TRANSFLUID

# TRANSFLUID®

## industrial & marine

ISO 9001 Certified Company since 1997

**INSTALLATION AND MAINTENANCE**

BEFORE ASSEMBLING AND OPERATING THE FLUID COUPLING, CAREFULLY READ ALL THE SAFETY AND OPERATING INSTRUCTIONS REPORTED IN THIS MANUAL.

ALWAYS FOLLOW ALL THE INSTRUCTIONS AND ASSURE THAT ALL THE OPERATORS STANDING BY THE MACHINERY ARE WEARING ALL THE PROTECTIVE EQUIPMENT NECESSARY FOR THE JOB TYPE AND APPLICATION BEING PERFORMED.

DO NOT USE THE MACHINERY IF YOU DO NOT UNDERSTAND THESE INSTRUCTIONS, AND IMMEDIATELY REFER TO THE MANUFACTURER OR THE CUSTOMER SERVICE DESK FOR ASSISTANCE.

THE COUPLING MUST BE PROTECTED BY A CONVENIENT COVER GUARD TO AVOID PERSONAL INJURY TO PEOPLE.
AXIAL AND RADIAL VENTILATION OPENINGS SHOULD BE INCORPORATED IN THE GUARD FOR HEAT EXCHANGE.

IF THE COUPLING IS FITTED WITH FUSIBLE PLUGS, THE SAID OPENINGS SHOULD NOT BE DIRECTED TOWARDS OPERATORS OR ANY HOT OR ELECTRICAL INSTALLATION.



drive with us

# FLUID COUPLINGS
# ...KDM – ...KCM – ...KCG

TF6712A - rev. 3

**DECLARATION OF THE MANUFACTURER**

**Declaration of Incorporation** (Article 13 of Directive 2006/42/CE)

**The Manufacturer:** TRANSFLUID S.p.A.
Via Guido Rossa, 4
21013 Gallarate (VA) - Italy

hereby declares that, as per Attachment II, part 1, section B of directive 2006/42/CE, the products described below:

| | |
|---|---|
| **Description:** | Constant fill fluid coupling and relevant accessories |
| **Model:** | …KDM..., …KCM..., …KCG... |
| **Size:** | 7, 8, 9, 11, 12, 13, 15, 17, 19, 21, 24, 27, 29, 34, D34, 46 |
| **Function:** | transmission of power - rotating parts |
| **Specification number:** | according to shipping documents |

- should not be put into service before the machinery in which it will be incorporated is declared to comply with the provisions of directive 2006/42/EC, and with the regulations transposing it into national law;
- should not be put into service before the provided “installation and maintenance” manual has been read and completely understood by the user;
- comply with the requirements of the directive 2006/42/CE (which has replaced directive 98/37/EEC).

Each modification of the product, not approved in written form by TRANSFLUID S.p.A., voids this declaration.

As per Attachment VII, part B, of Directive 2006/42/CE, the technical file of the product is available by the seat of the TRANSFLUID.

Issued at: Gallarate (VA), Italy
On: 13/10/2016

Name of signatory: Ing. Ugo Pavesi Managing Director

Firma / Signature 

## GENERAL PRESCRIPTION (TF6737A - rev. 3)

## 1. - PREFACE

### 1.1 General information

This manual will support the user in using the product in a safe and correct way.
If the information contained into this manual will be observed, it will be possible:
- to increase the reliability and lifetime of the product and its installation
- to avoid risks,
- to reduce repairs and downtimes

**This manual must:**
**- always be available at the machine site**
**- be read, understood and used by every person who works on the product.**

The product is manufactured to the state of the art and according to current safety regulations.

Nevertheless, in case of improper handling or use:
- user’s or third parties’s life may be endangered
- the product or other materials could be damaged.

**Spare parts**

TRANSFLUID is not liable for injuries, damages, losses of any type, lack of performances resulting from use of non-original spare parts.
Use only appropriate workshop equipment for repair. Professional maintenance or repair can only be guaranteed by the manufacturer or an authorized specialist workshop.

TRANSFLUID reserves the rights for any modification of this manual.

### 1.2 Proper use

The product is provided for the use described in this manual.
The use, application values either then what stated in this manual or sales technical literature, or failure to comply with recommended inspection and maintenance interval indicated in this operator's manual is deemed as an infringement to the existing regulation.
All damages due to improper use will be borne solely by the user.

### 1.3 Remaining risks

Improper use or mishandling may cause death, severe injuries or minor injuries to the personnel , as well as property and/or environment damages.
Only persons who are qualified, trained and authorized are allowed to work on or with the product. Please pay attention to the warnings and safety information!

## 2. - SAFETY

### 2.1 Notes and symbols

The safety notes and symbols included in this manual are particularly marked with symbols according to DIN 4844-2.

| DAMAGE o HARM to per... | SIGNAL | DEFINITION | CONSEQUENCES | SYMBOL |
|---|---|---|---|---|
| Persons | DANGER! | Imminent danger | Fatal or most serious injuries |  |
| Persons | WARNING! | Danger situation possible | Fatal or most serious injuries possible | |
| Persons | CAUTION! | Less dangerous situation | Slight or minor injuries possible | |
| Persons<br>Property | DANGER! | Burning of combustible materials | Fire hazard |  |
| Persons | DANGER! | Use goggles | Risk of sight loss<br>Risk of blindness |  |
| Persons | DANGER! | Use ear protection | Hearing damage |  |
| Property | ATTENTION! | Harmful situation possible | Damage possible to:<br>- the product<br>- the environment |  |

### 2.2 Staff qualification

**DANGER**:
personnel not qualified is exposed to danger or it is dangerous for third parties. Possible consequences can be death, serious or minor injuries to the personnel, damage to properties and/or to the environment.

**DANGER:**
if the content of this manual, even in part, is not clear or if some doubts remain on how to proceed even after reading, don't perform any actions on the product and contact TRANSFLUID immediately.

Only properly trained, instructed and authorized persons can work on or with the product!
Keep unauthorized people away!
Qualified people only are allowed to carry out maintenance and inspection works, trouble shooting and/or remedial actions.

Staff in charge of any work to be done on the product must:
- be trained properly for the work
- have the legal minimum age
- trained and authorized with regard to the specific work to be done

**2.3 Product observation**

In compliance with the legal obligation to observe our products, even after shipment, we ask you to submit us useful information as:

- change in operating data
- experience gained with the unit
- recurring problems
- problems experienced with this installation and operating manual..

**2.4 General information**

For all works performed on the product, please observe the local regulations for prevention of accidents!

**DANGER:**
before installation of the product, stop all driving and driven rotating parts, taking moreover all necessary precautions to prevent their accidental operation.

**DANGER:**
prior to operate on the hydraulic circuit personnel must wear relevant eyes protection devices.

**ATTENTION:**
the use of unsuitable working means and methods may cause damage to the product.

**ATTENTION:**
if irregularities are found during operation, immediately switch off the driving unit!

**DANGER:**
the product generates noise during operation.
If the equivalent sound pressure level exceeds 80 dB(A) this can cause hearing damage!

**DANGER:**
exposed rotating parts, if any, need to be protected against contact by proper guards.
Never operate the product without these guards!

**DANGER:**
ensure suitable, working space, light and ventilation when working on the product.

**DANGER:**
if the product is equipped with fusible plug (fluid coupling), in case of thermal overload of the product, fusible plugs will operate. The high temperature operating fluid inside the product (fluid coupling) is therefore sprayed out through these fusible plugs. Be sure that the exiting operating fluid:
- cannot get into contact with hot machine parts, heaters, electricals, sparks or open flames! There is a risk of fire!
- be not dangerous for personnel.

**DANGER:**
energized terminals, electric lines and components may cause serious or even fatal injuries!
In the event of a fault, even assemblies operationally not energized may instead be energized.

**DANGER:**
during the installation, operation and maintenance of the product, do not modify electrical and hydraulic circuits.
This could cause malfunctions or unforeseen behaviours of the product with potential serious consequences for the product itself and for the safety of personnel.

## 3. - HANDLING

**DANGER:**
improper slinging and lifting of the product may cause personal injuries.

**ATTENTION:**
improper slinging and lifting of the product may cause damage of property.
Pay attention to the product weight.
All lifting appliances, slings, slinging points must be:
- checked and approved
- sufficiently dimensioned and in the best condition
- operated only by authorized and trained personnel.

## 4. - STORAGE, PACKING, PRESERVATION

**ATTENTION:**
- dispose of the packaging in accordance with the provisions of the local regulations
- storage area must be dry, and without dust
- for storage periods longer than 3 months, ask TRANSFLUID document relevant to prescriptions for conservation of the product.

## GENERAL FEATURES

Fluid couplings **KDM**, **KCM** and **KCG** series and those originated from, include two disc half couplings (**KDM**) or two gear half couplings (**KCG**) as indicated in Fig. **3** and **3a**. This kind of assembly offers the following advantages:
possible replacement of the fluid coupling without moving the electric motor and the driven machine (it is not necessary to perform any further alignment).
the weight of the fluid coupling can be shared between the driving and driven shafts.

## 1 - ASSEMBLY OF KDM-CKDM-CCKDM SERIES

(Fig. **1, 2, 2-1, 2-2, 3**)

**1.1** The disc half coupling includes: one hub (51), one disc pack (52), one connecting flange (50), 6 calibrated screws and relevant nuts (53 and 54), and three washers (59). These parts are supplied ready to be used (Fig. 1).

**1.2** If the half couplings are supplied with rough bores, the bore and the keyway may be machined without disassembling the half coupling referring to the surface S of the hub (51) Fig. 2. The interference between the shaft and the hub must not exceed 0.013 mm per mm of boring.

**1.3** Clean parts accurately. Fit half couplings onto the relevant shafts, the end of which must correspond with the end of the hub

Fig. **1**

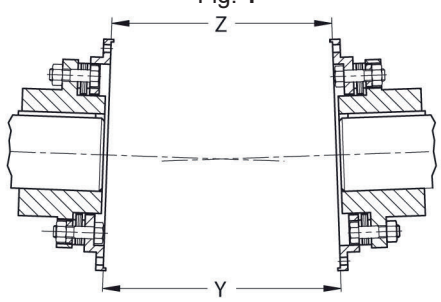



Fig. **2**

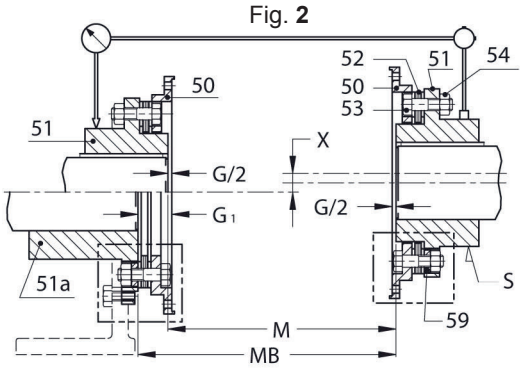



Fig. **2-1**

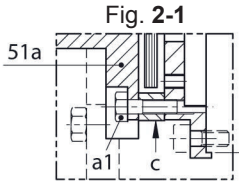
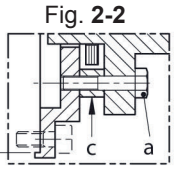



Fig. **2-2**




**1.4** Measure distance B for KDM, $B_1$ for CKDM or $B_2$ for CCKDM; by adding to them the dimension G, dimensions M, $M_1$ or $M_2$ (minimum distance between shaft ends) can be determined. For fluid couplings equipped with brake disc (KDMBP) or brake drum (KDMB), dimension MB is obtained with a similar procedure by adding to B, $B_1$ or $B_2$ the value G1 and G/2 (Tab. A).

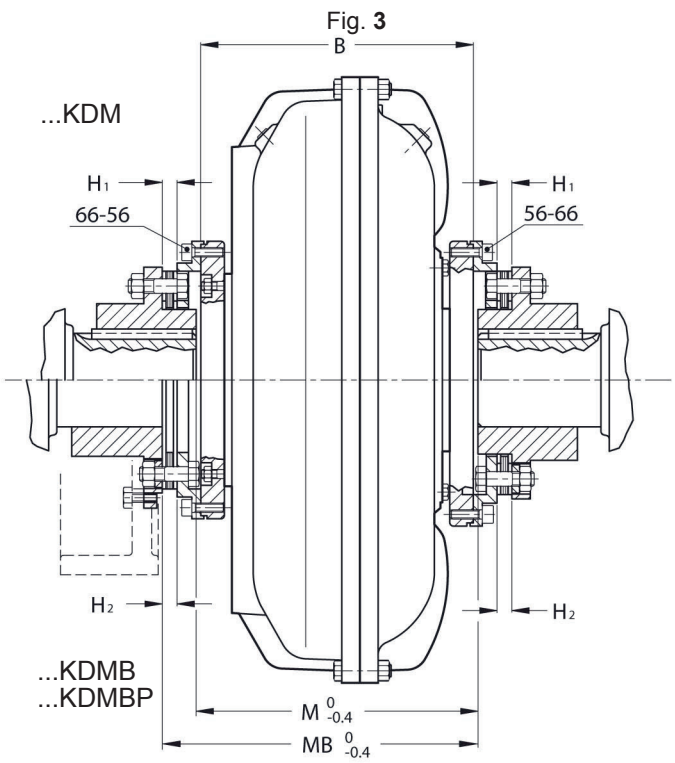
**1.5** Locate the electric motor and driven machine according to said dimensions M, $M_1$, $M_2$ or MB, $MB_1$, $MB_2$.Align the shafts by using a dial indicator. The alignment tolerances, radial X, angular Y-Z, (Fig. 1 and 2) are shown in Tab. A.

**1.6** Set the flanges (50) near the hubs (51) (KDM) or (51a) (KDMB or KDMBP), acting for each half coupling on the 3 screws a and a1. Inserting the spacers c, dimension H=(H1+H2)/2 is reduced to the value $H_0$; increasing therefore the distance B between the two flanges (50) from approximately 3 to 7mm. In this way the fitting of the fluid coupling in the respective centering position W is made easier.

**1.7** Make sure that the connecting flanges of the fluid coupling and of the half disc coupling are perfectly degreased. Insert the fluid coupling between the two half couplings and fix with screws (56) and relevant washers (66). IMPORTANT! Before locking, remove the 3+3 screws (pos. a) and relevant spacers (pos. c Fig. 2-1 and 2-2), then tighten screws (56) uniformly according to the locking torque shown in Tab. H.

**1.8** Verify alignment once again together with the max $H_1$ and min $H_2$ between hub (51) and flange (50) according to the allowable values shown in Tab. A.

Fig. **3**




Tab. **A**

| | | | Max. misalignment (mm) | | | | | Dimension M* | | | MB for disc brake * | | | Dimension B | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ...KDM | G | KDMB $G_1$ | Y-Z max | X | $H_1 - H_2$ | $\frac{H_1 + H_2}{2}$ | $H_0$ | KDM M | CKDM $M_1$ | CCKDM $M_2$ | KDMB MB | CKDMB $MB_1$ | CCKDMB $MB_2$ | KDM B | CKDM B1 | CCKDM B2 | Disc coupling |
| 9 | 3 | 19 | 0.20 | 0.10 | 0.16 | 7±0.2 | 5.7 | 180 | - | - | 197.5 | - | - | 177 | - | - | 1055 |
| 11 | | | | | | | | 189 | 235 | | | | | 186 | 232 | | |
| 12 | | | | | | | | | 256 | | 206.5 | 273.5 | | | 253 | | |
| 13 | | 23 | | | 0.19 | 9±0.2 | 7.6 | 219 | 279 | | 240.5 | 300.5 | | 216 | 276 | | 1065 |
| 15 | 5 | 27 | | | 0.22 | 10±0.3 | 8.3 | 251 | 319 | 369 | 275.5 | 343.5 | 393.5 | 246 | 314 | 364 | 1075 |
| 17-19 | | 32 | 0.25 | 0.15 | 0.25 | 13±0.4 | 11.0 | 274 | 354 | 434 | 303.5 | 383.5 | 463.5 | 269 | 349 | 429 | 1085 |
| 21-24 | | 41 | 0.30 | 0.20 | 0.32 | 15.5±0.5 | 13.3 | 320 | 420 | 509 | 358.5 | 458.5 | 548.5 | 315 | 415 | 505 | 1110 |
| 27 | 6 | 50.5 | 0.40 | | 0.40 | 20±0.5 | 16.7 | 364 | 482 | 582 | 411.5 | 629.5 | 629.5 | 358 | 476 | 576 | 1140 |
| 29 | | | | | | | | 393 | 511 | 611 | 440.5 | 658.5 | 658.5 | 387 | 505 | 605 | |
| 34 | | 60.5 | | | 0.50 | 20±0.6 | 16.6 | 448 | 579 | 679 | 505.5 | 736.5 | 736.5 | 442 | 573 | 673 | 1160 |

*Minimum distance between shafts

## 2 - ASSEMBLY OF KCG-CKCG-CCKCG SERIES (Fig. **1a, 2a, 3a**)

**2.1** The gear half coupling includes one connecting flange (50a), one hub (51b), calibrated screws (53a), one sealing ring OR (86), and two plugs H (Fig. 2a).

**2.2** If the half couplings are supplied with rough bores, the bore and the keyway may be machined referring to the surface S.

**2.3** Clean parts accurately, grease the OR and insert them into the proper seat in the connecting flange (50a).

**2.4** Place the collars on the shafts, avoid damaging the OR. Install the hubs (51b) on respective shafts (long part of the hub towards the shaft end). The hub/shaft ends shall coincide.

**2.5** Measure distance C (KCG), C1 (CKCG), C2 (CCKCG). By adding to them the dimension G (Tab. A1), dimensions M or $M_1$ or $M_2$ are determined (minimum distance between shaft ends).

**2.6** Locate electric motor and driven machine according to M, $M_1$ or $M_2$ dimensions.

**2.7** Align the shafts by using a dial indicator (Fig. 2a). The alignment tolerances angular Y-Z (Fig. 1a), and radial X (Fig. 2a), depend on the rotational speed (see Tab. A1).

**2.8** Grease the teeth of the hubs and connecting flanges and slide these (50a) on the hubs (51b).

**2.9** Apply the sealing paste or the gasket on the connecting surfaces of the connecting flanges.

**2.10** Insert the fluid coupling between the two half couplings. Fix with the calibrated screws (53a) and nuts (54a) (only for sizes 7÷13 - Fig. 13). Tighten uniformly according to the locking torque shown in Tab. L.

**2.11** Remove the two plugs H of the flange (50a) Fig. 3a, and fill with grease in one hole until it leaks from the other one. Both holes should be in the horizontal position. Carry out the activity on both flanges. Re-assemble the plugs H.
Regarding grease quantity and type see Tab. **A1** and **B**.

Fig. **1a**

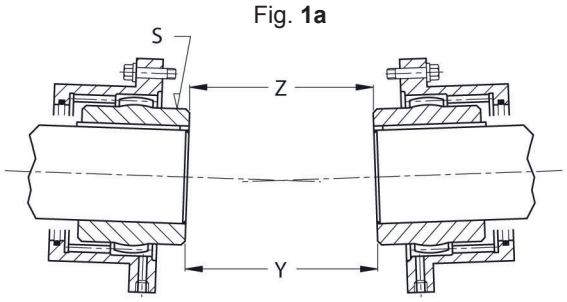



Fig. **2a**

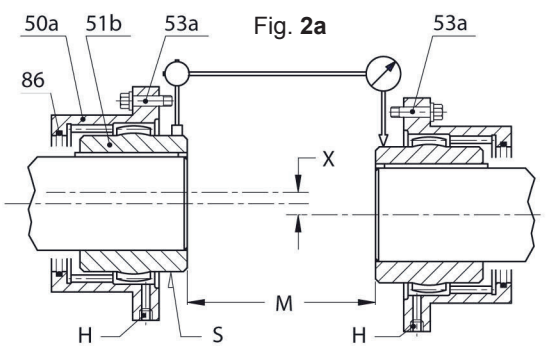
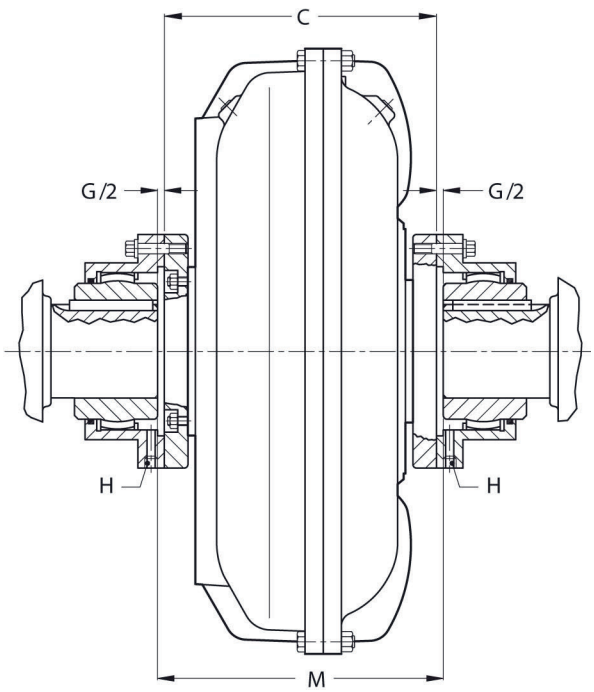



Fig. **3a**




Tab. **A1**

| ...KCG | G | Speed rpm 500 ÷ 1000 y-z | Speed rpm 500 ÷ 1000 x | Speed rpm 1000 ÷ 2000 y-z | Speed rpm 1000 ÷ 2000 x | Dimension M* KCG M | Dimension M* CKCG $M_1$ | Dimension M* CCKCG $M_2$ | Dimension C KCG C | Dimension C CKCG $C_1$ | Dimension C CCKCG $C_2$ | Gear coupling Type | Gear coupling Grease kg |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **7** | 3 | 0.25 | 0.25 | 0.20 | 0.15 | 143 | - | - | 140 | - | - | 1”-S | 2x0.03 |
| **8** | | | | | | 148 | | | 145 | | | | |
| **9** | | | | | | 192 | | | 189 | | | 1”1/2-S | 2x0.08 |
| **11** | | | | | | 201 | 247 | | 198 | 244 | | | |
| **12** | | | | | | 201 | 268 | | 198 | 265 | | | |
| **13** | | | | | | 226.5 | 286.5 | | 223.5 | 283.5 | | | |
| **15** | 5 | | | | | 257 | 325 | 375 | 252 | 320 | 370 | 2”1/2-E | 2x0.3 |
| **17-19** | | | | | | 281 | 361 | 441 | 276 | 356 | 436 | | |
| **21-24** | 6 | 0.35 | | | | 321 | 422 | 511 | 316 | 416 | 505 | 3”-E | 2x0.45 |
| **27** | | | | | | 414 | 532 | 632 | 408 | 526 | 626 | 3”1/2-E | 2x0.65 |
| **29** | | | | | | 443 | 561 | 661 | 437 | 555 | 655 | | |
| **34** | | | | | | 509 | 640 | 740 | 503 | 634 | 734 | 4”-E | 2x0.98 |
| **46** | 8 | 0.35 | 0.25 | - | - | - | - | 938 | - | - | 929 | 6”-E | 2x1.6 |

Tab. **B**

| RECOMMENDED GREASE | |
|---|---|
| **for NORMAL OPERATION** | |
| **AGIP** | GR MV/EP1 |
| **CALTEX** | Coupling Grease |
| **CASTOL** | Impervia MDX |
| **CHEVRON** | Polyurea Grease EP0 |
| **ESSO** | Fibrax 370 |
| **FINA** | Marson EPL1 - Lical EPL1 |
| **KLUBER** | Kluberplex GE 11-680 |
| **MOBIL** | Mobilux EP0 |
| **SHELL** | Alvania Grease EPR-0/EP1 |
| **TEXACO** | Coupling Grease |
| **TOTAL** | Specis EPG |
| **FOR HEAVY DUTY** | |
| **CALTEX** | Coupling Grease |
| **KLUBER** | Grafloscon C SG 500 plus |
| **TEXACO** | Coupling Grease |

## 3 - FILLING

Transfluid fluid couplings are not supplied filled with oil.
In order to correctly fill them it is necessary to follow the following procedures:

### ...KDM...-...KCM... - ...KCG... SERIES

**3.1** Place the coupling axis in the horizontal position (Fig. 4) with the letter X (max. filling) vertical (upward), so that the filling plug (13) be inclined as shown.

**3.2** Fill with the oil until it overflows from the plug seat. Rotate the coupling by hand, in order to enhance the vent of the air, or, if possible, open also the plug placed correspondingly on the other impeller. The quantity of fluid to be added is indicated in Tab. D1.

**3.3** Screw the plug (or both plugs) with recommended locking torques (Tab. E) and check that no leakage occurs; if necessary use sealing paste on threads.

**3.4** Fillings marked with X-1-2-3-4 can be chosen by the operator in order to obtain the best results for start-up and operating performances. With the maximum filling X, minimum slip and maximum efficiency are obtained, and the starting torque/ normal torque ratio is higher (values normally included between 1.8 and 2.0); decreasing the oil quantity inside the coupling (filling 1-2-3-4) the opposite result is obtained.

**3.5** A high slip causes an overheating of the oil included in the working circuit of the coupling, and a respective decrease of the efficiency.

**3.6** For operating conditions at temperatures equal or lower than -20°C use oil ISO HV 32 for low temperature. Check Tab. D for recommended oils.

**3.7** For fluid couplings installed in a vertical axis position, fill in the quantities indicated in Tab. D1.

### ...CKDM...-...CCKDM...-...CKCM...-...CCKCM... SERIES

Fluid couplings equipped with delay chamber (CK series) has the main objective to reduce the starting torque/nominal torque ratio to values up to 1.5. This feature is enhanced further by increasing the delay chamber (CCK series) and allowing values up to 1.2 of said ratio.

**3.8** The limitation of torque during start-up is obtained by decreasing the quantity of oil in the working circuit (filling 2 - 3 - 4) without a significant increase of the slip at normal operation. In fact, with fluid coupling stopped, the delay chamber contains part of the filling oil that during start-up is drawn into the working circuit. At normal operation, all the oil is located in the circuit and torque is transmitted with minimum slip.

**3.9** The transfer of the oil from the delay chamber to the working circuit occurs by centrifugal force, through calibrated nozzles (Fig. 5). Starting from size 15CK/CCK, such nozzles can be changed, with the fluid coupling already installed, simply by replacing the valve (57).
**Such a technical solution allows a very simple and easy operation, practicable in a short time and moreover, with the fluid coupling already installed.**
During the re-installation of the valve (**57**), tighten according to the torques indicated in Tab. E1; remember to install the soft copper gasket (**58**) and make sure that no leakage occurs; if necessary use sealing paste on threads.

**3.10** For each value of the starting torque/nominal torque ratio, TRANSFLUID can calculate and suggest the required filling level. Fluid couplings with delay chambers use max filling level 2 (Tab. D2), while those equipped with double delay chambers use filling level 3 (Tab. D3). Proceed as indicated at para. 3.1 - 3.2 - 3.3 - 3.6.

**3.11** For fluid couplings installed with vertical axis, the delay chamber must be placed downward. Fill with the oil quantities indicated in Tab. D2 or D3

**TAB. D**

| RECOMMENDED OIL: ISO HM 32 (SAE 10W) CLASSICATION | | | | | |
|---|---|---|---|---|---|
| **Agip** | OSO 32 | | | **Mobil** | DTE 24 |
| **Aral** | VITAM GF 32 | **Chevron** | RYKON OILS AW-32 | **Shell** | TELLUS S 2M32 |
| **BP** | ENERGOL HLP 32 | **Esso** | NUTO H 32 | **Texaco** | RANDO HD 32 |
| **Castrol** | HYSPIN AWS 32 | | | **Total** | AZOLLA ZS 32 |

| RECOMMENDED OIL: ISO HV 32 CLASSICATIONFOR LOW TEMPERATURES -20°C -40°C | |
|---|---|
| **AGIP** | ARNICA 32 |
| **CHEVRON** | RYKON OILS AW 32 |
| **MOBIL** | DTE 10 EXCEL 32 |
| **SHELL** | TELLUS S2V 32 |

Use only with machines designed for low ambient temperature operation.

**TAB. D1**

| | OIL QUANTITY (l) | | | | |
|---|---|---|---|---|---|
| **K...** | **X** | **1** | **2** | **3** | **4** |
| **7** | 0.920 | 0.860 | 0.800 | 0.730 | 0.650 |
| **8** | 1.510 | 1.405 | 1.295 | 1.190 | 1.080 |
| **9** | 1.950 | 1.820 | 1.690 | 1.550 | 1.400 |
| **11** | 2.750 | 2.550 | 2.350 | 2.100 | 1.850 |
| **12** | 4.100 | 3.875 | 3.575 | 3.250 | 2.900 |
| **13** | 5.200 | 4.850 | 4.450 | 4.050 | 3.600 |
| **15** | 7.650 | 7.150 | 6.600 | 6.000 | 5.400 |
| **17** | 11.70 | 10.90 | 10.00 | 9.100 | 8.200 |
| **19** | 14.20 | 13.30 | 12.30 | 11.20 | 10.00 |
| **21** | 19.20 | 17.80 | 16.40 | 15.00 | 13.50 |
| **24** | 28.40 | 26.50 | 24.60 | 22.60 | 20.50 |
| **27** | 42.00 | 39.00 | 36.00 | 33.50 | 31.50 |
| **29** | 55.00 | 51.00 | 47.00 | 44.00 | 41.50 |
| **34** | 82.50 | 76.60 | 70.60 | 66.20 | 62.50 |
| **46** | 183 | 170 | 158 | 148 | 135 |

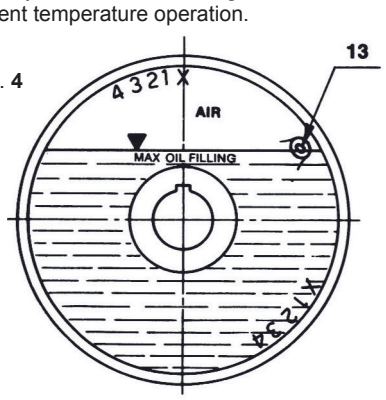
**TAB. D2**

| | OIL QUANTITY (l) | | |
|---|---|---|---|
| **CK...** | **2** | **3** | **4** |
| **11** | 3.350 | 3.050 | 2.750 |
| **12** | 4.800 | 4.200 | 3.600 |
| **13** | 5.800 | 5.200 | 4.700 |
| **15** | 8.600 | 7.700 | 6.400 |
| **17** | 13.60 | 12.80 | 11.70 |
| **19** | 16.50 | 15.20 | 14.00 |
| **21** | 23.00 | 21.30 | 19.30 |
| **24** | 31.20 | 28.60 | 26.00 |
| **27** | 50.00 | 46.50 | 43.00 |
| **29** | 63.00 | 59.00 | 54.00 |
| **34** | 92.50 | 88.50 | 83.50 |

**TAB. D3**

| | OIL QUANTITY (l) | |
|---|---|---|
| **CCK...** | **3** | **4** |
| **15** | 9.30 | 8.00 |
| **17** | 16.36 | 14.86 |
| **19** | 18.76 | 16.86 |
| **21** | 27.30 | 24.30 |
| **24** | 35.43 | 31.63 |
| **27** | 59.35 | 55.15 |
| **29** | 70.60 | 65.20 |
| **34** | 96.70 | 86.40 |
| **46** | 215 | 200 |

Fig. **4**



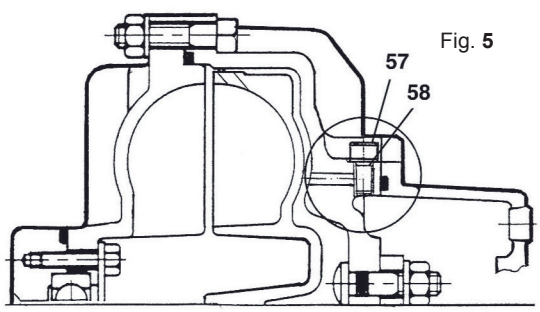

**TAB. E**

| DIM. | 13 - 13a | | D. nom. |
|---|---|---|---|
| | N. 7018.. | Torque (Nm) | |
| 7 - 8 - 9<br>11 - 12 | BB | 12 | 1/4" |
| 13 - 15<br>17 - 19<br>21 - 24 | CB | 29 | 3/8" |
| 27 - 29<br>34 | DB | 44 | 1/2" |
| 46 | EB | 69 | 1" |

**TAB. E1**

| DIM. | Valve items 57 | |
|---|---|---|
| | Dia | Torque (Nm) |
| 15<br>17 - 19 | M8 | 7 |
| 21 - 24<br>27 - 29<br>34 | M12 | 20 |
| 46 | M16 | 45 |

Fig. **5**



## 4 - OPERATION AND MAINTENANCE

### 4.1 FLUID COUPLINGS

The standard operating procedures for the coupling shall be applied controlling stability and temperature. Provided that seals are made of Viton, operating temperature must not exceed 90 °C. As described in Tab. **F** showing causes and relevant remedies, a high value of temperature can be caused by the following conditions:

a) insufficient filling
b) absorbed power greater than the rated
c) high ambient temperature
d) high number of start-up per hour
e) prolonged start-up time
f ) high number of consecutive starts
g) protection cover too shut.

**4.1.1** Approximately 20 days after installation, check the fluid level (**activity to be carried out with cold oil**), the tightening of screws, and alignment and tightening of the fixing screws of the driving and driven machine. The fluid coupling is supplied with fusible plug calibrated at 140 °C with exclusion of fluid couplings with special fluid (par. **9**). If requested also calibration at 109 °C, 120 °C, and 198 °C are available, according to the application.
If the fusible plug melts frequently, perform checks level as shown in Tab. **D1, D2, D3** and Tab. **F**.

**4.1.2** In case of installation of the switching pin, or the electronic device for speed measurement, check that distances as indicated in Fig. **6** and **7** are in conformity with the values foreseen during installation stage.

**4.1.3** It is recommended to replace the working fluid every 4000 hours of operation.

### 4.2 DISC COUPLINGS (for KDM series)

No particular maintenance is necessary.
It is recommended anyway to check alignment indicated at para. **1.7** and screw locking torque after the first hours of operation. Every 3000 hours, check that there is no evidence of fatigue or failures on external discs, and check alignment as per para. **1.8.**

### 4.3 GEAR COUPLINGS (for KCG series)

It is recommended to check alignment as indicated at para. **2.7** and locking torque of calibrated screws **53a** (Fig. 2a) or nuts **54a** (only for 7÷13K Fig. **13**) after the first operating hours. Every 3000 hours, replace grease proceeding as indicated in para. **2.11** and check that there is no evidence of wear on teeth.

Tab. **F**

| SYMPTOM | CAUSED | REMEDY |
|---|---|---|
| TOO HIGH TEMPERATURE | INSUFFICIENT OIL LEVEL | Check oil level and restore if necessary (Tab. D1, D2 o D3) |
| | TOO MANY START-UPS REPEATED IN SEQUENCE | Wait for cooling before next start-up, or decrease start-up number |
| | ABSORPTIONS GREATER THAN RATED VALUES | Eliminate cause and/or check coupling/motor design |
| FUSIBLE PLUG INTERVENTION | HIGH AMBIENT TEMPERATURE | Improve coupling ventilation |
| | TRIP OR OVERLOAD OF THE DRIVEN MACHINE | Eliminate cause |
| | HEAT SOURCE TOO CLOSE | Move away the source or place a shield in between |
| | PROTECTIVE COVER WITHOUT SUFFICIENT VENTILATION | Make air path for proper heat exchange |
| PERFORMANCES DECREASE | OIL LEVEL | Check level and restore with proper type if necessary according to Tab. D1, D2 or D3 |
| | OIL TYPE | Replace if necessary (Tab. D) |
| | | Check compliance with recommended oil specifications (Tab. D) |
| | TEMPERATURE LOWER THAN OR CLOSE TO 0 °C | Use proper oil (see par. 3.6) |
| OPERATING SPEED NOT REACHED AND/OR EXCESSIVE SLIP | DEFECTIVE MOTOR | Check motor rpm (if electric, check connections) |
| | STAR / DELTA INSERTION TIME | If time is too long, reduce it to 3 sec. max. |
| | LOCKED OR BRAKE DRIVEN MACHINE | Eliminate cause |
| NOISE AND VIBRATIONS | ALIGNMENT | Check alignment par. 1.5 and 1.8 (KDM series), - par. 2.7 (KCG series) |
| | BEARING FAILURE | Disassembling, inspection, replacement of bearing (and relevant sealing devices) |
| | ALIGNMENT COUPLING WITH WORN OUT PARTS | Replace worn out part |
| SIBILATION/ WHISTLE | PROTECTION CRANKCASE | Eliminate small dimension air paths |

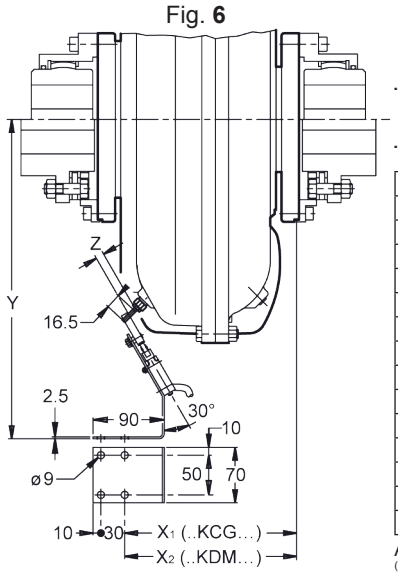
## 5 - ACCESSORIES

The fluid coupling can be equipped, in addition to the normal fusible plug, with similar safety devices that avoid the expulsion of working fluid and in case of an electronic system, can handle also different parameters.
The fusible plug is anyway installed as a component for additional safety, being however calibrated at a higher temperature value.

### 5.1 SWITCHING PIN (Fig. **6** and **6a)**

This device is made of a fusible plug equipped with a metallic pin inserted in the fusible alloy material of the plug.
In case the intervention temperature is reached, the alloy material melts making the pin free so that it escapes due to the centrifugal force, hitting the cam of the switch, activating it and supplying the relevant output signal, that can be used as alarm or motor trip.
Install firmly the switch to the base unit according to dimensions indicated in Tab. G, taking into account that the pin of the fusible plug, in case of intervention, extends by 16.5 mm and it shall move the cam of the switch (Fig. 6 and

Fig. **6**




Tab. **G**

| Dim. | $X_1$ | $X_2$ | Y | Z |
|---|---|---|---|---|
| **7** | 128 | - | 262 | - |
| **8** | 137 | | 272 | |
| **9** | 166.5 | 156 | 287.5 | |
| **11** | 173.5(1) | 163(1) | 300.5 | |
| **12** | 183.5 | 173 | 323 | 15 |
| **13** | 195.5 | 187 | 335 | 16 |
| **15** | 220 | 214 | 358 | 16 |
| **17** | 240 | 235 | 382 | 12 |
| **19** | 232 | 227 | 400.5 | 9 |
| **21** | 281 | 276 | 423 | 8 |
| **24** | 281 | 277 | 460 | 4 |
| **27** | 331 | 295 | 491 | 9 |
| **29** | 356 | 322 | 524 | 8 |
| **34** | 404 | 369 | 584 | 4 |

Approximate dimensions
(1) only for K.. (for CK.. on request)

It is possible to install this system on all couplings starting from size 13K, even in case it has been not included as initial supply. The package includes: switching pin complete with conical plug, switch complete with support, counterweight for balancing, glue and instruction for a correct installation and operation.

**The electrical connection of the switch shall be realized with voltage not greater than 230 V and current 6 A max.**

**N.B. Regarding dimensions and further details, refer to the relevant supplied instructions (TF5728D).**

**5.2 ELECTRONIC DEVICE (**Fig. **7a - 7b - 7c)**

The electronic device for the control of overload is made by a proximity switch and an electronic speed controller (Fig. 7a). It reads the coupling output speed. When the resistant torque increases the coupling slip increases, as a consequence the output speed decreases. If this output speed decreases below the controller set point for a time period greater than the period of non-intervention time set, the switching of the internal relay occurs.

It is possible to install this electronic system on all fluid couplings where it has not been included as initial supply.

For couplings size 7K÷13K, it is sufficient to replace the two screws placed at 180° along the external rim (as indicated in Fig. 7c) with special ones (longer screws and nuts). For couplings of greater size (15K÷34K) KDM series it is necessary to prepare two fixing holders as indicated in Fig. 8 - Tab. H, and insert them below two screws and relevant washers (56)(66) at 180° (Fig. 7a).

For coupling KCG series it is necessary to install two screws M10x16 and relevant nuts (Fig. 7b) into the proper threaded holes at 180° on part 27 or 63 (reverse mounting).

It is necessary that the proximity switch be in line with the two fixing holders (KDM) or screws (KCG), at a distance not greater than 5 mm, while the controller can be installed in the most suitable place as chosen by the operator, within a max. wiring length of 20 m, increasing properly the cable of the proximity switch.

**Before cabling the wiring connections always check the voltage supply.**

**N.B. For further details regarding electronic functions and connections, refer to the relevant supplied instructions.**

**5.3 INFRARED TEMPERATURE (**Fig. **7d)**

The electronic controller is used for the detection of the temperature in operation. A device equipped with infrared sensor is available, that, properly placed close to the fluid coupling, allows an extremely accurate temperature measurement without contact.

Temperature is shown on a proper display that allows the setting of 2 alarm values (logic alarm on the first, relay alarm on the second). The sensor should be positioned close to the external impeller or the cover of the fluid coupling, choosing, for instance, the solution as shown in Fig. 7d.

The distance between the sensor and the fluid coupling should be approx. 15 - 20 mm (the cooling ribs doesn't disturb the correct operation of the sensor itself).

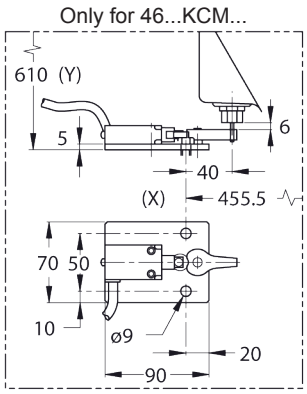
In order to avoid that the shining surface of the fluid coupling can produce reflexes that can distort the correct reading of the temperature, it is necessary to paint opaque black the surface of the coupling directly exposed to the sensor (a 6- 7 cm stripe is sufficient). Sensor cable has a standard length of 90 cm. In case, it can be extended only with twisted and shielded wire for thermocouples type "K".

**N.B. For further details regarding electronic functions and connections, refer to the relevant supplied instructions**.

**5.4 RESTORING OF THE SWITCHING PIN (**Fig. **9)**

For the 109°C version completeley replace SW.PIN

Fig. **6a**




**5.4.1** Screw off the teflon cover and remove the small pin A with the residuals of melted material.

**5.4.2** Drive the fusible ring B on the small pin, paying attention to the choice for the correct value of the temperature for the fusible alloy material.

**5.4.3** Put the small pin with the fusible ring in the housing C.

**5.4.4** Using the tool D similar to that indicated, rivet the fusible ring at bottom.

**5.4.5** Make sure that the pin is blocked.

**5.4.6** Screw the teflon cover on the plug body.

**N.B.: Such activities must be carried out with fluid coupling at ambient temperature.**

Fig. **7a** Fig. **7** Fig. **7d**

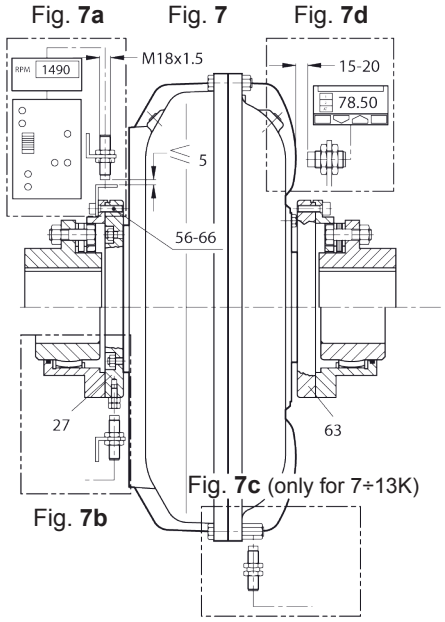
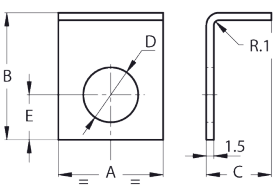



Fig. **7b**

Fig. **7c** (only for 7÷13K)

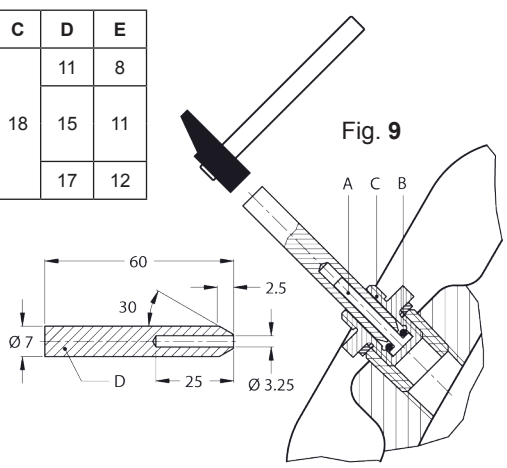
Fig. **8**




Tab. **H**

| Dim. | A | B | C | D | E |
|---|---|---|---|---|---|
| **15-17-19** | 21 | 31 | 18 | 11 | 8 |
| **21-24** | 25 | 36 | | 15 | 11 |
| **27-29** | | | | | |
| **34** | 28 | 38 | | 17 | 12 |

Fig. **9**



## 6 - RECOMMENDED SPARE PARTS

**(**Fig. **10-11-12-13-14-15-16)**

When ordering spare parts, always mention the type of coupling and specification number marked on the external impeller in the positions indicated in Fig. **10** or on the opposite side (cover) (27K, 29K, 34K and 46K have a name plate showing the serial number also).

**6.1** Gasket kit (**4**) (**5**) (**5a** for versions C../CC..) (**6**)(**15**)(**20**)(**41**) (**41**only for **27K, 29K, 34K** and **46K** (**90**) only for **46K O-rings and sealing rings in viton.**

**6.2** Fusible plug (**13a**).

**6.3** Disc pack kit (**52**) (**53**) (**54**).

**6.4** Gear half coupling kit (**50a**) (**51b**) (**53a**) (**86**).

## 7 - REPLACEMENT OF SEALING RINGS, BEARINGS AND DISC PACKS (Fig. 11-12-13-14)

**NB: To operate on the surfaces described as follows, always use a mallet in teflon, and not a metal hammer.**

**7.1** Remove screws (**56**) (KDM) or (**53a**) (KCG)

**7.2** Remove the fluid coupling proceeding as indicated at para. **1** pos. **1.6** (KDM) and para **2** (KCG)

**7.3** Remove the oil from the coupling removing plugs pos. **13** on cover and delay chamber and (**13a)**.

**7.4** If the coupling is equipped with delay chamber, remove it after removal of screws (**34**). Together with it, the flange (**27**) or (**27a**) (not to be removed) and seal ring (**15**) will remain.

**7.5** Remove nuts (**11**), insert two screwdrivers into the gap between bearing carrier (**14**) or (**14a**) and cover (**3**) or (**3a**) and lever up to the extraction of the bearing carrier and seal ring (**15**).

**7.6** Remove screws (**8**)(**10**), and remove cover (**3**) by the help of the mallet in teflon.

**7.7** Remove the bearing (**16**) with a puller and recover the screen (**47**).
Remove the flange (**63**). For couplings from **9..K** up to **19..K**, remove the screw (**25**), insert a small threaded bar into the hole for extraction "Q" (dimensions in Tab. **K**), so that pushing against the end of the flange, allows the removal of the flange itself. For couplings from **21..K** up to **34..K**, remove screws (**64**) and washer (**65**).

**7.8** Remove the elastic ring (**18**) and remove the impeller (**1**).

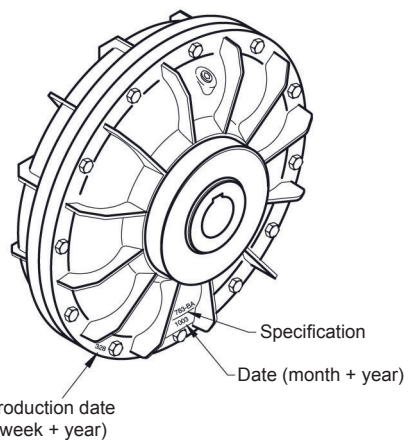
**7.9** Remove the screws (**9**) and the screen (**17**) (**11K÷24K**) or the closing disc (**40**) (**27K÷34K**). Hitting on surface "B" of shaft (**24**), take off the bearing carrier (**23**) or the seal carrier (**19**) (only for **27K÷34K**) with sealing ring (**20**).

**7.10** During re-installation, proceed in the reverse sequence, replacing the bearings and all seals. Interpose sealing paste between surfaces of disc (**17**) and impeller (**2**), screwing the screw with a thread restrainer Loctite 243 type.

**7.11** For the replacement of the disc pack (**52**), remove the flange (**50**), removing the nut (**54**) and the calibrated screw (**53**).

**NB: For the tightening of nuts, screws and plugs, refer to the tightening torques indicated in the following tables:**
Tab. **E** for plugs (**13**)(**13a**)
Tab. **L** and **N** for other positions.

Fig. **10**




Tab. **J**

| ...KDM ...KCG | KIT GASKETS (Viton) GA2395... | | FUSIBLE PLUG GUN7018... (°C) (*) Kit | | | | ...KDM (**) Kit disk pack | ...KCG half gear coupling |
|---|---|---|---|---|---|---|---|---|
| | K | CK.. CCK.. | 109 | 120 | 140 | 198 | | |
| **7** | W | - | - | BA | BB | BC | - | 1" E |
| **8** | X | | | | | | | |
| **9** | D | | | | | | 1055 | 1" 1/2 E |
| **11** | EA | EB | | | | | | |
| **12** | FA | FB | | | | | | |
| **13** | HA | HB | CE | CA | CB | CC | 1065 | |
| **15** | KA | KB | | | | | 1075 | 2" 1/2 E |
| **17** | LA | LB | | | | | 1085 | |
| **19** | MA | MB | | | | | | |
| **21** | NA | NB | | | | | 1110 | 3" E |
| **24** | OA | OB | | | | | | |
| **27** | PA | PB | DE | DA | DB | DC | 1140 | 3" 1/2 E |
| **29** | QA | QB | | | | | | |
| **34** | RA | RB | | | | | 1160 | 4 E" |
| **46** | ZA | ZB | EE | EA | EB | EC | - | 6" E |

(*) Kit includes: plates pack, calibrated screws, nuts
(**) Kit includes: hub, calibrated screws and OR rubber

Tab. **K**

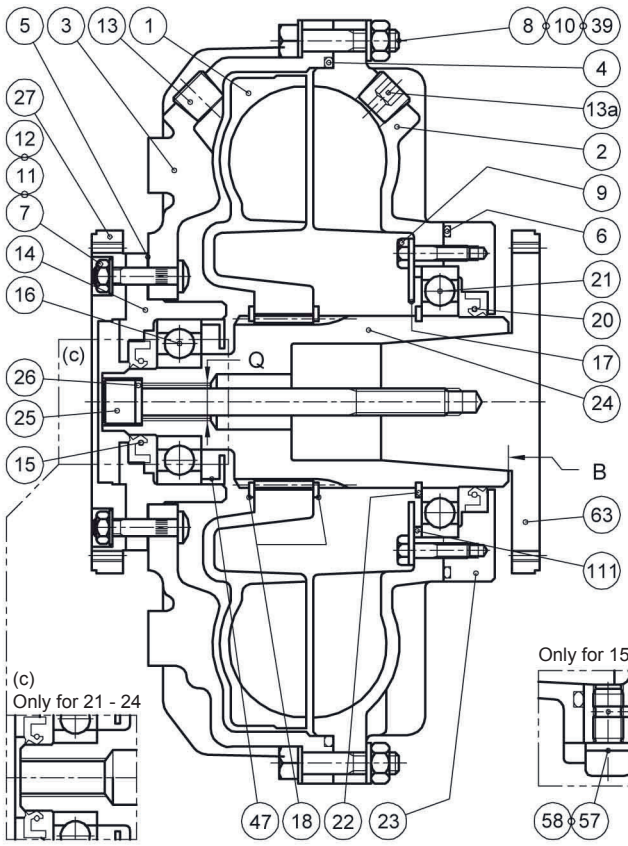
| DIM. | Q |
|---|---|
| **7-8** | M12 |
| **9-11-12** | M20 |
| **13-15-17-19** | M27 |
| **21-24** | M36 |
| **27-29-34** | M45 |
| **46** | M52 |

Tab. **L**

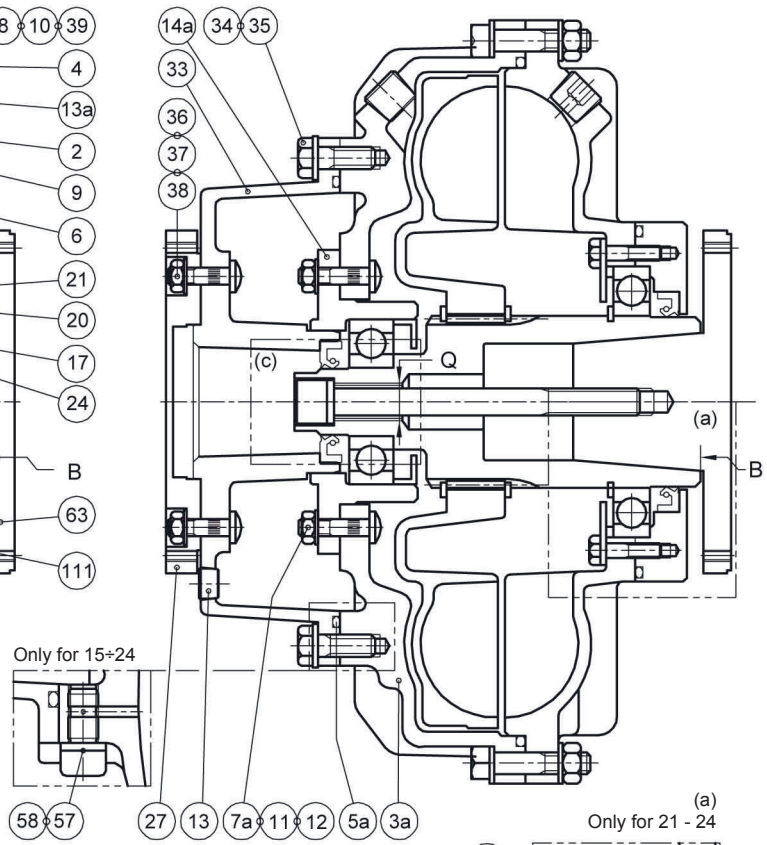
| ...KDM ...KCG | Screw pos. 7-7a | | Screw pos. 9 | | Nut pos. 10 | | Nut pos. 11-37 | | Screw pos. 25 | | Screw pos. 34 | | Screw pos. 48-48a | | Calibrated bolt pos. 53a-54a | | Bolt pos.53-54 | | Nut pos. 54a | | Screw pos. 56 | | Valve pos. 57 | | Screw pos. 60 | | Screw pos. 64 | | Screw pos. 72 | | Screw pos. 78 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | dia | Nm | dia | Nm | dia | Nm | dia | Nm | dia | Nm | dia | Nm | dia | Nm | dia | Nm | dia | Nm | dia | Nm | dia | Nm | dia | Nm | dia | Nm | dia | Nm | dia | Nm | dia | Nm |
| **7-8** | - | - | M6 | 10 | M6 | 10 | M7 | 16 | M10 | 50 | - | - | - | - | 1/4" 28 UNF | 12 | - | - | 1/4" 28UNF | 12 | - | - | - | - | - | - | - | - | - | - | - | - |
| **9-11** | | | M8 | 24 | M8 | 24 | M8 | 24 | M16 | 205 | M8 | 24 | | | 3/8" 24UNF | 42 | M8 | 34 | 3/8" 24UNF | 42 | M8 | 35 | - | - | | | - | - | | | | |
| **12** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **13** | | | | | | | M10 | 50 | M20 | 400 | | | - | - | | | M10 | 67 | - | - | M10 | 70 | M8 | 7 | - | - | | | - | - | - | - |
| **15** | | | M10 | 54 | M10 | 50 | | | | | | | | | 5/8" 11UNC | 203 | M12 | 114 | | | | | | | | | | | | | | |
| **17-19** | | | | 84 | | | | | | | M10 | 50 | | | | | M14 | 180 | | | | 84 | | | | | | | | | | |
| **21** | | | M14 | 135 | M12 | 85 | M14 | 135 | - | - | | | | | | | M18 | 380 | - | - | M14 | 190 | M12 | 20 | | | M12 | 143 | | | | |
| **24** | | | | | M14 | 115 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **27** | | | | | | 135 | | | | | M14 | 135 | | | 3/4" 10UNC | 460 | M22 | 725 | | | | | | | | | M16 | 346 | | | | |
| **29** | | | | | M16 | 205 | M16 | 205 | | | | | | | | | | | | | | | | | | | | | | | | |
| **34** | | | M16 | 205 | M18 | 283 | | | | | | 190 | M16 | 174 | | | M24 | 930 | | | M16 | 346 | | | | | | | | | | |
| **46** | M22 | 332 | M20 | 400 | M20 | 400 | - | - | | | M18 | 283 | M20 | 400 | 7/8" 9UNC | 550 | - | - | | | - | - | M16 | 45 | M6 | 10 | M24 | 1117 | M22 | 1117 | M18 | 410 |

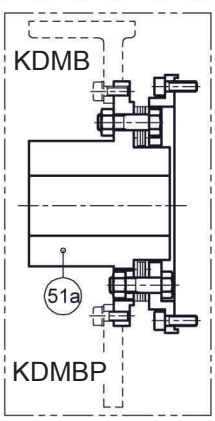
Fig. **11 ( 9 ÷ 24...K)**

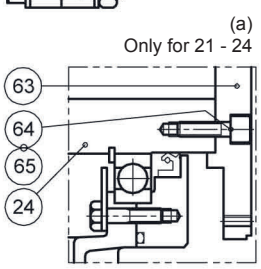
KDM

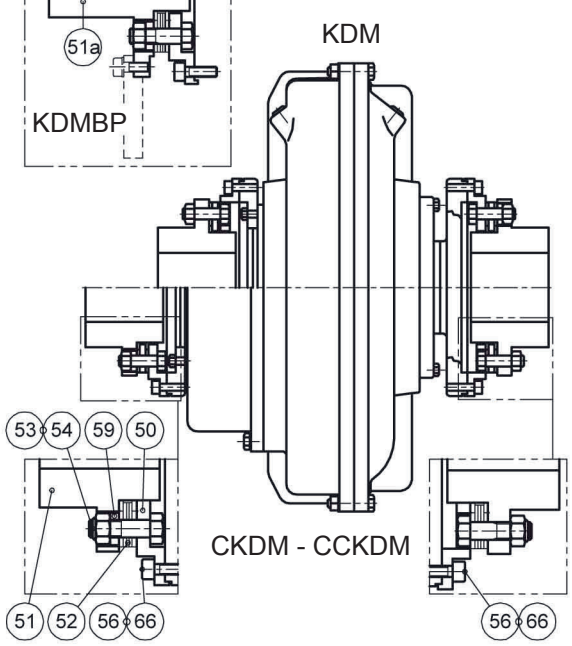



CKDM - CCKDM



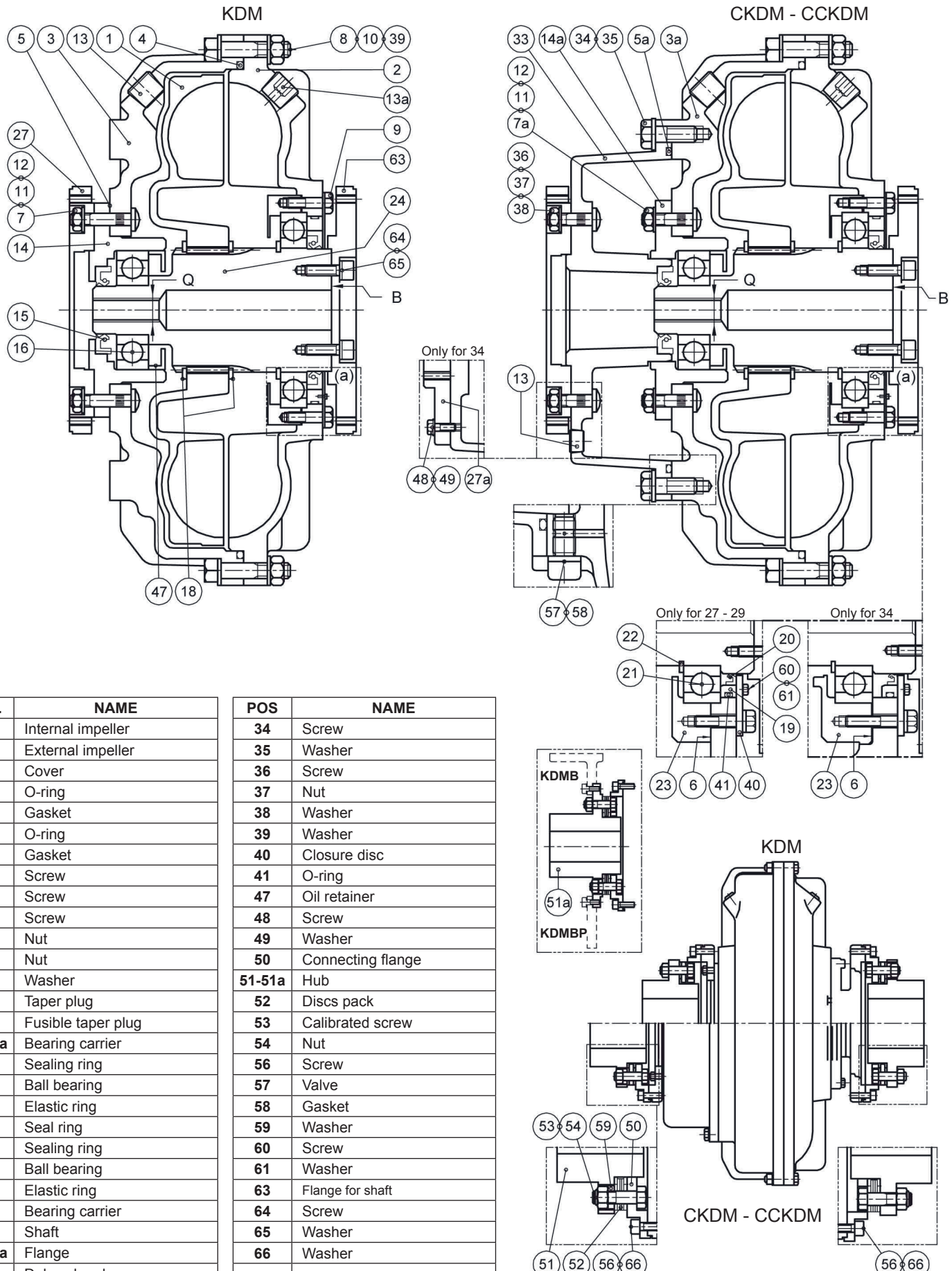




| POS. | NAME |
|---|---|
| **1** | Internal impeller |
| **2** | External impeller |
| **3-3a** | cover |
| **4** | O-ring |
| **5** | Gasket |
| **5a** | O-ring |
| **6** | O-ring |
| **7-7a** | Screw |
| **8** | Screw |
| **9** | Screw |
| **10** | Nut |
| **11** | Nut |
| **12** | Washer |
| **13** | Taper plug |
| **13a** | Fusible taper plug |
| **14-14a** | Bearing carrier |
| **15** | Sealing ring |
| **16** | Ball bearing |
| **17** | Shield |
| **18** | Elastic ring |
| **20** | Sealing ring |
| **21** | Ball bearing |
| **22** | Elastic ring |
| **23** | Bearing carrier |
| **24** | Shaft |

| POS | NAME |
|---|---|
| **25** | Tie screw |
| **26** | Washer |
| **27** | Flange |
| **33** | Delay chamber |
| **34** | Screw |
| **35** | Washer |
| **36** | Screw |
| **37** | Nut |
| **38** | Washer |
| **39** | Washer (only for 12÷24) |
| **47** | Oil retainer |
| **50** | Connecting flange |
| **51-51a** | Hub |
| **52** | Discs pack |
| **53** | Calibrated screw |
| **54** | Nut |
| **56** | Screw |
| **57** | Valve |
| **58** | Gasket |
| **59** | Washer |
| **63** | Flange for shaft |
| **64** | Screw (only for 21÷24) |
| **65** | Washer (only for 21÷24) |
| **66** | Washer |
| **111** | Spacer (only for 9÷11) |

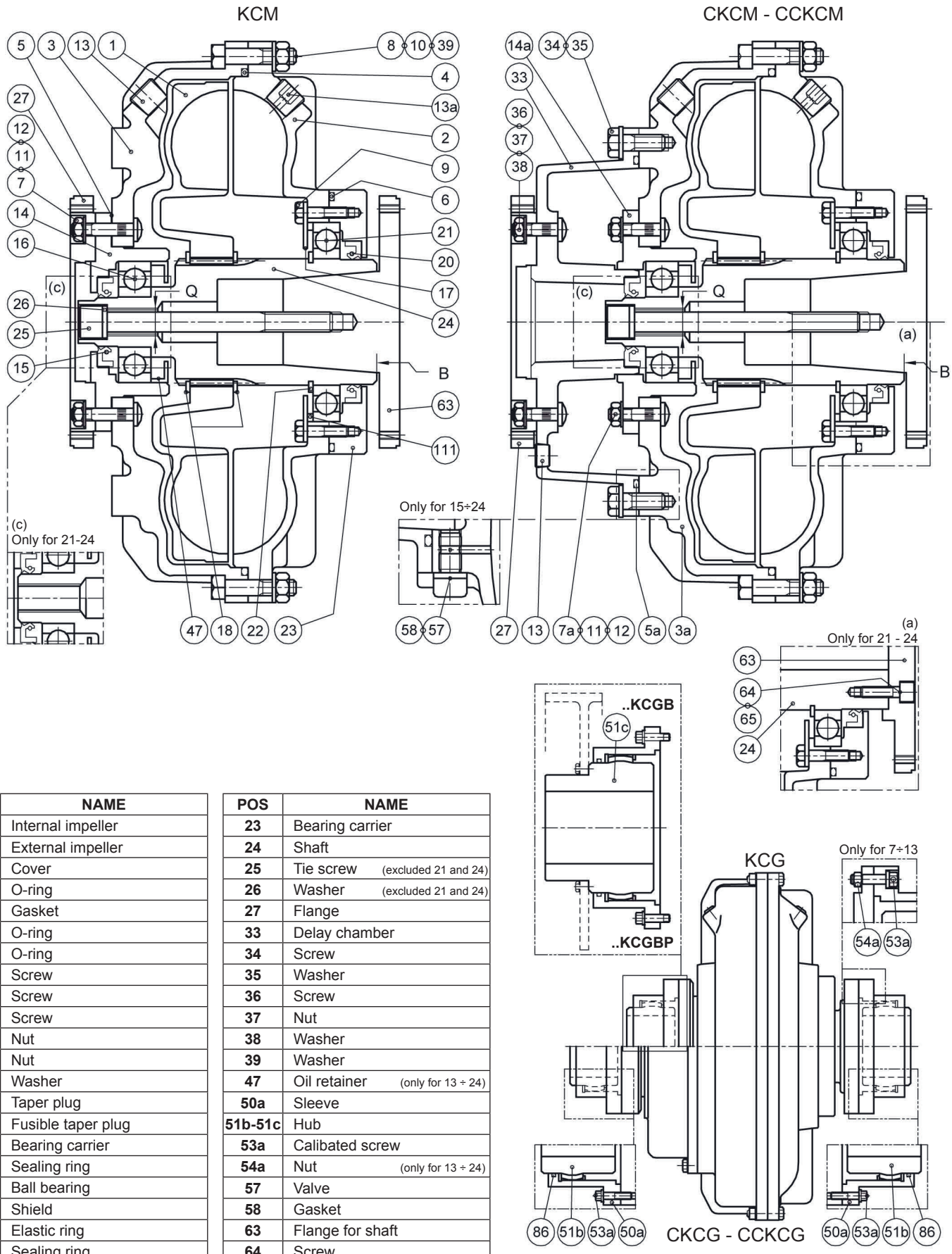
Fig. **12 ( 27K ÷ 34K)**




| POS. | NAME |
|---|---|
| **1** | Internal impeller |
| **2** | External impeller |
| **3-3a** | Cover |
| **4** | O-ring |
| **5** | Gasket |
| **5a** | O-ring |
| **6** | Gasket |
| **7-7a** | Screw |
| **8** | Screw |
| **9** | Screw |
| **10** | Nut |
| **11** | Nut |
| **12** | Washer |
| **13** | Taper plug |
| **13a** | Fusible taper plug |
| **14-14a** | Bearing carrier |
| **15** | Sealing ring |
| **16** | Ball bearing |
| **18** | Elastic ring |
| **19** | Seal ring |
| **20** | Sealing ring |
| **21** | Ball bearing |
| **22** | Elastic ring |
| **23** | Bearing carrier |
| **24** | Shaft |
| **27-27a** | Flange |
| **33** | Delay chamber |

| POS | NAME |
|---|---|
| **34** | Screw |
| **35** | Washer |
| **36** | Screw |
| **37** | Nut |
| **38** | Washer |
| **39** | Washer |
| **40** | Closure disc |
| **41** | O-ring |
| **47** | Oil retainer |
| **48** | Screw |
| **49** | Washer |
| **50** | Connecting flange |
| **51-51a** | Hub |
| **52** | Discs pack |
| **53** | Calibrated screw |
| **54** | Nut |
| **56** | Screw |
| **57** | Valve |
| **58** | Gasket |
| **59** | Washer |
| **60** | Screw |
| **61** | Washer |
| **63** | Flange for shaft |
| **64** | Screw |
| **65** | Washer |
| **66** | Washer |
| | |

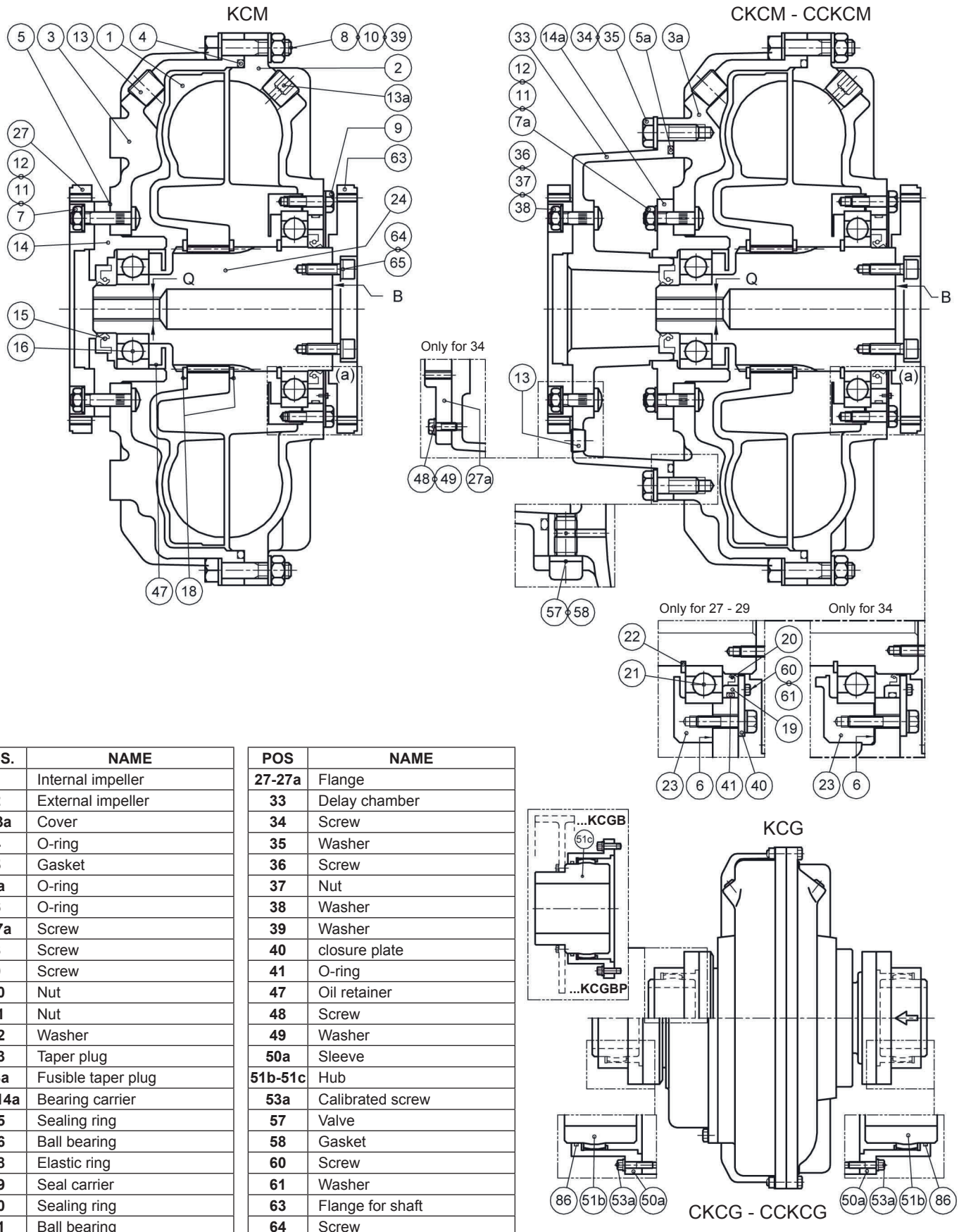
Fig. **13 ( 7K ÷ 24K)**




| POS. | NAME |
|---|---|
| **1** | Internal impeller |
| **2** | External impeller |
| **3-3a** | Cover |
| **4** | O-ring |
| **5** | Gasket |
| **5a** | O-ring |
| **6** | O-ring |
| **7-7a** | Screw |
| **8** | Screw |
| **9** | Screw |
| **10** | Nut |
| **11** | Nut |
| **12** | Washer |
| **13** | Taper plug |
| **13a** | Fusible taper plug |
| **14-14a** | Bearing carrier |
| **15** | Sealing ring |
| **16** | Ball bearing |
| **17** | Shield |
| **18** | Elastic ring |
| **20** | Sealing ring |
| **21** | Ball bearing |
| **22** | Elastic ring |

| POS | NAME |
|---|---|
| **23** | Bearing carrier |
| **24** | Shaft |
| **25** | Tie screw (excluded 21 and 24) |
| **26** | Washer (excluded 21 and 24) |
| **27** | Flange |
| **33** | Delay chamber |
| **34** | Screw |
| **35** | Washer |
| **36** | Screw |
| **37** | Nut |
| **38** | Washer |
| **39** | Washer |
| **47** | Oil retainer (only for 13 ÷ 24) |
| **50a** | Sleeve |
| **51b-51c** | Hub |
| **53a** | Calibated screw |
| **54a** | Nut (only for 13 ÷ 24) |
| **57** | Valve |
| **58** | Gasket |
| **63** | Flange for shaft |
| **64** | Screw |
| **65** | Washer |
| **86** | O-ring |

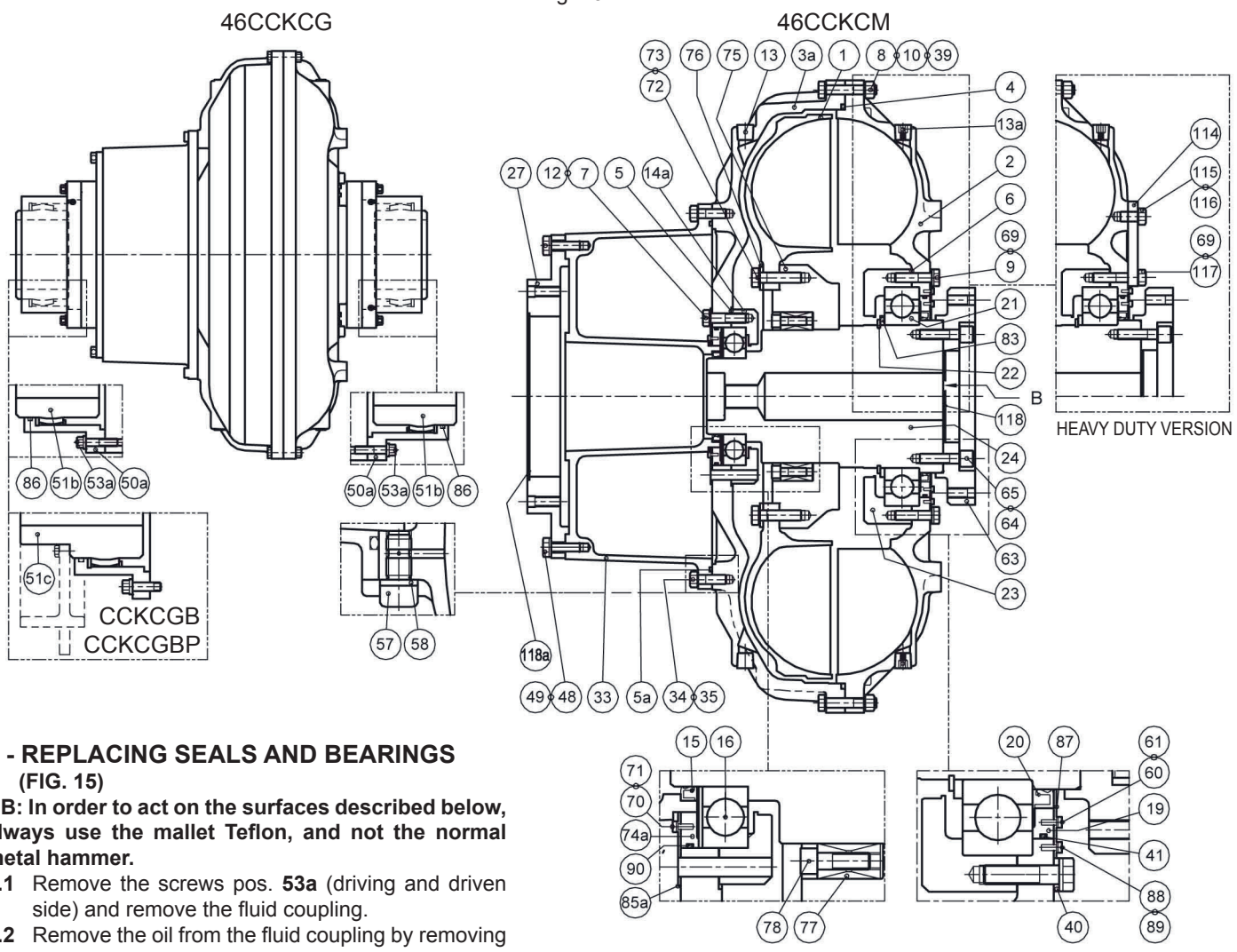
Fig. **14 ( 27K ÷ 34K)**




| POS. | NAME |
|---|---|
| **1** | Internal impeller |
| **2** | External impeller |
| **3-3a** | Cover |
| **4** | O-ring |
| **5** | Gasket |
| **5a** | O-ring |
| **6** | O-ring |
| **7-7a** | Screw |
| **8** | Screw |
| **9** | Screw |
| **10** | Nut |
| **11** | Nut |
| **12** | Washer |
| **13** | Taper plug |
| **13a** | Fusible taper plug |
| **14-14a** | Bearing carrier |
| **15** | Sealing ring |
| **16** | Ball bearing |
| **18** | Elastic ring |
| **19** | Seal carrier |
| **20** | Sealing ring |
| **21** | Ball bearing |
| **22** | Elastic ring |
| **23** | Bearing carrier |
| **24** | Shaft |

| POS | NAME |
|---|---|
| **27-27a** | Flange |
| **33** | Delay chamber |
| **34** | Screw |
| **35** | Washer |
| **36** | Screw |
| **37** | Nut |
| **38** | Washer |
| **39** | Washer |
| **40** | closure plate |
| **41** | O-ring |
| **47** | Oil retainer |
| **48** | Screw |
| **49** | Washer |
| **50a** | Sleeve |
| **51b-51c** | Hub |
| **53a** | Calibrated screw |
| **57** | Valve |
| **58** | Gasket |
| **60** | Screw |
| **61** | Washer |
| **63** | Flange for shaft |
| **64** | Screw |
| **65** | Washer |
| **69** | Washer |
| **86** | O-ring |

Fig. **15**




## 8 - REPLACING SEALS AND BEARINGS
**(FIG. 15)**

**NB: In order to act on the surfaces described below, always use the mallet Teflon, and not the normal metal hammer.**

**8.1** Remove the screws pos. **53a** (driving and driven side) and remove the fluid coupling.

**8.2** Remove the oil from the fluid coupling by removing the plugs pos. **13** and **13a**.

**8.3** Remove the delay chamber pos. 33 removing the screws pos. **34**. The delay chamber will include the flange pos. **27** with screws pos. 48 and the sealing ring pos. **15**.

**8.4** Remove two screws. **7** (diametrically opposed), all bolts pos. **8** and **10**, remove the cover pos. **3a** with a suitable extractor, using the two holes free from pos. **7**; the cover will include: seal carrier pos. **74a**, O-ring pos. **90**, disc pos. **85a** and screws pos. 70.

**8.5** Remove with extractor bearing pos. 16 and bearing carrier pos. **14a**.

**8.6** Remove the impeller pos. **1**, complete with hub pos. **75**, disc pos. **76**, screws pos. **78** and clamping unit pos. **77**.

**8.7** Remove the flange pos. **63**, by removing the screws pos. **64**.

**8.8** Remove the outer impeller pos. **2** by removing the screws pos. **9**; the impeller will include: seal ring and seal carrier pos. **20** and **19**, Oring pos. **41** screws pos. **60** and **88** and discs pos. **40** and **87**.

**8.9** Remove the elastic ring pos. **22** and spacer pos. **83**. Remove the bearing pos. **21**, bearing carrier pos. **23** and gasket pos. **6**.

**8.10** When reassembling, proceed in reverse way replacing all the bearings and seals by tightening the screws with Loctite thread lock type **243**.

**NB: For tightening of nuts, screws and plugs, refer to the torques shown in the following tables:**

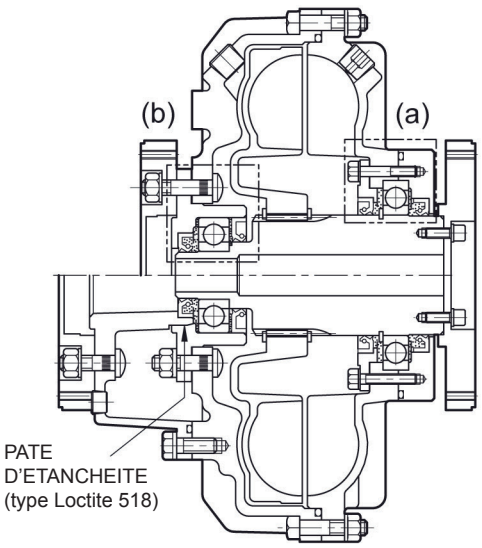
Table E for plugs pos. 13-13a
Table L for other positions.

| POS. | NAME |
|---|---|
| 1 | Internal impeller |
| 2 | External impeller |
| 3-3a | Cover |
| 4 | O-ring |
| 5 | Gasket |
| 5a | O-ring |
| 6 | Gasket |
| 7 | Screw |
| 8 | Screw |
| 9 | Screw (For pos. 40) |
| 10 | Nut |
| 12 | Lock washer |
| 13 | Taper plug |
| 13a | Flusible plug |
| 14a | Bearing carrier |
| 15 | Seal |
| 16 | Ball bearing |
| 19 | Seal carrier |
| 20 | Seal |
| 21 | Ball bearing |
| 22 | Snap ring |
| 23 | Bearing carrier |
| 24 | Shaft |
| 27 | Flange |
| 33 | D.F. chamber |
| 34 | Screw |
| 35 | Lock washer |
| 39 | Lock washer |
| 40 | Plate (or pos. 114) |
| 41 | O-ring |
| 48 | Screw |
| 49 | Lock washer |
| 50a | Sleeve |

| POS. | NAME |
|---|---|
| 51b-51c | Hub |
| 53a | Calibrated screw |
| 57 | Valve |
| 58 | Gasket |
| 60 | Screw |
| 61 | Lock washer |
| 63 | Flange for shaft |
| 64 | Screw |
| 65 | Washer |
| 69 | Lock washer |
| 70 | Screw |
| 71 | Lock washer |
| 72 | Screw |
| 73 | Lock washer |
| 74a | Seal carrier |
| 75 | Hub |
| 76 | Plate |
| 77 | Clamping device |
| 78 | Screw |
| 80 | Seal |
| 83 | Spacer |
| 85a | Plate |
| 86 | O-ring |
| 87 | Plate |
| 88 | Screw |
| 89 | Lock washer |
| 90 | O-ring |
| 114 | Reinforcement plate (or pos. 40) |
| 115 | Screw |
| 116 | Lock washer |
| 117 | Screw (For pos. 114) |
| 118 | Plate |
| 118a | Plate |

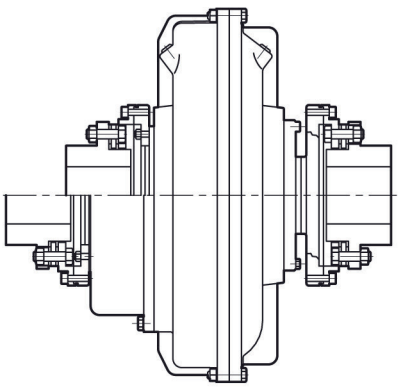
Fig. **16 (13K ÷ 34K)**

KDMW-KCMW



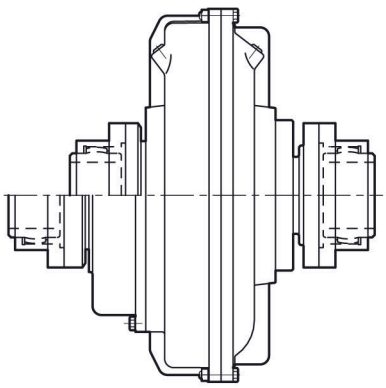

CKDMW - CCKDMW
CKCMW - CCKCMW

KDMW

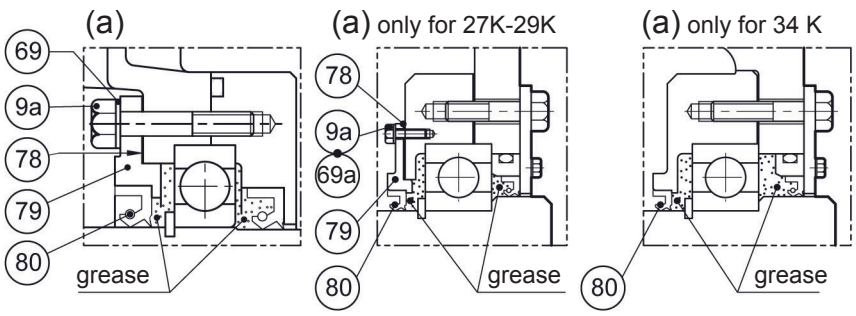


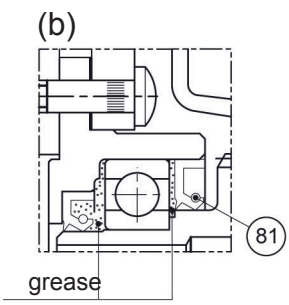
CKDMW - CCKDMW

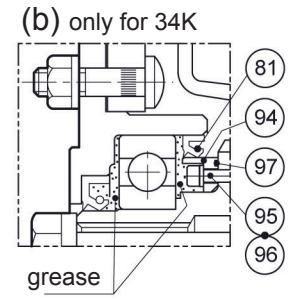
KCGW



CKDGW - CCKDGW




## 9 - FLUID COUPLINGS WITH SPECIAL WORKING FLUID

Fluid couplings **...KDMW - ...KCMW** are different from ordinary fluid couplings because bearings are completely isolated from fluid and are lubricated with grease **ROCOL SAPPHIRE AQUA 2** or equivalent ( for **LT** fluid couplings silicone grease **OKS 1133** must be used).
For installation and maintenance of fluid couplings ...K...W series please comply with prescriptions described in this installation manual except Tab. **D** relevant to working fluid. Such fluid is water mixed with special liquid (AGIP ECOFREEZE or equivalent); this liquid, inhibited propylene glycol based, is usually used in the cooling circuits of all kind of vehicles with internal combustion engines, offering the following advantages: **BIODEGRADABLE, ANTI-FOAMING, NON-FLAMMABLE**. Properly mixed (50% water and 50% special liquid) it **rises the boiling point and lowers the freezing point** (see Tab. **M**). Fluid couplings ...K...W can be operated alternatively with oil suitable for low temperature.
They are supplied complete with fusible plug 109 °C.
It is recommended to check periodically the level of fluid, and if necessary, restore it according to prescriptions described at para. **3**.
For replacement of sealing rings and bearings, comply with prescriptions described at para. 7 with exception described in the paragraphs below.

**9.1** Remove bearing pos. **16** (Fig. **11 - 12 - 13 - 14**) and sealing ring pos. **81**.
**9.2** Remove screws pos. **9a**, the seal carrier pos. **79**, gasket and sealing ring **78** and **80**.
**9.3** When reassembling proceed in reverse order replacing bearings and all seals, placingbetween bearings and seals the grease **ROCOL SAPPHIRE AQUA 2** (or equivalent) as shown in Fig. (**a**) and (**b**) (for **LT** fluid couplings use silicone grease **OKS 1133**).

Tab. **M**

| Volume % | Boiling point | Freezing point |
|---|---|---|
| 50 | 104°C | -33°C |
| 60 | 106°C | -48°C |
| 80 | 118°C | -54°C |
| 100 | 160°C | -60°C |

Tab. **N**

| DIM | Tightening torque | | | |
|---|---|---|---|---|
| | Pos. 9a | | Pos. 96 | |
| | Screw | Nm | Screw | Nm |
| **13-15-17-19** | M10 | 50 | - | - |
| **21-24** | M14 | 135 | - | - |
| **27-29** | | | - | - |
| 34 | M16 | 205 | M8 | 24 |

| POS. | NAME |
|---|---|
| **9a** | Screw |
| **69a** | Washer |
| **78** | Gasket |
| **79** | Seal carrier |
| **80** | Sealing ring |
| **81** | Sealing ring |
| **94** | Seal carrier |
| **95** | Screw |
| **96** | Washer |
| **97** | O-ring |

TF6408A - Rev. 4

# ADDITIONAL RULES FOR USE OF THE FLUID COUPLINGS TYPE ..KR.., ..KDM.., ..KCM, ..KCG.., ..KS.., ..KBM, EK IN HAZARDOUS AREAS

**Following prescriptions complete the Product Installation and Maintenance manual in case a fluid coupling is used in hazardous area according to ATEX standard, in group II, category 2 or 3.**

## 1 - INSTALLATION

For serie ..KR.. misalignment values stated in the manual are subject to the following limitations:

| | |
|---|---|
| radial misalignment (R): | max. of 0,2 mm |
| angular misalignment (A1-A2): | reduces 50% of indicated value |
| distance between coupling halves (k): | dimensional tolerance is± 0,5 mm |

For serie ..KDM.. refer to annex TF6429.
For serie ..KCG.. refer to annex TF6429A..

**All holes must be machined by TRANSFLUID only.**

## 2 - FILLING / WORKING FLUID

In ATEX - CAT 2 environment use fire resistant oil (see TAB. TF6115A) or water+glycol mixture.
In ATEX - CAT 3 environment use standard oil as reported in the manual or water+glycol mixture.

## 3 - OPERATION

- After first start-up verify the tightening of the drive and driven machines screws; it's also recommended to check their tightenings periodically. Check again misalignment.

**It is recommended:**

- to use a strong coupling guard, preferably using a "no-spark" material with openings smaller than the smallest nut installed in the fluid coupling. The coupling guard is intended to protect the environment from the centrifugation of any rotating part and the rotating coupling from any falling object;
- to clean carefully the surfaces of the coupling before every system start, in such a way there is no stratification of dust or dirt in general;
- to use drive belts suitable for the pulley (if installed) and for potentially explosive atmospheres;
- to check periodically the state of wear of the rubber elements of elastic couplings BT/B3T (if installed) and replace them if necessary;
- with the use of specific devices, the continuous checking of temperature of the elastic couplings surfaces. Temperature must not exceed 90°C;
- if a brake disc or brake drum is present, make sure that it is assembled on suitable breaking device that complies to the ATEX directive;
- to check periodically the discs of flexible couplings (if installed) and if cracks, deformation, abnormal vibration or abnormal noise are present replace the whole disc pack.

**Verify every 6 months:**

- washers' conditions: replace them immediately once they show brake signs;
- the wear of o-rings and oil seals: replace them immediately if they are broken or show signs of wear;
- the wear condition of rubber elements (if installed); the rotational gap is always lower than 2°;
- that there are no fluid leaks: in case of leaks overhaul immediately the fluid coupling.

## 4 - ELECTRIC DEVICE

Check every 6 months the functionality of the electric device (if installed).

## 5 - MAINTENANCE

Any overhaul and repair of the fluid coupling must be effected by an official TRANSFLUID service centre that will document performed modifications.

**TRANSFLUID S.p.A. disclaims all responsibility if the user does not observe and does not apply these instructions with scrupulous attention.**

## ADDITIONAL RULES FOR FLUID COUPLINGS ..KR.., ..KDM.., ..KS.. TYPES IN MINES

**Following prescriptions complete the Product Installation and Maintenance Manual in case a fluid coupling is used in hazardous area according to ATEX standard, in group I, category M2.**

### 1 - INSTALLATION

For ..KR.. types maximum misalignments are limited to the following values:

| | |
|---|---|
| radial misalignment (R): | max. of 0,2 mm |
| angular misalignment (A1-A2): | reduces 50% of indicated value |
| distance between coupling halves (k): | |

For ..KDM.. types refer to annex TF6429.

**All holes must be machined by TRANSFLUID only.**

### 2 - FILLING / WORKING FLUID

In ATEX - CAT 2 environment use fire resistant oil (see TAB. TF6115A) or water+glycol mixture.
In ATEX - CAT 3 environment use standard oil as reported in the manual or water+glycol mixture.

### 3 - OPERATION

- After first start-up verify the tightening of the drive and driven machine screws, however it's recommended to check the tightening of them periodically. Check again misalignment.

**It is recommended:**

- to use a strong coupling guard, preferably using a "no-spark" material with openings smaller than the smallest nut installed in the fluid coupling. The coupling guard is intended to protect the environment from the centrifugation of any rotating part and the rotating coupling from any falling object;
- to clean carefully the surfaces of the coupling before every system start, in such a way there is no stratification of dust or dirt in general;
- to use drive belts suitable for the pulley (if installed) and for potentially explosive atmospheres;
- to check periodically the state of wear of the rubber elements of elastic couplings BT/B3T (if installed) and replace them if necessary;
- with the use of specific devices, the continuous checking of temperature of the elastic couplings surfaces. Temperature must not exceed 90°C;
- if a brake disc or brake drum is present, make sure that it is assembled on suitable breaking device that complies to the ATEX directive;
- to check periodically the discs of flexible couplings (if installed) and if cracks, deformation, abnormal vibration or abnormal noise are present replace the whole disc pack.

**Verify every 6 months:**

- washers' conditions: replace them immediately once they show brake signs;
- the wear of o-rings and oil seals: replace them immediately if they are broken or show signs of wear;
- the wear condition of rubber elements (if installed); the rotational gap is always lower than 2°;
- that there are no fluid leaks: in case of leaks overhaul immediately the fluid coupling.

### 4 - ELECTRIC DEVICE

Check every 6 months the functionality of the electric device (if installed).

### 5 - MAINTENANCE

Any overhaul and repair of the fluid coupling must be effected by an official TRANSFLUID service centre that will document performed modifications.

**TRANSFLUID S.p.A. disclaims all responsibility if the user does not observe and does not apply these instructions with scrupulous attention.**

TF6429 - Rev.1

## ADDITIONAL RULES FOR USE IN HAZARDOUS AREAS OF DISC COUPLINGS INSTALLED ON FLUID COUPLINGS

In case of use of disc couplings in potentially explosive atmospheres ,  further to the general assembly and maintenance instructions, the specific measures described in this attachment must be taken.

### 1 - Use of the coupling

The coupling is dedicated for use in potentially explosive atmospheres according to European Directive 94/9/CE (Atex 100 A).
Coupling is classified in equipment group II, equipment category 2 and 3, temperature class T4 and is intended for use in areas in which explosive atmospheres caused by gases, vapors, mists of air/dust mixtures are likely to occur.
Only in case the disc coupling is mounted on fluid coupling the assembly of both is also ready to be used in mine (group I), M2 category.

### 2 - Warnings

No modification must be made on the supplied and marked product.
Besides the general assembly and maintenance instructions, in explosive atmosphere the following prescriptions must apply:

- before proceeding with any assembly, operation or maintenance operation on the coupling, make sure that the necessary measures have been taken to ensure safety, such as but not limited to:
  - proper ventilation of the area;
  - proper lightning and electrical tools.
- If hub must be heated for assembly on the shaft, make sure that heating source and surface temperature will not affect the safety of the working area.
- It is recommended to have a strong coupling guard, preferably in “no-spark” material with openings (if any) smaller than the smallest centrifugable part (nut is 10 mm dia). The coupling guard is intended to protect the environment from the centrifugation of any rotating part and the rotating coupling from any falling part. To limit ventilation effects, distance between cover and coupling outside surface must be at least 50 mm.

### 3 - Assembly

Besides the general assembly and maintenance instructions, in explosive atmosphere the following prescriptions must be observed:

- maximum machine disalignments must be reduced by 50% respect to the ones reported in the manual;
- in cold condition the heat expansion during running has to be taken into account.

### 4 - Operation

The general assembly and maintenance instructions must apply in any case.
In explosive atmosphere, the following specific instructions must apply:

- Before Start-up
  - Make sure coupling is perfectly clean and properly aligned;
  - make sure, screws, nuts are properly tightened;
  - coupling guard must be properly installed and fixed;
  - monitoring system, if any, must be tested to verify its effectiveness.
- During start up
  - Check for any abnormal noise and/or vibration. If any of these happens, stop the machine immediately and take appropriate action.
- Checking intervals during operation
  - After the first 3000 hours or 6 months:
    - inspect external disc for any fatigue crack;
    - verify alignment.
- Continuous checking
  - Immediately stop the machine if noise, vibrations or other abnormal phenomena are detected during operation.
  - Furthermore, if direct check is not possible for access or safety reasons, proper monitoring system has to be installed to follow up couplings behaviour.

### 5 - Maintenance

The general assembly and maintenance instructions must apply in any case.
In explosive atmosphere the following specific instructions must apply:

- Every 8.000 hours or 18 month:
  - dismount the coupling and inspect;
  - proceed as indicated in point **3- Assembly**

TF6429A - Rev.2

## ADDITIONAL RULES FOR USE IN HAZARDOUS AREAS OF GEAR COUPLINGS

In case of use in potentially explosive atmospheres of gear couplings, further to general assembly and maintenance instructions, specific measures described in this attachment must be taken.

### 1 - Use of the coupling

The coupling is dedicated for use in potentially explosive atmospheres according to European Directive 94/9/CE (Atex 100A), with ambient temperature not exceeding 50°C. Coupling is classified in equipment group II, equipment category 2 and 3, temperature class T4 and are intended for use in areas in which explosive atmospheres caused by gases, vapours, mists of air/dust mixtures are likely to occur.

### 2 - Warnings

No modification is allowed on marked products.
In addition to general prescriptions stated in the manual, in explosive atmosphere follwing warnings must be taken:

- before proceeding with any assembly, operation or maintenance operation on the coupling, make sure that the necessary measures have been taken to ensure safety, such as but not limited to:
  - proper ventilation of the area
  - proper lightning and electrical tools.
- If hub must be heated for assembly on the shaft, make sure heating source and surface temperature will not affect the safety of the working area.
- It is recommended to have a strong coupling guard, preferably in “no-spark” material with openings (if any) smaller than the smallest centrifugable part (plug is 6 mm diameter). The coupling guard is intended to protect the environment from the centrifugation of any rotating part and the rotating coupling from any falling part. To limit ventilation effects, distance between cover and coupling outside surface must be at least 50 mm.

### 3 - Assembly

In addition to general prescriptions stated in the manual, in explosive atmosphere follwing warnings must be taken:

- For alignment of the machine in cold condition the possible heat expansion in running conditions must be take into account.
- Max misalignment must be reduced by 50% respect to what indicated in the manual.
- To improve the friction coefficient and the leakage resistance, use following lubricants dedicated for gear couplings:
  - TEXACO Coupling Grease
  - CALTEX Coupling Grease
  - KLÜBER Klüberplex GE 11-680
  - SHELL Albida GC1.

### 4 - Operation

In addition to general prescriptions stated in the manual, in explosive atmosphere follwing warnings must be taken:

- before Start-up
  - Make sure coupling is perfectly aligned and clean.
  - Make sure that screws, nuts and plugs are properly tightened.
  - Coupling guard must be properly installed and fixed.
  - Monitoring system, if any, must be tested to verify its effectiveness.
- During start up
  - Check for any leakage. If any, stop the machine immediately.
  - Check for any abnormal noise and/or vibration. If any, stop the machine immediately.
- Checking intervals during operation
  - After the first 2000 hours or 6 months: check
- for leakage, noise, vibration and loss of parts;
- for free axial movement of the sleeves in regard of the hubs.
  - After 4000 hours or one year
- for leakage, noise, vibration and loss of parts;
- for free axial movement of the sleeves in regard of the hubs
- Continuous checking
  - Immediately stop the machine if noise, vibrations or other abnormal phenomena are detected during operation.
  - Furthermore, if direct check is not possible for access or safety reasons, proper monitoring system has to be installed to follow up couplings behaviour.

### 5 - Maintenance

The general assembly and maintenance instructions must be followed in any case.
In explosive atmosphere, the following additional specific instructions must be taken:

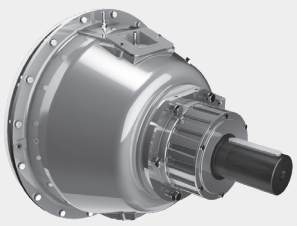
- Every 6.000 hours or 18 months:
  - Dismount the coupling and inspect.

Proceed as indicated in paragraph **3 - Assembly.**

## NOTES / PERIODIC MAINTENANCES

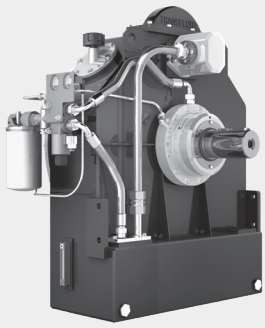
**NOTES / PERIODIC MAINTENANCES**

**PRESE DI FORZA A COMANDO IDRAULICO**
*HF*
potenze fino a 1300 kW



**OIL OPERATED POWER TAKE OFF**
*HF*
Up to 1300 kW

**GIUNTI IDRODINAMICI**
*KPTO*
A riempimento variabile per avviamento graduale disinnesto carico

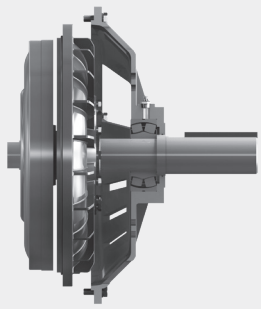


**FLUID COUPLING**
*KPTO*
For internal combustion engine P.T.O. for pulley and caerdan shaft
Up to 1000 kW

**PRESE DI FORZA CON GIUNTO IDRODINAMICO**
*KKFBD*
A riempimento costante
potenze fino a 500 kW

**POWER TAKE OFF WITH FLUID COUPLING**
*KFBD*
Costant fill
Up to 500 kW

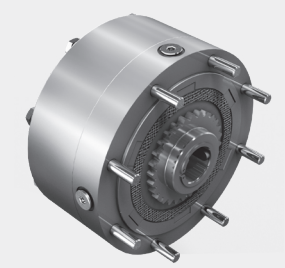
**GIUNTI IDRODINAMICI**
*SKF*
A riempimento costante per motori endotermici.
montaggio diretto su volani predisposti



**FLUID COUPLING**
*SKF*
Costant fill for internal combustion engine

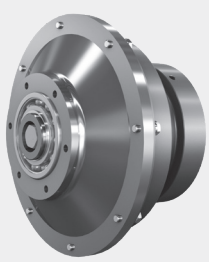
---

**FRENI DI SICUREZZA AD APERTURA IDRAULICA**
*SL*
Per coppie fino a 9000 Nm



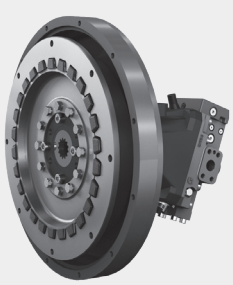
**SPRING LOADED SAFETY BRAKES**
*SL*
Up to 9000 Nm

**FRIZIONI PNEUMATICHE E IDRAULICHE**
*TPO - SHC*
Per coppie fino a
2500 Nm • 2500 Nm • 9000 Nm



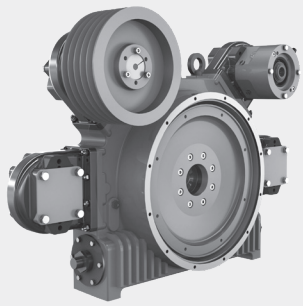
**AIR AND HYDRAULIC CLUTCH**
*TPO - SHC*
Up to 2500 Nm • Up to 2500 Nm
Up to 9000 Nm

**ACCOPPIATORI ELASTICI**
*RBD - SRBD*
Per accomppiamento di motori endotericimi a pompe, compressori, generatori
Per coppie fino a 16000 Nm



**ELASTIC COUPLING**
*RBD - SRBD*
For internal combustion engine, pumps, compressors, generators
Up to 16000 Nm

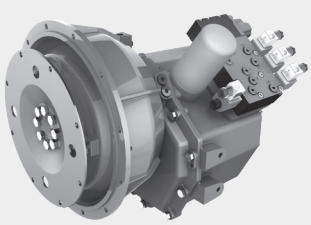
**STELLADRIVE**
*MPD - SPD*
Per motori endotermici
Potenze fino a 1300 kW



**STELLADRIVE**
*MPD - SPD*
For internal combustion engine
Up to 1300 kW

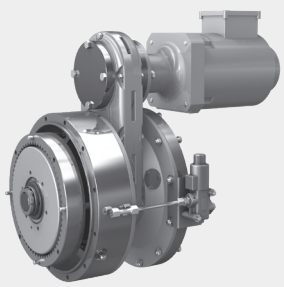
---

**TRASMISSIONI IDRODINAMICHE**
Con convertirore di coppia, fino a tre marce.
Selettore elettrico
Per potenze fino a 95 kW



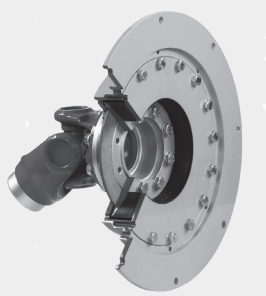
**POWER SHIFT TRASMISSION**
With torque converter
Up to three speeds
Electric selector
Up to 95 kW

**TRASMISSIONE IBRIDA**
*HM*
Modulo ibrido per applicazioni marine e industriali.
per potenze fino a 620 kW



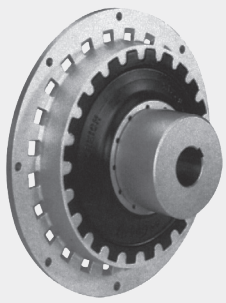
**HYBRID TRANSMISSION**
*HM*
Hybrid module for marine and industrial applications
Up to 620 kW

**GIUNTI ELASTICI PER CARDANO**
*VSK - REICH*
Per coppie fino a 16000 Nm



**ELASTIC COUPLINGS FOR CARDAN SHAFT**
*VSK - REICH*
Up to 16000 Nm

**GIUNTI ELASTICI**
*AC - REICH*
Per abbattimento vibrazioni torsionali
Per coppie fino a 4000 N



**ELASTIC COUPLINGS**
*AC - REICH*
To reduce torsional vibrations
Up to 40000 N

# BASIC GUARANTEE
# TERMS AND CONDITIONS

TRANSFLUID
industrial & marine

TF6401 - Rev. 3

**1) Preamble**

TRANSFLUID guarantees that at the time of shipment, its products comply with the specifications published in its catalogues or technical documents, which were valid at the time of shipment, and that the products are free from defects in material and workmanship. These terms of warranty supersede all other war the course of the services, negotiations or commercial use). Except in the event of serious negligence and fraud, under no circumstances will TRANSFLUID be held liable for direct, indirect, consequential, fortuitous or extra contractual damage based upon claims for compensation by the Buyer for violation of the warranty, contract or objective responsibility.
Under no circumstances can the compensation by TRANSFLUID exceed the amount paid by the Buyer for the product supplied by TRANSFLUID.

**2) Duration and limits of the guarantee**

a) The duration of the warranty is equal to eighteen (18) months from the time the product supplied by TRANSFLUID is commissioned, and nonetheless, no more than twenty-four (24) months from the date of shipment of the original product from TRANSFLUID's plant.

b) Product that are not used and stored for a long period must be kept and handled in keeping with the guidelines, which are available upon request, drawn up by TRANSFLUID according to product type.

c) The wear or tear of parts, which is particularly due to conditions of use (tension of the belts, environmental conditions, unforeseen knocks and overloading), or to the sensitivity of the operator (use within the approved limits) or to external circumstances (jamming of the machine), is not covered by the warranty if these parts have been used (are not new), unless the Buyer can clearly prove the manufacturing defect, which is ascribable to TRANSFLUID.
Typical parts subject to wear or tear include:
- Filters, seals and gaskets
- Springs, screws, plugs
- Switches and fuses
- Material and friction surfaces
- Belts and chains
- Lubricants in general
- Electric components (motors, instruments, accessoires, sensors,...)

d) Installation and maintenance of TRANSFLUID products must be carried out following the installation, use and maintenance manual, which is always supplied with each product and using original spare parts.

e) With regard to the supply of loose/disassembled parts, the warranty solely and exclusively covers faults of the components themselves, related to the material or mechanical workmanship carried out by TRANSFLUID.

f) The warranty is no longer valid when:
- the product is used exceeding the limits stated in the catalogues or installation manuals, or in applications that are not approved by TRANSFLUID;
- breakage results from abuse, negligence, omission or inadequate maintenance, failed connection or control of the protection devices or as a result of accidents;
- the product is modified or disassembled without TRANSFLUID'S written approval.
- the product is repaired or maintained without using original spare parts.

**3) Services included/excluded in the guarantee**

a) In TRANSFLUID'S final decision, products or components, whose faults are covered by the warranty, will be repaired or replaced at no extra cost, with the exception of the subsequent points.
The replaced parts will be covered from the remaining period of the original warranty, which stays in force for the product initially supplied (a new warranty period will therefore not come into effect).

b) Excluded from the warranty and remaining at the Buyer's expense are the costs resulting from:
- Removal of the TRANSFLUID product from the machinery onto which it is fitted, and recommissioning;
- Suitable packing and charges resulting from the return transport of the material;
- Restoration of lubricants in general, piping, sound proof canopies, guards, etc.
- All other costs not expressly approved in writing by TRANSFLUID.

c) The Buyer can request the support of a specialised technician to disassemble/re-install/recommission the product by sending a standard purchase order. TRANSFLUID will invoice the work, applying the current ASSIOT rates (Italian Association of Gears and Transmission Elements Manufacturers, a member of EUROTRANS).

d) TRANSFLUID cannot be held liable for lost or reduced profit, costs for replaced machinery, still machinery, damage to equipment or property caused by failure of its products.

**4) Conditions for requesting services under warranty**

a) If the Buyer intends to take advantage of the guarantee, he must inform TRANSFLUID in writing within 7 (seven) days of discovering a fault, stating:
- Product description;
- Serial number (where foreseen), specification number or article code;
- Reference to the date and document of purchase or delivery;
- Reasonable proof that the fault falls within the conditions of warranty, together with a detailed description of the irregularity or failure and where possible, supported by photographs.
In the event of failure after commissioning the product, the following must also be communicated:
- Type of application;
- Power and engine rpm (stating also the make and model for endothermic engines);
- Diameter, type, number of races and position of pulley (if foreseen by the application);
- Hours of operation.

b) TRANSFLUID will indicate whether the product must be delivered or sent free port to an authorised centre or directly to its own plant depending on the product concerned, the failure indicated and the urgency of the intervention.

c) On receiving the product, TRANSFLUID or the authorised distributor will carry out a thorough analysis; if the product is deemed to be covered by the warranty:
- TRANSFLUID will repair or replace the parts needed to restore full and safe working at no cost;
If the product is NOT deemed to be covered by the warranty, TRANSFLUID:
- will send a technical report explaining its decision;
- will draw up an estimate for the repair;
- will carry out the repair upon receipt of the order from the Buyer.

d) The repaired products will be returned to the Buyer freight collect, by the same means of transport that was used for the arrival (unless stated otherwise).

e) Should the Buyer decide not to accept the estimate for the repair, he must communicate his decision in writing, explicitly asking for the parts to be scrapped or returned; the parts will be sent in their current state.