HIGH OUTPUT PROPULSION SYSTEMS

500 Series Models

GENERAL INSTALLATION MANUAL

KONRAD, INC.

1421 HANLEY ROAD • HUDSON, WI 54016-9376 USA

Phone: 715-386-4203 • Toll Free: 1-800-927-3545 • Fax: 715-386-4219

www.konradmarine.com

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Version 3

Part # 11-660

*Written/Narrated by Randall J. Sofie, January 2007
*Modified by Randall J. Sofie, January 2010

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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 500 Series (standard configuration) **

Complete Sterndrive, 520 model - **approximately** eighteen (7) quarts (6.6 liters).
Complete Sterndrive, 540 model - **approximately** sixteen (6.5) quarts (6.1 liters).
Complete Sterndrive, 560 model - **approximately** eighteen (6.5) quarts (6.1 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 line from reservoir is purged of air prior to operating.

KVD Transmisson

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

Approved Alternative - Shell Spirax S4 CX 30

Fluid capacity
Fluid capacity will vary depending on the location and type of cooler used. Refer to the Velvet Drive owners manual for instructions on 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.

TABLE OF CONTENTS

520 Stern Drive Description 1
540 Stern Drive Description 2
560 Stern Drive Description 3
Stern Drive General Information 4
General Operation 4
Safety Notices 4
Tools Recommended For Installation 5-6
Torque Specifications For Selected Fasteners 7
Installation Guidelines 8
Figure A: 500 Series Cutout Template 9
Figure B: 500 Series X-Dimension Guidelines 10

KONRAD 500 SERIES DRIVE INSTALLATION

Step 1: Transom Cutout 11-12
Step 2: Transom Assembly Installation 13-14
Step 3: Oil Reservoir Installation 15-17
Step 4: Trim/Lift Pump Installation 18-21
Figure C: Trim System Electrical Drawing 12 Volt 22
Figure D: Trim System Electrical Drawing 24 Volt 23
Step 5: Stern Drive Installation 24-27
Figure E: Alignment Specifications Chart 28
Step 6: Alignment Procedures 29-32
Step 7: Trim Cylinder Installation 33-34
Figure F: Trim Assembly Diagram 35
Figure G: Trim Assembly Individual Components 36
Step 8(a): 520 / 540 Propeller Installation 37
Step 8(b): 560 Propeller Installation 38
Step 9: Stern Drive Lubrication 39-41
Step 10: Trim/Lift Control Module Installation 42-45
Step 11: Trim/Lift Pump Filling/Bleeding Procedure 46-47
Step 12: Setting Trim/Lift Limit & Sender Switch 48-49
Step 13: Manual Hydraulic Steering System Installation 50-53
Figure H: Routing Diagram 30-462R 54
Step 14: Power Steering System Installation 55-59
Figure I: Routing Diagram 30-390R 60
Figure J: Hoses for Assembly KM #30-390 61
Figure K: 30-264 Parts List 62
Figure L: 30-274 Parts List 63

TABLE OF CONTENTS *(Continued)*

Step 15: Rubber Coupling Extension Shaft(s).....64-67
Step 16: U-Joint Extension Shaft Installation.....68-69
Step 17: CV Extension Shaft Installation 70-71
Step 18: Drive Shaft Shroud Installation 72
Figure M: Rear Mount/Tailpiece Cutout Template.....73
Step 19: Rear Mount / Tailpiece Installation 74-76
Step 20:Installation Review.....77-78
Application Trial Data Forms 79-81

520 Stern Drive Description

The Konrad 520 stern drive is the hardest working stern drive in the marine industry today. Designed for high-use, endurance-type applications, the Konrad 520 is recognized for its versatility and long-term durability. It is not a “pleasure” drive. It’s a working drive that can take you fishing all day or patrol harbors 24/7. The Konrad 520 is the only commercial-rated stern drive available for diesel applications in the 180-440 hp (134 - 328 kw) range.

The Konrad 520 stern drive is designed to accommodate aluminum or stainless steel propellers with three (3) to five (5) blades. Propellers are chosen depending on the application and performance criteria. The maximum diameter propeller size for the Konrad 520 stern drive is 20 in. (50.8 cm).

520 Classifications

Recreational Performance

Maximum Recommendation:

1000 Nm (738 lb. ft.) of torque for diesel or gas applications. Maximum operation: 250 hours per year for planing type hulls of highly intermittent operation. Gross weight to horsepower less than 15.2 kg/kw (25 lbs./hp). This classification includes private, non-commercial, non-charter, sport/leisure activity craft. Long range pleasure cruisers, sport fishing charters and commercial service craft are NOT in this service classification. Standard warranty.

Commercial/Military Performance

Maximum recommendation:

755 Nm (557 lb. ft.) of torque for semi displacement and planing hulls of intermittent operation. Maximum operation: 1000 hours per year and gross weight to horsepower less than 21.3 kg/kw (35 lbs./hp). This classification includes light commercial charter/sport activity craft, patrol and crew boats. Standard warranty.

Medium Duty Performance

Maximum operation:

678 Nm (500 lb. ft.) of torque for semi-displacement and displacement mono-hulls of intermittent operation with some variations in engine rpm and power. This classification includes charter and commercial craft. Note: These applications must be approved by the factory. Standard warranty.

540 Stern Drive Description

The Konrad 540 is specifically designed for high speed applications, both diesel and gasoline. This versatile stern drive is manufactured in two variations: Standard and High Performance. The High Performance model includes a lower hydrodynamic nose cone, and both versions have a lightweight design to deliver superior hole-shot and on-plane performance. The Konrad 540 allows mariners to apply greater power levels, while still delivering performance and reliability.

The Konrad 540 stern drive is designed to accommodate aluminum or stainless steel propellers with three (3) to six (6) blades. Propellers are chosen depending on the application and performance criteria. The maximum diameter propeller size for the Konrad 540 stern drive is 16 in. (40.6 cm).

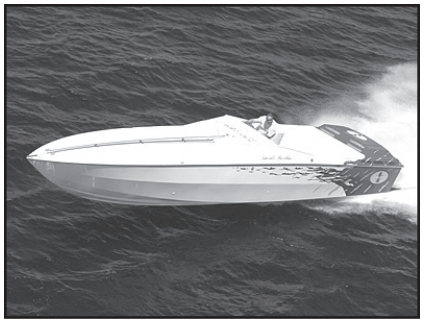
540 Classifications

Recreational Performance

Maximum recommendation:
1000 Nm (738 lb. ft.) of torque for diesel or gas applications. Maximum operation: 250 hours per year for planing type hulls of highly intermittent operation. Gross weight to horsepower less than 12.2 kg/kw (20 lbs./hp). This classification includes private, non-commercial, non-charter, sport/leisure activity craft. Long range pleasure cruisers, sport fishing charters and commercial service craft are NOT in this service classification. Standard warranty.

Commercial Performance

Maximum recommendation:
755 Nm (557 lb. ft.) of torque for diesel or gas applications. Maximum operation: 500 hours per year for planing type hulls of highly intermittent operation. Gross weight to horsepower less than 12.2 kg/kw (20 lbs./hp). This classification includes light commercial charter/sport activity craft, patrol and intercept boats. Standard warranty.



High Performance

Maximum operation:
100 hours/year for racing applications at highly intermittent operation. Gross weight to horsepower less than 12.2 kg/kw (20 lbs./hp). No warranty.

560 Stern Drive Description

The Konrad 560 Twin Prop System is engineered to reduce stress on the gears using dual propeller technology, providing a reliable, durable stern drive unit. With counter rotating propellers, the 560 reduces propeller roll, which increases efficiency and control.

The Konrad 560 stern drive features two, one piece propeller shafts that accommodate two stainless steel propellers. The specially designed propellers have one blade configuration: 3 blades on the forward prop and 4 blades on the rear prop. The propeller pitches are manipulated on each application to meet the performance criteria. The maximum diameter of the propellers in the Konrad 560 is 16 in. (40.6 cm) for the forward prop, and 15.25 in. (38.7 cm) for the rear prop.

560 Classifications

Recreational Performance

Maximum recommendation:
1000 Nm (738 lb. ft.) of torque for diesel or gas applications. Maximum operation: 250 hours per year for planing type hulls of highly intermittent operation. Gross weight to horsepower less than 12.2 kg/kw (20 lbs./hp). This classification includes private, non-commercial, non-charter, sport/leisure activity craft. Long range pleasure cruisers, sport fishing charters and commercial service craft are NOT in this service classification. Standard warranty.

Commercial Performance

Maximum recommendation:
755 Nm (557 lb. ft.) of torque for diesel or gas applications. Maximum operation: 500 hours per year for planing type hulls of highly intermittent operation. Gross weight to horsepower less than 12.2 kg/kw (20 lbs./hp). This classification includes light commercial charter/sport activity craft, patrol and intercept boats. Standard warranty.

Stern Drive General Information

The Konrad 500 Series stern drives are designed to accommodate engines that generate up to 738 lb. ft. (1000 Nm) of torque.

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 stern drive is being serviced or transported.

The Konrad 500 Series stern drives are designed for applications where the vessel transom angle is 14 degrees (14°). Applications that do not meet this criteria may require extra equipment or modifications, or may not be possible at all. The Konrad 520 stern drive is designed to accommodate propellers (aluminum and stainless steel) with a maximum diameter of 20 in (50.8 cm). The Konrad 540 and 560 can accommodate propellers (aluminum and stainless steel) with a maximum diameter of 16 in. (40.6 cm).

General Operation

The engine produces power (clockwise or counterclockwise) 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 (different shafts are discussed in detail in Step 6 on pages 29 - 32 in this manual). The power is then transmitted through a series of shafts and gears and then to the propeller(s).

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 and 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 eyewear 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 stern drive components. Make sure all lifting devices such as chains, hooks or slings are in good condition and are of the correct lifting capacity.

Tools Recommended for Installation

Konrad has an installation tool kit available for purchase.
The following is a complete list of all items included in the kit.

Installation Tool Kit
30 – 190
NOTE: Additional tools may be required.

Tool box
3/8 in. Drill
13/64 in. Drill Bit (pilot for lag screws)
Jig Saw
Jig Saw Blades (2)
3/8 in. Drive Ratchet (quick release)
3/8 in. Drive 3 in. Extension
3/8 in. Drive 6 in. Wobble Extension
3/8 in. Drive to 1/4 in. Drive Reducer
1/4 in. Drive 1/4 in. Socket
3/8 in. Drive to 5/16 in. Socket
3/8 in. Drive 7/16 in. Socket
3/8 in. Drive 1/2 in. Deep Socket
3/8 in. Drive 1/2 in. Socket
3/8 in. Drive 9/16 in. Socket
3/8 in. Drive 5/8 in. Deep Socket
3/8 in. Drive 3/4 in. Socket
3/8 in. Drive 3/4 in. Deep Socket
3/8 in. Drive 5/16 in. Allen Head Socket
5/16 in. Combination Wrench
3/8 in. Combination Wrench
7/16 in. Combination Wrench
1/2 in. Combination Wrench
9/16 in. Combination Wrench
5/8 in. Combination Wrench
11/16 in. Combination Wrench
3/4 in. Combination Wrench
1-7/16 in. Combination Wrench
8 in. Adjustable Wrench
4 in. Flat Blade Screwdriver
6 in. Flat Blade Screwdriver
4 in. #2 Phillips Screwdriver
6 in. #3 Phillips Screwdriver
6 in. #2 Phillips Bit
6 in. #3 Phillips Bit
7 in. Vice Grips
6 in. Slip Joint Pliers
12 in. Flat Blade Pry Bar
15 in. Pry Bar
Diagonal Side Cutter
1-1/4 in. Putty Knife
Center Punch/Scratch
100 Grit Sandpaper (5) pcs.
Black Permanent Marker
2 lb. Hammer
Breathing Mask
Rasp File (Flat/Half Round)
Assortment of Cable Clamps (15)
Screws for Cable Clamps (15)
Pilot Drill 4/Cable Clamp Screws 3/32 in.
8 in. Cable Ties (15)
Horseshoe Magnet

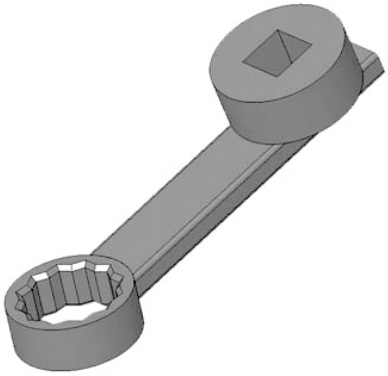
Tools Recommended for Installation *(continued)*

Tools for 30-264 and 30-272
Rubber Coupling Drive Shaft (if applicable)

TO-066 Adapter, Torque Wrench 12 mm

TO-068 Adapter, Torque Wrench 24 mm.

TO-067 Adapter, Torque Wrench 22 mm.



GO-017, Dial Indicator with Magnetic Stand

Torque Specifications for Selected Fasteners

Listed below are the torque specifications for selected fasteners. Additional torque specifications are listed throughout this 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 (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)	Tighten until approx. two (2) threads show. Do not over tighten.
Lifting Bracket Top Cover (and Emergency Tiller Arm 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 Rear Propeller Nut (1)	60 ft.lb. (81 Nm)

Installation Guidelines

1) Ensure that the propeller height is performed according to guidelines detailed in diagrams 10-410 (Figures A and B on pages 9 and 10 in this manual). The height of the propeller is critical to a successful application. If the propeller centerline is too low, excessive drag can occur based on transom assembly location. Intermediate spacers are available for special concerns.

2) Ensure that the water flow to the propeller is clear and consistent without interruptions. Protrusions on the hull surface create a negative pressure area and induce turbulence. Turbulence can cause severe propeller inefficiency and excessive torsional vibration.

   Common problems are:

   - Water pickup
   - Sonar transducers
   - Retrofitted surfaces which are not properly faired or smoothed
   - Any hull shape which does not provide smooth transition
   - In heavy applications, the bow can produce turbulence if the attitude of the vessel is weighted forward.
   - Improper listing of the vessel due to weight distribution

3) Ensure that the vessel center of gravity is properly placed. Excessive weight forward or aft can significantly affect performance and the efficiency of the propeller.

4) Ensure that the stern drive is trimmed to the correct level. While undertrimming can cause premature u-joint wear, overtrimming can cause propeller inefficiency, porpoising, and premature gear wear.

FIGURE A: 500 Series CUTOUT TEMPLATE

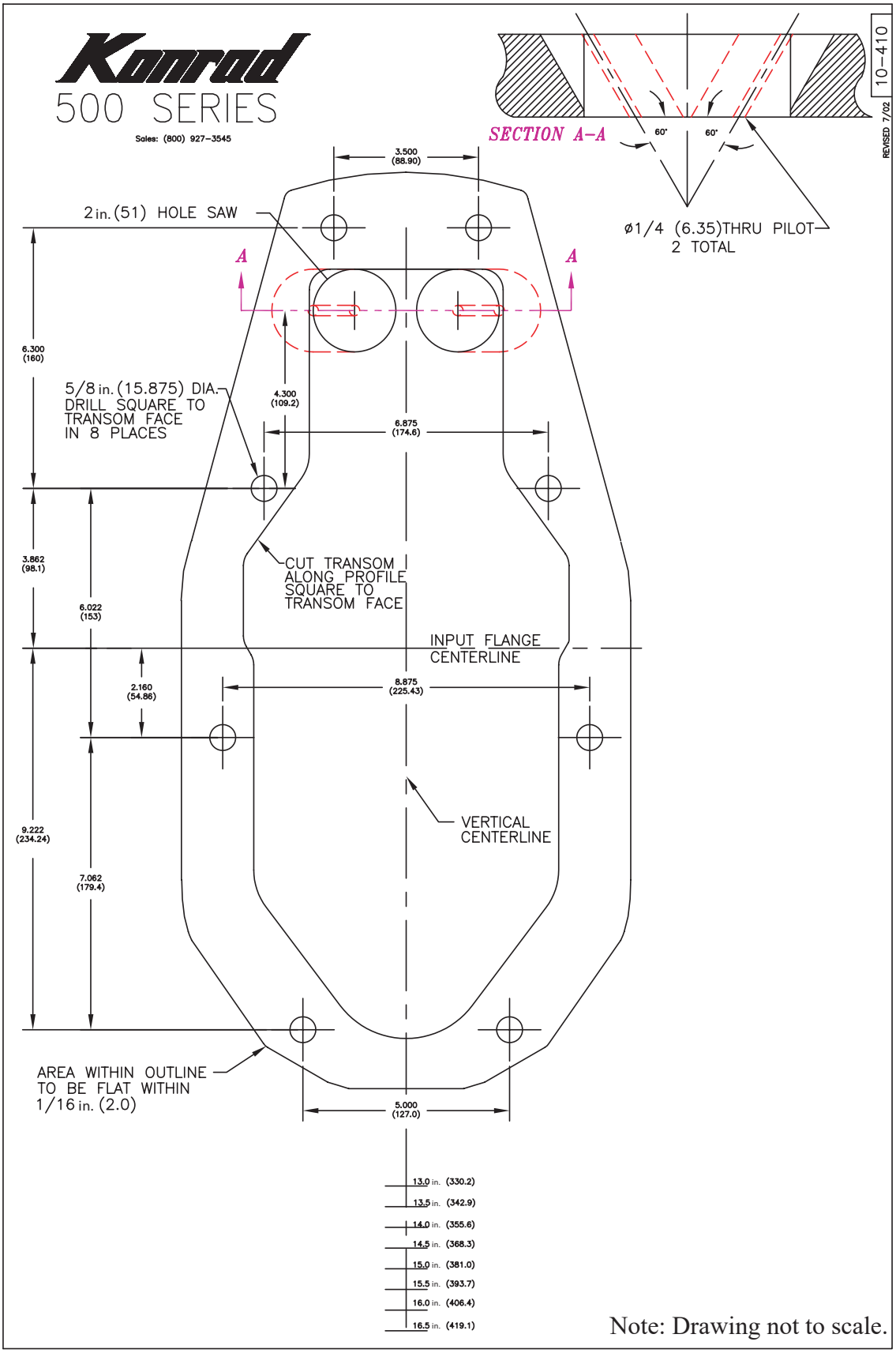


FIGURE B: 500 Series X-DIMENSION GUIDELINES

Konrad

500 SERIES

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10-410

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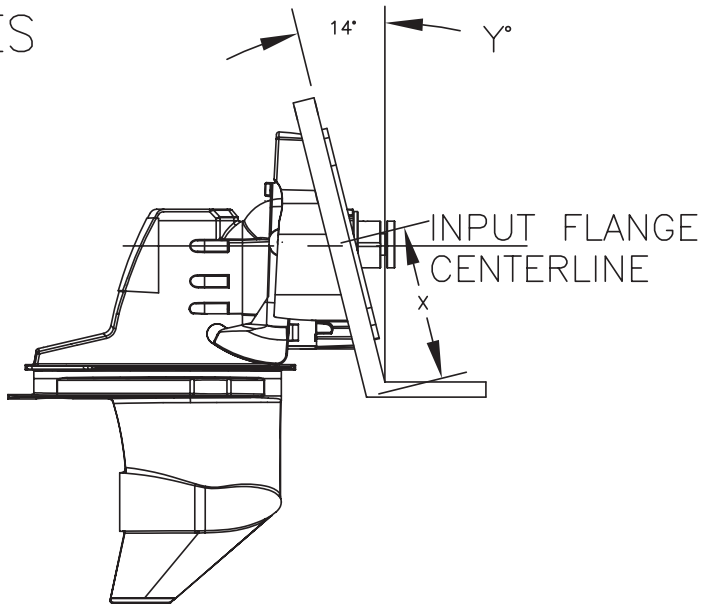
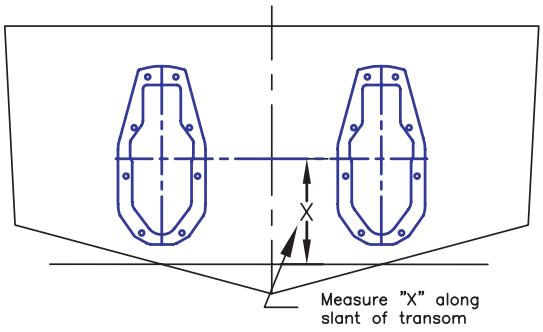


520 "X" DIMENSION

1. Typical transom distance is 15.5" (393.7mm) @ 14°
2. Measure the transom angle Y° as displayed in the above drawing.
3. Fold the bottom of this sheet along the line listing the correct distance.
4. Cut the sheet using the fold as a guide.
5. Tape this sheet to the aft side of the transom with the bottom cut edge of this sheet aligned to the bottom of the transom.

540/560 "X" DIMENSION

1. Typical transom distance is 14.5" (368.3mm) @ 14°
2. Measure the transom angle Y° as displayed in the above drawing.
3. Fold the bottom of this sheet along the line listing the correct distance.
4. Cut the sheet using the fold as a guide.
5. Tape this sheet to the aft side of the transom with the bottom cut edge of this sheet aligned to the bottom of the transom



IMPORTANT:The following instructions will provide a stern drive unit mounting location that is suitable for most boats. Best mounting location for a particular boat, however, can be determined only by testing.

1. Below 25 m.p.h.(21.7knots): Subtract 1/2 inch (13mm) from "X" dimension shown.

2. Heavy duty applications: Subtract 1 in. (25mm) from "X" Dimension shown.

3. All other applications: Use "X" dimension shown.

IMPORTANT: Damage to Konrad products caused by too high of an installed height will not be covered by Konrad warranty.

Note: Drawings not to scale.

Step 1: Transom Cutout

1.1 Scribe an arc from points A and B to the bottom center of the transom exterior. Scribe an arc from points C and D to the top center of the transom exterior. Where the previous mentioned arcs intersect, scribe a vertical line approximately 28 in. (71 cm) long. This will represent the center line of the stern drive.

NOTE: *For twin application, measure (to the port and starboard) off the vessel vertical center line over to the engine crank shaft center line and scribe a vertical center line parallel to the vessel vertical center line. See the lower drawing of Figure B on page 10 in this manual for explanation.*

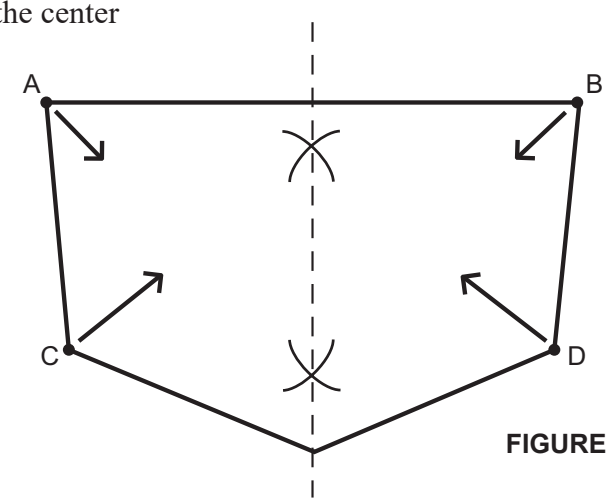


FIGURE 1A

1.2 After establishing the x-dimension (see Figure B on page 10 in this manual), scribe a horizontal line at least 18 in. (46 cm) long, perpendicular and centered on the existing vertical line (scribed in Step 1.1).

NOTE: *Specific characteristics of an installation may change the recommended vertical drive position. Please contact Konrad with any specific concerns.*

ATTENTION: *If you are installing the Konrad "Rear Mount / Tail Piece" assembly, please go to step 19 (page 73 - 74) in this manual.*

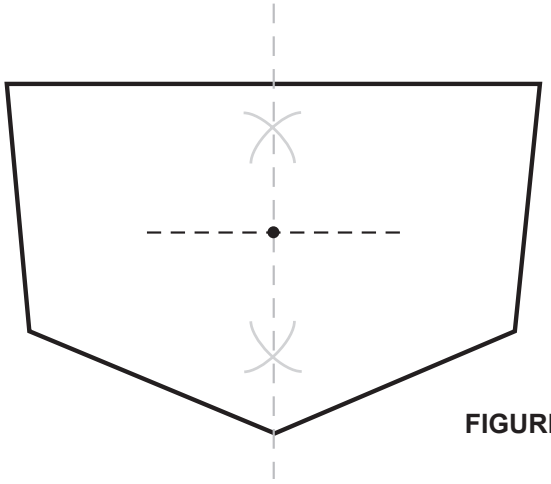


FIGURE 1B

Step 1: Transom Cutout *(continued)*

1.3 Place the cutout template (10-455) on the exterior of the transom and position it so the scribed horizontal and vertical match up with the scribed center lines on the template.

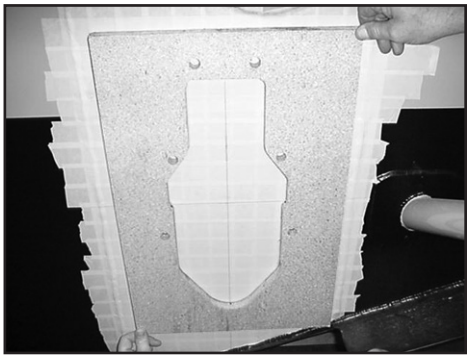


FIGURE 1A

1.4 Trace the cut out area and the eight (8) holes. Remove the template.

1.5 Center punch the eight (8) holes traced in Step 1.4. Drill the eight (8) holes through the transom using a 5/8 in. (16 mm) drill bit.

NOTE: *Holes must be drilled perpendicular to the transom face.*

FIGURE 1B

1.6 Using a reciprocating saw, cut out the area traced in Step 1.4. Use a file or rasp to touch up the cutout area.

NOTE: *Cut must be made perpendicular to transom face.*

NOTE: *For fiberglass transoms, it is recommended that fiberglass epoxy resin be applied to the cut areas. Verify that cutout area is correctly sized and shaped before applying epoxy. Allow proper drying/setup time for epoxy to cure.*

FIGURE 1C

Step 2: Transom Assembly Installation

2.1 Grease the transom assembly gasket with marine grade grease (see Figure 2A).

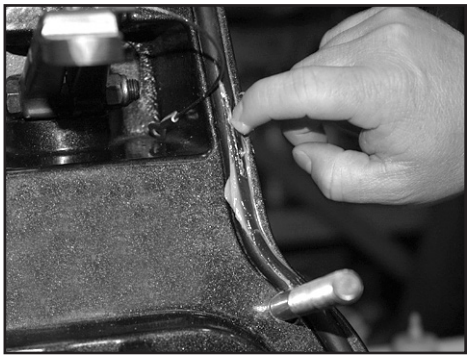


FIGURE 2A

NOTE: *If the gimbal carrier assembly is not mounted in the gimbal housing bore, it should be done at this time (see Figure 2B).*
NOTE: *The gimbal carrier flange may differ from the one pictured in Figure 2B per application.*

1) Lightly grease the carrier assembly and o-ring, then slide it into the gimbal housing bore.
2) Rotate the carrier assembly to achieve correct orientation. The brass nipple should be at approximately two o'clock.
3) Torque the three (3) fasteners to 70 lb. ft. (95 Nm).

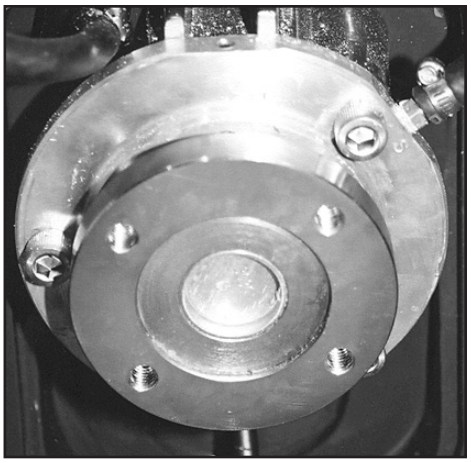


FIGURE 2B

NOTE: *The gimbal carrier flange may differ from the one pictured in Figure 2B per application.*

2.2 Guide the transom assembly studs through the eight (8) holes in the transom.

NOTE: *The weight of the transom assembly is 81 lbs. (36.7 kg). Use caution when lifting.*

NOTE: *Some installations/applications require an external adapter plate.*

NOTE: *Proper stud length varies due to hull thickness. Stud length is also dictated by peripheral equipment that mounts inside the hull (steering cylinder bracket, inner transom plate, drive shaft shroud, etc.). Verify correct stud length before continuing past this step.*

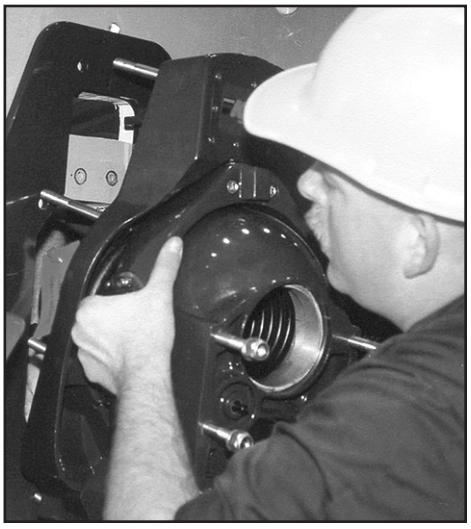


FIGURE 2C

Step 2: Transom Assembly Installation *(continued)*

2.3 Place the inner transom backing plate (10-357) over the eight (8) studs from the inside of the vessel.

NOTE: *If an internal steering cylinder is going to be used, the bracket can be mounted on the upper one (1) or two (2) sets of horizontal studs depending on the steering cylinder style used.*

NOTE: *The inner transom plate may require modification or elimination depending on steering cylinder assembly used.*

NOTE: *If an inner transom backing plate is not used, the round washers (10-415) must be replaced with rectangular washers (10-941).*

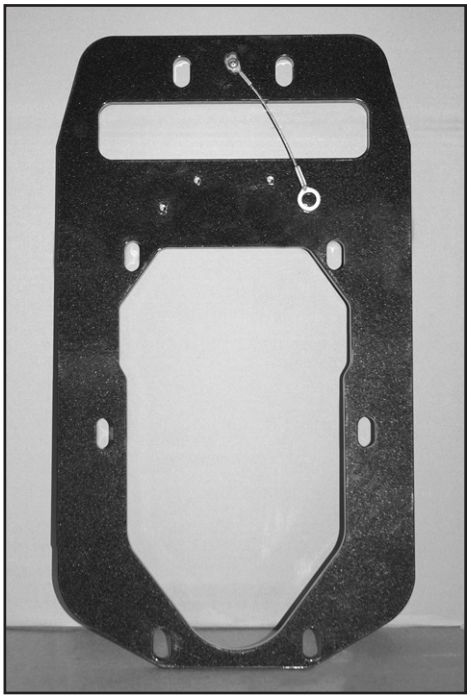


FIGURE 2D

2.4 Secure the transom assembly to the transom by using eight (8) nylock nuts (10-334) and eight (8) flat washers (10-415). Torque to 25-30 lb. ft. (34-41 Nm).

NOTE: *Place inner transom backing plate continuity cable between the washer and nylock nut of either of the top two transom assembly studs before tightening (if applicable).*

NOTE: *Connect the tiller arm continuity cable to the inner transom backing plate by using the small phillips head screw (if applicable).*

NOTE: *The two (2) oil lines in this photo will be ran and attached in a later step.*

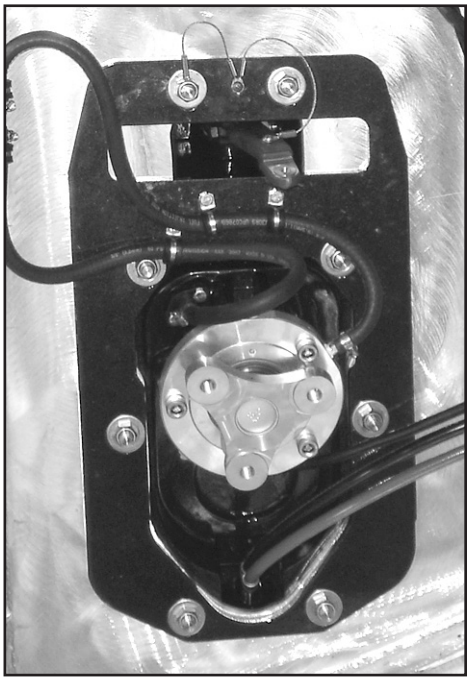


FIGURE 2E

Step 3: Oil Reservoir Installation

Provided the stern drive and gimbal carrier (if applicable) are purged, the oil level can be checked at the remote oil reservoir. The bottle should be visible upon opening the engine compartment cover. There are two (2) different styles of reservoirs, one (1) reservoir is used per drive. The one (1) pt. (.47 l) reservoir assembly (with a rectangular bottle) has a part number of 30-179. The part number of the bottle only is 10-431. The one (1) qt. (.95 l) reservoir assembly (with a cylindrical bottle) has a part number of 30-295. The part number of the bottle only is 30-941 (See Figure 3A). Manufacturer will have predetermined the correct reservoir.

FIGURE 3A

3.1 This is a gravity feed system. Position the oil reservoir bottle and bracket on the transom, keeping it as high as possible. The oil bottle must be above the line input to the stern drive and gimbal carrier (if applicable). When considering the position make sure that there is enough clearance to fill the bottle with oil. Keep in mind that the bottle may be removed from the bracket to be filled, however, it must be secured again after filling is complete (see Figure 3B).

NOTE: *Pay attention to the placement of the bottle bracket to ensure that they will clear the steering cylinder ram or other moving parts that will potentially be mounted in later steps.*

NOTE: *The connecting oil hoses must be fastened to the transom within 6 in. (15 cm) of the oil bottle and every 6 in. (15 cm) afterward (see Figure 3C). Oil hoses must not be kinked or looped such that it impedes gravity feed.*

FIGURE 3B

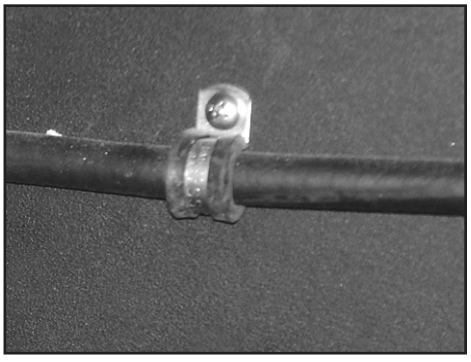


FIGURE 3C

3.2 For fiberglass hulls, mount the bottle bracket with two (2) lag screws. For aluminum hulls, attach bottle bracket to hull by welding or using a mounting plate (see Figure 3B).

Step 3: Oil Reservoir Installation *(continued)*

3.3 Connect the long hose (1/4 in. that feeds the brass "T" fitting) to the bottom of the reservoir bottle with a hose clamp.

NOTE: *Ensure the bottle is mounted 4 ft. (122 cm) or less from the carrier assembly and stern drive, and 4 ft. (122 cm) or less from the trim pump.*

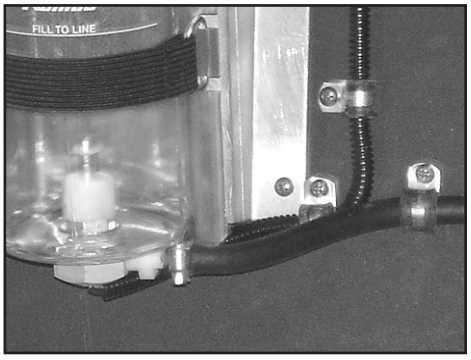


FIGURE 3D

3.4 Connect the 3/8 in. hose from the brass "T" to the gimbal carrier nipple. Secure hose clamp.

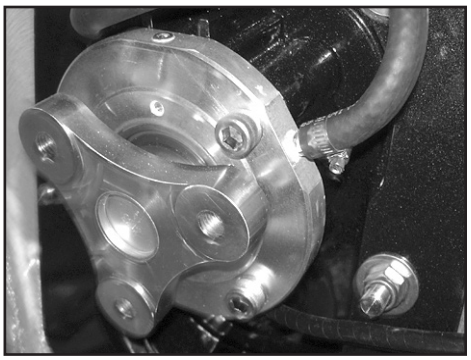


FIGURE 3E

3.5 Connect the 3/8 in. hose (attached to gimbal housing) to the brass "T" fitting.

NOTE: *Oil hose should be cut to length for easiest downward flow.*

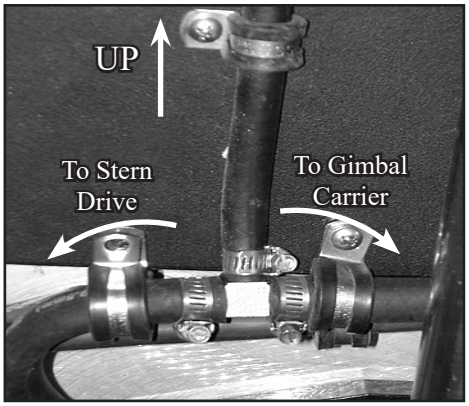


FIGURE 3F

Step 3: Oil Reservoir Installation *(continued)*

3.6 For tailpiece application, a gimbal carrier is not utilized. Connect oil bottle to long 1/4 in. hose. Connect 3/8 in. hose which is attached to the gimbal housing to brass reducer coupling, located on 1/4 in. hose.

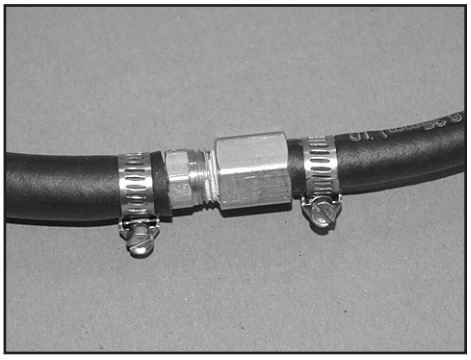


FIGURE 3G

3.7 Fill oil bottle to "fill" line with Konrad 75W90 synthetic gear lube.

NOTE: *In accordance with MSDS regulations and requirements, the stern drive is shipped full of the above mentioned lubricant. Prior to operation, verify that the entire system is completely purged of air and filled with lubricant.* ***If a different gear oil is chosen for your application, it is recommending that the stern drive is drained and refilled. This may void manufacturer's warranty.*** *Purge oil line to the stern drive by manually opening connecting valve located on the outside port face of bell housing (outboard side of transom). Open valve until solid oil flow occurs. Refill oil bottle at proper level indicated on bottle.*

FIGURE 3H

3.8 Purge the air out of the oil line feeding the stern drive by depressing the check valve nipple, located on the bell housing face, until a solid stream of oil comes out. Refill reservoir bottle to the appropriate level.

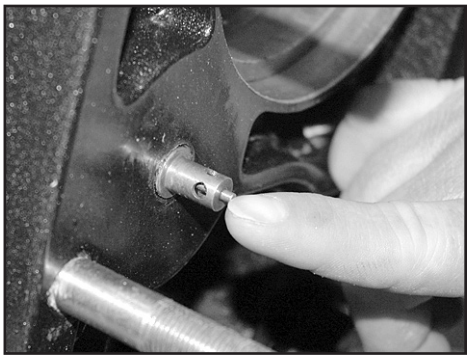


FIGURE 3I

Step 4: Trim/Lift Pump Installation

Wire style and gauge shall meet requirements of local, state and national codes.

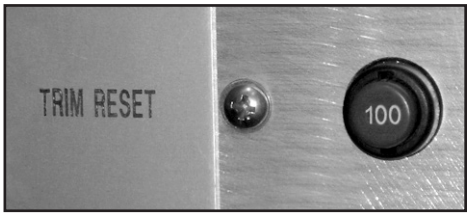


FIGURE 4A

4.1 Trim pump circuit requires inline fuse/breaker (on the positive lead) of the following values:

1) 12 Volt = 100 Amperes (see Figure 4A)
2) 24 Volt = 50 Amperes (see Figure 4B)

This item should be mounted in an accessible and logical position away from bilge fluid contact. It must also be labeled clearly.

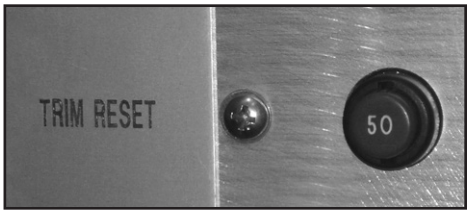


FIGURE 4B

NOTE: *Battery, or batteries, must be disconnected while all electrical connections are being made or serviced (see Figure 4C).*

NOTE: *Refer to the Trim System Electrical Drawings (Figure C and Figure D on pages 22 and 23 in this manual) for further documentation on this and proceeding instructions.*

FIGURE 4C

4.2 Mount trim pump in a location which is:

1) As elevated as possible and away from bilge fluid contact.
2) Is within reach of transom assembly wiring approximately 36 in. (91.4 cm).
3) Is within reach of oil bottle wiring approximately 48 in. (122 cm).
4) Is within reach of transom assembly hydraulic hoses, 32 in. or 48 in. (81.3 cm or 122 cm). Measure to determine length.

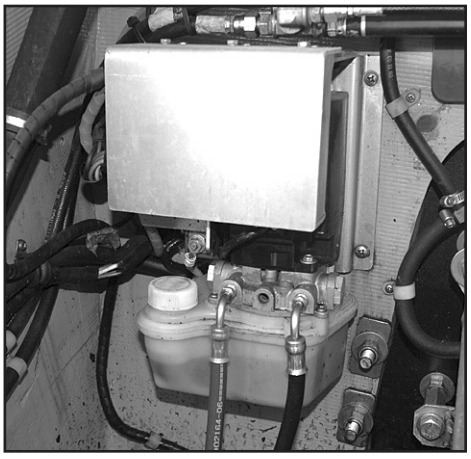


FIGURE 4D

NOTE: *For fiberglass hulls, it is recommended that a pilot hole be drilled prior to lag screw installation.*

NOTE: *For metal hulls, attach by either welding or using a mounting plate.*

NOTE: *The two (2) hydraulic hoses in this photo will be attached in later steps.*

Step 4: Trim/Lift Pump Installation *(continued)*

4.3 Remove the cover of the trim/lift pump assembly by removing the front three (3) bolts and lock washers.

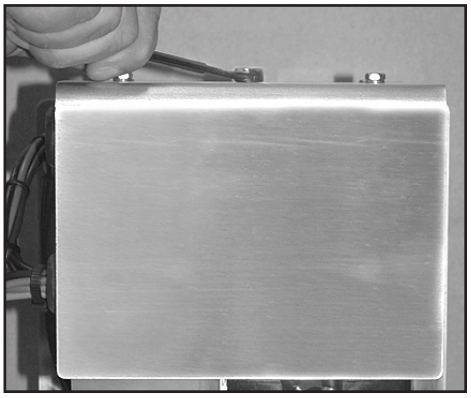


FIGURE 4E

4.4 Remove the three (3) rear bolts and lock washers and remove the top portion of the trim/lift pump assembly bracket.

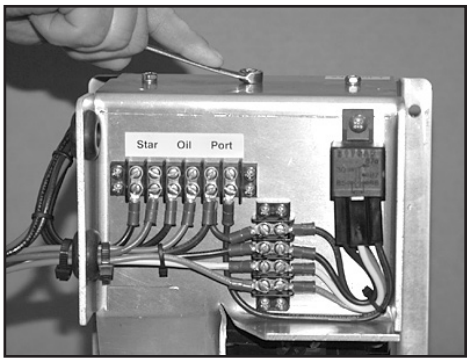


FIGURE 4F

4.5 Attach the positive trim/lift pump power feed (from the breaker/fuse unit) to one of the solenoid bolts on the link-bar side.

NOTE: *Coat terminal with corrosion protectant.*

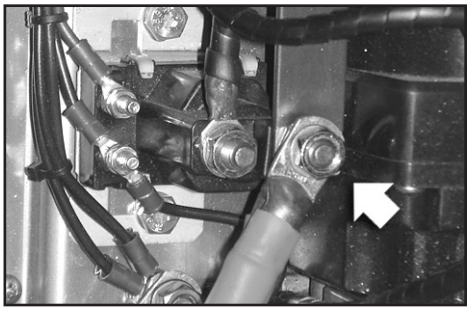


FIGURE 4G

4.6 Attach the negative trim/lift pump power feed to the ground bolt.

NOTE: *Coat terminal with corrosion protectant.*

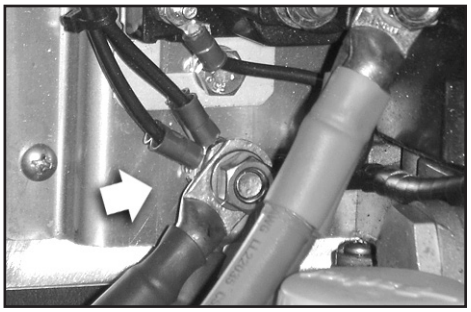


FIGURE 4H

Step 4: Trim/Lift Pump Installation *(continued)*

4.7 Reattach the top portion of the trim/lift pump assembly bracket.

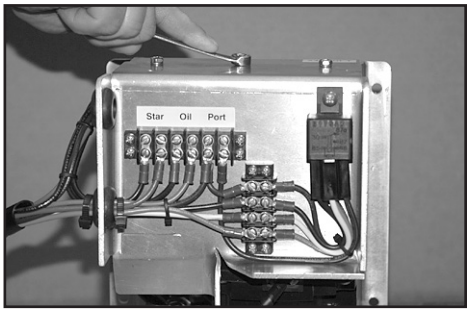


FIGURE 4I

4.8 Route the four (4) wires from the transom assembly to the trim/lift pump. Fasten to the transom or hull every 6 in. (15 cm).

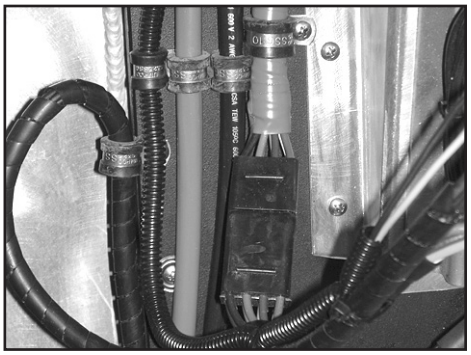


FIGURE 4J

4.9 Route the two (2) wires (color coded black and grey) from the oil reservoir to the trim/lift pump. Fasten to the transom or hull every 6 in. (15 cm). Attach the wires by running them through the upper hole of the trim/lift pump assembly bracket. Connect them to the two (2) terminals on the terminal strip labeled “Oil”.

NOTE: *Coat the terminals with corrosion protectant.*

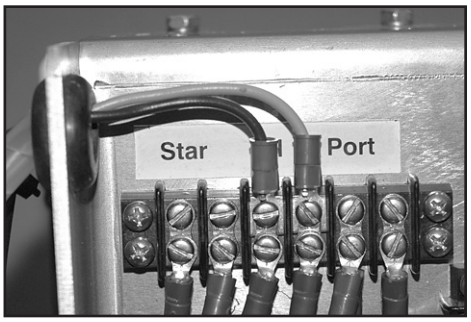


FIGURE 4K

4.10 Attach the wires by running them through the upper hole of the trim/lift pump assembly. Connect them to the appropriate terminals of the terminal strip.

NOTE: *The two (2) wires coming from the port side switch (color coded blue and purple) on the transom assembly go to the terminals labeled “Port”. The two (2) wires coming from the starboard side switch (color coded red and black) go to the terminals labeled “Star”.*

NOTE: *Coat the terminals with corrosion protectant.*

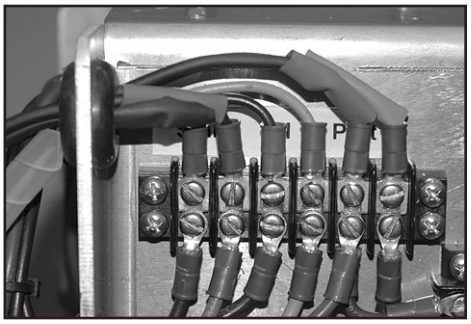


FIGURE 4L

Step 4: Trim/Lift Pump Installation *(continued)*

4.11 Reattach the trim/lift pump assembly cover plate.

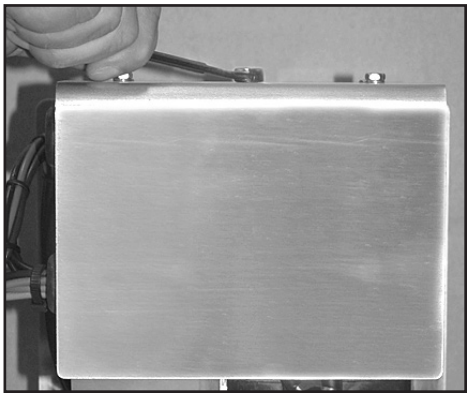


FIGURE 4M

4.12 Route the two (2) hydraulic hoses from the transom assembly to the trim/lift pump. Fasten to the transom or hull every 6 in. (15 cm). Connect the "up" line to the trim/lift pump. Hook the line up according to the "up" label on the line and on the port marked "up" on the trim/lift pump. Ensure not to cross thread. Tighten till snug.

NOTE: *The "down" line will be hooked up later during the bleeding process (Step 11 on page 46 in this manual).*

NOTE: *Be sure to avoid potential moving objects (such as the steering ram or drive shaft if applicable) when routing the trim/lift pump hydraulic lines.*

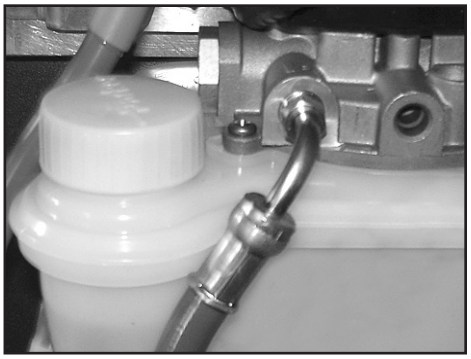


FIGURE 4N

4.13 Connect the appropriate length wire harness (predetermined) to the trim/lift pump pigtail. Run the harness across the transom (to the starboard side of the vessel) and up through the bilge compartment, or raceway, towards the helm control station. Use wire ties and cable fasteners as necessary. Run the harness up to the helm station and to the location of the trim/lift pump control plate, on the instrument/switch panel (which will be mounted at a later time, Step 10 on pages 42 - 45 in this manual).

NOTE: *Wire harness comes in 5 lengths: 3 ft./.91 m (30-183), 10 ft./3 m (30-182), 20 ft./6.1 m (30-181), 30 ft./9.1 m (30-227), 40 ft./12.2 m (30-228).*

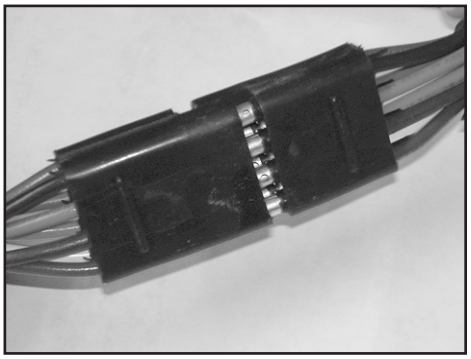


FIGURE 4O

FIGURE C: TRIM SYSTEM ELECTRICAL DRAWING (12 VOLT)

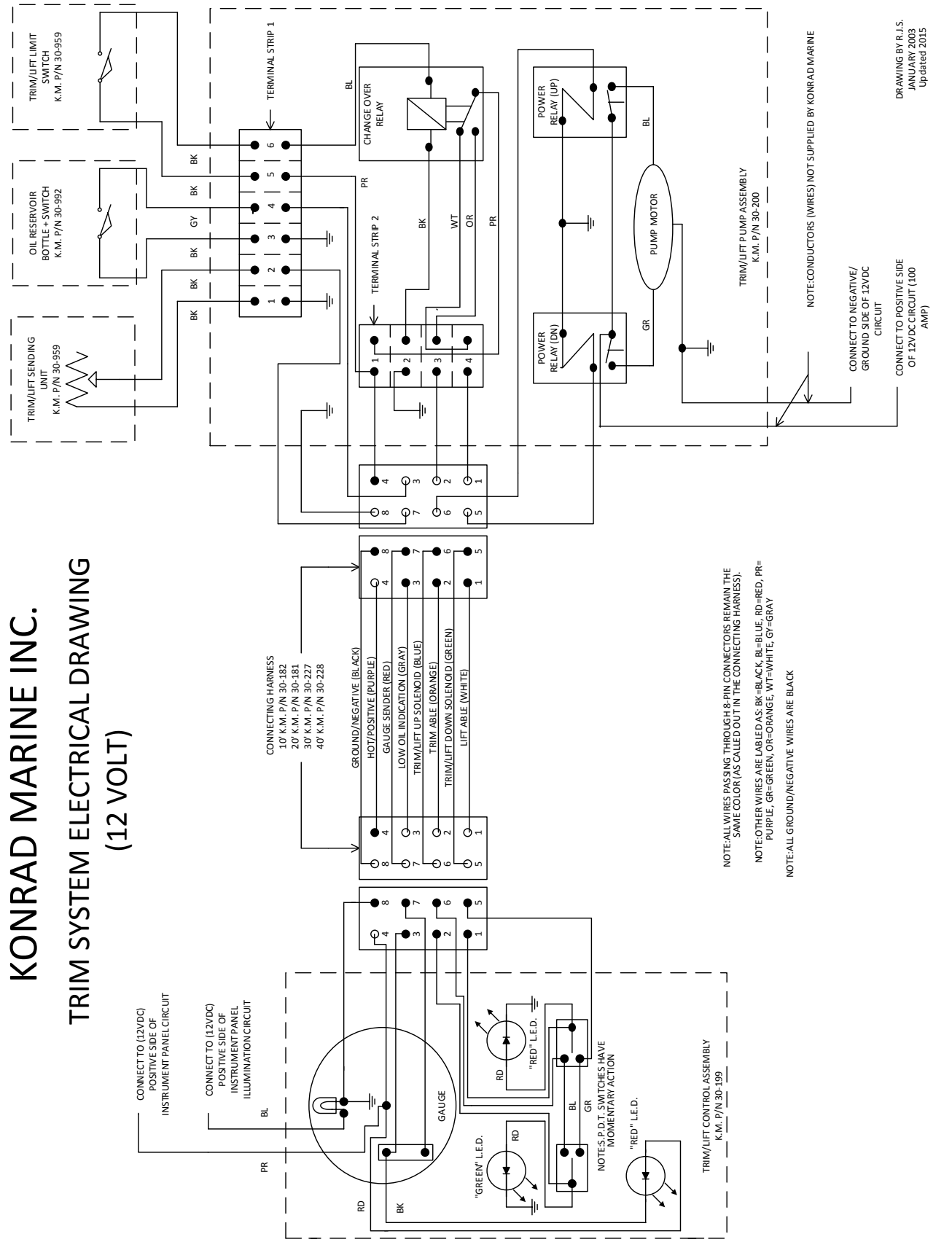
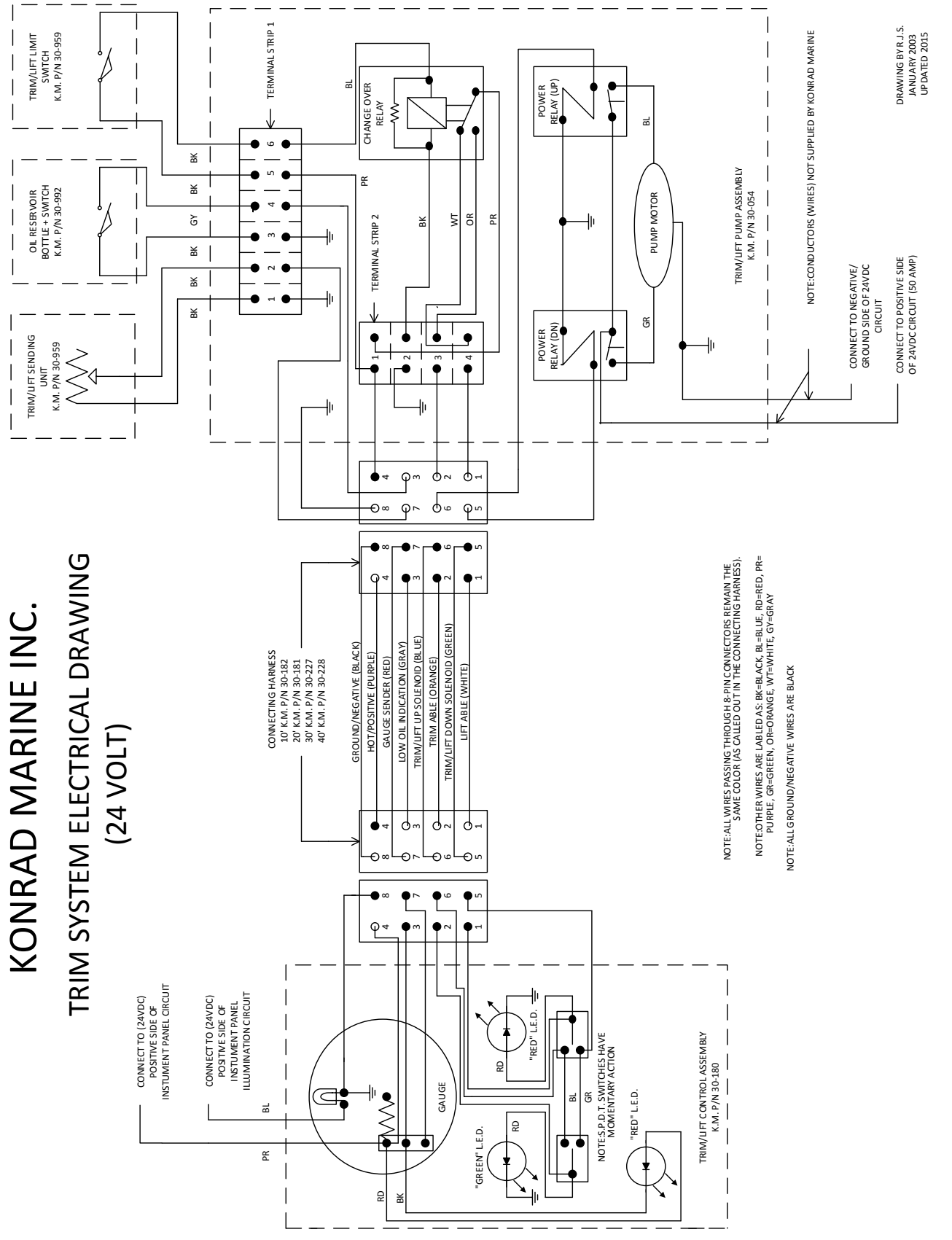


FIGURE D: TRIM SYSTEM ELECTRICAL DRAWING (24 VOLT)



Step 5: Stern Drive Installation

NOTE: *If this is a direct couple tailpiece application, do not install the stern drive at this time. Return to this step after completing Step 6A on page 29 in this manual.*

5.1 Rig the Konrad drive for lifting. Secure the stern drive to the lifting device with a nylon strap.

NOTE: *Optional lifting bracket (12-388) is available to assist in the lifting process (see Figure 5A).*

520 Stern Drive Weight is 188 lbs. (85.3 kg)
540 Stern Drive Weight is 153 lbs. (69.4 kg)
560 Stern Drive Weight is 167 lbs. (75.7 kg)

NOTE: *An overhead lifting device is the preferred method of lifting the Konrad drive. A lifting cart or forklift may be used as an alternate lifting device.*

FIGURE 5A

5.2 Remove the six (6) nuts (10-334) and six (6) washers (10-415) from the bell housing studs (10-250). (These nuts and washers are on the studs when shipped from Konrad).

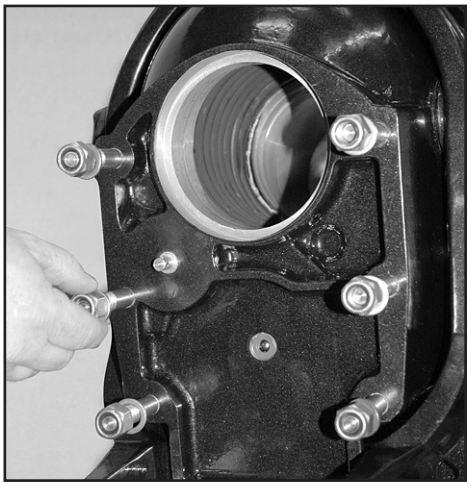


FIGURE 5B

Step 5: Stern Drive Installation *(continued)*

5.3 Using marine grade grease, grease both sides of the gasket (10-305) and slide it over the six (6) studs on the bell housing. Slide it forward until it makes full contact with the bell housing face.

NOTE: *Observe proper orientation of gasket.*

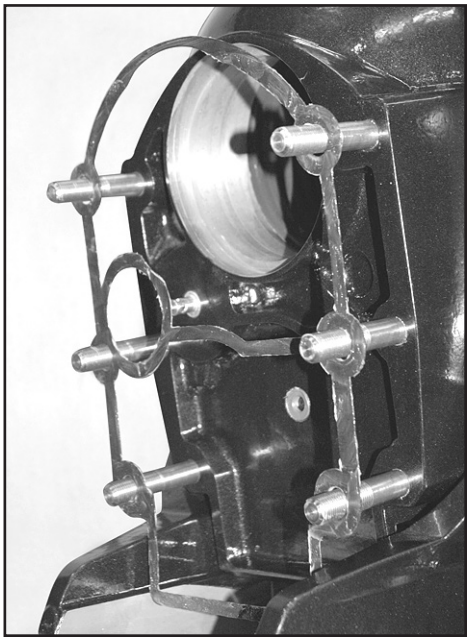


FIGURE 5C

5.4 Grease the o-rings (10-306) (see Figure 5D) and (10-493) (see Figure 5E).

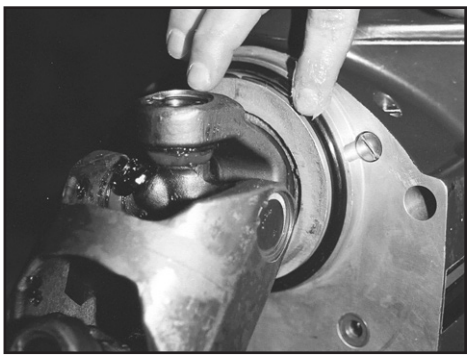


FIGURE 5D

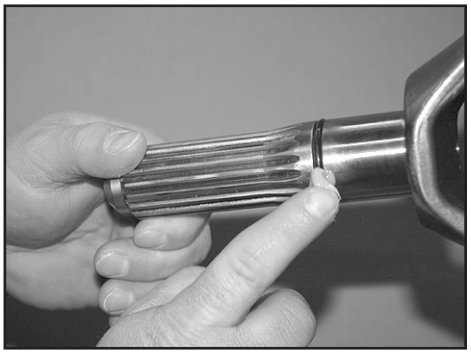


FIGURE 5E

Step 5: Stern Drive Installation *(continued)*

5.5 Grease the splined end yoke shaft (10-365).

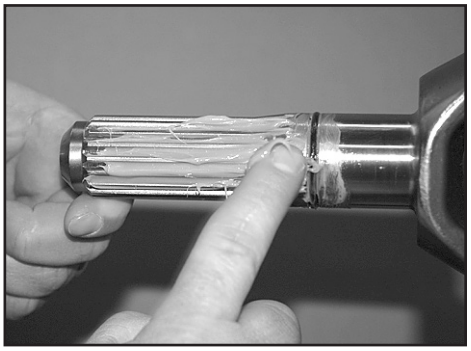


FIGURE 5F

5.6 Grease one end of the engagement pin (10-494) (see Figure 5G). Insert greased end into the end of the splined end yoke shaft (see Figure 5H). Three quarters (3/4) of the engagement pin should remain beyond the end of the splined end yoke shaft.

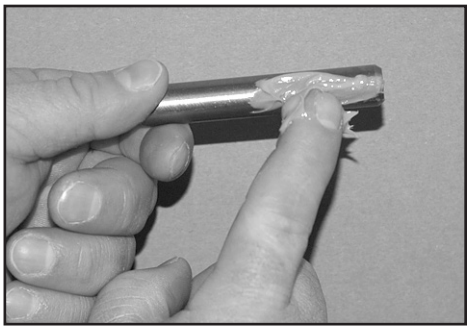


FIGURE 5G

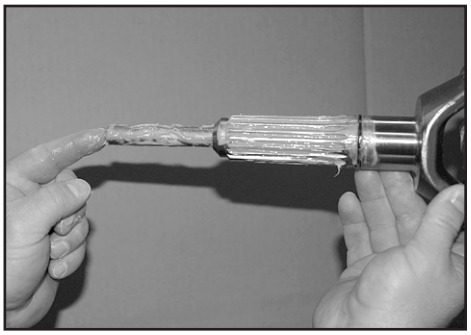


FIGURE 5H

Step 5: Stern Drive Installation *(continued)*

5.7 Slide drive onto transom assembly. The splined end yoke shaft and u-joint assembly must be held up and guided into the gimbal carrier or tailpiece assembly.

NOTE: *It may be necessary to rotate the splined end yoke shaft (this can be achieved by sliding the propeller onto the splined propeller shaft and rotating it back and forth or re-orientating input yoke using a screwdriver as pictured in Figure 5I) or yoke assembly so the splines line up for the drive to be fully seated against the transom assembly.*

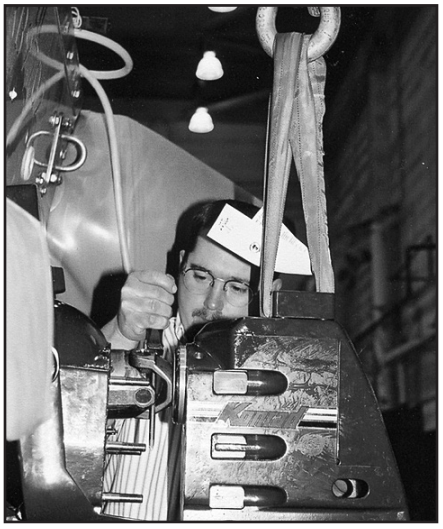


FIGURE 5I

⚠ ***NOTE:*** *If the stern drive does not engage easily, pull stern drive back, reset engagement pin and reattempt 5.7.*

WARNING! Do not impact or apply force to the drive while engaging the input shaft as this will damage the gimbal carrier seal.

5.8 Fasten the stern drive to the transom assembly using the six (6) nuts and six (6) washers provided. Torque to 55 lb. ft. (74 Nm).

NOTE: *Be sure to put the continuity cable ring on the upper starboard stud before putting the washer and nut on.*

An alternate method of stern drive installation is to remove the gimbal carrier assembly (non-tailpiece applications) from the gimbal housing (inside of the vessel). This can be done by removing the three (3) S.H.C.S. (10-385). Hold up the splined end yoke shaft and guide it into gimbal carrier as the carrier is reinstalled. Torque the three (3) S.H.C.S. (10-385) to 70 lb. ft. (95 Nm).

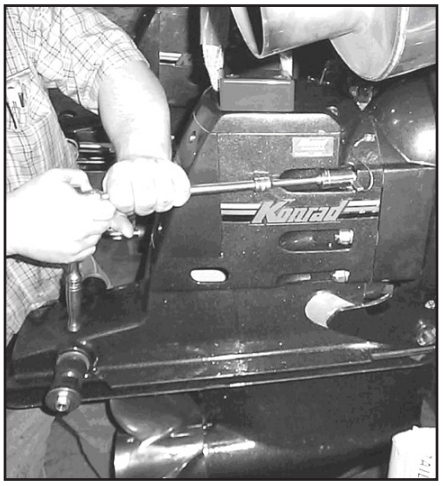


FIGURE 5J

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
Direct (Rear Mount Tailpiece)	30-449	Fixed (Close Couple)	N/A	N/A	Fixed	N/A	TO-094	N/A	N/A	Tail Piece Coaxial	N/A
Direct (Rubber)	30-286 30-287 30-464	Fixed (Close Couple)	< .003 in. < .076 mm	< .003 in. < .076 mm	N/A	Yes (See Step 15)	11-284 GO-017	70 ft. lbs. 95 Nm	Yes	Output Flange	3-Lobe 30-301
Driveshaft w/Rubber Couplings Short (w/slip joint)	30-264	9 - 15 in. 23 - 38 cm	< .010 in. < .254 mm	< .010 in. < .254 mm	1 in. 25.4 mm	Yes (See Step 15)	GO-017 TO-096	70 ft. lbs. 95 Nm	Yes	Output Flange	3-Lobe 30-301
Driveshaft w/Rubber Couplings Long (w/slip joint)	30-272	15 - 48 in. 38 - 122 cm	< .010 in. < .254 mm	< .010 in. < .254 mm	1 in. 25.4 mm	Yes (See Step 15)	11-284 GO-017	70 ft. lbs. 95 Nm	Yes	Output Flange	3-Lobe 30-301
Constant Velocity (CV)	11-797 30-391	>9.5 - <55 in. 25.4 - 140 cm	Max 2°	Max Offset 2°	1/16 in. 1.59 mm	N/A	GO-017	85 ft. lbs. 115 Nm	Yes	Output Flange	30-303
U-Joint Carden	30-043	>9.5 - <60 in. 24 - 152 cm	< .010 in. < .254 mm	Compound Offset between .5°< x <1°	1 in. 25.4 mm	Yoke Orientation	GO-017	89 ft. lbs. 121 Nm	Yes	Output Flange	30-303

***NOTE:** In most cases, the use of a u-joint shaft is not recommended, please contact Konrad for approval prior to installation.*

Step 6: Alignment Procedures

NOTE: *General vessel installation plans should be directed at near straight shaft angles. The shaft's maximum misalignment tolerances should be reserved for temporary movement of components while the vessel is underway.*

A) Direct Couple Rear Mount with Tailpiece

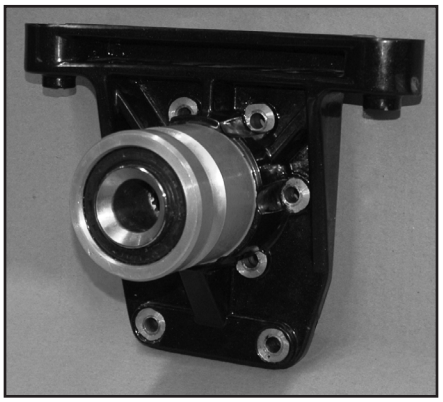


FIGURE 6A

1) Attach transmission to engine.
2) Attach tailpiece unit to transmission.
3) Slide o-ring on to tailpiece.
4) Lightly grease o-ring.
5) Position engine into vessel.
6) Slide tailpiece into gimbal housing bore.
7) Fasten tail piece assembly to tail piece mounting plate.
8) Use Tool TO-094 for alignment. Shaft must slide easily into tailpiece spline until fully engaged to the limiting shoulder surface.

NOTE: *See Step 19 for complete detailed instructions.*

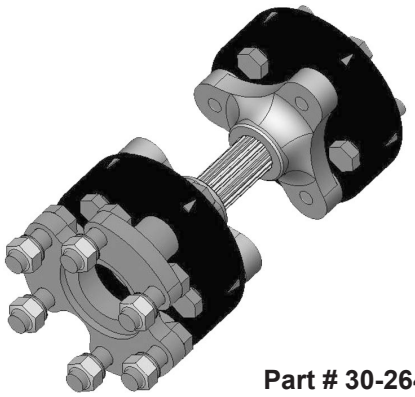
B) Direct Rubber Coupling

FIGURE 6B

1) Rubber coupling must be oriented for transmission output rotation in forward mode as stated in Steps 15 on pages 64 - 67 in this manual.
2) Install engine transmission and shaft to gimbal carrier trilobe flange. Do not tighten any bolts.
3) Transmission output flange must be indicated to the gimbal carrier outside diameter (and face) within .003 in. (.076 mm). Adjust engine mounts accordingly.
4) Tighten all fasteners to specified torque of 70 lb. ft. (95 Nm).

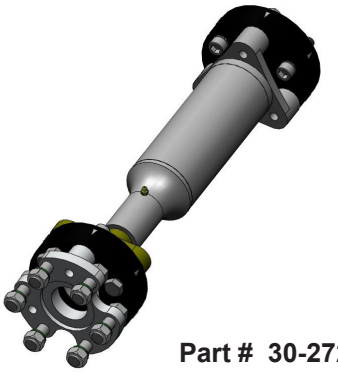
C) Rubber Coupling Extension Shafts

1) Remove frost plug (10-485).
2) Fasten alignment flange (11-284) to gimbal carrier.
3) Fix magnetic base, arm and dial indicator assembly (GO-017) to transmission output flange. Complete assembly must be rigidly fastened.
4) Rotate transmission flange indicating the face of the alignment flange. All facial measurements must be within .010 in. (.25 mm).
5) Rotate transmission flange indicating the circumference of the alignment flange. All measurements must be within .010 in. (.25 mm).
6) Remove alignment flange and install frost plug.
7) Install rubber coupling drive shaft assembly according to Step 15 on pages 64 - 67 in this manual.
8) For longer extension shafts, an extension piece should be attached to the transmission flange. The dial indicator base can be fixed to this extension piece allowing the indicator to reach the alignment flange. The extension piece, dial indicator base and arm must all be rigidly fastened.



Part # 30-264

NOTE: Drawing shows drive in clockwise position



Part # 30-272

NOTE: Drawing shows drive in counterclockwise position

D) U-Joint Extension Shaft

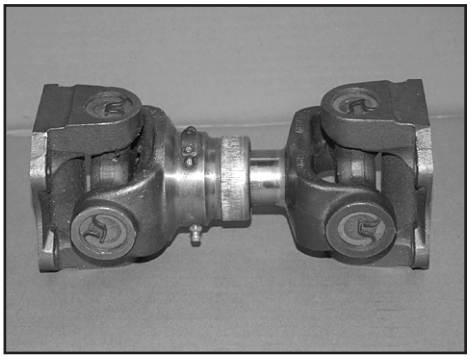


FIGURE 6C

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. In most cases, the use of a u-joint shaft is not recommended, please contact Konrad for approval prior to installation.*

1) Transmission output flange and gimbal carrier input flange must be parallel within .010 in. (.25 mm).
2) Transmission output flange and gimbal carrier input flange must have a compounded vertical and horizontal offset angle (a) which is 1.0˚ > (a) > 0.5˚. This dimension is a function of the length of the shaft.
3) To determine vertical offset (see Figure 6D)
   (x): x = tan a (y - 3.376 in.) *or*
   (x): x = tan a (y - 8.575 cm)
4) Fix magnetic base, arm and dial indicator assembly (GO-017) to transmission output flange.
5) Rotate transmission flange indicating the face of the alignment flange. All facial measurements must be within .010 in. (.25 mm).
6) Rotate transmission flange indicating the circumference of the alignment flange. All measurements must be within .010 in. (.25 mm). Offset measurements are according to calculation in section D3 above.
7) Refer to Step 16 on pages 68 - 69 in this manual for u-joint extension shaft installation.

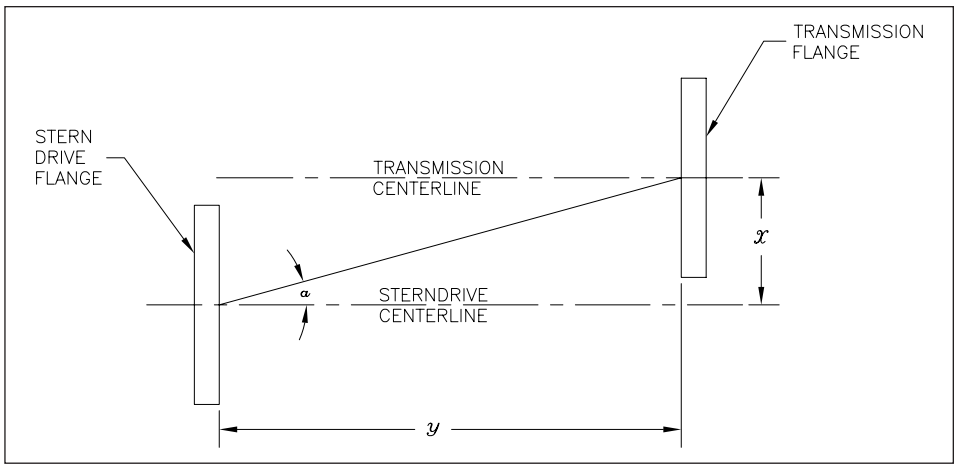


FIGURE 6D

E) CV Extension Shaft

NOTE: *The transmission output flange and gimbal carrier input flange must be parallel within two degrees (2°) or manufacturer's approval dependent on power and RPM levels.*

1) A constant velocity joint is recommended over a u-joint shaft because, unlike the u-joint, it has no significant impacts on the stern drive gear sets.
2) The transmission output flange and gimbal carrier input flange must be concentric within the manufacturer's recommended specifications.
3) Fix magnetic base, arm and dial indicator assembly (GO-017) to transmission output flange.
4) Rotate transmission flange indicating the face of the alignment flange. All facial measurements must be within manufacturer's requirements.
5) Rotate transmission flange indicating the circumference of the alignment flange. All measurements must be within the manufacturer's requirements.
6) Refer to Step 17 on pages 70 - 71 in this manual for CV extension shaft installation.
7) The axial distance must be within .0625 in. (1.59 mm) of the shaft's working length (including the adapter flanges).

FIGURE 6E

Step 7: Trim Cylinder Installation

7.1 Remove the nut (10-314), the outer retaining washer (10-444), and the outer bushing (10-443) from the forward trim cylinder anchor pin (port and starboard side).

FIGURE 7A

7.2 Locate the rear anchor pin assembly and remove all hardware and bushings. Slide the rear anchor pin through the anchor pin bore in the aft end of the upper housing.

FIGURE 7B

7.3 Following the order listed, place one washer (10-442), spacer (12-535), one washer (10-442) and bushing (10-443) (tapered pointing away from drive) on to the port and starboard side of the rear trim cylinder anchor pin.

FIGURE 7C

7.4 Slide the trim cylinders onto the anchor pins.

NOTE: *If trim cylinders are at an inappropriate length to fit onto the anchor pins, the drive must be lifted up manually or the red caps (see Step 7.6 on page 34 in this manual) must be removed and length must be adjusted. CAUTION: Fluid may run or squirt out of the ports when adjusting length.*

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

FIGURE 7D

Step 7: Trim Cylinder Installation *(continued)*

7.5 Place bushing (10-443), retaining washer (10-444) and nylock nut (10-314) on forward and aft anchor pins. Tighten the forward nuts to 20 lb ft (27 Nm). Tighten the aft nut so the retaining washer (10-444) bottoms out on the shoulder of the anchor pin. Make sure at least two or three (2-3) threads are showing beyond the end of the nuts.

NOTE: *Install all four (4) nylock nuts (10-314) before tightening nuts completely.*

FIGURE 7E

7.6 Remove the red caps from the trim cylinders if they have not been removed previously (see step 7.4 on page 33 in this manual). The trim cylinders have red plastic caps in the hydraulic line ports when they are shipped from Konrad.

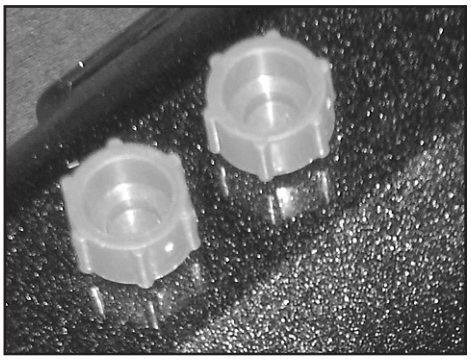


FIGURE 7F

7.7 Hook up the four (4) trim lines (from the transom assembly to the trim cylinders) according to their tags. The line input on the trim cylinders closest to the transom is up.

NOTE: *Ensure to not cross thread the hose's fittings and tighten down until snug. DO NOT overtighten. Check for leaks after the trim pump is bled (Step 11 on pages 46-47 in this manual).*

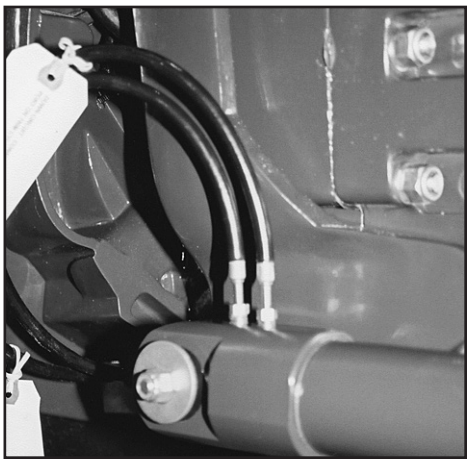
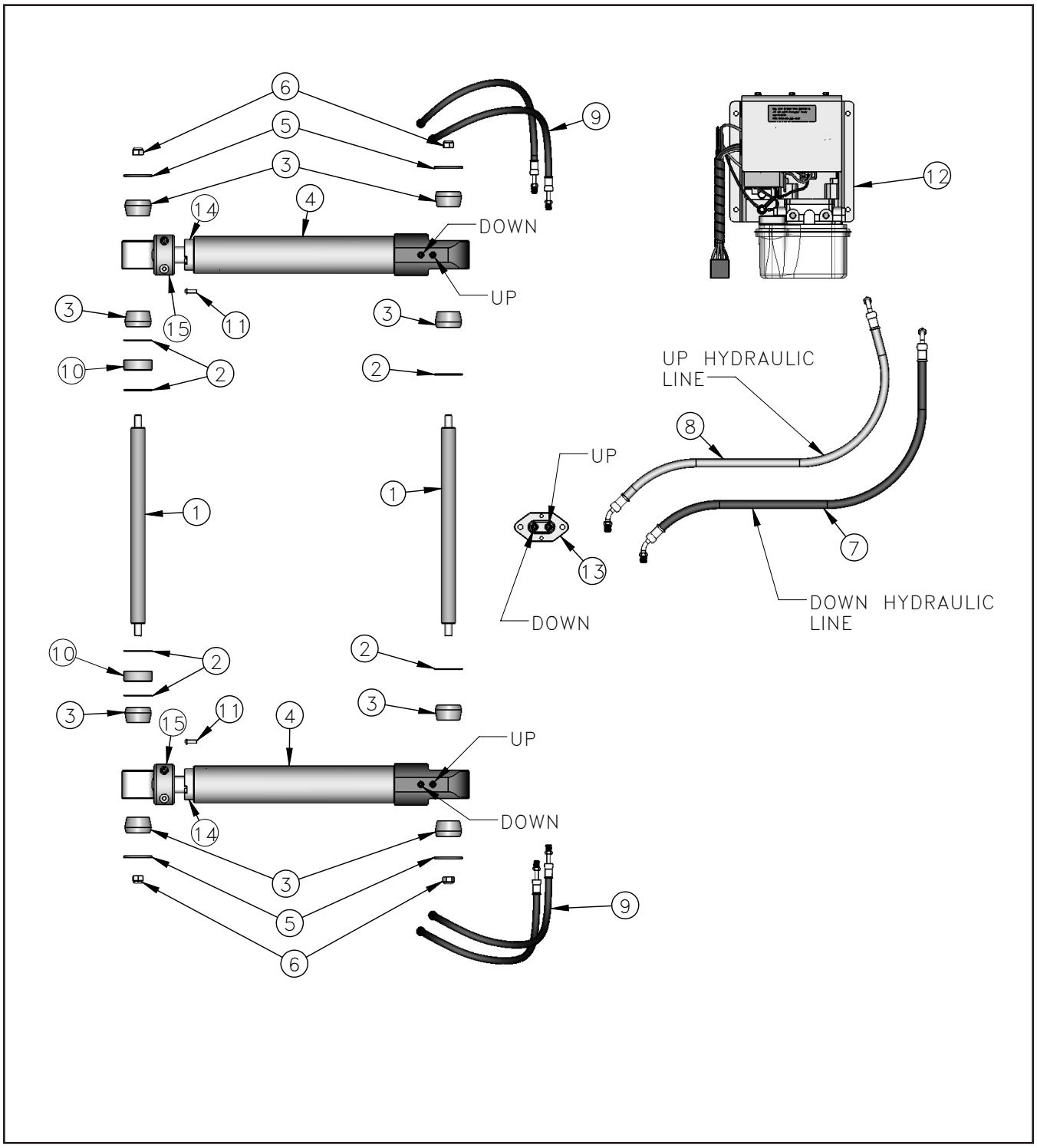


FIGURE 7G

FIGURE F: TRIM ASSEMBLY DIAGRAM



Complete 30-002 Trim Assembly

FIGURE G: TRIM ASSEMBLY INDIVIDUAL COMPONENTS

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 (Pump Only), 12 Volt OR Pump Assembly, Trim, 12 Volt	1	10-430 30-200
	Pump, Trim (Pump Only), 24 Volt OR Pump Assembly, Trim, 24 Volt		10-690 30-054
13	Connector	1	10-331
14	Anode	2	11-277
15	Anode	2	10-434

Step 8(a): 520 & 540 Propeller Installation

8.1a Grease and slide thrust washer onto propeller shaft (model 520 only).

NOTE: Tapered end of thrust washer must be towards the drive.

8.2a Grease splined area and the threads of the propeller shaft.

8.3a Place the propeller on the propeller shaft followed by the appropriate hardware (see below).

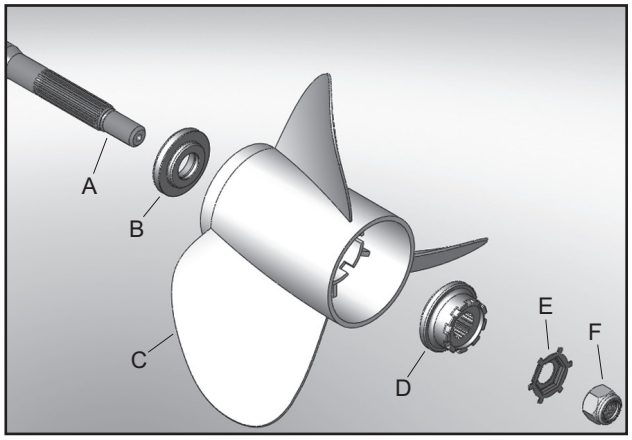
8.4a Torque the propeller nut to 80 lb. ft. (109 Nm) for the 520 model. When approaching 80 lb. ft. (109 Nm), 520 model only, make sure that the tabs on the tabbed retaining washer (at least 2 out of 6) line up with the grooves in the splined washer/hub.

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.*

8.5a Torque the propeller nut to 55 lb. ft. (75 Nm) for the 540 model only.

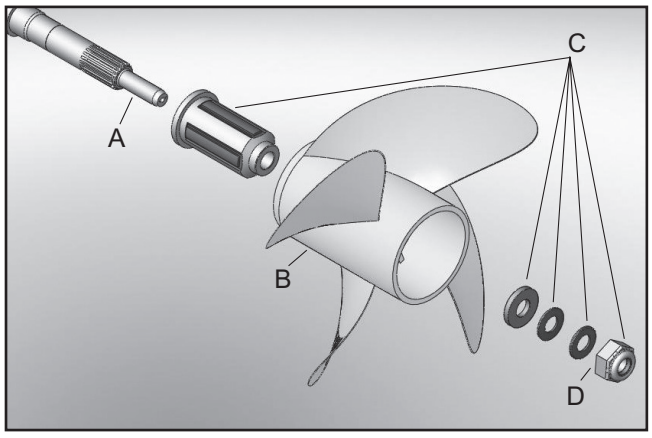
8.6a Bend over the tabs using appropriate tools, 520 model only.

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

Step 8(b): 560 Propeller Installation

8.1b Slide forward thrust prop onto forward prop shaft so the tapers meet. Some grease can be used on tapers to hold in place.

8.2b Grease splined area and the threads of the forward propeller shaft.

8.3b Place the forward propeller on the propeller shaft until it seats against thrust hub.

8.4b Torque the forward propeller nut to 100 lb.ft (136 Nm) using hex wrench TO-121.

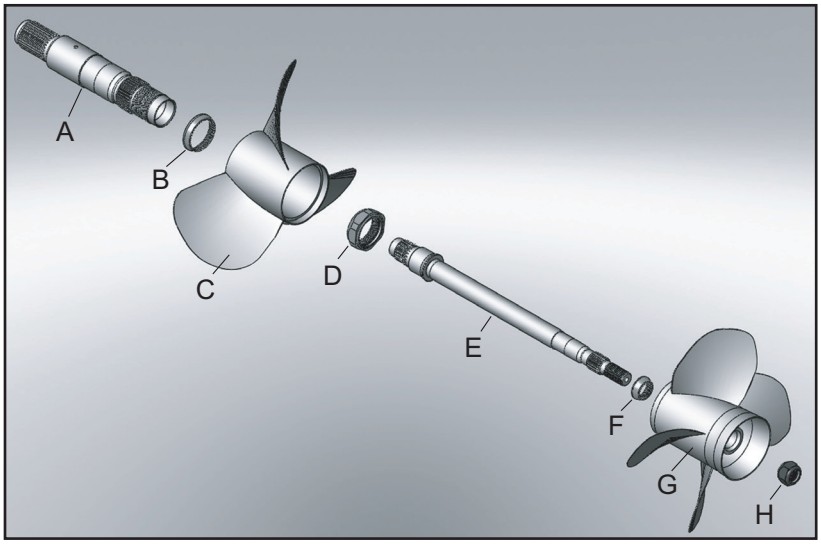
8.5b Slide rear thrust prop onto rear prop shaft so the tapers meet. Some grease can be used on tapers to hold in place.

8.6b Grease splined area and the threads of the forward propeller shaft.

8.7b Place the forward propeller on the propeller shaft until it seats against thrust hub.

8.8b Torque the rear propeller nut to 60 lb.ft (81 Nm) using $1^{7}/_{16}$" socket wrench.

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

Step 9: Stern Drive Lubrication

Pour Method:

9.1 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 (12-388) by removing the two (2) socket head cap screws (12-421) and two (2) nylon washers (11-033) and the four (4) socket head cap screws (10-110).

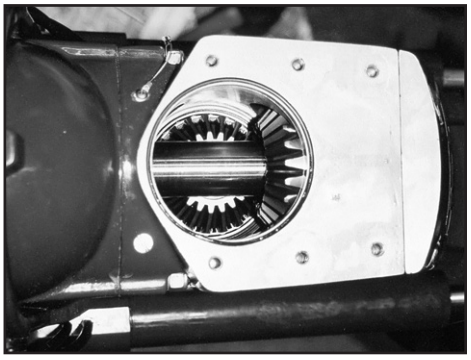


FIGURE 9A

9.2 Pour in gear oil until drive is full.

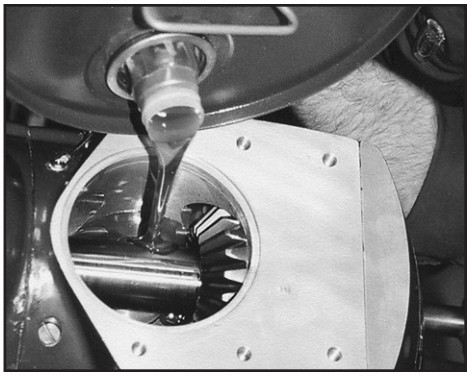


FIGURE 9B

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

9.4 Repeat steps 9.2 and 9.3.

9.5 Replace the top cover and the emergency tiller arm 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.*

FIGURE 5C

Pump Method: (Pump Required)

9.1a Remove the upper breather screw (10-010) located on the top port side of the upper housing (see Figure 9D). Remove the lower drain plug (10-155) located on the lower housing under the tip of the nose cone on the 520 model (see Figure 9E), and the starboard side of the lower housing on the 540 and 560 models (see Figure 9F).

FIGURE 9D

FIGURE 9E

FIGURE 9F

Step 9: Stern Drive Lubrication *(continued)*

9.2a Pump gear oil into the drive using a pump from the bottom until it comes out of the top breather plug. Let the gear oil settle for ten to fifteen (15) minutes. Pump additional oil until it comes out of the top breather plug.

FIGURE 9G

9.3a Replace upper breather screw (see Figure 9D on page 40 in this manual) and lower drain plug (see Figure 9E or 9F on page 40 in this manual depending on stern drive model).

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

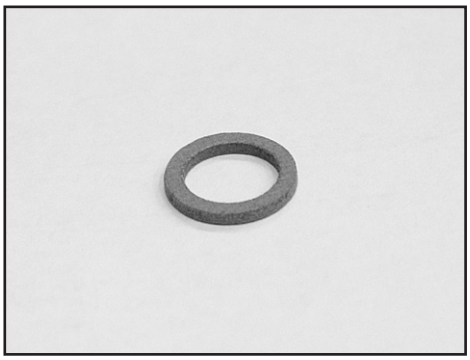


FIGURE 9H

Step 10: Trim/Lift Control Module Installation

10.1 Select an appropriate location at the helm to mount the trim/lift control module (the dimensions are 3.125 in. (7.938 cm) x 5.032 in. (12.781 cm) and 4 in. (10 cm) deep, see Figure 10A). The module should be mounted in plain view and reach of the boat operator.

FIGURE 10A

NOTE: *For a twin application, it may be desirable to mount both modules next to each other so they can be operated with one hand simultaneously (see Figure 10B).*

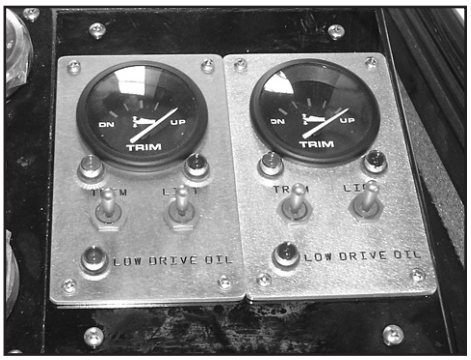
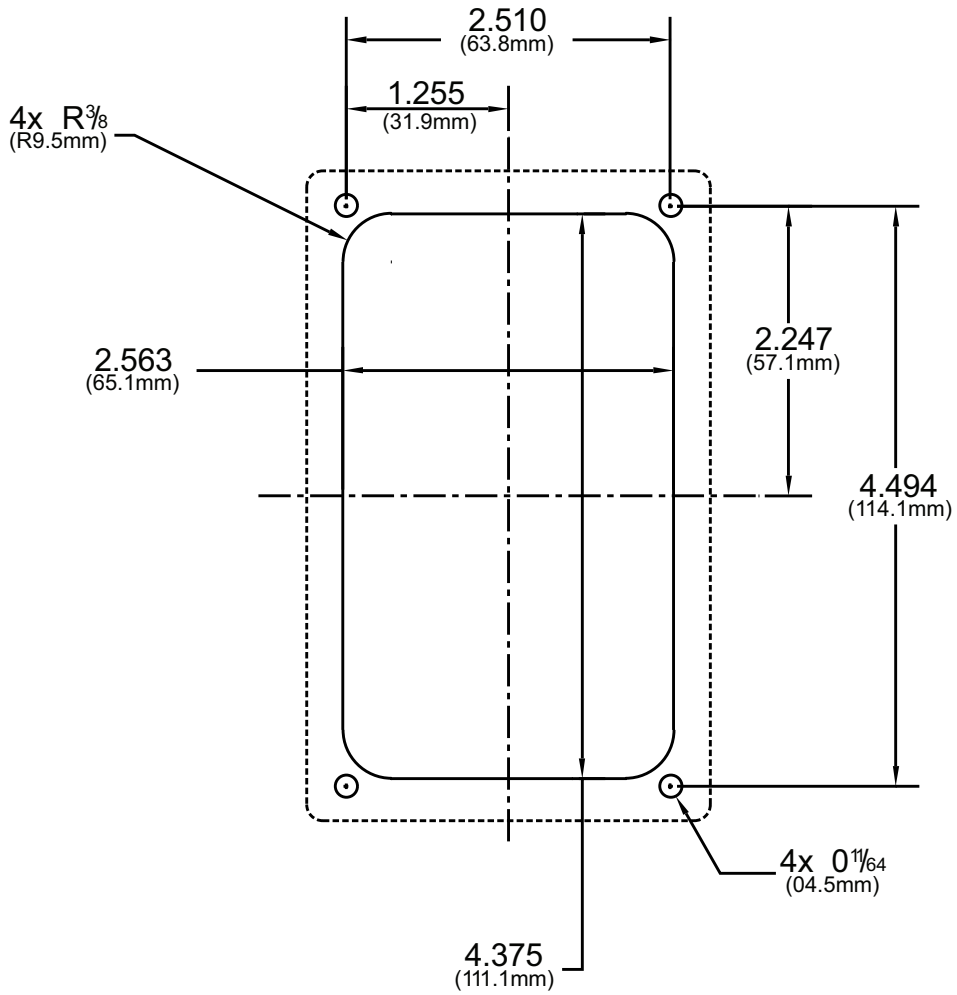


FIGURE 10B

Step 10: Trim/Lift Control Module Installation *(continued)*

10.2 Layout the cutout area and mark the four (4) holes that need to be drilled per the drawing below.

NOTE: *Do not scale the drawing or use it as a template.*



10.3 Use a reciprocating saw to cut out the area laid out in the previous step. Drill the four (4) holes laid out in the previous step.

NOTE: *Touch up and remove burs from the cutout area with a file.*

Step 10: Trim/Lift Control Module Installation *(continued)*

10.4 Mount the module in the cutout area using the hardware provided.

NOTE: *If access under the panel is limited, the module may need to be wired before mounting.*

FIGURE 10C

10.5 Connect the purple wire to a +12 VDC or +24 VDC source (whichever is the operating voltage of the vessel) that is powered when the ignition key is in the "on" position.

NOTE: *Refer to the Trim System Electrical Drawings (Figure C and Figure D on pages 22 and 23 in this manual) for further documentation on this and proceeding instructions.*

NOTE: *Battery or batteries must be disconnected while all electrical connections are being made.*

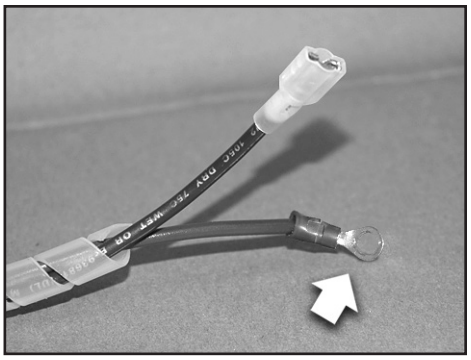


FIGURE 10D

10.6 Connect the blue wire to the positive side of the instrument panel illumination circuit.

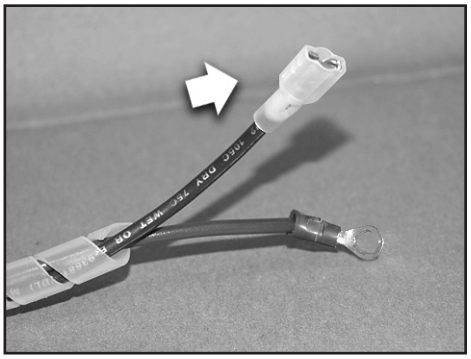


FIGURE 10E

Step 10: Trim/Lift Control Module Installation *(continued)*

10.7 Connect the eight (8) wire harness (run in Step 4.13) to the eight (8) wire pigtail on the trim/lift control module.

NOTE: *Bundle, cable tie and secure any excess harness.*

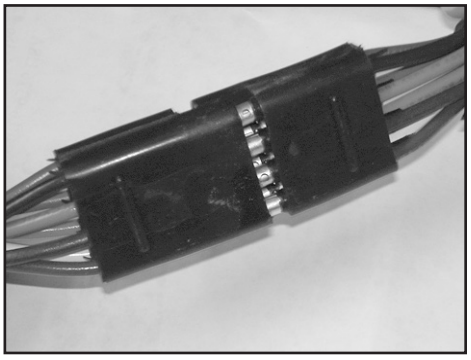


FIGURE 10F

10.8 Mount the module in the cutout area using the hardware provided (if not done in Step 10.4 on page 44 in this manual).

FIGURE 10G

Step 11: Trim/Lift Pump Filling/Bleeding Procedure

11.1 Fill the trim/lift pump reservoir with Automatic Transmission Fluid type Dextron III or a non-foaming light hydraulic fluid.

NOTE: *If ATF Dextron III is not used, it is recommended that the trim cylinders be purged of any fluid since they are shipped new from Konrad with this fluid in them.*

FIGURE 11A

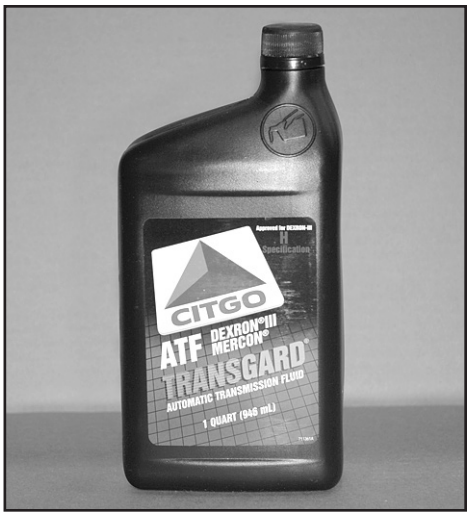


FIGURE 11B

11.2 Place the return line of the trim cylinders (the line labeled "down") in a container to catch any purged fluid. The "up" line should already be attached from Step 4.12 on page 21 in this manual (Trim/Lift Pump Installation). Hold one 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 whose 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.*

FIGURE 11C

Step 11: Trim/Lift Pump Filling/Bleeding Procedure *(continued)*

11.3 With the drive in the up position, attach the "down" line to the trim/lift pump.

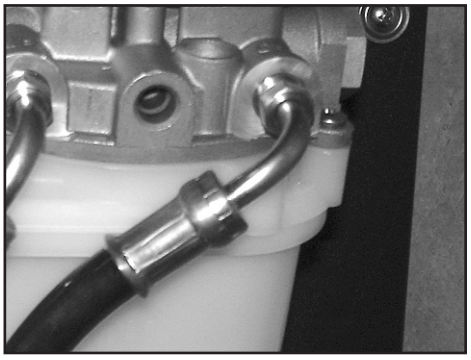


FIGURE 11D

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

NOTE: *Re-check the fluid level of the reservoir. Add fluid if necessary.*

NOTE: *Check entire trim system (inboard and outboard the transom) for leaks before proceeding.*

Step 12: Setting Trim/Lift Limit & Sender Switch

NOTE: *If mechanical trim indicators are used, skip Step 12 and refer to the manufacturers instructions for installation and adjustment.*

FIGURE 12A

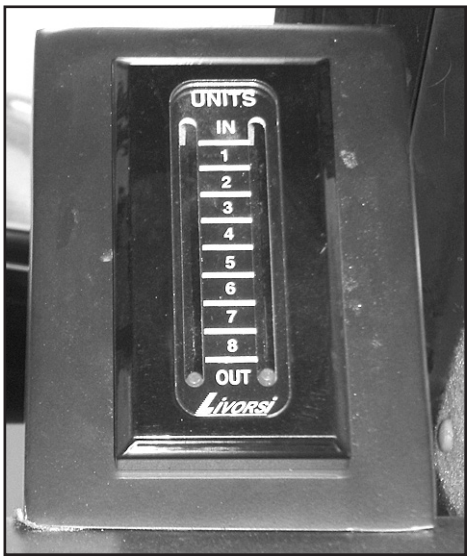


FIGURE 12B

12.1 Trim the drive all the way to the down position, approximately negative seven degrees (-7º).

NOTE: *In the case where trim limiting trim cylinders are used, trim the drive all the way to the down position, approximately negative two degrees (-2º).*

Step 12: Setting Trim/Lift Limit & Sender Switch *(continued)*

12.2 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.*

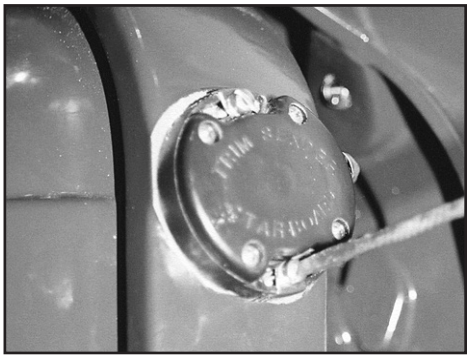


FIGURE 12C

12.3 Set the drive at approximately eight degrees (+8°). This can be accomplished by trimming the drive up until the trim cylinder measures 22 in. (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 eight degrees (+8°): Insert a 1 in.(2.54 cm) shim at the front of the top cover. Place one end of a level on the 1 in. (2.54 cm) shim and the other end on the back of the top cover. Trim the drive up or down until the level indicates levelness.*

FIGURE 12D

12.4 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.*

FIGURE 12E

Step 13: Manual Hydraulic Steering System Installation

13.1 Steering cylinder bracket should have been mounted when the transom assembly was installed (Step 2.3 on page 13 in this manual). If not, take the two (2) nuts and washers off the transom assembly studs, and mount the steering cylinder bracket at this time.

NOTE: *It is also necessary to connect the continuity cable ring to the port side stud (if applicable), if this has not been previously done.*

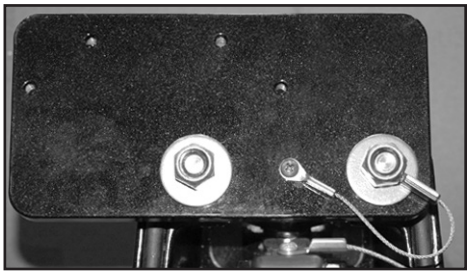


FIGURE 13A

13.2 Install steering cylinder assembly.

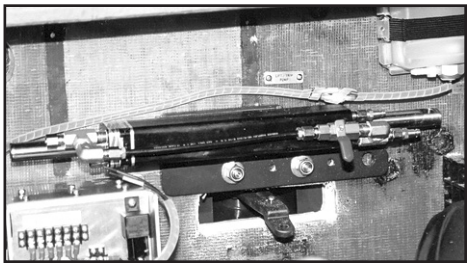


FIGURE 13B

13.3 With the steering cylinder ram and tiller arm in the center position, adjust the drag link to the correct length and attach it between the cylinder and the tiller arm with the hardware provided.

NOTE: *For a twin engine installation with an internal tie bar, verify center to center stern drive mounting distance (on the fixed transom assembly) and adjust tie bar to length to match. Attach the tie bar to the tiller arms with the hardware provided.*

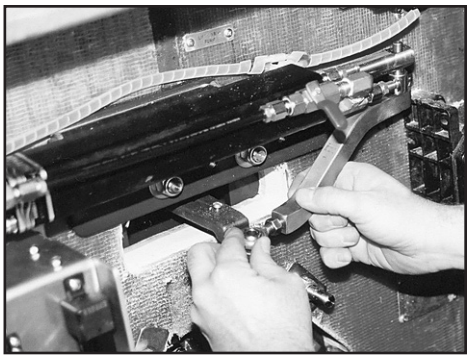


FIGURE 13C

13.4 Connect the long continuity wire from the steering bracket to the tiller arm (if applicable).

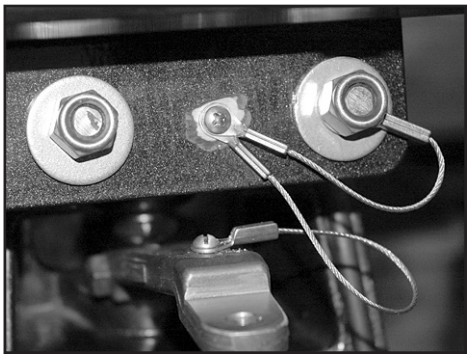


FIGURE 13D

Step 13: Manual Hydraulic Steering Installation *(continued)*

13.5 Determine the correct mounting location for the helm assembly.

NOTE: *Be sure there is adequate clearance under the dash for the helm assembly and hoses.*

NOTE: *Be sure there is adequate clearance above the dash for the steering wheel.*

Lay out and cut/drill the appropriate area described by the template provided from the manufacturer.

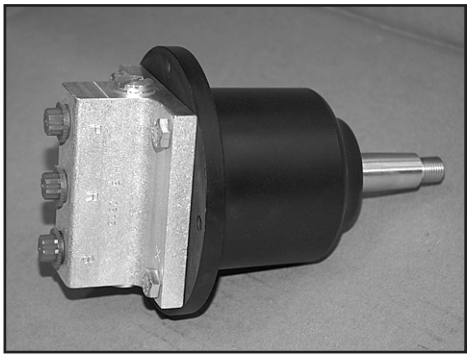


FIGURE 13E

13.6 Install the helm assembly with the hardware provided.

FIGURE 13F

13.7 Install the steering wheel with the hardware provided.

FIGURE 13G

Step 13: Manual Hydraulic Steering Installation *(continued)*

13.8 Determine the correct location and mount the reservalve.

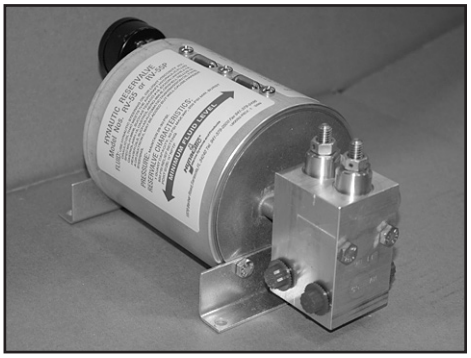


FIGURE 13H

13.9 Mark/identify the two (2) steering lines/hoses (port and starboard). Run the two (2) lines from the steering cylinder to the reservalve. Mark/identify the three (3) steering lines/hoses (port, starboard and reservalve). Run the three (3) lines from the reservalve forward through the starboard raceway, and up to the helm assembly. Fasten lines as necessary. Bundle/coil excess and secure if necessary.

FIGURE 13I

13.10 Attach the two (2) hydraulic steering lines to the steering cylinder assembly, observing port and starboard identification.

NOTE: *Please refer to the 30-462R routing diagram (Figure H on page 54 in this manual) for assistance and further explanation.*

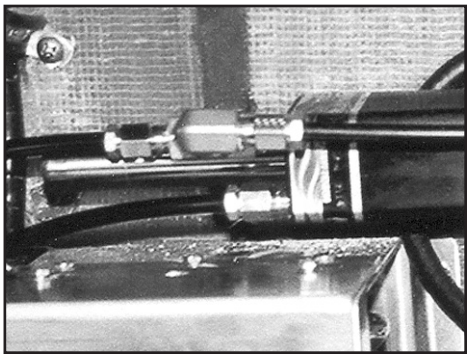


FIGURE 13J

Step 13: Manual Hydraulic Steering Installation *(continued)*

13.11 Attach the other three (3) hydraulic steering lines to the helm assembly, observing port, starboard and reservalve identification.

NOTE: *Please refer to the 30-462R routing diagram (Figure H on page 54 in this manual) for assistance and further explanation.*

FIGURE 13K

13.12 Attach all five (5) lines to the reservalve.

NOTE: *Please refer to the 30-462R routing diagram (Figure H on page 54 in this manual) for assistance and further explanation.*

FIGURE 13L

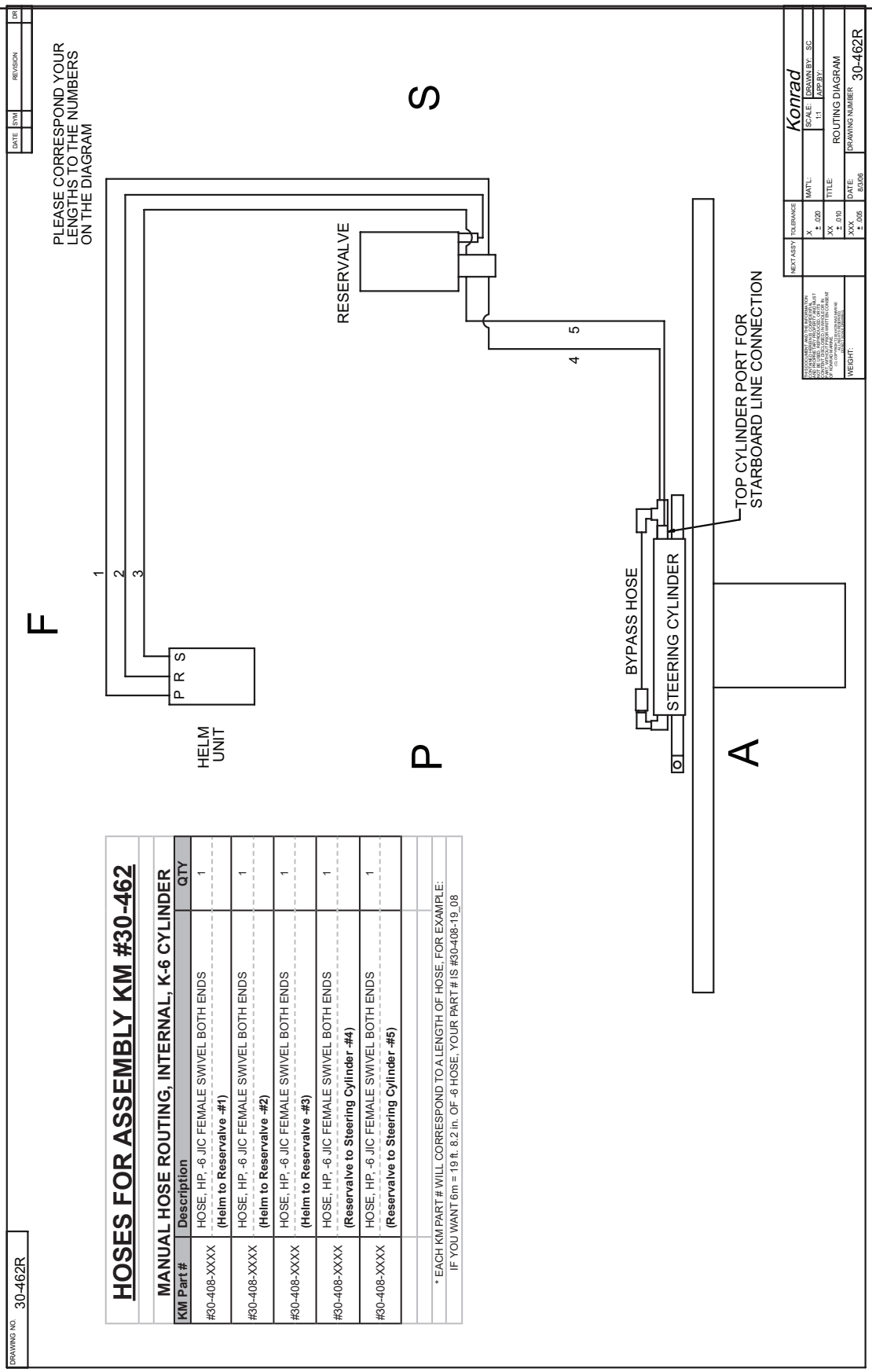
13.13 Fill helm assembly or reservoir valve with the appropriate fluid.

13.14 Bleed system per manufacturer's specifications.

NOTE: *Additional fluid may need to be added during the bleeding process.*

13.15 Check system for leaks.

FIGURE H: ROUTING DIAGRAM 30-462R



Step 14: Power Steering System Installation

14.1 Steering cylinder bracket should have been mounted when the transom assembly was installed (Step 2.3 on page 13 in this manual). If not, take the two (2) nuts and washers off the transom assembly studs, and mount the steering cylinder bracket at this time.

NOTE: *It is also necessary to connect the continuity cable ring to the port side stud (if applicable), if this has not been previously done.*

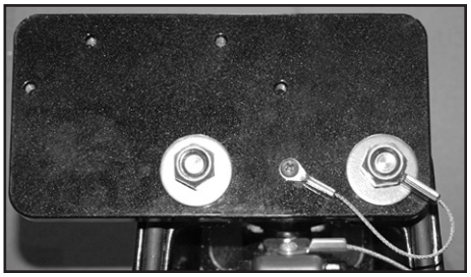


FIGURE 14A

14.2 Install steering cylinder assembly.

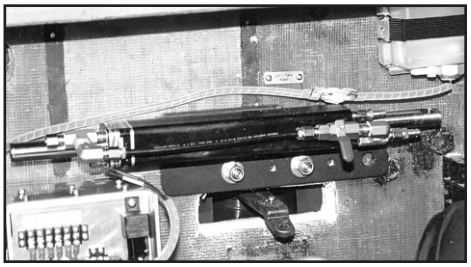


FIGURE 14B

14.3 With the steering cylinder ram and tiller arm in the center position, adjust the drag link to the correct length and attach it between the cylinder and the tiller arm with the hardware provided (see Figure 14C).

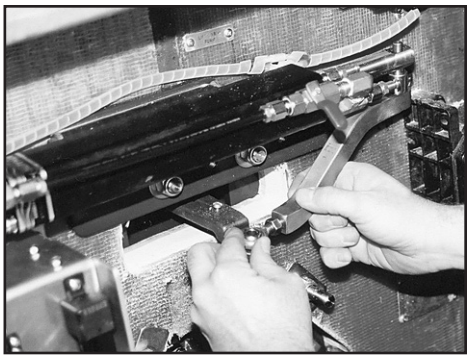


FIGURE 14C

NOTE: *For a twin engine installation with an internal tie bar, verify center to center stern drive mounting distance and adjust tie bar to length to match. Attach the tie bar to the tiller arms with the hardware provided (see Figure 14D).*

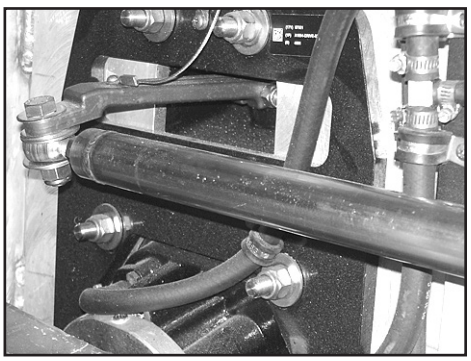


FIGURE 14D

Step 14: Power Steering System Installation *(continued)*

14.4 Connect the long continuity wire from the steering bracket to the tiller arm (if applicable).

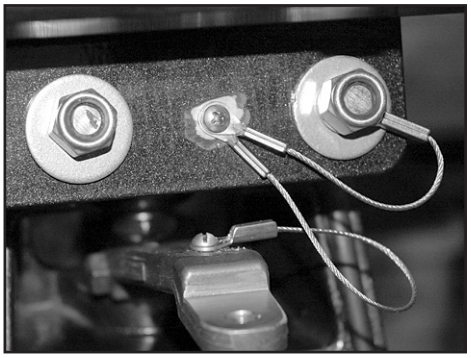


FIGURE 14E

14.5 Determine an appropriate location and mount the power steering pump onto the engine using the brackets and hardware provided. Install the belt (if applicable) and verify proper tension.

NOTE: *If an electric power steering pump is used (instead of an engine mounted unit) consult with manufacturer for installation details.*

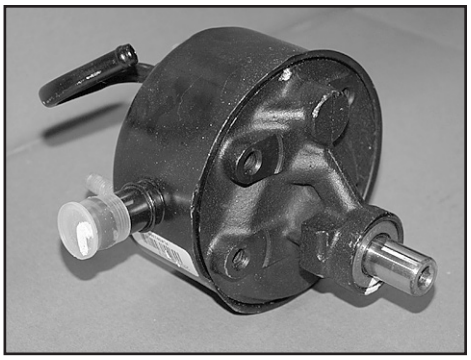


FIGURE 14F

14.6 Mount the power steering fluid cooler and plumb it into the cooling system of the engine.

NOTE: *A mounting bracket may be fabricated or obtained from the engine manufacturer.*

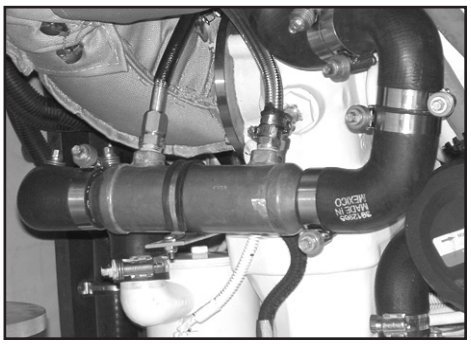


FIGURE 14G

Step 14: Power Steering System Installation *(continued)*

14.7 Determine an appropriate location and mount the power steering fluid reservoir.

NOTE: *The reservoir must be mounted higher than, and in close proximity to, the power steering pump.*

NOTE: *Be sure the reservoir is in an accessible location for adding and checking fluid.*

FIGURE 14H

14.8 Determine an appropriate location and mount the power steering fluid filter.

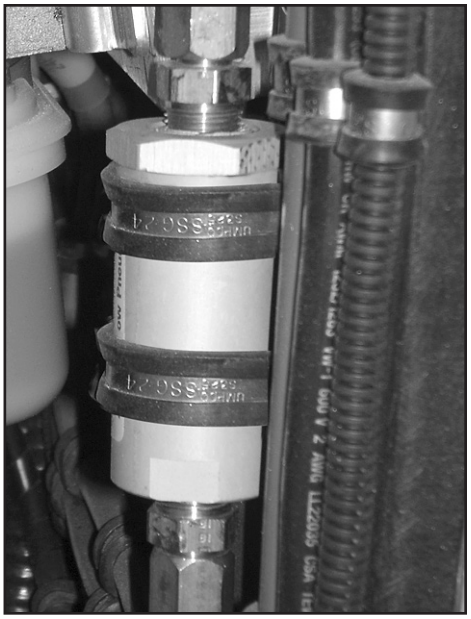


FIGURE 14I

14.9 Determine the correct mounting location for the helm assembly.

NOTE: *Be sure there is adequate clearance under the dash for the helm assembly and hoses.*

NOTE: *Be sure there is adequate clearance above the dash for the steering wheel.*

Lay out and cut/drill the appropriate area described by the template provided from the manufacturer.

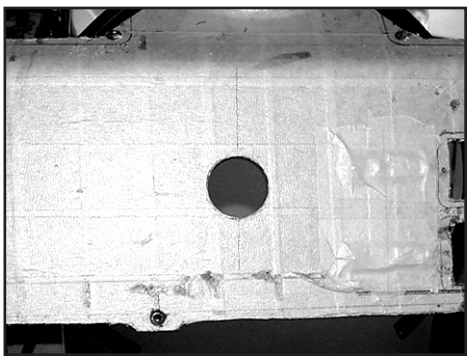


FIGURE 14J

Step 14: Power Steering System Installation *(continued)*

14.10 Install the helm assembly with the hardware provided.

FIGURE 14K

14.11 Install the steering wheel with the hardware provided.

FIGURE 14L

14.12 Determine an appropriate location and mount the steering lock valve assembly.

NOTE: *This should be in close proximity to the helm assembly.*

FIGURE 14M

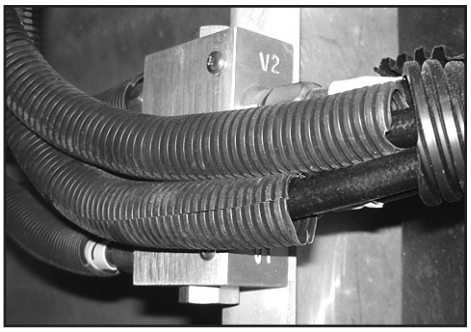


FIGURE 14N

Step 14: Power Steering System Installation *(continued)*

14.13 Mark/identify each of the four (4) steering lines/hoses (high pressure, return, port and starboard) that run forward from the engine compartment. Run the four (4) lines from the engine compartment forward through the starboard raceway, and up to the helm and lock valve assembly. Fasten lines as necessary. Bundle/coil excess and secure if necessary.

FIGURE 14O

14.14 Using the routing diagram 30-390R (Figure I on page 60 in this manual), connect the four (4) lines/hoses run in the previous step. Also using the diagram, hook up the remaining five (5) hoses, numbered 1, 2, 7, 8 and 9.

14.15 Fill the steering fluid reservoir and power steering pump with the appropriate fluid.

14.16 Bleed system per manufacturer's specifications.

NOTE: *Additional fluid may need to be added during the bleeding process.*

14.17 Check system for leaks.

FIGURE I: ROUTING DIAGRAM 30-390R

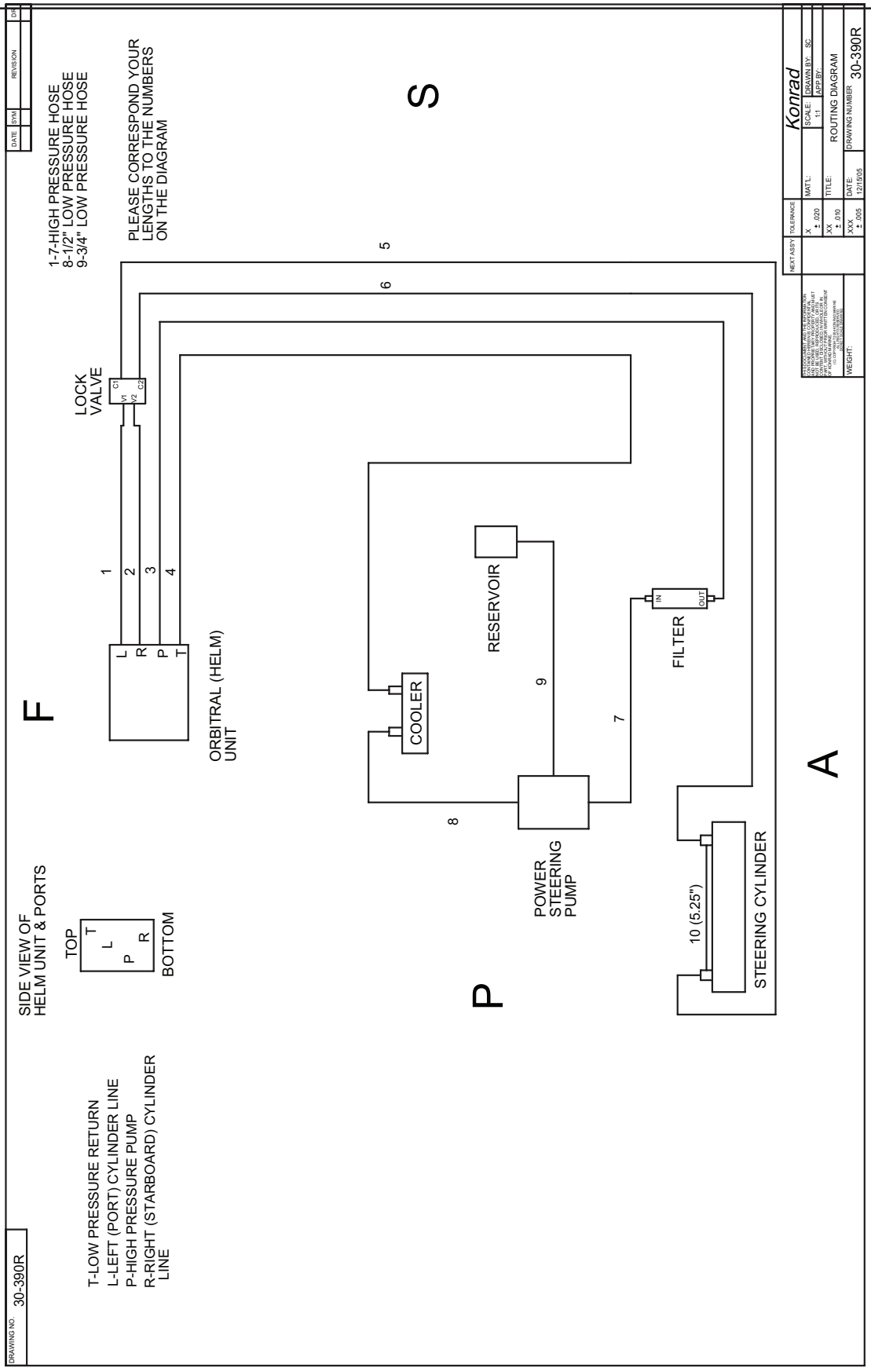


FIGURE J: HOSES FOR ASSEMBLY KM #30-390

HOSES FOR ASSEMBLY KM #30-390

POWER STEERING HOSE ROUTING -4

KM Part #	Description	QTY
#11-852	HOSE, HP, -4 JIC FEMALE SWIVEL / -4 NPT MALE, 5.25 in.	1
	(Steering cylinder bypass - #10)	

POWER STEERING HOSE ROUTING -6

KM Part #	Description	QTY
#30-408-XXXX	HOSE, HP, -6 JIC FEMALE SWIVEL BOTH ENDS	2
	(Orbitrol to Lock Valve - #1 & #2)	
#30-408-XXXX	HOSE, HP, -6 JIC FEMALE SWIVEL BOTH ENDS	1
	(Orbitrol to Filter - #3)	
#30-408-XXXX	HOSE, HP, -6 JIC FEMALE SWIVEL BOTH ENDS	1
	(Orbitrol to Oil Cooler - #4)	
#30-408-XXXX	HOSE, HP, -6 JIC FEMALE SWIVEL BOTH ENDS	2
	(Lock Valve to Steering Cylinder - #5 & #6)	
#30-408-XXXX	HOSE, HP, -6 JIC FEMALE SWIVEL BOTH ENDS	1
	(Filter to Power Steering Pump - #7)	

POWER STEERING HOSE ROUTING - Low Pressure

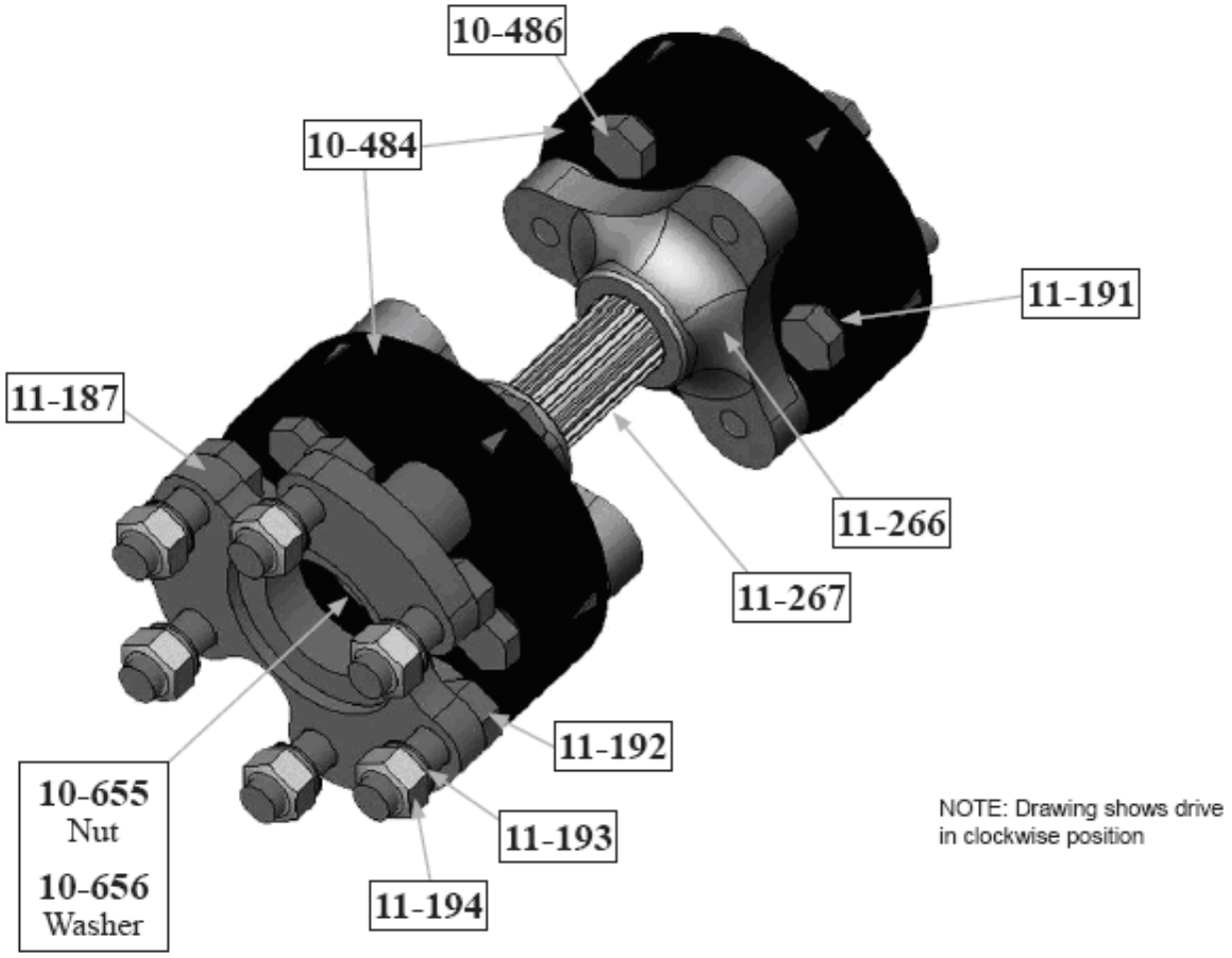
KM Part #	Description	QTY
#11-956-XXXX	HOSE, LP, 1/2 in. ID	1
	(Oil Cooler to Power Steering Pump - #8)	
#11-957-XXXX	HOSE, LP, 3/4 in. ID	1
	(Power Steering Pump to Reservoir - #9)	

* EACH KM PART # WILL CORRESPOND TO A LENGTH OF HOSE, FOR EXAMPLE:

IF YOU WANT 6m = 19 ft. 8.2 in. OF -6 HOSE, YOUR PART # IS #30-408-19_08

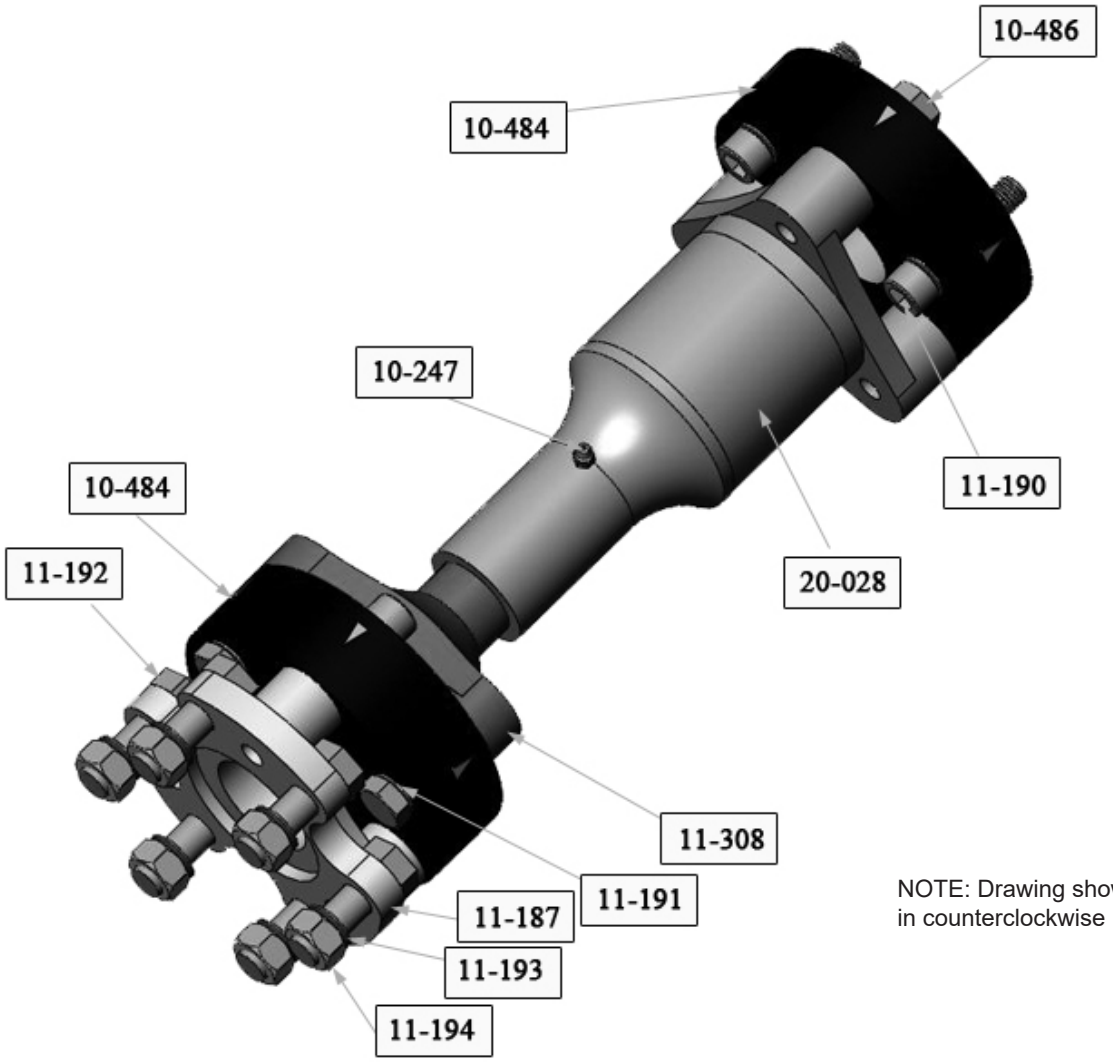
IF YOU WANT 2m = 6 ft. 6.72 in. OF 1/2 in. LP HOSE, YOUR PART # IS #11-956-06_07

FIGURE K: 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	Flange, Female	2
11-267	Shaft, Splined	1

FIGURE L: 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	Adapter Flange, Male	1
20-028	Drive Shaft, Splined	1

Step 15: Rubber Coupling Extension Shaft(s) Installation

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.

15.1 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)

15.2 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:

<u>30-264 Assembly</u>
- Three (3) M-14 H.H.C.S. (10-486)
- Three (3) Belleville Washers (11-191)

<u>30-272 Assembly</u>
- Three (3) M-14 S.H.C.S. (11-190)
- Three (3) Belleville Washers (11-191)

30-264 CCWR

30-272 CCWR

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).

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

Step 15: Rubber Coupling Shaft(s) Installation *(continued)*

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.*

30-264 CWR

30-272 CWR

15.3 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:

<u>30-264 Assembly</u>

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

<u>30-272 Assembly</u>

- 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.*

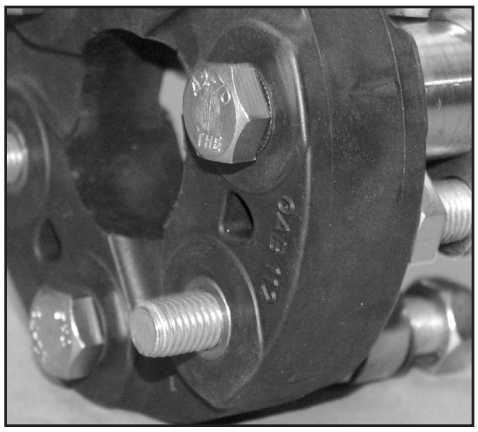
30-264 CCWR

30-272 CCWR

Step 15: Rubber Coupling Shaft(s) Installation *(continued)*

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

15.4 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)

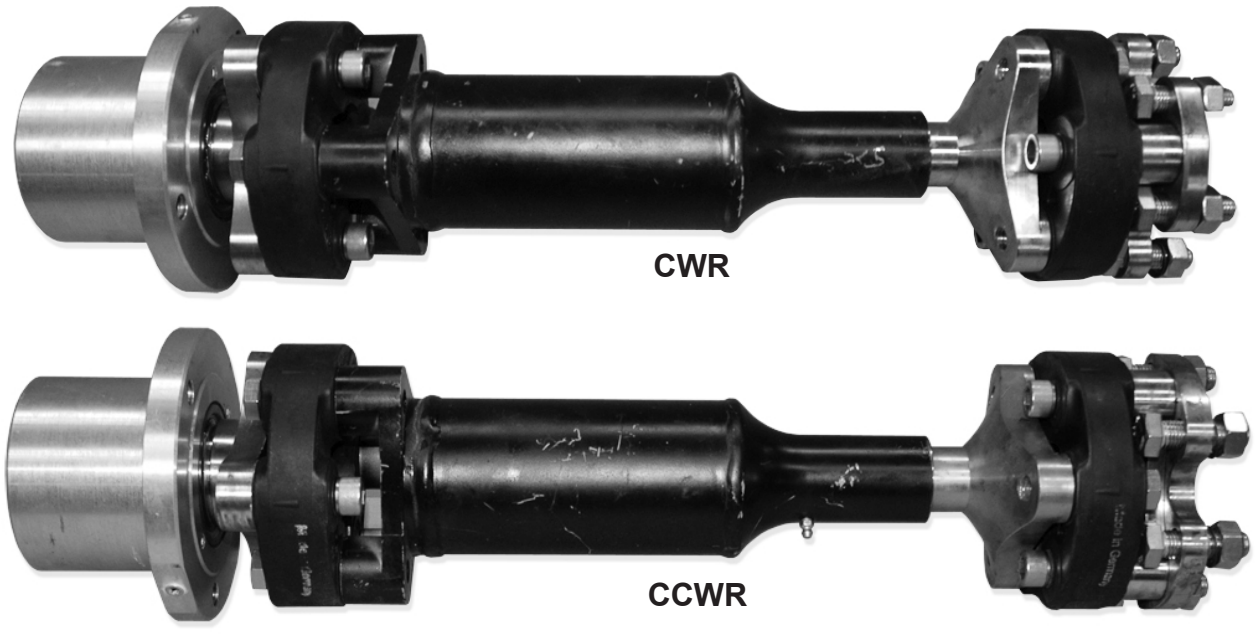
30-272 Assembly
- Adapter (11-308)
- Drive Shaft (20-028)

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

Step 15: Rubber Coupling Shaft(s) Installation *(continued)*

30-264 Complete Assembly

30-272 Complete Assembly



Step 16: U-Joint Extension Shaft Installation

16.1 Verify correct shaft length and installation parameters as defined in the Alignment Specifications Chart (Figure E on page 28 in this manual) and the alignment procedure from Step 6D on page 31 in this manual before proceeding.

FIGURE 16A

16.2 If applicable, bolt transmission output flange adaptor on to the transmission output flange. Apply *Loctite* to the fasteners before tightening. Torque fasteners correctly according to their size.

16.3 Bolt u-joint shaft on to gimbal carrier flange. Apply *Loctite* to the four (4) fasteners before tightening. Torque to 88 lb. ft. (120 Nm).

NOTE: *Ensure pilot is correctly sized and fully engaged (if applicable).*

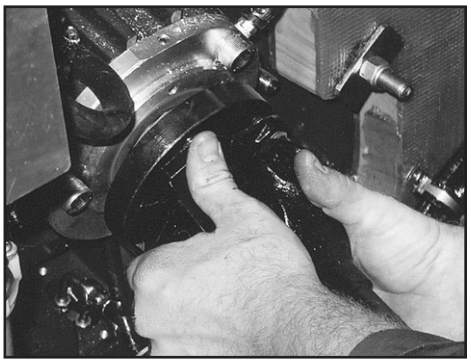


FIGURE 16B

Step 16: U-Joint Extension Shaft Installation *(continued)*

16.4 Adjust u-joint shaft to appropriate length and bolt it on to the transmission output flange (or output flange adaptor). Apply *Loctite* to the four (4) fasteners before tightening. Torque to 88 lb. ft. (120 Nm).

NOTE: *Ensure pilot is correctly sized and fully engaged (if applicable).*

NOTE: *Ensure that the shaft is installed within the working limitations of the slip compensating spline.*

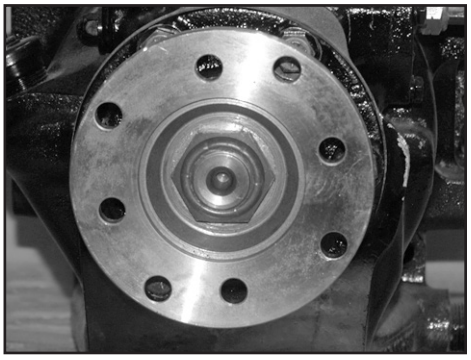


FIGURE 16C

16.5 Grease u-joints and extension joint before operation of the shaft occurs.

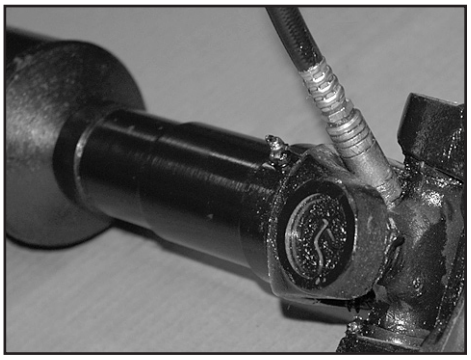


FIGURE 16D

Step 17: CV Extension Shaft Installation

17.1 Verify correct shaft length and installation parameters as defined in the Alignment Specifications Chart (Figure E on page 28 in this manual) and the alignment procedure from Step 6E on page 32 in this manual before proceeding.

FIGURE 17A

17.2 Connect CV adaptor flange to gimbal carrier flange. Apply *Loctite* to threads of fasteners. Torque fasteners to 88 lb. ft. (120 Nm).

17.3 Connect CV adaptor flange to transmission output flange. Apply *Loctite* to threads of fasteners. Torque fasteners correctly according to their size.

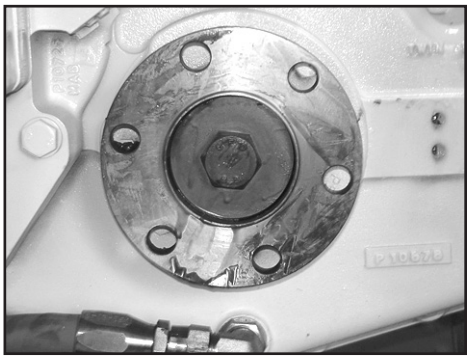


FIGURE 17B

Step 17: CV Extension Shaft Installation *(continued)*

17.4 Place the CV shaft between the adaptor flanges. The shaft may be installed either direction. Fasten the shaft to the adaptor flange on the transmission using the six (6) S. H. C. S.s and the three (3) 2-hold washer plates provided. Repeat this for the gimbal carrier flange. Apply *Loctite* to the threads of the fasteners and torque to 85 lb. ft. (115 Nm).

NOTE: *In some cases only four (4) of the six (6) fasteners can be installed. Inspect adaptor flanges prior to shaft installation. In this case insert a plastic plug (provided with shaft hardware) in each of the two (2) holes without a fastener.*

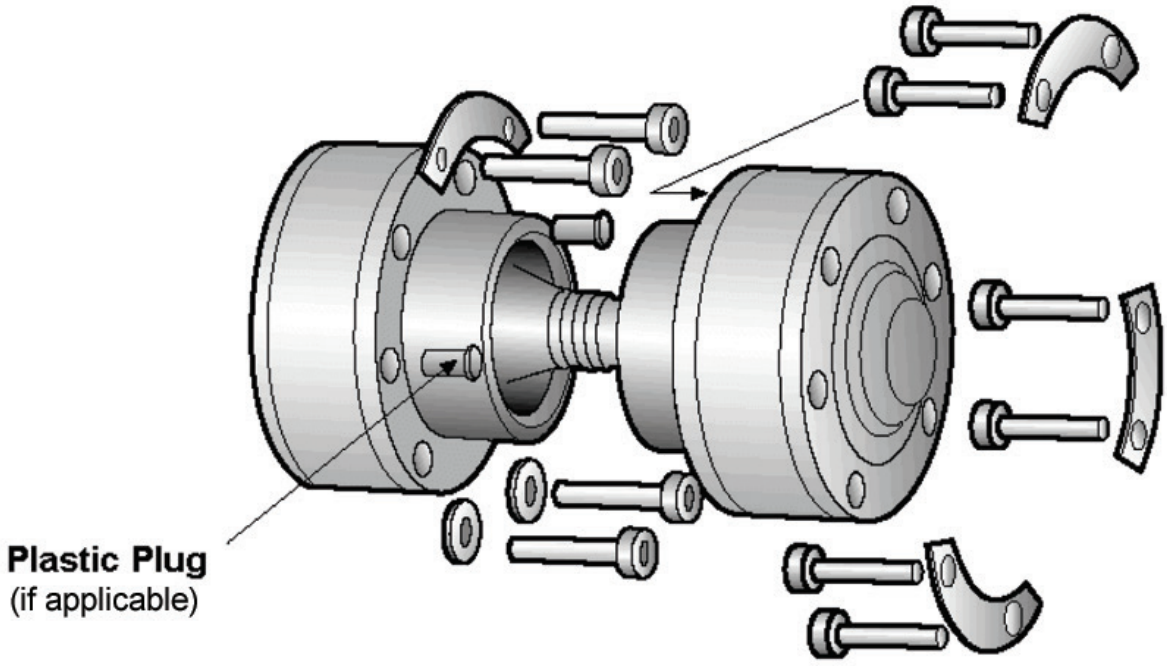


FIGURE 18C

Step 18: Drive Shaft Shroud Installation

NOTE: *Drive shaft shrouds are optional equipment and are not shipped with Konrad stern drives unless ordered.*

18.1 If the drive shaft is already installed, remove the lower plate/strap from the shroud (shrouds are shipped assembled from Konrad). If the drive shaft is not installed, refer to Step 16 on page 68 in this manual.

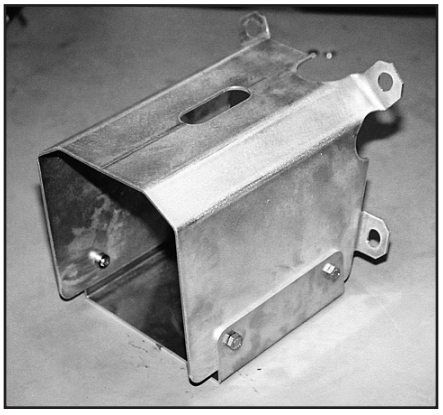


FIGURE 18A

18.2 Place the shroud over the aft portion of the drive shaft. Position the shroud so end with the tabs or ears are aft. Replace the lower plate/strap removed in the previous step.

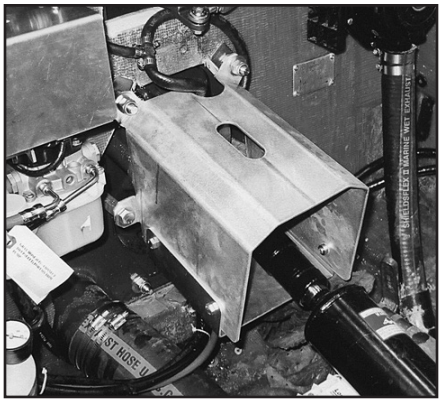


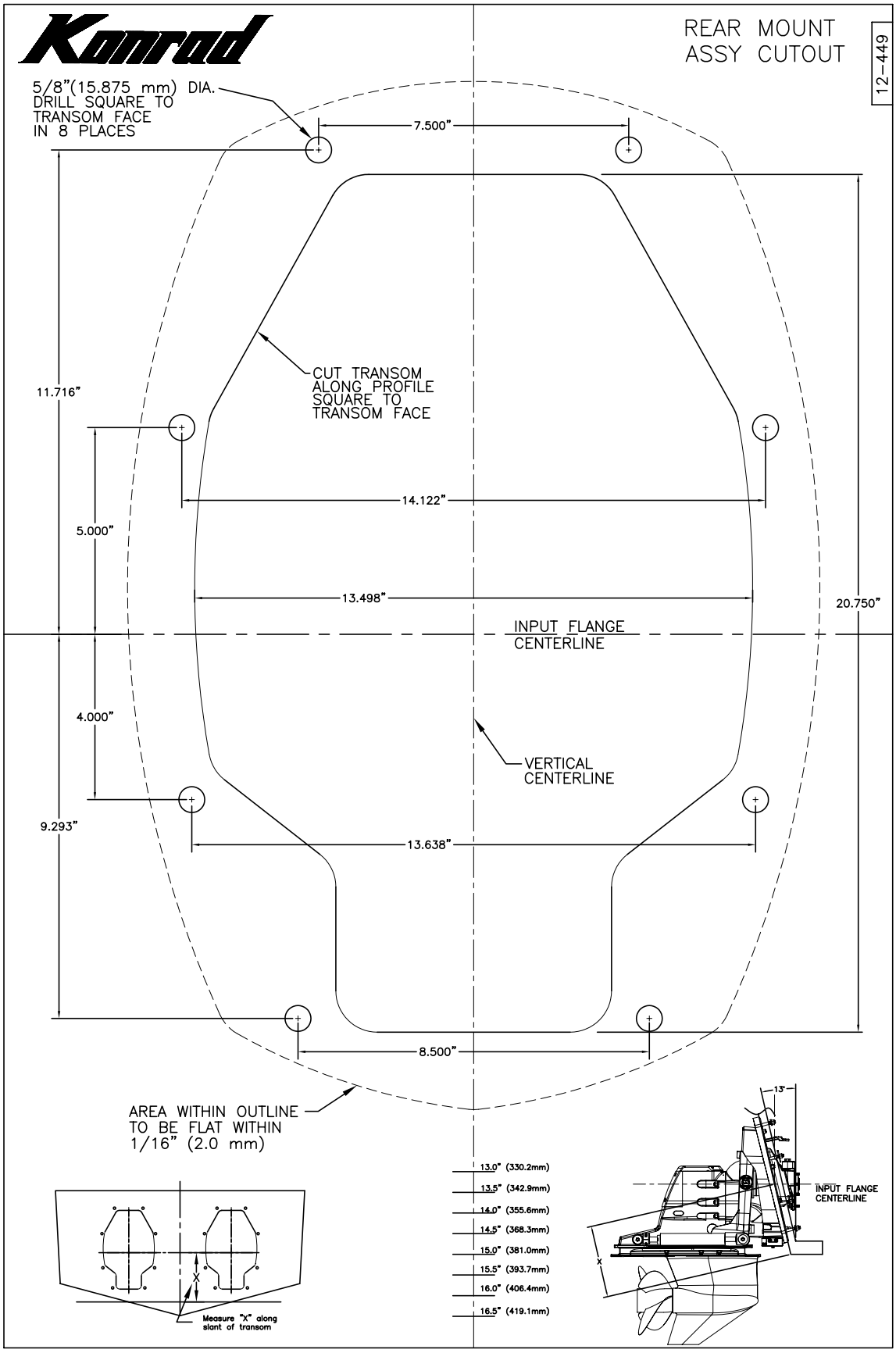
FIGURE 18B

18.3 Slide the shroud aft and place it on the four (4) center studs of the transom assembly.

18.4 Secure the shroud using one (1) washer and one (1) nylock nut on each stud.

18.5 Rotate drive shaft to verify adequate clearance.

FIGURE M: Rear Mount / Tailpiece CUTOUT TEMPLATE



Note: Drawing not to scale.

Step 19: Rear Mount / Tailpiece Installation

19.1 Use paper template (12-449) to set X-dimension and center the stern drive cutout on the boat transom. Cut hole and drill holes through the transom following the template.

FIGURE 19A

19.2 Bolt transom plate (12-268) on the outside of transom. For the top four (4) holes, use cap screw (12-315), seal washer (10-930), backing plate (10-941), and nut (10-565).
Torqure all fasteners to 35 lb-ft (48 Nm).

NOTE: *If a steering plate (20-082 or 12-450) is used, replace top four (4) screws and backing plates with cap screw (11-982) and washer (10-415).*

FIGURE 19B

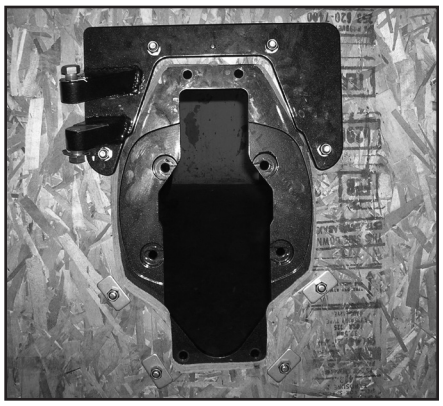


FIGURE 19C

Step 19: Rear Mount / Tailpiece Installation

19.3 Mount Konrad transom assembly (30-014) to outside of transom plate (12-268). Be sure appropriate hoses and cable are fed through plate and cutout. Tighten washer (10-415) and nut (10-334) to the top two (2) and bottom two (2) studs on the gimbal housing.

Torque to 35 lb-ft (48 Nm).

FIGURE 19D

19.4 Slide tailhousing mount assembly (30-450) onto middle four (4) studs of gimbal housing. Tighten washer (10-415) and nut (10-334) to the middle four (4) studs on the gimbal housing.

FIGURE 19E

19.5 Connect tiller arm continuity cable to inner steering plate using the small Phillips head screw (if applicable).

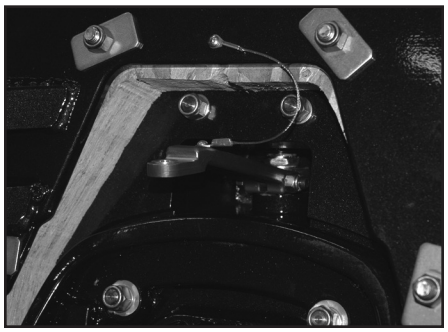


FIGURE 19F

Step 19: Rear Mount / Tailpiece Installation

19.6 With Konrad tailpiece assembly (30-807) mounted on the transmission and the transmission mounted on the engine, position the tailpiece on the bore and move into place until the ears on the tailpiece align with the mounts on the tailpiece mount (30-450).

NOTE: *It is recommended that Steps 3 and 4 of this manual are completed prior to proceeding with 19.6.*

FIGURE 19G

19.7 Insert washer (12-085) and bolt (12-084) through tailpiece ears in two (2) places. Secure with washer (12-085) and nut (12-086) on bottom side of tailpiece mount.
Tighten and torque two (2) bolts to 90 lb-ft (120 Nm).

FIGURE 19H

19.8 For final alignment, slide rod of alignment tool (TO-094) through bell housing and into tailpiece (30-449). Slide disc of alignment tool (TO-094) over rod. Adjust front engine mounts until disc fully slides into bore of bell housing.

The Rear Mount / Tailpiece Installation is complete. Please continue with Step 5 **OR** Step 3 if not completed yet of this manual to proceed with installation

FIGURE 19I

Step 20: Installation Review

Installation Checklist-Inside of Vessel

20.1 Verify proper position and level of oil in reservoir bottle. Confirm proper routing of hoses and check all connection points for leaks. Make sure hose is secure to transom a minimum of every 6 inches with fasteners.

20.2 Confirm proper amount of ATF fluid (Dexron III) in trim pump and verify proper bleeding of the system.

20.3 Check all internal trim cylinder hoses for proper routing and leaks at connection points.

20.4 Verify 12V or 24V system of vessel and confirm that proper trim pump has been supplied. Confirm circuit breaker (fuse) is installed on trim pump. Check for proper connection points for wiring of trim pump.

20.5 Tilt drives up and down to confirm proper function of trim pump and trim assembly. (Trim Sender) If fitted with mechanical trim senders, verify proper adjustment.

20.6 Confirm connection of continuity cables. Also check for continuity from prop shaft of sterndrive to the gimbal assembly, gimbal housing, trim cylinder and steering cylinder.

20.7 Steering:

A) Confirm proper fluid level
B) Verify proper bleeding procedure was done
C) Check all hose routing and connection points for leaks
D) Verify # of turns lock to lock
E) Verify correct rudder indicator position, when compared with the drive position.

20.8 Transmission:

A) Confirm proper fluid level in transmission
B) Verify proper routing of lines and check for leaks at connection points
C) Confirm proper orientation of lines and that they are going to the correct ports
D) (If applicable) Mechanical Shift: Verify proper throw and linkage on mechanical arm.
E) Check that the Neutral Safety Switch circuit is correct

20.9 Confirm that engine mounts/vibration isolators (on stringers) are within angular and height tolerance.

20.10 Driveshaft - If applicable

A) Confirm Parallelism and Concentricity meet Konrad requirements for specific shaft type and length. Reference Step 6 in this manual for information.
B) Confirm proper torque on hardware at both drive and transmission connection. Also, verify that Loctite was used where recommended.

Step 20: Installation Review (continued)

Installation Checklist-Outside of Vessel

20.11 Verify Serial #'s on drives for proper ratio and rotation.

20.12 X-Dimension: Confirm proper height. Verify from application drawing.

20.13 Confirm propeller specs for correct diameter and pitch.

20.14 Verify that alignment was done correctly for close couple or remote mount per your install type.

20.15 Confirm proper oil level in sterndrives.

20.16 External Steering: Confirm torque specs on fasteners. Steering rams, tie bars, etc…

20.17 Twin applications: Confirm centerline distance of drives on transom and take measurement from center to center on propshafts to make sure drives are in-line.

20.18 Inspect all hoses and fittings on trim and steering lines for any leaks at connection points and also proper routing of hoses.

20.19 Confirm proper orientation of bellows and check for secure connection on drive and gimbal assembly. Tighten hose clamps.

20.20 Check stern drive for side to side play. The movement should be minimal to none.

20.21 Check for proper continuity on drive from prop shaft to transom using a volt meter.

20.22 Verify correct adjustment of electrical trim senders.

20.23 Inspect bottom of hull for any protrusions impeding clean water flow to propellers. Ex. Transducers, water pickups, anodes, etc…(See drawing in Installation Guidelines section)

Prepare vessel for sea trail, fill out Application Trial Data Forms on following pages. Send in Konrad Warranty forms and trial forms to Konrad Marine.

www.konradmarine.com
sales@konradmarine.com

Office: 715-386-4203
Fax: 715-386-4219

KONRAD APPLICATION TRIAL DATA FORM

DEALER or DISTRIBUTOR COMPANY NAME

DEALER or DISTRIBUTOR CONTACT NAME

DEALER or DISTRIBUTOR EMAIL:

PROJECT NAME/NUMBER:

CLIENT NAME:

DATE:

CHART 1

CONDITION DESCRIPTIONS

Please circle the unit of measure (KG) or (LBS) you are using for entries with weights

CONDITION	DATE	STERN DRIVE MODEL	DRIVE RATIO	TRANS-MISSION MAKE & MODEL	TRANS-MISSION RATIO	X-DIM	SPACERS	ENGINE HP@ RPM	VESSEL RUNNING WEIGHT *(no fuel)*	FUEL WEIGHT	PERSONNEL AND / OR CARGO WEIGHT	VESSEL TOTAL RUNNING WEIGHT	PROP MFG	NUMBER OF BLADES	DIAMETER & PITCH	PROP MATERIAL (AL or SS)
1																
2																
3																
4																
5																
6																
7																
8																

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Fax: 715-386-4219

KONRAD APPLICATION TRIAL DATA FORM

VESSEL MAKE:

VESSEL LENGTH:

HULL TYPE: Catamaran / Monohull (**Circle**)

APPLICATION: Single / Twin (**Circle**)

CHART 2

TRIAL DATA FOR MAX VELOCITY AT VARIOUS CONDITIONS (OUTLINED IN CHART 1)

CONDITION (See Chart 1 for Description)	**ENGINE** NO LOAD MAX RPM (NUETRAL)		**MAXIMUM VELOCITY READINGS**								**ENGINE** EXHAUST TEMP(C°) AND LOAD %	ENGINE BOOST PRESSURE (kPa)
			TIME TO PLANE (SEC.)	TRIM POSITION	ORIGINAL HEADING (0°)			OPPOSITE HEADING (180°)				
					VELOCITY MAX (KTS)	RPM (ENGINE)		VELOCITY MAX (KTS)	RPM (ENGINE)			
	Port	Star				Port	Star		Port	Star		
1												
2												
3												
4												
5												
6												
7												
8												
GPS Speeds at Varying RPM												
RPM	GPS @ Idle		GPS @ 1000	GPS @ 1500	GPS @ 2000	GPS @ 2500	GPS @ 3000	GPS @ WOT				
Knots												

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Fax: 715-386-4219

KONRAD APPLICATION TRIAL DATA FORM

VESSEL MAKE:

VESSEL LENGTH:

HULL TYPE: Catamaran / Monohull (**Circle**)

APPLICATION: Single / Twin (**Circle**)

CHART 2

TRIAL DATA FOR CRUISE VELOCITY AT VARIOUS CONDITIONS (OUTLINED IN CHART 1)

CONDITION (See Chart 1 for Description)	**ENGINE** NO LOAD MAX RPM (NUETRAL)		**CRUISE VELOCITY READINGS - MINIMUM 3 READINGS, 200 RPM INCREMENTS**								**ENGINE** EXHAUST TEMP(C^o) AND LOAD %	ENGINE BOOST PRESSURE (kPa)
			TIME TO PLANE (SEC.)	TRIM POSITION	ORIGINAL HEADING (0^o)			OPPOSITE HEADING (180^o)				
					VELOCITY CRUISE (KTS)	RPM (ENGINE)		VELOCITY CRUISE (KTS)	RPM (ENGINE)			
	Port	Star				Port	Star		Port	Star		
1												
2												
3												
4												
5												
6												
7												
8												

GPS Speeds at Varying RPM

RPM	GPS @ Idle	GPS @ 1000	GPS @ 1500	GPS @ 2000	GPS @ 2500	GPS @ 3000	GPS @ WOT				
Knots											

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