



NOTICE TO INSTALLER

After completing installation this Maintenance Manual should be placed with the Stern Drive for the Owner's future use.

500 Series

MAINTENANCE MANUAL

All rights reserved. Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. While every precaution has been taken in the preparation of this book, the publisher assumes no responsibility for errors or omission. Neither is any liability assumed for damages resulting from use of the information contained herein.

All instructions and diagrams have been checked for accuracy and ease of application; however, success and safety in working with tools depend to a great extent upon individual accuracy, skill and caution. For this reason, the publishers are not able to guarantee the result of any procedure contained herein. Nor can they assume responsibility for any damage to property or injury to persons occasioned from the procedures. Persons engaging in the procedure do so entirely at their own risk.

Konrad

MODEL 500 Series STERN DRIVE MAINTENANCE MANUAL

Version 5.0

PART # 10-544

KONRAD, INC.

1421 HANLEY ROAD

HUDSON, WI 54016

715-386-4203

800-927-3545

sales@konradmarine.com

www.konradmarine.com

TABLE OF CONTENTS

1. Stern Drive

General Information	1
Safety Notices	1
Operation	2
Break-In Procedure	2
Torque Specifications for Fasteners	3
Removal	3
Installation	4

2. General Maintenance

Maintenance Schedule	5
Specified Lubricant (Gear Oil)	5
General	5
Naval	6
Filling	6
Removing Lubricant	7
Checking Lubricant	7
Hydraulic Fluids	8
Trim/Lift Pump	8
Specified Fluids	8
Filling	8
Bleeding	8
Steering System	9
Specified Fluids	9
Filling	9
Bleeding	10
520 / 540 Propeller and Hardware	11
Description and Parts Breakdown	11
Inspection	12
Removal	12
Installation	12

TABLE OF CONTENTS

(continued)

560 Propeller and Hardware	13
Description and Parts Breakdown	13
Inspection	13
Removal	14
Installation	14

3. Complex Maintenance

Trim/Lift Electrical Drawing (12 Volt)	15
Trim/Lift Electrical Drawing (24 Volt)	16
Trim/Lift Electrical Drawing <u>for Navy RIBs</u> (24 Volt)	17
Setting Trim/Lift Switches	18
Universal Joints	20
Description and Parts Breakdown	20
Maintenance	21
Inspection	21
Removal	22
Installation	22
Bellows	24
Description and Parts Breakdown	24
Maintenance	24
Inspection	24
Removal & Installation	24
Trim System	25
Description and Parts Breakdown	25
Maintenance	26
Inspection	26
Trim Cylinder Removal	26
Trim Cylinder Installation	27
Steering Cylinder	28
Description and Parts Breakdown	29
Maintenance	29
Inspection	29
Anodes	30
Description and Parts Breakdown	30
Maintenance	31

TABLE OF CONTENTS

(continued)

Continuity Cables	32
Maintenance	32
Inspection	32
Description and Parts Breakdown	33
Propeller Shaft Bearing Carrier (Model 520)	34
Parts Breakdown	34
Removal	35
Rebuilding	35
Installation	35
Propeller Shaft Seal Carrier (Model 540)	36
Parts Breakdown	36
Removal	37
Rebuilding	37
Installation	37
Propeller Shaft Seal Carrier (Model 560)	38
Parts Breakdown	38
Removal	39
Rebuilding	39
Installation	40
Drive Shafts	41
Parts Breakdown	41
Maintenance	41
30-264 Parts List	42
30-272 Parts List	43
Tools	44
Installation	45

1. STERN DRIVE

General Information

The Konrad 500 Series stern drives are steerable propulsion systems designed to accommodate engines that generate up to 738 lb ft of torque. The Konrad 500 Series stern drives have sixteen degrees (16°) trim range to optimize vessel performance while underway. However, when necessary, there is an additional thirty degrees (30°) of lift range. The additional lift may only be used when the stern drive is being serviced or trailered. The Konrad 500 Series stern drives are designed for applications where the vessel transom angle is thirteen to fourteen degrees (13° to 14°). Applications that do not meet this criterion may require extra equipment or modifications. In some applications, it may not be possible to use Konrad equipment.

The Konrad 500 Series stern drives are designed to accommodate propellers with three (3) to five (5) blades, made of aluminum or stainless steel. Propellers are chosen depending on the application and performance criterion. The maximum diameter propeller size for the Konrad 520 stern drive is twenty inches (20"). The maximum diameter propeller for the Konrad 540 and 560 stern drive is sixteen inches (16").

Safety Notices

Read and understand all of the safety precautions and warnings before performing any installation or repair. This list contains the general safety precautions and warnings that **MUST** be followed to provide personal safety.

This list is only a suggested safety guideline. Working conditions vary greatly, consequently safety measures will vary upon your individual circumstances. **Always use caution.** Make sure the work area surrounding the product is safe. Be aware of hazardous conditions that can exist.

ALWAYS wear protective eyeglasses and protective footwear when working.

DO NOT wear loose-fitting or torn clothing. Remove all jewelry when working.

DO NOT work on anything that is supported **ONLY** by lifting jacks or a hoist. **ALWAYS** use blocks or proper stands to support the product before performing any service work.

TO AVOID PERSONAL INJURY, use a hoist or get assistance when lifting drive components. Make sure all lifting devices such as chains, hooks, or slings are in good condition and are of the correct capacity.

ALWAYS use tools that are in good condition. Make sure you understand how to use them before doing any service work.

ALWAYS use the same fastener part number (or equivalent) when replacing fasteners. **DO NOT** use a fastener of lesser quality if replacements are necessary.

ADDITIONAL SAFETY PRECAUTIONS ARE INCLUDED IN THE PROCEDURES WHENEVER THEY APPLY.

Operation

The engine produces power (clockwise or counterclockwise rotation) that is transmitted through a reversing transmission. A coaxial planetary style reversing transmission is normally used in recreational applications. A twin shaft vertically offset standard reversing transmission (with coaxial additions available) is normally used in commercial applications. From this point the transmission is connected via close couple or drive shaft. The power is then transmitted through a series of shafts and gears and then to the propeller.

Break-In Procedure

NOTE: Make sure the stern drive and the gimbal carrier are properly filled with gear oil prior to operation.

Any new Konrad stern drive unit, whether a lower, upper or complete, requires a ten (10) hour break-in running period. Please use the following guidelines during the first ten (10) hours to assure optimum performance from your new Konrad stern drive.

- 1. Avoid full throttle starts.**
- 2. Avoid straining or heavy loading of the stern drive.**
- 3. To achieve even wear patterns on your new drive gear sets, operate at intermittent throttle levels throughout the entire break-in period.**
- 4. DO NOT exceed seventy-five percent (75%) of full throttle during the first five (5) hours.**
- 5. During the next five (5) hours of the break-in period, operate periodically at full throttle.**
- 6. The stern drive should be shifted into forward gear a minimum of ten (10) times during the first ten (10) hours with moderate (but not excessive) RPM's after each shift.**
- 7. Change the gear oil when the break-in period is complete. See pages 7 and 8 for oil change procedure.**

NOTE: When the initial oil change is done, small metal particles may be found in the break-in oil. Do not be alarmed. This is typical during the break-in of the drive and will decrease as you continue to run the drive system.

Torque Specifications for Fasteners

Listed below are the torque specifications for those fasteners that have a specified torque value. Securely tighten all other fasteners. Internal drive component torque specifications are stated in the Konrad Technical Manual (10-591).

Description	Torque Value
Drive Shaft Flange to Transmission Output Flange Shaft Nuts/Bolts (if applicable)	70 lb. ft. (95 Nm)
Transom Assembly / Gimbal Housing Studs to Inner Transom Plate Nuts (8)	25-30 lb. ft. (34-41 Nm)
Drive Shaft Housing to Gear Housing Nuts and Bolts (8)	35 lb. ft. (47 Nm)
Power Trim Cylinder to Anchor Pin, Nuts (4) (Rubber Bushings Only)	Tighten until approx. two (2) threads show.
Power Trim Cylinder to Anchor Pin, Nuts (4) (Hardened Bushings Only)	30-35 lb ft. (41-47 Nm)
Lifting Bracket Top Cover (and Emergency Tiller Arm Bracket if applicable) (6)	20 lb. ft. (27 Nm)
Stern Drive Unit to Bell Housing, Nuts (6)	55 lb. ft. (75 Nm)
Gimbal Carrier Bolts (S.H.C.S.) (3) (if applicable)	70 lb. ft. (95 Nm)
520 Propeller Nut (1)	80 lb. ft. (109 Nm)
540 Propeller Nut (1)	55 lb. ft. (75 Nm)
560 Forward Propeller Nut (1)	100 lb.ft. (136 Nm)
560 Aft Propeller Nut (1)	60 ft.lb. (81 Nm)

Removal

1. Rig the Konrad drive for lifting. Secure the stern drive to the lifting device with a nylon strap or other fastener.

NOTE: An overhead lifting device is the preferred method of lifting the stern drive. The Konrad 520 weight is 188 lbs (85 kg), the Konrad 540 weight is 153 lbs (69 kg) and Konrad 560 weight is 167 lbs (75.7 kg).

NOTE: A lifting cart or forklift may be used as an alternate lifting device.

2. Disconnect hydraulic lines from the trim cylinders.
3. Remove the trim cylinders. (Refer to page 29).
4. Remove the six (6) nuts (10-334) and six (6) washers (10-415) attaching the stern drive to the transom assembly.
5. Remove the continuity cable (10-487) from the upper starboard side transom stud.
6. Slide the stern drive horizontally away from the transom, separating it from the transom assembly.

NOTE: It is recommended that a new gasket (10-305) be used when drive reinstallation occurs.

Installation

1. Rig the Konrad drive for lifting. Secure the stern drive to the lifting device with a nylon strap or other fastener.

NOTE: An overhead lifting device is the preferred method of lifting the stern drive. The Konrad 520 weight is 188 lbs (85 kg), the Konrad 540 weight is 153 lbs (69 kg) and the Konrad 560 weight is 167 lbs (75.7 kg).

NOTE: A lifting cart or forklift may be used as an alternate lifting device.

2. Grease (using marine grade grease) both sides of the gasket (10-305) and slide it over the six (6) studs on the bell housing.
3. Grease the bellows (10-230).
4. Grease the splined shaft (10-365).
5. Grease both o-rings (10-306) and (10-493).
6. Grease and insert engagement pin (10-494) into the end of the splined shaft. 3/4 of the engagement pin should remain visible beyond the end of the splined shaft.
7. Slide the stern drive onto transom assembly. The splined shaft and u-joint assembly must be held up and guided into the gimbal carrier assembly.

NOTE: It may be necessary to rotate the splined shaft (this can be achieved by sliding the propeller onto the propeller shaft and rotating it back and forth) or yoke assembly so the splines line up for the drive to be fully seated against the transom assembly.

NOTE: If this step cannot be achieved, an alternate method is to remove the gimbal carrier, (from the inside of the vessel) slide the drive onto the transom assembly, then reinstall the gimbal carrier.
8. Fasten the stern drive to the transom assembly using the six (6) nuts (10-334) and six (6) washers (10-415). Torque nuts to 55 lb ft (75 Nm).

NOTE: Be sure to put the continuity cable (10-487) on the upper starboard stud before putting the washer and nut on.

2. GENERAL MAINTENANCE

Maintenance Schedule

USE SERVICE HOURS OR TIME INTERVAL, WHICHEVER OCCURS FIRST!!

Location and Service	Weekly	Every 50 Hours or 60 Days	Every 100 Hours or 120 Days	Every 400 Hours	At Least Once a Year
Stern Drive Unit Oil (Check Level)	EVERY DAY				
Stern Drive Unit Oil (Change Break-in Oil)	Change the break-in oil after the first 10 hours				
Stern Drive Unit Oil (Change)	EVERY 200 HOURS = Standard Oil EVERY 400 HOURS = Synthetic Oil				
Transom Assembly and Stern Drive Unit – (Inspect for corrosion or impact damage, including propeller)	X	X			X
Hoses – (Inspect for cracks, swelling, or other signs of deterioration. Check connections for adequate tightness)			X		X
Continuity Circuit – (Check components for continuity, loose connections, and broken or fraying wires)		X	X		X
Universal Joints (Greaseless)	Replace Every 200 Hours for Heavy Use Replace Every 1000 Hours for Light Use				
Propeller Shaft and Nut (Lubricate and tighten)		X	X		X
Transom Gimbal Housing Assembly Swivel Shaft and Gimbal Bushing (Inspect for wear)		X	X		X
Bellows and Bellows Clamps (Inspect for wear and verify correct installation)			X		X

Specified Lubricants (Gear Oil)

NOTE: Synthetic gear lube (75-90W marine certified synthetic gear lube) MUST be used in cold waters under sixty degrees Fahrenheit, sixteen degrees Celsius (60°F, 16°C).

General

- | | |
|-------------------------------|-------------|
| 1. Konrad 75W90 Synthetic Oil | Part Number |
| 1 Quart (.95 Liters) | (13-090) |
| 2.5 Gallon (9.5 Liters) | (13-091) |
| 55 Gallon (208.20 Liters) | (13-092) |
| 2. 80w90 Gear Lube Oil | |

Naval

1. Military PRF 2106, NSN 9150-01-035-5393

Filling

Lubricant Capacity:

Complete Stern Drive, 520 model - **approximately** seven (7) quarts (6.6 liters).

Complete Stern Drive, 540 model - **approximately** six (6) quarts (5.7 liters).

Complete Stern Drive, 560 model - **approximately** six (6) quarts (5.7 liters).

Pour Method:

1. Remove the top cover (10-209) of the stern drive by removing the six (6) socket head cap screws (10-110). If applicable, remove emergency tiller arm bracket (10-719) by removing the (4) four socket head cap screws (11-026) and four (4) nylon washers (11-033) and the two (2) socket head cap screws (10-110) **OR** If applicable, remove the lifting bracket (12-388) by removing the two (2) socket head cap screws (12-421), the two (2) nylon washers (11-033) and the four (4) socket head cap screws (10-110).
2. Pour in gear oil until drive is full.
3. Wait fifteen (15) minutes. Rotate the propeller five or six (5-6) times in both directions during those fifteen (15) minutes.
4. Repeat steps 2 and 3.
5. Replace the top cover (and the emergency tiller arm or lifting bracket if applicable) and torque to 20 lb ft (27 Nm).

NOTE: Make sure top cover o-ring (10-303) is greased and properly seated.

Pump Method (Pump Required)

1. Remove the upper breather screw (10-010) located on the top of the upper housing, port side and the lower drain plug (10-155) located on the lower housing.
2. Using a pump, pump gear oil into the drive from the bottom until it comes out of the top breather plug. Let the gear oil settle for ten to fifteen (10 to 15) minutes. Pump additional oil until it comes out of the top breather plug.
3. Replace lower drain plug and upper breather screw.

NOTE: Both drain plug and breather screw seal/gasket (10-285) must be in place when reinstalled.

Removing Lubricant

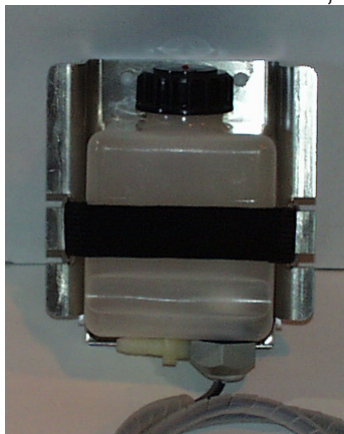
1. Trim drive unit to full “Out” or “Up” position.
2. Remove upper drive unit top vent plug (10-010) and bottom fill/drain plug (10-155). Allow lubricant to drain completely.
NOTE: Discharge of oil or oily waste into or upon the water is a direct violation of today’s laws. Dispose of or recycle these substances properly.
3. Trim drive unit to full “In” or “Down” position (with anti-ventilation plate level) to complete draining process (540 and 560 models only).
4. Refer to previous pages for filling procedure and required lubricant.

Checking Lubricant Level

NOTE: The stern drive oil level is checked at the remote oil reservoir. There are two (2) different styles of reservoirs, only one (1) reservoir is used per drive. The one (1) pint (.47 liter) reservoir (rectangular bottle) assembly has a part number of 30-179. If you only need a replacement bottle, that part number is 10-931. The one (1) quart (.95 liter) reservoir (cylindrical bottle) assembly has a part number of 30-295. If you only need a replacement bottle, that part number is 30-941.

CAUTION: If the lubricant in the reservoir is milky brown or the lubricant is not level with the “fill line”, there may be a leak in the drive unit. Before further use, the area where the leak occurs should be identified and corrected. Then refill the unit with new lubricant.

IMPORTANT: Always check oil level when the drive is cool and engine is shut down. Oil level in the reservoir will rise and fall during drive operation. If the lubricant reservoir is empty, **DO NOT** attempt to fill drive unit through reservoir, as air may be trapped in the drive unit and the stern drive could be damaged from lack of lubrication. After cause for low lubricant has been found and corrected, refill drive unit with lubricant, as outlined under “Filling” on pages 7 and 8.



30-179

Rectangular Reservoir Assembly
1 Pint (0.47 liters)



30-295

Cylindrical Reservoir Assembly
1 quart (0.95 liters)

Hydraulic Fluids

Trim / Lift Pump

Specified Fluids

General

1. Automatic Transmission Fluid Type Dextron III
2. Light Hydraulic Fluid

Naval

1. Military H-17672, NSN 9150-00-985-7237
2. Military H-5606, NSN 9150-00-223-4134

Fluid Capacity

Trim Pump Reservoir - approximately one (1) quart (.95 liter).

Filling

1. Remove cap (10-689) from the trim/lift pump reservoir.
2. Fill reservoir with specified fluid to indication line (maximum level).

IMPORTANT: Check fluid level with stern drive unit in the full down position.

Bleeding

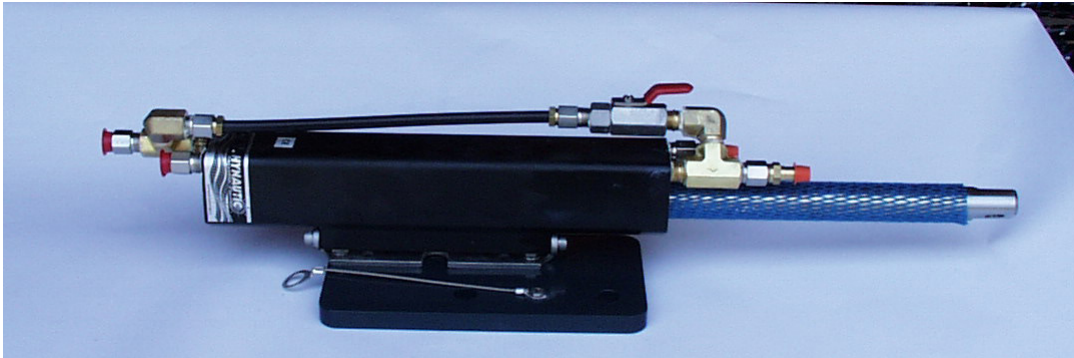
1. Fill the trim/lift pump reservoir to appropriate level (if not already done).
2. Remove the down line from trim pump and place it in a container to catch any purged fluid. Hold one (1) finger over the down line port of the trim/lift pump to prevent the intake of air. Trim the drive all the way up using the toggle switches on the trim/lift control plate.

NOTE: Only the toggle switch that's LED is illuminated can be used to trim or lift the drive.

NOTE: Fluid may need to be added if the reservoir bottle level goes below the minimum.

3. With the drive in the up position, attach the down line to the trim/lift pump.
4. Cycle the drive all the way to the down position and then all the way to the up position. Repeat this step three or four (3-4) times to purge any remaining air out of the system.

Steering System



Specified Fluids

General

1. Automatic Transmission Fluid Type Dextron III
2. Power Steering Fluid

Naval

1. Military H-17672, NSN 9150-00-985-7237

Filling

1. Remove cap from reserve (depressurize first), helm pump reservoir, or power steering pump reservoir.
2. Fill with specified fluid to appropriate level.

Emergency Tiller Arm (Navy applications)

Part Number 10-845



Bleeding Procedure (NAVY RIBs only)

1. Fill the steering reserve (30-151) to appropriate level (if not already done).
2. With the bypass valve in the closed position, pressurize the steering system at the reserve to 40 psi (276 kPa).
NOTE: Check steering system for leaks.
3. Turn steering bypass valve to the open position. Open the relief valve screws on reserve.
4. Oscillate steering wheel slowly forty (40) full rotations clockwise, followed by forty (40) full rotations counterclockwise. Repeat this procedure for twenty (20) and ten (10) full rotations.
5. Close bypass valve. Close relief valve screws on reserve. Oscillate the stern drive (using the steering wheel) four to five (4-5) times to the extreme port and starboard directions.
NOTE: Attempt to move the stern drive manually from left to right (from the outboard side of the transom). If the movement feels “springy” or “mushy” there is still air in the system, repeat steps 3 and 4.
6. Fill/top-off the reserve to the appropriate fluid level. Set operating pressure to 25-30 psi (172-207 kPa).
NOTE: Reserve gage has a Konrad Marine part number of 11-472.
NOTE: Steering wheel helm pump has a Konrad Marine part number of 30-192.



30-151 Reserve



30-192 Helm Pump

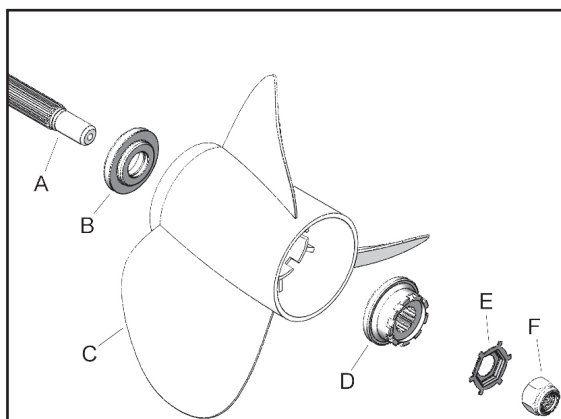
Propeller and Hardware

520 / 540 Description and Parts Breakdown



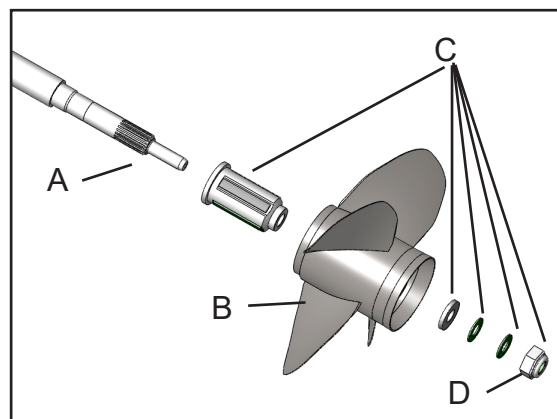
WARNING: Remote Control must be in **NEUTRAL**, the engine turned off and ignition key removed from switch before removing and/or installing propeller.

Model 520



	Description	Qty	Part #
A	Prop shaft (L) OR	1	10-360
	Prop shaft (R)	1	10-363
B	Forward thrust hub	1	10-292
C	Propeller	1	variable
D	Splined washer	1	10-293
E	Tab washer	1	10-295
F	Propeller Nut	1	10-296

Model 540



	Description	Qty	Part #
A	Prop shaft (L) OR	1	10-677
	Prop shaft (R)	1	10-596
B	Propeller	1	variable
C	Prop Hardware Kit	1	10-680
D	Propeller Nut	1/0	10-667

When a stainless steel propeller is used, care must be taken to maintain good continuity between the prop and the prop shaft to prevent corrosion. Periodic removal of the propeller, a thorough cleaning of its hub, the prop shaft and all mounting components, and lubrication of the shaft with **marine grade grease** (or equivalent) will help maintain good continuity and prevent corrosion. A continuity washer can be installed between the propeller and the splined washer on all models to help maintain continuity.

Inspection

1. Check propeller shaft nut for correct torque – 55 lb ft (75 Nm) 540 model, 80 lb ft (109 Nm) 520 model.
2. Check propeller blades for any indication of damage.
3. Check tab washer - verify at least two (2) tabs are bent over (model 520 only).

Removal

- A. Unbend retaining washer tabs using Konrad Tool TO-063 (model 520 only).
- B. Place a block of wood between the propeller and cavitation plate.
- C. Remove propeller nut.
- D. Remove additional propeller hardware (see diagram on previous page).
- E. Slide propeller off of splined shaft.
6. Remove thrust washer (model 520 only).

Installation

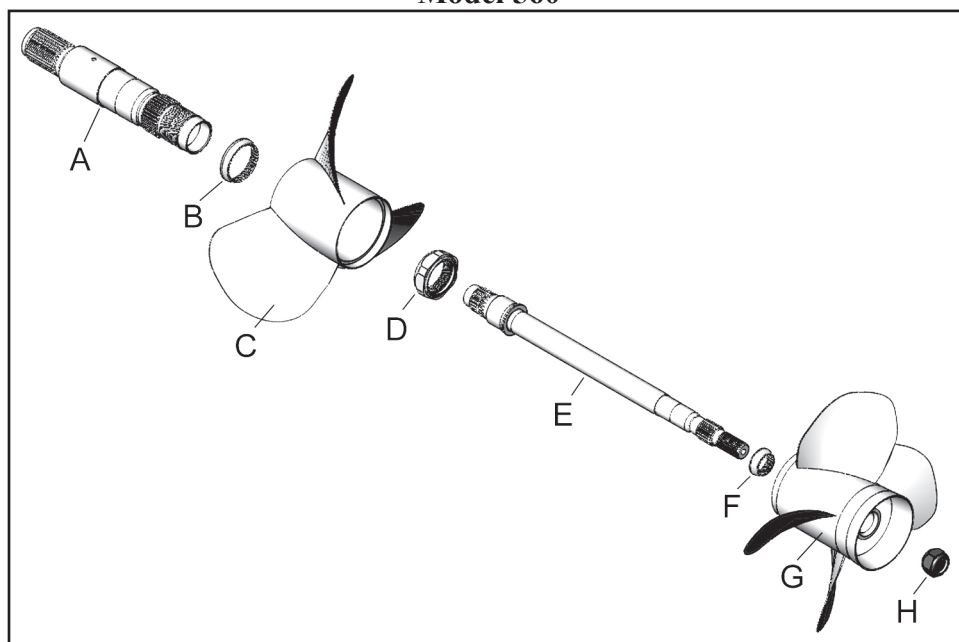
1. Grease and slide thrust washer onto propeller shaft (model 520 only).
NOTE: Tapered end of thrust washer must be towards the drive.
2. Grease splined area and the threads of the propeller shaft.
3. Place the propeller on the propeller shaft followed by the appropriate hardware (see diagram on previous page).
4. Torque the propeller nut to 55 lb ft (75 Nm) 540 model, 80 lb ft (109 Nm) 520 model. When approaching 80 lb ft (109 Nm), 520 model only, make sure that the tabs on the tabbed retaining washer (at least 2 out of 6) line up with the grooves in the splined washer/hub.
NOTE: A block of wood can be placed between the propeller and the lower drive housing to prevent the propeller from spinning, while torquing the propeller nut.
5. Bend over the tabs using appropriate tools (model 520 only).

560 Description and Parts Breakdown



WARNING: Remote Control must be in **NEUTRAL**, the engine turned off and ignition key removed from switch before removing and/or installing propeller.

Model 560



	Description	Qty	Part #
A	Forward prop shaft	1	12-502
B	Thrust hub	1	12-509
C	Rear propeller	1	Variable
D	Forward prop nut	1	12-506
E	Rear prop shaft	1	12-503
F	Thrust hub	1	12-508
G	Rear propeller	1	Variable
H	Rear prop nut	1	12-529

When a stainless steel propeller is used, care must be taken to maintain good continuity between the prop and the prop shaft to prevent corrosion. Periodic removal of the propeller, a thorough cleaning of its hub, the prop shaft and all mounting components, and lubrication of the shaft with **marine grade grease** (or equivalent) will help maintain good continuity and prevent corrosion. A continuity washer can be installed between the propeller and the splined washer on all models to help maintain continuity.

Inspection

1. Check Aft propeller shaft nut for correct torque – 60 lb ft (81 Nm).
2. Check propeller blades for any indication of damage.
3. After removal of aft propeller, check forward propeller shaft nut for correct torque – 100 lb ft

(136 Nm).

Removal

1. Once procedure below is completed for the aft propeller, repeat steps to remove the forward propeller.
2. Place a block of wood between the propeller and cavitation plate.
3. Remove aft propeller nut with $1\frac{7}{16}$ " socket and breaker bar (for forward propeller use hex wrench TO-121).
4. Remove additional propeller hardware (see diagram on previous page).
5. Slide propellers off of splined shafts.

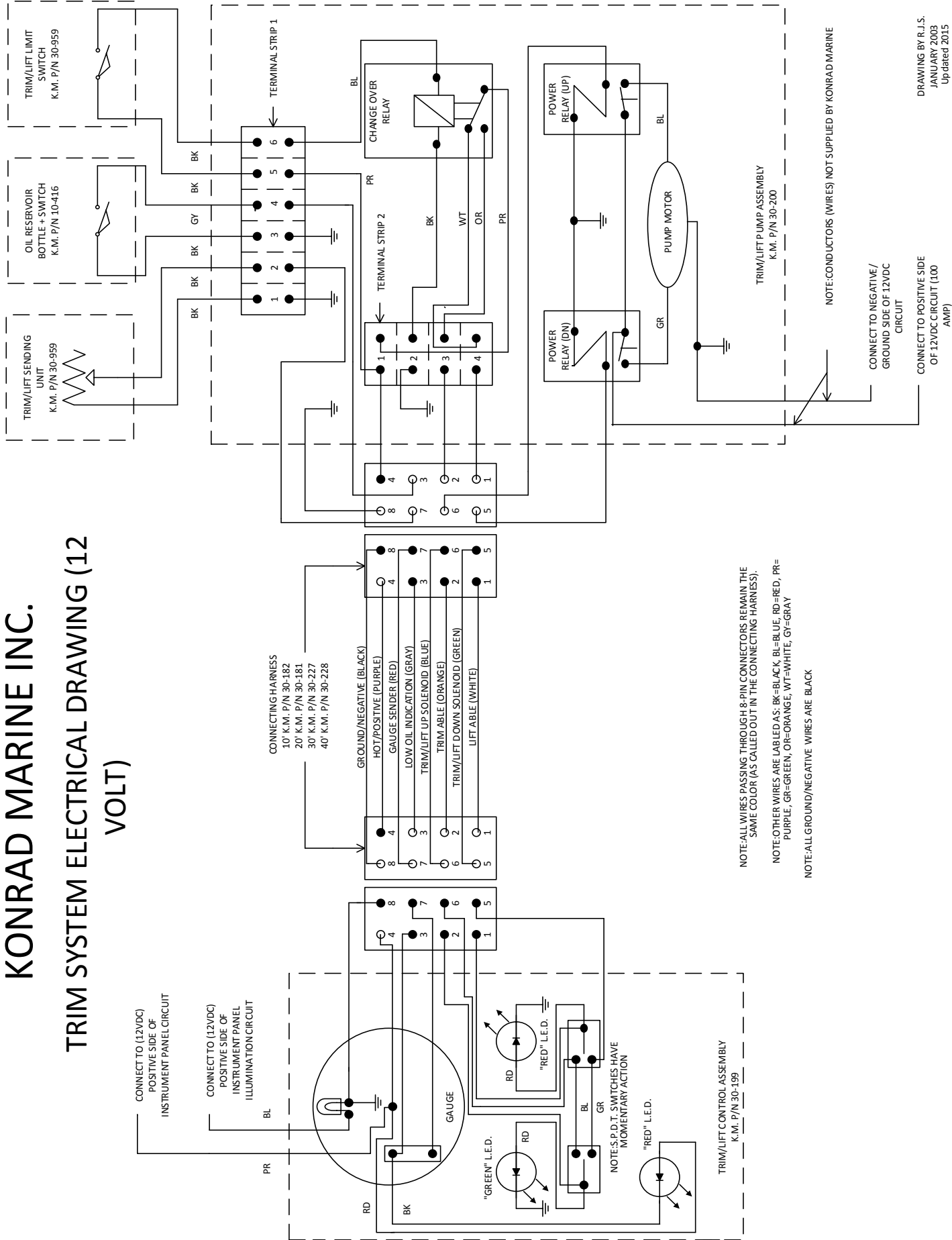
Installation

1. Slide forward thrust prop onto forward prop shaft so the tapers meet. Some grease can be used on tapers to hold in place.
2. Grease splined area and the threads of the forward propeller shaft.
3. Place the forward propeller on the propeller shaft until it seats against thrust hub.
4. Torque the forward propeller nut to 100 lb.ft (136 Nm) using hex wrench TO-121.
5. Slide rear thrust prop onto rear prop shaft so the tapers meet. Some grease can be used on tapers to hold in place.
6. Grease splined area and the threads of the forward propeller shaft.
7. Place the forward propeller on the propeller shaft until it seats against thrust hub.
8. Torque the rear propeller nut to 60 lb.ft (81 Nm) using $1\frac{7}{16}$ " socket wrench.

TRIM SYSTEM ELECTRICAL DRAWING (12 VOLT)

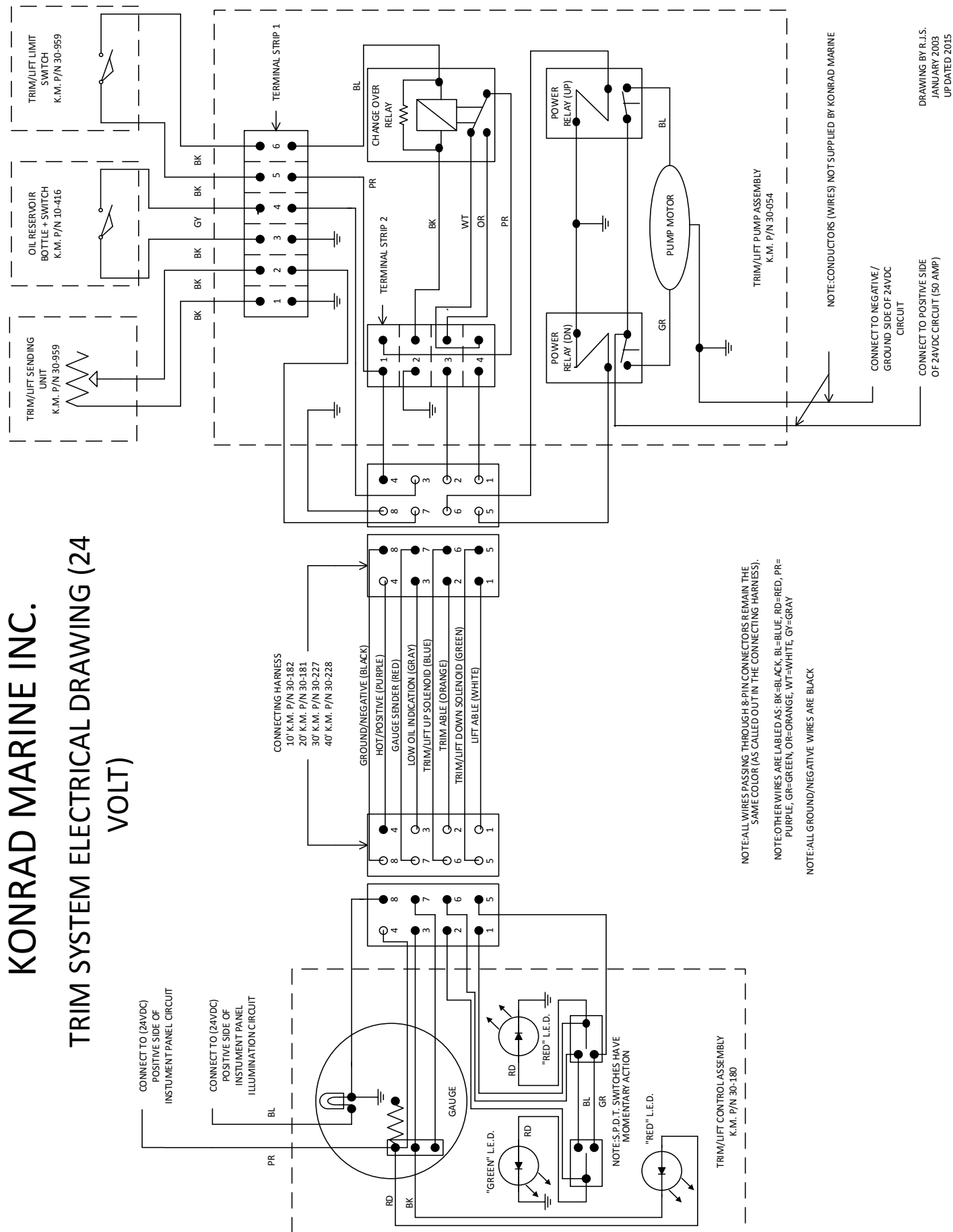
3. COMPLEX MAINTENANCE

Trim/Lift Electrical Drawing (12 Volt)



KONRAD MARINE INC.

TRIM SYSTEM ELECTRICAL DRAWING (24 VOLT)

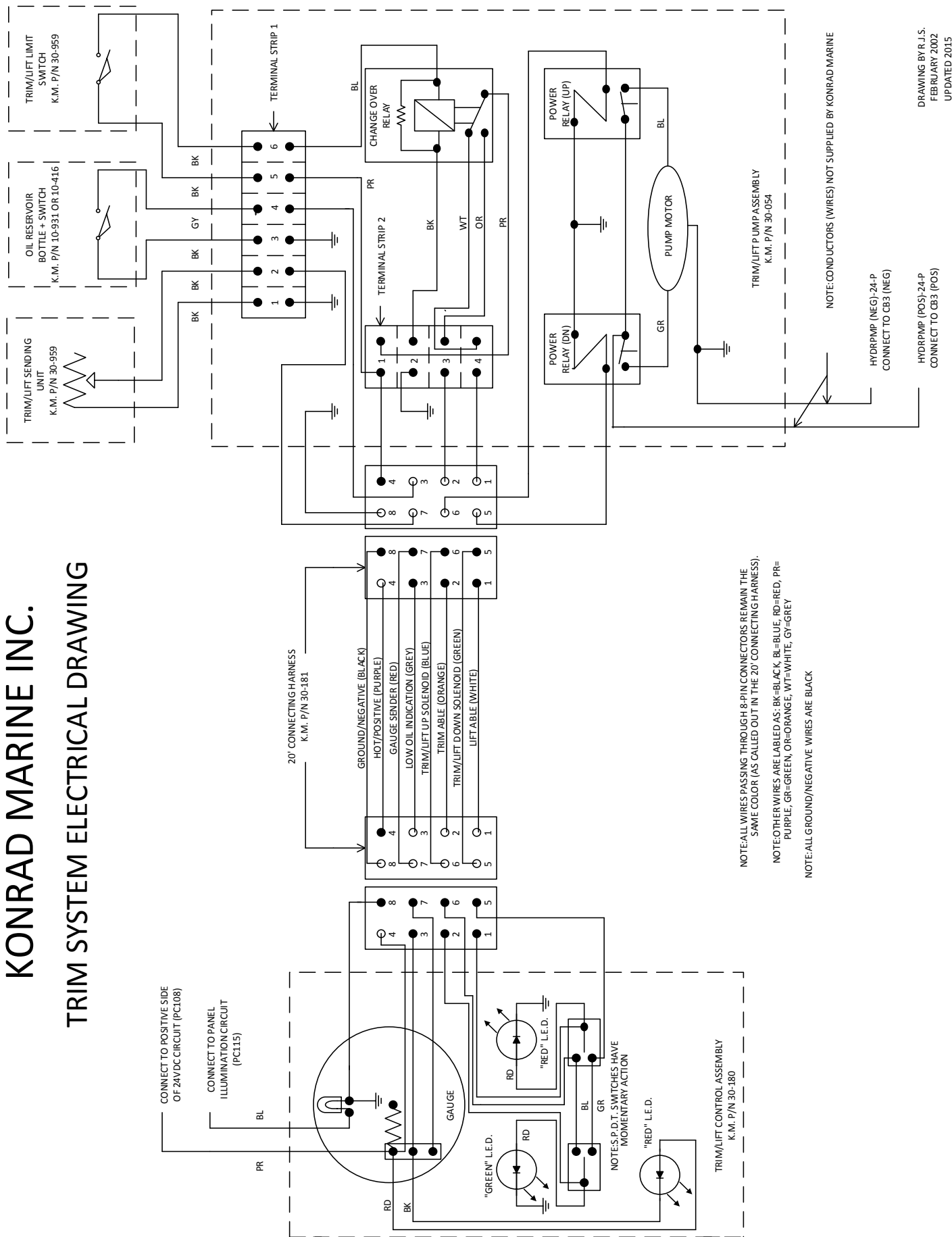


DRAWING BY R.J.S.
 JANUARY 2003
 UP DATED 2015

KONRAD MARINE INC.

TRIM SYSTEM ELECTRICAL DRAWING

Trim/Lift Electrical Drawing for Navy RIBs (24 Volt)



DRAWING BY R.J.S.
FEBRUARY 2002
UPDATED 2015

Setting Trim/Lift Limit and Sender Switch

1. Trim the drive all the way to the down position, approximately negative seven degrees (-7°).
2. Loosen the starboard side switch on the transom assembly and rotate the switch until gauge reads DN (farthest down position).

Note: If this position cannot be achieved by rotating the switch, it will be necessary to take the switch completely off the transom assembly and rotate the gray star-hex shaped knob until desired position is achieved. Remount the switch and fine tune.



3. Set the drive at approximately positive eight degrees ($+8^{\circ}$). This can be accomplished by trimming the drive up until the trim cylinders measure twenty-two inches (22") (56 cm) between the center of the front anchor pin and the center of the rear anchor pin.



Note: Alternate method of setting the drive at positive eight degrees ($+8^{\circ}$).

Insert a one inch (1") (2.5 cm) shim at the front of the top cover.

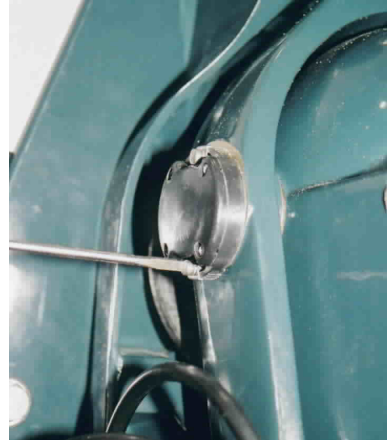
Place one end of a level on the one inch (1") (2.5 cm) shim and the other end on the back of the top cover.



Trim the drive up or down until the level indicates levelness.

4. Loosen the port side switch on the transom assembly and rotate until the red and green LED's are on the verge of switching.

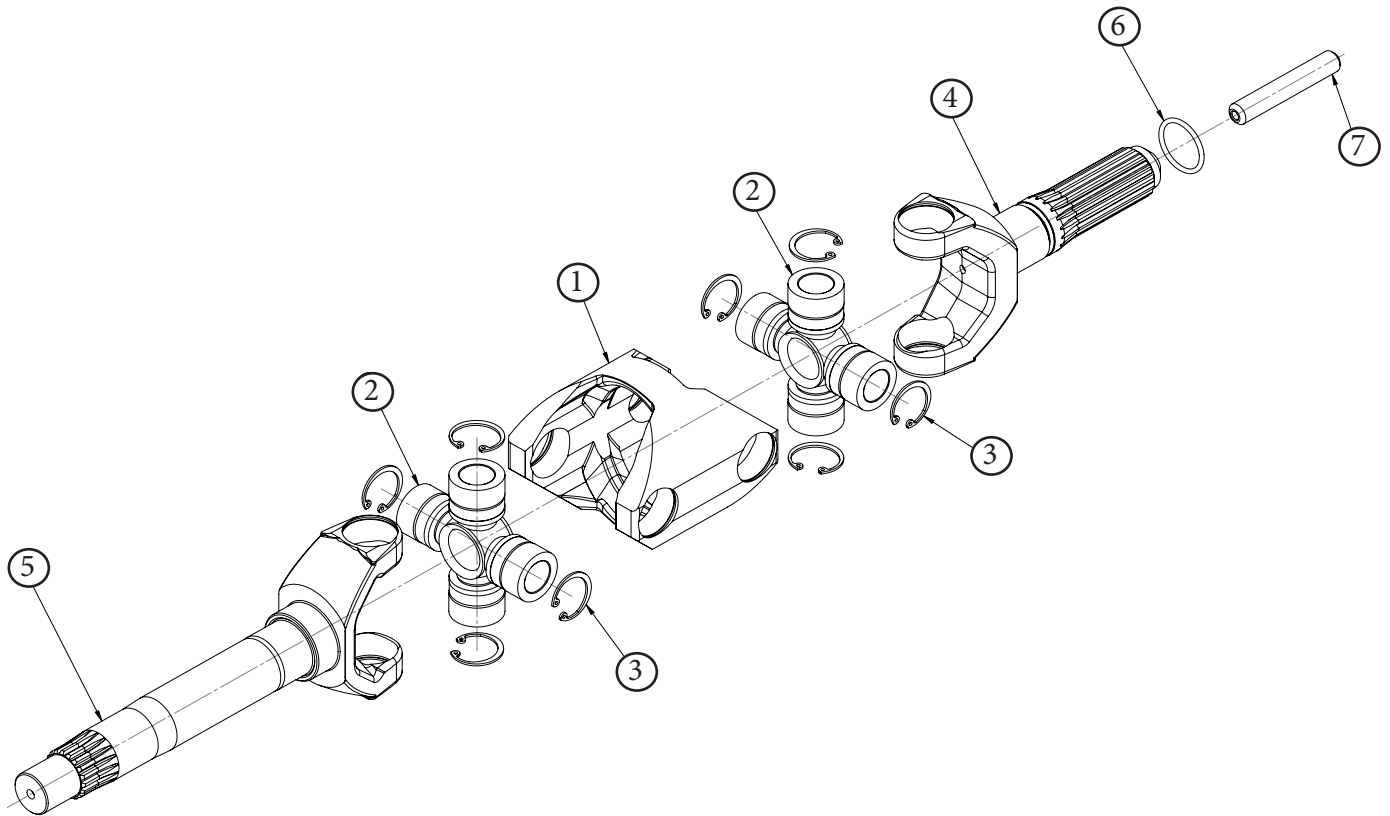
Note: If this position cannot be achieved by rotating the switch, it will be necessary to take the switch off the transom and rotate the gray star-hex shaped knob until desired position is achieved. Remount the switch and fine tune.



NOTE: Complete trim/lift switch assembly has a part number of 30-959.
(Includes both port and starboard sending units)

Universal Joints

Description and Parts Breakdown

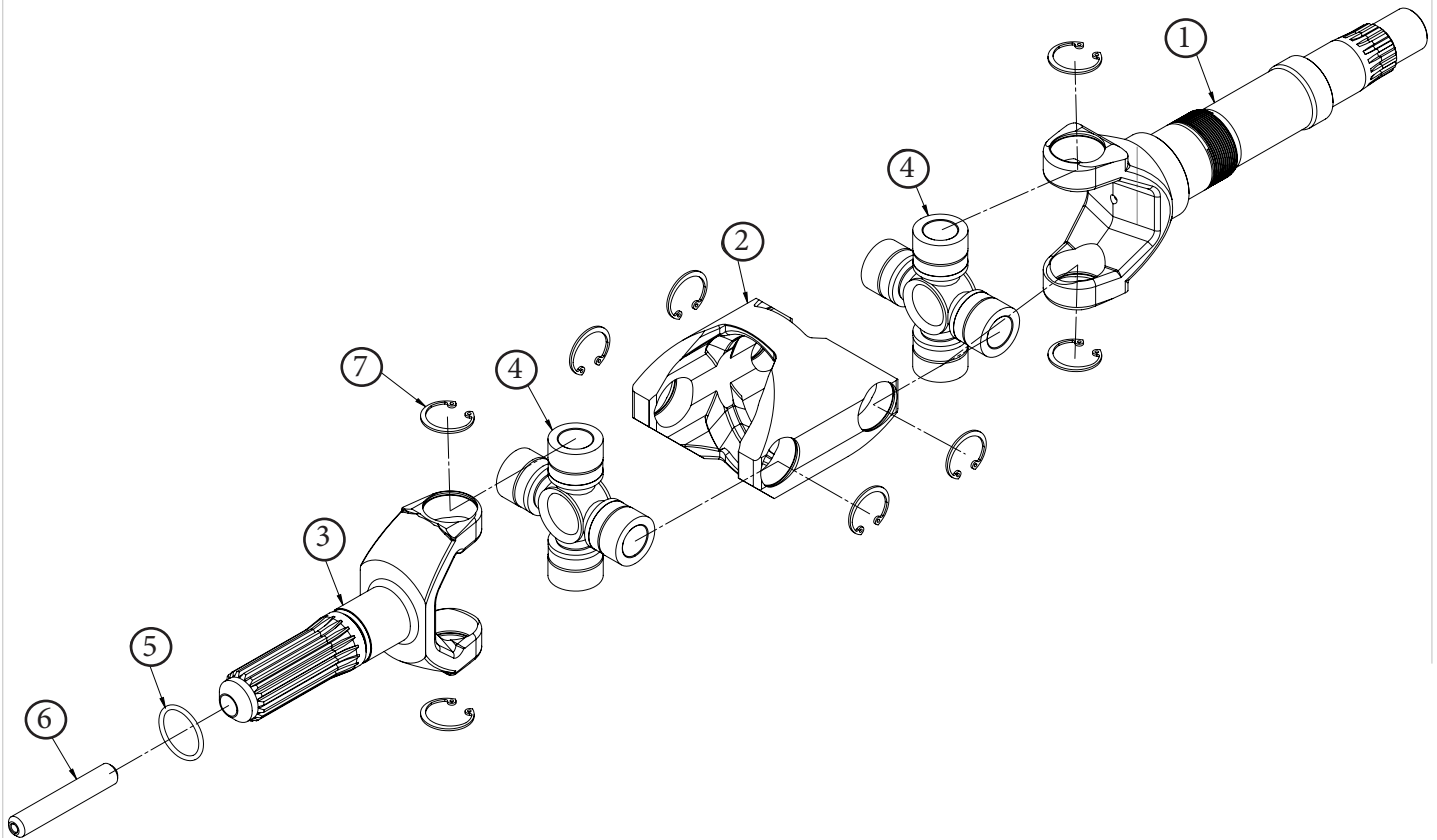


Complete Standard
U-Joint Assembly
30-033

Item No.	Description	Quantity	Part #
1	H-Yoke	1	10-366
2	Cross & Bearing	2	10-373
3	Snap Ring	8	10-518
4	End Yoke	1	10-365
5	Gear End Yoke	1	10-367
6	O-Ring	1	10-493
7	Engagement Pin	1	10-494

Universal Joints

Description and Parts Breakdown



Complete HD
U-Joint Assembly
30-533

Item No.	Description	Quantity	Part #
1	Shaft, End Yoke, HD Drive	1	11-990
2	H-Yoke	1	10-373
3	Shaft, End Yoke	1	10-365
4	Cross & Bearing	2	10-373
5	O-Ring	1	10-493
6	Engagement Pin	1	10-494
7	Snap Ring	8	10-518

Maintenance

Inspection

Inspection Before Disassembly

1. U-joint cross and bearings should be inspected every two hundred (200) hours for wear and possible replacement, depending on usage. Severe applications may require shorter intervals.
2. Check cross and bearing for roughness and excessive side-to-side play.
3. Check splines on coupling end yoke for wear.
4. If troubleshooting a u-joint knocking condition, inspect for evidence of interference with bearing caps hitting center socket or gimbal housing.

Cleaning and Inspection

1. Clean all parts **except the bearing** in fresh solvent. Blow dry with compressed air.

IMPORTANT: DO NOT clean bearing with solvent, as this will wash away the lubricant that retains needle bearings.

2. Inspect crosses for the following:
 - Bearing surfaces - for pitting, scratches and grooves
 - Ends - for galling
 - Seal - for cracks or other signs of deterioration
3. Inspect coupling and gear end of u-joint - for spline wear.
4. Clean all corrosion from the coupling.
5. Replace coupling yoke if splines are partially corroded away.

NOTE: If wear or corrosion is found in the u-joint assembly, contact Konrad for new parts and/or service.

Removal

Universal Joint Shaft Disassembly

U-joint cross and bearings should be replaced at four hundred (400) hours (or before if necessary). The u-joint assembly requires two (2) cross and bearing kits, (10-373).

CAUTION: New snap rings should be installed whenever new cross and bearing kits are installed. The 500 Series stern drives utilize a **special snap ring** (10-518), different than many of those found on other stern drives or with after market cross and bearing sets. It is required that only these snap rings be used.

1. Drain oil from drive and remove the top and rear covers.
2. Remove the SHCS from the locking nut, then remove the nut and washer from the end yoke shaft.
3. Slide gear and bearing off of end yoke shaft.
4. (For HD units only) remove inner locking nut by using (TO-120).
5. Remove u-joint assembly from drive and place on work bench.
6. Remove external snap rings from the cross and bearings.
7. Remove all the bearing cups from both cross and bearings using a press.
8. Remove both end yokes and H-yoke from the crosses.

Installation

Universal Joint Shaft Reassembly

1. Remove the bearing caps from the new cross and bearings then place the crosses into the end yokes.
2. Press bearing caps into end yokes and onto cross. If a press is unavailable, use a large c-clamp and socket.
3. Repeat same procedure for the other bearing caps for the H-yoke.
4. Install all external snap rings(10-518).
5. (For HD units only) Reinstall gear end yoke into upper housing through the front seal and bearing, then tighten the first lock nut with (TO-120) to 100 lb.ft (136 Nm). Install the second locking nut by hand until touching the first. Back off the second nut until all the holes line up. Once the holes line up, back off the second nut two flat spots or 2/6 of a turn. Place red *loctite* onto the six (6) SHCS (12-568) and tighten to 75 lb. in.(8.5 Nm).
6. (For standard shafts) Reinstall gear end yoke into the upper housing through the front seal and bearing. Place the spacer tube onto the shaft.
7. Reinstall the aft gear and bearing, then slide the hard washer (10-280) onto the end of the shaft.
8. Reinstall the first lock nut (11-589) and tighten to 200 lb.ft. (271 Nm) using a 1³/₄" socket.
9. Place the second lock nut (11-588) onto the shaft and hand tighten until it touches the first lock nut. Back off the second lock nut until all the holes line up. Then back off an additional two flats, or 2/6 of a turn.
10. Put red *loctite* onto the six (6) SHCS (11-590) and tighten to 75 lb. in. (8.5 Nm).
11. Reinstall the shims, tab washer, and oring, then position the back cover into place.
12. (For a standard back cover) Place grease onto the bolts and tighten to 20 lb. ft.(27 Nm).
13. (For a HD or Steering back cover) Place blue *loctite* onto the bolts and tighten to 40 lb.ft. (54 Nm).

14. Reinstall top cap, grease and tighten the SHCS to 20 lb.ft. (27 Nm).

NOTE: When u-joint assembly is completely removed from the upper housing of the stern drive for u-joint maintenance, it is recommended that a new front seal (10-307) or (12-018 HD) and new SHCS's (11-590) and (12-568 for fwd HD) for the locking nut(s) be used when reinstallation occurs.

Bellows

Description and Parts Breakdown

Individual Components

Item	Description	Qty	Part #
A	Bellows	1	10-230
B	Hose clamp	2	10-336



Maintenance

Inspection

1. Look for any cracks, holes, tears or a broken seal.
2. Look for large amount of corrosion on the surface of material or excessive wear.

Removal & Installation

NOTE: Sterndrive must be removed for removal and installation of bellows. Refer to a previous section in this manual for removal instructions.

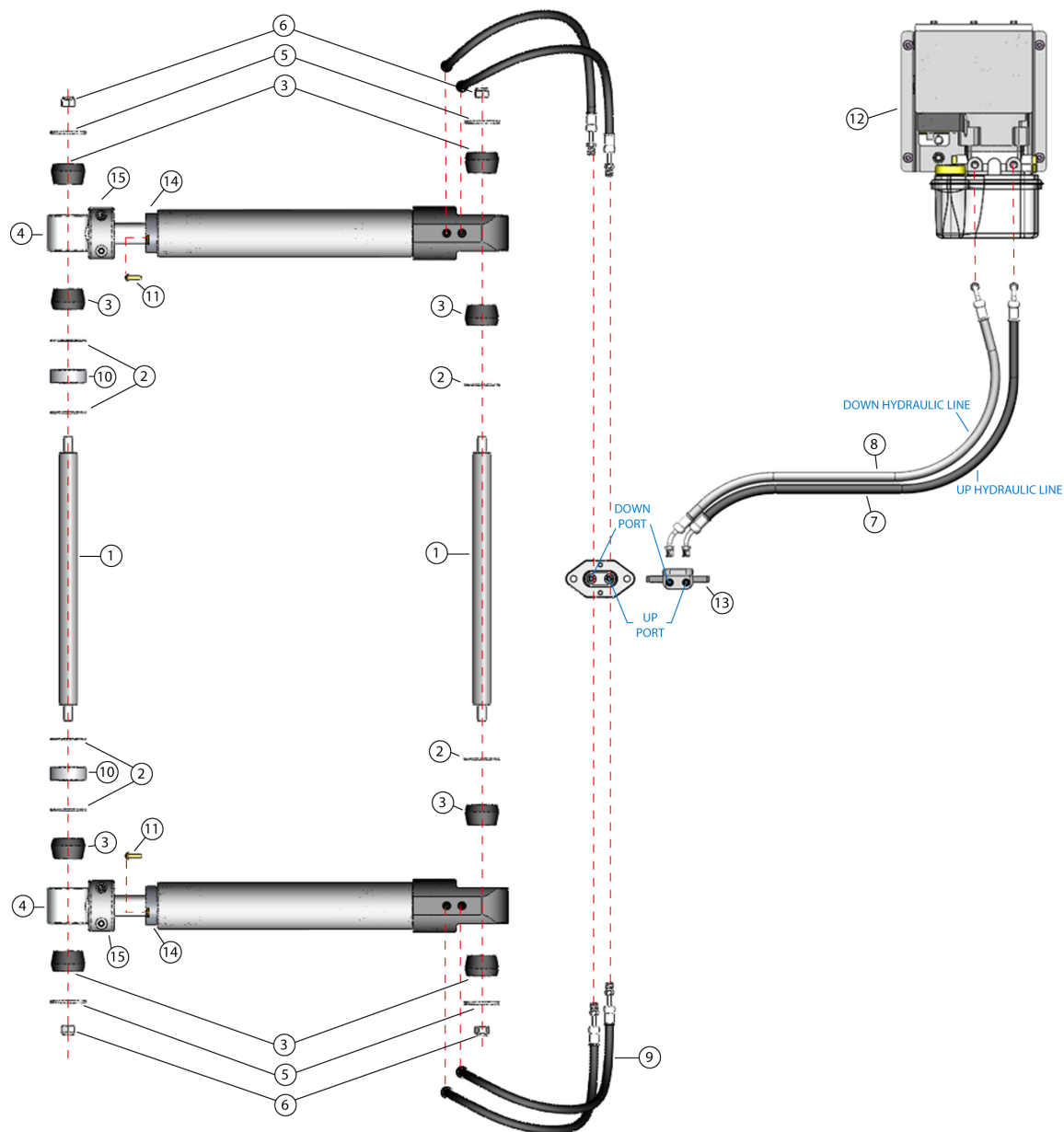
1. Remove U-joint bellows from gimbal housing by loosening the two (2) hose clamps (10-336).
2. Position ground clips on bellows.
3. Position u-joint bellows with “TOP” mark facing upwards and install u-joint bellows on gimbal housing flange and position clamp. Torque to 30-40 lb in (3.4 - 4.5 Nm).

NOTE: When ordering the bellows (10-230), two (2) hose clamps (10-336) are included.

IMPORTANT: Be sure that the bead on the inner mating surface of bellows is positioned in the groove on the gimbal housing flange.

Trim System

Description and Parts Breakdown



Complete Trim Assembly 30-002

Trim System

Individual Components

Item #	Description	Qty.	Part #
1	Pin , Anchor	2	10-458
2	Washer	6	10-442
3	Bushing, Anchor Pin	8	10-443
4	Cylinder, Trim, Assembly OR	2	30-024
	Cylinder, Trim, Assembly (with stops)	2	30-265
5	Washer	4	10-444
6	Nut	4	10-314
7	Hose, Oil (Black) 32 in. (81 cm) OR	1	10-490
	Hose, Oil (Black) 48 in. (122 cm)	1	11-170
8	Hose, Oil (Gray) 32 in. (81 cm) OR	1	10-489
	Hose, Oil (Gray) 48 in. (122 cm)	1	11-180
9	Hose, Braided, Trim	4	11-078
10	Spacer, Anchor Pin	2	12-535
11	Screw	4	11-278
12	Pump, Trim, 12 Volt OR	1	10-430
	Pump Assembly, Trim, 12 Volt		30-200
	Pump, Trim (Pump Only), 24 Volt OR	1	10-690
	Pump Assembly, Trim, 24 Volt		30-054
13	Connector	1	10-331
14	Anode	2	11-277
15	Anode	2	10-434

Maintenance

Inspection

1. Check for external leaks.
2. Check hydraulic line fittings for corrosion or fatigue.
3. Inspect bushings for excessive wear.
4. Check for correct tightness of nuts (10-314). Two (2) threads should be visible beyond the nut. (Rubber Bushings only) 30-35 lb ft. (41-47 Nm)(Hardened Bushings only)

Trim Cylinder Replacement

1. Remove hydraulic oil hoses from trim cylinders and identify for reinstallation.
2. Remove the nut (10-314), the outer retaining washer (10-444), and the outer bushing (10-443) from the trim cylinder anchor pin.

NOTE: Repeat step #2 for front and rear anchor pin, port and starboard sides.

3. Slide trim cylinders off of anchor pins.

Trim Cylinder Installation

1. Slide the trim cylinders onto the anchor pins.

NOTE: If trim cylinders are at an inappropriate length to fit onto the anchor pins, the red caps must be removed and length must be adjusted. Another method is to lift the stern drive manually to the appropriate level to match the length of the trim cylinder.

NOTE: The end of the trim cylinder with the line inputs must be face up and toward the transom.

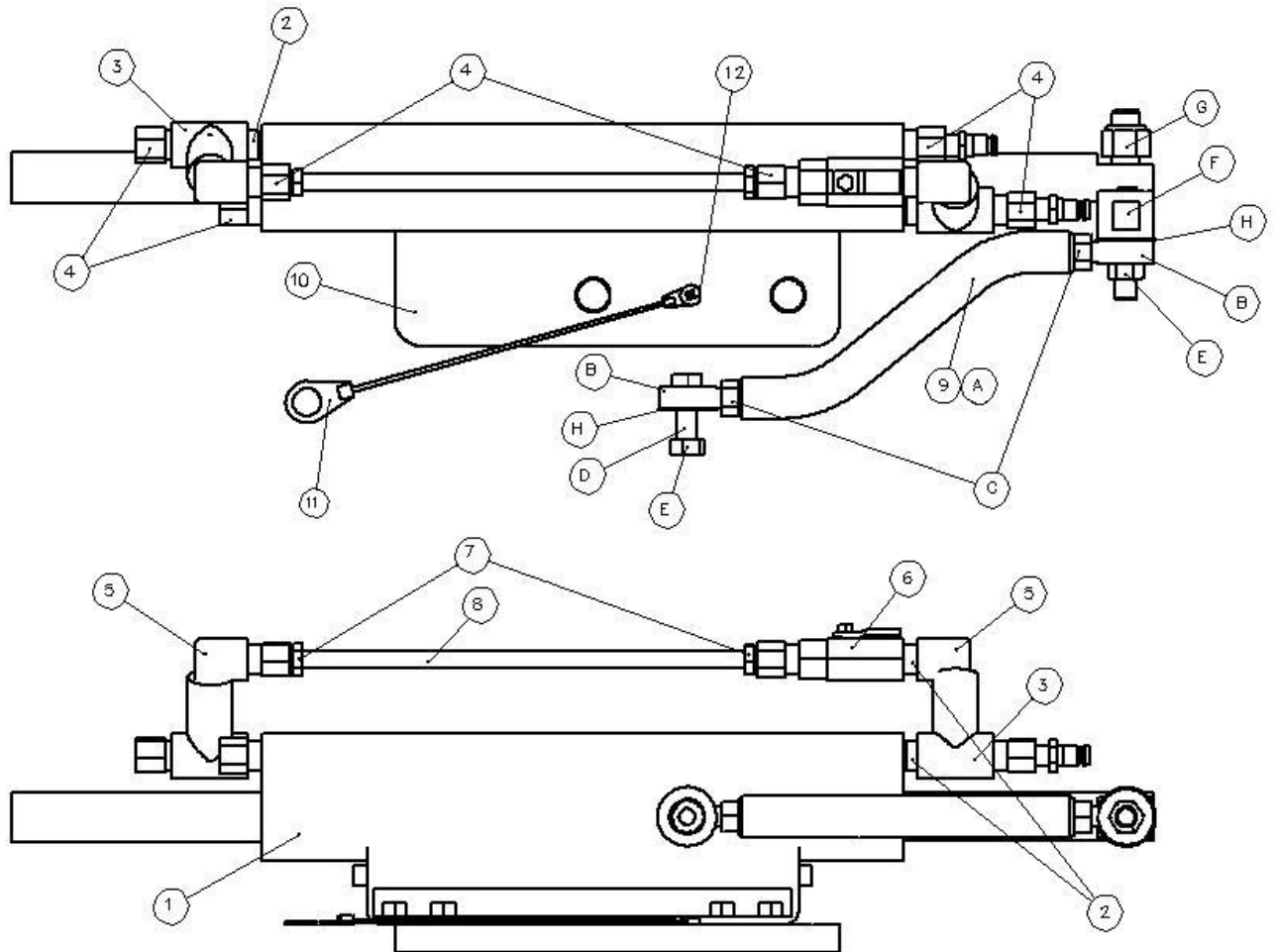
2. Place the outer bushing, followed by the outer retaining washer and the nut, back on the trim cylinder anchor pin. Repeat process for both sides of both pins. Tighten the nuts so two (2) threads of the anchor pin are showing beyond the end of the nut (Rubber Bushings only) 30-35 lb ft. (41-47 Nm)(Hardened Bushings only)

NOTE: Start all four (4) nuts before tightening any nut completely.

3. Remove the red caps from the trim cylinders if they have not been removed previously (new trim cylinders only).
4. Hook up the four (4) trim lines (from the transom assembly to the trim cylinders) according to their tags, which are labeled “up” and “down”, (new installations only). The threaded line input on the trim cylinders, which is closest to the transom, is the “up” line. The remaining threaded line input, is the “down” line.

Steering Cylinder

Steering Cylinder Assembly 30-267



***NOTE: ALL LETTERED BALLOONS ARE CONSIDERED
PART OF THE 30-266 DRAG ARM ASSEMBLY**

Description and Parts Breakdown

Individual Components

Item	Description	Qty	Part #
G	Nylock Nut	1	10-334
12	Self Tapping Screw	1	10-479
11	Continuity Cable	1	10-487
C	Jam Nut	2	10-758
D	Hinge Bolt	1	10-915
E	Nylock Nut	2	10-927
5	90 Degree Elbow	2	11-027
10	Inner Steering Transom Plate	1	11-044
3	Tee	2	11-051
2	Nipple	3	11-052
6	Bypass Valve	1	11-053
8	Hose	1	11-054
4	Adapter	6	11-055
7	Sleeve	2	11-056
B	Rod End	2	11-077
A	Drag Arm	1	11-265
F	Steering Post	1	11-271
H	Nylon Washer	2	11-286
1	Cylinder Assembly	1	30-062
9	Drag Arm Assembly	1	30-266

Maintenance

Inspection

1. Check for any external fluid leaks.
2. Inspect all parts for excessive fatigue or wear.

Bleeding System After Installation (Navy RIBs only)

Refer to page 10 for instruction on bleeding the steering system.

Anodes

Description and Parts Breakdown

Individual Components

Complete Anode Kits

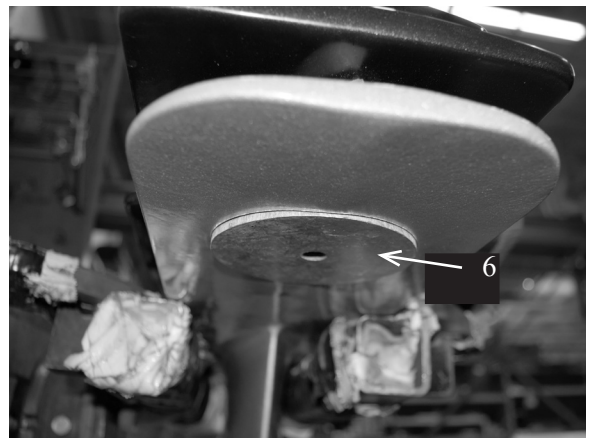
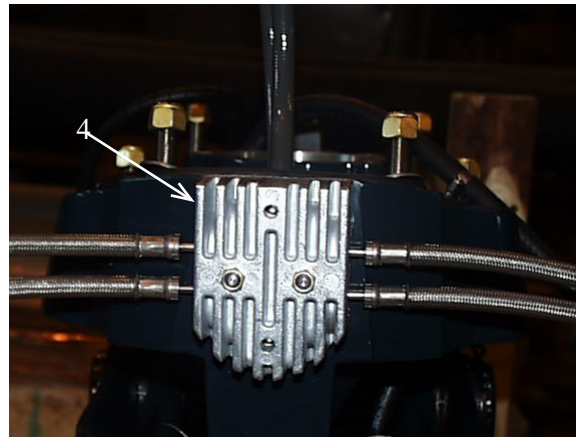
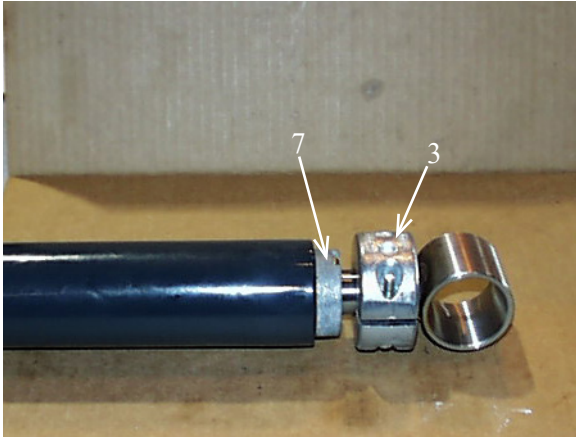
30-471 – 520 Anode Kit

30-508 – 540 / 560 Anode Kit

Item #	Description	Quantity	Zinc Part #	Magnesium Part #	Aluminum Part #
1	Plate, Inhibitor	1 (if applicable)	10-432	11-038	12-473
2	Plate, Inhibitor	2 (if applicable)	10-433	11-076	12-475
3	Shaft, Collar	2 (if applicable)	10-434		12-476
4	Anode, Gimbal Housing	1	10-456	11-039	12-474
5	Trim Tab	1 (if applicable)	10-139		
6	Anode	1 (if applicable)	11-254		12-477
7	Trim Cylinder Anode	2 (if applicable)	11-277		12-472

Placement on Stern Drive





Maintenance of Anodes

The stern drive unit is equipped with several sacrificial zinc (salt water) or magnesium (fresh water) alloy anodes to help protect underwater metal parts from galvanic corrosion. Because of their self-sacrificing nature, all anodes **MUST BE REPLACED** if eroded 50% or more.

In replacing anodes, the following should be kept in mind to maximize anode effectiveness:

Anodes offer no protection when the boat is out of the water. Whenever the boat is put in storage, the external surface of the drive unit should be thoroughly flushed with fresh water to remove any polluted or salt water.

When the boat is moored in the water, the drive unit must be kept in the full down position to make sure that the anodes remain in the water. If they are not, they will offer no protection against corrosion. The anodes should not be painted. Paint will prevent them from protecting the drive unit against corrosion. Whenever an anode is replaced, make sure the anode mounting screws are fastened tightly and making good electrical contact with the drive unit.

Continuity Cables

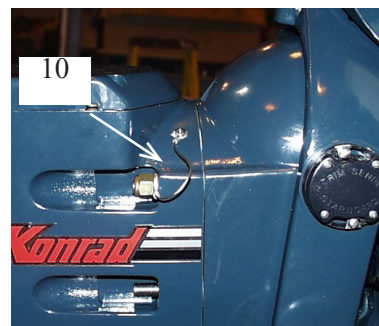
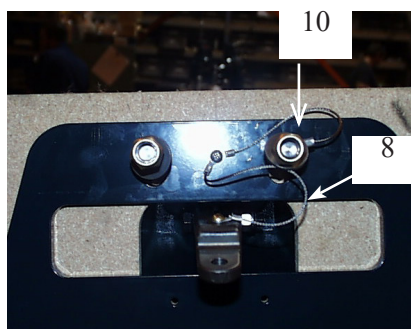
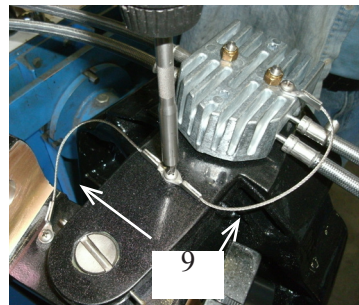
Maintenance

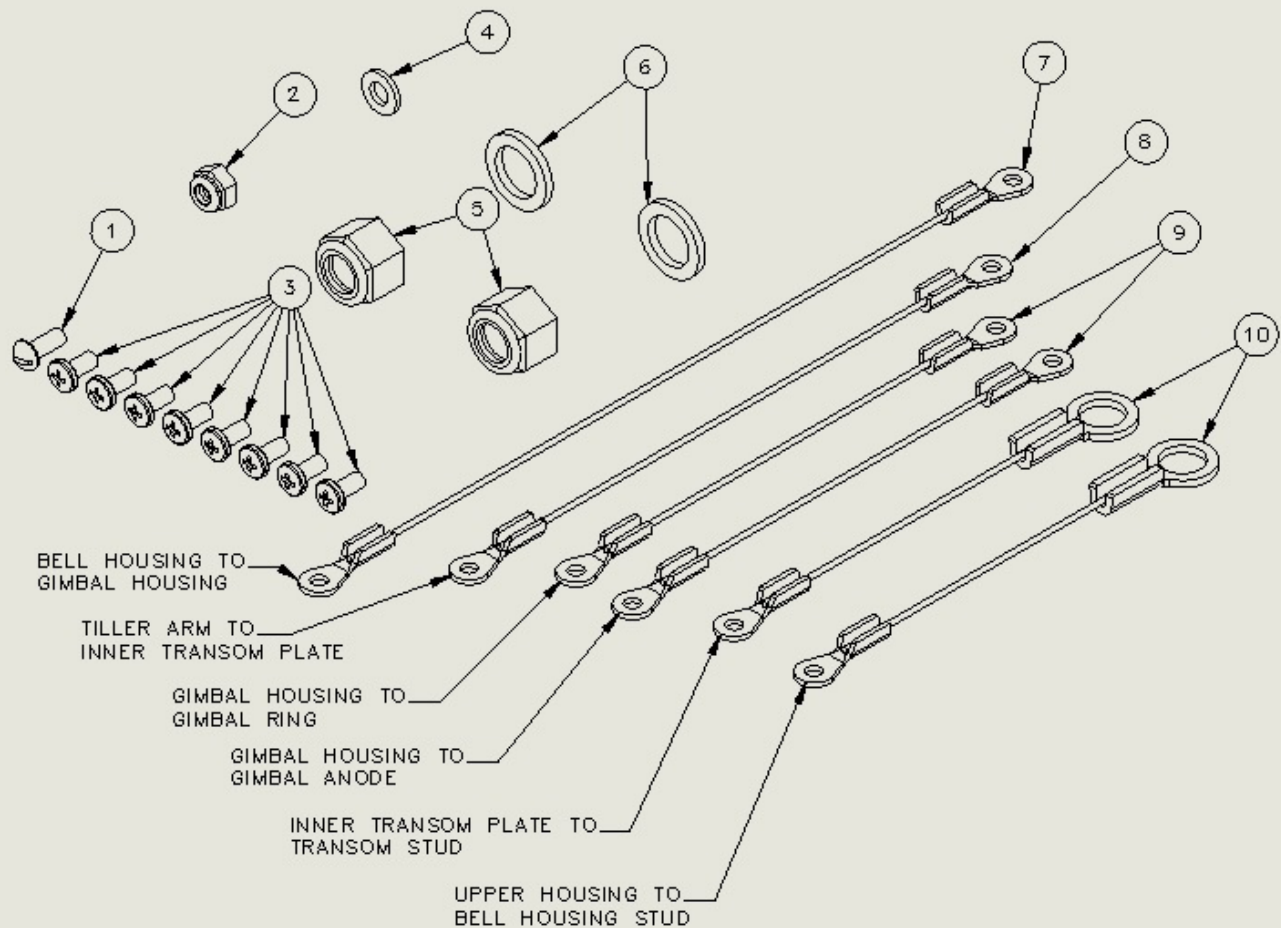
Inspection

1. Check cable for corrosion.
2. Inspect for fatigue wear.
3. Inspect for breaks.

NOTE: If continuity cables become ineffective, damage could be done to the stern drive system.

Placement on drive





Continuity Replacement kit 30-016

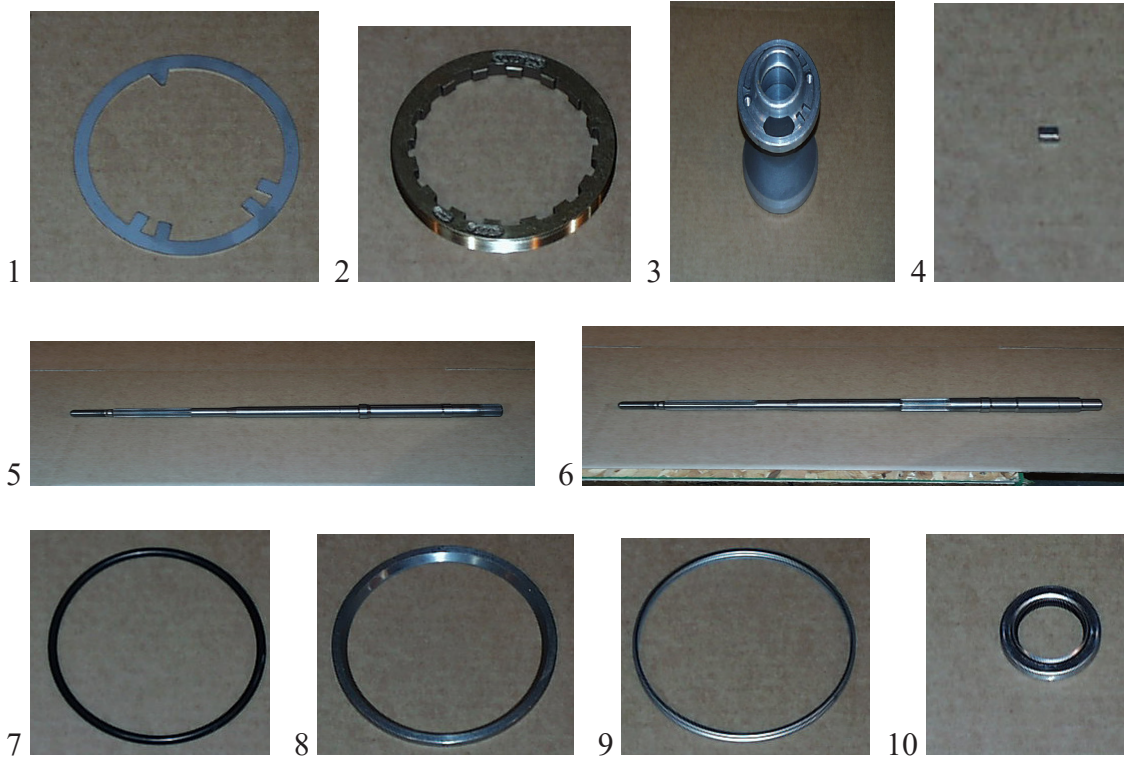
Item #	Description	Quantity	Part #
1	Screw	1	10-482
2	Nut, Nylock, Brass	1	10-333
3	Screw, Self Tapping	8	10-479
4	Flat Washer, SS	1	10-343
5	Nut, Nylock, Brass	2	10-334
6	Washer	2	10-415
7	Cable, Continuity, 9.25"	1	30-904
8	Cable, Continuity, 6.75"	1	30-905
9	Cable, Continuity, 5.25"	2	30-907
10	Cable, Continuity, 4.5"	2	30-906

Propeller Shaft Bearing Carrier

Seal Replacement

Model 520

Parts Breakdown



	Description	Qty	Part #
1	Tab Washer	1	10-203
2	Cover Nut	1	10-242
3	Bearing Carrier	1	10-364
4	Key	1	10-017
5	Propeller Shaft (Left Hand)	1/0	10-360
6	Propeller Shaft (Right Hand)	1/0	10-363
7	O-Ring	1	10-290
8	Thrust Washer	1	10-499
9	Crush Ring	1	10-289
10	Seal	1	13-641
11	Seal	1	13-641
12	Bearing	1	10-394



Removal

1. Bend down tab on tab washer (10-203).
2. Remove cover nut (10-242) from lower housing using tool TO-029.
3. Remove tab washer (10-203).
4. Remove bearing carrier (10-364) using slide hammer TO-028.
NOTE: If bearing carrier cannot be removed using slide hammer, either heat up lower housing or use a puller on the prop shaft.
NOTE: Recover key (10-017).
5. Remove propeller shaft (10-360 Left Hand) or (10-363 Right Hand), o-ring (10-290), thrust washer (10-499) and crush ring (10-289).

Rebuilding

1. Remove both (13-641) seals using a seal driver or punch.
1. Remove bearing (10-394) using a bearing driver or punch.
2. Clean carrier unit (10-364) thoroughly.
3. Press new bearing (10-394) into carrier unit using tool TO-019.
4. Apply *Loctite* to outside of first seal (13-641) and grease inner seal surface. Press into carrier unit with the numbers printed on the seal facing up using the long end of tool TO-030 with the thick shoulder. Apply *Loctite* to outside of second seal (13-641) and grease inner seal surface. Press into carrier unit with the numbers printed on the seal facing down using opposite side of tool TO-030 with the thin shoulder.

Installation

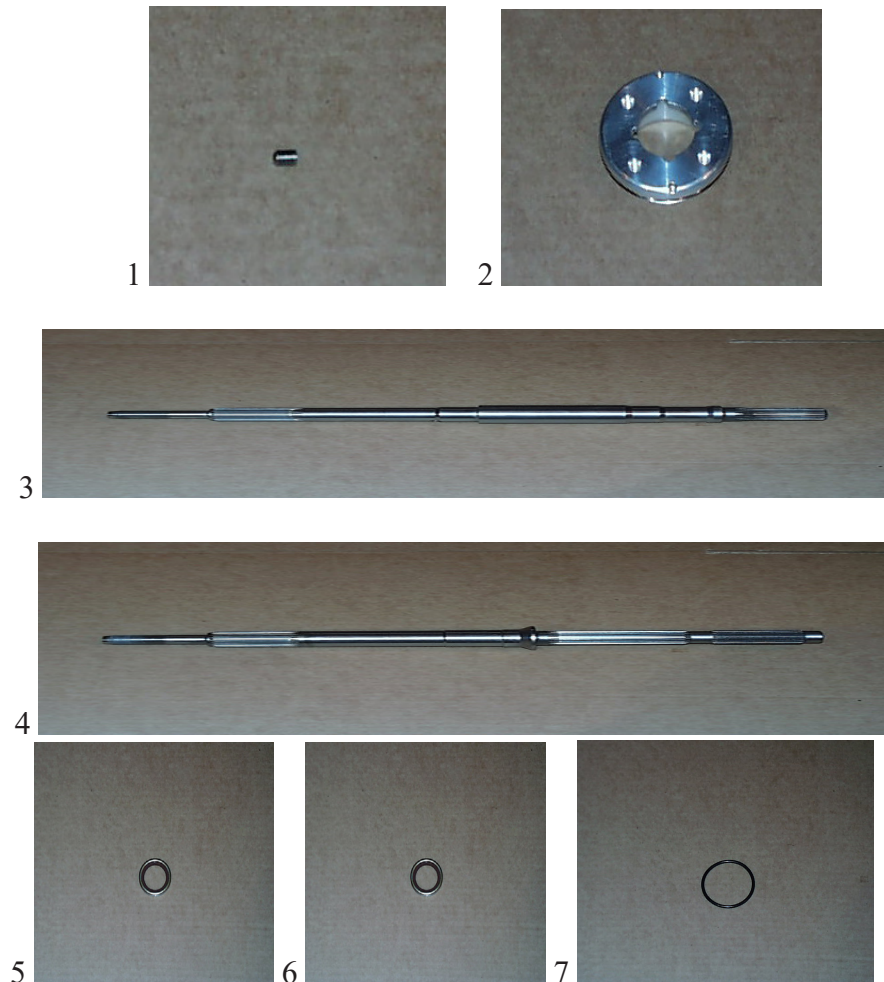
1. Install a new crush ring (10-289). The old one may not be reused.
2. Install thrust washer (10-499), o-ring (10-290), propeller shaft (10-360 Left Hand) or (10-363 Right Hand) and key (10-017) into housing.
3. Bend tabs up thirty degrees (30°) on tab washer (10-203) and insert into housing.
4. Lubricate with 90w oil and install cover nut (10-242) into housing. Tighten until 25-30 lb ft (34-41 Nm) of rolling torque is achieved on the propeller shaft.
5. Bend tab over on tab washer (10-203).

Propeller Shaft Seal Carrier

Seal Replacement

Model 540

Parts Breakdown



	Description	Qty	Part #
1	Set Screw	2	11-204
2	Seal Carrier	1	10-678
3	Propeller Shaft (Left Hand)	1/0	10-677
4	Propeller Shaft (Right Hand)	1/0	10-596
5	Seal	1	10-679
6	Seal	1	11-518
7	O-Ring	1	10-449

Propeller shaft part numbers may vary depending if you have a standard or HP lower assembly.

Removal

1. Loosen both set screws (11-204).
2. Remove seal carrier (10-678) from propeller shaft bearing carrier (10-677 left hand) or (10-596 right hand) using tool TO-051.

Rebuilding

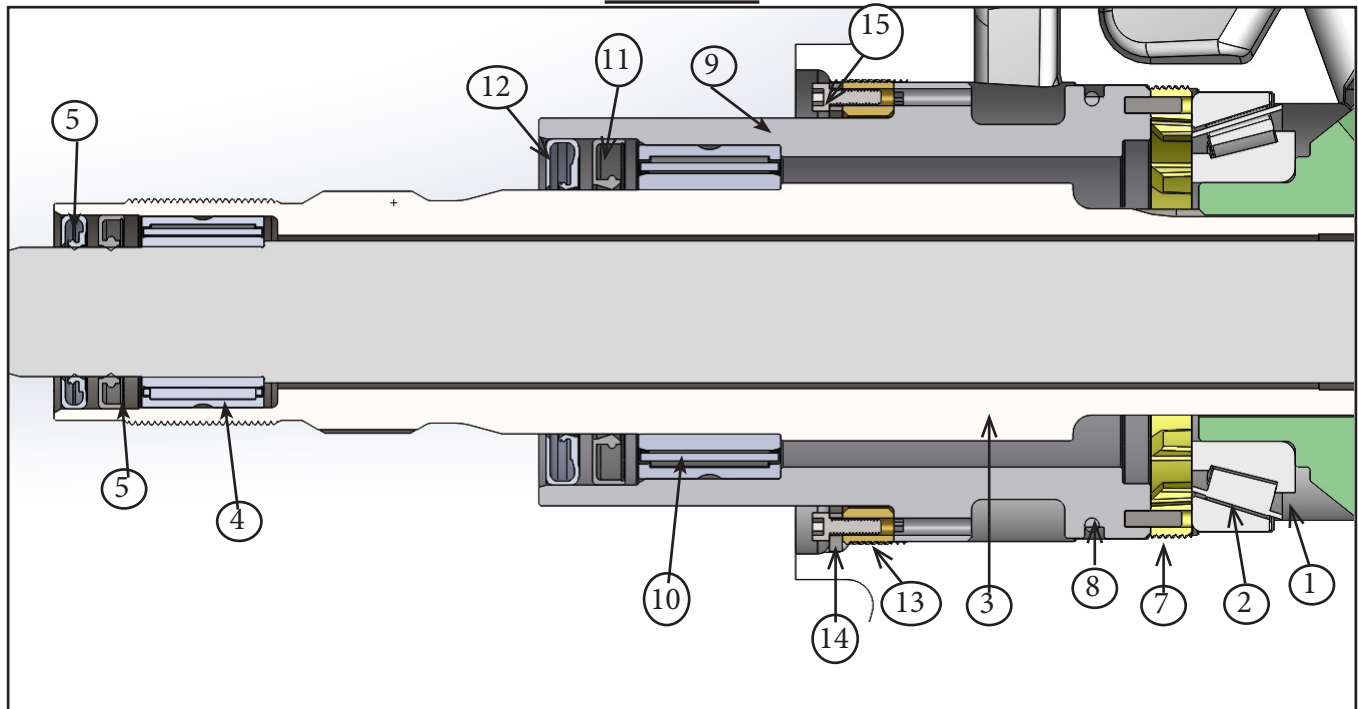
1. Remove both seals (10-679) and (11-518) using a seal driver or punch.
2. Clean seal carrier (10-678) thoroughly.
3. Apply *Loctite* to outside of both seals (10-679) and (11-518) then press them into seal carrier (10-678) using tool TO-043.

Installation

1. Grease o-ring (10-449).
2. Lubricate with 90w oil and install seal carrier (10-678) into propeller shaft bearing carrier (10-677 left hand) or (10-596 right hand) using tool TO-051.
3. Tighten both set screws (11-204).

Propeller Shaft Bearing Carrier Seal Replacement

Model 560



Individual Components

Item #	Description	Quantity	Part #
1	Shim Set	1	12-515
2	Bearing Set	1	12-521
3	Shaft, Prop, Fwd	1	12-502
4	Needle Bearing, Aft	1	12-520
5	Seal, Inner	1	13-761
5	Seal, Fishline Cutter	1	13-761
7	Nut, Retaining, Fwd	1	12-513
8	O-Ring, TP Carrier	1	12-527
9	Carrier, TP	1	12-510
10	Needle Bearing, Fwd	1	12-522
11	Seal, Inner Fwd	1	12-526
12	Seal, Fishline Cutter	1	12-518
13	Nut, Retaining, Aft	1	12-954
14	Washer, Tab	1	12-838
15	Cap Screw	4	12-839

Removal

1. Remove four (4) (12-839) SHCS using a standard Allen socket wrench.
2. Using a needle nose pliers, remove tab washer (12-838).
3. Remove outer retaining nut (12-954) from lower housing using tool TO-142. Turn counter clockwise to loosen. Remove carrier (12-510) from lower housing using tool TO-151.
4. Remove retaining nut (12-513) from lower housing using tool TO-119. Turn counter clockwise to loosen.
5. Remove forward propeller shaft assembly (12-502) by pulling straight out and over the aft propeller shaft. The race of bearing (12-521) from the lower housing should pull out with this assembly.

NOTE: *The gear assembly and thrust cap will come out with the propeller shaft as they are assembled to the shaft.*

6. Recover shims (12-515) from lower housing and /or stuck to bearing race.

Rebuilding

1. Remove both seals (13-761) and (13-761) from propeller shaft assembly (12-502) using slide hammer TO-028.

NOTE: Be careful not to damage surface of thrust cap on the opposite end of the propeller shaft. Protect with some sort of cloth.

2. Clean propeller shaft assembly (12-502) thoroughly.
3. Apply *Loctite* to outside of first seal (13-761) and grease inner seal surface. Press into propeller shaft using long end of tool TO-116. Apply *Loctite* to outside of second seal (13-761) and grease inner seal surface. Press into propeller shaft using opposite side of tool TO-116. Pack space in between two seals with grease.
4. Remove both seals (12-518) and (12-526) from carrier (12-510) using punch or slide hammer TO-028.
5. Remove o-ring (12-527) from carrier (12-510).
6. Clean carrier unit (12-510) thoroughly.
7. Place new o-ring (12-527) in groove on carrier and grease o-ring.
8. Apply *Loctite* to outside of first seal (12-526) and grease inner seal surface. Press into carrier unit

using long end of tool TO-117. Apply *Loctite* to outside of second seal (12-518) and grease inner seal surface. Press into carrier unit using opposite side of tool TO-117. Pack space in between two seals with grease.

Installation

1. Install forward propeller shaft assembly (12-502) by sliding it over the aft propeller shaft.
2. Install shims (12-515) into lower housing. If shims look damaged or were damaged during disassembly, replace with the same thickness as came out.
3. Slide race of bearing (12-521) into lower housing until it seats against bearing on gear assembly. May need to guide race down with retaining nut (12-513) in next step.

NOTE: This should not be a press fit.

4. Lubricate outer diameter of retaining nut (12-513) with 90W oil and install into lower housing.
*Torque nut to 200 lb-ft (271 Nm) using spanner wrench (TO-119).

NOTE: Please refer to the appropriate table in the Konrad Technical Manual to see what reading to set torque wrench to achieve 200 lb-ft (271 Nm) of torque.

5. Check rolling torque of lower unit as described in the Konrad Technical Manual.
6. Slide carrier (12-510) into lower housing, be sure to align dowel pins on carrier to retaining nut (12-513). Grease outer retaining nut with Teflon/anti-seize lubricant (12-954) Tighten retaining nut using tool TO-142 and **Torque to 100 ft. lb.
7. Install tab washer. Check to see if threaded hole lines up to hole in tab washer.

If the bolt holes line up, put *Loctite* on threads and install SHCS.

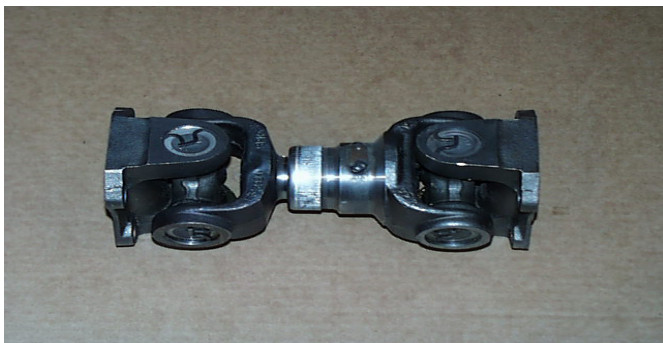
If the bolt holes don't line up, remove tab washer and tighten carrier until holes line up.

NOTE: Please refer to the appropriate table in the Konrad Technical Manual to see what reading is needed to set torque wrench to achieve 100 lb-ft (136 Nm) of torque.

8. Install tool TO-103 and pressurize drive to 10-12 psi. Let set for 10-15 minutes and check gauge for pressure loss. If pressure loss is noted, re-pressurize drive and spray with soapy water and check for leaks, repair as needed.

Drive Shafts

U-joint style



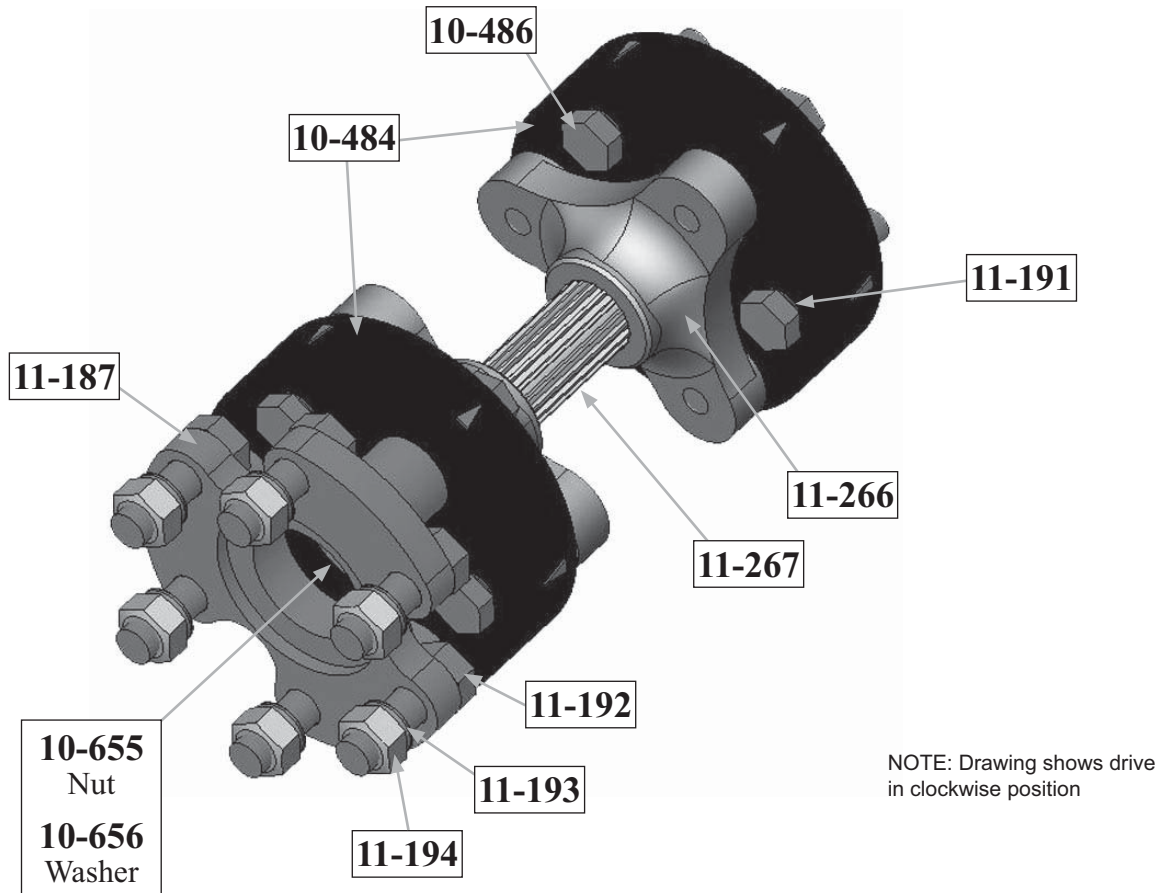
Description and Parts Breakdown

<u>Part #</u>	<u>Length</u>	<u>Range</u>	<u>Used in/Application</u>
30-043	9.25"	8.73"-9.73"	
30-063	59.11"	57.38"-60.85"	U.S. Navy 7m RIB ('96/'97 only)
30-173	62.86"	61.60"-64.97"	U.S. Navy 7m RIB (excluding '96/'97)
30-174	60.63"	59.00"-62.47"	U.S. Navy 24' RIB
30-175	10.00"	9.50"-10.25"	
30-214	62.27"	60.50"-63.97"	
30-215	46.27"	45.00"-48.47"	

Maintenance

1. Grease joints weekly or every fifty (50) hours of operation.
2. Replace joints after one thousand to fifteen hundred (1000-1500) hours of operation.

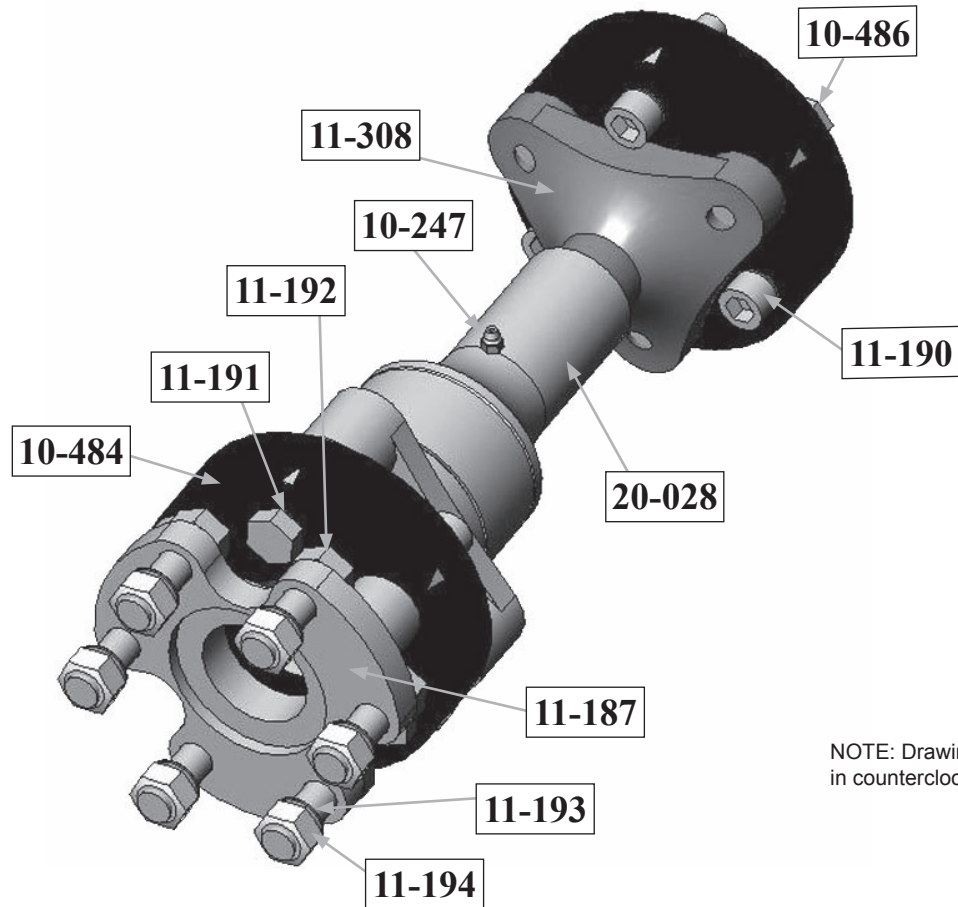
30-264 Parts List



PART NO.	DESCRIPTION	QTY.
----------	-------------	------

10-484.....	Rubber Coupling.....	2
10-486.....	M-14 H. H. C. S.	12
10-655.....	Nut.....	2
10-656.....	Washer.....	2
11-187.....	Adapter Flange.....	1
11-191.....	M-14 Belleville Washer	12
11-192.....	M-16 H. H. C. S.	6
11-193.....	M-16 Belleville Washer	6
11-194.....	M-16 Nut.....	6
11-266.....	Trilobe, Brass	2
11-267.....	Solid Drive Shaft.....	1

30-272 Parts List



NOTE: Drawing shows drive
in counterclockwise position

PART NO.	DESCRIPTION	QTY.
----------	-------------	------

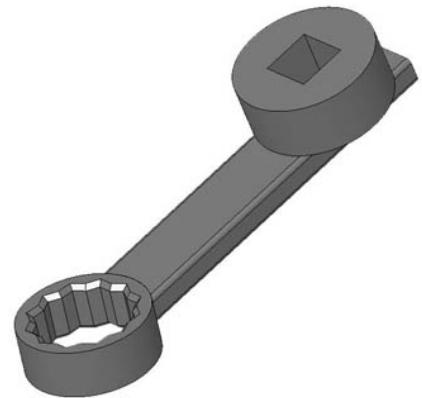
10-247.....	Grease Fitting	1
10-484.....	Rubber Coupling	2
10-486.....	M-14 H. H. C. S.	6
11-187.....	Adapter Flange	1
11-190.....	M-14 S. H. C. S.	6
11-191.....	M-14 Belleville Washer.....	12
11-192.....	M-16 H. H. C. S.	6
11-193.....	M-16 Belleville Washer.....	6
11-194.....	M-16 Nut.....	6
11-308.....	Splined Trilobe	1
20-028.....	Tube.....	1

Tools available for Rubber Coupling Drive Shaft Installation



TO-066

Used to tighten
M-14 S.H.C.S.



TO-067

Used to tighten
M-14 H.H.C.S.



TO-068

Used to tighten
M-16 H.H.C.S.

Note: These tools can be purchased from Konrad Marine.

Installation Procedure

NOTE: Verify correct shaft length before proceeding.

NOTE: Apply Loctite to all fasteners in this step before fastening occurs.

NOTE: Rotation determined by viewing transmission flange from stern of vessel.

“CCWR” = Counterclockwise rotation

“CWR” = Clockwise rotation.

1. Install the adapter flange (11-187) onto the back of the transmission using:
 - Six (6) M-16 H.H.C.S (11-192)
 - Six (6) M-16 Belleville Washers (11-193)
 - Six (6) M-16 Nuts (11-194)



2. Prior to assembly, place three (3) H.H.C.S. (10-486) and three (3) Belleville washers (11-191) into the rubber coupling (10-484) element according to the clockwise and counterclockwise rotations. These fasteners will attach to the center drive shaft component (11-266 & 11-308). Install the rubber coupling (10-484) to the adapter flange (11-187) using:

30-264 Assembly

- Three (3) M-14 H.H.C.S. (10-486)
- Three (3) Belleville Washers (11-191)

30-272 Assembly

- Three (3) M-14 S.H.C.S. (11-190)
- Three (3) Belleville Washers (11-191)

Counterclockwise rotation: The fasteners (10-486 or 11-190) should be inserted through the rubber coupling in the direction of the arrows. When attaching the rubber coupling to the adapter flange (11-187), point arrows on the rubber coupling toward the adapter flange (11-187).



30-264

CCWR

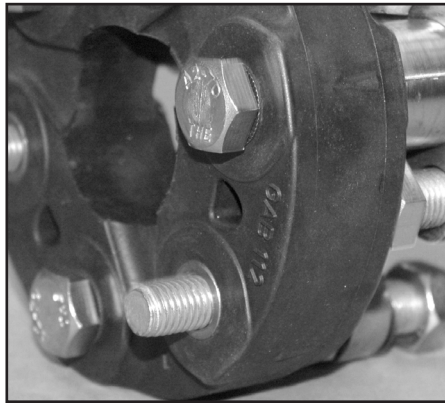


30-272

CCWR

Clockwise rotation: The fasteners (10-486 or 11-190) should be inserted through the rubber coupling against the direction of the arrows. When attaching the rubber coupling to the adapter flange (11-187), point arrows on the rubber coupling away from the adapter flange (11-187).

IMPORTANT: Thick section of rubber element should ALWAYS be in compression between driving and driven bolts.



3. Prior to assembly, place three (3) H.H.C.S. (10-486) and three (3) Belleville washers (11-191) into the rubber coupling (10-484) element. These fasteners will attach to the center drive shaft component (11-266; 20-028). Attach the second rubber coupling (10-484) to the gimbal carrier flange (10-466) using:

30-264 Assembly

- Three (3) M-14 H.H.C.S. (10-486)
- Three (3) Belleville Washers (11-191)

30-272 Assembly

- Three (3) M-14 S.H.C.S. (11-190)
- Three (3) Belleville Washers (11-191)

Counterclockwise rotation: The fasteners (10-486 or 11-190) should be inserted through the rubber coupling in the direction of the arrows. When attaching the rubber coupling to the gimbal carrier flange (10-466), point arrows on the rubber coupling toward the gimbal carrier flange (10-466).

IMPORTANT: Thick section of rubber element should ALWAYS be in compression between driving and driven bolts.



30-264

CWR



30-272

CWR



30-264

CCWR

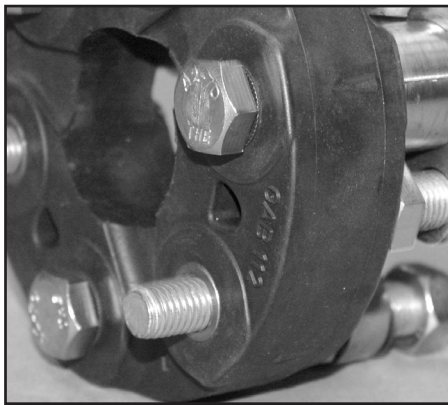


30-272

CCWR

Clockwise rotation: The fasteners (10-486 or 11-190) should be inserted through the rubber coupling against the direction of the arrows. When attaching the rubber coupling to the gimbal carrier flange (10-466), point arrows on the rubber coupling away from the gimbal carrier flange (10-466).

IMPORTANT: Thick section of rubber element should ALWAYS be in compression between driving and driven bolts.



30-264

CWR



30-272

CWR

4. Insert the center drive shaft component (see below) in between the two (2) rubber couplings (10-484) using:

- Six (6) M-14 H.H.C.S. (10-486)
- Six (6) Belleville Washers (11-191)

30-264 Assembly

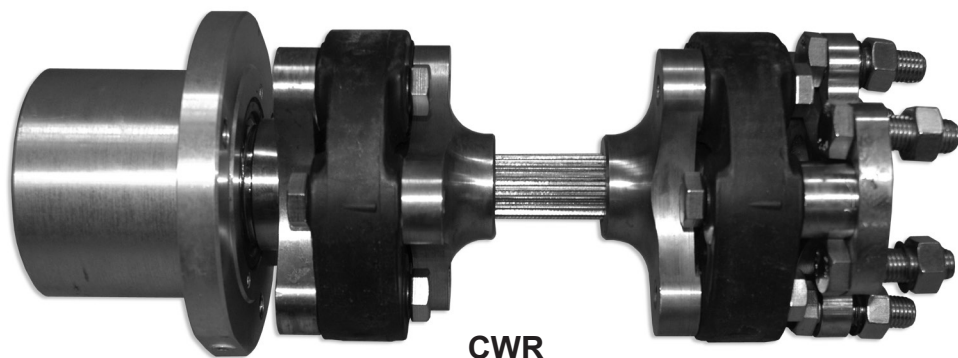
- Adapter (11-266)
- Drive Shaft (11-267)

30-272 Assembly

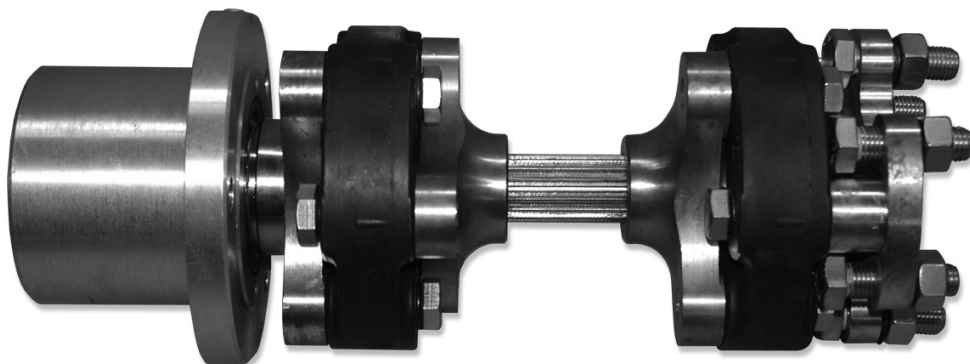
- Adapter (11-308)
- Drive Shaft (20-028)

Tighten all fasteners to 70 lb. ft. (95 Nm).

30-264 Complete Assembly



CWR



CCWR

30-272 Complete Assembly



CWR



CCWR



1421 Hanley Road
Hudson, Wisconsin 54016-9376 USA

Sales 715-386-4203
Toll Free 800-927-3545
Fax 715-386-4219

Website: www.konradmarine.com
E-mail: sales@konradmarine.com