

HURTH

HSW 630A Marine Transmissions

Owner's Manual

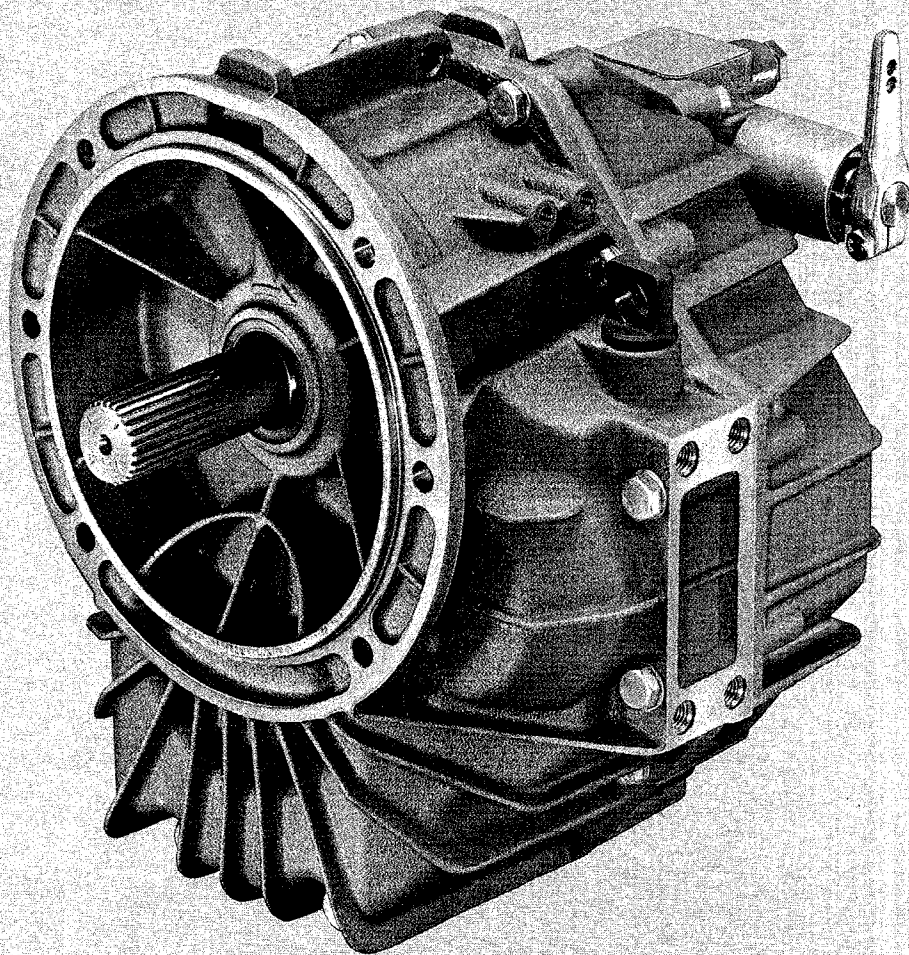


Table of Contents

Section		Page
I	Introduction	1
II	Gear identification	2
III	Description	3
IV	Operation	4
V	Maintenance	7
VI	Troubleshooting	11
VII	Technical data	12
VIII	Warranty	13
IX	Maintenance Record	14

Owner's Responsibilities...

It is the owner's/operator's responsibility to perform the necessary safety checks to ensure that all lubrication, cooling, maintenance and recommended practices are followed for safe, enjoyable operation.

All transmission units are covered by a guarantee given by the manufacturer, therefore:

The instructions in this manual are to be strictly observed with reference to the handling of the transmission units.

CAUTION

The manufacturer is not liable for damages caused by a faulty installation, wrong handling and deficient maintenance.
Please make sure to avoid any external forces as well as vibrations caused by torsion and bending.

The interaction between the engine, shaft equipment and propeller may lead to torsional vibrations producing a hammering noise of gears and eventually damaging the engine and transmission. HURTH ist not responsible for such torsional vibrations inherent to the installation.

I Introduction

This manual includes among others the following three main chapters:

III Description

This part briefly describes the function and operation, as well as the design of the HSW 630A.

IV Operation

This part describes all necessary procedures for operation, as well as all safety measures.

V Maintenance

This part contains all maintenance and service tasks to be performed by the operator.

When used in the manual, the terms "right-hand, front, rear, starboard, port" always refer to the installed transmission in the direction of forward movement.

Important information relating to technical dependability and operational safety are highlighted by the identifying words as follows:

WARNING

An operation or maintenance procedure, practice, condition, statement, etc., which is not strictly observed, could result in injury or death of personnel.

CAUTION

An operation or maintenance procedure, practice, condition, statement, etc., which is not strictly observed, could result in damage to, or destruction of, equipment.

NOTE: Applies to technical requirements to which the user of the equipment must pay particular attention.

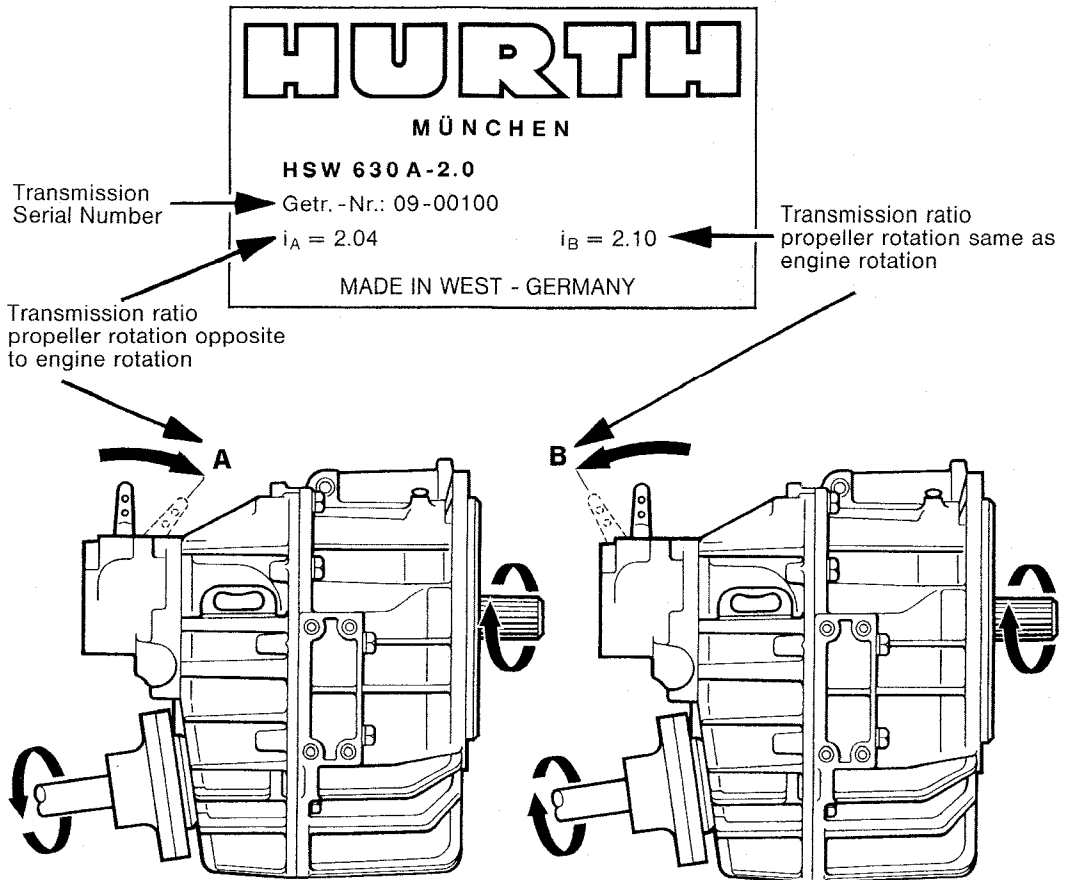
WARNINGS and **CAUTIONS** always precede the text to which they apply.

II Gear Identification

Rating plate

The rating plate is mounted to the transmission.

Example of rating plate:



Position of shifting lever when driving forward

Propeller pitch	Propeller rotation	Shifting lever in position
Right hand	opposite to engine rotation	A
Left hand	as engine rotation	B

Significance of transmission designations:

Size of transmission

Version of transmission

Type of transmission

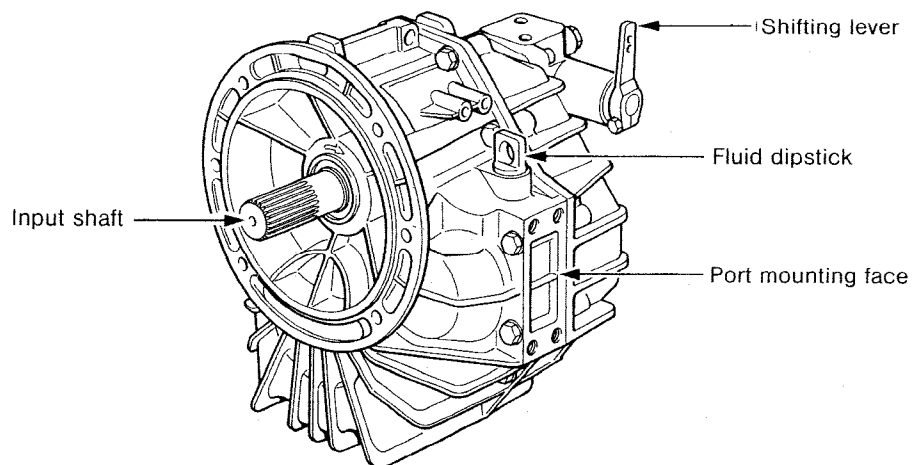
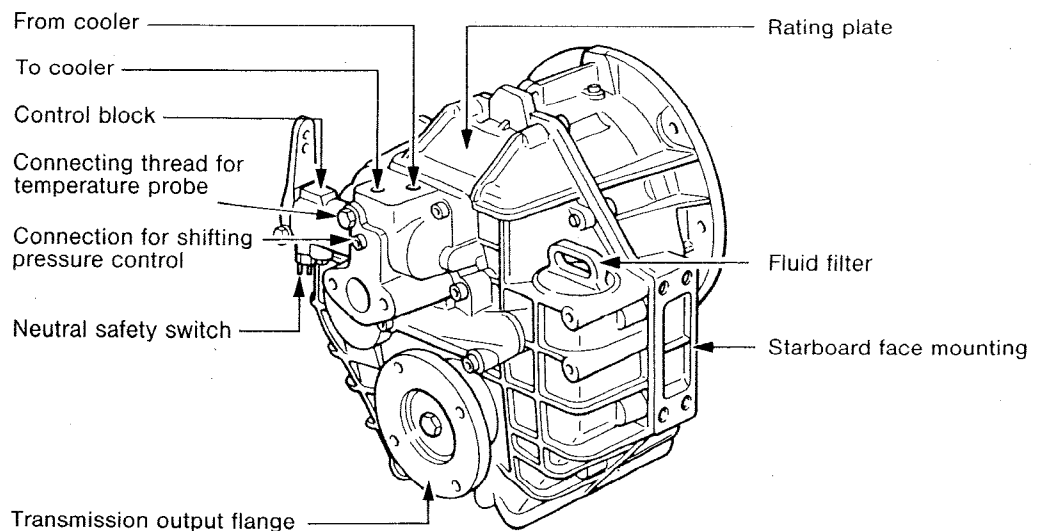
Nominal transmission ratio

HSW 630 A - 2.0

III Description

The HSW 630A marine transmission is a hydraulically activated helical gear unit, developed for use in pleasure and commercial craft and designed as a three-shaft type gearbox. Its multiple disc reversing clutch is mounted on the input shaft and is supplied with hydraulic fluid by a pump geared to the engine speed and integrated into the control block. The transmission can be reversed even at increased engine speeds, for example in emergencies.

The torque transmission capacity of the transmission clutches is exactly rated by maintaining the fluid pressure constant, so as to prevent shock loads from exceeding a pre-determined value and to protect the driving unit against overload. Thus the effect of a safety clutch is provided.



IV Operation

4.1 General

All HSW transmissions have been submitted to a trial run before shipment.

Lubrication of the transmission is ensured by splash and circulating lubrication.

Optimum effectiveness of the fluid can only be assured if the fluid and filters are changed regularly according to schedule. See Chapter 5.2.

Visual checks for leakage should be made from time to time.

WARNING

Work on the transmission must only be performed with the engine and propeller at standstill.

CAUTION

Before the first start-up, the transmission must be filled with transmission fluid.

For filling procedure, fluid type, quantity and level refer to Chapter 5.1 and 5.2 fluid change.

CAUTION

Excessive filling of the transmission may produce leaks at the shaft seals and the transmission breather, and may increase its operating temperature.

IV Operation

4.2 Operating Procedures

CAUTION

Before operating the transmission, check the fluid level (See Chap. 5.1).

CAUTION

Whenever possible, gears should be shifted with the engine idling. Shifting at higher engine speeds may lead to an overstress of the friction linings of the coupling and should therefore be avoided during normal operation.

NOTE:

Gears may be shifted from forward to reverse in case of emergency even up to an engine speed of 3200 rpm.

The transmission is shifted by actuating shifting lever (Figure 1, Item 1) at the control block (Figure 1, Item 2).

Shifting positions:

Position A = Propeller rotation
opposite to engine
rotation

Position N = neutral position

Position B = Propeller rotation
same as engine
rotation

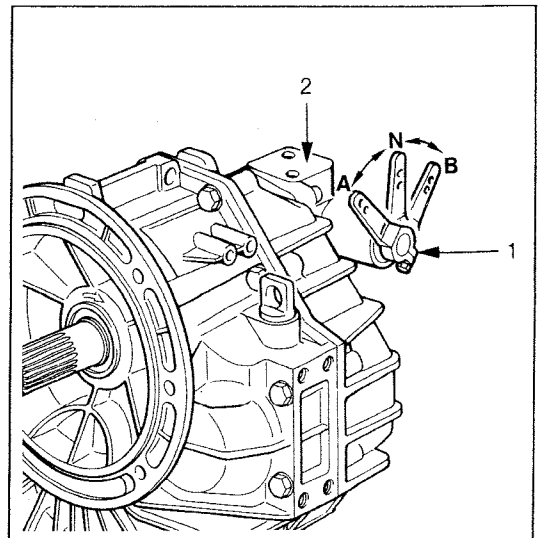


Figure 1

WARNING

Start engine with transmission in neutral only.

The operating temperature of the transmission should not exceed 80°C (176°F). Temperature sensor as an optional. At wide open throttle operating fluid temperature may reach 105°C (220°F).

CAUTION

If the fluid temperature is too high, stop engine and check transmission fluid level, as well as oil cooler for proper water flow. Do not start the engine again until the malfunction is eliminated.

IV Operation

4.2.1 Moving in tow or anchoring

When being towed, as well as when anchoring in a river, the propeller shaft may rotate due to water current forcing the propeller to rotate without harm to transmission. While the engine is stopped, the position of the shifting lever is not important.

4.2.2 Freewheeling

Freewheeling one propeller of a twin engine boat at trolling speeds will not cause damage to the transmission connected to the freewheeling propeller.

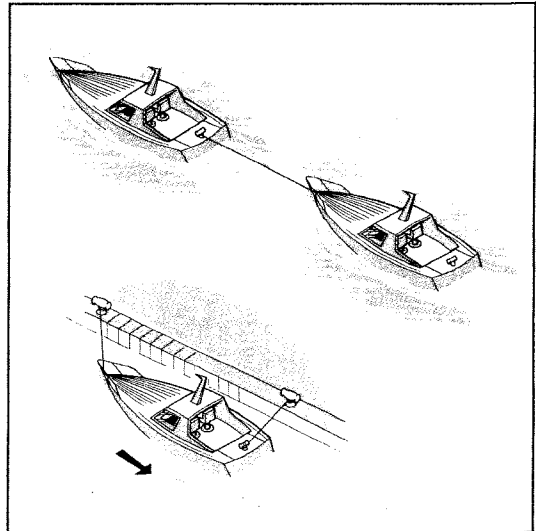


Figure 2

WARNING

Do not work on the transmission when being towed or anchoring in a river because the propeller may rotate.

WARNING

Do not work on the transmission when, in a twin engine boat, only one unit is under power. The propeller shaft of the inoperative transmission will rotate.

WARNING

If the engine is idling with the propeller shaft stopped (e.g. when running the generator to charge the battery) the shift lever (Figure 3, Item 1) must remain in neutral position otherwise the boat will move.

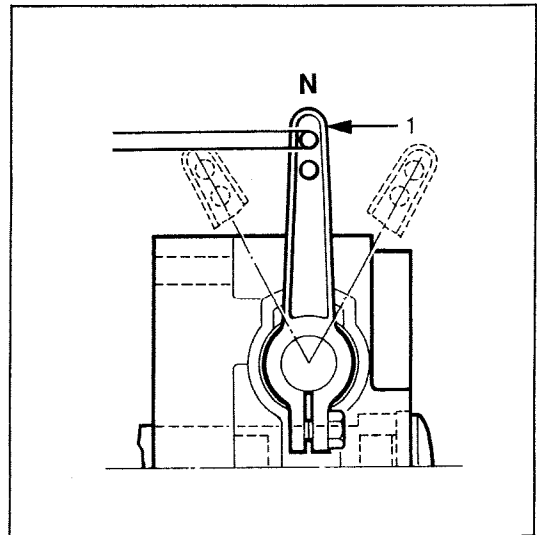


Figure 3

V Maintenance

WARNING

Work on the transmission must only be performed with the engine and propeller at standstill.
Always wear gloves when working on a hot transmission.

5.1 Checking the fluid levels

The fluid level may be checked with the transmission cold or hot.

Check fluid level before operating the transmission.

1. Loosen fluid dipstick (Figure 2, Item 1) turning the handle (Figure 1, Item 1) counterclockwise.
2. Wipe dipstick with a clean and dustfree cloth and insert dipstick to its stop.
3. Remove dipstick and check fluid level.

NOTE:

Quantity of fluid between min. and max. mark is 0.5 liters (0.53 US qts).

4. Insert the dipstick to its stop and lock it by turning the handle clockwise.

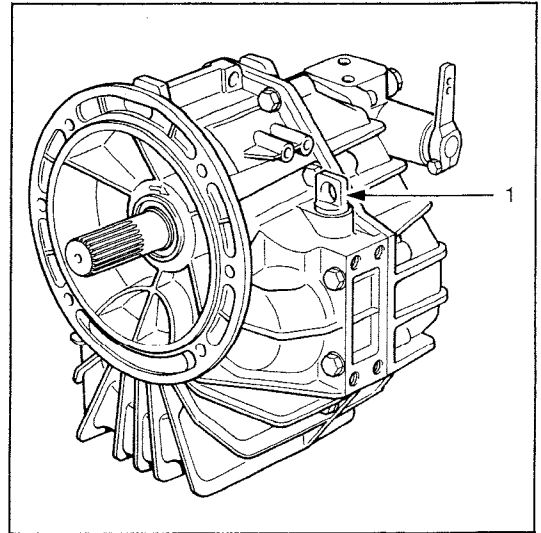


Figure 1

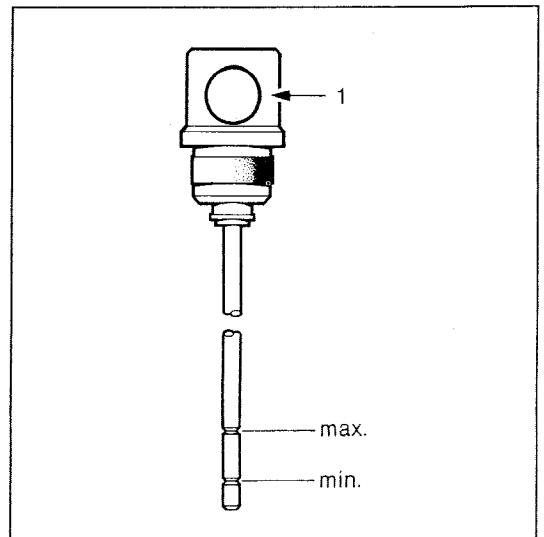


Figure 2

V Maintenance

5.2 Fluid change

The first fluid change must be performed after 25 hours of operation. Subsequent fluid changes after every 300 hours of operation.

NOTE:

The filter element must be renewed whenever the fluid is changed.

1. Turn filter cover (Figure 3, Item 1) counter-clockwise to loosen the fluid fine filter (Figure 4, Item 1).
2. Remove filter cover complete with fluid fine filter.

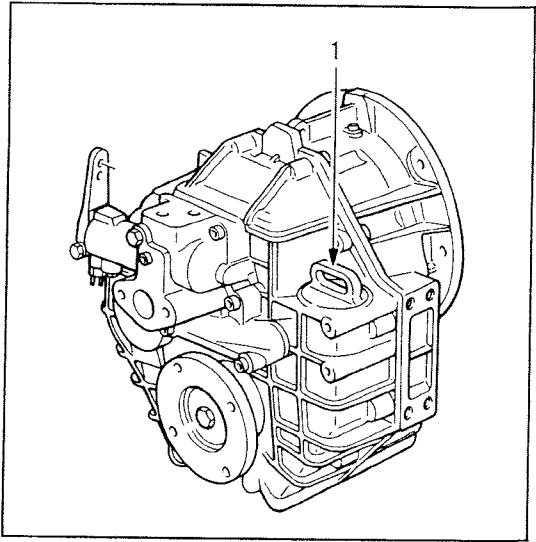


Figure 3

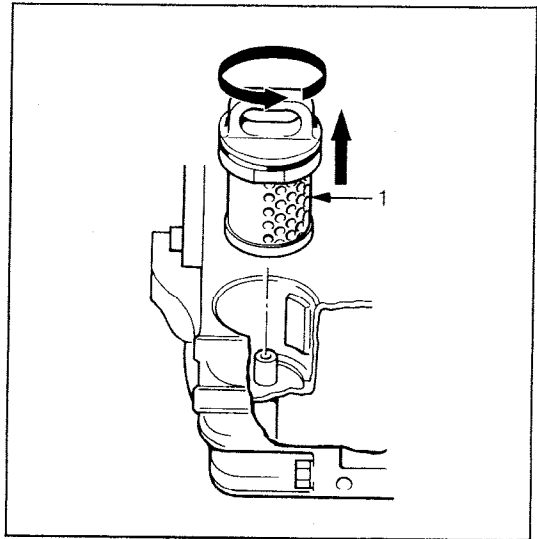


Figure 4

V Maintenance

3. Pump out old transmission fluid through suction pipe (Figure 5, Item 1) in the filter compartment.

NOTE:

Max. outside diameter of suction hose is 16 mm (5/8 in) (Figure 5, Item 2).

4. Fill with 3.5 liters (0.92 US gallon) of Automatic Transmission Fluid (ATF) Figure 6.
Plus amount required for cooler and pipelines.

CAUTION

Only use automatic transmission fluid as specified in the technical data (Chapter VII).

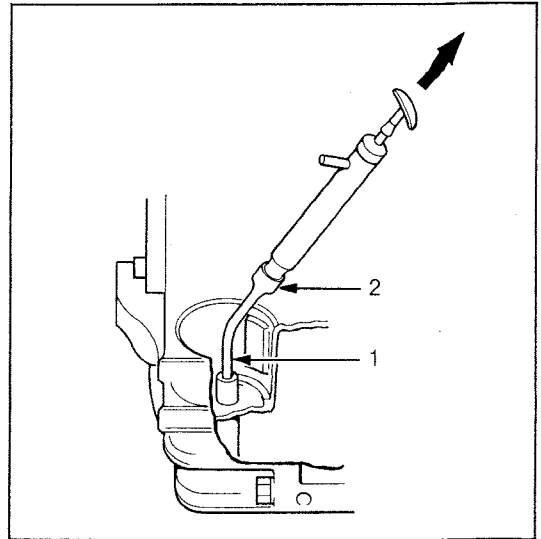


Figure 5

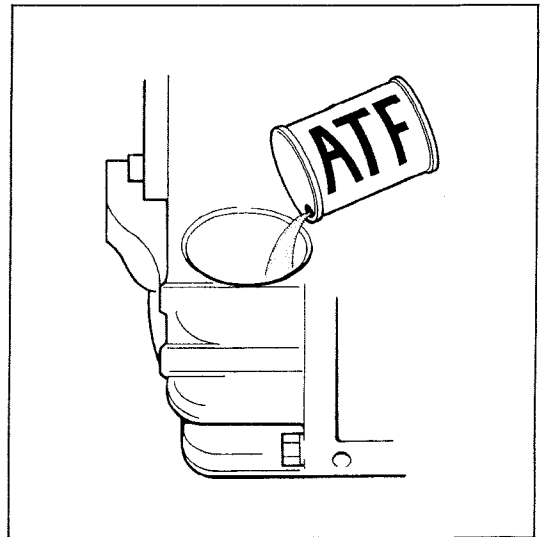


Figure 6

V Maintenance

5. Remove filter element (Figure 7, Item 1) from cover (Figure 7, Item 2).
6. Check O-ring (Figure 7, Item 5) and place new filter element onto cover.
7. Check O-ring (Figure 7, Item 3) and insert filter cover with fluid fine filter to its stop into the transmission housing.
8. Lock filter cover in place by turning clockwise.

NOTE:

When inserting the filter cover, make sure that flat side of cover (Figure 7, Item 4) matches with lug (Figure 8, Item 1) in the filter compartment.

9. Let engine run at idle speed with shifting lever in neutral position until fluid cooler and all pipelines are filled with fluid.
10. Shut down engine and check fluid level again. If necessary, top up to the marking on the dipstick (See Chapter 5.1).

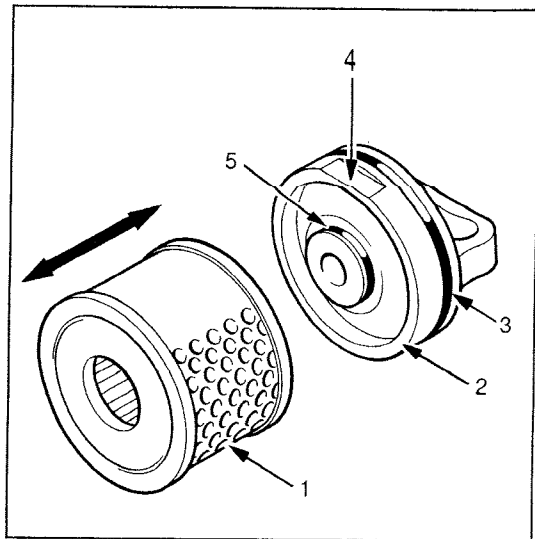


Figure 7

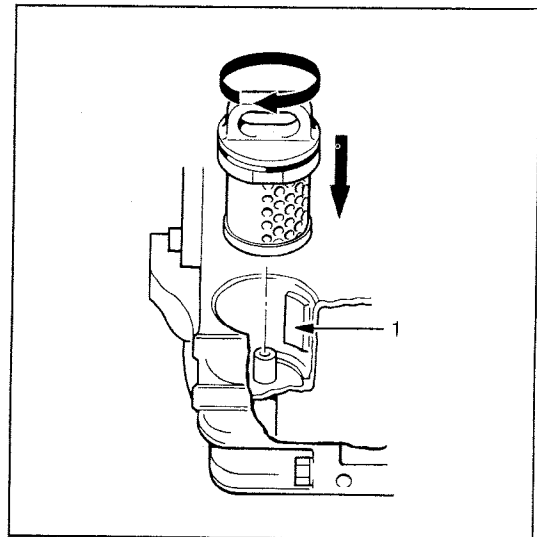


Figure 8

5.3 Storage

If the transmission is stored for longer time, for example winter storage, it should be topped up through the dipstick hole with the prescribed transmission fluid to protect it against corrosion.

Moreover, it is recommended to drain the water from the transmission fluid cooling system.

VI Trouble shooting

Check first whether all items of the present operating instructions have been complied with.

The subsequent table assists you in trouble shooting.

Symptom:	Possible cause:	Remedy:
1. High fluid temperature	Fluid level high	Pump fluid out to max. mark on dipstick
	Fluid level low	Add fluid
	Plugged or restricted fluid cooler	Replace cooler and flush water system
	No water in cooling system	Check cooling system & Repair
	Unknown	Consult service facility
2. Fluid on transmission	Loose bolts	Tighten to specifications
	Loose fittings	Tighten, replace
	Loose dipstick	Tighten, replace
	Loose filter cover	Tighten, replace
	Fluid level high	Pump fluid out to max. mark on dipstick
	Unknown	Consult service facility
3. Fluid and water mixed	Damaged fluid cooler	Consult service facility
4. Shifts hard	Selector control	Consult service facility
	Linkage	Adjust
	Unknown	Consult service facility
5. Slow engagement	Selector control	Consult service facility
	Low fluid level	Add fluid
	Linkage	Adjust
	Unknown	Consult service facility
6. Boat will not move	Selector control	Consult service facility
	Improper selector position	Adjust
	Low fluid level	Add fluid
	Propeller missing	Replace
	Propeller shaft broken	Consult service facility
	Transmission malfunction	Consult service facility
	Engine malfunction	Consult service facility

VII Technical data

Type	HSW 630 A -	1.2	1.55	2.0	2.5
Rated input torque*	PC Nm (ft. lb.)	630 (465)			560 (413)
	ID Nm (ft. lb.)	500 (370)			450 (332)
	CC Nm (ft. lb.)	450 (332)			400 (295)
Max. input power	PC kW (hp)	265 (360)			235 (320)
	ID kW (hp)	210 (290)			190 (260)
	CC kW (hp)	190 (260)			170 (230)
Max. propeller thrust	N (lb.)	18000 (80070)			16000 (71170)
Shifting pressure	bar (psi)	21.5-23.5 (312-341)			
Max. input speed	1/min (r.p.m.)	5500			
Weight without fluid and fluid cooler	kg (lb.)	44 (97)			
Fluid capacity without fluid cooler	Liters (qts.)	3.5 (3.7)			
Type of fluid	ATF (Automatic Transmission Fluid) e.g.: DEXRON II-D; FORD M2 C-33G; Allison C-3 no other fluids unless authorized by HURTH				

PC = Pleasure Craft; ID = Intermediate Duty; CC = Commercial Craft

When mounting the HURTH HSW transmissions, the following items should be specially noted:

- Mounting should be done by a specialist only.
- Arrange the transmission and engine correctly.
- Align correctly with regard to engine and propeller shaft.
- Choose adequate coupling.
- Choose adequate cooler.
- Mount the transmission correctly in the boat.

For detailed information see Installation Manual.

* Maximum input torque is not to exceed 10% above the rated input torque.

VIII Warranty

LIMITED WARRANTY

HURTH HBW/HSW REVERSING MARINE TRANSMISSIONS

HURTH warrants its type HBW/HSW Reversing Marine Transmission to be free from defects in material and workmanship under normal use and maintenance, provided that this warranty shall apply if, and only if, the equipment has been properly installed and operated.

The obligation of HURTH under this warranty shall be limited to the replacement or repair, at its choice, of any part or parts found to be defective by HURTH upon its examination of same, provided that the part or parts are returned to HURTH at the place specified in Appendix A, freight prepaid, within the time

- (1) Transmission for pleasure craft Twelve (12) months from date of commission **or** twenty-four (24) months from date of delivery to engine manufacturer, whichever occurs first.
- (2) Transmission for commercial craft . . . Six (6) months from date of commission or twelve (12) months from date of delivery to engine manufacturers, whichever occurs first.

The obligations of HURTH under this warranty as set forth herein shall also be subject to compliance by the distributor or engine manufacturer who has purchased the product with the Warranty Procedures as set forth in attached Appendix A which is made a part of this warranty.

All warranties shall run to distributors and engine manufacturers who have purchased the type HBW/HSW Reversing Marine Transmission.

This warranty shall not apply to any part or parts which have been repaired or altered, without the prior written consent of the warranty facility mentioned in Appendix A.

This warranty shall not apply if the product or any of its components or parts have been subject to misuse, abuse, negligence, alteration, or accident, or has not been operated in accordance with printed instructions of HURTH or has been operated under conditions more severe than, or otherwise exceeding, those set forth in the specifications for said product, or has been improperly installed or reinstalled, or improperly maintained and operated.

THIS WARRANTY IS EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES EXPRESSED OR IMPLIED INCLUDING THE WARRANTIES OF MERCHANTABILITY AND FITNESS FOR USE AND OF ALL OTHER OBLIGATIONS INCLUDING WITHOUT LIMITATION, CONSEQUENTIAL DAMAGES, AND HURTH NEITHER ASSUMES NOR AUTHORIZES ANY OTHER PERSON TO ASSUME FOR HURTH, ANY OTHER LIABILITY IN CONNECTION WITH THE SALE OF THE HBW/HSW REVERSING MARINE TRANSMISSION. THIS WARRANTY SHALL APPLY ONLY WITHIN THE BOUNDARIES OF THE UNITED STATES. HURTH SHALL IN NO EVENT BE LIABLE FOR ANY BREACH OF WARRANTY IN AN AMOUNT EXCEEDING THE PURCHASE PRICE OF THE HBW/HSW REVERSING MARINE TRANSMISSION.

Please ask for the appendix A at your HURTH dealer or at:

CH Corporation
1018 Carolina Drive
West Chicago, IL 60185
Phone: (312) 231-1680

IX Maintenance Record

Record the model number, serial number and ratio of your transmission below for future reference.

HURTH	
MÜNCHEN	
HSW 630A-	
Getr. -Nr.:	
$i_A =$	$i_B =$
MADE IN WEST - GERMANY	

Date placed in operation: _____

Propeller diameter and pitch: _____

Engine builder: _____

Engine model and type: _____

Fluid Changed:

Date	Date	Date	Date	Date

Service Record:

Date	Service Required	Date	Service Required

CARL HURTH Maschinen- und Zahnradfabrik GmbH & Co

Moosacher Strasse 36 · D - 8000 München 40 · Phone (089) 35 40 1-0 · Telex 17 898 186 · Teletex 898 186 · Telefax (089) 35 401 660

HURTH HSW 630A Marine Transmissions (Owner's Manual) 10/87/1.0 e. · Printed in FR of Germany · Subject to technical modifications.