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# ***BETA* MARINE**

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## **Operator's Maintenance Manual**



**Saildrives  
13.5, 20 and 28 bhp**

CALIFORNIA — Proposition 65 Warning

Diesel engine exhaust and some of its constituents are known to the state of California to cause cancer, birth defects and other reproductive harm.

# SAIL DRIVE

The **SAIL DRIVE UNIT SELVA** is used on pleasure boats or on professional boats with either petrol or diesel engines, whose power capacity is in conformity with the following diagram of use. The SAIL DRIVE UNIT is sold complete with a fiberglass base to be fixed to the hull, which is prearranged to fit to different kinds of motors.

The structure of the unit is in aluminium alloy, with a high -level resistance to corrosion.

The anodic protection and the oversize thickness give it a long life.

The mechanical parts are made by high-quality steels, thermically treated.

It is possible to draw, from a special hole, the water for the engine cooling.

The transmission oil is cooled directly by the structure plunged in water.

The maintenance is easy ; the oil can be changed while the boat is in the water.

If folding propellers are used, it is better that the gears are in the reverse position, when the boat is sailing or when it is moored counter-current, When the gears are in neutral position, the motor can only idle (max. 1500 r.p.m. ).

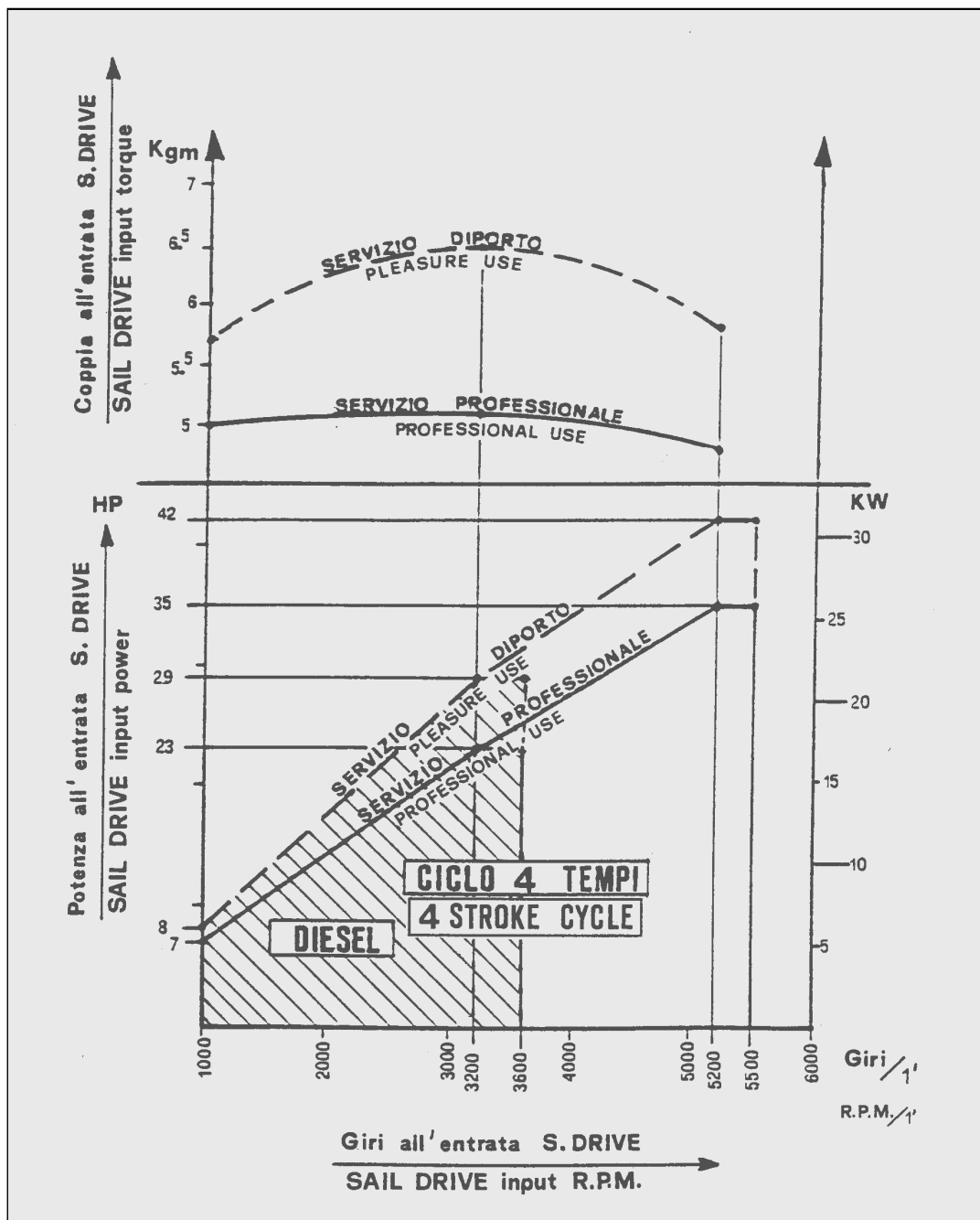
## ATTENTION

**THE PROPELLER IN FORWARD GEAR HAS GOT A CLOCKWISE ROTATION, IF YOU LOOK AT THE STERN. THEREFORE USE ONLY RIGHT-HAND PROPELLERS (RH).**

## TECHNICAL FEATURES

<b>MAXIMUM POWER AND MAXIMUM TORQUE APPLIABLE</b>				
<b>KIND OF MOTOR</b>	<b>PLEASURE USE</b>		<b>PROFESSIONAL USE</b>	
<b>8 - 4 STROKE CYCLE</b>	31 KW - 42 HP	65 Nm - 6.5 Kgm	26 KW - 35 HP	52 Nm -5,2 Kgm
<b>DIESEL</b>	21 KW - 29 HP	65 Nm - 6.5 Kgm	17 KW - 23 HP	52 Nm -5,2 Kgm
<b>GEAR RATIO</b>	2,2:1			
<b>DIRECTION REVERSE</b>	MECHANICAL F-N-R			
<b>PROPELLER</b>	RIGHT ROTATION, WITH FIXED BLADES OR FOLDING BLADES			
<b>RECOMMENDED OIL</b>	API. GL-5 (SAE 80/90W) MIL-L2105C (SAE 90)			
<b>OIL QUANTITY</b>	Lt. 2,3			
<b>FIRST OIL CHANGE</b>	AFTER THE FIRST 20 HOURS OF USE			
<b>OIL CHANGE</b>	ONCE A YEAR			
<b>WEIGHT ( WITHOUT PROPELLER )</b>	Kg 39			

SELVA S.p.A. reserves the right to make modifications concerning weight, assembling, material and technical features without notice or obligation.



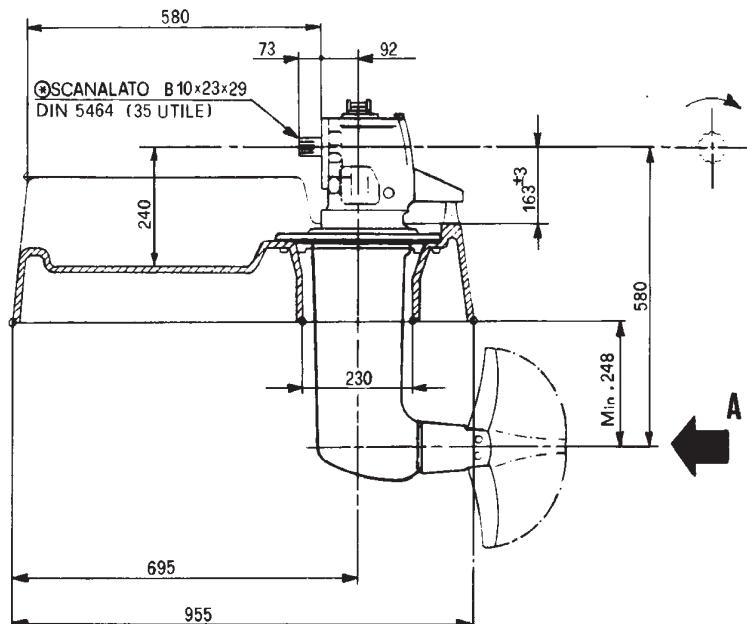
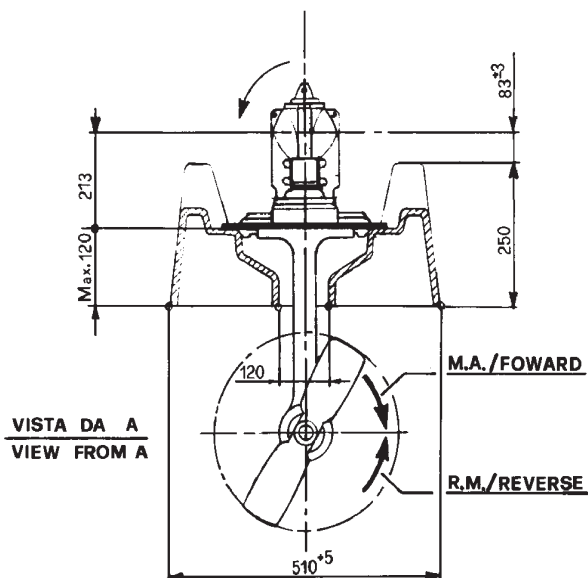
IF MOTORS WITH LESS THAN THREE CYLINDERS ARE USED, IT IS NECESSARY TO REDUCE THE POWER WITH A SHOCKE FACTOR = 1,20.

### **PLEASURE USE** PLEASURE BOATS and SAILING BOATS

THE USE AT MAXIMUM POWER MUST BE DONE FOR LIMITED PERIODS AND IT MUST NEVER BE MORE THAN THE 20% OF THE DAILY USE. UNINTERRUPTED USE IS ALLOWED ONLY AT MEDIUM POWER.

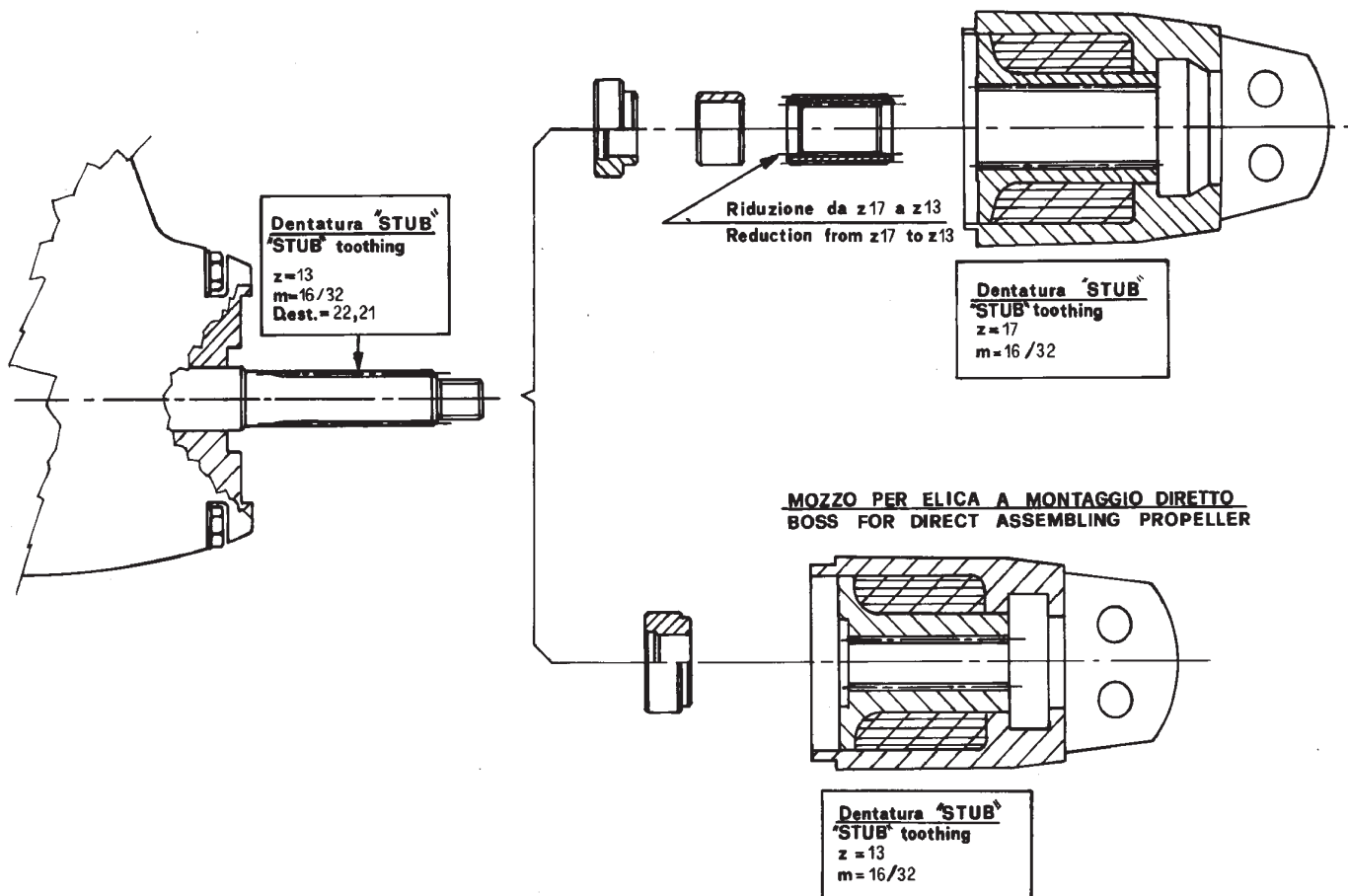
### **PROFESSIONAL USE**

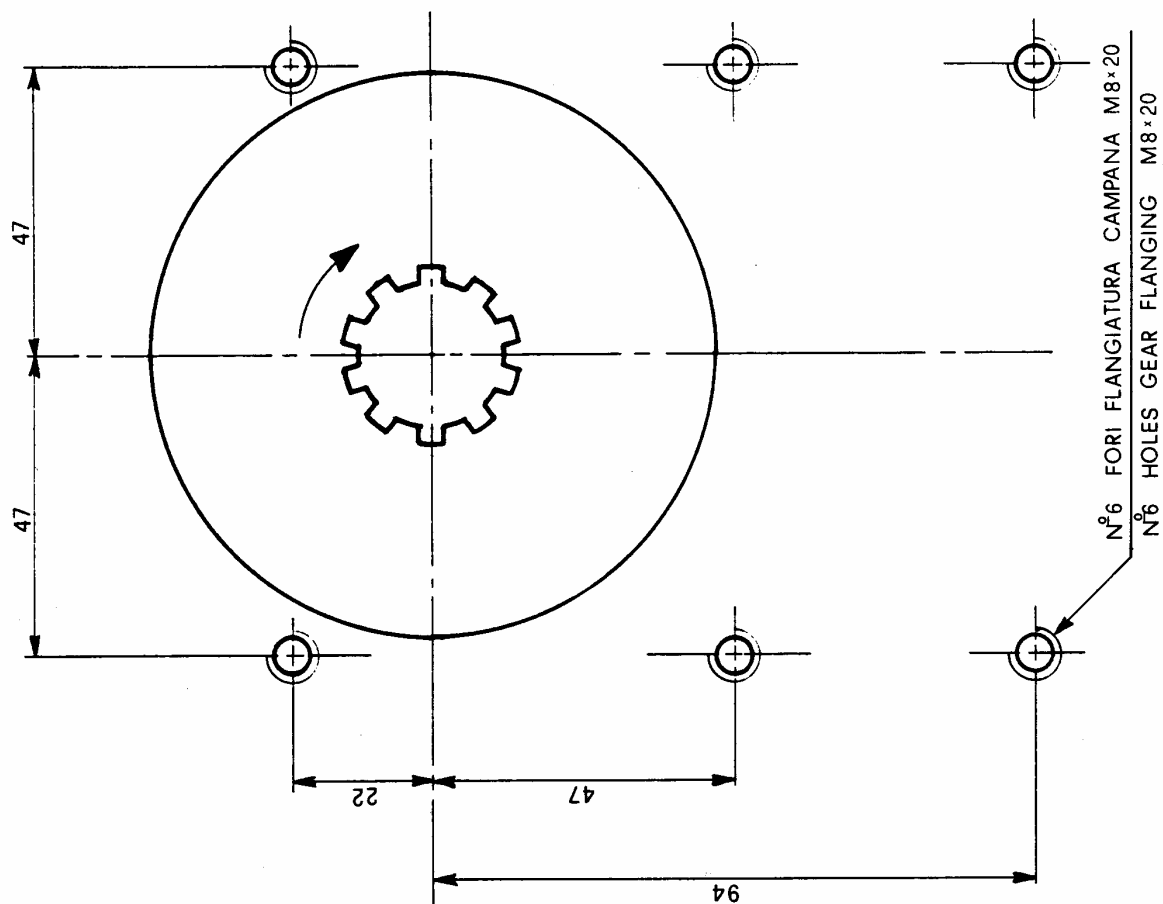
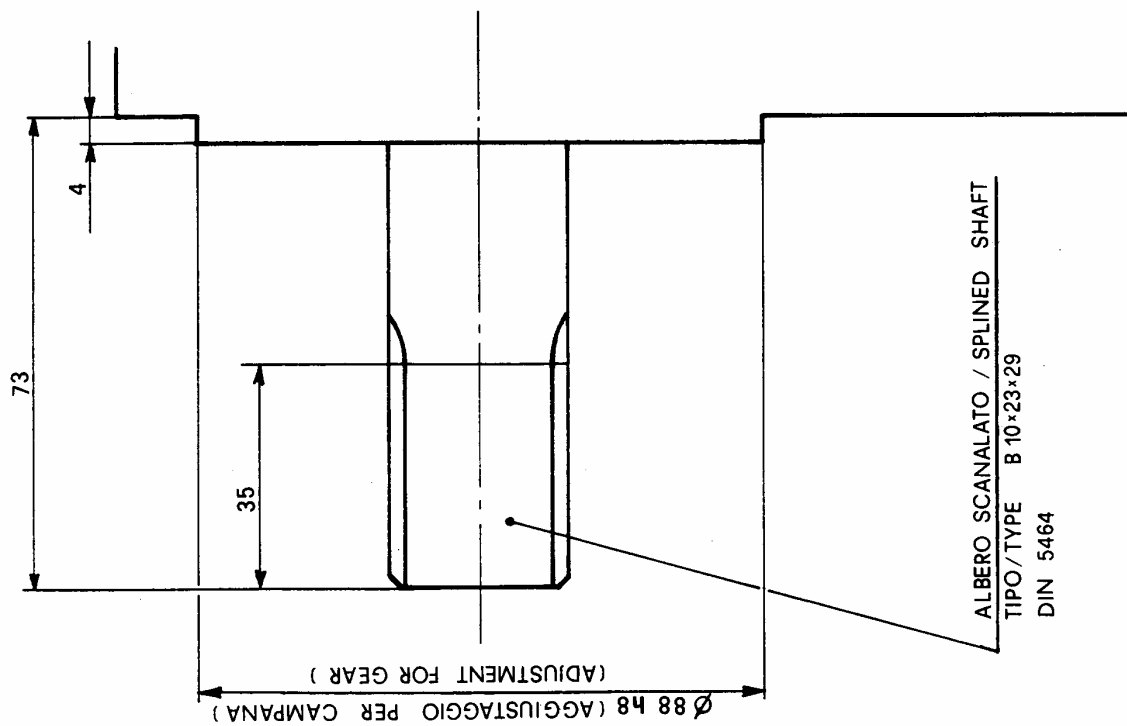
BOATS AND SAILING BOATS WITH INTENSIVE USE OF THE MOTOR.



- ⊙ INPUT, SPLINE PROFIL B10x23x29 DIN 5464
- ⊙ ENTRÉE, PROFIL D'ARBRE CANNÉ  
B10x23x29 DIN 5464
- ⊙ ANTRIEB, KEILWELLENPROFIL  
B10x23x29 DIN 5464

**MOZZO CON FORO A 17 DENTI**  
**BOSS WITH 17 - TEETH HOLE**





**FLANGIATURA PER CAMPANA DI ACCOPPIAMENTO**  
**FLANGING FOR CONNECTION GEAR**

1- WASHER M8

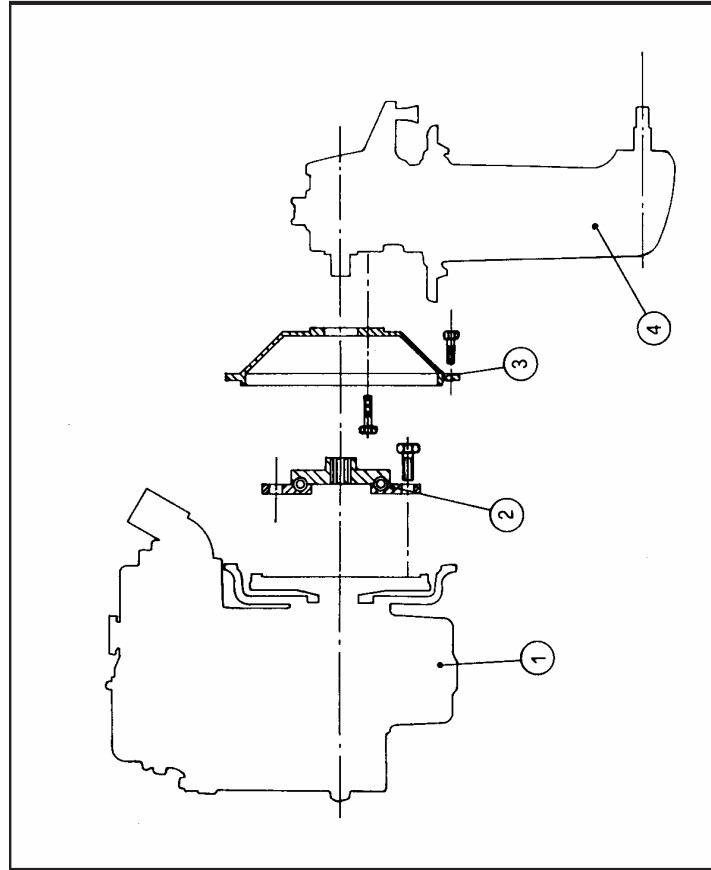
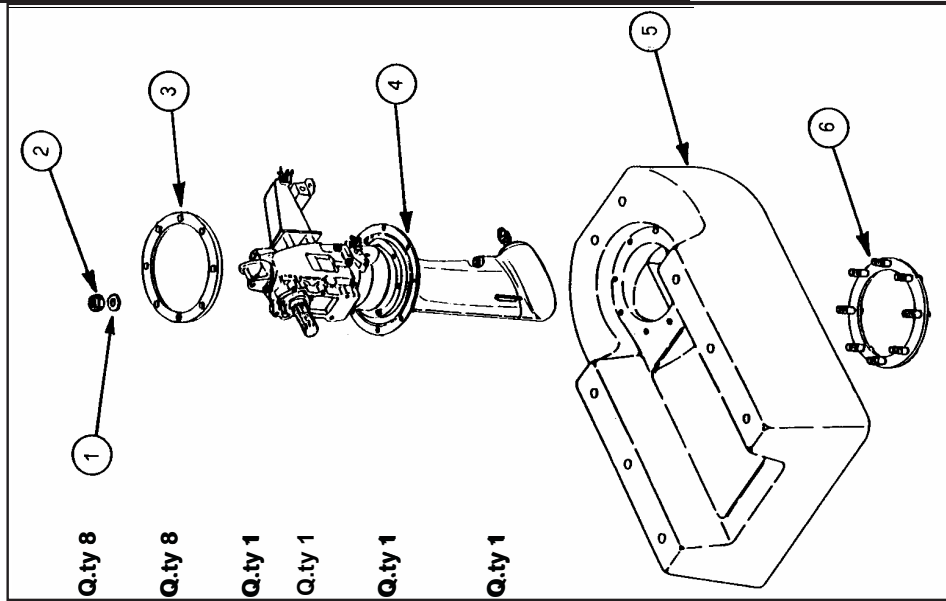
2- SELFLOCKING NUT M8

3- BASE UPPER FLANGE

4- SAIL DRIVE

5- BASE FOR SAIL DRIVE

6- BASE LOWER FLANGE WITH STUDS



1- MOTOR

2- ELASTIC JOINT

3- CONNECTION GEAR

4- SAIL DRIVE

IT IS NECESSARY TO PUT A TORSIONAL ELASTIC JOINT BETWEEN THE MOTOR AND THE SAIL DRIVE UNIT.

1- Water circuit tap hole for engine cooling (1/2 gas)

2- Oil tap with level dipstick

3- Cover with lifting hook

4- Oil exhaust tap

5- Silentblock support

6- Gears remote control flex cable retaining hook

7- Silentblock

8- Gears cam

9- Split pin

10- Gears control flex cable attachment head

11- Gears control lever

12- Gears cam spring

13- Propeller nut

14- Washer

16- Propeller shoulder

17- Propeller shaft

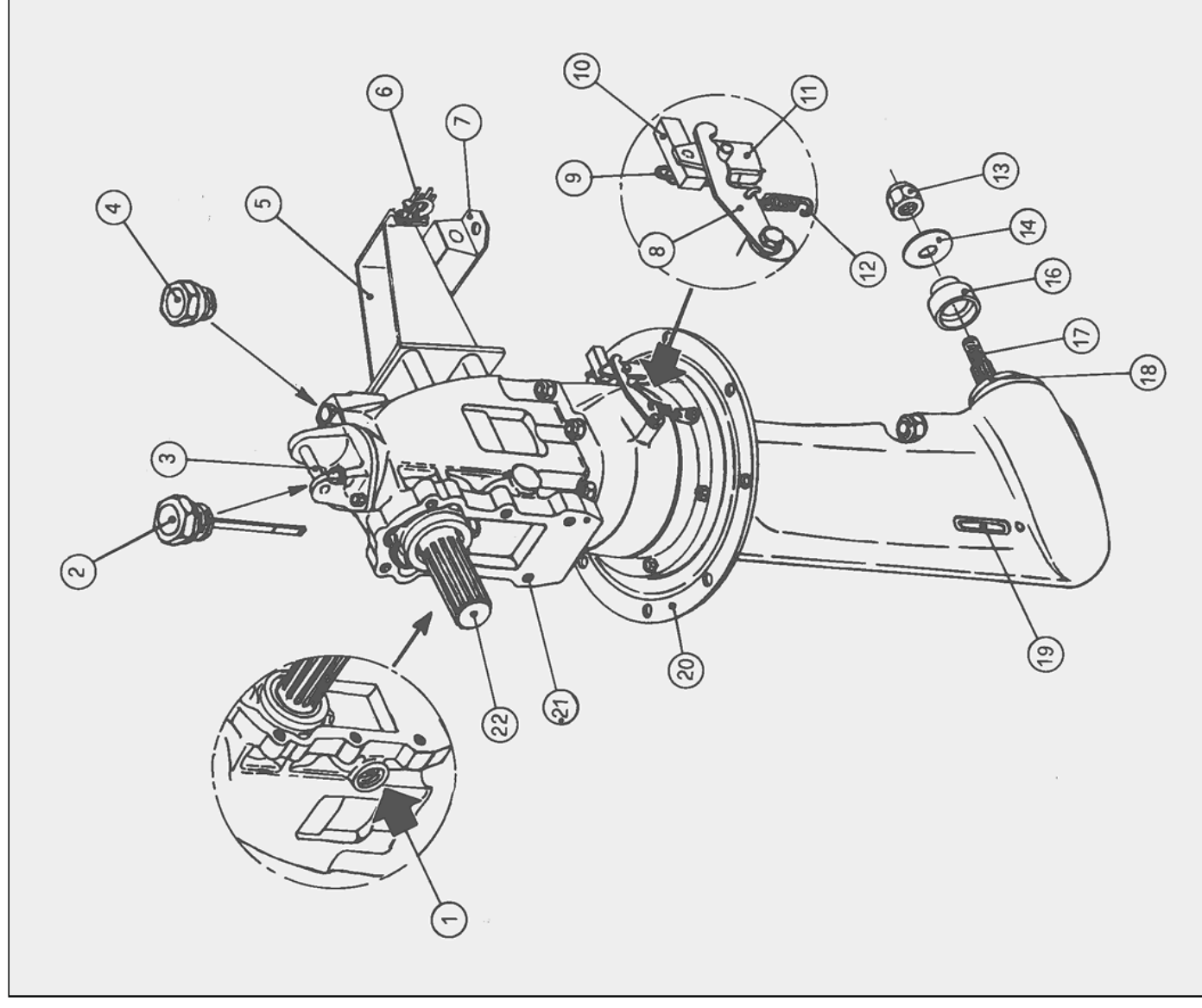
18- Anode

19- Engine cooling water inlet louver

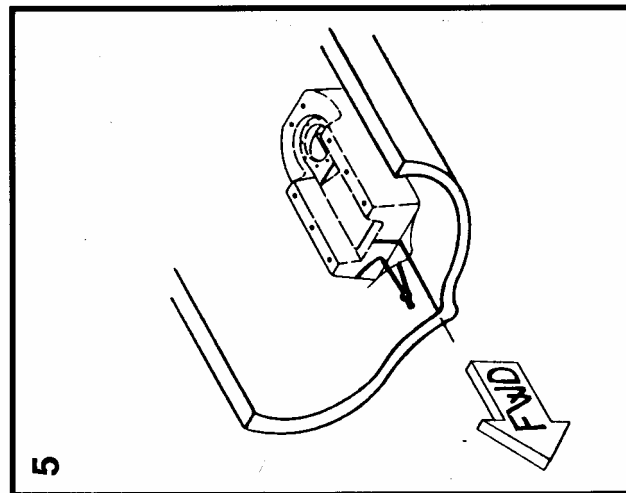
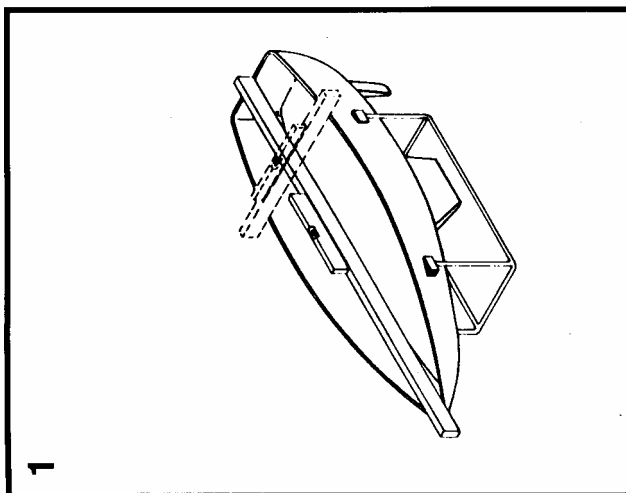
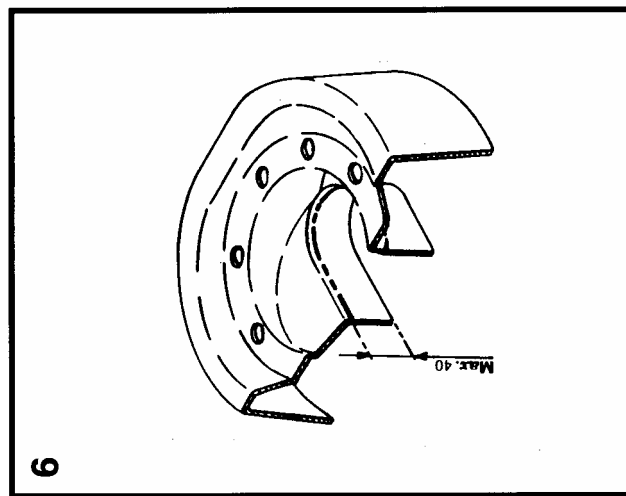
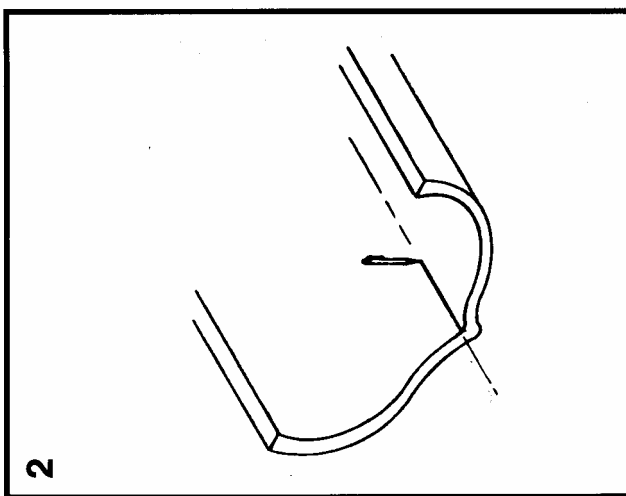
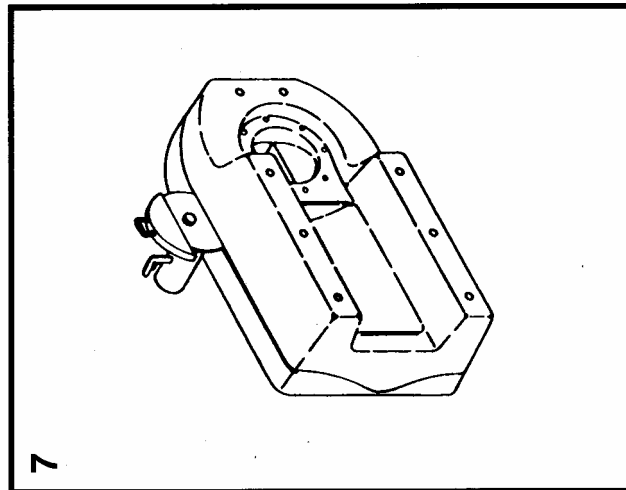
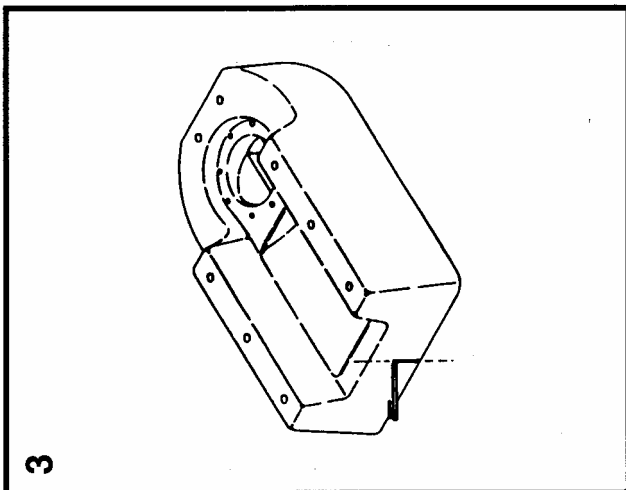
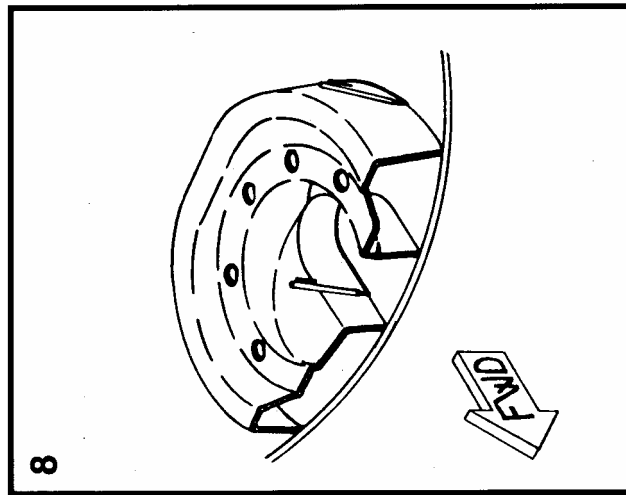
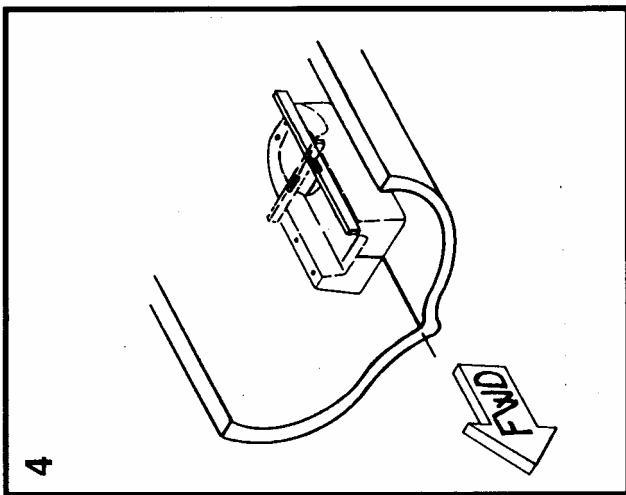
20- Rubber elastic membrane

21- Cover fixing holes (M8)

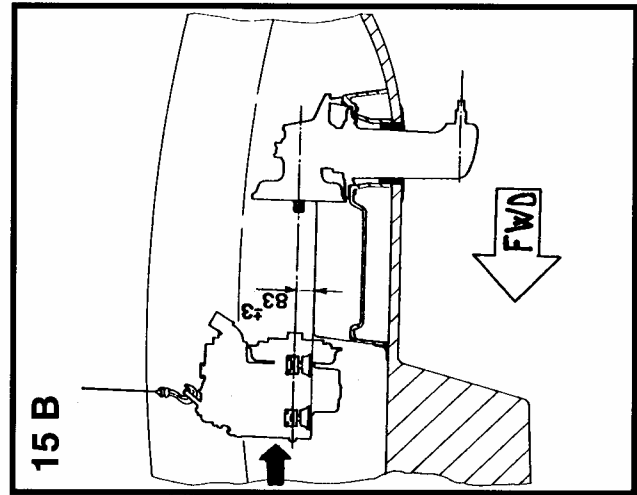
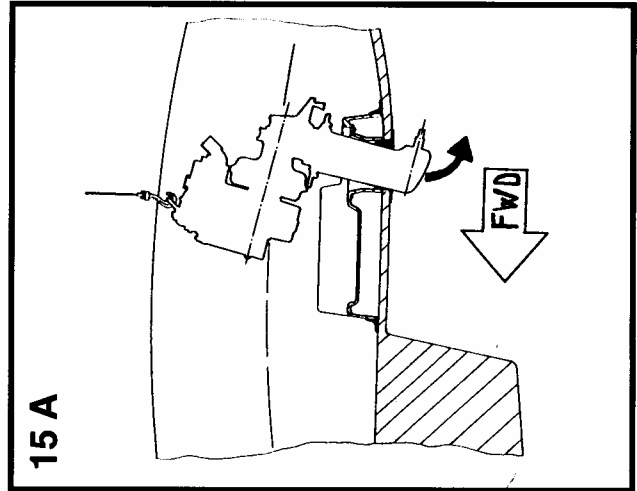
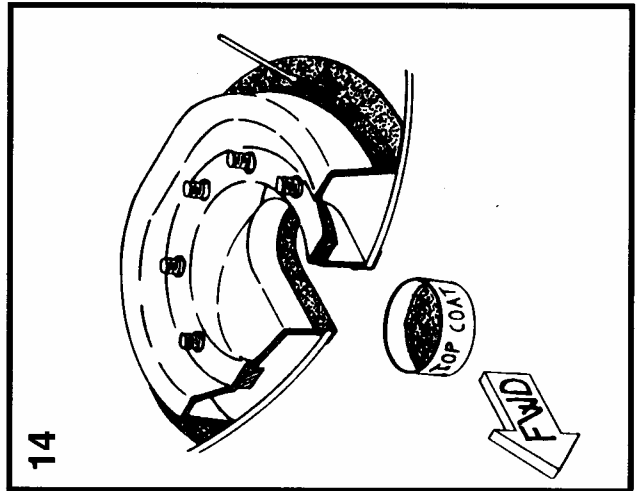
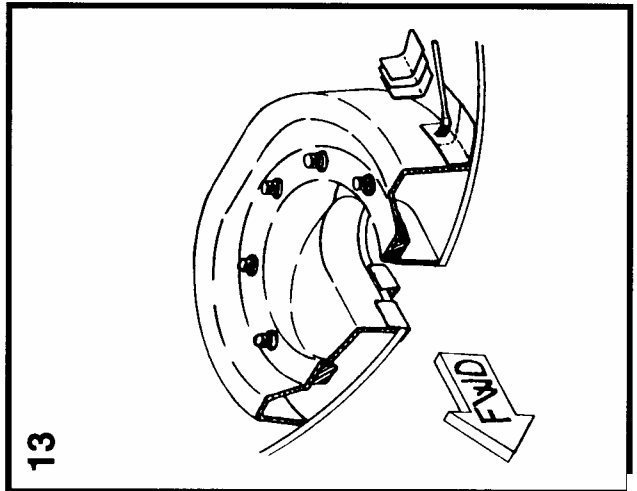
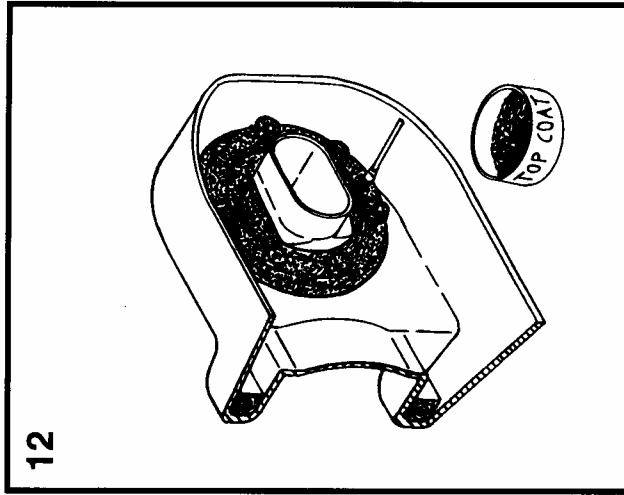
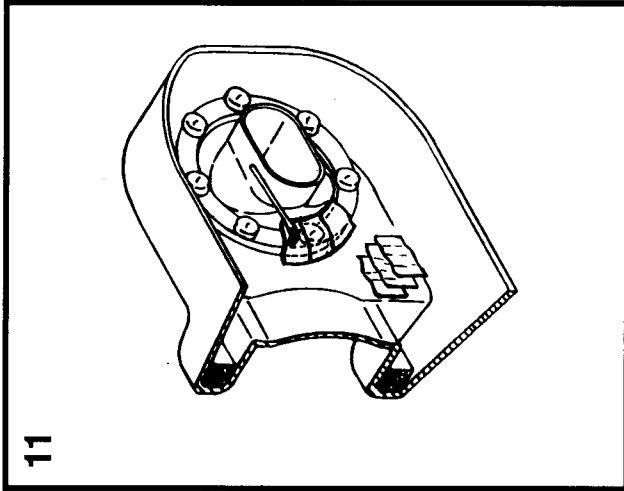
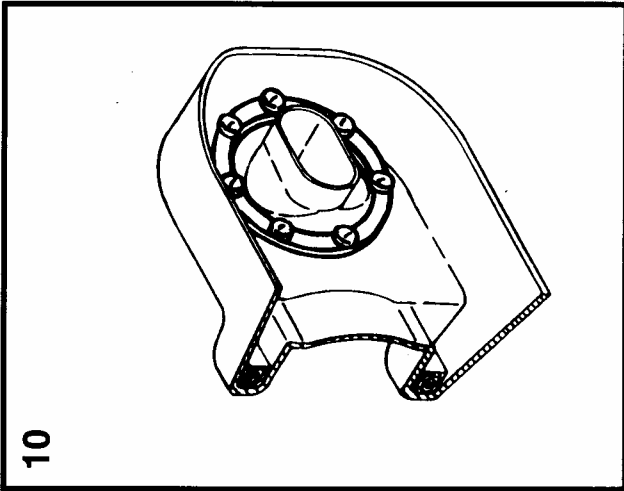
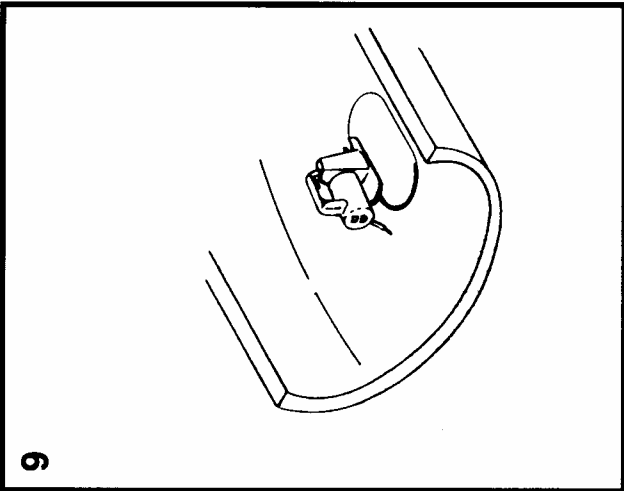
22- Engine connecting shaft

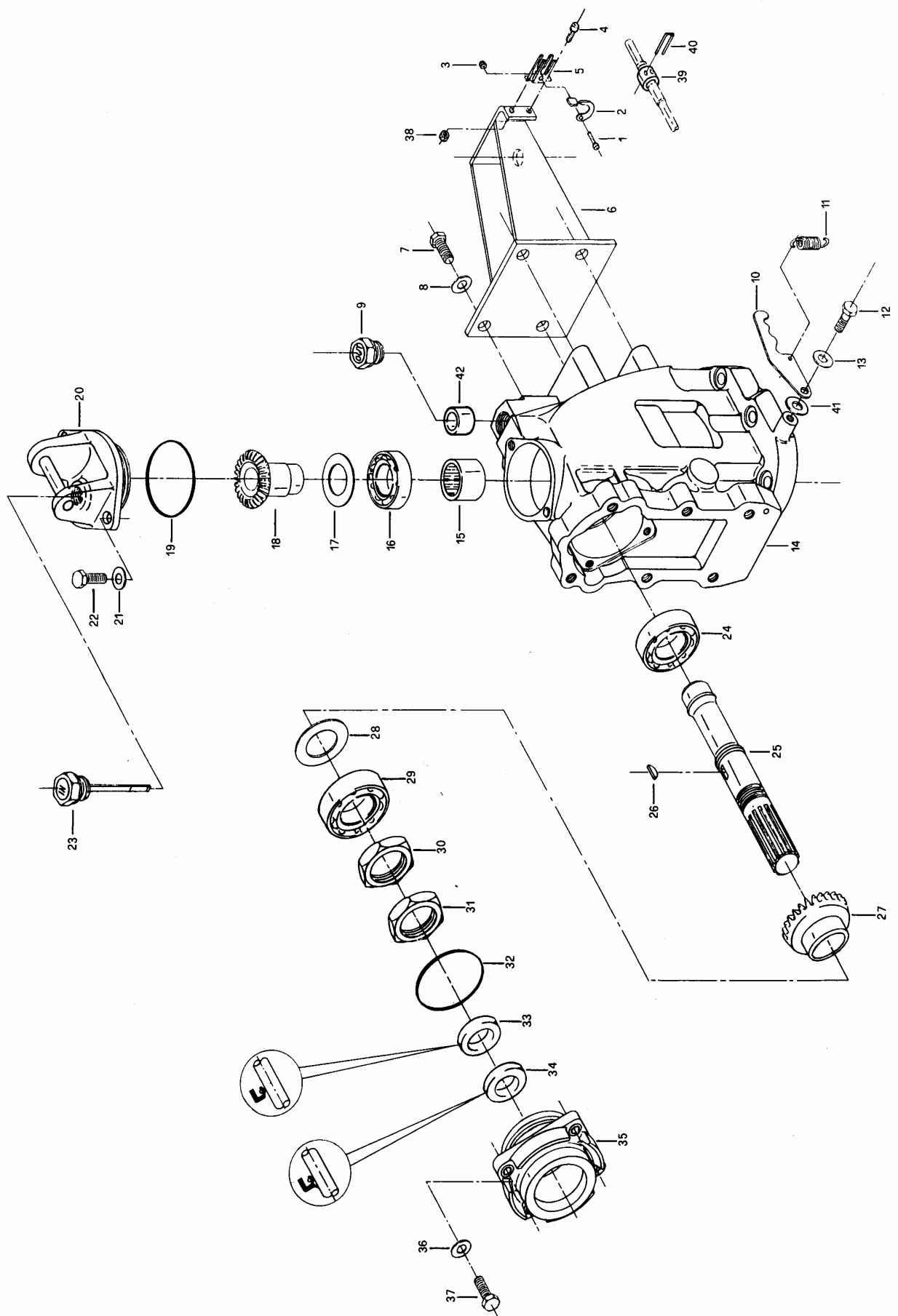






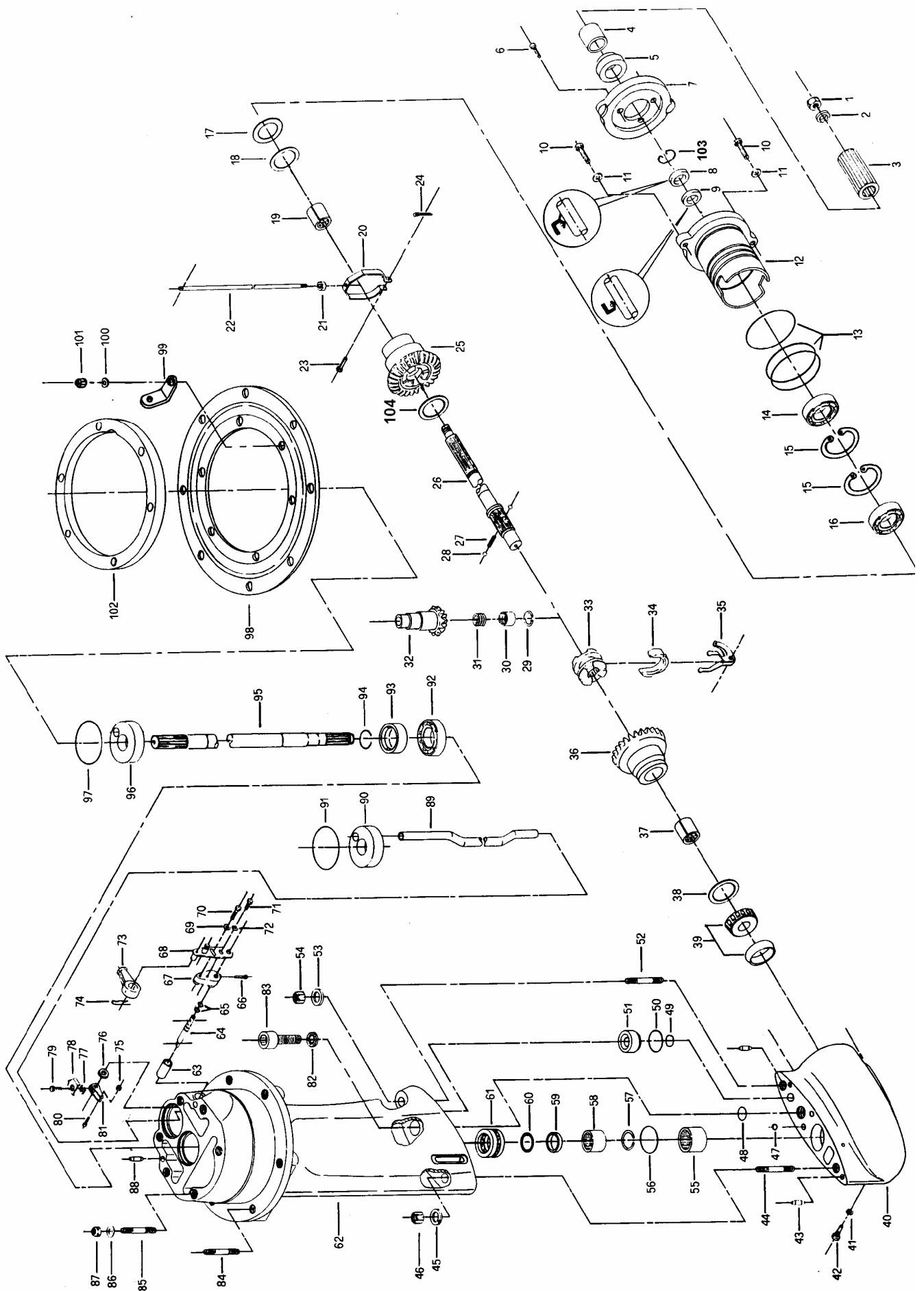






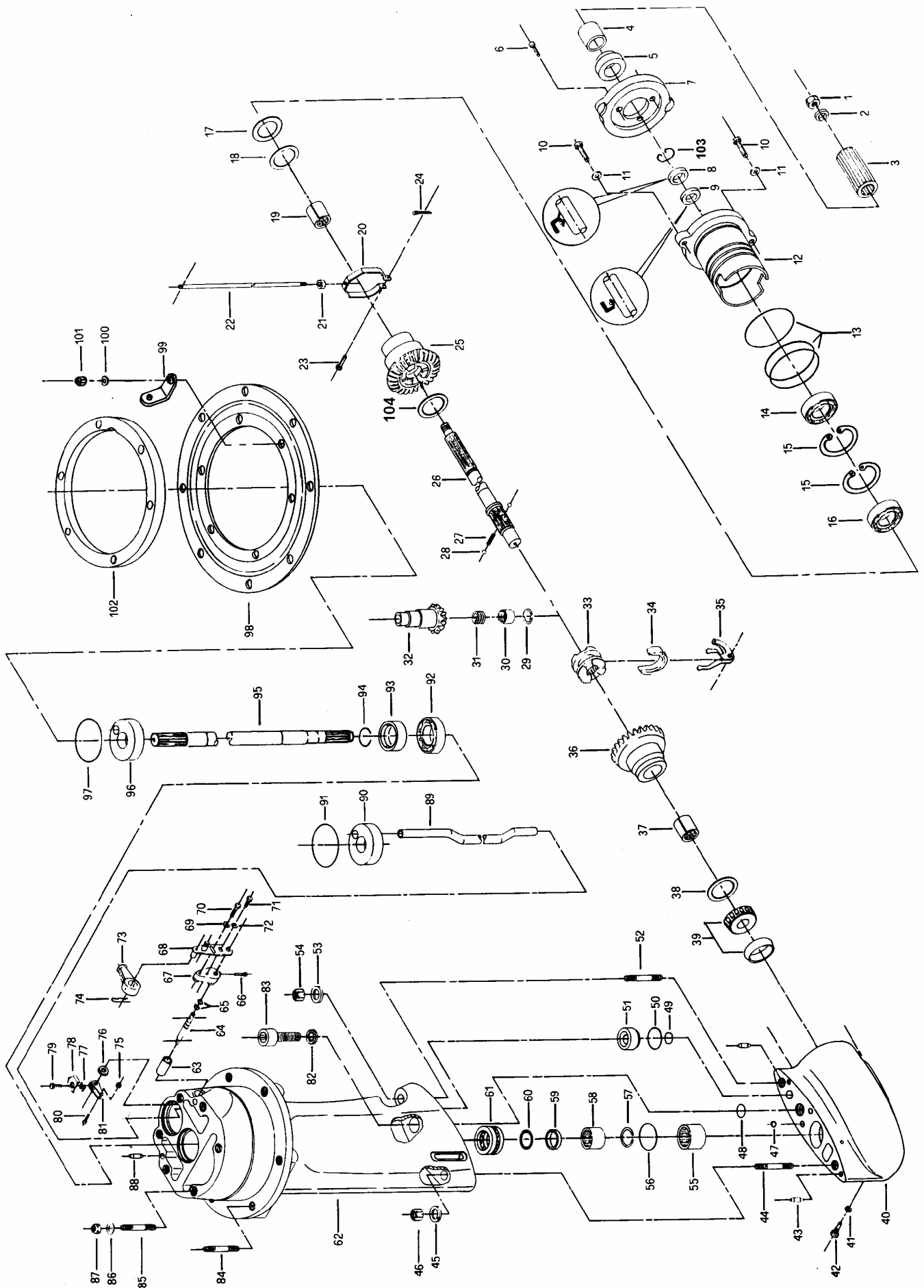
## **BEVEL DRIVE**

<b>Ref.No</b>	<b>Q.ty</b>	<b>Part No</b>	<b>Name of part</b>
4	2	4015531	Screw TCEI M5x14
6	1	9010860	Silentblock support
7	4	4005100	Screw TE M8X20
8	4	5505060	Washer M8
9	1	8000380	Oil plug
10	1	9005145	Gear selector
11	1	5590220	Selector spring
12	1	7020610	Selector pin
13	1	9025450	Selector washer
14	1	2060010	Bevel drive box (with thread)
14	1	2060015	Bevel drive box (Whit hole)
15	1	3015170	Roller bearing
16	1	3005200	Ball bearing
17	1	9030250	Crown shim
18	1	6030490	Bevel drive crown
19	1	3570430	OR ring
20	1	1515140	Cover with pin
21	2	5505060	Washer M8
22	2	4005100	Screw TE M8X20
23	1	8000370	Plug with level control
24	1	3005060	Ball bearing
25	1	651021	Shaft for bevel drive
26	1	5565090	Tab
27	1	6005270	Bevel drive pinion
28	1	9030250	Shim on bevel drive pinion
29	1	3005200	Ball bearing
30	1	5080020	Metal ring
31	1	5080020	Metal ring
32	1	3570430	OR ring
33	1	3550210	Grommet
34	1	3555080	Grommet
35	1	2045460	Plug - engine side
36	4	5505080	Washer M6
37	4	4005110	Screw TE M6X25
38	2	5050080	Selflocking nut M5
39	1	8025635	Stop bushing
40	1	5590665	Fork
41	1	9025452	Washer
42	1	8000020	Grommet
<b>ASSEMBLIES</b>			
5	1	1598100	Remote control attachment support ( pos. 1+2+3+5 )



# SHAFT - GEAR

Pos. Ref.No	Q.tà Q.ty	N°Codice Part No	Name of part
1	1	5050040	Propeller selflocking nut M16X1,5
2	1	9025520	Washer
5	1	7040276	Propeller shoulder Z 13
6	3	4015070	Screw TCEI M6X20
7	1	2504011	Anode
8	1	3555010	RP grommet
9	1	3550200	Grommet
10	2	4010070	Screw TE M8X35
11	2	5505060	Washer M8
12	1	2045451	Plug
13	3	3570350	OR ring
14	1	3005300	Bearing
15	2	5570520	Seeger
16	1	3005250	Bearing
17	1	9030280	Shim
18	1	9035210	Shoulder ring
19	1	9080160	Reverse gear bushing
20	1	9020080	U-bolt
21	1	5005010	Nut M6
22	1	6530460	Gear rod
23	1	7020820	Equalizer/U-bolt pin
24	1	5580010	Split pin
25	1	1564040	Reverse gear
26	1	1567030	Propeller shaft
27	1	5590560	Spring
28	2	3005260	Ball
29	1	5570510	Seeger J17
30	1	7005330	Pinion retainer metal ring
31	1	5590670	Pinion retainer spring
32	1	6005280	Pinion
33	1	6020202	Slider
34	1	2510340	Ring
35	1	9045070	Equalizer
36	1	1599315	Forward gear
37	1	9060110	Forward gear bushing
38	1	9030280	Shim
39	1	3010040	Bearing
40	1	2095200	Gear-box
41	1	9025210	Equalizer pin gasket
42	1	7020780	Equalizer pin
43	2	5560510	Pin diam. 5x18
44	1	7015420	Stud
45	1	5515060	Washer Grower M10
46	1	5015010	Selflocking nut M10
47	2	3570230	OR ring
48	1	3570450	OR ring
49	1	3570030	OR ring
50	1	3570370	OR ring
51	1	7055210	OR housing of oil tube
52	1	7015420	Stud
53	1	5505030	Washer M10
54	1	5015010	Selflocking nut M10
55	1	3015190	Roller bearing
56	1	3570140	OR ring
57	1	5570220	Seeger JV33
58	1	3015180	Roller bearing
59	1	9035200	Pinion shoulder
60	1	9030390	Shim
61	1	3005080	Step bearing
62	1	2085360	Shaft
63	1	9080180	Bushing
64	1	6540480	Gear rod
65	2	3570130	OR ring
66	1	4005140	Screw TE M5X20
67	1	2510350	Gear control
68	1	1598110	Gear control lever
69	1	5505060	Washer
70	1	4005130	Screw TE M8X16
71	1	4005050	Screw TE M6X16

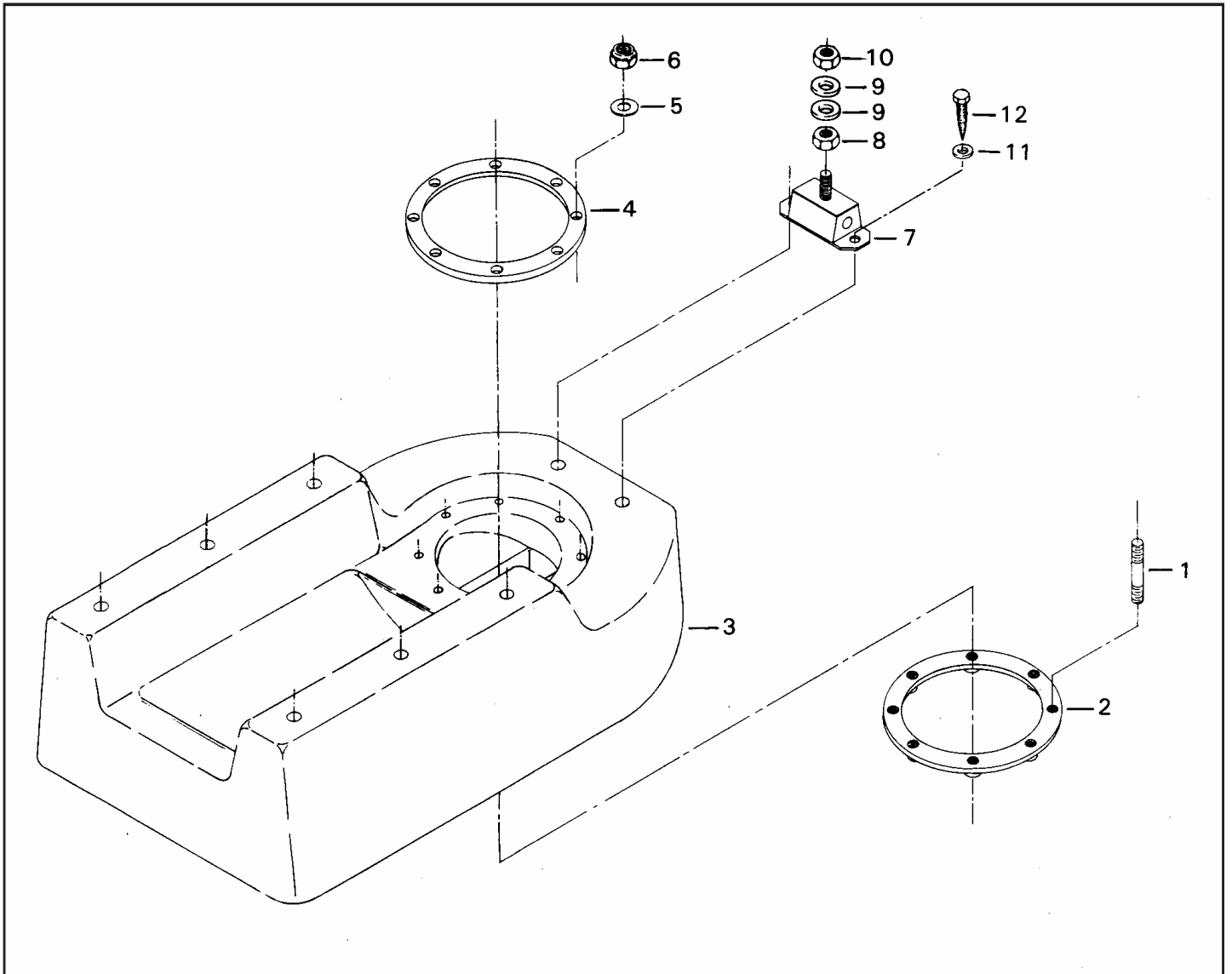


<b>Ref.No</b>	<b>Q.ty</b>	<b>Part No</b>	<b>Name of part</b>
72	1	5505080	Washer
73	1	8025630	Gear control cable attachment head
74	1	5580100	Split pin
75	1	5050090	Selflocking nut
76	1	9040150	Spacer on gear rod
77	1	7025050	Screw spacer
78	1	9010260	Retainer for screw
79	1	4005080	Screw TE M5X16
80	1	4005170	Screw TE M4X16
81	1	9010270	Equalizer body
82	1	5520040	Washer
83	1	7005320	Screw
84	6	7015100	Stud
85	6	7015410	Stud
86	6	5505030	Washer M10
87	6	5015010	Selflocking nut
88	2	5560030	Pin diam. 8x20
89	1	6580300	Oil tube
90	1	7055200	Ring on OR housing
91	1	3570490	OR ring
92	1	3005280	Bearing
93	1	7025340	RW housing
94	1	5570470	Seeger RW18
95	1	6520500	Vertical shaft
96	1	7055200	Ring on OR housing
97	1	3570490	OR ring
98	1	8005340	Rubber membrane
99	1	9006120	Selector spring attachment plate
100	6	5505060	Washer M8
101	6	5050030	Selflocking nut
102	1	2100010	Flange on shaft
103	1	5590610	Bull ring
104	1	7040280	Shoulder
 <b>* PROPELLERS FOR "SELVA" SAIL DRIVE (Right - side propellers )</b>			
 * Three - blades fixed propeller tipe SSD diameter 14      Pass from 9 to 14			
 * Two folding blades propellers diameter 13 - 14 - 15 - 16      Pass from 8 to 16			
3 *	1	7040260	Adaptor from Z 13 to Z 17
4 *	1	7025350	Spacer on adaptor ( Z 17 )
5 *	1	7040270	Propeller shoulder ( Z 17 )

\* : Non - standard parts



# BASE

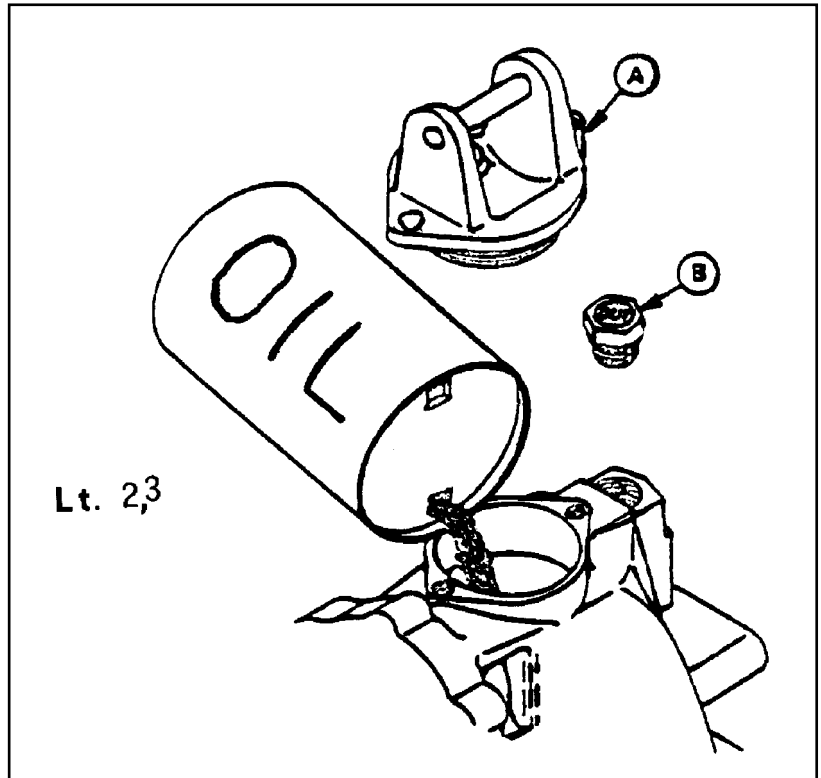


Ref.No	Q.ty	Part No	Name of part
1	8	7015100	Stud M8X12
2	1	2100030	Base lower flange
3	1	8070590	Base for S-Drive
4	1	2100020	Base upper flange
5	8	5505060	Washer M8
6	8	5050030	Selflocking nut
7	1	8005330	Silentblock
8	1	5005030	Nut M12
9	2	5505050	Washer M12
10	1	5050070	Selflocking nut M12
11	2	4505500	Screw for wood 10x45
12	2	5505030	Washer M10

## OIL FILLING

*In order to make the oil filling it is necessary:*

- 1- *To remove the cover A and the plug B.*
- 2- *To pour the oil in the quantity shown (2,3 lt.).*
- 3- *To close again the cover and the plug.*
- 4- *To control the oil level by the special dipstick.*



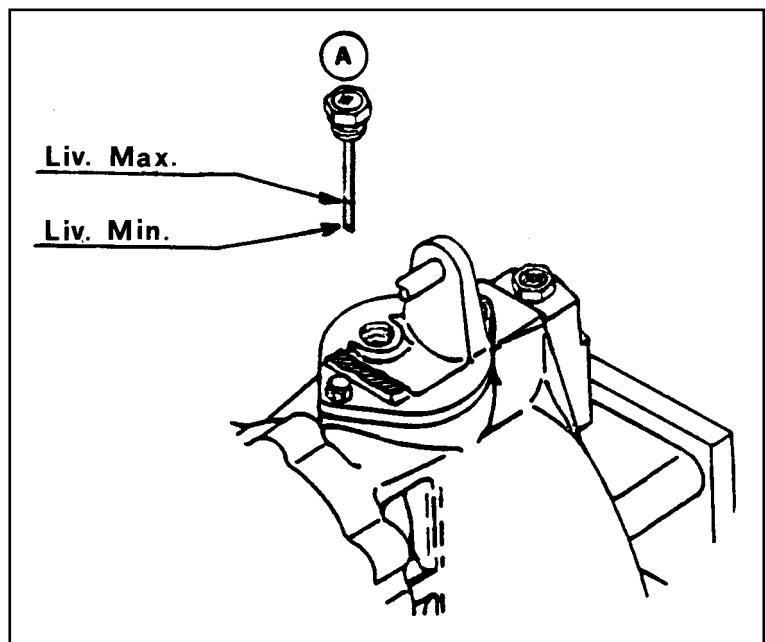
## OIL LEVEL CONTROL AND TOPPING UP

*It is necessary to control the oil level every month.*

*The control can be effected by the special dipstick which is under the cover A.*

*On the dipstick the oil minimum and maximum quantities are shown.*

*If a topping up is required, put some oil in the hole of cover A, then control the oil level again.*



## **OIL CHANGE**

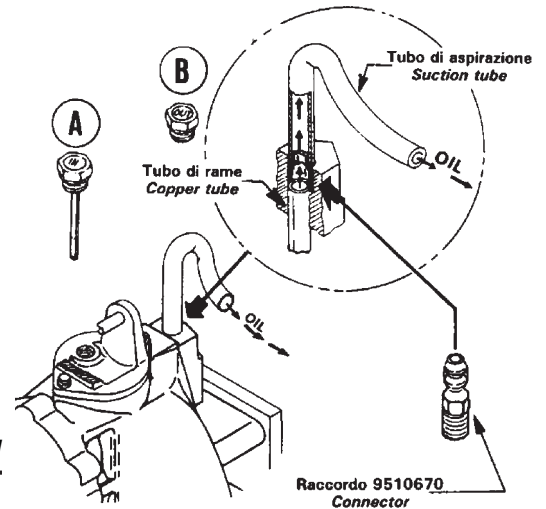
The oil can be changed while the boat is in water.

## **OIL EXHAUST**

In order to remove the old oil, two methods can be followed:

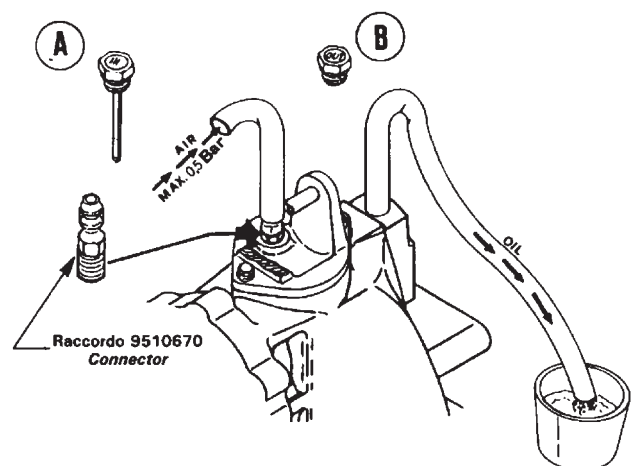
### **FIRST METHOD: SUCTION**

- 1- Remove the plugs A and B.
- 2- Screw the connector p/n 9510670 in the housing of the cap B
- 3- Put a hose (inside dia 7 mm ) on the connector for the oil suction
- 4- Suck the oil until the gearcase is completely empty.



### **SECOND METHOD : EJECTION**

- 1- Remove the plugs A and B.
- 2- Screw the tube connectors p/n 9510670 in the housing of the caps
- 3- Put on the connector in the B housing a tube for the oil exhaust (inside diameter 7mm ).
- 4- Put on the connector in the A housing a tube (inside diameter 7mm ) for inlet air oil ejection and connect it with a compressor.
- 5- Let air in (Maximum pressure admitted 0,5 Bar.).



## **ATTENTION**

The reclaimed oil must not be scattered in the environment, but it must be delivered to special collection centres.

## **REVERSING GEAR CONTROL CABLE CONNECTION**

The reverse gear control cable connection must be made beginning with the remote control box side. After connecting the box, it is possible to go on with the side of the SAIL DRIVE.

### **ATTENTION**

**To connect the control cable to the Sail Drive unit, it is necessary that the control box lever is in the neutral position.**

**Use only single-lever remote control boxes.**

### **CONNECTION PRACTICE:**

Put the retaining washer on the cable and fix it with the special fork.

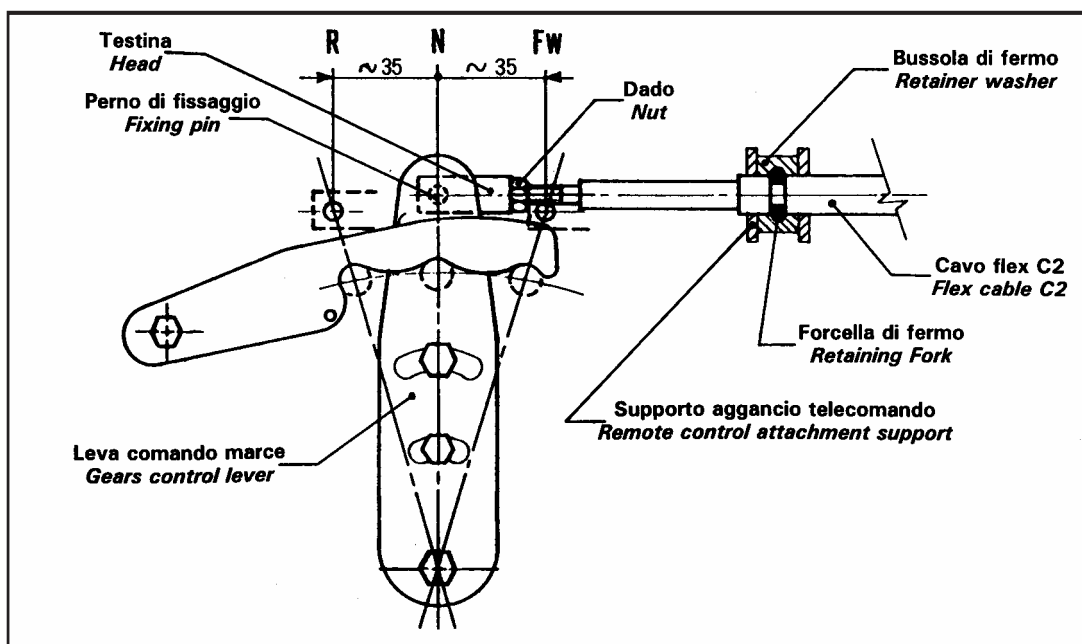
Screw the nut on the cable threaded terminal.

Screw the head until its holes are in correspondence with the fixing pin on the gears control lever.

Fix the nut on the head.

Put the head on the fixing pin and insert the split pin in order to keep it in the right position.

Fix the retaining washer on the remote control attachment support.



### **ATTENTION**

**In order to reverse, the motor must idle.**

## **SACRIFICE ANODE**

*In order to avoid that the SAIL DRIVE gets eletrochemical corrosion, a sacrifice anode has been installed, which, by getting corroded, protects the other components.  
On the anode foulings and deposits of weeds can easily grow.*

*It is necessary to keep it clean so that it keeps efficient.*

### **IMPORTANT**

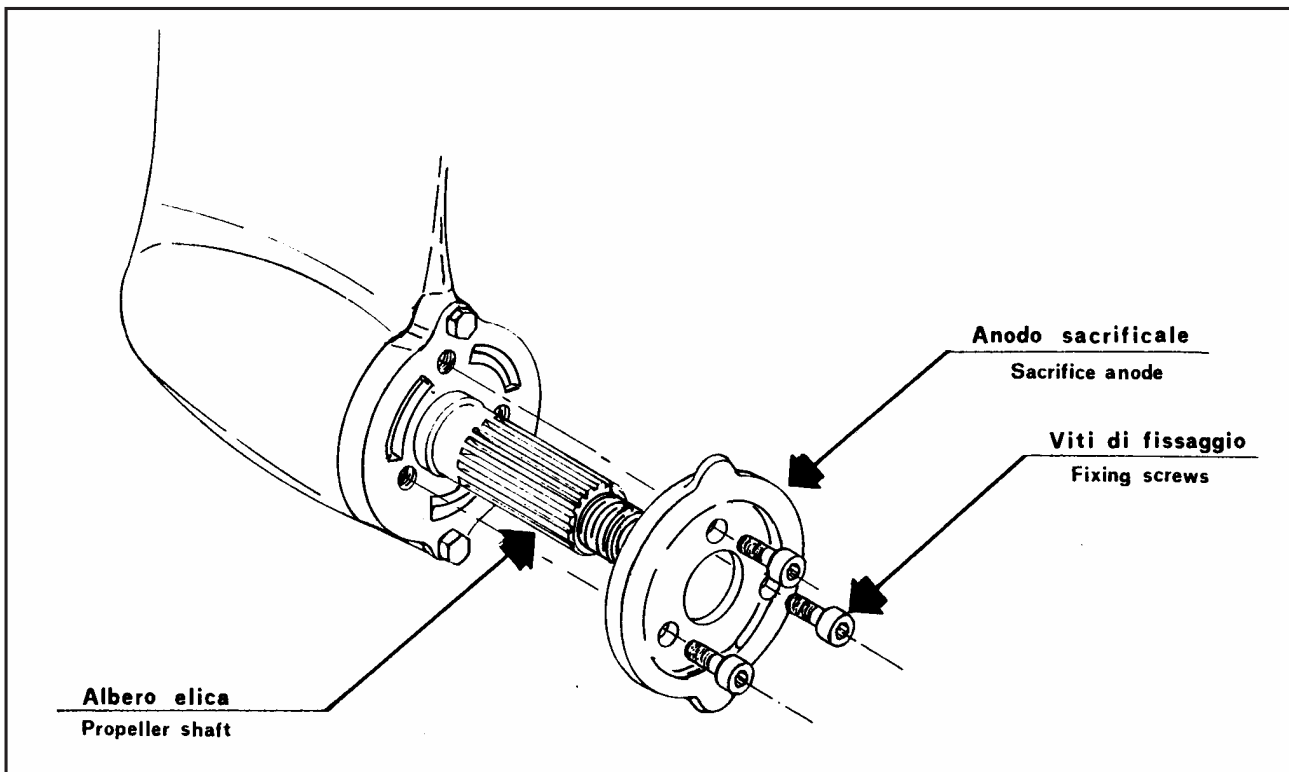
**DO NOT PAINT OR PROTECT IN ANY WAY THE ANODE, IN ORDER NOT TO ENDANGER ITS FUNCTIONALITY.**

*When the anode is not useful anymore, it must be changed.*

*We recommend to change it every year.*

*To do this, it is necessary to take the propeller out in order to reach the threee fixing screws.*

*Before assembling the new anode, clean the connecting surfaces.*



**SPARES & REPLACEMENT PARTS** – These items are available from

# **BETA MARINE**

Merretts Mills  
Bath Road  
South Woodchester  
Stroud  
Gloucestershire GL5 5EU, UK

Telephone: 01453 835282 Int.Tel: 44 1453 835282  
Fax: 01453 836749  
Internet: [www.betamarine.co.uk](http://www.betamarine.co.uk)  
Spares email: [stevelovegrove@betamarine.co.uk](mailto:stevelovegrove@betamarine.co.uk)  
Warranty email: [adrian@betamarine.co.uk](mailto:adrian@betamarine.co.uk)

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