Konrad®

HIGH OUTPUT PROPULSION SYSTEMS

NOTICE TO INSTALLER

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

Series 600B

Maintenance Manual

HIGH OUTPUT PROPULSION SYSTEMS

600B Series Models

MAINTENANCE MANUAL

Version 2.6 for production as of July 1, 2017

If your drive was produced prior to the above date, please consult an earlier version of this manual

Part # 13-657

*Core Content Originated by Randall J. Sofie, October 2007
*Adapted for 600 Series, November 2011
* Adapted for 600B Series, July 2016

TABLE OF CONTENTS

1 - KONRAD 600B SERIES STERNDRIVES

General Information 1
Safety Notices 1
Operation 2
Break-In Procedure 2
Torque Specifications for Fasteners 3
Sterndrive Weights 4
Maintenance Schedule 5
Specified Gear Oil and Lubricants. 6
Sterndrive Removal - All Models 7
Sterndrive Installation - All Models 9

2 - KONRAD 600B SERIES GENERAL MAINTENANCE

Sterndrive Gear Lube
- Removing 11
- Filling. 12
- Checking 13

Hydraulic Fluids
- Trim/Lift Pump 14

Propeller and Hardware
- Model 620B 15
  - Inspection 16
  - Removal 16
  - Installation 16
- Model 660B 17
  - Inspection 18
  - Removal 18
  - Installation 18
- Model 680B 19
  - Inspection 20
  - Removal 20
  - Installation 20

TABLE OF CONTENTS

(continued)

Anodes 21-25
- Model 620B 21
- Model 660B. 22
- Model 680B 23
- Placement on Sterndrive 24-25

Hoses 26
Bushings 27
Continuity Cables 28

3 - KONRAD 600B SERIES COMPLEX MAINTENANCE

Bellows 29
Universal Joints 30-32
Propeller Shaft Bearing Carrier Seal Replacement
- Model 620B. 33-35
- Model 660B. 36-39
- Model 680B 40-43

Electrical Drawings
- Trim/Lift Electrical Drawing (12 Volt) 44-49
- Trim/Lift Electrical Drawing (24 Volt) 50-55

Setting the Trim/Lift Sender Switch 56-57
Direct Mount/Tailpiece Alignment. 58
Remote Mount Driveshaft Alignment. 59-62

Chapter 1 - Sterndrive

General Information

The Konrad 600B Series sterndrives are designed to accommodate engines that generate up to 1200 Nm (885 lb. ft.) of torque at rated / maximum RPM. Maximum torque ratings are drive model and application dependent.

There is a sixteen degree (16°) trim range to optimize vessel performance while underway. There is an additional 30 degrees (30°) of lift range that may only be used in an emergency or when the sterndrive is being serviced or transported.

The Konrad 600B Series sterndrives are designed for applications where the vessel transom angle is 13 degrees (13°). Applications that do not meet this criteria may require extra equipment or modifications, or may not be possible at all. The Konrad 620B and 680B sterndrives are designed to accommodate propellers (aluminum or stainless steel) with a maximum diameter of 20 in (50.8 cm). The Konrad 660B can accommodate propellers (stainless steel) with a maximum diameter of 16 in. (40.6 cm).

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 WHEN APPLICABLE.

Operation

The engine produces power (clockwise or counterclockwise) that is transmitted through a reversing transmission. Either a coaxial planetary-style reversing transmission or a twin shaft vertically offset standard reversing transmission (with coaxial additions available) are normally used depending upon your application, and vessel design. 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(s).

⚠ **WARNING: If a u-joint style drive shaft is used, the drive shaft angle may not exceed one-half degree (.5º). If the angle exceeds one-half degree (.5º), any warranty offered with your application is void.**

Break-In Procedure

Make sure the sterndrive and gimbal carrier are properly filled with gear oil prior to operation.

Any new Konrad sterndrive unit, whether a lower, upper or complete, requires a fifty (50) hour break-in running period. Please use the following guidelines during the first fifty (50) hours to assure optimum performance from your new Konrad sterndrive.

1. Avoid full throttle starts.

2. Avoid straining or heavy loading of the sterndrive.

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 sterndrive 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 or filter (Using Konrad filter kit 13-389) the gear oil after the fifty (50) hour break-in period is complete.

***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 break-in and will decrease as you run the drive.*

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 Series 600B Technical Manual.

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 (6)	50 lb. ft. (67.8 Nm)
Gimbal Ring Center Pin Cover, Hex Head Cap Screw (2)	35 lb. ft. (47.5 Nm)
Gimbal Ring Center Pin Retaining Hex Head Cap Screw (1)	50 lb. ft. (67.8 Nm)
Trim Sender Cover Button Head Cap Screws (2)	13 lb. in. (147 Ncm)
Trim Sender Housing Socket Head Cap Screws (2)	8 lb. ft. (10.8 Nm)
Trim Sender Socket Head Cap Screws (2)	8 lb ft. (10.8 Nm)
Upper Gear Housing Cap, Socket Head Cap Screws (4)	20 lb. ft. (27 Nm)
Gimbal Carrier Compression Ring Socket Head Cap Screws (4) Tail piece Compression Ring Hex Head Cap Screws (5)	45 lb. ft. (61 Nm) 35 lb. ft. (47.5 Nm)
620B Propeller Nut (1)	80 lb. ft. (109 Nm)
660B Forward Propeller Nut (1)	100 lb. ft. (136 Nm)
660B Aft Propeller Nut (1)	60 lb. ft. (81 Nm)
680B Forward Propeller Nut (1)	100 lb. ft. (136 Nm)
680B Aft Propeller Nut (1)	80 lb. ft. (109 Nm)

600 Series Stern Drive
Weight Descriptions

620B Stern Drive

Item Description	620B Weight	
600B Transom assembly (with trim and steering cylinders)	115 lbs	52.2 kg
Trim pump	13 lbs	5.9 kg
Upper housing and Intermediate	151 lbs	68.5 kg
Lower housing assembly	84 lbs	38.1 kg
Total Dry Weight	363 lbs	164.7 kg

Standard 620B Propellers	Propeller Weight	
3 Blade, Stainless Steel, 18.5” Diameter	24 lbs	10.9 kg
4 Blade, Stainless Steel, 18.5” Diameter	28 lbs	12.7 kg
5 Blade, Stainless Steel, 18.5” Diameter	30 lbs	13.6 kg

660B Stern Drive

Item Description	660B Weight	
600B Transom assembly (with trim and steering cylinders)	115 lbs	52.2 kg
Trim pump	13 lbs	5.9 kg
Upper housing and Intermediate	151 lbs	68.5 kg
Lower housing assembly	67 lbs	30.4 kg
Total Dry Weight	346 lbs	156.9 kg

Standard 660B Propellers	Propeller Weight	
3 Blade, Stainless Steel, 16” Diameter	14 lbs	6.4 kg
4 Blade, Stainless Steel, 15.25” Diameter	15 lbs	6.8 kg

680B Stern Drive

Item Description	680B Weight	
600B Transom assembly (with trim and steering cylinders)	115 lbs	52.2 kg
Trim pump	13 lbs	5.9 kg
Upper housing and Intermediate	151 lbs	68.5 kg
Lower housing assembly	115 lbs	52.2 kg
Total Dry Weight	394 lbs	178.7 kg

Standard 680B Propellers	Propeller Weight	
3 Blade, Stainless Steel, FWD, 18.5” Diameter	21 lbs	9.5 kg
4 Blade, Stainless Steel, AFT, 17.25” Diameter	26 lbs	11.8 kg

Chapter 1 - Sterndrive *(continued)*

Maintenance Schedule

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

All applications will be assigned a Maintenance Schedule "A", "B", or "C", depending on usage characteristics, which must be followed to ensure warranty coverage.			
TASK	**Maintenance Service Schedule "A"**	**Maintenance Service Schedule "B"**	**Maintenance Service Schedule "C"**
Sterndrive Unit Oil **- Check Level**	Daily	Daily	Daily
Sterndrive Unit Oil **- Filter or Change Break in oil**	After First 50 Hours	After First 50 Hours	After First 50 Hours
Sterndrive Unit Oil **- Change**	Every 400 Hours or once a year	Every 600 Hours or once a year	Every 800 Hours or once a year
Power Trim Pump Oil - Check Level	Daily	Daily	Daily
Power Steering Fluid - Check Fluid	Daily	Daily	Daily
Transmission Fluid - Check Level - Change Fluid	Daily See Owners Manual	Daily See Owners Manual	Daily See Owners Manual
Anodes - Inspect for Erosion	Monthly	Monthly	Monthly
Continuity Circuit Check - Check Components for continuity, loose connections, and broken or fraying wires	Every 60 days	Every 60 days	Every 60 days
Hoses - Inspect for cracks, swelling, or signs of deterioration - Check for proper tightness	Every 120 Days	Every 6 months	Once a year
Propeller Shaft - Saltwater Use - Lubricate shaft, check shaft seals for leaking and damage, check propeller hardware torque	Every 60 days	Every 60 days	Every 60 days
Propeller Shaft - Freshwater Use - Lubricate shaft, check shaft seals for leaking and damage, check propeller hardware torque	Every 120 days	Every 120 days	Every 120 days
Universal Joints - Replace	Every 200 hours	Every 400 hours	Every 800 hours
Engine / Tailpiece - Check Alignment	After initial 50 hours then every 200	After initial 50 hours then every 400	After initial 50 hours then every 800
Transom Assembly Bushings - Check for wear at the gimbal ring, trim cylinder, and steering cylinder mounts	Every 200 hours	Every 400 hours	Every 800 hours
Bellows and Clamps - Inspect for proper installation and wear	Every 200 hours	Every 400 hours	Every 800 hours
Transom and Sterndrive Unit **- Inspect for corrosion or impact damage, including propeller**	Weekly	Weekly	Weekly

Specified Lubricants

Gear / Drive Oil

Konrad 75W90 Full Synthetic Oil		Part number
1 Quart	(.95Liters)	(13-090)
2.5 Gallon	(9.5Liters)	(13-091)
55 Gallon	(208.20 Liters)	(13-092)

Lubricant Capacity 600B Series (standard configuration) **

Complete Sterndrive, 620 model - **approximately** eighteen (18) quarts (17 liters).
Complete Sterndrive, 660 model - **approximately** sixteen (16.5) quarts (15.1 liters).
Complete Sterndrive, 680 model - **approximately** eighteen (18) quarts (17 liters).

**** Oil capacities will vary depending on application configurations, such as spacers, by 1-3 quarts (.95-2.84 liters)**
Make sure the drive is completely filled to the top and purged of air prior to operating.

KVD Transmisson

Mobiltrans HD30 Drive-train oil SAE 30		Part number
1 Gallon	(3.79 Liters)	(13-758)

Fluid capacity
Refer to the owners manual for fluid capacity and how to check the fluid level.

Trim / Lift pump

Dextron III automatic transmission fluid		Part number
1 Quart	(.95 Liters)	(10-585)

Fluid capacity
Trim Pump Reservoir - approximately (1) quart (.95 liters)

Steering system

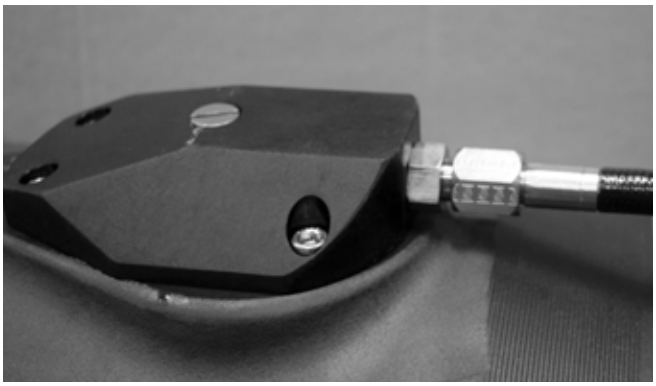
Dextron III automatic transmission fluid		Part number
1 Quart	(.95 Liters)	(10-585)

Fluid capacity
Capacity will vary depending on the type of steering system used and length of the vessel.

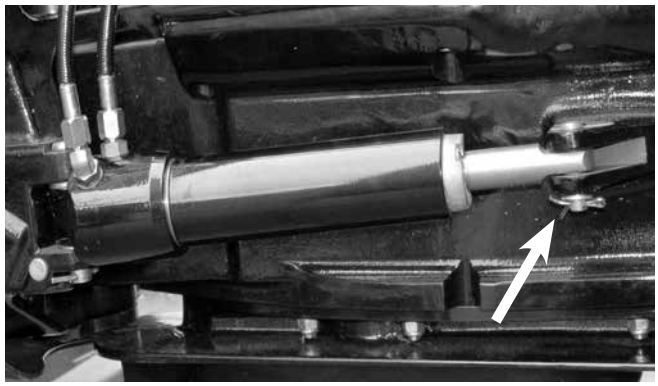
A. Removal All Models

1A. Remove the six (6) M6 X 18mm S.H.C.S. (13-696) and the six (6) washers (12-335) from each side of the upper housing cover. As pictured to the right.

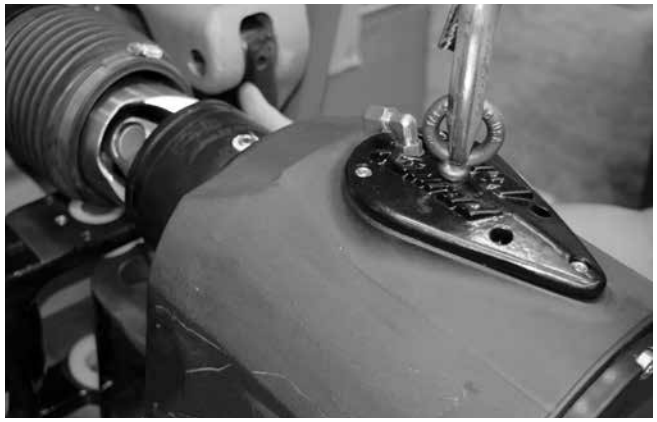
2A. Remove the oil supply hose from the connector on the upper housing assembly, and install cap.



3A. Disconnect the steering cylinder(s) (30-986) from the drive leg by removing the aft cotter pins (13-368), washers (12-352), and the clevis pins (13-341) from the steering cylinder. Repeat the process for the port and starboard sides. Secure the steering cylinders and lines out to the side of the transom.



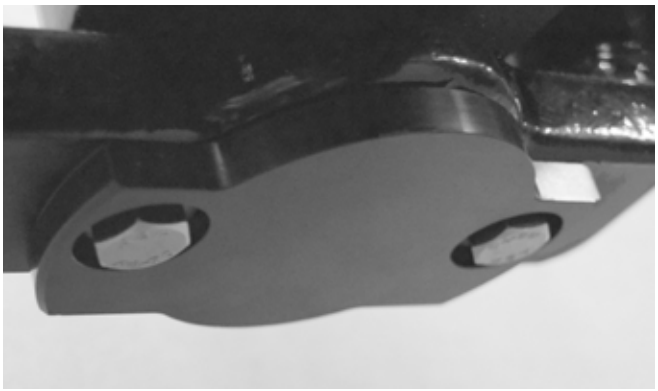
4A. Rig the Konrad drive for lifting. Secure the sterndrive to the lifting device with a nylon strap or other fastener. An overhead lifting device is the preferred method of lifting the sterndrive, though a lifting cart or forklift may be used as an alternate lifting device.



A. Removal All Models

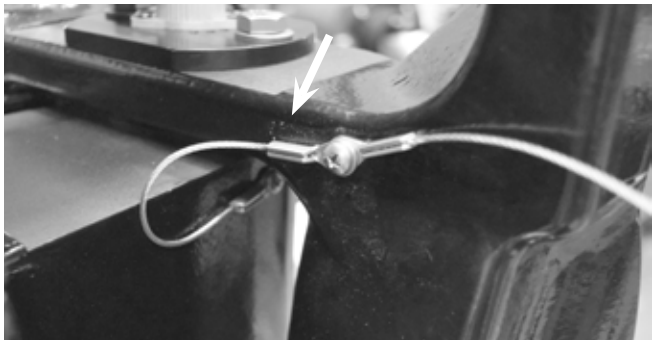
5A. Loosen the aft bellows clamp, (10-336) and push the bellows (10-230) forward off of the drive.

6A. Remove the two (2) H.H.C.S. (13-310) from the lower pivot pin cover (13-320) and remove cover.



7A. Remove the pivot pin retaining H.H.C.S. (13-560) from the front of the intermediate section of the drive. Slide the pivot pin (13-561) downward and remove from the gimbal ring.

8A. Remove the continuity cable (30-907) from the intermediate housing, and slide the drive aft, away from the gimbal ring and housing.

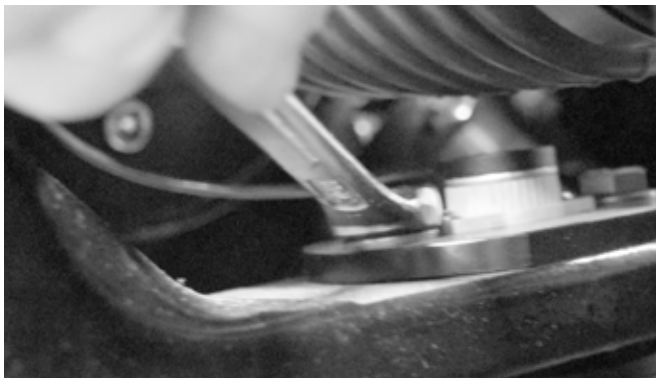


Chapter 1 - Sterndrive

B. Installation All Models

1B. Remove the two H.H.C.S. (12-378) from the top pivot pin cover / rudder indicator plate cover. (13-574).

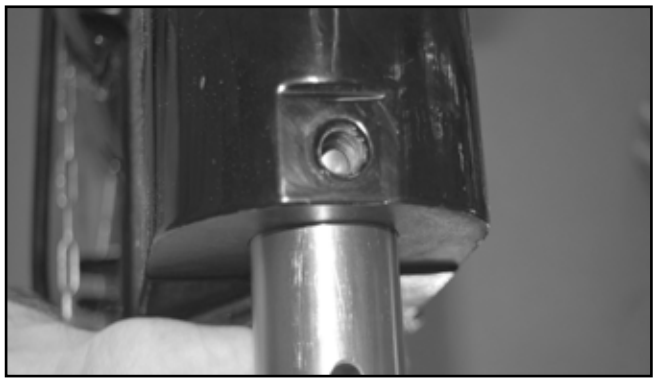
Be careful not to rotate the sensor shaft.



2B. Pull the alignment pin (10-494) out of the recess in the input yoke and grease the input yoke splines and the alignment pin. Insert the alignment pin 1/4 of the way back into the yoke.

3B. Slide the drive toward the transom assembly, aligning the center of the gimbal ring with the drive's intermediate pivot point making sure the gimbal ring bushings are in place. Carefully slide the alignment pin and end yoke into the bellows and into the splines of the drive shaft carrier or transmission tailpiece. Reinstall the u-joint bellows onto the drive and tighten the clamp.

4B. Reinstall the center pivot pin (13-561) into the lower gimbal ring and upward through the drives intermediate section, align the hole in the pin for the retaining bolt by using the slot on the bottom of the pin. Secure the pin by reinstalling the retaining H.H.C.S. (13-560) Apply red *Loctite 263* to the threads of the retaining H.H.C.S. and tighten to 50 lb. ft. (67.8 Nm).

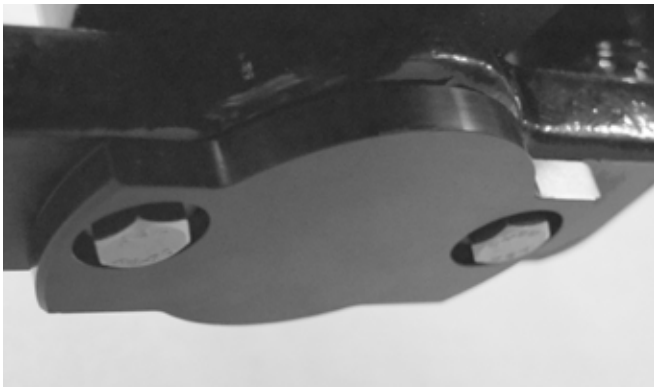


B. Installation All Models

5B. Reinstall the top pivot pin cover by applying red *Loctite 263* to the H.H.C.S. (12-378).

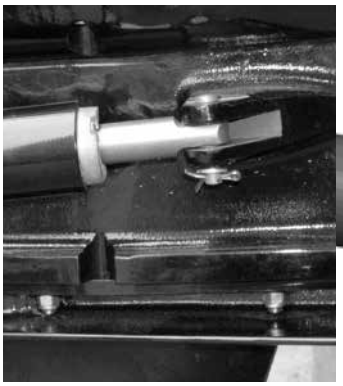
Reinstall the bottom pivot pin cover by applying red *Loctite 263* to the H.H.C.S. (13-310).

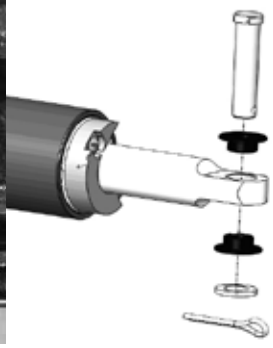
Tighten to 35 lb.ft. (47.5 Nm).



NOTE: When reinstalling the top cover with a rudder indicator, be sure to align the sensor pin with the slot on top of the drive pivot pin.

6B. Reattach the steering cylinders to the drive leg by installing the aft clevis pins (13-341), washers (12-352), and the cotter pins (13-368) to the steering cylinder. Repeat the process for the port and starboard sides.





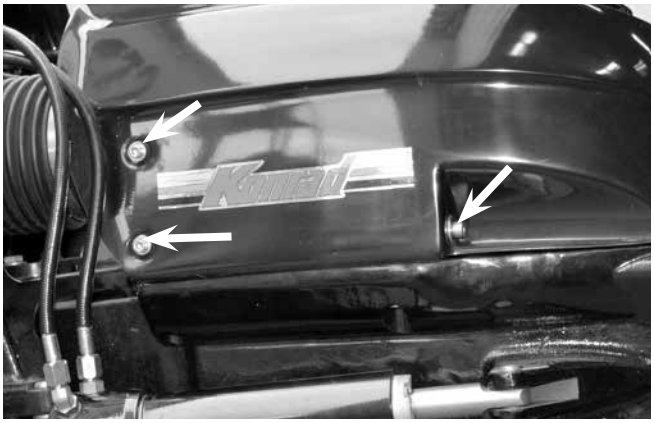
NOTE: Make sure the steering cylinder bushings (13-319) are installed on each side of the rod end prior to installing steering cylinders into the drive steering tabs.

7B. Remove the lifting ring and install the plug (10-010) and gasket (10-285). Remove the cap (13-251) on the oil supply line fitting, and reinstall the oil supply line (31-130) from the transom using blue *Loctite* 243 on the fitting, and tighten the fitting.

Secure the continuity cable (30-907) that was previously removed in step 8A by installing the self tapping screw (10-479).

8B. Reinstall the cover onto the upper housing. Install blue *Loctite* 243 onto the S.H.C.S. before placing them through the flat washers and hand tightening.

9B Install the six (6) M6 X 18mm S.H.C.S. (13-696) and the six (6) washers (12-335) into each side of the upper housing cover.



Removing Lubricant

1. Trim drive unit to full “OUT” or “UP” position.

NOTE: Units produced 1May2016 SN 9015 and later, All six (6) S.H.C.S. attaching the cover are the same M6 X 18mm (13-696) and washer (12-335)

2. Remove the six (6) M6 X 18mm S.H.C.S. (13-696) and the six (6) washers (12-335) from each side of the upper housing cover. As pictured to the right.

   Remove theupper housing cover.

Note: either of the following methods for venting will work.

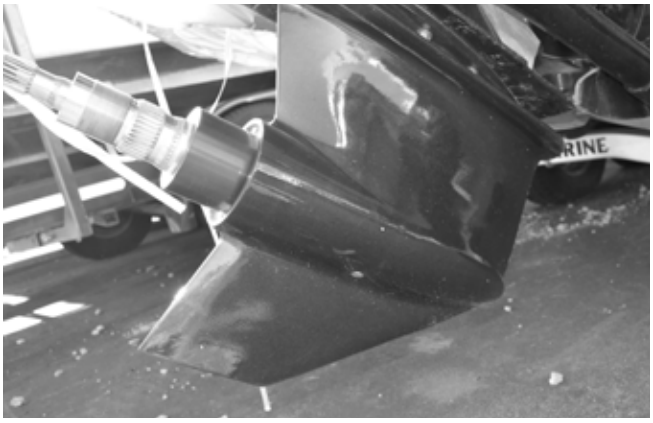
3a. Remove the top vent plug (10-010) located on the top cap (13-421).

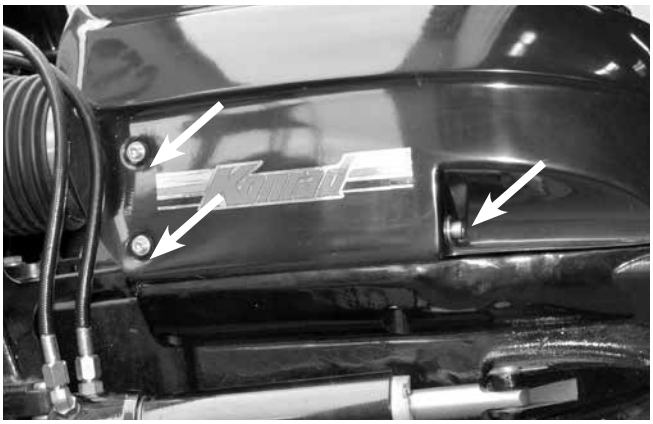
3b. Remove the S.H.C.S. from the top cap and remove the top cap from the upper housing.

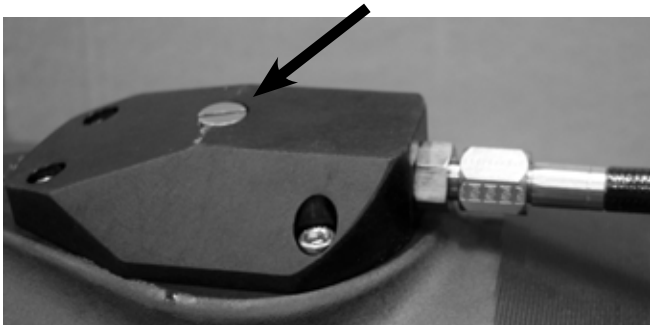
4. Remove the bottom fill/drain plug (10-155). Allow lubricant to drain completely.

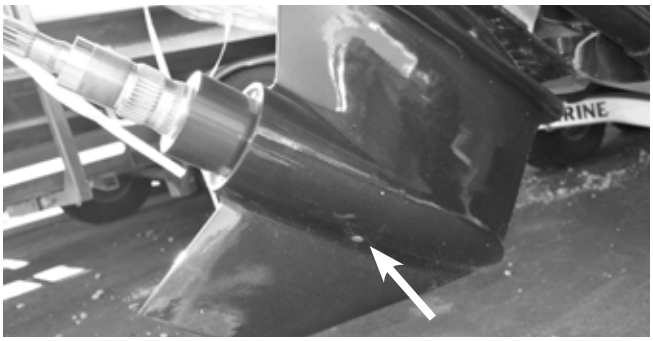
5. Trim drive unit to full “In” or “Down” position (with anti-ventilation plate level) to complete draining process.

6. Refer to previous page for filling procedure and required lubricant.





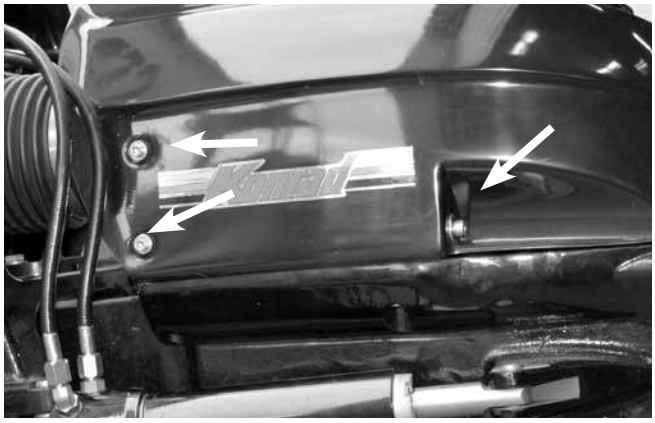




NOTE: *Discharge of oil or oily waste into or upon the water is a direct violation of today’s laws. Dispose of or recycle these substances properly.*

Chapter 2 - General Maintenance

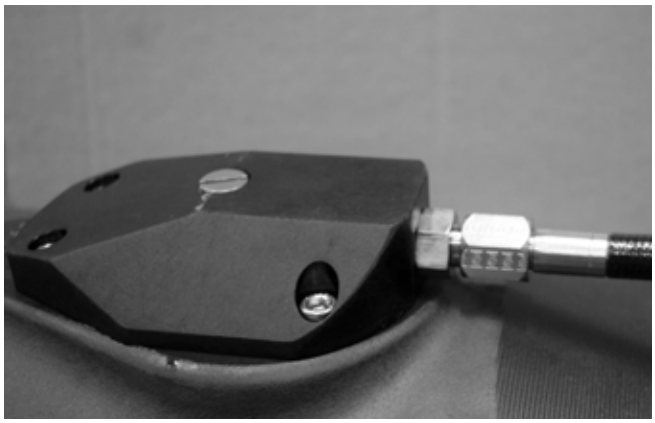
Filling



Pour Method Is Recommended:

1. Remove the six (6) M6 X 18mm S.H.C.S. (13-696) and the six (6) washers (12-335) from each side of the upper housing cover. As pictured to the right.

2. Remove the top cap (13-421) of the sterndrive by removing the socket head cap screws (12-951).



3. Pour in gear oil until it reaches just below the top cap.

4. Wait fifteen (15) minutes. Rotate the propeller five or six (5-6) times in both directions during those fifteen (15) minutes.

5. Repeat steps 3 and 4.

6. Replace the top cap (13-421) and torque the S.H.C.S. (12-951) to 80 lb in (9 Nm).

NOTE: *Make sure top cover o-ring (12-759) is greased and properly seated.*

7. Reinstall the upper housing cover (13-333 or 13-587) onto the drive housing. Apply blue *Loctite* 243 to the S.H.C.S. and secure the cover onto the drive.

Checking Lubricant Level

***NOTE*:** *The sterndrive oil level is checked at the remote oil reservoir. There is only one (1) reservoir used per drive. The four (4) quart (3.79 l) reservoir assembly has a part number of 30-992.*

30-992
Reservoir Assembly
4 Quart

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 sterndrive 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 the previous pages.

Hydraulic Fluids

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 sterndrive 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 switch on the side of the trim pump cover.

***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.

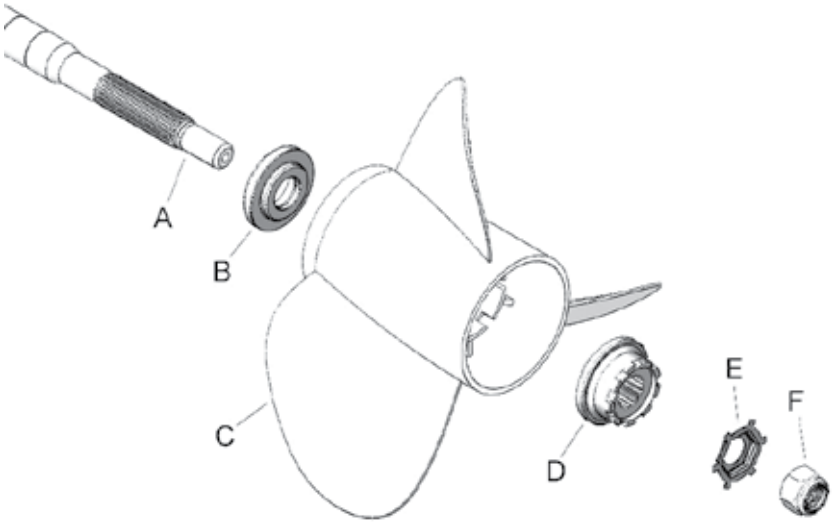
4. Cycle the drive all the way to the "DOWN" position and then all the way to the "UP" position. Repeat this step three or four (3-4) times to purge any remaining air out of the system.

Propeller and Hardware

Model 620B 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 620B



Individual Components

	Description	Quantity	Part Number
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

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, 80 lb. ft. (108 Nm).

2. Check propeller blades for any indication of damage.

3. Check tab washer - verify at least two (2) tabs are bent over.

Removal

1. Unbend retaining washer tabs using Konrad Tool TO-063.

2. Place a block of wood between the propeller and cavitation plate.

3. Remove propeller nut.

4. Remove additional propeller hardware (see diagram on previous page).

5. Slide propeller off of splined shaft.

6. Remove thrust washer.

Installation

1. Grease and slide thrust washer onto propeller shaft.

***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 previous page).

4. Torque the propeller nut, using a 1 7/16" socket tool, to 80 lb. ft. (108 Nm). When approaching 80 lb. ft. (108 Nm), 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.

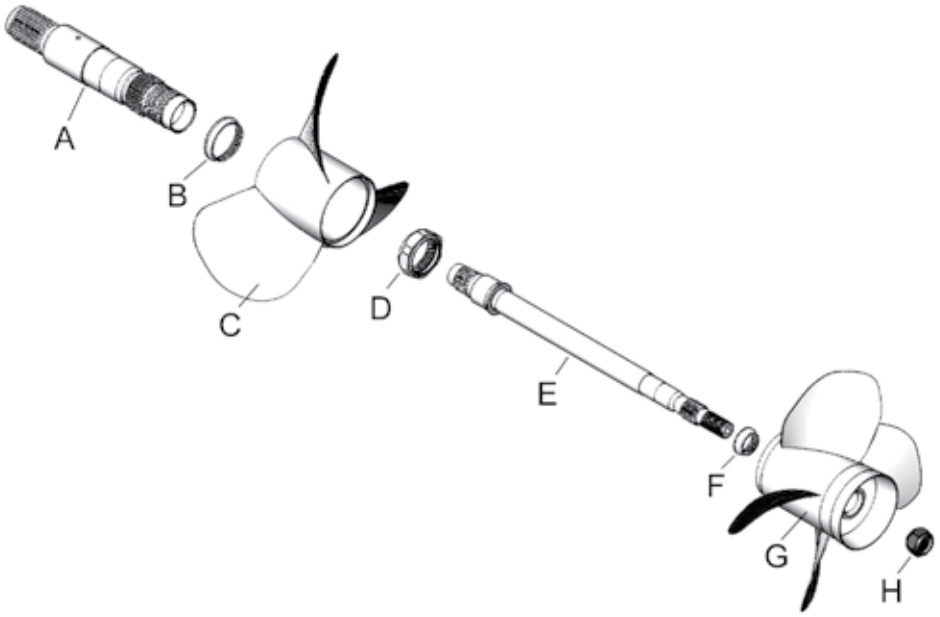
***NOTE:** A block of wood can be placed between the propeller and the lower drive housing to prevent the propeller from spinning, while torquing the propeller nut.*

5. Bend over the tabs using appropriate tools.

Propeller and Hardware

Model 660B 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.**



Individual Components

	Description	Quantity	Part Number
A	Forward Prop Shaft	1	12-502
B	Forward Thrust Hub	1	12-509
C	Forward Propeller	1	variable
D	Forward Prop Nut	1	12-506
E	Aft Prop Shaft	1	12-503
F	Aft Thrust Hub	1	12-508
G	Aft Propeller	1	variable
H	Aft 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 $1^{7}/_{16}$" socket and breaker bar (for forward propeller, use hex wrench TO-121).
4. Remove additional propeller hardware (see diagram on previous page).
5. Slide propeller off of splined shaft.

Installation

FORWARD Propeller:

1a. Slide forward thrust hub onto forward prop shaft so the tapers meet. Some grease can be used on tapers to hold in place.

2a. Grease splined area and the threads of the forward propeller shaft.

3a. Place the forward propeller on the propeller shaft until it seats against thrust hub.

4a. Torque the forward propeller nut to 100 lb.ft. (136 Nm) using hex wrench TO-121.

AFT Propeller:

1b. Slide aft thrust hub onto aft prop shaft so the tapers meet. Some grease can be used on tapers to hold in place.

2b. Grease splined area and the threads of the aft propeller shaft.

3b. Place the aft propeller on the propeller shaft until it seats against thrust hub.

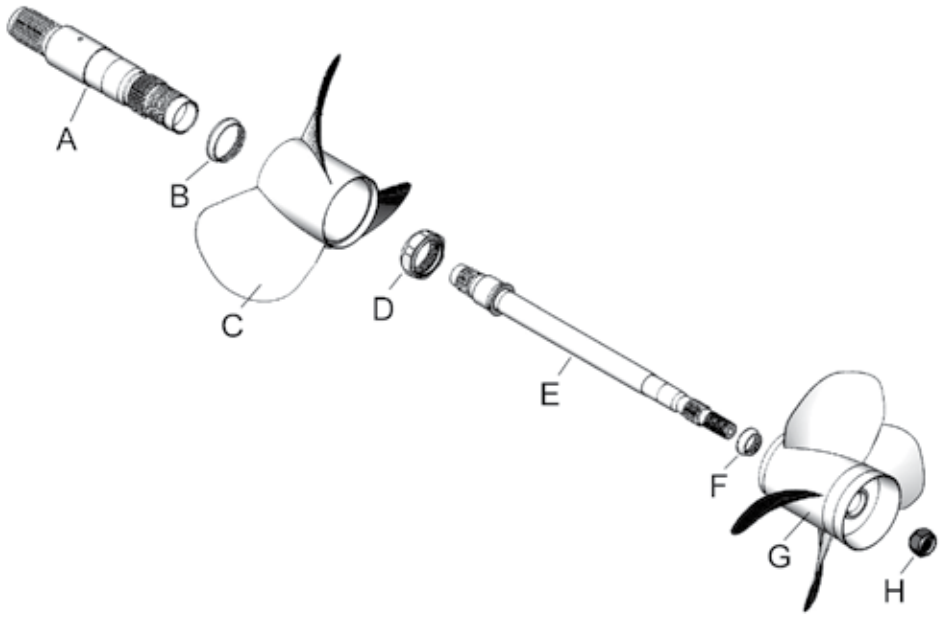
4b. Torque the aft propeller nut to 60 lb.ft. (81 Nm) using $1^{7}/_{16}$" socket wrench.

Propeller and Hardware

Model 680B 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 680B



Individual Components

	Description	Quantity	Part Number
A	Forward Prop Shaft	1	12-705
B	Forward Thrust Hub	1	12-707
C	Forward Propeller	1	variable
D	Forward Prop Nut	1	12-710
E	Aft Prop Shaft	1	12-704
F	Aft Thrust Hub	1	12-708
G	Aft Propeller	1	variable
H	Aft Prop Nut	1	12-716

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, 80 lb. ft. (108 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 $1^{13}/_{16}$" socket and breaker bar (for forward propeller, use hex wrench TO-129).
4. Remove additional propeller hardware (see diagram on previous page).
5. Slide propeller off of splined shaft.

Installation

FORWARD Propeller:

1a. Slide forward thrust hub onto forward prop shaft so the tapers meet. Some grease can be used on tapers to hold in place.

2a. Grease splined area and the threads of the forward propeller shaft.

3a. Place the forward propeller on the propeller shaft until it seats against thrust hub.

4a. Torque the forward propeller nut to 100 lb.ft. (136 Nm) using hex wrench TO-129.

AFT Propeller:

1b. Slide aft thrust hub onto aft prop shaft so the tapers meet. Some grease can be used on tapers to hold in place.

2b. Grease splined area and the threads of the aft propeller shaft.

3b. Place the aft propeller on the propeller shaft until it seats against thrust hub.

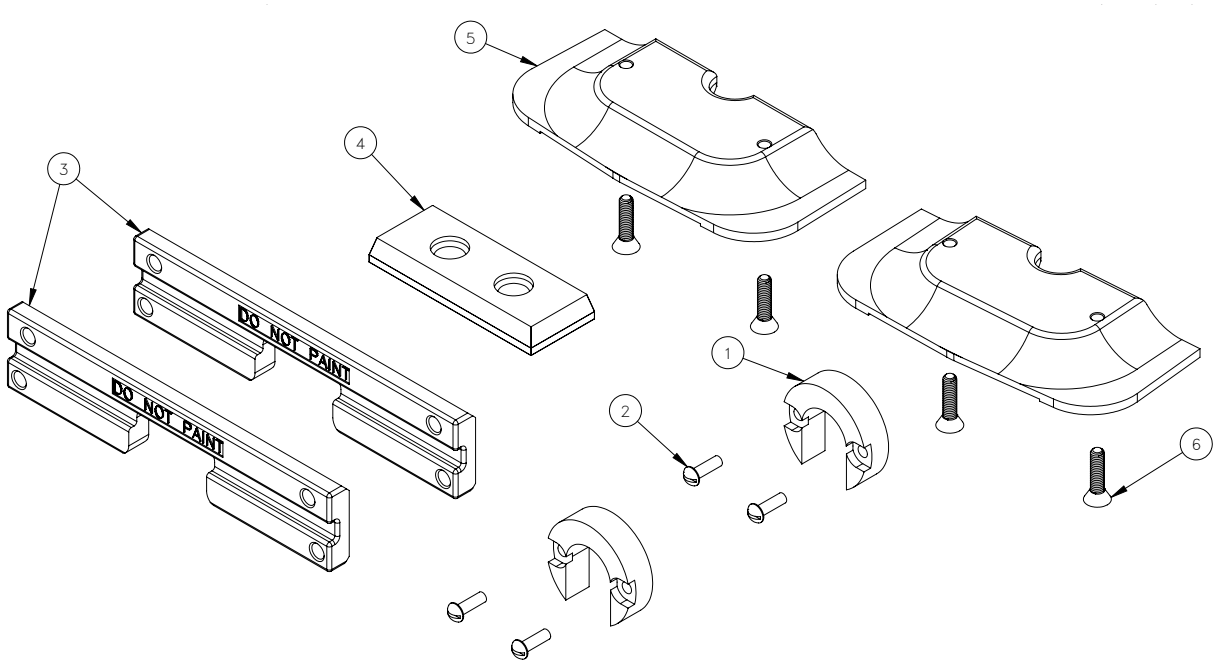
4b. Torque the aft propeller nut to 80 lb.ft. (108 Nm) using $1^{13}/_{16}$" socket wrench.

Anodes

Description and Parts Breakdown

Model 620B

Models built prior to 1 April 2017 don't use item 5 or 6.



Individual Components - 620B

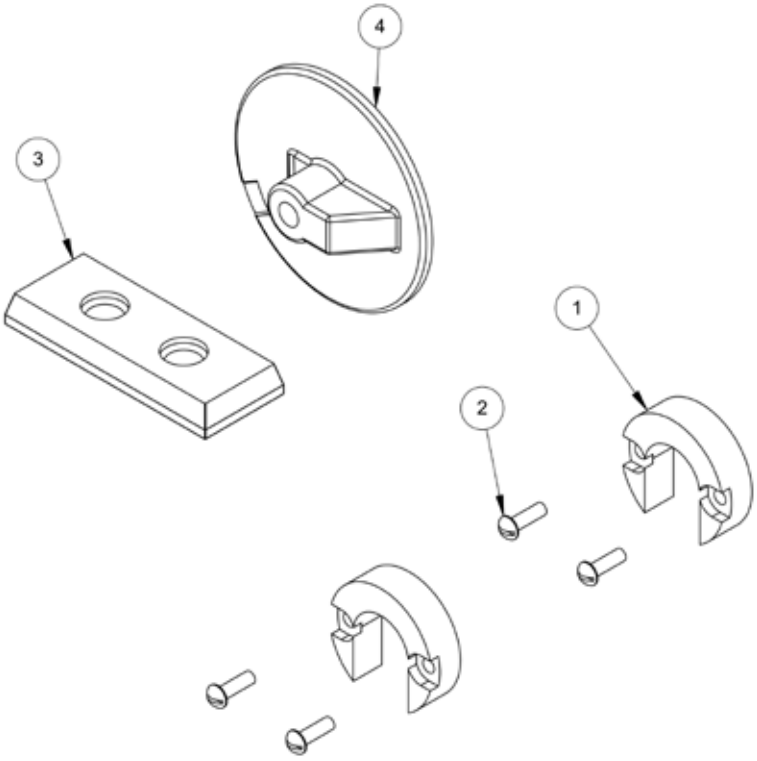
Item #	Description	Quantity	Part #	Part #
1	Anode, Cylinder	2	-	13-749
2	Screw	4	13-750	-
3	Plate, Inhibitor	2	-	12-475
4	Anode, 600 Upper	1	-	13-640
5	Plate, Inhibitor	2	-	12-473
6	F.H.C.S.	4	10-461	-

Complete Anode Kit for 620B as shown above is Part # 31-099
All Anode Kits are created with Aluminum Anodes

Anodes

Description and Parts Breakdown

Model 660B



Individual Components - 660B

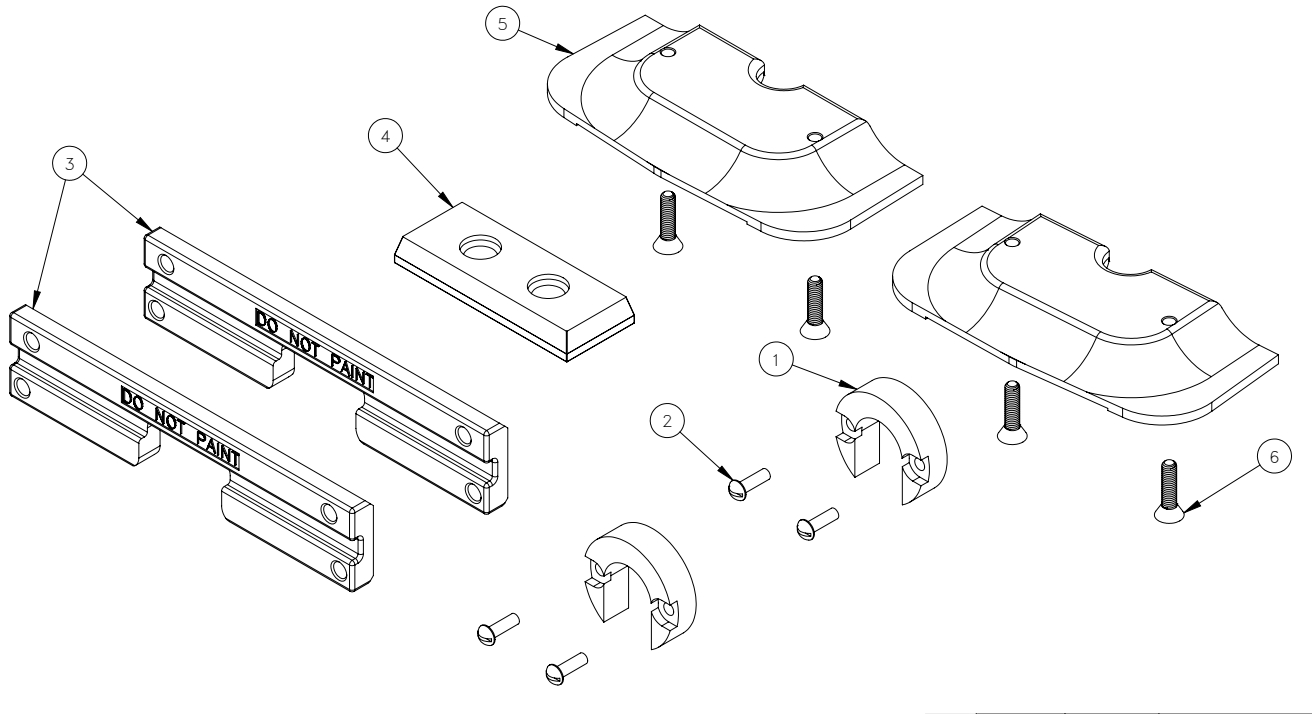
Item #	Description	Quantity	Part #	Part #
1	Anode, Cylinder	2	-	13-749
2	Screw	4	13-750	-
3	Anode, 600 Upper	1	-	13-640
4	Anode	1	-	13-666

Complete Assembly Kit for 660B Part # 31-098
All Anode Kits are created with Aluminum Anodes

Anodes

Description and Parts Breakdown

For Model 680B built after 1 June 2016
For Models built prior to 1 June 2016 don't use item 5 or 6.



Individual Components - 680B

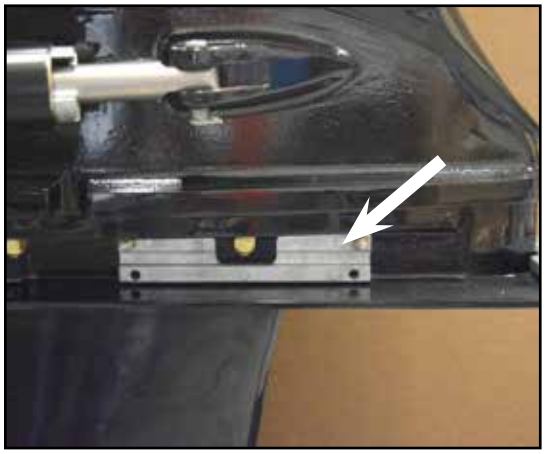
Item #	Description	Quantity	Part #	Part #
1	Anode, Cylinder	2	-	13-749
2	Screw	4	13-750	-
3	Plate, Inhibitor	2	-	12-475
4	Anode, 600 Upper	1	-	13-640
5	Plate, Inhibitor	2	-	12-473
6	F.H.C.S.	4	10-461	-

Complete Anode Kit for 680B as shown above is Part # 31-099
All Anode Kits are created with Aluminum Anodes

Anodes

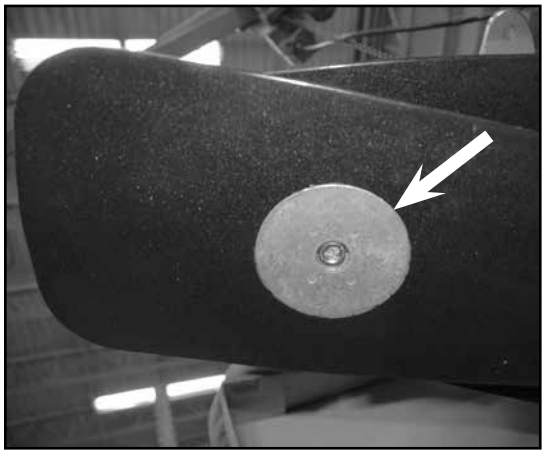
Placement on Sterndrive

1



2

3



4

5

Model 620B - Placement of Anodes on Sterndrive

Item #	Description	Quantity	Part #
1	Plate Inhibtor after 1 April 2017	2	12-473
2	Plate, Inhibitor	2	12-475
3	Anode, 600 Upper	1	13-640
5	Steering Cylinder Anode	2	13-749

Model 660B - Placement of Anodes on Sterndrive

Item #	Description	Quantity	Part #
3	Anode, 600 Upper	1	13-640
4	Anode	1	13-666
5	Steering Cylinder Anode	2	13-749

Model 680B - Placement of Anodes on Sterndrive

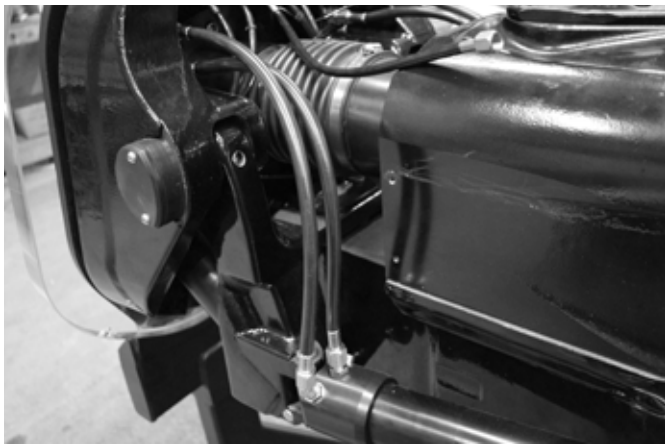
Item #	Description	Quantity	Part #
1	Plate, Inhibitor after 1 June 2016	2 (if applicable)	12-473
2	Plate, Inhibitor	2	12-475
3	Anode, 600 Upper	1	13-640
5	Steering Cylinder Anode	2	13-749

Hoses

Trim Cylinder - External - 30-995

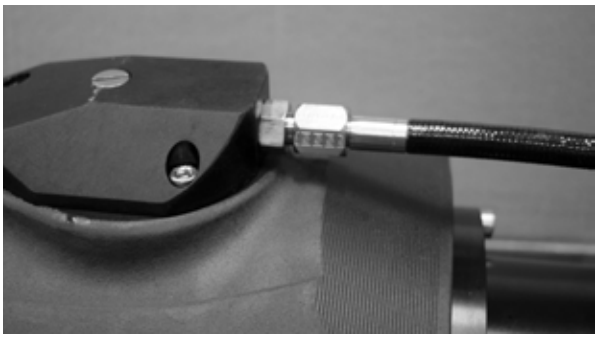
4 per drive

Steering Cylinder - External - 30-993



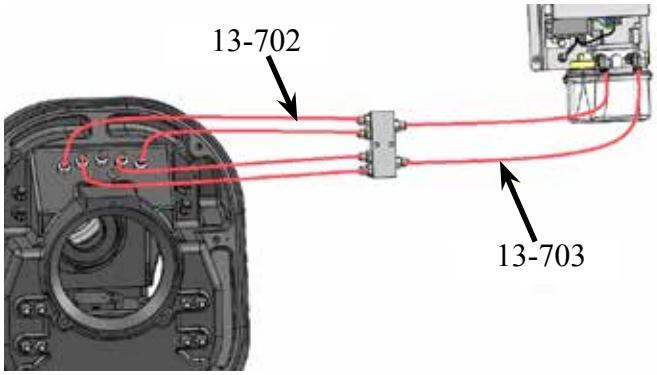
2 per cylinder

Overflow Hose - 31-130



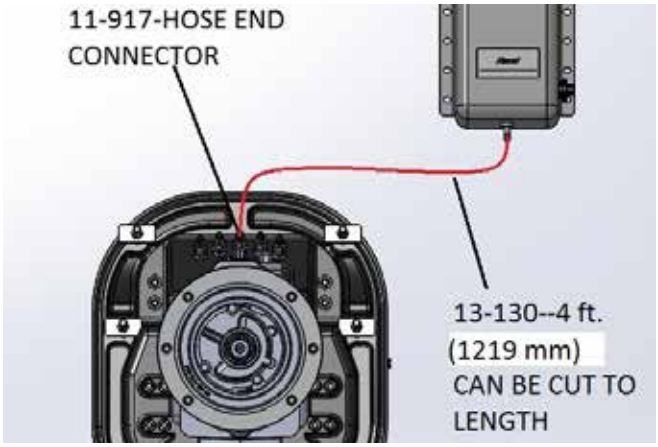
1 per drive

Trim Pump to Transom

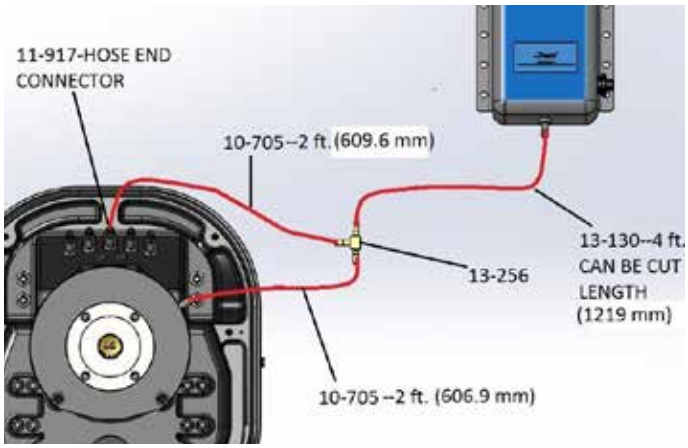


6 per drive

Oil Reservoir to Transom - Direct Mount



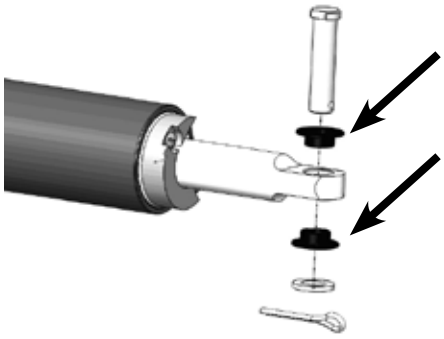
Oil Reservoir to Transom - Remote Mount



13-130 - 1 per drive for Direct and Remote Mount - 10-705 - 2 Per drive Remote Mount

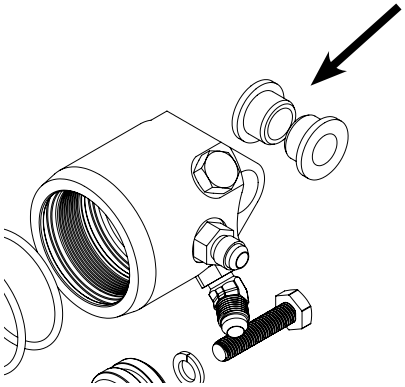
Bushings

Steering Cylinder - 13-319



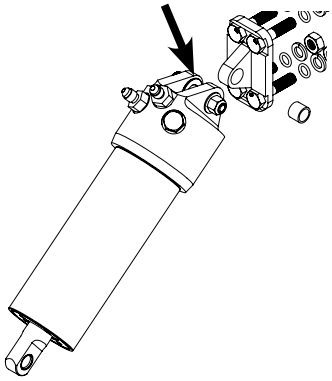
2 per cylinder

Steering Cylinder - 13-342



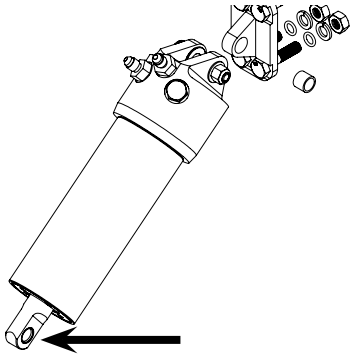
2 per cylinder

Trim Cylinder - 13-319



2 per cylinder

Trim Cylinder - 13-360

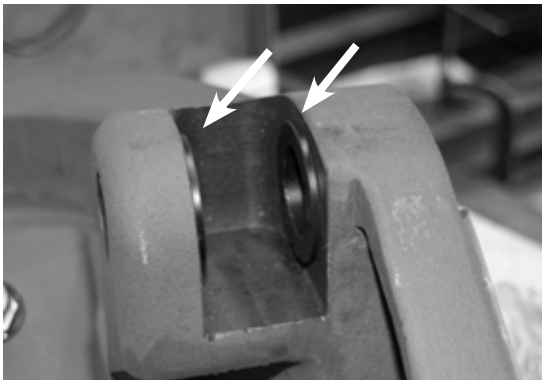


1 per cylinder

Gimbal Ring - 13-314

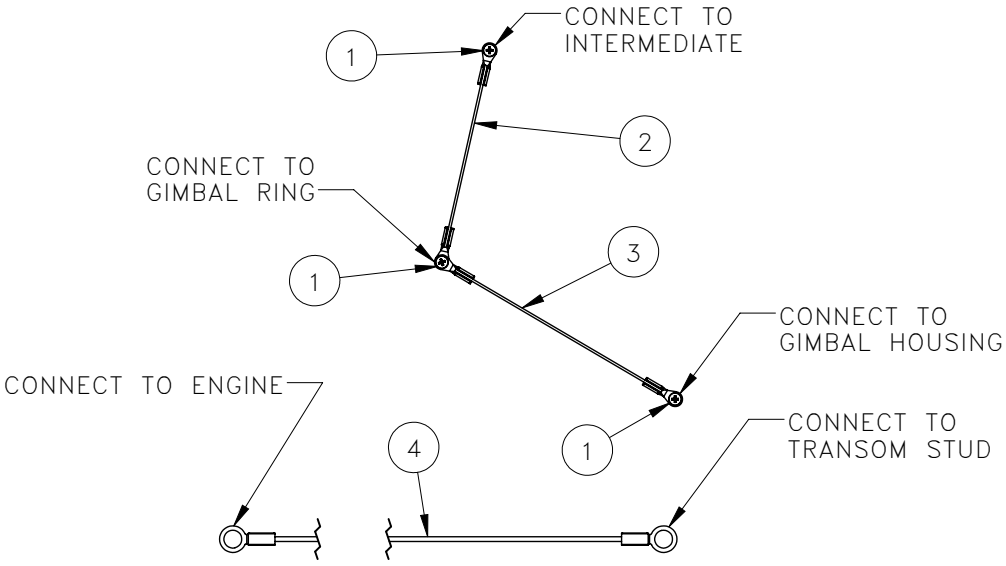
2 per drive

Gimbal Pin - 13-322 and 13-324



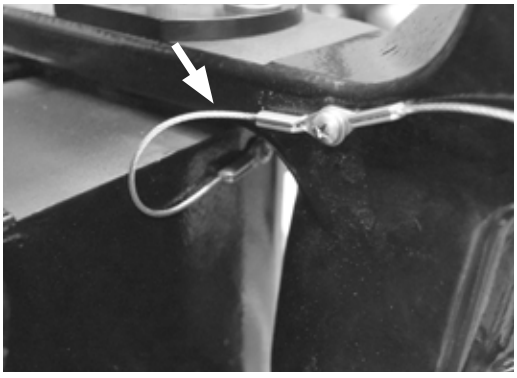
2 of each per drive

Complete Continuity Kit for 600B Series
Part # 31-034

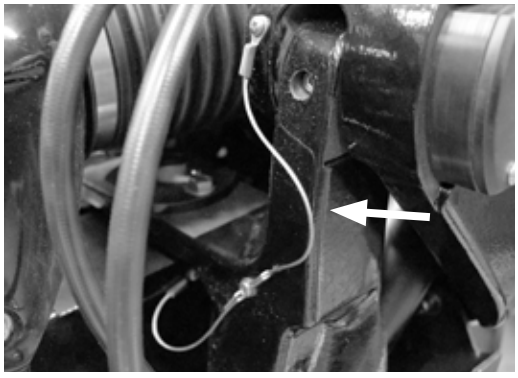


Individual Components

Item #	Description	Quantity	Part #
1	Screw, Self Tapping	3	10-479
2	Cable, Continuity	1	30-907
3	Cable, Continuity	1	30-905
4	Cable, Continuity	1	31-094



2

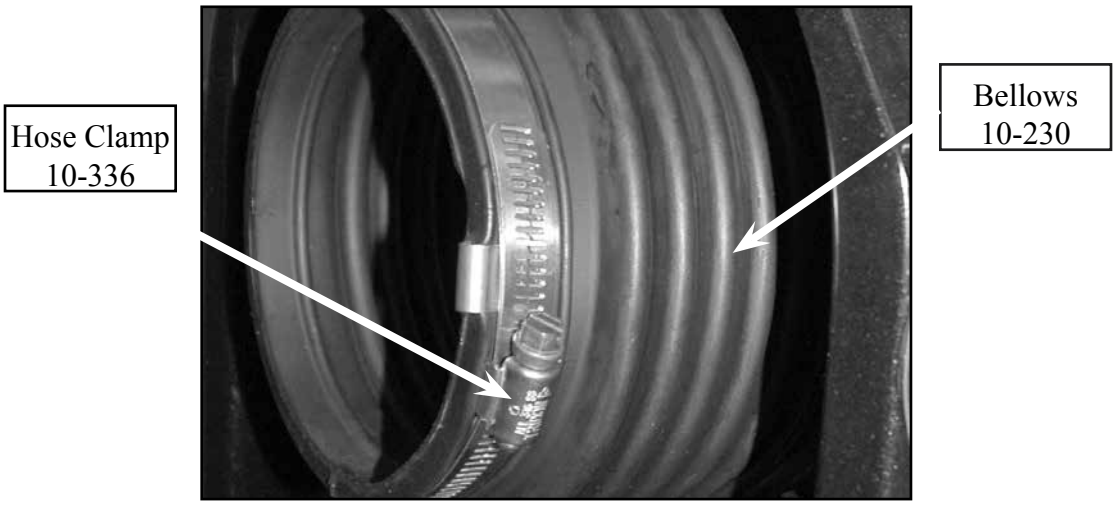


3

Chapter 3 - Complex Maintenance

Bellows

Description and Parts Breakdown



Individual Components

Description	Quantity	Part #
Bellows	1	10-230
Hose clamp	2	10-336

Inspection

Look for any cracks, holes, tears or a broken seal.

Look for large amount of corrosion on the surface of material or excessive wear.

Removal & Installation - Bellows

***NOTE*:** Sterndrive must be removed for removal and installation of bellows.

Remove U-joint bellows from gimbal housing by loosening the two (2) hose clamps (10-336).

Position ground clips on bellows.

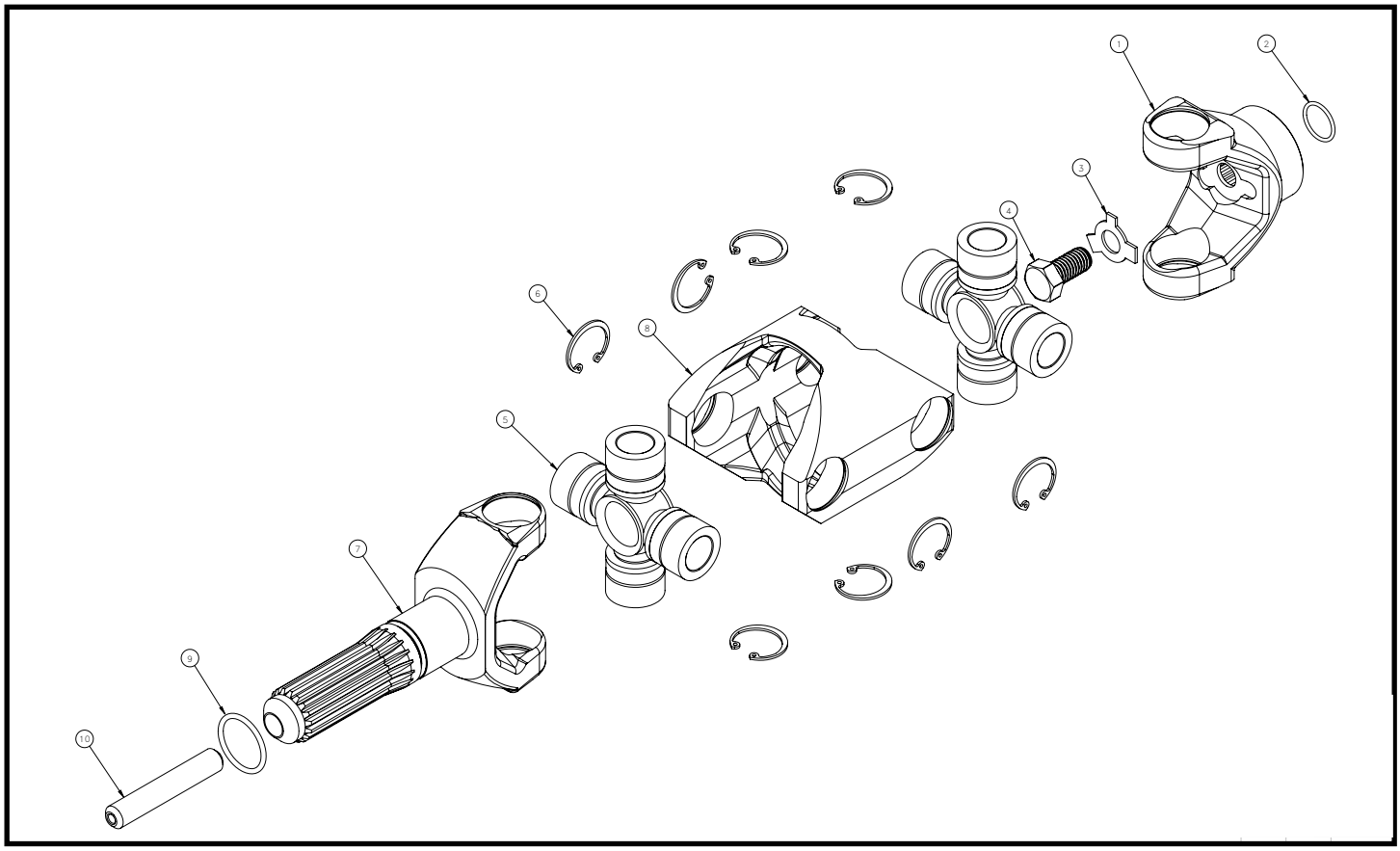
Position u-joint bellows with "TOP" mark facing upwards and install u-joint bellows on gimbal housing flange and position clamp. Torque to 30-40 lb. in. (3.4 - 4.5 Nm).

***NOTE**: When ordering the bellows (10-230), the 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.

Universal Joints

Description and Parts Breakdown



Complete U-Joint Assembly
30-831

Individual Component

Item No.	Description	Quantity	Part #
1	Yoke, End	1	12-766
2	O-Ring	1	12-586
3	Washer, Tab	1	12-768
4	Cap Screw	1	12-840
5	Cross & Bearing	2	10-373
6	Ring, Snap	8	10-518
7	Shaft, End Yoke	1	10-365
8	H-Yoke	1	10-366
9	O-Ring	1	10-493
10	Pin, Engagement	1	10-494

Maintenance U-Joint

NOTE: *Sterndrive must be removed for inspection, removal and installation of the u-joint assembly.*

Inspection

Inspection Before Disassembly

1. U-joint cross and bearings should be inspected for wear and possible replacement following the maintenance schedule for your application. Some 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.

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 Assembly

U-joint cross and bearings should be replaced in accordance with your assigned Mainteance Schedule A, B, or C, at two hundred (200) to eight hundred (800) hours (or before if necessary depending on usage). The u-joint assembly requires two (2) cross and bearings, (10-373).

CAUTION: New snap rings should be installed whenever new cross and bearing kits are installed. The 600 sterndrive utilizes a **special snap ring** (10-518), different than many of those found on other sterndrives or with after market cross and bearing sets. It is required that only these snap rings be used.

1. Remove external snap rings.
2. Remove bearing cup.
3. Remove second bearing.
4. Remove yoke.

Installation

Universal Joint Shaft Reassembly

Lube Specifications

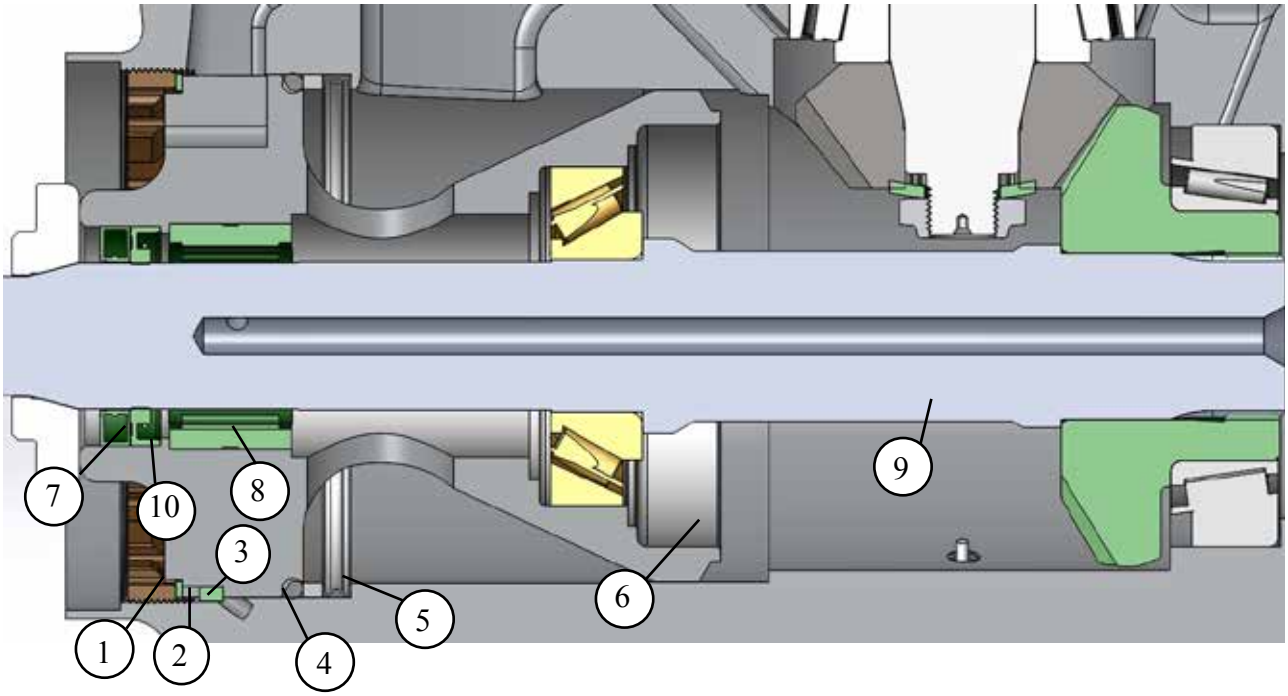
Use only non-lithium soap base or equivalent E.P. grease with an operating temperature of three hundred twenty-five degrees Fahrenheit (+325º F) (163º C) to minus ten degrees Fahrenheit (-10º F) (-23º C), meeting N.L.G.I. grade one (1) or two (2) specifications or DIN51. **The use of any other lubricant will decrease the life of the bearings.**

1. Press bearing caps into yoke and onto cross. If a press is unavailable, use a large c-clamp.
2. Install external snap rings (10-518)
3. Repeat same procedure for other bearing caps.
4. Lubricate cross and bearings with a liberal amount of above specified lube.

NOTE: *When u-joint assembly is completely removed from the upper housing of the sterndrive for u-joint maintenance, it is recommended that a new front seal (12-018) be used when reinstallation occurs.*

Propeller Shaft Bearing Carrier Seal Replacement

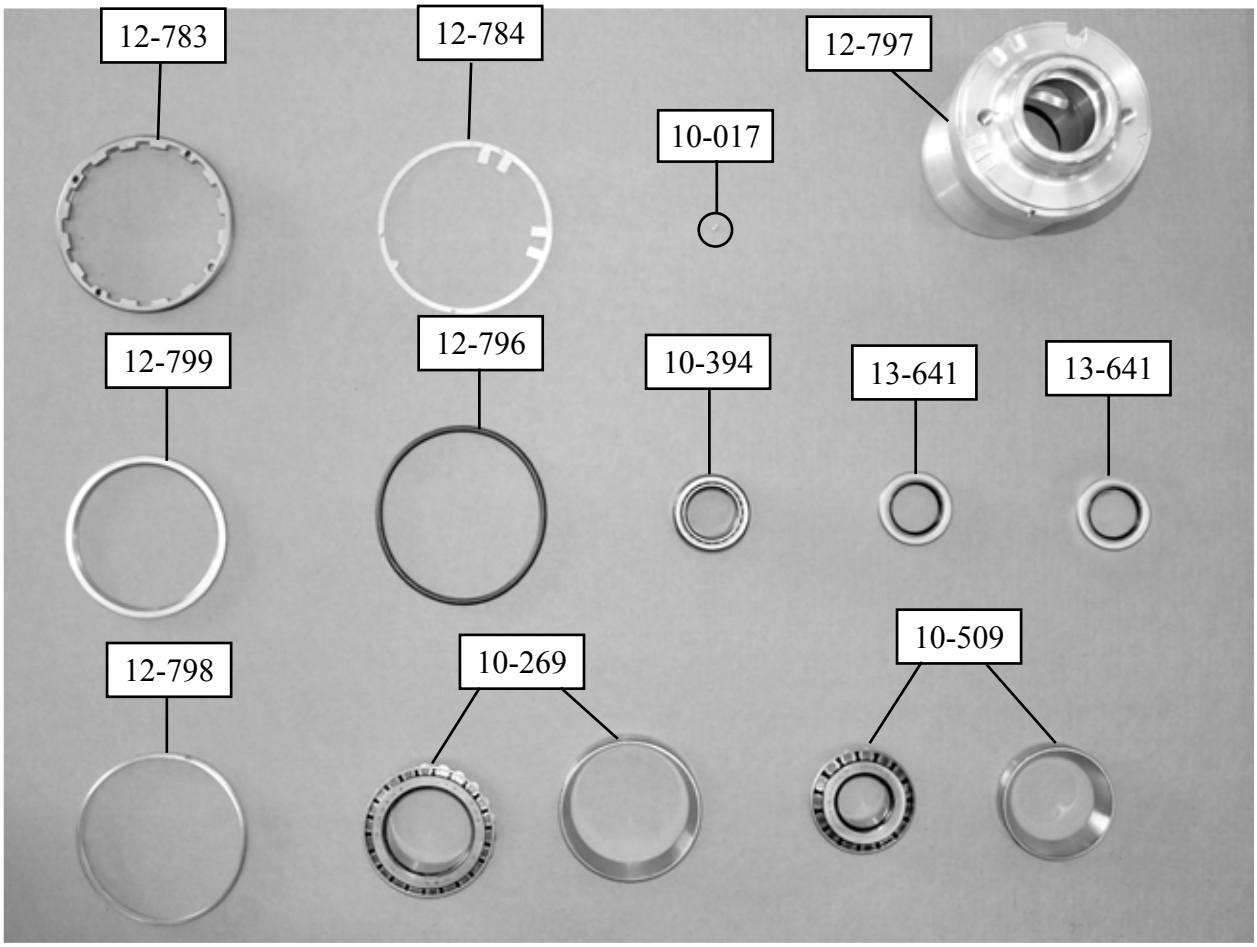
Model 620B

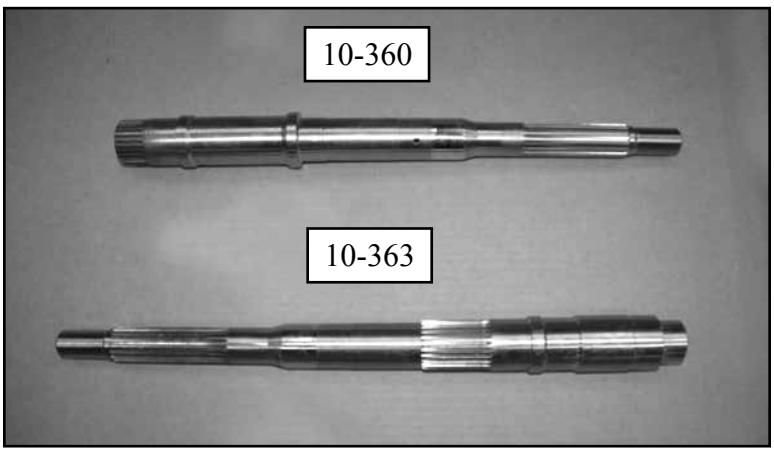


Individual Components - 620B

Item #	Description	Quantity	Part #
1	Cover Nut	1	12-783
2	Washer	1	12-784
3	Key	1	10-017
4	O-Ring	1	12-796
5	Ring, Load	1	12-798
6	Carrier, Bearing	1	12-797
7	Seal	1	13-641
8	Bearing, Roller	1	10-394
9	Shaft, Prop - RH - OR Shaft, Prop - LH	1	10-363 OR 10-360
10	Seal	1	13-641

Model 620B Prop Shaft Parts





Removal

1. Bend down tab on tab washer (12-784).
2. Remove cover nut (10-783) from lower housing using tool TO-148.
3. Remove tab washer (12-784).
4. Remove bearing carrier (12-797) using TO-036, remove o-ring (12-796), thrust washer (12-799), and load ring (12-798).

   ***NOTE**: If bearing carrier cannot be removed, try to heat up lower housing.*

   ***NOTE**: Recover key (10-017).*

5. Remove propeller shaft (10-360 Left Hand) or (10-363 Right Hand).

Rebuilding

1. Remove both (13-641) seals using a seal driver or punch.
2. Remove bearing (10-394) using a bearing driver or punch.
3. Clean carrier unit (12-797) thoroughly.
4. Press new bearing (10-394) into carrier unit using tool TO-019.
5. Apply red *Loctite* 263 to outside of first seal (13-641) and grease inner seal surface. Press into carrier unit with raised numbers printed on the seal facing up using the long side of tool TO-030 with the thick shoulder.

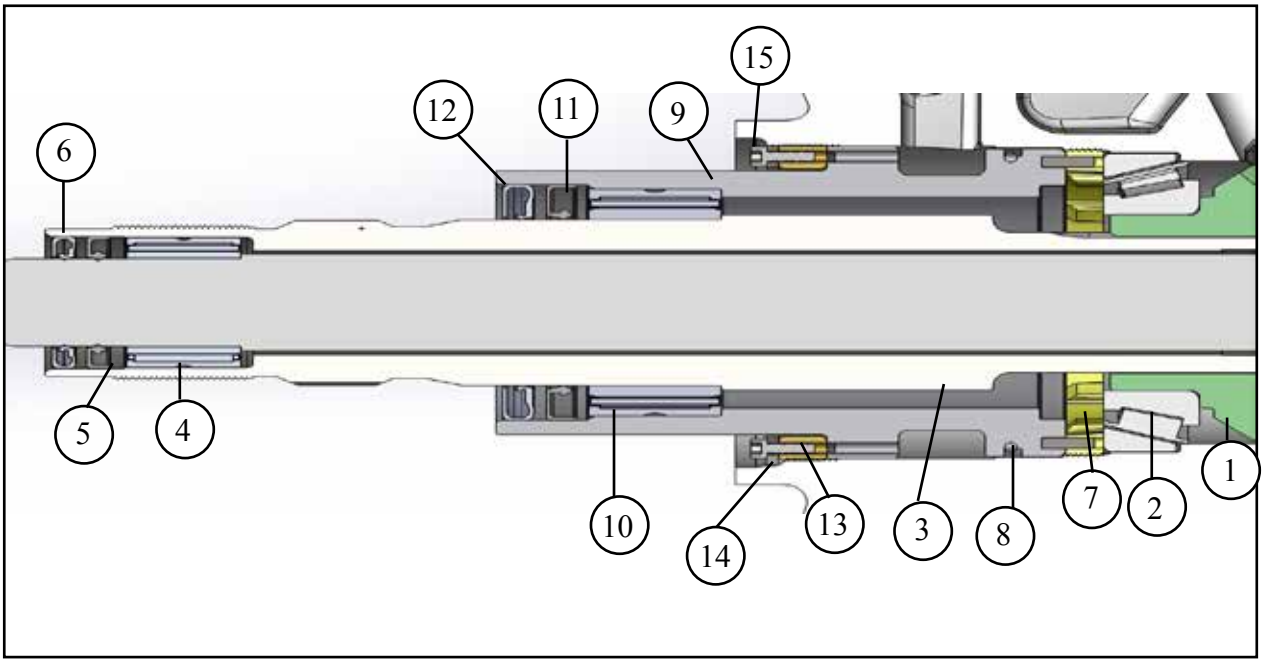
   Apply red *Loctite* 263 to outside of second seal (13-641) and grease inner seal surface. Press into carrier unit with the raised numbers printed on the seal facing downward using the opposite, shorter side of tool TO-030 with the thin shoulder. Fill the space in between the two seals with grease.

Installation

1. Install a new crush ring (12-798). The old one may not be reused.
2. Install thrust washer (12-799), propeller shaft (10-360 Left Hand) or (10-363 Right Hand) and key (10-017) into housing.
3. Install bearing carrier (12-797)
4. Bend tabs up thirty degrees (30°) on tab washer (12-784) and insert into housing.
5. Lubricate cover nut (12-783) with 90w oil and install into housing. Tighten until 25-30 lb ft (34-41 Nm) of rolling torque is achieved on the propeller shaft.
6. Bend tab over on tab washer (12-784) into open slot on cover nut (12-783).
7. 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, repressurize drive and spray with soapy water and check for leaks, repair as needed.

Propeller Shaft Bearing Carrier Seal Replacement

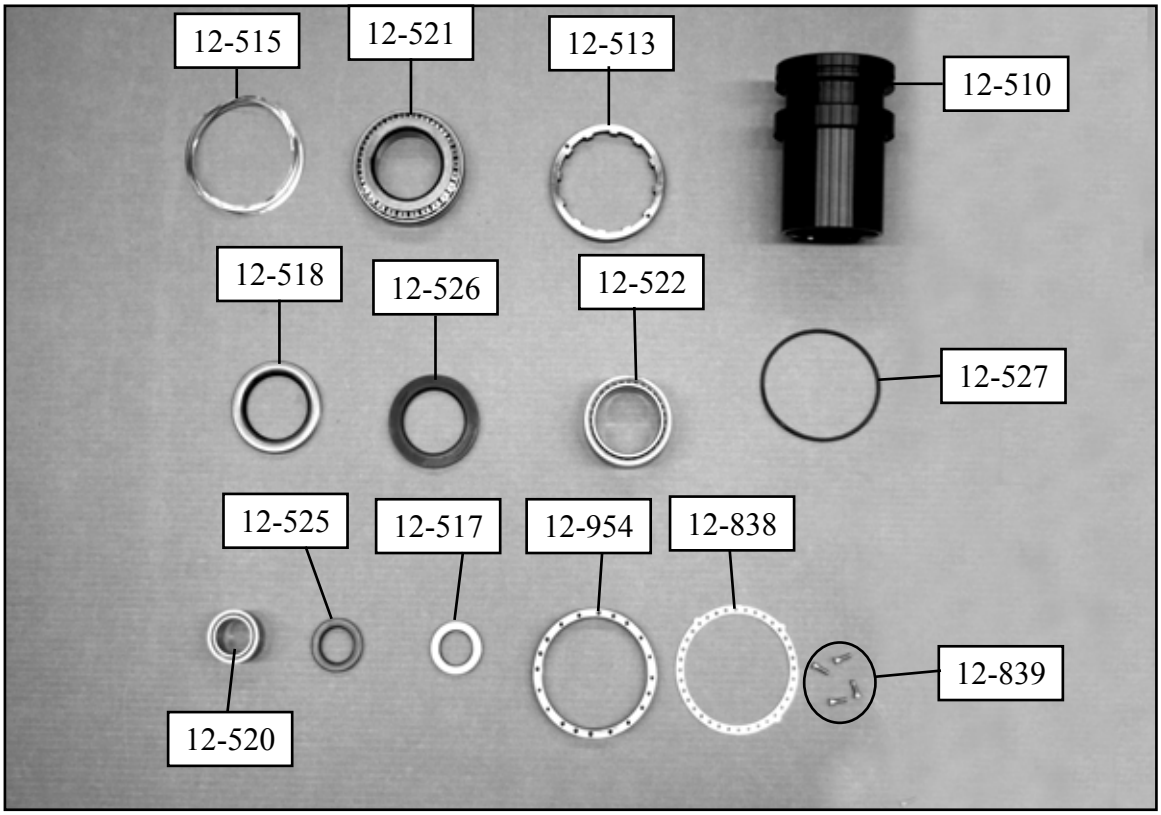
Model 660B



Individual Components - 660B

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	12-525
6	Seal, Fishline Cutter	1	12-517
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

Model 660B Prop Shaft Parts



Removal

1. Remove four (4) (12-839) S.H.C.S. 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 counterclockwise 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 (12-517) and (12-525) 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 red *Loctite* 263 to outside of first seal (12-525) and grease inner seal surface. Press into propeller shaft using long end of tool TO-116. Apply red *Loctite* 263 to outside of second seal (12-517) and grease inner seal surface. Press into propeller shaft using opposite side of tool TO-116. Fill 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 red *Loctite* 263 to outside of first seal (12-526) and grease inner seal surface. Press into carrier unit using long end of tool TO-117. Apply red *Loctite* 263 to outside of second seal (12-518) and grease inner seal surface. Press into carrier unit using opposite side of tool TO-117. Fill space in between two seals with grease.

Installation

1. Install forward propeller shaft assembly (12-502) by sliding it over aft propeller shaft.

2. Install shims (12-515) into lower housing. If shims look damaged or were damage 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.

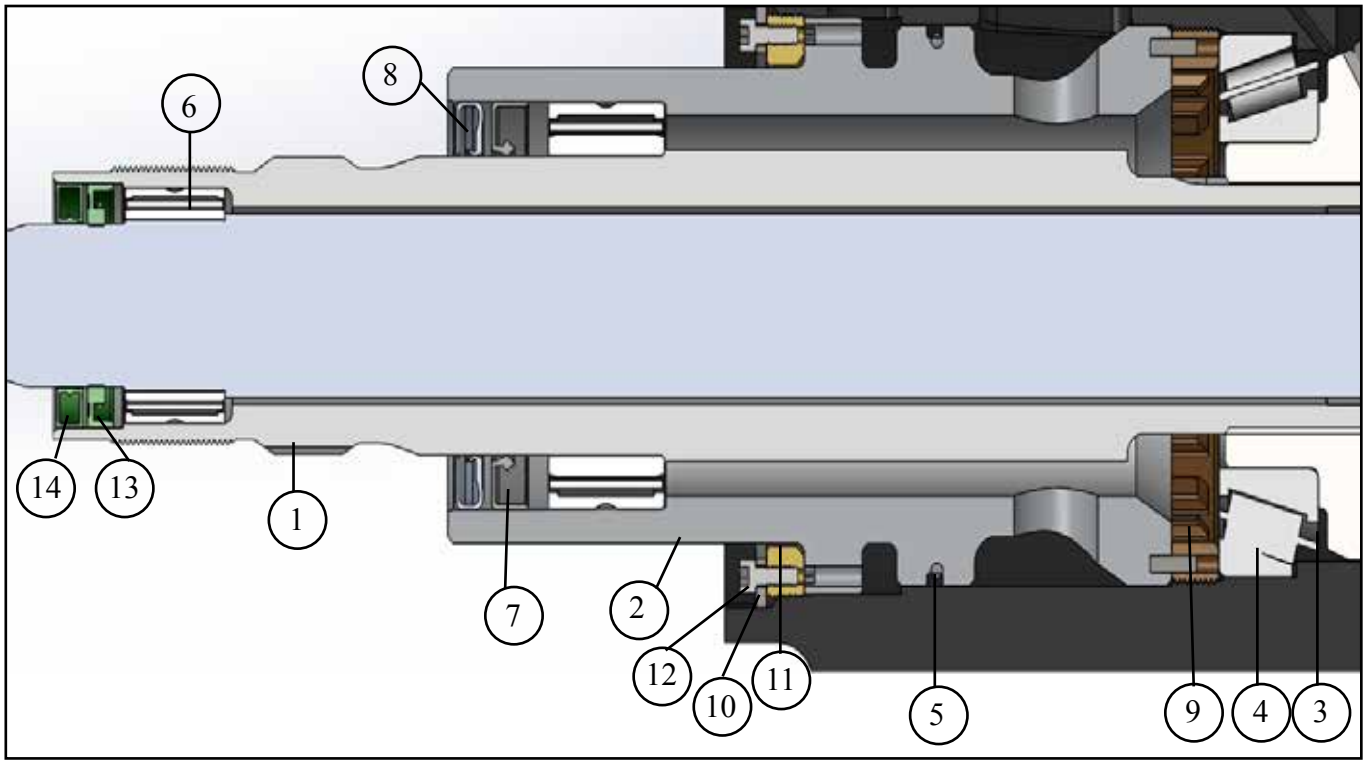
7. Install tab washer. Look to see if threaded hole lines up to hole in tab washer.
   If bolt lines up, put *Loctite* on threads and install S.H.C.S.
   If bolt holes don't line up, remove tab washer and tighten carrier until holes line up.

***NOTE:** Please refer to the appropriate table in the Konrad Technical Manual to see what reading 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, repressurize drive and spray with soapy water and check for leaks, repair as needed.

Propeller Shaft Bearing Carrier Seal Replacement

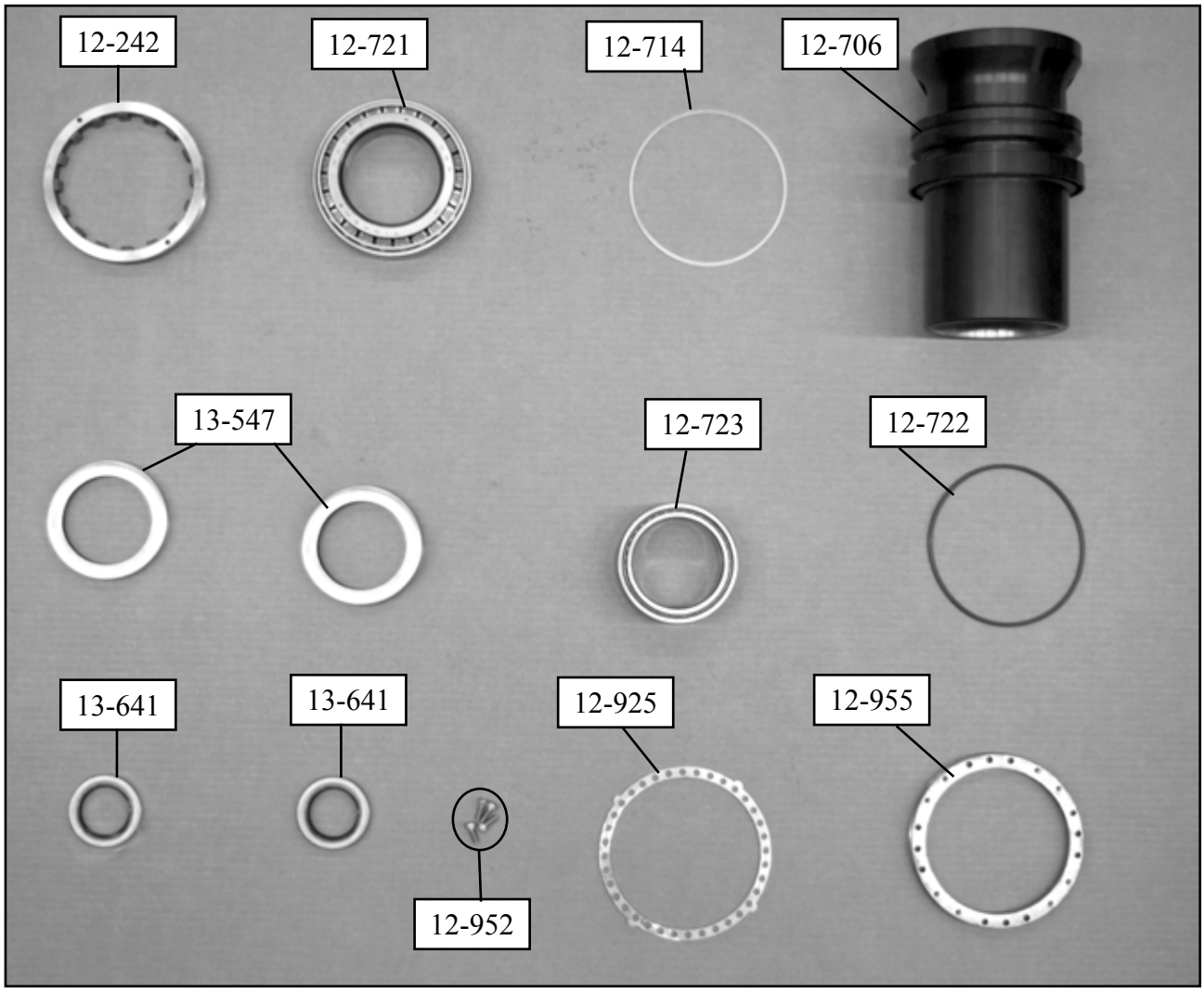
Model 680B

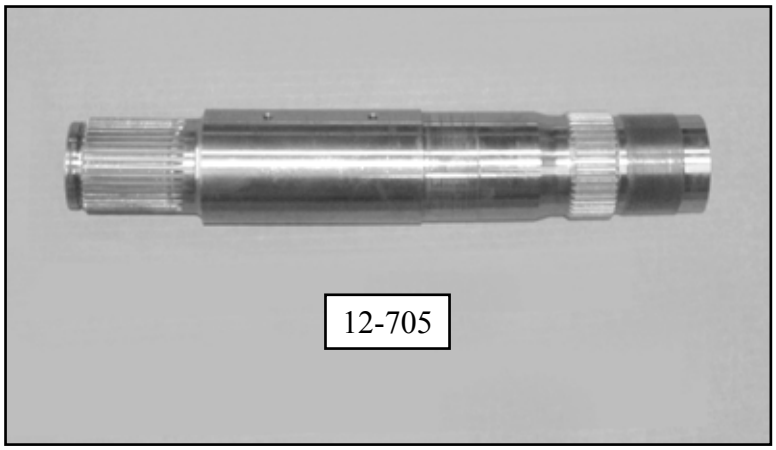


Individual Components - 680B

Item #	Description	Quantity	Part #
1	Prop Shaft, Fwd	1	12-705
2	Carrier, Bearing	1	12-706
3	Shim Set, Aft Bearing	1	12-714
4	Bearing	1	12-721
5	O-Ring	1	12-722
6	Roller Bearing, Fwd	1	12-723
7	Seal, Inner, Fwd Prop Shaft	1	13-547
8	Seal Outer, Fwd Prop Shaft	1	13-547
9	Cover, Nut, Fwd	1	10-242
10	Washer, Tab	1	12-925
11	Cover, Nut, Aft	1	12-955
12	Cap Screw	4	12-952
13	Seal, Inner, Aft Prop Shaft	1	13-641
14	Seal, Outer, Aft Prop Shaft	1	13-641

Model 680B Prop Shaft Parts





Removal

1. Remove (4) S.H.C.S. (12-952) from tab washer (12-925) and remove tab washer using needle nose pliers.

2. Remove outer retaining nut (12-955) from lower housing using tool (TO-149).

3. Remove bearing carrier (12-706) using carrier remover (TO-171).

4. Remove inner retaining nut (10-242) from lower housing using inner nut wrench (TO-150).

5. Remove forward propeller shaft assembly (12-705) by pulling straight out and over the aft propeller shaft. The race of bearing (12-721) 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 (12-714) from lower housing and/or stuck to the bearing race.

Rebuilding

1. Remove both (13-641) seals from propeller shaft assembly (12-705) using slide hammer TO-028.

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

2. Clean propeller shaft assembly (12-705) thoroughly.

3. Apply red *Loctite* 263 to outside of first seal (13-641) and grease inner seal surface. Press into propeller shaft with the raised numbers printed on the seal facing up using the long end of tool TO-030 with the thick shoulder. Apply red *Loctite* 263 to outside of second seal (13-641) and grease inner seal surface. Press into propeller shaft with the raised numbers printed on the seal facing down using opposite end of tool TO-030 with thin shoulder. Pack space in between the two seals with grease.

4. Remove both (13-547) seals from carrier (12-706) using punch or slide hammer TO-028.

5. Remove o-ring (12-722) from carrier (12-706).

6. Clean carrier (12-706) thoroughly.

7. Apply red *Loctite* 263 to outside of first seal (13-547) and grease inner seal surface. Press into carrier unit with the numbers printed on the seal facing up using the long end of the tool TO-131 with the thick shoulder. Apply red *Loctite* 263 to outside of second seal (13-547) and grease inner seal surface. Press into carrier unit with the numbers printed on the seal facing down using opposite thin end of tool TO-131 with the thin shoulder. Pack space in between the two seals with grease.

Installation

1. Install forward propeller shaft assembly (12-705) by sliding it over aft propeller shaft.

2. Install shims (12-714) into lower housing. IF shims look damaged or were damage during disassembly, replace with the same thickness as came out.

3. Slide race of bearing (12-721) into lower housing until it seats against bearing on gear assembly. May need to guide race down with retaining nut (10-242) in next step.

***NOTE**: This race should not be a press fit into lower housing.*

4. Lubricate threads with 90W oil and install retaining nut (10-242) into lower housing. *Torque nut to 200 lb. ft. (271 Nm) using spanner wrench (TO-150)

***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. Grease outer diameter of carrier and install carrier unit (12-706) into lower housing, aligning dowel pins on carrier to retaining nut (10-242).

7. Lubricate threads on outer retaining nut (12-955) with a Teflon/anti-seize lube and install using tool TO-149. **Torque nut to 100 lb. ft. (136 Nm) using tool (TO-149)

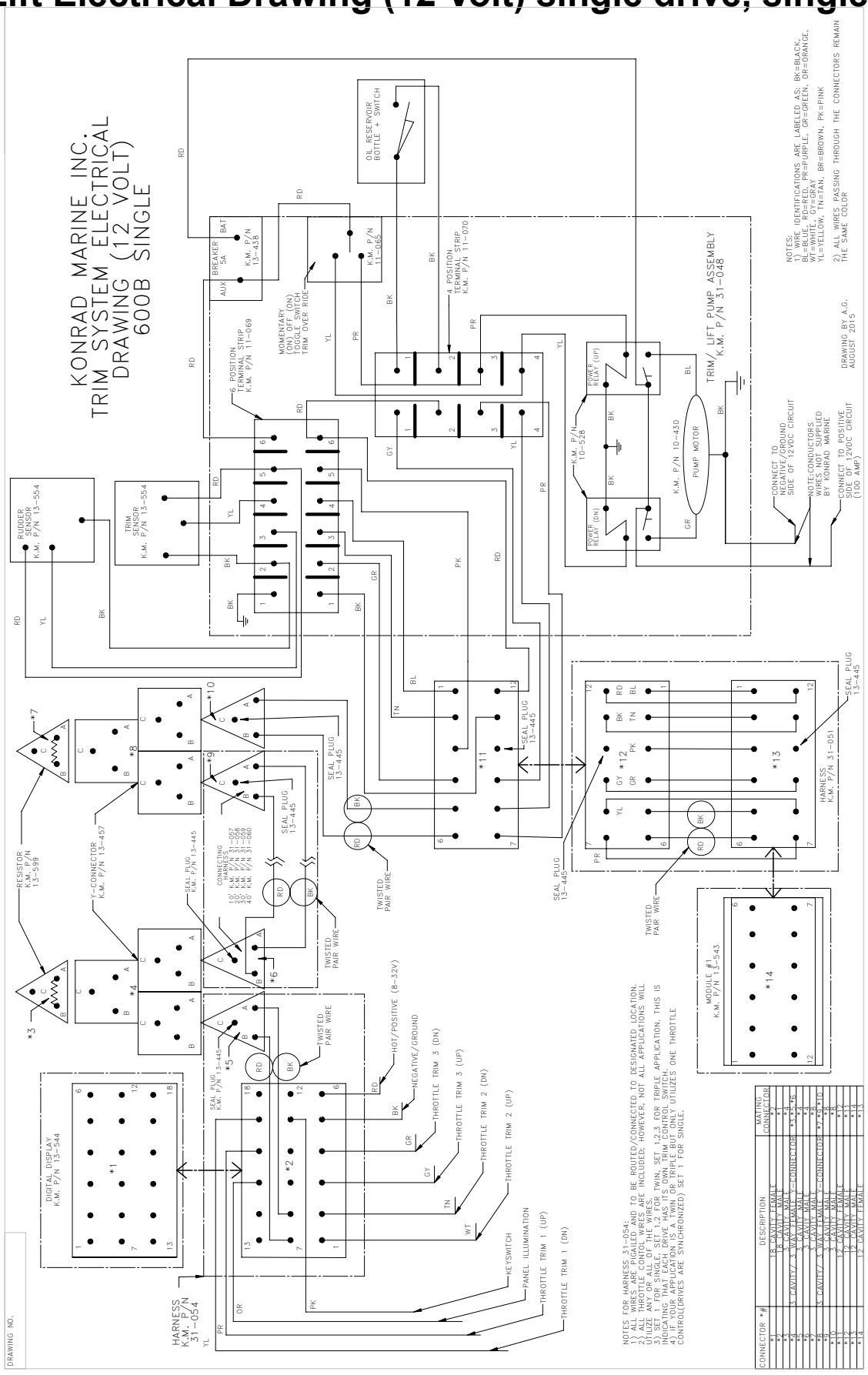
***NOTE:** Please refer to the appropriate table in the Konrad Technical Manual to see what reading to set torque wrench to achieve 100 lb. ft. (136 Nm) of torque.*

8. Install tab washer (12-925) into lower housing. If holes don't align, tab washer must be removed and retaining nut must be tightened until both parts have aligning holes.

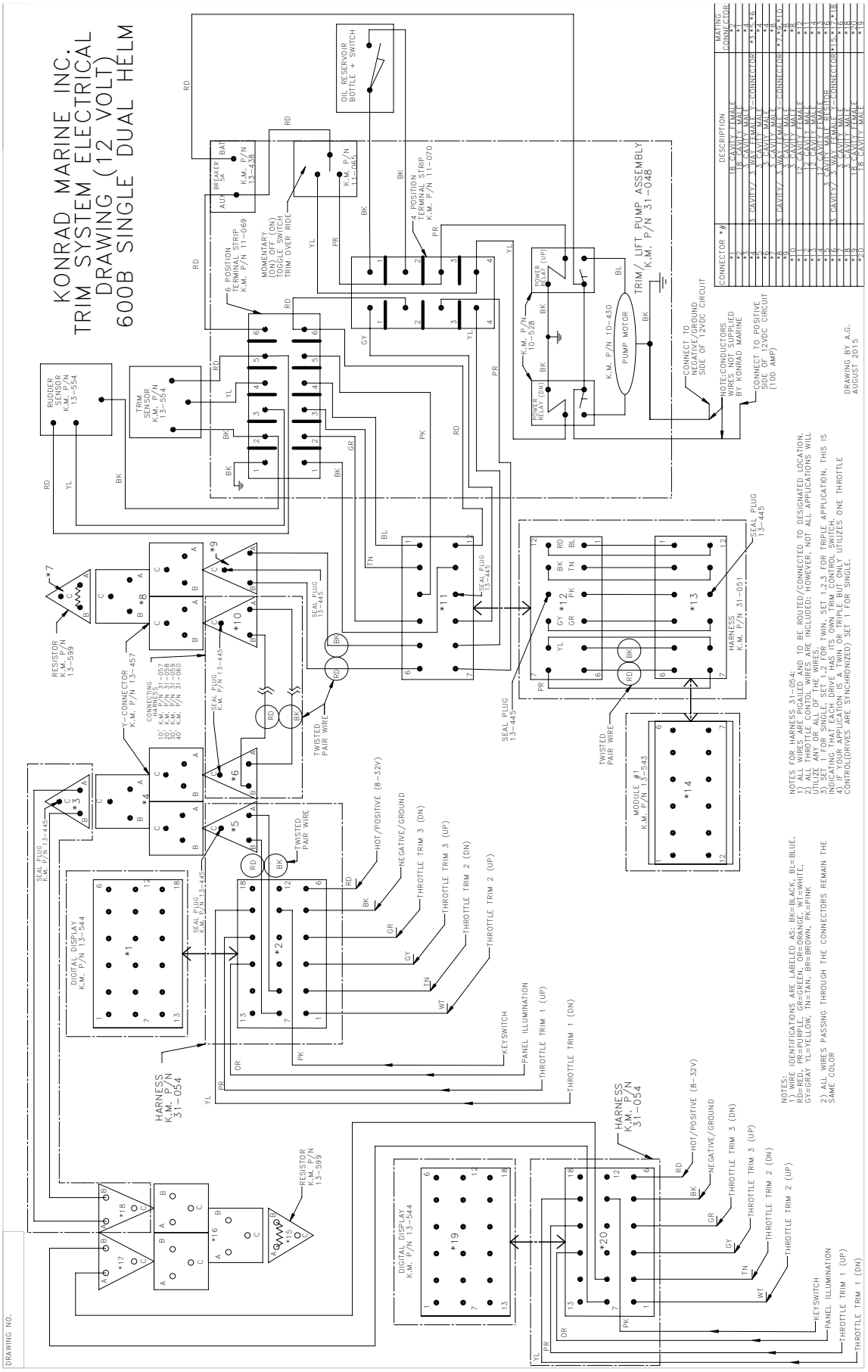
9. Install blue Loctite on the four S.H.C.S. (12-925) and install into tab washer and outer retaining nut. Torque to 28 lb. in. (3.2 Nm)

10. 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, repressurize drive and spray with soapy water and check for leaks, repair as needed.

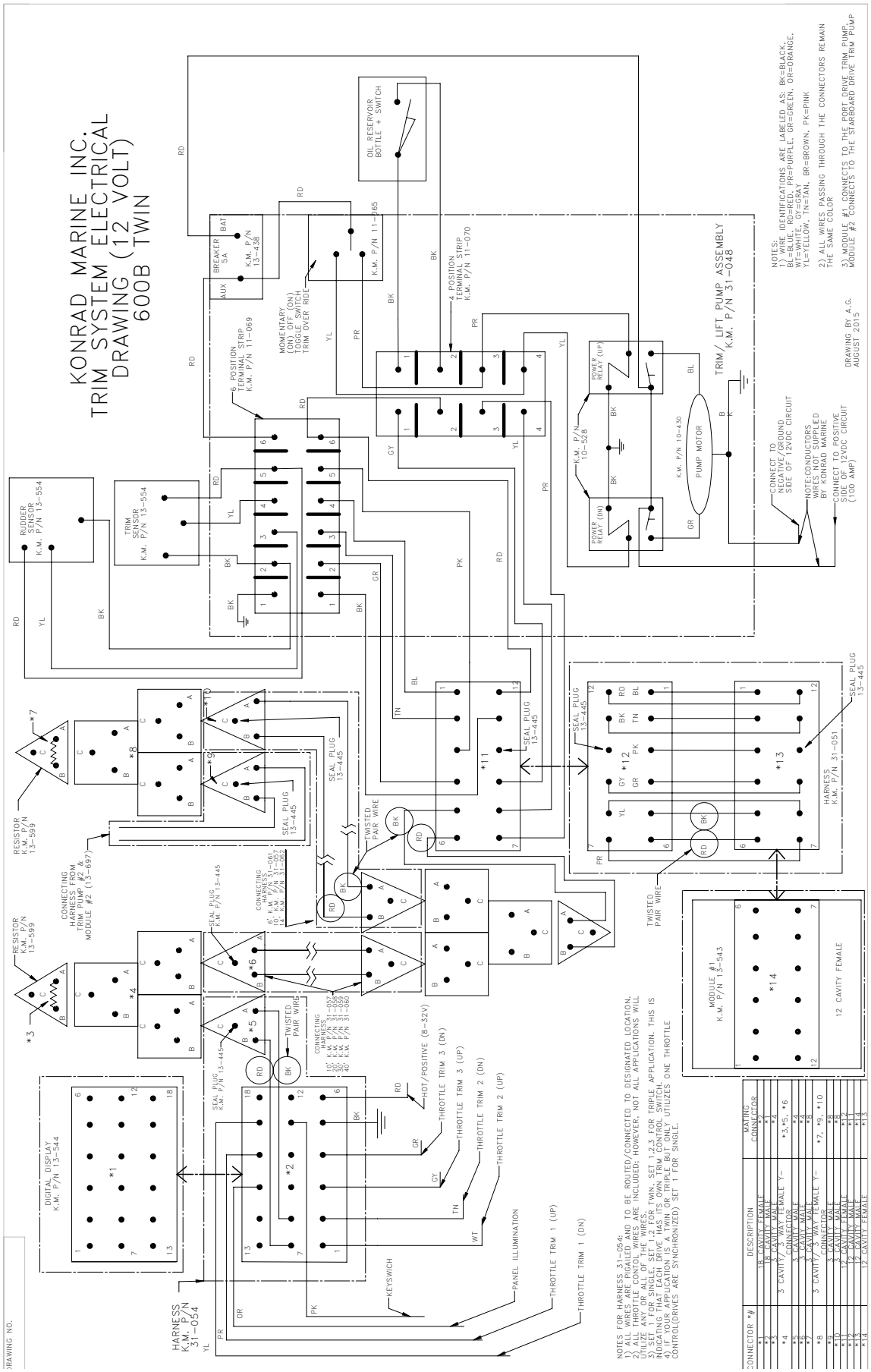
Trim/Lift Electrical Drawing (12 Volt) single drive, single helm



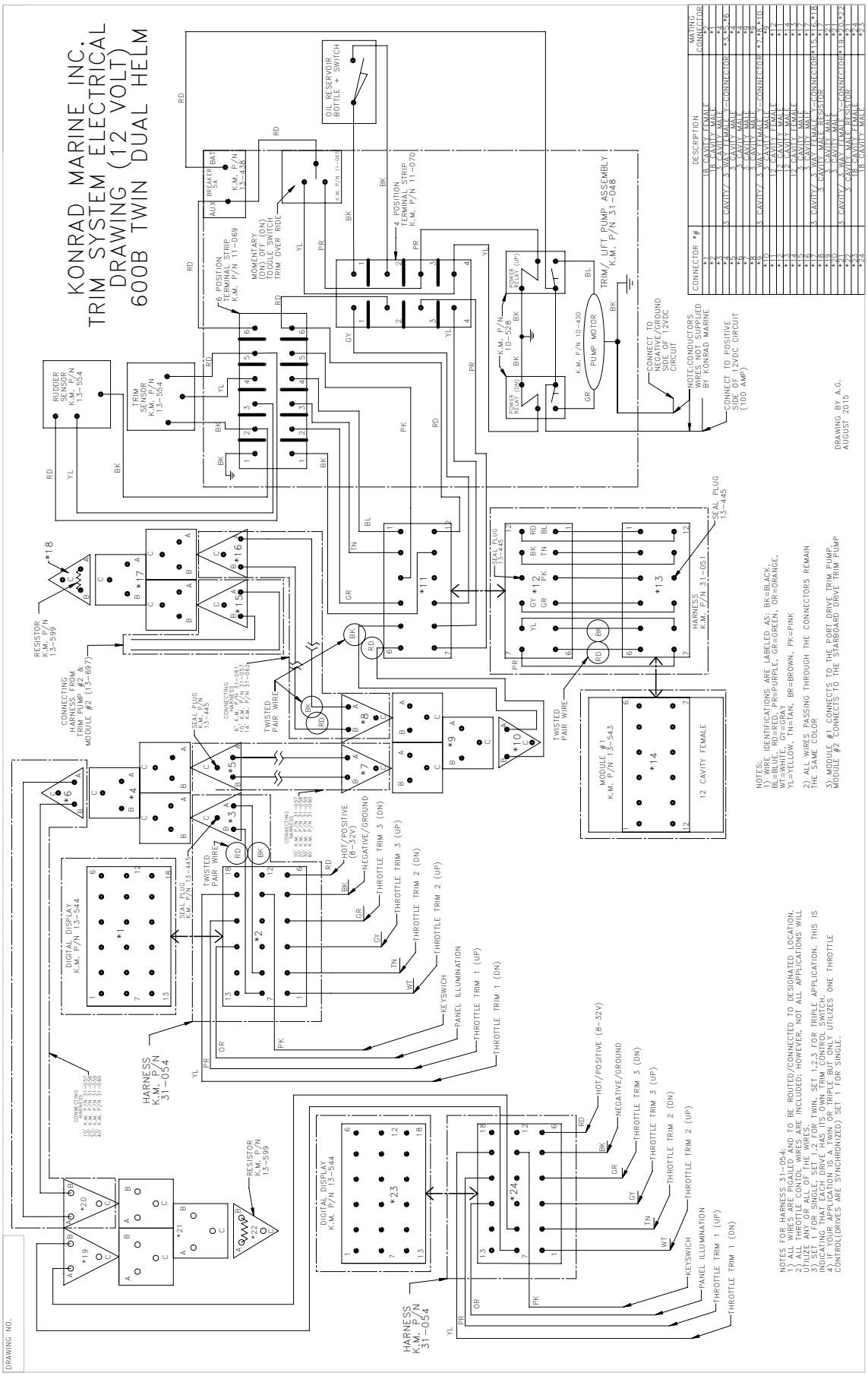
Trim / Lift Electrical Drawing (12 Volt) single drive, dual helm



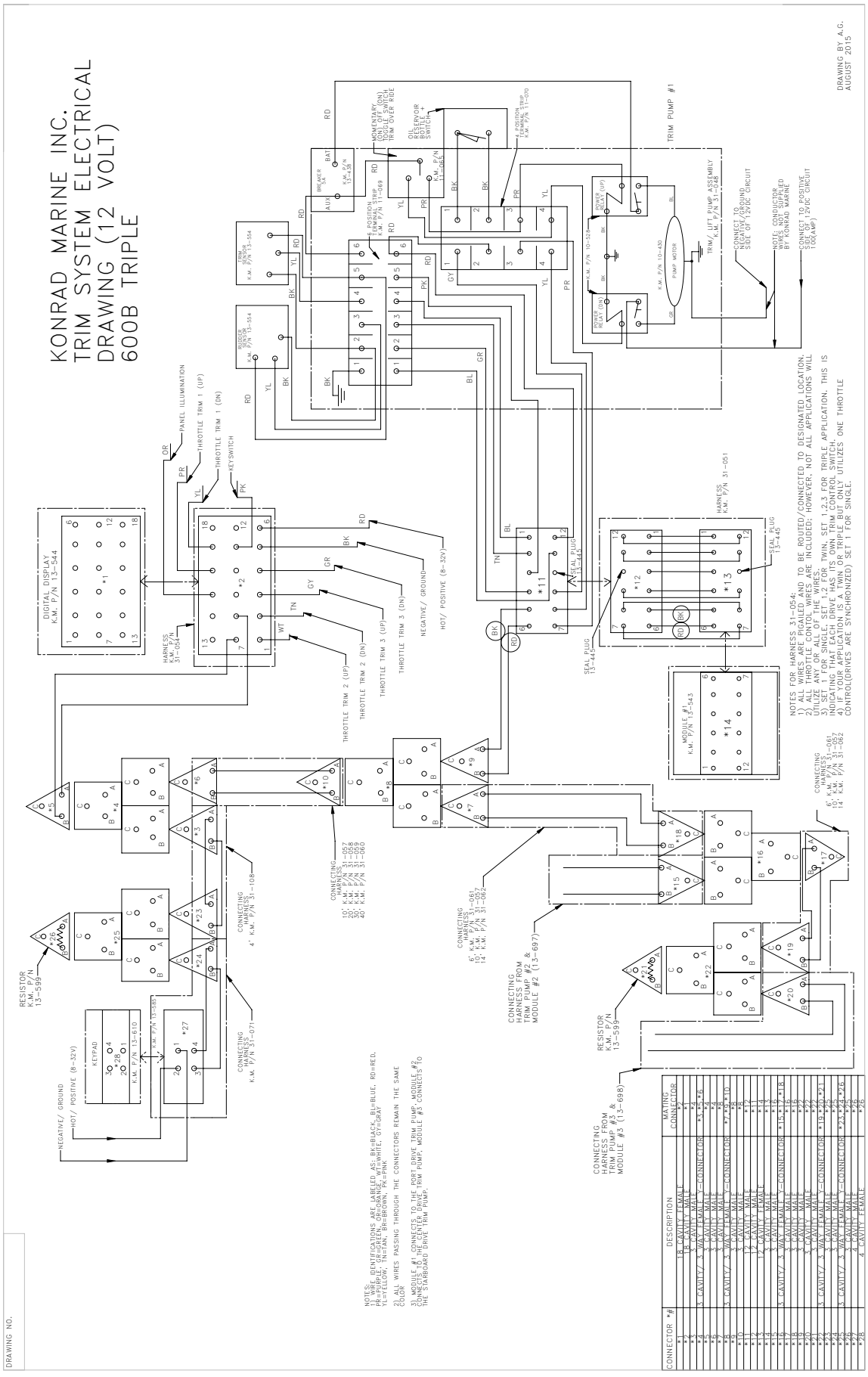
Trim / Lift Electrical Drawing (12 Volt) twin drive, single helm



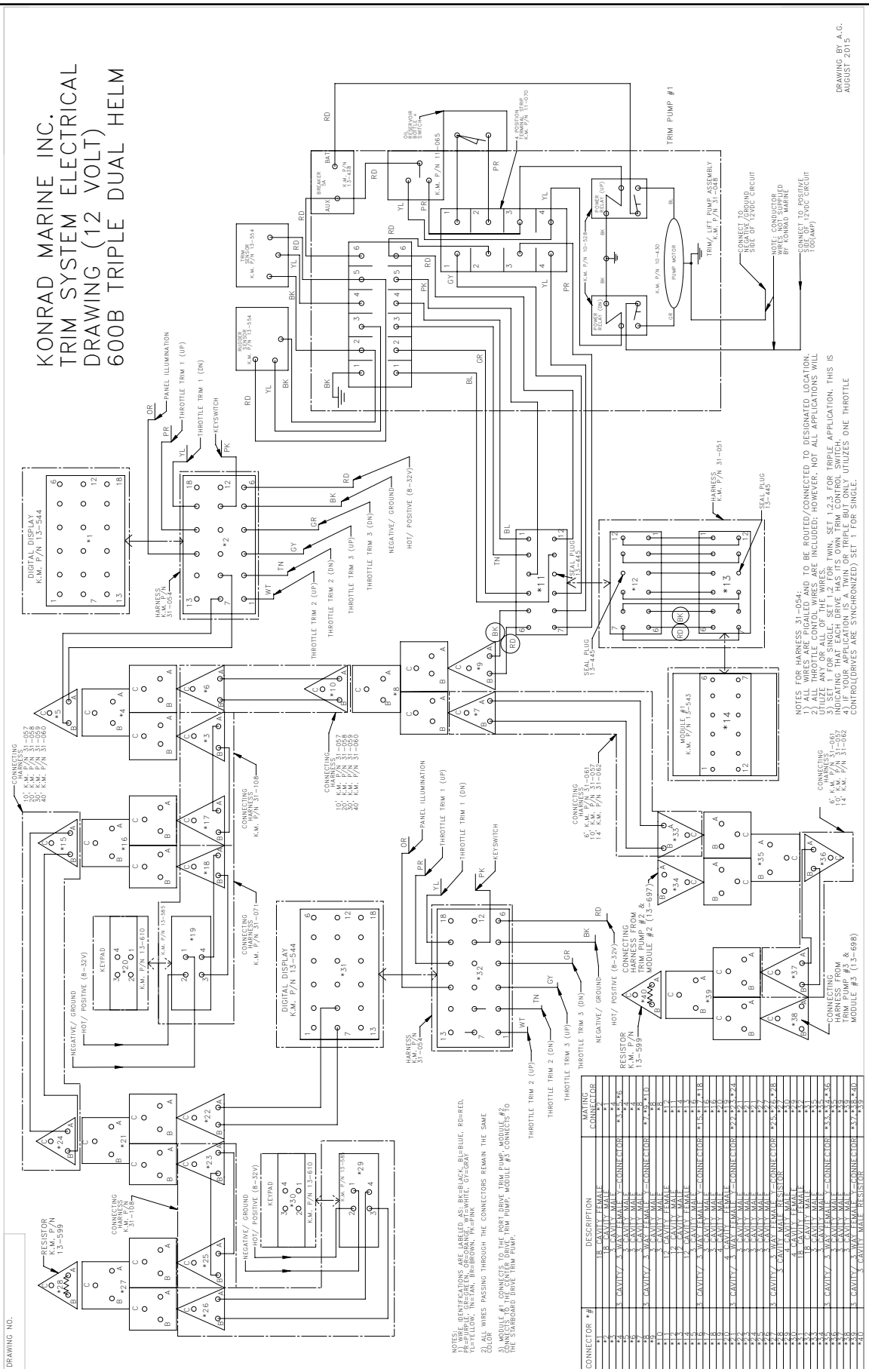
Trim / Lift Electrical Drawing (12 Volt) twin drive, dual helm



Trim / Lift Electrical Drawing (12 Volt) triple drive, single helm

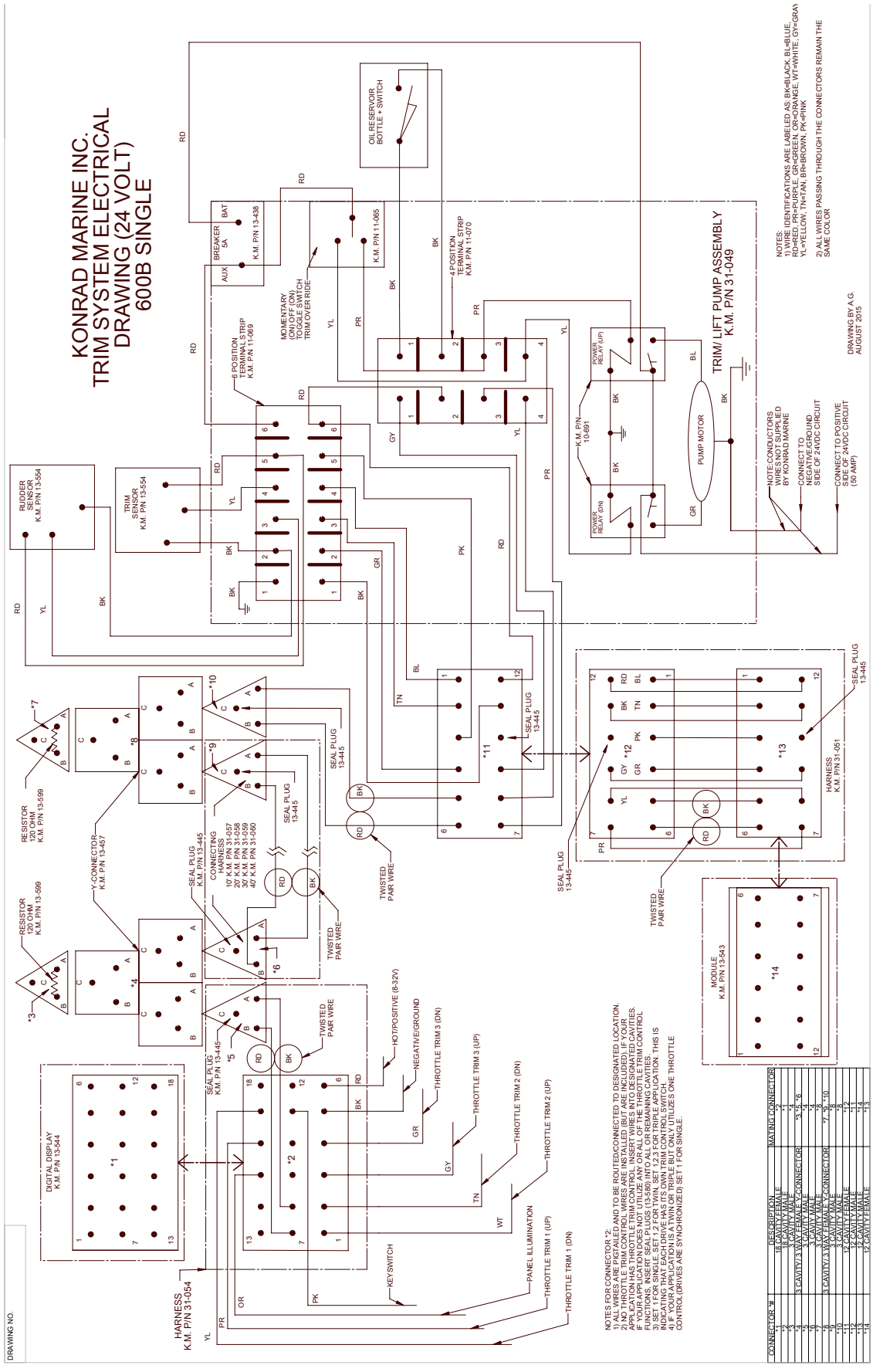


Trim / Lift Electrical Drawing (12 Volt) triple drive, dual helm

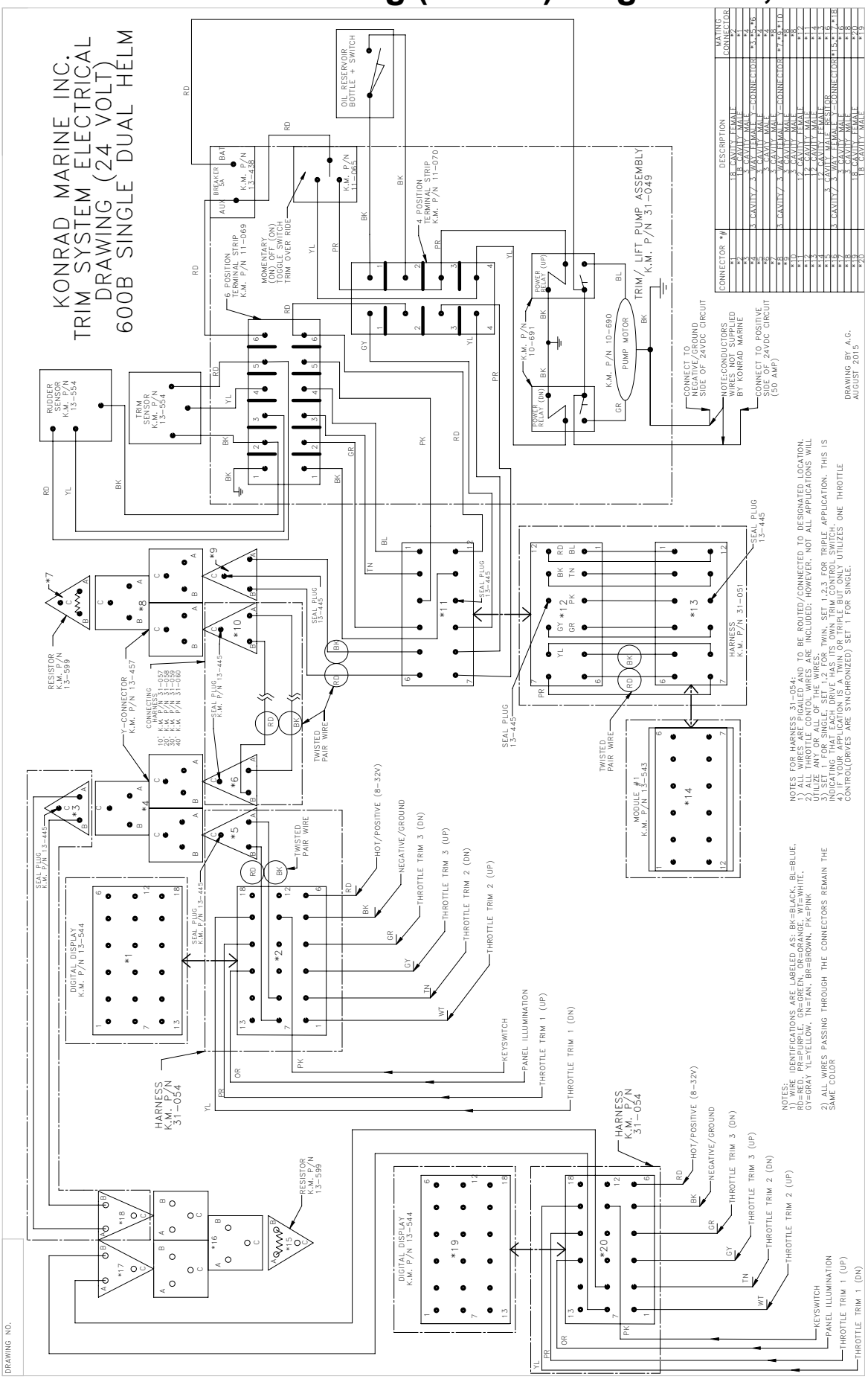


CONNECTOR #	DESCRIPTION	MATING CONNECTOR
*1	18 CAVITY MALE	*1
*2	18 CAVITY FEMALE	*2
*3	3 CAVITY / 3 WAY MALE CONNECTOR	*3 *6 *10
*4	3 CAVITY MALE	*4
*5	3 CAVITY FEMALE	*5
*6	3 CAVITY / 3 WAY FEMALE CONNECTOR	*7 *9 *10
*7	3 CAVITY MALE	*8
*8	12 CAVITY MALE	*12
*9	12 CAVITY FEMALE	*11
*10	12 CAVITY MALE	*13
*11	14 CAVITY FEMALE	*14
*12	3 CAVITY MALE	*15
*13	3 CAVITY / 3 WAY FEMALE CONNECTOR	*15 *17 *18
*14	3 CAVITY MALE	*16
*15	3 CAVITY FEMALE	*15
*16	3 CAVITY / 3 WAY FEMALE CONNECTOR	*17 *18
*17	3 CAVITY MALE	*19
*18	4 CAVITY FEMALE	*19
*19	4 CAVITY / 4 WAY FEMALE CONNECTOR	*22 *23 *24
*20	3 CAVITY / 3 WAY FEMALE CONNECTOR	*21
*21	3 CAVITY MALE	*20
*22	3 CAVITY MALE	*24
*23	3 CAVITY FEMALE	*25
*24	3 CAVITY FEMALE	*27
*25	3 CAVITY / 3 WAY FEMALE CONNECTOR	*25 *26 *28
*26	3 CAVITY MALE	*29
*27	3 CAVITY FEMALE	*29
*28	3 CAVITY MALE	*29
*29	4 CAVITY FEMALE	*29
*30	18 CAVITY FEMALE	*30
*31	18 CAVITY MALE	*31
*32	3 CAVITY / 3 WAY FEMALE CONNECTOR	*32 *34 *36
*33	3 CAVITY MALE	*33
*34	3 CAVITY FEMALE	*35
*35	3 CAVITY / 3 WAY FEMALE CONNECTOR	*35 *36 *38
*36	3 CAVITY MALE	*37
*37	3 CAVITY FEMALE	*39
*38	3 CAVITY MALE	*39
*39	3 CAVITY FEMALE	*39
*40	2 CAVITY MALE RESISTOR	*40

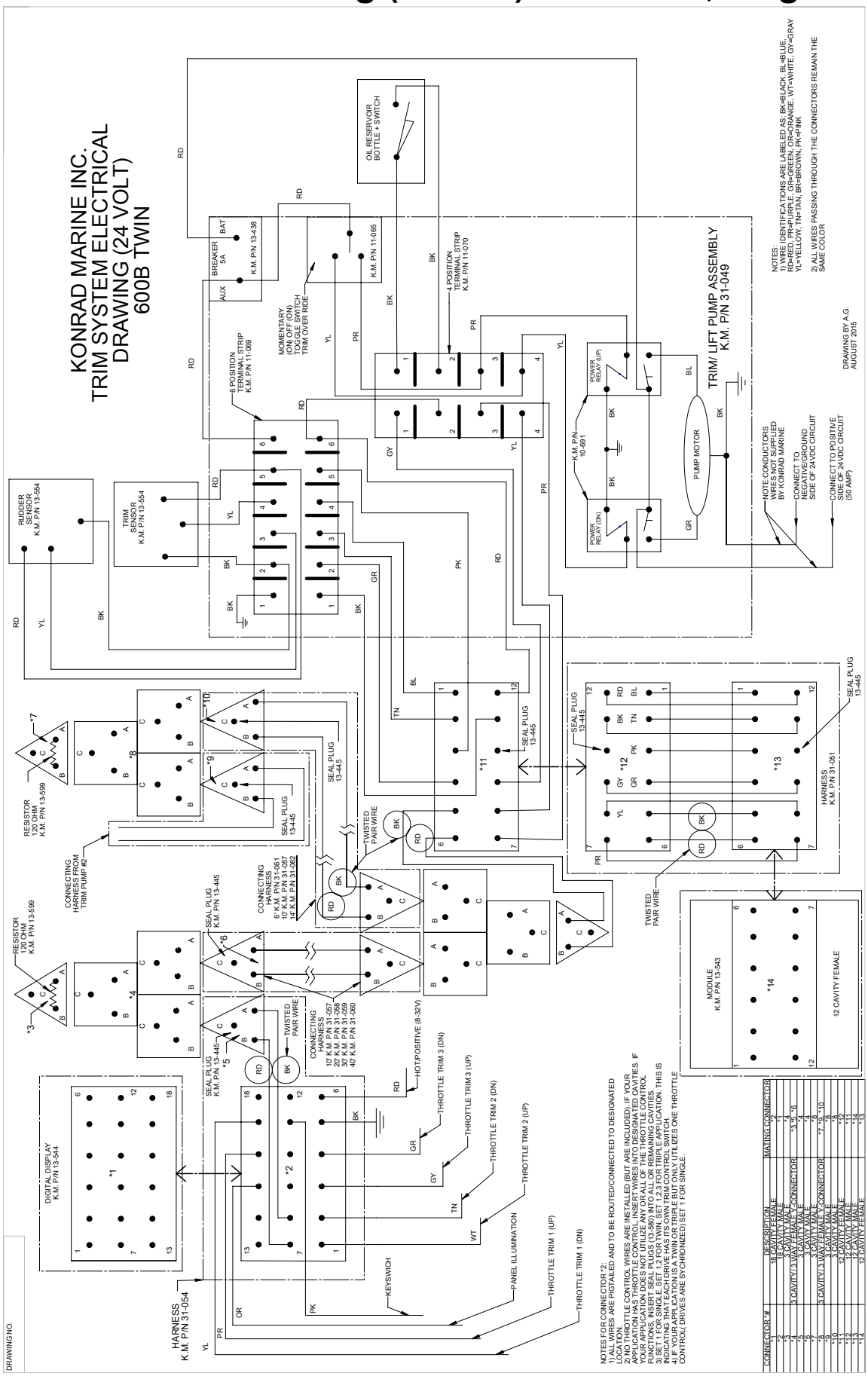
Trim / Lift Electrical Drawing (24 Volt) single drive, single helm



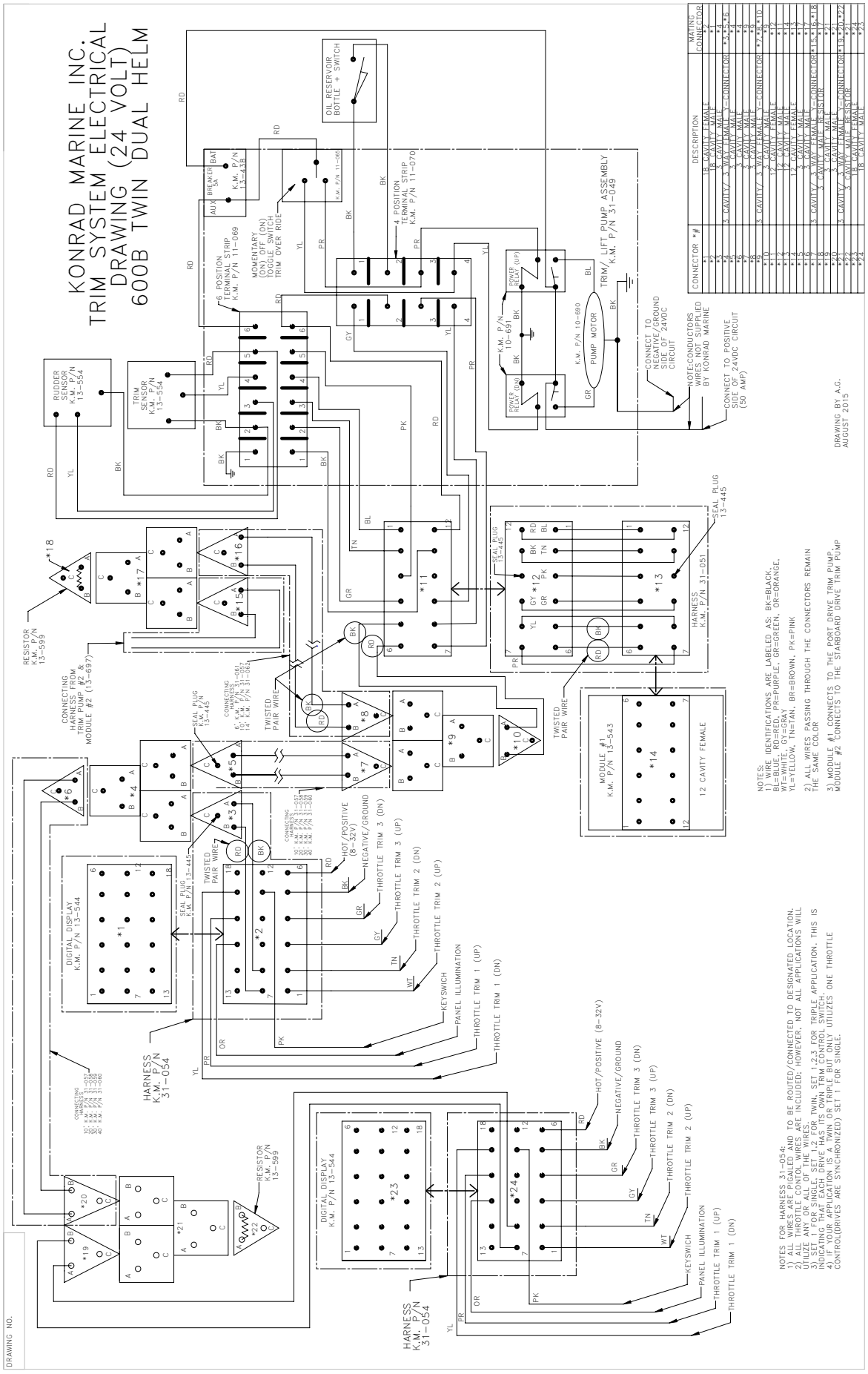
Trim / Lift Electrical Drawing (24 Volt) single drive, dual helm



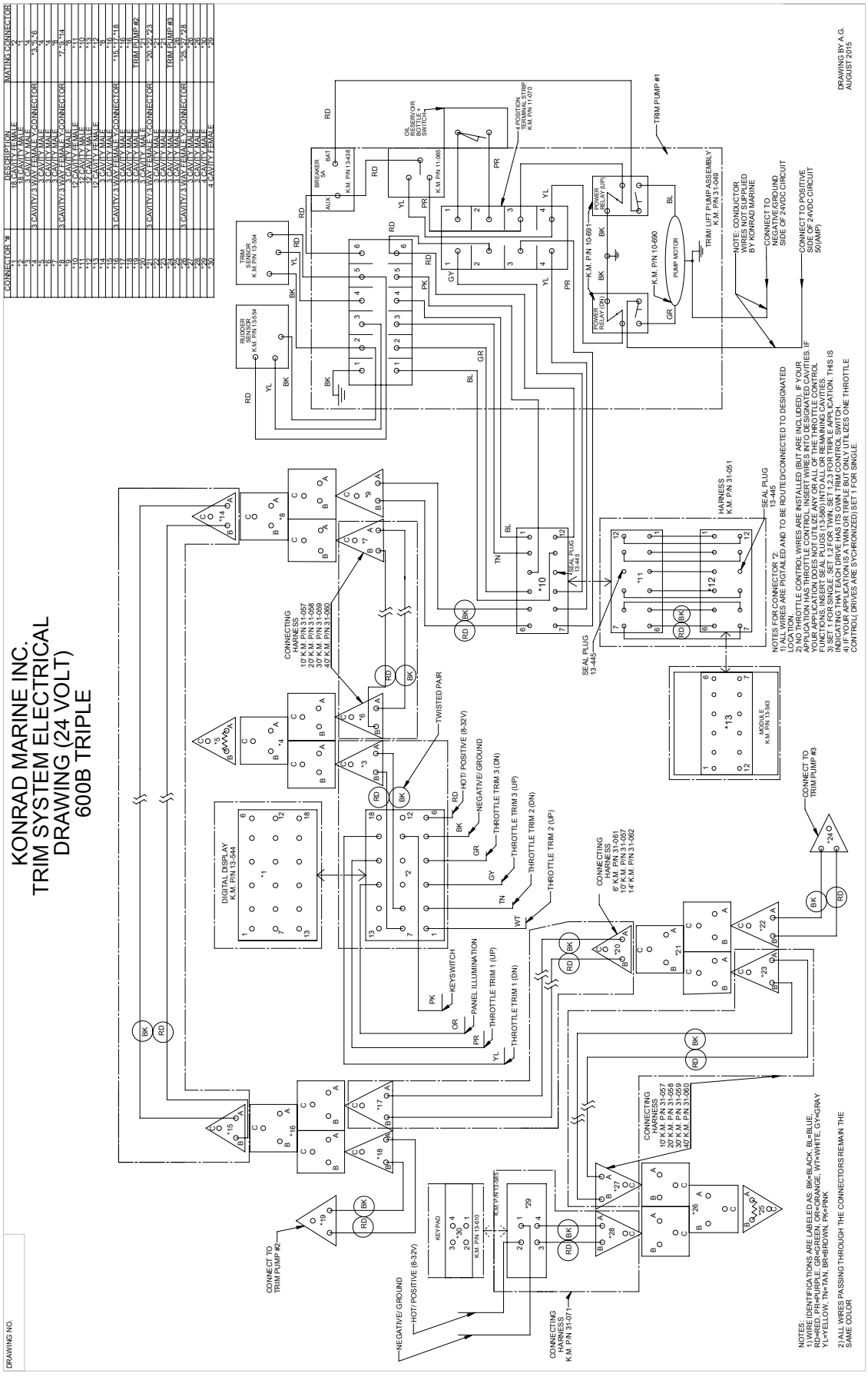
Trim / Lift Electrical Drawing (24 Volt) twin drive, single helm



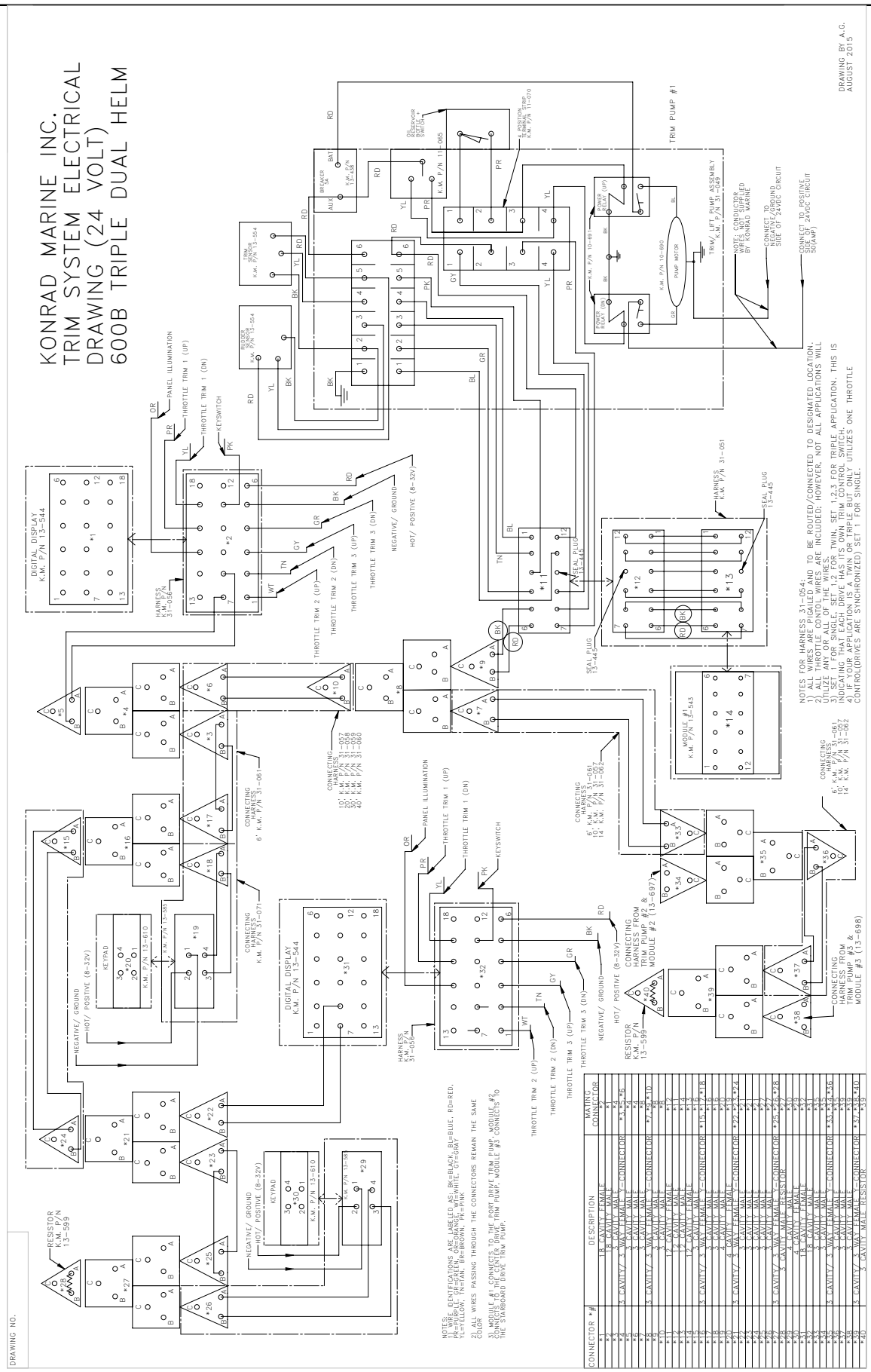
Trim / Lift Electrical Drawing (24 Volt) twin drive, dual helm



Trim / Lift Electrical Drawing (24 Volt) triple drive, single helm



Trim / Lift Electrical Drawing (24 Volt) triple drive, dual helm



CONNECTOR #	DESCRIPTION	MATING CONNECTOR
#1	18 CAVITY FEMALE	
#2	18 CAVITY FEMALE	
#3	3 CAVITY MALE	
#4	3 CAVITY MALE	
#5	3 CAVITY MALE	
#6	3 CAVITY MALE	
#7	3 CAVITY MALE	
#8	3 CAVITY MALE	
#9	3 CAVITY MALE	
#10	3 CAVITY MALE	
#11	12 CAVITY MALE	
#12	12 CAVITY MALE	
#13	12 CAVITY MALE	
#14	12 CAVITY MALE	
#15	3 CAVITY MALE	
#16	3 CAVITY MALE	
#17	3 CAVITY MALE	
#18	3 CAVITY MALE	
#19	4 CAVITY MALE	
#20	4 CAVITY MALE	
#21	4 WAY FEMALE	
#22	3 CAVITY MALE	
#23	3 CAVITY MALE	
#24	3 CAVITY MALE	
#25	3 CAVITY MALE	
#26	3 CAVITY MALE	
#27	3 CAVITY MALE	
#28	3 CAVITY MALE	
#29	4 CAVITY MALE	
#30	4 CAVITY MALE	
#31	18 CAVITY MALE	
#32	18 CAVITY MALE	
#33	3 CAVITY MALE	
#34	3 CAVITY MALE	
#35	3 CAVITY MALE	
#36	3 CAVITY MALE	
#37	3 CAVITY MALE	
#38	3 CAVITY MALE	
#39	3 CAVITY MALE	
#40	3 CAVITY MALE	

Setting the Trim/lift Range and Rudder Indicator

NOTE: If your vessel is a twin or triple application that uses an external tie bar, you must disconnect the tie bar from the drives before proceeding.

1. Turn power on to the trim gauge and trim system The Main Menu will appear once power is supplied. Use the center arrow button to navigate down to the enter number of drives option, then press the button below the word “ENTER” on the screen to select..

NOTE: To enter the main menu screen from the home screen, press the up arrow on the center directional button.

NOTE: If you are asked to enter a password, the default password code is 1111.

2. Use the arrow key to scroll to the number of drives your vessel has. Once the correct number is shown on the screen, press the key below the word “ENTER”.

3. Press the key below the word “HOME” to go back to the main menu. Scroll down using the center directional key and select the calibrate system option.

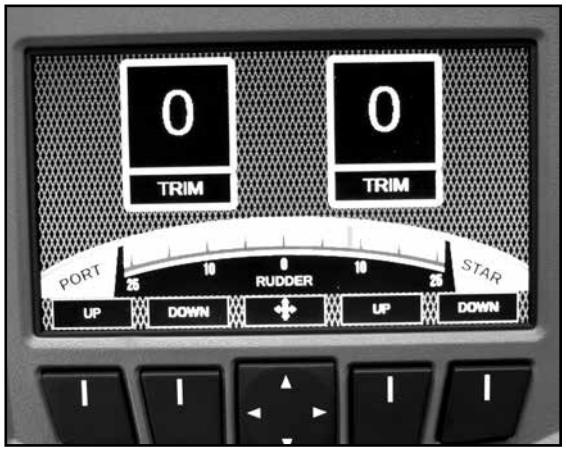
4. Follow the on screen instructions to set the drive parameters. The first step is to set the zero trim position, (this is when the cavitation plate is level)

5. Trim the drive to the zero position, and press the key below the word enter on the trim control gauge. Once complete then the maximum, minimum trim, and rudder indicator will be set. Follow the on screen instructions to accomplish this.

Setting the Trim/lift Range and Rudder Indicator

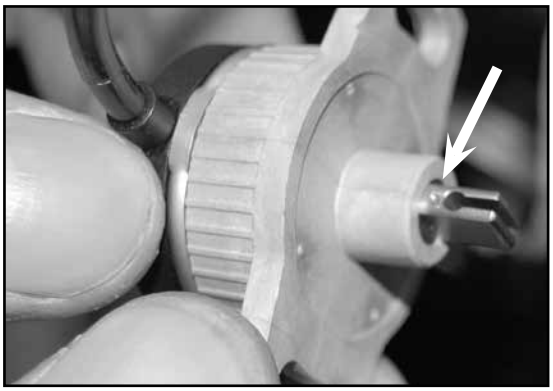
Note: *Applications that have multiple drives will require each drive to be reconfigured, even if only one sensor is replaced.*

Note: *In multiple drive applications, the trim system refers to the drives by number (1,2,3). Drive number 1 by default is the drive on the port side, then proceeds towards the starboard side.*



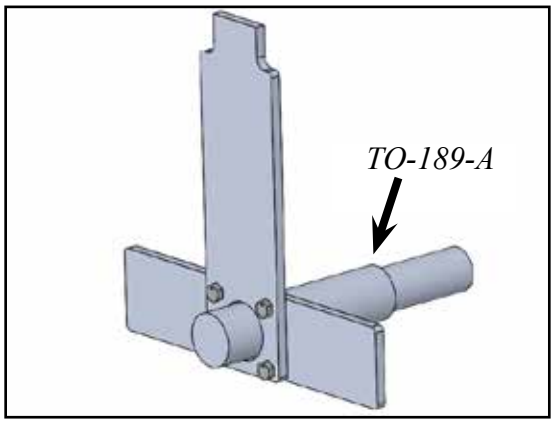
Note: *If the sensor reading jumps around, it maybe out of position. Check to ensure the sensor wires and indent on the shaft are aligned towards the front of the vessel.*

Note: *Complete sensor assembly has a part number of 31-053. (Includes sensor, wiring with connectors and transom fitting).*



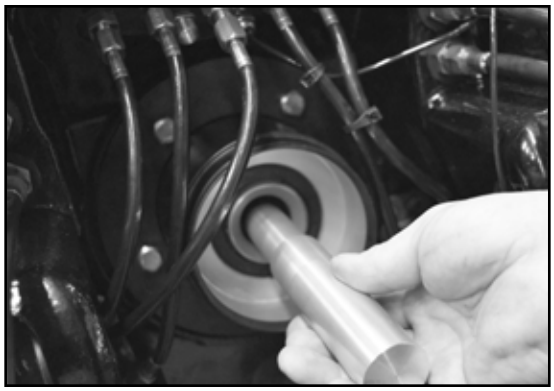
Direct Mount tailpiece/engine alignment

1. Tool TO-189 is used to align the engine, transmission and tailpiece with the gimbal housing.

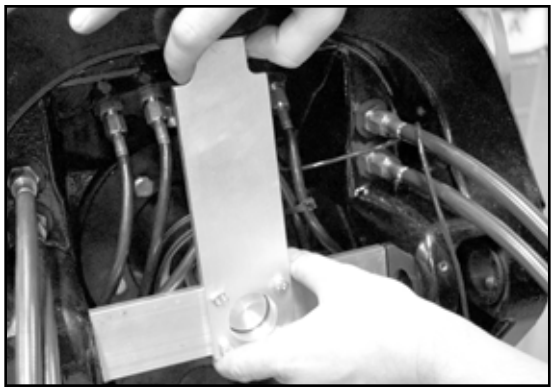


NOTE: The sterndrive will have to be removed to complete these steps. Please refer to the sterndrive removal section in this manual.

2. Slide the tailpiece alignment shaft (TO-189-A) all the way into the tailpiece output.

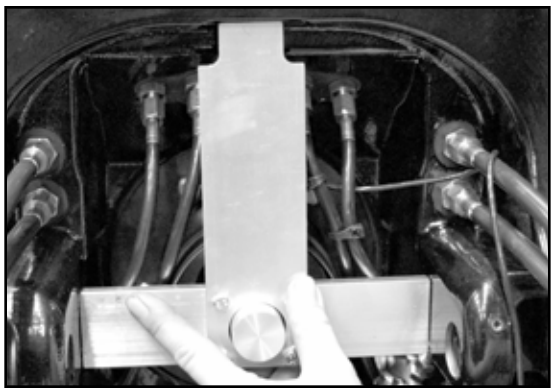


3. Hold the top portion of the alignment gauge against the flat surface on the top of the gimbal housing. Slide the gauge towards the back of the tailpiece until it is flush with the tailpiece.



Adjust the engine mounts until the gauge slides over the alignment shaft while sitting flush against the tailpiece housing, and the top of the gauge is up against the flat on the upper portion of the gimbal housing.

4. When the correct alignment is made, the alignment pin will be centered in the alignment gauge as shown in the picture to the right.



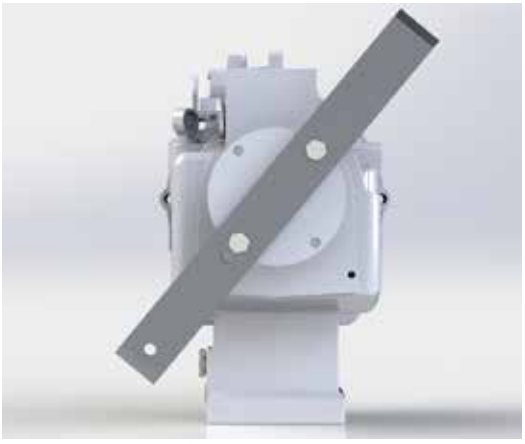
Remote Mount driveshaft alignment

1. We suggest using tool (TO-186) to bolt onto the flange faces of the transmission and the gimbal housing to make measuring the distances easier. .

   If aligning without Konrad tool (TO-186) then skip ahead to the NOTES and alignment specifications chart.

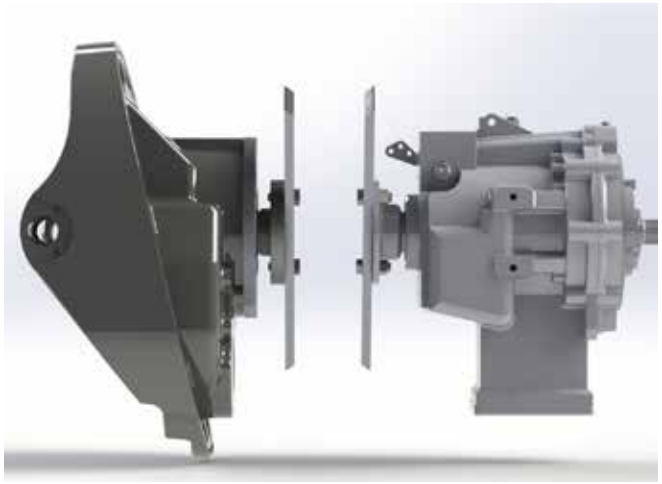
2. Place one of the alignment sticks onto the gimbal flange with the beveled edge facing away from the gimbal flange and fasten using two 13-625 H.H.C.S.

3. Take the remaining alignment stick and fasten it to the transmission output flange using two 13-716 bolts and two 11-247 nuts.



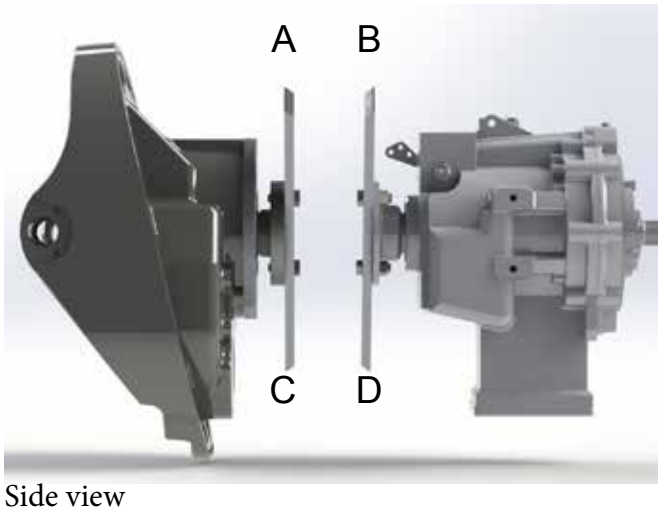
Remote Mount driveshaft alignment

4. Rotate both flanges until the alignment sticks are in a vertical position..



5. Measure the distance between points A-B, C-D, and A-D, C-B
   Adjust the engine mounts until the measured distance between points A-B and C-D are within .030 inches or .762mm. of each other.

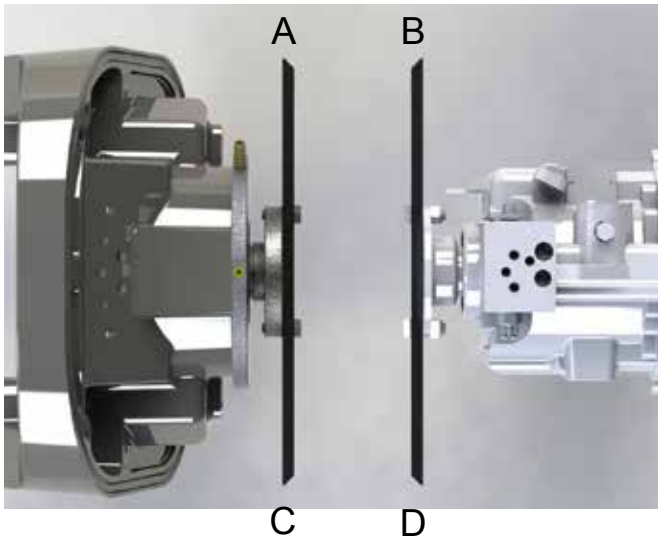
See alignment specifications chart in the following pages.



Side view

6. Rotate the flanges until the sticks are horizontal and remeasure points A-B, C-D, A-D, and C-B

Adjust the engine mounts until the measured distances between the points A-B and C-D is within .030 inches or .762 mm. of each other.



Top view looking down

Remote Mount driveshaft alignment

NOTE: *It is recommended to hold either the horizontal or vertical offset at zero and achieve the offset in one plane. In most cases it is easier to hold the horizontal measurement at zero*

7. Adjust the vertical or horizontal offset on measure points, A-D, and C-B.

   Adjust the engine mounts until the distances between the two points A-D and C-B is within .047 - .094 inches or 1.19 - 2.39 mm. of each other for a standard Konrad (13-430) 9 inch shaft.

If your application is using another shaft, refer to the notes and chart below.

NOTES:

1) Transmission output flange and gimbal carrier input flange must be parallel within .030 inches or .762 mm.

2) Transmission output flange and gimbal carrier input flange must have a compounded vertical and horizontal offset angle (a) which is $1.0^\circ > (a) > 0.5^\circ$ in a u-joint shaft application.

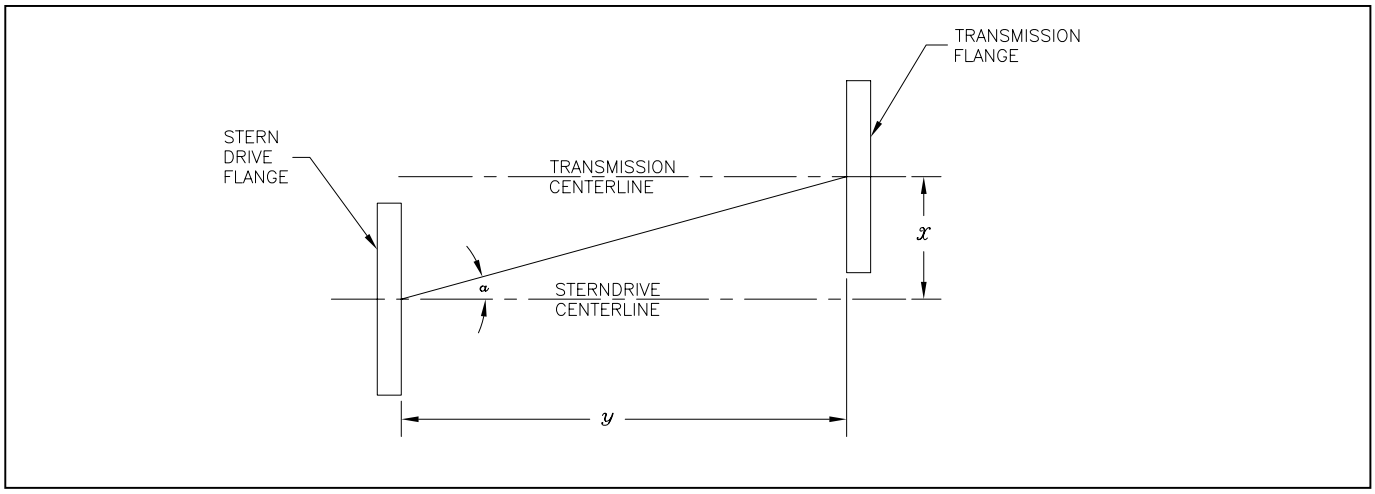
   CV shaft applications have a maximum of 2.0° compounded vertical and horizontal offset angle (a) which is $2.0^\circ > (a) > 1.0^\circ$.

This dimension is a function of the length of the shaft.

3) To determine vertical offset for a u-joint shaft, see picture below and use the following formula.

   (x): x = tan a (y - 3.0 in.) *or*
   (x): x = tan a (y - 7.62 cm)

4) To determine vertical offset for a CV shaft, use the following formula. (see picture below)
   (x): x = tan a (y - 5.04 in.) *or*
   (x): x = tan a (y - 12.8 cm)



Alignment Specifications Chart for Transmission to Stern Drive Coupling

Coupling Type	Part #	Length (Range)	Parallelism	Concentricity	Axial Slip Compensation	Coupling Orientation	Tools Suggested	Torque (Fasteners)	Thread Lock Compound	Transmission Type	Stern Drive Carrier Type
Constant Velocity (CV)	31-044	>12.7 - <55 in. 32.3 - 140 cm	Max 2°	Max Offset 2°	.0625 in. 1.59 mm	N/A	GO-017 or TO-186 or TO-187	85 ft. lbs. 115 Nm	Yes	Output Flange	30-999
U-Joint Carden	13-430	>9 - <60 in. 23 - 152 cm	< .030 in. < .762 mm	Compound Offset between .5°< x <1°	1 in. 25.4 mm	Yoke Orientation	GO-017 or TO-186 or TO-187	89 ft. lbs. 121 Nm	Yes	Output Flange	30-999

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