected for wear and damage. Worn or damaged parts must be replaced. Thoroughly clean parts before reassembly. Do not use solvent to clean the friction plates.

During reassembly, lubricate all O-rings and oil seals with grease before installation.

In the following service instructions, reference to parts is made by numbers and shown on the applicable drawing and or on the assembly drawing.

DISASSEMBLY

For the majority of required service or repair work, disassembly may be required only on the brake housing of the PULLMASTER Model H75 planetary winch. Since the parts are heavy, appropriate care should be taken during disassembly and reassembly. There are no special tools needed for the service or repair work and no adjustments or calibrations are necessary. Puller holes are provided on the parts, for safety use of proper eye-bolts or any other safe means must be used for handling parts during assembly and disassembly of the winch.

DRAIN OIL FROM THE WINCH:

To drain hydraulic oil from the Brake Housing, item 700 remove Pipe Plug, item 801.

To drain gear lube oil from the Primary Housing, item 701 and Secondary Housing, item 456 remove Pipe Plug, item 121 and 457.

To drain gear lube oil from the Final housing, item 100 and Cable Drum, item 500 remove Pipe Plug 121 from End Cover, item 120 and Cable Drum, item 500.

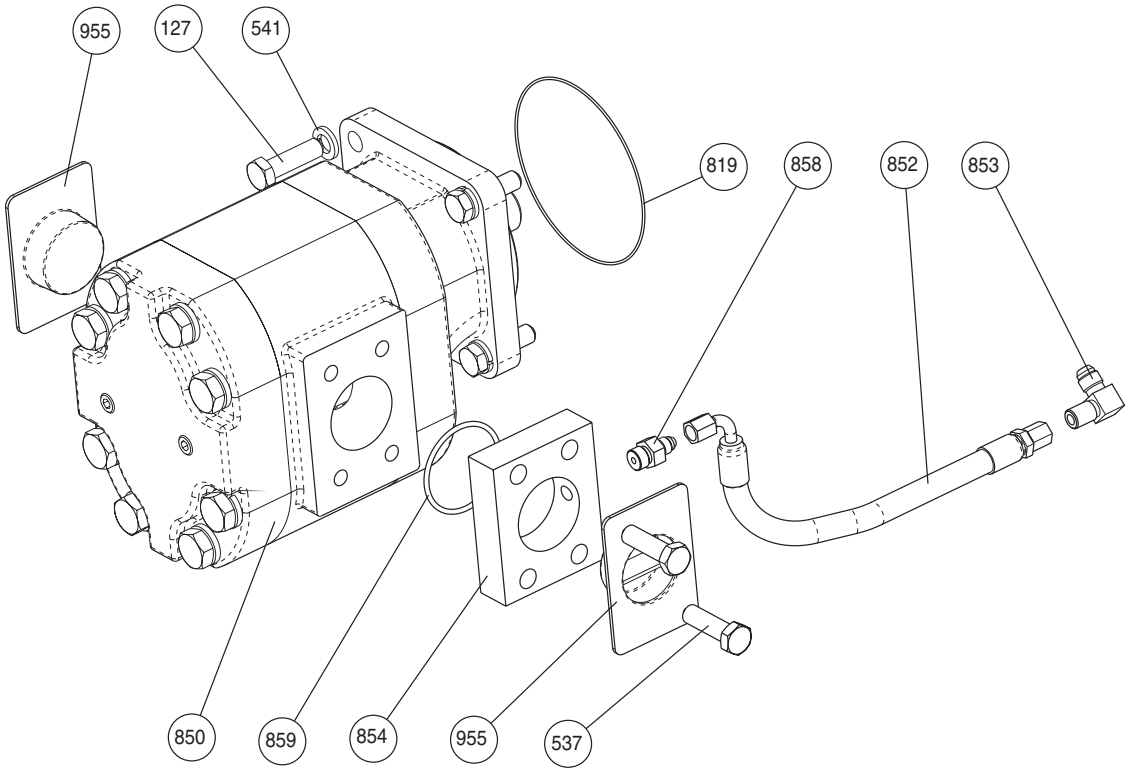
Proceed with the disassembly after draining the oil from the winch as described below:

SERVICE INSTRUCTIONS CONTINUED

REMOVAL OF HYDRAULIC MOTOR:

1) Disconnect brake hose, item 852, from motor, item 800.
2) Remove 4 capscrews, item 127, along with lockwashers, item 541.
3) Carefully withdraw motor from motor adaptor, item 800, motor drive shaft, item 730 may or may not stay with the motor.
4) Discard O-Ring, item 819.

Teflon seals, gasket seals and ring seals in the hydraulic motor assembly are not part of the winch seal kit. The



HYDRAULIC MOTOR

DISASSEMBLY OF BRAKE PLATES ONLY:

If removal of piston and hydraulic motor is not necessary, proceed as follows:

1) Disconnect Brake Hose, item 852
2) Remove 12 hex head capscrews, item 537 and lock washers, item 541 from Motor Adaptor, item 800.
3) Remove 12 Friction Plates, item 715 and 13 Divider Plates, item 713. Inspect for damage or wear. Plates should be flat and smooth. Plates should not show heat discoloration. Paper material on friction plates should be intact and grooved. If any damage is detected, replace friction and divider plates as a set.

DISASSEMBLY OF BRAKE, PRIMARY AND SECONDARY DRIVE SUB-ASSEMBLY:

(Refer to Brake Group sub or Assembly drawing for item numbers.)

SERVICE INSTRUCTIONS CONTINUED

1) Remove 12 cap screws, item 537 along with 12 lock washers, item 541 from Secondary Housing, item 456. Pull Brake Group (brake, primary drive and secondary drive along with motor) out of secondary housing, item 456. Secondary Sun Gear, item 490 may or may not stay with secondary drive.

2) Remove Secondary Sun Gear, item 490.

3) Disassembly of Brake Housing:

   3.1) Remove 12 cap screws, item 537 and 12 lock washers, item 541 from Brake Housing, item 700. Brake Springs, item 752 apply pressure against the Primary Housing, item701, it is recommended that cap screws are unscrewed, one turn at a time, until spring pressure has been released.

   3.2) Remove Primary Housing, item 701 along with Brake Hub, item 720 out of Brake housing, item 700. Motor Drive Shaft, item 730 may or may not stay with the Motor, item 850.

   3.3) Remove 20 brake springs, item 752. Replace if springs measures less than 2.21 inches.

   3.4) Pull brake piston, item 750, out of the brake housing using two 5/8-11UNC bolts screwed into two puller holes in piston and discard O-rings, item 751, and item 753.

   3.5) Remove 12 friction plates, item 715 and 13 divider plates, item 713. Inspect for damage or wear. Plates should be flat and smooth. Plates should not show heat discoloration. Paper material on friction plates should be intact and grooved. If any damage is detected, replace friction and divider plates as a set.

DANGER

DAMAGED FRICTION OR DIVIDER PLATES WILL REDUCE BRAKING CAPACITY AND ALLOW THE LOAD TO DROP, CAUSING PROPERTY DAMAGE, SEVERE INJURY OR DEATH. SOLVENT MAY DAMAGE THE FRICTION PLATES. DO NOT USE SOLVENT TO CLEAN THE FRICTION PLATES. PERFORM THOROUGH INSPECTION AND, IF NECESSARY, REPLACE FRICTION AND DIVIDER PLATES AS A SET.

   3.6) Thoroughly examine bores of brake housing and outer diameters of brake piston for scoring caused by contamination. By polishing with fine emery cloth, minor surface damages of brake housing bore and or piston outer diameter may be repaired.

   3.7) Pull motor drive shaft, item 730, out of brake hub assembly. Surface of motor drive shaft which engages sprag clutch, item 723, should be inspected for wear or indentations. If motor drive shaft shows any surface damage, it should be replaced.

   3.8) Remove Retaining Ring, item 432, Planet Hub Sub-assembly item 400A and Primary Sungear, item 440 from Primary Internal Gear, item 430.

   3.9) Remove Circlip, item 431 and Primary Internal Gear, item 430 along with Thrust Washer, item 433 and Thrust bearing, item 435 from Connecting shaft, item 600.

   3.10) Remove Connecting Shaft sub-assembly, item 600 from Primary Housing, item 701. Remove Brake Hub, item 440, Thrust Washer and Thrust Bearing, item 615 and 617.

   3.11) Remove Sprag Clutch Aligner, item 724, Sprag Clutch, item 723, Needle Bearing, item 603 and Oil Seal, item 607. Thoroughly inspect surfaces of Motor Drive Shaft, item 730 where sprag clutch, item 723 ride on and in Connecting Shaft, item 600.

DANGER

MINOR SURFACE DEFECTS WHERE THE SPRAG CLUTCH ENGAGES THE MOTOR DRIVE SHAFT AND CONNECTING SHAFT, WILL RESULT IN BRAKE FAILURE AND ALLOW THE LOAD TO DROP, CAUSING PROPERTY DAMAGE, SEVERE INJURY OR DEATH. THOROUGHLY INSPECT THESE AREAS AND, IF NECESSARY, REPLACE MOTOR DRIVE SHAFT, SPRAG CLUTCH AND CONNECTING SHAFT AS A SET.

3.12) Remove Oil Seal, item 711 from Primary Housing, item 701. Inspect, Needle Bearings item 605.

3.13) Remove and discard oil seal, item 711and backup washer, item 710 if present, from bore of brake housing. Inspect two needle bearings, item 605, and replace if necessary.

3.14) Brake Housing and all brake related components are disassembled now. Inspect all parts before re-assembling.

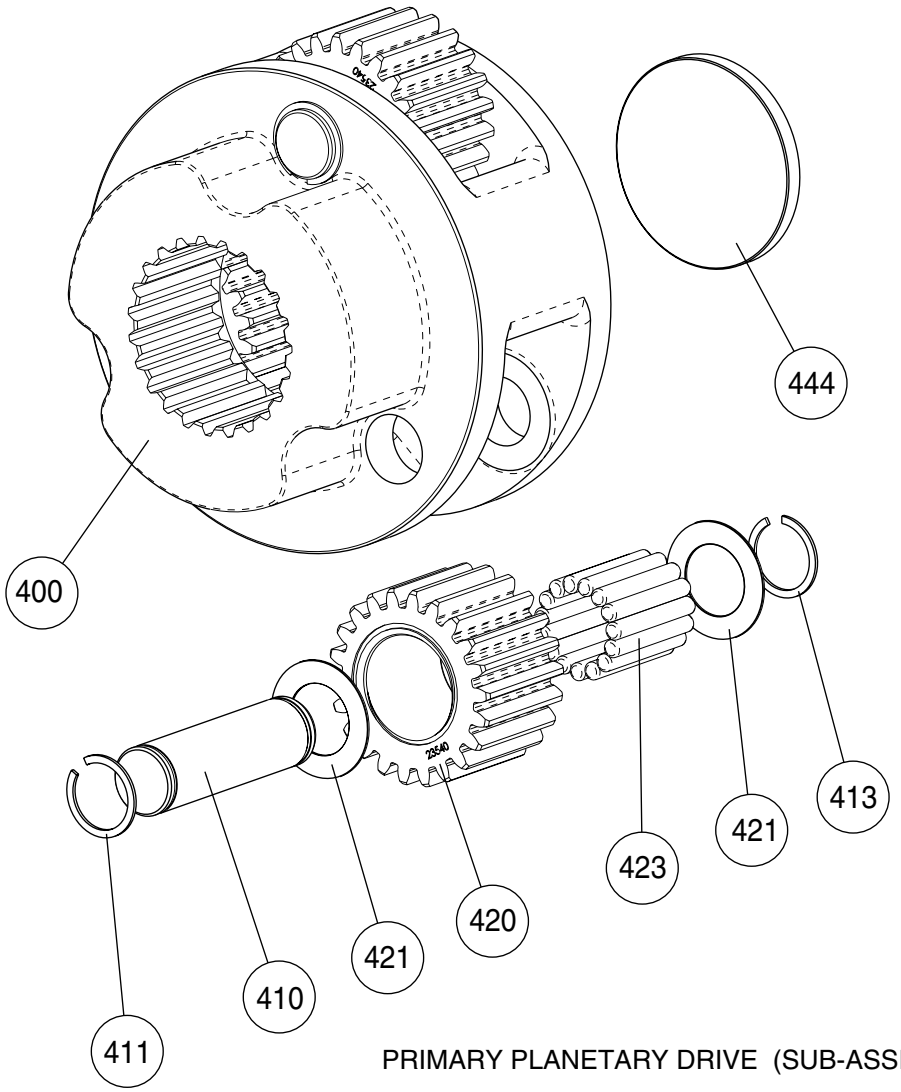
DISASSEMBLY OF PRIMARY PLANETARY DRIVE (item 400A):

4.1) If primary planet gears, item 420, must be removed.

4.2) Remove Circlip, item 411, from Planet Pin, item 410, and press Planet Pin out of primary Planet Hub, item 400. Remove Primary Planet Gear, item 420, together with loose rollers, item 423, and thrust washers, item 421.

4.3) Inspect Primary Sungear Stopper, item 444 for wear, replace if thickness is less than .21 inch.

SERVICE INSTRUCTIONS CONTINUED



PRIMARY PLANETARY DRIVE (SUB-ASSEMBLY)

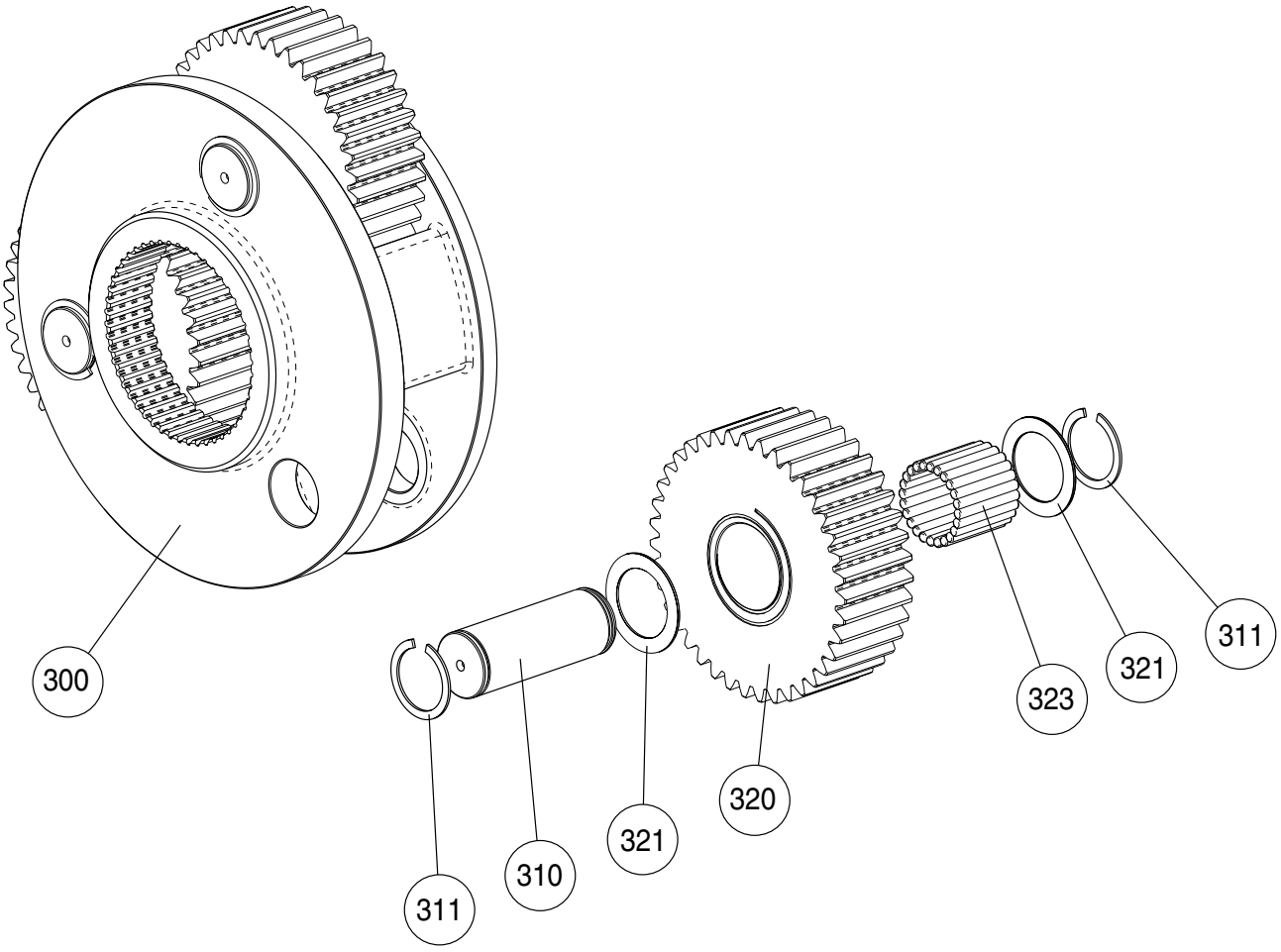
400A	23543	1	SUB-ASSY PRIMARY PLANETARY DRIVE
400	23539	1	PLANET HUB HLV30 PRIMARY
410	20369	3	PLANET PIN PL4 FINAL M25 PRIMARY
411	25004	3	CIRCLIP ROTOR CLIP C-87
413	25091	3	CIRCLIP ROTOR CLIP SH-87
420	23540	3	PLANET GEAR HLV30 PRIMARY
421	25068	6	THRUST WASHER TORRINGTON # TRA 1423
423	25308	45	LOOSE ROLLER 7/32 DIA X 1.50
444	21809	1	STOPPER SUNGEAR - SPEC 224

SERVICE INSTRUCTIONS CONTINUED

5) DISASSEMBLY OF SECONDARY PLANETARY DRIVE (item 300A).

5.1 Remove Circlip, item 311, from Planet Pin, item 310, and press Planet Pin out of primary Planet Hub, item 300. Remove Primary Planet Gear, item 320, together with loose rollers, item 323, and thrust washers, item 321.

5.2 Inspect Sungear Stopper, item 344 for wear, replace if thickness is less than .44 inch.



SECONDARY PLANETARY DRIVE (SUB-ASSEMBLY)

300A	23544	1	SECONDARY PLANETARY DRIVE SUB-ASSEMBLY
300	23538	1	PLANET HUB FINAL
310	20406	3	PLANET PIN M25 FINAL
311	25199	6	CIRCLIP ROTOR CLIP SH-168
320	23536	3	PLANET GEAR HLV30 FINAL
321	25167	6	THRUST WASHER TORRINGTON # TRB 2840
323	25297	72	LOOSE ROLLER TORRINGTON # 024054

REMOVAL OF DRUM SEAL (item 531):

Remove Circlip item 344 from Coupling item 341 and pull Coupling out of Secondary Housing.

Remove 17 Capscrews item 541 along with Lockwashers item 537 from Secondary Housing item 456 to disassemble Base item 550.

Pull Secondary Housing out of Cable Drum item 500

Remove Retaining Ring item 532 and pull oil Seal item 531 out of Cable drum item 500.

DISASSEMBLY OF FINAL DRIVE:

1) Remove 12 Capscrews, item 537 along with 12 Lockwashers, item 541 from End Cover item 120.

2) Remove End Cover, item 120, from End Housing, item 100 and discard O-ring, item 123.

3) Check thickness of planet hub stopper, item 126, and sungear stopper, item 122, for excessive wear. Replace planet hub Stopper if less than .25 inch thick and sungear stopper if less than .44 inch thick.

4) Insert eye-bolts in Puller holes remove final planet hub assembly from Final Housing, item 100 and cable Drum, item 500.

5) Pull Final Sungear, item 340, out of Cable Drum, item 500. (Puller holes are provided on both sides of the shaft).

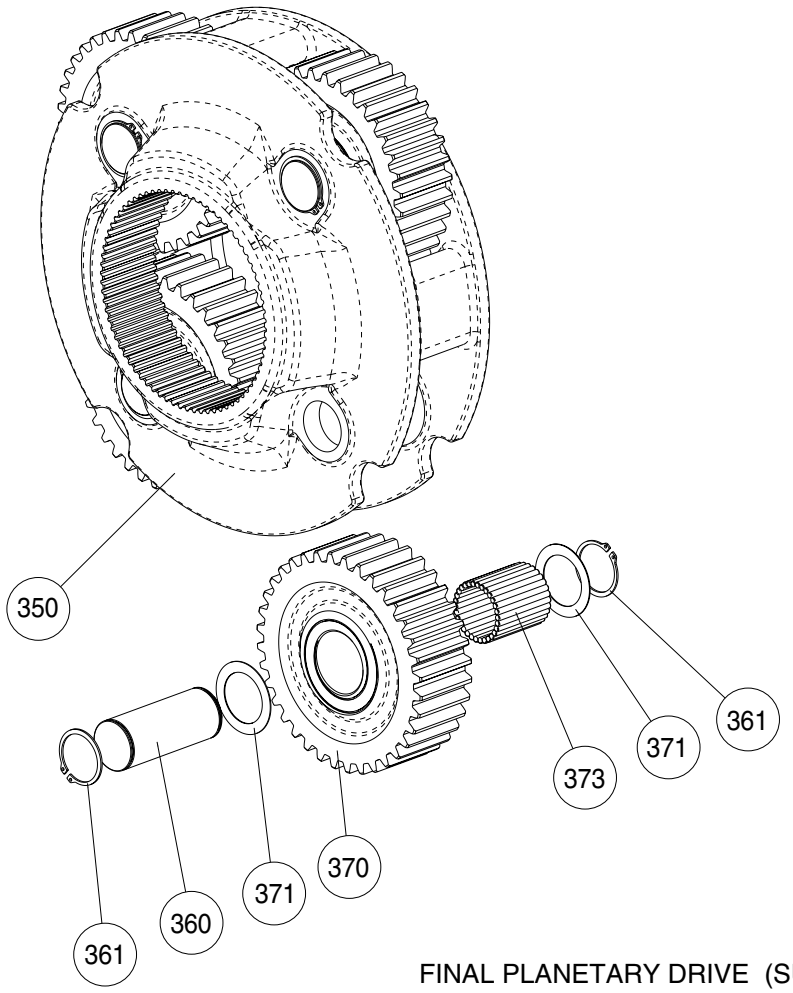
NOTE: Tapered pin, item 342, is installed on the end of Sungear, item 340, with Setscrew, item 343, to facilitate reassembly of the sungear if installing from the Final Drive end.

SERVICE INSTRUCTIONS CONTINUED

DISASSEMBLY OF FINAL PLANETARY DRIVE (item 350A).

If disassembly of Final Planetary Drive is required, follow the following steps.

Remove Circlip, item 361, from Planet Pin, item 360.
Press planet pin, item 360, out of planet hub, item 350.
Remove Planet Gear, item 370 out of Planet Hub, item350.
Inspect loose rollers, item 373 and two thrust washers, item 371. Replace if necessary.



FINAL PLANETARY DRIVE (SUB-ASSEMBLY)

350A	23750	1	SUB-ASSY FINAL DRIVE
350	23751	1	PLANET HUB H/M75 FINAL
360	21027	4	PLANET PIN M50 FINAL
361	25678	8	CIRCLIP ROTOR CLIP SH-215
370	21010	4	PLANET GEAR M50 FINAL
371	25677	8	THRUST WASHER INA # AS 5578
373	26630	120	LOOSE ROLLER

REASSEMBLE: IN REVERSE PROCEDURE.

RECOMMENDED MAINTENANCE

Winch gear train lubricating oil should be changed after the initial six months or 50 hours of operation, whichever comes first. Lubricating oil should then be changed every 12 months or 500 operating hours, whichever comes first.

Hydraulic system fluid should be changed at least once every 12 months.

For optimum performance over an extended period of time, the following preventive maintenance service should be done every 12 months or 500 operating hours (whichever comes first):

1) Disconnect all hydraulic hoses and remove the winch from its mounting.

2) Disassemble the winch as per instructions.

3) Discard and replace all O-rings and oil seals.

4) Clean all parts and inspect for wear and damage as per instructions. Replace worn or damaged parts as required.

5) Reassemble the winch as per instructions.

6) Follow INSTALLATION and OPERATING INSTRUCTIONS when returning winch to its mounting.

Please record for future reference a complete model and serial number from the nameplate of the Pullmaster Model H75 planetary winch. Quote complete model and serial number when ordering parts.

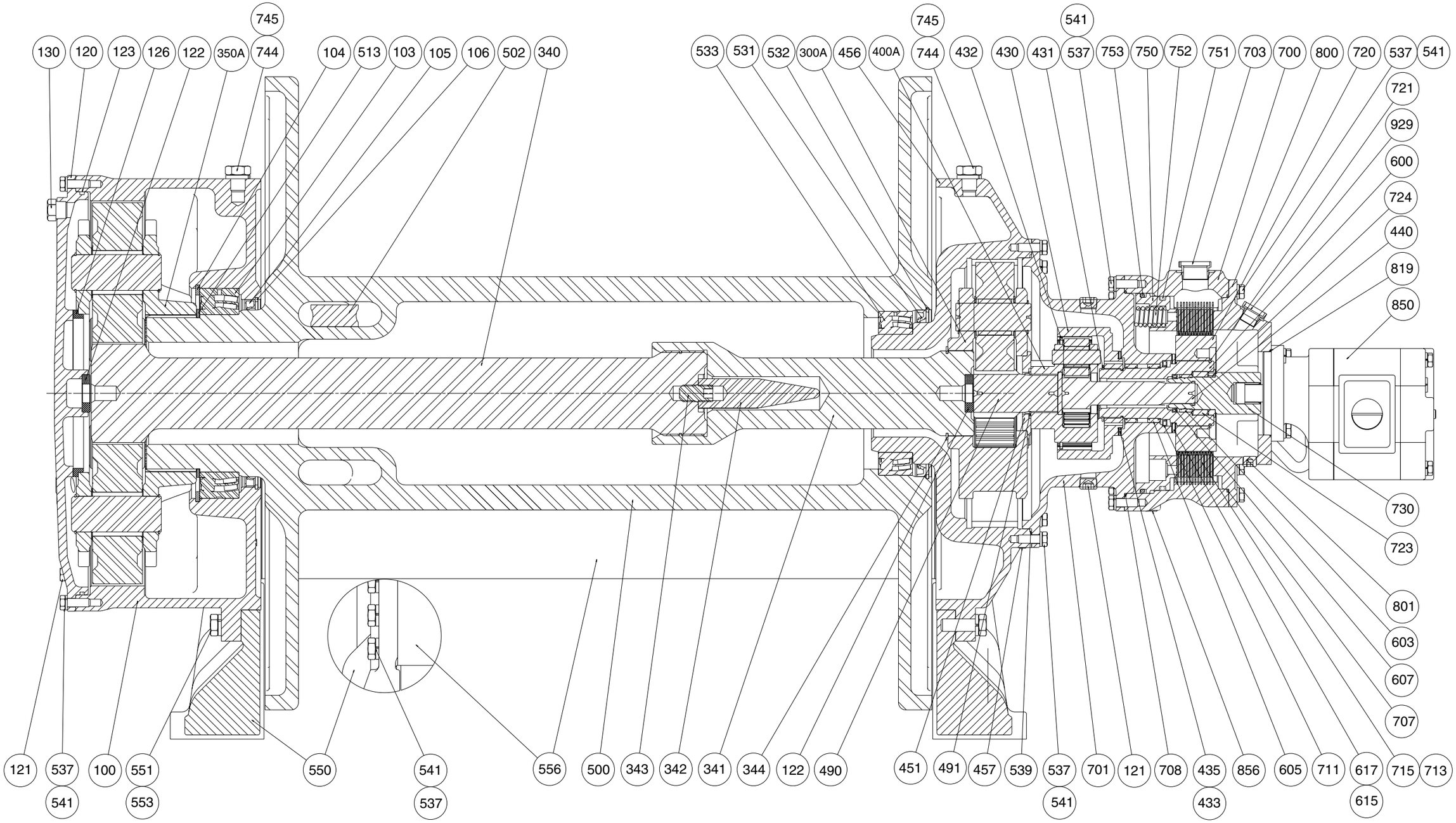
MODEL NUMBER _____

SERIAL NUMBER _____

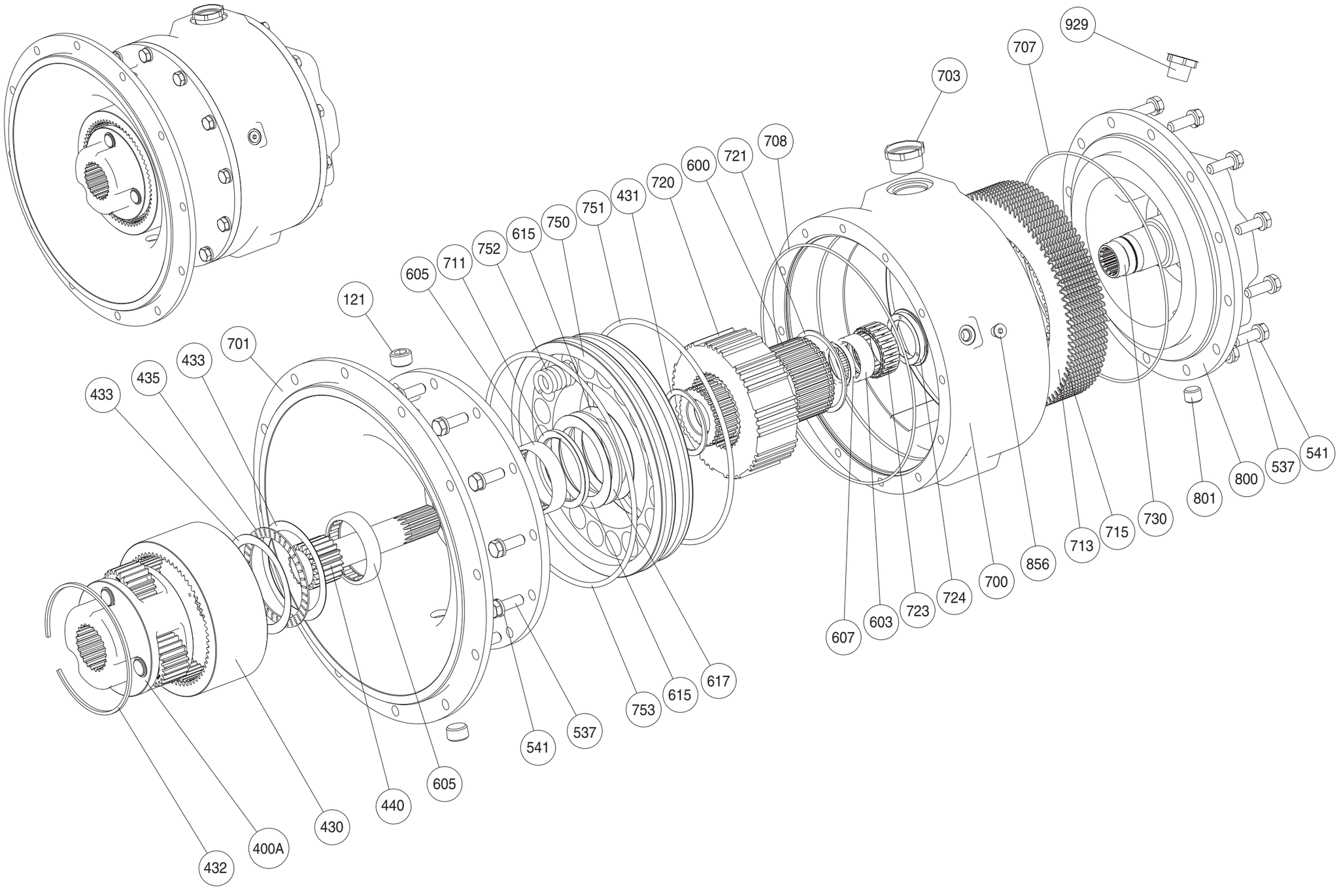
PULLMASTER WINCH CORPORATION reserves the right to change specifications and the design of PULLMASTER planetary winches at any time without prior notice and without incurring any obligations.

ASSEMBLY DRAWING

H75



BRAKE GROUP - EXPLODED VIEW



PARTS REFERENCE

REF NO.	PART NO.	QTY.	DESCRIPTION
100	23752	1	FINAL HOUSING M/H75-1
103	26631	1	BEARING - SPHER. ROLLER SKF # 23948 CC OR EQ.
104	26634	1	CIRCLIP ROTOR CLIP DHO-320
105	25511	1	OIL SEAL 10.000 X 11.250 X .625
106	23841	1	RETAINING RING INT 5/32 X 1/4 X 11.5 OD
120	23753	1	END C0VER H75
121	25237	5	PIPE PLUG 3/4 NPT SOC STEEL, AIRWAY #5409-12
122	23817	2	SUNGEAR STOPPER M/H75
123	26638	1	O-RING -392 23"ID 3/16" CS
126	23805	1	PLANET HUB STOPPER H/M75 FINAL
127	25158	4	CAPSCREW - HEX HEAD 1/2 - 13NC X 1.75 GR 5
130	20677	1	BREATHER RELIEF ASSEMBLY
300A	23544	1	SECONDARY PLANETARY DRIVE SUB-ASSEMBLY
340	23780	1	SUNGEAR H/M75 FINAL -01 DRUM
341	23834	1	SUNGEAR EXTENSION -3 DRUM
342	23833	1	TAPERED PIN
343	26642	1	SET SCREW 1-8 UNC X 2" LG.
344	25514	1	CIRCLIP ROTOR CLIP SH-500
350A	23750	1	SUB-ASSY FINAL DRIVE H/M75
400A	23543	1	SUB-ASSY PRIMARY PLANETARY DRIVE
430	23541	1	INTERNAL GEAR H/M30 PRIMARY
431	25338	1	CIRCLIP ROTOR CLIP SH-300
432	20417	1	RETAINING RING INTERNAL
433	25363	2	THRUST WASHER TORRINGTON # TRA 6681
435	25362	1	THRUST BEARING TORRINGTON # NTA 6681
440	23782	1	SUNGEAR M30, M75 - PRIMARY
451	23811	1	PLANET HUB STOPPER M/H75 SECONDARY
456	23763	1	SECONDARY HOUSING H/M75
457	25085	1	PIPE PLUG 3/8 NPT SOC STEEL,AIRWAY#5409-6
490	23776	1	SUNGEAR H/M75 SECONDARY
491	26640	1	CIRCLIP ROTOR CLIP SH-237
500	23822	1	CABLEDRUM 75-03 14.0 X 38.0 X 36.0
502	21005	1	CABLE ANCHOR 50’S 3/4" TO 1-1/4" WIRE
513	26633	1	CIRCLIP ROTOR CLIP SH-950
531	25670	1	OIL SEAL 8.500 X 10.000 X .562
532	20898	1	RETAINING RING INT 5/32 X 1/4 X 10.88 OD
533	26632	1	BEARING - SPHER. ROLLER SKF # 23936 CC OR EQ.
537	25081	50	CAPSCREW - HEX HEAD 1/2 - 13NC X 1.50 GR 5
539	25840	1	O-RING -282 16" ID 1/8" CS
541	25014	52	LOCKWASHER 1/2"
550	23823	2	BASE PLATE H/M75-3
551	25572	60	CAPSCREW - HEX HEAD 3/4 - 10NC X 2.50 GR 5
553	25299	60	LOCKWASHER 3/4"
556	23826	2	TIE BAR H/M75 36" DRUMS
600	20412	1	CONNECTING SHAFT H25
603	25361	1	NEEDLE BEARING TORRINGTON # B-3012
605	25366	2	NEEDLE BEARING TORRINGTIN # NBH4812
607	26009	1	OIL SEAL DAEMAR 175225312 HP3

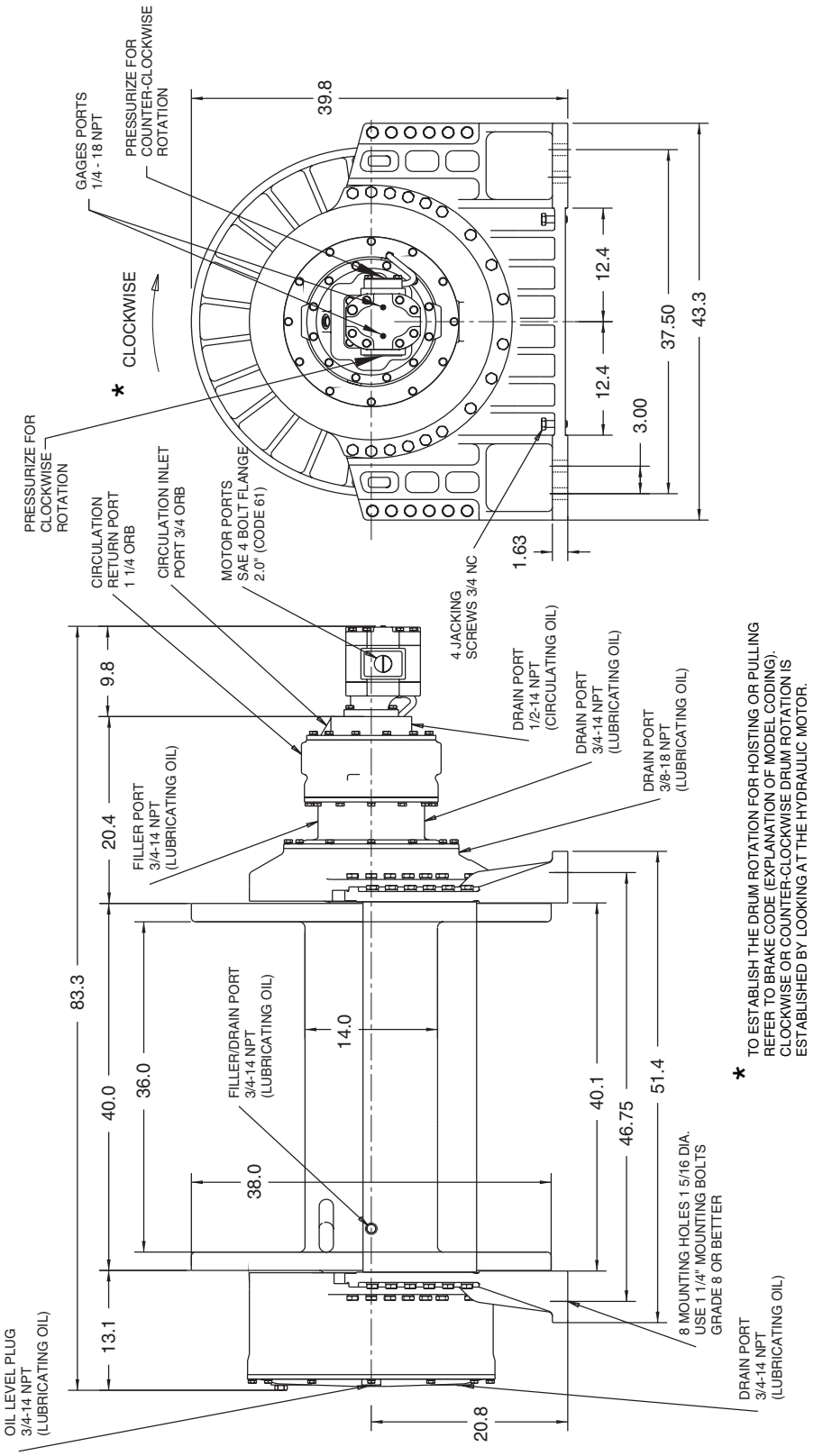
PARTS REFERENCE

REF. NO.	PART NO.	QTY.	DESCRIPTION
615	25365	2	THRUST WASHER INA # AS 90120
617	25364	1	THRUST BEARING INA # AXK 90120
700	23775	1	BRAKE HOUSING H/M75
701	23777	1	PRIMARY HOUSING H75
703	25557	1	PLASTIC CAPLUG SAE #20 ORB
707	25286	1	O-RING -277 11-1/2"ID 1/8"CS
708	25339	1	O-RING -278 12"ID 1/8"CS
711	25933	1	OIL SEAL SIMIRIT BABSL 80 X 100 X 7
713	25305	13	DIVIDER PLATE
715	25304	12	FRICTION PLATE
720	20410	1	BRAKE HUB H25, H50, H75
721	25369	1	CIRCLIP ROTOR CLIP SH-387
723	25303	1	SPRAG CLUTCH BORG WARNER # 40373A
724	20421	1	SPRAG CLUTCH ALIGNER H25 RIGHT
730	23810	1	MOTOR DRIVE SHAFT M/H75
744	25890	2	LOCKWASHER 7/8"
745	22613	2	CAPSCREW - HEX HEAD 7/8 - 9NC X 1 LONG
750	20397	1	PISTON M/H25
751	25343	1	O-RING -90 DURO -451 11"ID 1/4" CS
752	20413	20	BRAKE SPRING #4G 5C 2.270 X 1.230
753	25342	1	O-RING -90 DURO -452 11-1/2"ID 1/4"CS
800	23779	1	MOTOR ADAPTOR H/M75
801	25032	1	PIPE PLUG 1/2 NPT SOC STEEL, AIRWAY #5409-8
819	25136	1	O-RING -159 5"ID 3/32" CS
850	26639	1	MOTOR -191 (3" GEAR)
852	26610	1	HOSE ASSY 1/4"ID #4JIC STRT #4JIC 90‘ -15"LG
853	26120	1	TUBE 90 ELB #4 JIC X #6 ORB; AIRWAY 6801-4-6
854	26643	1	SANDWICH GAGE BLOCK 2" (CODE 61) ORB#6
856	25972	1	PLUG - SAE #6 ORB SOC HEAD AIRWAY 6409-6
858	26439	1	TUBE CONN #4 JIC X #6 ORB; AIRWAY 6400-4-6
859	26644	1	O-RING -228 2-1/4" ID 1/8"CS
929	25536	1	PLASTIC CAPLUG SAE #12 ORB
955	25559	2	PLASTIC CAPLUG 2.0" DAEMAR T-21

INSTALLATION DIMENSIONS

IN84020-A

FOR SAFETY: A minimum of 5 wraps of wire rope under tention must be maintained at all times!



BOLT TORQUE CHART

BOLT DIAMETER Inches	TORQUE Lb-ft	TORQUE Nm
1/4	9	12
5/16	18	24
3/8	32	43
7/16	50	68
1/2	75	102
9/16	110	149
5/8	150	203
3/4	265	359
7/8	420	569
1	640	868
1 1/8	800	1085
1 1/4	1000	1356
1 3/8	1200	1627
1 1/2	1500	2034

NOTE: Unless otherwise specified, torque bolts per above chart.