
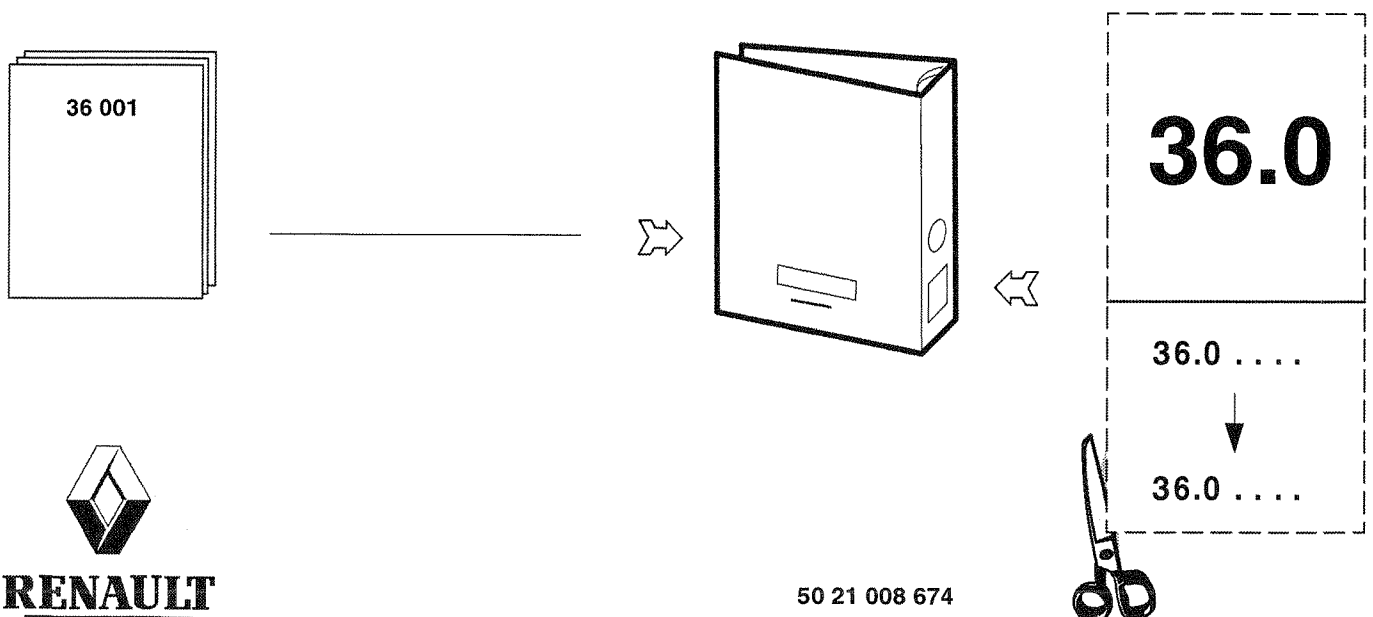


36 001 - GB - 10/2002

POWER TAKE-OFF INSTALLATION

RANGE	FAMILY	VARIANTE
MAGNUM		ZF.N71-1B ZF.N71-1C NH/1B NH/1C NH/4B NH/4C
PREMIUM		ZF.N74-4B ZF.N71-4C ZF.N71-1B NH/1B NH/1C NH/4B NH/4C
KERAX		NH/1B NH/4B NH/4C

 The above information may change in the course of time. Only the "Consult" section of the workshop manuals repository in standard N° 10320 serves as reference.



CONTENTS

Generalities	A-1 → 6
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Assembly N 71 / 1 - N 353 / 1	B-1 → 5
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— Tightening torques	B1-2 → 2
— Possible versions	B2-1 → 1
— Preparations work	B3-1 → 1
— Layshaft	B4-1 → 2
— PTO installation	B5-1 → 2

Assembly N 71 / 2 - N 353 / 2	C-1 → 5
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— Tightening torques	C1-2 → 2
— Possible versions	C2-1 → 1
— Preparations work	C3-1 → 1
— Layshaft	C4-1 → 2
— Possible versions	C5-1 → 2

Assembly N 71 / 4 - N 353 / 4	D-1 → 5
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— Tightening torques	D1-2 → 2
— Possible versions	D2-1 → 1
— Preparations work	D3-1 → 1
— Layshaft	D4-1 → 2
— PTO installation	D5-1 → 2

Assembly NH / 1 - NL / 1	E-1 → 5
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— Tightening torques	E1-2 → 2
— Possible versions	E2-1 → 1
— Preparations work	E3-1 → 2
— Layshaft	E4-1 → 2
— Possible versions	E5-1 → 4

Assembly NH / 4 - NL / 4	F-1 → 5
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— Tightening torques	F1-2 → 2
— Possible versions	F2-1 → 1
— Preparations work	F3-1 → 2
— Layshaft	F4-1 → 2
— Possible versions	F5-1 → 4

GENERALITIES

Safety instructions

The following safety instructions are included in these installation instructions:

NOTE:

Refers to special processes, techniques, data, use of auxiliary equipment etc.

CAUTION

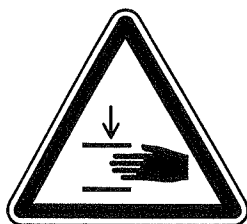
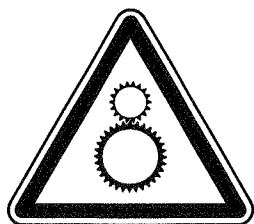
This is used when incorrect, unprofessional working practices could damage the product.

DANGER

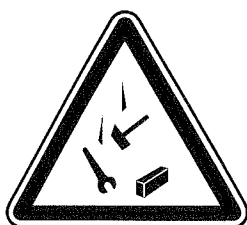
This is used when lack of care could lead to personal injury or death.



Take the necessary precautions to ensure that the transmission unit and PTO are not started up unintentionally



Never work on a unit or transmission while it is running. There is a risk of being hit by moving parts (e.g. propshaft). This could result in serious accidents or even death.



Always take the necessary precautions to ensure that moving or raised fixtures, which could present a danger to yourself or other personnel working on the vehicle, are secure in order to prevent them falling or moving. Unintentionally actuated levers or linkages can cause reactions in the unit or transmission which may lead to serious accidents or life-threatening injuries.

Preface - Installation notes

The illustrations, drawings and parts included in these instructions do not always depict the original. They are merely used to show work sequences. The illustrations, drawings and parts are not drawn to scale, and no inference should be made with regard to size and weight (even within any single drawing or illustration).

All work must be carried out as per the instructions contained herein.

PTO start-up

Once installation and inspection work has been completed, the experts must convince themselves that the product will function perfectly again.

We must point out that, before the PTO can be used and after the propshaft bolts have been secured, the output flange and propshaft must be checked by hand to ensure free movement and the requisite clearance.

This check must be performed without starting the engine.

Assembly recommendations

Non-observance of these recommendations may lead to seizing or jamming of the gearbox:

- either due to lack of oil ⇒ aspiration of gearbox oil by the hydraulic pump (seizing),
- or due to too much oil ⇒ discharge of oil from the hydraulic system into the gearbox (jamming).

You will find hereafter the choice criteria and basic calculations for defining the characteristics of the PTO necessary for correct operation of your installation.

Choice criteria

In all cases, the choice of PTO must be made with the equipment manufacturer. It must take account of the hydraulic system's operating characteristics and installation.

Hydraulic pump output (**Q in dm³/mn**)
 Operating pressure (**p in bar**)
 Engagement time (**mn**)
 Working speed (**n in rpm**)
 Load exerted by pump on PTO (**M in Nm**)

PTO calculations

PTO output rotating speed:

$$n_{pto} = n_{eng} \times f$$

f: rotating speed coefficient
n_{pto}: PTO output rotation frequency in rpm
n_{eng}: engine rotation frequency in rpm

Permissible torque:

$$C_{perm} = \frac{16.75 \times Q \times p}{n_{pto}}$$

$$C_{perm} = \frac{9552 \times permP}{n_{pto}}$$

Q: output in dm³
p: pressure in bars

Anti-leak

Installation specifications for attaching hydraulic pumps to ZF PTOs, version "c"

Hydraulic pump connection must comply with ISO 7653 Standard Type D.

a) Additional specification: (for all PTO versions)

Sealing between pump and PTO

Sealing between pump and PTO must be effected by means of two sealing rings (**D1 + D2**) and a vent (**E1**) between the sealing rings.

The vent is to make sure that no transmission oil is sucked out and no hydraulic oil can penetrate into the transmission.

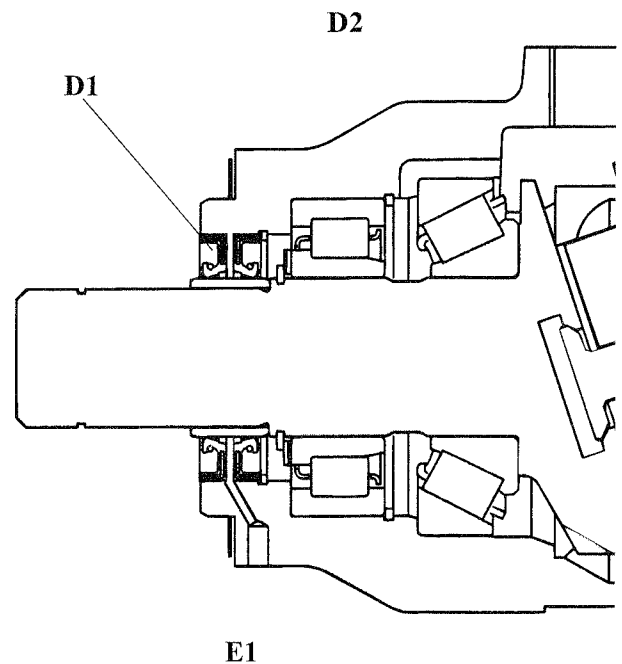
The sealing rings must resist temperatures of up to 120°C.

The sealing ring on the PTO side (**D1**) must seal off the transmission with the oil released by the vehicle manufacturer / ZF.

The sealing ring on the pump side (**D2**) must seal off the pump with the hydraulic oil.

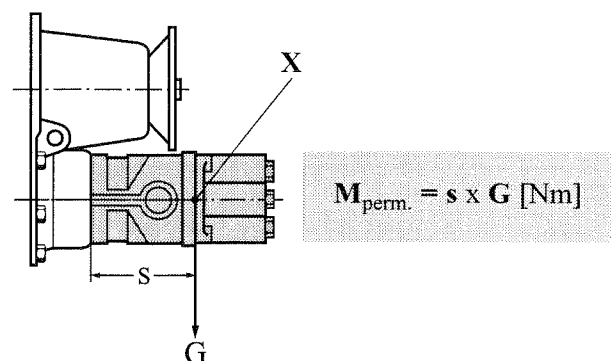
Vent bore function must be guaranteed at all times (not blocked by paint, plug, or dirt).

In the event of oil leakage of (E1), a prompt check of the entire system is required.



b) Load: Gravity torque "M"

With version "c" of the PTOs NH/4 and NL/4, static load caused by the pump on the mounting face (gravity moment "M") may amount to 50 Nm.



$$M_{\text{perm.}} = s \times G \text{ [Nm]}$$

M = Gravity torque

G = Pump weight (incl. fittings)

s = Distance between the centre of gravity of the pump and the flange mounting face

X = Centre of gravity

Output torque

Depending on configuration and mode of operation, high torque peaks may occur. Single jerks are permitted up to 2 times nominal torque. An overload protection device is necessary when this is exceeded. Series of jerk torques or excessive vibration behaviour $> 1.5 \times T$ (active torque) are not permissible. The values given apply to an output speed of 1500 min^{-1} .

Installation

Maximum permitted flexion angle on the drive-shaft must not exceed 7° .

PTO start-up

Once installation and inspection work has been completed, the experts must convince themselves that the product will function perfectly again.

CAUTION

We must point out that, before the PTO can be used and after the propshaft bolts have been secured, the output flange and propshaft must be checked by hand to ensure free movement and the requisite clearance.

DANGER

This check must be performed without starting the engine.

ASSEMBLY N 71 / 1 - N 353 / 1

Tightening torques**Tightening torques for nuts and bolts**

Tightening torques for nuts and bolts (see **ZFN 148**), bolt class 5, tightening torque tolerance $\pm 15\%$.

This standard applies to bolts as per DIN 912, DIN 931, DIN 933, DIN 939, DIN 960, DIN 961, and to nuts as per DIN 934.

Always use calibrated torque wrenches and torque indicator wrenches when tightening bolts.

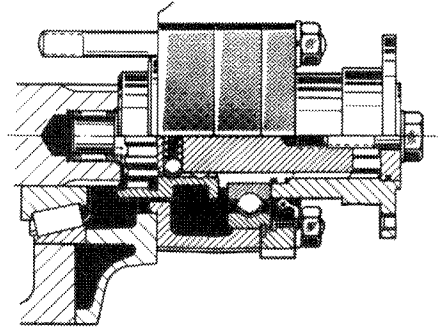
N 71/1 and N 353/1 PTO		Dimensions for dowel pins Version b and c 4x each	N 353/1 PTO		Dimensions for dowel pins Version b and c 4x each
attached to ZF transmission	Version b and c		attached to PTO	Version b and c	
S 6-36 S 6-36/2	N 353/1	M12x80	N 36/10	N 353/1	M12x100
9 S 75	N 71/1	M12x80	N 75/10	N 353/1	M12x100
9/16 S 109	N 71/1	M12x80	N 109/10	N 353/1	M12x100
16 S 151/221 16 S 181/251 8 S 151	N 71/1	M12x80	N 221/10	N 353/1	M12x100
16 S 151/221 8 S 151	N 71/1	M12x80	N 151/10	N 353/1	M12x100

Attention: Only use genuine dowel pins and nuts.

Possible versions

Version "B"

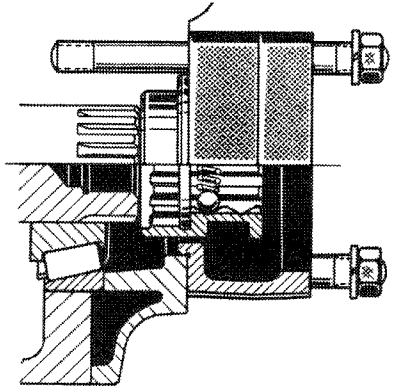
with 90 mm Ø output flange, 4 bores
Ø 8.1 mm (other flange sizes on request).



003101

Version "C"

for direct pump connection as per BNA standard
NF.R 17-102 and ISO standard 7653.
(Ensure clearance between the pump and transmission
output flange/propshaft).



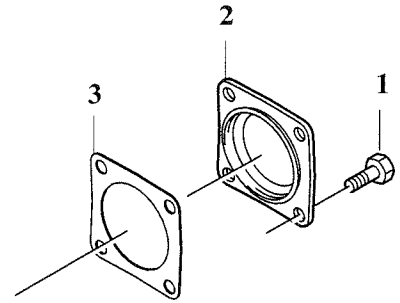
003102

NOTE: See page B 1-2 of summary sheet for ZF N 71/1
and N 353/1 PTO installation options.

Preparations work

Preparation work on basic transmissio

- 1 If necessary, drain transmission oil from transmission and attached N.../10.
- 2 Remove in sequence indicated by numbers on illustration.
- 3 Clean sealing faces.

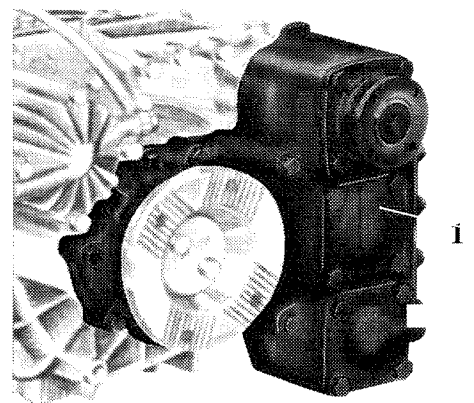


NOTE: Do not re-use old gasket (1 mm thick transportation gasket) for pump attachment.

001296

Preparation work for attachment of N 353 / 1 PTO to ZF N... / 10 PTO

- 1 Remove cover (1) and spacer ring. Measure the distance between the face end and bearing outer race on the available attachment point.
- 2 Place gasket on intermediate housing and measure distance between centering collar and gasket. The difference between the two measurements must equal between 0 and 0.2 mm (free play).
- 3 If this difference is any greater, shims must be used.
- 4 Attach intermediate housing.



004039

Shims are available in the following thicknesses:

- = 0.4 mm
- = 0.6 mm
- = 0.8 mm
- = 1.0 mm
- = 1.2 mm

Layshaft

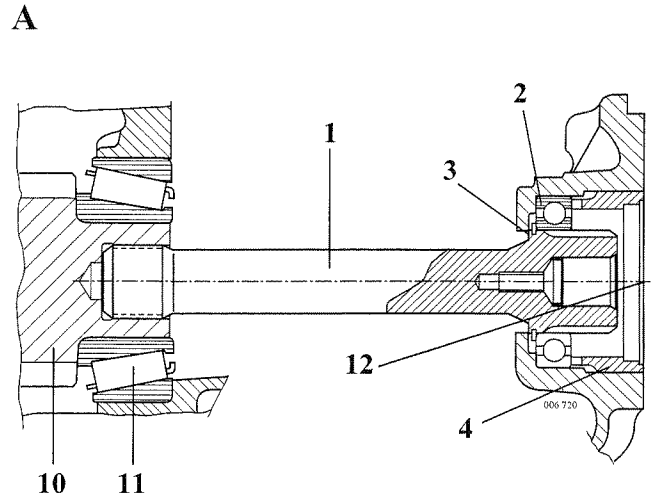
Sélection and installation of correct intermediate shaft → "ECOSPLIT"

A: Ecosplit transmissions without Intarder

16 S 151/221 length = 213.5 mm
(items 1, 2, 3, 4)

Polygon
Toothed shaft

16 S 251 length = 250 mm



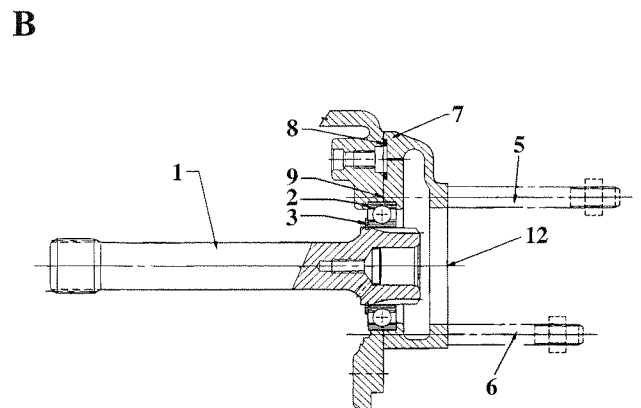
006720

B: Ecosplit transmission with Intarder

16 S 151/221 length = 250 mm
(items 1-10)

Polygon
Toothed shaft

16 S 251 length = 286.5 mm

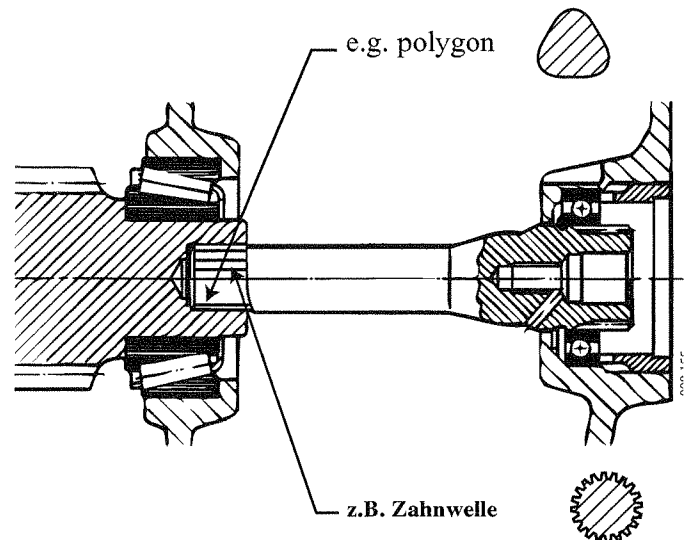


016393

NOTE: The intermediate shaft can be installed without the need for measurement.

Key

- 1 Intermediate shaft
- 2 Ball bearing
- 3 Circlip
- 4 Bushing
- 5 Dowel pin M12x135
- 6 Dowel pin M12x115
- 7 Adapter
- 8 O-ring
- 9 Gasket
- 10 Layshaft
- 11 Taper roller bearing
- 12 N1 connection



Installation of intermediate shaft in "ECOMID" transmissions

Always check the following before installation!

- Read the top gear ratio from the transmission type plate:

e.g. 1.0 = direct drive ratio

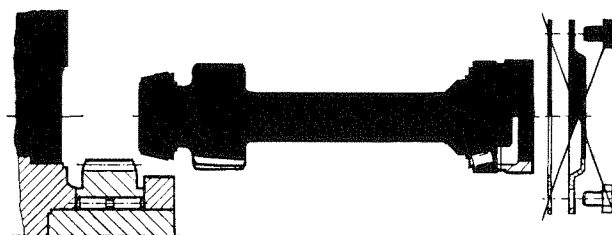
e.g. 0.85 = overdrive ratio (less than 1.0)

- The ratio determines the type of intermediate shaft installed:

9/16 S 109 Direct drive = interm. shaft with 14 teeth

slow RG = interm. shaft with 14 teeth

Overdrive = interm. shaft with 17 teeth



005 864

Attention:

9 S 75 = interm. shaft with 16 teeth

NOTE: The bearing outer race (2) is already pre-installed in the transmission and securely fixed thanks to multiple peening.

Key

Transmission

1 Housing

2 Bearing outer race

3 Cover omitted

Adapter kit

4 Intermediate shaft

5 Taper roller bearing

6 Bushing

7 Shim

Measurement and adjustment of taper roller bearing

Ensure that both taper roller bearings are free of play but without axial preload when measuring and adjusting. Play-free condition can be assured by pushing on the output end bearing outer race while continually turning the intermediate shaft. Select shim thickness "S" so that the bushing is a maximum of 0.05 mm inset or a max. of 0.15 mm protruding, relative to the housing face.

NOTE: Shims are available in the following thicknesses ("S"):

= 0.80 mm

= 0.95 mm

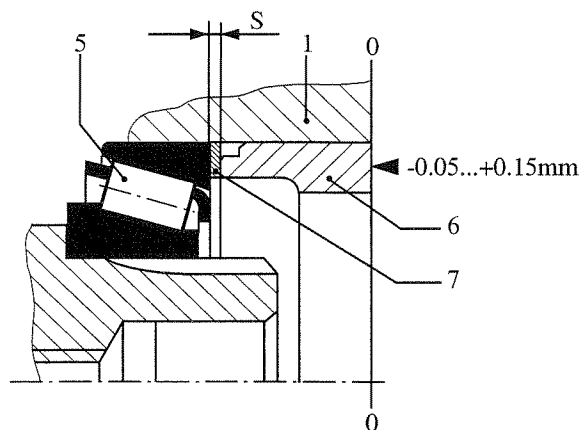
= 1.10 mm

= 1.25 mm

= 1.40 mm

= 1.50 mm

= 1.60 mm



008041

CAUTION

The adapter kit must be installed at the same time as the PTO.

PTO installation

Version "B"

NOTE: Always note the following before installing the N 71/1 PTO.

Dowel pins for securely fixing the PTO are included with the loose PTO.

CAUTION

Insert dowel pins into transmission housing short-thread first as per DIN (see illustration).

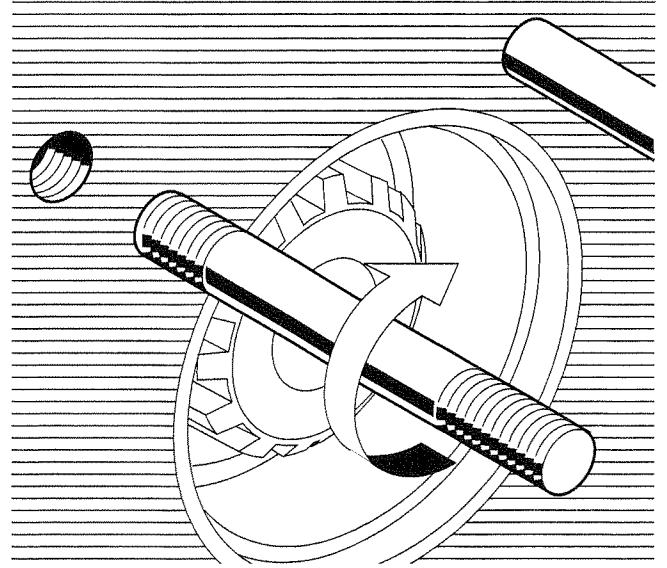
If an Intarder is included, only use DIN 939.

- 1 In the case of transmission housings with non-blind threads, apply sealing compound or sealing tape on screw-in thread of dowel pin.
- 2 Insert 4 dowel pins (1) M12 into attachment threads. Tightening torque = 20 Nm
- 3 Insert needle bearing (3) into layshaft/output shaft bearing bore. Needle bearing width:
N 71/1 approx. 16 mm
N 353/1 approx. 12 mm
- 4 Place PTO (4) together with **new** gasket (2) onto attachment point.

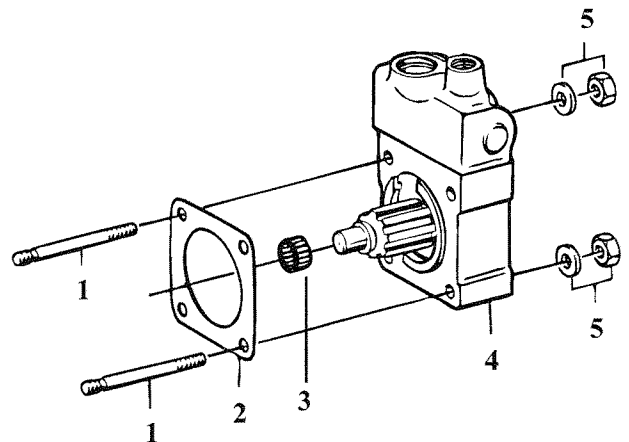
Secure PTO using 4 hex nuts with washers (5).
Tightening torque = 79 Nm

CAUTION

Check oil level in transmission. If required, add more oil and tighten oil plug to specified torque.



001294



007929

Version "C"

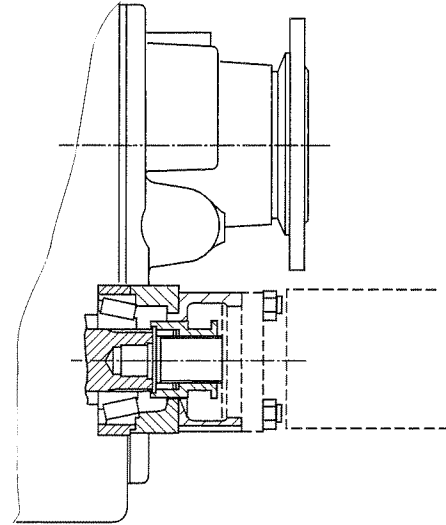
without output shaft for direct pump connection

1 Preparations:

Remove dowel pins and transportation brackets (1 and 9) from PTO.

NOTE: Catch sliding pad (5) when removing the sliding sleeve (6).

- 2 Push sliding sleeve (6) onto pump input shaft.
- 3 Ensure the sliding sleeve (6) guide groove is facing towards the pump.
- 4 Place PTO (4) with **new** gasket (10) onto pump.
- 5 At the same time, insert sliding pad (5) and driver journal into sliding sleeve (6) guide groove.
- 6 Insert dowel pins (2) at attachment point.
- 7 Place pump and PTO onto **new** gasket (3) and insert 4 hex nuts (8) with washers (7).
M12 dowel pin tightening torque = 20 Nm
M12 hex nut tightening torque = 79 Nm



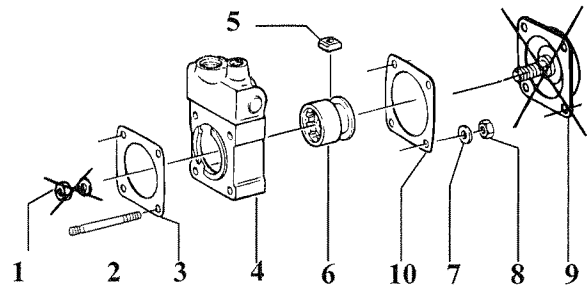
006771

NOTE: Version "c" has no needle bearing.

NOTE: If the pump is to be attached at a later date, insert the dowel pins (2) at the attachment point and attach the PTO (4) with gasket (3). Finally, attach the transportation cover (9) and gasket to close off the unit. The transportation cover and gasket can be ordered separately if not available.

M12 dowel pin tightening torque = 20 Nm

M12 hex nut tightening torque = 46 Nm



007928

CAUTION

Check the oil level in transmission. If required, add more oil and tighten oil plug to specified torque.

ASSEMBLY N 71 / 2 - N 353 / 2

Tightening torques

Tightening torques for nuts and bolts

Tightening torques for nuts and bolts (see **ZFN 148**), bolt class 5, tightening torque tolerance $\pm 15\%$.

This standard applies to bolts as per DIN 912, DIN 931, DIN 933, DIN 939, DIN 960, DIN 961, and to nuts as per DIN 934.

Always use calibrated torque wrenches and torque indicator wrenches when tightening bolts.

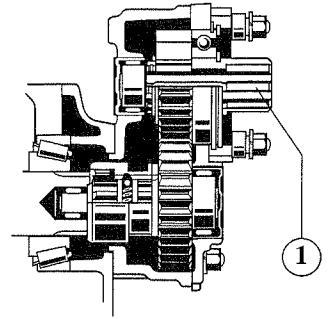
N 71/2 and N 353/2 PTO		Dimensions for dowel pins		N 353/2 PTO		Dimensions for dowel pins Version b and c 2x each
attached to ZF transmission	Version a, b, c	Version a 2x each	b and c 2x each	attached to PTO	Version b and c	
S 6-36 S 6-36/2	N 353/2	M12 x 80 M12 x 120	M12 x 80 M12 x 100	N 36/10	N 353/2	M12 x 100 M12 x 125
S 6-66	N 71/2	M12 x 80 M12 x 120	M12 x 80 M12 x 100			
9 S 75	N 71/2	M12 x 80 M12 x 120	M12 x 80 M12 x 100	N 75/10	N 353/2	M12 x 100 M12 x 125
9/16 S 109	N 71/2	M12 x 80 M12 x 120	M12 x 80 M12 x 100	N 109/10	N 353/2	M12 x 100 M12 x 125
16 S 151/221 16 S 181/251 8 S 151	N 71/2	M12 x 80 M12 x 120	M12 x 80 M12 x 100	N 221/10	N 353/2	M12 x 100 M12 x 120
16 S 151/221 8 S 151	N 71/2	M12 x 80 M12 x 120	0630 604 468 M12 x 80 M12 x 100	N 151/10	N 353/2	M12 x 100 M12 x 125

Caution: Only use genuine dowel pins and nuts.

Possible versions

Version "A"

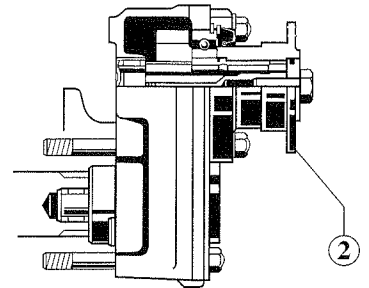
for direct pump connection (1) via an intermediate flange.



001 296

Version "B"

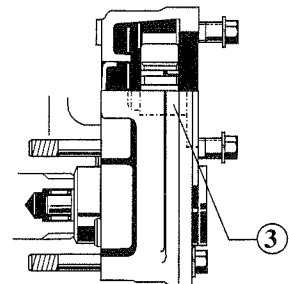
with 90 mm Ø output flange (2), 4 bores Ø 8.1 mm (other flange sizes on request).



056 927

Version "C"

for direct pump connection (3) as per BNA standard NF.R 17-102 and ISO standard 7653.
(Ensure clearance between pump and transmission output flange/propshaft).



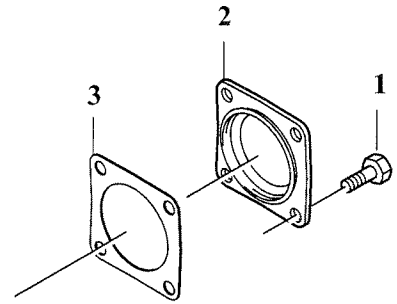
001 294

NOTE: See page C1-2 of summary sheet for ZF N 71/2 and N 353/2 PTO installation options.

Preparations work

Preparation work on basic transmission

- 1 If necessary, drain transmission oil from transmission and attached N .../10.
- 2 Remove in sequence indicated by numbers on illustration.
- 3 Clean sealing faces.

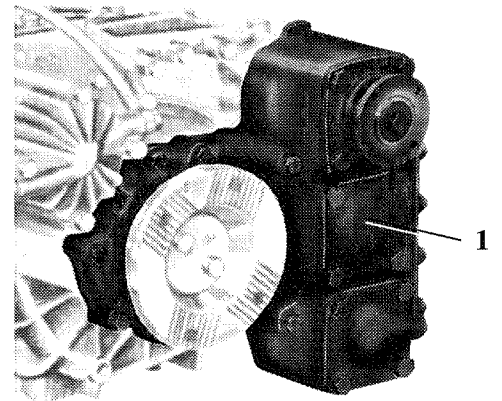


NOTE: Do not re-use old gasket (1mm thick transportation gasket) for pump attachment.

001 296

Preparation work for attachment of N 353 / 2 PTO to ZF N.../ 10 PTO

- 1 Remove cover (1) and spacer ring. Measure the distance between the face end and bearing outer race on the available attachment point.
- 2 Place gasket on intermediate housing and measure distance between centering collar and gasket. The difference between the two measurements must equal between 0 and 0.2 mm (free play).
- 3 If this difference is any greater, shims must be used.
- 4 Attach intermediate housing.



004039

Shims are available in the following thicknesses:

- = 0.4 mm
- = 0.6 mm
- = 0.8 mm
- = 1.0 mm
- = 1.2 mm

Layshaft

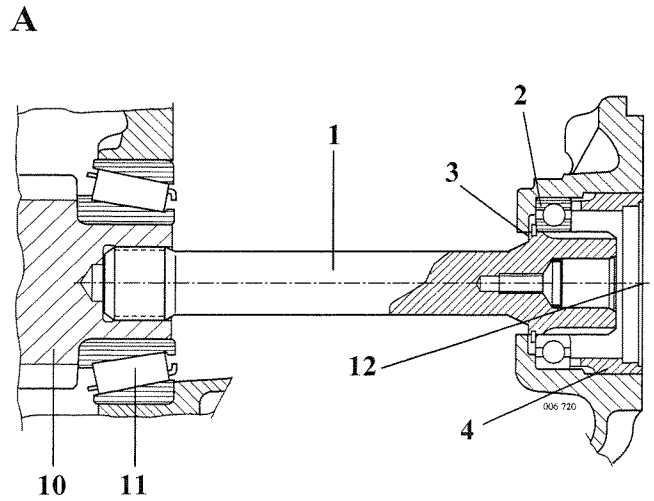
Sélection and installation of correct intermediate shaft → "ECOSPLIT" transmissions

A: Ecosplit transmissions without Intarder

16 S 151/221 length = 213.5 mm
(items 1, 2, 3, 4)

Polygon
Toothed shaft

16 S 251 length = 250 mm



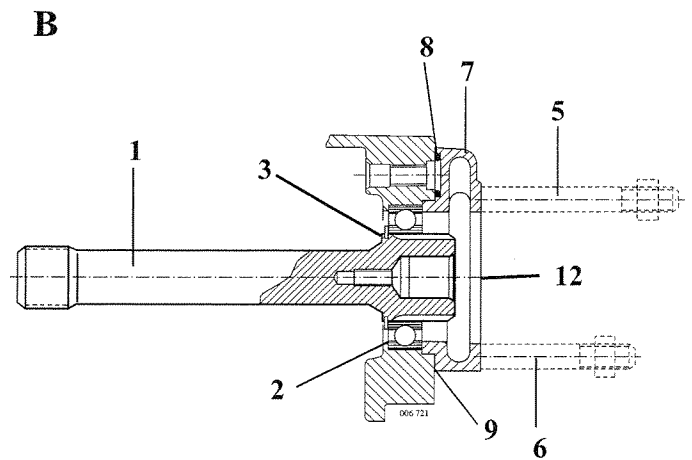
006720

B: Ecosplit transmissions with Intarder

16 S 151/221 length = 250 mm
(items 1-10)

Polygon
Toothed shaft

16 S 251 length = 286.5 mm

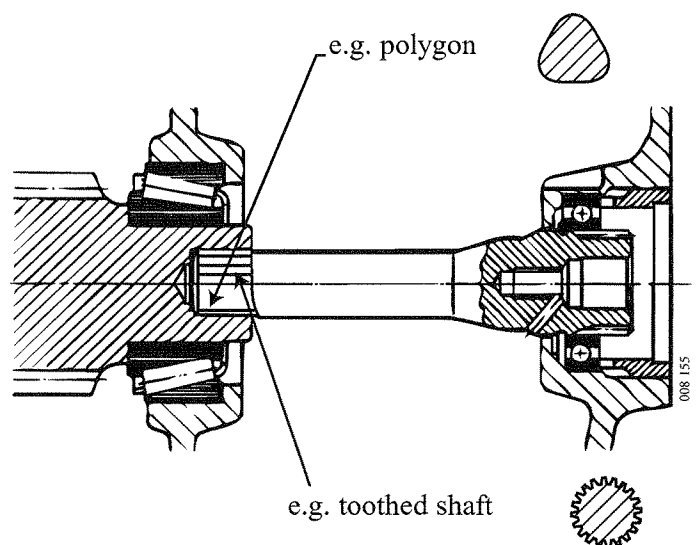


006721

NOTE: The intermediate shaft can be installed without the need for measurement.

Key

- 1 Intermediate shaft
- 2 Ball bearing
- 3 Circlip
- 4 Bushing
- 5 Dowel pin M12x135
- 6 Dowel pin M12x115
- 7 Adapter
- 8 O-ring
- 9 Gasket
- 10 Layshaft
- 11 Taper roller bearing
- 12 NI connection



008155

Installation of intermediate shaft in "ECOMID" transmissions

Always check the following before installation!

- Read the top gear ratio from the transmission type plate:
 - e.g. 1.0 = direct drive ratio
 - e.g. 0.85 = overdrive ratio less than 1.0
- The ratio determines the type of intermediate shaft installed:
 - 9/16 S 109 Direct drive = interm. shaft with 14 teeth
 - slow RG = interm. shaft with 14 teeth
 - Overdrive = interm. shaft with 17 teeth

Caution: contact After-Sales Service re 8 S 109.

9 S 75 = interm. shaft with 16 teeth

NOTE: The bearing outer race (2) is already pre-installed in the transmission and securely fixed thanks to multiple peening.

Measurement and adjustment of taper roller bearing

Ensure that both taper roller bearings are free of play but without axial preload when measuring and adjusting. Play-free condition can be assured by pushing on the output end bearing outer race while continually turning the intermediate shaft. Select shim thickness "S" so that the bushing is a maximum of 0.05 mm inset or a max. of 0.15 mm protruding, relative to the housing face.

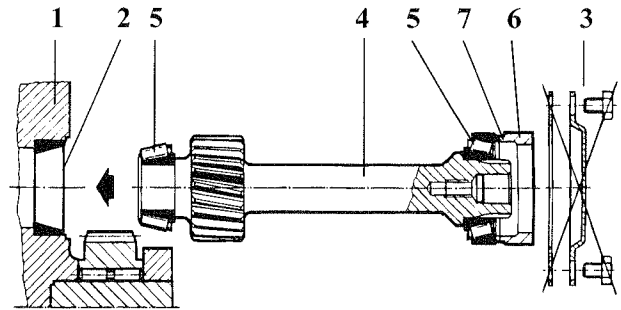
NOTE: Shims are available in the following thicknesses ("S"):

Part number

- = 0.80 mm
- = 0.95 mm
- = 1.10 mm
- = 1.25 mm
- = 1.40 mm
- = 1.50 mm
- = 1.60 mm

CAUTION

The adapter kit must be installed at the same time as the PTO.



Key

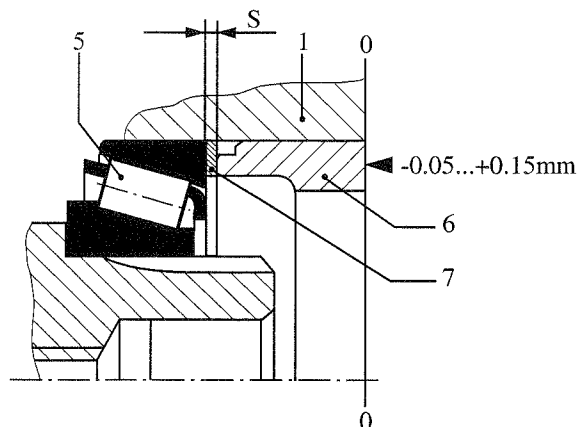
Transmission

- 1 Housing
- 2 Bearing outer race
- 3 Cover omitted

Adapter kit

- 4 Intermediate shaft
- 5 Taper roller bearing
- 6 Bushing
- 7 Shim

005 864



056 930

Possible versions

NOTE: Always note the following before installing the N 71/2 PTO.

Dowel pins for securely fixing the PTO are included with the loose PTO.

CAUTION

Insert dowel pins into transmission housing short-thread first as per DIN (see illustration).

If an Intarder is included, only use DIN 939.

- 1 In the case of transmission housings with non-blind threads, apply sealing compound or sealing tape on screw-in thread of dowel pin.
- 2 Insert 4 dowel pins (1) M 12 into attachment threads.
Tightening torque = 20 Nm
- 3 Insert needle bearing (2) into layshaft/output shaft bearing bore. Needle bearing with:
N 71/2 approx. 16 mm
N 353/2 approx. 12 mm
- 4 Place PTO (3) with **new** gasket (4) onto attachment point.

Version "a": Place pump with gasket onto PTO as per manufacturer instructions. Secure the pump and PTO using 4 hex nuts with washers (5).

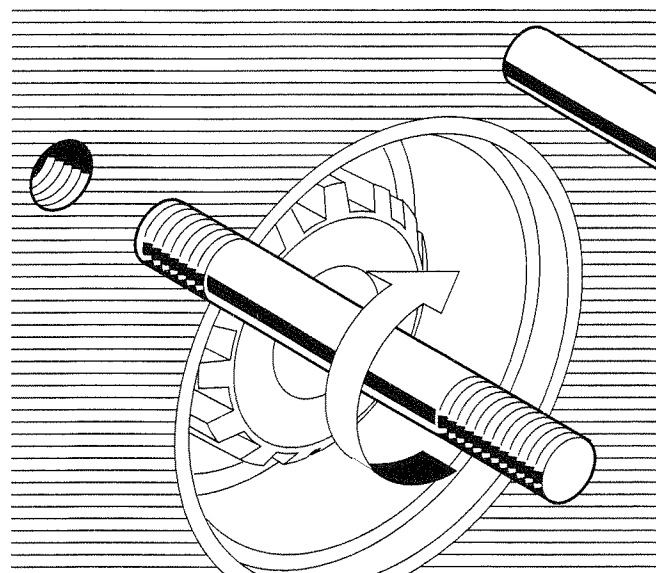
Tightening torque = 79 Nm.

Version "b": Secure PTO using 4 hex nuts with washers (5).

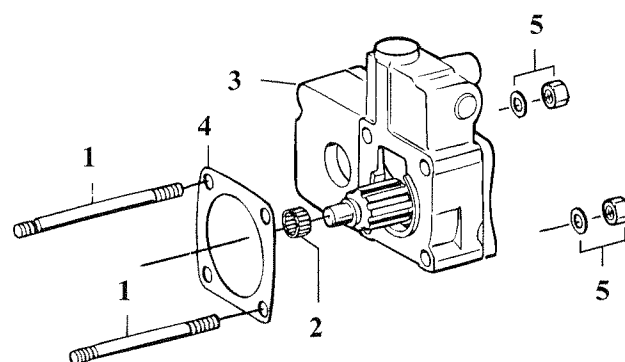
Tightening torque = 79 Nm

CAUTION

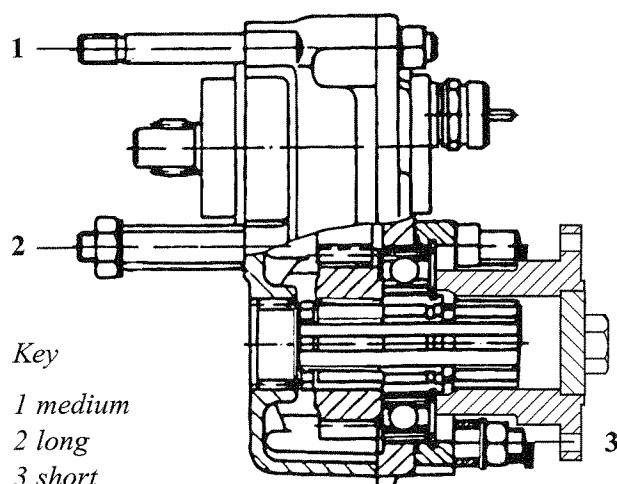
Check oil level in transmission. If required, add more oil and tighten oil plug to specified torque.



005596



007932



006796

Version "C"

without output shaft for direct pump connection.

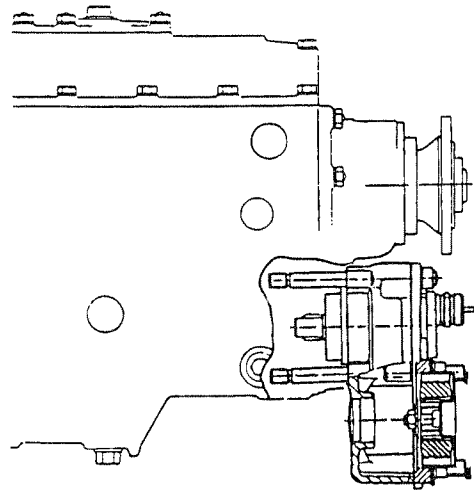
1 Preparations

Remove dowel pins and transportation brackets from PTO.

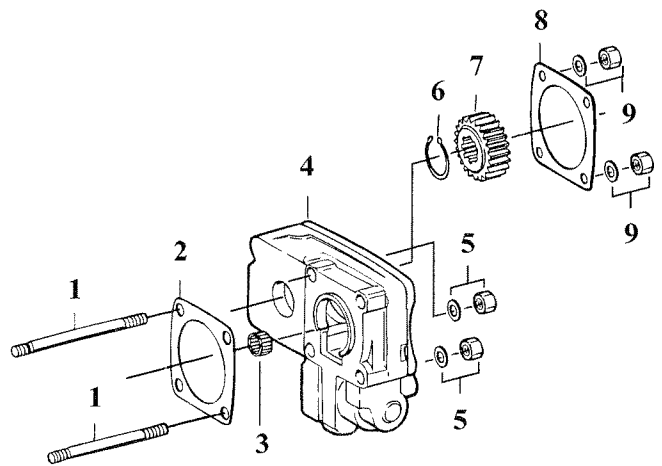
CAUTION

The spur gear (7) and circlip (6) are in the transportation cover.

- 2 In the case of non-blind threads, coat screw-in thread with sealing compound or sealing tape.
- 3 Insert four M12 dowel pins (1) into the attachment threads.
Tightening torque = 20 Nm
- 4 Insert needle bearing (3) into layshaft/output shaft bore.
Needle bearing width:
N 71/2 approx. 16 mm
N 353/2 approx. 12 mm



006772



007933

DANGER

Always wear protective gloves when handling hot spur gear.

- 5 Heat spur gear (7) to 150 °C, slide onto pump input shaft and secure using circlip (6).
- 6 Place PTO with new gasket (2) onto attachment point.
- 7 Insert four M12 hex nuts and washers (5).
Tightening torque = 79 Nm
- 8 Place pump with gasket (8) onto PTO.

NOTE: if the pump is to be attached at a later date, insert the dowel pins at the attachment point and attach the PTO (4) with gasket (2). Finally, attach the transportation cover and gasket (8) to close off the unit.

The transportation cover and gasket can be ordered separately if not available.

M12 dowel pin tightening torque = 20 Nm

M12 hex (9) nut tightening torque = 46 Nm.

CAUTION

Check the oil level in the transmission. If required, add more oil and tighten oil plug to specified torque.

ASSEMBLY N 71 / 4 - N 353 / 4

Tightening torques

Tightening torques for nuts and bolts

Tightening torques for nuts and bolts (see **ZFN 148**), bolt class 5, tightening torque tolerance $\pm 15\%$.

This standard applies to bolts as per DIN 912, DIN 931, DIN 933, DIN 939, DIN 960, DIN 961, and to nuts as per DIN 934.

Always use calibrated torque wrenches and torque indicator wrenches when tightening bolts.

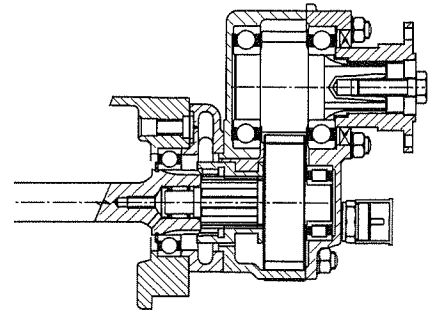
N 71/4 and N 353/4 PTO		Dimensions for dowel pins		N 353/4 PTO		Dimensions for dowel pins	
attached to ZF transmission	Version b, c	Versions		attached to PTO	Version	Versions	
		b 2x each	c 2x each			b 2x each	c 2x each
S 6-36 S 6-36/2	N 353/4	M12x80	M12x80	N 36/10	N 353/4	M12x105	M12x105
		M12x105	M12x120			M12x130	M12x140
9 S 75	N 71/4	M12x80	M12x80	N 75/10	N 353/4	M12x105	M12x105
		M12x105	M12x120			M12x130	M12x140
9 S 109 16 S 109 8 S 109	N 71/4	M12x80	M12x80	N 109/10	N 353/4	M12x105	M12x105
		M12x105	M12x120			M12x130	M12x140
16 S 151/221 16 S 181/251 8 S 151	N 71/4	M12x80	M12x80	N 221/10	N 353/4	M12x105	M12x105
		M12x105	M12x120			M12x130	M12x140
16 S 151/221 8 S 151	N 71/4	M12x80	M12x80	N 151/10	N 353/4	M12x105	M12x105
		M12x105	M12x120			M12x130	M12x140

Caution: Only use genuine dowel pins and nuts.

Possible versions

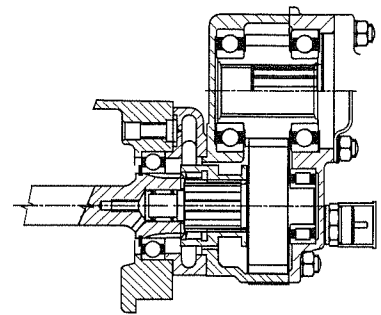
Version "B"

with 90 mm Ø output flange, 4 bores
Ø 8.1 mm (other flange sizes on request).



Version "C"

for direct pump connection as per BNA standard
N.F.R 17-102 and ISO standard 7653.
(Ensure clearance between pump and transmission out-
put flange/propshaft).



006716

NOTE: See page D 1-2 of summary sheet for ZF N 71/4
and N 353/4 PTO installation options.

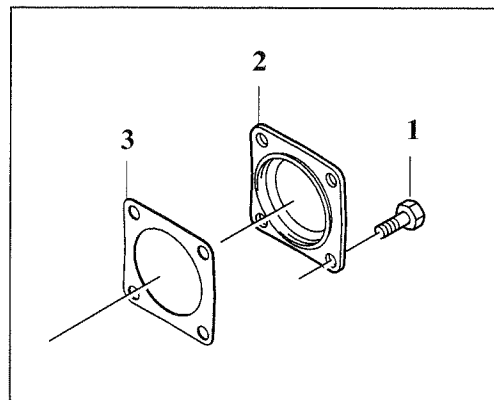
006717

Preparations work

Preparation work on basic transmission

- 1 If necessary, drain transmission oil from transmission and attached N .../10.
- 2 Remove in sequence indicated by numbers on illustration.
- 3 Clean sealing faces.

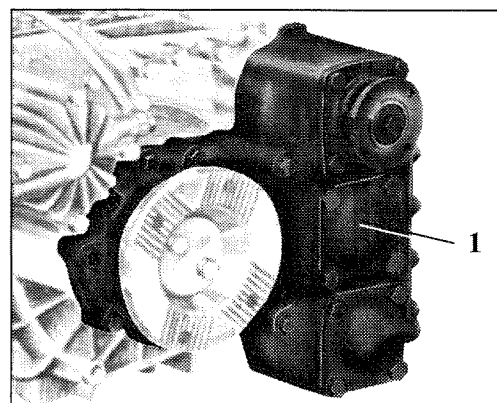
NOTE: Do not re-use old gasket (1mm thick transportation gasket) for pump attachment.



001 296

Preparation work for attachment of N 353 / 4 PTO to ZF N.../ 10 PTO

- 1 Remove cover (1) and spacer ring. Measure the distance between the face end and bearing outer race on the available attachment point.
- 2 Place gasket on intermediate housing and measure distance between centering collar and gasket. The difference between the two measurements must equal between 0 and 0.2 mm (free play).
- 3 If this difference is any greater, shims must be used.
- 4 Attach intermediate housing.



004039

Shims are available in the following thicknesses:

- = 0.4 mm
- = 0.6 mm
- = 0.8 mm
- = 1.0 mm
- = 1.2 mm

Layshaft

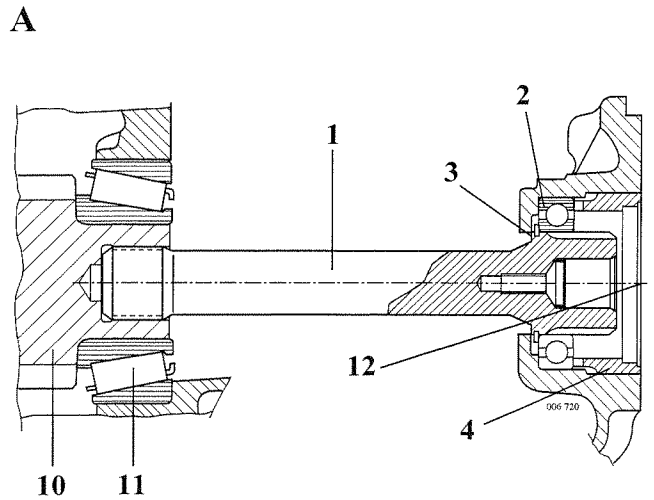
Sélection and installation of correct intermediate shaft → "ECOSPLIT" transmissions

A: Ecosplit transmissions without Intarder

16 S 151/221 length = 213.5 mm
(items 1, 2, 3, 4)

Polygon
Toothed shaft

16 S 251 length = 250 mm



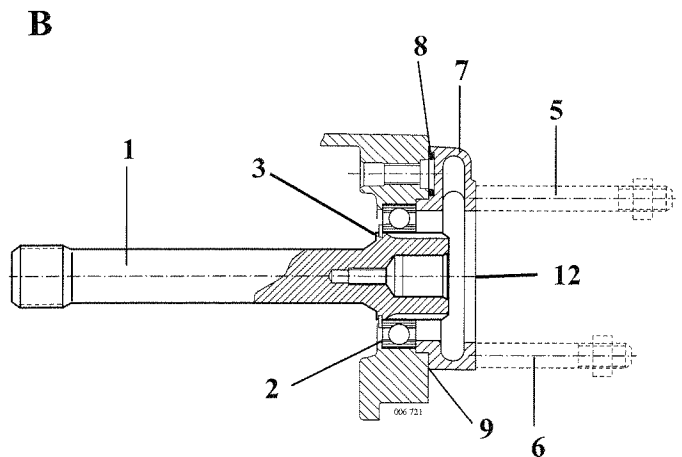
006720

B: Ecosplit III transmission with Intarder

16 S 151/221 length = 250 mm
(items 1-10)

Polygon
Toothed shaft

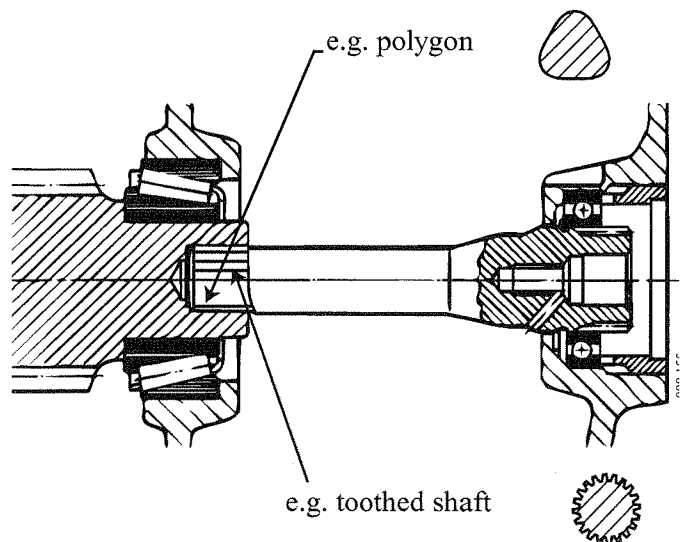
16 S 251 length = 286.5 mm



NOTE: The intermediate shaft can be installed without the need for measurement.

Key

- 1 Intermediate shaft
- 2 Ball bearing
- 3 Circlip
- 4 Bushing
- 5 Dowel pin M12x135
- 6 Dowel pin M12x115
- 7 Adapter
- 8 O-ring
- 9 Gasket
- 10 Layshaft
- 11 Taper roller bearing
- 12 NI connection



008155

Installation of intermediate shaft in "ECOMID" transmissions

Always check the following before installation!

- Read the top gear ratio from the transmission type plate:

e.g. 1.0 = direct drive ratio

e.g. 0.85 = overdrive ratio (less than 1.0)

- The ratio determines the type of intermediate shaft installed:

9/16 S 109 Direct drive = interm. shaft with 14 teeth

slow RG = interm. shaft with 14 teeth

Overdrive = interm. shaft with 17 teeth

Caution:

9 S 75 = interm. shaft with 16 teeth

NOTE: The bearing outer race (2) is already pre-installed in the transmission and securely fixed thanks to multiple peening.

Measurement and adjustment of taper roller bearing

Ensure that both taper roller bearings are free of play but without axial preload when measuring and adjusting. Play-free condition can be assured by pushing on the output end bearing outer race while continually turning the intermediate shaft. Select shim thickness "S" so that the bushing is a maximum of 0.05 mm inset or a max. of 0.15 mm protruding, relative to the housing face.

NOTE: Shims are available in the following thicknesses ("S"):

Part number

= 0.80 mm

= 0.95 mm

= 1.10 mm

= 1.25 mm

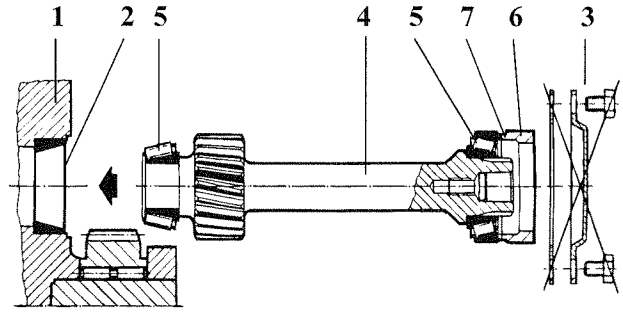
= 1.40 mm

= 1.50 mm

= 1.60 mm

CAUTION

The adapter kit must be installed at the same time as the PTO.



Key

Transmission

1 Housing

2 Bearing outer race

3 Cover omitted

Adapter kit

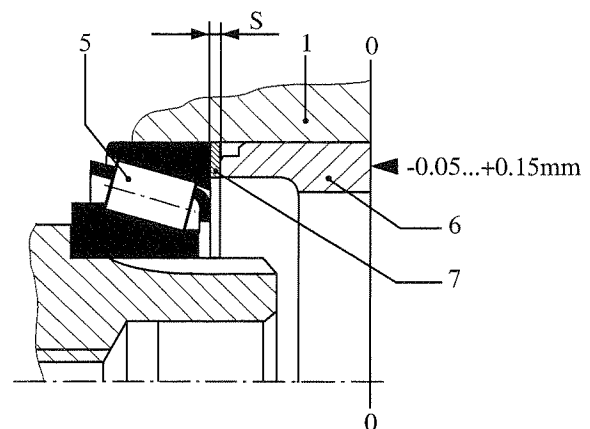
4 Intermediate shaft

5 Taper roller bearing

6 Bushing

7 Shim

005 864



056 930

PTO installation

Version "B"

NOTE: Always note the following before installing the N 71/4 PTO.

Dowel pins for securely fixing the PTO are included with the loose PTO.

CAUTION

Insert dowel pins into transmission housing short-thread first as per DIN (see illustration).

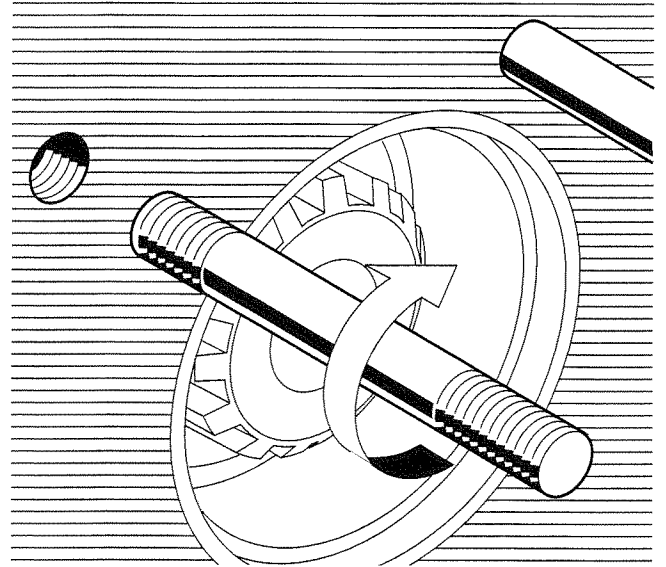
If an Intarder is included, only use DIN 939.

- 1 In the case of transmission housings with non-blind threads, apply sealing compound or sealing tape on screw-in thread of dowel pin.
- 2 Insert 4 dowel pins (1) M12 into attachment threads. Tightening torque = 20 Nm
- 3 Insert needle bearing (2) into layshaft/output shaft bearing bore. Needle bearing with:
N 71/4 approx. 16 mm
N 353/4 approx. 12 mm
- 4 Place PTO (3) with **new** gasket (4) onto attachment point.

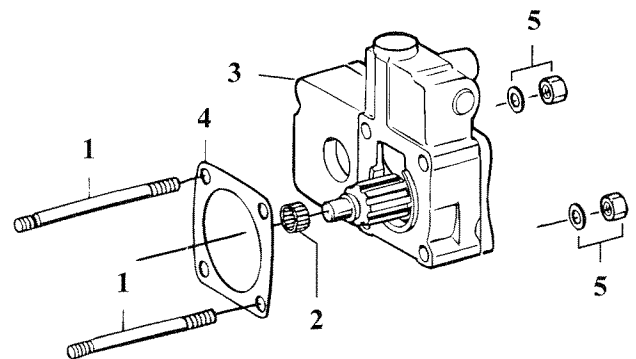
Secure PTO using 4 hex nuts with washers (5).
Tightening torque = 79 Nm

CAUTION

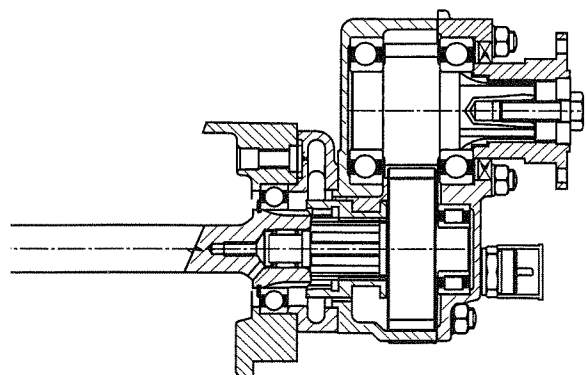
Check oil level in transmission. If required, add more oil and tighten oil plug to specified torque.



005596



007932



006716

Version "C"

without output shaft for direct pump connection.

1 Preparations

Remove dowel pins and transportation brackets from PTO.

2 In the case of non-blind threads, coat screw-in thread with sealing compound or sealing tape.

3 Insert four M12 dowel pins (1) into the attachment threads.

Tightening torque = 20 Nm

4 Insert needle bearing (2) into layshaft/output shaft bore.

Needle bearing width:

N 71/4 approx. 16 mm

N 353/4 approx. 12 mm

5 Place PTO (3) with new gasket (4) onto attachment point.

6 Insert four M12 hex nuts and washers (6).

Tightening torque = 79 Nm

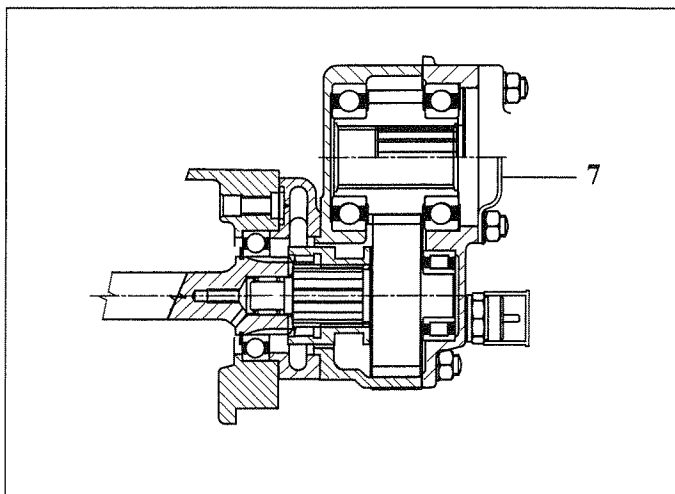
7 Place pump with gasket (5) onto PTO.

NOTE: if the pump is to be attached at a later date, insert the dowel pins at the attachment point and attach the PTO (3) with gasket (5). Finally, attach the transportation cover (7) and gasket to close off the unit.

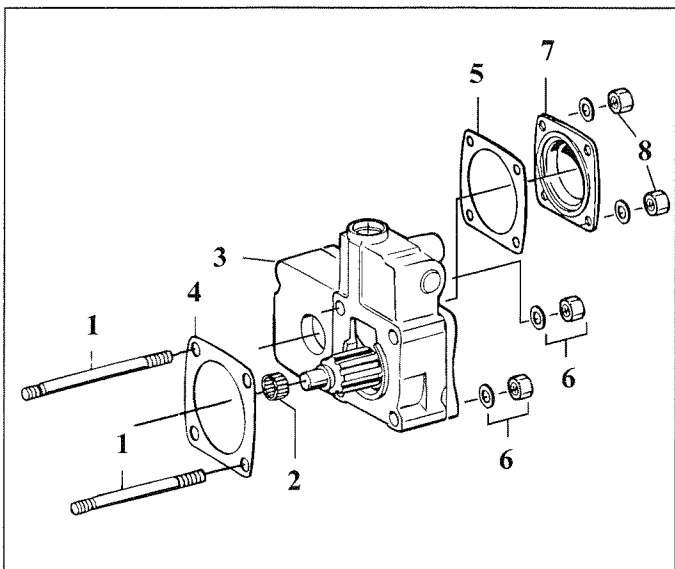
The transportation cover and gasket can be ordered separately if not available.

M12 dowel pin tightening torque = 20 Nm

M12 hex nut (8) tightening torque = 46 Nm.



006717



00837 9

CAUTION

Check the oil level in the transmission. If required, add more oil and tighten oil plug to specified torque.

ASSEMBLY NH / 1 - NL / 1

Tightening torques

Tightening torques for nuts and bolts

Tightening torques for nuts and bolts (see **ZFN 148**), bolt class 4, tightening torque tolerance $\pm 10\%$.

This standard applies to bolts as per DIN 835 and DIN 939.

Always use calibrated torque wrenches and torque indicator wrenches when tightening bolts.

Tightening torques are in the following instructions.

Dowel pins

NH/1 and NL/1 PTO		Dimensions for dowel pins	NL/1 PTO		Dimensions for dowel pins
attached to ZF transmission	Version b, c	Versions b and c 4x each	attached to PTO	Version b and c	Version b and c 4x each
S 6-36 S 6-36/2 6 S 850	NL/1	M12 x 80 DIN 835	N 36/10	NL/1	M12 x 105 DIN 939
9 S 75	NH/1	M12 x 80 DIN 835	N 75/10	NL/1	M12 x 105 DIN 939
9/16 S 109	NH/1	M12 x 80 DIN 835	N 109/10	NL/1	M12 x 105 DIN 939
16 S 151/221 16 S 181/251 8 S 151 without Intarder	NH/1	M12 x 80 DIN 835	N 221/10	NL/1	M12 x 105 DIN 835
16 S 151/221 16 S 181/251 8 S 151/181 with Intarder	NH/1	M12 x 120 DIN 939	N 221/10 IT	NL/1	M12 x 105 DIN 835

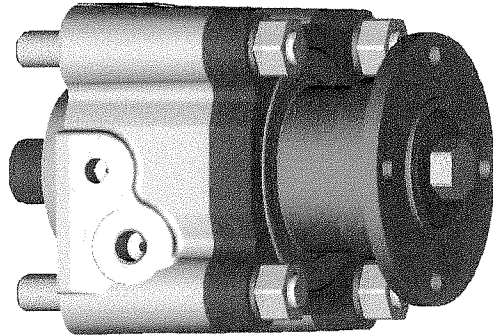
CAUTION

Only use genuine dowel pins and nuts.

Possible versions

Version "B"

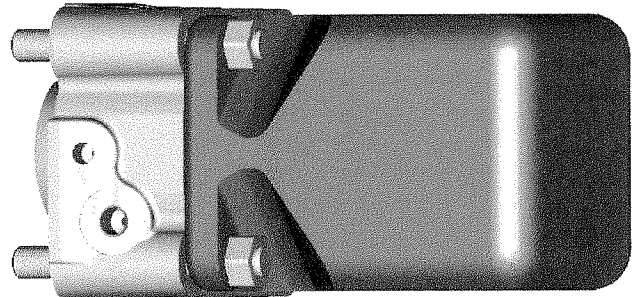
with 90 mm Ø output flange, 4 bores
Ø 8.1 mm (other flange sizes on request).



013006

Version "C"

for direct pump connection as per ISO standard 7653.
(Ensure clearance between the pump and transmission
output flange/propshaft).



013007

NOTE

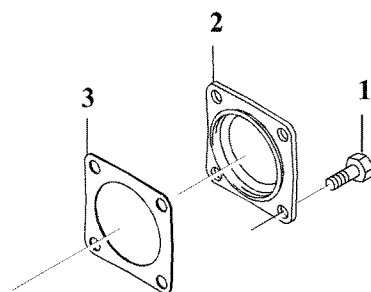
See page E 1-2 of summary sheet for ZF NH/1 and NL/1
PTO installation options.

Preparation work on basic transmission

- 1 If necessary, drain transmission oil from transmission and attached N.../10.
- 2 Remove in sequence indicated by numbers on illustration
- 3 Clean sealing faces.

NOTE

Do not re-use old gasket (1mm thick transportation
gasket) for pump attachment.



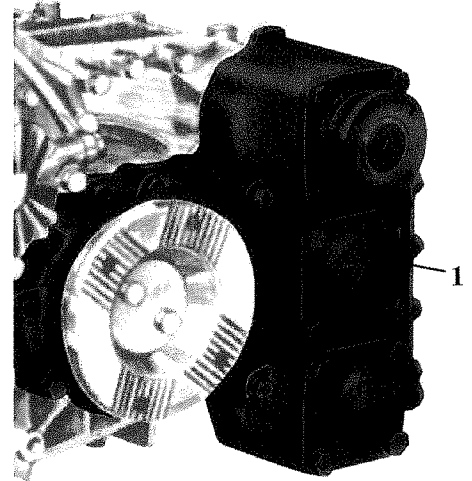
001296

Preparations work

Preparation work for attachment of:

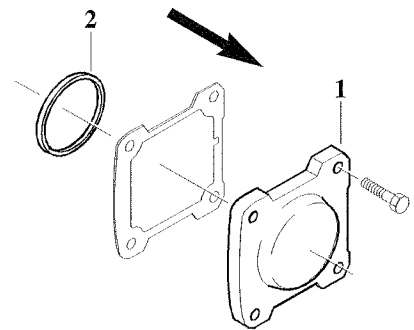
NL / 1 PTO to ZF N 36 / 10, N 221 / 10, N 221 / 10 IT and N 251 / 10 IT PTO

- 1 Remove cover (1) and spacer ring (2). Measure the distance between the face end and bearing outer race on the available attachment point.
- 2 Place gasket (4) on intermediate housing (3) and measure distance between centering collar and gasket. The difference between the two measurements must equal between 0 and 0.2 mm (free play).
- 3 If this difference is any greater, shims (5) must be used (see Table).
- 4 Attach intermediate housing (3) with gasket (4).

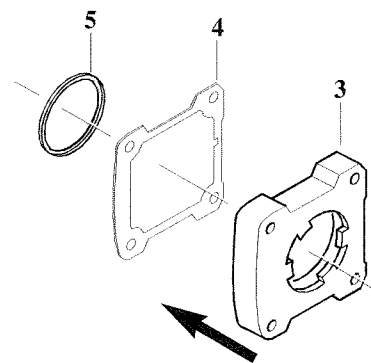


004039

Pos.	Description	Order-No / dimension
3	<i>intermediate housing</i>	
4	<i>gasket</i>	
5	<i>shim</i>	= 1.2 mm = 1.1 mm = 1.0 mm = 0.8 mm = 0.6 mm = 0.4mm



015287

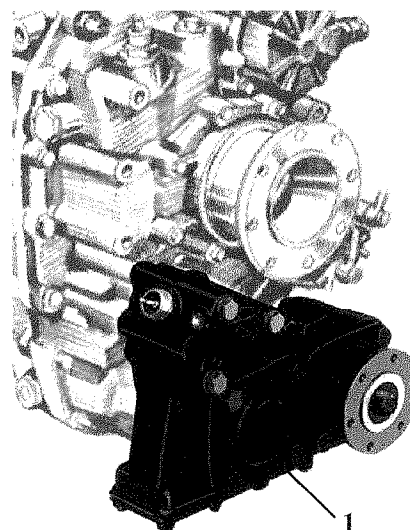


015622

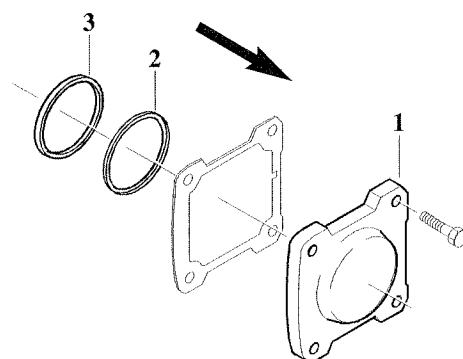
Preparation work for attachment of NL / 1 PTO to ZF N 75 / 10 and N 109 / 10 PTO

- 1 Remove cover (1) and remove disc, 3 mm thick (3), together with shim (2). Measure the distance between the face end and bearing outer race on the available attachment point.
- 2 Place gasket (5) on intermediate housing (4) and measure distance between centering collar and gasket. The difference between the two measurements must equal between 0.05 and 0.15 mm (free play).
- 3 If this difference is any greater, shims (6) must be used (see Table).
- 4 Attach intermediate housing (4) with gasket (5).

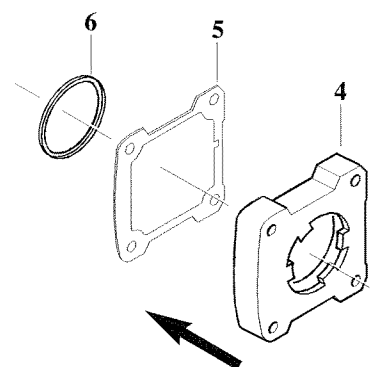
Pos.	Description	Order-No / dimension
4	<i>intermediate housing</i>	
5	<i>gasket</i>	
6	<i>shim</i>	= 2.95 mm = 3.10 mm = 3.25 mm = 3.40 mm = 3.55 mm = 3.70 mm = 3.85 mm = 4.00 mm = 4.10 mm



003255



015803



015804

Layshaft

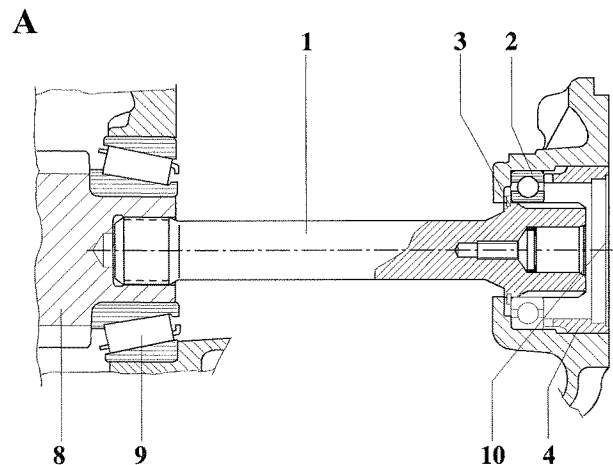
Sélection and installation of correct intermediate shaft → "ECOSPLIT" transmissions

A: Ecosplit transmissions without Intarder 16 S 151/221, 8 S 151, 16 S 181, 16 S 251

16 S 151/221 length = 213.5 mm
(items 1, 2, 3, 4)

Toothed shaft

16 S 251 length = 250 mm
Toothed shaft



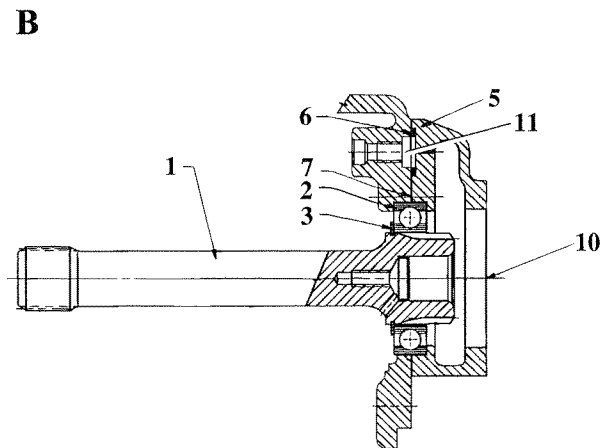
015796

B: Ecosplit transmission with Intarder 16 S 151/221, 8 S 151, 16 S 181, 16 S 251

16 S 151/221 length = 250 mm
(items 1-10)

Toothed shaft

16 S 251 length = 286.5 mm
Toothed shaft



016392

NOTE

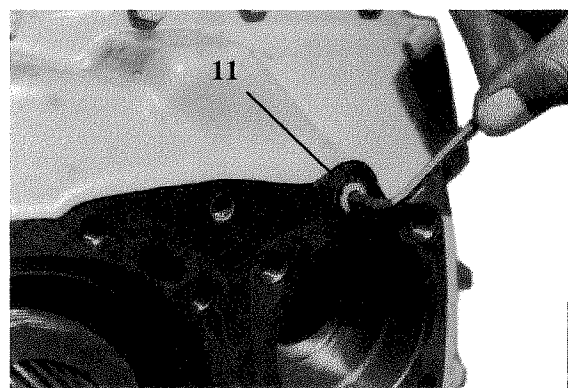
The intermediate shaft can be installed without the need for measurement.

NOTE

Screw out screw plug M10x1 (11) from lube oil duct.

Key

- 1 Intermediate shaft
- 2 Ball bearing
- 3 Circlip
- 4 Bushing
- 5 Adapter
- 6 O-ring
- 7 Gasket
- 8 Layshaft
- 9 Taper roller bearing
- 10 NI connection
- 11 screw plug



008032

Installation of intermediate shaft in "ECOMID" transmissions

Always check the following before installation!

- Read the top gear ratio from the transmission type plate:

e.g. 1.0 = direct drive ratio

e.g. 0.85 = overdrive ratio (less than 1.0)

- The ratio determines the type of intermediate shaft installed:

9/16 S 109

Direct drive (slow RG) = interm. shaft with 14 teeth

Overdrive = interm. shaft with 17 teeth

Direct drive (old version) = interm. shaft with 14 teeth

CAUTION: contact After-Sales Service re 8 S 109

9 S 75 = interm. shaft with 16 teeth

NOTE

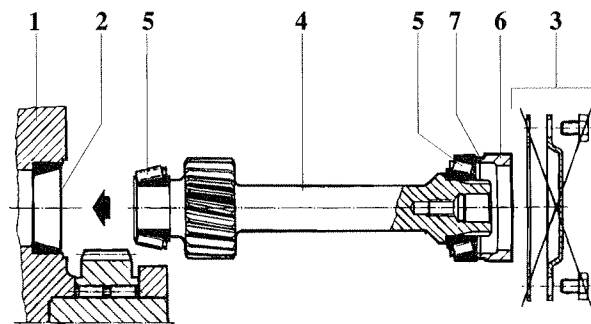
The bearing outer race (2) is already pre-installed in the transmission (1) and securely fixed thanks to multiple peening.

Measurement and adjustment of taper roller bearing

Ensure that both taper roller bearings are free of play but without axial preload when measuring and adjusting. Play-free condition can be assured by pushing on the output end bearing outer race while continually turning the intermediate shaft. Select shim thickness "S" so that the bushing is a maximum of 0.05 mm inset or a max. of 0.15 mm protruding, relative to the housing face.

CAUTION

The adapter kit must be installed at the same time as the PTO.



015798

Key

Transmission

1 Housing

2 Bearing outer race

3 Cover omitted

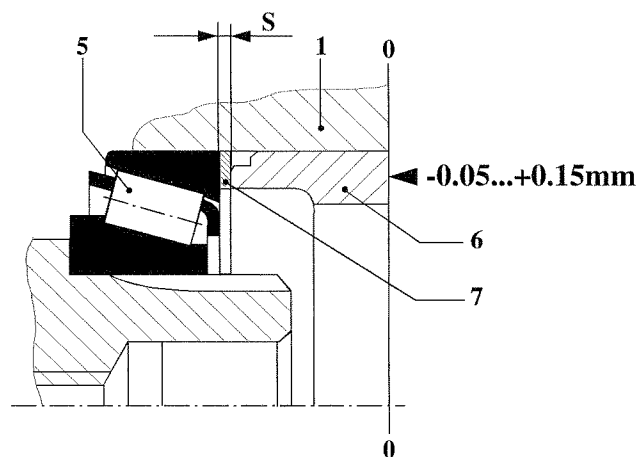
Adapter kit

4 Intermediate shaft

5 Taper roller bearing

6 Bushing

7 Shim



015799

NOTE

Shims are available in the following thicknesses ("S"):

= 0.80 mm	= 1.40 mm
= 0.95 mm	= 1.50 mm
= 1.10 mm	= 1.60 mm
= 1.25 mm	

Possible versions

Version "B"

NOTE

Always note the following before installing the NH/1 PTO: Dowel pins for securely fixing the PTO are included with the loose PTO.

CAUTION

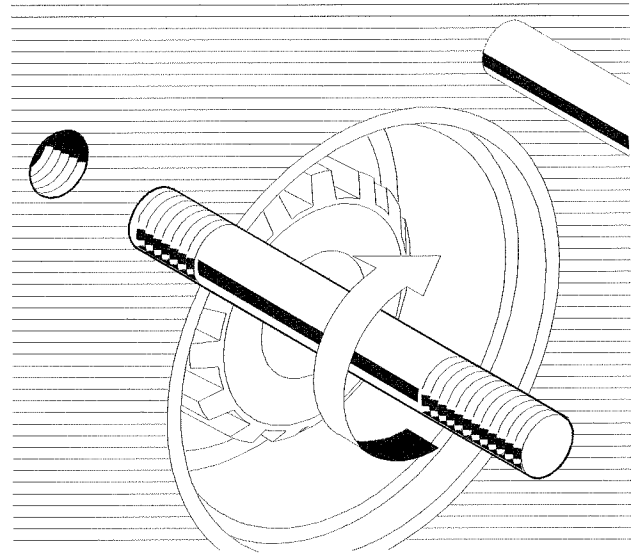
Insert dowel pins into transmission housing short-thread first as per DIN (see illustration).

If an Intarder is included, only use DIN 939 (10.9).

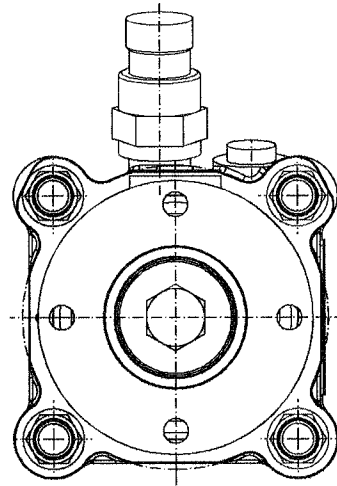
- 1 In the case of transmission housings with non-blind threads, apply Loctite Nr. 241 on screw-in thread of dowel pin.
- 2 Insert 4 dowel pins (1) M 12 into attachment threads.
Tightening torque = 18 Nm
- 3 Insert needle bearing (3) into layshaft/output shaft bearing bore. Needle bearing width:
NH/1 + NL/1 approx. 16 mm
NL/1 installed on N.../10 approx. 12 mm
- 4 Place PTO (4) together with **new** gasket (2) onto attachment point.
- 5 Secure PTO using 4 hex nuts with washers (5).
Tightening torque = 65 Nm

CAUTION

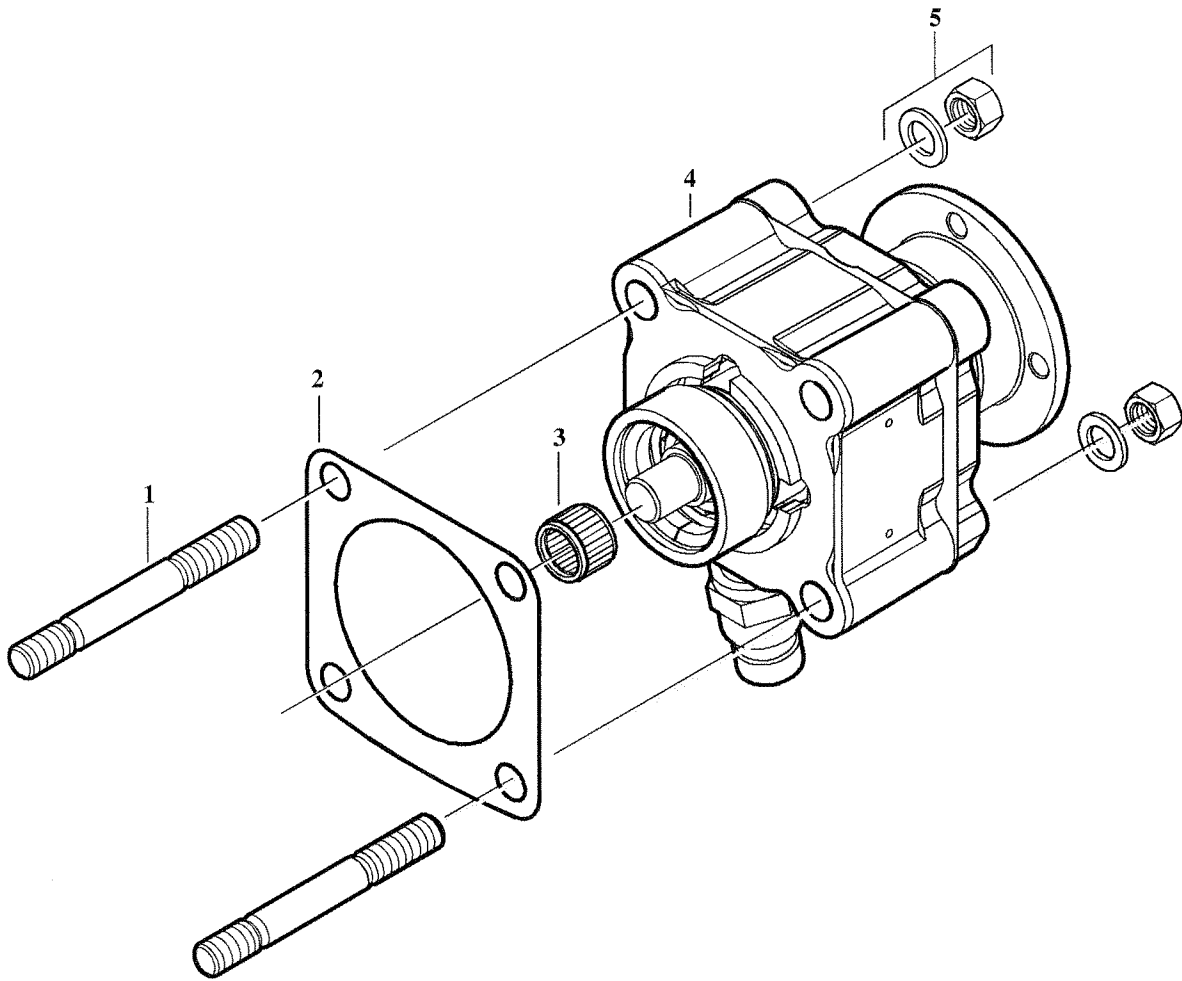
Check oil level in transmission. If required, add more oil and tighten oil plug to specified torque.



001294



015806



015801

Pos.	Description	Order-No.
1	<i>dowel pin</i>	<i>see table page E1-2</i>
2	<i>gasket</i>	
3	<i>needle bearing</i>	
5	<i>hex nut shim</i>	

Version "C"

without output shaft for direct pump connection

- 1 Preparations:
Remove transportation brackets from PTO.
- 2 Place PTO (3) with **new** gasket (4) onto pump.
- 3 Insert dowel pins (1) at attachment point.
Tightening torque = 18 Nm
- 4 Place pump and PTO onto **new** gasket (2) and insert 4 hex nuts (5) with washers.
Tightening torque = 65 Nm

NOTE

Version "c" has no needle bearing.

NOTE

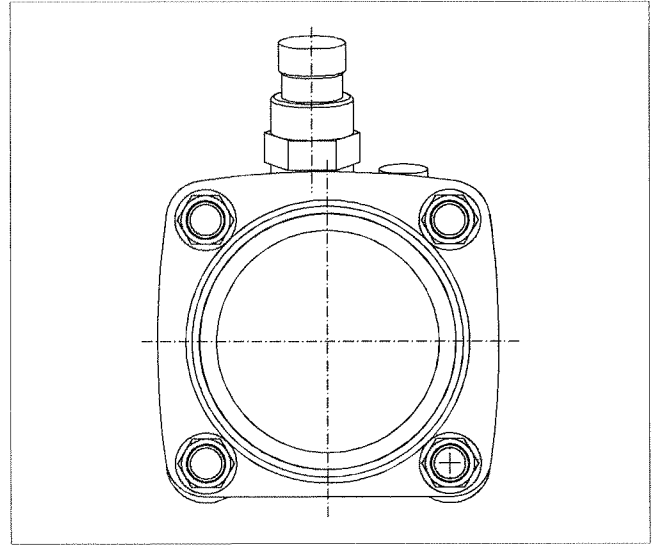
If the pump is to be attached at a later date, insert the dowel pins (1) at the attachment point and attach the PTO (3) with gasket (2). Finally, attach the transportation cover (6) and gasket to close off the unit. The transportation cover and gasket can be ordered separately if not available.

M12 dowel pin tightening torque = 18 Nm

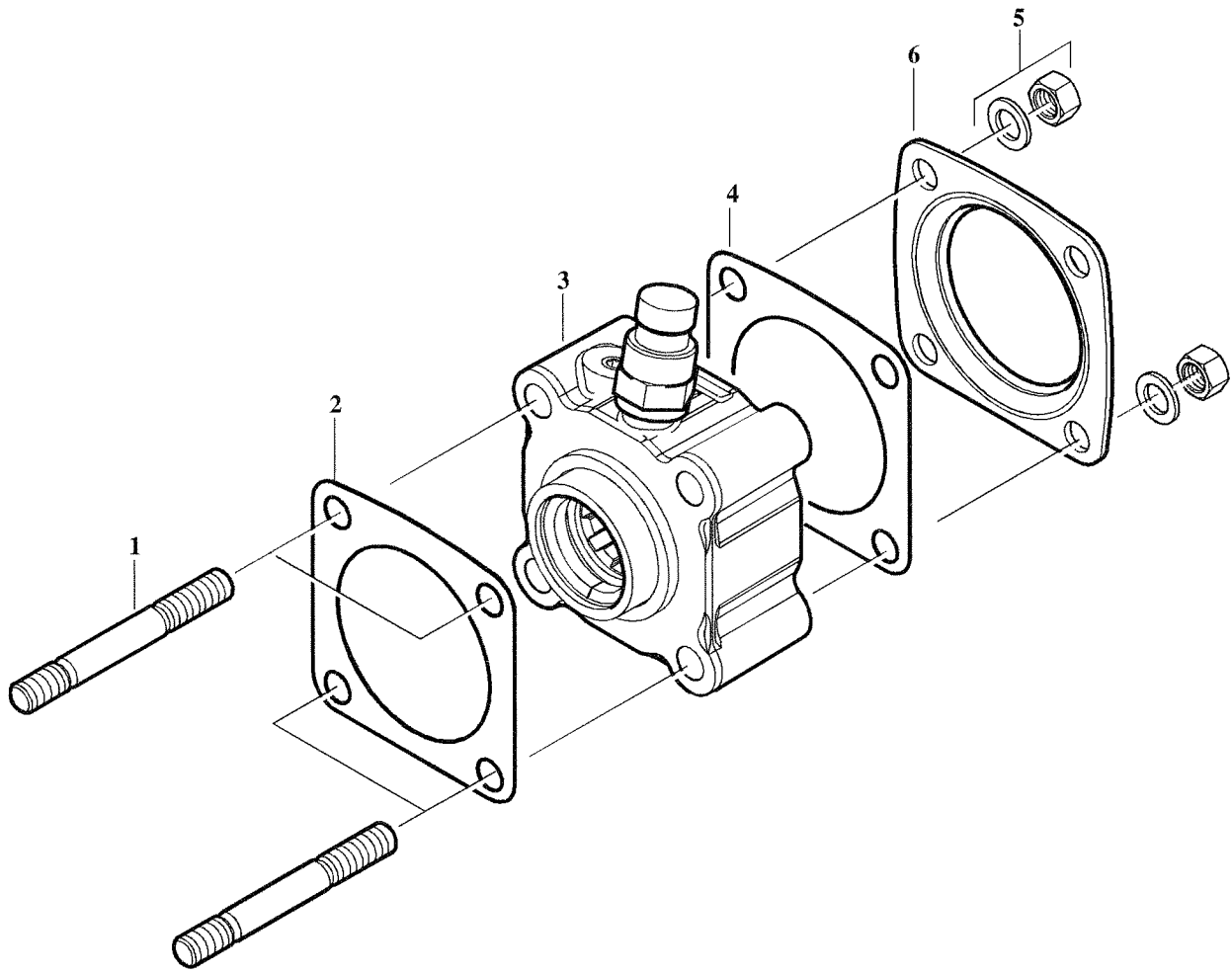
M12 hex nut tightening torque = 65 Nm

CAUTION

Check the oil level in transmission. If required, add more oil and tighten oil plug to specified torque.



015805



Pos.	Description	Order-No.
1	<i>dowel pin</i>	<i>see table page E 1-2</i>
2	<i>gasket</i>	
4	<i>gasket</i>	
5	<i>hex nut shim</i>	

ASSEMBLY NH / 4 - NL / 4

Tightening torques

Tightening torques for nuts and bolts

Tightening torques for nuts and bolts (see **ZFN 148**), bolt class 4, tightening torque tolerance $\pm 10\%$.

This standard applies to bolts as per DIN 835 and DIN 939.

Always use calibrated torque wrenches and torque indicator wrenches when tightening bolts.

Tightening torques are in the following instructions.

Dowel pins

NH/4 and NL/4 PTO		Dimensions for dowel pins		NL/4 PTO		Dimensions for dowel pins	
attached to ZF transmission	Version b, c	Versions		attached to PTO	Version	Versions	
		b 2x each	c 2x each			b 2x each	c 2x each
S 6-36 S 6-36/2 6 S 850	NL/4	M12 x 90 M12 x 120 DIN 835	M12 x 90 M12 x 130 DIN 835	N 36/10	NL/4	M12 x 115 M12 x 135 DIN 939	M12 x 115 M12 x 150 DIN 939
9 S 75	NH/4	M12 x 90 M12 x 120 DIN 835	M12 x 90 M12 x 130 DIN 835	N 75/10	NL/4	M12 x 115 M12 x 135 DIN 939	M12 x 115 M12 x 150 DIN 939
9 S 109 16 S 109 8 S 109	NH/4	M12 x 90 M12 x 120 DIN 835	M12 x 90 M12 x 130 DIN 835	N 109/10	NL/4	M12 x 115 M12 x 135 DIN 939	M12 x 115 M12 x 150 DIN 939
16 S 151/221 16 S 181/251 8 S 151 without Intarder	NH/4	M12 x 90 M12 x 120 DIN 835	M12 x 90 M12 x 130 DIN 835	N 221/10	NL/4	M12 x 115 M12 x 135 DIN 835	M12 x 115 M12 x 150 DIN 835
16 S 151/221 16 S 181/251 8 S 151/181 with Intarder	NH/4	M12 x 125 M12 x 150 DIN 939	M12 x 125 M12 x 165 DIN 939	N 221/10 IT	NL/4	M12 x 115 M12 x 135 DIN 835	M12 x 115 M12 x 150 DIN 835

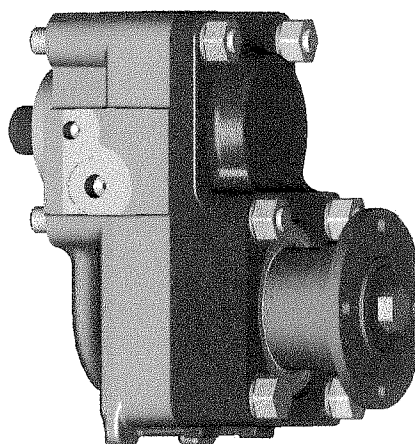
CAUTION

Only use genuine dowel pins and nuts.

Possible versions

Version "B"

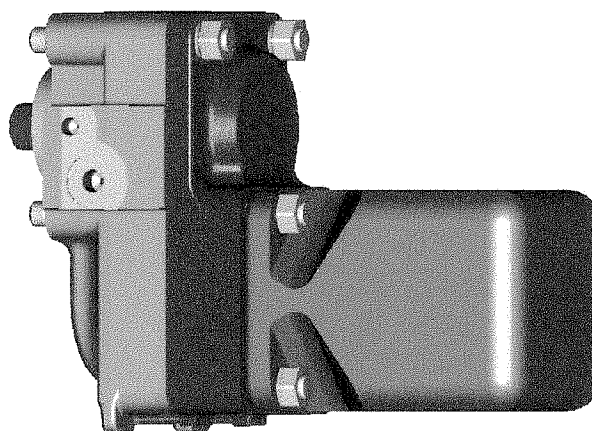
with 90 mm Ø output flange, 4 bores
Ø 8.1 mm (other flange sizes on request).



Version "C"

for direct pump connection as per ISO standard 7653.
Ensure clearance between pump and transmission output flange/propshaft.

013010



NOTE

See page F 1-2 of summary sheet for ZF NH/4 and NL/4
PTO installation options.

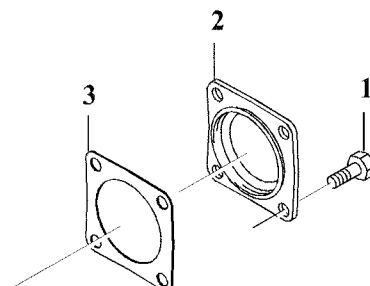
013011

Preparation work on basic transmission

- 1 If necessary, drain transmission oil from transmission and attached N.../10.
- 2 Remove in sequence indicated by numbers on illustration
- 3 Clean sealing faces.

NOTE

Do not re-use old gasket (1mm thick transportation gasket) for pump attachment.



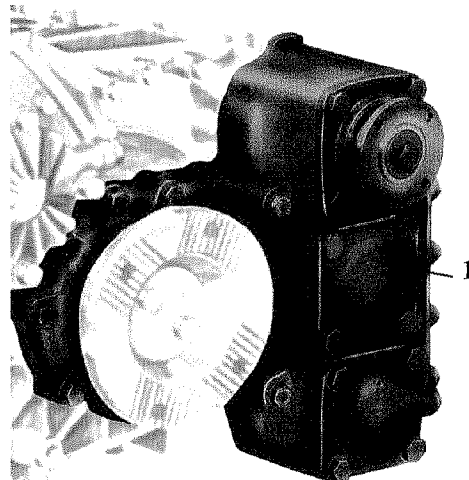
001296

Preparations work

Preparation work for attachment of:

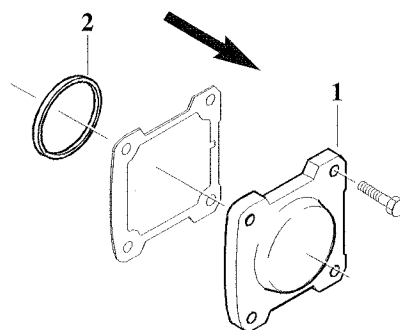
NL / 1 PTO to ZF N 36 / 10, N 221 / 10, N 221 / 10 IT and N 251 / 10 IT PTO

- 1 Remove cover (1) and spacer ring (2). Measure the distance between the face end and bearing outer race on the available attachment point.
- 2 Place gasket (4) on intermediate housing (3) and measure distance between centering collar and gasket. The difference between the two measurements must equal between 0 and 0.2 mm (free play).
- 3 If this difference is any greater, shims (5) must be used (see Table).
- 4 Attach intermediate housing (3) with gasket (4).

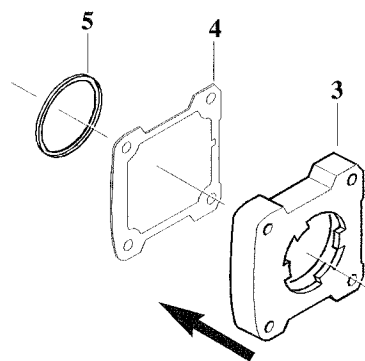


004039

Pos.	Description	Order-No / dimension
3	<i>intermediate housing</i>	
4	<i>gasket</i>	
5	<i>shim</i>	= 1.2 mm = 1.1 mm = 1.0 mm = 0.8 mm = 0.6 mm = 0.4 mm



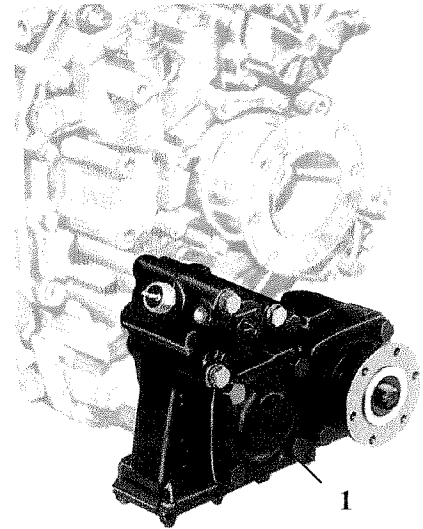
015287



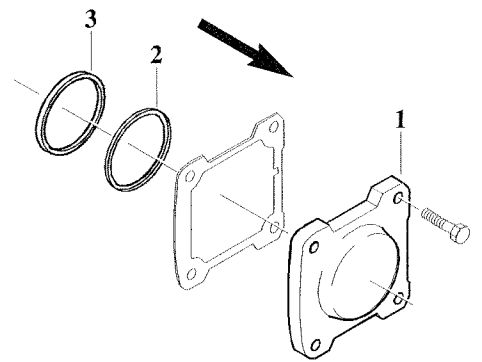
015622

Preparation work for attachment of NL / 1 PTO to ZF N 75 / 10 and N 109 / 10 PTO

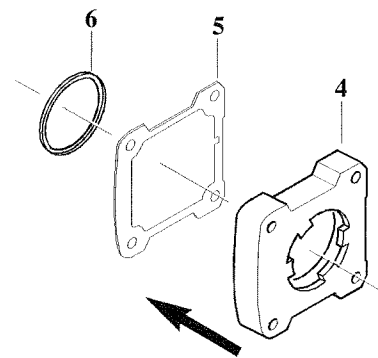
- 1 Remove cover (1) and remove disc, 3 mm thick (3), together with shim (2). Measure the distance between the face end and bearing outer race on the available attachment point.
- 2 Place gasket (5) on intermediate housing (4) and measure distance between centering collar and gasket. The difference between the two measurements must equal between 0.05 and 0.15 mm (free play).
- 3 If this difference is any greater, shims (6) must be used (see Table).
- 4 Attach intermediate housing (4) with gasket (5).



Pos.	Description	Order-No / dimension
4	<i>intermediate housing</i>	
5	<i>gasket</i>	
6	<i>shim</i>	= 2.95 mm = 3.10 mm = 3.25 mm = 3.40 mm = 3.55 mm = 3.70 mm = 3.85 mm = 4.00 mm = 4.10 mm



003255



015803

015804

Layshaft

Sélection and installation of correct intermediate shaft → "ECOSPLIT" transmissions

A: Ecosplit transmissions without Intarder

16 S 151/221, 8 S 151, 16 S 181, 16 S 251

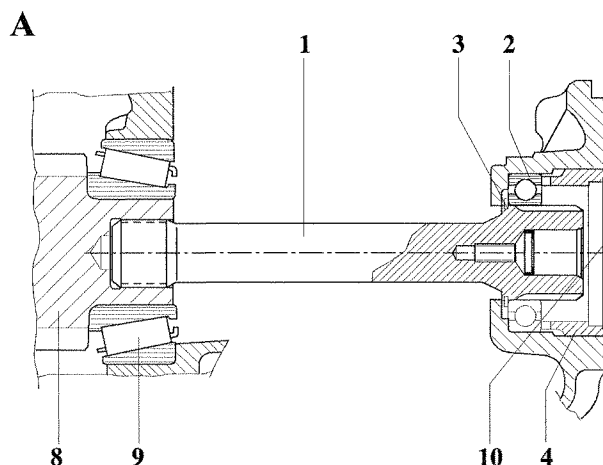
16 S 151/221 length = 213.5 mm

(items 1, 2, 3, 4)

Toothed shaft

16 S 251 length = 250 mm

Toothed shaft



015796

B: Ecosplit transmission with Intarder

16 S 151/221, 8 S 151, 16 S 181, 16 S 251

16 S 151/221 length = 250 mm

(items 1-10)

Toothed shaft

16 S 251 length = 286.5 mm

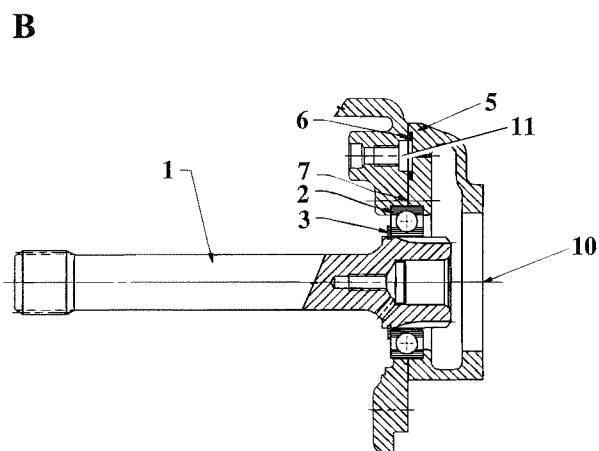
Toothed shaft

NOTE

The intermediate shaft can be installed without the need for measurement.

NOTE

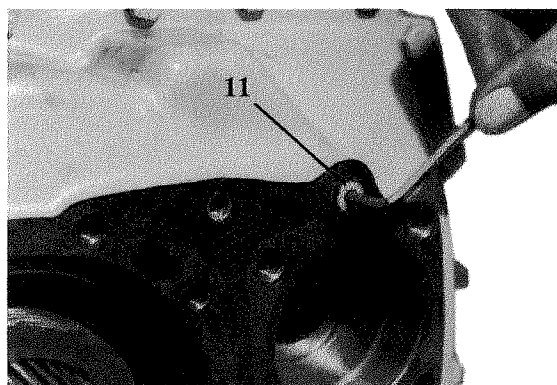
Screw out screw plug M10x1 (11) from lube oil duct.



016392

Key

- 1 Intermediate shaft
- 2 Ball bearing
- 3 Circlip
- 4 Bushing
- 5 Adapter
- 6 O-ring
- 7 Gasket
- 8 Layshaft
- 9 Taper roller bearing
- 10 N4 connection
- 11 screw plug



008032

Installation of intermediate shaft in "ECOMID" transmissions

Always check the following before installation!

- Read the top gear ratio from the transmission type plate:

e.g. 1.0 = direct drive ratio

e.g. 0.85 = overdrive ratio (less than 1.0)

- The ratio determines the type of intermediate shaft installed:

9/16 S 109

Direct drive (slow RG) = interm. shaft with 14 teeth

Overdrive = interm. shaft with 17 teeth

Direct drive (old version) = interm. shaft with 14 teeth

CAUTION: contact After-Sales Service re 8 S 109

9 S 75 = interm. shaft with 16 teeth

NOTE

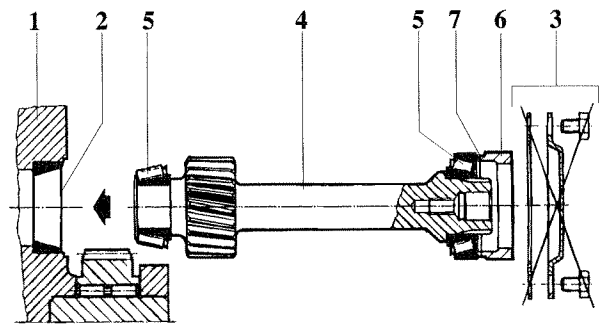
The bearing outer race (2) is already pre-installed in the transmission (1) and securely fixed thanks to multiple peening.

Measurement and adjustment of taper roller bearing

Ensure that both taper roller bearings are free of play but without axial preload when measuring and adjusting. Play-free condition can be assured by pushing on the output end bearing outer race while continually turning the intermediate shaft. Select shim thickness "S" so that the bushing is a maximum of 0.05 mm inset or a max. of 0.15 mm protruding, relative to the housing face.

CAUTION

The adapter kit must be installed at the same time as the PTO.



015798

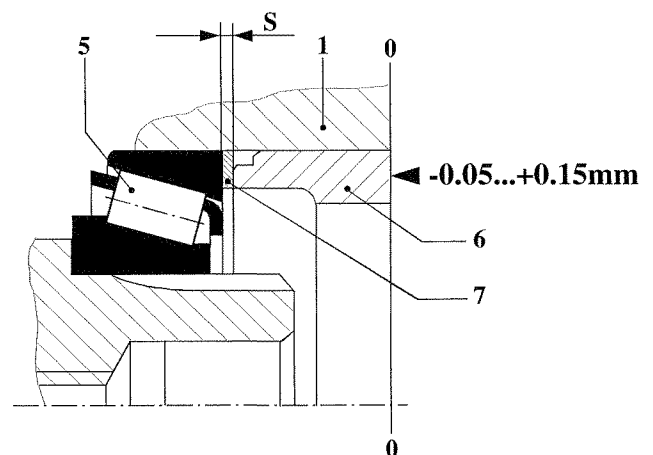
Key

Transmission

- 1 Housing
- 2 Bearing outer race
- 3 Cover omitted

Adapter kit

- 4 Intermediate shaft
- 5 Taper roller bearing
- 6 Bushing
- 7 Shim



015799

NOTE

Shims are available in the following thicknesses ("S"):

- = 0.80 mm
- = 0.95 mm
- = 1.10 mm
- = 1.25 mm
- = 1.40 mm
- = 1.50 mm
- = 1.60 mm

Possible versions

Version "B"

NOTE

Always note the following before installing the NH/4 PTO: Dowel pins for securely fixing the PTO are included with the loose PTO.

CAUTION

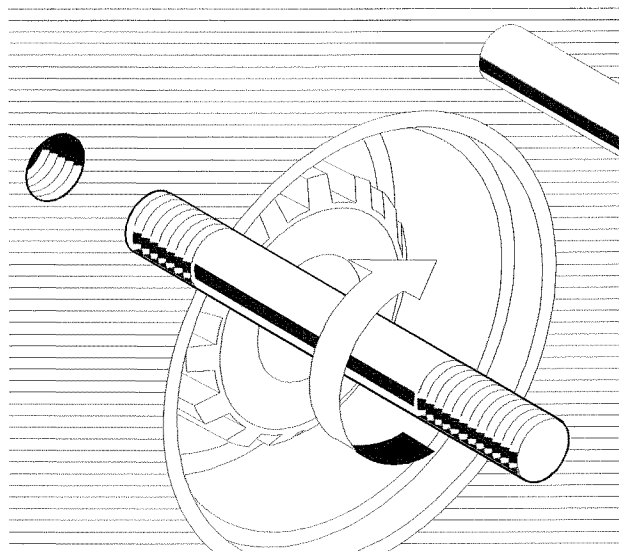
Insert dowel pins into transmission housing short-thread first as per DIN (see illustration).

If an Intarder is included, only use DIN 939 (10.9).

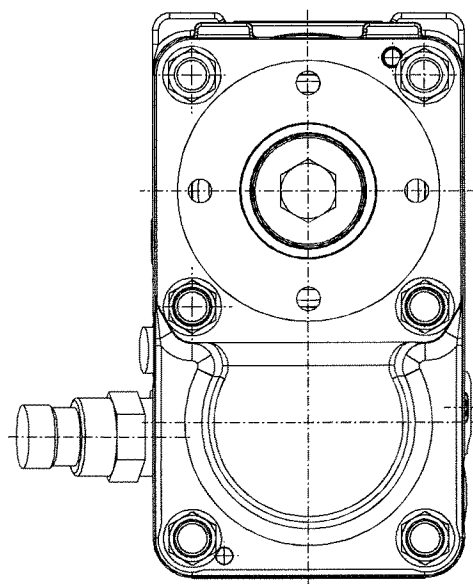
- 1 In the case of transmission housings with non-blind threads, apply Loctite Nr. 241 on screw-in thread of dowel pin.
- 2 Insert 4 dowel pins (1) M 12 into attachment threads.
Tightening torque = 18 Nm
- 3 Insert needle bearing (3) into layshaft/output shaft bearing bore. Needle bearing width:
NH/4 + NL/4 approx. 16 mm
NL/4 installed on N.../10 approx. 12 mm
- 4 Place PTO (4) with **new** gasket (2) onto attachment point.
- 5 Secure PTO using 6 hex nuts with washers (5).
Tightening torque = 65 Nm.

CAUTION

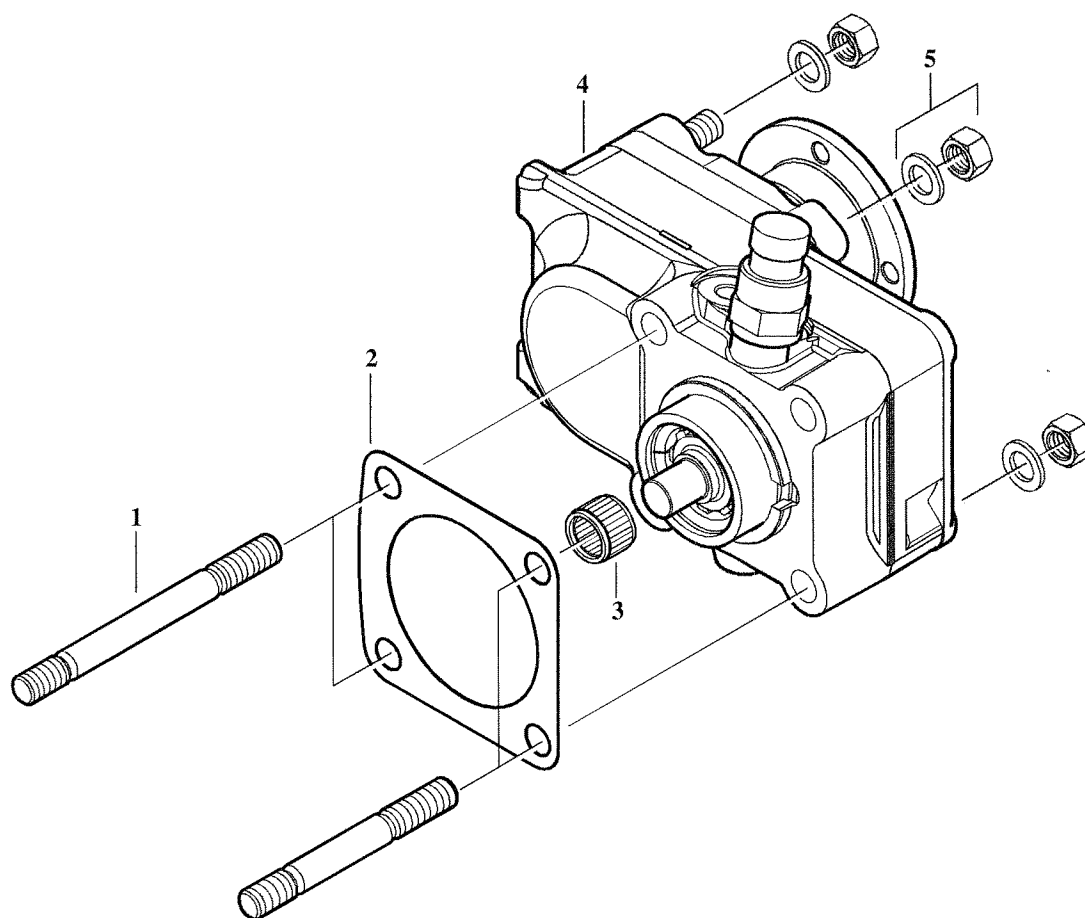
Check oil level in transmission. If required, add more oil and tighten oil plug to specified torque.



005596



015823



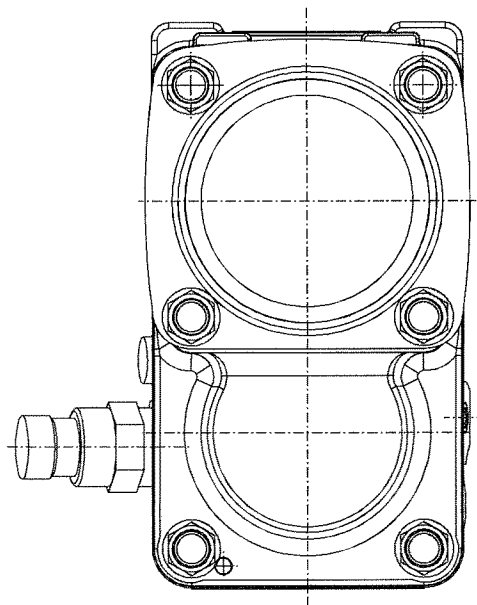
015820

Pos.	Description	Order-No.
1	<i>dowel pin</i>	<i>see table page F 1-2</i>
2	<i>gasket</i>	
3	<i>needle bearing</i>	
5	<i>hex nut shim</i>	

Version "C"

without output shaft for direct pump connection.

- 1 Preparations
Remove transportation brackets from PTO.
- 2 In the case of transmission housings with non-blind threads, apply Loctite Nr. 241 on screw-in thread of dowel pin.
- 3 Insert four M12 dowel pins (1) into the attachment threads.
Tightening torque = 18 Nm
- 4 Insert needle bearing (3) into layshaft/output shaft bore.
Needle bearing width:
NH/4 + NL/4 approx. 16 mm
NL/4 installed on N.../10 approx. 12 mm
- 5 Place PTO (4) with new gasket (2) onto attachment point.
- 6 Insert six M12 hex nuts (5) and washers.
Tightening torque = 65 Nm
- 7 Place pump with gasket (8) onto PTO.



015822

NOTE

If the pump is to be attached at a later date, insert the dowel pins at the attachment point and attach the PTO (4) with gasket (2). Finally, attach the transportation cover (7) and gasket (6) to close off the unit.

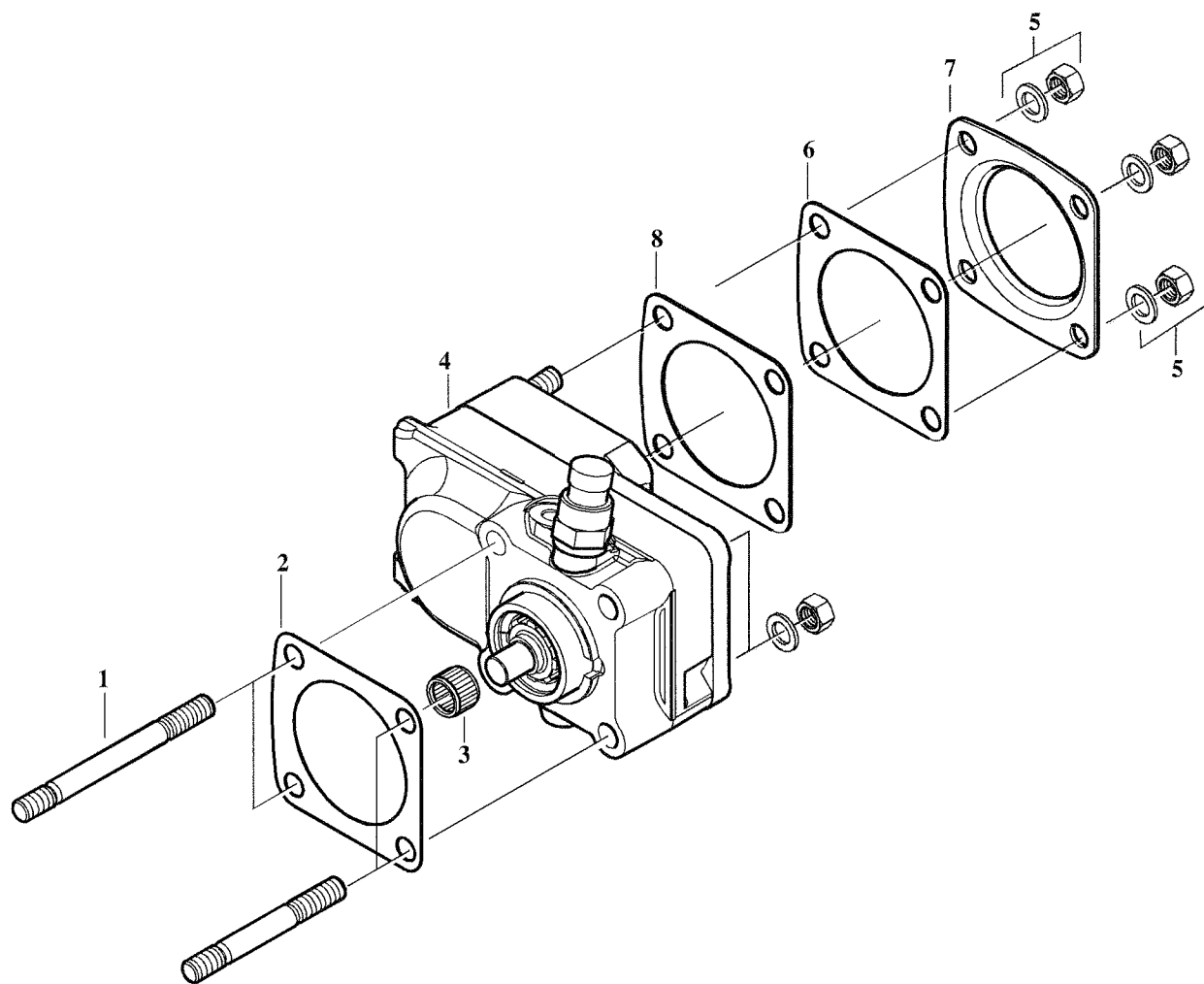
The transportation cover and gasket can be ordered separately if not available.

M12 dowel pin tightening torque = 18 Nm

M12 hex nut tightening torque = 65 Nm.

CAUTION

Check the oil level in the transmission. If required, add more oil and tighten oil plug to specified torque.



015821

Pos.	Description	Order-No.
1	dowel pin	see table page F 1-2
2	gasket	
3	needle bearing	
5	hex nut shim	
8	gasket	