



**ZF 63 - ZF 63 A**  
**ZF 80 A - ZF 80-1 A**

FEBRUARY 2004  
cod. 310.01.0054e





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## **INTRODUCTION**

This manual gives specific instructions for the proper repair on ZF 63 - ZF 63 A - ZF 80 A - ZF 80-1 A transmissions.

Please follow the procedures carefully to insure quality service.

ZF HURTH MARINE recommends to read the manual completely before starting with repairs, as some of the procedures described are rather complex.

Along with standard tools, ZF HURTH MARINE recommends the use of special tools, necessary to perform repairs correctly. The special tools are available through your local ZF HURTH MARINE dealer.

This manual is based on the technical information at the time of printing. The manual has been checked carefully in order to avoid errors. However ZF HURTH MARINE is not liable for any misrepresentations, errors of description or omissions.

Modifications on future manuals may be introduced without prior notice.



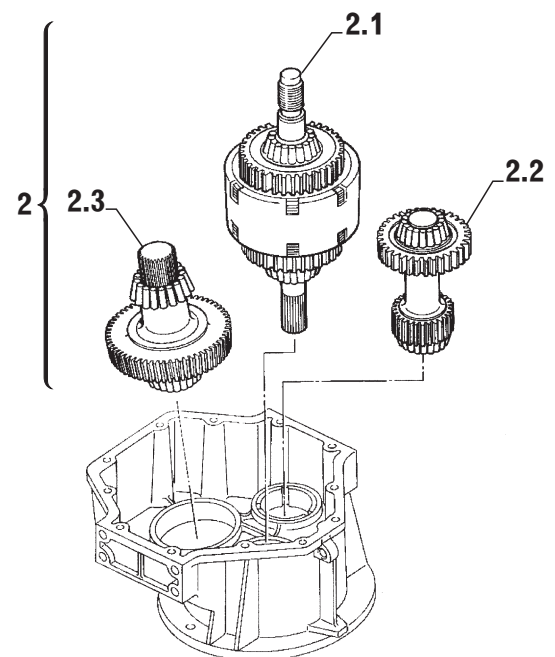
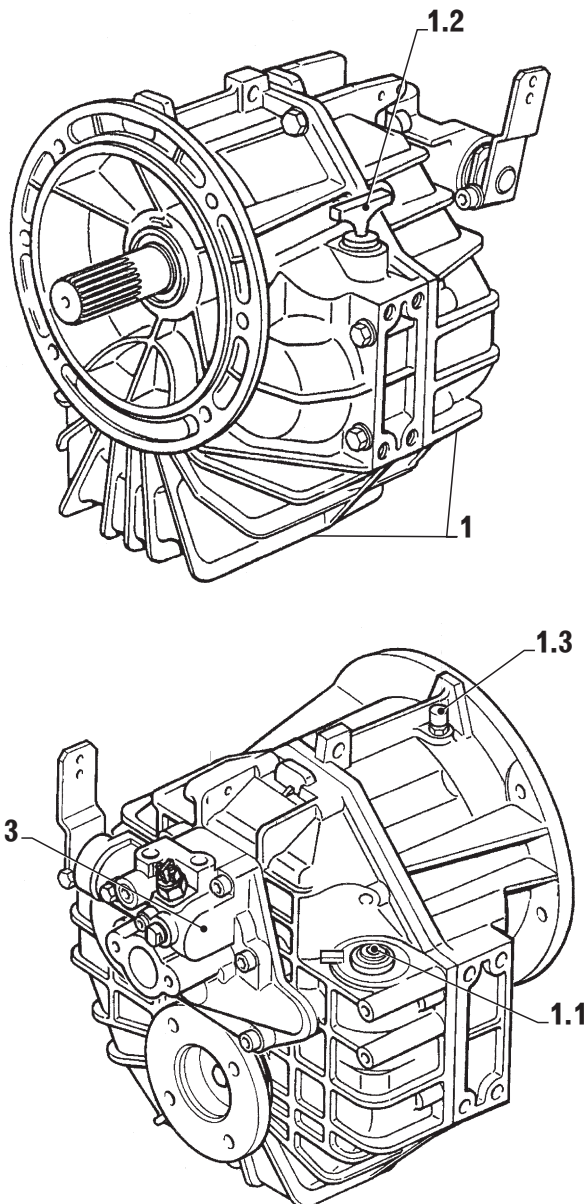
# MAJOR COMPONENTS

## 1. TRANSMISSION SET-UP

The main components of the HSW Marine Transmissions are:

ITEM	DESCRIPTION
1	Two-piece aluminum die cast
1.1	Oil filter
1.2	Oil dipstick
1.3	Breather valve

ITEM	DESCRIPTION
2	Gears
2.1	Input shaft with reversing clutch pack assembly
2.2	Intermediate shaft
2.3	Output shaft
3	Control block





## 2. CLEANERS AND SEALANTS

For cleaning:

Cold cleaner such as benzene, trichloroethane or Loctite fast cleaner No. 7063.



**Keep detergents away from your skin, do not drink and do not inhale their vapors! Always wear protective gloves and safety glasses! Note accident prevention rules!**

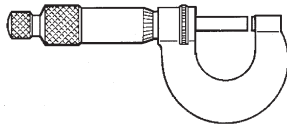
For assembly:

- Loctite 243 medium-hard for securing oil plug on ZF 80 A - ZF 80-1 A.

- Loctite 245 for securing output flange on spline.
- Loctite 518 for housing surfaces.
- Loctite 574 for outer diameter sealing rings.
- Grease: Staburags NBU 30, Klüber Co. for radial shaft seals.
- ATF FLUID: 3.8 litres (1.0 US.gallons) for ZF 63  
4.0 litres (1.05 US.gallons) for ZF 63 A  
5.5 litres (1.5 US.gallons) for ZF 80 A - ZF 80-1 A

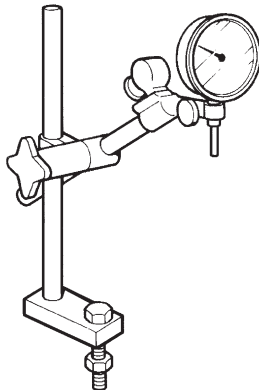
## 3. MEASURING TOOLS

### MICROMETER

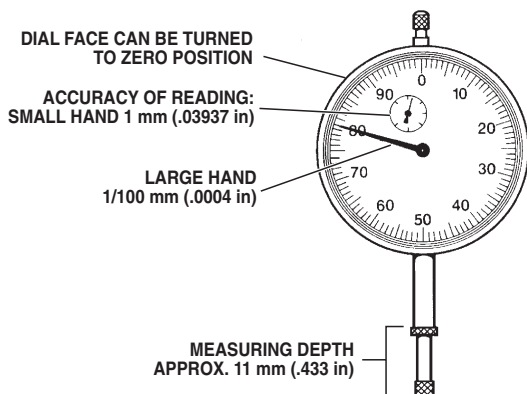


Measuring gauge from 0-25 mm (0-1.0 in.)  
Accuracy of reading 1/100 mm (0.0004 in.)

### DIAL INDICATOR GAUGE WITH ARM-TYPE SUPPORT



### DIAL GAUGE INCREMENTS

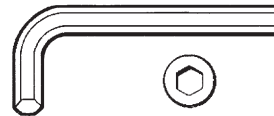


## 4. STANDARD TOOLS AND FIXTURE

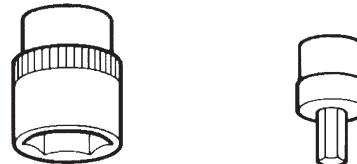
**WRENCH** for hexagon bolts (8 - 17 - 19 - 22 mm) (7/8")



**ALLEN WRENCH** (6 mm)



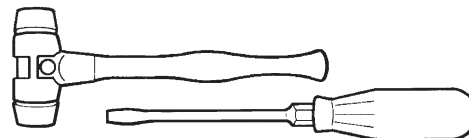
**HEXAGON SOCKET WRENCH** (6 - 17 - 19 mm)



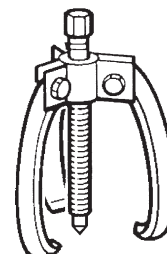
**TORQUE WRENCH** adjustable up to 180 Nm (152 ft.lb.)



**PLASTIC HAMMER** (1000 g) and sturdy screwdriver



**EXTRACTOR** minimum diameter 130 m







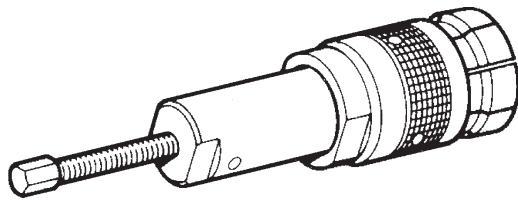
## SPECIAL TOOLS

It is assumed that all standard tools, such as, torque wrenches, open-end wrenches, allen keys and extractors, are available.

All fixtures for pressing parts in or out should be used in conjunction with a hydraulic or manual press.

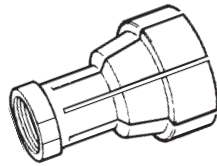
### EXTRACTOR

Tapered roller bearing inner races  
Basic Unit P/N 978.25.0017.0 (454421)



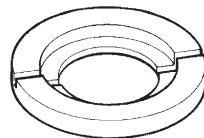
### ADAPTER for basic unit 978.25.0017.0 (454421).

For bearing input shaft - spline side.  
- P/N 978.25.0018.0 (469686) ZF 63 A - ZF 63  
- P/N 978.35.0019.0 (500465) ZF 80 A - ZF 80-1 A

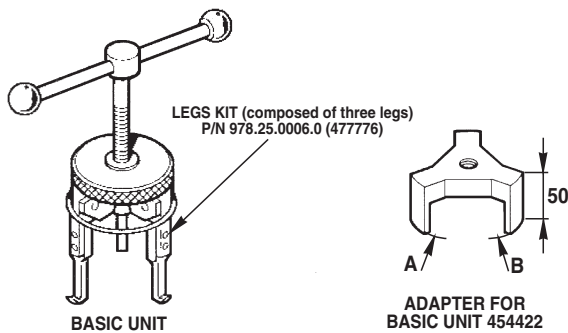


### EXTRACTOR SPLIT RING

Input shaft. Taper roller bearing inner race - control block side. P/N 224.836.009 (456170)

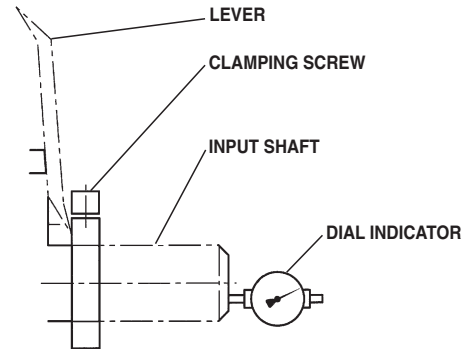


### EXTRACTOR Tapered roller bearing outer races basic unit P/N 978.25.0021.0 (454422)



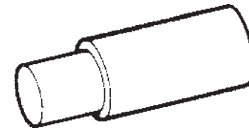
ZF 63 A - ZF 63	ZF 80 A - ZF 80-1 A
978.25.0012.0 (477856)	978.25.0011.0 (477854)
978.25.0009.0 (477853)	978.35.0016.0 (477895)
978.25.0011.0 (477854)	
978.25.0013.0 (477857)	

### CLAMPING RING for measuring the bearing clearance input shaft P/N 219.354.3 (618582)



### MANDREL

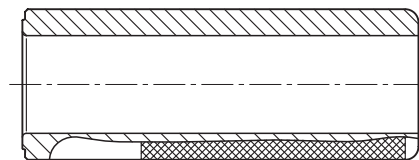
For disassembly and assembly  
Shaft seal - input side : P/N 224.836.005 (454425)  
Shaft seal - output side:  
- P/N 224.836.006 (454426) ZF 63 A - ZF 63  
- P/N 978.35.0005.0 (500449) ZF 80 A - ZF 80-1 A



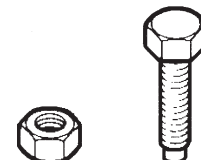
For assembling input shaft seal on the input spline side  
Bushing P/N 20.0012.01 to insert input shaft seal



Mandrel P/N 20.0012.02 to assemble input shaft seal



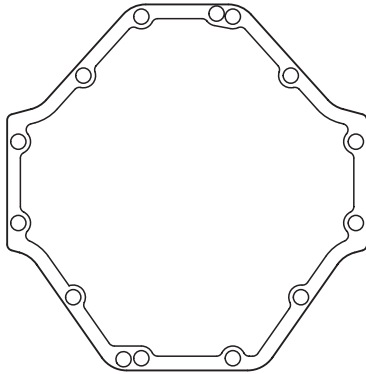
### SPECIAL HEX HEAD BOLT WITH BEARING for measuring the bearing clearance intermediate shaft P/N. 224.836.008 (458105)



**SHIM**

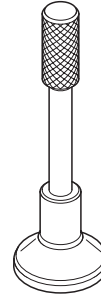
To determinate the correct preload of the tapered roller bearings.

- P/N 20.1005.00 ZF 63 A
- P/N 20.1018.00 ZF 63
- P/N 20.1016.00 - ZF80 A - ZF 80-1 A

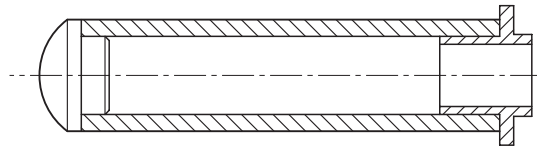


**PUNCH**

for assembly Seal - suction pipe  
- P/N 20.1021.00 ZF 80 A - ZF 80-1 A  
- P/N 20.1029.00 ZF 63 A - ZF 63



**CENTRE SQUARE PUNCH** To position the oil suction pipe into housing P/N 20.1041.00

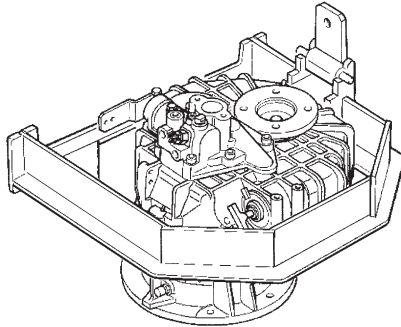


## DISASSEMBLY

### INTRODUCTION

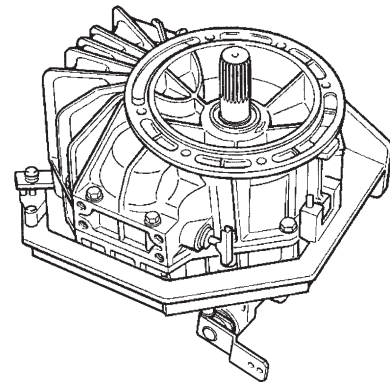
Clean the transmission thoroughly on the outside before disassembly.

**Swiveling stand ZF**  
Output - half side up



The repair area should be clean and well lighted. ZF HURTH MARINE recommends using a swiveling stand for aiding in assembly and disassembly.

**Swiveling stand ZF**  
Input - half side up



## 1. FLUID FILTER

### 1.1 Remove fluid filter

Turn the screw that fixes the oil filter cover in a counter-clockwise direction and remove the filter from its housing (item 1, fig. 1-1). Use a 6 mm Allen wrench. Pull filter element off (item 2, fig.1-1). Check O-rings (item 3 and 4, fig. 1-1) for wear, replace if necessary.

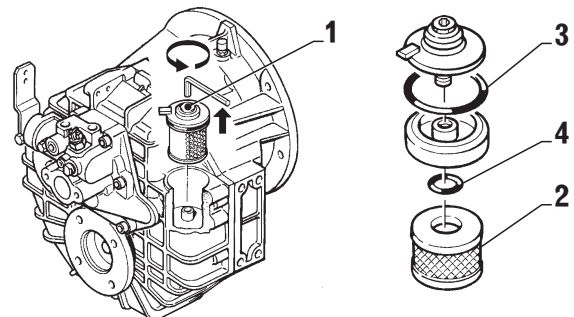


FIG. 1-1

### 1.2 Suction of transmission fluid

Push hose of suction pump (item 1, Fig. 1-2) through the suction pipe (item 2, Fig. 1-2) down to the bottom of the housing and suck the fluid off.

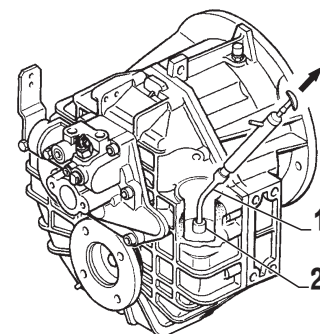


FIG. 1-2

## 2. DIPSTICK

Unscrew dipstick (item 1, Fig. 2-1) (counterclockwise) and pull out of housing. Replace O-Ring if present (check parts list section 10).

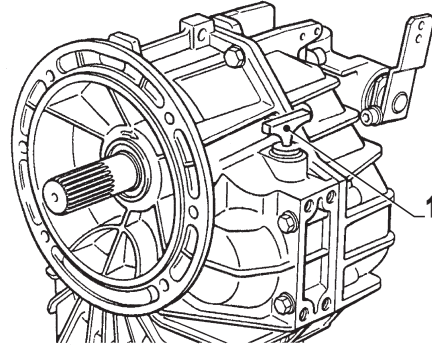


FIG. 2-1

## 3. BREATHER VALVE

Unscrew breather valve (item 1, Fig. 3-1). Wash valve in a detergent, let dry and dip in oil, then let oil drip off.

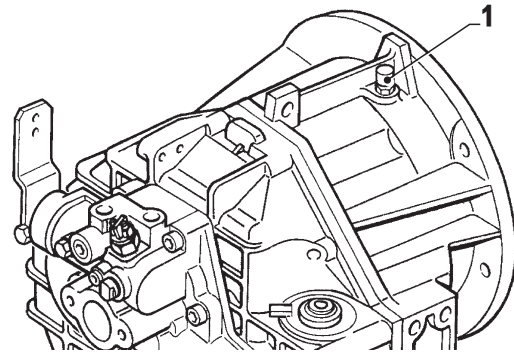


FIG. 3-1

## 4. OUTPUT FLANGE

Lock output flange in swivel frame.

Unscrew hex head bolt (item 1, Fig. 4-1).

Remove disc (item 2, Fig. 4-1) and O-ring (item 3, Fig. 4-1).

Screw hex bolt (item 1, Fig. 4-1) in again.

Place extractor on the transmission and pull output flange (item 1, Fig. 4-2) off.

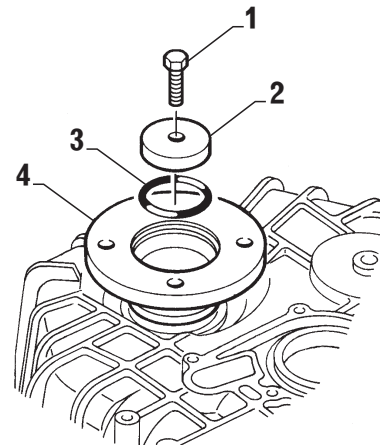


FIG. 4-1

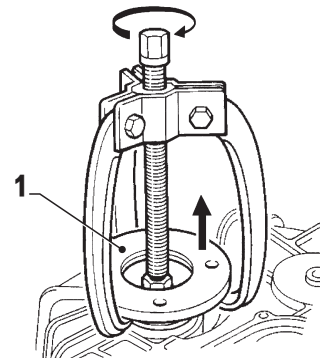


FIG. 4-2

## 5. CONTROL BLOCK

Unscrew allen head bolts (item 1, Fig. 5-1)

Pull control block (item 2, Fig. 5-1) together with seal (item 3, Fig. 5-1) off the input shaft.

Remove key (item 4, Fig. 5-1) from input shaft (item 5, Fig. 5-1).

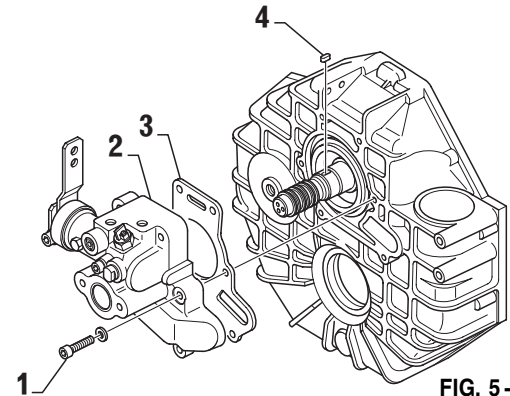


FIG. 5-1

### 5.1 Neutral Safety Switch

Unscrew neutral safety switch (item 1, Fig. 5-2).

Note: Use 7/8 inch wrench for hex bolts.

To reassemble switch:

tightening torque: 25 Nm (18.5 ft.lb.)

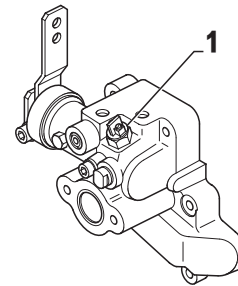


FIG. 5-2

### 5.2 Neutral Safety Switch Check

To check for proper operation of the switch perform one of the following tests:

#### A: Ohm meter

Connect the ohm meter leads to the terminal connection of the switch.

With the pin (item 1a Fig. 5-3) extended you should get a reading, indicating a good switch.

Compressing the pin (item 1b Fig. 5-3) you should have «O» reading,

#### B: 12 volt light

Connect the neutral safety switch with a light in series to a 12 volt battery. The switch is good when the light goes out when the center pin (item 1b Fig. 5-3) is compressed.

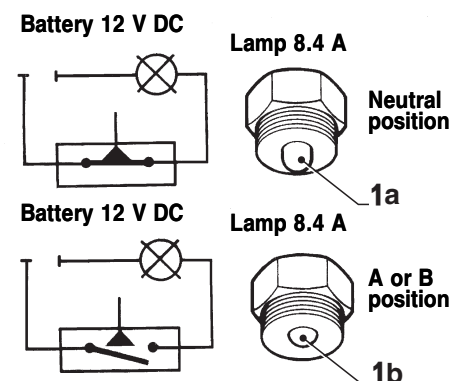


FIG. 5-3

## 6. HOUSING

### 6.1 Transmission housing halves

Using an adequate drift punch, top the locating pins (item 1, Fig. 6-1a and 6-1b) out of the housing.

Loosen and remove all hex head bolts and lock washers (item 2 and 3, Fig. 6-1b). Using a plastic hammer slightly top the split line of the case halves to break the seal. Then remove the input side of the housing.

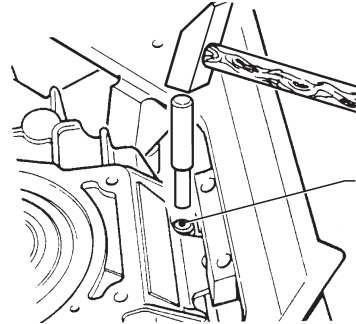


FIG. 6-1a

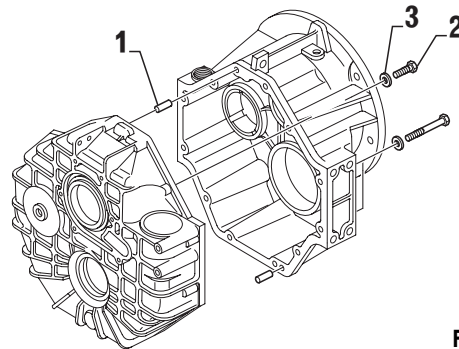


FIG. 6-1b

### 6.2 Shafts and gears

Take the gear set out of the housing

- Intermediate shaft (item 2, Fig. 6-2).
- Input shaft (item 1, Fig. 6-2).
- Output shaft (item 3, Fig. 6-2).

Check all gears, bearings and three piston rings on the input shaft (item 4, Fig. 6-2) for signs of wear or failure. If any of the gears are damaged or showing signs of excessive wear ZF HURTH MARINE recommends replacing the complete gear set.

When tapered roller bearings on the input shaft need to be replaced, the butting rings and needle bearings should also be replaced. To check for correct clutch operation, rotate the gears on the input shaft. If it is hard to turn the gears, the clutch is probably damaged.

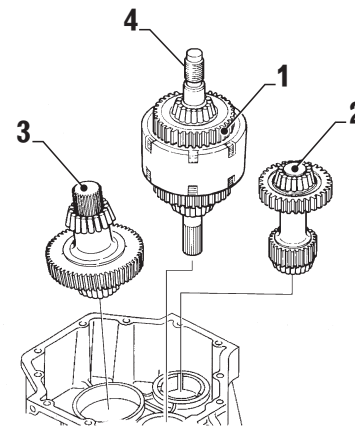


FIG. 6-2

### 6.3 Radial shaft seals

#### Input shaft seal

Using a seal mandrel inside the housing top the input shaft seal out.

Discard seal and replace with a new one. (Fig. 6-3a).

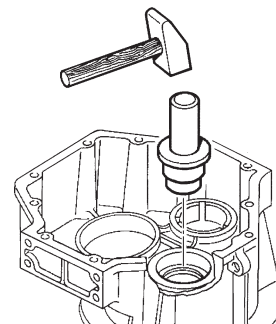


FIG. 6-3a

### Output shaft seal

Using a mandrel punch top the output flange seal out from the other side of the housing. Discard seal and replace with a new one. (Fig. 6-3b).

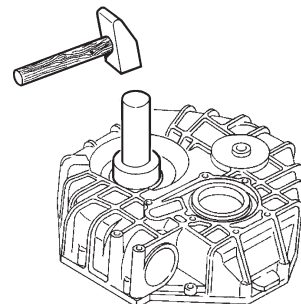


FIG. 6-3b

### 6.4 Fluid inlet pipe

Replacing the seal:

#### ZF 63 A - ZF 63 (Fig. 6-4a)

- Remove baffle plate (item 2).
- Remove suction pipe (item 3).
- Drive out seal (item 1).

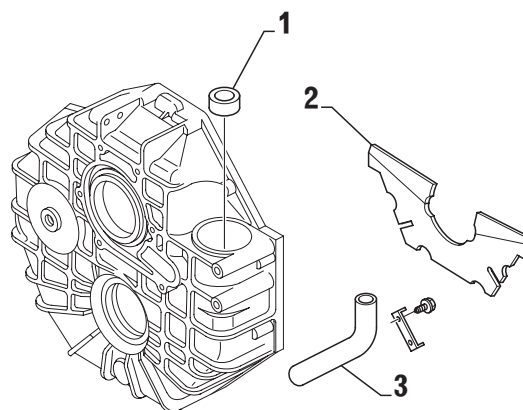


FIG. 6-4a

#### ZF 80 A - ZF 80-1 A (Fig. 6-4b)

- Remove suction pipe (item 2).
- Drive out seal (item 1).

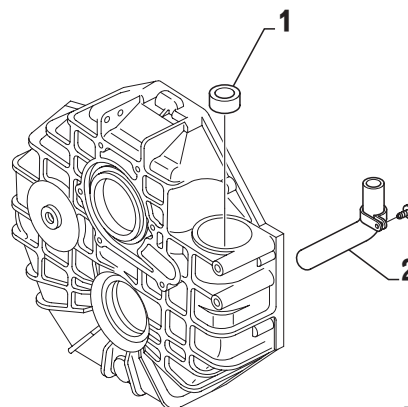


FIG. 6-4b



## 7. TAPERED ROLLER BEARINGS

Check for failed bearings or excessive bearing wear.

### 7.1 Outer races of tapered roller bearing

Remove the outer races out of the housing halves by means of the special tool (Fig. 7-1) or by heating the housing halves in an oven to approx. 120 °C (248 F):

Put the housing in the oven upside down, so the outer races will fall down.

 **WARNING**

Use protective gloves when handling the heated housing and outer races.

 **IMPORTANT**

Regard location of shims under each outer race for correct position during reassembling.

Shims are located under outer races of the cover only.

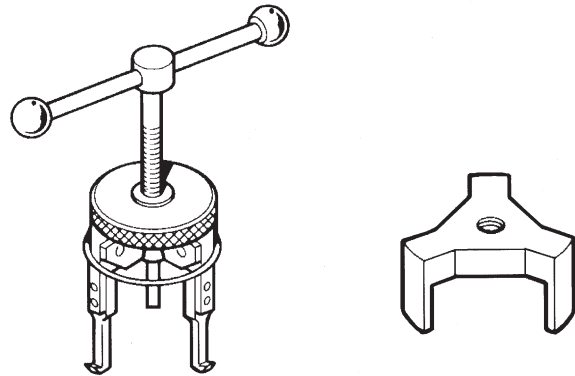


FIG. 7-1

### 7.2 Inner races of tapered roller bearings

#### NOTE

- Input shaft - spline side
- The extractor (Fig. 7-2a) is required for pulling the inner races off.

For extracting the inner races proceed as follows:

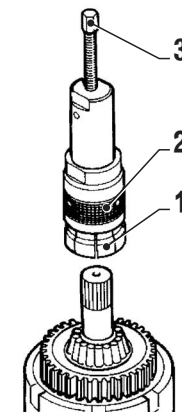
- Screw in adapter onto the puller (item 1).
- Place adapter onto the roller cage.
- Tighten collar to rollers by means of cap nut (item 2).
- Screw spindle (item 3) against shaft and pull bearing evenly and carefully off.

 **WARNING**

Improper use of the extractor when removing the races, could cause damage to the race or slip off.

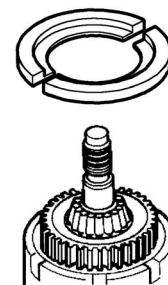
#### Input shaft - Control block side

The inner race and the gear on the control block side can be removed by using the split ring and a standard hydraulic press (fig. 7-2b).



INPUT SPLINE SIDE

FIG. 7-2a



CONTROL BLOCK SIDE

FIG. 7-2b



## 8. CLUTCH PACK

### 8.1 Removal of the clutch discs

#### Control block side (Fig. 8-1a)

##### ZF 63 A - ZF 63

- Remove thrust washer (1) off using two screwdrivers.
- Take off gear (2) and, needle bearings (3).
- Removal of pressure plate. Press snap ring (5) against periphery of pressure ring (4) by means of screwdrivers. Extract them together. The discs (6) can now be removed from the clutch housing.

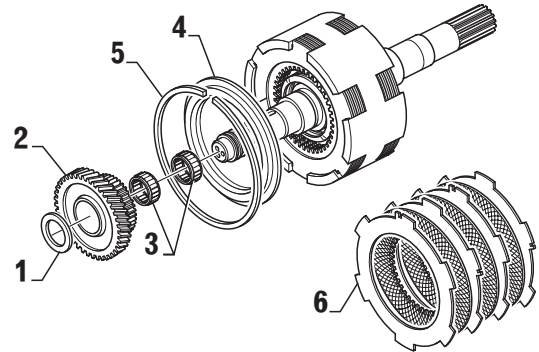


FIG. 8-1a

#### Control block side (Fig. 8-1b)

##### ZF 80 A - ZF 80-1 A

- Remove thrust washer (1) off using screwdrivers.
- Take off gear (2), needle bearings (3), and spacer (7).
- Removal of pressure plate. Press snap ring (5) against periphery of pressure plate (4) by means of screwdrivers. Extract them together. The discs (6) can now be removed from clutch housing.

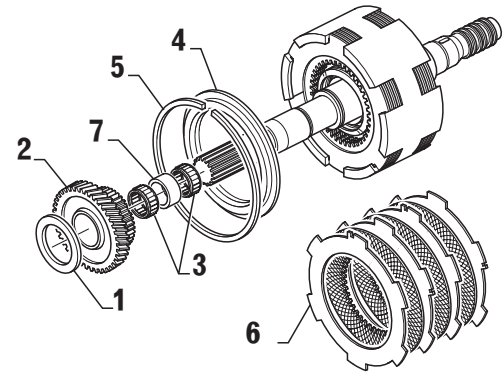


FIG. 8-1b

#### Input spline side (fig. 8-2a)

##### ZF 63 A (no ratio 2.7) - ZF 63

- Remove thrust washer (1) off using two screwdrivers.
- Take off gear (2) and needle bearings (3).
- Remove pressure plate (5). Press snap ring (4) against periphery of pressure plate by means of screwdrivers. Extract them together. The discs (6) can now be removed from the clutch housing.

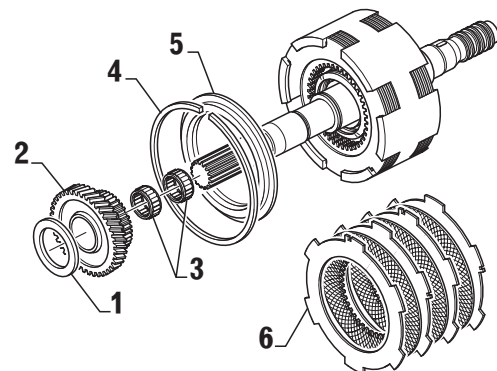


FIG. 8-2a

#### Input spline side (fig. 8-2b)

##### ZF 80 A - ZF 80-1 A

##### ZF 63 A (only ratio 2.7)

- Remove thrust washer (1) off using two screwdrivers.
- Take off gear (2), needle bearings (3) and spacer (4).
- Remove pressure plate (6). Press snap ring (5) against periphery of pressure plate by means of screwdrivers. Extract them together. The discs (7) can now be removed from the clutch housing.

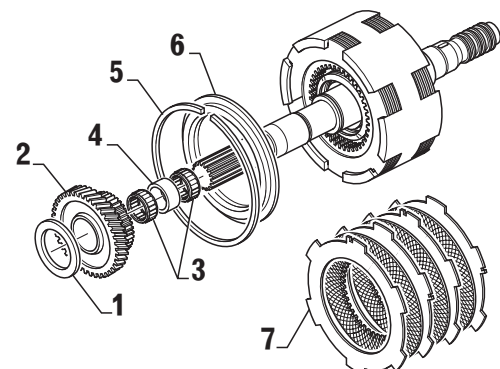


FIG. 8-2b



## ASSEMBLY

### INTRODUCTION

A well-lighted work area that is free from dirt and chips, will facilitate the work considerably.

ZF HURTH MARINE recommends to use a swiveling stand, described in the disassembly section to aid in the assembly.

Thoroughly clean all mating surfaces from any Loctite or gasket material.



#### WARNING

Cleaners and solvents can be toxic and potentially harmful without proper ventilation.

**Use caution when using such cleaners.  
Always wear protective gloves and glasses!**

The next assembly procedure requires the following:

- An electric oven or heating lamp for heating the housing halves will be required when mounting the bearings.
- A hydraulic or mechanical press

## 1. INPUT SHAFT

### 1.1 Mount discs into reversing clutch

#### NOTE

- For exact quantity of inner (item 2, Fig. 1-1a) and outer discs (item 1, Fig. 1-1a), please refer to the spare parts list at the end of this manual.
- Stagger the position of the notches on the outer discs as shown in Fig. 1-1b.

Starting with one of the outer discs, build up the clutch. The lugs on the outer discs have to be positioned in line with each other as shown in Fig. 1-1b.

Place end disc (item 1 Fig. 1-1c) and snap ring engaging it into clutch housing groove.

Repeat same procedure on opposite side of clutch (Fig. 1-1d).

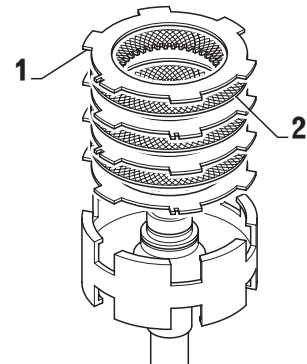


FIG. 1-1a

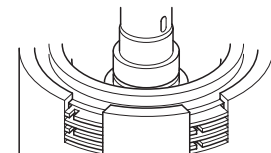


FIG. 1-1b

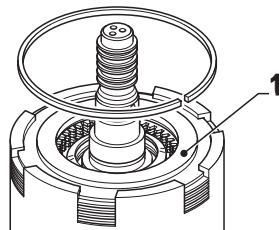


FIG. 1-1c

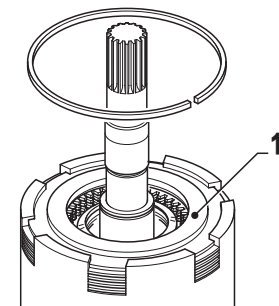


FIG. 1-1d

## 1.2 Install needle bearings and gear

### Input spline side

- Install needle bearing (item 1 fig. 1-2) onto shaft.
- Slide spacer (item 3 fig. 1-2) where required.
- Align splines on clutch discs previously installed and install gear (item 2 fig. 1-2).

Make sure clutch gear is fully installed, engaging all clutch discs.

### Control block side

- Repeat same procedure of input spline.  
Spacer is only in ZF 80 A and ZF 80-1 A.

ZF 63 A (Ratio = 2.7 only)  
ZF 80 A - ZF 80-1 A

ZF 63 A (no Ratio = 2.7)  
ZF 63

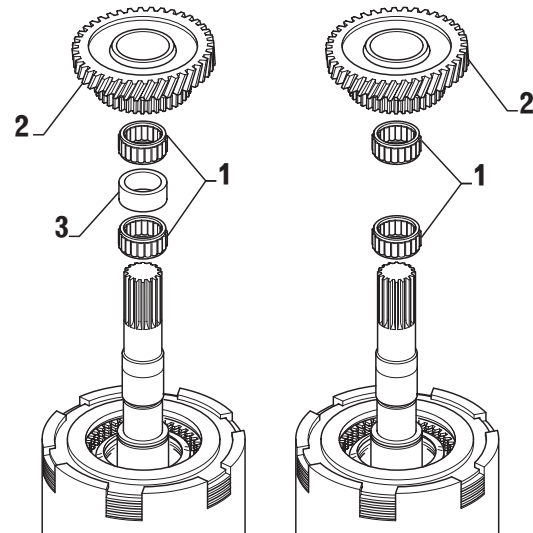


FIG. 1-2

## 1.3 Assemble butting rings

### NOTE

- Make sure thrust washer is fully pressed on and gear is free to rotate.
- Thrust washer must not be bent.

Position shaft assembly on suitable holding fixture. Using a tube with a bore dia. of 35 mm/1.38 in and a plastic hammer gently drive thrust washer in position. (item 1 Fig. 1-3). Repeat same procedure on opposite side.

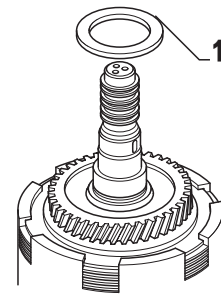


FIG. 1-3

## 1.4 Mounting inner races of tapered roller bearings

Heat inner race of tapered roller bearing (item 1 Fig. 1-4) to approx. 120 °(248 °F) and push onto input shaft. After cooling down, press bearing carefully against button ring (item 2, Fig. 1-4) by means of a sleeve and a manual press or a copper brass punch.

### CAUTION

Handle heated tapered roller bearing inner race only with special gloves!

### NOTE

For pressing, apply sleeve to inner race but not to rollers.

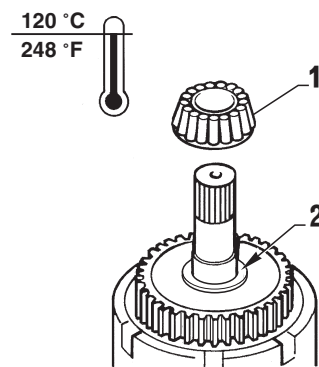


FIG. 1-4

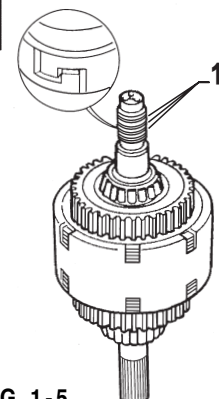


FIG. 1-5

## 1.5 Assemble piston rings

Mount piston ring seals (item 1, Fig. 1-5) onto input shaft.

### IMPORTANT

Make sure the interlocking position of the piston rings are staggered on the shaft.

## 2. INTERMEDIATE SHAFT

### 2.1 Mounting inner races of tapered roller bearings

Heat inner races of tapered roller bearings (item 1 and 2, Fig. 2-1) to approx. 120 °C (248 °F) and push them onto the intermediate shaft up against the shaft collar.

#### **WARNING**

Handle heated taper roller bearing inner races only with protective gloves!

When the inner races have cooled down, drive them carefully against the collar using a copper/brass punch.

#### **NOTE**

Apply copper/brass punch on inner race and not on the rollers.

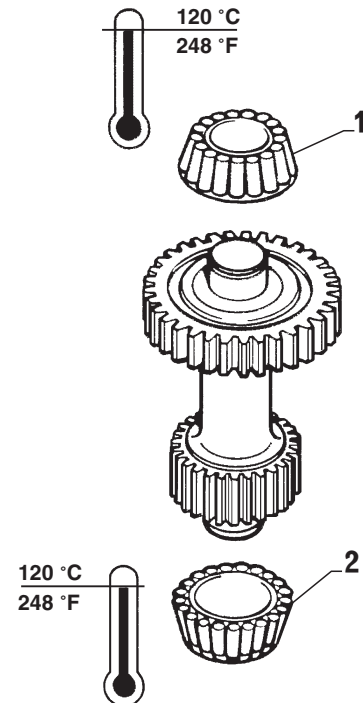


FIG. 2-1

## 3. OUTPUT SHAFT

### 3.1 Mounting inner race of tapered roller bearing

Heat inner races of tapered roller bearings (item 1 and 2, Fig. 3-1) to approx. 120 °C (248 °F) and push them onto output shaft up against shaft collar.

#### **CAUTION**

Handle heated tapered roller bearing inner races only with protective gloves!

When the inner races have cooled down, drive them carefully against the collar using a copper/brass punch.

#### **NOTE**

Apply copper/brass punch on inner race and not on the rollers.

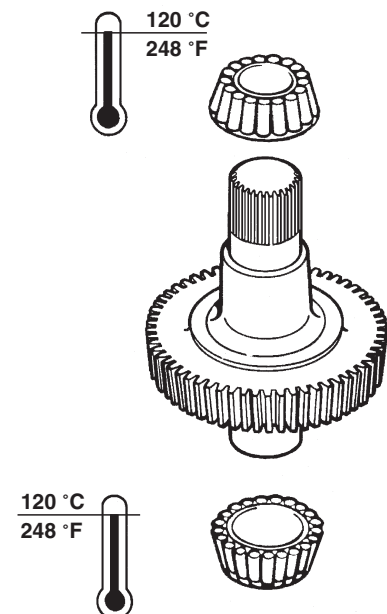


FIG. 3-1

## 4. PREASSEMBLY OF HOUSING

### 4.1 Assembly of outer races (tapered roller bearings)

Heat output half of the housing (item 1, Fig. 4-1) in an oven to approx. 120 °C (248 °F).

Insert outer races (item 2, Fig.4-1) into housing.

#### **WARNING**

**Handle heated tapered roller bearings outer races on with protective gloves.**

When housing has cooled down to ambient temperature, with a copper/brass punch seat outer races carefully into housing.

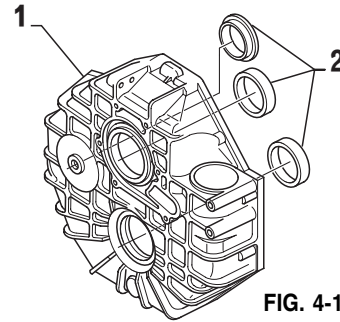


FIG. 4-1

### 4.2 Installation of fluid suction pipe and baffle

#### 4.2.1 Installation of fluid suction pipe

- Position oil suction pipe (item 1, Fig. 4-2a) in the housing.
- Put one drop of Loctite 242 into screw threaded hole.
- Lightly tighten the screw (item 3, Fig. 4-2a).
- Insert centre square punch and tighten definitely the screw.
- Adjust oil suction pipe to measure "A" (A = 26 mm) (Fig. 4-2b).
- Put some ATF fluid on the seal seat and on the oil suction pipe using a brush.
- Press into housing over the oil suction pipe the seal using the appropriate punch (Fig. 4-2c).

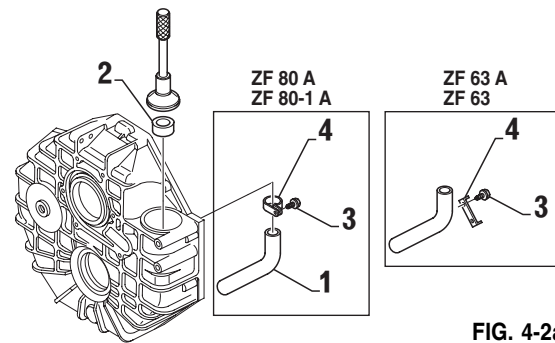


FIG. 4-2a

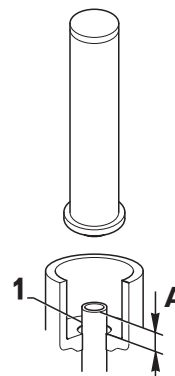


FIG. 4-2b

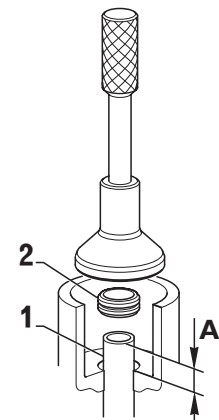


FIG. 4-2c

#### 4.2.2 Installation of baffle (Fig. 4-2d) (ZF 63 A - ZF 63)

Put one drop of Loctite 243 on the screw thread (item 1) and screw baffle plate (item 2) into the housing. After tightening the screws bend plate lugs when present over the hexagon of screws (see fig. 4-2d).

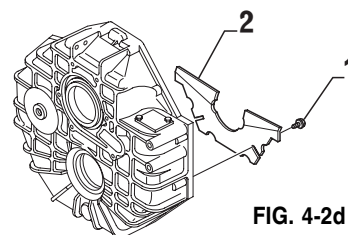


FIG. 4-2d

### 4.3 Assembling input shaft seal

Apply thin coat of Loctite 574 on periphery of new radial shaft seal rings (item 1, Fig. 4-3a and Fig. 4-3b) and grease lips with STABURAGS NBU 30.

Put it onto the mounting mandrel.

Drive shaft seal uniformly into the housing by tapping slightly onto the mounting mandrel.

#### NOTE

The sealing lip (A) on the shaft seal should point into the inside of the housing. The radial shaft seal must be adjusted so that the sealing lip runs on the grounded surface of the shaft.

FIG. 4-3a

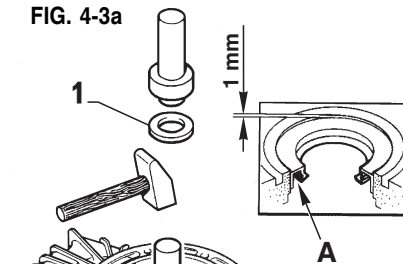
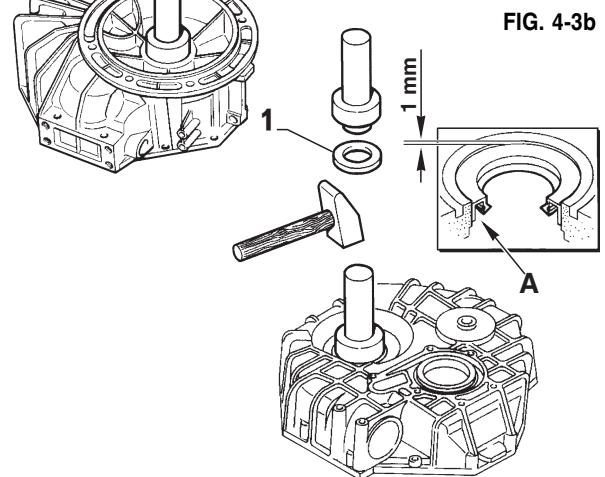


FIG. 4-3b



#### ALTERNATIVELY (Fig. 4-3c):

- Smear loctite 574 on the outside diameter of the input shaft seal using a roller.
- Lubricate the inside lip with Kluber Staburags NBU30 grease.
- Insert the input shaft seal into input shaft (item 2) using the appropriate bushing p/n 20.0012.01 (item 1).
- Use mandrel p/n 20.0012.02 (item 3) to position the input shaft seal in the correct way.

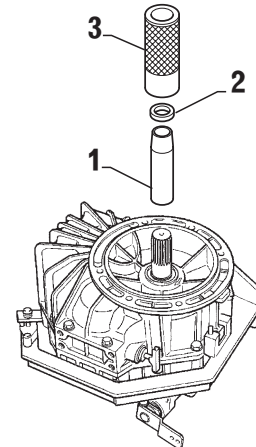


FIG. 4-3c

### 4.4 Mounting the breather filter

Due to the taper thread, the breather (item 1, Fig. 4-4) need not to be coated with Loctite or equipped with a sealing washer.

Tighten carefully during assembly (hand-tight).

Cheek leakage during a later test run. Retighten slightly if it leaks.

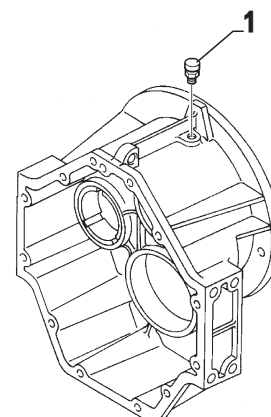


FIG. 4-4



## 5. MEASURING THE BEARING CLEARANCE/ADJUSTING THE PRETENSION OF BEARINGS

### 5.1 General

The required pretension/play of bearings of the individual shafts in the housing is obtained by using shims of different thickness under the outer races of the taper roller bearings. Shims which have been removed during disassembly may be reused.

First adjustment must refer to bearing clearance.

Take out from the front cover (Fig. 5-1) at least shims of 0.2 mm (0.0079 in.) thickness from the shims packages which were removed during disassembly.

Adjustment values

#### Pretension (mm)

Shaft	Input	Intermediate	Output
ZF 80 A - ZF 80-1 A	0.02-0.12	0.00-0.12	0.00-0.12
ZF 63 A - ZF 63	0.02-0.12	0.00-0.12	0.05-0.15

#### Pretension (inches)

Shaft	Input	Intermediate	Output
ZF 80 A - ZF 80-1 A	0.001-0.005	0.000-0.005	0.000-0.005
ZF 63 A - ZF 63	0.001-0.005	0.000-0.005	0.002-0.006

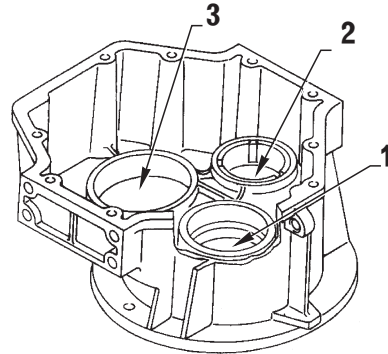


FIG. 5-1

### 5.2 Mounting outer races of tapered roller bearings into housing

Heat input half housing in an oven to approx. 120 °C (248 °F) and insert shims and outer races of bearings into it (item 1, Fig. 5-2).

#### **WARNING**

Handle heated housing half only with protective gloves!

When half housing has cooled down to ambient temperature, press outer races carefully down using a copper/brass punch.

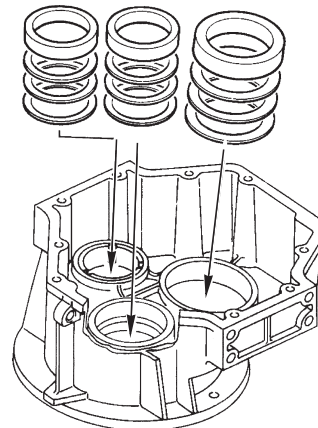


FIG. 5-2

### 5.3 Inserting gear set into housing

Finish housing mating face halves with an oilstone.

#### **CAUTION**

Make sure to keep any dirt out of housing.

- Holding the half housing on a swiveling stand, insert gears into it.
- Mount input housing half (item 1, Fig. 5-3) with all bolts, lock washers (item 2 and 3, Fig. 5-3) and parallel pins (item 4, Fig. 5-3).
- Tightening torque of bolts: 40 Nm (30 ft.lb.).

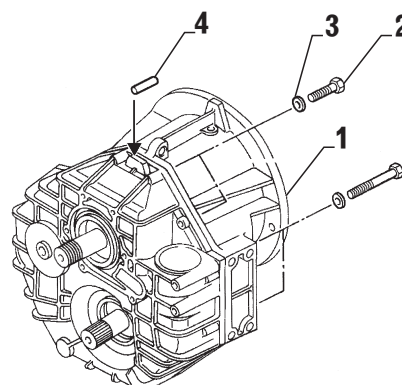


FIG. 5-3



#### 5.4 Measuring bearing clearance on input shaft

- Turn input shaft several times to permit bearings to seat.
- Fit clamping ring (tool p/n 219.354.3 (618582)) to the spline of the input shaft (item 1, Fig. 5-4).
- Adjust to «0», dial indicator to obtain accurate reading.
- With two levers carefully pry on the clamping ring and record end play of shaft.

#### NOTE

**This step must be done very carefully to obtain the actual bearing clearance.**

- Carry out steps, a) and d) several times.
- The bearing clearance measured plus the pretension required in section 5.1 determine the required thickness of shims.

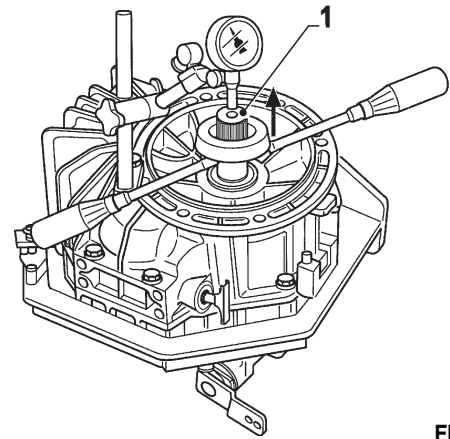


FIG. 5-4

#### 5.5 Measuring bearing clearance at intermediate shaft

- Unscrew plug (item 1, Fig. 5-5a) from the housing.
- Screw in special tool (p/n 224.836.008 (458105)) (item 2, Fig. 5-5a) into intermediate shaft hole.
- Mount dial gauge support securely onto housing.
- Turn intermediate shaft several times to permit bearings to seat.
- Adjust the dial indicator needle on top of the bolt head and «O» to dial indicator (Fig. 5-5b).
- Screw hexagon nut carefully against housing (intermediate shaft moves up) until bearing clearance is overcome (Fig. 5-5b).

#### NOTE

**This step should be done very carefully to obtain the actual bearing clearance.**

- Carry out steps d) and f) several times.
- The clearance measured plus the pretension required in section 5.1 determine the required thickness of shims.

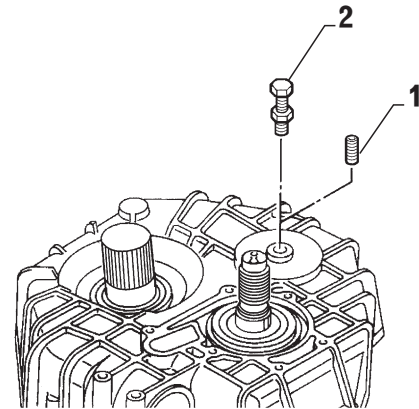


FIG. 5-5a

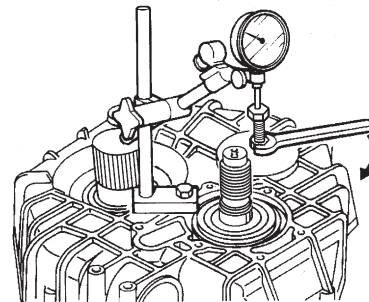


FIG. 5-5b

#### 5.6 Measuring the bearing clearance on the output shaft

- Insert output flange onto the output shaft and screw in nut ring.
- Install bolt and spacer on input shaft.
- Turn output shaft repeatedly to permit bearings to seat.
- Mount dial gauge support securely onto housing.
- Place dial gauge onto top of the output shaft and adjust it to «0» reading.
- Lift output shaft carefully, using two screwdrivers, and record measurement (Fig. 5-6).

#### NOTE

**This step should be done very carefully to obtain the actual bearing clearance.**

**Carry out steps c) and f) for several times.**

The bearing clearance measured plus the pretension required in section 5.1 will determine the required thickness of shims.

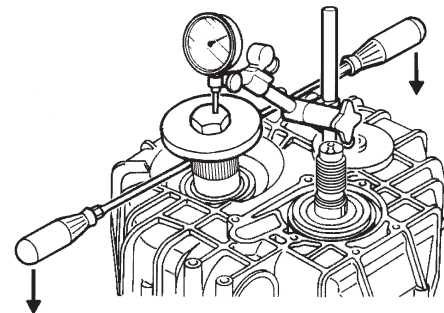


FIG. 5-6

### 5.7 Adjusting the pretension/clearance of bearings

When the thickness of shims has been determined, the transmission must be disassembled again.

- Using a adequate drift punch, drive the parallel pins (item 1, Fig. 5-7a) with slight blows, out of the housing.
- Loosen hex bolts (item 2 and 3) with lockwashers (item 4, Fig. 5-7a) and remove input side of housing (item 5, Fig. 5-7a).
- Pull outer races of bearings out of the input side of the housing using the extracting unit (Fig. 5-7b) or heating the half housing in an oven to approx. 120°C (248°F) and remove the outer races of bearings together with shims.

#### **WARNING**

Handle heated housing half and outer race only with protective gloves!

#### **NOTE**

Make sure to keep the shims with each outer race and not mix them together.

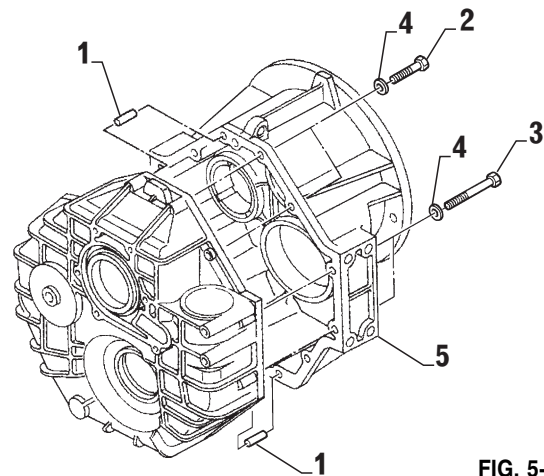


FIG. 5-7a

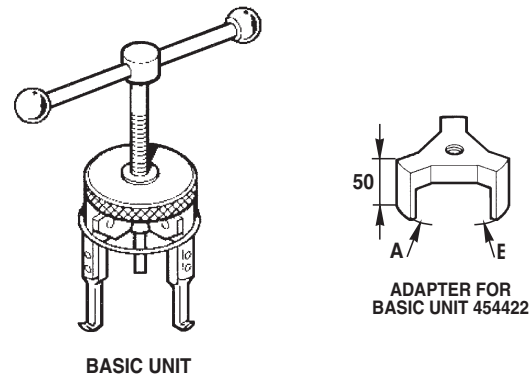


FIG. 5-7b

### 5.8 Final assembly of the housing

- Heat input side of the housing in an oven to approx. 120°C (248 °F).

#### **WARNING**

Handle heated housing only with protective gloves!

- Insert the required shims for proper pretension into bearings bore under bearing outer race.
- Insert outer races of bearings. When the housing has reached ambient temperature, drive outer races of bearings down to the stop, using a copper punch.
- Insert shafts.
- Fill space between seal and dust lips of shaft seal rings with a high quality bearing grease (Staburags Kluber NBU 30).
- Apply a thin coat of Loctite 518 on mating surface of input side of the housing and join both housing halves together.
- Drive parallel pins into housing to align housing halves, before tightening.
- Install mounting bolts (item 2 and 3 Fig. 5-5a) and torque them to 40 Nm (30 ft.lb.).

#### **NOTE**

There must be not measurable bearing clearance.

#### **WARNING**

The necessary time for a complete polymerization is 5 hours: we recommend therefore to clean carefully the mating surfaces with Loctite 7063 cleaner before applying the Loctite 518 and wait the requested time before the spin test.

## 6. CONTROL BLOCK

### 6.1 Mounting the control block

#### NOTE

**Piston rings (item 1, Fig. 6-1) have to be replaced, if thickness is less than 2.39 mm (0.094in).**

- Insert key (item 2, Fig. 6-1) into groove of shaft.
- Place new seal (item 3, Fig. 6-1) onto control block.
- Align key and slot in rotor pump.
- Slide control block carefully on input shaft.
- Insert lock washers (item 4, Fig. 6-1) on socket head bolts (item 5, Fig. 6-1) and provide screw threads each with a drop of Loctite 243.
- Tight control block bolts. Tightening torque:  
18 Nm (14 ft.lb.).

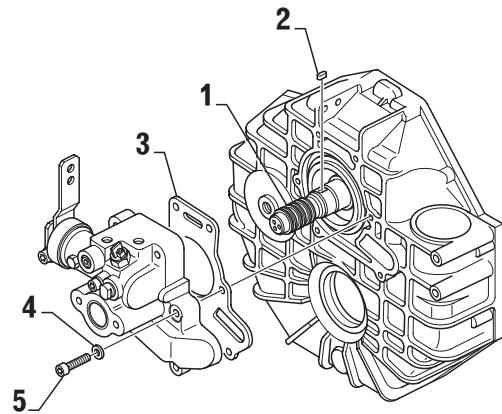


FIG. 6-1

## 7. FLUID FILTER

### 7.1 Mounting the fluid filter

- Wet O-rings (item 1 and 2, Fig. 7-1) with some ATF fluid and mount them.
- Install filter element (item 3, Fig. 7-1) into the transmission.
- Lock cover (item 4 Fig. 7-1) to the transmission using an allen wrench. Tightening torque: min. 5 Nm - max 8 Nm (min. 4 ft.lb. - max 6 ft.lb.)

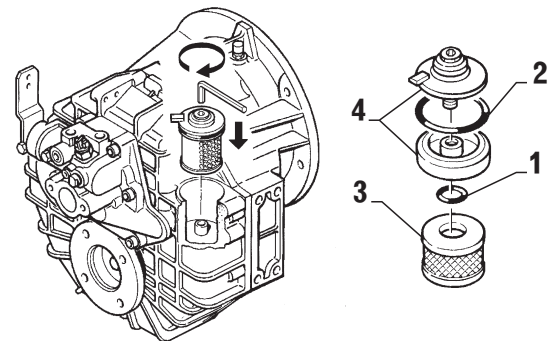


FIG. 7-1

## 8. OUTPUT FLANGE

Provide spline (X) of output shaft with a thin coat of Loctite 245 and sealing lip (Z) of shaft seal with a thin coat of ATF fluid. (Fig. 8-1)

Fit output flange (item 1, Fig. 8-1).

Provide O-ring (item 2, Fig. 8-1) with ATF fluid and insert into output flange.

Tight output flange down on output shaft with bolt (item 3, Fig 8-1) and washer (4).

Tightening torque:

ZF 63 A - ZF 63: 100 Nm (74 ft.lb.)

ZF 80 A - ZF 80-1 A: 180 Nm (133 ft.lb.)

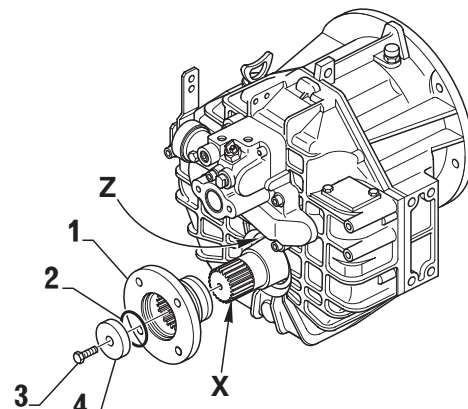


FIG. 8-1

## 9. MAKING THE TRANSMISSION READY FOR OPERATION

### 9.1 Filling up with transmission Fluid

Filling with ATF fluid into the fluid filter opening. (Fig. 9-1)

Quantity:

ZF 63 A - ZF 63: 3.2 US-qts (3.0 liters)

ZF 80 A - ZF 80-1 A: 5.8 US-qts (5.5 liters)

ATF (Automatic Transmission Fluid) such as, per list on section IX.

Fit filter element as specified in section 7.1.

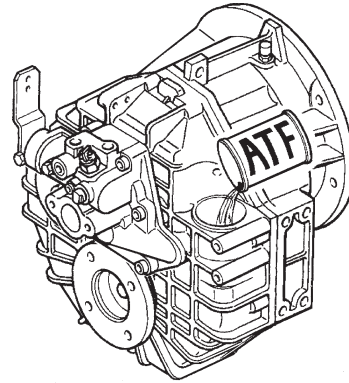


FIG. 9-1

### 9.2 Check fluid level

Carry out a trial run after oil filling.

Set shifting lever to neutral position (N). Start engine and let it run idle for a short time to fill the cooler and pipelines with transmission oil. Stop the engine and check oil level again. If necessary, top up with oil. Excessive oil should be removed. The fluid level on the dipstick (item 1, figure 9-2) should be between the min. and max. marks. The fluid level should be checked again after a short driving period.

#### NOTE

Some transmissions may have different oil dipsticks, depending on the version:

A) When inserted into the housing hole, it expands by turning the handle in clockwise direction. (Fig. 9-2 item A)

B) It is threaded (Fig. 9-2 item B).



#### IMPORTANT

Oil check with threaded dipstick (B) must be done in a different way compared with the one not threaded (A):

A) Oil dipstick and housing hole not threaded: dipstick completely inserted into hole.

B) Oil dipstick and housing hole threaded: dipstick not inserted into the housing hole (not screw in).

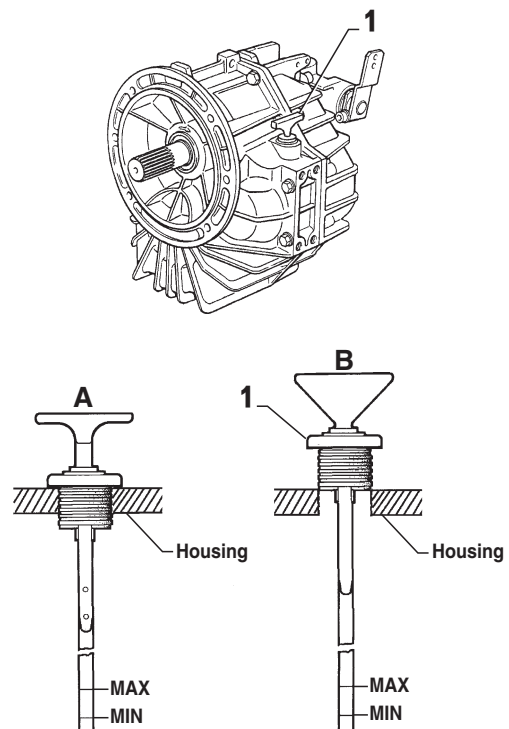
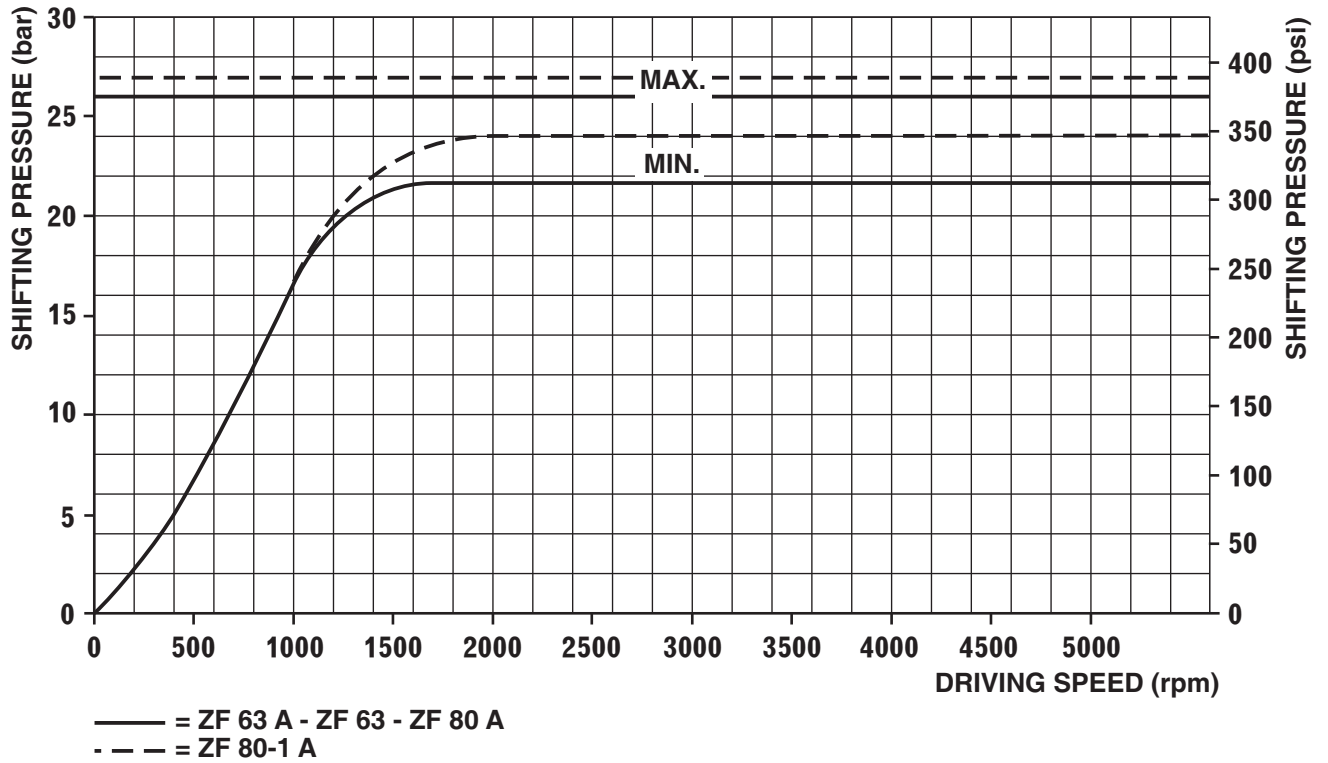


FIG. 9-2

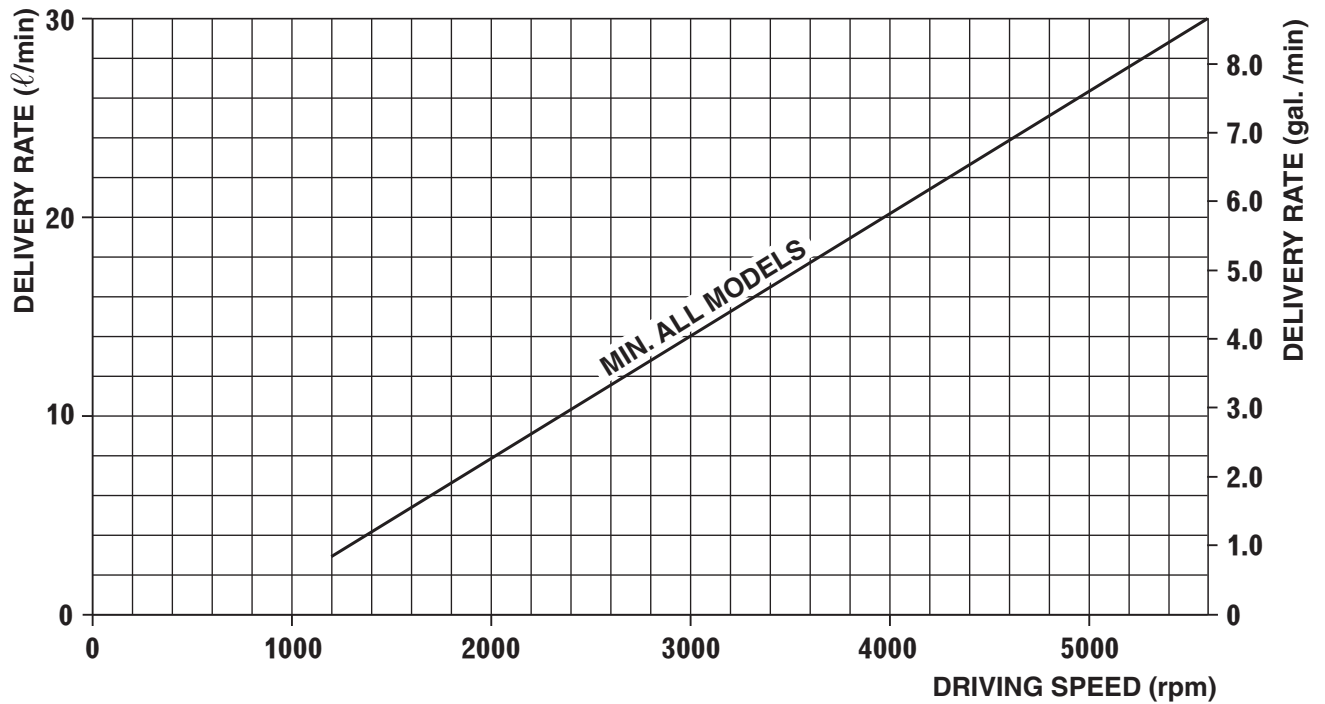


# ADJUSTMENT DATA

## 1. SHIFTING PRESSURE



## 2. LUBE OIL DELIVERY RATE





## TIGHTENING TORQUES

PART	SIZE	TORQUE IN lb.ft.	TORQUE IN Nm	LOCTITE
Output flange bolt ZF 63 A - ZF 63	M16	74	100	242 or 262
Housing bolts	M10	30	40	-
Control block bolts	M8	14	18	242 or 262
Shifting lever bolt	M8	17	23	-
Output flange bolt ZF 80 A - ZF 80-1 A	M16	132	180	242 or 262
Fluid filter bolt	-	min 4 - max 6	min 5 - max 8	-
Breather	-	Hand tight	Hand tight	-
Fluid dipstick	-	Hand tight	Hand tight	-
Oil plug	-	30	40	243

## FUNCTION TEST

When the transmission has been completely assembled and filled up with transmission fluid, it would be convenient to make a function test.

This test can be carried out on a bench test rig, or in a boat. If no fluid cooler can be connected, a hydraulic hose must be connected between the inlet and outlet of the hydraulic pump.

### Measuring instruments required:

- Pressure gauge 0-40 bar (0-580 psi), with connecting thread M10x1.
- Temperature gauge 0-120°C (0-250°F) connecting thread 3/8«-18NPSF.
- Flow meter 0-35 liters/min (0-10 gals/min).

### Tests to be carried out:

1. Fluid leaks
2. Noise emission
3. Output direction of rotation, LH/RH
4. Lube oil temperature
5. Shifting pressure
6. Lube oil flow rate

### The function test should be carried out follows:

Motor speed rpm	Shift lever position	Temperature	Durat. minutes	Test
800-1000	neutral	40°C/104 °F	5	1, 2
600-800 (idling speed)	A <-> B position repeatedly	40°C/104 °F	-	1, 2, 3
1500-2500	B position	80°C / 176 °F	-	1, 2, 4
600-800 (idling speed)	A <-> B position repeatedly	80°C/176 °F	-	1, 2, 3
idling - max. speed	A position	80°C/176 °F	-	1, 2, 5*, 6*
600-800 (idling speed)	A-> B position 80°C/176 °F	-	-	1, 2
idling - max. speed	B position	80°C/176 °F	-	1, 2, 5*, 6*
		80°C/176 °F	-	

\* At different speeds.







## TROUBLESHOOTING

In case of trouble, check first whether all items of the mounting and operating instructions have been completed with. The subsequent tables will assist you in troubleshooting.

Symptom	Possibly cause	Remedy
1. Transmission cannot be shifted	1.1 Shifting lever is loose 1.2 Remote control does not permit lever travel required 1.3 Remote control faulty 1.4 No shifting pressure available	1.1 Tighten clamping bolt on shifting lever 1.2 Lift remote control off, if gears can be shifted by hand, adjust remote control 1.3 Repair remote control 1.4 Refer to 7
2. Delayed shift time	2.1 Shift linkage misadjust not allowing full engagement	2.1 Lift remote control off, if gear can be shifted by hand, adjust remote control. If the transmission cannot be shifted correctly by hand, replace the control block
3. Clutch is slipping, i.e. propeller speed too low as compared to engine speed.	3.1 Inadmissible fluid used 3.2 Fluid contains water 3.3 Shifting pressure too low 3.4 Wear on clutch discs 3.5 Piston rings are damaged	3.1 Drain fluid, refill with prescribed fluid, flush transmission while engine runs in neutral position drain fluid, refill transmission 3.2 Refer to 9 3.3 Refer to 6 3.4 Disassemble transmission, replace clutch discs 3.5 Disassemble transmission, replace piston rings
4. Transmission locked in gear	4.1 Medium piston ring in input shaft in control block is faulty 4.2 Warped discs due to overheating of slipping clutch 4.3 Needle bearings on input shaft are worn out	4.1 Remove control block, replace piston ring, if control block is worn, replace likewise 4.2 Refer to 3 4.3 Disassemble transmission, replace needle bearing and check for damage input shaft and gears
5. Output shaft turns in neutral position	5.1 Rotary slide valve in control block is worn 5.2 Faulty needle bearing on input shaft 5.3 Warped discs due to overheating of slipping clutch	5.1 Replace control block 5.2 Disassemble transmission and input shaft, replace bearing concerned and other damaged parts 5.3 Refer to 3
6. Shifting pressure too low	6.1 Fluid filter clogged 6.2 Fluid level in transmission too low 6.3 Fluid pump is worn out 6.4 Spring in shifting pressure relief valve is broken 6.5 Piston rings on input shaft are faulty 6.6 Piston rings in clutch are faulty	6.1 Replace fine filter 6.2 Top-up with fluid; in case of fluid loss check transmission, cooler and pipelines for leakage also refer to 10 through 13 6.3 Replace control block containing fluid pump 6.4 Replace control block 6.5 Remove control block and replace piston rings. In case of wear in control block due to faulty piston rings replace block as well 6.6 Disassemble transmission, replace piston rings.



Symptom	Possibly cause	Remedy
7. No shifting pressure available	7.1 Direction of engine rotation does not agree with arrow on transmission front cover 7.2 No fluid in the transmission 7.3 Fine filter is dirty 7.4 Fluid level in transmission is too low 7.5 Fluid pump worn out 7.6 Pump key in input shaft for fluid pump drive is broken 7.7 Spring of shifting pressure relief valve is broken	7.1 Replace with suitable rotation engine 7.2 Refill with fluid 7.3 Replace fine filter 7.4 Top-up with fluid. In case of loss of fluid check transmission, cooler and pipelines for leakage, also refer to 10 through 13 7.5 Replace control block 7.6 Remove control block. Replace pump key, and any other faulty parts 7.7 Replace control block
8. Excessive fluid temperature	8.1 Fluid cooler is too small 8.2 Excessive fluid in transmission 8.3 Fluid cooler is dirty on water side 8.4 Worn fluid pump in control block 8.5 Faulty piston rings in control block 8.6 Clutch is slipping 8.7 Clutch does not open completely due to worn disc support 8.8 Clutch does not open completely due to broken cup springs 8.9 With fluid cooler in bypass and unfavorable arrangement of pipelines too little coolant water flows through bypass to cooler	8.1 Use a larger fluid cooler 8.2 Remove excessive fluid with commercial suction pump 8.3 Detach coolant water lines and clean fluid cooler on water side 8.4 Replace control block containing fluid pump 8.5 Remove control block, replace piston rings. In case of wear in the control block due to faulty piston rings replace control block as well 8.6 Refer to 3 8.7 Dismount transmission and clutch, replace all faulty parts 8.8 Dismount transmission and clutch, replace all faulty parts 8.9 Correct bypass pipeline
9. Water in the fluid, fluid looks milky	9.1 Fluid cooler faulty 9.2 High water level in engine compartment, water entering at output shaft seal	9.1 Repair leakage at cooler or replace cooler. Change transmission fluid 9.2 Remedy cause for water level in engine compartment. Change transmission fluid
10. Fluid leakage at input or output shaft	10.1 Breather clogged with paint or dirt 10.2 Shaft seal faulty 10.3 Excessive fluid in transmission	10.1 Remove paint or dirt from breather Replace seal. If seal location on shaft is worn, regrind 10.3 Remove excessive fluid with commercial suction pump
11. Fluid leakage at breather	11.1 Excessive fluid in transmission	11.1 Pump excessive fluid out with commercial hand pump
12. Fluid leakage at joints or screw connections	12.1 Bolts are not tight at the prescribed torque 12.2 Loctite not properly spread onto sealing surface 12.3 Gasket has been used several times	12.1 Tighten bolts to prescribed torque 12.2 Reseal after removing old Loctite and cleaning. Finish mating faces with oilstone. 12.3 Replace gasket



Symptom	Possibly cause	Remedy
13. Transmission noise becomes louder	<p>13.1 Fluid level too low so that pump sucks in air</p> <p>13.2 Damage starting on flexible coupling due to wear or fatigue probably due to misalignment between engine and transmission</p> <p>13.3 Beginning damage of bearings in transmission, e.g. due to torsional vibration, running without fluid, overload, wrong alignment of transmission</p> <p>13.4 Beginning damage of gearing, e.g. due to torsional vibrations, running without fluid, overload</p> <p>13.5 Fluid suction pipe in transmission has come loose</p>	<p>13.1 Top up with fluid to marking on dipstick</p> <p>13.2 Replace flexible coupling. Check alignment between engine and transmission</p> <p>13.3 Disassemble transmission, replace bearings concerned and other faulty parts. Find causes and remedy</p> <p>13.4 Disassemble transmission, replace faulty parts</p> <p>13.5 Disassemble transmission fix fluid suction pipe</p>
14. Chattering transmission noise mainly at low engine speed	<p>14.1 The engine or propeller generates torsional vibrations in the drive unit which produces a hammering noise in the transmission</p> <p>14.2 Misaligned cardan shafts on input or output</p>	<p>14.1 Mount a flexible coupling with a different stiffness factor between engine and transmission; a coupling with a higher stiffness factor might be sufficient. Otherwise analyze the torsional vibrations to find out the required stiffness for the coupling.</p> <p>14.2 Mount and align cardan shaft strictly according to instructions issued by cardan shaft manufacturer</p>



## AUTOMATIC TRANSMISSION FLUID

MANUFACTURER	PRODUCT	MANUFACTURER	PRODUCT
ADDINOL MINERALÖL GMBH, KRUMPA/D	<ul style="list-style-type: none"> <li>• ADDINOL ATF D IID</li> <li>• ADDINOL ATF D III</li> </ul>	ENGEN PETROLEUM, CAPE TOWN/ZA	<ul style="list-style-type: none"> <li>• ENGEN ATF 22D</li> </ul>
AGIP PETROLI SPA, ROM/I	<ul style="list-style-type: none"> <li>• AGIP ATF II D</li> <li>• AGIP ATF D 309</li> <li>• AGIP ATF PLUS</li> <li>• AGIP DEXRON III</li> </ul>	ERTOIL SA, MADRID/E	<ul style="list-style-type: none"> <li>• TRANSMISIONES AUTOMATICAS D2</li> </ul>
AGIP SCHMIERTECHNIK, WÜRZBURG/D	<ul style="list-style-type: none"> <li>• AUTOL GETRIEBEÖL ATF-D</li> <li>• AUTOL GETRIEBEÖL ATF III D</li> </ul>	ESSO AG, HAMBURG/D	<ul style="list-style-type: none"> <li>• ESSO ATF D (21611)</li> <li>• ESSO ATF F-30320</li> <li>• ESSO ATF D (21065)</li> </ul>
ARAL LUBRICANTS GMBH, BOCHUM/D	<ul style="list-style-type: none"> <li>• ARAL GETRIEBEÖL ATF 22</li> <li>• ARAL GETR.ÖL ATF 55 F-30589</li> </ul>	FIAT LUBRIFICANTI, VILLASTELLONE/I	<ul style="list-style-type: none"> <li>• TUTELA G/A</li> </ul>
AVIA MINERALÖL-AG, MÜNCHEN/D	<ul style="list-style-type: none"> <li>• AVIA FLUID ATF 86</li> </ul>	FINA EUROPE SA, BRÜSSEL/B	<ul style="list-style-type: none"> <li>• FINAMATIC II-D</li> </ul>
BLASER SWISSLUBE, HASLE-RÜEGSAU/CH	<ul style="list-style-type: none"> <li>• BLASOL 229</li> </ul>	FUCHS LUBRICANTS (UK), DERBY/GB	<ul style="list-style-type: none"> <li>• SILKTRAN MP-ATF</li> <li>• SILKTRAN PSV ATF</li> </ul>
BP OIL DEUTSCHLAND, HAMBURG/D	<ul style="list-style-type: none"> <li>• FRONTOL UNIVERSAL-ATF 100</li> </ul>	FUCHS MINERALÖLWERKE, MANNHEIM/D	<ul style="list-style-type: none"> <li>• TITAN ATF 4000</li> </ul>
BP OIL INTERNATIONAL, LONDON/GB	<ul style="list-style-type: none"> <li>• AUTRAN DX II</li> <li>• AUTRAN MBX</li> <li>• AUTRAN DX III (F-30370)</li> <li>• AUTRAN DX III (F-30381)</li> </ul>	GINOUVES GEORGES SA, LA FARLEDE/F	<ul style="list-style-type: none"> <li>• YORK LT 785</li> </ul>
BUCHER + CIE AG, LANGENTHAL/CH	<ul style="list-style-type: none"> <li>• MOTOREX ATF SUPER D-22656</li> <li>• MOTOREX ATF DEXRON III MC</li> </ul>	GULF OIL (GB) LTD, CHELTENHAM/GB	<ul style="list-style-type: none"> <li>• UNIFLUID</li> <li>• ATF 2</li> </ul>
CALPAM GMBH, ASCHAFFENBURG/D	<ul style="list-style-type: none"> <li>• PAMATIC FLUID 289</li> <li>• CALPAMATIC FLUID III F</li> </ul>	HANDELSMIJ NOVIOL B.V., NIJMEGEN/NL	<ul style="list-style-type: none"> <li>• KENDALL ATF DEXRON IID</li> </ul>
CALTEX PETROLEUM CORP., LONDON/GB	<ul style="list-style-type: none"> <li>• CALTEX ATF-HDA</li> <li>• CALTEX ATF-HDM</li> <li>• CALTEX TEXAMATIC 1278</li> <li>• CALTEX TEXAMATIC 7045</li> <li>• CALTEX TEXAMATIC 1205A</li> </ul>	HOMBERG GMBH + CO KG, WUPPERTAL/D	<ul style="list-style-type: none"> <li>• HOMBERG-GETRIEBE-FLUID D</li> </ul>
CASTROL LTD, SWINDON/GB	<ul style="list-style-type: none"> <li>• CASTROL TQ-D (22765)</li> <li>• CASTROL TQ DEXRON III F-30520</li> <li>• CASTROL TRANSMAX S (F-30319)</li> <li>• CASTROL TRANSMAX T (F-30359)</li> <li>• CASTROL TQ-D (21289)</li> <li>• CASTROL ATF 21293</li> </ul>	IGOL FRANCE, PARIS/F	<ul style="list-style-type: none"> <li>• IGOL ATF 420</li> </ul>
CEPSA, MADRID/E	<ul style="list-style-type: none"> <li>• CEPSA ATF-70</li> </ul>	INA RAFINERIJA ZAGREB/CROATIA	<ul style="list-style-type: none"> <li>• INA-ATF SUPER</li> </ul>
CHEVRON PRODUCTS CO., RICHMOND/USA	<ul style="list-style-type: none"> <li>• CHEVRON ATF F-30108</li> </ul>	ITALIANA PETROLI, GENOVA/I	<ul style="list-style-type: none"> <li>• TRANSMISSION FLUID DX</li> </ul>
CITGO PETROLEUM CORP., TULSA/USA	<ul style="list-style-type: none"> <li>• CITGO ATF DEXRON III F-30167</li> </ul>	JAPAN ENERGY CORP., TOKYO/JAPAN	<ul style="list-style-type: none"> <li>• JOMO ATF K</li> </ul>
C.J.DIEDERICHS SÖHNE, WUPPERTAL/D	<ul style="list-style-type: none"> <li>• CIDISOL-HYDR.-FLUID DEXRON IID</li> </ul>	KÄPPLER K., STUTTGART/D	<ul style="list-style-type: none"> <li>• SELECTOL FLUID GETR.ÖL IID 23</li> </ul>
DE OLIEBRON B.V., ZWIJNDRECHT/NL	<ul style="list-style-type: none"> <li>• ATF DMM</li> <li>• ATF 289</li> </ul>	KLÖCKNER ENERGIEHANDEL GMBH, KÖLN/D	<ul style="list-style-type: none"> <li>• DEUTZ OEL ATF-D</li> </ul>
DEA MINERALÖL AG, HAMBURG/D	<ul style="list-style-type: none"> <li>• DEAMATIC</li> <li>• DEAFUID 4011</li> <li>• DEAFUID 3003</li> </ul>	KROON OIL BV, ALMELO/NL	<ul style="list-style-type: none"> <li>• ATF DEXRON IID</li> <li>• ALMIROL ATF</li> </ul>
DEUTSCHE SHELL AG, HAMBURG/D	<ul style="list-style-type: none"> <li>• MAC ATF D-21666</li> </ul>	KUWAIT PETROLEUM, HOOGLIET/NL	<ul style="list-style-type: none"> <li>• Q8 AUTO 15</li> <li>• Q8 AUTO 14 (IID-21677)</li> <li>• Q8 AUTO 14 (IID)</li> <li>• Q8 AUTO 14 (IID-21883)</li> </ul>
DUCKHAMS OIL, BROMLEY/GB	<ul style="list-style-type: none"> <li>• UNIMATIC</li> </ul>	LEPRINCE + SIVEKE GMBH, HERFORD/D	<ul style="list-style-type: none"> <li>• LEPRINXOL FLUID CN</li> </ul>
ELF LUBRIFIANTS, PARIS/F	<ul style="list-style-type: none"> <li>• TRANSANTAR DF2</li> <li>• ANTAR 22329</li> <li>• ELFMATIC G2 22329</li> <li>• HUILE RENAULT DIESEL</li> <li>• STARMATIC</li> </ul>	LIQUI MOLY / MEGUIN, ULM/D	<ul style="list-style-type: none"> <li>• ATF IIE</li> <li>• MEGOL ATF IID</li> </ul>
ELFMATIC G3	<ul style="list-style-type: none"> <li>• TRANSANTAR DF3</li> </ul>	LUBRICATION ENGIN., FORT WORTH/USA	<ul style="list-style-type: none"> <li>• AUTOMATIC TRANSMISSION FLUID</li> </ul>
ELLER-MONTAN-COMP., DUISBURG/D	<ul style="list-style-type: none"> <li>• ELLMO-AUTOMATIK-FLUID 22233</li> </ul>	MAURAN SA, ODARS/F	<ul style="list-style-type: none"> <li>• INTER OIL INTER MATIC ATF D2</li> </ul>
		MIN.ÖL-RAFFIN. DOLLBERGEN, UETZE/D	<ul style="list-style-type: none"> <li>• PENNASOL FLUID-GETR.ÖL TYP PCN</li> </ul>
		MOBIL OIL, WEDEL/D	<ul style="list-style-type: none"> <li>• MOBIL ATF 220 D20104 / D21685</li> <li>• MOBIL ATF F-30107</li> <li>• MOBIL ATF 220 D21412 / D22187</li> </ul>
		MOBIL SEKIYU KABUS. KAISHA, TOKYO/J	<ul style="list-style-type: none"> <li>• MOBIL ATF 220Y (D-21412)</li> </ul>
		MOL HUNGARIAN OIL, KOMARON/H	<ul style="list-style-type: none"> <li>• CARRIER ATF</li> </ul>
		MORRIS LUBRICANTS, SHREWSBURY/GB	<ul style="list-style-type: none"> <li>• LIQUIMATIC DII</li> </ul>
		NAFTEC, ALGIER/DZ	<ul style="list-style-type: none"> <li>• TASSILIA</li> </ul>



MANUFACTURER	PRODUCT
NANHAI SUPERIOR LUB-OIL, CHINA	• NANHAI ATF (D2)
NIS-RAFINERIJA NAFTE BEOGRAD/YU	• GALAX MATIC DAC
OEST G. MIN.ÖLWERK, FREUDENSTADT/D	• ATF T 4011
OMEX PETROLEUM PTY, BELLEVUE/AUS	• OMEX ATF DEXRON II
OMV AG, SCHWECHAT/A	• OMV ATF D II (D22427) • OMV ATF III (F-30580)
OPTIMOL ÖLWERKE, HAMBURG/D	• OPTIMOL ATF T 4011
OSWALD KLUTH, BARGFELD-STEGEN/D	• UNIVERSAL ATF-D
PAKELO MOTOR OIL, SAN BONIFACIO/I	• MULTIPURPOSE TRANSM. FLUID IID
PANOLIN AG, MADETSWIL/CH	• PANOLIN ATF MULTI 21996 • PANOLIN ATF DEXRON III
PARS OIL CO., TEHRAN/IR	• PARS ENTEGHAL-E AUTOMATIC OIL
PAZ LUBRICANTS & CHEMICALS, HAIFA/IL	• PAZBO EZF
PENNZOIL PRODUCT COMP., HOUSTON/USA	• PENNZOIL ATF F-30110
PETRO-CANADA, MISSISSAUGA/CDN	• DEXRON III/MERC.ATF (F-30395)
PETROL OFISI A.S., BAKANLIKLAR/TR	• PETROL OFISI ATF II
PETROLEX, KWIDZYN/PL	• VECO MATIC IID
PRINZ-SCHULTE, FRECHEN/D	• AERO-LINE ATF-2 • AERO-LINE ATF-D
REPSOL DISTRIBUCION SA, MADRID/E	• REPSOL MATIC ATF
S.A.E.L, ALCOBENDAS/E	• GULF ATF DII D-22233
SASOL OIL, RANDBURG/ZA	• SASOL ATF DXII
SCHMIERSTOFFRAFFINERIE SALZBERGEN/D	• WINTERSHALL ATF D
SHELL ASEOL AG, BERN/CH	• ASEOL ATF DB UNIVERSAL
SHELL INTERNATIONAL, LONDON/GB	• SHELL DONAX TA (D-21666) • SHELL DONAX TG (F-30358)
SLOVNAFT JS CO, BRATISLAVA/SLO	• MADIT AUTOMATIC
SONOL ISRAEL LTD, HAIFA/IL	• DEXRON 2 D

MANUFACTURER	PRODUCT
SOPROGRASA SA, MADRID/E	• SOPRAL 164
STATOIL STAVANGER/N	• TRANSWAY DX III (F-30373) • TRANSWAY DX II
STL TECNOL, ESCALQUENS/F	• TECNOL TECMATIC D2
SUN OIL COMPANY, AARTSELAAR/B	• SUNAMATIC 149 • SUNAMATIC 153
SUOMEN PETROOLI OY, HAMINA/SF	• TEBOIL FLUID E (F-30301) • TEBOIL FLUID D
SVENSKA STATOIL AB, NYNÄSHAMN/S	• TRANSWAY DX III (F-30373)
TAMOIL LUBES, GENEVA/CH	• TAMOIL ATF II D
TEXACO LUBRICANTS COMP., BEACON/USA	• ATF MERCON / DEXRON III  • TEXAMATIC 7045 • TEXAMATIC 4261 • TEXAMATIC 7080 • TEXTTRAN PSM • TEXAMATIC 4011 • TEXAMATIC 4291 • TEXAMATIC 9226
TEXACO SERVICES LTD, BRÜSSEL/B	
TOTAL RAFFINAGE DISTR., PARIS/F	• TOTAL FLUIDE ATX • TOTAL FLUIDE IID • TOTAL FLUIDE AT 42
TOTAL SOUTH AFRICA, JOHANNESBURG/ZA	• TOTAL FLUIDE ATD
TURBOTANK BÖSCHE BÖDEKER, BREMEN/D	• TURBO UNIV. ATF MERCON 4011
UFANEFTCHIM REFINERY, UFA/RUS	• UFALUB ATF
UNIL DEUTSCHLAND GMBH, BREMEN/D	• UNIL MATIC CN T 4011
VALVOLINE INC., LEXINGTON/USA	• VALVOLINE MULTI-PURPOSE ATF
VALVOLINE INTERNAT., DORDRECHT/NL	• VALVOLINE ATF TYPE D
VEBA OEL AG, GELSENKIRCHEN/D	• MOVARA ATF-GETRIEBEÖL DIID
VEEDOL INTERNATIONAL, SWINDON/GB	• VEEDOL ATF-M (22764) • VEEDOL ATF DEXRON III F-30521 • VEEDOL UNITRANS S PLUS
YACCO SA, ST PIERRE-LES-ELBEUF/F	• YACCO ATF D
ZELLER + GMELIN GMBH&CO, EISLINGEN/D	DIVINOL FLUID 666

## SPARE PARTS LIST

### Preface

The spare parts list is only valid for the type and versions of transmission, as shown below.

You will find the transmission type and version on your transmission name plate.

If the type and version indicated differs from that printed in this Manual, the relative Spare Parts List should be ordered from ZF HURTH MARINE.

The indicated dimensions and standards are as such not enough for ordering parts.

When ordering parts, please state:

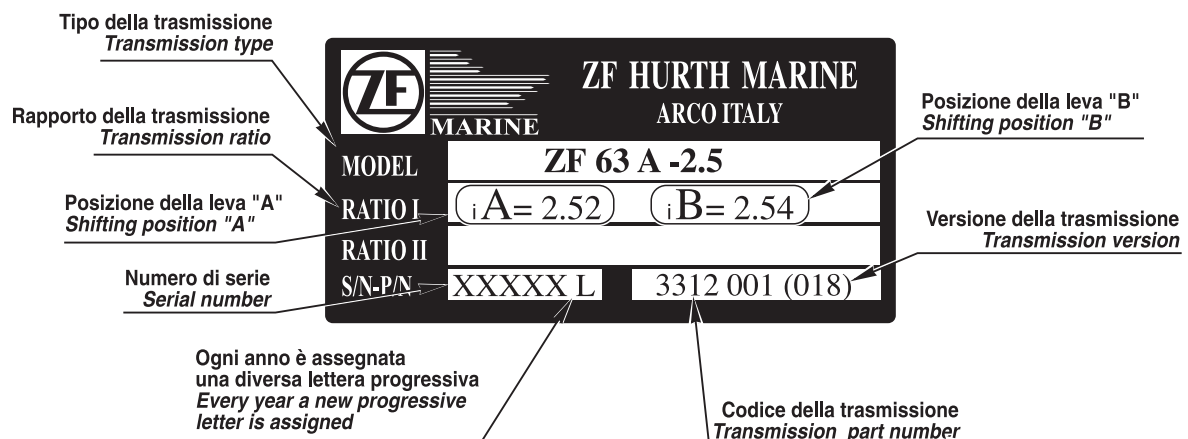
- Transmission type
- Serial number
- Item no.
- Part name
- Identification no.
- quantity of parts required.

The spare parts list is referring to the following versions:

<b>ZF 63 A</b>	<b>versions 21</b> (1.22 R); 22 (1.56 R); 24 (2.04 R); 25 (2.52 R); 30 (2.70 R); versions 001 (1.22 R); 002 (1.56 R); 003 (2.04 R); 004 (2.52 R); 005 (2.70 R); versions 015 (1.22 R); 016 (1.56 R); 017 (2.04 R); 018 (2.52 R); 021 (2.70 R);
<b>ZF 63</b>	<b>versions 01</b> (1.51 R); 02 (1.93 R); 03 (2.48 R); 04 (2.78 R); versions 009 (1.25 R); 001 (1.51 R); 002 (1.93 R); 003 (2.48 R); 004 (2.78 R); versions 010 (1.25 R); 011 (1.51 R); 013 (1.93 R); 014 (2.48 R); 015 (2.78 R);
<b>ZF 80 A</b>	<b>versions 15</b> (1.20 R); 16 (1.41 R); 17 (1.57 R); 18 (1.96 R); 19 (2.50 R); 20 (2.85 R); versions 001 (1.20 R); 002 (1.41 R); 003 (1.57 R); 004 (1.96 R); 005 (2.50 R); 006 (2.85 R);
<b>ZF 80-1 A</b>	<b>versions 009</b> (1.21 R); 010 (1.41 R); 007 (1.57 R); 008 (1.96 R); 011 (2.50 R); 012 (2.85 R);

### Name plate

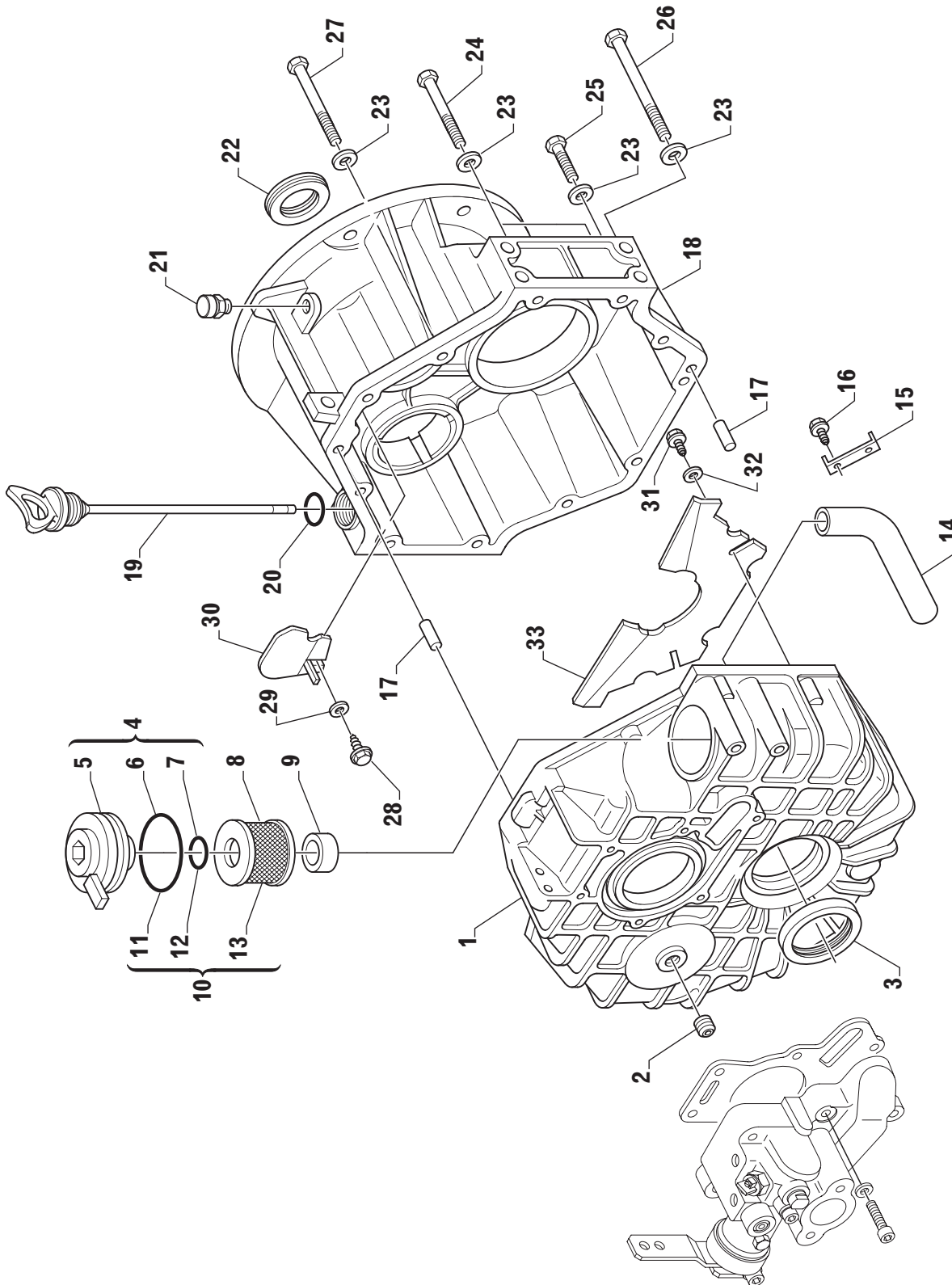
The name plate is mounted to the transmission





ZF 63 A

FIG. 1







Pos.	Part number	Old P/N	Descrizione	Description	Q.tà Q.ty	Note
1	3312 301 004	451892	Scatola	Housing	1	
2	0636 301 041	442373	Tappo	Plug	1	
3	0634 319 132	442135	Paraolio uscita	Output shaft seal	1	
4	3312 101 003	500484	Coperchio filtro completo	Filter cover, assy.	1	
5	☆		. Coperchio filtro	. Filter cover	1	
6	0634 304 688	442731	. Guarnizione OR	. O-Ring	1	
7	0634 306 204	105542	Guarnizione OR	O-Ring	1	
8	3312 301 007	438637	Filtro olio	Oil filter	1	
9	3312 301 008	439653	Guarnizione	Sealing washer	1	
10	3312 199 031	463772	Filtro olio completo	Oil filter, assy	1	
11	0634 304 688	442731	. Guarnizione OR	. O-Ring	1	
12	0634 306 204	105542	. Guarnizione OR	O-Ring	1	
13	3312 301 007	438637	. Filtro olio	. Oil filter	1	
14	3312 301 005	438948	Tubo aspirazione	Suction pipe	1	
	3312 301 033		Tubo aspirazione con supporto	Suction pipe with support	1	
15	3312 301 013	439223	Piastra ritegno	Retaining plate	1	
16	0636 113 006	455079	Vite T.E.	Hex head screw	2	
			(ritegno tubo aspirazione)	(suction pipe retainer)		
	0636 015 020		Vite T.E.	Hex head screw	2	
			(tubo aspirazione con supporto)	(suction pipe with support)		
17	0631 315 520	335817	Spina	Locator pin	2	
18	3312 301 002	451889	Coperchio	Cover (housing)	1	
	3312 301 003	501352	Coperchio	Cover (housing)	1	Only Ratio I = 2.7
▼ 19	978.36.701.02	454913	Asta livello olio	Oil dipstick	1	
△	3312 201 002	500989	Asta livello olio + OR	Oil dipstick + OR	1	
20	0634 304 405	501211	. Guarnizione OR (Asta livello olio)	. O-Ring (Oil dipstick)	1	
21	3311 301 002	442369	Valvola di sfiato	Breather valve	1	
22	3312 301 030	413883	Paraolio entrata	Input shaft seal	1	
23	0630 302 091	442371	Rosetta	Washer	12	
24	0636 010 550	442374	Vite T.E.	Hex head screw	4	
25	0636 015 227	442375	Vite T.E.	Hex head screw	5	
26	0636 010 572	442376	Vite T.E.	Hex head screw	2	
27	0636 015 386	452512	Vite T.E.	Hex head screw	1	
28	0636 113 006	455079	Vite T.E.	Hex head screw	1	
	0636 015 020		Vite T.E.	Hex head screw	1	
29	0630 001 046		Rosetta	Washer	1	
30	3312 301 011	455053	Piastra	Baffle plate	1	Ratio I = 1.2; 1.6; 2.0
	3312 301 012	458290	Piastra	Baffle plate	1	Ratio I = 2.5; 2.7
31	0636 113 006	455079	Vite T.E.	Hex head screw	2	
	0636 015 020		Vite T.E.	Hex head screw	2	
32	0630 001 046		Rosetta	Washer	2	
33	3312 301 006	438963	Piastra	Baffle plate	1	

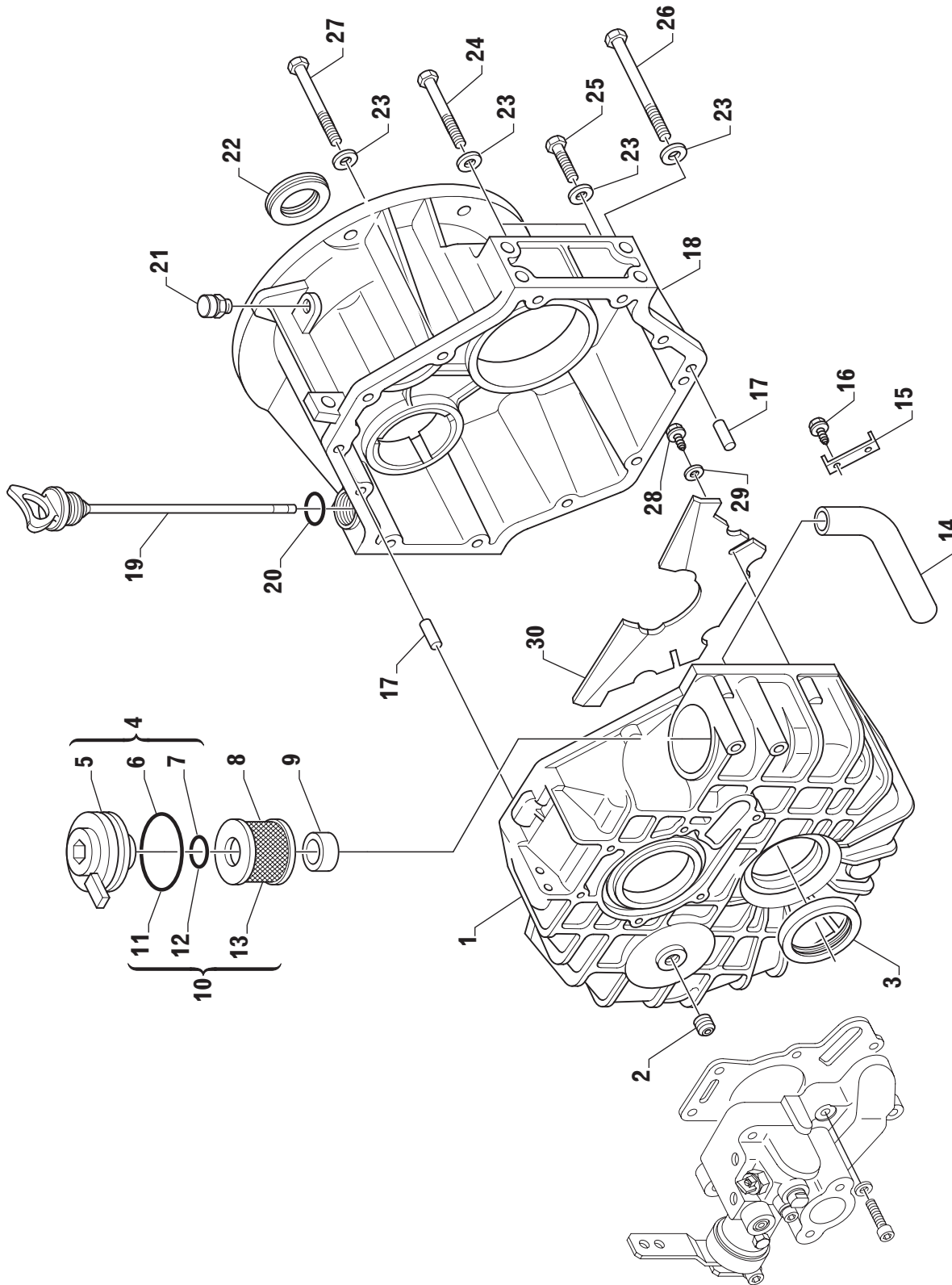
▼ Fino a matricola 10730G - Up to serial number 10730G

△ Da matricola 10731G - From serial number 10731G



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FIG. 1





Pos.	Part number	Old P/N	Descrizione	Description	Q.tà Q.ty	Note
1	3312 301 020	455502	Scatola	Housing	1	
2	0636 301 041	442373	Tappo	Plug	1	
3	0634 319 132	442135	Paraolio uscita	Output shaft seal	1	
4	3312 101 003	500484	Coperchio filtro completo	Filter cover, assy.	1	
5	☆		. Coperchio filtro	. Filter cover	1	
6	0634 304 688	442731	. Guarnizione OR	. O-Ring	1	
7	0634 306 204	105542	. Guarnizione OR	. O-Ring	1	
8	3312 301 007	438637	Filtro olio	Oil filter	1	
9	3312 301 008	439653	Guarnizione	Gasket	1	
10	3312 199 031	463772	Filtro olio completo	Oil filter, assy	1	
11	0634 304 688	442731	. Guarnizione OR	. O-Ring	1	
12	0634 306 204	105542	. Guarnizione OR	. O-Ring	1	
13	3312 301 007	438637	. Filtro olio	. Oil filter	1	
14	3312 301 022	455499	Tubo aspirazione	Suction pipe	1	
	3312 301 032		Tubo aspirazione con supporto	Suction pipe with support	1	
15	3312 301 013	439223	Piastra ritegno	Retaining plate	1	
16	0636 113 006	455079	Vite T.E.	Hex head screw	2	
			(ritegno tubo aspirazione)	(suction pipe retainer)		
	0636 015 020		Vite T.E. (tubo aspirazione con supporto)	Hex head screw (suction pipe with support)	2	
17	0631 315 520	335817	Spina	Locator pin	2	
18	3312 301 018	455501	Coperchio	Cover (housing)	1	
	3312 301 019	501861	Coperchio	Cover	1	Only Ratio I = 1.25
▼ 19	978.21.701.01	468239	Asta livello olio	Oil dipstick		
△	3312 201 001	500992	Asta livello olio + OR	Oil dipstick + OR		
20	0634 304 405	501211	. Guarnizione OR (Asta livello olio)	. O-Ring (Oil dipstick)	1	
21	3311 301 002	442369	Valvola di sfiato	Breather valve	1	
22	3312 301 030	413883	Paraolio entrata	Input shaft seal	1	
23	0630 302 091	442371	Rosetta	Washer	12	
24	0636 010 550	442374	Vite T.E.	Hex head screw	4	
25	0636 015 227	442375	Vite T.E.	Hex head screw	5	
26	0636 010 569	455443	Vite T.E.	Hex head screw	2	
27	0636 015 386	452512	Vite T.E.	Hex head screw	1	
28	0636 113 006	455079	Vite T.E.	Hex head screw	2	
	0636 015 020		Vite T.E.	Hex head screw	2	
29	0630 001 046	442371	Rosetta	Washer	2	
30	3312 301 023	455500	Piastra	Baffle plate	1	

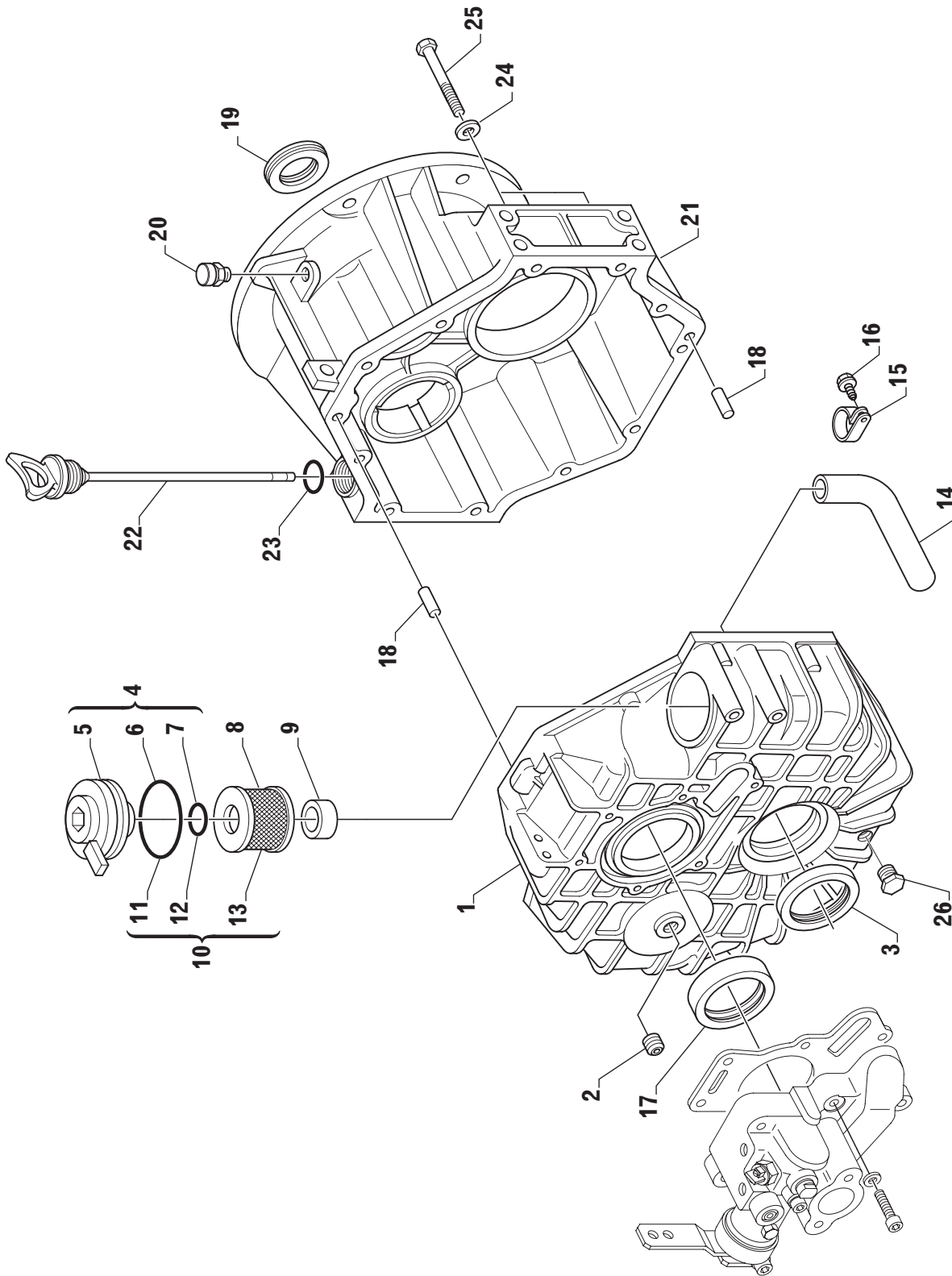
▼ Fino a matricola 18672F - Up to serial number 18672F

△ Da matricola 18673F - From serial number 18673F



ZF 80 A - ZF 80-1 A

FIG. 1





Pos.	Part number	Old P/N	Descrizione	Description	Q.tà Q.ty	Note
1	3313 301 013	489412	Scatola	Housing	1	Not available any more From s/n 21410 L (1)
	3313 301 009		Scatola	Housing	1	
2	0636 301 041	442373	Tappo	Plug	1	
3	0634 319 104	448160	Paraolio uscita	Output shaft seal	1	
4	3312 101 003	500484	Coperchio filtro completo	Filter cover, assy.	1	
5			. Coperchio filtro	. Filter cover	1	
6	0634 304 688	442731	. Guarnizione OR	. O-Ring	1	
7	0634 306 204	105542	. Guarnizione OR	. O-Ring	1	
8	3312 301 007	438637	Filtro olio	Oil filter	1	
9	3312 301 008	439653	Guarnizione	Gasket	1	
10	3312 199 031	463772	Filtro olio completo	Oil filter, assy	1	
11	0634 304 688	442731	. Guarnizione OR	. O-Ring	1	
12	0634 306 204	105542	. Guarnizione OR	. O-Ring	1	
13	3312 301 007	438637	. Filtro olio	. Oil filter	1	
14	3313 301 015	439522	Tubo aspirazione	Suction pipe	1	(3)
	3313 301 011		Tubo aspirazione	Suction pipe	1	
	3313 301 022		Tubo aspirazione con supporto	Suction pipe with support	1	
15	0632 311 398	479439	Fascetta	Suction pipe clamp	1	
16	0636 101 411	102879	Vite T.E. (fascetta tubo aspirazione)	Hex head screw (suction pipe clamp)	1	
17	3313 301 014	462997	Anello centratore	Centering ring	1	
18	0631 315 520	335817	Spina	Locator pin	2	
19	3312 301 030	413883	Paraolio entrata	Input shaft seal	1	
20	3311 301 002	442369	Valvola di sfiato	Breather valve	1	
21	3313 301 012	489414	Coperchio	Cover (housing)	1	Not available any more From s/n 21410 L (2)
	3313 301 010		Coperchio	Cover (housing)	1	
▼22	978.36.701.01	439520	Asta livello olio	Oil dipstick	1	
△	3313 201 001	500993	Asta livello olio + OR	Oil dipstick + OR	1	
23	0634 304 405	501211	. Guarnizione OR (Asta livello olio)	. O-Ring (Oil dipstick)	1	
24	0630 302 091	442371	Rosetta	Washer	14	
25	0636 015 227	442375	Vite T.E.	Hex head screw	14	
26	3312 301 017	469691	Tappo	Plug	1	

(1) Scatola non fornibile con coperchio cod. 3310 301 012. Fornibile solo con coperchio codice 3313 301 010  
*This housing is not suitable with cover p/n 3313 301 012. But only with the new cover p/n 3313 301 010*

(2) Coperchio non fornibile con scatola cod. 3310 301 013. Fornibile solo con scatola codice 3313 301 009  
*This cover is not suitable with housing p/n 3313 301 013. But only with the new housing p/n 3313 301 009*

(3) Adatto solo alla nuova scatola p/n 3313 301 009  
*Suitable only to new housing p/n 3313 301 009*

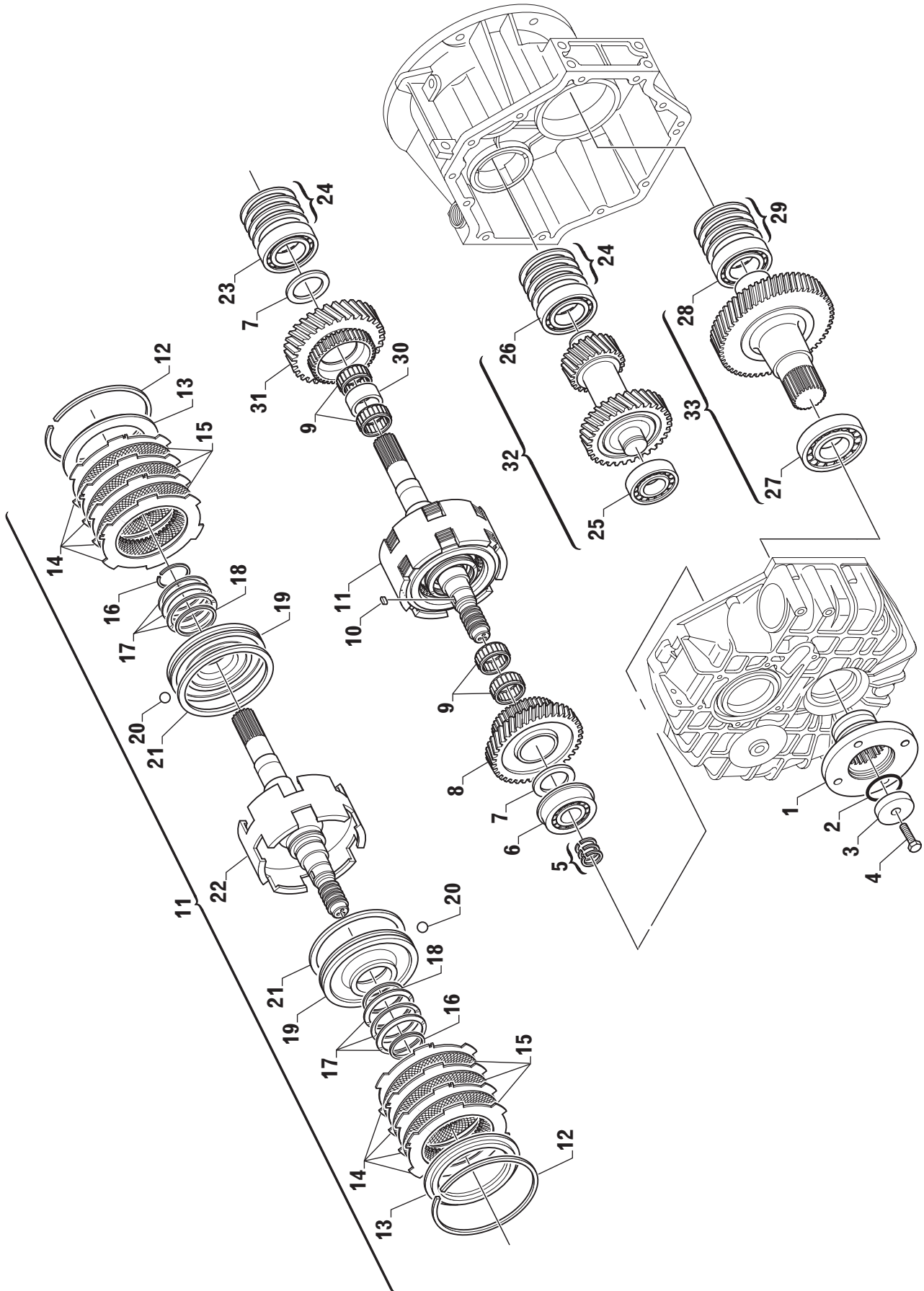
▼ Fino a matricola 35909E - Up to serial number 35909E

△ Da matricola 35910E - From serial number 35910E



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FIG. 2

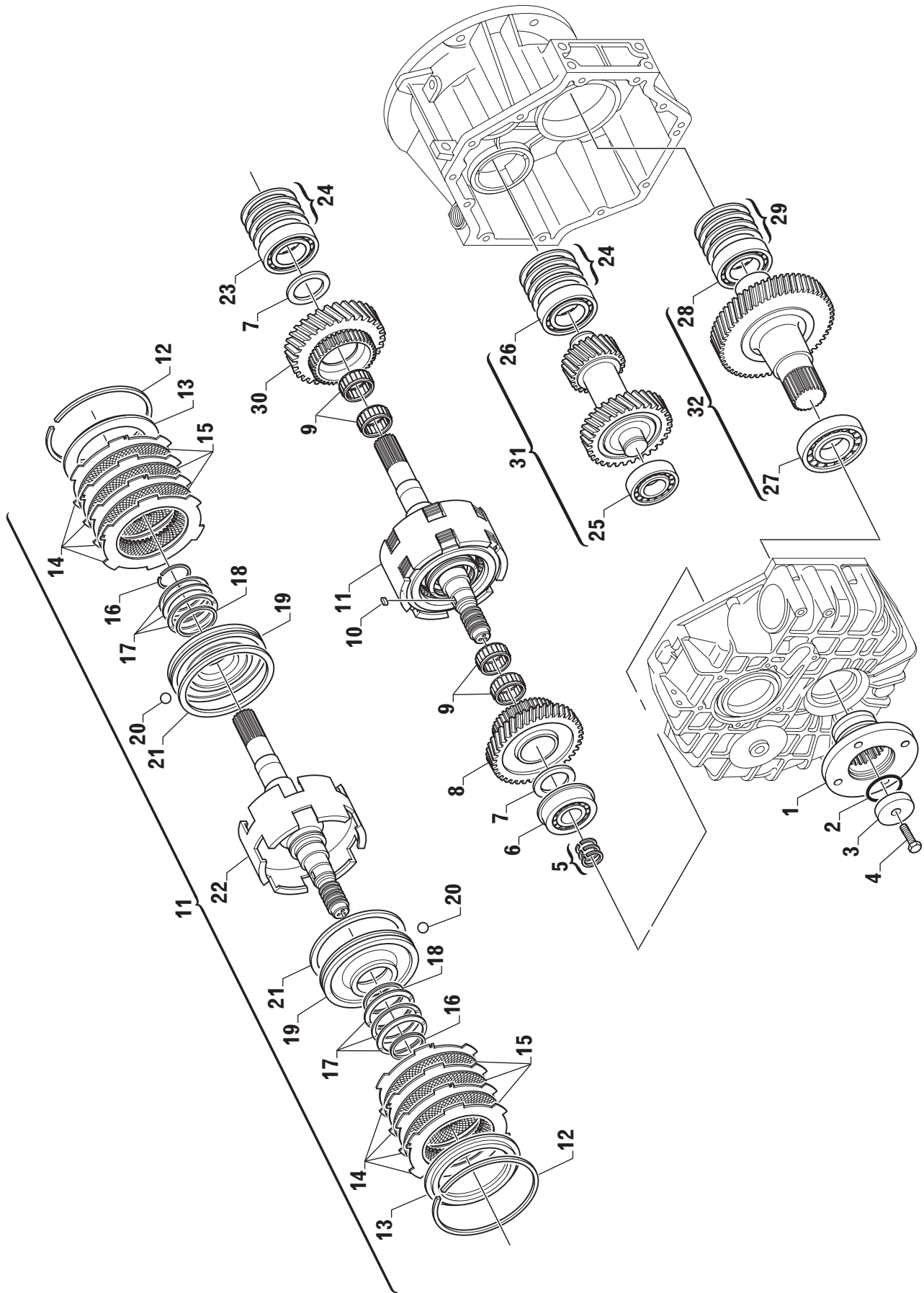


Pos.	Part number	Old P/N	Descrizione	Description	Q.tà Q.ty	Note
1	3312 304 009	439489	Flangia uscita	Output flange	1	
2	0634 306 328	105571	Guarnizione OR	O-Ring	1	
3	3313 304 017	475710	Rondella	Washer	1	
4	0636 016 111	348826	Vite T.E.	Hex head screw	1	
5	3312 302 041	447038	Anello di tenuta	Piston ring	3	
6	0635 501 940		Cuscinetto a rulli conici	Tapered roller bearing	1	
7	3312 302 004	454406	Rasamento	Butting ring	2	
8	3312 302 006	488955	Ingranaggio Z3 = 49	Reverse gear Z3 = 49	1	
	3312 302 007	501462	Ingranaggio Z3 = 50	Reverse gear Z3 = 50	1	Only Ratio I = 2.04
9	3312 302 040	441438	Cuscinetto a rullini	Needle bearing	4	
10	0631 501 062	437956	Chiavetta	Key	1	
11	3312 199 051		Albero di ingresso completo	Input shaft, assy.	1	
	3312 199 052		Albero di ingresso completo	Input shaft, assy.	1	Only Ratio I = 2.7
12	0630 513 066	455788	. Anello elastico	. Snap ring	2	
13	3312 302 012	455789	. Disco finale	. End disc	2	
	3312 302 013	501345	. Disco finale	. End disc	2	Only Ratio I = 2.7
14	3312 302 008	455787	. Disco frizione esterno	. Outer clutch disc	10	
15	3312 302 009	455786	. Disco frizione interno	. Inner clutch disc	8	
16	0630 501 038	500076	. Anello di ritegno	. Retainer ring	2	
17	3312 302 015	500148	. Molla a tazza	. Cup spring	6	
	3312 302 038		. Molla a tazza	. Cup spring	6	From s/n 18674 L
18	0634 402 178	500066	. Anello interno	. Inner clutch piston ring	2	
19	3312 302 014	500147	. Pistone	. Clutch piston	2	
20	0635 460 006	106690	. Sfera	. Ball	2	
21	0634 402 176	500069	. Anello esterno	. Outer clutch piston ring	2	
22	3312 199 032		. Albero di ingresso + cilindro frizione	. Input shaft & clutch housing	1	
	3312 199 033		. Albero di ingresso + cilindro frizione	. Input shaft & clutch housing	1	Only Ratio I = 2.7
23	0635 501 937	447754	Cuscinetto a rulli conici	Tapered roller bearing	1	
	0635 501 941	500367	Cuscinetto a rulli conici	Tapered roller bearing	1	Only Ratio I = 2.7
24	3312 302 023	277213	Spessore 0,1 mm	Shim 0.1 mm	2	
	3312 302 024	277214	Spessore 0,15 mm	Shim 0.15 mm	2	
	3312 302 025	277215	Spessore 0,2 mm	Shim 0.2 mm	2	
25	0635 501 942		Cuscinetto a rulli conici	Tapered roller bearing	1	
26	0635 501 941		Cuscinetto a rulli conici	Tapered roller bearing	1	
	0735 370 229	501332	Cuscinetto a rulli conici	Tapered roller bearing	1	Only Ratio I = 2.7
27	0635 501 938	333859	Cuscinetto a rulli conici	Tapered roller bearing	1	
28	0635 501 922		Cuscinetto a rulli conici	Tapered roller bearing	1	
29	3312 304 027	166807	Spessore 0,1 mm	Shim 0.1 mm	2	
	3312 304 028	442340	Spessore 0,15 mm	Shim 0.15 mm	2	
	3312 304 029	154102	Spessore 0,3 mm	Shim 0.3 mm	2	
	3312 304 030	154101	Spessore 0,5 mm	Shim 0.5 mm	2	
30	3312 302 016	501341	Distanziale	Spacer	1	Only Ratio I = 2.7
<b>Vers. 21,001,015 (Rapporto I = 1,22)</b>				<b>Vers. 21,001,015 (Ratio I = 1.22)</b>		
31	3312 302 005	500860	Ingranaggio Z1 = 37	Forward gear Z1 = 37	1	
32	3312 199 023	455731	Albero intermedio Z4 = 45, Z5 = 34	Intermediate shaft Z4 = 45, Z5 = 34	1	
33	3312 199 024	455732	Albero di uscita Z2 = 45	Output shaft Z2 = 45	1	
<b>Vers. 22,002,016 (Rapporto I = 1,56)</b>				<b>Vers. 22,002,016 (Ratio I = 1.56)</b>		
31	3312 202 003	451950	Ingranaggio Z1 = 32	Forward gear Z1 = 32	1	
32	3312 199 025	455733	Albero intermedio Z4 = 45, Z5 = 29	Intermediate shaft Z4 = 45, Z5 = 29	1	
33	3312 199 026	455734	Albero di uscita Z2 = 50	Output shaft Z2 = 50	1	
<b>Vers. 24,003,017 (Rapporto I = 2,04)</b>				<b>Vers. 24,003,017 (Ratio I = 2.04)</b>		
31	3312 202 004	452128	Ingranaggio Z1 = 27	Forward gear Z1 = 27	1	
32	3312 199 027		Albero intermedio Z4 = 44, Z5 = 24	Intermediate shaft Z4 = 44, Z5 = 24	1	
33	3312 199 028	455736	Albero di uscita Z2 = 55	Output shaft Z2 = 55	1	
<b>Vers. 25,004,018 (Rapporto I = 2,52)</b>				<b>Vers. 25,004,018 (Ratio I = 2.52)</b>		
31	3312 202 005	452148	Ingranaggio Z1 = 23	Forward gear Z1 = 23	1	
32	3312 199 029	455737	Albero intermedio Z4 = 45, Z5 = 21	Intermediate shaft Z4 = 45, Z5 = 21	1	
33	3312 199 030	455738	Albero di uscita Z2 = 58	Output shaft Z2 = 58	1	
<b>Vers. 30,005,021 (Rapporto I = 2,7)</b>				<b>Vers. 30,005,021 (Ratio I = 2.7)</b>		
31	3312 202 006	501340	Ingranaggio Z1 = 22	Forward gear Z1 = 22	1	
32	3312 199 003		Albero intermedio Z4 = 45, Z5 = 20	Intermediate shaft Z4 = 45, Z5 = 20	1	
33	3312 199 056		Albero di uscita Z2 = 59	Output shaft Z2 = 59	1	



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FIG. 2





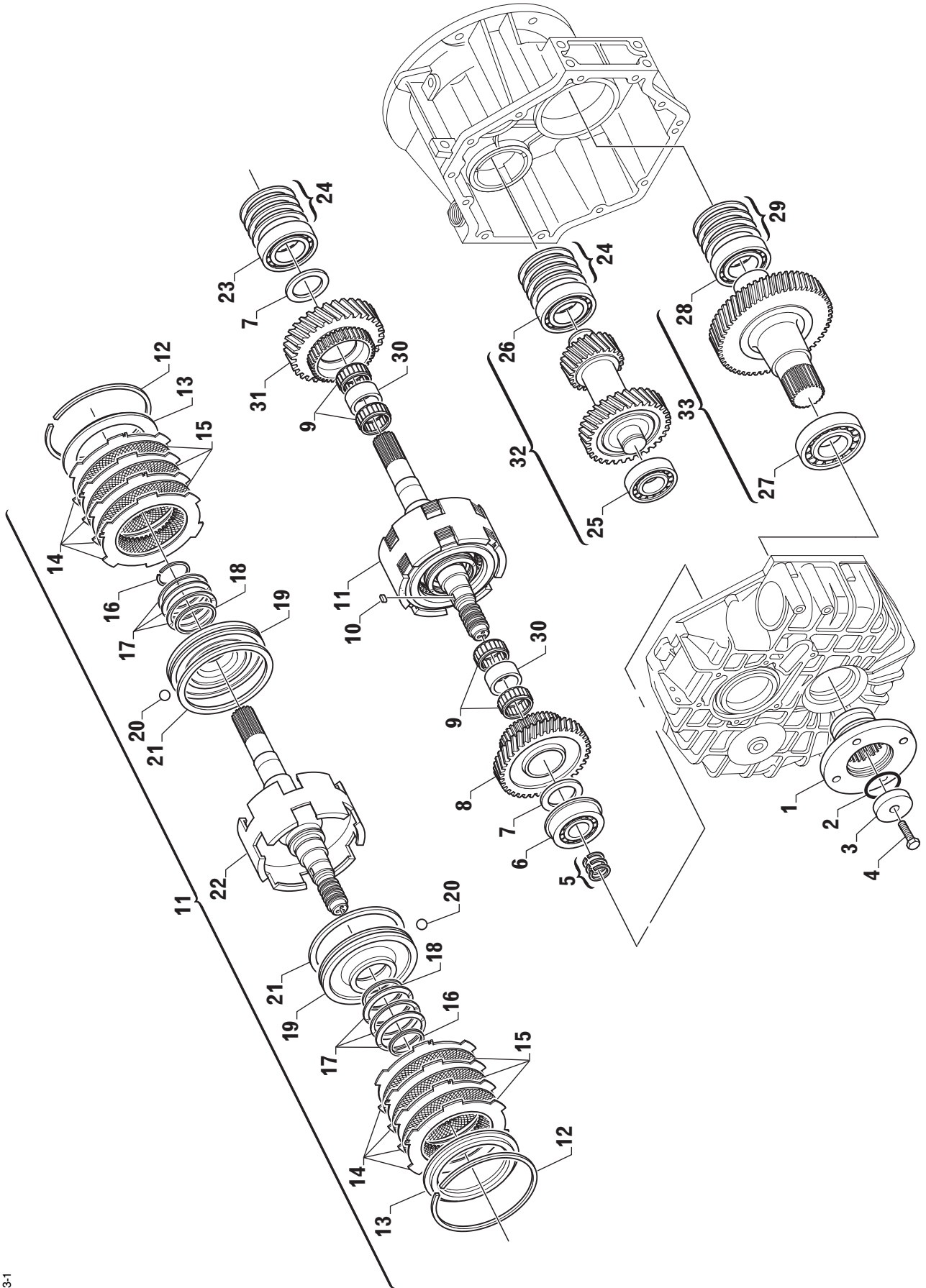


Pos.	Part number	Old P/N	Descrizione	Description	Q.tà Q.ty	Note
1	3312 304 009	439489	Flangia uscita	Output flange	1	
2	0634 306 328	105571	Guarnizione OR	O-Ring	1	
3	3313 304 017	475710	Rondella	Washer	1	
4	0636 016 111	348826	Vite T.E.	Hex head screw	1	
5	3312 302 041	447038	Anello di tenuta	Piston ring	3	
6	0635 501 940		Cuscinetto a rulli conici	Tapered roller bearing	1	
7	3312 302 004	454406	Rasamento	Butting ring	2	
8	3312 302 006	488955	Ingranaggio Z3 = 49	Reverse gear Z3 = 49	1	
9	3312 302 040	441438	Cuscinetto a rullini	Needle bearing	4	
10	0631 501 062	437956	Chiavetta	Key	1	
11	3312 199 051		Albero di ingresso completo	Input shaft, assy.	1	
12	0630 513 066	455788	. Anello elastico	. Snap ring	2	
13	3312 302 012	455789	. Disco finale	. End disc	2	
14	3312 302 008	455787	. Disco frizione esterno	. Outer clutch disc	10	
15	3312 302 009	455786	. Disco frizione interno	. Inner clutch disc	8	
16	0630 501 038	500076	. Anello di ritegno	. Retainer ring	2	
17	3312 302 015	500148	. Molla a tazza	. Cup spring	6	
	3312 302 038		. Molla a tazza	. Cup spring	6	From s/n 18854 L
18	0634 402 178	500066	. Anello interno	. Inner clutch piston ring	2	
19	3312 302 014	500147	. Pistone	. Clutch piston	2	
20	0635 460 006	106690	. Sfera	. Ball	2	
21	0634 402 176	500069	. Anello esterno	. Outer clutch piston ring	2	
22	3312 199 032		. Albero di ingresso + cilindro frizione	. Input shaft and clutch housin	1	
23	0635 501 937	447754	Cuscinetto a rulli conici	Tapered roller bearing	1	
24	3312 302 023	277213	Spessore 0,1 mm	Shim 0.1 mm	2	
	3312 302 024	277214	Spessore 0,15 mm	Shim 0.15 mm	2	
	3312 302 025	277215	Spessore 0,2 mm	Shim 0.2 mm	2	
25	0635 501 942		Cuscinetto a rulli conici	Tapered roller bearing	1	
26	0635 501 941		Cuscinetto a rulli conici	Tapered roller bearing	1	
27	0635 501 938	333859	Cuscinetto a rulli conici	Tapered roller bearing	1	
28	0635 501 922		Cuscinetto a rulli conici	Tapered roller bearing	1	
29	3312 304 027	166807	Spessore 0,1 mm	Shim 0.1 mm	2	
	3312 304 028	442340	Spessore 0,15 mm	Shim 0.15 mm	2	
	3312 304 029	154102	Spessore 0,3 mm	Shim 0.3 mm	2	
	3312 304 030	154101	Spessore 0,5 mm	Shim 0.5 mm	2	
<b>Vers. 009,010 (Rapporto I = 1,25)</b>				<b>Vers. 009,010 (Ratio I = 1.25)</b>		
30	3312 302 019	500856	Ingranaggio Z1 = 39	Forward gear Z1 = 39	1	
31	3312 199 048		Albero intermedio Z4 = 45, Z5 = 36	Intermediate shaft Z4 = 45, Z5 = 36	1	
32	3312 199 049		Albero di uscita Z2 = 49	Output shaft Z2 = 49	1	
<b>Vers. 01,001,011 (Rapporto I = 1,51)</b>				<b>Vers. 01,001,011 (Ratio I = 1.51)</b>		
30	3312 202 008	439253	Ingranaggio Z1 = 35	Forward gear Z1 = 35	1	
31	3312 199 040	470065	Albero intermedio Z4 = 45, Z5 = 32	Intermediate shaft Z4 = 45, Z5 = 32	1	
32	3312 199 011		Albero di uscita Z2 = 53	Output shaft Z2 = 53	1	
<b>Vers. 02,002,013 (Rapporto I = 1,93)</b>				<b>Vers. 02,002,013 (Ratio I = 1.93)</b>		
30	3312 202 009	439254	Ingranaggio Z1 = 30	Forward gear Z1 = 30	1	
31	3312 199 042	470068	Albero intermedio Z4 = 45, Z5 = 27	Intermediate shaft Z4 = 45, Z5 = 27	1	
32	3312 199 034		Albero di uscita Z2 = 58	Output shaft Z2 = 58	1	
<b>Vers. 03,003,014 (Rapporto I = 2,48)</b>				<b>Vers. 03,003,014 (Ratio I = 2.48)</b>		
30	3312 202 010	455504	Ingranaggio Z1 = 25	Forward gear Z1 = 25	1	
31	3312 199 035	479681	Albero intermedio Z4 = 45, Z5 = 23	Intermediate shaft Z4 = 45, Z5 = 23	1	
32	3312 199 036	479685	Albero di uscita Z2 = 62	Output shaft Z2 = 62	1	
<b>Vers. 04,004,015 (Rapporto I = 2,78)</b>				<b>Vers. 04,004,015 (Ratio I = 2.78)</b>		
30	3312 202 011	455510	Ingranaggio Z1 = 23	Forward gear Z1 = 23	1	
31	3312 199 012		Albero intermedio Z4 = 45, Z5 = 21	Intermediate shaft Z4 = 45, Z5 = 21	1	
32	3312 199 013		Albero di uscita Z2 = 64	Output shaft Z2 = 64	1	



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FIG. 2





Pos.	Part number	Old P/N	Descrizione	Description	Q.tà Q.ty	Note
1	3313 304 007	439581	Flangia	Flange	1	
2	0634 303 505	384176	Guarnizione OR	O-Ring	1	
3	3313 304 026	387841	Rondella	Washer	1	
4	0636 016 085	102823	Vite T.E.	Hex head screw	1	
5	3312 302 041	447038	Anello di tenuta	Piston ring	3	
6	0635 501 937	447754	Cuscinetto a rulli conici	Tapered roller bearing	1	
7	3313 302 023	457823	Rasamento	Butting ring	2	
8	3313 302 024	500819	Ingranaggio Z3 = 44	Reverse gear Z3 = 44	1	
9	3312 302 040	441438	Cuscinetto a rullini	Needle bearing	4	
10	0631 501 062	437956	Chiavetta	Key	1	
11	3313 199 026	486633	Albero di ingresso completo	Input shaft, assy.	1	
12	0630 513 066	455788	. Anello elastico	. Snap ring	2	
13	3312 302 012	455789	. Disco finale	. End disc	2	
14	3312 302 008	455787	. Disco frizione esterno	. Outer clutch disc	12	
15	3312 302 009	455786	. Disco frizione interno	. Inner clutch disc	10	
16	0630 501 038	500076	. Anello di ritegno	. Retainer ring	2	
17	3312 302 015	500148	. Molla a tazza	. Cup spring	6	
△	3312 302 038	500148	. Molla a tazza	. Cup spring	6	
18	0634 402 178	500066	. Anello interno	. Inner clutch piston ring	2	
19	3312 302 014	500147	. Pistone	. Clutch piston	2	
20	0635 460 006	106690	. Sfera	. Ball	2	
21	0634 402 176	500069	. Anello esterno	. Outer clutch piston ring	2	
22	3313 199 027	500237	. Albero di ingresso + cilindro frizione	. Input shaft and clutch housing	1	
23	0635 501 939		Cuscinetto a rulli conici	Tapered roller bearing	1	
24	3313 302 042	439630	Spessore 0,1 mm	Shim 0.1 mm	2	
	3313 302 043	439631	Spessore 0,15 mm	Shim 0.15 mm	2	
	3313 302 044	439632	Spessore 0,2 mm	Shim 0.2 mm	2	
	3313 302 045	439633	Spessore 0,5 mm	Shim 0.5 mm	2	
	3313 302 046	439634	Spessore 1,0 mm	Shim 1.0 mm	2	Intermediate shaft
25	0635 501 937	447754	Cuscinetto a rulli conici	Tapered roller bearing	1	
26	0635 373 021	106664	Cuscinetto a rulli conici	Tapered roller bearing	1	
27	0635 373 008	384182	Cuscinetto a rulli conici	Tapered roller bearing	1	
28	0635 501 914		Cuscinetto a rulli conici	Tapered roller bearing	1	
29	3208 304 023	449125	Spessore 0,15 mm	Shim 0.15 mm	2	
	3208 304 024	449126	Spessore 0,3 mm	Shim 0.3 mm	2	
	3208 304 027	449127	Spessore 0,5 mm	Shim 0.5 mm	2	
30	3313 302 030	439533	Distanziale	Spacer	2	
△	Da matricola 43448L (ZF 80 A) e 43463L (ZF 80-1 A) From serial number 43448L (ZF 80 A) and 43463L (ZF 80-1 A)					
<b>SOLO PER ZF 80 A</b>				<b>ONLY FOR ZF 80 A</b>		
<b>Vers. 15,001 (Rapporto I = 1,2)</b>				<b>Vers. 15,001 (Ratio I = 1.2)</b>		
31	3313 302 021		Ingranaggio Z1 = 35	Forward gear Z1 = 35	1	
32	3313 199 030	500392	Albero intermedio Z4 = 44, Z5 = 35	Intermediate shaft Z4 = 44, Z5 = 35	1	
33	3313 199 031	500398	Albero di uscita Z2 = 42	Output shaft Z2 = 42	1	
<b>Vers. 16,002 (Rapporto I = 1,41)</b>				<b>Vers. 16,002 (Ratio I = 1.41)</b>		
31	3313 302 026	500850	Ingranaggio Z1 = 32	Forward gear Z1 = 32	1	
32	3313 199 032	500393	Albero intermedio Z4 = 44, Z5 = 32	Intermediate shaft Z4 = 44, Z5 = 32	1	
33	3313 199 033	500399	Albero di uscita Z2 = 45	Output shaft Z2 = 45	1	
<b>Vers. 17,003 (Rapporto I = 1,57)</b>				<b>Vers. 17,003 (Ratio I = 1.57)</b>		
31	3313 302 025	500849	Ingranaggio Z1 = 30	Forward gear Z1 = 30	1	
32	3313 199 034	500394	Albero intermedio Z4 = 44, Z5 = 30	Intermediate shaft Z4 = 44, Z5 = 30	1	
33	3313 199 035	500400	Albero di uscita Z2 = 47	Output shaft Z2 = 47	1	
<b>Vers. 18,004 (Rapporto I = 1,96)</b>				<b>Vers. 18,004 (Ratio I = 1.96)</b>		
31	3313 202 004	459589	Ingranaggio Z1 = 26	Forward gear Z1 = 26	1	
32	3313 199 036	500395	Albero intermedio Z4 = 44, Z5 = 26	Intermediate shaft Z4 = 44, Z5 = 26	1	
33	3313 199 016	500401	Albero di uscita Z2 = 51	Output shaft Z2 = 51	1	
<b>Vers. 19,005 (Rapporto I = 2,5)</b>				<b>Vers. 19,005 (Ratio I = 2.5)</b>		
31	3313 202 005	462133	Ingranaggio Z1 = 22	Forward gear Z1 = 22	1	
32	3313 199 037	500396	Albero intermedio Z4 = 44, Z5 = 22	Intermediate shaft Z4 = 44, Z5 = 22	1	
33	3313 199 038	500402	Albero di uscita Z2 = 55	Output shaft Z2 = 55	1	
<b>Vers. 20,006 (Rapporto I = 2,85)</b>				<b>Vers. 20,006 (Ratio I = 2.85)</b>		
31	3313 202 006	462134	Ingranaggio Z1 = 20	Forward gear Z1 = 20	1	
32	3313 199 039	500397	Albero intermedio Z4 = 44, Z5 = 20	Intermediate shaft Z4 = 44, Z5 = 20	1	
33	3313 199 040	500403	Albero di uscita Z2 = 57	Output shaft Z2 = 57	1	



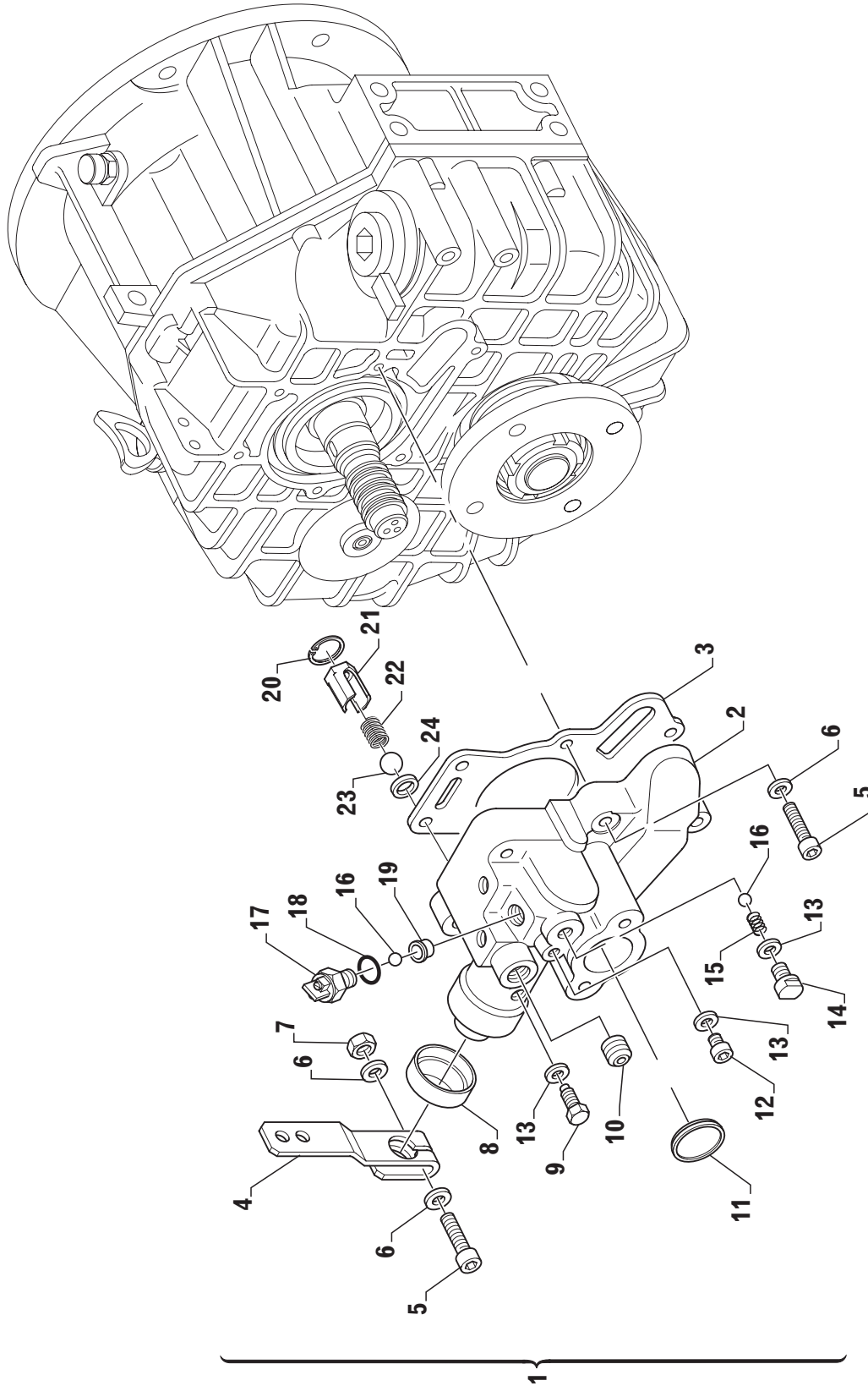
Pos.	Part number	Old P/N	Descrizione	Description	Q.tà Q.ty	Note
<b>SOLO PER ZF 80-1 A</b>				<b>ONLY FOR ZF 80-1 A</b>		
<b>Vers. 007 (Rapporto I = 1,57)</b>				<b>Vers. 007 (Ratio I = 1.57)</b>		
31	3313 302 025	500849	Ingranaggio Z1 = 30	Forward gear Z1 = 30	1	
32	3313 199 034	500394	Albero intermedio Z4 = 44, Z5 = 30	Intermediate shaft Z4 = 44, Z5 = 30	1	
33	3313 199 035	500400	Albero di uscita Z2 = 47	Output shaft Z2 = 47	1	
<b>Vers. 008 (Rapporto I = 1,96)</b>				<b>Vers. 008 (Ratio I = 1.96)</b>		
31	3313 202 004	459589	Ingranaggio Z1 = 26	Forward gear Z1 = 26	1	
32	3313 199 036	500395	Albero intermedio Z4 = 44, Z5 = 26	Intermediate shaft Z4 = 44, Z5 = 26	1	
33	3313 199 003		Albero di uscita Z2 = 51	Output shaft Z2 = 51	1	
<b>Vers. 009 (Rapporto I = 1,21)</b>				<b>Vers. 009 (Ratio I = 1.21)</b>		
31	3313 302 021		Ingranaggio Z1 = 35	Forward gear Z1 = 35	1	
32	3313 199 030	500392	Albero intermedio Z4 = 44, Z5 = 35	Intermediate shaft Z4 = 44, Z5 = 35	1	
33	3313 199 031	500398	Albero di uscita Z2 = 42	Output shaft Z2 = 42	1	
<b>Vers. 010 (Rapporto I = 1,41)</b>				<b>Vers. 010 (Ratio I = 1.41)</b>		
31	3313 302 026	500850	Ingranaggio Z1 = 32	Forward gear Z1 = 32	1	
32	3313 199 032	500393	Albero intermedio Z4 = 44, Z5 = 32	Intermediate shaft Z4 = 44, Z5 = 32	1	
33	3313 199 033	500399	Albero di uscita Z2 = 45	Output shaft Z2 = 45	1	
<b>Vers. 011 (Rapporto I = 2,5)</b>				<b>Vers. 011 (Ratio I = 2.5)</b>		
31	3313 202 005	462133	Ingranaggio Z1 = 22	Forward gear Z1 = 22	1	
32	3313 199 001		Albero intermedio Z4 = 44, Z5 = 22	Intermediate shaft Z4 = 44, Z5 = 22	1	
33	3313 199 004		Albero di uscita Z2 = 55	Output shaft Z2 = 55	1	
<b>Vers. 012 (Rapporto I = 2,85)</b>				<b>Vers. 012 (Ratio I = 2.85)</b>		
31	3313 202 007	501739	Ingranaggio Z1 = 20	Forward gear Z1 = 20	1	
32	3313 199 002		Albero intermedio Z4 = 44, Z5 = 20	Intermediate shaft Z4 = 44, Z5 = 20	1	
33	3313 199 005		Albero di uscita Z2 = 57	Output shaft Z2 = 57	1	





ZF 63 A - ZF 63  
ZF 80 A - ZF 80-1 A

FIG. 3

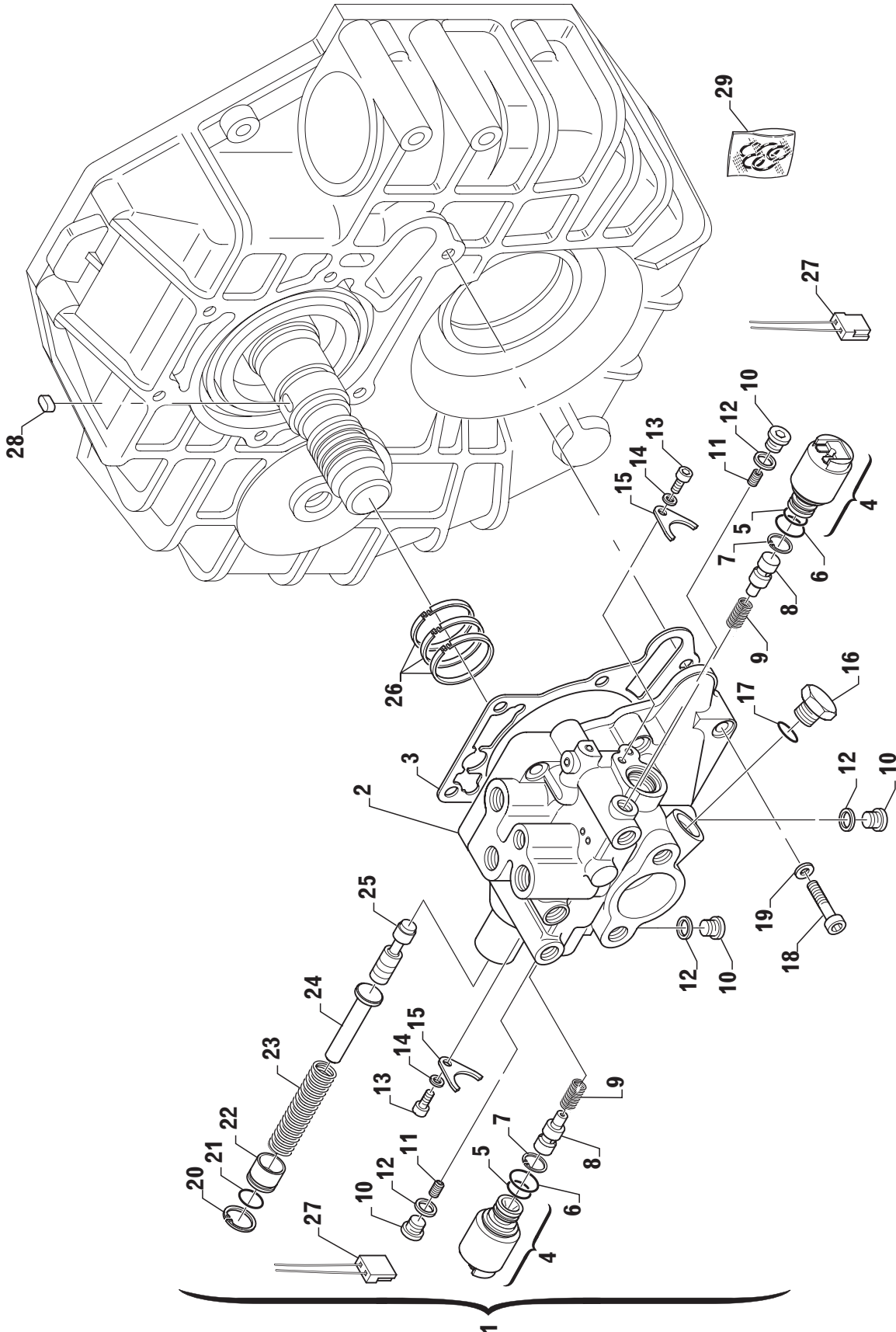


Pos.	Part number	Old P/N	Descrizione	Description	Q.tà Q.ty	Note
1	3312 108 001		Valvola di comando completo	Control valve assy.	1	
1	3313 108 001		Valvola di comando alta velocità	High speed control valve assy.	1	Only for ZF 80-1A
2	☆		. Valvola di comando	. Control valve	1	
3	3312 308 020	408388	. Guarnizione	. Gasket	1	
4	3312 308 025	452963	. Leva	. Lever	1	
5	0636 101 727	442377	. Vite T.E.	. Hex head screw	7	
6	0630 302 090	442372	. Rosetta	. Washer	8	
7	0637 006 157	455785	. Dado	. Nut	1	
8	0634 309 621	500065	. Guarnizione	. Gasket	1	
9	3312 308 034	500026	. Vite di fermo	. Stop screw	1	
10	0636 309 007	455756	. Tappo	. Plug	1	
11	0631 405 061	500107	. Tappo	. Plug	1	
12	0636 302 053	103465	. Tappo	. Plug	1	
13	0634 801 302	107410	. Rosetta	. Washer	3	
14	3312 308 037	500028	. Vite di guida	. Guide bolt	1	
15	3312 308 047	500044	. Molla	. Spring	1	
16	0635 460 014	106695	. Sfera	. Ball	2	
17	3312 308 029	455764	. Interruttore completo	. Neutral safety switch assy.	1	
18	001.105.0158	105527	. Guarnizione OR	. O-Ring	1	
19	3312 308 039	500030	. Boccia	. Bushing	1	
20	0630 502 005	500083	Anello elastico	Snap ring	1	
21	3312 308 038	500029	Boccia	Bushing	1	
22	3312 308 042	500032	Molla per lubrificazione	Spring	1	
23	0635 460 023	500097	Sfera	Ball	1	
24	3312 308 036	500027	Distanziale	Spacer	1	



ZF 63 A - ZF 63  
ZF 80 A - ZF 80-1 A

FIG. 4







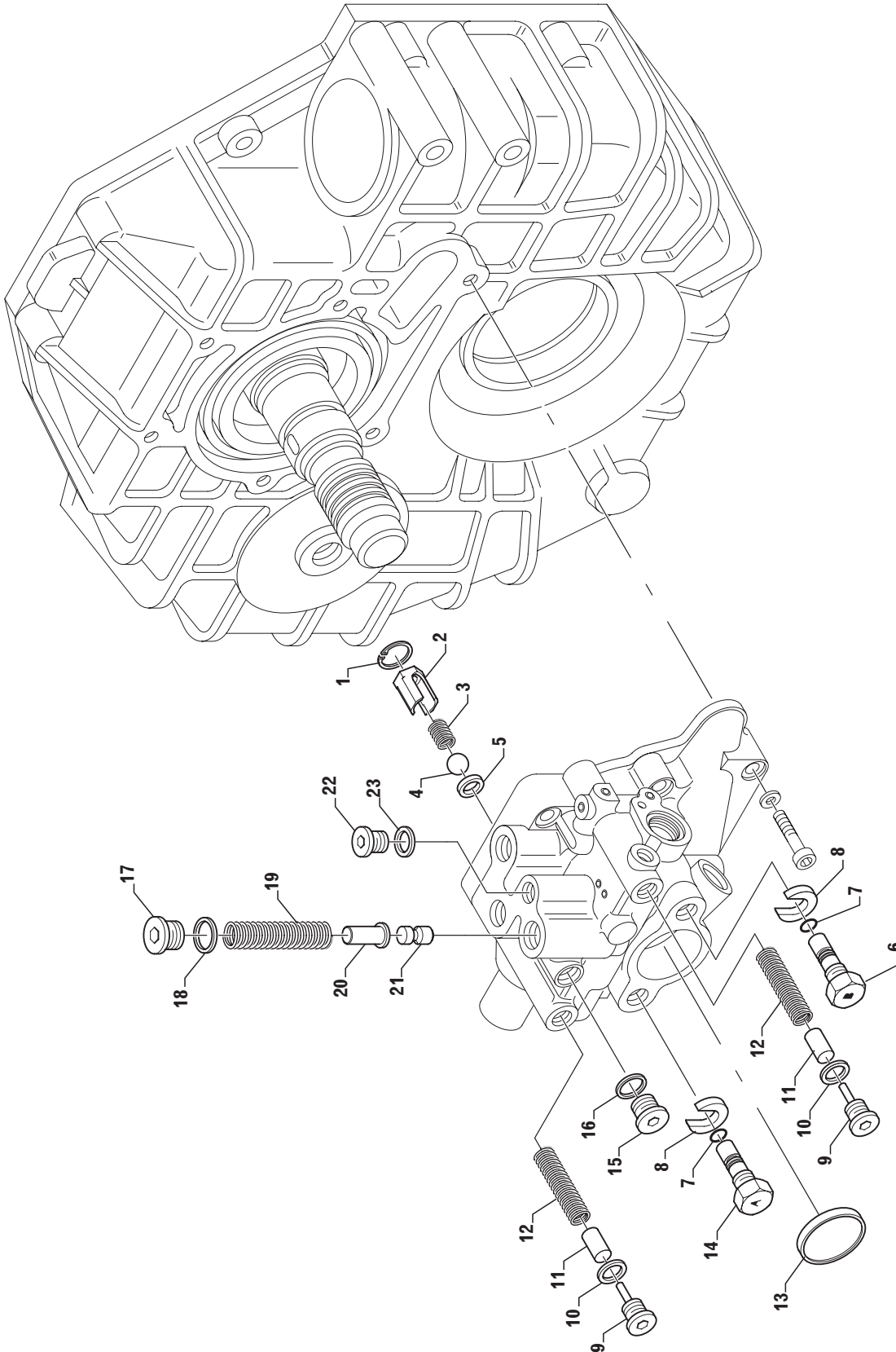
Pos.	Part number	Old P/N	Descrizione	Description	Q.tà Q.ty	Note
1	3312 199 004		Distributore elettrico	Electric selector valve	1	(1)
	3312 199 005		Distributore elettrico	Electric selector valve	1	(2)
	3313 108 003		Distributore elettrico	Electric selector valve	1	(3) Only for ZF 80-1 A
	3313 108 004		Distributore elettrico	Electric selector valve	1	(4) Only for ZF 80-1 A
2	☆		. Valvola di comando	. Control valve	1	
3	3312 308 020	408388	Guarnizione	Gasket	1	
4	3312 308 064	501634	Valvola proporzionale 12 V	Electric valve 12 V	2	
	3312 308 065	501635	Valvola proporzionale 24 V	Electric valve 24 V	2	
5	0634 304 651	501724	Guarnizione OR	O-Ring	2	
6	0634 304 391	501524	Anello di tenuta	Piston ring	2	
7	0630 502 078	501528	Anello elastico	Snap ring	2	
8	3312 308 054	501502	Pistoncino valvola 2/3 vie	Valve piston	2	
9	3312 308 062	501533	Molla per pistone	Piston spring	2	
10	0636 302 053	103465	Tappo	Plug	4	
11	3312 308 059	501516	Grano	Drilled plug	2	
12	0634 801 302	107410	Rosetta	Washer	4	
13	0636 101 651	501525	Vite	Screw	2	
14	0630 001 096	501527	Rondella	Washer	2	
15	1043 326 045		Fermo valvola	Valve lock	2	
16	3312 308 063	501562	Tappo	Plug	1	
17	0634 306 524		Anello OR	O-Ring	1	
18	0636 101 727	442377	Vite T.E.	Hex head screw	6	
19	0630 302 090	442372	Rosetta	Washer	6	
20	0630 532 004	501529	Anello elastico	Snap ring	1	
21	0634 304 309	501523	Anello di tenuta OR	O-Ring	1	
22	3312 308 058	501515	Tappo	Plug	1	
23	3312 308 040	500031	Molla	Spring	1	
24	3312 308 043	500038	Perno guida molla	Spring guide pin	1	
25	3312 308 046	500040	Pistoncino	Valve piston	1	
26	3312 302 041	447038	Anello di tenuta	Piston ring	3	
27	3312 117 001		Kit connettori	Connectors kit	1	
28	0631 501 062	437956	Chiavetta	Key	1	
29	978.28.641.01	501751	Kit guarnizioni	Seal kit	1	

- (1) Installare con 12 V - *to be instelled with 12 V power supply*  
(2) Installare con 24 V - *to be instelled with 24 V power supply*  
(3) Installare con 24 V - 26 bar - *to be instelled with 24 V power supply - 26 bar*  
(4) Installare con 12 V - 26 bar - *to be instelled with 12 V power supply - 26 bar*



ZF 63 A - ZF 63  
ZF 80 A - ZF 80-1 A

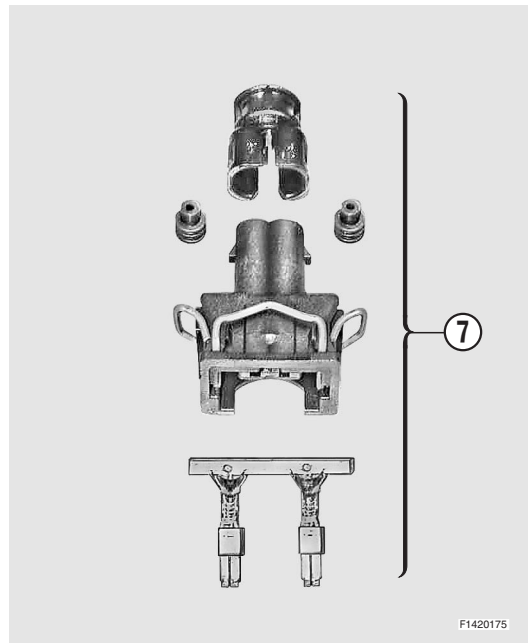
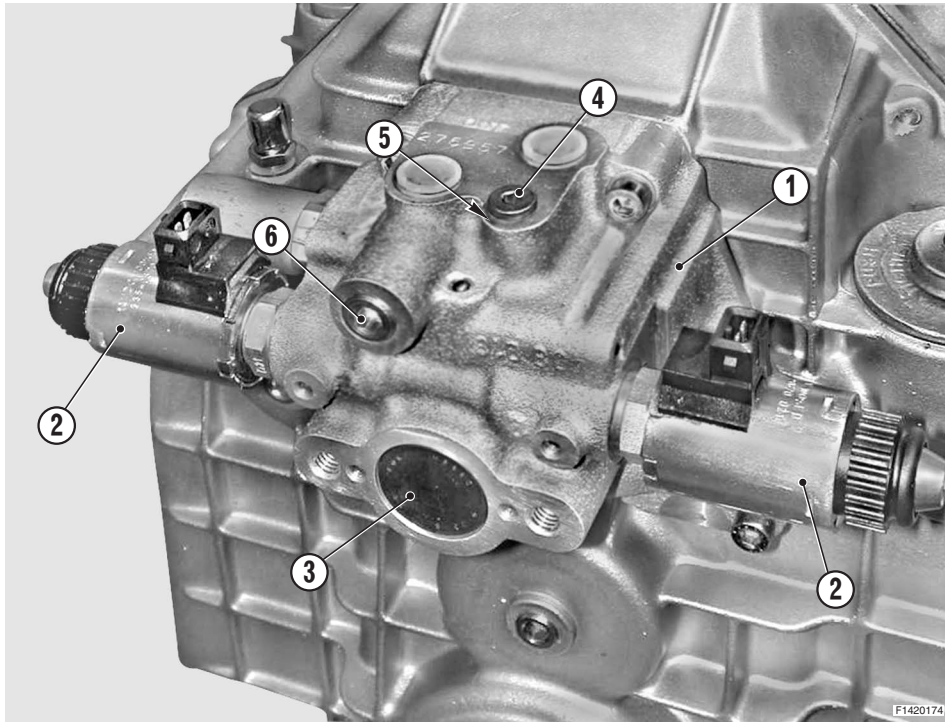
FIG. 5



Pos.	Part number	Old P/N	Descrizione	Description	Q.tà Q.ty	Note
1	0630 502 005	500083	Anello elastico	Snap ring	1	
2	3312 308 038	500029	Boccola	Bushing	1	
3	3312 308 042	500032	Molla per lubrificazione	Spring	1	
4	0635 460 023	500097	Sfera	Ball	1	
5	3312 308 036	500027	Distanziale	Spacer	1	
6	3312 308 052	501497	Vite torna a casa "B"	Come home screw "B"	1	
7	0634 304 690	501522	Anello di tenuta OR	O-Ring	2	
8	3312 308 050	501495	Rondella	Washer	2	
9	3312 308 056	501513	Vite	Screw	2	
10	0634 801 298	500095	Rosetta	Washer	2	
11	4656 306 013		Pistoncino ammortizzatore	Piston	2	
12	0732 042 539		Molla ammortizzatore	Spring	2	
13	0631 405 062	501530	Tappo	Plug	1	
14	3312 308 051	501496	Vite torna a casa "A"	Come home screw "A"	1	
15	0636 302 068	500744	Tappo	Plug	1	
16	0634 801 260	500897	Rosetta	Washer	1	
17	0636 302 065	501520	Vite	Screw	1	
18	0634 801 281	227851	Rosetta	Washer	1	
19	3312 308 061	501532	Molla	Spring	1	
20	3312 308 057	501514	Perno guida molla	Spring guide pin	1	
21	3312 308 053	501498	Pistoncino valvola riduzione	Valve piston	1	
22	0636 302 053	103465	Tappo	Plug	1	
23	0634 801 302	107410	Rosetta	Washer	1	



## ELECTRIC SELECTOR VALVE ON/OFF



Pos.	Part number	Old P/N	Descrizione	Description	Q.tà Q.ty	Note
1	3312 199 015		Distributore elettrico 26 bar ON/OFF	Electric selector valve 26 bar ON/OFF	1	*
2	3312 308 069		Elettrovalvola ON/OFF 12V	Solenoid valve ON/OFF 12V	2	
3	0631 405 061		Tappo	Dummy plug	1	
4	0636 302 053		Tappo M10x1	Screw plug M10x1	1	Ma = 12 Nm
5	0634 801 302		Rosetta	Washer	1	
6	0636 309 007		Tappo	Screw plug	1	Ma = 30 Nm
7	3316 117 001		Assieme connettore	Connector kit	2	

\* Installare con 12 V - To be installed with 12 V power supply

**COMPOSIZIONE KIT ZF 63 A - ZF 63 - ZF 63 A - ZF 63 KIT COMPONENTS**

Fig.	Pos.	Part number	Old P/N	Descrizione	Description	Q.ty
-	-	<b>3312 199 017</b>	501175	<b>Kit guarnizioni e anelli elastici</b>	<b>Seal kit &amp; piston rings</b>	
2	2	0634 306 328	105571	. Anello OR	. O-ring	1
1	22	3312 301 030	413883	. Paraolio entrata	. Input shaft seal	1
1	3	0634 319 132	442135	. Paraolio uscita	. Output shaft seal	1
3	3	3312 308 020	408388	. Guarnizione	. Gasket	1
1	20	0634 304 405	501211	. Guarnizione OR	. O-Ring	1
2	5	3312 302 041	447038	. Anello elastico	. Piston ring	3
3	8	0634 309 621	500065	. Anello di tenuta	. Seal	1
1	6	0634 304 688	442731	. Guarnizione OR	. O-Ring	1
1	7	0634 306 204	105542	. Guarnizione OR	. O-Ring	1
1	9	3312 301 008	439653	. Guarnizione	. Gasket	1
-	-	<b>3312 199 018</b>	500432	<b>Kit guarnizioni e frizioni</b>	<b>Seal kit &amp; clutch kit</b>	
-	-	3312 199 017	501175	. Kit guarnizioni e anelli elastici	. Seal kit & piston rings	1
2	15	3312 302 009	455786	. Disco frizione interno	. Inner disc	10
2	14	3312 302 008	455787	. Disco frizione esterno	. Outer disc	12
-	-	<b>3312 199 019</b>	501216	<b>Kit cuscinetti</b>	<b>Bearing kit</b>	
2	9	3312 302 040	441438	. Cuscinetto a rullini conici	. Needle bearing	4
2	25	0635 501 942		. Cuscinetto a rullini conici	. Tapered roller bearing	1
2	26	0635 501 941		. Cuscinetto a rullini conici	. Tapered roller bearing	1
2	6	0635 501 940		. Cuscinetto a rullini conici	. Tapered roller bearing	1
2	23	0635 501 937	447754	. Cuscinetto a rullini conici	. Tapered roller bearing	1
2	27	0635 501 938	333859	. Cuscinetto a rullini conici	. Tapered roller bearing	1
2	28	0635 501 922		. Cuscinetto a rullini conici	. Tapered roller bearing	1
2	24	3312 302 023	277213	. Spessore 0,1 mm	. Shim 0.1 mm	2
2	24	3312 302 024	277214	. Spessore 0,15 mm	. Shim 0.15 mm	2
2	24	3312 302 025	277215	. Spessore 0,2 mm	. Shim 0.2 mm	2
2	29	3312 304 027	166807	. Spessore 0,1 mm	. Shim 0.1 mm	2
2	29	3312 304 028	442340	. Spessore 0,15 mm	. Shim 0.15 mm	2
2	29	3312 304 029	154102	. Spessore 0,3 mm	. Shim 0.3 mm	2
2	29	3312 304 030	154101	. Spessore 0,5 mm	. Shim 0.5 mm	2

**COMPOSIZIONE KIT CUSCINETTI ZF 63 A R. 2,7 - ZF 63 A BEARINGS KIT, RATIO I=2.7**

Fig.	Pos.	Part number	Old P/N	Descrizione	Description	Q.ty
-	-	<b>3312 199 053</b>		<b>Kit cuscinetti</b>	<b>Bearing kit</b>	
2	9	3312 302 040	441438	. Cuscinetto a rullini conici	. Needle bearing	4
2	25	0635 501 942		. Cuscinetto a rullini conici	. Tapered roller bearing	1
2	23	0635 501 941	500367	. Cuscinetto a rullini conici	. Tapered roller bearing	1
2	6	0635 501 940		. Cuscinetto a rullini conici	. Tapered roller bearing	1
2	26	0735 370 229	501332	. Cuscinetto a rullini conici	. Tapered roller bearing	1
2	27	0635 501 938	333859	. Cuscinetto a rullini conici	. Tapered roller bearing	1
2	28	0635 501 922		. Cuscinetto a rullini conici	. Tapered roller bearing	1
2	24	3312 302 023	277213	. Spessore 0,1 mm	. Shim 0.1 mm	2
2	24	3312 302 024	277214	. Spessore 0,15 mm	. Shim 0.15 mm	2
2	24	3312 302 025	277215	. Spessore 0,2 mm	. Shim 0.2 mm	2
2	29	3312 304 027	166807	. Spessore 0,1 mm	. Shim 0.1 mm	2
2	29	3312 304 028	442340	. Spessore 0,15 mm	. Shim 0.15 mm	2
2	29	3312 304 029	154102	. Spessore 0,3 mm	. Shim 0.3 mm	2
2	29	3312 304 030	154101	. Spessore 0,5 mm	. Shim 0.5 mm	2



## Repair Manual and Spare Parts List

### COMPOSIZIONE KIT ZF 80 A - ZF 80-1 A - ZF 80 A - ZF 80-1 A KIT COMPONENTS

Fig.	Pos.	Part number	Old P/N	Descrizione	Description	Q.ty
-	-	<b>3313 199 020</b>	501171	<b>Kit guarnizioni e anelli elastici</b>	<b>Seal kit &amp; piston rings</b>	
2	2	0634 303 505	384176	. Anello OR	. O-ring	1
1	19	3312 301 030	413883	. Paraolio entrata	. Input shaft seal	1
1	3	0634 319 104	448160	. Paraolio uscita	. Output shaft seal	1
3	3	3312 308 020	408388	. Guarnizione	. Gasket	1
1	23	0634 304 405	501211	. Guarnizione OR	. O-Ring	1
2	5	3312 302 041	447038	. Anello elastico	. Piston ring	3
3	8	0634 309 621	500065	. Anello di tenuta	. Seal	1
1	6	0634 304 688	442731	. Guarnizione OR	. O-Ring	1
1	7	0634 306 204	105542	. Guarnizione OR	. O-Ring	1
1	9	3312 301 008	439653	. Guarnizione	. Gasket	1
-	-	<b>3313 199 021</b>	500434	<b>Kit guarnizioni e frizioni</b>	<b>Seal kit &amp; clutch kit</b>	
-	-	3313 199 020	501171	. Kit guarnizioni e anelli elastici	. Seal kit & piston rings	1
2	15	3312 302 009	455786	. Disco frizione interno	. Inner disc	10
2	14	3312 302 008	455787	. Disco frizione esterno	. Outer disc	12
-	-	<b>3313 199 022</b>	501218	<b>Kit cuscinetti</b>	<b>Bearing kit</b>	
2	9	3312 302 040	441438	. Cuscinetto a rullini conici	. Needle bearing	4
2	23	0635 501 939	500390	. Cuscinetto a rullini conici	. Tapered roller bearing	1
2	6,25	0635 501 937	447754	. Cuscinetto a rullini conici	. Tapered roller bearing	2
2	26	0635 501 938	333859	. Cuscinetto a rullini conici	. Tapered roller bearing	1
2	27	0635 373 008	384182	. Cuscinetto a rullini conici	. Tapered roller bearing	1
2	28	0635 501 914	500391	. Cuscinetto a rullini conici	. Tapered roller bearing	1
2	24	3313 302 042	439630	. Spessore 0,1 mm	. Shim 0.1 mm	2
2	24	3313 302 043	439631	. Spessore 0,15 mm	. Shim 0.15 mm	2
2	24	3313 302 044	439632	. Spessore 0,2 mm	. Shim 0.2 mm	2
2	24	3313 302 045	439633	. Spessore 0,5 mm	. Shim 0.5 mm	2
2	24	3313 302 046	439634	. Spessore 1,0 mm	. Shim 1.0 mm	2
2	29	3208 304 023	449125	. Spessore 0,15 mm	. Shim 0.15 mm	2
2	29	3208 304 024	449126	. Spessore 0,3 mm	. Shim 0.3 mm	2
2	29	3208 304 027	449127	. Spessore 0,5 mm	. Shim 0.5 mm	2

## SPARE PARTS LIST ZF 80 A, ZF 80 - 1 A NEW VERSION

### Preface

The spare parts list is only valid for the type and versions of transmission, as shown below.

You will find the transmission type and version on your transmission name plate.

If the type and version indicated differs from that printed in this Manual, the relative Spare Parts List should be ordered from ZF HURTH MARINE.

The indicated dimensions and standards are as such not enough for ordering parts.

When ordering parts, please state:

- Transmission type
- Transmission version
- Serial number
- Item no.
- Part name
- Identification no.
- quantity of parts required.

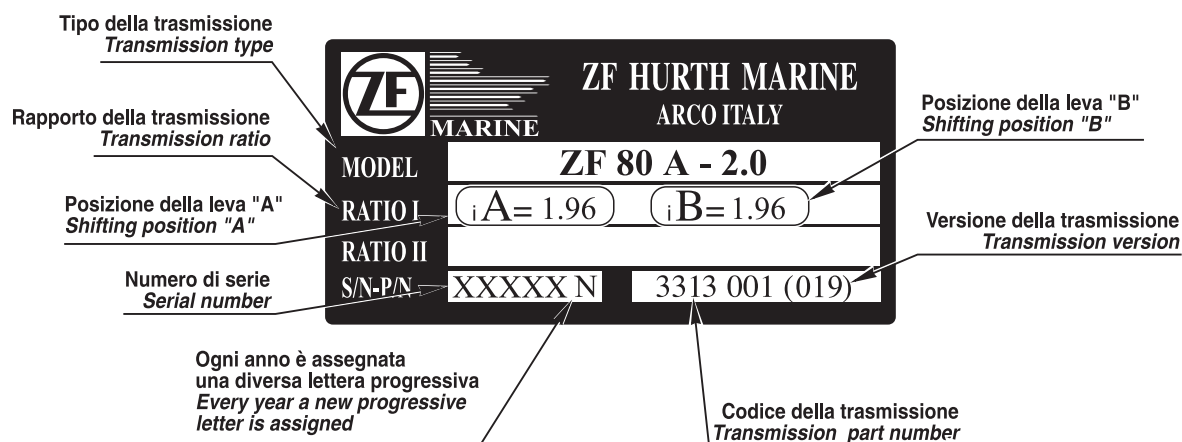
The spare parts list is referring to the following versions:

**ZF 80 A** versions 016 (1.20 R); 017 (1.41 R); 018 (1.57 R); 019 (1.96 R); 020 (2.50 R); 021 (2.85 R).

**ZF 80-1 A** versions 024 (1.21 R); 025 (1.41 R); 026 (1.57 R); 027 (1.96 R); 029 (2.50 R); 030 (2.85 R).

### Name plate

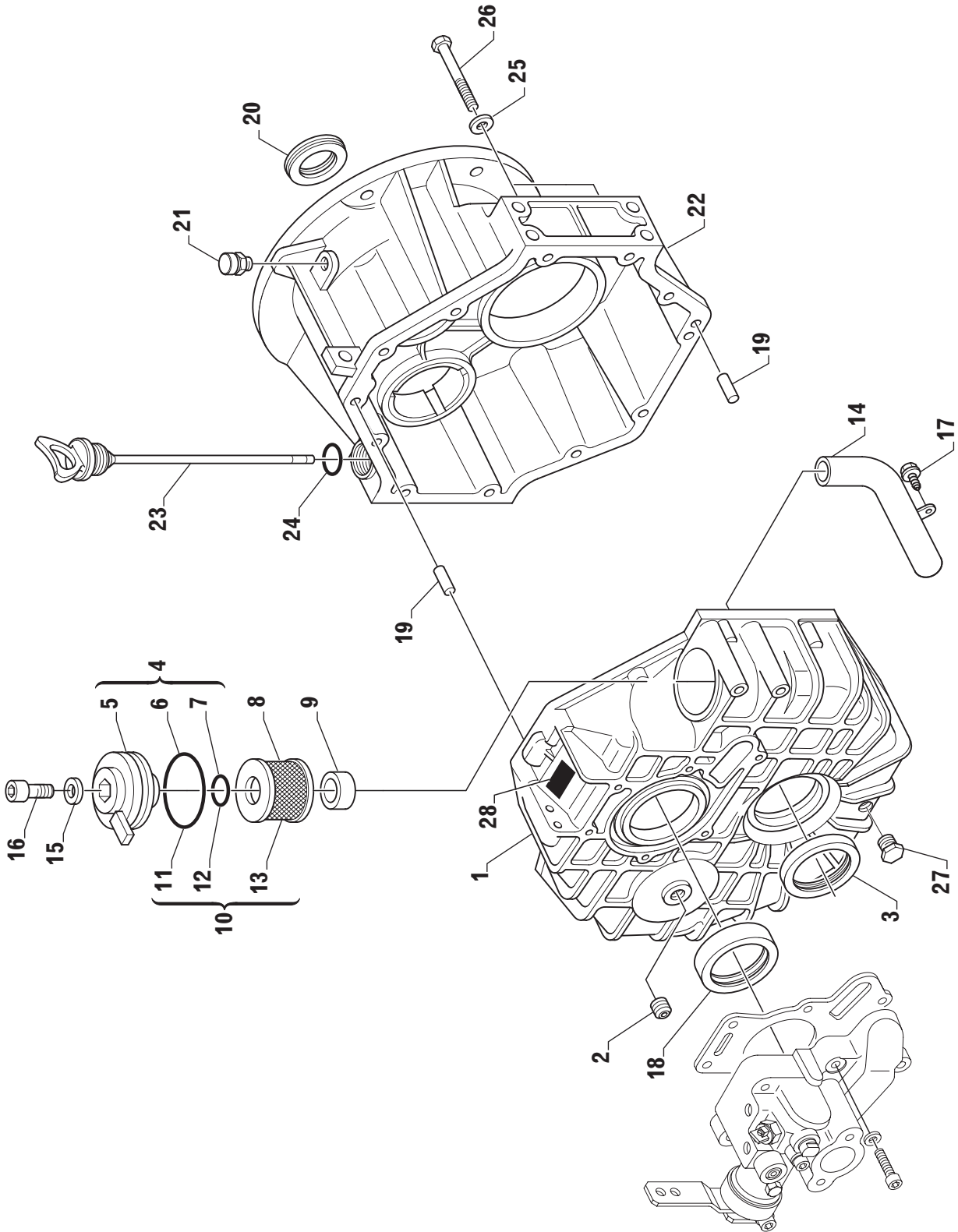
The name plate is mounted to the transmission





**ZF 80 A** versions 016 - 017 - 018 - 019 - 020 - 021  
**ZF 80-1 A** versions 024 - 025 - 026 - 027 - 029 - 030

**FIG. 1**





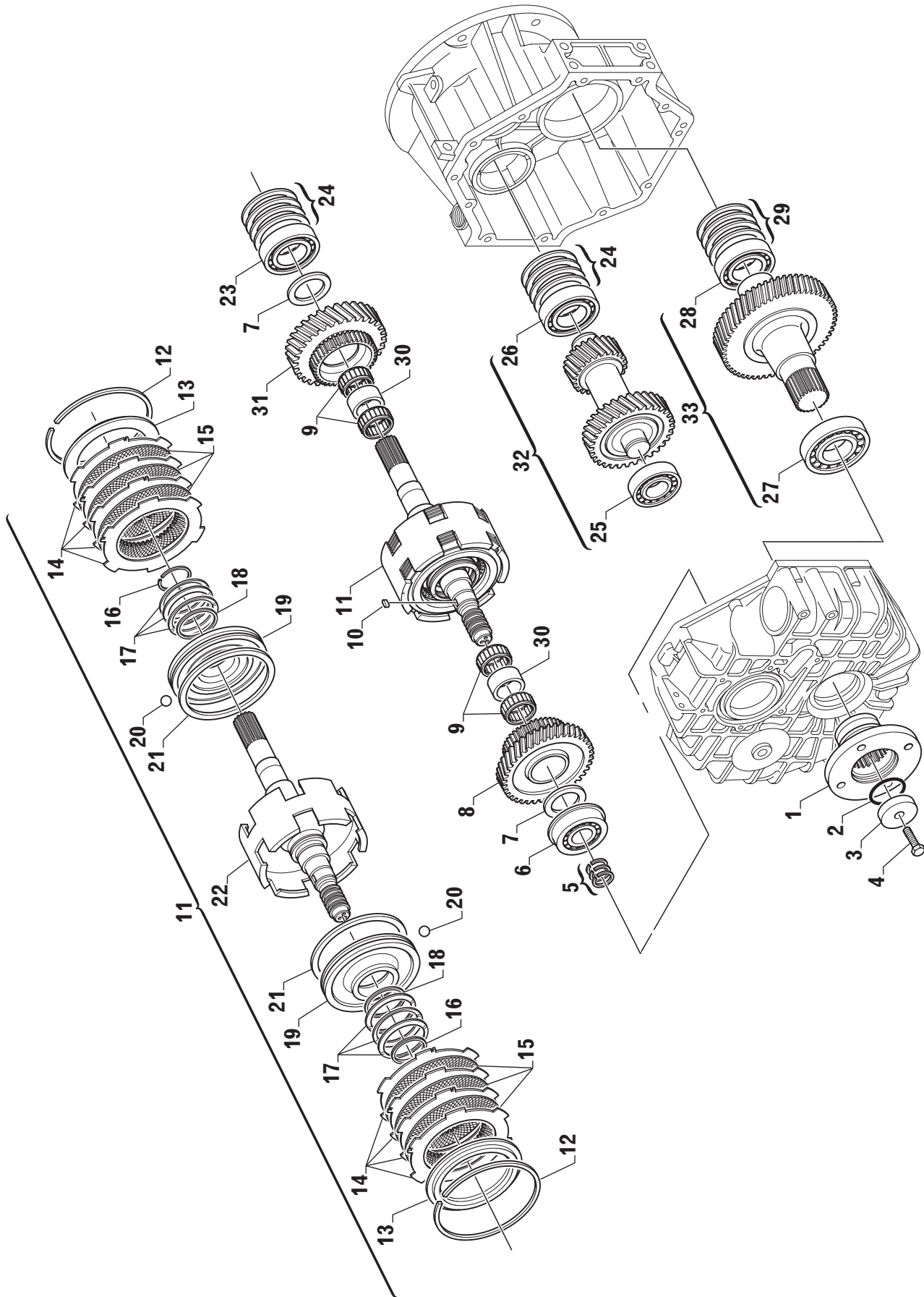


Pos.	Part number	Old P/N	Descrizione	Description	Q.tà Q.ty	Note
1	3313 199 078		Assieme scatola	Housing, assy.	1	
	3313 301 009		. Scatola	. Housing	1	
	3313 301 022		. Tubo aspirazione con supportp	. Suction pipe with support	1	
	0636 101 411		. Vite	. Screw	1	
	3312 301 008		. Guarnizione	. Gasket	1	
2	0636 301 041	442373	Tappo M16x1,5	Plug M16x1.5	1	
3	0634 319 104	448160	Paraolio uscita	Output shaft seal	1	
4	3312 101 003	500484	Coperchio filtro completo	Filter cover, assy.	1	
5			. Coperchio filtro	. Filter cover	1	
6	0634 304 688	442731	. Guarnizione OR	. O-Ring	1	
7	0634 306 204	105542	. Guarnizione OR	. O-Ring	1	
8	3312 301 007	438637	Filtro olio	Oil filter	1	
9	3312 301 008	439653	Guarnizione	Gasket	1	
10	3312 199 031	463772	Filtro olio completo	Oil filter, assy	1	
11	0634 304 688	442731	. Guarnizione OR	. O-Ring	1	
12	0634 306 204	105542	. Guarnizione OR	. O-Ring	1	
13	3312 301 007	438637	. Filtro olio	. Oil filter	1	
14	3313 301 022		Tubo aspirazione con supporto	Suction pipe with support	1	
15	0630 001 085		Rosetta	Washer	1	
16	0636 101 475		Vite M8x30	Screw M8x30	1	
17	0636 101 411	102879	Vite T.E. M6x16 (fascetta tubo aspirazione)	Hex head screw M6x16 (suction pipe clamp)	1	
18	3313 301 014	462997	Anello centratore	Centering ring	1	
19	0631 315 520	335817	Spina	Locator pin	2	
20	3312 301 030	413883	Paraolio entrata	Input shaft seal	1	
21	3311 301 002	442369	Valvola di sfiato	Breather valve	1	
22	3313 301 010		Coperchio	Cover (housing)	1	
23	3313 201 001	500993	Asta livello olio + OR	Oil dipstick + OR	1	
24	0634 304 405	501211	. Guarnizione OR (Asta livello olio)	. O-Ring (Oil dipstick)	1	
25	0630 302 091	442371	Rosetta	Washer	14	
26	0636 015 227	442375	Vite T.E. M10x35	Hex head screw M10x35	14	
27	3312 301 017	469691	Tappo	Plug	1	
28	3312 301 001		Targhetta di identificazione	Name plate	1	



ZF 80 A versions 016 - 017 - 018 - 019 - 020 - 021  
ZF 80-1 A versions 024 - 025 - 026 - 027 - 029 - 030

FIG. 2





Pos.	Part number	Old P/N	Descrizione	Description	Q.tà Q.ty	Note
1	3313 304 007	439581	Flangia	Flange	1	
2	0634 303 505	384176	Guarnizione OR	O-Ring	1	
3	3313 304 026	387841	Rondella	Washer	1	
4	0636 016 085	102823	Vite T.E.	Hex head screw	1	
5	3312 302 041	447038	Anello di tenuta	Piston ring	3	
6	0635 501 937	447754	Cuscinetto a rulli conici	Tapered roller bearing	1	
7	3313 302 023	457823	Rasamento	Butting ring	2	
8	3313 302 024	500819	Ingranaggio Z3 = 44	Reverse gear Z3 = 44	1	
9	3312 302 040	441438	Cuscinetto a rullini	Needle bearing	4	
10	0631 501 062	437956	Chiavetta	Key	1	
11	3313 199 075		Albero di ingresso completo	Input shaft, assy.	1	
12	0630 513 065		. Anello elastico	. Snap ring	2	
13	3319 302 003		. Disco finale	. End disc	2	
14	3319 302 001		. Disco frizione esterno	. Outer clutch disc	10	
15	3319 302 002		. Disco frizione interno	. Inner clutch disc	8	
16	0630 501 038	500076	. Anello di ritegno	. Retainer ring	2	
17	3313 302 059		. Molla a tazza	. Cup spring	6	
18	0634 402 178	500066	. Anello interno	. Inner clutch piston ring	2	
19	3319 302 004		. Pistone	. Clutch piston	2	
20	0635 460 006	106690	. Sfera	. Ball	2	
21	0634 402 177		. Anello esterno	. Outer clutch piston ring	2	
22	3313 199 076		. Albero di ingresso + cilindro frizione	. Input shaft and clutch housing	1	
23	0635 501 939		Cuscinetto a rulli conici	Tapered roller bearing	1	
24	3313 302 042	439630	Spessore 0,1 mm	Shim 0.1 mm	2	
	3313 302 043	439631	Spessore 0,15 mm	Shim 0.15 mm	2	
	3313 302 044	439632	Spessore 0,2 mm	Shim 0.2 mm	2	
	3313 302 045	439633	Spessore 0,5 mm	Shim 0.5 mm	2	
	3313 302 046	439634	Spessore 1,0 mm	Shim 1.0 mm	2	Intermediate shaft
25	0635 501 937	447754	Cuscinetto a rulli conici	Tapered roller bearing	1	
26	0635 373 021	106664	Cuscinetto a rulli conici	Tapered roller bearing	1	
27	0635 373 008	384182	Cuscinetto a rulli conici	Tapered roller bearing	1	
28	0635 501 914		Cuscinetto a rulli conici	Tapered roller bearing	1	
29	3208 304 023	449125	Spessore 0,15 mm	Shim 0.15 mm	2	
	3208 304 024	449126	Spessore 0,3 mm	Shim 0.3 mm	2	
	3208 304 027	449127	Spessore 0,5 mm	Shim 0.5 mm	2	
30	3313 302 030	439533	Distanziale	Spacer	2	
<b>SOLO PER ZF 80 A</b>				<b>ONLY FOR ZF 80 A</b>		
<b>Vers. 016 (Rapporto I = 1,2)</b>				<b>Vers. 016 (Ratio I = 1.2)</b>		
31	3313 302 021		Ingranaggio Z1 = 35	Forward gear Z1 = 35	1	
32	3313 199 030	500392	Albero intermedio Z4 = 44, Z5 = 35	Intermediate shaft Z4 = 44, Z5 = 35	1	
33	3313 199 031	500398	Albero di uscita Z2 = 42	Output shaft Z2 = 42	1	
<b>Vers. 017 (Rapporto I = 1,41)</b>				<b>Vers. 017 (Ratio I = 1.41)</b>		
31	3313 302 026	500850	Ingranaggio Z1 = 32	Forward gear Z1 = 32	1	
32	3313 199 032	500393	Albero intermedio Z4 = 44, Z5 = 32	Intermediate shaft Z4 = 44, Z5 = 32	1	
33	3313 199 033	500399	Albero di uscita Z2 = 45	Output shaft Z2 = 45	1	
<b>Vers. 018 (Rapporto I = 1,57)</b>				<b>Vers. 018 (Ratio I = 1.57)</b>		
31	3313 302 025	500849	Ingranaggio Z1 = 30	Forward gear Z1 = 30	1	
32	3313 199 034	500394	Albero intermedio Z4 = 44, Z5 = 30	Intermediate shaft Z4 = 44, Z5 = 30	1	
33	3313 199 035	500400	Albero di uscita Z2 = 47	Output shaft Z2 = 47	1	
<b>Vers. 019 (Rapporto I = 1,96)</b>				<b>Vers. 019 (Ratio I = 1.96)</b>		
31	3313 202 004	459589	Ingranaggio Z1 = 26	Forward gear Z1 = 26	1	
32	3313 199 036	500395	Albero intermedio Z4 = 44, Z5 = 26	Intermediate shaft Z4 = 44, Z5 = 26	1	
33	3313 199 016	500401	Albero di uscita Z2 = 51	Output shaft Z2 = 51	1	
<b>Vers. 020 (Rapporto I = 2,5)</b>				<b>Vers. 020 (Ratio I = 2.5)</b>		
31	3313 202 005	462133	Ingranaggio Z1 = 22	Forward gear Z1 = 22	1	
32	3313 199 037	500396	Albero intermedio Z4 = 44, Z5 = 22	Intermediate shaft Z4 = 44, Z5 = 22	1	
33	3313 199 038	500402	Albero di uscita Z2 = 55	Output shaft Z2 = 55	1	
<b>Vers. 021 (Rapporto I = 2,85)</b>				<b>Vers. 021 (Ratio I = 2.85)</b>		
31	3313 202 006	462134	Ingranaggio Z1 = 20	Forward gear Z1 = 20	1	
32	3313 199 039	500397	Albero intermedio Z4 = 44, Z5 = 20	Intermediate shaft Z4 = 44, Z5 = 20	1	
33	3313 199 040	500403	Albero di uscita Z2 = 57	Output shaft Z2 = 57	1	



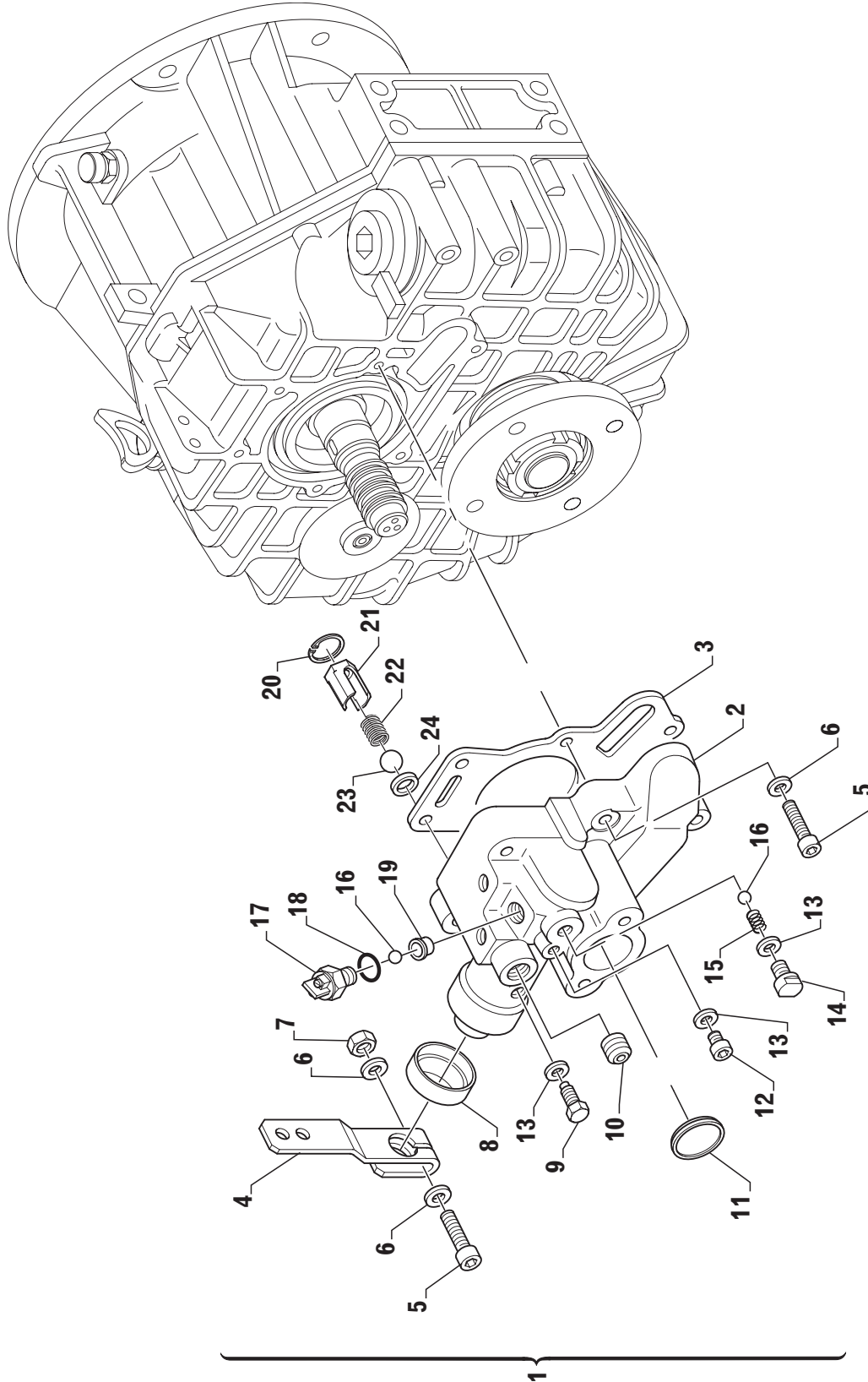
Pos.	Part number	Old P/N	Descrizione	Description	Q.tà Q.ty	Note
<b>SOLO PER ZF 80-1 A</b>				<b>ONLY FOR ZF 80-1 A</b>		
<b>Vers. 024 (Rapporto I = 1,21)</b>				<b>Vers. 024 (Ratio I = 1.21)</b>		
31	3313 302 021		Ingranaggio Z1 = 35	Forward gear Z1 = 35	1	
32	3313 199 030	500392	Albero intermedio Z4 = 44, Z5 = 35	Intermediate shaft Z4 = 44, Z5 = 35	1	
33	3313 199 031	500398	Albero di uscita Z2 = 42	Output shaft Z2 = 42	1	
<b>Vers. 025 (Rapporto I = 1,41)</b>				<b>Vers. 025 (Ratio I = 1.41)</b>		
31	3313 302 026	500850	Ingranaggio Z1 = 32	Forward gear Z1 = 32	1	
32	3313 199 032	500393	Albero intermedio Z4 = 44, Z5 = 32	Intermediate shaft Z4 = 44, Z5 = 32	1	
33	3313 199 033	500399	Albero di uscita Z2 = 45	Output shaft Z2 = 45	1	
<b>Vers. 026 (Rapporto I = 1,57)</b>				<b>Vers. 026 (Ratio I = 1.57)</b>		
31	3313 302 025	500849	Ingranaggio Z1 = 30	Forward gear Z1 = 30	1	
32	3313 199 034	500394	Albero intermedio Z4 = 44, Z5 = 30	Intermediate shaft Z4 = 44, Z5 = 30	1	
33	3313 199 035	500400	Albero di uscita Z2 = 47	Output shaft Z2 = 47	1	
<b>Vers. 027 (Rapporto I = 1,96)</b>				<b>Vers. 027 (Ratio I = 1.96)</b>		
31	3313 202 004	459589	Ingranaggio Z1 = 26	Forward gear Z1 = 26	1	
32	3313 199 036	500395	Albero intermedio Z4 = 44, Z5 = 26	Intermediate shaft Z4 = 44, Z5 = 26	1	
33	3313 199 003		Albero di uscita Z2 = 51	Output shaft Z2 = 51	1	
<b>Vers. 029 (Rapporto I = 2,5)</b>				<b>Vers. 029 (Ratio I = 2.5)</b>		
31	3313 202 005	462133	Ingranaggio Z1 = 22	Forward gear Z1 = 22	1	
32	3313 199 001		Albero intermedio Z4 = 44, Z5 = 22	Intermediate shaft Z4 = 44, Z5 = 22	1	
33	3313 199 004		Albero di uscita Z2 = 55	Output shaft Z2 = 55	1	
<b>Vers. 030 (Rapporto I = 2,85)</b>				<b>Vers. 030 (Ratio I = 2.85)</b>		
31	3313 202 007	501739	Ingranaggio Z1 = 20	Forward gear Z1 = 20	1	
32	3313 199 002		Albero intermedio Z4 = 44, Z5 = 20	Intermediate shaft Z4 = 44, Z5 = 20	1	
33	3313 199 005		Albero di uscita Z2 = 57	Output shaft Z2 = 57	1	





ZF 80 A versions 016 - 017 - 018 - 019 - 020 - 021  
ZF 80-1 A versions 024 - 025 - 026 - 027 - 029 - 030

FIG. 3



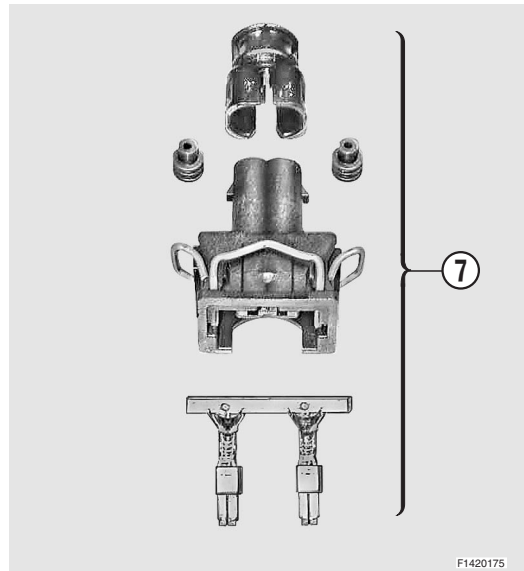
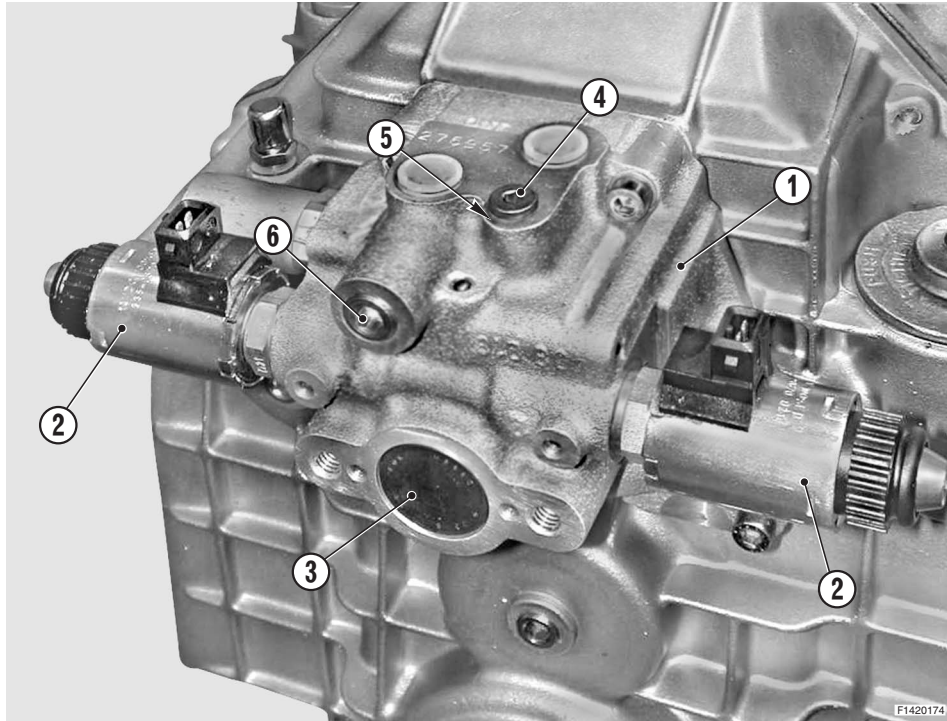


Pos.	Part number	Old P/N	Descrizione	Description	Q.tà Q.ty	Note
1	3312 108 001		Valvola di comando completo	Mechanical selector valve	1	
1	3313 108 001		Valvola di comando alta velocità	Mechanical selector valve 26 bar	1	Only for ZF 80-1A
2	☆		. Valvola di comando	. Control valve	1	
3	3312 308 020	408388	. Guarnizione	. Gasket	1	
4	3312 308 025	452963	. Leva	. Lever	1	
5	0636 101 727	442377	. Vite T.E.	. Hex head screw	7	
6	0630 302 090	442372	. Rosetta	. Washer	8	
7	0637 006 157	455785	. Dado	. Nut	1	
8	0634 309 621	500065	. Guarnizione	. Gasket	1	
9	3312 308 034	500026	. Vite di fermo	. Stop screw	1	
10	0636 309 007	455756	. Tappo	. Plug	1	
11	0631 405 061	500107	. Tappo	. Plug	1	
12	0636 302 053	103465	. Tappo	. Plug	1	
13	0634 801 302	107410	. Rosetta	. Washer	3	
14	3312 308 037	500028	. Vite di guida	. Guide bolt	1	
15	3312 308 047	500044	. Molla	. Spring	1	
16	0635 460 014	106695	. Sfera	. Ball	2	
17	3312 308 029	455764	. Interruttore completo	. Neutral safety switch assy.	1	
18	001.105.0158	105527	. Guarnizione OR	. O-Ring	1	
19	3312 308 039	500030	. Boccia	. Bushing	1	
20	0630 502 005	500083	Anello elastico	Snap ring	1	
21	3312 308 038	500029	Boccia	Bushing	1	
22	3312 308 042	500032	Molla per lubrificazione	Spring	1	
23	0635 460 023	500097	Sfera	Ball	1	
24	3312 308 036	500027	Distanziale	Spacer	1	

ZF 80 A versions 016 - 017 - 018 - 019 - 020 - 021  
 ZF 80-1 A versions 024 - 025 - 026 - 027 - 029 - 030

FIG. 4

## ELECTRIC SELECTOR VALVE ON/OFF



Pos.	Part number	Old P/N	Descrizione	Description	Q.tà Q.ty	Note
1	3312 199 015		Distributore elettrico 26 bar ON/OFF	Electric selector valve 26 bar ON/OFF	1	*
2	3312 308 069		Elettrovalvola ON/OFF 12V	Solenoid valve ON/OFF 12V	2	
3	0631 405 061		Tappo	Dummy plug	1	
4	0636 302 053		Tappo M10x1	Screw plug M10x1	1	Ma = 12 Nm
5	0634 801 302		Rosetta	Washer	1	
6	0636 309 007		Tappo	Screw plug	1	Ma = 30 Nm
7	3316 117 001		Assieme connettore	Connector kit	2	

\* Installare con 12 V - To be installed with 12 V power supply



**COMPOSIZIONE KIT - KIT COMPONENTS****ZF 80 A versions 016 - 017 - 018 - 019 - 020 - 021****ZF 80-1 A versions 024 - 025 - 026 - 027 - 029 - 030**

Fig.	Pos.	Part number	Old P/N	Descrizione	Description	Q.ty
-	-	<b>3313 199 020</b>	501171	<b>Kit guarnizioni e anelli elastici</b>	<b>Seal kit &amp; piston rings</b>	
2	2	0634 303 505	384176	. Anello OR	. O-ring	1
1	20	3312 301 030	413883	. Paraolio entrata	. Input shaft seal	1
1	3	0634 319 104	448160	. Paraolio uscita	. Output shaft seal	1
3	3	3312 308 020	408388	. Guarnizione	. Gasket	1
1	24	0634 304 405	501211	. Guarnizione OR	. O-Ring	1
2	5	3312 302 041	447038	. Anello elastico	. Piston ring	3
3	8	0634 309 621	500065	. Anello di tenuta	. Seal	1
1	6	0634 304 688	442731	. Guarnizione OR	. O-Ring	1
1	7	0634 306 204	105542	. Guarnizione OR	. O-Ring	1
1	9	3312 301 008	439653	. Guarnizione	. Gasket	1
-	-	<b>3313 199 077</b>		<b>Kit guarnizioni e frizioni</b>	<b>Seal kit &amp; clutch kit</b>	
-	-	3313 199 020	501171	. Kit guarnizioni e anelli elastici	. Seal kit & piston rings	1
2	15	3319 302 002		. Disco frizione interno	. Inner disc	8
2	14	3319 302 001		. Disco frizione esterno	. Outer disc	10
-	-	<b>3313 199 022</b>	501218	<b>Kit cuscinetti</b>	<b>Bearing kit</b>	
2	9	3312 302 040	441438	. Cuscinetto a rullini conici	. Needle bearing	4
2	23	0635 501 939	500390	. Cuscinetto a rullini conici	. Tapered roller bearing	1
2	6,25	0635 501 937	447754	. Cuscinetto a rullini conici	. Tapered roller bearing	2
2	26	0635 501 938	333859	. Cuscinetto a rullini conici	. Tapered roller bearing	1
2	27	0635 373 008	384182	. Cuscinetto a rullini conici	. Tapered roller bearing	1
2	28	0635 501 914	500391	. Cuscinetto a rullini conici	. Tapered roller bearing	1
2	24	3313 302 042	439630	. Spessore 0,1 mm	. Shim 0.1 mm	2
2	24	3313 302 043	439631	. Spessore 0,15 mm	. Shim 0.15 mm	2
2	24	3313 302 044	439632	. Spessore 0,2 mm	. Shim 0.2 mm	2
2	24	3313 302 045	439633	. Spessore 0,5 mm	. Shim 0.5 mm	2
2	24	3313 302 046	439634	. Spessore 1,0 mm	. Shim 1.0 mm	2
2	29	3208 304 023	449125	. Spessore 0,15 mm	. Shim 0.15 mm	2
2	29	3208 304 024	449126	. Spessore 0,3 mm	. Shim 0.3 mm	2
2	29	3208 304 027	449127	. Spessore 0,5 mm	. Shim 0.5 mm	2

