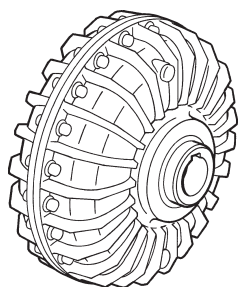


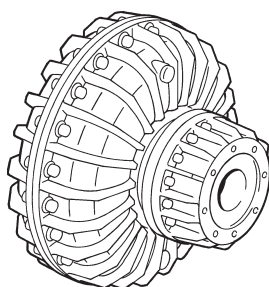


ROTOFLUID

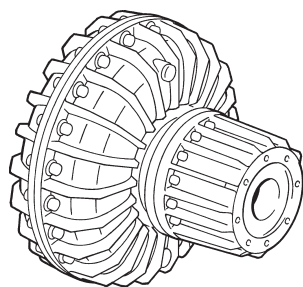
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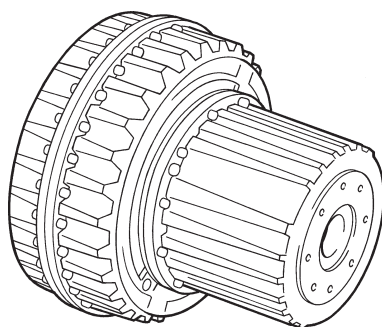
ROTOFLUID



ROTOFLUID-SCF



ROTOFLUID-DCF



ROTOFLUID-CA

Constant-fill HYDRO DYNAMIC COUPLINGS



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ROTOFLUID COUPLING

CLIENT _____

ORDER _____

FLUID COUPLING TECHNICAL DATA SHEET

TYPE OF MACHINE: _____

☐ No-load start-up ☐ Full-load start-up

Load inertia (PD²) _____ kgm²

Full-load start-up time _____ sec.

Bore of driven end shaft _____ mm

Type of work: _____

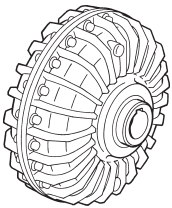
Start-up procedures/h _____ Consecutive start-up _____

No. overloads _____ Load start-up _____ sec.

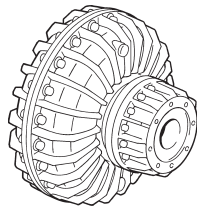
Bore of drive end shaft _____ mm

Operating area temperature _____ °C

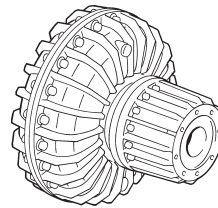
☐ ROTOFLUID



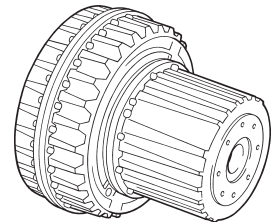
☐ ROTOFLUID SCF



☐ ROTOFLUID DCF



☐ ROTOFLUID CA



Definition: _____ Constant - fill FLUID COUPLING

Type: _____

Code: _____

Series No. _____

Year: _____

Transmission fluid: _____

Filling: ☐ Standard ☐ Calibration

Actuation on primary wheel: ☐ internal (standard)

☐ external (reverse)

Temperature during start-up: max _____ °C

Rated operating temperature: _____ °C

Expected start-up time: _____ S

Maximum start-up time: _____ S

Lubrication ☐ with transmission oil

☐ constant

☐ self-lubricating

SAFETY/TEMPERATURE CONTROL DEVICES SUPPLIED:

TF (Fusible Plug) ☐ 96°C ☐ 120°C ☐ 145°C ☐ 180°C ☐ _____ °C

ETP (Expandable Thermal Plug) ☐ 96°C ☐ 120°C ☐ 145°C ☐ 180°C ☐ _____ °C

T09 (Plug with Thermostat and RPM counter) ☐ 100°C ☐ 120°C ☐ 145°C ☐ 160°C ☐ _____ °C

☐ STANDARD MANUFACTURE

☐ ATEX MANUFACTURE

Ambient: _____ Max temp.: _____ °C Ambient: ZONE _____ Max. Temp: _____ °C

DRIVE SIDE DATA:

Installation: ☐ Horizontal

☐ Vertical

Type of engine: ☐ Diesel

☐ Petrol

☐ Electric

Voltage: _____ V _____ Hz _____ RPM

Installed Power: _____ kW

Power input: _____ kW

DRIVEN SIDE DATAS:

☐ In-line transmission

Flexible coupling: ☐ YES ☐ NO

☐ Drive - through pulley

ROTOFLEXI type _____ Ø bore _____

Primitive diameter: _____

ROTOPIN type _____ Ø bore _____

Race section: _____ No. of races: _____

ROTOGEAR type _____ Ø bore _____

Ø bore _____ Ø bore _____

LAMELLAR type _____ Ø bore _____

OPTIONAL

☐ Brake disc

type _____

☐ Brake drum

type _____

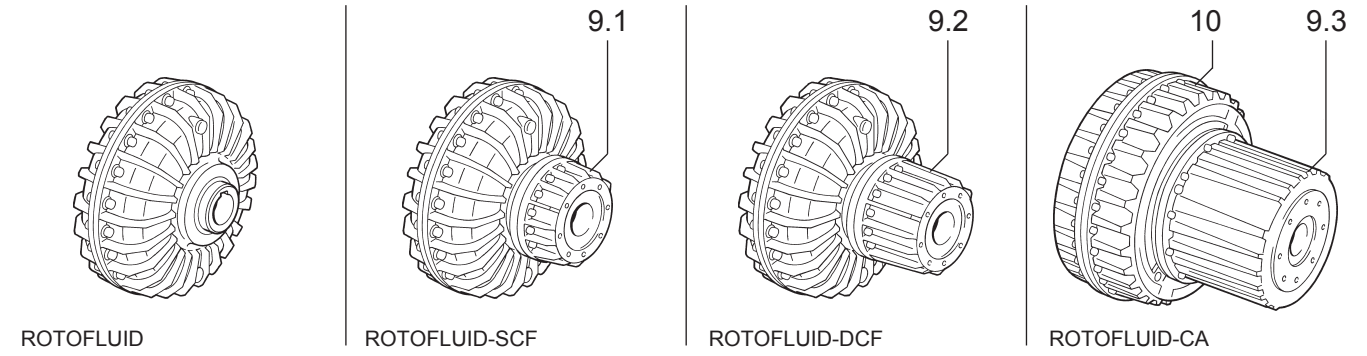


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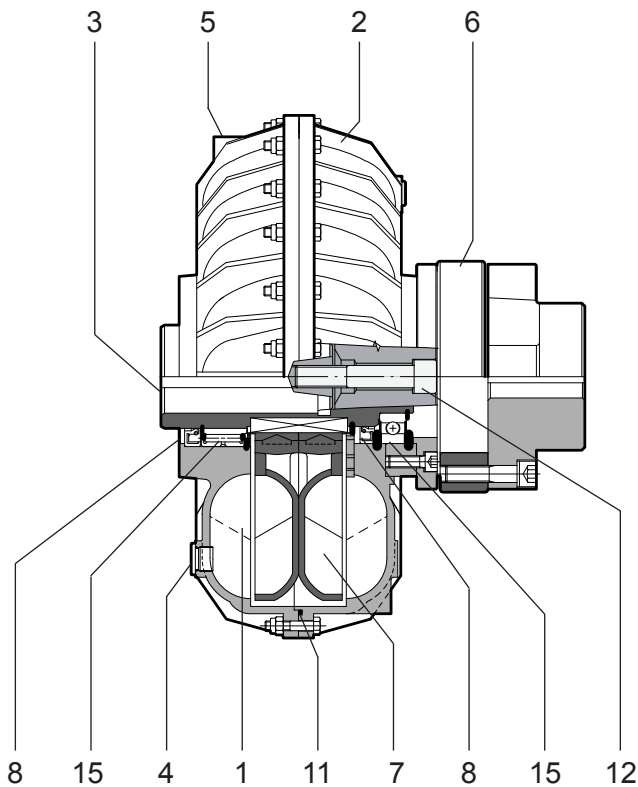
0.3 COMPONENT DEFINITIONS



TYPES OF FLUID COUPLINGS

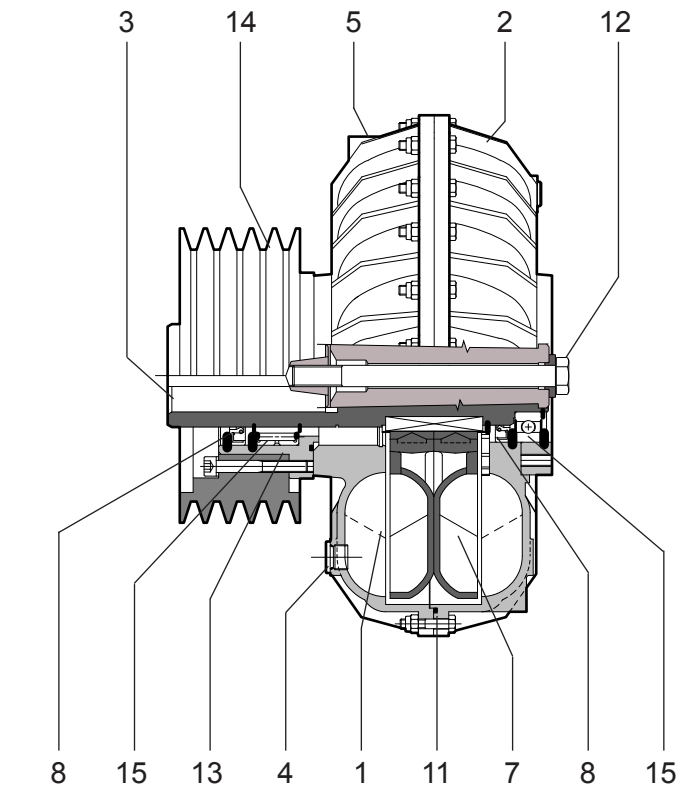


ROTOFLUID ALFA (in-line)



POS.	DEFINITION
1	TRANSMISSION FLUID
2	OUTER SHELLS (external part)
3	HOLLOW SHAFT and INNER PRIMARY WHEEL (internal part)
4	OIL PLUG POSITION (STANDARD)
5	RADIAL PLUG POSITION (OPTIONAL)
6	FLEXIBLE COUPLING
7	PRIMARY WHEEL
8	ROTATING GASKETS

ROTOFLUID BETA (belt-driven)



POS.	DEFINITION
9.1	SINGLE DELAY CHAMBER SCF
9.2	DOUBLE DELAY CHAMBER DCF
9.3	TRIPLE DELAY CHAMBER CA
10	ANNULAR CHAMBER CA
11	RADIAL SHELL SEALING
12	CENTRAL CLAMPING SCREW
13	PULLEY SLEEVE
14	PULLEY
15	RADIAL BEARINGS



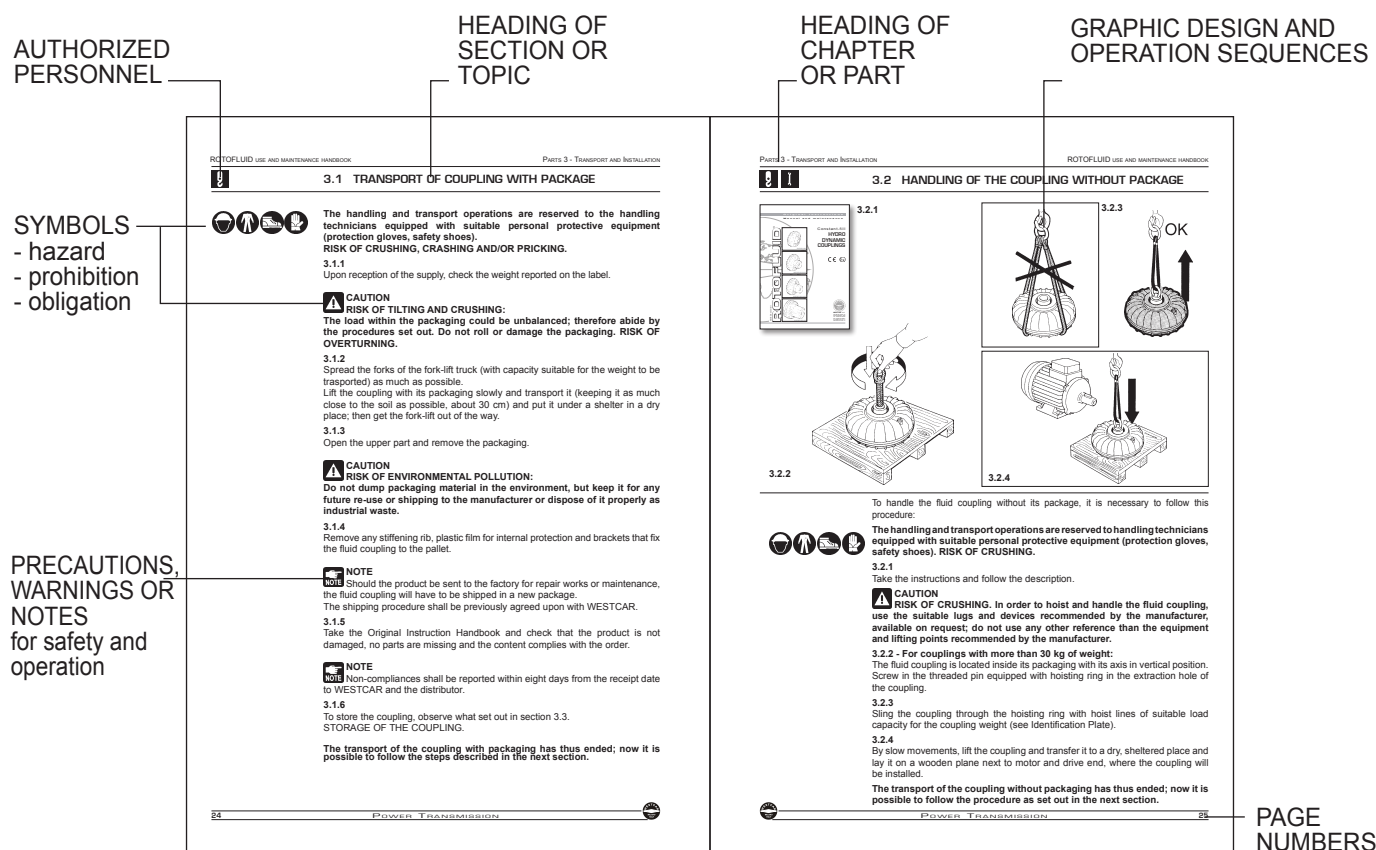


0.4 HANDBOOK LAYOUT AND SYMBOLS

This handbook has been subdivided into topics in order to classify information and operators' activity.

This handbook is composed of several PARTS (chapters) and sections dealing with operational topics to enable correct installation, use and maintenance of the ROTOFLUID fluid couplings.

Pages have the following layout and contents:



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This handbook is an integral part to this partly completed machine and it has to be considered as a SAFETY DEVICE; it provides both the purchaser and the personnel (operators and qualified technicians) with the necessary installation, use and maintenance instructions in order to keep the product safe and in good working order for its whole life-cycle. **We recommend to read and to fully understand the content of this manual.** Topics are dealt with in chapters and sections, so that each stage is clearly illustrated in a numbered step-by-step sequence. At the beginning of each section a bar shows the symbols associated with the personnel qualified for the task.

Any operation-related residual risk is highlighted through suitable symbols in the text. In the handbook some symbols are used to highlight and differentiate particular instructions or recommendations, which are of crucial importance for safe operation and/or correct use and maintenance.

These measures allow WESTCAR to draw operators' and qualified technicians' attention to the CAUTIONS, WARNINGS OR NOTES concerning them.

For any further clarification on the content of this handbook, do not hesitate to contact your WESTCAR Customer Support Service.

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SYMBOL

CAUTION



This signal warns the workers that the described task may involve exposure to residual risks with harmful effects on health and it may result in very serious accidents, should they fail to comply with the procedures and safety regulations herein described.

SYMBOL

WARNING



This signal warns the workers that the described task may damage the partly completed machine and its components; failing to comply with the safety rules may involve consequent risks for the operator and/or the environment.

SYMBOL

NOTE



It provides information on the task in progress, when it needs to be highlighted due to its great technical significance.

SYMBOL

PRODUCT MANUFACTURED ACCORDING TO THE ATEX STANDARD



The fluid coupling bearing this mark has been manufactured according to the ATEX standards in compliance with the ATEX Directive 2014/34 EU.

SYMBOL

SYMBOLS OF DANGER

In combination with the text, they point out the type of residual risk that the task in progress may involve:



Danger of ignition and/or zones with explosive atmosphere



General hazard



Heated areas, danger of burns



Moving components



Danger of explosion



Fire danger



Dangerous voltage and risk of electric shock



Risk of slippery floor and falling

SYMBOL

SYMBOLS OF PROHIBITION

In combination with the text, they point out the type of prohibition that shall be observed during the described activity:



Do not touch and keep away



Do not remove protections and guards, when machine is operating



Do not lubricate or interfere with moving parts.

SYMBOL

SYMBOLS FOR MANDATORY SIGNS

In combination with the text, they point out the type of individual protection that must be used to carry out the described intervention:



It is mandatory to wear protection gloves



It is mandatory to wear protection shoes



It is mandatory to wear protective clothing



It is mandatory to use protection helmets



It is mandatory to disconnect voltage before any task

SYMBOL

HANDLING OPERATOR



It identifies the kind of worker, who qualifies for the task in question. The workers, who qualify for this task must have thorough knowledge and understanding of the manufacturer's handbook instructions as well as specific competencies and knowledge of hoisting equipment and systems, slinging and safe handling features.

SYMBOL

MACHINE OPERATOR



It identifies the kind of worker, who qualifies for the task in question. This qualification is based on thorough knowledge and understanding of the manufacturer's instruction handbook as well as the required training. Special engineering competencies are required to accomplish mechanical installation and assembly. When this sign is matched with the explosion protection symbol, the technician or operator must have a profound and specific knowledge of the safety rules necessary to work in these environments.

SYMBOL

MECHANICAL INSTALLER



It identifies the kind of worker, who qualifies for the intervention in question. This qualification is based on thorough knowledge and understanding of the manufacturer's instruction handbook as well as the completion of the required training. Specific requirements and competencies are required to carry out both mechanical repair and ordinary maintenance. When this sign is matched with the explosion protection symbol, the technician or operator must have a profound and specific knowledge of the safety rules necessary to work in these environments.

SYMBOL

EXTRAORDINARY INTERVENTIONS



It identifies the tasks solely and exclusively reserved to technicians of the WESTCAR Customer Support Service.



1.1 WESTCAR INSTRUCTION LETTER ON DELIVERY

If equipped with suitable ATEX marking, the fluid coupling of the ROTOFLUID series has been designed and manufactured in compliance with the 2006/42/EC Directive (concerned points) and the ATEX 2014/34/EC Directive.

It is not harmful for the operator, if it is used according to the instructions of this handbook and provided that the safety equipment is constantly kept in good working order.

This paper aims at certifying that, on receipt of the fluid coupling:

- the coupling safety equipment is undamaged and efficient;
- the fluid coupling is delivered with this handbook and the user takes the responsibility to read and understand it as well as to follow it step-by-step.

The manual must be kept in good condition and the instructions about maintenance, safety inspections, warnings and prescriptions shall always be kept available on site for the technicians, who are in charge of the installation and final operators.

The manufacturer is not liable for any modification, tampering or any alteration accomplished in violation of what above described and dealt with in this handbook. Any modification not duly authorised in written by Westcar may be dangerous to safety, people's and animals' health or property near the machine. The manufacturing company has committed itself to developing an easily searchable guide aimed at illustrating any function and performance of the fluid coupling as well as the safety-related aspects to fully exploit its potential.

The drawings and any other document delivered with the hydrodynamic coupling are the property of WESTCAR, which reserves all rights and forbids any conveyance to third parties without its written authorization.

ANY INTEGRAL OR PARTIAL REPRODUCTION THROUGH ANY MEANS OF THIS MANUAL AND ITS CONTENT, TEXT OR PICTURES, IS STRICTLY FORBIDDEN.



1.2 FLUID COUPLING IDENTIFICATION

Each WESTCAR fluid coupling is equipped with a small identification plate which, besides the manufacturing code and serial number, shows important safety information necessary for transport and handling, installation and maintenance as well as for its correct use.



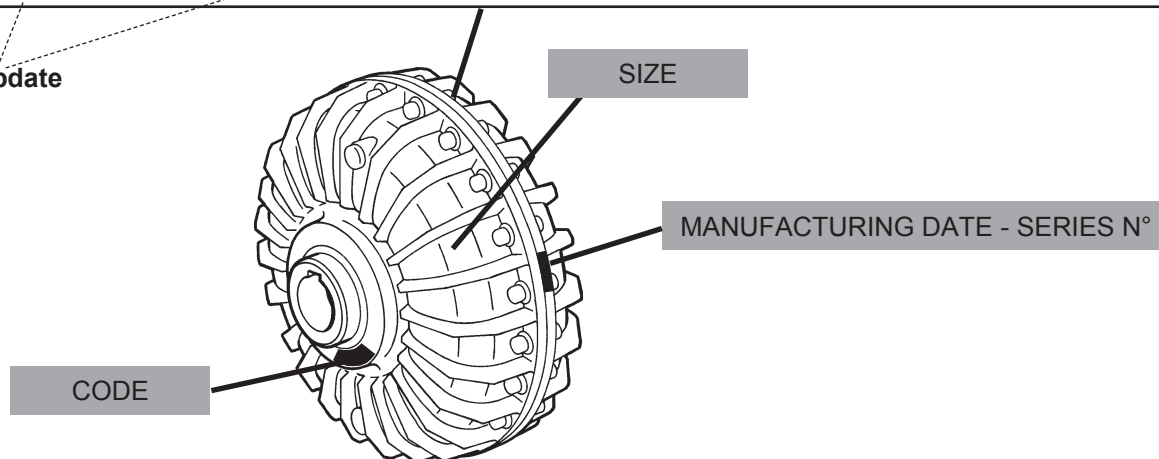
CAUTION

Any removal and/or alteration of the ID plate and the data reported in it may determine the expiry of the warranty and the loss of compliance with the mentioned directives.

To contact the manufacturer or other Customer Support Service authorized by WESTCAR, always point out the data showed on the identification plate. Below you can read the content of the fields of the ID plates fixed on the ROTOFLUID hydrodynamic couplings.

A	B	C	I	G	L	Q	M	N
WESTCAR S.r.l. - Via Monte Rosa 14 - 20149 Milano - ITALY			ANNO / YEAR		Peso/Weight kg	Pot./Power kW	Parte motrice	
Nome/Name: GIUNTO IDRODINAMICO / HYDRAULIC COUPLING			Installaz./Installation		giri/min /rpm	Driving side		
N° serie / Serial			CE		☐ Verticale/Vertical	Olio/Oil: ISO VG22	☐ Interna/Internal	
					☐ Orizz./Horizontal	lit./lt. ☐ liv./lev. ☐	☐ Esterna/External	
O	D	E	J	F	H	P	K	

update



POS.	FIELD DESCRIPTION
A	WESTCAR logo
B	Manufacturer's identification data
C	Name of the partly completed machine
D	Coupling identification code abbreviation: type
E	Component or accessory identification code
F	EC Marking
G	ATEX marking and protocol no. (if any)
H	ATEX product protection class (if any)
I	Production year

POS.	FIELD DESCRIPTION
J	Product serial number
K	Oil fill data / Calibration
L	Weight of the no-load fluid coupling
M	Maximum admitted rotation speed
N	Connection to the drive end
O	Product code
P	Installation: horizontal / vertical
Q	Drive end: power/rpm



1.3 MARKING OF ATEX FLUID COUPLINGS

The ROTOFLUID constant-fill fluid coupling is manufactured to fulfil the specific client’s needs, in compliance with the 2014/34/UE/ATEX directive.

- The fluid couplings are built:
- **Category I M2** for mining industry
 - **Category II 2 G/D** for surface industries

CE	Ex	I/II	M2/2	G/D	Ex	c	Mb/Gb/Db	IIB/IIC	T3/T4
									Class of temperature: T3=200°C T4=135°C
									Assembly for gas ignition: IIB=Ethylene IIC=Hydrogen acetylene
									EPL Protection Level: - Mb = Mining Protection valid for ordinary functioning and foreseeable malfunction - Gb Db = Surface Protection valid for ordinary function and foreseeable malfunction
									Construction Safety Protection Mode
									Ex - International Sign Ex
									G gas D dust
									M2 High protection category for mining industry 2 High protection category for surface industries
									I Mining II Surface
									Symbol for ATEX marking (2014/34/UE directive)
									European Compliance



1.4 WARRANTY

The ROTOFLUID couplings are submitted to the following controls:

- dimensioning test of single parts,
- balancing in G6.3 ISO grade of single components,
- inspection of seals on the whole surface and gaskets with 4 bar internal pressure,
- concentricity and perpendicularity control of all assembled parts with respect to the rotation axis.

Should abnormalities occur, please call your WESTCAR CUSTOMER SUPPORT SERVICE, which will help you as early as possible.

Please always point out what follows:

- A- Full client's address,
- B- Fluid coupling type and serial number, as shown on the identification plate
- C- Description of the defect or abnormality found.

THE ROTOFLUID CONSTANT-FILL COUPLING IS COVERED BY THE FOLLOWING WARRANTY:

1 Warranty Conditions

The WESTCAR guarantee term is 12 months (barring different forms of contract) for all defective mechanical parts with exemption of all worn parts. The guarantee term starts from the machine delivery date as shown in the delivery note.

2 Defect Report

The purchaser shall notify in written to WESTCAR within 8 days the defect found.

3 Defective Materials

WESTCAR may solve any problem due to material, machining or design defects, under the terms set out in point 1 of the warranty.

4 Warranty Extension

In case of repair or replacement of fluid coupling parts, this warranty will not be extended. Our six-month warranty only covers the parts replaced in our workshops.

Our technician's travelling and maintenance expenses as well as the shipping expenses borne for the removal of any defect will be fully charged.

5 Reserved Evaluation

The defective parts shall be returned to WESTCAR, which reserves the right to check them in its own workshops in order to identify the real defects or the external reasons which may have caused the damage. If no defect can be found in the product parts, WESTCAR reserves the right to debit the full cost of the parts previously replaced and covered by this warranty.

TO BE BORNE BY THE PURCHASER:

1 Transport of Materials

Costs and risks of transport of the defective, repaired parts as well as of the parts supplied for replacement, inclusive of any custom duties, are to be borne by the purchaser.

2 Obligations from Warranty

Repair or replacement of the defective parts amount to full satisfaction of the obligations stemming from this warranty.

3 Direct and Consequential Damages

This warranty shall NOT include any consequential damage and specifically any machine standstill or production downtime.

4 Wear-and-Tear of Materials

The warranty does not cover the usual wear-and-tear of any material.

5 Exclusion from Warranty

Any damage resulting from improper or negligent use, wrong maintenance of the part, transport or any circumstance other than operating or manufacture defects is not included in this warranty.

6 Disclaimer of responsibility

Warranty cover expires in case of improper use, wrong application and disregard of the instructions of this handbook.

All WESTCAR products are covered worldwide by this "Product Liability Insurance"



1.5 GENERAL NOTES ON DELIVERY

Upon delivery, please check that the number of packages matches what reported in the delivery note:

- ROTOFLUID fluid coupling
- Use and maintenance handbook (Original Instructions)
- Warning plate kit
- Overheating control devices (TF, TE, PM+T09)
- Accessories (if any)

Please also check what follows:

- 1- the parcel is intact,
- 2- shipping data (consignee's address, number of parcels, order no.) matches the order and the goods delivery note.
- 3- the delivered objects are not damaged.

Should any of the parts be damaged or missing, please inform immediately (within 8 days from receipt) the manufacturer or the local distributors or agents, the forwarding agent and/or the insurance company providing details (photographs, if needed).

The operator in charge of the maintenance must conveniently store the supplied materials under shelter, in a dry and safe place, not accessible to unauthorized personnel.



1.6 FLUID COUPLING DESCRIPTION

The ROTOFLUID constant-fill fluid coupling is composed of two opposing radial blade wheels, one being integral to the motor shaft or drive end, named pump or primary wheel, and the other connected to the machine or driven end, named turbine or secondary wheel.

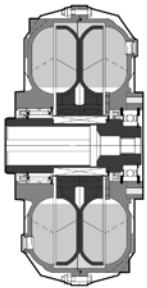
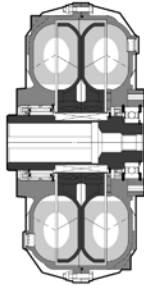
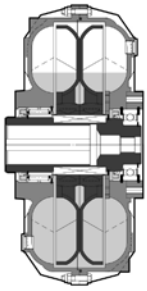
Both the pump and the turbine are not connected to each other and the movement and torque transmission occur without wear by means of a suitable transmission fluid in the fluid coupling.

The mechanical energy output from the motor or drive end, which the coupling pump is connected to, is transformed into hydrodynamic energy of the transmission fluid (inside the coupling), which being in contact with the opposing turbine, converts it into mechanical energy again, while the torque is gradually transmitted to the driven end.

The operating principle of the transmission torque of the ROTOFLUID coupling provides for a series of important advantages for the mechanical protection of transmission elements: soft starts, a remarkable reduction in power and energy consumption on start-up as well as an important protection against overload at full capacity.



1.7 OPERATING PRINCIPLE



To operate, the mechanical status of the fluid coupling and the transmission fluid it contains must undergo three main changes:

Step 1: DRIVE END STOP

The stopping of the motor or the drive end, which the pump is connected to, determines a state of hydrostatic equilibrium of the filling fluid inside the fluid coupling and the lack of motion and torque transmission.

Step 2: START-UP

By starting the motor or drive end, the pump starts speeding up the transmission fluid by progressively creating a hydrodynamic dragging force in the hydraulic circuit of the coupling, which imparts motion and transmits the torque to the turbine (or driven end).

This step results in a higher slip of the transmission fluid and the subsequent conversion of the force into thermal energy or heat.

During the start-up phase, the torque is transmitted by the characteristic flow pattern of the fluid in the hydraulic circuit (ROTOFLUID, SCF, DCF or CA) of the coupling and by the type and level of transmission fluid.

Step 3: OPERATION AT FULL CAPACITY

Once operation at full capacity is reached, the fluid coupling only transmits the requested torque to the driven machine.

During correct operation at full capacity of the constant-fill fluid coupling, the differential between input and output revolutions, which is defined RATED SLIP, is very small, while a constant hydrodynamic effect of the transmission fluid is obtained inside the coupling.



1.8 INTENDED USE AND SAFETY DEVICES

INTENDED USE

The ROTOFLUID constant-fill fluid couplings have been designed and built to transmit the torque (or torsional moment) from the motor (or drive end) to the driven machine through a suitable internal transmission fluid, so to obtain a gradual start-up without resorting to any starting equipment (delta-star start-up, inverter, static starter).

The correct intended use of the constant-fill fluid coupling is determined by an installation, which complies with the following requirements:

- correct dimension of the coupling (size),
- correct definition of circuit pattern (ROTOFLUID, SCF, DCF or CA),
- quantity and type of transmission fluid (transmission oil) for the type of requested start-up,
- maximum number of consecutive start-up procedures / start-up procedures per hour
- suitable safety and temperature control devices
- correct use of both the standard and ATEX version of the coupling designed for hazardous areas.
- correct connection of the driving end to the external or internal side of the fluid coupling.

Each fluid coupling is thus designed for a specific industrial application, that shall be subsequently respected.

COUPLING DIMENSION

The coupling dimensioning (fluid coupling size) and filling are defined as a function of the power and rpm of the driving end and the torque required by the driven machine (see identification plate).

START-UP TYPE

The WESTCAR coupling is available in four different versions according to the desired hydrodynamic circuit pattern (ROTOFLUID, ROTOFLUID-SCF, ROTOFLUID-DCF, ROTOFLUID-CA); together with the quantity of transmission fluid in the coupling, this pattern defines the ratio between the STARTING TORQUE (ca) and the RATED TORQUE (cn), thus showing a typical transmission curve on start-up.

MAXIMUM NUMBER OF START-UP PROCEDURES

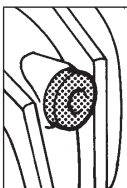
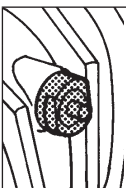
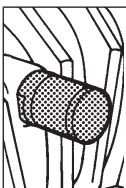
In the event of difficult start-up of the coupling (on load or due to frequent machine start-up), when temperature increases too much if compared to normal operating conditions, it is necessary not to exceed the MAXIMUM NUMBER OF START-UP PROCEDURES/HOUR AND/OR THE MAXIMUM NUMBER OF CONSECUTIVE START-UP PROCEDURES, which shall comply with the results obtained from the formulas reported in the WESTCAR catalogue.

SAFETY AND TEMPERATURE CONTROL DEVICES

The constant-fill fluid coupling is configured according to the specific clients' needs and equipped with one or more safety and/or overheating control devices (TF = Fusible plug, TE = Expandable Trip Plug or PM+T09 = plug with thermocouple and rpm controller, SCD = device for overload control). These devices become an integral part of the coupling configuration and further define the field of application and the boundaries of its intended use (see chapter PART 5). They perform an important safety function against overheating phenomena, that may be originated by overloads on the driven end or abnormal conditions.

IDENTIFICATION OF THE DEVICE TRIGGERING TEMPERATURES

The overheating control devices TF, TE and PM are identified through special stamping and suitable colours, that make easier to recognize the special features of each device:

	TF			TE			PM	
	BLUE	96°C		BLUE	96°C		BLUE	100°C
	WHITE	120°C		WHITE	120°C		WHITE	120°C
	RED	145°C		RED	145°C		RED	140°C
	GREEN	180°C		GREEN	180°C		GREEN	160°C

 **CAUTION**

It is not allowed to change colour or replace the pad of fusible material in the safety and overheating control devices. RISK OF OVERHEATING OF THE COUPLING DUE TO TAMPERING.

DRIVE END CONNECTION TO THE COUPLING

The standard assembly foresees the driving end (motor) connected to the internal part of the coupling. For reversed assembly (motor connected to the external part of the coupling), refer to the identification plate.

 **WARNING**

Size 10 to 65 couplings are reversible and the drive end can be connected to both the internal or external part of the coupling without variations in operation. Conversely, the size 70P to 95P couplings are not reversible and they can only be mounted respecting the data reported on their identification plate.



1.9 IMPROPER AND FORBIDDEN USE OF STANDARD AND ATEX COUPLINGS



CAUTION

Any deviation from the use previously dealt with in these Original Instructions has to be considered as misuse and it is not allowed by WESTCAR.

It is especially forbidden to use the ROTOFLUID constant-fill fluid coupling for the following applications:

- as revolution limiter,
- when the drive end is mounted on the opposite side in spite of what pointed out in the instructions on the fluid coupling,
- when it is mounted in unsuitable locations or in locations, where temperature is higher or lower than expected,
- when torque transmitted is higher than the value requested by the coupling,
- when rotation speed is higher than permitted (see plate),
- when the coupling is filled with a too large or too small amount of transmission fluid in comparison with the quantity reported by the manufacturer,
- when transmission fluids are not appropriate or do not match the fluids recommended by the manufacturer,
- when the start-up time is higher than the maximum time expected,
- when start-up cycles occur in close sequence or exceed the number recommended by the manufacturer,
- in default of safety and temperature control devices or if devices have been tampered with, deteriorated or are different from what reported on coupling configuration (see Technical Data Sheet),
- in case the motor is lacking of an automatic shutdown device, which may block it in the event of transmission fluid leakage (TF) or triggering of maximum temperature devices (TE or PM),
- when there are no suitable protections and/or fluid containment elements for couplings equipped with TF,
- if a suitable ventilation air intake is not available,
- when it is mounted next to intense heating radiation sources, hot air streams,
- next to strong vibration or percussion sources,
- in case of tampering, removal, insertion, deformation due to shocks or fire, which may bring about unbalance,
- in case of both axial or orthogonal installation misalignments, which generate unbalance or vibrations,
- when couplings without ATEX marking are used in potentially explosive atmospheres,
- if checks and maintenance have not been planned as recommended by the manufacturer.

ONLY FOR ATEX FLUID COUPLINGS



CAUTION

Do not install or use fluid couplings without ATEX marking:

- when the coupling be part of ATEX protection or temperature category, which does not match the classification of the location, where it operates,
- in environments, where methane concentration is or may temporarily be equal or higher than 1%,
- when the fluid coupling is lacking of a suitable earthing system and equipotential bonding.



1.10 REQUIREMENTS FOR STANDARD and/or ATEX INSTALLATION

The fluid coupling is a partly completed machine exclusively designed for use in industrial environments and its installation must be in compliance with the following requirements:

- indoor use in a protected location/room,
- ambient temperature between -20°C and $+60^{\circ}\text{C}$ (suitable types of oil must be used),
- atmosphere of the operating zone void of corrosive or acid mists
- plant including a coupling equipped with a safety device TF (Fusible Plug) and provided with both protection guards and fluid collection containers, should the fluid leak due to overheating,
- mandatory use of appropriate biologic mineral oil to safeguard the environment
- installation room provided with interlocked protections, which prevent any access when voltage is supplied,
- suitable room layout to prevent objects from falling or any access to the coupling during operation,
- installation location far from intense vibration sources,
- installation location far from heat irradiation, hot air streams or electrostatically charged air,
- it must be installed in ATEX atmospheres, where methane concentration is lower than 1%.
- correct identification of:
 - usage location I mining - II surface industries
 - category M2 mining - 2 surface industries
 - Epl Protection Level Mb mining - Gb/Db surface industries
 - Gas group Ignition IIB /IIC



CAUTION

This handbook must be made available to the final user of the machine or partly completed machine, where the fluid coupling will be incorporated, because it provides information for its safe use and correct maintenance schedule.

The installation of the ROTOFLUID constant-fill fluid coupling must be compliant with the data reported on the identification plate, the manufacturer's instructions in the TECHNICAL DATA SHEET and in this use, maintenance and installation handbook. For use in environment with characteristics, which differ from what pointed out above, please call the WESTCAR Technical Department.



CAUTION

Should oil leak after intervention of the fusible plug (TF), it is mandatory to stop the motor as soon as possible; RISK OF OVERHEATING of non lubricated bearings and gasket seals.

- When using a coupling in over see machines, it is required to stop the motor within 3 min.
- When using a coupling in machines without operator, it is required to install an automatic shutdown device to immediately stop the engine.



2.1 GENERAL SAFETY RULES

2.1.1

Before installation, the customer has to make sure that the safety requirements for installation are observed (see section 1.10 REQUIREMENTS FOR STANDARD AND ATEX INSTALLATION). The temperature in the installation location must respect the operating characteristics of each fluid coupling (see TECHNICAL DATA SHEET OF THE FLUID COUPLING).

2.1.2

Handling (hoisting and unloading) of the fluid coupling must be effected with lifting equipment of suitable load capacity recommended by the manufacturer.



Do not use any equipment and hoisting point other than the equipment and hoisting points expressly recommended by the manufacturer; the fluid coupling centre of gravity of the fluid coupling is irregular: RISK OF OVERTURNING AND/OR LOAD LOSS.

2.1.3

The installation of the fluid coupling must respect all instructions reported in the identification plate and the TECHNICAL DATA SHEET OF THE FLUID COUPLING. **The installation of the fluid coupling, which is not in compliance with the data reported on the identification plate and the TECHNICAL DATA SHEET, is prohibited.**

2.1.4

The fluid coupling must be connected and held tightly in place at the drive end through an integral clamping system using appropriate devices as foreseen by the manufacturer (central clamping screw, see section 2.3).



Any installation of the fluid coupling not integral to the plant or accomplished through devices, which are not included in the manufacturer's recommended parts list, is not allowed.

RISK OF UNBALANCE AND/OR DYNAMIC FAILURE

2.1.5



The installation room must have suitable air intakes for heat dissipation.

Fluid coupling installation with no or insufficient air flow is not allowed. RISK OF OVERHEATING

2.1.6

The fluid coupling should never be exposed to heat sources, which may rise its temperature; installation in hot rooms needs a suitable forced ventilation system for heat dissipation.



Do not install the fluid coupling next to heat sources, if no forced ventilation is available. RISK OF OVERHEATING.

2.1.7

The installation room of the fluid coupling must be equipped with interlocked protections and suitable safety switch in order to prevent access during component rotation and/ or when voltage is applied to the drive end.



No admittance to the fluid coupling is permitted during component rotation and/or when voltage is applied to the drive end. RISK OF DEATH.

2.1.8

In plants where the noise level is higher than 80 dB, suitable sound absorbing devices are required.

2.1.9

The fluid coupling equipped with fusible plug TF must have suitable protections for hot oil containment and collection in case of overheating.



Do not install the fluid coupling equipped with fusible plug FP if no suitable protection is available to contain and collect hot oil. RISK OF SCALDING AND/OR SLIPPERY FLOOR.

2.1.10

Under abnormal operating conditions or when the fluid coupling is equipped with fusible plug TF, hot oil leakage may occur.



The fluid coupling cannot be installed near cables or electric equipment, which are accessible or not protected against high temperature. RISK OF SHORT CIRCUIT AND/OR FIRE.

2.1.11

The fluid coupling is equipped with one or more safety and temperature control devices, whose triggering causes the driving end to automatically stop.



The drive end and the fluid coupling must be prevented from operating after the release of the safety and temperature control devices, which the coupling is equipped with. In particular, the FP triggering causes the transmission and bearing lubrication oil to leak. RISK OF OVERHEATING, SEIZURE AND/OR FIRE.

2.1.12

The fluid coupling is equipped with one or more safety devices for overheating control. **Do not tamper with, remove and/or disable the installed safety device.**



After triggering, it is necessary to restore and/or replace the device with an original spare part having identical triggering characteristics and to reset it before restarting the drive end. RISK OF OVERHEATING, SEIZURE AND/OR FIRE.

2.1.13

The installation of the fluid coupling must be effected by observing the axial levelling and planarity between the driving and the driven end (see enclosed instructions PART 5). **Incorrect installation or higher tolerance values axial levelling and/or planarity between the drive and the driven end than pointed out by the manufacturer cannot be authorized.**



RISK OF DYNAMIC UNBALANCE AND VIBRATIONS.

2.1.14

All the components of the fluid coupling undergo balancing in order to avoid dangerous vibrations. **Do not apply any unbalanced mass to the coupling and/or remove flaps or external parts of it. RISK OF VIBRATIONS AND/OR STRUCTURAL FAILURE.**



2.1.15

The assembly and/or disassembly of the fluid coupling must be effected with the suitable tools recommended by the manufacturer.



Do not hit, bore and/or bang on the external shells and the seats of the coupling; do not use flames for assembling or disassembling it. RISK OF DEFORMATION, IRREVERSIBLE IMBALANCE AND/OR STRUCTURAL FAILURE

2.1.16

Upon request the fluid coupling may be manufactured with anodized shells and for installation in environments with aggressive agents or they may be painted (max 200µm) with a suitable high-temperature resistant paint.



Do not paint the coupling with paints, which are inadequate and/or flammable and/or do not apply a thicker coat. RISK OF FIRE AND/OR BAD HEAT DISSIPATION

2.1.17

The fluid coupling must be filled with transmission fluid suitable for the relevant start-up characteristics and the environment, where it is mounted.



Do not use transmission fluids and/or oils not recommended by the manufacturer (see SECTION 6.1 TRANSMISSION OIL TECHNICAL CHARACTERISTICS). RISK OF DAMAGED SEALS AND/OR SEIZURE OF THE BEARINGS.

2.1.18

The fluid coupling must be filled up in compliance with the type of start-up.



Do not operate the fluid coupling without transmission fluid or with an insufficient quantity of fluid. RISK OF OVERHEATING, DAMAGED SEALS, SEIZURE OF THE BEARING AND/OR FIRE IGNITION.



Do not use the fluid coupling with too much transmission fluid. RISK OF OIL LEAKAGE DUE TO INTERNAL OVERPRESSURE AND/OR STRUCTURAL FAILURE.

2.1.19

The fluid coupling has been designed for a maximum amount of start-up/hour (see WESTCAR Technical Catalogue).



Never exceed the maximum amount of start-up procedures/hour and/or never start-up for a longer time than allowed by the manufacturer. RISK OF OVERHEATING.

2.1.20

The standard fluid coupling is designed for continuous operation (uninterrupted rotation) for periods not exceeding 4 or 5 subsequent full days.

For long-lasting uninterrupted running, use more lubricating transmission oils and/or for higher performance, ask for the special coupling with self-lubricating bearings.

2.1.21

When the fluid coupling and the drive end are stopped, the driven end is free to rotate; the fluid coupling cannot block the driven end nor can it guarantee its motion irreversibility. Suspended or sloping loads require a brake installed on the driven end.

2.1.22

Before gaining access to the fluid coupling and/or before carrying out any cleaning, maintenance, regulation or fluid make up work, perform the following steps:



- stop the drive end and wait for the moving parts to stop,
- disconnect the supply voltage and apply a suitable safety padlock,
- wait for the surfaces of the fluid coupling to cool down (max 40°C) before starting the activity,
- use suitable protection gloves, safety devices and protection garments.

2.1.23

Before admittance to the room, where the fluid coupling is installed, check for oil leakage; as an alternative, fully remove and dry out the coupling.



RISK OF SLIPPING.

2.1.24

Should the transmission oil and/or parts of the fluid coupling (gaskets and seals) catch fire, please follow these steps:

- cut out power supply upstream,
- use suitable powder fire extinguishers (see long-range nozzle) loaded with A, B or C powders or carbon dioxide fire extinguishers.

2.1.25

To clean the fluid coupling, use disposable cloths made of cellulose dampened with neutral detergents.

Do not use inflammable solvents, liquid agents or dry synthetic cloths, which may become electrostatically charged.



RISK OF FIRE.

2.1.26

Regulation and/or maintenance shall be carried out by trained and authorized technicians.

Do not tamper and/or alter the state-of-the-art technology of the fluid coupling.

2.1.27

Worn parts or triggered protections must be replaced by original spare parts only; each fluid coupling component has been expressly designed to perform both an operational and a safety task.

FAILING TO OBSERVE WHAT ABOVE MAY RESULT IN DANGERS FOR THE OPERATORS, TECHNICIANS, PEOPLE OR THE MACHINE, WHERE THE COUPLING IS MOUNTED, WHICH THE MANUFACTURER MAY NOT BE HELD LIABLE FOR.





2.2 SAFETY RULES FOR POTENTIALLY EXPLOSIVE ATMOSPHERES

In addition to the general rules set out in section 2.1 "GENERAL SAFETY RULES", the coupling installation in an ATEX atmosphere shall comply with the following supplementary requirements:

2.2.1

The ATEX fluid couplings are manufactured in different protection classes, which are characterised by a suitable marking on the identification plate.



Do not use couplings without ATEX marking or couplings with unsuitable category and/or lower class than that required for the location, where they are used. RISK OF FIRE.

2.2.2

The fluid coupling equipotential protection is implemented through the metal bonding of the mechanic connection with the drive end shaft and the driven end, by checking the resistance and the dispersion values of the installed coupling.



Do not connect the fluid coupling with elements, which generate bad conductivity with both the driving and the driven end (e.g. paints, oxide). RISK OF LOSS OF EQUIPOTENTIAL INSULATION AND/OR RISK OF IGNITION.

2.2.3

The ATEX fluid coupling must be used with suitable transmission oils and selected among different temperature classes (T3, T4, T5 and T6).



Do not use the coupling in an ATEX atmosphere, if it is filled with non suitable oil or the class of temperature is lower or does not fulfil the requirements for both the coupling manufacture and the location classification. RISK OF FIRE.

2.2.4

Do not expose the external surfaces of the fluid coupling to hot air streams and/or sources or accumulators of electrostatic currents (synthetic or plastic material, etc.).



RISK OF IGNITION AND FIRE.

2.2.5

To clean the surfaces of the fluid coupling, use disposable cellulose cloths dampened with neutral detergent.



Do not use inflammable solvents or agents or dry synthetic cloths, which may become electrostatically charged. RISK OF IGNITION AND FIRE.

2.2.6

Service and repair operations may only be carried out by trained and skilled technicians, who qualify for work in locations with hazardous atmospheres.

The maintenance and repair work carried out, must be entered in a proper book (see section 7.5 INTERVENTION RECORD).



RISK OF FIRE.

2.2.7

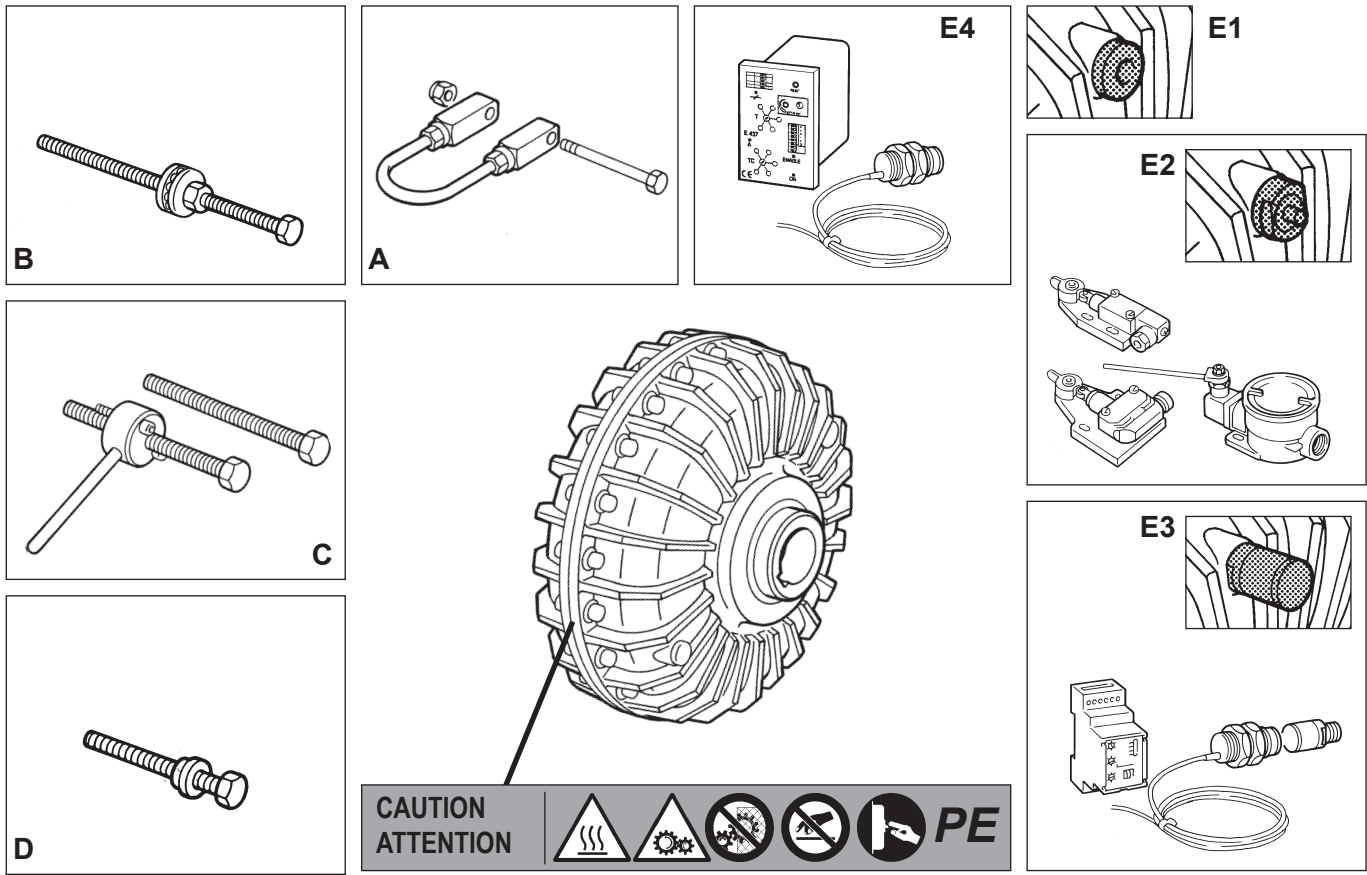
The worn parts or triggered protections of the ATEX couplings must be exclusively replaced by original spare parts.



FAILING TO OBSERVE WHAT ABOVE MAY RESULT IN DANGER FOR THE OPERATORS, TECHNICIANS, PEOPLE OR THE MACHINE, WHERE THE COUPLING IS MOUNTED, WHICH THE MANUFACTURER MAY NOT BE HELD LIABLE FOR.



2.3 SAFETY DEVICES AND SIGNALLING PLATES



CAUTION Before commissioning and operating the ROTOFLUID fluid coupling, make sure that signalling plates and all safety and temperature control devices are correctly installed, used and efficient; if not, restore good working conditions before going on with installation and use.

POS.	DESCRIPTION
A	SLINGING DEVICES FOR LIFTING: They enable lifting through grip and slinging points and safe handling of the fluid coupling.
B	DM ASSEMBLY DEVICE: It enables the safe, fitting of the fluid coupling on the drive end shaft.
C	DISASSEMBLY DEVICE “VE” or “SE: It enables the safe, removal of the fluid coupling from the driving shaft.
D	DEVICES FOR COUPLING CLAMPING ON “TT” DRIVE SHAFT: They enable to safely fix the fluid coupling to the drive end shaft.
E ₁	FUSIBLE PLUG “TF”: It detects any leakage of transmission fluid from the fluid coupling and any drive failure at the driven machine, when the maximum temperature of the fitted TF is exceeded.
E ₂	EXPANDABLE TRIP PLUG “TE”: It permits to detect the overheating value as set up in the fitted TE through release of the signalling stud by means of a suitable microswitch, which shall be of “ET” type for standard and “ETA” type for ATEX manufacture.
E ₃	PLUG WITH thermocouple AND RPM CONTROLLER “PM” with “T09”: It permits to detect the maximum temperature of the fitted PM plug and to transmit an electromagnetic pulse signal, which is detected by suitable sensor and sent to the electronic control unit, which in turn compares the rpm with the threshold set point.
E ₄	DEVICE FOR OVERLOAD CONTROL “SCD”: It detects the output rotation speed of the coupling. This SCD device is composed of an rpm controller, which receives a pulse train through a sensor and generates a signal for alerting and stopping the system in case of extreme speed reduction.



2.4 SAFETY INSPECTIONS

BEFORE INSTALLING AND/OR INTERFERING WITH THE FLUID COUPLING:

2.5.1

Verify that are fulfilled all the requirements for installation as provided for in section 1.10 REQUIREMENTS FOR STANDARD and/or ATEX INSTALLATION

2.5.2

Make sure that the ATEX marking complies with the zone classification for installation in hazardous atmospheres.

2.5.3

Make sure that no alarm conditions have arisen and/or no signals have been released as a consequence of the activation of a safety and overheating control device.

2.5.4

Verify that the drive part and the moving components are stopped.

2.5.5

Make sure that power supply at the drive end is disconnected and the relevant switch is blocked with an adequate safety padlock and report the event under way.

2.5.6

Wait for cooling - max 40°C - before starting any operation.

2.5.7

Make sure that no oil overflow or leakage have occurred.

If so:

- promptly remove and dry up the coupling, before handling it,
- detect the origin of the transmission oil leakage and make the necessary arrangements before going on using the fluid coupling.

2.5.8

Check up on integrity of the safety and overheating control devices and the correct positioning of the electric detectors (microswitch for TE or a sensor for T09); in case the device has triggered or has been damaged, replace it with an original spare part calibrated for the same trigger temperature.

2.5.9

If necessary, verify the filling of the fluid coupling based on the operation and/or any traces or transmission oil leakage (see section 7.2 OIL LEVEL CHECK AND TOP-UP).

BEFORE RESTARTING THE FLUID COUPLING:

2.5.10

Make sure that in the installation room or on the coupling there are no tools, foreign bodies or cloths and if so, remove them.

2.5.11

Close in safety position the guards in the room, where the fluid coupling is installed.



3.1 TRANSPORT OF COUPLING WITH PACKAGE



The handling and transport operations are reserved to the handling technicians equipped with suitable personal protective equipment (protection gloves, safety shoes).

RISK OF CRUSHING, CRASHING AND/OR PRICKING.

3.1.1

Upon reception of the supply, check the weight reported on the label.



CAUTION

RISK OF TILTING AND CRUSHING:

The load within the packaging could be unbalanced; therefore abide by the procedures set out. Do not roll or damage the packaging. **RISK OF OVERTURNING.**

3.1.2

Spread the forks of the fork-lift truck (with capacity suitable for the weight to be transported) as much as possible.

Lift the coupling with its packaging slowly and transport it (keeping it as much close to the soil as possible, about 30 cm) and put it under a shelter in a dry place; then get the fork-lift out of the way.

3.1.3

Open the upper part and remove the packaging.



CAUTION

RISK OF ENVIRONMENTAL POLLUTION:

Do not dump packaging material in the environment, but keep it for any future re-use or shipping to the manufacturer or dispose of it properly as industrial waste.

3.1.4

Remove any stiffening rib, plastic film for internal protection and brackets that fix the fluid coupling to the pallet.



NOTE

Should the product be sent to the factory for repair works or maintenance, the fluid coupling will have to be shipped in a new package.

The shipping procedure shall be previously agreed upon with WESTCAR.

3.1.5

Take the Original Instruction Handbook and check that the product is not damaged, no parts are missing and the content complies with the order.



NOTE

Non-compliances shall be reported within eight days from the receipt date to WESTCAR and the distributor.

3.1.6

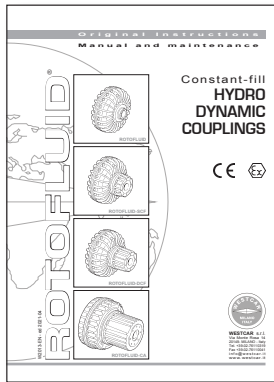
To store the coupling, observe what set out in section 3.3.

STORAGE OF THE COUPLING.

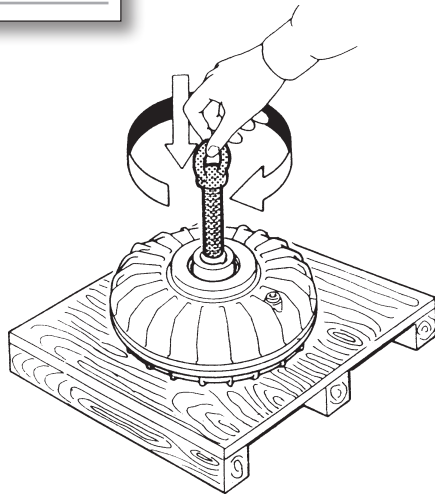
The transport of the coupling with packaging has thus ended; now it is possible to follow the steps described in the next section.



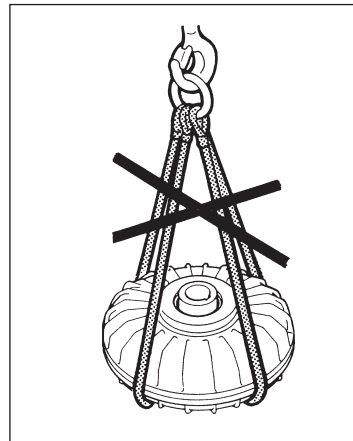
3.2 HANDLING OF THE COUPLING WITHOUT PACKAGE



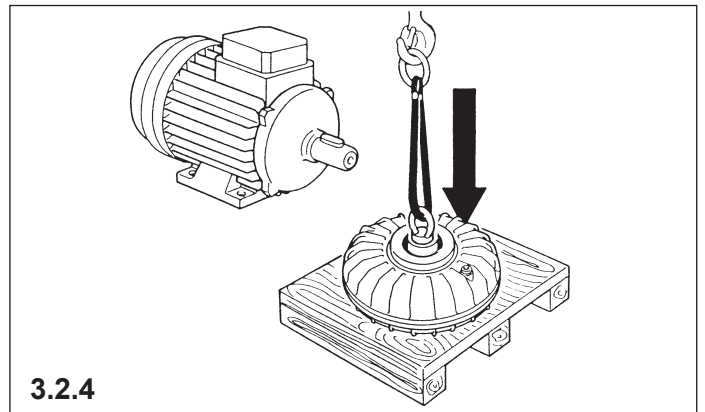
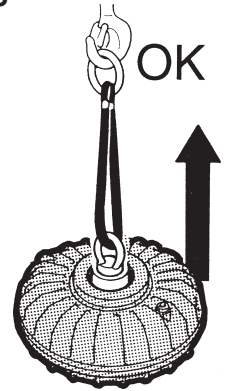
3.2.1



3.2.2



3.2.3



3.2.4

To handle the fluid coupling without its package, it is necessary to follow this procedure:



The handling and transport operations are reserved to handling technicians equipped with suitable personal protective equipment (protection gloves, safety shoes). **RISK OF CRUSHING.**

3.2.1

Take the instructions and follow the description.



CAUTION

RISK OF CRUSHING. In order to hoist and handle the fluid coupling, use the suitable lugs and devices recommended by the manufacturer, available on request; do not use any other reference than the equipment and lifting points recommended by the manufacturer.

3.2.2 - For couplings with more than 30 kg of weight:

The fluid coupling is located inside its packaging with its axis in vertical position. Screw in the threaded pin equipped with hoisting ring in the extraction hole of the coupling.

3.2.3

Sling the coupling through the hoisting ring with hoist lines of suitable load capacity for the coupling weight (see Identification Plate).

3.2.4

By slow movements, lift the coupling and transfer it to a dry, sheltered place and lay it on a wooden plane next to motor and drive end, where the coupling will be installed.

The transport of the coupling without packaging has thus ended; now it is possible to follow the procedure as set out in the next section.



3.3 COUPLING STORAGE AND CONSERVATION

STORAGE IN THE SUPPLY DELIVERY PACKAGE

When delivered, the fluid coupling steel surfaces are protected by suitable lubricant, wrapped in a solid polyethylene bag.

Externally the packaging for couplings up to 40 kg is made of carton; the carton box is delivered on pallet if the coupling is heavier or in crates, if it is shipped by sea or if the client expressly requests it.

Inside the external packaging a bag contains the coupling protected with suitable shock-proof material.

The packaged coupling may be stored for 6 months in dry, clean and protected marine environment and for 12 months in dry, clean and protected land environment.

3.3.1 MEASURES FOR THE FUTURE STORAGE OF THE COUPLING



NOTE

The fluid couplings with delay chamber must be positioned inside the packaging with delay chamber pointing upwards; the coupling filling oil will thus guarantee sealing lubrication.

3.3.1a

The coupling must be filled with transmission oil before storage; if not the shaft sealing must be protected with suitable grease (AGIP 33FD, SHELL Alvania R3 or equivalent).

3.3.1b

Clean the external surfaces of the coupling and protect them with suitable protection lubricant (type CRC 3.36 or equivalent).



CAUTION

The fluid coupling and any flexible coupling with rubber elements must be stored inside a suitable packaging, to protect it from sunlight and dust, solvents and corrosive agents.

3.3.1c

Put the coupling in a suitable package inside an appropriate protective bag and close it tightly.



NOTE

The packaging including a polyethylene bag can last 6 months in protected, dry marine environment and 12 months in dry and protected land environment. Long-lasting storage may be achieved by using a package consisting of a hot-sealed, composite bag (aluminium and plastic) lasting 12 months in dry and protected marine environment and 24 months in dry and protected land environment.

3.3.1d

On expiry of the storage time, it is necessary to inspect and replace the package.

3.3.2 AFTER FIRST ASSEMBLY, COUPLING UNUSED UP TO 6 MONTHS

Apply protective coating CRC 6.66 Marine or equivalent, that guarantees 3 months protection in marine environment, or protection agent CRC Protective Marine that guarantees up to 6 months protection - to the component steel parts.

This product can be removed with diluent CRC Marine Elmec Clean.

If the coupling is not filled with oil, spray 0,25 litres (8,79 imp fl oz) of TECTYL 930 SAE 30 oil inside and re-assemble the plug so to ensure the air-tight sealing of the coupling. The rotating seals must be greased.

3.3.3 ALREADY OPERATED COUPLING, UNUSED UP TO 6 MONTHS

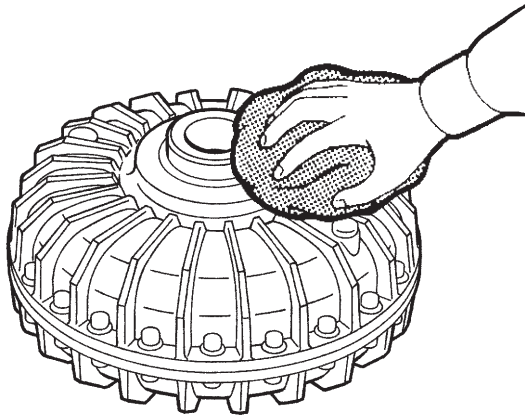
In this case it is necessary that on shutdown the procedures as per point 3.3.2 are observed.

3.3.4 AFTER COUPLING INSTALLATION, UNUSED OVER 6 MONTHS

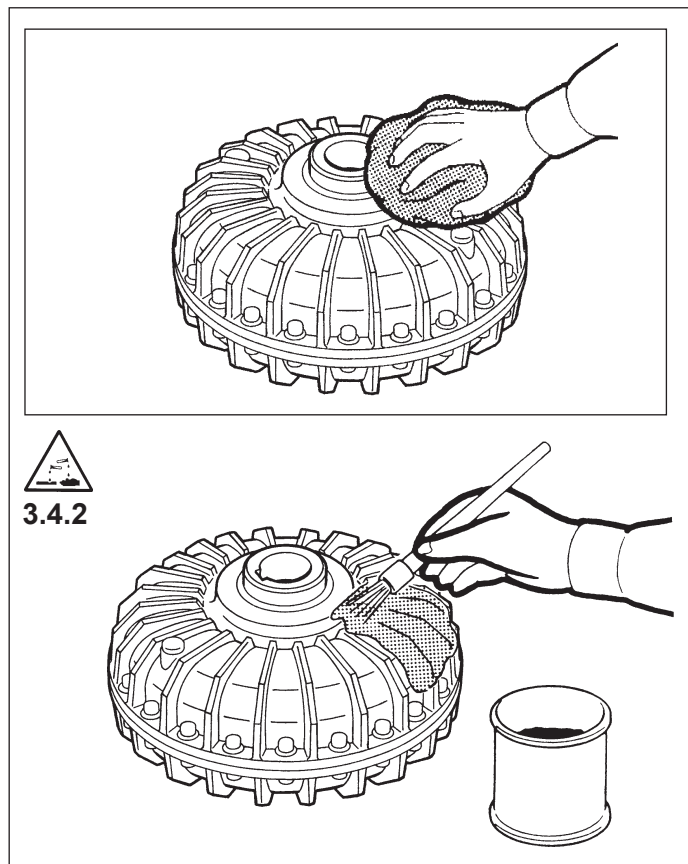
Follow what described in point 3.3.2 and carry out the prescribed operations every 6 months, removing the old protection each time before the new one is applied. Manually turn the coupling one or more times. This ensures that the filling oil lubricates the rotating seals and the internal bearings.



3.4 COUPLING PRE-ASSEMBLY



3.4.1



3.4.2

The pre-assembly steps vary according to the location, where the coupling shall operate; to prepare it for assembly, observe what follows:

3.4.1 CLEANING AND REMOVAL OF PROTECTIVE LAYERS

The coupling metal parts must be duly protected with fluid CRC 3.36 for shipment. Before the coupling is installed, provide for the removal of the protective fluid with Elmec Clean diluent or equivalent.

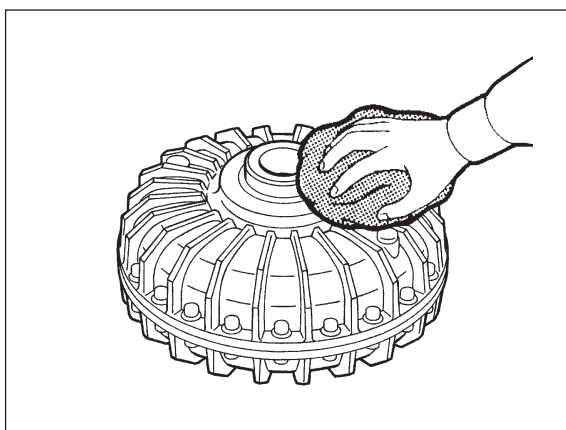
3.4.2 AGGRESSIVE AND/OR CORROSIVE ATMOSPHERES

In order to install a coupling in an environment filled with aggressive or corrosive atmosphere (marine environment, atmospheres with corrosive acids), it is appropriate to use specially manufactured fluid couplings, i.e. with protection paint C5 - M/I on the metallic parts:

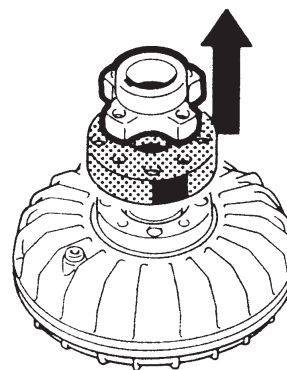
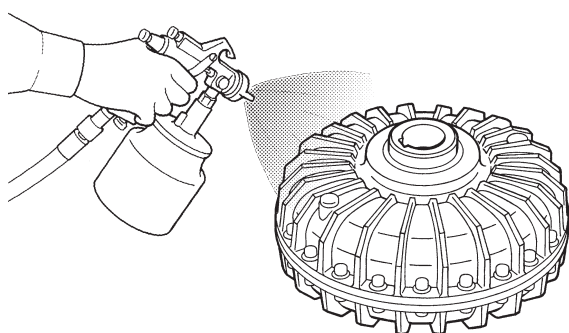
- Degrease the coupling surfaces with a suitable solvent, protecting the shaft seals.
- Paint the external surfaces with a suitable high-temperature resistant paint (see the coupling maximum temperature).



NOTE The layer of paint must not exceed 200 µm in order to avoid bad heat dissipation.

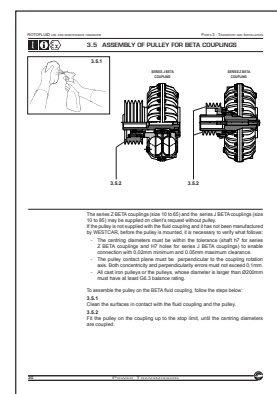
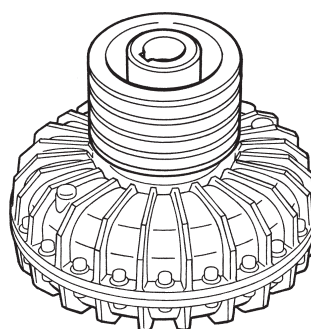


3.4.3



3.4.4

3.4.5



3.4.3 POTENTIALLY EXPLOSIVE ATMOSPHERES

If the painting exceeds 200 μm , it is required to use antistatic paint.

3.4.4 PRE-ASSEMBLY FOR “ALFA” IN-LINE COUPLINGS

The “ALFA” in-line coupling equipped with accessories (rubber element and hub) must be prepared, disassembling the accessories to gain access to the rear part during its installation on the machine.

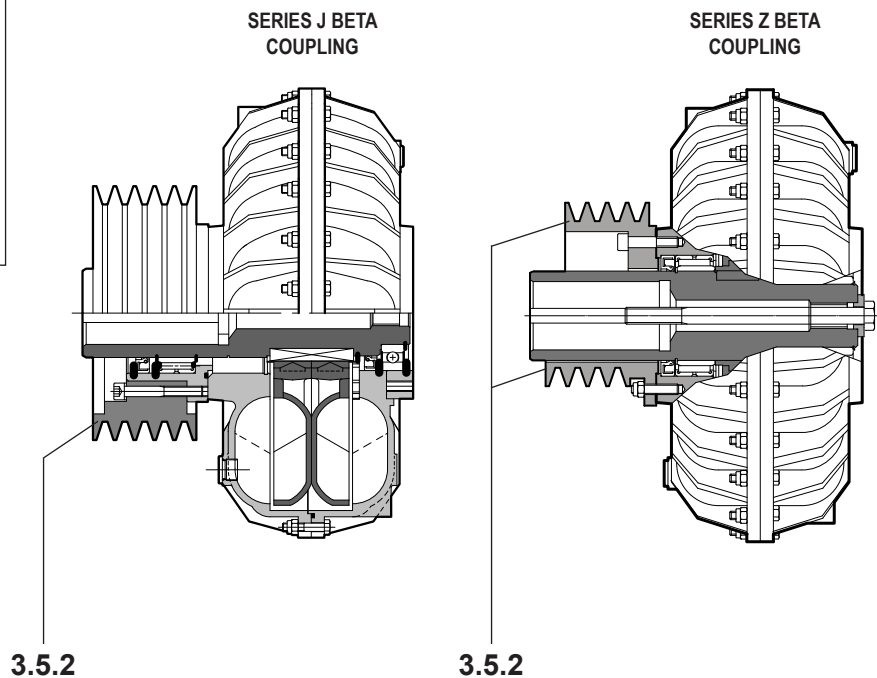
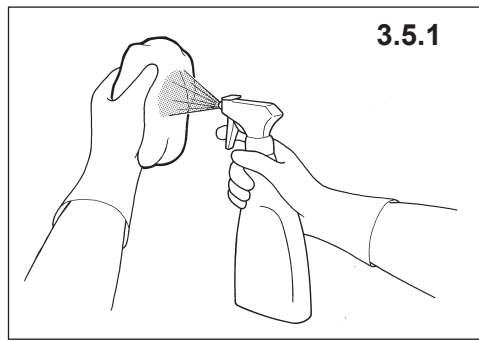
3.4.5 PRE-ASSEMBLY FOR BELT-DRIVEN “BETA” COUPLINGS

The “BETA” coupling must be prepared for the fitting of the driving pulley, if not yet mounted, by following what described in section 3.5 ASSEMBLY OF THE PULLEY.

The pre-assembly works for the fluid coupling have been completed and it is now possible to install it as described in the next chapter.



3.5 ASSEMBLY OF PULLEY FOR BETA COUPLINGS



The series Z BETA couplings (size 10 to 65) and the series J BETA couplings (size 10 to 85) may be supplied on client's request without pulley.

If the pulley is not supplied with the fluid coupling and it has not been manufactured by WESTCAR, before the pulley is mounted, it is necessary to verify what follows:

- The centring diameters must be within the tolerance (shaft h7 for series Z BETA couplings and H7 holes for series J BETA couplings) to enable connection with 0,02mm minimum and 0.05mm maximum clearance.
- The pulley contact plane must be perpendicular to the coupling rotation axis. Both concentricity and perpendicularity errors must not exceed 0,1mm.
- All cast iron pulleys or the pulleys, whose diameter is larger than Ø200mm must have at least G6.3 balance rating.

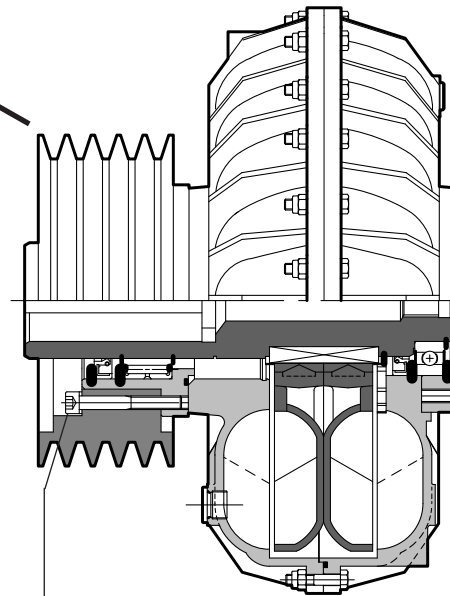
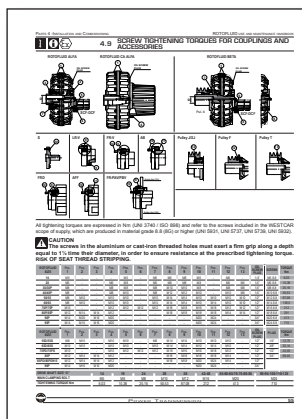
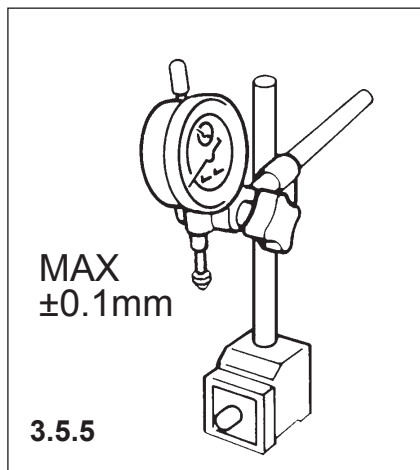
To assemble the pulley on the BETA fluid coupling, follow the steps below:

3.5.1

Clean the surfaces in contact with the fluid coupling and the pulley.

3.5.2

Fit the pulley on the coupling up to the stop limit, until the centring diameters are coupled.

**WARNING**

The screw to fix the pulley to the coupling must hold deep in the aluminium threaded holes for one and a half time their diameter, in order to guarantee the resistance of the prescribed tightening torque.

The pulley fixing screws must be in material grade 8.8 or higher. **RISK OF LOSS OF THREADING IN THE SEATS OR SCREW BREAKAGE.**

3.5.3

Insert the screws of suitable material and length inside the holes.

3.5.4

Tighten all the clamping screws of the pulley to the fluid coupling according to the torques as pointed out in section 4.9 SCREW TIGHTENING TORQUES FOR COUPLING AND ACCESSORIES.

Tighten them stepwise and in a crosswise sequence.

3.5.5

Upon completion of the assembly, check eccentricity and perpendicularity of the pulley, by touching with the comparator tip inside the first and last groove as shown in the picture. The maximum eccentricity error must be within $\pm 0.1\text{mm}$.

If the assembly of the pulley on the BETA coupling has been successful, carry out the installation as described in PART 4.



4.1 SPECIFIC RULES ON THE USE OF ROTOFLUID COUPLINGS IN ATEX ATMOSPHERES

The fluid coupling is designed for installation on a machine, which is in compliance with the ATEX guideline 2014/34/UE.

- 4.1.1 The body of the fluid coupling shall be grounding system connected either the motor or the driven machine; this can be performed through a mechanical connection to the motor or the driven part. In this event the continuity of the connection shall be controlled by the user before the first start-up.
- 4.1.2 The wear parts and the oil of the fluid coupling can be only replaced with original spare parts from WESTCAR.
- 4.1.3 Do not overload the device beyond the operating limits as shown in the relevant diagrams and in the TECHNICAL DATA SHEET, that have to be filled out and signed by the Client.
- 4.1.4 Do not perform consecutive start-up procedures.
- 4.1.5 Do not exceed the number of starts/hour pointed out in the TECHNICAL DATA SHEET
- 4.1.6 The WESTCAR couplings are always equipped with protection devices, such as fusible plugs TF or expandable trip plugs ET coupled with the limit switch ET-A (Ex).
Should oil leak due to the fusible plug TF triggering, it is required to stop the motor as soon as possible. RISK of overheating of bearings and gasket seals.
- 4.1.7 Couplings with fusible plug TF may be only used, if the machinery is monitored; if oil leaks from the fusible plug, it is required to stop the motor within 3 minutes.
- 4.1.8 When using a coupling in machines without operator, it is required to install an automatic shutdown device to immediately stop the motor (to be performed by the Customer or by WESTCAR).
- 4.1.9 It is prohibited to tamper with or inadequately replace the FP and ETP protection plugs.
- 4.1.10 The devices included in this risk evaluation and relevant technical dossier according to EN ISO/IEC 80079-36, bear the following markings:



I M2 h Mb T4



II 2GD h Gb Db IIB /IIC

Where h means the protection mode "construction safety" (which is optional in the marking)

SAFETY EQUIPMENT AGAINST OVERHEATING AND MOTOR SHUTDOWN**4.1.11 FUSIBLE PLUG “TF”:**

The standard WESTCAR coupling is equipped with a fusible plug TF; the FP operation consists in the melting of a hot-melt pad calibrated according to the temperature class of the ATEX zone as specified by the customer. In case of overheating of the coupling due to malfunction, the hot-melt pad melts, thus causing the transmission oil to leak from the coupling and the driven machine shutdown. Under these conditions, with stopped machine and rotating motor, the bearings and sealing without lubrication overheat, thus giving rise to the RISK OF FIRE IGNITION. The motor should be stopped within the shortest time (maximum 3 minutes after the oil leakage). When the fusible plug TF melts, it is necessary to with original spare parts from WESTCAR (see chapter 5.1 of this manual).

4.1.12 EXPANDABLE TRIPPING PLUG TE + ET-A (Ex)

The expandable trip plug TE must be mounted on the coupling and coupled with the ET-A (Ex) switch.

It is required that the external part of the coupling is integral to the motor.

The operation of the TE plug consists in a small pin making a 6 mm movement, when the temperature of 120° is reached, so to activate the switch ET-A (Ex) in order to stop the motor without oil leakage. When the hot-melt pad melts, it is necessary to replace the TE plug with a new, original spare parts from WESTCAR (see chapter 5.2 of this manual).

4.1.13 NON-CONTACT PLUG PM +T09

The non-contact PM plug is equipped with a thermostat calibrated for the temperature of 100/120°C, which is incorporated in the body of the PM plug and it belongs to the fluid coupling.

The PM plug is coupled with the Ex sensor, which is connected to the electronic control unit T09, it this to be placed in a safe zone, where a ZENNER barrier is needed.

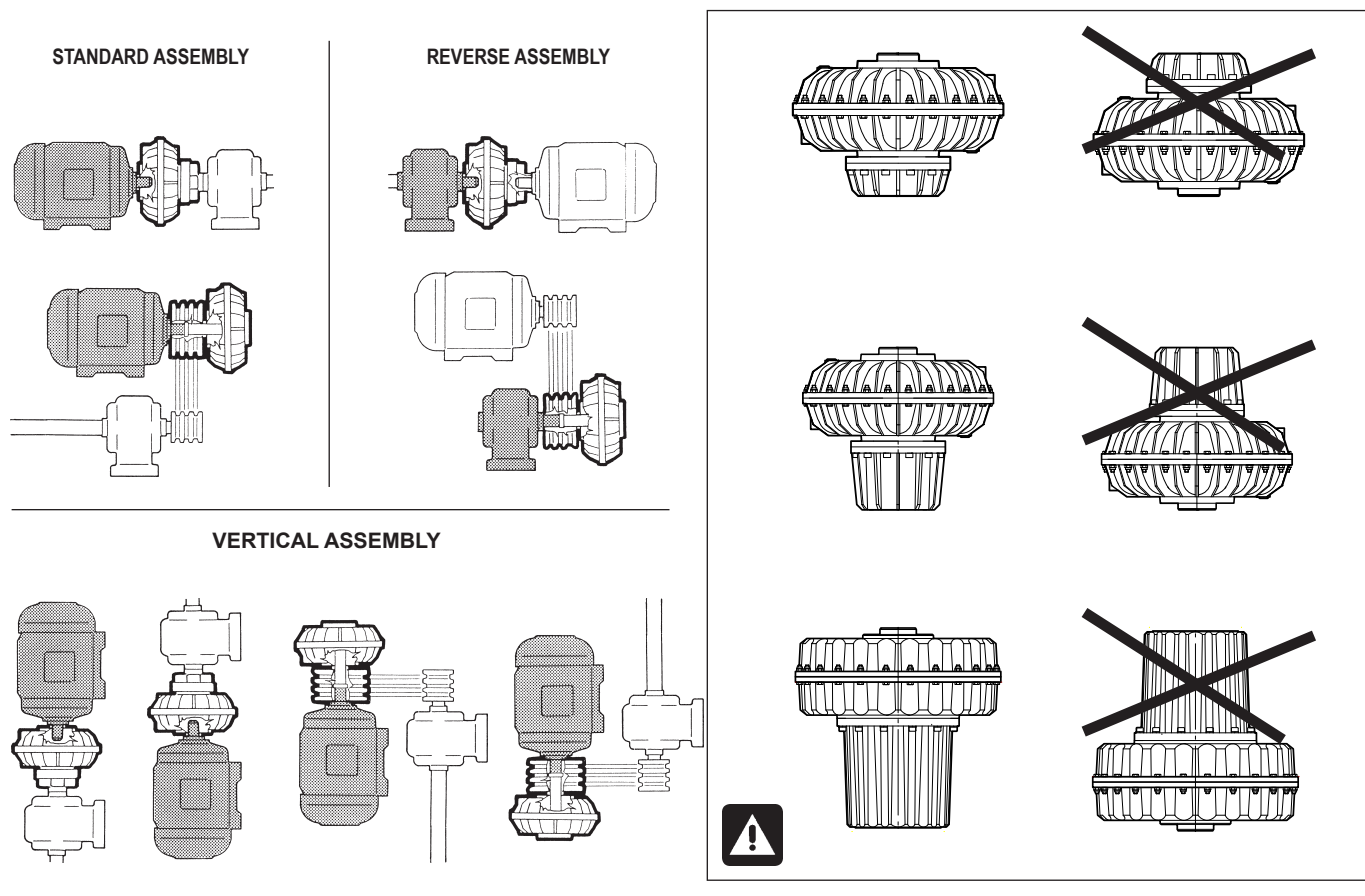
The PM plug has the function to transmit (without contact) a signal to the Ex sensor positioned at a distance of 2/5mm from the PM plug. When the temperature of the coupling exceeds 100/120°C, the Ex sensor does not receive the signal any more and it triggers the electronic control unit T09 to stop the motor.

During the ordinary operation of the coupling, the electronic control unit T09 continuously receives the signal, which is transmitted by the PM plug to the Ex sensor. In this way it is possible to control the speed revolutions of the coupling, when the external part of the coupling is connected to the driven part, as this help establish a pre-alarm threshold before the motor stop.

After the PM plug triggering, a plug replacement is not required; it is sufficient to allow the coupling to cool down for about 30 minutes and then restart the machine. (See chapter 5.3 of this manual).



4.2 FITTING OF ROTOFLUID COUPLING ON DRIVE SHAFT



The standard ROTOFLUID coupling (standard production) is delivered with hollow shaft and keyseat according to DIN 6885 standard for UNEL MEC motors. The keying of the coupling (hollow shaft side) can be carried out on the motor (electric or endothermic) as well as on the machine driven end, according to the specific instructions reported on both the Identification Plate and the TECHNICAL DATA SHEET OF THE FLUID COUPLING.

STANDARD ASSEMBLY

Motor connected to the hollow shaft of the coupling (inner part)

REVERSED ASSEMBLY

Motor connected with the coupling shells (outer part).

This kind of installation is preferred in case of very long or frequent start-up procedures, because it allows greater heat dissipation and easier rotation of the coupling when checking the oil level.

VERTICAL ASSEMBLY

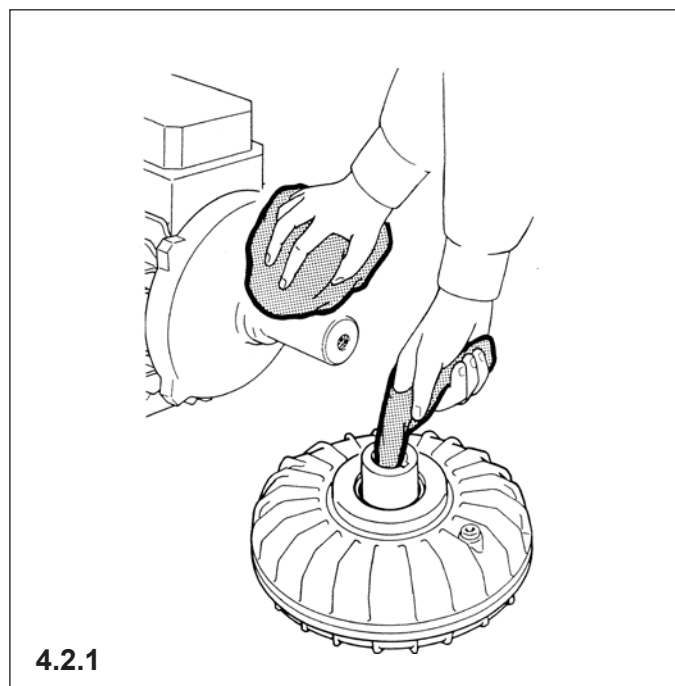
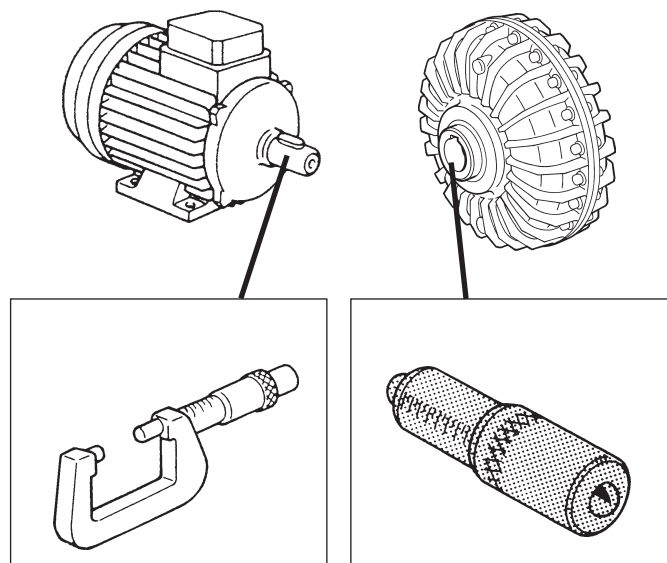
The fluid coupling produced with "C" manufacture is designed for vertical installation, in order to ease both the filling and the oil level calibration (see Identification Plate).



CAUTION

When the fluid coupling with delay chamber (SCF, DCF and CA) is mounted vertically, the delay chamber must never be positioned in the upper part of the coupling.

Below you can read by way of example the instructions for the coupling keying (hollow shaft side) on the motor and/or machine.

**4.2.2**

MOTOR	BACKLASH ON DIAMETER/HOLE/SHAFT FOR ROTOFLUID COUPLING																	
SPEED	14 ^{H7}	19 ^{H7}	24 ^{H7}	28 ^{H7}	38 ^{G7}	42 ^{G7}	48 ^{G7}	55 ^{G7}	60 ^{G7}	65 ^{G7}	70 ^{G7}	75 ^{G7}	80 ^{G7}	90 ^{G7}	100 ^{G7}	110 ^{G7}	125 ^{G7}	140 ^{G7}
UP TO 1500 rpm MAX. BACKLASH (hundredths)	1.5	1.5	2	2	2	2.5	2.5	3	3	3	3	3	3	4	4	4	4	4
OVER 1500 rpm MAX. BACKLASH (hundredths)	1	1	1	1	1.5	1.5	1.5	2	2	2	2	2	2	3	3	3	3	3

**CAUTION**

Motor keying must be effected at the bench with coupling axis placed horizontally. Before fitting the fluid coupling on the machine, it is necessary to observe the following steps:

- Stop the motor and wait for the rotating components to stop.
- Cut out the power supply and apply a safety padlock.
- Wait for the cooling, if needed (max 40°C).

4.2.1

Accurately clean the motor shaft surfaces and the seat of the fluid coupling.

**NOTE**

The seats of the coupling are manufactured with tolerance H7 or G7, that may result in an interference fit connection. A good connection between shaft and seat must not show any interferences or too much backlash. Comply with the values reported in the table.

4.2.2

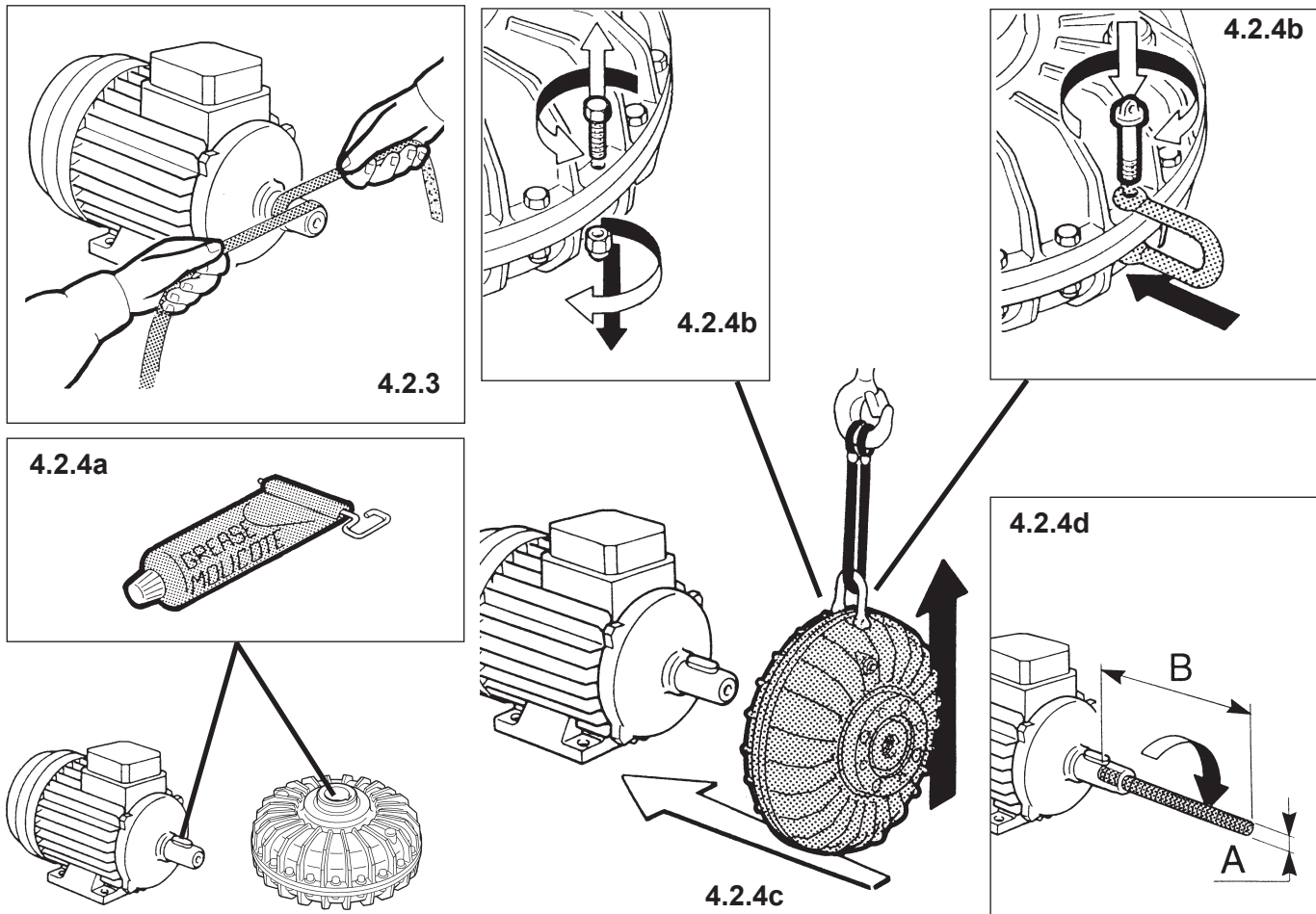
Measure with a suitable micrometric tool the real dimension of the drive shaft or the machine and the fluid coupling.

**CAUTION**

The bore-shaft connection of the fluid coupling must not be a force fit and no flames or heaters must be used. **RISK OF SEAL DAMAGING AND/OR IMPOSSIBLE DISASSEMBLING OF THE COUPLING.**

4.2.3

In case of interference in the connection, it is necessary to make backlash adjustments all along the drive shaft or machine using an abrasive cloth.



WARNING

A larger backlash in comparison with the one pointed out in the table may cause unbalancing during rotation with subsequent vibrations.

4.2.4 - SHAFT ASSEMBLY WITH KEY

In order to mount the coupling on a shaft with key, respect the following steps:

4.2.4a

Lubricate the whole surface of the drive shaft and machine and the relevant seat of the fluid coupling.

NOTE

Use pressure-resistant grease, such as MOLLICOTE or equivalent.

4.2.4b

For fluid couplings weighing more than 30 kg, fully unscrew and remove one of the screws for coupling shell closure and insert a suitable WESTCAR hoisting device (available on request).

4.2.4c

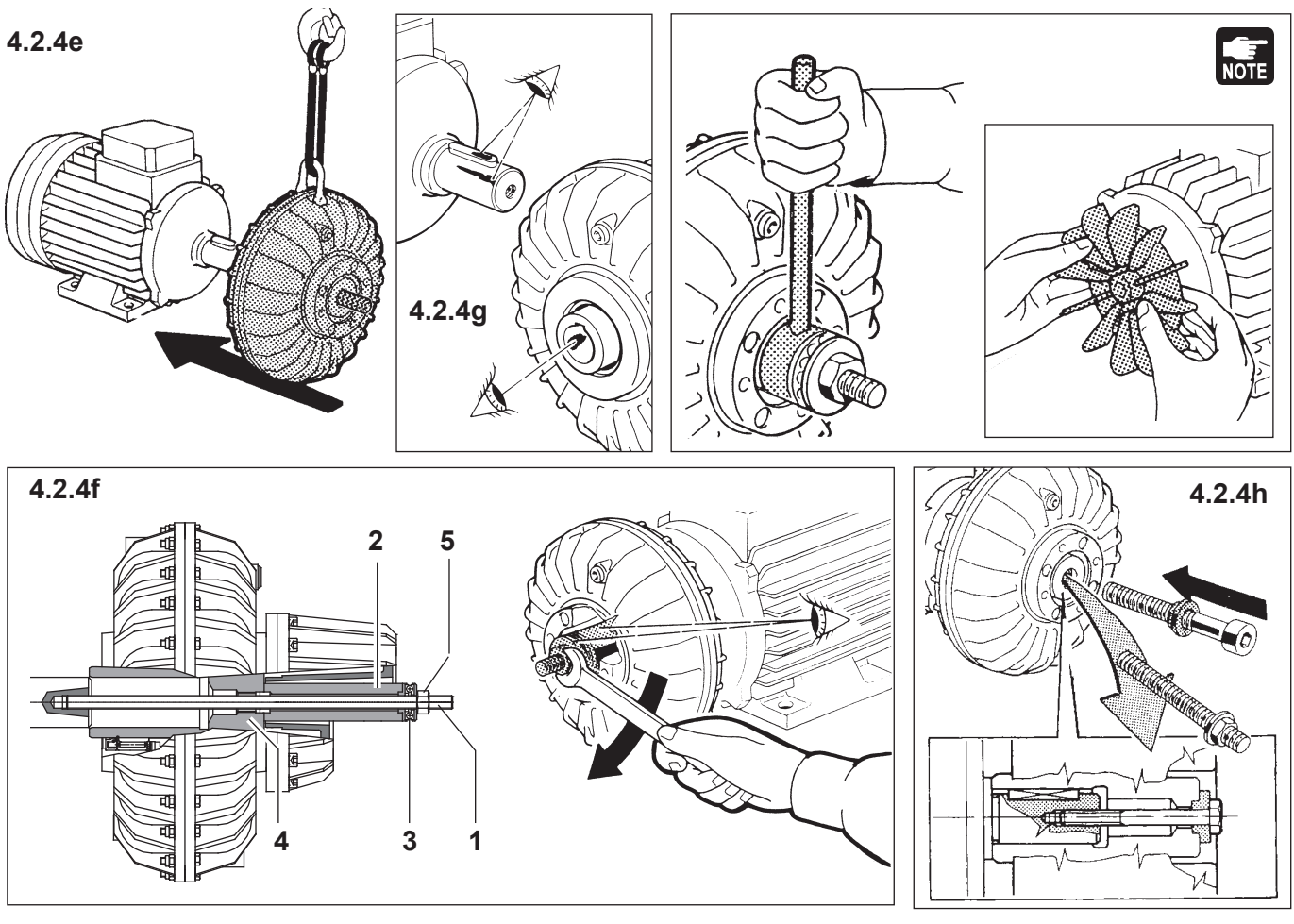
Sling the fluid coupling on the hoisting device with ropes having load capacity suitable for its weight (see Identification Plate).

4.2.4d

Place on the hole of the drive shaft a threaded bar, whose length must be suitable for the fluid coupling dimensions (see technical catalogue) without blocking it.

4.2.4e

Move the coupling at a minimum height above the ground with slow movements and bring it near the installation shaft in horizontal position.

**CAUTION**

Do not hit, bang about or exert any force on the coupling shells. **DANGER OF DAMAGING THE BEARING SEATS, CRACKINGS, VIBRATIONS AND/OR UNBALANCE.**

4.2.4f

In case of coupling with delay chamber, insert on the threaded bar (1) the suitable spacing tube (2) and a thrust bearing (3) resting only on the primary shaft (4) of the coupling or on the spacing tube; afterwards screw the nut (5) on the threaded bar and tighten the nut until the coupling fits on the motor shaft.

**NOTE**

This operation must be carried out holding up the motor shaft from the blower side or, in case of couplings provided with extraction holes, using the SE extraction system to block the shaft.

4.2.4g

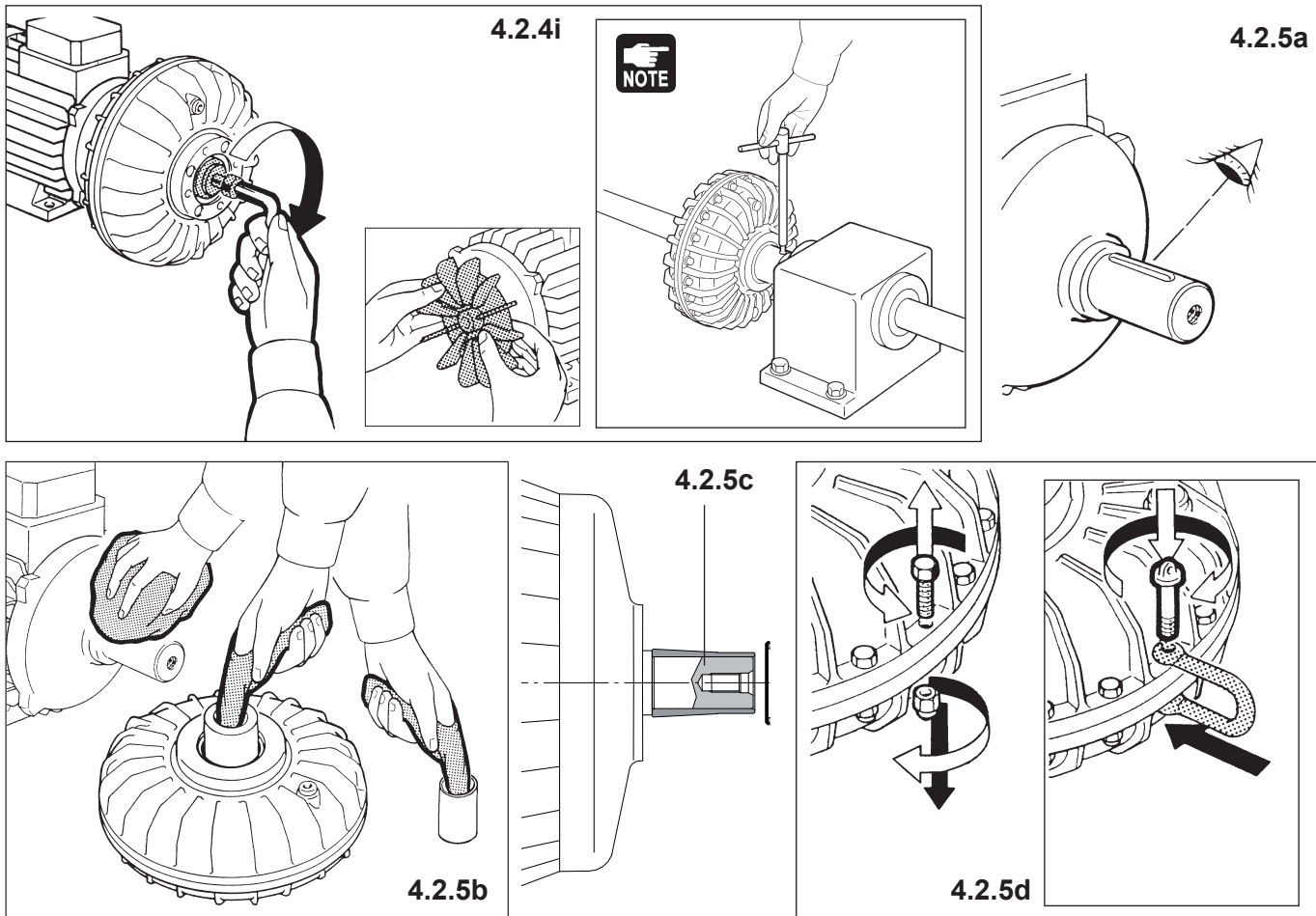
In case the coupling keying turns out to be difficult and subject to strain, disassemble the coupling (see chapter 9.1 DISASSEMBLY OF THE COUPLING) and follow the procedure from step 4.2.1 more accurately.

**CAUTION**

Check the surfaces of the shaft, the keys and its seat. **RISK OF SEIZURE AND/OR CRACKING OF THE COUPLING.**

4.2.4h

After the coupling has been fitted up to the stop limit on the shaft, loose the nut and remove both the threaded bar and the thrust bearing; insert the head through bolt equipped with the suitable centring washer supplied with the coupling.



4.2.4i

Tighten the head through bolt accurately, holding firmly in place the machine or motor shaft, where it is mounted.



NOTE

The Rotofluid couplings, whose shafts bore are in inches, will be equipped with grub screw for axial fastening on the shaft, as an alternative to the axial fixing screw.

4.2.5 - SHAFT ASSEMBLY WITH TAPER SLEEVE

To fit the coupling on shaft with taper sleeve, proceed as follows:

4.2.5a

In order to fit fluid couplings with taper sleeves without keyway, remove feather key from drive shaft/reduction gear.

4.2.5b

Accurately clean with a neutral detergent all the contact surfaces between shaft, sleeve and taper hole.

4.2.5c

Position the sleeve using a retainer (to be removed after tightening the retaining screw on shaft end).



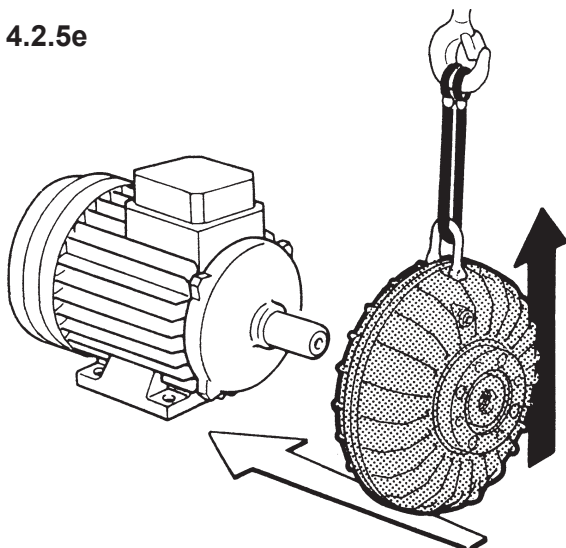
NOTE

The length of the closely fitted shaft must be lower than the taper hole depth and have a threaded bore on the top.

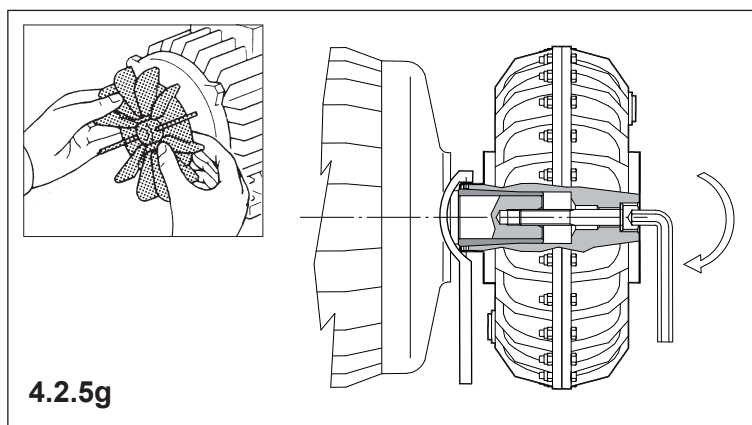
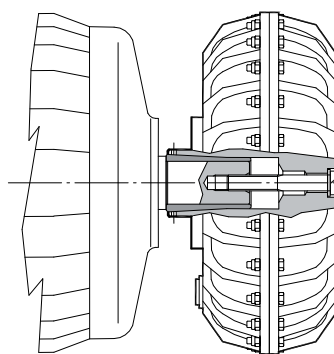
4.2.5d

For fluid couplings weighing more than 30 kg, fully unscrew and remove one of the screws of coupling shell closure and insert a suitable WESTCAR hoisting device (available on request).

4.2.5e



4.2.5f



4.2.5e

Sling the fluid coupling on the hoisting device with ropes having a load capacity in compliance with its weight (see identification plate). Lift the coupling to a minimum height, bring it to the installation shaft with slow movements and fit it on the taper sleeve of the motor.

**CAUTION**

**Do not hit, bang about or exert any force on the coupling shells.
DANGER OF DAMAGING THE BEARING SEATS, CRACKINGS, VIBRATIONS
AND/OR UNBALANCE.**

4.2.5f

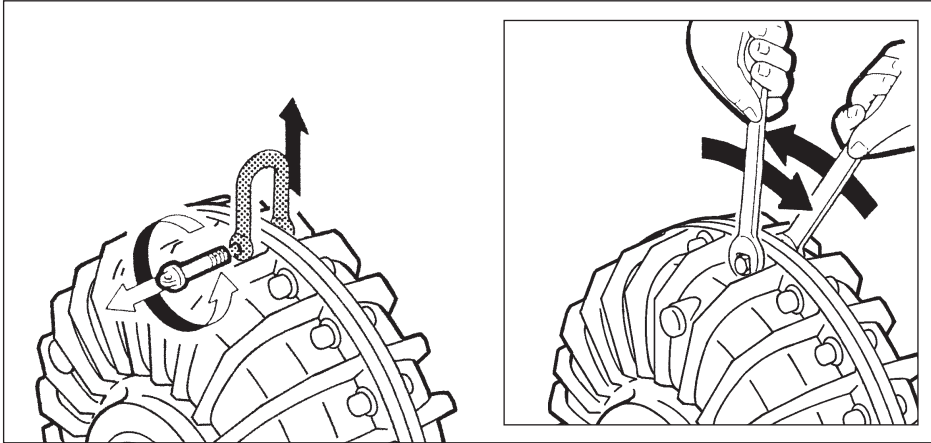
Insert the retaining screw on the end of the shaft provided with a suitable washer and screw it on the drive shaft.

4.2.5g

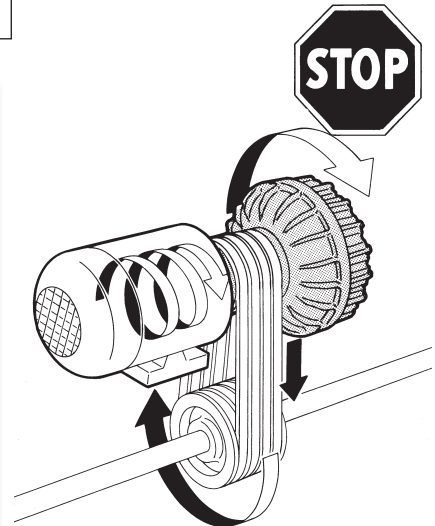
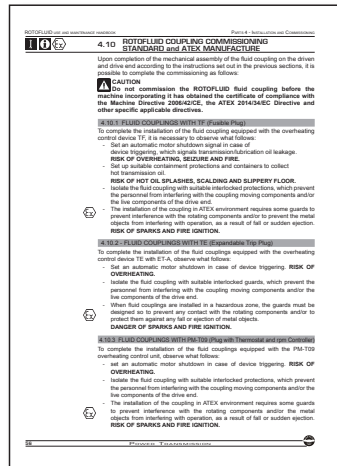
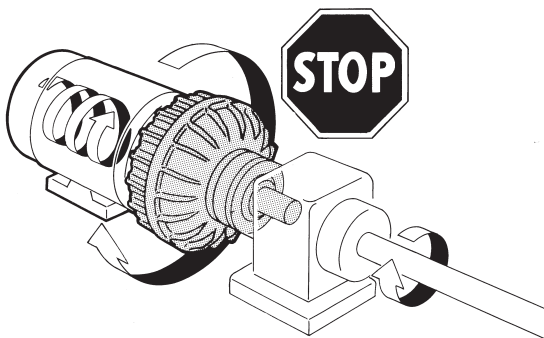
Tighten the central clamping screw, preventing any motion of the machine or motor shaft, where it is mounted. For tightening, respect the torque values as reported in the table.

COUPLING SIZE FC	SLEEVE NC	RETAINING SCREW	CLASS	TORQUE Nm
30 / 30P	3BC 54 D= ø28	M10	8.8	50
	3BC 54 D= ø38	M12	8.8	80
	* 3BC 54 D= ø42÷50	M16	8.8	210
40P	4BC 58 D= ø38÷40	M12	8.8	80
	4BC 58 D= ø40÷42	M16	8.8	210
	* 4BC 58 D= ø48÷50	M16	8.8	210
50 / 55	5BC 73 D= ø38÷40	M12	10.9	120
	5BC 73 D= ø40÷42	M16	8.8	210
	* 5BC 73 D= ø55÷65	M20	8.8	230
60 / 65[B]	6BC 79,5 D= ø40÷50	M16	10.9	290
	6BC 79,5 D= ø55	M20	8.8	410
	* 6BC 79,5 D= ø60÷65	M20	8.8	410

* Hydraulic coupling with taper sleeves without keyways



4.2.7



4.2.6

Remove the sling and the hoisting device, then reinsert the screw and the nut previously removed and screw it in tightly.



NOTE The Rotofluid couplings, with cylindric hole for shafts in inches, are equipped with setscrews for axial fastening on the shaft, as an alternative to clamping with the central clamping screw.

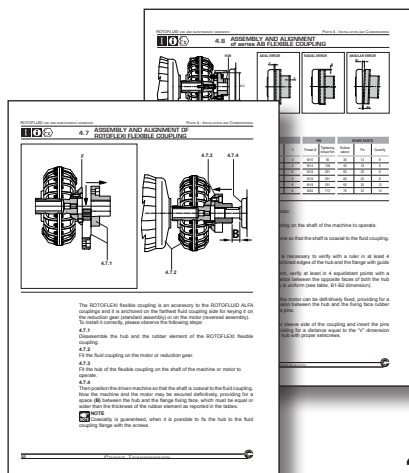
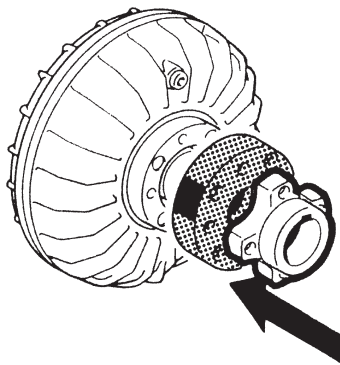
4.2.7

The transmission oil carries out an important lubrication function inside the fluid coupling; therefore the motor or the drive parts should not be activated, if it is missing. Before starting the motor, complete the operation described in section 4.10 STANDARD AND ATEX FLUID COUPLING COMMISSIONING.



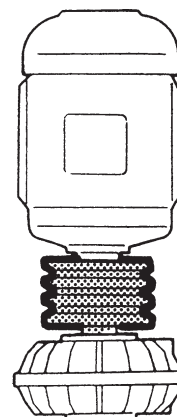
Do not start up the motor or the drive part without or with insufficient oil filling. RISK OF BEARING SEIZURE, OVERHEATING AND/OR FIRE IGNITION.

ALFA COUPLINGS

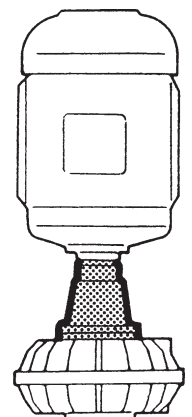


BETA COUPLINGS

4.2.8b



BETA X



BETA J

**CAUTION**

Do not start up the motor or the drive part without or with insufficient oil filling. RISK OF BEARING SEIZURE, OVERHEATING AND/OR FIRE IGNITION.

4.2.8

Start to install the hydraulic coupling Rotofluid, taking into account the type of coupling at disposal (ALFA or BETA):

4.2.8a - ALFA COUPLINGS

To install the ALFA in-line fluid couplings, it is necessary to assemble the accessories (rubber element, hub, etc.) according to the instructions dealt with in section 4.7 FITTING AND ALIGNMENT OF ROTOFLEXI FLEXIBLE COUPLINGS or 4.6 FITTING AND ALIGNMENT OF AB series FLEXIBLE COUPLINGS.

**NOTE**

The Rotofluid Alfa couplings are supplied with embedded main retaining screw in order to allow the radial removal of the Rotoflexi elastic ring.

4.2.8b - BETA COUPLINGS

To install the BETA, fluid couplings for belt drive, it is necessary to assemble and tension the belts according to the instructions of the belt manufacturer.

**CAUTION**

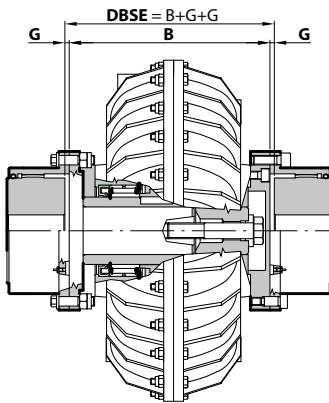
Too loose belts may originate vibrations, while too stiff tensioning or wrong alignment may damage the seats of the roller bearings of the coupling, motor or machine.

The assembly of the fluid coupling on the hollow shaft side has thus ended.

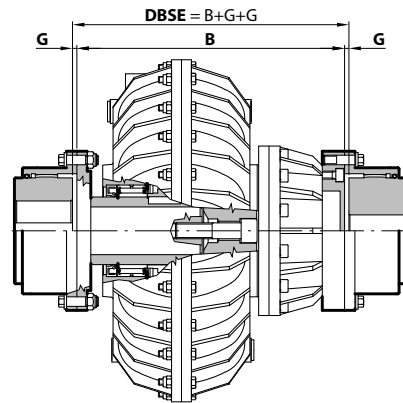


4.3 ASSEMBLY AND ALIGNMENT OF THE ROTOFLUID WAG-G COUPLING

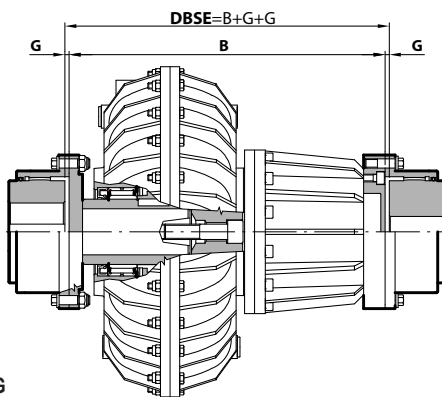
WAG-G



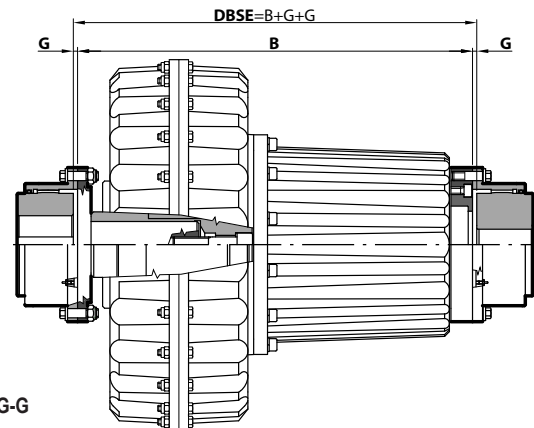
SCF WAG-G



DCF WAG-G



CA WAG-G



4.3.1 GENERAL DESCRIPTION

The series of ROTOFLUID WAG-G couplings and alike (SCF WAG-G, DCF WAG-G and CA WAG-G) includes two half couplings as shown in the picture.

This combination offers the following advantages:

- it is possible to replace the fluid coupling without removing the electrical motor and the driven machine (no further alignment is required),
- the weight of the fluid coupling is distributed both on the shaft of the electric motor and the driven shaft.

The tooth gear coupling includes a sleeve, a hub, fit screws, screw nuts, gaskets and two plugs.

4.3.2 ASSEMBLY AND ALIGNMENT

4.3.2a

If the half couplings have been supplied as semi-finished products, bore the hole and provide them with keyway, respecting the tolerances for the hole (for transition fit or force fit with maximum negative allowance of 0,5µm per millimeter). The hole must be concentric to the outer diameter of the hub and the runout error cannot exceed ±0,05mm.

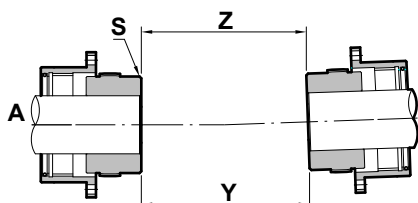
4.3.2b

Clean the parts accurately, grease the gaskets and insert them in the seats of the sleeve.

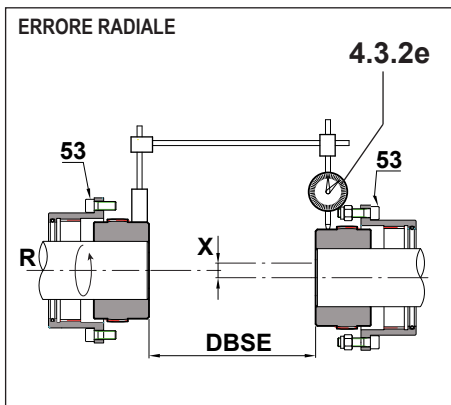
4.3.2c

Position the sleeves on the axis without damaging the gaskets. Assemble the hubs on the shaft according to the technical specifications included in the catalogue or the specific drawings enclosed.

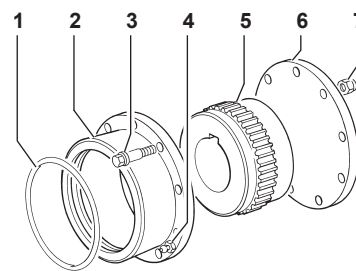
ERRORE ANGOLARE



ERRORE RADIALE



4.3.2h



COUPLINGS/SIZE		ROTOGEAR			ROTOFLUID		ROTOFLUID		ROTOFLUID		ROTOFLUID		TABLE A	
ROTOFLUID	ROTOFLUID CA	Type	G	S (=Y-Z)	WAG-G		SCF WAG-G		DCF WAG-G		CA WAG-G		GREASE	TIGHTENING TORQUE
			mm	mm	B	X	B	X	B	X	B	X		
20		RE 40		0,10	162	0,22	--	--	--	--	--	--	2x0,04	26
30		RE 55	1,5	0,12	197	0,28	252	0,36	292	0,42			2x0,1	52
30P					197	0,28	252	0,36	292	0,42				
40P					233	0,34	291	0,42	363	0,53				
50					214	0,31	294	0,43	369	0,54				
55	55S-55D	RE 85	2,5	0,19	256,5	0,37	336,5	0,49	411,5	0,60	509	0,74	2x0,14	91
60					265	0,35	355	0,48	435	0,59	--	--		
65	65S-65D				313	0,41	403	0,55	483	0,66	553	0,76		
70P		RE 100		0,22	293,5	0,39	403,5	0,55	518,5	0,71			2x0,35	
75P	75PS-75PD				348,5	0,47	458,5	0,63	573,5	0,79	655,5	0,91		
75P	75PS-75PD	RE 120	3	0,26	330	0,49	440	0,66	555	0,80	642	0,85	2x0,40	215
80P	80P				370	0,49	488	0,66	588	0,80	663,5	0,90	2x0,5	215
85P	85PD	RE 120	3	0,26	440	0,59	558	0,76	658	0,91	865	1,20		
85P	85PD	RE 140			410	0,57	528	0,74	628	0,88	835	1,22	2x0,6	215
90P	90P	RE 180			4	0,37	440	0,65	500	0,82	580	0,84	846	1,24
95P	--	RE 200	4	0,40	565	0,72	685	0,9	765	0,92	--	--	2x2,2	575

4.3.2d

Install the electric motor and the driven machine respecting the DBSE dimension of the coupling.

4.3.2e

Level the shafts using a gauge or a comparator. The tolerance for the "S" angular and "X" radial alignment must be in compliance with the levels shown in the table.

4.3.2f

Grease the teeth of the hub with a suitable lubricant (see table B) and put the sleeves on the hubs.

4.3.2g

Position the fluid coupling between the sleeves. Connect them accurately using the fitting screws and the nuts. Tighten the screws evenly according to the torque as shown in table A.

4.3.2h

Remove both plugs (4) of the sleeves (2). Place both holes in horizontal position in order to go along with the task on both sleeves at the same time. Fill them with grease until it leaks from the opposite hole. Screw the plugs again. The quantity of grease may be inferred from table A.



CAUTION

Every 12 months provide visual inspection of hubs and sleeves teeth; greasing before replacement. Every 7000 hours or 2 years operation; grease has to be replaced completely according to the point 4.3.2 F.

TABLE B

RECOMMENDED GREASE

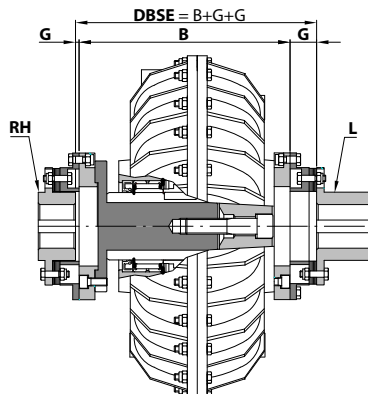
AGIP	API	IP	SHELL	MOBIL	ESSO
GR-MU/EPO (EP1)	APIGREASE PGX-0	ATHESIA-EPO	ALVANIA EP GREASE 1	MOBIL GREASE SPECIAL	PEN-O-LED-EP-350



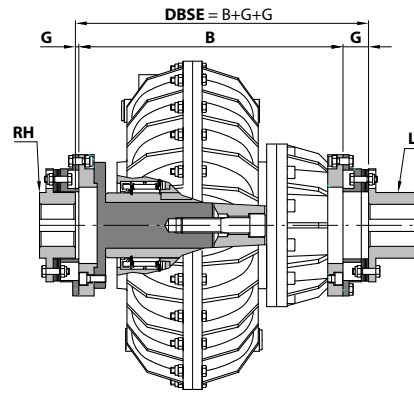


4.4 ASSEMBLY AND ALIGNMENT OF THE ROTOFLUID KLM COUPLING

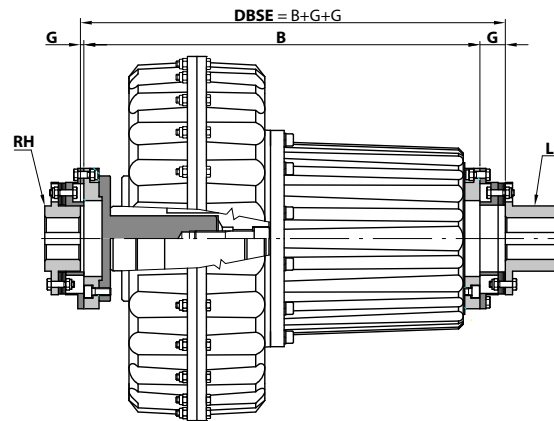
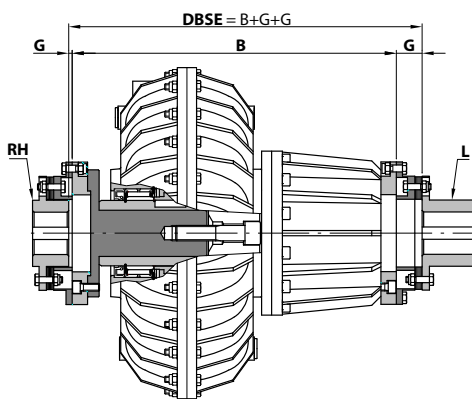
KLM



SCF KLM



DCF KLM



4.4.1 GENERAL DESCRIPTION

The KLM series of the ROTOFLUID couplings and alike (SCF KLM, DCF KLM and CA KLM) includes two disc half couplings.

This kind of assembly offers a number of advantages:

- the fluid coupling can be replaced without removing the electric motor and the driven machine (no further alignment is required),
- the weight of the fluid coupling is distributed both on the shaft of the electric motor and on the driven shaft.
- the disc half coupling does not require any maintenance.

The disc half coupling includes a hub, a set of discs, a flange and a set of bolts. These parts are supplied ready for use.

4.4.2 ASSEMBLY AND ALIGNMENT

4.4.2a

If the half couplings have been supplied as semi-finished products, bore the hole and provide them with keyways, respecting the tolerances for both hole (for transition fit or force fit) and concentricity $\pm 0,05\text{mm}$. The hole must be concentric to the outer diameter of the hub and the runout error cannot exceed $\pm 0,05\text{mm}$.

4.4.2b

Clean the parts accurately.

4.4.2c

Position the electric motor and the driven machine respecting the "DBSE" dimension.

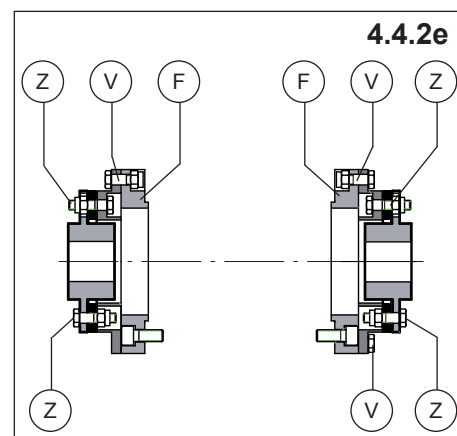
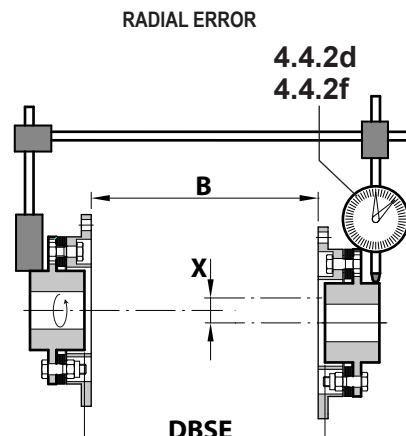
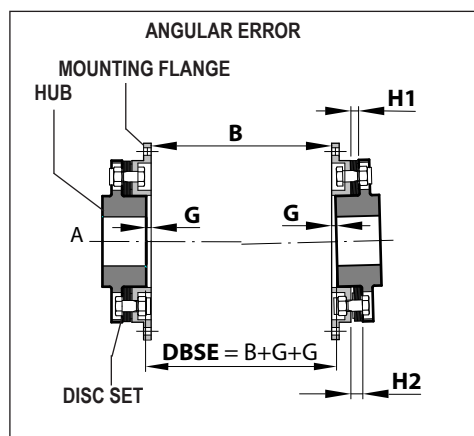


TABLE A		DISC COUPLINGS HBSX.../8/RX				ROTOFLUID		ROTOFLUID		ROTOFLUID		ROTOFLUID	
ROTOFLUID Size	ROTOFLUID CA Size	Size	L	RH	H2-H1	K-KLM		SCF KLM		DCF KLM		CA KLM	
			G	G		B	X	B	X	B	X	B	X
			mm	mm		mm	mm	mm	mm	mm	mm	mm	mm
30-30P	--	170	28,2	1,5	0,23	214	0,38	269	0,46	309	0,60	--	--
40P	--				0,23	250	0,44	308	0,52	380	0,70	--	--
50	--	330	33,5	1,5	0,28	234	0,43	314	0,54	389	0,74	--	--
55	55S-55D				0,28	266	0,47	346	0,59	421	0,79	522	0,94
60	--	650	38,5	1,5	0,39	256	0,58	346	0,60	426	0,82	--	--
65	65S-65D				0,39	304	0,54	394	0,67	474	0,89	544	0,99
70P	--	1260	50,5	2,5	0,44	276	0,58	386	0,74	501	1,04	--	--
75P	75PS-75PD				0,44	331	0,61	441	0,77	556	1,08	638	1,20
80P	80P	2700	73	3	0,48	360	0,65	478	0,82	578	1,15	655	1,39
80P	80P	3160	82	3	0,55	360	0,73	478	0,90	578	1,28	655	1,39
85P	85PD				0,55	430	0,84	548	1,01	648	1,38	855	1,68
90P	90P	4630	93	4	0,62	461	0,91	521	1,00	601	1,37	867	1,76
95P	--				0,62	576	1,08	696	1,25	776	1,63	--	--

4.4.2d

Align the shafts using a comparator.



NOTE

The tolerances for the radial alignment "X", the angular alignment H1-H2, are reported in table A.

4.4.2e

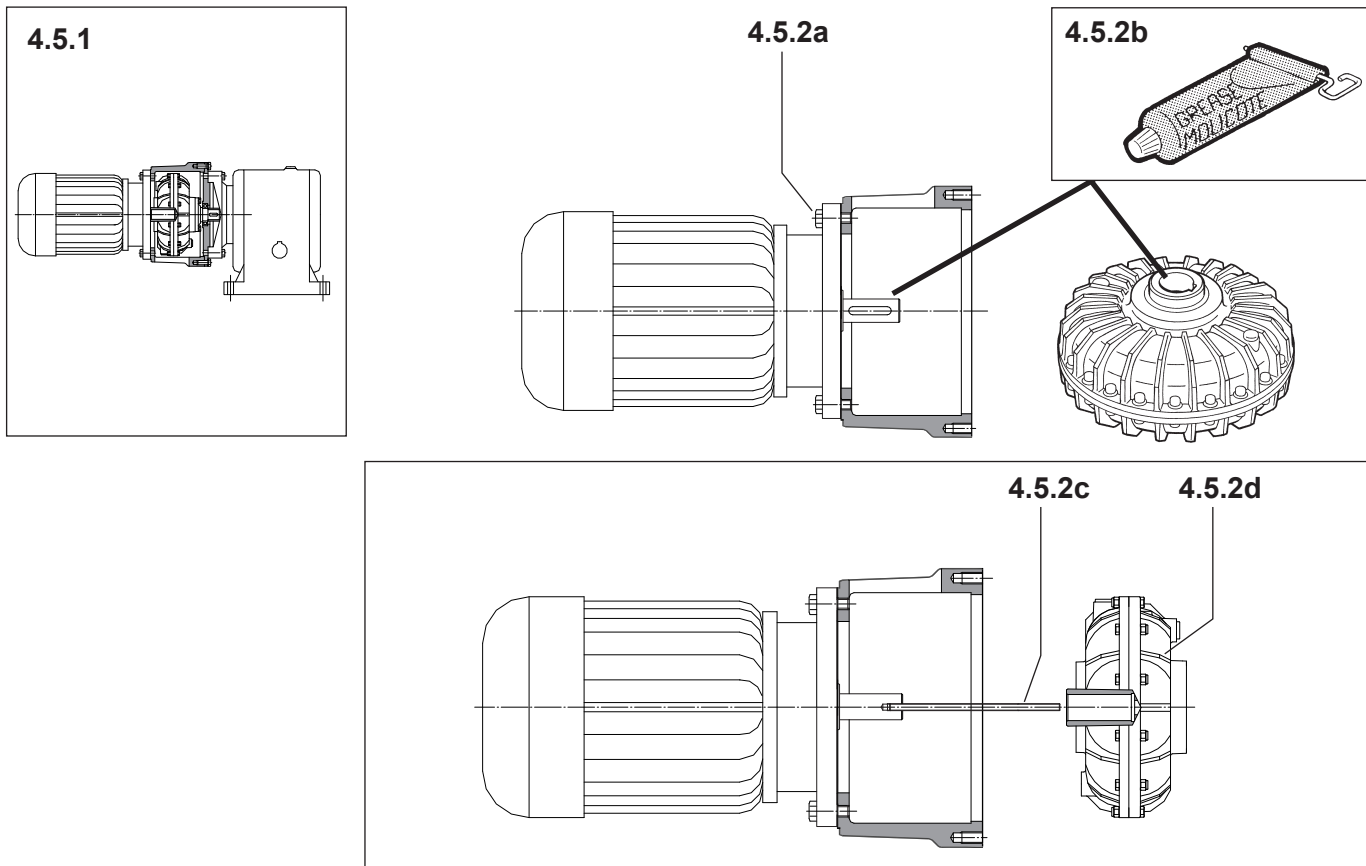
Make sure that the matching flanges (F) of the fluid coupling and the disc half-couplings or perfectly clean. Insert the fluid coupling between the two half-couplings and tighten it with the screws (V), then tighten them uniformly according to the tightening torque values as reported in table B.

4.4.2f

Check the angle alignment again (H2-H1) between the coupling and the flange according to the values reported in table A.

TABLE B	COUPLING	30 - 30P - 40P	50 - 55	60 - 65	70P - 75P	80P - 85P	90P - 95P
DISC COUPLING	POS.	HBSX 170	HBSX 330	HBSX 650	HBSX 1260	HBSX 2700 / 3160	HBSX 4630
TIGHTENING TORQUE Nm	V	23	23	45	45	80 80	180
	Z	23	45	80	180	500 650	950

4.5 ASSEMBLY OF ROTOFLUID- CKS Series



4.5.1 GENERAL DESCRIPTION

The fluid couplings of the ROTOFLUID CKS series have been equipped with housing for centering and fixing them on the motor flange and on the driven side, on the reduction gear flange, as shown in the picture.

This design offers the following advantages:

- Maximum stiffness and alignment with driving and driven components, respectively upstream and downstream the fluid coupling;
- The weight of the coupling and the drive end may be supported by the driven components;
- Safe functioning of rotating components of the coupling, which are kept separated inside the housing.

4.5.2 ASSEMBLY AND ALIGNMENT

4.5.2a

Fix the housing of the fluid coupling on the flange of the drive end (electric motor and/or internal combustion engine).

4.5.2b

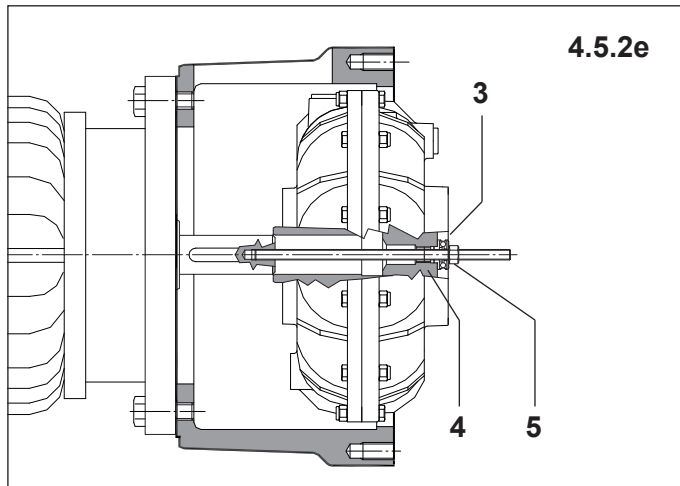
Accurately clean and lubricate the surface of the driving shaft and hole of the fluid coupling.

4.5.2c

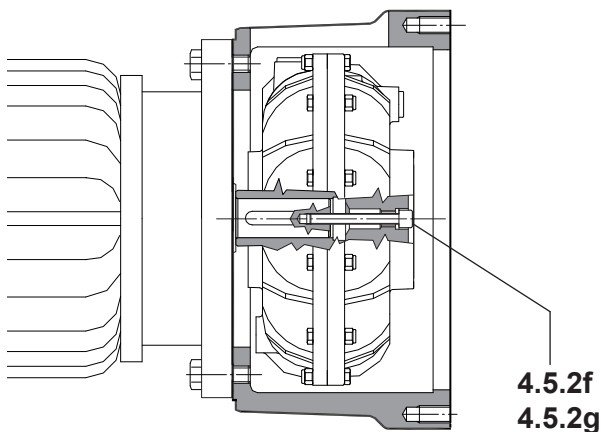
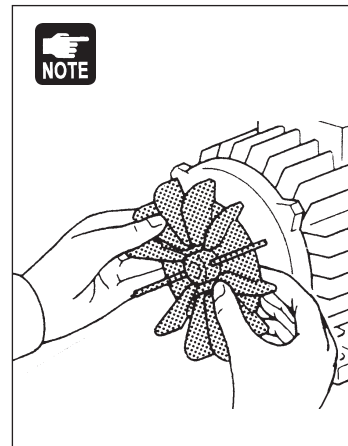
Screw the threaded bar required for assembly on the driving shaft.

4.5.2d

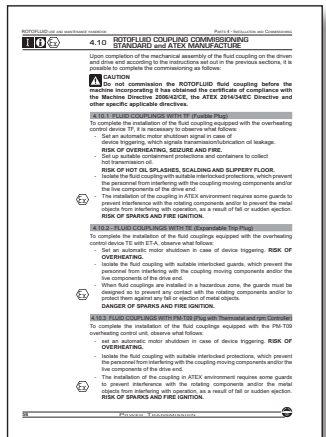
Sling the fluid coupling and bring it near the motor shaft with longitudinal axis.



4.5.2e

4.5.2f
4.5.2g

4.5.2h

**4.5.2e**

Insert a thrust-bearing (3), which rests exclusively on the primary shaft (4) of the coupling. Screw the nut (5) on the threaded bar and tighten until the fluid coupling fits the drive shaft stop limit.

**NOTE**

This operation must be accomplished, by holding the drive shaft firmly on the fan side.

4.5.2f

After the coupling has been fitted up to the stop limit on the shaft, loosen the nut and remove both threaded bar and thrust bearing; insert the main retaining screw equipped with the suitable centering washer supplied with the coupling.

4.5.2g

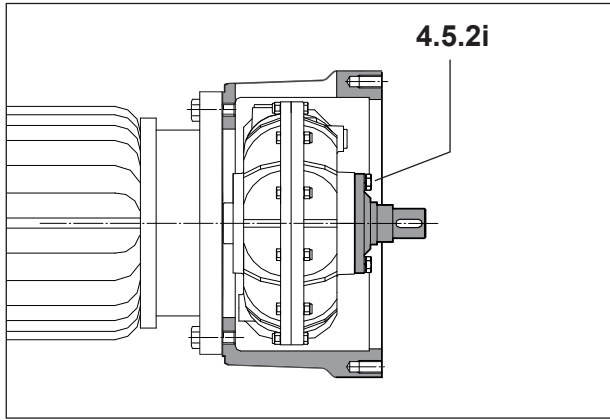
Tighten the retaining screw, by holding the motor shaft firmly in position.

4.5.2h

The gear lubrication oil has the important function to lubricate the bearings inside the coupling; therefore the motor or driving components should not be started if oil is missing. Before starting the motor, complete the operations tackled in section 4.10 STANDARD AND ATEX FLUID COUPLING COMMISSIONING.

**CAUTION**

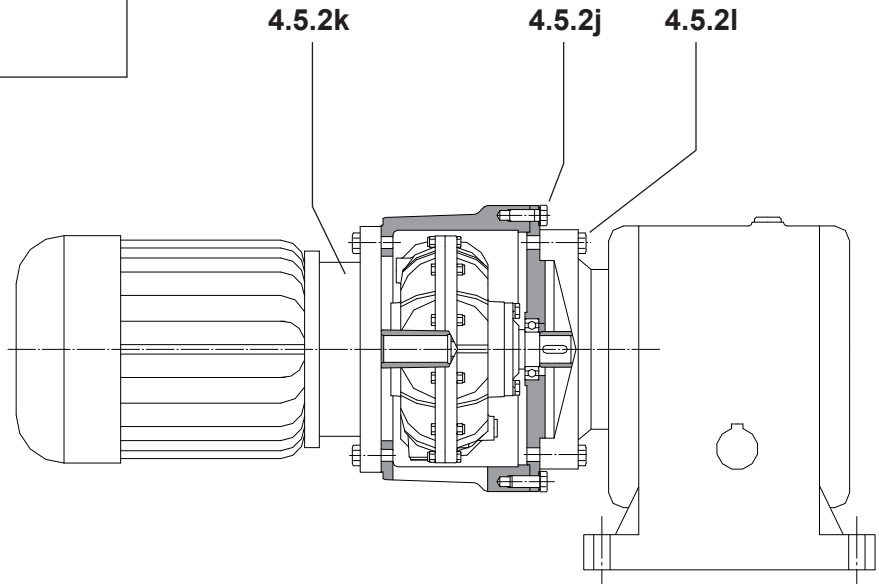
Do not start up the motor or the drive part without or with insufficient oil filling. **RISK OF BEARING SEIZURE, OVERHEATING AND/OR FIRE IGNITION.**



4.9 SCREW TIGHTENING TORQUES FOR COUPLINGS AND ACCESSORIES

4.5.2i
4.5.2j
4.5.2l

CAUTION
All tightening torques are expressed in Nm (2.75 ft-lb) and refer to the screws indicated in the MISTICAL screw of study, which are provided in separate parts 4.5.2i to 4.5.2l, 4.5.2m, 4.5.2n, 4.5.2o, 4.5.2p, 4.5.2q, 4.5.2r, 4.5.2s, 4.5.2t, 4.5.2u, 4.5.2v, 4.5.2w, 4.5.2x, 4.5.2y, 4.5.2z, 4.5.2aa, 4.5.2ab, 4.5.2ac, 4.5.2ad, 4.5.2ae, 4.5.2af, 4.5.2ag, 4.5.2ah, 4.5.2ai, 4.5.2aj, 4.5.2ak, 4.5.2al, 4.5.2am, 4.5.2an, 4.5.2ao, 4.5.2ap, 4.5.2aq, 4.5.2ar, 4.5.2as, 4.5.2at, 4.5.2au, 4.5.2av, 4.5.2aw, 4.5.2ax, 4.5.2ay, 4.5.2az, 4.5.2ba, 4.5.2bb, 4.5.2bc, 4.5.2bd, 4.5.2be, 4.5.2bf, 4.5.2bg, 4.5.2bh, 4.5.2bi, 4.5.2bj, 4.5.2bk, 4.5.2bl, 4.5.2bm, 4.5.2bn, 4.5.2bo, 4.5.2bp, 4.5.2bq, 4.5.2br, 4.5.2bs, 4.5.2bt, 4.5.2bu, 4.5.2bv, 4.5.2bw, 4.5.2bx, 4.5.2by, 4.5.2bz, 4.5.2ca, 4.5.2cb, 4.5.2cc, 4.5.2cd, 4.5.2ce, 4.5.2cf, 4.5.2cg, 4.5.2ch, 4.5.2ci, 4.5.2cj, 4.5.2ck, 4.5.2cl, 4.5.2cm, 4.5.2cn, 4.5.2co, 4.5.2cp, 4.5.2cq, 4.5.2cr, 4.5.2cs, 4.5.2ct, 4.5.2cu, 4.5.2cv, 4.5.2cw, 4.5.2cx, 4.5.2cy, 4.5.2cz, 4.5.2da, 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4.5.2ud, 4.5.2ue, 4.5.2uf, 4.5.2ug, 4.5.2uh, 4.5.2ui, 4.5.2uj, 4.5.2uk, 4.5.2ul, 4.5.2um, 4.5.2un, 4.5.2uo, 4.5.2up, 4.5.2uq, 4.5.2ur, 4.5.2us, 4.5.2ut, 4.5.2uu, 4.5.2uv, 4.5.2uw, 4.5.2ux, 4.5.2uy, 4.5.2uz, 4.5.2va, 4.5.2vb, 4.5.2vc, 4.5.2vd, 4.5.2ve, 4.5.2vf, 4.5.2vg, 4.5.2vh, 4.5.2vi, 4.5.2vj, 4.5.2vk, 4.5.2vl, 4.5.2vm, 4.5.2vn, 4.5.2vo, 4.5.2vp, 4.5.2vq, 4.5.2vr, 4.5.2vs, 4.5.2vt, 4.5.2vu, 4.5.2vv, 4.5.2vw, 4.5.2vx, 4.5.2vy, 4.5.2vz, 4.5.2wa, 4.5.2wb, 4.5.2wc, 4.5.2wd, 4.5.2we, 4.5.2wf, 4.5.2wg, 4.5.2wh, 4.5.2wi, 4.5.2wj, 4.5.2wk, 4.5.2wl, 4.5.2wm, 4.5.2wn, 4.5.2wo, 4.5.2wp, 4.5.2wq, 4.5.2wr, 4.5.2ws, 4.5.2wt, 4.5.2wu, 4.5.2wv, 4.5.2ww, 4.5.2wx, 4.5.2wy, 4.5.2wz, 4.5.2xa, 4.5.2xb, 4.5.2xc, 4.5.2xd, 4.5.2xe, 4.5.2xf, 4.5.2xg, 4.5.2xh, 4.5.2xi, 4.5.2xj, 4.5.2xk, 4.5.2xl, 4.5.2xm, 4.5.2xn, 4.5.2xo, 4.5.2xp, 4.5.2xq, 4.5.2xr, 4.5.2xs, 4.5.2xt, 4.5.2xu, 4.5.2xv, 4.5.2xw, 4.5.2xx, 4.5.2xy, 4.5.2xz, 4.5.2ya, 4.5.2yb, 4.5.2yc, 4.5.2yd, 4.5.2ye, 4.5.2yf, 4.5.2yg, 4.5.2yh, 4.5.2yi, 4.5.2yj, 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4.5.2i

Fit the pin on to the centering diameter of the fluid coupling and clamp it with the screws supplied with the coupling. The coupling must be clamped gradually (in crosswise sequence) through torque wrench, respecting the tightening torques reported in Section 4.9 SCREW TIGHTENING TORQUES FOR COUPLINGS AND ACCESSORIES.



CAUTION

Make sure that no tools or foreign bodies are left behind inside the housing, as they may damage the coupling on start-up.

4.5.2j

Position the flange on the housing of the fluid coupling and fix it with suitable fastening screws. Tighten them progressively (in crosswise sequence) through torque wrench, respecting the torques shown in Section 4.9 SCREW TIGHTENING TORQUES FOR COUPLING AND ACCESSORIES

4.5.2k

Sling the fluid coupling with housing and motor and fit the coupling pin into the reduction gear up to the stop limit.

4.5.2l

Tighten the coupling with its housing to the reduction gear with suitable screws. Tightening must be carried out progressively (in crosswise sequence) through torque wrench according to the torques shown in Section 4.9 SCREW TIGHTENING TORQUES FOR COUPLING AND ACCESSORIES.

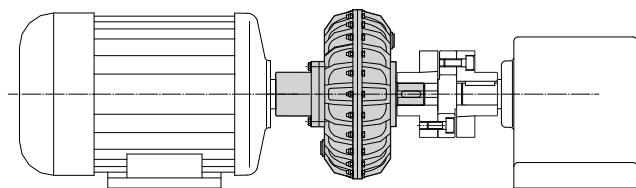
4.5.2m

Remove lifting slings and any tools.

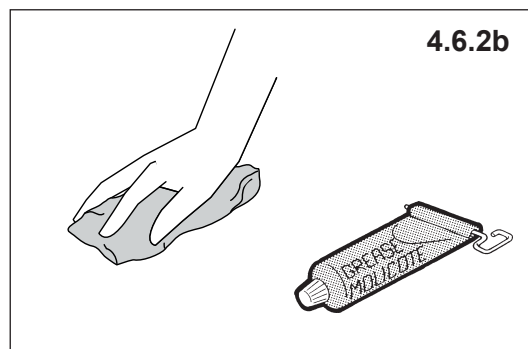
The assembly of the CKS fluid coupling has been concluded.

4.6 ROTOFLUID ASSEMBLY Series NY

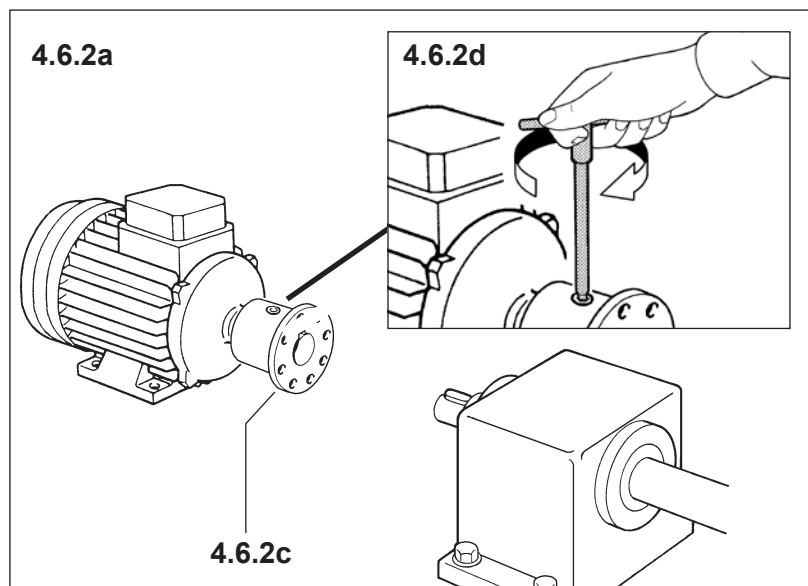
4.6.1



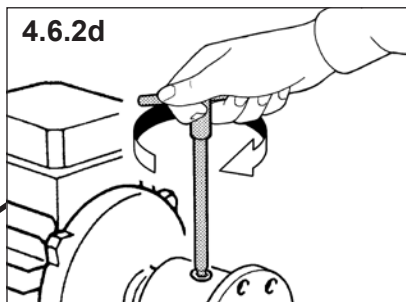
4.6.2b



4.6.2a



4.6.2d



4.6.2c

4.6.1 GENERAL DESCRIPTION

The series of the ROTOFLUID NY fluid couplings is manufactured with drilled bush, assembly keyway for fixing the engine and with built-in shaft pin with key for driving the driven end. This design offers the following advantages:

- Installation with "reverse assembly";
- Easy maintenance (on mounting and dismounting) and alignment;
- Radial removal (with ROTOFLEXI flexible coupling on driven end).

4.6.2 ASSEMBLY AND ALIGNMENT

4.6.2a

Position the machine with drive and non-drive end downstream, respecting the overall dimensions of the fluid coupling and check alignment and coaxiality of the two axes (drive and driven end).

4.6.2b

Accurately clean and lubricate the surfaces of the drive shaft and the bush bore.

4.6.2c

Slip the bush of the fluid coupling on the drive shaft.

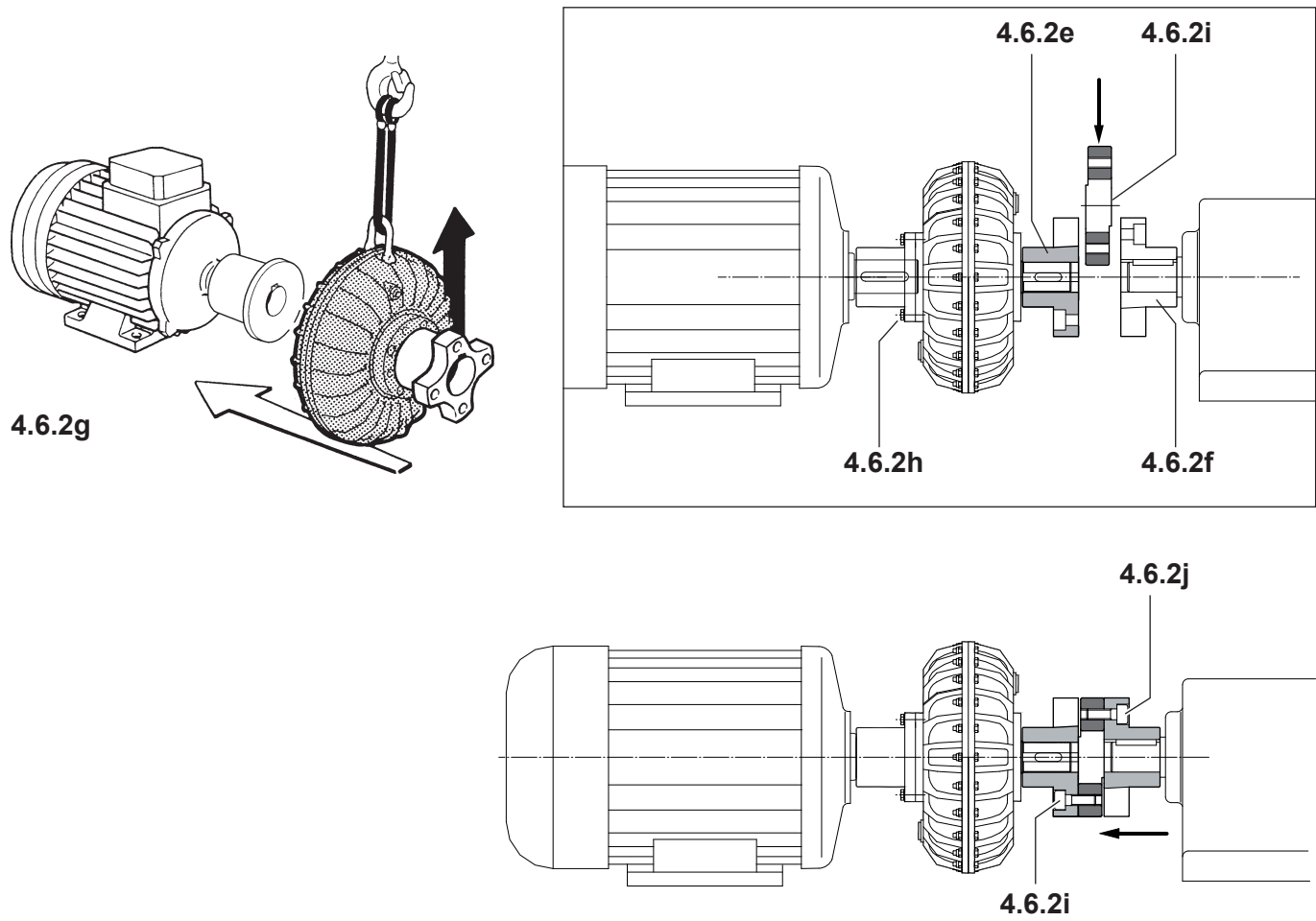


CAUTION

The bore-shaft connection must not be loose, but slightly forced;
RISK OF DANGEROUS VIBRATIONS DURING OPERATION.

4.6.2d

Lock the bush on to the drive shaft with fixing pins.



4.6.2e

Mount the hub of the ROTOFLUXI flexible coupling on the pin of the fluid coupling.

4.6.2f

Mount the hub of the ROTOFLUXI flexible coupling on the pin of the reduction gear or on the pin of the non-drive machine downstream.

4.6.2g

Sling the fluid coupling and position it longitudinally in front of the bush, which is mounted on the drive shaft.

4.6.2h

Couple the bush with the flange of the fluid coupling and fix with the suitable fastening screws supplied with the coupling. Fasten progressively the screws (crosswise) with a torque wrench, respecting the torques as shown in Section 4.9 SCREW TIGHTENING TORQUES FOR COUPLINGS AND ACCESSORIES.

4.6.2i

Connect the elastic element of the ROTOFLUXI coupling to the hub mounted on the fluid coupling and fasten with suitable fastening screws.

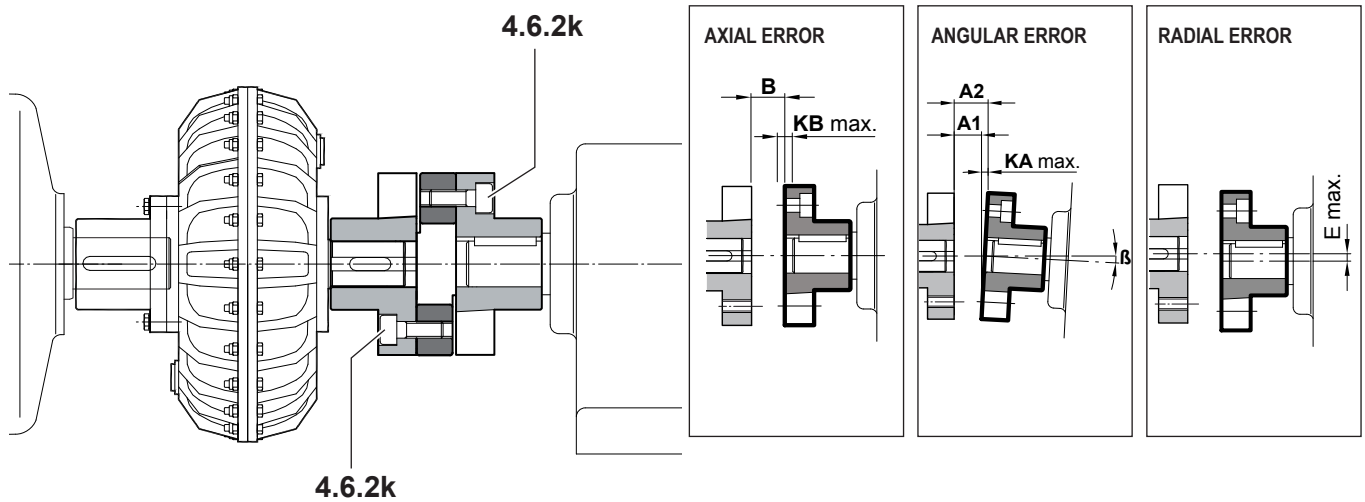
4.6.2j

Bring the hub mounted on the reducing gear shaft or non-drive end shaft near the rubber element of the ROTOFLUXI coupling and fix it with the suitable fastening screws.



CAUTION

Insufficient tightening torque values may lead to the loosening of the screws during operation, and subsequently, to the destruction of the elastic element of the coupling.



ROTOFLEXI	ROTOFLUID COUPLING					MISALIGNMENT				SCR	
Type	K-RNV	B	K-FRNV	B	Rated Torque Nm	KB (max)	KA max (A2-A1)	β (max.)	E (max.)	Size	Tightening Torque Nm
1*	10	18	-	-	45	±0,5	0,3	1	0,3	M6 / M8	10 / 25
2	20	22	10	22	75	±0,5	0,4	1°	0,4	M8	25
3	30/30P	30	20	30	230	±0,5	0,4	1°15'	0,4	M10	50
4	40P	34	30	34	470	±0,5	0,4	1°15'	0,4	M12	87
5	50/55	38	40P	38	750	±0,7	0,4	1°15'	0,4	M14	138
6	60/65	42	50/55	42	1125	±0,8	0,5	1°30'	0,5	M14	138
7	70P	48	60/65	48	1100	±1	0,6	1°30'	0,6	M16	212
8	75P	56	75P	56	4000	±1	0,6	1°30'	0,6	M18	291

* For coupling with SCFM / DCFM chambers

4.6.2k

Fix the fastening screws of the hub and the elastic element with a torque wrench at the tightening torque as shown in the table. Take care of the final tightening of the screws in order to avoid the deformation of the rubber element.



NOTE

The fixing of the screws must be accomplished by using threadlocker of MEDIUM strength.

4.6.2l

The lubrication oil carries out an important lubrication function of the bearings inside the fluid coupling, therefore neither motor nor drive end must be actuated if the oil is missing. Before motor start-up, complete the operations described in section 4.10 COMMISSIONING OF THE FLUID COUPLING – STANDARD AND ATEX MANUFACTURE.



CAUTION

Do not start-up motor or drive end if oil is completely or partially lacking. RISK OF OVERHEATING, SEIZURE AND FIRE.

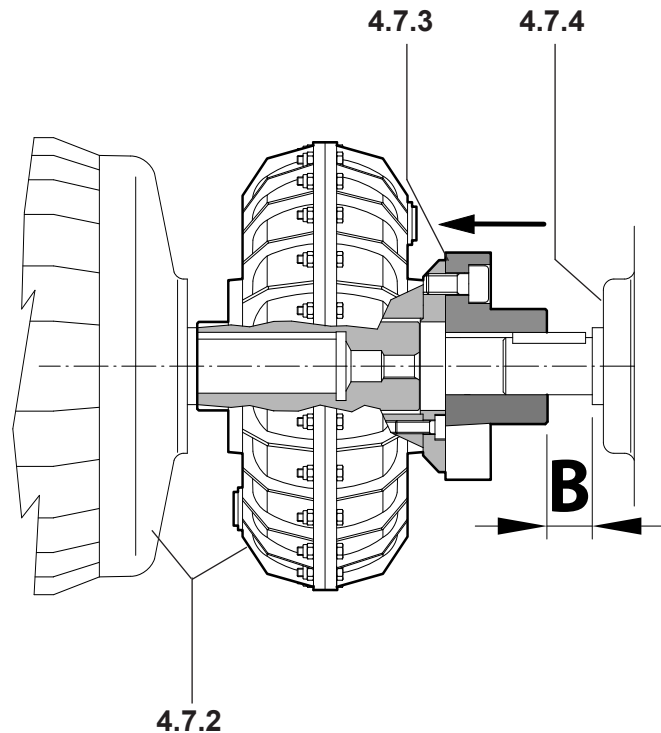
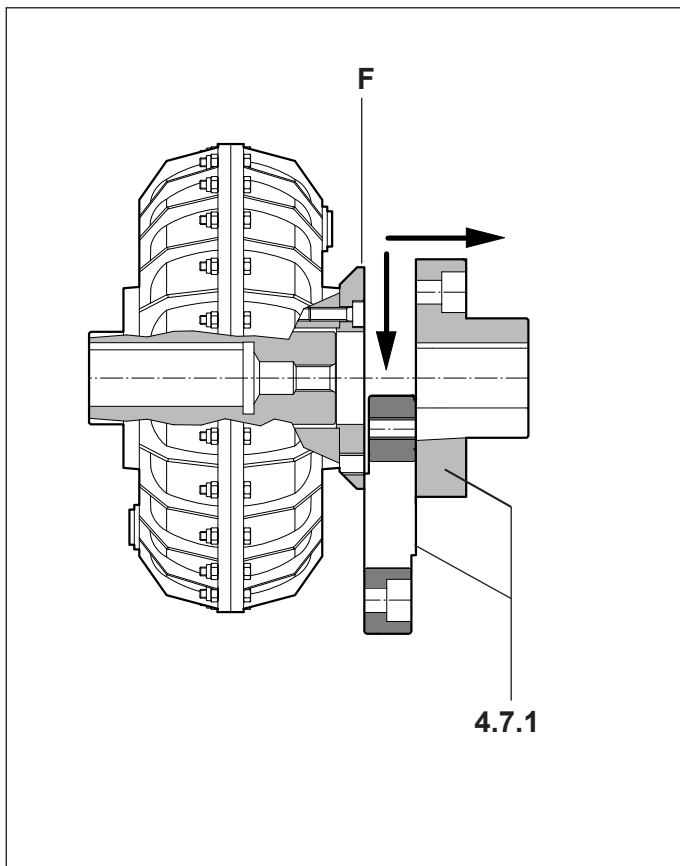
4.6.2m

Remove any lifting slings and tools.

The assembly of the NY fluid coupling has thus been completed.



4.7 ASSEMBLY AND ALIGNMENT OF ROTOFLEXI FLEXIBLE COUPLING



The ROTOFLEXI flexible coupling is an accessory to the ROTOFLUID ALFA couplings and it is anchored on the farthest fluid coupling side for keying it on the reduction gear (standard assembly) or on the motor (reversed assembly). To install it correctly, please observe the following steps:

4.7.1

Disassemble the hub and the rubber element of the ROTOFLEXI flexible coupling.

4.7.2

Fit the fluid coupling on the motor or reduction gear.

4.7.3

Fit the hub of the flexible coupling on the shaft of the machine or motor to operate.

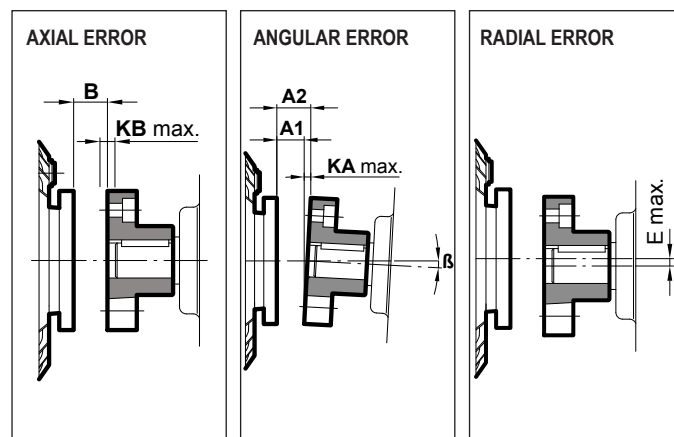
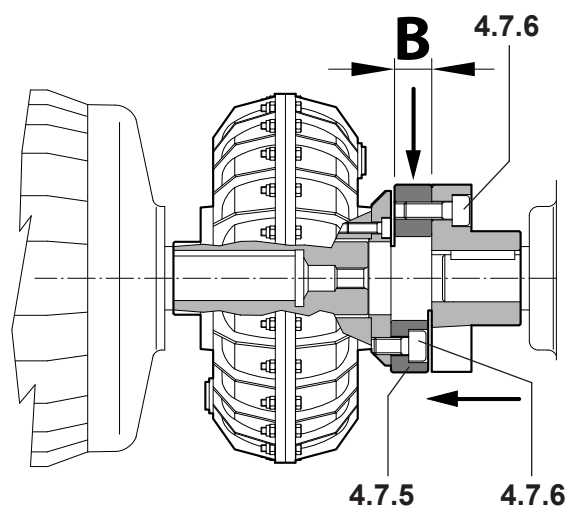
4.7.4

Then position the driven machine so that the shaft is coaxial to the fluid coupling. Now the machine and the motor may be secured definitively, providing for a space **(B)** between the hub and the flange fixing face, which must be equal or wider than the thickness of the rubber element as reported in the tables.



NOTE

Coaxiality is guaranteed, when it is possible to fix the hub to the fluid coupling flange with the screws.



ROTOFLEXI	ROTOFLUID COUPLING					MISALIGNMENT				SCR	
Type	K-RNV	B	K-FRNV	B	Rated Torque Nm	KB (max)	KA max (A2-A1)	β (max.)	E (max.)	Size	Tightening Torque Nm
1*	10	18	-	-	45	±0,5	0,3	1°	0,3	M6 / M8	10 / 25
2	20	22	10	22	75	±0,5	0,4	1°	0,4	M8	25
3	30/30P	30	20	30	230	±0,5	0,4	1°15'	0,4	M10	50
4	40P	34	30	34	470	±0,5	0,4	1°15'	0,4	M12	87
5	50/55	38	40P	38	750	±0,7	0,4	1°15'	0,4	M14	138
6	60/65	42	50/55	42	1125	±0,8	0,5	1°30'	0,5	M14	138
7	70P	48	60/65	48	1100	±1	0,6	1°30'	0,6	M16	212
8	75P	56	75P	56	4000	±1	0,6	1°30'	0,6	M18	291

* For coupling with SCFM / DCFM chambers

ROTOFLEXI	ROTOFLUID COUPLING					MISALIGNMENT				SCR	
Typeo	K-LRV K-LRU	B	K-FRV K-FRU	B	Rated Torque Nm	KB (max)	KA max (A2-A1)	β (max.)	E (max.)	Size	Tightening Torque Nm
1	10	20	-	-	25	±0,5	0,3	1°	0,3	M6 / M8	10 / 25
2	20	24	10	22	65	±0,5	0,4	1°	0,4	M8	25
3	30/30P	32	20	30	175	±0,5	0,4	1°15'	0,4	M10	50
4	40P	36	30/30P	34	330	±0,5	0,4	1°15'	0,4	M12	87
5	50/55	40	40P	38	440	±0,8	0,4	1°15'	0,4	M14	138
6	60/65	44	50/55	42	630	±0,8	0,6	1°30'	0,6	M14	138
7	70P/75P	50	60/65	48	1160	±1	0,6	1°30'	0,6	M16	212
8	80P/85P	62	70P/75P	56	2000	±1	0,6	1°30'	0,6	M18	291

4.7.5

Unscrew the screws, remove the hub and insert the rubber element.



CAUTION

Insufficient tightening torque values may cause the loosening of the screws during operation, and subsequently destroy the rubber element of the coupling.

4.7.6

Block the fixing screws of the hub and rubber element by means of the torque wrench using the tightening torque shown in the table.

Pay attention to the final tightening in order to avoid the deformation of the rubber element.

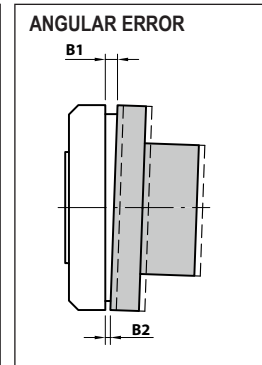
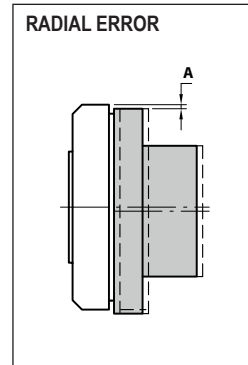
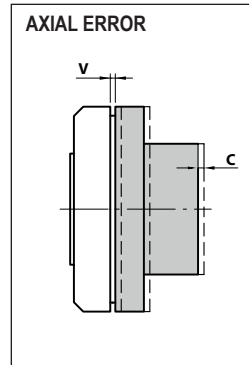
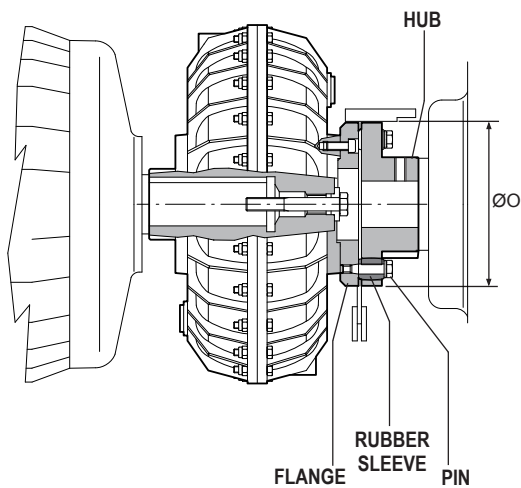


NOTE

The screws must be blocked using some MEDIUM-STRENGTH thread sealant.



4.8 ASSEMBLY AND ALIGNMENT of series AB FLEXIBLE COUPLING



ROTOFLUID	FLEXIBLE COUPLING			SIZE IN MM				PIN		SPARE PARTS		
Size	Type	Ø O	Rated Torque Nm	A	B1-B2 max	C	V	Thread Ø	Tightening torque Nm	Rubber sleeve	Pin	Quantity
50-55	AB-5	186	950	0,18	1	2	4	M10	50	30	12	8
60-65	AB-6	224	2200	0,22	1,2	2	4	M14	138	40	18	8
70P-75P	AB-8/7	330	6500	0,35	1,7	3	6	M18	291	60	25	8
80P	AB-8	330	6500	0,35	1,7	3	6	M18	291	60	25	8
85P	AB-8M	400	12000	0,35	2	3	6	M18	291	60	25	12
90P-95P	AB-9	550	32000	0,55	2,7	4	6	M24	710	76	32	14

4.8.1

Fit the fluid coupling on the motor.

4.8.2

Fit the hub of the flexible coupling on the shaft of the machine to operate.

4.8.3

Then position the driven machine so that the shaft is coaxial to the fluid coupling.



NOTE

To confirm coaxiality, it is necessary to verify with a ruler in at least 4 equidistant points, that the machined edges of the hub and the flange with guide pins are levelled.

To confirm the angle alignment, verify at least in 4 equidistant points with a thickness gauge that the distance between the opposite faces of both the hub and the flange with guide pins is uniform (see table, B1-B2 dimension).

4.8.4

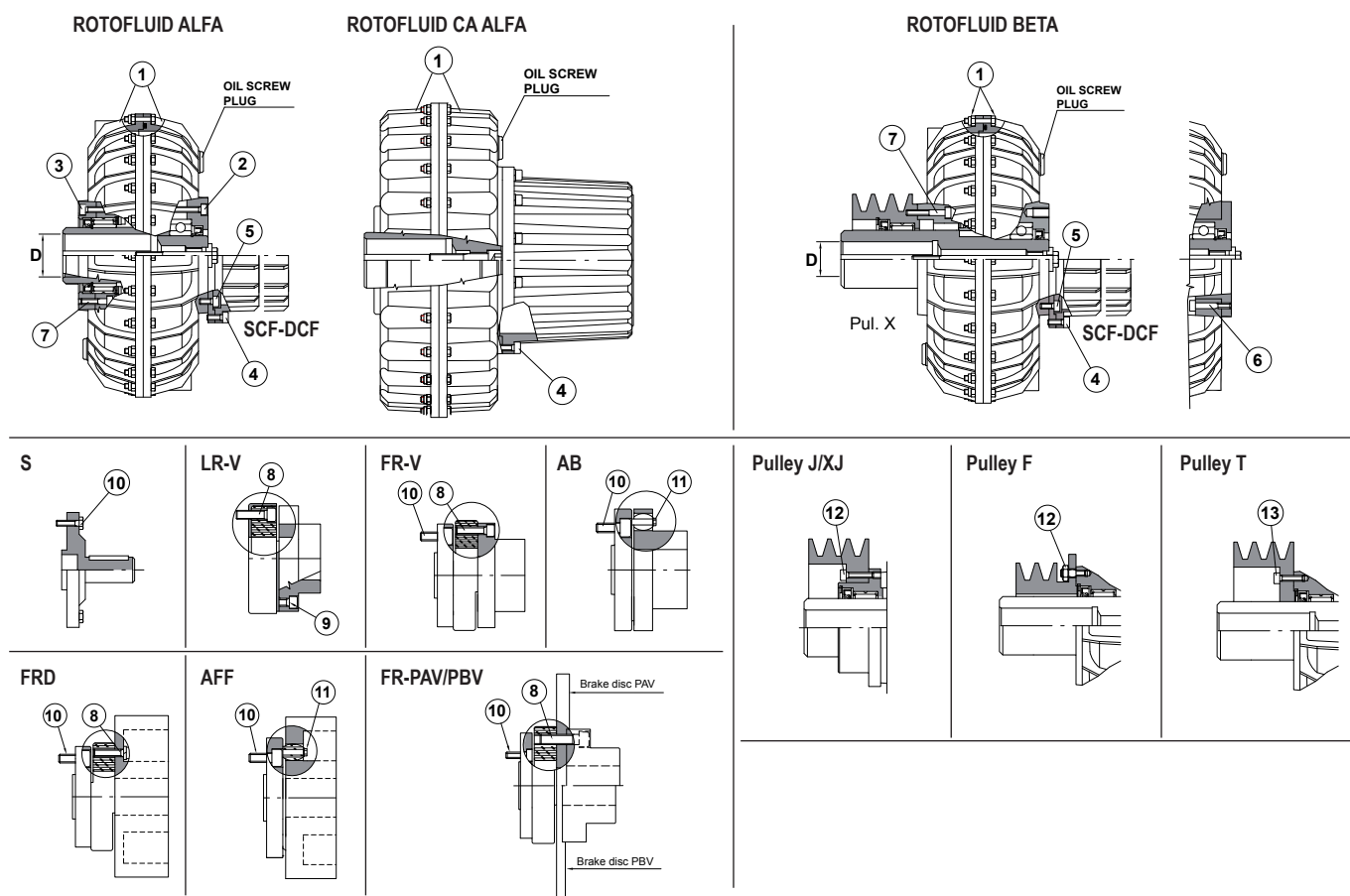
Now the driven machine and the motor can be definitively fixed, providing for a space equal to the "V" dimension between the hub and the fixing face rubber sleeve of the flange with guide pins.

4.8.5

Bring the hub near the rubber sleeve side of the coupling and insert the pins in the relevant housings, providing for a distance equal to the "V" dimension shown in the table and fix the hub with proper setscrews.



4.9 SCREW TIGHTENING TORQUES FOR COUPLINGS AND ACCESSORIES



All tightening torques are expressed in Nm (UNI 3740 / ISO 898) and refer to the screws included in the WESTCAR scope of supply, which are produced in material grade 8.8 (8G) or higher (UNI 5931, UNI 5737, UNI 5739, UNI 5932).



CAUTION

The screws in the aluminium or cast-iron threaded holes must exert a firm grip along a depth equal to $1\frac{1}{2}$ times their diameter, in order to ensure resistance at the prescribed tightening torque. **RISK OF SEAT THREAD STRIPPING.**

ROTOFLUID SIZE	Pos. 1	Pos. 2	Pos. 3	Pos. 4	Pos. 5	Pos. 6	Pos. 7	Pos. 8	Pos. 9	Pos. 10	Pos. 11	Pos. 12	Pos. 13	OIL SCREW PLUG	SCREWS	TORQUE Nm
10	M5	-	-	-	M6	-	M6	M6	M8	M6	-	M6	-	1/4"	M5 8.8	6,03
20	M6	-	-	M6	M8	-	M6	M8	M8	M8	-	M6	M6	1/4"	M6 8.8	10,38
30/30P	M8	-	-	M8	M8	-	M8	M10	M10	M8	-	M8	M8	1/4"	M8 8.8	25,16
40/40P	M8	-	-	M8	M10	-	M8	M12	M12	M10	-	M10	M8	1/4"	M10 8.8	50,53
50/55	M8	M10	-	M10	M10	-	M10	M14	M14	M10	M10	M10	M10	1/2"	M12 8.8	87,08
60/65	M8	M10	-	M10	M10	-	M10	M14	M14	M10	M14	M10	M10	1/2"	M14 8.8	138,5
70P/75P	M10	-	-	M12	M12	M12	M12	M18	M18	M16	M18	M12	M12	1/2"	M16 8.8	212
80P/85P	M12	M14	M14	M12	-	-	-	M18	M18	M18	M18	M14	M14	1/2"	M18 8.8	291
90P	M14	M20	M16	M20	-	-	-	-	-	M20	M24	-	-	3/4"	M20 8.8	413
95P	M14	M16	M16	M20	-	-	-	-	-	M20	M24	-	-	3/4"	M24 8.8	710

ROTOFLUID SIZE	Pos. 1	Pos. 2	Pos. 3	Pos. 4	Pos. 5	Pos. 6	Pos. 7	Pos. 8	Pos. 9	Pos. 10	Pos. 11	Pos. 12	Pos. 13	OIL SCREW PLUG	PLUG	TORQUE Nm
55D/55S	M8	M10	-	M10	M10	-	M8	M14	M14	M10	M10	M10	-	1/2"	1/4"	12,75
65D/65S	M10	M10	-	M10	M10	-	M10	M14	M14	M10	M14	M10	-	1/2"	3/8"	25,14
75PD/75PS	M10	-	-	M10	M12	M12	M12	M16	M16	M16	M18	M12	-	1/2"	1/2"	43,03
80P	M12	M14	M14	M12	-	-	-	M18	M18	M18	M18	M14	-	1/2"	3/4"	68,46
85PD/85PD915	M12	M14	M14	M12	-	-	-	M18	M18	M20	M24	M14	-	1/2"		
90P	M14	M16	M16	M20	-	-	-	-	-	M20	M24	-	-	3/4"		

DRIVE SHAFT SIZE "D"	14	19	24	28	38	42-48	55-60-65-70-75-80-85	90-95-100-110-125
MAIN CLAMPING BOLT	M5	M6	M8	M10	M12	M16	M20	M24
TIGHTENING TORQUE Nm	6,03	10,38	25,16	50,53	87,08	212	413	710



4.10 ROTOFLUID COUPLING COMMISSIONING STANDARD and ATEX MANUFACTURE

Upon completion of the mechanical assembly of the fluid coupling on the driven and drive end according to the instructions set out in the previous sections, it is possible to complete the commissioning as follows:



CAUTION

Do not commission the ROTOFLUID fluid coupling before the machine incorporating it has obtained the certificate of compliance with the Machine Directive 2006/42/CE, the ATEX 2014/34/EC Directive and other specific applicable directives.

4.10.1 FLUID COUPLINGS WITH TF (Fusible Plug)

To complete the installation of the fluid coupling equipped with the overheating control device TF, it is necessary to observe what follows:

- Set an automatic motor shutdown signal in case of device triggering, which signals transmission/lubrication oil leakage.

RISK OF OVERHEATING, SEIZURE AND FIRE.

- Set up suitable containment protections and containers to collect hot transmission oil.

RISK OF HOT OIL SPLASHES, SCALDING AND SLIPPERY FLOOR.

- Isolate the fluid coupling with suitable interlocked protections, which prevent the personnel from interfering with the coupling moving components and/or the live components of the drive end.



- The installation of the coupling in ATEX environment requires some guards to prevent interference with the rotating components and/or to prevent the metal objects from interfering with operation, as a result of fall or sudden ejection.

RISK OF SPARKS AND FIRE IGNITION.

4.10.2 - FLUID COUPLINGS WITH TE (Expandable Trip Plug)

To complete the installation of the fluid couplings equipped with the overheating control device TE with ET-A, observe what follows:

- Set an automatic motor shutdown in case of device triggering. **RISK OF OVERHEATING.**
- Isolate the fluid coupling with suitable interlocked guards, which prevent the personnel from interfering with the coupling moving components and/or the live components of the drive end.
- When fluid couplings are installed in a hazardous zone, the guards must be designed so to prevent any contact with the rotating components and/or to protect them against any fall or ejection of metal objects.



DANGER OF SPARKS AND FIRE IGNITION.

4.10.3 FLUID COUPLINGS WITH PM-T09 (Plug with Thermostat and rpm Controller)

To complete the installation of the fluid couplings equipped with the PM-T09 overheating control unit, observe what follows:

- set an automatic motor shutdown in case of device triggering. **RISK OF OVERHEATING.**
- Isolate the fluid coupling with suitable interlocked protections, which prevent the personnel from interfering with the coupling moving components and/or the live components of the drive end.
- The installation of the coupling in ATEX environment requires some guards to prevent interference with the rotating components and/or the metal objects from interfering with operation, as a result of fall or sudden ejection.



RISK OF SPARKS AND FIRE IGNITION.

4.10.4 FIRST START-UP AND COMMISSIONING OF THE FLUID COUPLING

On completion of all operations dealt with in the previous sections, observe the following steps:

4.10.4a

For filling and calibration of the transmission oil of the fluid coupling, follow the steps described in section 6.3 FILLING AND CALIBRATION OF HORIZONTALLY MOUNTED COUPLINGS or 6.4 FILLING AND CALIBRATION OF VERTICALLY MOUNTED COUPLINGS.

4.10.4b

The ROTOFLUID fluid couplings are designed to achieve 4-5 days of continuous running. The vertically installed BETA fluid couplings of the X, J and H type, with pulley in the upper part, must be equipped with permanent lubrication or self-lubricating system (see technical data sheet).

**WARNING**

For heavy-duty applications or in case of continuous running for a longer time than previously cited, use transmission oils with a higher lubricating power (see technical data sheet and table B for oils) or fluid couplings equipped with permanent lubrication or self-lubrication system (see COUPLING TECHNICAL DATA SHEET).

4.10.4c

To install the ATEX fluid coupling in hazardous locations (ATEX), it is necessary to use suitable transmission oil with flash temperature (T max) higher than the maximum safety temperature of both the coupling and the installed overheating protection devices, as shown on the ATEX marking applied on the product.

**CAUTION**

Do not use oil, not suitable for an anti-explosive environment with flash temperature (T max) lower than the safety temperature reported on the ATEX marking of the fluid coupling.

4.10.4d

Promptly remove any oil dripping or leakage from the coupling or the soil.

**CAUTION**

Oil leakage may cause dangerous accidents, in particular during the initial start-up phases; therefore it must be carefully wiped out.

RISK OF SLIPPERY FLOOR, CRASH AND FALL.

4.10.4e

Remove tools, cloths and/or foreign bodies from the coupling and the operating area.

4.10.4f

Close the guard of the fluid coupling operating area.

**CAUTION**

During normal operation, the ROTOFLUID fluid coupling is not noisy; in case of high noise level and/or vibrations, stop immediately the motor and trace the causes to remove them.

4.10.4g

During inspection and afterwards, during operation, remember never to exceed the maximum number of start-ups/hours prescribed by the manufacturer (see technical catalogue). **RISK OF OVERHEATING.**

4.10.4h

If after evaluation of the start-up results the calibration of the start-up is required, follow what described in section

6.3 FILLING AND CALIBRATION OF HORIZONTALLY MOUNTED COUPLINGS or 6.4 FILLING AND CALIBRATION OF VERTICALLY MOUNTED COUPLINGS.

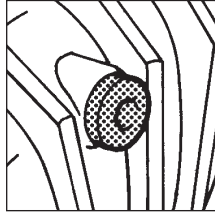
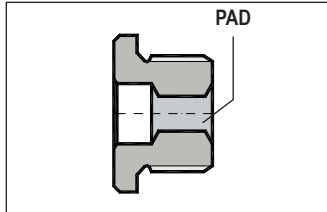
Commissioning has thus ended.



5.1 TF (Fusible Plug) OPERATION AND REPLACEMENT

5.1.1 EXPECTED DEVICE OPERATION

The TF are calibrated for different triggering temperatures, which may be inferred from the marking and they are characterized by different identification colours.



TRIGGERING TEMPERATURES	COLOUR
96°C [204.80°F]	BLUE
120°C [248°F]	WHITE
145°C [293°F]	RED
180°C [356°F]	GREEN

The Fusible Plug is a device designed for safeguarding the fluid coupling. It is composed of a bored plug, filled with a pad in hot-melt material, which melts when temperature reaches the threshold temperature.

In case of abnormalities, due to an excessive slip and subsequent overheating of the transmission fluid, the melting of the pad and the transmission oil leakage occur, so that the power transmission to the driven machine is cut off.

CAUTION

The transmission oil leakage prevents the lubrication of the internal bearings; therefore the activation of this device MUST ALWAYS be followed by the automatic shutdown of the motor and the drive end. RISK OF OVERHEATING, SEIZURE AND/OR FIRE IGNITION.

5.1.2 TF REPLACEMENT

After this device has triggered causing the shutdown of the machine, where the fusible plug is installed, it is necessary to replace the TF as described below:

- Wait for all moving components to stop.
- Cut out power supply to motor or drive end and apply an appropriate safety padlock.
- Wait for the cooling down of the fluid coupling (max 40°C) before intervening.

CAUTION

Remove any oil dripping or leakage from the coupling or the soil. RISK OF SLIPPERY FLOOR, CRASH AND/OR FALL.

- Open the guard to access the fluid coupling.

CAUTION

Do not install the TF on ATEX fluid couplings belonging to device protection category 2. RISK OF FIRE IGNITION.

- Replace the fusible plug with a spare part having the same triggering characteristics and fill the coupling with suitable transmission oil as described in section 6.3 FILLING AND CALIBRATION OF HORIZONTALLY MOUNTED COUPLINGS or 6.4 FILLING AND CALIBRATION OF VERTICALLY MOUNTED COUPLINGS.
- Remove the causes, which have determined the device triggering due to overheating.
- Check the shaft for oil leakage and the condition of the shaft sealing.
- Remove any tools, cloths and/or foreign bodies from the coupling and the working area.
- Close the guard in the fluid coupling operating area again.

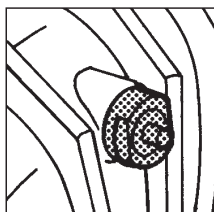
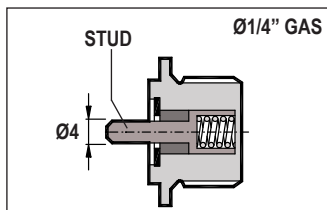
The replacement of the TF is thus ended.



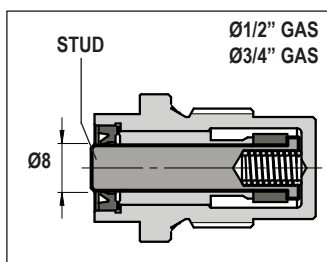
5.2 TE (Expandable Trip Plug) OPERATION AND REPLACEMENT

5.2.1 EXPECTED DEVICE OPERATION

The TE are calibrated for different triggering temperatures, which may be inferred from the marking and they are characterized by different identification colours



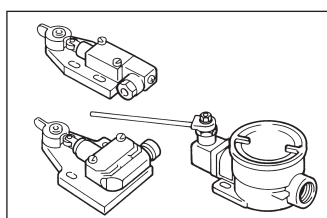
TRIGGERING TEMPERATURES	COLOUR
96°C [204.80°F]	BLUE
120°C [248°F]	WHITE
145°C [293°F]	RED
180°C [356°F]	GREEN



TE = Expandable Trip Plug (trigger temperatures 96°C [204.80°F], 120°C [248°F], 145°C [293°F] e 180°C[356°F]).

The Expandable Trip Plug is a detection device, which permits to activate a signal through a suitable microswitch available in both the STANDARD (ET or ET-CE) and the ATEX (ET-A) manufacture.

It is a closed plug (which does not permit any leakage of transmission fluid) with an external seat, which houses an actuating piston, retained by a hot-melt spacer. When the maximum temperature is exceeded, the hot-melt ring is pushed outside, while a suitable microswitch senses this movement. The triggering of this device controls the automatic motor and drive part stop in order to avoid that the maximum temperature is exceeded.



5.2.2 TE REPLACEMENT

After this device has triggered causing the shutdown of the machine, where the expandable trip plug is installed, it is necessary to replace the TE as described below:

- Wait for all moving components to stop.
- Cut out power supply to motor or drive end and apply an appropriate safety padlock.
- Wait for the cooling down of the fluid coupling (max 40°C) before intervening.
- Open the guard to access the fluid coupling.
- Check the shaft for oil leakage and the condition of the shaft sealing.
- Turn the fluid coupling until the triggered TE is positioned along its vertical axis.
- Replace the device with an original spare part having the same triggering characteristics.
- Put the lever of the microswitch in operating position again.
- Remove the causes, which have determined the device triggering due to overheating.

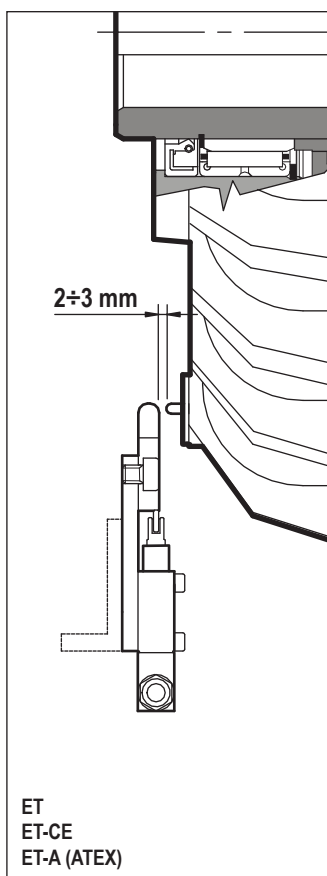


CAUTION

Remove any oil dripping or leakage from the coupling or the soil. RISK OF SLIPPERY FLOOR, CRASH AND/OR FALL.

- Remove any tools, cloths and/or foreign bodies from the coupling and the working area.
- Close the guard in the fluid coupling operating area again.

The replacement of the TE has thus ended.





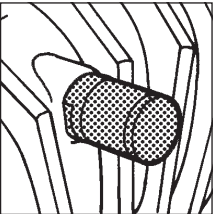
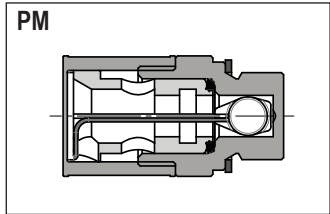
5.3

PM-T09 UNIT (Plug with Thermostat and rpm Controller) OPERATION AND RESET

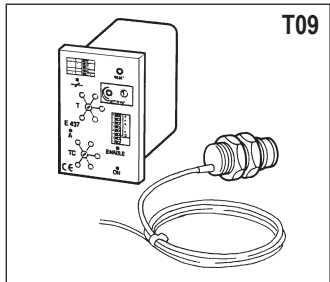
5.3.1

EXPECTED PM-T09 UNIT OPERATION

The PMs are calibrated for different triggering temperatures, which may be inferred from their marking, and they are also characterized by different identification colours.



TRIGGERING TEMPERATURE	COLOUR
100°C [212°F]	BLUE
120°C [248°F]	WHITE
140°C [284°F]	RED
160°C [320°F]	YELLOW



The plug with thermostat is a device, which transmits a magnetic and detection signal to a suitable electronic central unit by means of sensors. It is a closed plug (which does not permit any leakage of transmission fluid) and it houses externally a temperature probe with a thermostat capable of emitting a pulse signal.

When the fluid couplings are mounted with standard installation (internal drive end), the PM-T09 unit can be used to control both motor revolutions and overtemperature.

In the reversed installation of the fluid coupling (external drive end), the PM-T09 unit can only control overheating.

CAUTION
The use of this PM-T09 unit ATEX environment with hazardous atmosphere requires the installation of Zenner barriers for an intrinsically safe electric system (see Original Instruction Manual of the PM-T09 unit). Install the T09 device in a safe zone.

5.3.2

MAXIMUM TEMPERATURE CONTROL

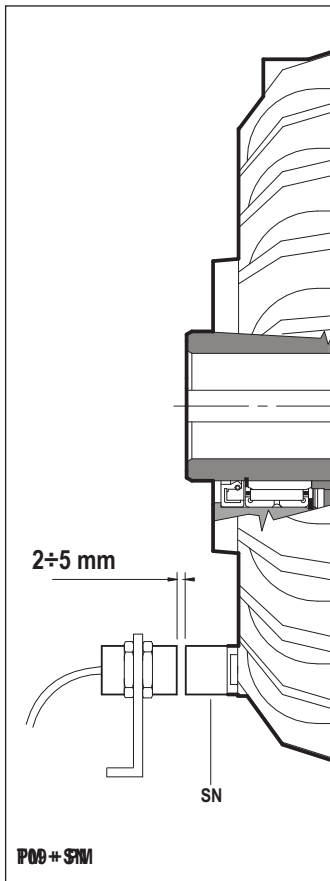
When the maximum temperature of the fluid coupling is exceeded, the sensor detects it and the signal emitted generates an alarm condition and automatically causes the motor or drive member to stop.

5.3.3

REPLACEMENT OF PM-T09 UNIT DUE TO OVERTEMPERATURE

When the maximum temperature is reached, a prolonged, 30 minute's stop is required in order to enable temperature dissipation of both the fluid coupling and the transmission fluid (lowering of 20°C below maximum temperature), which is a necessary requirement to reset the thermostat of the PM-T09 unit.

- Check the shaft for oil leakage and the condition of the shaft sealing.
- Remove the causes, which have determined the device triggering due to overheating.



5.3.4 RPM CONTROL

The pulse signal from the T09 device in the PM plug is detected by a sensor and transformed by the electronic central unit into a number of revolutions.

The minimum threshold number of revolutions for the driven member is keyed in in an appropriate regulator included in the electronic central unit, which generates an alarm condition and causes the motor or drive member to shut down when the two following conditions pre-set in suitable integrated timers are met:

- Start-up timer (max 60 seconds): it permits to ignore the signals from the revolution controller for the time set up, during the start-up phase, until the motor reaches stable operating conditions; afterwards the specific Pre-alarm Timer takes over.
- Pre-alarm Timer (max 30 seconds): it permits to generate a pre-alarm condition for the pre-set time.

If any rotational slow-down has been detected under normal operating conditions for longer than the set up pre-alarm time, an alarm signal is released and the motor or drive member are automatically shut down.

- Remove the causes, which have determined the device triggering due to overheating.

5.3.5 T09 RESET DUE TO A REDUCTION IN RPM

The alarm released as a consequence of a reduction in the number of revolutions entails no downtime for the reset of this device.

This device is installed upon customer's request in the standard couplings, when overloads of the driven end during operation are likely to occur, which may determine a reduction in the number of revolutions or a start-up overextension beyond the maximum pre-set time, or in order to avoid the TF fusible plug and/or the TE Expandable Trip Plug reset after overheating of the fluid coupling.



6.1 TRANSMISSION OIL TECHNICAL CHARACTERISTICS

The ROTOFLUID fluid coupling operates with hydraulic oil as transmission fluid. The applications of the fluid couplings in the natural environment must give priority to biodegradable mineral oils used for environmental protection.

CAUTION



The couplings manufactured according to the ATEX directive and installed in explosive atmospheres shall use oils with higher flash temperature (T max) than pointed out on the marking of the fluid couplings.

The basic characteristics for a good selection of transmission oils are:

6.1.1 VISCOSITY

Good oil viscosity and dynamic fluidity permit the maximum torque transmission. Remember that oil varies its fluidity as a function of temperature (the hotter the temperature, the more fluid the oil).

6.1.2 LUBRICATING POWER

High lubricating power ensures the lubrication of the coupling bearings. Basically, oil with viscosity degree among 1,9° and 4° Engler may be used.

CAUTION

The oil inside the coupling must be fluid enough to transmit the torque. In case of low temperature (below 0°C), the first start-up requires a longer time to transmit the torque until standard operating conditions are reached.

The recommended oils are listed below according to their technical characteristics and the properties of environment (temperature), where they are used.

TABLE A OILS FOR TEMPERATURE UP TO -20°C

These oils are very fluid and their viscosity is between 21 and 22 CST; they are adequate for operating temperatures not below -20°C.

OIL TRADEMARK		BP	CASTROL	ESSO	MOBIL	Q 8	SHELL
OIL TYPE		ENERGOL HPL22	HYSPIN AWS22	NUTO H22	DTE 22	VERDI 22	MORLINA 22
VISCOSITY	ISO VG	22	22	22	22	22	22
	CST A 40°C	21	22	21.01	22	22	22
	ENGLER	2.3	2.3	2.3	2.3	2.3	2.3
VISCOSITY INDEX		104	100	104	110	98	80
DENSITY	kg/m ³	875	870	864	860	863	865
POURPOINT	°F	-22	-22	-31	-22	-22	-22
	°C	-30	-30	-35	-30	-30	-30
FLASH POINT	°F	377.6	410	399.2	392	406	401
	°C	192	210	204	200	208	205

TABLE B HIGH PERFORMANCE OILS

The viscosity range of the following oils is 46 - 48 CST. Thanks to their high lubricating power they are suitable for longer periods of continuous running, provided that temperature is not below -20°C.

OIL TRADEMARK		BP	CASTROL	ESSO	MOBIL	Q 8	SHELL
OIL TYPE		BARTRAN HW46	HYSPIN AWH46	INVAROL EP46	DTE 15	VERDI 46	MORLINA 46
VISCOSITY	ISO VG	46	46	46	46	46	46
	CST A 40°C	46	46	46	46	46	48
	ENGLER	4	4	4	4	4	4
VISCOSITY INDEX		152	150	167	155	98	100
DENSITY	kg/m ³	882	875	867	880	877	875
POURPOINT	°F	-33	-38	-33	-38	-22	-16,6
	°C	-36	-39	-36	-39	-30	-27
FLASH POINT (T max)	°F	431	410	437	374	432	455
	°C	222	210	225	190	222	235

TABLE C OILS FOR TEMPERATURE UP TO -40°C

These oils have a high viscosity index (more stable as temperature changes) and they are suitable for longer periods of continuous running, provided that temperature is not below -40°C.

OIL TRADEMARK		ESSO	MOBIL	ROLOIL
OIL TYPE		INVAROL EP22	SCH 524	SYNTHST-HP32 BIO
VISCOSITY	ISO VG	22	32	32
	CST A 40°C	20.75	32	32
	ENGLER	2.3	3.3	3,3
VISCOSITY INDEX		167	144	200
DENSITY	kg/m ³	888	855	914
POURPOINT	°F	-45.4	-65.2	-81,4
	°C	-43	-54	-63
FLASH POINT (T max)	°F	302	543.2	446
	°C	150	234	230

TABLE D BIODEGRADABLE OILS

The table below shows the synthetic biodegradable fluids, which are particularly suitable for out door applications.

OIL TRADEMARK		ROLOIL	ROLOIL	ROLOIL
OIL TYPE		SYNTHST 46 BIO	SYNTHST HP 32 BIO	SYNTHST HP 46 BIO
VISCOSITY	ISO VG	45	32	48
	CST A 40°C	45	32	48
	ENGLER	4	3,3	
VISCOSITY INDEX		190	200	190
DENSITY	kg/m ³	915	914	914
POURPOINT	°F	45,4	-81,4	-81,4
	°C	-43	-63	-63
FLASH POINT (T max)	°F	563	446	473
	°C	295	230	245
BIODEGRADABILITY %		> 90	> 80	> 80



6.2 TABLES FOR COUPLING FILLING

This section shows the tables with the filling quantity (in litres) for the coupling, according to a specific angular location of the lubricant oil screw plug with respect to the vertical axis of each version of horizontally mounted fluid coupling, notably ROTOFLUID, ROTOFLUID SCF, ROTOFLUID DFC and ROTOFLUID CA.

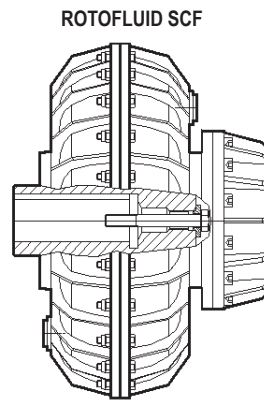
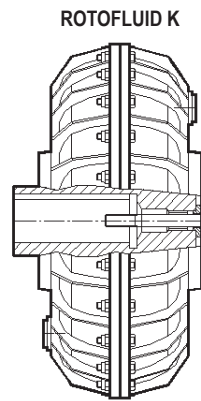
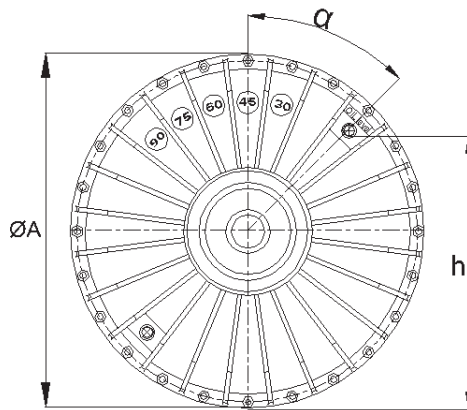
For different filling angles (reported on the first line above) of each fluid coupling size (as pointed out on the first column left) you may read the correct angular position of the horizontally mounted coupling and the height of the plug with respect to the lowest point along the external diameter of the coupling.



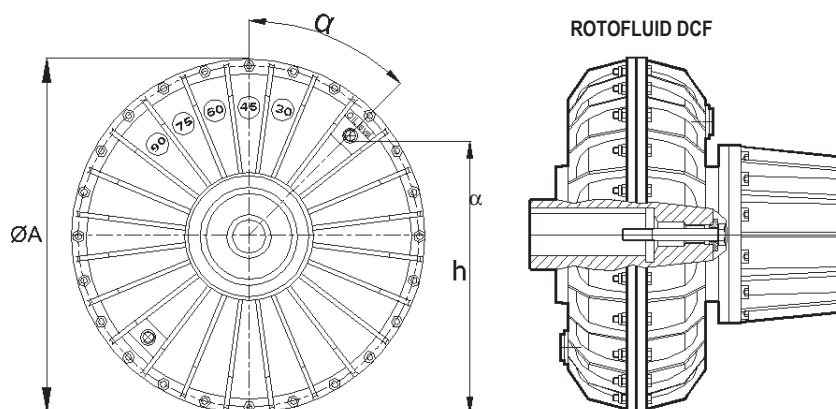
CAUTION

The fluid coupling must be filled in compliance with the type of expected start-up.

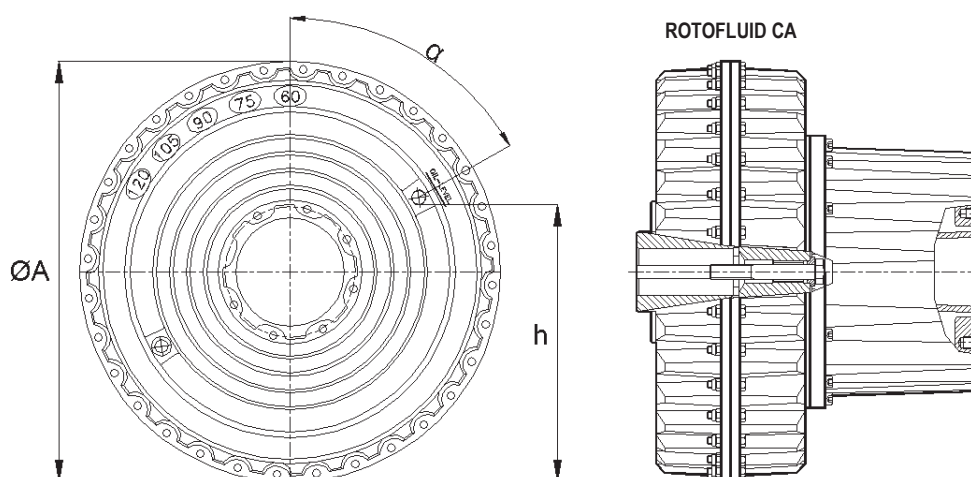
Do not fill the coupling with a too small or a too large amount of fluid. RISK OF OVERHEATING AND BEARING SEIZURE AND RISK OF OIL LEAKAGE DUE TO INTERNAL OVERPRESSURE AND POSSIBLE STRUCTURAL FAILURE.



K and SCF		FILLING ANGLE (α) AND HEIGHT (h) IN mm																			
		45°		50°		55°		60°		65°		70°		75°		80°		85°		90°	
SIZE	ØA	litres	h mm	litres	h mm	litres	h mm	litres	h mm	litres	h mm	litres	h mm	litres	h mm	litres	h mm	litres	h mm	litres V	h mm
10 K	193	0,55	138	0,52	134	0,50	129	0,47	125	0,44	119	0,42	114	0,40	109	0,37	103	0,35	97	0,32	92
20 K	230	1,20	167	1,14	161	1,09	156	1,03	150	0,97	144	0,92	137	0,86	131	0,81	124	0,76	117	0,71	110
30 K	290	2,39	218	2,28	211	2,17	203	2,04	195	1,91	186	1,79	178	1,67	168	1,56	159	1,45	150	1,34	140
30P K	327	4,05	250	3,87	242	3,67	233	3,46	224	3,24	213	3,03	203	2,83	192	2,64	181	2,45	170	2,27	159
40P K	338	4,07	256	3,89	248	3,69	239	3,48	229	3,26	219	3,06	208	2,87	198	2,68	187	2,50	175	2,32	164
50 K	430	4,39	312	4,20	302	3,99	292	3,78	281	3,59	269	3,40	257	3,21	244	3,03	232	2,85	219	2,67	206
55 K	430	7,19	312	6,85	302	6,52	292	6,21	281	5,90	269	5,61	257	5,31	244	5,02	232	4,73	219	4,44	206
60 K	520	8,61	395	8,21	382	7,77	368	7,32	353	6,88	337	6,47	321	6,08	304	5,70	286	5,33	268	4,95	251
65 K	520	13,48	395	12,83	382	12,12	368	11,44	353	10,79	337	10,17	321	9,58	304	9,00	286	8,42	268	7,84	251
70P K	640	18,05	498	17,28	481	16,40	463	15,43	443	14,45	422	13,52	401	12,64	379	11,80	357	10,98	337	10,16	311
75P K	640	30,14	498	28,80	481	27,27	463	25,64	443	24,06	422	22,58	401	21,18	379	19,82	357	18,48	337	17,15	311
80P K	810	35,53	625	33,99	604	32,26	582	30,43	558	28,59	533	26,83	507	25,18	480	23,59	452	22,01	423	20,48	396
85P K	810	60,64	625	57,92	604	54,89	582	51,77	558	48,72	533	45,81	507	43,04	480	40,38	452	37,70	423	35,12	396
90P K	1000	91,92	782	88,52	775	84,49	727	79,73	696	74,47	664	69,25	630	64,35	596	59,80	560	55,41	524	51,06	488
95P K	1000	153,33	782	146,91	775	139,59	727	131,48	696	123,03	664	115,16	630	107,68	596	100,58	560	93,63	524	86,72	488
120 P	1305	185	966	178	936	170	904	162	870	154	835	145	798	137	760	130	720	122	680	114	640
30 SCF	290	2,65	218	2,54	211	2,43	203	2,30	195	2,15	186	2,01	178	1,86	168	1,73	159	1,60	150	1,47	140
30P SCF	327	4,32	250	4,14	242	3,94	233	3,72	224	3,50	213	3,27	203	3,04	192	2,81	181	2,60	170	2,39	159
40P SCF	338	4,44	256	4,26	248	4,06	239	3,84	229	3,61	219	3,36	208	3,14	198	2,92	187	2,71	175	2,50	164
50 SCF	430	5,27	312	5,07	302	4,85	292	4,62	281	4,37	269	4,11	257	3,83	244	3,57	232	3,32	219	3,07	206
55 SCF	430	8,06	312	7,72	302	7,38	292	7,04	281	6,68	269	6,31	257	5,93	244	5,56	232	5,20	219	4,84	206
60 SCF	520	10,01	395	9,61	382	9,16	368	8,71	353	8,23	337	7,72	321	7,16	304	6,61	286	6,09	268	5,58	251
65 SCF	520	14,86	395	14,20	382	13,49	368	12,80	353	12,11	337	11,39	321	10,65	304	9,90	286	9,18	268	8,47	251
70P SCF	640	20,53	498	19,75	481	18,86	463	17,89	443	16,89	422	15,80	401	14,65	379	13,48	357	12,38	337	11,31	311
75P SCF 420	640	36,64	498	35,23	481	33,45	463	31,42	443	29,36	422	27,40	401	25,51	379	23,73	357	22,01	337	20,29	311
80P SCF	810	42,50	625	40,95	604	39,22	582	37,38	558	35,21	533	32,90	507	30,58	480	28,25	452	25,92	423	23,76	396
85P SCF 535	810	71,49	625	68,59	604	65,15	582	61,55	558	57,79	533	54,12	507	50,53	480	47,06	452	43,64	423	40,39	396
90P SCF	1000	104,80	782	101,37	775	97,05	727	91,70	696	85,70	664	79,68	630	73,72	596	67,92	560	62,54	524	57,25	488
95P SCF	1000	178,18	782	171,72	775	163,98	727	154,89	696	144,95	664	135,14	630	125,43	596	116,10	560	107,31	524	98,63	488



DCF COUPLING		FILLING ANGLE (α) AND HEIGHT (h) IN mm																			
		45°		50°		55°		60°		65°		70°		75°		80°		85°		90°	
SIZE	ØA	litres	h mm	litres	h mm	litres	h mm	litres	h mm	litres	h mm	litres	h mm	litres	h mm	litres	h mm	litres	h mm	litres	h mm
30 DCF	290	2,94	218	2,84	211	2,72	203	2,58	195	2,42	186	2,24	178	2,07	168	1,91	159	1,76	150	1,61	140
30P DCF	327	4,62	250	4,44	242	4,23	233	4,02	224	3,78	213	3,54	203	3,26	192	3,01	181	2,77	170	2,53	159
40P DCF	338	5,34	256	5,16	248	4,96	239	4,70	229	4,41	219	4,09	208	3,78	198	3,48	187	3,20	175	2,93	164
50 DCF	430	6,36	312	6,15	302	5,94	292	5,67	281	5,34	269	4,98	257	4,59	244	4,23	232	3,89	219	3,56	206
55 DCF	430	9,12	312	8,78	302	8,44	292	8,05	281	7,63	269	7,17	257	6,67	244	6,21	232	5,77	219	5,33	206
60 DCF	520	11,63	395	11,23	382	10,79	368	10,35	353	9,80	337	9,15	321	8,41	304	7,65	286	6,96	268	6,29	251
65 DCF-375	520	21,22	395	20,26	382	19,14	368	17,97	353	16,79	337	15,65	321	14,60	304	13,60	286	12,61	268	11,63	251
70P DCF	640	24,28	498	23,48	481	22,58	463	21,60	443	20,55	422	19,19	401	17,64	379	16,00	357	14,49	337	13,06	311
75P DCF 420	640	42,98	498	41,54	481	39,52	463	37,09	443	34,53	422	32,09	401	29,68	379	27,48	357	25,35	337	23,25	311
80P DCF	810	48,45	625	46,89	604	45,14	582	43,29	558	40,92	533	38,16	507	35,27	480	32,29	452	29,30	423	26,57	396
85P DCF 535	810	79,94	625	76,92	604	73,14	585	69,07	558	64,73	533	60,49	507	56,28	480	52,20	452	48,21	423	44,43	396
90P DCF	1000	118,72	782	115,26	775	110,62	727	104,61	696	97,71	664	90,62	630	83,45	596	76,52	560	70,17	524	63,94	488
95P DCF	1000	192,94	782	186,42	775	178,31	727	168,50	696	157,64	664	146,71	630	135,76	596	125,25	560	115,46	524	105,81	488

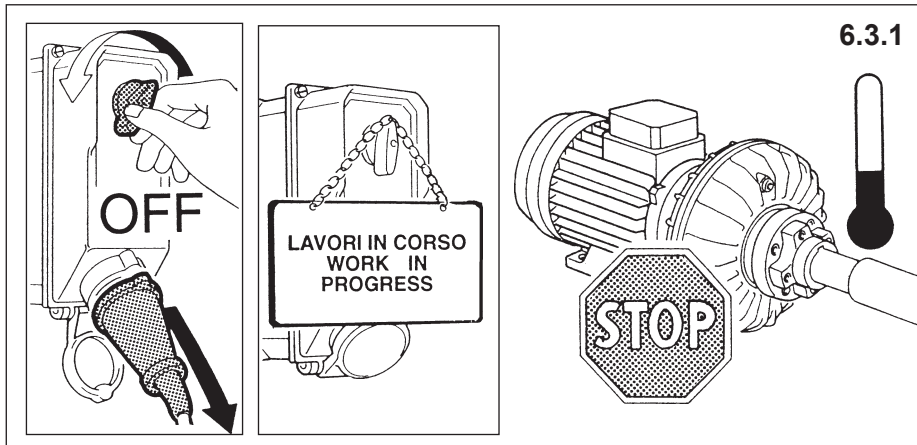


CA COUPLING		FILLING ANGLE (α) AND HEIGHT (h) IN mm															
		55°		60°		65°		70°		75°		80°		85°		90°	
SIZE	ØA	litres	h mm	litres	h mm	litres	h mm	litres	h mm	litres	h mm	litres	h mm	litres	h mm	litres	h mm
55 S	480	18,2	322	17	311	15,8	298	14,6	285	13,6	272	12,8	258	11,7	244	10,8	231
55 D	480	17	322	16	311	14,9	298	13,9	285	12,9	272	12,1	258	11,2	244	10,3	231
65 S	580	34,4	398	32,5	383	30,6	367	28,7	351	26,6	334	24,3	316	22,6	298	20,8	281
65 D	580	31,9	398	29,7	383	27,9	367	26,1	351	24,3	334	22,45	316	20,08	298	19,01	281
75 PS	710	63,2	498	59,5	478	55,9	457	52	436	48,1	414	44,5	392	41	369	37,7	346
75 PD	710	59	498	55,4	478	52	457	48,4	436	44,8	414	41,4	392	38,4	369	35,3	346
80 P	820	79,2	604	74,5	578	69,5	551	64,2	522	58,9	492	54,4	462	50	431	45,6	401
85 PD	890	138,5	662	132,1	633	123,8	602	114,9	571	105,5	538	95,9	504	86,3	470	77,3	436
90 P	1010	186,3	731	176,9	701	166,1	669	153,8	635	141,4	601	129,6	565	118,9	529	108,2	493

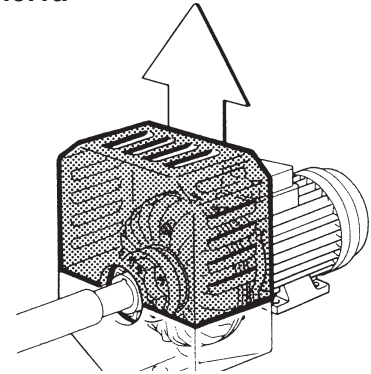


6.3

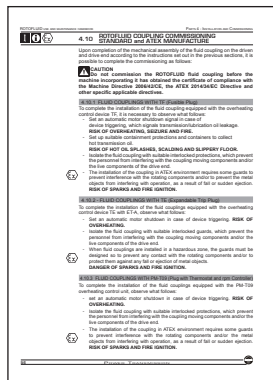
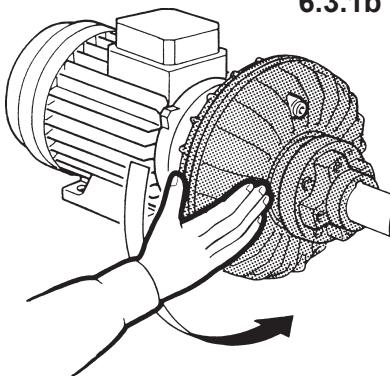
FILLING AND CALIBRATION OF HORIZONTALLY MOUNTED COUPLINGS



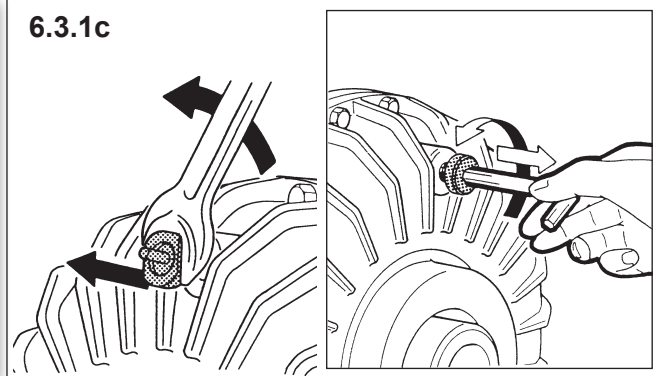
6.3.1a



6.3.1b

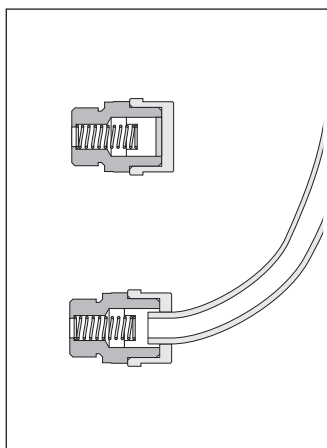
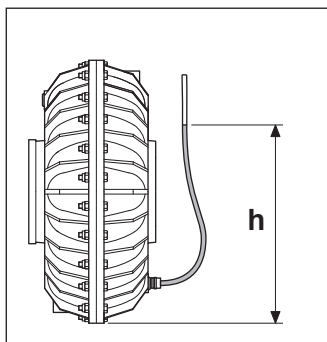


6.3.1c



To fill and calibrate the horizontally mounted fluid coupling, observe the following steps:

6.3.1 TRANSMISSION OIL FILLING



CAUTION

 Before the fluid coupling is filled and/or calibrated, observe the following steps:

**A- stop the motor and wait for the rotation components to stop,
B- cut out power supply and apply a safety padlock,
C- signal the operation underway,
D- wait for cooling, if needed (max 40°C).**

6.3.1a

Open the accident-prevention guard of the operating area to access the coupling.

6.3.1b

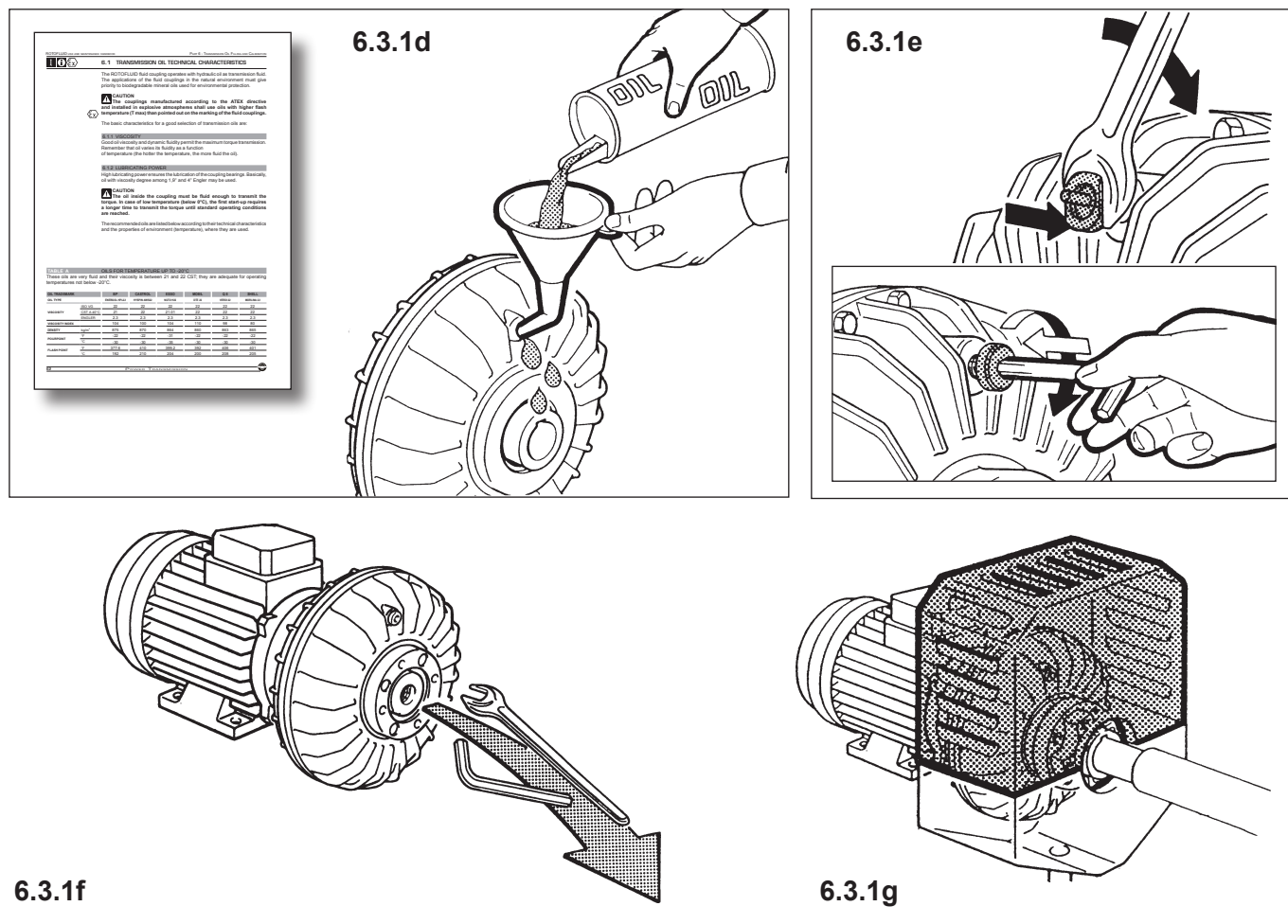
Turn the coupling until the oil screw plug is accessible on the pre-established angular position with respect to the vertical axis (see section TABLES FOR COUPLING FILLING).

NOTE

NOTE In plants, where the couplings outer shell cannot freely rotated to adequately position the oil screw plug, a CL device may be installed (see section 6.2 OIL LEVEL CHECK AND TOP-UP and 7.2.4 COUPLINGS EQUIPPED WITH CL DEVICE).

6.3.1c

Remove the plug (or the device) to fill the coupling with oil.

**6.3.1d**

Fill up the coupling until the fluid overflows from the filling hole, using only the oil recommended by the manufacturer (see section 6.1 TRANSMISSION OIL TECHNICAL CHARACTERISTICS).

**CAUTION**

Promptly remove any oil dripping or leakage from the coupling or the soil. **RISK OF SLIPPERY FLOOR, CRASH AND/OR FALL.**

6.3.1e

Position the plug or the device on the filling hole of the coupling again.

6.3.1f

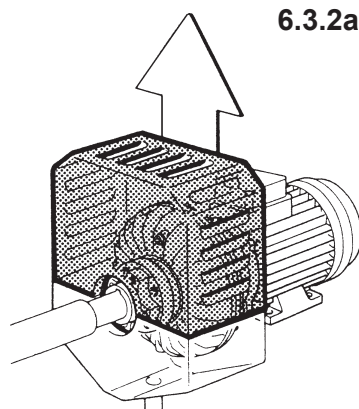
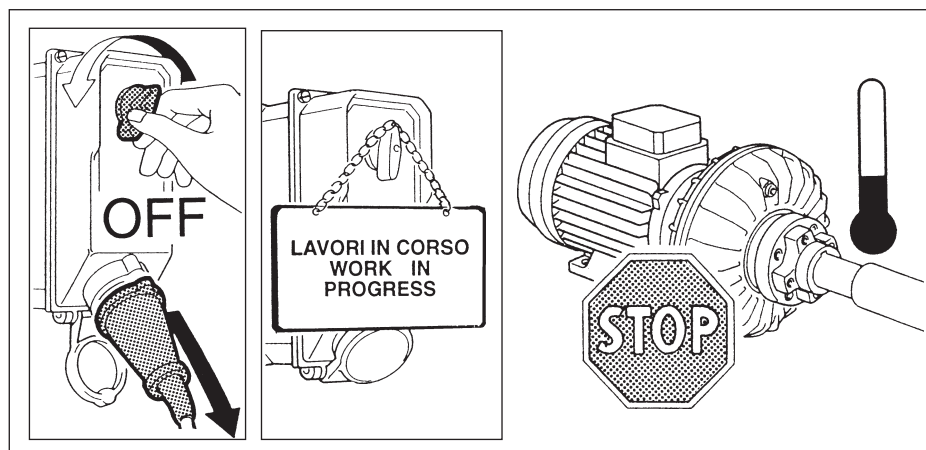
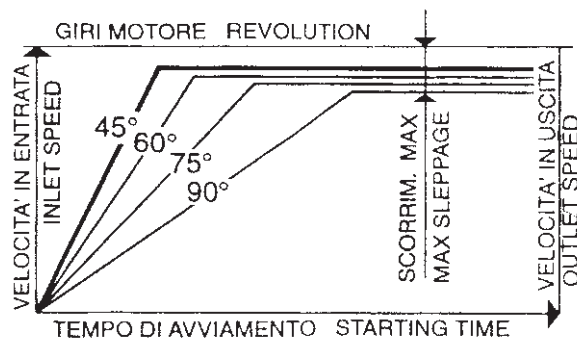
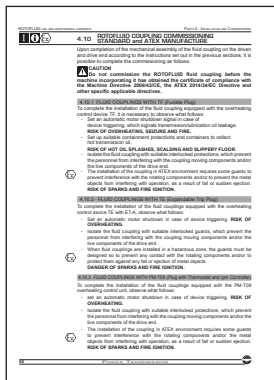
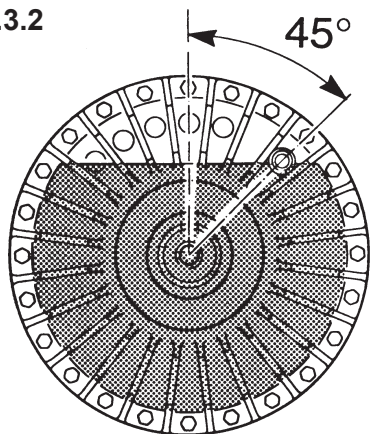
Remove any used key and/or cloth or tool from the coupling and the operating area. **RISK OF PHYSICAL INTERFERENCE**

6.3.1g

Close the guard protecting the fluid coupling operating area again.

The filling up of the horizontally mounted coupling has thus ended.

6.3.2



6.3.2 FILLING OIL CALIBRATION OF HORIZONTALLY MOUNTED COUPLING

The standard filling level for ROTOFLUID couplings without delay chamber is equivalent to a 45° angle with respect to the vertical axis. For couplings with delay chamber SCF, DCF and CA, read the tables in section 6.2 TABLES FOR COUPLING FILLING.

In view of the fluid coupling use and performance, it may be necessary to modify the filling, reducing the oil quantity.

Less oil in the coupling determines

- A- a longer and more gradual start-up,
- B- lower power consumption on start-up,
- C- better protection of the power transmission elements in case of overload,
- E- higher slip under stable operating conditions.

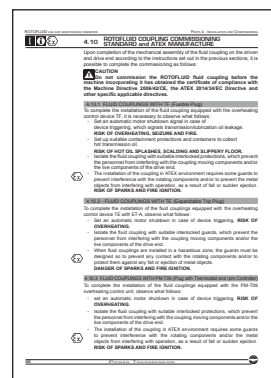
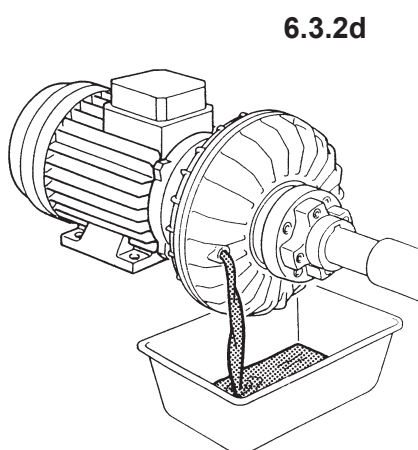
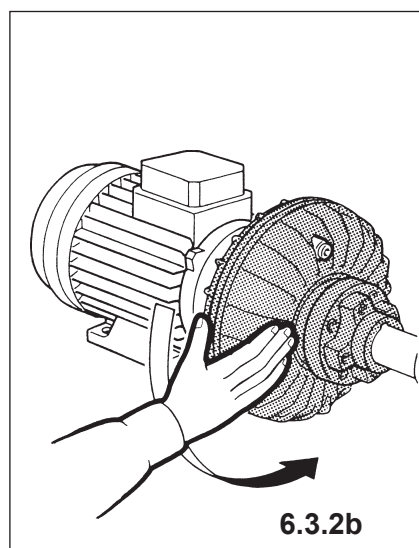
CAUTION

Before the fluid coupling is calibrated, observe the following steps:

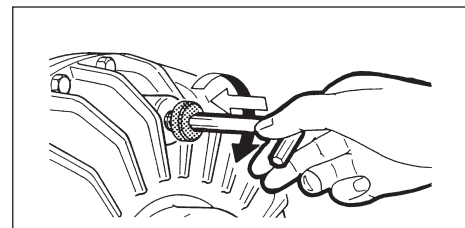
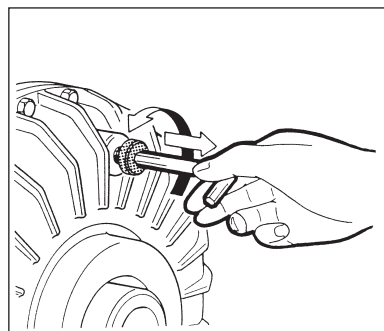
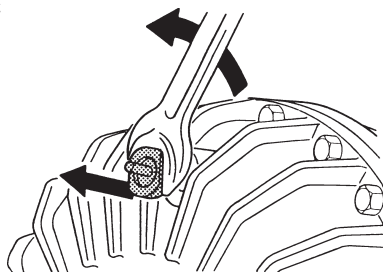
- A- stop the motor and wait for the rotation components to stop,
- B- cut out power supply and apply a safety padlock,
- C- signal the operation underway,
- D- wait for the cooling, if needed (max 40°C).

6.3.2a

Open the accident-prevention guard of the operating area to access the coupling.



6.3.2c

**6.3.2b**

Manually turn the coupling until the oil filler plug is accessible on the upper part.

6.3.2c

Unscrew the plug or device and remove it from the oil filling hole.

**CAUTION**

The fluid coupling must be filled in compliance with the type of expected start-up. Do not fill the coupling with a too small or a too large amount of fluid. Respectively: **RISK OF OVERHEATING, SEALING DAMAGE, OVER HEATING OF THE BEARINGS AND/OR FIRE IGNITION OR RISK OF OIL LEAKAGE DUE TO OVERPRESSURE AND/OR STRUCTURAL FAILURE.**

6.3.2d

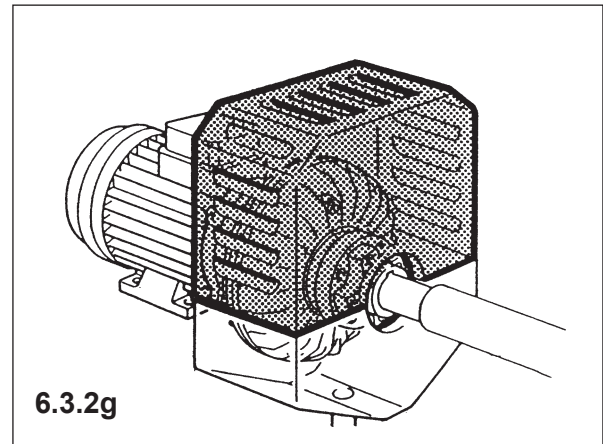
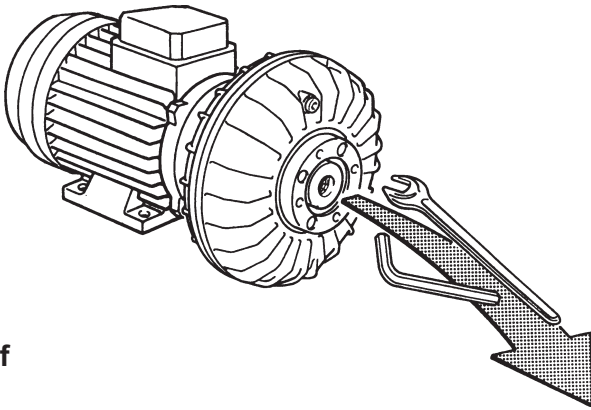
In order to diminish the quantity of oil, use a collection bowl and turn the coupling until it reaches the desired filling position on the vertical axis (see section 6.2 TABLES FOR COUPLING FILLING) and wait until the excessive oil flows out.

**CAUTION**

Promptly remove any oil dripping and/or leakage from the coupling or the soil. **RISK OF SLIPPERY FLOOR, CRASH AND/OR FALL.**

6.3.2e

Screw the plug or the device on the filling hole of the coupling again and make a reference mark for any future oil top-up and replacement.

[illegible]

 **CAUTION**

 Do not spill oil in the environment, but provide for its collection and storage in appropriate drums and/or have it disposed of by authorised firms. RISK OF POLLUTION.

6.3.2f

Remove any used key and/or cloth or tool from the coupling and from the operating area. **RISK OF PHYSICAL INTERFERENCE.**

6.3.2g

Close the guard protecting the fluid coupling operating area again.

6.3.2h

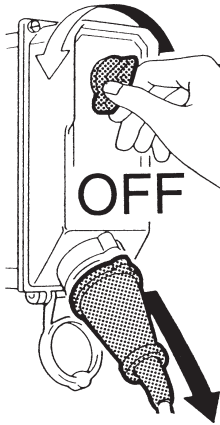
Mark down in the appropriate box of the COUPLING TECHNICAL DATA SHEET the final calibration value (see FILLING DATA SHEET) for future oil replacement or top-up.

The calibration of the horizontally mounted fluid coupling has thus ended.

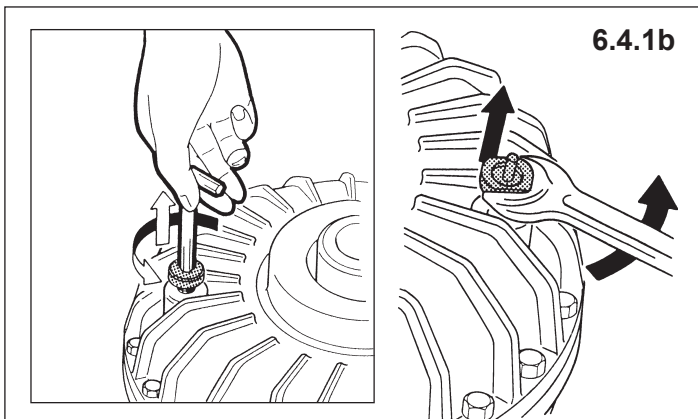
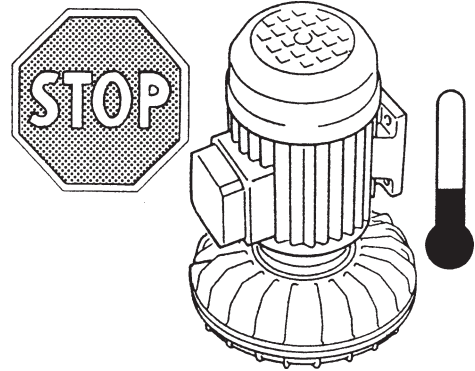


6.4

FILLING AND CALIBRATION OF VERTICALLY MOUNTED COUPLINGS



6.4.1



The first filling must be carried out on the bench with the coupling installed on the motor and its axis positioned horizontally (see section 6.3).

To fill and calibrate the vertically mounted fluid coupling, please follow the described procedure:

6.4.1 TRANSMISSION OIL FILLING

**CAUTION**

Before the fluid coupling is filled and/or calibrated, observe the following steps:

- A- stop the motor and wait for the rotation components to stop,
- B- cut out power supply and apply a safety padlock,
- C- signal the operation under way,
- D- wait for the cooling, if needed (max 40°C).

6.4.1a

Open the accident-prevention guard of the operating area to access the coupling.

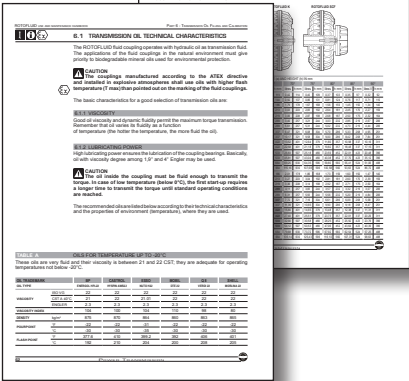
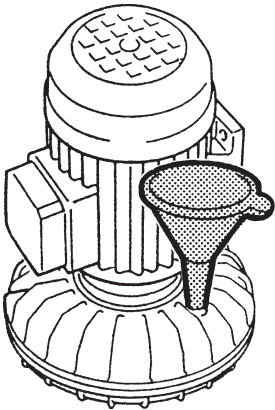
6.4.1b

Remove the plug or the device, whatever part may be positioned on the upper part of the oil filling hole of the coupling.

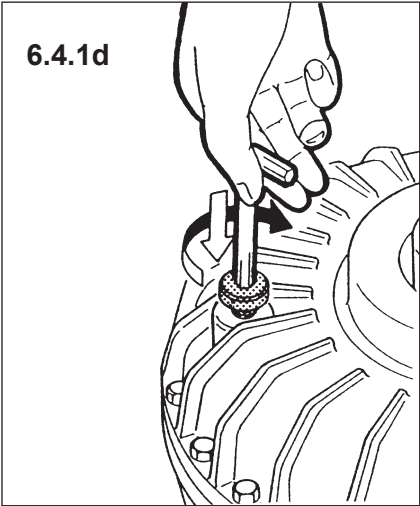
**CAUTION**

The maximum filling permitted in couplings designed for vertical installation must never exceed the filling equivalent to a 45° angle with respect to the vertical axis, whereas the minimum quantity for start-up must never be lower than the filling equivalent to a 75° angle.

6.4.1c



6.4.1d



6.4.1c

Fill up the coupling with oil of suitable grade (see section 6.1 TRANSMISSION OIL TECHNICAL CHARACTERISTICS), observing the predefined quantity pointed out in section 6.2 TABLES FOR COUPLING FILLING. During the filling, the external part of the coupling must be turned to release any air bubbles.

CAUTION
Promptly remove any oil dripping and/or leakage from the coupling or the soil. **RISK OF SLIPPERY FLOOR, CRASH AND/OR FALL.**

6.4.1d

Position the plug or the device on the oil filling hole of the coupling.

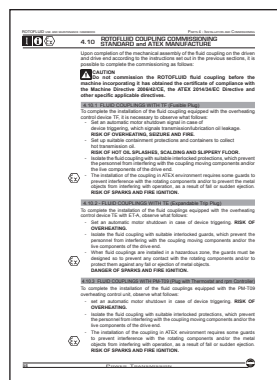
6.4.1e

Remove any used key and/or cloth or tool from the coupling and the operating area. **RISK OF PHYSICAL INTERFERENCE.**

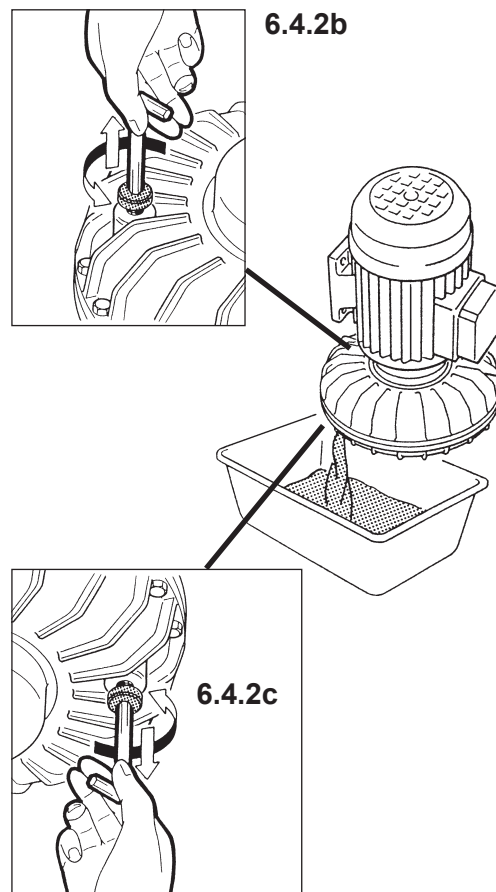
6.4.1f

Close the guard of the fluid coupling operating area again.

The filling of the vertically mounted fluid coupling has thus ended.



6.4.2



6.4.2 FILLING OIL CALIBRATION OF VERTICALLY MOUNTED COUPLINGS

The standard filling level for ROTOFLUID couplings without delay chamber is equivalent to a 45° angle with respect to the vertical axis.

For couplings with delay chamber SCF, DCF and CA read the tables in section 6.2 TABLES FOR COUPLING FILLING. Depending on the intended use and performance of the fluid coupling, it may be necessary to modify the filling and reduce the quantity of oil.

Less oil in the coupling determines

- A- a longer and more gradual start-up,
- B- lower power consumption on start-up,
- C- better protection of the power transmission elements in case of overload,
- E- higher slip under stable operating conditions.

**CAUTION**

Before the fluid coupling is calibrated, it is necessary to observe the following steps:

- A- stop the motor and wait for the rotation components to stop,**
- B- cut out power supply and apply a safety padlock,**
- C- signal the operation under way,**
- D- wait for the cooling, if needed (max 40°C).**

6.4.2a

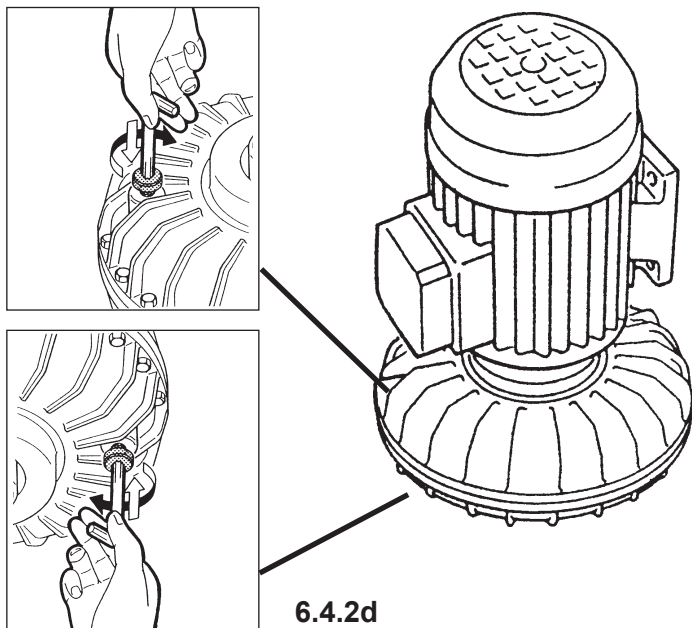
Open the accident-prevention guard of the operating area to access the coupling.

6.4.2b

Unscrew the plug or device and remove it from the upper oil filling hole.

6.4.2c

Use a container for oil collection; remove the plug or the device at the radial or lower hole of the coupling and drain the oil in excess of the calibration quantity.



6.4.2d

6.4.2h

ROTOFLUID COUPLING		Order - Reference Document	
Model		Order	
FLUID COUPLING TECHNICAL DATA SHEET			
TYPE OF MACHINE ☐ Full load start-up ☐ Full load start-up ☐ Full load start-up ☐ Full load start-up			
FLUID COUPLING DATA Type of work: ☐ Start-up ☐ Start-up ☐ Start-up ☐ Start-up Start-up pressure: ☐ Start-up pressure ☐ Start-up pressure ☐ Start-up pressure Full load start-up time: ☐ Full load start-up time ☐ Full load start-up time ☐ Full load start-up time Rate of rise and start: ☐ Rate of rise and start ☐ Rate of rise and start ☐ Rate of rise and start Rate of rise and start: ☐ Rate of rise and start ☐ Rate of rise and start ☐ Rate of rise and start			
FLUID COUPLING DATA ☐ ROTOFLUID ☐ ROTOFLUID ☐ ROTOFLUID ☐ ROTOFLUID			
FLUID COUPLING DATA Definition: ☐ Constant ☐ Variable ☐ Variable ☐ Variable Type: ☐ Type ☐ Type ☐ Type ☐ Type Series No.: ☐ Series No. ☐ Series No. ☐ Series No. Activation or primary wheel: ☐ Internal (standard) ☐ External (standard) ☐ External (standard) Temperature during start-up: ☐ Internal (standard) ☐ External (standard) ☐ External (standard) Expected start-up time: ☐ Expected start-up time ☐ Expected start-up time ☐ Expected start-up time Lubrication: ☐ with transmission oil ☐ with transmission oil ☐ with transmission oil ☐ with transmission oil			
FLUID COUPLING DATA Type of engine: ☐ Internal ☐ External ☐ External ☐ External Type of engine: ☐ Internal ☐ External ☐ External ☐ External Type of engine: ☐ Internal ☐ External ☐ External ☐ External Type of engine: ☐ Internal ☐ External ☐ External ☐ External			
FLUID COUPLING DATA Type of engine: ☐ Internal ☐ External ☐ External ☐ External Type of engine: ☐ Internal ☐ External ☐ External ☐ External Type of engine: ☐ Internal ☐ External ☐ External ☐ External Type of engine: ☐ Internal ☐ External ☐ External ☐ External			
FLUID COUPLING DATA Type of engine: ☐ Internal ☐ External ☐ External ☐ External Type of engine: ☐ Internal ☐ External ☐ External ☐ External Type of engine: ☐ Internal ☐ External ☐ External ☐ External Type of engine: ☐ Internal ☐ External ☐ External ☐ External			
FLUID COUPLING DATA Type of engine: ☐ Internal ☐ External ☐ External ☐ External Type of engine: ☐ Internal ☐ External ☐ External ☐ External Type of engine: ☐ Internal ☐ External ☐ External ☐ External Type of engine: ☐ Internal ☐ External ☐ External ☐ External			



CAUTION

The fluid coupling must be filled in compliance with the expected start-up. Do not fill the coupling with a too small or a too large amount of fluid. Respectively: **RISK OF OVERHEATING, SEALING DAMAGE, SEIZURE OF THE BEARINGS AND/OR FIRE IGNITION OR DANGER OF OIL LEAKAGE DUE TO OVERPRESSURE AND/OR STRUCTURAL FAILURE.**

6.4.2d

Screw the lower and the upper plug again.



CAUTION

Promptly remove any oil dripping and/or leakage from the coupling or the soil. **RISK OF SLIPPERY FLOOR, CRASH AND/OR FALL.**

6.4.2e

Remove any used key and/or cloth or tool from the coupling and the operating area. **RISK OF PHYSICAL INTERFERENCE.**



CAUTION

Do not spill oil in the environment, but provide for its collection and storage in appropriate drums and/or have it disposed of by authorised firms. **RISK OF POLLUTION.**

6.4.2f

Close the guard of the fluid coupling operating area again.

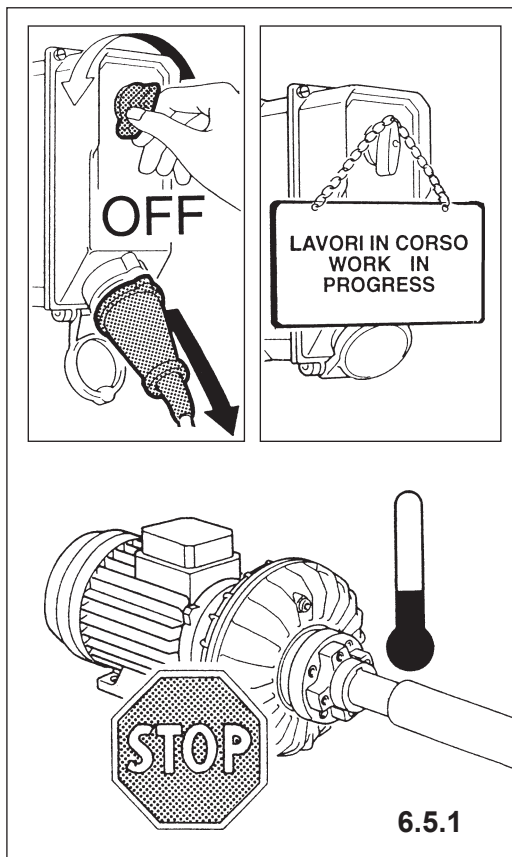
6.4.2g

Mark down in the appropriate box of the COUPLING TECHNICAL DATA SHEET the final calibration (see FILLING DATA SHEET) for future oil replacement or top-up.

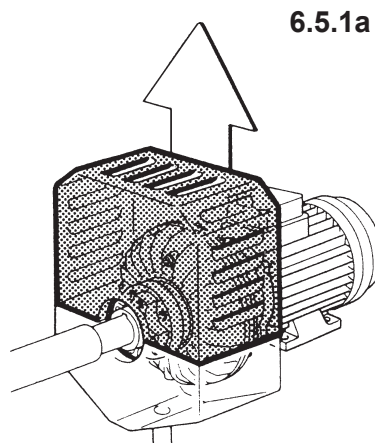
The calibration of the vertically mounted fluid coupling has thus ended.



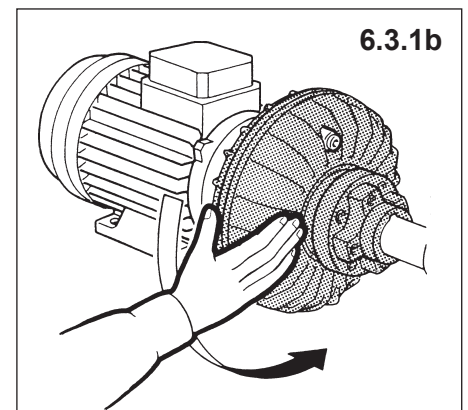
6.5 TRANSMISSION OIL REPLACEMENT HORIZONTALLY MOUNTED COUPLINGS



6.5.1



6.5.1a



6.3.1b

The first transmission oil change must be carried out after 2000 operating hours and later every 4000 operating hours. The use of the coupling in particularly dusty environments also shortens the planned intervals and requires oil replacement every 1000 operating hours.

The oil change must be effected even after a partial start-up of the motor so that any impurity contained in the oil is suspended. After that, please follow the described procedure:

CAUTION

Before transmission oil replacement, observe the following steps:

A- stop the motor and wait for the rotation components to stop,

B- cut out power supply and apply a safety padlock,

C- signal the operation under way,

D- wait for the cooling, if needed (max 40°C).

6.5.1

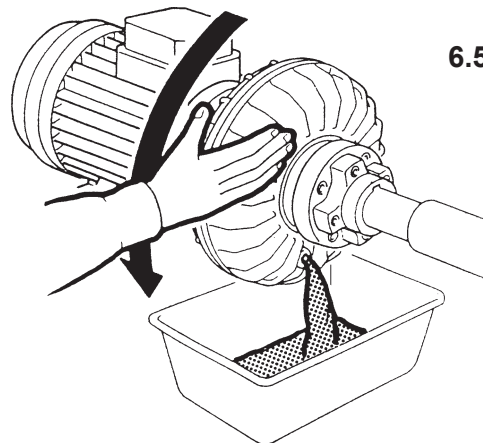
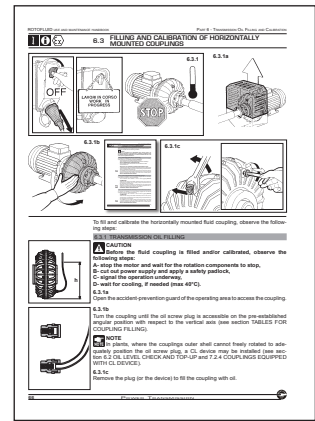
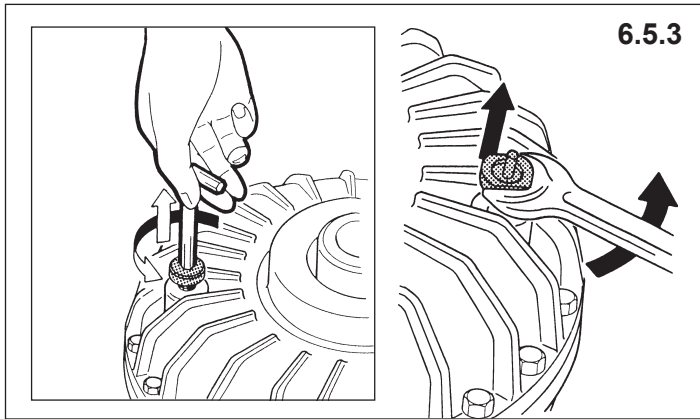
Open the accident-prevention guard of the operating area to access the coupling.

6.5.2

Manually turn the coupling until the plug reaches an accessible upper position near its vertical axis.

CAUTION

Before removing the plug, take suitable cloths to protect yourself against oil splashes due to residual pressures.



6.5.3

Remove the plug or the accessible device completely.



CAUTION

 Promptly remove any oil dripping and/or leakage from the coupling or the soil. **RISK OF SLIPPERY FLOOR, CRASH AND/OR FALL.**

6.5.4

Position under the coupling a suitably sized container to collect the oil.

Turn the coupling until the oil discharge hole is in the lowest position and wait for the oil to flow out.



CAUTION

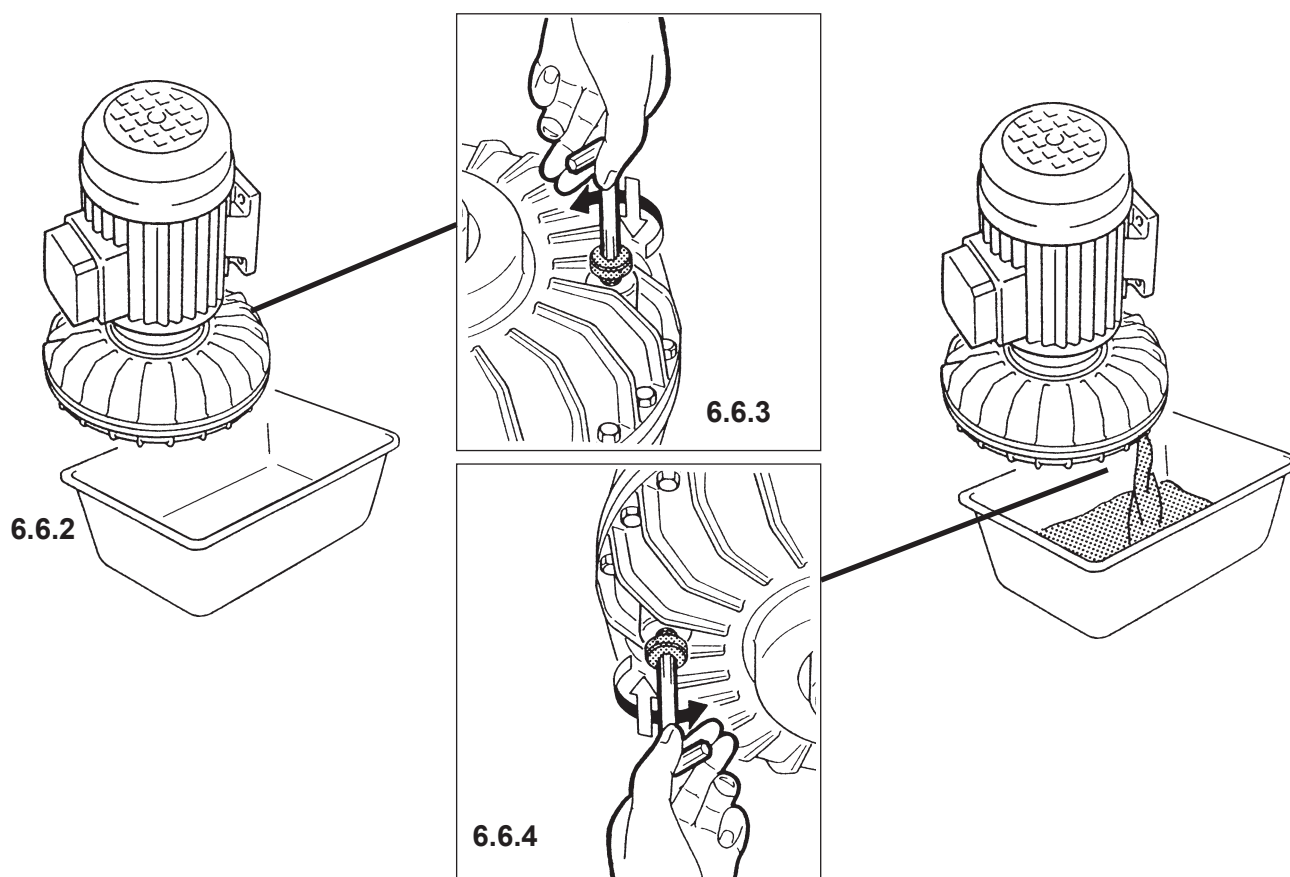
 Do not spill exhausted oil in the environment, but provide for its collection and storage in appropriate drums and/or have it disposed of by authorised waste disposal companies. RISK OF POLLUTION.

6.5.5

FILLING AND CALIBRATION OF HORIZONTALLY MOUNTED COUPLING

Upon completion of these operations, the oil change in horizontally mounted couplings has ended.

6.6 TRANSMISSION OIL REPLACEMENT VERTICALLY MOUNTED COUPLINGS



The first transmission oil change must be carried out after 2000 operating hours and later every 4000 operating hours. The use of the coupling in particularly dusty environments also shortens the planned intervals and requires oil replacement every 1000 operating hours. The oil must be changed even after a partial start-up of the motor, so that impurities are suspended in the oil. After that, please follow the described procedure:



CAUTION

Before transmission oil replacement, observe the following steps:

A- stop the motor and wait for the rotation components to stop,

B- cut out power supply and apply a safety padlock,

C- signal the operation under way,

D- wait for the cooling, if needed (max 40°C).

6.6.1

Open the accident-prevention guard of the operating room to access the coupling.

6.6.2

Put under the coupling a suitable bowl of appropriate capacity to collect transmission oil.



CAUTION

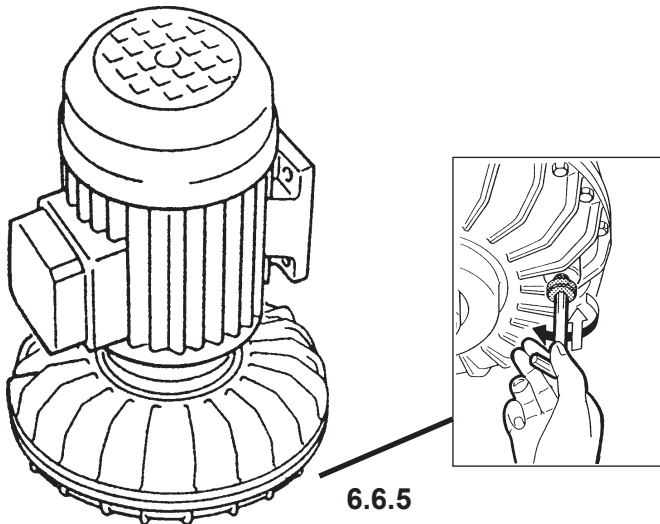
Before removing the oil filler plug, take suitable cloths to protect yourself against oil splashes due to residual pressures.

6.6.3

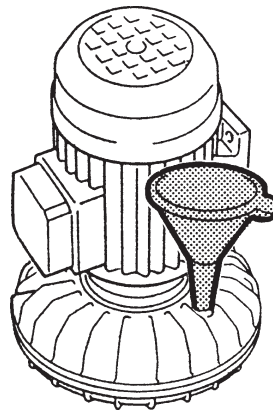
Unscrew the upper plug.

6.6.4

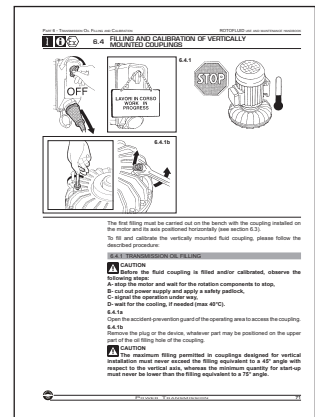
Unscrew the lower plug and wait until all the oil flows out completely.



6.6.5



6.6.6



CAUTION
Promptly remove any oil dripping and/or leakage from the coupling or the soil. **RISK OF SLIPPERY FLOOR, CRASH AND/OR FALL.**

CAUTION
Do not spill exhausted oil in the environment, but provide for its collection and storage in appropriate drums and/or call authorised waste disposal companies. **RISK OF POLLUTION.**

6.6.5
Screw the plug or the device in the filling hole of the coupling again.

6.6.6
Effect the oil filling and/or coupling calibration as described in section 6.4 FILLING AND CALIBRATION OF VERTICALLY MOUNTED COUPLINGS.

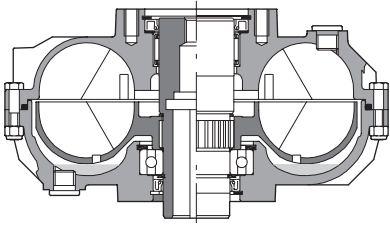
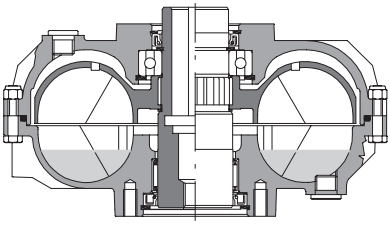
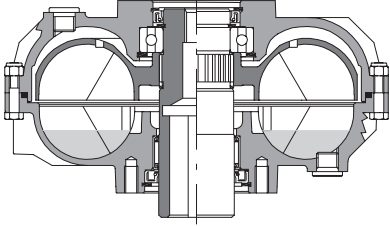
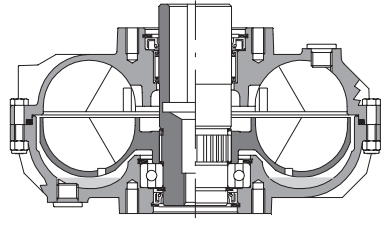
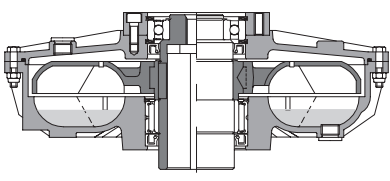
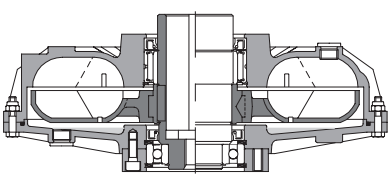
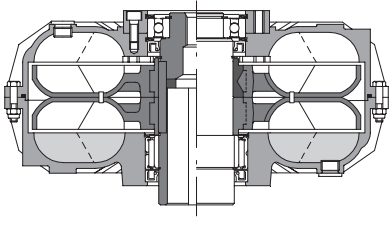
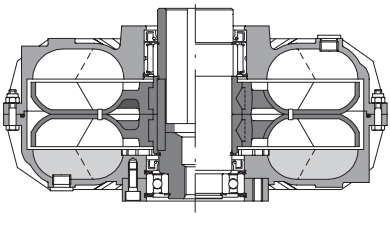
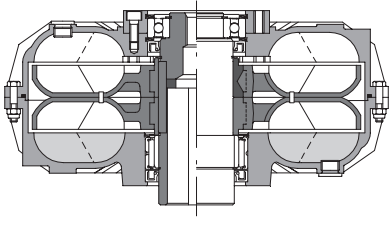
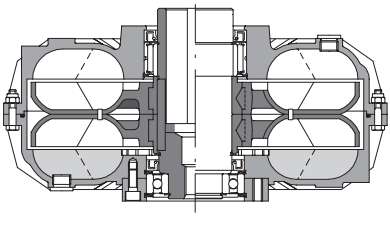
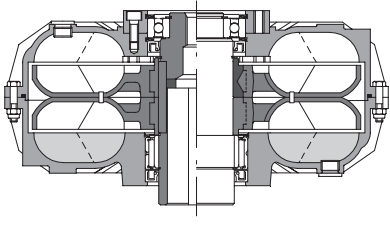
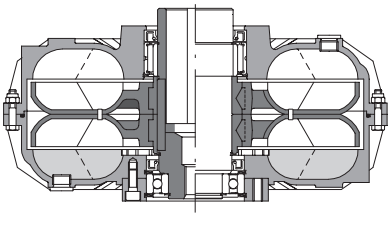
NOTE
The oil inside the coupling does not flow out completely, because a very small quantity remains in the interstices; this has to be taken into account during the filling of the coupling (see section 6.7 TABLE FOR RESIDUAL OIL DEPLETION IN VERTICALLY MOUNTED COUPLINGS).

Once these operations have been completed, the oil change in vertically mounted couplings has ended.



6.7 TABLE FOR RESIDUAL OIL DEPLETION VERTICALLY MOUNTED COUPLINGS

The following table shows how much residual oil remains after depleting the coupling already prepared for vertical installation (C manufacture). This quantity must be taken into account and subtracted from the filling quantities described in section 6.2 TABLES FOR COUPLING FILLING.

SIZE	Q.TY	MOTOR BELOW COUPLING	SIZE	Q.TY	MOTOR ABOVE COUPLING
10 K1 (ø24)	Lt. 0,1		10 K1 (ø24)	Lt. 0,125	
20 K1 (ø28)	Lt. 0,1		20 K1 (ø28)	Lt. 0,230	
30 K1 (ø42)	Lt. 0,1		30 K1 (ø42)	Lt. 0,400	
30P K1 (ø42)	Lt. 0,1		30P K1 (ø42)	Lt. 0,950	
40P K1 (ø55)	Lt. 0,1		40P K1 (ø55)	Lt. 0,850	
10 K3 (ø28)	Lt. 0,125		10 K3 (ø28)	Lt. 0,1	
20 K3 (ø38)	Lt. 0,230		20 K3 (ø38)	Lt. 0,1	
30 K3 (ø48)	Lt. 0,400		30 K3 (ø48)	Lt. 0,1	
30P K3 (ø48)	Lt. 0,950		30P K3 (ø48)	Lt. 0,1	
40P K2 (60)	Lt. 0,850		40P K2 (ø60)	Lt. 0,1	
50 K2 (ø65)	Lt. 1,0		50 K2 (ø65)	Lt. 0,1	
60 K2 (ø75)	Lt. 1,9		60 K2 (ø75)	Lt. 0,2	
60 K3 (ø80)	Lt. 1,9		60 K3 (ø80)	Lt. 0,2	
70P K-2N (ø90)	Lt. 3,1		70P K-2N (ø90)	Lt. 0,3	
70P K-3N (ø100)	Lt. 3,1		70P K-3N (ø100)	Lt. 0,3	
80P K-2N (ø110)	Lt. 8,8		80P K-2N (ø110)	Lt. 0,5	
80P K-3N (ø125)	Lt. 8,8		80P K-3N (ø125)	Lt. 0,5	
90P K2 (ø130)			90P K2 (ø130)		
90P K3 (ø140)			90P K3 (ø140)		
55 K2 (ø65)	Lt. 1,8		55 K2 (ø65)	Lt. 1,8	
55 K3 (ø75)	Lt. 1,8		55 K3 (ø75)	Lt. 1,8	
65 K2 (ø80)	Lt. 3,6		65 K2 (ø80)	Lt. 3,6	
75P K-2N (ø90)	Lt. 5,0		75P K-2N (ø90)	Lt. 5,0	
75P K-3N (ø100)	Lt. 5,0		75P K-3N (ø100)	Lt. 5,0	
85P K-2N (ø110)	Lt. 12,5		85P K-2N (ø110)	Lt. 12,5	
85P K-3N (ø125)	Lt. 12,5		85P K-3N (ø125)	Lt. 12,5	
95P K2 (ø130)			95P K2 (ø130)		
95P K3 (ø140)			95P K3 (ø140)		



7.1 OIL LEAKAGE CHECK

This check must be effected after one week since the first installation and later after any operation abnormality or overload, in order to make sure that no abnormal oil leakage occurs due to wear of the fluid coupling sealing.

The leakage of transmission oil may cause excessive overheating, unnecessary triggering of the overheat protection devices and troubles in the transmission of the required torque/speed.

To perform the check, please follow the described procedure:

CAUTION

Before transmission oil replacement, observe the following steps:

A- stop the motor and wait for the rotation components to stop,

B- cut out power supply and apply a safety padlock,

C- signal the operation under way,

D- wait for the cooling, if needed (max 40°C).

7.1.1

Open the accident-prevention guard of the operating area to access the coupling.

7.1.2

Inspect the fluid coupling and the installation space and check for oil leakage.

CAUTION

Promptly remove any oil dripping and/or leakage from the coupling or the soil. RISK OF SLIPPERY FLOOR, CRASH AND/OR FALL.

7.1.3

Carefully inspect, where possible, the condition of the sealing of the coupling shaft in order to establish if it is necessary to substitute it.

7.1.4

In section 7.5 SERVICE RECORDS register the result of the operation and, if necessary, replace the sealing, as described in section PART 9 EXTRAORDINARY MAINTENANCE.

CAUTION

Do not use the fluid coupling when the sealing is worn out or damaged due to excessive overheating. RISK OF HOT OIL LEAKAGE AND COUPLING OVERHEATING.

7.1.5

Remove any used key and/or cloth or tool from the coupling and from the operating area. **RISK OF PHYSICAL INTERFERENCE.**

7.1.6

Close the guard of the fluid coupling operating area again.

The check for oil leakage has thus ended.



7.2 OIL LEVEL CHECK AND TOP-UP

The oil level check must be performed periodically every 2000 operating hours, after the onset of any start-up abnormalities or in consequence of overheating of the fluid coupling and if an oil leakage from the fluid coupling is detected. To carry out this check, please follow the described procedure:



CAUTION

Before transmission oil replacement, observe the following steps:

A- stop the motor and wait for the rotation components to stop,

B- cut out power supply and apply a safety padlock,

C- signal the operation under way,

D- wait for the cooling, if needed (max 40°C).

7.2.1

Open the accident-prevention guard of the operating area to access the coupling.

7.2.2 HORIZONTALLY MOUNTED COUPLINGS

Check the oil level in the coupling (see identification plate and TECHNICAL DATA SHEET OF THE COUPLING).

7.2.2a

Manually turn the coupling until the oil screw plug reaches the angle inclination determined through the pre-established calibration.



NOTE

In case the couplings are equipped with plug and level indicator, it is sufficient to position the coupling in the pre-established filling position and check the oil level.

7.2.2b

Remove the plug or the device mounted in the oil filling hole and check the oil level; as an alternative, it is necessary to make up the oil as described in section 6.3 FILLING AND CALIBRATION OF HORIZONTALLY MOUNTED COUPLINGS.

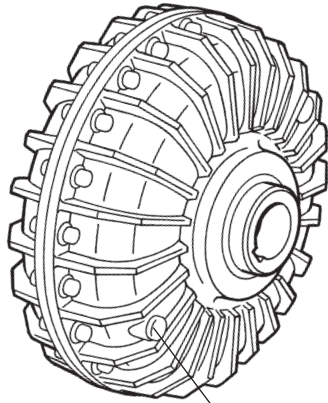
7.2.3 VERTICALLY MOUNTED COUPLINGS

The couplings designed for vertical installation (C manufacture) are not equipped with level check points; therefore this control must be carried out depleting and filling the coupling again according to the final calibration values as pointed out in the TECHNICAL DATA SHEET OF THE COUPLING.

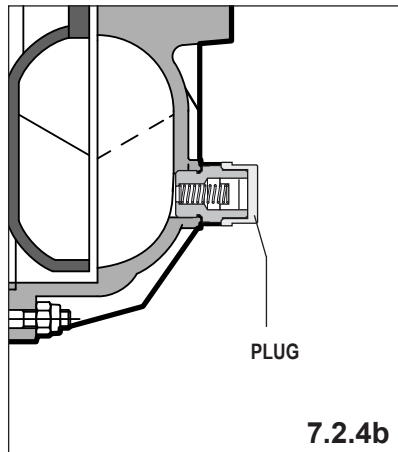
7.2.3a

To deplete and store the coupling, observe what set out in section 6.6. TRANSMISSION OIL REPLACEMENT IN VERTICALLY MOUNTED COUPLING.

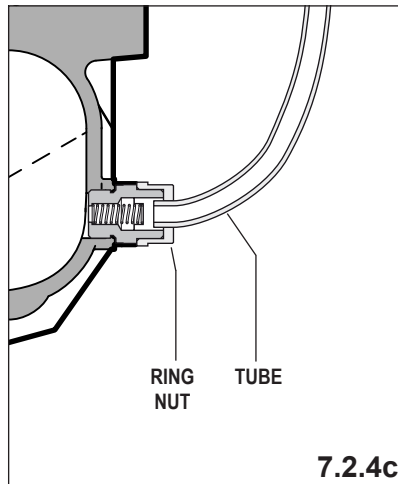
The level check of the fluid coupling has thus ended.



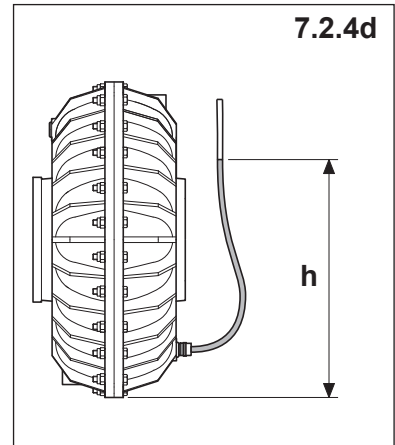
7.2.4a



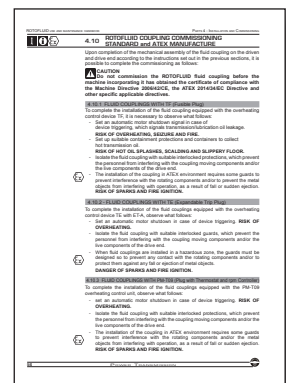
7.2.4b



7.2.4c



7.2.4d



7.2.4e

7.2.4 COUPLINGS EQUIPPED WITH CL

The oil level check in the fluid couplings equipped with CL device for level control may be easily carried out inspecting the coupling, be it horizontally or vertically mounted, (see section 6.3 FILLING AND CALIBRATION OF HORIZONTALLY MOUNTED COUPLINGS) as follows:

7.2.4a

Turn the coupling until the control device is in an accessible position below the oil level.

7.2.4b

Unscrew the plug of the CL device.

7.2.4c

Screw on the CL device the ring nut and the tube, taking care to keep the free end of the scoop tube upright.



CAUTION When the scoop tube is installed with a ring nut on the CL device, the inside oil will flow through the scoop tube and the free end shall have to be kept upright. **RISK OF OIL LEAK AND SLIPPERY FLOOR.**

7.2.4d

Let the oil flow into the tube until it reaches the appropriate oil level inside the fluid coupling.

7.2.4e

Measure the oil level "h" in the scoop tube and compare the value obtained with the dimension "h" in the filling tables (see 6.2 TABLES FOR COUPLING FILLING).



7.3 EXTERNAL CLEANING OF THE COUPLING

During operation, dust deposits do not specifically affect the fluid coupling thanks to rotation and ventilation.

However if external surfaces are exposed to humid atmospheres, vapours or oily fluids, the dusts are likely to be retained in the environment, thus generating deposit layers, which may interfere with the dissipation of the heat absorbed by the coupling during operation. **RISK OF OVERHEATING.**

Another factor which may affect operation and produce more dust deposits on the coupling surfaces, are long stops.



This phenomenon plays an even more important role in safety when the ATEX fluid coupling is installed in a potentially explosive atmosphere, where inflammable dusts occur. **RISK OF FIRE.**

The coupling surfaces must be cleaned before starting up the machine after prolonged stops.

The intervals and frequency for the external cleaning of the coupling must be defined taking into account the characteristics of the location, where the coupling is installed and cleaning must be carried out in order to avoid the above described conditions.

Below you can find a description of the steps to observe to clean the coupling externally:



CAUTION

Before you start cleaning outside of the joint must:

- A- stop the motor and wait for the rotation components to stop,**
- B- cut out power supply and apply a safety padlock,**
- C- signal the operation under way,**
- D- wait for the cooling, if needed (max 40°C).**

7.3.1

Open the accident-prevention guard of the operating area to access the coupling.

7.3.2

Disposable cloths soaked in neutral detergent may be used to remove the dust and/or any other deposit on the external surfaces of the coupling, the sealing on the shaft and the overheating control devices.



CAUTION

Do not use solvents or inflammable agents, especially in places with potentially explosive atmosphere. RISK OF FIRE AND/OR SEALING DAMAGE.

7.3.3

Remove any deposits or dusts from the operating area.

7.3.4

Remove any used key and/or cloth or tool from the coupling and the operating area. **RISK OF EJECTION.**

7.3.5

Close the accident-prevention guard of the fluid coupling operating area again.

The cleaning of the external surfaces has thus ended.



7.4 INSPECTION OF OVERHEATING CONTROL DEVICES

These mandatory inspections guarantee the correct operation of the overheating control devices, which are installed on the fluid coupling. They must take place regularly, in connection with the ORDINARY MAINTENANCE activities to monitor the conditions of the devices installed. To perform the inspection, please follow the described procedure:

CAUTION

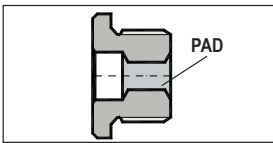
Before you start checking devices must:

- A- stop the motor and wait for the rotation components to stop,**
- B- cut out power supply and apply a safety padlock,**
- C- signal the operation under way,**
- D- wait for the cooling, if needed (max 40°C).**

7.4.1

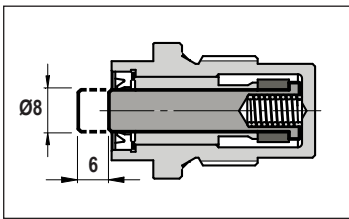
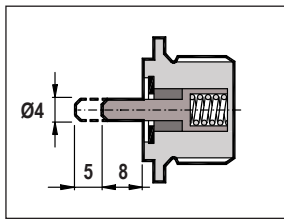
Open the accident-prevention guard of the operating area to access the coupling.

7.4.2 TF DEVICE (Fusible Plug)



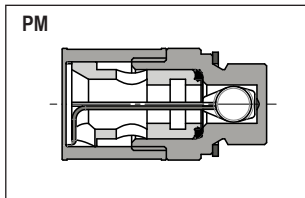
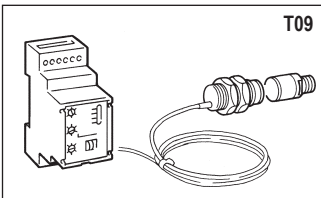
- Unscrew the TF and check the inside pad for deformation and damages.
- Make sure that the FP is in good working order and its outside seat is not obstructed.

7.4.3 TE DEVICE (Expandable Trip Plug)



- Make sure that the TE device is not impaired and the piston is not deformed or blocked and the return spring is in good working order.
- Make sure that the detection device (safety microswitch) has not been tampered with, it is in good working order and the distance between the detector and the device is 2mm.

7.4.4 PM-T09 UNIT



- Make sure that the PM device in the coupling is in good operating conditions and it is not damaged.
- Make sure that the sensor of the T09 device has not been tampered with, is in good operating conditions and detecting distance is between 2mm and 5mm (see distance defined during test and inspection).

NOTE

The correct functioning of the PM-T09 combined unit is signalled by a yellow led, when the PM plug passes in front of the sensor.

7.4.5

Note in section 7.5 SERVICE RECORD the results of the operation and/or, if necessary carry out the replacement or resetting of the overheat protection devices.

CAUTION

Do not use fluid couplings without devices or if devices have been tampered with or are inefficient. RISK OF OVERHEATING AND/OR FIRE IGNITION.

The PM sensor to be used in an ATEX zone must be equipped with a Zenner barrier and the device T09 must be located in a safe area.

7.4.6

Remove any used key and/or cloth or tool from the coupling and the operating area. **RISK OF EJECTION.**

7.4.7

Close the accident-prevention guard of the fluid coupling operating area again.

The check of the overheating control devices has thus ended.



7.5 SERVICE RECORD

Both ordinary and extraordinary maintenance operations, especially those concerning the ATEX couplings, must be recorded to ensure the traceability of the replaced components and the state-of-the-art technology of the fluid coupling.

The components provided with ATEX certificate must be replaced with components having same characteristics and certificates in order not to downgrade the fluid coupling ATEX classification.

[illegible]



7.6 COUPLING OUTER PROFILE AND MAIN ELEMENTS

ROTOFLUID

LARGE PUMP

ALFA

10 K1
20 K1
30 K1
30P K1
40P K1

LARGE PUMP

ALFA

10 K3
20 K3
30 K3
30P K2-K3
40P K2

BETA

10 Z
20 Z-X-J-H
30 Z-X-J-H
30P Z-X-J-H
40P Z-X-J-H

SINGLE PUMP

ALFA

50 K2
60 K2
70P K2-K3
80P K2
90P K2

BETA

50 Z-X-J-H
60 Z-X-J-H
70P Z-X-J-H
80P X-J-H
90P X-J-H

DOUBLE PUMP

ALFA

25 K2
55 K2
65 K2
75P K2
85P K2
95P K2

BETA

25 Z-X-J-H
55 Z-X-J-H
65 Z-X-J-H
75P Z-X-J-H
85P X-J-H

ROTOFLUID SCF

LARGE PUMP

ALFA

30 K2
30P K2
40P K2

BETA

30 Z-X-J-H
30P Z-X-J-H
40P Z-X-J-H

SINGLE PUMP

ALFA

50 K2
60 K2
70P K2N
80P K2N
90P K2

BETA

50 Z-X-J-H
60 Z-X-J-H
70P X-J-H
80P X-J

DOUBLE PUMP

ALFA

55 K2
65 K2
75P K2N
85P K2N
95P K2

BETA

55 Z-X-J-H
65 Z-X-J-H
75P X-J-H
85P X-J

1 - Hollow shaft
5 - Female turbine

2 - Cover
6 - Male turbine

3 - Internal pump
7 - Delay chamber

4 - External turbine

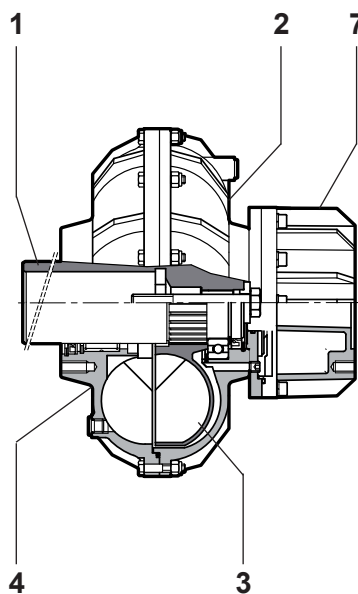
POWER TRANSMISSION

WESTON
ITALY



ROTOFLUID DCF

LARGE PUMP



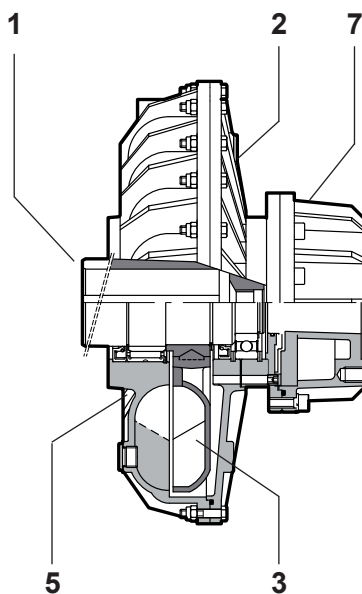
ALFA

30 K2
30P K2
40P K2

BETA

30 Z-X-J-H
30P Z-X-J-H
40P Z-X-J-H

SINGLE PUMP



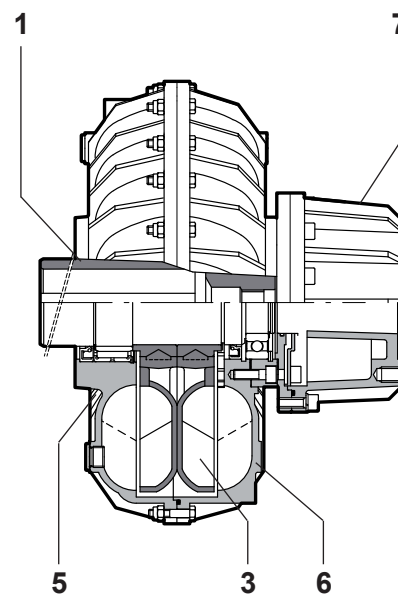
ALFA

50 K2
60 K2
70P K2N
80P K2N
90P K2

BETA

50 Z-X-J-H
60 Z-X-J-H
70P X-J-H
80P X-J

DOUBLE PUMP



ALFA

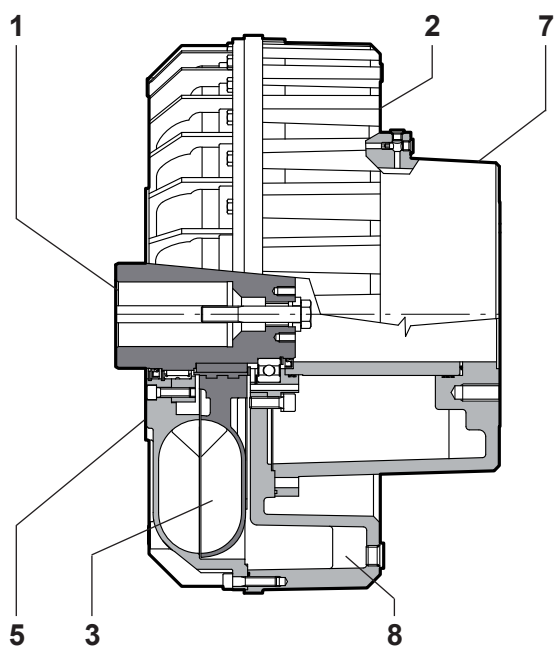
55 K2
65 K2
75P K2N
85P K2N
95P K2

BETA

55 Z-X-J-H
65 Z-X-J-H
75P X-J-H
85P X-J

ROTOFLUID CA

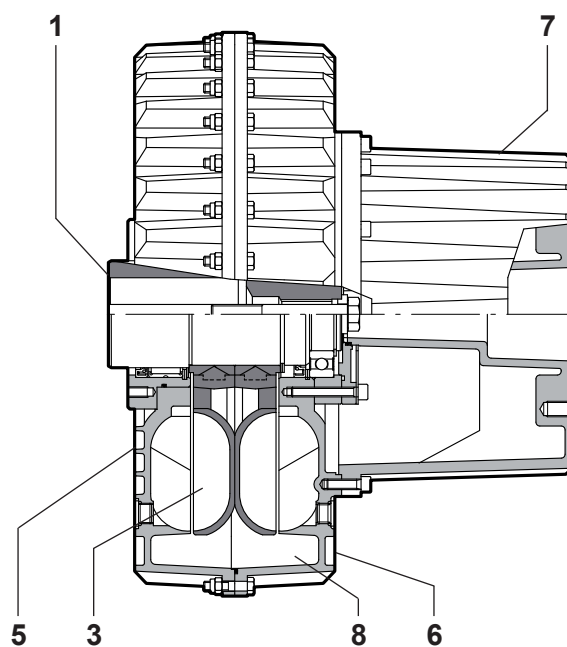
SINGLE PUMP



ALFA

80P K2N
90P K2

DOUBLE PUMP



ALFA

55D K2
65D K2
75PD K2N
85PD K2N

1 - Hollow shaft
5 - Female turbine

2 - Cover
6 - Male turbine

3 - Internal pump
7 - Delay chamber

4 - External turbine
8 - Annular chamber CA





8 INCONVENIENCES AND REMEDIES

In case of operation abnormalities and/or to remedy any operation faults, take advantage of the instructions included in this chapter to trace the causes.



CAUTION

Only skilled and qualified technicians may provide technical support. For any other kind of work or instruction, please feel free to contact the WESTCAR Customer Support Service. You will benefit from a prompt intervention by very experienced staff.

Below you can find summarized data tables about the faults, which may occur during operation and the first maintenance work to be planned.

FAULT	THE FLUID COUPLING OVERHEATS OR THE FUSIBLE OR EXPANDABLE TRIP PLUG ARE RELEASED TOO OFTEN
Probable causes to be checked	1 Cooling is not enough due to missing or unsuitable air intake on the carter or on the guard 2 The carter is equipped with a cooling fan, but it is out of order and it turns in opposite direction 3 The ambient temperature is still high, or there are sources of heat next to the coupling 4 The driven machine is operating with excessive overload 5 Not enough transmission oil in the coupling 6 Oil is leaking from the fluid coupling 7 Too frequent or too long start-up cycles 8 The fluid coupling is undersized
FAULT	THE DRIVEN MACHINE CANNOT REACH FULL SPEED
Probable causes to be checked	1 Not enough transmission oil in the coupling 2 Oil leaks from the fluid coupling 3 The driven machine is operating with excessive overload 4 The motor installed power is not enough 5 Too low ambient temperature 6 Too thick transmission oil in the coupling 7 Insufficient input speed to the fluid coupling 8 The fluid coupling is undersized
FAULT	START-UP IS TOO FAST
Probable causes to be checked	1 Excessive quantity of all oil in the fluid coupling 2 The fluid coupling is oversized for the required performance

FAULT	START-UP TAKES TOO LONG
Probable causes to be checked	1 Not enough transmission oil in the coupling 2 Oil leaks from the fluid coupling 3 The driven machine is operating with excessive overload 4 Not enough motor installed power 5 Too low ambient temperature 6 Too thick transmission oil in the coupling 7 The fluid coupling is undersized
FAULT	OIL LEAKS FROM THE FLUID COUPLING
Probable causes to be checked	1 The melting pad in the fusible plug has melted 2 The oil plugs were not tightened properly and the gasket is damaged 3 The gaskets failed as a consequence of excessive overheating 4 The gaskets failed as a consequence of overpressure inside the coupling 5 The gaskets are worn out and the sealing is damaged due to foreign bodies under the mim oil seals 6 Inadequate gaskets are mounted on the coupling 7 The screws on the coupling crown are not correctly tightened 8 The coupling shells cracked or broke because of crashes or internal overpressure
FAULT	THE COUPLING VIBRATES OR IT IS NOISY
Probable causes to be checked	1 The components connected to the coupling are not aligned or rotate off-axis 2 The central clamping screw of the coupling has loosened or it is not properly tightened 3 The central clamping screw is tightened off centre line or there is no centering washer. 4 The connection between coupling and shaft has got too much backlash 5 The drive belts are too loose or too tensioned 6 The driven parts or the alignment coupling are unbalanced 7 The coupling or the pulley are unbalanced 8 Unbalanced masses have been applied to the coupling or have been removed from the parts 9 Air eddies form inside the carter 10 There is interference among the rotating parts and the fixed parts of the coupling. 11 The bearings are damaged by lacking or insufficient lubrication.



9.1 COUPLING DISASSEMBLY FROM MACHINE

Usually the coupling does not require any internal maintenance, unless extraordinary causes (faults or breaks) make it necessary. When for whatever reason it is necessary to replace the pulley, bearings, seals or any other internal components in a BETA "I" or "X" coupling, remove the coupling (hollow shaft side) from the drive shaft or from the machine as described below:



CAUTION

Before coupling disassembly from machine, observe the following steps: A- stop the motor and wait for the rotation components to stop, B- cut out power supply and apply a safety padlock, C- signal the operation under way, D- wait for the cooling, if needed (max 40°C).

9.1.1

Open the accident-prevention guard of the operating area to access the coupling.

9.1.2

Deplete the coupling following the steps described in section 6.5 for horizontally mounted couplings or in section 6.6 for vertically mounted couplings.

9.1.3

Remove the components, which connect to the external part of the coupling, belts in case of BETA couplings, or the accessories (flexible elements, hubs, etc.) in case of ALFA couplings.

9.1.4

In case of couplings with delay chamber, it is necessary to remove the delay chamber and the flange to access the central clamping screw.

9.1.5

Unscrew the central clamping screw completely, preventing any motion of the machine or motor shaft on the blower side.

9.1.6

Screw in the extractor in the hole of the coupling, keeping into account that the extraction system S.E. can be used, if the couplings are equipped with bored shaft (sizes 70P to 95P). Otherwise use the V.E. extraction system.

9.1.7

Unscrew and remove one of the screws set in the crown of the coupling and insert the suitable hoisting device as foreseen by the manufacturer.

9.1.8

Sling up the coupling with a hoisting device. The load capacity of the hoist lines must be in compliance with its weight (see identification plate).



CAUTION

Do not lift the coupling using devices other than the hoisting equipment foreseen by the manufacturer. RISK OF CRUSHING.

9.1.9

Tension the ropes slightly without stressing the shaft, with a suitable hoisting system.

9.1.10

Screw the extractor screw tightly until the coupling is completely extracted, preventing the machine or motor shaft on the blower side from rotating in case of V.E. extractor, or preventing the shaft rotation in case of S.E. system.

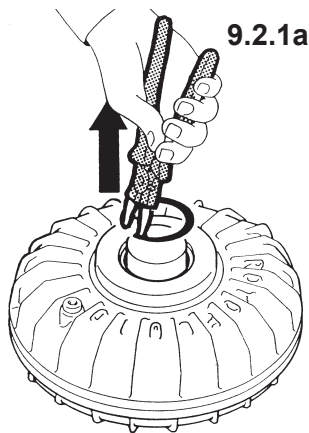
9.1.11

Once removed, handle the coupling with care just above the soil and lay it slowly on a pallet.

Now the coupling is fully disassembled. Should extraordinary maintenance be carried out (bearing, gasket or internal component replacement), ship the coupling to WESTCAR or to the nearest distributor after the conclusion of a shipping agreement.

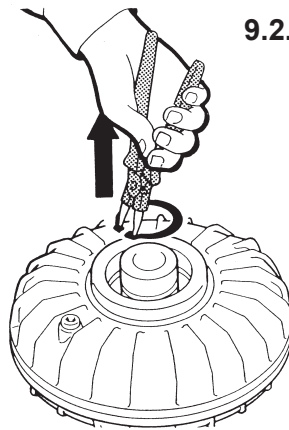


9.2 OPENING OF THE COUPLING AND SPARE PARTS REPLACEMENT



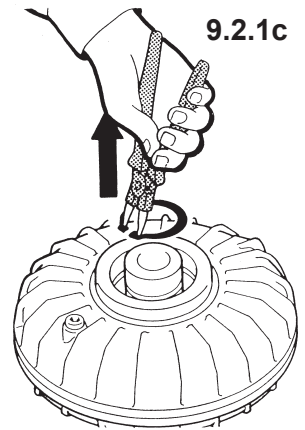
9.2.1a

COUPLING SIZE
10/20/30/30P/40P



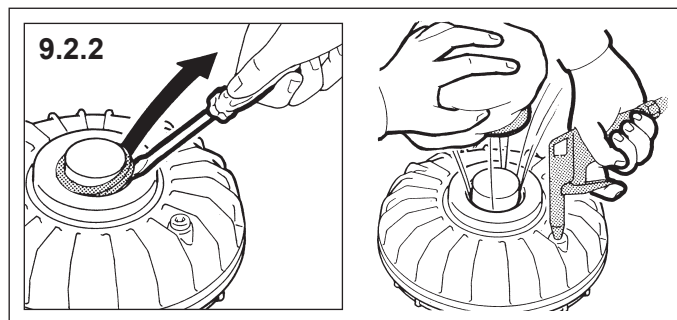
9.2.1b

COUPLING SIZE
50/55/60/65



9.2.1c

COUPLING SIZE
70P/75P/80P/85P/90P/95P



9.2.2

Should the coupling be opened on site, after removing it from the motor or the drive end, take the following steps:

9.2.1a COUPLING SIZE 10/20/30/30P/40P

Remove the seeger ring from the mim seal on the coupling side with the ROTOFLUID logo.

9.2.1b COUPLING SIZE 50/55/60/65

Remove the seeger ring of the shielded bearing placed on the side of the threaded extraction hole of the coupling.

9.2.1c COUPLING SIZE 70P/75P/80P/85P/90P/95P

Remove the seeger ring from the mim seal placed on the side of the threaded extraction hole.

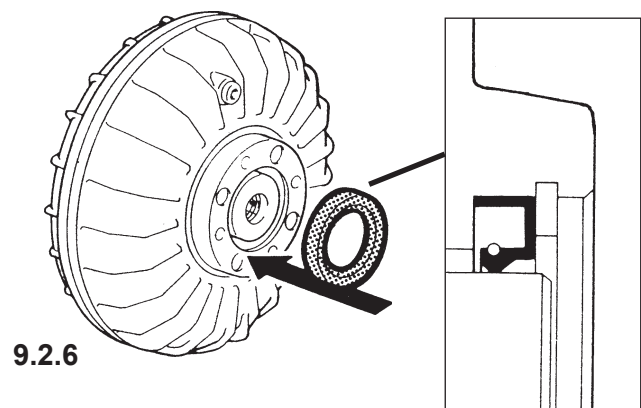
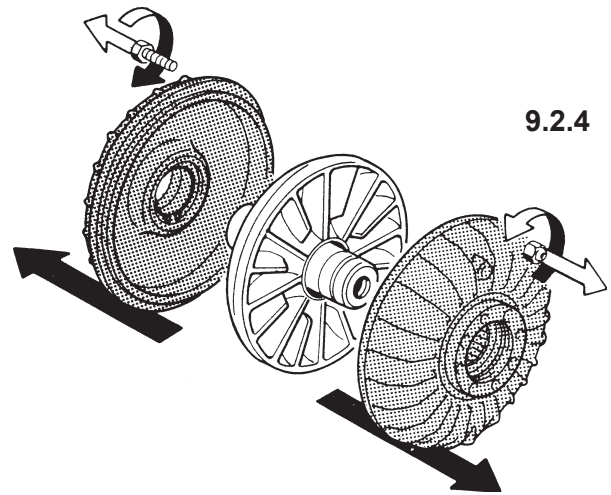
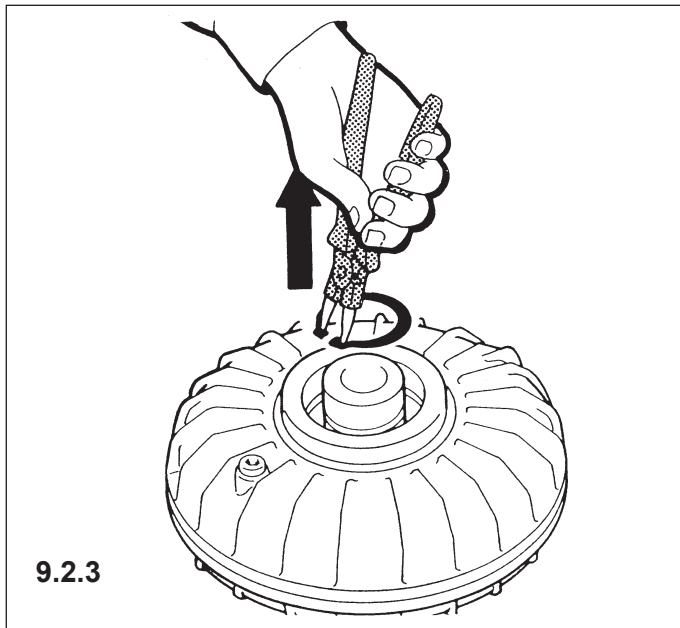


CAUTION

RISK OF SPLASHES AND SEAL EJECTION.

9.2.2

To remove the mim seal, use a screwdriver or, as an alternative, position a protective cloth on the shaft at the mim seal and let compressed air through the hole of the plug until the gasket is ejected.



9.2.3

Remove the second seeger ring placed on the shaft on the same side of the coupling as pointed out in section 9.2.1a and 9.2.1b.

9.2.4

Unscrew all the screws placed on the coupling crown and open both fluid coupling shells.

9.2.5

After the opening of the coupling, it is possible to clean it inside and/or replace any worn parts with original WESTCAR spare parts.

9.2.6

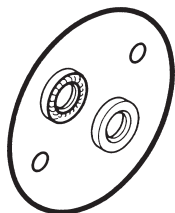
To reassemble the coupling, follow the reverse sequence, repositioning the mim seals with their edge inwards without deforming it.

The opening of the coupling and the spare part replacement have thus ended.

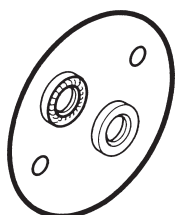


9.3 SPARE PARTS

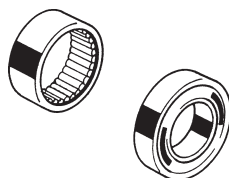
Kit of gaskets in NBR



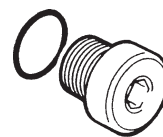
Kit of gaskets in VITON



Bearing kit



Fusible plug kit



Expandable trip plug kit



Seeger kit



	WESTCAR S.r.l. - Via Monte Rosa 14 - 20149 Milano - ITALY		ANNO / YEAR	Peso/Weight	kg	Pot./Power	kW	Parte motrice
	Nome/Name: GIUNTO IDRODINAMICO / HYDRAULIC COUPLING			Installaz./Installation	giri/min./rpm			Driving side
	N° serie / Serial			Vertical/Vertical		Olio/Oil: ISO VG22		Interna/Internal
				Orizz./Horizontal		Ilv./lev.		Esterna/External

To enable the effective and timely extraordinary maintenance of the coupling, it is recommended to keep a small supply of parts available, especially the ones, which are most subject to wear or substitution.

To order the KITS, please report:

- SIZE AND IDENTIFICATION CODE of the coupling, shown on the Identification Plate.

To submit a request for FUSIBLE PLUG or EXPANDABLE TRIP PLUG KITS, also specify the triggering temperature.

For any further information on single components of the coupling, you may request the SPARE PART DRAWINGS, specifying the ROTOFLUID coupling model.



10.1 COUPLING DECOMMISSIONING

The decommissioning of the fluid coupling must be carried out in case of operation abnormalities or downtime for longer periods or extraordinary maintenance works.

For the decommissioning, follow the described procedure:

10.1.1

Open the accident-prevention guard of the operating area to access the coupling.

10.1.2

Disassemble the coupling from the machine, following the description in section 9.1 COUPLING REMOVAL FROM THE MACHINE.

10.1.3

To store the coupling, observe what set out in section 3.3 STORAGE AND CONSERVATION OF THE COUPLING.

The decommissioning of the coupling has thus ended.



10.2 FLUID COUPLING DISMANTLING AND DEMOLITION

At the end of the machine life-cycle, the dismantling of the coupling includes separate waste collection and disposal of the materials composing it, as follows:

10.2.1

Adopt measures to collect any transmission oil leakage in appropriate airtight containers.



CAUTION

Do not spill exhausted oils in the environment, but instruct authorized waste collection companies to dispose of them. RISK OF ENVIRONMENTAL POLLUTION:

10.2.2

The TF and TEs are to be removed from the coupling and require special handling and disposal procedures.



CAUTION

The TF and TE devices contain a fusible pad in heavy metal, which is dangerous for the environment; therefore it has to be disposed of as special waste. RISK OF ENVIRONMENTAL POLLUTION

10.2.3

Provide for the separation of the metal components (steel, aluminium, etc).

Specialised and authorized firms may be charged with the disposal and the scrapping of the materials



CAUTION

Dispose of components, small or big parts properly, as they may cause accidents, direct or consequential damages and/or adversely affect the environment pollution.



11 NOTES



OUR DISTRIBUTORS AROUND THE WORLD:

Albania	Serbia
Australia	Singapore
Belarus	Slovak Republic
Belgium	Slovenia
Bosnia and Herzegovina	South Africa
Brazil	Spain
Canada	Sweden
Chile	Thailand
China	Turkey
Colombia	USA
Croatia	
Czech Republic	
Denmark	
Egypt	
Estonia	
Finland	
France	
Germany	
Great Britain	
Greece	
Holland	
Iran	
Korea	
Latvia	
Lithuania	
Macedonia	
Morocco	
New Zealand	
Norway	
Pakistan	
Peru	
Poland	
Portugal	
Romania	
Russia	

