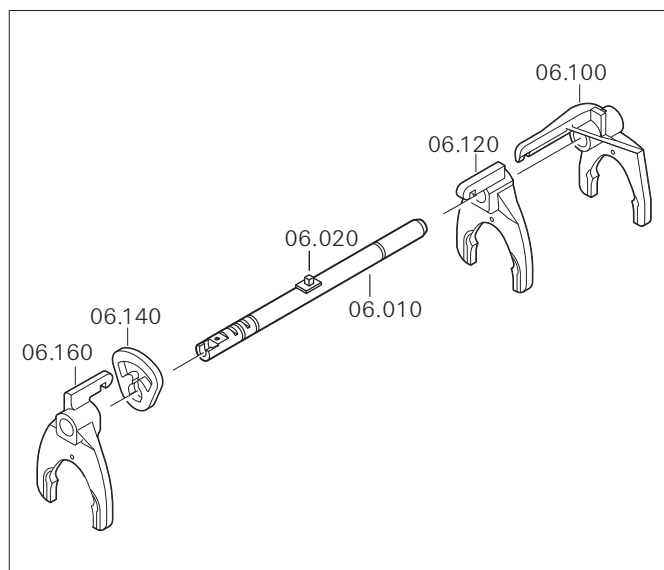


Eixo de mudança

Desmontagem do eixo de mudança

- 1 Destruar e retirar os garfos **06.100***, **06.120** e **06.160**.
- 2 Retirar a trava **06.140** do eixo de mudança **06.010**.



Modelo com 16 marchas

028241

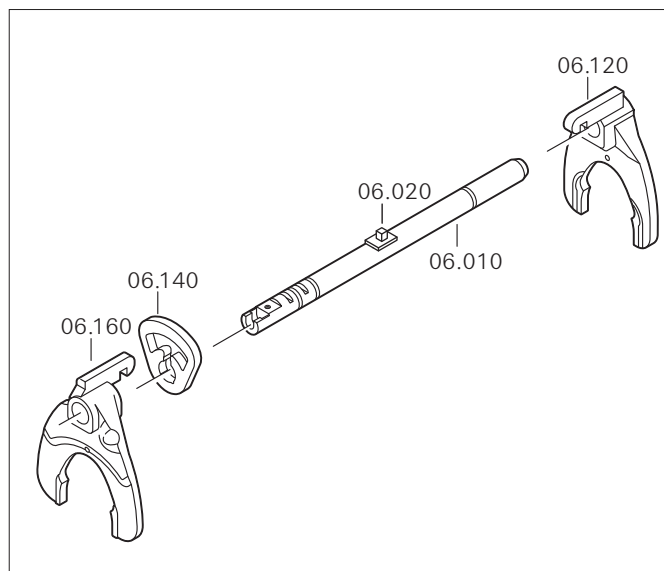
Montagem do eixo de mudança

- 1 Colocar a trava **06.140** do eixo de mudança.
- 2 Observando a posição correta de montagem, encaixar os garfos **06.100***, **06.120** e **06.160** na trava.

CUIDADO

Não confundir os garfos 06.120 e 06.160; caso necessário, verificar a lista de peças.

- 3 Para proceder à montagem do eixo de mudança, ver o capítulo “Montagem do conjunto de eixos”.

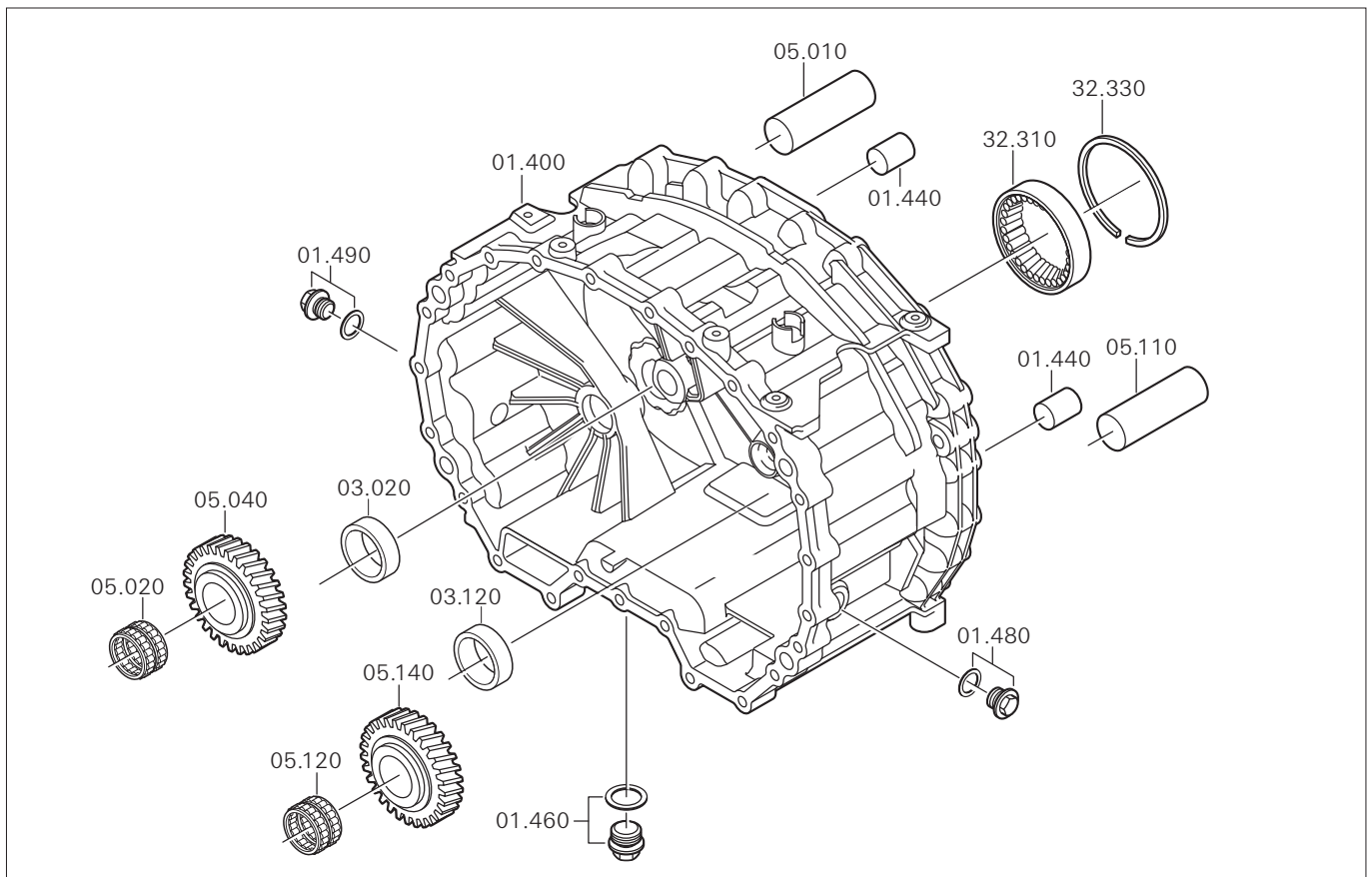


Modelo com 12 marchas

028240

* Somente no modelo com 16 marchas

Carça II



028197

Desmontagem da carça II

ATENÇÃO

Os pinos da marcha ré **05.010** e **05.110** já foram removidos.

- 1 Remover as engrenagens inversoras da marcha ré **05.040** e **05.140** e retirar as gaiolas de agulhas **05.020** e **05.120**.
- 2 Remover os bujões M24x1,5 **01.460**, **01.480** e **01.490**.

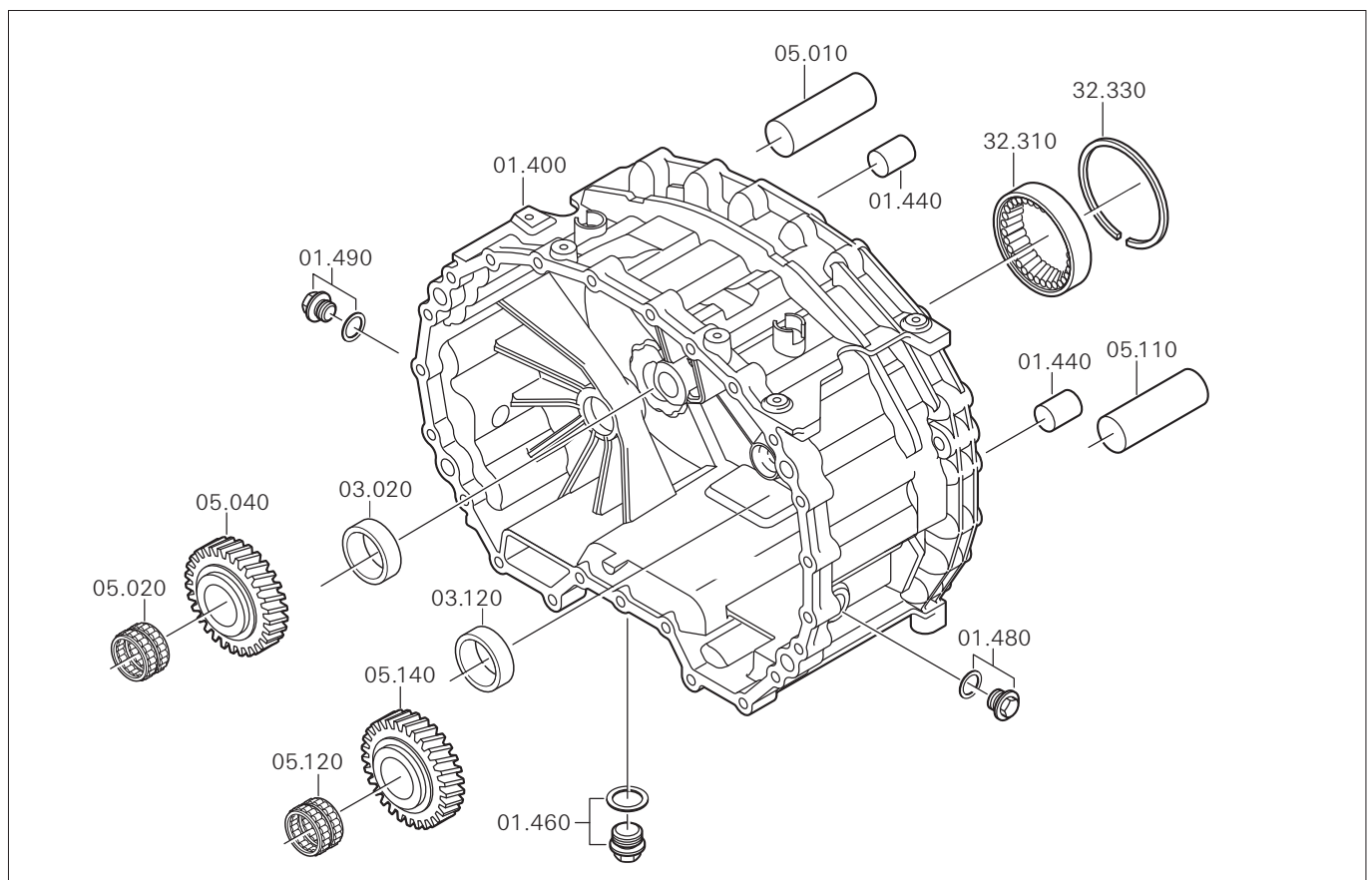
**PERIGO**

Somente pegar as peças aquecidas utilizando luvas de proteção.

- 3 Retirar os anéis externos dos rolamentos de rolos cônicos **03.020** e **03.120** se os anéis internos dos rolamentos do eixo intermediário tiverem que ser trocados.

Antes de desmontar os anéis externos, aquecer os apoios dos rolamentos a uma temperatura de aprox. 80 °C.

- 4 Remover o anel de retenção **32.330**.
- 5 Aquecer o apoio do rolamento a uma temperatura de aprox. 100 °C e retirar cuidadosamente o anel externo do rolamento de rolos cilíndricos **32.310**.
- 6 Somente remover os pinos **01.440** se estiverem danificados ou se a carça II tiver que ser trocada.
Aquecer a carça II a uma temperatura de aprox. 90 °C e extrair os pinos.



028196

Montagem da carçaça II

PERIGO

Somente pegar as peças aquecidas utilizando luvas de proteção.

CUIDADO

Para evitar estrias durante a montagem, aplicar óleo nos apoios dos rolamentos antes de aquecê-los.

- 1 Aquecer o apoio do rolamento de rolos cilíndricos **32.310** a uma temperatura de aprox. 100 °C e montar o anel externo do rolamento na carçaça II (até atingir a posição axial).
- 2 Montar o anel de retenção **32.330**.
- 3 Aquecer os apoios dos rolamentos de rolos cônicos **03.020** e **03.120** a uma temperatura de aprox. 100 °C e montar os anéis externos dos rolamentos.

- 4 Parafusar os bujões M24x1,5 **01.460**, **01.480** e **01.490** e apertá-los com 60 Nm.
- 5 Montar as engrenagens inversoras da marcha ré **05.040** e **05.140** juntamente com as gaiolas de agulhas **05.020** e **05.120**.
- 6 Os pinos da marcha ré **05.010** e **05.110** são montados posteriormente.
- 7 Se os pinos **01.440** ainda não estiverem colocados, aquecer a carçaça II a uma temperatura de aprox. 90 °C, lubrificar levemente os pinos e montá-los cuidadosamente dando batidas ou utilizando uma prensa manual.

CUIDADO

Não torcer os pinos durante a montagem – perigo de quebra da carçaça!

- 8 Para proceder à montagem do conjunto de eixos, ver o respectivo capítulo.

Nr. 08_00

| | | | | | | |
|-------|----------|--------|------------------|-----|-------------|------------|
| Type: | ECOLITE | Model: | 1304 | cc: | Date: | 07-03-2000 |
| | ECOMID | | 1307 | | Page 1 of 4 | |
| | ECOSPLIT | | 1315, 1316 | | | |
| | ECOMAT | | 4139, 4149 | | | |
| | ASTRONIC | | 1314, 1318, 1327 | | | |

Impulse sensor and speed sensor (output sensor) in ZF transmissions

As requested by some customers, ZF transmission production series are delivered without impulse sensor or speed sensor. The threaded hole is then sealed by a screw plug. If the impulse sensor or speed sensor should go missing during a repair operation, it will not be possible to determine which impulse sensor or speed sensor is to be installed. Tables 1, 2 and 3 are to assist in detecting the relevant components.

Transmissions affected

- ECOLITE: S 6-36, S 5-42, S 6-85, 6 S 850, 6 S 1600
- ECOMID: 9 S 75, 9 S 109, 16 S 109, 8 S 180
- ECOSPLIT: 8 S 151, 8 S 181; 8 S 221; 8 S 251; 16 S 151, 16 S 181; 16 S 221; 16 S 251
- ECOMAT: HP 500; HP 590; HP 600; HP 502; HP 592; HP 602
- ASTRONIC

Measures

Repair method for transmissions :

Assembly of new output sensor according to parts list and exchange of old component in accordance with the table.

Repair method for vehicles :

Replacement of output sensor in accordance with parts list, comparison of old component with the contents of the table or inspection of the respective speed sensor in the vehicle.

Replacement transmissions :

Depending on the parts list, output sensor is either installed on the replacement transmission or bore hole is sealed with a screw. In this case, the vehicle manufacturer is responsible for the correct installation of the output sensor.

Variants of impulse sensors / speed sensors, mechanical transmissions

Table 1

| sensor types | impulse sensor "Inductive" | impulse sensor "Hall" | impulse sensor "Hall" | impulse sensor "Hall" | KITASI "Hall" (standard) | KITASI Inductive (for Telma) | sensor distance (mm) | application according to transmission type |
|--------------|-------------------------------|-----------------------|-----------------------|-----------------------|--------------------------|------------------------------|----------------------|--|
| → | Renk | Renk | Bajonett DIN 72585 | Bajonett DIN 72585 | Bajonett DIN 72585 | Bajonett DIN 72585 | | |
| → | Part No. | Part No. | Part No. | Part No. | Part No. | Part No. | | |
| | 0501 208 791 | 0501 209 399 | 0501 210 855 | 0501 211 731 | --- | --- | 19,8 | 6 S 1600 with/without Intarder, S 6-85; 9 S 109, 16S 109, 8 S 180 Model maintenance package; 9 S 75, 9 S 109, 16S 109, 8 S 180 with Intarder, ECOSPLIT 3 with Intarder |
| | 0501 208 792 | 0501 209 400 | 0501 210 856 | 0501 211 732 | --- | --- | 25 | S 5-42, S 6-36, 6 S 850 |
| | 0501 208 793 | --- | --- | --- | --- | 0501 211 842 | 35 | 8 S 180 with Telma |
| | 0501 208 794 | 0501 209 402 | 0501 210 858 | 0501 211 734 | --- | --- | 63,2 | S 5-42 implemented by Daimler- Chrysler Wörth |
| | 0501 208 795 | 0501 209 403 | 0501 210 859 | 0501 211 735 | --- | --- | 90 | 9 S 109, 16S 109, 8 S 180 ECOSPLIT 3 without Intarder |
| | 0501 208 796 Voith + Telma | --- | 0501 210 860 Voith | --- | --- | 0501 211 843 Telma | 115 | 6 S 1600, S 6-85 |
| | 0501 208 796 | --- | --- | --- | --- | 0501 211 843 | 115 | 8 S 180 + Telma Model maintenance package |
| | --- | --- | 0501 210 991 | --- | --- | --- | 136,8 | 8 S 180 + Voith Model maintenance package |

Variants of impulse sensors / speed sensors, ECOMAT transmission

Table 2

| sensor type | impulse sensor "inductive" | impulse sensor "Hall" | impulse sensor "Hall" | impulse sensor "Hall" (standard) | KITAS I inductive (for Telma) | sensor distance (mm) | Observation |
|-------------|----------------------------------|----------------------------------|---|---|---|----------------------|---|
| → | Renk Part No. 0501 208 793 | Renk Part No. --- | Bajonett DIN 72585 Part No. 0501 210 857 | Bajonett DIN 72585 Part No. --- | Bajonett DIN 72585 Part No. 0501 211 842 | 35 | applied to ECOMAT 1/2, with co-axial transmission type and angle drive with thread bolt M18x1,5. Co-axial transmission type depends on the output cover version. |
| → | Renk Part No. 0501 208 794 | Renk Part No. 0501 209 402 | Bajonett DIN 72585 Part No. 0501 210 858 | Bajonett DIN 72585 Part No. 0501 211 734 | --- | 63,2 | applied to ECOMAT 1/2, with co-axial transmission version and thread bolt M18x1,5. Not possible if angle drive applied. Co-axial transmission type depends on the type of output cover. |

Variants of switches and impulse sensors /ASTRONIC transmissions

Table 3

| sensor type → | impulse sensor "Hall" | impulse sensor "Hall" | KITAS I "Hall" (standard) | Neutral position switch | sensor distance (mm) | | Observation |
|----------------------|--------------------------|--------------------------|---------------------------------|-------------------------------|-------------------------|---------------------|--|
| | | | | | Part No. | Part No. | |
| plug connection → | Renk | Bajonett DIN 72585 | Bajonett DIN 72585 | | | | |
| | Part No. | Part No. | Part No. | Part No. | | | |
| | 0501 209 399 | 0501 201 855 | 0501 211 731 | --- | 19,5 | with Intarder | threaded bolt sealed with Screw plug 0768 406 235 consists of: ↓ |
| | 0501 209 403 | 0501 210 859 | 0501 211 735 | --- | 90 | without Intarder | Screw plug (M18x1,5) + sealing |
| | | | | 0501 210 059 | --- | | 0636 302 021 0634 801 055 |

SERVICE INFORMATION

Nr. 02_04

Type: ASTRONIC
CC list SSO: All
CC list OEM: DAF
CC list customer: --

Model: 1327, 1328, 1329, 1337
Subassembly: Electrics

Date: 2004-02-03
Page 1 of 5

Wiring Fastening for Clutch Actuator on ASTRONIC Transmissions

During the course of further development work, the wiring fastening for the clutch actuator was modified. The two retaining plates, to which the cable harness was previously attached by means of cable clips, were discarded in two modification stages. They have been replaced by cable clamps. A modification related to this has also been undertaken on housing section 2. The new housing section 2 has been introduced to volume production by modifying the parts list and using new item numbers.

Components affected:

Parts list modification for 1st stage

| | NEW | OLD | | |
|----------------|-------------------|-------------------|-----------|---------|
| Designation | Item number | Item number | Model no. | Mod. +) |
| Housing, short | 1327 301 023 | 1327 301 020 | 1327 | 2223D |
| Fixing device | no longer used | 1328 301 052 (1x) | 1327 | 2227D |
| Cable clip | 0501 317 817 (1x) | 0501 317 817 (2x) | | |
| Housing, long | 1328 301 060 | 1328 301 045 | 1328 | 2231D |
| Fixing device | no longer used | 1328 301 052 (1x) | 1328 | 2234D |
| Cable clip | 0501 317 817 (1x) | 0501 317 817 (2x) | 1329 | 2237D |
| | | | 1329 | 2239D |

+) Mod = announcement number of parts list modification

Parts list modification for 2nd stage

| | NEW | OLD | | |
|---------------|-------------------|-------------------|-----------|---------|
| Designation | Item number | Item number | Model no. | Mod. +) |
| Fixing device | no longer used | 1328 301 052 (1x) | 1327 | |
| Cable clip | no longer used | 0501 317 817 (1x) | 1328 | 2250D |
| Fastening | 0501 214 086 (1x) | --- | 1329 | |
| | | | 1337 | |

+) Mod. = announcement number of parts list modification

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Kundendienst Technischer Service

Availability of parts in spare parts system:

| Designation | Item number | Remark |
|--------------------|--------------------|--|
| Housing, OLD | 1327 301 020 | can no longer be supplied |
| Housing, OLD | 1328 301 045 | can no longer be supplied |
| Fixing device | 1328 301 052 | can still be supplied |
| Cable clip | 0501 317 817 | available |
| Fastening | 0501 214 086 | available, can only be fitted on new housing 2 |

Start data:

1st modification stage

The start of the parts list modification has been recorded as follows:

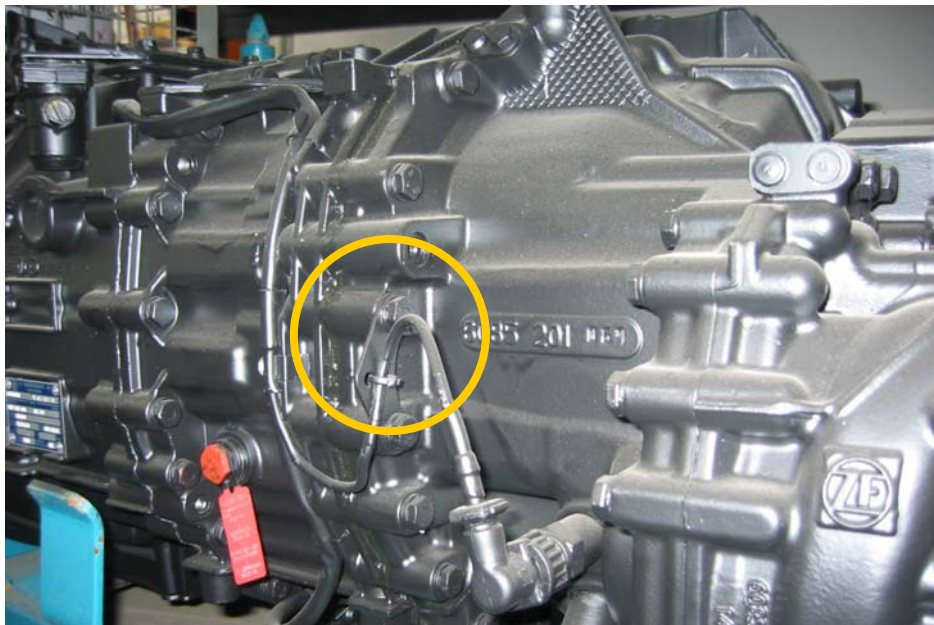
| Transmission | Model no. | As of product number | Mod. +) |
|---------------------|------------------|-----------------------------|----------------|
| 12 AS 3001 | 1329 | 262.440 | 2239D |
| 12 AS 3001 IT | 1329 | 261.753 | 2237D |
| 16 AS TD/TO IT | 1328 | 262.655 | 2234D |
| 16 AS TD/TO | 1328 | 262.643 | 2231D |
| 12 AS TD/TO | 1327 | 263.843 | 2227D |
| 12 AS TD/TO IT | 1327 | 263.895 | 2223D |

+) Mod. = announcement number of parts list modification

2nd modification stage

Only the start date of December 1, 2003 has been recorded for the modification.

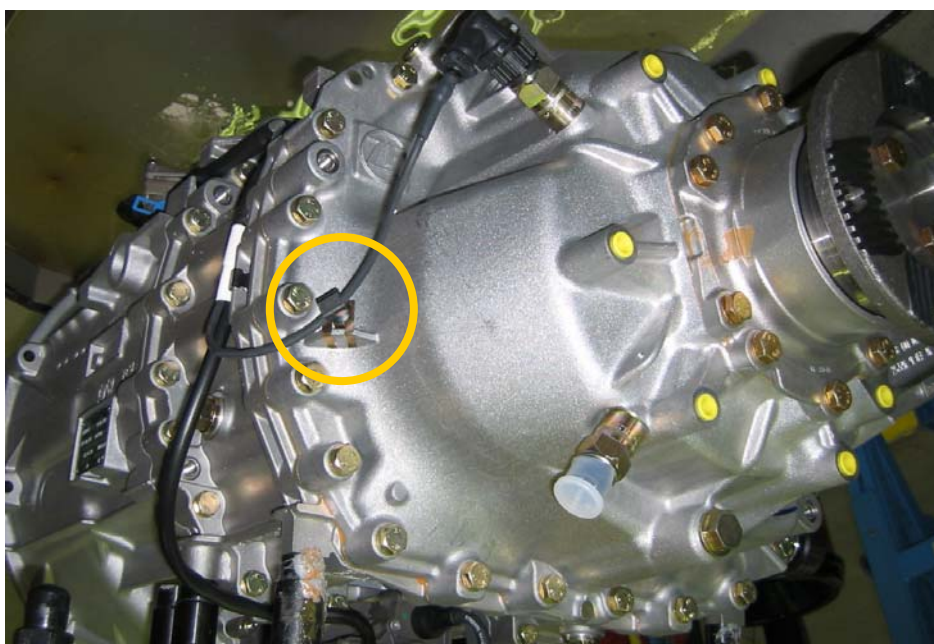
OLD fastening of wiring



Fixing device
1328 301 052



NEW fastening of wiring

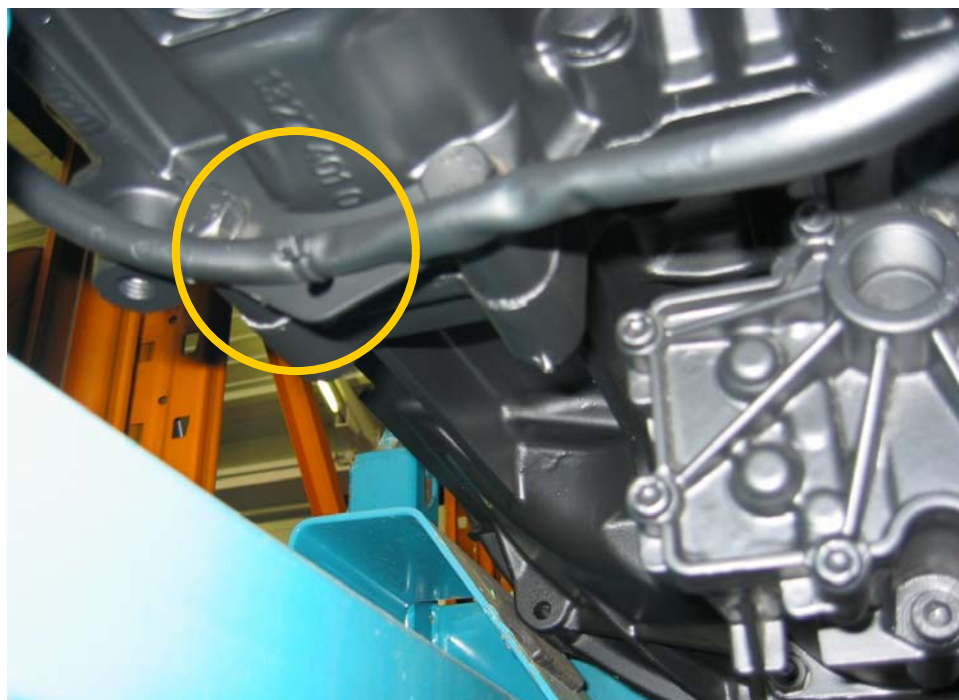


Fastening
0501 214 086



Fastening for wiring (underside of transmission, second modification stage)

OLD



Fixing device
1328 301 052



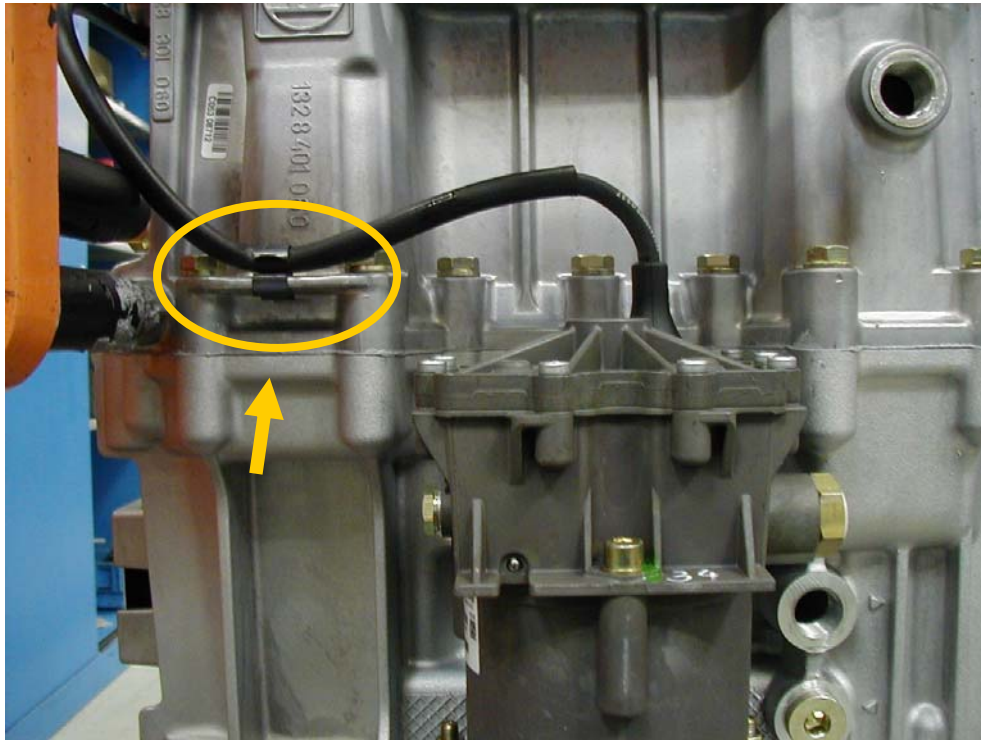
NEW



Cable clamp 0659 050 410



Modified point on housing 2



SERVICE INFORMATION

Nr. 20_04

Type: ASTRONIC
CC list VSO: all
CC list OEM: --
CC list customer: --

Model: 1314,1318,1327,1328,1329,
1337,1338,1339, 1353
Subassembly: Synchronizer

Date: 2004-10-21
Page 1 of 4

New Splitter Group Synchronizer Unit in ASTRONIC Transmissions

During the course of further development work, the splitter group synchronizer unit in the ASTRONIC 2 transmission has been further optimized. The design of the synchronizer rings and plate has been changed. To ensure uniformity, the synchronizer rings and plate of the synchronizer unit in the ASTRONIC 1 transmission have also been modified.

Components affected:

ASTRONIC 1

- Synchronizer unit for DD version, direct gear

| Scope of parts | | | NEW Modular system PL 1314 202 089 | OLD Modular system PL 1314 202 082 |
|----------------|--------------------|------|--|--|
| Pos. | Designation | Qty. | consisting of: Item number | consisting of: Item number |
| 110 | Synchronizer ring | 1 | 1328 302 084 | 1328 302 111 |
| 120 | Pin | 3 | 0731 201 698 | 0731 201 698 |
| 150 | Gear shift sleeve | 1 | 1314 302 188 | 1314 302 188 |
| 160 | Bolt | 3 | 1328 302 016 | 1328 302 016 |
| 180 | Plate | 1 | 1328 302 109 | 1328 302 015 |
| 190 | Circlip | 1 | 0730 505 158 | 0730 505 158 |
| 210 | Pin | 3 | 0731 201 699 | 0731 201 699 |
| 220 | Synchronizer ring | 1 | 1328 302 085 | 1328 302 112 |
| 240 | Compression spring | 3 | 0732 040 385 | 0732 040 385 |
| 250 | Cylinder roller | 3 | 0635 470 046 | 0635 470 046 |

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ASTRONIC 2

- **Synchronizer unit for OD version, overdrive gear**

| Scope of parts | | | NEW Modular system PL 1328 202 039 | OLD Modular system PL 1328 202 016 |
|----------------|--------------------|-------------|--|--|
| | | | consisting of: | consisting of: |
| Pos. | Designation | Qty. | Item number | Item number |
| 110 | Synchronizer ring | 1 | 1328 302 084 | 1328 302 111 |
| 120 | Pin | 3 | 0731 201 698 | 0731 201 698 |
| 150 | Gear shift sleeve | 1 | 1328 302 064 | 1328 302 064 |
| 160 | Bolt | 1 | 1328 302 072 | 1328 302 072 |
| 180 | Plate | 1 | 1328 302 109 | 1328 302 015 |
| 210 | Pin | 3 | 0731 201 699 | 0731 201 699 |
| 220 | Synchronizer ring | 1 | 1328 302 086 | 1328 302 113 |
| 240 | Compression spring | 3 | 0732 040 385 | 0732 040 385 |
| 250 | Cylinder roller | 3 | 0635 470 046 | 0635 470 046 |

- **Synchronizer unit for DD version, direct gear**

| Scope of parts | | | NEW Modular system PL 1328 202 040 | OLD Modular system PL 1328 202 017 |
|----------------|--------------------|-------------|--|--|
| | | | consisting of: | consisting of: |
| Pos. | Designation | Qty. | Item number | Item number |
| 110 | Synchronizer ring | 1 | 1328 302 084 | 1328 302 111 |
| 120 | Pin | 3 | 0731 201 698 | 0731 201 698 |
| 150 | Gear shift sleeve | 1 | 1328 302 064 | 1328 302 064 |
| 160 | Bolt | 1 | 1328 302 072 | 1328 302 072 |
| 180 | Plate | 1 | 1328 302 109 | 1328 302 015 |
| 210 | Pin | 3 | 0731 201 699 | 0731 201 699 |
| 220 | Synchronizer ring | 1 | 1328 302 085 | 1328 302 112 |
| 240 | Compression spring | 3 | 0732 040 385 | 0732 040 385 |
| 250 | Cylinder roller | 3 | 0635 470 046 | 0635 470 046 |

Measures:

In the event of repairs, the synchronizer rings and plate should always be replaced in complete sets. Old and new components must not be combined with one another. Old parts may be used up.

Spare parts:

If repairs are undertaken, 3 synchronizer kits are available and have to be ordered under the relevant kit number.

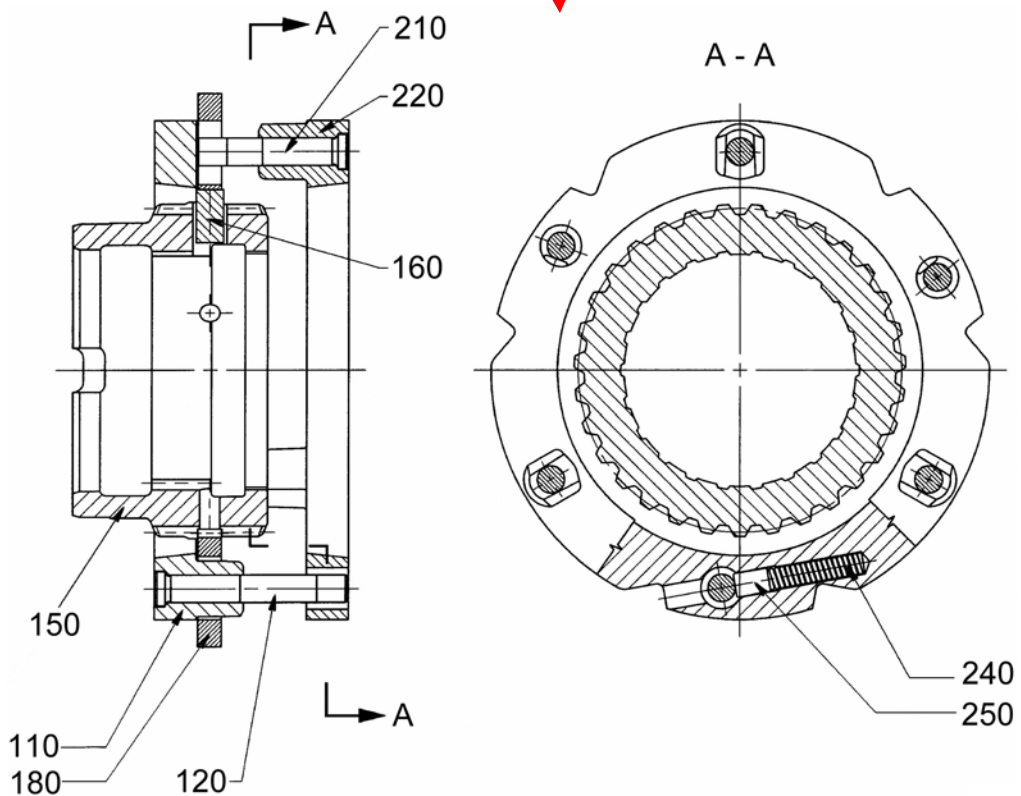
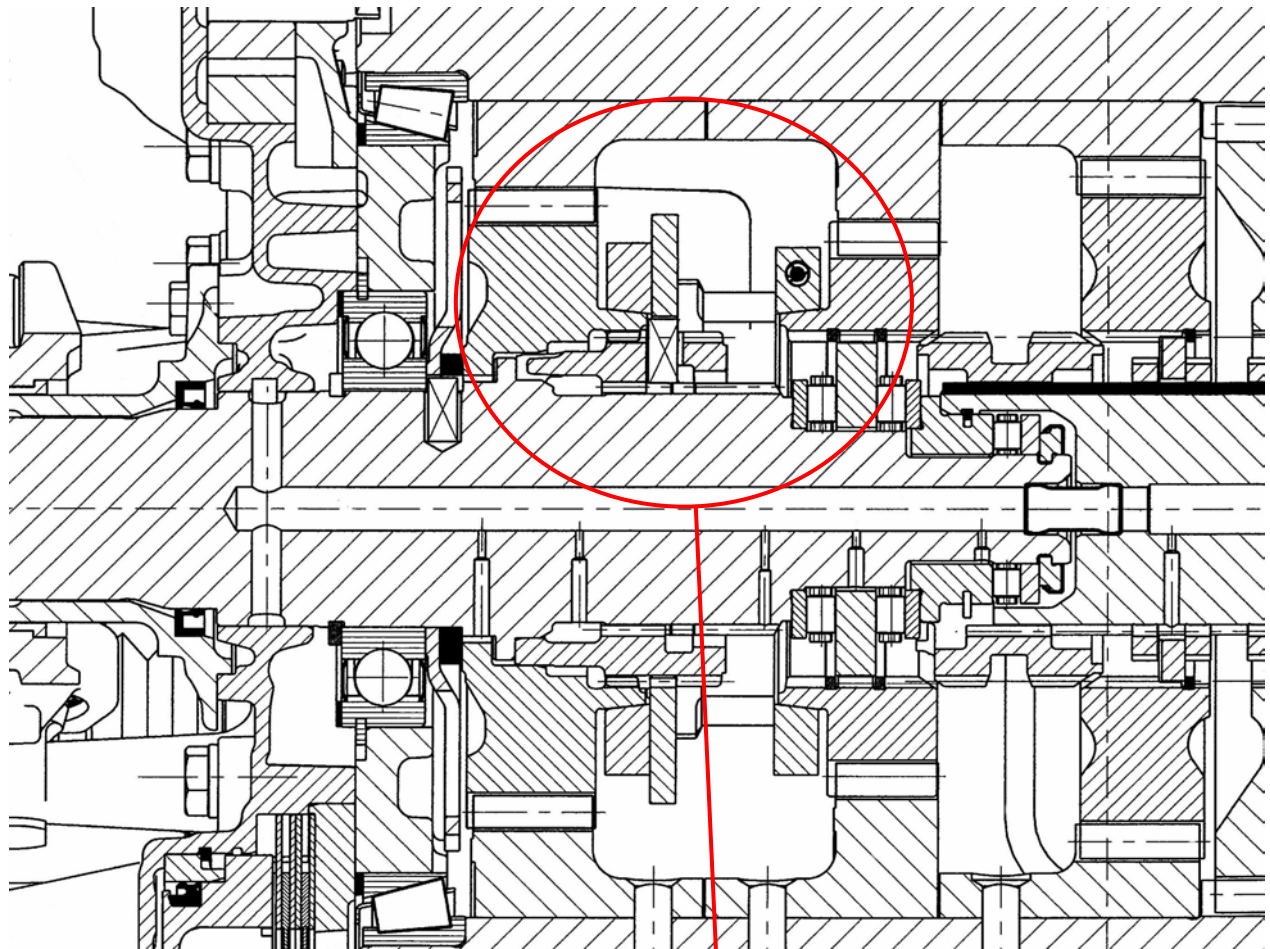
Synchronizer kits available:

| Kit order number | Version | Scope of parts identical to modular system PL | Transmission type |
|------------------|------------------|---|-------------------|
| 1314 298 007 | DD (direct gear) | 1314 202 089 | ASTRONIC 1 |
| 1328 298 001 | OD (overdrive) | 1328 202 039 | ASTRONIC 2 |
| 1328 298 002 | DD (direct gear) | 1328 202 040 | ASTRONIC 2 |

Start data:

| Modular system parts list | Model no. | Serial number | Date | Bulletin number Change to parts list |
|---------------------------|---------------------------------|---------------|------------|---|
| 1314 202 089 | 1314, 1318 | -- | 15-04-2004 | 3544D |
| 1328 202 039 | 1327, 1329, 1337, 1338, 1339 | -- | 15-03-2004 | 3543D |
| 1328 202 040 | 1327 | 276.490 | 17-03-2004 | 3545D |
| | 1328 | 276.492 | 17-03-2004 | |
| | 1329 | 276.485 | 17-03-2004 | |
| | 1338 | -- | -- | |
| | 1353 | 301.120 | 27-09-2004 | |

Sample sketch of installation situation of splitter group synchronizer unit in ASTRONIC 2 transmissions



SERVICE INFORMATION

Nr. 02_05

Type: ASTRONIC

Model: 1327,1328,1329,1337,1339

Date: 2005-01-20

CC list SSO: all

1348,1353,4231,4232,4240,4241

Page 1 of 5

CC list OEM: all

Subassembly: Heat exchanger

CC list customer: --

New Housing Seals in ASTRONIC 2 Transmissions

In the past, the housing seals used on ASTRONIC 2 transmissions have involved a liquid gasketing agent. Solid seals (metal gaskets) are to be used instead in the future. The thicknesses of the metal gaskets must be taken into account in the housing assembly. New housings 2 with a reduced total length have been introduced for this purpose. There are two versions of housing 2, with different lengths.

The new components, housings and metal gaskets are being launched into volume production through parts list changes.

Measures:

The new housings are being introduced in two steps:

1st step: Introduction of housing with reduced total length, (raw part as before, see Figure 2).

2nd step: Introduction of housing with reduced total length with optimized raw part (new pressure die cast part, see Fig. 3).

The following MUST be noted during repairs:

**Old housings must be fitted with liquid gaskets,
New housings must be fitted with solid seals (2 metal gaskets).**

Non-compliance with this procedure will result in transmission failure!

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Components affected:

- Housing 2 (1st step)

| | OLD | NEW | |
|-------------|--------------|--------------|--------------------------|
| Designation | Item number | Item number | Remark |
| Housing | 1328 301 060 | 1328 301 069 | Housing 2, long version |
| Housing | 1327 301 023 | 1327 301 026 | Housing 2, short version |

- Seals

| | Designation | Item number | Remark |
|------------|------------------|--------------|---|
| OLD | Sealing compound | 0666 791 001 | Replacement part, 22 g tube |
| | Gasket | 0666 790 040 | Replacement part, 7 g tube |
| NEW | Seal | 0501 321 442 | Metal gasket, Clutch housing - housing 2 |
| | Seal | 0501 321 443 | Metal gasket, Housing 2 - GP housing |

Diagram of sealing face/GP thrust surface of housing 2:

- **OLD** Assembly with liquid gasket

Housing sealing face and thrust surface of GP plate at the same height

Figure 1

